



Request for Proposals
Specifications and Proposal Documents Attached

Proposal No.: 2022-05

Opening Date and Time: April 5, 2022 at 2 P.M.

Title: Water Street at Ferry Street and Governor Winthrop Boulevard Traffic Signal Improvements

Special Instructions:

- 1. There will be a **MANDATORY** site visit on **March 21, 2022 at 10 A.M.**
- 2. All questions should be directed to Joshua Montague by email at jmontague@newlondonct.org no later than **March 28, 2022 at 4 P.M.**

The following information must appear in the lower left hand corner of the envelope:

Sealed Proposal No.: 2022-05

Not to be opened until April 5, 2022 at 2 P.M.

Return Bid to:

Joshua Montague; Accounting Purchasing Agent
City of New London
13 Masonic Street
New London, CT 06320

Proposals shall not be accepted after the Opening Date and Time indicated above.



PLEASE RETURN THIS FORM IMMEDIATELY

Acknowledgment: Receipt of Request for Proposals

Bid No.: 2022-05 Water Street at Ferry Street and Governor Winthrop Boulevard Traffic Signal Improvements

Please take a moment to acknowledge receipt of the attached documents. Your compliance with this request will help us to maintain proper follow-up procedures and will ensure that you receive any addendum that may be issued.

Date Issued: March 2, 2022

Date documents received: _____/_____/_____

Do you plan to submit a response? Yes _____ No _____

Print or type the following information:

Company Name: _____

Address: _____

Telephone: _____ Fax: _____

E-mail: _____

Received by: _____

Note: Faxed or e-mailed acknowledgments are requested.

Fax No.: (860)447-5297

E-mail: jmontague@newlondonct.org

Fax this sheet only. A cover sheet is not required.



City of New London

Department of Finance-Purchasing Agent
13 Masonic Street • New London, CT 06320 • Phone (860) 447-5215 • Fax (860) 447-5297

Standard Invitation for Bids (IFB) and Contract Terms and Conditions

All Invitations for Bids issued by the City of New London (City) will bind Bidders to the terms and conditions listed below, unless specified otherwise in any individual Invitation for Bids.

Incorporated by reference into this contract are the provisions of Section 2-66 through 2-71 of the Code of Ordinances of the City of New London.

The contractor agrees to comply with the Code of Ordinances as they exist on the date of the contract and as they may be adopted or amended from time to time during the term of this contract and any amendments thereto.

Submission of Bids

1. Bids must be submitted on forms supplied by the City of New London. Telephone, facsimile or e-mail bids will not be accepted in response to an Invitation for Bids. An original and one (1) copy of the Proposal Form shall be returned to the Purchasing Agent.
2. The date and time bids are to be opened are given in each Invitation for Bids issued. Bids received after the specified date and time of the bid opening given in each Invitation for Bids will not be considered. Bid envelopes must clearly indicate the bid number as well as the date and time of the bid opening. The name and address of the bidder should appear in the upper left-hand corner of the envelope.
3. Incomplete proposal forms may result in the rejection of the bid Amendments to bids received by the Purchasing Agent after the date and time specified for the bid opening shall not be considered. Bids shall be computer prepared, typewritten or handwritten in ink. Bids submitted in pencil shall be rejected. A person duly authorized to sign bids for the bidder shall sign all bids. Unsigned bids shall be rejected. The person signing the Proposal Form or their authorized designee must initial errors, alterations or corrections on both the original and copy of the Proposal Form to be returned. In the event an authorized designee initials a correction, there must be written authorization from the person signing the Proposal Form to the person initialing the erasure, alterations or corrections. Failure to do so shall result in rejection of the bid for those items erased, altered or corrected and not initialed.
4. Conditional bids are subject to rejection in whole or in part. A conditional bid is defined as one that limits, modifies, expands or supplements any of the terms and conditions and/or specifications of the Invitation for Bids.
5. Alternate bids will not be considered. An alternate bid is defined as one that is submitted in addition to the bidder's primary response to the Invitation for Bids.
6. Prices should be extended in decimal, not fraction, to be net and shall include delivery and transportation charges fully prepaid by the Contractor to the destination specified in the Invitation for Bids and subject only to cash discount.
7. Pursuant to Sections 12-412 and 12-412(1) of the Connecticut General Statutes, the City of New London is exempt from the payment of excise, transportation and sales taxes imposed by the Federal Government and/or the State. Such taxes must not be included in the bid prices.
8. In the event of a discrepancy between the unit price and the extension, the unit price shall govern.
9. By its submission the Bidder represents that the bid is not made in connection with any other Bidder submitting a bid for the same commodity or commodities and is in all respects fair and without collusion or fraud.

Standard Invitation for Bids (IFB) and Contract Terms and Conditions

10. All bids will be opened and read publicly and upon award are subject to public inspection.

Guaranty or Surety

11. Bid bonds, performance bonds, and labor and material bonds will be required as specified below. Guaranty or surety may be in the form of certified check. Bonds must meet the following requirements: Corporation – must be signed by an official of the corporation above their official title and the corporate seal must be affixed over the signature; Firm or Partnership - must be signed by all of the partners and indicate they are “doing business as”; Individual – must be signed by the owner and indicated as “Owner”. The surety company executing the bond or countersigning must be licensed in Connecticut and an official of the surety company must sign the bond with the corporate seal affixed over the signature. Signatures of two (2) witnesses for both the principal and the surety must appear on the bond. Power of attorney for the official signing the bond for the surety company must be submitted with the bond.

Bid Bond – Ten percent (10%) due at time of bid for all contract services and public works/construction projects that exceed twenty thousand dollars (\$20,000.00)

Performance Bond – One hundred percent (100%) of contract price for projects that exceed fifty thousand dollars (\$50,000.00).

Labor and Material Payment Bonds – One hundred percent (100%) of contract price for projects that exceed fifty thousand dollars (\$50,000.00).

Award

12. Award of this contract will be made to the lowest responsible, qualified bidder and will be based on net cost and City specifications.
13. The City of New London may reject any bidder in default of any prior contract or guilty of misrepresentation or any bidder with a member of its firm in default or guilty of misrepresentation.
14. The Purchasing Agent may correct inaccurate awards resulting from clerical or administrative errors.

Other Requirements

15. The City has an employment preference goal that jobs be offered to local residents on public prevailing wage projects with thresholds great than \$100,000 for renovation and \$1,000,000 for new construction. For such projects, it is understood that contractors shall make a good faith effort to employ a participating workforce comprised of twenty-five (25%) local residents of New London County, CT, with residents of the City of New London, CT getting a priority representing fifty percent (50%) of said participation, which will include twenty-five percent (25%) female and minority.
16. The City has an employee training preference goal that apprenticeship opportunities be made available for state licensed trades on public prevailing wage projects with thresholds greater than \$100,000 for renovation and \$1,000,000 for new construction. For such projects, it is understood that contractors shall make a good faith effort to employ a minimum of ten percent (10%) of the workforce per state licensed trade as apprentices and, of this number, a minimum of fifty percent (50) shall be in the first year of apprenticeship training.

Standard Invitation for Bids (IFB) and Contract Terms and Conditions (con't)

Contract

17. The existence of a contract shall be determined in accordance with the requirements set forth above.
18. The contractor who is selected to perform this State project must comply with CONN. GEN. STAT. §§ 4a-60, 4a-60a, 4a-60g, and 46a-68b through 46a-68f, inclusive, as amended by June 2015 Special Session Public Act 15-5. State law requires a minimum of twenty-five (25%) percent of the state-funded portion of the contract for award to subcontractors holding current certification from the Connecticut Department of Administrative Services (“DAS”) under the provisions of CONN. GEN. STAT. § 4a-60g. (25% of the work with DAS certified Small and Minority owned businesses and 25% of that work with DAS certified Minority, Women and/or Disabled owned businesses.) The contractor must demonstrate good faith effort to meet the 25% set-aside goals. For municipal public works contracts and quasi-public agency projects, the contractor must file a written or electronic non-discrimination certification with the Commission on Human Rights and Opportunities. Forms can be found at: http://www.ct.gov/opm/cwp/view.asp?a=2982&q=390928&opmNav_GID=1806
19. The Contractor shall not assign or otherwise dispose its contract or its right, title or interest, or its power to execute such contract to any other person, firm or corporation without the prior written consent of the City of New London.
20. Failure of a Contractor to deliver commodities or perform services as specified will constitute authority for the City of New London to purchase these commodities or services on the open market. The contractor agrees to promptly reimburse the City of New London for excess cost of these purchases. The purchases will be deducted from the contracted quantities.
21. The Contractor agrees to hold the City of New London harmless from liability of any kind for the use of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention furnished or used in the performance of the Contract; Guarantee its products against defective material or workmanship; repair damages of any kind, for which it is responsible to the premises or equipment, to its own work or to the work of other contractors; obtain and pay for all licenses, permits, fees etc., and to give all notices and comply with all requirements of the City of New London, the State of Connecticut and the U.S. Government.
22. Insurance requirements generally apply to contract services, professional services and public works improvement/construction projects. The Contractor will carry commercial general liability insurance to protect the City of New London from loss. The following minimum limits shall be met:

Bodily Injury and Property Damage – One million dollars (\$1,000,000.00) each occurrence; two million dollars (\$2,000,000.00) aggregate

Products or Completed Operations - One million dollars (\$1,000,000.00) each occurrence; two million dollars (\$2,000,000.00) aggregate

Professional Liability (Errors and Omissions) Coverage appropriate to the contractor's operations – Two million dollars (\$2,000,000.00) each occurrence

Commercial Automobile Coverage including owned, non-owned, leased and hired vehicles (if used on City of New London property) – One million dollars (\$1,000,000.00) combined single limit for each accident.

Workers' Compensation Coverage - Will be in accordance with State of Connecticut requirements at the time of bid.

Any deductible or self-insured retention must be disclosed and any claim payments falling within the deductible shall be the responsibility of the contractor.

The Contractor shall require all subcontractors to carry the same forms and minimum coverages that it is required to provide. Evidence of these coverages must be provided to the City of New London Purchasing Agent prior to the contractor or subcontractor coming onto the work site.

Standard Invitation for Bids (IFB) and Contract Terms and Conditions (con't)

All insurance policies shall be endorsed to the City of New London, its officers and employees as additional insured, and shall not be reduced or cancelled without thirty (30) days prior written notice to the Purchasing Agent. In addition, the contractor's insurance shall be primary as respects the City of New London, and any other insurance maintained by the City of New London shall be excess and not contributing insurance with the contractor's insurance.

Contractor shall agree to maintain in force at all times during the contract the following minimum coverages and shall name the City of New London as an Additional Insured on a primary and non-contributory basis to all policies, except Workers Compensation. All policies should also include a Waiver of Subrogation. The Additional Insured Endorsement shall be written on ISO Form 2010 and 2037 or its equivalent and shall include coverage for Products/Completed Operations after the work is complete.

23. Notwithstanding any provision or language in this contract to the contrary, the Mayor may, without cause, terminate this contract upon approval by the City Council, whenever he/she determines that such termination is in the best interest of the City of New London. Any such termination shall be effected by delivery to the Contractor of a written notice of termination. The notice of termination shall be sent by registered mail to the Contractor address furnished to the City of New London for purposes of correspondence or by hand delivery. Upon receipt of such notice, the Contractor shall both Immediately discontinue all services affected (unless the notice directs otherwise) and deliver to the City of New London all data, drawings, specifications, reports, estimates, summaries, and such other information and materials as may have been accumulated by the Contractor in performing its duties under this contract, whether completed or in progress. All such documents, information and materials shall become the property of the City of New London. In the event of such termination, the contractor shall be entitled to reasonable compensation as determined by the Mayor, however, no compensation for lost profits shall be allowed.

Delivery

24. All products and equipment delivered must be new unless otherwise stated in the proposal specifications.
25. All deliveries will be to the locations specified by the City of New London. The City of New London does not have a loading dock therefore all Contractors will be responsible for inside delivery without assistance from City of New London personnel.
26. Payment terms are net 45 days after receipt of goods or invoice, whichever is later, unless otherwise specified.
27. Charges against a Contractor shall be deducted from current obligations. Money paid to the City of New London shall be payable to the Treasurer, City of New London.

Saving Clause

28. The Contractor shall not be liable for losses or delays in the fulfillment of the terms of the contract due to wars, acts of public enemies, strikes, fires, floods, acts of God or any other acts not within the control of or reasonably prevented by the Contractor. The contractor will give written notice of the cause and probable duration of any such delay.

Advertising

29. Contractors may not reference sales to the City of New London for advertising and promotional purposes without prior approval of the City of New London.

Standard Invitation for Bids (IFB) and Contract Terms and Conditions (con't)

Rights

30. The City of New London has sole and exclusive right and title to all printed material produced for the City of New London and the Contractor shall not copyright the printed matter produced under this contract.
31. The Contractor assigns to the City of New London all rights, title and interests in and to all causes of action it may have under Section 4 of the Clayton Act, 15 USC 15, or under Chapter 624 of the Connecticut General Statutes. This assignment occurs when the contractor is awarded the contract.
32. The Contractor agrees that it is in compliance with all applicable federal, state and local regulations, including but not limited to Connecticut General Statutes Section 7-148i. The Contractor also agrees that it will hold the City of New London harmless and indemnify the City of New London from any action which may arise out of any act by the Contractor concerning lack of compliance with these laws and regulations. All purchases will be in compliance with Sections 22a-194 to 22a-194g of the Connecticut General Statutes related to product packaging.
33. This contract is subject to the provisions of Executive Order Number Three of Governor Thomas J. Meskill promulgated June 16, 1971, the provision of Executive Order Number Seventeen of Governor Thomas J. Meskill promulgated February 15, 1973 and Section 16 of Public Act 91-58, nondiscrimination regarding sexual orientation, and the provisions of Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999 regarding Violence in the Workplace Prevention Policy.

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST. QTY	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
0201001		LS	CLEARING AND GRUBBING at _____ dollars and _____ cents per lump sum		
0202452A	2	EA	TEST PIT at _____ dollars and _____ cents per each		
0202529	125	LF	CUT BITUMINOUS CONCRETE PAVEMENT at _____ dollars and _____ cents per lineal foot		
0205002	5	CY	ROCK-IN-TRENCH EXCAVATION 0'-4' DEEP at _____ dollars and _____ cents per cubic yard		
0219011	8	EA	SEDIMENT CONTROL SYSTEM AT CATCH BASIN at _____ dollars and _____ cents per each		
0504009		EST	RAILROAD PROTECTION at _____ dollars and _____ cents estimated	\$5,000	\$5,000
0813021	100	LF	6" GRANITE STONE CURBING at _____ dollars and _____ cents lineal foot		
0813031	30	LF	6" GRANITE CURVED STONE CURBING at _____ dollars and _____ cents per lineal		
0921001	1050	SF	CONCRETE SIDEWALK at _____ dollars and _____ cents per square foot		
0921005	275	SF	CONCRETE SIDEWALK RAMP at _____ dollars and _____ cents per square foot		
0921031A	330	SF	DECORATIVE CONCRETE CROSSWALK (BRICK PATTERN) at _____ dollars and _____ cents square foot		
0921039	6	EA	DETECTABLE WARNING STRIP at _____ dollars and _____ cents per each		

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
0944000	25	SY	FURNISHING AND PLACING TOPSOIL at _____ dollars and _____ cents per square yard		
0950005	25	SY	TURF ESTABLISHMENT at _____ dollars and _____ cents per square yard		
0970006		EST	TRAFFICPERSON (MUNICIPAL POLICE OFFICER) at _____ dollars and _____ cents estimated	\$30,000	\$30,000
0971001A		LS	MAINTENANCE AND PROTECTION OF TRAFFIC at _____ dollars and _____ cents per lump		
0975004		LS	MOBILIZATION AND PROJECT CLOSEOUT at _____ dollars and _____ cents per lump		
0976002	100	DAY	BARRICADE WARNING LIGHTS- HIGH INTENSITY at _____ dollars and _____ cents per day		
0977001	25	EA	TRAFFIC CONE at _____ dollars and _____ cents per each		
0978002	25	EA	TRAFFIC DRUM at _____ dollars and _____ cents per		
0979003	5	EA	CONSTRUCTION BARRICADE TYPE III at _____ dollars and _____ cents per each		
0980001		LS	CONSTRUCTION STAKING at _____ dollars and _____ cents per lump sum		
1001001	300	LF	TRENCHING AND BACKFILLING at _____ dollars and _____ cents per linear foot		

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
1002015	6	VF	ROCK IN FOUNDATION EXCAVATION at _____ dollars and _____ cents per vertical foot		
1002202A	3	EA	TRAFFIC CONTROL FOUNDATION - MAST ARM at _____ dollars and _____ cents per each		
1002203	3	EA	TRAFFIC CONTROL FOUNDATION - PEDESTAL - TYPE I at _____ dollars and _____ cents per each		
1002208	1	EA	TRAFFIC CONTROL FOUNDATION - CONTROLLER - TYPE IV at _____ dollars and _____ cents per each		
1005600A	1	EA	LED LUMINAIRE at _____ dollars and _____ cents per each		
1008115	90	LF	2" RIGID METAL CONDUIT IN TRENCH at _____ dollars and _____ cents per linear foot		
1008117	60	LF	3" RIGID METAL CONDUIT IN TRENCH at _____ dollars and _____ cents per linear		
1008215	380	LF	2" RIGID METAL CONDUIT UNDER ROADWAY at _____ dollars and _____ cents per linear		
1008908A	100	LF	CLEAN EXISTING CONDUIT at _____ dollars and _____ cents per linear		
1010011	4	EA	CONCRETE HANDHOLE - TYPE I at _____ dollars and _____ cents per each		
1010052	3	EA	CAST IRON HANDHOLE COVER at _____ dollars and _____ cents per each		

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
11010060A	3	EA	CLEAN EXISTING CONCRETE HANDHOLE at _____dollars and _____cents per each		
11017053	1	EA	SERVICE (UNMETERED) at _____dollars and _____cents per each		
1102002	3	EA	8' ALUMINUM PEDESTAL at _____dollars and _____cents per each		
1104033A	1	EA	40' STEEL MAST ARM ASSEMBLY at _____dollars and _____cents per each		
1104038A	1	EA	50' STEEL MAST ARM ASSEMBLY at _____dollars and _____cents per each		
1104555A	1	EA	COMBINATION MAST ARM ASSEMBLY, 40-1W at _____dollars and _____cents per each		
1105150A	2	EA	1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL, PROGRAMMED at _____dollars and _____cents per each		
1105103A	11	EA	1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL at _____dollars and _____cents per each		
1106001A	2	EA	1 WAY PEDESTRIAN SIGNAL POLE MOUNTED at _____dollars and _____cents per each		
1106003A	2	EA	1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED at _____dollars and _____cents per each		
1106004A	1	EA	2 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED at _____dollars and _____cents per each		

Bid Calculation Sheets

2022_05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
1107011A	6	EA	ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A) at _____dollars and _____cents per each		
1108115A	1	EA	FULL ACTUATED CONTROLLER 8 PHASE at _____dollars and _____cents per each		
1108725A	1	EA	PHASE SELECTOR (MODIFIED) at _____dollars and _____cents per each		
1111201A		LS	TEMPORARY DETECTION (SITE NO. 1) at _____dollars and _____cents per lump sum		
1112284A	1	EA	VEHICLE DETECTION MONITOR at _____dollars and _____cents per each		
1112286A	2	EA	360 DEGREE CAMERA ASSEMBLY at _____dollars and _____cents per each		
1112287A	1	EA	360 DEGREE VIDEO DETECTION PROCESSOR at _____dollars and _____cents per each		
1112413A	2	EA	DETECTOR (TYPE A) (MODIFIED) at _____dollars and _____cents per each		
1112471A	1	EA	PRE-EMPTION SYSTEM CHASSIS (MODIFIED) at _____dollars and _____cents per each		
1113005	50	LF	2 CONDUCTOR NO. 8 AWG TYPE SE STYLE RHW OR THW at _____dollars and _____cents per linear foot		
1113102	1175	LF	5 CONDUCTOR NO. 14 CABLE at _____dollars and _____cents per linear foot		

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
1113103	400	LF	7 CONDUCTOR NO. 14 CABLE at _____ dollars and _____ cents per linear foot		
1113511A		LS	RELOCATE RAILROAD PRE-EMPTION CABLE (SITE NO. 1) at _____ dollars and _____ cents per lump		
1113725A	400	LF	23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE at _____ dollars and _____ cents per linear foot		
1113550	300	LF	DETECTOR CABLE (OPTICAL) at _____ dollars and _____ cents per linear		
1116100A	2	EA	INTERNALLY ILLUMINATED SIGN (LED) at _____ dollars and _____ cents per each		
1118012A		LS	REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT at _____ dollars and _____ cents per lump sum		
1118051A		LS	TEMPORARY SIGNALIZATION (SITE NO. 1) at _____ dollars and _____ cents per lump sum		
1206023		LS	REMOVAL AND RELOCATION OF EXISTING SIGNS at _____ dollars and _____ cents per lump sum		
1208931	175	SF	SIGN FACE - SHEET ALUMINUM (TYPE IX RETROREFLECTIVE SHEETING) at _____ dollars and _____ cents per square foot		
1210101	345	LF	4" WHITE EPOXY RESIN PAVEMENT MARKINGS at _____ dollars and _____ cents per linear foot		
1210102	230	LF	4" YELLOW EPOXY RESIN PAVEMENT MARKINGS at _____ dollars and _____ cents per linear foot		

Bid Calculation Sheets

2022-05 Water/Ferry Street Improvements

Water Street at Governor Winthrop Boulevard & Ferry Street Traffic Control Signal Upgrade

ITEM NO.	EST.	UNITS	DESCRIPTION AND WRITTEN UNIT PRICE	UNIT PRICE	AMOUNT
1210104	415	LF	8" WHITE EPOXY RESIN PAVEMENT MARKINGS at _____dollars and _____cents per linear foot		
1210105	750	SF	EPOXY RESIN PAVEMENT MARKINGS, SYMBOLS, AND LEGENDS at _____dollars and _____cents per square foot		
1211001	520	SF	REMOVAL OF PAVEMENT MARKINGS at _____dollars and _____cents per square foot		
1220000A	1	EA	PROJECT SIGN at _____dollars and _____cents per each		
1220027	50	SF	CONSTRUCTION SIGNS at _____dollars and _____cents per square foot		

The total amount of this Bid is based on the estimated quantities above and include all items listed above (taking into account changes due to addenda if any) as computed by the above signed bidder is:

			Total (in Dollars)		\$
			Total (in words)		
			_____dollars and _____cents		

**Minimum Rates and Classifications for
Heavy/Highway Construction**

ID#: 22-32185

**Connecticut Department of Labor
Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: #2022-05

Project Town: New London

State#: #2022-05

FAP#: New London

Project: Water and Ferry Streets Improvements (New London)

CLASSIFICATION	Hourly Rate	Benefits
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	38.27	34.47
2) Carpenters, Piledrivermen	35.57	25.65
2a) Diver Tenders	35.57	25.65
3) Divers	44.03	25.65
03a) Millwrights	36.32	26.81
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	54.0	22.90
4a) Painters: Brush and Roller	36.42	22.90
4b) Painters: Spray Only	39.42	22.90
4c) Painters: Steel Only	38.42	22.90
4d) Painters: Blast and Spray	39.42	22.90
4e) Painters: Tanks, Tower and Swing	38.42	22.90

As of: March 1, 2022

5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	39.6	31.21+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	38.17	38.02 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	45.83	33.50
----LABORERS-----		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	31.5	23.25
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	31.75	23.25
10) Group 3: Pipelayers	32.0	23.25
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	32.0	23.25
12) Group 5: Toxic waste removal (non-mechanical systems)	33.5	23.25
13) Group 6: Blasters	33.25	23.25
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	32.5	23.25
Group 8: Traffic control signalmen	18.0	23.25
Group 9: Hydraulic Drills	32.25	23.25
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	33.73	23.25 + a
13b) Brakemen, Trackmen	32.76	23.25 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		

14) Concrete Workers, Form Movers, and Strippers	32.76	23.25 + a
15) Form Erectors	33.09	23.25 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	32.76	23.25 + a
17) Laborers Topside, Cage Tenders, Bellman	32.65	23.25 + a
18) Miners	33.73	23.25 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	40.22	23.25 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	40.02	23.25 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	38.04	23.25 + a
21) Mucking Machine Operator	40.81	23.25 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	30.16	27.16 + a
Three axle trucks; two axle ready mix	30.27	27.16 + a
Three axle ready mix	30.33	27.16 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	30.39	27.16 + a
Four axle ready-mix	30.44	27.16 + a
Heavy duty trailer (40 tons and over)	30.66	27.16 + a

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	30.44	27.16 + a
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----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	43.88	25.80 + a
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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	43.53	25.80 + a
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Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	42.72	25.80 + a
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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	42.3	25.80 + a
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Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24	41.65	25.80 + a
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Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	41.65	25.80 + a
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Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	41.31	25.80 + a
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Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24	40.94	25.80 + a
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Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	40.51	25.80 + a
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Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	40.04	25.80 + a
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Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	37.81	25.80 + a
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Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	37.81	25.80 + a
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Group 12: Wellpoint Operator.	37.74	25.80 + a
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Group 13: Compressor Battery Operator.	37.11	25.80 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	35.87	25.80 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	35.43	25.80 + a
Group 16: Maintenance Engineer/Oiler	34.72	25.80 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	39.42	25.80 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	36.77	25.80 + a
**NOTE: SEE BELOW		
----LINE CONSTRUCTION----(Railroad Construction and Maintenance)---		
-		
20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.5	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.1	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20

28) Material Men, Tractor Trailer Drivers, Equipment Operators

35.04

6.5% + 10.45

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.*

***Note: Hazardous waste premium \$3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)***
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson***
- 3) Cranes (under 100 ton rated capacity)***

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of each apprentice in a specific trade.

--Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

As of: March 1, 2022

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

Important Information:

For use with Building, Heavy/Highway, and Residential

Welders: Rate for craft to which welding is incidental.

*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

**Note: Hazardous waste premium \$3.00 per hour over classified rate.

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson
- 3) Cranes (under 100 ton rated capacity)

Crane with boom including jib, 150 feet - \$1.50 extra.

Crane with boom including jib, 200 feet - \$2.50 extra.

Crane with boom including jib, 250 feet - \$5.00 extra.

Crane with boom including jib, 300 feet - \$7.00 extra.

Crane with boom including jib, 400 feet - \$10.00 extra.

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

- Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyman instructing and supervising the work of one apprentice in a specific trade.

Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work

- The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.
- Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.
- The annual adjustments will be posted on the Department of Labor's Web page: www.ctdol.state.ct.us.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.
- All subsequent annual adjustments will be posted on our Web Site for contractor access.

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage.

- All Persons who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.
- All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)
- Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).


Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

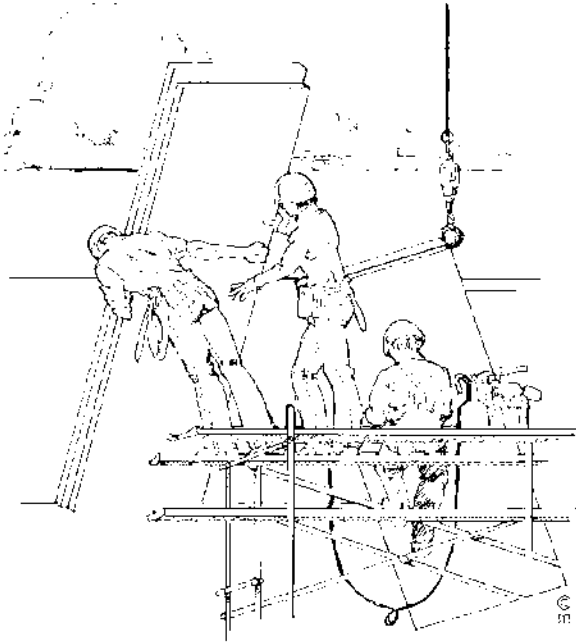
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached “Contracting Agency Certification Form” to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

 Inquiries can be directed to (860)263-6543.



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with
_____, located at _____,
project name and number address

shall be \$_____, which includes all work, regardless of whether such project
consists of one or more contracts.

CONTRACTOR INFORMATION

Name: _____

Address: _____

Authorized Representative: _____

Approximate Starting Date: _____

Approximate Completion Date: _____

Signature

Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM
Construction Manager at Risk/General Contractor/Prime Contractor

I, _____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

Street

City

and all of its subcontractors will pay all workers on the

Project Name and Number

Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

Signed

Subscribed and sworn to before me this _____ day of _____, _____.

Notary Public

Return to:
Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____

**Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES**

⇒ Please Note: If the “Benefits” listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the “Benefits” section for the occupation lists only a dollar amount, disregard the information below.

**Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)**

- a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

- a. Paid Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Veterans’ Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

- a. Paid Holidays: Labor Day and Christmas Day.

**Power Equipment Operators
(Heavy and Highway Construction & Building Construction)**

- a. Paid Holidays: New Year’s Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

- a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

Roofers

- a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

- a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

Information Bulletin *Occupational Classifications*

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

- **ASBESTOS WORKERS**

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- **ASBESTOS INSULATOR**

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- **BOILERMAKERS**

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- **BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS**

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- **CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS**

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **LABORER, CLEANING**

- The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

- **DELIVERY PERSONNEL**

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.

- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- **ELEVATOR CONSTRUCTORS**

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. **License required by Connecticut General Statutes: R-1,2,5,6.*

- **FORK LIFT OPERATOR**

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- **GLAZIERS**

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

- **IRONWORKERS**

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

- **INSULATOR**

- Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

- **LABORERS**

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal)).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- **PAINTERS**

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

- **LEAD PAINT REMOVAL**

- Painter's Rate

1. Removal of lead paint from bridges.
2. Removal of lead paint as preparation of any surface to be repainted.
3. Where removal is on a Demolition project prior to reconstruction.

- Laborer's Rate

1. Removal of lead paint from any surface NOT to be repainted.
2. Where removal is on a *TOTAL* Demolition project only.

- **PLUMBERS AND PIPEFITTERS**

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- **POWER EQUIPMENT OPERATORS**

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- **ROOFERS**

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

- **SHEETMETAL WORKERS**

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, fascia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air –balancing ancillary to installation and construction.

- **SPRINKLER FITTERS**

Installation, alteration, maintenance and repair of fire protection sprinkler systems.

****License required per Connecticut General Statutes: F-1,2,3,4.***

- **TILE MARBLE AND TERRAZZO FINISHERS**

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~How to pay truck drivers delivering asphalt is under REVISION~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. ****License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➤ *Any questions regarding the proper classification should be directed to:*
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

November 29, 2006

Notice
To All Mason Contractors and Interested Parties
Regarding Construction Pursuant to Section 31-53 of the
Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

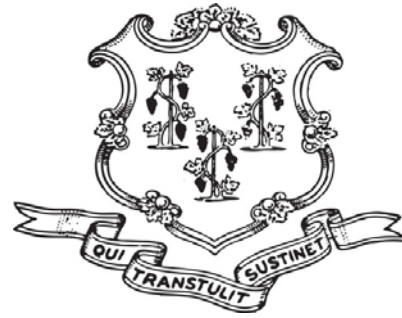
Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.
- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.



Opportunity * Guidance * Support



THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

**If you have QUESTIONS regarding your wages
CALL (860) 263-6790**

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

Connecticut Department of Labor
Wage and Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.

CONTRACTOR NAME AND ADDRESS:											SUBCONTRACTOR NAME & ADDRESS				WORKER'S COMPENSATION INSURANCE CARRIER					
PAYROLL NUMBER	Week-Ending Date	PROJECT NAME & ADDRESS									POLICY #				EFFECTIVE DATE:		EXPIRATION DATE:			
PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/FEMALE AND RACE*	WORK CLASSIFICATION	DAY AND DATE						Total ST Hours	BASE HOURLY RATE	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUCTIONS				GROSS PAY FOR THIS PREVAILING RATE JOB	CHECK # AND NET PAY	
				S	M	T	W	TH	F	S				Total O/T Hours	TOTAL FRINGE BENEFIT PLAN CASH	FICA	FEDERAL WITH-HOLDING			STATE WITH-HOLDING
			Trade License Type & Number - OSHA 10 Certification Number			HOURS WORKED EACH DAY														
												\$	1. \$							
												Base Rate	2. \$							
													3. \$							
													4. \$							
												\$	5. \$							
												Cash Fringe	6. \$							
												\$	1. \$							
												Base Rate	2. \$							
													3. \$							
													4. \$							
												\$	5. \$							
												Cash Fringe	6. \$							

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker’s compensation, income taxes, etc.).

Please specify the type of benefits provided:

- 1) Medical or hospital care _____ 4) Disability _____
- 2) Pension or retirement _____ 5) Vacation, holiday _____
- 3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____ of _____, (hereafter known as Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

- a) The records submitted are true and accurate;
- b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;
- c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);
- d) Each such person is covered by a worker’s compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;
- e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and
- f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

 (Signature) (Title) Submitted on (Date)

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the **contractor's** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- (16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTIMATELY ARISE CONCERNING THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

SAMPLE

CONTRACT FORMS

CONTRACT FOR SERVICES

THIS AGREEMENT made and entered into this **XX** day of **Month, 2022**, by and between (**Legal Name, address, city & state**), hereinafter called "**Contractor**" and the City of New London, 181 State Street, New London, CT 06320, hereinafter called "**City.**"

WHEREAS, the City desires to enter into a contract for the (**state work being performed**) and the Contractor represents itself as competent and qualified to accomplish the specific requirements of this contract to the satisfaction of the City, therefore this contract is entered into under the following terms and conditions:

1. The Contractor agrees to perform the services described below or in attachments if applicable. Only those attachments specifically referenced in this Contract for Services shall apply. The terms and conditions as contained in this Contract for Services shall take precedence over any conflicting terms as may be attached hereto.
2. **Term of the Contract:** The start date for this Contract shall be **Month/Day, 2021** and the completion date of this Contract shall be **Month/Day, 2021**, time being of the essence.
3. **Contract Price:** The City shall pay the Contractor for the performance of the Contract in current funds, for the total quantities of work performed for the price of (**written amount**) (**\$dollar amount**).

Based upon Applications for Payment submitted by the Contractor, the City shall make progress payments on account of the Contract Sum to the Contractor. The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. The City shall make payment to the Contractor within 30 days after the City receives the Application for Payment. With each Application for Payment, the Contractor shall submit the most recent schedule of values, which allocates the Contract Price among the various portions of the Work. The Applications for Payments shall indicate the percentage of completion of each portion of the Work. Such Applications may include requests for payment on account of changes in the Work, but not yet included in Change Orders. Partial payment shall be due Contractor in the amount of 95.0% of the work in place.

Final payment, constituting the entire unpaid balance of the Contract Price, including Change Orders, shall be made by the City to the Contractor no later than 30 days after the Contractor has fully performed the Contract and has provided to the Owner a final Application for Payment.

4. **Contract Documents:** The Contract Documents consist of this Agreement, the Standard Bid and Contract Terms and Conditions, the Instructions to Bidders, the Contractor's bid as accepted by the City, the General and Special Conditions of the Work, the Technical Specifications, the drawings and all Addenda attached hereto.

The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. In the event of any conflict or inconsistency between the provisions of this Agreement and the provisions of any of the other Contract Documents, the provisions of the Agreement shall prevail.

Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the edition of the standard specification, manual, code or laws or regulations identified in the reference. In the event a particular edition is not identified, the reference shall mean the latest edition in effect at the time of receipt of the bid. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall change the duties and responsibilities of the City, the Contractor or any of their consultants, agents or employees from those set forth in the Contract Documents.

5. **Obligations And Liability Of The Contractor:** The Contractor shall do all the work and perform and furnish all the labor, services, materials, equipment, plant, machinery, apparatus, appliances, tools, supplies and all other things (except as otherwise expressly provided herein) necessary and as herein specified for the proper performance and completion of the Work in the manner and within the time hereinafter specified, in strict accordance with the Drawings, Specifications and other Contract Documents, in conformity with the directions and to the satisfaction of the City, and at the prices herein agreed upon therefor.

All parts of the Work and all fixtures, equipment, apparatus and other items indicated on the Drawings and not mentioned in the Specifications, or vice versa, and all work and material usual and necessary to make the Work complete in all its parts, including all incidental work necessary to make it complete and satisfactory and ready for use and operation, whether

or not they are indicated on the Drawings or mentioned in the Specifications, shall be furnished and executed the same as if they were called for both by the Drawings and by the Specifications.

The Contractor shall coordinate his operations with those of any other contractors who may be employed on other work of the City, shall avoid interference therewith, and shall cooperate in the arrangements for storage of materials and equipment.

The Contractor shall conduct his work so as to interfere as little as possible with private business and public travel. Wherever and whenever necessary or required, he shall maintain fences, furnish watchmen, maintain lights, and take such other precaution as may be necessary to protect life and property.

The Contractor shall indemnify and save harmless the City and its officers, agents, servants and employees, from and against any and all claims, demands, suits, proceedings, liabilities, judgments, awards, losses, damages, costs and expenses, including attorneys' fees, on account of bodily injury, sickness, disease or death sustained by any person or persons or injury or damage to or destruction of any property, directly or indirectly arising out of, relating to or in connection with the Work, whether or not due to or claimed to be due in whole or in part to the active, passive or concurrent negligence or fault of the Contractor, his officers, agents, servants or employees, any of his subcontractors, the City or any of their respective officers, agents, servants or employees and/or any other person or persons, and whether or not such claims, demands, suits or proceedings are just, unjust, groundless, false or fraudulent; and the Contractor shall and does hereby assume and agrees to pay for the defense of all such claims, demands, suits and proceedings, provided, however, that the Contractor shall not be required to indemnify the City, its officers, agents, servants, or employees, against any such damages occasioned solely by acts or omissions of the owner other than supervisory acts or omissions of the City in the Work.

The Contractor shall have complete responsibility for the Work and the protection thereof, and for preventing injuries to persons and damage to the Work and property and utilities on or about the Work, until final completion and final acceptance thereof. He shall in no way be relieved of his responsibility by any right of the City to give permission or directions relating to any part of the Work, by any such permission or directions given, or by failure of the City to give such permission or directions. The Contractor shall bear all costs, expenses, losses and damages on account of the quantity or character of the Work or the nature of the land (including but not limited to subsurface conditions) in or under or on which the Work is done being different from that indicated or shown in the Contract Documents or from what was estimated or expected, or on account of the weather, elements, or other causes unless information regarding such condition(s) was known and not disclosed by the City prior to Contractor commencing its work.

The Contractor shall conduct his operations so as not to damage existing structures or work installed either by him or by other contractors. In case of any such damage resulting from his operations, he shall repair and make good as new the damaged portions at his own expense with the consent of the damaged party. In the event that consent is not given, the Contractor shall continue liable for the damage caused.

The Contractor shall be as fully responsible to the City for the acts and omissions of his subcontractors, their officers, agents, servants and employees as he is for his own acts and omissions and those of his own officers, agents, servants and employees.

Should the Contractor sustain any loss, damage or delay through any act or omission of any other contractor or any subcontractor of any such other contractor, the Contractor shall have no claim against the City therefor, other than for an extension of time, but shall have recourse solely to such other contractor or subcontractor.

If any other contractor or any subcontractor of any such other contractor shall suffer or claim to have suffered loss, damage or delay by reason of the acts or omissions of the Contractor or of any of his subcontractors, the Contractor agrees to assume the defense against any such claim and to reimburse such other contractor or subcontractor for such loss or damage.

The Contractor agrees to and does hereby indemnify and save harmless the City from and against any and all claims by such other contractors or subcontractors alleging such loss, damage or delay and from and against any and all claims, demands, suits, proceedings, liabilities, judgments, awards, losses, damages, costs and expenses, including attorneys' fees, arising out of, relating to or resulting from such claims.

The Contractor shall promptly pay all federal, state and local taxes which may be assessed against him in connection with the Work or his operations under this Agreement and/or the other Contract Documents, including, but not limited to, taxes attributable to the purchase of material and equipment, to the performance of services, and the employment of persons in the prosecution of the Work.

Because (i) anticipated damages hereunder are uncertain in amount and difficult to prove, (ii) the parties hereto wish to liquidate said damages in advance, and (iii) monies paid pursuant to this Agreement are not greatly disproportionate to the damage reasonably anticipated in the event of default, it is further agreed that if Contractor shall not complete all of its obligations under this contract within the time period and by the completion date specified in Paragraph 2 herein, Contractor shall pay liquidated damages to the City at a rate of \$___1,100___ per day for every day beyond the completion date until such time as the Contractor finally completes all of its obligations under this Contract.

6. Supervision Of Work: The Contractor shall be solely responsible for supervision of the Work, shall give the work the constant attention necessary to ensure the expeditious and orderly progress thereof, and shall cooperate with the City, its officers, agents or employees in every possible way.

At all times, the Contractor shall have as his agent on the Work a competent superintendent capable of reading and thoroughly understanding the Drawings and Specifications, with full authority to execute the directions of the Engineer without delay and to supply promptly such labor, services, materials, equipment, plant, apparatus, appliances, tools, supplies and other items as may be required. Such superintendent shall not be removed from the Work without the prior written consent of the City. If, in the opinion of the City, the superintendent or any successor proves incompetent, the Contractor shall replace him with another person approved by the City; such approval, however, shall in no way relieve or diminish the Contractor's responsibility for supervision of the Work.

Whenever the Contractor or his agent or superintendent is not present on any part of the Work where it may be necessary to give directions or instructions with respect to such work, such directions or instructions may be given by the City to and shall be received and obeyed by the foreman or any other person in charge of the particular work involved.

7. Insurance: The Contractor shall procure and maintain insurance of the types specified below, and to the limits for this insurance specified in the Standard Bid and Contract Terms and Conditions and the City of New London Code of Ordinances, Article IV., Section 2-71. All insurance shall be obtained from companies satisfactory to the City.

Insurance shall be in such forms as will protect the Contractor from all claims and liability for damages for bodily and personal injury, including accidental death, and for property damage, which may arise from operations under the Contract, whether such operations be by himself, his subcontractors, or by anyone directly or indirectly employed or engaged by him.

The following types of insurance shall be provided before starting and until final completion and acceptance of the Work and expiration of the guarantee period provided for in the Agreement.

- a. Workmen's Compensation and Employer's Liability Insurance.
- b. Bodily Injury Insurance for operations and completed operations and Contractor's Protective Bodily Injury Insurance.
- c. Property Damage Insurance for operations and completed operations and Contractor's Protective Property Damage Insurance, each including coverage for injury to or destruction of wires or pipes and similar property and appurtenant apparatus and the collapse of or structural injury to any building or structure except those on which work under the Contract is being done. Blasting and explosion coverage shall be obtained if there is a need for blasting under the Contract, and no blasting shall be performed until such insurance has been secured.
- d. Bodily Injury Insurance covering the operation of all motor vehicles owned by the Contractor.
- e. Personal Injury Insurance to cover claims for personal injury and including claims brought by employees.
- f. Property Damage Insurance covering the operation of all motor vehicles owned by the Contractor.
- g. Insurance to cover bodily injuries and property damage resulting from the use of motor vehicles not owned by the Contractor, while such vehicles are being operated in connection with the prosecution of the Work.

- h. Contractual Liability Insurance covering the liability assumed by the Contractor under the fifth paragraph of that subsection titled "Obligations and Liability of Contractor" of this Agreement.
- i. Owner's Protective Liability and Property Damage Insurance to protect the City and any Engineer against claims for Property damage and for bodily injuries, including accidental death, caused by the operations of the Contractor or his subcontractors on the Work. The policy shall indicate the City and any Engineer as the named insured. A copy of the policy shall be furnished to the City and a Certificate of Insurance shall be furnished to any Engineer.

Any of the above coverages written on a claims made form have an Extended Reporting Period of three years from the termination of the contract.

All policies shall be so written that the owner will be notified in writing of cancellation or restrictive amendment at least 30 days prior to the effective date of such cancellation or amendment.

Certificates from the Contractor's insurance carriers stating the coverages provided, the limits of liability, and expiration dates shall be filed in triplicate with the Engineer before operations are begun. Such certificates shall be on the form furnished by the Engineer.

The CITY requires that the aggregate limits be maintained by the CONSULTANT as required. It is the responsibility of the CONSULTANT or his representative to notify the CITY if ever or whenever claims reduce the General Aggregate below \$1,000,000.

Renewal certificates must be furnished by the Contractor prior to the expiration date of any of the initial insurances.

No insurance required or furnished hereunder shall in any way relieve the Contractor of or diminish any of his responsibilities, obligations and liabilities under the Contract.

8. Contract: This Agreement, which includes all the Contract Document elements listed in paragraph 1 above, forms the Contract between the parties identified in the heading of this document. In the event that any provision of the Contract conflicts with any other provision of this Contract, the decision of the City will be final.

9. Funding and Fiscal Year Appropriations: Appropriations for expenditures by the City and authorization to spend for a particular purpose are ordinarily made on a fiscal year basis. The fiscal year of the City is the twelve (12) month period ending June 30 of each year. The obligations of the City under this Contract for the present or any subsequent fiscal year following the fiscal year in which this Contract is executed are subject to the appropriation of funds sufficient to discharge the City's obligation, which accrues in this or any subsequent fiscal year. In the absence of such appropriation or authorization, this Contract shall be terminated immediately upon the Contractor's receipt of notice to said effect without liability for damages, penalties or other charges arising from early termination. Expenditures for Contracted services that will extend beyond a single fiscal year shall not exceed in any fiscal year the amount appropriated and authorized for said fiscal year. The Contractor's yearly costs, as contained herein, may not exceed the amount appropriated for said year.

10. Termination: The Contract may be terminated without cause by either party by giving written notice to the other at least thirty (30) calendar days prior to the effective date of termination stated in the notice. If Contractor fails to fulfill his obligations, the City may terminate this Contract by giving written notice to the Contractor at least seven (7) calendar days before the effective date of termination stated in the notice. The notice shall state the circumstances of the alleged breach and may state a period during which the alleged breach may be cured, which cure shall be subject to approval by the City.

11. Obligations in Event of Termination:

A. Upon termination, all finished or unfinished documents, data, studies, and reports prepared by the Contractor pursuant to this Contract, shall become the property of the City.

B. The City shall promptly pay the Contractor for all services performed to the effective date of termination, subject to indemnification provisions of Paragraph 5 hereof and subject to offset of sums due the Contractor against sums owed by the Contractor to the City.

12. Record keeping, Audit, and Inspection of Records: The Contractor shall maintain books, records and other compilations of data pertaining to the requirements of the Contract to the extent and in such detail as shall properly

substantiate claims for payment under the Contract. All such records shall be kept for a period of six (6) years or for such longer period as is specified herein. All retention periods start on the first day after final payment under this Contract. If any litigation, claim, negotiation, audit or other action involving the records is commenced prior to the expiration of the applicable retention period, all records shall be retained until completion of the action and resolution of all issues resulting therefrom, or until the end of the applicable retention period, whichever is later. The Federal grantor agency, the State Auditor, the City, or any of their duly authorized representatives or designees shall have the right at reasonable times and upon reasonable notice, to examine and copy, at reasonable expense, the books, records, and other compilations of data of the Contractor which pertain to the provisions and requirements of this Contract. Such access shall include on-site audits, review, and copying of records.

13. Publicity, Publication, Reproduction and Use of Contract Products or Materials: Unless provided otherwise by law or the City, title and possession of all data, reports, programs, software, equipment, furnishings, and any other documentation or product paid for with City funds shall vest with the City at the termination of the Contract. The Contractor shall at all times obtain the prior written approval of the City before it, any of its officers, agents, employees or subcontractors, either during or after termination of the Contract, makes any statement bearing on the work performed or data collected under this Contract to the press or issues any material for publication through any medium of communication. If the Contractor, or any of its subcontractors, publishes a work dealing with any aspect of performance under the Contract, or of the results and accomplishments attained in such performance, the City shall have a royalty-free non-exclusive and irrevocable license to reproduce, publish or otherwise use and to authorize others to use the publication. The Contractor shall use reasonable means to inform the public that the City provides financial support for its operations and services by explicitly stating on publicity material, stationery, posters and other written materials, and on its premises the following: "This program is supported in part (in full) by the City of New London."

14. Assignment by Contractor and Subcontracting: The Contractor shall not assign or in any way transfer any interest in this Contract without the prior written consent of the City, nor shall he subcontract any services without the prior written approval of the City.

15. Connecticut Law: It is agreed that this contract shall be governed by, construed, and enforced in accordance with the internal laws of the State of Connecticut.

16. Venue: In the event of litigation, the parties do agree to be contractually bound to submit themselves to the personal jurisdiction of the state courts of Connecticut. The venue for any court proceeding shall be in the Superior Court for the Judicial District for New London at New London, Connecticut.

17. Waiver of Jury Trial: CONTRACTOR HEREBY EXPRESSLY WAIVES ANY AND ALL RIGHTS IT MAY HAVE TO TRIAL BY JURY OF ANY CLAIM, DEMAND, ACTION OR CAUSE OF ACTION (1) ARISING UNDER THIS AGREEMENT OR ANY OTHER INSTRUMENT, DOCUMENT OR AGREEMENT EXECUTED OR DELIVERED IN CONNECTION HERewith, OR (2) IN ANY WAY CONNECTED WITH OR RELATED OR INCIDENTAL TO THE DEALINGS OF THE PARTIES HERETO OR ANY OF THEM WITH RESPECT TO THIS AGREEMENT OR ANY OTHER INSTRUMENT, DOCUMENT OR AGREEMENT EXECUTED OR DELIVERED IN CONNECTION HERewith, OR THE TRANSACTIONS RELATED HERETO OR THERETO, IN EACH CASE WHETHER NOW EXISTING OR HEREAFTER ARISING, AND WHETHER SOUNDING IN CONTRACT OR TORT OR OTHERWISE; AND CONTRACTOR HEREBY AGREES AND CONSENTS THAT ANY SUCH CLAIM, DEMAND, ACTION OR CAUSE OF ACTION SHALL BE DECIDED BY COURT TRIAL WITHOUT A JURY, AND THE CITY MAY FILE AN ORIGINAL COUNTERPART OR A COPY OF THIS SECTION WITH ANY COURT AS WRITTEN EVIDENCE OF CONTRACTOR'S CONSENT TO THE WAIVER OF ITS RIGHT TO TRIAL BY JURY.

18. Nondiscrimination and affirmative action provisions, nondiscrimination provisions regarding sexual orientation, Executive Order Number Three and guidelines and rules, Executive Order Number Seventeen, Executive Order Number Sixteen and sexual harassment policy:

For the purposes of this article, the word "contractor" is substituted for and has the same meaning and effect as if it read "Contractor's name." Section A of this article is inserted in connection with subsection (a) of Section 4a-60 of the General Statutes of Connecticut, as revised. Section B of this article is inserted in connection with subsection (a) of Section 4a-60a of the General Statutes of Connecticut, as revised.

A. (a) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one percent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of Conn. Gen. Stat. Section

32-9n; and “good faith” means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. “Good faith efforts” shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.

For the purposes of this section, “Commission” means the Commission on Human Rights and Opportunities.

For the purposes of this section, “public works contract” means any agreement between any individual, firm, or corporation and the State or any political subdivision of the State other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the State, including, but not limited to, matching expenditures, grants, loans, insurance, or guarantees.

(b) (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the State of Connecticut. The contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation, or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved; (2) the contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an “affirmative action-equal opportunity employer” in accordance with regulations adopted by the Commission; (3) the contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission advising the labor union or workers’ representative of the contractor’s commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (4) the contractor agrees to comply with each provision of this section and Conn. Gen. Stat. Sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to Conn. Gen. Stat. Sections 46a-56, 46a-68e, and 46a-68f; (5) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records, and accounts concerning the employment practices and procedures of the contractor as they relate to the provisions of this section and Conn. Gen. Stat. Section 46a-56. If the contract is a public works contract, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.

(c) Determination of the contractor’s good faith efforts shall include, but shall not be limited to, the following factors: The contractor’s employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the Commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

(d) The contractor shall develop and maintain adequate documentation, in a manner prescribed by the Commission, of its good faith efforts.

(e) The contractor shall include the provisions of subsection (b) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor, or manufacturer unless exempted by regulations or orders of the Commission. The contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Conn. Gen. Stat. Section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(f) The contractor agrees to comply with the regulations referred to in this section as they exist on the date of this contract and as they may be adopted or amended from time to time during the term of this contract and any amendments thereto.

B. (a) (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the State of Connecticut, and that employees are treated when employed without regard to their sexual orientation; (2) the contractor agrees to provide each labor union or representative

of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment; (3) the contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to Section 46a-56 of the Connecticut General Statutes; (4) the contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the Commission, and permit access to pertinent books, records, and accounts concerning the employment practices and procedures of the contractor that relate to the provisions of this section and Section 46a-56 of the Connecticut General Statutes.

(b) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the State and such provisions shall be binding on a subcontractor, vendor, or manufacturer unless exempted by regulations or orders of the Commission. The contractor shall take such action with respect to any such subcontract or purchase order as the Commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with Section 46a-56 of the Connecticut General Statutes; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Commission, the contractor may request the State of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the State and the State may so enter.

(c) The contractor agrees to comply with the regulations referred to in this section as they exist on the date of this contract and as they may be adopted or amended from time to time during the term of this contract and any amendments thereto.

C. This contract is subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971, and, as such, this contract may be cancelled, terminated, or suspended by the State Labor Commissioner for violation of or noncompliance with said Executive Order No. Three, or any State or federal law concerning nondiscrimination, notwithstanding that the State Labor Commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the State Labor Commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The contractor agrees, as part consideration hereof, that this contract is subject to the Guidelines and Rules issued by the State Labor Commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the State Labor Commissioner.

D. This contract is subject to the provisions of Executive Order No. Seventeen of Governor Thomas J. Meskill promulgated February 15, 1973, and, as such, this contract may be cancelled, terminated, or suspended by the contracting agency or the State Labor Commissioner for violation of or noncompliance with said Executive Order No. Seventeen, notwithstanding that the State Labor Commissioner may not be a party to this contract. The parties to this contract, as part of the consideration hereof, agree that Executive Order No. Seventeen is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the contracting agency and the State Labor Commissioner shall have joint and several continuing jurisdiction in respect to contract performance in regard to listing all employment openings with the Connecticut State Employment Service.

E. This contract is subject to the provisions of Executive Order No. Sixteen of Governor John G. Rowland promulgated August 4, 1999, and, as such, the contract may be canceled, terminated, or suspended by the State for violation of or noncompliance with said Executive Order No. Sixteen. Executive Order No. Sixteen is attached hereto and made a part hereof. The parties agree to comply with such executive order. In addition, the contractor agrees to include a copy of Executive Order No. Sixteen, and the requirement to comply with said executive order, in all contracts with its contractors, subcontractors, consultants, sub-consultants, and vendors.

F. This contract is subject to the provisions of the City of New London Sexual Harassment Policy ("Policy") and, as such, the contract may be canceled, terminated, or suspended by the City in the event that the contractor, its employees, contractors, subcontractors, consultants, sub-consultants, or vendors engages in behavior prohibited by the provisions of the Policy (a copy of the Policy is attached hereto). The contractor agrees to include a copy of the Policy, and the requirement to prevent behavior as defined in such Policy, in all contracts with its contractors, subcontractors, consultants, sub-consultants, and vendors.

19. Force Majeure: Neither party shall be liable to the other or be deemed to be in breach of this Contract for any failure or delay in rendering performance arising out of causes beyond its reasonable control and without its fault or negligence. Such causes may include, but are not limited to, acts of God or of a public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or unusually severe weather. Dates or times of performance shall be extended to the extent of delays excused by this section, provided that the party whose performance is affected notifies the other promptly of the existence and nature of such delay.

20. Compliance with Laws and Indemnification of the City of New London: The Contractor shall comply with all applicable laws, rules, regulations, ordinances, orders or requirements of the State of Connecticut and any governmental authority relating to the delivery of the services specified in this Contract. The City may require the Contractor to pay fines, penalties, and damages that may arise out of or may be imposed because of, the Contractor's breach or failure to comply with the provisions of this Contract. Unless otherwise provided by law the Contractor shall indemnify and hold harmless the City, its agents, officers and employees against any and all liability, loss, damages, penalties, costs or expenses for personal injury or damage to real or tangible personal property which the City may sustain, incur or be required to pay resulting from, arising out of, or in connection with the services performed or delivered under this Contract by reason of acts, inactions, omissions, negligence, reckless or intentional misconduct of the Contractor, its agent(s), officers, employees or subcontractors; provided that the Contractor is notified of any claim within a reasonable time after the City becomes aware of it, and the Contractor is afforded an opportunity to participate in the defense of such claim. In such event, no negotiated settlement agreement shall be binding on the Contractor without the Contractor's concurrence.

21. Waivers And Severability: All conditions, covenants, duties and obligations contained in this Contract can be waived only by written agreement. Forbearance or indulgence in any form or manner by a party shall not be construed as a waiver, nor in any way limit the legal or equitable remedies available to that party. A waiver or breach of any term, condition, or covenant by a party shall not constitute a waiver or breach of any other term, condition or covenant. If any court of competent jurisdiction declares a provision of this Agreement invalid, illegal, or otherwise unenforceable, the remaining provisions of the Agreement shall remain in full force and effect.

22. Amendments: No amendment to this Contract shall be effective unless it is signed by authorized representatives of both parties and complies with all other regulations and requirements of law.

23. Entire Agreement: The parties understand and agree that this Contract and attachments (if any), which includes all Contract Documents, supersede all other verbal and written agreements and negotiations by the parties relating to the services under this Contract.

24. Notice: Unless otherwise specified in an attachment hereto, any notice hereunder shall be in writing addressed to the persons and addresses indicated in the caption of this Contract on page 1.

IN WITNESS WHEREOF, the parties hereto have caused this AGREEMENT to be executed in two (2) original copies on the day and year first above written.

OWNER:

CONTRACTOR:

Michael Passero
Its Mayor

Its Duly Authorized Agent

Approved as to form:

Jeffrey T. Londregan, Esq., Director of Law

Date Signed _____

NON COLLUSION AFFIDAVIT OF SUBCONTRACTOR

State of _____)
County of _____) ss.

_____, being first duly sworn,
deposes and says that:

- (1) He is _____ of _____ herein referred to as the "Subcontractor";
- (2) He is fully informed respecting the preparation and content of the Subcontractor's Proposal submitted by the Subcontractor to _____, the Contractor for certain work in connection with the _____ Contract pertaining to the Project in New London, Connecticut;
- (3) Such Subcontractor's Proposal is genuine and is not a collusive or sham Bid;
- (4) Neither the said Subcontractors nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in said Subcontractor's Proposal or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the City of New London, CT or any person interested in the proposed Contract; and
- (5) The price or prices quoted in the attached Subcontractor's Proposal are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties of interest, including this affiant.
- (6) That no officer or employee or person whose salary is payable in whole or in part from the City of New London is directly or indirectly interested in this Bid, or in the supplies, materials, equipment, work or labor to which it relates, or in any of the profits thereof.

Signed _____

Title _____

Subscribed and sworn before me this

_____ day of _____ 20____

(Notary Public)

My Commission expires _____

AFFIRMATIVE ACTION POLICY STATEMENT
(must be submitted on your firm's letterhead)

It has always been the policy and will continue to be the strong commitment of _____ and all contractors and subcontractors who do business with this City to provide equal opportunities in employment to all qualified persons solely on the basis of job-related skills, ability and merit. _____ will continue to take Affirmative Action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, national origin, ancestry, mental disorder (present or past history thereof), age, physical disability (but not limited to blindness), marital status, mental retardation, and criminal record. Such action includes, but is not limited to, employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation and selection for training including apprenticeship. _____, and its subcontractors will continue to make good faith efforts to comply with all federal and state laws and policies which speak to equal employment opportunity.

The principles of Affirmative Action are addressed in the 13th, 14th, and 15th Amendments of the United States Constitution, Civil Rights Act of 1866, 1870, 1871, Equal Pay Act of 1963, Title VI and VII of - the 1964 United States Civil Rights Act, Presidential Executive Orders 11246, amended by 11375, (nondiscrimination under federal contracts), Act I, Sections 1 and 20 of the Connecticut Constitution, Governor Grasso's Executive Order Number 11, Governor O'Neill's Executive Order Number 9, the Connecticut Fair Employment Practices Law (Sec. 46a-60-69) of the Connecticut General Statutes, Connecticut Code of Fair Practices (46a-70-81), Deprivation of Civil Rights (46a-58(a)(d)), Public Accommodations Law (46a-63-64), Discrimination against Criminal Offenders (46a-80), definition of Blind (46a-51(1)), definition of Physically Disabled (46a-51(15)), definition. of Mentally Retarded (46a-51(13)), cooperation with the Commission on Human Rights and Opportunities (46 - 77), Sexual Harassment (46a-60(a)-8), Connecticut Credit Discrimination Law (36-436 through 439), Title I of the State and Local Fiscal Assistance Act of 1972.

This Affirmative Action Policy Statement re-affirms my personal commitment to the principles of Equal Employment Opportunity.

DATE

Signature of Authorized Signer

CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 Part II, Section 203(b), (30 FR 12319, 12935). The implementing rules and regulations provide that any bidder or prospective contractor, or any of its proposed subcontractors, shall state whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicated that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven (7) calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name _____

Address and Zip Code _____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

Yes () No () If answer is yes, identify the most recent contract.

2. Compliance reports were required to be filed in connection with such contract or subcontract

Yes () No () If answer is yes, identify the most recent contract.

3. Bidder has filed all compliance reports due under applicable instructions, including SF. 100.

Yes () No () Not Required ()

4. If answer to Item 3 is "No" please explain in detail on reverse side of this Certification.

Certification - The information above is true and complete to the best of my knowledge and belief. A willfully false statement is punishable by law (U.S. Code, Title 18, Section 1001).

Name and Title of Signer (Please Type)

Signature

Date

2022-05 Water/Ferry Street Improvements

CERTIFICATION OF NON-SEGREGATED FACILITIES

This Bidder certifies that he does not maintain or provide his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The Bidder certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any locations, under his control, where segregated facilities are maintained. The Bidder agrees that a breach of his certification will be a violation of the Equal Opportunity clause and any Contract resulting from acceptance of this Bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion or national origin, because of habit, local custom or otherwise. The Bidder agrees that (except where he has obtained identical certification from proposed Subcontractors for specific time periods) he will obtain identical certifications from proposed Subcontractors prior to the award of Subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have already submitted identical certifications for the specific time periods):

“Notice to prospective subcontractors of requirements for non-segregated facilities. A certification of non-segregated facilities must be submitted prior to the award of a subcontract exceeding the Equal Opportunity Clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e. quarterly, semi-annually, or annually).

Note: The penalty for making false statements in offers is prescribed in 18 U.S.C. Paragraph 1001.

Date: _____

By: _____

Official Address: _____

Title: _____

CERTIFICATION OF BIDDER REGARDING
EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246 Part II, Section 203(b), (30 FR 12319, 12935). The implementing rules and regulations provide that any bidder or prospective contractor, or any of its proposed subcontractors, shall state whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicated that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven (7) calendar days after bid opening. No contract shall be awarded unless such report is submitted.

CERTIFICATION BY BIDDER

Bidder's Name _____

Address and Zip Code _____

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.

Yes () No () If answer is yes, identify the most recent contract.

2. Compliance reports were required to be filed in connection with such contract or subcontract

Yes () No () If answer is yes, identify the most recent contract.

3. Bidder has filed all compliance reports due under applicable instructions, including SF. 100.

Yes () No () Not Required ()

4. If answer to Item 3 is "No" please explain in detail on reverse side of this Certification.

Certification - The information above is true and complete to the best of my knowledge and belief. A willfully false statement is punishable by law (U.S. Code, Title 18, Section 1001).

Name and Title of Signer (Please Type)

Signature

Date



City of New London

Department of Finance-Purchasing Agent
13 Masonic Street • New London, CT 06320 • Phone (860) 447-5215 • Fax (860) 447-5297

Anti-Fracking Provision

We _____ hereby submit a bid for materials, equipment and/or labor for the City of New London. The Bid is for bid documents titled **Bid No. 2022-05 Water Street at Ferry Street and Governor Winthrop Boulevard Traffic Signal Improvements**. We hereby certify under penalty of perjury that no natural gas waste or oil waste will be used by the undersigned bidder or any contractor, sub-contractor, agent or vendor agent in connection with the bid; nor will the undersigned bidder or any sub-contractor, agent or vendor agent thereof apply any natural gas waste or oil waste to any road or real property within the City of New London as a result of the submittal of this bid if selected.

DATE

Signature of Authorized Signer

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____

as Principal, and _____
a corporation duly organized under the laws of the State of _____ as Surety are held and firmly
bound unto the **City of New London, 181 State Street, New London, CT 06320**, hereinafter called the "Owner" in the
sum of _____ Dollars (\$ _____), for the payment of which sum
well and truly to be made, the said Principal and Surety, bind ourselves, our heirs, executors, administrators, successors,
and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid dated _____ to

NOW THEREFORE, if the Owner shall accept the bid of the Principal and the Principal shall enter into a Contract with the
Owner in accordance with the terms of such bid and give such bond or bonds as may be specified in the bidding or
Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt
payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter
such Contract and give such bond or bonds, if the Principal shall pay to the Owner the difference not to exceed the
penalty hereof between the amount specified in said bid and such larger amount for which the Owner may in good faith
contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise
to remain in full force and effect.

Signed and sealed this _____ day of _____ 2022.

(Principal) (Seal)

(Title)

(Surety) (Seal)

(Title)

(Witness)

(Witness)

Attorney-in-Fact, State of _____, Power-of-Attorney for person signing for Surety Company must be attached to Bond.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____ certify that I am the _____
_____, of the Corporation named as Principal in the within bond; that _____
_____ who signed the said bond on behalf of the Principal was then the _____
_____ of said corporation; that I know his signature, and his signature thereto is genuine; and
that said bond was duly signed, sealed, and attested to for and in behalf of said corporation by authority of this governing
body.

Affix
_____ Corporate
Seal

Title _____

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____, as Principal

(hereinafter called Principal) and _____
as Surety, (hereinafter called Surety) are held and firmly bound unto _____
_____ as Obligee (hereinafter called Owner), for the use and
benefit of claimants as hereinbelow defined;
in the amount of _____ Dollars (\$
_____) for the payment whereof the Principal and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a Contract with the
owner for _____

_____ which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, the condition of this obligation is such that, if the said Principal shall promptly pay for all materials
furnished and labor supplied or performed in the prosecution of the work included in and under the aforesaid Contract,
whether or not the material or labor enters into and becomes a component part of the real asset, then this obligation shall
be null and void otherwise it shall remain in full force and effect.

PROVIDED, that any alterations which may be made in the terms of the Contract or in the work to be done under it, or the
giving by the Owner or any other forbearance on the part of either the Owner or the Principal to the other shall not in any
way release the Principal and the Surety or either or any of them, their heirs, executors, administrators, successors or
assigns from their liability hereunder, notice to the Surety for any such alterations, extension or forbearance being hereby
waived.

Any party, whether a subcontractor or otherwise, who furnished materials or supplies or performs labor or services in the
prosecution of the work under said Contract, and who is not paid therefore, may bring a suit on this Bond in the name of
the person suing, prosecute the same to a final judgment and have the execution thereon for such sum as may be justly
due.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, 20____, the name and corporate seal of each corporate party being hereto affixed and these presents signed by its undersigned representative, pursuant to authority of its governing body.

(Corporate Principal)

(Business Address)

Affix
Corporate
Seal

Attest:

_____ By

(Corporate Surety)

Attest:

(Business Address)

Affix
Corporate
Seal

_____ By

Countersigned
by _____

Attorney-in-Fact, State of _____, Power-of- Attorney for person signing for
Surety Company must be attached to Bond.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That _____ as Principal, hereinafter called Contractor, and _____ as Surety, hereinafter called Surety, are held and firmly bound unto _____ as Obligee, hereinafter called Owner, in the amount of _____ Dollars (\$ _____), for payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contract has by written agreement dated _____ entered into a Contract with Owner for _____

_____ which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, the condition of this obligation is such that, if Contractor shall promptly and faithfully perform said Contract, including such remedial work as may be required under the guaranty during the period of guaranty and shall certify in writing that all wages paid under said Contract to any mechanic, laborer or workman were equal to the rates or wages customary or then prevailing for the same trade or occupation in Connecticut, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default or shall promptly:

- (1) Complete the Contract in accordance with its terms and conditions, by another Contractor acceptable to the Owner, said other Contractor to act as an agent for the Surety, or
- (2) Obtain a Bid or Bids for submission to the Owner for completing the Contract in accordance with its terms and conditions, and upon determination by the Owner and Surety of the lowest responsible Bidder, arrange for a Contract as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price, but not exceeding, including, other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The terms "balance of the contract price" , as used in this paragraph, shall mean the total amount payable by the Owner to the Contractor under the Contract and any amendments thereto, less the amount properly paid by the Owner to the Contractor.

Unless otherwise required by law, any suit under this Bond must be instituted before the expiration of one (1) year from the date on which the guaranty period under the Contract expires.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators and successors of the Owner.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, 20____, the name and corporate seal of each corporate party being hereto affixed and these presents signed by its undersigned representative, pursuant to authority of its governing body.

No extension of time or other modification of this Bid Bond shall be valid unless agreed in writing by the parties to this Bond.

(Corporate Principal)

Attest:

(Business Address)

By

Affix
Corporate
Seal

(Corporate Surety)

Attest:

(Business Address)

By

Affix
Corporate
Seal

Countersigned
by _____

Attorney-in-Fact, State of _____, Power-of- Attorney for person signing for Surety Company must be attached to Bond.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____ certify that I am the _____ of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the Principal was then the _____ of said corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and attested to for and in behalf of said corporation by authority of this governing body.

Affix
Corporate
Seal

Title _____

Statement of Bidder's Qualifications

All items and questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The bidder may submit any additional information it desires.

- 1. Name of Bidder _____
- 2. Bidder's Tax Identification No. _____
- 3. Permanent main office address _____

- 4. When organized _____
- 5. If corporation, where incorporated _____
- 6. Number of years have you been engaged in the contracting business under your present firm or trade name _____
- 7. Contracts on hand: (Schedule these showing amount of each contract and the appropriate anticipated dates of completion) _____

- 8. General character of work performed by your company _____

- 9. Have you ever failed to complete any work awarded to you? If so, where and why? _____

- 10. Have you ever defaulted on a contract? If so, where and why? _____

- 11. List the more important projects recently completed by your company, stating the approximate cost for each, and the month and year completed (use a separate sheet if necessary) _____

- 12. List your major equipment available for this Contract _____

- 13. List your experience in work similar to this project _____

14. List the background and experience of the principal members of your organization, including officers _____

15. List the work to be done by Subcontractors and summarize the dollar value of each Subcontract

16. Credit available \$ _____

17. Give Bank reference _____

18. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner? _____

19. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated _____ (Name of Bidder)

By _____

Title _____

State of _____)
County of _____) ss.

_____ being duly sworn deposes and says that (s)he is _____
_____ of _____

_____, and that the answers to the foregoing items and questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this

_____ day of _____ 20

(Notary Public)

My Commission expires _____

SPECIAL PROVISIONS

Water Street at Ferry Street and Governor Winthrop Boulevard Traffic Signal Improvements

New London, Connecticut

PREPARED BY



100 Great Meadow Road
Suite 200
Wethersfield, CT 06109

February 2022

The following Special Provisions amend and supplement the CTDOT Standard Specifications Form 818

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Water Street at Ferry Street and Governor Winthrop Boulevard Traffic Signal Improvements

City of New London, Connecticut

SCOPE OF WORK

The scope of work entails the full replacement of traffic signal equipment and associated improvements at the intersection of Water Street at Ferry Street and Governor Winthrop Boulevard in New London, CT. The scope of work also includes relocation of existing railroad pre-emption cables to maintain railroad pre-emption, installation of concrete sidewalk and ADA sidewalk ramps, installation of pavement markings and signs, and maintenance and protection of traffic during construction.

The intersection is located adjacent to and within the at-grade railroad crossing of the Amtrak railroad. The work involves removing, reusing and installing traffic control signal equipment at and within the crossing.

NOTICE TO CONTRACTOR – TECHNICAL SPECIFICATIONS

All work done under this contract shall be in conformance with the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, Facilities and Incidental Construction, Form 818, including Supplemental Specifications dated July 2020, as modified by the Special Provisions contained herein.

All references to Commission, Department, Engineer, and State anywhere within the Contract Documents and Form 818 shall be interpreted to mean the City of New London or a duly authorized agent of the City. Any questions regarding any definitions shall be brought to the immediate attention of the City.

NOTICE TO CONTRACTOR – CONTRACT TIME AND LIQUIDATED DAMAGES

Two-hundred-forty-four (244) calendar days will be allowed for completion of the work on this project, and the liquidated damages charge to apply will be one thousand one hundred dollars (\$1,100.00) per calendar day.

NOTICE TO CONTRACTOR – RAILROAD PRE-EMPTION

The Contractor is hereby advised that the signalized intersection of Water Street at Governor Winthrop Boulevard and Ferry Street operates as part of an existing railroad pre-emption system with the railroad tracks running through the intersection. When a train enters the track circuit, the Railroad provides immediate pre-emption to the traffic signal controller cabinet via a hard-wire connection to the existing traffic signal controller cabinet.

Under this project, the Contractor shall be responsible for disconnecting the pre-emption cables from the existing traffic controller cabinet and reconnecting in the new controller cabinet as described under the special provision for item #1113511A. This work must be completed under supervision of Amtrak - National Railroad Passenger Corp. (Amtrak) to ensure minimal disruption to the railroad pre-emption system.

The Contractor must submit a schedule and procedure to switch the railroad pre-emption cables over to the new traffic signal controllers for review by the City of New London and Amtrak. The Contractor shall not be allowed to perform any work that may interfere with operation of this railroad pre-emption system until the schedule and procedure is approved by the City of New London and Amtrak in writing.

The Contractor shall be responsible for coordinating with Amtrak during construction as needed to accomplish this work. Coordination with Amtrak shall be considered incidental to the project. No claim for additional compensation will be allowed for the work required to, or that results from, coordination with Amtrak.

Refer to Section 1.07 – Legal Relations and Responsibilities for Amtrak contact information.

NOTICE TO CONTRACTOR – REMOVAL AND RELOCATION OF EVERSOURCE LUMINAIRE

The Contractor is advised that the project includes removal and relocation of an existing luminaire owned by Eversource that is currently mounted to a city-owned combination mast arm that will be removed by the Contractor.

The Contractor shall be responsible for removing the existing pole, installing a new combination steel mast arm with luminaire bracket as shown on the plans, and installing underground conduits for electrical service in accordance with Eversource requirements. Eversource shall be responsible for installing a luminaire on the luminaire brackets installed by the contractor, pulling new wiring from energy source to pole location, and energizing the new lighting system.

The Contractor shall be responsible for coordination with Eversource as needed to complete the work as indicated on the plans and described in these special provisions. The Contractor shall schedule and attend a meeting with Eversource to schedule the work and review all luminaires to be removed and installed under this project, as shown on the plans.

Coordination with Eversource shall be considered incidental to the project. No claim for additional compensation will be allowed for the work required to, or that results from, work to coordinate with Eversource.

Refer to Section 1.07 – Legal Relations and Responsibilities for Eversource contact information.

NOTICE TO CONTRACTOR – COORDINATION WITH UTILITIES

The Contractor is hereby notified and advised that construction operations by other contractor(s) and/or utilities may occur within and/or near the project limits identified on the plans for this project. It is expected that in some cases the work of other contractors and utilities may overlap and/or occur simultaneously to the operation(s) conducted under this project.

Specifically, the Contractor is hereby advised that utility companies must raise existing overhead utility lines on the east side of Ferry Street to provide necessary overhead clearance for installation of a proposed steel mast arm to be installed by the Contractor. The Contractor will be responsible for coordinating with the utility companies to schedule this work during construction. Additionally, the Contractor is hereby advised that an existing traffic signal mast arm located on the east side of Ferry Street passes through these overhead utility lines above the communication cables and below the power cables. The Contractor will be responsible for temporarily removing this existing mast arm so that the utility companies can raise the existing communication cables. Refer to Item #1118051A – Temporary Signalization (Site No. 1) for additional information on the requirements for temporary signalization during construction.

The Contractor shall coordinate its work with the work of others in such a manner that allows for construction to proceed in an expeditious manner in accordance with the contract plans and as directed by the Engineer. Some delays and/or rescheduling of work may occur during the prosecution of work as a result of coordination with others. No claim for additional compensation will be allowed for the work required to, or that results from, work to coordinate with others.

Refer to Section 1.07 – Legal Relations and Responsibilities for utility company contact information.

NOTICE TO CONTRACTOR – TRAFFIC SIGNALS

The Contractor is hereby notified that certain conditions pertaining to the installation of new signals and maintenance of traffic signal operations are required when relevant, as part of this contract.

Qualified/Unqualified Workers**U.S. Department of Labor**

Occupational Safety & Health Administration (OSHA) www.osha.gov

Part Number 1910

Part Title Occupational Safety & Health Administration

Subpart S

Subpart Title Electrical

Standard Number 1910.333

Title Selection and use of work practices

Completion of this project will require Contractor employees to be near overhead utility lines. All workers and their activities when near utility lines shall comply with the above OSHA regulations. In general, unqualified workers are not allowed within 10 feet of overhead, energized lines. It is the contractor's responsibility to ensure that workers in this area are qualified in accordance with OSHA regulations.

The Controller Unit (CU) shall conform to the current edition of the Functional Specifications for Traffic Control Equipment. The Functional Specifications require the CU meet NEMA Standard Publication No. TS2-1992 Type 2. The Functional Specifications are available on the Departments' web site <http://www.ct.gov/dot/site/default.asp>, click on "Doing Business with CONNDOT", under Engineering Resources click on "Traffic Engineering", Scroll down to Traffic Documents click on "Functional_Specifications_for_Traffic_Control_Equip.pdf".

The contractor will be held liable for all damage to existing equipment resulting from his or his subcontractor's actions. A credit will be deducted from monies due the Contractor for all maintenance calls responded to by City of New London personnel.

SECTION 1.05 - CONTROL OF THE WORK

Article 1.05.02 - Plans, Working Drawings and Shop Drawings are supplemented as follows:

Sub article 1.05.02 - (2) is supplemented by the following:

Traffic Signal Items:

When required by the contract documents or when ordered by the Engineer, The Contractor shall prepare and submit product data sheets, working drawings and/or shop drawings for all traffic signal items, including Mast Arm Assemblies, to the City of New London for review before fabrication. The packaged set of product data sheets, working drawings and/or shop drawings shall be submitted in an electronic portable document format (.pdf).

The packaged set submitted in an electronic portable document format (.pdf) shall be in an individual file with appropriate bookmarks for each item. The electronic files for product data sheets shall be created on ANSI A (8 ½” x 11”; 216 mm x 279mm; letter) sheets. Working drawings and shop drawings shall be created on ANSI B (11” x 17”; 279 mm x 432 mm; ledger/tabloid) sheets.

Please send the pdf documents via email to:

Brian Sear bsear@newlondonct.org
Thomas Quintin tquintin@newlondonct.org
cc: Felix Reyes freyes@newlondonct.org

Steel Mast Arm:

The submission for Steel Mast Arm Assemblies shall follow the format described in the Steel Mast Arm Assembly special provision.

Please send the pdf documents via email to:

Brian Sear bsear@newlondonct.org
Thomas Quintin tquintin@newlondonct.org
cc: Felix Reyes freyes@newlondonct.org

SECTION 1.06 - CONTROL OF MATERIALS

Article 1.06.01 - Source of Supply and Quality:

Add the following:

Traffic Signal Items:

For the following items the contractor shall submit a complete description of the item, shop drawings, product data sheets and other descriptive literature which completely illustrates such items presented for formal review. Such review shall not change the requirements for a certified test report and materials certificate as may be called for. All documents shall be grouped into one separate file for each group of items as indicated by the Roman numerals below (for example, one pdf file for all of the pedestal items). The documents for all of the traffic signal items shall be submitted at one time, unless otherwise allowed by the engineer.

- I. 1005600A – LED Luminaire
- II. 10080XX – Rigid Metal Conduit
- III. 11020XX – Aluminum Pedestals
- IV. 11051XXA – Traffic Signals, Mast Arm Mounted - LEDs, Housings and Hardware
- V. 11060XXA – Pedestrian Signals - LEDs, Housings, and Hardware
11070XXA – Accessible Pedestrian Signal & Detector - Button, Housings & Sign (Type)
- VI. 1108115A – Full Actuated Controller, 8-Phase – Cabinet and Components
- VII. 11122XXA – Vehicle Detection - Camera Assembly, Processor and Monitor
- VIII. 1113XXXA – Cable - Control Cable, Comm., CAT6, VC, Detector Cable (optical)
- IX. 1116100A – Internally Illuminated Sign (LED)
- X. 1220000A – Project Sign

SECTION 1.07 - LEGAL RELATIONS AND RESPONSIBILITIES

Article 1.07.13 - Contractor's Responsibility for Adjacent Property, Facilities and Services is supplemented as follows:

The following company and representative shall be contacted by the Contractor to coordinate the protection of their utilities on this project 30 days prior to the start of any work on this project involving their utilities:

Mr. Chap Hanley
Atlantic Broadband (CT), LLC
61 Myrock Avenue
Waterford, CT 06385
(860) 629-6782

Mr. Richard Russo
District 2 Electrical Supervisor
Department of Transportation
Colchester, CT
(860) 537-8942/8943

Mr. Eric C Johnson
MCI Communications Services, Inc. dba
Verizon Enterprise Solutions
85 High St
Pawtucket, RI 02860
(401) 727-9558

Mr. Eric Clark
Lighttower Fiber Networks I, LLCS dba Crown
Castle Fiber
1781 Highland Avenue, Suite 102
Cheshire, CT 06410
(203)-649-3904

Mr. Jim Bitzas
Comcast of Connecticut, Inc.
1110 East Mountain Road
Westfield, MA 01085
(413) 642-8582

Mr. Joseph Lanzafame
City of New London Dept. of Public Utilities
120 Broad Street
New London, CT 06320
(860) 437-6365

Mr. David Hatfield
Yankee Gas Services Company dba
Eversource Energy - Gas
107 Selden Street, Mail Stop NUE2
Berlin, CT 06037
203-592-3494

Mr. Michael Kolonauski
Amtrak - National Railroad Passenger Corp.
30th Street Station, 4S-027, Mail Box 64,
2955 Market Street
Philadelphia, PA 19104
(215) 349-1127

Susan J. Bellion
The Connecticut Light and Power Company
dba Eversource Energy - Electric Transmission
56 Prospect Street
Hartford, CT 06103
(860) 728-4628

Mr. Thomas Woronik
The Connecticut Light & Power Company dba
Eversource Energy - Electric Distribution
63R Myrock Avenue
Waterford, CT 06385
860-447-5713

The local Building Department shall be contacted by the Contractor to coordinate an inspection of the service entrance into the controller. Please provide the electrical service request number provided by the power company.

SECTION 1.08 - PROSECUTION AND PROGRESS

Article 1.08.03 - Prosecution of Work:

Add the following:

The Contractor shall stake the limits of the concrete sidewalks and ramps in conjunction with staking the locations of foundations to ensure that pedestrian push buttons will be located appropriately and will be accessible from a landing area.

The Contractor will not be allowed to install traffic signal or pedestrian heads until the controllers are on hand and ready for installation. Once installation of this equipment commences, the Contractor shall complete this work in a most expeditious manner.

The Contractor shall notify the Engineer when all traffic signal work is completed. This will include all work at signalized intersections including loop replacements, adjusting existing traffic signals or any relocation work including handholes. The Engineer will notify the City of New London to coordinate a field inspection of all work. Refer to Section 10.00 – General Clauses For Highway Illumination And Traffic Signal Projects, Article 10.00.10 and corresponding special provision.

Article 1.08.04 – Limitations of Operations – Add the following:

In order to provide for traffic operations as outlined in the Special Provision “Maintenance and Protection of Traffic,” the Contractor will not be allowed to perform any work which will interfere with existing traffic operations during the following periods:

Monday through Friday between 7:00 a.m. and 9:00 a.m. and
between 3:30 p.m. and 6:00 p.m.

Saturday and Sunday between 10:00 a.m. and 6:00 p.m.

General

The Contractor shall adhere to all the Limitations of Operations stated herein. All requested modification/exceptions to these Limitations shall be submitted to the Engineer a minimum of one week in advance of the work being performed and must receive written approval by the Engineer and the City. Should the Contractor fail to comply with these limitations, the Engineer shall order an immediate stop work until such time the Contractor does comply. There will be no additional cost should such a stop work be issued. Should at any time the Engineer determines that the work is severely impacting traffic, the Contractor shall be responsible for altering the traffic pattern and work zone to alleviate the traffic issues. This effort shall be included in the lump sum price bid for Maintenance and Protection of Traffic.

Road Closure

The Contractor will not be allowed to close any roads during the prosecution of work on this contract unless specifically indicated otherwise on the plans or in the specifications. All roads within the project limits shall be open to minimum two-way traffic after work hours. Detours should be avoided.

SECTION 10.00 - GENERAL CLAUSES FOR HIGHWAY ILLUMINATION AND TRAFFIC SIGNAL PROJECTS

Article 10.00.03 – Plans:

In the first paragraph, replace the 2nd, 3rd, and 4th sentences with the following:

The Contractor shall digitally mark, in red, any changes on the plan(s) using a pdf program.

The Contractor shall submit the digital pdf file(s) to the Engineer and to bsear@newlondonct.org, tquintin@newlondonct.org, and cc: freyes@newlondonct.org prior to requesting the Functional Inspection.

Also prior to requesting the Functional Inspection, the Contractor shall deliver to the Engineer the following:

In item no. 1, replace “Four (4)” with “Digital PDF Files and Five (5)” [paper prints of schematics and wiring diagrams...].

After item no. 3, add an item no. 4 as the following:

4. Digital field pictures, in .JPG format and labeled appropriately, of the following constructed items:
 - a. Signals heads facing each approach. The pictures are to be taken along each intersection approach in order to observe the relation between the signal faces and the approach centerline, lane line(s), and edge line.
 - b. Inside of hand holes
 - c. Inside of the controller cabinet
 - d. Traffic foundations (Mast Arms, Controller Cabinet, Pedestals)
 - e. Video detector locations and mountings
 - f. Utility Clearances from mast arm assemblies
 - g. Screen shots of detection zones

Article 10.00.10 Section 2. Subsection a) After Part 3, add the following:

4. **360-Degree Video Detection System Tests:** The following tests shall be performed on all traffic signals with 360-Degree Video Detection Systems. The test results shall be recorded and submitted to the Engineer prior to the functional inspection of the traffic signal. Refer to the "Quality Best Practices" attachment to the special provision for Item # 1112286A - 360 DEGREE VIDEO DETECTION PROCESSOR:
 - a) **Cabinet Grounding Test:** The cabinet ground shall be tested with a clamp-on ground meter in accordance with the detection system manufacturer's recommendations to ensure a ground reading of a maximum of 25 Ohms. The results of this test shall be recorded.
 - b) **AC Power Test:** The AC outlet for the processor shall be checked with a digital voltmeter according to the detection system manufacturer's recommendations to ensure

that all three connections for the outlet are properly connected and to verify that the AC voltage from the line to neutral and the line to ground is 120VAC. The results of this test shall be recorded.

- c) **Ethernet Cable Test:** Each Ethernet cable shall be tested with a digital Ethernet cable tester in accordance with the detection system manufacturer's recommendations to ensure the cable length does not exceed 300-ft and ensure a Real World Certification of at least 100 MB. The results of this test shall be recorded.
- d) **Drain Wire Resistance Test:** Each Ethernet cable drain wire shall be checked with a digital voltmeter in accordance with detection system manufacturer's recommendations to ensure that the resistance between the drain wire grounding post and the cabinet ground rod equals 0 Ohms. The results of this test shall be recorded.

Article 10.00.10 Section 2. Subsection b) Part 3. Functional Inspection:

After the fourth paragraph, add the following:

Upon the successful completion of the Functional Inspection and once all corrections and adjustments resulting from the Functional Inspection are completed, the Contractor shall update as-built plans and pictures to reflect any changes made and submit as required in Section 10.00.03 within 7 days of the completion of the 30-day test.

Article 10.00.12 - Negotiations with utility company: Add the following:

The Contractor shall give notice to utility companies a minimum of 30 days prior to required work or services to the utility company. Refer to Section 1.07 – Legal Relations and Responsibilities for the list of utility companies and representatives the contractor shall use.

The Contractor shall perform all work in conformance with Rules and Regulations of Public Utility Regulatory Authority (PURA) concerning Traffic Signals attached to Public Service Company Poles. The Contractor is cautioned that there may be energized wires in the vicinity of the specified installations. In addition to ensuring compliance with NESC and OSHA regulations, the Contractor and/or its Sub-Contractors shall coordinate with the appropriate utility company for securing/protecting the site during the installation of traffic signal mast arms, span poles or illumination poles.

ITEM # 0202452A – TEST PIT

Description:

Excavate and backfill a designated area to determine the exact location of utility facilities which are near a proposed foundation.

Materials:

- Compacted Granular Fill: Article M.02.02
- Bituminous Concrete Materials: Article M.04

Construction Methods:

Keep affected utility owner apprised of proposed test pit excavation.

Excavate only as authorized and as directed by the Engineer. The size, depth and location will be as authorized by the Engineer.

If rock greater than 0.5 c.y. is encountered, the Engineer will determine if it must be removed and the method. Do not use explosives. See the pertinent construction methods of Section 2.02.03. When concrete must be removed, reinforced or not, it shall be considered, measured, and paid for as rock in foundation excavation.

If unsuitable backfill material is excavated, dispose as directed by the Engineer. Replace with suitable backfill and compact in accordance with Section 2.14.

Repair all damaged bituminous pavement in accordance with Section 4.06.03. Sawcut the edges to neat lines if there will be no subsequent excavation at the test pit for a foundation.

Method of Measurement:

Test pit excavation will be measured for payment by the number of test pits completed.

When necessary, rock in foundation excavation will be measured at the contract price per vertical foot (vertical meter) for the rock actually removed in accordance with Article 2.02.04.

Basis of Payment:

This work will be paid for at the contract unit price each for “Test Pit”, which price shall include excavation, unsuitable material disposal, compacted backfill, bituminous pavement, sawcut, pavement repair, all utility costs, all equipment, tools, labor and work incidental thereto. This item excludes the volume of material that is measured as Rock In Foundation Excavation.

<u>Pay Item</u>	<u>Pay Unit</u>
Test Pit	EA

ITEM # 0921031A – DECORATIVE CONCRETE CROSSWALK (BRICK PATTERN)

Description:

The work under this item shall consist of installing a new decorative concrete crosswalk with a brick pattern as shown on the plans and restoring existing decorative concrete crosswalks impacted by construction activities under this project.

Materials:

1. Portland Cement: Concrete shall meet the requirements of M.03 for Class PCC04460 Concrete.
2. Colored Pigment: The concrete shall include a pigment to permanently color the concrete to match the existing stamped concrete crosswalks at the intersection. The pigment shall be SCOFIELD® Integral Color SG 160, “Red Brick” color, or approved equal. The contractor shall submit product data sheets for the pigment to the City for approval.
3. Granular Fill Base: Granular fill shall meet the requirements of M.02.01.
4. Reinforcement: Shall meet the requirements of M.06.01.

Construction Methods:

1. Sawcut existing pavement surface at the limits of decorative concrete crosswalk as shown on the plans or as directed. Where connecting to existing decorative crosswalks, sawcut the existing decorative concrete crosswalk along a neat line parallel to the existing brick pattern so that the new crosswalk continues the pattern of the existing decorative crosswalk.
2. Excavation of existing road shall be made to the required depths below the finished grade, as shown on the plans or as directed. All soft and yielding material shall be removed and replaced with suitable material.
3. The granular fill shall be placed in layers not to exceed 6 inches deep and to such a depth that after compaction it shall be at the specified depth below the finished grade of the crosswalk. The base shall be wetted and rolled or tamped after the spreading of each layer.
4. The concrete shall be proportioned, mixed, placed, reinforced, etc., in accordance with the provisions of 4.01.03, except as modified herein. The color pigment shall be added to the concrete in accordance with manufacturer’s recommended procedure.
5. A grid shall be used to establish a brick pattern in the concrete to match the surrounding existing decorative crosswalks at the intersection. Care shall be taken to create a uniform pattern in the concrete. Hand work may be required at the edges and other locations where the main pattern varies to conform to field conditions.

Method of Measurement

The payment for “Decorative Concrete Crosswalk (Brick Pattern)” shall be measured for payment by the actual number of square feet completed and accepted by the City.

Basis of Payment:

Work under this Section will be paid for at the unit price per square foot for “Decorative Concrete Crosswalk (Brick Pattern)” complete, in place and accepted, which price shall include all excavation as specified above, saw cutting the existing pavement and decorative concrete crosswalks, backfill, disposal of surplus materials, and all labor, materials, equipment and tools necessary for and incidental to the completion of the work under this section.

Pay Item
Decorative Concrete Crosswalk (Brick Pattern)

Pay Unit
SF

ITEM # 0971001A – MAINTENANCE AND PROTECTION OF TRAFFIC

Article 9.71.01 – Description is supplemented by the following:

The Contractor shall maintain and protect traffic as described by the following and as limited in the special provision for Section 1.08 - Prosecution and Progress:

Water Street, Governor Winthrop Boulevard, and Ferry Street

The Contractor shall maintain and protect a minimum of one lane of traffic in each direction, each lane on a paved travel path not less than 11 feet in width.

Where turn lanes exist, the Contractor shall provide an additional 10 feet of paved travel path to be used for turning vehicles. This additional 10 feet of travel path shall be a minimum length of 150 feet. It shall be implemented so that sufficient storage, taper length, and turning radius are provided.

Excepted therefrom, will be those times, during these hours when the Contractor is installing traffic signal equipment. During these times when the signal Contractor is working over the roadway, the Contractor may hold traffic for a period not to exceed five minutes to adequately secure all materials before allowing traffic to pass. The Contractor shall receive prior approval from the Engineer to perform this operation.

Commercial and Residential Driveways

The Contractor shall maintain access to and egress from all commercial and residential driveways throughout the Project limits. The Contractor will be permitted to temporarily close affected driveways while actively working with coordination and permission from the owner or proprietor.

Intermediate Term Sidewalk Closures

The Contractor shall maintain and protect existing pedestrian accommodations, or a minimum of 4 feet in width, on all existing sidewalks, sidewalk ramps, and access to pedestrian pushbuttons, with the following exception:

- During the allowable periods and when the Contractor is actively constructing pedestrian amenities or installing signal equipment, the Contractor will be allowed to close pedestrian sidewalks and sidewalk ramps and restrict access to pedestrian pushbuttons for no more than a continuous 48 hour period of time.

No more than two corners of an intersection may be closed for an intermediate term sidewalk closure at any time. Where all four corners of an intersection have sidewalks and sidewalk ramps, diagonal corners shall not be closed at the same time.

During the intermediate term sidewalk closure, all approaches to the sidewalk shall be blocked by Construction Barricade Detectable with Sidewalk Closed signs.

The Contractor shall ensure that traffic control signals with pedestrian phases where access to the pushbuttons cannot be provided are revised at the start of the closure to automatically activate the pedestrian phase every signal cycle.

Intermediate term sidewalk closures may be extended to 72 hours with prior approval of the Engineer.

Traffic Operation Over Railroad – Highway Grade Crossing(s)

The Contractor will not be allowed to queue traffic over the railroad – highway grade crossing(s) at any time during the construction of the Project. If, due to the nature of the Contractor's operations, queuing is unavoidable, the Contractor shall use the Railroad's Police Protection to ensure that vehicles are kept clear of the crossing area. City Police Officers and/or Uniformed Flaggers may be used in lieu of Railroad Protective Services with the approval of the Railroad and the Engineer.

The Contractor shall coordinate its work with the Railroad's authorized representative:

Mr. Michael Kolonauski
Amtrak - National Railroad Passenger Corp.
30th Street Station, 4S-027, Mail Box 64, 2955
Market Street
Philadelphia, PA 19104
(215) 349-1127

Article 9.71.03 - Construction Method is supplemented as follows:

General

Unpaved travel paths will only be permitted for areas requiring full depth and full width reconstruction. The unpaved section shall be the full width of the road and shall be perpendicular to the travel lanes. The Contractor will be allowed to maintain traffic on processed aggregate for a duration not to exceed 10 calendar days and opposing traffic lane dividers shall be used as a centerline.

The Contractor is required to delineate any raised structures within the travel lanes, so that the structures are visible day and night, unless there are specific Contract plans and provisions to temporarily lower these structures prior to the completion of work.

The Contractor shall schedule operations so that pavement removal and roadway resurfacing shall be completed full width across a roadway or bridge section by the end of a work shift, or as directed by the Engineer.

When the installation of all intermediate courses of bituminous concrete pavement is completed for the entire roadway, the Contractor shall then install the final course of bituminous concrete pavement.

When the Contractor is excavating adjacent to the roadway, the Contractor shall provide a 3 foot shoulder between the work area and travel lanes, with traffic drums spaced every 50 feet. At the end of the work shift if the vertical drop-off exceeds 3 inches, the Contractor shall provide a temporary bituminous concrete traversable slope of 4:1 or flatter that is acceptable to the Engineer.

The Contractor, during the course of any active overhead construction work, shall close the lanes directly below the work area for the entire length of time overhead work is being undertaken.

At no time shall an overhead sign be left partially removed or installed.

When an existing sign is to be relocated or replaced, the work shall be completed during the same work shift.

The field installation of a signing pattern shall constitute interference with existing traffic operations and shall not be allowed, except during the allowable periods.

On limited-access highways, construction vehicles entering travel lanes shall not be allowed without a lane closure. The lane closure shall be of sufficient length to allow vehicles to enter or exit the work area at the posted speed limit, in order to merge with existing traffic.

Existing Signing

The Contractor shall maintain all existing overhead and side-mounted signs within the Project limits throughout the duration of the Project. The Contractor shall temporarily relocate signs and sign supports as many times as deemed necessary and shall install temporary sign supports if necessary and as directed by the Engineer.

Requirements for Winter

The Contractor shall schedule a meeting with representatives of the City of New London to determine any interim traffic control measures the Contractor shall accomplish prior to winter to provide safety to motorists and permit adequate snow removal procedures. This meeting shall be held prior to October 31 of each year and will include, but not be limited to, discussion of the status and schedule of the following items: lane and shoulder widths, pavement restoration, traffic signal work, pavement markings, and signing.

Signing Patterns

The Contractor shall erect and maintain all signing patterns in accordance with the traffic control plans contained herein. Proper distances between advance warning signs and proper taper lengths are mandatory.

Pavement Markings -Non-Limited Access Multilane Roadways Secondary and Local Roadways

During construction, the Contractor shall maintain all pavement markings on paved surfaces on all roadways throughout the limits of the project.

Interim Pavement Markings

The Contractor shall install painted pavement markings, which shall include centerlines, shoulder edge lines, lane lines (broken lines), lane-use arrows, and stop bars, on each intermediate course of bituminous concrete pavement and on any milled surface by the end of the work day/night. If the next course of bituminous concrete pavement will be placed within seven days, shoulder edge lines are not required. The painted pavement markings will be paid under the appropriate items.

If the Contractor will install another course of bituminous concrete pavement within 24 hours, the Contractor may install Temporary Plastic Pavement Marking Tape in place of the painted pavement markings by the end of the work day/night. These temporary pavement markings shall include centerlines, lane lines (broken lines) and stop bars; shoulder edge lines are not required. Centerlines shall consist of two 4 inch wide yellow markings, 2 feet in length, side by side, 4 to 6 inches apart, at 40-foot intervals. No passing zones should be posted with signs in those areas where the final centerlines have not been established on two-way roadways. Stop bars may consist of two 6 inch wide white markings or three 4 inch wide white markings placed side by side. The Contractor shall remove and dispose of the Temporary Plastic Pavement Marking Tape when another course of bituminous concrete pavement is installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

If an intermediate course of bituminous concrete pavement will be exposed throughout the winter, then Epoxy Resin Pavement Markings should be installed unless directed otherwise by the Engineer.

Final Pavement Markings

The Contractor should install painted pavement markings on the final course of bituminous concrete pavement by the end of the work day/night. If the painted pavement markings are not installed by the end of the work day/night, then Temporary Plastic Pavement Marking Tape shall be installed as described above and the painted pavement markings shall be installed by the end of the work day/night on Friday of that week.

If Temporary Plastic Pavement Marking Tape is installed, the Contractor shall remove and dispose of these markings when the painted pavement markings are installed. The cost of furnishing, installing and removing the Temporary Plastic Pavement Marking Tape shall be at the Contractor's expense.

The Contractor shall install permanent Epoxy Resin Pavement Markings in accordance with Section 12.10 entitled "Epoxy Resin Pavement Markings, Symbols, and Legends" after such time as determined by the Engineer.

Traffic Control During Construction Operations

The following guidelines shall assist field personnel in determining when and what type of traffic control patterns to use for various situations. These guidelines shall provide for a safer

and more efficient movement of traffic through work zones and enhance the safety of work forces in the work area.

Traffic Control Patterns

Traffic control patterns shall be used when a work operation requires that all or part of any vehicle or work area protrudes onto any part of a travel lane or shoulder or is within the clear zone. For each situation, the installation of traffic control devices shall be based on the following:

- Speed and volume of traffic.
- Duration of operation.
- Exposure to hazards.

Traffic control patterns shall be uniform, neat, and orderly in order to command respect from the motorist.

Lane reduction tapers should be placed so that the entire length of the taper is installed on a tangent section of roadway and the entire taper area can be seen by the motorist.

All existing conflicting signs shall be removed, covered with an opaque material, or turned so that they are not legible to oncoming traffic prior to implementing a traffic control pattern. The existing signs shall be uncovered or reinstalled once the pattern is removed.

A buffer area should be provided during installation of a traffic control pattern and maintained for the duration of the work. The buffer area shall be free of any equipment, workers, materials, and parked vehicles.

Construction Traffic Control Plans 19 through 25 should be used for moving operations such as line striping, rumble strips, pothole patching, mowing, or sweeping when it is necessary for equipment to occupy a travel lane.

Traffic control patterns are not required for vehicles on an emergency patrol type activity or for a short duration stop of up to one hour, as long as the equipment is contained within the shoulder. Flashing lights, arrow boards, truck-mounted or trailer-mounted impact attenuators, and appropriate Trafficperson(s) shall be used when required.

In a situation not adequately covered by the Construction Traffic Control Plans, the Contractor shall contact the Engineer for assistance prior to setting up a traffic control pattern.

Placement of Signs

Signs shall be placed in a position that allows motorists the opportunity to reduce their speed prior to the work area. Signs shall be installed on the same side of the roadway as the work area. On multi-lane divided highways, advance warning signs shall be installed on both sides of the highway. On directional roadways (on-ramps, off-ramps, one-way roads) where the sight distance to signs is restricted, these signs should be installed on both sides of the roadway.

Allowable Adjustment of Signs and Devices Shown on the Construction Traffic Control Plans

The Construction Traffic Control Plans contained herein show the location and spacing of signs and devices under ideal conditions. Signs and devices should be installed as shown on these plans.

The proper application of the Construction Traffic Control Plans and installation of traffic control devices is dependent upon actual field conditions.

In the case of a horizontal or vertical sight restriction in advance of the work area, the traffic control pattern shall be extended to provide adequate sight distance for approaching traffic.

Adjustments to the Construction Traffic Control Plans shall only be made at the direction of the Engineer.

Table 1 indicates the minimum taper lengths required for a lane closure based on the posted speed limit and lane width of the roadway. These taper lengths shall only be used when the recommended taper lengths shown on the Construction Traffic Control Plans cannot be achieved.

Table 1 – Minimum Taper Length

POSTED SPEED LIMIT (MPH)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE (FEET)	
	FREEWAYS	SECONDARY ROADS
30 OR LESS	180	165
35	245	225
40	320	295
45	540	495
50	600	550
55	660	605
65	780	715

1. Work Zone Safety Meetings

- 1.a) Prior to the commencement of work, a Work Zone Safety Meeting shall be conducted with representatives from DOT Construction, Connecticut State Police (Local Barracks), Municipal Police, the Contractor (Project Superintendent) and the Traffic Control Subcontractor (if different than the prime Contractor) to review the traffic operations, lines of responsibility, and operating guidelines which will be used on the Project. DOT Traffic Engineering shall be invited to the Work Zone Safety Meeting. Other Work Zone Safety Meetings during the course of the Project should be scheduled as needed.
- 1.b) A Work Zone Safety Meeting Agenda shall be developed and used at the Meeting to outline the anticipated traffic control issues during the construction of this Project. Any issues that can't be resolved at these Meetings will be brought to the attention of the District Engineer and the Office of Construction. The agenda shall include:
 - i. Review Project scope of work and time;
 - ii. Review Section 1.08, Prosecution and Progress;
 - iii. Review Section 9.70, Trafficpersons;
 - iv. Review Section 9.71, Maintenance and Protection of Traffic;
 - v. Review Contractor's schedule and method of operations;
 - vi. Review special concern areas: ramps, turning roadways, medians, lane drops, etc.;
 - vii. Open discussion of work zone questions and issues;
 - viii. Discussion of review and approval process for changes in Contract requirements as they relate to work zone areas.

2. General

- 2.a) Traffic control patterns shall only be installed if the required minimum number of signs, traffic cones, traffic drums, and other equipment (i.e. one Arrow Board for each lane closed, two Truck-Mounted or Trailer-Mounted Attenuators (TMAs), Changeable Message Sign, etc.) are on Site.
- 2.b) The Contractor shall have spare maintenance and protection of traffic equipment (TMAs, Arrow Board, Changeable Message Sign(s), construction signs, traffic cones, traffic drums, etc.) available at all times in case of mechanical failures, etc. Spare maintenance and protection of traffic equipment installed as a result of a sudden equipment breakdown shall be replaced by the Contractor within 24 hours.
- 2.c) Failure of the Contractor to have the required minimum number of signs, personnel, and equipment, which results in the pattern not being installed, shall not be a reason for a time extension or claim for lost time.
- 2.d) In cases of differences of opinion between the Contractor and the Inspection staff, the Contractor shall follow the directions of the Engineer. The matter shall be brought to the District Office for resolution immediately or, in the case of work after regular business hours, on the next business day.

3. Installing and Removing Traffic Control Patterns

- 3.a) Lane closures shall be installed beginning with the advance warning signs and proceeding forward toward the work area.
- 3.b) Lane closures shall be removed in the reverse order, beginning at the end of the work area, or traffic control pattern, and proceeding back toward the advance warning signs.
- 3.c) Stopping traffic may be allowed within the allowable hours stated in Section 1.08.04:
 - i. For those activities stated within the Contract.
 - ii. During paving, milling operations, or similar activities where, in the middle of the operation, it is necessary to flip the pattern to complete the operation on the other half of the roadway so traffic does not travel across the longitudinal joint or difference in roadway elevation.
 - iii. To move slow moving equipment across live traffic lanes into the work area.
- 3.d) The Contractor shall adhere to using the proper signs, placing the signs correctly, and ensuring the proper spacing of signs.
- 3.e) Additional devices are required on entrance ramps, exit ramps, and intersecting roads to warn and/or move traffic into the proper travel path prior to merging with or exiting from the mainline traffic. This shall be completed before installing the mainline pattern past the ramp or intersecting roadway.
- 3.f) Workers are prohibited from crossing the travel lanes on limited access roadways to install and remove signs or other devices on the opposite side of the roadway. Any signs or devices on the opposite side of the roadway shall be installed and removed separately.

4. Implementation of Rolling Road Block (RRB)

- 4.a) Temporary road closures using a RRB may be allowed on limited access highways for operations associated with the installation and removal of temporary lane closures. RRB may be allowed for the installation and removal of lead signs and lane tapers only and shall meet the following requirements:
 - i. Refer to the Limitation of Operations Chart provided in Section 1.08.04 for the hours allowed for implementing a RRB operation. The Contractor shall only implement a RRB operation within the hours shown in the Chart.
 - ii. In areas with good sight lines and full shoulders, signs on the side of the road opposite the traffic pattern should be installed in a separate operation.
 - iii. TMAs equipped with Arrow Boards shall be used to slow traffic to implement the RRB. State Police Officers in marked vehicles may be used to support the implementation of the RRB. The RRB shall start by having all vehicles, including TMAs and police vehicles, leave the shoulder or on-ramp and accelerate to normal roadway speeds in each lane. The vehicles will then position themselves side by side and decelerate to the RRB speed on the highway.

- iv. A Pre-Warning Vehicle, as specified elsewhere in the Contract, shall be used to advise the motorists that sign pattern installation or removal is underway.
- v. The RRB duration shall not exceed 15 minutes from the start of the traffic block until all lanes are opened as designated in the Limitation of Operations chart. If the RRB duration exceeds 15 minutes on 2 successive shifts, no further RRB will be allowed until the Contractor obtains approval for a revised installation procedure from the District.
- vi. RRB shall not be used to expand a lane closure pattern to an additional lane during the shift. The workers and equipment required to implement the additional lane closure should be staged from within the closed lane. TMAs (and State Police if available) shall be used to protect the workers installing the taper in the additional lane.
- vii. Exceptions to these work procedures may be submitted to the District Office for consideration. A minimum of 2 business days shall be allowed for review and comment by the District.
- viii. The Engineer and the Contractor will review and discuss the RRB procedures (including any revisions) in advance of the work. The implementation of the agreed upon plan will be reviewed with the State Police during the Work Zone Safety Meeting held before each shift involving temporary lane closures. If the State Police determine that alternative procedures should be implemented for traffic control during the work shift, the Department and Contractor will attempt to resolve any discrepancies with the duty sergeant at the Troop. If the discrepancies are unable to be resolved prior to the start of the shift, then the work will proceed as recommended by the Department. Any unresolved issues shall be addressed the following day.

5. Use of Arrow Boards

- 5.a) On limited access roadways, one Arrow Board shall be used for each lane that is closed. The Arrow Board shall be installed concurrently with the installation of the traffic control pattern and its placement shall be as shown on the Construction Traffic Control Plans. Additional Arrow Boards shall be deployed if sight distances are limited.
- 5.b) On non-limited access roadways, the use of an Arrow Board for lane closures is optional. The roadway geometry, sight distance, and traffic volume shall be considered in the decision to use the Arrow Board.
- 5.c) A vehicle displaying an arrow board shall be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.
- 5.d) The flashing arrow mode shall be used for lane closure (merge) tapers.
- 5.e) The flashing arrow mode shall not be used for temporary alternating one-way traffic operations or to laterally shift lanes of traffic.

- 5.f) The flashing double arrow mode shall only be used for closing a center lane on a multilane roadway where adjacent left and right lanes remain open.
- 5.g) For shoulder work or roadside work near the shoulder, the Arrow Board shall be positioned in the shoulder and the flashing alternating diamond mode should be used.
- 5.h) The flashing alternating diamond caution mode should also be used when supplemental Arrow Boards are positioned in an already closed lane.

6. Use of Truck-Mounted or Trailer-Mounted Impact Attenuators (TMAs)

- 6.a) On limited access roadways, lane closures shall use a minimum of two TMAs to install and remove traffic control patterns. If two TMAs are not available, then the pattern shall not be installed.
- 6.b) On non-limited access roadways, the use of TMAs to install and remove patterns closing a lane(s) is optional. The roadway geometry, sight line distance, and traffic volume shall be considered in the decision to utilize the TMAs.
- 6.c) On limited access roadways, one TMA shall be placed on the shoulder and the second TMA shall be approximately 1,000 feet ahead blocking the lane to establish the advance and transition signing. The Arrow Board mounted on the TMA shall be in the arrow mode when taking the lane. The sign truck and workers shall be at sufficient distance ahead of the second TMA. In no case shall the TMA be used as the sign truck or a work truck. Once the transition is in place, the TMAs shall travel in the closed lane until all Portable Changeable Message Signs, signs, Arrow Boards, and cones/drums are installed. The Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when traveling in the closed lane.
- 6.d) A TMA shall be placed prior to the first work area in the pattern. If there are multiple work areas within the same pattern, then additional TMAs shall be positioned at each additional work area as needed. The Arrow Board mounted on the TMA should be in the flashing alternating diamond caution mode when in the closed lane.
- 6.e) TMAs shall be positioned a sufficient distance prior to the workers or equipment being protected to allow for appropriate vehicle roll-ahead in the event that the TMA is hit, but not so far that an errant vehicle could travel around the TMA and into the work area. For additional placement and use details, refer to Section 18.06. Some operations, such as paving and concrete repairs, do not allow for placement of the TMA(s) within the specified distances. In these situations, the TMA(s) shall be placed at the beginning of the work area and shall be advanced as the paving or concrete operations proceed.
- 6.f) TMAs will be paid for in accordance with how the unit is used. If it is used as a TMA and is in the proper location as specified, then it will be paid for at the specified hourly rate for Truck-Mounted or Trailer-Mounted Impact Attenuator. When the TMA is used as an Arrow Board, it will be paid for at the daily rate for Arrow Board. If a TMA is

used to install and remove a pattern and is also used as an Arrow Board in the same day, then the unit will be paid for as a Truck-Mounted or Trailer-Mounted Impact Attenuator for the hours used to install and remove the pattern, typically 2 hours (1 hour to install and 1 hour to remove). If the TMA is also used as an Arrow Board during the same day, then the unit will only be paid for at the daily rate as an Arrow Board.

7. Use of Traffic Drums and Traffic Cones

- 7.a) On limited-access highways, ramps, and turning roadways:
 - i. Traffic drums shall be used for taper channelization.
 - ii. Traffic drums shall be used to delineate raised catch basins and other hazards.
 - iii. Traffic cones with a minimum height of 42 inches may be used in place of drums in the tangent section of a closed lane or shoulder.
 - iv. Traffic cones less than 42 inches in height shall not be used.
- 7.b) On all roadways:
 - i. Traffic drums shall be used in place of traffic cones in traffic control patterns that are in effect for more than a 36-hour duration.
 - ii. Traffic cones shall not be left unattended.
 - iii. Traffic cones with a minimum height of 42 inches shall be used when the posted speed limit is 45 MPH or above.
- 7.c) Typical spacing of traffic drums and/or cones shown on the Construction Traffic Control Plans in the Contract are maximum spacings and may be reduced to meet actual field conditions as required.

8. Use of Barricade Warning Lights

- 8.a) Barricade Warning Lights may be installed on channelizing devices when used in a merge taper. The Barricade Warning Lights shall flash in a sequential pattern when used in a merge taper. The successive flashing shall occur from the upstream end (beginning) of the merge taper to the downstream end (end) of the merge taper.
- 8.b) Type C Barricade Warning Lights may be used at night to delineate the edge of the travel way.
- 8.c) Type B Barricade Warning Lights shall be used on post-mounted advanced warning signs.

9. Use of Portable Changeable Message Signs (PCMS)

- 9.a) On limited access roadways, one PCMS shall be used in advance of the traffic control pattern for all lane closures. Prior to installing the pattern, the PCMS shall be installed and in operation, displaying the appropriate lane closure information. The PCMS shall be positioned ½ to 1 mile ahead of the start of the lane closure taper. If the distance to the nearest exit ramp is greater than the specified ½ to 1 mile distance, then an additional PCMS shall be positioned a sufficient distance ahead of the exit ramp (and before the

previous on-ramp where practical) to alert motorists to the work and therefore offer them an opportunity to take the exit.

- 9.b) On non-limited access roadways, the use of PCMS for lane closures is optional. The roadway geometry, sight line distance, and traffic volume shall be considered in the decision to use the PCMS.
- 9.c) PCMS should be placed off the shoulder of the roadway and behind a traffic barrier, if practical. Where a traffic barrier is not available to shield the PCMS, it should be placed off the shoulder and outside of the clear zone. If a PCMS has to be placed on the shoulder of the roadway or within the clear zone, it should be placed on the paved shoulder with a minimum of five traffic drums placed in a taper in front of it to delineate its position. The taper shall meet minimum distance requirements for a shoulder closure. The PCMS shall be protected if it is used for a continuous duration of 36 hours or more.
- 9.d) The PCMS shall be removed from the clear zone and have the display screen cleared and turned 90 degrees away from the roadway when the PCMS is no longer required.
- 9.e) The PCMS should not be used within 1,000 feet of an existing PCMS or Variable Message Sign (VMS).
- 9.f) A PCMS message shall:
 - i. consist of no more than two phases;
 - ii. contain no more than three lines of text per phase;
 - iii. have no more than eight characters per line, including spaces.
- 9.g) The PCMS should be used for specific situations that need to command the motorist's attention which cannot be conveyed with standard construction signs. The PCMS should not be used for generic messages (ex.: Road Work Ahead, Bump Ahead, Gravel Road, etc.) or for messages that need to be displayed for long periods of time, such as during stage construction. These types of messages should be displayed with construction signs. Special signs shall be coordinated with the Office of Construction and the Division of Traffic Engineering for the proper layout/dimensions required.
- 9.h) Typical messages that are allowed on the PCMS are shown below. Approval must be received from the Office of Construction for any message(s) different than the typical messages shown in Figure 1.
- 9.i) All messages shall comply with the information provided in Tables 2 and 3.

	<u>Phase 1</u>	<u>Phase 2</u>	<u>Message No.</u>	<u>Phase 1</u>	<u>Phase 2</u>
1	LEFT LANE CLOSED	MERGE RIGHT	9	LANES CLOSED AHEAD	REDUCE SPEED
2	2 LEFT LANES CLOSED	MERGE RIGHT	10	LANES CLOSED AHEAD	USE CAUTION
3	LEFT LANE CLOSED	REDUCE SPEED	11	EXIT XX CLOSED	USE EXIT YY
4	2 LEFT LANES CLOSED	REDUCE SPEED	12	EXIT XX CLOSED USE YY	FOLLOW DETOUR
5	RIGHT LANE CLOSED	MERGE LEFT	13	2 LANES SHIFT AHEAD	USE CAUTION
6	2 RIGHT LANES CLOSED	MERGE LEFT	14	3 LANES SHIFT AHEAD	USE CAUTION
7	RIGHT LANE CLOSED	REDUCE SPEED			
8	2 RIGHT LANES CLOSED	REDUCE SPEED			

Figure 1: Typical PCMS Messages

Table 2: Acceptable Abbreviations

Word Message	Standard Abbreviation	Word Message	Standard Abbreviation
Access	ACCS	Minimum	MIN
Afternoon / Evening	PM	Minor	MNR
Ahead	AHD	Minute(s)	MIN
Alternate	ALT	Monday	MON
Avenue	AVE, AV	Morning / Late Night	AM
Bicycle	BIKE	Mount	MT
Blocked	BLKD	Mountain	MTN
Boulevard	BLVD	National	NATL
Bridge	BR	Normal	NORM
CB Radio	CB	North	N
Center	CTR	Northbound	NBND
Center	CNTR	Oversized	OVRSZ
Chemical	CHEM	Parking	PKING
Circle	CIR	Parkway	PKWY
Compressed Natural Gas	CNG	Pavement	PVMT
Condition	COND	Pedestrian	PED
Congested	CONG	Place	PL
Construction	CONST	Pounds	LBS
Court	CT	Prepare	PREP
Crossing	XING	Quality	QLTY
Crossing (other than highway-rail)	XING	Right	RT
Downtown	DWNTN	Road	RD
Drive	DR	Roadwork	RDWK
East	E	Route	RT, RTE
Eastbound	EBND	Saint	ST
Electric Vehicle	EV	Saturday	SAT
Emergency	EMER	Service	SERV
Entrance, Enter	ENT	Shoulder	SHLDR
Exit	EX	Slippery	SLIP
Express	EXP	South	S
Expressway	EXPWY	Southbound	SBND
Feet	FT	Speed	SPD
Freeway	FRWY, FWY	State, county, or other non-US or non-Interstate numbered route	[Route Abbreviation determined by highway agency]**
Friday	FRI	Street	ST
Frontage	FRNTG	Sunday	SUN
Hazardous	HAZ	Telephone	PHONE
Hazardous Material	HAZMAT	Temporary	TEMP
High Occupancy Vehicle	HOV	Terrace	TER
Highway	HWY	Thruway	THWY
Highway-Rail Grade Crossing	RR XING	Thursday	THURS
Hospital	HOSP	Tons of Weight	T

Hour(s)	HR, HRS	Traffic	TRAF
Information	INFO	Trail	TR
International	INTL	Travelers	TRVLRS
Interstate	I-	Tuesday	TUES
Junction / Intersection	JCT	Turnpike	TPK
Lane	LN	Two-Way Intersection	2-WAY
Left	LFT	Two-Wheeled Vehicles	CYCLES
Liquid Propane Gas	LP-GAS	Upper	UPR
Local	LOC	US Numbered Route	US
Lower	LWR	Vehicle(s)	VEH, VEHS
Maintenance	MAINT	Warning	WARN
Major	MAJ	Wednesday	WED
Maximum	MAX	West	W
Mile(s)	MI	Westbound	WBND
Miles Per Hour	MPH		

** A space and no dash shall be placed between the abbreviation and the number of the route.

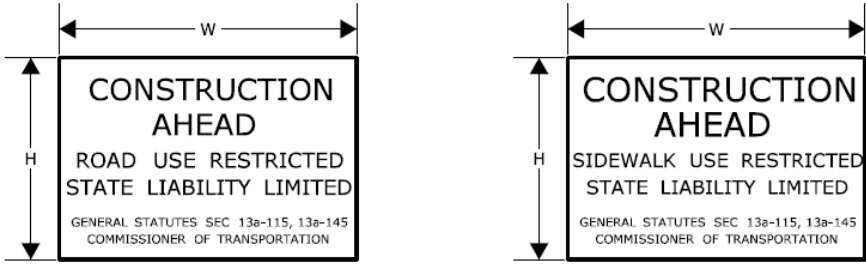
Table 3: Unacceptable Abbreviations

Unacceptable Abbreviation	Intended Word	Common Misinterpretation
ACC	Accident	Access (Road)
CLRS	Clears	Colors
DLY	Delay	Daily
FDR	Feeder	Federal
L	Left	Lane (Merge)
LT	Light (Traffic)	Left
PARK	Parking	Park
POLL	Pollution (Index)	Poll
RED	Reduce	Red
STAD	Stadium	Standard
WRNG	Warning	Wrong

10. Use of State Police Officers

- 10.a) State Police may be used only on limited access highways and secondary roadways that are under their primary jurisdiction. A minimum of one Officer may be used per critical sign pattern; however, a State Police presence is not required. Shoulder closures and right lane closures can generally be implemented without the presence of a State Police Officer. Left lane closures may also be implemented without State Police presence in areas with only moderate traffic and wide, unobstructed medians. It may be desirable to have a State Police presence, when available, under specific situations, such as nighttime lane closures; left lane closures with minimal width for setting up advance signs and staging; lane and shoulder closures on turning roadways/ramps or mainline where sight distance is minimal; and closures where extensive turning movements or traffic congestion regularly occur; however, they are not required.
- 10.b) If a State Police presence is provided, once the pattern is in place, the State Police Officer should be positioned in a non- hazardous location in advance of the pattern to provide advance warning to the motorist. If traffic backs up beyond the beginning of the pattern, then the State Police Officer shall reposition so that they are located prior to the backup. The State Police Officer should not be located immediately behind or within the roll ahead area of any TMA or within the work zone buffer area. The State Police Officer shall not be positioned in such a way that the State Police Officer obstructs any construction warning signs or PCMS from view of the motorist.
- 10.c) Other functions of the State Police Officer(s) may include:
 - i. Assisting construction vehicles entering and exiting the work area.
 - ii. Enforcement of motor vehicle laws within the work area, if specifically requested by the Engineer.
- 10.d) State Police Officers assigned to a work site shall take direction from the Engineer.

SERIES 16 SIGNS



		W	H
16-E	80-1605	84"	60"
16-H	80-1608	60"	42"
16-M	80-1613	30"	24"

		W	H
16-S	80-1619	48"	30"

THE 16-S SIGN SHALL BE USED ON ALL PROJECTS THAT REQUIRE SIDEWALK RECONSTRUCTION OR RESTRICT PEDESTRIAN TRAVEL ON AN EXISTING SIDEWALK.

SERIES 16 SIGNS SHALL BE INSTALLED IN ADVANCE OF THE TRAFFIC CONTROL PATTERNS TO ALLOW MOTORISTS THE OPPORTUNITY TO AVOID A WORK ZONE. SERIES 16 SIGNS SHALL BE INSTALLED ON ANY MAJOR INTERSECTING ROADWAYS THAT APPROACH THE WORK ZONE. ON LIMITED-ACCESS HIGHWAYS, THESE SIGNS SHALL BE LOCATED IN ADVANCE OF THE NEAREST UPSTREAM EXIT RAMP AND ON ANY ENTRANCE RAMPS PRIOR TO OR WITHIN THE WORK ZONE LIMITS.

THE LOCATION OF SERIES 16 SIGNS CAN BE FOUND ELSEWHERE IN THE PLANS OR INSTALLED AS DIRECTED BY THE ENGINEER.

SIGNS 16-E AND 16-H SHALL BE POST-MOUNTED.

SIGN 16-E SHALL BE USED ON ALL EXPRESSWAYS.

SIGN 16-H SHALL BE USED ON ALL RAMPS, OTHER STATE ROADWAYS, AND MAJOR TOWN/CITY ROADWAYS.

SIGN 16-M SHALL BE USED ON OTHER TOWN ROADWAYS.

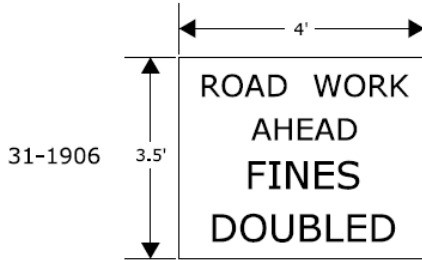
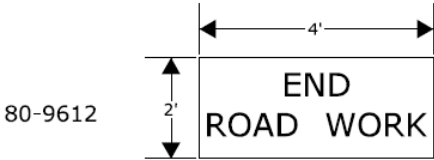
REGULATORY SIGN "ROAD WORK AHEAD, FINES DOUBLED"

THE REGULATORY SIGN "ROAD WORK AHEAD FINES DOUBLED" SHALL BE INSTALLED FOR ALL WORK ZONES THAT OCCUR ON ANY STATE HIGHWAY IN CONNECTICUT WHERE THERE ARE WORKERS ON THE HIGHWAY OR WHEN THERE IS OTHER THAN EXISTING TRAFFIC OPERATIONS.

THE "ROAD WORK AHEAD FINES DOUBLED" REGULATORY SIGN SHALL BE PLACED AFTER THE SERIES 16 SIGN AND IN ADVANCE OF THE "ROAD WORK AHEAD" SIGN.

"END ROAD WORK" SIGN

THE LAST SIGN IN THE PATTERN MUST BE THE "END ROAD WORK" SIGN.



SCALE: NONE

**CONSTRUCTION TRAFFIC CONTROL PLAN
 REQUIRED SIGNS**

NOTES FOR TRAFFIC CONTROL PLANS

1. IF A TRAFFIC STOPPAGE OCCURS IN ADVANCE OF SIGN (A), THEN AN ADDITIONAL SIGN (A) SHALL BE INSTALLED IN ADVANCE OF THE STOPPAGE.
2. SIGNS (AA), (A), AND (D) SHOULD BE OMITTED WHEN THESE SIGNS HAVE ALREADY BEEN INSTALLED TO DESIGNATE A LARGER WORK ZONE THAN THE WORK ZONE THAT IS ENCOMPASSED ON THIS PLAN.
3. SEE TABLE 1 FOR ADJUSTMENT OF TAPERS IF NECESSARY.
4. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN TRAFFIC DRUMS SHALL BE USED IN PLACE OF TRAFFIC CONES.
5. ANY LEGAL SPEED LIMIT SIGNS WITHIN THE LIMITS OF A ROADWAY / LANE CLOSURE AREA SHALL BE COVERED WITH AN OPAQUE MATERIAL WHILE THE CLOSURE IS IN EFFECT, AND UNCOVERED WHEN THE ROADWAY / LANE CLOSURE IS RE-OPENED TO ALL LANES OF TRAFFIC.
6. IF THIS PLAN REMAINS IN CONTINUOUS OPERATION FOR MORE THAN 36 HOURS, THEN ANY EXISTING CONFLICTING PAVEMENT MARKINGS SHALL BE ERADICATED OR COVERED, AND TEMPORARY PAVEMENT MARKINGS THAT DELINEATE THE PROPER TRAVELPATHS SHALL BE INSTALLED.
7. DISTANCES BETWEEN SIGNS IN THE ADVANCE WARNING AREA MAY BE REDUCED TO 100' ON LOW-SPEED URBAN ROADS (SPEED LIMIT < 40 MPH).
8. IF THIS PLAN IS TO REMAIN IN OPERATION DURING THE HOURS OF DARKNESS, INSTALL BARRICADE WARNING LIGHTS - HIGH INTENSITY ON ALL POST-MOUNTED DIAMOND SIGNS IN THE ADVANCE WARNING AREA.
9. A CHANGEABLE MESSAGE SIGN SHALL BE INSTALLED ONE HALF TO ONE MILE IN ADVANCE OF THE LANE CLOSURE TAPER.
10. SIGN (P) SHALL BE MOUNTED A MINIMUM OF 7 FEET FROM THE PAVEMENT SURFACE TO THE BOTTOM OF THE SIGN.

TABLE 1 - MINIMUM TAPER LENGTHS

POSTED SPEED LIMIT (MILES PER HOUR)	MINIMUM TAPER LENGTH FOR A SINGLE LANE CLOSURE
30 OR LESS	180' (55m)
35	250' (75m)
40	320' (100m)
45	540' (165m)
50	600' (180m)
55	660' (200m)
65	780' (240m)

METRIC CONVERSION CHART (1" = 25mm)

ENGLISH	METRIC	ENGLISH	METRIC	ENGLISH	METRIC
12"	300mm	42"	1050mm	72"	1800mm
18"	450mm	48"	1200mm	78"	1950mm
24"	600mm	54"	1350mm	84"	2100mm
30"	750mm	60"	1500mm	90"	2250mm
36"	900mm	66"	1650mm	96"	2400mm



SCALE: NONE

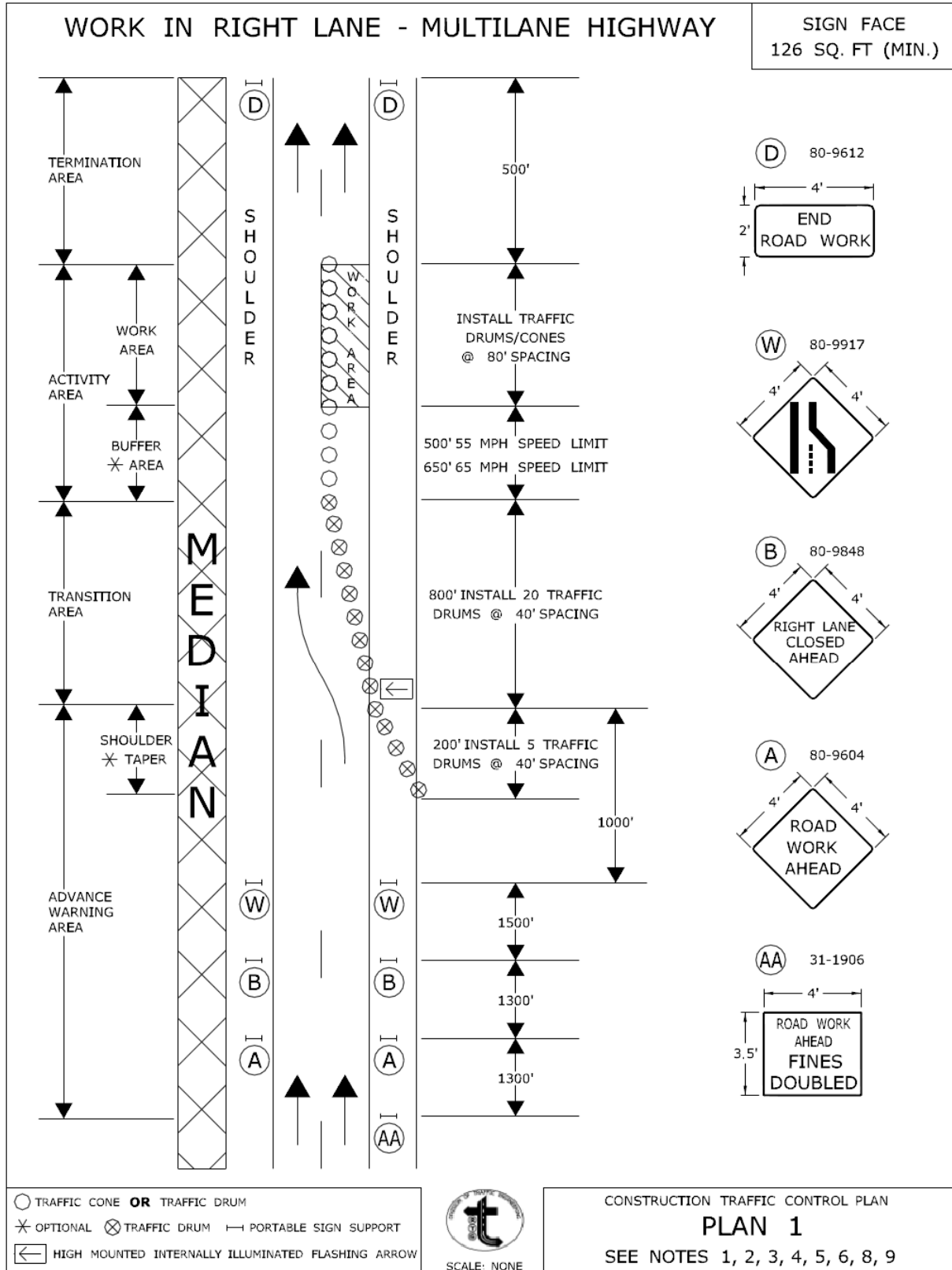
CONSTRUCTION TRAFFIC CONTROL PLAN
NOTES

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 BUREAU OF ENGINEERING & CONSTRUCTION

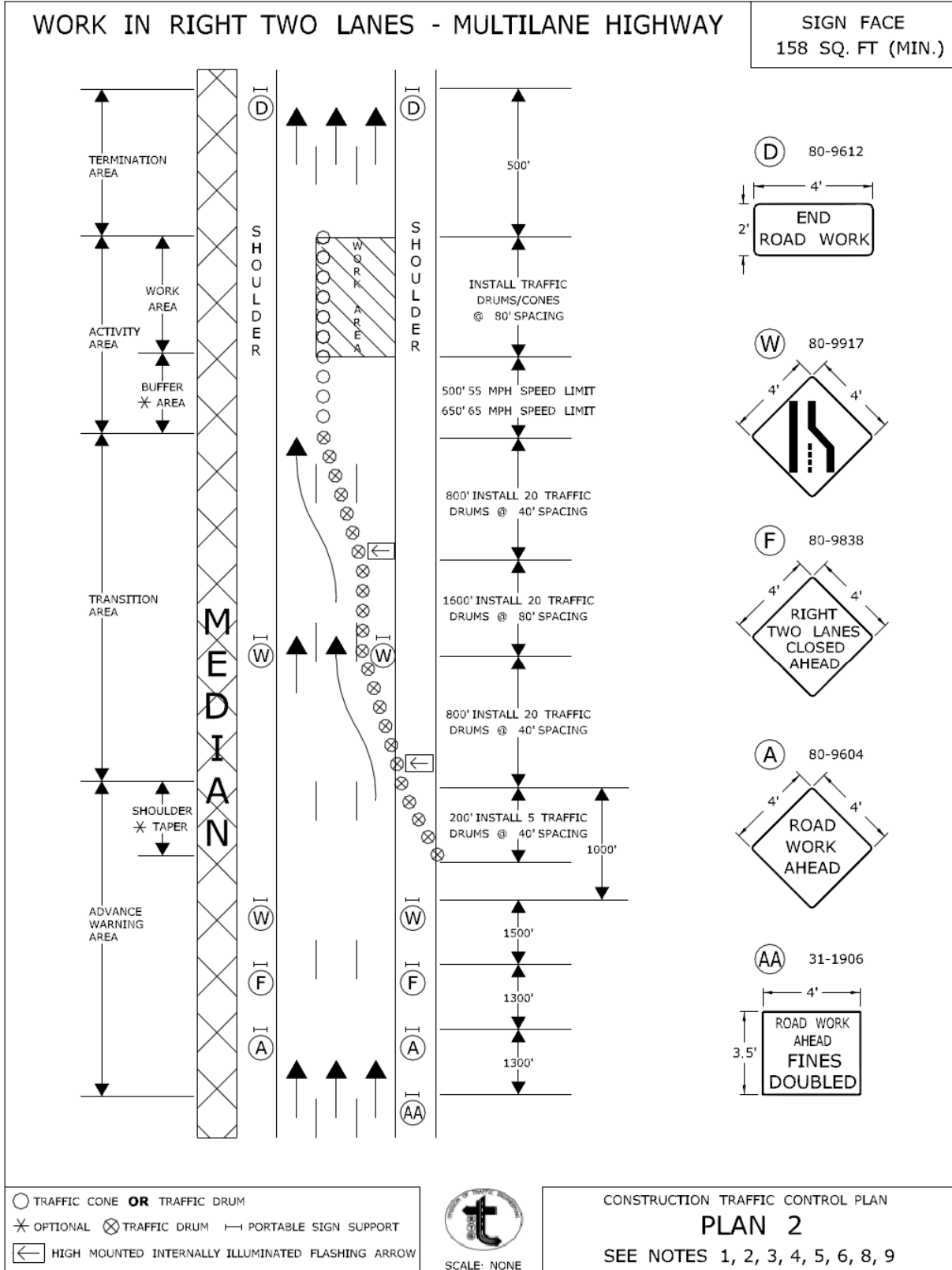
APPROVED

Charles S. Harlow
 PRINCIPAL ENGINEER

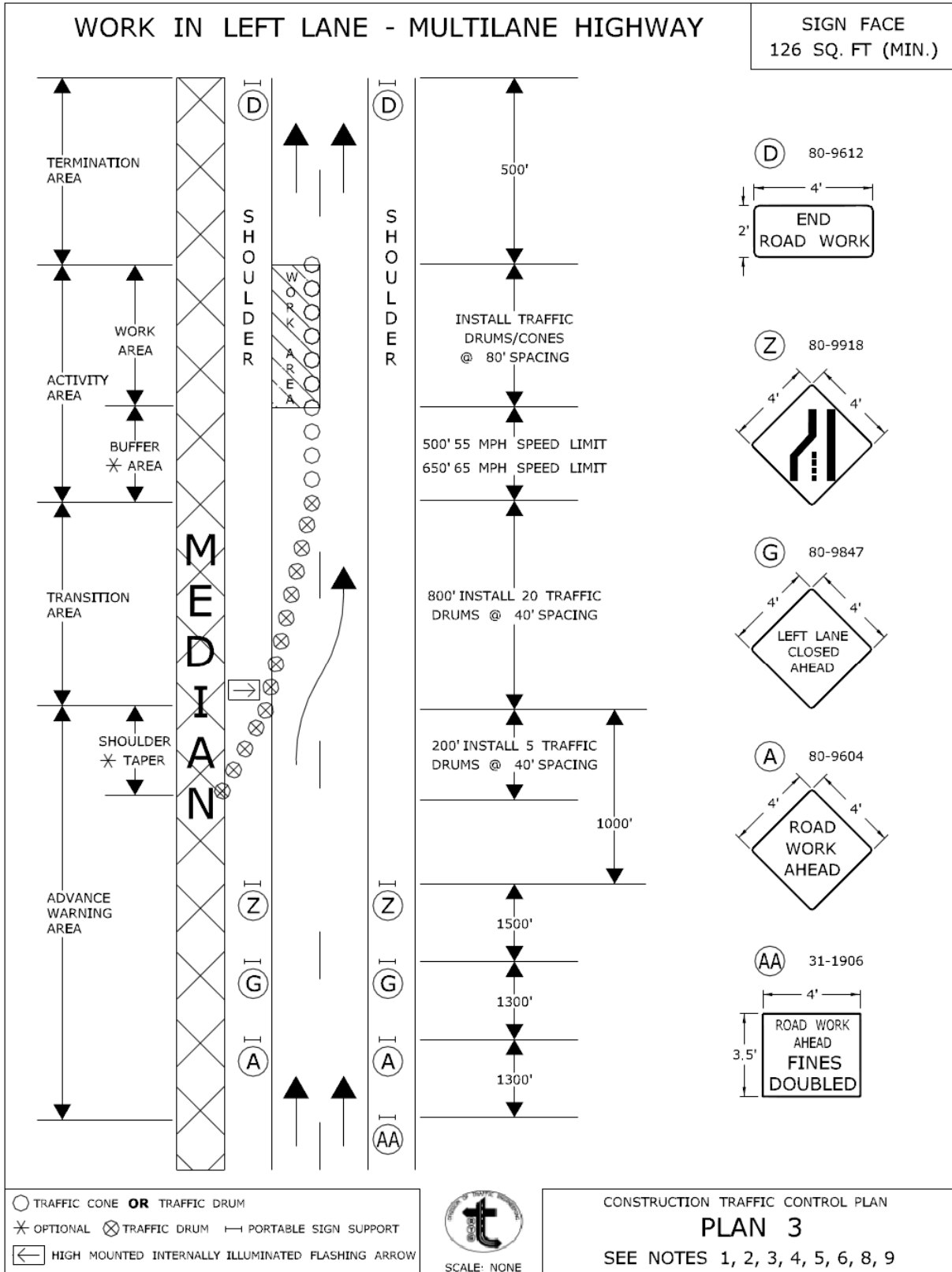
Charles S. Harlow
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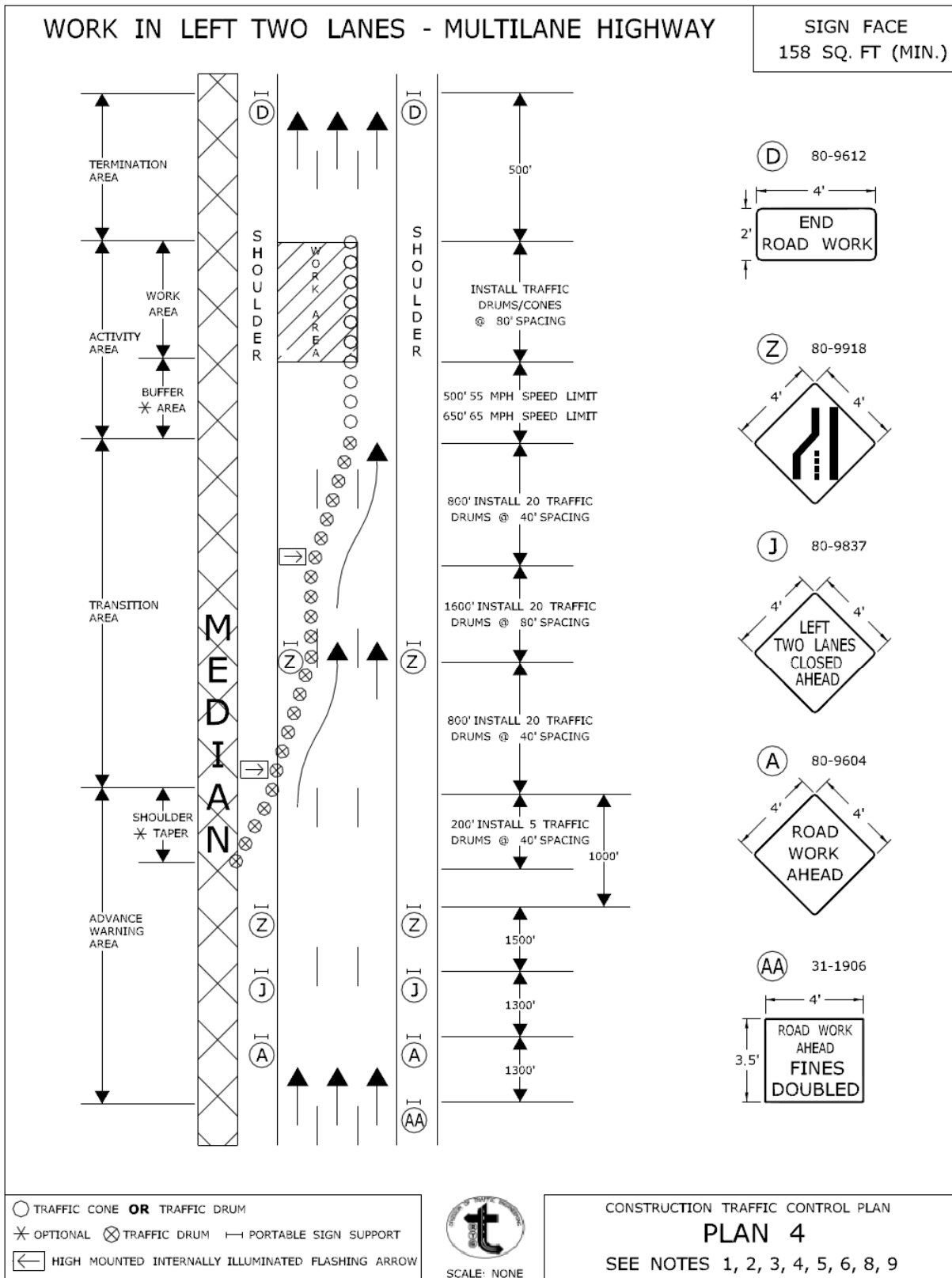
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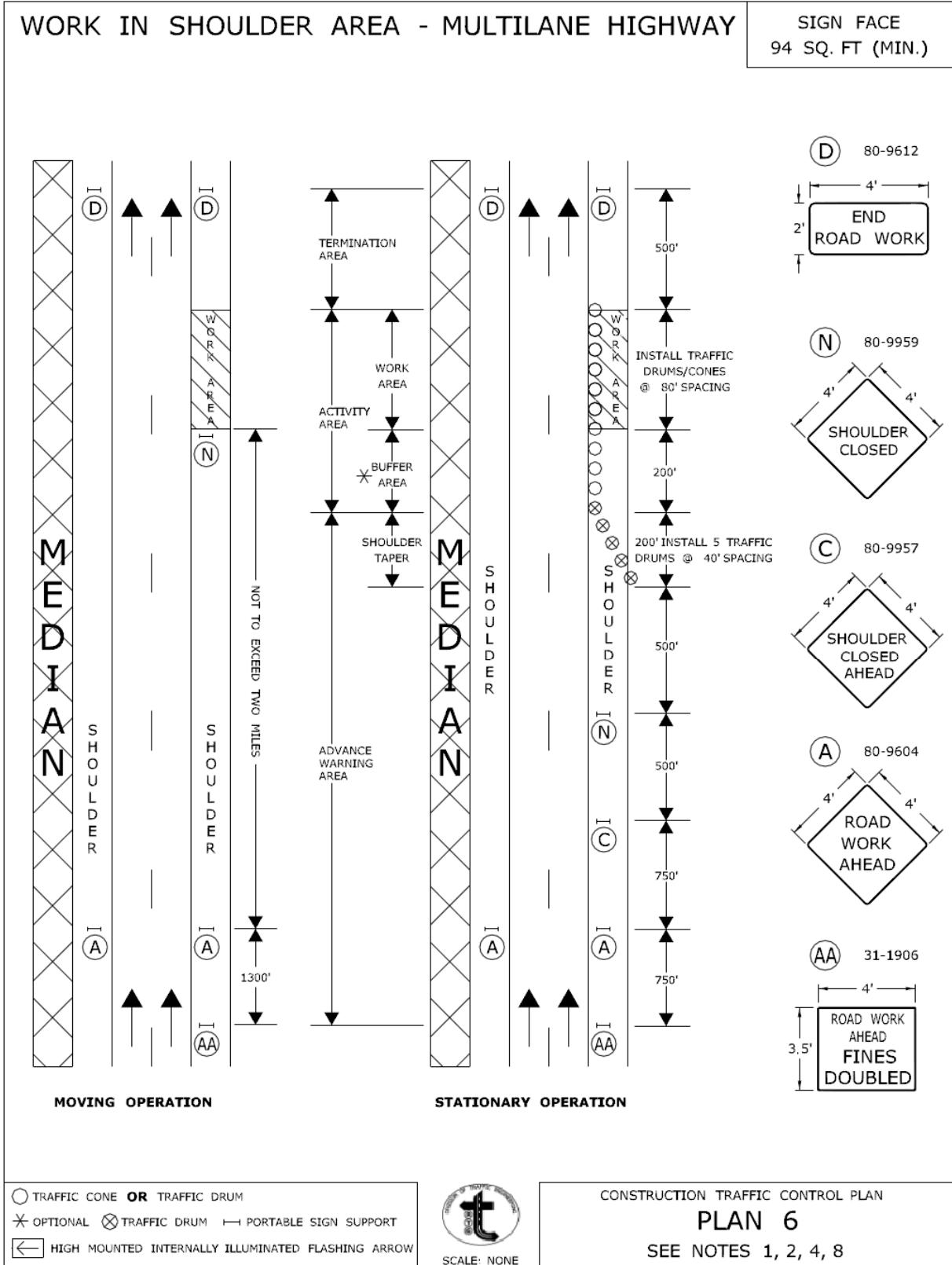
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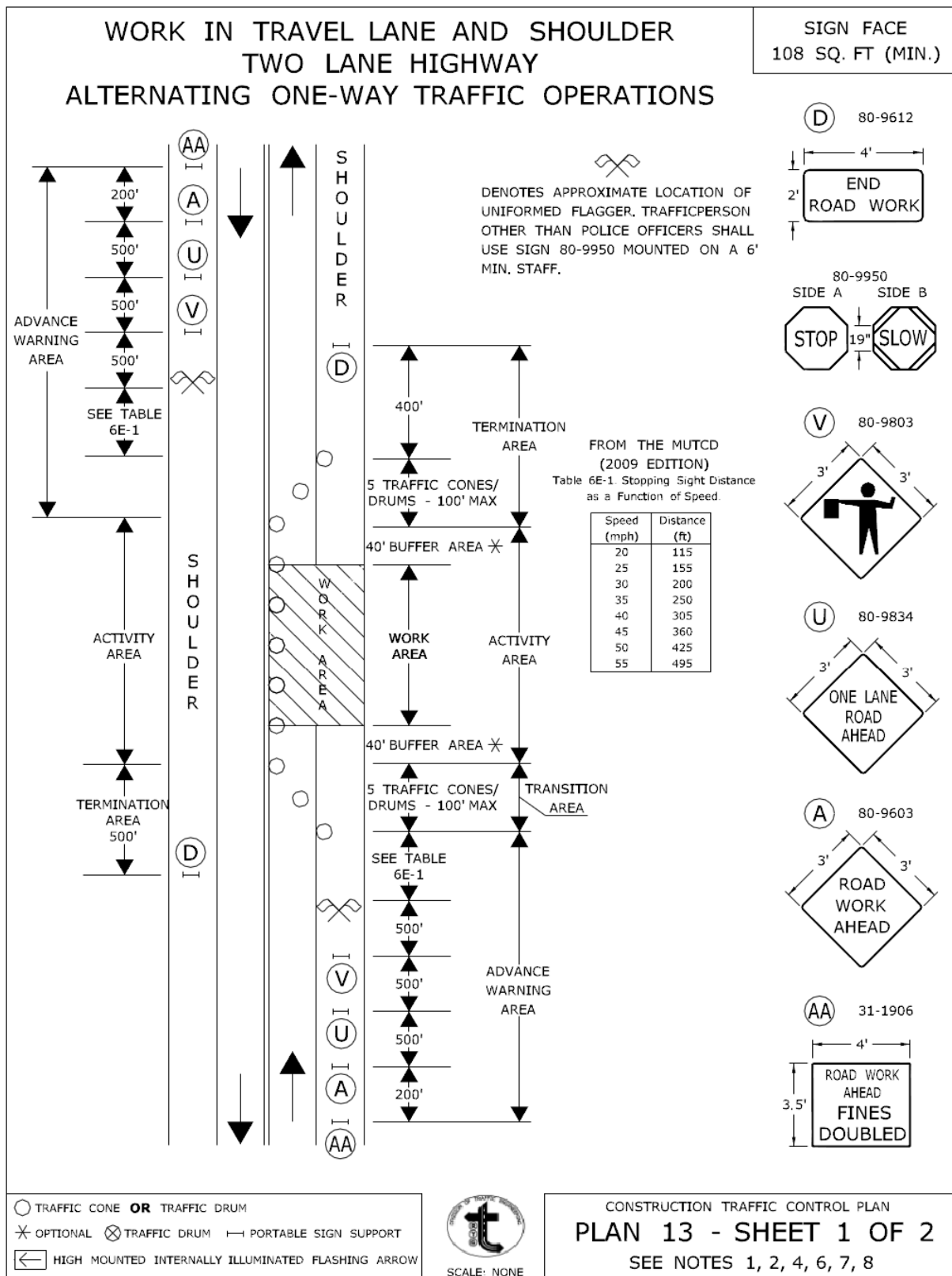


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- TRAFFIC CONE OR TRAFFIC DRUM
- ✕ OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW



CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 1 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

CONNECTICUT DEPARTMENT OF TRANSPORTATION
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APPROVED *Charles S. Harlow* Charles S. Harlow
2012.06.05 15:55:23-04'00'
PRINCIPAL ENGINEER

WORK IN TRAVEL LANE AND SHOULDER TWO LANE HIGHWAY ALTERNATING ONE-WAY TRAFFIC OPERATIONS

SIGN FACE
108 SQ. FT (MIN.)

HAND SIGNAL METHODS TO BE USED BY UNIFORMED FLAGGERS

THE FOLLOWING METHODS FROM SECTION 6E.07, FLAGGER PROCEDURES, IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," SHALL BE USED BY UNIFORMED FLAGGERS WHEN DIRECTING TRAFFIC THROUGH A WORK AREA. THE STOP/SLOW SIGN PADDLE (SIGN NO. 80-9950) SHOWN ON THE TRAFFIC STANDARD SHEET TR-1220 01 ENTITLED, "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" SHALL BE USED.

A. TO STOP TRAFFIC

TO STOP ROAD USERS, THE FLAGGER SHALL FACE ROAD USERS AND AIM THE STOP PADDLE FACE TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FREE ARM SHALL BE HELD WITH THE PALM OF THE HAND ABOVE SHOULDER LEVEL TOWARD APPROACHING TRAFFIC.



B. TO DIRECT TRAFFIC TO PROCEED

TO DIRECT STOPPED ROAD USERS TO PROCEED, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. THE FLAGGER SHALL MOTION WITH THE FREE HAND FOR ROAD USERS TO PROCEED.



C. TO ALERT OR SLOW TRAFFIC

TO ALERT OR SLOW TRAFFIC, THE FLAGGER SHALL FACE ROAD USERS WITH THE SLOW PADDLE FACE AIMED TOWARD ROAD USERS IN A STATIONARY POSITION WITH THE ARM EXTENDED HORIZONTALLY AWAY FROM THE BODY. TO FURTHER ALERT OR SLOW TRAFFIC, THE FLAGGER HOLDING THE SLOW PADDLE FACE TOWARD ROAD USERS MAY MOTION UP AND DOWN WITH THE FREE HAND, PALM DOWN.



- TRAFFIC CONE **OR** TRAFFIC DRUM
- * OPTIONAL ⊗ TRAFFIC DRUM — PORTABLE SIGN SUPPORT
- ◀ HIGH MOUNTED INTERNALLY ILLUMINATED FLASHING ARROW

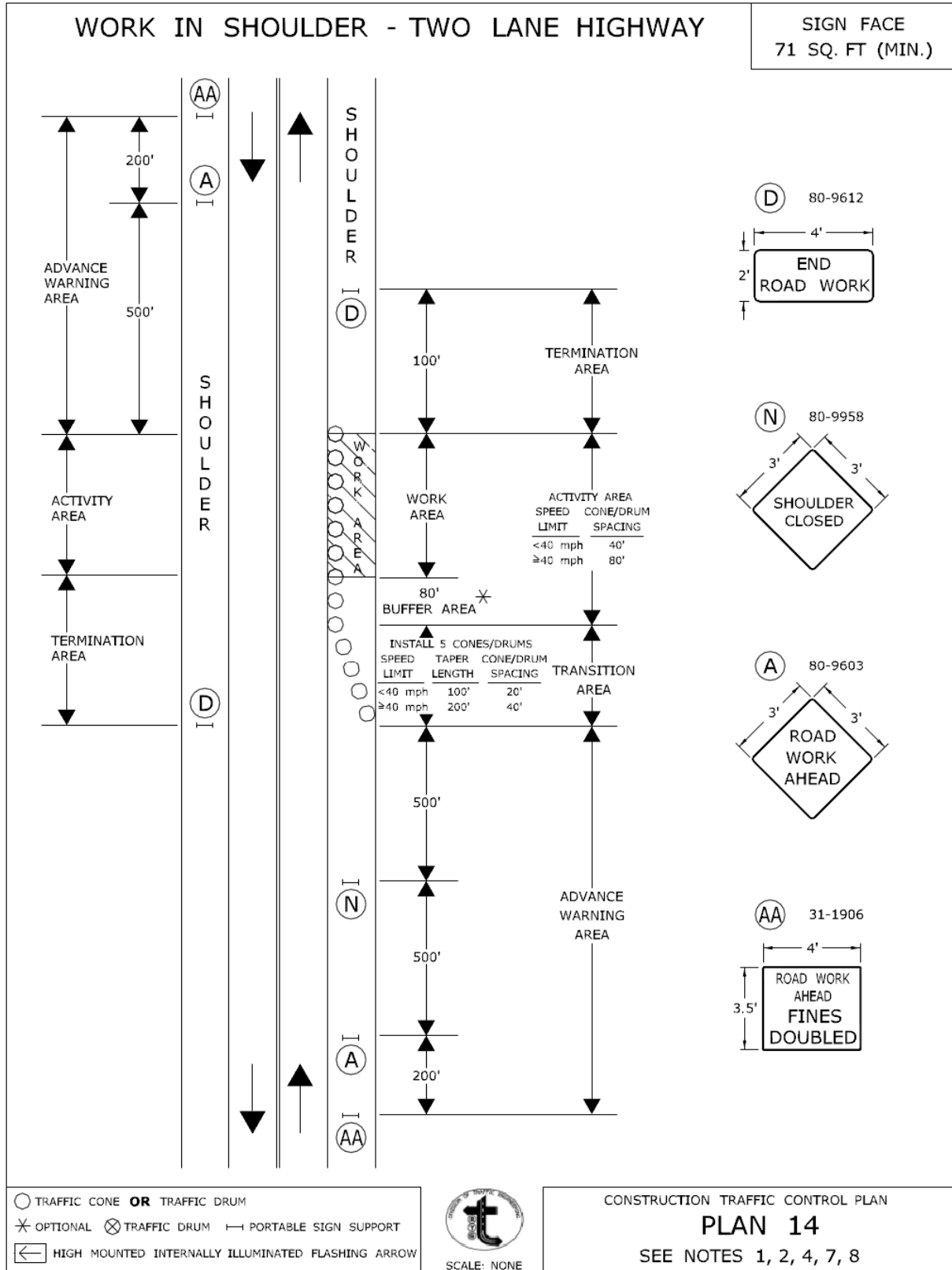


SCALE: NONE

CONSTRUCTION TRAFFIC CONTROL PLAN
PLAN 13 - SHEET 2 OF 2
SEE NOTES 1, 2, 4, 6, 7, 8

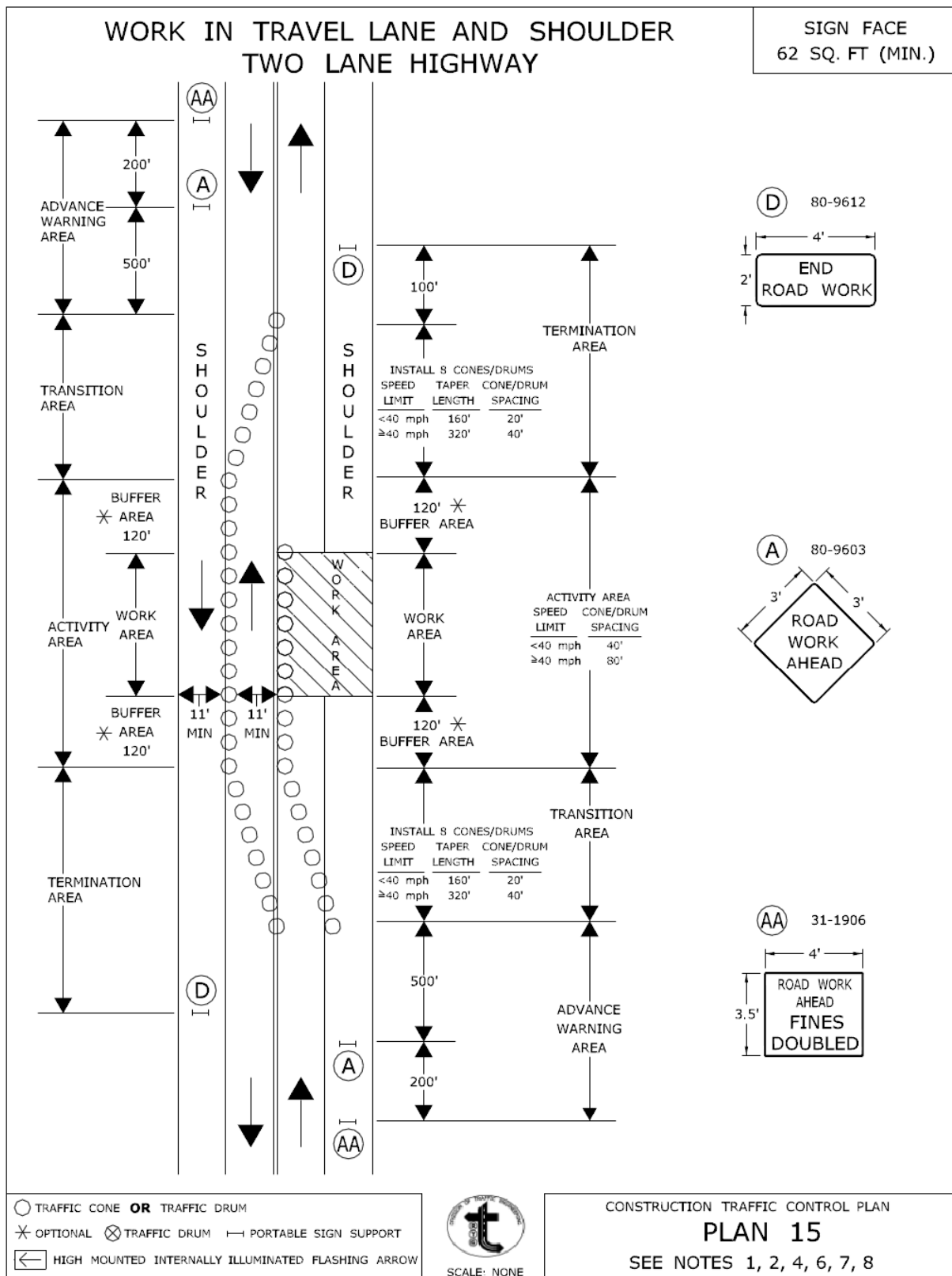
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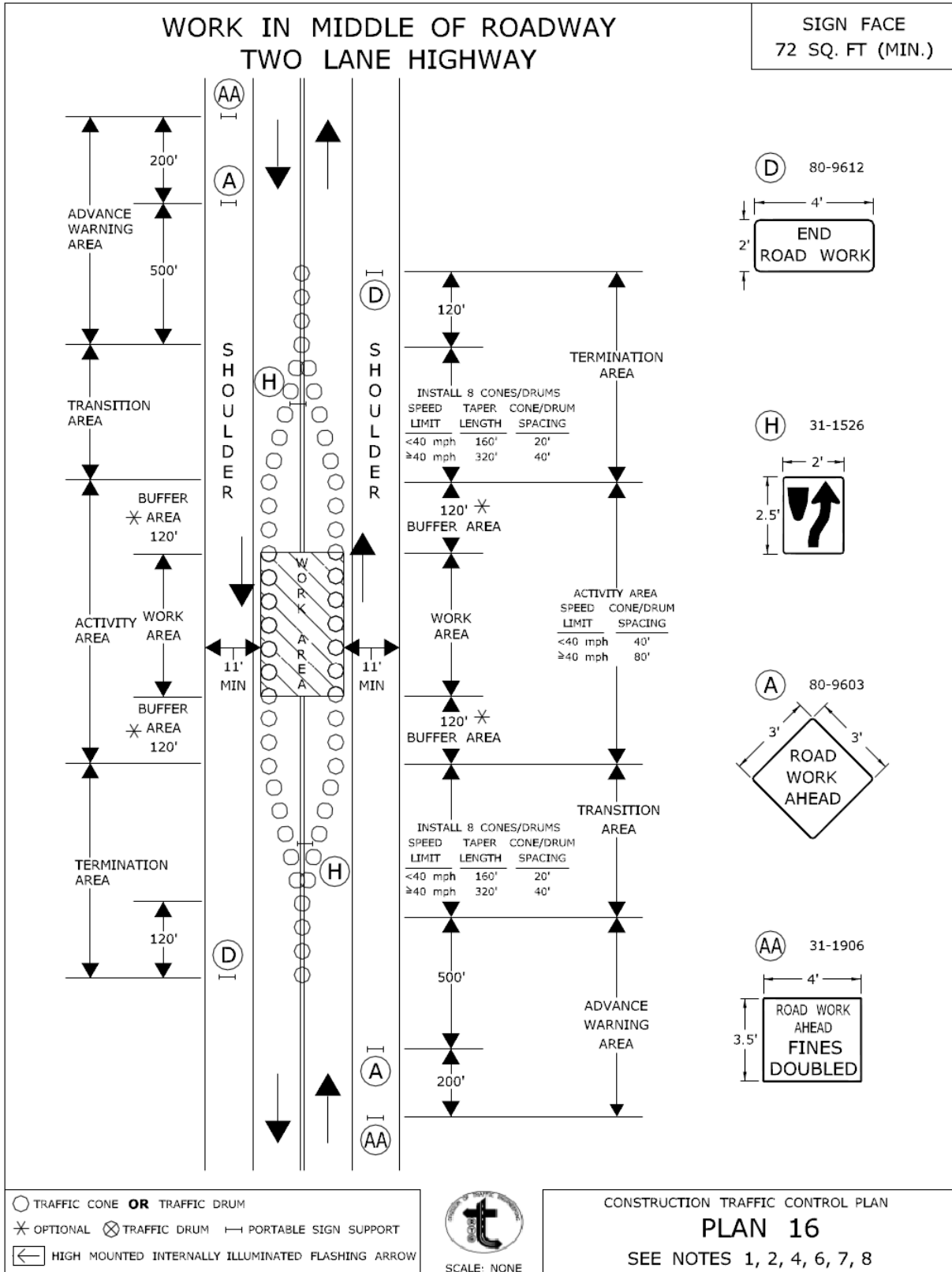
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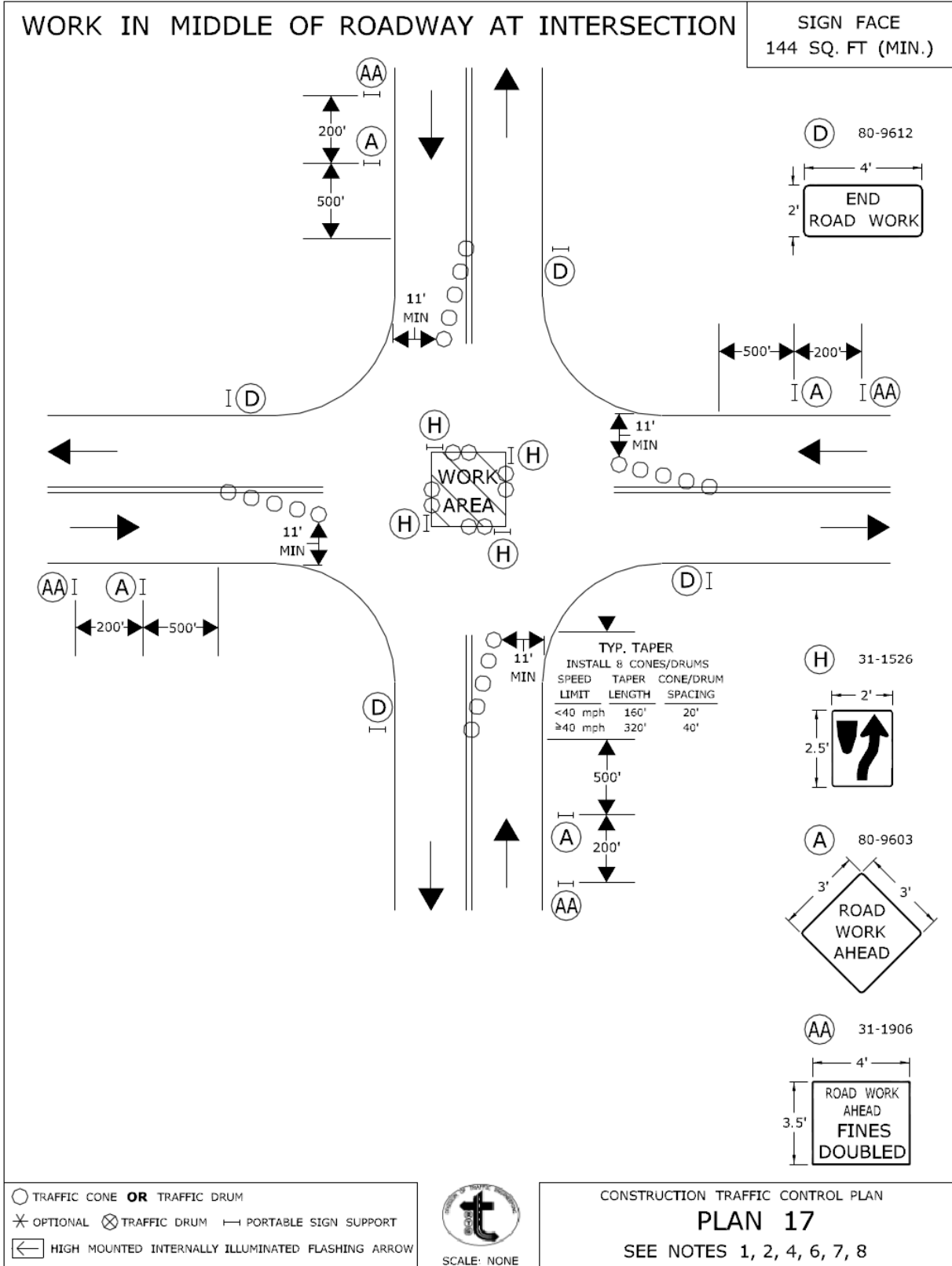
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PRINCIPAL ENGINEER



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PRINCIPAL ENGINEER



Article 9.71.05 – Basis of Payment is supplemented by the following:

The temporary relocation of signs and supports, and the furnishing, installation and removal of any temporary supports shall be paid for under the item “Maintenance and Protection of Traffic”. Temporary overhead sign supports and foundations shall be paid for under the appropriate item(s).

The cost of furnishing, installing, and removing the material for the 4H:1V traversable slope shall be paid for under the item “Maintenance and Protection of Traffic.”

ITEM # 1002202A – TRAFFIC CONTROL FOUNDATION – MAST ARM

Description: Work under this item shall consist of designing and constructing drilled shaft foundations for mast arm assemblies, in accordance with the details shown on the plans and as ordered by the Engineer.

Materials: The reinforcing steel shall be uncoated, ASTM A615, Grade 60 reinforcement conforming to the requirements of Article M.06.01.

The concrete for the drilled shaft shall conform to Article M.03 for Class ‘F’ Concrete. The 28 day minimum compressive strength of the concrete in the constructed foundation shall be 4,400 psi. The concrete mix design, including admixtures, shall be submitted to the Engineer for approval.

The slurry shall be Contractor designed mineral slurry that meets the range of values listed herein. The slurry mix design, including admixtures, shall be submitted to the Engineer for approval.

Rigid metal conduit, ground rod sleeves and related hardware, and end caps shall be galvanized steel conduit, and shall conform to Article M.15.09.

Ground rods shall be 0.625 in. diameter by 10.0 ft. long copper clad steel. The copper cladding shall be a minimum thickness of 0.128 in. The ground clamp shall be a square-head bolt type, approved for direct burial.

Bare copper wire shall conform to Article M.15.13.

Topsoil shall conform to Article M.13.01.

Fertilizer shall conform to Article M.13.03.

Seed mixture shall conform to Article M.13.04.

Mulch shall conform to Article M.13.05.

Erosion control matting shall conform to Article M.13.09.

Construction Methods: For the purpose of bidding this item, the Contractor shall assume that the subsurface conditions for each drilled shaft foundation location consists of cohesionless, medium dense, granular soil (AASHTO A-1 or A-2) with cobbles present and a high groundwater table which requires the use of wet construction/concreting methods. During excavation and construction of each foundation, should the Contractor encounter subsurface conditions that differ materially from those assumed at the time of bid, the Contractor shall notify the Engineer. All matters regarding increased cost relating to an agreed upon change in subsurface conditions will be handled per Section 1.04.04 – Differing Site Conditions.

The design of drilled shaft foundations shall conform to the requirements of AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals – latest edition, including the latest interim specifications, available prior to the advertising date of the contract, amended as follows:

1. The foundation shall be designed for the soils and rock properties and parameters based on the subsurface conditions (character of the soil and rock, presence of ground water, etc.) in the location of, adjacent to and below the drilled shaft foundation excavation. The need and extent of all subsurface explorations and investigations shall be determined by the Contractor.
2. The specified compressive strength, f'_c , of the concrete used in the design shall be 4,400 psi.
3. The reinforcement shall be uncoated and conform to ASTM A615, Grade 60.
4. The foundation shall be designed for the mast arm assembly reactions of all group loads and load combinations. The reactions shall include axial, shear, flexural and torsional load effects. No reduction of the reactions or increase in the allowable stresses of the materials is permitted.
5. The diameter of the drilled shaft foundation for mast arms 40-feet or less shall be 3.0 ft., unless otherwise allowed by the Engineer. The foundation diameter for mast arms greater than 40-feet shall be 4.0 ft or less, unless otherwise allowed by the Engineer.
6. The design of the drilled shaft foundation shall include embedment of the foundation in soil, the embedment of the foundation in rock or the embedment of the foundation partially in soil and partially in rock, as applicable.
7. The design of the drilled shaft embedment depth shall account for the slope of the finished grade.
8. The minimum embedment for a drilled shaft foundation, constructed entirely in soil, shall be no less than 12.0 ft. below the finished grade at the low side of a sloping grade. The minimum embedment for a drilled shaft foundation, constructed entirely in rock shall be no less than 8.0 ft. below the finished grade at the low side of a sloping grade, unless otherwise approved by the Engineer.
9. The embedment depth for a drilled shaft foundation, determined by the Brom's design method, shall have a minimum factor of safety of 3.25 applied to the shear and moment load effects. The factor of safety applied to the torsional load effect shall be no less than 1.3.
10. The load factor method shall be used for the structural design of the drilled shaft foundation. The load factor applied to all loads, dead, wind and ice, and their

effects, axial, shear, flexure and torsion, shall be no less than 1.6. The drilled shaft may be designed in accordance with the load factor method presented in the latest edition of the Building Code Requirements for Reinforced Concrete”, ACI 318.

11. The structural design of the drilled shaft shall be based on stress and strain compatibility in the circular drilled shaft cross section.
12. The drilled shaft foundation shall be reinforced with longitudinal and transverse reinforcement. The area of longitudinal reinforcement should be no less than the sum of the reinforcement required for flexure and the longitudinal reinforcement required for torsion. The area of transverse reinforcement should be no less than the sum of the reinforcement required for shear and the transverse reinforcement required for torsion.
13. The minimum number of longitudinal reinforcing bars shall be 16. The minimum size of longitudinal reinforcing bars shall be #8. The minimum area of longitudinal reinforcing bars shall be no less than 1% of the gross cross-sectional area of the shaft. The minimum clear distance between longitudinal reinforcing bars shall be no less than 5 times the maximum aggregate size or 5 in., whichever is greater. The reinforcement shall extend full length of the drilled shaft foundation, including the pedestal. Splicing of the longitudinal reinforcement is not permitted.
14. The drilled shaft foundation shall be transversely reinforced with spirals or circular, one piece, enclosed ties. The minimum size of the transverse reinforcement shall be #4. The maximum spacing/pitch of the transverse reinforcement shall be no more than 6 in.. The minimum spacing/pitch of the transverse reinforcement shall be no more than 4 in.. The spiral reinforcement shall be terminated at the top and the bottom with 1 ½ turns of the reinforcing and a 135° standard hook. Spirals may be spliced with lap splices or mechanical connectors. For spirals, the minimum lap splice length shall be 1.7 times the tension development length (including modification factors) of the bar or 48 bar diameters, whichever is greater. For spirals, the mechanical connectors shall develop both in tension and compression 125% of the specified yield strength of the bar and conform to the latest edition of the AASHTO LRFD Bridge Design Specifications, including the latest interim specifications. For ties, the minimum lap splice length shall be no less than 1.7 times the tension development length (including modification factors) of the bar. Tie lap splices shall be alternated.
15. The design of the foundation shall be coordinated with the traffic structure to avoid conflicts between the embedded support anchorage and the foundation reinforcement.

Prior to excavating for the foundation, the Contractor shall submit working drawings and design calculations, with all details and documents necessary for fabrication and construction, for each

mast arm assembly foundation or span pole foundation for review in accordance with the special provision “Section 1.05 – Control of Work”.

The working drawings and design calculations for the mast arm assembly foundations and span pole foundations shall conform to working drawing requirements for permanent construction.

A single set of drawings with tabulated data for multiple mast arm foundations is not permitted. Each mast arm foundation shall be referenced with an alpha-numeric identifier noted on the Contract documents. The working drawings and calculations shall be prepared in Customary U.S. units.

The mast arm foundation working drawing and calculation submittal shall include the following:

1. title sheet
2. table of contents
3. contact information for designer – contact information shall include name and address of design firm, name of contact person with phone number and email address
4. copy of the certificate of insurance
5. foundation working drawings
6. foundation design calculations

The working drawings shall include complete details of all foundation components. The drawings shall include, but not be limited to the following:

1. the Project number, town and support identification number
2. reference to the design specifications, including interim specifications
3. material specifications for all components
4. embedment depths for foundation in soil, rock and a combination of soil and rock
5. anchor bolt details, including dimensions, embedment and projection

The design calculations shall include, but not be limited to the following:

1. the Project number, town and support identification number

2. references to design specifications, including interim specifications, and the applicable code section and articles
3. description/documentation for all computer programs used in the design
4. drawings/models of the foundation with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
5. traffic structure reactions of all group loads and load combinations
6. soil and rock design parameters
7. calculations demonstrating the geotechnical and structural capacity of the drilled shaft is adequate for all group load combinations

Prior to excavating for the foundation, the Contractor shall submit the following:

Reinforcing Steel Shop Drawings: Based on the reviewed foundation design, the Contractor shall prepare reinforcing steel shop drawings for each foundation. The drawings shall be reviewed and stamped by the foundation designer. A PDF copy of the drawings shall be submitted to the City of New Britain as described in the special provision “Section 1.05 – Control of Work”.

Concrete and Slurry Mix Designs: The Contractor shall submit to the City of New Britain the concrete mix design and the slurry mix design, including admixtures, for review.

Foundation Construction Procedure: The Contractor shall submit to the Engineer a written foundation construction procedure outlining the equipment; drilling procedure for soil and rock, including removal of obstructions and removal of excavated spoils; temporary casing placement and removal; slurry placement; reinforcement, anchor bolt and conduit placement; and concrete placement required for the drilled shaft foundation construction for review. The procedure should include contingencies for the various soil, rock and subsurface water conditions that may be encountered during the foundation construction.

The Engineer will evaluate the foundation construction procedure for conformance with the Contract documents and will then notify the Contractor of any additional information required and/or changes necessary to meet the Contract requirements. All procedural approvals given by the Engineer shall be subject to trial in the field and shall not relieve the Contractor of the responsibility to satisfactorily complete the work as detailed in the plans and specifications. The Contractor shall not commence construction of the drilled shafts until the Engineer has accepted the foundation construction procedure.

Excavations required for shafts shall be performed through whatever materials are encountered, to the dimensions and elevations in the working drawings or as ordered by the Engineer. The methods and equipment used shall be suitable for the intended purpose and materials encountered. Shaft excavation may be performed by combinations of augering, rotary drilling, down-the-hole hammer, reverse circulation drilling, clamming, scraping, or other means approved by the Engineer. Generally, either the dry method, wet method, or temporary casing method may be used, as necessary, to produce sound, durable concrete foundation shafts free of defects. The Contractor shall select and use the method that is needed to properly accomplish the work, as determined by site conditions and subject to the approval of the Engineer. The Contractor is responsible for maintaining the stability of the shaft excavation during all phases of construction.

The dry method consists of drilling the shaft excavation, removing accumulated water and loose material from the excavation, and placing the shaft concrete in a relatively dry excavation. The dry construction method shall be used only at sites where the groundwater table and site conditions are suitable to permit construction of the shaft in a relatively dry excavation, and where the sides and bottom of the shaft are stable and may be visually inspected prior to placing the concrete. The use of the dry construction method is permitted if less than one foot of water accumulates in the bottom of a hole without pumping over a one hour period, the excavation remains stable and any loose material and water can be removed prior to placement of concrete.

The wet construction method shall be used at sites where a dry excavation cannot be maintained for placement of the shaft concrete. Wet construction methods consist of using a mineral slurry to maintain stability of the hole perimeter while advancing the excavation to final depth, placing the reinforcing cage and shaft concrete. This procedure may require desanding and cleaning the slurry; final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump or other devices; and placing the shaft concrete with a tremie. Unless it is demonstrated to the satisfaction of the Engineer that the surface casing is not required, temporary surface casings shall be provided to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation. Surface casing is defined as the amount of casing required from the ground surface to a point in the shaft excavation where sloughing of the surrounding soil does not occur.

The temporary casing construction method shall be used at all sites where the dry or wet construction methods are inappropriate. Temporary casing construction method consists of advancing the excavation through caving material by the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. When a nearly impervious formation is reached, a casing is placed in the hole and sealed in the nearly impervious formation. After the drilling fluid is removed from the casing, drilling may proceed as with the dry method except that the casing is withdrawn when the shaft concrete is placed. If seepage conditions prevent use of the dry method, excavation is completed using the wet method. Temporary casing may be installed by driving or vibratory procedures in advance of excavation to the lower limits of the caving material. Slurry may be omitted if the casing can be installed with only minor caving of the hole.

If the Engineer determines that the foundation material encountered during excavation is unsuitable or differs from that anticipated in the design of the shaft, or if rock is encountered at

an unanticipated elevation, the Contractor's foundation designer shall determine if the foundation embedment should be revised from that shown on the working drawings. If rock is encountered, the Engineer shall be notified to inspect and determine the elevation of the top of competent rock. Any revisions to the foundation embedment during construction shall be reviewed by the Engineer.

Excavated materials which are removed from the shaft excavation and any drilled fluids used shall be disposed of by the Contractor as directed by the Engineer and in accordance with Section 1.10.

Casings shall be metal, smooth, clean, watertight, and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth materials. The outside diameter of casing shall not be less than the specified size of the shaft. Temporary casings shall be removed while the concrete remains workable (i.e., a slump of 4 in. or greater). Before the casing is withdrawn and while the casing is being withdrawn, a 5.0 ft. minimum head of fresh concrete in the casing shall be maintained so that all the fluid trapped behind the casing is displaced upward without contaminating the shaft concrete. The required minimum concrete head may have to be increased to counteract groundwater head outside the casing. Separation of the concrete by hammering or otherwise vibrating the casing, during withdrawal operations, shall be avoided. Casing extraction shall be at a slow, uniform rate with the pull in line with the shaft axis.

Slurry used in the drilling process shall be a mineral slurry. The slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. The level of the slurry shall be maintained at a height sufficient to prevent caving of the hole.

The mineral slurry shall be premixed thoroughly with clean fresh water at a temperature above 41° F and adequate time allotted for hydration prior to introduction into the shaft excavation. The elevation of the slurry within the shaft foundation shall be maintained within 24 in. of the top casing and at least 48 in. above the existing water level during drilling and until the concrete placement is essentially complete. The slurry properties shall be maintained at all times, including non-working periods and stoppages. The slurry shall be circulated and agitated, continuously if necessary, to maintain the slurry properties and to prevent it from setting up in the shaft.

The Contractor, in the presence of the Engineer, shall perform control tests on the slurry to ensure that the density, viscosity, and pH fall within the acceptable limits tabulated below. The Contractor shall provide all equipment required to perform the tests. If desanding is required, sand content shall not exceed 4% (by volume) at any point in the shaft excavation as determined by the American Petroleum Institute sand content test.

Range of Values (at 68°F)

Property (Units)	Time of Slurry Introduction	Time of Concreting (in Hole)	Test Method
Density (pcf)	64.3 to 69.1	64.3 to 75.0	Density Balance
Viscosity (seconds per quart)	28 to 45	28 to 45	Marsh Cone
pH	8 to 11	8 to 11	pH paper or meter

The control tests to determine unit weight (density), viscosity, and pH values of the slurry shall be done during the shaft excavation to establish a consistent working pattern.

Prior to placing shaft concrete, slurry samples shall be taken from the bottom and at intervals not exceeding 10.0 ft. for the full height of slurry. Any heavily contaminated slurry that has accumulated at the bottom of the shaft shall be eliminated. The mineral slurry shall be within specification requirements immediately before shaft concrete placement.

The hole shall be covered when left unattended.

After completing the shaft excavation, all loose material existing at the bottom of the hole shall be removed.

Prior to placing the reinforcement into the shaft, the Contractor, in the presence of the Engineer, shall determine the shaft dimensions, depth and alignment of the shaft. The concrete shaft shall not be out of plumb by more than 0.25 in. per foot of depth. The Contractor shall provide all equipment necessary for checking the shaft excavation. The Engineer shall inspect the shaft and verify that it has been properly cleaned.

The reinforcing steel shall be fabricated and assembled in accordance with Article 6.02.03. All reinforcement shall be assembled with wire ties. Welding to assemble the reinforcement is not permitted.

Immediately after the shaft excavation has been inspected and approved by the Engineer and prior to placement of the concrete, the assembled reinforcing steel cage, including cage stiffener bars, spacers, centralizers, and other necessary appurtenances, shall be carefully placed into the shaft excavation as a unit. Dropping or forcing cages into the shaft will not be allowed. The reinforcing steel in the shaft shall be tied and supported so that the reinforcing steel will remain within allowable tolerances of its intended position until the concrete will support the reinforcing steel. When concrete is placed by tremie methods, temporary hold-down devices shall be used to prevent uplifting of the reinforcing steel cage during concrete placement. Concrete spacers or other approved noncorrosive spacing devices shall be used at sufficient intervals not exceeding 5.0 ft. along the shaft to insure concentric location of the cage within the shaft excavation. When the size of the longitudinal reinforcing steel is larger than a #8 bar, such spacing shall not exceed 10.0 ft. After placement of the reinforcing cage, the Engineer shall inspect the shaft to ensure that it has remained clean. If the inspection indicates that loose material has accumulated at the

bottom of shaft excavation, the Contractor shall remove the reinforcing cage and reclean the shaft.

If directed by the Engineer, the top of the shaft shall be formed square with the length of the sides matching the diameter of the shaft.

Concrete construction shall conform to Subarticle 6.01.03-2,3,4,5 and 6 as amended herein.

Concrete shall be placed in the shaft excavation as soon as possible, but no more than 4 hours after completion of excavation and cleaning of the bottom of the excavation, and no more than 2 hours after placement of the reinforcing steel cage. Concrete shall be placed in a continuous operation to the top of the shaft. The concrete level shall be horizontal during the pouring operations. Concrete placement shall continue after the shaft is full until good quality concrete is evident at the top of the shaft. The elapsed time from the beginning of concrete placement in the shaft to the completion of placement shall not exceed 2 hours.

In dry construction, concrete shall be placed in a single continuous operation with the flow of concrete down the center of the shaft excavation so as to consolidate the concrete on impact. During placement operations, the concrete is not permitted to hit the reinforcing steel. A dropchute, consisting of a hopper and flexible hose, may be used to direct the concrete down the center of the foundation and prevent the concrete from hitting the reinforcing steel. Accumulated water shall be removed before placing the concrete. At the time of concrete placement, no more than 2 in. of water may exist at the bottom of the excavation and loose sediment no more than 0.5 in. over one-half the base is acceptable.

In wet (slurry) construction, concrete to be placed by the tremie method, where the concrete displaces the slurry from bottom of the excavation to the top. The concrete shall be placed through a top metal hopper and into a rigid leak-proof elephant trunk tremie tube, sufficiently large enough to permit free flow of concrete. The tremie tube shall be positioned so that it can be removed without disturbing the reinforcing. Initially, the discharge end of the tremie tube shall be sealed closed (plugged) to prevent slurry from entering the tube after it is placed in the excavation and before the tube is filled with concrete. After concrete placement has started, the tremie tube shall be kept full of concrete to the bottom of the hopper to maintain a positive concrete head. The flow of concrete shall be induced by slightly raising the discharge end of the tube, always keeping the tube end in the deposited concrete. No horizontal movement of the tremie tube will be permitted.

The shaft concrete shall be vibrated or rodded to a depth of 5 ft. below the ground surface except where soft uncased soil or slurry remaining in the excavation will possibly mix with the concrete.

Exposed concrete shall be cured and finished in accordance with Subarticle 6.01.03-7, 9 and 10.

Anchor bolt assemblies shall be embedded in the concrete as shown on the working drawings. A template plate shall be used to hold the anchor bolt assemblies, conduits and ground rod sleeve in the correct position. The anchor bolts shall be installed plumb.

All conduit ends terminating below grade shall be capped with a malleable iron caps. All above-grade conduit ends shall be terminated with an insulated bonding bushing with tinned insert.

Ground rod and ground wire shall be installed as shown on the plans.

No construction operations that would cause soil movement adjacent to the shaft, other than mild vibration, shall be conducted for at least 48 hours after shaft concrete has been placed.

The top of the foundations shall be backfilled and the adjacent disturbed ground surfaces restored to match the surrounding area after the concrete has cured and the forms are removed. Placement of topsoil shall conform to Articles 9.44.01 and 9.44.03. Turf establishment shall conform to Article 9.50.03.

The mast arm assemblies shall not be erected on the foundation until the concrete in the shaft has attained a 28 day compressive strength, f'_c , greater than or equal to 4,400 psi.

Method of Measurement: This work will be measured for payment by the number of foundation units, each completely installed and accepted.

The work to remove rock from the foundation excavation will be measured from the top of rock to the bottom of rock excavation.

Basis of Payment:

The work will be paid for at the Contract unit price each for “Traffic Control Foundation – Mast Arm”, completed and accepted in place, which price shall include all equipment, materials, tools and labor incidental to the subsurface exploration, design, fabrication, construction and disposal of drilling spoils, of the foundations at the locations specified on the plans.

Backfilling and restoration of adjacent ground surfaces (pavement, slope protection, topsoil & seed, etc.) in all areas disturbed by the work will not be paid for separately, but will be included as part of the work. The Engineer will determine the type, thickness and horizontal limits of the surfaces to be restored.

When rock is encountered within the limits of excavation, its removal will be paid for at the Contract unit price per vertical foot for "Rock in Foundation Excavation," which price shall include any additional excavation to remove the rock and any additional concrete required to fill the excavation beyond the designed foundation hole dimensions. Rock, in so far as it applies to "Rock in Foundation Excavation," shall be defined as rock in definite ledge formation, boulders, or portions of boulders, cement masonry structures, concrete structures or portland cement concrete pavement which has a cross-sectional area that exceeds 50% of the cross-sectional area of the designed foundation hole.

Pay Item
Traffic Control Foundation – Mast Arm

Pay Unit
EA

ITEM # 1005600A – LED LUMINAIRE

Description:

This item shall consist of furnishing and installing a LED luminaire attached to a horizontal extension bracket on a mast arm.

Materials:

The materials for this work shall meet the requirements of M.15.05. The luminaire shall be an Evolve™ LED Roadway Luminaire, 88W Type III, manufactured by GE Lighting, or approved equal. The contractor shall submit product data sheets to the City for approval prior to furnishing luminaire.

Construction Methods:

The construction methods shall conform to section 10.04.03.

Method of Measurement:

This work shall be measured for payment by the number of LED luminaires installed and accepted.

Basis of Payment:

This work shall be paid for at the Contract unit price each for “LED Luminaire” completed and accepted in place, which price shall include all materials, including luminaire, ballast, conductors, connectors, lamp, brass slug, fuses, fuse holders, identification sticker, photoelectric control where required, coordination with power company to provide electrical service, and all labor, tools equipment, and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
LED Luminaire	EA

ITEM # 1008908A – CLEAN EXISTING CONDUIT

Description:

Clean existing conduit as required, or as directed by the Engineer to remove dirt and debris to facilitate the installation of new cable.

Construction Methods:

Where cable is to be installed in existing conduit the conduit may have to be cleared prior to the installation. Cleaning will only be necessary if the new cable cannot be easily installed in the existing conduit. By field inspection, and with the concurrence of the Engineer, determine the sections of conduit that require cleaning.

Remove all existing cable from conduit. Install temporary cable elsewhere, as necessary, to maintain normal signalization complete with vehicle & pedestrian detection, EVPS, and coordination. Clean the conduit by one of the following methods:

- 1) Rodding.
- 2) A high pressure jet spray, or air pressure.
- 3) By pulling a mandrel or ball through the conduit.

Submit in writing the anticipated method of cleaning the conduit to the Engineer for approval prior to cleaning any conduit.

If the conduit is found damaged to any extent that the cleaning process will not clear the obstruction, it will be the judgment of the Engineer whether to replace the entire conduit run or excavate and replace only the damaged section.

If the existing conduit is found to be missing hardware such as bonding bushings and bond wire, the missing material shall be provided and installed under this item prior to installation of the cable.

Method of Measurement:

This work shall be measured from termination point to termination point. This work shall be measured for payment on actual number of linear feet.

Basis of Payment:

The work under the Item “Clean Existing Conduit” shall be paid for at the contract unit price per linear foot, which price shall include all material, tools, equipment, labor, and work incidental thereto. Replacement of any damaged conduit shall be paid for under the applicable conduit item.

Pay Item	Pay Unit
Clean Existing Conduit	L.F.

ITEM # 1010060A – CLEAN EXISTING CONCRETE HANDHOLE

DESCRIPTION:

Clean all debris from an existing concrete handhole where shown on the plans or as directed by the Engineer.

MATERIAL:

- Insulated Bonding Bushings:
 - Specification Grade
 - Threaded
 - Malleable Iron or Steel
 - Galvanized
 - UL listed
- Bonding Wire:
 - M.15.13
- Grout:
 - M.03.05

CONSTRUCTION METHODS:

Remove to a level even with the bottom of the handhole all sand, silt and other debris. Remove any material that is accessible from the ends of conduit. Additional conduit cleaning will be paid for under Item 1008908A-Clean Existing Conduit. Place approximately 4” (100) of ¾” (19) crushed stone in bottom of handhole using care not to allow crushed stone to enter conduits. Grout around conduits to prevent future entrance of dirt and silt. Properly dispose all removed debris. Inspect bonding bushings. Tighten loose bushings. Secure loose bond connections. Install new bonding bushings on spare conduits and bond to other conduits.

METHOD OF MEASUREMENT:

This work will be measured for payment by the number of concrete handholes cleaned, complete and accepted.

BASES OF PAYMENT:

This work will be paid for at the contract unit price each for "Clean Existing Concrete Handhole", which price shall include the removal and disposal of debris from handhole and associated conduit, crushed stone, grout, bonding bushings, bonding wire, and all equipment and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Clean Existing Concrete Handhole	Each (Ea)

ITEM #1102002A – 8’ ALUMINUM PEDESTAL

Article 11.02.02 – Materials: The materials for this work shall conform to the requirements of Article M.16.03.

Article M.16.03 – Materials:

Add the following paragraph:

The shaft, base and all brackets and hardware shall be coated at the manufacturer’s site prior to shipping and protected from damage during shipping. The color shall be **Black, Federal Standard No. 595, Color No. 37038** as approved by the City of New London. Submit the proposed coating process and a color sample on a representative material of the final products to the City of New London.

<u>Pay Item</u>	<u>Pay Unit</u>
8’ Aluminum Pedestal	EA

ITEM # 1104033A – 40’ STEEL MAST ARM ASSEMBLY

ITEM # 1104038A – 50’ STEEL MAST ARM ASSEMBLY

ITEM # 1104555A – COMBINATION MAST ARM ASSEMBLY 40-1W

Description:

Work under this item shall consist of designing, fabricating and installing a mast arm assembly to carry traffic appurtenances (such as traffic signals, signs, antenna, etc.) of the type specified, on a prepared foundation, in accordance with the details shown on the plans and as ordered by the Engineer.

Materials:

The tubular components, such as the pole, arm and luminaire arm shall be made of steel with a minimum yield stress of 35,000 psi.

The structural plate components, **such as the baseplates, handhole frames, and the plates in the arm to pole ring stiffened, built-up box connection**, shall be made of steel that conforms to the requirements of ASTM A709, Grade 50.

Anchorage plates shall conform to the requirements of ASTM A709, Grade 50T2.

The steel for arm and pole members; structural plate components, such as the baseplates, connection/flange plates, gusset plates, handhole frames and the plates in the arm to pole connection, shall meet Charpy V-notch impact testing requirements for non-fracture critical members in Zone 2 and the following:

Yield Strength	Thickness in.	Minimum Average Energy, ft.-lbf
$F_y \leq 36 \text{ ksi}$	≤ 4	15 at 40°F
$36 \text{ ksi} < F_y \leq 50 \text{ ksi}$	≤ 2	15 at 40°F
$36 \text{ ksi} < F_y \leq 50 \text{ ksi}$	$2 < t \leq 4$	20 at 40°F
$50 \text{ ksi} < F_y \leq 70 \text{ ksi}$	≤ 4	15 at -20°F
Charpy V-notch sampling and testing shall be in accordance with AASHTO T243, “H” piece frequency.		

The non-structural components, such as hand hole covers, caps and anchor bolt covers, shall be made of steel with minimum yield stress of 35,000 psi.

The filler metal shall have a matching strength relationship with the base metal.

All high strength bolts shall conform to ASTM F3125, Grade A325, Type 1. Nuts shall conform to ASTM A563, Grade DH. Circular, flat, hardened steel washers shall conform to ASTM F436.

The bolts, nuts and washers shall be galvanized in accordance with ASTM F2329 or ASTM B695, Class 55. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. The high strength bolts shall conform to the requirements of Subarticle M.06.02-3.

The anchor bolts shall conform to ASTM F1554, Grade 105. The nuts shall conform to ASTM A563, Grade DH. The washers shall conform to ASTM F436. The bolts, nuts and washers shall be galvanized in accordance with ASTM F2329 or ASTM B695, Class 55. The nuts shall be overtapped to the minimum amount required for the bolt assembly and all surfaces of the nuts shall be lubricated with a lubricant containing a visible dye of any color that contrasts with the color of the galvanizing. Prior to shipping the anchor bolts, the nuts and washers shall be installed by hand on the anchor bolts to ensure that the nuts can be run on the threads. Only anchor bolts on which the nuts are free running shall be shipped. The anchor bolts shall be shipped with the nuts and washers on the threads.

All steel components, including anchor bolts, shall be completely galvanized, after fabrication, in accordance with ASTM A123, ASTM F2329 or ASTM B695, Class 55, as applicable. Repairs to damaged areas of the galvanized coatings shall conform to the requirements of ASTM A780.

The silicone sealant shall be a 1-component, 100% silicone sealant recommended for use with galvanized steel.

Neoprene gasket material for the access openings shall conform to ASTM D1056, Grade 2A2 or 2A3. Other grades of neoprene approved by the Engineer may be used.

Closed cell elastomer for sealing the space between the foundation and base plate shall conform to ASTM D1056, Grade 2A2 or 2A3 and shall have a pressure-sensitive adhesive backing on one side for adhesion to steel. Closed cell elastomer contained within the anchor bolt pattern shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

Non-shrink grout shall meet the requirements of M.03.05 and be suitable for exterior applications.

Bare copper grounding conductor shall be #8 AWG stranded bare copper wire conforming to M.15.13. The grounding bolt shall be stainless steel with a hex head.

All materials used in the finished structure shall be new. The use of materials that have been previously used in a structure or salvaged from a structure is not permitted.

The Contractor shall submit Certified Test Reports and Materials Certificates in conformance with Article 1.06.07 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers) and anchor bolts (including nuts and washers). The Certified Test Reports shall include the following:

- a. Mill test reports that indicate the place where the material was melted and manufactured.
- b. High-strength bolt test results for proof load tests, wedge tests, and rotational-capacity tests that indicate where the tests were performed, date of tests, location of where the components were manufactured and lot numbers.
- c. Galvanized material test results that indicate the thickness of the galvanizing.

Prior to incorporation into the work, the Contractor shall submit samples in conformance with Article 1.06.02 for the steel used in the mast arm members and components, high-strength bolts (including nuts and washers), anchor bolts (including nuts and washers). U-bolts (including nuts and washers) and threaded rods (including nuts and washers).

Construction Methods: The design and fabrication of the mast arm assembly, including its anchorage (into the foundation), shall conform to the requirements of the latest edition of the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, including the latest interim specifications, available prior to the advertising date of the contract, amended as follows:

1. The design of the mast arm system shall consider all load effects due to the Strength I, Extreme I, Service II, and Fatigue I limit states.
2. The design wind speed shall be 150 mph for the Extreme I limit state.
3. The design shall investigate the load effects resulting from applying the maximum and minimum load factors for each applicable limit state.
4. The mast arms shall be designed to support fixed mounted traffic signals and signs. The wind drag coefficient, C_d , for traffic signals and luminaires shall be 1.2.
5. The luminaire arm length shall be as indicated on the plans.
6. For mast arms with an arm length of 40-feet or less, the maximum diameter of the pole at its base shall be 18 in. For mast arms with an arm length greater than 40-feet, the maximum diameter of the pole at its base shall be 21 in., unless otherwise approved by the Engineer.
7. The maximum diameter of the arm at the arm-pole connection shall be 15 in., unless otherwise approved by the Engineer.
8. The height and exposure factor, K_z , shall be determined based on the highest elevation of the structure or the appurtenances. The factor shall be considered

constant in all pressure computations required for the design of the structure. The height and exposure factor shall be no less than 1.05.

9. The mast arms shall be designed for fatigue importance category I for cantilevered structures. The mast arms shall be designed for the wind load effects due to galloping, natural wind gusts and truck-induced gusts. The luminaire arms shall be designed for the wind load effects due to natural wind gusts. The design pressure for the truck-induced gust shall be based on a truck speed of 65 mph. The design of the mast arms shall assume that vibration mitigation devices will not be installed.
10. The vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts shall not exceed 8.00 inches.
11. The minimum effective length factor, K , shall be as follows:

For the poles, $k = 2.1$

For cantilevered mast arm member, $k \geq 1.2$
12. For any structure components subject to combined forces, the combined force interaction (CFI) ratio due to each limit state shall not exceed 0.75. For any structure components not subject to combined forces, the ratio of the computed force (or stress) to the force (or stress) limit due to each limit state shall not exceed 0.75.
13. All tubular members on a structure shall have the same material designation.
14. The arm, luminaire arm and pole shall be tubular members with either round or multisided cross-sections. Multisided tubular members with other than 8, 12 or 16 sides are not permitted. Multisided tubular members with fluted sides are not permitted. The arm and luminaire arm shall be fabricated with a taper (change in diameter).
15. Multisided tubular members with diameters less than or equal to 13.00 inches shall have a minimum of 8 sides. Multisided tubular members with diameters greater than 13.00 inches and less than or equal to 18.00 inches shall have no less than 12 sides.
16. Multisided tubular members shall have a minimum internal bend radius of 5 times the tubular member thickness or 1.00 inch, whichever is greater.
17. The minimum wall thickness of the arm at the pole connection and the pole shall be 0.3125 inches. The wall thickness of the pole and arm component members shall be uniform throughout their lengths. The use of multiple plies (laminations)

to obtain the required arm and pole thickness is not permitted. The use of shop-fabricated stepped members is not permitted.

18. Joining 2 tubular members together with a circumferential weld to fabricate a pole is not permitted.
19. A maximum of 1 slip-type field splice is permitted in the arm. Slip-type field splices are not permitted in the pole.
20. A maximum of 1 longitudinal seam weld is permitted in the arm. The pole may be fabricated with no more than 2 longitudinal seam welds. The seam welds shall be ground smooth and flush with the adjacent base metal. The use of external longitudinal reinforcement bars at longitudinal seam welds is not permitted. The use of spiral seam welds is not permitted.
21. The longitudinal seam welds within 6.00 inches of the member ends shall be complete joint penetration groove welds.
22. Non-destructively test 100% of partial joint penetration longitudinal seam welds in accordance with the magnetic particle method. Non-destructively test 100 % of complete joint penetration seam welds in members less than 0.25 inches thick in accordance with the magnetic particle method on both the inside and outside surfaces. Non-destructively test 100% of complete joint penetration seam welds in members greater than or equal to 0.25 inches thick in accordance with the ultrasonic method in accordance with AWS D1.1 Annex S.
23. All tubular member to transverse plate connections shall be made with a complete joint penetration groove weld with a backing ring attached to the plate with a continuous fillet weld. Non-destructively test 100% of the complete joint penetration groove welds by the ultrasonic method after fabrication and prior to galvanizing. Non-destructively test 100% of the complete joint penetration groove welds by the ultrasonic method for toe cracks after galvanizing. Non-destructively test 100% of backing ring fillet welds by the magnetic particle method after fabrication prior to galvanizing. After galvanizing, the joint between the backing ring and tubular member shall be sealed with silicone sealant to prevent the ingress of moisture.
24. The use of stiffeners at tubular member to transverse plate connections is not permitted.
25. The strength of a connection made with a complete joint penetration groove weld shall be no greater than the strength of the base metal. In connections joining base metal with different yield strengths, the base metal with the lower yield strength shall govern the design.

26. The flange plate connection in the arm to pole in the ring stiffened, built-up box connection shall be designed as slip critical connections with standard holes. The minimum number of high-strength bolts in a flange splice shall be 8. Consideration should be given to the use of smaller diameter bolts since they require lower specified minimum bolt tensions.
27. The minimum flange plate thickness shall no less than 2.00 inches. The determination of the plate thickness in the tubular member to transverse plate connections shall consider the potential for the plate to warp due to the heat from welding. Consideration should be given to the use of thicker plates to allow for subsequent machining of warped plates to a flat surface so that removal of material will not compromise the required strength of the plate.
28. The minimum thickness of the ring plates and gusset plates in the ring stiffened, built-up box connection shall be 0.5 inches.
29. The size of fillet welds specified in designed connections shall be no less than 0.3125 inches. The use of seal and tack welds is not permitted. No welding shall be performed after galvanizing.
30. The minimum base plate thickness shall be no less than 2.5 inches or at least as thick as the anchor bolt diameter, whichever is greater. The determination of the plate thickness in the tubular member to transverse plate connections shall consider the potential for the plate to warp due to the heat from welding. Consideration should be given to the use of thicker plates to allow for subsequent machining of warped plates to a flat surface so that removal of material will not compromise the required strength of the plate.
31. The opening in the base plate shall be sized to allow for proper galvanizing and allow conduits projecting from the foundation to pass through it. The size of the opening shall be kept to a minimum to reduce the flexibility of the baseplate.
32. The pole base plate anchor bolt circle diameter for mast arms 40-feet or less shall be 24 in., unless otherwise approved by the Engineer. The bolt circle diameter for mast arms greater than 40-feet length shall be designed by the Contractor.
33. The anchor bolt to base plate connection shall be designed as a double-nut connection with shear holes. The minimum distance from the center of the anchor bolt hole to the edge of the base plate shall be no less than 2 times the diameter of the anchor bolt. The anchor bolts shall use an embedded anchorage plate, 0.5 inch minimum thickness, to transmit loads from the pole base to the concrete foundation. The use of hooked anchor bolts is not permitted. The minimum number of anchor bolts shall be 8. The minimum anchor bolt diameter shall be 2.00 inches. The minimum anchor bolt embedment, the distance from the top of the foundation to the top of the embedded anchorage plate, shall be 3.5 feet or the tension development length of the vertical foundation reinforcement plus the end

concrete cover, whichever is greater. Each anchor bolt shall be supplied with 4 nuts and 4 washers. Washers shall be placed on the top and bottom surfaces of the pole base plate and anchorage plate. Welding to the anchor bolts is not permitted. The use of lock washers with the anchor bolt assembly is not permitted.

The mast arm shall be designed for the load effects due to the actual traffic appurtenances (signals, signs, luminaires, cameras, etc.). The mast arm shall also be designed for load effects from future traffic appurtenances arranged, positioned and located as shown on the plans. The mast arm shall also be designed for load effects during all stages of construction that may exist during the Project under which the mast arm is installed. The mast arm shall be designed to support traffic appurtenances with properties no less than those tabulated on the plans.

The dimensions of the mast arm assemblies are shown on the traffic plans, elevations, cross-sections or in the special provisions. The arm, luminaire arm and pole lengths and the attachment heights shall be verified by the Contractor based on the finished grade at the site, top of foundation elevation, the locations of overhead utility cables and the traffic appurtenance mounting heights. If either the arm or pole length is inadequate, the Contractor shall notify the Engineer.

The minimum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 16.0 feet. The maximum vertical clearance from the top of the finished road to the bottom of the traffic signals shall be 18.0 feet. The traffic signals shall be installed so that the bottom of all the signals for each approach is at the same elevation.

The arm to pole connection shall be made with a ring stiffened, built-up box. The luminaire arm to pole connection shall be made with either a built-up box or a ring stiffened built-up box. A minimum of 8 high-strength bolts shall be used to connect the arm flange plate to the built-up box connection plate. A minimum of 4 high-strength bolts shall be used to connect the luminaire arm flange plate to the built-up box connection plate. All fasteners and their components used in the each connection shall be visible. The use of tapped holes in the plates of each connection is not permitted. A hole(s) shall be provided in each connection to allow wires to pass from the pole to the arm and luminaire arm. The sides of all holes in each connection shall be ground smooth and the edges rounded by grinding to prevent the wires from chafing.

Vent and drain holes shall be provided for galvanizing. The number, size and location of vent and drain holes should be coordinated with the galvanizer prior to the submission of the working drawings and design computations. The area of vent and drain holes at each end of a member shall be at least 30% of the inside area of the member for members with diameters 3.00 inches and greater and 45% of the inside area of the member for members with diameters less than 3.00 inches. The vent and drain holes shall be strategically located for reducing stress and for proper galvanizing. The holes shall be made by drilling. Flame cut holes are not permitted. The edges of all holes shall be rounded by grinding. After galvanizing, exposed holes placed in the sign support components for galvanizing shall be sealed with neoprene plugs.

A J-hook shall be welded to the inside of the pole at the top for wire handling and support.

The mast arm shall have a hand hole, reinforced with a frame, located at the base of the pole. The hand hole shall be located with a normal direction that is 90° to the plane formed by the pole and arm. The clear distance from the top of the baseplate to the outside face of the bottom of the hand hole frame shall be no less than the diameter of the tubular member plus 1.00 inch and no greater than the diameter of the tubular member plus 3.00 inches. The hand hole frame shall have a minimum 4.00 inch wide by minimum 6.00 inch high clear opening. The maximum width of the hand hole opening, the clear opening plus twice the frame thickness, shall not be greater than 40% of the tubular member diameter at that section. The inside corners of the hand hole frame shall be rounded to a radius of 30% to 50% of the width of the clear opening. The minimum thickness of the hand hole frame shall be no less than the thickness of the pole or 0.3125 inches, whichever is greater. The hand hole frame shall be connected to the pole with a partial joint penetration groove weld reinforced with a fillet weld. The hand hole weld shall start and end at the point that is coincident with the longitudinal axis of symmetry of the tubular member and the longitudinal axis of symmetry of the hand hole frame. 100% of the weld shall be non-destructively tested in accordance with the magnetic particle method. The hand hole shall be provided with a cover connected to the frame with no less than 2 stainless steel screws. The cover shall be installed with a neoprene gasket matching the dimensions of the cover. The cover and the gasket and the hand hole frame shall be in firm and continuous contact after tightening the fasteners. The cover shall also be attached to the frame with a 1.5 foot long stainless steel chain. The inside bottom of the frame shall have a hole tapped for the stainless steel grounding bolt.

The mast arm shall be supplied with a pole cap plate, arm cap plate, and anchor bolt covers. The cap plates shall be attached with no less than 3 threaded fasteners. The joint between the tubular member and plate shall be sealed with a neoprene gasket matching the dimensions of the plate.

The design of the mast arm and the anchorage shall be coordinated with the design of the foundation to ensure that the foundation is adequate for the support reactions and to avoid conflicts between the embedded anchorage and the foundation reinforcement.

The luminaire arms shall be fabricated of pipe with a minimum thickness equal to schedule 40. Single arm luminaires shall be used for luminaires with arm lengths less than or equal to 8.0 feet. Truss type luminaires shall be used for luminaires with arm lengths greater than 8.0 feet. The truss type luminaires shall consist of an upper and lower members joined with vertical members at the tip and midspan. To accommodate the luminaire fixture, the size of the pipe in the luminaire arm at the tip shall be 2.00 inch diameter, schedule 40. If necessary, a reducing tenon shall be installed at the tip of the arm to accommodate the luminaire fixture.

The luminaire arm(s) shall be connected to the pole with clamp connections. Each clamp connection shall use 4 high-strength bolts. The installed nuts shall be prevented from loosening while in service. The use of lock washers to meet this requirement is not permitted. The arms shall be fillet welded, all-around, to the clamp(s). The size of the weld shall be no less than 0.25 inches. A hole shall be provided in the clamp, (upper arm clamp for truss type arms) and pole to allow for wires to pass from the pole to the luminaire arm. The sides of all holes in the

connection shall be ground smooth and edges rounded by grinding to prevent the wires from chafing.

Prior to fabrication, the Contractor shall submit working drawings and design calculations, with all details and documents necessary for fabrication and erection of the structure and its components, for each mast arm assembly for review in accordance with the special provision “Section 1.05 – Control Of Work”.

The working drawings and design calculations for the mast arm assemblies shall conform to working drawing requirements for permanent construction. **A single set of drawings with tabulated data for multiple mast arm locations is not permitted.** Each mast arm shall be referenced with an alpha-numeric identifier noted on the Contract documents. The working drawings and calculations shall be prepared in Customary U.S. units.

The mast arm working drawing and calculation submittal shall include the following:

1. title sheet
2. table of contents
3. contact information for designer, fabricator and galvanizer – contact information shall include name and address of each firm and the name of contact person with phone number and email address
4. copy of the certificate of insurance
5. copy of fabricator’s AISC certification
6. copy of the traffic signal control plan detailing mast arm assembly
7. mast arm assembly working drawings
8. mast arm assembly design calculations
9. welding procedures
10. mast arm installation procedure, including the method to plumb the pole

The working drawings shall include complete details of all mast arm components. The drawings shall include, but not be limited to the following:

1. the Project number, town and mast arm identification number
2. reference to the design specifications, including interim specifications

3. reference to the design specifications design criteria, such as design wind speed, minimum design life, fatigue category, vehicle speed, etc.
4. material specifications for all components
5. material designations for the arm and pole, with an explanation of the alpha numeric characters (equivalent thickness, in inches, shall be provided for gage numbers)
6. non-destructive weld testing requirements
7. details of the location of the longitudinal seam welds in the arm, luminaire arm and pole
8. vent and drain holes for galvanizing
9. dead load and permanent camber
10. a plan view of the anchor bolt layout relative to the orientation of the arm
11. anchor bolt dimensions, including embedment and projection
12. mast arm installation procedure, including the method to plumb the pole

The design calculations shall include, but not be limited to the following:

1. the Project number, town and alpha-numeric mast arm identifier
2. references to design specifications, including interim specifications, and the applicable code section and articles
3. description/documentation for all computer programs used in the design
4. drawings/models of the structure, components and connections, with dimensions, loads and references to the local and global coordinate systems used (as applicable), to facilitate review of the results
5. coefficients and factors used in the design
6. summary sheet of the analysis results, including but not limited to the following:
 - the maximum CFI ratios for the following structure components, for each limit state:
 - the arm at the pole connection
 - the arm at the slip splice

- the bolts connecting the arm to pole
 - the arm flange plate
 - the pole at the base
 - the base plate
 - the anchor bolts
- the maximum fatigue stress ratio (ratio of computed stress to the stress limit) for the following structure components the each applicable fatigue load:
 - the arm at the pole connection
 - the bolts connecting the arm flange plate to the built-up box connection plate
 - the pole below the arm connection
 - the pole base hand hole
 - the pole at the base
 - the anchor bolts
 - the maximum reactions applied to the foundation due to each limit state
 - horizontal and vertical deflections due to all applicable limit states
 - vertical deflection of the free end of the arm due to the wind load effects of galloping and truck-induced gusts

The mast arm assemblies shall be fabricated in accordance with the latest edition of the AASHTO LRFD Bridge Construction Specifications, including the latest interim specifications, amended herein.

The steel fabricator shall be AISC certified for the fabrication to the **Standard for Bridge and Highway Metal Component Manufacturers (CPT)**.

Fabrication of the mast arm may begin only after the working drawings and design calculations have been reviewed and the Engineer has authorized fabrication to begin. The Contractor shall submit to the Engineer, no less than 2 weeks prior to the start of fabrication, the name and location of the fabrication shop where the work will be done so that arrangements can be made for an audit of the facility and the assignment of the Department Quality Assurance (QA) inspector. No fabrication will be accepted unless the QA inspector is present during fabrication. No changes may be made during fabrication without prior written approval by the Department.

The Contractor shall furnish facilities for the inspection of material and workmanship in the shop by the Engineer. The Engineer and Department QA representative shall be allowed free access to the necessary parts of the premises.

The Engineer will coordinate with CTDOT to provide QA inspection at the fabrication shop to assure that all applicable Quality Control plans and inspections are adequately adhered to and

maintained by the Contractor during all phases of the fabrication. A thorough inspection of a random selection of elements at the fabrication shop may serve as the basis of this assurance.

Prior to shipment to the project, each individual piece of steel shall be marked in a clear and permanent fashion by a representative of the fabricators' Quality Control (QC) Department to indicate complete final inspection by the fabricator and conformance to the Project specifications for that piece. The mark must be dated. A Materials Certificate in accordance with Article 1.06.07 may be used in lieu of individual stamps or markings, for all material in a single shipment. The Materials Certificate must list each piece within the shipment and accompany the shipment to the Project site.

Following the final inspection by the fabricator's QC personnel, the Engineer may select pieces of steel for re-inspection by the Department's QA inspector. Should non-conforming pieces be identified, all similar pieces must be re-inspected by the fabricator and repair procedure(s) submitted to the Engineer for approval. Repairs shall be made at the Contractor's expense.

The pieces selected for re-inspection and found to be in conformance, or adequately repaired pieces, may be marked by the QA inspector. Such markings indicate the Engineer takes no exception to the pieces being sent to the Project site. Such marking does not indicate acceptance or approval of the material by the Engineer.

All welding details, procedures and nondestructive testing shall conform to the requirements of AWS D1.1 Structural Welding Code - Steel.

Personnel performing the nondestructive testing shall be certified as a NDT Level II technician in accordance with the American Society for Non Destructive Testing (ASNT), Recommended Practice SNT-TC-1A and approved by the Engineer.

All nondestructive testing shall be witnessed by Engineer. Certified reports of all tests shall be submitted to the Engineer for examination. Each certified report shall identify the structure, member, and location of weld or welds tested. Each report shall also list the length and location of any defective welds and include information on the corrective action taken and results of all retests of repaired welds.

The Department reserves the right to perform additional testing as determined by the Engineer. Should the Engineer require nondestructive testing on welds not designated in the contract, the cost of such inspection shall be borne by the Contractor if the testing indicates that any weld(s) are defective. If the testing indicates the weld(s) to be satisfactory, the actual cost of such inspection will be paid by the Department.

All members and components shall be hot-dip galvanized in a single dip. Double-dipping of members and components is not permitted. All exterior and interior surfaces of the mast arm members and components, including the interior of the ring-stiffened built-up box connection, shall be completely galvanized.

Galvanized members and components shall be free from uncoated areas, blisters, flux deposits, and gross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be permitted.

After galvanizing the joint between the backing ring and the tubular member shall be sealed with silicone sealant to prevent the ingress of moisture.

All exterior surfaces shall be powder coated over the hot dip galvanized surface. The powder coating shall be electrostatically applied and cured in a gas fired convection oven. **The color of the finish coat for steel mast arms, luminaire arms, anchor bolt covers, handhole covers, post caps, and end caps shall be Black, Federal Standard No. 595, Color No. 37038** as approved by the City of New London. Submit the proposed coating process and a color sample to the City of New London.

The powder coating shall be completed at a facility selected by the pole manufacturer to ensure a quality coating system. Any coating damaged prior to or during the installation shall be repaired. Areas to be repaired shall be clean, dry, free from grease, oil, corrosion products and other contamination. If contaminated, power wash or scrub with stiff brush and clean water. Repair areas may be brushed or sprayed as appropriate. If the Contractor elects to spray he must provide overspray containment. The minimum overspray containment shall conform to the requirements of SSPC Guide 6 for the Class 3A level.

After fabrication, the arm to pole bolted connection shall be assembled in the fabricator's shop, in the presence of the Engineer, to determine the acceptability of the connection. The faying surfaces shall be free of dirt, loose scale, burrs, other foreign material and other defects that would prevent solid seating of the parts. Prior to assembly, the galvanized faying surfaces shall be scored by wire brushing. The faying surfaces of the connection plates shall be checked with a straight edge to ensure that the surfaces are not distorted and the entire faying surface of each plate will be in contact when assembled. The high-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). A connection may be found acceptable by the Engineer if the faying surfaces of the flange (connection) plates are in firm, continuous contact after properly tensioning the bolts. Only mast arm assemblies with acceptable arm to pole bolted connections shall be shipped. If a bolted connection is found unacceptable, the Contractor shall submit a procedure to repair the connection to the Engineer for review. The use or installation of galvanized hardened steel washer between the faying surfaces of the connection is not permitted. Galvanized surfaces damaged by the repair procedure shall be hot dip galvanized. Repair of the damaged galvanized surfaces in accordance with the requirements of ASTM A780 or with a galvanizing repair stick is not permitted. Bolts, nuts and washers used for the trial shop fit-up shall not be reused in the final field assembly.

After fabrication and prior to shipping, aluminum identification tags shall be attached to the arm and pole members with self-tapping tamper resistant screws.

The finished members and components shall be protected with sufficient dunnage and padding to protect them from damage and distortion during transportation. Damage to any material during transportation, improper storage, faulty erection, or undocumented fabrication errors may be

cause for rejection of said material at the Project site. All costs associated with any corrective action will be borne by the Contractor.

Following delivery to the Project site, the Engineer will perform a visual inspection of all material to verify shipping documents, fabricator markings, and that there was no damage to the material or coatings during transportation and handling.

The Engineer is not responsible for approving or accepting any fabricated materials prior to final erection and assembly at the Project site.

High-strength bolts, nuts and washers shall be stored in accordance with Subarticle 6.03.03-4(f).

The mast arm shall be erected, assembled and installed in accordance with these specifications and the procedures and methods submitted with the working drawings. The Contractor and the mast arm designer are responsible to ensure that the erection and assembly procedures and methods in this specification are acceptable for use with the mast arm assembly. Changes to these method and procedures shall be submitted with the working drawings and computations.

Prior to installation of the mast arm pole, the exposed threads of all the embedded anchor bolts shall be cleaned of accumulated dirt and concrete and shall be lubricated. The threads and bearing surfaces of all the anchor bolt nuts shall be cleaned and lubricated. The anchor bolts and nuts are properly lubricated if the nuts can be turned by hand on the anchor bolt threads. The lubricant shall contain a visible dye of any color that contrasts with the color of the galvanizing. Re-lubricate the threads of the anchor bolts and nuts if more than 24 hours has elapsed since earlier lubrication, or if the anchor bolts and nuts have become wet since they were first lubricated.

Install (turn) the leveling nuts onto the anchor bolts and align the nuts to the same elevation or plane. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1 in. Place a structural hardened washer on top of each leveling nut, 1 washer on each anchor bolt.

Two methods are acceptable to seal between the baseplate and top of the foundation, a closed cell elastomer ring and non-shrink grout. If a closed cell elastomer ring is used, prior to erecting the pole, place the ring within the anchor bolt pattern. The closed sell elastomer ring shall not interfere with the anchor bolt leveling nuts and shall not block the opening in the base plate.

The pole shall be erected so that the centerline of the pole will be plumb after the application of all the dead loads. The Contractor shall carefully erect the pole in a manner to avoid overhead utility conflicts. The pole may be initially installed raked in the opposite direction of the overhead member to obtain the plumb condition. Raking the pole may be accomplished by installing the leveling nuts in a plane other than level.

Install the pole base plate atop the washers resting on the leveling nuts, place a structural hardened washer on each anchor bolt resting it on the top of the base plate, and install (turn) a top nut on each anchor bolt until the nut contacts the washer. The leveling nuts and washers shall

be inspected, and if necessary the nuts (turned), so that the washers are in full contact with the bottom surface of the base plate.

Tighten the top nuts to a snug tight condition in a star pattern. Snug tight is defined as the maximum rotation resulting from the full effort of one person using a 12 in. long wrench or equivalent. A star tightening pattern is one in which the nuts on opposite or near-opposite sides of the bolt circle are successively tightened in a pattern resembling a star (e.g., For an 8-bolt circle with bolt sequentially numbered 1 to 8, tighten nuts in the following bolt order: 1, 5, 7, 3, 8, 4, 6, 2.).

Tighten leveling nuts to a snug tight condition in a star pattern.

Before final tightening of the top nuts, mark the reference position of each top nut in a snug-tight condition with a suitable marking on 1 flat with a corresponding reference mark on the base plate at each bolt. Then incrementally turn the top nuts using a star pattern one-sixth of a turn beyond snug tight. Turn the nuts in at least two full tightening cycles (passes). After tightening, verify the top nut rotation. The top nuts shall have full thread engagement. The distance from the bottom of the leveling nuts to the top of the foundation shall not exceed 1 in.

High-strength bolts, including nuts and washes, shall be installed and tensioned in accordance with Subarticle 6.03.03-4(f). The arm shall be temporarily and fully supported while all the high-strength bolts are installed and tensioned. The temporary arm support shall not be removed until the Engineer has confirmed that the faying surfaces of the flange (connection) plates are in firm, continuous contact and the high-strength bolts were properly installed and tensioned. All high-strength bolts in the arm to pole bolted connection shall be inspected (in accordance with Subarticle 6.03.03-4(f)) to confirm the high-strength bolts were properly tensioned. The use or installation of galvanized hardened steel washer between the faying surfaces of the connection is not permitted.

After erecting the mast arm, the mast arm shall be electrically grounded by attaching the bare copper grounding conductor to the inside of the handhole frame with a stainless steel bolt and to the ground rod with a ground clamp. The rigid metal conduit shall be electrically grounded by attaching the bare copper grounding conductor to the insulated bonding bushing and to the ground rod with a ground clamp.

After erection of the mast arm and before the installation of the traffic appurtenances, if the structure exhibits excessive vibration, oscillations or deflections as determined by the Engineer, the Contractor shall immediately stabilize the structure to the satisfaction of the Engineer. Stabilizing the structure may require the removal of a portion of the structure or the entire structure.

The traffic appurtenances shall be located and mounted on the arm as shown on the cross-sections. Holes, if required for wires, shall be located adjacent to the appurtenances and shall be drilled in the bottom of the arm. A rubber grommet shall be installed in each hole to protect the wires from chafing.

After installation of the traffic appurtenances, the anchor bolt nuts (leveling and top anchor nut) and washers shall be in full contact with the top and bottom surfaces of the pole base plate and the centerline of the pole shall be plumb.

After plumbing the pole, if a closed cell elastomer ring has not been previously installed, seal the opening between the baseplate and foundation with non-shrink grout. The non-shrink grout shall be placed within the anchor bolt pattern so that the anchor bolts will remain visible.

After installation of the traffic appurtenances, if the structure exhibits excessive vibration, oscillations or deflections as determined by the Engineer, the Contractor shall design and construct devices to mitigate the movements. The Contractor is responsible for immediately stabilizing the structure to the satisfaction of the Engineer. Stabilizing the structure may require the removal of the traffic appurtenances or the entire structure. Prior to installation of any mitigation device, the Contractor shall submit drawings, design computations other documentation to the Engineer for review in accordance with Article 1.05.02.

The last character of the mast arm identification number shall be stenciled with white paint, unless otherwise specified, on the pole of each mast arm. The character shall be 3 in. high and placed approximately 12 in. above the top of the base plate facing the centerline of the roadway.

Method of Measurement:

This work will be measured for payment by the number of steel mast arm assemblies of the type specified, completed and accepted in place.

Basis of Payment:

The unit bid price for "XX Steel Mast Arm Assembly", of the type specified, shall include all equipment, materials, tools and labor incidental to the design, fabrication and installation, mitigation devices, of the mast arms at the locations specified on the plans. The unit bid price for "Steel Combination Mast Arm Assembly XX-1W" shall also include all equipment, materials, tools, and labor incidental to design, furnish and attach the luminaire arms to a pole shaft at the locations called for on the plans.

<u>Pay Item</u>	<u>Pay Unit</u>
XX' Steel Mast Arm Assembly	EA

ITEM #1105103A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL
ITEM #1105150A - 1 WAY, 3 SECTION MAST ARM TRAFFIC SIGNAL,
PROGRAMMED

Article 11.05.03 – Construction Methods:

In the second paragraph, delete the last sentence (“A balance adjuster shall..”).

Add the following paragraphs:

Circular indications that have an identification mark (such as an arrow) on the top of the lens shall be installed with that mark at the 12 o'clock position.

Article 11.05.05 – Basis of Payment:

In the first sentence of the first paragraph, delete “balance adjuster,”.

Article M.16.06 - Traffic Signals

Sub Article 2 – Traffic Control Signals:

Add the following paragraph:

Programmed signal heads shall include the capability to limit signal visibility to specific target areas optically without the use of hoods or louvers. The programmable signal heads shall be programmed by the contractor to limit the signal visibility as shown on the plan.

Sub Article 3 - Housing:

In the last sentence, between the words “housing” and “shall” add “and all internal hardware”.

Add the following after the last paragraph.

Each section of the housing shall be provided with a removable visor. The visor shall be the cap type, unless otherwise noted on the plan. The visor shall be a minimum .05 inch (.13 mm) thick. The visor shall be the twist on type and secured to the signal by four equidistant flat tabs screwed to the signal head.

Sub Article 4 - Brackets:

Add the following at the end of the last paragraph:

Backplates shall be 5” wide and louvered.

Install a 2” wide fluorescent yellow retroreflective strip (Type XI sheeting) along the perimeter of the face of the backplate.

Replace the last paragraph with the following:

When indicated on the plans, a backplate of dimensions, as shown on the plans, constructed of 5052-H32 aluminum alloy sheet between 0.050-in to 0.065-in thickness meeting the requirements of ASTM B209 shall be attached to the signal head housing. The front surface of backplate per MUTCD shall have a dull black finish to minimize light reflection and to increase contrast between the signal indication and its background.

Delete Sub Article 5 - Optical Unit and Sub Article 6 – Lamp Socket and replace with the following:

Optical Unit, Light Emitting Diode:

(a) General:

Only Optical Units that meet the requirements contained herein supplied by the below manufacturers that have been tested by the Department’s Signal Lab will be accepted. Final approval for model numbers will be done at the time of the catalog cut submittals.

Duralight
Trastar, Inc.
860 N. Dorothy Dr., Suite 600
Richardson, TX 75081

GE Lighting Solutions
Corporate Headquarters
1975 Noble Road Building 338E
East Cleveland, OH 44112-6300

Dialight
1501 Foute 34 South
Farmingdale, NJ 07727

Leotek
726 South Hillview Drive
Milpitas, CA 95035

The materials for Light Emitting Diode (LED), Optical Unit, circular and arrow, shall conform to the following:

- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement for circular indications dated June 27, 2005.
- The ITE Performance Specification for Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement for arrow indications dated July 1, 2007.

Section 4, Adjustable Traffic Signals and General Housing sections of the **Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs**. Where the Department of Transportation Functional Specifications conflict with this

Special Provision or the 2005/2007 ITE Performance Specifications, this Special Provision and the 2005/2007 ITE Performance Specifications shall govern.

The Optical Unit shall have an Incandescent look and be made up of a smooth surfaced outer shell, multiple LED light sources, a filtered power supply and a back cover, assembled into a sealed unit. The Optical Unit shall be certified as meeting the 2005/2007 ITE Specifications by Intertek Testing Services, Inc. (ITSNA, formerly ETL) or another organization currently recognized by the Occupational Safety and Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL.) The Optical Unit shall perform to the requirements of the ITE Specification for a minimum of 60 months.

A “Swing Test” will be performed by the Department to ensure no significant dimming or blanking occurs, until the lamp is obscured by the visor. All L.E.D Lamps will be subjected to further field testing for reliable operation.

The Arrow Optical Unit shall be “Omni-Directional” so that it may be oriented in a right, left or straight configuration without degradation of performance.

(b) Electrical Requirement:

Operating voltage:

80 to 135 Volts AC with cutoff voltage (no visible indication) below 35Volts AC.

Power requirements:

- Circular Indications: 12”, (300 mm) – no more than 16 Watts
- Circular Indications: 8”, (200mm) - no more than 16 Watts
- Arrows Indications: 12”, (300mm) - no more than 16 Watts

Power Supply:

Fused and filtered to provide excess current protection and over voltage protection from electrical surges and transient voltages.

(c) Photometric Requirement:

Beam Color:

Meet 2005/2007 ITE Specifications

(d) Mechanical Requirements:

Diameter:

The Circular Optical Unit shall fit into standard 12” (300mm) or 8” (200mm) housing.
The Arrow Optical Unit shall fit 12” (300mm) housings only.

Enclosure:

UV (Ultraviolet) stabilized polycarbonate back cover.
Clear lens cover for all Red, Yellow and Green Circular Optical Units.
For Arrow Optical Units the arrow indication segment of the lens shall be clear.
Enclosure sealed and waterproofed to eliminate dirt contamination and be suitable for installation in all weather conditions.

Clearly mark on the housing the following information:

- Manufacturer & model number
- Date of manufacture (must be within one year of installation)

The model number shall end with the number of LEDs used to comprise the unit as the last digits of the model number. Example, if the unit comprised of 3 LEDs and the model is x12y, then the new model number shall read x12y3.

Operating temperature:

Meet 2005/2007 ITE Specification

Wiring: L.E.D. lamps shall have **color coded 16 AWG wires** for identification of heads as follows:

RED L.E.D. Lamps	RED with WHITE neutral
YELLOW L.E.D. Lamps	YELLOW with WHITE neutral
GREEN L.E.D. Lamps	GREEN or Brown with WHITE neutral
RED L.E.D. ARROWS	RED/WHITE with WHITE neutral
YELLOW L.E.D. ARROWS	YELLOW/WHITE with WHITE neutral
GREEN L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE with WHITE neutral
GREEN/YELLOW L.E.D. ARROWS	GREEN/WHITE or BROWN/WHITE, YELLOW/WHITE, with WHITE neutral

Wires shall be terminated with a Block Spade, 6-8 stud/ 16-14 wire size.

All Circular Optical Units shall be supplied with a minimum 40” pigtail and all Arrow Optical Units Supplied with a minimum 60” pigtail.

Sub Article 9 - Painting:

Third coat:

Replace with the following:

The housing, housing door, the back surface of the backplate, and all brackets and hardware shall be painted black by the manufacturer. The color shall be No. 37038, Federal Standard No. 595.

The outside of the visors shall have a dull black finish that meets Federal Specification TT-E-527.

The inside of the visors per MUTCD shall have a dull black finish to minimize light reflection and to increase contrast between the signal indication and its background. The dull black finish shall meet Federal Specification TT-E-527.

<u>Pay Item</u>	<u>Pay Unit</u>
1-Way 3-Section Mast Arm Traffic Signal	EA
1-Way 3-Section Mast Arm Traffic Signal, Programmed	EA

ITEM # 1106001A- 1 WAY PEDESTRIAN SIGNAL POLE MOUNTED

ITEM # 1106003A- 1 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

ITEM # 1106004A- 2 WAY PEDESTRIAN SIGNAL PEDESTAL MOUNTED

Section 11.06.02 Pedestrian Signal, Materials

Section M.16.07 C. Optical Unit

Delete 2. LED: and replace with the following:

General

- Meet requirements of current MUTCD Section 4E.
- Meet current ITE specifications for Pedestrian Traffic Control Signal Indications - (PTCSI) Part 2: Light Emitting Diode (LED).
- Meet CT DOT, 2008 - 2010 Functional Specifications for Traffic Control Equipment; Section 5D, LED Pedestrian Signal with Countdown Timer.
- Meet EPA Energy Star® requirements for LED Pedestrian Signal Modules.

Operational

- Countdown display only during the flashing Pedestrian Clearance (Ped Clr) Interval. Timer goes blank at end of flashing ped clr even if countdown has not reached zero.

Physical

- Sealed optical module to prevent entrance of moisture and dust.
- Self-contained optical module, including necessary power supplies.
- Designed to securely fit into standard housing without the use of special tools or modifications to the housing.
- Identification information on module: manufacturer's name, model number, serial number, and date code.

Optical

- Multiple LED sources; capable of partial loss of LED's without loss of symbol or countdown message.
- Two complete self contained optical systems. One to display the walking person symbol (walk) and the hand symbol (don't walk). One to display the countdown timer digits.
- Visual Image similar to incandescent display; smooth, non-pixelated.
- Symbol and countdown digit size as shown on the plan.
- Solid hand/person symbol; outline display not allowed.
- Overlaid hand/person symbols and countdown digits arranged side by side.
- Countdown digit display color: Portland Orange in accordance with ITE requirements.

- Countdown digits comprised of two seven segments, each in a figure 8 pattern.
- Photometric Requirements: Luminance, Uniformity, and Distribution in accordance with ITE requirements.
- Color Uniformity in accordance with ITE requirements.
- Blank-Out design; symbols and digits illegible even in direct sunlight when not illuminated.

Electrical

- Operating voltage: 89 VAC to 135 VAC.
- Low Voltage Turn-Off: 35 VAC.
- Turn-On and Turn-Off times in accordance with ITE specifications.
- Combined Hand – Countdown Digits wattage: ≥ 20 Watts.
- Input impedance at 60 Hertz sufficient to satisfy Malfunction Management Unit (MMU) requirements.
- Two separate power supplies. One to power the walking person symbol. One to power the hand symbol and the countdown digits.
- Meet Federal Communication Commission (FCC) regulations concerning electronic noise.
- Filtered and protected against electrical transients and surges.

Warranty

- Five years from date ownership is accepted.

Section M.16.07 F. Painting:

Remove the 2nd and 3rd sentences referring to the color.

Third coat: Replace with the following:

The housing, housing door, and all brackets and hardware shall be painted black by the manufacturer. The color shall be No. 37038, Federal Standard No. 595.

The inside and outside of the visors shall be flat black No. 37038, Federal Standard No. 595.

ITEM #1107011A - ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR (TYPE A)

Description:

Furnish and install an Accessible Pedestrian Signal and Detector (APS&D). The APS&D provides audio and tactile information to augment the visual pedestrian signal.

Type A provides a low frequency percussive tone or a speech message during the walk interval and is used where there is an exclusive or a concurrent pedestrian phase.

Material:

A. General:

- Conform to applicable sections of the current MUTCD Chapter 4E, Pedestrian Control Features as specified herein.
- All features fully operational when the traffic signal is in colors mode.
- All features non-operational when the traffic signal is in flash mode.
- Interchangeable with a non-accessible type pedestrian pushbutton with no modifications to the Controller Assembly (CA) or Controller Unit.
- Audible transducer integral with the APS&D housing, adjacent to the pushbutton.
- Operation programming method: Either or combination of:
 - Mechanically by dip switches or circuit board jumpers
 - Infrared remote-control hand-held device

B. Electrical:

- Metallic components either grounded or insulated to preclude an electrical hazard to pedestrians under all weather conditions.
- All features powered by the 110VAC Walk signal and the 110VAC Don't Walk signal so that additional conductors from the CA are not needed.

C. Audible Pushbutton Locator Tone

- Frequency: repeating tone at one (1) second intervals
- Tone duration: ≤ 0.15 seconds
- Volume:
 - Minimum setting of zero
 - Manually adjustable initial setting
 - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
 - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
 - Automatic volume adjustment independent of other APS&Ds at the intersection.
 - May be disabled without affecting operation of other features.
- Silent only during walk interval. Active all other times.

D. Vibrotactile Arrow Pushbutton

- Pushbutton contained in a circular assembly which fits inside the housing and is attached to the housing with 4 screws.
- Actuation of pushbutton acknowledged by confirmation light.
- Actuation of pushbutton initiates speech message "Wait".
- ADA compliant: Size: ≥ 2.0 " (50) diameter, Actuation force: ≤ 5 ft-lb (22.2 N)

- Shape: Circular, raised slightly above housing so that it may be actuated with the back of a hand
- Tamper-proof, vandal-proof, weatherproof, freeze-proof, impact-resistant design and construction.
- Operation: Vibrates only during the walk interval (when the walk indication is displayed).
- Tactile Arrow:
 - Attached to surface of the button assembly by a tamperproof method.
 - Raised slightly above surface of pushbutton, minimum 0.125" (0.3)
 - Size: Length \geq 1.5" (38), Height \geq 1.0" (25)
 - Color: Sharp contrast to background color of pushbutton and housing

E. Audible Walk Interval

1. General:

- Operation independent of other APS&Ds at intersection.
- Active only during the walk interval (when the walk indication is displayed).
- Volume:
 - Minimum setting of zero
 - Manually adjustable initial setting
 - Automatically adjusted after initial setting. Volume increased in response to a temporary increase in ambient noise and subsequently decreased with a decrease in ambient noise.
 - Automatic volume adjustment independent of other APS&Ds at the intersection.
 - Maximum volume: 100 dBA which is the approximate sound pressure of a gasoline powered lawn mower nearby.
- Duration:
 - Default method: Automatically set by the duration of the visual walk signal display.
 - When selected: Manually set when rest-in-walk is used for a concurrent pedestrian movement.
- Audible sounds that mimic any bird call are not allowed.

2. Percussive Tone where called for on the signal plan:

- Repeating tone at eight (8) to ten (10) ticks per second.
- Tone frequency: Multiple frequencies with a dominant component at 880 Hz which creates a "tick - tick - tick..." sound.

3. Speech Message where called for on the signal plan:

- Clearly enunciate the name of the travel way to be crossed and the message that the walk signal is on for that crossing.. See signal plan for specific message.

F. Pushbutton Housing/Sign Frame/Sign

- One piece die cast aluminum meeting requirements of ASTM B85.
- Sign frame designed to accept 9" x 15" (230 x 380) four-hole advisory sign.
- Flat back to facilitate surface mount.
- Available brackets to either pedestal top-mount or pole side-mount on pole diameter range of 3½" (89) to 15" (380).
- Available brackets to allow mounting two (2) APS&Ds to the same 3½" (89) pole, facing \geq 60 degrees apart, at the same height.
- Available extension bracket of a size indicated on the plan – 18" maximum.
- Wire entrance through the rear.
- Stainless steel mounting hardware.
- Color: The color shall be black No. 37038, Federal Standard No. 595.
- Finish: Housing/Frame and all mounting brackets either:
 1. Painted with 3 coats of infrared oven-baked paint before assembly.

- Primer: Baked iron oxide which meets or exceeds FS TT-P-636.
- Second coat: Exterior-baking enamel, light gray, which meets or exceeds FS TT-E-527.
- Third coat: Exterior-baking enamel, which meets or exceeds FS TT-E-489.
- 2. Electrostatic powder coated after chemically cleaned.
- Sign: CT DOT Sign No. 31-0856

Construction Methods:

Install the APS&D according to the manufacturer’s instructions. Position the APS&D so the plane of the sign face is parallel to the crossing (sign is facing perpendicular) and the arrow is pointing in the same direction as the crossing, not necessarily at the ramp. Notify the Engineer if there is any discrepancy or ambiguity between the plans and field conditions that prevent placement of the APS&D as shown on the plan. Set the minimum sound levels of the locator tone and the audible walk indication when there is little or no ambient noise as in night time operation. Set the volume of audible walk indications and pushbutton locator tones to a maximum of 5dBA louder than ambient sound. The locator tone should be audible 6’ to 12’ (1.8 m to 3.6 m) from the pushbutton or to the building line, whichever is less. Confirm the volume of both audible walk indication and the locator tone increases with an increase in ambient sound and subsequently decreases when the ambient noise decreases.

If programming method is remote, by an infrared hand-held device, provide one device and operation manual for each intersection where APS&D is installed.

Method of Measurement:

This work is measured by the number of APS&Ds of the type specified, installed, tested, fully operational, and accepted.

Basis of Payment:

Payment for this work is based on the installation, inspection, successful completion of the 30 day test period, and final acceptance of the Accessible Pedestrian Signal and Detector of the type specified. Payment includes the sign, mounting brackets for adjacent buttons on the same structure, extension brackets, all necessary cable, all incidental materials, labor, tools, and equipment necessary to complete the installation. Payment also includes the warrantee, installation manual, and operation manual.

If programming method is remote by an infrared hand-held device, the total bid price of all APS&Ds includes one remote programming device and accompanying operation manual for each intersection where APS&D is installed.

<u>Pay Item</u>	<u>Pay Unit</u>
Accessible Pedestrian Signal and Detector (Type A)	Each

ITEM #1108115A - FULL ACTUATED CONTROLLER 8 PHASE

Article 11.08.01 - Description: Delete the second paragraph and replace with the following:

This item shall consist of furnishing and installing an actuated ATC controller, which shall be a completely digital solid state unit, for controlling the operation of the traffic signals. The Controller manufacturer shall be Cubic/Trafficware in order to continue the City's use of specific controller manufacturers for interoperability and maintenance.

The controller shall be completely furnished with the number of phases called for in the item. The cabinet to house the controller shall be completely wired and all sub-bases shall be complete with load switches and flash relays as specified in the **Functional Specifications For Traffic Control Equipment**. The cabinet shall also have all necessary auxiliary equipment required to provide the sequence and timing indicated on the plans.

Article 11.08.03 – Construction Methods: Delete the entire second paragraph.

Article M.16.09 - Controllers: Add the following sub-articles:

2. Actuated Controllers: The purpose of this sub-article is to set forth minimum design and operating requirements for the materials and components for a digitally timed actuated controller.

Ventilation:

For cabinets that will be painted other than Department-approved gray, the cabinet ventilation shall include two intakes, exhausts, filtrations, two fans, and one thermostat assembly. Each electric fan shall be equipped with ball or roller bearings and with a capacity of at least 100 cfm. The fans shall be mounted inside the front top of the cabinet ventilation holes. The fans shall be controlled by one manually adjustable thermostat.

The Connecticut Department of Transportation Functional Specifications for Traffic Control Equipment, current edition governs the material for the Controller Assembly. The Functional Specifications are advertised biennial for vendors to provide equipment to the State on a low bid basis. All underlined text indicates an addition or revision to these specifications from the previous version. The Functional Specifications are available on the Departments website.

The following sections of the **Notice to Bidders**, pages 1 - 10, shall apply to contract supplied traffic controllers: 12, 15, 16, 17, 18, & 19.

Item 1108115A – FULL ACTUATED CONTROLLER 8 PHASE shall conform to the requirements of Section 1, pages 11 – 94. The Controller Unit (CU) shall conform to the requirements of Item 1D1, CONTROLLER (PRE-EMPTION TYPE), pages 29 – 31. All cabinets shall conform to the specifications of the “D” CABINET REQUIREMENTS, pages 78 – 84.

Traffic signal equipment which has not been previously approved to meet the requirements of the Functional Specifications for the above items, will not be approved for use on this contract.

Several parts of Item 1 of the Functional Specifications do not apply to contract supplied and developer supplied traffic controllers. The specifications which are to be disregarded are listed below.

- Item 1A-1 - Controller, Two Phase Microprocessor Keyboard Entry
 - Type 6 Conflict Monitor
- Item 1A-2 - Two Phase Type "A" Cabinet

Supplemental specifications listed below, have been added for material and controller operations which the Department of Transportation does not include in the Functional Specifications for Traffic Control Equipment.

- U.C.F. Time Switch Flash Command Procedure
- Time Clock/Time Base Installation Requirements
- 24 Volt Relay Type A
- 110 Volt Relay Type F
- Type G
- Time Delay Relay
- Non-Actuated Advance Green Phase
- Actuated Advance Green Phase
- Non-Actuated Clearance / Lag Green Phase
- Actuated Clearance / Lag Green Phase
- Flashing Stop Ahead Sign
- Max II Actuation By Pedestrian Call

UNIFORM CODE FLASH COMMAND PROCEDURE

1. Activate the **MINIMUM RECALL** input to the controller to ensure cycling prior to transferring to flashing operation.
2. Omit all non-actuated and actuated artery advance phases.
3. Omit phases 1 & 5 of all quad sequences.
4. Activate the **STOP TIME** input to the controller, upon entering flash, to prevent cycling.
5. Transfer to flash at the end of the last side street all red condition (at the point the artery **ON** output becomes active).
6. Special technical notes on the intersection plan supercede the above requirements.

24 VOLT RELAY

All 24 Volt relays shall meet the requirements of one of the following two types. Diodes shall be installed across the coils of all direct current relays to shunt the reverse voltage generated when the coil de-energizes. All diodes shall be general purpose ECG 125 1000prv @ 25A or equivalent, rated at least .5 amp forward biased. Diodes shall be external to the relay, not enclosed in the dust cover.

TYPE A: Midland Ross, Midtex 155-92 or equivalent.

DESCRIPTION:

This relay shall be enclosed in a clear polycarbonate removable dust cover. It shall have a mechanical life of more than 100,000 operations at rated load.

CONTACTS:

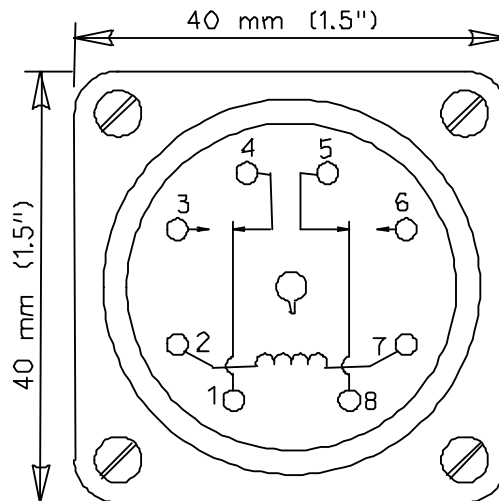
The contacts shall be 2 form C (D.P.D.T), U.L. rated at 5 amps 120 volts A.C. The contacts shall be pure fine silver (gold flash). There shall be no tungsten (lamp) load on the contacts of this relay.

COIL: The coil shall operate on 24 V.D.C. and have no less than 450 OHMS impedance.

SIZE: The relay shall be no larger than 65mm(2.5") H x 40mm(1.5") L x 40mm(1.5") W.

BASE: This relay shall have an eight pin octal plug-in base with the pin designation shown below:

1. Common (1)
2. Coil
3. Normally open (1)
4. Normally closed (1)
5. N.C. (2)
6. N.O. (2)
7. Coil (2)
8. Comm.



Bottom View And Wiring Diagram

SOCKET: The socket shall be a closed back, screw terminal type. The front mounted screws shall be 6-32 capable of accepting #14 AWG wire.

110 VOLT RELAY

All 110 volt relays shall meet the requirements of one of the following two types. Across the coil of each relay there shall be a molded suppressor rated at .1uf - 47 ohm @ 600V to suppress electrical noise created by the energization / de-energization of the relay.

TYPE F: Midland Ross, Midtex 136-62T3A1 or equivalent

DESCRIPTION:

Relays of this type shall function as flash transfer, power switching and signal drive. Other uses are acceptable, however, type G relays cannot be used for the above applications.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 10mm(3/8") diameter silver cadmium oxide, rated at 20 Amps @ 117 VAC resistive.

COIL:

The coil shall operate on 110 VAC. No semi-conductors will be allowed in the coil circuit of this relay.

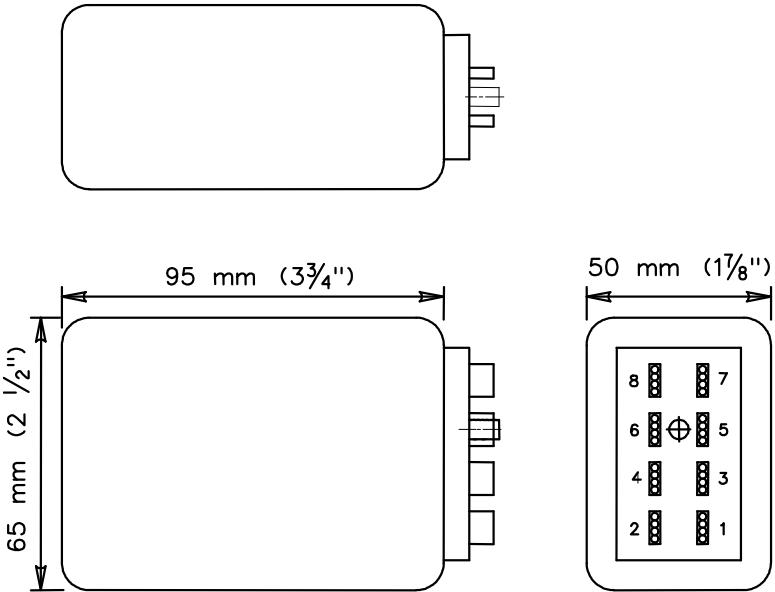
SIZE:

The relay shall be enclosed in a clear plastic dust cover. The overall dimensions shall be no larger than 63mm(2 1/2") x 94mm(3 3/4") x 47mm(1 7/8") as illustrated below.

BASE:

This relay shall have an eight blade plug-in base, Ventron Beau Plug P-5408 or equivalent with the pin designations as shown below:

- 1. Coil
- 2. Coil
- 3. N.C. 1
- 4. N.C. 2
- 5. Comm. 1
- 6. Comm. 2
- 7. N.O. 1
- 8. N.O. 2



SOCKET:

The socket shall be Ventron Beau Plug S-5408 or equivalent, contacts rated at 15 Amps @ 1750 VRMS.

TYPE G: Magnecraft, W 88 ACXP-8 or equivalent

DESCRIPTION:

Relays of this type shall function in low current switching applications such as interconnect interface or pre-emption circuits. A clear polycarbonate plastic enclosure shall cover the relay mechanism.

CONTACTS:

The contacts shall be in the D.P.D.T. form and consist of 5mm (3/16") diameter gold flashed, silver alloy, rated at 10 Amps @ 120 VAC resistive.

COIL:

The coil shall operate on 120 Volts AC and require a nominal 3 VA.

SIZE:

Height, length and width dimensions shall be the same as the 24 volt relay Type A: 35mm (1 3/8") x 60mm (2 3/8") x 35mm (1 3/8").

BASE:

The base shall be an octal plug with the pin designations the same as the 24 volt relay Type A.

SOCKET:

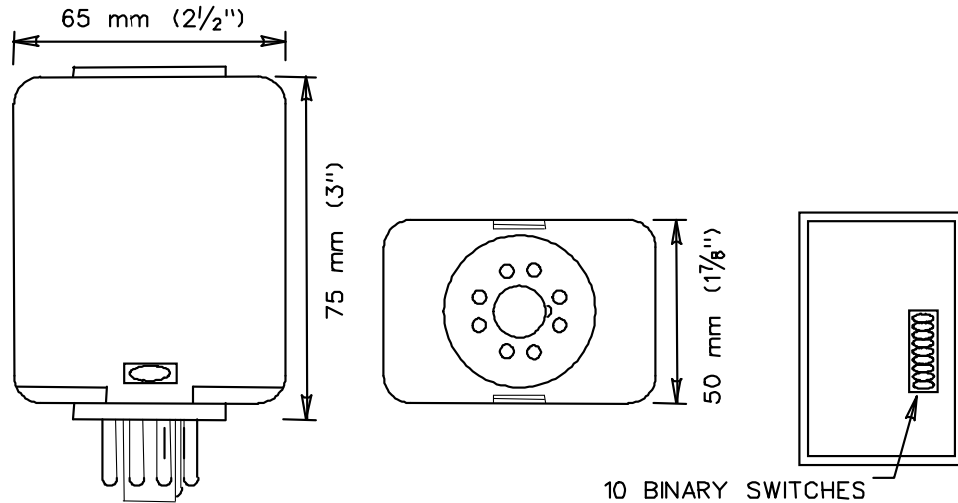
The socket shall be the same as that for the 24 volt relay Type A.

TIME DELAY RELAY

120 VAC SSAC TDM120A or equivalent
 24 VDC SSAC TDM24DL or equivalent

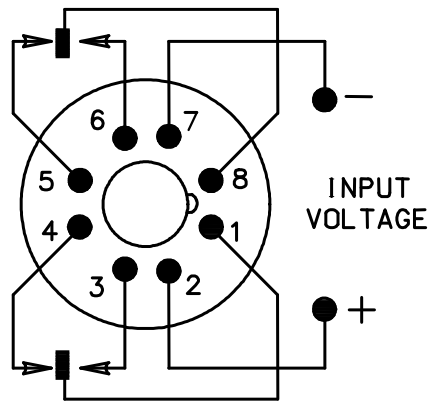
DESCRIPTION:

The time delay relays shall be self enclosed, plug-in, delay on operate type. They shall be digitally timed and adjustable by the use of dip switches located on the top of the case. The timing range shall be 1 to 1023 seconds in 1 second intervals. The time delay relays shall have an internal double pole double throw relay with form "C" contacts rated at 10 amps 120 volts AC. They shall operate accurately in a temperature range of -20 to +65 degrees C. A 120 volt AC input shall initiate timing of the 120 VAC TDR and a 24 VDC input shall initiate timing of the 24 VDC TDR. Removal of the input voltage shall reset the timer. Maximum dimensions of the case shall be as shown below.



SOCKET:

The socket shall be a standard octal base (8 pin) with screw terminal connectors. The pin designation shall be as shown below.



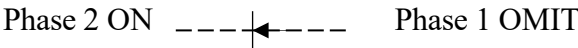
OCTAL (8 PIN) BASE

NON-ACTUATED ADVANCE GREEN PHASE

Where the timing and sequence indicates an advance green phase that always precedes the phase in recall (usually phase 2), and that either is fixed timed or is to be extended only, the following guidelines shall be in effect:

- 1. The parent phase ON output shall be diode connected to the advance phase OMIT input.
- 2. If the advance phase is to be extendable, it shall be in minimum recall. If the advance phase is fixed timed, it shall be in maximum recall. A different advance time may be selected by switching to maximum 2.

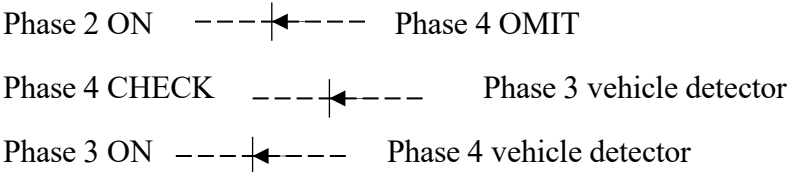
Example: Phase 1 is the advance phase (extendable), in minimum recall.
Phase 2 is the artery, in recall.
Phase 4 is the minor street, in non-lock.



Where the timing and sequence indicates an advance phase that is fixed timed (not extendable), and that always precedes either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

- 1. The recall phase (usually Phase 2) ON output shall be diode connected to the advance phase's, parent phase OMIT input.
- 2. The parent phase CHECK output shall be diode connected to the advance phase vehicle detector input.
- 3. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication on the parent phase.
- 4. The advance phase shall be in the non-lock mode. The advance time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
Phase 3 is the advance for phase 4, in non-lock mode.
Phase 4 (parent phase) is the minor street, in non-lock mode.

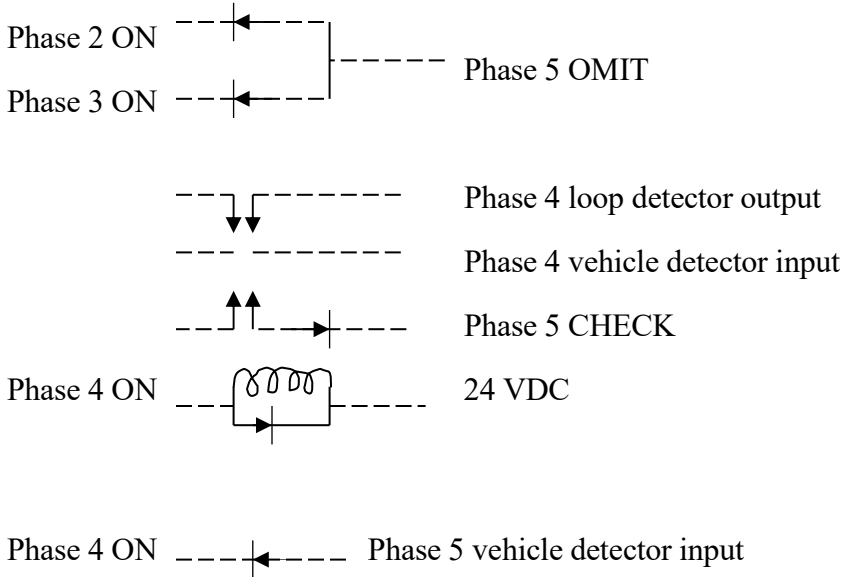


ACTUATED ADVANCE GREEN

Where the timing and sequence indicates an advance green phase that is to be extended only, and is to always precede either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The phase ON outputs of all phases that could precede the advance phase, shall be diode connected to the parent phase OMIT input.
2. The parent phase CHECK output shall be diode connected, through the normally closed contacts of a relay, to the advance phase vehicle detector input. The advance phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the advance phase ON output, which in turn will switch the vehicle detector input from the parent phase CHECK circuit to the loop detector.
4. The advance phase ON output shall be diode connected to the following parent phase vehicle detector input. This is to insure a green indication from the parent phase.
5. The advance phase shall be in the non-lock mode.

Example: Phase 2 is the artery, in recall.
 Phase 3 is the pedestrian phase.
 Phase 4 is the advance for phase 5, in non-lock.
 Phase 5 (parent phase) is the minor street, in non-lock.



The 24 volt relay shall be Type C as previously described in these specifications.

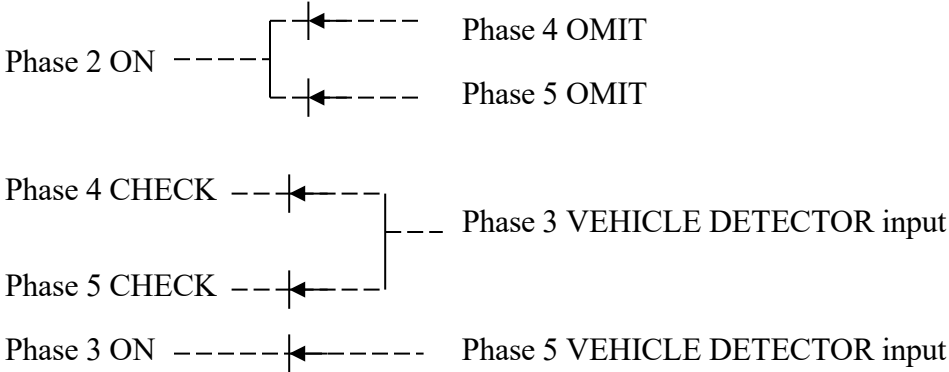
NON-ACTUATED CLEARANCE PHASE

NON-ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates a non-actuated clearance phase or a lagging green phase that always follows the phase in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to all appropriate phase OMIT inputs except the clearance phase.
2. The remaining actuated phases shall have their CHECK outputs diode connected to the clearance phase vehicle detector input.
3. The clearance phase ON output shall be diode connected to the following phases vehicle detector input (if the phase is in non-lock mode). This will prevent the controller from returning to the parent phase from the clearance phase without servicing the minor street.
4. The clearance phase shall be in the non-lock mode.
5. The clearance, or lag green time shall be selected from the maximum interval.

Example: Phase 2 is the artery, in recall.
 Phase 3 is the clearance phase, in non-lock.
 Phase 4 is the pedestrian phase.
 Phase 5 is the minor street, in non-lock.



Where the timing and sequence shows a non-actuated clearance phase or lagging green phase following either a phase other than phase 2 or a phase not in recall, the following guidelines shall be in effect:

1. The parent phase ON output shall be diode connected to the following clearance phase vehicle detector input. This insures the clearance phase will always follow the parent phase.
2. The clearance phase shall be in the non-lock mode.
3. The clearance, or lag green time shall be selected from the minimum green interval.



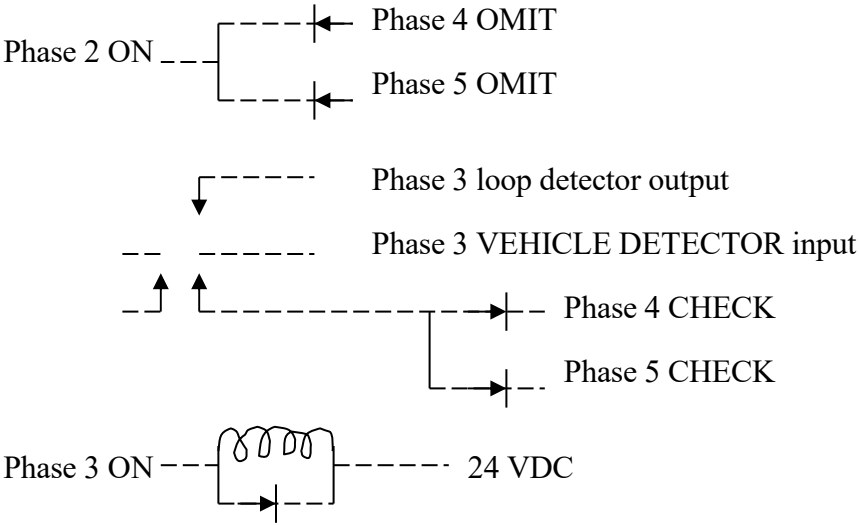
ACTUATED CLEARANCE PHASE

ACTUATED LAG GREEN PHASE

Where the timing and sequence indicates an actuated lagging green phase that is to be extended only, and always follows another phase, the following guidelines shall be in effect:

1. The parent phase (usually phase 2) ON output shall be diode connected to the phase OMIT inputs of all phases that could follow the lag phase.
2. The CHECK outputs of all phases that could follow the lag phase shall be diode connected, through the normally closed contacts of a relay, to the lag phase vehicle detector input. The lag phase loop detector output shall be connected to the normally open contacts.
3. The relay coil shall be energized by the lag phase ON output which in turn will switch the phase detector input from the CHECK circuits to the loop detector.
4. The lag phase shall be in the non-lock mode.

Example: Phase 2 (parent phase) is the artery, in recall.
 Phase 3 is the lag phase, in non-lock.
 Phase 4 is the pedestrian phase.
 Phase 5 is the minor street, in non-lock.



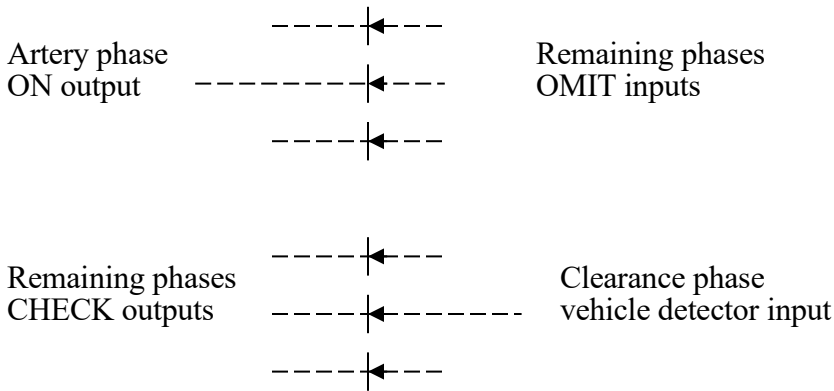
The 24 VDC relay shall be Type C as previously described in these specifications.

FLASHING STOP AHEAD SIGN

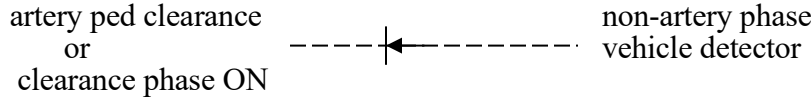
Where the timing and sequence indicates a flashing stop ahead sign, the clearance interval following the phase that the sign is off shall be timed by the following method.

The following phase shall be used for the clearance time. These phases shall be overlapped. The green indication will be maintained by the overlap feature and the following phase green time will be the stop ahead sign clearance.

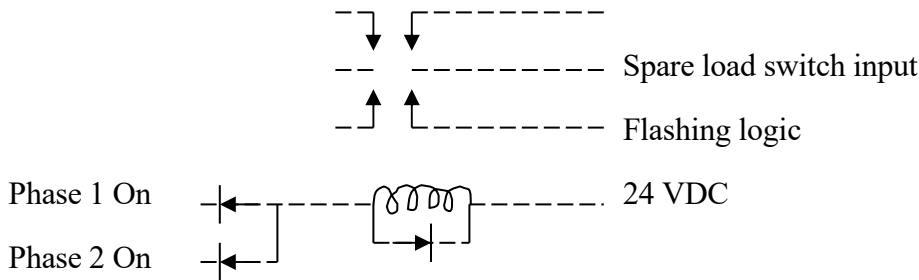
The artery phase ON output shall be diode connected to all other phase OMIT inputs except the clearance phase and the artery phase. The CHECK outputs from the remaining phases (as needed) shall be diode connected to the sign clearance phase vehicle detector input. The clearance phase shall be in the non-lock mode.



If the non-artery phases are in the non-lock mode, a call must be forced to the non-artery phase once the controller leaves the artery Hold interval (either artery walk or artery green). This prevents a false "Stop Ahead" indication if a vehicle turns right on red during the flashing sign clearance interval.



Unless otherwise shown on the plans, the 110 VAC flash power shall be from a spare load switch in the controller cabinet. The load switch input shall be driven with the flashing logic output from the controller. The flashing logic output shall be disconnected from the load switch during the intervals the sign is inactive.



Typical drive circuit for "WHEN FLASHING STOP AHEAD" sign

TIME BASE COORDINATION
MAX II ACTUATION BY PEDESTRIAN CALL

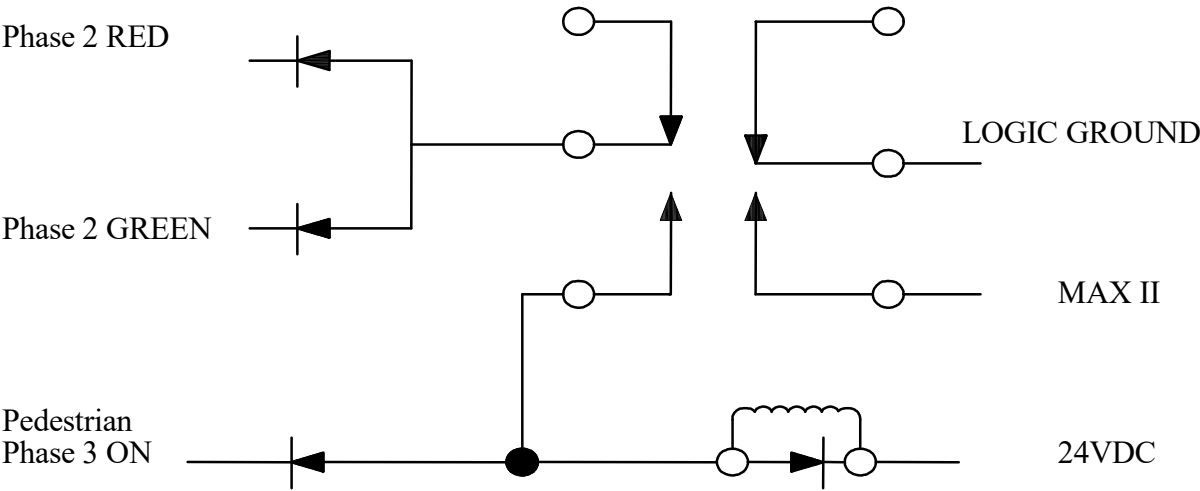
When the sum of the split times, including the walk and don't walk, exceed the background cycle length, the designer may choose to either allow a double cycle of the background timer or reduce the phase timings when the ped phase is called. Reduction of the phase timing by switching to MAX 2 avoids double cycling.

Where indicated on the plans the exclusive pedestrian phase will call MAX II. The minor movement max 2 times are set low so that the total phase times do not exceed the coordination cycle length.

Install a 24 volt relay connected to the inputs and outputs as shown on the following schematic.

Operation: When the controller advances to the exclusive pedestrian phase, the relay is actuated and latched. MAX II timing is selected for one complete cycle, until the relay is unlatched by the artery yellow (absence of red or green).

Example: Phase 2 is the artery. Phase 3 is the exclusive pedestrian phase.



ITEM #1108725A - PHASE SELECTOR (MODIFIED)

ITEM #1112413A - DETECTOR (TYPE A) (MODIFIED)

ITEM #1112471A - PRE-EMPTION SYSTEM CHASSIS (MODIFIED)

ITEM #1113552A - DETECTOR CABLE (OPTICAL) (MODIFIED)

SYSTEM DESCRIPTION:

The emergency vehicle traffic signal priority control system shall enable designated vehicles to remotely cause the traffic signal controller to advance to and/or hold a desired traffic signal display by using existing controller functions. The control shall be effective for a distance of up to 2500 feet (762 m) along an unobstructed "line of sight" path. The control shall not terminate until the vehicle is within 40 feet (12.2m) of the detector or at the intersection.

The system shall consist of the following components:

- A. Phase Selector {GTT (typ.) model 762 (2 channel) or model 764 (4 channel)} which shall cause the signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle. A pre-emption system chassis (GTT (typ.) model 770) shall house one phase selector and pre-emption system chassis model 760 shall house one multimode phase selector model 764.
- B. Optical Detector which shall be mounted on or near a traffic signal and shall receive the optical energy signals generated by the Vehicle Emitter.

Detector (Type A) 1 Direction, 1 Channel (GTT (typ.) model 711)
- C. Detector Cable (Optical) (GTT (typ.) model 138)

System Operation:

- A. The operating sequence shall be initiated when the Optical Detector receives the required optical energy signal from the Vehicle Emitter.
- B. The Phase Selector shall cause the traffic signal controller to advance to and/or hold the desired traffic signal display for the emergency vehicle.
- C. The Phase Selector shall cause the controller to advance to and/or hold the desired traffic signal display even if the optical energy signals cease before the desired display is obtained.
- D. The Phase Selector shall allow the traffic signal controller to resume normal operation within ten seconds after optical energy signals cease if the optical energy signals cease after the desired traffic signal display is obtained.

- E. The Phase Selector shall not respond to optical energy signals from an emergency vehicle if it is already processing optical energy signals from another emergency vehicle.

System Components:

A. Optical Detector:

The optical detector receives the high intensity optical pulses produced by the emitter. These optical energy pulses are transformed by the detector into appropriate electrical signals which are transmitted to the phase selector. The optical detector is mounted at or near the intersection in a location which permits an unobstructed line of sight to vehicular approaches. The units may be mounted on signal span wires, mast arms or other appropriate structures.

1. Shall be of solid state construction.
2. Shall operate over an ambient temperature range of minus 30^o F. to plus 165^o F. (minus 34^o C to plus 74^o C.)
3. Shall have internal circuitry potted in a semi-flexible compound to ensure moisture resistance.
4. Shall operate in 5% to 95 % relative humidity.
5. Shall have a cone of detection of not more than 13 degrees. The detector and/or phase selector shall not sense a pre-emption signal from an emitter outside this cone.

B. Phase Selector

The Phase Selector utilizes solid state and relay circuitry to interface between the Optical Detector and the traffic signal controller. The Phase Selector supplies power to and receives electrical signals from the Optical Detector. When Detector signals are recognized as a valid call, the Phase Selector causes the signal controller to advance to and/or hold the desired traffic signal display. This is accomplished by utilizing Phase Selector circuitry in conjunction with normal internal controller functions, such as;

The phase selector is capable of assigning priority traffic movement to one of two channels on a first-come, first-serve basis. Each channel is connected to select a particular traffic movement from those normally available within the controller. Once a call is recognized, "commit to green" circuitry in the phase selector functions so that the desired green indication will be obtained even if optical communication is lost. After serving a priority traffic demand, the phase selector will release the controller to follow normal sequence operation.

1. Shall include an internal power supply to supply power to the optical detectors.
2. Shall have two channel operation with the capability of interfacing with an additional phase selector for expansion of channels of operation.
3. Shall have adjustable detector range controls for each channel of operation, from 40 feet (12m) to 2500 feet (762m).
4. Shall have solid state indicator lights for power on and channel called.

5. Shall operate over an ambient temperature range of minus30^o F. to plus 165^o F. (minus 34^o C to plus74C)
6. Shall operate in 5% to 95 % relative humidity.

C. Pre-emption System Chassis.

1. Opticom Model 760 and 770 card racks shall consist of a metal enclosure.
2. Dedicated card slot for one Opticom phase selector.
3. Front panel shall include a terminal strip for connecting the Opticom detectors and outputs to a gate operator as well as a 9-pin circular connector and harness to connect to 120 VAC.
4. Stable “on-shelf” mounting.
5. Easy-to-read terminal designations.
6. Relay Specifications:
 - a. Shall be designed to actuate gate opener circuit.
 - b. Shall be designed to switch AC or DC.
 - c. Shall include normally open and closed contacts.

D. Detector Cable (Optical).

1. 3 Conductor cable with shield and ground wire.
2. AWG #20 (7x28) stranded.
3. Individually tinned copper strands.
4. Conductor insulation: 600 volt, 167^o F. (75 deg. C).
5. 1 Conductor-yellow; 1 Conductor-blue; 1 Conductor-orange.
6. Aluminized mylar shield tape or equivalent.
7. AWG #20 (7x28) stranded uninsulated drain wire
8. DC resistance not to exceed 11.0 ohms per 1000 feet (305m).
9. Capacitance from one conductor to other two conductors and shield not to exceed 48 pf/ft. (157pf/m).
10. Jacket: 600 volts, 176^o F. (80 deg. C), minimum average wall thickness – 0.045” (1.14mm).
11. Finished O.D.: 0.3” (7.62mm) max.

System Interface:

System shall be capable of operating in a computerized traffic management system when appropriate interfacing is provided by the computer supplier.

General:

The Contractor shall furnish the manufacturer the phasing diagrams indicating controller sequence and timing.

The optical equipment manufacturer shall replace or repair without charge, any component parts that prove to be defective within five years from the date of shipment from manufacturer. Manufacturer shall certify upon request that all materials furnished will conform to this specification. The manufacturer or his designated representative shall be responsible for determining and setting all required range and emitter intensity for the emergency vehicle operation.

Construction Methods:

All equipment shall be installed and wired in a neat and orderly manner in conformance with the manufacturers' instructions.

Detector cables shall be installed continuous with no splices between the optical detector and the controller cabinet.

Detector locations shown on the plan are for illustration purposes only. Exact location shall be determined by the manufacturer or the designated representative for the best possible line of sight.

The following items shall be installed and connected, in conformance with the current Functional Specifications for Traffic Control Equipment, "D" Cabinet Requirements (Pre-emption Type):

- Controller "D" harness and adapter.
- Pre-emption termination panel with terminal block and relay bases.
- Pre-emption disconnect switch, mounted on the emergency switch panel (on inside of cabinet door).
- Pre-emption test buttons, mounted on the pre-emption termination panel.

All connections from the phase selector to the "D" harness and to the cabinet wiring shall be made at the termination panel. The termination panel shall have AC+ Lights, AC-, and a switched logic ground. The switched logic ground feeds all the pre-empt inputs to the phase selector. When switched off by the pre-emption disconnect switch, the traffic controller shall not be affected by pre-empt calls from the optical pre-emption system. A minimum of two test buttons shall be provided. If there are more than two pre-empt runs, a button for each shall be installed. A chart or print out, indicating the program steps and settings shall be provided along with the revised cabinet wiring diagrams.

Test the pre-emption system at the semi-final inspection according to the following guidelines:

1. Notify the system owner/user, such as the municipal fire chief or public works director, of the scheduled inspection
2. Request a fire department representative and an emergency vehicle, which has an emitter, to conduct the test. If not available, the contractor shall provide an emitter.
3. In the presence of the Engineer, and the municipal representative, test each pre-empted approach with the emergency vehicle. Test the following items of the system:
 - * Confirm the emitter activates the phase selector and the phase selector activates the correct pre-emption input to the controller.
 - * Confirm adequate range. The traffic signal must be pre-empted to green sufficiently in advance of the emergency vehicle arrival. The vehicle emitter shall initiate pre-emption at a minimum distance of 2500 FT. (760m).
 - * Confirm there are no false calls. Keep the emitter active as the emergency vehicle passes through the intersection. No other optical detectors shall sense the strobe.
4. Document the test. Provide the Engineer and, upon request, the municipality copies of the test results.

If a malfunction is found or the system needs adjustment (such as range, emitter intensity, or detector location), schedule a follow-up test. Repeat the above steps for all approaches that did not pass.

All adjustments such as emitter intensity, phase selector range, sensitivity, detector placement, shall be made at the intersection, by the contractor so that the optical pre-emption operates correctly with other major manufacturers' equipment currently owned by the town.

Method of Measurement:

Optical Detectors (modified), Phase Selectors (modified), System Chassis (modified) will be measured for payment by the number of each supplied, installed and accepted. Detector Cable (Optical) (modified) will be measured by the number of linear feet (meters) supplied, installed and accepted.

Basis of Payment:

Payment for Optical Detectors (modified), Phase Selector (modified), System Chassis (modified) and Detector Cable (Optical) (modified) will include the item unit cost, including all manufacturer's required mounting hardware and the cost of installation and supervision by the manufacturer or his designated representative, including travel and subsistence, and all materials, equipment and labor incidental thereto. Payment for termination panel, "D" harness, test buttons, program chart (or print out) and revised cabinet wiring diagrams shall be included in the item PRE-EMPTION SYSTEM CHASSIS (MODIFIED).

Pay Items	Pay Units
Detector (TYPE A) (MODIFIED)	Ea.
Phase Selector (MODIFIED)	Ea.
Detector Cable (Optical) (MODIFIED)	L.F.
Pre-Emption System Chassis (MODIFIED)	Ea.

ITEM # 1111201A – TEMPORARY DETECTION (SITE NO. 1)

Description:

Provide a Temporary Detection (TD) system at signalized intersections throughout the duration of construction, as noted on the contract plans or directed by the Engineer. TD is intended to provide an efficient traffic-responsive operation which will reduce unused time for motorists travelling through the intersection. A TD system shall consist of all material, such as pedestrian pushbutton, accessible pedestrian signal, conduit, handholes, cable, messenger, sawcut, loop amplifier, microwave detector, Video Image Detection System (VIDS), Self-Powered Vehicle Detector (SPVD), and any additional components needed to achieve an actuated traffic signal operation.

Materials:

Material used for TD is either owned by the Contractor and in good working condition, or existing material that will be removed upon completion of the contract. Approval by the Engineer is needed prior to using existing material that will be incorporated into the permanent installation. New material that will become part of the permanent installation is not included or paid for under TD.

Construction Methods:

The work for this item includes furnishing, installation, relocating, realigning, and maintaining the necessary detection systems as to provide vehicle and pedestrian detection during each phase of construction. If not shown on the plan, program the TD modes (pulse or presence) as the existing detectors or as directed by the Engineer. If the TD method is not specified elsewhere in the Contract, (loops, SPVD, microwave, VIDS, pushbutton, or other) it may be the Contractor's choice. The method chosen for TD must be indicated on the TD Plan submission.

The traffic signal plan-of-record, if not in the controller cabinet will be provided upon request. Ensure the controller phase mode (recall, lock, non-lock) and phase timing are correct for the TD. Adjust these settings as needed or as directed by the Engineer.

At least 30 days prior to implementation of each phase of construction submit a TD proposal to the Engineer for approval. Submit the TD proposal at the same time as the Temporary Signalization plan. Indicate the following information for each intersection approach:

- Phase Mode
- Temporary Detection Method
- Area of Detection
- Detector Mode

Submit the proposed temporary phase timing settings and the TD installation schedule with the TD proposal. See the example below.

Example Proposed Temporary Detection and Timing

Site 1

Warren, Rt. 45 at Rt. 341, Location #149-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 45 NB</i>	<i>2</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Presence</i>
<i>Rt. 45 SB</i>	<i>2</i>	<i>Min Recall</i>	<i>SPVD</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Microwave</i>	<i>30' from Stop Bar</i>	<i>Pulse</i>
<i>Rt. 341</i>	<i>4</i>	<i>Lock</i>	<i>Pushbutton</i>	<i>At SE & SW corners</i>	<i>n/a</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>2</i>	<i>20</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>45</i>	<i>60</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2011* **Site 2**

Scotland, Rt. 14 at Rt. 97, Location #123-201

Approach	Phase	Phase Mode	TD Method	Area of Detection	Det Mode
<i>Rt. 15 WB Left Turn</i>	<i>1</i>	<i>Non-Lock</i>	<i>VIDS</i>	<i>5' in front to 10' Behind Stop Bar</i>	<i>Presence</i>
<i>Rt. 14 EB</i>	<i>2</i>	<i>Min Recall</i>	<i>Existing Loop</i>	<i>150' from Stop Bar</i>	<i>Pulse</i>
<i>Ped Phase</i>	<i>3</i>	<i>Non-Lock</i>	<i>Pushbutton</i>	<i>At all corners</i>	<i>n/a</i>
<i>Rt. 14 WB</i>	<i>6</i>	<i>Min Recall</i>	<i>VIDS</i>	<i>150' from Stop Bar</i>	<i>Presence</i>
<i>Rt. 97</i>	<i>4</i>	<i>Lock</i>	<i>Loop, Pre-formed</i>	<i>20' from Stop Bar</i>	<i>Pulse</i>

Temporary Phase Timing Settings:

Phase	Min	Ped	Ped Clr	Ext	Max 1	Max2	Yel	Red
<i>1</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>2</i>	<i>12</i>	<i>18</i>	<i>3</i>	<i>1</i>
<i>2 & 6</i>	<i>24</i>	<i>0</i>	<i>4</i>	<i>4</i>	<i>26</i>	<i>36</i>	<i>4</i>	<i>1</i>
<i>3</i>	<i>16</i>	<i>7</i>	<i>9</i>	<i>0</i>	<i>16</i>	<i>16</i>	<i>4</i>	<i>1</i>
<i>4</i>	<i>14</i>	<i>7</i>	<i>9</i>	<i>3</i>	<i>27</i>	<i>35</i>	<i>3</i>	<i>1</i>

Scheduled TD: *July 4, 2011*

When at any time during construction the existing vehicle or pushbutton detection becomes damaged, removed, or disconnected, install TD to actuate the affected approaches. Install and make TD operational prior to removing existing detection. TD must be operational throughout all construction phases.

Provide a list of telephone numbers of personnel who will be responsible for the TD to the Engineer. If the TD malfunctions or is damaged, notify the Engineer and place the associated phase on max recall. Respond to TD malfunctions by having a qualified representative at the site within three (3) hours. Restore detection to the condition prior to the malfunction within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and the Contractor does not respond within three (3) hours following the initial contact, then an alternative maintenance service will be called to restore TD. Expenses incurred by the State for alternative service will be deducted from monies due to the Contractor with a minimum deduction of \$500.00 for each service call. The alternate maintenance service may be the traffic signal owner or another qualified Contractor.

TD shall be terminated when the detection is no longer required. This may be either when the temporary signal is taken out of service or when the permanent detectors are in place and fully operational.

Any material and equipment supplied by the Contractor specifically for TD shall remain the Contractor’s property. Existing material not designated as scrap or salvage shall become the property of the Contractor. Return and deliver to the owner all existing equipment used as TD that is removed and designated as salvage.

Method of Measurement:

- Temporary Signalization (TS) shall be measured for payment as follows:
 - Fifty percent (50%) will be paid when Temporary Detection is initially set up, approved, and becomes fully operational.
 - Fifty percent (50%) will be paid when Temporary Detection terminates and all temporary equipment is removed to the satisfaction of the Engineer.

Basis of Payment:

This work will be paid at the contract Lump Sum price for “Temporary Detection (Site No.)”. The price includes furnishing, installing, relocating, realigning, maintaining, and removing, the necessary detection systems and all incidental material, labor, tools, and equipment. This price also includes any detector mode setting changes, timing or program modifications to the controller that are associated with TD. All Contractor supplied material that will remain the Contractor’s property will be included in the contract Lump Sum price for “Temporary Detection (Site No.)”. Any items installed for TD that will become part of the permanent installation will not be paid for under this item but are paid for under the bid item for that work.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Detection (Site No.)	L. S.

ITEM #1112284A — VEHICLE DETECTION MONITOR

Description:

Furnish and install a Vehicle Detection Monitor with stand in the Controller Cabinet.

Materials:

All hardware shall be new, corrosion-resistant. All equipment shall be current production.

Physical:

- Compact and easily accessible stand-mounted LCD/ LED Flat Panel Display.
- Diagonal screen size minimum 10 inches and maximum 15 inches.
- Withstand temperatures ranging from -4 to 140°F (-20 to 60°C).
- Operating humidity: 10-90% non-condensing.

Functional:

- Compatible with Color or Monochrome Detection systems.
- Industrial-grade video panel.
- ANSI contrast ratio of 300:1 minimum.
- Minimum brightness level: 400 candelas per square meter (400 lux).
- Native resolutions: 1024 (horizontal) x 768 (vertical).
- Support both National Television Standards Committee (NTSC) and Phase Alternating Line (PAL) video formats with auto-sensing.
- Minimum viewing angle: 140 degrees horizontally, 120 degrees vertically.
- On-Screen Display (OSD) controls brightness, contrast, color as well as horizontal and vertical positioning.
- Compatible with video detection processor output. Use appropriate converters/ adapters if necessary.
- Operable on 110 VAC or 220 VAC, 50 or 60 Hz.
- FCC, Voluntary Control Council for Interference (VCCI), Electromagnetic Compatibility (EMC), Consumer Electronics (CE) approved, UL listed and Energy Star efficient.
- MTBF Rating: 50,000 hours minimum.

Warranties and Guarantees:

Provide warranties and guarantees to the **City of New London**. Warranties for all equipment furnished as part of this Contract are to cover a period of 24 months following successful completion of the entire intersection acceptance test.

Method of Measurement:

The Vehicle Detection Monitor will be measured for payment as the number of units furnished, installed, operational and accepted.

Basis of Payment:

This work will be paid at the Contract unit price for each accepted “Vehicle Detection Monitor,” which price shall include the Vehicle Detection Monitor, stand, documentation, warranty, labor, tools and equipment incidental thereto.

Pay Item
Vehicle Detection Monitor

Pay Unit
EA.

ITEM #1112286A – 360 DEGREE CAMERA ASSEMBLY

ITEM #1112287A – 360 DEGREE VIDEO DETECTION PROCESSOR

ITEM #1113725A – 23 AWG 4 TWISTED PAIR CATEGORY 6 CABLE

Description:

Furnish and install a 360 Degree Video Image Detection System (360VIDS) as shown on the plans or as directed by the Engineer. The 360VIDS consists of a 360 Degree Camera Assembly (360CA), 360 Degree Video Detection Processor (360VDP) and 23 AWG 4 Twisted Pair Category 6 Cable.

Materials:

All hardware shall be new, corrosion resistant. All equipment shall be current production.

360 Degree Camera Assembly:

Camera:

- No-aim, no-focus camera
- Downward facing lens and camera shroud
- Single Power Over Ethernet (POE) connection for power and data collection.
- Color image camera with 360 degree point of view (POV)
- Active picture elements (pixels): 2560 (H) x 1920 (V), minimum.
- Signal to noise ratio : ≥ 55 dB
- Heated camera
- IP addressable

Camera Enclosure:

- Tamper proof constructed of painted or powder coated aluminum of at least 0.25 inch thickness.
- IP66-rated camera housing.

Camera Mounting Hardware:

- Smartmount bracket.
- Junction box.
- Banded bracket.
- 90 degree vertical riser:
 - For mast arms, use vertical riser height specified on the plans
 - For span poles with horizontal extension brackets, use shortest vertical riser height physically possible
 - For span poles with no horizontal extension brackets (Shaft mounted), use vertical riser height specified on the plans

360 Degree Video Detection Processor: Functional:

- Connectivity: Local Area Network (LAN), Wide Area Network (WAN), Camera interfaces.
- NEMA TS1/ TS2, ATC, Type 170, and 2070 compatible
- Four (4) USB 3.0 expansion ports.
- Front panel LED indicators displays calls and light states.
- Twenty-four (24) optically isolated I/O interface.
- Two (2) camera ports – Up to two (2) 360 Degree Camera Assembly; or one (1) 360 Degree Camera Assembly and four (4) IP video detection camera assembly or thermal detector assembly; or eight (8) IP video detection camera assembly or thermal detector assembly.
- Phase and detection display.
- Shall include at least a built-in 4g modem (or higher) and be Wi-Fi capable
- Power – 110/220 VAC 50/60 Hz
- Point and click zone drawing feature
- Omni-directional vehicle tracking
- Zone level visibility monitoring
- Monitor phases and loops, generates calls to controllers
- Software required to support collection of data
- Environmental : -29F to +165F (-34C to +74C), 0-95% non-condensing
- Fail-safe in the event of loss of video from 360CA or loss of power to 360VDP.
- Shall be able to configure and adjust the detection zone with the cabinet mounted Vehicle Detection Monitor (VDM) or remotely.
- Shall be activated to collect and report traffic data such as turning movements/volume counts, vehicle classification, speed, and red/green occupancy.
- Shall be configured to transmit collected traffic data and alarm events from field devices to remote desktop PC.
- Shall be configured to sync with a cloud network resource to allow for data backup including signal performance metrics data such as the Purdue coordination diagram.

Application Software:

- Shall be freely available for installation on any number of computers used to manage the 360VIDS.
- Shall be capable of point and click zone drawing
- Shall support the assignment of a detector output(s) to each zone. These assignments can be modified at any time through the software.
- Shall have the ability to digitally flatten CA image
- Shall have the ability to mask objects that occlude the camera field of view and/or disrupt the camera automatic gain and exposure control.
- Shall store detection zone data non-volatile memory so that after recovery from power interruption, all parameters are returned to latest settings.

- Shall have the ability to import and export program database to notebook PC or remote desktop PC. The program database shall also be allowed to be transferred via an external storage device.
- Shall be capable of superimposing detection zone on real time video image from selected camera with time stamping capabilities.
- Shall be capable of monitoring real time video and adjusting zones in field or remotely while 360VDP is actuating the traffic controller.
- Shall provide visual confirmation of detection by highlighting detection zone symbols.
- Shall allow for remote display of site/camera status for all connected sites.
- Shall provide visual indication of the light state for each zone within the graphical user interface.
- Shall be capable of searching the network for other 360VDP.
- Shall be compatible with Windows operating system supported by the Department.
- Shall maintain a historical log of all configurations when site is modified
- Shall feature the ability to digitally pan, tilt, and zoom within the camera assembly's field of view without movement of the camera.
- Shall support quad view video monitoring.
- Shall be capable of syncing with a cloud network resource to allow for group site sharing of site program database information and historical traffic data report generation.
- Shall maintain a database of current and historical traffic data
- Shall allow users to create reports for turning movements/volume counts, vehicle classification, speed, red/green occupancy, and site alerts remotely via the software and online reports/performance measures via the web.
- Shall display data in a graph, chart, and table format.
- Shall display data in 15, 30, and 60-minute intervals.
- Shall provide a means by which alerts can be configured to be delivered to different individuals via email
- Report output formats shall include at minimum PDF, rich text format, and Microsoft Excel formats.

Physical:

- Either shelf mounted, stand-alone design or modular card rack design.
- Aluminum card rack frame capable of accepting four (4) 360VDP modules.
- TS1 harness cable.
- Standard Ethernet and USB connectors for video input and video output.
- Female metal shell connector with latching clamp for NEMA TS 1 detector outputs and inputs.
- LED indications to monitor all detector outputs.
- Side or rear mounted connectors and controls are not allowed on stand-alone units.
- NEMA FR-4 glass epoxy or equivalent circuit boards.

Antenna:

- Shall be mounted externally on top of traffic cabinet
- Shall be “Multiple-Input and Multiple-Output” (MIMO)
- Shall cover the Cellular, WIFI, DSRC, GPS, and Bluetooth networks
- Shall connect to the 360VDP

Ethernet Repeater:

- Utilize Ethernet repeater if CAT6 cable distance is over 300’.

Ethernet Switch:

- Power Over Ethernet (POE) switch
- Ports for up-to four (4) traditional or thermal cameras.
- Powder coated aluminum.
- Dual purpose LED port lights.
- RJ-45 CAT6 connectivity.
- Environmental: -29F to +165F (-34C to +74C).
- NEMA TS2 compliant.

Video Encoder:

- Power Over Ethernet (POE)
- Video: H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profile
- Compression: Motion JPEG
- Resolutions: 176x120 to 720x576, 176x120 to 1536x1152 for quad view.
- Frame rate:
 - H.264: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution,
 - Motion JPEG: 25/30 (50/60 Hz) fps,
 - 15fps in quad view in full resolution.
- Video Streaming: Multi-stream H.264 and Motion JPEG: One H.264 and one JPEG stream on each channel (8 streams in total) in full frame rate individually configured streams in max. resolution at 25/30 fps; more streams if identical or limited in frame rate/ resolution. Controllable frame rate and bandwidth; VBR/CBR H.264.
- Environmental: -40F to +167F (-40C to +75C), 10-95% non-condensing.
- NEMA TS2 compliant.

Ethernet Protection Module:

- Either shelf mounted or stand-alone design.
- Protect 360CA, IP video detection camera assembly, thermal cameras and 360VDP in the event of a surge or lightning.

Environmental:

- Comply with NEMA TS 2, Section 2 requirements for Controller Assembly.
- Pass following NEMA TS 2 tests and applicable test procedures.
 - Vibration: Section 3.13.3, Section 3.13.8.

- Shock: Section 3.13.4, Section 3.13.9.
- Transients, Temperature, Voltage and Humidity: Section 3.13.7.
- Power Interruption: Section 3.13.10.

Peripherals:

- Separable Keypad & Joystick or Computer Mouse including all necessary cables for connectivity to 360VDP.

23 AWG 4 Twisted Pair Category 6 Cable:

- Supply the 360CA power and return the video signal to the 360VDP.
- Outdoor Aerial CAT6 cable with UV insulation.
- Rated for 48VDC
- 250MHZ, shielded, gel-filled (flooded core) direct burial grade.
- Shall be equipped with a drain wire.
- Terminate with compatible connector.
- Polyethylene insulation.
- Shall be installed continuous between the 360CA and 360VDP.
- Cable shall be installed according to TIA/EIA-568-B.
- Other type cable may be substituted at the request of the 360VDP manufacturer with the Engineer's approval.

Documentation: (360VDP and 360CA)

Provide to the **City of New London** three (3) copies of equipment manuals furnished by the manufacturer, which includes the following:

- Installation and operation procedures.
- Performance specifications (functions, electrical, mechanical and environmental) of the unit.
- Schematic diagrams (point to point wiring).
- Pictorial of component layout on circuit board.
- List of replaceable parts including names of vendors for parts not identified by universal part numbers such as JEDEC/RETMA or EIA.
- Troubleshooting, diagnostic and maintenance procedures.
- Testing results of grounding, voltage, and cable length measurements as indicated on the installation best practice verification at the end of this document.

Site Survey:

Perform a site survey with the 360VDP manufacturer representative at all 360VIDS locations prior to installation. The purpose of the survey is to optimize the performance from the 360VIDS equipment when it is installed. Prior to installation, submit the results of this survey to the Engineer in a report, which lists all 360VIDS locations with any recommended changes to camera locations, mounting adjustments, camera lens adjustments, and desired detection zone locations.

Warranties and Guarantees: (360VDP and 360CA)

Provide warranties and guarantees to the **City of New London** in accordance with Article 1.06.08 of the Standard Specifications. Warranties for all equipment furnished as part of this Contract are to cover a period of 36 months following successful completion of the entire intersection acceptance test.

Construction Methods:

Install 360VIDS equipment in accordance with the manufacturer instructions. Detection zones shall be replicated as shown in the plans. The Contractor shall install vehicle-counting zones for each lanes as shown in the plans. The Contractor shall ensure the vehicle counting zones be as accurate as possible. The Contractor shall contact the Engineer to confirm detection zone and vehicle counting zone locations. The Contractor shall refer to the “Installation Best Practices Guide” attached below to this specification and the Intersection Design Guide located on the Manufacturer’s website. Note that all references to “Cat5e cable” in the attached “Installation Best Practices Guide” shall refer to “23 AWG 4 Twisted Pair Category 6 Cable” as specified above in this specification. In addition, any references to the SMARTMOUNT 7’ extension on the “System overview and Installation Guidance” shall follow the Camera Mounting Hardware section of this specification. The location of the 360CA shown on the plan may be revised as a result of the Site Survey. Peripherals are to be furnished and fully installed in an easily accessible position within the controller cabinet. Leave proper clearance(s) surrounding video monitor to allow for accessible connections and space to utilize surrounding equipment.

The Contractor shall forward the configuration file in electronic format to the City of New London, immediately upon completion of configuration of the detection zones. The Contractor shall address any comments/corrections identified by the City.

Method of Measurement:

The 360 degree Camera Assembly will be measured for payment as the number of 360 degree cameras furnished, installed operational and accepted.

The 360 degree Video Detection Processor will be measured for payment as the number of units including all additional work and materials listed in Basis of Payment, furnished, installed, operational and accepted.

23 AWG 4 Twisted Pair Category 6 Cable will be measured for payment as linear feet, furnished, installed and accepted.

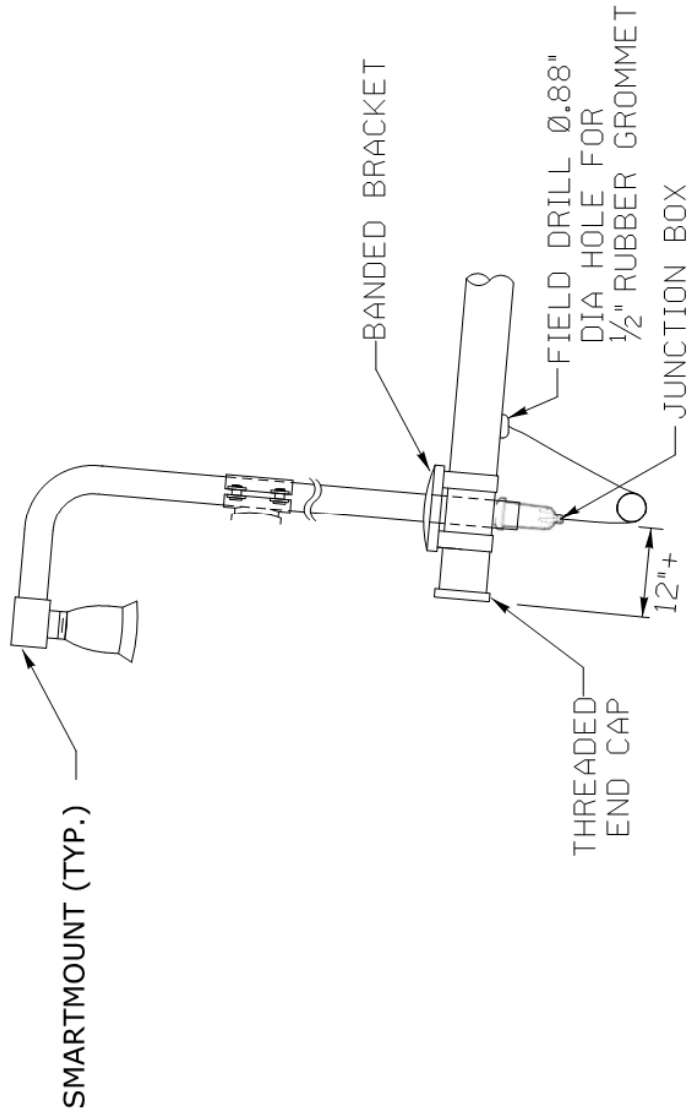
Basis of Payment:

The unit bid price for 360 degree Camera Assembly includes the 360 degree camera, enclosure, vertical riser and hardware used to attach the 360CA to a support structure, documentation, warrantee, labor, tools and equipment necessary to provide the specified video signal to the 360VDP.

The unit bid price for 360 degree Video Detection Processor includes the manufacturers' site survey, unlimited number of any necessary 360VIDS configuration software and license, card rack frame, power supply, all miscellaneous hardware such as PC interface cable with connectors, necessary peripherals such as Ethernet repeater, Ethernet switch, video encoder, Ethernet protection module, documentation, warrantee, labor, tools and equipment necessary to make the 360VIDS fully operational.

The unit bid price for 23 AWG 4 Twisted Pair Category 6 Cable includes all connectors, labor, tools and equipment necessary to install the cable between the 360CA and the 360VDP.

<u>Pay Item</u>	<u>Pay Unit</u>
360 Degree Camera Assembly	Ea.
360 Degree Video Detection Processor	Ea.
23 AWG 4 Twisted Pair Category 6 Cable	LF



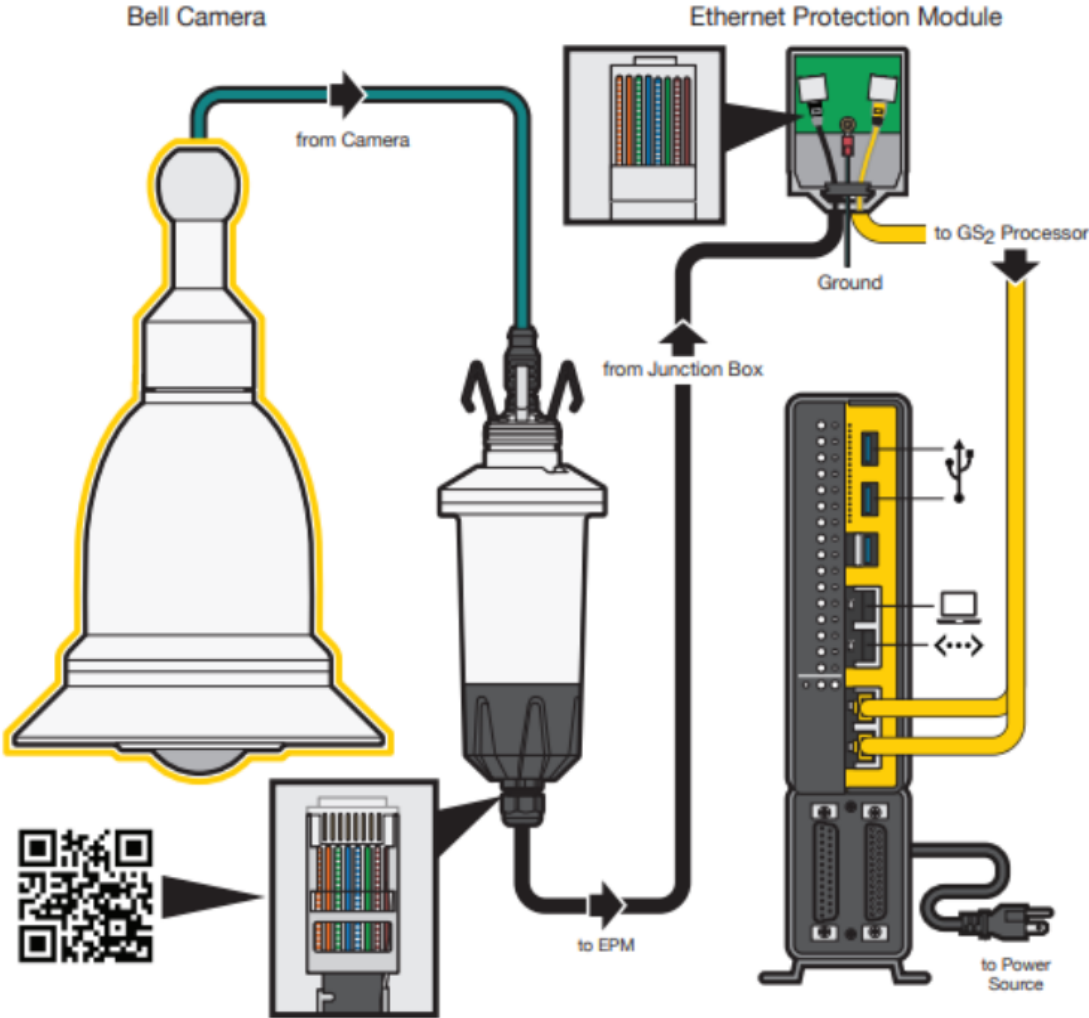
MAST ARM / POLE MOUNT
EXTENSION BRACKET MOUNTING DETAIL

NOTE: TORQUE ALL BOLTS TO MANUFACTURER'S SPECIFICATIONS.

MODEL - \$MODELNAME\$

FILENAME - \$FILEI\$

SYSTEM CONNECTIONS




Pro Tips (Before Beginning Installation):

- Test Bell Camera (while still in foam packaging).
- Make sure unit is grounded correctly.
- Make sure Bell Camera is level and in front of stop bar.
- Check TS1 Wiring Harness Insert – TS1 connection.
- Check "Tool List" in installation guide.

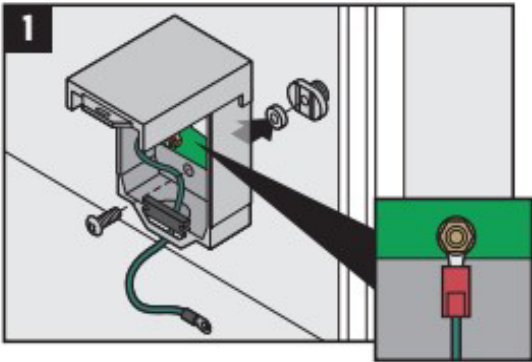
GRIDSMART. INSTALLATION GUIDE

TOOLS AND ITEMS NEEDED

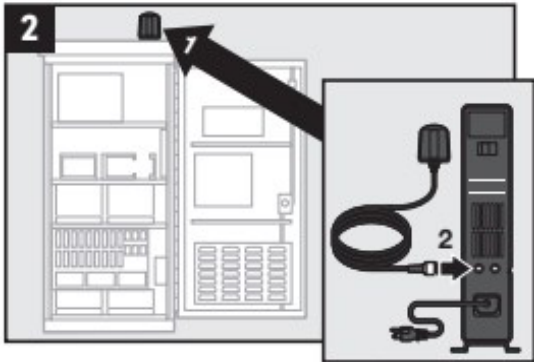
- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> • 7/16" Wrench • 1/2" Wrench • 3/4" Wrench • 1/4" Wrench • 3/32" Wrench • 17 mm Wrench • Utility knife • Phillips screwdriver | <ul style="list-style-type: none"> • Flat-head screwdriver • 1/2" Drill bit • 5/32" Allen wrench (included) • Mounting bracket • CAT5e test cable • 24AWG Shielded CAT5e cable • RJ-45 Crimper • Laptop (with GRIDSMART Client installed) | <ul style="list-style-type: none"> • EXO Crimp frame • Ground wire clamp (included) • USB flash drive • Cable tester • Hand level | <ul style="list-style-type: none"> • DLG Di-120b Tester  |
|--|---|--|--|

BEFORE INSTALLATION

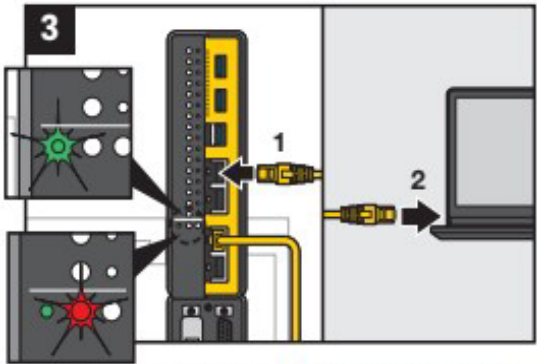
Helpful tip: On your laptop, verify that the GRIDSMART Client is updated to the latest software version. Download the latest update from GRIDSMARTCloud.com.



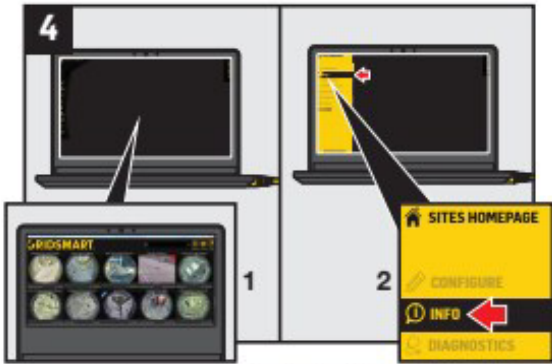
Install EPM onto cabinet DIN rail on opposite side from power distribution. Cut along rubber grommet "X". Connect 10AWG ground wire as close to ground rod as possible using ground wire clamp.



Mount Antenna to top of cabinet using 1/2" drill bit. Connect CELL Antenna lead to female connector on back of Processor.



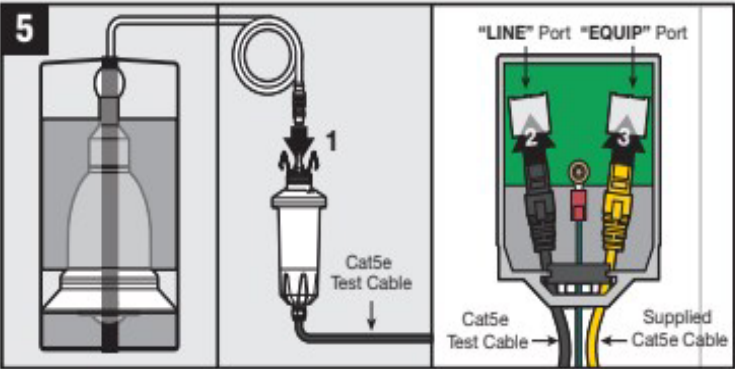
Connect Processor to power source and power on (status light turns green in 2-3 minutes). **DO NOT USE A GFCI TYPE OUTLET.** Connect laptop to "LAPTOP" port on Processor with a CAT5e cable.



Launch GRIDSMART Client on laptop. Select factory default site card. Select "Info", verify "Site Info" version.

NOTE: The Bell Camera has not yet been connected, so there will be no Camera image.

BEFORE INSTALLATION (continued)

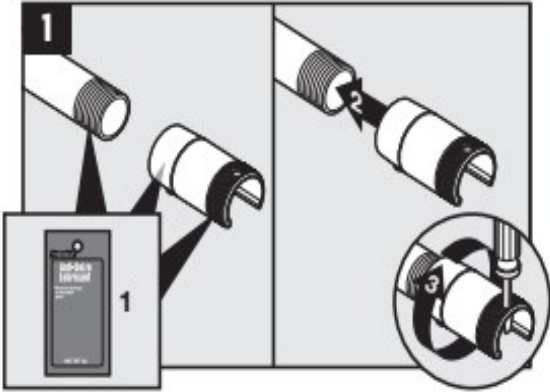


With Bell Camera in foam packaging, connect Camera cable to Junction Box upper connection. Connect one end of CAT5e test cable to Junction Box lower connection and remaining end to the EPM Module "LINE" port. Connect one end of supplied CAT5e cable to EPM Module "EQUIP" port and remaining end to Processor. Verify Bell Camera image. Camera status light turns green in 2-3 minutes.

After successful equipment test, disconnect cables to Junction Box, EPM, Processor and laptop. Leave cable connected to Bell Camera.

INSTALLATION

Helpful tip: Before proceeding, route 24 AWG gel-filled, shielded, burial grade CAT5e cable from traffic cabinet to the Bell Camera mounting location.



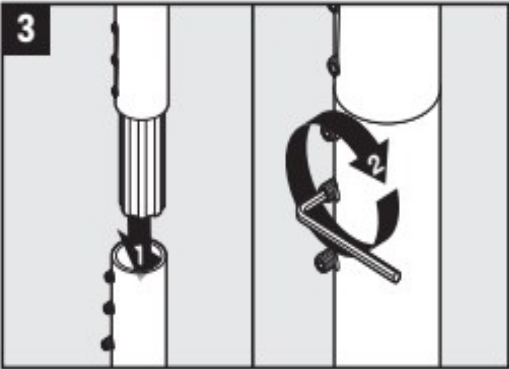
Apply anti-seize to 3' elbow and internal and external threads of SMARTMOUNT body. Install SMARTMOUNT body to upper end of 3' elbow turning clockwise to secure.

NOTE: SMARTMOUNT body opening must be facing down in final position. Tighten center set screw.

2

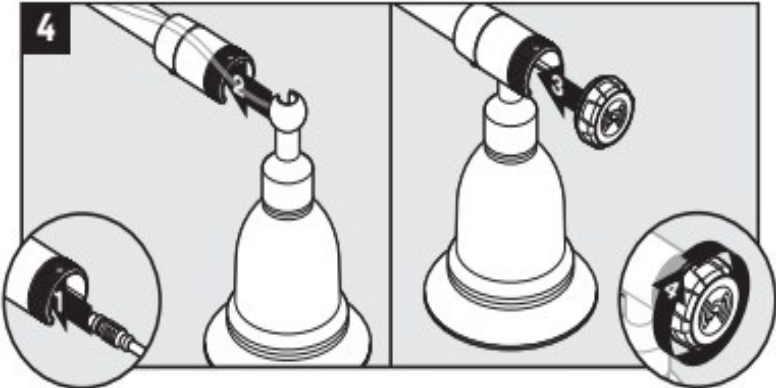
Take 7' extension pole, 3' elbow/SMARTMOUNT body/Bell Camera assembly in bucket above the road.

Install 7' extension pole to mounting bracket (follow mounting bracket instructions).



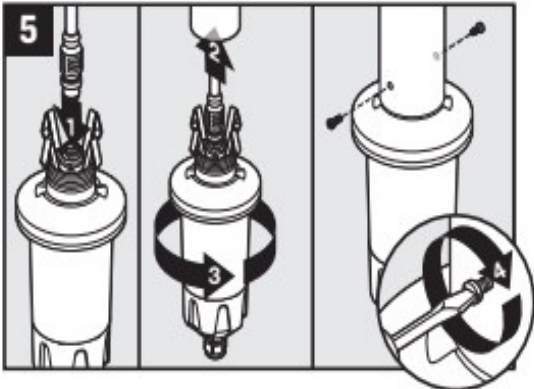
Insert 3' elbow connector into 7' extension using pole connector. Tighten screws with Allen wrench to secure.

INSTALLATION (continued)

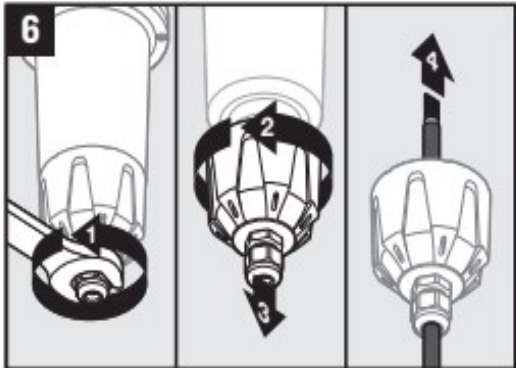


Feed Bell Camera cable through SMARTMOUNT body, 3' elbow and 7' pole extension. Slide Bell Camera ball joint into SMARTMOUNT body, being sure the ball joint opening is well aligned with body/pole opening so as not to damage cable.

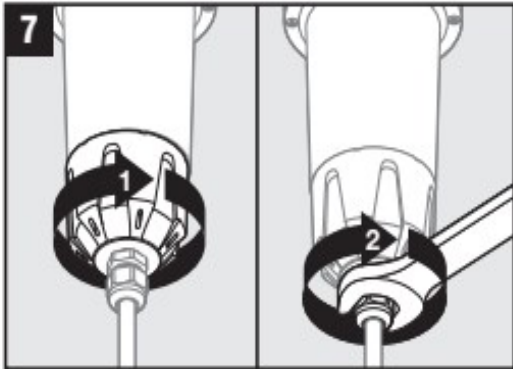
Secure Bell Camera to SMARTMOUNT body with cap. Turn cap clockwise to tighten.



Connect Bell Camera cable from 7' extension to junction box upper connection. Insert Junction Box (turning counter clockwise up to three times to prevent kinking or binding of cable) into 7' extension pole. Install Junction Box set screws to 7' extension pole to secure Junction Box. Tighten with flathead or hexhead screwdriver.

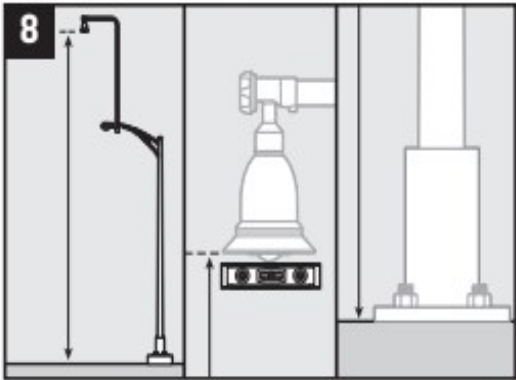


Using a 3/4" wrench, loosen cord grip from cap on bottom of Junction Box. Loosen cap and remove from Junction Box. Push unterminated field cable through cord grip and cap. **Do not tighten cord grip until step 7.** Terminate cable with RJ45, using standard 568B configuration color wiring.



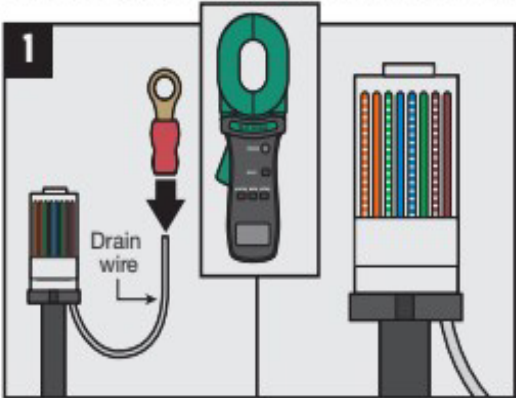
Connect the RJ45 to receptacle and replace cap onto Junction Box (hand-tighten) until fully closed. Tighten cord grip using a 3/4" wrench, to 30 in-lbs max torque.

INSTALLATION (continued)

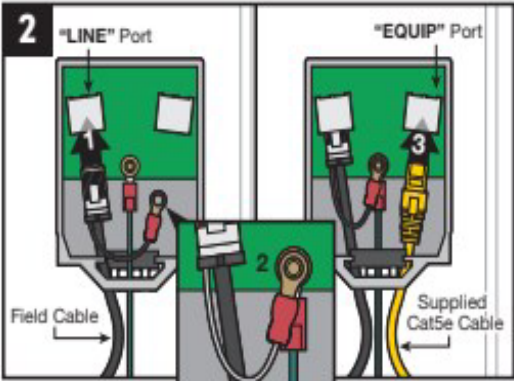


VERY IMPORTANT
 Using a tape measure, measure height of Bell Camera. Record the height for use later to set up system. Orient the "G" logo away from area of consequence, level the Bell Camera and tighten the center set screw.

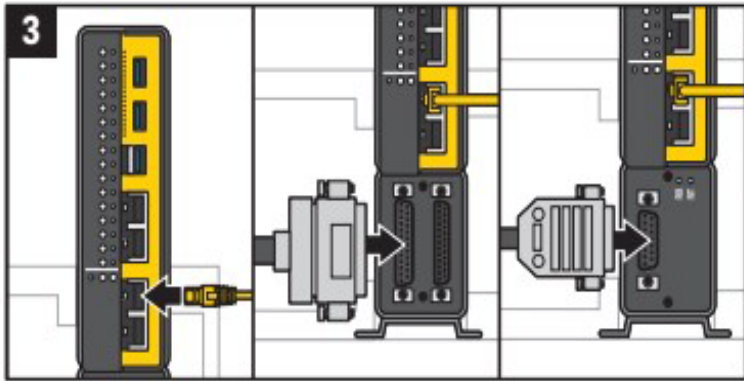
GROUNDING AND FINAL INSTALLATION



Crimp an RJ45 onto remaining end of field cable and verify with cable tester. Crimp the ring terminal to the CAT5e cable drain wire. Verify good crimp on drain wire ring terminal.



Connect field cable to EPM "LINE" port. Connect drain wire ring terminal to the EPM ground to eliminate signal noise and EMI. Connect supplied CAT5e cable EPM "EQUIP" port.



Connect supplied CAT5e to Processor "CAMERA" port. Reconnect the laptop to the "LAPTOP" port. Connect TS1, TS2 or ITS wiring harness to Processor.

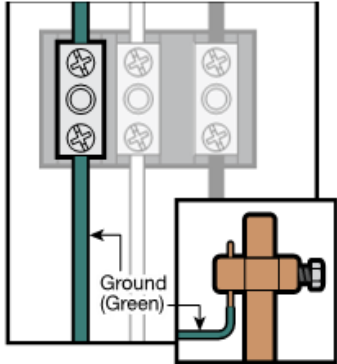
GRIDSMART[®] QUALITY BEST PRACTICES

1 CABINET GROUNDING

A proper cabinet ground helps mitigate interference from electrical noise at the intersection.

- The U.S. National Electrical Code (NEC) recommends a maximum of 25 ohms for touch safety and telecommunications; PLC industry standards require a maximum of 5.0 ohms for logic reference purposes.
- Use a clamp-on ground meter to verify the cabinet ground.
- GRIDSMART requires the Diligent Instruments DLG Di-120b Tester (<http://www.diligentinstruments.com/di-120.html>).
- If the ground reading is higher than the recommended NEC value, check the connection between the cabinet ground wire and the ground rod for corrosion; clean if corrosion is present. If you are in an area with poor grounds, you may need to add a ground rod to the grounding system to improve the ground.

SPECIFICATION:	25 Ohms Max
MEASURED:	



DLG Di-120b Tester

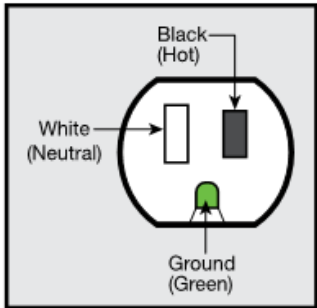


2 AC POWER

Plug the GRIDSMART Processor into an outlet on the filtered side of the cabinet power. Do not use GFCI type outlet.

- The outlet needs to be checked to verify that all three connections for the outlet are properly connected.
- Using a digital voltmeter (DVM), check the ac voltage from the line to the neutral and the line to ground. Both readings should be ~ 120/240VAC.

SPECIFICATION:	HOT/NEU: 120/240VAC HOT/GND: 120/240VAC
MEASURED:	HOT/NEU: HOT/GND:



GRIDSMART.

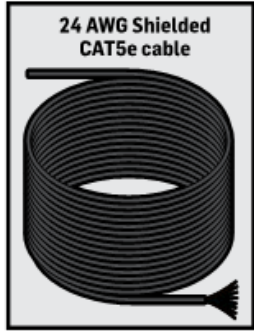
GRIDSMART Support 866.652.5347

3 CABLE TYPE & LENGTH

All GRIDSMART installations require burial grade, shielded, gel filled, CAT5e cable with solid core 24 AWG conductors. The shield will protect the data signals from radiated noise which is present in most intersections. LED streetlights have been found to be very noisy electrically and as more streetlights are switched to LED lights, the level of radiated noise will increase. The cable that GRIDSMART supplies and requires for all installations is Vertical Cable part #059-487/S/CMXF.

- The maximum length that a segment of CAT5e can be is 300 feet. If the distance from the EPM to the camera is more than 300 feet, a repeater (RBA) must be used.
- When determining length of the cable, a cable tester that measures the length of the cable is required. Do not rely on sight distance or "walking off" the distance.
- Many times, there are service loops in the pull boxes and at the base of the pole, which will not be accounted for when you do not use a meter for measuring the cable length. GRIDSMART recommends the Triplet Real World Certifier (www.triplett.com/shop/real-world-certifier-rwc1000k/) for testing the cable. The tester will provide length measurements as well as cable quality measurements.

SPECIFICATION:	Cable Length: 300 Ft Max Real World Certification: 100 MB Min Cable Type: Vertical Cable part #059-487/S/CMXF
MEASURED:	Cable Length: Real World Certification: Cable Type:



Triplet Real World Certifier



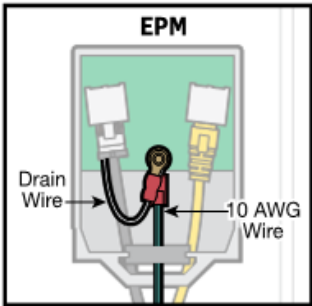
4 CONNECT DRAIN WIRE

The drain wire for the shielded CAT5e cable must be connected to the ground post in the EPM (Ethernet Protection Module). A crimp lug should be attached to the end of drain wire to attach it to the ground post. The drain should only be connected at the EPM end of the cable.

- If you are using an RBA, the drain must be spliced so the drain is continuous from the junction box to the EPM. A 10 AWG Wire is required to connect the EPM ground post to the traffic cabinet ground rod.
- Using a digital voltmeter, you should measure 0 Ohms between the EPM Ground Post and the traffic cabinet ground rod.

SPECIFICATION:	0 Ohms
MEASURED:	

Intersection:	
Camera Serial Number:	
GS₂ Processor Serial Number:	



ITEM #1113511A – RELOCATE RAILROAD PRE-EMPTION CABLE (SITE NO. 1)

Description:

The signalized intersection of Water Street at Governor Winthrop Boulevard and Ferry Street operates as part of an existing railroad pre-emption system, as shown on the plans. When a train enters the track circuit, the Railroad provides immediate pre-emption to the traffic signal controller cabinet via a hard-wire connection to the existing traffic signal controller cabinet.

Under this item, the Contractor shall disconnect the existing railroad pre-emption cable from the existing traffic signal controller cabinet and reconnect in the new controller cabinet to maintain the existing railroad pre-emption operation as indicated on the plans.

This work must be completed under supervision of Amtrak - National Railroad Passenger Corp. (Amtrak) to ensure minimal disruption to the railroad pre-emption system.

Construction Methods:

The location of existing railroad pre-emption cable are not shown on the plans. The Contractor shall be responsible for field verifying the location of the existing railroad pre-emption cable prior to starting this work.

After field verifying the location of existing railroad pre-emption cable, the Contractor must submit a schedule and procedure to switch the railroad pre-emption cable over to the new traffic signal controller for review by the City of New London and Amtrak. The Contractor shall not be allowed to perform any work that may interfere with operation of this railroad pre-emption system until the schedule and procedure is approved by the City of New London and Amtrak in writing.

Upon receipt of approval from the City of New London and Amtrak, the contractor shall disconnect the existing pre-emption cable from the existing traffic signal controller cabinet and reconnect in the new controller cabinet as described below:

1. Disconnect the pre-emption cable from the existing traffic signal controller cabinet and pull it back to the nearest handhole/manhole beyond the area of construction.
2. Relocate and extend the existing rigid metal conduit and/or install new rigid metal conduit and handholes as directed by the Engineer to connect to the new traffic signal controller foundation.
3. Clean the existing rigid metal conduit if needed for installation of interconnect. Cleaning the existing conduit must first be approved by the Engineer as noted under Item #1008908A.
4. Re-install the pre-emption cable through the existing and/or new rigid metal conduit and reconnect the interconnect cable to the new traffic signal controller. The cable must be installed continuously between each cabinet. Splicing shall be allowed only with prior approval in writing by the City of New London and Amtrak.

- 5. If the existing railroad pre-emption cable is too short to reach the new traffic signal controller cabinet, then the Contractor shall notify the Engineer. Upon approval by the Engineer, the Contractor shall install a new 14/5 cable continuously between each cabinet.

Upon completion of the above work, the Contractor shall coordinate with Amtrak to test the operation of the railroad pre-emption system.

Method of Measurement:

This work will be measured as Lump Sum when all relocation work shown on the plans is completed and the railroad pre-emption cable is in the permanent location and the railroad pre-emption system at each intersection is reestablished and tested.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for “Relocate Pre-Emption Cable (Site No. 1)”. This price includes all materials, tools, equipment, labor, and work incidental to relocate and reinstall the existing railroad pre-emption cable to maintain the existing operation of the railroad pre-emption system. This price shall also include field locating the existing railroad pre-emption cable and testing the system after relocation.

Installation of new conduit, handholes, and 14/5 cable shall be paid under the applicable items. Cleaning existing conduit shall be paid under Item #1008908A – Clean Existing Conduit.

Coordination with Amtrak shall be considered incidental to the project. No claim for additional compensation will be allowed for the work required to, or that results from, work to coordinate with Amtrak.

<u>Pay Item</u>	<u>Pay Unit</u>
Relocate Railroad Pre-emption Cable (Site No. 1)	LS

ITEM # 1116100A – INTERNALLY ILLUMINATED SIGN (LED)

Description:

This item shall consist of furnishing and installing Internally Illuminated Signs at the locations shown on the plans, or as directed by the Engineer, and in accordance with these specifications.

Materials:

Illuminated Signs using LED technology shall conform to the following requirements:

General:

- Symbol and/or Text as Shown on plans.
- Comply with current MUTCD standards.
- Size: As shown on the plans.
- Weight: not more than 10-lbs./ square ft. including frame.
- Operational between -40 degrees F (-40 C) to 160 degrees F (74 C).
- Warrantee:
 - Includes shipping to and from manufacturer.
 - Start date is final acceptance date.
 - Defects: 2 years.
 - LED light source: 5 years.
 - Power Supply: 2 years.

Housing:

- Frame: Extruded 6063-T6 aluminum.
- All brackets and hardware shall be painted BLACK by the manufacturer. The color shall be No. 37038, Federal Standard No. 595.
Minimum 4 weep holes in bottom.
- Removable visor to prevent sun reflection. Outside powder coated to match frame. Inside powder coated flat black.
- Stainless steel external mounting hardware and internal hardware.
- Cable entrance designed to prevent entrance of dirt, moisture, & insects.
- Clearly stamp, etch or permanently mark on the housing the following information:
 - Manufacturer & model number.
 - Date of manufacture.
- Backcover: UV (Ultraviolet) stabilized black polycarbonate or ABS plastic.
- Face: UV stabilized clear, vandal resistant, non-glare, polycarbonate or lexan.

Optical Unit:

- Blank out. Not legible when not illuminated.
- Clearly legible in direct sunlight when illuminated.
- LED light sources that comply with current CT Department of Transportation specifications and with current ITE specifications.
- Intensity degradation no more than 10% per year.
- Extended view. Visible cone not less than 20 degrees.
- Text and symbol size as shown on the plans.
- Symbol color: as required or as shown on plans.
- Text color: White against black background.

Electrical:

- Parallel circuit designed so loss of 5% of individual LED light sources does not compromise legend or message.
- Operating voltage: 12VDC.
- Maximum power requirement: 100 Watts.
- External power supply mounted in controller cabinet.
 - Off-the-shelf type with readily available replacement components.
 - Designed to protect LED's from electrical surges and transient voltages.
 - Sufficient VA rating to continuously operate minimum two signs.

Construction Methods:

Erection of the Internally Illuminated Sign shall be accomplished in a manner so as not to cause twisting, bending, deforming, or scratching of the sign or sign face. Signs shall be level, correctly aligned as indicated on the plans and shall be properly fastened to the mast arm with the necessary hardware.

Method of Measurement:

This work is measured for payment by the number of Internally Illuminated Signs, of the type and size specified, completed in place, accepted, and operating.

Basis of Payment:

This work shall be paid for at the Contract unit price each for “Internally Illuminated Sign (LED)” complete in place, which price shall include mounting brackets, hardware, fitting, snap switch, all materials, equipment, paint, tools, labor, and work incidental thereto. Cable to the sign shall be paid under the applicable item.

<u>Pay Item</u>	
Internally Illuminated Sign (LED)	

<u>Pay Unit</u>
EA

ITEM #1118012A – REMOVAL AND/OR RELOCATION OF TRAFFIC SIGNAL EQUIPMENT

Section 11.18: Replace the entire section with the following:

11.18.01 – Description:

Remove all abandoned traffic signal equipment. Restore the affected area. Where indicated on the plans remove and reinstall existing traffic signal equipment to the location(s) shown.

Lead paint is presumed present on the painted surface of all cabinets and structures located within project limits. Any activities performed by the contractor that results in a painted surface being impacted or altered, shall be performed in accordance OSHA Lead in Construction Standard 29CFR 1926.62, or the painted surface shall be tested prior to any paint being disturbed by a qualified third party hired by the contractor to confirm that no lead is present.

11.18.02 – Materials:

The related sections of the following specifications apply to all incidental and additional material required for the proper relocation of existing equipment and the restoration of any area affected by this work.

- Division III, “Materials Section” of the Standard Specifications.
- Current Supplemental Specifications to the Standard Specifications.
- Applicable Special Provisions to the Standard Specifications.
- Current Department of Transportation, Functional Specifications for Traffic Control Equipment.

Article 11.18.03 - Construction Methods:

Schedule/coordinate the removal and/or relocation of existing traffic signal equipment with the installation of new equipment to maintain uninterrupted traffic signal control. This includes but is not limited to vehicle signals and detectors, pedestrian signals and pushbuttons, co-ordination, and pre-emption.

Abandoned Equipment

The contract traffic signal plan usually does not show existing equipment that will be abandoned. Consult the existing traffic signal plan for the location of abandoned material especially messenger strand, conduit risers, and handholes that are a distance from the intersection. A copy of the existing plan is usually in the existing controller cabinet. If not, a plan is available from the Division of Traffic Engineering upon request.

Unless shown on the plans it is not necessary to remove abandoned conduit in-trench and conduit under-roadway

When a traffic signal support strand, rigid metal conduit, down guy, or other traffic signal equipment is attached to a utility pole, secure from the pole custodian permission to work on the pole. All applicable Public Utility Regulatory Authority (PURA) regulations and utility company requirements govern. Keep utility company apprised of the schedule and the nature of the work. Remove all abandoned hardware, conduit risers, and down guys, Remove anchor rods, to 6” (150mm) below grade.

When underground material is removed, backfill the excavation with clean fill material. Compact the fill to eliminate settling. Remove entirely the following material: pedestal foundation; controller foundation; handhole; pressure sensitive vehicle detector complete with concrete base. Unless otherwise shown on the plan, remove steel pole and mast arm foundation to a depth of 2 feet (600mm) below grade. Restore the excavated area to a grade and condition compatible with the surrounding area.

- If in an unpaved area apply topsoil and establish turf in accordance with Section 9.44 and Section 9.50 of the Standard Specifications.
- If in pavement or sidewalk, restore the excavated area in compliance with the applicable Sections of Division II, “Construction Details” of the Standard Specifications.

Relocated Equipment

In the presence of the Engineer, verify the condition of all material that will be relocated and reused at the site. Carefully remove all material, fittings, and attachments in a manner to safeguard parts from damage or loss. Replace at no additional cost, all material which becomes damaged or lost during removal, storage, or reinstallation.

Salvage Equipment

The City of New London will retain the existing controller cabinet and all existing aluminum pedestals.

In the presence of the Engineer, verify the condition and quantity of salvage material prior to removal. After removal, transport and store the material protected from moisture, dirt, and other damage.

Within 4 working days of removal, return the City owned pedestals and controller cabinet to the City of New London. Supply all necessary manpower and equipment to load, transport, and unload the material. The condition and quantity of the material after unloading will be verified by the Engineer.

Contact Brian Sear at bsear@newlondonct.org or 860-447-5250 or Thomas Quintin at tquintin@newlondonct.org or 860-447-5241 to coordinate delivery of the salvage equipment.

All material not listed as salvage becomes the property of the Contractor; which assumes all liabilities associated with material’s final disposition.

Article 11.18.04 – Method of Measurement:

This work will be measured as a Lump Sum.

Article 11.18.05 – Basis of Payment:

This work will be paid for at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” which price shall include relocating signal equipment and associated hardware, all equipment, material, tools and labor incidental thereto. This price shall also include removing, loading, transporting, and unloading of signal equipment/materials designated for salvage and all equipment, material, tools and labor incidental thereto. This price shall also include removing and disposing of traffic signal equipment not to be salvaged and all equipment, material, tools and labor incidental thereto.

Payment is at the contract lump sum price for “Removal and/or Relocation of Traffic Signal Equipment” inclusive of all labor, vehicle usage, storage, and incidental material necessary for the complete removal of abandoned equipment/material and/or relocation of existing traffic signal equipment/material. Payment will also include the necessary labor, equipment, and material for the complete restoration of all affected areas.

A credit will be calculated and deducted from monies due the Contractor equal to the listed value of salvage material not returned or that has been damaged and deemed unsalvageable due to the Contractor’s operations.

Pay Item	Pay Unit
Removal and/or Relocation of Traffic Signal Equipment	L.S. (L.S.)

ITEM # 1118051A – TEMPORARY SIGNALIZATION (SITE NO. 1)

Description:

Work under this item shall consist of providing Temporary Signalization (TS) at the project intersection during construction.

This item also consists of temporary signalization to assist utility companies in relocating overhead utility lines. Utility companies must raise existing overhead utility lines on the east side of Ferry Street to provide necessary overhead clearance for installation of a proposed steel mast arm to be installed by the Contractor. An existing traffic signal mast arm located on the east side of Ferry Street passes through these overhead utility lines above the communication cables and below the power cables. The Contractor will be responsible for coordinating with utility companies during construction and temporarily removing this existing mast arm so that the utility companies can raise the existing communication cables. Once the utility companies have completed shifting the overhead utility lines, the Contractor must restore full operation of the traffic signal.

The Contractor shall keep the traffic signal and railroad pre-emption system completely operational at all times during construction through the use of existing signal equipment, temporary signal equipment, new signal equipment, or any combination thereof once TS has started as noted in the section labeled “Duration.”

Materials:

- Pertinent articles of the Standard Specifications
- Supplemental Specifications and Special Provisions contained in this contract

Construction Methods: The Contractor shall perform a Preliminary Inspection and submit a Temporary Signalization (TS) Plan as described herein. No physical work will be allowed at any location until the requirements of the Preliminary Inspection and Temporary Signalization (TS) Plan have been met.

1. Preliminary Inspection

Prior to beginning any physical work, the Contractor shall meet with the Engineer and a representative from the City of New London, to inspect and document (for the Engineer’s concurrence) the existing traffic signal’s physical and operational condition prior to implementing any Temporary Signalization (TS.) The inspection shall include, but not be limited to, the condition of the following:

- Controller Assembly (CA)
 - Controller Unit (CU)
 - Detection Equipment
- Vehicle and Pedestrian Signals
- Vehicle and Pedestrian Detectors
- Railroad pre-emption system
- Support Structures
- Handholes, Conduit and Cable

It may be necessary to repair or replace equipment that is missing, damaged, or malfunctioning. The Contractor shall prepare a list of items for replacement or repair. If authorized by the Engineer, this work will be considered “Extra Work” under Article 1.09.04.

The Preliminary Inspection meeting shall also include discussion of potential utility conflicts according to the *Utilities* section under *TS Plan* below.

2. Temporary Signalization (TS) Plan

At least 30 days prior to implementation of each stage, the Contractor shall submit a 1:40 (1:500 metric) scale TS plan in pdf format for each location to the Engineer for review and comment. This TS Plan shall include, but not be limited to the following:

- Survey Ties
- Dimensions of Lanes, Shoulders, and Islands
- Slope Limits
- Clearing and Grubbing Limits
- Signal Phasing and Timing
- Location of Signal Appurtenances such as Supports, Signal Heads, Pedestrian Push buttons, Pedestrian Signals
- Location of Signing and Pavement Markings (stop bars, lane lines, etc.)
- Location, method, and mode of Temporary Detection
- Location of utilities and potential conflicts

Review of the TS plan does not relieve the Contractor of ensuring the TS meets the requirements of the MUTCD. The existing traffic signal plan of record is available from the City of New London upon request.

It is acceptable to use the existing traffic signal plan as the TS plan by marking up the existing plan to show any needed changes.

The Contractor shall not implement the TS plan until all review comments have been addressed.

The TS Plan shall also address the following elements:

Earthwork

The Contractor shall perform the necessary clearing and grubbing and the grading of slopes required for the installation, maintenance, and removal of the TS equipment. Upon termination of the TS, the Contractor shall restore the affected area to its prior condition and to the satisfaction of the Engineer.

Maintenance and Protection of Traffic

The Contractor shall furnish, install, maintain, relocate, and remove signal-related signing (lane-use, signal ahead, NTOR, etc.), and pavement markings, as needed.

The Contractor shall install, relocate, or remove, equipment in a manner to cause no hazard to pedestrians, traffic or property. The Contractor shall maintain traffic as specified in the Special Provisions “Prosecution and Progress” and “Maintenance and Protection of Traffic” in the Contract.

Utilities

The Contractor shall verify that proposed temporary and/or relocated signal equipment will not conflict with proposed project utility relocations. The Contractor shall ensure that temporary span/temporary poles will not restrict the ability to shift utility cables off of the poles.

The Contractor shall coordinate its TS activities with Amtrak and all utility companies in the project area to ensure that the proposed temporary and/or relocated signal equipment will not be in conflict with existing utilities. The Contractor shall coordinate any utility work that may be needed prior to the Contractor implementing the TS plan.

Electrical Service and Telephone Service at Existing Signalized Intersections

The Contractor shall be responsible for relocating and changing any electrical service or telephone service source if required. Any arrangements with these companies and costs associated with any relocation or change shall be paid for by the Contractor. The Contractor shall ensure that the party previously responsible for the monthly payment of service shall continue to be responsible for that payment during TS.

Temporary Signalization

The Contractor shall furnish, install, maintain, relocate, and remove existing, temporary, and proposed traffic signal equipment and all necessary hardware; modifications to or furnishing of a new CA; and reprogramming of the CU phasing and timing; and any other incidentals related to this TS, as many times as necessary for each stage/phase of construction to maintain and protect traffic and pedestrian movements as shown on the plans or as directed by the Engineer.

Inspection

When requested by the Engineer, the TS will be subject to a field review by a representative of the Division of Traffic Engineering and/or the Town, The Contractor shall revise the TS as needed to address comments.

Detection

The Contractor shall provide vehicle detection on the existing, temporary, and/or new roadway alignment for all intersection approaches that have existing detection, detection in the final condition as shown on the signal plan, or as directed by the Engineer. The Contractor shall keep existing pedestrian pushbuttons accessible and operational at all times during TS. Temporary Detection is described and is paid for under Item # 1111201A - Temporary Detection (Site No. 1)

Maintenance

Once TS is in effect, the Contractor shall assume all maintenance responsibilities of the entire installation in accordance with Section 1.07.12 of the Standard Specifications. The Contractor shall notify the Engineer for the project records the date that Temporary Signalization begins. The Contractor shall coordinate with the Engineer to notify the following parties that maintenance responsibility has been transferred to the Contractor:

City of New London Police Department
City of New London Public Works Department

The Contractor shall provide the Engineer a list of telephone numbers of personnel who will be on-call during TS and shall respond to traffic signal malfunctions by having a representative at the site within three hours from the initial contact. Any traffic signal malfunction shall be made operational according to plan within twenty-four (24) hours.

If the Engineer determines that the nature of a malfunction requires immediate attention and/or the Contractor does not respond within three (3) hours, then an alternate maintenance service will be called to repair the signal. Expenses incurred by the alternate maintenance service for each call will be deducted from monies due to the Contractor with a minimum deduction of \$1,000. The alternate maintenance service may be the owner of the signal or another qualified electrical contractor.

Duration

Temporary Signalization shall commence when the Contractor begins physical work at a particular intersection.

- a) For intersections with a Contractor furnished controller, Temporary Signalization terminates at the beginning of the 30 day test period for the permanent signal.

Ownership

The Contractor shall remove and deliver any existing equipment that is designated as salvage to its original owner upon completion of use. Any temporary equipment supplied by the Contractor shall be removed by the Contractor unless noted otherwise.

Method of Measurement:

Temporary Signalization (TS) shall be measured for payment as follows:

Fifty percent (50%) shall be paid when the TS for that site is operational as shown on the plan and to the satisfaction of the Engineer.

Fifty percent (50%) shall be paid upon termination of the TS as described herein.

Basis of Payment:

This work shall be paid at the contract Lump Sum price for “Temporary Signalization (Site No.)” for each site. This price includes the preliminary inspection, TS plan for each stage/phase, furnishing, installing, maintaining, relocating and revising traffic signal equipment, controller assembly modifications, controller unit program changes such as phasing and timing, removing existing, temporary, and proposed traffic signal equipment, arrangements with utility companies, towns or cities including the fees necessary for electric and telephone service, clearing and grubbing, earthwork and grading, area restoration and all necessary hardware, materials, labor, and work incidental thereto.

All material and work for signing and pavement markings is paid for under the appropriate Contract items.

All material and work necessary for vehicle and pedestrian detection for TS is paid for under item 1111201A - Temporary Detection (Site No. 1).

All Contractor supplied items that will remain the Contractor’s property shall be included in the contract Lump Sum price for “Temporary Signalization.”

Any items installed as part of the permanent installation will be paid for under those separate pay items in the Contract.

<u>Pay Item</u>	<u>Pay Unit</u>
Temporary Signalization (Site No.1)	L.S.

ITEM # 1220000A – PROJECT SIGN

Description:

Work under this item shall consist of installing a project sign at a location directed by the Engineer and maintaining this sign throughout the duration of construction.

Materials:

The materials for the project sign shall meet the following requirements.

Sign Panel:

Signs should be made from suitable materials to perform effectively for a minimum of 3 years. Example of allowable materials include ¾” MDO-EXT-APA Plywood or 0.125-gauge sheet aluminum. The following types of materials shall not be used: mesh, non-rigid, roll-up, corrugated or waffle board types substrates, foam core and composite aluminum sign substrates.

Suitable attachments shall be provided so that the signs can be firmly attached to the sign supports without causing damage to the signs.

Signs may be painted or use non-reflective plastic sheeting. Paint shall be extremely durable, high quality, semi-gloss enamel resistant to air, sun and water. Non-reflective plastic sheeting shall be permanently adhered to the backing. The material shall withstand 3 years’ vertical, south-facing exterior exposure.

Colors:

All letters and symbols shall be blue code #0000FF, rgb (0, 0, 255), pantone 294, or approved equal. Background shall be white code #FFFFFF, rgb (255, 255, 255), or approved equal. If plywood is used for the sign panel, the back of the panel shall be painted matte black.

Typeface: Helvetica Medium

Sign Support:

Sign panels shall be attached to vertical sign support posts. All sign supports shall have breakaway features that meet AASHTO requirements contained in the current “Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals”. The breakaway features shall be structurally adequate to carry the sign panel at 60-mph wind loading. Installation shall be in accordance with the manufacturer’s recommendations. A minimum 2-ft embedment depth below the ground line is required.

Construction Methods:

The signs SHALL be installed parallel to the travelway, so they are NOT easily viewable by drivers, as the signs are not MUTCD compliant and not intended to be roadway signs.

The lateral offset from the edge of road to the face of sign should be 6-12 feet. 12 feet is preferred where space is available for installation. When installed on a trail, the lateral offset should be 2 feet.

The bottom of the sign should be mounted 7 feet above the edge of road.

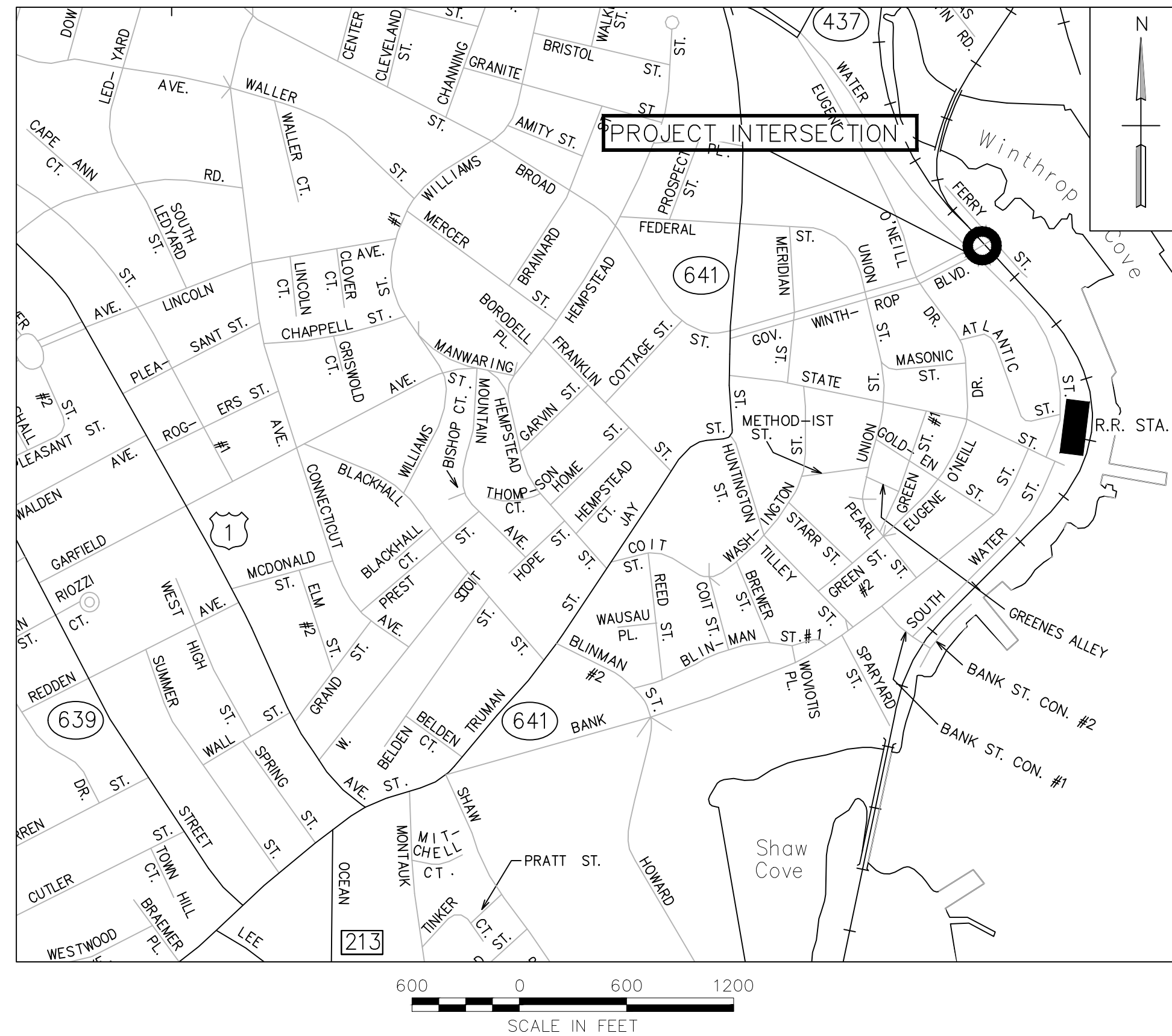
The signs shall be erected for the life of the construction project. This means that they should be erected only after Notice to Proceed has been given to the contractor and should be removed with all other construction related signs at the end of the project considered to be the point that acceptance of the construction work is given.

Method of Measurement:

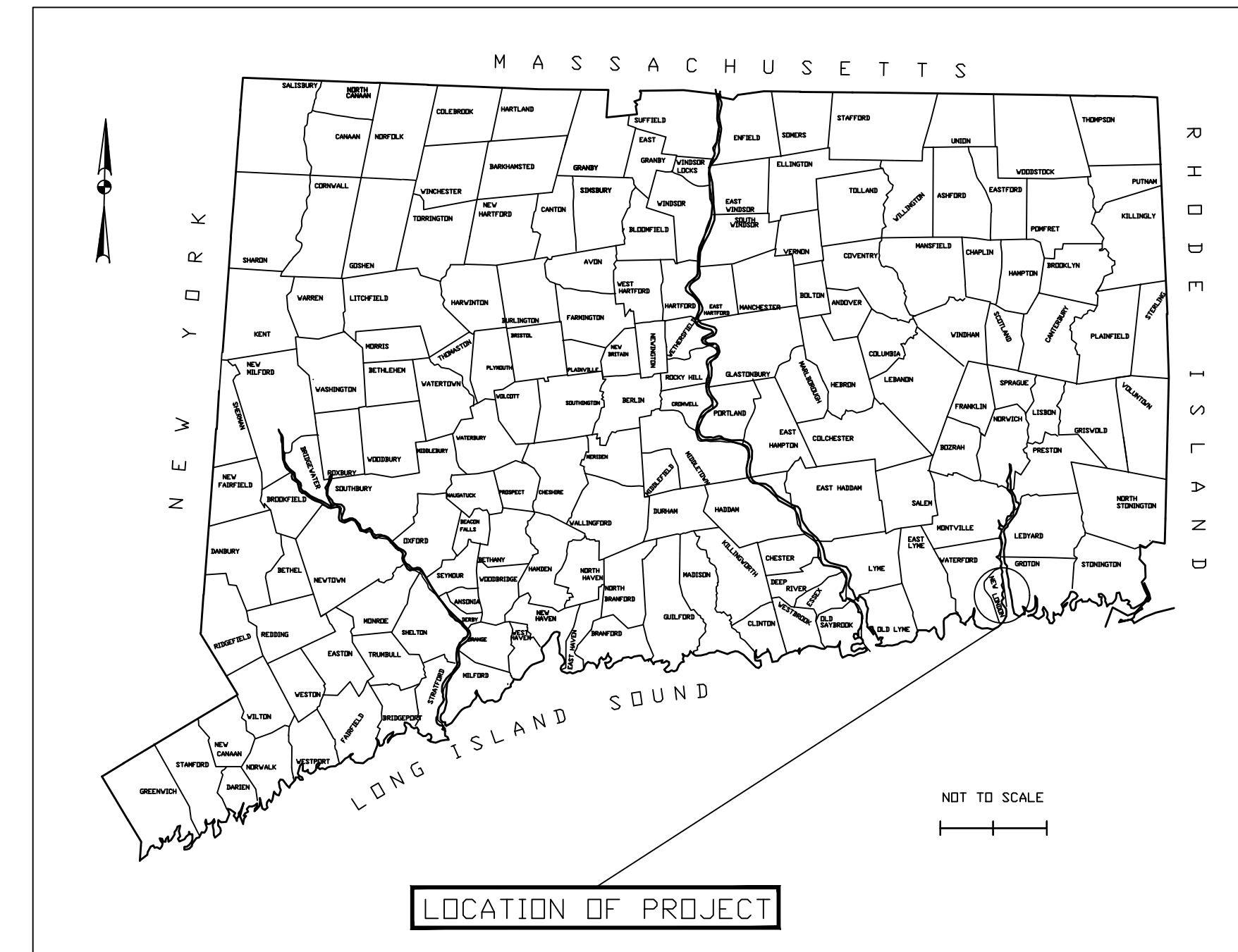
This work shall be measured for payment by the number of Project Signs installed and maintained throughout the duration of construction.

Basis of Payment:

This work shall be paid for at the Contract unit price each for “Project Sign” installed, which price shall include all materials, labor, tools, equipment, and work incidental thereto.



CITY OF NEW LONDON WATER STREET AT GOVERNOR WINTHROP BOULEVARD & FERRY STREET TRAFFIC CONTROL SIGNAL UPGRADE NEW LONDON, CONNECTICUT



CONTRACT INTERSECTIONS :	
1.	WATER STREET AT GOVERNOR WINTHROP BOULEVARD AND FERRY STREET (094-001)

NOVEMBER 2021

**SCALES AS NOTED
TO BE MAINTAINED BY THE CITY OF NEW LONDON**

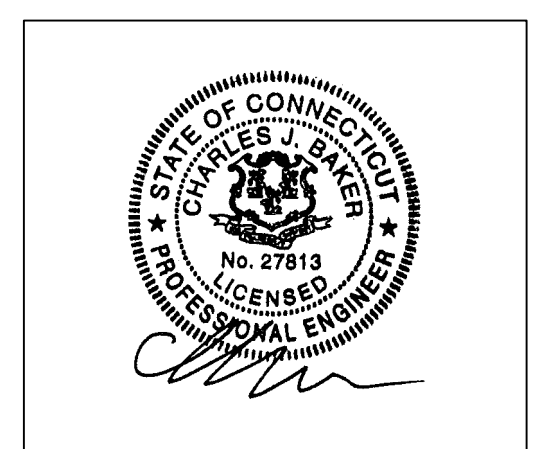
INDEX OF DRAWINGS

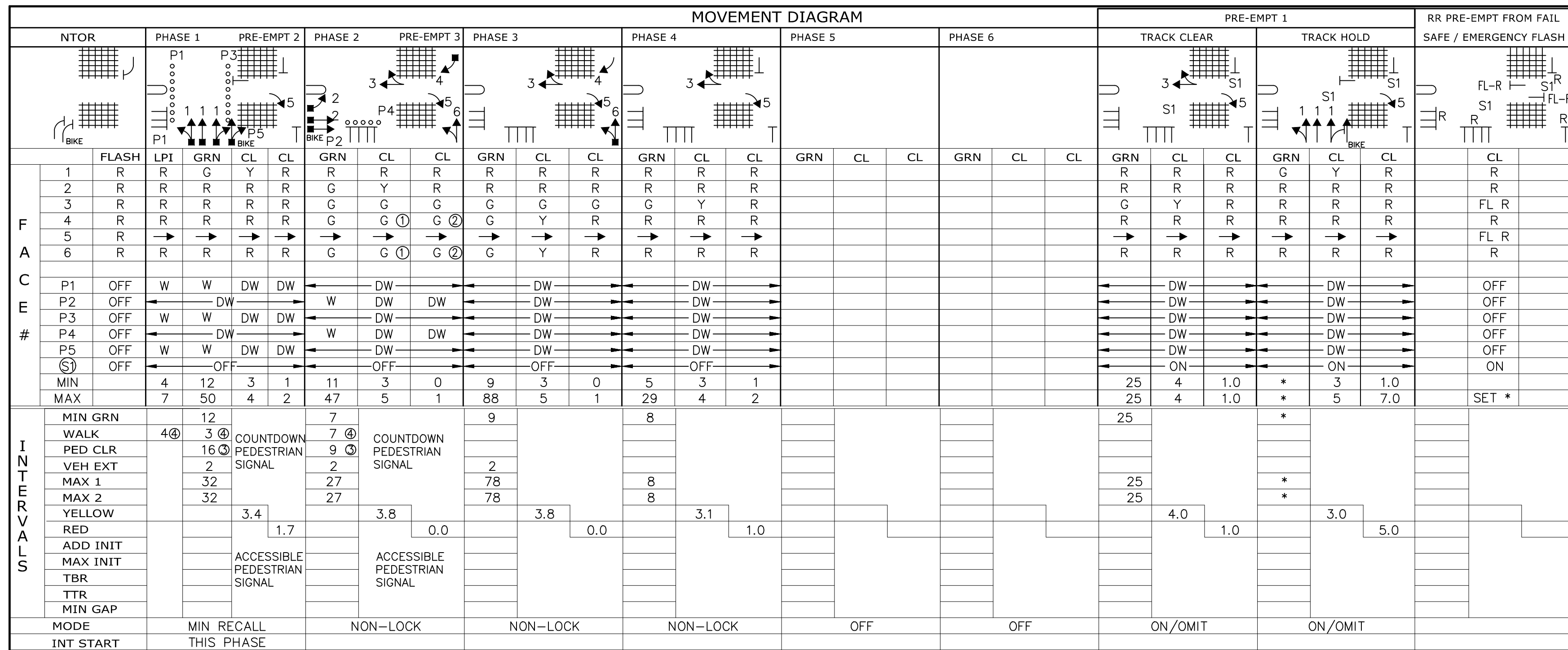
DWG #	DRAWING TITLE	SHEET NO.
-	TITLE SHEET	01
TCS-01 & TCS-02	TRAFFIC CONTROL SIGNAL PLANS	02-03
PLN-01	CONSTRUCTION PLAN	04
SPM-01	PAVEMENT MARKING PLAN	05
MDS-01 TO MDS-08	MISCELLANEOUS DETAILS	06-13

vhb 100 Great Meadow Road, Suite 200
Wethersfield, Connecticut 06109

Charles J. Baker
CHARLES J. BAKER, P.E.

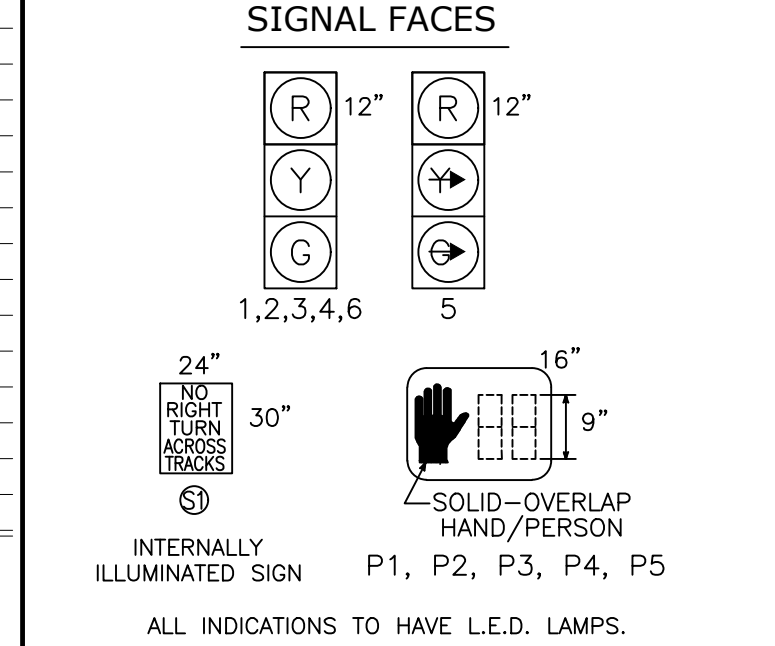
11/11/21
DATE





TECHNICAL NOTES
 STANDARD OVERLAP SKIP FEATURES APPLY
 1 TO BE 'Y' IF PHASE 4 IS NEXT.
 2 TO BE 'R' IF PHASE 4 IS NEXT.
 3 COUNTDOWN ONLY DURING FLASHING PEDESTRIAN CHANGE INTERVAL.
 4 AUDIBLE MESSAGE DURING LPI AND WALK INTERVAL ONLY. MESSAGE SHALL BE AS FOLLOWS:
 P1, P2, P3 - PERCUSSIVE TONE
 P4 - SPEECH WALK MESSAGE - "WATER STREET WALK SIGN IS ON TO CROSS WATER STREET"
 P5 - SPEECH WALK MESSAGE - "FERRY STREET WALK SIGN IS ON TO CROSS FERRY STREET"
 * INTERVAL TO BE DETERMINED BY PRESENCE OF TRAIN.

REV #	OFFICE RECORD
TIR # 094-2103-01	SM # N/A
TRAFFIC CONTROL SIGNAL EQUIPMENT REPLACED.	



- RAILROAD OPERATIONAL NOTES**
 RAILROAD PRE-EMPTION (NORMAL OPERATION)
- RAILROAD PRE-EMPTION DETECTION IS LOCATED AT A POINT 41 SECONDS FROM CROSSING.
 - WHEN THE TRAIN ENTERS TRACK CIRCUIT, R.R. PROVIDES IMMEDIATE PRE-EMPTION CIRCUIT TO THE TRAFFIC SIGNAL CONTROLLER CABINET.
 - THE TRAFFIC SIGNAL CONTROLLER IMMEDIATELY ADVANCES THE SEQUENCE TO THE "TRACK CLEAR" PHASE VIA THE PROPER YELLOW AND RED CLEARANCE INTERVALS.
 - THE TURN RESTRICTION SIGNS WILL BE ILLUMINATED WITH THE TRAFFIC SIGNAL PRE-EMPTION "TRACK CLEAR" PHASE.
 - THE "TRACK CLEAR" PHASE WILL TERMINATE, AND THE TRAFFIC SIGNAL CONTROLLER WILL HOLD IN THE "TRACK HOLD" PHASE.
 - THE R.R. FLASHING LIGHTS, BELL, AND GATES WILL COMMENCE OPERATION 6 TO 11 SECONDS INTO THE "TRACK CLEAR" PHASE DEPENDING ON WHAT INTERVAL THE TRAFFIC SIGNAL CONTROLLER IS IN WHEN THE PRE-EMPTION CALL IS RECEIVED. STANDARD R.R. TIMING FOR LIGHTS, BELL, AND GATES WILL COMMENCE OPERATION A MINIMUM OF 29 SECONDS PRIOR TO THE TRAIN ENTERING THE CROSSING.
 - WHEN THE TRAIN HAS LEFT THE CROSSING AND THE TRACK CIRCUIT, THE TRAFFIC CONTROL SIGNAL SHALL RETURN TO NORMAL OPERATION, PHASE 2.

RAILROAD PRE-EMPTION (FAIL/SAFE FLASH & EMERGENCY FLASH OPERATION)

- TRAIN ENTERS TRACK CIRCUIT - RR PROVIDES IMMEDIATE PRE-EMPTION CIRCUIT TO THE TRAFFIC SIGNAL CONTROLLER CABINET.
- THE FLASHING OPERATION REMAINS FLASHING RED ON ALL APPROACHES EXCEPT SIGNAL HEADS 3 & 5, WHILE SIGNAL HEADS 1,2,4, AND 6 WILL GO TO STEADY RED.
- THE TURN RESTRICTION SIGNS WILL BE ILLUMINATED IMMEDIATELY UPON RECEIPT OF THE RAILROAD PRE-EMPTION CALL.
- THE RR FLASHING LIGHTS, BELL, AND GATES WILL COMMENCE OPERATION 12 SECONDS AFTER THE TRAIN HAS ENTERED THE TRACK CIRCUIT. STANDARD RR TIMING FOR BELL, LIGHTS AND GATES WILL COMMENCE A MINIMUM OF 29 SECONDS PRIOR TO THE TRAIN ENTERING THE CROSSING.
- WHEN THE TRAIN HAS LEFT THE CROSSING AND THE TRACK CIRCUIT, THE TRAFFIC CONTROL SIGNAL SHALL RETURN TO FLASHING RED ON ALL APPROACHES, AND THE TURN RESTRICTION SIGNS ARE DEACTIVATED.

PRE-EMPTION SETTINGS

	PRE-EMPT 1	PRE-EMPT 2	PRE-EMPT 3
PRIORITY	YES	NO	NO
DET. LOCK	YES	YES	YES
DELAY	0	0	0
ALT. MIN. GRN	0	5	5
ALT. YELLOW	PARENT	PARENT	PARENT
ALT. RED	PARENT	PARENT	PARENT
ALT. PED. CLR.	0	16	9
TRACK CLR GRN	25	---	---
TRACK CLR YLW	4.0	---	---
TRACK CLR RED	1.0	---	---
TRACK CLR PHASE	7	---	---
HOLD GREEN	*	12	7
HOLD YELLOW	3.0	3.4	3.8
HOLD RED	5.0	1.7	0
HOLD PHASE	8	1	2
EXIT PHASE	2	2	3
EXIT CALL	NONE	NONE	NONE

TECHNICAL NOTES (CONTINUED)
 EMERGENCY VEHICLE PRE-EMPTION TO BE INOPERATIVE DURING RAILROAD PRE-EMPTION AND RAILROAD PRE-EMPTION FROM FAIL SAFE/EMERGENCY FLASHING OPERATIONS.
 PHASE 4 TO ALWAYS FOLLOW PHASE 2 EXCEPT WHEN PHASE 3 OR PRE-EMPTION IS NEXT.
 PHASE 4 TO ALWAYS FOLLOW PHASE 3 EXCEPT WHEN RAILROAD PRE-EMPTION IS NEXT.
 UPON RECEIPT OF A RAILROAD PRE-EMPTION CALL THE SIGNAL TO IMMEDIATELY ADVANCE OUT OF ANY GREEN INCLUDING MINIMUM GREEN INTO CLEARANCE INTERVAL TIMINGS GOING TO PRE-EMPT, THEN GO IMMEDIATELY TO RAILROAD PRE-EMPTION "TRACK CLEAR" PHASE.
 IF RAILROAD PRE-EMPTION OCCURS DURING THE CLEARANCE INTERVALS OF ANY PHASE, THE CONTROLLER TO DROP NEXT PHASE CALL, FINISH TIMING THE CLEARANCE INTERVALS GOING TO PRE-EMPT AND THEN GO IMMEDIATELY TO THE RAILROAD PRE-EMPTION "TRACK CLEAR" PHASE.
 IF RAILROAD PRE-EMPTION OCCURS DURING EITHER THE WALK OR PEDESTRIAN CHANGE INTERVAL, THE SIGNAL SHALL IMMEDIATELY ADVANCE OUT OF THE WALK AND PEDESTRIAN CHANGE INTERVALS INTO THE CLEARANCE INTERVAL TIMINGS GOING TO PRE-EMPT, THEN GO IMMEDIATELY TO THE RAILROAD PRE-EMPTION "TRACK CLEAR" PHASE.
 POLICE BOX MANUAL CONTROL SHALL BE ABLE TO BE PRE-EMPTED BY RAILROAD CIRCUIT. THE POLICE BOX MANUAL CONTROL SHALL REMAIN INOPERATIVE FROM THE TIME A RAILROAD PRE-EMPTION CALL IS RECEIVED UNTIL THE CONTROLLER LEAVES THE RAILROAD HOLD PHASE AND RETURNS TO PHASE 2.
 ANY CHANGE IN THE CLEARANCE INTERVALS NOTED ON THIS PLAN MAY REQUIRE A MODIFICATION OF THE RAILROAD TRACK CIRCUIT.

INTERVALS

MODE	MIN RECALL THIS PHASE	NON-LOCK	NON-LOCK	NON-LOCK	OFF	OFF	ON/OMIT	ON/OMIT
INT START	4	11	9	5	29	88	25	25
MIN GRN	7	47	8	29	88	25	25	25
WALK	12	7	8	8	8	8	8	8
PED CLR	4	4	4	4	4	4	4	4
VEH EXT	2	2	2	2	2	2	2	2
MAX 1	32	27	27	27	27	27	27	27
MAX 2	32	27	27	27	27	27	27	27
YELLOW	3.4	3.8	3.8	3.1	3.1	3.1	3.0	3.0
RED	1.7	0.0	0.0	1.0	1.0	1.0	5.0	5.0
ADD INIT								
MAX INIT								
TBR								
TTR								
MIN GAP								

DETECTORS

IDENT	SIZE (WXL)	TYPE	MODE	SYSTEM LOC	COORDINATION TYPE: NONE	PROGRAM	FUNCTION	TIME	DAYS	CYCLE	OFFSET	PHASE SPLITS	SEC / %	PERMIS PERIOD
D1	6' X 40'	VIDEO 360	PRESENCE				FLASH			DAILY		01-09		0 SEC
D1B	6' X 40'	VIDEO 360	PRESENCE				MAX 1	ALL OTHER TIMES				01-09		
D2	6' X 40'	VIDEO 360	PRESENCE				MAX 2	FUTURE				01-09		
D2A	6' X 40'	VIDEO 360	PRESENCE									01-09		
D2B	6' X 40'	VIDEO 360	PRESENCE									01-09		
D3	10' X 40'	VIDEO 360	PRESENCE									01-09		
BD1	14' X 34'	VIDEO 360	PRESENCE									01-09		
BD2	14' X 26'	VIDEO 360	PRESENCE									01-09		

RAILROAD PRE-EMPTION

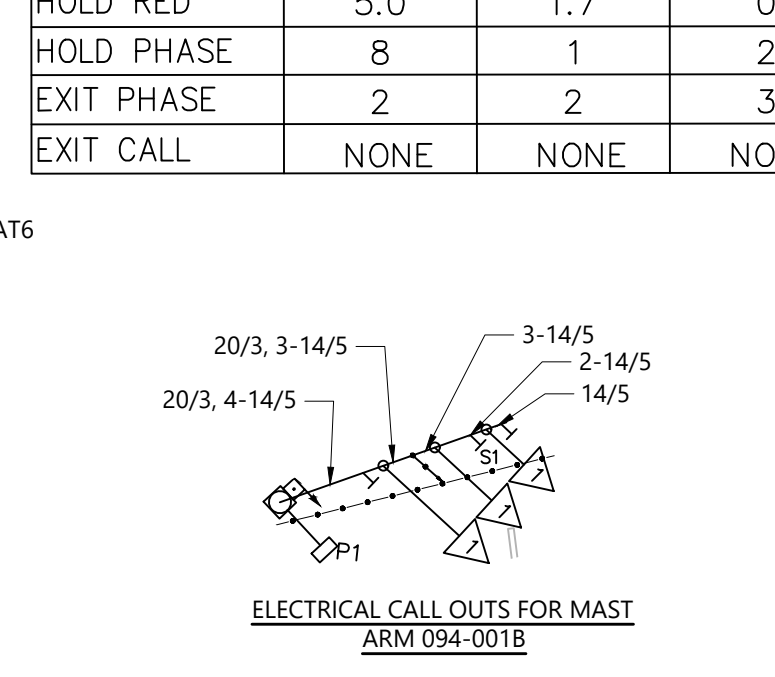
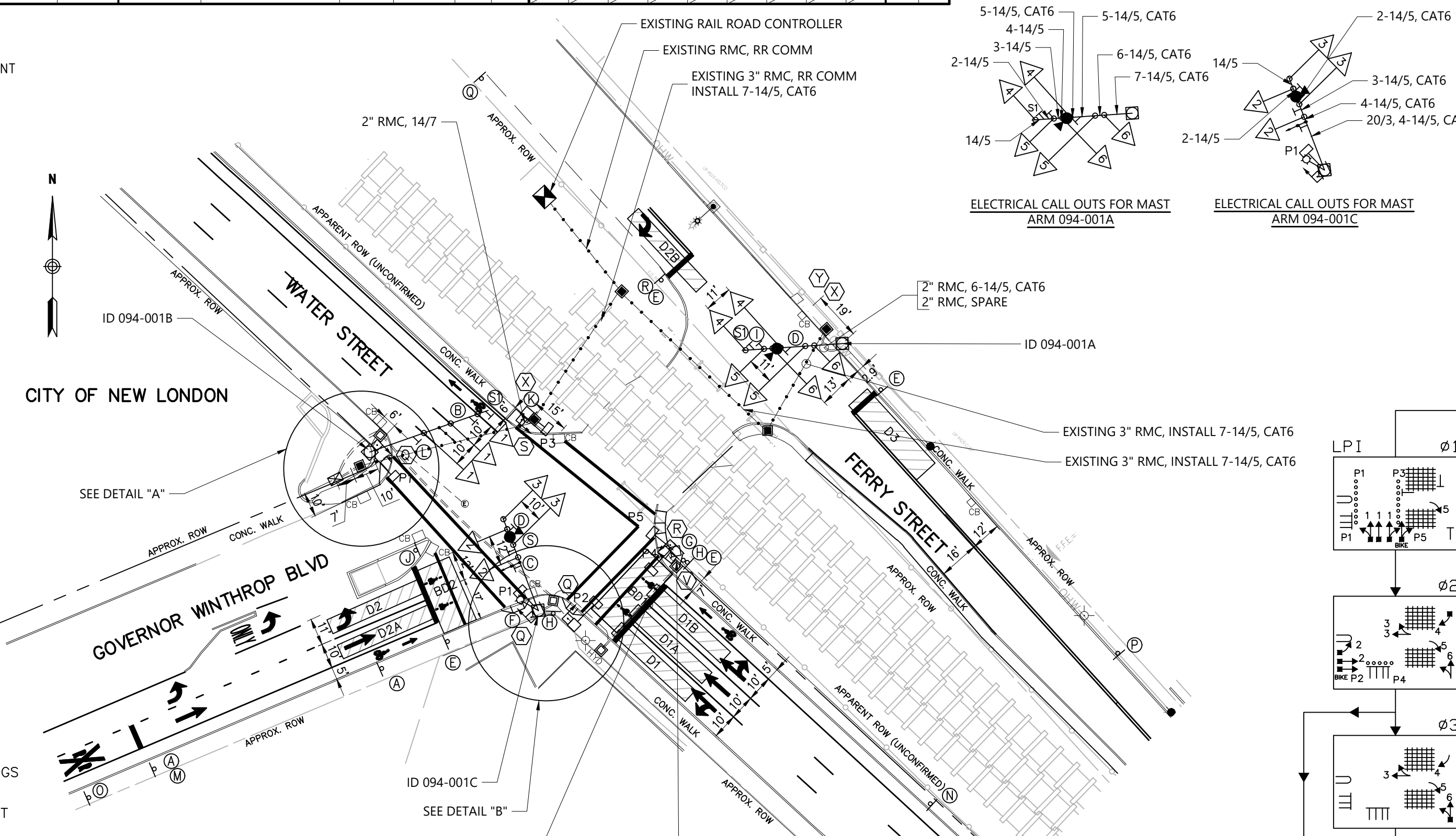
TIME	EVENT
0"	START OF TRAFFIC SIGNAL PRE-EMPTION
12"	START OF RAILROAD FLASHING LIGHTS
19"	RAILROAD GATE-ARMS START TO DROP
29"	RAILROAD GATE ARMS ARE HORIZONTAL
41"	TRAIN ENTERS CROSSING

DETECTOR CHART

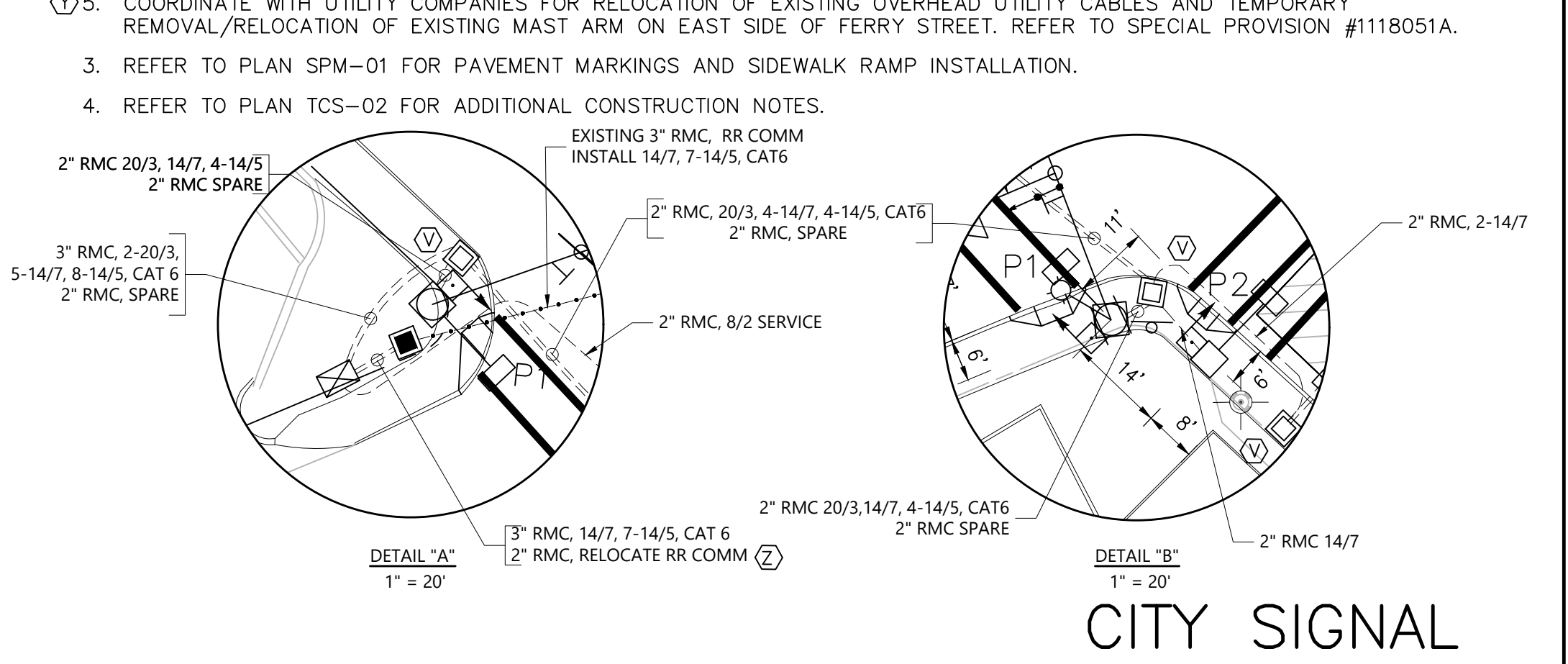
DETECTOR	LOCAL
D1, D1A, D1B, BD1	01 E
D2, D2A, D2B, BD2	02 C&E
D3	03 C&E

C&E = CALL AND EXTEND
 E = EXTEND

- SIGN LEGEND**
- 31-0222Z (A) - MAST ARM MOUNT
 - 31-0816 (B) - MAST ARM MOUNT
 - 31-1627 (C) - MAST ARM MOUNT
 - 31-1629 (D) - MAST ARM MOUNT
 - 31-0802 (E) - MAST ARM MOUNT
 - 31-0505 (F) - POLE MOUNT
 - 31-1188L (G) - POLE MOUNT
 - 31-1177R (H) - PEDESTAL MOUNT
 - 31-1188L (I) - PEDESTAL MOUNT
 - 31-1177R (J) - PEDESTAL MOUNT
 - 31-1119 (K) - MAST ARM MOUNT
 - 31-0184 (L) - MAST ARM MOUNT
 - 31-1526 (M) - PEDESTAL MOUNT
 - 31-1625Z (N) - PEDESTAL MOUNT
 - 31-1626Z (O) - MAST ARM MOUNT
 - 41-2205 (P) - MAST ARM MOUNT
 - 41-2205 (Q) - MAST ARM MOUNT
 - 41-2201 (R) - MAST ARM MOUNT
 - 41-2206 (S) - MAST ARM MOUNT
 - 41-2206 (T) - MAST ARM MOUNT
 - 31-0830 (U) - MAST ARM MOUNT
 - 41-0809 (V) - MAST ARM MOUNT



- CONSTRUCTION NOTES:**
- ALL TRAFFIC SIGNAL EQUIPMENT IS NEW, EXCEPT AS NOTED.
 - INSTALL CAST IRON HANDHOLE COVER.
 - DISCONNECT RAILROAD PRE-EMPTION CABLE FROM EXISTING CONTROLLER CABINET AND RECONNECT IN NEW CONTROLLER CABINET. REFER TO SPECIAL PROVISION #1113511A - RELOCATE RAILROAD PRE-EMPTION CABLE (SITE NO. 1).
 - MODIFY EXISTING HANDHOLE TO ACCEPT NEW CONDUIT AND CLEAN EXISTING HANDHOLE.
 - COORDINATE WITH UTILITY COMPANIES FOR RELOCATION OF EXISTING OVERHEAD UTILITY CABLES AND TEMPORARY REMOVAL/RELOCATION OF EXISTING MAST ARM ON EAST SIDE OF FERRY STREET. REFER TO SPECIAL PROVISION #1118051A.
 - REFER TO PLAN SPM-01 FOR PAVEMENT MARKINGS AND SIDEWALK RAMP INSTALLATION.
 - REFER TO PLAN TCS-02 FOR ADDITIONAL CONSTRUCTION NOTES.



MAST ARM INFORMATION

ID #	APPROX. ARM ATTACHMENT HEIGHT	ARM LENGTH	VERTICAL RISER FOR 360-CAMERA	LUMINAIRE BRACKET LENGTH	YEAR INSTALLED
094-001A	40'	40'	8'	-	-
094-001B	50'	40'	8'	-	-
094-001C	40'	40'	8'	6'	-

*ARM ATTACHMENT HEIGHT TO BE DETERMINED BY THE CONTRACTOR BASED ON FIELD CONDITIONS.

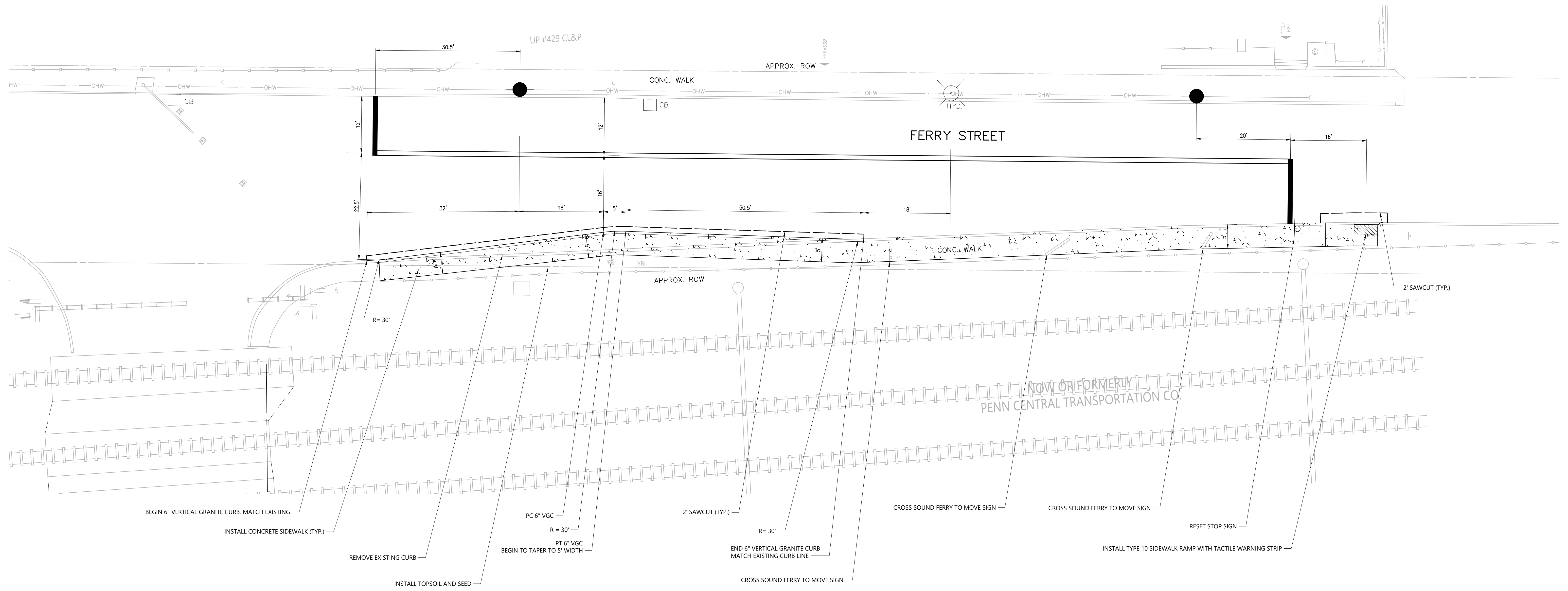
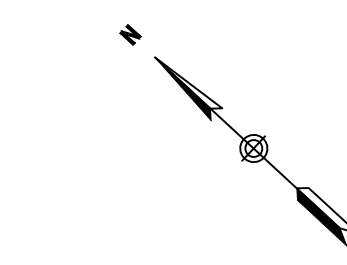
LEGEND:

- R - RED
- Y - YELLOW
- G - GREEN
- ← - RED ARROW
- ← - YELLOW ARROW
- ← - GREEN ARROW
- W - WALK / PED. CLR
- D.W. - DON'T WALK
- FL. - FLASHING
- - PROPOSED WOOD SPAN POLE
- - EXISTING WOOD SPAN POLE
- - PROPOSED STEEL SPAN POLE
- - EXISTING STEEL SPAN POLE
- - PROPOSED UTILITY POLE
- - EXISTING UTILITY POLE
- - PEDESTAL MOUNTING
- - PEDESTRIAN PUSH BUTTON & SIGN
- - DIRECTIONAL ARW. FOR PUSH BUTTON
- - EXISTING PEDESTAL TRAFFIC SIGNAL FACE
- - PEDESTRIAN SIGNAL FACE
- - DET. LEADS IN SAW CUT
- - PROPOSED RMC (RIGID METAL CONDUIT)
- - EXISTING RMC (RIGID METAL CONDUIT)
- - EXISTING UTILITY POLE
- - PEDESTAL MOUNTING
- - PEDESTRIAN PUSH BUTTON & SIGN
- - DIRECTIONAL ARW. FOR PUSH BUTTON
- - EXISTING LIGHT POLE WITH ARM
- - PROPOSED LIGHT POLE WITH ARM
- - SIDEWALK RAMP
- - CABLE CLOSURE
- - GUY WIRE
- - PROPOSED HANDHOLE
- - EXISTING HANDHOLE
- - EXISTING LIGHT POLE WITH ARM
- - PROPOSED LIGHT POLE WITH ARM
- - SIDEWALK RAMP
- - CABLE CLOSURE
- - GUY WIRE
- - PROPOSED HANDHOLE
- - EXISTING HANDHOLE

CITY OF NEW LONDON

CITY SIGNAL
 INTERSECTION # 094-001

ENGINEER	TRAFFIC	DATE	ELECTRICAL	DATE
DRAWN BY	vhb			
CHECKED BY	100 Great Meadow Road, Suite 200 Waterford, Connecticut 06189 Tel: 860 807-4300 Fax: 860 372-4570			
SUBMITTED BY	ENERGY BY - CITY			
APPROVED BY	MAINT LEVEL - CITY			
APPROVED DATE	METER # - N/A			
TOWN: NEW LONDON				PROJECT NO. 42573.00
DRAWING TITLE: TRAFFIC CONTROL SIGNAL PLAN				DRAWING NO. TCS-01
SCALE 1" = 40'				SHEET NO. 02

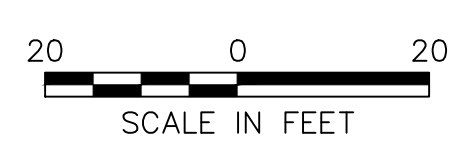


- BEGIN 6" VERTICAL GRANITE CURB, MATCH EXISTING
- INSTALL CONCRETE SIDEWALK (TYP.)
- REMOVE EXISTING CURB
- INSTALL TOPSOIL AND SEED
- PC 6" VGC
- R = 30'
- PT 6" VGC
- BEGIN TO TAPER TO 5' WIDTH
- 2" SAWCUT (TYP.)
- R = 30'
- END 6" VERTICAL GRANITE CURB
- MATCH EXISTING CURB LINE
- CROSS SOUND FERRY TO MOVE SIGN
- CROSS SOUND FERRY TO MOVE SIGN
- RESET STOP SIGN
- INSTALL TYPE 10 SIDEWALK RAMP WITH TACTILE WARNING STRIP

LEGEND :

INSTALL CONCRETE SIDEWALK

REV.	DATE	DESCRIPTION	SHEET. NO.



DESIGNER: CB
 DRAFTER: MP
 CHECKED BY: JB
 APPROVED BY: CB



PROJECT TITLE:
NEW LONDON TRAFFIC SIGNAL UPGRADE

DATE: December 15, 2020

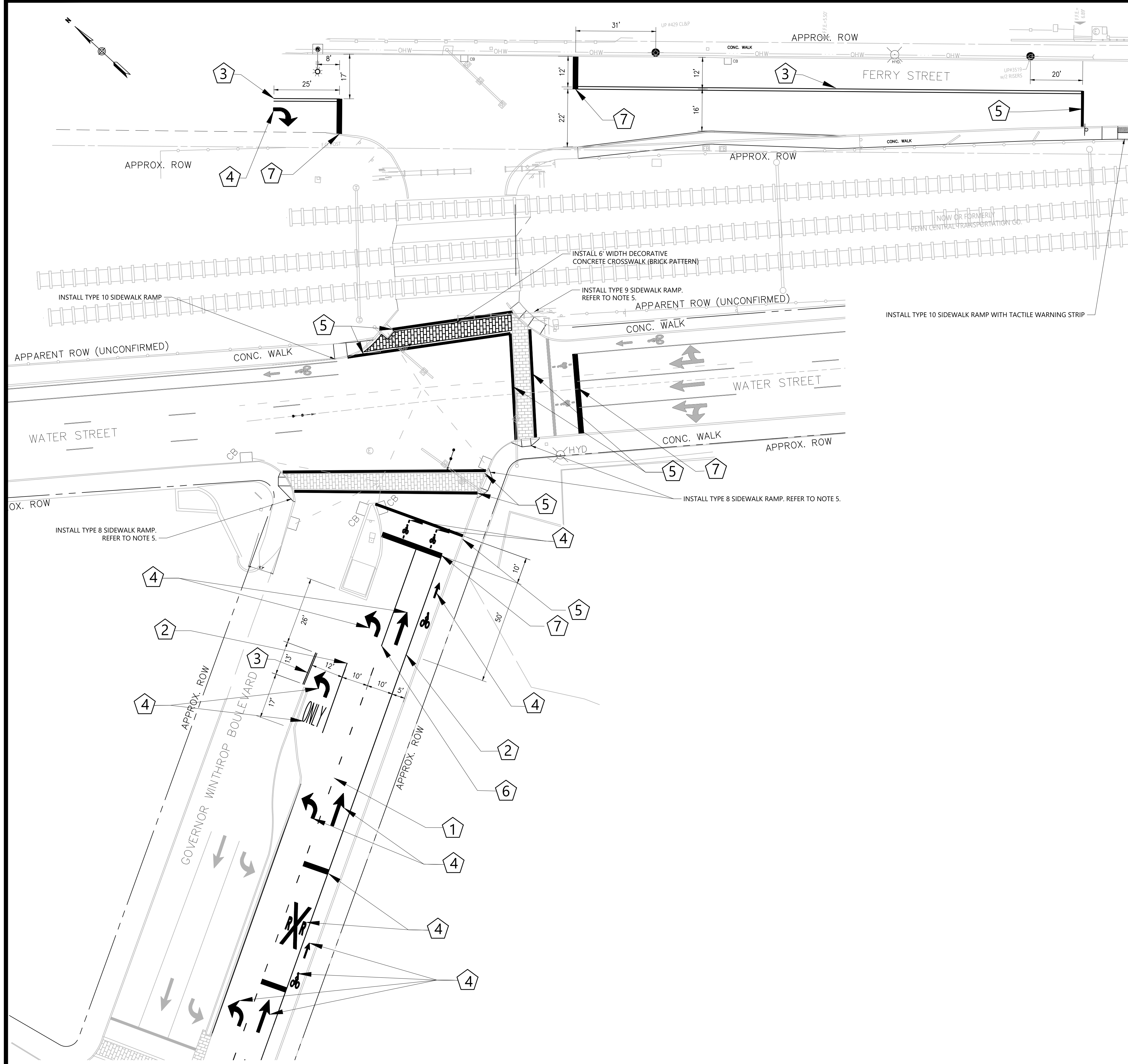
TOWN:
 NEW LONDON

DRAWING TITLE:

PROJECT NO.
 42573.00

DRAWING NO.
 PLN-01

SHEET NO.
 04



PAVEMENT MARKING LEGEND

- ① 8" DOTTED WHITE EPOXY RESIN PAVEMENT MARKINGS (3' LINE, 9' SPACE)
- ② 4" SOLID WHITE EPOXY RESIN PAVEMENT MARKINGS
- ③ 4" DOUBLE YELLOW EPOXY RESIN PAVEMENT MARKINGS
- ④ WHITE EPOXY RESIN PAVEMENT MARKING SYMBOLS
- ⑤ 12" SOLID WHITE EPOXY RESIN PAVEMENT MARKING (STOP BARS AND CROSSWALKS)
- ⑥ 8" SOLID WHITE EPOXY RESIN PAVEMENT MARKINGS
- ⑦ 24" SOLID WHITE EPOXY RESIN PAVEMENT MARKING (STOP BARS NEAR RAIL CROSSING)

NOTES:

1. INSTALL NEW PAVEMENT MARKINGS ON GOVERNOR WINTHROP BOULEVARD AND FERRY STREET AS SHOWN ON THE PLAN OR AS DIRECTED BY THE ENGINEER.
2. ALL OTHER PAVEMENT MARKINGS SHOWN ON PLAN ARE EXISTING TO REMAIN.
3. ALL CONFLICTING PAVEMENT MARKINGS SHALL BE REMOVED USING NON-DESTRUCTIVE METHODS ACCEPTABLE TO THE CITY OF NEW LONDON.
4. ALL EXISTING PAVEMENT MARKINGS DISTURBED BY THE ROADWAY CONSTRUCTION SHALL BE REPLACED IN KIND.
5. RESTORE EXISTING STAMPED CONCRETE CROSSWALKS IMPACTED BY THE SIDEWALK RAMP INSTALLATION IN KIND. REFER TO SPECIAL PROVISION #0921031A- DECORATIVE CONCRETE CROSSWALK (BRICK PATTERN).

REV.	DATE	DESCRIPTION	SHEET. NO.



DESIGNER: CB
DRAFTER: MP
CHECKED BY: JB
APPROVED BY: CB



vhb

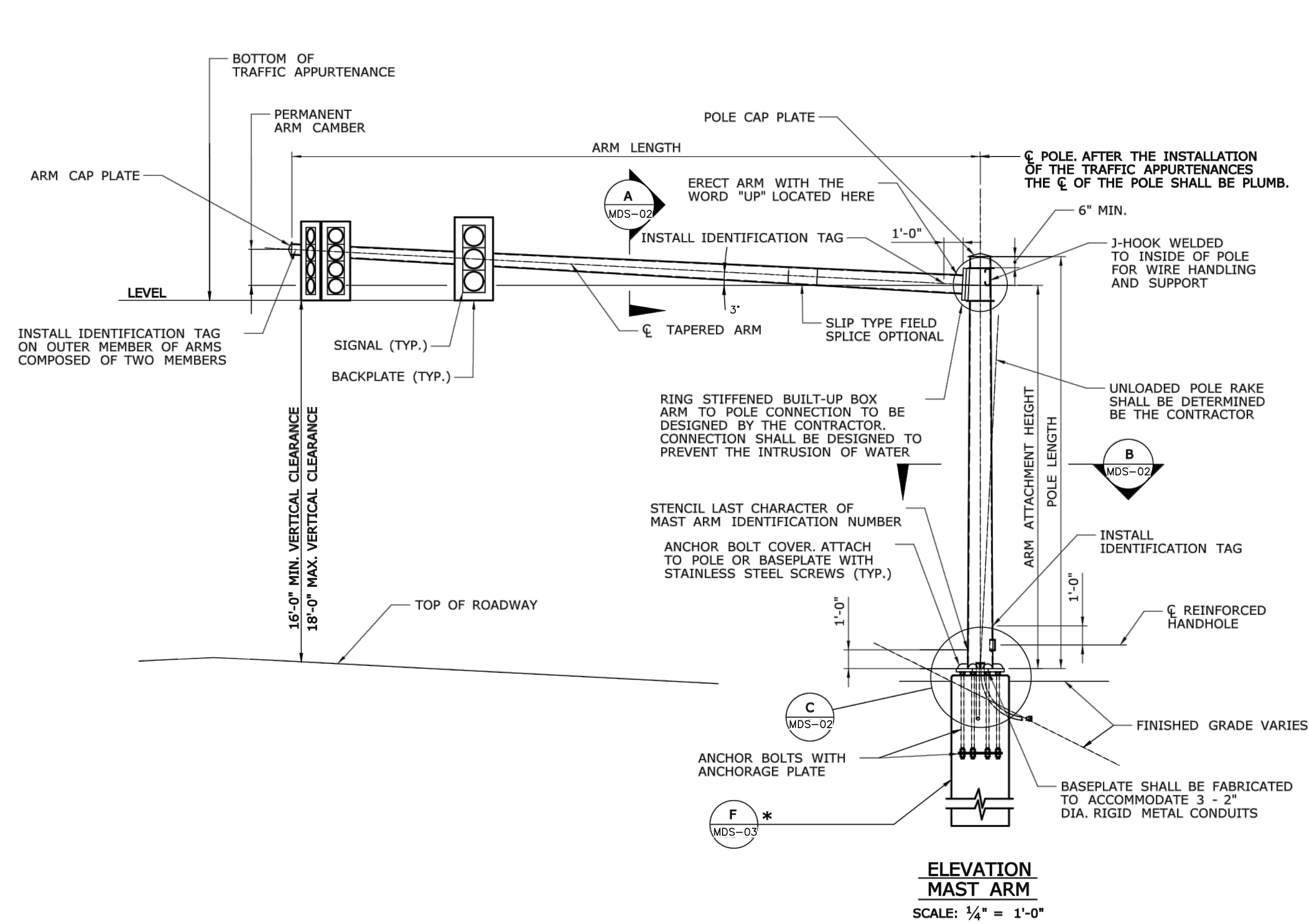
 Engineers Scientists Planners Designers



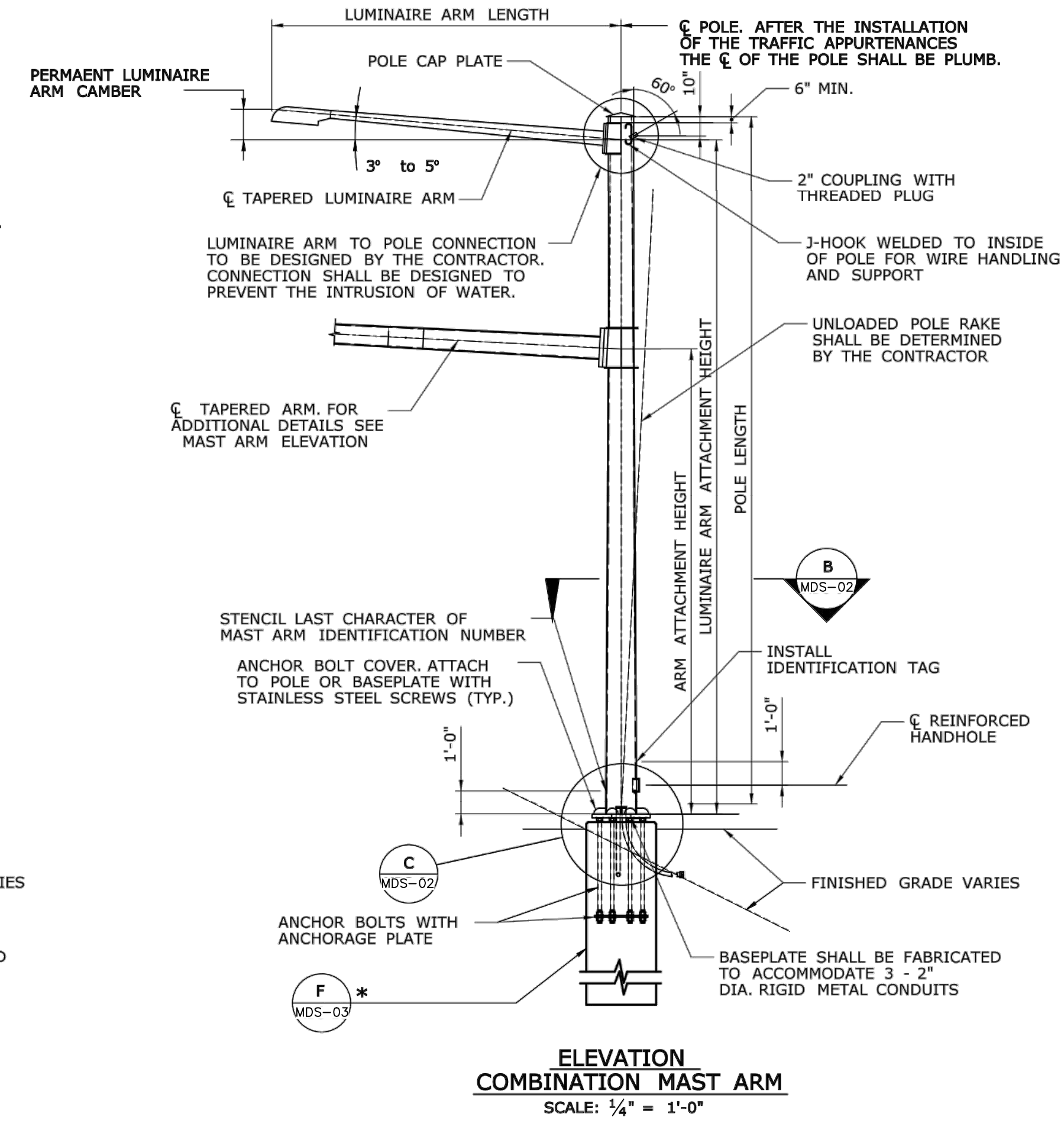
PROJECT TITLE:	NEW LONDON TRAFFIC SIGNAL UPGRADE
DATE:	January 15, 2021

TOWN:	NEW LONDON
DRAWING TITLE:	PAVEMENT MARKING PLAN

PROJECT NO.	42573.00
DRAWING NO.	SPM-01
SHEET NO.	05



**ELEVATION
MAST ARM**
SCALE: 1/4" = 1'-0"



**ELEVATION
COMBINATION MAST ARM**
SCALE: 1/4" = 1'-0"

MAST ARM ASSEMBLY NOTES

THE MAST ARM, INCLUDING THE ANCHORAGE TO THE FOUNDATION, SHALL BE DESIGNED, FABRICATED AND INSTALLED BY THE CONTRACTOR, OF THE SPAN SPECIFIED, IN ACCORDANCE WITH THE SPECIAL PROVISION "XX STEEL MAST ARM ASSEMBLY" OR "XX STEEL COMBINATION MAST ARM ASSEMBLY".

THE DIMENSIONS OF THE MAST ARM ASSEMBLY AND DETAILS OF THE TRAFFIC APPURTENANCES SUPPORTED BY THE MAST ARM ASSEMBLY ARE SHOWN ON THE TRAFFIC SIGNAL PLANS, ELEVATIONS, CROSS-SECTIONS OR IN THE SPECIAL PROVISIONS. THE ARM AND POLE LENGTHS AND THE ATTACHMENT HEIGHTS SHALL BE VERIFIED BY THE CONTRACTOR BASED ON THE FINISHED GRADE AT THE SITE, TOP OF FOUNDATION ELEVATION, THE LOCATIONS OF OVERHEAD UTILITY CABLES AND THE TRAFFIC APPURTENANCE MOUNTING HEIGHTS. IF EITHER THE ARM OR POLE LENGTH IS INADEQUATE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER.

THE MAST ARMS SHALL BE DESIGNED IN ACCORDANCE WITH THE LATEST EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, INCLUDING THE LATEST INTERIM SPECIFICATIONS, AS AMENDED BY THE AS SPECIAL PROVISION "XX STEEL MAST ARM ASSEMBLY" OR "XX STEEL COMBINATION MAST ARM ASSEMBLY".

THE MAST ARM SHALL BE DESIGNED FOR THE LOAD EFFECTS DUE TO THE ACTUAL TRAFFIC APPURTENANCES (SIGNALS, SIGNS, LUMINAIRES, CAMERAS, ETC.). THE MAST ARMS SHALL ALSO BE DESIGNED FOR THE EFFECTS OF TRAFFIC APPURTENANCES DURING ALL STAGES OF CONSTRUCTION THAT MAY EXIST DURING THE PROJECT UNDER WHICH THE MAST ARMS ARE INSTALLED.

THE MAST ARMS SHALL BE DESIGNED TO SUPPORT TRAFFIC APPURTENANCES WITH PROPERTIES NO LESS THAN THOSE SHOWN IN THE TABLE ENTITLED "TRAFFIC APPURTENANCE PROPERTIES - MINIMUM DESIGN VALUES".

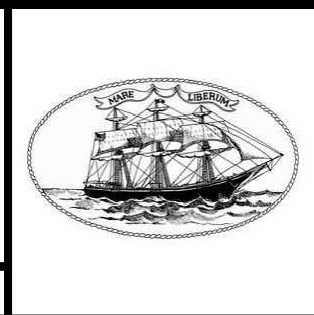
REV.	DATE	DESCRIPTION	SHEET. NO.

NOT TO SCALE

DESIGNER: CB
DRAFTER: MP
CHECKED BY: JB
APPROVED BY: CB


Engineers Scientists Planners Designers

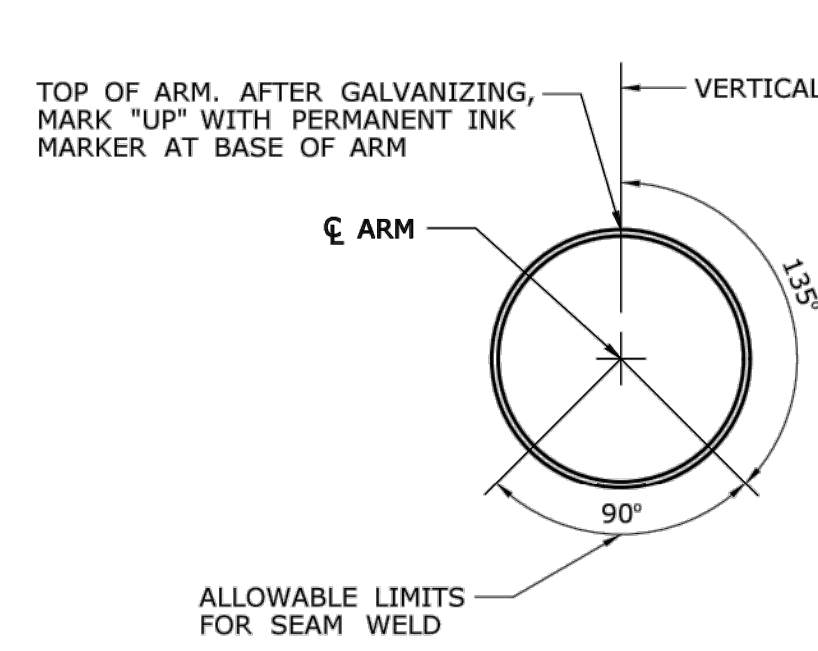
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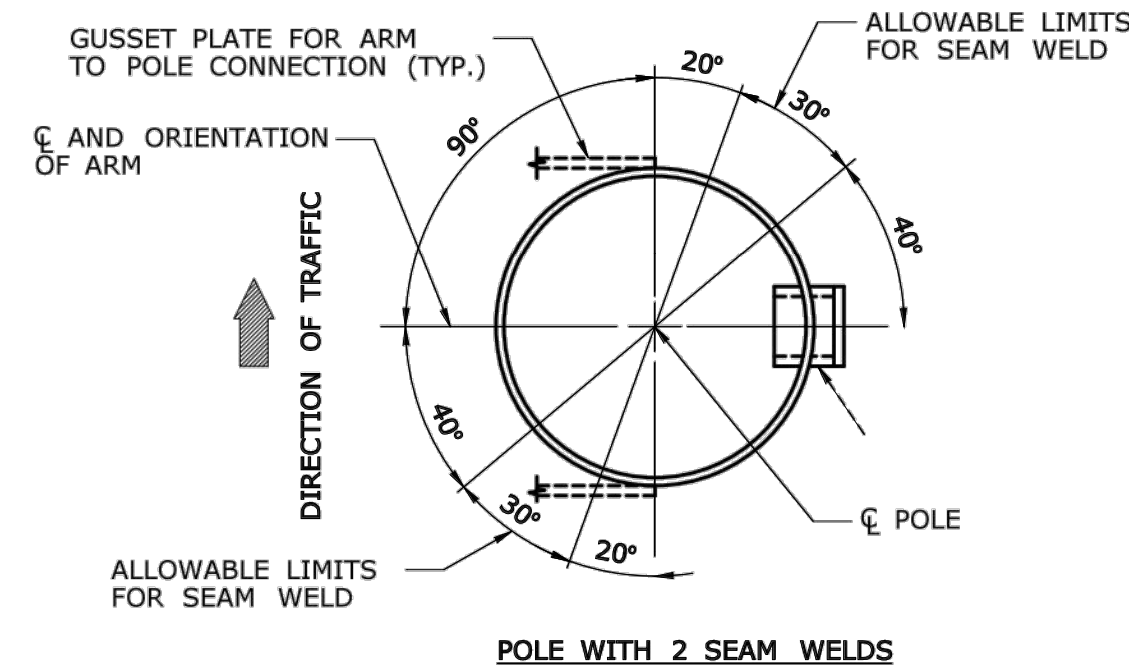
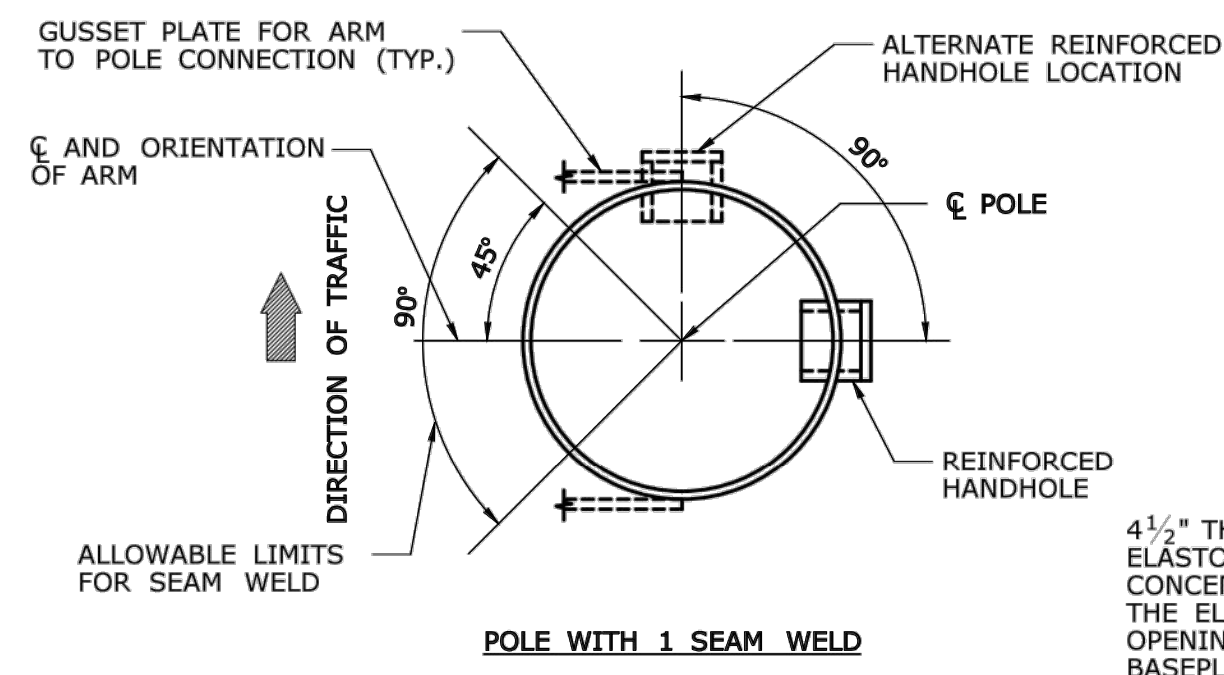
PROJECT TITLE:	NEW LONDON TRAFFIC SIGNAL UPGRADE
DATE:	January 15, 2021

TOWN:	NEW LONDON
DRAWING TITLE:	MISCELLANEOUS DETAILS

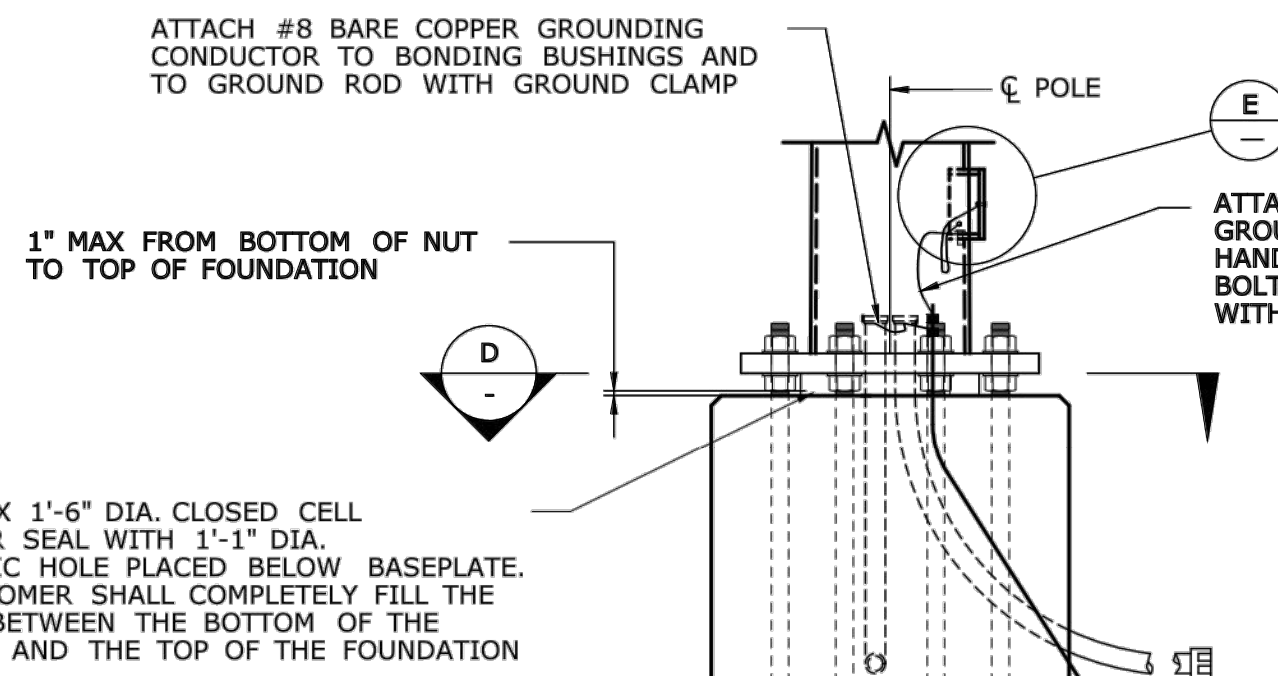
PROJECT NO.	42573.00
DRAWING NO.	MDS-01
SHEET NO.	06



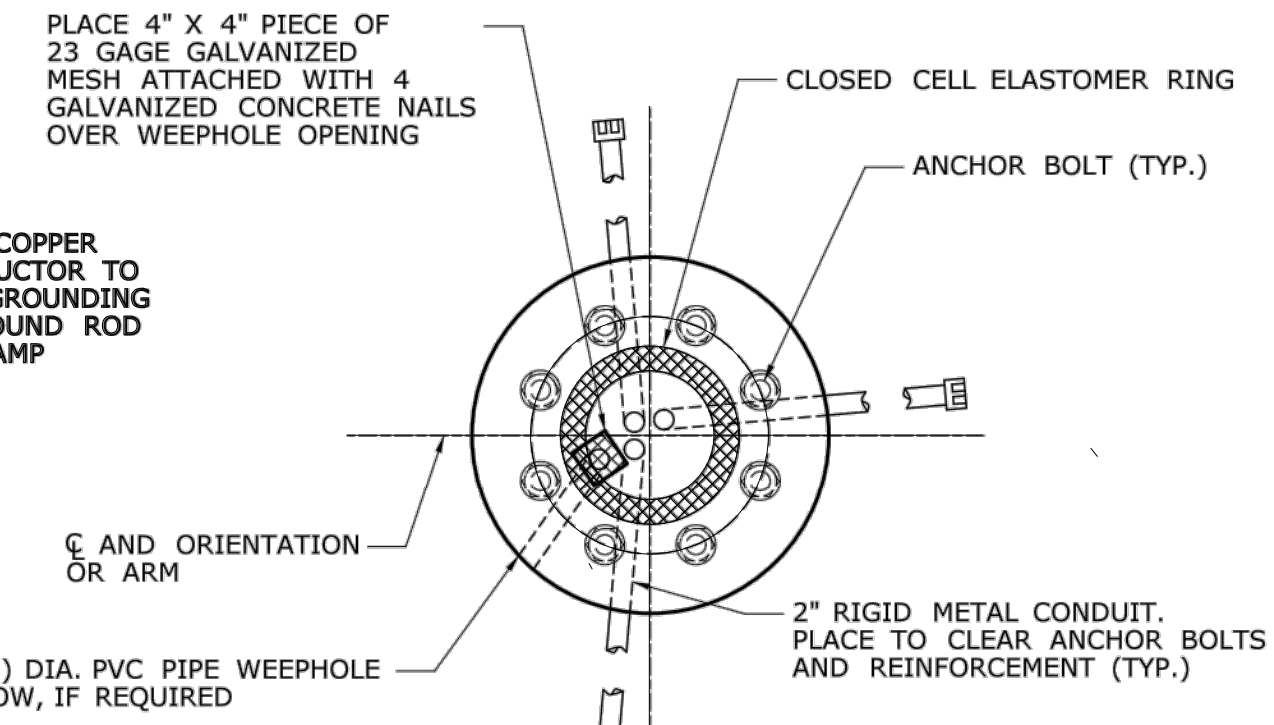
SECTION A
SCALE: 1 1/2" = 1'-0" MDS-01



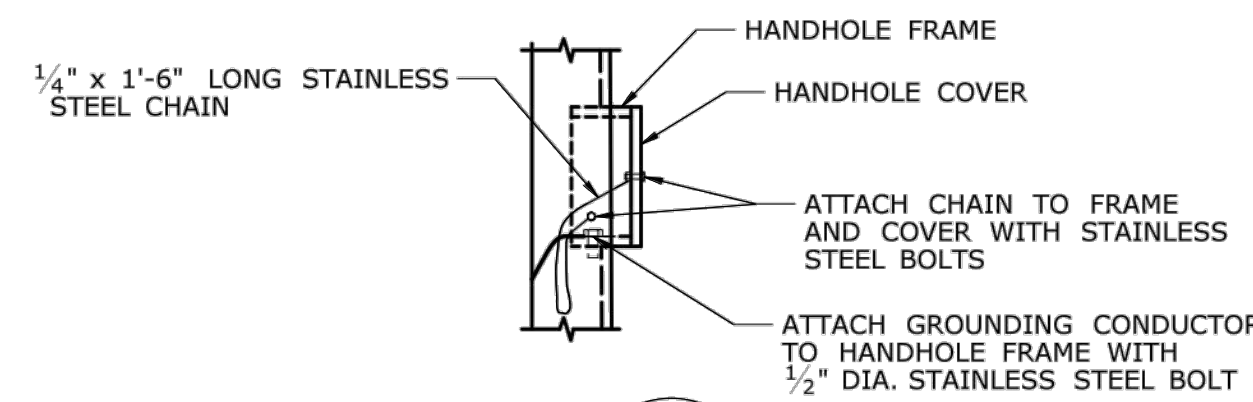
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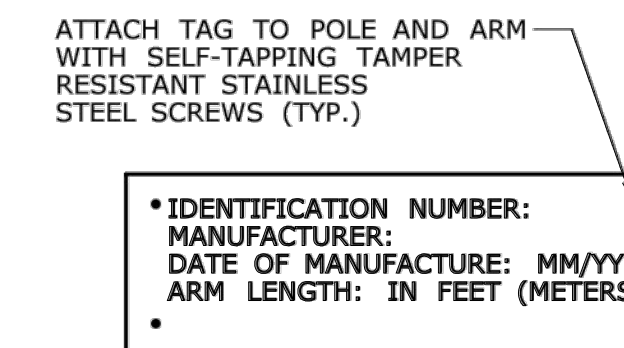
SECTION C
SCALE: 3/4" = 1'-0" MDS-01



SECTION D
SCALE: 3/4" = 1'-0" MDS-01



DETAIL E
SCALE: 1 1/2" = 1'-0" MDS-01



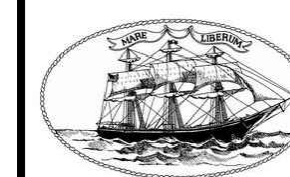
IDENTIFICATION TAG
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TRAFFIC APPURTENANCE PROPERTIES MINIMUM DESIGN VALUES					
	2'-0"	2'-0"	2'-0"	3'-2"	WIDTH HEIGHT
					SHEET ALUMINUM SIGN PANEL
WEIGHT, INCLUDING MOUNTING HARDWARE	65 LBS	80 LBS	95 LBS	105 LBS	4 LBS/SQ.FT.
TOTAL SURFACE AREA	28.04 SQ. FT.	35.46 SQ. FT.	45.16 SQ. FT.	41.04 SQ. FT.	BASED ON PANEL DIMENSIONS
PROJECTED AREA, FRONT FACE	8.62 SQ. FT.	10.91 SQ. FT.	13.34 SQ. FT.	13.72 SQ. FT.	BASED ON PANEL DIMENSIONS
PROJECTED AREA, BOTTOM FACE	1.18 SQ. FT.	1.18 SQ. FT.	1.18 SQ. FT.	2.58 SQ. FT.	BASED ON PANEL DIMENSIONS
<p>NOTES:</p> <p>THE TABULATED VALUES ARE THE MINIMUM VALUES THAT SHALL BE USED FOR THE DESIGN.</p> <p>MAST ARMS SHALL BE DESIGNED ASSUMING ALL TRAFFIC SIGNALS ARE COMPOSED OF 12" DIAMETER SECTIONS WITH BACKPLATES.</p> <p>THE PROJECTED FRONT FACE AREA IS IN A PLANE PARALLEL TO THE PLANE FORMED BY THE ARM AND THE POLE.</p> <p>IF MULTIPLE APPURTENANCES ARE ATTACHED AT THE SAME LOCATION, THE MINIMUM DESIGN VALUE SHALL BE NO LESS THAN THE SUM OF THE CORRESPONDING TRAFFIC APPURTENANCE PROPERTIES.</p> <p>FOR TRAFFIC APPURTENANCES NOT SHOWN, THE PROPERTIES SHALL BE DETERMINED BY THE CONTRACTOR AND SUBMITTED FOR REVIEW WITH THE WORKING DRAWING SUBMITTAL.</p>					

REV.	DATE	DESCRIPTION	SHEET. NO.

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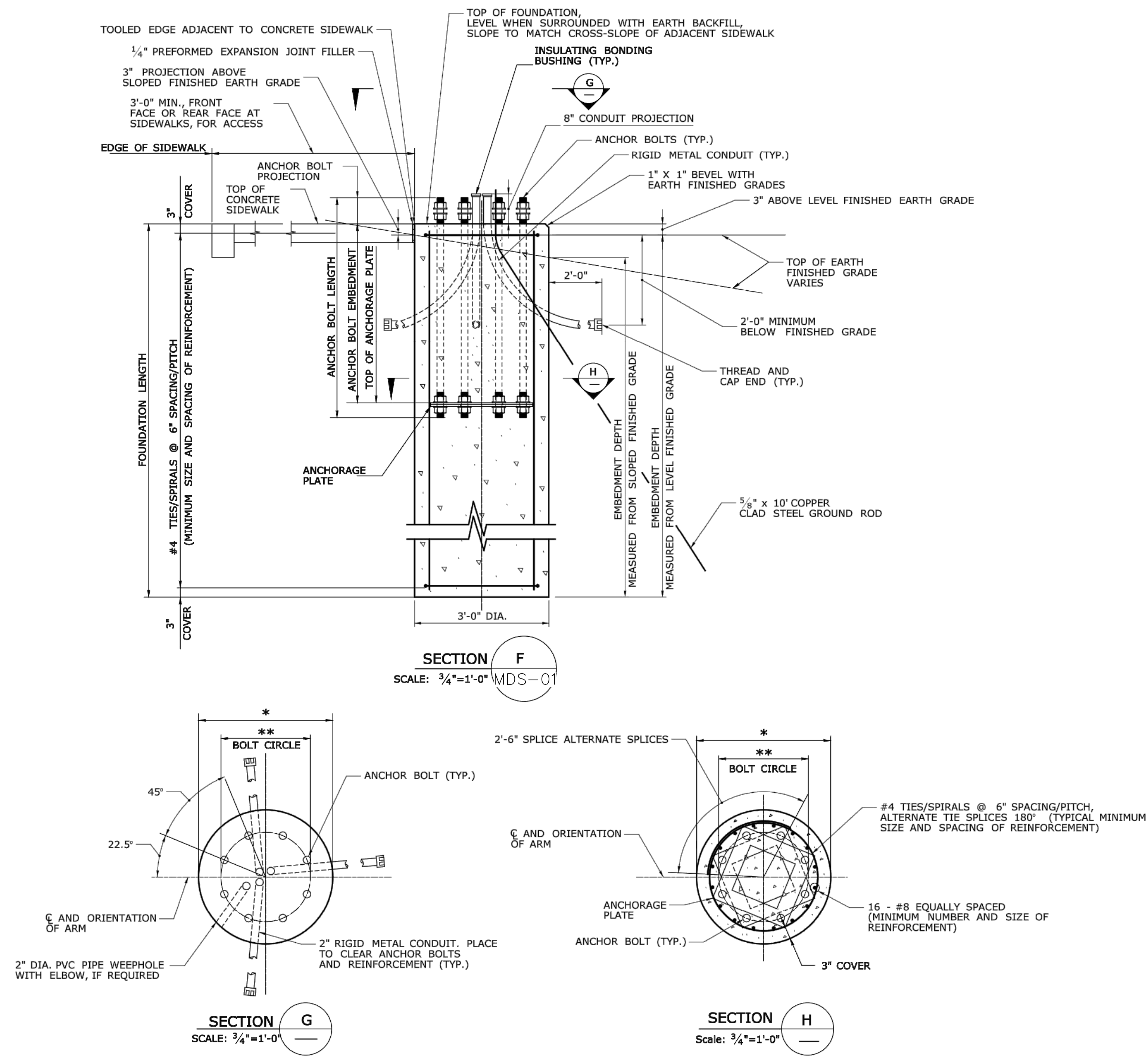
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PROJECT TITLE: NEW LONDON TRAFFIC SIGNAL UPGRADE
DATE: January 15, 2021

TOWN: NEW LONDON
DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 42573.00
DRAWING NO. MDS-02
SHEET NO. 07



FOUNDATION NOTES

THE DRILLED SHAFT FOUNDATION FOR THE MAST ARM ASSEMBLY SHALL BE DESIGNED, FABRICATED, AND CONSTRUCTED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIAL PROVISION "TRAFFIC CONTROL FOUNDATION - MAST ARM".

THE FOUNDATION SHALL BE DESIGNED FOR THE SOILS AND ROCK PROPERTIES BASED ON THE SUBSURFACE CONDITIONS (CHARACTER OF THE SOIL AND ROCK, PRESENCE OF GROUND WATER, ETC.) IN THE LOCATION OF, ADJACENT TO AND BELOW THE DRILLED SHAFT FOUNDATION EXCAVATION. THE NEED AND EXTENT OF ALL SUBSURFACE EXPLORATIONS AND INVESTIGATIONS SHALL BE DETERMINED BY THE CONTRACTOR.

THE DESIGN OF THE FOUNDATION SHALL BE COORDINATED WITH THE MAST ARM ASSEMBLY AND THE MAST ARM ANCHORAGE TO ENSURE THAT THE FOUNDATION IS ADEQUATE FOR THE MAST ARM REACTIONS AND TO AVOID CONFLICTS BETWEEN THE EMBEDDED MAST ARM ANCHORAGE AND THE FOUNDATION REINFORCEMENT.

THE CONCRETE FOR THE FOUNDATION SHALL CONFORM TO CLASS "F" CONCRETE. THE MINIMUM 28 DAY COMPRESSIVE STRENGTH OF THE CONCRETE IN THE CONSTRUCTED FOUNDATION SHALL BE 4,400 PSI.

THE REINFORCEMENT SHALL BE UNCOATED AND CONFORM TO ASTM A615, GRADE 60 (ASTM A615M, GRADE 420). THE REINFORCEMENT SHALL BE ASSEMBLED WITH WIRE TIES. WELDING TO ASSEMBLE REINFORCEMENT IS NOT PERMITTED. ALL REINFORCEMENT SHALL HAVE 3" COVER, UNLESS OTHERWISE NOTED.

THE CONCRETE SHALL BE PLACED IN THE EXCAVATION AGAINST UNDISTURBED EARTH.

THE MAST ARM SHALL NOT BE ERECTED ON THE FOUNDATION UNTIL THE CONCRETE HAS ATTAINED A 28 DAY COMPRESSIVE STRENGTH, f_c , GREATER THAN OR EQUAL TO 4000 PSI.

THE COST OF THE FOUNDATION, INCLUDING THE EXCAVATION, CONCRETE AND REINFORCEMENT, INCLUDING THE DESIGN AND FABRICATION, SHALL BE PAID FOR UNDER THE ITEM "TRAFFIC CONTROL FOUNDATION - MAST ARM".

* THE FOUNDATION DIAMETER FOR MAST ARMS 40-FEET OR LESS SHALL BE 3'-0", UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE FOUNDATION DIAMETER FOR MAST ARMS GREATER THAN 40-FEET SHALL BE DESIGNED BY THE CONTRACTOR.

** THE BOLT CIRCLE DIAMETER FOR MAST ARMS 40-FEET OR LESS SHALL BE 2'-0", UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE BOLT CIRCLE DIAMETER FOR MAST ARMS GREATER THAN 40-FEET SHALL BE DESIGNED BY THE CONTRACTOR.

REV.	DATE	DESCRIPTION	SHEET. NO.

DESIGNER: CB	<p>Engineers Scientists Planners Designers</p>
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CADD FILENAME: \\vhb\gbl\proj\WETHERSFIELD\42573.00\CAD\TS\PLANSET\MDS-4257300.DWG	

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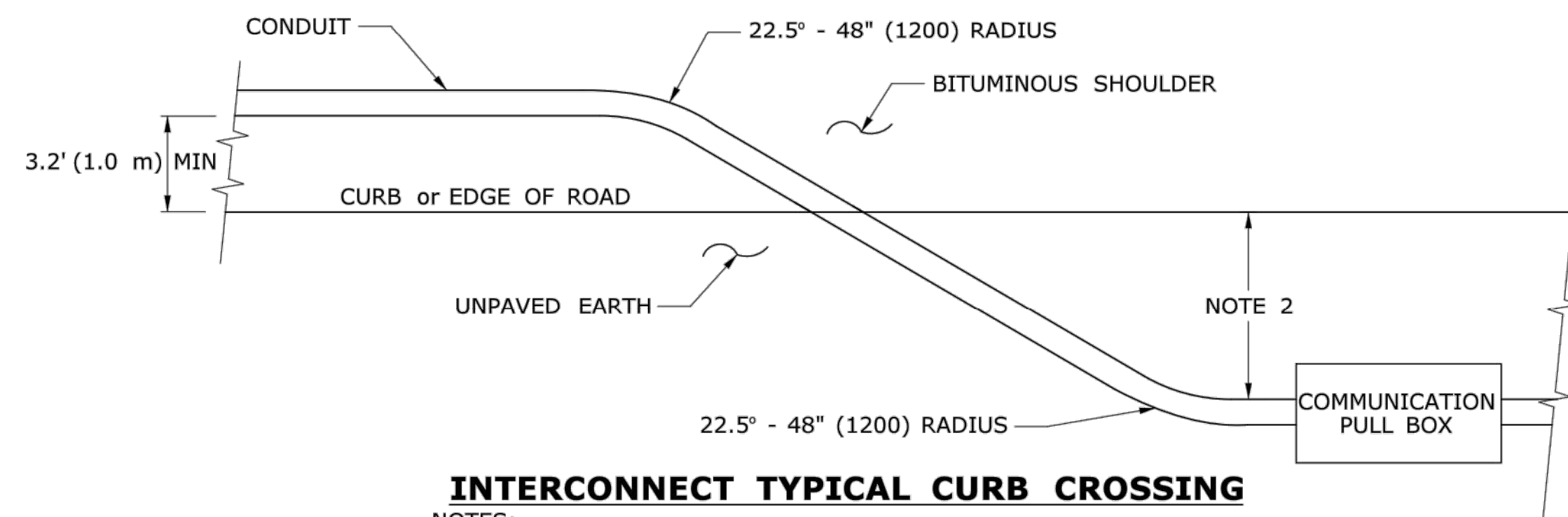
PROJECT TITLE: **NEW LONDON TRAFFIC SIGNAL UPGRADE**

DATE: January 15, 2021

TOWN: **NEW LONDON**

DRAWING TITLE: **MISCELLANEOUS DETAILS**

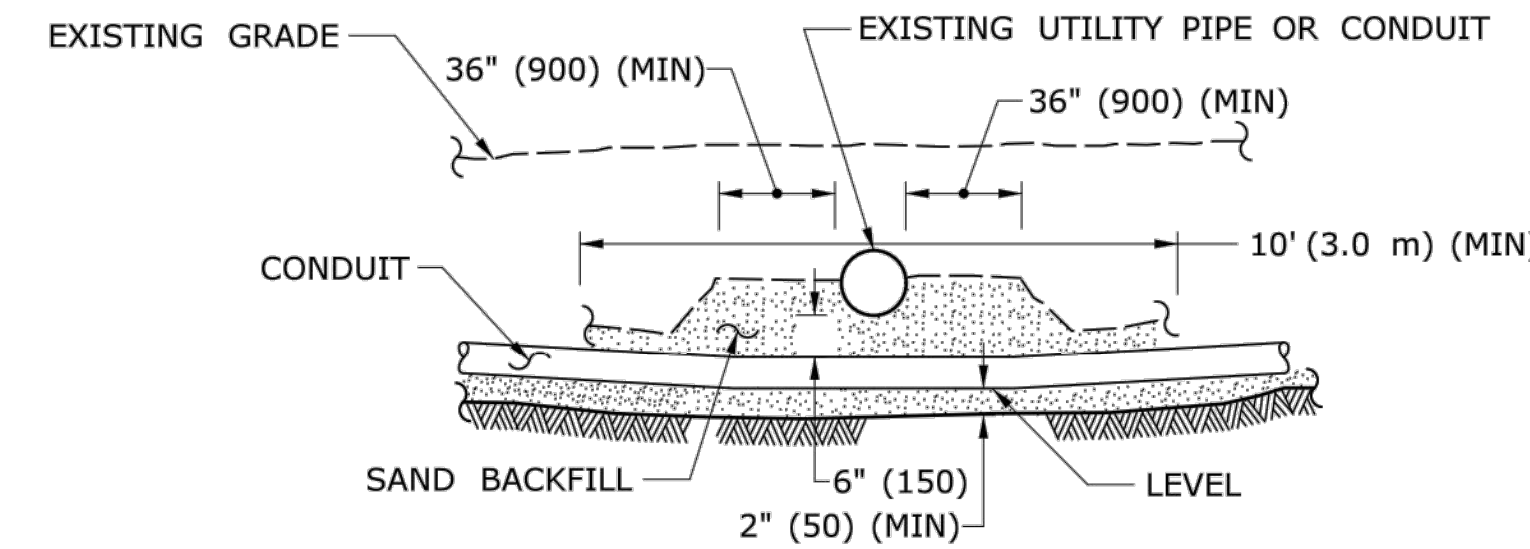
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DRAWING NO. MDS-03
SHEET NO. 08



INTERCONNECT TYPICAL CURB CROSSING

NOTES:

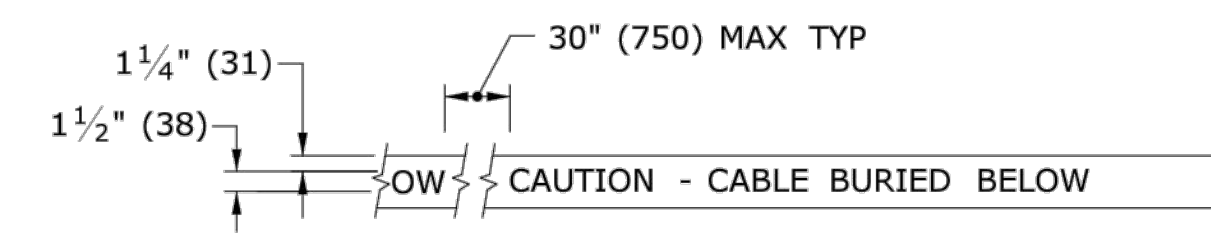
- RESTORE AREAS DISTURBED BY TRENCH TO ORIGINAL CONDITION.
- INSTALL PULL BOX A MINIMUM OF 10' (3.0 m) FROM CURB UNLESS OTHERWISE SHOWN ON PLANS OR DIRECTED BY ENGINEER.



CROSSING UNDER EXISTING UTILITY

NOTES:

- WHEN ENCOUNTERED AT APPROXIMATELY THE SAME DEPTH, CROSS BENEATH.
- PROTECT & SUPPORT EXPOSED EXISTING UTILITY.



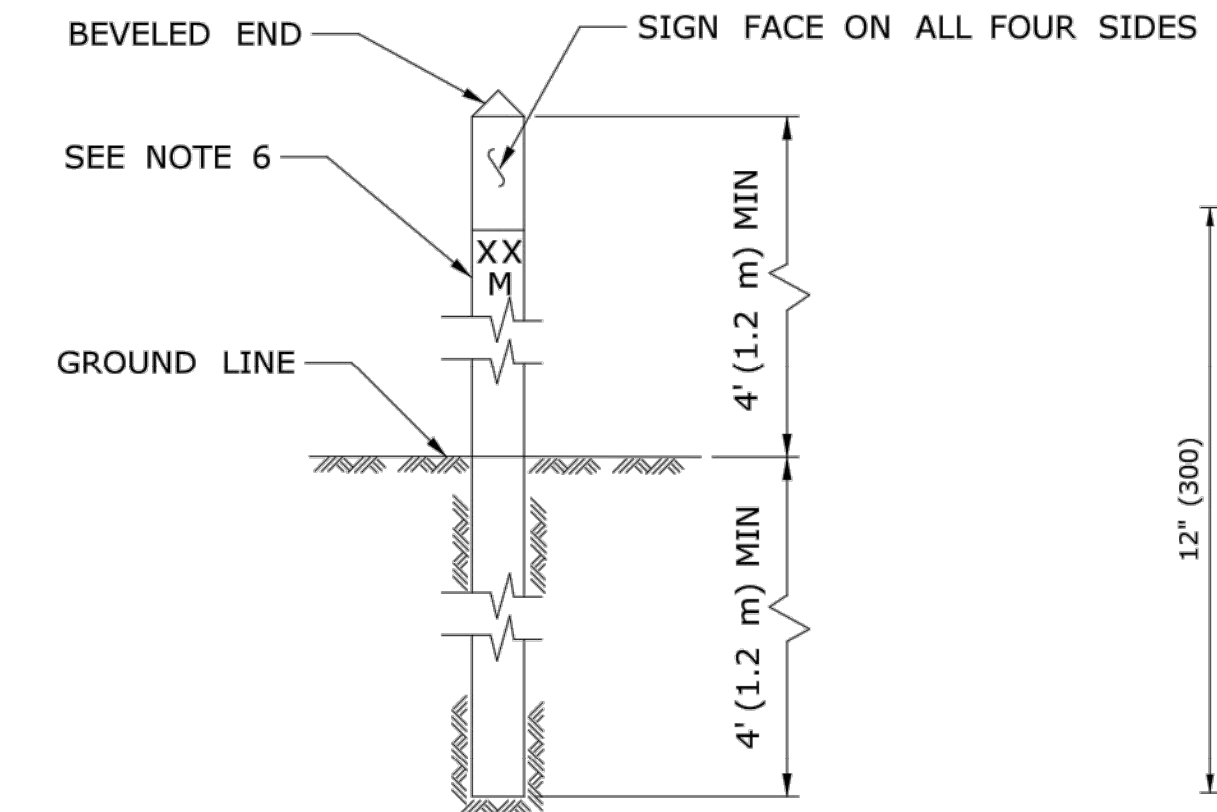
DETECTABLE WARNING TAPE

NOTE:

STANDARD SPECIFICATIONS, ARTICLE: 1.05.15

1. TAPE COLORS:

- COMMUNICATION - ORANGE BACKGROUND / BLACK LEGEND
- POWER - RED BACKGROUND / BLACK LEGEND

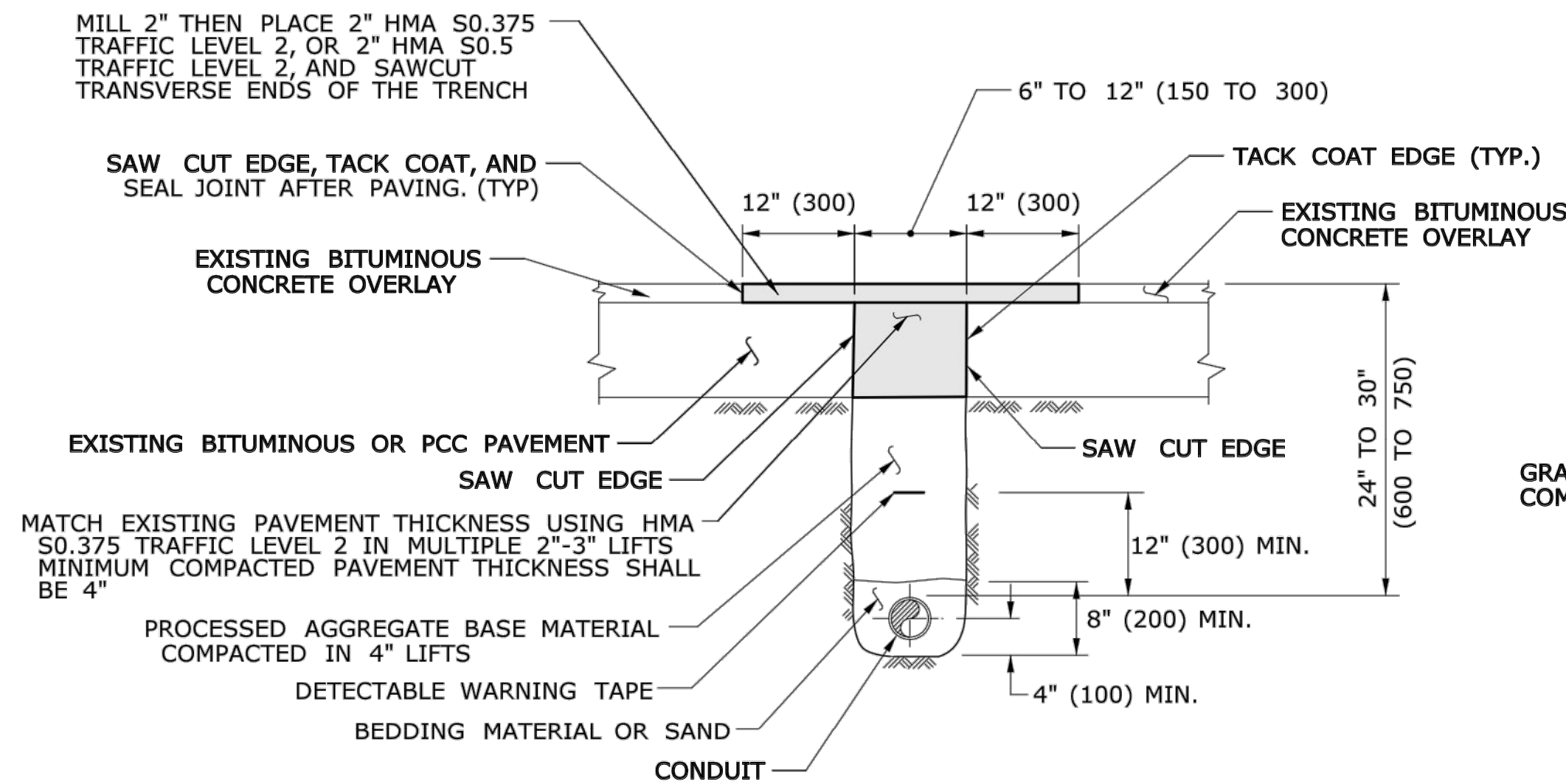
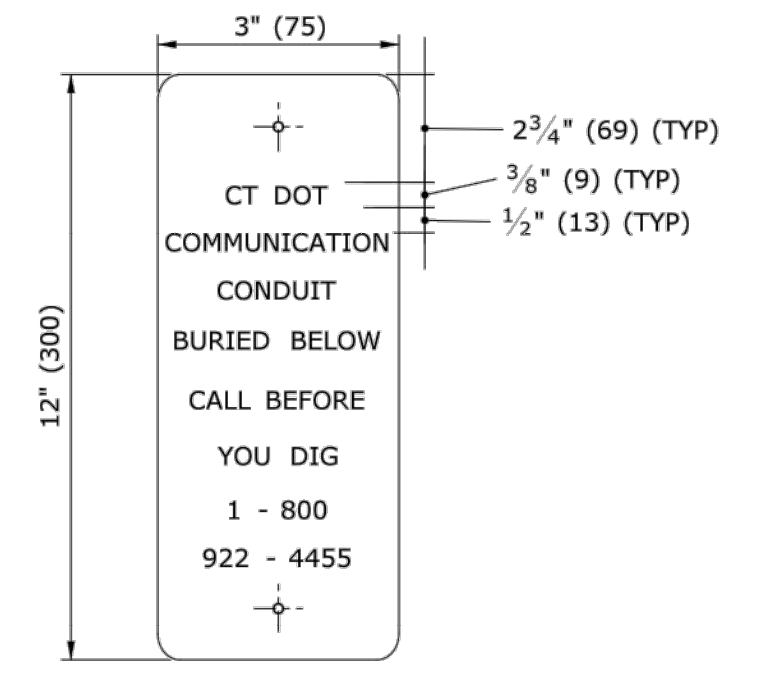


INTERCONNECT CONDUIT IDENTIFICATION POST

NOTES:

- 4" x 4" (100 x 100) NOMINAL, PRESSURE TREATED WOOD POST.
- ATTACH SIGN TO POST WITH 1/4" x 1 1/4" (6 x 31) STAINLESS STEEL LAG SCREW WITH NYLON WASHER ON FACE OF SIGN.
- SIGN COLORS: BACKGROUND - ORANGE (RETROREFLECTIVE) LEGEND - BLACK (OPAQUE).
- INSTALL POST APPROX 24" (600) FROM RMC IN VICINITY OF EACH PULL BOX.
- INSTALL POSTS BETWEEN PULL BOXES, APPROX 10' (3.0 m) OFF CURB. SPACE POSTS 1500'± (460 m)± APART.
- PERMANENTLY ATTACH STAINLESS STEEL NUMBERS INDICATING DISTANCE TO TRENCH IN FEET (METERS) CONTAINING COMMUNICATION CABLE. ATTACH NUMBERS TO SIDE OF POST FACING CONDUIT. INCLUDE "M" SUFFIX IF METERS.

SIGN FACE DETAIL
SIGN # 41-4669

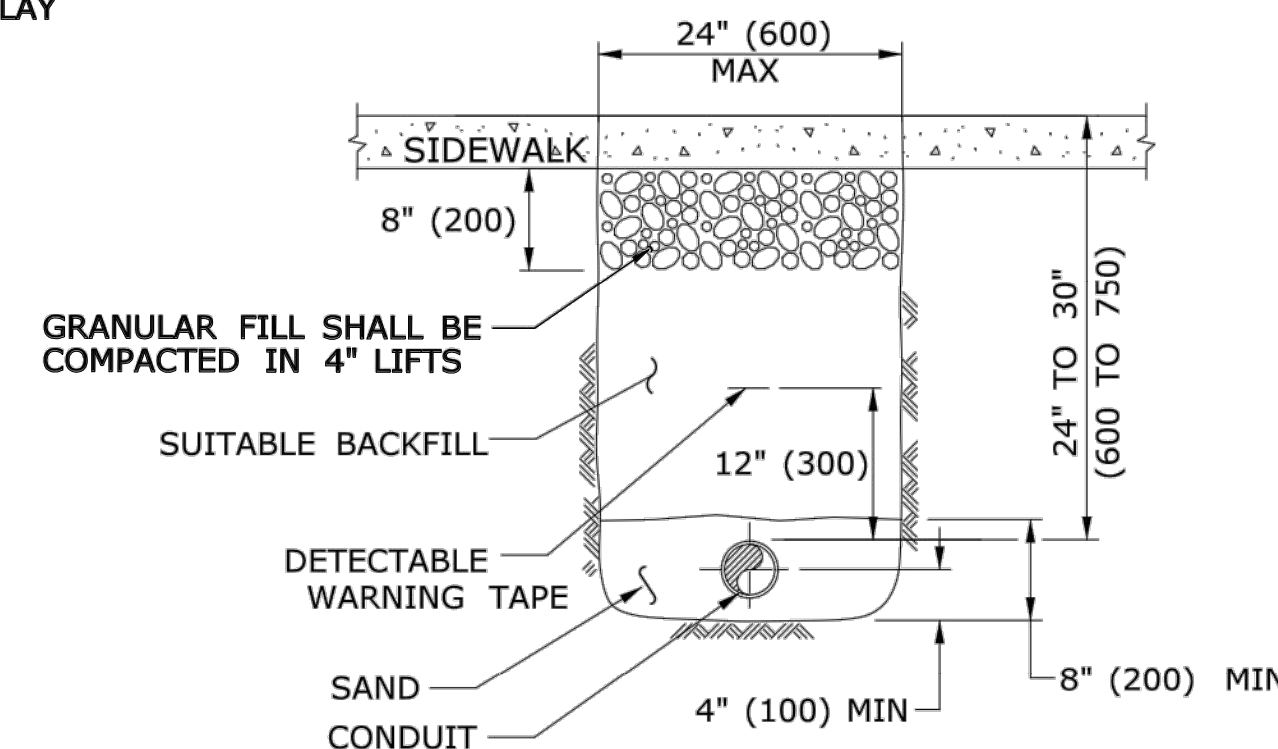


PAVEMENT - BITUMINOUS CONCRETE OR OVERLAVED PORTLAND CEMENT CONCRETE

NOTES:

STANDARD SPECIFICATION, ARTICLE 3.04 AND SPECIAL PROVISION, SECTION 4.06.03

- TOTAL HOT MIX ASPHALT (HMA) THICKNESS TO MATCH EXISTING BITUMINOUS CONCRETE AND PORTLAND CEMENT CONCRETE (PCC) THICKNESS.
- WHEN ALLOWED BY ENGINEER, USE CONTROLLED LOW STRENGTH MATERIAL (CLSM) AS BEDDING MATERIAL. TOP OF CLSM AT LEAST 20" (500) BELOW SURFACE.

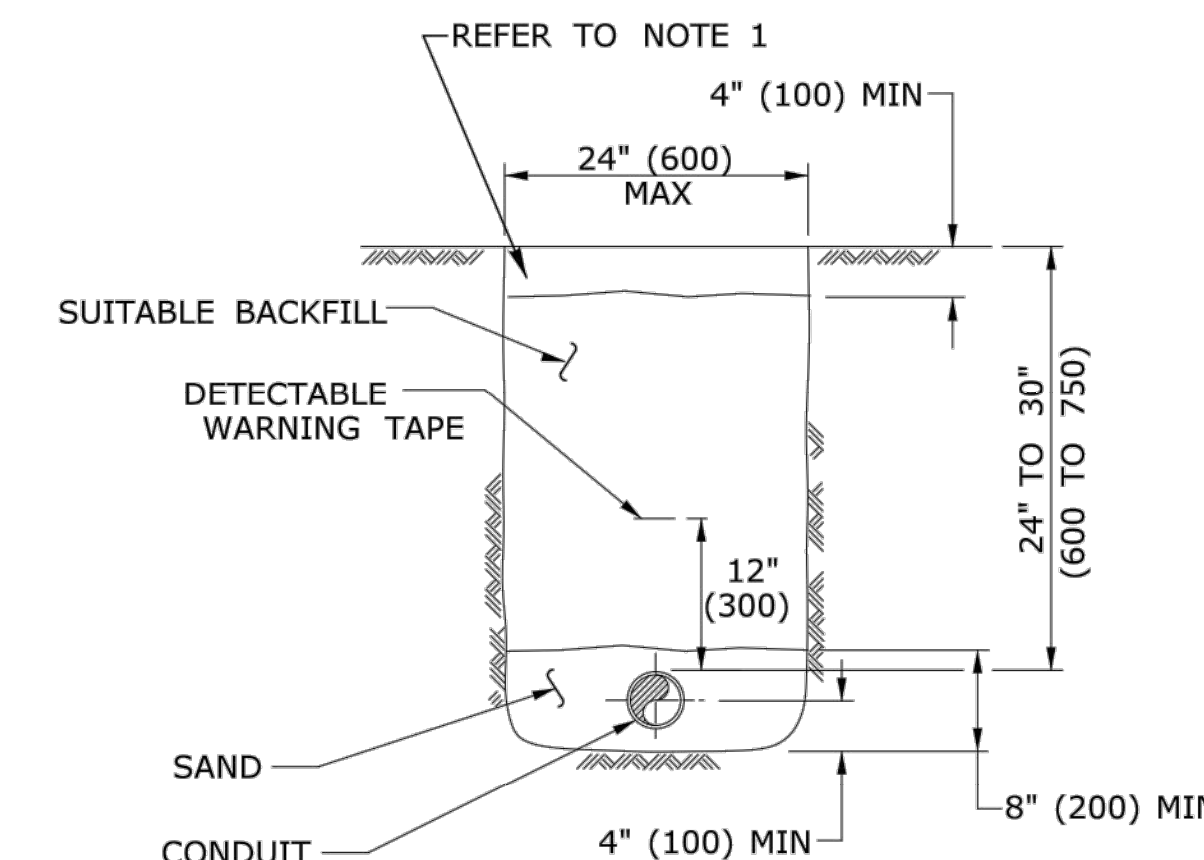


SIDEWALK

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.21 & 9.22

- WHERE CONCRETE SIDEWALK DAMAGED OR CUT, REPLACE THE ENTIRE SECTION BETWEEN JOINTS. REPLACEMENT SIDEWALK IS PAID FOR AT THE CONTRACT UNIT PRICE FOR "CONCRETE SIDEWALK".



EARTH

NOTES:

STANDARD SPECIFICATIONS, ARTICLE: 9.50

- IN MOWED AREAS: PLACE TOPSOIL, FERTILIZER, SEED, & MULCH.

GENERAL NOTES:

- TOP OF CONDUIT NO LESS THAN 24" (600) DEEP.
- COMPACT BACKFILL IN ≤ 6" (150) LIFTS. HAND COMPACTION NOT PERMITTED.

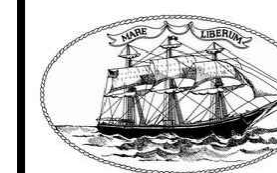
LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:
--- RMC (RIGID METAL CONDUIT)

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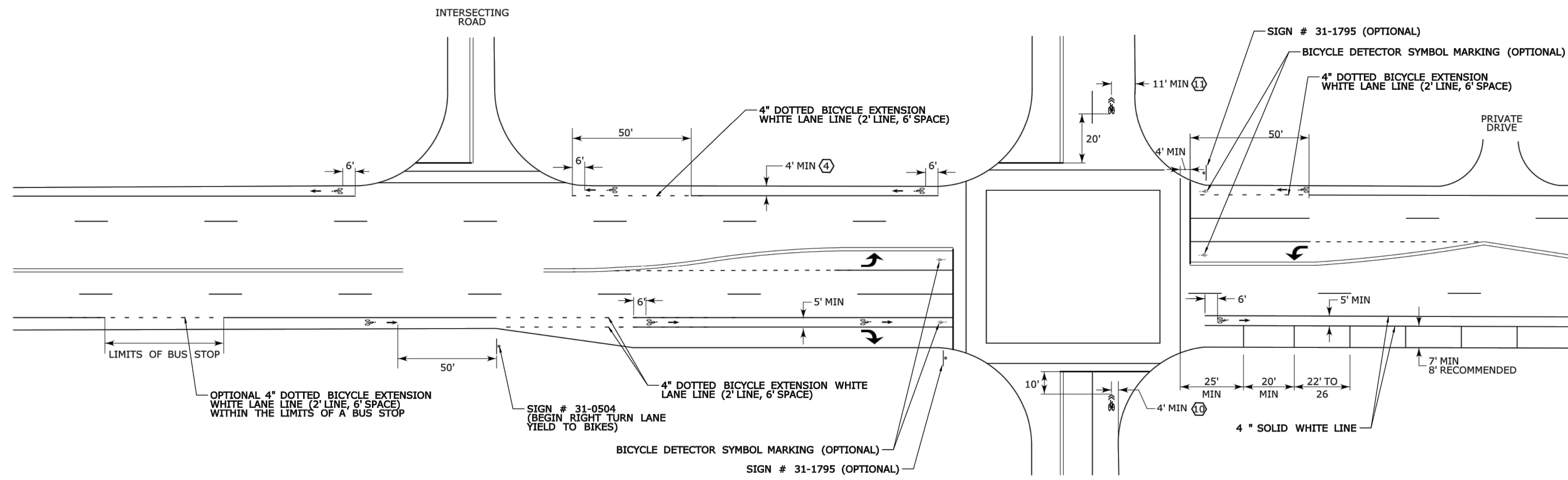


PROJECT TITLE: NEW LONDON TRAFFIC SIGNAL UPGRADE
DATE: January 15, 2021

TOWN: NEW LONDON
DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 42573.00
DRAWING NO. MDS-04
SHEET NO. 09

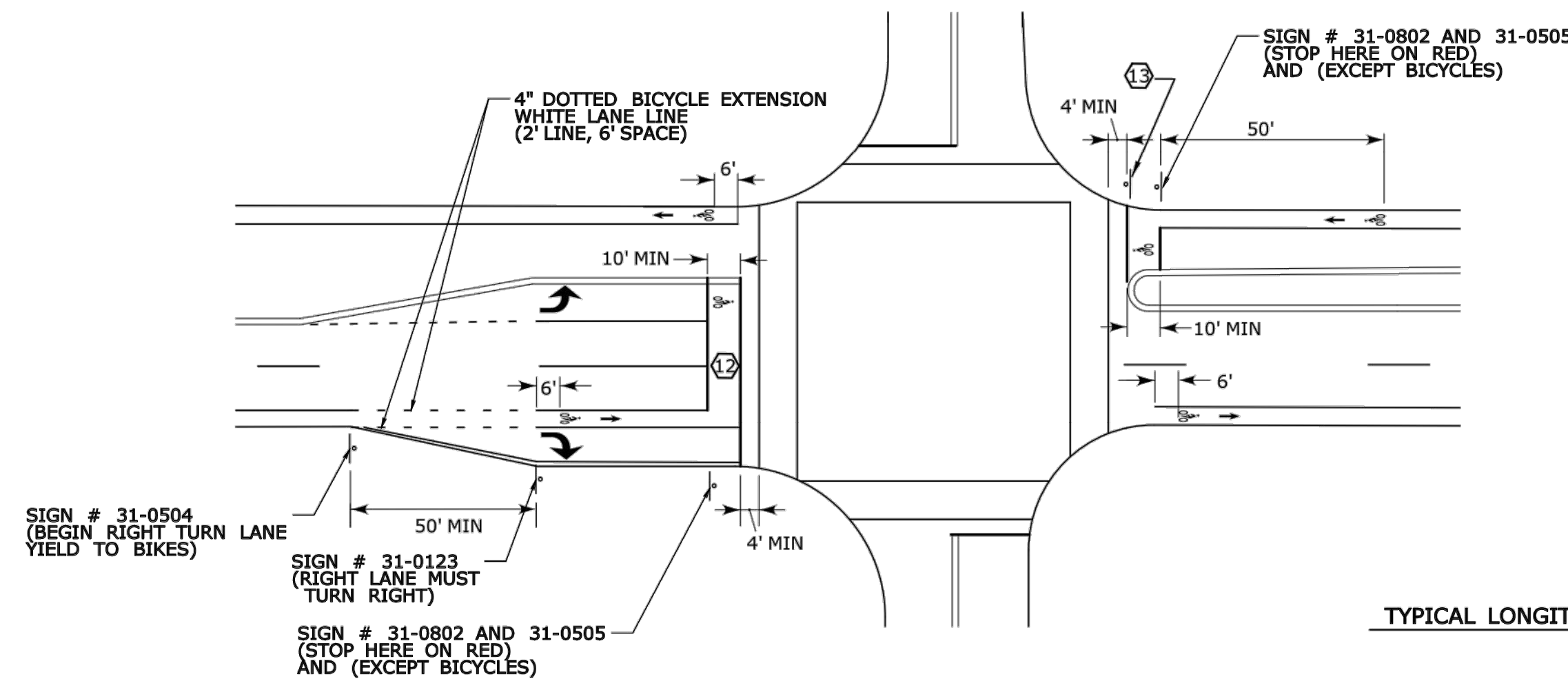
TYPICAL BICYCLE LANE AND SHARROW MARKING DETAIL



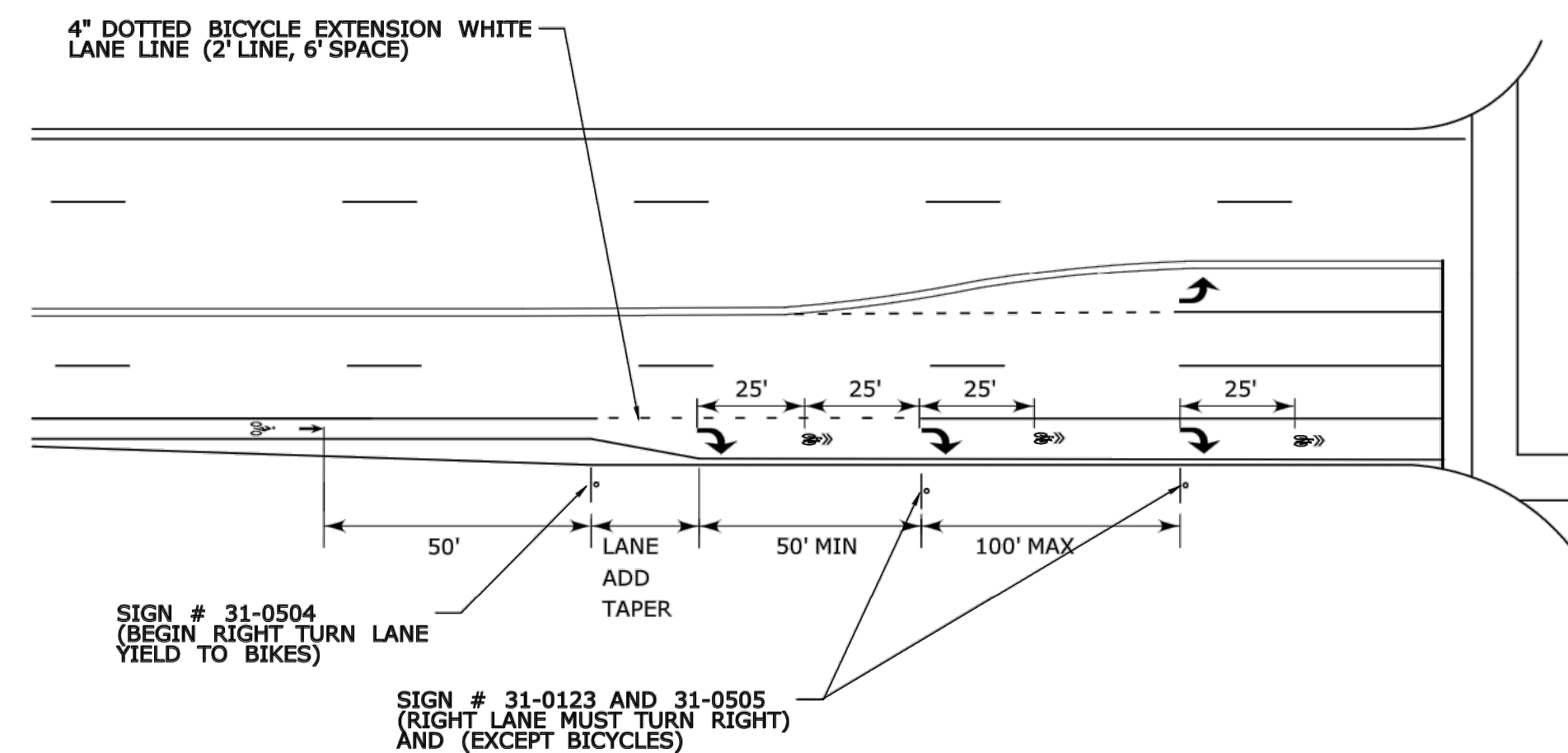
NOTES:

- BICYCLE PAVEMENT MARKINGS AND GREEN PAVEMENT TO BE OWNED AND MAINTAINED BY THE MUNICIPALITY.
- MUNICIPALITY MUST OBTAIN FHWA INTERIM APPROVAL FOR BICYCLE BOX INSTALLATION AND COMPLY WITH THE REQUIREMENTS OF FHWA INTERIM APPROVAL No. IA-18, OPTIONAL USE OF AN INTERSECTION BICYCLE BOX. BICYCLE BOX USE IS LIMITED TO SIGNALIZED INTERSECTIONS.
- MUNICIPALITY MUST OBTAIN FHWA INTERIM APPROVAL FOR GREEN PAVEMENT INSTALLATION AND COMPLY WITH THE REQUIREMENTS OF FHWA INTERIM APPROVAL No. IA-14, OPTIONAL USE OF GREEN COLORED PAVEMENT FOR BIKE LANES AND FHWA INTERPRETATION LETTER 9(09)-86(1), CHROMATICITY REQUIREMENTS FOR GREEN-COLORED PAVEMENT. GREEN COLORED PAVEMENT MAY BE INSTALLED ONLY WITHIN A BICYCLE LANE OR WITHIN AN EXTENSION OF A BICYCLE LANE.
- 5 FEET WIDE BICYCLE LANES SHOULD BE USED IF IMMEDIATELY ADJACENT TO A CURB, GUIDE RAIL, OR OTHER VERTICAL SURFACES.
- MARKINGS USED ON BIKEWAYS SHALL BE RETROREFLECTORIZED.
- BICYCLE LANES MARKINGS SHOULD BE SPACED AT INTERVALS NO GREATER THAN 500 FT.
- IF USED, SHARED LANE MARKINGS SHOULD BE SPACED AT INTERVALS NO GREATER THAN 250 FT.
- SHARED LANE MARKINGS SHOULD NOT BE PLACED ON ROADWAYS THAT HAVE A SPEED LIMIT ABOVE 35 MPH.
- BICYCLE DETECTOR SYMBOL MARKINGS MAY BE PLACED ON THE PAVEMENT INDICATING THE OPTIMUM POSITION FOR A BICYCLIST TO ACTUATE THE SIGNAL. THE LOCATION OF THE MARKINGS SHALL BE SPECIFIED ON THE SIGNAL PLAN. THE MARKINGS MAY BE SUPPLEMENTED BY SIDE MOUNTED SIGN # 31-1795.
- ON STREETS WITHOUT ON-STREET PARKING AND WITH OUTSIDE TRAVEL LANES LESS THAN 14 FEET WIDE, THE CENTERS OF THE SHARED LANE MARKINGS SHOULD BE AT LEAST 4 FEET FROM THE FACE OF THE CURB, OR FROM THE EDGE OF THE PAVEMENT WHERE THERE IS NO CURB.
- ON STREETS WITH ON-STREET PARKING THE CENTERS OF THE SHARED LANE MARKINGS SHOULD BE AT LEAST 11 FEET FROM THE FACE OF THE CURB, OR FROM THE EDGE OF THE PAVEMENT WHERE THERE IS NO CURB.
- COUNTDOWN PEDESTRIAN SIGNAL HEADS ARE REQUIRED FOR BICYCLE BOXES LOCATED ACROSS MULTILANE APPROACHES.
- URNS ON RED SHALL BE PROHIBITED FROM THE APPROACH WHERE A BICYCLE BOX IS PLACED USING A NO TURN ON RED (R10-11 SERIES) SIGN.
- AREA OF PAVEMENT MARKING SYMBOLS AS INDICATED IS APPROXIMATE.
- REFER TO STANDARD SHEET TR-1210.04 FOR PAVEMENT MARKING LINE DETAILS.

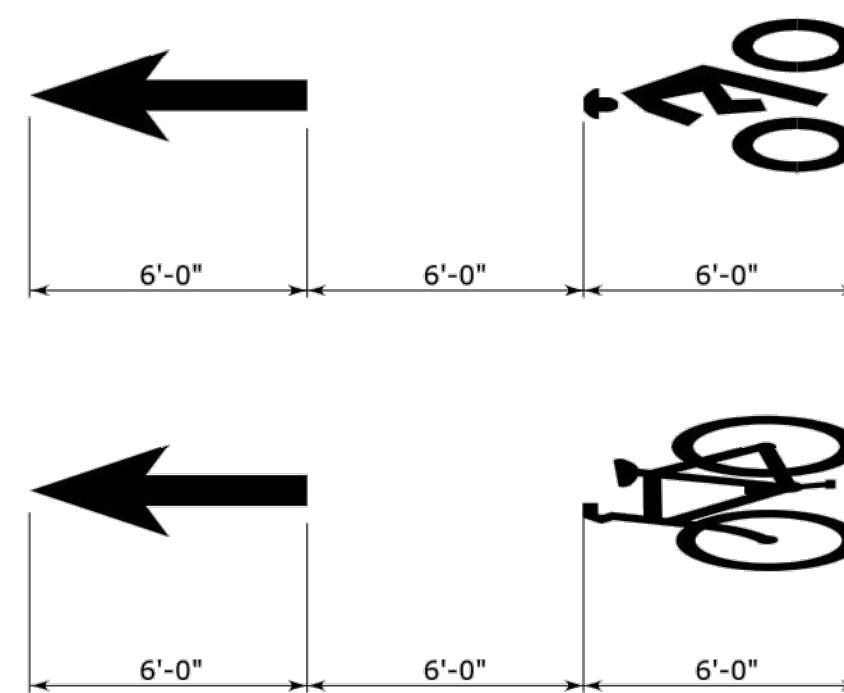
TYPICAL BICYCLE BOX DETAIL



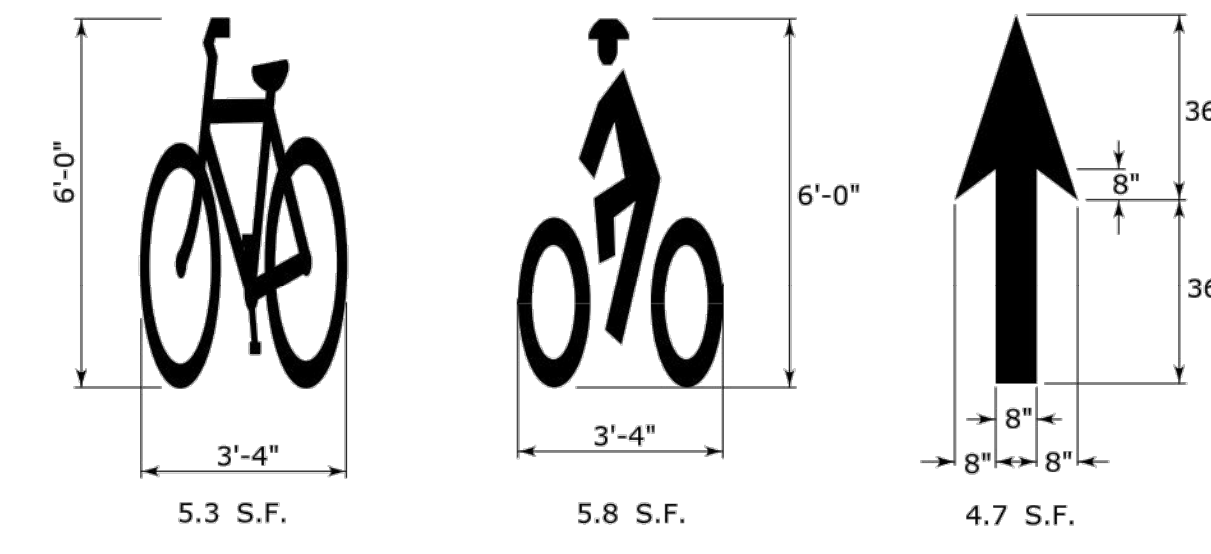
TYPICAL SHARED BICYCLE LANE AND TURN LANE DETAIL



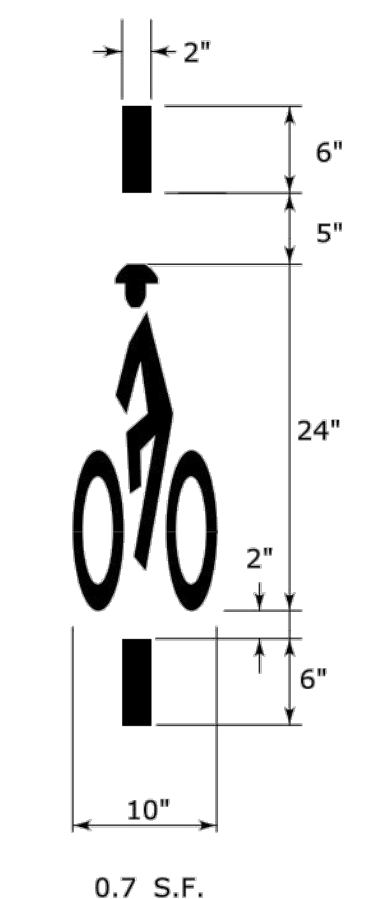
TYPICAL LONGITUDINAL SPACING



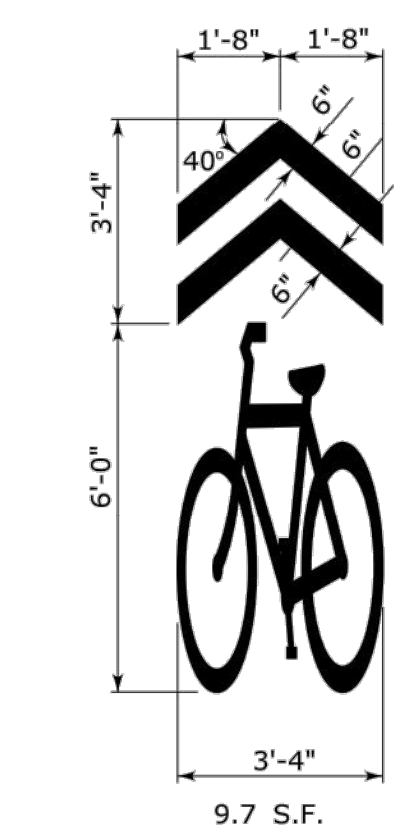
BICYCLE LANE SYMBOL MARKINGS



BICYCLE DETECTOR SYMBOL MARKING



SHARED LANE SYMBOL MARKING



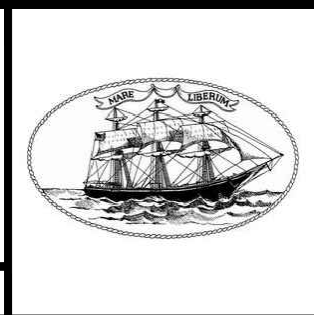
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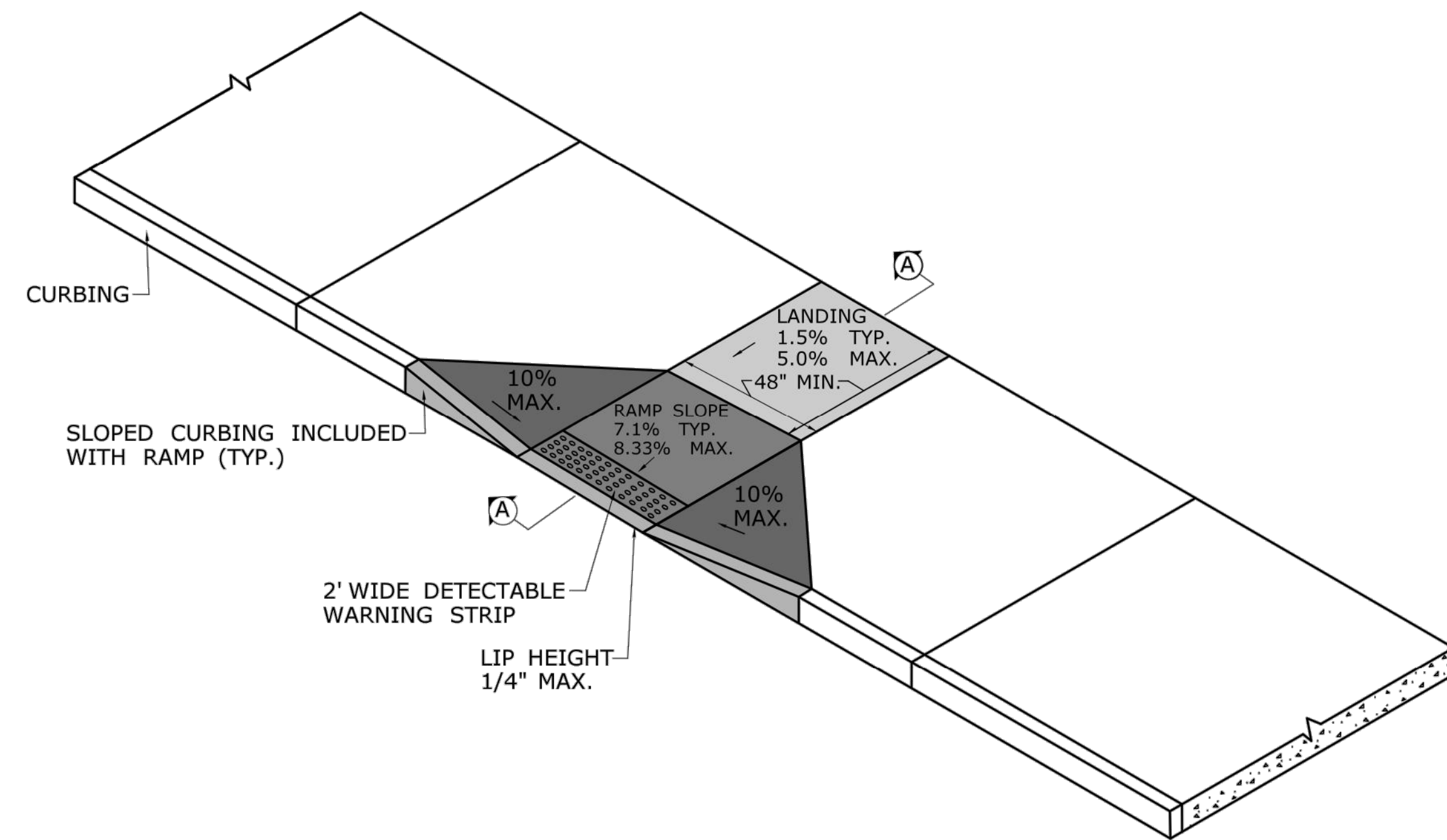
PROJECT TITLE:
NEW LONDON TRAFFIC SIGNAL UPGRADE

DATE: January 15, 2021

TOWN:
NEW LONDON

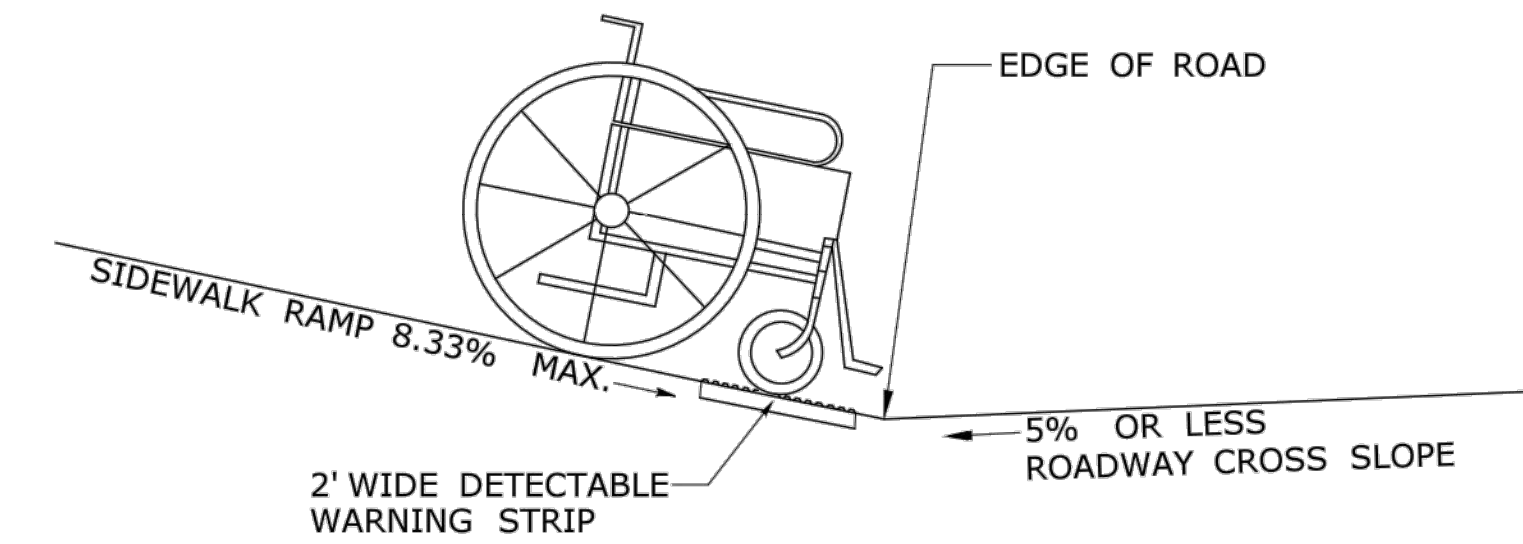
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MISCELLANEOUS DETAILS

PROJECT NO. 42573.00
DRAWING NO. MDS-05
SHEET NO. 10

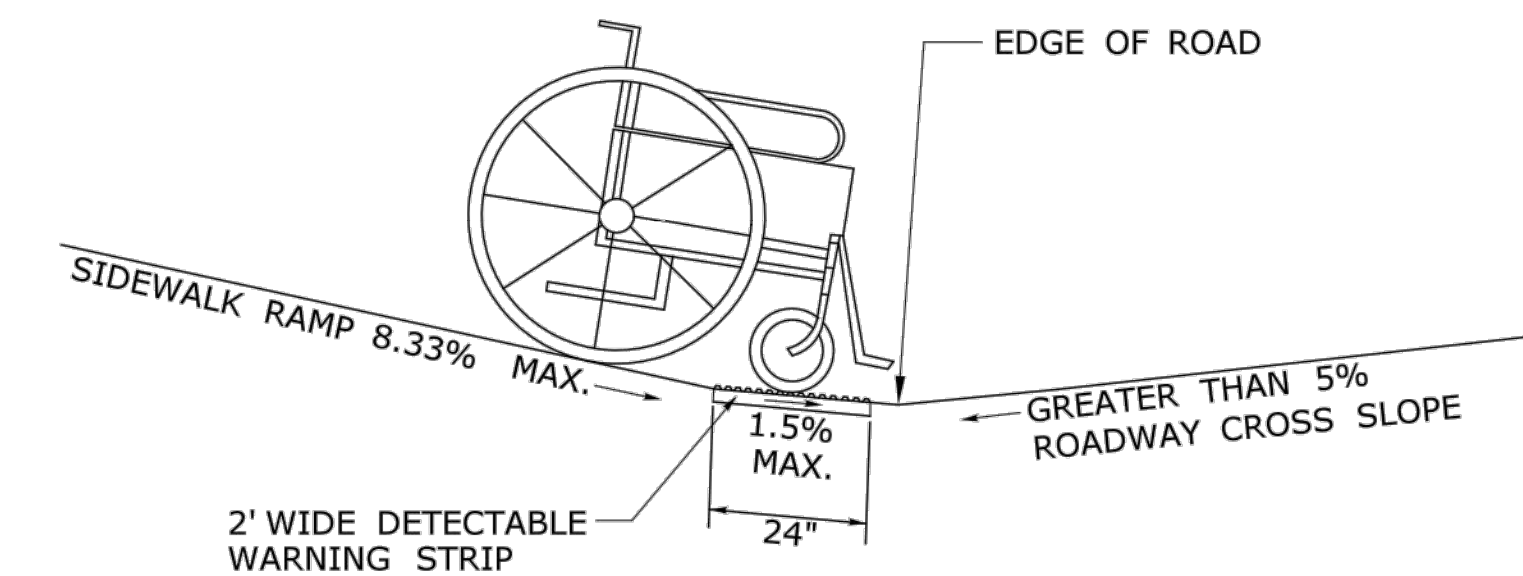


**PERPENDICULAR
SIDEWALK RAMP**

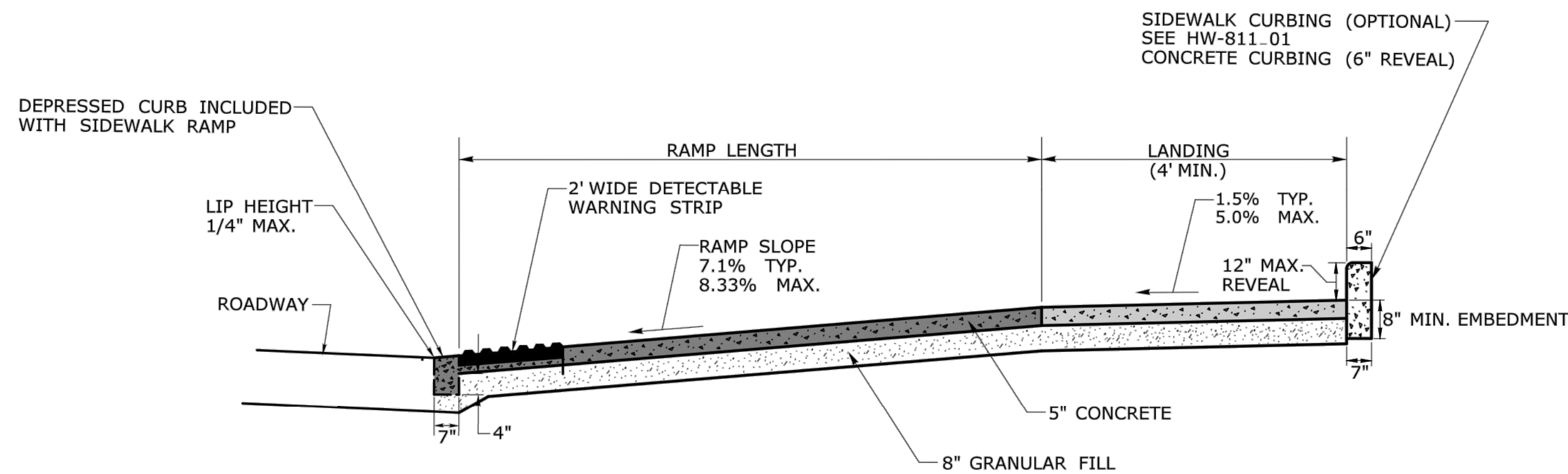
- GENERAL NOTES:**
1. SIDEWALK RAMP SHALL HAVE A COARSE BROOM FINISH TRAVERSE TO THE SLOPE OF THE RAMP.
 2. VERTICAL SURFACE DISCONTINUITIES AT JOINTS SHALL NOT EXCEED 1/4 INCH.
 3. REMOVAL OF EXISTING SIDEWALK FOR NEW RAMP INSTALLATIONS SHALL BE TO THE NEAREST EXPANSION OR CONTRACTION JOINT.
 4. THE RUNNING SLOPE OF THE CURB RAMP SHALL BE 8.3 PERCENT MAXIMUM BUT SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET.



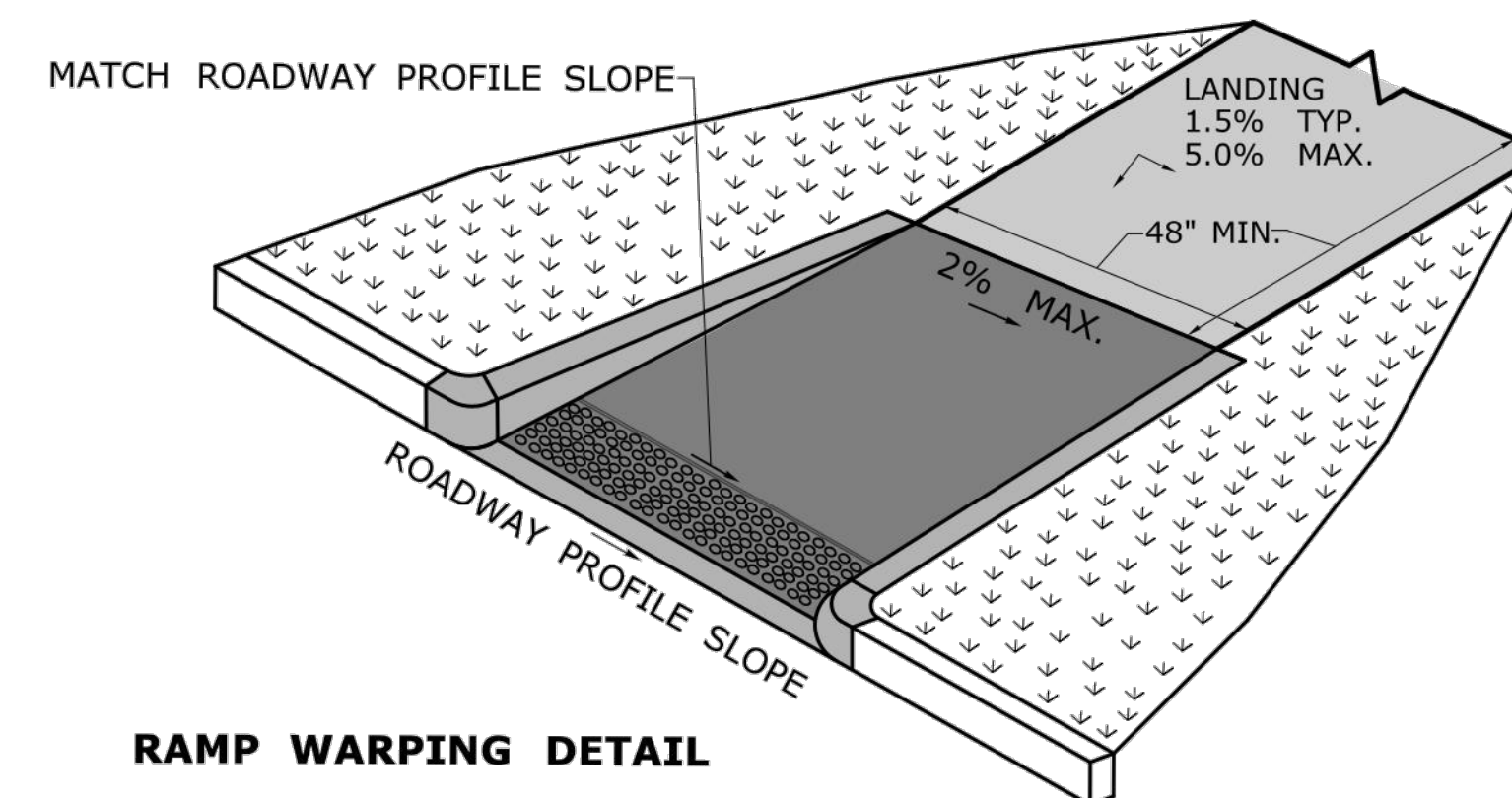
**SIDEWALK RAMP GRADE AT
ROADWAY CROSS SLOPE OF 5% OR LESS**



**SIDEWALK RAMP GRADE AT
ROADWAY CROSS SLOPE OF GREATER THAN 5%**



SECTION AA



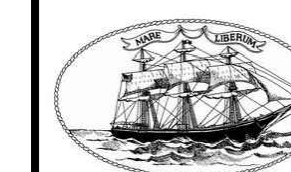
RAMP WARPING DETAIL

1. TRANSITION SIDEWALK RAMP TO MATCH ROADWAY PROFILE AS GRADUALLY AS POSSIBLE. DO NOT EXCEED 3% PER FOOT CROSS SLOPE RATE OF CHANGE WHEN TRANSITIONING TO ROADWAY PROFILE.
2. COMPLETE TRANSITION TO ROADWAY PROFILE BEHIND DETECTABLE WARNING SURFACE.

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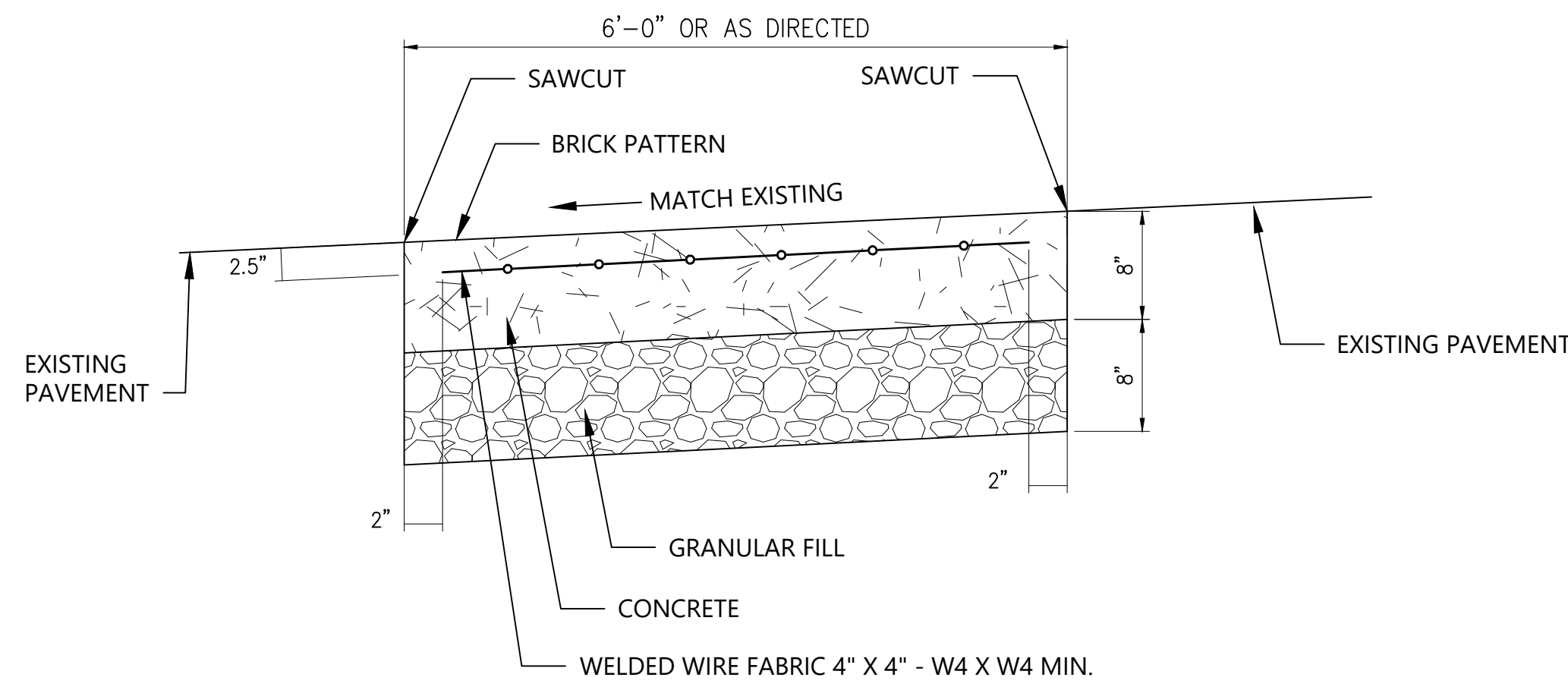
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PROJECT TITLE: NEW LONDON TRAFFIC SIGNAL UPGRADE
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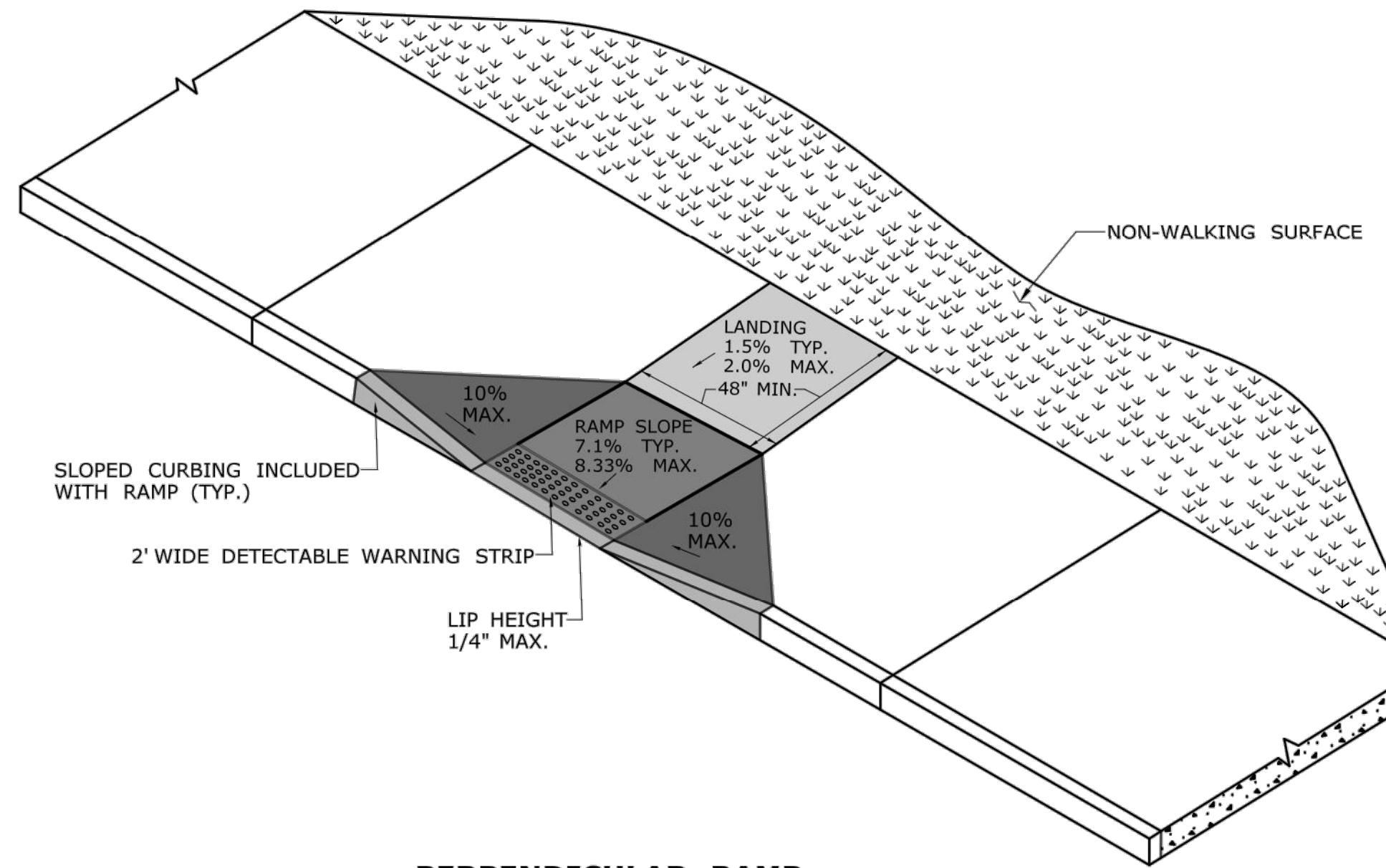
TOWN: NEW LONDON
DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 42573.00
DRAWING NO. MDS-07
SHEET NO. 12

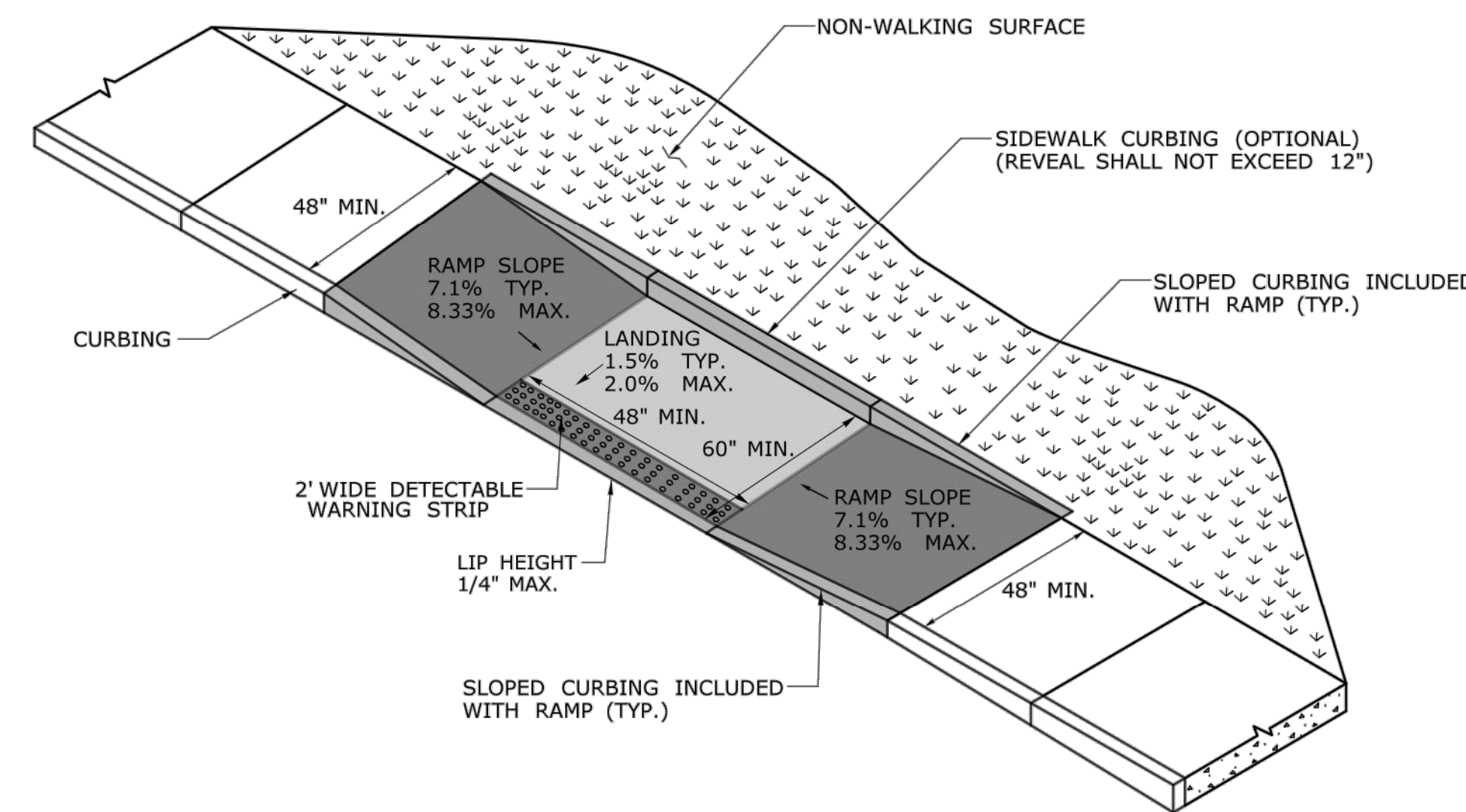


NOTE: TRANSVERSE EXPANSION JOINTS SHALL BE LOCATED EVERY 15-FEET

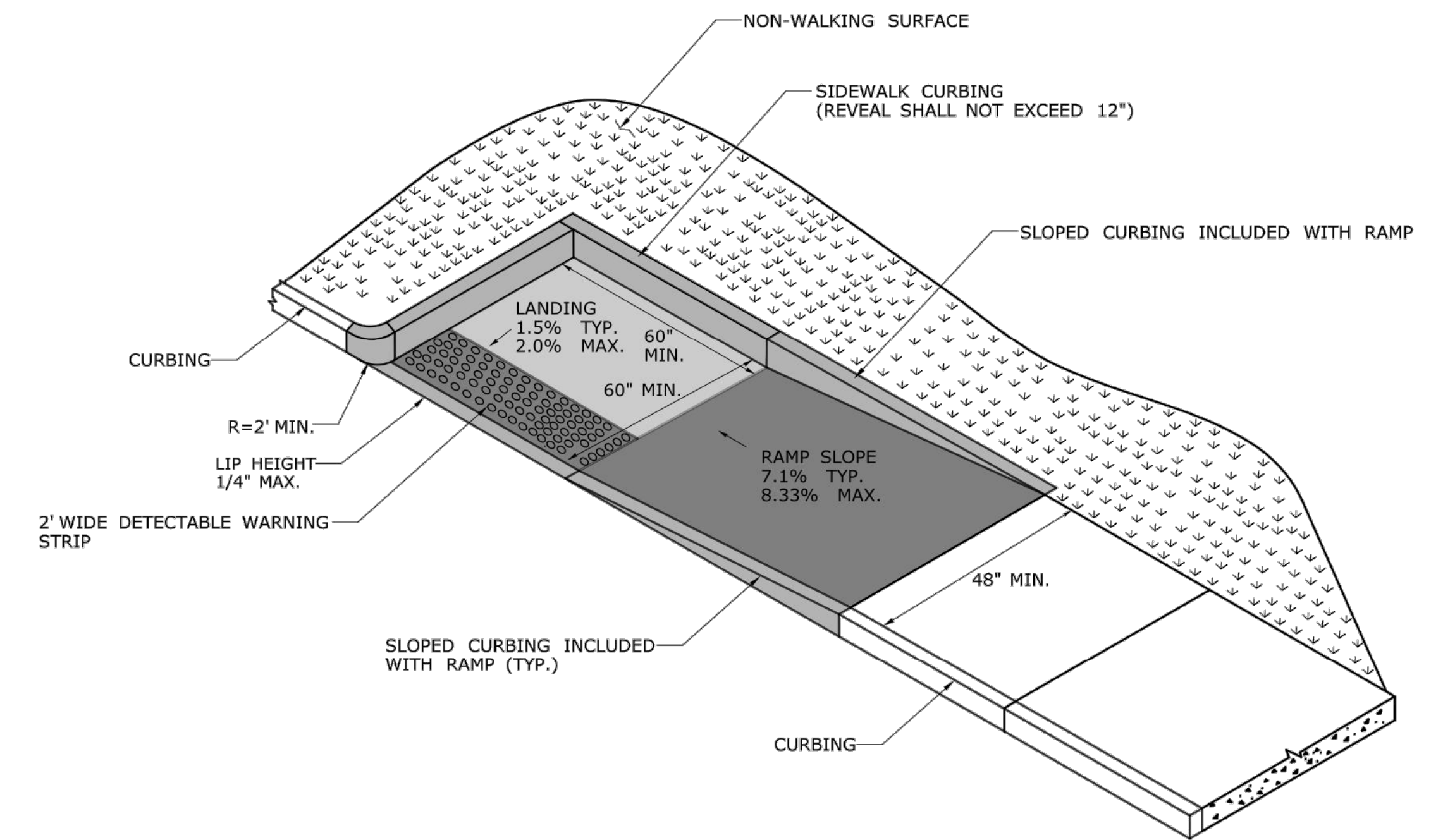
DECORATIVE CONCRETE CROSSWALK (BRICK PATTERN)



PERPENDICULAR RAMP WITH 48" BY-PASS (TYPE 8)



PARALLEL RAMP WITHOUT NON-WALKING SURFACE (TYPE 9)



PARALLEL RAMP WITH LANDING AT BOTTOM ON CORNER (TYPE 10)

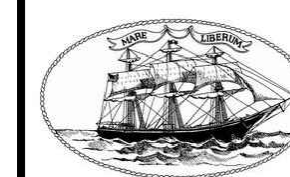
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PROJECT TITLE:	NEW LONDON TRAFFIC SIGNAL UPGRADE
DATE:	January 15, 2021

TOWN:	NEW LONDON
DRAWING TITLE:	MISCELLANEOUS DETAILS

PROJECT NO.	42573.00
DRAWING NO.	MDS-08
SHEET NO.	13

DOCUMENT ALL LOOP DETECTOR VALUES BOTH CALCULATED AND MEASURED.

DEFINITIONS:

LOOP: #14 AWG WIRE IN SAWCUT, TERMINATED IN HANDHOLE, IMSA SPEC 51-7.
 LEAD-IN: 14/2 SHIELDED TWISTED PAIR CABLE FROM HANDHOLE TO CONTROLLER, IMSA SPEC 50-2.
 LOOP CIRCUIT: LOOP SAWCUT WIRE SPLICED TO 14/2 LEAD-IN CABLE.
 AMPLIFIER: ELECTRONIC DEVICE CONNECTED TO LOOP CIRCUIT. SENSES CHANGE IN RESONANT FREQUENCY AND CREATES AN OUTPUT TO THE CONTROLLER.
 MEGOHMMETER: INSTRUMENT SPECIFICALLY DESIGNED TO TEST THE INSULATION RESISTANCE OF A CIRCUIT. COMMON MANUFACTURERS: AMEC®, AMPROBE®, FLUKE®, MEGGER®.

1: RESISTANCE:

1a: INSULATION RESISTANCE: PERFORM A 600 VOLT (MINIMUM) MEGOHMMETER TEST ON LOOP CIRCUIT. THE LOOP AMPLIFIER MUST BE DISCONNECTED FROM THE LOOP CIRCUIT OR THE LOOP AMPLIFIER WILL BE DAMAGED. THE RESISTANCE OF THE LOOP WIRE TO GROUND MUST BE GREATER THAN 100 MEG OHMS.

1b: WIRE RESISTANCE: MEASURE THE DC RESISTANCE OF THE LOOP CIRCUIT. THE LOOP CIRCUIT MUST BE DISCONNECTED FROM THE AMPLIFIER. USING AN OHMMETER CONNECTED ACROSS THE LOOP CIRCUIT, MEASURE THE DC RESISTANCE OF THE CONDUCTORS. THE RESISTANCE SHOULD BE LESS THAN 4 OHMS.

NOTE: ALL TESTS SHALL BE DONE AT THE CONTROLLER ASSEMBLY (CA), HOWEVER IT IS RECOMMENDED TO PERFORM A PRELIMINARY MEGOHMMETER TEST AT THE HANDHOLE PRIOR TO SEALING THE SAWCUT AND SPLICING TO THE LEAD-IN. IF A DEFECTIVE LOOP WIRE IS FOUND, IT MAY BE EASILY REPLACED.

2: LOOP CIRCUIT INDUCTANCE:

2a: CALCULATE INDUCTANCE OF LOOP (L_{LOOP}) AND LEAD-IN CABLE (L_{14/2}).

LOOP INDUCTANCE (ENGLISH)	LOOP INDUCTANCE (METRIC)
$L_{LOOP} = (P/4) (N^2 + N)$	$L_{LOOP} = (3.28P/4) (N^2 + N)$
LEAD-IN INDUCTANCE	LEAD-IN INDUCTANCE
$L_{14/2} = (0.24 \mu h/FT) (D)$	$L_{14/2} = (0.78 \mu h/m) (D)$

WHERE:
 L_{LOOP} = INDUCTANCE OF INDIVIDUAL LOOP SEGMENTS IN MICROHENRIES (μh).
 L_{14/2} = INDUCTANCE OF LEAD-IN CABLE.
 P = PERIMETER OF INDIVIDUAL LOOP SEGMENT, IN FEET OR METERS.
 N = NUMBER OF TURNS.
 D = LENGTH OF LEAD-IN CABLE FROM SPLICE IN HANDHOLE TO CONTROLLER, IN FEET OR METERS.
 $L_T = L_1 + L_2 + L_3$ etc.,
 (TOTAL INDUCTANCE OF SEGMENTED LOOP SPLICED IN SERIES.)
 $L_T = 1 / [(1/L_1) + (1/L_2) + (1/L_3) + \text{etc.}]$,
 (TOTAL INDUCTANCE OF SEGMENTED LOOP SPLICED IN PARALLEL.)

WHERE:
 L_T = TOTAL INDUCTANCE OF THE SEGMENTED ARRANGEMENT.
 L₁, L₂, L₃ = INDUCTANCE OF INDIVIDUAL LOOP SEGMENTS.

EXAMPLE: (IN ENGLISH)

6' x 6', 4 TURNS, APPROXIMATELY 300' FROM THE CONTROLLER

$L_{LOOP} = (24/4) (4^2 + 4)$	$L_{14/2} = (0.24 \mu h/FT) (300)$
$L_{LOOP} = (6) (20)$	$L_{14/2} = (0.24) (300)$
$L_{LOOP} = 120 \mu h$	$L_{14/2} = 72 \mu h$

2b: MEASURE INDUCTANCE OF LOOP AND LEAD-IN AT CONTROLLER. USE INSTRUMENT DESIGNED TO MEASURE LOOP CIRCUIT INDUCTANCE.

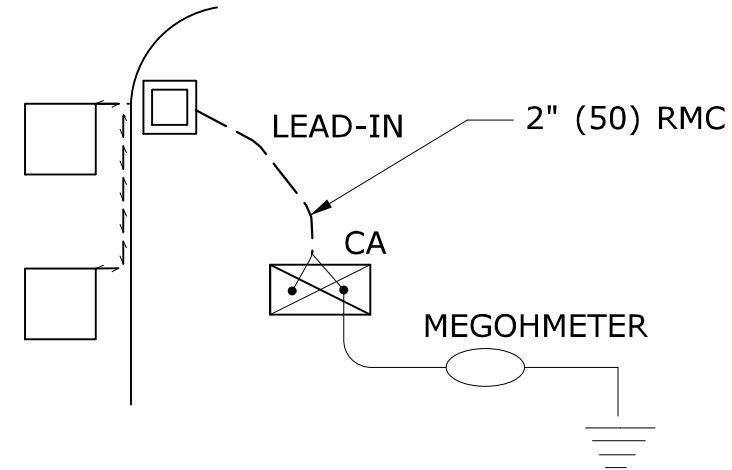
3: POWER INTERRUPTION:

AFTER THE AMPLIFIER HAS TUNED AND IS OPERATING, DISCONNECT POWER BY REMOVING FUSE OR HARNESS CONNECTOR. RETURN POWER TO THE AMPLIFIER AND CONFIRM IT RE-TUNES AUTOMATICALLY WITHOUT ANY MANUAL ADJUSTMENTS.

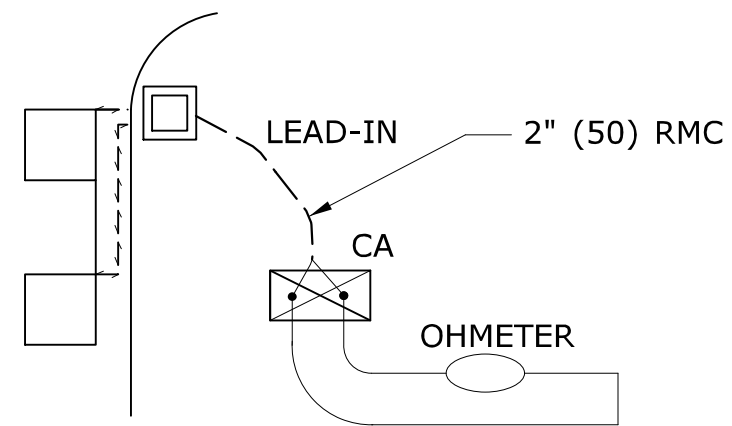
INDUCTIVE LOOP TEST PROCEDURE

PIN	COLOR	FUNCTION
A	WHITE	110 VAC Neutral
B	BROWN	Output Relay Common (moving contact)
C	BLACK	110 VAC (Fused)
D	RED	Loop
E	ORANGE	Loop
F	YELLOW	Output Relay Contact (Closes with moving contact when detecting vehicle)
G	BLUE	Output Relay Contact (Opens with moving contact when detecting vehicle)
H	GREEN	Chassis Ground
J	GREY	110 VAC Delay/Extend Override
Shell		Ground (shall be connected to pin H in the connector)

DETECTOR AMPLIFIER PIN DESIGNATION



TEST 1a



TEST 1b

LOOP NUMBER	RESISTANCE OHMS		INDUCTANCE MICROHENRIES (μh)		AMPLIFIER POWER INTERRUPTION PASS/FAIL (3)
	TO GROUND (1a)	LOOP WIRE (1b)	CALCULATED (2a)	MEASURED (2b)	
D1 FRONT					
D1 REAR					
D2A					
D2B					
D4A FRONT					
D4B REAR					
D5					
D6A					
D6B					

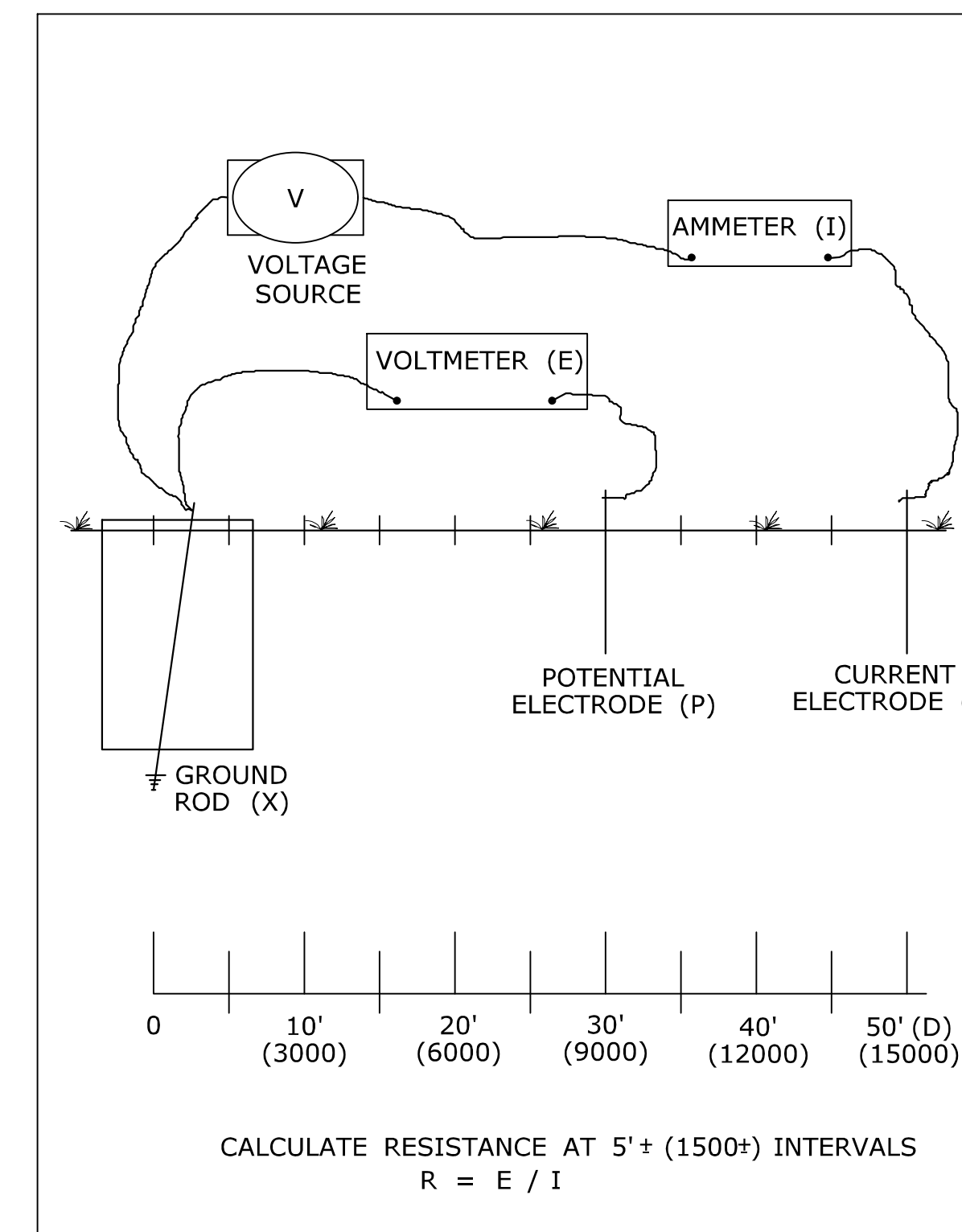
LOOP CIRCUIT TEST DATA (EXAMPLE)

TEST PROCEDURE:

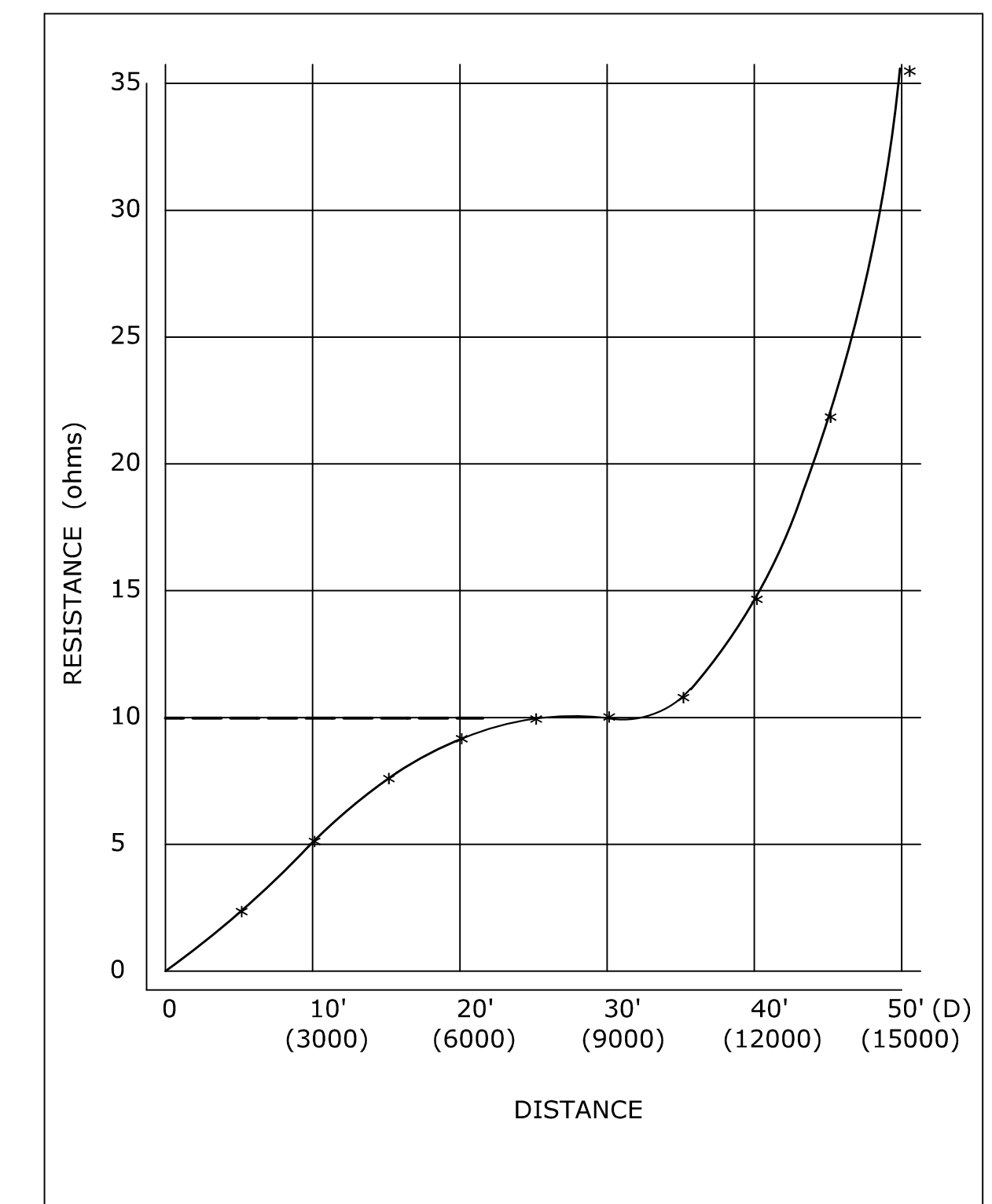
- INSERT ELECTRODE (C) A DISTANCE (D) FROM THE FOUNDATION. RECOMMEND A MINIMUM 50'.
- CONNECT A VOLTAGE SOURCE AND AMMETER BETWEEN THE FOUNDATION GROUND ROD (X) AND C.
- MEASURE THE CURRENT FLOW (I) BETWEEN X AND C.
- INSERT POTENTIAL ELECTRODE (P) AT 5' (1500) INTERVALS IN A STRAIGHT LINE TO ELECTRODE C.
- MEASURE VOLTAGE (E) AT EACH LOCATION OF P.
- CALCULATE RESISTANCE (R) AT EACH LOCATION OF P USING THE FORMULA $R = E/I$.
- PLOT THE VALUES ON A RxD GROUND RESISTANCE CHART.
- THE ACTUAL GROUND RESISTANCE IS WHERE THE PLOTTED CURVE IS RELATIVELY FLAT, USUALLY AT 62%± OF D.
- SEE EXAMPLE CHART: CURVE FLATTENS OUT AT 10 OHMS, APPROXIMATELY 30' (9000) FROM FOUNDATION.
- IF GROUND RESISTANCE IS GREATER THAN 10 OHMS, PERFORM CORRECTIVE ACTION AND RE-TEST.

SUGGESTED CORRECTIVE ACTION:

- A. INSTALL ADDITIONAL 10' (3000) GROUND ROD(S). REFER TO NESC SECTION 09, RULE 94.B.2. DRIVE ADDITIONAL GROUND RODS NO CLOSER TO FOUNDATION THAN 6' (1800). IF MORE THAN ONE IS NEEDED, SPACE MINIMUM 6' (1800) APART. BONDS TO ADDITIONAL GROUND ROD(S) SHALL BE MADE BY A CLAMP DESIGN FOR DIRECT BURIAL OR BY EXOTHERMIC WELDING TECHNIQUE. TOP OF ADDITIONAL GROUND ROD(S) SHALL BE 6" (150) BELOW GRADE.
- B. IN AREAS OF SHALLOW BEDROCK, INSTALL A GROUND GRID OR ARRAY CONSISTING OF BURIED WIRE, RODS, STRIPS OR PLATES. REFER TO NESC SECTION 09, RULE 94.B.3. REFER TO NEC SECTION 250. MINIMUM DEPTH OF 18" (450). GRID CONNECTIONS AND BONDS ON GROUND GRID SHALL BE MADE BY CLAMPS DESIGNED FOR DIRECT BURIAL OR BY EXOTHERMIC WELDING TECHNIQUE.



3 POINT GROUND RESISTANCE TEST CIRCUIT



GROUND RESISTANCE CHART (EXAMPLE)

NOTES:

1. WHEN REQUESTED BY THE ENGINEER, MEASURE RESISTANCE-TO-GROUND OF GROUND ROD AT TRAFFIC CONTROL FOUNDATIONS. SEE FALL-OF-POTENTIAL METHOD. IF LESS THAN 10 ohms, INSTALL SUPPLEMENTAL ELECTRODES AS REQUIRED. NEC ARTICLE 250.
2. DURING THE TEST, THE GROUND ROD SHOULD NOT BE BONDED TO ANY RMC IN THE FOUNDATION.
3. THE VOLTAGE SOURCE, VOLTMETER, AMMETER, ELECTRODES P AND C, AND CONNECTING CABLES ARE AVAILABLE AS A SPECIALIZED TEST INSTRUMENT.
4. REFER TO NATIONAL ELECTRICAL SAFETY CODE (NESC) SECTION 09, GROUNDING METHODS FOR ELECTRIC SUPPLY AND COMMUNICATIONS FACILITIES.
5. REFER TO NATIONAL ELECTRICAL CODE (NEC) CHAPTER 2, ARTICLE 250, GROUNDING.

3 POINT FALL-OF-POTENTIAL GROUND RESISTANCE TEST

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

- INDUCTIVE LOOP DETECTOR
- SAW CUT
- RIGID METAL CONDUIT
- HANDHOLE

REV.	DATE	REVISION DESCRIPTION
2	1-2014	REVISED GROUND RESISTANCE NOTES.
1	4-2012	MINOR REVISIONS.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 1/7/2014

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_TRAFFIC_STD.DGN Model: TR-1000_01

SUBMITTED BY: NAME/DATE/TIME:
 Tracy L. Fogarty Tracy L. Fogarty 2014.01.07 16:11:26-05'00'

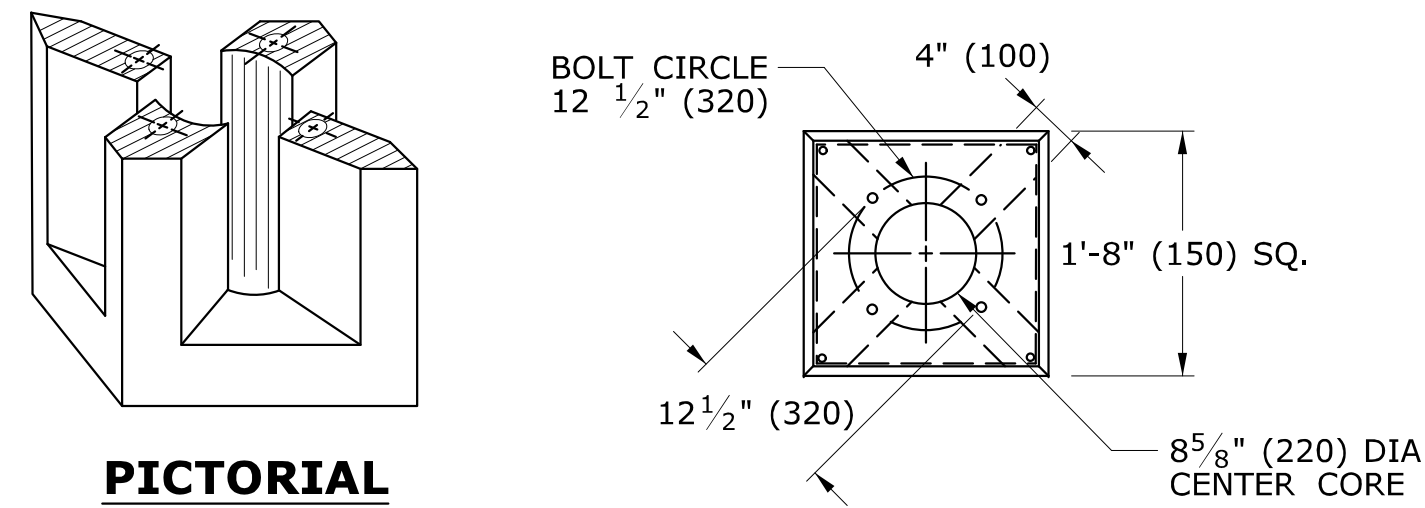
APPROVED BY: NAME/DATE/TIME:
 Charles S. Harlow Charles S. Harlow 2014.01.08 09:02:11-05'00'

CTDOT
STANDARD SHEET

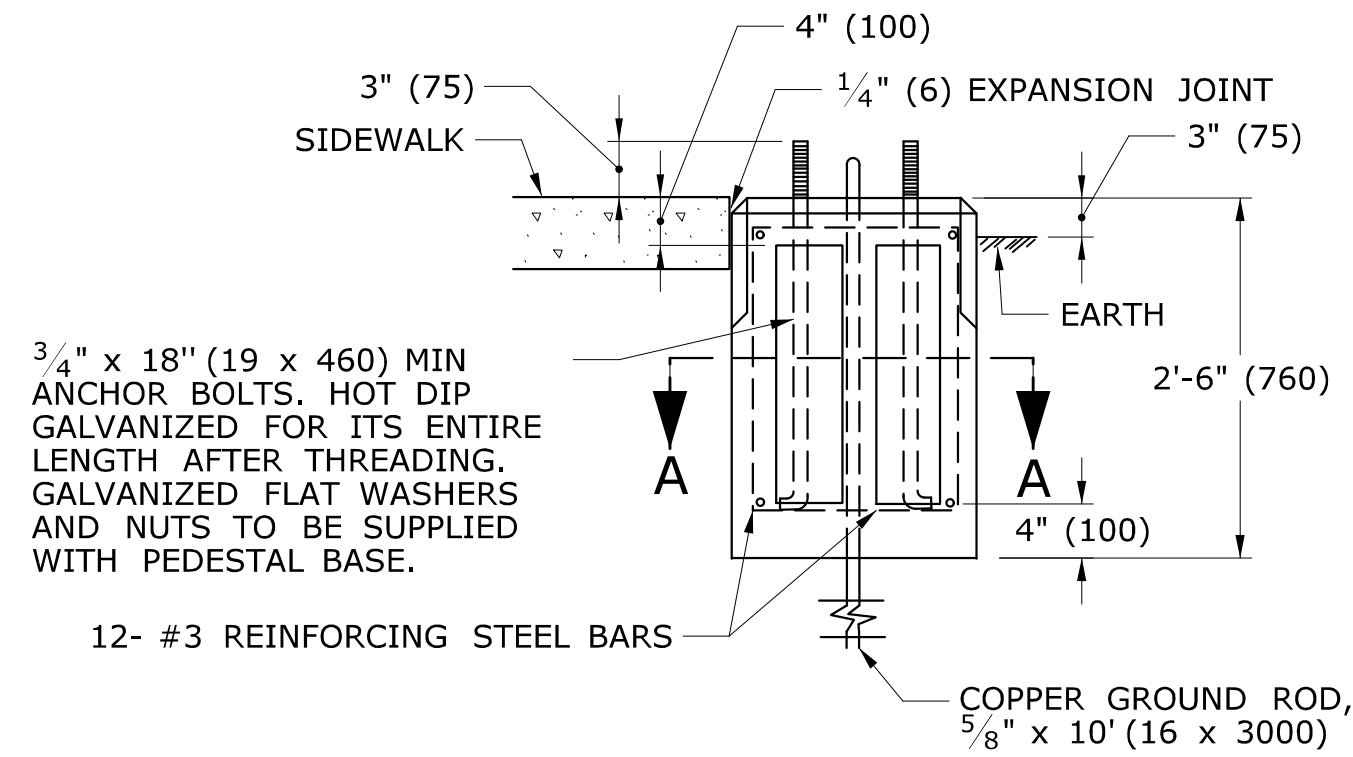
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
GENERAL CLAUSES (TEST PROCEDURES)

STANDARD SHEET NO.:
TR-1000_01



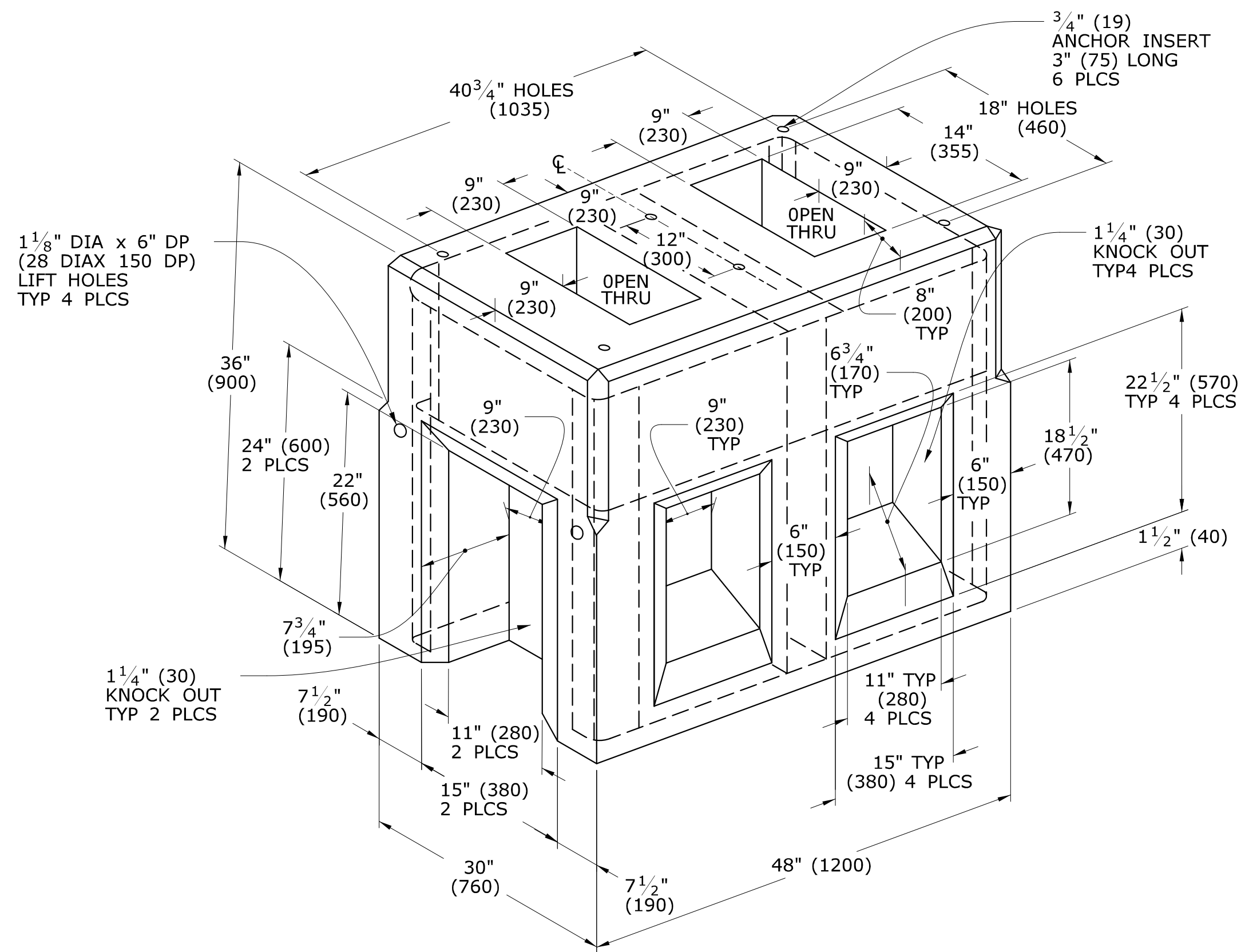
PICTORIAL SECTION A-A



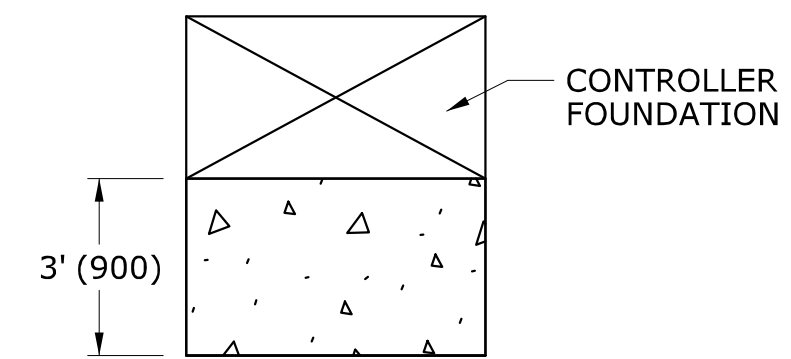
TRAFFIC CONTROL FOUNDATION PEDESTAL - TYPE I - PRECAST

NOTES:

PLACE NO. 6 CRUSHED STONE IN CENTER OPENING AFTER CONDUITS AND GROUND ROD HAVE BEEN INSTALLED.

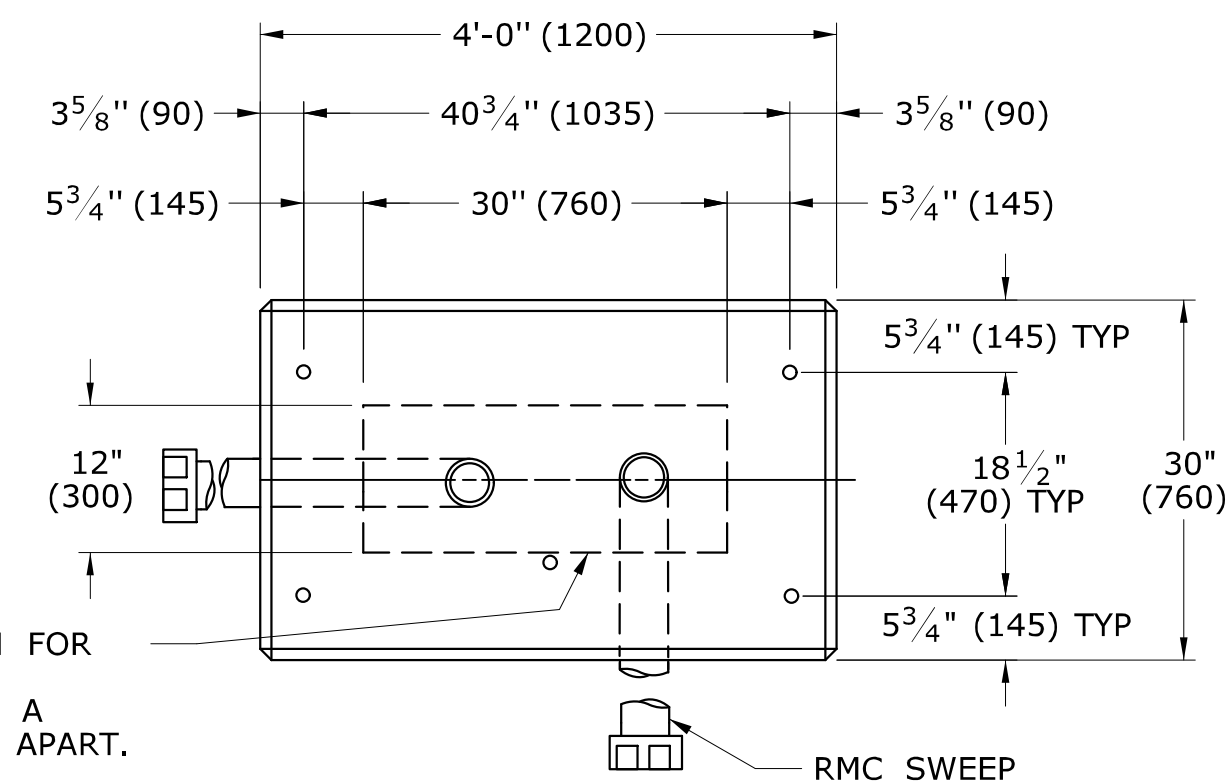


TRAFFIC CONTROL FOUNDATION CONTROLLER - TYPE IV - PRECAST

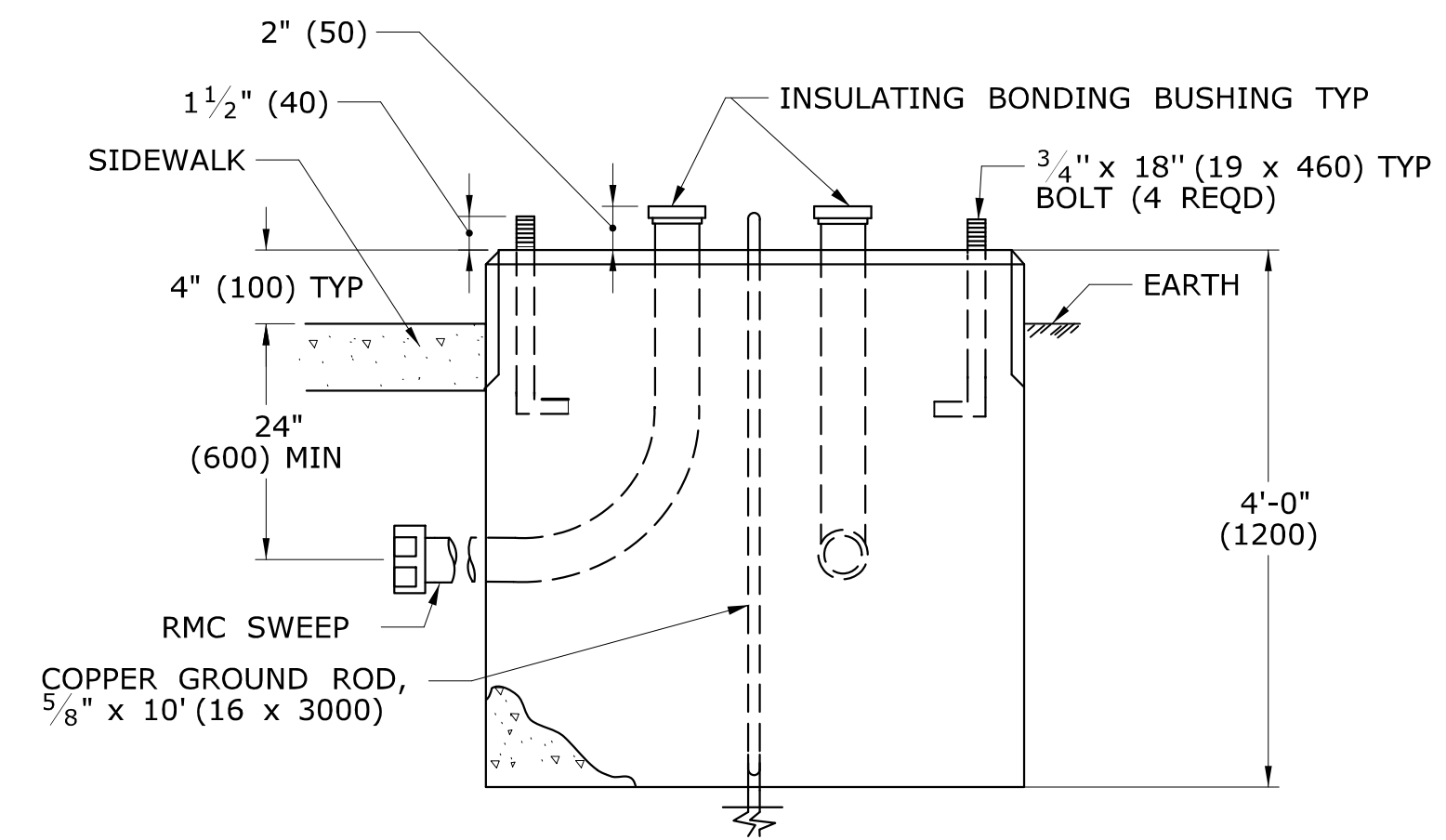


INSTALL PRECAST OR CAST IN PLACE CONCRETE SIDEWALK ON CABINET DOOR SIDE OF CONTROLLER FOUNDATION.
PITCH SIDEWALK 1/4" PER FOOT (20 PER METER) AWAY FROM THE CONTROLLER FOUNDATION.
REFER TO HIGHWAY STANDARD SHEET HW-921.01 FOR SIDEWALK CONSTRUCTION.

TYPICAL CONCRETE SIDEWALK AT CONTROLLER FOUNDATION



AREA OF LIMITATION FOR CONDUIT SWEEPS. SEPARATE CONDUITS A MINIMUM OF 2" (50) APART.



TRAFFIC CONTROL FOUNDATION CONTROLLER - TYPE IV - CAST IN PLACE

NOTES:

INSTALL FOUNDATION ON 6" (150) OF COMPACTED GRAVEL IN ACCORDANCE WITH SECTION 2.14. LEVEL FOUNDATION WITH A PROJECTION OF 4" (100) ABOVE FINISHED GRADE.
INSTALL COPPER GROUND ROD: 5/8" x 10' (16 x 3000).
PLACE NO. 6 CRUSHED STONE IN THE CENTER OPENINGS AFTER THE CONDUITS AND GROUND ROD HAVE BEEN INSTALLED. THE OPENINGS SHALL BE CAPPED WITH A 2" (50) GROUT LEVEL WITH THE TOP OF THE FOUNDATION AND NEATLY FINISHED. THE GROUT SHALL CONFORM WITH THE REQUIREMENTS OF ARTICLE M.3.01-12.
CONCRETE: CLASS "A" CONFORMING TO ARTICLE M.03.01.
#4 REBAR 2" (50) MIN COVER AROUND ALL OPENINGS, 3-#4 REBARS IN EACH CORNER. CONDUITS SHALL NOT PROJECT MORE THAN 2" (50) ABOVE FOUNDATION.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:	
	PROPOSED CONTROLLER
	EXISTING CONTROLLER
	PROPOSED STEEL SPAN POLE
	EXISTING STEEL SPAN POLE

REV.	DATE	REVISION DESCRIPTION
2	1-2014	REMOVED SPAN POLE FOUNDATION DETAILS, REVISED TYPICAL CONCRETE SIDEWALK AT CONTROLLER FOUNDATION.
1	4-2012	MINOR REVISIONS.

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Plotted Date: 1/7/2014

DIMENSIONS ARE IN ENGLISH ("') & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm. - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

FILENAME: CTDOT_TRAFFIC_STD.DGN Model: TR-1002_01

SUBMITTED BY: Tracy L. Fogarty
NAME/DATE/TIME: Tracy L. Fogarty 2014.01.07 16:12:06-05'00'

APPROVED BY: Charles S. Harlow
NAME/DATE/TIME: Charles S. Harlow 2014.01.08 09:02:54-05'00'

CTDOT STANDARD SHEET

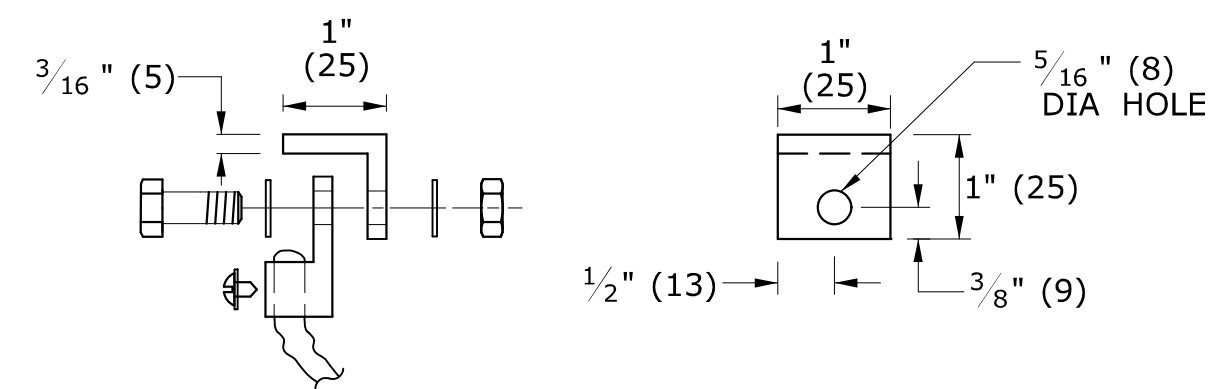
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
TRAFFIC CONTROL FOUNDATIONS

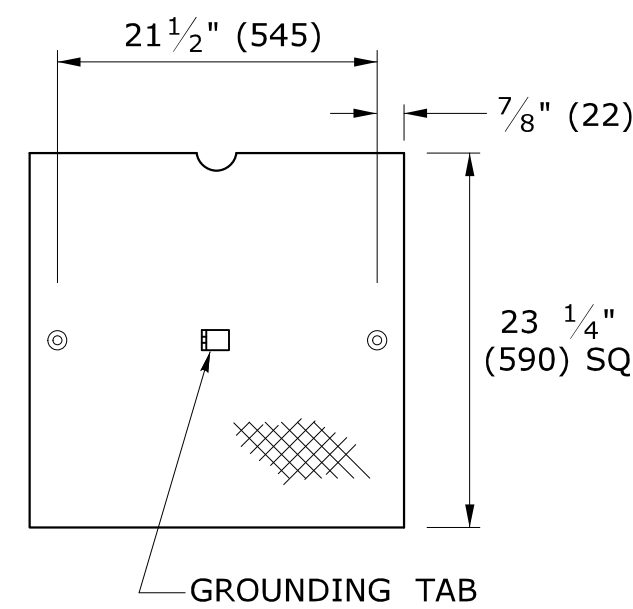
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COVER NOTES:

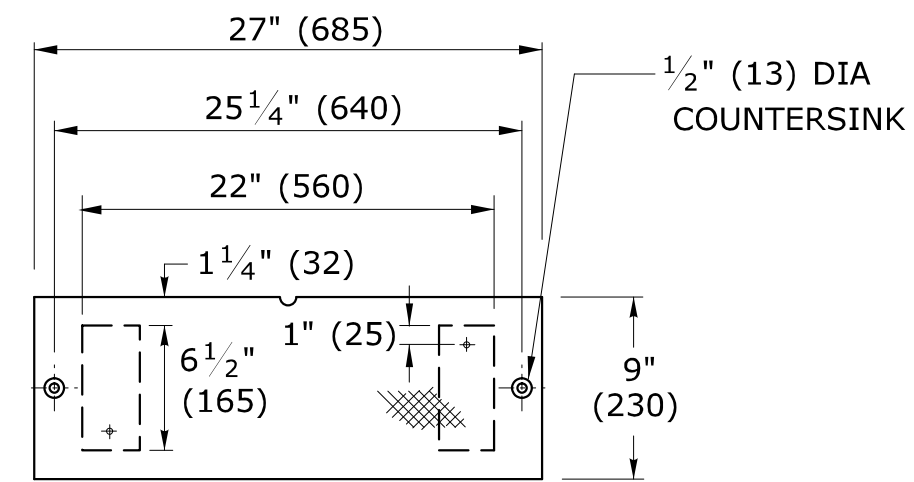
1. GROUNDING TAB WELDED TO BOTTOM CENTER OF COVER WITH $\frac{3}{16}$ " (5) WELD (3 SIDES).
2. ATTACH 6' (2 m) LENGTH OF NO. 8 GROUND WIRE TO GROUNDING TAB WITH CONDUCTOR CONNECTOR, $\frac{1}{4}$ " - 20 X $\frac{3}{4}$ " (M6 X 20) LG SST HEX HEAD BOLT, AND SST FLAT WASHER. ATTACH FREE END OF GROUND WIRE TO CONDUIT BONDING BUSHING IN HANDHOLE.
3. CONDUCTOR CONNECTOR: COPPER ALLOY BODY, BRASS SCREW, BRASS OR COPPER ALLOY PRESSURE PLATE.
4. COVER SCREW INSERT: $\frac{3}{8}$ "-16 (9-16), $1\frac{1}{2}$ "L (37L), STAINLESS STEEL.
5. COVER SCREW: $\frac{3}{8}$ "-16 (9-16), 1"L (25L), FLAT HEAD, SLOTTED, STAINLESS STEEL.



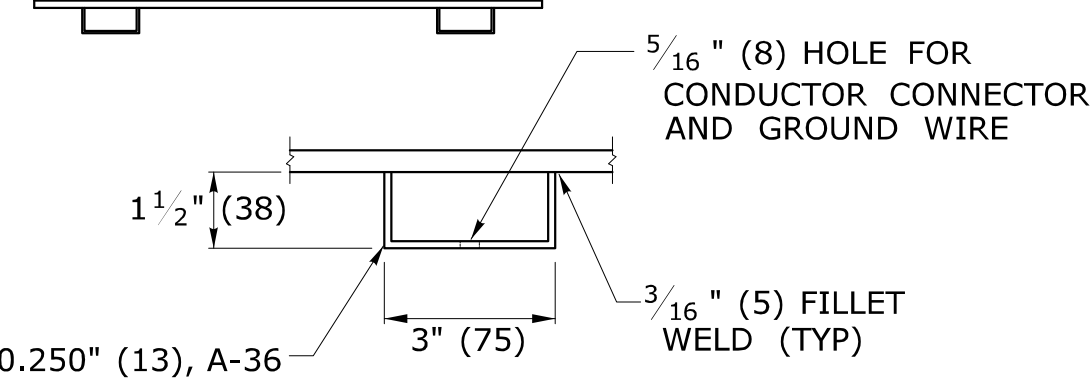
**STEEL GROUNDING TAB
w/ CONDUCTOR CONNECTOR**



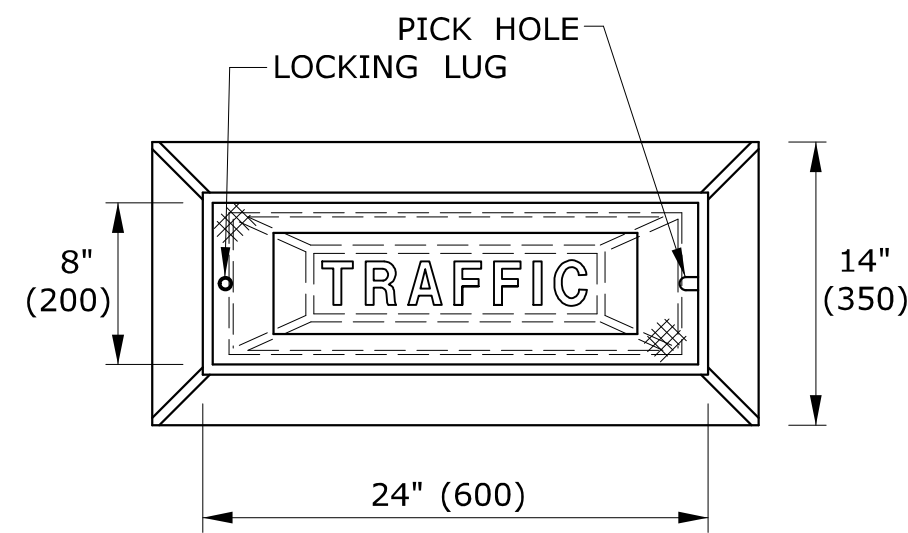
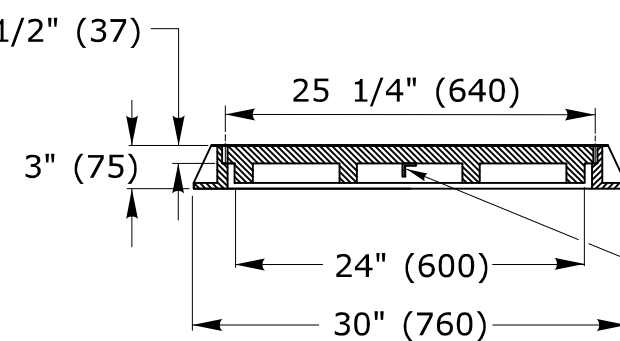
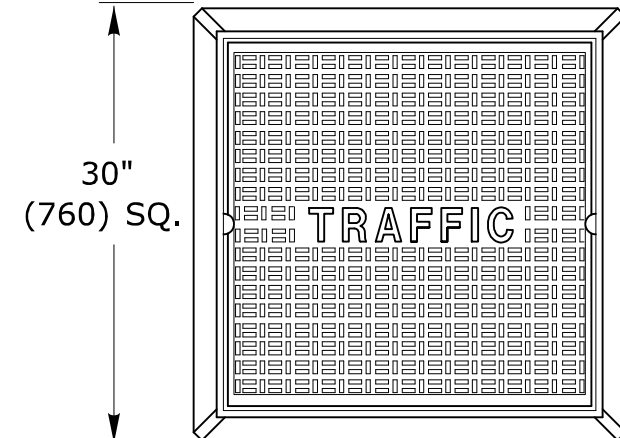
GROUNDING TAB



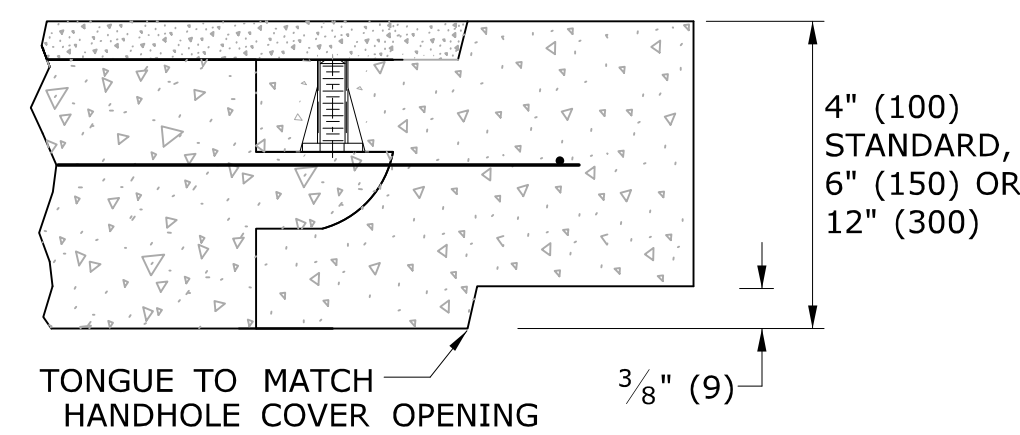
C-CHANNEL 0.250" (13), A-36



**NON SKID FLOOR PLATE
GALVANIZED STEEL, 3/8" (10)**



**CAST IRON
HANDHOLE COVERS**

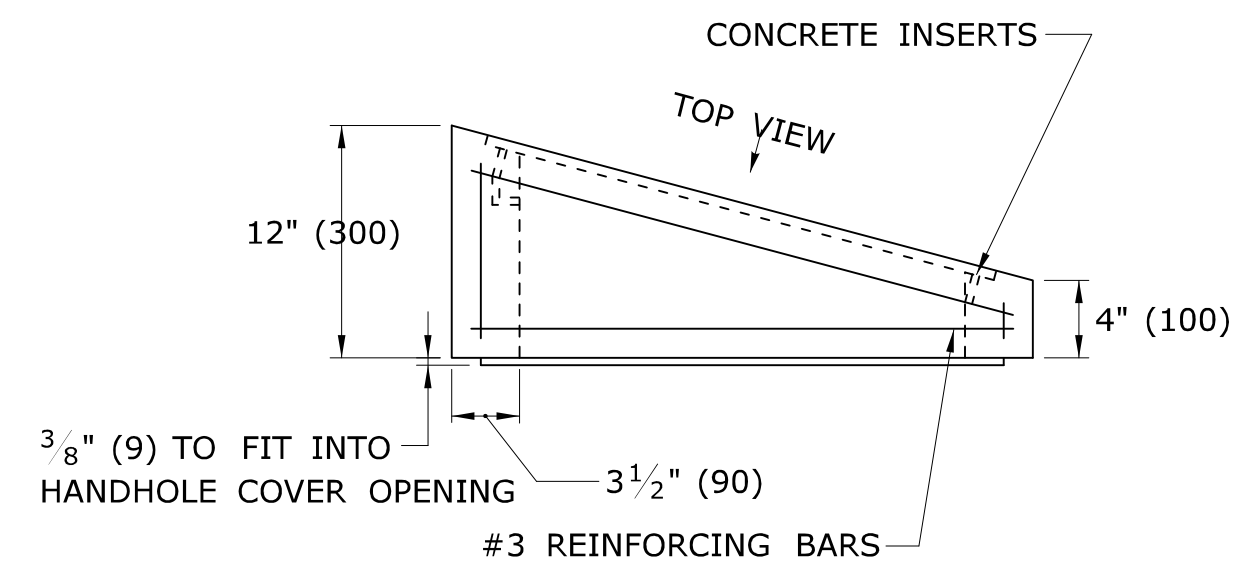


**SECTION A-A
HANDHOLE EXTENSIONS**

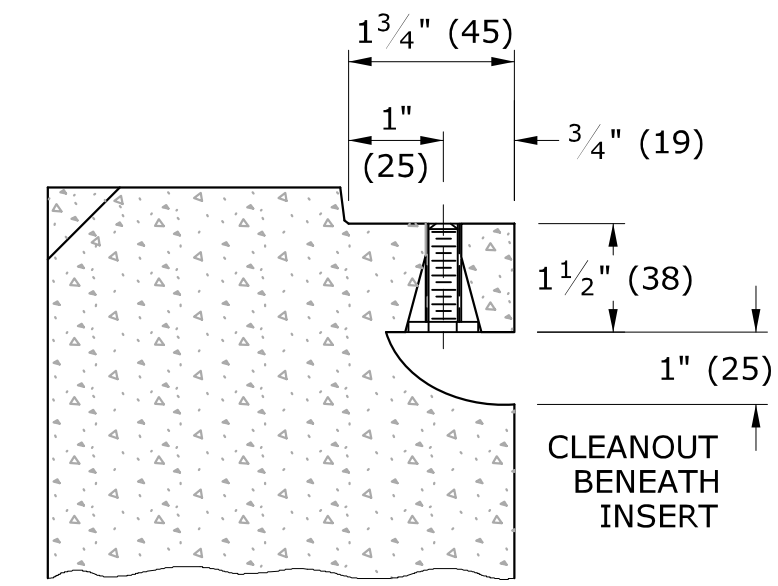
4 - #8 REINFORCING BARS REQ'D

HANDHOLE NOTES:

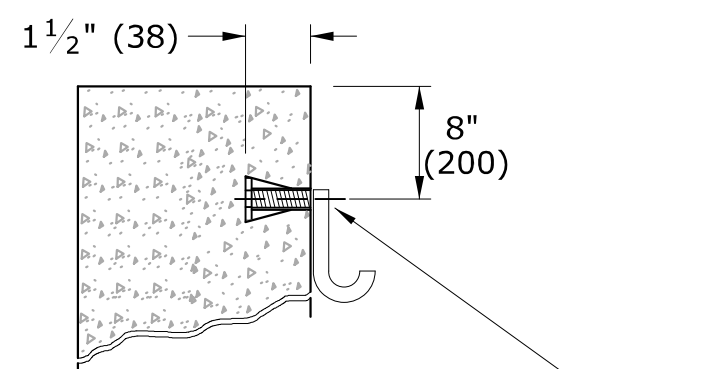
1. MINIMUM CLASS "C" CONCRETE.
2. COMPLETE TYPE II HANDHOLE:
IN EARTH AREAS, CONSISTS OF A BASE SECTION WITH 4" (100) HANDHOLE EXTENSION,
IN SIDEWALK AREAS, CONSISTS OF A BASE SECTION WITH 4" (100) CAST IRON COVER.
3. PLAN VIEW DIMENSIONS, SECTION VIEW, & DETAILS, SAME FOR BASE SECTION,
EXTENSIONS & BANK ADAPTER.
4. GROUT AROUND ALL CONDUITS.



BANK ADAPTER

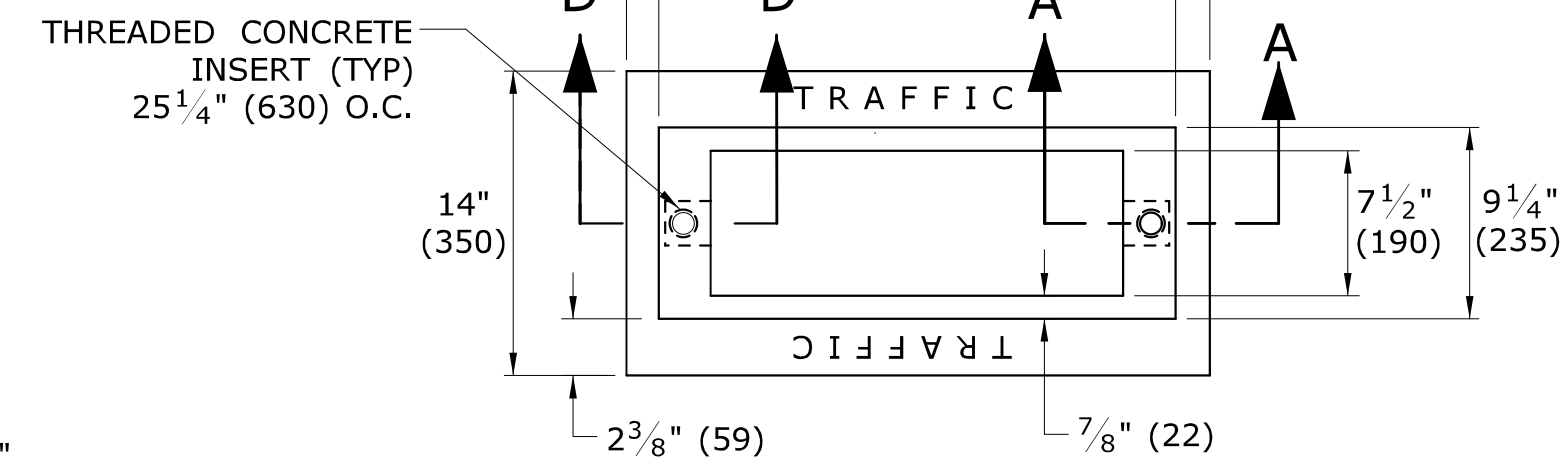


SECTION D-D

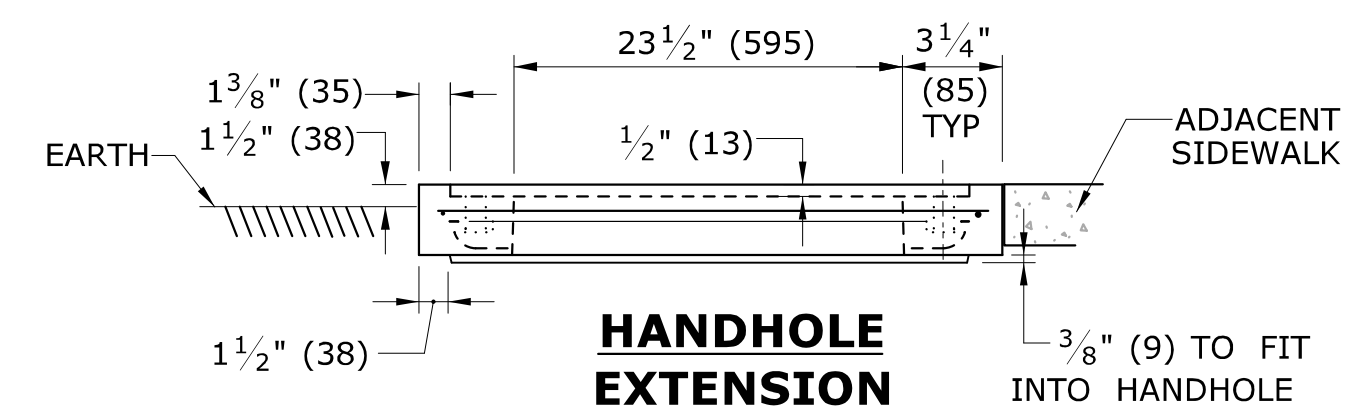


INSERT DETAIL

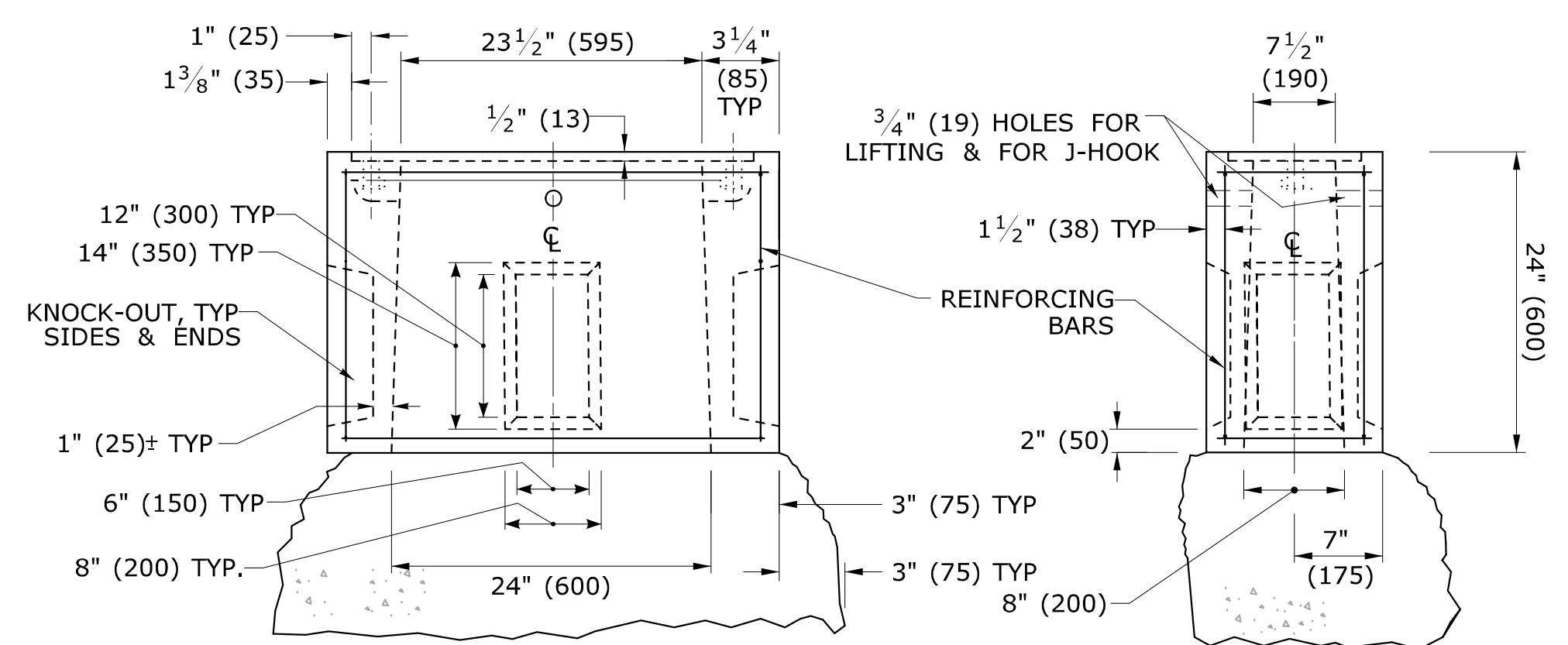
TYP IN TWO PLACES FOR ALL HANDHOLES



PLAN VIEW



**HANDHOLE
EXTENSION**



**BASE SECTION
CONCRETE HANDHOLE TYPE II**

5. INSTALL 30" (750) SIDE PARALLEL TO ROAD UNLESS OTHERWISE NOTED.
6. INSTALL HANDHOLES APPROX. 12" (300) BEHIND CURB OR
IF NO CURB, 24" (600) BEHIND EDGE OF ROAD UNLESS OTHERWISE SPECIFIED.
7. CAST THE WORD "TRAFFIC" INTO TOP EDGE OF HANDHOLE, $1\frac{1}{2}$ " (38) LETTERS.
8. WHERE AN EXISTING CONCRETE SIDEWALK SLAB ABUTTING A HANDHOLE IS DAMAGED OR
CUT DURING INSTALLATION, REPLACE THE ENTIRE SIDEWALK SECTION.
9. 12-#3 REINFORCING BARS REQUIRED FOR ALL HANDHOLES. (8 HORIZONTAL, 4 VERTICAL)

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

- PROPOSED HANDHOLE
- EXISTING HANDHOLE

REV.	DATE	REVISION DESCRIPTION
2	4-2014	REVISED HANDHOLES NOTES, ADDED NOTE #6. ADDED "J" HOOK TO INSERT DETAIL.
1	4-2012	CAST IRON COVER: CHANGED BOLT TO PICK HOLE. ADDED EXTENSIONS, C-CHANNEL, CONDUCTOR CONNECTOR & MINOR REVISIONS.

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Plotted Date: 4/11/2014

DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm).
METRIC DIMENSIONS ARE ROUNDED:
- OVER 1" TO NEAREST 5 mm.
- UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

FILENAME: CTDOT_TRAFFIC_STD.DGN Model: TR-1010_01

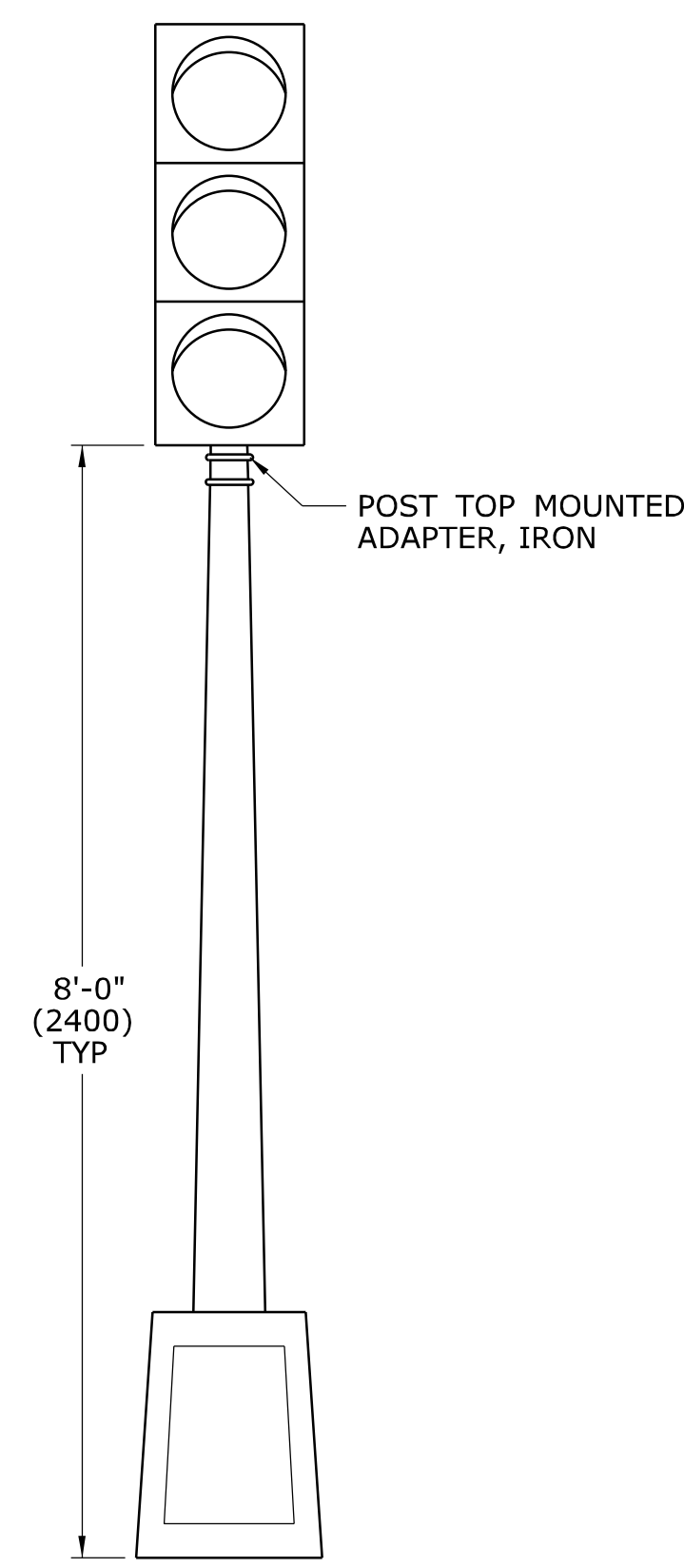
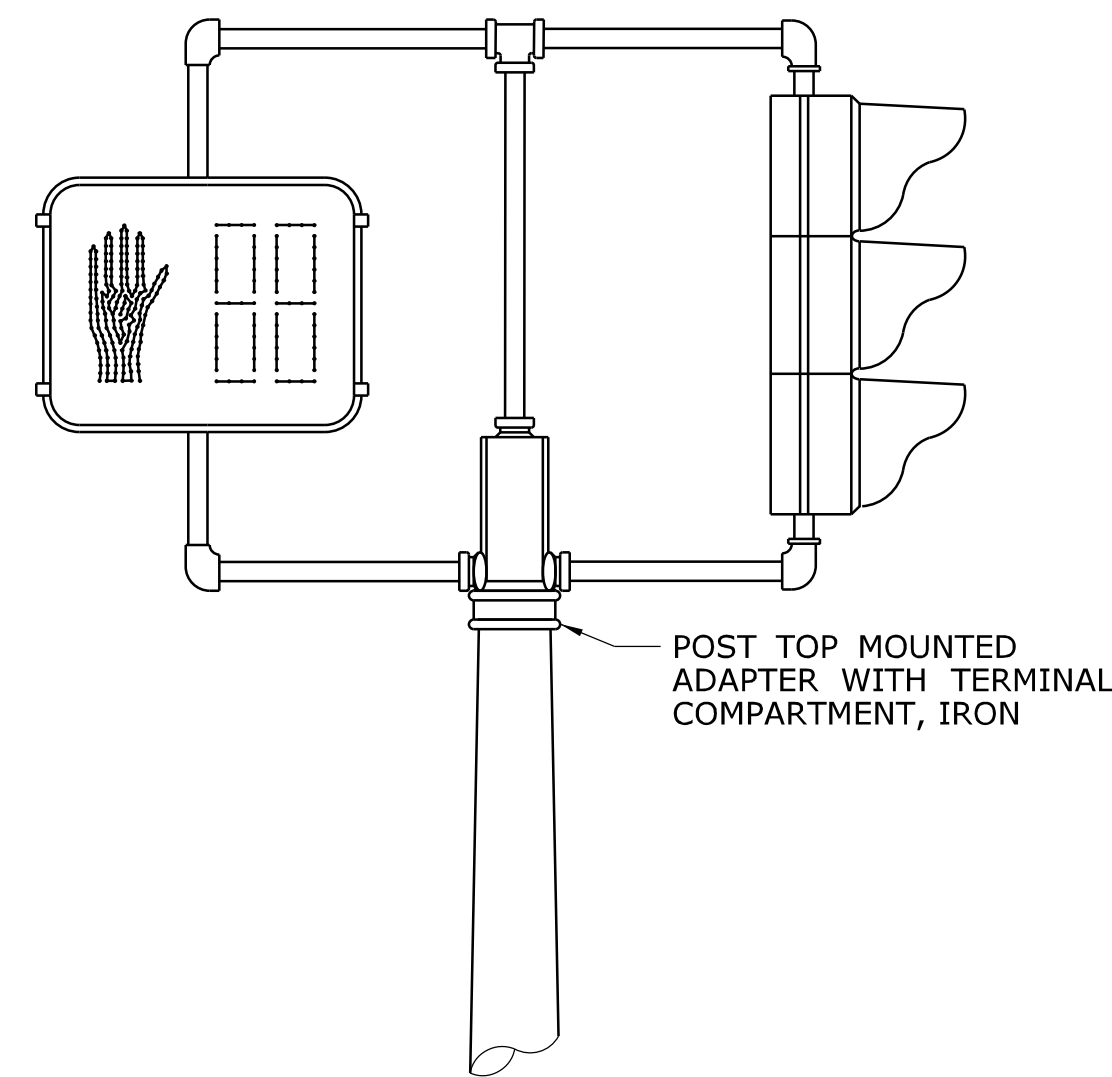
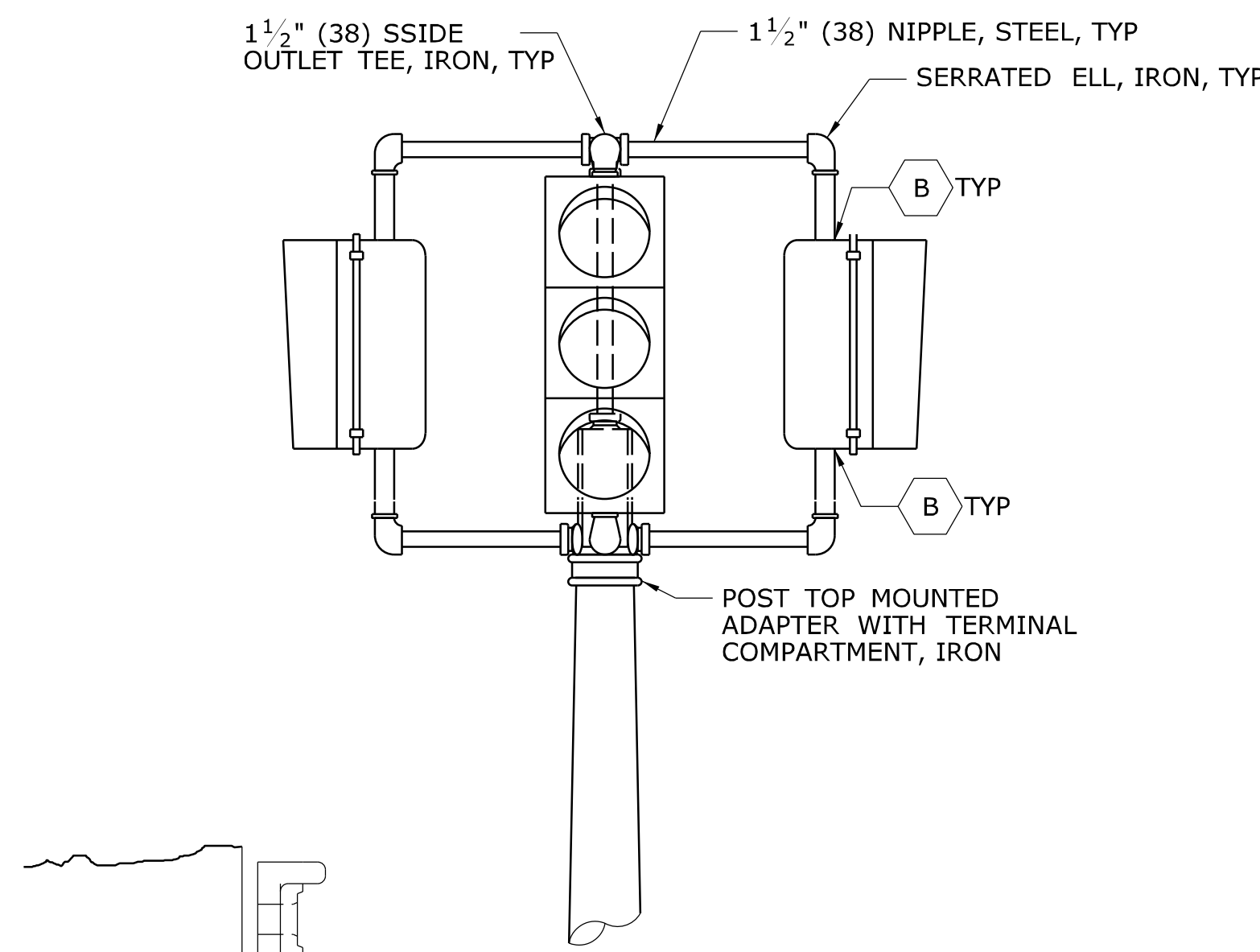
SUBMITTED BY: Tracy L. Fogarty
NAME/DATE/TIME: Tracy L. Fogarty, P.E. 2014.04.25 16:01:09-04'00'

APPROVED BY: Charles S. Harlow
NAME/DATE/TIME: Charles S. Harlow, P.E. Digitally signed by Charles S. Harlow, Date: 2014.04.29 14:26:25-04'00'

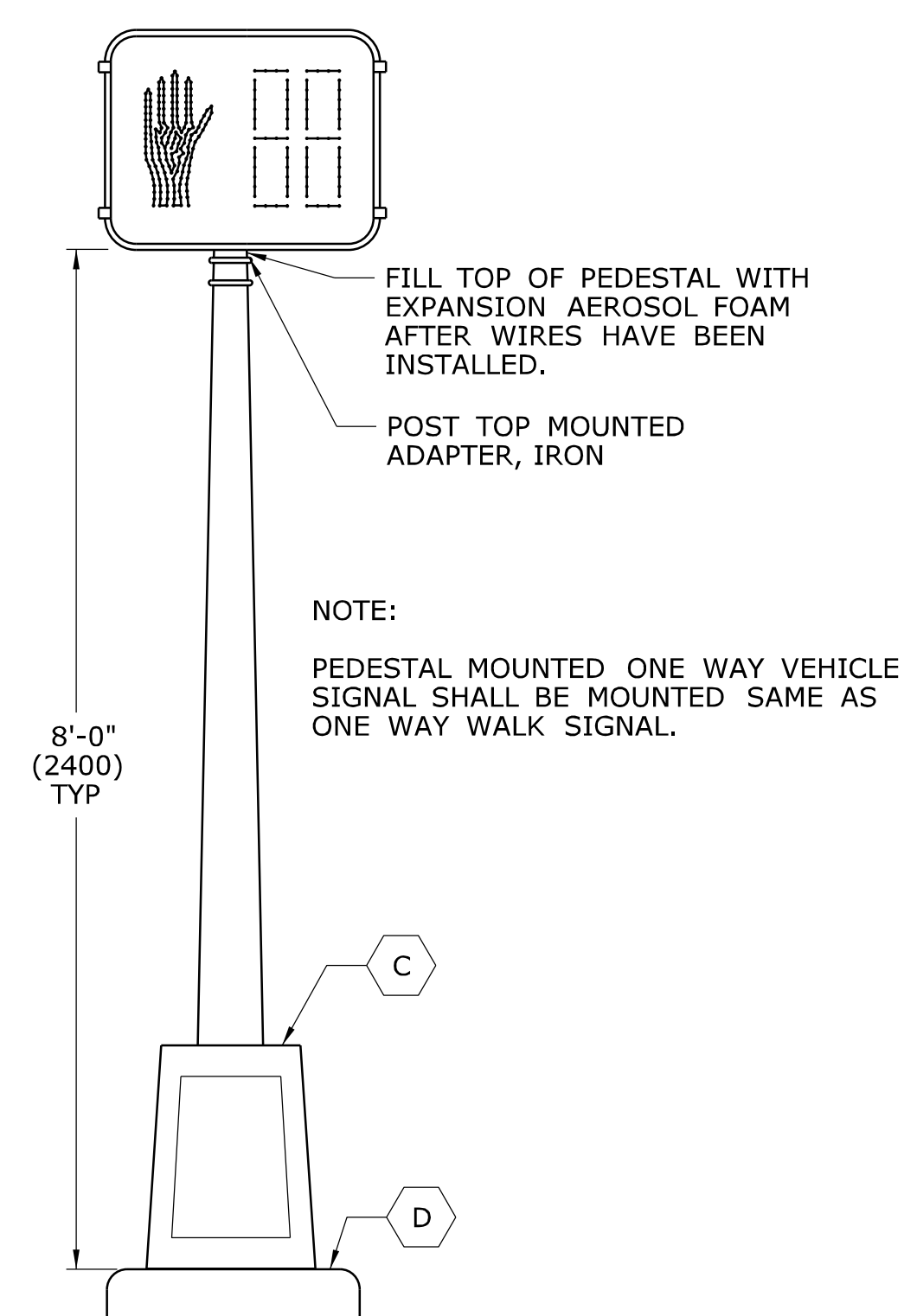
CTDOT
STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
CONCRETE HANDHOLE

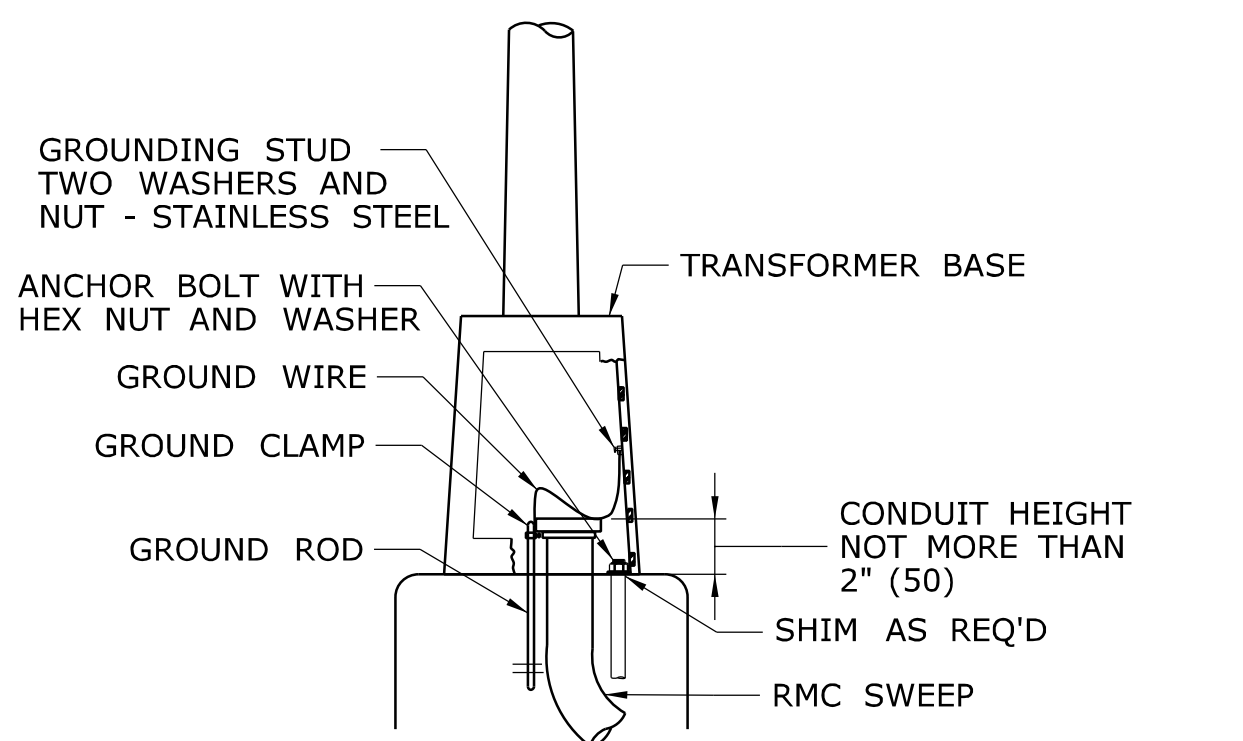
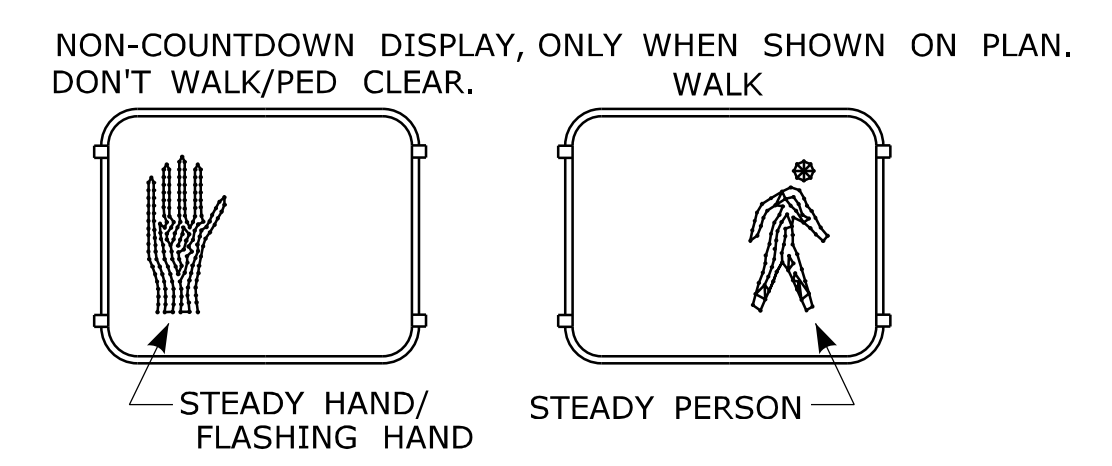
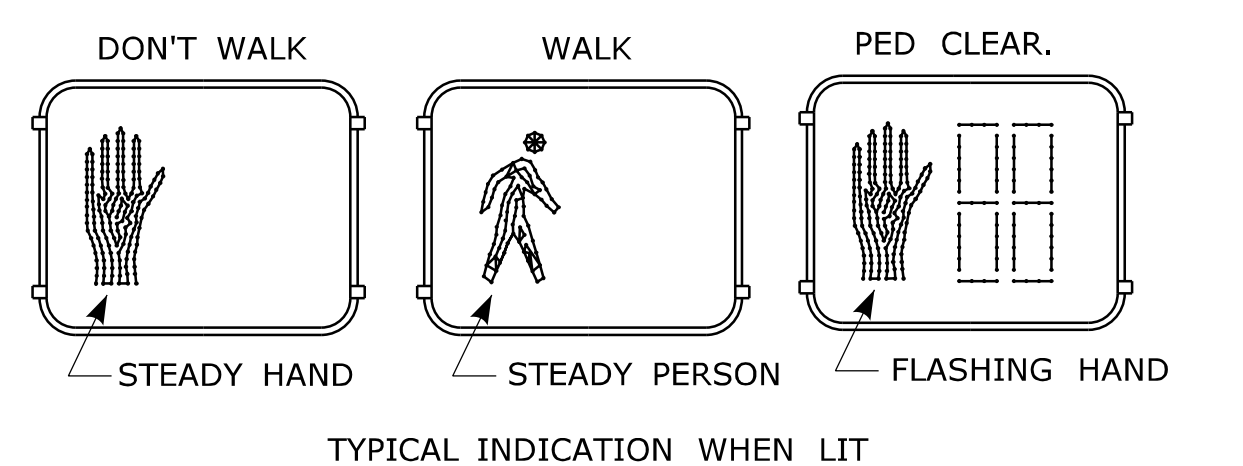
STANDARD SHEET NO.:
TR-1010_01



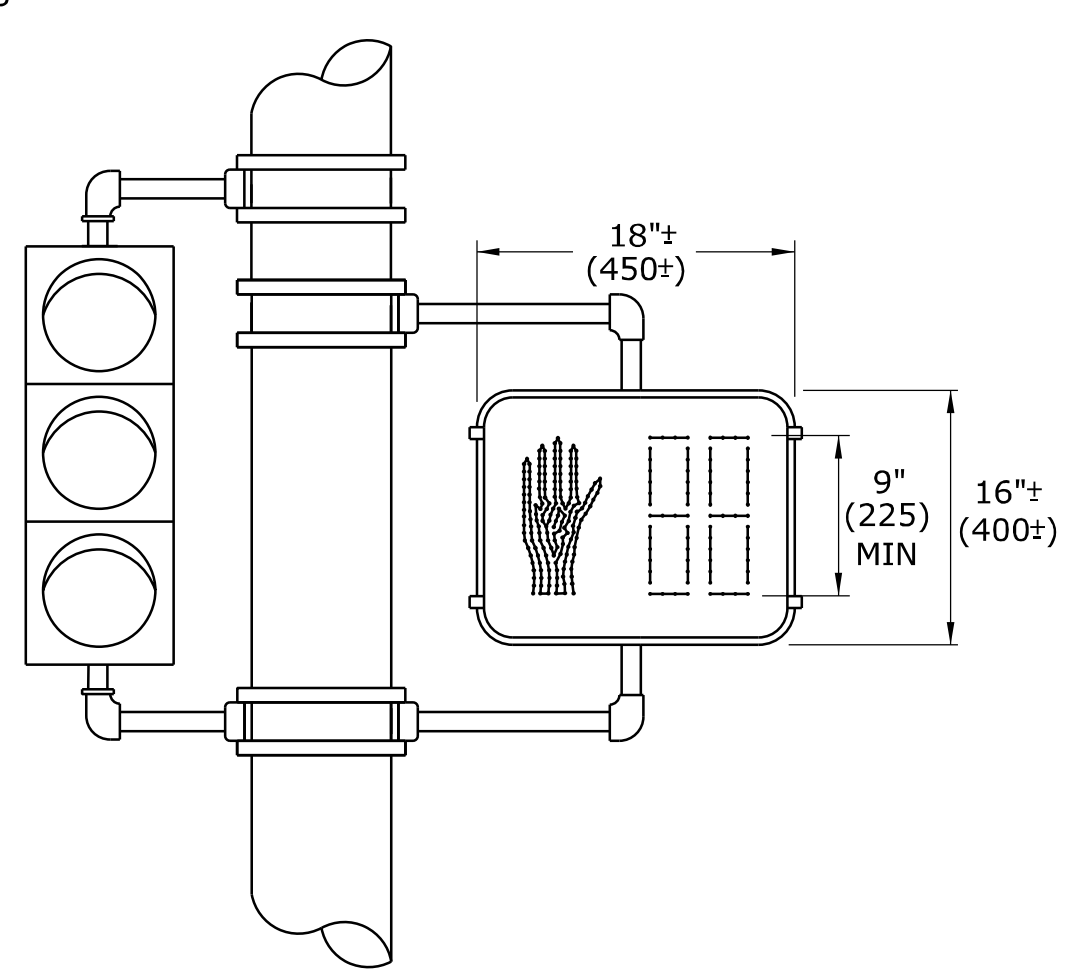
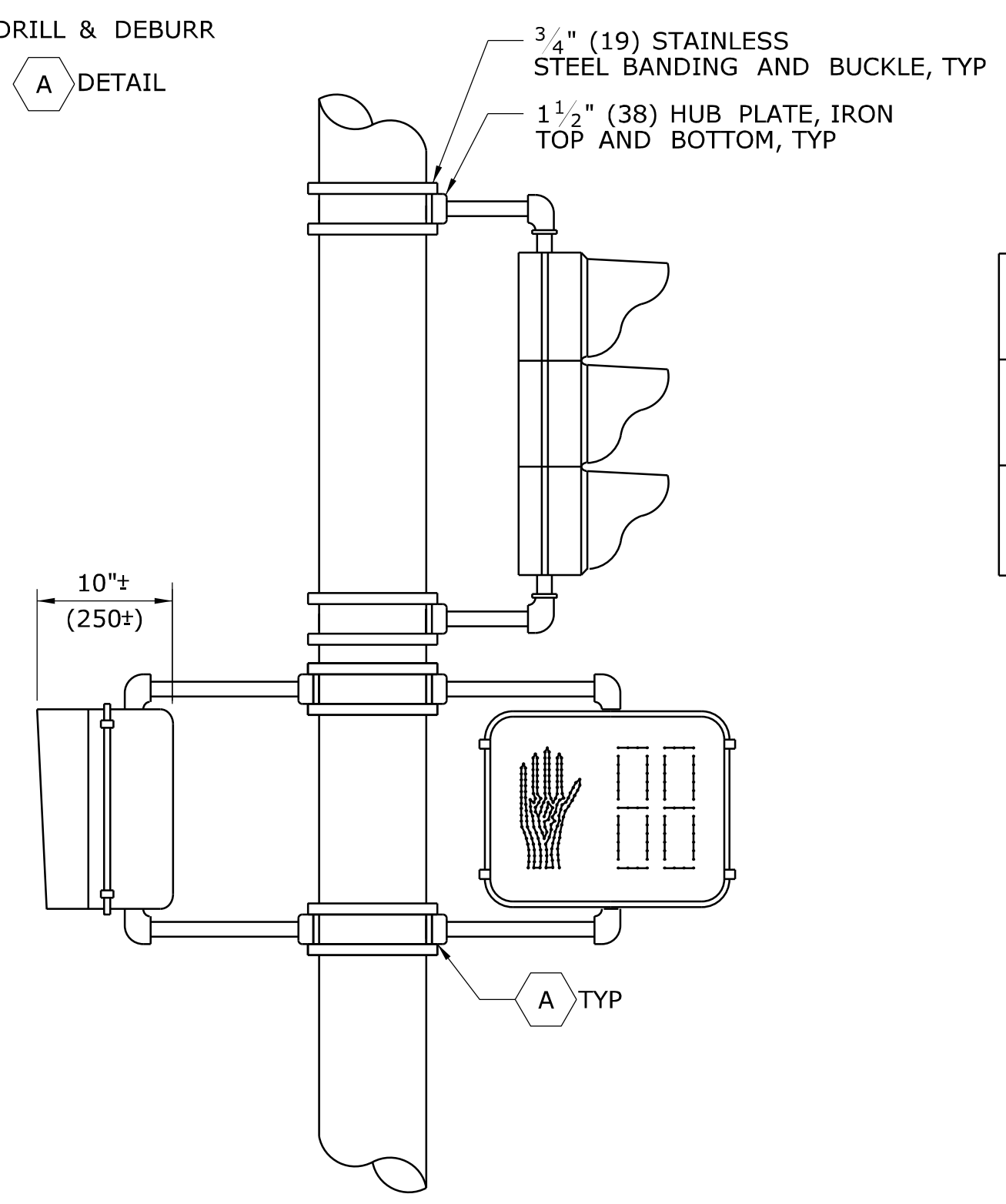
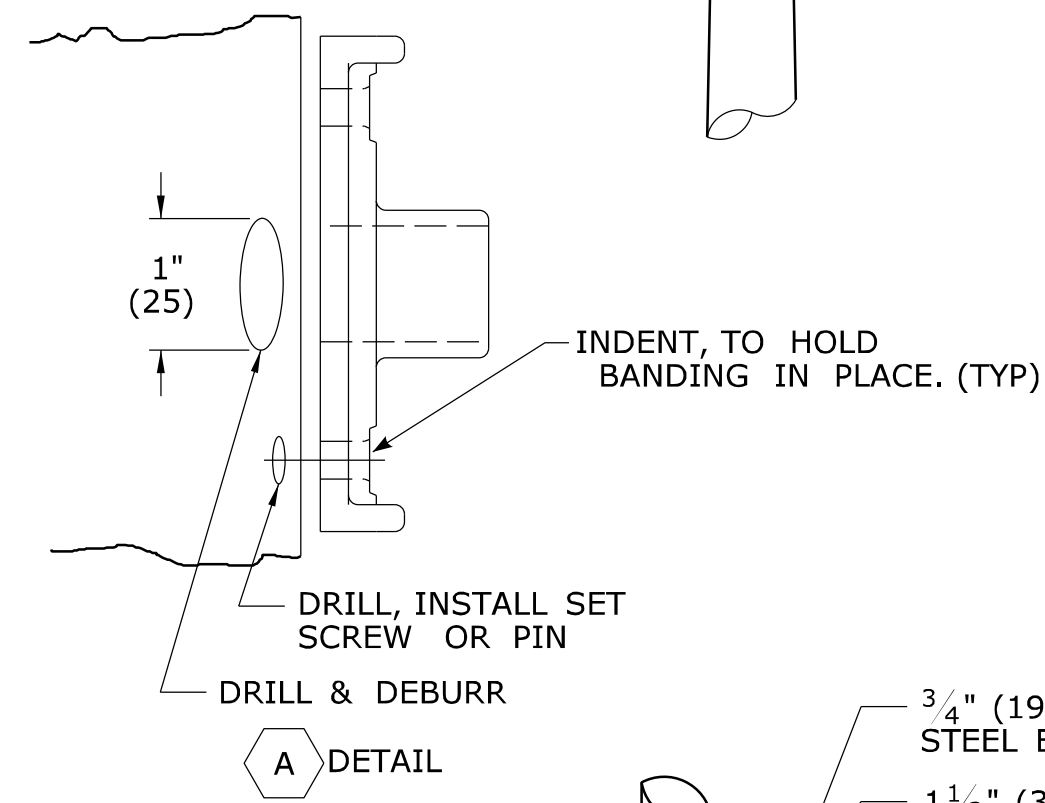
ONE WAY TRAFFIC SIGNAL PEDESTAL MOUNTED



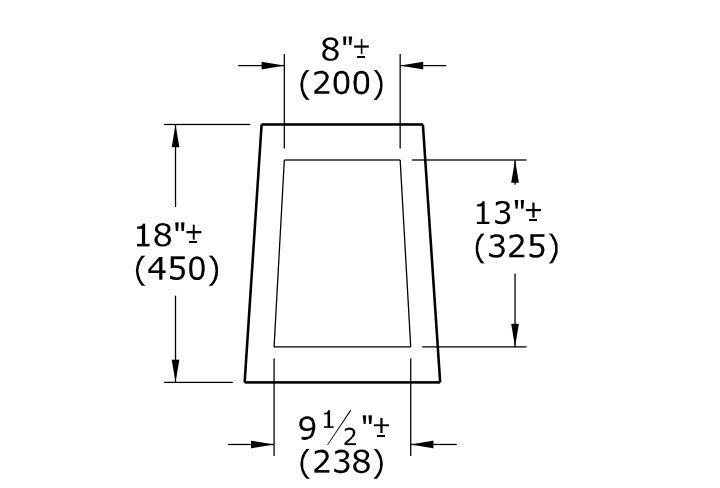
ONE WAY WALK SIGNAL PEDESTAL MOUNTED



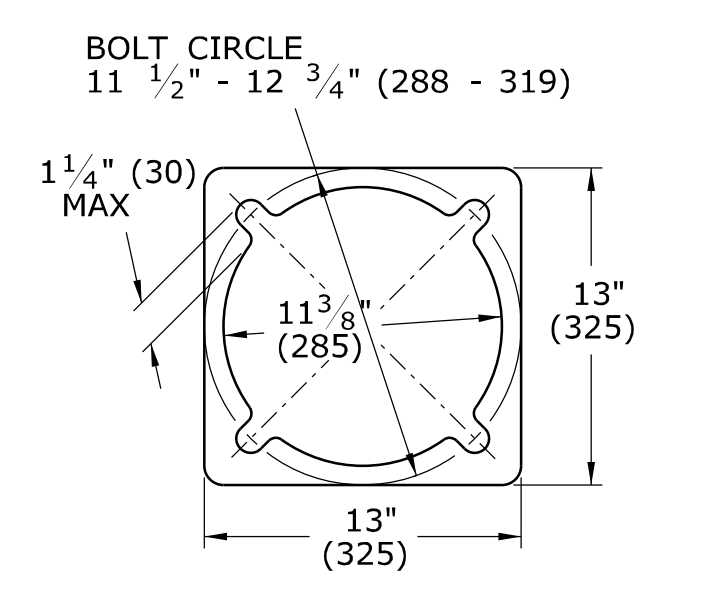
ALUMINUM PEDESTAL INSTALLATION DETAIL



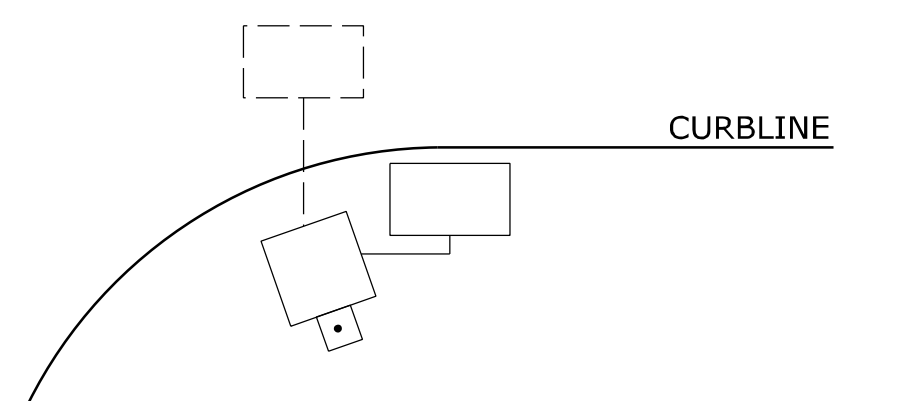
ONE WAY TRAFFIC SIGNAL POLE MOUNTED



ALUMINUM PEDESTAL DOOR OPENING DETAIL



ALUMINUM PEDESTAL BASE PLAN



WHEN PEDESTALS OR SPAN POLES ARE INSTALLED CLOSE TO THE CURB, SIDE MOUNT PEDESTRIAN OR TRAFFIC SIGNALS TO AVOID VISOR DAMAGE FROM TURNING VEHICLES.

NOTES:

- A SECURE LOWER HUB PLATE WITH STAINLESS STEEL SET SCREW OR PIN PRIOR TO BANDING TO PREVENT MOVEMENT. INSTALL CABLE THROUGH BOTTOM OF HUB PLATE.
 - B REFER TO CTDOT TRAFFIC STANDARD SHEET, TR-1105.01, TRAFFIC SIGNALS & CABLE ASSIGNMENTS.
 - C IF THREADED, MIN 1" (25) THREADED INTO BASE, SECURED WITH STAINLESS STEEL SET SCREWS.
 - D BASE DESIGNED AS BREAK-AWAY.
- INCANDESCENT WALK SIGNAL LAMPS ARE 67 WATTS, RATED AT 8000 HOURS LAMP LIFE. LED WALK SIGNAL LAMPS ARE MAXIMUM 15 WATTS, WARRANTED AT 5 YEAR LIFE.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:		□ PEDESTRIAN SIGNAL
□	STEEL SPAN POLE, MAST ARM ASSEMBLY SHAFT	□ PEDESTAL MOUNTED, TRAFFIC & PEDESTRIAN SIGNALS
□	ALUMINUM PEDESTAL	□ POLE MOUNTED, TRAFFIC & PEDESTRIAN SIGNALS
□	TRAFFIC SIGNAL	

2	4-2012	MINOR REVISIONS.
1	1-2010	INCLUDED COUNTDOWN PEDESTRIAN SIGNALS.
REV.	DATE	REVISION DESCRIPTION

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Plotted Date: 4/14/2012

DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_TRAFFIC_STD.dgn Model: TR-1102_01

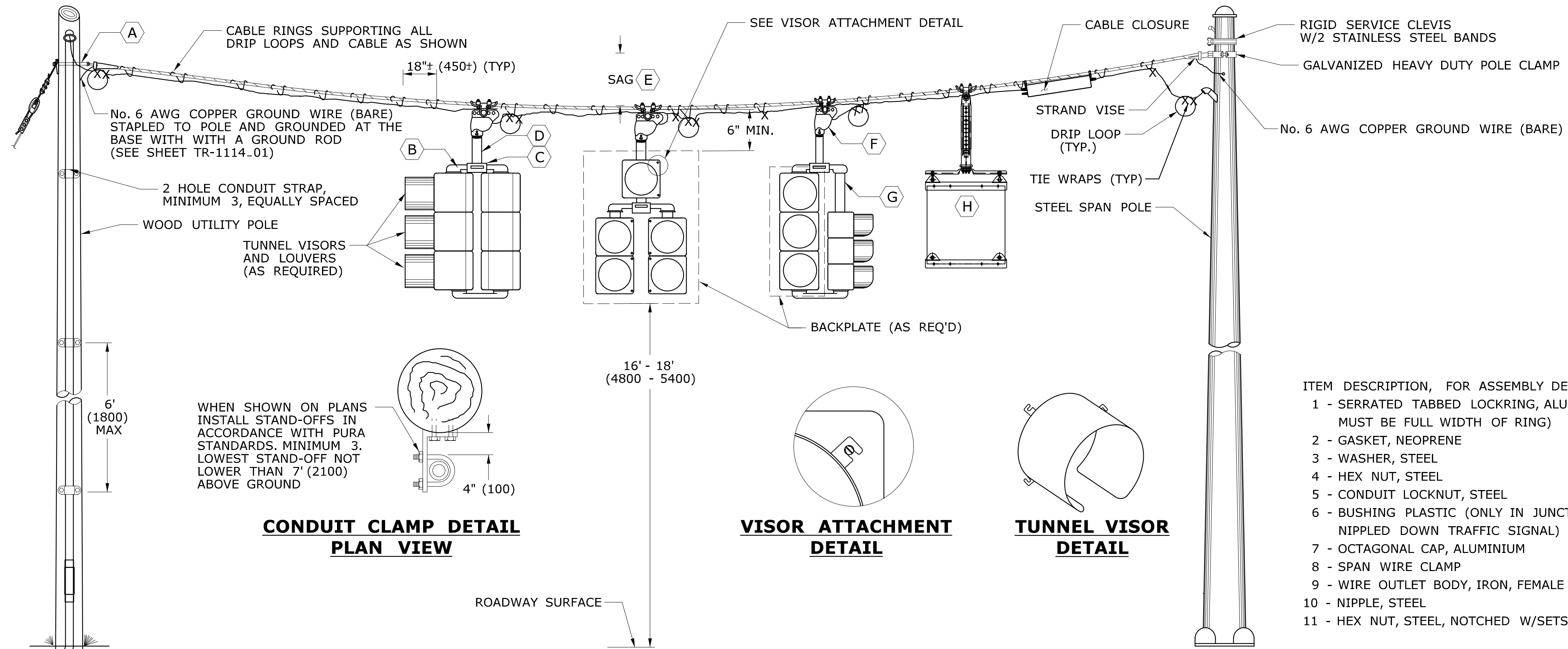
SUBMITTED BY: NAME/DATE/TIME:
Tracy L. Fogarty Tracy L. Fogarty 2012.05.01 12:55:27-04'00'

APPROVED BY: NAME/DATE/TIME:
Timothy M. Wilson Timothy M. Wilson 2012.05.09 10:24:58-04'00'

CTDOT
STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
PEDESTALS, PEDESTRIAN SIGNALS

STANDARD SHEET NO.:
TR-1102_01



TRAFFIC SIGNAL CABLE COLOR ASSIGNMENTS					
SIGNAL ASSEMBLY & CABLE USED	SIGNAL FUNCTION	ARTERY 1	ARTERY 2	SIDE STREET 1	SIDE STREET 2
2 - WAY 9 CONDUCTOR	RED	RED		BLACK	
	YELLOW	ORANGE		WHITE \ BLACK	
	GREEN	GREEN		BLUE	
	SPARE	GREEN\BLACK		RED \ BLACK	
	NEUTRAL	WHITE			
3 - WAY 12 CONDUCTOR	RED	RED	RED \ BLACK	BLACK	
	YELLOW	ORANGE	ORANGE \ BLACK	WHITE \ BLACK	
	GREEN	GREEN	GREEN \ BLACK	BLUE	
	SPARE	BLUE\BLACK	BLACK \ WHITE		
	NEUTRAL	WHITE			
4 - WAY 15 CONDUCTOR	RED	RED	RED \ BLACK	BLACK	RED \ WHITE
	YELLOW	ORANGE	ORANGE \ BLACK	WHITE \ BLACK	BLACK \ WHITE
	GREEN	GREEN	GREEN \ BLACK	BLUE	GREEN \ WHITE
	SPARE	BLUE\BLACK		BLUE \ WHITE	
	NEUTRAL	WHITE			

PEDESTRIAN SIGNAL CABLE COLOR ASSIGNMENTS		
SIGNAL ASSEMBLY & CABLE USED	SIGNAL FUNCTION	WIRE COLOR
WALK SIGNAL W/ PUSHBUTTON 7 CONDUCTOR	DON'T WALK	RED
	WALK	GREEN
	NEUTRAL FOR WALK SIGNAL	WHITE
	PEDESTRIAN PUSHBUTTON	BLACK
	NEUTRAL FOR PUSHBUTTON	ORANGE
WALK SIGNAL W/ PUSHBUTTON 7 CONDUCTOR	SPARE CONDUCTOR	WHITE \ BLACK
	SPARE CONDUCTOR *	BLUE \ BLACK
	RED	RED
	YELLOW	ORANGE
	GREEN	GREEN
NEUTRAL FOR TRAFFIC SIGNAL PEDESTRIAN PUSHBUTTON NEUTRAL FOR PUSHBUTTON SPARE CONDUCTOR *	WHITE	WHITE
	BLACK	BLACK
	WHITE \ BLACK	WHITE \ BLACK
	BLUE \ BLACK	BLUE \ BLACK

- ITEM DESCRIPTION, FOR ASSEMBLY DETAILS
- 1 - SERRATED TABBED LOCKRING, ALUMINUM (TAB MUST BE FULL WIDTH OF RING)
 - 2 - GASKET, NEOPRENE
 - 3 - WASHER, STEEL
 - 4 - HEX NUT, STEEL
 - 5 - CONDUIT LOCKNUT, STEEL
 - 6 - BUSHING PLASTIC (ONLY IN JUNCTION BOX OR NIPPLED DOWN TRAFFIC SIGNAL)
 - 7 - OCTAGONAL CAP, ALUMINIUM
 - 8 - SPAN WIRE CLAMP
 - 9 - WIRE OUTLET BODY, IRON, FEMALE ONLY
 - 10 - NIPPLE, STEEL
 - 11 - HEX NUT, STEEL, NOTCHED W/SETSCREWS

* IF 14/7 FEEDS MORE THAN ONE BUTTON, SPLIT THE BUTTONS AND USE BLUE WITH BLACK TRACER FOR THE ADDITIONAL BUTTON.

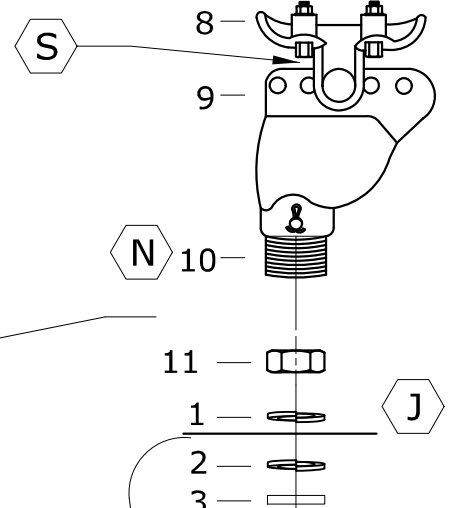
TABLE NOTES:

1. INSTALL SEPARATE CABLE BETWEEN CLOSURE AND EACH TRAFFIC SIGNAL ASSEMBLY. WIRE EACH TRAFFIC SIGNAL SECTION SEPARATELY BACK TO CABLE CLOSURE. JUMPERS BETWEEN TERMINALS ARE NOT ALLOWED EXCEPT ON NEUTRAL CONDUCTORS.
2. WIRE ALL SIGNALS, SAME DIRECTION FROM CONTROLLER, SEPARATELY WITH CONDUCTORS IN 21 CONDUCTOR CABLE, EVEN IF INDICATIONS ARE IDENTICAL.
3. CABLES THAT FEED PEDESTRIAN INDICATIONS, PUSH BUTTONS, AND DETECTORS BYPASS CABLE CLOSURE.
4. REFER TO STANDARD SHEET TR-1113.01 FOR CABLE CLOSURE - TYPE A.

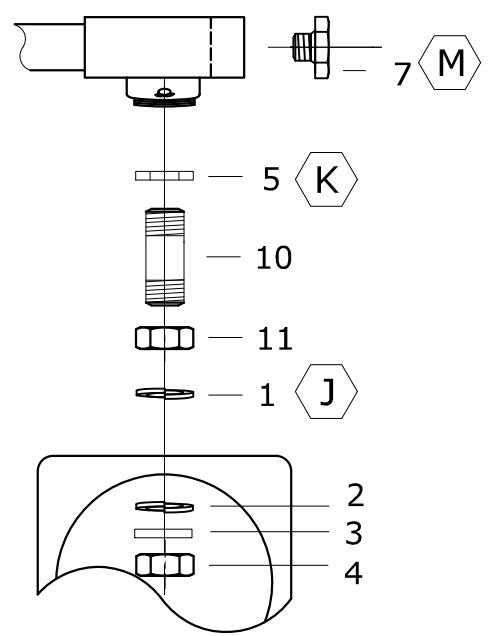
NOTES:

- SERVICE CONDUCTORS: THW, THWN OR XHHW. INDIVIDUAL WIRES MAY BE USED IN LIEU OF MULTI-CONDUCTOR CABLE.
- ALL WORK ON UTILITY POLES MUST COMPLY WITH CURRENT PURA REGULATIONS AND NESC RULES.
- (A) ATTACH SPAN AT LEAST 12" (300) BELOW LOWEST POWER COMPANY ATTACHMENT, AND AT LEAST 40" (1000) ABOVE HIGHEST COMMUNICATIONS ATTACHMENT, UNLESS OTHERWISE DIRECTED ON PLANS.
 - (B) ELBOW OR "T" FITTING MUST HAVE NOTCH FOR SERRATED TABBED LOCKRING.
 - (C) TOP BRACKET CENTER HUB SHALL BE MIN 4" (100) ROUND AND 3" (75) DEEP OR EQUAL VOLUME. SERRATION CAST IN HUB OR TABBED OR SERRATED LOCKRING, TOP OPENING NOT THREADED.
 - (D) NIPPLE LENGTH DEPENDS ON SPAN HEIGHT.
 - (E) SAG OF SPAN TO BE 5%± LENGTH, UNLESS OTHERWISE ALLOWED BY ENGINEER.
 - (F) FACE ALL ENTRANCE FITTINGS TOWARD CABLE CLOSURE.
 - (G) INSTALL EXTENSION NIPPLE ON TOP OF SIGNAL HOUSING SO BOTTOM OF ALL SIGNALS ARE EVEN.
 - (H) REFER TO TR-GS-01 "SIGN FACE SHEET ALUMINUM, R-SERIES SIGNS TYPICAL DETAILS", AND TO TR-1114.01 FOR SIGN HANGER ASSEMBLY. MAXIMUM SIGN SIZE 36" X 36" (900 X 900). ALL STAINLESS STEEL HARDWARE. SECURE LOUVERS TO TUNNEL VISORS WITH 3 STAINLESS STEEL SCREWS.

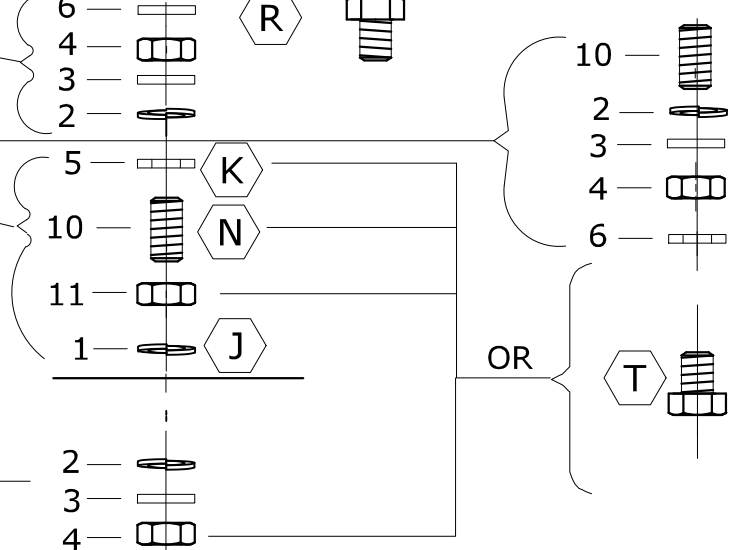
SPAN WIRE HANGER ASSEMBLY DETAIL



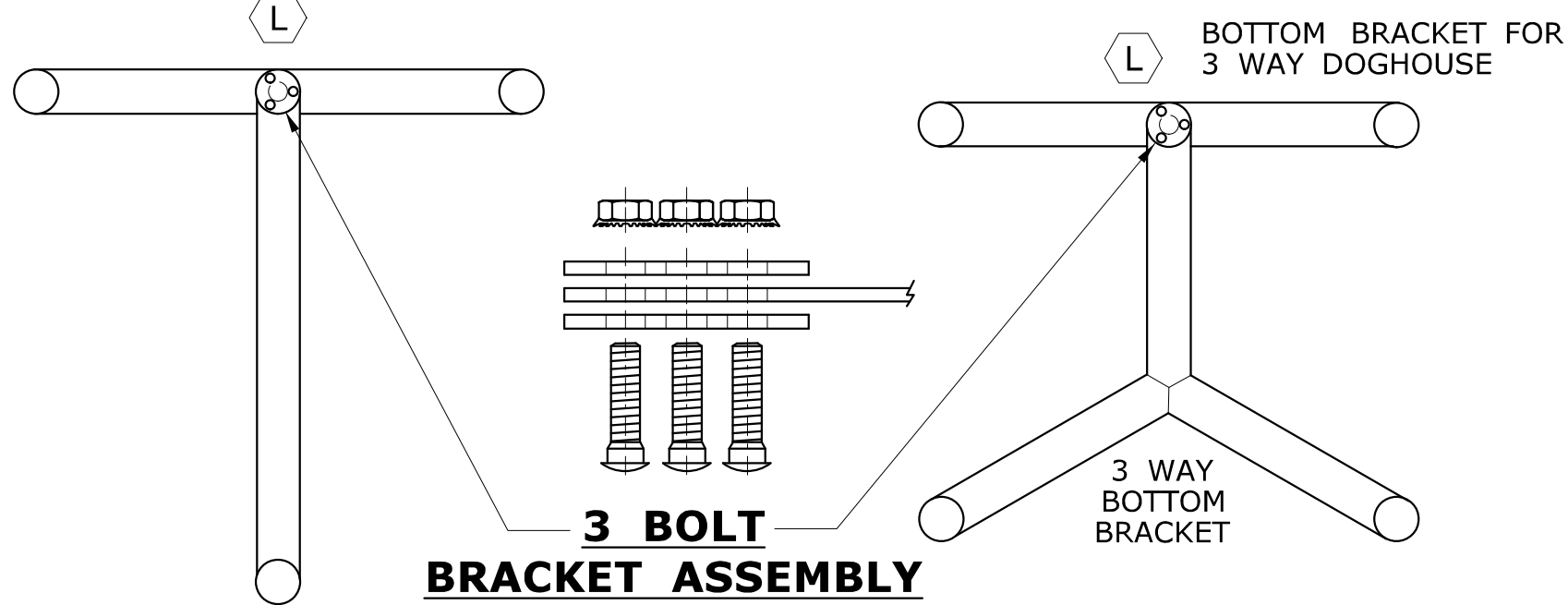
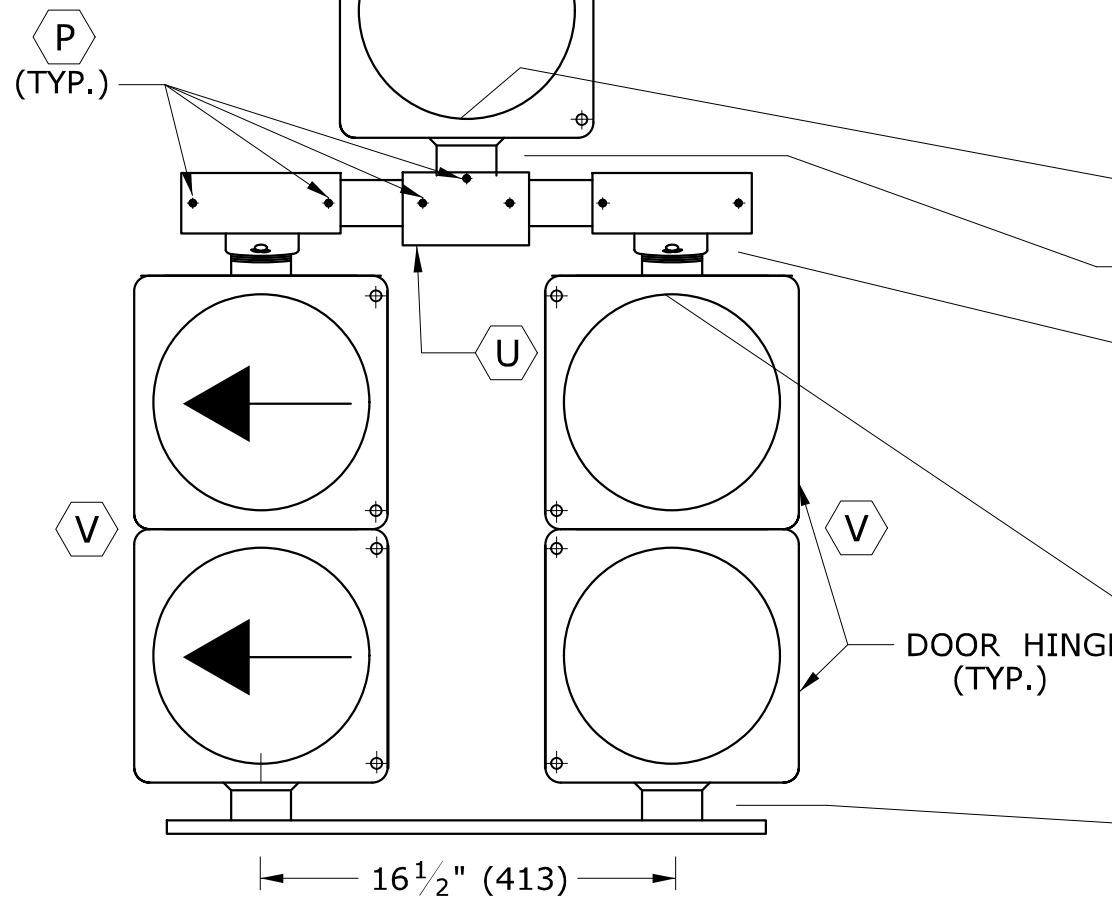
TWO WAY, THREE WAY & FOUR WAY NIPPLE DOWN ASSEMBLY DETAIL



UPPER CENTER SUPPORT DETAIL



DIRECT ASSEMBLY DETAIL



BOTTOM "T" BRACKET FOR 2 WAY DOGHOUSE

- NOTES: FOR ASSEMBLY DETAILS
- (J) APPLY SILICONE CAULK BETWEEN OR AROUND SERRATED LOCKRING AND HOUSING.
 - (K) OPTIONAL USE IF NIPPLE THREADS TOO FAR INTO ELBOW.
 - (L) DRILL HOLE IN CENTER OF 2 WAY BOTTOM BRACKET - INSTALL 3 BOLT BRACKET (SEE DETAIL).
 - (M) DO NOT INSERT ORNAMENTAL CAP PAST DOTTED LINE.
 - (N) ALL THREAD.
 - (P) SETSCREW (SQUARE OR ALLEN) ON ALL FITTINGS.
 - (R) CHASE NIPPLE CAN BE SUBSTITUTED FOR THE COMBINATION OF ITEMS 6, 5 AND 10.
 - (S) INSTALL STAINLESS STEEL WASHER ON INSIDE OF COTTER PIN. COTTER PIN AND WASHER SHALL BE ON SIDE OF HANGER AWAY FROM SIGNAL CABLES.
 - (T) CHASE NIPPLE CAN BE SUBSTITUTED FOR COMBINATION 4, 5, 10 AND 11.
 - (U) CENTER HUB SAME AS (C) EXCEPT TOP OPENING MAY BE THREADED.
 - (V) DOOR HINGE ON OUTSIDE OF SIDE BY SIDE ASSEMBLY.

REV.	DATE	REVISION DESCRIPTION
4	1-2018	REVISED GROUNDING NOTE FOR SPAN AND OTHER MINOR REVISIONS.
3	3-2015	REMOVED STRAIN INSULATOR.
2	5-2013	MINOR REVISIONS.
1	4-2012	MINOR REVISIONS.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 5/22/2018

DIMENSIONS ARE IN ENGLISH ("") & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm. - UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION

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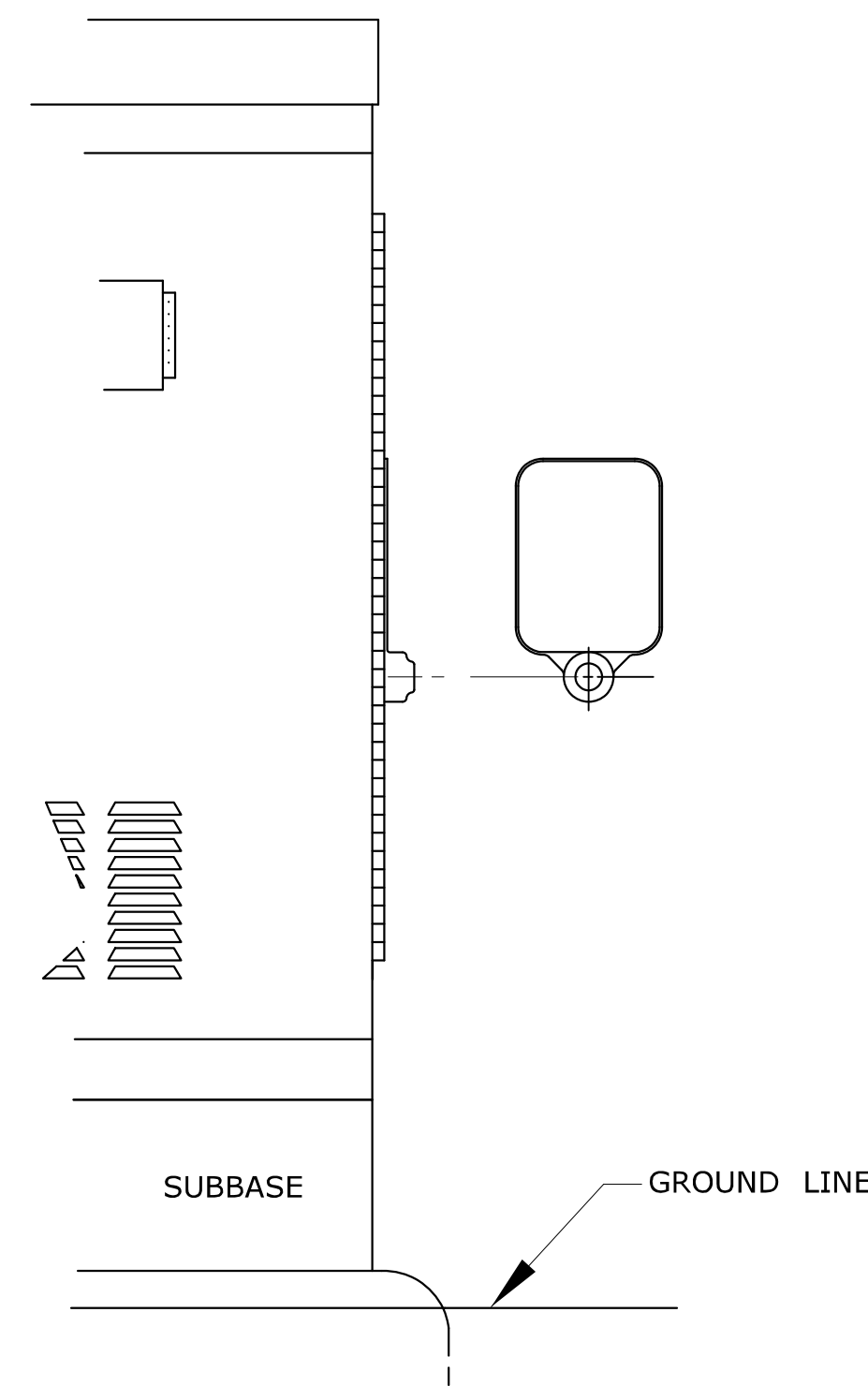
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APPROVED BY: Mark F. Carlini, P.E. 2018.08.21 07:46:03-04'00'

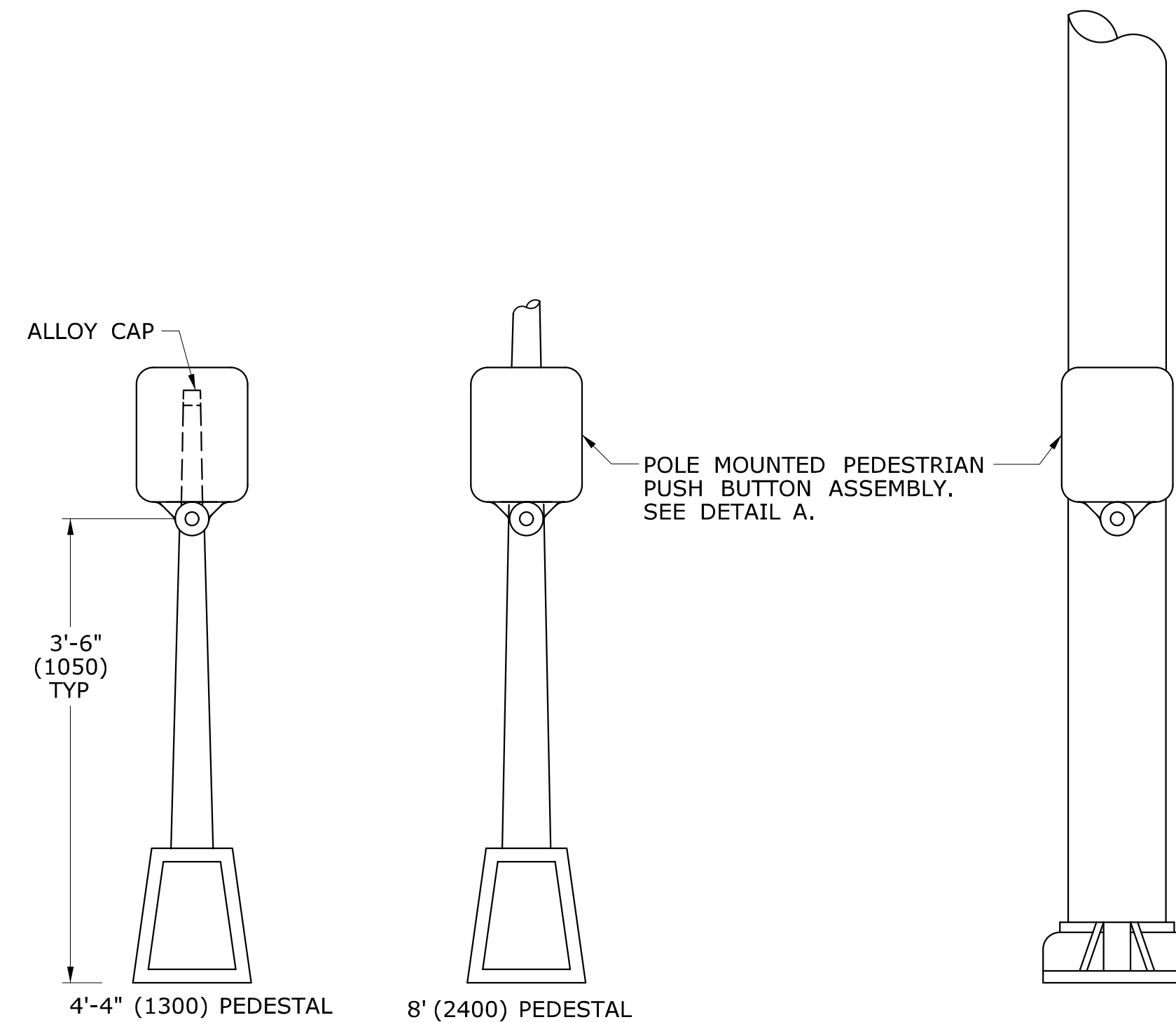
CTDOT STANDARD SHEET OFFICE OF ENGINEERING

STANDARD SHEET TITLE: TRAFFIC SIGNALS & CABLE ASSIGNMENTS

STANDARD SHEET NO.: TR-1105_01

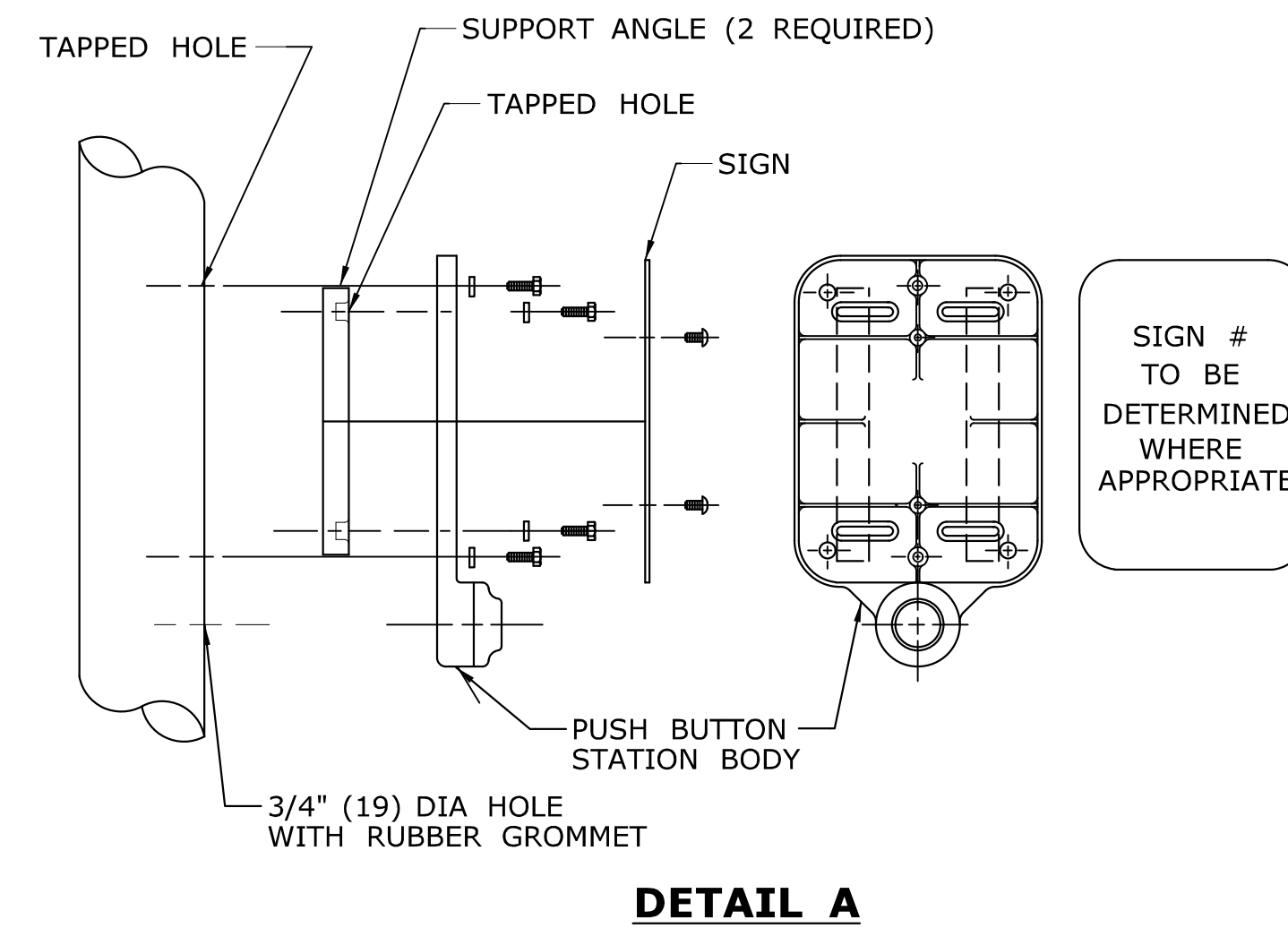


SURFACE MOUNTED



PEDESTAL MOUNTED

SPAN POLE/MAST ARM MOUNTED



DETAIL A



SIGN # 31-0833
USE APPROPRIATE LEFT OR RIGHT ARROW

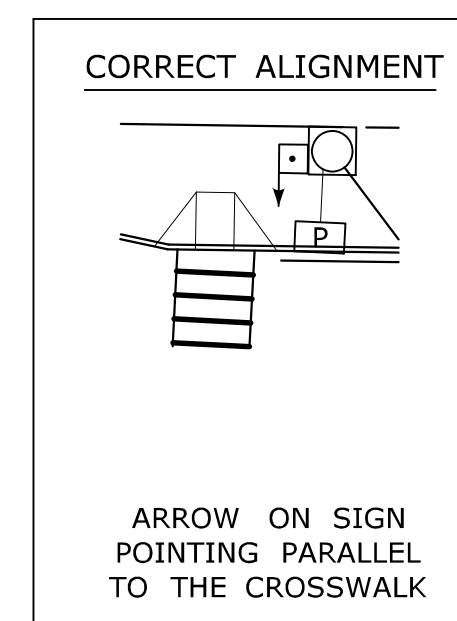


SIGN # 31-0835

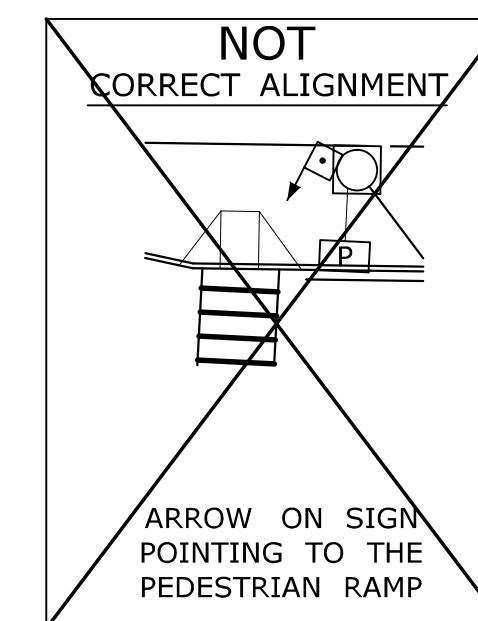
FOR CROSSING WITH SIDE STREET GREEN

GENERAL NOTES:

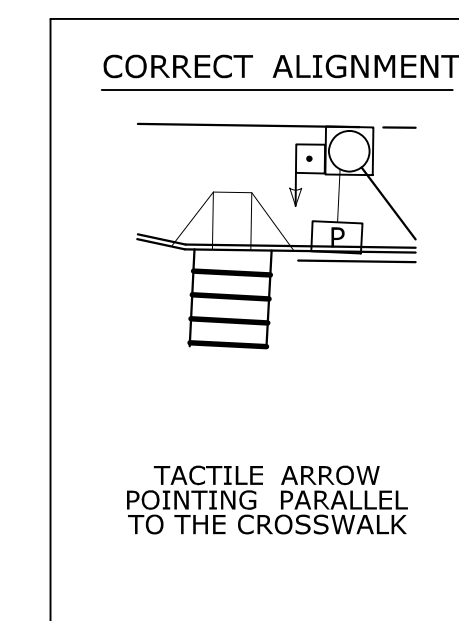
- 3'-6" (1050) FROM FINISHED GRADE SUCH AS SIDEWALK TO CENTER OF PUSH BUTTON.
- PUSH BUTTON INSTALLATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN, CURRENT EDITION GOVERNS.
- 4'-4" (1300) PEDESTAL TO INCLUDE ALLOY CAP SECURED WITH STAINLESS STEEL SET SCREW.



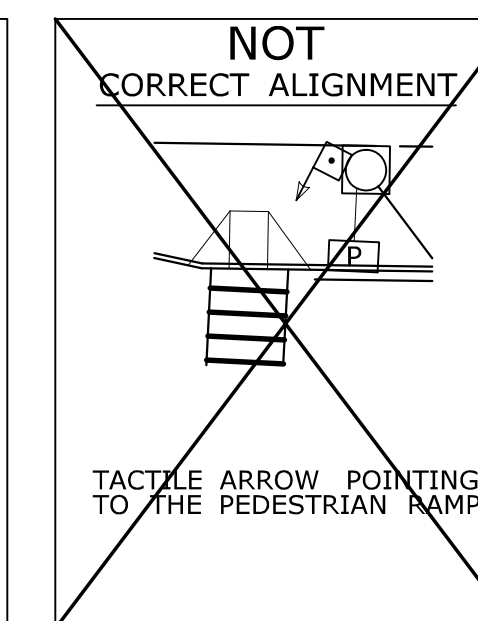
PEDESTRIAN PUSH BUTTON ALIGNMENT



NOT CORRECT ALIGNMENT
ARROW ON SIGN POINTING TO THE PEDESTRIAN RAMP

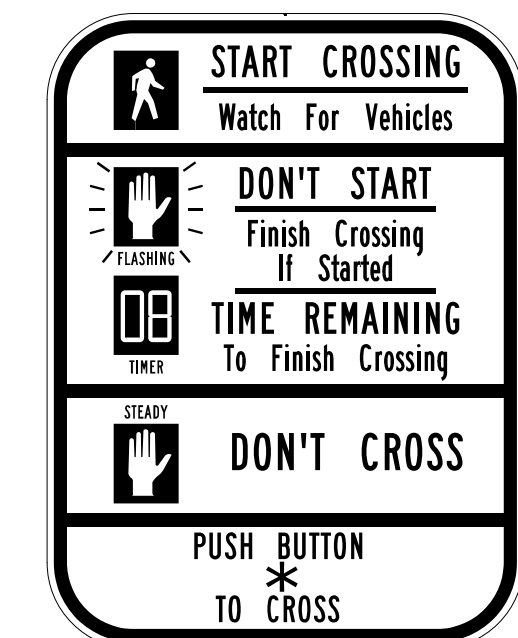


ACCESSIBLE PEDESTRIAN SIGNAL AND DETECTOR



NOT CORRECT ALIGNMENT
TACTILE ARROW POINTING TO THE PEDESTRIAN RAMP

EXAMPLE ALIGNMENTS FOR EXCLUSIVE PEDESTRIAN PHASE



*USE APPROPRIATE ARROW UNLESS OTHERWISE NOTED ON PLAN.

FOR NEW PUSHBUTTON HOUSING, USE 9" x 15" SIGN NO. 31-0856.

FOR EXISTING PUSHBUTTON HOUSING, WITH 9" x 12" SIZE, USE SIGN NO. 31-0845.

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

	PEDESTRIAN PUSH BUTTON
	PEDESTRIAN PUSH BUTTON, PEDESTAL MOUNTED
	PEDESTRIAN PUSH BUTTON, POLE MOUNTED

REV.	DATE	REVISION DESCRIPTION
3	8-2018	UPDATED PEDESTRIAN SIGN LEGENDS AND NOTES.
2	4-2014	ADDED PEDESTRIAN EXAMPLE ALIGNMENTS
1	4-2012	MINOR REVISIONS & UPDATED SIGN #31-0845.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 8/9/2018

DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm).
METRIC DIMENSIONS ARE ROUNDED:
- OVER 1" TO NEAREST 5 mm
- UNDER 1" TO NEAREST 1 mm.

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

File name: CTDOT_TRAFFIC_STD_2018-01-25.dgn Model: TR-1107_01

SUBMITTED BY: NAME/DATE/TIME:
Tracy L. Fogarty Tracy L. Fogarty, P.E.
2018.08.16 12:13:35-04'00'

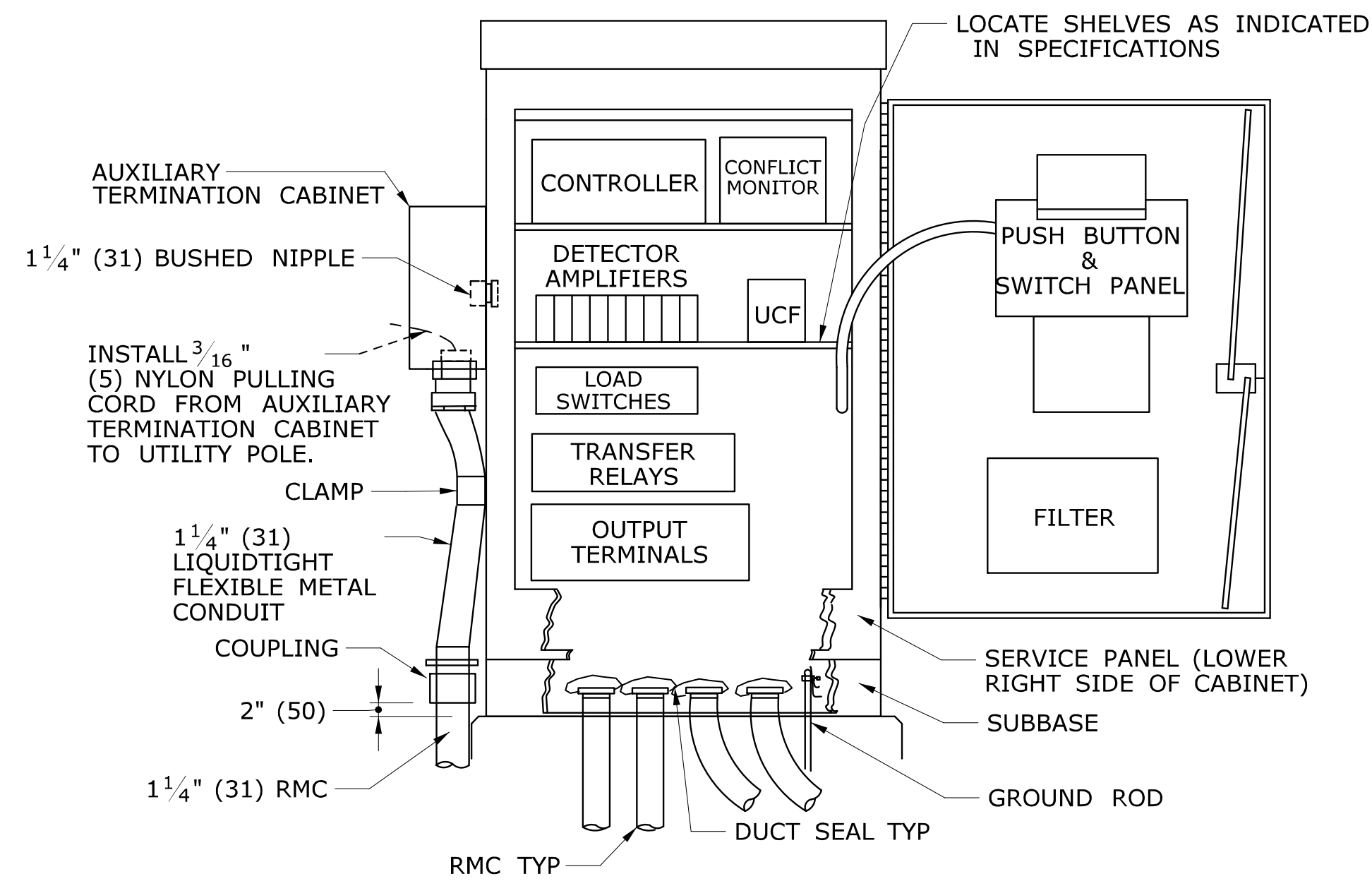
APPROVED BY: NAME/DATE/TIME:
Mark F. Carliano Mark F. Carliano, P.E.
2018.08.21 07:46:57-04'00'

CTDOT STANDARD SHEET

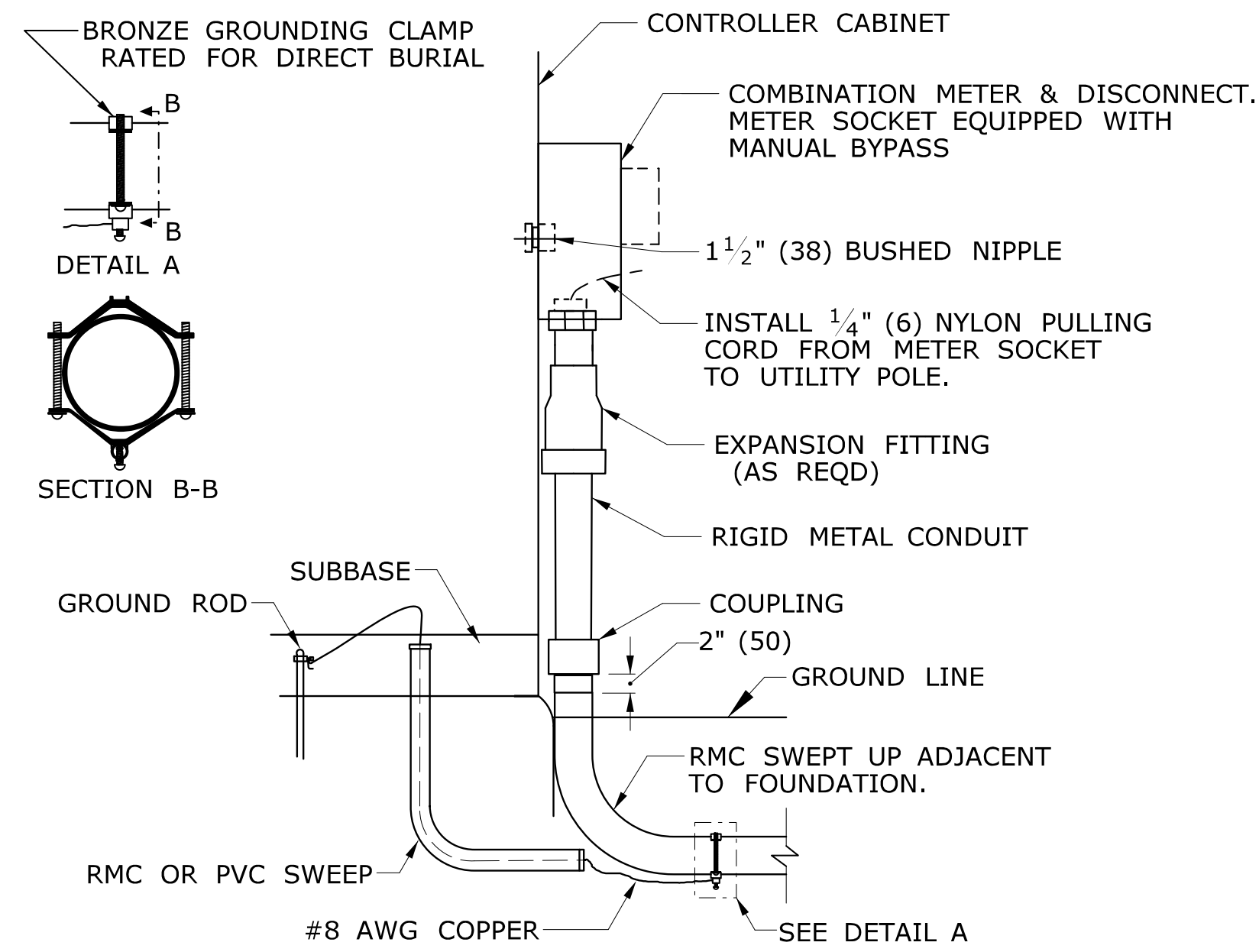
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
PEDESTRIAN PUSH BUTTONS

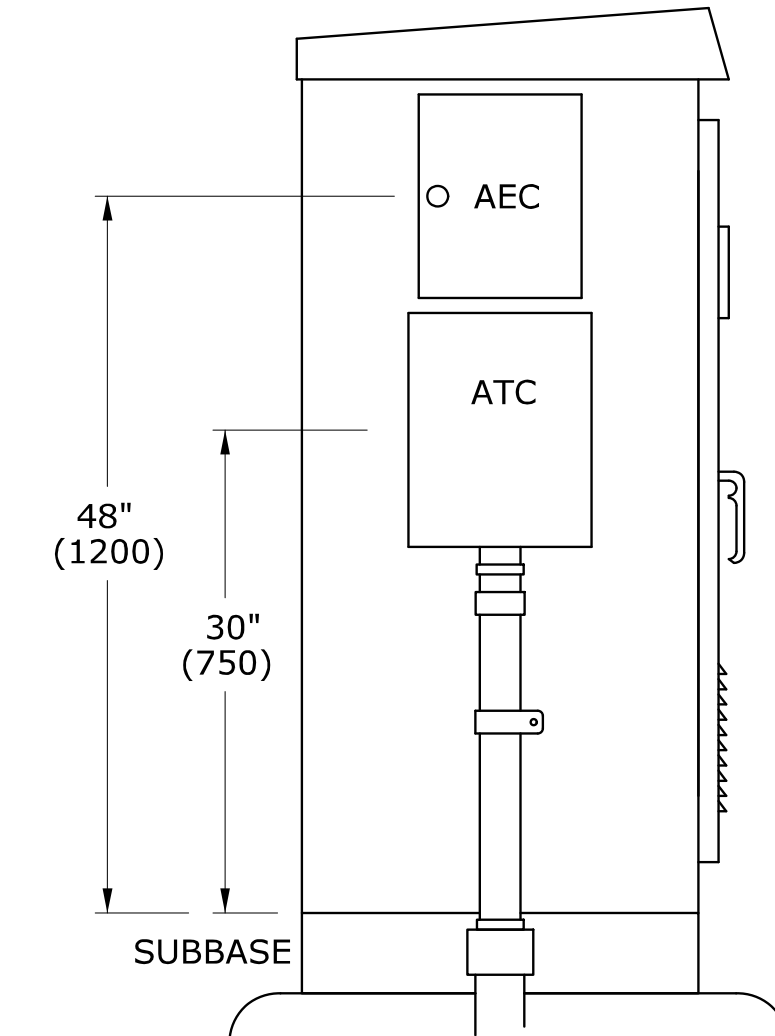
STANDARD SHEET NO.:
TR-1107_01



PROVIDE A MINIMUM CLEARANCE OF 6" (150) FROM THE CABINET BASE TO ALL COMPONENTS AND TERMINALS.
TYPICAL BASE MOUNTED CONTROLLER ON TYPE IV FOUNDATION

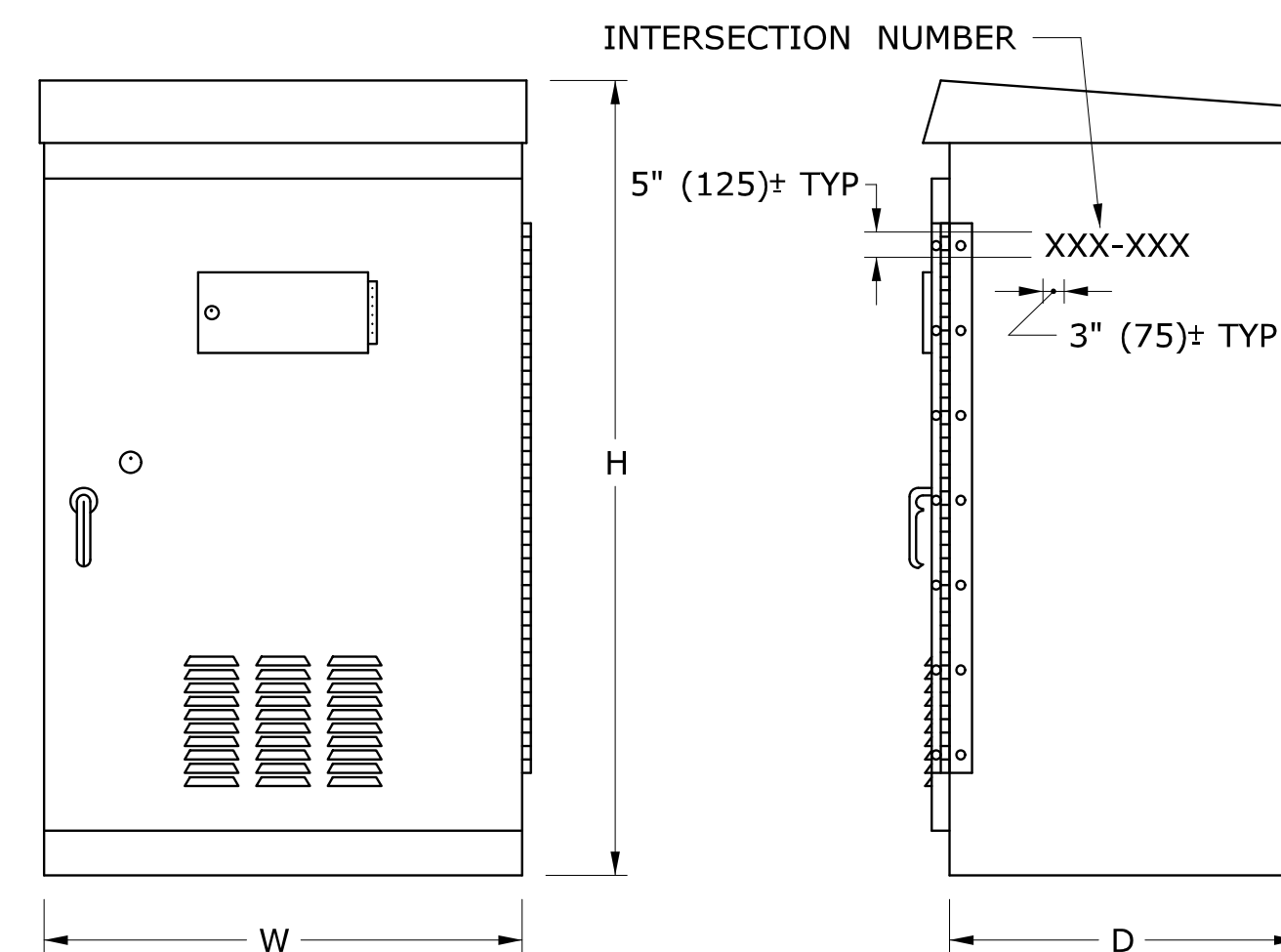


CONTROLLER CABINET WITH METERED SERVICE



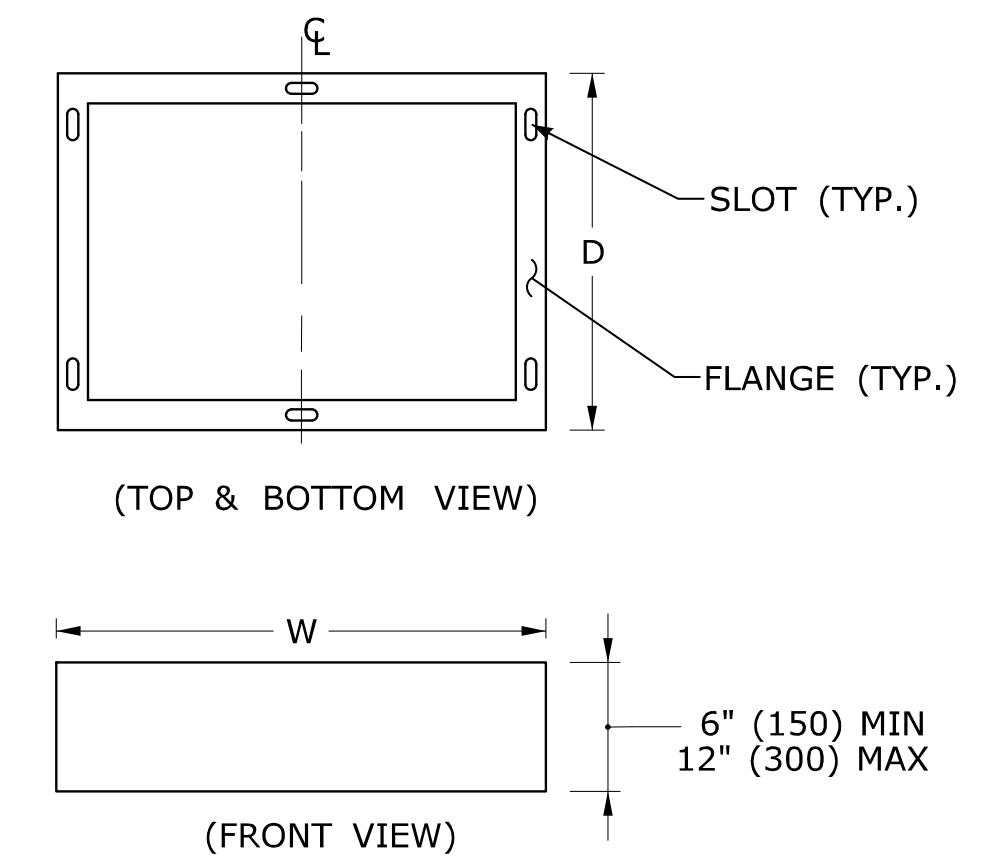
AUXILIARY EQUIPMENT CABINET (AEC) AUXILIARY TERMINATION CABINET (ATC)

CABINET TYPE	HEIGHT	WIDTH	DEPTH
ATC	16"(400)	12"(300)	6"(150)
AEC	14"(350)	11"(275)	11"(275)



BASE MOUNTED TRAFFIC CONTROLLER (TYPE B, D & E)

CABINET TYPE	DEPTH		WIDTH		HEIGHT	
	MIN	MAX	MIN	MAX	MIN	MAX
B	17" (425)	19" (475)	30" (750)	34" (850)	52" (1300)	56" (1400)
D	25" (625)	27" (675)	42" (1050)	45" (1125)	54" (1350)	59" (1475)
E	17" (425)	19" (475)	30" (750)	32" (800)	49" (1225)	52" (1300)



SUBBASE

SLOT AND FLANGE DIMENSIONS TO BE PER MANUFACTURER.

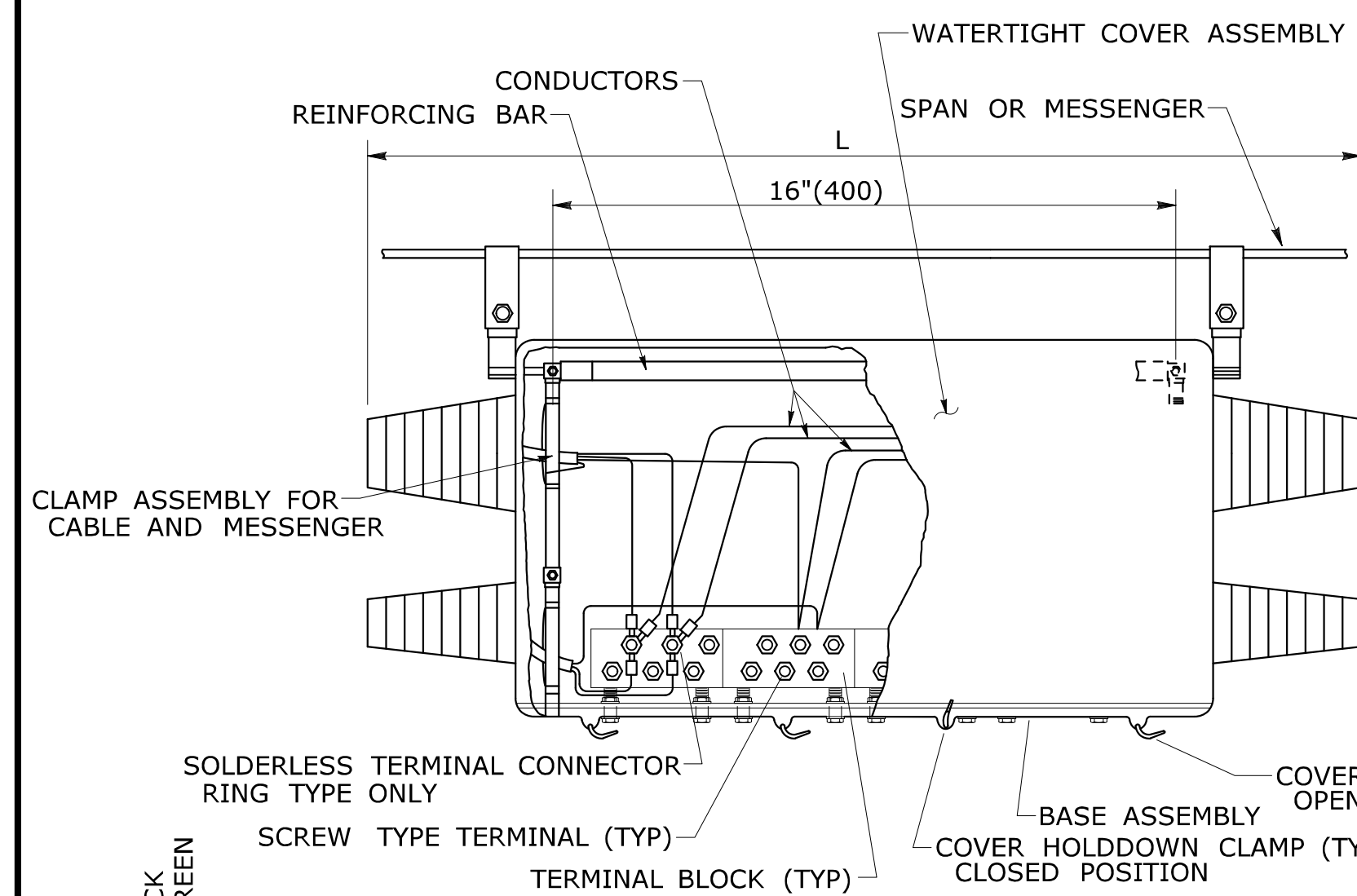
GENERAL NOTES:

- GROUT ALL BASES AFTER MOUNTING ON FOUNDATIONS, WHERE NECESSARY. 3'-0" (900) FROM SIDEWALK TO BOTTOM OF CONTROLLER.
- INSTALL PEDESTALS AND POLES SO THAT DOORS AND COVERS ARE ON THE SIDE AWAY FROM THE STREET, UNLESS OTHERWISE SPECIFIED.
- INSTALL CABINET SO THAT DOOR OPENS FIELD SIDE UNLESS OTHERWISE NOTED ON PLANS.
- CAULK SEAM BETWEEN SUBBASE AND FOUNDATION.
- STENCIL SIX DIGIT INTERSECTION NUMBER, USING BLACK PAINT ON SIDE, FRONT OR BACK OF CABINET MOST VISIBLE FROM THE ROAD.

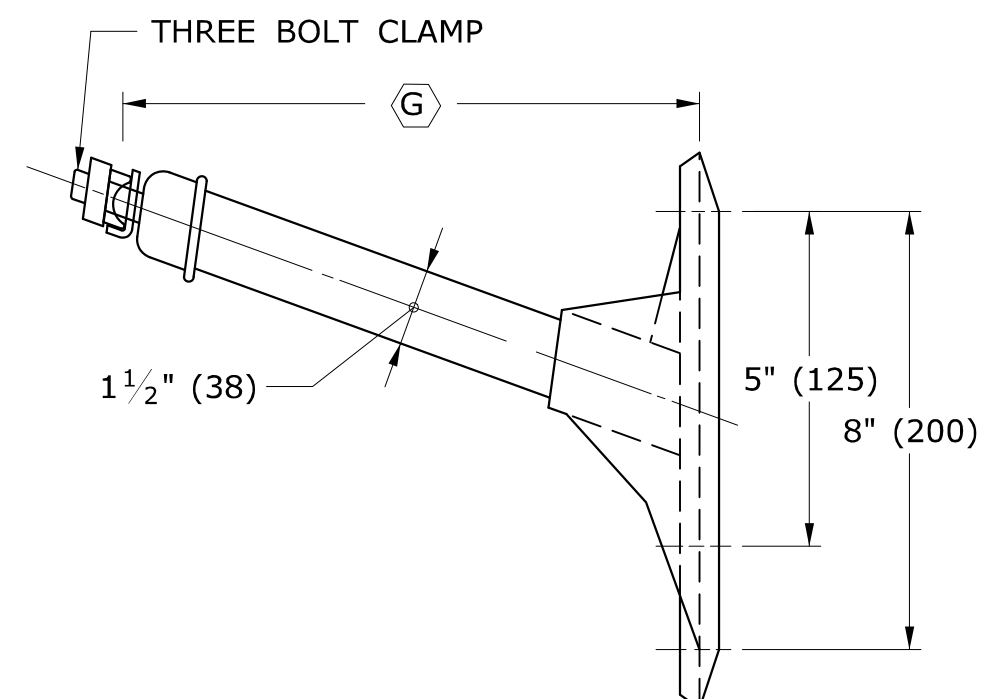
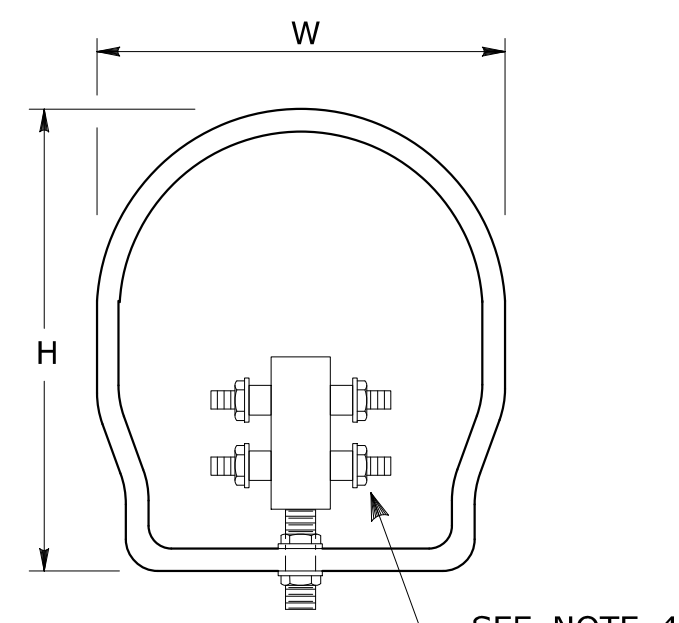
LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:

	CONTROLLER ASSEMBLY
	AUXILIARY EQUIPMENT CABINET
	AUXILIARY TERMINATION CABINET

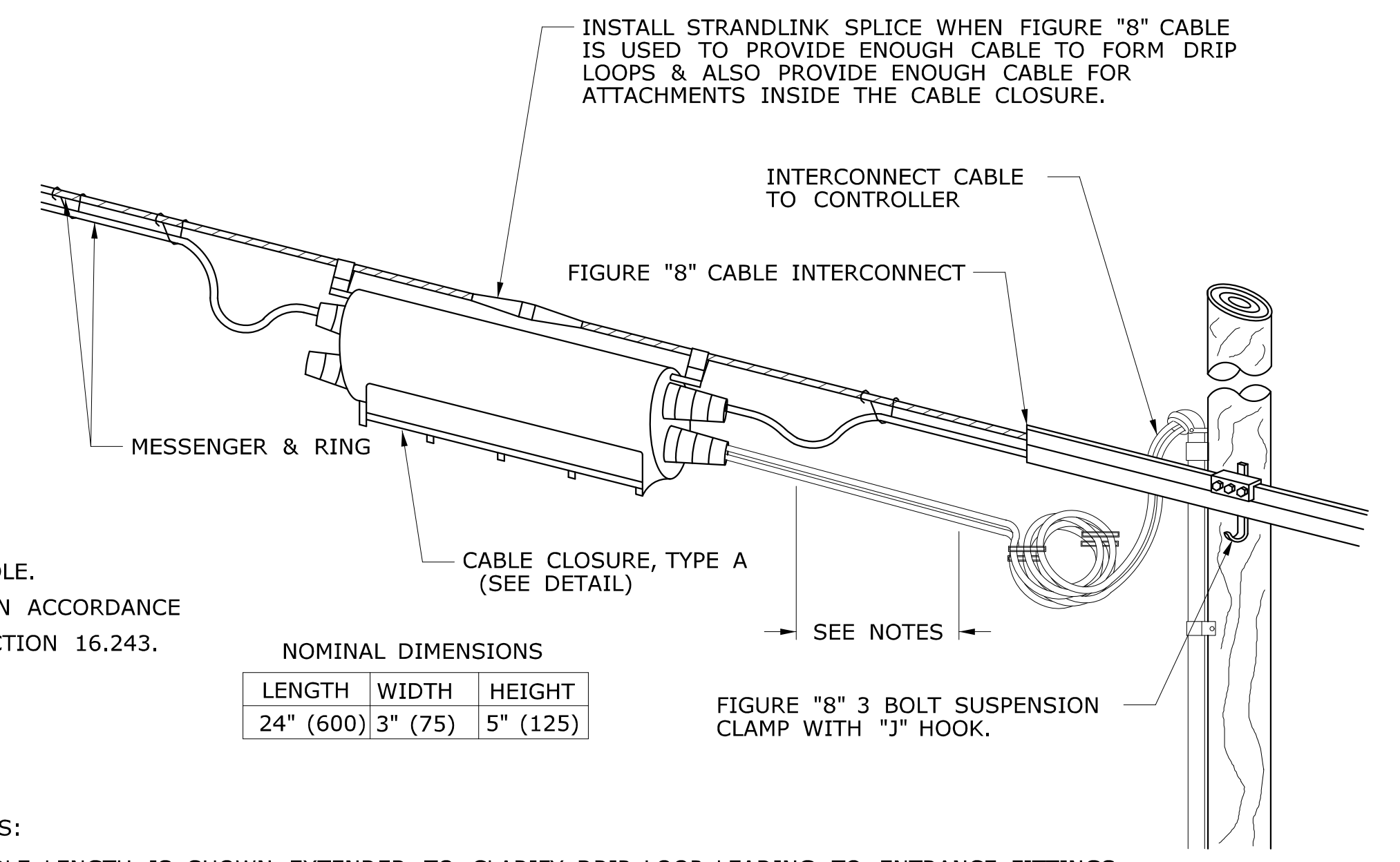
2 5-2013 REVISED SUBBASE. 1 4-2012 REVISED CABINET TYPES & MINOR REVISIONS.	THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.	DIMENSIONS ARE IN ENGLISH (") & METRIC UNITS (mm). METRIC DIMENSIONS ARE ROUNDED: - OVER 1" TO NEAREST 5 mm - UNDER 1" TO NEAREST 1 mm.	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	SUBMITTED BY: Tracy L. Fogarty NAME/DATE/TIME: Tracy L. Fogarty 2013.07.29	CTDOT STANDARD SHEET OFFICE OF ENGINEERING	STANDARD SHEET TITLE: CONTROLLERS	STANDARD SHEET NO.: TR-1108_01
				APPROVED BY: Charles S. Harlow NAME/DATE/TIME: Charles S. Harlow 2013.07.29 14:59:45-04'00'			
REV. DATE REVISION DESCRIPTION 2 5-2013 REVISED SUBBASE. 1 4-2012 REVISED CABINET TYPES & MINOR REVISIONS.	Plotted Date: 5/15/2013	NOT TO SCALE	Filename: CTDOT-TRAFFIC-STD.dgn Model: TR-1108_01	Charles S. Harlow 2013.07.29 14:59:45-04'00'	OFFICE OF ENGINEERING	CONTROLLERS	TR-1108_01



	LENGTH	WIDTH	HEIGHT
MIN	28" (700)	3" (75)	5" (125)
MAX	33" (840)	6" (150)	8" (200)



NOTES:
 5/8" (16) THROUGH BOLT IN TOP HOLE.
 1/2" (13) X 4" (100) LAG BOLT IN BOTTOM HOLE.
 (G) LENGTH REQUIRED TO PROVIDE CLEARANCE IN ACCORDANCE WITH PURA CONSTRUCTION STANDARD SECTION 16.243.



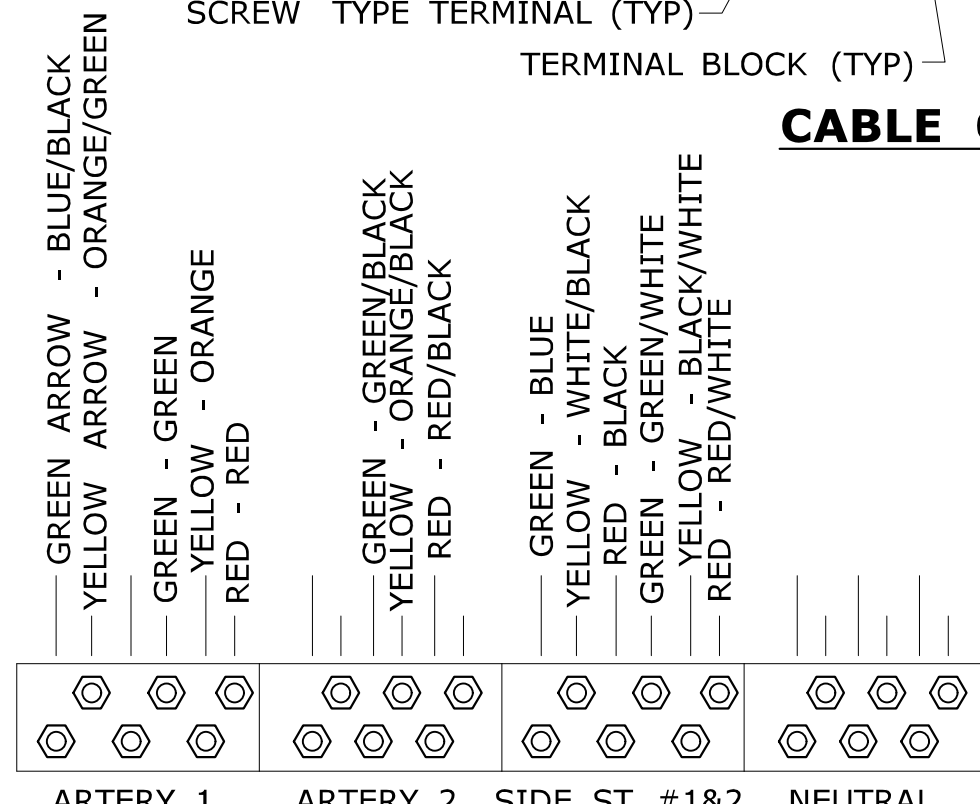
NOMINAL DIMENSIONS

LENGTH	WIDTH	HEIGHT
24" (600)	3" (75)	5" (125)

NOTES:
 CABLE LENGTH IS SHOWN EXTENDED TO CLARIFY DRIP LOOP LEADING TO ENTRANCE FITTINGS.
 WHEN CABLE IS TOO LARGE TO FORM DRIP LOOPS, INSTALL DIRECTLY INTO CLOSURE WITHOUT DRIP LOOPS.

CABLE CLOSURE FOR TRAFFIC SIGNALS

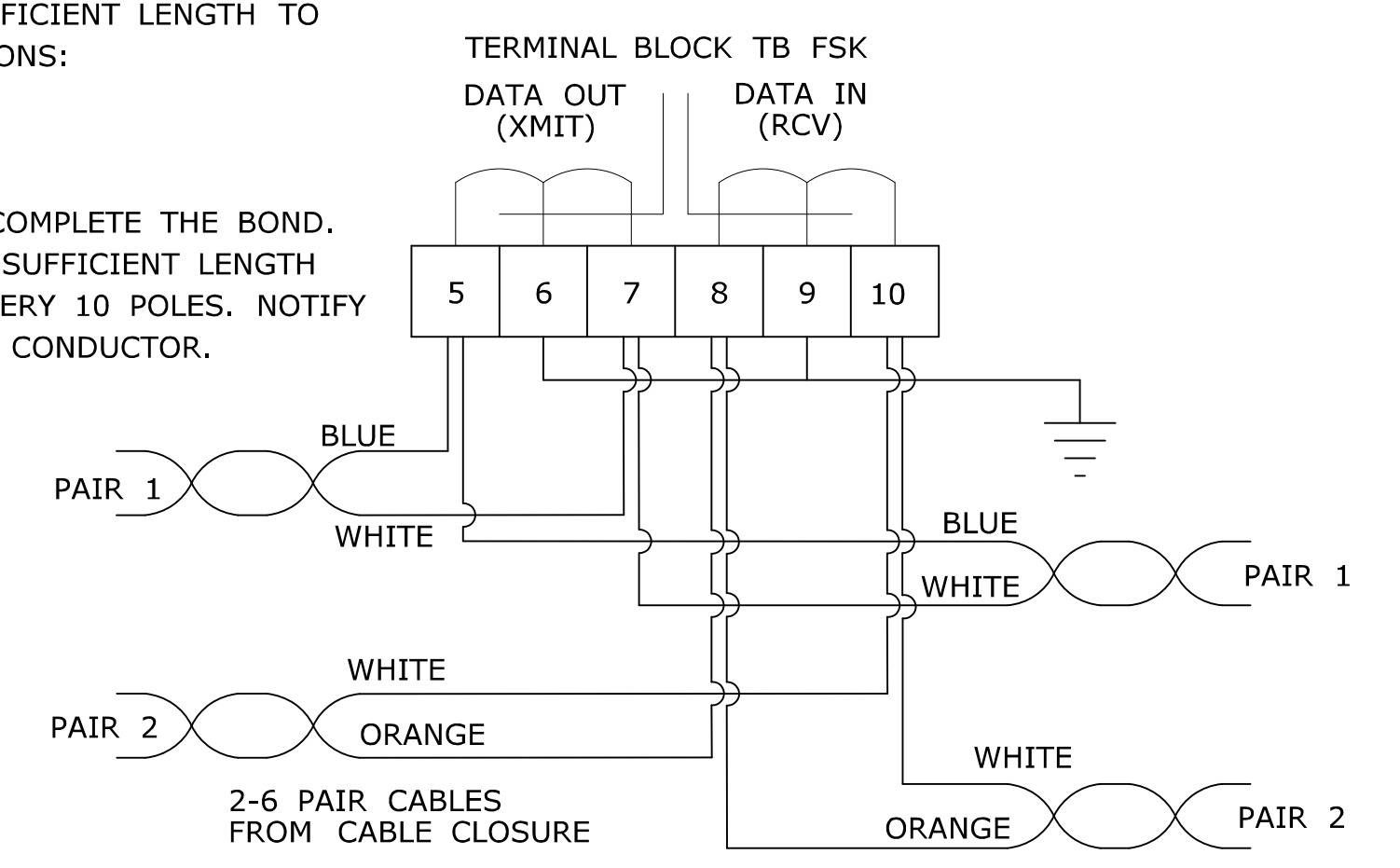
- NOTES:
- PROVIDE A MINIMUM OF FOUR TERMINAL BLOCKS WITH SEPARATE SCREW TYPE TERMINALS, SIX ON EACH SIDE.
 - INSTALL SEPARATE CABLE BETWEEN CLOSURE & EACH TRAFFIC SIGNAL ASSEMBLY. WIRE EACH TRAFFIC SIGNAL SECTION SEPARATELY BACK TO CABLE CLOSURE. JUMPERS BETWEEN TERMINALS ARE NOT ALLOWED EXCEPT ON NEUTRAL CONDUCTORS.
 - WIRE ALL SIGNALS, SAME DIRECTION FROM CONTROLLER, SEPARATELY WITH CONDUCTORS IN 21 OR 25 CONDUCTOR CABLE, EVEN IF INDICATIONS ARE IDENTICAL.
 - PREVENT CONNECTORS, TERMINAL POSTS AND CONDUCTORS FROM CONTACT WITH CLOSURE COVER AND SECURELY WRAP WITH ELECTRICAL TAPE OR RUBBER MASTIC TAPE.
 - CABLES THAT FEED PEDESTRIAN INDICATIONS, PUSH BUTTONS, AND DETECTORS BYPASS CABLE CLOSURE.
 - INSTALL TRAFFIC SIGNAL CABLE CLOSURE ON THE SPAN +5' (+1.5 m) FROM CURBLINE.



RECOMMENDED CONNECTION OF 21 CONDUCTOR CABLE IN CLOSURE

OVERHEAD INTERCONNECT INSTALLATION

- BONDING AND GROUNDING REQUIREMENTS FOR COMMUNICATION CABLES
- PLACE BOND ON STRAND USING #6 AWG LEAVE COIL OF SUFFICIENT LENGTH TO REACH THE NEXT STRAND AT ALL OF THE FOLLOWING LOCATIONS:
 - FIRST POLE
 - LAST POLE
 - JUNCTION POLE
 CONTACT THE UTILITY THAT OWNS THE NEXT STRAND TO COMPLETE THE BOND.
 - LEAVE COIL #6 AWG WIRE ATTACHED TO CABLE STRAND OF SUFFICIENT LENGTH TO REACH VERTICAL GROUNDING CONDUCTOR AT LEAST EVERY 10 POLES. NOTIFY ELECTRIC COMPANY TO MAKE ATTACHMENT TO GROUNDING CONDUCTOR.



NOTES:
 CONNECT SHIELDS TO GROUND ONLY AT EVERY OTHER CABINET, LEAVE SHIELD OPEN AT ALTERNATE CABINETS.
 TAG 6 PAIR CABLES WITH INTERSECTION DESTINATION.
 SPARE PAIRS TO BE FOLDED BACK AND NEATLY TIED ADJACENT TO TERMINAL BLOCK.

TYPICAL COMMUNICATION CABLE CONNECTION IN CONTROLLER CABINET

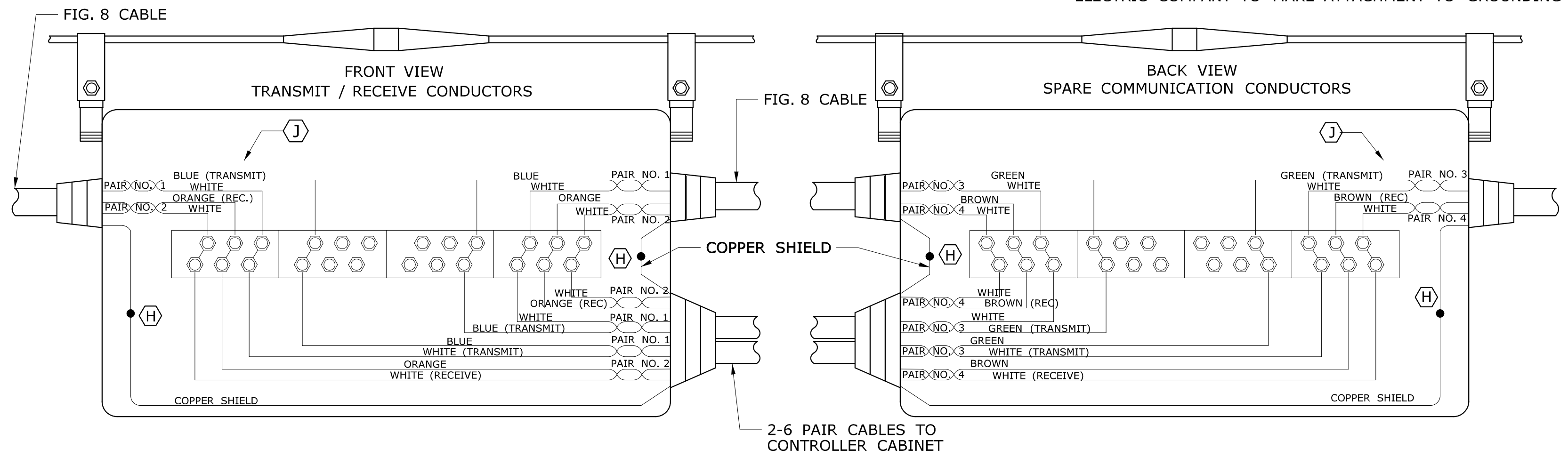
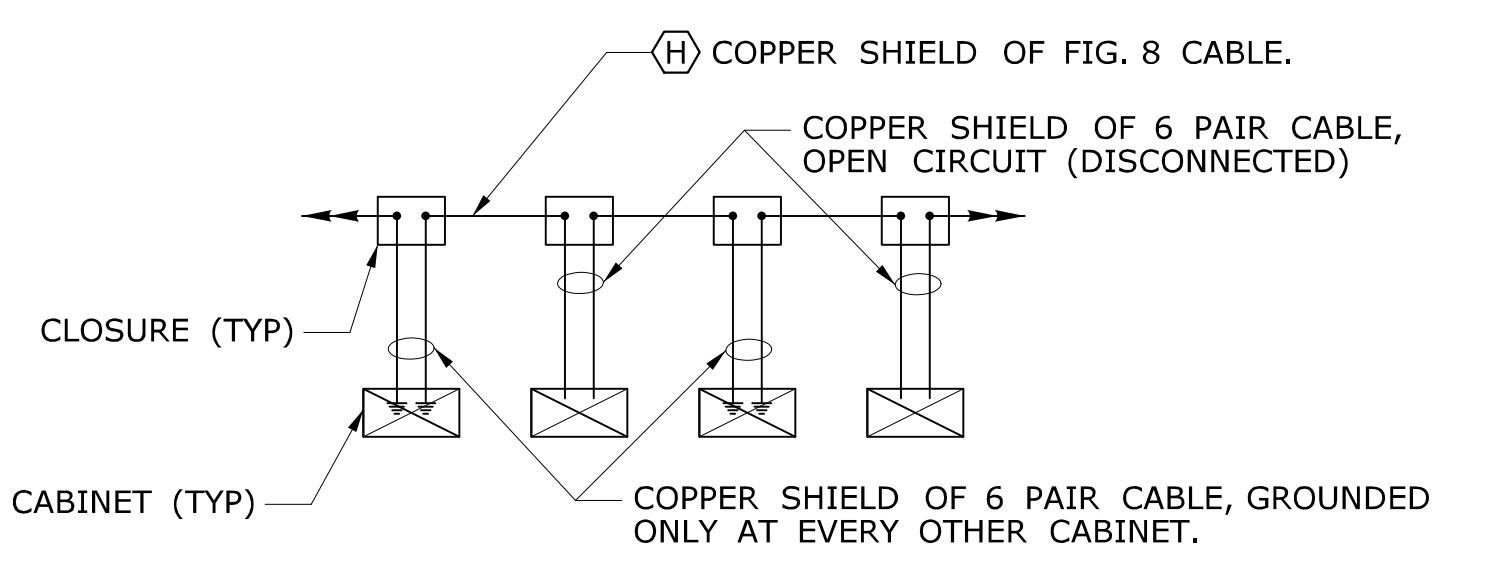


FIG. 8 CABLE				6 PAIR, CABLE			
PAIR #	DOT	SPARE	PAIR #	MUNICIPAL SPARES	PAIR #	DOT	SPARE
3	GREEN	- WHITE	5	SLATE - WHITE	5	SLATE	- WHITE
4	BROWN	- WHITE	6	BLUE - RED	6	BLUE	- RED

NOTES:
 SPARE PAIRS TO BE FOLDED BACK AND NEATLY TIED. GROUP MUNICIPAL SPARES TOGETHER, SEPARATE FROM THOSE RESERVED FOR D.O.T. MUNICIPAL SPARES ARE NOT TO BE CUT.
 DO NOT BOND THE CABLE SHEATH TO THE SUPPORT STRAND.
 (H) CONNECT ONLY TO SHIELD OF CORRESPONDING 6 PAIR CABLE.
 (J) WHEN CONNECTING TO AN EXISTING SYSTEM, VERIFY COLOR CODE OF TRANSMIT AND RECEIVE CONDUCTORS.

TYPICAL COMMUNICATION CABLE CONNECTION IN CABLE CLOSURE, TYPE A

LEGEND AS SHOWN ON TRAFFIC CONTROL SIGNAL PLAN:
 ○ PROPOSED UTILITY POLE
 ● EXISTING UTILITY POLE
 ○ POLE ANCHOR & GUY
 ○ CABLE CLOSURE

REV.	DATE	REVISION DESCRIPTION
2	4-2014	ADDED CABLE CLOSURE FOR TRAFFIC SIGNALS, NOTE #6.
1	4-2012	MINOR REVISIONS.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.
 Plotted Date: 4/12/2014

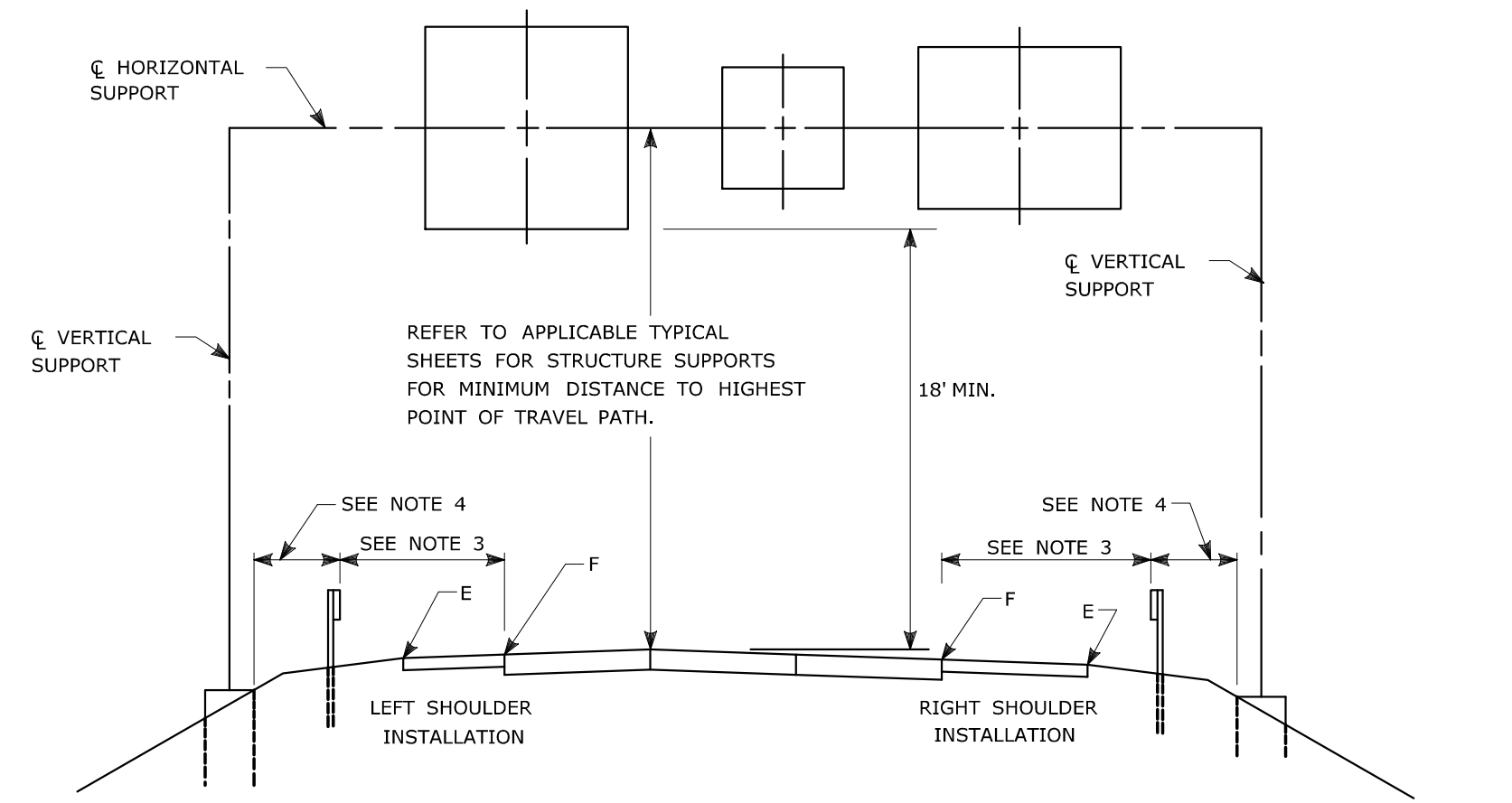
STATE OF CONNECTICUT
 DEPARTMENT OF TRANSPORTATION
 NOT TO SCALE
 Filename: CTDOT_TRAFFIC_STD.DGN Model: TR-1113_01

SUBMITTED BY: Tracy L. Fogarty
 NAME/DATE/TIME: Tracy L. Fogarty, P.E. 2014.04.25 16:02:38-04'00'
 APPROVED BY: Charles S. Harlow, P.E.
 NAME/DATE/TIME: Digitally signed by Charles S. Harlow, P.E. Date: 2014.04.29 14:31:58-04'00'

CTDOT
 STANDARD SHEET
 OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
CONTROL CABLE

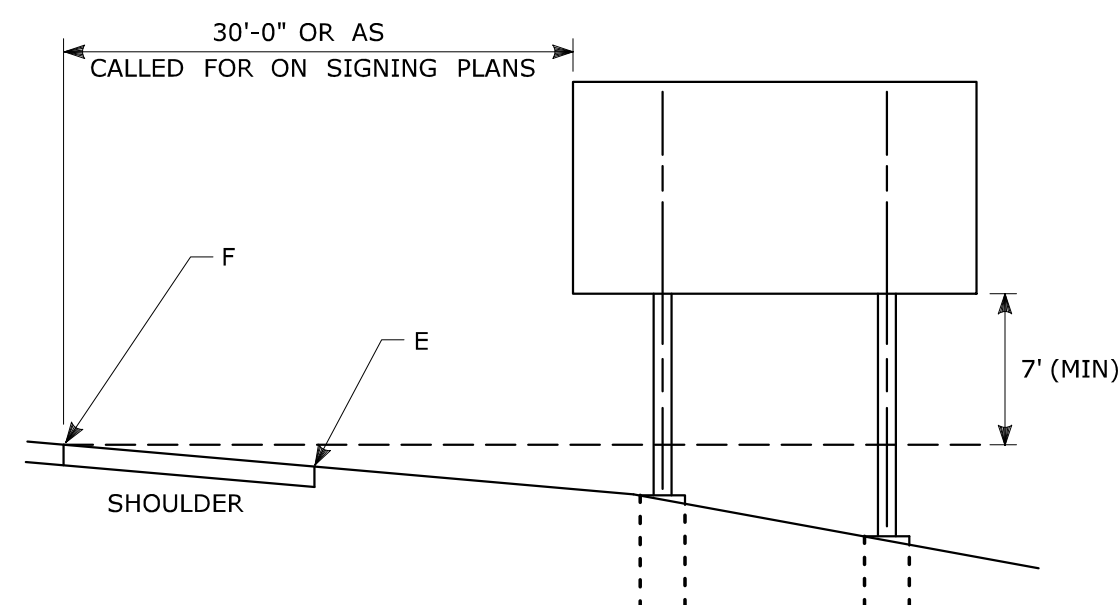
STANDARD SHEET NO.:
TR-1113_01



TYPICAL PLACEMENT OF OVERHEAD SIGNS ON SIGN SUPPORTS

NOTES:

- 1) FOR PLACEMENT OF CANTILEVER SIGN SUPPORT USE APPLICABLE PORTION OF ABOVE DETAIL.
- 2) BARRIER SYSTEMS MAY BE REQUIRED FOR BOTH SIDES OF SUPPORTS IN MEDIANS.
- 3) IMPACT PROTECTION SHALL BE PROVIDED FOR THE SIGN SUPPORTS LOCATED WITHIN CLEAR ZONE.
- 4) SIGN SUPPORT FOUNDATIONS SHALL BE LOCATED OUTSIDE OF BARRIER SYSTEMS DEFLECTION AREA.
- 5) ALL SIGNS ARE TO BE LEVEL, REGARDLESS OF CAMBER IN SUPPORT.



TYPICAL PLACEMENT OF SIDE MOUNTED SIGNS ON STRUCTURAL STEEL BREAKAWAY SIGN SUPPORTS

NOTES:

- 1) MIN. VERTICAL CLEARANCE ABOVE SIDEWALKS SHALL BE 7'.
- 2) WHERE GUIDE RAIL IS USED, THE OFFSET TO THE NEAR EDGE OF SIGN FACE SHALL BE AS SHOWN ELSEWHERE IN THE CONTRACT PLANS.
- 3) ON INTERSECTING ROADS AT RAMP TERMINI, THE OFFSET TO THE NEAR EDGE OF OF SIGN FACE SHALL BE 6' MIN. FROM POINT "E".
- 4) IF 30'-0" MIN. CANNOT BE MET, PLEASE CONTACT THE ENGINEER.

FOR MAXIMUM EFFECTIVENESS, POSITION SIDE MOUNTED SIGNS ON STRUCTURAL STEEL BREAKAWAY SIGN SUPPORTS AS FOLLOWS:

ON A TANGENT SECTION, POSITION THE SIGN SO THE VERTICAL AXIS IS PLUMB AND THE HORIZONTAL AXIS IS AT AN ANGLE OF 90° WITH THE TRAFFIC LANE WHICH THE SIGN SERVES. SIGNS LOCATED 30 FT OR MORE FROM THE EDGE OF THE ROAD SHALL BE TURNED APPROXIMATELY 3° TOWARD THE ROAD.

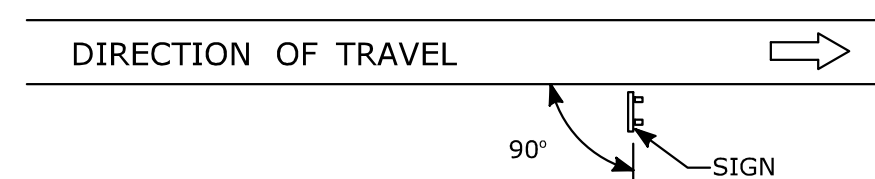


DIAGRAM "A"

ON A HORIZONTAL CURVE SECTION, POSITION THE SIGN SO THE VERTICAL AXIS IS PLUMB AND THE HORIZONTAL AXIS IS AT AN ANGLE OF 90° WITH A STRAIGHT LINE BETWEEN THE SIGN AND THE POINT AT WHICH THE SIGN SHALL BE READ.

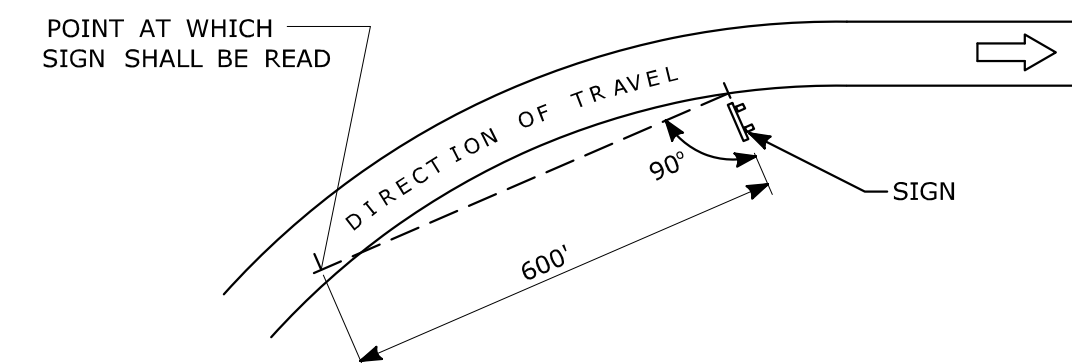
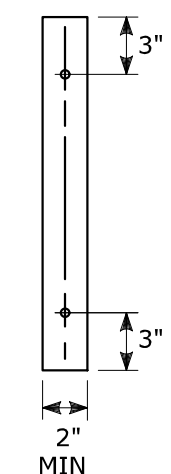


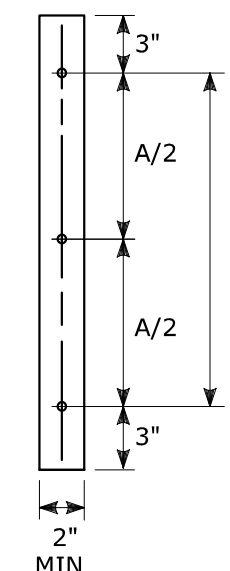
DIAGRAM "B"

SIGN ORIENTATION DETAILS FOR SIDE MOUNTED SIGNS ON STRUCTURAL STEEL BREAKAWAY SIGN SUPPORTS

RETROREFLECTIVE STRIPS 48" LONG OR LESS:



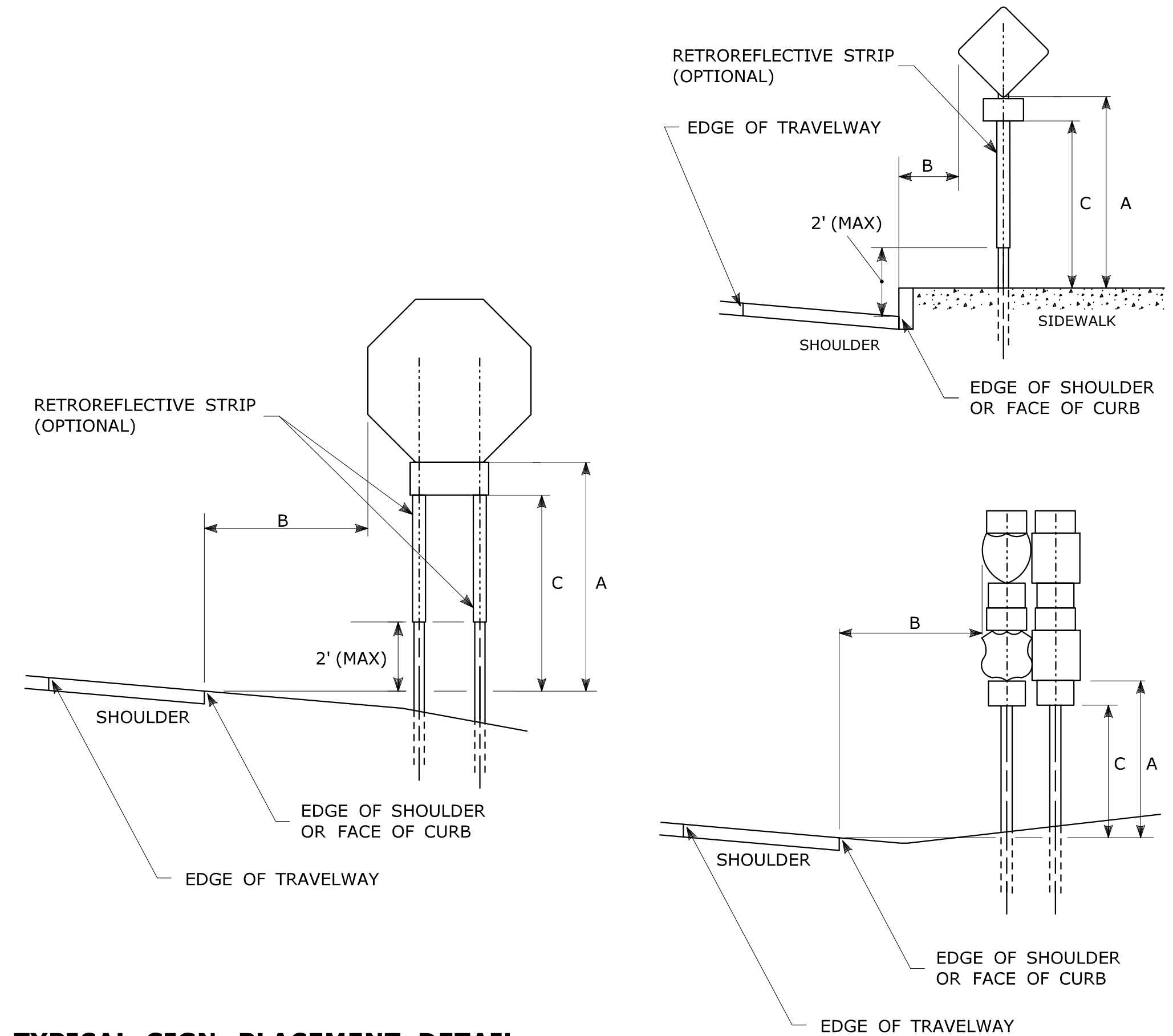
RETROREFLECTIVE STRIPS OVER 48" LONG:



RETROREFLECTIVE STRIP DETAIL

NOTES:

- RETROREFLECTIVE STRIPS WHICH ARE 48 IN LONG OR LESS SHALL BE ATTACHED USING 2 BOLTS AND RETROREFLECTIVE STRIPS OVER 48 IN LONG SHALL BE ATTACHED USING 3 BOLTS AS SHOWN ON THE DETAILS ABOVE. REFER TO STANDARD SHEET No. TR-1208.02 "METAL SIGN POSTS AND SIGN MOUNTING DETAILS" FOR MOUNTING DETAILS.
- RETROREFLECTIVE STRIP COLOR SHALL MATCH THE BACKGROUND COLOR OF THE SIGN, EXCEPT THAT THE COLOR OF THE STRIP FOR "YIELD" AND "DO NOT ENTER" SIGNS SHALL BE RED.



TYPICAL SIGN PLACEMENT DETAIL

NOTES:

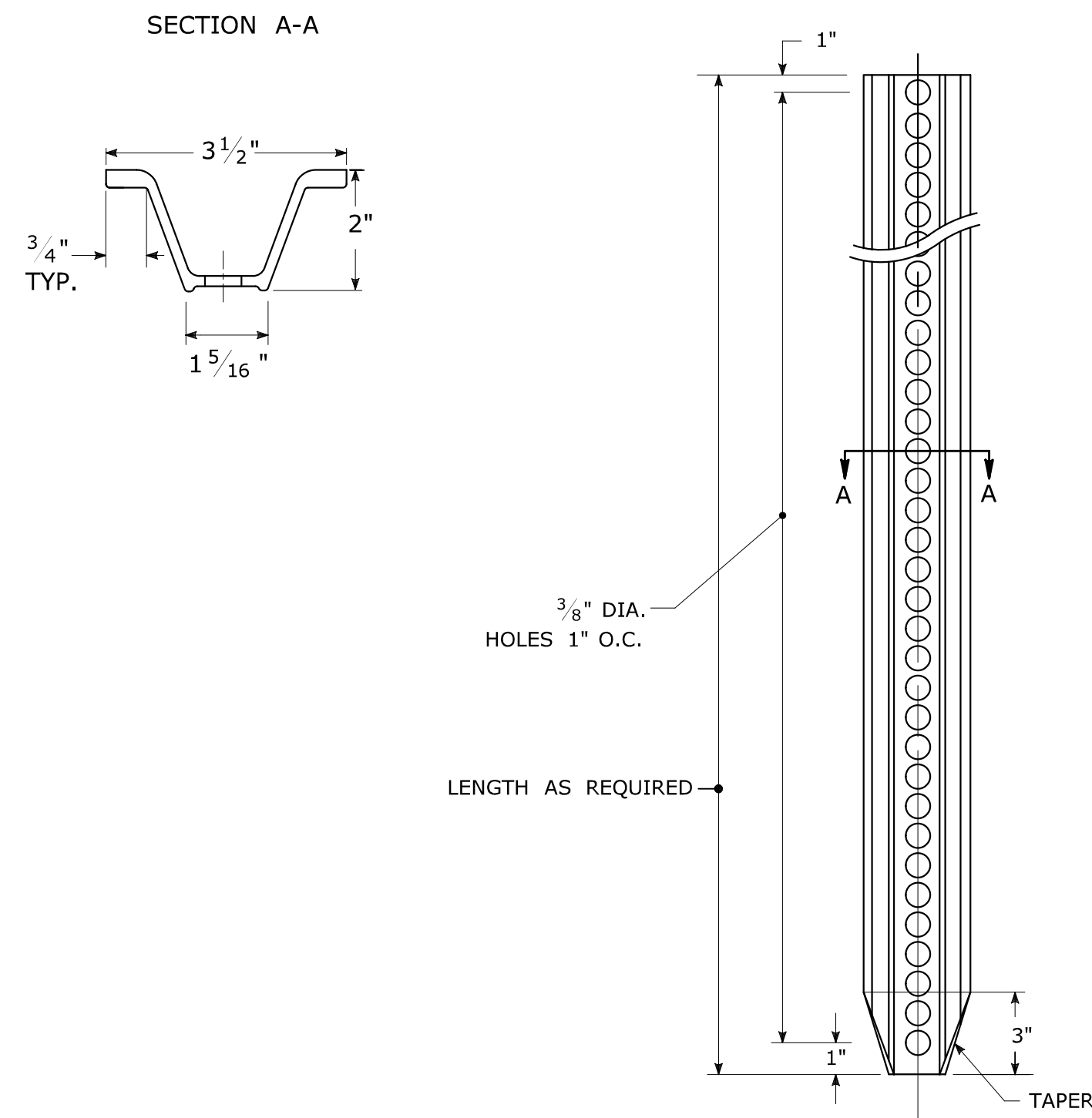
- ALL SIGNS AND SHIELDS ON DIRECTIONAL ASSEMBLIES SHALL ABUT VERTICALLY. REFER TO STANDARD SHEET No. TR-1208.02 "METAL SIGN POSTS AND SIGN MOUNTING DETAILS" FOR SIGN POSTS AND SIGN MOUNTING.
- IF A RETROREFLECTIVE STRIP IS USED ON SIGN SUPPORT, IT SHALL BE PLACED FOR THE FULL LENGTH OF THE SUPPORT FROM THE BOTTOM OF THE SIGN TO WITHIN 2 FT ABOVE THE EDGE OF THE ROADWAY. PARKING SIGNS TYPICALLY USE 45° MOUNTING BRACKET.

DIM."A" MIN SIGN HEIGHT	DIM."B" MIN LATERAL OFFSET (1)	DIM."C" MIN PLAQUE HEIGHT (1)	ASSEMBLY LOCATION
7' (2)	6' (3) 12' (3)	5'	SIGNS ON FREEWAYS AND EXPRESSWAYS EXCEPT CHEVRON ALIGNMENT SIGNS, ONE-DIRECTION LARGE ARROW SIGNS, DO NOT ENTER SIGNS, AND WRONG WAY SIGNS
5'	2'	4'	<ul style="list-style-type: none"> • SIGNS IN RURAL AREAS • DO NOT ENTER AND WRONG WAY SIGNS ALONG EXIT RAMP • DO NOT ENTER AND WRONG WAY SIGNS ON LIMITED ACCESS HIGHWAYS
5'	2'	N/A	<ul style="list-style-type: none"> • CHEVRON ALIGNMENT SIGNS LOCATED ON FREEWAYS, EXPRESSWAYS, RAMP, AND IN RURAL AREAS • ONE-DIRECTION LARGE ARROW SIGNS LOCATED ON FREEWAYS, EXPRESSWAYS, RAMP, AND IN RURAL AREAS
4'	6' (3) 12' (3)	N/A	INCIDENT MANAGEMENT SIGNS AND MILE POST MARKER ASSEMBLIES LOCATED ON FREEWAYS AND EXPRESSWAYS
4'	2'	4'	CENTRAL ISLANDS OF ROUNDABOUTS
7'	2' (4)	6'	BUSINESS & RESIDENTIAL AREAS WHERE PARKING OR OTHER OBSTRUCTIONS LIMIT VISIBILITY
7'	2' (4)	7'	SIDEWALKS (5)

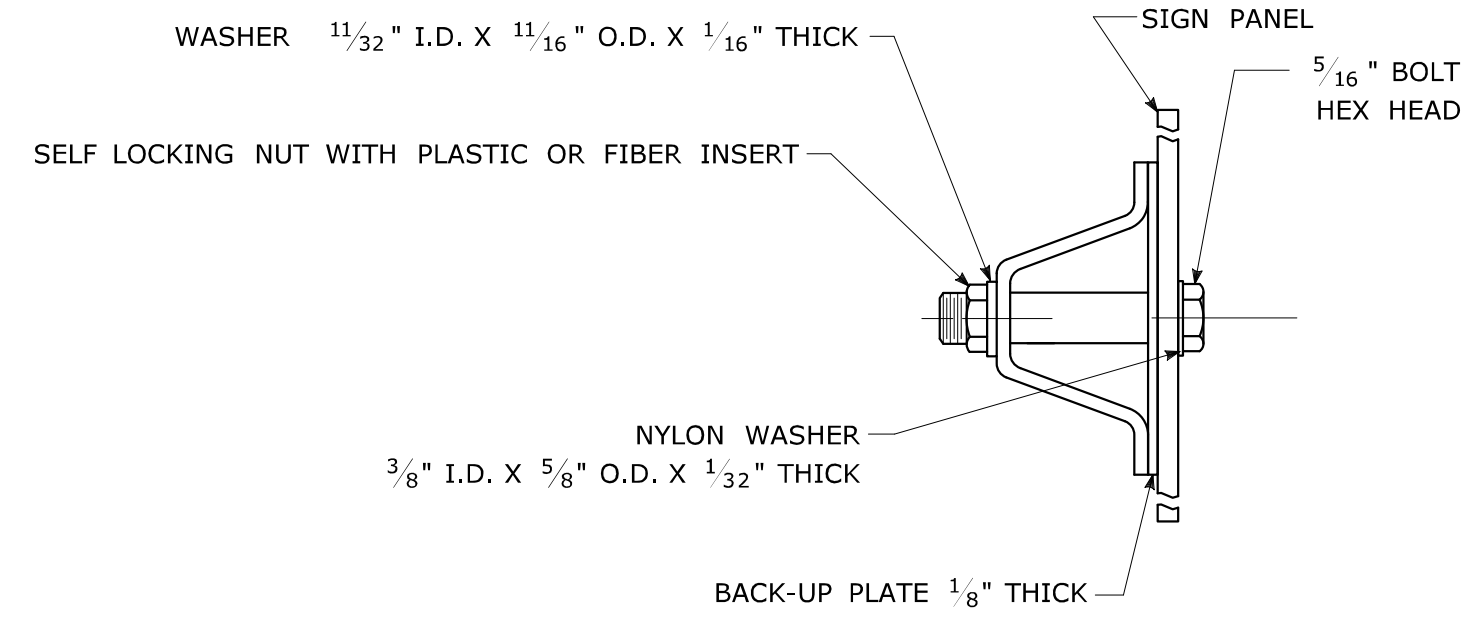
- (1) OR AS DIRECTED BY THE ENGINEER
- (2) 8 FT MINIMUM HEIGHT REQUIRED IF A SUPPLEMENTAL PLAQUE IS SUBMOUNTED BELOW THE MAJOR SIGN.
- (3) 6 FT FROM EDGE OF SHOULDER, WHEN SHOULDER IS OVER 6 FT WIDE
12 FT FROM EDGE OF TRAVELWAY, WHEN SHOULDER IS LESS THAN 6 FT WIDE.
- (4) A LATERAL OFFSET OF AT LEAST 1 FT FROM THE FACE OF THE CURB MAY BE USED WHERE SIDEWALK WIDTH IS LIMITED OR WHERE EXISTING UTILITY POLES ARE CLOSE TO THE CURB.
- (5) A CLEAR PATH OF NOT LESS THAN 4 FT SHALL BE PROVIDED IN SIDEWALK AREAS.

<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</p>		<p>NOT TO SCALE</p>		<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>		<p>MARK F. MAKUCH, P.E. 2018.08.17 09:06:06-04'00'</p>		<p>CTDOT STANDARD SHEET</p>		<p>SIGN PLACEMENT AND RETROREFLECTIVE STRIP DETAILS</p>		<p>TR-1208_01</p>	
3	8-2018	INCLUDED INCIDENT MANAGEMENT AND MILE MARKER SIGNS.		<p>Plotted Date: 8/10/2018</p>		<p>MARK F. CARLINO, P.E. 2018.08.21 07:48:06-04'00'</p>		<p>OFFICE OF ENGINEERING</p>					
2	4-2017	MINOR REVISIONS.											
1	2-2011	MINOR REVISIONS.											
REV.	DATE	REVISION DESCRIPTION											

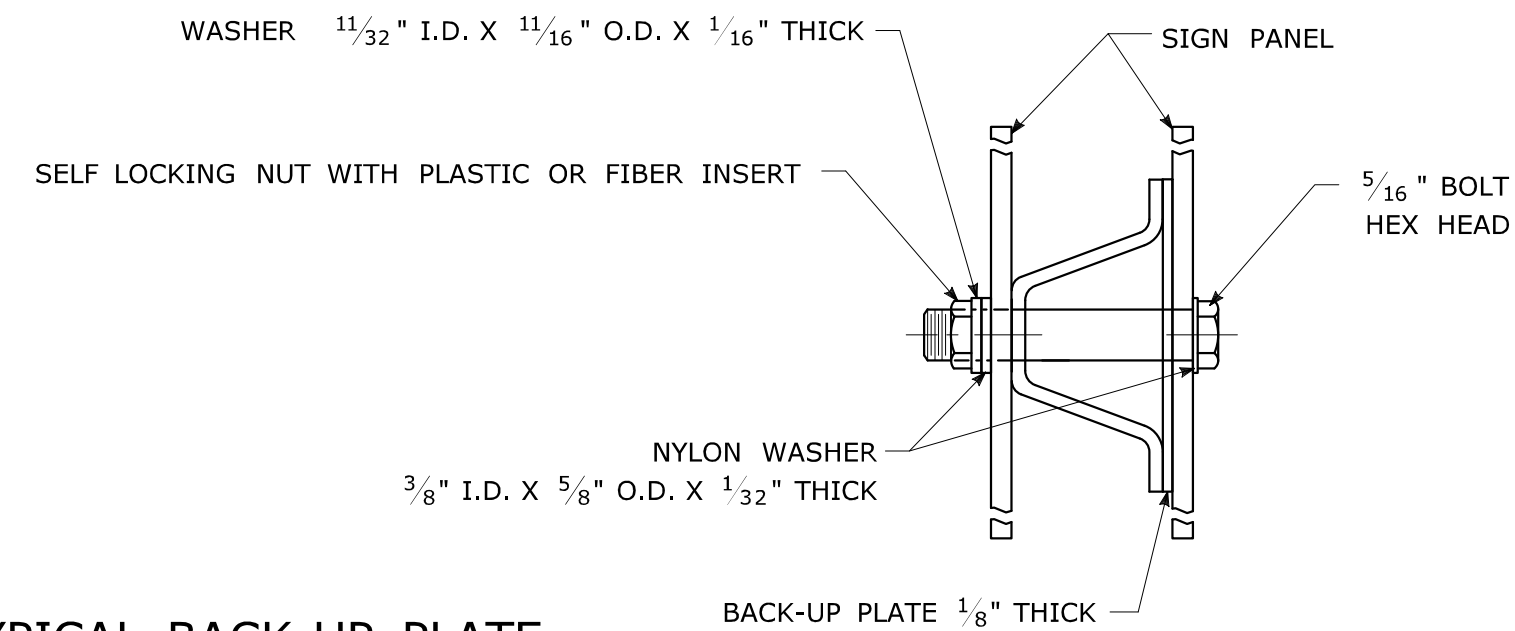
TYPICAL METAL SIGN POSTS



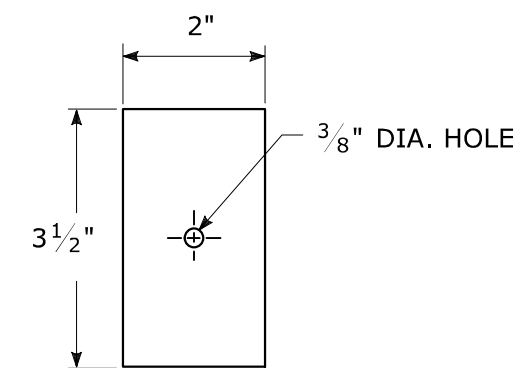
TYPICAL SIGN PANEL ATTACHMENT



TYPICAL BACK TO BACK SIGN PANEL ATTACHMENT



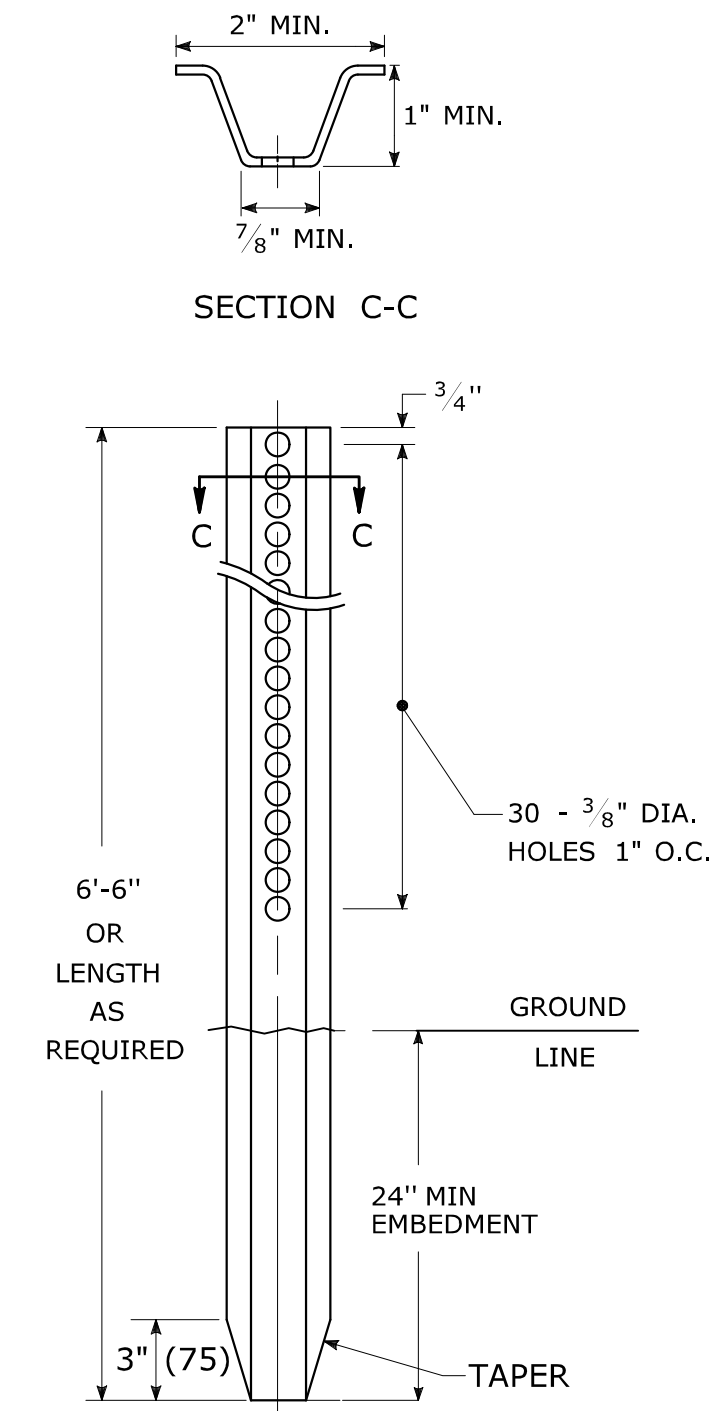
TYPICAL BACK-UP PLATE



BOLTS - STAINLESS STEEL CONFORMING TO ASTM F593, ALLOY GROUP 1 OR 2 (ALLOY TYPES 304 OR 316),
 SELF LOCKING NUTS - STAINLESS STEEL CONFORMING TO ASTM F594, ALLOY GROUP 1 OR 2 (ALLOY TYPES 304 OR 316),
 WASHERS - STAINLESS STEEL CONFORMING TO ASTM A240, (ALLOY TYPES 304 OR 316).

METAL DELINEATOR POST

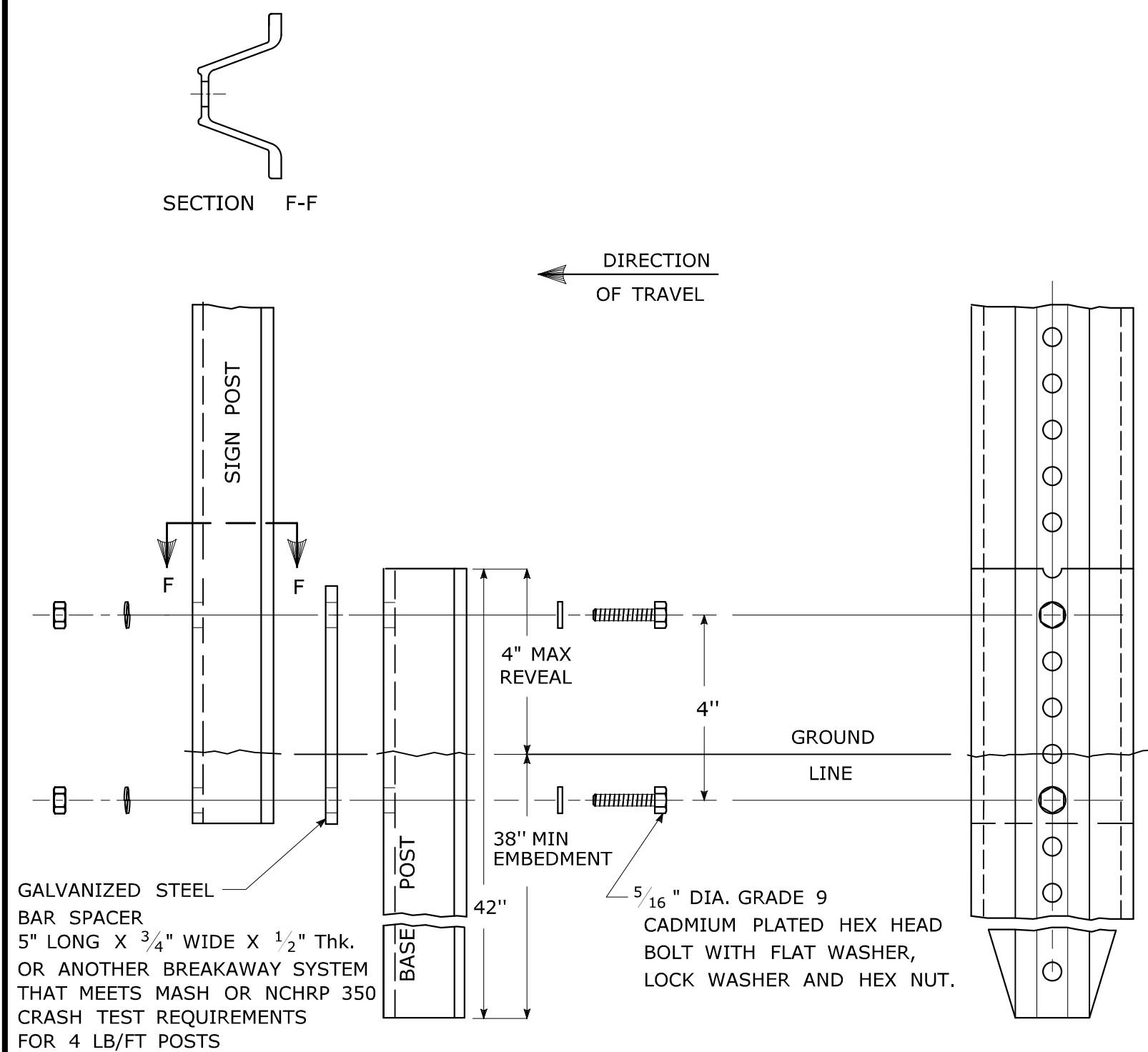
WT./FT. = 1.12 LBS./FT. MIN.



GENERAL NOTES:

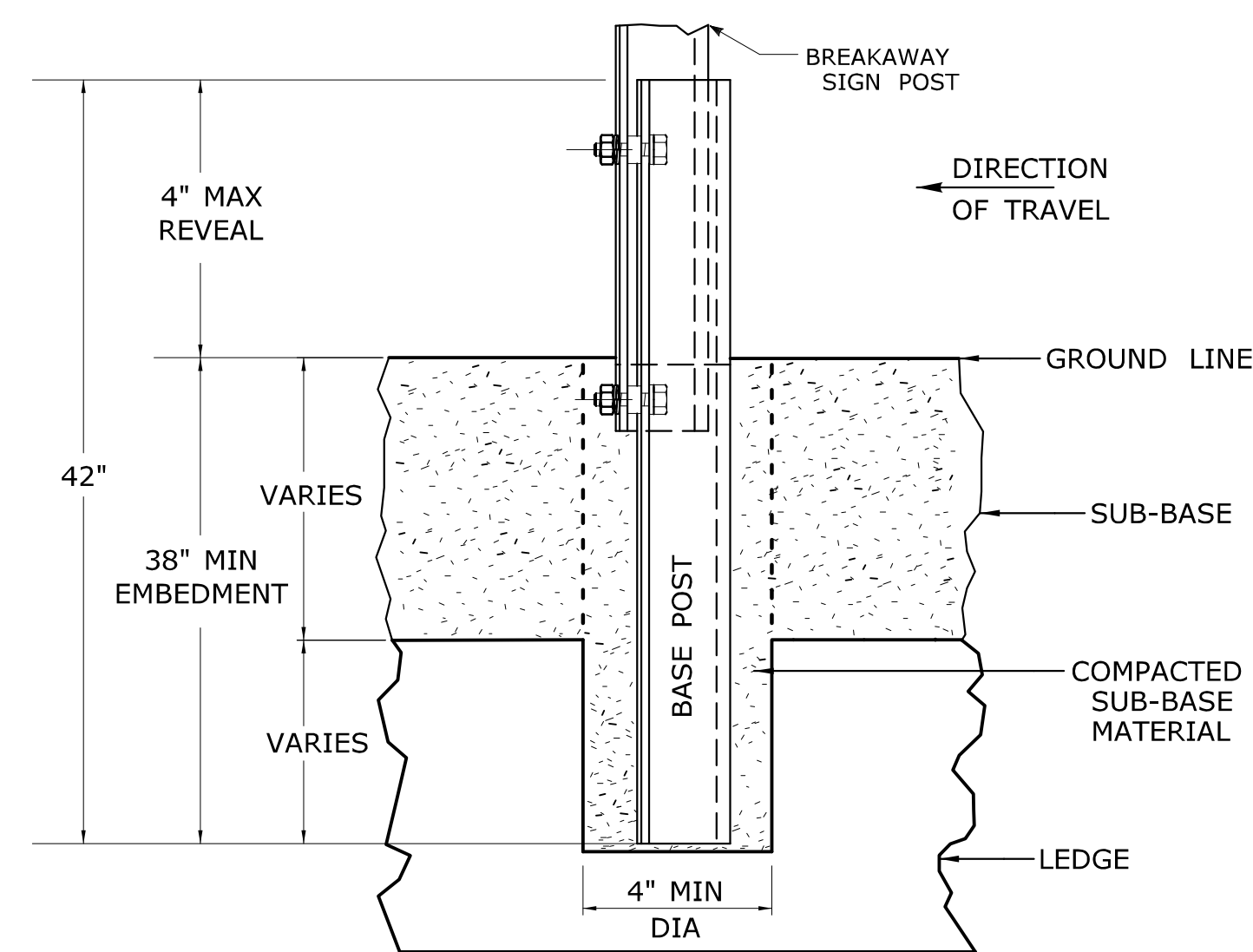
1. STEEL FOR DELINEATOR POSTS SHALL BE ASTM A36 STEEL. STEEL FOR ALL OTHER POSTS SHALL CONFORM TO THE MECHANICAL REQUIREMENTS OF ASTM A 499 GRADE 80 AND TO THE CHEMICAL REQUIREMENTS OF ASTM A1 CARBON STEEL TEE RAIL HAVING NOMINAL WEIGHT (MASS) OF 91 LBS. OR GREATER PER LINEAR YARD.
2. AFTER FABRICATION, ALL STEEL POSTS, STRAPS AND PLATES SHALL BE GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A123.
3. WASHERS FOR BREAKAWAY INSTALLATIONS SHALL MEET ASTM F436, TYPE 1.
4. SPACER BAR FOR BREAKAWAY INSTALLATION SHALL CONFORM TO THE MECHANICAL REQUIREMENTS OF ASTM A36.
5. ALL BOLTS, NUTS, AND WASHERS FOR BREAKAWAY INSTALLATIONS SHALL BE GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A153.
6. ALL SIGN POSTS SHALL HAVE BREAKAWAY FEATURES THAT MEET AASHTO REQUIREMENTS CONTAINED IN THE CURRENT "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS." THE BREAKAWAY FEATURES SHALL BE STRUCTURALLY ADEQUATE TO CARRY THE SIGNS SHOWN IN THE PLANS AT 60 MPH WIND LOADINGS. INSTALLATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
7. SIGN POSTS SHALL BE 4 LBS./FT.

BREAKAWAY INSTALLATION FOR 4 LBS./FT. POSTS

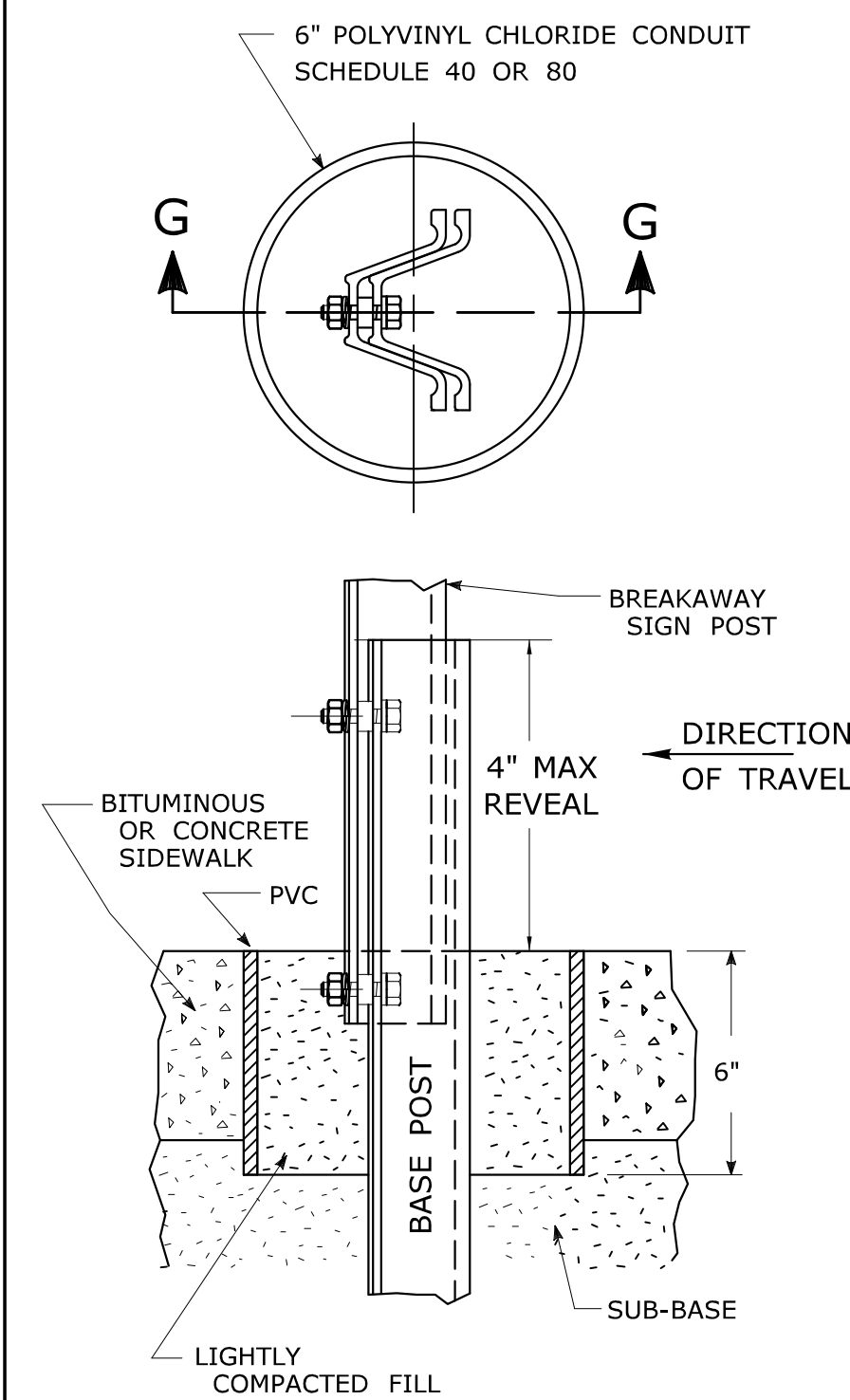


TYPICAL SIGN POST INSTALLATION IN LEDGE

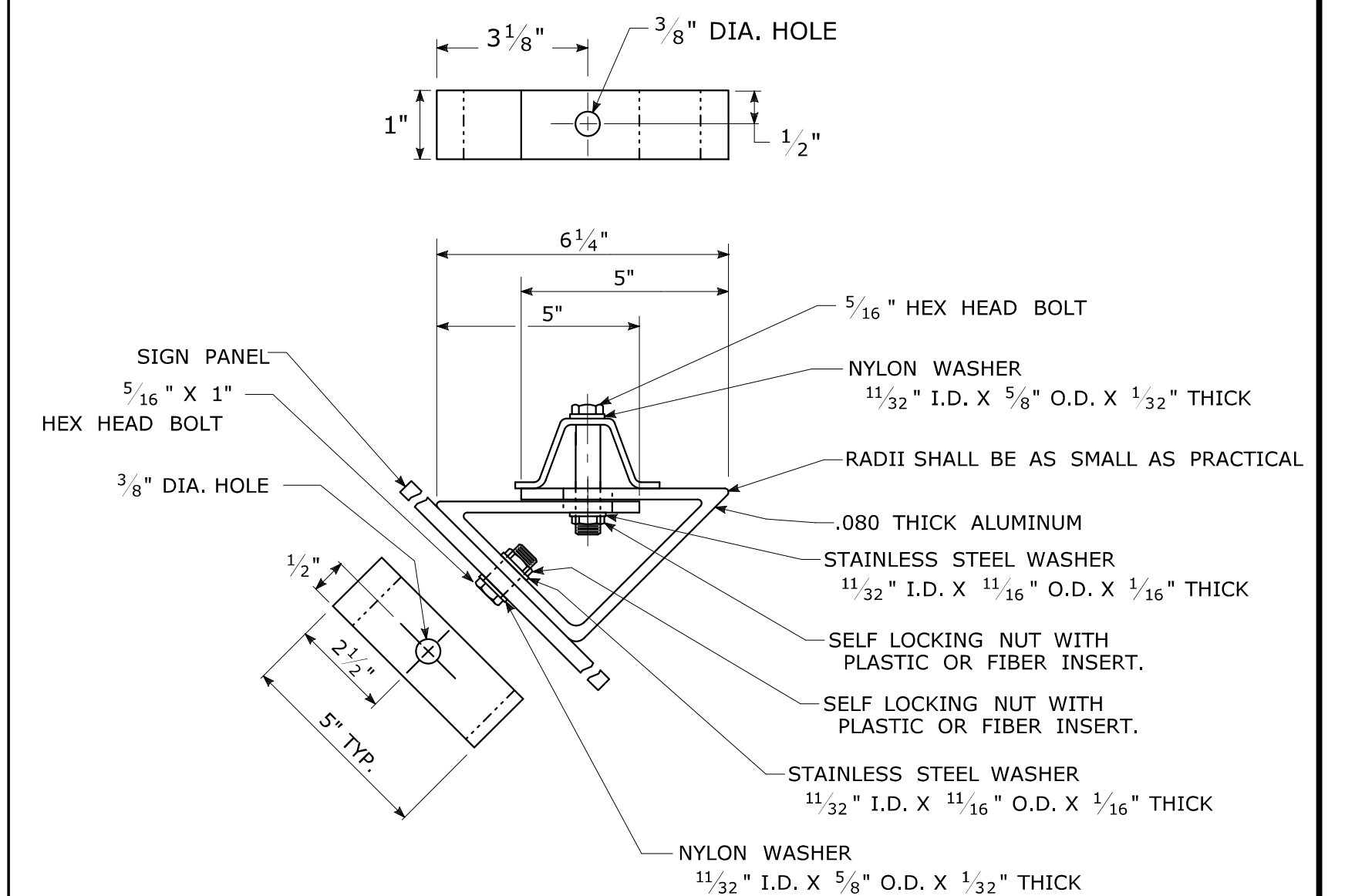
LEDGE SHALL BE REMOVED TO DRIVE THE BASE POST TO A DEPTH OF 38".
 HOLE SHALL BE FILLED WITH SUB-BASE MATERIAL AND COMPACTED WITH A TAMPING BAR, OR TECHNIQUE APPROVED BY THE ENGINEER, PRIOR TO BASE POST INSTALLATION.



TYPICAL SLEEVE FOR PAVED AREAS



45° MOUNTING BRACKET FOR INSTALLATION OF PARKING SIGNS



REV.	DATE	REVISION DESCRIPTION
2	6-2017	SIGN POST REVISIONS.
1	2-2011	MINOR REVISIONS.

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Plotted Date: 6/6/2017

NOT TO SCALE



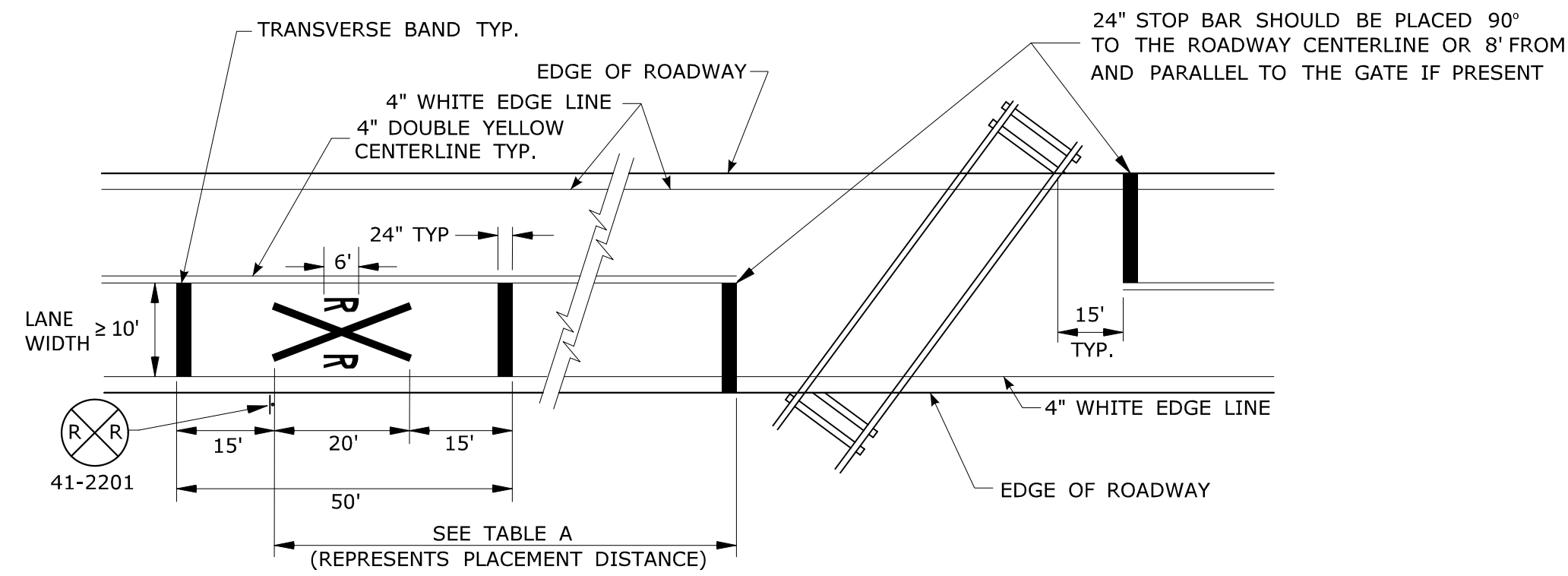
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SUBMITTED BY: Mark Makuch
 NAME/DATE/TIME: Mark F. Makuch, P.E. 2017.06.07 07:30:30-04'00'
 APPROVED BY: Mary E. Baker
 NAME/DATE/TIME: Mary E. Baker, P.E. 2017.06.13 15:28:14-04'00'
 APPROVED BY: Gregory M. Dorosh
 NAME/DATE/TIME: Gregory M. Dorosh, P.E. 2017.06.15 09:27:29-04'00'

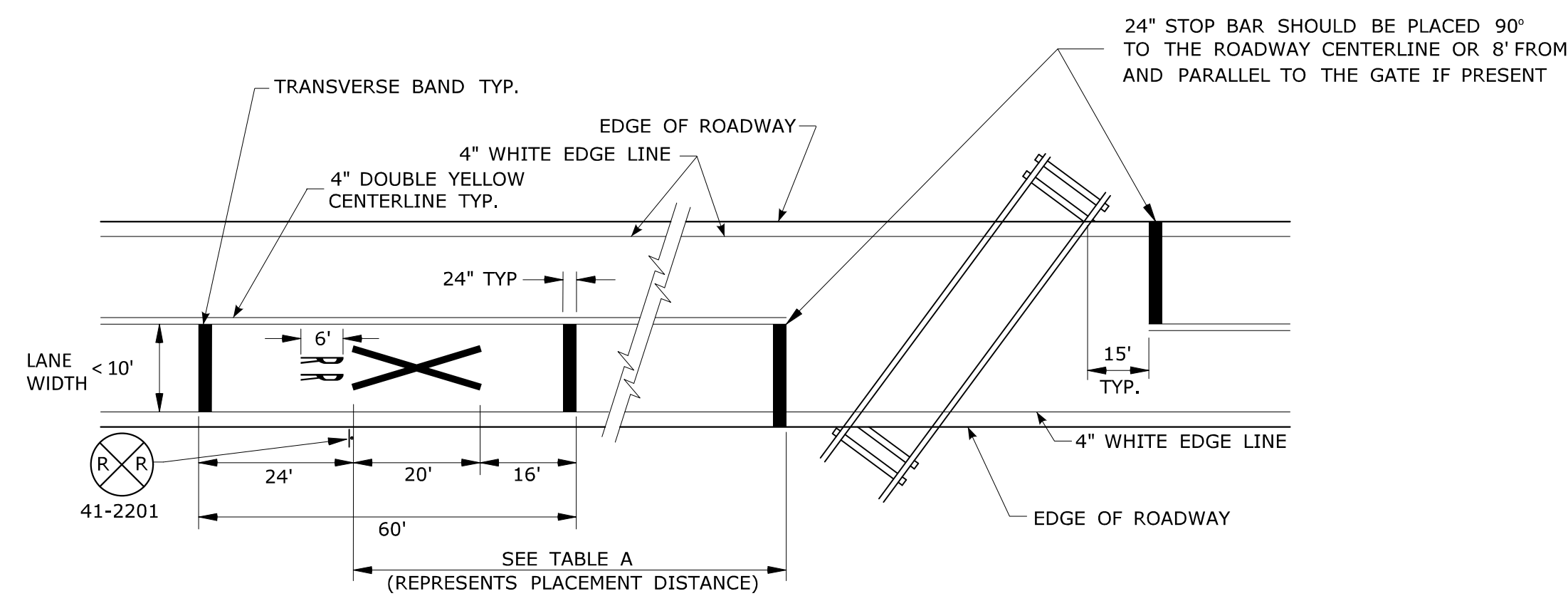
CTDOT
 STANDARD SHEET
 OFFICE OF ENGINEERING

STANDARD SHEET TITLE: METAL SIGN POSTS AND SIGN MOUNTING DETAILS
 GUIDE SHEET NO.: TR-1208_02

TYPICAL RAILROAD GRADE CROSSING DETAIL (LANE WIDTH ≥ 10')



TYPICAL RAILROAD GRADE CROSSING DETAIL (LANE WIDTH < 10')



NOTES:

GENERAL:

1. AREA OF PAVEMENT MARKING SYMBOLS AS INDICATED IS APPROXIMATE.
2. REFER TO STANDARD SHEET TR-1210_04 FOR PAVEMENT MARKING LINE DETAILS.

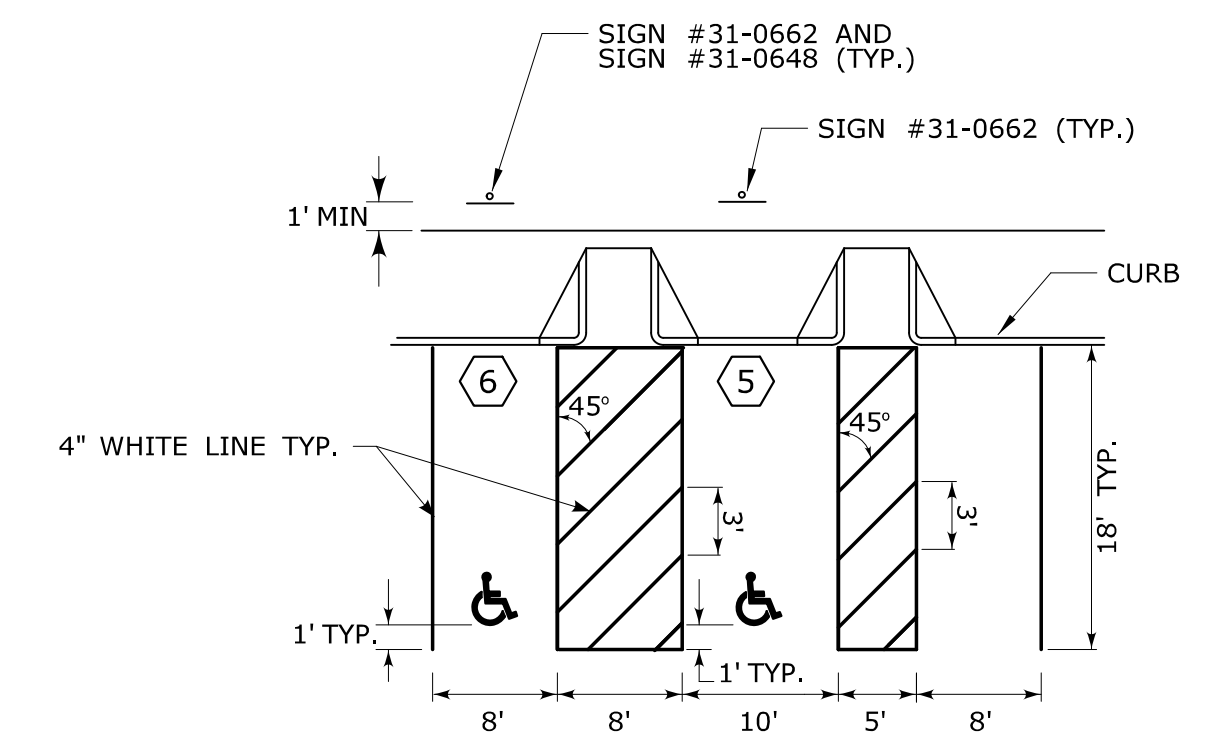
RAILROAD GRADE CROSSINGS:

3. RAILROAD MARKINGS SHALL BE WHITE.
4. ON MULTI-LANE ROADS THE TRANSVERSE BANDS SHOULD EXTEND ACROSS THE APPROACH LANES AND INDIVIDUAL R X R SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.

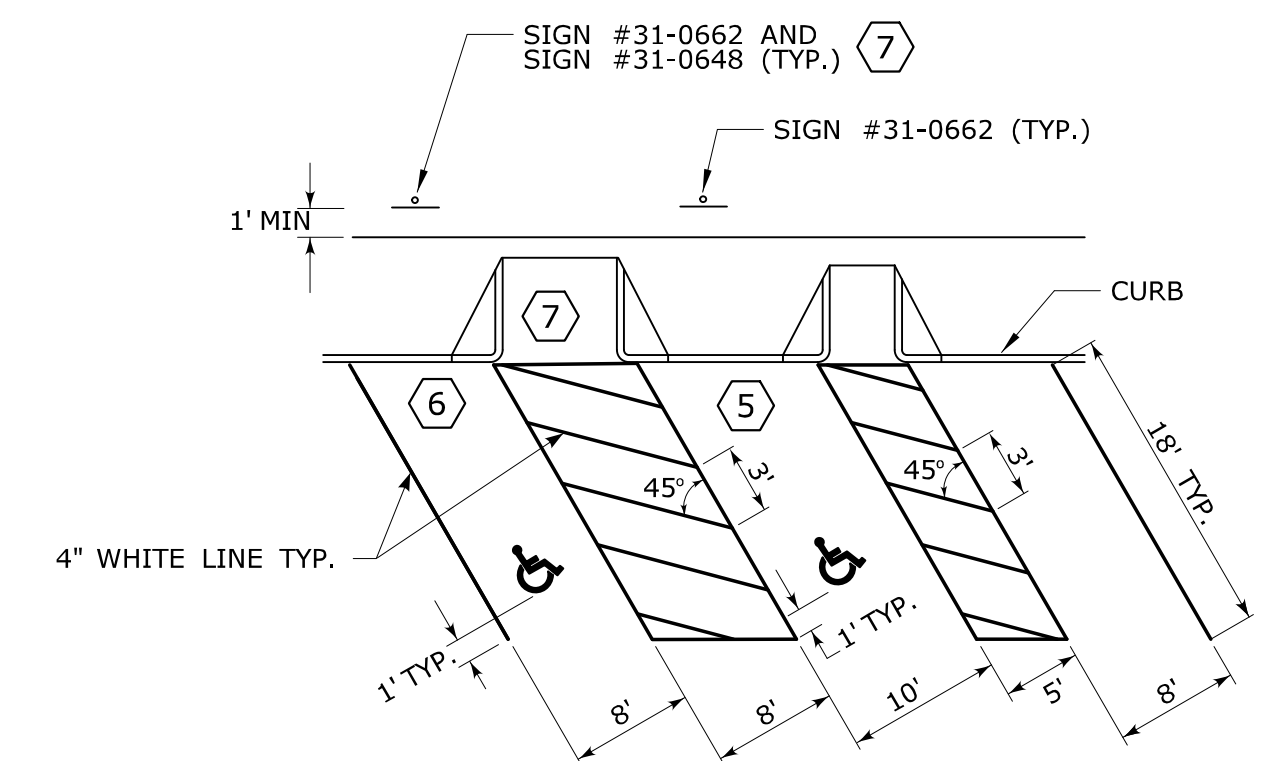
PARKING STALLS:

5. AUTOMOBILE ACCESSIBLE PARKING SPACES SHALL BE 15' WIDE INCLUDING 5' OF CROSSHATCH.
6. VAN ACCESSIBLE PARKING SPACES SHALL BE 16' WIDE INCLUDING 8' OF CROSSHATCH.
7. ACCESS AISLES FOR ANGLED VAN PARKING SPACES SHALL BE LOCATED ON THE PASSENGER SIDE OF THE PARKING SPACE.
8. CROSS HATCHED ACCESS AISLES SHALL NOT BE SHARED BETWEEN PARKING SPACES.

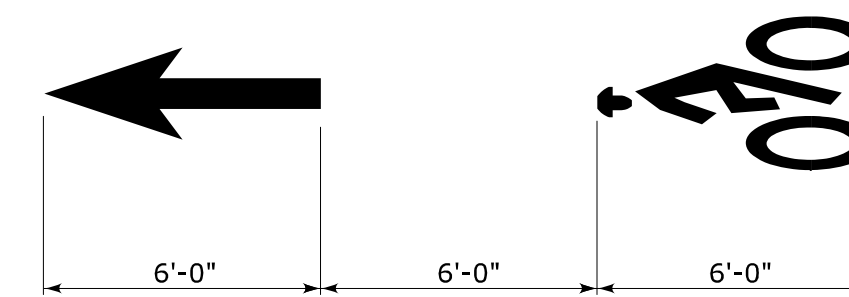
TYPICAL PERPENDICULAR PARKING STALLS DETAIL



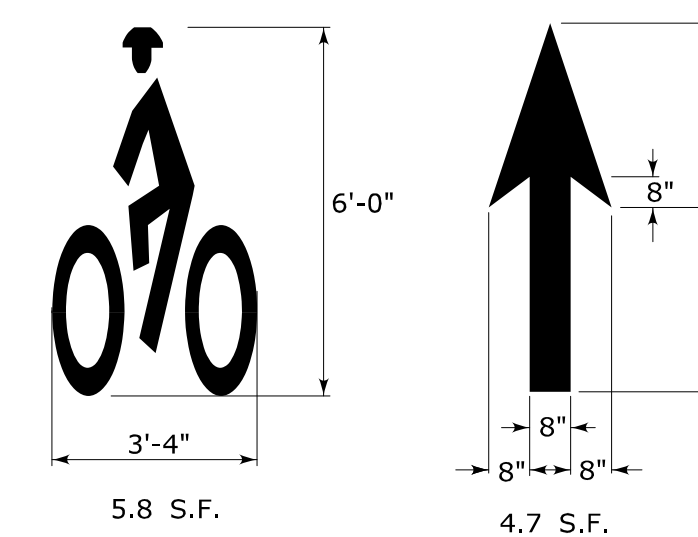
TYPICAL ANGLE PARKING STALLS DETAIL



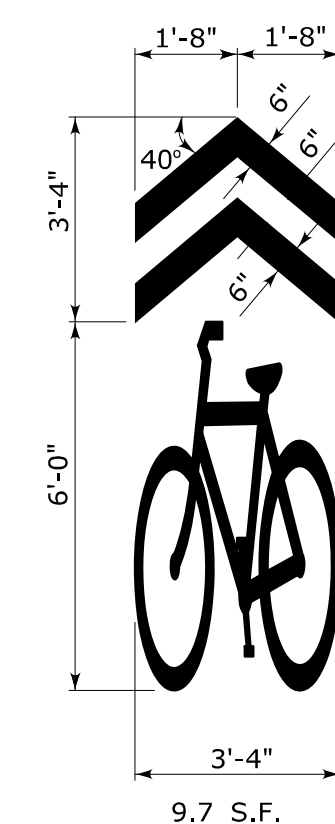
TYPICAL LONGITUDINAL SPACING



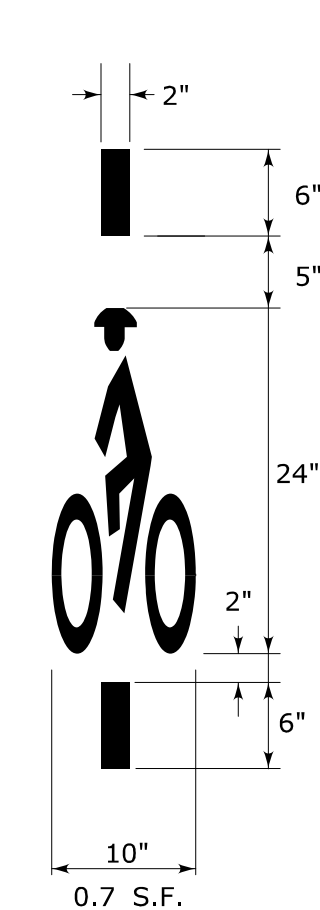
BICYCLE LANE SYMBOL MARKINGS



SHARED LANE SYMBOL MARKING



BICYCLE DETECTOR SYMBOL MARKING



ACCESSIBLE PARKING SPACE SYMBOL

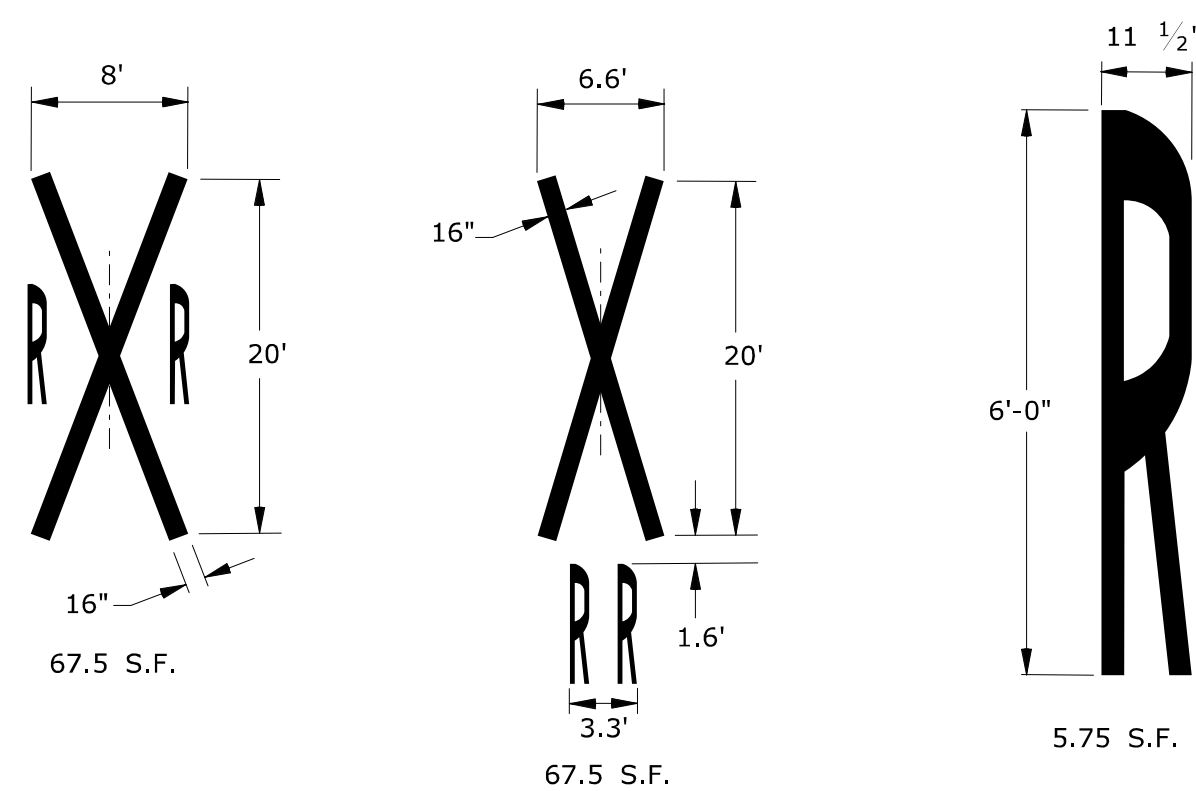
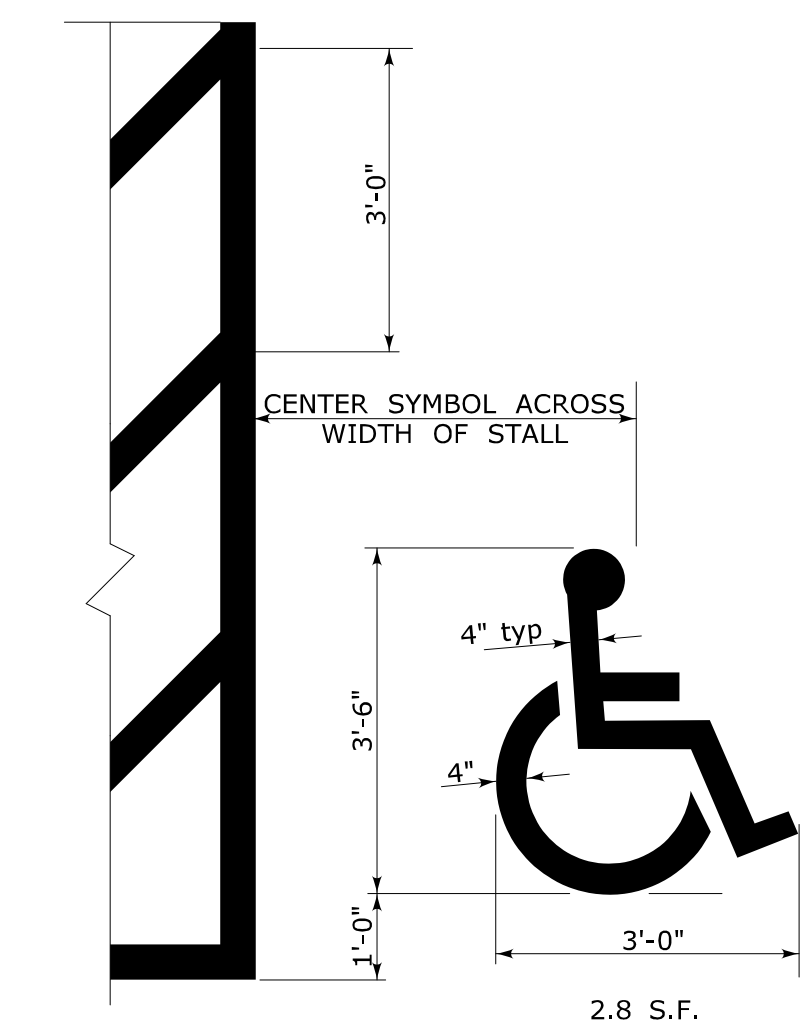


TABLE A	
POSTED OR 85 PERCENTILE SPEED M.P.H.	MINIMUM DISTANCE FT.
20	100
25	100
30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475

REV.	DATE	REVISION DESCRIPTION

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Plotted Date: 4/3/2017

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Mark F. Makuch, P.E.
11-17-36-0400

Gregory M. Dorosh, P.E.
2017.04.20
13/26/20-0400

Filename: TR-1210_09.dgn Model: CT_Civil_2D_Sheet

CTDOT
STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
PAVEMENT MARKINGS FOR BICYCLE LANES, PARKING STALLS, AND RAILROAD GRADE CROSSINGS

STANDARD SHEET NO.:
TR-1210_09

E5 - SERIES				G20 - SERIES				M4 - SERIES				R1 - SERIES				R9 & R11 - SERIES				W1 - SERIES				W3 - SERIES																																																																																																																											
<p>COPY & BORDER - WHITE BACKGROUND - GREEN</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>16.0</td> <td>48</td> <td>51-6147</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	16.0	48	51-6147	2	<p>END ROAD WORK</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>8.0</td> <td>48X24</td> <td>80-9612</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	8.0	48X24	80-9612	2	<p>DETOUR</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>2.0</td> <td>24X12</td> <td>80-9707</td> <td>1</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	2.0	24X12	80-9707	1	<p>STOP</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>5.19</td> <td>30</td> <td>31-0552</td> <td>1</td> </tr> <tr> <td>13.30</td> <td>48</td> <td>31-0557</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	5.19	30	31-0552	1	13.30	48	31-0557	2	<p>SIDEWALK CLOSED</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>3.75</td> <td>30X18</td> <td>80-9076</td> <td>1</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	3.75	30X18	80-9076	1	<p>ROAD CLOSED 00 MILES AHEAD LOCAL TRAFFIC ONLY</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>12.5</td> <td>60X30</td> <td>80-9077</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	12.5	60X30	80-9077	2	<p>(L) (R)</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>9.0</td> <td>36</td> <td>80-9432L</td> <td>1</td> </tr> <tr> <td>9.0</td> <td>36</td> <td>80-9431R</td> <td>1</td> </tr> <tr> <td>16.0</td> <td>48</td> <td>80-9452L</td> <td>2</td> </tr> <tr> <td>16.0</td> <td>48</td> <td>80-9451R</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	9.0	36	80-9432L	1	9.0	36	80-9431R	1	16.0	48	80-9452L	2	16.0	48	80-9451R	2	<p>(L) (R)</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>16.0</td> <td>48</td> <td>80-9433L</td> <td>2</td> </tr> <tr> <td>16.0</td> <td>48</td> <td>80-9435R</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	16.0	48	80-9433L	2	16.0	48	80-9435R	2	<p>(L) (R)</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>25.0</td> <td>60</td> <td>80-9483L</td> <td>2</td> </tr> <tr> <td>25.0</td> <td>60</td> <td>80-9485R</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	25.0	60	80-9483L	2	25.0	60	80-9485R	2	<p>OCTAGON - RED W/ WHITE BORDER ARROW & BORDER - BLACK BACKGROUND - FLUORESCENT ORANGE</p> <table border="1"> <thead> <tr> <th>AREA (SQ. FT)</th> <th>SIZE (INCHES)</th> <th>CONN. D.O.T. #</th> <th>POSTS</th> </tr> </thead> <tbody> <tr> <td>9.0</td> <td>36</td> <td>80-9050</td> <td>1</td> </tr> <tr> <td>16.0</td> <td>48</td> <td>80-9051</td> <td>2</td> </tr> </tbody> </table>				AREA (SQ. FT)	SIZE (INCHES)	CONN. D.O.T. #	POSTS	9.0	36	80-9050	1	16.0	48	80-9051	2
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2.0	24X12	80-9707	1																																																																																																																																																
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5.19	30	31-0552	1																																																																																																																																																
13.30	48	31-0557	2																																																																																																																																																
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3.75	30X18	80-9076	1																																																																																																																																																
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9.0	36	80-9431R	1																																																																																																																																																
16.0	48	80-9452L	2																																																																																																																																																
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<p>6 8-2018 REVISED POST REQUIREMENTS AND SHEETING TYPE.</p> <p>5 8-2015 UPDATED PER MUTCD AND FORM 816 JAN 2015 REVISION.</p> <p>4 6-2012 REVISED NOTE # 1 TO REFERENCE "O.S.T.A."</p> <p>3 4-2012 REVISED NEW SIGNAL SIGN(S) TO CONFORM TO 2009 MUTCD.</p> <p>2 2-2011 MINOR REVISIONS.</p> <p>1 3-2010 REMOVED OBSOLETE SIGNS (50-5925, 50-5935).</p> <p>REV. DATE REVISION DESCRIPTION</p>		<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</p> <p>Plotted Date: 8/10/2018</p>		<p>NOT TO SCALE</p>		<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p> <p>Filename: TR-1220.01.1.2018.dgn Model: TR-1220.01</p>		<p>SUBMITTED BY: <i>Mark Makuch</i> NAME/DATE/TIME: Mark F. Makuch, P.E. 2018.08.17 09:11:08-04'00'</p> <p>APPROVED BY: <i>Mark F. Carfino</i> NAME/DATE/TIME: Mark F. Carfino, P.E. 2018.08.21 07:49:34-04'00'</p>		<p>STANDARD SHEET TITLE: CTDOT STANDARD SHEET OFFICE OF ENGINEERING</p>		<p>STANDARD SHEET NO.: SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS TR-1220_01</p>	
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NOTES:

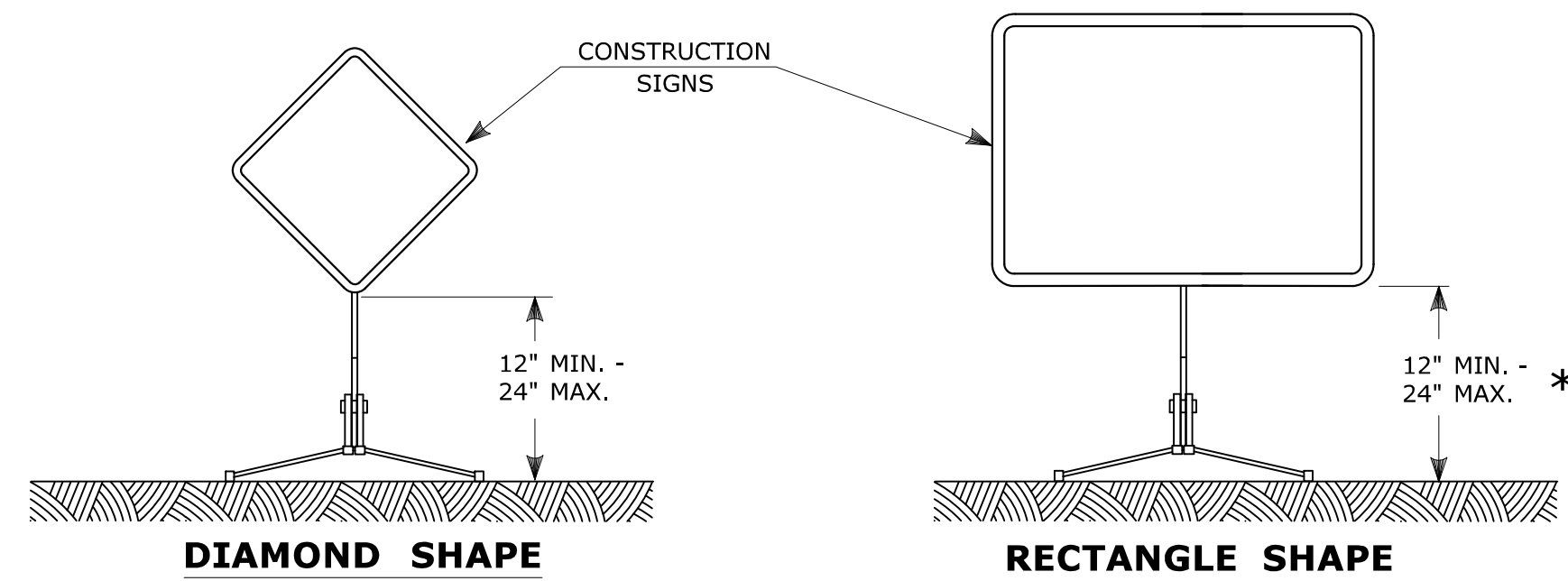
- R1-SERIES SIGN THE LEGEND "O.S.T.A." SHALL APPEAR.
- POSTS - SEE STANDARD SHEET TR-1208.02 - "METAL SIGN POSTS AND SIGN MOUNTING DETAILS".
- POSTS SHALL BE 4 LBS./FT.
- ALL POSTS NOTED ARE FOR LONG TERM INSTALLATION. SEE STANDARD SHEET TR-1208.02.
- FOR TEMPORARY SUPPORTS SEE STANDARD SHEET TR-1220.02 - "CONSTRUCTION SIGN SUPPORTS AND CHANNELIZING DEVICES".
- FOR SPECIFIC SIGN DESIGN, CONTACT CONN. D.O.T., DIVISION OF TRAFFIC ENGINEERING. FOR BOLT HOLE PATTERN REFER TO FHWA PUBLICATION "STANDARD HIGHWAY SIGNS". SIGNS OF DIFFERENT DIMENSIONS TO BE ERRECTED ON THE SAME POSTS, OR SPAN/MAST ARM MOUNTED, MAY REQUIRE SPECIAL BOLT HOLE PATTERNS.
- ALL CONSTRUCTION SIGNS TO BE PAID FOR UNDER THE CONSTRUCTION SIGNS ITEM IN THE CONTRACT.
- MATERIALS & COLORS SHALL CONFORM TO STATE SPECIFICATIONS.

MATERIALS:

SIGNS AND THEIR PORTABLE SUPPORTS SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 2 DEVICES. ALUMINUM THICKNESS FOR POST MOUNTED SIGNS SHALL BE .100" EXCEPT SIGN #s. 80-1605, 80-9914, 80-9815, 80-9728, 80-9519, & 51-6147 (L OR R) WHICH SHALL BE .125", PLYWOOD THICKNESS FOR POST MOUNTED SIGNS SHALL BE 1/2" EXTERIOR GRADE A-C OR BETTER. SIGN BLANKS SHALL HAVE ONE COAT OF PRIMER PAINT PRIOR TO APPLICATION OF RETROREFLECTIVE SHEETING & COPY.

COLORS:

BACKGROUND - FLUORESCENT ORANGE - EXCEPT AS NOTED.
LEGEND - BLACK - EXCEPT AS NOTED.
ALL SIGNS WITH FLUORESCENT ORANGE BACKGROUND TO USE TYPE VIII RETROREFLECTIVE SHEETING.
ALL OTHER SIGNS TO USE TYPE IX RETROREFLECTIVE SHEETING.

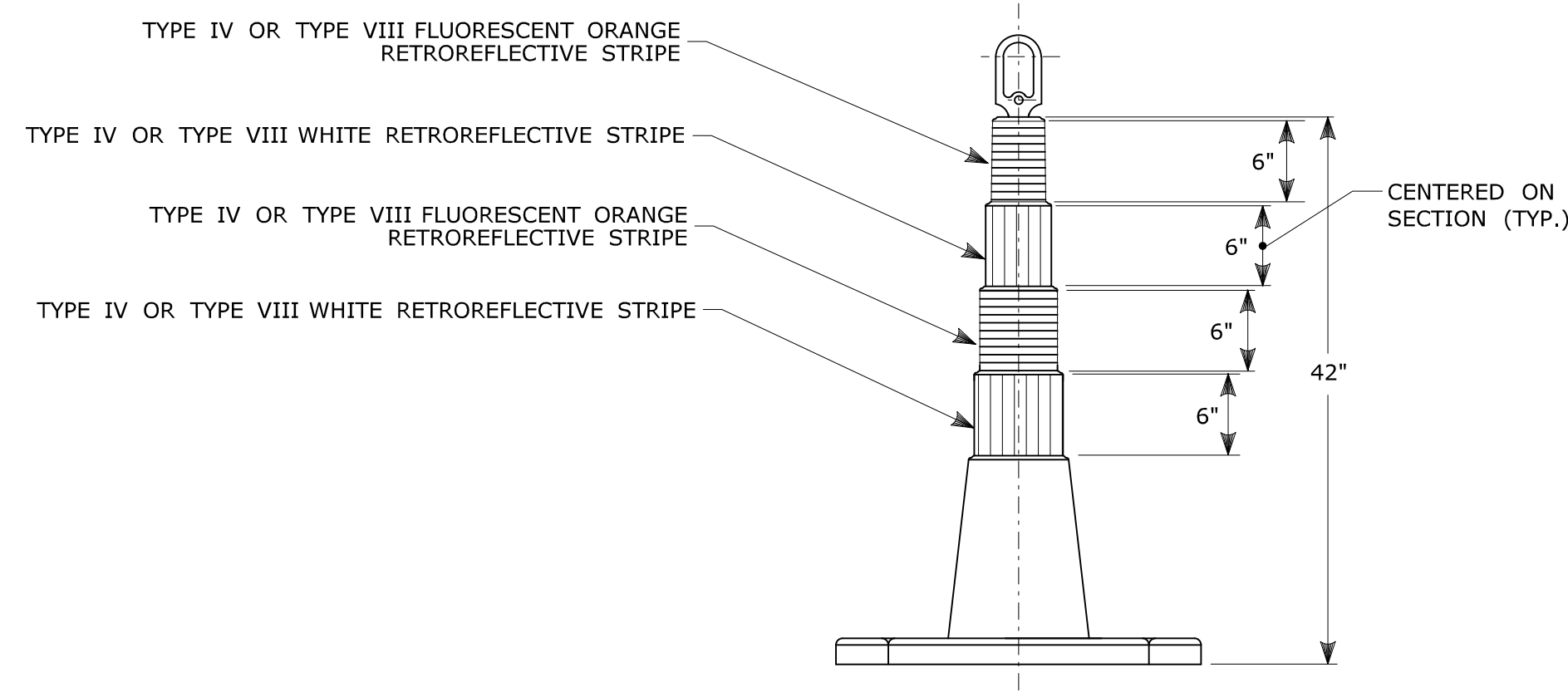


PORTABLE CONSTRUCTION SIGNS

NOTES FOR PORTABLE SIGN SUPPORTS:

- SIGNS AND THEIR PORTABLE SUPPORTS SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 2 DEVICES AND THE LATEST EDITION OF THE MUTCD.
- MOUNTING HEIGHT OF SIGNS SHALL BE A MINIMUM OF 12" AND A MAXIMUM OF 24". SIGNS SHALL BE MOUNTED HIGHER AS NEEDED TO MEET FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.
- THE ENGINEER RESERVES THE RIGHT TO REJECT ANY SUPPORT DEEMED UNSUITABLE FOR THE PURPOSE INTENDED.
- PORTABLE SIGN SUPPORTS SHALL BE STABILIZED IN A MANNER THAT WILL NOT AFFECT THEIR COMPLIANCE WITH NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 2 DEVICES.
- PORTABLE CONSTRUCTION SIGN SUPPORTS SHOULD NOT BE USED FOR DURATION OF MORE THAN 3 DAYS EXCEPT FOR R9-8 THROUGH R9-11a SERIES, R11 SERIES, W1-6 THROUGH W1-8 SERIES, M4-10, AND E5-1. SEE STANDARD SHEET TR-1220.01 - "SIGNS FOR CONSTRUCTION AND PERMIT OPERATIONS" FOR SIGN DETAILS.

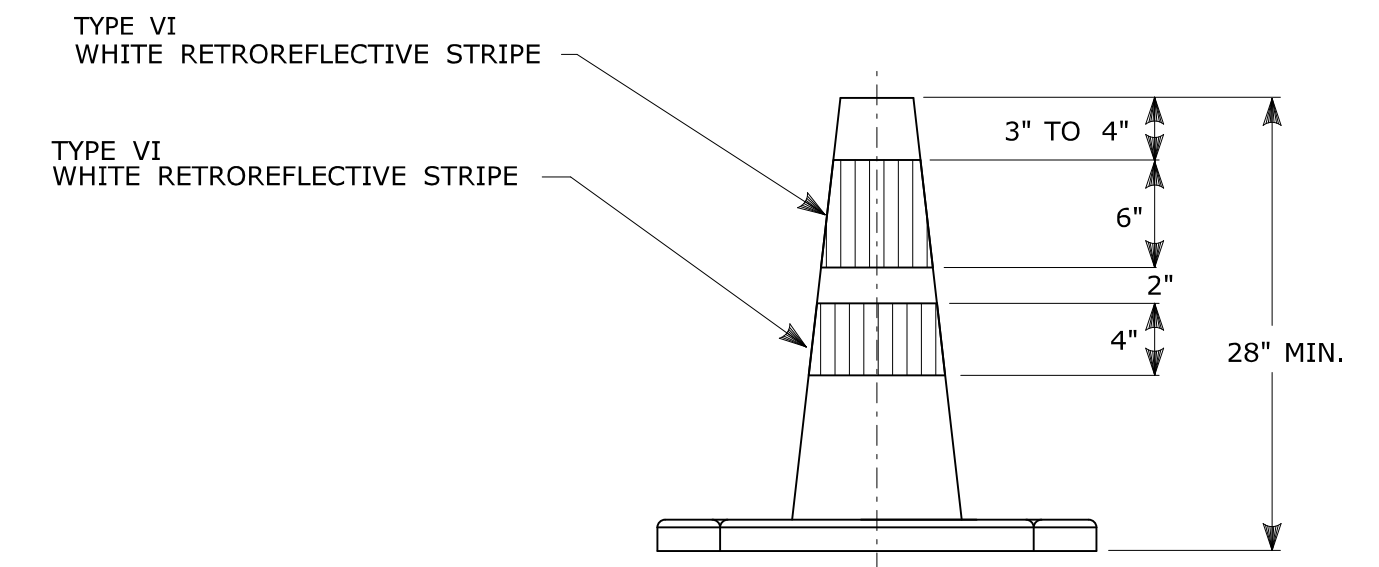
* FOR E5-1 (EXIT SIGNS) USE MIN 48".



42" TRAFFIC CONE

NOTES:

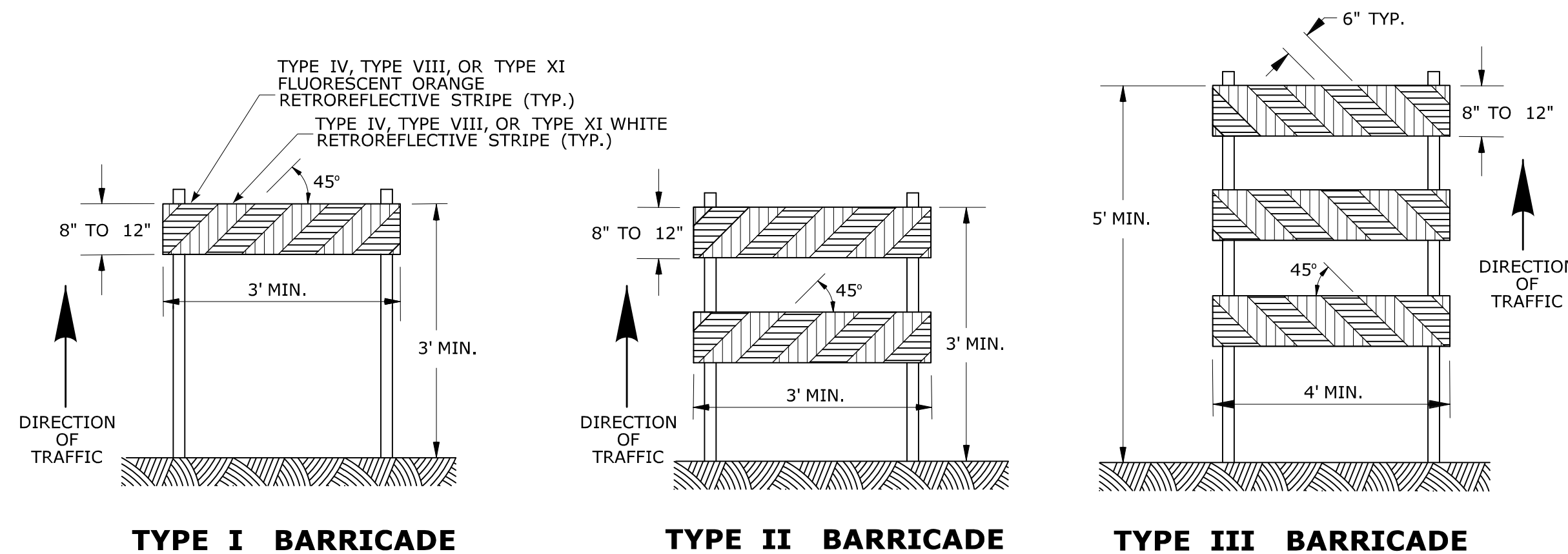
- TRAFFIC CONES SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 1 DEVICES AND THE LATEST EDITION OF THE MUTCD.
- IF RUBBER CONES ARE USED, THEY SHALL HAVE INTERIOR RIBS FOR RIGIDITY.
- IF PLASTIC CONES ARE USED, THEY SHALL BE COLOR IMPREGNATED.
- THE ENGINEER RESERVES THE RIGHT TO REJECT ANY CONE DEEMED UNSUITABLE FOR THE PURPOSE INTENDED.
- THE ENTIRE AREA OF FLUORESCENT ORANGE AND WHITE STRIPES SHALL BE RETROREFLECTIVE SHEETING AS REQUIRED IN THE SPECIFICATIONS.
- THE SECTIONS OF CONES NOT COVERED WITH RETROREFLECTIVE STRIPES SHALL BE ORANGE.



TRAFFIC CONE

NOTES:

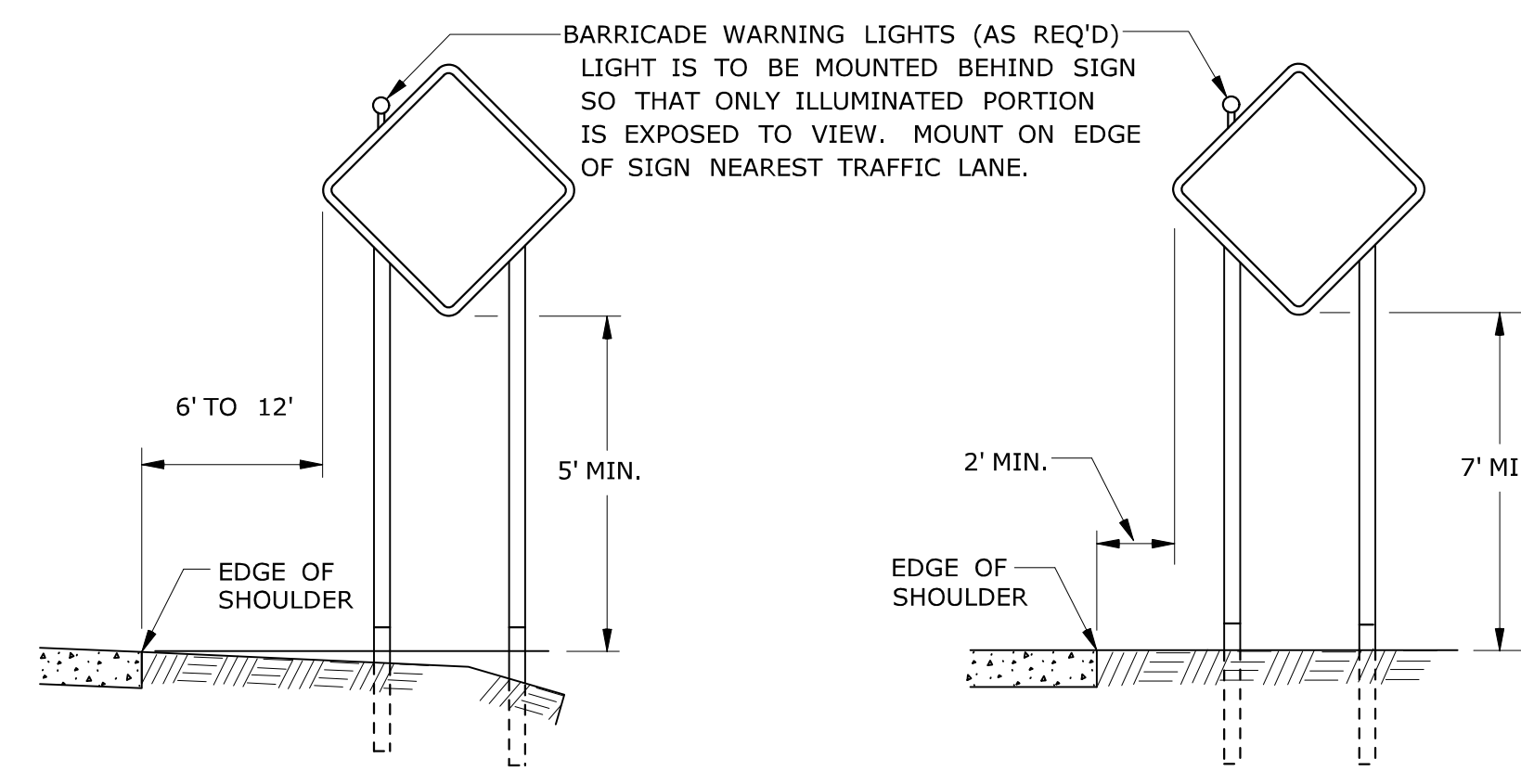
- TRAFFIC CONES SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 1 DEVICES AND THE LATEST EDITION OF THE MUTCD.
- IF RUBBER CONES ARE USED, THEY SHALL HAVE INTERIOR RIBS FOR RIGIDITY.
- IF PLASTIC CONES ARE USED, THEY SHALL BE COLOR IMPREGNATED.
- THE ENGINEER RESERVES THE RIGHT TO REJECT ANY CONE DEEMED UNSUITABLE FOR THE PURPOSE INTENDED.
- THE ENTIRE AREA OF WHITE STRIPES SHALL BE RETROREFLECTIVE SHEETING AS REQUIRED IN THE SPECIFICATIONS.
- TRAFFIC CONES NOT USED AT NIGHT MAY UTILIZE TYPE III SHEETING.
- THE SECTIONS OF CONES NOT COVERED WITH RETROREFLECTIVE STRIPES SHALL BE ORANGE.



CONSTRUCTION BARRICADES

NOTES:

- CONSTRUCTION BARRICADES SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH AND THE LATEST EDITION OF THE MUTCD.
- MARKINGS FOR BARRICADE RAILS SHALL BE ALTERNATE FLUORESCENT ORANGE AND WHITE STRIPES SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS. 6" WIDE STRIPES SHALL BE USED.
- THE ENTIRE AREA OF FLUORESCENT ORANGE AND WHITE STRIPES SHALL BE RETROREFLECTIVE SHEETING AS REQUIRED IN THE SPECIFICATIONS. THE SIDES OF BARRICADES FACING TRAFFIC SHALL HAVE RETROREFLECTIVE RAIL FACES.
- THE ENGINEER RESERVES THE RIGHT TO REJECT ANY BARRICADE DEEMED UNSUITABLE FOR THE PURPOSE INTENDED.
- CORNERS OF BARRICADE RAILS SHALL BE ROUNDED.
- SIGNS MAY ONLY BE INSTALLED ON TYPE III BARRICADES AND SHALL BE PLACED SO AS TO COVER NO MORE THAN ONE BARRICADE RAIL.



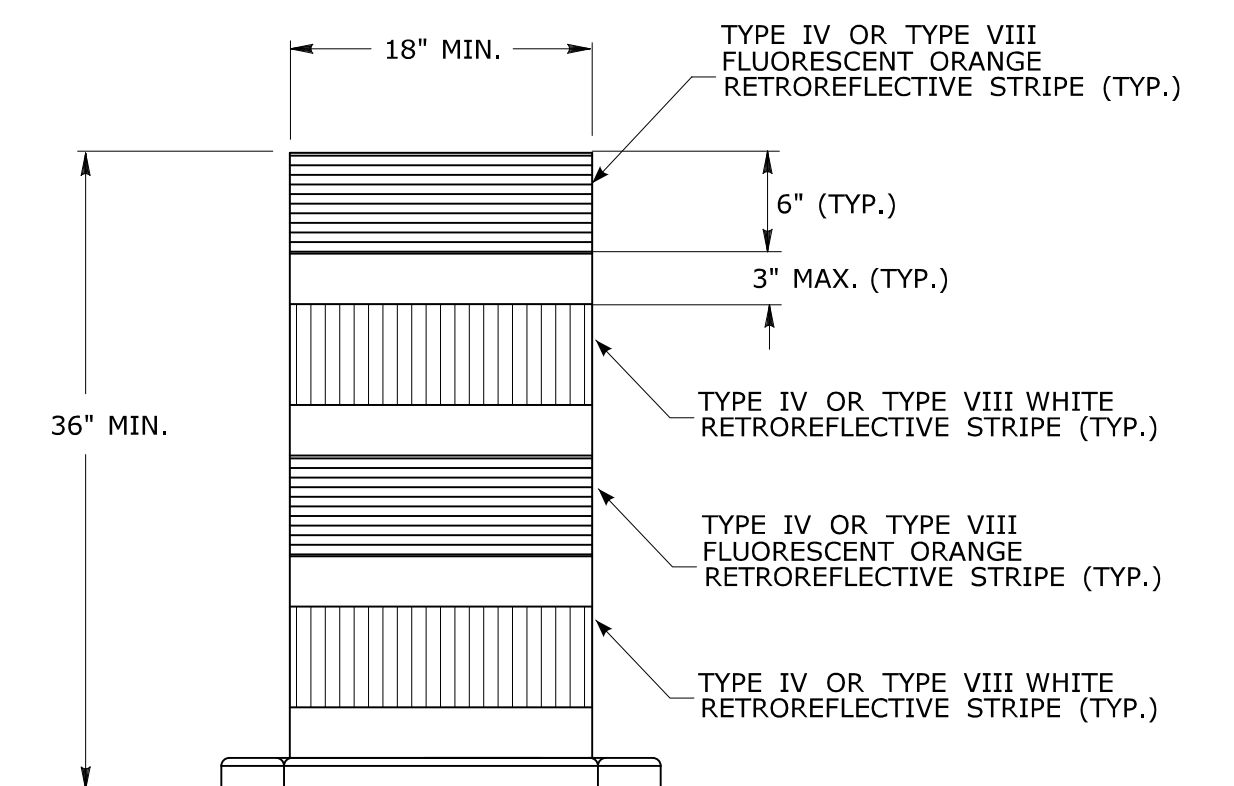
RURAL AREA

URBAN AREA

**PLACEMENT OF CONSTRUCTION SIGNS
TYPICAL LONG TERM INSTALLATION**

NOTES:

- SUPPORTS SHALL BE METAL SIGN POSTS AND HAVE BREAK-AWAY FEATURES.
REFER TO STANDARD SHEETS:
TR-1208.01 - "SIGN PLACEMENT AND RETROREFLECTIVE STRIP DETAILS."
TR-1208.02 - "METAL SIGN POSTS AND SIGN MOUNTING DETAILS."



**TRAFFIC DRUM
FRONT VIEW**

NOTES:

- TRAFFIC DRUM SHALL CONFORM TO THE REQUIREMENTS OF NCHRP REPORT 350 (TL-3) OR THE AASHTO MASH FOR CATEGORY 1 DEVICES AND THE LATEST EDITION OF THE MUTCD.
- THE ENGINEER RESERVES THE RIGHT TO REJECT ANY DRUM DEEMED UNSUITABLE FOR THE PURPOSE INTENDED.
- THE ENTIRE AREA OF FLUORESCENT ORANGE AND WHITE STRIPES SHALL BE RETROREFLECTIVE SHEETING AS REQUIRED IN THE SPECIFICATIONS.
- THE SECTIONS OF DRUMS NOT COVERED WITH RETROREFLECTIVE STRIPES SHALL BE ORANGE.

<p>THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.</p>		<p>NOT TO SCALE</p>	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>SUBMITTED BY: <i>Mark Makuch</i> NAME/DATE/TIME: Mark F. Makuch, P.E. 2018.08.17 09:12:43-04'00'</p>	<p>CTDOT STANDARD SHEET</p>	<p>STANDARD SHEET TITLE: CONSTRUCTION SIGN SUPPORTS AND CHANNELIZING DEVICES</p>	<p>STANDARD SHEET NO.: TR-1220_02</p>
<p>3 8-2018 UPDATED SHEETING TYPE AND COLOR.</p> <p>2 8-2015 UPDATED PER MUTCD AND FORM 816 JAN 2015 REVISION.</p> <p>1 2-2011 MINOR REVISIONS.</p>	<p>APPROVED BY: <i>YFC</i> NAME/DATE/TIME: Mark F. Carfino, P.E. 2018.08.21 07:49:51-04'00'</p>			<p>OFFICE OF ENGINEERING</p>			
<p>REV. DATE REVISION DESCRIPTION</p>	<p>Plotted Date: 8/10/2018</p>		<p>Filename: TR-1220.02.3.2018.dgn Model: TR-1220.02</p>				