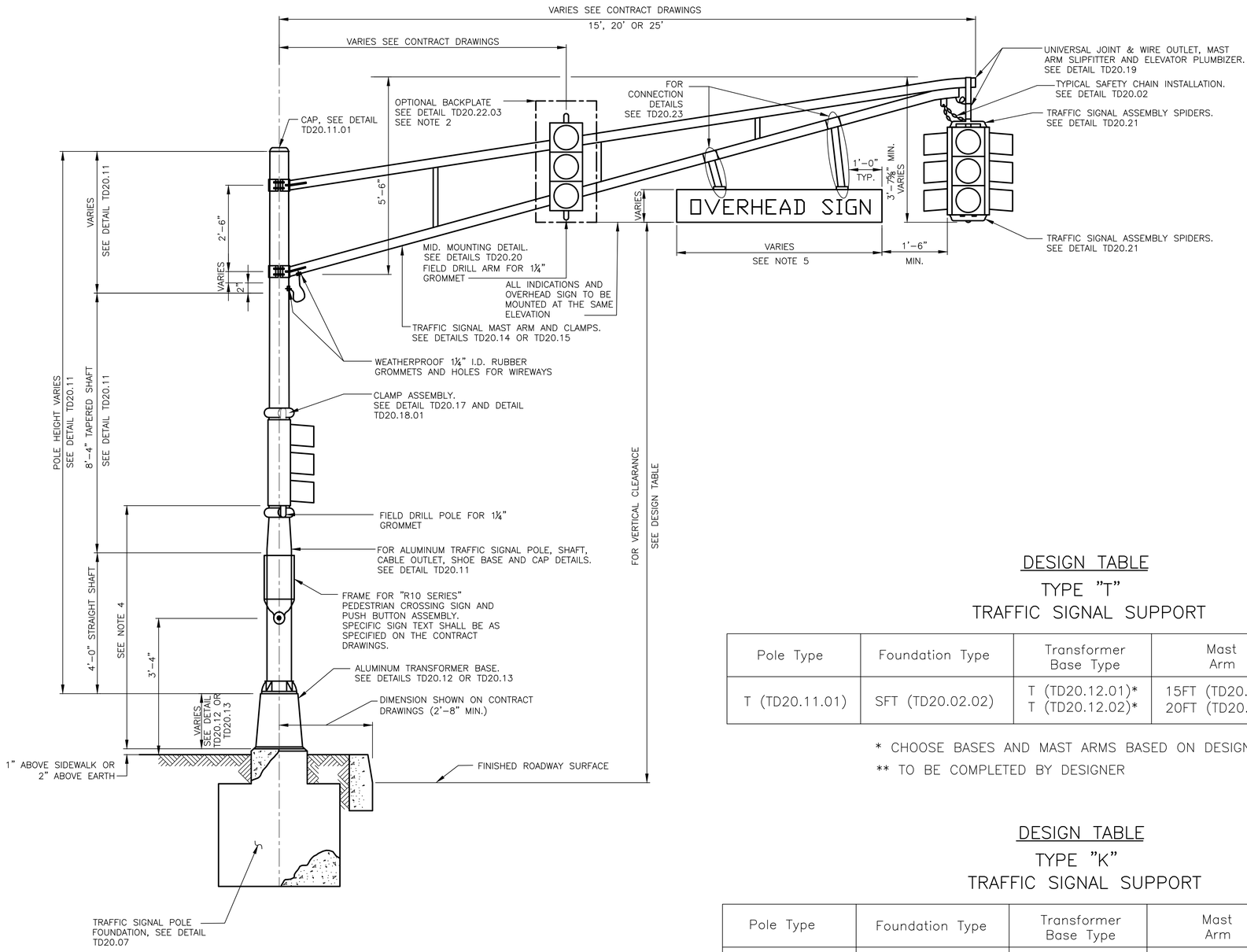


TYPICAL ALUMINUM TRAFFIC SIGNAL INSTALLATION

N.T.S.

NOTES:

1. ALL ALUMINUM SIGNAL STRUCTURE ELEMENTS SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. DESIGN SHALL BE IN ACCORDANCE WITH THE FOLLOWING:

   1. DESIGN LIFE: 25 YEARS
   2. BASIC WIND SPEED: 110 MPH (IN ACCORDANCE W/ SECTION 3.8)
   3. FATIGUE DESIGN SHALL BE WAIVED.
   4. THE MANUFACTURER SHALL PROVIDE A STATEMENT CERTIFYING THAT ALL ELEMENTS OF THE ALUMINUM SIGNAL STRUCTURE HAVE BEEN ANALYZED AND FABRICATED IN ACCORDANCE WITH ALL DESIGN CRITERIA PROVIDED AND CAN SUPPORT LOADING THAT MEETS OR EXCEEDS THE LOAD REQUIREMENTS FOUND IN NOTE 2.

2. SIGNAL ARM, POLE, BASE, CONNECTIONS, ETC. SHALL BE DESIGNED TO SUPPORT ALL LOAD COMBINATIONS SHOWN IN THE CONTRACT PLANS. AS A MINIMUM, THE DESIGN LOAD SHALL BE:

   T POLE ARM W/ 15' ARM :
   1–4 WAY 3 SECTION SIGNAL LOCATED AT 14'–6" (FREE SWINGING)
   1–1 WAY 3 SECTION SIGNAL LOCATED AT 4'–6" (FIX MOUNT)

   T POLE ARM W/ 20' ARM :
   1–4 WAY 3 SECTION SIGNAL LOCATED AT 19'–6" (FREE SWINGING)
   1–1 WAY 3 SECTION SIGNAL LOCATED AT 7'–6" (FIX MOUNT)

   K POLE ARM W/ 25' ARM :
   1–4 WAY 3 SECTION SIGNAL LOCATED AT 24'–6" (FREE SWINGING)
   1–18" X 48" OVERHEAD SIGN PANEL LOCATED AT 18'–9" (FREE SWINGING)
   1–1 WAY 3 SECTION SIGNAL LOCATED AT 12'–6" (FIX MOUNT)

   ALL DISTANCES ARE MEASURED FROM THE ℄ POLE.

   DESIGN LOAD DOES NOT INCLUDE EFFECTS OF BACKPLATES ON SIGNAL HEADS. IF BACKPLATES ARE NEEDED THEY CONSTITUTE ADDITIONAL LOADING AND SHALL BE INCLUDED IN THE DESIGN OF THE STRUCTURE.

   THE ALUMINUM SIGNAL STRUCTURE SIZES AND DETAILS PROVIDED IN THE DRAWINGS ARE FOR REFERENCE ONLY. THE MANUFACTURER SHALL DESIGN AND ANALYZE THE ALUMINUM SIGNAL STRUCTURE WITH THE PROPOSED ATTACHMENTS AND CONFIGURATIONS AS PER AASHTO STANDARD AND SHALL VERIFY, CONFIRM AND/OR REVISE (IF REQUIRED) STRUCTURAL ELEMENT SIZES AND CONNECTIONS AT NO ADDITIONAL COST TO THE AUTHORITY.

3. MINIMUM VERTICAL CLEARANCE SHALL BE AS NOTED IN DESIGN TABLE OR ON CONTRACT DRAWINGS.

4. CLAMP MOUNTED TRAFFIC SIGNAL HEAD HEIGHT SHALL BE 12 FEET. FOR PEDESTRIAN SIGNAL HEADS, THE HEIGHT IS 8 FEET UNLESS OTHERWISE NOTED IN DESIGN TABLE OR ON CONTRACT DRAWINGS.

5. OVERHEAD SIGNS SHALL BE MOUNTED PERPENDICULAR TO THE DIRECTION OF TRAFFIC WHICH THEY ARE INTENDED TO SERVE.

6. HEX LOCK NUT, HEAD POSITIONING RING AND HARDWARE SHALL BE INSTALLED FOR ALL TRAFFIC SIGNAL HEADS. SEE DETAILS TD20.19.

7. ALL FREE–SWINGING TRAFFIC SIGNAL HEADS MUST BE ALUMINUM.

8. FOR SIGNAL HEAD ASSEMBLY AND INSTALLATION DETAILS, SEE DRAWING NUMBERS TD20.19, TD20.20 AND TD20.21.

DESIGN TABLE

TYPE "T"

TRAFFIC SIGNAL SUPPORT

| Pole Type | Foundation Type | Transformer Base Type | Mast Arm | **Vertical Clearance |
|---|---|---|---|---|
| T (TD20.11.01) | SFT (TD20.02.02) | T (TD20.12.01)*<br>T (TD20.12.02)* | 15FT (TD20.14)*<br>20FT (TD20.14)* | |

* CHOOSE BASES AND MAST ARMS BASED ON DESIGN PLANS

** TO BE COMPLETED BY DESIGNER

DESIGN TABLE

TYPE "K"

TRAFFIC SIGNAL SUPPORT

| Pole Type | Foundation Type | Transformer Base Type | Mast Arm | **Vertical Clearance |
|---|---|---|---|---|
| K (TD20.11.02) | SFK (TD20.02.01) | K (TD20.13) | 25FT (TD20.15) | |

** TO BE COMPLETED BY DESIGNER

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CHIEF

| No. | Date | Revision | Approved |
|---|---|---|---|
| 2 | 09/03/2014 | DIMENSION CHANGE | |
| 1 | 08/19/2014 | DETAIL UPDATE | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**TYPICAL ALUMINUM TRAFFIC SIGNAL INSTALLATION**

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Date **JULY 2014**

Contract Number

Drawing Number **TD20.01**

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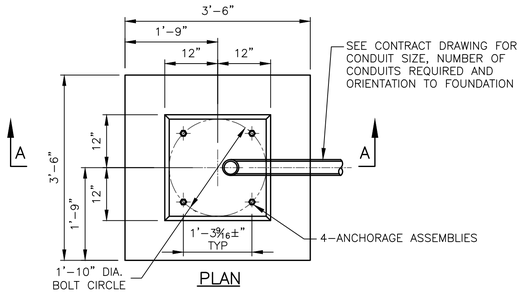
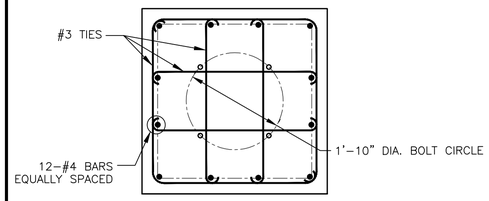
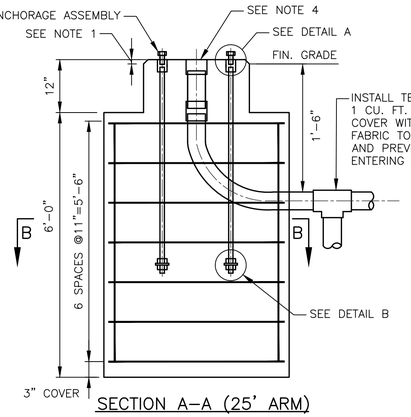



PLAN




PROVIDE 2" COVER UNLESS NOTED OTHERWISE

SECTION B-B




SECTION A-A (25' ARM)

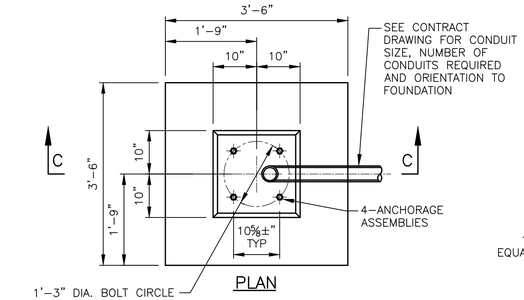
## FOUNDATION TYPE "SFK"

N.T.S.

25' ARM

| TOP OF FOUNDATION LOAD: (UNITS IN LBS AND FT) | | | | | |
|---|---|---|---|---|---|
| | GR I | GR IIA | GR IIB | GR IIIA | GR IIIB |
| AXIAL | 573 | 573 | 573 | 1096 | 1096 |
| SHEAR | 0 | 918 | 604 | 641 | 420 |
| MOMENT | 6556 | 17567 | 14078 | 18294 | 17352 |
| TORSION | 0 | 11048 | 6689 | 6399 | 3839 |

TD20.02.01

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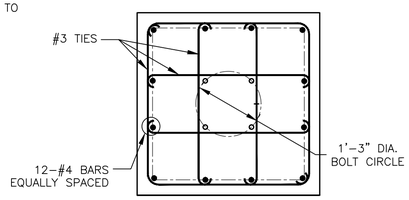
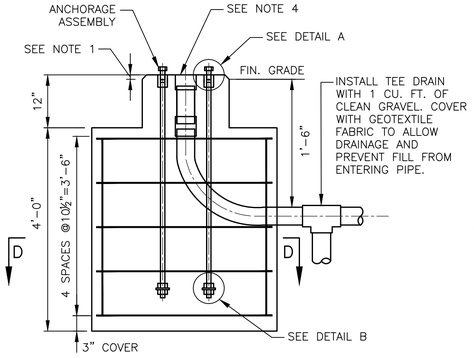
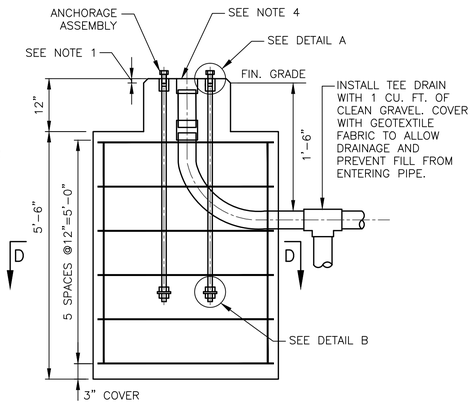



PROVIDE 2" COVER UNLESS NOTED OTHERWISE

SECTION D-D




SECTION C-C (15' ARM)




SECTION C-C (20' ARM)

## FOUNDATION TYPE "SFT"

N.T.S.

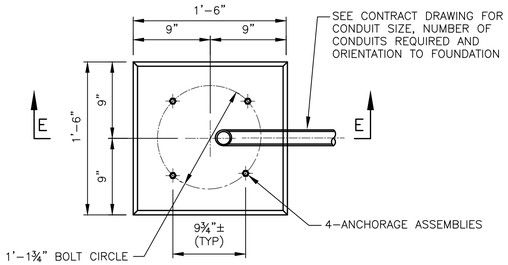
15' ARM

| TOP OF FOUNDATION LOAD: (UNITS IN LBS AND FT) | | | | | |
|---|---|---|---|---|---|
| | GR I | GR IIA | GR IIB | GR IIIA | GR IIIB |
| AXIAL | 383 | 383 | 383 | 938 | 938 |
| SHEAR | 0 | 736 | 484 | 450 | 296 |
| MOMENT | 2820 | 11961 | 8913 | 10661 | 9886 |
| TORSION | 0 | 4794 | 2876 | 2655 | 1593 |

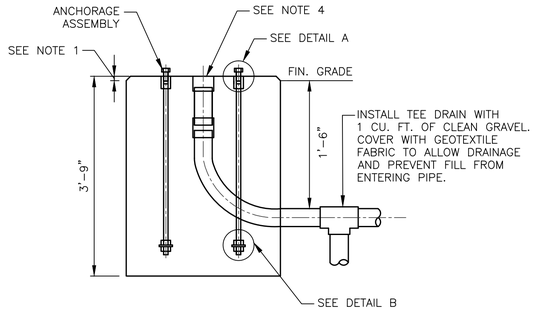
20' ARM

| TOP OF FOUNDATION LOAD: (UNITS IN LBS AND FT) | | | | | |
|---|---|---|---|---|---|
| | GR I | GR IIA | GR IIB | GR IIIA | GR IIIB |
| AXIAL | 450 | 450 | 450 | 970 | 970 |
| SHEAR | 0 | 782 | 514 | 498 | 327 |
| MOMENT | 4407 | 13525 | 10595 | 13688 | 13039 |
| TORSION | 0 | 7106 | 4264 | 4095 | 2457 |

TD20.02.02




PLAN




SECTION E-E

## PEDESTAL FOUNDATION TYPE "SPF"

N.T.S.

| TOP OF FOUNDATION LOAD: (UNITS IN LBS AND FT) | | | |
|---|---|---|---|
| | GR I | GR II | GR III |
| AXIAL | 172 | 172 | 363 |
| SHEAR | 0 | 533 | 263 |
| MOMENT | 82 | 5663 | 2936 |
| TORSION | 0 | 180 | 90 |

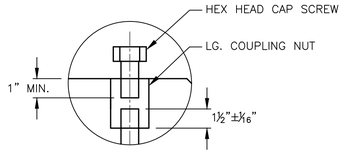
TD20.02.03

### ANCHORAGE ASSEMBLY:

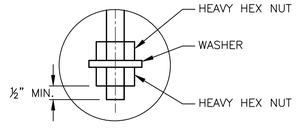
1 – 1" STAINLESS STEEL HEX HEAD CAP SCREW (ASTM A193 GR B8)
1 – 1" STAINLESS STEEL LOCK WASHER (SS304)
1 – 1" STAINLESS STEEL FLAT WASHER (SS304)
1 – 1" X 3" LG. HEAVY HEX COUPLING NUT (ASTM A194 GR 8)
1 – 1" X 48" LG ANCHOR ROD OR THREADED ROD (ASTM FI554 GR 55)
HOT DIP GALVANIZED (ASTM F2329 OR A153)
1 – 1" HEAVY HEX NUTS (ASTM A563A)
HOT DIP GALVANIZED (ASTM F2329 OR A153)
1 – 1" WASHER (ASTM F436) HOT DIP GALVANIZED (ASTM F2329 OR A153)
1 – 1" HEAVY HEX NUT (ASTM A563A) HOT DIP GALVANIZED (ASTM F2329 OR A153)

### NOTE:

FOR SPF FOUNDATION USE ¾" HARDWARE WITH 24" ANCHOR ROD OR THREADED ROD.




DETAIL A




DETAIL B

### NOTES:

1. TOP OF FOUNDATION SHALL EXTEND ABOVE THE SURROUNDING GROUND SURFACE A MINIMUM HEIGHT AS FOLLOWS:
   1" IF SURROUNDING GROUND SURFACE IS CONCRETE PAVEMENT OR SIMILAR.
   2" IF SURROUNDING GROUND SURFACE IS EARTH OR SIMILAR.
2. MATERIALS
   CONCRETE : CATEGORY VI; f'c = 4000 PSI
   REINFORCING STEEL : ASTM A615 GR.60
3. FOUNDATION SHALL BE POURED MONOLITHICALLY AND THE TOP FINISHED LEVEL.
4. CONDUIT SHALL BE INSTALLED SO THAT COUPLING IS EMBEDDED PLUMB AND FLUSH WITH TOP OF CONDUIT FOUNDATION.
5. PROVIDE 1" X 1" CHAMFER ON ALL EXPOSED EDGES.
6. ANCHOR BOLTS SHOWN IN THIS DRAWING ARE DESIGNED FOR LOADS SHOWN.
7. WHERE UNSUITABLE SOIL IS ENCOUNTERED AT THE FOUNDATION SUBGRADE LEVEL, OVER-EXCAVATE BY 3 FEET AND REPLACE WITH SUITABLE FILL MATERIAL AS DIRECTED BY THE ENGINEER.

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| No. | Date | Revision | Approved |
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| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# ALUMINUM TRAFFIC SIGNAL POLE FOUNDATION (SFT, SPF, SFK)

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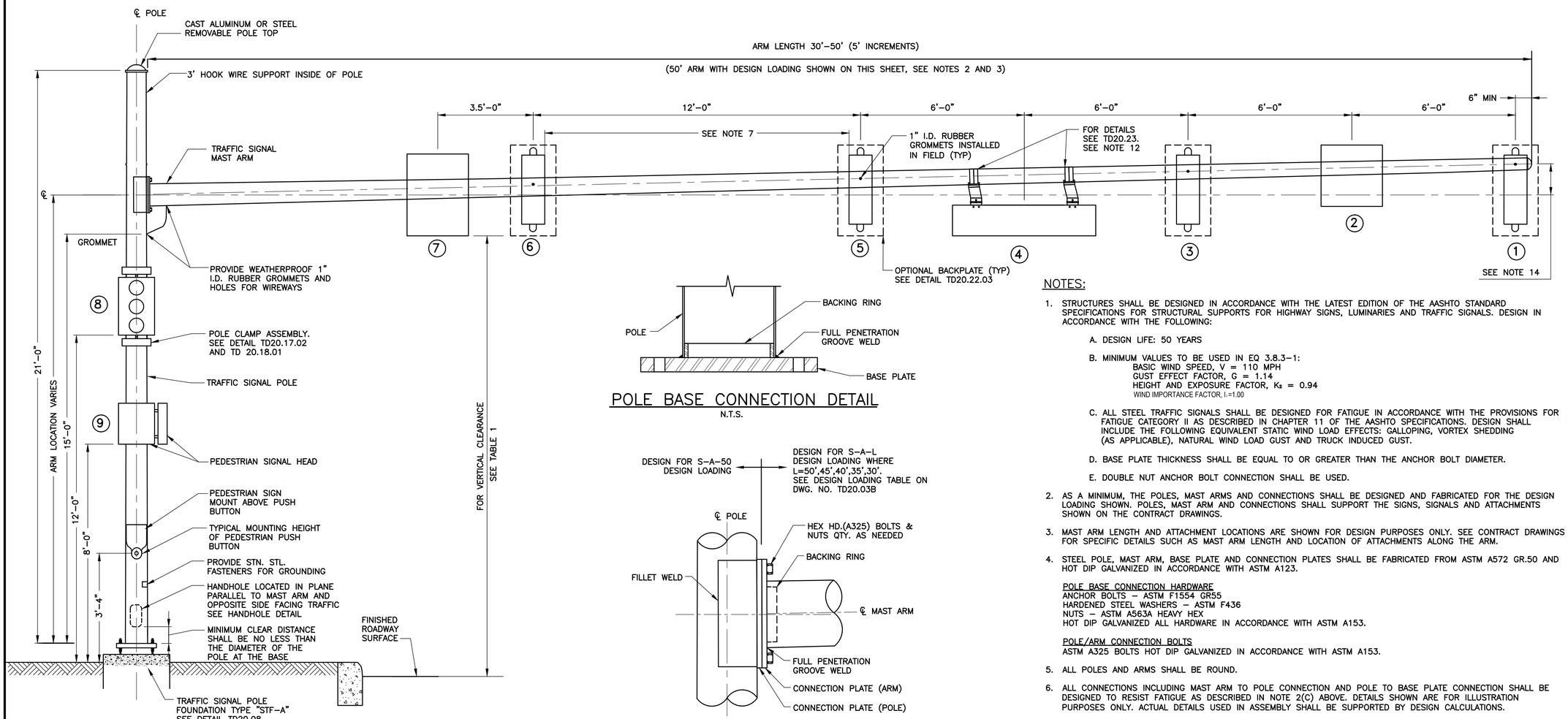
Contract Number

Drawing Number **TD20.02**

PID#




## TYPICAL TYPE "S–A" STEEL TRAFFIC SIGNAL INSTALLATION

N.T.S.




## POLE BASE CONNECTION DETAIL

N.T.S.

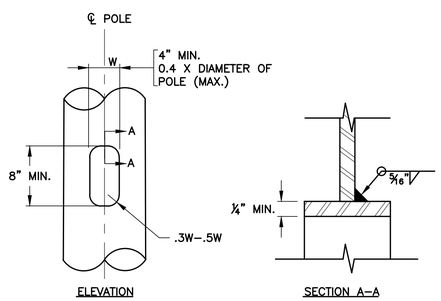



## TABLE 1

TYPE "S–A"
TRAFFIC SIGNAL SUPPORT

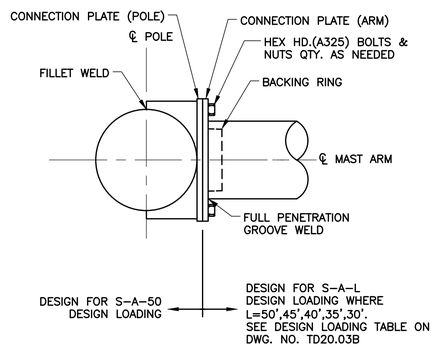
| FOUNDATION TYPE | *VERTICAL CLEARANCE |
|---|---|
| STF–A | |

*(TO BE COMPLETED BY DESIGNER)




## HANDHOLE DETAIL

N.T.S.




## ARM CONNECTION DETAIL

N.T.S.

## NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:

   A. DESIGN LIFE: 50 YEARS

   B. MINIMUM VALUES TO BE USED IN EQ 3.8.3–1:
   BASIC WIND SPEED, V = 110 MPH
   GUST EFFECT FACTOR, G = 1.14
   HEIGHT AND EXPOSURE FACTOR, $K_z$ = 0.94
   WIND IMPORTANCE FACTOR, I=1.00

   C. ALL STEEL TRAFFIC SIGNALS SHALL BE DESIGNED FOR FATIGUE IN ACCORDANCE WITH THE PROVISIONS FOR FATIGUE CATEGORY II AS DESCRIBED IN CHAPTER 11 OF THE AASHTO SPECIFICATIONS. DESIGN SHALL INCLUDE THE FOLLOWING EQUIVALENT STATIC WIND LOAD EFFECTS: GALLOPING, VORTEX SHEDDING (AS APPLICABLE), NATURAL WIND LOAD GUST AND TRUCK INDUCED GUST.

   D. BASE PLATE THICKNESS SHALL BE EQUAL TO OR GREATER THAN THE ANCHOR BOLT DIAMETER.

   E. DOUBLE NUT ANCHOR BOLT CONNECTION SHALL BE USED.

2. AS A MINIMUM, THE POLES, MAST ARMS AND CONNECTIONS SHALL BE DESIGNED AND FABRICATED FOR THE DESIGN LOADING SHOWN. POLES, MAST ARM AND CONNECTIONS SHALL SUPPORT THE SIGNS, SIGNALS AND ATTACHMENTS SHOWN ON THE CONTRACT DRAWINGS.

3. MAST ARM LENGTH AND ATTACHMENT LOCATIONS ARE SHOWN FOR DESIGN PURPOSES ONLY. SEE CONTRACT DRAWINGS FOR SPECIFIC DETAILS SUCH AS MAST ARM LENGTH AND LOCATION OF ATTACHMENTS ALONG THE ARM.

4. STEEL POLE, MAST ARM, BASE PLATE AND CONNECTION PLATES SHALL BE FABRICATED FROM ASTM A572 GR.50 AND HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.

   POLE BASE CONNECTION HARDWARE
   ANCHOR BOLTS – ASTM F1554 GR55
   HARDENED STEEL WASHERS – ASTM F436
   NUTS – ASTM A563A HEAVY HEX
   HOT DIP GALVANIZED ALL HARDWARE IN ACCORDANCE WITH ASTM A153.

   POLE/ARM CONNECTION BOLTS
   ASTM A325 BOLTS HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.

5. ALL POLES AND ARMS SHALL BE ROUND.

6. ALL CONNECTIONS INCLUDING MAST ARM TO POLE CONNECTION AND POLE TO BASE PLATE CONNECTION SHALL BE DESIGNED TO RESIST FATIGUE AS DESCRIBED IN NOTE 2(C) ABOVE. DETAILS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY. ACTUAL DETAILS USED IN ASSEMBLY SHALL BE SUPPORTED BY DESIGN CALCULATIONS.

7. ALL INDICATIONS SHALL BE SET PLUMB AND AT THE SAME ELEVATION.

8. ALL HEX NUTS SHALL BE INSTALLED BY "TURN OF THE NUT METHOD", SEAT NUT, THEN TORQUE MINIMUM ½ TURN.

9. ANCHOR BOLTS, LOCK WASHERS, FLAT WASHERS, NUTS AND LEVELING NUTS SHALL BE SUPPLIED WITH EACH POLE.

10. ALL ARMS SHALL BE FABRICATED IN ONE PIECE FOR LENGTHS UP TO 40 FEET. FOR LENGTHS MEASURING 45 FEET AND 50 FEET FABRICATE ARMS USING TWO–PIECE CONSTRUCTION WITH AN OVERLAP JOINT LENGTH OF 1 1/2 TIMES THE MAXIMUM INSIDE DIAMETER OF THE OUTER SHAFT. SECURE THE OVERLAP JOINT WITH A THROUGH BOLT AND LOCK NUT. FOR NON–STANDARD SIZES BETWEEN 40 FEET AND 45 FEET, SEE SPECIFICATIONS SECTION 16572 – "TRAFFIC SIGNAL POLES, MAST ARMS, SPAN WIRE AND POLE FOUNDATION."

11. CLAMP MOUNTED TRAFFIC SIGNAL HEAD AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED AT HEIGHTS SHOWN.

12. OVERHEAD SIGNS SHALL BE MOUNTED PERPENDICULAR TO THE DIRECTION OF TRAFFIC WHICH THEY ARE INTENDED TO SERVE.

13. A PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE TRAFFIC SIGNAL RESIDES SHALL SUBMIT A CERTIFICATION TO PANYNJ FOR EACH TRAFFIC SIGNAL ASSEMBLY PROVIDED. THE CERTIFICATION SHALL INCLUDE A STATEMENT, WITH SUPPORTING CALCULATIONS, THAT THE SIGNAL ASSEMBLY HAS BEEN DESIGNED AND FABRICATED TO MEET OR EXCEED ALL REQUIREMENTS SPECIFIED IN THE CONTRACT DOCUMENTS.

    CERTIFICATION SHALL BE FOR ALL ELEMENTS LOCATED ABOVE THE TOP OF THE FOUNDATION INCLUSIVE OF THE POLE BASE CONNECTION ELEMENTS (ANCHOR BOLTS, NUTS, WASHERS). THE BOLT CIRCLE AND ANCHOR BOLT DIAMETER SHOWN ON DWG. NO. TD20.09A SHALL BE USED WHEREVER POSSIBLE. ALL ELEMENTS INCLUDING AND WITHIN THE FOUNDATION ARE OUTSIDE THE SCOPE OF THIS CERTIFICATION AND ARE COVERED BY THE STANDARDS WHEN USED WITH THE DESIGN LOADING (DWG. NO. TD20.04A.1), BOLT CIRCLE, AND ANCHOR BOLT SIZE SHOWN. SHOULD DESIGN REQUIRE OTHER THAN WHAT IS SHOWN ON THESE STANDARDS OR CONTAINED IN THE CONTRACT DOCUMENTS, THE PROFESSIONAL ENGINEER'S CERTIFICATION AND DESIGN SHALL EXTEND TO ALL ELEMENTS OF THE SIGNAL STRUCTURE ASSEMBLY INCLUDING THE FOUNDATION AND ANCHORAGE AND SHALL BE PROVIDED AT NO ADDITIONAL COST TO PANYNJ.

14. FINAL ELEVATION OF FREE END OF MAST ARM SHALL BE BASED ON A RISE OF ½" PER FOOT OF MAST ARM.

15. SIZE OF BASE PLATE SHALL BE DETERMINED BY THE MANUFACTURER. A MINIMUM OF SIX ANCHOR BOLTS SHALL BE USED FOR THE CONNECTION.

16. DO NOT INSTALL SUPPORT WITHOUT MAST ARM.

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|---|---|---|---|
| 1 | 09/03/2014 | DIMENSION CHANGE | |
| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# TYPE "S-A" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE

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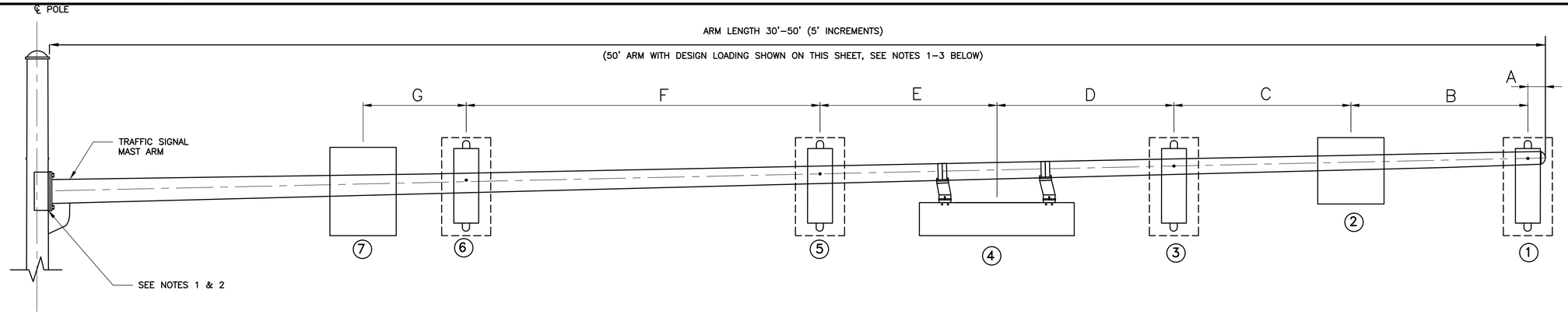
| | | |

Date **JULY 2014**

Contract Number

Drawing Number **TD20.03A**

PID#




# TYPE "S–A" STEEL TRAFFIC SIGNAL MAST ARM DETAIL

## DESIGN LOADING FOR TYPE "S–A" TRAFFIC SIGNALS

| NUMBER | ATTACHMENT [1] | FIXED/FREE SWINGING | DEAD LOAD | WIND AREA [2] | | ICE LOAD | ATTACHMENT LOCATIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | VERTICAL PROJECTION | HORIZONTAL PROJECTION | | DIMENSION | DESIGN LOADING S–A–50 | DESIGN LOADING S–A–45 | DESIGN LOADING S–A–40 | DESIGN LOADING S–A–35 | DESIGN LOADING S–A–30 |
| 1 | 2 WAY SIGNAL WITH BACKPLATE | FIXED | 72.6 LBS | 9.83 SF [3] | 6.05 SF | 168 LBS | A | 0.5' | 0.5' | 0.5' | 0.5' | 0.5' |
| 2 | 36" X 36" SIGN | FIXED | 36 LBS | 10.08 SF | 0 SF | 27 LBS | B | 6' | 6' | 6' | 6' | 6' |
| 3 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | C | 6' | 6' | 6' | 6' | 6' |
| 4 | 84" X 18" SIGN | FREE SWINGING | 39 LBS | 0.72 SF/10.33 SF [4] | 0 SF | 31.5 LBS | D | 6' | 6' | 6' | 6' | 6' |
| 5 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | E | 6' | 6' | 6' | – | – |
| 6 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | F | 12' | – | – | – | – |
| 7 | 36" X 48" SIGN | FIXED | 42 LBS | 13.68 SF | 0 SF | 36 LBS | G | 3.5' | 3.5' (FROM NO. 5) | 3.5' (FROM NO. 5) | 7' (FROM NO. 4) | 7' (FROM NO. 4) |
| 8 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | N/A | 84 LBS | | ON POLE | ON POLE | ON POLE | ON POLE | ON POLE |
| 9 | 2 WAY PEDESTRIAN SIGNAL | FIXED | 30 LBS | 3.6 SF | N/A | 40.5 LBS | | ON POLE | ON POLE | ON POLE | ON POLE | ON POLE |

[1] ALL SIGNAL HEADS CONSIST OF 3–12" SECTIONS
[2] WIND AREA INCLUDES DRAG COEFFICIENT, Cd
[3] SIGNALS ARE BACK TO BACK
[4] LEFT SIDE VALUE REFLECTS EXPOSED AREA UNDER DESIGN WIND; RIGHT SIDE VALUE REFLECTS EXPOSED AREA UNDER NATURAL WIND GUST (11.2 MPH) – FATIGUE

## NOTES:

1. POLE & CONNECTION DETAIL, INCLUDING CONNECTION PLATE (POLE) SHALL BE DESIGNED TO ACCOMMODATE DESIGN LOAD S–A–50.
2. CONNECTION PLATE (ARM), BOLT PATTERN AND BOLT SIZE SHALL BE DESIGNED TO BE CONSISTENT WITH CONNECTION PLATE (POLE) AS DESCRIBED IN NOTE 1.
3. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   A. DESIGN LIFE: 50 YEARS
   B. MINIMUM VALUES TO BE USED IN EQ 3.8.3–1:
      BASIC WIND SPEED, V = 110 MPH
      GUST EFFECT FACTOR, G = 1.14
      HEIGHT AND EXPOSURE FACTOR, $K_z$ = 0.94
      WIND IMPORTANCE FACTOR, $I_w$ = 1.00
   C. ALL STEEL TRAFFIC SIGNALS SHALL BE DESIGNED FOR FATIGUE IN ACCORDANCE WITH THE PROVISIONS FOR FATIGUE CATEGORY II AS DESCRIBED IN CHAPTER 11 OF THE AASHTO SPECIFICATIONS. DESIGN SHALL INCLUDE THE FOLLOWING EQUIVALENT STATIC WIND LOAD EFFECTS: GALLOPING, VORTEX SHEDDING (AS APPLICABLE), NATURAL WIND LOAD GUST AND TRUCK INDUCED GUST.
   D. BASE PLATE THICKNESS SHALL BE EQUAL TO OR GREATER THAN THE ANCHOR BOLT DIAMETER.
   E. DOUBLE NUT ANCHOR BOLT CONNECTION SHALL BE USED.

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| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*
Title
**TRAFFIC SIGNALS**

**TYPE "S-A" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE**

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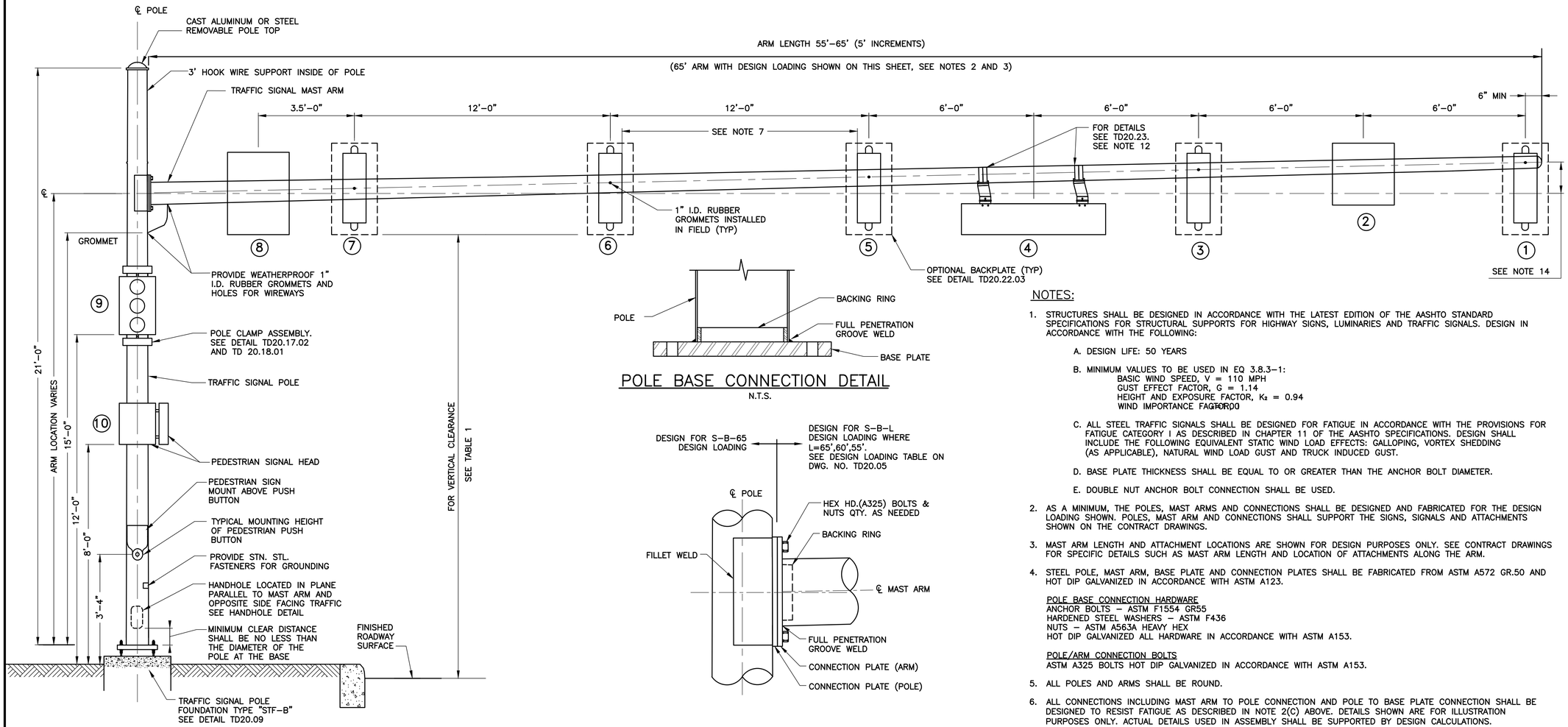
Date **JULY 2014**

Contract Number

Drawing Number **TD20.03B**

PID#




## TYPICAL TYPE "S–B" STEEL TRAFFIC SIGNAL INSTALLATION

N.T.S.




## POLE BASE CONNECTION DETAIL

N.T.S.

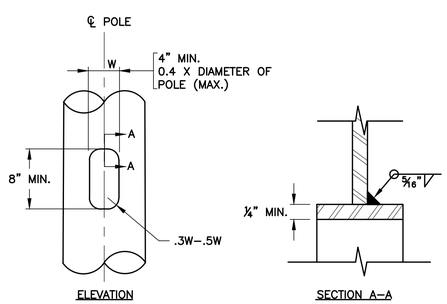



## TABLE 1

TYPE "S–B"
TRAFFIC SIGNAL SUPPORT

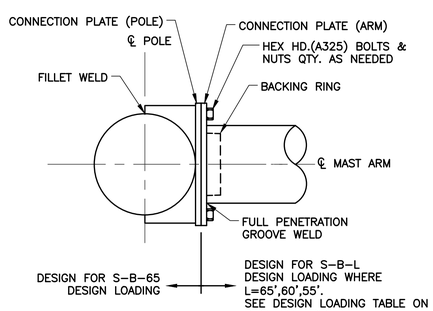
| FOUNDATION TYPE | *VERTICAL CLEARANCE |
|---|---|
| STF–B | |

*(TO BE COMPLETED BY DESIGNER)




## HANDHOLE DETAIL

N.T.S.




## ARM CONNECTION DETAIL

N.T.S.

## NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:

   A. DESIGN LIFE: 50 YEARS

   B. MINIMUM VALUES TO BE USED IN EQ 3.8.3–1:
   BASIC WIND SPEED, V = 110 MPH
   GUST EFFECT FACTOR, G = 1.14
   HEIGHT AND EXPOSURE FACTOR, $K_z$ = 0.94
   WIND IMPORTANCE FACTOR, I = 1.00

   C. ALL STEEL TRAFFIC SIGNALS SHALL BE DESIGNED FOR FATIGUE IN ACCORDANCE WITH THE PROVISIONS FOR FATIGUE CATEGORY I AS DESCRIBED IN CHAPTER 11 OF THE AASHTO SPECIFICATIONS. DESIGN SHALL INCLUDE THE FOLLOWING EQUIVALENT STATIC WIND LOAD EFFECTS: GALLOPING, VORTEX SHEDDING (AS APPLICABLE), NATURAL WIND LOAD GUST AND TRUCK INDUCED GUST.

   D. BASE PLATE THICKNESS SHALL BE EQUAL TO OR GREATER THAN THE ANCHOR BOLT DIAMETER.

   E. DOUBLE NUT ANCHOR BOLT CONNECTION SHALL BE USED.

2. AS A MINIMUM, THE POLES, MAST ARMS AND CONNECTIONS SHALL BE DESIGNED AND FABRICATED FOR THE DESIGN LOADING SHOWN. POLES, MAST ARM AND CONNECTIONS SHALL SUPPORT THE SIGNS, SIGNALS AND ATTACHMENTS SHOWN ON THE CONTRACT DRAWINGS.

3. MAST ARM LENGTH AND ATTACHMENT LOCATIONS ARE SHOWN FOR DESIGN PURPOSES ONLY. SEE CONTRACT DRAWINGS FOR SPECIFIC DETAILS SUCH AS MAST ARM LENGTH AND LOCATION OF ATTACHMENTS ALONG THE ARM.

4. STEEL POLE, MAST ARM, BASE PLATE AND CONNECTION PLATES SHALL BE FABRICATED FROM ASTM A572 GR.50 AND HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.

   POLE BASE CONNECTION HARDWARE
   ANCHOR BOLTS – ASTM F1554 GR55
   HARDENED STEEL WASHERS – ASTM F436
   NUTS – ASTM A563A HEAVY HEX
   HOT DIP GALVANIZED ALL HARDWARE IN ACCORDANCE WITH ASTM A153.

   POLE/ARM CONNECTION BOLTS
   ASTM A325 BOLTS HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153.

5. ALL POLES AND ARMS SHALL BE ROUND.

6. ALL CONNECTIONS INCLUDING MAST ARM TO POLE CONNECTION AND POLE TO BASE PLATE CONNECTION SHALL BE DESIGNED TO RESIST FATIGUE AS DESCRIBED IN NOTE 2(C) ABOVE. DETAILS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY. ACTUAL DETAILS USED IN ASSEMBLY SHALL BE SUPPORTED BY DESIGN CALCULATIONS.

7. ALL INDICATIONS SHALL BE SET PLUMB AND AT THE SAME ELEVATION.

8. ALL HEX NUTS SHALL BE INSTALLED BY "TURN OF THE NUT METHOD", SEAT NUT, THEN TORQUE MINIMUM ½ TURN.

9. ANCHOR BOLTS, LOCK WASHERS, FLAT WASHERS, NUTS AND LEVELING NUTS SHALL BE SUPPLIED WITH EACH POLE.

10. ALL ARMS SHALL BE FABRICATED OF TWO–PIECE CONSTRUCTION WITH AN OVERLAP JOINT LENGTH OF 1 1/2 TIMES THE MAXIMUM INSIDE DIAMETER OF THE OUTER SHAFT. SECURE THE OVERLAP JOINT WITH A THROUGH BOLT AND LOCK NUT.

11. CLAMP MOUNTED TRAFFIC SIGNAL HEAD AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED AT HEIGHTS SHOWN.

12. OVERHEAD SIGNS SHALL BE MOUNTED PERPENDICULAR TO THE DIRECTION OF TRAFFIC WHICH THEY ARE INTENDED TO SERVE.

13. A PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE TRAFFIC SIGNAL RESIDES SHALL SUBMIT A CERTIFICATION TO PANYNJ FOR EACH TRAFFIC SIGNAL ASSEMBLY PROVIDED. THE CERTIFICATION SHALL INCLUDE A STATEMENT, WITH SUPPORTING CALCULATIONS, THAT THE SIGNAL ASSEMBLY HAS BEEN DESIGNED AND FABRICATED TO MEET OR EXCEED ALL REQUIREMENTS SPECIFIED IN THE CONTRACT DOCUMENTS.

    CERTIFICATION SHALL BE FOR ALL ELEMENTS LOCATED ABOVE THE TOP OF THE FOUNDATION INCLUSIVE OF THE POLE BASE CONNECTION ELEMENTS (ANCHOR BOLTS, NUTS, WASHERS). THE BOLT CIRCLE AND ANCHOR BOLT DIAMETER SHOWN ON DWG. NO. TD20.09B SHALL BE USED WHEREVER POSSIBLE. ALL ELEMENTS INCLUDING AND WITHIN THE FOUNDATION ARE OUTSIDE THE SCOPE OF THIS CERTIFICATION AND ARE COVERED BY THE STANDARDS WHEN USED WITH THE DESIGN LOADING (DWG. NO. TD20.04B.1), BOLT CIRCLE, AND ANCHOR BOLT SIZE SHOWN. SHOULD DESIGN REQUIRE OTHER THAN WHAT IS SHOWN ON THESE STANDARDS OR CONTAINED IN THE CONTRACT DOCUMENTS, THE PROFESSIONAL ENGINEER'S CERTIFICATION AND DESIGN SHALL EXTEND TO ALL ELEMENTS OF THE SIGNAL STRUCTURE ASSEMBLY INCLUDING THE FOUNDATION AND ANCHORAGE AND SHALL BE PROVIDED AT NO ADDITIONAL COST TO PANYNJ.

14. FINAL ELEVATION OF FREE END OF MAST ARM SHALL BE BASED ON A RISE OF ½" PER FOOT OF MAST ARM.

15. SIZE OF BASE PLATE SHALL BE DETERMINED BY THE MANUFACTURER. A MINIMUM OF SIX ANCHOR BOLTS SHALL BE USED FOR THE CONNECTION.

16. DO NOT INSTALL SUPPORT WITHOUT MAST ARM.

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| No. | Date | Revision | Approved |
|---|---|---|---|
| 2 | 09/03/2014 | DIMENSION CHANGE | |
| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# TYPE "S–B" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE

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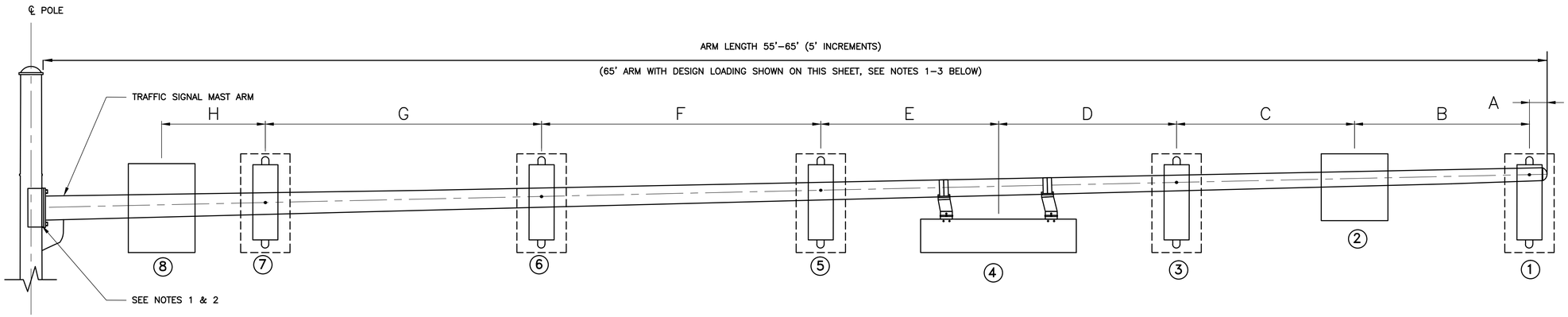
Date **JULY 2014**

Contract Number

Drawing Number **TD20.04**

PID#




## TYPE "S–B" STEEL TRAFFIC SIGNAL MAST ARM DETAIL

### DESIGN LOADING FOR TYPE "S–B" TRAFFIC SIGNALS

| NUMBER | ATTACHMENT [1] | FIXED/FREE SWINGING | DEAD LOAD | WIND AREA [2] | | ICE LOAD | ATTACHMENT LOCATIONS | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | VERTICAL PROJECTION | HORIZONTAL PROJECTION | | DIMENSION | DESIGN LOADING S–B–65 | DESIGN LOADING S–B–60 | DESIGN LOADING S–B–55 |
| 1 | 2 WAY SIGNAL WITH BACKPLATE | FIXED | 72.6 LBS | 9.83 SF [3] | 6.05 SF | 168 LBS | A | 0.5' | 0.5' | 0.5' |
| 2 | 36" X 36" SIGN | FIXED | 36 LBS | 10.08 SF | 0 SF | 27 LBS | B | 6' | 6' | 6' |
| 3 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | C | 6' | 6' | 6' |
| 4 | 84" X 18" SIGN | FREE SWINGING | 39 LBS | 0.72 SF/10.33 SF [4] | 0 SF | 31.5 LBS | D | 6' | 6' | 6' |
| 5 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | E | 6' | 6' | 6' |
| 6 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | F | 12' | 12' | 12' |
| 7 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | 3.02 SF | 84 LBS | G | 12' | – | – |
| 8 | 36" X 48" SIGN | FIXED | 42 LBS | 13.68 SF | 0 SF | 36 LBS | H | 3.5' | 3.5' (FROM NO. 6) | 3.5' (FROM NO. 6) |
| 9 | 1 WAY SIGNAL WITH BACKPLATE | FIXED | 36.3 LBS | 9.83 SF | N/A | 84 LBS | | ON POLE | ON POLE | ON POLE |
| 10 | 2 WAY PEDESTRIAN SIGNAL | FIXED | 30 LBS | 3.6 SF | N/A | 40.5 LBS | | ON POLE | ON POLE | ON POLE |

[1] ALL SIGNAL HEADS CONSIST OF 3–12" SECTIONS
[2] WIND AREA INCLUDES DRAG COEFFICIENT, Cd
[3] SIGNALS ARE BACK TO BACK
[4] LEFT SIDE VALUE REFLECTS EXPOSED AREA UNDER DESIGN WIND; RIGHT SIDE VALUE REFLECTS EXPOSED AREA UNDER NATURAL WIND GUST (11.2 MPH) – FATIGUE

NOTES:

1. POLE & CONNECTION DETAIL, INCLUDING CONNECTION PLATE (POLE) SHALL BE DESIGNED TO ACCOMMODATE DESIGN LOAD S–B–65.
2. CONNECTION PLATE (ARM), BOLT PATTERN AND BOLT SIZE SHALL BE DESIGNED TO BE CONSISTENT WITH CONNECTION PLATE (POLE) AS DESCRIBED IN NOTE 1.
3. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   A. DESIGN LIFE: 50 YEARS
   B. MINIMUM VALUES TO BE USED IN EQ 3.8.3–1:
      BASIC WIND SPEED, V = 110 MPH
      GUST EFFECT FACTOR, G = 1.14
      HEIGHT AND EXPOSURE FACTOR, $K_z$ = 0.94
      WIND IMPORTANCE FACTOR, I = 1.0
   C. ALL STEEL TRAFFIC SIGNALS SHALL BE DESIGNED FOR FATIGUE IN ACCORDANCE WITH THE PROVISIONS FOR FATIGUE CATEGORY I AS DESCRIBED IN CHAPTER 11 OF THE AASHTO SPECIFICATIONS. DESIGN SHALL INCLUDE THE FOLLOWING EQUIVALENT STATIC WIND LOAD EFFECTS: GALLOPING, VORTEX SHEDDING (AS APPLICABLE), NATURAL WIND LOAD GUST AND TRUCK INDUCED GUST.
   D. BASE PLATE THICKNESS SHALL BE EQUAL TO OR GREATER THAN THE ANCHOR BOLT DIAMETER.
   E. DOUBLE NUT ANCHOR BOLT CONNECTION SHALL BE USED.

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**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**TYPE "S-B" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE**

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Contract Number

Drawing Number **TD20.05**

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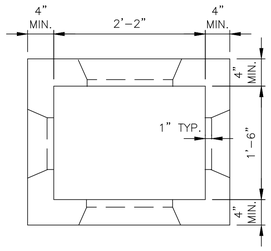
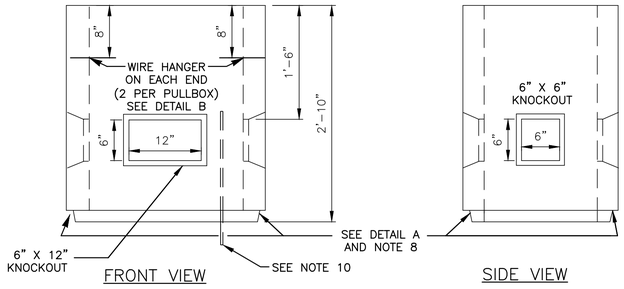


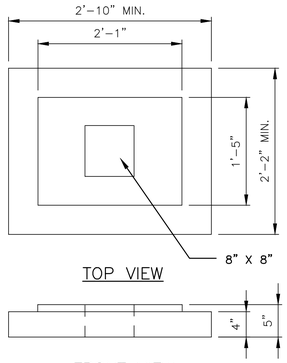

TOP VIEW




FRONT VIEW SIDE VIEW

## REINFORCED CONCRETE RECTANGULAR PULLBOX

MINIMUM VERTICAL & HORIZONTAL
REINFORCEMENT 0.12 IN²/FT (SEE NOTE 9)

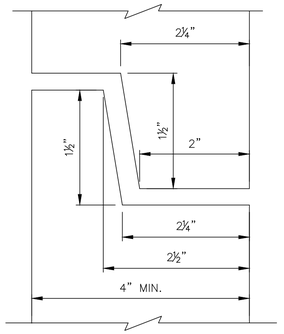



TOP VIEW

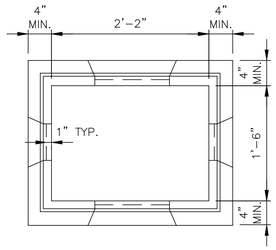
FRONT VIEW

## RECTANGULAR PULLBOX BASE

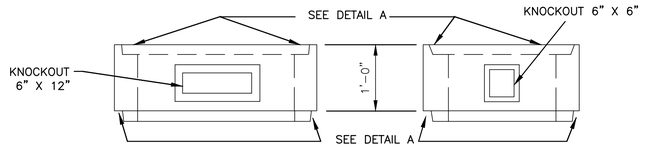
MINIMUM VERTICAL & HORIZONTAL
REINFORCEMENT 0.12 IN²/FT (SEE NOTE 9)




JOINT DETAIL
DETAIL A



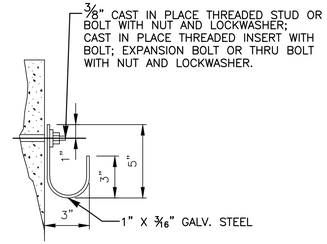

TOP VIEW



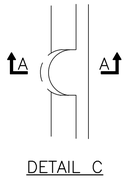

FRONT VIEW SIDE VIEW

## EXTENSION FOR RECTANGULAR PULLBOX

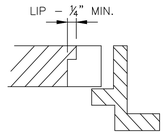
MINIMUM VERTICAL & HORIZONTAL
REINFORCEMENT 0.12 IN²/FT (SEE NOTE 9)




WIRE HANGER DETAIL
DETAIL B




DETAIL C




SECTION A–A
LIFTING NOTCH OR EQUAL

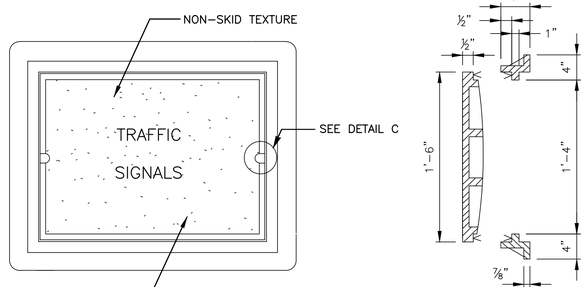
## NOTES:

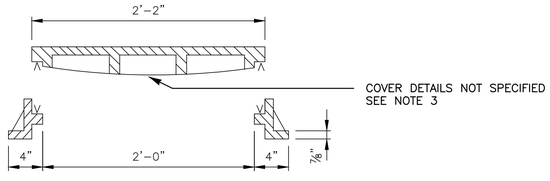
(APPLIES TO TD20.06.01)

1. CONCRETE CATEGORY VI SHALL BE POURED MONOLITHICALLY.
2. STANDARD KNOCKOUT LOCATIONS ARE SHOWN FOR EACH PULLBOX. THE CONTRACTOR MAY ALSO ELECT TO FURNISH PULLBOXES WITH ONLY THE NUMBER AND SIZE CONDUIT OPENINGS THAT ARE REQUIRED FOR THAT PARTICULAR INSTALLATION.
3. FRAMES AND COVERS SHALL BE HEAVY DUTY TO SUPPORT AN H-20 WHEEL LOADING.
4. A NON-SKID TEXTURE SHALL BE CAST INTO THE TOP SURFACE OF THE COVER.
5. PULLBOX BASES ARE REQUIRED ONLY FOR PULLBOXES PLACED IN THE PAVEMENT SHOULDER AND AS INDICATED ON THE PLANS. BASES, WHEN REQUIRED, MAY BE CAST OR INTEGRAL WITH THE PULLBOX.
6. A ROUGH FINISH IS ACCEPTABLE FOR PULLBOX KNOCKOUTS.
7. THE CONTRACTOR MAY ELECT TO FURNISH PULLBOXES PRECAST TO GREATER DEPTH, IN ONE FOOT INCREMENTS, INSTEAD OF USING EXTENSIONS.
8. WHERE PULLBOXES ARE INTENDED FOR USE WITHOUT EXTENSIONS THE JOINT SHOWN IN "DETAIL A" MAY BE OMITTED.
9. STEEL REINFORCEMENT SHALL BE PLACED WITHIN THE CENTER THIRD OF THE WALL. MINIMUM COVER SHALL BE 1".
10. ¾" X 10'-0" LG. COPPER CLAD GROUND ROD.
11. THE TOP OF THE PULLBOX COVER SHALL BE SET FLUSH WITH THE SURROUNDING GRADE.

## PULL BOX, FRAME AND COVER

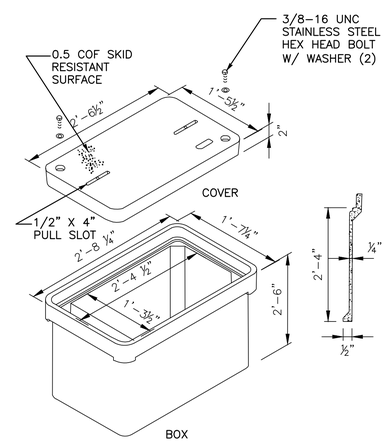
N.T.S. TD20.06.01




## CAST IRON FRAME AND COVER FOR RECTANGULAR PULLBOX

APPROXIMATE WEIGHT 300 LBS.




## NOTES:

(APPLIES TO TD20.06.02)

1. LOADINGS FOR COVERS SHALL COMPLY WITH ALL TEST PROVISIONS OF ANSI/SCTE 77 EXCEPT THAT THE VERTICAL DESIGN LOAD IS 22,500 LBS. WITH A TEST LOAD OF 33,750 LBS. OVER A 10"x1'-8" PLATE.
2. METHODS FOR CUTTING HOLDS SHALL BE ACCOMPLISHED BY USING EITHER A MASONRY HOLE SAW OR KNOCKOUT PUNCH DRIVER IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS.
3. SPLICE BOX SHALL BE A QUAZITE MATERIAL, OR APPROVED EQUAL.

## LOOP DETECTOR SPLICE BOX

N.T.S. TD20.06.02

Sheet of

**THE PORT AUTHORITY OF NY & NJ**

CHIEF

| No. | Date | Revision | Approved |
|---|---|---|---|
| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# PULL BOX FRAME, COVER, AND LOOP DETECTOR SPLICE BOX

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| Designed by | Drawn by | Checked by |
|---|---|---|
| Date | | **SEPT 2011** |

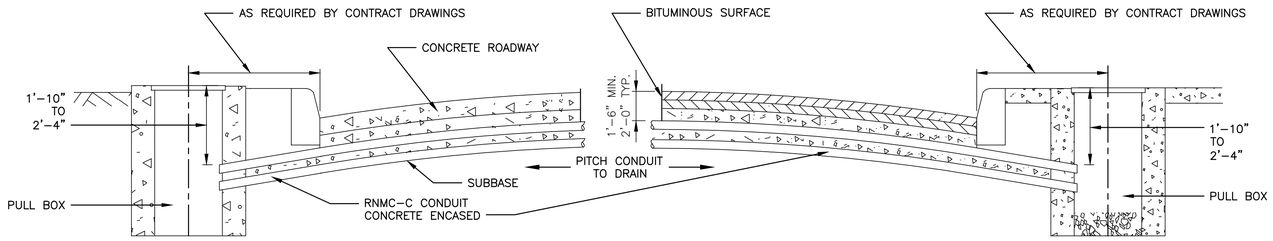
Contract Number

Drawing Number **TD20.06**

PID#

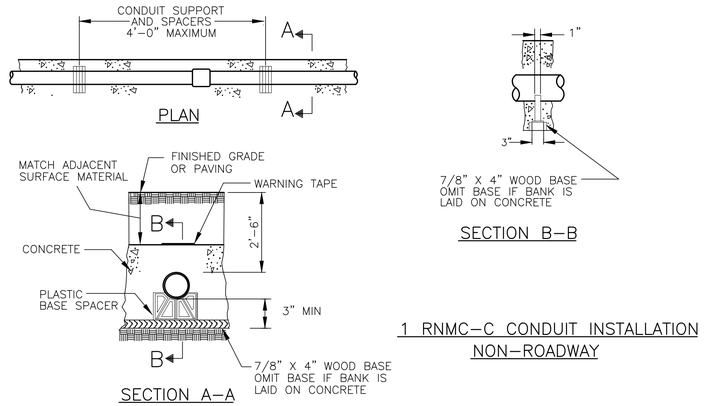
## RNMC–C CONDUIT INSTALLED IN SUBBASE OF CONCRETE ROAD

## RNMC–C CONDUIT INSTALLED IN SUBBASE OF BITUMINOUS SURFACE ROAD




## TYPICAL CONDUIT INSTALLATION UNDER ROADWAY

N.T.S. TD20.07.01

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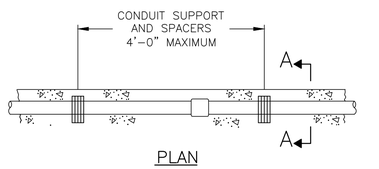
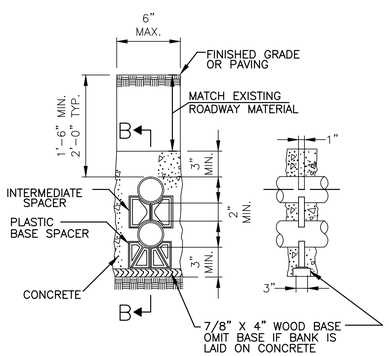
NON–ROADWAY

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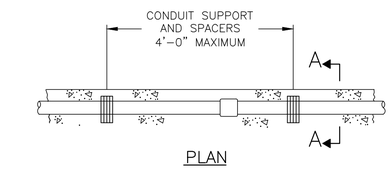
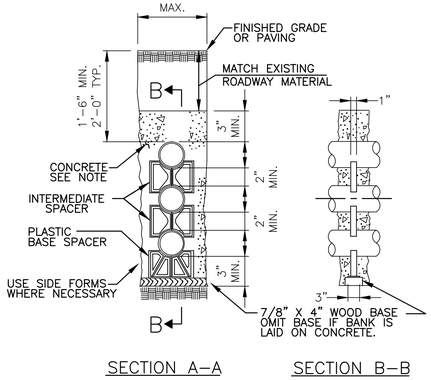
OPEN CUT METHOD – IN ROADWAY
TD20.07.02

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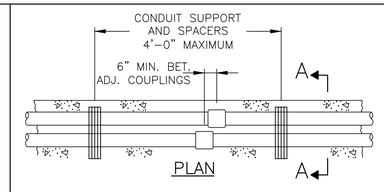
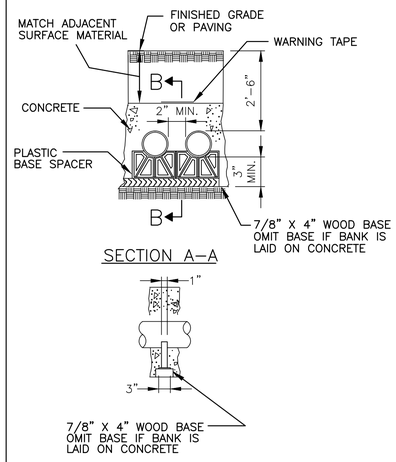
OPEN CUT METHOD – IN ROADWAY
N.T.S. TD20.07.03

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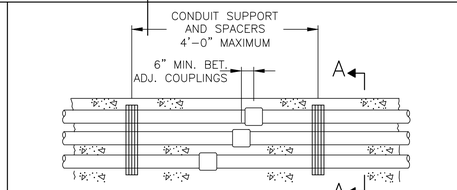
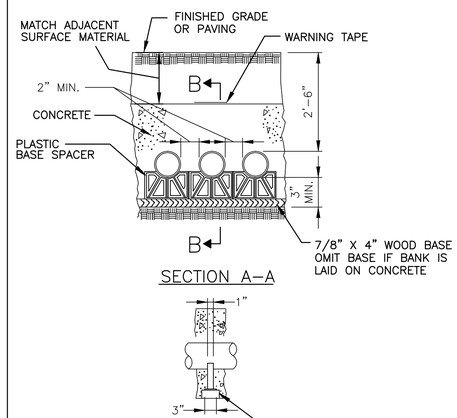
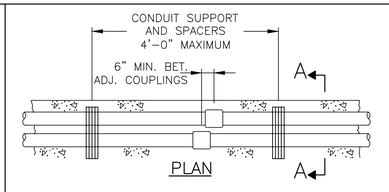
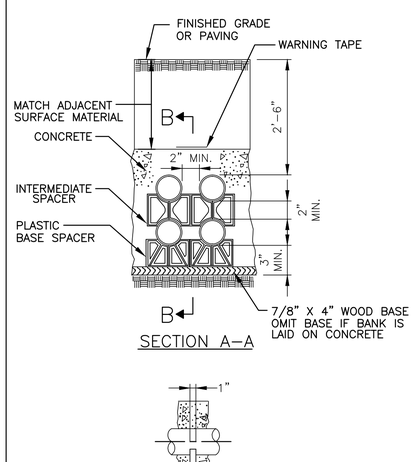
NON–ROADWAY
N.T.S. TD20.07.04




3 RNMC–C CONDUIT INSTALLATION
NON–ROADWAY
N.T.S. TD20.07.05




4 RNMC–C CONDUIT INSTALLATION
NON–ROADWAY
N.T.S. TD20.07.06

### NOTES:

(APPLIES TO TD20.07.01, TD20.07.02, TD20.07.03, TD20.07.04, TD20.07.05 AND TD20.07.06.)

1. ALL CONCRETE FOR ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATION SECTION 03300 AND 03301, CATEGORY VI, WITH A 28–DAY DESIGN COMPRESSIVE STRENGTH 4000 PSI.

BLACK LETTERS ON RED BACKGROUND

WARNING TAPE
N.T.S. TD20.07.07

Sheet of

**THE PORT AUTHORITY OF NY & NJ**

CHIEF

| No. | Date | Revision | Approved |
|---|---|---|---|
| 2 | 08/29/2014 | UPDATE DETAIL | |
| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# CONDUIT INSTALLATION

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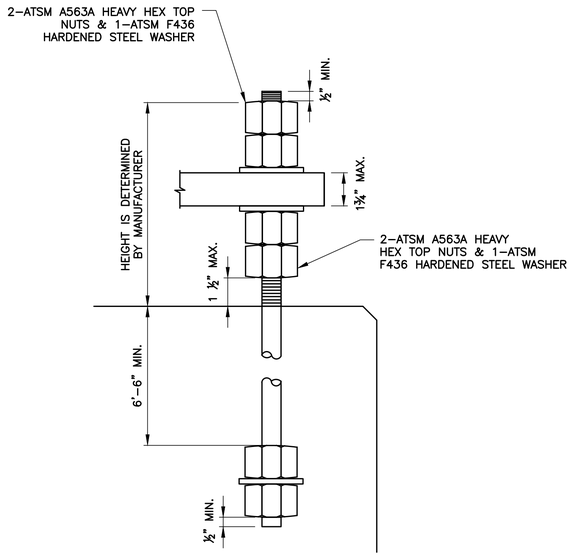
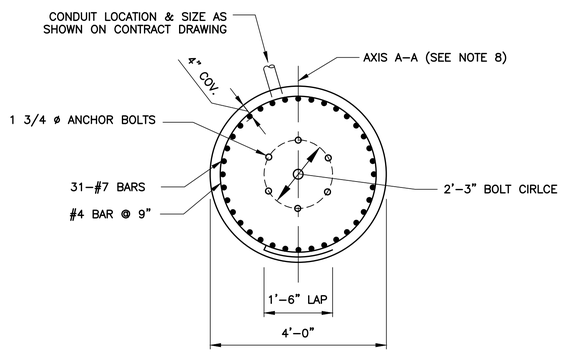
|---|---|---|
| Date | | SEPT 2011 |
| Contract Number | | |
| Drawing Number | | TD20.07 |

PID#



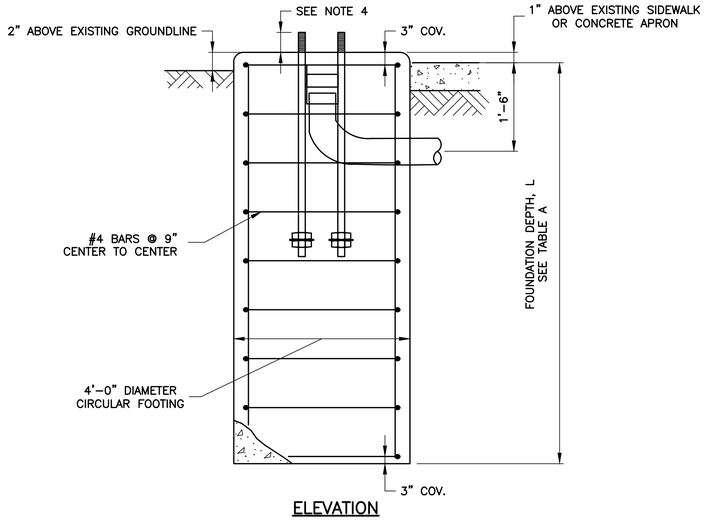

## ANCHOR BOLT DETAIL (FOUNDATION REINFORCEMENT NOT SHOWN)

N.T.S.




## PLAN

N.T.S.




## ELEVATION

## STEEL TRAFFIC SIGNAL POLE FOUNDATION

N.T.S.

| TABLE A | | | |
|---|---|---|---|
| CAISSON NO. | LOCATION | BORING NO. | FOUNDATION DEPTH, (L) |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

NOTES:

1. USE WITH TYPE "S–A" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE SHOWN ON DWG. NO. TD20.04A.
2. MATERIALS
   CONCRETE SHALL HAVE A MINIMUM CONCRETE STRENGTH, f'c=4000 PSI AT 28 DAYS
   CONCRETE FOUNDATIONS SHALL BE POURED MONOLITHICALLY
   REINFORCEMENT STEEL SHALL BE ASTM A615 GR.60
3. ANCHOR BOLTS SHALL BE HOT DIPPED GALVANIZED STEEL ASTM F1554 GRADE 55, GALVANIZE IN ACCORDANCE WITH ASTM A153.
4. MANUFACTURER SHALL DETERMINE HEIGHT OF ANCHOR BOLT ABOVE TOP OF FOUNDATION.
5. FOUNDATION DEPTH IS CALCULATED BASED ON TYPE "S–A" DESIGN LOADING PROVIDED ON DWG. NO. TD20.04 AND SHALL BE AS SHOWN IN TABLE A.
6. CONFORM TO THE SPECIFICATION 02379, "CAISSON (DRILL SHAFT)", FOR THE INSTALLATION OF THE POLE FOUNDATIONS, BEFORE STARTING THE POLE FOUNDATION, INSTALLATION, BACKFILL ANY OPEN EXCAVATION NEAR THE POLE FOOTING AS PER SPECIFICATION 02221, "EXCAVATION, BACKFILLING AND FILLING".
7. ANCHOR BOLT DIAMETER AND BOLT CIRCLE PATTERN SHALL BE AS SHOWN ON PLANS. MANUFACTURER SHALL PROVIDE CERTIFICATION THAT ANCHOR BOLT DIAMETER AND PATTERN ARE ACCEPTABLE. IF OTHER THAN SHOWN, CONTRACTOR SHALL NOTIFY PANYNJ.
8. ORIENT ANCHOR BOLT PATTERN SO AXIS A–A IS AT 90° TO THE MAST ARM.

Sheet of

**THE PORT AUTHORITY OF NY & NJ**

| No. | Date | Revision | Approved |
|---|---|---|---|
| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*
Title
**TRAFFIC SIGNALS**

# STEEL TRAFFIC SIGNAL POLE FOUNDATION STF-A

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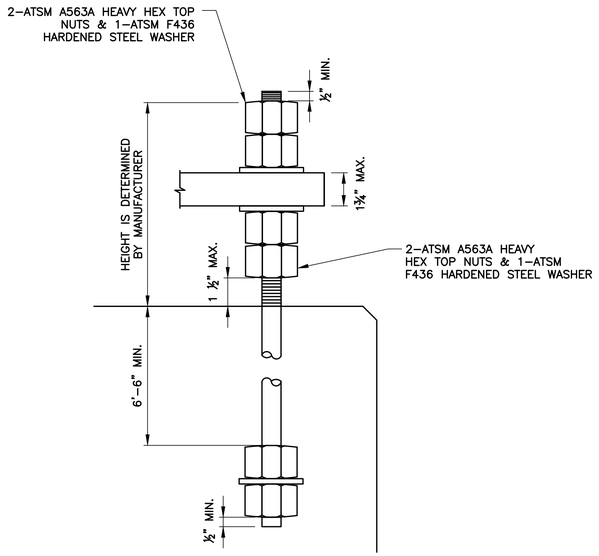
Designed by | Drawn by | Checked by

Date **JULY 2014**

Contract Number

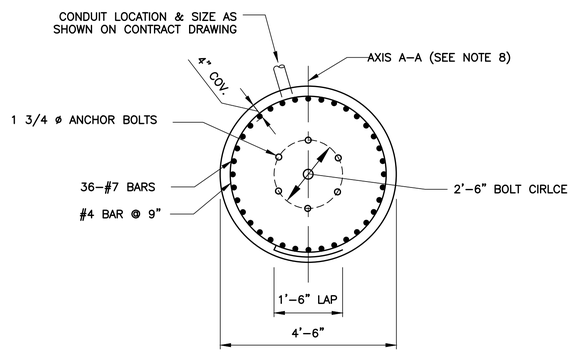
Drawing Number **TD20.08**

PID#



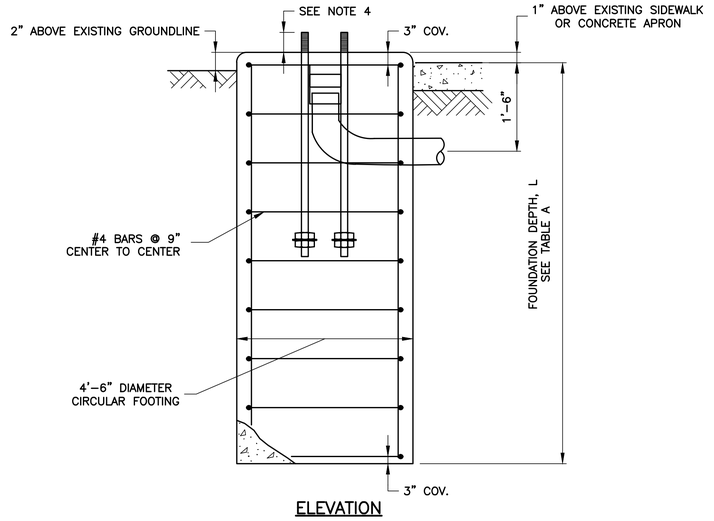

ANCHOR BOLT DETAIL
(FOUNDATION REINFORCEMENT NOT SHOWN)

N.T.S.




PLAN

N.T.S.




ELEVATION

STEEL TRAFFIC SIGNAL POLE FOUNDATION

N.T.S.

| TABLE A | | | |
|---|---|---|---|
| CAISSON NO. | LOCATION | BORING NO. | FOUNDATION DEPTH, (L) |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

NOTES:

1. USE WITH TYPE "S–B" STEEL TRAFFIC SIGNAL POLE, ARM AND BASE SHOWN ON DWG. NO. TD20.04B.
2. MATERIALS
   CONCRETE SHALL HAVE A MINIMUM CONCRETE STRENGTH, f'c=4000 PSI AT 28 DAYS
   CONCRETE FOUNDATIONS SHALL BE POURED MONOLITHICALLY
   REINFORCEMENT STEEL SHALL BE ASTM A615 GR.60
3. ANCHOR BOLTS SHALL BE HOT DIPPED GALVANIZED STEEL ASTM F1554 GRADE 55, GALVANIZE IN ACCORDANCE WITH ASTM A153.
4. MANUFACTURER SHALL DETERMINE HEIGHT OF ANCHOR BOLT ABOVE TOP OF FOUNDATION.
5. FOUNDATION DEPTH IS CALCULATED BASED ON TYPE "S–B" DESIGN LOADING PROVIDED ON DWG. NO. TD20.05 AND SHALL BE AS SHOWN IN TABLE A.
6. CONFORM TO THE SPECIFICATION 02379, "CAISSON (DRILL SHAFT)", FOR THE INSTALLATION OF THE POLE FOUNDATIONS, BEFORE STARTING THE POLE FOUNDATION, INSTALLATION, BACKFILL ANY OPEN EXCAVATION NEAR THE POLE FOOTING AS PER SPECIFICATION 02221, "EXCAVATION, BACKFILLING AND FILLING".
7. ANCHOR BOLT DIAMETER AND BOLT CIRCLE PATTERN SHALL BE AS SHOWN ON PLANS. MANUFACTURER SHALL PROVIDE CERTIFICATION THAT ANCHOR BOLT DIAMETER AND PATTERN ARE ACCEPTABLE. IF OTHER THAN SHOWN, CONTRACTOR SHALL NOTIFY PANYNJ.
8. ORIENT ANCHOR BOLT PATTERN SO AXIS A–A IS AT 90° TO THE MAST ARM.

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| No. | Date | Revision | Approved |
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| 1 | 08/19/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*
Title
**TRAFFIC SIGNALS**

# STEEL TRAFFIC SIGNAL POLE FOUNDATION STF-B

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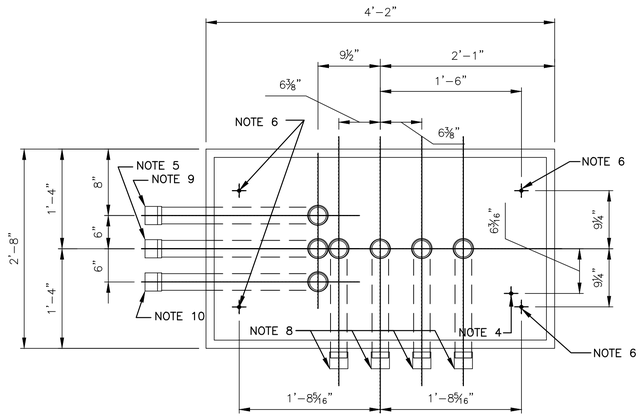
Date **JULY 2014**

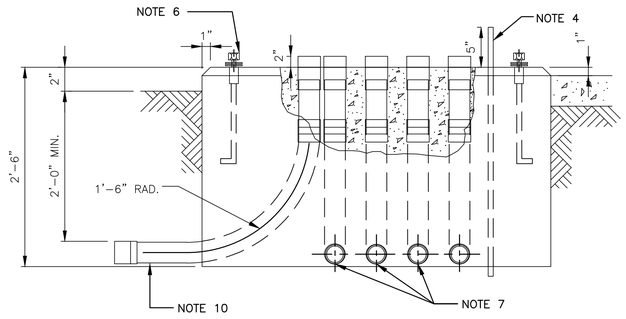
Contract Number

Drawing Number **TD20.09**

PID#




PLAN



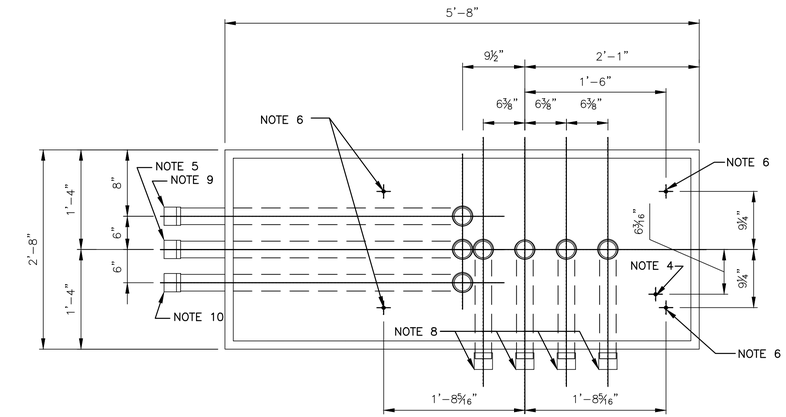

ELEVATION

# FOUNDATION TYPE "P"

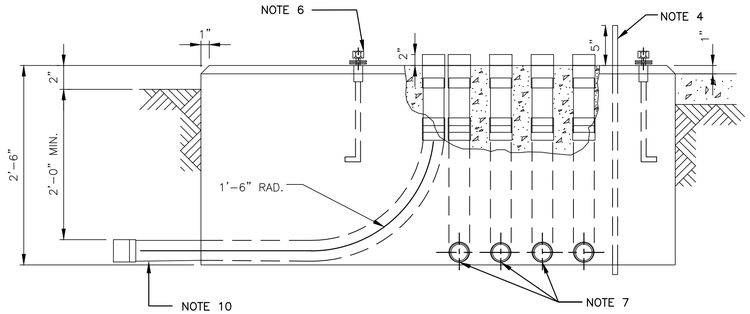
N.T.S. TD20.10.01

## NOTES:

1. CONCRETE SHALL BE POURED MONOLITHICALLY.
2. ALL CONDUIT SHALL BE INSTALLED SO THAT COUPLINGS ARE EMBEDDED PLUMB AND FLUSH WITH TOP OF CONCRETE FOUNDATION.
3. J-BOLTS MUST BE INSERTED 1½" ± 1/16" INTO 3" COUPLING
4. ¾" X 10'-0" LG. GROUND ROD.
5. RIGID GALVANIZED STEEL CONDUIT (SERVICE CONDUIT). SEE ELECTRICAL CONTRACT DRAWINGS FOR DIRECTION AND SIZE.
6. ¾" DIA. ANCHOR BOLTS. ANCHOR BOLTS WITH 1" OF THREAD COUPLINGS, STN. STL. HEX HEAD CAP SCREWS 1½" LG. ASTM A193, GRADE B8, STN. STL. LOCK WASHERS AND STN. STL. FLAT WASHERS. ALL THREAD SHALL BE ¾" 10NC CL. 2 FIT.
7. RIGID METALLIC CONDUIT (ALL SHALL CONNECT TO PVC-H CONDUIT WITH THE APPROPRIATE ADAPTER). SEE CONTRACT DRAWINGS FOR DIRECTION AND SIZE. ANY CONDUITS NOT DESIGNATED FOR USE ON THE CONTRACT DRAWINGS SHALL BE EXTENDED BEYOND THE FOUNDATION A MINIMUM OF 12" AND CAPPED.
8. JOINT SEALANT SHALL CONFORM TO SPECIFICATION SECTION 02578 "PAVEMENT JOINT SEALING."
9. 3" RIGID NON-METALLIC CONDUIT FOR COMMUNICATION (FIBER OPTIC).
10. RIGID GALVANIZED STEEL CONDUIT FOR TELEPHONE SERVICE (IF REQUIRED).




PLAN




ELEVATION

# FOUNDATION TYPE "P-SME"

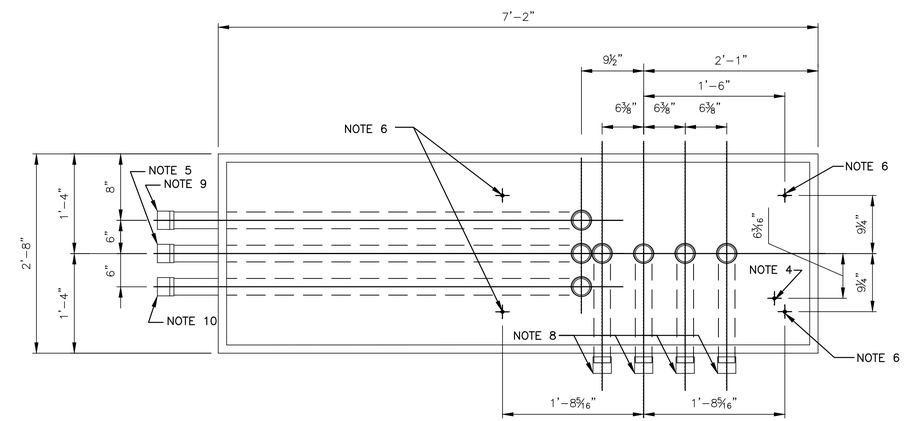
N.T.S. TD20.10.02



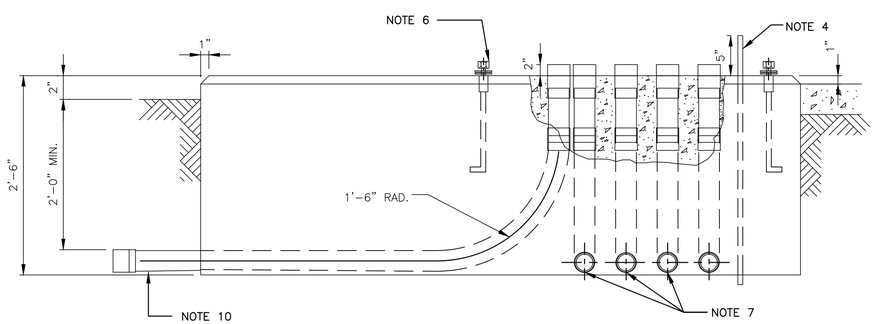

GALVANIZED COUPLING TD20.10.02

(GALVANIZED PER ASTM A-153 CONTINUOUS THREADS)

N.T.S.




PLAN




ELEVATION

# FOUNDATION TYPE "P-2SME"

N.T.S. TD20.10.03

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| 1 | 08/28/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

## CONTROLLER CABINET FOUNDATIONS (P, P-SME, P-2SME)

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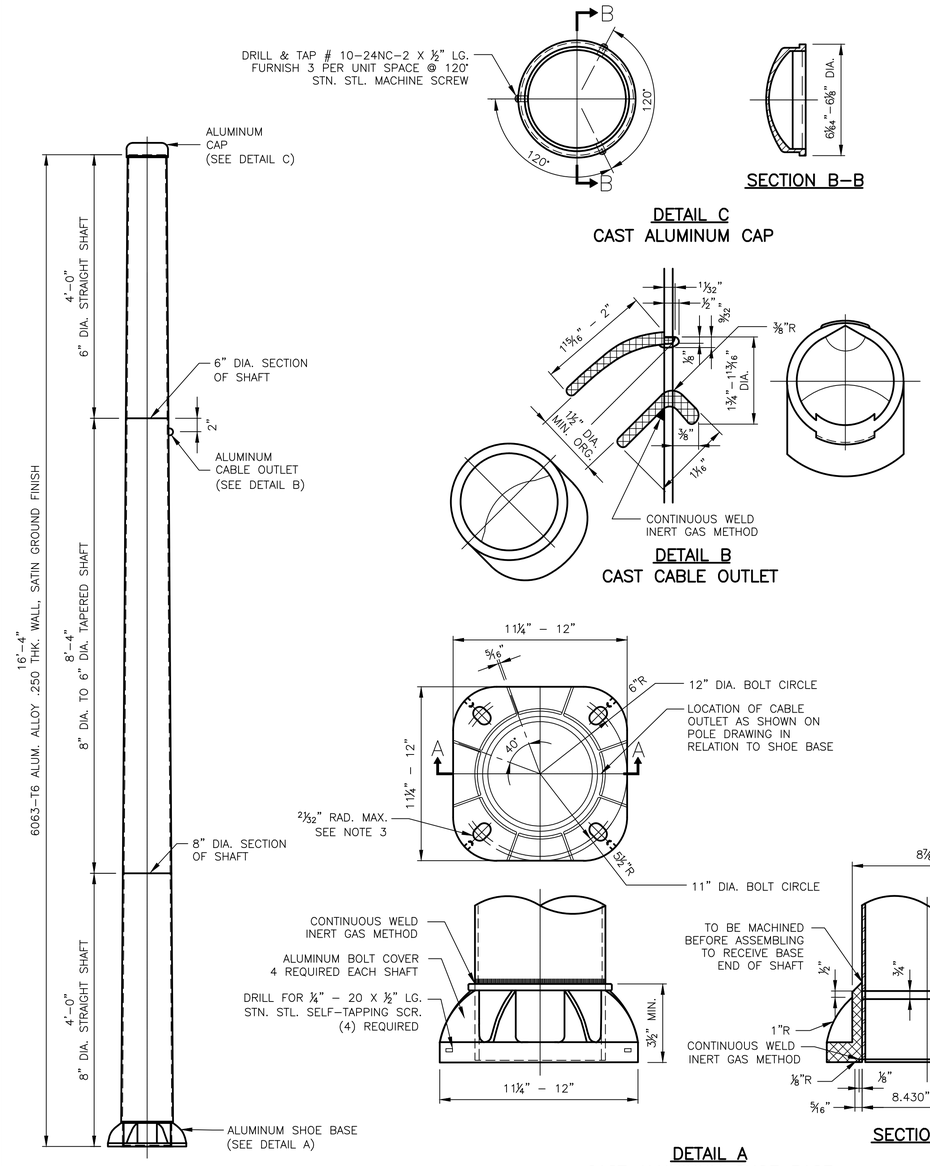
| Designed by | Drawn by | Checked by |
|---|---|---|
| | | |

Date **SEPT 2011**

Contract Number

Drawing Number **TD20.10**

PID#




TRAFFIC SIGNAL POLE TYPE "T"

N.T.S.





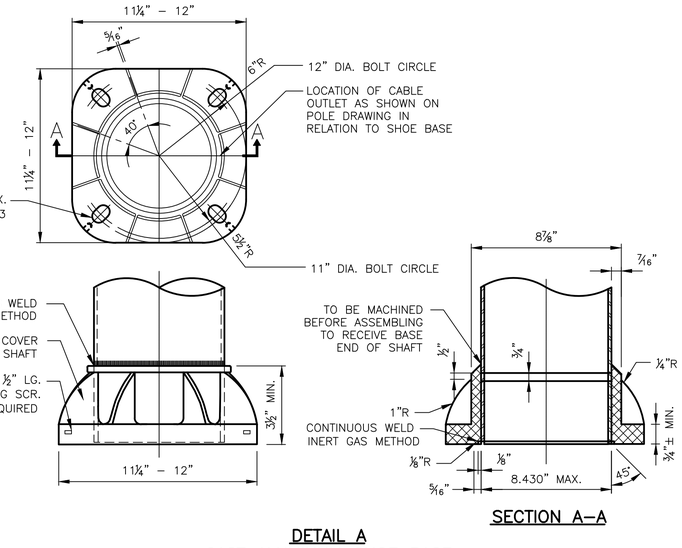


SECTION B-B

DETAIL C
CAST ALUMINUM CAP




DETAIL B
CAST CABLE OUTLET




DETAIL A
CAST ALUMINUM SHOE BASE

SECTION A-A

TRAFFIC SIGNAL POLE TYPE "T"

N.T.S.

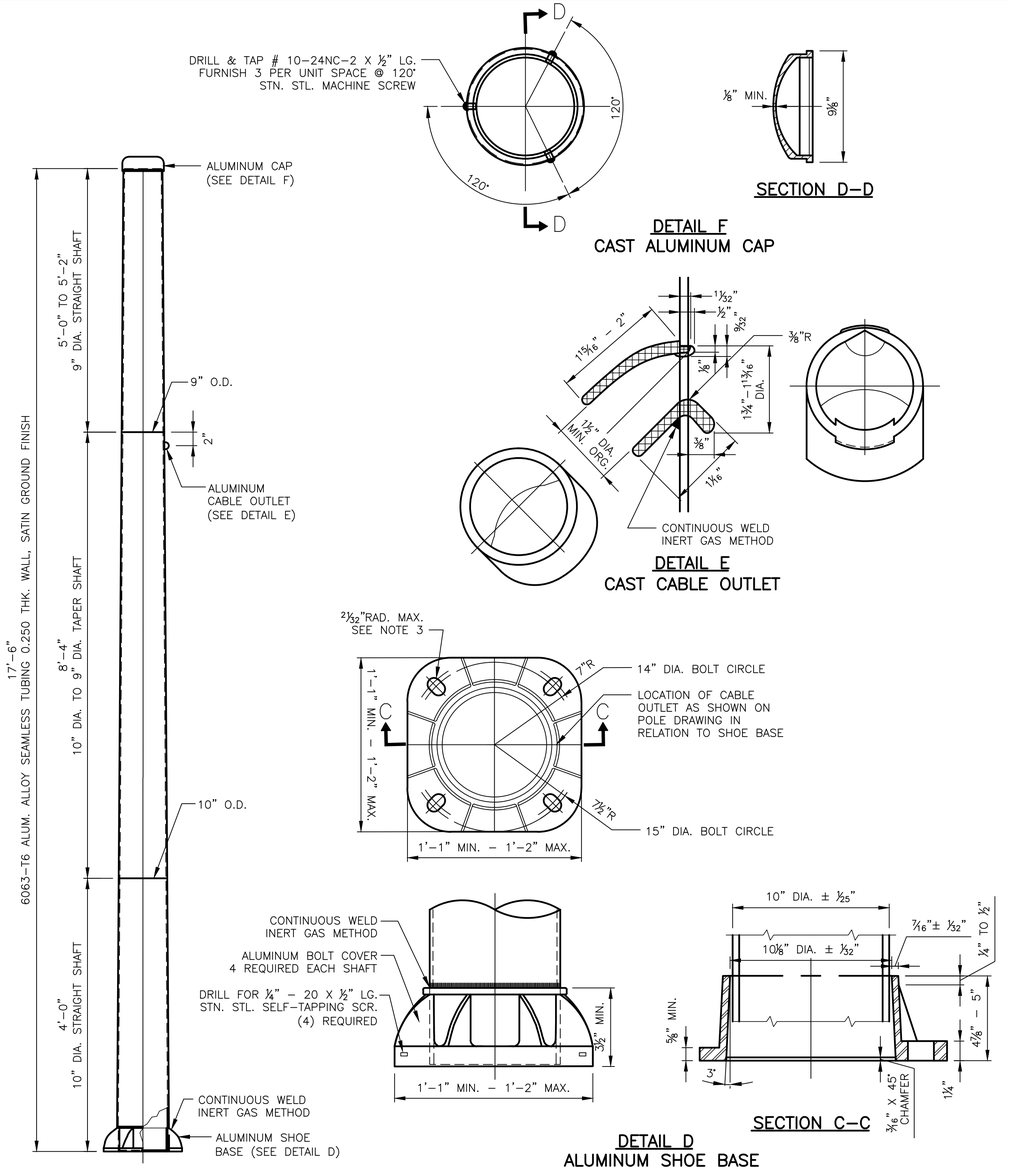
FURNISH WITH EACH POLE

| QTY | DESCRIPTION |
|---|---|
| 4 | 1" DIA. X 3" LONG HEX HEAD BOLTS, 8 THREADS PER INCH CLASS 2 – FREE FIT STAINLESS STEEL ASTM A193 GRADE B8 |
| 8 | 1" DIA. PLAIN WASHERS, STAINLESS STEEL (4-2" O.D., 4-2 1/2" O.D.) |
| 4 | 1" DIA. LOCK WASHERS, STN. STL. |
| 4 | 1" DIA. HEX NUTS, STAINLESS STEEL |
| 4 | BOLT COVERS ALUMINUM ALLOY WITH STAINLESS STEEL SCREWS |
| 1 | POLE CAP |

NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   A. DESIGN LIFE: 25 YEARS
   B. BASIC WIND SPEED: 110 MPH
   C. FATIGUE DESIGN SHALL BE WAIVED
2. ALL TOLERANCES FOR CASTINGS SHALL BE ±1/32".
3. HOLE SHALL BE OF SUFFICIENT DIAMETER TO ACCEPT 1" DIAMETER BOLT.
4. MATERIAL – ALUMINUM CASTINGS
   ALUMINUM ALLOY 356-T6 (ASTM ALLOY DESIGNATION SG 70A)
   SAND CASTING : ASTM B26
   PERMANENT MOLD CASTING ASTM B108

TD20.11.01







SECTION D-D

DETAIL F
CAST ALUMINUM CAP




DETAIL E
CAST CABLE OUTLET













SECTION C-C

DETAIL D
ALUMINUM SHOE BASE

TRAFFIC SIGNAL POLE TYPE "K"

N.T.S.

FURNISH WITH EACH POLE

| QTY | DESCRIPTION |
|---|---|
| 4 | 1" DIA. X 4½" LONG HEX HD. BOLTS 8 THDS. PER INCH, CLASS 2 – FREE FIT STAINLESS STEEL. ASTM A-193 GRADE B8. |
| 4 | 1" DIA. PLAIN WASHERS, STAINLESS STEEL. (2" O.D. X ⅛" THICK) |
| 4 | 1" DIA. LOCK WASHERS, STAINLESS STEEL. (¼" THICK) |
| 4 | 1" DIA. HEX NUTS, STAINLESS STEEL. |
| 4 | BOLT COVERS, ALUMINUM ALLOY WITH GR. B8 STAINLESS STEEL SCREWS. |
| 4 | 1" DIA. PLAIN WASHERS, STAINLESS STEEL (2½" O.D. ⅛" THK OR 2" O.D. ⅛" THK AS RECOMMENDED BY MANUFACTURER.) |
| 1 | POLE CAP |

NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   A. DESIGN LIFE: 25 YEARS
   B. BASIC WIND SPEED: 110 MPH
   C. FATIGUE DESIGN SHALL BE WAIVED
2. ALL TOLERANCES FOR CASTINGS SHALL BE ±1/32".
3. HOLE SHALL BE OF SUFFICIENT DIAMETER TO ACCEPT 1" DIAMETER BOLT.
4. MATERIAL – ALUMINUM CASTINGS
   ALUMINUM ALLOY 356-T6 (ASTM ALLOY DESIGNATION SG 70A)
   SAND CASTING : ASTM B26
   PERMANENT MOLD CASTING ASTM B108

TD20.11.02

Sheet of

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CHIEF

| No. | Date | Revision | Approved |
|---|---|---|---|

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# TYPE "T" AND "K" POLES ELEVATION, SHOE BASE, CABLE OUTLET, AND CAP

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.
All recipients of Contract documents, including bidders and those who do not bid and their prospective subcontractors and suppliers who may receive all or a part of the Contract documents or copies thereof, shall make every effort to ensure the secure and appropriate disposal of the Contract documents to prevent further disclosure of the information contained in the documents. Secure and appropriate disposal includes methods of document destruction such as shredding or arrangements with refuse handlers that ensure that third persons will not have access to the documents' contents either before, during, or after disposal. Documents may also be returned for disposal purposes to the Contract Desk on the 3rd Floor, 3 Gateway Center, Newark NJ 07102 or the office of the Director of Procurement, One Madison Avenue, 7th Floor, New York NY 10010.
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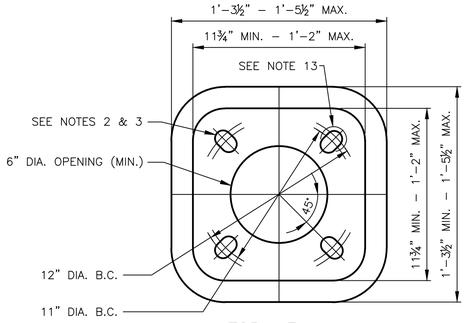
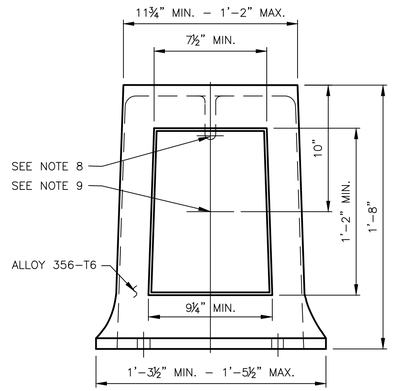
| Designed by | Drawn by | Checked by |
|---|---|---|
| Date | | **JULY 2014** |
| Contract Number | | |
| Drawing Number | | **TD20.11** |

PID#

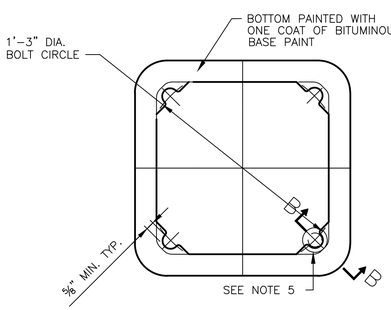
## TYPE 'T'
## ALUMINUM TRANSFORMER BASE
N.T.S.




TOP VIEW



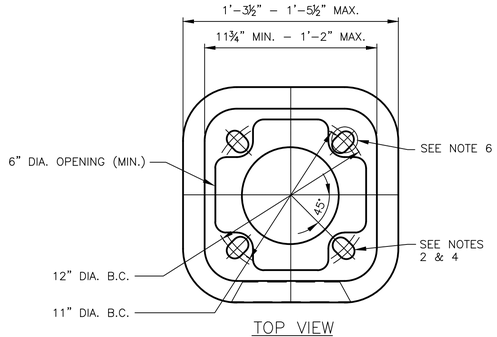

ELEVATION



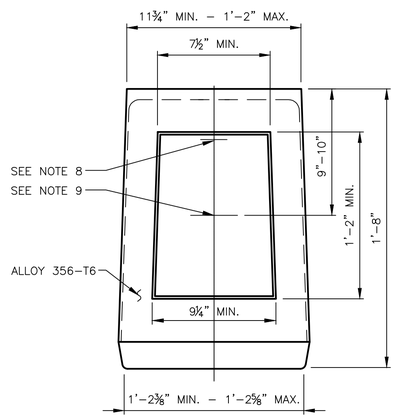

BOTTOM VIEW OF BASE

TD20.12.01

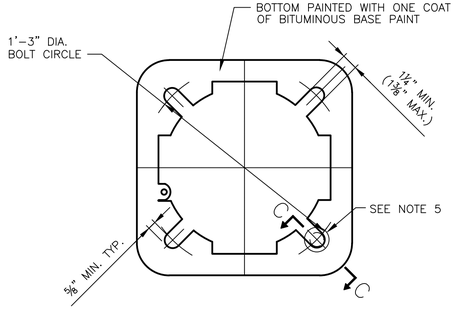
## TYPE 'T' ALTERNATE
## ALUMINUM TRANSFORMER BASE
N.T.S.




TOP VIEW

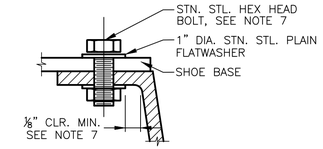



ELEVATION

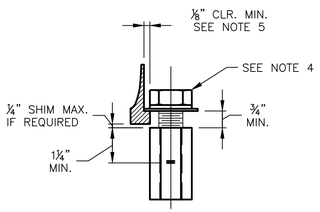



BOTTOM VIEW OF BASE

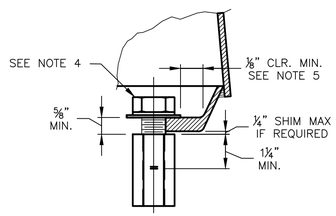
TD20.12.02



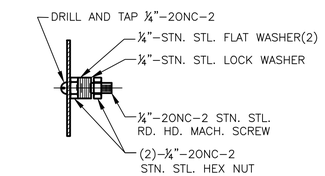

BOLTING DETAIL



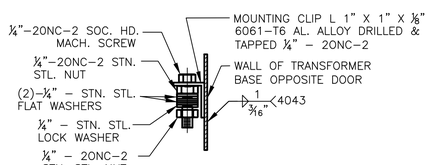

SECTION B–B




SECTION C–C




DETAIL A
(GROUND STUD DETAIL OPPOSITE DOOR OPENING)




DETAIL B
(ALT. GROUND STUD DETAIL OPPOSITE DOOR OPENING)

## NOTES:

1. THE "T" POLE TRANSFORMER BASE SHALL MEET THE STRENGTH REQUIREMENTS NECESSARY TO SUPPORT AND TRANSFER ALL LOADS FROM THE "T" POLE SHOE BASE TO THE SFT FOUNDATION.
2. THE SLOT SHALL BE OF SUFFICIENT SIZE TO ACCEPT 1" DIA. BOLTS.
3. THE MAXIMUM LENGTH OF THE SLOT SHALL BE SUCH WHEN A 11¼" SQUARE SHOE BASE IS MOUNTED ON THAT TOP OF THE TRANSFORMER BASE, THE SLOTS SHALL BE COMPLETELY COVERED BY SHOE BASE.
4. THE MAXIMUM ALLOWABLE TRANSFORMER BASE THICKNESS SHALL BE DETERMINED BY GUARANTEEING A 3" ANCHOR BOLT WITH LOCK WASHER, FLAT WASHER AND ¼" SHIM INSTALLED CAN ACHIEVE A MINIMUM INSERTION OF 1¼" INTO THE COUPLING NUT. SEE SECTION C–C.
5. THE BASE SHALL BE DESIGNED SUCH THAT THERE IS ⅛" MINIMUM CLEARANCE FROM THE 2½" FLAT WASHER A TO THE INNER SIDES.
6. THE BASE SHALL BE DESIGNED SUCH THAT THERE IS ¼" MINIMUM CLEARANCE FROM THE 1" FLAT WASHER A TO THE OUTER SIDES OF THE BASE.
7. THE MANUFACTURER SHALL PROVIDE INSTRUCTIONS AS WELL AS ALL HARDWARE THEY DEEM NECESSARY FOR INSTALLATION OF "T" POLE TRANSFORMER BASE.
8. PROVIDE ALUMINUM DOOR AND ATTACH DOOR TO BASE. LOCKING DEVICE SHOULD USE A ¼" OR ⅜" STN. STL. GRADE B8 SOCKET HD. CAP SCREW WITH AN APPROVED VANDAL RESISTANT LOCKING DEVICE.
9. INSTALL GROUND STUD ON THE WALL OPPOSITE DOOR (SEE DETAIL A OR ALTERNATE DETAIL B).
10. THE BOTTOM OF THE TRANSFORMER BASE STRUCTURE THAT IS IN CONTACT WITH THE FOUNDATION SHALL BE PAINTED WITH ONE COAT OF BITUMINOUS BASE PAINT.
11. ALL HEX. HD. BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL, ASTM A193, GRADE B8.
12. EITHER TRANSFORMER BASE STYLE MAY BE USED AS LONG AS IT IS CONSISTENT THROUGHOUT THE PROJECT
13. SUPPLIER SHALL FURNISH DETAIL DRAWINGS OF TRANSFORMER BASE FOR APPROVAL.
14. CERTIFIED MILL TEST REPORTS SHALL BE FURNISHED THAT ALLOYS AND TEMPER SHOWN MEET REQUIREMENTS AS INDICATED ON DRAWING.

Sheet of

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|---|---|---|---|

*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

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Title

**TRAFFIC SIGNALS**

# ALUMINUM "T" POLE TRANSFORMER BASE

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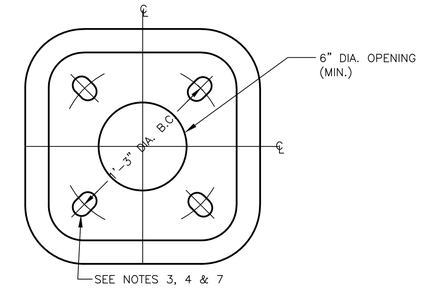
Designed by Drawn by Checked by

Date **JULY 2014**

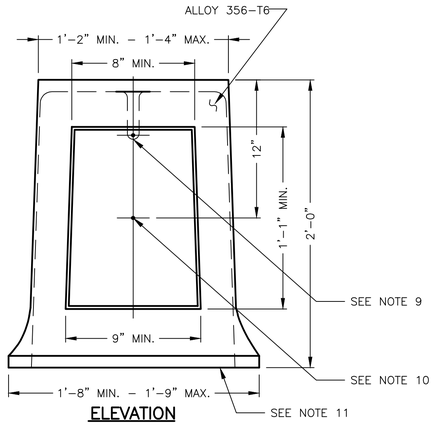
Contract Number

Drawing Number **TD20.12**

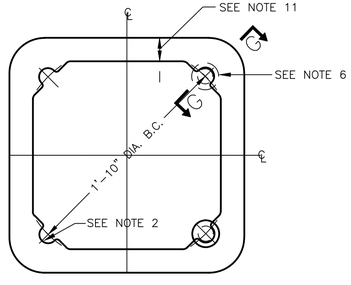
PID#



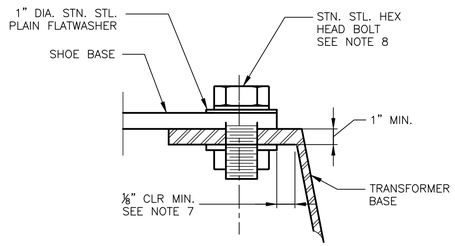

TOP VIEW



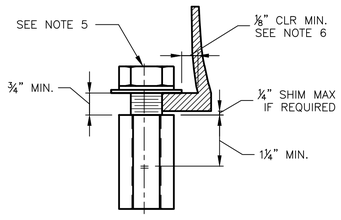

ELEVATION



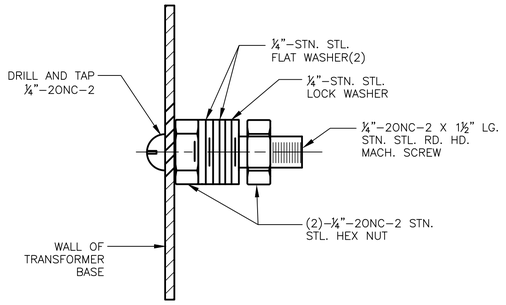

BOTTOM VIEW




BOLTING DETAIL

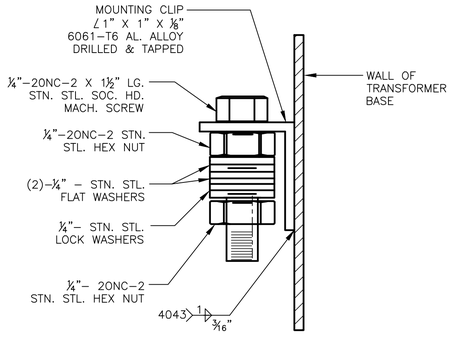



SECTION G-G




DETAIL E

(GROUND STUD DETAIL OPPOSITE DOOR OPENING) N.T.S.




DETAIL F

(ALT. GROUND STUD DETAIL OPPOSITE DOOR OPENING) N.T.S.

NOTES:

1. THE "K" POLE TRANSFORMER BASE SHALL MEET THE STRENGTH REQUIREMENTS NECESSARY TO SUPPORT AND TRANSFER ALL LOADS FROM "K" POLE SHOE BASE TO THE SFK FOUNDATION.
2. SLOT SHALL BE OF SUFFICIENT SIZE TO ACCEPT 1" DIA. BOLTS ON A 1'-10" DIA. BOLT CIRCLE.
3. SLOT SHALL BE OF SUFFICIENT SIZE TO ACCEPT 1" DIA. BOLTS ON A 1'-3" DIA. BOLT CIRCLE.
4. THE MAXIMUM LENGTH OF SLOT SHALL BE SUCH THAT WHEN A 1'-1½" SQUARE SHOE BASE IS MOUNTED ON TOP OF THE TRANSFORMER BASE, THE SLOTS SHALL BE COMPLETELY COVERED BY SHOE BASE.
5. THE MAXIMUM ALLOWABLE TRANSFORMER BASE THICKNESS SHALL BE DETERMINED BY GUARANTEEING A 3" ANCHOR BOLT, WITH LOCK WASHER, FLAT WASHER AND ¼" SHIM INSTALLED CAN ACHIEVE A MINIMUM INSERTION OF 1¼" INTO THE COUPLING NUT. SEE SECTION G-G.
6. THE BASE SHALL BE DESIGNED SUCH THAT THERE IS A ⅛" MINIMUM CLEARANCE FROM THE 2½" FLAT WASHER TO THE INNER SIDES.
7. THE BASE SHALL BE DESIGNED SUCH THAT A 2" OR 2½" FLATWASHER AS SUPPLIED BY THE MANUFACTURER SHALL HAVE A CLEARANCE TO THE INNER SIDES.
8. THE MANUFACTURER SHALL PROVIDE INSTRUCTIONS AS WELL AS ALL HARDWARE THEY DEEM NECESSARY FOR INSTALLATION OF "K" POLE TRANSFORMER BASE.
9. PROVIDE ALUMINUM DOOR AND ATTACH DOOR TO THE BASE WITH AN APPROVED, VANDAL RESISTANT LOCKING DEVICE, LOCKING DEVICE SHOULD USE A ¼" OR ⅜" STN. STL. GRADE B8 SOCKET HD. CAP SCREW.
10. INSTALL GROUND STUD ON WALL OPPOSITE DOOR. (SEE DETAIL E OR ALTERNATE DETAIL F)
11. THE BOTTOM OF THE TRANSFORMER BASE STRUCTURE THAT IS IN CONTACT WITH THE FOUNDATION SHALL BE PAINTED WITH ONE COAT OF BITUMINOUS BASE PAINT.
11. ALL HEX HD. BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL, ASTM A193, GRADE B8.
13. SUPPLIER SHALL FURNISH DETAIL DRAWINGS OF TRANSFORMER BASE FOR APPROVAL.
14. THE MANUFACTURER SHALL FURNISH CERTIFIED MILL TEST REPORTS THAT SHOW ALL ALLOYS AND TEMPER ARE IN ACCORDANCE WITH WHAT IS SHOWN ON THE DRAWINGS.

# TYPE "K" ALUMINUM TRANSFORMER BASE

N.T.S.

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| No. | Date | Revision | Approved |
|---|---|---|---|

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

## ALUMINUM "K" POLE TRANSFORMER BASE

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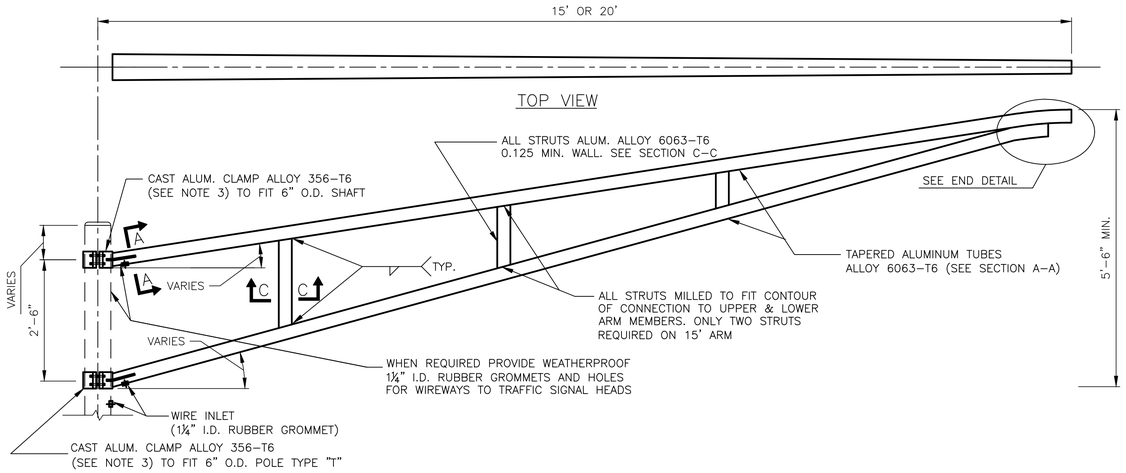
Designed by Drawn by Checked by

Date **JULY 2014**

Contract Number

Drawing Number **TD20.13**

PID#




# TRUSS TYPE MAST ARM FOR TYPE "T" POLES

N.T.S.

NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   1. DESIGN LIFE: 25 YEARS
   2. BASIC WIND SPEED: 110 MPH
   3. FATIGUE DESIGN SHALL BE WAIVED

2. SIGNAL ARM, CONNECTIONS, ETC. SHALL BE DESIGNED TO SUPPORT ALL LOAD COMBINATIONS SHOWN IN THE CONTRACT PLANS. AS A MINIMUM, THE DESIGN LOAD SHALL BE:
   15' ARM:
   1-4 WAY, 3 SECTION SIGNAL HEAD (FREE SWINGING) LOCATED 14'-6" FROM THE ℄ OF POLE.
   1-1 WAY, 3 SECTION SIGNAL HEAD (FIXED MOUNT) LOCATED 4'-6" FROM THE ℄ OF POLE.
   20' ARM:
   1-4 WAY, 3 SECTION SIGNAL HEAD (FREE SWINGING) LOCATED 19'-6" FROM THE ℄ OF POLE.
   1-1 WAY, 3 SECTION SIGNAL HEAD (FIXED MOUNT) LOCATED 7'-6" FROM THE ℄ OF POLE.

   DESIGN LOAD DOES NOT INCLUDE EFFECTS OF BACKPLATES ON SIGNAL HEADS. IF BACKPLATES ARE NEEDED THEY CONSTITUTE ADDITIONAL LOADING AND SHALL BE INCLUDED IN THE DESIGN OF THE STRUCTURE.

   THE ALUMINUM SIGNAL STRUCTURE SIZES AND DETAILS PROVIDED IN THE DRAWINGS ARE FOR REFERENCE ONLY. THE MANUFACTURER SHALL DESIGN AND ANALYZE THE ALUMINUM SIGNAL STRUCTURE WITH THE PROPOSED ATTACHMENTS AND CONFIGURATIONS AS PER AASHTO STANDARD AND SHALL VERIFY, CONFIRM AND/OR REVISE (IF REQUIRED) STRUCTURAL ELEMENT SIZES AND CONNECTIONS AT NO ADDITIONAL COST TO THE AUTHORITY.

3. DO NOT USE THIS STANDARD DETAIL FOR 12" SIGNAL FACE(S) OF 4 SECTIONS OR MORE SUSPENDED AT THE END OF THE MAST ARM FOR TYPE "T" POLES DUE TO VERTICAL CLEARANCE REQUIREMENTS.

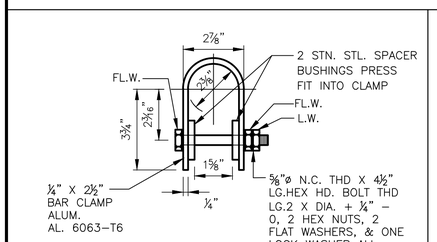
4. MAST ARMS WILL BE INSTALLED ON THE PORT AUTHORITY STANDARD ALUMINUM TRAFFIC SIGNAL POLE CONFORMING TO DETAIL TD20.11.01 WITH TRANSFORMER BASE DETAIL TD20.12.01 OR TD20.12.02.

5. AN EXTRUDED CLAMP MAY BE SUPPLIED AS AN ALTERNATE TO THE CAST BAND INDICATED. GENERAL CONFIGURATION MUST BE SIMILAR AND STIFFENERS MUST BE INSTALLED AS INDICATED. CLAMP MUST FIT A 6" POLE AND BOLT ARRANGEMENT MUST BE IDENTICAL STRENGTH OF ASSEMBLED ARM MUST EQUAL OR EXCEED CAST CLAMP CONSTRUCTION EXTRUSION ALLOY 6061-T6.

6. ALL STAINLESS STEEL ITEMS SHALL CONFORM TO ASTM A193 GRADE B8.

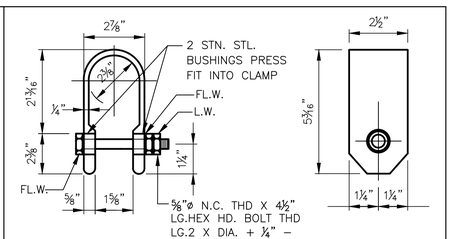
7. CASTINGS SHALL BE FABRICATED TO THE DIMENSIONS SHOWN ±½".

8. THE TOP AND BOTTOM CHORDS FOR THE 15' AND 20' MAST ARMS SHALL BE FABRICATED FROM A TAPERED TUBE. MINIMUM TAPERED TUBE DIMENSIONS SHALL BE 5" DIA. X 0.125" THICK AT THE LARGER END AND SHALL TAPER SUFFICIENTLY TO ACCOMMODATE ELEMENTS SHOWN IN DETAILS 1, 2, 3 AND 4 ON THIS SHEET.



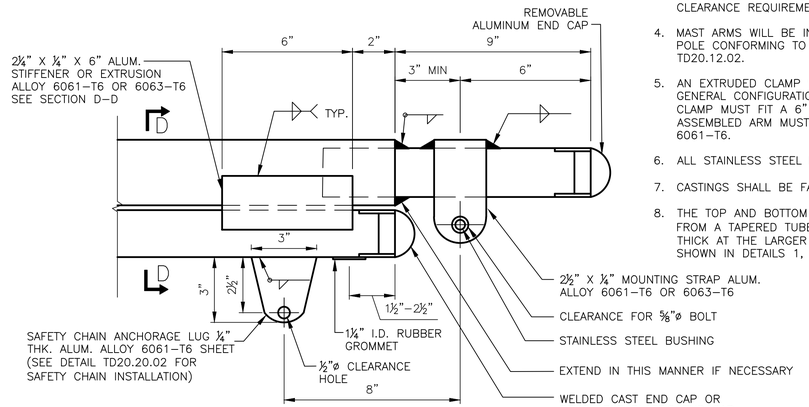

MOUNTING STRAP DETAIL

TD20.14.02



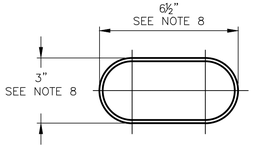

ALTERNATE MOUNTING STRAP

TD20.14.03

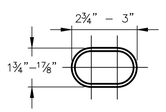



END DETAIL

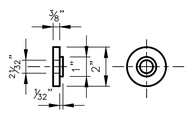
TD20.14.01



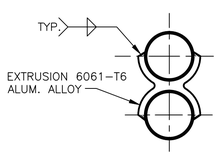

SECTION A-A
(TYPICAL BOTH MEMBERS)



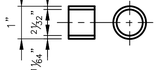

SECTION C-C
(TYPICAL ALL STRUTS)




STN. STL. SPACER BUSHING

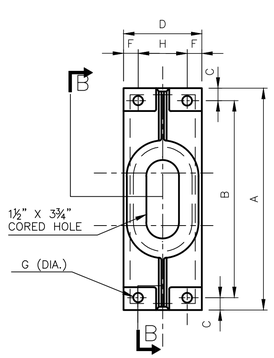



SECTION D-D

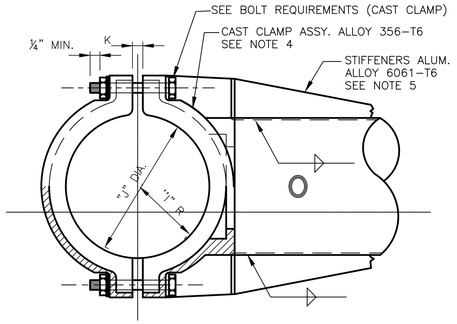



STN. STL. BUSHING FOR
ALTERNATE MOUNTING STRAP

TD20.14.04




CAST CLAMP

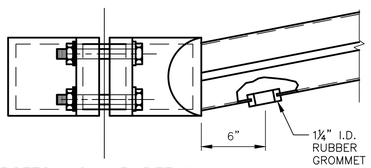



SECTION B-B

BOLT REQUIREMENTS

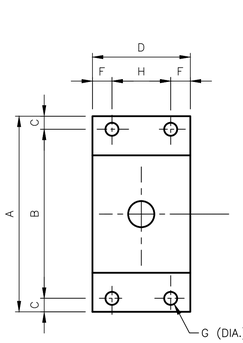
8 - ⅝" ø STN. STL. HEX HD. BOLTS
ASTM 193, GRADE B8
16 -⅝" ø STN. STL. FLATWASHERS
8 -⅝" ø STN. STL. LOCK WASHERS
8 -⅝" ø STN. STL. HEX NUTS

NOTE:

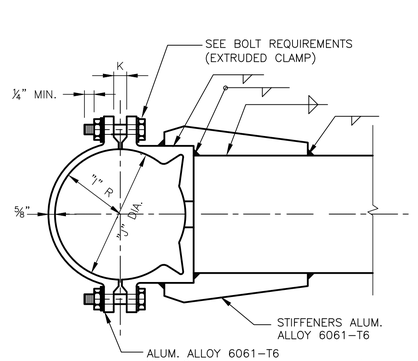



BOTTOM CLAMP DETAIL
ALUM. ALLOY 356-T6 MIN. DRAFT
WHERE REQUIRED

TD20.14.05



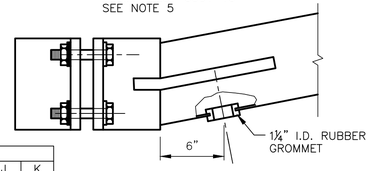

ALTERNATE EXTRUDED CLAMP




BOLT REQUIREMENTS

8-⅝" ø STN. STL. HEX HD. BOLTS
ASTM 193, GRADE B8
16-⅝" ø STN. STL. FLAT WASHERS
8-⅝" ø STN. STL. LOCK WASHERS
8-⅝" ø STN. STL. HEX NUTS

| DIMENSION CHART - CAST & EXTRUDED CLAMP | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LETTER | A | B | C | D | E | F | G | H | I | J | K |
| MIN. | 9¼" | 7⅞" | ⅝" | 4½" | – | ¾" | 1 1⁄16" | 2⅜" | 3" | 6 1⁄16" | ½" |
| MAX. | 10½" | 8 5⁄16" | ⅞" | 5" | – | 1 7⁄16" | 1 1⁄16" | 3" | 3 1⁄32" | 6 1⁄16" | ½" |




TD20.14.06

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*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**"T" POLE TRUSS TYPE MAST ARM, CLAMP AND END**

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All recipients of Contract documents, including bidders and those who do not bid and their prospective subcontractors and suppliers who may receive all or a part of the Contract documents or copies thereof, shall make every effort to ensure the secure and appropriate disposal of the Contract documents to prevent further disclosure of the information contained in the documents. Secure and appropriate disposal includes methods of document destruction such as shredding or arrangements with refuse handlers that ensure that third persons will not have access to the documents' contents either before, during, or after disposal. Documents may also be returned for disposal purposes to the Contract Desk on the 3rd Floor, 3 Gateway Center, Newark NJ 07102 or the office of the Director of Procurement, One Madison Avenue, 7th Floor, New York NY 10010.
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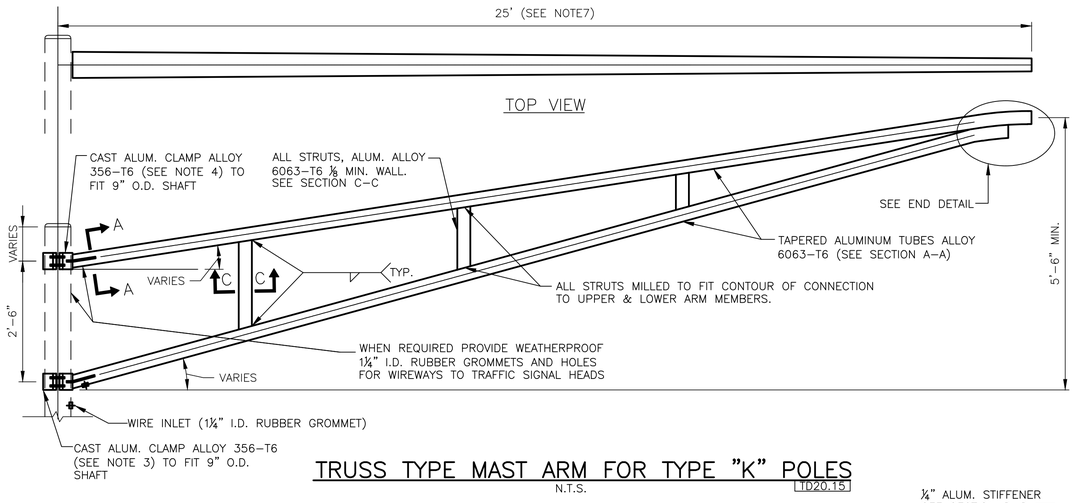
| Designed by | Drawn by | Checked by |
|---|---|---|
| | | |

Date **JULY 2014**

Contract Number

Drawing Number **TD20.14**

PID#




# TRUSS TYPE MAST ARM FOR TYPE "K" POLES

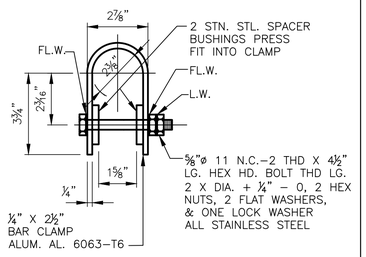
N.T.S. TD20.15

NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   1. DESIGN LIFE: 25 YEARS
   2. BASIC WIND SPEED: 110 MPH
   3. FATIGUE DESIGN SHALL BE WAIVED.
2. SIGNAL ARM, CONNECTIONS, ETC. SHALL BE DESIGNED TO SUPPORT ALL LOAD COMBINATIONS SHOWN IN THE CONTRACT PLANS. AS A MINIMUM, THE DESIGN LOAD SHALL BE:
   25' ARM:
   1-4 WAY, 3 SECTION SIGNAL HEAD (FREE SWINGING) LOCATED 24'-6" FROM THE ℄ OF POLE.
   1-18" X 48" SIGN (FREE SWINGING) WITH CENTER LOCATED 18'-9" FROM THE ℄ OF POLE.
   1-1 WAY, 3 SECTION SIGNAL HEAD (FIXED MOUNT) LOCATED 12'-6" FROM THE ℄ OF POLE.

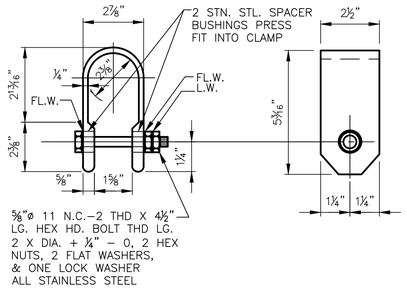
   DESIGN LOAD DOES NOT INCLUDE EFFECTS OF BACKPLATES ON SIGNAL HEADS. IF BACKPLATES ARE NEEDED THEY CONSTITUTE ADDITIONAL LOADING AND SHALL BE INCLUDED IN THE DESIGN OF THE STRUCTURE.

   THE ALUMINUM SIGNAL STRUCTURE SIZES AND DETAILS PROVIDED IN THE DRAWINGS ARE FOR REFERENCE ONLY. THE MANUFACTURER SHALL DESIGN AND ANALYZE THE ALUMINUM SIGNAL STRUCTURE WITH THE PROPOSED ATTACHMENTS AND CONFIGURATIONS AS PER AASHTO STANDARD AND SHALL VERIFY, CONFIRM AND/OR REVISE (IF REQUIRED) STRUCTURAL ELEMENT SIZES AND CONNECTIONS AT NO ADDITIONAL COST TO THE AUTHORITY.
3. MAST ARMS WILL BE INSTALLED ON THE PORT AUTHORITY STANDARD ALUMINUM TRAFFIC SIGNAL POLE TYPE "K" WITH TRANSFORMER BASE CONFORMING TO DETAIL TD20.13.
4. AN EXTRUDED CLAMP MAY BE SUPPLIED AS AN ALTERNATE TO THE CAST BAND INDICATED. GENERAL CONFIGURATION MUST BE SIMILAR AND STIFFENERS MUST BE INSTALLED AS INDICATED. CLAMP MUST FIT A 9" POLE AND BOLT ARRANGEMENT MUST BE IDENTICAL STRENGTH OF ASSEMBLED ARM MUST EQUAL OR EXCEED CAST CLAMP CONSTRUCTION EXTRUSION ALLOY 6061-T6.
5. ALL STAINLESS STEEL ITEMS SHALL CONFORM TO ASTM A193 GRADE B8.
6. CASTINGS SHALL BE FABRICATED TO THE DIMENSIONS SHOWN ±1/32".
7. THE TOP AND BOTTOM CHORD FOR THE 25' ARM SHALL BE FABRICATED FROM A TAPERED TUBE. MINIMUM TAPERED TUBE DIMENSIONS SHALL BE 6" DIA. X 0.188" THICK AT THE LARGER END AND SHALL TAPER SUFFICIENTLY TO ACCOMMODATE ELEMENTS SHOWN IN DETAILS 1, 2, 3 AND 4 ON THIS SHEET.



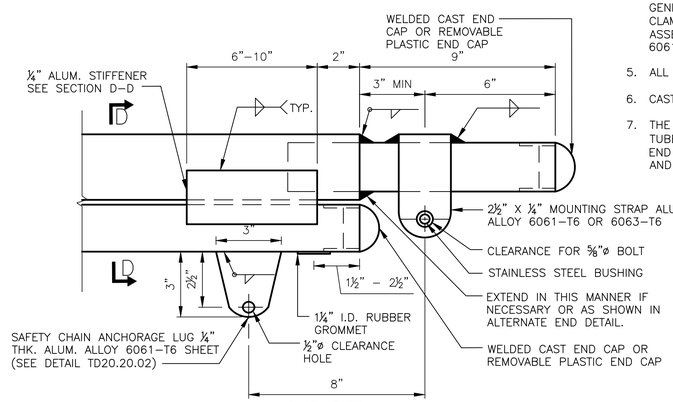

## MOUNTING STRAP DETAIL

TD20.15.02

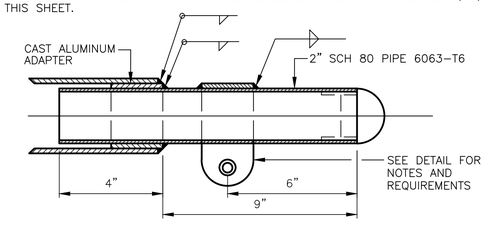



## ALTERNATE MOUNTING STRAP

TD20.15.03

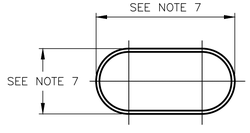



## END DETAIL



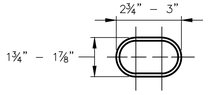

## ALTERNATE END DETAIL

TD20.15.01



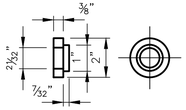

## SECTION A-A

(TYPICAL BOTH MEMBERS)

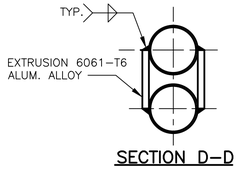



## SECTION C-C

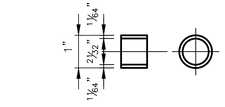
(TYPICAL ALL STRUTS)




## STN. STL. SPACER BUSHING

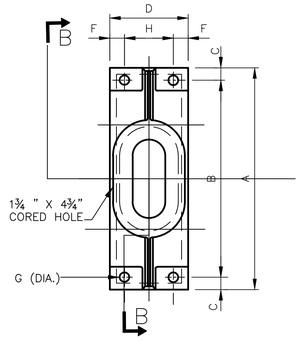



## SECTION D-D

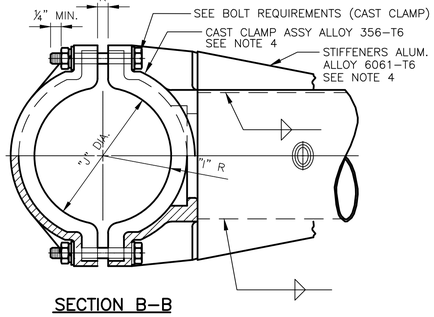



## STN. STL. BUSHING FOR ALTERNATE MOUNTING STRAP

TD20.15.04



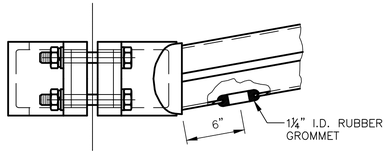

## CAST CLAMP




## SECTION B-B

## BOLT REQUIREMENTS

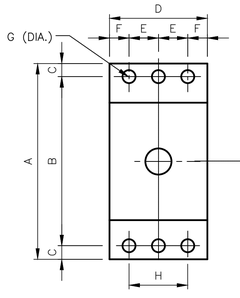
8 - ¾" ø STN. STL. HEX HD. BOLTS
16 - ¾" ø STN. STL. FLAT WASHERS
8 - ¾" ø STN. STL. LOCK WASHERS
8 - ¾" ø STN. STL. HEX NUTS



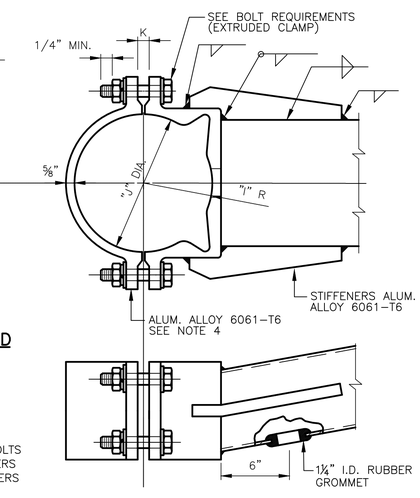

## BOTTOM CLAMP DETAIL

ALUM. ALLOY 356-T6 MIN. DRAFT WHERE REQUIRED

TD20.15.05




## ALTERNATE EXTRUDED CLAMP




## BOLT REQUIREMENTS

12 - ⅝" ø STN. STL. HEX HD. BOLTS
24 - ⅝" ø STN. STL. FLAT WASHERS
12 - ⅝" ø STN. STL. LOCK WASHERS
12 - ⅝" ø STN. STL. HEX NUTS

| DIMENSION CHART - CAST & EXTRUDED CLAMP | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LETTER | A | B | C | D | E | F | G | H | I | J | K |
| MIN. | 12⅞" | 10⅞" | 15⁄16" | 5" | 1½" | 15⁄16" | 1 1⁄16" | 3" | 4½" | 9" | ½" |
| MAX. | 14⅜" | 12⅜" | 1" | 7" | 1 15⁄16" | 1½" | 25⁄32" | 3⅞" | 4 17⁄32" | 9 1⁄16" | 2¼" |

TD20.15.06

Sheet of

**THE PORT AUTHORITY OF NY & NJ**

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| No. | Date | Revision | Approved |
|---|---|---|---|

*ENGINEERING DEPARTMENT*

**PANYNJ**

**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**"K" POLE TRUSS TYPE MAST ARM, CLAMP AND END**

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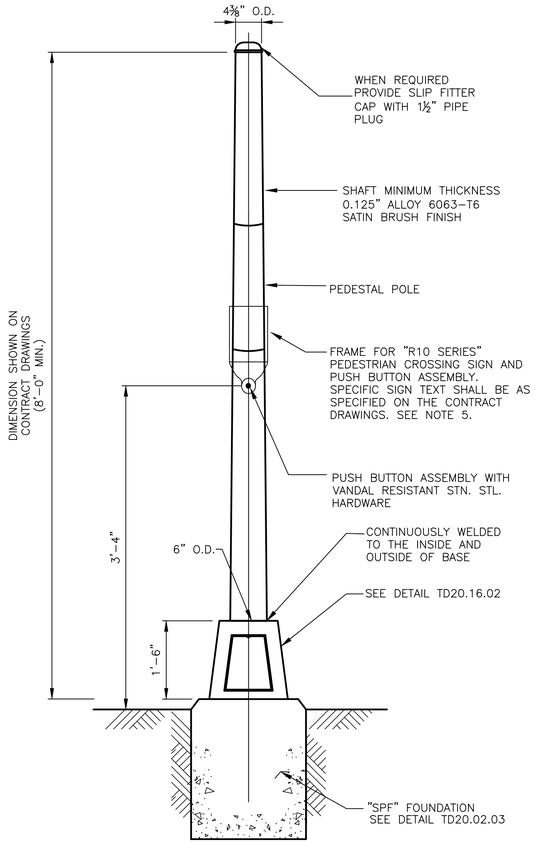
Designed by Drawn by Checked by

Date **JULY 2014**

Contract Number

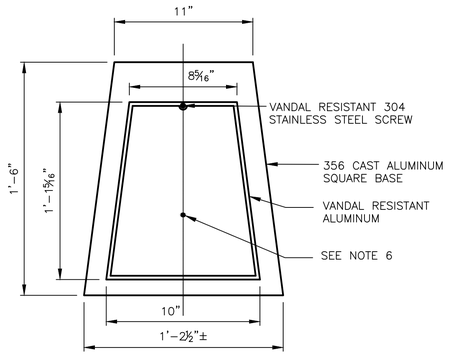
Drawing Number **TD20.15**

PID#

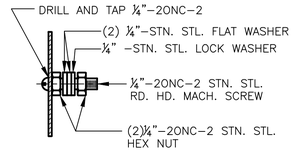



SIGNAL PEDESTAL

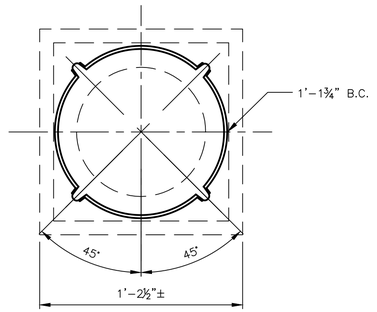
N.T.S.



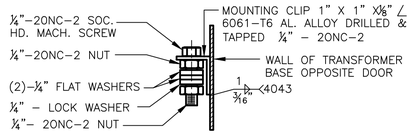

SIDE VIEW




DETAIL A
(GROUND STUD DETAIL OPPOSITE DOOR OPENING)




PLAN VIEW




ALTERNATE DETAIL B
(GROUND STUD DETAIL OPPOSITE DOOR OPENING)

RECTANGULAR TRANSFORMER BASE

N.T.S.

TD20.16.01

TD20.16.02

NOTES:

1. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   1. DESIGN LIFE: 25 YEARS
   2. BASIC WIND SPEED: 110 MPH
   3. FATIGUE DESIGN SHALL BE WAIVED

2. POLE, BASE, CONNECTIONS, ETC. SHALL BE DESIGNED TO SUPPORT ALL LOAD COMBINATIONS SHOWN IN THE CONTRACT PLANS. AS A MINIMUM, THE DESIGN LOAD FOR A SIGNAL PEDESTAL ASSEMBLY SHALL BE:

   1-2 WAY 3 SECTION SIGNAL HEAD - TOP MOUNT
   1-PEDESTRIAN SIGNAL HEAD MOUNTED AT 8' (MEASURED FROM FINISHED GRADE)

   DESIGN LOAD DOES NOT INCLUDE EFFECTS OF BACKPLATES ON SIGNAL HEADS. IF BACKPLATES ARE NEEDED THEY CONSTITUTE ADDITIONAL LOADING AND SHALL BE INCLUDED IN THE DESIGN OF THE STRUCTURE.

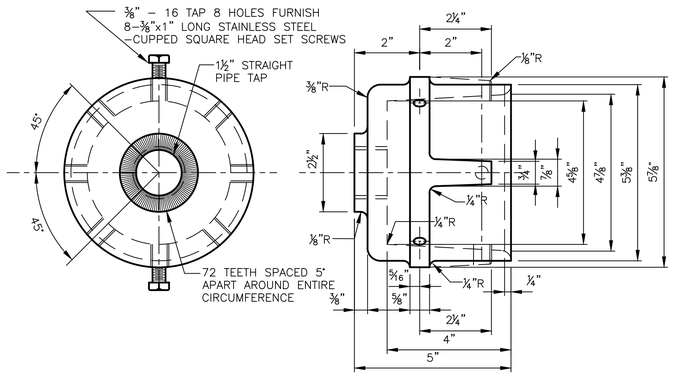
   THE ALUMINUM SIGNAL STRUCTURE SIZES AND DETAILS PROVIDED IN THE DRAWINGS ARE FOR REFERENCE ONLY. THE MANUFACTURER SHALL DESIGN AND ANALYZE THE ALUMINUM SIGNAL STRUCTURE WITH THE PROPOSED ATTACHMENTS AND CONFIGURATIONS AS PER AASHTO STANDARD AND SHALL VERIFY, CONFIRM AND/OR REVISE (IF REQUIRED) STRUCTURAL ELEMENT SIZES AND CONNECTIONS AT NO ADDITIONAL COST TO THE AUTHORITY.

3. ALL TOLERANCES OF CASTINGS SHALL BE ± 1/32".

4. FOR ALTERNATIVE VEHICULAR AND PEDESTRIAN SIGNAL MOUNTING DETAILS, SEE DETAIL TD20.18.

5. SIGN SHALL BE ALUMINUM MOUNTED IN A VANDAL RESISTANT FRAME MOUNTED ON THE PEDESTAL POLE.

6. INSTALL GROUND STUD WALL OPPOSITE ACCESS DOOR.




SLIP FITTER CAP DETAIL

N.T.S.

ALUMINUM ALLOY 356

TD20.16.03

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| No. | Date | Revision | Approved |
|---|---|---|---|
| 1 | 09/03/2014 | DIMENSION CHANGE | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# TRAFFIC SIGNAL PEDESTAL ASSEMBLY

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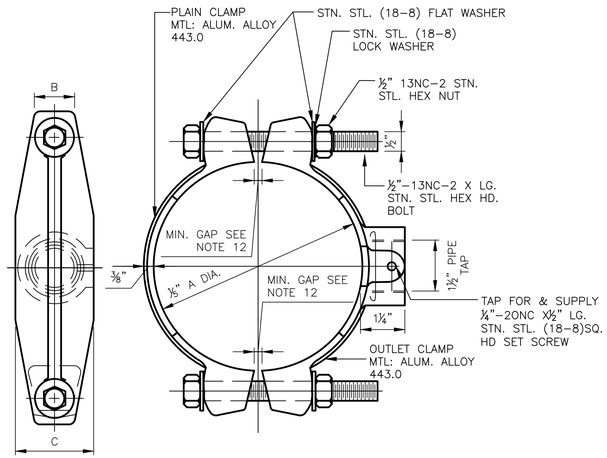
Designed by Drawn by Checked by

Date **JULY 2014**

Contract Number

Drawing Number **TD20.16**

PID#




## CLAMP TYPE POLE CLAMP ASSEMBLY

N.T.S. TD20.17.01

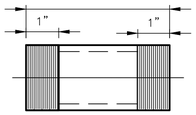
NOTE:

TIGHTEN HARDWARE AS PER TORQUE RATING AS RECOMMENDED BY THE MANUFACTURER.

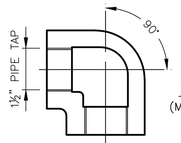
| CLAMP LIST OF MATERIALS | | |
|---|---|---|
| DESCRIPTION | MATERIAL | NO.REQ'D |
| PLAIN CLAMP | ALUM. ALLOY 443.0 | 2 |
| OUTLET CLAMP | ALUM. ALLOY 443.0 | 2 |
| BOLT, HEX HD. ½" -13NC-2 X LG. | STN. STL. | 4 |
| LOCK WASHER ½" | STN. STL. | 4 |
| FLAT WASHER ½" | STN. STL. | 8 |
| HEX NUT ½" - 13NC-2 | STN. STL. | 4 |
| SET SCREW, SO. HD. ¼ -20 X ½" LG. | STN. STL. | 2 |
| 1½" CHASE NIPPLE | BRZ. 85-5-5-5 | 2 |
| 90° SERRATED ELBOW | ALUM. ALLOY 443.0 | 2 |
| STD. 1½" NIPPLE X LG. | ALUM. 6061-T6 | 2 |

| CLAMP DIMENSIONS | | | |
|---|---|---|---|
| A | B | C | BOLT LENGTH |
| 6"-8" | 1¼" | 2½" | 6" |
| 8"-10" | 1¼" | 2½" | 7½" |
| 10"-12" | 1½" | 2⅞" | 9" |

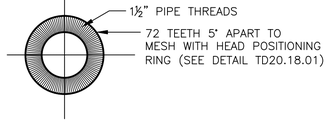
6", 12" OR 1'-4" AS REQ'D
TRAFFIC SIGNAL HEAD INSTALLATION

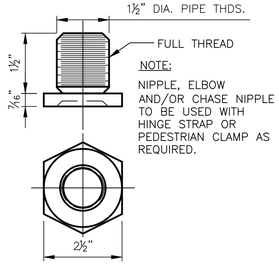



STD. 1½" NIPPLE
(MTL:ALUM. ALLOY 6061-T6
ASTM B-241)




ELBOW
(MTL: ALUM. ALLOY 443.0)




NOTE:
NIPPLE, ELBOW AND/OR CHASE NIPPLE TO BE USED WITH HINGE STRAP OR PEDESTRIAN CLAMP AS REQUIRED.

STANDARD 1½" CHASE NIPPLE
(MTL: BRZ. 85-5-5-5)
N.T.S.

NOTES:

1. CLAMP TYPE POLE ASSEMBLY (CAST ALUMINUM) SHOWN MUST MEET THE FOLLOWING TEST: 6" DIA. CLAMP TEST.

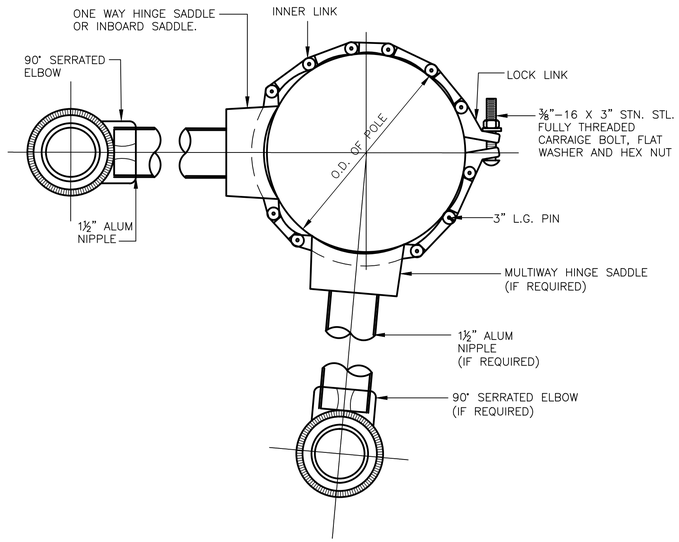
   COMPLETE CLAMP SHALL BE SET ON 6" DIA. POLE.
   COMPLETE CLAMP WITH 6.5" DIA. SET SHALL BE SET ON 8" DIA. POLE.
   COMPLETE CLAMP AFTER BEING SET FROM 8" DIA. POLE SHALL BE RESET ON 6" DIA. POLE.
   CLAMPS SHALL NOT SHOW ANY FRACTURES AFTER THE SETTING AND RESETTING PROCEDURE.
   THIS TEST TO BE CONDUCTED IN THE PRESENCE OF A REPRESENTATIVE OF THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY.
   MANUFACTURER SHALL ALSO SUBMIT DRAWING OF CLAMP TO BE FURNISHED FOR APPROVAL BY THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY-DEPT. OF ELECTRICAL ENGINEERING.
2. CAST ALUM. CLAMPS OF LARGER DIA. WILL BE TESTED IN A SIMILAR MANNER.
3. PROVIDE SLOTS OR SERRATIONS IN FACE OF ELBOW OR SLOTS & SERRATED POSITIONING RING. SLOTS TO BE 5/32" DP X 3/16" W. SERRATIONS TO MATCH HOUSING AND ALLOW 5° ADJUSTMENT.
4. STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   1. DESIGN LIFE: 25 YEARS
   2. BASIC WIND SPEED: 110 MPH
   3. FATIGUE DESIGN SHALL BE WAIVED
5. INSTALL 1¼" I.D. RUBBER GROMMET IN TRAFFIC SIGNAL STANDARD.
6. ALL STN. STL. BOLTS PER ASTM A-193 GRADE B8 OR ASTM F593 ALLOY 304.
7. ALL ALUM. SAND CASTINGS SHALL BE ASTM B26 ALLOY.
8. ALL ALUM. NIPPLES SHALL BE 6061-T6, ASTM B-241 ALLOY; MIL. SPEC. QQA 200/80F.
9. HINGE STRAP IS ADAPTABLE TO ANY POLE DIA. BY ADDING OR REMOVING INNER LINKS.
10. HINGE STRAP CAN BE INSTALLED ON ROUND, SQUARE, OCTAGONAL OR ANY SHAPE POLE DESIRED.
11. ALL TOLERANCES OF CASTINGS SHALL BE ±1/32".
12. WHEN PEDESTRIAN CLAMP IS INSTALLED ON A 6" DIA. POLE, CLAMP SHALL BE DESIGNED TO PROVIDE A MINIMUM GAP OF ¼".

NOTE:
(FOR HINGE STRAP TYPE ONLY)

ALL HINGE STRAPS INNER LINK AND LOCK LINK PARTS SHALL BE TUMBLED FOR 18 HOURS MINIMUM USING ¾" CERAMIC MEDIA TO PROVIDE A UNIFORM AND SMOOTH SURFACE.

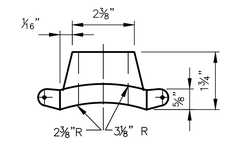
| HINGE STRAP LIST OF MATERIALS | | |
|---|---|---|
| DESCRIPTION | MATERIAL | NO.REQ'D |
| HINGE SADDLE | B26-82 CAST ALUM. | 2 |
| INNER LINK | B26-82 CAST ALUM. | 23*(32) |
| LOCK LINK | B26-82 CAST ALUM. | 4 |
| STD. 1 1/2" NIPPLE | ALUM. ALLOY | 2 |
| 90° SERRATED ELBOW | ALUM. ALLOY 443.0 | 2 |
| 3" ALUMINUM PIN | ALUM. ALLOY 443.0 | 30*(38) |
| BOLT 3/8" - 16 X 3" | STN. STL. | 4 |
| FLAT WASHER | STN. STL. | 4 |
| LOCK WASHER | STN. STL. | 4 |
| NUT, HEX 3/16" - 16 | STN. STL. | 4 |
| MULTI-WAY HINGE SADDLE | CAST ALUM. | AS REQ'D |
| INBOARD SADDLE | CAST ALUM. | AS REQ'D |
| 1 1/2" CHASE NIPPLE | BRZ. 85-5-5-5 | 2 |

*( ) NUMBER REQUIRED WHEN INSTALLED ON "K" POLE
(NUMBER REQUIRED MAY VARY ON STEEL POLES)

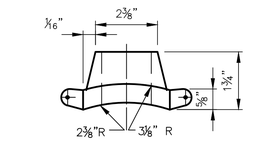



## HINGE STRAP TYPE POLE CLAMP ASSEMBLY

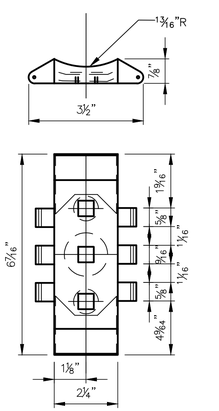
N.T.S. TD20.17.02




ONE-WAY HINGE SADDLE
(MTL: ALUM. CASTING)




MULTI-WAY HINGE SADDLE
(MTL: ALUM. CASTING)

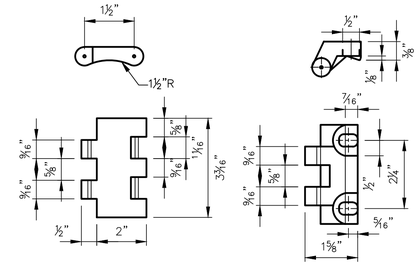



INBOARD SADDLE
(MTL: ALUM. CASTING)

HINGE STRAP LIST OF MATERIALS

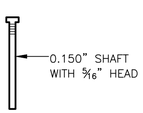
| DESCRIPTION | MATERIAL | NO.REQ'D |
|---|---|---|
| HINGE SADDLE | B26-82 CAST ALUM. | 2 |
| INNER LINK | B26-82 CAST ALUM. | 23*(32) |
| LOCK LINK | B26-82 CAST ALUM. | 4 |
| STD. 1½" NIPPLE | ALUM. ALLOY | 2 |
| 90° SERRATED ELBOW | ALUM. ALLOY 443.0 | 2 |
| 3" ALUMINUM PIN | ALUM. ALLOY 443.0 | 30*(38) |
| BOLT ⅜" - 16 X 3" | STN. STL. | 4 |
| FLAT WASHER | STN. STL. | 4 |
| LOCK WASHER | STN. STL. | 4 |
| NUT, HEX 3/16" - 16 | STN. STL. | 4 |
| MULTI-WAY HINGE SADDLE | CAST ALUM. | AS REQ'D |
| INBOARD SADDLE | CAST ALUM. | AS REQ'D |
| 1½" CHASE NIPPLE | BRZ. 85-5-5-5 | 2 |

ON "K" POLE *( )NUMBER REQUIRED WHEN INSTALLED

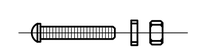



INNER LINK
(MTL: ALUM. CASTING)

LOCK LINK
(MTL: ALUM. CASTING)




3" ALUM. ALLOY PIN
(PROVIDED WITH SADDLES AND LINKS)



⅜" - 16 X 3" STN. STL. FULLY THREADED CARRIAGE BOLT WITH HEX NUT AND FLAT WASHER.

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*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**POLE CLAMP MOUNTING ASSEMBLES**

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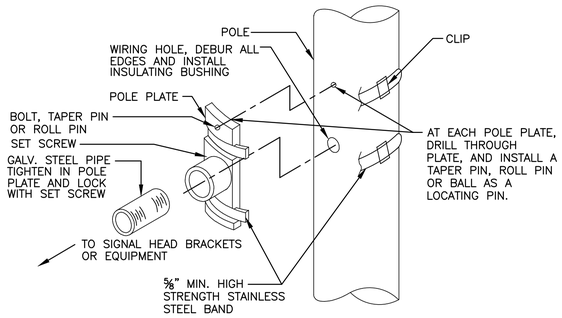
Designed by Drawn by Checked by

Date **JULY 2014**

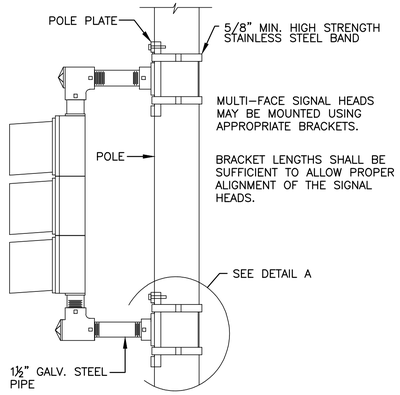
Contract Number

Drawing Number **TD20.17**

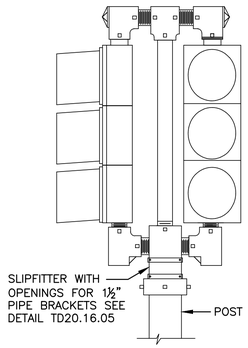
PID#



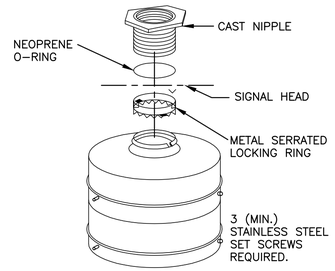

DETAIL A



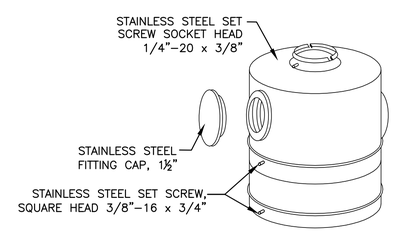

POLE CLAMP ASSEMBLY BAND TYPE
N.T.S. TD20.18.01




POST TOP MOUNT
N.T.S. TD20.18.02



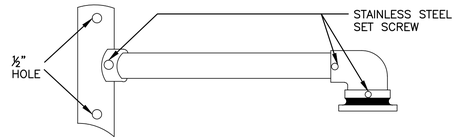

SLIP FITTER FOR ONE WAY SIGNAL
(POLE TOP CAST ALUMINUM SIGNAL HEADS ONLY) TD20.18.03
N.T.S.



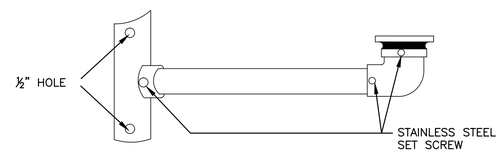

SLIP FITTER FOR TWO WAY SIGNAL
(POLE TOP CAST ALUMINUM SIGNAL HEADS ONLY) TD20.18.04
N.T.S.

NOTES:

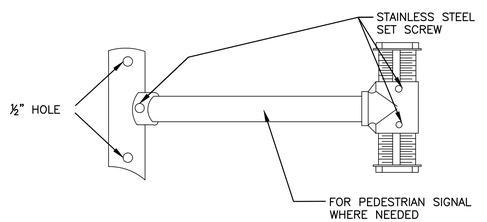
1. IF PEDESTRIAN SIGNALS ARE BEING INSTALLED, THE MOUNTING ATTACHMENTS SHALL BE A TYPE SPECIFICALLY MANUFACTURED FOR THAT PURPOSE.
2. MOUNTING DETAILS SHOWN ARE TYPICAL FOR ONE WAY AND TWO WAY SIGNAL DISPLAY. MULTI-WAY ASSEMBLIES, WHEN REQUIRED, SHALL BE OF SIMILAR APPROPRIATE DESIGN.
3. SEE DETAIL TD20.16 FOR TRAFFIC SIGNAL PEDESTAL STANDARD DETAILS.
4. POLE AND HARDWARE COLOR SHALL MATCH.




IF MOUNTED ON WOOD POLE A CONDUIT BODY SHALL BE INSTALLED IN BRACKET ARM TO CONNECT SIGNAL HEAD CABLE CONDUIT.




STEEL POLE SHALL BE DRILLED AND TAPPED AND MOUNTING ACCOMPLISHED UTILIZING ½" STAINLESS STEEL BOLTS.




POLE BRACKET MOUNTING SIGNAL HEADS AND PEDESTRIAN SIGNAL BRACKETS
N.T.S. TD20.18.05

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**TRAFFIC SIGNALS**

**SIGNAL HEAD POLE TOP AND BRACKET MOUNTING**

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|---|---|---|
| Date | | SEPT 2011 |

Contract Number

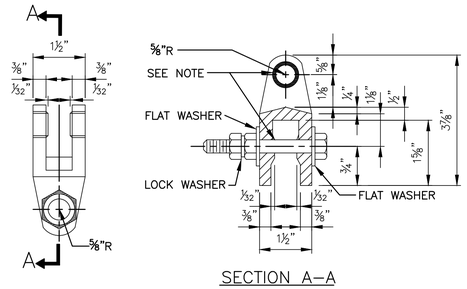
Drawing Number **TD20.18**

PID#

NOTE:

DRILL CASTING FOR C304 STN. STL. ⅛" THK. WALL BUSHINGS. FURNISH AND PRESS FIT INTO CASTING.

FURNISH WITH EACH UNIVERSAL JOINT:
(1) ⅜" 11NC X 3" L.G. STN. STL. HEX BOLT
(2) ⅜" 11NC STN. STL. HEX NUTS
(2) ⅜" STN. STL. FLAT WASHERS
(1) ⅜" STN. STL. LOCK WASHER



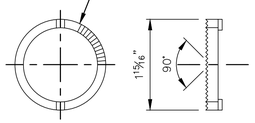

SECTION A–A

## UNIVERSAL JOINT DETAIL

(MATL: BRONZE, 85–5–5–5) TD20.19.01
N.T.S.

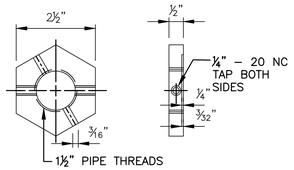
NOTE:

SERRATED POSITIONING RING TO BE PROVIDED WHEN TRAFFIC SIGNAL IS DIRECTLY ATTACHED TO WIRE OUTLET FITTING.




## HEAD POSITIONING RING DETAIL

(MATERIAL: DELRIN) N.T.S. TD20.19.02



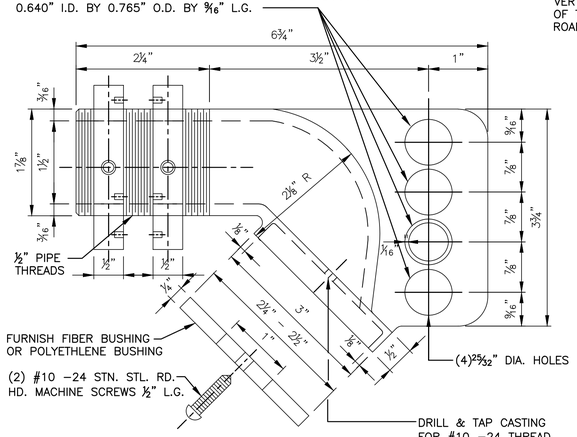

## HEX LOCK NUT

(MATL: BRONZE, 85–5–5–5) TD20.19.03
N.T.S.

DRILL HOLES (4) INSERT (1) STN. STL. BUSHING –1/16" THK. WALL I.D. TO TAKE 5/16"ø STN. STL. BOLT SLIDING FIT. BUSHING SHALL BE INSERTED BY THE FABRICATOR IN HOLE OF CASTING AS SHOWN AND TO BE OF A FIT WHERE AS BUSHING CAN BE READILY CHANGED FROM ONE HOLE TO ANOTHER. BUSHING 0.640" I.D. BY 0.765" O.D. BY 9/16" L.G.

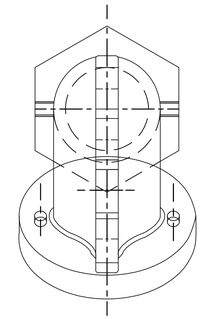
NOTE:

ON INSTALLATION THE CONTRACTOR SHALL PLACE THE BUSHING IN THE APPROPRIATE MOUNTING HOLE AS REQUIRED TO OBTAIN VERTICAL POSITIONING AND MAXIMUM VISIBILITY OF THE SIGNAL ASSEMBLY TO THE APPROACH ROADWAY.

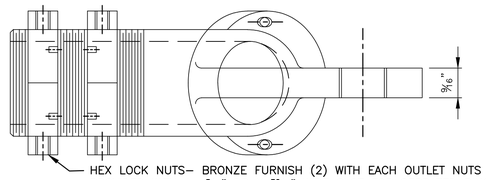



## WIRE OUTLET DETAIL

(MATL: BRONZE, 85–5–5–5) TD20.19.04
N.T.S.



FRONT VIEW




HEX LOCK NUTS– BRONZE FURNISH (2) WITH EACH OUTLET NUTS TO BE PROVIDED WITH A 5/32" DP X 33/14" WIDE SLOT FOR SERRATED RING; DRILL AND TAP ¼"– 20" NC FOR (2) STN. STL. SOC. HD. SET SCR. ONE EACH SIDE

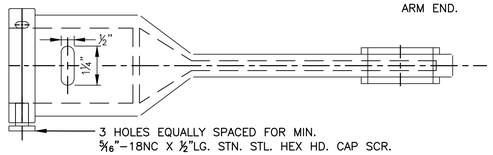
TOP VIEW

NOTES:
(APPLIES TO TD20.19.01, TD20.19.02, TD20.19.03, TD20.19.04, TD20.19.05, TD20.19.06)

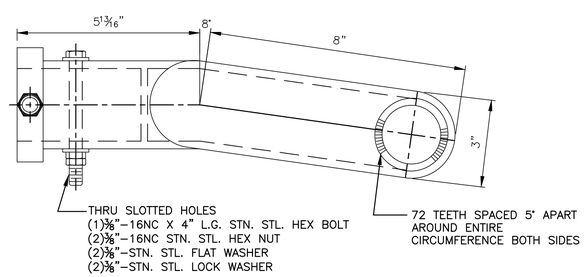
1. ALL TOLERANCES OF CASTINGS SHALL BE ± 1/32"
2. ALL STAINLESS STEEL BOLTS ON THIS SHEET PER ASTM A193, GRADE B8.

NOTE:

AN 8" OFFSET REQUIRED WHEN BACKING PLATE IS USED. PLUMBIZER TO FIT A 2"DIA. MAST ARM END.

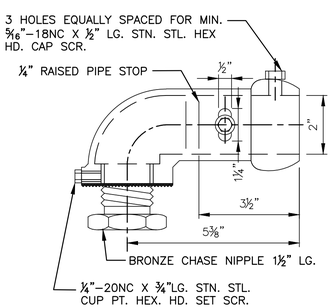



TOP VIEW



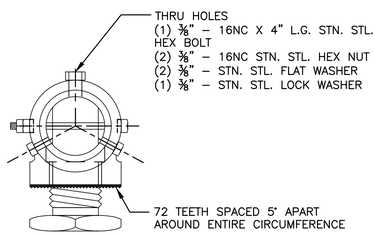

## ELEVATOR PLUMBIZER DETAIL

(MATL – ALUMINUM ALLOY 356) TD20.19.05
N.T.S.

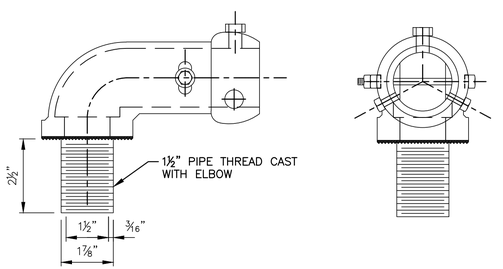



## MAST ARM SLIP FITTER DETAIL

(MATL: BRONZE, 85–5–5–5)




NOTES:
1. THE SLIP FITTER SHALL BE UTILIZED IN MOUNTING OPTICALLY PROGRAMMED TRAFFIC SIGNALS
2. WHEN USED FOR MOUNTING SIGNALS BACK TO BACK DRILL THRU NIPPLE AND USE A 1" L.G. CAP SCREW.
3. SLIP FITTER TO FIT A 2"DIA. MAST ARM END




## ALTERNATE MAST ARM SLIP FITTER

(SAME AS LEFT EXCEPT WHERE NOTED)

## MAST ARM SLIP FITTERS

N.T.S. TD20.19.06

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*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# UNIVERSAL JOINT, WIRE OUTLET, ELEVATOR PLUMBIZER, AND MAST ARM SLIP FITTER

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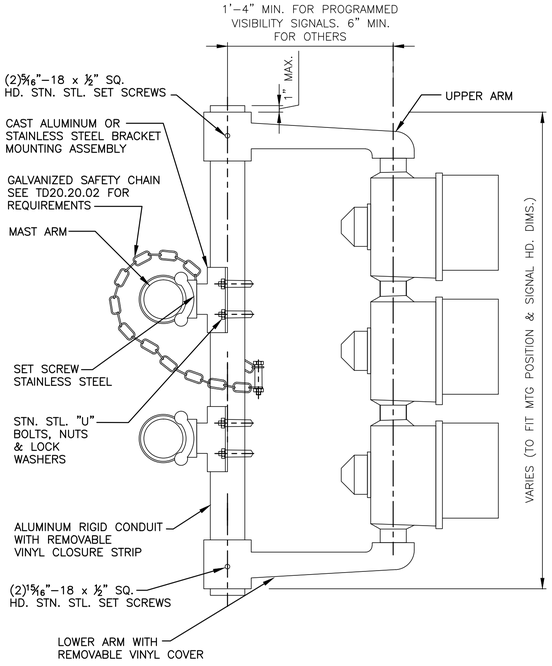
| Date | | SEPT 2011 |

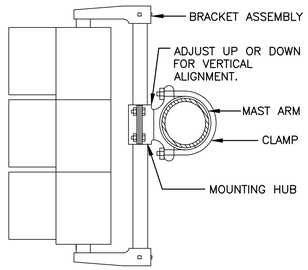
Contract Number

Drawing Number **TD20.19**

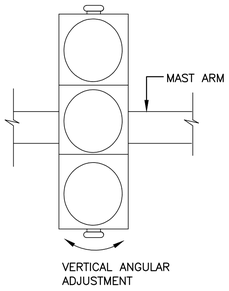
PID#



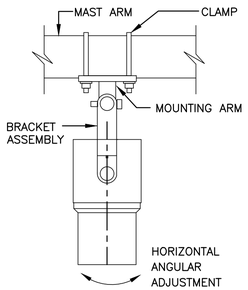

MID-MAST ARM MOUNTING DETAIL
N.T.S. TD20.20.01




SIDE VIEW



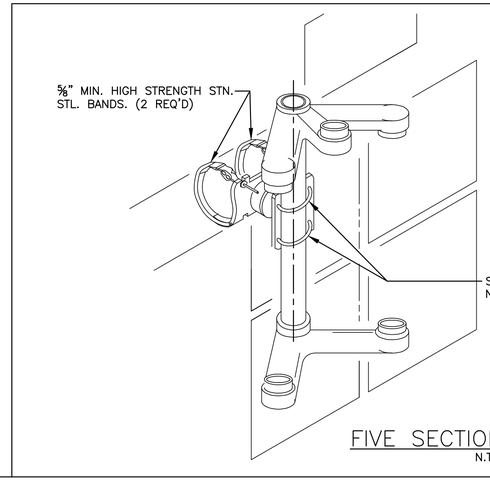

FRONT VIEW



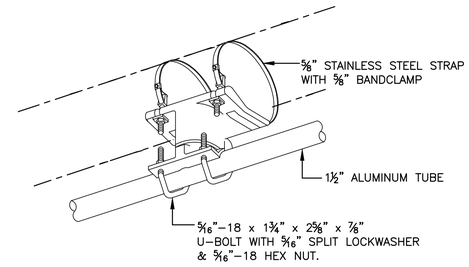

TOP VIEW

NOTES:

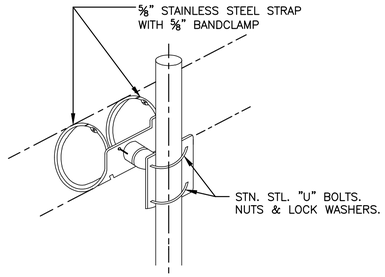
1. SIGNAL HEAD CABLES SHALL BE CONTINUOUS FROM THE CONTROLLER TO THE BASE OF THE TRAFFIC SIGNAL SUPPORT WITHOUT ANY SPLICES. THE CABLE SHALL ALSO BE CONTINUOUS FROM THE FIRST SIGNAL HEAD TO ANY ADDITIONAL HEADS WITH TERMINATION ON THE TERMINALS WITHIN THE SIGNAL HEAD HOUSING. SPARE WIRES SHOULD BE TERMINATED IN THE TRAFFIC SIGNAL HEAD TERMINAL BLOCKS.
2. ALL BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL.
3. ALTERNATIVE SIMILAR MAST ARM MOUNTING BRACKET DESIGNS MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
4. ALL HARDWARE SHALL BE STAINLESS STEEL EXCEPT AS NOTED.
5. ALL WIRING SHALL BE INTERNAL.
6. SEE DETAIL TD20.21 FOR VEHICULAR SIGNAL HEAD DETAILS.
7. USE APPROPRIATE BRACKET ASSEMBLY FOR 5-SECTION OR MULTI-FACE SIGNALS.
8. POLE AND HARDWARE COLOR SHALL MATCH.




FIVE SECTION INSTALLATION
N.T.S. TD20.20.06



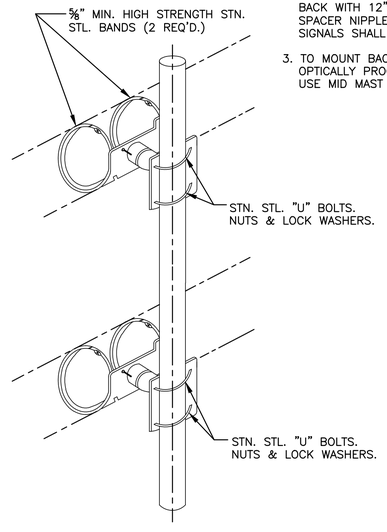

HORIZONTAL MAST-ARM MOUNTING
N.T.S. TD20.20.03



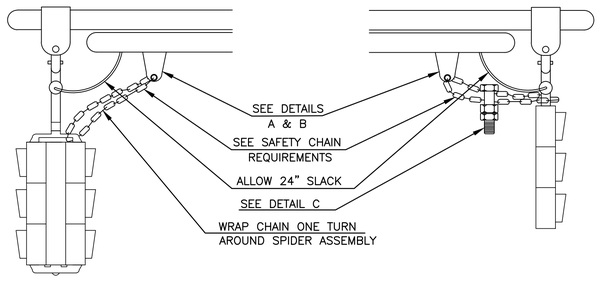

VERTICAL MAST-ARM MOUNTING
N.T.S. TD20.20.04

NOTES:

1. TO MOUNT SIGNALS ON A PEDESTAL STANDARD INVERT 3 IN LINE BRACKETS WITH PIPE AND ELBOWS, USE A 4½" SLIPFITTER IN PLACE OF THE MAST ARM PLUMBIZER.
2. TO MOUNT 8" SIGNALS BACK TO BACK WITH 12" SIGNALS USE SPACER NIPPLES ON BOTTOM. RED SIGNALS SHALL BE IN LINE.
3. TO MOUNT BACK TO BACK OPTICALLY PROGRAMMED SIGNALS USE MID MAST BRACKET.

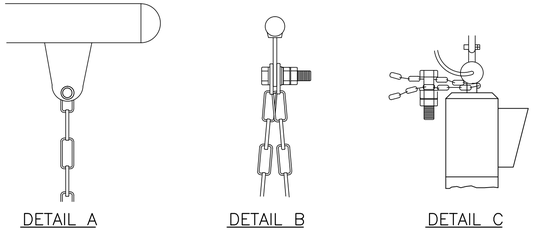



MID MAST BRACKET DETAIL
N.T.S. TD20.20.05




TYPICAL INSTALLATION FOR TWO OR MORE TRAFFIC SIGNALS

TYPICAL INSTALLATION FOR ONE TRAFFIC SIGNAL




TYPICAL SAFETY CHAIN INSTALLATIONS
N.T.S. TD20.20.02

NOTE:

SAFETY CHAIN REQUIRED TO BE FURNISHED & INSTALLED ON ALL INSTALLATIONS.

SAFETY CHAIN REQUIREMENTS FOR ONE TRAFFIC SIGNAL

FURNISH:

1. 42" OF ¼" HOT DIPPED GALVANIZED COILPROOF STRAIGHT LINK CHAIN
2. 2 – 5/16" DIA. X 2½" LG. STN. STL. HEX HEAD BOLT FULLY THREADED
3. 4 –5/16"ø STAINLESS STEEL HEX NUTS
4. 4 –5/16"ø STAINLESS STEEL FLAT WASHERS
5. 2 –5/16"ø STAINLESS STEEL LOCK WASHERS

SAFETY CHAIN REQUIREMENTS FOR TWO OR MORE TRAFFIC SIGNALS

FURNISH:

1. 42" OF ¼" HOT DIPPED GALVANIZED COILPROOF STRAIGHT LINK CHAIN
2. 1 – 5/16"ø X 2½" LG. STN. STL. HEX HEAD BOLT FULLY THREADED
3. 2 –5/16"ø STAINLESS STEEL HEX NUTS
4. 2 –5/16"ø STAINLESS STEEL FLAT WASHERS
5. 1 –5/16"ø STAINLESS STEEL LOCK WASHERS

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| No. | Date | Revision | Approved |
|---|---|---|---|
| 2 | 09/03/2014 | UPDATE NOTE 1 AND ADD DETAIL | |
| 1 | 08/28/2014 | UPDATE DETAIL | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

**SIGNAL HEAD MID-MAST ARM AND SAFETY CHAIN MOUNTING**

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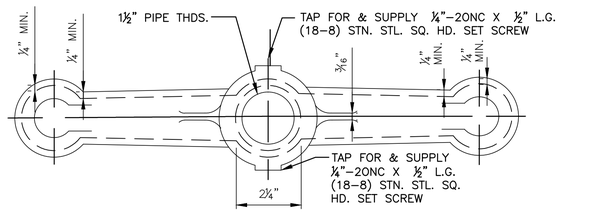
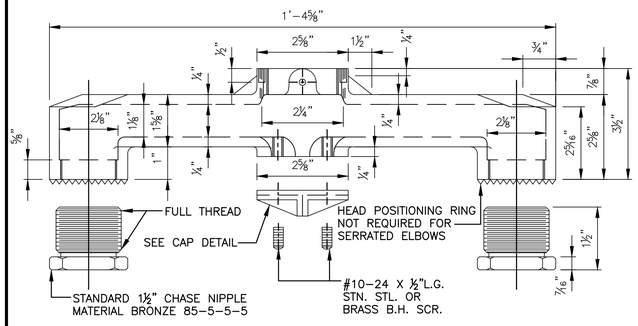
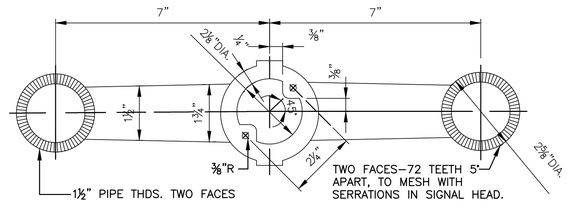
|---|---|---|
| Date | | SEPT 2011 |
| Contract Number | | |
| Drawing Number | | TD20.20 |
| | | PID# |

NOTE:

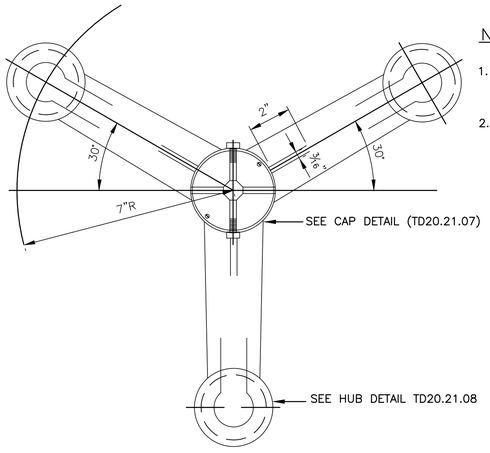
EACH HOLLOW SPIDER FOR 2-WAY ASSEMBLY SHALL CONSIST OF:
(1)-2-WAY SPIDER
(2)-STANDARD 1½" CHASE NIPPLE, BRONZE 85-5-5-5
(1)-CAP
(2)-10-24 X½" LG. STN. STL. OR BRASS BH. SCREWS
(2)-HEAD POSITIONING RINGS, IF NON SERRATED HUBS
(1)-T-BAR ASSEMBLY (SEE T-BAR NOTE 2)



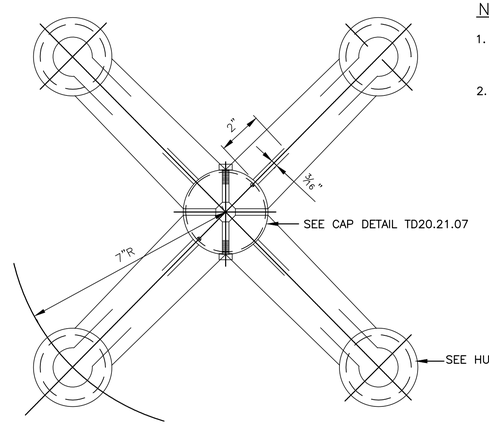

HOLLOW SPIDER FOR 2-WAY ASSEMBLY
N.T.S. TD20.21.01




NOTES:

1. FOR DETAILED DIMENSIONS OF 3-WAY SPIDER SEE DETAILED VIEWS OF 2-WAY ASSEMBLY (TD20.21.01).
2. EACH HOLLOW SPIDER FOR 3-WAY ASSEMBLY SHALL CONSIST OF:
   (2)-3-WAY SPIDERS
   (6)-STANDARD 1½" CHASE NIPPLES, BRONZE 85-5-5-5
   (3)-CAPS
   (6)-10-24 X ½" LG. STN. STL. OR BRASS BH. SCREWS
   (6)-HEAD POSITIONING RINGS. IF NON-SERRATED HUBS.

HOLLOW SPIDER FOR 3-WAY ASSEMBLY
N.T.S. TD20.21.02




NOTES:

1. FOR DETAILED DIMENSIONS OF 4-WAY SPIDER SEE DETAILED VIEWS OF 2-WAY ASSEMBLY (TD20.21.01).
2. EACH HOLLOW SPIDER FOR 4-WAY ASSEMBLY SHALL CONSIST OF:
   (2)-4-WAY SPIDERS
   (8)-STANDARD 1½" CHASE NIPPLES, BRONZE 85-5-5-5
   (3)-CAPS
   (6)-10-24 X ½" LG. STN. STL. OR BRASS BH. SCREWS
   (8)-HEAD POSITIONING RINGS. IF NON-SERRATED HUBS.

HOLLOW SPIDER FOR 4-WAY ASSEMBLY
N.T.S. TD20.21.03

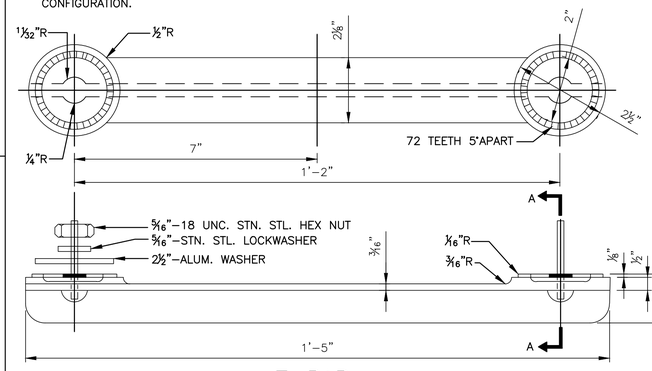
NOTES:

(APPLIES TO TD20.21.01 THROUGH TD20.21.08.)

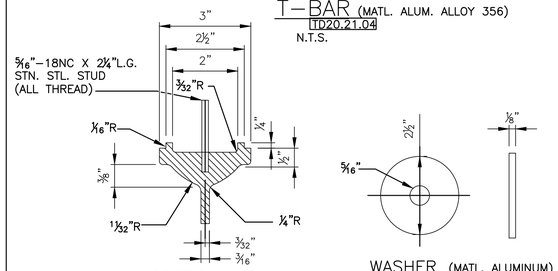
1. UNITS SHALL BE MANUFACTURED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS.
2. ALL TOLERANCES OF CASTINGS SHALL BE ±1/32".
3. ALL STAINLESS STEEL ITEMS ON THIS SHEET PER ASTM A193 GRADE B8.
4. PAINT: THE SURFACE OF THE ALUMINUM CASTING MUST BE CLEANED. DEGREASED AND SHOP PAINTED WITH ONE COAT OF ZINC CHROMATE-IRON-OXIDE PAINT CONFORMING TO THE CURRENT REQUIREMENTS OF SPECIFICATION M-142 OF AASHTO. WHEN THIS PAINT HAS THOROUGHLY DRIED, IT SHALL THEN BE SHOP PAINTED WITH A COAT OF YELLOW ENAMEL PAINT READY MIXED CONFORMING TO THE REQUIREMENTS OF FEDERAL SPECIFICATIONS 595a FOR ENAMEL; GLOSS, SYNTHETIC (FOR EXTERIOR AND INTERIOR SURFACES) CLASS A, AIR DRYING THE TINT OF WHICH SHALL MATCH GLOSS-YELLOW STANDARD COLOR NO.13538, AS SHOWN IN THE FEDERAL SPECIFICATION 595a COLOR; (FOR READY MIXED PAINT).

NOTES:

1. EACH T-BAR ASSEMBLY SHALL CONSIST OF: (1)-T-BAR, (2)-WASHERS, (2)-5/16" DIA. STN. STL. LOCKWASHERS, AND (2)-5/16" -18NC STN. STL. HEX NUTS.
2. FOR USE WITH 2-WAY HOLLOW SPIDER ASSEMBLIES WHERE SIGNAL FACES ARE SAME SIZE AND CONFIGURATION.




T-BAR (MATL. ALUM. ALLOY 356)
TD20.21.04
N.T.S.

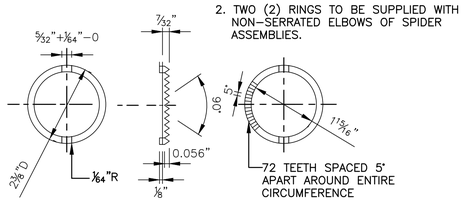



SECTION A-A

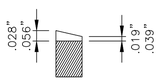
WASHER (MATL. ALUMINUM)

NOTES:

1. RING SHALL BE MADE OF DELRIN
2. TWO (2) RINGS TO BE SUPPLIED WITH NON-SERRATED ELBOWS OF SPIDER ASSEMBLIES.



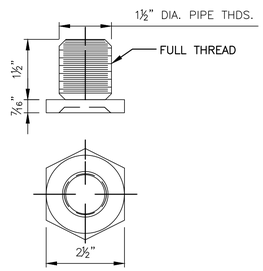

DETAIL OF HEAD POSITIONING RING
N.T.S. TD20.21.05



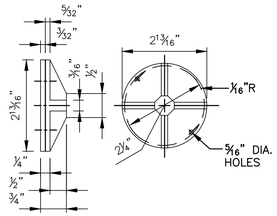

TOOTH PROFILE
N.T.S.

NOTE:

NIPPLE, ELBOW AND/OR CHASE NIPPLE TO BE USED WITH HINGE STRAP OR PEDESTRIAN CLAMP AS REQUIRED.



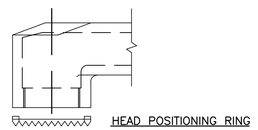

STANDARD 1½" CHASE NIPPLE
(MTL:BRZ. 85-5-5-5) TD20.21.06
N.T.S.




CAP (MAT. ALUM. ALLOY 356)
TD20.21.07
N.T.S.

NOTE:

PROVIDE SLOTS 3/16" DEEP X 3/16" WIDE FOR SERRATED POSITIONING RING



HEAD POSITIONING RING

HOLLOW SPIDER HUB
NON-SERRATED HUB (TYPICAL)
N.T.S. TD20.21.08

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| 1 | 09/03/2014 | DETAIL DELETED | |

*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title
**TRAFFIC SIGNALS**

# HOLLOW SPIDER ASSEMBLY

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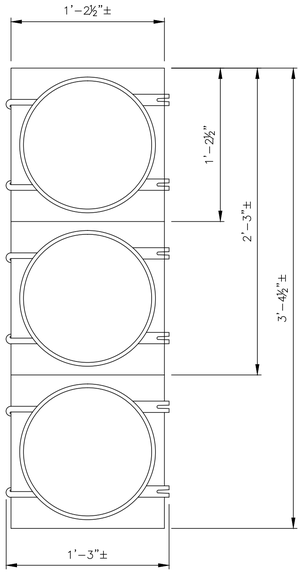
Designed by | Drawn by | Checked by

Date **SEPT 2011**

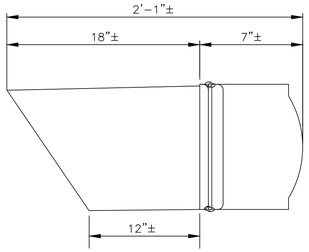
Contract Number

Drawing Number **TD20.21**

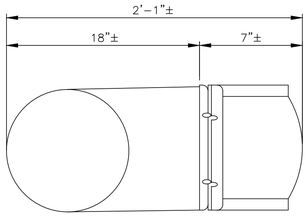
PID#



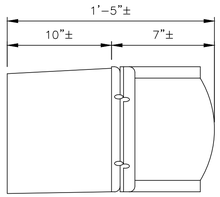

12" SIGNAL DIMENSIONS



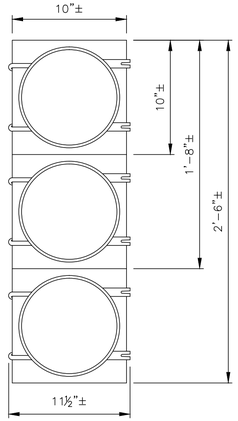

45° ANGLE VISOR (TOP VIEW)



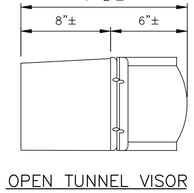

45° ANGLE VISOR (SIDE VIEW)




OPEN TUNNEL VISOR




8" SIGNAL DIMENSIONS



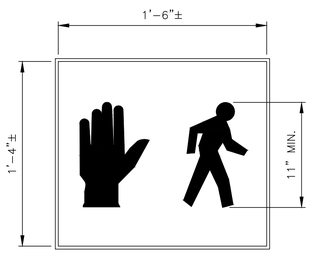

OPEN TUNNEL VISOR

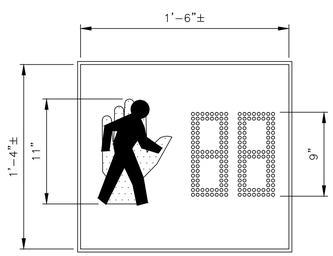
NOTES:

1. THE STANDARD SIGNAL IS COMPOSED OF THREE POLYCARBONATE BODY SECTIONS CONTAINING THE OPTICAL UNIT, LENS, DOOR, AND VISOR. ALUMINUM SIGNAL HEADS ARE STILL USED IN CERTAIN APPLICATIONS.
2. SIGNAL SECTIONS SHALL BE INCANDESCENT LOOK LED-TYPE.
3. USE OPEN TUNNEL VISORS UNLESS SHOWN OTHERWISE ON CONTRACT DRAWINGS.

## VEHICULAR SIGNAL HEAD

N.T.S. TD20.22.01




COUNTDOWN DISPLAY

## PEDESTRIAN SIGNAL HEADS

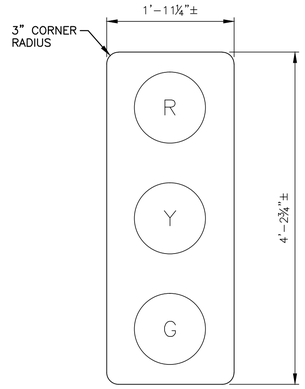
N.T.S. TD20.22.02

NOTES:

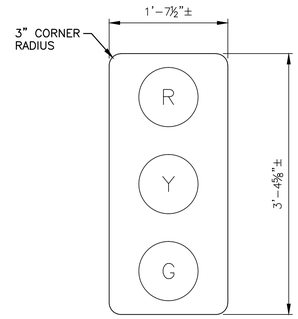
1. PEDESTRIAN SIGNALS FACES SHALL BE LED UNITS. SYMBOL HEIGHT SHALL BE A MINIMUM OF 11".
2. ALL PEDESTRIAN SIGNAL HEADS SHALL BE EQUIPPED WITH EGG CRATE VISORS.

NOTES:

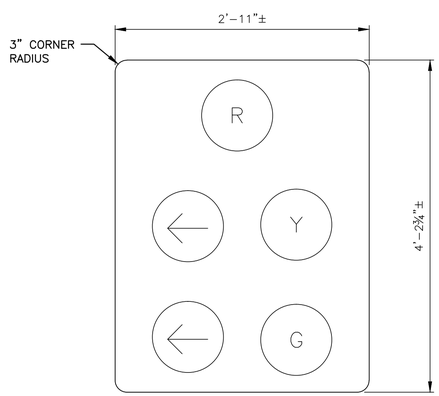
1. ANY COMBINATION OF BACKPLATES FOR SIGNAL HEADS, INCLUDING MIXED 12" AND 8" SIGNAL HEADS, ARE AVAILABLE. REFER TO MANUFACTURER FOR DETAILS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL.
2. MATERIAL: ⅛" BLACK ABS WITH HAIRCELL FINISH FRONT SIDE.
3. FABRICATION: VACUUM FORMED.
4. IF A BACKPLATE IS USED, THE VERTICAL CLEARANCE SHALL BE MEASURED FROM THE BOTTOM OF THE BACKPLATE TO THE FINISHED GRADE OF ROADWAY. REFER TO CONTRACT DRAWINGS.
5. DETAILS SHOWN ARE TYPICAL ONLY. SLIGHT VARIATIONS EXIST DEPENDING ON SIGNAL MANUFACTURER. THE CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR APPROVAL.
6. BACKPLATES SHALL CONFORM TO THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES



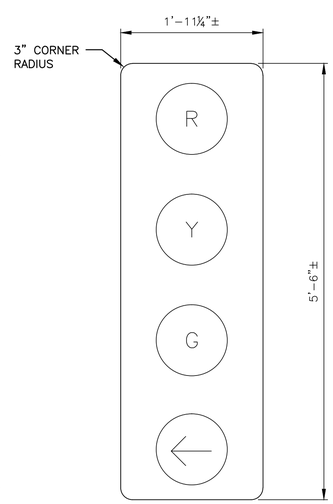

BACKPLATE FOR 12" SIGNAL HEAD




BACKPLATE FOR 8" SIGNAL HEAD




5 SECTION CLUSTER (TYP.) FOR 12" SIGNAL HEAD




4 SECTION BACKPLATE (TYP.) FOR 12" SIGNAL HEAD

## BACKPLATES

N.T.S. TD20.22.03

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|---|---|---|---|
| 2 | 09/03/2014 | UPDATED NOTES | |
| 1 | 08/28/2014 | UPDATE DETAIL | |

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**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# SIGNAL HEADS AND BACKPLATES

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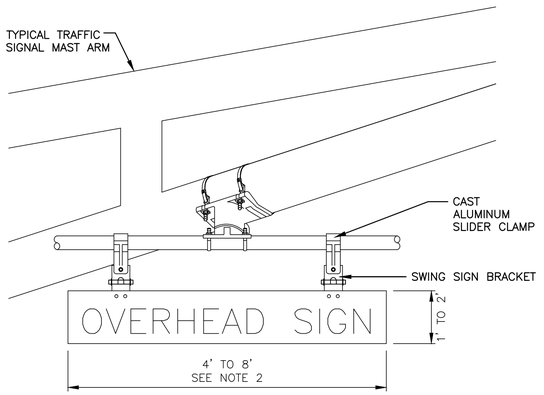
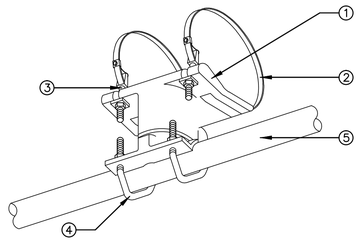
|---|---|---|
| Date | | SEPT 2011 |
| Contract Number | | |
| Drawing Number | | TD20.22 |

PID#

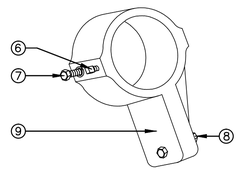



MAST ARM ASSEMBLY BRACKET

N.T.S. TD20.23.01




CLAMP DETAIL




SLIDER CLAMP

NOTES:

1. INSTALLATION OF SLIDER: DRILL 3/8" HOLE THRU ONE WALL OF PIPE. TIGHTEN 5/16" x 1½" HEX BOLT WITH LOCKWASHER INTO SLIDER THRU HOLE IN PIPE. ATTACH 3/8" SQUARE HEAD SET SCREW.

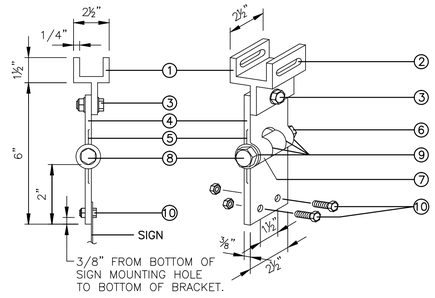
2. MAST–ARM SIGNS EXCEEDING 60 INCHES IN WIDTH SHALL BE FITTED WITH ALUMINUM EDGING RIVETED TO THE SIGN PANEL BETWEEN THE SWING BRACKETS. THE EDGING SHALL HAVE A 1½" FLANGE PERPENDICULAR TO THE SIGN FACE AND SHALL BE RIVETED AT THE TOP EDGE OF THE SIGN PANEL AS FOLLOWS:

   SINGLE–FACED SIGN PANELS:
   ALUMINUM EDGING SHALL BE MOUNTED TO THE FACE OF THE SIGN PANEL NOT CARRYING THE LEGEND.

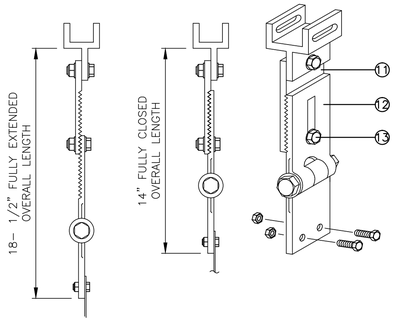
   DUAL–FACED SIGN PANELS:
   ALUMINUM EDGING SHALL BE MOUNTED TO THE FACE OF THE SIGN PANEL OPPOSING THE FLOW OF TRAFFIC IN THE TRAVEL LANES BELOW. THE PORTION OF THE FLANGE COVERING THE SIGN LEGEND SHALL BE COVERED WITH THE REFLECTIVE SHEETING IN KIND WITH THE SIGN BORDER, OR IN CASE WHERE A BORDER IS NOT USED, IN KIND WITH THE SIGN BACKGROUND. THE REFLECTIVE SHEETING SHALL BE APPLIED TO THE EDGING PRIOR TO INSTALLING THE EDGING ON THE SIGN PANEL.

PARTS:

1. CLAMP ALUMINUM ALLOY (356–T6)
2. 5/8" STAINLESS STEEL STRAP (2) WITH 5/8" BANDCLAMP.
3. STAINLESS STEEL CLAMP SCREW WITH BEARING WASHER, 7/16" FLATWASHER & 7/16" – 14 HEX NUT. CLAMP SCREW SHALL BE INSTALLED WITH MAINTAINING A MINIMUM OF 1/4" CLEARANCE TO THE MAST ARM CLAMP.
4. 5/16" – 18 x 1¾" x 2⅝" x 7/8" U–BOLT WITH 5/16" SPLIT LOCKWASHER & 5/16" – 18 HEX NUT.
5. 1½" ALUMINUM TUBE
6. 3/8" SQUARE HEAD SET SCREW
7. 5/16" x 1½" HEX BOLT WITH LOCKWASHER
8. 3/8" x 1½" STAINLESS STEEL HEX HEAD BOLT WITH STAINLESS STEEL HEX LOCK NUT AND 1/16" STAINLESS STEEL WASHER (BOTH SIDES). A BRONZE REDUCER BUSHING (1/2" TO 3/8") SHALL BE USED INSIDE THE SLIDER CLAMP.
9. CAST ALUMINUM SLIDER CLAMP




FIXED LENGTH NON–ADJUSTABLE SWING SIGN BRACKET




ADJUSTABLE LENGTH SWING SIGN BRACKET

PARTS:

1. PIVOTAL UPPER BRACKET.
2. 1⅝" x 1/4" SLOT FOR DOUBLE STRAPPING TO MAST ARM. (M2G–34S(HD) 0.030 x 3/4" HEAVY DUTY STAINLESS STEEL STRAP WITH M2G–34B(HD) BUCKLE RECOMMENDED.)
3. 1/2" – 13 x 1½" STAINLESS STEEL HEX HEAD BOLT WITH STAINLESS STEEL HEX LOCK NUT AND 1/16" STAINLESS STEEL WASHER (BOTH SIDES). ALLOWS UPPER BRACKET TO PIVOT AND ALIGN WITH MAST ARM.
4. 6" OVERALL DROP WITH FIXED LENGTH SIGN BRACKET.
5. STAINLESS STEEL DAMPENER SPRING (REMOVABLE).
6. STAINLESS STEEL HEX LOCK NUT WITH 1/16" STAINLESS STEEL WASHER.
7. 1" O.D. AXLE HOUSING.
8. 1/2" – 13 x 4" STAINLESS STEEL HEX HEAD BOLT WITH 1/16" STAINLESS WASHER.
9. OILITE BUSHING.
10. SIGN MOUNTING SETS, CONSISTING OF TWO EACH 5/16" – 18 x 1" STAINLESS STEEL HEX HEAD BOLT WITH STAINLESS STEEL HEX LOCK NUT. TWO HOLES ON 1½" CENTERS PROVIDE POSITIVE LOCK SIGN MOUNTING TO BRACKET.
11. 8¾" OVERALL LENGTH UPPER ADJUSTABLE SIGN BRACKET SECTION.
12. 9" OVERALL LENGTH LOWER ADJUSTABLE SIGN BRACKET SECTION, INCLUDING AXLE HOUSING (8" OVERALL LENGTH TO TOP OF AXLE HOUSING).
13. 1/2" – 13 x 1½" STAINLESS STEEL HEX BOLT WITH STAINLESS STEEL HEX LOCK NUT AND 1/16" STAINLESS STEEL WASHERS (BOTH SIDES). LOOSEN LOCK NUT, ADJUST BRACKET TEETH TO LEVEL SIGN.

NOTES:

1. EXTENDER ADAPTERS ARE ALL ALUMINUM 6061T6 ALLOY. 3/8" THICK x 2½" WIDE BAR x VARIABLE LENGTH COMPLETE WITH ONE HOLE EACH END FOR 1/2" BOLT. EACH EXTENDER BAR INCLUDES ONE PIVOT POINT 1/2" – 13 x 1½" STAINLESS STEEL HEX HEAD BOLT WITH HEX LOCK NUT AND 2 WASHERS. (EXTENDER ADAPTERS ARE AVAILABLE IN VARIABLE LENGTHS ON REQUEST.)

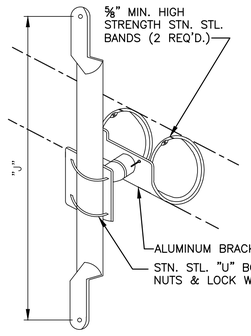
2. MAST–ARM SIGNS EXCEEDING 60 INCHES IN WIDTH SHALL BE FITTED WITH ALUMINUM EDGING RIVETED TO THE SIGN PANEL BETWEEN THE SWING BRACKETS. THE EDGING SHALL HAVE A 1–½" FLANGE PERPENDICULAR TO THE SIGN FACE AND SHALL BE RIVETED AT THE TOP EDGE OF THE SIGN PANEL AS FOLLOWS:

   SINGLE–FACED SIGN PANELS:
   ALUMINUM EDGING SHALL BE MOUNTED TO THE FACE OF THE SIGN PANEL NOT CARRYING THE LEGEND.

   DUAL–FACED SIGN PANELS:
   ALUMINUM EDGING SHALL BE MOUNTED TO THE FACE OF THE SIGN PANEL OPPOSING THE FLOW OF TRAFFIC IN THE TRAVEL LANES BELOW. THE PORTION OF THE FLANGE COVERING THE SIGN LEGEND SHALL BE COVERED WITH THE REFLECTIVE SHEETING IN KIND WITH THE SIGN BORDER, OR IN CASE WHERE A BORDER IS NOT USED, IN KIND WITH THE SIGN BACKGROUND. THE REFLECTIVE SHEETING SHALL BE APPLIED TO THE EDGING PRIOR TO INSTALLING THE EDGING ON THE SIGN PANEL.

NOTES:

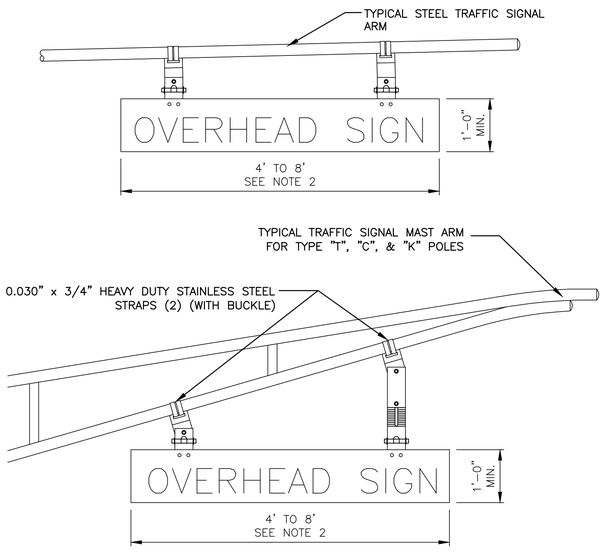
1. SIGN BRACKET SHALL PERMIT ROTATIONAL ADJUSTMENT ABOUT BRACKET AXIS, VERTICAL AND ROTATIONAL ADJUSTMENT ABOUT MAST ARM, AND ROTATIONAL ADJUSTMENT RIGHT & LEFT IN VERTICAL PLANE.
2. THE SIGN BRACKET SHALL BE DESIGNED TO SUPPORT A 35 LB. SIGN WITH A PROJECTED AREA OF 19 SQ. FT.
3. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL.
4. TWO BRACKETS SHALL BE FURNISHED FOR EACH SIGN.




| SIGN SIZE | DIM. "J" |
|---|---|
| 12" X 5'–0" | 10" |
| 2'–0" X 2'–6" | 1'–6" |
| 2'–0" X 2'–0" | 1'–6" |
| 2'–6" X 2'–6" | 2'–0" |
| 3'–0" X 3'–0" | 2'–6" |
| 4'–0" X 4'–0" | 3'–6" |

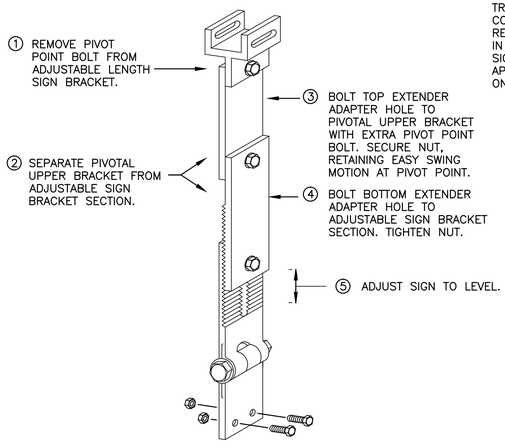
ALUMINUM SIGN BRACKET DETAIL

N.T.S. TD20.23.02



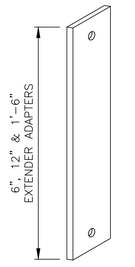

SWING SIGN ASSEMBLY DETAILS

N.T.S. TD20.23.03




EXTENDER ADAPTERS

FOR ADJUSTABLE LENGTH SWING SIGN BRACKET. EXTENDS BRACKET TO LEVEL SIGN. FITS ANY DEGREE OF MAST ARM RISE.

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*ENGINEERING DEPARTMENT*

**PANYNJ Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# OVERHEAD MAST ARM SWING SIGN BRACKET

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Drawing Number **TD20.23**

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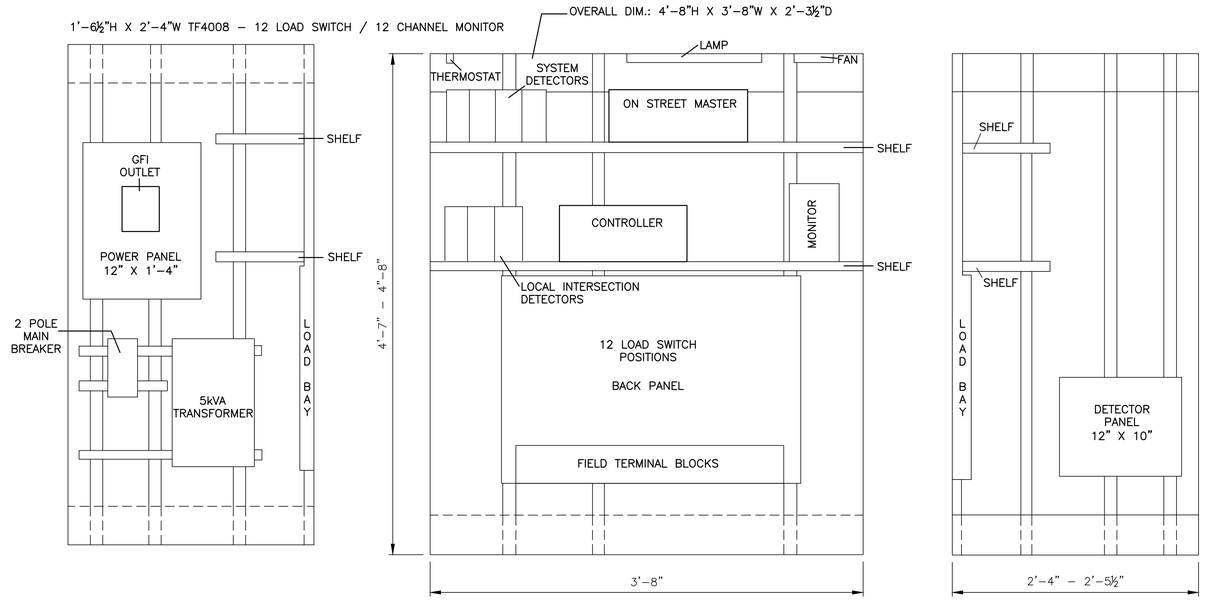
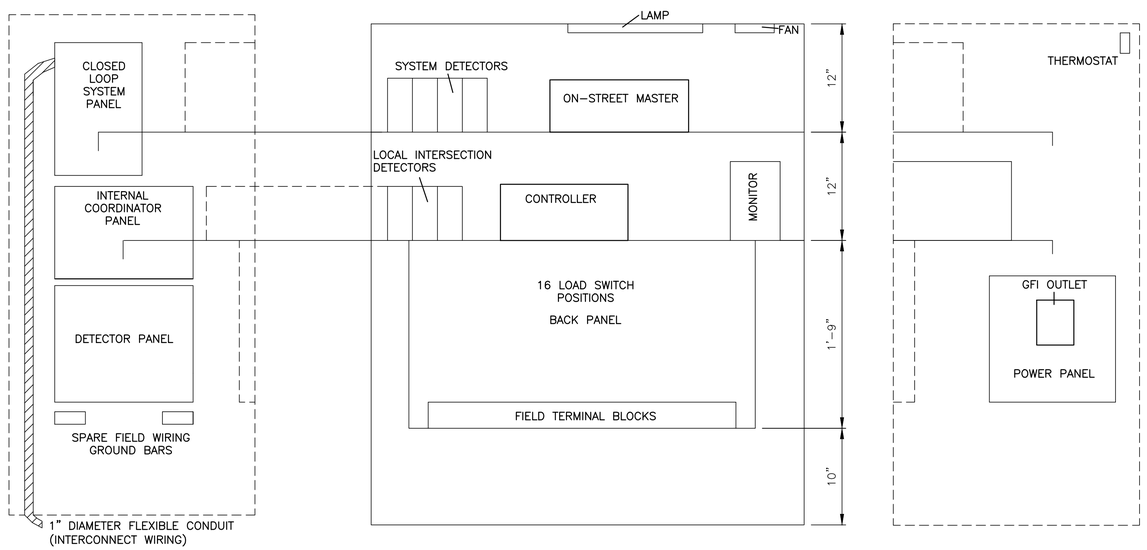



CABINET LEFT WALL

CABINET REAR WALL

CABINET RIGHT WALL




ALTERNATE

## P CABINET LAYOUT

N.T.S. TD20.24

NOTE:

ALL AUXILIARY PANELS SHALL BE INSTALLED AS FAR BACK FROM THE OUTSIDE EDGE OF THE CABINET WITHOUT INTERFERING WITH THE BACK PANEL OR ADJUSTMENT OF SHELVES.

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**P CABINET LAYOUT**

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Drawing Number **TD20.24**

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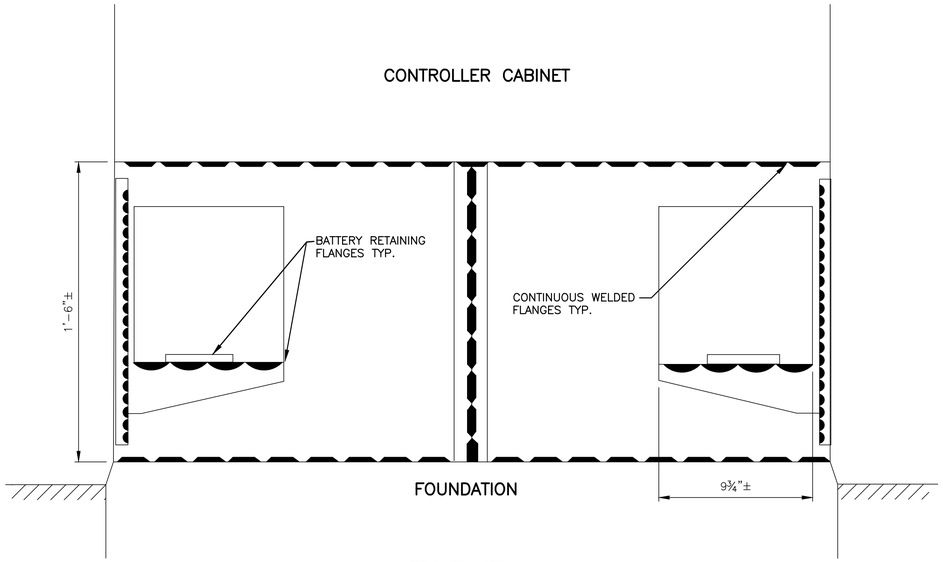
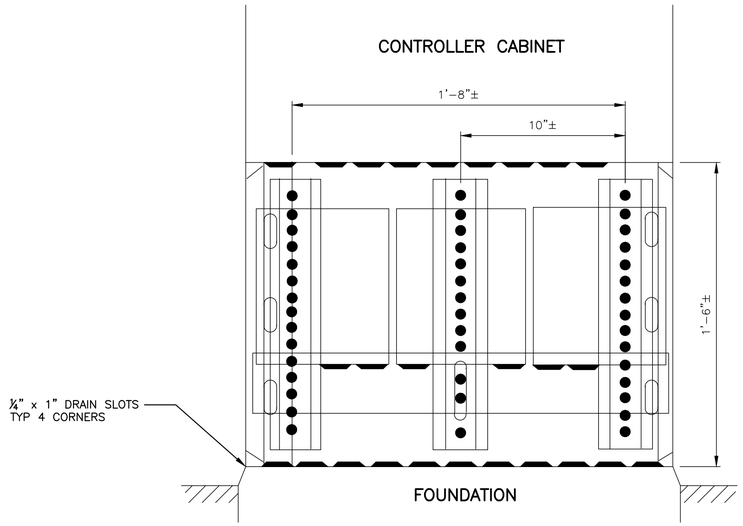
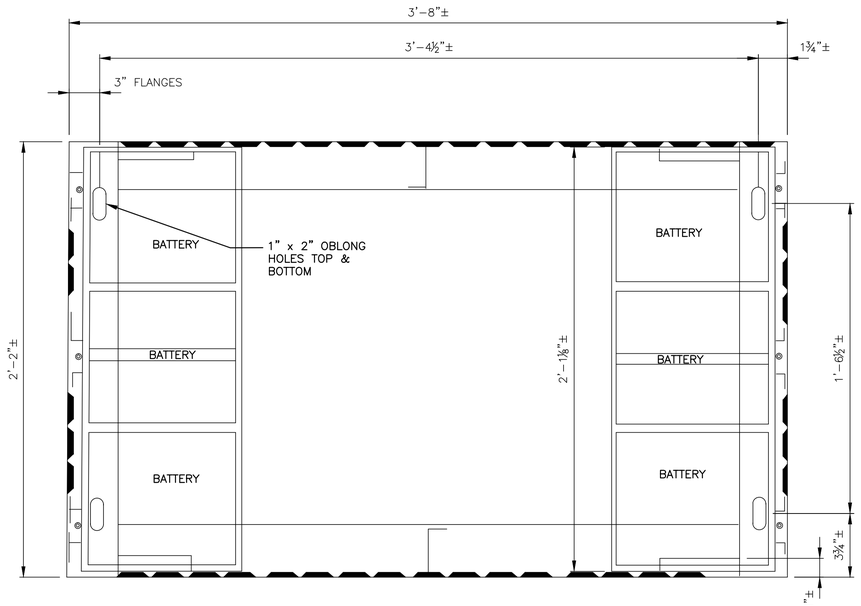


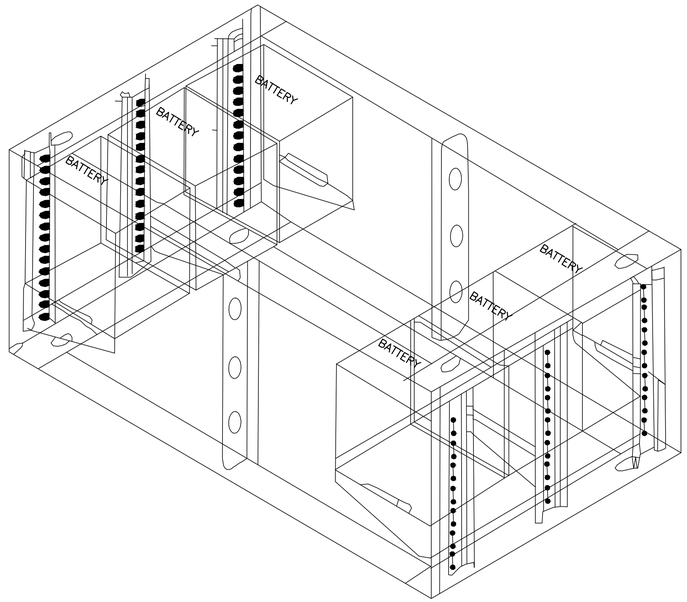

FRONT VIEW




SIDE VIEW




TOP VIEW

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CONTROLLER CABINET SKIRT
N.T.S. TD20.25

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**TRAFFIC SIGNALS**

## CONTROLLER CABINET SKIRT FOR UPS

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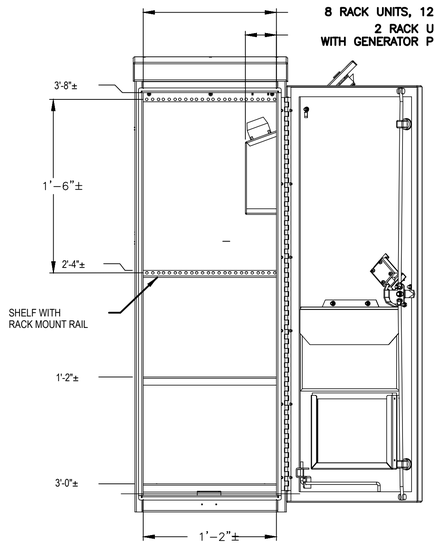
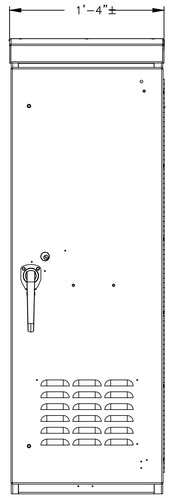
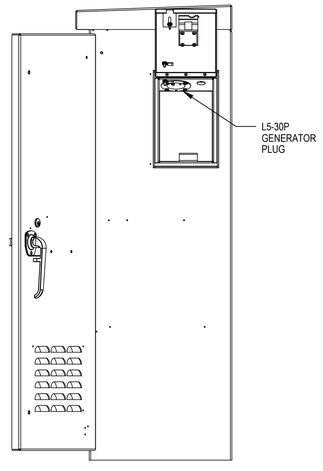
Contract Number

Drawing Number **TD20.25**

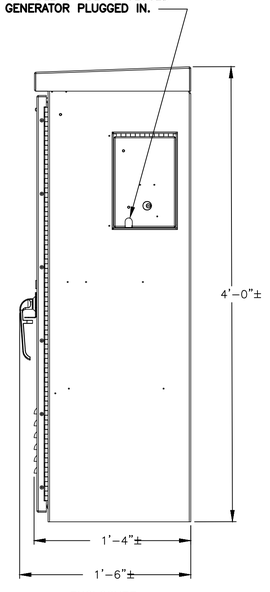
PID#



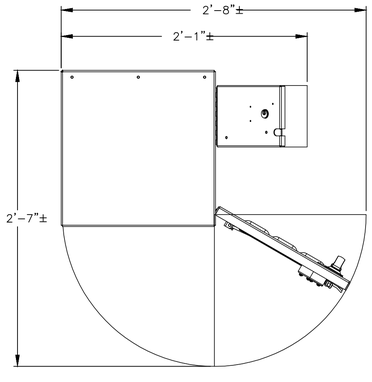




GENERATOR PLUG COMPARTMENT DOOR
SHALL BE CAPABLE OF BEING CLOSED
WITH GENERATOR PLUGGED IN.




ENCLOSURE
WITH GEN PORT




SIDEMOUNT ENCLOSURE FOR UNINTERRUPTIBLE POWER SOURCE (UPS)

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**TRAFFIC SIGNALS**

# SIDE-MOUNT ENCLOSURE (SME) FOR UPS

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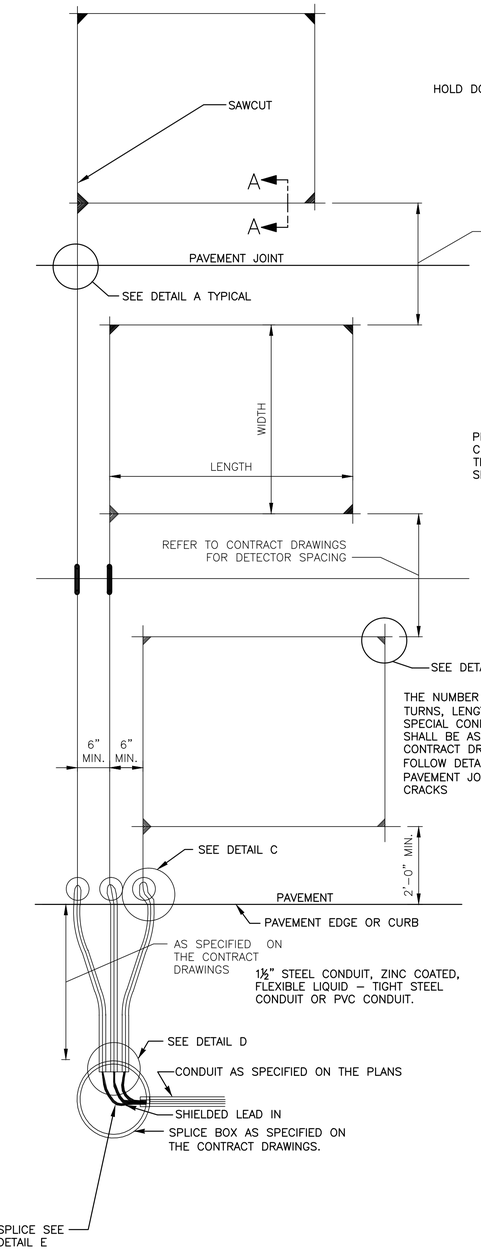
Designed by Drawn by Checked by

Date **SEPT 2011**

Contract Number

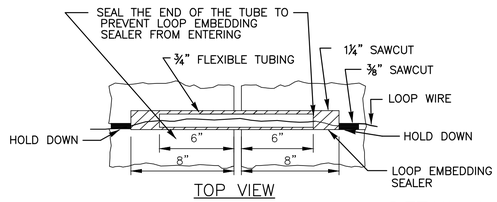
Drawing Number **TD20.25A**

PID#

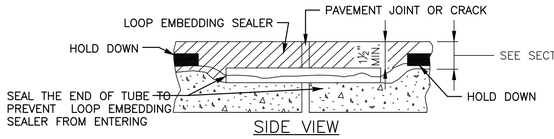



## LOOP INSTALLATION DETAILS

N.T.S. TD20.26

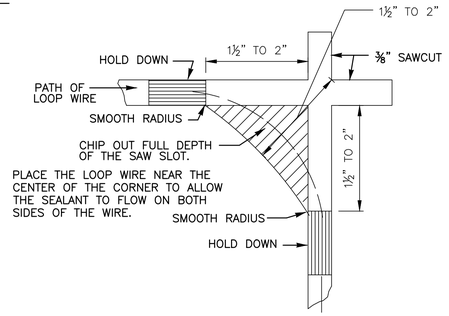



TOP VIEW

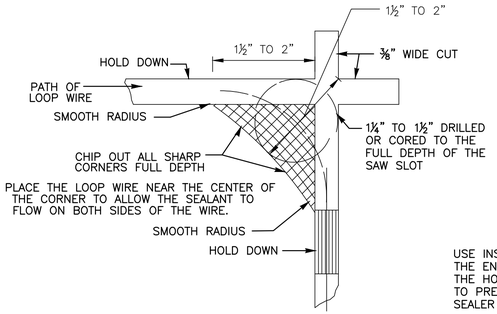



SIDE VIEW

## DETAIL A – CROSSING PAVEMENT JOINTS OR CRACKS

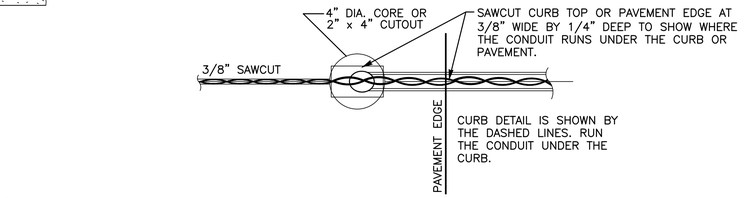



CHIPPED OUT CORNER

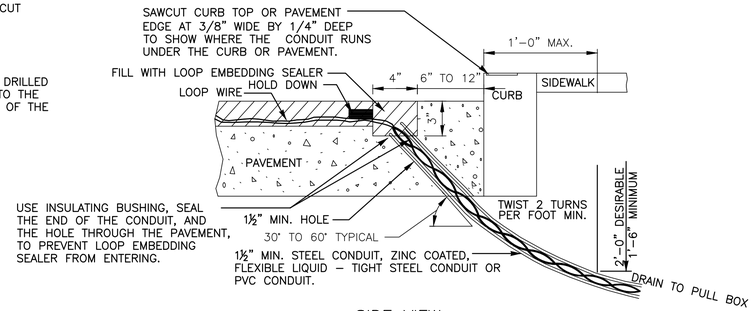



CORE CORNER

## DETAIL B – CORNER DETAILS

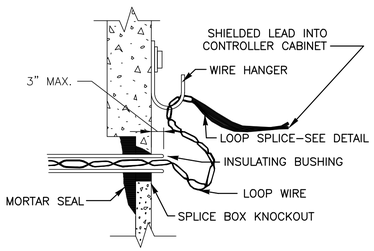



TOP VIEW

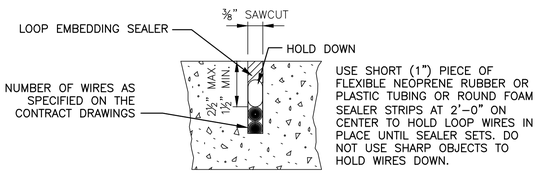



SIDE VIEW

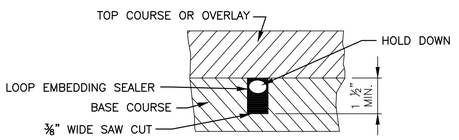
## DETAIL C – LOOP LEAD IN AT PAVEMENT EDGE




## DETAIL D

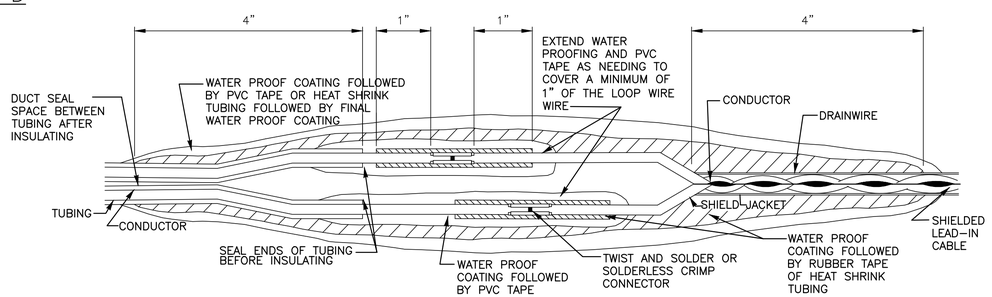



SAWCUT CROSS SECTION IN CONCRETE OR ASPHALT




SAWCUT CROSS SECTION IN ASPHALT WHERE AN OVERLAY IS BEING PLACED

## SECTION A–A




## DETAIL E – LOOP SPLICE

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*ENGINEERING DEPARTMENT*

**PANYNJ**
**Traffic Standard Details**

*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# LOOP DETECTOR INSTALLATION

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Date **SEPT 2011**

Contract Number

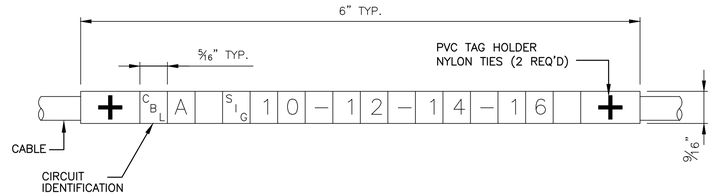
Drawing Number **TD20.26**

PID#

## CIRCUIT IDENTIFICATION:

CBL = CABLE
PED = PEDESTRIAN
PB = PUSH BUTTON

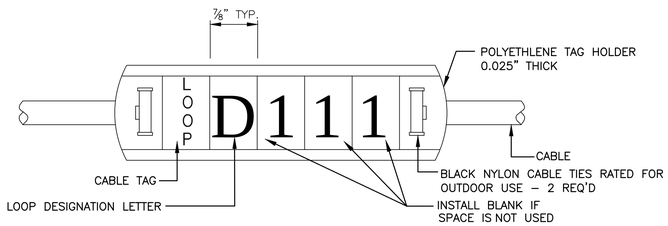
(TAG LETTERS SHALL BE BLACK ON YELLOW)




## TRAFFIC SIGNAL CABLE IDENTIFICATION TAG DETAIL

N.T.S.

TD20.27.01




## LOOP DETECTOR CABLE IDENTIFICATION TAG DETAIL

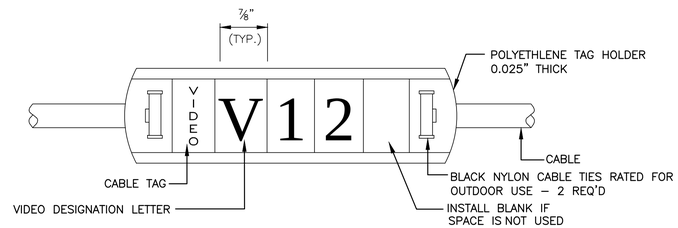
(TAG LETTERS SHALL BE BLACK ON YELLOW)

TD20.27.02

N.T.S.

LOOP DESIGNATION LETTERING

1st COLUMN: DETECTOR TYPE
2nd COLUMN: PHASE
3rd COLUMN: DETECTOR UNIT NUMBER
4th COLUMN: CHANNEL




## VIDEO DETECTOR CABLE IDENTIFICATION TAG DETAIL

(TAG LETTERS SHALL BE BLACK ON YELLOW)

N.T.S.

VIDEO DESIGNATION LETTERING

1st COLUMN: DETECTOR TYPE
2nd COLUMN: CAMERA NUMBER
3rd COLUMN: PHASE NUMBER

NOTE: VIDEO DESIGNATION NUMBER SHALL BE LABELED IN ACCORDANCE TO CONTRACT DRAWINGS

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| 1 | 08/28/2014 | UPDATE DETAIL | |

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*TRAFFIC*

Title

**TRAFFIC SIGNALS**

# CABLE IDENTIFICATION TAG

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Date **SEPT 2011**

Contract Number

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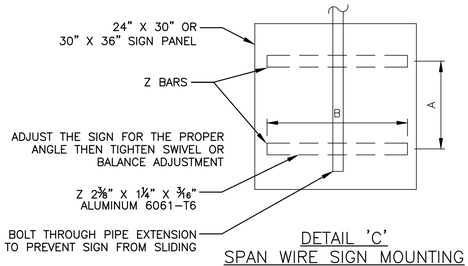
PID#




DETAIL 'C'
SPAN WIRE SIGN MOUNTING

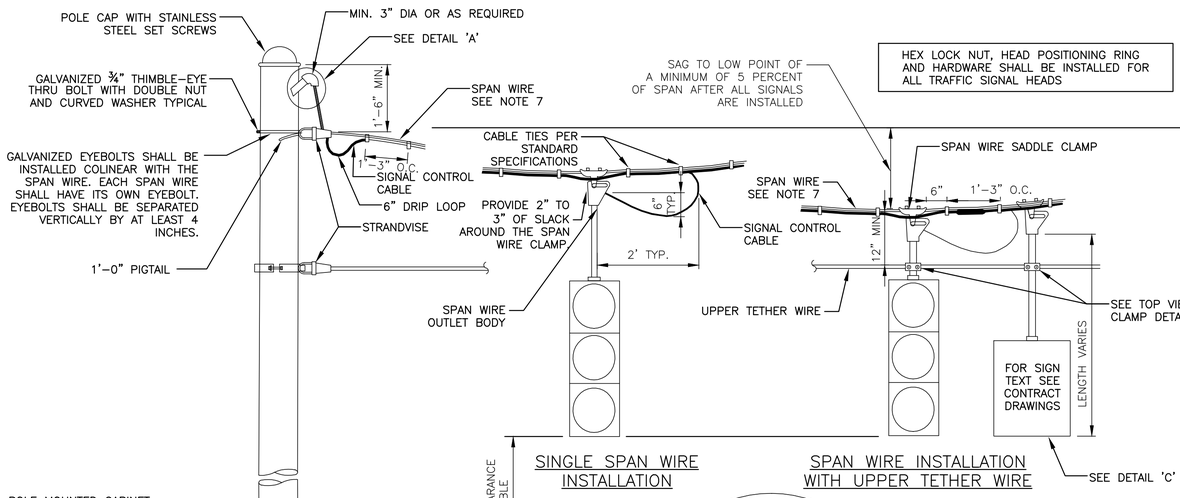
| SIGN SIZE | DIMENSION | |
|---|---|---|
| | A | B |
| 24 X 30 | 24" | 18" |
| 30 X 36 | 30" | 24" |

## NOTES:

1. THE BOTTOM OF THE SIGNAL HEADS ON EACH APPROACH SHALL BE ALIGNED.
2. POLES SHALL BE ADJUSTED BY USE OF THE NUTS ON THE ANCHOR BOLTS SO THAT THEY ARE VERTICAL WHEN ALL SIGNAL HEADS & SIGNS HAVE BEEN INSTALLED. A POLE RAKE OF ONE HALF OF DESIGN LOAD DEFLECTION, SET WHEN THE POLE IS FIRST ERECTED, MAY PROVIDE A CLOSE INITIAL SETTING.
3. SIGNED AND SEALED SHOP DRAWINGS, PREPARED BY A PROFESSIONAL ENGINEER, SHALL BE SUBMITTED FOR APPROVAL FOR ALL SPAN POLES INSTALLED AT PANYNJ FACILITIES.
4. ALL HARDWARE TO BE PAINTED YELLOW.
5. ALL FITTINGS USED WITH SPAN AND TETHER WIRES SHALL DEVELOP THE FULL BREAKING STRENGTH OF THE WIRE, EXCEPT "S HOOK" INSTALLED ON TETHER WIRES. SPAN WIRE DIAMETER SHALL BE SELECTED FROM THE FOLLOWING TABLE BASED ON THE POLE DESIGN LOAD SHOWN IN TABLE 1 OR CALCULATED BY THE POLE FABRICATOR.

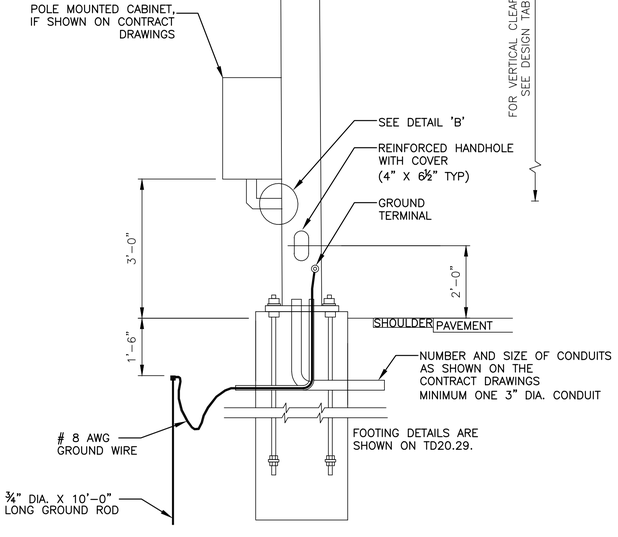
| POLE DESIGN LOAD LBS | SPAN WIRE DIA. IN | SPAN WIRE BREAKING STRENGTH LBS | TETHER WIRE DIA. IN | TETHER WIRE BREAKING STRENGTH LBS |
|---|---|---|---|---|
| 11,300 | 7/16 | 16,900 | 5/16 | 9,190 |
| 13,700 | ½ | 20,500 | 5/16 | 9,190 |
| 16,500 | 9/16 | 24,650 | ⅜ | 13,900 |
| 19,750 | ⅝ | 29,450 | ⅜ | 13,900 |

6. SPAN WIRE MOUNTING HEIGHT MAY BE ADJUSTED IN THE FIELD TO THE ALLOWABLE CLEARANCE A FIVE PERCENT MINIMUM SAG SHALL BE PROVIDED. THE SPAN WIRE ATTACHMENT DISTANCE TO THE TOP OF THE POLE SHALL NOT BE LESS THAN 18".
7. CIRCUMFERENTIAL POLE CLAMPS, AS AN ALTERNATE TO GALVANIZED THIMBLE EYE BOLTS, MAY BE USED TO CONNECT SPAN WIRE(S) TO THE TOPS OF POLYGONAL SHAPED SIGNAL POLES. HOWEVER, ONLY GALVANIZED THIMBLE EYE BOLTS SHALL BE USED FOR CONNECTING SPAN WIRE(S) TO ROUND SIGNAL POLES. IN EITHER CASE, THE DESIGN LOAD OF THE CONNECTING HARDWARE SHALL BE CERTIFIED TO BE NO MORE THAN 70% OF ITS YIELD STRENGTH.

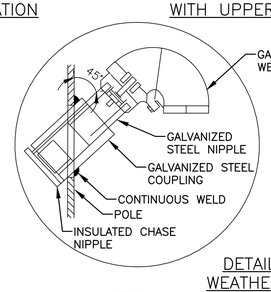



SINGLE SPAN WIRE INSTALLATION

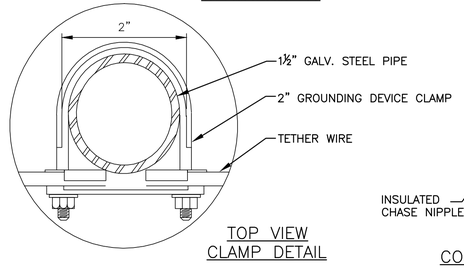
SPAN WIRE INSTALLATION WITH UPPER TETHER WIRE



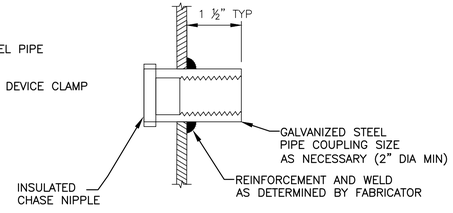

SPAN WIRE MOUNTED INSTALLATION
N.T.S. TD20.28




DETAIL 'A'
WEATHERHEAD




TOP VIEW
CLAMP DETAIL




DETAIL 'B'
COUPLING FOR WIRING FITTING

DESIGN TABLE

SPAN WIRE POLE
AND CLEARANCE

| POLE HEIGHT | POLE DESIGN LOAD | VERTICAL CLEARANCE |
|---|---|---|
| | | |

(DESIGN TABLE TO BE COMPLETED BY DESIGNER)

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| 1 | 09/03/2014 | UPDATE DETAIL | |

ENGINEERING DEPARTMENT

PANYNJ
Traffic Standard
Details

TRAFFIC

Title

**TRAFFIC SIGNALS**

## SPAN WIRE MOUNTED INSTALLATION

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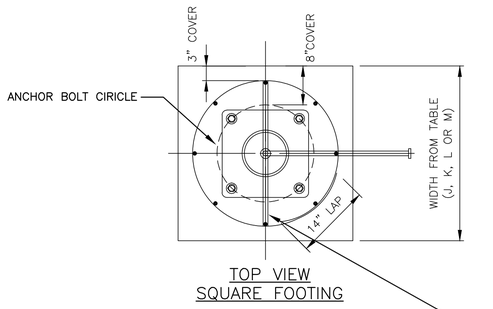
Date SEPT 2011

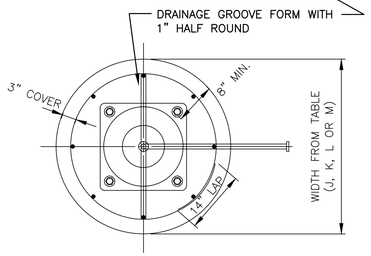
Contract Number

Drawing Number TD20.28

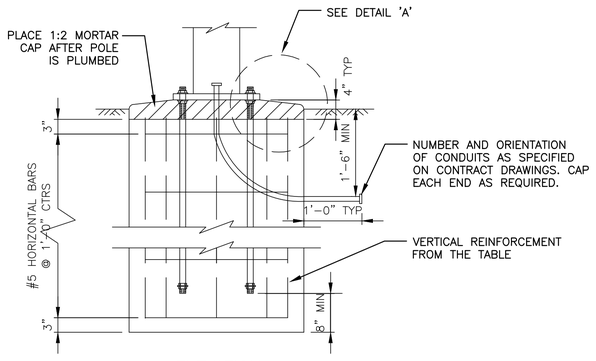
PID#




TOP VIEW
SQUARE FOOTING

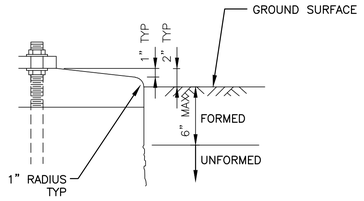



TOP VIEW
CIRCULAR FOOTING




ELEVATION

NOTE:
ANCHOR BOLTS SHOWN ARE TYPICAL ONLY. SHOP DRAWINGS SHALL BE PROVIDED.




DETAIL 'A'

| CODE NO. | FOOTING CAPACITY MOMENT IN FT – KIP AT TOP OF EARTH | J (2'–6" FOOTING) | | | | K (3'–0" FOOTING) | | | | L (3'–6" FOOTING) | | | | M (4'–0" FOOTING) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CU YDS | MINIMUM EMBEDMENT IN EARTH | VERTICAL REINFORCEMENT BARS | | CU YDS | MINIMUM EMBEDMENT IN EARTH | VERTICAL REINFORCEMENT BARS | | CU YDS | MINIMUM EMBEDMENT IN EARTH | VERTICAL REINFORCEMENT BARS | | CU YDS | MINIMUM EMBEDMENT IN EARTH | VERTICAL REINFORCEMENT BARS | |
| | | | | NO. | TYPE | | | NO. | TYPE | | | NO. | TYPE | | | NO. | TYPE |
| 1 | 40 & UNDER | 1.1 | 6'–0" | 8 | # 5 | 1.4 | 5'–3" | 8 | # 5 | – | – | – | – | – | – | – | – |
| 2 | 50 | 1.2 | 6'–6" | 8 | # 5 | 1.6 | 5'–9" | 8 | # 5 | 1.9 | 5'–4" | 8 | # 5 | 2.4 | 5'–0" | 8 | # 5 |
| 3 | 60 | 1.3 | 7'–0" | 14 | # 5 | 1.8 | 6'–6" | 12 | # 5 | 2.1 | 5'–10" | 12 | # 5 | 2.6 | 5'–6" | 8 | # 5 |
| 4 | 70 | 1.4 | 7'–6" | 14 | # 5 | 1.8 | 6'–9" | 12 | # 5 | 2.4 | 6'–6" | 12 | # 5 | 2.8 | 6'–0" | 12 | # 5 |
| 5 | 80 | 1.5 | 8'–0" | 14 | # 5 | 1.9 | 7'–3" | 16 | # 5 | 2.5 | 6'–9" | 12 | # 5 | 3.1 | 6'–6" | 12 | # 5 |
| 6 | 90 | 1.6 | 8'–6" | 14 | # 6 | 2.1 | 7'–9" | 16 | # 5 | 2.6 | 7'–3" | 16 | # 5 | 3.2 | 6'–9" | 12 | # 5 |
| 7 | 100 | 1.7 | 9'–0" | 14 | # 6 | 2.2 | 8'–3" | 16 | # 5 | 2.7 | 7'–6" | 16 | # 5 | 3.3 | 7'–0" | 16 | # 5 |
| 8 | 120 | 1.9 | 10'–0" | 14 | # 6 | 2.5 | 9'–3" | 16 | # 5 | 3.0 | 8'–3" | 16 | # 5 | 3.7 | 7'–9" | 16 | # 5 |
| 9 | 140 | 2.0 | 11'–0" | 14 | # 7 | 2.7 | 10'–0" | 16 | # 6 | 3.3 | 9'–3" | 16 | # 5 | 4.0 | 8'–6" | 16 | # 5 |
| 10 | 160 | | | | | 2.9 | 10'–9" | 16 | # 6 | 3.5 | 9'–9" | 16 | # 6 | 4.2 | 9'–0" | 16 | # 5 |
| 11 | 180 | | | | | 3.1 | 11'–6" | 16 | # 7 | 3.8 | 10'–6" | 16 | # 6 | 4.6 | 9'–9" | 16 | # 5 |
| 12 | 200 | | | | | 3.3 | 12'–3" | 16 | # 7 | 4.1 | 11'–3" | 16 | # 6 | 4.8 | 10'–3" | 16 | # 6 |
| 13 | 220 | | | | | 3.4 | 12'–9" | 16 | # 7 | 4.2 | 11'–9" | 16 | # 7 | 5.1 | 10'–9" | 16 | # 6 |
| 14 | 250 | | | | | 3.6 | 13'–9" | 16 | # 8 | 4.6 | 12'–10" | 16 | # 7 | 5.5 | 11'–9" | 16 | # 7 |
| 15 | 275 | | | | | 3.9 | 14'–9" | 16 | # 8 | 4.9 | 13'–6" | 16 | # 8 | 5.9 | 12'–6" | 16 | # 7 |
| 16 | 300 | | | | | | | | | | | | | 6.1 | 13'–0" | 16 | # 8 |
| 17 | 350 | | | | | | | | | | | | | 6.7 | 14'–4" | 16 | # 8 |
| 18 | 400 | | | | | | | | | | | | | 7.2 | 15'–6" | 16 | # 10 |
| 19 | 450 | | | | | | | | | | | | | 7.8 | 16'–9" | 19 | # 10 |
| 20 | 500 | | | | | | | | | | | | | 8.4 | 18'–0" | 21 | # 10 |

TABLE 2

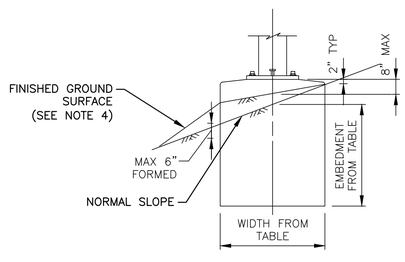
## DESIGN TABLE
## SPAN WIRE POLE FOUNDATIONS

| LOCATION | FOOTING CAPACITY (FT–KIPS) | WIDTH |
|---|---|---|
| | | |
| | | |

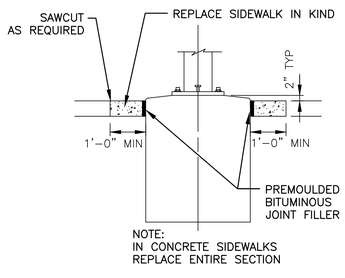
TABLE 1
(TO BE COMPLETED BY DESIGNER)

NOTES:

1. FOOTING CAPACITY AND WIDTH ARE SPECIFIED IN TABLE 1. FOOTING EMBEDMENT SHALL BE DETERMINED FROM TABLE 2 BY THE CONTRACTOR AND APPROVED BY THE ENGINEER BEFORE INSTALLATION.
2. FOOTINGS FOR SPAN WIRE POLES MAY BE EITHER CIRCULAR OR SQUARE.
3. ADJUST THE FINISHED GROUND SURFACE IN THE VICINITY OF THE FOOTING AS NECESSARY SO THAT NO FILL SPILLS ON THE TOP OF THE FOOTING AND SO THAT THE MAXIMUM DISTANCE FROM THE TOP OF FOOTING TO THE FINISHED GROUND AT THE C DOES NOT EXCEED 8 INCHES.
4. THE PANYNJ GEOTECHNICAL GROUP SHALL BE CONSULTED IF THE FOOTING WILL BE PLACED ON SOFT CLAY, ORGANIC DEPOSITS OR ANY OTHER UNSUITABLE MATERIALS.

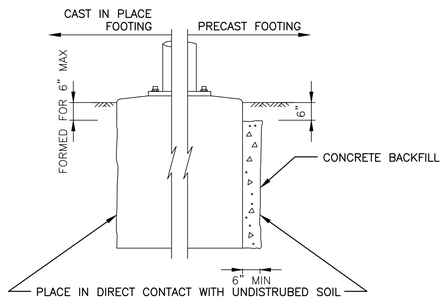



FOOTINGS IN EMBANKMENTS




NOTE:
IN CONCRETE SIDEWALKS
REPLACE ENTIRE SECTION

FOOTINGS IN SIDEWALKS




AUGERED OR DUG FOOTING

## METHODS FOR PLACING FOOTINGS

## SPAN WIRE TRAFFIC SIGNAL POLE FOUNDATION

N.T.S. TD20.29

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**TRAFFIC SIGNALS**

**SPAN WIRE TRAFFIC SIGNAL POLE FOUNDATION**

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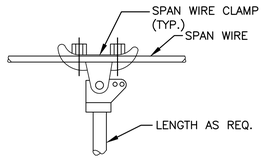


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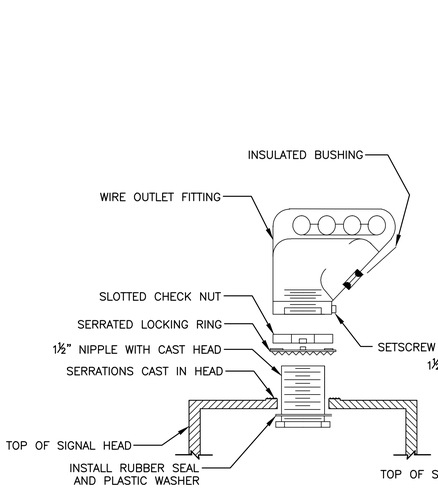
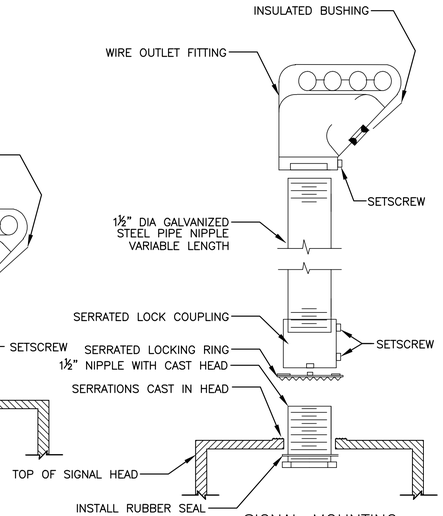
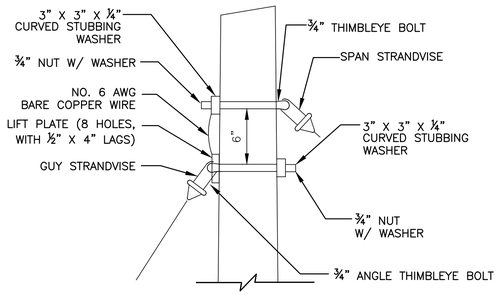



SIGNAL MOUNTING DETAIL

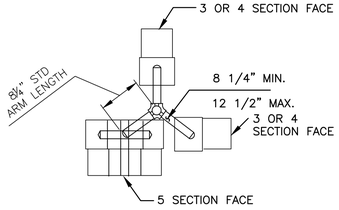



SIGNAL MOUNTING DETAIL WITH PIPE NIPPLE

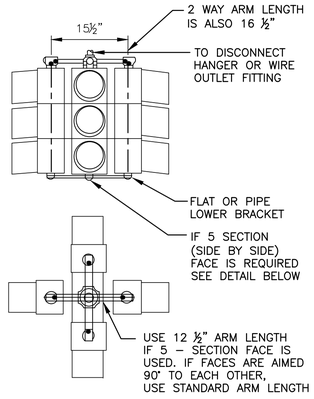
DETAIL "B"



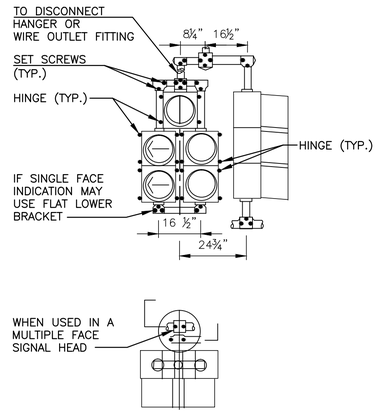

DETAIL "C"




3 – WAY, 3,4, OR 5 SECTION SIGNAL HEAD




4 – WAY 3 SECTION SIGNAL HEAD




5 – SECTION SIGNAL FACE

TRAFFIC SIGNAL ASSEMBLIES

N.T.S.

TD20.30.02

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**TRAFFIC SIGNALS**

# TRAFFIC SIGNAL ASSEMBLY

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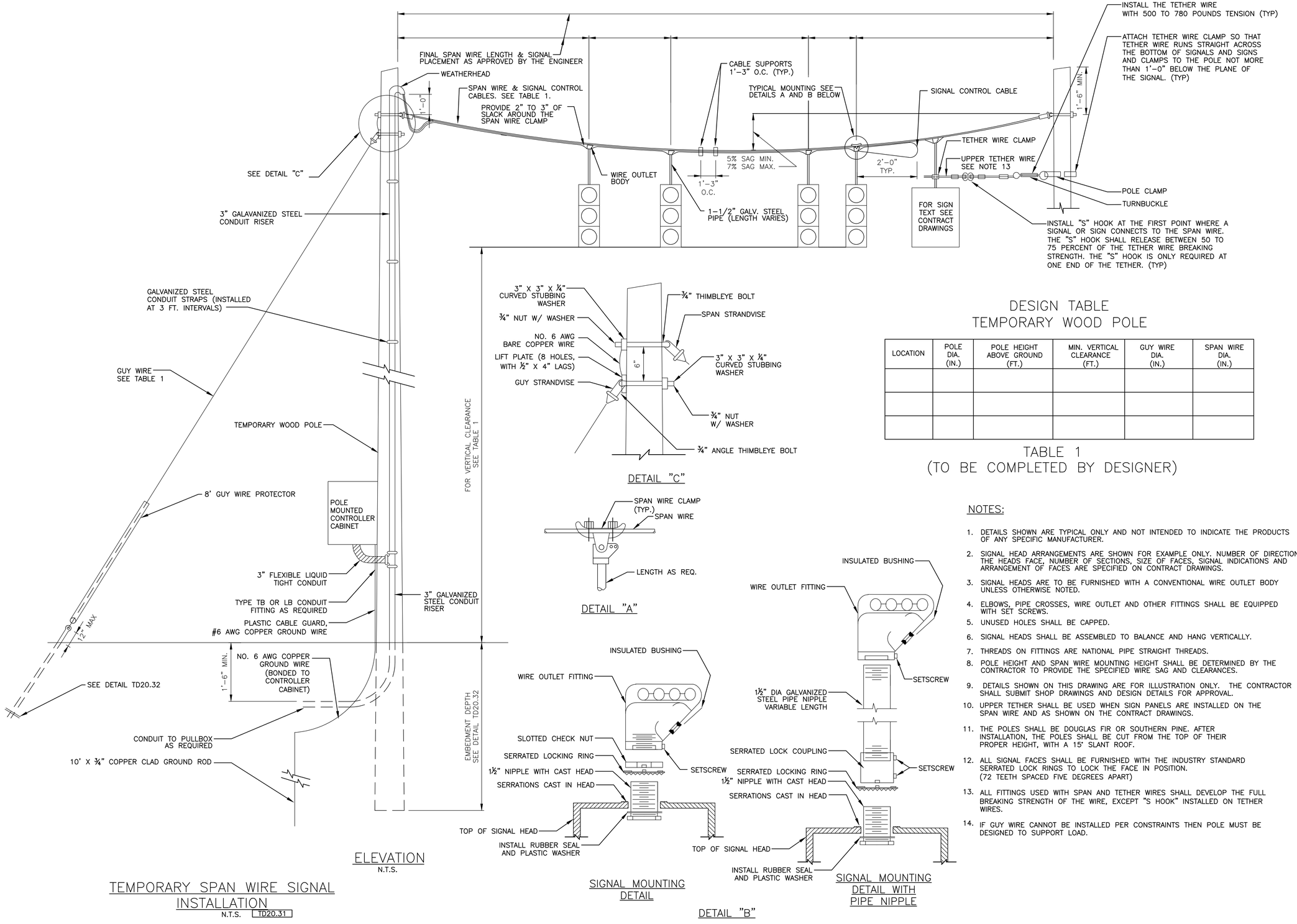


ELEVATION
N.T.S.

DETAIL "C"

DETAIL "A"

SIGNAL MOUNTING DETAIL

DETAIL "B"

SIGNAL MOUNTING DETAIL WITH PIPE NIPPLE

## DESIGN TABLE
## TEMPORARY WOOD POLE

| LOCATION | POLE DIA. (IN.) | POLE HEIGHT ABOVE GROUND (FT.) | MIN. VERTICAL CLEARANCE (FT.) | GUY WIRE DIA. (IN.) | SPAN WIRE DIA. (IN.) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

TABLE 1
(TO BE COMPLETED BY DESIGNER)

NOTES:

1. DETAILS SHOWN ARE TYPICAL ONLY AND NOT INTENDED TO INDICATE THE PRODUCTS OF ANY SPECIFIC MANUFACTURER.
2. SIGNAL HEAD ARRANGEMENTS ARE SHOWN FOR EXAMPLE ONLY. NUMBER OF DIRECTIONS THE HEADS FACE, NUMBER OF SECTIONS, SIZE OF FACES, SIGNAL INDICATIONS AND ARRANGEMENT OF FACES ARE SPECIFIED ON CONTRACT DRAWINGS.
3. SIGNAL HEADS ARE TO BE FURNISHED WITH A CONVENTIONAL WIRE OUTLET BODY UNLESS OTHERWISE NOTED.
4. ELBOWS, PIPE CROSSES, WIRE OUTLET AND OTHER FITTINGS SHALL BE EQUIPPED WITH SET SCREWS.
5. UNUSED HOLES SHALL BE CAPPED.
6. SIGNAL HEADS SHALL BE ASSEMBLED TO BALANCE AND HANG VERTICALLY.
7. THREADS ON FITTINGS ARE NATIONAL PIPE STRAIGHT THREADS.
8. POLE HEIGHT AND SPAN WIRE MOUNTING HEIGHT SHALL BE DETERMINED BY THE CONTRACTOR TO PROVIDE THE SPECIFIED WIRE SAG AND CLEARANCES.
9. DETAILS SHOWN ON THIS DRAWING ARE FOR ILLUSTRATION ONLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN DETAILS FOR APPROVAL.
10. UPPER TETHER SHALL BE USED WHEN SIGN PANELS ARE INSTALLED ON THE SPAN WIRE AND AS SHOWN ON THE CONTRACT DRAWINGS.
11. THE POLES SHALL BE DOUGLAS FIR OR SOUTHERN PINE. AFTER INSTALLATION, THE POLES SHALL BE CUT FROM THE TOP OF THEIR PROPER HEIGHT, WITH A 15° SLANT ROOF.
12. ALL SIGNAL FACES SHALL BE FURNISHED WITH THE INDUSTRY STANDARD SERRATED LOCK RINGS TO LOCK THE FACE IN POSITION. (72 TEETH SPACED FIVE DEGREES APART)
13. ALL FITTINGS USED WITH SPAN AND TETHER WIRES SHALL DEVELOP THE FULL BREAKING STRENGTH OF THE WIRE, EXCEPT "S HOOK" INSTALLED ON TETHER WIRES.
14. IF GUY WIRE CANNOT BE INSTALLED PER CONSTRAINTS THEN POLE MUST BE DESIGNED TO SUPPORT LOAD.

## TEMPORARY SPAN WIRE SIGNAL INSTALLATION

N.T.S. TD20.31

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**TRAFFIC SIGNALS**

**TEMPORARY SPAN WIRE SIGNAL INSTALLATION -1-**

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Date **SEPT 2011**

Contract Number

Drawing Number **TD20.31**

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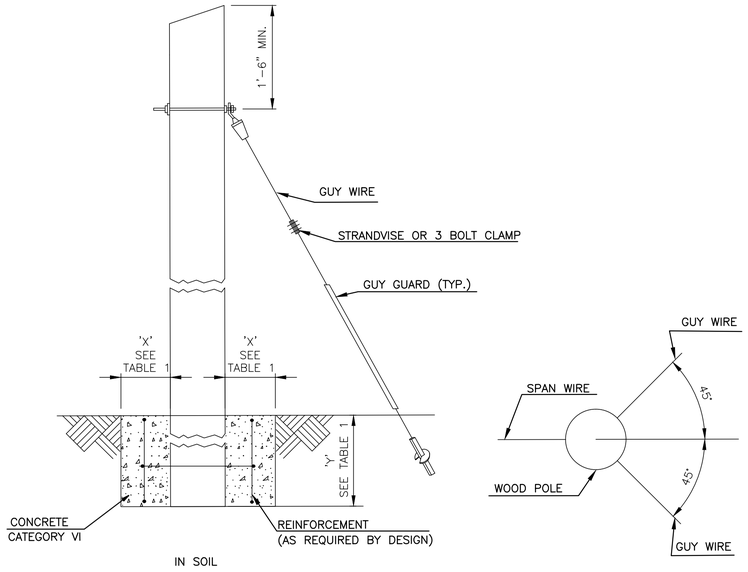



SIDE VIEW TOP VIEW

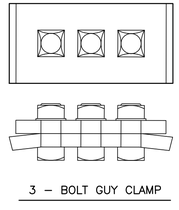
## WOOD POLE INSTALLATION

(FOR SPANS WITH OVER-THE-ROADWAY TRAFFIC SIGNALS)

## DESIGN TABLE SPAN WIRE

| WIRE DIAMETER IN. | BREAKING STRENGTH LBS. |
|---|---|
| 5/16" | 6,000 |
| 3/8" | 11,500 |
| 1/2" | 25,000 |

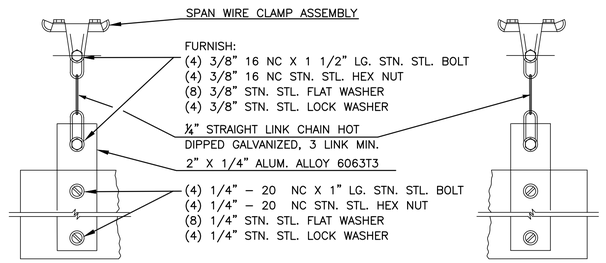
TABLE 2



3 - BOLT GUY CLAMP

## TEMPORARY SPAN WIRE SIGNAL INSTALLATION

N.T.S. TD20.32




SIGN INSTALLATION

## TEMPORARY WOOD POLE FOUNDATION DESIGN TABLE

| LOCATION | X (FT.) | Y (FT.) | NUMBER OF HELICES |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

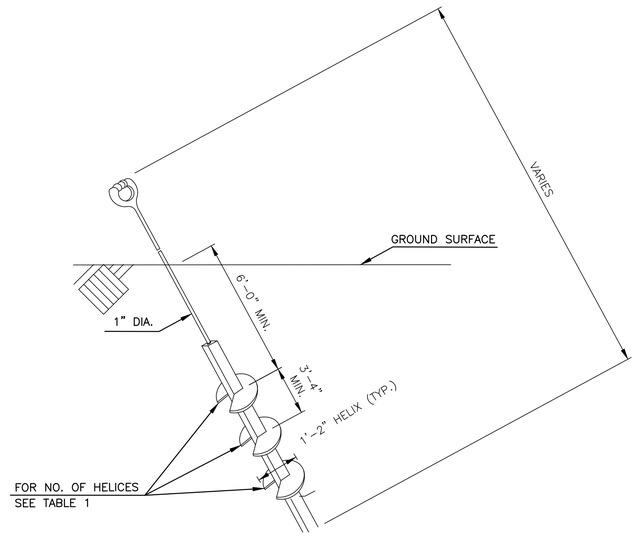
TABLE 1
(TO BE COMPLETED BY DESIGNER)

### SPECIFICATIONS:

1. MINIMUM DEPTH TO UPPER MOST HELIX = 6'.
2. MINIMUM SPACING OF HELICES = 3'-4".
3. MINIMUM HELIX DIAMETER = 1'-2".
4. MINIMUM SHAFT AREA = 2.25 SQ. IN.

### NOTES:

1. PROVIDE GALVANIZED HELICAL ANCHOR SYSTEM AS MANUFACTURED BY CHANCE CO. OR APPROVED EQUAL.
2. INSTALL HELICAL ANCHOR SYSTEM IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. SUBMIT CATALOG CUT FOR ACCEPTANCE PRIOR TO INSTALLATION.

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**TRAFFIC SIGNALS**

**TEMPORARY SPAN WIRE SIGNAL INSTALLATION -2-**

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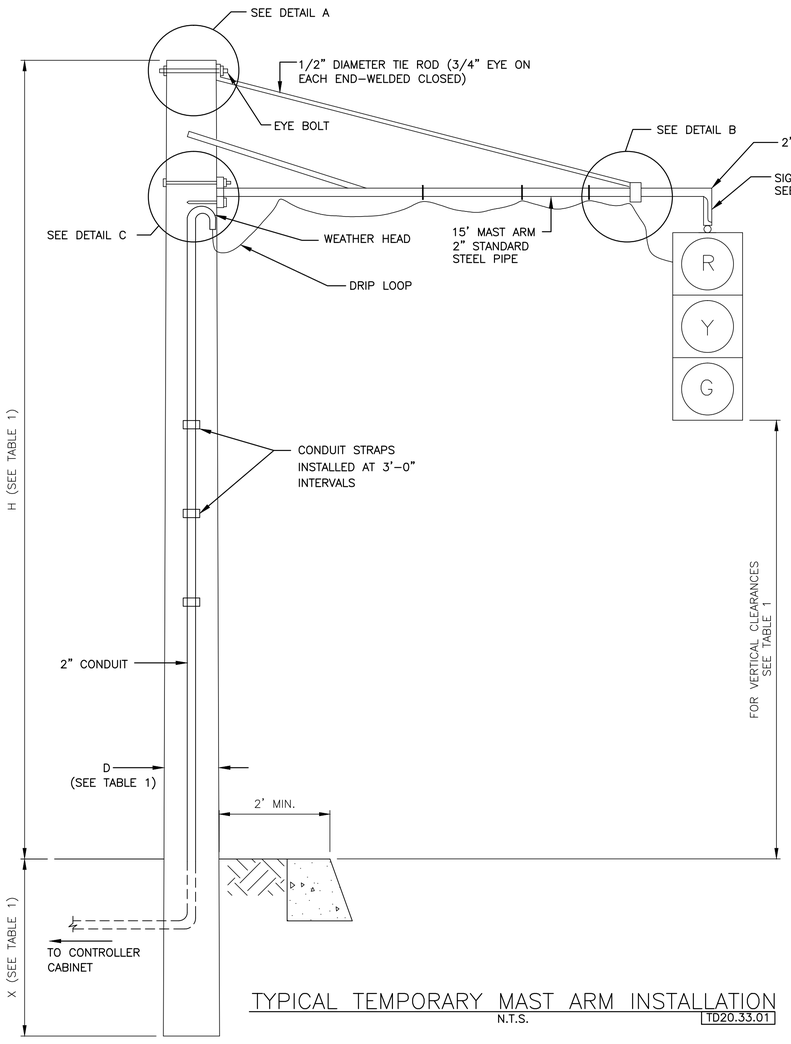


TYPICAL TEMPORARY MAST ARM INSTALLATION
N.T.S. TD20.33.01

NOTE:

1. DETAILS SHOWN ON THIS DRAWING ARE FOR ILLUSTRATION ONLY. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN DETAILS FOR APPROVAL.
2. ALTERNATIVE MOUNTING DESIGN MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

DESIGN TABLE

TEMPORARY WOOD POLE

| | D | H | X |
|---|---|---|---|
| LOCATION | POLE DIAMETER | POLE HEIGHT ABOVE GROUND | DEPTH OF EMBEDMENT |
| | | | |
| | | | |
| | | | |

TABLE 1
(TO BE COMPLETED BY DESIGNER)

NOTES:

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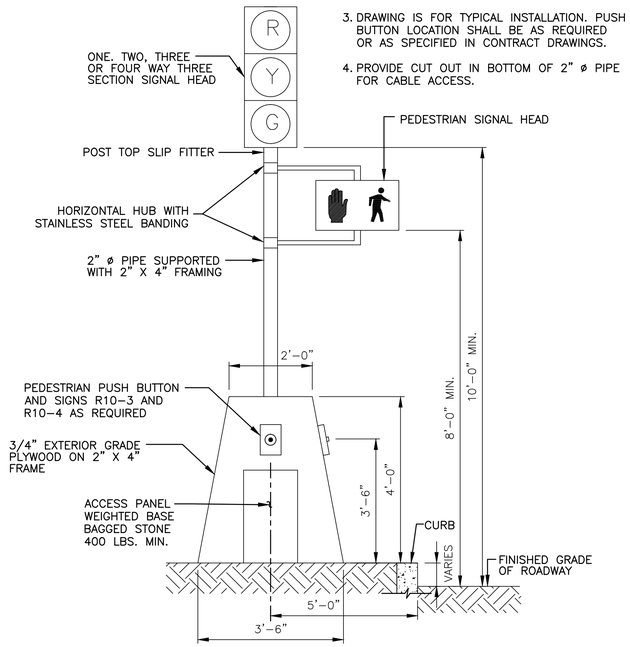
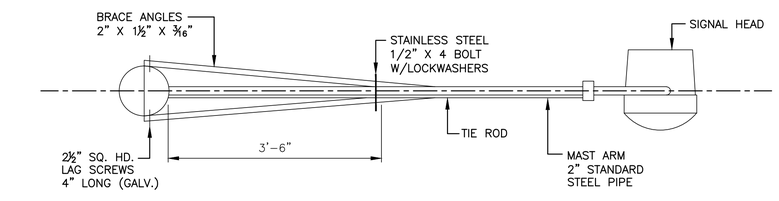
2. ALTERNATIVE MOUNTING DESIGN MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
3. DRAWING IS FOR TYPICAL INSTALLATION. PUSH BUTTON LOCATION SHALL BE AS REQUIRED OR AS SPECIFIED IN CONTRACT DRAWINGS.
4. PROVIDE CUT OUT IN BOTTOM OF 2" ø PIPE FOR CABLE ACCESS.

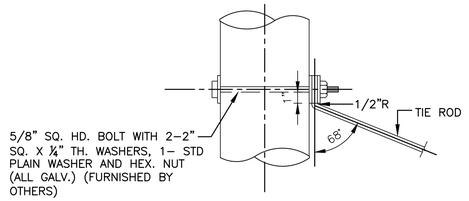



TEMPORARY PEDESTAL POLE
N.T.S. TD20.33.02

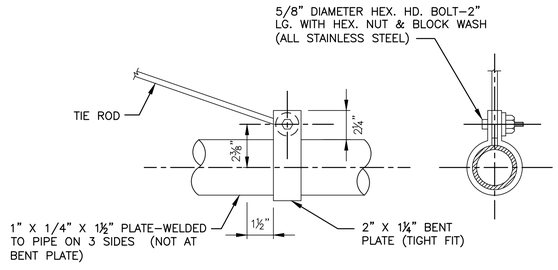



PLAN

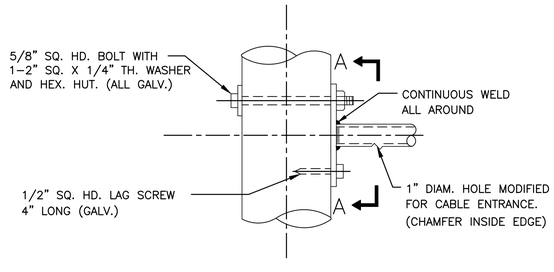
TEMPORARY MAST ARM



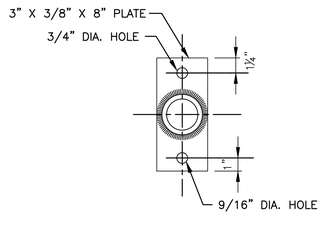

DETAIL A




DETAIL B




DETAIL C




SECTION A–A

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**TRAFFIC SIGNALS**

# TEMPORARY MAST ARM AND PEDESTAL

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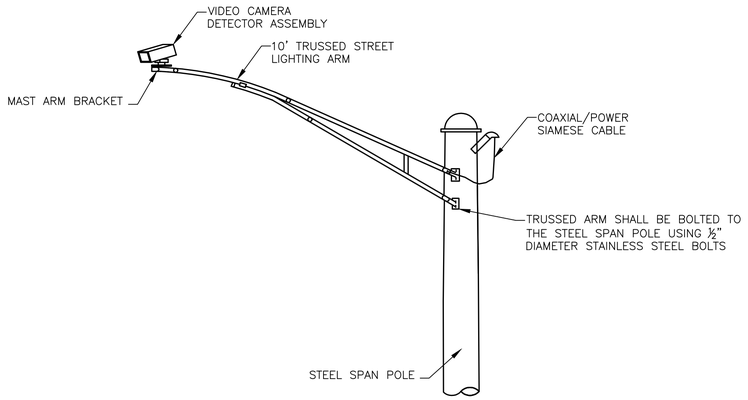
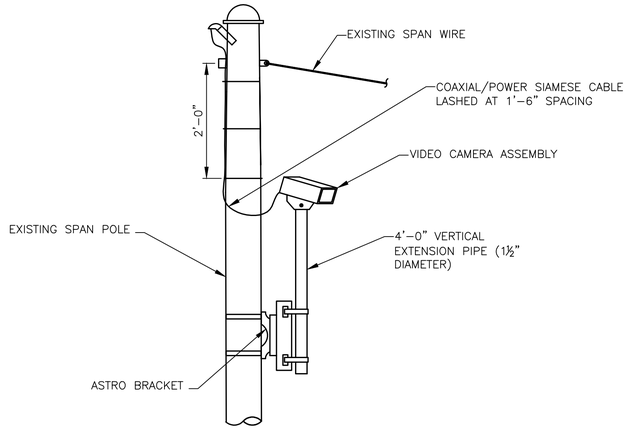


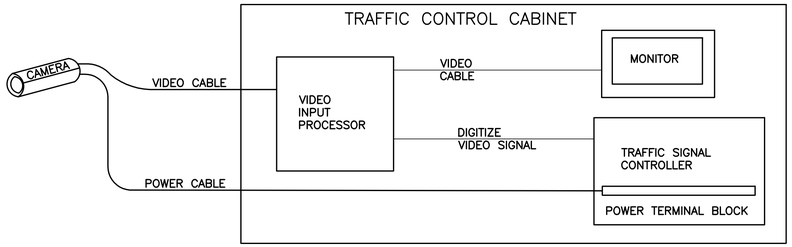

CAMERA MOUNTING ON ROADWAY LIGHTING MAST ARM



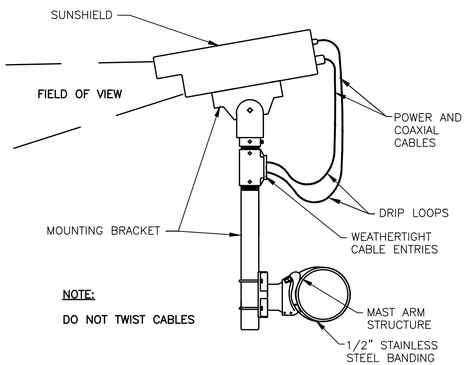

CAMERA MOUNTING ON SPAN WIRE SIGNAL POLE

NOTES:

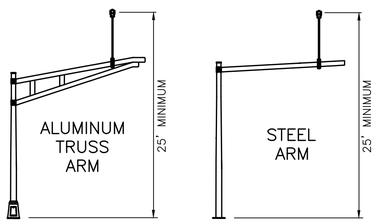
1. REFER TO MANUFACTURER FOR INSTALLATION DETAILS AND DETECTION ZONE SET-UP.
2. CONTINUOUS WIRE SHALL BE INSTALLED FROM CAMERA TO CONTROLLER. NO SPLICES ALLOWED.




OPERATIONAL BLOCK DIAGRAM




CAMERA DETAIL




POLE MOUNTING DETAILS ARE FOR ILLUSTRATIVE PURPOSES ONLY. FINAL MOUNTING LOCATIONS TO BE DETERMINED DURING INSTALLATION.

TYPICAL MAST ARM MOUNTING DETAIL

CAMERA MOUNTING ON TRAFFIC SIGNAL MAST ARM

# VIDEO CAMERA MOUNTING DETAILS

N.T.S. TD20.34

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**VIDEO CAMERA MOUNTING DETAILS**

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