

Uniform Traffic Control Specifications and Standards For Operating Authorities Within the Region of Halton

Custodial Office

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UTSS (Uniform Traffic Control Specifications and Standards for Operating Authorities within the Region of Halton) Acknowledgements

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Development team members (current and past):

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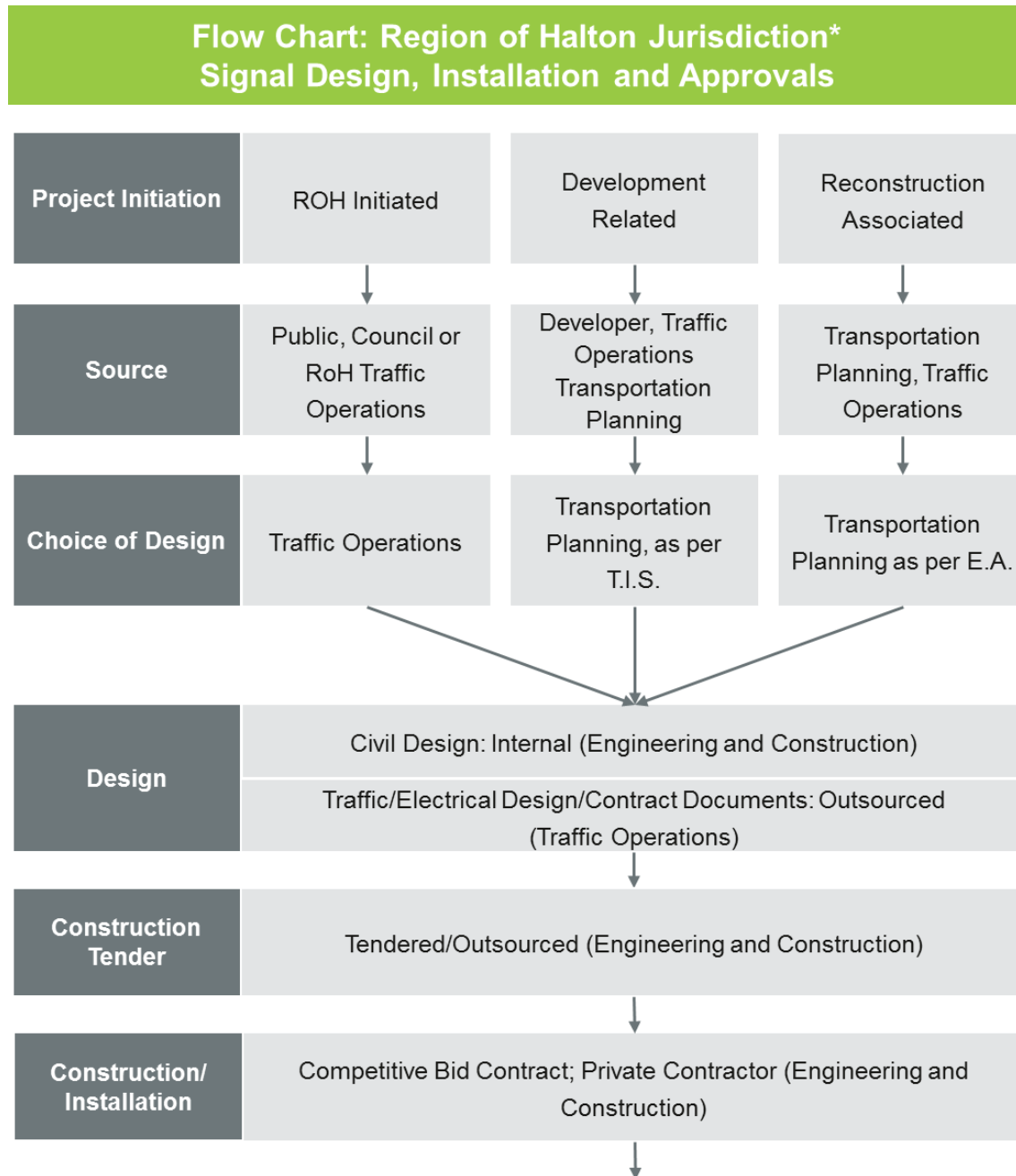
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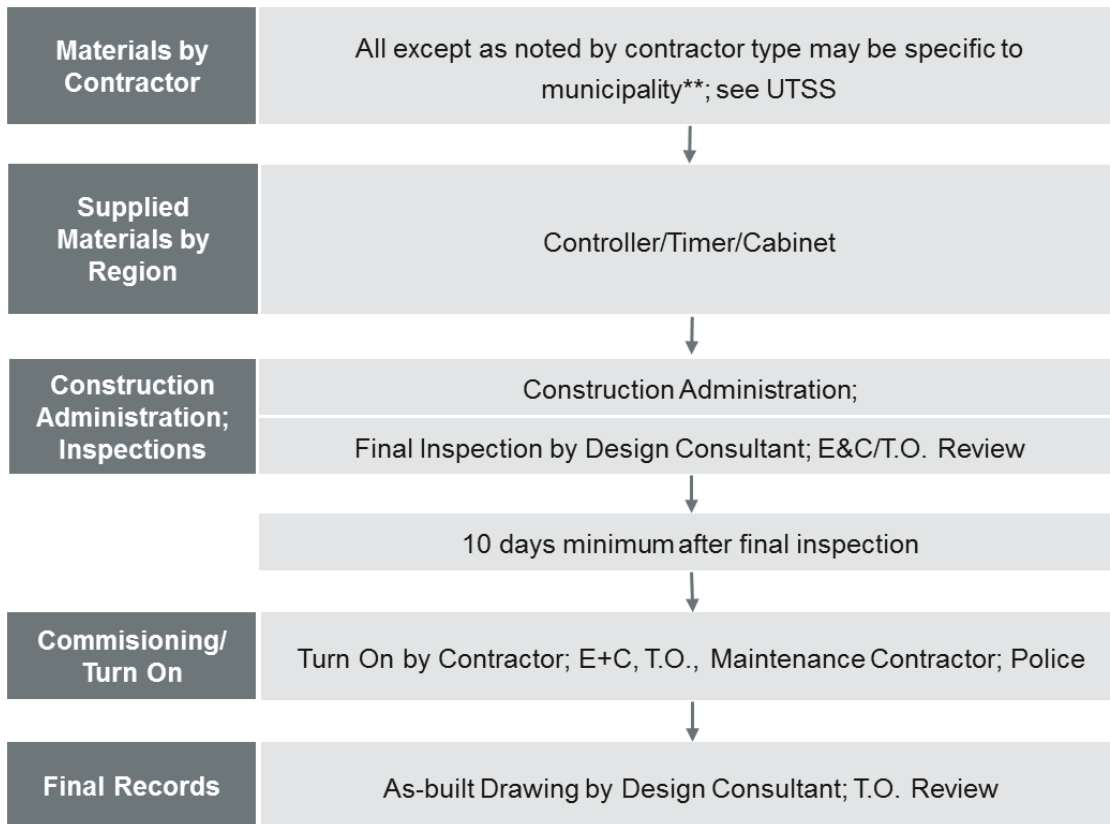
1. GENERAL

This specification covers the requirements for electrical work and is applicable to all electrical work. Unless otherwise amended herein, the provisions of the Ontario Provincial Standard Specifications listed under Section 2 - REFERENCES shall apply to this work.

1.1 Region of Halton Signal Design Approvals Workflow



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*Refer to contract documents for specific requirements for each municipality.

**It is the contractor's responsibility to ensure all materials supplied are compatible in all regards with materials supplied by the Operating Authority.

2. REFERENCES

This document refers to the following standards, specifications or publications:

Ontario Provincial Standard Specifications:

Construction

Electrical Work - General	In accordance with OPSS 106, April 2017,
Electrical Chambers	In accordance with OPSS 602, November 2017,
Duct Systems	In accordance with OPSS 603, November 2017,
Installation of Cable	In accordance with OPSS 604, November 2017,
Grounding Systems	In accordance with OPSS 609, November 2012,
Removal of Electrical Equipment	In accordance with OPSS 610, November 2016,
Installation of Underpass Luminaires	In accordance with OPSS 611, November 2013,
Installation of Power Supply Equipment	In accordance with OPSS 614, November 2012,
Erection of Poles	In accordance with OPSS 615, April 2017,
Footings & Pads for Electrical Equipment	In accordance with OPSS 616, November 2012,

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Installation of Roadway Luminaires	In accordance with OPSS 617, November 2013,
Traffic Signal Equipment and Electrical Traffic Control Devices	In accordance with OPSS 620, April 2017,
Traffic Signal Interconnection Equipment	In accordance with OPSS 624, November 2007,
Pavement Marking	In accordance with OPSS 710, November 2010,
Concrete Structure	In accordance with OPSS MUNI 904, November 2012
Material	
Concrete – Material and Production	In accordance with OPSS MUNI 1350, November 2008,
Thermoplastic Pavement Marking Materials	In accordance with OPSS 1713, February 1991,
Traffic Paint ReflectORIZING Glass Beads	In accordance with OPSS 1750, December 1983,
Cable	In accordance with OPSS 2409, November 2014,
Wood Poles	In accordance with OPSS 2420, November 2010,
Spun Concrete Poles	In accordance with OPSS 2421, November 2012,
Steel Poles, Base Mounted	In accordance with OPSS 2423, April 2017,
Aluminum Tapered Elliptical Brackets	In accordance with OPSS 2428, November 2017,
Aluminum Poles, Base Mounting	In accordance with OPSS 2452, November 2010,
Traffic Signal Arms, Brackets, Hangers, Fittings and Hardware	In accordance with OPSS 2460, November 2009,
Signal Heads	In accordance with OPSS 2461, April 2017.

Ontario Provincial Standard Specification (OPSS)
Ontario Provincial Standard Drawings (OPSD)

All requirements of the latest revisions of the Ontario Provincial Standard Specification and the Ontario Provincial Standard Drawings shall apply to these specifications and standards, as defined. It shall be the Contractor's responsibility to obtain a copy of these standards for their use.

OPS General Conditions of Contracts

The OPSS MUNI 100 - General Conditions of Contract shall apply to this specification and the Operating Authority contract documents. It shall be the Contractor's responsibility to obtain a copy of this document for their use. The following items of Supplemental Specifications shall supplement OPSS MUNI 100.

Order of Precedence

The order of precedence for the electrical work shall be as follows:

- Special Provisions of Contract,
- Uniform Traffic Signal Specifications and Standards for Operating Authorities Within the Region of Halton,
- Ontario Provincial Standard Specifications,
- Ontario Provincial Standard Drawings,
- General Conditions of Contract – Ontario Provincial Standards

Others:

Occupational Health and Safety Act and Regulations for Construction Projects, Current Edition

Infrastructure Health & Safety Association (Electrical & Utilities Safety Association of Ontario) - Electrical Utilities Safety Rules,

Infrastructure Health & Safety Association (Electrical & Utilities Safety Association of Ontario) - Telecommunications Utility Safety Rules

Ontario Electrical Safety Code - Current Edition, including all appending bulletins issued by the Electrical Safety Authority.

3. DEFINITIONS

For the purpose of this specification, the following abbreviations apply:

AASHTO - American Association of State Highway and Transportation Officials

AISI - American Institute of Steel and Iron

AODA - Accessibility for Ontarians with Disabilities Act

AWG - American Wire Gauge

ASTM - American Society for Testing and Materials International

BCD - Bolt Circle Diameter

CSA – Canadian Standards Association

EEMAC - Electrical Equipment Manufacturers Association of Canada

EIA - Electronic Industries Association

ESA - Electrical Safety Authority

E&USA - Electrical & Utilities Safety Association of Ontario (refer to IH&SA),

IEEE - Institute of Electrical and Electronic Engineers

IES - Illuminating Engineering Society of North America

IH&SA - Infrastructure Health & Safety Association

IMSA - International Municipal Signal Association

IES - Illuminating Engineering Society

ITE - Institute of Transportation Engineers

MTO - Ministry of Transportation of Ontario

NEMA - National Electrical Manufacturers Association

OPSS - Ontario Provincial Standard Specifications

OPSD - Ontario Provincial Standard Drawings

OACETT - Ontario Association of Certified Engineering Technicians and Technologists

OTM - Ontario Traffic Manual

PEO - Professional Engineers of Ontario

SCTE - Society of Cable Telecommunications Engineers

SAE – Society of Automobile Engineers

ULC - Underwriters Laboratories of Canada

Whenever a publication of any one of the above or similar organization is mentioned in these specifications, such mention shall refer to the latest issue of the said publication, including all appendices and revisions thereto.

For the purpose of this specification, the following definitions apply:

Code: means Ontario Electrical Safety Code;

Contract Administrator: shall be interpreted as meaning the Engineer, the person, partnership or corporation designated by the Operating Authority to be the Operating Authority's representative for purposes of the Contract. (OPS General Conditions of Contract);

Contractor: means the person, partnership or corporation undertaking the Work as identified in the Agreement. (OPS General Conditions of Contract);

Engineer: shall be interpreted as meaning the Commissioner of Public Works for the Regional Municipality of Halton or such other officers as may be authorized by Halton to act in any particular capacity;

Operating Authority: means one or combination of the Regional Municipality of Halton, City of Burlington, Town of Halton Hills, Town of Milton and / or Town of Oakville.

Maintenance Contractor: means the current Electrical Contractor under Contract to perform traffic signal and/or roadway lighting maintenance work for the Operating Authority.

4. ELECTRICAL WORK - General

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Under this specification, the following districts have been designated for traffic signal maintenance by the Operating Authorities Traffic Signal Maintenance Contractor:

Area Municipality	Traffic Signal Maintenance Contractor	Service Area
Region of Halton	City of Burlington Transportation Services Department	On Regional Roads within City of Burlington
	Southwestern Energy- Routine Maintenance -- Emergency Maintenance - Town of Oakville Traffic Operation Division	On Regional Roads within Town of Halton Hills
	Maintenance Contractor	On Regional Roads within Town of Milton
	Town of Oakville Traffic Operation Division	On Regional Roads within Town of Oakville
City of Burlington	City of Burlington Transportation Services Department	Within City of Burlington

Area Municipality	Traffic Signal Maintenance Contractor	Service Area
Town of Halton Hills	Southwestern Energy - Routine Maintenance -- Emergency Maintenance - Town of Oakville Traffic Operation Division	Within Town of Halton Hills
Town of Milton	Maintenance Contractor	Within Town of Milton
Town of Oakville	Town of Oakville Traffic Operation Division	Within Town of Oakville

The selection of electrical, roadway lighting and traffic signal equipment specified in this document has to be discussed, accepted and approved by the Operating Authorities Project Manager, prior to finalizing contract documents.

Amendment to OPSS 106, dated April 2017 - Electrical Work - General

Subsection 106.01 of OPSS 106 is amended to include the following:

106.01 SCOPE

For the purpose of this specification the following definition of electrical work shall apply:

Underground Electrical Work - consists of the supply of all labour, equipment and materials for the installation of electrical chamber, service boxes, conduit, concrete pole bases, island marker bases, traffic controller cabinet bases, communication splice cabinet bases and any other items as shown on the Contract drawings. The quantities listed in the contract documents may be subject to change; therefore, the Contractor must be willing to perform additional work using the same unit prices.

Aboveground Electrical Work - consists of the supply of all labour, equipment and materials not supplied by the Operating Authority required for the aboveground installation of signalized traffic control device and roadway lighting devices. These installations shall be made as shown on the Contract drawings. The quantities listed in the contract documents may be subject to change; therefore, the Contractor must be willing to perform additional work using the same unit prices.

Subsection 106.04.01 of OPSS 106 is deleted and replaced with the following:

106.04 SUBMISSION AND DESIGN REQUIREMENTS

106.04.01 Submission Requirements

106.04.01.01 Electrical Equipment Working Drawings

Working Drawings for the following electrical equipment are required:

- a) Poles,
- b) Luminaires,
- c) Luminaire Photo Control Units,
- d) Anchor Assemblies,
- e) Electrical Chambers,
- f) LED Signal Lamp Units, and
- g) Low Voltage Power Cable for Weather Exposed Applications.

Working Drawings for luminaires shall consist of manufacturer's catalogue information and photometric data. Working Drawings for all other items shall include all information required in the applicable material specification.

106.04.01.02 Submission of Drawings

Three sets of electrical equipment Working Drawings shall be submitted to the Contractor Administrator prior to the commencement of fabrication.

106.04.01.03 Return of Submissions

Each submission or resubmission shall be reviewed and returned within 2 weeks.

Three copies of the electrical equipment Working Drawings to be returned shall be marked as one of the following:

- a) Stamped with wording that allows for "Permission to Construct".

In this case, the Contractor shall then submit another three copies of these final drawings to the Contract Administrator, who shall stamp them with wording that allows for "Permission to Construct". Work can commence on receipt of the drawings by the Contractor.

- b) Showing only required changes.

In this case, the drawings shall be updated as required and the submission process repeated.

Once fabrication of the electrical equipment has commenced, materials and dimensions shown on the final Working Drawings shall not be changed.

Subsection 106.05 of OPSS 106 is amended to include the following:

106.05 MATERIALS

Unless otherwise specified in the Contract or by the Contract Administrator, all electrical materials shall be new, of uniform pattern throughout the work and fabricated and supplied by recognized equipment manufacturers to meet the requirements of the Operating Authority. All electrical materials, components or completed assemblies of components shall be approved and certified by either:

- a) Canadian Standards Association,
- b) An organization that has been accredited by the Standards Council of Canada; or
- c) Electrical Safety Authority.

All materials shall be stored in accordance with manufacturer's instructions to prevent damage, soiling, or finish spoilage. New poles shall be stacked to prevent bending or warping and shall be protected against any condition that may cause chipping or pitting in the finish.

The Contractor shall supply all materials as specified in the contract documents and any miscellaneous hardware and material (electrical tape, marrettes, connectors, etc.), required for each installation.

If the Contractor is unable to comply with all items in this specification but still wishes to submit a bid, all variances from this specification must be submitted in writing to the Contract Administrator.

106.05.01 Systems

While the specifications include specific requirements for the work, subdivided into sections, it shall be understood and acknowledged by the Contractor that complete illumination and signal systems are required. Minor items or accessories not herein specified, but obviously required for such systems, shall be provided as if specified and in conformance with modern practice and workmanship. Any omission or errors or misinterpretations of the specifications or Contract order shall not relieve the Contractor of the responsibility of providing equipment as aforesaid.

Subsection 106.07.01 of OPSS 106 is amended to by including the following:

106.07 CONSTRUCTION

106.07.01 Qualification of Workmen

Contractors currently recognized by the Operating Authorities as having the necessary qualifications are as follows:

- a) Beacon Utilities Contractor Limited,
- b) Black and MacDonald Limited
- c) Ducon Utilities Limited,
- d) E.C. Power & Lighting Limited,
- e) Fellmore Electric Limited,
- f) Guild Electric Limited,
- g) TM3 (Trademark Industrial Inc.); or
- h) Weinmann Electric Limited

OR; any other Electrical Contractor having a minimum of five (5) previous years' experience in the construction of traffic signals and street lighting systems and approved by the Operating Authority prior to the submission of tender for award of the Contract.

Subsection 106.07.01.02 of OPSS 106 is deleted and replaced with the following:

106.07.01.02 Contractor's Workers

The Contractor shall have a licensed master electrician on staff and shall use workers qualified to do the electrical work in accordance with the following:

- a) All electrical work shall be performed under the supervision of a licensed (Construction and Maintenance, 309A) electrician.
- b) Personnel certified under "The Apprenticeship and Tradesman's Qualification Act" shall perform all electrical work. All personnel performing electrical work shall carry proof of their certification under the Act on their person at all times while on the work site.
- c) Electrical work being conducted within 3 metres of an energized overhead electrical conductor with nominal phase to phase voltage rating of 750 or more volts shall be performed by a certified journey linesperson, as defined by Electrical & Utilities Safety Association of Ontario (E&USA),
- d) Electrical work at a traffic signal equipment installation shall be performed by an electrician or an electronic technician who have completed the IMSA Level I and II, Traffic Signal Technician Certification program; or be a worker who is similarly qualified by training and experience and is acceptable to the Operating Authority.
- e) Electrical work at a traffic signal control equipment installation shall be performed by an electrician or an electronic technician who have successfully completed the IMSA Level I and II, Traffic Signal Technician Certification program and having a minimum of five years previous experience in the assembly and maintenance of NEMA based traffic controller timers and cabinet assemblies.
- f) Electrical work at street lighting equipment installations shall be performed by a licensed electrician who has completed the IMSA Level 1 Roadway Certification Program.
- g) Personnel shall be trained in the installation, programming and aiming of the traffic video / thermal detection equipment and have access to a laptop computer and related software to complete the tasks.
- h) Personnel shall have related experience in the overall fields of traffic signal and street lighting installations.

- i) A qualified representative must be present and on-site whenever work is being carried out under the Contract.
- j) All testing and inspection work shall be performed by an Electrician.

The Contractor shall provide proof that the individuals performing the electrical work are currently certified.

The Contract Administrator may direct the Contractor to cease all electrical work until a licensed electrician, with proof of such, is on site to do or supervise the electrical work.

Where the Contract administrator directs the removal of staff or the cessation of Electrical Work, no additional payment will be made for any costs incurred by the Contractor as a result of such direction.

Subsection 106.07.02 of OPSS 106 is deleted and replaced with the following:

106.07.02 Work to be Inspected by Electrical Safety Authority

All electrical work is subject to inspection by the Electrical Safety Authority. The Contractor shall perform all work associated with inspection or re-inspection by the Electrical Safety Authority. This work includes, but is not limited to:

- a) Arranging and coordinating all visits to the construction site by the ESA's inspectors.
- b) Correcting all defects identified by the ESA.
- c) Submitting all applications for inspection.
- d) Obtaining all permits.
- e) Obtaining all certificates.
- f) Obtaining all connection authorizations from the ESA.
- g) Payment of fees related to permits, applications, inspections and connections; and
- h) Performing any other work that may be required under the Code.

Upon completion of all work, the Contractor shall obtain a final certificate of approval from ESA and shall furnish one copy of the certificate to the Operating Authority.

No additional payment will be made by the Operating Authority for the work associated with inspection or re-inspection by the Electrical Safety Authority except for correcting defects that are the direct result of compliance with the Operating Authority's design of the work.

No additional payment will be made by the Operating Authority for any work resulting from any direction, action or omission by the Electrical Safety Authority.

Subsection 106.07.04.03 of OPSS 106 is deleted and replaced with the following:

106.07.04.03 New Traffic Signal Systems Activation

A new traffic signal system, at an intersection not previously signalized, shall be initially switched on for operation in conformance with the following requirements:

- a) For the testing of circuitry and components, operation of the system shall take place with the signal head covers in place.

- b) The Contractor shall give the Contract Administrator a minimum of five (5) working days' notice of when the system will be ready for operation to schedule with the Operating Authority for the installation of the traffic controller cabinet, UPS and timer by their Maintenance Contractor. The Contractor shall reconfirm that the work will be done as scheduled 24 hours prior to doing the work.
- c) The Contractor shall be responsible to arrange for Pay Duty Police officer to control traffic during the activation of the traffic control system.
- d) Testing and switch on for operation will not be permitted on a Friday, Saturday, Sunday, Monday or statutory holiday without the authorization of the Operating Authority Project Manager or Contract Administrator.
- e) All repairs or replacement of defective components prior to final energization shall be completed by Contractor.
- f) The Contractor shall schedule with the Contract Administrator sufficient time to permit the Operating Authority Traffic Signal Maintenance Contractor to install the traffic controller cabinet, UPS and timer. The Contractor shall have a representative on site to address any concerns raised by the Operating Authority Traffic Signal Maintenance Contractor related to the field wiring and installation of the traffic signal plant.

The Signal Maintenance Contractor shall complete all of the following preliminary system testing:

- a) Perform the CMU/MMU test on temporary and permanent signal installations in the presence of the Operating Authority's Maintenance and the Contract Administrator,
- b) Assist in the testing of the emergency vehicle pre-emption equipment,
- c) Assist in the testing of the transit priority equipment,
- d) Assist in the testing of the and setup accessible pedestrian pushbutton equipment,
- e) Testing of the communication cable installed by the Contractor, and
- f) Document the activity in the controller cabinet log book.

The Contract Administrator, representative(s) from the Operating Authority and the Electrical Contractor must be present when the Operating Authority Traffic Signal Maintenance Contractor energizes the traffic signal system(s) into operation. The Operating Authority shall confirm with the Traffic Signal Maintenance Contractor that the signal timings are programmed in traffic controller timer, prior to installation in the field.

Contractor is responsible to advise the Contract Administrator prior to scheduling activation of the traffic signal control system that the system is fully operational and all noted deficiencies identified during inspections have been corrected.

Subsection 106.07.04.05.01 OPSS 106 is amended by deleting the 2nd and 3rd paragraphs and replace them with the following:

106.07.04.05.01 General

The Contract Administrator must be present when the Contractor energizes the traffic signals for full operation. Prior to energizing the signal, the Contractor shall provide the Operating Authority with three (3) working days' notice to have the new signal timings installed.

The Contractor shall have a qualified electrician present when energizing or de-energizing a traffic signal installation. The Contractor shall also arrange and pay for a Pay Duty Police to control traffic during the energizing or de-energizing of the traffic signals.

Subsection 106.07.06 of OPSS 106 is deleted and replaced with the following:

106.07.06 Temporary Electrical Work

All temporary electrical work specified in the Contract Documents shall be installed and made ready for operation prior to opening the associated traffic lanes or sidewalks that the work is intended to serve. Removal of temporary work shall be according to OPSS 610.

Existing lighting systems and traffic signals are to remain in operation until new or temporary systems are in operation.

Subsection 106.07.07 of OPSS 106 is deleted and replaced with the following:

106.07.07 Layout of Equipment

Equipment shall be located in accordance with the listed stations, offsets, co-ordinates, elevations and dimensions shown in the Contract drawings or to the lines and grades as set out by the Contract Administrator. The layout of equipment shown in the Contract drawings is a schematic indication of the general requirements only as the symbolization may not be true scale in relation to the intersection geometrics. The Contract Administrator, at his option, may revise the locations of equipment as required by field conditions, prior to installation.

Subsection 106.07.08 of OPSS 106 is deleted and replaced with the following:

106.07.08 Adjustment of Equipment

The Contractor shall adjust all traffic signal heads, optical lens assemblies, luminaires, photoelectric controllers and other devices, which may be adjusted to give optimum performance. All equipment shall be installed in a neat and orderly manner to the satisfaction of the Contract Administrator. Minor adjustments to equipment, which in the opinion of the Contract Administrator are required to improve the appearance of the site, shall be carried out at the Contractor's expense.

The Contractor shall also make adjustments in luminaires during night-time conditions, if so required, to any equipment that can be adjusted to provide optimum performance. All such adjustments shall be carried out to the satisfaction of the Contract Administrator at the Contractor's expense.

Subsection 106.07.10.01 of OPSS 106 is deleted and replaced with the following:

106.07.10.01 General Requirements

Tests and inspections on electrical equipment shall be according to the appropriate specifications covering the work and conform to the Code.

The Contractor is responsible for all pre-installation and proof of performance testing and inspections for electrical work. Each time the Contractor is to perform an inspection or test, the Contract Administrator shall be notified 48 hours prior to commencing the inspection or test.

Testing shall be performed by qualified personnel only and shall be done in the presence of the Contract Administrator or an Electrical Safety Authority Inspector.

The Contractor shall provide all necessary instruments, equipment and personnel required to satisfactorily carry out prescribed tests at his own expense.

The following tests shall be performed by the Contractor and record of results provided to the Contract Administrator once completed:

- a) All conduits and duct systems shall be proven free of stones, dirt, water or other debris by pulling a test mandrel 6mm smaller in diameter than the nominal conduit or duct size through each individual conduit or duct.
- b) All circuits shall be proven continuous and free of short circuits or ground faults.
- c) All circuits shall be proven free of unspecified grounds and the resistance to ground of all circuits shall be no less than fifty (50) megohms.
- d) All circuits shall be proven operable. Each control or switching device shall be operated no less than five (5) times and each circuit no less than eight (8) hours.
- e) The resistance to ground for all grounded equipment shall be proven to not exceed ten (10) ohms.

In addition to the above tests, the Contractor shall, where directed by the Contract Administrator, perform any tests called for where performance of the electrical system indicates a deficiency.

The Contract Administrator shall provide for tests on materials other than electrical measurements. The Contractor shall repair or replace the faulty equipment at his own expense, and to the satisfaction of the Contract Administrator.

All installations shall be made in a workmanlike manner to the satisfaction of the Contract Administrator. The Contractor shall take all necessary measurements in the field in order to enable him to completely dimension all Contract drawings. The Contractor shall demonstrate that the materials supplied meet the standards set forth in the specifications. The Contractor at his expense shall correct all defects.

The Contractor shall provide an unconditional warranty on the work done by the Contractor for a period of one year from the date of acceptance by the Operating Authority.

Subsection 106.07.11.02 of OPSS 106 is deleted and replaced with the following:

106.07.11.02 Test Results and Inspection Reports

Test results and inspection reports, including any required verifications and certifications shall be submitted to the Contract Administrator within 48 hours of completion of the inspection or test. Inspection reports shall include the completed checklist and any observations made of the material at the time of the inspection.

The documentation shall include the method of testing and inspecting employed of each item. The method of testing and inspecting shall ensure that the functional, physical, and environmental aspects of the Contract specifications are demonstrated.

The documentation shall include all quantitative information generated as part of the testing and inspecting work, including meter readings, screen displays, charts, and any other numerical or graphical data.

The documentation shall include all applicable verifications and certifications. The documentation shall demonstrate the results of all tests and inspections in a format that is logical and easily understood.

Test results and inspection reports shall be submitted to the Contract Administrator within 48 hours of completion of the inspection or test detailing:

- a) The installation and operation of the system components on an item-by-item basis.
- b) Clear detailed illustrations, including control layouts, displays, schematic diagrams, and all other information, required to correctly operate a fully functional unit as well as the maintenance and service aspects of the system components.
- c) The model number, suggested and actual settings, and options as installed and configured for each piece of electrical equipment.
- d) Sections that completely describe the theory of operation using block diagrams and schematic drawings.
- e) Diagnostic and repair procedures for corrective maintenance of the unit, assembly and disassembly instructions and drawings, layout drawings showing location of all components, and complete components listing showing component type, ratings, cost, and acceptable manufacturers. Complete schematic diagrams to the component level.
- f) Fully described adjustments and alignment procedures and provide descriptions of expected signals at all test points and outputs.
- g) The specifications of system components performance.

INSTALLATION OF ELECTRICAL CHAMBERS

Amendment to OPSS 602, dated November 2017 – Installation of Electrical Chambers

Subsection 602.02 of OPSS 602 is amended by deleting the references under the headings of “Ontario Provincial Standard Specifications, Construction”, “ASTM International”, and “Canadian Standards Association (CSA)” and adding the following:

602.02 REFERENCES

American National Standards Institute (ANSI):

ANSI/SCTE 77-2010 - Specification for Underground Enclosure Integrity

American Society for Testing and Materials International (ASTM):

ASTM A48/A48M-03 (2008) - Standard Specification for Gray Iron Castings

ASTM A123 / A123M-09 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM C1028 - 07e1 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method

Bureau de Normalisation du Québec (BNQ)

3624-115-2007-05-04 Polyethylene (PE) Pipe and Fittings - Flexible Pipes for Drainage - Characteristics and Test Methods

Canadian Standards Association (CSA):

CSA C22.2 No. 42-10 - General Use Receptacles, Attachment Plugs and Similar Wiring Devices

CSA C22.3 No. 7-10 - Underground Systems

CSA C83-96 (R2011) - Communication and Power Line Hardware

CABLE INSTALLATION

Amendment to OPSS 604, dated November, 2017 - Installation of Cable

Subsection 604.01 of OPSS 604 is deleted and replaced with the following:

604.01 SCOPE

This specification covers the requirements for the installation of high-voltage, low-voltage, and extra low-voltage cables, including cable splicing and terminations.

All power feed, traffic signal, communication and detection cable used must meet this specification and the Ontario Electrical Safety Code.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Subsection 604.02 of OPSS 604 is amended by deleting the paragraphs under the headings: “Canadian Standards Association”, “Insulated Cable Engineers Association”, “International Municipal Signal Association” and “Others” and replaced with the following:

604.02 REFERENCES

American National Standards Institute (ANSI):

Insulated Cable Engineers Association (ICEA):

National Electrical Manufacturers Association (NEMA):

ANSI/ICEA S-81-570-2005 - Standard for 600 Volt Rated Cables of Ruggedized Design for Direct Burial Installation as Single Conductors or Assemblies of Single Conductors

ANSI/ICEA S-93-639/NEMA WC74-2006 - 5-46kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy

ANSI/ICEA S-94-649-2004 - Concentric Neutral Cables Rated 5 - 46 kV

ANSI/ICEA S-95-658-2009/NEMA WC 70-2009 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy

ANSI/ICEA S-96-659-1999/NEMA WC71-1999 - Standard for Nonshielded Cables Rated 2001-5000 Volts for use in the Distribution of Electric Energy

ANSI/ICEA S-97-682-2007 - Utility Shielded Power Cable Rated 5 - 46 kV

ANSI/ICEA S-105-692-2004 - 600 Volt Single Layer Thermoset Insulated Utility Underground Distribution Cable

American Society for Testing and Materials International (ASTM):

ASTM B496 - 04 (2010) - Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors

Canadian Standards Association (CSA):

CSA C22.2 No. 38-10 - Thermoset-Insulated Wires and Cables (Tri-National standard, with UL 44 and ANCE NMX-J-451)

CSA C22.2 No. 65-03 (R2008) - Wire Connectors (Tri-National standard, with UL 486A-486B and NMX-J-543-ANCE-03)

CSA C22.2 No. 129-10 - Neutral Supported Cable

CSA C22.2 No. 197-M1983 (R2008) - PVC Insulating Tape

CSA C22.2 No. 239-09 - Control and Instrumentation Cables

CAN/CSA C22.3 No. 1-10 - Overhead Systems

CSA C49.2-10 - Compact Round Aluminum Conductors Steel Reinforced (ACSR)

CSA C57-98 (R2011) - Electric Power Connectors for Use in Overhead Line Conductors

CAN/CSA C68.3-F97 (R2006) - Shielded and Concentric Neutral Power Cables Rated 5-46 kV

CSA C83-96 (R2011) - Communication and Power Line Hardware

CAN/CSA C61089-11 - Round Wire Concentric Lay Overhead Electrical Stranded Conductors (Adopted CEI/IEC 1089:1991, first edition, 1991-05, with Canadian deviations)

CAN/CSA G12-92 (R2007) - Zinc-Coated Steel Wire Strand

International Municipal Signal Association (IMSA):

International Municipal Signal Association Specification No. 19-1C-2001 (Solid) - Polyethylene Insulated Polyvinyl Chloride Jacketed Signal Cable,

International Municipal Signal Association Specification No. 19-2-1999 - Paired, Polyethylene Insulated, Polyvinyl Chloride Jacketed Communication Cable with Electrical Shielding

International Municipal Signal Association Specification No. 19-5 1991 - Polyethylene Insulated Polyethylene Belted Polyvinyl Chloride Jacketed Communication Cable with Electrical Shielding,

International Municipal Signal Association Specification No. 50-2 1991 - Polyethylene Insulated Polyethylene Jacketed Loop Detector Lead-in Cable,

Others:

Infrastructure Health & Safety Association (IHSA) - Electrical & Utilities Safety Association of Ontario Rule Book,

Occupational Health and Safety Act and Regulations for Construction Projects, Current Edition

Ontario Electrical Safety Code, Current Edition

GROUNDING

Amendment to OPSS 609, dated November 2012 - Grounding

Subsection 609.02 of OPSS 609 is amended by deleting the references under the headings “Canadian Standards Association (CSA)” “American Standards for Testing and Materials” and “Other” and adding the following:

609.02 REFERENCES

Canadian Standards Association (CSA):

CSA C22.2 No. 38-10 - Thermoset-Insulated Wires and Cables (Tri-National standard, with UL 44 and ANCE NMX-J-451)

CSA C22.2 No. 41-07 (R2012) - Grounding and Bonding Equipment (Bi-National standard, with UL 467)

CSA G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel

American Society for Testing and Materials International (ASTM):

ASTM A123 / A123M-09 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM B3 (2007) Standard Specification for Soft or Annealed Copper Wire

Underwriters Laboratories (ULC):

UL 467 - 10th Edition - Grounding and Bonding Equipment

Other:

IEEE 837-2002 Standard for Qualifying Permanent Connections Used in Substation Grounding

Ontario Electrical Safety Code, Current Edition

UNDERPASS LUMINAIRES

Amendment to OPSS 611, dated November 2013 – Installation of Underpass Lighting

Subsection 611.02 is deleted and replaced with the following:

611.02 REFERENCES

Canadian Standards Association (CSA):

CSA C22.2 No. 49 -10 - Flexible Cords and Cables (Tri-national standard, with UL 62 and ANCE NMX-J-436)

CSA C22.2 No. 59.1-M1987 (R2001) - Fuses (Both Plug and Cartridge-Enclosed Types)

CAN/CSA-C22.2 No. 65-03 (R2008) - Wire Connectors (Tri-National standard, with UL 486A-486B and NMX-J-543-ANCE-03)

CSA C22.2 No. 197-M1983 (R2008) - PVC Insulating Tape

CAN/CSA C22.2 No. 227.2.1-04 (R2009) - Liquid-Tight Flexible Non-metallic Conduit (Bi-National standard, with UL 1660)

CSA G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

CSA W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding)

American National Standards Institute (ANSI)

ANSI C78.380-2007 - Method of Designation High Intensity Discharge Lamps

American Society for Testing and Materials International (ASTM):

ASTM A123 / A123M - 08 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

POLE ERECTION

Amendment to OPSS 615, dated April 2017 - Erection of Poles

Subsection 615.02 of OPSS 615 is amended by deleting the references under the headings “Canadian Standards Association (CSA)” and adding the following:

615.02 REFERENCES

Canadian Standards Association (CSA)

CSA C83-96 (R2011) - Communication and Power Line Hardware

CAN/CSA G12-92 (R2007) - Zinc-Coated Steel Wire Strand

FOOTINGS AND PADS FOR ELECTRICAL EQUIPMENT

Amendment to OPSS 616, dated November 2012 - Footing & Pads for Electrical Equipment

Subsection 616.02 of OPSS 616 is amended by deleting the references under the headings “Canadian Standards Association (CSA)”, “American Standards for Testing and Materials”, American National Standards Institute” and “Society of Automobile Engineers” and adding the following:

616.02 REFERENCES

Canadian Standards Association (CSA):

CSA G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

CSA W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding)

American National Standards Institute (ANSI):

ANSI/ASME B18.22.1-1965 (R2008) - Plain Washers

American Society for Testing and Materials International (ASTM):

ASTM A53 / A53M-07 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A123 / A123M-09 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A193 / A193M-08b - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications

ASTM A325M - 08 - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength [Metric]

ASTM A563-07a - Standard Specification for Carbons and Alloy Steel Nuts

Society of Automobile Engineers (SAE):

SAE J403h - November 2001 - Chemical Composition of SAE Carbon Steel

TRAFFIC SIGNAL EQUIPMENT

Amendment to OPSS 620, dated April 2017 - Traffic Signal Equipment and Electrical Traffic Control Devices

Subsection 620.02 of OPSS 620 is amended by deleting the References under “Canadian Standards Association” and replacing them with the following:

620.02 REFERENCES

Canadian Standards Association (CSA):

CSA C22.2 No. 41-07 (R2012) - Grounding and Bonding Equipment (Bi-National standard, with UL 467)

C22.2 No. 45.2-08 - Electrical Rigid Metal Conduit - Aluminum, Red Brass, and Stainless Steel

CSA C22.2 No. 65-03 (R2008) - Wire Connectors (Tri-National standard, with UL 486A-486B and NMX-J-543-ANCE-03)

CAN/CSA C22.2 No. 85-M89 (R2010) - Rigid PVC Boxes and Fittings

CSA C22.2 No. 197-M1983 (R2008) - PVC Insulating Tape

CSA C22.2 No. 211.2-06 (R2011) - Rigid PVC (Unplasticized) Conduit

CSA C57-98 (R2011) - Electric Power Connectors for Use in Overhead Line Conductors

CABLES

Amendment to OPSS 2409, dated November 2014 - Materials for Cable

Subsection 2409.02 of OPSS 2409 is deleted and replaced with the following:

2409.02 REFERENCES

Canadian Standards Association (CSA):

CSA C22.2 No. 239-09 - Control and Instrumentation Cables

ALUMINUM TAPERED ELLIPTICAL BRACKETS

Amendment to OPSS 2428, dated November 2017 - Materials for Aluminum Tapered Elliptical Brackets

Subsection 2428.02 of OPSS 2428 is deleted and replaced with the following:

2428.02 REFERENCES

American Society for Testing and Materials International (ASTM):

ASTM B221-08 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

Canadian Standards Association (CSA):

CSA G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel

CSA W59.2-M1991 (R2008) - Welded Aluminum Construction

ALUMINUM POLES BASE MOUNTED

Amendment to OPSS 2452, dated November 2010 - Material Specification for Aluminum Poles, Base Mounted

Subsection 2452.02 of OPSS 2452 is deleted and replaced with the following:

2452.02 REFERENCES

This specification refers to the following standards, specifications or publications:

American Standard for Testing and Materials International (ASTM):

ASTM B221-08 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

Canadian Standards Association (CSA):

CSA W47.2-M1987 (2009) - Certification of Companies for Fusion Welding of Aluminum

SIGNAL HEADS

Amendment to OPSS 2461, dated April 2017 – Material Specification for Signal Heads

Subsection 2461.02 of OPSS 2461 is amended by deleting the references under the headings “Canadian Standards Association”, “Institute of Transportation Engineers” and adding the following:

2461.02 REFERENCES

Canadian Standards Association (CSA):

CAN/CSA C22.2 No. 0.4-04 (R2009) - Bonding of Electrical Equipment

CSA C22.2 No. 127-09 - Equipment and Lead Wires

CAN/CSA-S157-05/S157.1-05 (R2010) - Strength Design in Aluminum

Institute of Transportation Engineers:

ST-017B - Equipment and Material Standards of the Institute of Transportation Engineers, April 3, 2006

ST-052 - Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement, June 27, 2005 - Performance Specification

ST-054 - Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement (July 2007)

Pedestrian Traffic Control Signal Indicators - Light Emitting Diode (LED) Modules, August 4, 2010 - Performance Specification

Others:

United States Federal Standard 595C-33538 - Colours Used in Government Procurement

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

United States Federal Standard - Colour Gray MVCL-14187

Ontario Highway Traffic Act, R.S.O. 1990, Chapter H.8

5. RECORD DRAWINGS / MAINTENANCE MANUALS / WARRANTIES

The Contractor shall co-ordinate and maintain the project “As-Constructed” record drawings and record for all work completed under the maintenance, modification or reconstruction of the traffic signal and/or street lighting facilities.

The Contractor will receive from the Contract Administrator, immediately following execution of the Contract, two (2) extra sets of Contract drawings for record purposes, on which the Contractor shall clearly mark all changes or deviations, as the work progresses. Authorized deviations from the Contract drawings shall be marked in red accurately on one set of Contract Drawing prints in a neat, legibly printed manner and shall be dated. Upon contract completion and prior to final inspection, neatly transfer the recorded information to a second set of Contract Drawing prints of the most recent version to the Contract drawings and submit both sets to the Contract Administrator.

The Contractor will mark all changes regardless of whether they were initiated by the Contractor or the Operating Authority.

The Contractor shall make available an updated copy of the “As-Constructed” drawings for viewing from time to time by the Contract Administrator.

Record accurately all changes / revisions in the work caused by:

- a) Site conditions and changes originated by the Operating Authority, Contract Administrator or by the Contractor.
- b) Site instructions.
- c) Supplementary inspections.
- d) Field orders.
- e) Change Orders.
- f) Shop Drawing revisions.

Accurately record locations of all disconnected and capped ends of utility services.

All existing utilities discovered during excavation operations shall be identified and accurately located by horizontal and vertical control dimensions.

The cost of this work is incidental to the contract and no additional payment will be made for this work.

The Operating Authority will retain the amount of Ten Thousand Dollars (\$10,000) on progress payment draws until receipt and approval of all record drawings, maintenance manuals and warranties, and any other submittals as may be required under the contract are provided by the Contractor. Status of maintained record drawings may be considered as a condition for validation of applications for payment.

6. REMOVAL OF ELECTRICAL EQUIPMENT

Amendment to OPSS 610, dated November 2008 - Removal of Electrical Equipment

Subsection 610.01 of OPSS 610 is deleted and replaced with the following:

610.01 SCOPE

The Contractor shall remove the designated traffic signal control device, street light fixtures and related electrical equipment, as indicated on the Contract drawings.

The electrical equipment designated for reuse shall remain the property of the Operating Authority and to be salvaged, stored, refurbished and/or reinstalled or delivered to the designated Operating Authority facility, as specified in the Contract.

The Contractor shall remove and dispose of all traffic signal and roadway illumination cabling conductors from existing conduits. All pole bases and handholes are to be removed in their entirety and disposed of. The Contractor shall remove all temporary traffic signal or roadway illumination equipment within the project limits after the completion and energizing of the permanent signals or roadway illumination.

Any equipment designated for removal and not designated to be salvaged for return to the Operating Authority shall become the property of the Contractor, upon removal and shall be disposed of in an orderly and safe manner.

The removal of the existing and temporary traffic signal control device and roadway illumination shall be done in accordance with OPSS 610 with the following amendments.

Subsection 610.07.07 of OPSS 610 is amended with the addition of the following:

610.07 CONSTRUCTION

610.07.07 Power Load Centre / Pedestal

The power load centres / pedestal, including all internal components shall be removed as specified in the Contract Documents.

The Contractor shall:

- a) Contact the respective Hydro Electric Authority two (2) weeks before power to the service is to be disconnected, submitting a completed “Application for General Service” form relating to the Applicant” and request disconnection of service.
- b) Meet the Hydro Electric Authority service representative on the site and explain what is required to complete the service;
- c) Coordinate with the Contract Administrator in advance so the Operating Authority can be notified to arrange for the adjustment of the billing account for the existing service; and
- d) Be responsible for the cost of arranging for the disconnection of the service by the respective Hydro Electric Authority.

Subsection 610.07.09.03 of OPSS 610 is deleted and replaced with the following:

610.07.09 Salvaged Equipment

610.07.09.03 Shipping of Salvaged Electrical Equipment and Materials

The Contractor shall disassemble all signal hardware and return components to the Operating Authority unloading site individually. (i.e.: Traffic Signal Heads, Pedestrian Heads, Poles, Arms, etc.)

All salvaged equipment and materials shall be loaded, transported, and unloaded at the sites specified in the Contract Documents.

Delivery to any Operating Authority unloading site shall be made between 9:00 a.m. and 3:00 p.m. local time. The Contract Administrator shall be notified three working days in advance of delivery to the Operating Authority unloading site, as specified and shall be present at delivery to confirm inventory salvaged.

610.07.09.04 Salvaged Electrical Equipment for Reuse

Where salvaged electrical equipment is required for re-use under the Contract, the Contractor shall be responsible for a clean and safe storage facility; the equipment shall be stored as per the manufacturers' requirements to avoid damage prior to re-installation.

The electrical equipment indicated for removal and to be salvaged for reuse shall be dismantled, salvaged and stored in a secured area by the Contractor until such time as they are reinstalled as part of the permanent traffic signal or roadway lighting installation or delivered to the designated Operating Authority's facility, as specified in the Contract.

7. UNDERGROUND ELECTRICAL WORK

Underground Electrical Work is as defined in amended OPSS 106 Subsection 106.01.

INSTALLATION OF ELECTRICAL CHAMBERS

Amendment to OPSS 602, dated November 2012 – Installation of Electrical Chambers

Subsection 602.01 of OPSS 602 is amended by adding the following:

Electrical chambers and splicing service boxes shall be installed as shown on the Contract drawings and in Standard Specification Drawings UTS 602.010, UTS 602.020, UTS 602.025, UTS 602.026, UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090 and OPSD 401.010.

Subsection 602.03 of OPSS 602 is deleted and replaced with the following:

602.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Electrical Chamber: means a structure or chamber for placing and maintaining conductors, cables, ducts, or electrical equipment. Electrical chamber is a general name for electrical maintenance hole, handwell and prefabricated underground enclosures.

Handwell: means an electrical chamber as detailed in Standard Specification Drawings UTS 602.010 or UTS 602.020.

Maintenance Hole: means an electrical chamber as detailed in Standard Specification Drawings UTS 602.025 or UTS 602.026.

Prefabricated Underground Enclosure: means an electrical chamber as detailed in Standard Specification Drawings UTS 602.030.

Rock: means as defined in OPSS 206.

Subsection 602.05.05 of OPSS 602 is amended by adding the following:

602.05 MATERIALS

602.05.16 Prefabricated Underground Enclosures

Prefabricated underground enclosures and covers for off roadway applications:

- a) Shall conform to the requirements of latest version of ANSI/SCTE 77 for Tier 15 loading. Boxes shall be open bottom.
- b) Shall be polymer concrete with straight sidewalls or polymer concrete with flared or straight fibreglass sidewalls.
- c) Shall have hexagon bolts to secure the cover,

- d) The cover design load may not exceed the design load of the box.
- e) All covers are required to have a minimum coefficient of friction of .50 in accordance with ASTM C1028 and the corresponding Tier Level embossed on the top surface.
- f) A service identification logo shall be cast into the cover (i.e. "Streetlighting", or "Traffic Signals").
- g) Must display a UL Listed label which corresponds to the proper Tier Level application.

Other materials may be submitted for the sidewalls provided they conform to the requirements of ANSI/SCTE 77-2007 for Tier 15 loading.

602.05.16.01 Prefabricated Underground Pull Boxes

The following prefabricated electrical pull boxes are approved for use:

- a) Type I - 394mm x 635mm x 457mm
 - 1. Quazite (Hubbell) - Model # PT1324BA18 with cover
 - i. Model # PT1324HA00-12 (Communication)
 - ii. Model # PT1324HA00-29 (Lighting),
 - iii. Model # PT1324HA00-46 (Traffic Signal), or
 - 2. Synertech -(Oldcastle) - Model # S1324B18FA with cover
 - i. Model # S1324HBBOA-10 (Lighting),
 - ii. Model # S1324HBBOA-13 (Traffic Signal),
 - iii. Model # S1324HBBOA-16 (Communication)
- b) Type II - 486mm x 841mm x 457mm
 - 1. Quazite (Hubbell) - Model # PT1730BA18 with cover
 - i. Model # PT1730HA00-12 (Communication),
 - ii. Model # PT1730HA00-29 (Lighting),
 - iii. Model # PT1730HA00-46 (Traffic Signal), or
 - 2. Synertech (Oldcastle) - Model # S1730B18FA with cover
 - i. Model # S1730HBBOA-10 (Lighting),
 - ii. Model # S1730HBBOA-13 (Traffic Signal)
 - iii. Model # S1730HBBOA-16 (Communication).

602.05.16.02 Prefabricated Electrical Splice Boxes

Prefabricated electrical splice boxes, when used as a splice point for traffic detection loops in median islands, shall be installed as shown in the Standard Specification Drawing UTS 602.040, set plumb and firmly bedded on the drainage pocket backfill.

The following prefabricated electrical splice boxes (12" x 12" x 12") are approved for use:

- a) Quazite (Hubbell) - Model # PC1212BG12 with cover Model # PC1212HA00-46 (Traffic Signal),
- b) Synertech (Oldcastle) - Model # S1212B12FA with cover Model # S1212HFAOA-13 (Traffic Signal).

Subsection 602.07.11 of OPSS 602 is amended by adding the following:

602.07 CONSTRUCTION

602.07.11 Installation

The following size of electrical chamber shall be installed in the following areas, unless otherwise specified on the Contract drawings:

Traffic Signal Equipment	Concrete	Prefabricated
a) Electrical Chamber - Adjacent to Controller Cabinet Pad	600mm x 600mm; or 675mm Diameter	486mm x 841mm x 457mm
b) Electrical Chamber - Intersection Quadrants to Poles and Road Crossings	600mm x 600mm; or 675mm Diameter	394mm x 635mm x 457mm; or 486mm x 841mm x 457mm
c) Electrical Chamber - Loop Detection Lead-in	460mm Diameter	300mm x 300mm x 300mm
Communication Equipment		
a) Communication Chamber - Adjacent to Communication Cabinet Pad	600mm x 600mm; or 675mm Diameter	394mm x 635mm x 457mm
b) Communication Chamber - Mid Section Pull Points *	600mm x 600mm*; or 460mm Diameter **	394mm x 635mm x 457mm
* - Spacing of communication chambers between intersections along a straight line for fibre optic cable conduit system should be approximately 300mm apart. ** - Spacing of communication chambers between intersections along a straight line for copper communication cable conduit system should be approximately 100mm apart.		
Roadway Lighting Equipment		
a) Electrical Chamber - Road Crossings	460mm Diameter	N/A

Subsection 602.07.11.02 of OPSS 602 is amended by adding the following:

602.07.11.02 Precast Concrete Hand Holes / Maintenance Holes

Precast concrete electrical chambers shall be constructed as shown in Standard Specification Drawings UTS 602.010, UTS 602.025 and UTS 602.026 and installed plumb and firmly bedded on the drainage pocket backfill and in accordance with Standard Specification Drawing UTS 602.050.

Subsection 602.07.11.02.01 of OPSS 602 is deleted and replaced with the following:

602.07.11.02.01 Cast-In-Place Concrete Electrical Handholes

Formwork shall be secured to form a concrete envelope of uniform thickness and set plumb and firmly bedded on the drainage pocket backfill. The cast iron frame and all ducts shall be installed in the formwork prior to pouring concrete.

Concrete shall be poured, cured, protected and finished conforming to OPSS MUNI 904. Concrete shall be according to OPSS MUNI 1350 with requirements in conformance with CSA A23.1 of Exposure Class C-1 and a nominal minimum 28-Day compressive strength of 35 MPa. The supplier of “Ready Mix Concrete” shall be an approved “Ready Mixed Concrete Operation”.

After the setting of concrete, the formwork shall be completely removed on the internal surface area and at least 150mm below grade on the external surface area.

Cast-in-place hand holes shall be constructed as shown in Standard Specification Drawing UTS 602.020 and set plumb and firmly bedded on the drainage pocket backfill and in accordance with Standard Specification Drawing UTS 602.050.

Subsection 602.07.11.02.02 of OPSS 602 is added as follows:

602.07.11.02.02 Prefabricated Underground Enclosures

Prefabricated Electrical Pull Boxes

Prefabricated electrical pull boxes, when used as a pull point for traffic signal and roadway lighting cables shall be installed as shown in the Standard Specification Drawings UTS 602.030 and set plumb and firmly bedded on the drainage pocket backfill.

Prefabricated Electrical Splice Boxes

Prefabricated electrical splice boxes, when used as a splice point for traffic detection loops in median islands, shall be installed as shown in the Standard Specification Drawing UTS 602.040, set plumb and firmly bedded on the drainage pocket backfill.

Subsection 602.07.13 of OPSS 602 is amended by adding the following:

602.07.13 Grounding

Where a ground electrode is required adjacent to the electrical chamber or prefabricated underground enclosure, the system #6 AWG stranded bare copper ground wire shall exit out of the electrical chamber or prefabricated underground enclosure to enable ground electrode connection, as indicated in the Contract.

INSTALLATION OF DUCTS

Amendment to OPSS 603, dated November 2012 – Installation of Duct Systems

Subsection 603.05.08 of OPSS 603 is deleted and replaced with the following:

603.05 MATERIALS

603.05.08 Ducts and Fittings

Ducts and fittings shall be according to the applicable standards specified in Table 1.

For surface mounted duct systems, shall be rigid or Electrical Non-Metallic Tube (ENT) PVC conduit in the size(s) specified on the Contract drawings.

The following minimum size of conduit shall be installed in the following areas, unless otherwise specified on the Contract drawings:

TABLE 1

Traffic Signal Equipment	Conduit Configuration
a) Road Crossings - Electrical Chamber to Electrical Chamber,	2 – 75mm,
b) Boulevard - Electrical Chamber to Traffic Cabinet Controller Pad	2 – 100mm 1 - 75mm & 1 – 50mm,
c) Boulevard - Electrical Chamber to Pole Footing	100mm,
d) Boulevard - Electrical Chamber to Pole Footing (in median)	75mm,
e) Boulevard - Electrical Chamber to Wooden Pole	75mm,
f) Boulevard - Electrical Chamber to Flasher Pole Footing	50mm,
g) Boulevard - Controller Pad to Communication Pedestal/Pad	75mm,
h) Boulevard - Electrical Chamber to Controller Pad Communication Pedestal/Pad	100mm,
i) Boulevard – Hydro Power Source Power to the Service Load Centre Pedestal	50mm,
j) Boulevard - Power Service Load Centre to Electrical Chamber for Intersection Illumination Power	50mm,
k) Boulevard - Power Service Load Centre to Electrical Chamber or Controller Pad for Traffic Signal Power	50mm
l) Boulevard - Electrical Chamber to Junction Box for Loop Lead-in	50mm,
m) Boulevard - Electrical Chamber / Junction Box to Curb Line / Edge of Pavement or Loop Lead-in	25mm
Communication Equipment *	Conduit Configuration
a) Boulevard - Communication “M” Cabinet Pad to Electrical Chamber	2 – 100mm
b) Boulevard - Communication “M” Cabinet Pad to Controller Pad	75mm
c) Road Crossings - Communication Electrical Chamber to Communication Electrical Chamber	100mm,
d) Boulevard - Communication Electrical Chamber to Communication Electrical Chamber	100mm,
* - Conduits to enter through the side of electrical chamber with “Bell End” couplings.	
Roadway Lighting Equipment	Conduit Configuration
a) Road Crossings - Lighting Electrical Chamber to Lighting Electrical Chamber	1 - 100mm,
b) Boulevard - Electrical Chamber to Light Standard Pole Footing	50mm,
c) Boulevard - Light Standard Pole Footing to Light Standard Pole Footing	50mm,
d) Boulevard - Power Service Load Centre to Electrical Chamber	2 - 50mm

Subsection 603.07.01 of OPSS 603 is deleted and replaced with the following:

603.07 CONSTRUCTION

603.07.01 General

General requirements for duct installation shall be as specified in the Contract Documents.

Non-metallic ducts installed and used when exposed to direct rays of the sun shall be specifically approved for the purpose and be marked (e.g., “SR,” “Outdoor,” “RTRC Type AG”) according to the Ontario Electrical Safety Code.

The type and number of conduit shall be laid out and constructed as shown in the Contract drawings and Standard Specification Drawings UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.090 and UTS 603.010.

The Operating Authority shall give consideration for the installation of the roadway crossings by the directional bore method. The Contractor shall notify the Operating Authority prior to commencing with construction of the conduit systems and consideration shall be given for the installation of the conduit by this method.

All directional drilling within the Operating Authority right of way shall conform to the requirements of OPSS 450 and NASTT Horizontal Directional Drilling Good Practices Guidelines (3rd Edition). Where existing utilities allow, pits for directional bore installation operations shall be setback a minimum 1.0m back from the existing or proposed curb. Bore holes shall only be 25mm larger in diameter than the conduit being installed. High Density Polypropylene (HDPE SDR13.5 minimum) conforming to TC-7-200 may be used for directional bore applications. Transition between HDPE to Rigid PVC conduit shall be completed with the HDPE duct being inserted and cemented into a Bell end section of rigid PVC conduit with a solvent suitable for connection of HDPE duct and rigid PVC conduit.

In situations where the Contractor makes three attempts to directional bore across a roadway section and is unsuccessful, the Contractor shall notify the Operating Authority so that the Operating Authority may verify the boring attempts and consider alternatives. Should it be determined that boring is not possible, the Contractor shall provide an open-cut crossing at the same bid price.

Ducts for communication cables shall be installed in trenches which have varying depth so as to provide drainage. The minimum cover depth of 500mm may be used in ‘flat’ terrain or as otherwise required, in order to ensure that the ducts slope towards an electrical chamber. Where the terrain will allow natural drainage due to its slope, a standard cover depth of 600mm shall be used.

Wobble joint fittings with expanded polystyrene bedding shall be installed where direct buried rigid ducts terminate at concrete structures such as bridge structures, retaining walls, and duct banks.

Subsection 603.07.06 of OPSS 603 is amended with the addition of the following:

603.07.06 Flexible Ducts

Lengths of High Density Polypropylene should be a continuous run between the two end points nearest to where the duct enters the electrical chamber, service, or junction box.

Subsection 603.07.14 of OPSS 603 is deleted and replaced with the following:

603.07.14 Cable and Duct Protection and Marking

The Contractor shall install marking tape at the centreline of the trench, a minimum 300mm below finished grade or asphalt or concrete surfaces and no lower than midpoint depth of excavation.

Subsection 603.07.15 of OPSS 603 is deleted and replaced with the following:

603.07.15 Termination

All ducts, terminating in traffic signal control cabinets and electrical chambers shall have standard “Bell” ends.

All ducts shall be temporarily plugged or sealed until wiring is installed. All ducts, terminating in traffic signal control cabinets, power supply assemblies, with wiring installed, shall be sealed with duct fill compound or expanding foam to a depth of no more than 100mm (4”) of the top of the conduit.

When ducts are specified in the Contract Documents as “spare” or intended for future use, the duct ends shall be plugged with plastic plugs and taped shut.

Subsection 603.07.16 of OPSS 603 is deleted and replaced with the following:

603.07.16 Backfill

Except when unshrinkable backfilling is used, backfilling shall be according to OPSS 401. Backfill materials containing rock fragments and stone larger than 50 mm in diameter shall not be placed within 300 mm of the duct.

Sand bedding shall be placed in trenches for flexible duct where the trench bottom contains sharp rock fragments and where crossover of flexible ducts is required.

Unshrinkable or granular backfill in trench for rigid ducts crossing paved areas shall extend to the wall of electrical chamber, where electrical chamber are required, otherwise, 1.0 m beyond the back face of curb or, where there is no curb, to the back edge of shoulder.

All grassed areas in boulevards will be reinstated with a minimum of 150mm of good topsoil and sod or seed as required under the Contract.

All sidewalk areas removed during the installation of conduit systems shall be reinstated with the respective asphalt or concrete surface material specified on the Contract drawings and in accordance with the Operating Authority reinstatement policy and standards. Temporary reinstatement of any removed sidewalk area is required at the end of the work day with a minimum 50mm depth of asphalt, matching the adjacent permanent sidewalk sections with a maximum 5mm lip.

When existing pavement is encountered, the Contractor shall saw cut trench limits and remove asphalt pavement. The existing pavement shall be cold planed to a depth of 50mm and a 300mm width on both sides of the trench.

The trench shall be backfilled with an unshrinkable fill to bottom of existing asphalt. The unshrinkable fill material shall be placed at a slump of between 150mm and 200mm. The material shall flow into the

excavation so that it fills the entire space. Care shall be taken to ensure that no air is entrapped beneath horizontal projections or in other locations within the excavation.

Where bracing, shoring and/or sheeting is used to support the sides of the excavation or to prevent movements that could damage other services or adjacent pavements, this support system shall be removed as backfilling proceeds. Where road traffic is to be accommodated, the backfilled excavation shall be covered with steel plates or other protection for users of the road allowance until the unshrinkable backfill will support the weight of an adult person.

Subsection 603.07.18 of OPSS 603 is deleted and replaced with the following:

603.07.18 Fish Line

Fish line shall be installed in all ducts specified in the Contract Documents. A 1.5 m length of fish line shall extend out of each end of the duct beside the plastic plug, left coiled, and tied in an accessible location. Fish line shall be nylon or polypropylene material with minimum test strength of 400 N.

In all ducts specified as being spare or intended for future use a fish line along with a Cu RWU low voltage conductor of minimum size #14 AWG, shall be installed for conduit locating purposes.

Subsection 603.07.19 of OPSS 603 is amended to include the following:

603.07.19 Quality Control

The installation shall be made in a manner to the satisfaction of the Contract Administrator. All underground work must be inspected and approved by an Operating Authority representative, prior to proceeding with the installation of the above ground facilities.

The above ground installation shall not proceed until all deficiencies noted in the underground inspection have been corrected. On completion of the installation, the Contractor shall test all cable, signal heads, pedestrian heads and loops to ensure that there are no short circuits or open circuits and that all exposed equipment components are properly grounded.

The Contractor at his expense shall correct all defects disclosed by testing until all of the equipment is accepted as satisfactory by the Contract Administrator. Installation of the controller cabinet shall not proceed until all deficiencies have been corrected.

The Contract Administrator prior to the installation must approve any variations from this specification in writing.

Subsection 603.07.21 of OPSS 603 is deleted and replaced with the following:

603.07.21 Site Restoration

Site restoration shall be according to OPSS 492.

CONCRETE FOUNDATIONS IN EARTH

Amendment to OPSS 616, dated November 2012 – Installation of Footings & Pads for Electrical Equipment

616.05 MATERIALS

Subsection 616.05.01 of OPSS 616 is deleted and replaced with the following:

616.05.01 Concrete

Concrete shall be according to OPSS MUNI 1350 with requirements in conformance with CSA A23.1 of Exposure Class C-1 and a nominal minimum 28-Day compressive strength of 35 MPa. The supplier of “Ready Mix Concrete” shall be an approved “Ready Mixed Concrete Operation.”

Subsection 616.05.06 of OPSS 616 is deleted and replaced with the following:

616.05.06 Anchorage Assemblies and Hardware

Bolts shall be high strength Type 1 conforming to ASTM A325.

Nuts and washers shall be high strength Type 1 conforming to ASTM A325.

All steel components shall be hot dip galvanized conforming to ASTM A153 / A153M or ASTM A123 / A123M.

The complete anchorage assembly shall be as shown in the Standard Specification Drawings UTS 616.020, UTS 616.021, UTS 616.025 and UTS 616.026. A wood template shall be provided on each assembly.

The following manufacturers of anchorage assembly units are approved for use:

- a) National Concrete Accessories; or
- b) AMG. Metal Inc.

Or; approved equivalent.

Subsection 616.05 of OPSS 616 is amended by adding the following:

616.05.12 Controlled Access Distribution Pedestals (Bell Boxes)

The Operating Authority will supply the controlled access distribution pedestal enclosure, when specified. The Operating Authority guarantees to the Contractor that the controlled access distribution pedestal enclosure and all associated equipment are free of any defects.

Upon award of the Contract, the Contractor shall notify the Operating Authority Project Manager to schedule the purchase of the designated traffic signal equipment for supply by the Operating Authority for installation of the Contractor under the Contract.

Controlled access distribution pedestals are used as a splice point for the traffic signal / communication cable shall be installed in the controller cabinet foundation as shown in the Standard Specification Drawings UTS 616.030, and UTS 616.040. The interconnect cable-controlled access distribution pedestal enclosure

shall be of round corner, square design, with a hinged bonding bracket, ground connector, flexible bonding braid, heavy gage dielectric shield and 900 pair spliced connection capacity.

The Contractor shall pick up the following controlled access distribution pedestal enclosure and transport them from the following Operating Authority's facility, providing the Operating Authority 48 hours' notice for the picking up of the unit.

- | | |
|--|---|
| a) Champion Products Incorporated -
Model # CPED 8, Champion Products
(For signals maintained by City of Burlington) | <u>Within City of Burlington</u>
City of Burlington
Traffic Signals Shop
3330 Harvester Road,
Burlington, ON
1-905-333-7671 x 6163 |
| b) Channell Commercial Canada -
Model # MAH1010 6 C3 B3 LH1 A39
(For signals maintained by Town of Oakville) | <u>Within Town of Oakville</u>
Town of Oakville
Traffic Operation Division
1140 South Service Road
Oakville ON L6L 5T7
Contact: Dave Gyselinck,
Signal Lead Hand
905-845-6601 x 4156 |
| ; Or | |
| c) Channell Commercial Canada -
Model # MAH1010 6 C3 B3 LH1 A39 | <u>Within Town of Halton Hills</u>
Southwestern Energy - Stacey Electric |

Subsection 616.07.03.01.01 of OPSS 616 is deleted and replaced with the following:

616.07 CONSTRUCTION

616.07.03 Concrete Footings and Pads

616.07.03.01 General

616.07.03.01.01 Earth Excavation

The Contractor shall only utilize a Hydro-Vac excavation system to install pole footings and controller cabinet foundations. When additional excavation is required beyond the limits, such excavation shall be a maximum of 300mm width beyond the needed dimensions of the foundation, to accommodate granular backfill.

When unsuitable material is encountered in the excavation, it shall be removed and disposed of outside the right-of-way limits. Material required to replace unsuitable material must be approved by the Contract Administrator.

Where rock is encountered, the earth excavation shall be widened to dimensions suitable for rock excavation or rock drilling operations.

Subsection 616.07.03.01.03 of OPSS 616 is amended by deleting the first paragraph and adding the following paragraphs:

616.07.03.01.03 Concrete

Concrete shall be poured as one monolithic slab and formed, placed, vibrated, finished and cured, protected according to OPSS MUNI 904. The alignment of the sleeves and/or duct entry points shall be scribed marked with indentations on the top of the concrete footing or slab. Concrete shall be sampled and tested according to OPSS MUNI 1350.

Subsection 616.07.03.02 of OPSS 616 is amended by adding the following:

616.07.03.02 Concrete Footings

The pole bases shall be constructed as shown on the Contract drawings and Standard Specification Drawings UTS 616.010, UTS 616.011, UTS 616.012 and UTS 616.014. The setting of elevation for and finish grading around the pole bases shall be in accordance with Standard Specification Drawings UTS 616.015.

Subsection 616.07.03.02.02 of OPSS 616 is deleted and replaced with the following:

616.07.03.02.02 Anchorage Assemblies

The anchorage assembly shall be in the size and configuration shown in the Standard Specification Drawings UTS 616.020, UTS 616.021, UTS 616.025 and UTS 616.026 and supplied with studs or bolts, as specified in the contract.

Anchorage assemblies shall be accurately positioned in the signal or lighting pole and sign footings. The alignment of the studs or bolts shall be parallel to the edge of the driving lane. Anchorage assemblies shall be securely tied to steel reinforcement.

Studs shall be factory inserted in the ferrules (or coils for Town of Oakville) and held in place with a pre-applied thread locking compound. A wooden template shall be provided. Nuts and washers shall be installed hand tight by the fabricator. Studs shall have the exposed threads above the ferrule coated with factory applied white lithium grease. The integrity of the compound shall be maintained throughout the installation and no attempt shall be made to remove or adjust the studs under normal circumstances.

The anchor assembly shall be spaced and supported by means of a wooden template. Before the concrete is poured, the Contractor shall "spin" the nuts on the studs or bolts in the anchor assembly down snug to the top of the template and in accordance with the standard specification drawing. The Contractor when installing an anchor assembly with studs shall leave a minimum 120mm or maximum 140mm section of the studs above the top of the finished foundation. Once the pole plate has been installed a maximum 50mm of the stud shall extend above the double nuts (four threads). The anchorage assembly shall be installed and adjusted level in all directions on the wooden template using a carpenter's level. Upon initial setting of concrete the wood template shall be removed and the drainage channels, marking the entry points of conduits and other features shall be completed. Once the top surface of the concrete is finished, the wooden template and the nuts or bolts shall be reset and hand tightened to secure it on the assembly.

Under no conditions shall the studs or bolts be removed and left out of the ferrules while the concrete sets. Where the removal of the studs for repair or replacement purposes is required, the ferrules and the studs shall be cleaned to remove the old thread locking compound. New thread locking compound shall be applied to the insertion length of the studs prior to tightening to full depth.

After the setting of the concrete, the template shall be removed and the projecting threads of the studs or bolts shall be greased and protected until the metal pole is mounted in place. The formwork shall be completely removed on the external surface area at least 200mm below grade.

Subsection 616.07.03.03 of OPSS 616 is deleted and replaced with the following:

616.07.03.03 Concrete Pads

The concrete pad for the controller cabinet foundation shall be constructed as shown in the Contract drawings and Standard Specification Drawings UTS 616.030, UTS 616.031, UTS 616.035, UTS 616.036 (flat pad in the Town of Milton) and UTS 616.040. The setting of elevation for and finish grading around the controller base foundation shall be in accordance with this Standard Specification Drawing. The alignment of the sleeves and/or duct entry points shall be scribed marked on the top of the concrete slab.

After the setting of the concrete, the formwork shall be completely removed on the external surface area at least 200mm below grade.

Subsection 616.08 of OPSS 616 is deleted and replaced with the following:

616.08 Quality Assurance

The Contract Administrator will inspect each pole / pedestal footing and controller pad. A maximum tolerance of 25 mm will be allowed from the top elevation of the footing and controller pad to the adjacent grades or Contract Detail information.

8. ABOVEGROUND ELECTRICAL WORK

Aboveground Electrical Work is as defined in amended OPSS 106 Subsection 106.01.

CABLE INSTALLATION

Amendment to OPSS 604, dated November 2012 – Installation of Cable

Subsection 604.05.01 of OPSS 604 is deleted and replaced with the following:

604.05 MATERIALS

604.05.01 General

All cable installed in locations subject to the weather shall be approved for exposure to direct rays of the sun and shall be marked as such according to the Ontario Electrical Safety Code (i.e.: SR and Sunlight Resistant).

In installations where the low voltage sun resistant cable is lashed to an exclusive aerial support system, the support cable shall be 9mm steel messenger cable. The steel messenger cable shall be utilized as the ground circuit and any ground leads from the underground feed, ground electrodes and equipment shall be bonded to the messenger cable.

A fish line shall be installed along with all cables in all ducts specified in the Contract Documents for pulling of additional cable in the future. A 1.5 m length of fish line shall extend out of each end of the duct, left coiled, and tied in an accessible location. Fish line shall be nylon or polypropylene material with minimum test strength of 400 N.

Subsection 604.05.03.01 of OPSS 604 is deleted and replaced with the following:

604.05.03 Low Voltage Cables

604.05.03.01 General

Low voltage multi-conductor cables shall be according to CSA C22.2 No. 239.

Low voltage single conductor cables installed in enclosed conduit applications shall be type RWU90 cross-linked polyethylene, according to CSA C22.2 No. 38.

Low voltage single conductor cables installed in locations subject to the weather with exposure to direct rays of the sun shall be type RW90 SR or RWU90 SR cross-linked polyethylene, according to CSA C22.2 No. 38.

Low-voltage multi-conductor traffic signal cable shall be according to OPSS 2409 or IMSA Specification No. 19-1C-2001.

604.05.03.01.01 Power Cable

The following low voltage conductor cable configurations have been approved for use:

- a) Coloured conductors for enclosed conduit applications:

1. Solid Coloured - RWU90 cross-link polyethylene insulated, CSA approved, minimum 600V rated copper stranded conductors with solid coloured (“WHITE (Neutral)”, “BLACK”, “RED” and “GREEN” (and “BLUE” if indicated)),
- b) Sun Resistant Coloured conductors for locations subject to the weather with exposure to direct rays of the sun:
 1. Solid Coloured - RW90 cross-link polyethylene insulated, “SR” (Sun Resistant) rated, CSA approved, minimum 600V rated copper stranded conductors with solid coloured (“WHITE (Neutral)”, “BLACK”, and “RED” (and “BLUE” if indicated)),
 2. Solid Coloured - RWU90 cross-link polyethylene insulated, “SR” (Sun Resistant) rated, CSA approved, minimum 1000V rated copper stranded conductors with solid coloured (“WHITE (Neutral)”, “BLACK” and “RED” (and “BLUE” if indicated)),

The following cable manufacturer product is approved for use:

- i. Southwire Canada

Or; approved equivalent

Or;

- c) Sun Resistant Black / Black with Three Continuous Coloured Stripes for in locations subject to the weather with exposure to direct rays of the sun:
 1. RWU90 cross-link polyethylene insulated, “SR” (Sun Resistant) rated, CSA approved, minimum 1000V rated copper stranded conductors,
 - i. The assigned “BLACK” circuit conductor shall have no indication marking.
 - ii. The “WHITE” (Neutral), “RED” and “GREEN” (and “BLUE” if indicated) circuit conductors shall be manufactured with three colour stripes in the respective colour indication marking, continuous along the entire length of the conductor insulation,

Power feed cables shall be supplied and installed in accordance with the following and as shown on the Contract drawings:

- a) From the power disconnect load centre to the hydro supply system shall be 3 (three) continuous sections of 1/C #2 AWG, “SR” rated, copper stranded conductors with approved “WHITE (Neutral)”, “BLACK” and “RED” circuit indication markings, leaving a 2.0m length of each conductor coiled at top of the service entrance fitting;
- b) From the power disconnect load centre to the traffic controller in an enclosed conduit system shall be 3 (three) continuous sections of 1/C #6 AWG rated, copper stranded (“WHITE” (Neutral), “BLACK” and “GREEN”) conductors, leaving a 1.5m length of each conductor coiled and extending up from the controller pad;
- c) From the power disconnect load centre to the luminaire poles within an enclosed traffic signal conduit system shall be continuous sections of copper stranded (“WHITE” (Neutral) and “RED”) conductors. The size of conductor and number of circuits shall be specified in the Contract.
- d) The lighting system grounding system within an enclosed conduit shall have a 1/C #6 AWG, copper stranded “GREEN” insulated conductor. All equipment shall be properly bonded together

to the ground electrodes installed at locations shown along the lighting system and the power disconnect load centre (Minimum of 2 (two) electrodes).

- e) The traffic signal grounding system on an aerial messenger or within an enclosed conduit system shall have a 1/C #6 AWG, copper stranded “GREEN” insulated conductor. All traffic signal equipment shall be properly bonded together to the ground electrodes installed on each quadrant of the intersection (Minimum of 4 (four) electrodes) and the power disconnect load centre. (Minimum of 4 (four) electrodes).
- f) From the power disconnect load centre to the luminaire poles and between luminaire poles within an enclosed roadway illumination conduit system shall have continuous sections of copper stranded conductors in the numbers, colours and size specified in the Contract.
- g) From the power disconnect load centre to the luminaire poles and between luminaires along an aerial roadway illumination system shall have continuous sections of “SR” rated, copper stranded conductors, in the numbers and size specified in the Contract.

The Contractor shall supply the following to the Contract Administrator and /or the Operating Authority for approval, prior to the installation of the power feed cables under the Contract:

- a) The name of the manufacturer(s) of the cable(s), and
- b) A one (1) metre sample of each type of the cable(s) proposed for installation. These samples shall include the marking / tracer coding of the jacket and the individual conductors cable, to confirm the integrity of permanent marking / tracer.

The Operating Authority reserves the right to reject the use of the said cable(s) should the marking / tracer coding fail to meet the above noted criteria. All cable installed without prior approval is subject to having to be removed and replaced by the Contractor, at no cost to the Operating Authority.

604.05.03.01.02 Traffic Signal Cable

All traffic signal cable shall have #14 **solid** copper conductors, meeting or exceeding Ontario Provincial Standard Specification 2409 or the IMSA Specification No. 19-1C-2001. Mixing of MTO and IMSA cable types at an installation will not be permitted. The type of traffic signal cable specified in the Contract shall be utilized throughout the installation. Stranded traffic signal cable is not approved for use.

The Contractor shall supply the following to the Contract Administrator and /or the Operating Authority for approval, prior to the installation of the traffic signal cables under the Contract:

- a) The name of the manufacturer(s) of the cable(s), and
- b) A one (1) metre sample of each type of the cable(s) proposed for installation. These samples shall include the marking / tracer coding of the jacket and the individual conductors cable, to confirm the integrity of permanent marking / tracer.

The Operating Authority reserves the right to reject the use of the said cable(s) should the marking / tracer coding fail to meet the above noted criteria. All cable installed without prior approval is subject to having to be removed and replaced by the Contractor, at no cost to the Operating Authority.

Traffic Signal Cable Colour Coding

The Electrical Contractor shall be responsible to:

- a) Identify the traffic signal cables and extra low voltage detection (pedestrian pushbutton / loop) cables in electrical chambers, pole handholes and controller assembly cabinet by the designated group /loop number, as per the wiring diagram. Electrical tape of any colour other than “Black” shall be used to apply the corresponding number of rings on the jacket of the cable to the group / loop number it belongs to.
- b) Place the colour coded diagram in the controller cabinet outlining the signal cabling.
- c) Clearly mark all cables with the appropriate colour codes, remove any excess tape, secure and wrap tightly with no loose or exposed ends.
- d) All tape shall be:
 1. 3M Scotch 35 Vinyl electrical color-coding tape; or
 2. 3M Scotch Super 33 Vinyl electrical tapeOr; approved equivalent

MTO Cable (not applicable in the Town of Milton)

The Coding of the individual conductors forming a cable shall consist of a combination of colour, conductor number and size of conductor as shown in OPSS 2409 (November 2000). The colours used shall be clearly distinguishable under all conditions of illumination and shall be permanent and not subject to fading, bleaching, or darkening due to aging or the action of light, oil, water, abrasion or other causes met within normal usage. The conductor number and wire size shall be printed in black and shall consist of sharp, clearly defined letters and figures, approximately 16mm tall, applied in such a way as to resist all normal abrasion. The ink or other material used shall be insoluble in all common liquids, especially water, oil and carbon tetrachloride. The spacing between words or numerals forming one group shall be 6mm and the spacing between groups shall be 250mm. These markings shall be printed parallel to the conductor.

MTO traffic signal cable shall be installed as per the Contract drawings wiring diagram and wiring running list and Standard Specification Drawings UTS 604.010, UTS 604.011, UTS 604.015 and UTS 604.016.

IMSA Cable

The Coding of the individual conductors forming a cable shall consist of a combination of colour, tracers and size of conductor as shown in Table 5.1 of IMSA Specification No. 19-1C-2001. The colours used shall be clearly distinguishable under all conditions of illumination and shall be permanent and not subject to fading, bleaching, or darkening due to aging or the action of light, oil, water, abrasion or other causes met within normal usage. The conductor wire size shall be impression printed and shall consist of sharp, clearly defined letters and figures, in such a way as to resist all normal abrasion. These markings shall be printed parallel to the conductor.

IMSA traffic signal cable shall be installed as per the Contract drawings wiring diagram and wiring running list and Standard Specification Drawings UTS 604.020, UTS 604.021 and UTS 604.025.

604.05.03.01.03 Video Detection Power Cable

The video detection power cable shall be supplied and installed as specified on the Contract drawings or as directed by the Operating Authority. The video detection power cable configurations shall be suitability rated for aerial or underground applications or the cable specified by the vehicle detector unit manufacturer.

The following types of video detection power cable are approved for use, as specified in the Contract drawings:

- a) Aerial Application - 3 conductor, #18 AWG, Carolprene Jacketed, type SJ100W flexible power cable,
- b) Aerial and Underground Applications - 3-conductor, 18 AWG, Polyethylene Jacketed conduit-rated power cable.

Or; approved equivalent.

The video detection power cable is to be compatible with the camera system. Video detection power cable from the video detection unit shall be supplied and installed, leaving a 3m coiled in the traffic signal cabinet at the location specified on the Contract drawings. The Operating Authority Traffic Signal Maintenance Contractor shall make connections within the controller cabinet.

Subsection 604.05.04 of OPSS 604 is deleted and replaced with the following:

604.05.04 Extra-low Voltage Cables

Extra-low voltage cables for use of traffic signal interconnect communication systems shall meet or exceed the IMSA Specification No. 19-2.

Extra-low voltage cables for use of traffic signal actuation devices shall meet or exceed the Ontario Provincial Standard Specification 2410.

604.05.04.01 Interconnection Communication Cables

This specification is for the supply and installation of the following interconnection cable configurations:

604.05.04.01.01 Overhead Interconnect Communications Cable

Interconnect communication cable for overhead locations and subject to the weather with exposure to direct rays of the sun shall be sun resistant rated. The following overhead interconnect communication cables are approved for use:

- a) Figure 8 Exchange Cable with 6mm (¼") Messenger Cable, PE-38 Type (REA) Solid / Aircore / Calpeth
 - 1. 6 pair, 22 AWG,
 - i. Anixter Canada Incorporated - Catalogue # E-000622AACF, Superior Essex Cable, Part # 01-057-38
 - 2. 12 pair, 22 AWG,
 - i. Anixter Canada Incorporated - Catalogue # E-001222AACF-F, Superior Essex Cable, Part # C 01-059-38, or
 - 3. 25 pair, 22AWG
 - i. Anixter Canada Incorporated - Catalogue # E-002519AACF, Superior Essex Cable, Part # 01-031-38

Or; approved equivalent.

604.05.04.01.02 Underground Interconnect Communications Cable

The following underground interconnect communication cable is approved for use:

- a) Exchange Cable, PE89 Smooth AL Solid Filled Sealpeth

1. 6 pair, 22 AWG,
 - i. Anixter Canada Incorporated Catalogue # E-000622APE,
 - ii. Superior Essex Cable Part # C 85-057-13
2. 12 pair, 22 AWG,
 - i. Anixter Canada Incorporated Catalogue # E-001222APE,
 - ii. Superior Essex Cable Part # C 85-059-13, or
3. 25 pair, 22 AWG,
 - i. Anixter Canada Incorporated Catalogue # E-002519APE,
 - ii. Superior Essex Cable Part # C 85-031-13

Or; approved equivalent.

Cable type and sequential length markings shall be printed every one (1) meter on the surface of the outer jacket.

The Contractor must provide the Contract Administrator a schedule of the material supplier's delivery dates.

The Contractor shall notify the Contract Administrator and the Operating Authority respective Traffic Signal Maintenance Contractor upon the completion of the installation of the communication cable in the conduit systems. Once the cable is installed and tested, the Contractor shall schedule and permit the Operating Authority respective Traffic Signal Maintenance Contractor crews to terminate the communication cable runs in the traffic controller cabinets to establish a coordinated traffic control system.

604.05.04.02 Loop Lead-in and Pushbutton Cable

This specification is for the supply and installation of lead-in cable for traffic loops or pedestrian pushbuttons in locations. The number of cable runs shall be as specified in the contract documents.

The following types of cable are approved for use at intersections without accessible pedestrian system facilities:

- a) Run Cable - 4/C #18 AWG, Tinned Copper Stranded Multi-Conductor, Shielded Wire
 1. Global Traffic Technologies Canada Incorporated, Canoga Catalogue No. CC30003 - 7 Strand Conductors; or
 2. Reno A&E Catalogue No. LW-418 – 7x26 Strand Conductors.

The following types of cable are approved for use at intersections with audible pedestrian pushbutton detection in locations with accessible pedestrian system facilities:

- a) Run Cable - 2/C #14 AWG, Tinned Copper Stranded Multi-Conductor, Shielded with Drain Wire
 1. General Cable / Carol Brand Catalogue No. C4163A - 41x30 Strand Conductors; or
 2. Belden Catalogue No. 3080A - 7x22 Strand Conductors.
- b) Riser Cable - 4/C #18 AWG, Tinned Copper Stranded Multi-Conductor, Shielded Wire on 4 Wire System, between Pedestrian Pushbutton and Control Board (in Pedestrian Signal Head)
 3. Global Traffic Technologies Canada Incorporated, Canoga Catalogue No. CC30003 - 7 Strand Conductors,

4. Reno A&E Catalogue No. LW-418 - 7x26 Strand Conductors; or
5. Belden - Catalogue 27326A - 7x26 Strand Conductors.

NO SUBSTITUTION FOR THIS CABLE IS PERMITTED.

Detection cable from the detection unit shall be supplied and installed, leaving a 3m coiled in the traffic signal cabinet at the location specified on the Contract drawings. The Operating Authority Traffic Signal Maintenance Contractor shall terminate the detection cable to the detector inputs of the traffic signal controller cabinet.

604.05.04.03 Traffic Signal Pre-Emption Detector Cable

The traffic signal pre-emption extra low voltage cable shall be supplied and installed for use with the Global Traffic Technologies Canada Incorporated emergency vehicle pre-emption detector unit(s).

The following types of traffic signal pre-emption cable are approved for use:

- a) Global Traffic Technologies Canada Incorporated, Opticom™ No.138 Cable, with operating parameters of:
 1. 600 Volt Rating,
 2. 75°C temperature range,
 3. Three-conductor (3/C) #20 AWG (7 x 28) stranded, individually tinned copper: colour coded Yellow, Blue and Orange,
 4. Aluminized polyester shield with 20% overlap,
 5. Drain Wire #20 AWG (7 x 28) stranded, individually tinned copper; and
 6. Controlled electrical characteristics

Or;

- b) Global Traffic Technologies Canada Incorporated, Opticom™ No. 1070 GPS Installation Cable with operating parameters of:
 1. 300 Volt Rating,
 2. Outer Jacket: Black SR-PVC, UV and moisture resistant,
 3. Ten (5 twisted pair) conductors, #20 AWG (7 x 28) stranded, individually tinned copper: colour coded Yellow/Yellow-Black, Blue/Blue-White, Orange/Orange Green, Brown/Brown-White and Purple/Purple-White,
 4. Aluminized polyester shield,
 5. Drain Wire #22 AWG (7 x 28) stranded, individually tinned copper,
 6. Controlled electrical characteristics; and
 7. UL and cUL recognized.

NO SUBSTITUTION FOR THIS CABLE IS PERMITTED.

The Contractor shall install emergency vehicle pre-emption detector cable from the detector unit to the controller cabinet pad, leaving 3m coiled in the traffic signal controller. The Operating Authority Traffic

Signal Maintenance Contractor shall make connections to the detector inputs of the traffic signal controller cabinet and power supply.

604.05.04.04 Radar Detector Cable and Connectors

The radar detection power cable shall be supplied and installed for use with the Wavetronix Radar detector unit(s).

The radar detection power cable and connectors shall have the following operating parameters of:

Cable

1. Communication conductors:
 - i. RS-485 conductors: 2 twisted pairs
 - ii. RS-485 conductor nominal capacitance, conductor to conductor: less than 40 pF/ft. at 1 kHz,
 - iii. RS-485 conductor nominal conductor DC resistance: less than 16.7 ohms/1000 ft. (304.8 m) at 20°C,
2. Power conductors:
 - i. Twisted pair with nominal conductor DC resistance of less than 11 ohms/1000 ft. (304.8m) at 20°C,
 - ii. Cable assembly shielded with aluminum/polyester shield and tinned copper drain wire
 - iii. Jacket: 0.053-in. (1.3-mm) gray PVC,
 - iv. Cable diameter: 0.41 in. (1.04 cm)
3. Wire gauges:
 - i. Power conductors: 20 AWG
 - ii. Communication conductors: 22 AWG
4. RoHS compliant
5. Approvals: UL/cUL Type CMG
6. Ambient operating temperature: up to 221°F (105°C) dry / 167°F (75°C) wet
7. Flammability rating: FT4
8. UV resistant: Yes (per UL 720 Hour Sunlight Resistance Test)

Connector

1. Meets MIL-C-26482 specification
2. Backshell is environmentally sealed
3. Backshell offers excellent immersion capability
4. All conductors that interface with the connector are encased in a single jacket
5. Backshell has a strain relief with enough strength to support the cable slack under extreme weather conditions

NO SUBSTITUTION FOR THE CABLE AND CONNECTORS IS PERMITTED

604.05.04.05 Gridsmart Detector Cable

The Contractor shall supply and install Catalogue 5e cable, with Ethernet connectors to communicate and power the Gridsmart video detector unit system(s). The cable shall meet the manufacturers' specification.

The cable will be fitted as appropriate for environmental conditions (i.e., shielded, underground rated, etc.) and requires final approval from the Operating Authority.

NO SUBSTITUTION FOR THE CABLE AND CONNECTORS IS PERMITTED

The radar detection power cable to be compatible with the camera system.

Subsection 604.07 of OPSS 604 is amended by adding the following:

604.07 CONSTRUCTION

604.07.01 General

The installation of cables shall be carried out in the following manner and according to the specifications:

- a) The Contract Administrator must approve materials used to facilitate the pulling of cables in conduit. Cable shall not be pulled at temperatures below -6 degrees C.
- b) Cable runs shall be continuous between poles. Splicing of underground cable runs shall only be made within a steel / aluminum pole hand hole or a junction box on a wooden pole.
- c) No cable splices are permitted below ground level.
- d) Sufficient length of free cable shall be left in pole hand holes or junction boxes to permit proper connection to be made with cable coming from signal, pedestrian heads and/or roadway luminaires.
- e) Cable from signal and/or pedestrian heads on steel / aluminum poles shall run inside the mast arms and carry on down inside the pole to the pole hand hole.
- f) Cable from signal and/or pedestrian heads mounted on wood poles shall run inside the mast arms and carry along the outside of the pole to a 200mm x 200mm x 100mm (8" x 8" x 4") PVC watertight junction box. The junction box shall be mounted between 3.7m and 5m above the finished grade.
- g) Detector lead in cable from the vehicle loop / video / thermal camera / pre-emption detection devices shall be brought to the controller pad through the designated conduit, leaving a 1.5m coiled above the pad. These cables shall be one continuous piece with no splices and shall run from the detection device termination point to the controller pad. Detection cable shall be properly labelled to identify the detection device that each cable run feeds.
- h) Traffic signal cable shall enter the controller pad through the designated conduit, leaving a 1.5m coiled above the pad. All traffic signal cable shall be one continuous piece with no splices from the closest pole hand hole, as specified in the Contract and terminate in the controller cabinet. The traffic signal cable conductors shall be properly labelled with the cable group and phase indication that each cable run feeds.
- i) Cable type and sequential length markings shall be printed every one (1) metre on the surface of the outer jacket.

If, in the opinion of the Contract Administrator, any material used in the construction of any part of the cable is defective, or otherwise unsuitable, or if, in their opinion, the workmanship does not conform to accepted standards, the supplier shall replace such defective cable at his own expense.

Any errors or omissions in, or misinterpretation of the specifications, or order shall not relieve the supplier of the responsibility of providing cable conforming to modern practices and the best workmanship.

The Contractor must provide the Contract Administrator a schedule of the material suppliers' delivery dates.

The Contract Administrator / Inspector shall confirm the markings of the cable and conductors conform to this specification.

GROUNDING

Amendment to OPSS 609, dated November 2012 – Installation of Grounding Systems

609.05 MATERIALS

Sub-section 609.05.02 of OPSS 609 is deleted in its entirety and replaced with the following:

609.05.02 Ground Plates

Ground plates shall be hot dipped galvanized solid steel, 254mm x 406mm x 6.3mm minimum dimensions, complete with ground rod clamp extension. Steel shall be according to CAN/CSA G40.20/G40.21, Grade 230G and shall be galvanized according to ASTM A123 / A123M - 09.

Sub-section 609.07.10 of OPSS 609 is deleted in its entirety and replaced with the following.

609.07 CONSTRUCTION

609.07.10 Ground Electrodes

609.07.10.01 General

The installation of ground electrodes shall be according to the Ontario Electrical Safety Code.

The work for ground electrodes shall include the work to install ground rods, ground plates, and the associated work described in this specification.

Where bedrock, rock fill, or similar materials unsuitable for driving ground rods are encountered at depths of 450 mm to 2.0 m below finished grade, the ground rod shall be replaced with a ground plate.

In situations where the ground rod is replaced with a ground plate, the number of ground plates shall be of the same number as ground rods, based on the size of ground electrodes described in Subsection 609.05.01 and Subsection 609.05.02.

Where bedrock, rock fill, or similar materials are encountered at less than 450 mm below finished grade, the ground electrode shall be installed at a different location where driving of a ground rod or installation of a ground plate is possible.

Subsection 609.07.14.02 of OPSS 609 is amended by deleting the last paragraph.

609.07 CONSTRUCTION

609.07.14 Quality Control

609.07.14.02 Proof of Performance

UNDERPASS LUMINAIRES

Amendment to OPSS 611 dated November 2012 – Installation of Underpass Lighting

Sub-section 611.05 of OPSS 611 is deleted in its entirety and replaced with the following.

611.05 MATERIALS

611.05.01 Luminaires

Underpass luminaires shall be Light Emitting Diode fixtures, C.S.A. approved and shall be equipped with ground lug.

611.05.01.02 Light Emitting Diode Luminaires

Light Emitting Diode roadway lighting luminaire fixtures shall have the following characteristics:

- a) Kelvin temperature between 4000K and 4500K,
- b) Minimum 525 Milliamp to maximum 1000Milliamp Driver,
- c) Prewired to operate at 120 Volts,
- d) ULC/CSA list approved,
- e) Equipped with ground lug and mounting plate; and
- f) Calculation for the accumulated Light Loss Factor to be in the range of .74 to .76.

The following Light Emitting Diode Medium Cut-off luminaire fixtures are approved for use:

- a) CREE Lighting –SEC-EDG Series fixture,
- b) Cooper McGraw Edison, or
- c) GE Lighting Solutions - EWS3 Series fixture

SECONDARY SUPPLY FACILITIES

Amendment to OPSS 614 dated November 2012 - Installation of Power Supply Equipment

Subsection 614.04.02 of OPSS 614 is added:

614.04 DESIGN AND SUBMISSION REQUIREMENTS

614.04.02 Design Requirements

The secondary power supply facility shall be installed in the following manner:

- a) Traffic Signal Installations:
 - 1. Non-metered Pedestal on:
 - i. A controller pad foundation; or
 - ii. An independent foundation;
 - 2. Metered Pedestal on:
 - iii. A controller pad foundation (only option for the Town of Milton); or
 - iv. An independent foundation;
 - 3. Non-metered Mounted on an independent pole; or
 - 4. Metered Mounted on an independent pole.
- b) Roadway Illumination Installations:
 - 1. Non-metered Pedestal on an independent foundation;
 - 2. Metered Pedestal on an independent foundation (only option for the Town of Milton);
 - 3. Non-metered Mounted on an independent pole; or
 - 4. Metered Mounted on an independent pole.

The method of installation of the secondary power supply shall be confirmed with the Operating Authority.

The following table outlines where secondary power supply facility services require metering as per the local Hydro Authorities:

Metered Power Supply Facility		
Hydro Authority	Traffic Signals	Roadway Lighting
Burlington Hydro	No	No
Halton Hills Hydro	Yes	Yes
Milton Hydro Distribution	Yes	Yes
Oakville Hydro	No	No

Subsection 614.05.02 of OPSS 614 is deleted and replaced with the following:

614.05 MATERIALS

614.05.02 Supply Control Cabinet Assemblies

614.05.02.01 Pole Mounted – Traffic Signal

A load centre assembly mounted on an independent pole for a traffic signal application shall be supplied and installed complete with circuit breakers at the location(s) shown on the Contract drawings. The load centre shall be a Square “D”, Model # CQ018M100RB, 120/240 V, 100 Amp rated, 1Ø, 3 Wire assembly and include:

- a) 1 - Main Circuit Breaker - 2 pole - 240V - 60 Amp common trip circuit breaker - Square “D”, Catalogue # QO-260,

- b) 2 - Lighting Circuit Breaker - 1 pole – 120 V - 30 Amp circuit breaker - Square “D”, Catalogue # QO-130,
- c) 1 - Traffic Signal Circuit Breaker - 1 pole – 120 V - 50 Amp circuit breaker - Square “D”, Catalogue # QO-150,
- d) 1 - Secondary Surge Arrester, 650 Vac phase to ground - Square “D”, Catalogue # QO2175SB.

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, “SR” (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to the load centre, leaving a sufficient length of cable coiled for connection to the hydro feed.

The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.030.

614.05.02.02 Pole Mounted – Lighting

A load centre assembly mounted on an independent pole for a roadway lighting application shall be supplied and installed complete with circuit breakers at the location(s) shown on the Contract drawings. The load centre shall be a Square “D”, Model # CQ018M100RB, 120/240 V, 100 Amp rated, 1Ø, 3 Wire load centre assembly and include:

- a) 1 - Main Circuit Breaker - 2 pole - 120/240 V - 100 Amp common trip circuit breaker - Square “D”, Catalogue # QO-2100,
- b) 4 - Lighting Circuit Breaker - 2 pole - 120/240 V - 30 Amp circuit breaker - Square “D”, Catalogue # QO-230,

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, “SR” (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to the load centre, leaving a sufficient length of cable coiled for connection to the hydro feed.

The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.031.

614.05.02.03 Pedestal Mounted – Traffic Signal

A base mounted power pedestal, complete with load centre assembly for a traffic signal application shall be supplied and installed at the location(s) shown on the Contract drawings.

The following base mounted power pedestal is approved for use:

- a) Sentinel Pole & Traffic Equipment – Model No. TCL60-8.
 - 1. Base mounted power pedestal unit with Number 2 traffic signal locking barrel; and
 - 2. Square “D”, Model # CQ018M60RB load centre (120/240 V, 100 Amp rated, 1Ø, 3 Wire assembly) complete with:
 - i. 1 - Main Circuit Breaker - 2 pole - 120/240 V - 60 Amp common trip circuit breaker - Square “D”, Catalogue # QO-260,
 - ii. 2 - Lighting Circuit Breaker - 1 pole - 120 V - 30 Amp circuit breaker - Square “D”, Catalogue # QO-130,

- iii. 1 - Traffic Signal Circuit Breaker - 1 pole - 120 V - 50 Amp circuit breaker - Square "D", Catalogue # QO-150,
- iv. 1 - Secondary Surge Arrester, 650 Vac phase to ground - Square "D", Catalogue # QO2175SB.

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, "SR" (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to the load centre, leaving a sufficient length of cable coiled for connection to the feed.

The conductors must be one continuous piece from the load centre to the controller pad and / or the luminaire poles, with no splices

The base mounted power pedestal unit shall be per the Standard Specification Drawing UTS 614.042.

The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.044.

614.05.02.04 Pedestal Mounted – Lighting

A base mounted power pedestal complete with load centre assembly for a roadway lighting application shall be supplied and installed at the location(s) shown on the Contract drawings.

The following base mounted power pedestal complete with load centre assembly is approved for use:

- a) Sentinel Pole & Traffic Equipment – Model No. TCL100-8.
 - 1. Base mounted power pedestal unit with the cover having provisions for a hasp locking mechanism.; and
 - 2. Square "D", Model # CQ018M100RB load centre (120/240 V, 100 Amp rated, 1Ø, 3 Wire assembly) complete with:
 - i. 1 - Main Circuit Breaker - 2 pole - 120/240 V - 100 Amp common trip circuit breaker - Square "D", Catalogue # QO-2100,
 - ii. 4 - Lighting Circuit Breakers - 2 pole - 120/240 V - 30 Amp circuit breaker - Square "D", Catalogue # QO-230.

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, "SR" (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to the load centre, leaving a sufficient length of cable coiled for connection to the feed.

The base mounted power pedestal unit shall be per the Standard Specification Drawing UTS 614.042. The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.043.

614.05.02.05 Metered Pedestal Mounted – Traffic Signal

A base mounted power pedestal, complete with meter base and with load centre assembly for a traffic signal application shall be supplied and installed at the location(s) shown on the Contract drawings.

The Contractor shall supply and install a base mounted power pedestal, complete with meter base and load centre assembly for traffic signal installations, at the specified supply.

The following base mounted power pedestal complete with load centre assembly is approved for use:

- a) Sentinel Pole & Traffic Equipment – Model No. MTL100-8.
 - 1. Base mounted power pedestal unit shall have two sections with separate cover for access to:
 - i. The load centre cover area with the cover having provisions for a No. 2 traffic signal locking barrel mechanism, and
 - ii. The socket type meter base area with the cover having provisions for a hasp locking mechanism.
 - 2. Square “D”, Model # CQ018M60RB load centre (120/240 V, 100 Amp rated, 1Ø, 3 Wire assembly) complete with:
 - i. Barrier Channel,
 - ii. 1 - Main Circuit Breaker - 2 pole - 120/240 V - 60 Amp common trip circuit breaker - Square “D”, Catalogue # QO-260,
 - iii. 2 - Lighting Circuit Breaker - 1 pole - 120 V - 30 Amp circuit breaker - Square “D”, Catalogue # QO-130,
 - iv. 1 - Traffic Signal Circuit Breaker - 1 pole - 120 V - 50 Amp circuit breaker - Square “D”, Catalogue # QO-150,
 - v. 1 - Secondary Surge Arrester, 650 Vac phase to ground - Square “D”, Catalogue # QO2175SB.; and:
 - 3. Microelectric meter socket, 100 Amp, 600 V - Catalogue # BE1-TCV.

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, “SR” (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to meter base and from the meter base to the load centre, leaving a sufficient length of cable coiled for connection to the hydro feed.

The base mounted power pedestal unit shall be per the Standard Specification Drawing UTS 614.046.

The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.044.

614.05.02.06 Metered Pedestal Mounted – Lighting

A base mounted power pedestal, complete with meter base and with load centre assembly for a roadway lighting application shall be supplied and installed at the location(s) shown on the Contract drawings.

The following base mounted power pedestal complete with load centre assembly is approved for use:

- a) Sentinel Pole & Traffic Equipment – Model No. MTL100-8.

1. Base mounted power pedestal unit shall have a single section with cover for access to the load centre cover and socket type meter base areas with the cover having provisions for a hasp locking mechanism;
2. Square “D”, Model # CQ018M100RB load centre (120/240 V, 100 Amp rated, 1Ø, 3 Wire assembly) complete with:
 - i. Barrier Channel,
 - ii. 1 - Main Circuit Breaker - 2 pole - 120/240 V - 100 Amp common trip circuit breaker - Square “D”, Catalogue # QO-2100,
 - iii. 4 - Lighting Circuit Breakers - 2 pole - 120/240 V - 30 Amp circuit breaker - Square “D”, Catalogue # QO-230; and
3. Microelectric meter socket, 100 Amp, 600 V - Catalogue # BE1-TCV.

Circuit breakers shall be installed as shown on the wiring schematics and in accordance with the Operating Authority Standard Drawings. The Contractor shall install three (3) #2 AWG, “SR” (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to meter base and from the meter base to the load centre, leaving a sufficient length of cable coiled for connection to the hydro feed.

The base mounted power pedestal unit shall be per the Standard Specification Drawing UTS 614.047.

The load centre shall have a typical equipment layout and wiring schematics as per the Standard Specification Drawing UTS 614.045.

Subsection 614.05 of OPSS 614 is amended with the addition of the following:

614.05.08 Meter Socket

When required, a socket type, 100-amp meter base, complete with top entry hub shall be supplied and installed at the location(s) shown on the Contract drawings.

The following manufacturer of meter socket unit is approved for use:

- a) Microelectric meter socket, 100 Amp, 600 V - Catalogue # BE1-TCV.

Or; approved equivalent.

The Contractor shall install three (3) #2 AWG, “SR” (Sun Resistant) rated, copper stranded conductors with Black, Red and White (Neutral) phase indication markings, from the hydro supply point to meter base and from the meter base to the load centre, leaving a sufficient length of cable coiled for connection to the hydro feed.

The meter base shall be installed as per the Standard Specification Drawings UTS 614.010, UTS 614.021, UTS 614.026 and UTS 614.027.

Subsection 614.07.01 of OPSS 614 is amended with the addition of the following:

614.07 CONSTRUCTION

614.07.01 General

The Contractor shall supply and install equipment for the power supply on the independent service facility as per the Standard Specification Drawings UTS 614.010, UTS 614.011, UTS 614.020, UTS 614.021, UTS 614.022, UTS 614.025, UTS 614.026 and UTS 614.027, leaving sufficient wire coiled at the weather head for the connection to the secondary supply on the service pole.

The Contractor shall:

- a) Coordinate with the Operating Authority in advance to confirm hydro facilities for the proposed source of power supply having been arranged with the respective Hydro Electric Authority. The Operating Authority is responsible for all Hydro Authority costs associated with establishing source of power (i.e. need for transformer and secondary power supply),
- b) Coordinate with the Operating Authority in advance for the establishment of the billing account for the proposed service,
- c) Contact the respective Hydro Electric Authority two (2) weeks before power to the service is required and requests a "Service Layout."
- d) Meet the service representative on the site and explain what is required to complete the service; and
- e) Be responsible for the cost of the Electrical Safety Authority inspection, the cost of arranging for power connection and the cost for connection of the service by the respective Hydro Electric Authority.

The installation of the power supply equipment and the power connections must be completed early in the Contract to ensure there is no delay to the traffic signal and illumination turn on. Therefore, the Contractor must have early communication with the respective Hydro Electric Authority to ensure that the requirements (i.e.: permits and inspection) have been satisfied and the earliest power connection can be made. The Contractor will arrange approval by the Electrical Safety Authority prior to the respective Hydro Electric Authority being able to connect power feed. The Contractor may be required to provide an electrical wiring schematic of the installed supply control cabinet assembly.

ERECTION OF POLES

Amendment to OPSS 615, dated November 2008 –Erection of Poles

Subsection 615.05.03 of OPSS 615 is deleted and replaced with the following:

615.05 MATERIALS

615.05.03 Poles

615.05.03.01 Concrete Poles

Concrete poles shall be according to OPSS 2421.

615.05.03.02 Steel Poles

Steel poles for base mounting shall be according to OPSS 2423.

The following base mounted, octagonal steel poles are approved for use:

- a) 4.6m (15') - Light Duty, 287mm BCD;
- b) 6.1m (20') - Standard Duty, 406mm BCD;
- c) 6.1m (20') - Heavy Duty, 406mm BCD;
- d) 10.7m (35') - Standard Duty, 406mm BCD;
- e) 12.2m (40') - Standard Duty, 406mm BCD.

The following manufacturers and/or suppliers of octagonal steel base mounted poles are approved for use:

- a) Valmont - West Coast Engineering Group Limited,
- b) Dynapole, or
- c) Spina's Steel Workers Company Limited

Or; approved equivalent.

Steel base mounted poles shall be per Standard Specification Drawings UTS 615.010 and installed as per the Contract drawings.

The manufacturer's catalogue number shall be as indicated on the Contract drawings. These poles shall be complete with pole cap, hand hole for underground wiring and hand hole cover. The poles shall be erected in accordance with procedures specified by the manufacturer and/or the Contract Administrator.

Pole extensions shall be per Standard Specification Drawings UTS 615.015 and installed as per the Contract drawings.

615.05.03.03 Aluminum Poles

Aluminum poles for base mounting shall be according to OPSS 2452.

The following manufacturers and/or suppliers of base mounted, aluminum poles are approved for use:

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Pole		Sentinel Poles & Equipment	Aluminous Lighting Products	Ewing Traffic & Lighting
Pole Length	Use			
1.5m (5')	Pedestrian Pushbutton	PDP-550B-AB-190	APDP-550B-AB-190	PDP-550B-AB190
3.05m (10')	Median Island	TP10-423A-AB-150	ATP10-423A-AB-150	TP10-423A-AB150
4.5m (15')	Traffic Signal	TP15-645C-AB-242	ATP15-645C-AB-242	TP15-645C-AB242
5.8m (19') Light Duty	Traffic Signal	TP19-866C-AB-292	ATP19-866C-AB-292	TP19-866C-AB292
5.8m (19') Heavy Duty	Traffic Signal	TP19-1080E-AB-406	ATP19-1080E-AB-406	TP19-1080E-AB406
6.85m (22.5')	Overhead Lane Control Signage	-	ATP22.5-1080E-AB406	TP22.5-1080E-AB406
7.3m (24')	Traffic Signal	TP24-866C-AB-406	ATP24-866C-AB-406	TP24-866C-AB406
7.3m (24')	Overhead Sign Support	TP24-1010E-AB-406	ATP24-1010E-AB-406	TP24-1010E-AB406
9.8m (32')	Twin Arm Lighting or Combination Lighting & Traffic Signal Mount	ET35-1060E-AB-406	AET35-1055E-AB-406	ET35-1055E-AB406
9.8m (32')	Single Arm Lighting Mount	E35-845E-AB-292	AE35-845E-AB-292	E35-845-AB292
9.8m (32')	Single Arm Lighting Mount on Bridge Structure	ET35-1060E-AB-406-B	AET35-1055E-AB-406-B	ET35-1055E-AB406B
11.3m (37')	Twin Arm Lighting or Combination Lighting & Traffic Signal Mount	ET40-1060E-AB-406	AET40-1055E-AB-406	ET40-1055E-AB406
11.3m (37')	Single Arm Lighting Mount	E40-845E-AB-292	AE40-845E-AB-292	E40-845E-AB292
11.3m (37')	Single Arm Lighting Mount on Bridge Structure	ET40-1060E-AB-406-B	AET40-1055E-AB-406-B	ET40-1055E-AB406B

Or; approved equivalent.

Pole Number Identification: (Based on Sentinel Pole & Equipment Limited Catalogue Numbers)

i.e.: TP - 19 - 1080 - E - AB - 406 - B

Mounted on Bridge Structure

Bolt Circle Diameter (BCD)

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

				Anchor Base Plate
				Wall Thickness (Inches)
				A = .125
				B = .156
				C = .188
				E = .250
				Shaft Bottom and Top OD Diameter (Inches)
				Pole Length for "TP" Poles; and Mounting Height of Luminaire for "ET" & "E" Poles
PDP				Pedestrian Detection Pole
TP				Traffic Signal Pole
ET				Combination Signal & Lighting Pole or Twin Arm Lighting Pole; or Lighting Pole, Single Arm Mounted on Bridge Structure ("- B")
E				Lighting Pole, Single Arm

The following base mounted, aluminium poles shall be complete with vibration dampening devices:

- a) 7.3m (24') - Traffic Signal;
 1. During any period when no traffic signal head is mounted on pole; or
 2. When supporting only pedestrian signal heads.
- b) 9.8m (32') - Twin Arm Lighting or Combination Lighting & Traffic Signal Mount,
- c) 9.8m (32') - Single Arm Lighting Mount,
- d) 9.8m (32') - Single Arm Lighting Mount on Bridge Structure,
- e) 11.3m (37') - Twin Arm Lighting or Combination Lighting & Traffic Signal Mount,
- f) 11.3m (37') - Single Arm Lighting Mount,
- g) 11.3m (37') - Single Arm Lighting Mount on Bridge Structure, or
- h) Any length of pole mounted on a bridge deck,

The base mounted, aluminium poles intended for installation on bridge structures shall be manufactured with:

- a) The pole hand hole 1600mm height above the base plate; and
- b) The fixture attachment holes drilled in line with the pole hand hole.

Aluminum base mounted poles shall be per Standard Specification Drawings UTS 615.020, UTS 615.025 and UTS 615.026 and installed as per the Contract drawings.

The manufacturer's catalogue number shall be as indicated on the Contract drawings. These poles shall be complete with pole cap, handhole for underground wiring and handhole cover. The poles shall be erected in accordance with procedures specified by the manufacturer and/or the Contract Administrator.

Subsection 615.05.04 is deleted and replaced with the following:

615.05.04 Frangible Bases

Frangible bases shall be grooved coupler type as detailed in OPSD 2428.01 and suited for the pole base being mounted. The following units, distributed by Sentinel Pole & Equipment Limited are approved for use:

- a) 292mm B.C.D. Footing – Safety Base Limited – Model # SB100-1150,
- b) 406mm B.C.D. Footing – Safety Base Limited – Model # SB125-16

Subsection 615.07.03.01 of OPSS 615 is deleted and replaced with the following:

615.07 CONSTRUCTION

615.07.03 Direct Buried Poles

615.07.03.01 Installation in Earth

Excavation shall be done by Hydro-vac excavation system to obtain a hole large enough to accommodate the pole butt and backfill. All backfill shall be limestone screening, tamped securely in place using a pneumatic tamper and compacted in conformance to OPSS 501.

Subsection 615.07.04.03 of OPSS 615 is amended with the addition of the following:

615.07.04.03 Pole Erection

Where poles are installed in the vicinity of existing overhead high voltage hydro conductors:

- a) Poles having a length greater of 7.3m, shall be installed to maintain a minimum 4.5m parallel offset clearance from the centre line alignment of the conductors between the supporting hydro poles,
- b) Poles having a length of 7.3m, shall be installed to maintain a minimum 0.5m parallel offset clearance from the centre line alignment of the neutral conductor between the supporting hydro poles while maintaining a minimum 3.0m radial clearance from the secondary and/or high voltage conductors; and
- c) Poles having a length of between 3.3m and 7.3m shall be installed to maintain a minimum 3.0m radius offset clearance of the supporting hydro pole.

Where it is impractical to achieve these offsets, the installation of pole shall be coordinated with the respective Hydro Electric Authority.

Base mounted poles shall be installed as per the Contract drawings and Standard Specification Drawings UTS 615.030 and UTS 615.035.

ROADWAY LIGHTING LUMINAIRE AND BRACKET ASSEMBLY

The design calculations and drawings for the roadway, roundabout and walkway lighting systems including intrusive lighting will be detailed and conform to the guidelines of:

- a) TAC (Transportation Association of Canada) publication:
 - i. Guide for the Design of Roadway Lighting; and

- b) IESNA (Illuminating Engineering Society of North America) publications:
 - i. ANSI/IES RP-8-22 - Roadway Lighting;
 - ii. IES DG-19-08 - Design Guide of Roundabout Lighting; and
 - iii. IES DG-5-94 - Recommended Lighting for Walkways and Class 1
Bikeways

Amendment to OPSS 617 dated November 2012 - Installation of Roadway Luminaires

Subsection 617.05.01.01 of OPSS 617 is amended by adding the following:

617.05 MATERIALS

617.05.01 Luminaires

617.05.01.01 Roadway Lighting Type

Roadway lighting luminaires shall be Light Emitting Diode fixtures, C.S.A. approved and shall be equipped with photo control receptacle, ground lug, and LightGrid Node Network B.

617.05.01.01.02 Light Emitting Diode (LED)

Light Emitting Diode roadway lighting luminaire fixtures shall have the following characteristics:

- a) Kelvin temperature between 3000K and 4500K,
- b) Dimming capabilities, if required and specified,
- c) Minimum 525 Milliamp to maximum 1050 Milliamp Driver,
- d) Calculation for the accumulated Light Loss Factor in the range of .78 to .86; and
- e) If specified, have provision for restricted back light applications.

The following Light Emitting Diode luminaire fixtures are approved for use:

- a) I.E.S. Type II-MCO photometric curve, prewired to operate at 120 Volts and equipped with integral NEMA photo control receptacle, ground lug, and LightGrid Node Network B. The luminaires shall be ULC/CSA listed.
 - 1. Cooper Lighting, - Town of Halton Hills
 - i. Verdon Grande-146W T2
 - ii. Verd-G-A02 143W T3
 - iii. Verd-G-A028 103W T3
 - iv. Verd-G-A028 92W T3
 - v. Verd-A028 72W T3
 - 2. GE Lighting - Town of Oakville
 - i. ERL2028C340AGRAYILR – 251W
 - ii. ERL2025E340AGRAYILR – 214W
 - iii. ERL2018C340AGRAYILR – 140W
 - iv. ERL2016C340AGRAYILR – 120W
 - 3. LED Roadway Lighting – Town of Milton
NXT-Lite Series L0 Series:

- i. L0-60M-5-7-2ES-4-S-GY-3-UL-2-S-A (86W)
- ii. L0-60M-5-7-2ES-4-S-GY-4-UL-2-S-A (86W)
- iii. L0-60M-5-7-2ES-5-S-GY-3-UL-2-S-A (100W)
- iv. L0-60M-5-7-2ES-7-S-GY-3-UL-2-S-A (134W)
- v. L0-60M-5-7-2ES-8-S-GY-3-UL-2-S-A (162W)
- vi. L0-60M-5-7-2ES-9-S-GY-3-UL-2-S-A (180W)

NXT-Lite Series LH Series:

- vii. LH-60M-5-7-2ES-W-S-GY-3-UL-2-S-A (213W)

NXT Series:

- viii. NXT-48M-5-7-3LB-6-GY-3-UL-X-2H (92W)
- ix. NXT-72M-5-7-2ES-7-GY-3-UL-X-2H (158W)

4. American Electric Lighting

- i. 40 LED - ATB2 Autobahn Series, or
- ii. 60 LED - ATB2 Autobahn Series

5. Phillips - City of Burlington

- i. RFM-108W32LED3K-T-R2M-UNV-DMG-API-PHXL-RCD7-GY3,
- ii. RFM-135W32LED3K-T-R2M-UNV-DMG-API-PHXL-RCD7-GY3,
- iii. RFM-145W64LED3K-T-R2M-UNV-DMG-API-PHXL-RCD7-GY3,
- iv. RFM-160W48LED3K-T-R2M-UNV-DMG-API-PHXL-RCD7-GY3, or
- v. RFM-180W80LED3K-T-R2M-UNV-DMG-API-PHXL-RCD7-GY3.

- b) I.E.S. Type III-MCO photometric curve, prewired to operate at 120 Volts and equipped with integral NEMA photo control receptacle, ground lug, and LightGrid Node Network B. The luminaires shall be ULC/CSA listed.

1. CREE Lighting

- i. 90 LED - STR-LWY-3M-HT-09-E-UL-SV-700-R-40KSeries,
- ii. 100 LED - STR-LWY-3M-HT-10-E-UL-SV-700-R-40KSeries; or
- iii. 110 LED - STR-LWY-3M-HT-11-E-UL-SV-700-R-40KSeries

2. Cooper Lighting – Town of Halton Hills

- i. Verdon Grande-146W T2
- ii. Verd-G-A02 143W T3
- iii. Verd-G-A028 103W T3
- iv. Verd-G-A028 92W T3
- v. Verd-A028 72W T3

3. GE Lighting - Town of Oakville

- i. ERL2028C340AGRAYILR – 251W
- ii. ERL2025E340AGRAYILR – 214W
- iii. ERL2018C340AGRAYILR – 140W
- iv. ERL2016C340AGRAYILR – 120W

4. LED Roadway Lighting – Town of Milton

NXT-Lite Series L0 Series:

- i. L0-60M-5-7-2ES-4-S-GY-3-UL-2-S-A (86W)
- ii. L0-60M-5-7-2ES-4-S-GY-4-UL-2-S-A (86W)
- iii. L0-60M-5-7-2ES-5-S-GY-3-UL-2-S-A (100W)
- iv. L0-60M-5-7-2ES-7-S-GY-3-UL-2-S-A (134W)
- v. L0-60M-5-7-2ES-8-S-GY-3-UL-2-S-A (162W)
- vi. L0-60M-5-7-2ES-9-S-GY-3-UL-2-S-A (180W)

NXT-Lite Series LH Series:

- vii. LH-60M-5-7-2ES-W-S-GY-3-UL-2-S-A (213W)

NXT Series:

- viii. NXT-48M-5-7-3LB-6-GY-3-UL-X-2H (92W)
- ix. NXT-72M-5-7-2ES-7-GY-3-UL-X-2H (158W)

5. American Electric Lighting

- i. 40 LED - ATB2 Autobahn Series, or
- ii. 60 LED - ATB2 Autobahn Series

Should a Manufacturer, Distributor or Contractor request approval from the Operating Authority of an alternate LED luminaire fixture to those listed above, the Manufacturer, Distributor or Contractor shall be responsible for the all costs incurred by the Operating Authority or their Lighting Design Consultant to run the calculation of LED luminaire fixture IES files, based on an established or original Contract pole spacing set out in the roadway lighting design.

Subsection 617.05.06 of OPSS 617 is deleted and replaced with the following:

617.05.06 Brackets

The Contractor shall supply and install the following type of aluminum tapered elliptical brackets or approved equivalent in quantities as outlined on the Contract drawings. The Contractor shall install the roadway lighting fixtures and brackets at the locations specified on the Contract drawings, or as directed by the Contract Administrator or their representative.

617.05.06.01 Aluminum Tapered Elliptical Brackets

Aluminum tapered elliptical brackets shall meet the requirements of OPSS 2428. The bracket shall be manufactured in accordance with Standard Specification Drawings UTS 617.010, UTS 617.015 or UTS 617.016 with the following amended characteristics:

- a) Arm to be constructed from 100mm (4") diameter aluminum tube material,
- b) Arm wall to be minimum 3.2mm (.125") thickness for brackets mounted on metal lighting poles less than 13.3m height or not mounted on bridge or overpass structure,
- c) Arm wall for brackets mounted on wooden lighting poles is dependent on the bracket length shall be in accordance with the chart "Mounting on Wooden Lighting Poles",
- d) External finish to be rotary polished, and
- e) The mounting plate shall be designed for proper installation on the respective metal or wooden poles.

The following aluminum tapered elliptical brackets are approved for use:

Mounting on Metal / Concrete Lighting Poles				
Tapered Elliptical Bracket		Manufacturer/Supplier		
Length	Rise	Sentinel Pole and Equipment	Aluminous Lighting Products	Ewing Traffic & Lighting
2.4m	1.2m	RE-8MA-4125 *	ALP-RE8-4125 *	EW-RE8-4125 *
3.0m	1.2m	RE-10MA-4156 **	ALP-RE10MA-4156 **	EW-RE10-4156 **
3.6m	1.5m	RE-12M-4156 **	ALP-RE12M-4156 **	EW-RE12M-4156 **
Mounting on Wooden Lighting Poles				
Tapered Elliptical Bracket		Manufacturer/Supplier		
Length	Rise	Sentinel Pole and Equipment	Aluminous Lighting Products	Ewing Traffic & Lighting
2.4m	1.2m	WE-8MA-4125 *	ALP-WE8-4125 *	EW-WE8M-4125 *
3.0m	1.2m	WE-10MA-4156 **	-	EW-WE10M-4156 **
3.6m	1.5m	WE-12MA-4188 ***	-	EW-WE12M-4188 ***

* - Standard 100mm (4") diameter aluminum tube material with 3.2mm (.125" or 1/8") wall thickness - 4125,

** - Standard 100mm (4") diameter aluminum tube material with 4.0mm (.156" or 5/32") wall thickness - 4156,

*** - Standard 100mm (4") diameter aluminum tube material with 4.8mm (.188" or 3/16") wall thickness - 4188

Or; approved equivalent.

617.05.06.02 Heavy Duty Aluminum Tapered Elliptical Brackets

Heavy duty aluminum tapered elliptical brackets proposed for the following installations shall meet the requirements of OPSS 2428 on:

- a) Poles of 11.3m (37') or greater length; or
- b) On bridge or overpass structures

The bracket shall be manufactured in accordance with UTS 617.010, with the following characteristics:

- a) Arm wall to be 4.8mm (.188") thickness,
- b) Arm to be constructed from 100mm diameter aluminum tube material, and
- c) External finish to be rotary polished

The following aluminum tapered elliptical brackets are approved for use:

Mounting on Metal Lighting Poles				
Tapered Elliptical Bracket		Manufacturer/Supplier		
Length	Rise	Sentinel Pole and Equipment	Aluminous Lighting Products	Ewing Traffic & Lighting
1.8m	0.9m	RE-6HA-4188 *	ARE-6HA-4188 *	EW-RE6-4188 *
2.4m	1.2m	RE-8HA-4188 *	ARE-8HA-4188 *	EW-RE8-MTO-4188 *
3.6m	1.5m	RE-12HA-4188 *	-	EW-RE12M-4188 *

* - Standard 100mm (4") diameter aluminum tube material with 4.8mm (.188" or 3/16") wall thickness - 4188

Or; approved equivalent.

Installation of aluminum tapered elliptical brackets shall be in accordance with UTS 617.020. Pole apertures for steel poles shall be field drilled, deburred and touched up with zinc rich paint for this operation.

Subsection 617.05.10 of OPSS 617 is amended by adding the following:

617.05.10 Fuse Holders and Fuses Cartridges

The following 30-amp, 600 volt, single-pole break-away fuse holder, 2 L Type insulated boots fuse holder for roadway lighting are approved for use:

- a) Ferraz Shawmutt - Model # FEB-11-11-BA,
- b) Cooper Bussman Tron - Model # HEB-AW-RLC-A,
- c) Cooper Bussman Tron - Model # HEB-AW-RLC-B, or
- d) Cooper Bussman Tron - Model # HEB-AW-RLC-C

Or; approved equivalent.

The following fast acting 10 Amp fuse cartridges for roadway lighting are approved for use:

- a) Cooper Bussman - Model # KTK 10,
- b) Ferraz Shawmut - Model # ATM 10
- c) Edison - Model # MEN10

Or; approved equivalent.

Subsection 617.05 of OPSS 617 is amended by adding the following:

617.05.11 Adaptive Control Technologies

The Region has converted its outdoor lighting network to LED technology and installed a state of the art Wireless Control System (WCS). The WCS produced by GE is a proprietary communication network formed by LightGrid Nodes installed on each street light which communicate wirelessly to the central management server via Gateways. It is the intent of the Region to continue to utilize the latest GE LightGrid technology for any new street lights installed in Halton Region as described below.

Gateways

The existing GE Lighting's LightGrid WCS 2.0 utilizes Gateways to connect the radio frequency (RF) mesh formed by the WCS External Nodes installed on each street light. The nodes report the status of the lights and allow for remote control dimming and scheduling from the central management server. Gateways have been installed throughout the Region as part of the Regional 'LED Retrofit Program'.

Smart Control Nodes

All new light fixtures installed on Regional roads shall be equipped with GE Lighting's LightGrid Nodes mounted on the fixture's 7-pin NEMA twist lock receptacle. The specific part numbers for the Nodes approved by the Region and corresponding luminaire type can be found in table below:

Manufacturer /Part Number	Part Description	Luminaire Type
ELWN1A8UBABXXAD2	120-277 Volt Network B	LED Cobra Head and Coachlight
ELWG0CXXGMG	4G Gateway	N/A

617.05.12 Marking

The following marking shall be part of the installation of luminaires:

- a) A permanently attached, corrosion resistant nameplate shall be provided on the interior of the luminaire. The label shall include the Manufacturer's name and trademark, catalogue number and wattage; the suitable supply voltage and frequency; input current and nominal operating voltage of the lamp;
- b) A permanent label indicating the socket positions required to provide the various distribution obtainable by use of various lamps shall be provided and attached to the interior of the luminaire so that it is clearly visible during maintenance operations.

- c) A label including wiring diagram shall be attached adjacent the ballast, showing the ballast schematic wiring diagram and shall be visible during maintenance operations.
- d) Marking of field identification of the wattage and light source shall be as per OPSD 2421.010.

Subsection 617.07.04 of OPSS 617 is deleted and replaced with the following:

617.07 CONSTRUCTION

617.07.04 Brackets

Brackets shall be installed at right angles to the centreline of the roadway being served. Bracket clamping assemblies shall be securely tightened. Brackets shall be mounted on wooden poles using 16 mm diameter galvanized steel square head through bolts, nuts, and 50 x 50 mm washer.

617.07.04.01 Roadway Elliptical Bracket Type

Installation of aluminum tapered elliptical brackets on a metal or concrete pole shall be in accordance with UTS 617.020. Pole apertures for steel poles shall be field drilled, deburred and touched up with zinc rich paint for this operation.

617.07.04.02 Single Member Arm Type

Installation of single member arm as a luminaire support bracket on a wood pole shall be installed using through bolts similar to Wooden Pole Attachment indicated on OPSD-2501.02.

TRAFFIC SIGNAL EQUIPMENT

Amendment to OPSS 620 dated November 2012 - Installation of Traffic Signal Equipment and Electrical Traffic Control Devices

Subsection 620.05 of OPSS 620 is amended with the addition of the following:

620.05 MATERIALS

The work and materials covered by the Operating Authority's Maintenance Contractor under this item are as follows:

- a) Supply and install the NEMA cabinet and all components as per the Operating Authority Standards, complete with the cabinet components for emergency vehicle pre-emption, transit priority and accessible pedestrian pushbutton equipment,
- b) Supply the emergency vehicle pre-emption unit(s) (cable to be installed by Contractor),
- c) Supply the transit priority unit(s) (cable to be installed by Contractor),
- d) Supply the accessible pedestrian pushbutton control units and interface (cable to be installed by Contractor).

The Operating Authority and their Traffic Signal Maintenance Contractor shall be responsible to:

- a) Install timings in controller timer,

- b) Verify the hardwire CMU test on temporary and permanent signal installations performed by Contractor,
- c) Test emergency vehicle pre-emption equipment,
- d) Test transit priority equipment,
- e) Test and setup accessible pedestrian pushbutton equipment,
- f) Installation communication cable interface equipment and termination of communication cable; and
- g) Document the activity in the controller cabinet log book.

The Operating Authority's Maintenance Contractor shall be notified three (3) working days prior to date of signal turn-on and shall be present at turn-on to complete the above referenced work.

The Contract Administrator shall supply a full set of Contract documents to the Operating Authority's Maintenance Contractor prior to construction.

SIGNAL HEADS

Subsection 620.05.01 of OPSS 620 is amended with the addition of the following:

620.05.01 Traffic Signal Heads and Flasher Beacons

Traffic signal heads shall be in accordance with Ontario Highway Traffic Act and OTM Book 12 – Traffic Signals and in accordance with the following subsections.

620.05.01.01 Vehicle Traffic Signal Head

The type and location of vehicle and flasher signal head for installation shall be specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The signal heads / flasher(s) shall be supplied complete:

- a) Without lenses or reflectors; and,
- b) With an approved respective "RED", "YELLOW", "GREEN", "GREEN ARROW" and "BIMODAL LEFT ARROW" Light Emitting Diode (LED) lamp units as outlined in Subsection 620.05.05.02 - Light Emitting Diode (LED) Lamp Units, retrofitted in the respective section housings.

Unless otherwise indicated in the Contract documents.

620.05.01.01.01 Vehicle Traffic Signal Head with LED Lamps

The "Highway", "Oversize Highway" and "Special Highway" vehicle traffic signal heads shall be complete assemblies constructed of polycarbonate:

1. Signal sections finished with Yellow (Federal Standard 595a-13538) front sections and Grey (ASA-70) rear sections;
2. Removal polycarbonate cowl / cap type visors, with Yellow (Federal Standard 595a-13538) external surface finish and Matt Black (Federal Standard 595b-37038) internal surface finish; and

3. Reflectorized polycarbonate backboard with:
 - i. Yellow (Federal Standard 595a-13538) front surface and Grey (ASA-70) back surface; and
 - i. The front of the backboard surface shall be finished with a 75mm strip of High Intensity reflective sheeting applied along the perimeter of the front of the backboard in accordance with all manufacturer's recommendations.;
 - ii. Provisions for knock-out to allow installation with plumbizer.

Unless otherwise indicated in the Contract documents.

A polycarbonate traffic signal head with single point plumbizer mounting must have stainless steel reinforcement plates. The reinforcement shall be in accordance with the manufacturer's specifications (e.g., inside and outside of the amber section or outside of the red and amber sections).

The Contractor shall use the appropriate backboard when the traffic signal head is mounted using a plumbizer. A spacer shall be provided to hide the plumbizer, preventing background lighting.

The following manufacturers or suppliers of vehicle traffic signal heads are approved for use:

- a) Eagle Traffic Control,
- a) Econolite Canada Incorporated,
- b) Fortran Traffic Systems Limited,
- c) McCain Incorporated; or
- d) Peek Traffic Corporation

Cable termination shall be made in the "AMBER" housing with approved wing-nut connectors to a suitable length of 7/C #14 AWG riser cable between the head and the pole hand hole.

620.05.01.01.02 Vehicle Traffic Signal Head with Programmable Lenses

The "Programmable Lenses" vehicle traffic signal head shall be complete assemblies:

- a) Constructed of cast aluminum:
 1. Signal sections finished with baked enamel Yellow (Federal Standard 595a-13538) front sections and Grey (ASA-70) rear sections;
 1. Removal aluminum cowl / cap type visors, with baked enamel Yellow external (Federal Standard 595a-13538) surface finish and Matt Black (Federal Standard 595b-37038) internal surface finish; and
 2. Reflectorized aluminum backboard finished with:
 - i. Baked enamel Yellow (Federal Standard 595a-13538) front surface and Grey (ANSI 70) back surface;
 - i. The front of the backboard surface shall be finished with a 75mm strip of High Intensity reflective sheeting applied along the perimeter of the front of the backboard in accordance with all manufacturer's recommendations.;
 - ii. Provisions for knock-out to allow installation with plumbizer
- b) With programmable "RED", "YELLOW", "GREEN" Circular Ball, "YELLOW" Arrow, or "GREEN" Arrow Light Emitting Diode (LED) lamp units in the respective section housings.

The following manufacturers or suppliers of vehicle traffic signal programmable head sections are approved for use:

- a) Intelight ESB (Electronic Steerable Beam), distributed by Tacel Traffic Limited,
- b) McCain Incorporated, distributed by Fortran Traffic Systems Limited.

Cable termination shall be made in the “AMBER” housing with approved wing-nut connectors to a suitable length of 7/C #14 AWG riser cable between the head and the pole hand hole.

The Contractor shall notify the Contract Administrator 48 hours prior to installation of the programmable traffic signal head sections and lamp units. The Contract Administrator shall be on the site to confirm alignment of this programmable head sections and lamp units.

620.05.01.01.03 Bicycle Traffic Signal Head with LED Lamps

The “Standard” bicycle traffic signal heads shall be complete assemblies constructed of:

Polycarbonate:

- 1. Signal sections finished with Matt Black (Federal Standard 595b-37038) front sections and rear sections;
- 2. Removal polycarbonate cowl / cap type visors, with Matt Black (Federal Standard 595b-37038) external and internal surface finish; and
- 3. With no backboard.

Unless otherwise indicated in the Contract documents.

The following manufacturers or suppliers of bicycle traffic signal heads are approved for use:

- a) Fortran Traffic Systems Limited.

Cable termination shall be made in the “AMBER” housing with approved wing-nut connectors to a suitable length of 7/C #14 AWG riser cable between the head and the pole hand hole.

620.05.01.02 “Pedestrian” Type Signal Heads with LED Lamps

The type, positioning and location of “Pedestrian” head assembly for installation shall be specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The “Pedestrian” signal heads shall be supplied complete:

- a) Without lenses or reflectors; and,
- b) With an approved 300mm x 300mm Light Emitting Diode (LED) lamp unit as outlined in Subsection 620.05.05.02 - Light Emitting Diode (LED) Lamp Units, retrofitted in the respective section housing capable of providing:

1. A dual message display of a symbolized "WALK" in lunar white and symbolized "DON'T WALK" in Portland Orange in the single section installations or in the upper section of the two section installations; and
2. A Portland Orange "COUNTDOWN TIMER" indication message in the lower section.

620.05.01.02.01 Single Section - "WALK" / "DON'T WALK" Display

The "Pedestrian" signal heads shall be complete assemblies constructed of a single 300mm x 300mm polycarbonate:

1. Signal Sections finished with Matt Black (Federal Standard 595b-37038) front door sections and Yellow (Federal Standard 595a-13538) rear sections;
2. Removable polycarbonate cutaway / full visor type, with Yellow (Federal Standard 595a-13538) external surface finish and Matt Black (Federal Standard 595b-37038) internal surface finish.

Unless otherwise indicated in the Contract documents.

The following manufacturers or suppliers of pedestrian signal heads are approved for use:

- a) Eagle Traffic Control,
- b) Econolite Canada Incorporated,
- c) Innovative Traffic Solutions Inc. (ITS),
- d) Fortran Traffic Systems Limited,
- e) McCain Incorporated, or
- f) Peek Traffic Corporation

Cable termination shall be made in the "WALK" / "DON'T WALK" housing with approved wing-nut connectors to a suitable length of 4/C, #14 AWG riser cable between the head and the pole hand hole or pole mounted junction box.

620.05.01.02.02 Two Section - "WALK"/ "DON'T WALK" & "COUNTDOWN TIMER" Displays

The "Pedestrian" signal heads shall be complete assemblies constructed of two (2) 300mm x 300mm polycarbonate:

1. Signal Sections finished with Matt Black (Federal Standard 595b-37038) front door sections and Yellow (Federal Standard 595a-13538) rear sections;
2. Removable polycarbonate cutaway / full visor type, with Yellow (Federal Standard 595a-13538) external surface finish and Matt Black (Federal Standard 595b-37038) internal surface finish.

Unless otherwise indicated in the Contract documents.

The following manufacturers or suppliers of pedestrian signal heads are approved for use:

- a) Eagle Traffic Control,
- b) Econolite Canada Incorporated,
- c) Innovative Traffic Solutions Inc. (ITS),

- d) Fortran Traffic Systems Limited,
- e) McCain Incorporated, or
- f) Peek Traffic Corporation

Cable termination shall be made in the “WALK” / “DON’T WALK” housing with approved wing-nut connectors to a suitable length of 4/C, #14 AWG riser cable between the head and the pole hand hole or pole mounted junction box.

620.05.01.03 Signal Head Cover Bags

The signal head cover bags shall be supplied and installed in accordance with the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The signal head cover bags shall be the property of the Contractor and shall remain such upon completion of the project.

The following pre-manufactured signal head cover bags are approved for use:

- a) The Traffic Jacket - Supplied by:
 - 1. Sentinel Pole & Traffic Equipment Limited, or
 - 2. Tacel Limited
- b) SignalSax - Supplied by Trans Canada Traffic Incorporated.

Subsection 620.05.02 of OPSS 620 is deleted and adding the following:

620.05.02 Mast Arms, Brackets, Signal Hangers

Mast arms, brackets and signal hangers shall be according to OPSS 2460 and the Contract Documents.

620.05.02.01 Mast Arms

The length and size of aluminum single member arms with steel pole plate shall be supplied and installed at the locations specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The following manufacturers and/or suppliers of single member arms are approved for use:

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Single Member Arm Length	Manufacturer/Supplier		
	Sentinel Poles & Equipment	Aluminous Lighting Products	Ewing Traffic & Lighting
0.6m	R2-JA	-	R2-JA/R4-JA
1.2m	R4-JA	ATR04SMA	SMA-4004
1.8m	TR6SMA	ATR06SMA	SMA-4006
2.4m	TR8SMA	ATR08SMA	SMA-4008
3.0m	TR10SMA	ATR10SMA	SMA-4010
3.6m	TR12SMA	ATR12SMA	SMA-4012
4.6m	TR15SMA	ATR15SMA	SMA-4015
5.5m	TR18SMA	ATR18SMA	SMA-4018
6.1m	TR20SMA	ATR20SMA	SMA-4020
6.7m	TR22SMA	ATR22SMA	SMA-4022
7.3m	TR24SMA	-	SMA-4024
7.6m	TR25SMA	-	SMA-4025

Or; approved equivalent.

620.05.02.02 Traffic Signal Arm Brackets

The proper size and shape of single member arm mounting bracket along with the single member arm shall be confirmed prior to the supply and installation of single member arm mounting bracket on:

a) Aluminum poles:

1. Having a base plate diameter of:

- i. 8" (i.e.: 845 & 866 Series), the back-support straps shall be octagonal shaped. (i.e.: Catalogue TR**SMA-45 or TR**SMA-67 single member arms); and
- i. 10" (i.e.: 1055 & 1080 Series), the back-support straps shall be curved shaped (i.e.: Catalogue TR**SMA-81 single member arms).

** - Indicates Arm Length

2. The front pole plate shall be of octagonal shaped with:

- i. A minimum 10mm (3/8") hole in the pole plate, for fastening to the pole for arms greater than 5.5m in length; and
- i. A minimum 10mm (3/8") hole in the wall of the pole plate socket, for optional fastening to the arm;

b) Steel poles:

1. Octagonal front pole plate and back support straps

; Or

c) Wooden poles:

1. Octagonal front pole plate.

620.05.02.03 Signal Head Mount Brackets

620.05.02.03.01 Extruded Aluminum

Extruded aluminum arm brackets shall be supplied and installed to mount the following equipment at the location(s) shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

- a) Vehicle Signal Heads, using a two-point application as per the Standard Specification Drawing UTS 620.050,
- b) Pedestrian Signal Heads
 1. Using a two-point application for a two section pedestrian signal head, as per the Standard Specification Drawing UTS 620.050,
 2. Using a single top mount application for a single section pedestrian signal head, as per the Standard Specification Drawing UTS 620.050.

The following manufacturer/supplier of signal head extruded aluminum arm brackets is approved:

- a) Sentinel Pole & Traffic Equipment Limited
 1. Model EDA-300,
 2. Model EDA-450; or
 3. Model EDA-600.

Or; approved equivalent.

620.05.02.03.02 Aluminum Tube

Signal head aluminum double arm brackets with unpainted surface shall be supplied and installed to mount signal heads, using a two-point application, in locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. Signal head double arm brackets shall be as per OPSD 2524.01.

The following manufacturers/suppliers of signal head aluminum double arm brackets is approved:

- a) Electromega:
 1. 300mm - Model # D-12
 2. 400mm - Model # D-16,
 3. 450mm - Model # D-18,
 4. 600mm - Model # D-24
- b) Sentinel Pole & Traffic Equipment Limited
 1. 300mm - Model # DA-300
 2. 457mm - Model # DA-450
 3. 600mm - Model # DA-600

Or; approved equivalent.

620.05.02.03.03 Signal Head Plumbizer Hanger

Signal head plumbizer (adjustable mid-section) hanger shall be supplied and installed to mount a three section signal head on single member arm at locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The signal head plumbizer hanger shall be as per the Standard Specification Drawing UTS 620.010.

The following manufacturer/supplier of signal head plumbizer brackets is approved for use:

- a) Sentinel Pole & Traffic Equipment Limited - Model # AP4020-T

620.05.02.03.04 Double Signal Head Mount Bracket

Double signal head mount brackets shall be supplied and installed for the mounting of signal heads, using a single point mounting, in locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The double signal head mounting brackets shall be as per the Standard Specification Drawing UTS 620.030.

The following manufacturer of signal, double head mount brackets is approved:

- a) Sentinel Pole & Traffic Equipment Limited - Model # STE 4022.

620.05.02.03.05 Dual-End Signal Head Hanger

Dual end signal head hanger shall be supplied and installed the following signal head(s) mounted on a single member arm at locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. Dual-end signal head hangers shall be as per the Standard Specification Drawing UTS 620.020.:

- a) Four section vehicle signal head;
- b) Three section bicycle signal head; or
- c) Two section pedestrian signal head,

The Contractor shall contact the supplier to coordinate the manufacturing of the proper length of the tubing on the dual end bracket to fit the respective signal heads.

The following manufacturers and/or suppliers of dual-end signal head hangers are approved for use:

- a) Olson Aluminium Castings - Sky-Bracket; or
- b) Sentinel Pole & Equipment Limited – Versa-brac signal bracket (VSB)

Or; approved equivalent.

620.05.02.03.06 Aerial Suspension Mounting Assembly

Signal head aerial suspension mounting assembly shall be as per the Ontario Provincial Standard Drawing OPSD 2540.03.

Subsection 620.05.05.02 of OPSS 620 is deleted and replaced with the following:

620.05.05 Light Sources

620.05.05.02 Light Emitting Diode (LED) Lamp Units

The type of light emitting diode (LED) lamp units for installation in vehicle, pedestrian and flasher heads shall be specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The following Light Emitting Diode (LED) lamp units shall meet the following minimum performance requirements:

- a) 200mm and 300mm circular LED vehicle signal modules,
- b) 300mm circular LED “Arrow” vehicle signal modules,
- c) 300mm circular LED Programmable vehicle signal modules,
- d) 300mm circular LED Programmable “Arrow” vehicle signal modules,
- e) 300mm square LED, dual message symbolized "WALK" and "DON'T WALK" pedestrian signal modules,
- f) 300mm square LED “Countdown” pedestrian signal modules,
- g) 200mm and 300mm circular LED bicycle signal indication modules.

The following are the minimum performance requirements for LED modules:

- a) The size, colour and design as identified in the Ontario Highway Traffic Act and OTM Book 12 – Traffic Signals or OTM Book 12A – Bicycle Traffic Signals and in accordance with OPSS 2461 and the latest TAC specifications for bicycle signals.
- b) Approved by the Electrical Safety Authority or by an organization accredited by the Standards Council of Canada, such as the Intertek LED Traffic Signal Modules Certification Program. Units certified under this program shall be provided with third party test data and Intertek’s ETL Verified product labeling for products that comply with the consensus ITE requirements.

The following manufacturers or suppliers of Light Emitting Diode (LED) lamp units are approved for use:

Manufacturer / Distributor						
L.E.D. Retrofit Module	Dialight / Innovative Traffic Solutions Inc.	GELcore / Tacel Limited	Leotek Electronic Corp. / Electromega Limited,	Dialight / Econolite Canada Inc.	EOI / Fortran Traffic Systems Limited	Trastar Duralight / Fortran Traffic Systems Limited
Vehicle Signal Indications – 300mm Ball Retrofit Module						
RED	433-1210-003XL	DR6-RTFB-VLA	TSL-12R-LX-IL6-A1-P2	433-1210-003XL	TRV-R12SG-D2T	-
AMBER	433-3230-905XL	DR6-YTFB-VLA	TSL-12Y-LX-IL6-A1-P2	433-3230-901XL	TRV-Y12SG-D1T	-

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GREEN	433-2220-001XL	DR6-GTFB-VLA	TSL-12G-LX-IL6-A1-P2	433-2220-001XL	TRV-G12SG-D2T	-
GREEN / AMBER Bi-Modal Arrow	430-6370-001	DR6-GTA-AN-17A	TSL-12BM-LD-A1	430-6370-001	TRA-B12DD1W3	JXJ-300VIYGA
GREEN Arrow	432-2324-001X	-	TSL-12GA-IL6-A1	432-2324-001X	TRA-G12DG-IN	JXJ-300VIGA
Vehicle Signal Indications – 200mm Ball Retrofit Module						
RED	433-1110-003XL	DR4-RTFB-VLA	TSL-08R-LX-IL6-A1-P2	433-1110-003XL	TRV-R08SG-D1T	-
AMBER	433-3130-901XL	DR4-YTFB-VLA	TSL-08Y-LX-IL6-A1-P2	433-3130-901XL	TRV-Y08SG-D1T	-
GREEN	433-2120-001XL	DR4-GTFB-VLA	TSL-08G-LX-IL6-A1-P2	433-2120-001XL	TRV-G08SG-D1T	-
Bicycle Signal Indications – 200mm Symbol Retrofit Module						
<i>RED</i>	-	-	-	-	TRB-R08SG-D2T-C	-
<i>AMBER</i>	-	-	-	-	TRB-Y08SG-D2T-C	-
<i>GREEN</i>	-	-	-	-	TRB-G08SG-D2T-C	-
Bicycle Signal Indications – 300mm Symbol Retrofit Module						
<i>RED</i>	-	-	-	-	TRB-R12SG-D2T-C	-
<i>AMBER</i>	-	-	-	-	TRB-Y12SG-D2T-C	-
<i>GREEN</i>	-	-	-	-	TRB-G12SG-D2T-C	-

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Pedestrian Signal Indications - 300mm Square Retrofit Module						
Overlay Full Symbol Lunar White Man / Portland Orange Hand Display	430-6776-001	PS6-CFL1-26A	TP12G-HM	430-6776-001	TRP-C30D32F2 TRP-C30DD2C3	-
Countdown, Portland Orange Numeric Display	430-7773-001X	PS6-PFD1-26A-H3	TP12N-CD	430-7773-001X	TRP-030D32E2 TR-CC0140	-

All LED kits shall have a warranty period on this equipment no less than 5 years from date of completion of the signal installation.

Subsection 620.05.13 of OPSS 620 is amended by adding the following:

620.05.13 Controllers

620.05.13.01 Communication Cabinets

Type “M” Communication Cabinet(s) shall be supplied and installed at the locations specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The Type “M” Communication Cabinet shall be constructed as follows:

- a) Typical dimensions of 49 in. (124cm) High, 30.25 in. (77cm) Wide and 16.875 in. (43cm) Depth,
- b) From type-5052-H32 aluminum with a minimum thickness of 0.125 inches,
- c) Supplied with a natural aluminum finish.
- d) Designed and manufactured with materials that will allow rigid base mounting on concrete base,
- e) A rain channel is incorporated into the design of the main door opening to prevent liquids from entering the enclosure. The door opening is a minimum of 80 percent of the front surface of the cabinet and a stiffener plate is welded across the inside of the main door to prevent flexing.
- f) The top of the cabinet incorporates a 1-inch slope from the front toward the rear preventing rain accumulation.
- g) All seams sealed with Room Temperature Vulcanization (RTV) sealant or equivalent material on the interior of the cabinet.
- h) Cabinets are supplied with no removable shelves
- i) With a 5/8 in. (16mm) Thick, 36 in. (90cm) High and 24 in. (60 cm) Wide sheet of plywood affixed to the vertical “C” channels on the back of the cabinet,
- j) One set (2 rails) of vertical “C” channels are mounted on each interior wall of the “M” cabinet for the purpose of mounting the cabinet components. The channels accommodate spring mounted nuts or studs. All mounting rails extend to within 7 in. (18cm) of the top and bottom of the cabinets. Rear wall rail spacing is 18.50 in. (47 cm) center to center.
- k) The main door and police door-in-door closes against a weatherproof and dust-proof, closed-cell, neoprene gasket seal. The gasket material for the main door is a minimum of 0.250 in. (6.3mm) thick by 1 in. (25mm) wide. The gasket material for the police door is a minimum of 0.250 in. (6.3mm) thick by 0.5 in. (50mm) wide. The gaskets are permanently bonded to the cabinet.

- l) The lower section of the cabinet is equipped with a louvered air entrance. The air inlet is large enough to allow sufficient airflow per the rated fan capacity. A non-corrosive, vermin, and insect-proof, removable air filter is secured to the inlet entrance.
- m) The roof of the cabinet incorporates an exhaust plenum with a vent screen. Perforations in the vent screen will not exceed 0.125 in. (3.1mm) in diameter.
- n) The main door on the cabinet is equipped with a three-point latching mechanism.
- o) The handle on the main door is either available in stainless steel. The main door cabinet shall utilize a 5/8 in. (16mm) shank. The handle includes a hasp for the attachment of an optional padlock. The cabinet door handle rotates counter-clockwise to open. The handle does not exceed beyond the perimeter of the main door at any time. The lock assembly is positioned so that the handle cannot cause any interference with the key when opening the cabinet door.
- p) The main door hinge is a one-piece, continuous piano hinge with a stainless-steel pin running the entire length of the door. The hinge is attached in such a manner that no rivets or bolts are exposed.
- q) The main door of the cabinet shall include a mechanism capable of holding the door open at approximately 90°, 125°, and 150° under windy conditions. Manual placement of the mechanism is not required by the field technician.
- r) The main door is equipped with a Corbin tumbler lock number 1548-1 or exact equivalent. Two keys are supplied.
- s) The police door is provided with a treasury type lock Corbin No. R357SGS or exact equivalent and one key.
- t) As an option, anchor bolts can be provided for base mounted cabinets. The cabinet flange for securing the anchor bolts will not protrude outward from the bottom of the cabinet.

The following manufacturers of Type “M” Communication Cabinet are approved for use:

- a) Econolite Canada Incorporated,
- b) Tacel Limited,
- c) Fortran Traffic Systems Limited; or
- d) Innovative Traffic Solutions

Subsection 620.05.16 of OPSS 620 is amended by adding the following:

620.05.16 Accessible Pedestrian Signal Assembly

The type and location of accessible pedestrian signal assembly equipment and pedestrian information signs for accessible pedestrian signal installations shall be specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The Operating Authority will supply the accessible pedestrian signal assembly equipment immediately prior to the scheduled installation said equipment. The Operating Authority guarantees to the Contractor that the accessible pedestrian signal assembly equipment and all associated equipment are free of any defects.

Upon award of the Contract, the Contractor shall notify the Operating Authority and the Contract Administrator to schedule the purchase of the designated accessible pedestrian signal assembly equipment for supply by the Operating Authority for installation of the Contractor under the Contract.

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The Contractor shall pick up and transport the accessible pedestrian signal assembly equipment from the respective Operating Authority facility indicated in the contract documents, providing the Operating Authority 48 hours' notice for the picking up of the units.

Town of Oakville
Traffic Operation Division
1140 South Service Road
Oakville ON L6L 5T7
Contact: Bill McManus
905-845-6601 x 3289

City of Burlington
Traffic Signals Shop
3330 Harvester Road
Burlington, ON
1-905-333-7671 x 6163

Town of Milton
Engineering Services
150 Mary Street
Milton, ON L9T 6Z5
Contact: Heide Schlegl
Manager, Traffic
905-878-7252 x 2506

Town of Halton Hills
Operations Facilities
1 Halton Hills Drive
Halton Hills, ON L7G 5G2
Contact: Matthew Roj
Traffic Coordinator
905-873-2106 x 2304

Contractor:
Ducon Utilities
986 Cumberland Ave
Burlington ON, L7N 3J6
(905) 634-2235

The Contractor shall ensure that all components are safely connected, secured or packaged prior to transporting the accessible pedestrian signal assembly equipment.

620.05.16.01 Accessible Pedestrian Signal Equipment

The following manufacturers of accessible pedestrian signal assembly equipment are approved for use:

- a) New Installations:
 - 1. Polara EN2 – EZ Communicator Navigator 2 Wire system complete with control unit, distributed by Tacel Limited
 - 2. Polara iN2 – iNavigator 2 Wire system complete with control unit, distributed by Tacel Limited
 - 3. Polara iN3 – iNavigator 3 Wire system complete with control unit, distributed by Tacel Limited
- b) Campbell (AGPS) 4 Wire system, complete with control units, distributed by Fortran Traffic Systems Limited or Innovative Traffic Solutions.
- c) Existing Installations:
 - 1. Polara EN4 – EZ Communicator Navigator 4 Wire system complete with control units, distributed by Tacel Limited
- d) Campbell (AGPS) 4 Wire system, complete with control units, distributed by Fortran Traffic Systems Limited or Innovative Traffic Solutions.

The accessible pedestrian signal assembly equipment shall employ distinct audible indications for each direction of travel as indicated as follows:

Pedestrian Direction of Travel	APS Indication Concurrent with Visual Walk Display
North-South	A “Cuckoo: sound
West-East	The “Montreal Melody” sound

(In accordance with TAC Guidelines for Understanding, Use and Implementation of Accessible Pedestrian Signals – 2008).

Subsection 620.05.17 of OPSS 620 is deleted and replaced with the following:

620.05.17 Sealant Compound

Sealant compound for traffic signal loops shall be of cold type. The following manufacturers of traffic signal loops sealant are approved for use:

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Company	Product Name	Model	Notes	Qualified Use
3M Canada - Traffic Safety Systems Division 1840 Oxford St E PO Box 5757 London ON N5V 3R6 www.3m.com/canada	Detector Loop Sealant 5000	DLS 5000	A	Cold pressure pumped for use at ambient temperatures greater than 20 degrees Celsius
BASF Building Systems 1846 Green Meadow Dr. Burlington ON L7P 2Y8 Canada www.buildingsystems.basf.com	MasterSeal SL 180	GLF-1P	A	Cold pressure pumped for use at ambient temperatures greater than 20 degrees Celsius
HB Fuller Company 266 Humberline Dr. Rexdale ON M9W 5X1 info@RASCP.com www.hbfuller.com	Q-Seal 290S	290S Summer Grade A	A, B	Summer Grade cold pressure pumped single component polyurethane sealant for use at ambient temperatures greater than 20 degrees Celsius
	Q-Seal 290W	290W Winter Grade	A, B	Winter Grade cold pressure pumped single component polyurethane sealant for use at ambient temperatures greater than 0 degrees Celsius

Notes regarding restrictions on use:

- A - Cold pressure pumped for use at temperatures greater than 20 degrees Celsius, except as indicated under heading "Qualified Use".
- B - Sealant shall not be used when loops are to be installed in binder course prior to placement of the top course of pavement over the loops.

Subsection 620.05.20 of OPSS 620 is deleted and replaced with the following:

620.05.20 Radar Detection

Radar detectors shall be according to the manufacturer's specification and the Contract Documents.

Radar vehicle detector units shall have an adjustable detection pattern and angle. Units shall be complete with heavy duty mounting bracket suitable for pole mounting.

The following radar vehicle detection systems are distributed by Fortran Traffic Systems Limited is approved for use:

- a) WAVETRONIX SmartSensor Matrix unit for stop bar detection applications; and

- b) WAVETRONIX SmartSensor Advance unit for long distance loop applications.

The WAVETRONIX radar vehicle detection systems shall include:

- a) WAVETRONIX radar vehicle detector unit,
- b) Preassembled Click 600 interface unit,
- c) Heavy Duty Sensor Mount 6" – 2 Axis Bracket,
- d) 12.2m (40') Smart Sensor Power and Communication Cable with Connector
- e) 2 Channel Contact Closure Rack Card(s);
- f) RS485 to Serial Converter;
- g) Operating Software and Documentation on CD-ROM and USB stick; and
- h) The Manufacturer providing on-site training required by Operating Authority for their staff, Traffic Signal Maintenance Contractor and the Project Electrical Contractor.

Subsection 620.05.21 of OPSS 620 is deleted and replaced with the following:

620.05.21 Video Detectors and Video Surveillance Equipment

Video detectors and video surveillance equipment shall be according to the manufacturer's specification and the Contract Documents.

Video camera vehicle detector units shall have an adjustable detection pattern and angle. Units shall be complete with heavy duty mounting bracket suitable for pole mounting.

The following video camera vehicle detector units are approved for use:

- a) Autoscope Vision unit distributed by Econolite Canada Incorporated;
- b) GridSmart unit distributed by Electromega Limited.

Or, approved equivalent.

The Operating Authority will supply the overhead video camera vehicle detector unit and mounting bracket. The Operating Authority guarantees to the Contractor that the overhead video camera vehicle detector unit and all associated equipment are free of any defects.

Video surveillance units shall have remote pan, tilt and zoom capability. Units shall be complete with all required mounting hardware.

The following surveillance camera unit is approved for use:

- a) Pelco Spectrum Enhanced

Or, approved equivalent.

Video surveillance software shall be fully compatible with the surveillance cameras and shall be able to utilize all camera features remotely.

The following software is approved for use:

- a) Centrac's CCTV

Or, approved equivalent.

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Upon award of the Contract, the Contractor shall notify the Operating Authority and the Contract Administrator to schedule the purchase of the designated traffic signal equipment for supply by the Operating Authority for installation of the Contractor under the Contract.

The Contractor shall pick up the designated traffic signal equipment and transport them from the following Operating Authority's facility.

<p>Town of Oakville Traffic Operation Division Central Operations Depot 1140 South Service Road Oakville ON L6L 5T7</p> <p>Contact: Bill McManus 905-845-6601 x 3289</p>	<p>City of Burlington Traffic Signals Shop 3330 Harvester Road P.O. Box 5013 Burlington, ON</p> <p>1-905-333-7671 x 6163</p>
<p>Town of Milton Engineering Services 150 Mary Street Milton, ON L9T 6Z5</p> <p>Contact: Heide Schlegl Manager, Traffic 905-878-7252 x 2506</p> <p>Ducon Utilities 986 Cumberland Ave Burlington ON, L7N 3J6 (905) 634-2235</p>	<p>Town of Halton Hills Operations Facilities 1 Halton Hills Drive Halton Hills, ON L7G 5G2</p> <p>Contact: Matthew Roj Traffic Coordinator 905-873-2106 x 2304</p>

The Contractor shall ensure that the designated traffic signal equipment is safely secured and/or packaged prior to transporting it from the Operating Authority's facility. The Contractor shall provide three (3) days' notice prior to picking up the traffic signal equipment.

Subsection 620.05.24 of OPSS 620 is deleted and replaced with the following:

620.05.24 Traffic Signal Pre-Emption Equipment

Traffic signal pre-emption equipment shall be according to the manufacturer's specifications, Contract Documents, and the specific requirements of the Operating Authority that is authorized to activate and use the pre-emption function.

The Operating Authority will supply the pre-emption detector units immediately prior to the scheduled installation said equipment. The Operating Authority guarantees to the Contractor that the traffic signal pre-emption detector units and all associated equipment are free of any defects.

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Upon award of the Contract, the Contractor shall notify the Operating Authority and the Contract Administrator to schedule the purchase of the designated traffic signal pre-emption equipment for supply by the Operating Authority for installation of the Contractor under the Contract.

The Contractor shall pick up and transport the traffic signal pre-emption detector units from the respective Operating Authority's facility indicated in the contract documents, providing the Operating Authority 48 hours' notice for the picking up of the units.

Town of Oakville
Traffic Operation Division
1140 South Service Road
Oakville ON L6L 5T7

Contact: Bill McManus
905-845-6601 x 3289
Town of Milton
Engineering Services
150 Mary Street
Milton, ON L9T 6Z5

Contact: Heide Schlegl
Manager, Traffic
905-878-7252 x 2506

City of Burlington
Traffic Signals Shop
3330 Harvester Road,
Burlington, ON

1-905-333-7671 x 6163

Town of Halton Hills
Operations Facilities
1 Halton Hills Drive
Halton Hills, ON L7G 5G2

Contact: Matthew Roj
Traffic Coordinator
905-873-2106 x 2304

The Contractor shall ensure that all components are safely connected, secured or packaged prior to transporting the traffic signal pre-emption detector units.

620.05.24.01 Traffic Signal Pre-Emption Detector

The optical traffic signal pre-emption detector units will have an adjustable detection pattern and angle. Units shall have a minimum response time of 200 milliseconds.

The following optical traffic signal pre-emption detector units and phase selector are approved for use:

a) Global Traffic Technologies Canada Incorporated (GTT) - Infrared System:

1. Opticom™ Model # 721 - Dual Detection, Single Channel Detector; or
2. Opticom™ Model # 722 - Dual Detection, Dual Channel Detector; and
3. Opticom™ Model # 764 - Multimode Phase Selector.

During the installation of the optical traffic signal pre-emption detector unit, the Contractor shall open the drain holes, allowing proper drainage of moisture entering the unit.

b) Global Traffic Technologies Canada Incorporated - GPS System:

1. Opticom™ Model # 3100 - GPS Radio Unit, containing a GPS receiver with antenna and a 2.4 GHz spread spectrum transceiver with antenna; and

2. Opticom™ Model # 764 - Multimode Phase Selector.

Units shall be aimed for the approaching emergency vehicle/ transit priority detection as indicated in accordance with the manufacturers' instructions. As aiming of units is very critical, the Contractor shall field test the zone of detection with their own equipped vehicle or arrange with the Operating Authority for an Operating Authority representative to conduct test with the Contractor, re-aiming as required to the satisfaction of the Operating Authority and/or the Contract Administrator.

620.05.24.02 Traffic Signal Pre-Emption Detector Pole Mount Bracket

An extruded aluminum arm bracket shall be supplied and installed for the single-point application mounting of overhead traffic signal pre-emption detector units, at the location(s) shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The mounting of the bracket and detector units shall be as detailed in Standard Specification Drawings UTS 620.090.

The following aluminum extruded arm bracket unit is approved for use:

a) Sentinel Pole & Traffic Equipment Limited

1. Model EPA-300 (Pre-emption Unit)

620.05.24.03 Traffic Signal Pre-Emption Detector Aerial Suspension Mounted Units

The aerial suspension brackets shall be supplied and installed for the mounting of the overhead traffic signal infrared system pre-emption detector units on the signal span wires of an aerial traffic signal layout, at the locations shown on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The mounting of the aerial suspension bracket and detector units shall be as detailed in OPSD 2540.100.

Subsection 620.05.26 of OPSS 620 is added as follows:

620.05.26 Pedestrian - Wooden Post Stand (Temporary)

The temporary wooden post stand(s) to support pedestrian actuation equipment shall be supplied and installed as specified in the Contract drawings. The details of the wooden stands are set out in Standard Specification Drawings UTS 620.055 and UTS 620.056.

620.05.27 Solar Flasher Beacons

Solar flashing beacons shall be according to the manufacturer's specification and the Contract Documents.

The type and location of solar flashing beacon equipment shall be specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator.

The following manufacturers of solar flashing beacon equipment and school zone flashing beacon systems are approved for use:

- a) Carmanah Technologies Corporation, Model No. R247 E Series, distributed by Tacel Limited; and
- b) JSF Technologies, Model # FL-1408, FL-1412, distributed by Fortran Traffic Systems Limited or Innovative Traffic Solutions.

- c) JSF Technologies, Model # SZ-7408, SZ-7412, distributed by Fortran Traffic Systems Limited or Innovative Traffic Solutions (Oakville).

Or; approved equivalent.

The housing unit for the solar flasher beacon unit shall be traffic signal yellow in colour. The solar flasher beacon housing unit shall include a 300mm “RED” LED lens module.

Subsection 620.07.02.02 of OPSS 620 is deleted and replaced with the following:

620.07 CONSTRUCTION

620.07.02 Traffic Signals

620.07.02.02 Traffic Signal Head Supports

Silicon based sealer shall be applied to the key slot and locknut to waterproof the assembly.

Traffic signal heads shall be supported as specified in the Contract Documents.

Traffic signal head supports shall be fastened onto the tenon of the mast arm or onto the traffic signal pole itself. Traffic signal head supports shall be adjusted and secured.

The traffic signal hangers shall be slip-fitted on the tenon of the mast arm, adjusted to vertical and secured in position. The lower compression nut on the signal hanger shall be turned down against the spread cotter pin. The upper compression nut and conduit locknut shall be securely tightened.

Upon completion of signal head adjustments, the slip-fitter set screws shall be tightened to bite into the mast arm tenon by approximately 1mm.

The installation of the signal hanger shall be in accordance with manufacturer’s recommendation.

Subsection 620.07.02.04 of OPSS 620 is deleted and replaced with the following:

620.07.02.04 Signal Heads

Vehicle signal heads shall be installed facing the direction of approaching traffic in accordance with procedures specified by the manufacturer and/or Contract Administrator. LED modules or incandescent lamps of the size and type specified in the Contract Documents shall be installed.

The vehicle traffic signal head mounting height shall be measured from the bottom of the head backboard to the road surface. This height shall be a minimum of:

- a) 5.0m when mounted on single member arms, as per the OPSD 2501.01; or
- b) 5.8m when mounted on aerial span cables, as per UTS 620.060 and UTS 620.061

Unless specified otherwise in the contract.

Vehicle signal heads shall be covered with approved dark coloured pre-manufactured signal cover bags and remain securely in place until all tests have been completed and the signal heads are put into operation.

Pedestrian signal heads shall be installed in accordance with procedures specified by the manufacturer and/or Contract Administrator. The pedestrian signal head mounting height shall be measured from the bottom of the head section to the adjacent sidewalk/boulevard grade. This height shall be a minimum of 2.75m, unless specified otherwise in the contract.

Pedestrian signal heads shall be turned to face the pole prior to all tests have been completed and the signal heads are put into operation.

Signal heads shall be adjusted for maximum visibility and focusing prior to final tightening or sealing of hardware. Unused top and bottom hubs in signal heads shall be plugged with bird stops and the top hub shall have a gasket.

Subsection 620.07.04.02.05 of OPSS 620 is deleted and replaced with the following:

620.07.04.02.05 Traffic Signal Control Programming and Timing

Traffic signal controller phasing shall be per the phasing diagram specified on the Contract drawings.

All controller and malfunction management unit programming shall be installed and all timing controls, switches, and programming controls shall be set by the Operating Authority Traffic Signal Maintenance Contractor.

The Contractor shall be provided with the controller and malfunction management unit programming data sheets for their information, by the Operating Authority, through the Contract Administrator.

Subsection 620.07.05 of OPSS 620 is amended by adding the following:

620.07.05 Activation Devices

620.07.05.01 Detector Loops

The Contractor shall supply all labour, equipment and material required for the installation of vehicular traffic actuation equipment.

The following configurations for traffic signal loops have been approved for use (dimensions are approximate and may be adjusted for site specific conditions):

- a) 1.8m x 1.8m – Simple (4 Turns),
- b) 1.8m x 3.0m - Simple (4 Turns),
- c) 1.8m x 6.1m - Simple (4 Turns),
- d) 1.8m x 7.6m - Simple (4 Turns),
- e) 1.8m x 7.6m - Duplex (2-4-2 Turns),
- f) 1.8m x 10.0m - Simple (4 Turns),
- g) 1.8m x 10.0m - Duplex (2-4-2 Turns), or
- h) 1.8m x 1.8m - Diamond Simple (4 Turns)

The number of turns and configuration of the loops shall be as specified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The installation shall be as per the Standard Specification Drawing UTS 620.080 and UTS 620.081.

Subsection 620.07.05.01.01 of OPSS 620 is amended by adding the following:

620.07.05.01.01 Loop Layout

A representative from the Operating Authority shall layout the loops on the pavement to the dimensions indicated in the contract. Slot cutting lines shall be marked with non-permanent materials.

The following procedure shall be adhered to:

- a) Loops may not be installed under conditions where temperatures are below 5°C. Each loop shall be completed the same day the saw cutting of the road surface is made. The saw cut slots are NOT to be left open overnight.
- b) All the loops are to be installed in the final layer of asphalt unless otherwise directed by the Operating Authority or the Contract Administrator. The slot is to be 10mm wide and cut to a depth that places the last turn of loop wire 25mm below the roadway surface. Recommended depths for slots shall be in accordance with UTS 620.081.
- c) The corners of all loops shall be cut diagonally as per the Standard Specification Drawing UTS 620.081. The slot must be wet cut, and then blown dry with all debris and dust removed from the slot.
- d) The loop wire must be a continuous wire beginning and ending inside the junction box. The loop wire must be installed in a clockwise direction and with the designated number of turns. Absolutely no splices are allowed. The leading end of each loop must be identified. The two lead wires between the junction box and loop are to be twisted symmetrically at a rate of 2 to 5 turns per 300mm.
- e) The Contractor shall measure and record DC wire resistance and leakage resistance with a "Megger". If the loop resistance measures between 1 and 5 ohms and leakage resistance measures 10 megohms or greater, complete the filling of slot with sealer. The complete loop wire must be replaced if the high DC resistance is 5 ohms or more, or less than 10 megohms of leakage resistance occurs.
- f) The sealant shall completely encapsulate the loop wires to prevent movement of wires and roadway abrasion to insulation. Only pure sealer shall be used to fill the entire slot. When sealant has set, scrape the overflow from the slot to form a neatly sealed cut.
- g) The Contractor shall measure and record the inductance of each loop at the junction box. One lead-in cable shall be installed for each signal phase. Where more than one loop is to be used for a single traffic signal phase, the loops must be wired in the proper series/parallel configuration at the junction box to give a minimum inductance reading of 150 μ h and maximum reading of 400 μ h. Upstream long-distance dilemma zone loops (passage) shall achieve minimum inductance reading of 110 μ h and maximum reading of 400 μ h.
- h) All loop wires and lead-in cables shall be soldier connected and sealed with heat shrinkable tubing or DBY kit containing a sealing compound. The Contract Administrator must first approve other methods of sealing this connection.

Where the layout of a loop crosses a major pavement crack, butt or expansion joint, or irregularity, the treatment for the crossing shall be as specified in the Contract Documents.

Subsection 620.07.05.01.06 of OPSS 620 is deleted and replaced with the following:

620.07.05.01.06 Sealant Compound

Cold type sealing compound shall be installed in slots as specified in the Contract Documents. The sealing compound shall be installed using a pressure pump or cartridge gun according to the manufacturer's instructions.

Sealing compounds shall be installed in slots as protection for loop cables. Sealing compound shall be allowed to set according to the manufacturer's instructions prior to allowing vehicles to cross over the loop. Loop sealant shall be applied directly into the loop slot with no spillage. Spilled loop sealant or other excess loop sealant on the road surface that is not within the loop slot shall be removed from the road surface.

Subsection 620.07.05.03 of OPSS 620 is deleted and replaced with the following:

620.07.05.03 Radar Detectors

The overhead radar vehicle detector unit(s) shall be installed in accordance with Standard Specification Drawing UTS 620.096. Radar detectors shall be supplied and installed by the Contractor at locations and mounting heights at the location(s) specified on the Contract Drawings. Radar detectors shall be orientated and configured for operation according to the manufacturer's specifications and the Contract Documents.

All cabling and equipment required to transmit, receive, and process radar detection signals shall be installed according to the manufacturer's specifications and the Contract Documents. Connection of the Smart Sensor power and communication cable to the shielded extra low voltage cable shall be completed in the pole handhole in metal poles and in a junction box on wooden poles.

The Contractor shall be responsible for the setup equipment as required with the assistance of the Operating Authorities Traffic Signal Maintenance Contractor and the equipment manufacturer's representative.

The Operating Authorities Traffic Signal Maintenance Contractor shall test the radar overhead detector equipment for the desired range. The Contractor shall make any adjustments necessary, as specified by the Operating Authority. The testing and adjustments to the desired range shall be completed on the day the detection equipment is activated.

The supply and installation of the radar detection units and radar detection power cable shall include all costs of labour, equipment, and material at the locations specified on the Contract drawings.

Subsection 620.07.05.04 of OPSS 620 is deleted and replaced with the following:

620.07.05.04 Video Detectors

The Contractor shall be responsible for the installation of the overhead video camera vehicle detector units supplied by the Operating Authority. The Contractor shall supply and install video camera detector cable from the detection unit to the traffic signal controller cabinet, leaving 3m coiled in the traffic signal controller cabinet, as per the Contract drawings.

The overhead video camera vehicle detector unit(s) shall be installed in accordance with Standard Specification Drawing UTS 620.095. Video detectors shall be installed at mounting heights a minimum of 9.0m above grade, orientated and configured for operation according to the manufacturer's specifications and at the locations specified in the Contract Documents.

All cabling and equipment required to transmit, receive, and process video and video camera detection signals shall be installed according to the manufacturer's specifications and the Contract Documents.

As aiming of units is very critical, the Contractor shall provide the Contract Administrator 72 hours' notice to the Operating Authority's Signal Maintenance Contractor once the brackets and wiring have been installed. The Signal Maintenance Contractor and manufacturer of the units shall schedule to be on site to assist in the field test of the zone of detection, direct the re-aiming as required to the satisfaction of the Operating Authority or the Contract Administrator.

The Operating Authority Signal Maintenance Contractor shall be responsible to terminate the detector inputs at the detector unit, traffic signal controller cabinet and power supply.

The installation of the video camera vehicle detector unit detection units and supply and installation of the low voltage detection power cable shall include all costs of labour, equipment, and material at the locations specified on the Contract drawings.

Subsection 620.07.05.07 of OPSS 620 is amended by deleting and replacing the first paragraph with the following:

620.07.05.07 Pedestrian Pushbuttons

The pushbutton/sign assemblies shall be supplied and installed as per the Standard Specification Drawing UTS 620.085 and UTS 620.086.

The accessible pedestrian signal assembly pushbutton/sign shall be supplied by the Operating Authority and installed by the Contractor as per the Standard Specification Drawing UTS 620.083 and UTS 620.084.

The pushbutton/sign assembly shall be mounted on the pole face indicated on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The pushbutton/sign assembly mounting height shall be measured from the centre of the pushbutton to the adjacent sidewalk/boulevard grade. This height shall be a minimum of 1.1m, unless specified otherwise in the contract. The accessible pedestrian signal assembly pushbutton shall be installed parallel to the serviced crosswalk.

Pedestrian detection cable shall be supplied and installed from the pedestrian actuation equipment to the traffic signal controller cabinet, leaving 3m coiled in the traffic signal controller cabinet, as per the Contract drawings. The Operating Authority Signal Maintenance Contractor shall be responsible to terminate the detector inputs at the traffic signal controller cabinet.

The supply and installation of the pedestrian actuation equipment and pedestrian information signs or accessible pedestrian signal assembly equipment and related cable shall include all costs of labour, equipment, and material at the locations specified on the Contract drawings.

Subsection 620.07.06 of OPSS 620 is deleted and replaced with the following:

620.07.06 Traffic Signal Pre-Emption Equipment

The Operating Authority will supply the traffic signal pre-emption detector units immediately prior to the scheduled installation said equipment. The Operating Authority guarantees the traffic signal pre-emption detector units and all associated equipment are free of any defects.

The traffic signal pre-emption detector unit(s) shall be installed at the location(s) on the Contract drawings in accordance with Standard Specification Drawing UTS 620.090 or OPSD 2540.100 and the manufacturer's instructions. Pre-emption equipment shall be set up to operate according to the

manufacturer's specifications and the specific requirements of the authority that is authorized to activate and use the pre-emption function. The drain hole in the pre-emption detector unit shall be opened during the installation.

The traffic signal pre-emption extra low voltage cable shall be supplied and installed for use with the Global Traffic Technologies Canada Incorporated emergency vehicle pre-emption detector unit(s). The type and number of runs of cable shall be installed from the detection unit to the traffic signal controller cabinet, leaving 3m coiled in the traffic signal controller cabinet, as per the Contract drawings.

As aiming of units is very critical, the Contractor shall provide the Operating Authority 48 hours' notice to the Operating Authority's Signal Maintenance Contractor once the brackets and wiring have been installed. The Signal Maintenance Contractor shall schedule to assist in the field test of the zone of detection, direct the re-aiming as required to the satisfaction of the Operating Authority or the Contract Administrator.

The Operating Authority Signal Maintenance Contractor shall be responsible to terminate the detector inputs at the traffic signal controller cabinet and power supply.

The installation of the pre-emption detector unit detection units and supply and installation of the low voltage detection power cable shall include all costs of labour, equipment, and material at the locations specified on the Contract drawings.

Subsection 620.07.08 of OPSS 620 is deleted and replaced with the following:

620.07.08 Controller Assembly Supplied by Operating Authority

Upon award of the Contract, the Contractor shall notify Operating Authority and the Contract Administrator to schedule the purchase of the designated NEMA traffic signal controller assembly being supplied by the Operating Authority for installation under the Contract.

The Operating Authority will supply the NEMA traffic signal controller assembly, and all associated equipment for installation prior to the scheduled inspection of the traffic signal installation by Electrical Safety Authority. The NEMA traffic signal controller assembly may include an uninterrupted backup power supply unit. The Operating Authority guarantees to the Contractor that the traffic signal controller assembly and all associated equipment are free of any defects.

The Contractor shall provide the Contract Administrator one weeks' notice of the intended completion of the installation of the traffic signal control device, to enable the scheduling of the installation of the traffic signal controller assembly by the Operating Authority Traffic Signal Maintenance Contractor.

620.07.08.01 Controller Assembly Supplied and Installed by Operating Authority

The Operating Authority shall supply and install the traffic signal controller assembly and all associated equipment at the location(s) shown on the Contract drawings. The Operating Authority will be responsible for the final signal hook-up and signal turn on.

The following outlines the procedure for installation of the traffic signal controller assembly and activation of the signal installation:

- a) The Operating Authority Traffic Signal Maintenance Contractor shall only install the controller assembly once the final approval has been received from Electrical Safety Authority and the

respective Hydro Electric Authority has made the power connection to the secondary power supply assembly.

- b) The Operating Authority Traffic Signal Maintenance Contractor shall be present when the Electrical Contractor conducts the “Flash-Out” and field wiring testing of the signal installation, using a power supply other than that feeding the signal installation.
- c) The Electrical Contractor shall provide 72 hours’ notice prior to the requested installation date (Installations and activations shall not be performed on Mondays, Fridays and Holidays).

The Operating Authority will be responsible for the signal turn on after final approval by Electrical Safety Authority. The Contractor on the project shall be responsible to arrange for and payment of costs associated to have a Pay Duty Police officer present during the installation and activation of the proposed traffic control system or during the transition period between the activation of the proposed (temporary or permanent) and de-energizing of the existing traffic control system(s).

Subsection 620.07.10.03 of OPSS 620 is deleted and replaced with the following:

620.07.10 Quality Control

620.07.10.03 Pre-Installation Testing and Inspection

Actuation devices and connection components shall be inspected prior to installation to ensure that they meet the requirements of the Contract Documents.

Traffic signal controllers and components shall be inspected prior to installation to ensure that they meet the requirements of the Contract Documents.

Signal heads, mast arms, traffic signal head supports, double arm brackets, and connection components shall be inspected prior to installation to ensure that they meet the requirements of the Contract Documents.

The Contractor is responsible to flash out the traffic signal head indications by use of generator or inverter prior to scheduling the installation of the traffic controller assembly by the Operating Authorities Traffic Signal Maintenance Contractor.

Subsection 620.07.10.04 of OPSS 620 is amended by addition of the following:

620.07.10.04 Proof of Performance Testing and Inspection

620.07.10.04.13 Traffic Signal System Activation

The Contractor shall request the Contract Administrator to contact the respective Operating Authority Traffic Signal Maintenance Contractor to be on site during the scheduled full test of the traffic signal by the Contractor, prior to turning on the signal.

9. TEMPORARY ELECTRICAL WORK

Scope

This specification covers the requirements of the Contractor to modify, install, maintain and operate the traffic signal control device, intersection / roadway lighting and associated electrical work. The Contractor shall assume maintenance and provide temporary signal and lighting modifications at the intersection or road section detailed in the Contract drawings.

All temporary signal installation shall be in accordance with UTS 620.061, OPSD 2242.02 and OPSD 2245.01 and, as applicable. All temporary traffic signal equipment supplied by the Contractor shall remain the Contractor's property at the end of the project. This equipment shall include:

- a) Temporary traffic signal heads,
- b) Temporary signal span wire and related mounting hardware,
- c) Temporary wood poles,
- d) Temporary back guy anchors,
- e) Temporary steel messenger cable and associated mounting devices,
- f) Temporary signal cable,
- g) Temporary video / radar detection cable,
- h) Temporary video / radar detection equipment (Provisional),
- i) Temporary emergency pre-emption cable,
- j) Temporary ground electrodes / wire,
- k) Temporary luminaires and elliptical brackets, and
- l) Temporary street lighting cable.

The Contractor will perform all routine and emergency maintenance work required for proper operation of the temporary traffic signal and roadway lighting systems during the period of construction. Routine maintenance of the temporary traffic signal control devices shall include, but not limited to weekly measurement of the traffic signal cable spans to confirm the minimum signal head mounting heights of the overhead traffic signal facilities. The Contractor shall provide a summary of the weekly measurements to the Contract Administrator for review and record. There will be no additional payment for this work.

The Contractor shall conduct the bi-yearly / yearly controller routine maintenance to confirm the integrity of the traffic signal controller cabinet operation. The Contractor shall be advised that under the Contract they will need to permit the Region's Maintenance Contractor access to the traffic signal controller cabinet to conduct the Region's scheduled controller routine maintenance. The Region's Maintenance Contractor responsibility would be limited to the traffic signal controller cabinet while the intersection is under construction.

The Contractor shall arrange for the connection of electrical power with the local hydro authority and pay for all permits including ESA inspection permits, licences and fees and the price for these inspections shall be included in the appropriate bid item. The Contractor shall provide the Contract Administrator or Operating authority with a "Certificate of Inspection" certified by the ESA prior to the Substantial Performance of the Contract. The Contractor shall provide all necessary instruments, equipment and personnel required to satisfactorily carry out prescribed tests at his own expense.

Under the different stages of the temporary traffic signal operations, certain traffic, pedestrian signal heads, emergency pre-emption detection units and video detection units will require to be relocated to the positions identified on the Contract drawings or as directed by the Operating Authority or the Contract Administrator. The Contractor shall be responsible for all costs associated with the relocation of the traffic signal heads in accordance with the respective stages of construction and the costs for representatives to be attendance for the aiming and testing of the pre-emption and video detection devices.

The Contractor is not to enter the traffic controller cabinet without the Operating Authorities Maintenance Contractor being on site. The Contractor shall notify the Contract Administrator 72 hours in advance of any work needing to be completed in the traffic controller cabinet, so arrangements can be made for the Maintenance Contractor to be on site

Definitions

For the purpose of this specification, the following definitions are applicable:

Emergency Repairs: means any activity required to bring the temporary traffic signal system to full functionality in accordance with the specifications other than Routine Maintenance activities.

Routine Maintenance: means ongoing preventive maintenance activities in accordance with the manufacturers' recommendations and includes the periodic adjustment of the temporary traffic signal system components to correct deviations from the system specifications resulting from normal operation of the system.

System Components: means all hardware and software components, devices, parts and materials included in the temporary traffic signal system supplied and installed by the Contractor.

Equipment: means all electrical or mechanical devices and vehicles used or reasonably required for use in emergency repairs or routine maintenance and operation of the temporary traffic signal system.

Materials

Used Equipment and Materials - Temporary

Used equipment and materials, except cables and lamps, may be used in the maintenance and operation of temporary installations provided that:

- a) All material components or completed assemblies of components have C.S.A. or UL approval,
- b) Complies with the requirements of the contract; and
- c) It is in good condition.

Used equipment and material meeting the requirements of the specifications shall be acceptable for use for the following items:

- a) Poles,
- b) Luminaires and Elliptical Brackets,
- c) Traffic Signal Heads and Associated Hardware; or
- d) Temporary video / radar detection equipment (Provisional).

Should the Contractor elect to employ used equipment, the Contractor shall indemnify and hold the Operating Authority harmless from all and every claim arising from the used of used materials.

Basis of Payment

Payment for the temporary items shall be made at the rate of 80% of the contract price upon acceptance of the installation and at the rate of 20% of the contract price upon acceptance of the removal work, in compensation for all labour, equipment and materials required to complete the work, maintain, operate, including adjustment and/or relocation of signal heads during various stages of construction. The work is subject to the provisions for advance payments for materials and hold back as given in the General Conditions of Contract.

10. MAINTENANCE OF TRAFFIC

The Contractor is responsible for the extra costs involved in keeping the road open to through traffic during construction, for the maintenance of the road, for maintaining access to businesses and residences for vehicles and pedestrians, and for carrying out other activities as specified and as required in connection with this specification.

The Contractor's traffic control and traffic maintenance shall be in accordance with the Ontario Traffic Manual - Book 7 – (Construction and Maintenance) Traffic Control in Roadway Work Zones.

Proper traffic control shall be maintained at all times during construction. The Contractor will be responsible for providing, maintaining and relocating where necessary, sufficient signs, delineators, barricades, lights, flashers, etc., and providing such traffic control persons and/or police officer as required so that motorists and pedestrians are properly directed to ensure safety.

Flagging procedures shall conform to the recommendations of Ontario Traffic Manual Book 7 – (Construction and Maintenance) Traffic Control in Roadway Work Zones and the Construction Safety Association of Ontario.

The Operating Authority will supply and the Contractor shall erect the construction identification signs. The Contractor shall supply and place all other construction warning signs and is responsible for their removal of all construction signs and posts upon the completion of the Contract.

The road shall be kept open to through traffic at all times unless otherwise indicated in the Contract. One lane of traffic will be permitted during working hours, with the approval of the Contract Administrator and when controlled by traffic control persons (TCP's).

The Contractor and the traffic control persons (TCP's) must be aware of the queuing of traffic flows when flagging. If a railway crossing is in close proximity of the control site, the traffic flows in conflict with the rail crossing should be given priority and at no time shall they queue back to and/or across the rail crossing.

Access shall be maintained at all times, regardless of the weather or the condition of the road, to all businesses and residences having access to the road. Safe and adequate passage for pedestrians shall be maintained at all times. If the Contractor fails to maintain access, the Operating Authority or its representative may take whatever action it deems necessary and charge the costs back to the Contractor.

If, in the opinion of the Contract Administrator, proper traffic control is not maintained, the Contractor shall immediately modify his operation to the satisfaction of the Contract Administrator. If the Contractor fails to take immediate action, the Contract Administrator may take such action, as he considers necessary and required and deduct the cost from monies owing the Contractor.

The performance of such work under the direction of the Contract Administrator shall in no way relieve the Contractor from any responsibility or damages which may occur during its performance or after such precautions have been carried out by the Contract Administrator.

The Contractor will remove road warning or regulatory signs as required to carry out the construction when advised by the Contract Administrator, and will re-erect these signs upon the completion of the Contract. Stop signs must not be removed, unless otherwise specified in the Contract or obstructed by the Contractors forces during construction; and may only be relocated by the Operating Authority, as required to permit the

Contractor to continue the progress of the project. Any relocation of stop signs must conform to local bylaws and requirements at all times.

The work of this specification shall include the control of dust to provide safe passage for traffic. Dust control shall be affected by the use of water or calcium chloride, or both.

11. TRAFFIC CONTROL, WARNING AND STREET NAME SIGNS

Scope

This specification covers the requirements for the supply and installation of “Traffic Control”, “Signal Ahead”, “NEW” traffic warning signs, “Arterial”, “Advance” and /or “Ornamental” Street Name signs, their respective support units and the removal and salvage of the existing “STOP” signs and “STOP Ahead” and “Intersection Ahead” warning signs and their respective support units.

Materials

The manufacturers of traffic control, warning and street name signs and sign support brackets must be approved by the Operating Authority, prior to the ordering of material for the project.

Advance Street Name Signs

“Advance Street Name” signs specified in the Contract documents and detailed in Standard Specification Drawing UTS 999.010 shall be installed in advance of the intersection at locations indicated on the Contract drawings.

The Contractor shall contact the Operating Authority for the sign layout table prior to the manufacturing of the signs.

Arterial Street Name Signs

“Arterial Street Name” signs specified in the Contract documents and detailed in Standard Specification Drawing UTS 999.020 shall be installed at locations indicated on the Contract drawings.

The signs shall be mounted on the primary traffic signal mast arm or aerial span cable with a sign support bracket detailed in Standard Specification Drawing UTS 999.031 and UTS 999.035, at locations indicated on the Contract drawings.

The Contractor shall contact the Operating Authority for the sign layout table prior to the manufacturing of the signs.

Ornamental Street Name Signs

Ornamental street name signs specified in the Contract documents and detailed in Standard Specification Drawing UTS 999.040 shall be installed on the primary traffic signal pole facing approaching traffic.

The signs shall be mounted on an ornamental street name sign support bracket, detailed in Standard Specification Drawing UTS 999.045, at locations indicated on the Contract drawings.

The Contractor shall contact the Operating Authority for the sign layout table prior to the manufacturing of the signs.

“Traffic Control” and “Warning” Signs

“Traffic Control” and “Warning” signs shall be installed at locations indicated on the Contract drawings. These signs shall conform to Ontario Traffic Manual Book 5 (Regulatory Signs) & Ontario Traffic Manual Book 6 (Warning Signs) or to the design specified in the Contract Documents and Drawings.

At signalized intersections with dual left lanes controlled by separate signal phase, Oversized “Left Turn Signal” (Rb-81) (60mm x 75mm) supplementary traffic signal control signs shall be mounted directly beside all left-turn signal heads allocated exclusively to the left turns, facing the left-turn lane at locations indicated on the Contract drawings. The signs shall be mounted on a sign support bracket detailed in

Standard Specification Drawing UTS 999.030 for permanent signal installations and UTS 999.031 for temporary signal installations.

Turn Control and Lane Designation Control signs shall be mounted overhead on the horizontal single member arms, at locations of each intersection approach as indicated on the Contract drawings. The signs shall be mounted on a sign support bracket detailed in Standard Specification Drawing UTS 999.030. The overhead horizontal single member arms shall be installed as detailed in Standard Specification Drawing UTS 999.050 and UTS 999.055.

These signs shall be turned away or securely covered from the view of traffic until immediately prior to the opening of designated left turn lanes to traffic and/or the traffic signal left turn indications have being placed into operation.

HOV Lane Designation signage shall be mounted overhead on the horizontal single member arms, directly over the designated lane as indicated on the Contract drawings. The signs shall be mounted on a sign support bracket detailed in Standard Specification Drawing UTS 999.035. The overhead horizontal single member arms shall be installed as detailed in Standard Specification Drawing UTS 999.060 and UTS 999.062.

The “Signal Ahead” (Wb-102) signs shall be mounted, on a support unit or stationary pole, at locations of each intersection approach as indicated on the Contract drawings. The “NEW” (Wb-3) sign and an extension support device, if required, will be temporarily mounted above the “Signal Ahead” (Wb-102) sign. These signs shall be turned away or securely covered from the view of traffic until immediately prior (30 minutes) to the traffic signal being turned on.

The signs, posts and extension support device shall become the property of the Operating Authority. The Operating Authority shall remove the “NEW” (Wb-3) sign after the introductory period.

The Contractor shall remove the existing “STOP” and “STOP AHEAD” and “Intersection Ahead” signs and support post or from stationary poles, immediately following the traffic signals being turned on. These signs and posts are to be delivered to the Operations Center of the Operating Authority specified on the Contract drawings.

Horizontal Single Member Arm

The Contractor shall supply and install the following types of aluminum horizontal single member arms with steel pole plate. The length and size of single member mast arms and location of installation are as specified on the Contract drawings or as directed by the Contract Administrator or their representative.

The following manufacturers of single member arms are approved for use:

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Horizontal Single Member Arm Length -Overhead Signing	Manufacturer	
	Sentinel Pole & Traffic Equipment	Aluminous Lighting Products
Tapered 150mm to 75mm – Wall 5mm		
5.5m	-	PH18SMA
6.1m	-	PH20SMA
6.7m	-	PH22SMA
Tapered 203mm to 102mm – Wall 4.7mm		
5.5m	TH18SMA	-
6.1m	TH20SMA	-
6.7m	TH22SMA	-

The Contractor shall confirm and supply the proper size and shape of single member arm mounting bracket along with the single member arm for:

a) Aluminum Pole:

1. Having a base plate diameter of 10” (i.e.: 1010, 1055 & 1080 Series), the back-support straps shall be curved shaped (i.e.: Catalogue TR**SMA-81 single member arms).
** - Indicates Arm Length
2. The front pole plate shall be of octagonal shaped with:
 - i. A minimum 3/8” (10mm) hole in the pole plate, for fastening to the pole; and
 - i. A minimum 3/8” (10mm) hole in the wall of the pole plate socket, for fastening to the arm.

Or; approved equivalent.

12. DURABLE PAVEMENT MARKINGS

This specification covers the requirements for the installation of following durable pavement markings.

- a) Stop line marking (white) - 60 cm in width,
- b) Centre line marking (yellow) - 10 cm in width,
- c) Lane line marking (white) - 10 cm in width,
- d) Crosswalk line marking (white) - 10 cm in width (3.5m crosswalk width); and
- e) Turn Arrow marking (white)
- f) Zebra stripes in crosswalk – 20cm in width (3.5m crosswalk width)

Provisions of OPSS 710, OPSS 1713 and OPSS 1750 shall apply.

The Contractor shall install durable pavement markings as shown in the Contract drawings and in accordance with OPSS 710.

The Contractor shall use for durable pavement markings the following approved products:

- a) Two-Component Cold Plastic – Methyl Methacrylate Marking Product Colours:
 - 1. White
 - 2. Yellow

Or; approved equivalent.

Amendment to OPSS 710, dated November 2010 – Construction Specifications for Pavement Marking

Subsection 710.02 of OPSS 710 is amended by deleting the references under the heading of Ontario Ministry of Transportation Publications, replacing them with the following:

710.02 REFERENCES

Ontario Ministry of Transportation Publications

Ontario Traffic Manual - Book 7 - Temporary Conditions (and Temporary Conditions Field Edition)

Ontario Traffic Manual - Book 11 – Pavement, Hazard and Delineation Markings

Subsection 710.03 of OPSS 710 is amended by revising the following definitions:

710.03 DEFINITIONS

MUTCD - Refer to Ontario Traffic Manual - Book 11 - Pavement, Hazard and Delineation Markings

Amendment to OPSS 1713, dated February 1991 - Thermoplastic Pavement Marking Materials

Subsection 1713.02 of OPSS 1713 is deleted and replaced with the following:

1713.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Material:

OPSS 1750 - Traffic Paint Reflectorizing Glass Beads

American Society for Testing and Materials International (ASTM):

ASTM D256 - 10 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

ASTM D570 - 98 (2010) e1 -Standard Test Method for Water Absorption of Plastics

ASTM D713 - 90 (2010) - Standard Practice for Conducting Road Service Tests on Fluid Traffic Marking Materials

ASTM D1415 - 06 - Standard Test Method for Rubber Property - International Hardness

ASTM D2240 – 05 (2010) Standard Test Method for Rubber Property—Durometer Hardness

ASTM D2244 - 11 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

ASTM E28-99 (2009) - Standard Test Methods for Softening Point of Resins Derived from Naval Stores by Ring-and-Ball Apparatus

ASTM E303-93 (2008) - Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

British Standards Institution:

BS 3262-3:1989 - Hot-Applied Thermoplastic Road Marking Materials. Specification for Application of Material to Road Surfaces

United States Federal Standard:

FED-STD-595C, January 16, 2008 - Colours Used in Government Procurement

International Commission on Illumination:

CIE S 014-4/E:2007 / ISO 11664-4:2008 - Colorimetry - Part 4: CIE 1976 L*a*b* Colour Spaces

Amendment to OPSS 1750, dated December 1983 - Traffic Paint Reflectorizing Glass Beads

1750.02 REFERENCES

Subsection 1750.02 of OPSS 1750 is deleted and replaced with the following:

This specification refers to the following standards, specifications or publications:

American Society for Testing and Materials International (ASTM):

ASTM D1155 - 10 - Standard Test Method for Roundness of Glass Spheres

ASTM D1214 - 10 - Standard Test Method for Sieve Analysis of Glass Spheres

ASTM E11 - 09e1 - Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

General Method

- a) Traffic control shall be maintained in accordance with the requirements of the Ontario Traffic Manual - Book 7,
- b) All work shall be carried out in compliance with the Ontario Health and Safety Act, Highway Traffic Act and Environmental Act or Regulation.
- c) Actual painting operations shall be restricted to the hours as directed by the Operating Authority.
- d) Qualified operators must have all the necessary licensing requirements to carry out the work with the associated equipment shall be provided.
- e) The minimum width of line applied shall not be less than 100 mm.
- f) Pavement markings shall be applied when the temperature is above 10 degrees C and the pavement is perfectly dry, as determined by the Contract Administrator.
- g) Any workmanship that does not conform to the requirements of OPSS 710 shall be corrected at the Contractor's expense.

It shall be the Contractor's responsibility to correct any severe tracking situation, which was created as a direct result of poor traffic control operations by the Contractor.

The Contractor shall ensure that all newly applied lines are not tracked or smeared by the traveling public, by protecting the lines with the use of appropriate traffic control measures.

The Contractor shall supply and operate the following minimum equipment during the work:

- a) Two (2) safety-warning trucks, equipped with a full complement of lights for safety.
- b) Rotating "AMBER" lights mounted on the vehicles and clearly visible from the front and the rear of each vehicle.
- c) Four-way flashers on each vehicle.
- d) Rear mounted bi-directional arrow board sign (TC 12), as outlined in the Ontario Traffic Manual - Book 7 for each vehicle.
- e) All vehicles, equipped with mobile radio for direct truck-to-truck communication.
- f) Any other equipment and/or traffic control signing defined in the Ontario Traffic Manual - Book 7 - Temporary Conditions (and Temporary Conditions Field Edition).

Marking

The Contractor shall provide pre-marking to establish the position of all pavement markings as noted in OPSS 710.

The Contractor shall ensure that all working involving the marking of pavement is carried out in accordance with OPSS 710, or as amended herein.

The pavement markings to be applied are as shown on the Contract drawings.

The road surface must be clean, dry and relatively smooth. The markings shall not be applied over any existing pavement markings. Any existing pavement markings shall be removed prior to application of new markings.

Longitudinal markings shall not be applied on the longitudinal asphalt joint. A fifteen (15) cm offset is recommended. It will therefore be necessary to vary the hot mix spreader widths to accommodate the pavement marking layouts.

All applications must conform to the manufacturer's specifications and guidelines.

The Contractor shall provide an unconditional warranty on the work done by the Contractor for a period of three (3) years from the date of acceptance by the Operating Authority. The Contractor shall be responsible for all labour, equipment and materials necessary to correct any defective "Durable Pavement Marking".

Removals

The Contractor shall remove all existing pavement markings indicated on the Contract drawings or as directed by the Contract Administrator. Any removed or corrected markings are to be totally removed by grinding the marking paint and reflective bead materials from the road surface. Stripolene is not permitted for use. The use of "Black Out" paint is not approved without the explicit permission of the Contract Administrator.

13. FIBRE OPTIC COMMUNICATION CABLES

13.1. SCOPE

This specification covers the requirements for the material requirements, installation, and testing of the fibre optic communication cables to be placed in ducts, aerially, or within equipment housing cabinets. The requirements apply to various types of fibre optic cables as defined within this specification.

The fibre optic splicing efforts shall be supplied under separate tender items, or by separate forces.

13.2 REFERENCES

This specification refers to the following standards, specifications or publications:

Electronic Industries Alliance / Telecommunications Industry Association:

EIA/TIA-455-B - Standard Test Procedure for Fibre Optic Fibres, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fibre Optic Components

TIA/EIA-598-B - Optical Fibre Cable Color Coding

13.3 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Spur Cable: means fibre optic cable interconnecting the trunk cable with communication equipment through which the trunk cable does not pass. The cable composition is specified in the Contract drawings.

Drop Cable: means fibre optic cable interconnecting the trunk cable or the spur cable with the Interconnect Centre in cabinets. The cable composition is specified in the Contract drawings.

PIT: means Pre-Installation Testing and includes all testing undertaken prior to installation of fibre optic plant and may also include testing of mock-ups, prototype testing and normal factory production testing.

POP: means Proof of Performance Testing and includes all testing undertaken following the installation of fibre optic plant to verify the physical and operational features of each item of equipment.

SIT: means System Integration Testing and includes all testing required to verify the harmonious operation of all communication equipment described in the Contract.

SM: means Single Mode Cabled Fibre. The number prior to the designator SM means the number of single mode fibres in the cable.

Trunk Cable: means fibre optic cable interconnecting the TOC communication equipment with the roadside communication equipment. The cable composition is specified in the Contract drawings.

TOC: means Traffic Operation Centre

OTDR: means Optical Time Domain Reflection

13.4 DESIGN AND SUBMISSION REQUIREMENTS

13.4.1 Submission Requirements

The Contractor shall supply the specification sheets for the fibre optic communication cables including colour coding and position of fibres and buffer tubes within the cable.

13.5 MATERIALS

The Contractor will be allowed to supply different combinations of fibre optic cables to meet the Contract requirements. However, no compensation will be made for additional lengths of cable or surplus fibres resulting from such substitutions.

13.5.1 Trunk Cable, Spur Cable

- 13.5.1.1 The trunk and spur cables shall consist of all required optical SM fibres divided into buffer tubes and housed within a protective cable structure suitable for installation in an outdoor underground duct or aerial on steel messenger cable.
- 13.5.1.2 The cables shall be suited to operation, and storage in a temperature range between minus 40 and plus 70 degrees Celsius.
- 13.5.1.3 The cables shall provide mechanical support and protection for the specified number of fibres.
- 13.5.1.4 The outer jacket of the cables shall be constructed of medium or high-density polyethylene and provide UV resistance to allow aerial installation.
- 13.5.1.5 The cables shall be able to withstand a maximum pulling tension of 2500 N during installation without any resulting damage.
- 13.5.1.6 The minimum static bending radius for the cables under no tension shall be 10 times the outside cable diameter. The minimum bending radius during installation and under tension shall be 20 times the outside cable diameter. The cable construction shall allow installation static bending radii under installation loading of up a minimum of 20 times the cable's outside diameter, and long-term operation under no pulling load of up to a minimum of 10 times the cable diameter.
- 13.5.1.7 All interstices within the cable's outer jacket shall be filled with a compound to prevent the ingress and migration of water. The compound shall be nontoxic and dermatologically safe. Some leakage of the compound is permitted; however, there shall be no bulk flow of compound out of the cable over the specified operating temperature range which could impact on the waterproofness of the cable.
- 13.5.1.8 Materials used in the cables shall not produce hydrogen in a concentration large enough to cause any degradation in the transmission performance of the optical fibres.
- 13.5.1.9 Materials used in the cables shall not support galvanic action.
- 13.5.1.10 Fibres shall be bundled in buffer tubes. Each buffer tube shall contain 6 fibre strands. Fillers shall be allowed to substitute for empty buffer tubes to achieve a balanced cable cross section.

13.5.1.11 Individual fibre in the cables shall be identified by means of colour coding or a combination of colour and positional coding in accordance with TIA/EIA-598-B. The single mode fibre(s) cladding and buffer tube colouring shall conform to industry standards, namely:

1. Blue,
2. Orange,
3. Green,
4. Brown,
5. Slate,
6. White,
7. Red,
8. Black,
9. Yellow,
10. Violet,
11. Pink, and
12. Aqua.

Cable jackets shall be constructed of UV stabilized and moisture resistant black polyethylene.

The jackets shall be indelibly marked with the vendors name, date, fibre cross section, and distance mark. The distance mark shall be incremented and impressed at 1 m intervals. Reels shall be ordered to suit the installation. Minimum reel length shall be 1000 m, unless specific runs between pedestals on a project are less than this distance.

Reel lengths shall be confirmed with the Project Administrator prior to ordering cable. The cable shall deliver the core count by the use of gel filled loose buffer construction. Core count per tube shall be 6 or 12. Fillers shall be allowed to substitute for empty buffer tubes to achieve a balanced cable cross section.

48 Core Trunk Cable:

The cable shall be constructed around a fibre reinforced plastic central strength member to yield an all dielectric cable construction. Additional strength members shall be constructed of Aramid yarn.

6 Core Spur Cable

The cable shall be constructed as per the trunk cable or a central buffer tube construction approach; with the single tube surrounded by a woven Aramid strength member approach shall also be allowed.

13.5.1.12 The following communication fibre-optic cable manufacturers' products are approved for use:

- i. 6 Core Trunk Spur Cable
 - a. Prysmian - Catalogue # M-ETH1JKT-12-ES-006-E1,
 - b. General Cable – Catalogue # AQ0064 MIA-DWB; or

- c. Corning - Catalogue # 006EU4-T410OD20
- d. Commscope – Catalogue # D006-LN-8W-FO6NS (760053835) (Oakville)
- ii. 12 Core SM Cable (Oakville)
 - a. Commscope – Catalogue # D-012-LN-8W-F12NS (760053843)
- iii. 24 Core SM Cable (Oakville)
 - a. Commscope – Catalogue # D-024-LN-8W-F12NS (760053850)
- iv. 48 Core Trunk Branch Cable
 - a. Prysmian - Catalogue # M-ETH1JKT-12-ES-048-E1,
 - b. General Cable – Catalogue # AQ00484 MIA-DWB; or
 - c. Corning - Catalogue # 048EU4-T410A20
 - d. Commscope – Catalogue # D-024-LN-8W-F12NS (760053850)
- v. 96 Core SM Cable (Oakville)
 - a. Commscope – Catalogue # D-096-LN-8W-F12NS (760053900)

13.5.2 Drop Cable

- 13.5.2.1 The Drop Cable shall consist of all required optical SM fibres housed in a protective jacket rated for outdoor installation in underground conduits and UV stable for aerial installation on steel messenger cable.
- 13.5.2.2 The attenuation of drop cable after installation, not including the connector loss, shall not exceed 0.1 dB measured at 850 nm operation, 0.4 dB/km at 1310 nm operation, and 0.3 dB/km at 1550 nm operation in all operating environments.
- 13.5.2.3 Fibres shall be protected with a 900µm tight buffer, surrounded by an aramid or Kevlar yarn strength member and an armoured jacket. Connectors shall be securely fastened to the strength member.
- 13.5.2.4 The drop cable shall be suitable for operation over the temperature range of -30°C to +60°C.
- 13.5.2.5 The exact number of drop cables at each cabinet or communications box and at the head end shall be in accordance with the Contract. The Contractor is free to employ the most efficient means of meeting the drop cable requirements, as approved by the Contract Administrator or if the Contract drawings allow, to not use of a drop cable.
- 13.5.2.6 Drop cables shall be of length suitably long to be connected to the active equipment in the cabinet. Sufficient slack shall be left at the splice enclosure and tray, and to allow relocation of the active equipment anywhere within the cabinet.

13.5.3 Single Mode (SM) Cabled Fibre

- 13.5.3.1 The mean optical attenuation at 1310 nm shall not be greater than 0.4 dB/km with a standard deviation not greater than 0.05 dB/km. The maximum attenuation of any continuous length of SM fibre at 1310 nm shall not exceed 0.45 dB/km.
- 13.5.3.2 The mean optical attenuation at 1550 nm shall not be greater than 0.3 dB/km with a standard deviation not greater than 0.06 dB/km. The maximum attenuation of any continuous length of SM fibre shall not exceed 0.36 dB/km.

- 13.5.3.3 The fibre attenuation shall not vary more than 0.2 dB/km over the specified cable operational temperature range.
- 13.5.3.4 The single mode (SM) fibres shall have a step refractive index profile.
- 13.5.3.5 The SM fibre shall consist of a glass core surrounded by a glass cladding surrounded by a polymer coating. If tight buffering of the SM fibre is used, the buffering material may be considered to be the polymer coating.
- 13.5.3.6 The SM fibre core shall have a diameter of between 8.3 to 9 μm inclusive with a tolerance of $\pm 1.3 \mu\text{m}$.
- 13.5.3.7 The SM fibre cladding shall have an outer diameter of 125 μm with a tolerance of $\pm 3 \mu\text{m}$.
- 13.5.3.8 The core eccentricity shall be less than or equal to 1.0 μm .
- 13.5.3.9 The SM fibre shall be coated with a protective polymer to preserve the strength of the fibre. The coating shall be removable by mechanical or chemical means. The coating shall retain its colour when subject to the manufacturer's recommended fibre cleaning and splicing preparation methods.
- 13.5.3.10 The SM fibre shall have attenuation and bandwidth specified at two wavelength windows.
- 13.5.3.11 The first wavelength window shall be at and around 1310 nm.
- 13.5.3.12 The second wavelength window shall be at and around 1550 nm.
- 13.5.3.13 The fibre optical bandwidth at 1310 nm or 1550 nm shall be equal to or greater than 1000 MHzkm.
- 13.5.3.14 The zero-dispersion wavelength shall be at a wavelength of $1310 \pm 10 \text{ nm}$.
- 13.5.3.15 The maximum dispersion at 1550 nm shall not exceed 18 ps/nmkm.
- 13.5.3.16 The maximum dispersion in the wavelength range of 1285 to 1330 nm shall not exceed 3.2 ps/nmkm.

13.5.5 Number of Fibres

The number of SM fibre specified for each cable shall be the guaranteed number of SM fibres, (i.e.: SM fibres in the cable shall comply with the specification after installation).

13.5.6 Fish Line

Fish line shall be nylon or polypropylene material with minimum test strength of 400 N.

13.5.7 Packing and Shipment

The cable shall be supplied on reels. Each reel shall have the following information clearly labelled on it in:

- a) Customer

- b) Customer order number
- c) Reel number
- d) Destination
- e) Ship date
- f) Manufactured date
- g) Manufacturer's name
- h) Cable code
- i) Length of cable

13.6 EQUIPMENT – Not Used

13.7 CONSTRUCTION

13.7.1 General

- 13.7.1.1 Cable shall be transported to site using cable reel trailers.
- 13.7.1.2 Care shall be taken at all times to avoid scraping, denting, or otherwise damaging the cable before, during or after installation. Damaged cable shall be replaced by the Contractor without additional compensation.
- 13.7.1.3 The Contractor shall not exceed the manufacturer's recommended safe pulling tension and minimum bending radius at any time.
- 13.7.1.4 Sufficient slack shall be pulled to allow cable cutting and connection to communications equipment.
- 13.7.1.5 All cable ends shall be protected from moisture ingress by using properly sealed caps.

13.7.2 Installation in Ducts

- 13.7.2.1 Cable shall be installed in duct in the field in accordance with the Contract drawings. The duct network consists of rigid duct between the TOC, pedestals, communications cabinets and electrical chambers as shown on the Contract drawings.
- 13.7.2.2 The Contractor shall ensure that all duct ends are smoothed prior to installation of the cables to prevent scraping the cable.
- 13.7.2.3 A stiff bristle brush shall be pulled through each section of duct before pulling cable.
- 13.7.2.4 A manufacturer recommended lubricant shall be applied to the cable to reduce friction between the cable and the duct.
- 13.7.2.5 The Contractor shall install plastic inner chamber inside ducts where drop cables are to be installed.

- 13.7.2.6 Drop cables (in plastic inner chamber) shall be manually pulled from the cabinet to the pedestal to prevent the connectors from being damaged. Clips shall be provided to support all drop cables.
- 13.7.2.7 Where fibre optic cables (trunk, spur or drop) are required to be installed in inner duct, the Contractor shall secure each section of inner duct to prevent it from being pulled with the cables.
- 13.7.2.8 A cable grip shall be attached to the cables so that no direct force is applied to the optical fibre. The cable grip shall have a ball bearing swivel to prevent the cable from twisting during pulling.
- 13.7.2.9 Cable rollers and feeders and winch cable blocks shall be used to guide the cable freely into the duct and at electrical chamber locations.
- 13.7.2.10 Mechanical aids and pulling cable or ropes shall be used as required.
- 13.7.2.11 Personnel equipped with two-way radios shall be stationed at each electrical chamber, cabinet, pedestal through which the cable is to be pulled to observe and lubricate the cable.
- 13.7.2.12 The Contractor shall be responsible for ensuring the cable length is sufficient to allow for connection between the communication equipment and the splice enclosures including provision for slack, vertical runs, cable necessary for splicing, wastage and cable to allow for the removal of the splice enclosure for future splicing.
- 13.7.2.13 Following installation of the cable in the ducts, all duct entrances at pedestals and cabinets shall be sealed with duct sealing compound to prevent the ingress of moisture, foreign materials, and rodents.
- 13.7.2.14 The “dead end” cables shall be left coiled and protected as directed by the Contractor Administrator.
- 13.7.2.15 Within the Terminal Traffic Signal Controller Cabinet locations a 10m coil shall be left of each cable going to and coming from 6 strand fibre optic cable.
- 13.7.2.16 Within the Intermediate Splicing Cabinet locations the following cable coils are provided to allow for subsequent fibre optic core splicing taking place inside a splicing van.
 - 13.7.2.16.1 A 20 m continuous loop of 48 strand fibre-optic cable shall be left coiled in the cabinet,
 - 13.7.2.16.2 A 10 m loop of the specified nominated number of terminal 6 and 48 strand fibre-optic cables shall be left coiled in the cabinets.
- 13.7.2.17 Within the Pull Point Chambers the following cable coils is to be provided:
 - 13.7.2.17.1 A minimum of 2.0m loop of the respective 6 and 48 strand fibre-optic cables shall be left coiled in the chamber.

- 13.7.2.17.2 A 25m of cable shall be left coiled in the first electrical chamber on each side of all surface mounted conduit systems.
- 13.7.2.18 All coiled cables shall be securely fastened in place in the Intermediate Splicing Cabinet locations with a minimum of four galvanized steel conduit straps.
- 13.7.2.19 Fish line shall be installed in all communications ducts or conduits along with fibre optic communication cables. A 2.0 m length of fish line shall be left coiled, tied securely and accessible in each cabinet, pedestal and electrical chamber. The fish line shall be installed according to manufacturer's specifications and shall be "free" and NOT helical about communications cables. Where multiple fish lines destinations is not obvious, each shall be labelled at both ends of the run.
- 13.7.2.20 At intermediate pulling points, to prevent over-tension on the cable, the cable shall be either taken up with an intermediate cable take up device as approved by the Contract Administrator, or all excess cable shall be laid out on the ground in a "figure eight" configuration before subsequent installation.
- 13.7.2.21 The Contractor may remove the pedestals to assist in the installation. If this option is exercised, all removed pedestals shall be reinstalled to their original condition including caulking of the pedestal base.
- 13.7.2.22 Unless otherwise noted in the Contract, the temporary fibre cable and associated drop cables shall be removed and delivered to the Operating Authority at the location specified by the Contract Administrator.

13.7.3 Aerial Installation

- 13.7.3.1 The cable shall be installed on messenger cable in accordance with the Contract drawings.
- 13.7.3.2 The Contractor shall be responsible for ensuring the cable length is sufficient to allow for connection between the pedestals or splice enclosures as shown in the drawings including provision for slack, vertical runs, cable necessary for splicing, wastage and cable to allow for the removal of the splice enclosure to the ground level for future splicing.
- 13.7.3.3 A coil of 25m of fibre optic cable shall be left at the first pole of transition between underground and aerial installation.
- 13.7.3.4 Unconnectorized ends of the drop cables shall be spliced to the trunk or spur cable fibres in accordance with the Contract by separate forces. Installations shall be arranged to facilitate this next operation.
- 13.7.3.5 Unless otherwise noted in the Contract, the temporary aerial cable and associated drop cables shall be removed and delivered to the Operating Authority at the location specified by the Contract Administrator, subsequent to fibre termination and successful system integration testing by other forces.

13.7.4 Installation in the Traffic Operations Centre (TOC)

At the TOC, cables shall be installed from the existing indoor splice enclosures to the communications equipment as indicated in the Contract drawings.

13.7.5 Splicing

- 13.7.5.1 Only the splices indicated in the Contract drawings shall be allowed. Actual permanent splices shall be installed by other forces. Temporary splicing of pig tail cables or launch box cables to facilitate pre-installation and proof of performance testing shall be fusion spliced, but shall not require statistical quality measures to be made of them.
- 13.7.5.2 All pedestal splices shall be housed in a Terminal Traffic Signal Controller Cabinet in accordance with the Contract. All splices in the TOC shall be housed in indoor splice enclosures. Aerial splice, where dictated shall be installed in suitable splicing enclosure, placed and sealed to protect the splice.
- 13.7.5.3 The splices shall be performed by high quality fusion type splicing equipment.
- 13.7.5.4 The maximum loss introduced by any single mode splice shall not exceed 0.25 dB at 1310 nm and 1550 nm.
- 13.7.5.5 The average single mode splice loss shall not exceed 0.1 dB for any given span, with a standard deviation not greater than 0.07 dB.
- 13.7.5.6 Only the fibres required to be spliced to drop cables indicated in the Contract shall be severed and spliced. Where required, the buffer tube splitting tool recommended by the manufacturer shall be used to open the correct buffer tube. Unsevered fibres in an open buffer tube shall be coiled in the splice tray. When buffer tubes do not need to be opened, at least 4.0 m of unopened buffer tubes shall be coiled in the fibre optic splice enclosure. The Contractor shall prepare the designated fibres of the cable for splicing to the drop cables following manufacturer recommended procedures. All splices shall be arranged neatly in splice trays, supported and protected with a suitable splice protector. At least 1.0 m of each fibre shall be stored in the splice tray.
- 13.7.5.7 Each splice shall be tested for tensile strength by applying a force of not less than 200 grams.
- 13.7.5.8 Drop cable entrances to the splice enclosures shall adhere to the manufacturer's recommendations for the type of cable and inner duct selected.
- 13.7.5.9 In order to reduce the overall number of splices required the cable shall be installed in continuous lengths with a minimum average of 2 km. The Contractor shall attempt to maximize the runs of cable beyond the minimum requirements. Locations for trunk or spur cable splicing shall be approved by the Contract Administrator and documented as part of As-constructed documentation.
- 13.7.5.10 The individual fibres shall be spliced and connected so that a constant identification scheme of the fibres to each subsystem is maintained throughout the system. Fibre identification shall be in accordance with the Contract drawings.

13.7.6 Quality Control

The Contractor is responsible for all testing and documentation required establishing the approval and acceptance of installation and operation of this equipment. The framework of the approval process shall be as specified elsewhere in the Contract Documents.

The following table details the clauses within this specification, which are to be validated through the PIT, POP, and SIT processes as indicated. All measurements shall be performed in accordance with EIA/TIA-455-B standard.

Clause	PIT	POP
13.5.3.1	√ 2	√ 2
13.5.3.2	√ 1	√ 2
13.5.3.3	√ 1	√ 2
13.7.1.3		√ 3

Testing Footnotes:

- ¹ Each reel shall be tested prior to installation in ducts. PIT shall include a minimum of 10% of the total fibre optic communication cable. Where 10% equates to more than one fibre, the fibres to be tested shall be located in different buffer tubes.
- ² Each length of fibre cable shall be tested after installation in ducts. POP shall include a minimum of 10% of the fibres to be connected to equipment. Contractor shall not test the same fibres on consecutive lengths. 100% of the spare cables shall be tested. The Contractor shall record the reel number from which the cable came, the identification of the fibres measured and the attenuation in dB/km of the fibres measured.
- ³ Pulling tension records shall be included in POP test results.

The OTDR test results shall include the following measurements:

- a) Total length of the optical link
- b) Total attenuation of the optical link
- c) Attenuation per kilometre of the optical link under test
- d) Wavelength of the Measurement
- e) Index of Refraction used for the test

Test results shall include electronic and PDF copies of the OTDR attenuation profile on CD and electronic file render CD. The electronic file names shall be correlated to the Contract Drawing references.

The Contractor shall submit a certificate confirming the calibration of the test equipment within the past year prior to undertaking any testing.

13.7 MEASUREMENT FOR PAYMENT

Measurement of cables shall be made horizontally in metres along the longitudinal axis of the duct trench or aerial cable from centre to centre of pull point chambers, intermediate splicing cabinet pads and traffic signal controller cabinet pads; and to the face of bridge structures and retaining walls. The coils of cables are not counted in this measurement condition.

13.8 BASIS OF PAYMENT

Payment at the Contract price for the tender items shall be full compensation for all labour, equipment, and material to complete the work. This includes all necessary testing equipment verification of material performance.

Appendix “A”

Standard Tender Item References

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

APPENDIX “A” - STANDARD TENDER ITEM REFERENCES

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A1	602	Electrical Chambers a) Precast Concrete Electrical Handwell with 460mm Diameter Cover, b) Cast in Place Concrete Electrical Handwell with 460mm Diameter Cover, c) Precast Concrete Maintenance Hole, 600mm x 600mm, d) Precast Concrete Maintenance Hole, 675mm Diameter e) Prefabricated Pull Box - Type I, f) Prefabricated Pull Box - Type II, g) Prefabricated Junction Box Installation for Loops	Each Each Each Each Each Each Each	UTS 602.010, UTS 602.020, UTS 602.025, UTS 602.026, UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090,	Designer to identify electrical chamber for use.
A2	603	Flexible Ducts a) 1-50mm, b) 2-50mm, c) 1-25mm, d) 2-25mm	Metre Metre Metre Metre	UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090, UTS 603.010,	Designer to identify combinations.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A3	603	Rigid PVC Conduit, Direct Buried, Boulevard a) 1-50mm, b) 2-50mm, c) 1-50mm & 1-100mm, d) 1-75mm, e) 2-75mm f) 1-100mm g) 2-100mm h) 1-50mm, 1-75mm & 2-100mm, i) 1-25mm	Metre Metre Metre Metre Metre Metre Metre Metre Metre	UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090, UTS 603.010,	Designer to identify combinations.
A4	603	Rigid PVC Conduit, Direct Buried, Roadway a) 1-50mm, b) 1-100mm, c) 1-50mm & 1-100mm, d) 2-75mm, e) 1-100mm, f) 2-100mm	Metre Metre Metre Metre Metre Metre	UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090, UTS 603.010,	Designer to identify combinations.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A5	603	HDPE Ducts, Directional Bored a) 1-50mm, b) 1-100mm, c) 1-50mm & 1-100mm, d) 2-75mm, e) 1-100mm, f) 2-100mm	Metre Metre Metre Metre Metre Metre	UTS 602.030, UTS 602.040, UTS 602.050, UTS 602.060, UTS 602.070, UTS 602.080, UTS 602.090, UTS 603.010,	Designer to identify combinations.
A6	604	Traffic Signal Cables (Solid) in Duct - MTO a) 19 Conductor, # 14 AWG, b) 7 Conductor, # 14 AWG, c) 4 Conductor, # 14 AWG	Metre Metre Metre	UTS 604.010, UTS 604.011, UTS 604.015, UTS 604.016	Designer to identify combinations.
A7	604	Traffic Signal Cables (Solid), Aerial - MTO a) 19 Conductor, # 14 AWG, b) 7 Conductor, # 14 AWG, c) 4 Conductor, # 14 AWG	Metre Metre Metre	UTS 604.010, UTS 604.011, UTS 604.015, UTS 604.016	Designer to identify combinations.
A8	604	Traffic Signal Cables (Solid), in Duct - IMSA a) 19 Conductor, # 14 AWG, b) 7 Conductor, # 14 AWG, c) 4 Conductor, # 14 AWG	Metre Metre Metre	UTS 604.020, UTS 604.021, UTS 604.025	Designer to identify combinations.

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Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A11	604	Low Voltage Cu Cables, Exposure to Direct Sunlight a) 1/C, # 8 AWG RW90 SR, Coloured, b) 1/C, # 6 AWG RW90 SR, Coloured, c) 1/C, # 4 AWG RW90 SR, Coloured, d) 1/C, # 2 AWG RW90 SR, Coloured, e) 1/C, # 8 AWG RWU90 SR, Coloured, f) 1/C, # 6 AWG RWU90 SR, Coloured, g) 1/C, # 4 AWG RWU90 SR, Coloured, h) 1/C, # 2 AWG RWU90 SR, Coloured, i) 1/C, # 8 AWG RWU90 SR, Black with Stripes, j) 1/C, # 6 AWG RWU90 SR, Black with Stripes, k) 1/C, # 4 AWG RWU90 SR, Black with Stripes, l) 1/C, # 2 AWG RWU90 SR, Black with Stripes	Metre Metre Metre Metre Metre Metre Metre Metre Metre Metre Metre Metre Metre	UTS 614.020, UTS 614.022, UTS 614.030, UTS 614.031	Designer to identify requirements.
A12	604	Communication Cables, Aerial a) 6 pair, # 22 AWG Cu, b) 12 pair, # 22 AWG Cu, c) 25 pair, # 22 AWG Cu	Metre Metre Metre		Designer to identify requirements.
A13	604	Communication Cables in Duct a) 4 pair, # 22 AWG Cu, b) 6 pair, # 22 AWG Cu, c) 12 pair, # 22 AWG Cu, d) 25 pair, # 22 AWG Cu	Metre Metre Metre Metre		Designer to identify requirements.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A14		Fibre Optic Communication Cables in Duct a) 6 Strand, b) 48 Strand	Metre Metre		Designer to identify requirements.
A15	604	Extra Low Voltage Cables, Aerial a) 4/C #18 AWG, Cu Shielded - Detection b) 4/C #18 AWG, Cu Shielded with Drain Wire - Audible Pushbutton Detection c) 2/C #14 AWG, Cu Shielded with Drain Wire - Audible Pushbutton Detection	Metre <i>Metre</i> <i>Metre</i>	UTS 604.010, UTS 604.011, UTS 604.015, UTS 604.016, UTS 604.020, UTS 604.021, UTS 604.025	Designer to identify requirements.
A16	604	Extra Low Voltage Cables in Duct a) 4/C #18 AWG, Cu Shielded - Detection b) 4/C #18 AWG, Cu Shielded with Drain Wire - Audible Pushbutton Detection c) 2/C #14 AWG, Cu Shielded with Drain Wire - Audible Pushbutton Detection	Metre <i>Metre</i> <i>Metre</i>	UTS 604.010, UTS 604.011, UTS 604.015, UTS 604.016, UTS 604.020, UTS 604.021, UTS 604.025	Designer to identify requirements.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A17	609	Ground Wire a) #6 AWG, Bare Cu, Stranded, b) #6 AWG, Insulated Cu, Stranded, c) #2/O AWG, Bare Cu, Stranded,	Metre Metre Metre	UTS 604.011, UTS 604.021, UTS 604.025, UTS 614.010, UTS 614.020, UTS 614.021, UTS 614.022, UTS 614.025, UTS 614.026, UTS 614.027, UTS 614.030, UTS 614.031, UTS 614.043, UTS 614.044,	Designer to identify combinations.
A18	609	Ground Electrode a) Copperclad Rod - 19mm x 3000mm, b) Hot Dip Galvanized Solid Steel Plate - 254mm x 406mm x 6.3mm, complete with ground rod clamp extension	Each Each	UTS 614.010, UTS 614.020, UTS 614.021, UTS 614.022, UTS 614.026,	Designer to identify requirements.
A19	610 SP	Removal of Electrical Equipment	Each or Lump Sum		SP required for material description.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A20	614	Secondary Supply Facilities a) Supply Control Cabinet b) Meter Base c) Power Supply Pedestal with Breaker Panel d) Metered Traffic Signal Power Supply Pedestal c/w Load Centre and Meter Base e) Metered Streetlighting Power Supply Pedestal c/w Load Centre and Meter Base	Each Each Each Each Each	UTS 614.010, UTS 614.011, UTS 614.020, UTS 614.021, UTS 614.022, UTS 614.025, UTS 614.026, UTS 614.027, UTS 614.030, UTS 614.031, UTS 614.042, UTS 614.043, UTS 614.044, UTS 614.045, UTS 614.046, UTS 614.047	Designer to identify material requirement for use of Meter Base in Local Hydro service area. SP required for material specification.
A21	615	Steel Poles, Base Mounted a) 4.6m Light Duty Pole - 287mm B.C.D. (8415), b) 6.1m Standard Duty Pole - 406mm B.C.D., c) 6.1m Heavy Duty Pole - 406mm B.C.D., d) 10.7m Standard Duty Pole - 406mm B.C.D., e) 11.3m Standard Duty Pole - 406mm B.C.D.	Each Each Each Each Each	UTS 615.010, UTS 615.015, UTS 615.030, UTS 615.035,	Designer to identify combination of poles. SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A22	615	Aluminum Poles, Base Mounted a) 3.3m (10') - 150mm B.C.D., b) 4.5m (15') - 242mm B.C.D., c) 5.8m (19') - 292mm B.C.D., d) 5.8m (19') - 406mm B.C.D., e) 6.85m (22.5') - 406mm B.C.D., f) 7.3m (24') - 406mm B.C.D., g) 7.3m (24') - 406mm B.C.D. - HOV Signage Mount h) 9.8m (32') - 406mm B.C.D., i) 9.8m (32') - 406mm B.C.D. - Bridge Mount, j) 11.3m (40') - 406mm B.C.D., k) 11.3m (40') - 406mm B.C.D. - Bridge Mount, l) 9.8m (32') - 292mm B.C.D., m) 11.3m (40') - 292mm B.C.D.	Each Each Each Each Each Each Each Each Each Each Each Each	UTS 615.020, UTS 615.021, UTS 615.025, UTS 615.030, UTS 615.035, UTS 620.075	Designer to identify combination of poles. SP required for material specification.
A23	615	Frangible Bases	Each	UTS 615.030,	Designer to identify requirements.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A24	616	Concrete Footings in Earth for Base-Mounted Pole / Pedestal a) 151mm (6") B.C.D. - 1200mm, b) 190mm (7.5") B.C.D. - 1200mm c) 242mm (9 1/2") B.C.D. - 2150mm, d) 292mm (11 1/2") B.C.D. - 2150mm, e) 292mm (11 1/2") B.C.D. - 2600mm, f) 292mm (11 1/2") B.C.D. - 2750mm, g) 406mm (16") B.C.D. - 2150mm, h) 406mm (16") B.C.D. - 2600mm, i) 406mm (16") B.C.D. - 2750mm, j) 406mm (16") B.C.D. - 1400m, k) 539mm (21.375") B.C.D. - 1400mm - Metered Power Pedestal	Each Each Each Each Each Each Each Each Each Each Each	UTS 616.010, UTS 616.011, UTS 616.012, UTS 616.014, UTS 616.015, UTS 616.020, UTS 616.021, UTS 616.025, UTS 616.026	Designer to identify combinations. SP required for material specification.
A25	616	Concrete Footings in Earth Spread Footing	Each	UTS 616.013, UTS 616.020, UTS 616.021	Designer to identify use.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A26	616	Traffic Controller Foundation a) "M" Series / "P44" Cabinets, One Pedestal b) Communication "M" Series Cabinet, c) "M" Series / "P44" Cabinets, With Power Pedestal, d) "M" Series / "P44" Cabinets, With Metered Power Pedestal, e) "M" Series / "P44" Cabinets, Two Pedestals	Each Each Each Each Each	UTS 616.030, UTS 616.031, UTS 616.035, UTS 616.036, UTS 616.040	Designer to identify type of Controller Cabinet for use.
A27	617	Roadway Lighting Luminaires – LED a) Type II-MCO b) Type III-MCO	Each Each		Designer to identify Manufacturer and Type of Luminaire. SP required for material specification.

Uniform Traffic Control Specifications and Standards for
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Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A28	617	Roadway Lighting Bracket Assemblies a) 2.4m - Metal/Concrete Pole, 1.2 Rise, b) 3.0m - Metal/Concrete Pole, 1.2 Rise, c) 3.6m - Metal/Concrete Pole, 1.5 Rise, d) 2.4m - Wooden Pole, 1.2 Rise, e) 3.0m - Wooden Pole, 1.2 Rise, f) 3.6m - Wooden Pole, 1.5 Rise g) 1.8m Heavy Duty - Metal Pole, 1.2 Rise, h) 2.4m Heavy Duty - Metal Pole, 1.2 Rise	Each Each Each Each Each Each Each Each	UTS 617.010, UTS 617.015, UTS 617.016, UTS 617.020	Designer to identify type of Luminaire.
A29	620	Vehicle Signal Head with Light Emitting Diode Lense Units a) "Highway" - 300mm (R), 200mm (Y-G), b) Oversized "Highway" - 300mm - R-Y-G	Each Each		Designer to identify type of Signal Heads. SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A30	620 SP	<p>Special Vehicle Signal Head with Light Emitting Diode Lense Units</p> <ul style="list-style-type: none"> a) Type 1 - 300mm - R-Y and Straight Arrow, b) Type 2 - 300mm - R-Y and Left Arrow, c) Type 3 - 300mm - R-Y and Right Arrow, d) Type 9A - 300mm - R-Y-G and Bimodal Arrow, e) Type 10A - 300mm - R-Y-G and Left Arrow, f) Type 11A - 300mm - R-Y-G and Right Arrow, g) Oversized "Highway" with Programmable 300mm Lenses h) "Highway" with Programmable 300mm - R-Y-G-YA-GA Lenses 	<p>Each</p> <p>Each</p> <p>Each</p> <p>Each</p> <p>Each</p> <p>Each</p> <p>Each</p> <p>Each</p>		<p>Designer to identify type of Signal Heads.</p> <p>SP required for material specification.</p>
A31	620 SP	<p>"Pedestrian" Type Signal Head with Light Emitting Diode Lense Units</p> <ul style="list-style-type: none"> a) One Section - Walk / Don't Walk, b) Two Section - Walk / Don't Walk and Countdown Timer 	<p>Each</p> <p>Each</p>	UTS 620.051	<p>Designer to identify type of Signal Heads.</p> <p>SP required for material specification.</p>

Uniform Traffic Control Specifications and Standards for Operating Authorities Within the Region of Halton

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Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A36	620	Extruded Aluminum Arm Bracket a) 300mm (EDA-300) - Signals, b) 450mm (EDA-450) - Signals, c) 600mm (EDA-600) - Signals, d) 300mm (EPA-300) - Emergency Pre-emption	Each Each Each Each	UTS 620.050, UTS 620.051, UTS 620.090	Designer to identify combinations.
A37	620	Double Arm Brackets, Aluminum Tube a) 300mm (12") b) 450mm (18"), c) 600mm (24")	Set Set Set	UTS 620.051, UTS 620.070, UTS 620.071,	Designer to identify combinations.
A38	620	Signal Head Aerial Suspension Mounting Bracket	Each		SP required for material specification.
A39	620	Traffic Signal Controller (NEMA) (Supplied by Operating Authority) a) Traffic Control and Contractor Field Representation During Installation	Lump Sum		SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A40	620	Loop Detectors a) 1.8m x 3.0m - Simple (4 Turns), b) 1.8m x 6.1m - Simple (4 Turns), c) 1.8m x 7.6m - Simple (4 Turns), d) 1.8m x 7.6m - Duplex (2-4-2 Turns), e) 1.8m x 10.0m - Simple (4 Turns), f) 1.8m x 10.0m - Duplex (2-4-2 Turns), g) 1.8m x 1.8m - Diamond Simple (4 Turns)	Each Each Each Each Each Each Each	UTS 620.080 UTS 620.081	Designer to identify combinations required for material specification.
A41	620 SP	Pedestrian Pushbutton Assemblies a) Audible Pedestrian Pushbutton Assembly, b) Audible Pedestrian Pushbutton Information Sign c) Pedestrian Pushbuttons and Information Signs d) Pedestrian Pushbutton Information Sign	Each Each	UTS 620.083 UTS 620.084 UTS 620.085 UTS 620.086	Designer to identify requirements.
A42	620 SP	Wooden Post Stand for Temporary a) Pedestrian Signals b) Pedestrian Pushbuttons	Each Each	UTS 620.055 UTS 620.056	SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A43	620 SP	Emergency Vehicle / Transit Priority Pre-Emption a) Installation of GTT Opticom™ Model # 721 Detector Unit b) 3/C #20 AWG Stranded, Shielded Cable (GTT Opticom™ Model # 138) c) Installation of GTT Opticom™ Model # 3100 GPS Radio Unit d) 5 pair - #20 AWG Stranded, Shielded Cable - (GTT Opticom Model # 1070 GPS Installation Cable)	Each Metre Each Metre	UTS 620.090	SP required for material specification.
A44	620 SP	Overhead Video Detection a) Installation of Video Camera Unit b) Video Detector Cable 3/C # 20 ELV	Each Metre	UTS 620.095	SP required for material specification.
A45	620 SP	Overhead Wavetronix (Radar) Detection a) Installation of Wavetronix Unit b) Wavetronix Detector Cable – 3 Pair #20 ELV	Each Metre	UTS 620.096	SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

Item No.	Spec. No.	Description	Unit	Applicable Standards	Remarks
A46	604, 615, 617, 620, SP	Temporary Electrical Work	Lump Sum	UTS 620.051, UTS 620.055, UTS 620.056, UTS 620.060, UTS 620.061,	SP required for material specification.
A47	SP	Traffic Control, Warning and Street Name Signs	Lump Sum	UTS 999.010, UTS 999.020, UTS 999.030, UTS 999.031, UTS 999.035, UTS 999.040, UTS 999.045	SP required for material specification.

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

A48	710 1713 1750 SP	Pavement Markings	Lump Sum		
A49	SP	Maintenance of Traffic	Lump Sum		

SP – Refers to a specification for the specific item required for installation as part of the Contract.

Appendix “B”

UTS Standard Drawings

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

APPENDIX “B” - OPERATING AUTHORITY UTS STANDARD DRAWINGS

<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Electrical Chambers</u>		
UTS 602.010	0	Precast Concrete Electrical Handwell with 460mm Diameter Cover
UTS 602.020	0	Electrical Handwell Cast in Place with 460mm Diameter Cover
UTS 602.025	0	Precast Concrete Maintenance Hole, 600mm x 600mm
UTS 602.026	0	Precast Concrete Maintenance Hole, 675mm Diameter
UTS 602.030	0	Prefabricated Underground Enclosures
UTS 602.040	0	Prefabricated Junction Box Installation for Loops
UTS 602.050	0	Electrical Handwell General Installation Requirements
UTS 602.060	0	Typical Median Island Electrical Chamber/ Junction Box Installation
UTS 602.070	0	Electrical Chamber Concrete Collar in Median
UTS 602.080	0	Local Grading at Electrical Chambers
UTS 602.090	0	Electrical Handwell Entry of Direct Buried Ducts
<u>Ducts</u>		
UTS 603.010	0	Typical Underground Conduit Details
<u>Cable</u>		
UTS 604.010	0	M.T.O. Cable Assignment for Traffic Control Signals
UTS 604.011	0	Typical Traffic Signal Pole Wiring Schematic (MTO Cable)
UTS 604.015	0	Typical Traffic Signal Wiring Schematic (MTO 19/C Cable) – One to Four Phase
UTS 604.016	0	Typical Traffic Signal Wiring Schematic (MTO 19/C Cable) – Five to Eight Phase
UTS 604.020	0	I.M.S.A. Specification #19-1C-2001 Cable Assignment for Traffic Control Signals
UTS 604.021	0	Typical Traffic Signal Pole Wiring Schematic (I.M.S.A. #19-1C-2001 Cable)
UTS 604.025	0	Typical Traffic Signal Wiring Schematic (I.M.S.A. #19-1C-2001 - 19/C Cable)

Uniform Traffic Control Specifications and Standards for
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<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Secondary Power Supply</u>		
UTS 614.010	0	Isolated Meter Application for Secondary Supply Facility
UTS 614.011	0	Isolated Stack for Secondary Supply to Pedestal Facility
UTS 614.020	0	Overhead Power Supply, Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.021	0	Metered Overhead Power Supply, Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.022	0	Combination Underground & Metered Overhead Supply Control Cabinet Wood/Concrete Pole Mounted
UTS 614.025	0	Underground Supply Control Cabinet Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.026	0	Metered Underground Feed Supply Control Cabinet Wood/Concrete Pole Mounted - Traffic Signal & Street Lighting Application
UTS 614.027	0	Metered Underground Feed Supply Control Cabinet Base Mounted Pole - Traffic Signal & Street Lighting Application
UTS 614.030	0	Traffic Signal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 100A, 1Ø, 3 Wire
UTS 614.031	0	Street Lighting Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic – 120/240V, 100A, 1Ø, 3 Wire
UTS 614.042	0	Power Supply Pedestal with Breaker Panel - Traffic Signal & Street Lighting Application
UTS 614.043	0	Street Lighting Pedestal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 100A, 1Ø, 3 Wire
UTS 614.044	0	Traffic Signal Pedestal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 60A, 1Ø, 3 Wire with Surge Arrestor
UTS 614.046	0	Metered Traffic Signal Power Supply Pedestal c/w Load Centre and Meter Base
UTS 614.047	0	Metered Streetlighting Power Supply Pedestal c/w Load Centre and Meter Base

Uniform Traffic Control Specifications and Standards for
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<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Pole Erection</u>		
UTS 615.010	0	Galvanized Steel Octagonal Pole, Base Mounted
UTS 615.015	0	Traffic Pole Extension
UTS 615.020	0	Aluminium Traffic Signal Pole, Base Mounted
UTS 615.021	0	Aluminium HOV Support Pole, Base Mounted
UTS 615.025	0	Aluminium Streetlight or Combination Streetlight / Signal Pole, Base Mounted
UTS 615.026	0	Aluminium Pole for Pedestrian Pushbuttons, Base Mounted
UTS 615.030	0	Pole Mounting Details for Base Mounted Metal Pole
UTS 615.035	0	Metal Lighting Pole, Base Mounted
<u>Footings and Pads</u>		
UTS 616.010	0	Concrete Footing for Base Mounted Pole Elevation Details
UTS 616.011	0	Concrete Footing for Base Mounted Pole Dimension Details
UTS 616.012	0	Concrete Footing for Base Mounted Power Pedestal
UTS 616.013	0	Pole Spread Footing in Median for Footing Conflicts
UTS 616.014	0	Concrete Footing for Base Mounted Pedestrian Pushbutton Pole
UTS 616.015	0	Local Grading at Pole Foundations
UTS 616.020	0	Anchorage Assembly with Studs for Traffic and Luminaire Poles
UTS 616.021	0	Anchorage Assembly with Bolts for Traffic and Luminaire Poles
UTS 616.025	0	Anchorage Assembly with Studs for Median Sign Pole – 151mm B.C.D.
UTS 616.026	0	Anchorage Assembly with Bolts for Pedestrian Pushbutton Pole - 190mm B.C.D.
UTS 616.030	0	Traffic Controller Base, “M” Series and “P44” Cabinets, One Pedestal
UTS 616.031	0	Communication “M” Series Cabinet Foundation
UTS 616.035	0	Traffic Controller Base, “M” Series and “P44” Cabinets with Power Pedestal (406mm B.C.D.)
UTS 616.036	0	Traffic Controller Base, “M” Series and “P44” Cabinets with Metered Power Pedestal (539mm B.C.D.)
UTS 616.040	0	Traffic Controller Base, “M” Series and “P44” Cabinets, Two Pedestals
STD. 9-11A		Traffic Controller Base “M” Cabinet Foundation with Power Pedestal
STD. 9-11B		Traffic Controller Base “M” Cabinet Foundation with IC Pedestal and Power Pedestal
STD. 9-11C		Traffic Controller Base “P44” Cabinet Foundation with Power Pedestal

Uniform Traffic Control Specifications and Standards for
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STD. 9-11D

Traffic Controller Base “P44” Cabinet Foundation with IC Pedestal and
Power Pedestal

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Roadway Luminaires</u>		
UTS 617.010	0	1.8m or 2.4m Aluminum Tapered Elliptical Bracket for Metal / Concrete Pole
UTS 617.015	0	3.6m Aluminum Tapered Elliptical Bracket for Metal / Concrete Pole
UTS 617.016	0	3.6m Aluminum Tapered Elliptical Bracket for Wood Pole
UTS 617.020	0	Aluminum Tapered Elliptical Bracket on Aluminum Poles Mounting Detail
<u>Traffic Signal Equipment and Electrical Traffic Control Devices</u>		
UTS 620.010	0	Plumbizer - Adjustable Mid-Section Signal Head Hanger
UTS 620.020	0	Dual End Signal Head Mounting Bracket
UTS 620.030	0	Double Signal Head Mounting Bracket
UTS 620.050	0	Extruded Aluminum Signal Arm Bracket
UTS 620.051	0	Pedestrian Signal Head Mounting Configurations
UTS 620.055	0	Wooden Post Stand for Temporary Pedestrian Signals
UTS 620.056	0	Wooden Post Stand for Temporary Pedestrian Push-Button
UTS 620.060	0	Fibreglass Insulating Rod Installation on Overhead Signal Spans
UTS 620.061	0	Aerial Traffic Signal Installation
UTS 620.070	0	Advanced Warning Flashers and Signs Direct Buried
UTS 620.071	0	Advanced Warning Flashers and Signs Concrete Base
UTS 620.072	0	Advanced Flasher, Wiring Schematic
UTS 620.075	0	Island Marker
UTS 620.076	0	Flasher Beacon, Wiring Schematic
UTS 620.080	0	Loop Detector Installation Details - I
UTS 620.081	0	Loop Detector Installation Details - II
UTS 620.083	0	Audible Pedestrian Pushbutton Assembly
UTS 620.084	0	Audible Pedestrian Pushbutton Signs
UTS 620.085	0	Pedestrian Pushbutton / Sign Assembly and Information Sign
UTS 620.086	0	Pedestrian Crossing Information Sign
UTS 620.090	0	Optical Pre-emption Detector Head Mounting
UTS 620.095	0	Mounting of Video Detection Unit

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Signing Applications</u>		
UTS 999.010	0	Advance Street Name Sign, Ground Mount
UTS 999.020	0	Arterial Street Name Sign, Mast Arm Mount
UTS 999.025	0	Route Marker & Extruded Street Name Signs
UTS 999.030	0	Lane Designation Sign Support Bracket
UTS 999.031	0	Aerial Suspension Mounting Bracket for Arterial Street Name
UTS 999.035	0	Arterial Street Name Sign Blade Support Bracket
UTS 999.040	0	Ornamental Arterial Street Name Sign
UTS 999.045	0	Ornamental Arterial Street Name Sign Bracket
UTS 999.050	0	Advance Overhead Lane Designation Signs for Dual Left Turn Lanes
UTS 999.055	0	Overhead Lane Designation Signs on Centre Median Signal Pole
UTS 999.060	0	Overhead HOV Lane Designation Signs – 5.5m Horizontal Single Member Arm
UTS 999.062	0	Overhead HOV Lane Designation Signs – 6.7m to 7.3m Horizontal Single Member Arms

Appendix “C”
Halton Region Permanent
Traffic Plant Installation &
Maintenance Inspection Form

HALTON REGION PERMANENT TRAFFIC PLANT INSTALLATION & MAINTENANCE INSPECTION FORM

Note: Complete the Interim Inspections form and submit to Halton Region Road Operations for review. Halton Region Road Operations will review and approve and then prepare signal timings. Halton Region Road Operations will schedule activation when all requirements are met.

Date: _____	Interim <input type="checkbox"/>
Contract No.: _____	Final <input type="checkbox"/>
Inspector: _____	Location: _____
Electrical Contractor: _____	

Traffic Signal Underground/Concrete Pour Checklist

Ductwork

Correct number of ducts, depth, and radii from handwell to handwell

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leg 1	Leg 2	Leg 3	Leg 4

Correct number of ducts, depth, and radii from handwell to each pole

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pole 1	Pole 2	Pole 3	Pole 4	Pole 5	Pole 6	Pole 7	Pole 8	Pole 9	Pole 10

Correct number of ducts from handwell to controller pad

☐

Pole Bases

Correct size

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pole 1	Pole 2	Pole 3	Pole 4	Pole 5	Pole 6	Pole 7	Pole 8	Pole 9	Pole 10

Correct location

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Correct depth

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Correct bolt set

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Controller Pad

Correct depth/size

☐

Correct orientation

☐

Civil Works

Sidewalk layout correct

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corner 1	Corner 2	Corner 3	Corner 4

Pour depth correct

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	Corner 1	Corner 2	Corner 3	Corner 4
Curb ramps line up with crosswalk pavement markings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Curb ramps extend enough for unimpeded walk from button to crosswalk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sidewalk level and no trip hazard	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TWSIs installed – correct number, type and orientation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Traffic Signal Construction Checklist

Physical Equipment

Traffic Cabinet

Gasket between extender base and concrete base	<input type="checkbox"/>
Silicon sealant on the gasket between extender base and cabinet base.	<input type="checkbox"/>
External silicone bead around both joints of extender base	<input type="checkbox"/>
Cabinet free from major dents and scratches	<input type="checkbox"/>
Ducts are sealed correctly	<input type="checkbox"/>
Field wire terminations as per UTSS	<input type="checkbox"/>
Cable tying as per UTSS	<input type="checkbox"/>
Cable labeling as per UTSS	<input type="checkbox"/>
Cable wrapping as per UTSS	<input type="checkbox"/>

Cabinet Mounted Equipment

Push button control modules correctly mounted on side panel brackets of controller cabinet	<input type="checkbox"/>
Camera equipment correctly mounted.	<input type="checkbox"/>

Signal Heads

	N/B Prim.	N/B Sec.	N/B Aux.	S/B Prim.	S/B Sec.	S/B Aux.	E/B Prim.	E/B Sec.	E/b Aux.	W/B Prim.	W/B Sec.	W/B Aux.
Correct type as per design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct mounting height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean and no obvious damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cowl visors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reflective tape (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Astrobrac cut flush with top of signal head (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Mast Arms

	Pole 1	Pole 2	Pole 3	Pole 4	Pole 5	Pole 6	Pole 7	Pole 8	Pole 9	Pole 10
Correct length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Securely fastened/all bolts and nuts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drip loop (mast arm to pole)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grommet at pole cable entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arms perpendicular to curb edge or as shown on Contract drawing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mast arm bracket (pod) to match pole cross section (i.e. round, octagonal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Poles

	Pole 1	Pole 2	Pole 3	Pole 4	Pole 5	Pole 6	Pole 7	Pole 8	Pole 9	Pole 10
No major scratches or dents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aligned correctly with HH cover away from major traffic flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levelling nuts underneath pole base	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Base nuts are tight (minimum one thread visible above base nuts)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hand hole cover present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pole cap installed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poles installed in correct location (as per drawing)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Base at correct grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poles are aligned plumb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sonotube cut flush with finished grade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conduits securely attached	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pedestrian / Countdown Heads

	Ped head 1	Ped head 2	Ped head 3	Ped head 4	Ped head 5	Ped head 6	Ped head 7	Ped head 8
Clean / no obvious damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mounted straight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct mounting height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drip loop in between double arm brackets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grommet at cable entry into pole	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Square LED modules

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Countdown, if specified

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Push Buttons

Height is 1.1m from sidewalk grade to center of button

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pole 1	Pole 2	Pole 3	Pole 4	Pole 5	Pole 6	Pole 7	Pole 8	Pole 9	Pole 10

Alignment to crosswalk

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Silicone sealant

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Information plate is correct type

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Civil

Handholes

Installed at correct grade

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corner 1	Corner 2	Corner 3	Corner 4

Level and presents no trip hazard

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Drainage material in base

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Stainless steel bolts

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Covers secured

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Colour code ducts in handholes

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

Loop Detection (if used)

Central in lane

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Approach 1	Approach 2	Approach 3	Approach 4

Placed correctly in relation to stop bar

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Correct dimensions

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Correctly sealed in asphalt

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Silicone marrette style connector with grease filled klick-it II covers on loop tail

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Restoration

Grass / sod

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Corner 1	Corner 2	Corner 3	Corner 4

Sidewalks

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Pavement

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Boulevard

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Electrical

Cables

- | | |
|---|--------------------------|
| Power cables neatly formed and correct gauge | <input type="checkbox"/> |
| Correct cable types used (i.e. MTO 12c / 7c) | <input type="checkbox"/> |
| All signal, push button, detection and auxiliary cables neatly formed | <input type="checkbox"/> |
| Phase conductors bent around the terminal screw (stake-on type connections not permitted) | <input type="checkbox"/> |

Labelling

- | | |
|--|--------------------------|
| All signal, push button, detection & Opticom cables labelled | <input type="checkbox"/> |
| Style tag with permanent marker | <input type="checkbox"/> |

Communications

- | | |
|--|--------------------------|
| Communications cable present in access panel | <input type="checkbox"/> |
|--|--------------------------|

Camera/Radar Detection

- | | | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Detection 1 | Detection 2 | Detection 3 | Detection 4 | Detection 5 | Detection 6 | Detection 7 | Detection 8 |
| Camera or detection unit installed as per manufacturers recommendations | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Emergency Vehicle Pre-emption Equipment

- | | |
|---|--------------------------|
| Detection unit installed as per manufacturers recommendations | <input type="checkbox"/> |
|---|--------------------------|

Ground Circuit and Bonding

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Isolated #2/0 ground cable between service cabinet and grounding grid | <input type="checkbox"/> | | | |
| Isolated #6 ground cable between service cabinet and traffic control cabinet | <input type="checkbox"/> | | | |
| Isolated grounds to traffic controller must be identified with yellow tape where visible in junction boxes | <input type="checkbox"/> | | | |
| | Corner 1 | Corner 2 | Corner 3 | Corner 4 |
| Ground rod or plate present on each corner of the intersection | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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#6 system ground to be directly connected to pole ground lug

☐ ☐ ☐ ☐

Compression style connection on all ground conductors

☐

Streetlighting

Fuse kits

☐

Correct cable type (RWU90 Stranded)

☐

Load side of streetlighting conductor, to be crimped in fuse kit

☐

Bird stops

☐

All connections to be compression type taped with insulated cover

☐

Luminaires levelled

☐

Correct wattage and distribution

Luminaire 1	Luminaire 2	Luminaire 3	Luminaire 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Install wattage labels on luminaire

Luminaire 1	Luminaire 2	Luminaire 3	Luminaire 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pavement Markings

Crosswalks line up correctly with the curb ramps and buttons

Approach 1	Approach 2	Approach 3	Approach 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Stop bar lines present and in correct location

Approach 1	Approach 2	Approach 3	Approach 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Durable markings used where designated on the drawings

Approach 1	Approach 2	Approach 3	Approach 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

No conflicting temporary markings visible

Approach 1	Approach 2	Approach 3	Approach 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

All lane markings at intersection as per approved design

Approach 1	Approach 2	Approach 3	Approach 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Signs

All signs replaced or installed as per spec and drawing

☐

‘Stop here on Red’ sign in correct location (where applicable)

☐

‘Signal Ahead’ and ‘New’ Starburst signs in correct location (if applicable)

☐

Stopping/Parking Prohibition signs installed

☐

“Left Turn Signal” signs installed (if required)

☐

Turn Prohibition signs installed (if required)

☐

Pedestrian information signs installed

☐

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Signal Activation

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Vehicle heads tested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Phase 2	Phase 4	Phase 6	Phase 8
Ped heads tested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Phase 2	Phase 4	Phase 6	Phase 8
(AODA) Pushbuttons tested	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Vehicle detection active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Conflict monitor tests correctly all functions ☐

Communication line active ☐

APPENDIX “B” - OPERATING AUTHORITY UTS STANDARD DRAWINGS

<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Electrical Chambers</u>		
UTS 602.010	0	Precast Concrete Electrical Handwell with 460mm Diameter Cover
UTS 602.020	0	Electrical Handwell Cast in Place with 460mm Diameter Cover
UTS 602.025	0	Precast Concrete Maintenance Hole, 600mm x 600mm
UTS 602.026	0	Precast Concrete Maintenance Hole, 675mm Diameter
UTS 602.030	0	Prefabricated Underground Enclosures
UTS 602.040	0	Prefabricated Junction Box Installation for Loops
UTS 602.050	0	Electrical Handwell General Installation Requirements
UTS 602.060	0	Typical Median Island Electrical Chamber/ Junction Box Installation
UTS 602.070	0	Electrical Chamber Concrete Collar in Median
UTS 602.080	0	Local Grading at Electrical Chambers
UTS 602.090	0	Electrical Handwell Entry of Direct Buried Ducts
<u>Ducts</u>		
UTS 603.010	0	Typical Underground Conduit Details
<u>Cable</u>		
UTS 604.010	0	M.T.O. Cable Assignment for Traffic Control Signals
UTS 604.011	0	Typical Traffic Signal Pole Wiring Schematic (MTO Cable)
UTS 604.015	0	Typical Traffic Signal Wiring Schematic (MTO 19/C Cable) – One to Four Phase
UTS 604.016	0	Typical Traffic Signal Wiring Schematic (MTO 19/C Cable) – Five to Eight Phase
UTS 604.020	0	I.M.S.A. Specification #19-1C-2001 Cable Assignment for Traffic Control Signals
UTS 604.021	0	Typical Traffic Signal Pole Wiring Schematic (I.M.S.A. #19-1C-2001 Cable)
UTS 604.025	0	Typical Traffic Signal Wiring Schematic (I.M.S.A. #19-1C-2001 - 19/C Cable)

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<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Secondary Power Supply</u>		
UTS 614.010	0	Isolated Meter Application for Secondary Supply Facility
UTS 614.011	0	Isolated Stack for Secondary Supply to Pedestal Facility
UTS 614.020	0	Overhead Power Supply, Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.021	0	Metered Overhead Power Supply, Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.022	0	Combination Underground & Metered Overhead Supply Control Cabinet Wood/Concrete Pole Mounted
UTS 614.025	0	Underground Supply Control Cabinet Wood/Concrete Pole Mounted - Traffic Signal & Streetlight Application
UTS 614.026	0	Metered Underground Feed Supply Control Cabinet Wood/Concrete Pole Mounted - Traffic Signal & Street Lighting Application
UTS 614.027	0	Metered Underground Feed Supply Control Cabinet Base Mounted Pole - Traffic Signal & Street Lighting Application
UTS 614.030	0	Traffic Signal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 100A, 1Ø, 3 Wire
UTS 614.031	0	Street Lighting Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic – 120/240V, 100A, 1Ø, 3 Wire
UTS 614.042	0	Power Supply Pedestal with Breaker Panel - Traffic Signal & Street Lighting Application
UTS 614.043	0	Street Lighting Pedestal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 100A, 1Ø, 3 Wire
UTS 614.045	0	Traffic Signal Pedestal Supply Control Cabinet Assembly Equipment Layout and Wiring Schematic, 120/240V, 60A, 1Ø, 3 Wire with Surge Arrestor
UTS 614.046	0	Metered Traffic Signal Power Supply Pedestal c/w Load Centre and Meter Base
UTS 614.047	0	Metered Streetlighting Power Supply Pedestal c/w Load Centre and Meter Base

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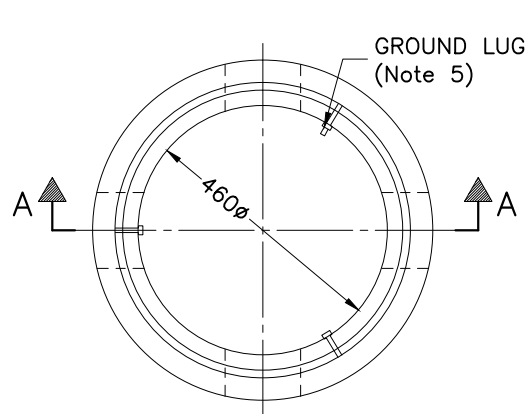
<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Pole Erection</u>		
UTS 615.010	0	Galvanized Steel Octagonal Pole, Base Mounted
UTS 615.015	0	Traffic Pole Extension
UTS 615.020	0	Aluminium Traffic Signal Pole, Base Mounted
UTS 615.021	0	Aluminium HOV Support Pole, Base Mounted
UTS 615.025	0	Aluminium Streetlight or Combination Streetlight / Signal Pole, Base Mounted
UTS 615.026	0	Aluminium Pole for Pedestrian Pushbuttons, Base Mounted
UTS 615.030	0	Pole Mounting Details for Base Mounted Metal Pole
UTS 615.035	0	Metal Lighting Pole, Base Mounted
<u>Footings And Pads</u>		
UTS 616.010	0	Concrete Footing for Base Mounted Pole Elevation Details
UTS 616.011	0	Concrete Footing for Base Mounted Pole Dimension Details
UTS 616.012	0	Concrete Footing for Base Mounted Power Pedestal
UTS 616.013	0	Pole Spread Footing in Median for Footing Conflicts
UTS 616.014	0	Concrete Footing for Base Mounted Pedestrian Pushbutton Pole
UTS 616.015	0	Local Grading at Pole Foundations
UTS 616.020	1	Anchorage Assembly with Studs for Traffic and Luminaire Poles
UTS 616.021	1	Anchorage Assembly with Bolts for Traffic and Luminaire Poles
UTS 616.025	0	Anchorage Assembly with Studs for Median Sign Pole – 151mm B.C.D.
UTS 616.026	0	Anchorage Assembly with Bolts for Pedestrian Pushbutton Pole - 190mm B.C.D.
UTS 616.030	0	Traffic Controller Base, “M” Series and “P44” Cabinets, One Pedestal
UTS 616.031	0	Communication “M” Series Cabinet Foundation
UTS 616.035	0	Traffic Controller Base, “M” Series and “P44” Cabinets with Power Pedestal (406mm B.C.D.)
UTS 616.036	0	Traffic Controller Base, “M” Series and “P44” Cabinets with Metered Power Pedestal (539mm B.C.D.)
UTS 616.040	0	Traffic Controller Base, “M” Series and “P44” Cabinets, Two Pedestals

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

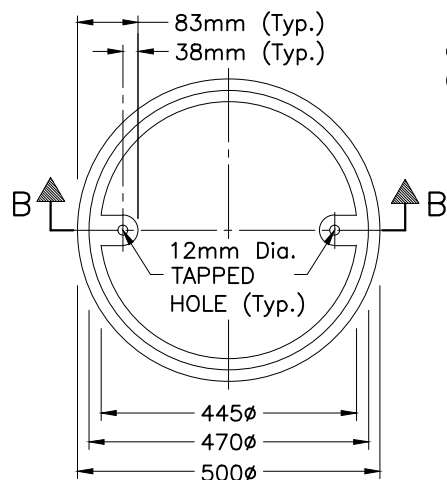
<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Roadway Luminaires</u>		
UTS 617.010	0	1.8m or 2.4m Aluminum Tapered Elliptical Bracket For Metal / Concrete Pole
UTS 617.015	0	3.6m Aluminum Tapered Elliptical Bracket For Metal / Concrete Pole
UTS 617.016	0	3.6m Aluminum Tapered Elliptical Bracket For Wood Pole
UTS 617.020	0	Aluminum Tapered Elliptical Bracket On Aluminum Poles Mounting Detail
<u>Traffic Signal Equipment and Electrical Traffic Control Devices</u>		
UTS 620.010	0	Plumbizer - Adjustable Mid-Section Signal Head Hanger
UTS 620.020	0	Dual End Signal Head Mounting Bracket
UTS 620.030	0	Double Signal Head Mounting Bracket
UTS 620.050	0	Extruded Aluminum Signal Arm Bracket
UTS 620.051	0	Pedestrian Signal Head Mounting Configurations
UTS 620.055	0	Wooden Post Stand for Temporary Pedestrian Signals
UTS 620.056	0	Wooden Post Stand for Temporary Pedestrian Push-Button
UTS 620.060	0	Fibreglass Insulating Rod Installation On Overhead Signal Spans
UTS 620.061	0	Aerial Traffic Signal Installation
UTS 620.070	0	Advanced Warning Flashers and Signs Direct Buried
UTS 620.071	0	Advanced Warning Flashers and Signs Concrete Base
UTS 620.072	0	Advanced Flasher, Wiring Schematic
UTS 620.075	0	Island Marker
UTS 620.076	0	Flasher Beacon, Wiring Schematic
UTS 620.080	0	Loop Detector Installation Details - I
UTS 620.081	0	Loop Detector Installation Details - II
UTS 620.083	0	Audible Pedestrian Pushbutton Assembly
UTS 620.084	0	Audible Pedestrian Pushbutton Signs
UTS 620.085	0	Pedestrian Pushbutton / Sign Assembly and Information Sign
UTS 620.086	0	Pedestrian Crossing Information Sign
UTS 620.090	0	Optical Pre-emption Detector Head Mounting
UTS 620.096	0	Mounting of Wavetronix Radar Detection Unit

Uniform Traffic Control Specifications and Standards for
Operating Authorities Within the Region of Halton

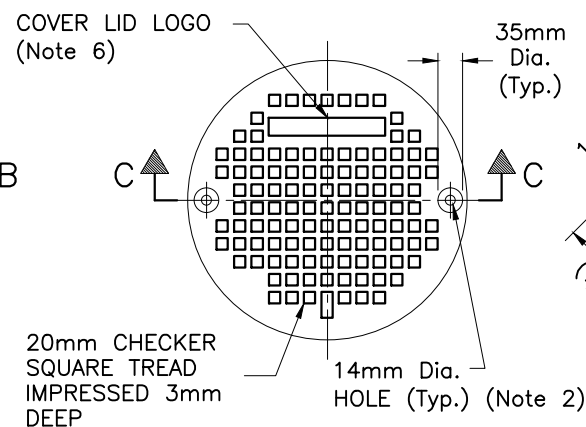
<u>Standard</u>	<u>Rev.</u>	<u>Description</u>
<u>Signing Applications</u>		
UTS 999.010	0	Advance Street Name Sign, Ground Mount
UTS 999.020	0	Arterial Street Name Sign, Mast Arm Mount
UTS 999.025	0	Route Marker & Extruded Street Name Signs
UTS 999.030	0	Lane Designation Sign Support Bracket
UTS 999.031	0	Aerial Suspension Mounting Bracket For Arterial Street Name
UTS 999.035	0	Arterial Street Name Sign Blade Support Bracket
UTS 999.040	0	Ornamental Arterial Street Name Sign
UTS 999.045	0	Ornamental Arterial Street Name Sign Bracket
UTS 999.050	0	Advance Overhead Lane Designation Signs For Dual Left Turn Lanes
UTS 999.055	0	Overhead Lane Designation Signs On Centre Median Signal Pole
UTS 999.060	0	Overhead HOV Lane Designation Signs – 5.5m Horizontal Single Member Arm
UTS 999.062	0	Overhead HOV Lane Designation Signs – 6.7m to 7.3m Horizontal Single Member Arms



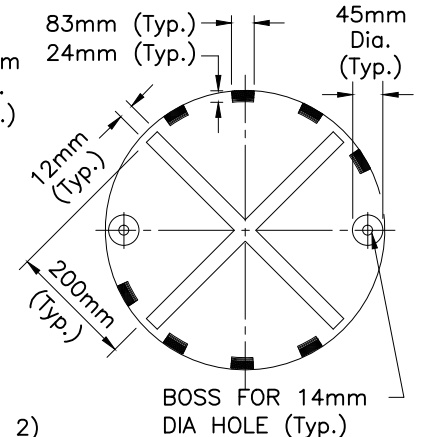
PLAN - HANDHOLE



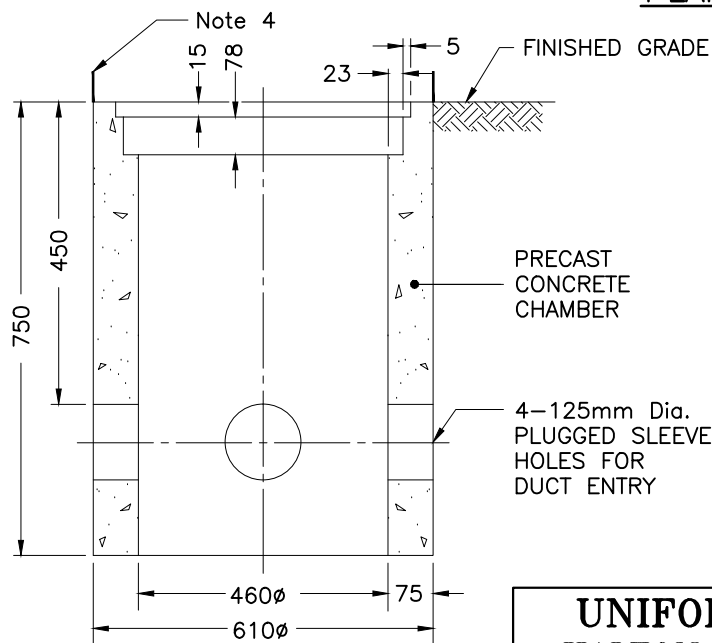
PLAN - FRAME



PLAN - COVER



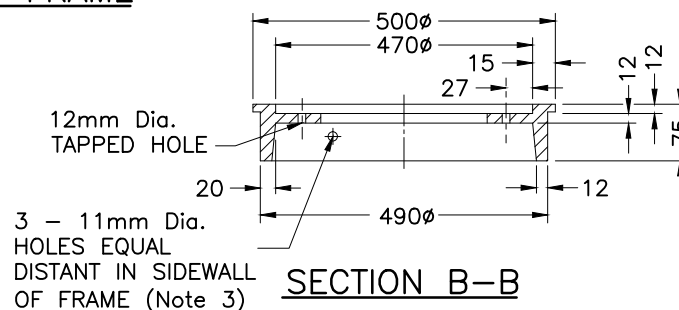
UNDERSIDE OF COVER



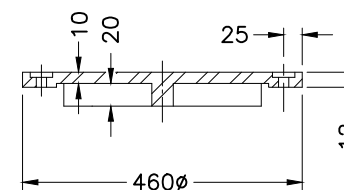
SECTION A-A

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

(OPSD 2112.02M)



SECTION B-B



SECTION C-C

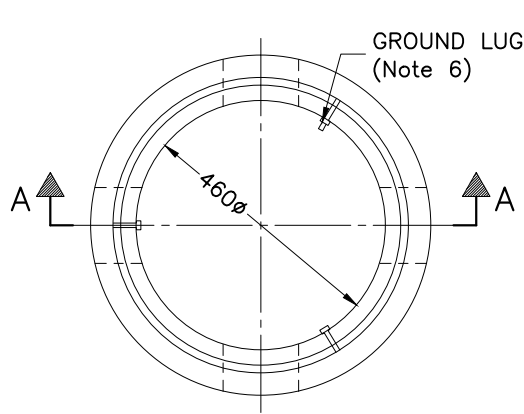
- NOTES:
1. FOR GENERAL INSTALLATION DETAIL REFER TO UTS 602.050 AND UTS 602.090.
 2. COVER TO BE RETAINED WITH 12mm DIA x 20mm LONG STAINLESS STEEL HEX HEAD MACHINE BOLTS TO BE FLUSH WITH TOP OF COVER WHEN FASTENED.
 3. FRAME TO BE ATTACHED USING 3-10mm DIA x 38mm LONG MACHINE BOLTS ANCHORED IN CONCRETE WALL.
 4. LIFTING HOOKS TO BE REMOVED AFTER HANDHOLE INSTALLATION.
 5. POINT OF CONNECTION OF #6 GROUND WIRE FROM GROUND ELECTRODE/SYSTEM.
 6. COVER LID TO HAVE "TRAFFIC", "LIGHTING" OR "COMMUNICATION" LOGO

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

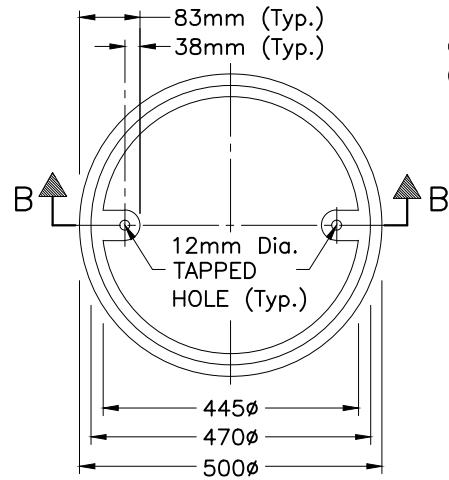
**PRECAST CONCRETE
ELECTRICAL HANDWELL WITH
460mm DIAMETER COVER**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	

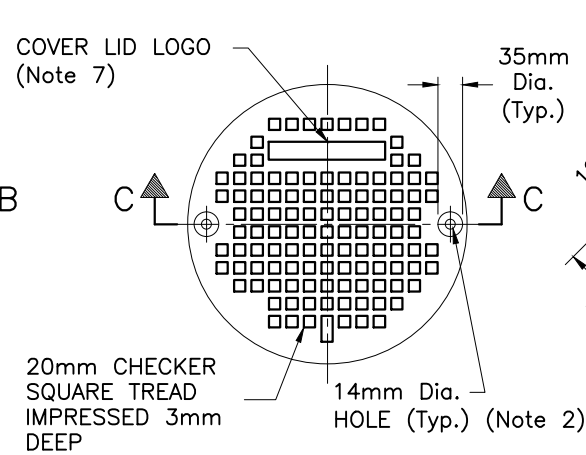
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 602.010</u>	



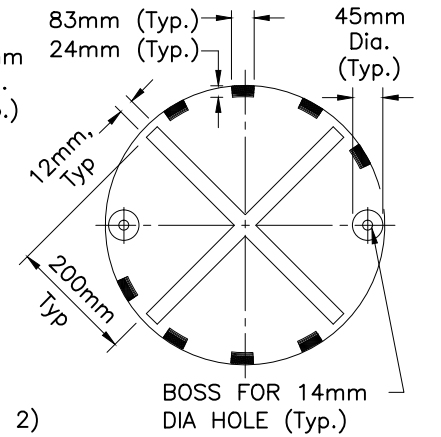
PLAN - HANDHOLE



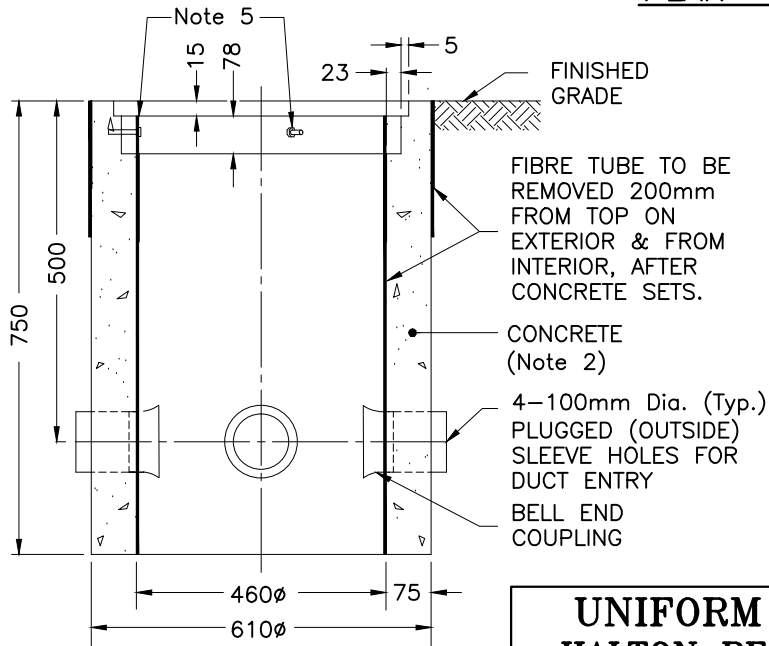
PLAN - FRAME



PLAN - COVER



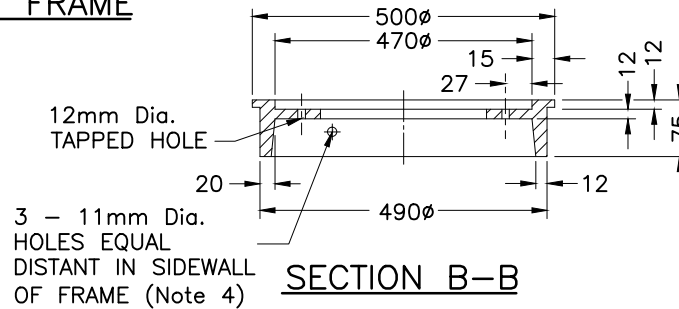
UNDERSIDE OF COVER



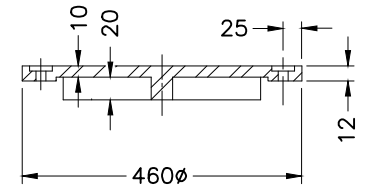
SECTION A-A

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

(OPSD 2112.02M)



SECTION B-B



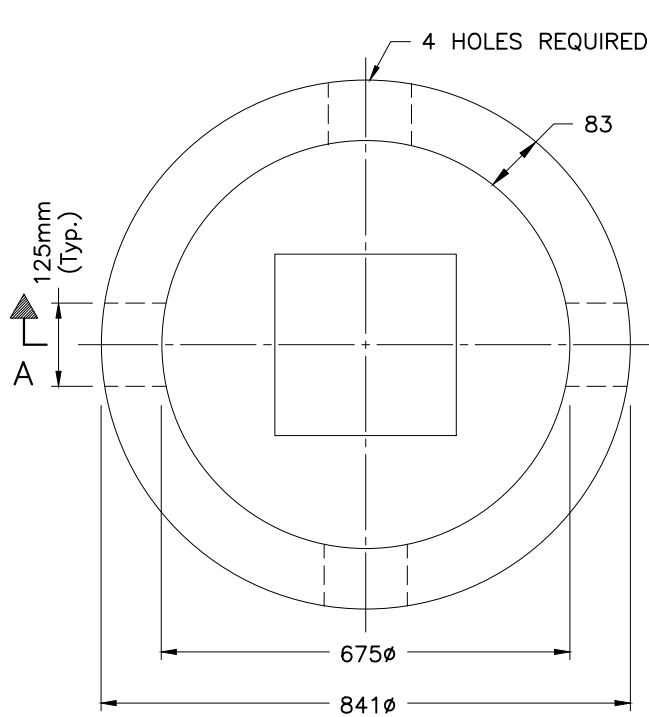
SECTION C-C

- NOTES:**
1. FOR GENERAL INSTALLATION DETAIL REFER TO UTS 602.050 AND UTS 602.090.
 2. CONCRETE TO BE CSA 23.1 OF EXPOSURE CLASS C-1, 35 MPa
 3. COVER TO BE RETAINED WITH 12mm DIA x 20mm LONG STAINLESS STEEL HEX HEAD MACHINE BOLTS TO BE FLUSH WITH TOP OF COVER WHEN FASTENED.
 4. FRAME TO BE ATTACHED USING 3-10mm DIA x 38mm LONG MACHINE BOLTS ANCHORED IN CONCRETE WALL.
 5. CUT SLOT 40mm x 12mm IN FIBRE AT EACH BOLT LOCATION TO ALLOW FOR VERTICAL ADJUSTMENT OF CASING.
 6. POINT OF CONNECTION OF #6 GROUND WIRE FROM GROUND ELECTRODE / SYSTEM.
 7. COVER LID TO HAVE "TRAFFIC", "LIGHTING" OR "COMMUNICATION" LOGO.

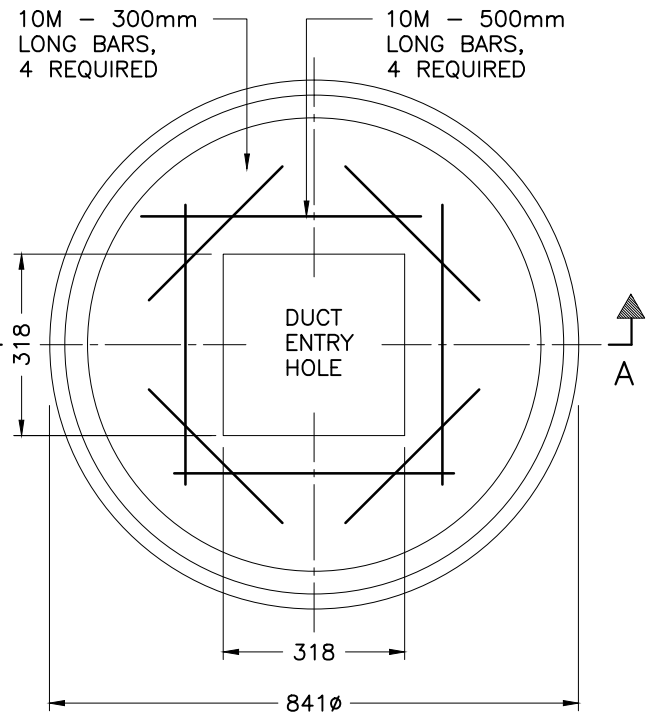
**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**CAST IN PLACE CONCRETE
ELECTRICAL HANDWELL WITH
460mm DIAMETER COVER**

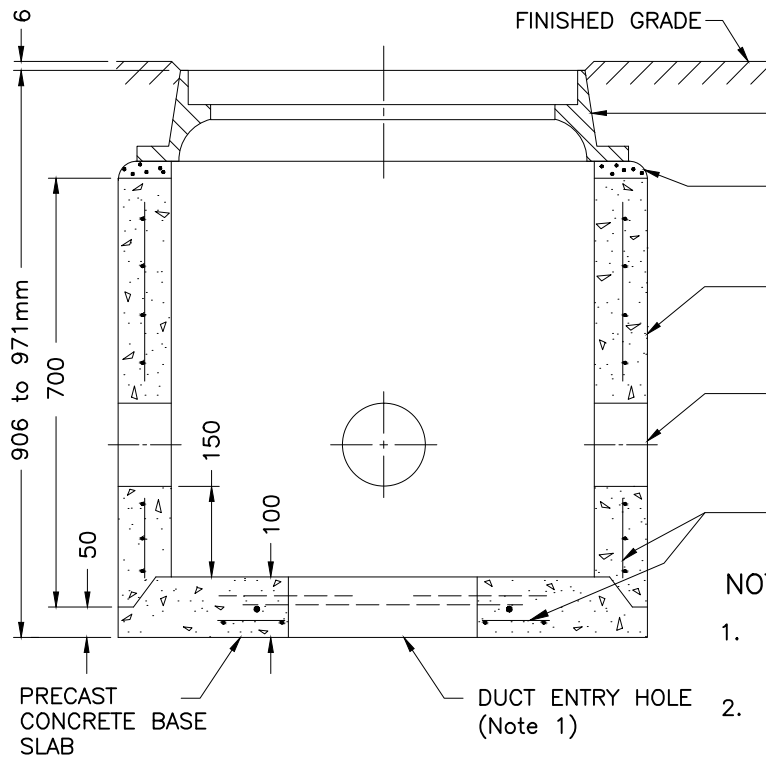
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 602.020</u>	



PLAN



BOTTOM - DUCT
ENTRY REINFORCING



SECTION A-A

FRAME WITH COVER OPSD-401.010 (TYPE A)

10mm MIN / 75mm MAX
CEMENT MORTAR FOR ADJUSTMENT

PRECAST CONCRETE RISER

125mm Dia. HOLE FOR DUCT ENTRY,
4 REQUIRED (Note 1)

WWF CIRCULAR STEEL 250mm²/m

NOTES:

1. FOR DUCT INSTALLATION DETAILS REFER TO UTS 602.090.
2. FOR GENERAL INSTALLATION DETAILS REFER TO UTS 602.050.

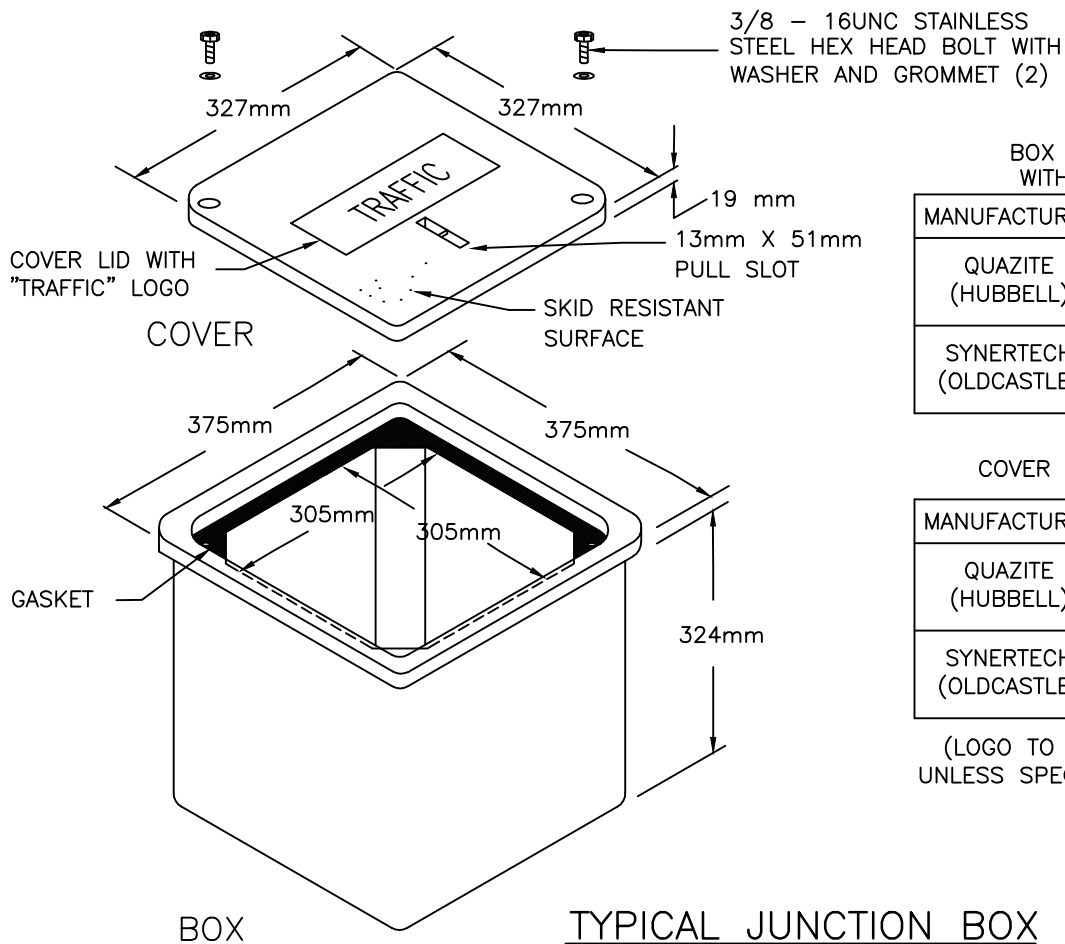
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

(OPSD 2112.030M)

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

PRECAST CONCRETE
MAINTENANCE HOLE
675mm DIAMETER

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 602.026</u>	



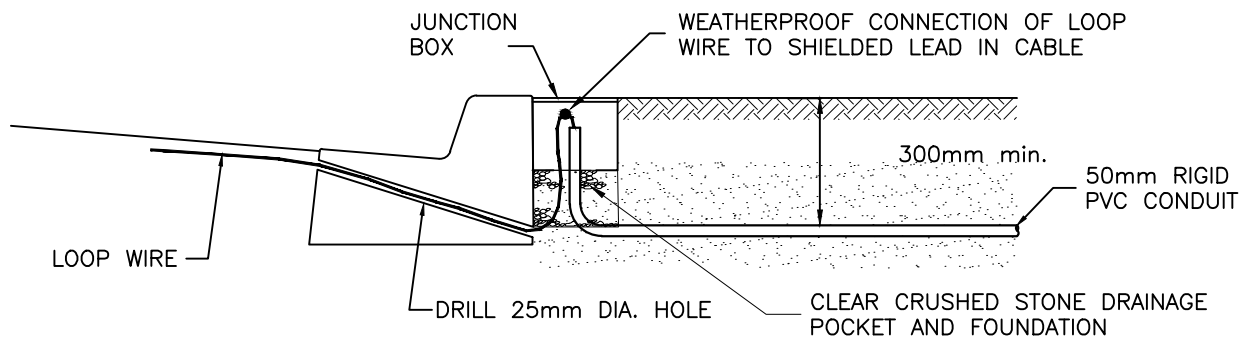
BOX (Stackable)
WITH NO BASE

MANUFACTURER	PART NO.
QUAZITE (HUBBELL)	PC1212BG12
SYNERTECH (OLDCASTLE)	S1212B12FA

COVER WITH 2 BOLTS

MANUFACTURER	PART NO.
QUAZITE (HUBBELL)	PC1212HA00-46
SYNERTECH (OLDCASTLE)	S1212HFA0A-13

(LOGO TO INDICATE "TRAFFIC" UNLESS SPECIFIED TO BE BLANK)



INSTALLATION

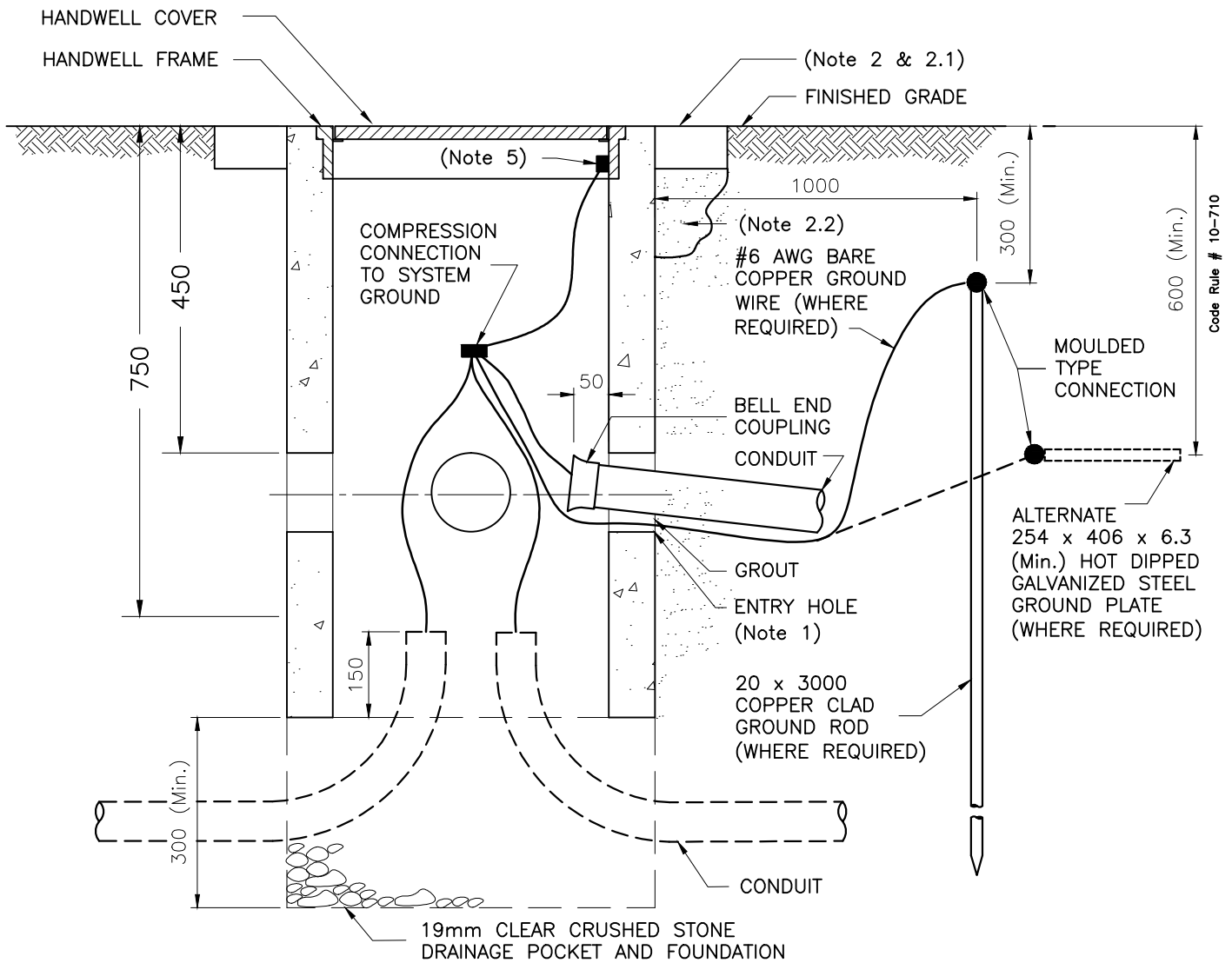
NOTES

1. BACKFILL UNDER ROAD AND IN ISLAND TO BE GRANULAR MATERIAL.
2. BACKFILL IN BOULEVARD TO BE SELECTED EXCAVATED MATERIAL UNLESS OTHERWISE SPECIFIED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

PREFABRICATED JUNCTION BOX INSTALLATION FOR DETECTION LOOPS

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 602.040</u>	



NOTES:

1. FOR DUCT ENTRY DETAILS REFER TO UTS 602.090.
2. BOX OUT REQUIRED FOR HARD SURFACE TREATMENT.
 - 2.1. BITUMINOUS FIBREBOARD TO BE INSTALLED 50mm FROM ELECTRICAL CHAMBER FOR BOX OUT. REFER TO UTS 602.070.
 - 2.2. UNSHRINKABLE FILL TO BE PLACED AS BACKFILL IN EXCAVATED VOID AREA AROUND ELECTRICAL CHAMBERS.
3. FOR SPECIFIC HANDWELL DETAILS REFER TO UTS 602.010, UTS 602.020, UTS 602.025 OR UTS 602.026.
4. HANDWELL AND COVER SHALL CONFORM TO FINISHED GRADE.
5. ATTACH GROUND WIRE TO ELECTRICAL CHAMBER COVER USING GROUND LUG SUITABLE FOR #6 AWG COPPER WIRE.

ALL DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

(OPSD 2117.02M)

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ELECTRICAL HANDWELL GENERAL INSTALLATION REQUIREMENTS

Rev. Date

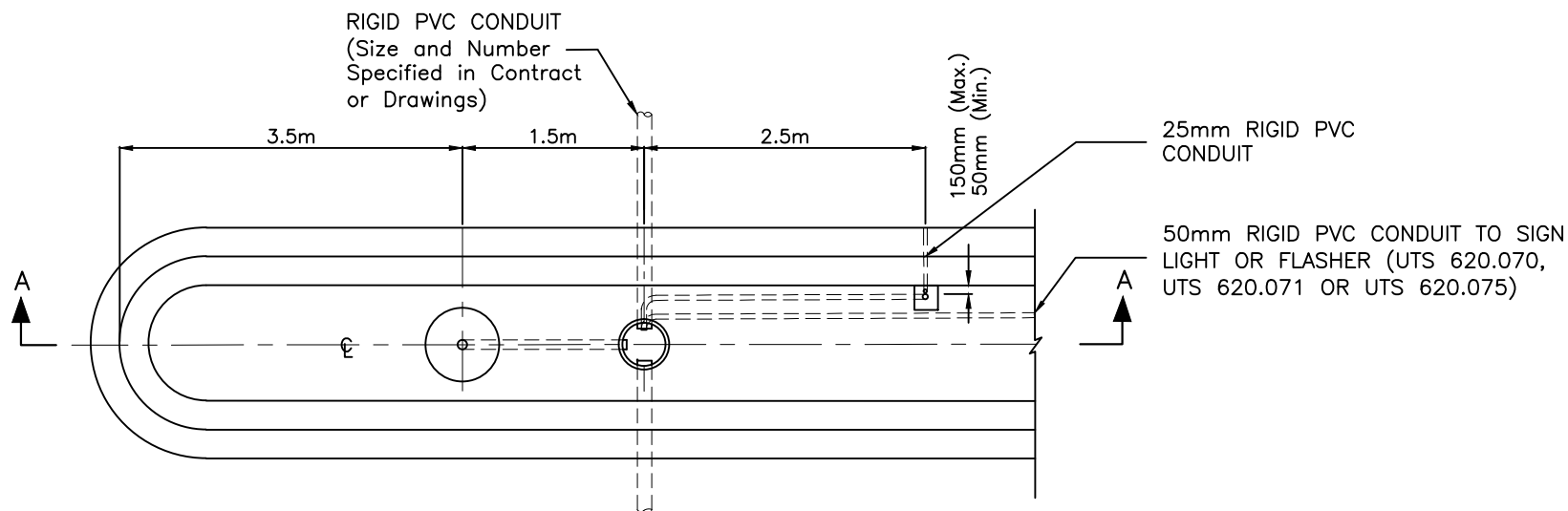
Rev. No. 0

Modification: _____

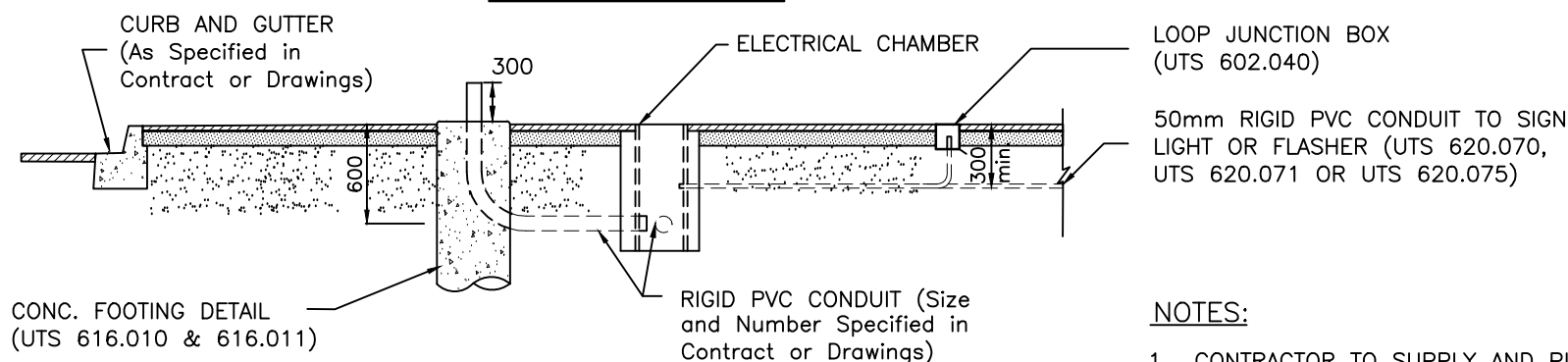
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 602.050



MEDIAN ISLAND



SECTION A-A

NOTES:

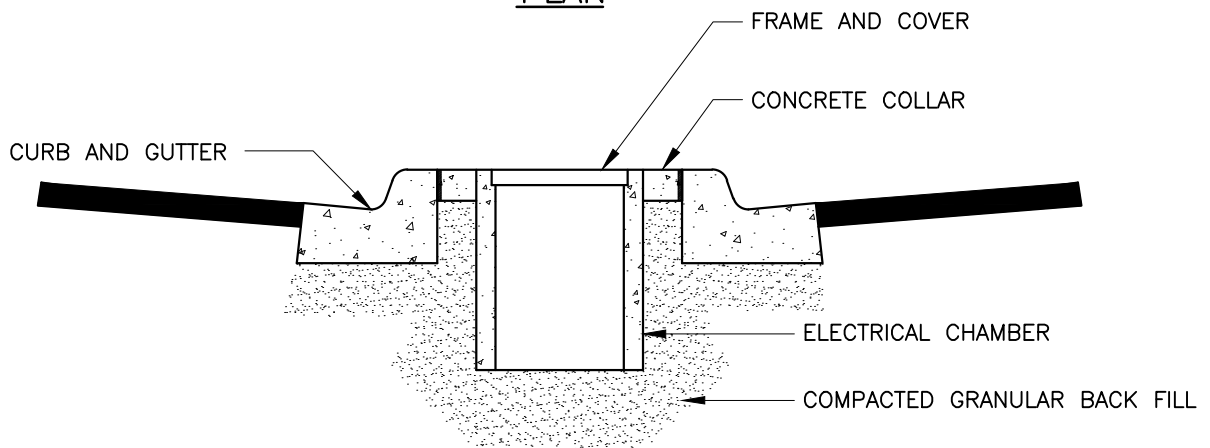
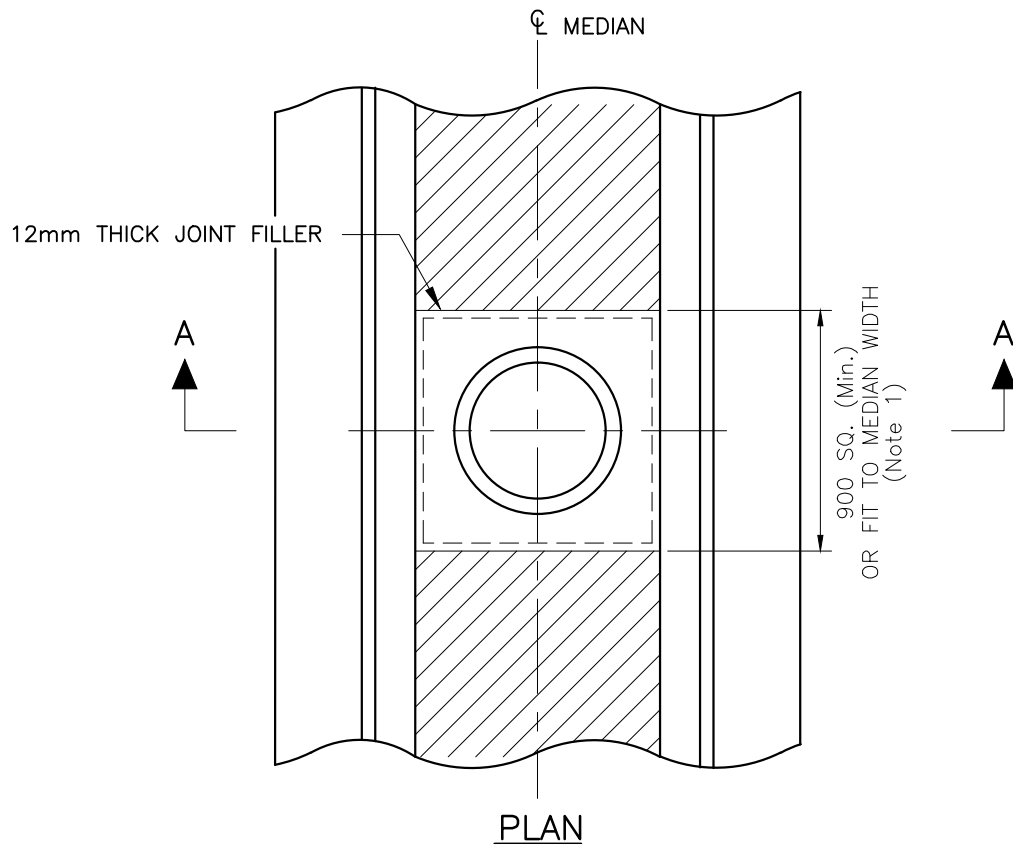
1. CONTRACTOR TO SUPPLY AND PLACE POLYPROPYLENE FISH STRING IN ALL CONDUITS.

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TYPICAL MEDIAN ISLAND ELECTRICAL CHAMBER / JUNCTION BOX INSTALLATION

Rev. Date	Rev. No. <u> 0 </u>
Modification: <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	
Modified By: <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	
Date: <u> </u> <u> </u> <u> </u> <u> </u> <u> </u>	
STANDARD No. UTS 602.060	



NOTE:

1. USE CONCRETE COLLAR WHEN MEDIAN SURFACE CAPPED WITH PAVING STONE, CONCRETE OR ASPHALT.

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

(OPSD 2118.01M)

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ELECTRICAL CHAMBER
CONCRETE COLLAR
IN MEDIAN**

Rev. Date

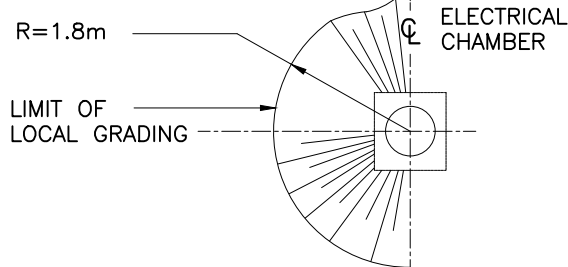
Rev. No. 0

Modification: _____

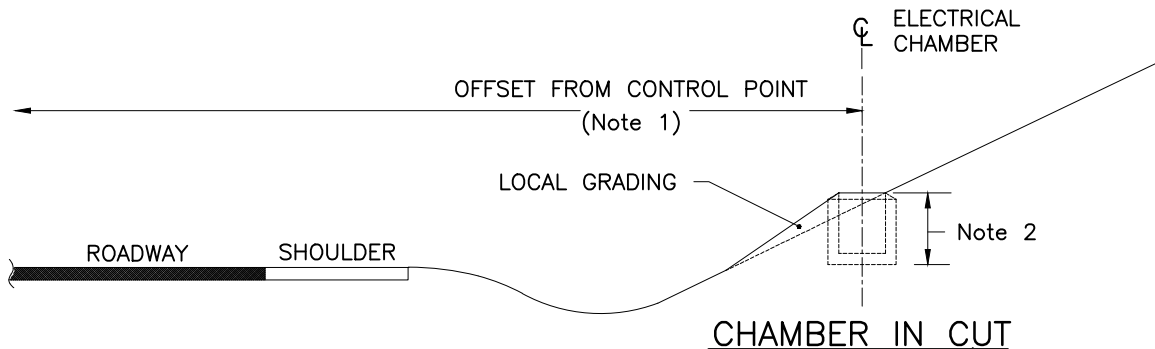
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

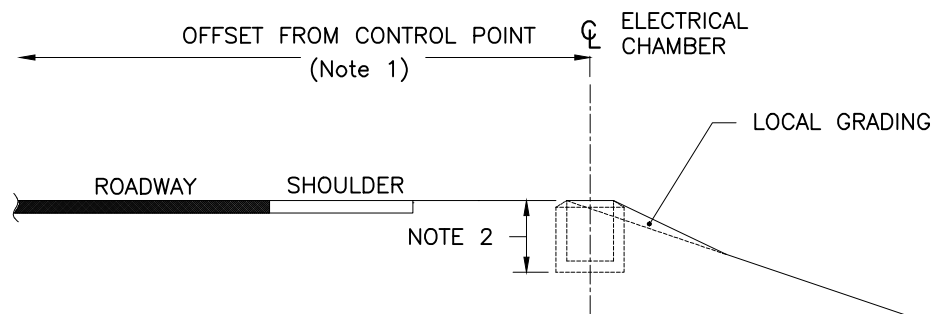
STANDARD No. UTS 602.070



TYPICAL PLAN



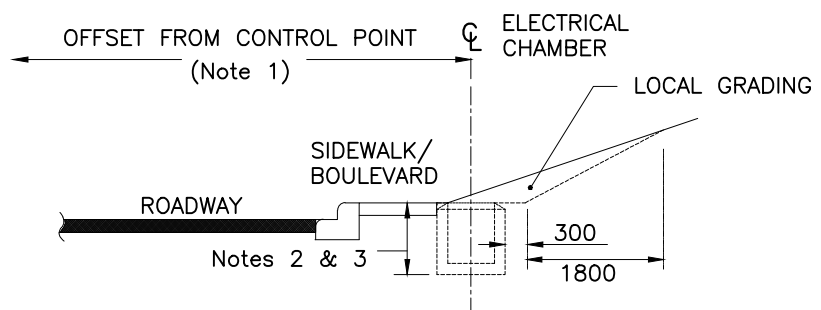
CHAMBER IN CUT



CHAMBER IN FILL

NOTES:

1. FOR LOCATION AND OFFSET, SEE CONTRACT DRAWINGS.
2. TOP ELEVATION OF CHAMBER SHALL BE MEASURED FROM THE HIGHEST GRADE ELEVATION.
3. SIDEWALK LOCATIONS SHALL HAVE FRAME FLOATED LEVEL INTO BOXED OUT AREA IN SIDEWALK CONCRETE WITHIN A 900mm x 900mm BOXED OUT AREA.



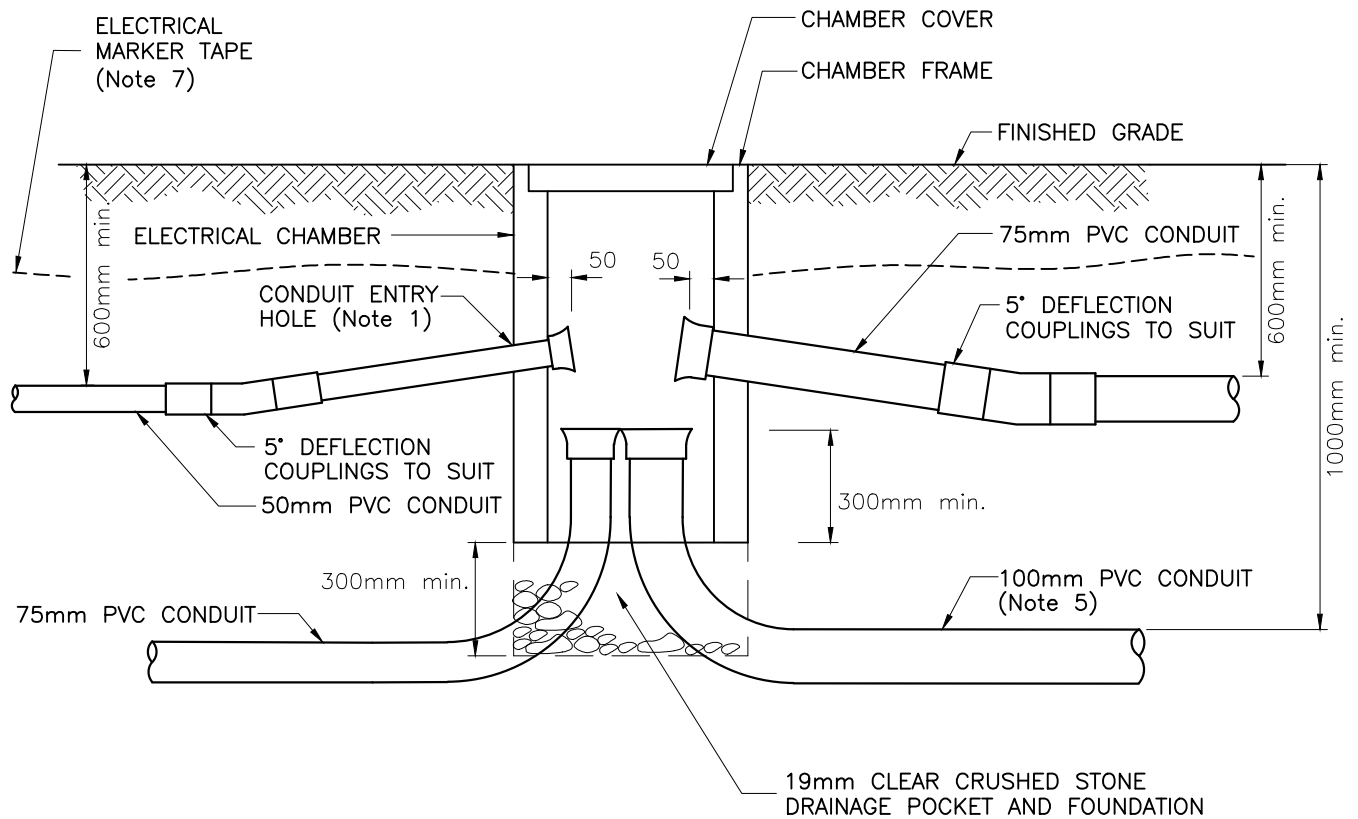
CHAMBER ADJACENT TO SIDEWALK

ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**LOCAL GRADING FOR
ELECTRICAL CHAMBERS**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 602.080</u>	



NOTES:

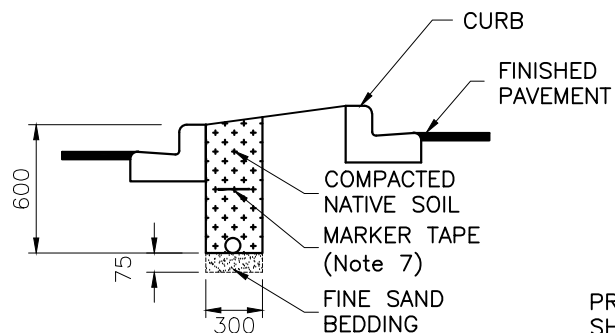
1. DUCTS IN ENTRY HOLES TO BE LEFT FREE FOR MOVEMENT.
2. ALL DUCTS MUST BE CLEAN AND FREE OF ALL DEBRIS AND OBSTRUCTIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL POLYPROPYLENE FISH STRING IN ALL CONDUITS.
4. ENDS OF ALL CONDUITS MUST BE CAPPED UNTIL WIRE PULLED.
5. ALL DUCTS USED IN DIRECTIONAL BORING TO BE HIGH DENSITY POLYPIPE.
6. TRANSITIONS FROM HIGH DENSITY POLYPIPE TO RIGID PVC CONDUIT SHALL BE DONE WITH RIGID PVC CONDUIT OR SWEEPS WITH BELL COUPLING END.
7. MARKER TAPE (POLY) SHALL BE PLACED AT MID POINT DEPTH OF OPEN CUT INSTALLATION.

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

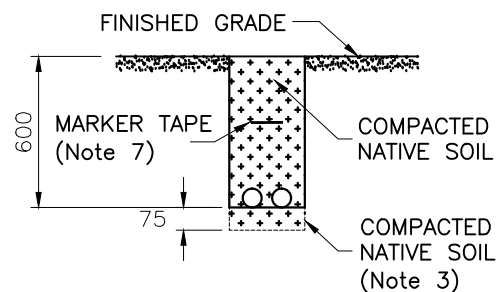
UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ELECTRICAL CHAMBER ENTRY OF DIRECT BURIED DUCTS

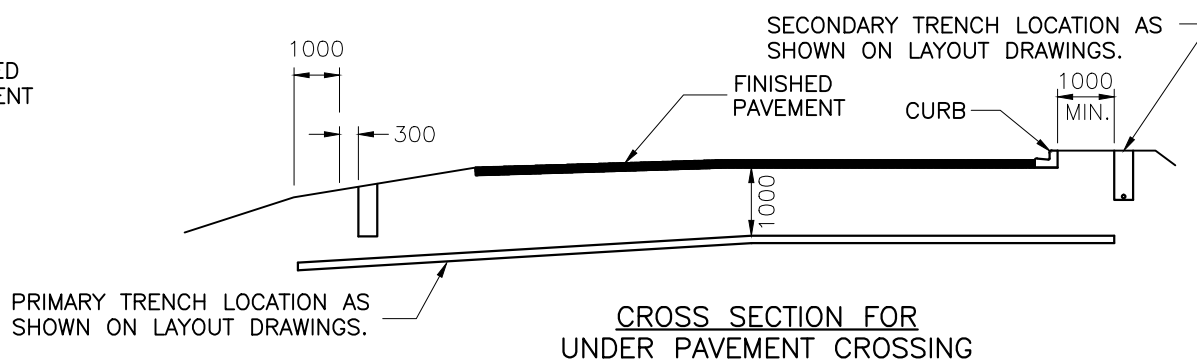
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 602.090</u>	



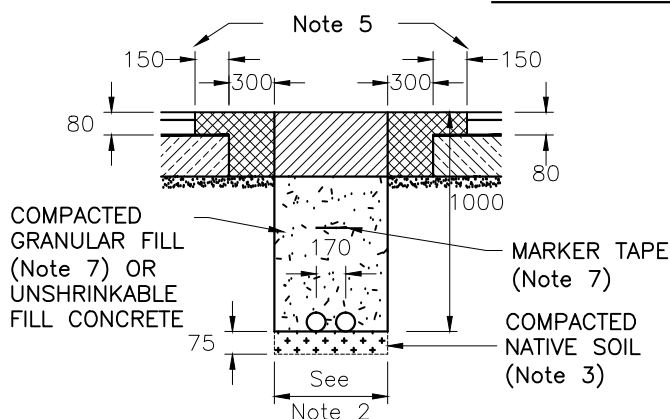
MEDIAN ISLAND TRENCH
DIRECT BURIED



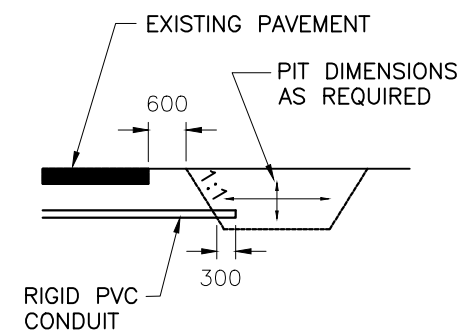
SECONDARY TRENCH
RIGID PVC CONDUIT
DIRECT BURIED



CROSS SECTION FOR
UNDER PAVEMENT CROSSING



PRIMARY TRENCH
RIGID PVC CONDUIT
DIRECT BURIED



TYPICAL SECTION AT
AUGURING PIT

NOTE:

1. ALL WORK WITHIN THE RIGHT-OF-WAY SHALL CONFORM TO THE CONDITIONS STIPULATED IN THE OPERATING AUTHORITY ROAD OCCUPANCY PERMIT.
 2. TRENCHES SHALL BE 300mm (Typ.) WIDE AND 1m DEEP (EXCEPT SECONDARY TRENCH) WITH VERTICAL WALLS. SAW CUT ASPHALT FULL DEPTH TO GRANULAR BASE PRIOR TO REMOVAL.
 3. INSTALL SAND BASE IN STONE OR ROCK SOIL CONDITIONS.
 4. CONDUIT SIZE AND TYPE AS PER LAYOUT DRAWINGS AND DOCUMENTS.
 5. PRIOR TO BACKFILLING TRENCH, REMOVE ASPHALT FULL DEPTH FOR 300mm AND STEP JOINT 150mm WIDE, 80mm DEPTH ON EACH SIDE OF TRENCH. COMPACT DISTURBED AREA AND RESURFACE WITH ASPHALT MATERIAL.
 6. ALL DUCT SYSTEMS SHALL HAVE A POLYPROPYLENE FISH STRING PULLED WITH CABLES OR LEFT IN SPARE DUCTS, FOR FUTURE USE. SINGLE SPARE CONDUIT SYSTEMS SHALL HAVE 1-#14 AWG CONDUCTOR FOR LOCATING PURPOSES.
 7. MARKER TAPE (POLY) SHALL BE PLACED AT MID POINT DEPTH OF OPEN CUT INSTALLATION WITH GRANULAR FILL.

ALL DIMENSIONS IN mm EXCEPT AS NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TYPICAL UNDERGROUND CONDUIT DETAILS

Rev. Date

Rev. No. 0

Modification:

Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 603.010

19 CONDUCTOR CABLE (OPSS 2409)					
M.T.O. Conductor #	Insulator Colour	Lettering	Abv. Colour Ref.	Conductor Assignment to Signal Indication	
				Cable Group 1	Cable Group 2
1	WHITE	White One	W1	Main Street – Neutral	Main Street – Neutral
2	WHITE	White Two	W2	Side Street – Neutral	Side Street – Neutral
3	BLACK	–	–	Spare	Spare
4	ORANGE	–	–	Spare	Spare
5	RED	Red One	R1	Main Street – Red – Phase 2 or 6	Main Street – Red – Phase 2 or 6
6	RED	Red Two	R2	Side Street – Red – Phase 4 or 8	Side Street – Red – Phase 4 or 8
7	RED	Red Three	R3	Left Red – Phase 1, 3, 5 or 7	Left Red – Phase 1, 3, 5 or 7
8	RED	Red Four	R4	Main Street – Don't Walk – Phase 2 or 6	Main Street – Don't Walk – Phase 2 or 6
9	RED	Red Five	R5	Side Street – Don't Walk – Phase 4 or 8	Side Street – Don't Walk – Phase 4 or 8
10	YELLOW	Amber One	A1	Main Street – Amber – Phase 2 or 6	Main Street – Amber – Phase 2 or 6
11	YELLOW	Amber Two	A2	Side Street – Amber – Phase 4 or 8	Side Street – Amber – Phase 4 or 8
12	YELLOW	Amber Three	A3	Left Amber (Arrow) – Phase 1, 3, 5, or 7	Left Amber (Arrow) – Phase 1, 3, 5 or 7
13	YELLOW	Amber Four	A4	Spare	Spare
14	YELLOW	Amber Five	A5	Spare	Spare
15	BLUE	Green One	G1	Main Street – Green – Phase 2 or 6	Main Street – Green – Phase 2 or 6
16	BLUE	Green Two	G2	Side Street – Green – Phase 4 or 8	Side Street – Green – Phase 4 or 8
17	BLUE	Green Three	G3	Left Green (Arrow) – Phase 1, 3, 5 or 7	Left Green (Arrow) – Phase 1, 3, 5 or 7
18	BLUE	Green Four	G4	Main Street – Walk – Phase 2 or 6	Main Street – Walk – Phase 2 or 6
19	BLUE	Green Five	G5	Side Street – Walk – Phase 4 or 8	Side Street – Walk – Phase 4 or 8

7 CONDUCTOR RISER CABLE (OPSS 2409)				
M.T.O. Conductor #	Insulator Colour	Lettering	Abv. Colour Ref.	Conductor Assignment to Vehicle Signal Indication (Multi-Sectional)
1	WHITE	–	W	Neutral
2	RED	Red One	R1	Red
3	RED	Red Two	R2	Spare
4	YELLOW	Amber One	A1	Amber
5	YELLOW	Amber Two	A2	(Amber Arrow)
6	BLUE	Green One	G1	Green
7	BLUE	Green Two	G2	(Green Arrow)

4 CONDUCTOR RISER CABLE (OPSS 2409)				
M.T.O. Conductor #	Insulator Colour	Abv. Colour Ref.	Lettering	Conductor Assignment to Pedestrian Signal Indication
1	WHITE	W	–	Neutral
2	RED	R	–	Don't Walk (DW)
3	YELLOW	Y	–	Spare
4	BLUE	Blu	–	Walk (W)

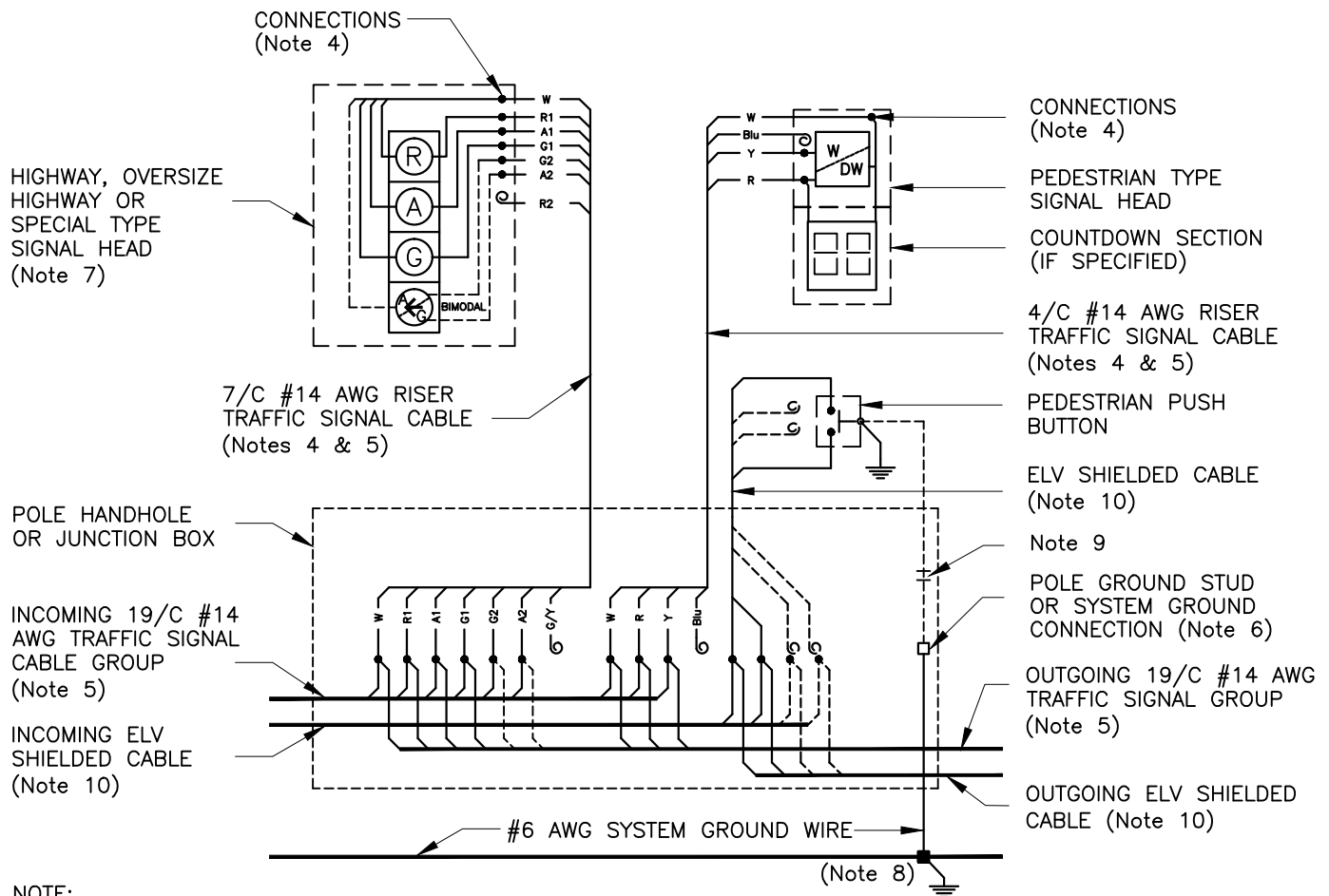
NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE DRAWINGS UTS 604.021 AND UTS 604.025.
2. TYPICALLY USED IN CITY OF BURLINGTON MAINTENANCE AREA. DESIGNER TO CONFIRM APPLICATION.
3. REFER TO MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.

**UNIFORM TRAFFIC SIGNAL STANDARD
 HALTON REGION AND LOCAL MUNICIPALITIES**

**M.T.O. CABLE ASSIGNMENT
 FOR TRAFFIC SIGNAL
 CONTROL**

Rev. Date	Rev. No. <u> 0 </u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 604.010</u>	



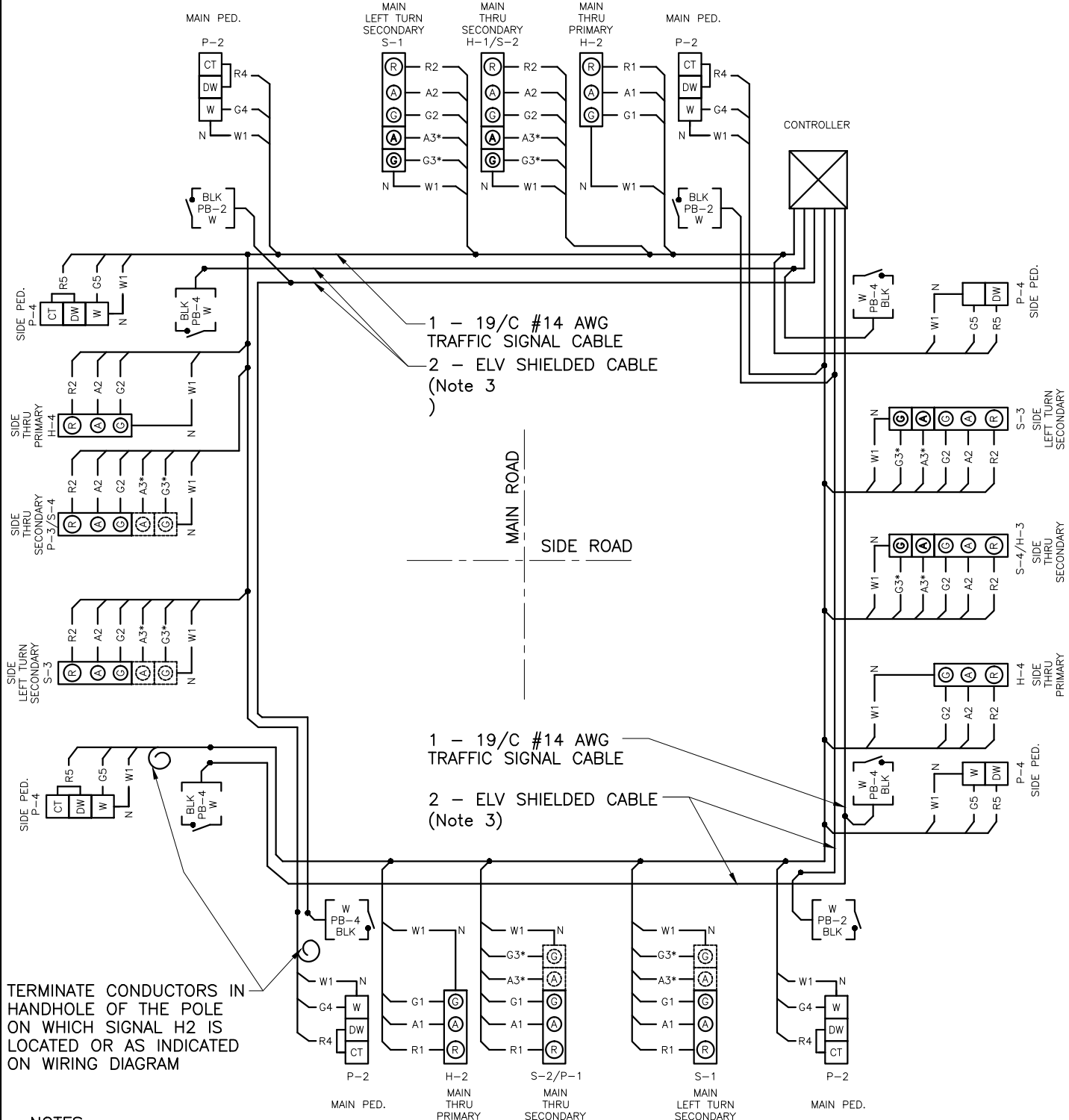
NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS UTS 604.010, UTS 604.015 AND UTS 604.016.
2. TRAFFIC SIGNAL CABLE SHALL BE RUN COMPLETELY AROUND THE INTERSECTION AND SHALL BE BROUGHT UP INTO THE HANDHOLE OF EACH POLE. ALL CONNECTIONS TO BE MADE ABOVE GROUND ELEVATION AT THE POLE HANDHOLE.
3. SIGNAL HEAD SHALL BE MADE AS SHOWN IN DETAIL.
4. ALL CONDUCTORS OF SIGNAL HEAD RISER CABLES (FROM THE POLE HANDHOLE) SHALL BE SOLID CONDUCTORS AND TERMINATED.
5. ALL POLE HANDHOLE CONNECTIONS AND TERMINATION OF CABLE SHALL BE MADE WITH INSULATED SPRING TYPE CONNECTORS. BUNDLE AND TAPE GROUPS OF CABLES LEAVING CONNECTORS EXPOSED NEATLY IN THE POLE HANDHOLE. LEAVE A 1.5m LOOP OF EACH CABLE COILED IN THE NEAREST ELECTRICAL CHAMBER AND A 0.5m LOOP IN EACH POLE HANDHOLE.
6. ALL CONDUCTORS DESIGNATED AS GROUND SHALL BE GROUNDED AT THE POLE GROUND STUD. A #6 AWG INSULATED (GREEN) SYSTEM GROUND WIRE SHALL BE RUN CONTINUOUSLY THROUGH THE SYSTEM AND CONNECTED TO EACH POLE GROUND STUD AS PER WIRING DIAGRAM.
7. THE GREEN/AMBER ARROW DISPLAY OF A FOUR SECTION HEAD SHALL CONSIST OF A SINGLE SECTION WITH A LED BIMODAL ARROW.
8. SYSTEM GROUND WIRE SHALL BE RUN CONTINUOUSLY AROUND THE INTERSECTION AND CONNECTED TO A GROUND ELECTRODE AT EACH QUADRANT ELECTRICAL CHAMBER.
9. INSTALL A 1/C #14 IGRD FROM HOUSING TO NEAREST COMMON GROUND POINT WHEN PEDESTRIAN PUSH BUTTON IS MOUNTED ON CONCRETE OR WOOD POLE.
10. REFER TO CONTRACT DRAWINGS AND MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**TYPICAL TRAFFIC SIGNAL
POLE WIRING SCHEMATIC
(MTO CABLE)**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 604.011</u>	



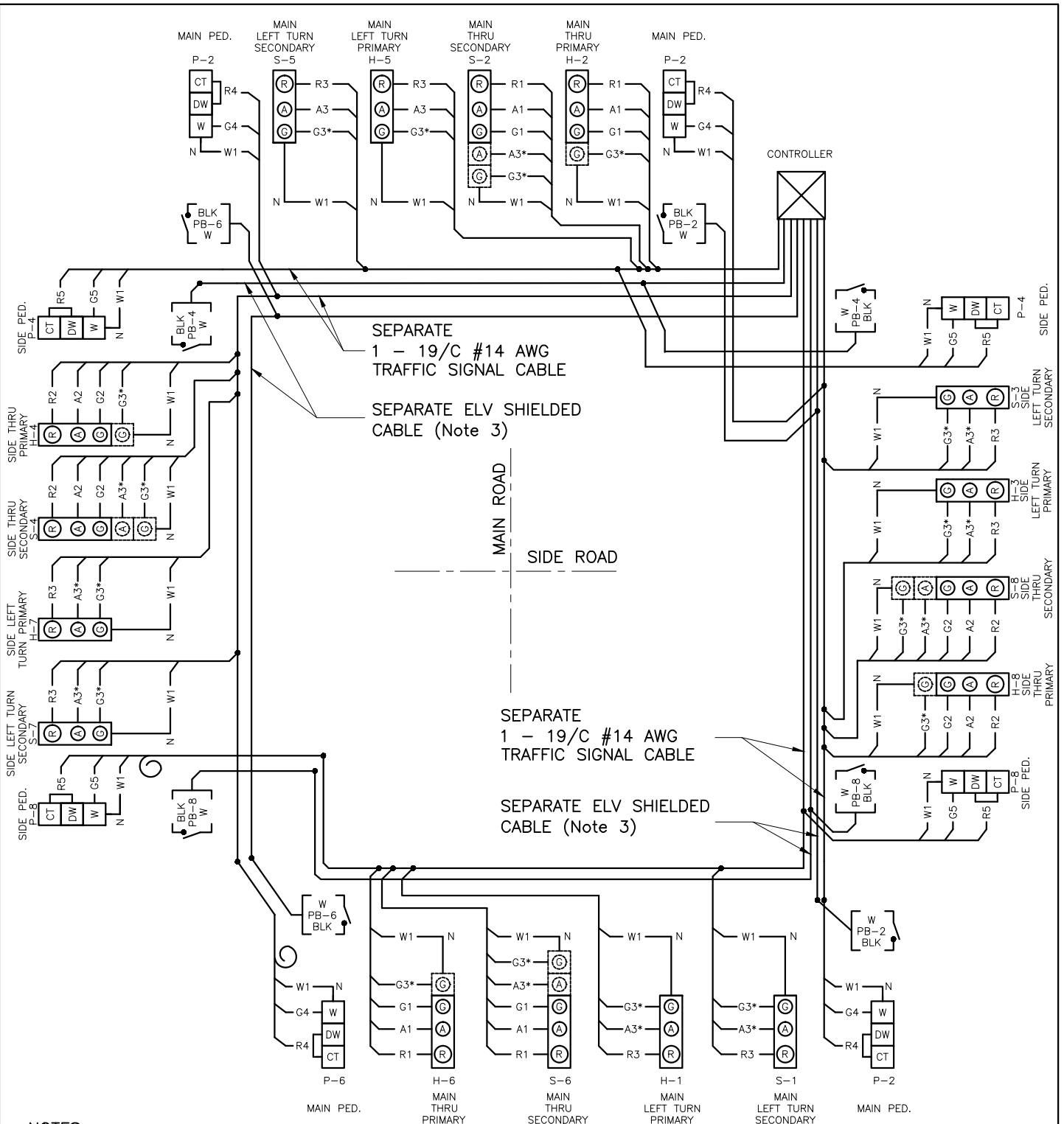
NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS UTS 604.010 AND UTS 604.015.
 - MAIN STREET IS COORDINATED PHASE ON TRAFFIC CONTROL SYSTEM.
 - REFER TO CONTRACT DRAWINGS AND MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.
- * - R3, A3 AND G3 CAN ONLY BE ASSIGNED TO ONE ARROW PHASE

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TYPICAL TRAFFIC SIGNAL WIRING SCHEMATIC (MTO 19/C CABLE) - TWO TO FOUR PHASE

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 604.015</u>	



NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS UTS 604.010 AND UTS 604.015.
 2. MAIN STREET IS COORDINATED PHASE ON TRAFFIC CONTROL SYSTEM.
 3. REFER TO CONTRACT DRAWINGS AND MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.
- * - R3, A3 AND G3 CAN ONLY BE ASSIGNED TO ONE ARROW PHASE

**UNIFORM TRAFFIC SIGNAL STANDARD
 HALTON REGION AND LOCAL MUNICIPALITIES**

**TYPICAL TRAFFIC SIGNAL
 WIRING SCHEMATIC
 (MTO 19/C CABLE) – FIVE TO EIGHT PHASE**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 604.016</u>	

19 CONDUCTOR (SOLID) CABLE (20) 2 GROUPS FOR 4 PHASE / 4 GROUPS FOR 8 PHASE OPERATIONS				
Insulator Colour/Tracer		Abv. Colour Ref.	Wire Colour Conductor #	Conductor Assignment to Signal Indication
1	PURPLE	P	4	Main Street Through Green
2	ORANGE	O	5	Main Street Through Amber
3	RED	R	3	Main Street Through Red
4	PURPLE/BLACK	P/Blk	9	Side Street Through Green
5	ORANGE/BLACK	O/Blk	10	Side Street Through Amber
6	RED/BLACK	R/Blk	8	Side Street Through Red
7	PURPLE/WHITE	P/W	14	Left Turn Green
8	ORANGE/RED	O/R	18	Left Turn Amber
9	RED/WHITE	R/W	13	Left Turn Red
10	BLUE	Blu	6	Walk – Main Street
11	BLUE/BLACK	Blu/Blk	11	Walk – Side Street
12	BLUE/WHITE	Blu/W	15	Spare
13	BLUE/RED	Blu/R	19	Don't Walk – Main Street
14	BLACK	Blk	1	Spare
15	BLACK/WHITE	Blk/W	12	Spare
16	BLACK/RED	Blk/R	16	Don't Walk – Side Street
17	WHITE	W	2	Neutral
18	WHITE/BLACK	W/Blk	7	Spare
19	WHITE/RED	W/R	17	Spare
20	RED/GREEN	R/G	20	Spare (If Used)

7 CONDUCTOR (SOLID) RISER CABLE (VEHICLE SIGNALS)				
Insulator Colour/Tracer		Abv. Colour Ref.	Wire Colour Conductor #	Conductor Assignment to Vehicle Signal Indication (Multi-Sectional)
1	PURPLE	P	4	Green
2	ORANGE	O	5	Amber
3	RED	R	3	Red
4	BLUE	Blu	6	(Green Arrow)
5	BLACK	Blk	1	(Amber Arrow)
6	WHITE	W	2	Neutral
7	WHITE/BLACK	W/Blk	7	Spare

NOTE:

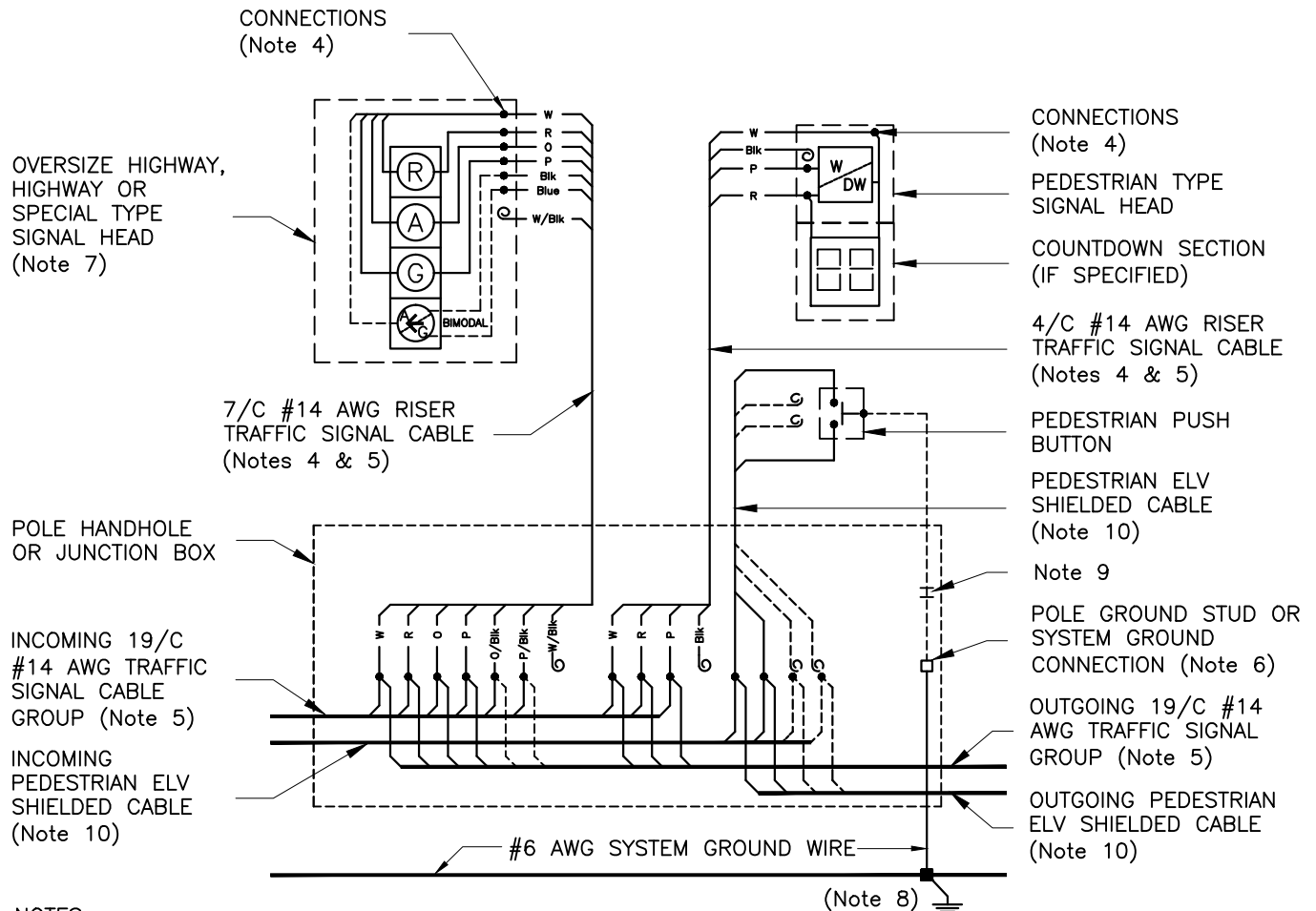
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE DRAWINGS UTS 604.021 AND UTS 604.025.
2. TYPICALLY USED IN TOWN OF OAKVILLE, TOWN OF MILTON, TOWN OF HALTON HILLS. DESIGNER TO CONFIRM APPLICATION.
3. REFER TO MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

I.M.S.A. SPECIFICATION #19-1C-2001
CABLE ASSIGNMENT FOR TRAFFIC
CONTROL SIGNAL INSTALLATIONS

Rev. Date	Rev. No. <u> 0 </u>
Modification: _____	

Modified By:	McCORMICK RANKIN
Date:	FEBRUARY, 2014
STANDARD No. UTS 604.020	



NOTES:

- THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS UTS 604.020 AND UTS 604.025.
- TRAFFIC SIGNAL CABLE SHALL BE RUN COMPLETELY AROUND THE INTERSECTION AND SHALL BE BROUGHT UP INTO THE HANDHOLE OF EACH POLE. ALL CONNECTIONS TO BE MADE ABOVE GROUND ELEVATION AT THE POLE HANDHOLE.
- SIGNAL HEAD AND PUSH BUTTON CONNECTIONS SHALL BE MADE AS SHOWN IN DETAIL.
- ALL CONDUCTORS OF SIGNAL HEAD RISER CABLES (FROM THE POLE HANDHOLE) SHALL BE SOLID CONDUCTORS AND TERMINATED.
- ALL POLE HANDHOLE CONNECTIONS AND TERMINATION OF CABLE SHALL BE MADE WITH INSULATED SPRING TYPE CONNECTORS. BUNDLE AND TAPE GROUPS OF CABLES LEAVING CONNECTORS EXPOSED NEATLY IN THE POLE HANDHOLE. LEAVE A 1.5m LOOP OF EACH CABLE COILED IN THE NEAREST ELECTRICAL CHAMBER AND A 0.5m LOOP IN EACH POLE HANDHOLE.
- ALL CONDUCTORS DESIGNATED AS GROUND SHALL BE GROUNDED AT THE POLE GROUND STUD. A #6 AWG INSULATED (GREEN) SYSTEM GROUND WIRE SHALL BE RUN CONTINUOUSLY THROUGH THE SYSTEM AND CONNECTED TO EACH POLE GROUND STUD AS PER WIRING DIAGRAM.
- THE GREEN/AMBER ARROW DISPLAY OF A FOUR SECTION HEAD SHALL CONSIST OF A SINGLE SECTION WITH A LED BIMODAL ARROW.
- SYSTEM GROUND WIRE SHALL BE RUN CONTINUOUSLY AROUND THE INTERSECTION AND CONNECTED TO A GROUND ELECTRODE AT EACH QUADRANT ELECTRICAL CHAMBER.
- INSTALL A 1/C #14 IGRD FROM HOUSING TO NEAREST COMMON GROUND POINT WHEN PEDESTRIAN PUSH BUTTON IS MOUNTED ON CONCRETE OR WOOD POLE.
- REFER TO CONTRACT DRAWINGS AND MANUFACTURER STANDARDS FOR ALL PERIPHERAL DEVICE CABLING.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TYPICAL TRAFFIC SIGNAL POLE WIRING SCHEMATIC (I.M.S.A. #19-1C-2001 CABLE)

Rev. Date

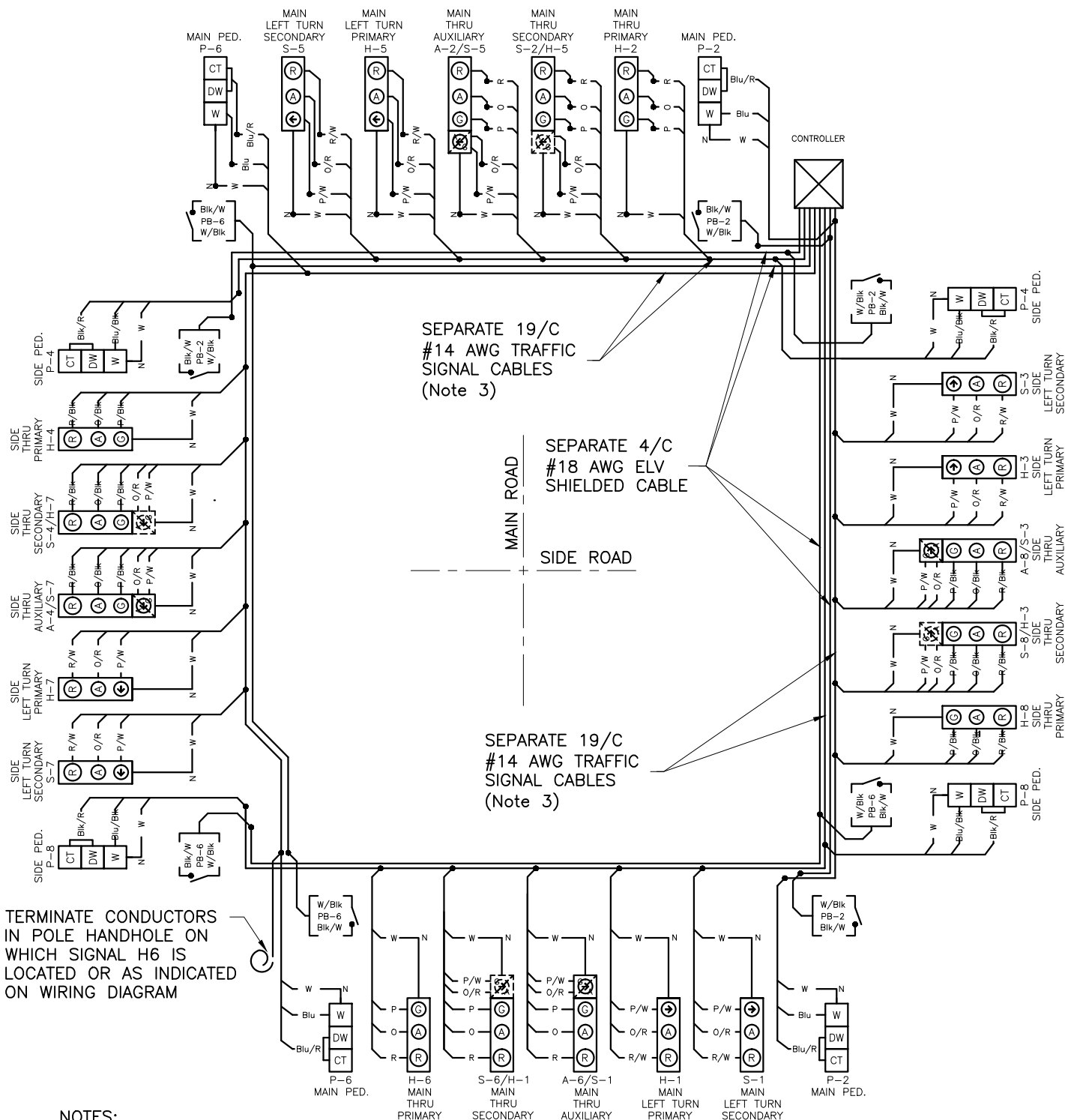
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 604.021



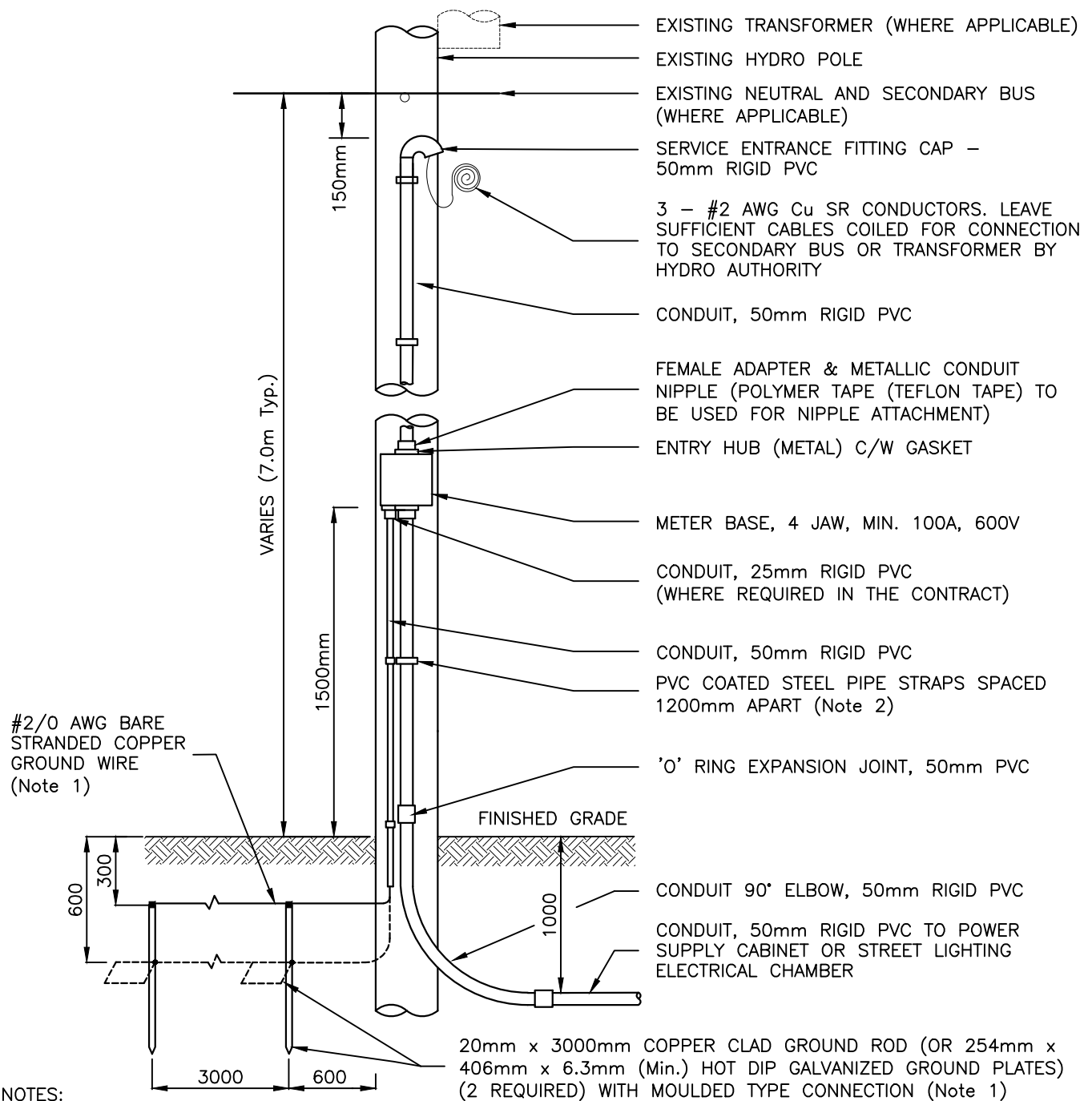
NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING UTS 604.020 AND UTS 604.021
2. MAIN STREET IS COORDINATED PHASE ON TRAFFIC CONTROL SYSTEM.
3. THE 19/C CAN BE SUBSTITUTED WITH 20/C CABLE.
4. USE TWO CABLE GROUPS FOR 4-PHASE OPERATION. REFER TO CONTRACT DRAWINGS.

**UNIFORM TRAFFIC SIGNAL STANDARD
 HALTON REGION AND LOCAL MUNICIPALITIES**

**TYPICAL TRAFFIC SIGNAL
 WIRING SCHEMATIC**
 (I.M.S.A. #19-1C-2001 - 19/C CABLE)

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. UTS 604.025	



NOTES:

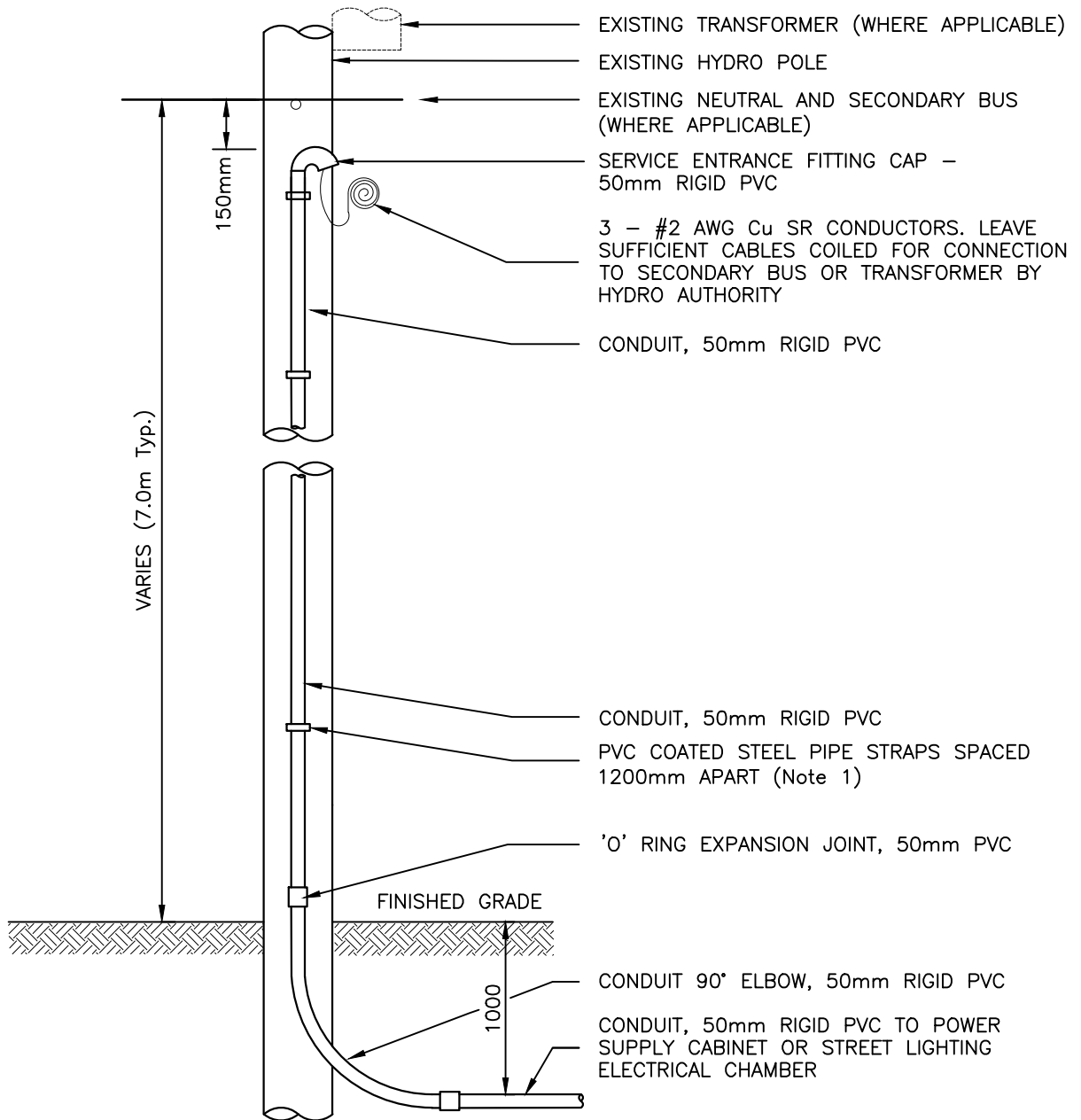
- WORK ON HYDRO POLE SHALL BE DONE ONLY IN THE PRESENCE OF OR WITH THE PERMISSION OF THE LOCAL HYDRO AUTHORITY.
 - COORDINATE THIS WORK WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
 - MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.
- ONLY INSTALL RODS (OR PLATES) WITH GROUND WIRE CONDUIT FOR STREETLIGHTING SUPPLY LOCATIONS.
 - 16mm STAINLESS STEEL BANDING TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ISOLATED METER BASE
APPLICATION FOR SECONDARY
SUPPLY FACILITY**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 614.010</u>	



NOTES:

- WORK ON HYDRO POLE SHALL BE DONE ONLY IN THE PRESENCE OF OR WITH THE PERMISSION OF THE LOCAL HYDRO AUTHORITY.
- COORDINATE THIS WORK WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
- MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.

- 16mm STAINLESS STEEL BANDING TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.

DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ISOLATED STACK FOR SECONDARY SUPPLY TO PEDESTAL FACILITY

Rev. Date

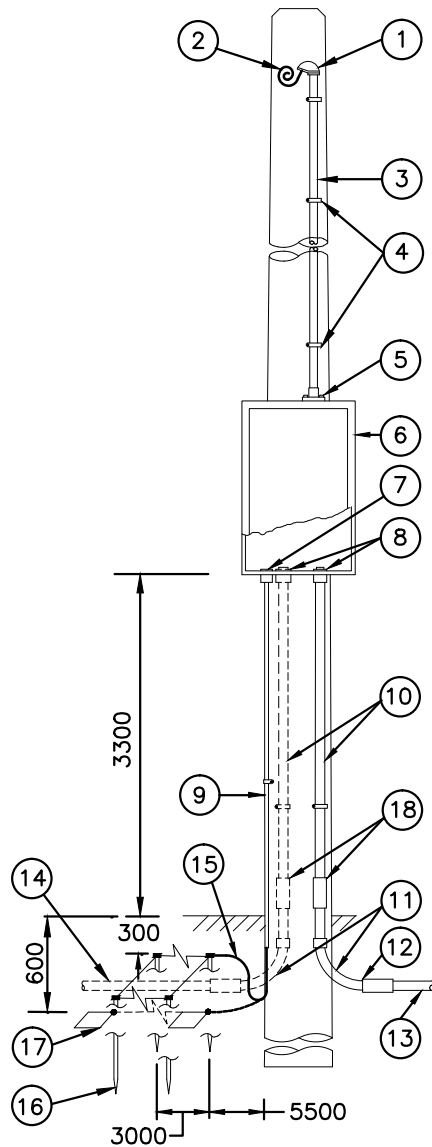
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 614.011



OVERHEAD SUPPLY INSTALLATION

A. INDEPENDENT POLE INSTALLATION
OWNED BY OPERATING AUTHORITY

ALL DIMENSIONS ARE MILLIMETRES
UNLESS OTHERWISE NOTED.

- ① SERVICE ENTRANCE FITTING CAP, 32mm, RIGID PVC
- ② 3 - #2 AWG Cu SR CONDUCTORS. LEAVE SUFFICIENT CABLES COILED FOR CONNECTION TO SECONDARY BUSS OR TRANSFORMER BY LOCAL HYDRO AUTHORITY.
- ③ CONDUIT, 32mm RIGID PVC
- ④ PVC COATED STEEL PIPE STRAPS SPACED 1.2m (Note 5)
- ⑤ FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 32mm RIGID STEEL, C/W GASKET
- ⑥ SUPPLY CONTROL CABINET ASSEMBLY (UTS 614.030 OR UTS 614.031)
- ⑦ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑧ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑨ CONDUIT, 25mm RIGID PVC
- ⑩ CONDUIT, 50mm RIGID PVC (IF REQUIRED)
- ⑪ 90° ELBOW, 50mm RIGID PVC
- ⑫ ADAPTER COUPLING, 50mm
- ⑬ CONDUIT, 50mm RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS TO TRAFFIC SIGNAL CONTROLLER OR ELECTRICAL CHAMBER.
- ⑭ CONDUIT, 50mm RIGID PVC, IF REQUIRED TO ELECTRICAL CHAMBER FOR STREETLIGHTING.
- ⑮ GROUND WIRE (Note 1)
- ⑯ 20mm x 3000mm COPPER CLAD GROUND RODS (Note 1)
- ⑰ 254mm x 406mm x 6.3mm (Min.) HOT DIP GALVANIZED STEEL GROUND PLATE (Note 1)
- ⑱ 'O' RING EXPANSION JOINT, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, COPPER CLAD GROUND ELECTRODES (4 RODS FOR TRAFFIC SIGNALS OR 2 RODS FOR STREETLIGHTING) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. WORK ON HYDRO POLES BE DONE ONLY IN THE PRESENCE OF OR WITH THE PERMISSION OF THE LOCAL HYDRO AUTHORITY.
3. CO-ORDINATE CONNECTION OF SERVICE CENTRE WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
4. MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.
5. 16mm STAINLESS STEEL BANDING TAPE TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

OVERHEAD POWER SUPPLY WOOD/CONCRETE POLE MOUNTED TRAFFIC SIGNAL & STREETLIGHT APPLICATION

Rev. Date

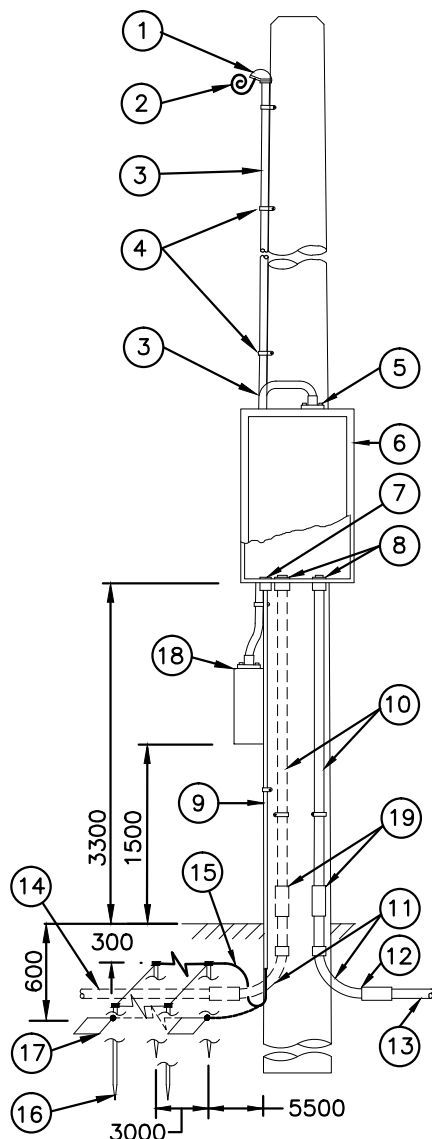
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

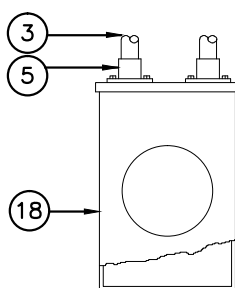
Date: FEBRUARY, 2014

STANDARD No. UTS 614.020



OVERHEAD SUPPLY INSTALLATION

FOR
OVERHEAD
SUPPLY
INSTALLATION
ONLY



DETAIL OF METER BASE INSTALLATION

- ① SERVICE ENTRANCE FITTING CAP, 32mm, RIGID PVC
- ② 3 - #2 AWG Cu SR CONDUCTORS. LEAVE SUFFICIENT CABLES COILED FOR CONNECTION TO SECONDARY BUSS OR TRANSFORMER BY LOCAL HYDRO AUTHORITY.
- ③ CONDUIT, 32mm RIGID PVC
- ④ PVC COATED STEEL PIPE STRAPS SPACED 1.2m (Note 5)
- ⑤ FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 32mm RIGID STEEL, C/W GASKET
- ⑥ SUPPLY CONTROL CABINET (LOAD CENTRE) (UTS 614.030 OR UTS 614.031)
- ⑦ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑧ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑨ CONDUIT, 25mm RIGID PVC
- ⑩ CONDUIT, 50mm RIGID PVC (IF REQUIRED)
- ⑪ 90° ELBOW, 50mm RIGID PVC
- ⑫ ADAPTER COUPLING, 50mm
- ⑬ CONDUIT, 50mm RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS. TO TRAFFIC SIGNAL CONTROLLER OR ELECTRICAL CHAMBER
- ⑭ CONDUIT, 50mm RIGID PVC, IF REQUIRED TO ELECTRICAL CHAMBER FOR STREETLIGHTING.
- ⑮ GROUND WIRE, (Note 1)
- ⑯ 20mm x 3000mm COPPER CLAD GROUND RODS (Note 1)
- ⑰ 254mm x 406mm x 6.3mm (Min.) HOT DIP GALVANIZED GROUND PLATE (Note 1)
- ⑱ METER BASE, 100A, 600V (INDICATED IN THE CONTRACT)
- ⑲ 'O' RING EXPANSION JOINT, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, 4-GROUND ELECTRODES (RODS OR PLATES) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. CO-ORDINATE CONNECTION OF SERVICE CENTRE WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
3. 16mm STAINLESS STEEL BANDING TAPE TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.
4. INDEPENDENT POLE INSTALLATION OWNED BY THE OPERATING AUTHORITY

ALL DIMENSIONS ARE MILLIMETRES UNLESS OTHERWISE NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

METERED OVERHEAD POWER SUPPLY WOOD/CONCRETE POLE MOUNTED TRAFFIC SIGNAL & STREETLIGHT APPLICATION

Rev. Date

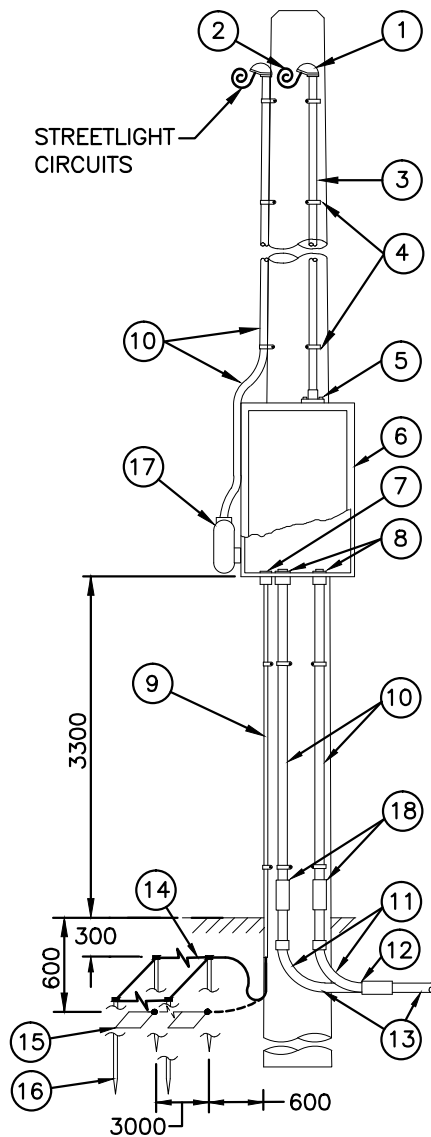
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 614.021



OVERHEAD SUPPLY INSTALLATION

A. INDEPENDENT POLE INSTALLATION
OWNED BY OPERATING AUTHORITY

- ① SERVICE ENTRANCE FITTING CAP, 32mm, RIGID PVC
- ② 3 - #2 AWG Cu SR CONDUCTORS. LEAVE SUFFICIENT CABLES COILED FOR CONNECTION TO SECONDARY BUSS OR TRANSFORMER BY LOCAL HYDRO AUTHORITY.
- ③ CONDUIT, 32mm RIGID PVC
- ④ PVC COATED STEEL PIPE STRAPS SPACED 1.2m (Note 5)
- ⑤ FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 32mm RIGID STEEL, C/W GASKET
- ⑥ SUPPLY CONTROL CABINET (LOAD CENTRE) (UTS 614.030 OR UTS 614.031)
- ⑦ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑧ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑨ CONDUIT, 25mm RIGID PVC
- ⑩ CONDUIT, 50mm RIGID PVC
- ⑪ 90° SWEEP, 50mm RIGID PVC
- ⑫ ADAPTER COUPLING, 50mm PVC
- ⑬ CONDUIT, 50mm, RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS TO ELECTRICAL CHAMBER.
- ⑭ GROUND WIRE, (Note 1)
- ⑮ 20mm x 3000mm COPPER CLAD GROUND RODS (Note 1)
- ⑯ 254mm x 406mm x 6.3mm (Min.) HOT DIP GALVANIZED STEEL GROUND PLATE (Note 1)
- ⑰ LB COUPLING, 50mm PVC
- ⑱ 'O' RING EXPANSION JOINT, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, COPPER CLAD GROUND ELECTRODES (4 FOR TRAFFIC SIGNALS, 2 FOR STREETLIGHTING) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. WORK ON HYDRO POLE SHALL BE DONE ONLY IN THE PRESENCE OF OR WITH THE PERMISSION OF THE LOCAL HYDRO AUTHORITY.
3. CO-ORDINATE THIS WORK WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
4. MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.
5. 16mm STAINLESS STEEL BANDING TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.

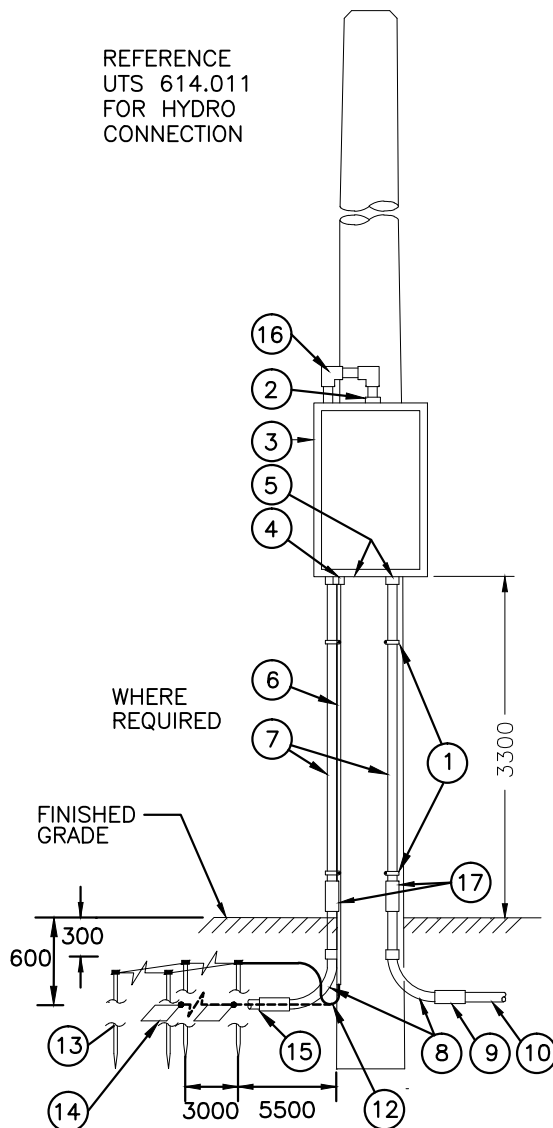
DIMENSIONS IN MILLIMETRES EXCEPT AS NOTED

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

COMBINATION UNDERGROUND & OVERHEAD SUPPLY CONTROL CABINET WOOD/CONCRETE POLE MOUNTED

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 614.022</u>	

REFERENCE
UTS 614.011
FOR HYDRO
CONNECTION



UNDERGROUND SUPPLY INSTALLATION

A. INDEPENDENT POLE INSTALLATION
OWNED BY OPERATING AUTHORITY

- ① PVC COATED STEEL PIPE STRAPS SPACED 1.2m (Note 3)
- ② FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 32mm RIGID STEEL, C/W GASKET
- ③ SUPPLY CONTROL CABINET (LOAD CENTRE) (UTS 614.030 OR UTS 614.031)
- ④ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑤ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑥ CONDUIT, 25mm RIGID PVC
- ⑦ CONDUIT, 50mm RIGID PVC
- ⑧ 90° SWEEP, 50mm RIGID PVC
- ⑨ ADAPTER COUPLING, 50mm
- ⑩ CONDUIT, 50mm, RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS, TO TRAFFIC SIGNAL CONTROLLER OR ELECTRICAL CHAMBER.
- ⑪ CONDUIT, 50mm RIGID PVC TO ELECTRICAL CHAMBER, FOR STREETLIGHTING, IF REQUIRED.
- ⑫ GROUND WIRE, (Note 1)
- ⑬ COPPER CLAD GROUND ELECTRODE, (Note 1)
- ⑭ 254mm x 406mm x 6.4mm (Min.) HOT DIP GALVANIZED STEEL GROUND PLATE (Note 1)
- ⑮ CONDUIT, 50mm, RIGID PVC TO POWER SUPPLY POINT (UTS 614.011)
- ⑯ "LB" ELBOW, 50mm RIGID PVC
- ⑰ 'O' RING EXPANSION JOINT, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, 4-GROUND ELECTRODES (RODS OR PLATES) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. CO-ORDINATE CONNECTION OF SERVICE CENTRE WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
3. 16mm STAINLESS STEEL BANDING TAPE TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.

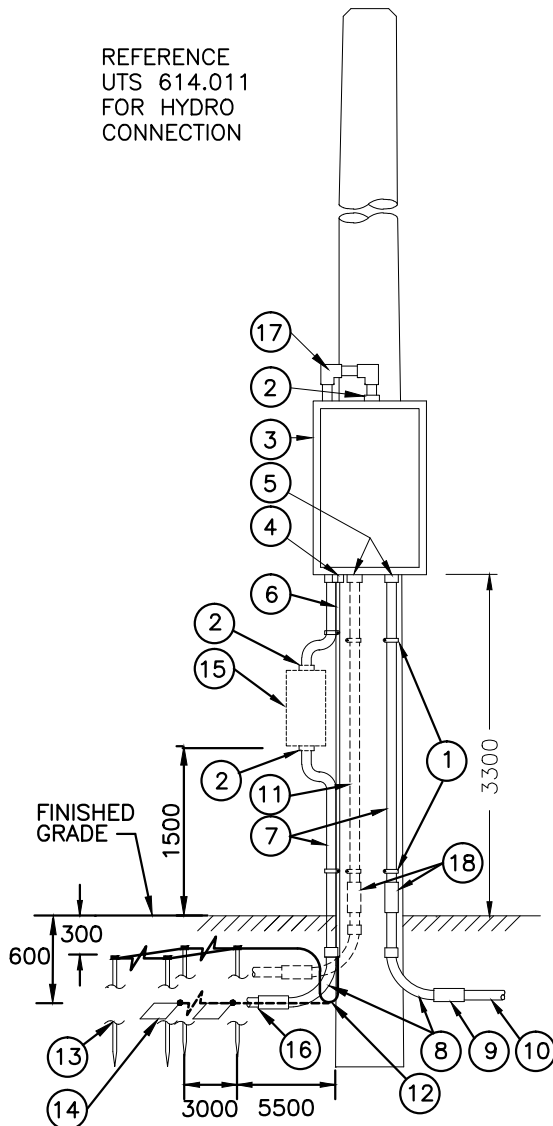
ALL DIMENSIONS ARE MILLIMETRES UNLESS OTHERWISE NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

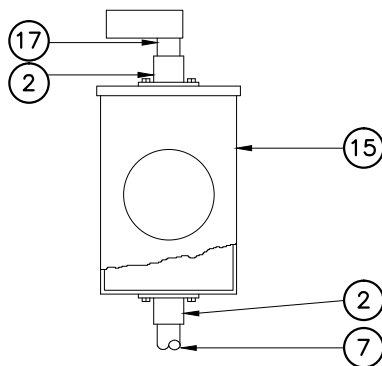
UNDERGROUND SUPPLY CONTROL CABINET WOOD/CONCRETE POLE MOUNTED TRAFFIC SIGNAL & STREETLIGHT APPLICATION

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 614.025</u>	

REFERENCE
UTS 614.011
FOR HYDRO
CONNECTION



UNDERGROUND FEED INSTALLATION



DETAIL OF METER BASE INSTALLATION

- ① PVC COATED STEEL PIPE STRAPS SPACED 1.2m (Note 5)
- ② FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 32mm RIGID STEEL, C/W GASKET
- ③ SUPPLY CONTROL CABINET (LOAD CENTRE) (UTS 614.030 OR UTS 614.031)
- ④ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑤ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑥ CONDUIT, 25mm RIGID PVC
- ⑦ CONDUIT, 50mm RIGID PVC
- ⑧ 90° SWEEP, 50mm RIGID PVC
- ⑨ ADAPTER COUPLING, 50mm
- ⑩ CONDUIT, 50mm, RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS, TO TRAFFIC SIGNAL CONTROLLER OR ELECTRICAL CHAMBER.
- ⑪ CONDUIT, 50mm RIGID PVC TO ELECTRICAL CHAMBER, FOR STREETLIGHTING, IF REQUIRED.
- ⑫ GROUND WIRE, (Note 1)
- ⑬ 20mm x 3000mm COPPER CLAD GROUND RODS (Note 1)
- ⑭ 254mm x 406mm x 6.3mm (Min.) HOT DIP GALVANIZED GROUND PLATE (Note 1)
- ⑮ METER BASE, 100A, 600V (INDICATED IN THE CONTRACT)
- ⑯ CONDUIT, 50mm, RIGID PVC TO POWER SUPPLY POINT (UTS 614.011)
- ⑰ "LB" ELBOW, 50mm RIGID PVC
- ⑱ 'O' RING EXPANSION JOINT, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, 4-GROUND ELECTRODES (RODS OR PLATES) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. CO-ORDINATE CONNECTION OF SERVICE CENTRE WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
3. 16mm STAINLESS STEEL BANDING TAPE TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.
4. INDEPENDENT POLE INSTALLATION OWNED BY THE OPERATING AUTHORITY

ALL DIMENSIONS ARE MILLIMETRES UNLESS OTHERWISE NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

METERED UNDERGROUND FEED
SUPPLY CONTROL CABINET
WOOD/CONCRETE POLE MOUNTED
TRAFFIC SIGNAL & STREETLIGHT APPLICATION

Rev. Date

Rev. No. 0

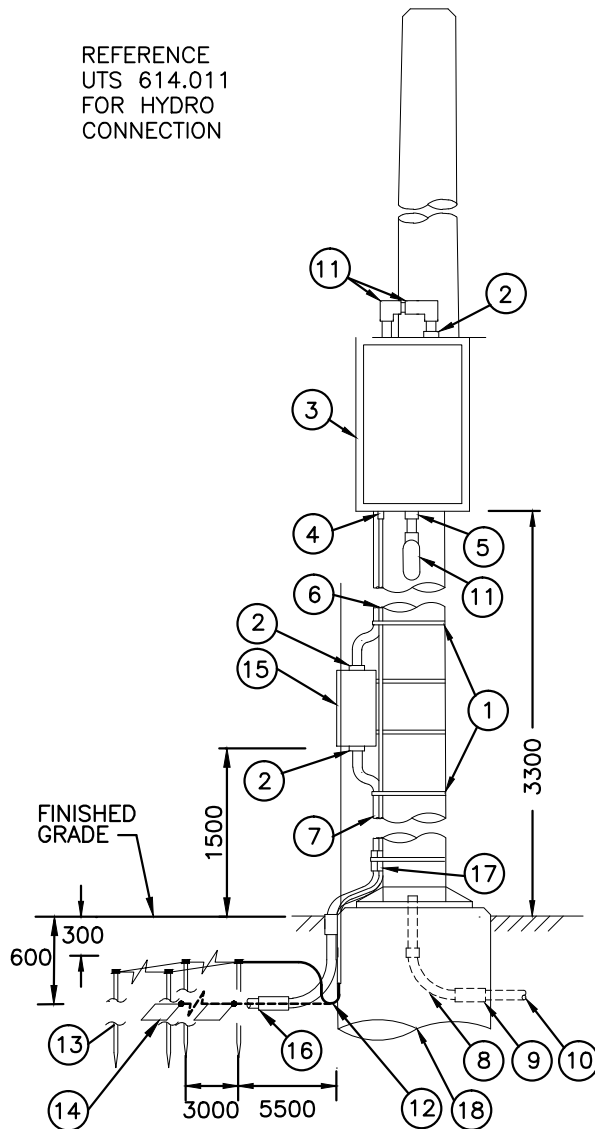
Modification: _____

Modified By: McCORMICK RANKIN

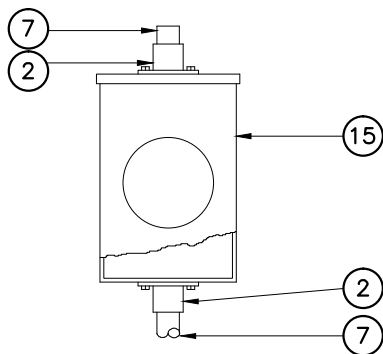
Date: FEBRUARY, 2014

STANDARD No. UTS 614.026

REFERENCE
UTS 614.011
FOR HYDRO
CONNECTION



UNDERGROUND FEED INSTALLATION



DETAIL OF METER BASE INSTALLATION

- ① 16mm STAINLESS STEEL BANDING TAPE
- ② FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT), C/W GASKET
- ③ SUPPLY CONTROL CABINET (LOAD CENTRE) (UTS 614.030 OR UTS 614.031)
- ④ TERMINAL ADAPTER AND LOCK NUT, 25mm RIGID PVC
- ⑤ TERMINAL ADAPTER AND LOCK NUT, 50mm RIGID PVC
- ⑥ CONDUIT, 25mm RIGID PVC
- ⑦ CONDUIT, 50mm RIGID PVC
- ⑧ 90° SWEEP, 50mm RIGID PVC
- ⑨ ADAPTER COUPLING, 50mm
- ⑩ CONDUIT, 50mm, RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS, TO TRAFFIC SIGNAL CONTROLLER OR ELECTRICAL CHAMBER.
- ⑪ "LB" ELBOW, 50mm RIGID PVC
- ⑫ GROUND WIRE, (Note 1)
- ⑬ 20mm x 3000mm COPPER CLAD GROUND RODS (Note 1)
- ⑭ 254mm x 406mm x 6.3m (Min.) HOT DIP GALVANIZED GROUND PLATE (Note 1)
- ⑮ METER BASE, 100A, 600V (INDICATED IN THE CONTRACT)
- ⑯ CONDUIT, 50mm, RIGID PVC TO POWER SUPPLY POINT (UTS 614.011)
- ⑰ 'O' RING EXPANSION JOINT, 50mm RIGID PVC
- ⑱ POLE FOUNDATION (REFER TO UTS 616.010 & UTS 616.011)

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING #2/0 AWG BARE STRANDED COPPER WIRE, 4-GROUND ELECTRODES (RODS OR PLATES) AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTANT RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART.
2. CO-ORDINATE CONNECTION OF SERVICE CENTRE WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE AND INCORPORATING ANY MINOR CHANGES REQUIRED.
3. INDEPENDENT POLE INSTALLATION OWNED BY THE OPERATING AUTHORITY

ALL DIMENSIONS ARE MILLIMETRES UNLESS OTHERWISE NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

METERED UNDERGROUND FEED SUPPLY CONTROL CABINET BASE MOUNTED POLE

TRAFFIC SIGNAL & STREETLIGHT APPLICATION

Rev. Date

Rev. No. 0

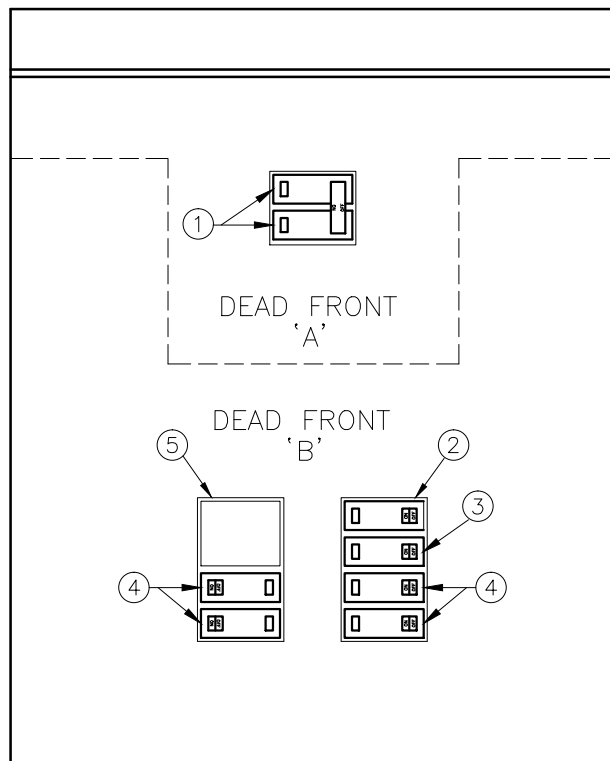
Modification: _____

Modified By: McCORMICK RANKIN

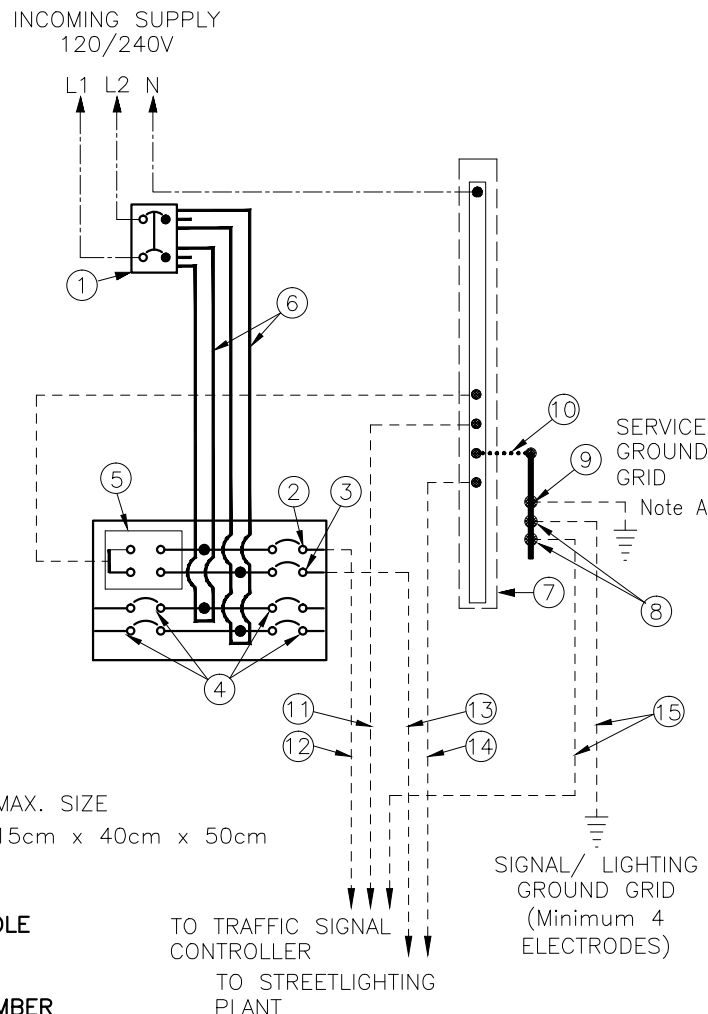
Date: FEBRUARY, 2014

STANDARD No. UTS 614.027

EQUIPMENT LAYOUT FOR SQUARE 'D' UNIT CQ018M100RB60



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① MAIN CIRCUIT BREAKER – 240V, 60A, 2–POLE.
- ② TRAFFIC SIGNAL CIRCUIT BREAKER – 120V, 50A 1–POLE
- ③ LIGHTING CIRCUIT BREAKER – 120V, 30A, 1–POLE.
- ④ BRANCH CIRCUIT BREAKERS – 120V – TYPE AND NUMBER OF BREAKERS AS INDICATED IN THE CONTRACT
- ⑤ SECONDARY SURGE ARRESTOR, 650V, 2–POLE (IF REQUIRED)
- ⑥ SECONDARY BUS
- ⑦ SOLID NEUTRAL BUS – 100A Minimum
- ⑧ GROUND LUG FOR #6 AWG STRANDED Cu INSULATED GROUND (SIGNAL/LIGHTING GROUND AND CONTROLLER GROUND).
- ⑨ GROUND LUG FOR #2/0 AWG STRANDED BARE Cu GROUND (HYDRO SERVICE GRID)
- ⑩ GREEN #4 AWG STRANDED Cu
- ⑪ WHITE #6 AWG STRANDED Cu
- ⑫ BLACK #6 AWG STRANDED Cu
- ⑬ WHITE #8 AWG STRANDED Cu
- ⑭ RED #8 AWG STRANDED Cu
- ⑮ GREEN #6 AWG STRANDED Cu

NOTE:

- A. 2/0 AWG Cu CABLE WITH MINIMUM TWO GROUND ELECTRODES (RODS OR PLATES) AT SERVICE. (ESA Bulletin 2–12)
- B. LOAD CENTRE USED FOR POLE MOUNTED AND METERED PEDESTAL APPLICATIONS

LEGEND:

- DENOTES TERMINAL CONNECTION
- DENOTES #2 AWG Cu RWU90 SR WIRE
- DENOTES FIELD WIRING (SIZES AS INDICATED ON CONTRACT DRAWINGS)
- GROUND BUS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TRAFFIC SIGNAL SUPPLY CONTROL CABINET ASSEMBLY EQUIPMENT LAYOUT AND WIRING SCHEMATIC

120/240V, 60A, 1 ϕ , 3 WIRE

Rev. Date

Rev. No. 0

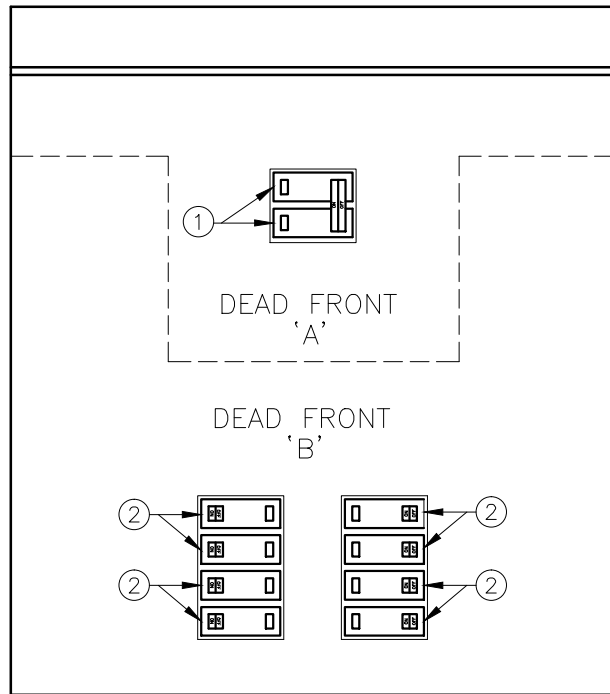
Modification: _____

Modified By: MCCORMICK RANKIN

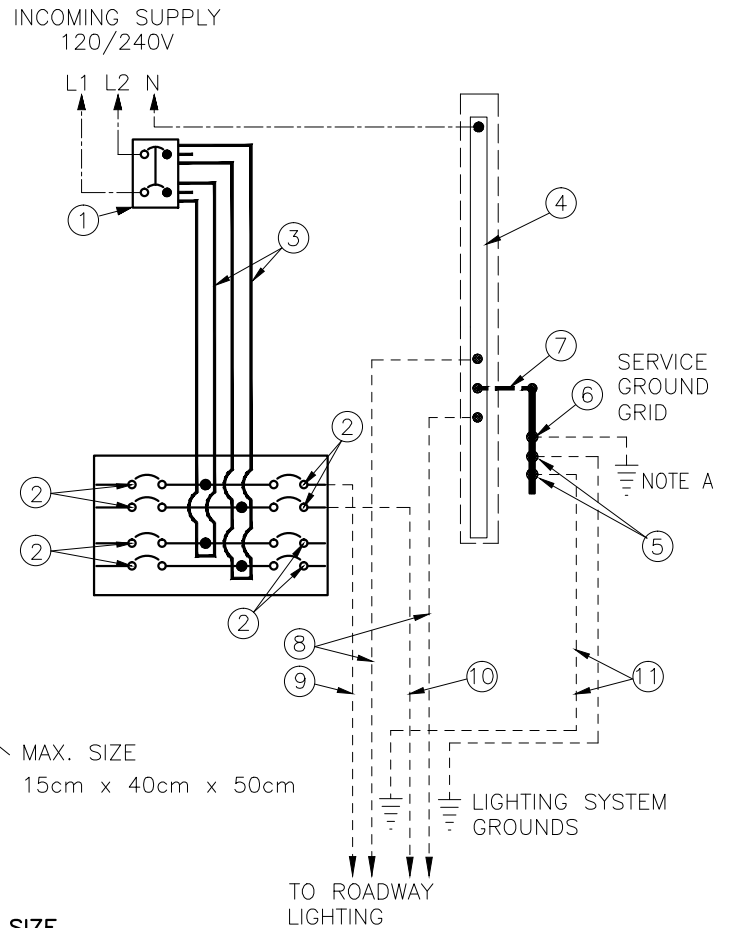
Date: FEBRUARY, 2014

STANDARD No. UTS 614.030

EQUIPMENT LAYOUT FOR SQUARE 'D' UNIT CQ018M100RB100



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① MAIN CIRCUIT BREAKER – 120/240V, 100A, 2–POLE
- ② BRANCH CIRCUIT BREAKERS – 120/240V, 2 POLE – SIZE AND NUMBER OF BREAKERS AS INDICATED IN THE CONTRACT
- ③ SECONDARY BUS
- ④ SOLID NEUTRAL BUS – 100A Minimum
- ⑤ GROUND LUG FOR #6 AWG STRANDED Cu INSULATED GROUND (SIGNAL/LIGHTING GROUND AND CONTROLLER GROUND).
- ⑥ GROUND LUG FOR #2/O AWG STRANDED BARE Cu GROUND (HYDRO SERVICE GRID)
- ⑦ GREEN #4 AWG STRANDED Cu
- ⑧ WHITE STRANDED Cu (SIZE INDICATED IN CONTRACT DOCUMENTS)
- ⑨ RED STRANDED Cu (SIZE INDICATED IN CONTRACT DOCUMENTS)
- ⑩ BLACK STRANDED Cu (SIZE INDICATED IN CONTRACT DOCUMENTS)
- ⑪ GREEN STRANDED Cu (SIZE INDICATED IN CONTRACT DOCUMENTS)

NOTE:

- A. 2/O AWG Cu CABLE WITH MINIMUM TWO GROUND ELECTRODES (RODS OR PLATES) AT SERVICE. (ESA Bulletin 2–12)
- B. LOAD CENTRE USED FOR POLE MOUNTED AND METERED PEDESTAL APPLICATIONS

LEGEND:

- DENOTES TERMINAL CONNECTION
- DENOTES #2 AWG Cu RWU90 SR WIRE
- DENOTES FIELD WIRING (SIZES AS INDICATED ON CONTRACT DRAWINGS)
- GROUND BUS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

STREETLIGHTING SUPPLY CONTROL CABINET ASSEMBLY EQUIPMENT LAYOUT AND WIRING SCHEMATIC

120/240V, 100A, 1Ø, 3 WIRE

Rev. Date

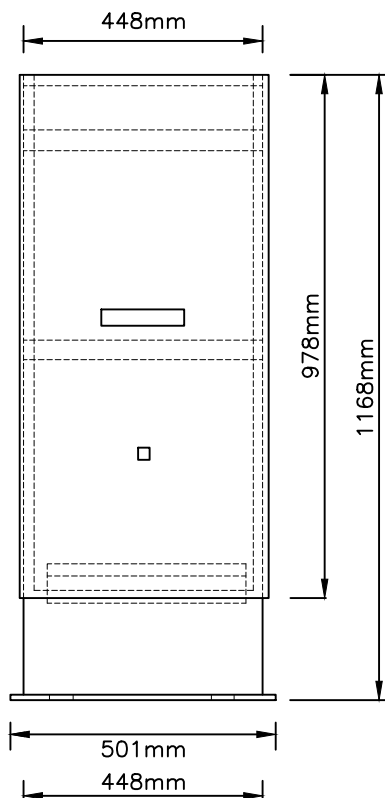
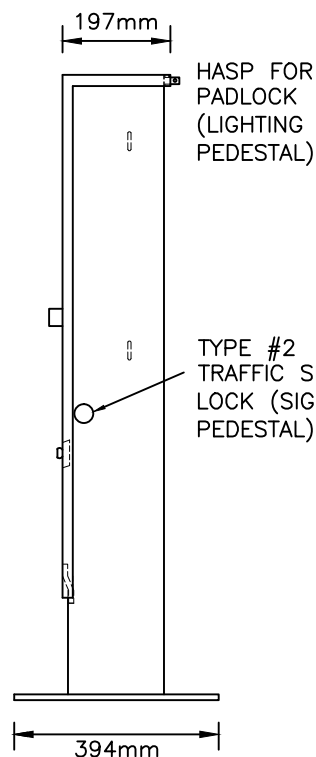
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 614.031



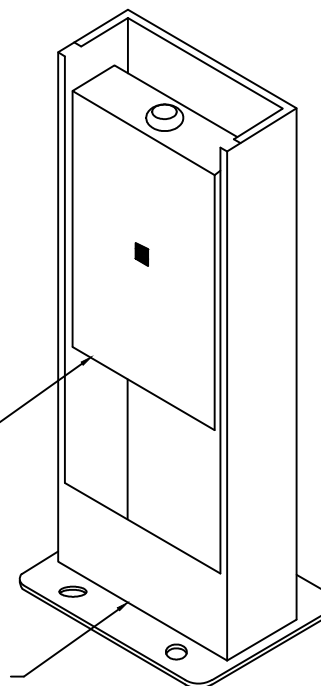
MATERIAL GAUGE

- BOX 3.0mm
- BASE PLATE 9.5mm
- COVER 3.2mm

ENCLOSURE SHOWN
WITHOUT DOOR PANEL

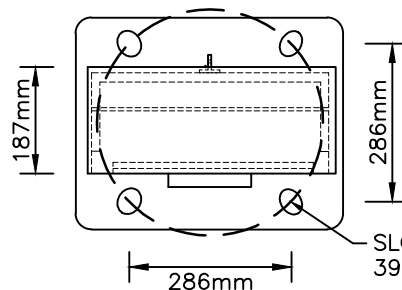
ENCLOSED PANEL
WITH BREAKERS
(NOTE 1 & 2)

BOTTOM ACCESS OPENING
(SIZE 448mm X 187mm)



NOTES:

1. PEDESTAL FOR TRAFFIC SIGNAL & STREETLIGHTING TO BE SUPPLIED WITH SQUARE "D", 8 CIRCUIT, 60 AMP. RATED MAIN BREAKER AND SURGE ARRESTOR. (REFER TO UTS 614.043)
2. PEDESTAL FOR STREETLIGHTING TO BE SUPPLIED WITH SQUARE "D", 8 CIRCUIT, 100 AMP. RATED MAIN BREAKER. (REFER TO UTS 614.044)
3. SIZE OF BRANCH BREAKERS SPECIFIED IN CONTRACT AND FIELD SUPPLIED.
4. PEDESTAL TO BE MOUNTED ON EITHER CONCRETE FOOTING (UTS 616.012) OR CONTROLLER PAD (UTS 616.035).



SLOTTED HOLES FOR
395mm TO 406mm B.C.D.

SENTINEL POLE & TRAFFIC			
MODEL	INSTALLATION	CIRCUIT PANEL	TYPE OF LOCK
TCL60-8	TRAFFIC SIGNAL	8	TYPE #2 TRAFFIC
TCL100-8	STREET LIGHTING	8	HASP/PADLOCK

ALL DIMENSION IN MILLIMETRES UNLESS OTHERWISE NOTED

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

POWER SUPPLY PEDESTAL WITH BREAKER PANEL TRAFFIC SIGNAL & STREETLIGHTING

Rev. Date _____ Rev. No. 0

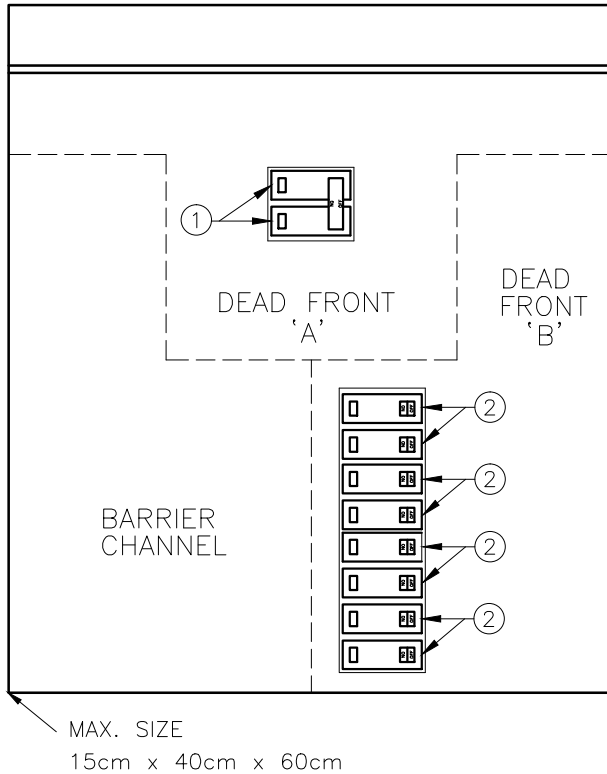
Modification: _____

Modified By: McCORMICK RANKIN

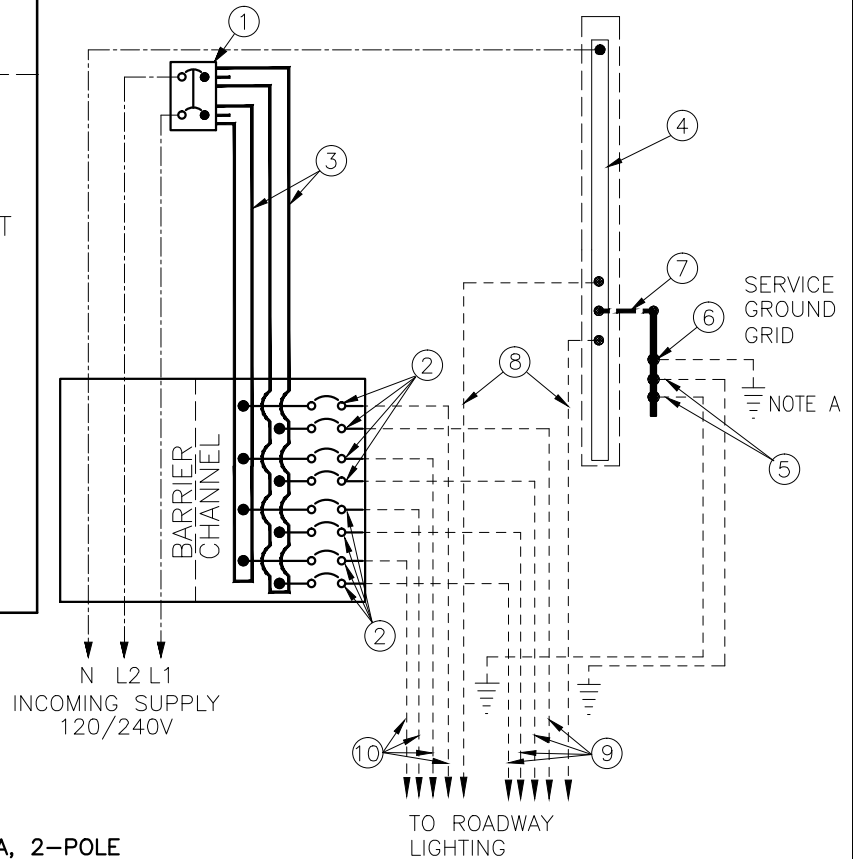
Date: FEBRUARY 2014

STANDARD No. UTS 614.042

EQUIPMENT LAYOUT FOR SQUARE 'D' "CQO116M100RB100" UNIT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① MAIN CIRCUIT BREAKER - 120/240V, 100A, 2-POLE
- ② BRANCH CIRCUIT BREAKERS - 120/240V, 2 POLE - SIZE AND NUMBER OF BREAKERS AS INDICATED IN THE CONTRACT
- ③ SECONDARY BUS
- ④ SOLID NEUTRAL BUS - 100A MINIMUM
- ⑤ GROUND LUG FOR #6 AWG STRANDED Cu INSULATED GROUND (LIGHTING CIRCUITS)
- ⑥ GROUND LUG FOR 2/0 AWG STRANDED Cu (GROUND GRID)
- ⑦ GREEN #4 AWG STRANDED Cu
- ⑧ WHITE STRANDED Cu
- ⑨ BLACK CIRCUIT STRANDED Cu
- ⑩ RED CIRCUIT STRANDED Cu

NOTE:

A. MINIMUM TWO GROUND RODS AT SERVICE.
(Latest ESA Bulletin 2-12)

LEGEND:

- DENOTES TERMINAL CONNECTION.
- DENOTES #2 AWG RWU90 SR Cu
- DENOTES FIELD WIRING (SIZES AS INDICATED ON THE CONTRACT DRAWINGS)
- GROUND BUS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

STREETLIGHTING PEDESTAL SUPPLY CONTROL CABINET ASSEMBLY EQUIPMENT LAYOUT AND WIRING SCHEMATIC

120/240V, 100A, 1 ϕ , 3 WIRE

Rev. Date

Rev. No. 0

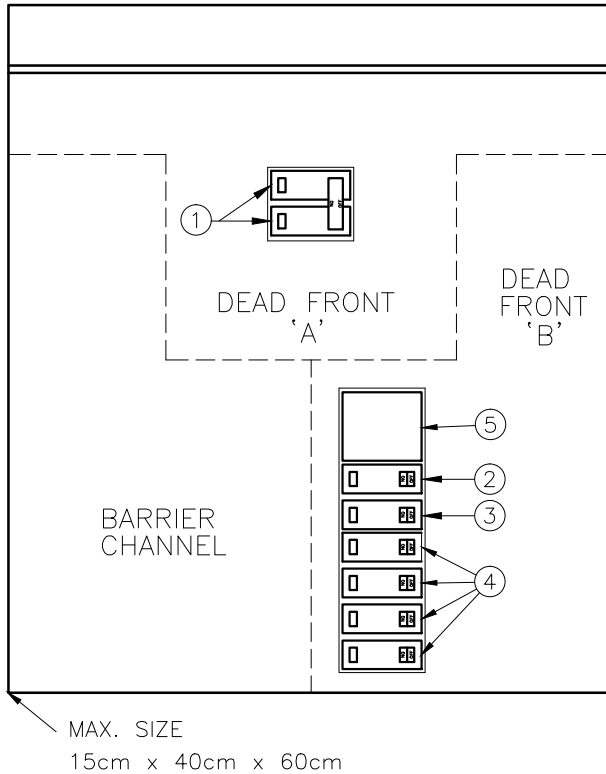
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Modified By: MCCORMICK RANKIN

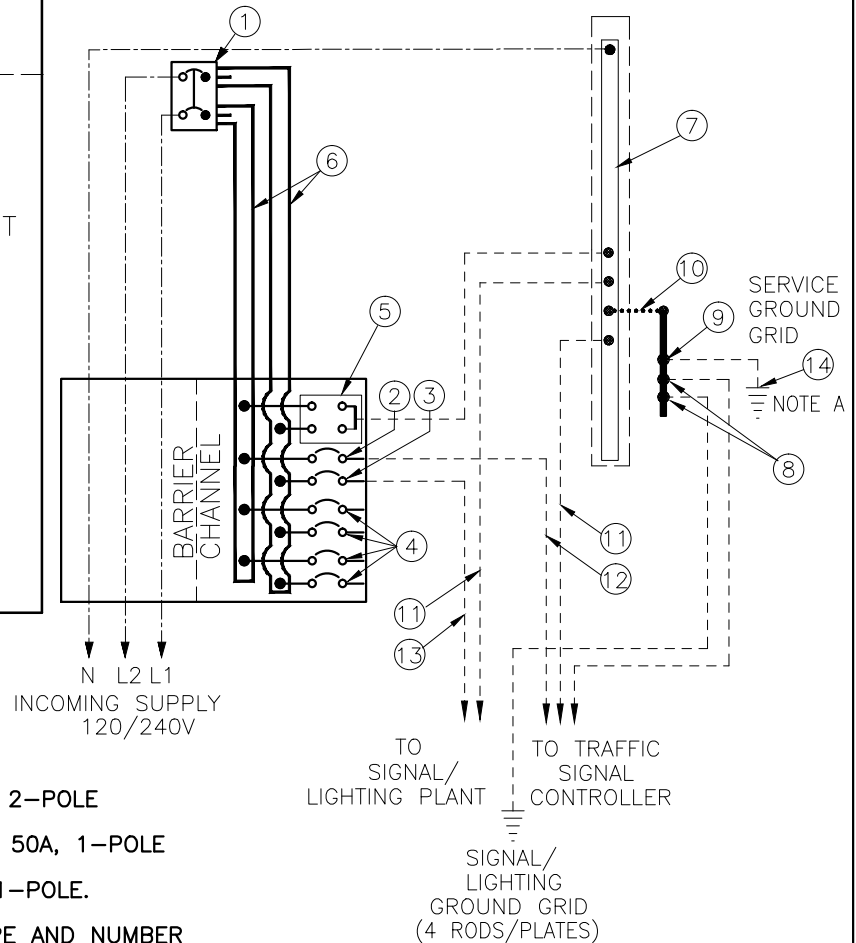
Date: FEBRUARY, 2014

STANDARD No. UTS 614.043

EQUIPMENT LAYOUT FOR SQUARE 'D' "CQ0116M10RB60" UNIT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① MAIN CIRCUIT BREAKER – 120/240V, 60A, 2-POLE
- ② TRAFFIC SIGNAL CIRCUIT BREAKER – 120V, 50A, 1-POLE
- ③ LIGHTING CIRCUIT BREAKER – 120V, 30A, 1-POLE.
- ④ BRANCH CIRCUIT BREAKERS – 120V – TYPE AND NUMBER OF BREAKERS AS INDICATED IN THE CONTRACT
- ⑤ SECONDARY SURGE ARRESTOR, 650V, 2-POLE
- ⑥ SECONDARY BUS
- ⑦ SOLID NEUTRAL BUS – 100A MINIMUM
- ⑧ GROUND LUG FOR 2-#6 AWG STRANDED Cu INSULATED GROUND (SIGNAL / LIGHTING GROUND AND CONTROLLER GROUND)
- ⑨ GROUND LUG FOR #2/0 AWG BARE Cu (GROUND GRID)
- ⑩ GREEN #4 AWG STRANDED Cu
- ⑪ WHITE STRANDED Cu (#6 AWG TYP.)
- ⑫ BLACK CIRCUIT STRANDED Cu (#6 AWG TYP.)
- ⑬ RED CIRCUIT STRANDED Cu (#8 AWG TYP.)
- ⑭ 2/0 AWG STRANDED Cu BARE GROUND (HYDRO GRID) (TYP.)

NOTE:

- A. MINIMUM FOUR GROUND RODS AT SERVICE FOR TRAFFIC SIGNAL (Latest ESA Bulletin 2-12)

LEGEND:

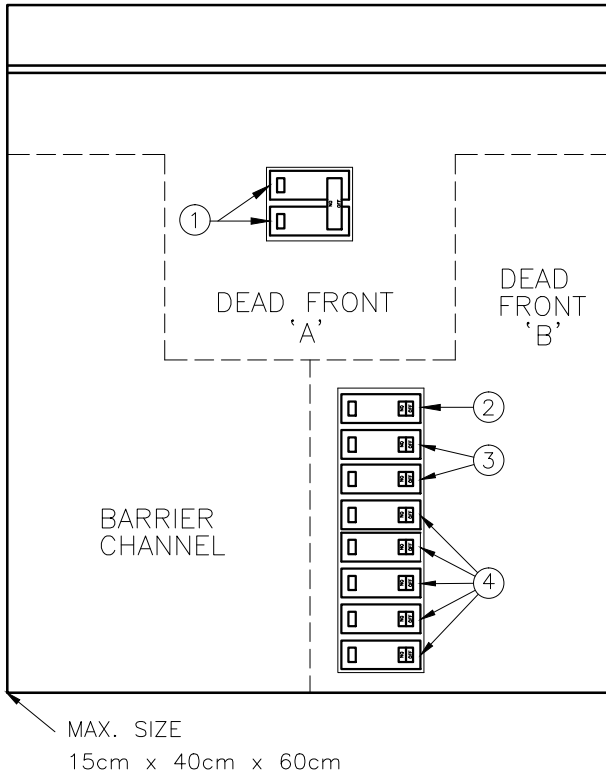
- DENOTES TERMINAL CONNECTION.
- DENOTES #2 AWG RWU90 SR Cu
- DENOTES FIELD WIRING (SIZES AS INDICATED ON THE CONTRACT DRAWINGS)
- GROUND BUS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

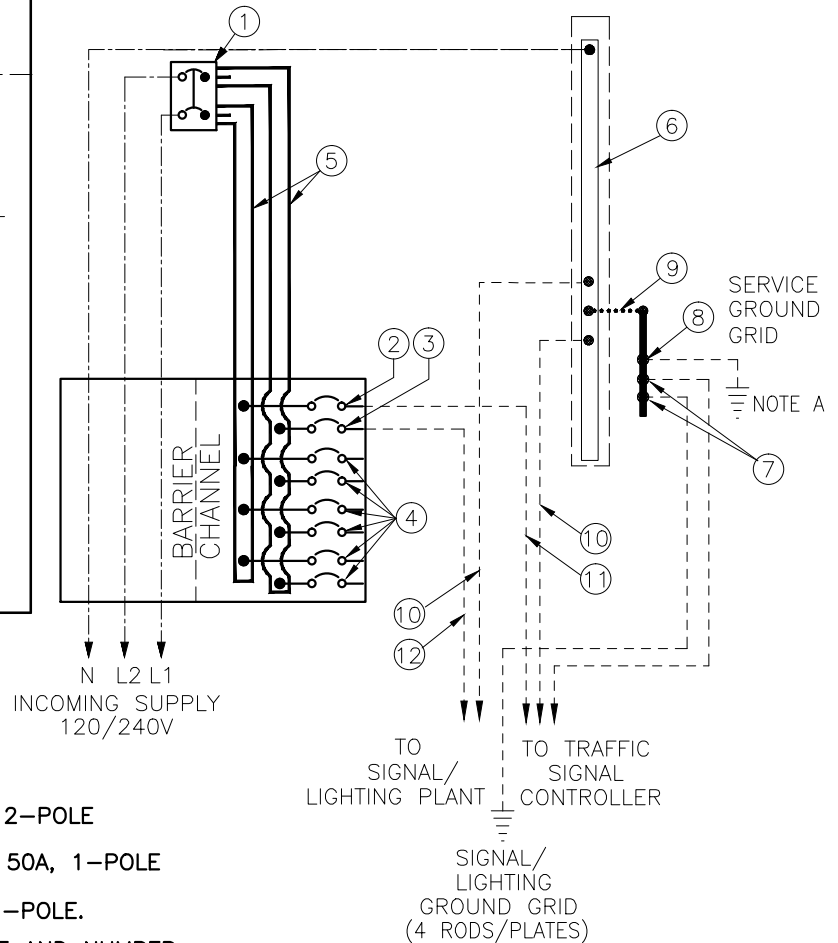
TRAFFIC SIGNAL PEDESTAL SUPPLY
CONTROL CABINET ASSEMBLY EQUIPMENT
LAYOUT AND WIRING SCHEMATIC
120/240V, 60A, 1 ϕ , 3 WIRE

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 614.044</u>	

EQUIPMENT LAYOUT FOR SQUARE 'D' UNIT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① MAIN CIRCUIT BREAKER – 120/240V, 60A, 2–POLE
- ② TRAFFIC SIGNAL CIRCUIT BREAKER – 120V, 50A, 1–POLE
- ③ LIGHTING CIRCUIT BREAKER – 120V, 30A, 1–POLE.
- ④ BRANCH CIRCUIT BREAKERS – 120V – TYPE AND NUMBER OF BREAKERS AS INDICATED IN THE CONTRACT
- ⑤ SECONDARY BUS
- ⑥ SOLID NEUTRAL BUS – 100A MINIMUM
- ⑦ GROUND LUG FOR 2–#6 AWG STRANDED Cu INSULATED GROUND (SIGNAL / LIGHTING GROUND AND CONTROLLER GROUND)
- ⑧ GROUND LUG FOR #2/0 AWG STRANDED BARE Cu (GROUND GRID)
- ⑨ GREEN #4 AWG STRANDED Cu
- ⑩ WHITE STRANDED Cu (#8 AWG TYP.)
- ⑪ BLACK STRANDED Cu (#8 AWG TYP.)
- ⑫ RED STRANDED Cu (#8 AWG TYP.)

NOTE:

- A. MINIMUM FOUR GROUND RODS AT SERVICE FOR TRAFFIC SIGNAL (Latest ESA Bulletin 2–12)

LEGEND:

- DENOTES TERMINAL CONNECTION.
- DENOTES #2 AWG RWU90 SR Cu
- DENOTES FIELD WIRING (SIZES AS INDICATED ON THE CONTRACT DRAWINGS)
- GROUND BUS

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TRAFFIC SIGNAL PEDESTAL SUPPLY
CONTROL CABINET ASSEMBLY EQUIPMENT
LAYOUT AND WIRING SCHEMATIC
120/240V, 60A, 1 ϕ , 3 WIRE

Rev. Date

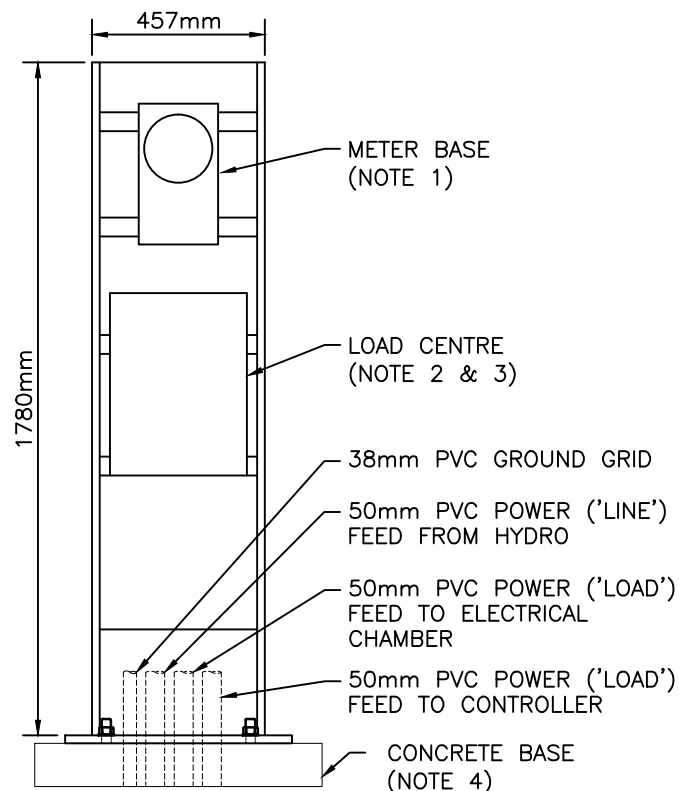
Rev. No. 0

Modification: _____

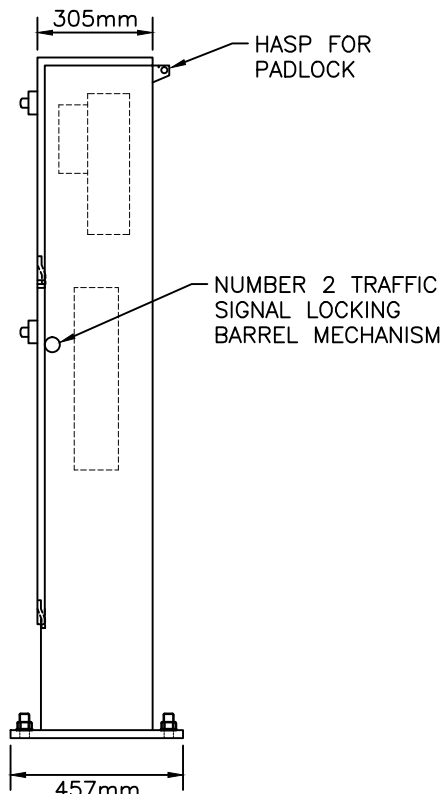
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

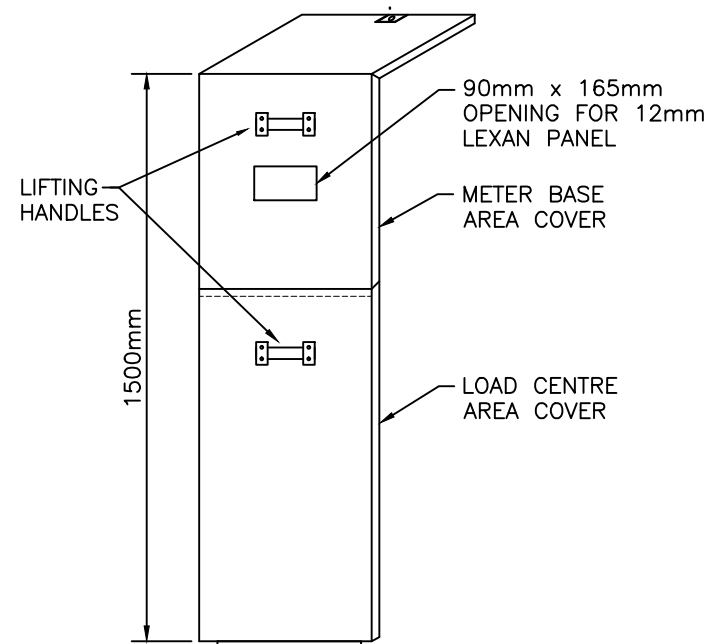
STANDARD No. UTS 614.045



FRONT VIEW



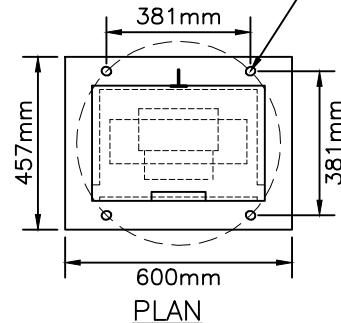
SIDE VIEW



NOTES:

1. MICROELECTRIC METER BASE (CATALOGUE # BE1-TCV) TO BE SUPPLIED WITH PEDESTAL.
2. SQUARE "D" 100 AMP RATED, 8 CIRCUIT, 100 AMP RATED LOAD CENTRE (CATALOGUE # CQ018M100RB100) C/W 2 POLE, 60 AMP MAIN BREAKER TO BE SUPPLIED WITH PEDESTAL. (REFER TO UTS 614.030)
3. SIZE AND NUMBER OF BRANCH BREAKERS SPECIFIED IN CONTRACT AND FIELD SUPPLIED.
4. PEDESTAL TO BE MOUNTED ON EITHER CONCRETE FOOTING (UTS 616.012) OR CONTROLLER PAD (UTS 616.036).

HOLES FOR 25mm DIA.
BOLTS AND WASHERS
(539mm BCD)



PLAN

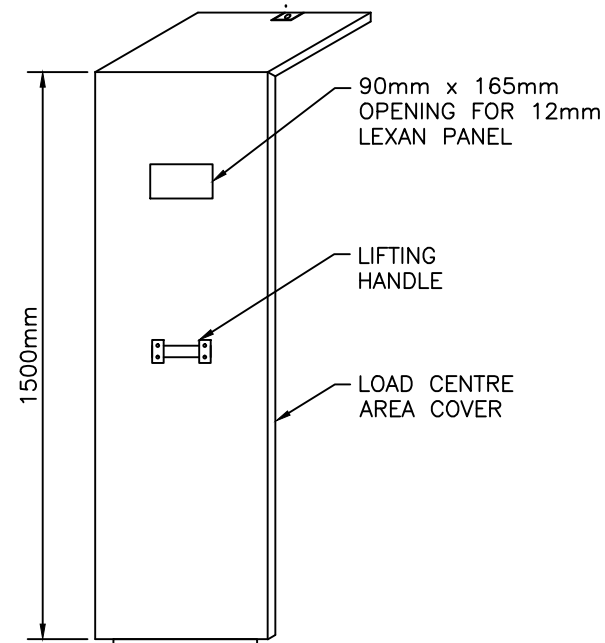
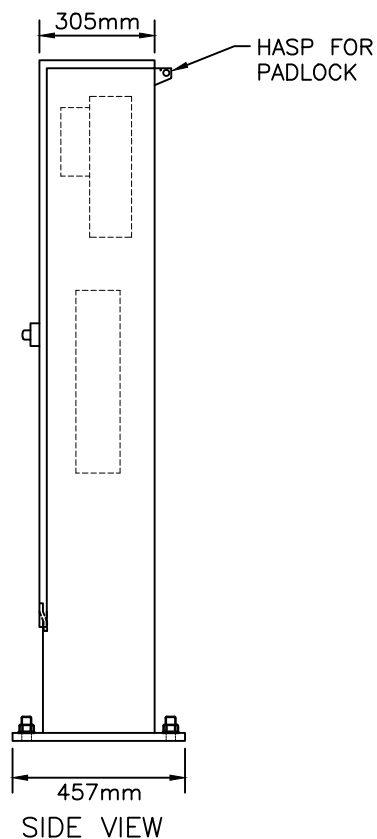
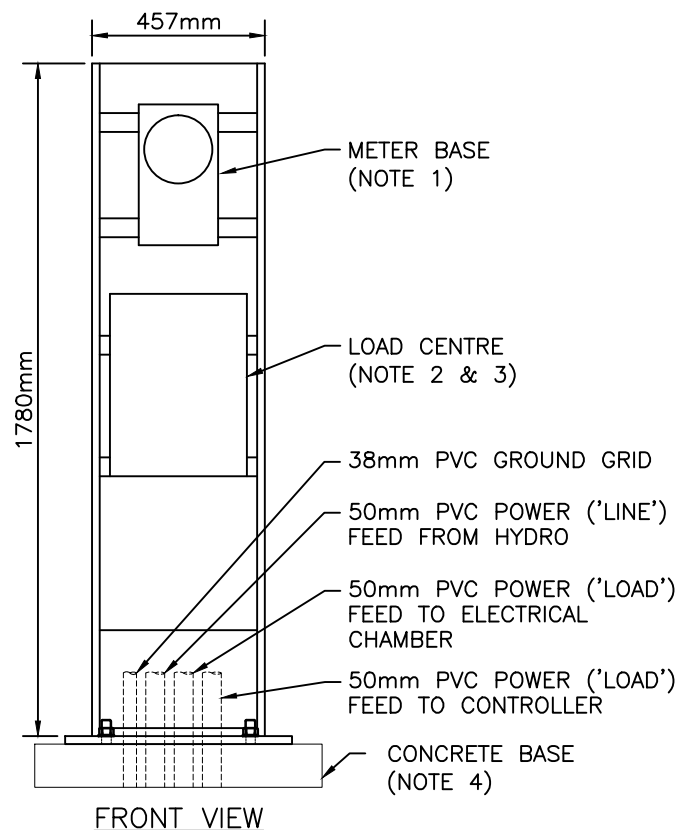
SENTINEL POLE & TRAFFIC EQUIPMENT		
MODEL	INSTALLATION	TYPE OF LOCK
MTL100-8	TRAFFIC SIGNAL	HASP/PADLOCK FOR METER BASE COVER TYPE #2 FOR LOAD CENTRE COVER

ALL DIMENSION IN MILLIMETRES UNLESS OTHERWISE NOTED

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

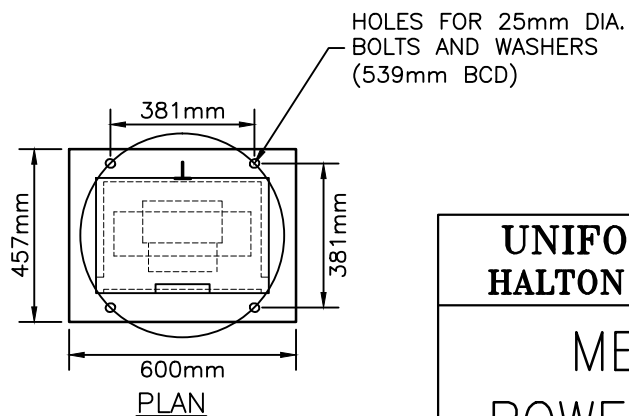
**METERED TRAFFIC SIGNAL
POWER SUPPLY PEDESTAL C/W
LOAD CENTRE AND METER BASE**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 614.046</u>	



NOTES:

1. MICROELECTRIC METER BASE (CATALOGUE # BE1-TCV) TO BE SUPPLIED WITH PEDESTAL.
2. SQUARE "D" 100 AMP RATED, 8 CIRCUIT, 100 AMP RATED LOAD CENTRE (CATALOGUE # CQ018M100RB100) C/W 2 POLE, 100 AMP MAIN BREAKER TO BE SUPPLIED WITH PEDESTAL. (REFER TO UTS 614.031)
3. SIZE AND NUMBER OF BRANCH BREAKERS SPECIFIED IN CONTRACT AND FIELD SUPPLIED.
4. PEDESTAL TO BE MOUNTED ON CONCRETE FOOTING. (REFER TO UTS 616.012)



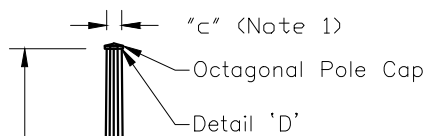
SENTINEL POLE & TRAFFIC EQUIPMENT		
MODEL	INSTALLATION	TYPE OF LOCK
MSL100-8	STREETLIGHTING	HASP/PADLOCK FOR COVER

ALL DIMENSION IN MILLIMETRES UNLESS OTHERWISE NOTED

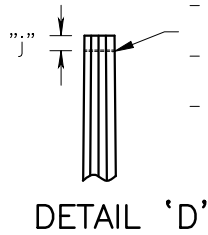
**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**METERED STREETLIGHTING
POWER SUPPLY PEDESTAL C/W
LOAD CENTRE AND METER BASE**

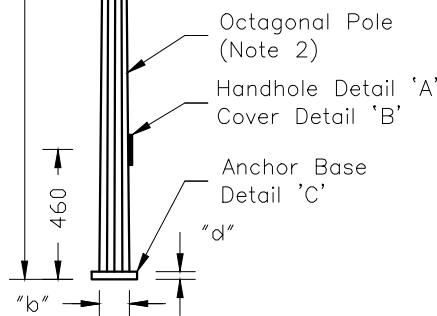
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 614.047</u>	



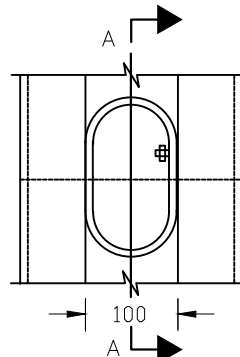
Wire Support Rod
(- 6.4mm Dia. x 98mm
Long in 4.6m Pole,
- 8mm Dia. Rod x 140mm
Long in 6.1m HD Pole,
- 8mm Dia. Rod x 92mm
Long in 10.7m Pole &
- 9.5mm Dia. Rod x 92mm
Long in 12.2m Pole)



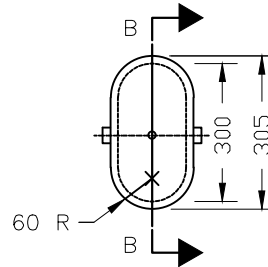
DETAIL 'D'



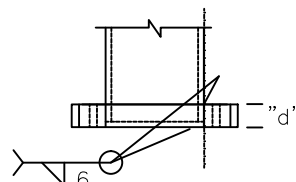
(Note 1)
POLE



HANDHOLE
DETAIL 'A'

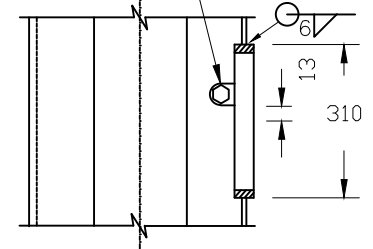


HANDHOLE COVER
DETAIL 'B'



ANCHOR BASE
DETAIL 'C'

6mm (1/4") National
Course Ground Stud



SECTION A-A

3mm Galvanized
Steel or Aluminium
Plate

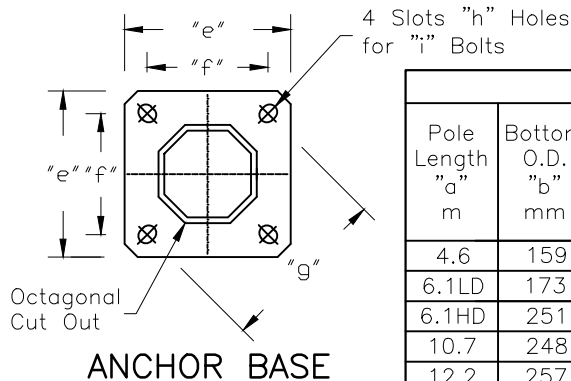
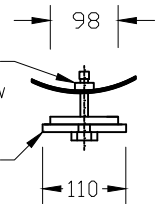
25mm x 150mm
x 6mm Thick
Locking Bar

Rubber Gasket

SECTION B-B

6mm Dia. x
50mm Captive
Stainless Steel
Allen Head Screw

3mm Galvanized
Steel or
Aluminium Plate



ANCHOR BASE

FABRICATION DATA

Pole Length "a" m	Bottom O.D. "b" mm	Top O.D. "c" mm	Plate Depth "d" mm	Plate Size "e" mm	Bolt Spacing "f" mm	Bolt Circle Diameter "g" mm	Bolt Slot "h" mm	Stud/ Bolt Size "i" mm	Wire Support Rod "j" mm	Handhole Frame	
										Height "k" mm	Width "l" mm
4.6	159	100	16	279	203	287	32X50	22	38	178	102
6.1LD	173	100	16	406	279	406	38X45	32	50	300	102
6.1HD	251	146	22	406	279	406	38X45	32	50	300	102
10.7	248	100	32	406	279	406	38X45	32	50	300	102
12.2	257	100	32	406	279	406	38X45	32	50	300	102

HD = HEAVY DUTY LD = LIGHT DUTY

NOTES

1. The diameter shall be measured across the flats.
2. All shafts shall be 3mm wall thickness, except 4.5mm for 10.7m and 12.2m poles.
3. All dimensions are in millimetres or metres unless otherwise shown.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

GALVANIZED STEEL OCTAGONAL POLE BASE MOUNTED

Rev. Date

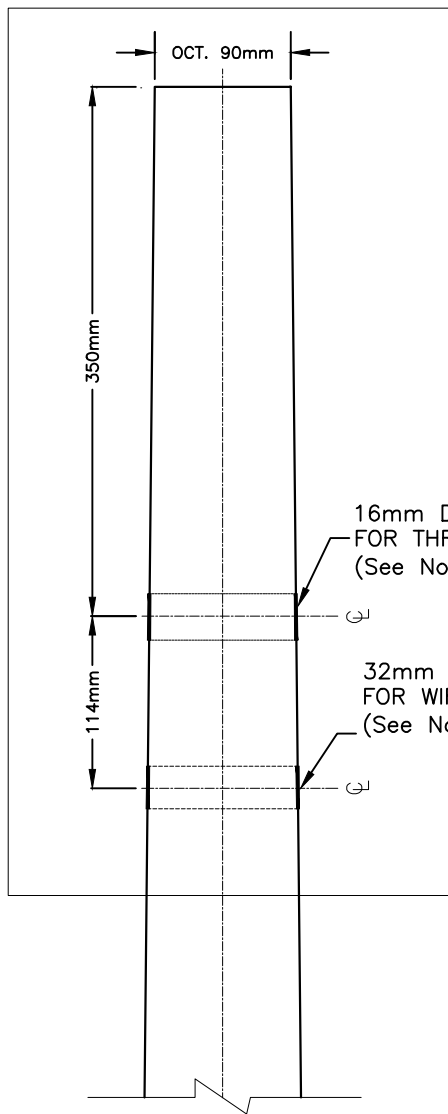
Rev. No. 0

Modification: _____

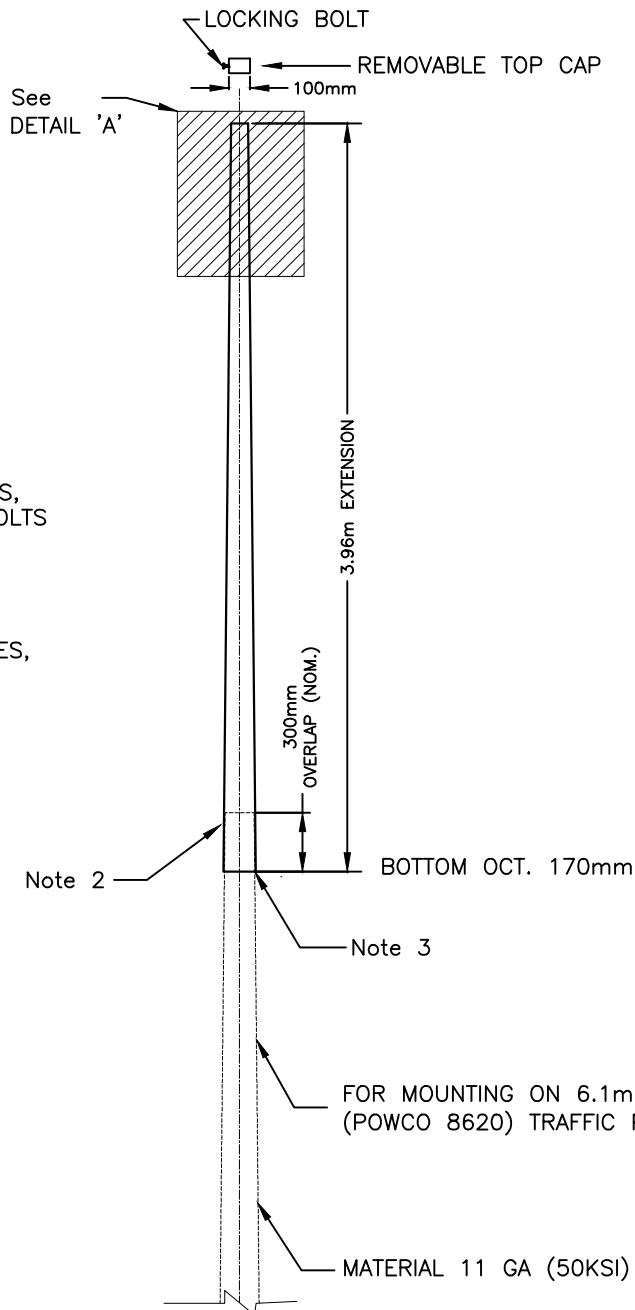
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 615.010



DETAIL 'A'



DIMENSIONS IN mm EXCEPT AS NOTED

NOTES:

- 1) HOLES TO BE DRILLED BEFORE POLE EXTENSION IS GALVANIZED.
- 2) ALL ACROSS THE FACE MEASUREMENTS AT THE TOP OF THE POLE MUST NOT BE LESS THAN 140mm OR GREATER THAN 142mm.
- 3) ALL ACROSS THE FACE MEASUREMENTS AT THE BOTTOM OF THE POLE EXTENSION MUST NOT BE LESS THAN 160mm OR GREATER THAN 145mm.
- 4) POLES AND/OR EXTENSIONS NOT MEETING THESE TOLERANCES WILL NOT BE ACCEPTED.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

TRAFFIC POLE EXTENSION

Rev. Date

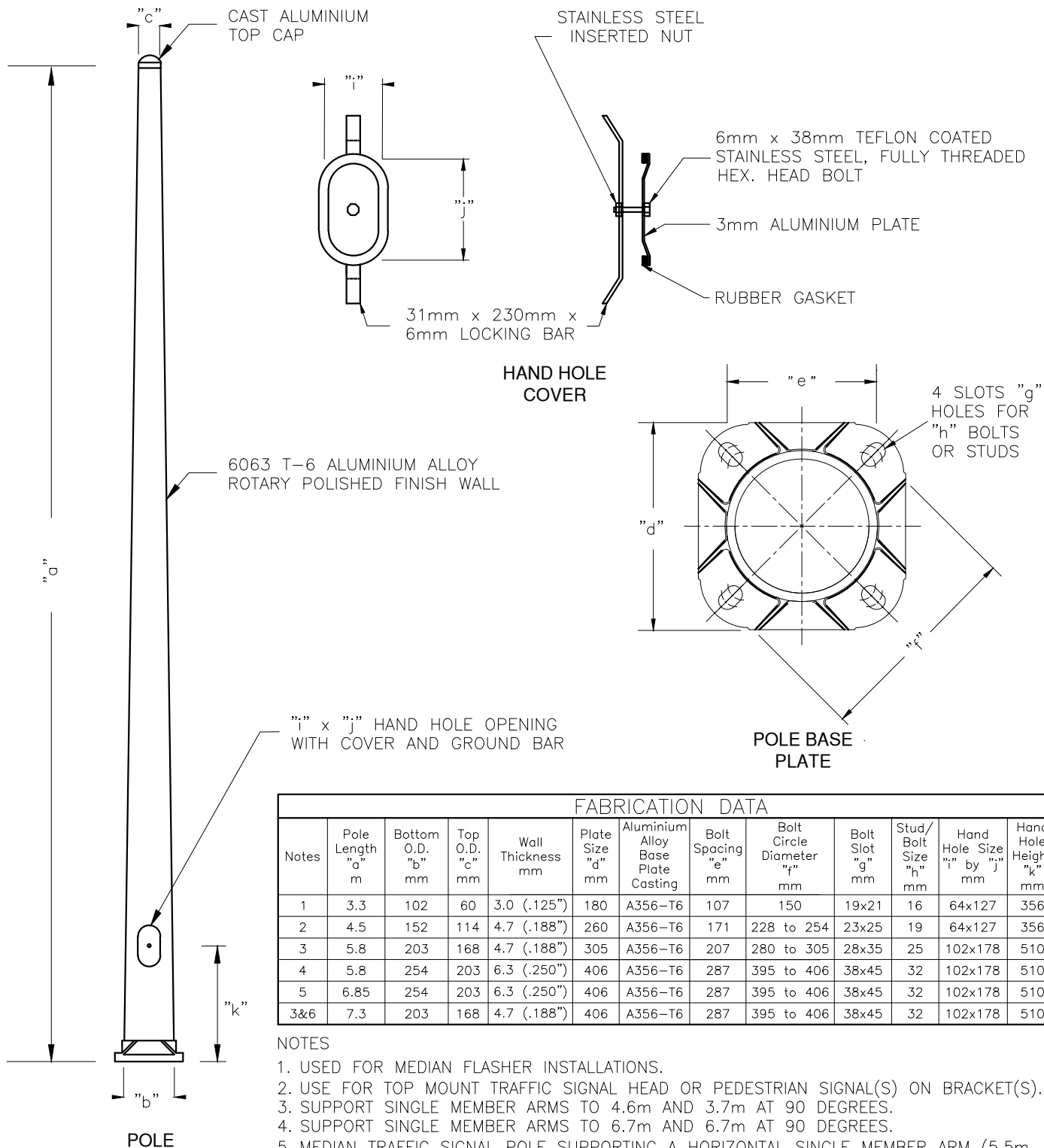
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 615.015



FABRICATION DATA												
Notes	Pole Length "a" m	Bottom O.D. "b" mm	Top O.D. "c" mm	Wall Thickness mm	Plate Size "d" mm	Aluminium Alloy Base Plate Casting	Bolt Spacing "e" mm	Bolt Circle Diameter "f" mm	Bolt Slot "g" mm	Stud/Bolt Size "h" mm	Hand Hole Size "i" by "j" mm	Hand Hole Height "k" mm
1	3.3	102	60	3.0 (.125")	180	A356-T6	107	150	19x21	16	64x127	356
2	4.5	152	114	4.7 (.188")	260	A356-T6	171	228 to 254	23x25	19	64x127	356
3	5.8	203	168	4.7 (.188")	305	A356-T6	207	280 to 305	28x35	25	102x178	510
4	5.8	254	203	6.3 (.250")	406	A356-T6	287	395 to 406	38x45	32	102x178	510
5	6.85	254	203	6.3 (.250")	406	A356-T6	287	395 to 406	38x45	32	102x178	510
3&6	7.3	203	168	4.7 (.188")	406	A356-T6	287	395 to 406	38x45	32	102x178	510

NOTES

1. USED FOR MEDIAN FLASHER INSTALLATIONS.
2. USE FOR TOP MOUNT TRAFFIC SIGNAL HEAD OR PEDESTRIAN SIGNAL(S) ON BRACKET(S).
3. SUPPORT SINGLE MEMBER ARMS TO 4.6m AND 3.7m AT 90 DEGREES.
4. SUPPORT SINGLE MEMBER ARMS TO 6.7m AND 6.7m AT 90 DEGREES.
5. MEDIAN TRAFFIC SIGNAL POLE SUPPORTING A HORIZONTAL SINGLE MEMBER ARM (5.5m to 7.3m) PERPENDICULAR TO TRAVELLED ROADWAY.
6. TO BE EQUIPPED WITH VIBRATION DAMPENER WHEN NO SIGNAL HEAD ATTACHED.

All dimensions are in millimetres or metres unless otherwise shown.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ALUMINIUM TRAFFIC SIGNAL POLE, BASE MOUNTED

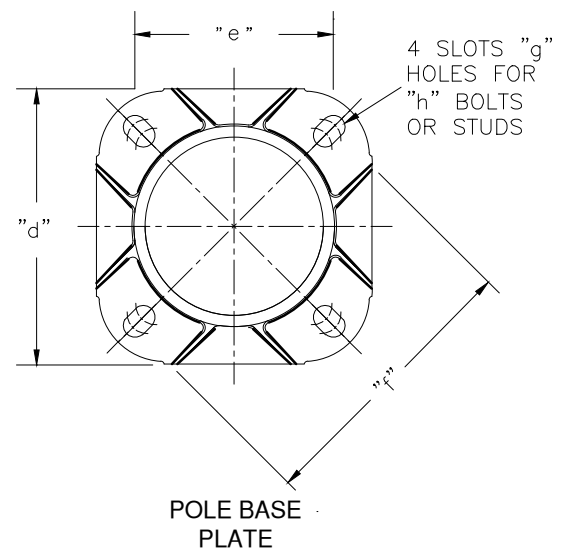
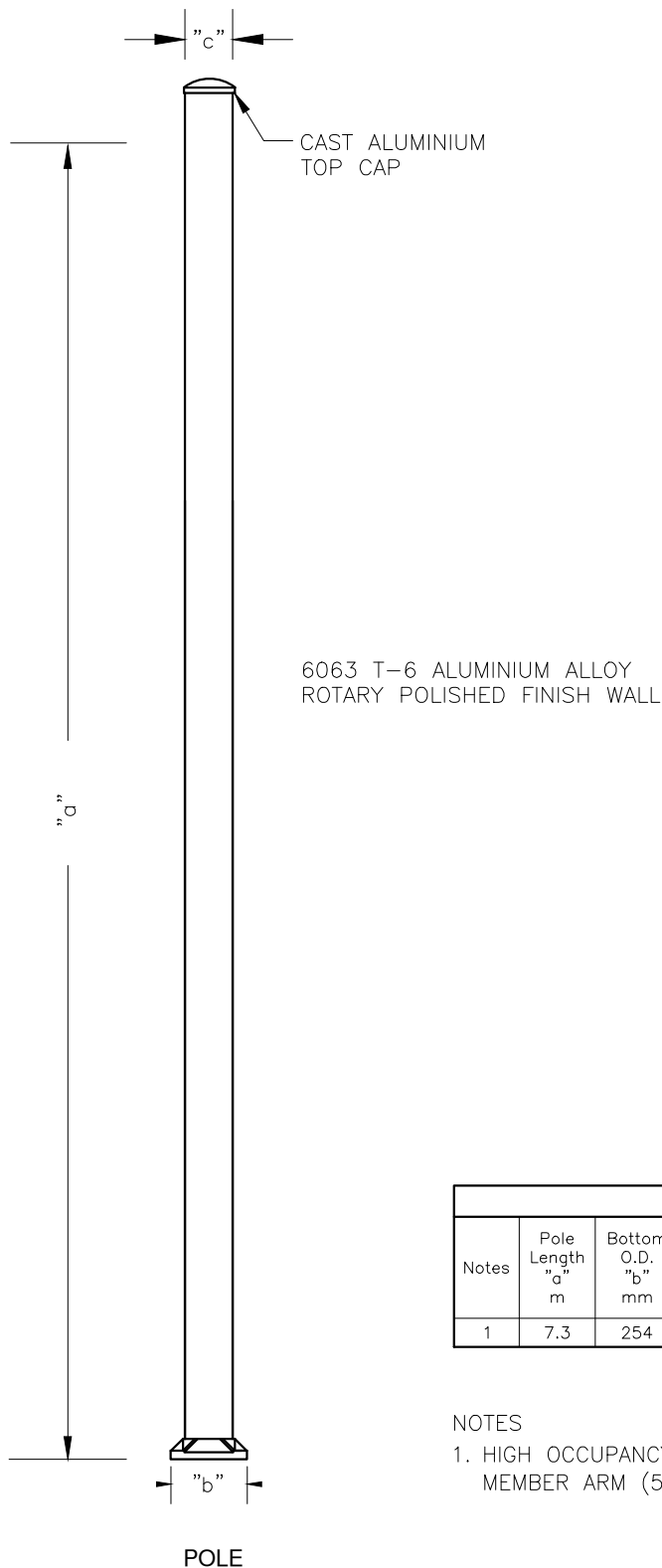
Rev. Date _____ Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 615.020



FABRICATION DATA										
Notes	Pole Length "a" m	Bottom O.D. "b" mm	Top O.D. "c" mm	Wall Thickness mm	Plate Size "d" mm	Aluminium Alloy Base Plate Casting	Bolt Spacing "e" mm	Bolt Circle Diameter "f" mm	Bolt Slot "g" mm	Stud/Bolt Size "h" mm
1	7.3	254	254	6.3 (.250")	406	6063-T6	287	395 to 406	38x45	32

NOTES

1. HIGH OCCUPANCY VEHICLE SIGN SUPPORT POLE WITH HORIZONTAL SINGLE MEMBER ARM (5.5m to 7.3m) PERPENDICULAR TO TRAVELLED ROADWAY.

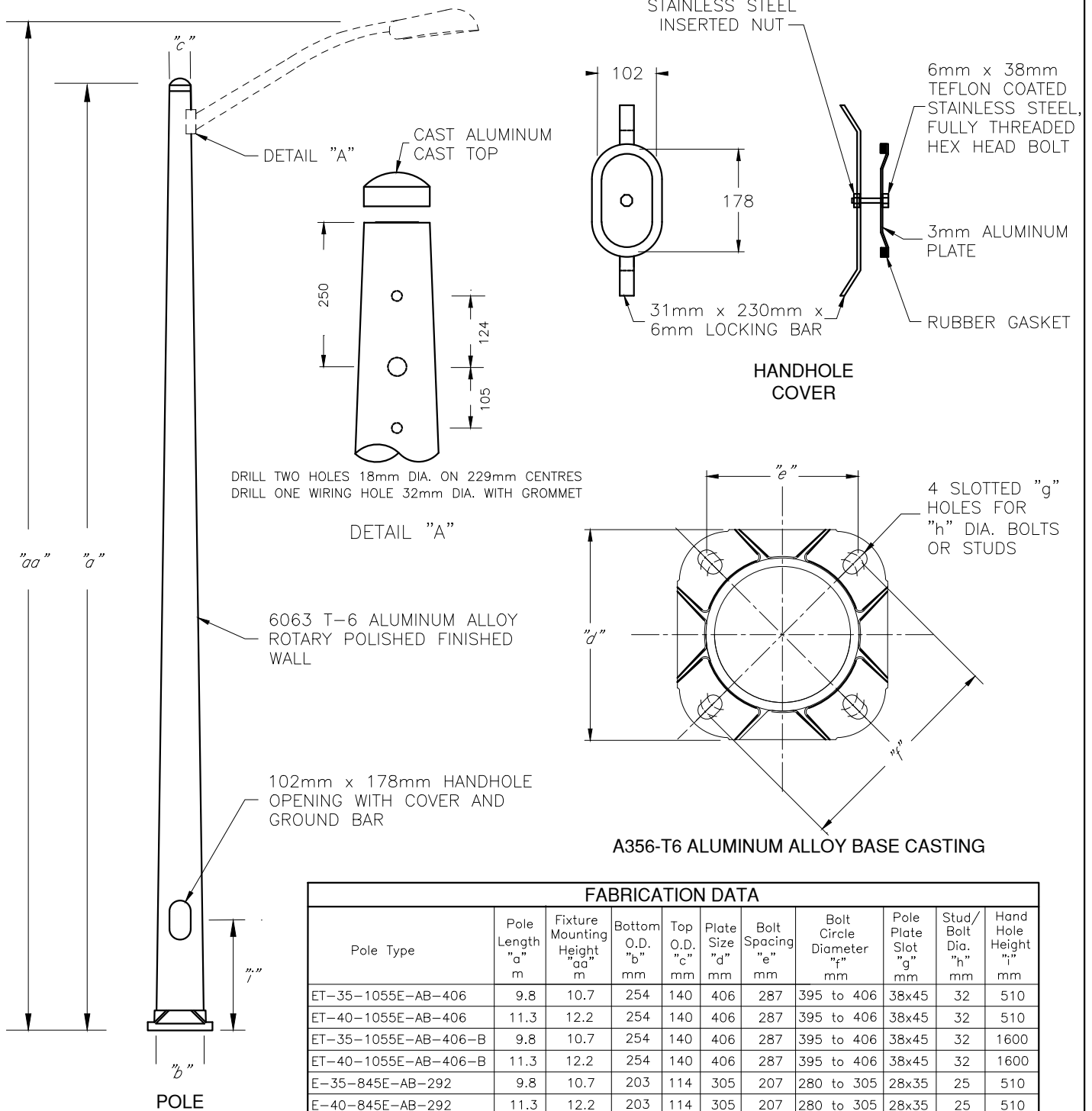
All dimensions are in millimetres or metres unless otherwise shown.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ALUMINIUM HOV SIGN SUPPORT POLE, BASE MOUNTED

Rev. Date	Rev. No. <u>0</u>
Modification: _____	

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Date:	FEBRUARY, 2014
STANDARD No.	UTS 615.021



FABRICATION DATA										
Pole Type	Pole Length "a" m	Fixture Mounting Height "aa" m	Bottom O.D. "b" mm	Top O.D. "c" mm	Plate Size "d" mm	Bolt Spacing "e" mm	Bolt Circle Diameter "f" mm	Pole Plate Slot "g" mm	Stud/Bolt Dia. "h" mm	Hand Hole Height "i" mm
ET-35-1055E-AB-406	9.8	10.7	254	140	406	287	395 to 406	38x45	32	510
ET-40-1055E-AB-406	11.3	12.2	254	140	406	287	395 to 406	38x45	32	510
ET-35-1055E-AB-406-B	9.8	10.7	254	140	406	287	395 to 406	38x45	32	1600
ET-40-1055E-AB-406-B	11.3	12.2	254	140	406	287	395 to 406	38x45	32	1600
E-35-845E-AB-292	9.8	10.7	203	114	305	207	280 to 305	28x35	25	510
E-40-845E-AB-292	11.3	12.2	203	114	305	207	280 to 305	28x35	25	510

NOTES

1. ALL SHAFTS SHALL BE 6.3mm (.250") WALL THICKNESS.
2. POLES TO BE EQUIPPED WITH FACTORY INSTALLED VIBRATION DAMPENER.
3. HANDHOLE TO BE IN LINE WITH STREETLIGHTING BRACKET ONLY ON THE BRIDGE MOUNTED POLES.

REFERENCE TO POLE NUMBERING

Letters Starting With:

- ET - Streetlighting and Combination Signal Pole; or Streetlighting Pole on Bridge Structure (-B)
- E - Streetlighting Pole

All dimensions are in millimetres or metres unless otherwise shown.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ALUMINIUM STREETLIGHT OR COMBINATION STREETLIGHT/SIGNAL POLE, BASE MOUNTED

Rev. Date

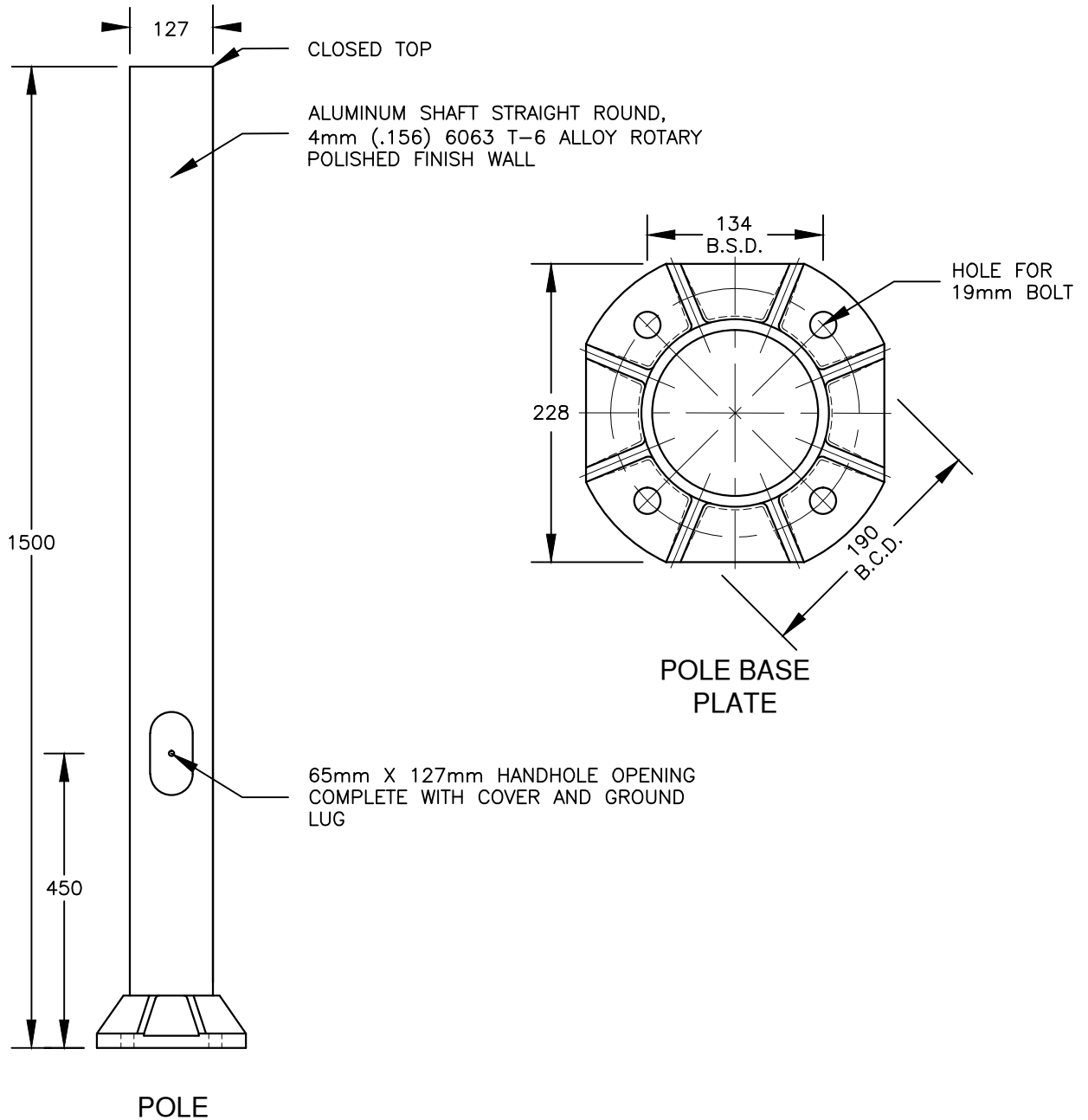
Rev. No. 0

Modification: _____

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Date: FEBRUARY, 2014

STANDARD No. UTS 615.025



NOTES

- A. ANCHOR ASSEMBLY SHALL HAVE 190mm B.C.D. WITH 19mm (3/4") BOLTS.
- B. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ALUMINIUM POLE FOR PEDESTRIAN PUSHBUTTONS, BASE MOUNTED

Rev. Date

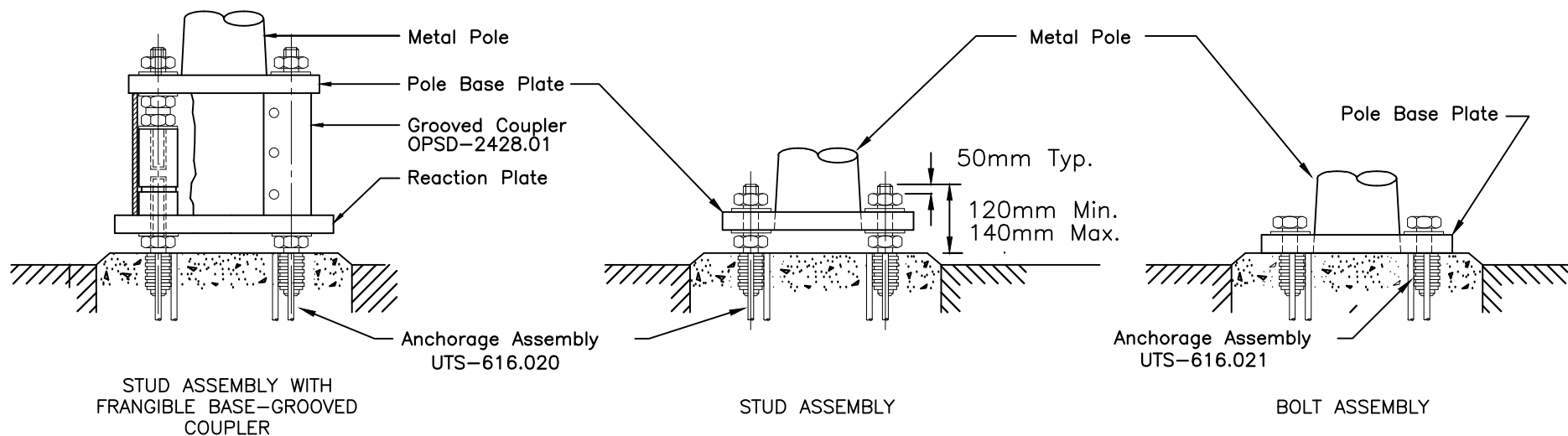
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 615.026



All Dimensions are in millimetres unless otherwise shown.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

POLE MOUNTING DETAILS FOR BASE MOUNTED METAL POLE

Rev. Date Rev. No. 0

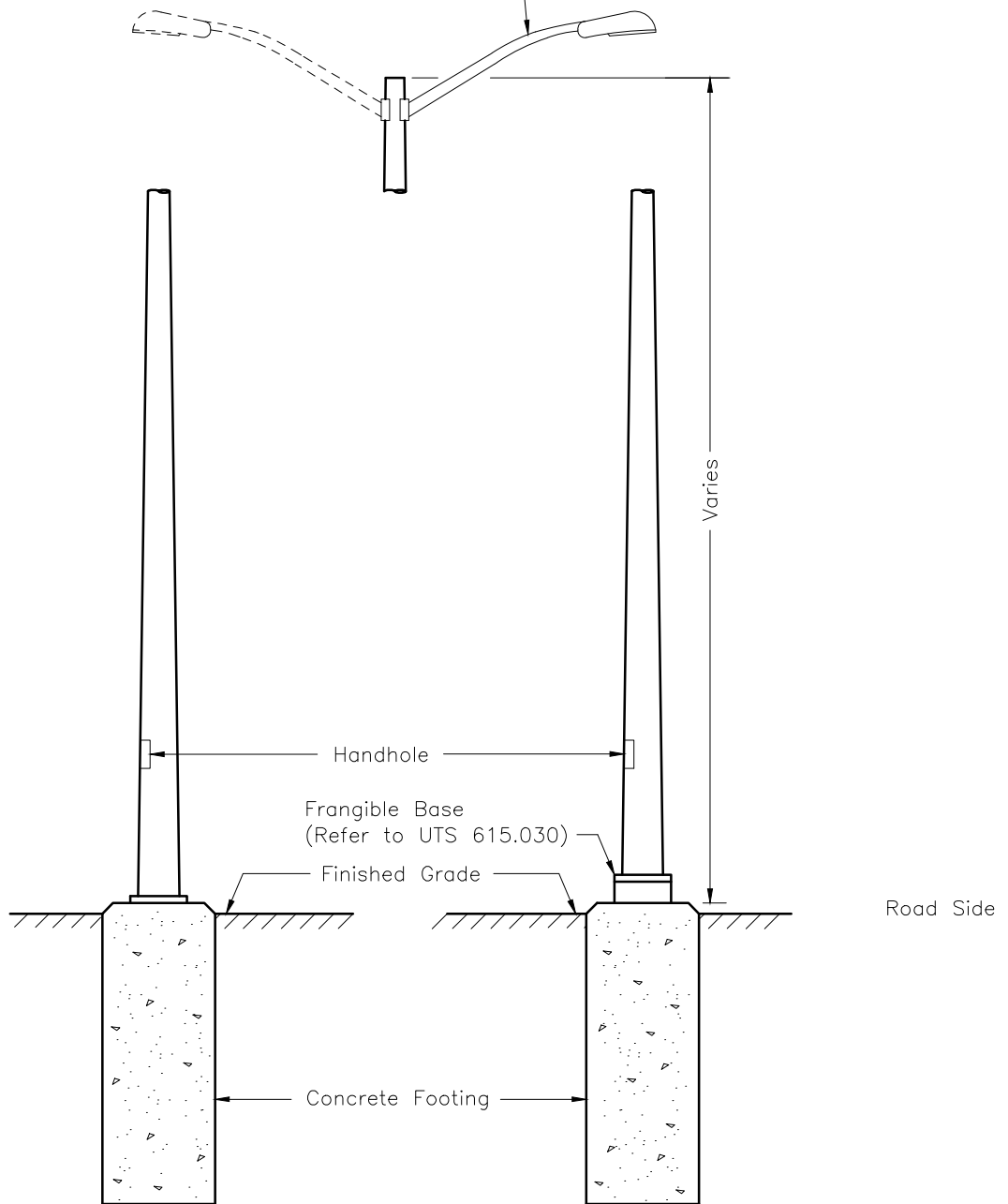
Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 615.030

Tapered Elliptical Bracket
(Refer to UTS 617.010
or UTS 617.015)



BASE MOUNTING

FRANGIBLE BASE
MOUNTING

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**METAL LIGHTING POLE
BASE MOUNTED**

Rev. Date

Rev. No. 0

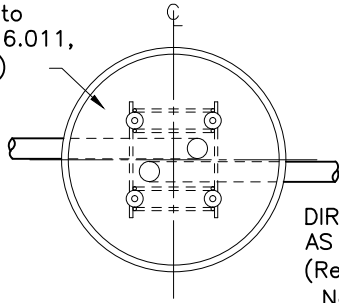
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Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 615.035

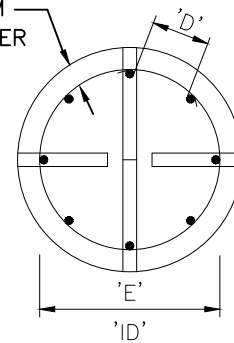
CONCRETE
(Refer to
UTS 616.011,
Note 6)



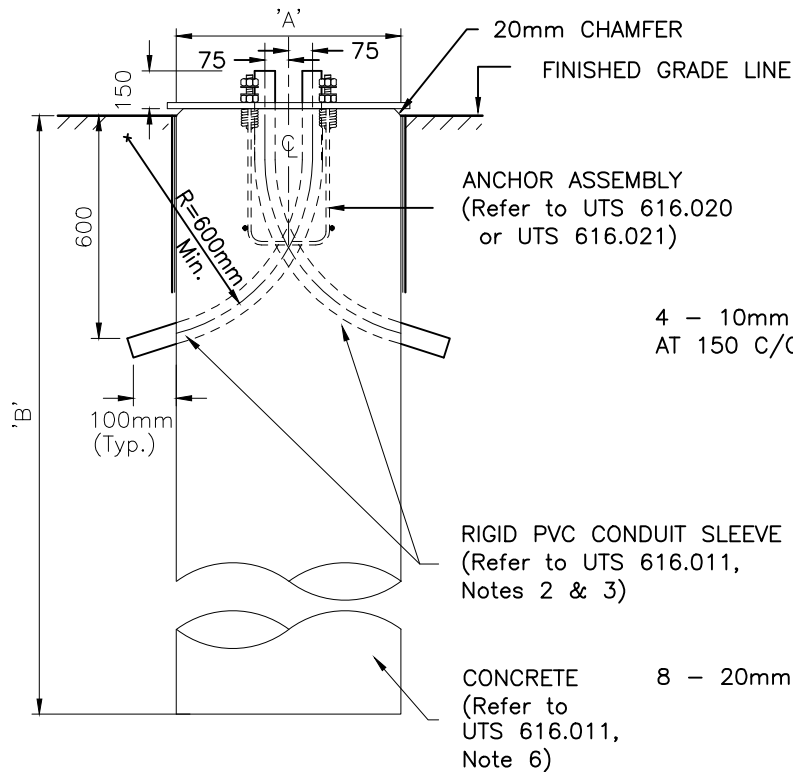
DIRECTION OF CONDUITS
AS SHOWN IN CONTRACT
(Refer to UTS 616.011
Notes 2 & 3)

PLAN

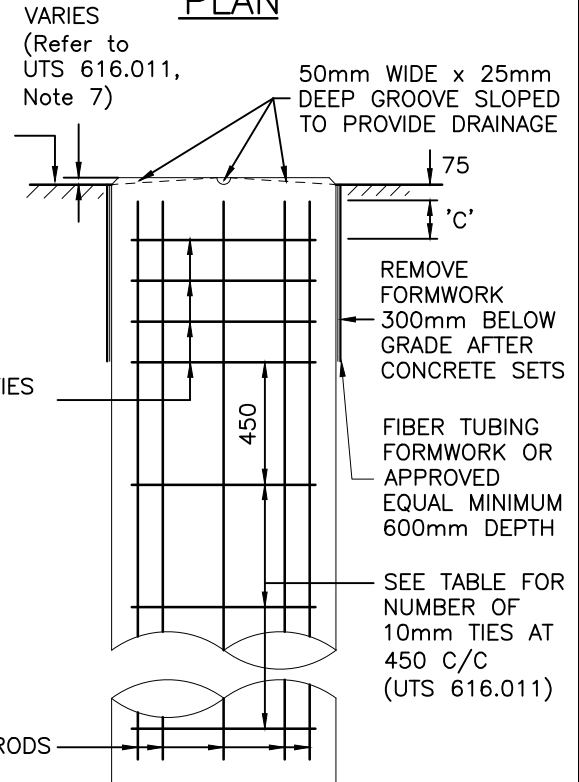
55mm MINIMUM
CONCRETE COVER



PLAN



ELEVATION DIMENSIONS



ELEVATION REINFORCEMENT

REINFORCEMENTS ARE SHOWN
IN SOLID LINES FOR CLARITY

REFERENCE UTS 616.011 FOR NOTES, TABLE AND DIMENSIONS.
ALL DIMENSION IN MILLIMETRES UNLESS OTHERWISE NOTED

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

CONCRETE FOOTING FOR BASE MOUNTED POLE ELEVATION DETAILS

Rev. Date

Rev. No. 0

Modification: _____

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Date: FEBRUARY, 2014

STANDARD No. UTS 616.010

REFERENCE UTS 616.010 FOR FOOTING ELEVATION DETAILS

POLE		FOUNDATION				CAGE					ANCHOR ASS. B.C.D.	REMARKS
TYPE S – STEEL AL – ALUMINIUM		LENGTH	DIA. 'A'	DEPTH 'B'	ROD LENGTH	NO. OF TIES			LAP 'D'	DIA. 'E'		
						'C'	AT 150	AT 450				
		m	mm	mm	mm	mm	c/c	c/c	mm	mm	mm	Note 2
S	8315	4.6	600	2150	2000	100	4	3	176	460	242	Note 2
S	8520M	6.1	600	2150	2000	100	4	3	176	460	406	Notes 1 & 2
S	8520M	6.1	760	2150	2000	100	4	3	214	560	406	Note 2
S	8620M	6.1	600	2150	2000	100	4	3	176	460	406	Notes 1 & 2
S	8620M	6.1	760	2150	2000	100	4	3	214	560	406	Note 2
S	8535M	10.7	760	2600	2450	100	4	4	214	560	406	Note 2
S	8540M	12.2	760	2750	2600	150	4	4	214	560	406	Note 2
AL	TP10-423A-AB-150	3.3	300	1200	N/A	N/A	N/A	N/A	N/A	N/A	151	Note 2
AL	TP15-645C-AB-242	4.5	600	2150	2000	100	4	3	176	460	242	Note 2
AL	TP19-866C-AB-292	5.8	600	2150	2000	100	4	3	176	460	292	Note 2
AL	TP19-1080E-AB-406	5.8	600	2150	2000	100	4	3	176	460	406	Notes 1 & 2
AL	TP19-1080E-AB-406	5.8	760	2150	2000	100	4	3	214	560	406	Note 2
AL	TP22.5-1080E-AB-406	6.85	600	2150	2000	100	4	3	176	460	406	Notes 1 & 2
AL	TP22.5-1080E-AB-406	6.85	760	2150	2000	100	4	3	214	560	406	Note 2
AL	TP24-866C-AB-406	7.3	600	2150	2000	100	4	3	176	460	406	Notes 1 & 2
AL	TP24-866C-AB-406	7.3	760	2150	2000	100	4	3	214	560	406	Note 2
AL	TP24-1010E-AB-406	7.3	760	2750	2600	150	4	4	214	560	406	No Sleeves
AL	ET35-1055E-AB-406	9.8	760	2600	2450	100	4	4	214	560	406	Note 2 or 3
AL	ET40-1055E-AB-406	11.3	760	2750	2600	150	4	4	214	560	406	Note 2 or 3
AL	E35-845E-AB-292	9.8	760	2600	2450	100	4	4	214	560	292	Note 3
AL	E40-845E-AB-292	11.3	760	2750	2600	150	4	4	214	560	292	Note 3

NOTES:

- REDUCE THE DIAMETER 'A' OF FOUNDATION TO 600mm IF CONFLICTS EXIST WITH UNDERGROUND UTILITIES AND APPROVED BY CONTRACT ADMINISTRATOR.
- ALL TRAFFIC SIGNAL AND COMBINATION TRAFFIC SIGNAL/STREET LIGHTING POLES SHALL HAVE 1-100mm CONDUIT SLEEVE PER CONCRETE FOOTING.
- INDEPENDENT STREET LIGHTING POLE INSTALLATIONS SHALL HAVE 2 – 75mm CONDUIT SLEEVES PER CONCRETE FOOTING.
- CONTRACTOR SHALL INSTALL 50mm FLEXIBLE PVC ENT CONDUITS WITHIN 75mm SLEEVES FOR INDEPENDENT STREET LIGHTING APPLICATIONS, CUTTING THE SLEEVES OFF AT TOP OF THE FOOTING. GROUND WIRE SHALL PASS THROUGH THE 75mm SLEEVE TO GROUND ELECTRODE ADJACENT TO POLE.
- ANCHOR ASSEMBLY AND CONDUITS ARE TO BE PLACED IN CENTRE OF FOOTING.
- CONCRETE SHALL BE ACCORDING TO OPSS MUNI 1350 WITH PERFORMANCE REQUIREMENTS IN CONFORMANCE WITH CSA A23.1 OF EXPOSURE CLASS C-1 AND A NOMINAL MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 Mpa. THE CONCRETE SHALL BE POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, FINISHED, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
- TOP OF FOOTING TO BE INSTALLED FLUSH WITH FINISHED GRADE OF PAVED OR CONCRETE SIDEWALK / BOULEVARD OR 50mm ABOVE GRADE IN EARTH OR GRANULAR BOULEVARD.
- DIRECTION OF CONDUIT SLEEVE ENTRY TO BE MARKED WITH INDENTATION ON TOP OF FOOTING.
- FIBRE BOARD TO BE INSTALLED AROUND CIRCUMFERENCE OF BASE IN CONCRETE SIDEWALK OR MEDIAN AREAS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

CONCRETE FOOTING FOR BASE MOUNTED POLE DIMENSION DETAILS

Rev. Date

Rev. No. 0

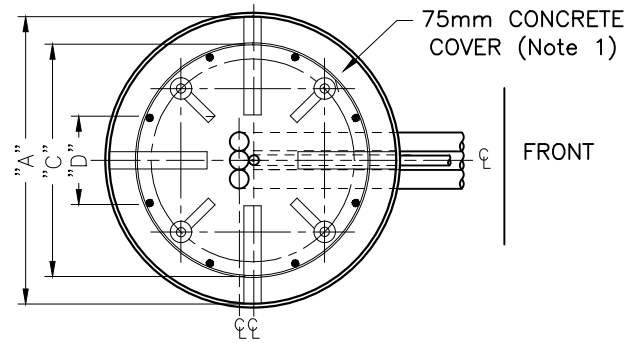
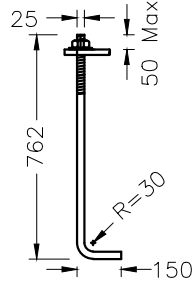
Modification: _____

Modified By: McCORMICK RANKIN

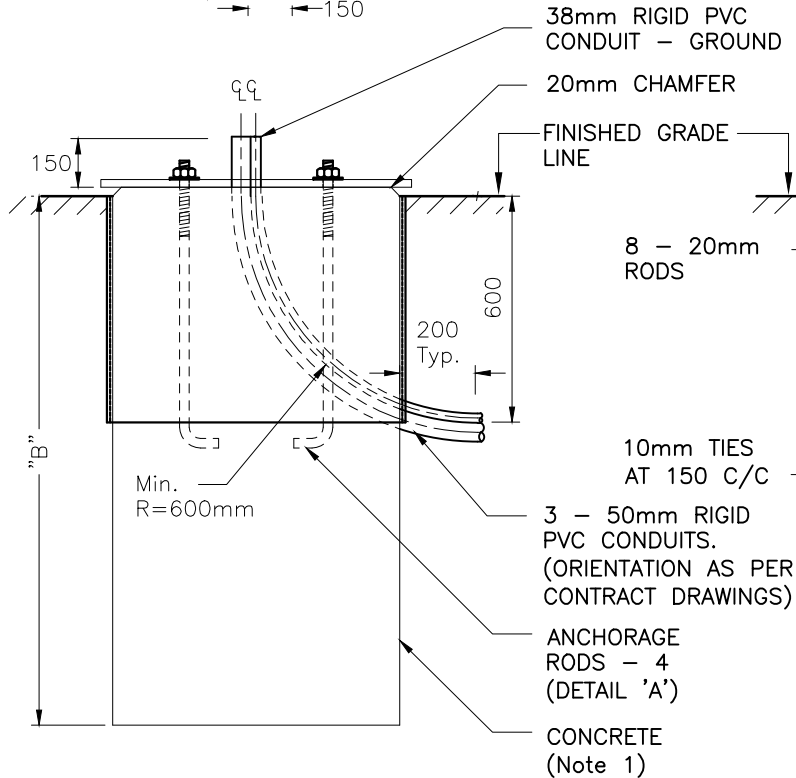
Date: FEBRUARY, 2014

STANDARD No. UTS 616.011

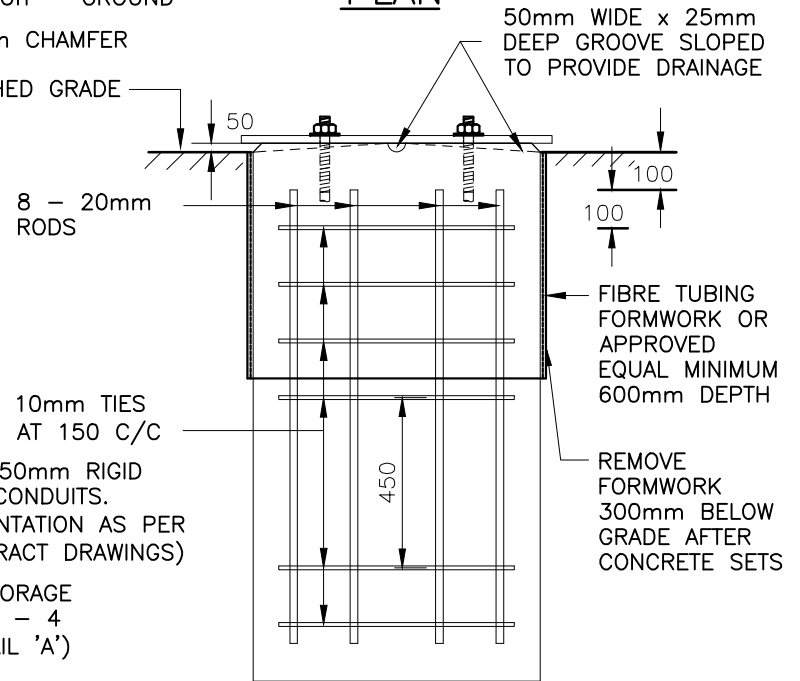
DETAIL 'A'
ANCHOR BOLT



PLAN



ELEVATION
DIMENSIONS



ELEVATION
REINFORCEMENT

REINFORCEMENTS ARE SHOWN IN SOLID LINES FOR CLARITY

TYPE (SENTINEL POLE & EQUIPMENT)	PEDESTAL	FOUNDATION		CAGE					ANCHOR	
	HEIGHT	DIA.	DEPTH	ROD	NO. OF TIES			ID DIA.	LAP	RODS
	mm	mm	mm	LENGTH	AT 100	AT 150	AT 450	'C'	'D'	BCD
POWER SUPPLY PEDESTAL	1168	600	1400	1200	1	4	1	460	176	406
METERED POWER SUPPLY PEDESTAL	1780	760	1400	1200	1	4	1	612	235	539

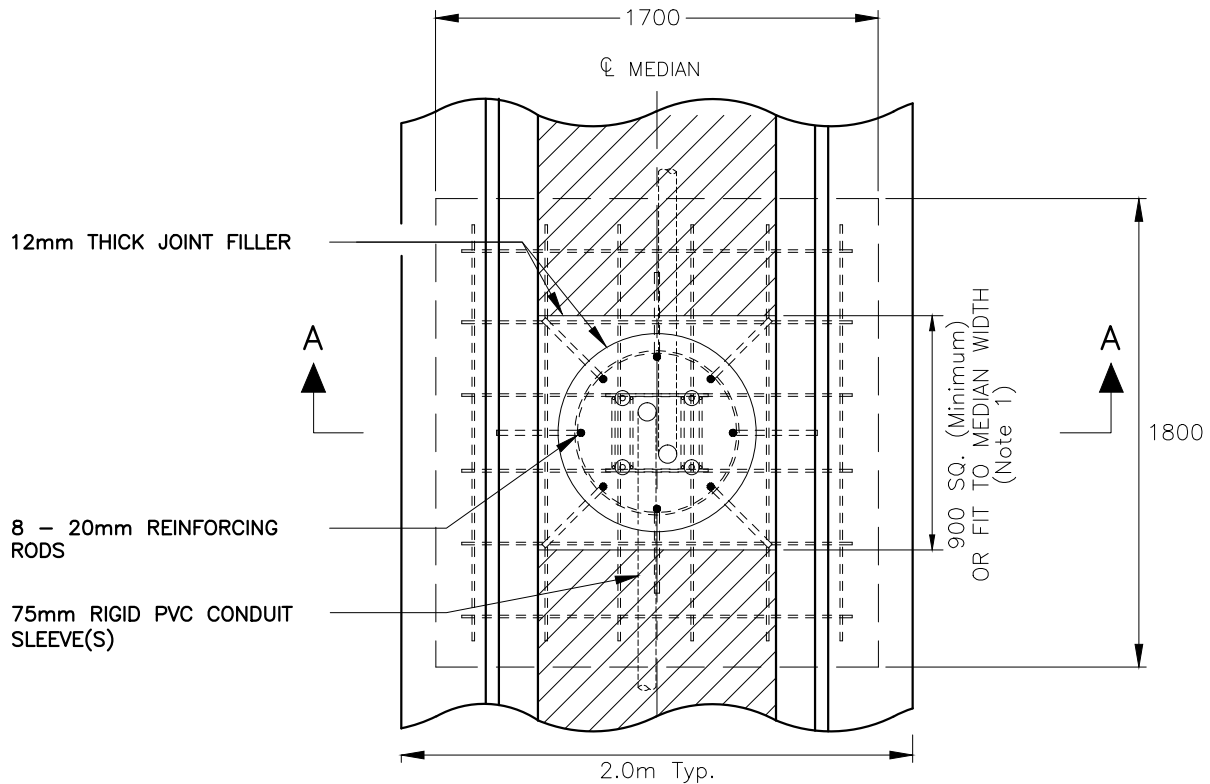
NOTES:

1. CONCRETE SHALL BE ACCORDING TO OPSS MUNI 1350 WITH PERFORMANCE REQUIREMENTS IN CONFORMANCE WITH CSA A23.1 OF EXPOSURE CLASS C-1 AND A NOMINAL MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 Mpa. THE CONCRETE SHALL BE POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, FINISHED, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
2. DIRECTION OF CONDUIT SLEEVE ENTRY TO BE MARKED WITH INDENTATION ON TOP OF FOOTING.

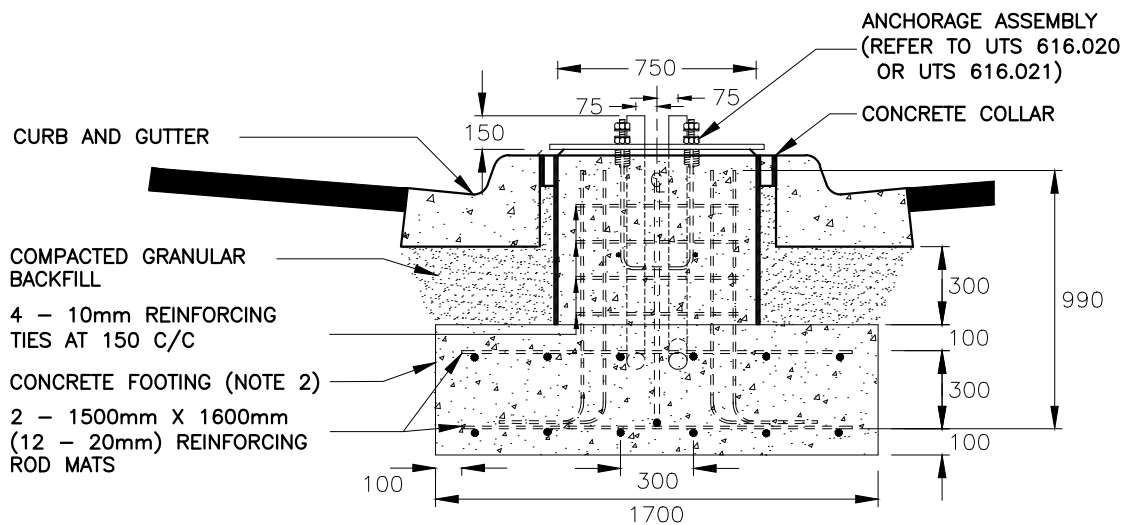
UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES

CONCRETE FOOTING
FOR BASE MOUNTED
POWER PEDESTAL

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.012</u>	



PLAN



SECTION A-A

DIMENSIONS IN mm EXCEPT AS NOTED

NOTE:

1. USE CONCRETE COLLAR WHEN MEDIAN SURFACE CAPPED WITH PAVING STONE, CONCRETE OR ASPHALT.
2. CONCRETE SHALL BE ACCORDING TO OPSS MUNI 1350 WITH PERFORMANCE REQUIREMENTS IN CONFORMANCE WITH CSA A23.1 OF EXPOSURE CLASS C-1 AND A NOMINAL MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 Mpa. THE CONCRETE SHALL BE POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, FINISHED, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
3. SPREAD FOOTING TO ONLY BE USED WHERE UTILITY CONFLICT IDENTIFIED AND AT THE DISCRETION OF THE PROJECT MANAGER.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**POLE SPREAD FOOTING
IN MEDIAN FOR
FOOTING CONFLICTS**

Rev. Date

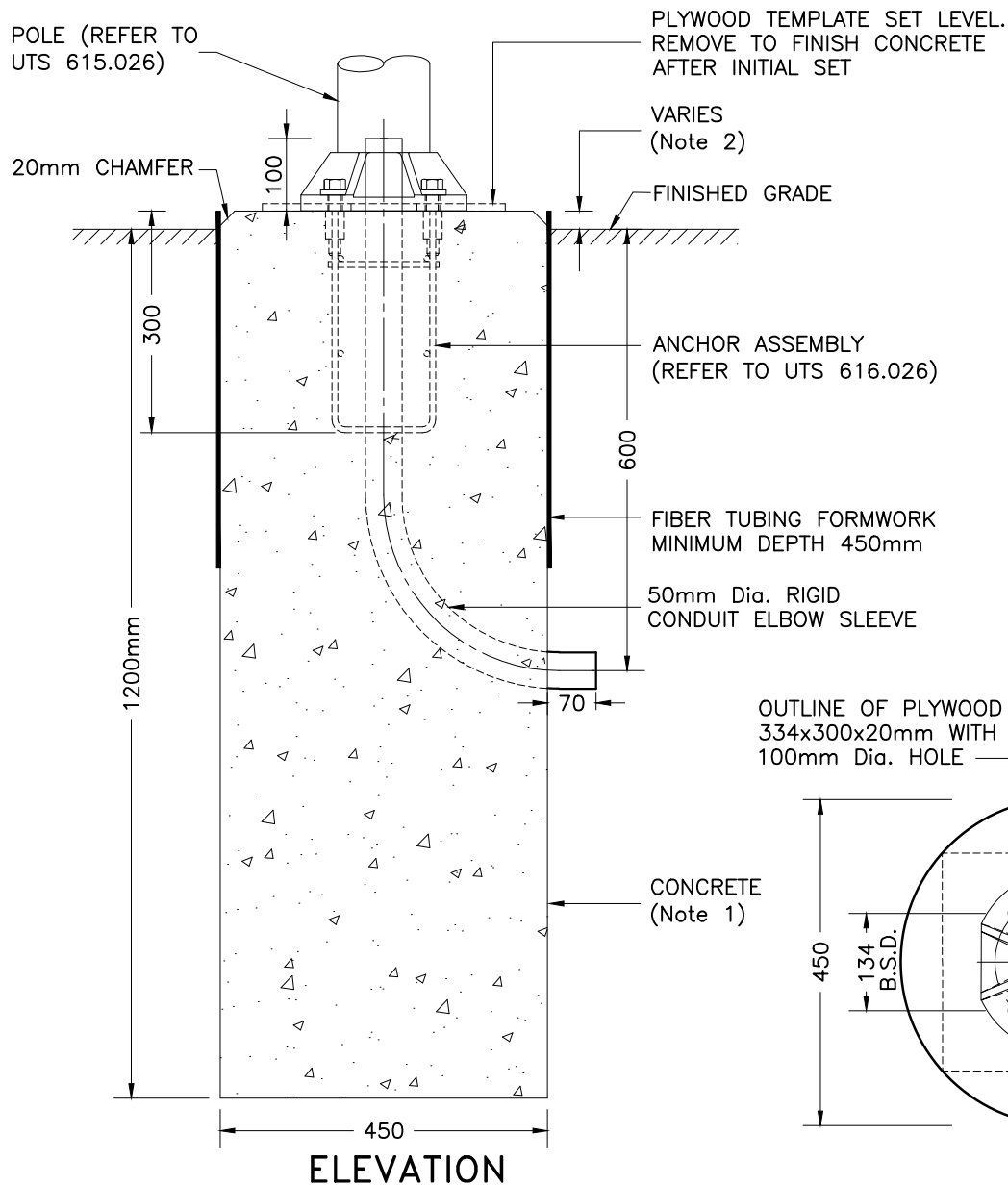
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 616.013



NOTES:

1. CONCRETE SHALL BE ACCORDING TO OPSS MUNI 1350 WITH PERFORMANCE REQUIREMENTS IN CONFORMANCE WITH CSA A23.1 OF EXPOSURE CLASS C-1 AND A NOMINAL MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 Mpa. THE CONCRETE SHALL BE POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, FINISHED, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
2. TOP OF FOOTING SHALL BE INSTALLED AT 40mm \pm 15mm ABOVE FINISHED GRADE IN PAVED OR CONCRETE AREAS AND 75mm \pm 25mm ABOVE FINISHED GRADE IN EARTH OR GRANULAR AREAS.
3. DIRECTION OF CONDUIT SLEEVE ENTRY TO BE MARKED WITH INDENTATION ON TOP OF FOOTING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

CONCRETE FOOTING FOR BASE MOUNTED PEDESTRIAN PUSHBUTTON POLE

Rev. Date

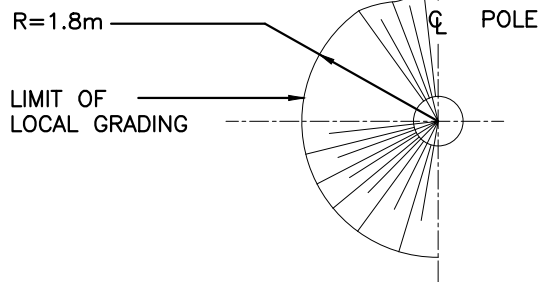
Rev. No. 0

Modification: _____

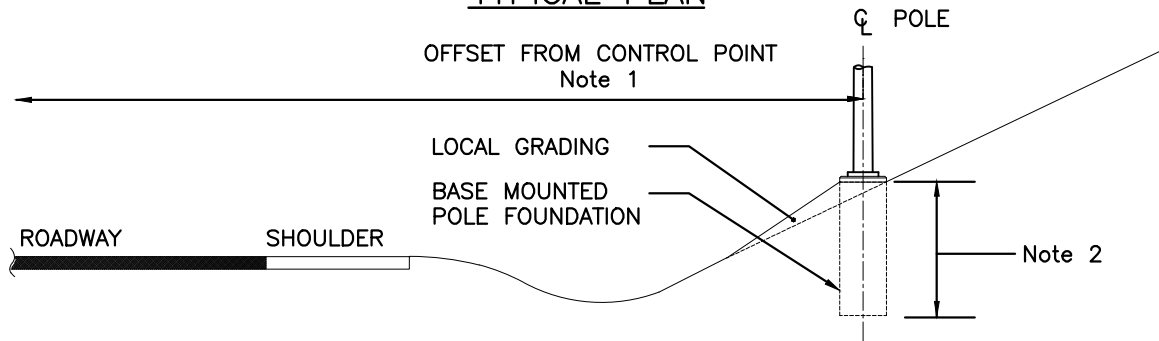
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

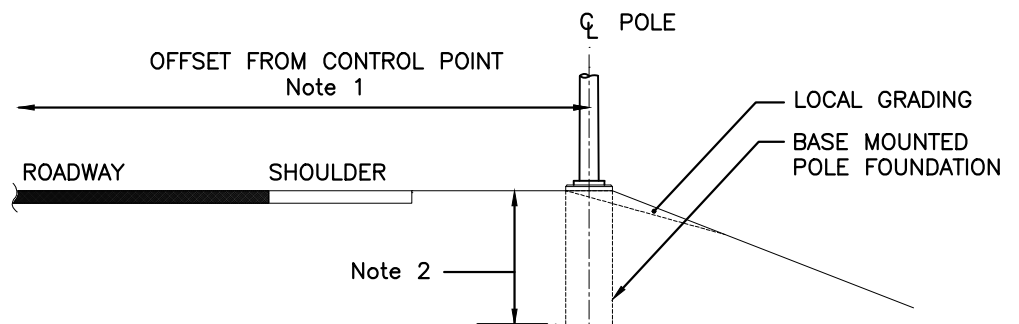
STANDARD No. UTS 616.014



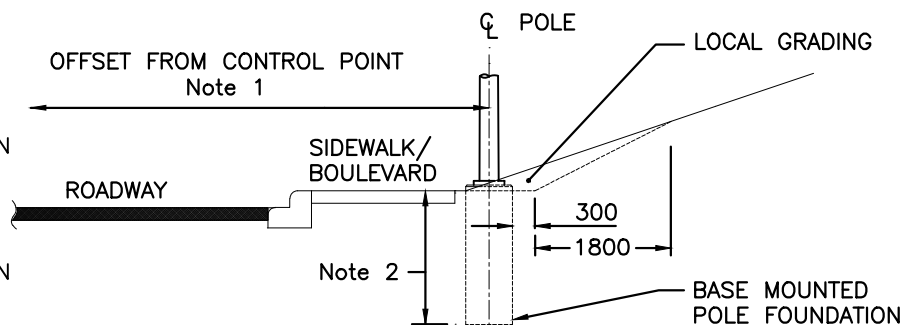
TYPICAL PLAN



POLE FOUNDATION CUT



POLE FOUNDATION FILL



POLE ADJACENT TO SIDEWALK

NOTES:

1. FOR FOUNDATION, POLE TYPE AND STATION, SEE CONTRACT DRAWINGS. REFER TO UTS 616.010 & UTS 616.011 FOR FOOTING REQUIREMENTS.
2. TOP ELEVATION OF FOUNDATION SHALL BE MEASURED FROM THE HIGHEST GRADE ELEVATION.
3. TOP ELEVATION OF FOUNDATION IN SIDEWALK AREAS SHALL BE LEVEL AND MAXIMUM 25mm ABOVE THE HIGHEST SIDEWALK GRADE ELEVATION.

ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

LOCAL GRADING AT POLE FOUNDATIONS

Rev. Date

Rev. No. 0

Modification: _____

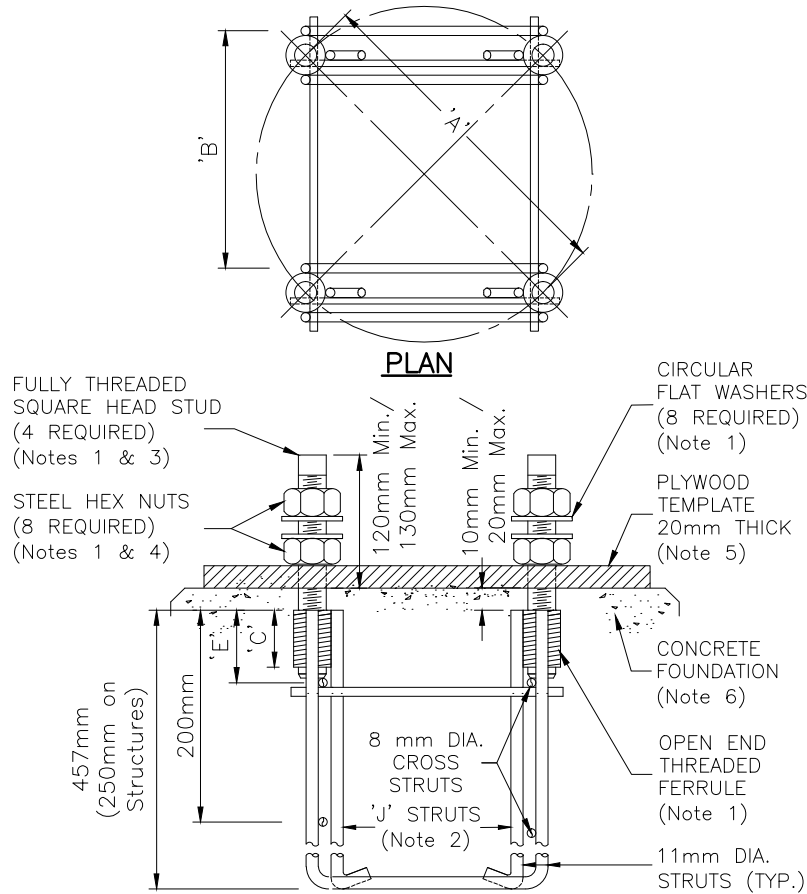
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 616.015

NOTES:

- ANCHORAGE ASSEMBLY:
 - STRUTS – GRADE SAE 1030-C STEEL, THREADED STEEL FERRULES – GRADE AISI C12L14 ROTOPROBED BAR,
 - STUDS – GRADE SAE C1541 STEEL, ALL ACCORDING TO SAE J403H,
 - NUTS – GRADE "B" ASTM A563 STEEL,
 - WASHERS – GRADE ANSI B18.22.1 STEEL.
 - ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED ACCORDING TO ASTM A123/A123M.
- ALL ASSEMBLIES SHALL HAVE 'J' STRUTS.
- STUDS TO BE FACTORY SET IN FERRULES WITH PREAPPLIED THREAD LOCKING COMPOUND.
- ASSEMBLY NUTS TO BE SHIPPED HAND TIGHTENED.
- THE SETTING TEMPLATE SHALL BE USED FOR ACCURATE POSITIONING OF ANCHOR WITHIN FORM AND SHALL BE REATTACHED TO ASSEMBLY FOLLOWING FINISHING OF CONCRETE.
- CONCRETE FOUNDATION FOR ANCHOR ASSEMBLY TO BE IN ACCORDANCE WITH UTS 616.010 AND UTS 616.011.
- ASSEMBLY TO BE MANUFACTURED BY NATIONAL CONCRETE ACCESSORIES, AMG METALS OR APPROVED EQUIVALENT.
- TYPICALLY INSTALLED ON REGION OF HALTON AND CITY OF BURLINGTON INSTALLATIONS.



ELEVATION

POLE			ANCHOR ASSEMBLY			TEMPLATE DIMENSIONS		FERRULE LENGTH	STUD LENGTH	STRUT LOCATION
TYPE	LENGTH		STUD DIA.	BOLT CIRCLE DIA.	BOLT DISTANCE	SQUARE	HOLE DIA.	'C' mm	'D' mm	'E' mm
S – STEEL		m	mm	'A' mm	'B' mm	mm	mm max.			
AL – ALUMINIUM										
S	8415	4.6	22	287	203	600	152	38	200	N/A
S	8520M	6.1LD	32	406	287	600	305	76	230	92
S	8620M	6.1HD	32	406	287	600	305	76	230	92
S	8535M	10.7	32	406	287	600	305	76	230	92
S	8540M	12.2	32	406	287	600	305	76	230	92
AL	TP15-645C-AB-242	4.5	19	242	171	600	152	38	200	N/A
AL	TP19-866C-AB-292	5.8LD	25	292	207	600	203	50	200	67
AL	TP19-1080E-AB-406	5.8HD	32	406	287	600	305	76	230	92
AL	TP22.5-1080E-AB-406	6.85	32	406	287	600	305	76	230	92
AL	TP24-866C-AB-406	7.3LD	32	406	287	600	305	76	230	92
AL	TP24-1010E-AB-406	7.3HD	32	406	287	600	305	76	230	92
AL	ET35-1055E-AB-406	9.8	32	406	287	600	305	76	230	92
AL	ET35-1055E-AB-406-B	9.8	32	406	287	600	305	76	230	92
AL	ET40-1055E-AB-406	11.3	32	406	287	600	305	76	230	92
AL	ET40-1055E-AB-406-B	11.3	32	406	287	600	305	76	230	92
AL	E35-845E-AB-292	9.8	25	292	207	600	203	50	200	67
AL	E40-845E-AB-292	11.3	25	292	207	600	203	50	200	67

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ANCHORAGE ASSEMBLY WITH STUDS FOR TRAFFIC, SIGN AND LUMINAIRE POLES

Rev. Date SEPT. 2014 Rev. No. 1

Modification: REVISE STUD LENGTHS

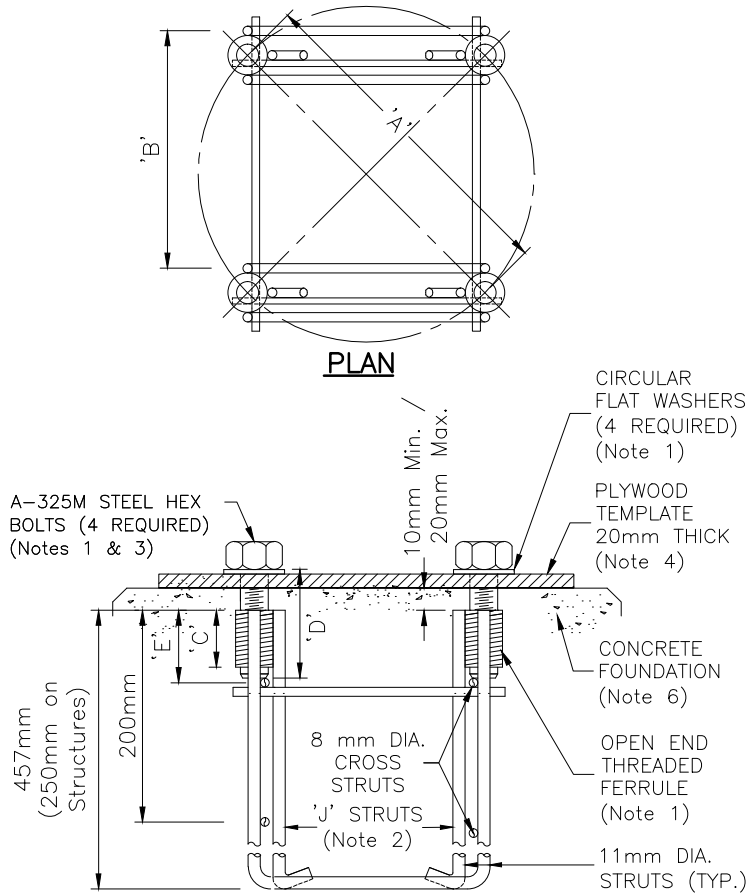
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 616.020

NOTES:

- ANCHORAGE ASSEMBLY:
 - STRUTS – GRADE SAE 1030-C STEEL, THREADED STEEL FERRULES – GRADE
 - AISI C12L14 ROTOPROBED BAR,
 - HEX. BOLTS – ASTM A325M STEEL AND HEAT TREATED TENSILE STRENGTH,
 - WASHERS – GRADE ANSI B18.22.1 STEEL.
 - ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED ACCORDING TO ASTM A123/A123M.
- ALL ASSEMBLIES SHALL HAVE 'J' STRUTS.
- BOLTS TO BE SHIPPED HAND TIGHTENED IN FERRULES.
- THE SETTING TEMPLATE SHALL BE USED FOR ACCURATE POSITIONING OF ANCHOR WITHIN FORM AND SHALL BE REATTACHED TO ASSEMBLY FOLLOWING FINISHING OF CONCRETE.
- CONCRETE FOUNDATION FOR ANCHOR ASSEMBLY TO BE IN ACCORDANCE WITH UTS 616.010 AND UTS 616.011.
- ASSEMBLY TO BE MANUFACTURED BY NATIONAL CONCRETE ACCESSORIES, AMG METALS OR APPROVED EQUIVALENT.
- TYPICALLY INSTALLED ON TOWN OF OAKVILLE, TOWN OF MILTON AND TOWN OF HALTON HILLS INSTALLATIONS.



ELEVATION

POLE			ANCHOR ASSEMBLY			TEMPLATE DIMENSIONS		FERRULE LENGTH	BOLT LENGTH	STRUT LOCATION
TYPE		LENGTH	STUD DIA.	BOLT CIRCLE DIA.	BOLT DISTANCE	SQUARE	HOLE DIA.	'C' mm	'D' mm	'E' mm
S – STEEL		m	mm	'A' mm	'B' mm	mm	mm max.			
AL – ALUMINIUM										
S	8415	4.6	22	287	203	600	152	38	102	N/A
S	8520M	6.1LD	32	406	287	600	305	76	125	92
S	8620M	6.1HD	32	406	287	600	305	76	125	92
S	8535M	10.7	32	406	287	600	305	76	125	92
S	8540M	12.2	32	406	287	600	305	76	125	92
AL	TP15-645C-AB-242	4.5	19	242	171	600	152	38	102	N/A
AL	TP19-866C-AB-292	5.8LD	25	292	207	600	203	50	102	67
AL	TP19-1080E-AB-406	5.8HD	32	406	287	600	305	76	125	92
AL	TP22.5-1080E-AB-406	6.85	32	406	287	600	305	76	125	92
AL	TP24-866C-AB-406	7.3LD	32	406	287	600	305	76	125	92
AL	TP24-1010E-AB-406	7.3HD	32	406	287	600	305	76	125	92
AL	ET35-1055E-AB-406	9.8	32	406	287	600	305	76	125	92
AL	ET35-1055E-AB-406-B	9.8	32	406	287	600	305	76	125	92
AL	ET40-1055E-AB-406	11.3	32	406	287	600	305	76	125	92
AL	ET40-1055E-AB-406-B	11.3	32	406	287	600	305	76	125	92
AL	E35-845E-AB-292	9.8	25	292	207	600	203	50	102	67
AL	E40-845E-AB-292	11.3	25	292	207	600	203	50	102	67

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ANCHORAGE ASSEMBLY WITH BOLTS FOR TRAFFIC, SIGN AND LUMINAIRE POLES

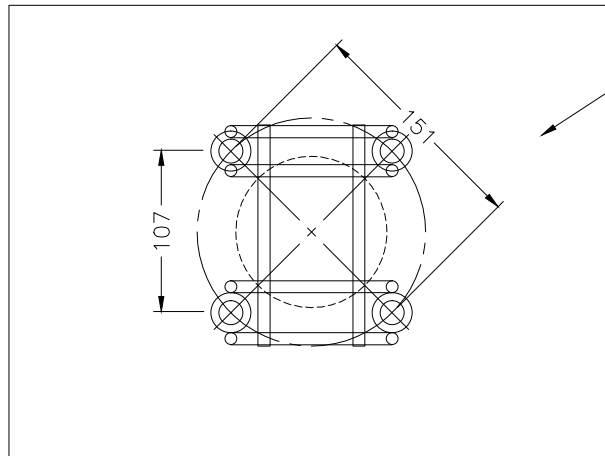
Rev. Date SEPT. 2014 Rev. No. 1

Modification: REVISE BOLT LENGTHS

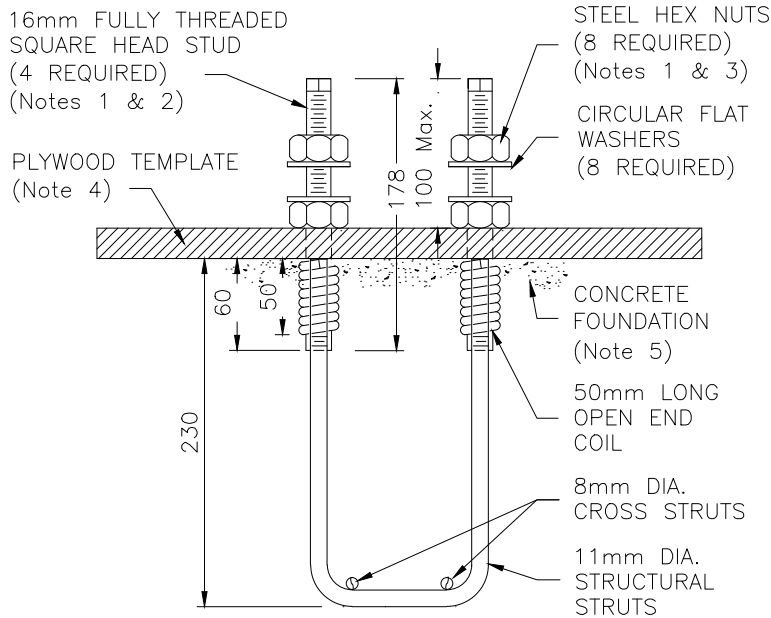
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 616.021



PLAN



ELEVATION

OUTLINE OF PLYWOOD TEMPLATE
400mmx300mmx20mm WITH
100mm Dia. HOLE
(Note 4)

NOTES:

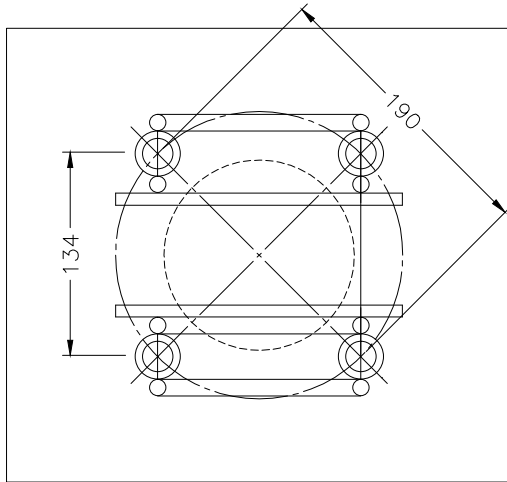
- ANCHORAGE ASSEMBLY:
 - STRUTS – GRADE SAE 1030–C STEEL, THREADED STEEL FERRULES – GRADE AISI C12L14 ROTOPROBED BAR,
 - STUDS – GRADE SAE C1541 STEEL, ALL ACCORDING TO SAE J403H,
 - NUTS – GRADE "B" ASTM A563 STEEL,
 - WASHERS – GRADE ANSI B18.22.1 STEEL.
 - ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED ACCORDING TO ASTM A123/A123M.
- STUDS TO BE FACTORY SET IN COILS WITH PREAPPLIED THREAD LOCKING COMPOUND.
- ASSEMBLY NUTS TO BE SHIPPED HAND TIGHTENED.
- THE SETTING TEMPLATE SHALL BE USED FOR ACCURATE POSITIONING OF ANCHOR WITHIN FORM AND SHALL BE REATTACHED TO ASSEMBLY FOLLOWING FINISHING OF CONCRETE.
- CONCRETE FOUNDATION FOR ANCHOR ASSEMBLY TO BE IN ACCORDANCE WITH UTS 616.010 AND UTS 616.011.
- ASSEMBLY TO BE MANUFACTURED BY NATIONAL CONCRETE ACCESSORIES, AMG METALS OR APPROVED EQUIVALENT.

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE SHOWN.

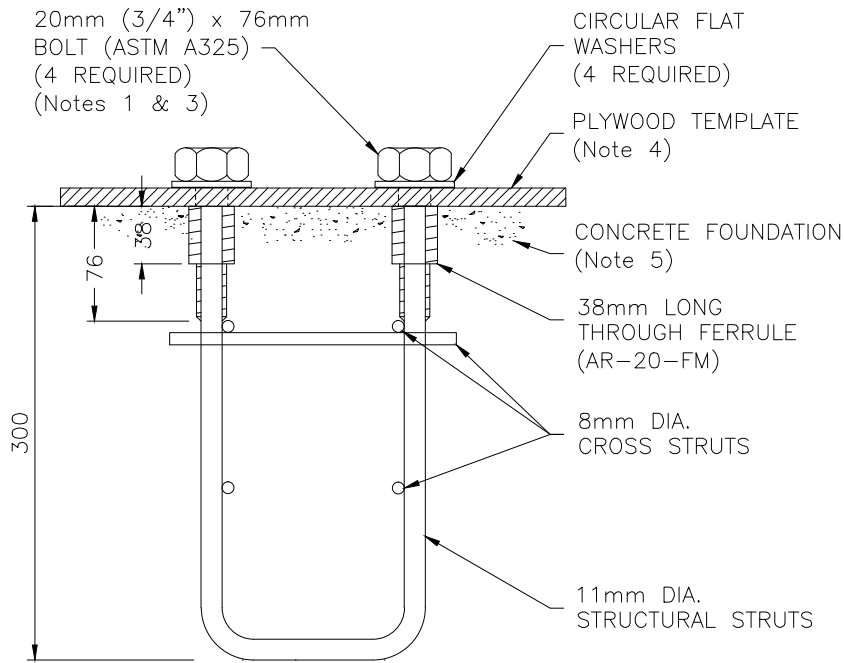
**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ANCHORAGE ASSEMBLY
WITH STUDS
FOR MEDIAN SIGN POLE – 151mm B.C.D.**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.025</u>	



PLAN



ELEVATION

OUTLINE OF PLYWOOD TEMPLATE
334mmx300mmx20mm WITH
100mm Dia. CENTRE HOLE
(Note 4)

NOTES:

- ANCHORAGE ASSEMBLY:
 - STRUTS – GRADE SAE 1030–C STEEL, THREADED STEEL FERRULES – GRADE AISI C12L14 ROTOPROBED BAR,
 - STUDS – GRADE SAE C1541 STEEL, ALL ACCORDING TO SAE J403H,
 - NUTS – GRADE "B" ASTM A563 STEEL,
 - WASHERS – GRADE ANSI B18.22.1 STEEL.
 - ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED ACCORDING TO ASTM A123/A123M.
- STUDS TO BE FACTORY SET IN COILS WITH PREAPPLIED THREAD LOCKING COMPOUND.
- ASSEMBLY NUTS TO BE SHIPPED HAND TIGHTENED.
- THE SETTING TEMPLATE SHALL BE USED FOR ACCURATE POSITIONING OF ANCHOR WITHIN FORM AND SHALL BE REATTACHED TO ASSEMBLY FOLLOWING FINISHING OF CONCRETE.
- CONCRETE FOUNDATION FOR ANCHOR ASSEMBLY TO BE IN ACCORDANCE WITH UTS 616.013.
- ASSEMBLY TO BE MANUFACTURED BY NATIONAL CONCRETE ACCESSORIES, AMG METALS OR APPROVED EQUIVALENT.

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE SHOWN.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**




**ANCHORAGE ASSEMBLY
WITH STUDS**

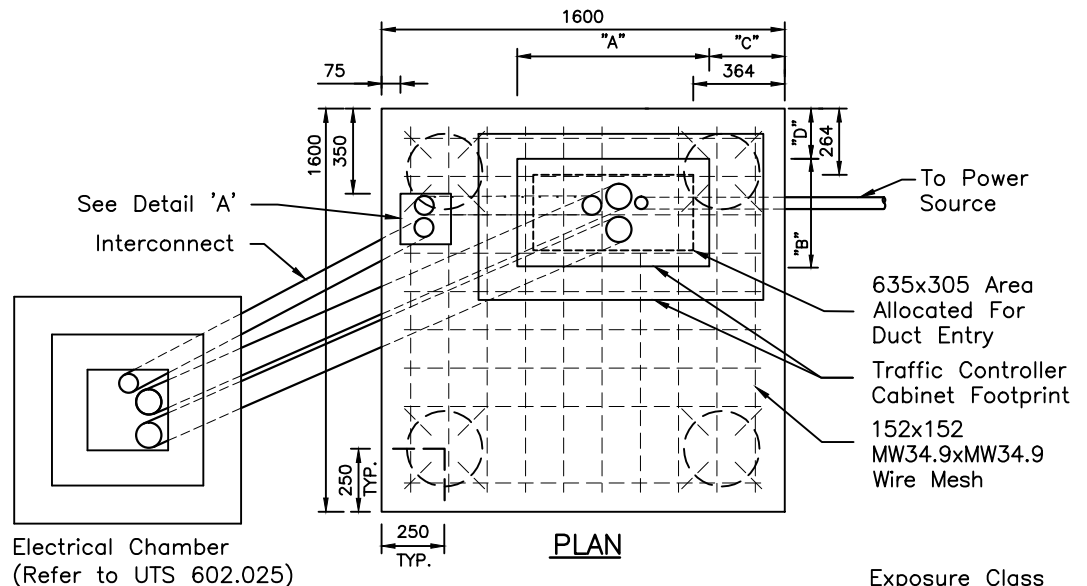
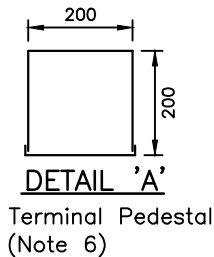
FOR PEDESTRIAN PUSHBUTTON POLE – 190mm B.C.D.

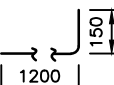
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.026</u>	

CABINET				DISTANCE "FROM CONCRETE PAD EDGE TO CONTROLLER CABINET"	
TYPE	HEIGHT	WIDTH "A"	DEPTH "B"	SIDE "C"	BACK "D"
"M"	1270	762	432	300	200
"MSX"	1473	762	432	300	200
"MXX"	1930	762	432	300	200
"P44"	1397	1118	660	100	85

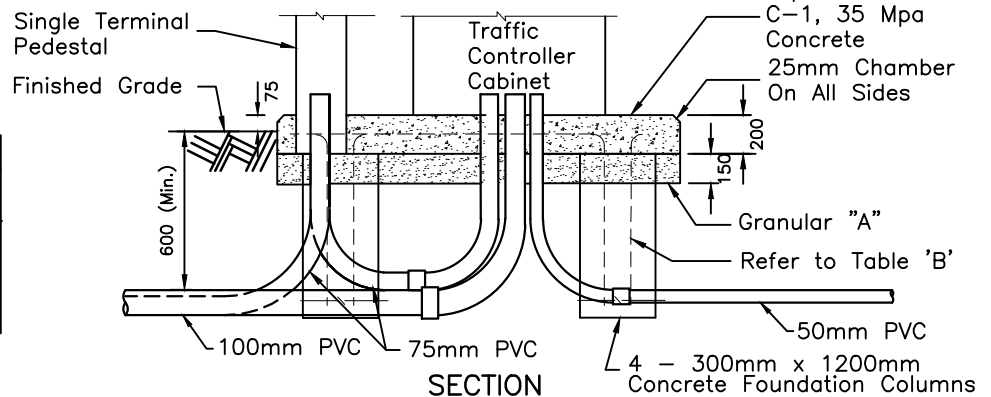
Conduit Legend

50mm Rigid PVC Conduit	
75mm Rigid PVC Conduit	
100mm Rigid PVC Conduit	



REBAR TABLE 'B' *		
SHAPE	SIZE	No REQ.'D
	20mm	16

* Reinforcing steel to be
Grade 400



NOTES




- CONCRETE TO BE CSA 23.1 OF EXPOSURE CLASS C-1, 35 MPa POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, WITH CLASS "A" FINISH, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
- RIGID PVC CONDUITS ARE TO BE PLACE TOGETHER IN PEDESTAL AND CABINET, WITHIN THE ALLOCATED AREA.
- CONTRACTOR TO SUPPLY AND PLACE 5mm POLYPROPYLENE FISH WIRE IN ALL CONDUITS.
- TOP OF TRAFFIC CONTROLLER BASE TO BE MIN. 75mm ABOVE FINISH GRADE AND LEVEL.
- REFER TO DETAIL ON TRAFFIC SIGNAL DRAWING FOR CONDUIT SIZES AND LOCATION OF COMMUNICATION CABINET BASE.
- INSTALL TERMINAL PEDESTAL UNLESS OTHERWISE SHOWN ON CONTRACT DRAWINGS.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.

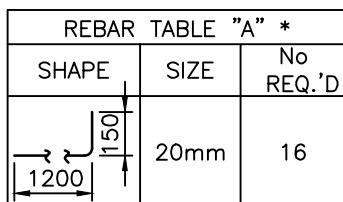
UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TRAFFIC CONTROLLER "M" AND "P44" SERIES CABINET FOUNDATION ONE PEDESTAL

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.030</u>	

Conduit Legend

50mm Rigid PVC Conduit	
75mm Rigid PVC Conduit	
100mm Rigid PVC Conduit	



PLAN

Exposure Class C-1, 35 MPa Concrete

25mm Chamfer on all sides

150 200

Granular "A"

75mm PVC

100mm PVC

Rebar "A"

Finished Grade

Communication Cabinet

SECTION

4 - 300mm x 1200mm Concrete Foundation Columns

1. CONCRETE TO BE CSA 23.1 OF EXPOSURE CLASS C-1, 35 MPa WITH CLASS "A" FINISH.
2. RIGID PVC CONDUITS ARE TO BE PLACE TOGETHER IN PEDESTAL AND CABINET, WITHIN THE ALLOCATED AREA.
3. CONTRACTOR TO SUPPLY AND PLACE 5mm POLYPROPYLENE FISH WIRE IN ALL CONDUITS.

4. TOP OF TRAFFIC CONTROLLER BASE TO BE MIN. 75mm ABOVE FINISH GRADE AND LEVEL.
5. REFER TO DETAIL ON TRAFFIC SIGNAL DRAWING FOR CONDUIT SIZES AND LOCATION OF COMMUNICATION CABINET BASE.
6. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.

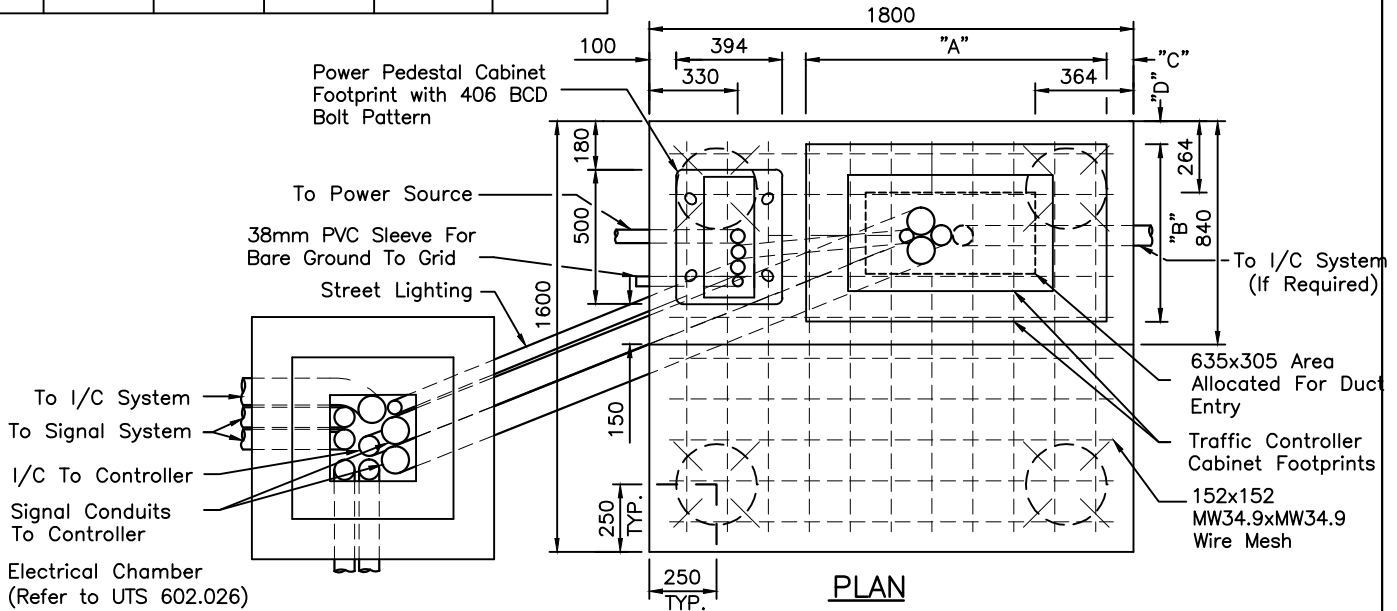
COMMUNICATION
"M" SERIES CABINET
FOUNDATION

STANDARD No. UTS 616.031

CABINET				DISTANCE "FROM CONCRETE PAD EDGE TO CONTROLLER CABINET"	
TYPE	HEIGHT	WIDTH "A"	DEPTH "B"	SIDE "C"	BACK "D"
"M"	1270	762	432	300	200
"MSX"	1473	762	432	300	200
"MXX"	1930	762	432	300	200
"P44"	1397	1118	660	100	85

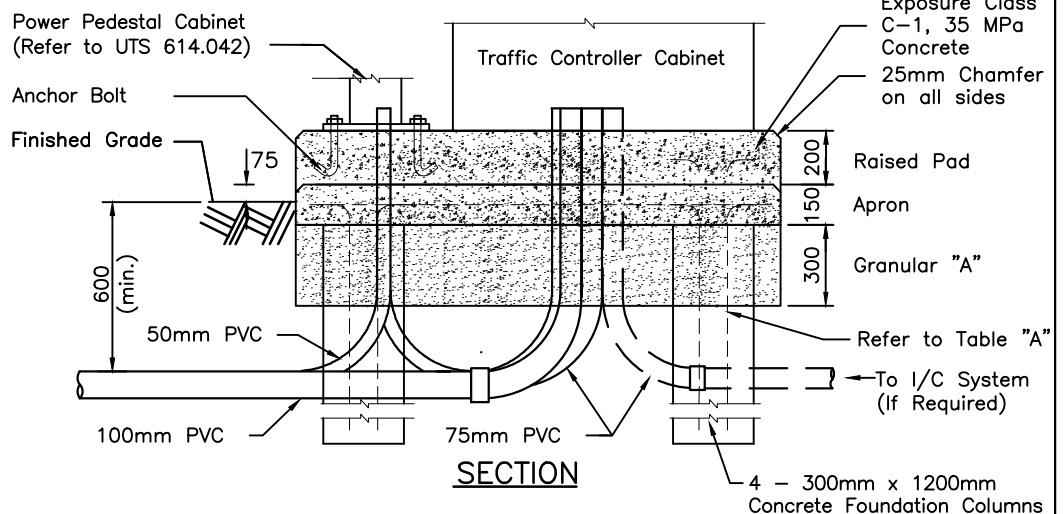
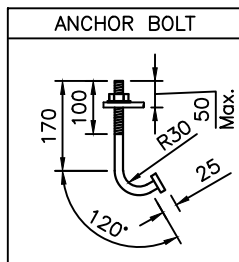
Conduit Legend

50mm Rigid PVC Conduit	
75mm Rigid PVC Conduit	
100mm Rigid PVC Conduit	



REBAR TABLE "A" *		
SHAPE	SIZE	No REQ.'D
	20mm	16

* Reinforcing steel to be Grade 400



NOTES

1. CONCRETE TO BE CSA 23.1 OF EXPOSURE CLASS C-1, 35 MPa WITH CLASS "A" FINISH.
2. RIGID PVC CONDUITS ARE TO BE PLACED TOGETHER IN PEDESTAL AND CABINET, WITHIN THE ALLOCATED AREA.
3. DIRECTION OF CONDUIT ENTRY TO BE MARKED WITH INDENTATION ON TOP OF BASE.
4. CONTRACTOR TO SUPPLY AND PLACE 5mm POLYPROPYLENE FISH WIRE IN ALL CONDUITS.
5. TOP OF TRAFFIC CONTROLLER BASE TO BE MIN. 75mm ABOVE FINISH GRADE AND LEVEL.
6. REFER TO DETAIL ON TRAFFIC SIGNAL DRAWING FOR CONDUIT SIZES AND LOCATION OF NEW TRAFFIC CONTROLLER BASE.
7. GROUND ELECTRODES TO BE INSTALLED MIN. 5.5m FROM EDGE OF FOUNDATION.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED.




UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

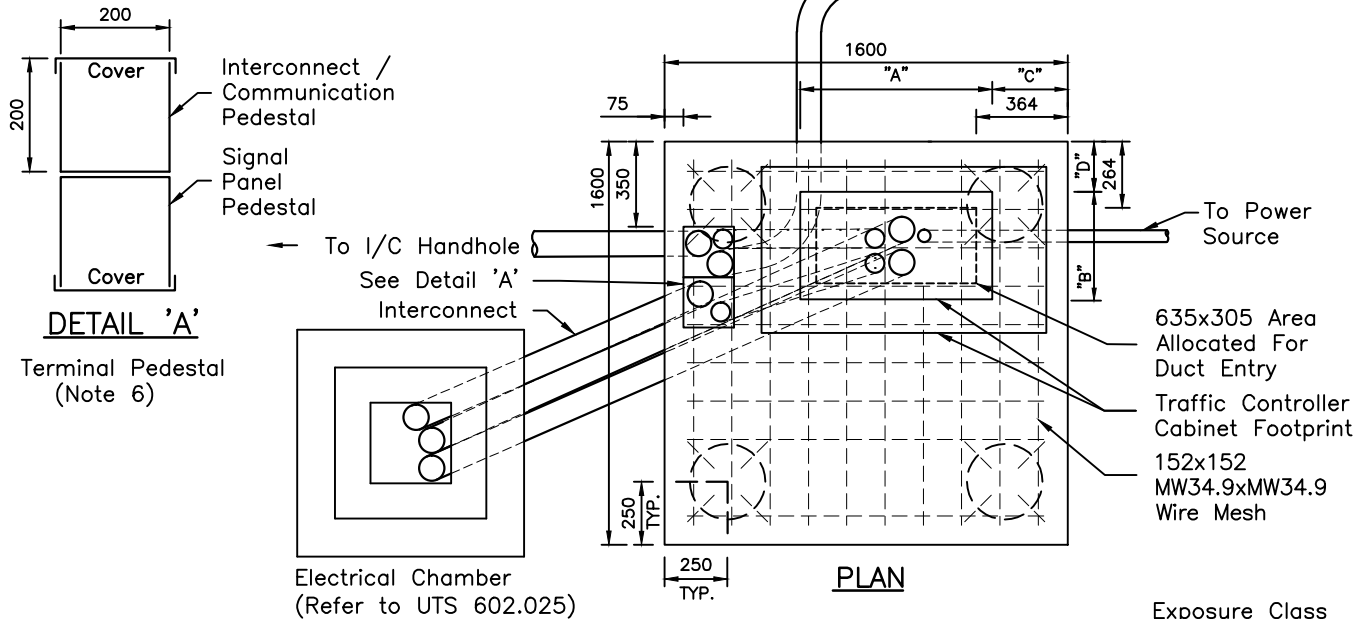
TRAFFIC CONTROLLER BASE "M" SERIES AND "P44" CABINETS WITH POWER PEDESTAL (406mm B.C.D.)


Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.035</u>	

CABINET				DISTANCE "FROM CONCRETE PAD EDGE TO CONTROLLER CABINET"	
TYPE	HEIGHT	WIDTH "A"	DEPTH "B"	SIDE "C"	BACK "D"
"M"	1270	762	432	300	200
"MSX"	1473	762	432	300	200
"MXX"	1930	762	432	300	200
"P44"	1397	1118	660	100	85

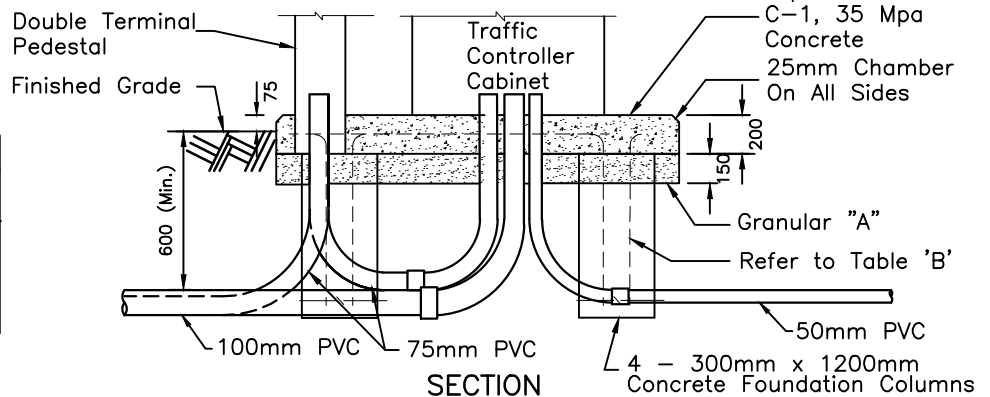
Conduit Legend

50mm Rigid PVC Conduit	
75mm Rigid PVC Conduit	
100mm Rigid PVC Conduit	



REBAR TABLE 'B' *		
SHAPE	SIZE	No REQ.'D
	20mm	16

* Reinforcing steel to be Grade 400



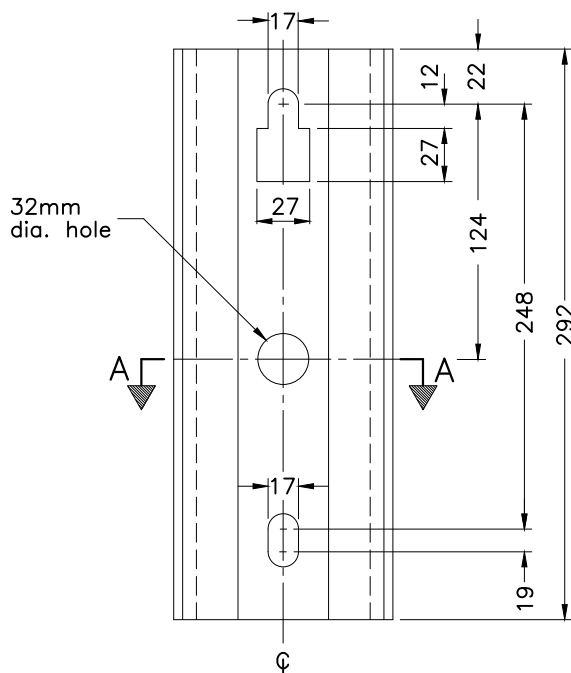
NOTES

1. CONCRETE TO BE CSA 23.1 OF EXPOSURE CLASS C-1, 35 MPa POURED AS ONE MONOLITHIC SLAB AND FORMED, PLACED, VIBRATED, WITH CLASS "A" FINISH, CURED AND PROTECTED IN ACCORDANCE WITH OPSS MUNI 904.
2. RIGID PVC CONDUITS ARE TO BE PLACE TOGETHER IN PEDESTAL AND CABINET, WITHIN THE ALLOCATED AREA.
3. CONTRACTOR TO SUPPLY AND PLACE 5mm POLYPROPYLENE FISH WIRE IN ALL CONDUITS.
4. TOP OF TRAFFIC CONTROLLER BASE TO BE MIN. 75mm ABOVE FINISH GRADE AND LEVEL.
5. REFER TO DETAIL ON TRAFFIC SIGNAL DRAWING FOR CONDUIT SIZES AND LOCATION OF COMMUNICATION CABINET BASE.
6. INSTALL TERMINAL PEDESTAL UNLESS OTHERWISE SHOWN ON CONTRACT DRAWINGS.
7. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE INDICATED.

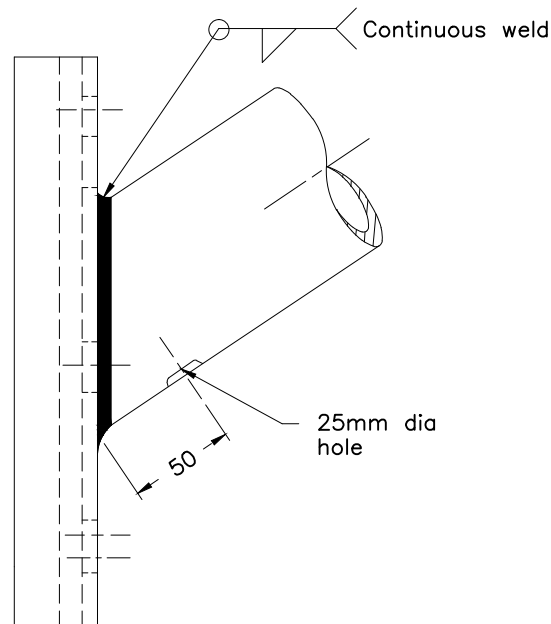
UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

TRAFFIC CONTROLLER "M" AND "P44" SERIES CABINET FOUNDATION TWO PEDESTALS

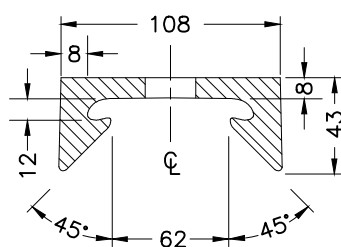
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 616.040</u>	



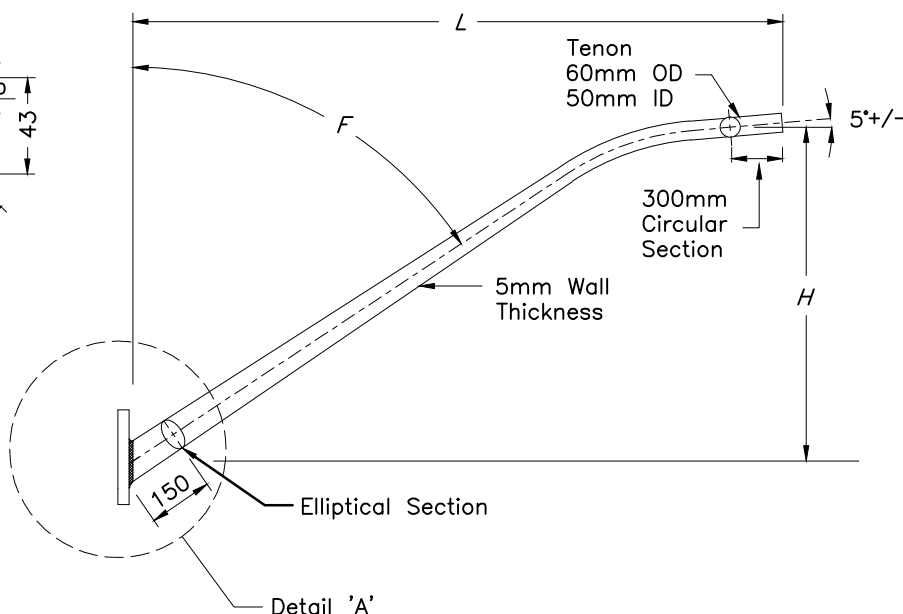
BRACKET BASE PLATE



DETAIL 'A'



SECTION A-A



DIMENSION	BRACKET	
	1.8m	2.4m
<i>L</i>	1.8m	2.4m
<i>H</i>	0.9m	1.2m
<i>F</i>	56°	56°
Elliptical section	64mm x 108mm OD	70mm x 125mm OD
Circular section	60mm OD	60mm OD

NOTES:

- BRACKET TO BE CONSTRUCTED FROM 100mm DIAMETER TUBE MATERIAL.
- FOR MOUNTING DETAILS, REFER TO UTS 617.020.
- WELDS TO BE IN ACCORDANCE WITH CSA W59.2.
- EXTERNAL FINISH TO BE ROTARY POLISHED.
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.

UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES

1.8m or 2.4m ALUMINUM
TAPERED ELLIPTICAL BRACKET
FOR METAL / CONCRETE POLE

Rev. Date

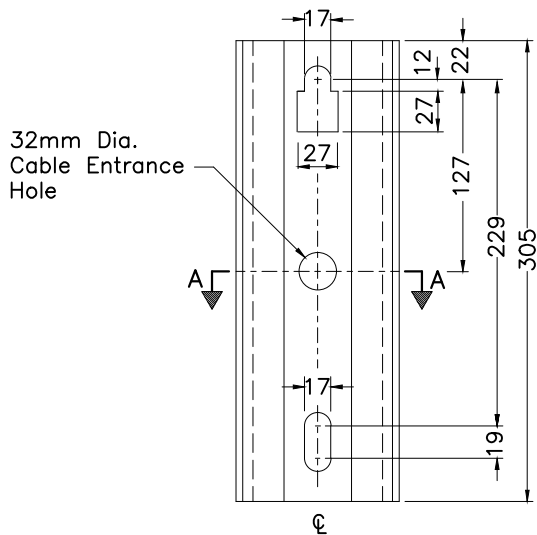
Rev. No. 0

Modification: _____

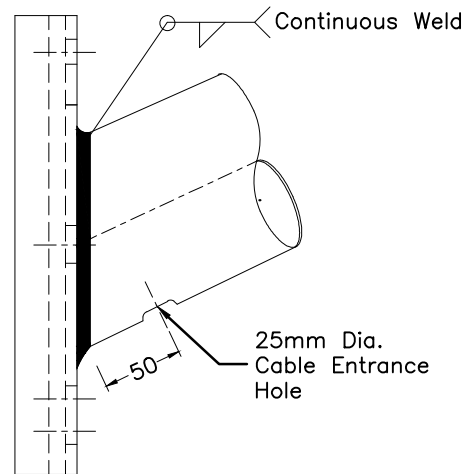
Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

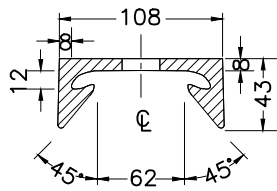
STANDARD No. UTS 617.010



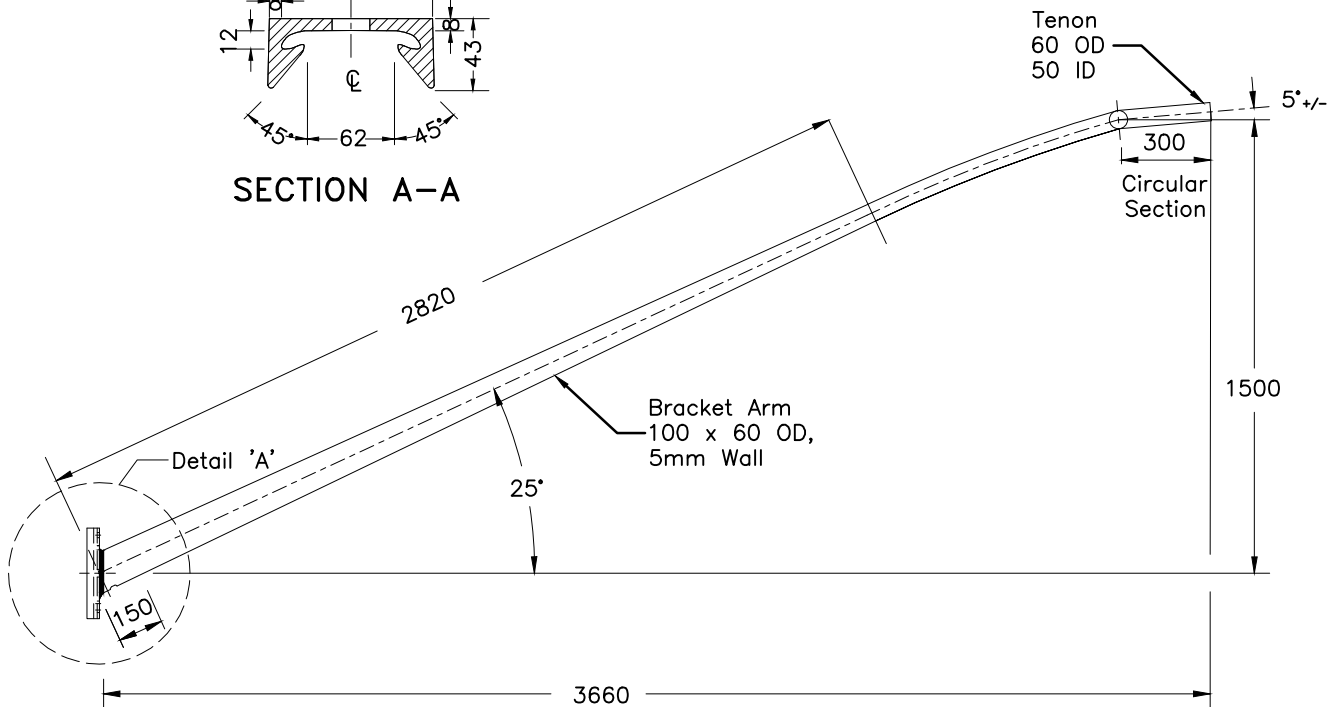
BRACKET BASE PLATE



DETAIL 'A'



SECTION A-A



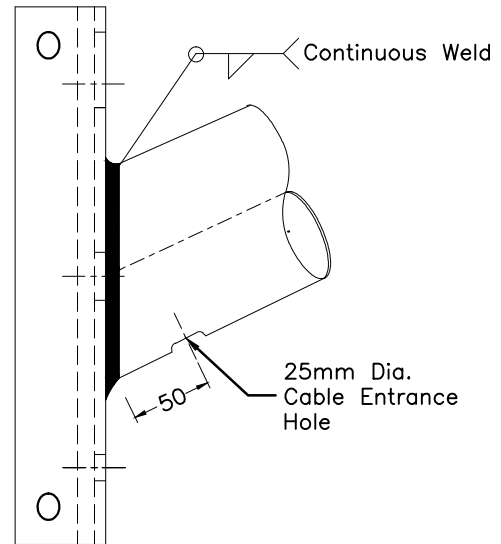
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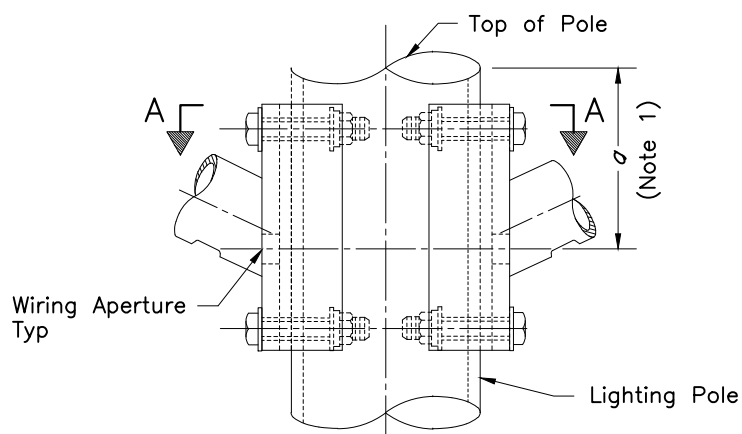
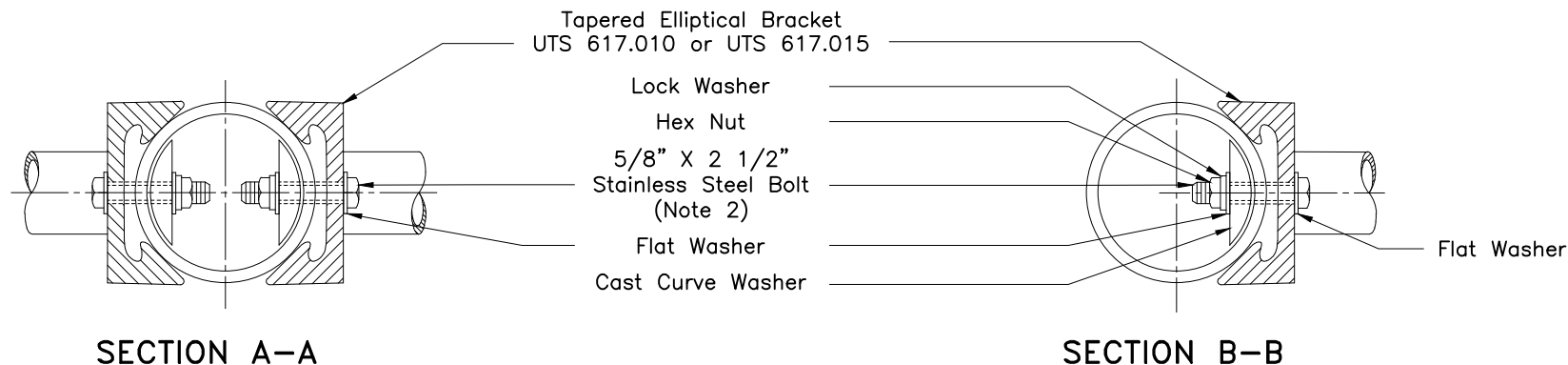
- BRACKET TO BE CONSTRUCTED FROM 100mm DIAMETER TUBE MATERIAL.
- FOR MOUNTING DETAILS, REFER TO UTS 617.020.
- WELDS TO BE IN ACCORDANCE WITH CSA W59.2.
- EXTERNAL FINISH TO BE ROTARY POLISHED.
- ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

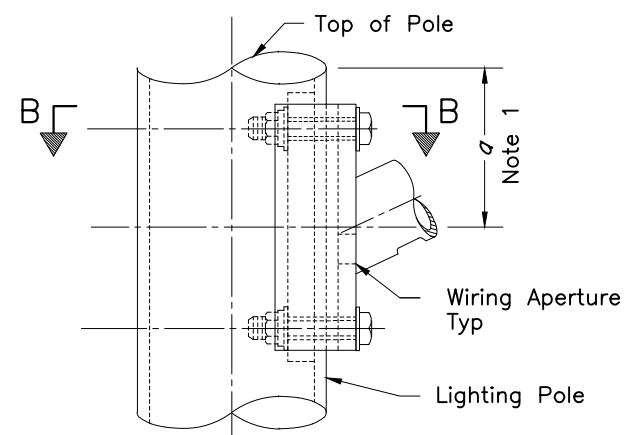
**3.6m ALUMINUM TAPERED
ELLIPTICAL BRACKET
FOR METAL / CONCRETE POLE**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 617.015</u>	





DOUBLE BRACKET



SINGLE BRACKET

NOTES:

- 1 For all steel and concrete poles, dimension σ = 250mm.
- 2 On steel and concrete poles, 16mm dia stainless steel hex head bolt length to suit pole.

DIMENSIONS IN mm EXCEPT AS NOTED

UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES

ALUMINUM TAPERED ELLIPTICAL
BRACKETS ON ALUMINUM POLES
MOUNTING DETAILS

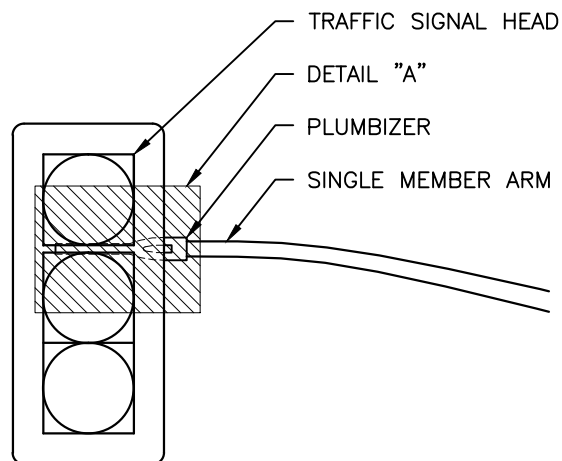
Rev. Date _____ Rev. No. 0

Modification: _____

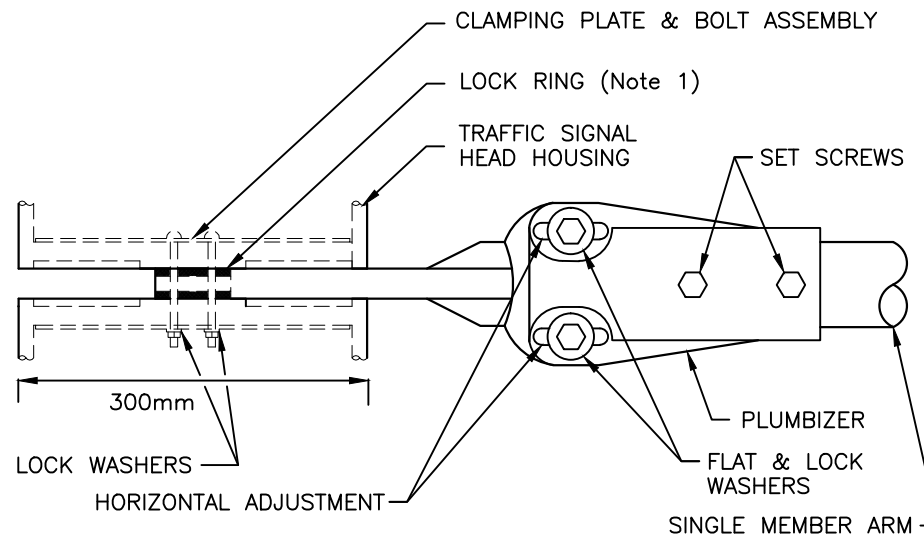
Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 617.020



FRONT VIEW



DETAIL "A"

NOTES:

1. LOCK RING OR ADAPTER SHALL BE USED WITH HEADS WITHOUT INTEGRALLY CAST MATCHING SERRATIONS. RINGS ARE TO BE OF BRASS OR BRONZE, WITH SUFFICIENT CONTACT AREA TO COVER FLANGE ON SIGNAL HOUSING.
2. THE PLUMBIZER IS TO BE INSTALLED BETWEEN THE RED AND AMBER SECTIONS OF THE TRAFFIC SIGNAL HEAD, UNLESS OTHERWISE SPECIFIED.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**PLUMBIZER – ADJUSTABLE
MID–SECTION SIGNAL
HEAD HANGER**

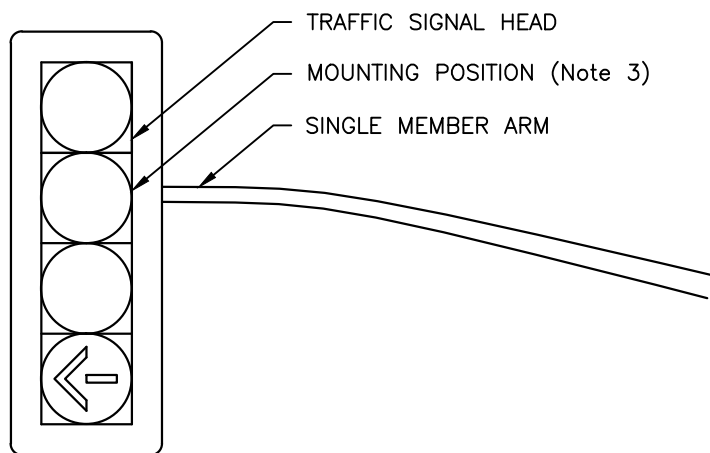
Rev. Date _____ Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

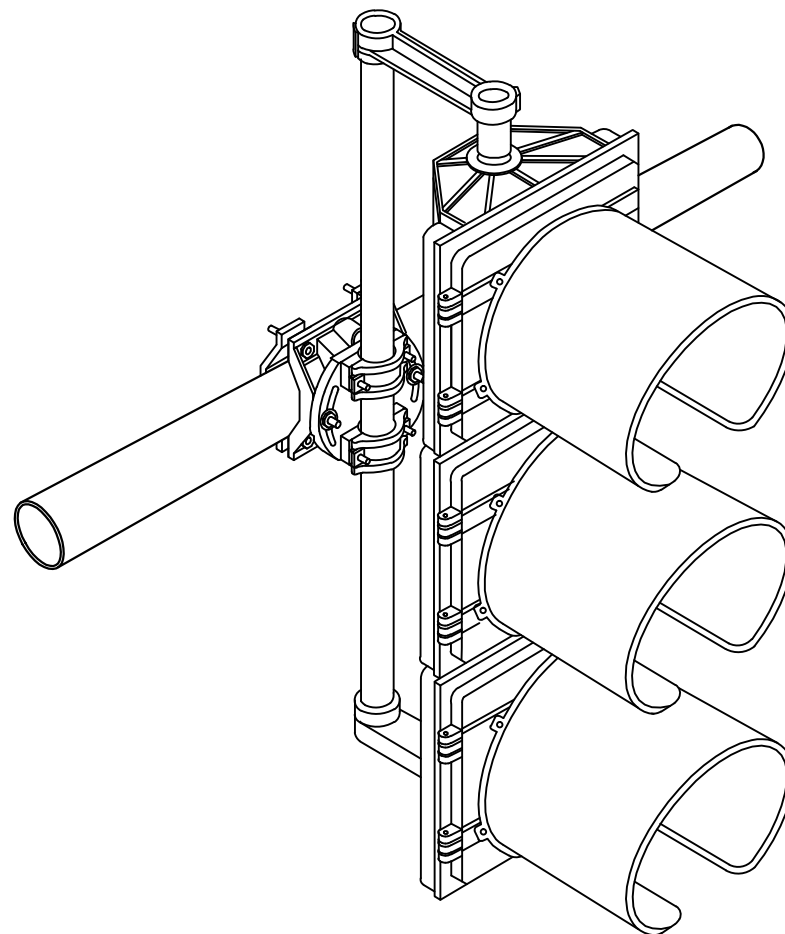
STANDARD No. UTS 620.010



FRONT VIEW

NOTES:

1. STANDARD 1168mm LONG TUBE WILL FIT SIGNAL COMBINATIONS FROM ONE 200mm SECTION UP TO 300mm HEAD SECTIONS. LONGER TUBE REQUIRED FOR ADDITIONAL SECTION HEAD ASSEMBLIES.
2. LOCATION OF SIGNAL HEAD MOUNTING ON MAST ARM SPECIFIED ON THE CONTRACT DRAWINGS.
3. TRAFFIC SIGNAL HEAD TO BE INSTALLED ON MOUNTING BRACKET AT CENTRE OF THE AMBER SECTION, UNLESS OTHERWISE SPECIFIED.



**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**DUAL END SIGNAL
HEAD MOUNTING BRACKET**

Rev. Date

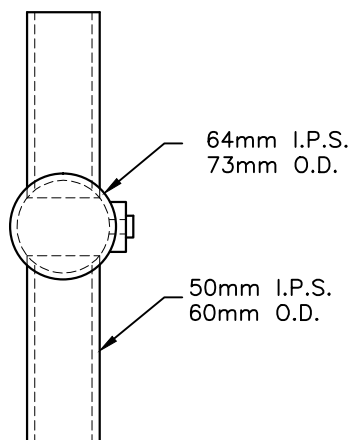
Rev. No. 0

Modification: _____

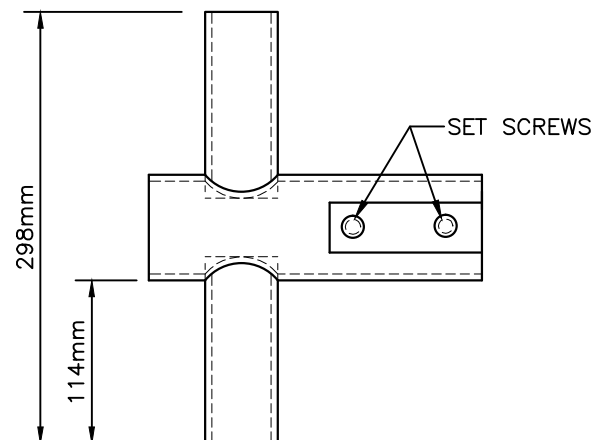
Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

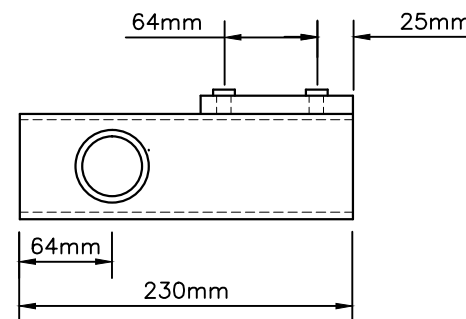
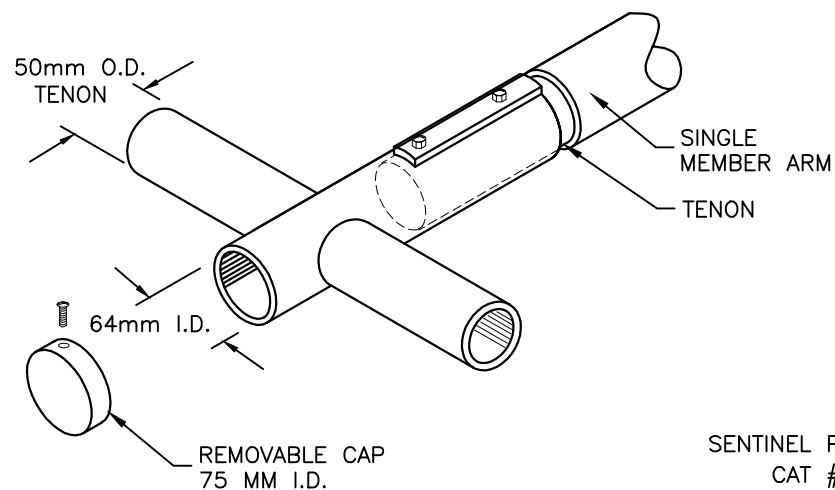
STANDARD No. UTS 620.020



END VIEW



TOP VIEW



SIDE VIEW

SENTINEL POLE AND EQUIPMENT
CAT # STE 4022

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**DOUBLE SIGNAL HEAD
MOUNTING BRACKET**

I.P.S. — IRON PIPE STEEL

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE SHOWN.

Rev. Date _____ Rev. No. 0

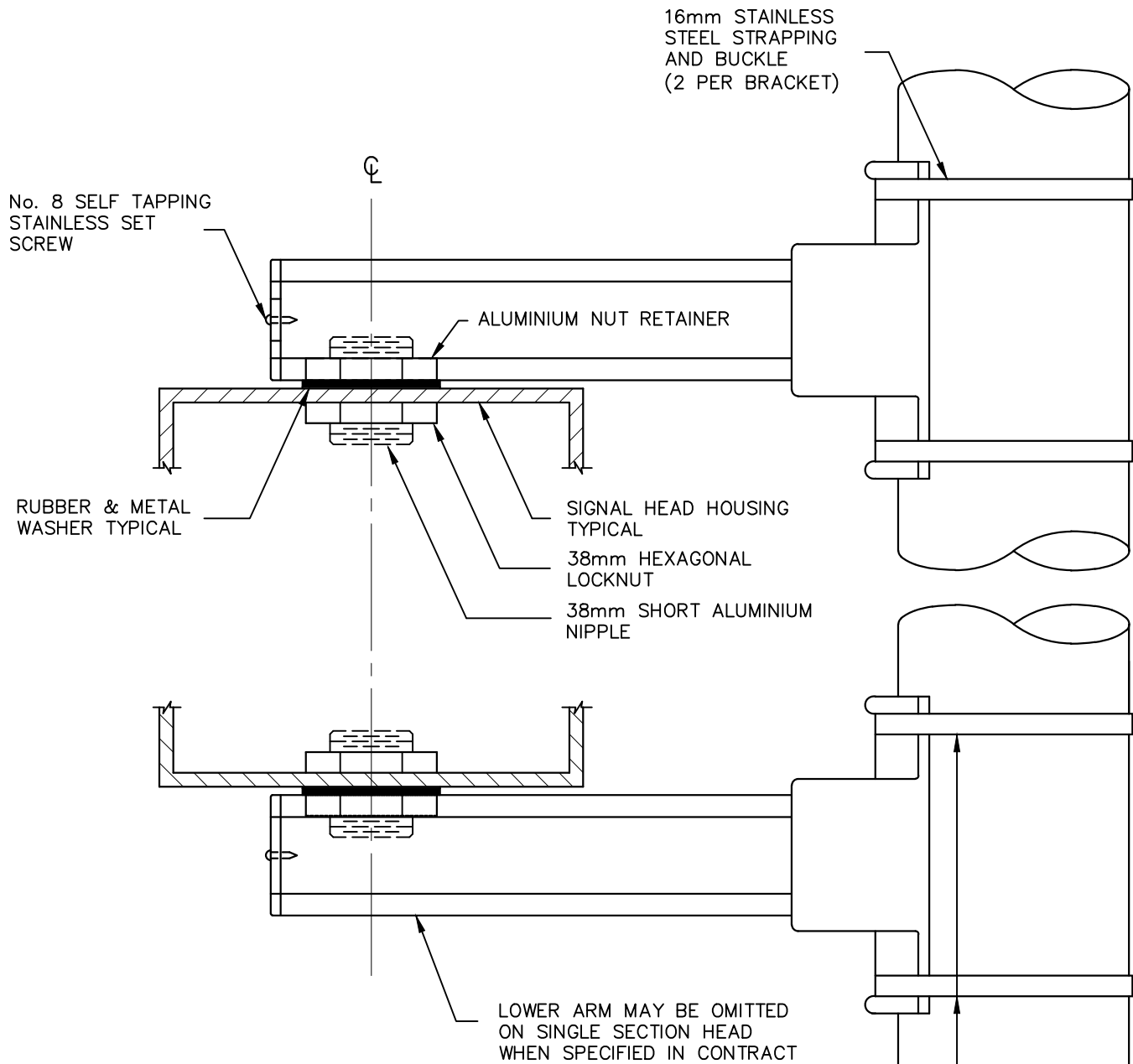
Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 620.030

FILE LOCATION: W:\7K\7101 CONSOLIDATION OF UNIFORM TRAFFIC CONTROL SPECS\2014 UTSS FINAL.DWG
 DRAWING NAME: 620050_HO_UTS.DWG
 DRAWN BY: D. THOMPSON
 MODIFIED: 14/02/03 09:38:36
 REVISED BY: K. MISTRY
 Revised



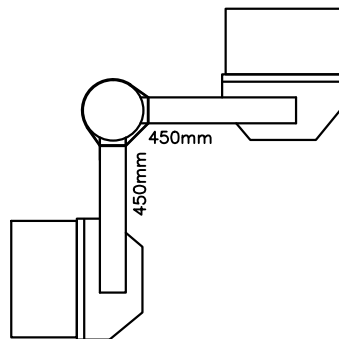
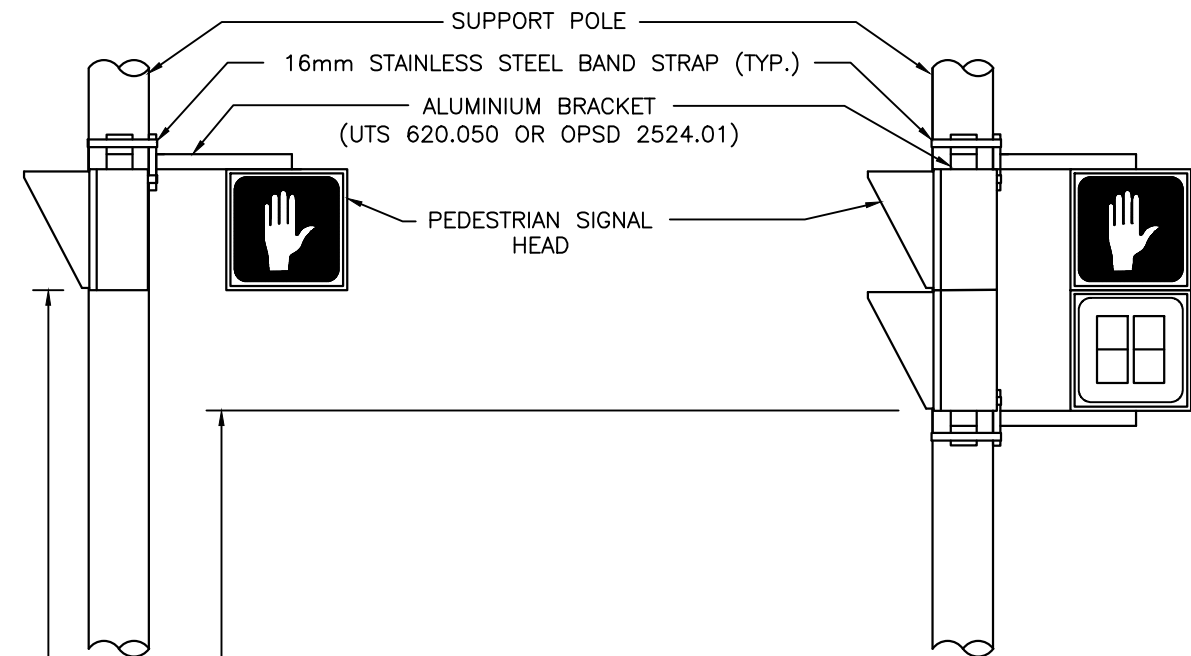
SENTINEL POLE & TRAFFIC EQUIPMENT LTD.
 BRACKET MODEL # EDA-300
 # EDA-450
 # EDA-600
 # EPA-300 - PRE-EMPTION
 # ERA-300 - RADIO SPECTRUM

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

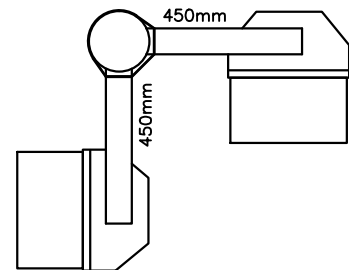
UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

EXTRUDED ALUMINIUM SIGNAL ARM BRACKET

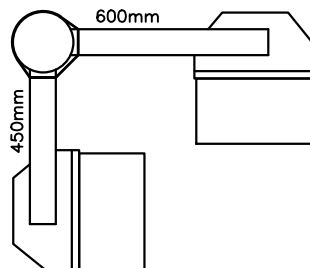
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.050</u>	



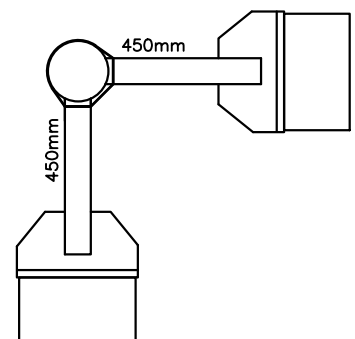
DESIRED HEAD CONFIGURATION



DESIRED HEAD CONFIGURATION



ACCEPTABLE PROVIDED ARM LENGTHS ARE SUFFICIENT TO ENABLE CLEAR SIGHT OF INDICATION



ALTERNATE HEAD CONFIGURATION

NOTES:

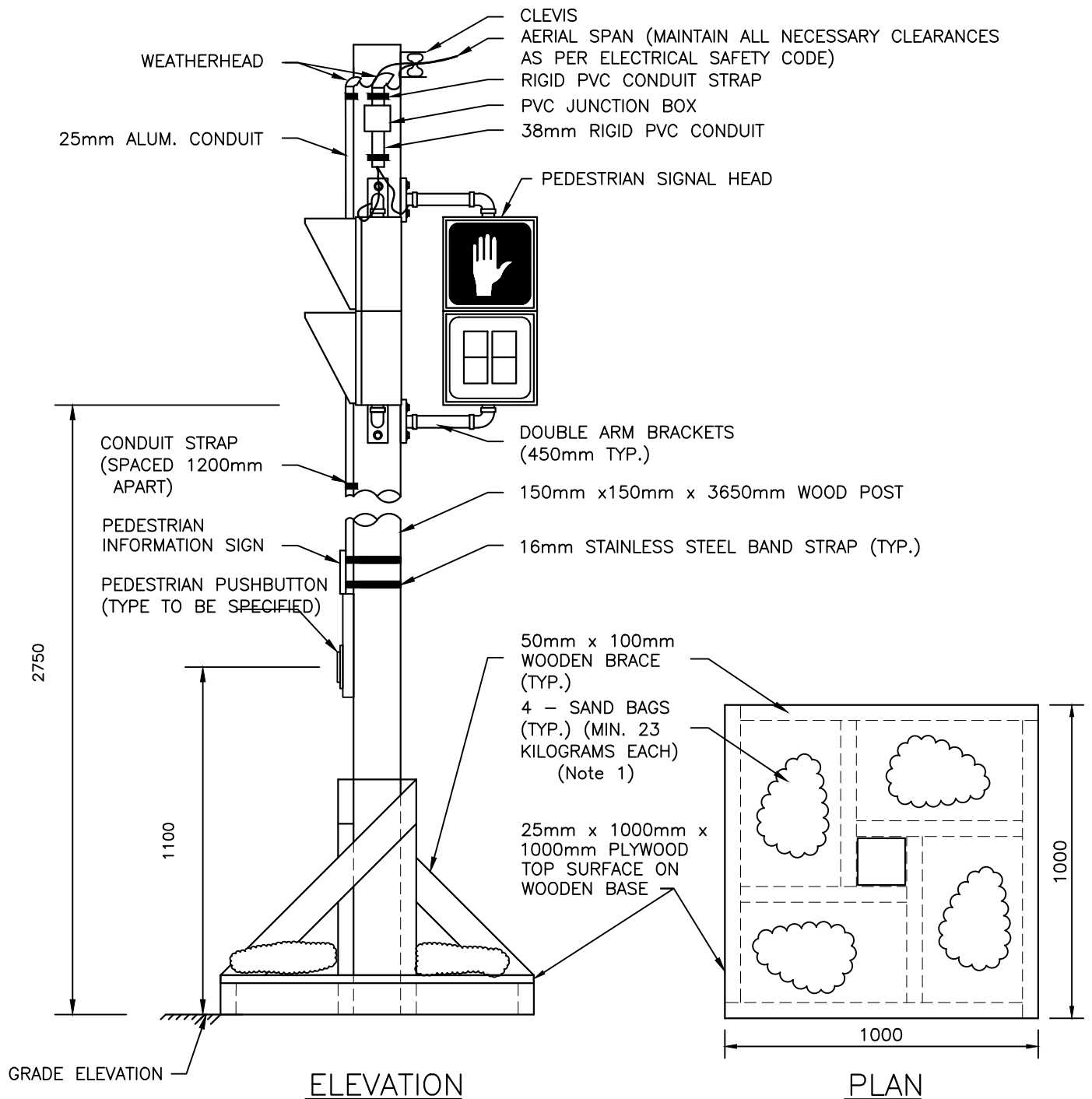
1. PEDESTRIAN SIGNAL HEAD SHALL BE POSITIONED PERPENDICULAR TO AND WITHIN CROSSWALK.

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

PEDESTRIAN SIGNAL HEAD MOUNTING CONFIGURATIONS

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.051</u>	



NOTES:

1. CONTRACTOR RESPONSIBLE TO ADD ADDITIONAL WEIGHT AS REQUIRED TO STABILIZE STAND IN ALL WEATHER CONDITIONS.

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**WOODEN POST STAND
FOR TEMPORARY
PEDESTRIAN SIGNALS**

Rev. Date

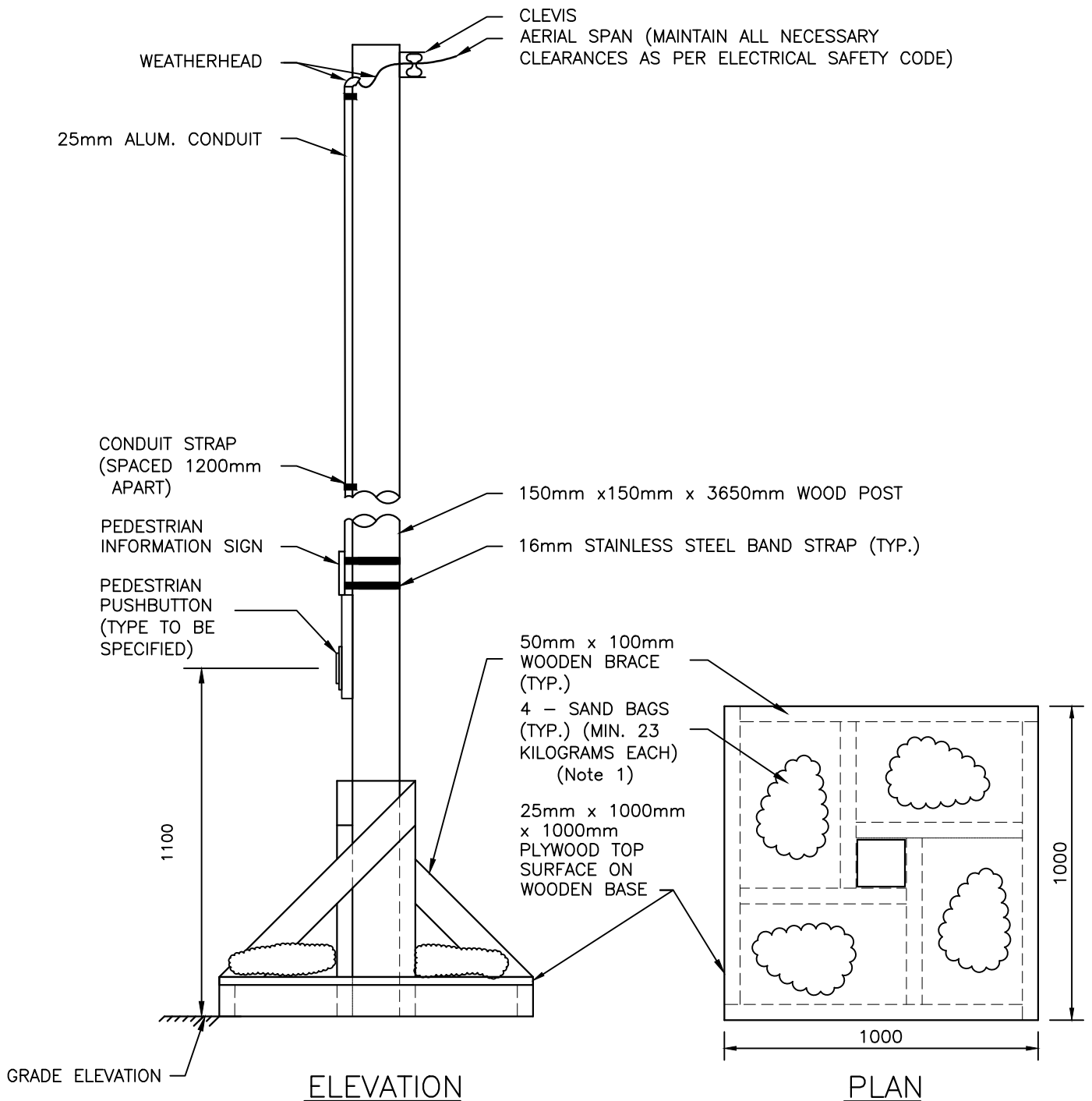
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.055



NOTES:

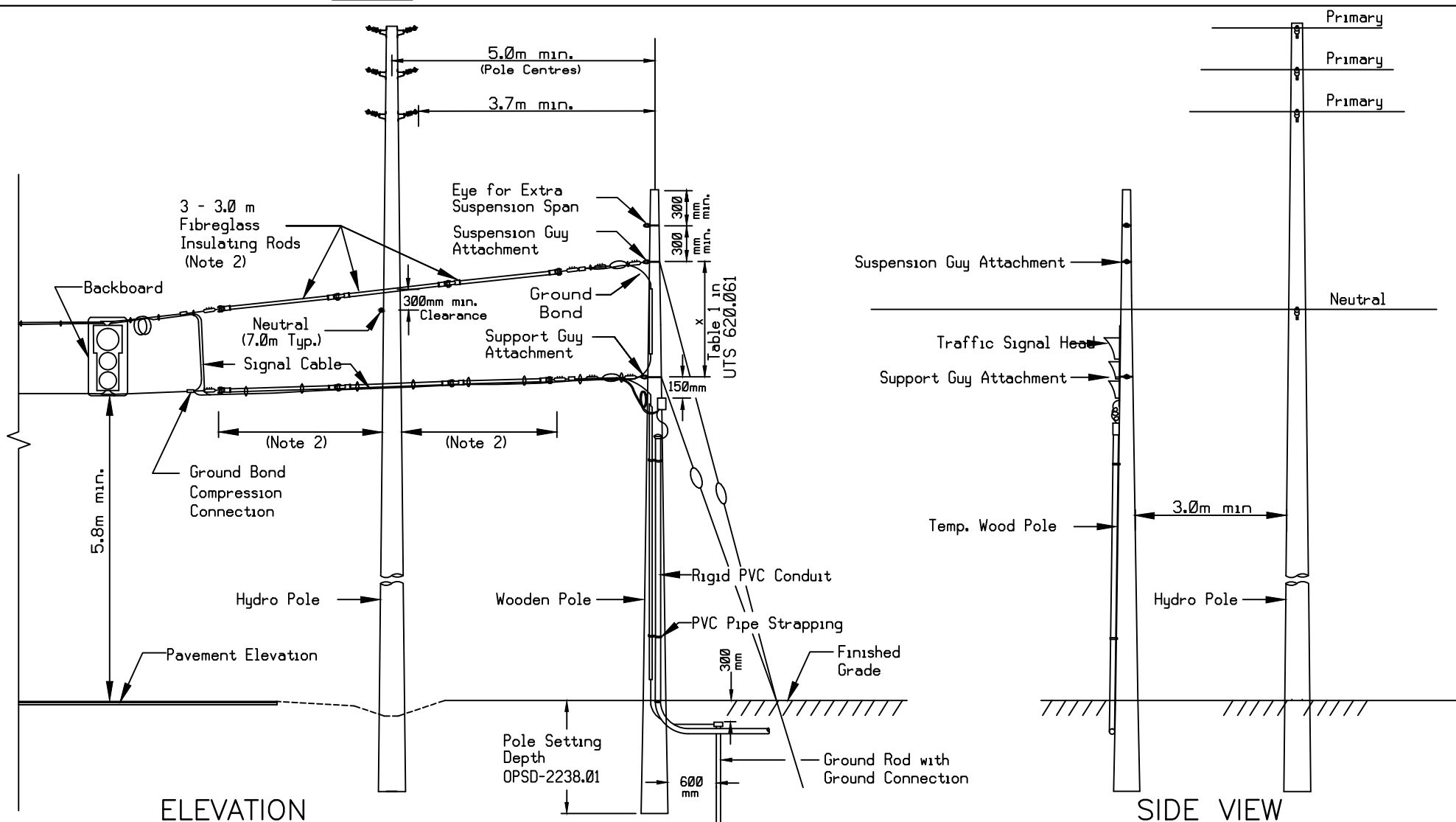
1. CONTRACTOR RESPONSIBLE TO ADD ADDITIONAL WEIGHT AS REQUIRED TO STABILIZE STAND IN ALL WEATHER CONDITIONS.

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

WOODEN POST STAND FOR TEMPORARY PEDESTRIAN PUSH-BUTTON

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.056</u>	



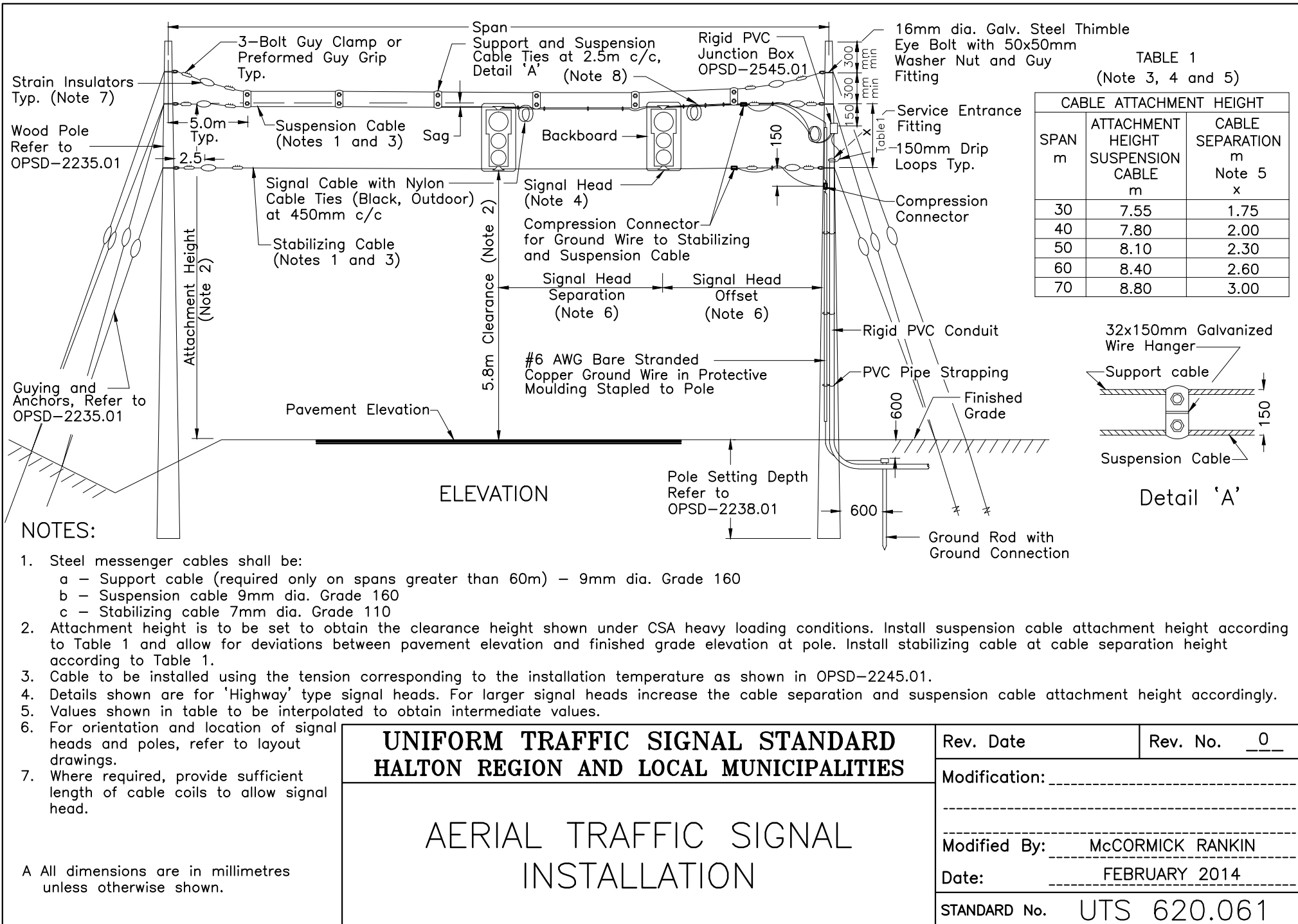
NOTES:

1. THIS DETAIL TO BE READ IN CONJUNCTION WITH UTS 620.061.
2. INSTALL FIBREGLASS INSULATING RODS ON THE SUSPENSION AND SUPPORT SIGNAL SPANS, EXTENDING MIN. 3.0M EACH SIDE OF PRIMARY CONDUCTORS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

FIBREGLASS INSULATING ROD INSTALLATION ON OVERHEAD SIGNAL SPANS

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 620.060</u>	



UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

AERIAL TRAFFIC SIGNAL INSTALLATION

Rev. Date

Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 620.061

"SIGNALS AHEAD" Wb-102 SIGN
(750mm x 750mm)

DOUBLE ARM BRACKET
OPSD 2524.01 OR
UTS 620.050

200mm LED AMBER
FLASHING BEACON C/W
SOLID STATE FLASHER

50mm PVC
ENTRANCE CAP

COWL VISOR

16mm STAINLESS
STEEL STRAPPING
4.5KN ULTIMATE
OR LAG BOLTS

DOUBLE ARM BRACKET
(LENGTH VARIES)

50mm RIGID
PVC CONDUIT

"PREPARE TO STOP
WHEN FLASHING"
Wb-102At SIGN

38mm X 38mm
TELESPAR SQ.
TUBE (TYP)

PVC COATED STEEL
STRAPS SPACED
1.2m APART

PVC COATED STEEL STRAPS
150mm FROM END EVERY
1200mm IN APART

25mm RIGID
PVC CONDUIT

#6 AWG BARE
STRANDED COPPER
GROUND WIRE

O-RING EXPANSION

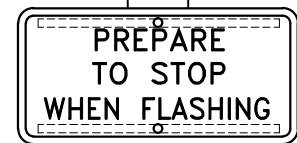
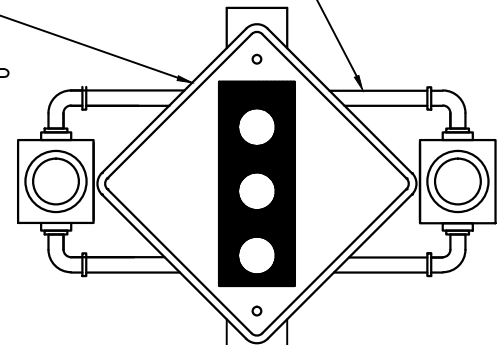
FINISHED GRADE

50mm RIGID PVC
CONDUIT TO POWER
OR CONTROLLER AS
INDICATED ON
DRAWING

50mm
90° RIGID PVC
SWEEP

20mm x 3000mm
COPPER CLAD GROUND
ROD (OR 254mm x 406mm x
6.3mm HOT DIP GALVANIZED
GROUND PLATE) WITH THERMIT
WELD CONNECTION

**ELEVATION
SIDE VIEW**



150mm x 150mm x
4900mm PRESSURE
TREATED POST (NOTE 1)

FRONT VIEW

NOTE:

1. POST TO BE BURIED 1000mm MIN. DEPTH.

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ADVANCE WARNING
FLASHERS AND SIGNS
DIRECT BURIED**

Rev. Date

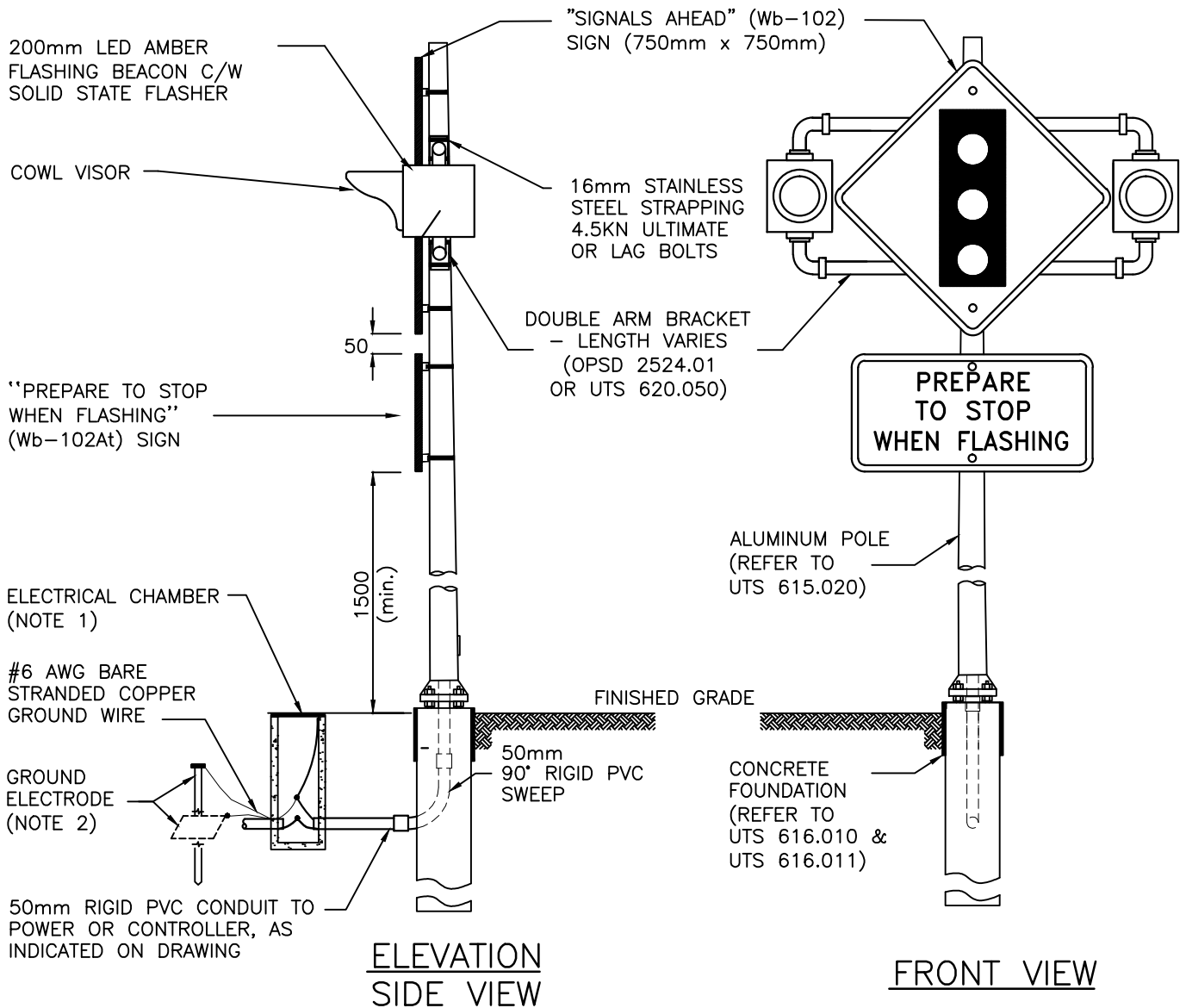
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.070



NOTES:

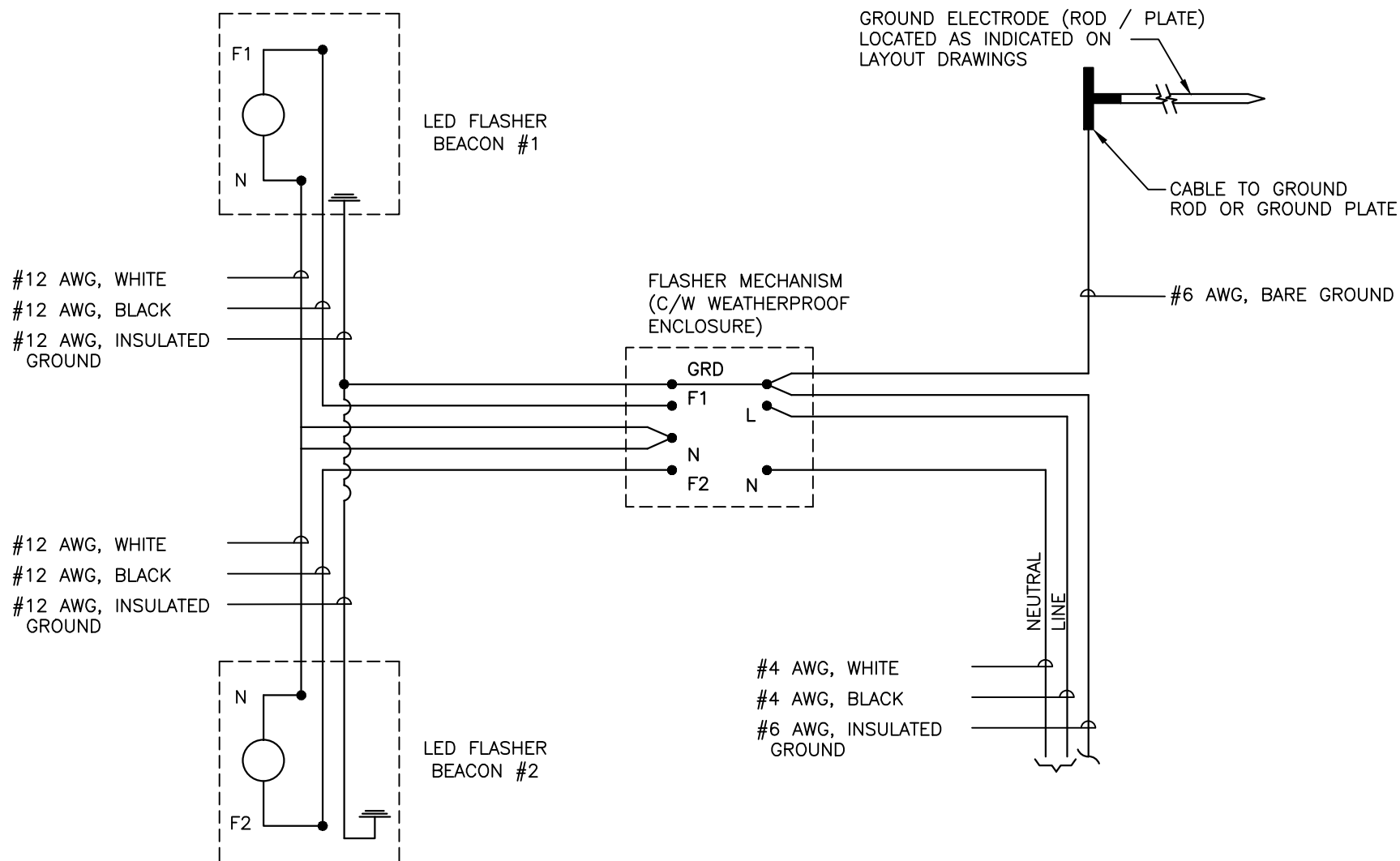
1. REFER TO UTS 602.010, UTS 602.020, UTS 602.030 OR AS INDICATED ON DRAWINGS)
2. GROUND ELECTRODE TO BE 20mm x 3000mm COPPER CLAD GROUND ROD OR 254mm x 406mm x 6.3mm HOT DIP GALVANIZED GROUND PLATE WITH THERMIT WELD CONNECTION.

DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ADVANCE WARNING
FLASHERS AND SIGNS
CONCRETE BASE**

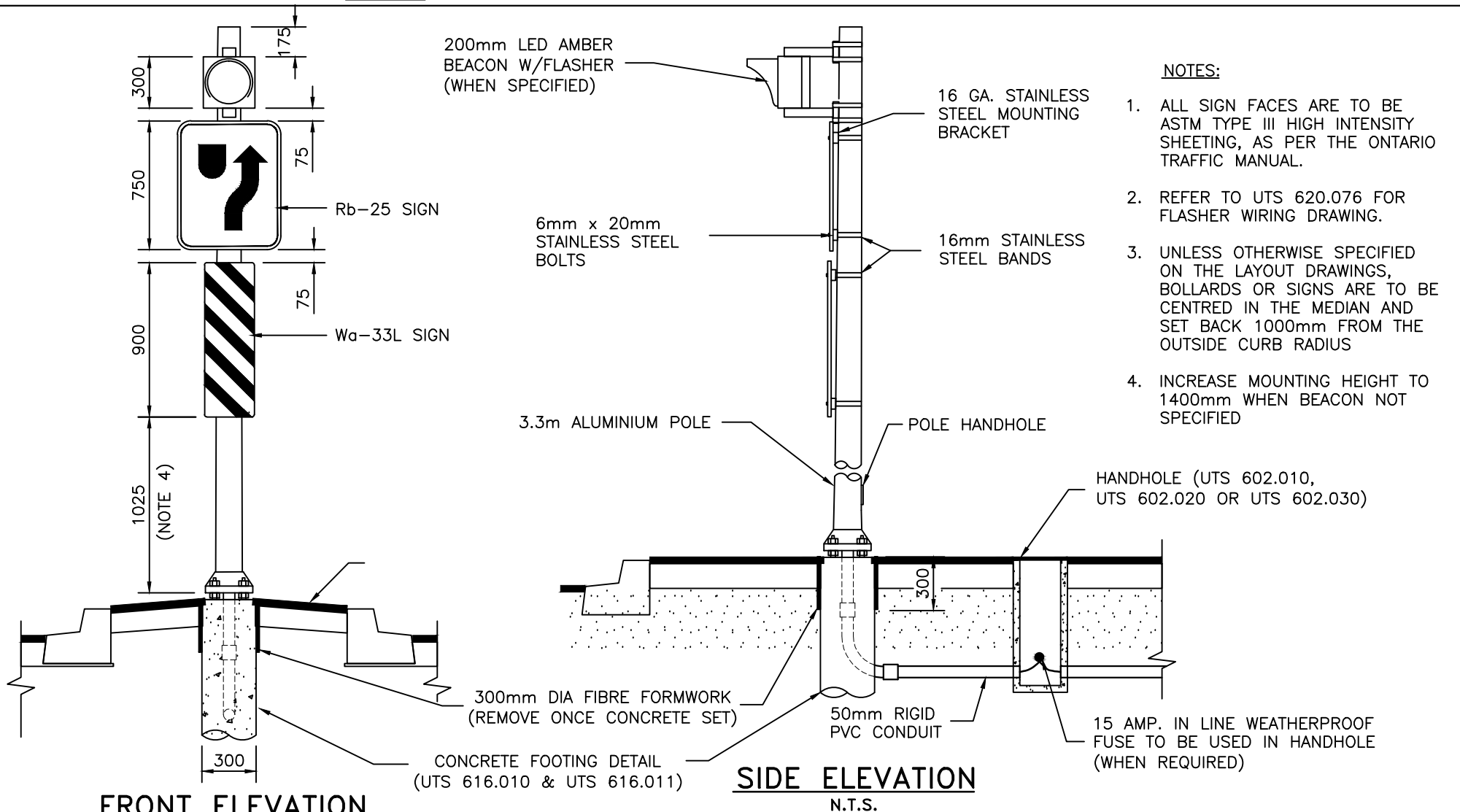
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.071</u>	



UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ADVANCE FLASHER WIRING SCHEMATIC

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 620.072</u>	



NOTES:

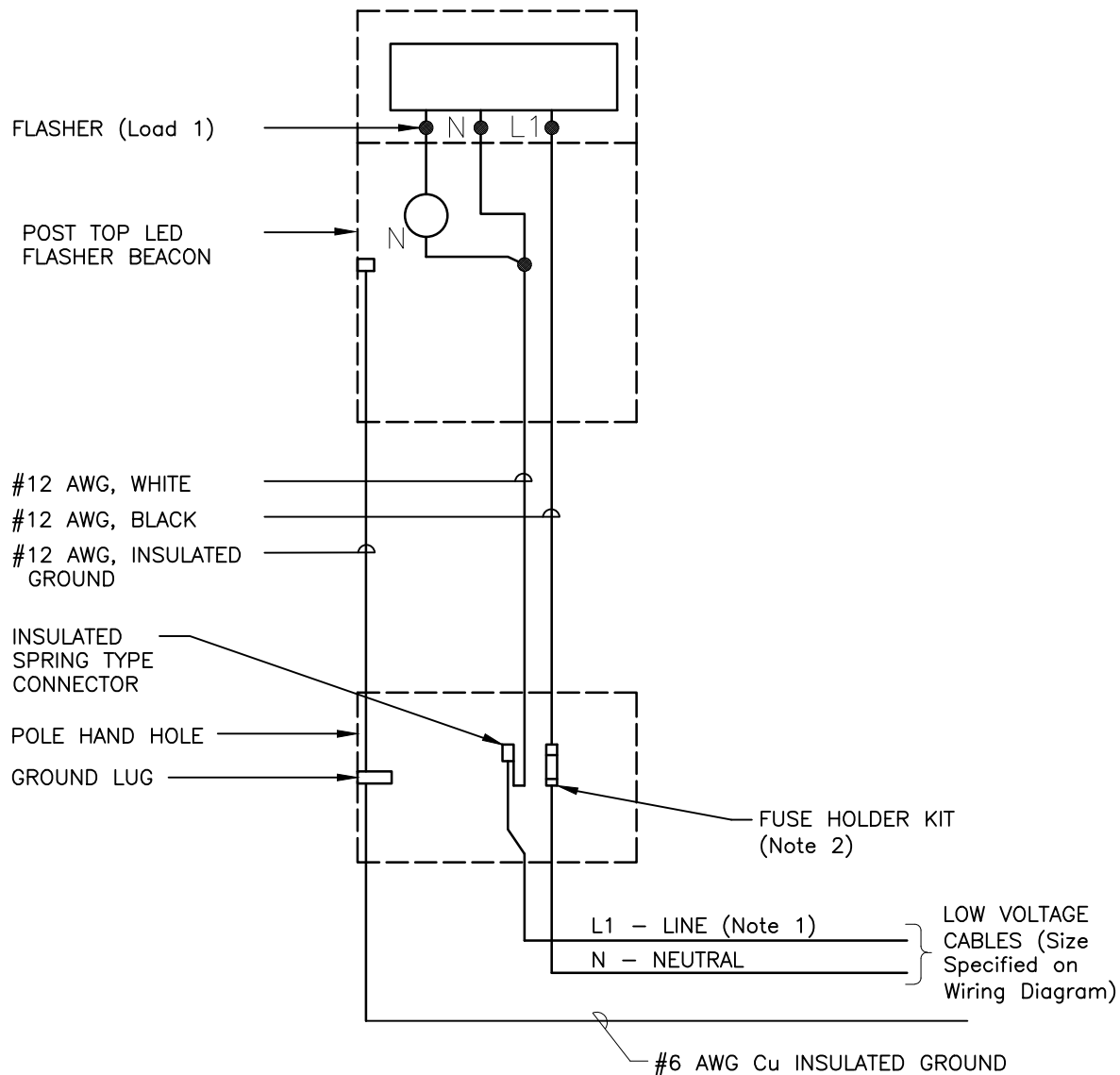
1. ALL SIGN FACES ARE TO BE ASTM TYPE III HIGH INTENSITY SHEETING, AS PER THE ONTARIO TRAFFIC MANUAL.
2. REFER TO UTS 620.076 FOR FLASHER WIRING DRAWING.
3. UNLESS OTHERWISE SPECIFIED ON THE LAYOUT DRAWINGS, BOLLARDS OR SIGNS ARE TO BE CENTRED IN THE MEDIAN AND SET BACK 1000mm FROM THE OUTSIDE CURB RADIUS
4. INCREASE MOUNTING HEIGHT TO 1400mm WHEN BEACON NOT SPECIFIED

DIMENSIONS IN mm EXCEPT AS NOTED

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

ISLAND MARKER

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 620.075</u>	



NOTES:

1. LINE L1 TO BE CONNECTED TO 120V CIRCUIT OF POWER SUPPLY.
2. FUSE HOLDER TO BE IN-LINE TYPE, 600V, COMPLETE WITH 15A KTK FUSE AND INSULATED KIT.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

FLASHER BEACON WIRING SCHEMATIC

Rev. Date

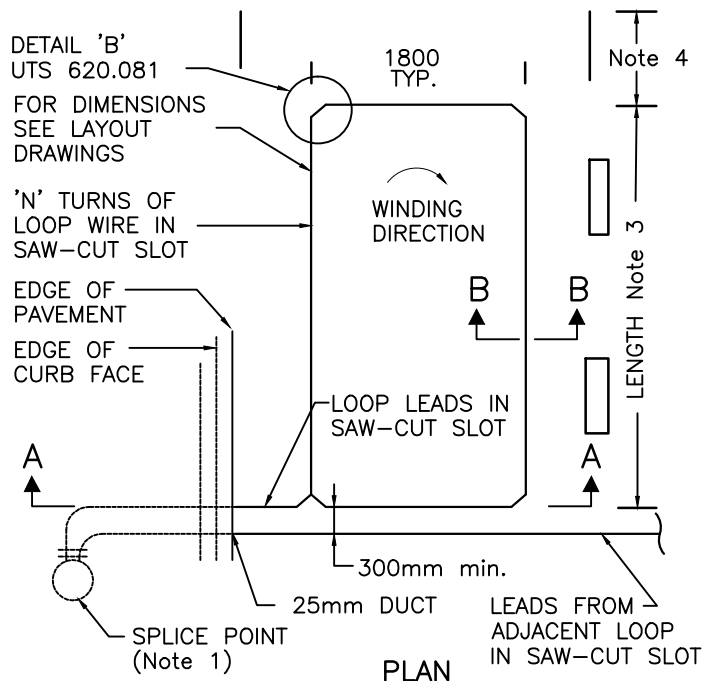
Rev. No. 0

Modification: _____

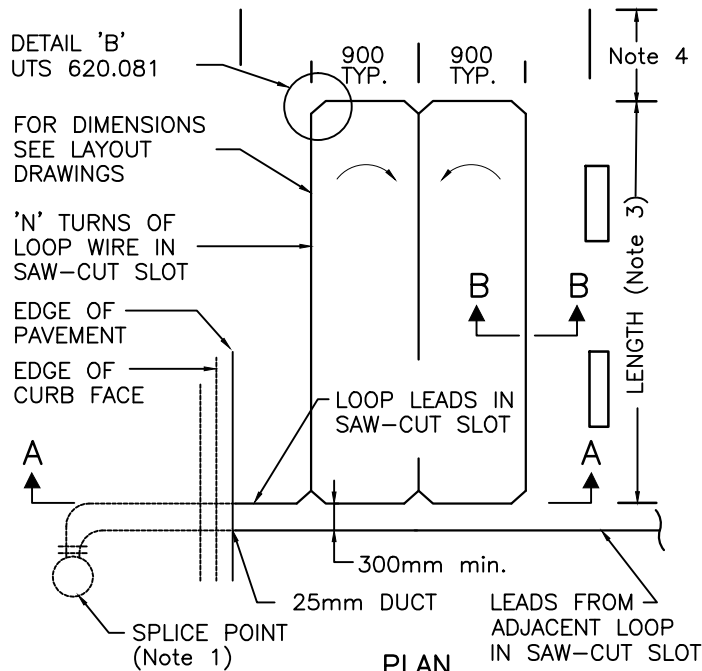
Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.076



SIMPLE LOOP

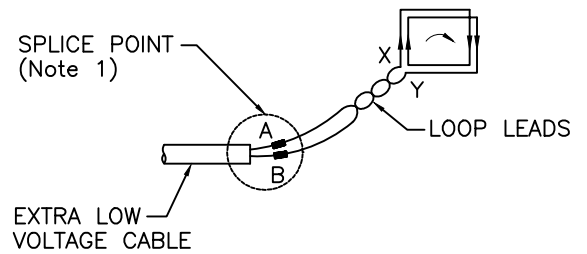


DUPLEX LOOP

NOTES:

- A. DRAWING TO BE READ IN CONJUNCTION WITH UTS 620.081
- B. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

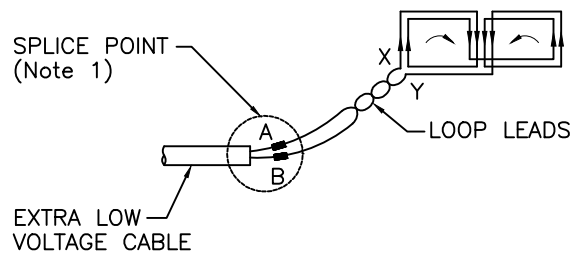
LOOP SIZE	NUMBER OF TURNS
LONG DISTANCE	4
DUPLEX	2-4-2
SIMPLE	3



SIMPLE LOOP CONNECTIONS

NO. OF LOOPS	LOOP	LEAD CONNECTION TO 4 CONDUCTOR ELV CABLE				
		LEAD	GREEN	RED	BLACK	WHITE
2	1	A	X	-	-	-
		B	-	X	-	-
	2	A	-	-	X	-
		B	-	-	-	X
1	1	A	X	-	-	X
		B	-	X	X	-

LEAD CONNECTED TO TWO CONDUCTORS ON SINGLE LOOP



DUPLEX LOOP CONNECTIONS

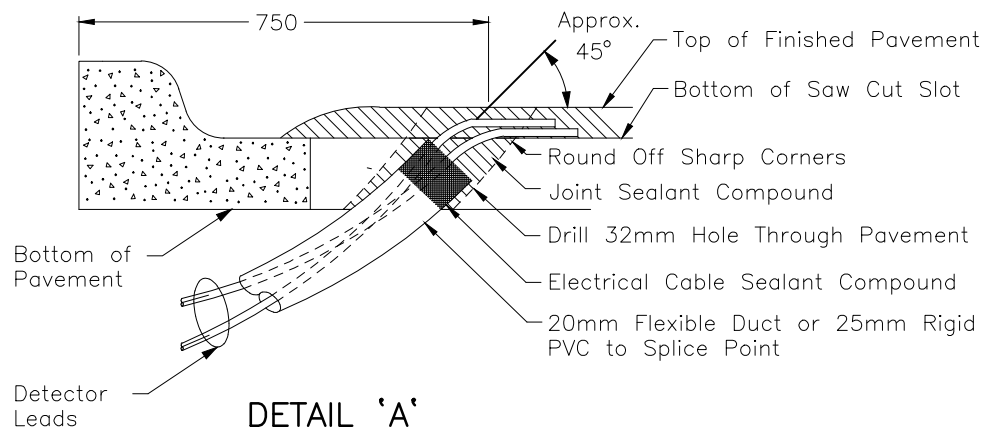
NOTES:

1. SPLICE TO BE MADE IN ELECTRICAL CHAMBER OR POLE HANDHOLE. REFER TO LAYOUT DRAWINGS.
2. FOR SECTIONS A-A & B-B, REFER TO UTS 620.081.
3. LENGTH AND NUMBER SPECIFIED IN CONTRACT.
4. HEAD OF LOOP TO BE SET:
 - a. 1.0m AHEAD OF THE STOP BAR; OR
 - b. 1.0m WITHIN PEDESTRIAN CROSSWALK LINE; OR
 - c. 15.0m BEHIND THE STOP BAR FOR LEFT TURN PROTECTIVE PERMISSIVE GREEN PHASE.

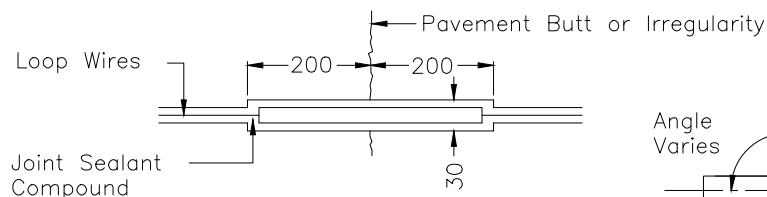
**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**LOOP DETECTOR
INSTALLATION DETAIL — I**

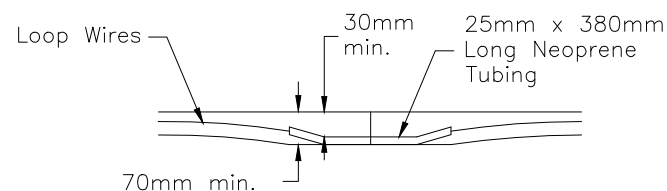
Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.080</u>	



DETAIL 'A'

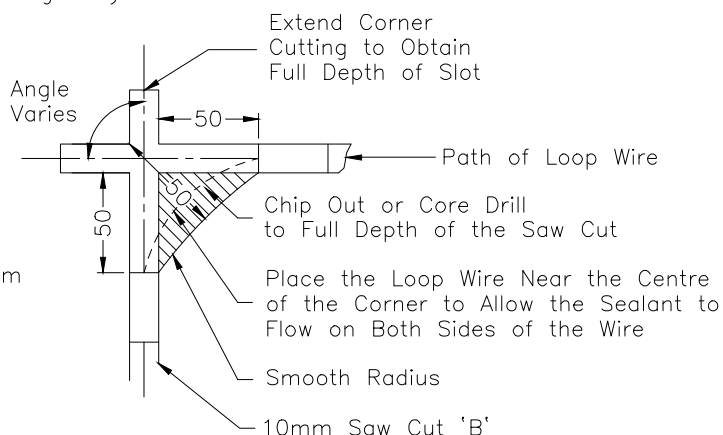


PLAN

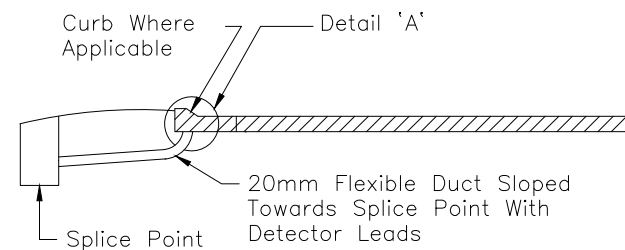


ELEVATION

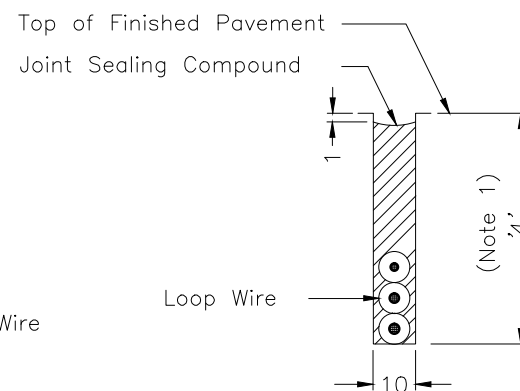
DETAIL-PAVEMENT BUTT OR IRREGULARITY



DETAIL 'B' AT 90° BEND



SECTION A-A
OF UTS 620.080



SECTION B-B
OF UTS 620.080

Number of Loop Wire	'A' mm min.
1	60
2	60
3	65
4	70
5	75
6	80

NOTES:

- Where cable is installed prior to the finished top course paving, the maximum depth of cover shall be 100mm.
- This drawing shall be read in conjunction with UTS 620.080.
- All dimensions are in millimetres or metres unless otherwise shown

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

LOOP DETECTOR INSTALLATION DETAILS — II

Rev. Date

Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 620.081

AUDIBLE
PEDESTRIAN
PUSHBUTTON

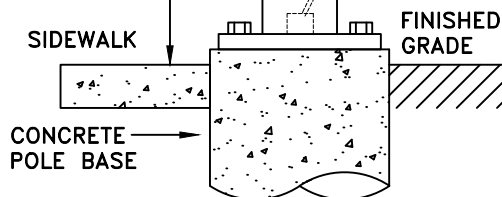
POLE DRILLED
AND ASSEMBLY
ATTACHED WITH
SELF TAPPING
SCREW

4/C #18 ELV
SHIELDED
CABLE W/
DRAIN WIRE
INSIDE POLE

APERTURE &
GROMMET
(Note 1)

MARRETT
& TAPE
CONNECTIONS
IN POLE
HANDHOLE

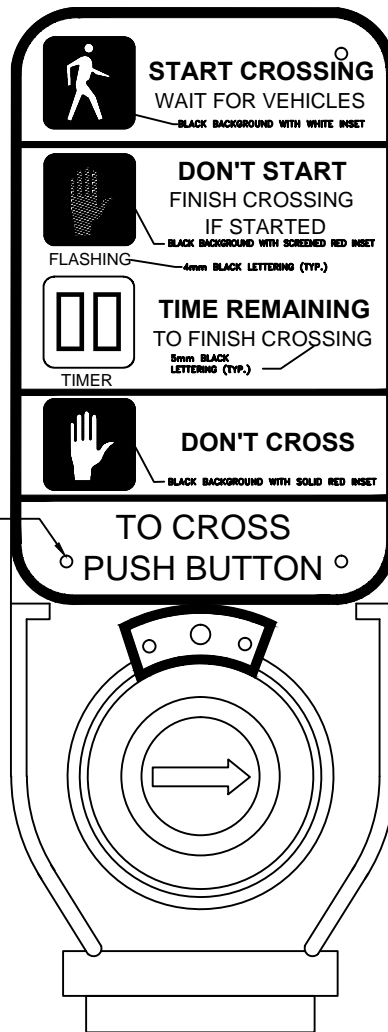
1.1m (TYP.)



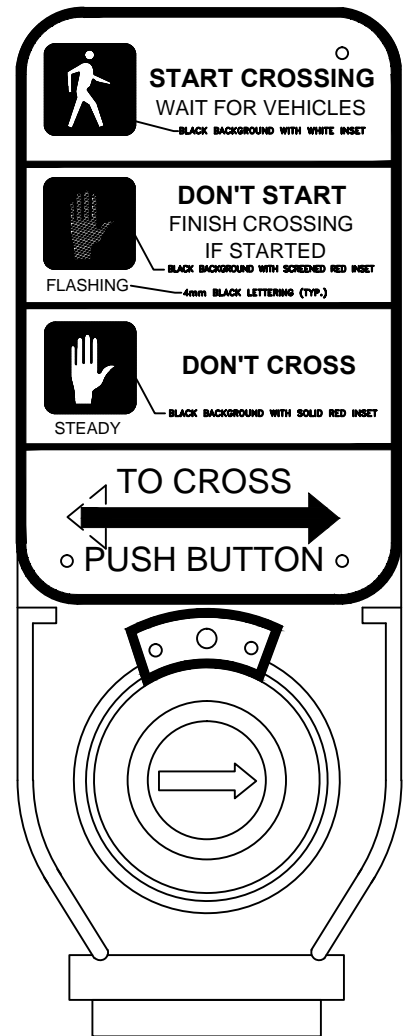
AUDIBLE PEDESTRIAN PUSHBUTTON INSTALLATION

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE NOTED.

NOTE 4



PEDESTRIAN COUNTDOWN /
WALK / DON'T WALK
INDICATION APPLICATION



PEDESTRIAN WALK /
DON'T WALK INDICATION
APPLICATION

PEDESTRIAN BUTTON & INFORMATION SIGNING

(POLARA BUTTON ILLUSTRATED) - (NOTE 3)

NOTES

1. ALL WIRING APERTURES ARE TO BE DE-BURRED & PROTECTED WITH RUBBER GROMMET. APERTURES ON STEEL POLES SHALL BE PROTECTED WITH GREY ZINC RICH PAINT.
2. THE CONTRACTOR SHALL REVIEW THE LAYOUT DRAWINGS FOR THE ORIENTATION AND LOCATION OF THE AUDIBLE PEDESTRIAN SIGNAL STATION TO THE APPROPRIATE DIRECTION OF THE PEDESTRIAN CROSSWALK.
3. DIRECTION OF ARROW ON PUSH BUTTON AND INFORMATION SIGN (UTS 620.084) TO COINCIDE WITH PEDESTRIAN CROSSING.
4. SIGNS TO BE ATTACHED WITH VANDAL PROOF SCREWS.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

AUDIBLE PEDESTRIAN PUSHBUTTON ASSEMBLY

Rev. Date

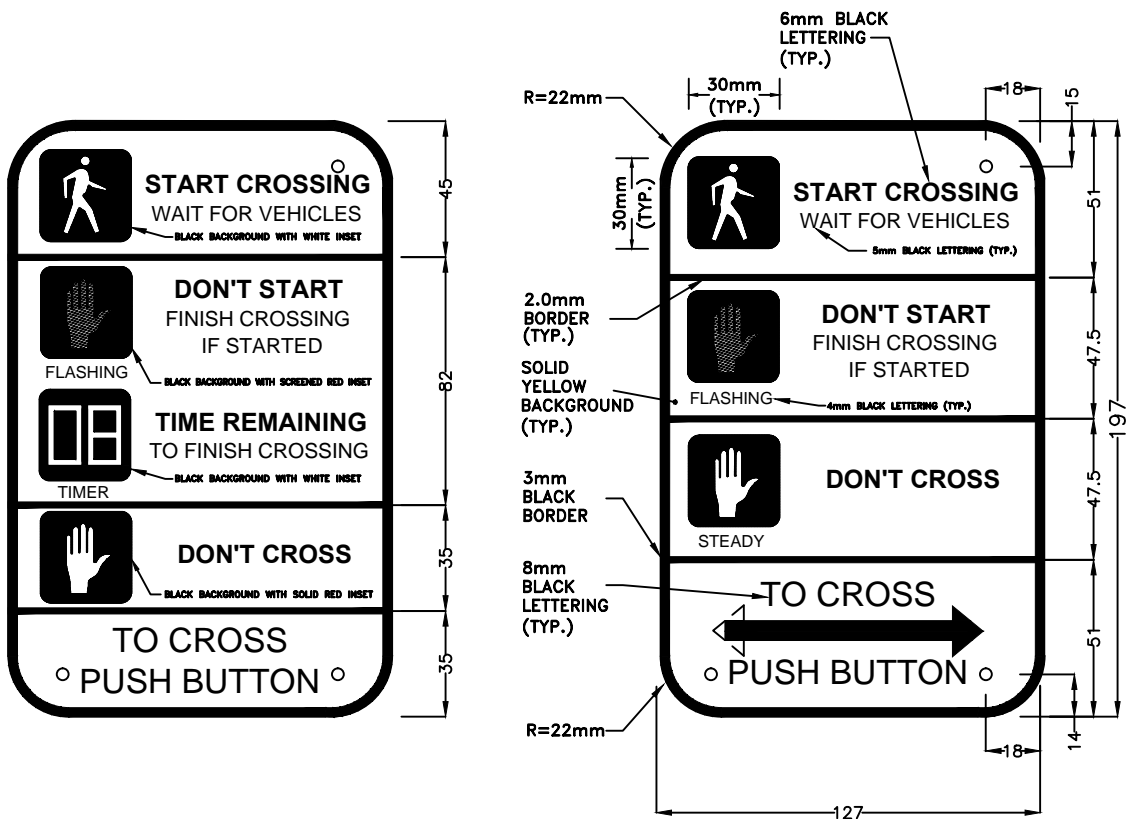
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.083



NOTES

1. MATERIAL TO BE 1.6mm GAUGE ALUMINUM.
2. SIGN BLANKS CAN BE ACQUIRED THROUGH TACEL LIMITED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

AUDIBLE PEDESTRIAN PUSHBUTTON INFORMATION SIGN

Rev. Date

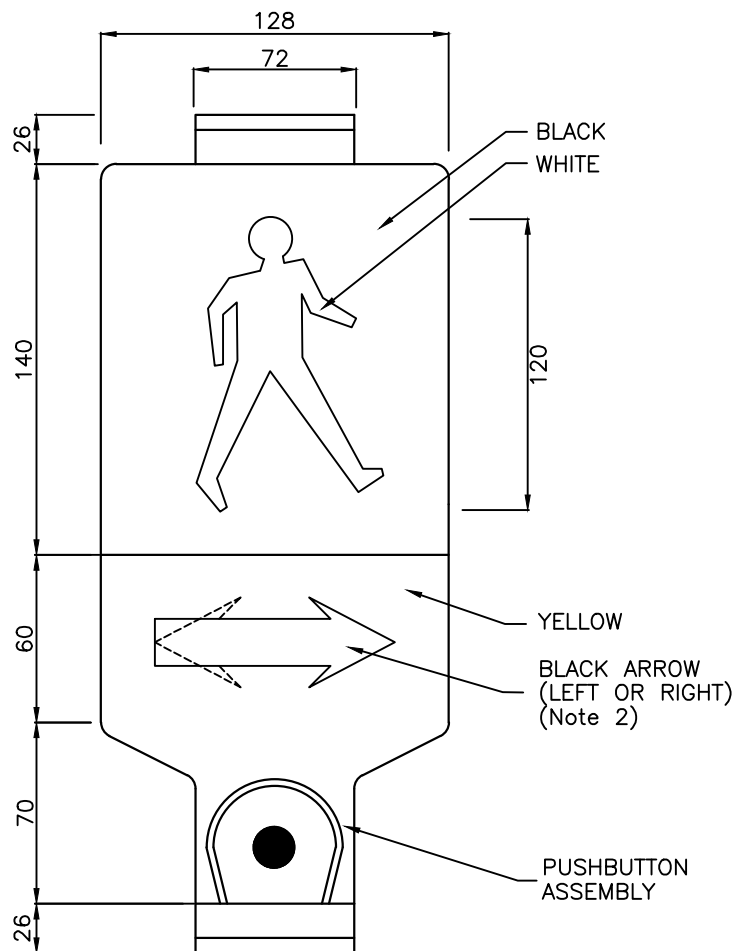
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.084



PEDESTRIAN BUTTON

NOTES

1. ALL WIRING APERTURES ARE TO BE DE-BURRED & PROTECTED WITH RUBBER GROMMET. APERTURES ON STEEL POLES SHALL BE PROTECTED WITH GREY ZINC RICH PAINT.
2. THE CONTRACTOR SHALL REVIEW THE LAYOUT DRAWINGS FOR THE ORIENTATION AND LOCATION OF THE AUDIBLE PEDESTRIAN SIGNAL STATION TO THE APPROPRIATE DIRECTION OF THE PEDESTRIAN CROSSWALK.
3. MOUNT PEDESTRIAN INFORMATION SIGN ON SAME FACE AS PUSH BUTTON ASSEMBLY. DIRECTION OF ARROW ON PUSH BUTTON AND INFORMATION SIGN (UTS 620.086) TO COINCIDE WITH PEDESTRIAN CROSSING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

PEDESTRIAN CROSSING
INFORMATION SIGN
UTS 620.086.
(Notes 2 & 3)

16mm STAINLESS
STEEL STRAP

APERTURE &
GROMMET
(Note 1)

WEATHERPROOF
BUTTON

1100mm TO FINISHED GRADE
UNLESS OTHERWISE SPECIFIED

1 - 4/C #18 ELV
SHIELDED CABLE
INSIDE POLE

16mm STAINLESS
STEEL STRAP

MARRETT & TAPE
CONNECTIONS IN
POLE HANDHOLE

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**PEDESTRIAN PUSHBUTTON/
SIGN ASSEMBLY
AND INFORMATION SIGN**

Rev. Date

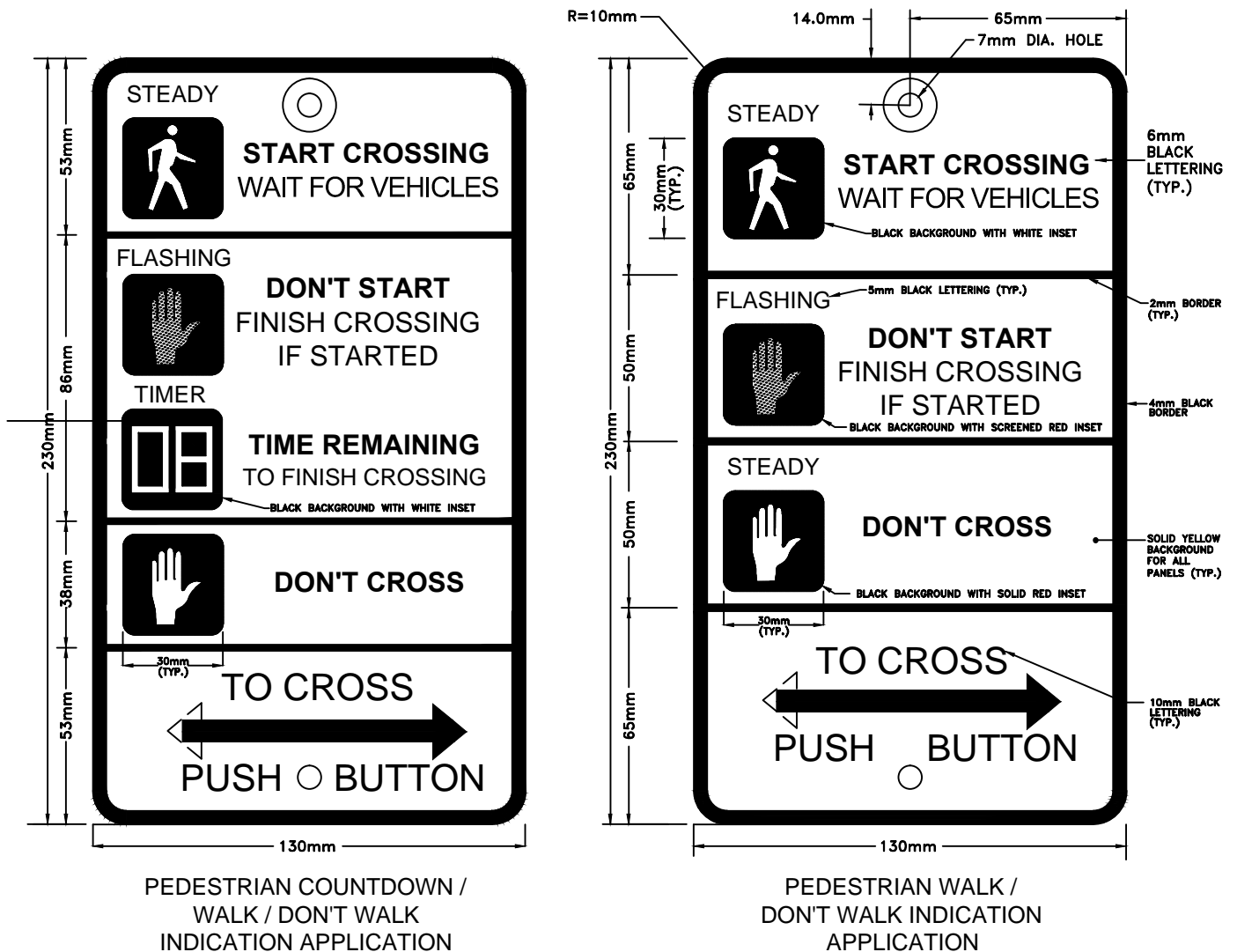
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 620.085



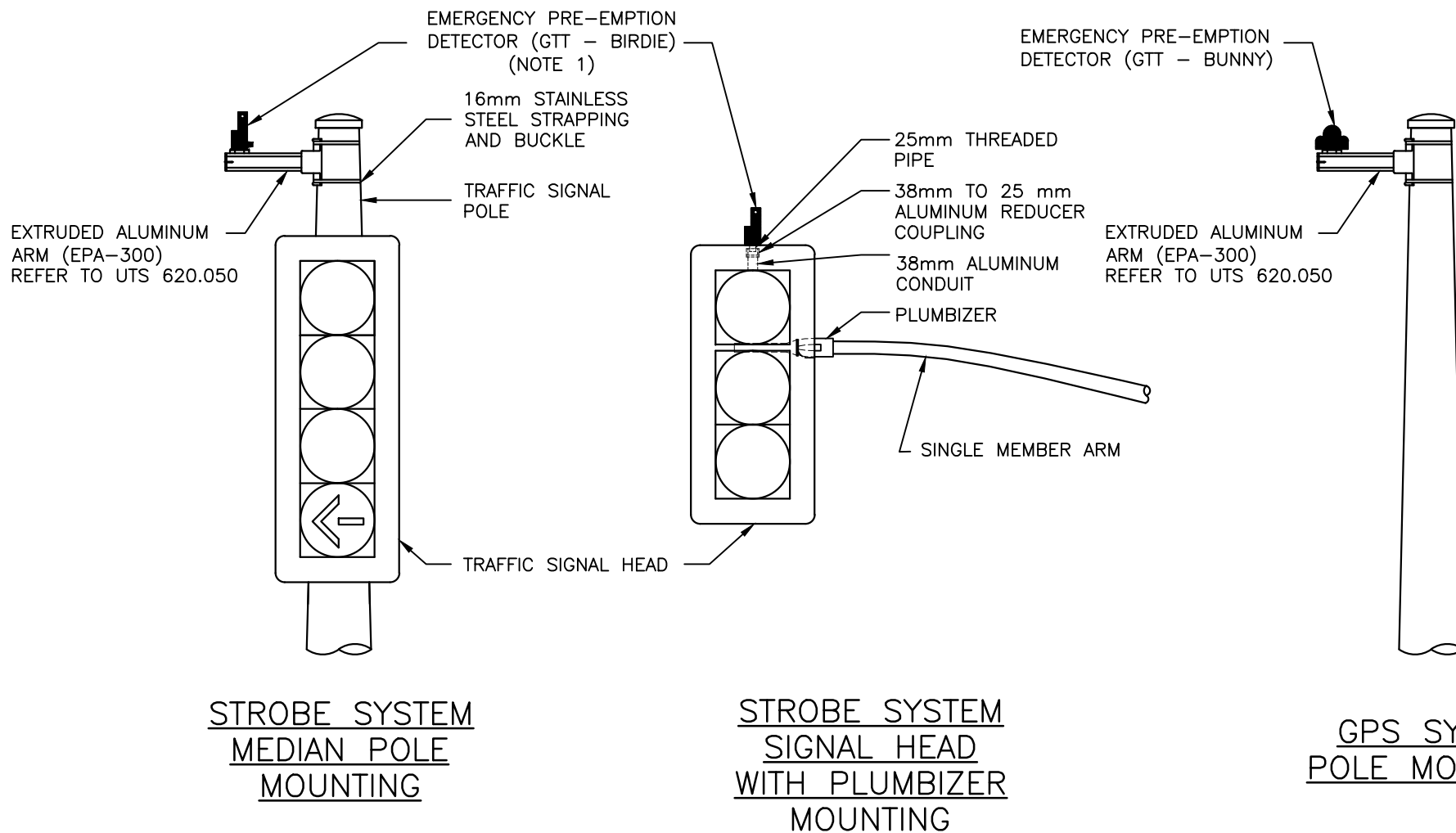
NOTES

1. MATERIAL TO BE 1.6mm GAUGE ALUMINUM.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

PEDESTRIAN PUSHBUTTON INFORMATION SIGN

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.086</u>	



NOTES :

1. CONTRACTOR SHALL OPEN THE DRAIN HOLE IN DETECTION UNIT DURING INSTALLATION

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**OPTICAL PRE-EMPTION
DETECTOR HEAD MOUNTING**

Rev. Date

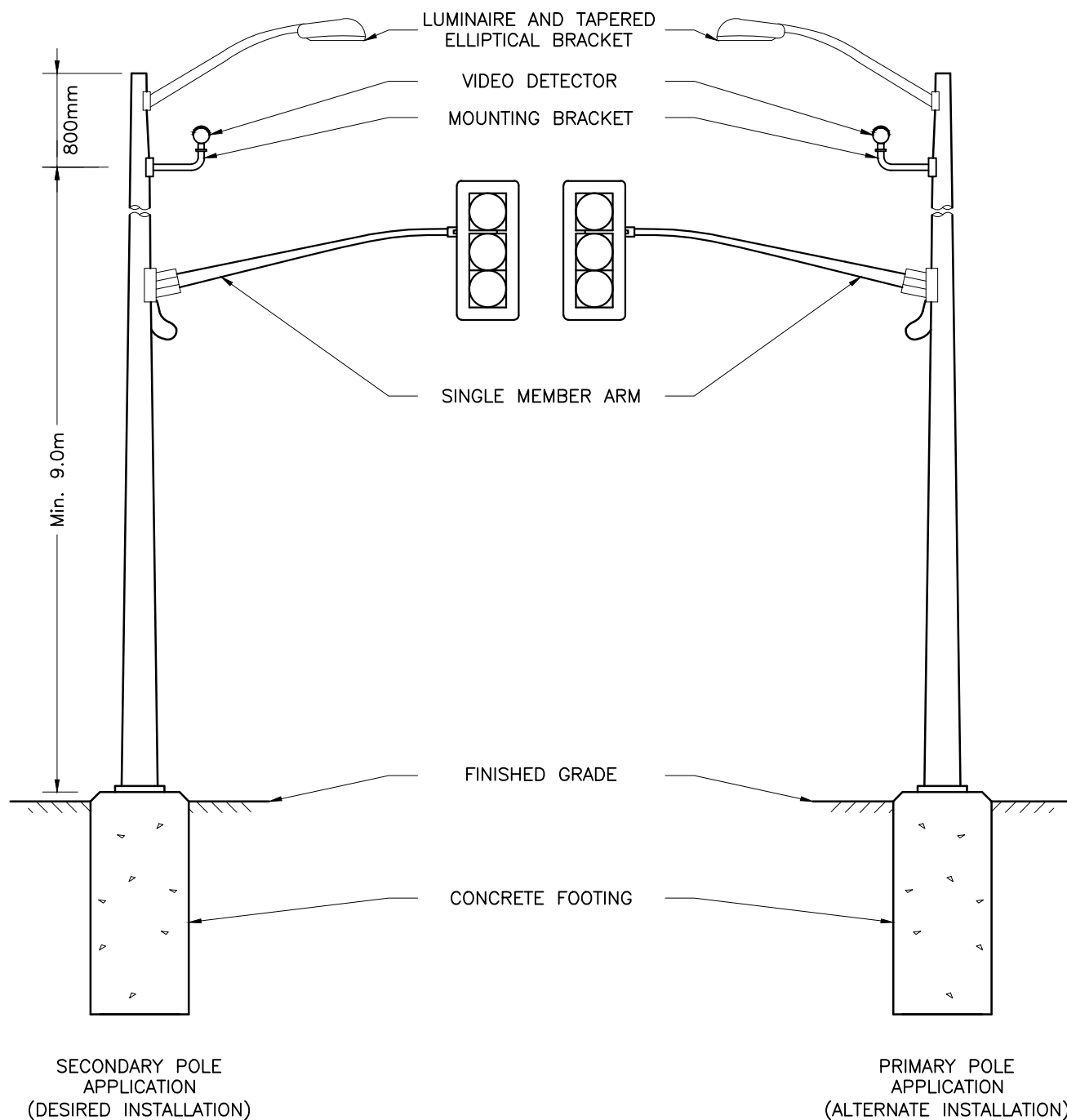
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY 2014

STANDARD No. UTS 620.090

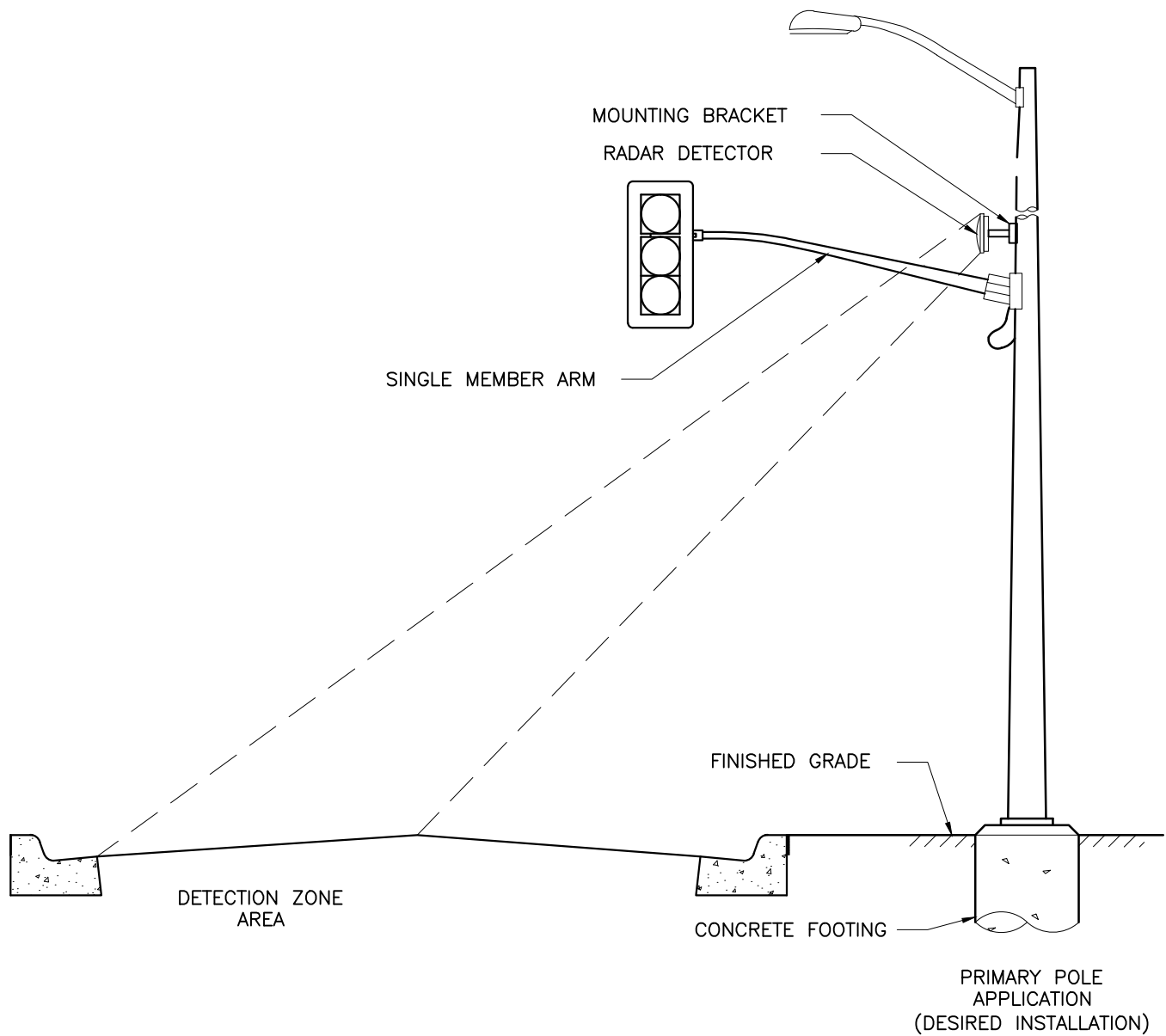


UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

MOUNTING OF VIDEO DETECTION UNIT

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 620.095</u>	

FILE LOCATION: W:\7\101 CONSOLIDATION OF UNIFORM TRAFFIC CONTROL SPECS\2014 UTSS FINAL.DWG
 DRAWING NAME: 620.096_RD_UTS.DWG
 DRAWN BY: D. THOMPSON
 REVISED BY: K. MISTRY
 MODIFIED: 14/02/03 09:41:13
 Revised

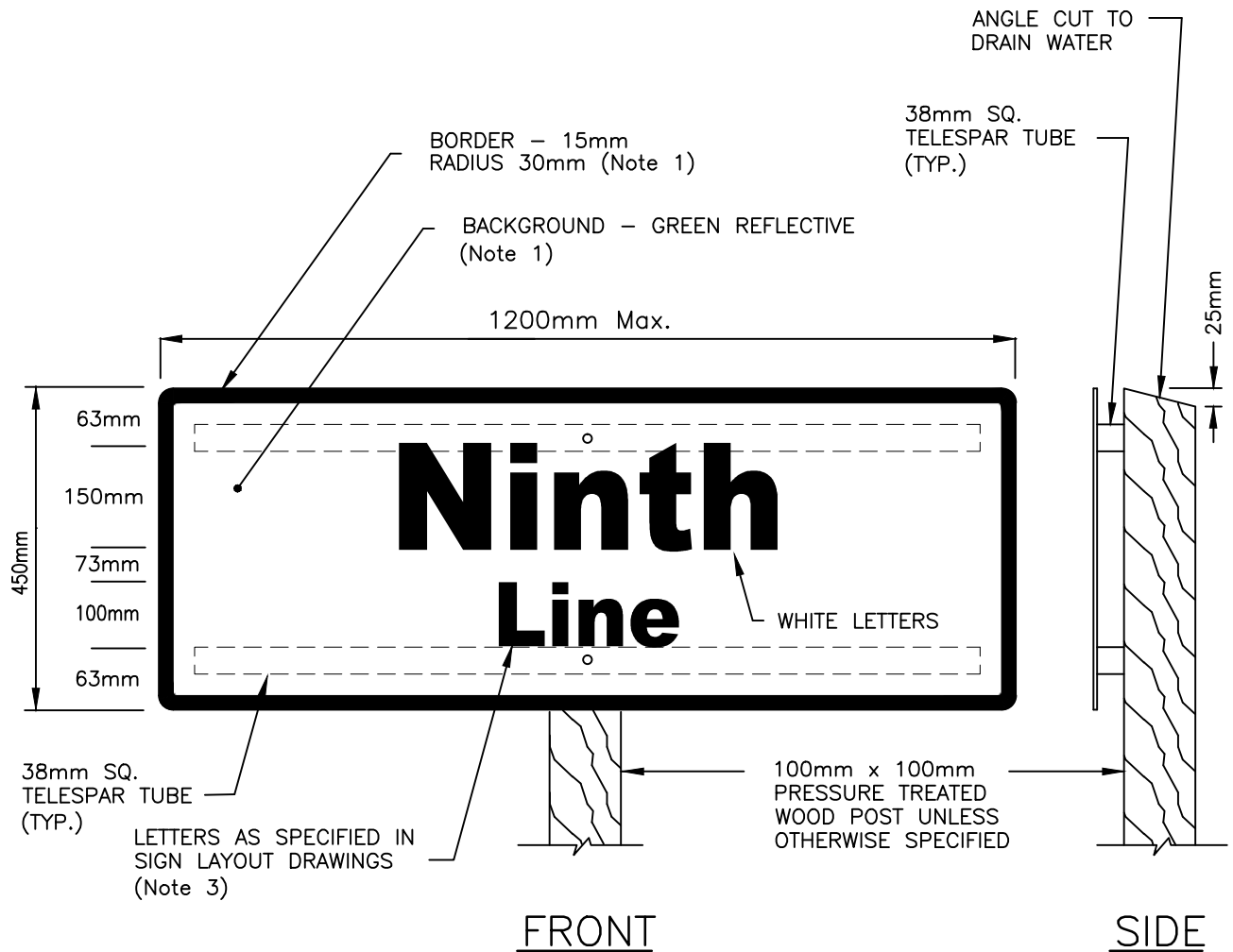


UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

MOUNTING OF WAVETRONIX RADAR DETECTION UNIT

Rev. Date	Rev. No. <u>0</u>
Modification: _____	

Modified By:	McCORMICK RANKIN
Date:	FEBRUARY, 2014
STANDARD No.	UTS 620.096



NOTES

1. ALL SIGNS TO BE MANUFACTURED WITH "3M" SCOTCHLITE, HIGH INTENSITY GRADE REFLECTIVE SHEETING.
2. ALL SIGNS TO BE MANUFACTURED FROM 3.18mm ALUMINUM SHEET STOCK.
3. CONTACT OPERATING AUTHORITY FOR SIGN LAYOUT TABLE PRIOR TO MANUFACTURING.
4. THIS SIGN MUST NOT BE COMBINED OR STACKED WITH OTHER TRAFFIC CONTROL SIGNS UNLESS DIRECTED OTHERWISE BY THE CONTRACT DRAWINGS OR THE ENGINEER.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ADVANCE STREET
NAME SIGN
GROUND MOUNT

Rev. Date

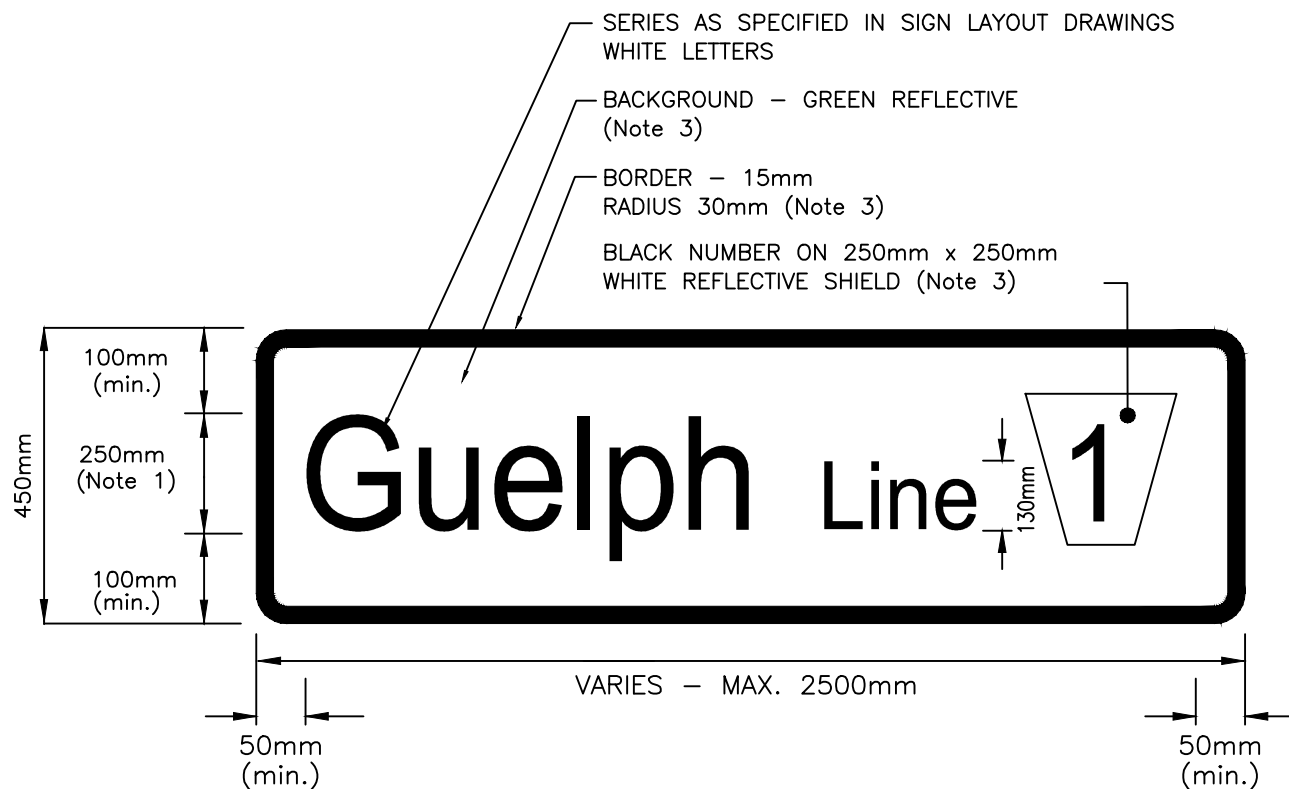
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 999.010



NOTES:

1. IN URBAN AREAS LETTER HEIGHT CAN BE REDUCED TO 200mm WITH 125mm TOP AND BOTTOM SPACING.
2. ALL SIGNS TO BE MANUFACTURED FROM 3.18mm ALUMINUM SHEET STOCK.
3. ALL SIGNS TO BE MANUFACTURED WITH "3M" SCOTCH LITE, HIGH INTENSITY GRADE REFLECTIVE SHEETING.
4. SIGNS GREATER THAN 2500mm NOT TO BE MOUNTED ON MAST ARMS.
5. CONTACT THE OPERATING AUTHORITY FOR SIGN LAYOUT TABLE PRIOR TO MANUFACTURING.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

ARTERIAL
STREET NAME SIGN
MAST ARM MOUNT

Rev. Date

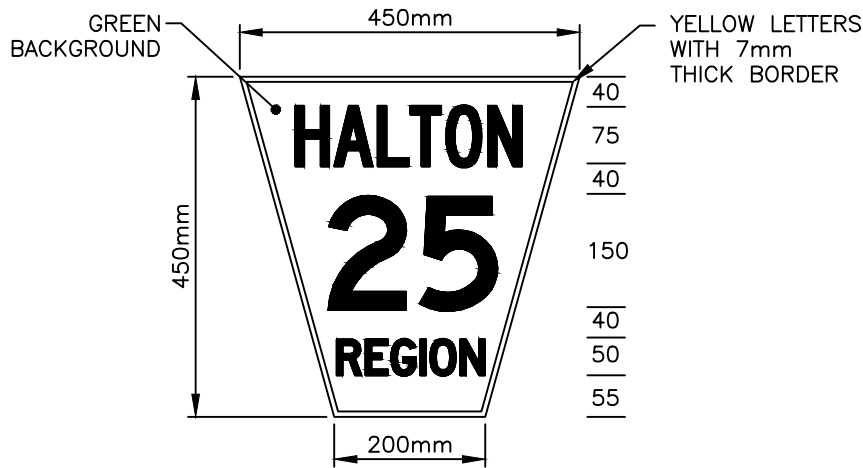
Rev. No. 0

Modification: _____

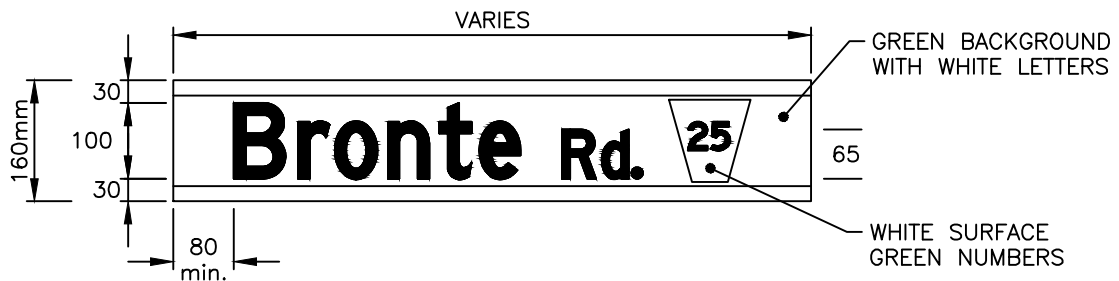
Modified By: McCORMICK RANKIN

Date: FEBRUARY 2014

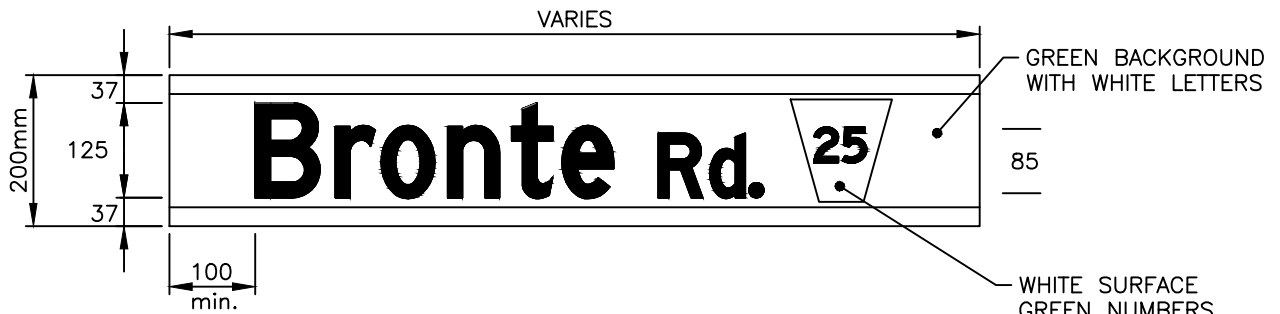
STANDARD No. UTS 999.020



ROUTE MARKER



SMALL STREET NAME



LARGE STREET NAME

NOTES

1. ALL SIGNS TO BE MANUFACTURED WITH "3M" SCOTCHLITE-REFLECTIVE SHEETING-HIGH INTENSITY GRADE.
2. STREET NAME SIGNS TO BE MANUFACTURED FROM EXTRUDED ALUMINUM WITH A 2mm WEB AND 6mm EXTRUDED FLANGE. ROUTE MARKER TO BE MANUFACTURED FROM 2mm THICK ALUMINUM.
3. CONTACT OPERATING AUTHORITY FOR SIGN LAYOUT TABLE PRIOR TO MANUFACTURING.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

ROUTE MARKER
AND EXTRUDED
STREET NAME SIGNS

Rev. Date

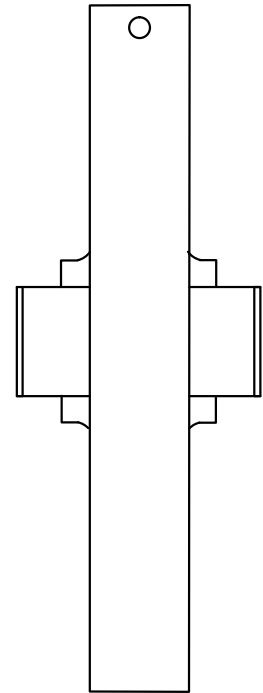
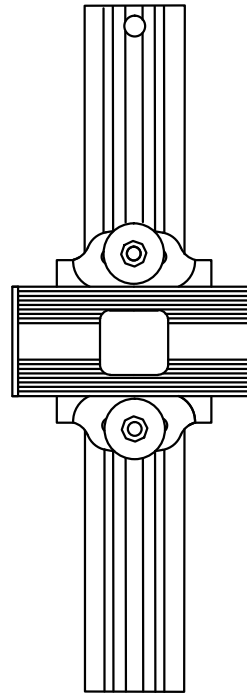
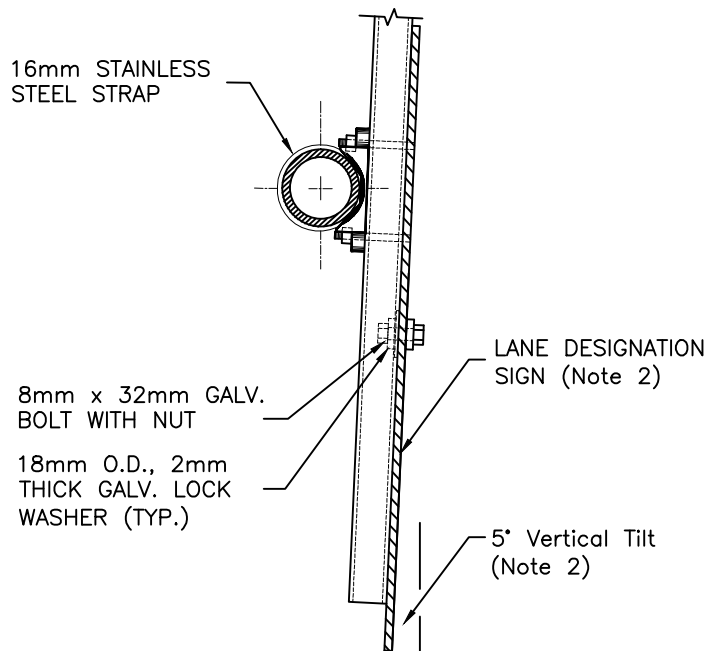
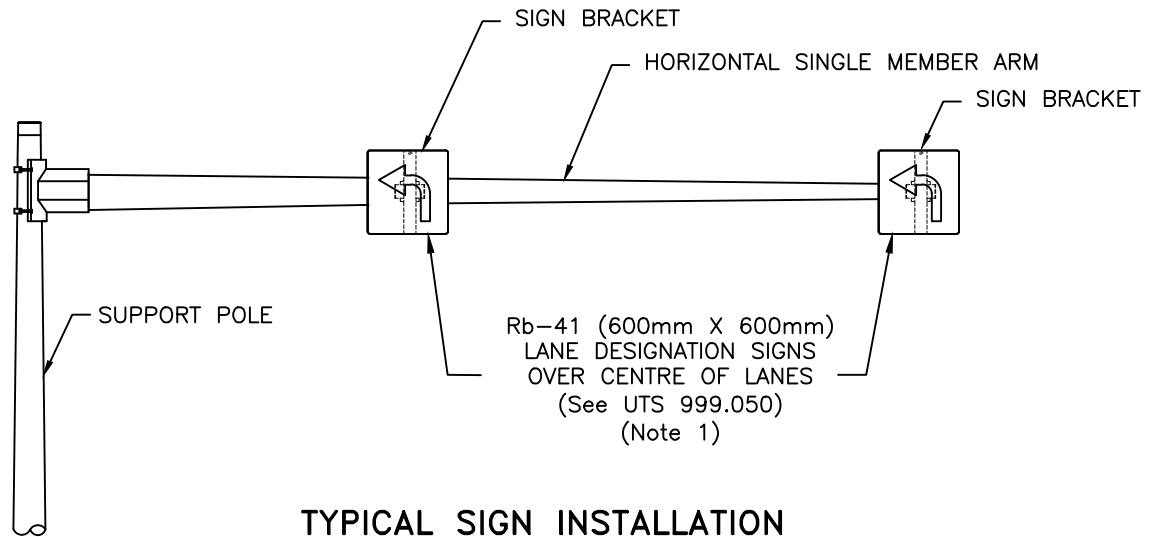
Rev. No. 0

Modification: _____

Modified By: MCCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 999.025



SUPPORT SIGN BRACKET MANUFACTURED BY SENTINEL POLE AND TRAFFIC EQUIPMENT.

NOTES

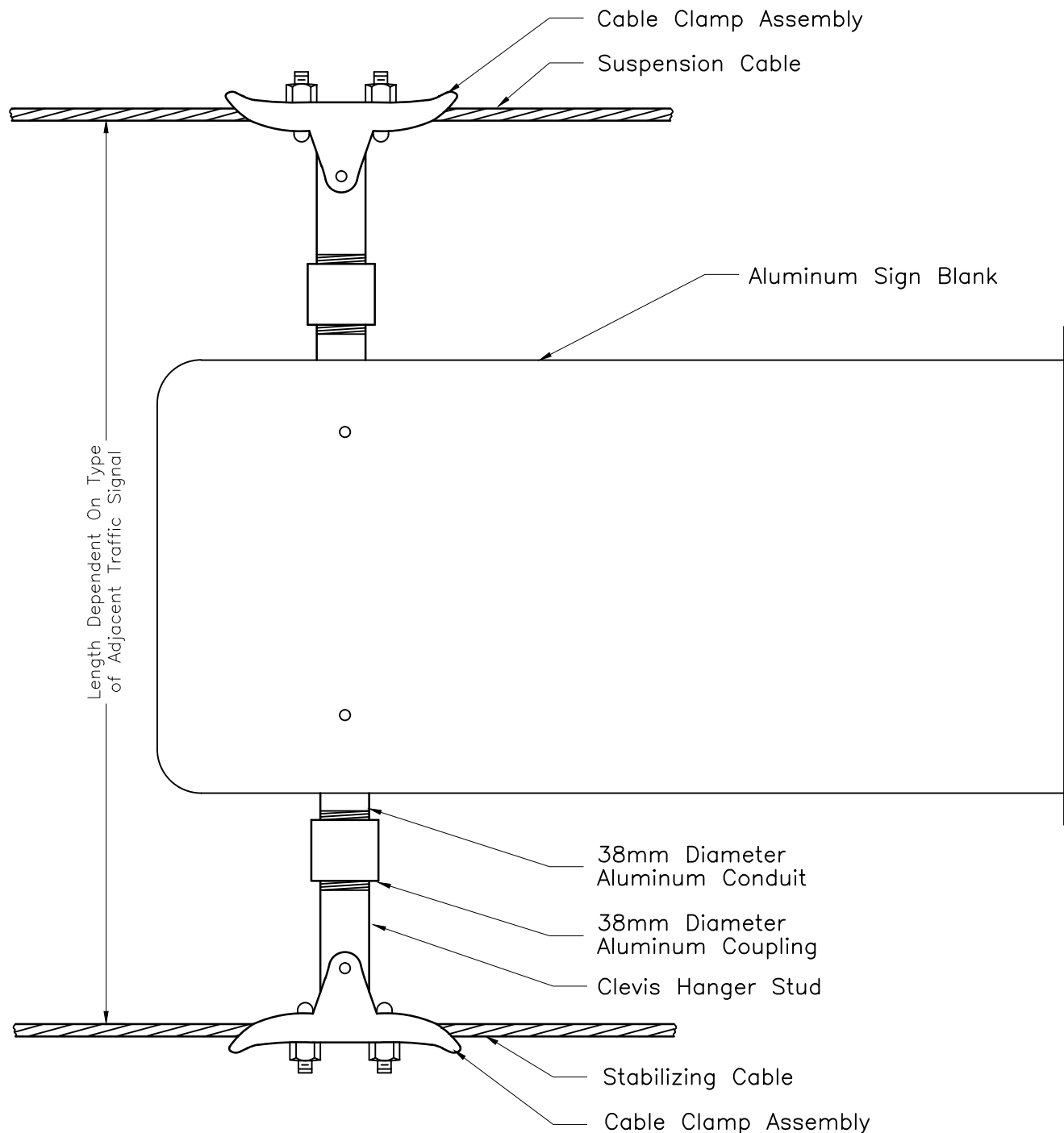
1. MOUNTING HOLES FOR BRACKET & SIGN TO BE FIELD DRILLED.
2. PLACE 5° VERTICAL DOWNWARD TILT ON SIGN.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE SHOWN.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**LANE DESIGNATION
SIGN BRACKET**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 999.030</u>	



NOTES:

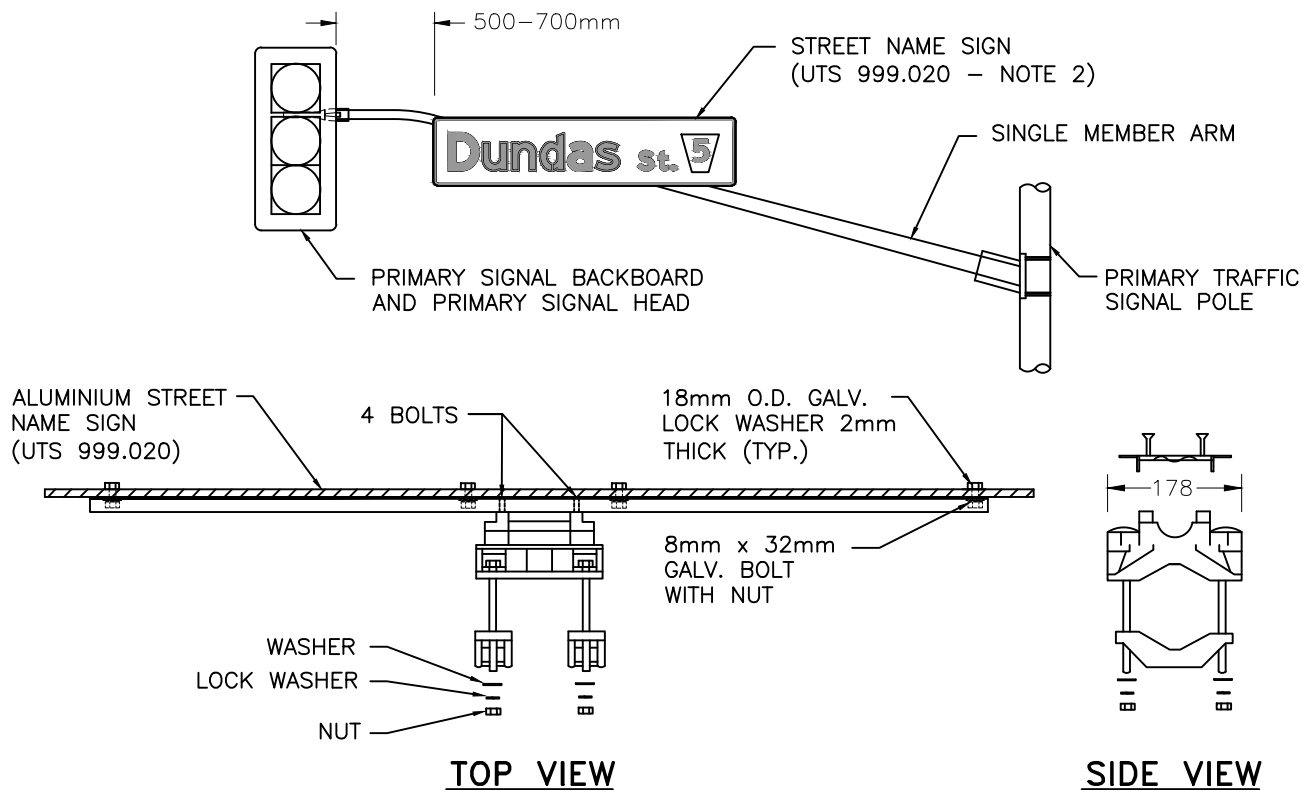
1. Two mounting bracket to be mounted on span cables per sign, over top of roadway adjacent to traffic signal as per signal layout.
- A. This standard to be used in conjunction with OPSD 2540.01 and OPSD 2540.02.

NTS

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

AERIAL SUSPENSION MOUNTING BRACKET FOR ARTERIAL STREET NAME SIGN

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 999.031</u>	



TOP VIEW

SIDE VIEW

FRONT VIEW

DIMENSIONS IN mm EXCEPT AS NOTED

SUPPORT SIGN BRACKET MANUFACTURED BY SENTINEL POLE AND TRAFFIC EQUIPMENT.
 - MODEL # VSB-4 - FOR 2.0 M SIGN
 - MODEL # VSB-6 - FOR 2.0M TO 2.4 M SIGN

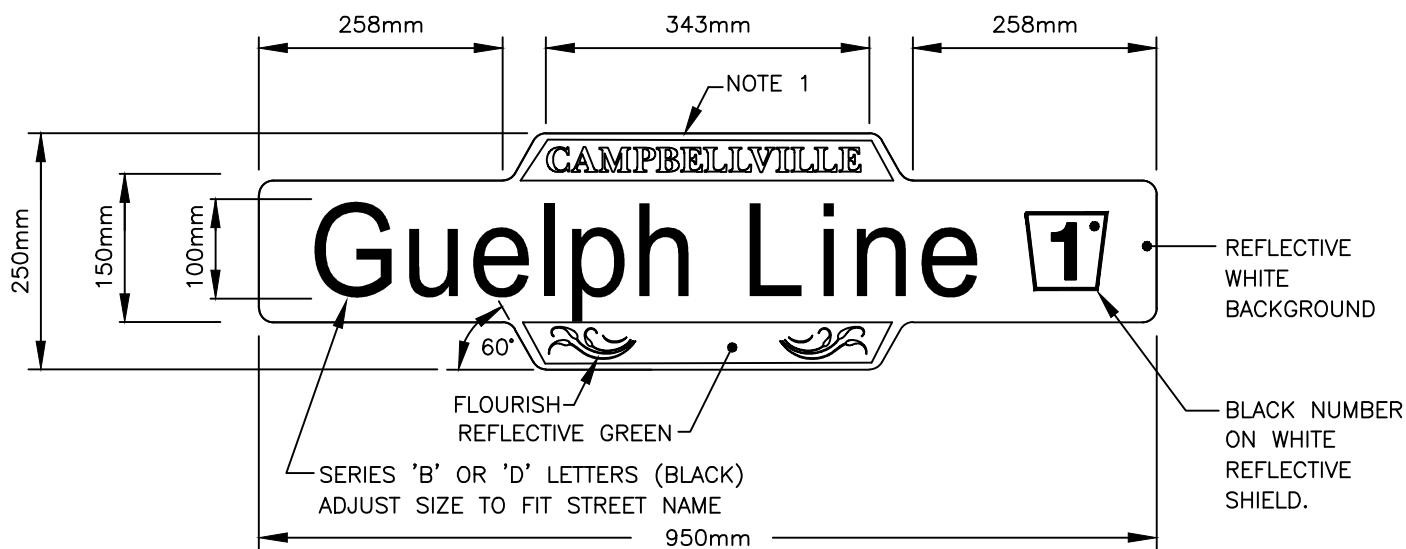
NOTES

1. POLE PLATE BOLTS TO BE ADJUSTED SO THAT HORIZONTAL PORTION OF ARM IS LEVEL.
2. SET TOP OF SIGN LEVEL WITH TOP OF AMBER INDICATION WHEN PLUMBIZER IS USED OR TOP OF RED INDICATION WHEN CUSHION HANGER IS USED.
3. MOUNTING HOLES FOR BRACKET AND SIGN TO BE FIELD DRILLED.
4. PLACE 5° VERTICAL TILT ON SIGN.
5. ON NON-DIVIDED ROADWAYS, ADJUST SIGNS POSITION ALONG MAST ARM TO ENSURE OPPOSING SECONDARY SIGNAL INDICATIONS ARE NOT OBSTRUCTED.

**UNIFORM TRAFFIC SIGNAL STANDARD
HALTON REGION AND LOCAL MUNICIPALITIES**

**ARTERIAL SIGN BLADE
SUPPORT BRACKET**

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>MCCORMICK RANKIN</u>	
Date: <u>FEBRUARY, 2014</u>	
STANDARD No. <u>UTS 999.035</u>	



ORNAMENTAL ARTERIAL WITH CONVENTIONAL LETTERING

NOTES

1. SIGN TO BE MANUFACTURED FROM 4.75mm THICK ALUMINIUM SHEETING. FACE BOTH SIDES.
2. CONTACT HALTON REGION PUBLIC WORKS FOR REGIONAL ROAD ROUTE NUMBER TO BE USED.
3. ALL SIGNS TO BE MANUFACTURED WITH "3M" SCOTCHLITE-REFLECTIVE SHEETING-HIGH INTENSITY GRADE.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ORNAMENTAL ARTERIAL STREET NAME SIGN

Rev. Date

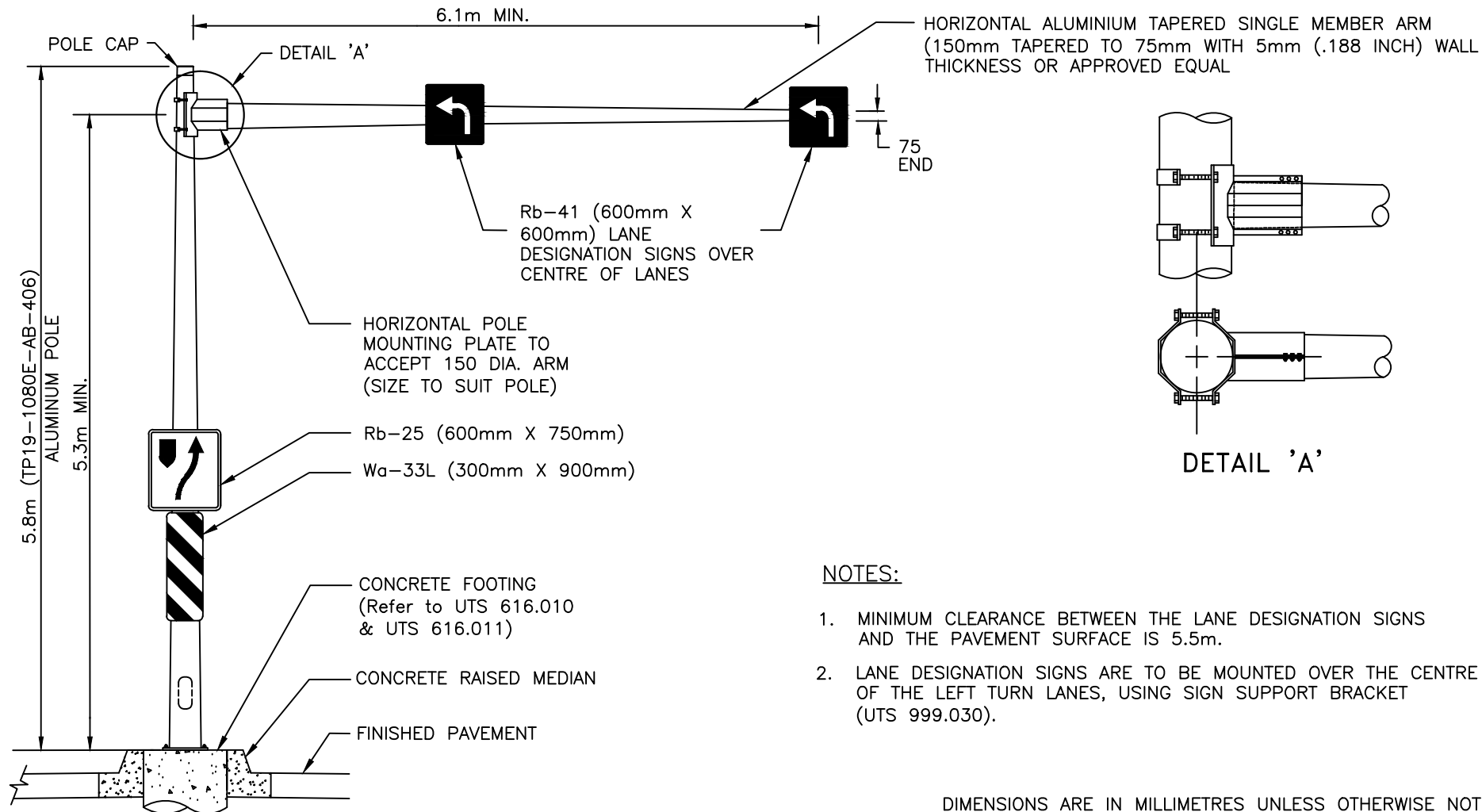
Rev. No. 0

Modification: _____

Modified By: McCORMICK RANKIN

Date: FEBRUARY, 2014

STANDARD No. UTS 999.040



NOTES:

1. MINIMUM CLEARANCE BETWEEN THE LANE DESIGNATION SIGNS AND THE PAVEMENT SURFACE IS 5.5m.
2. LANE DESIGNATION SIGNS ARE TO BE MOUNTED OVER THE CENTRE OF THE LEFT TURN LANES, USING SIGN SUPPORT BRACKET (UTS 999.030).

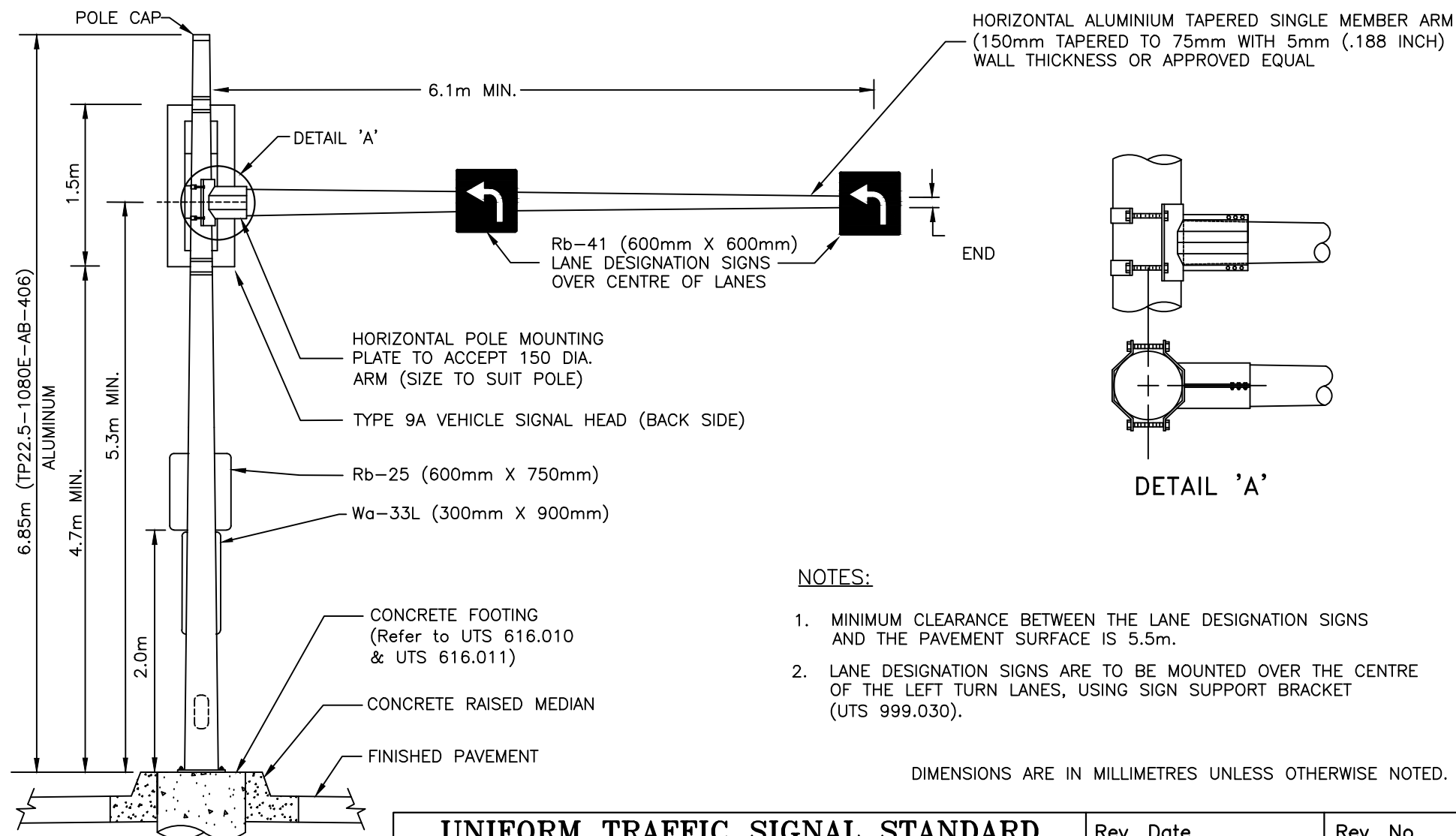
DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

ADVANCE OVERHEAD LANE DESIGNATION SIGNS FOR DUAL LEFT TURN LANES

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Modification: _____	

Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 999.050</u>	

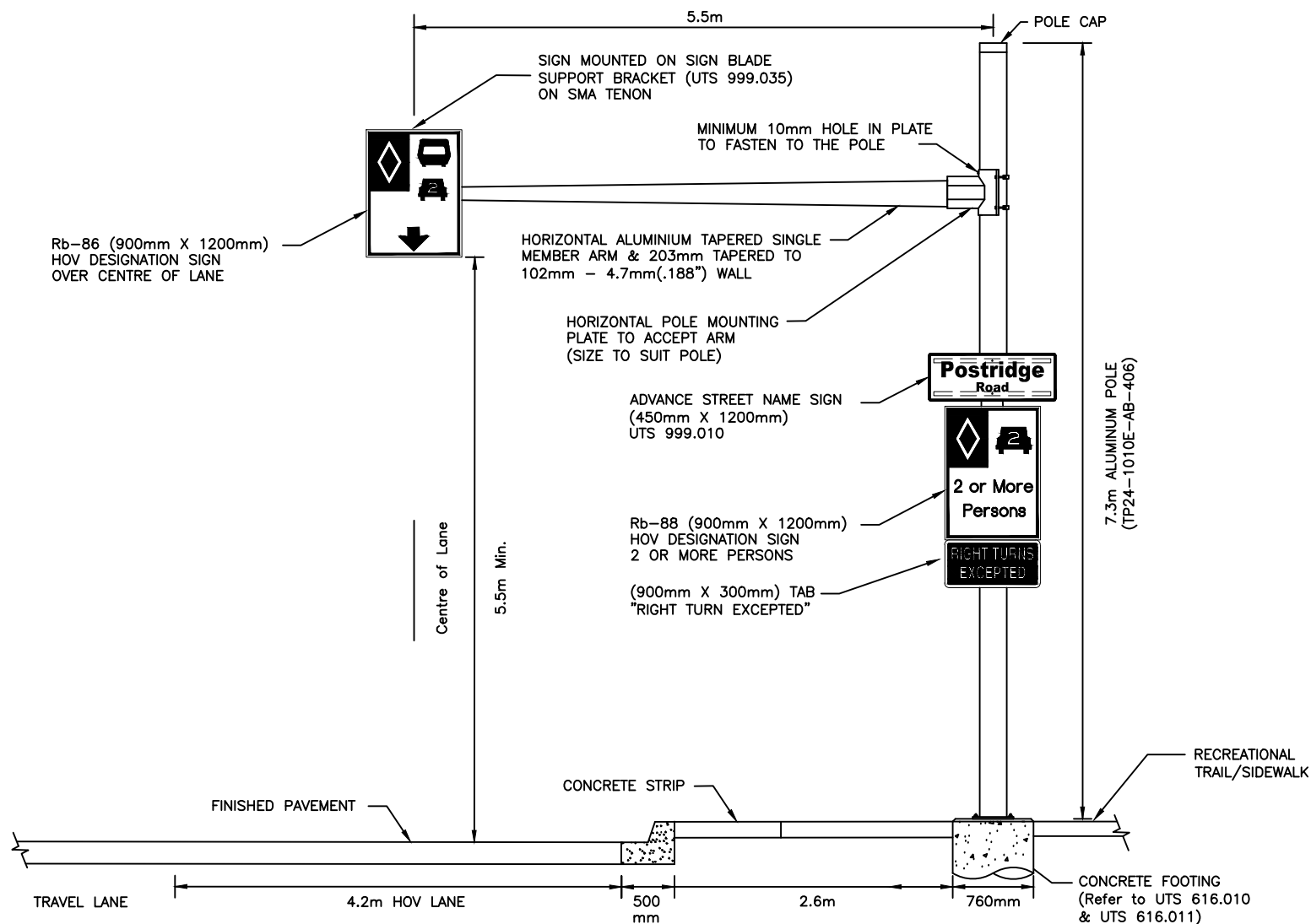


UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

OVERHEAD LANE DESIGNATION SIGNS ON CENTRE MEDIAN SIGNAL POLE

Rev. Date	Rev. No. 0
Modification: _____	

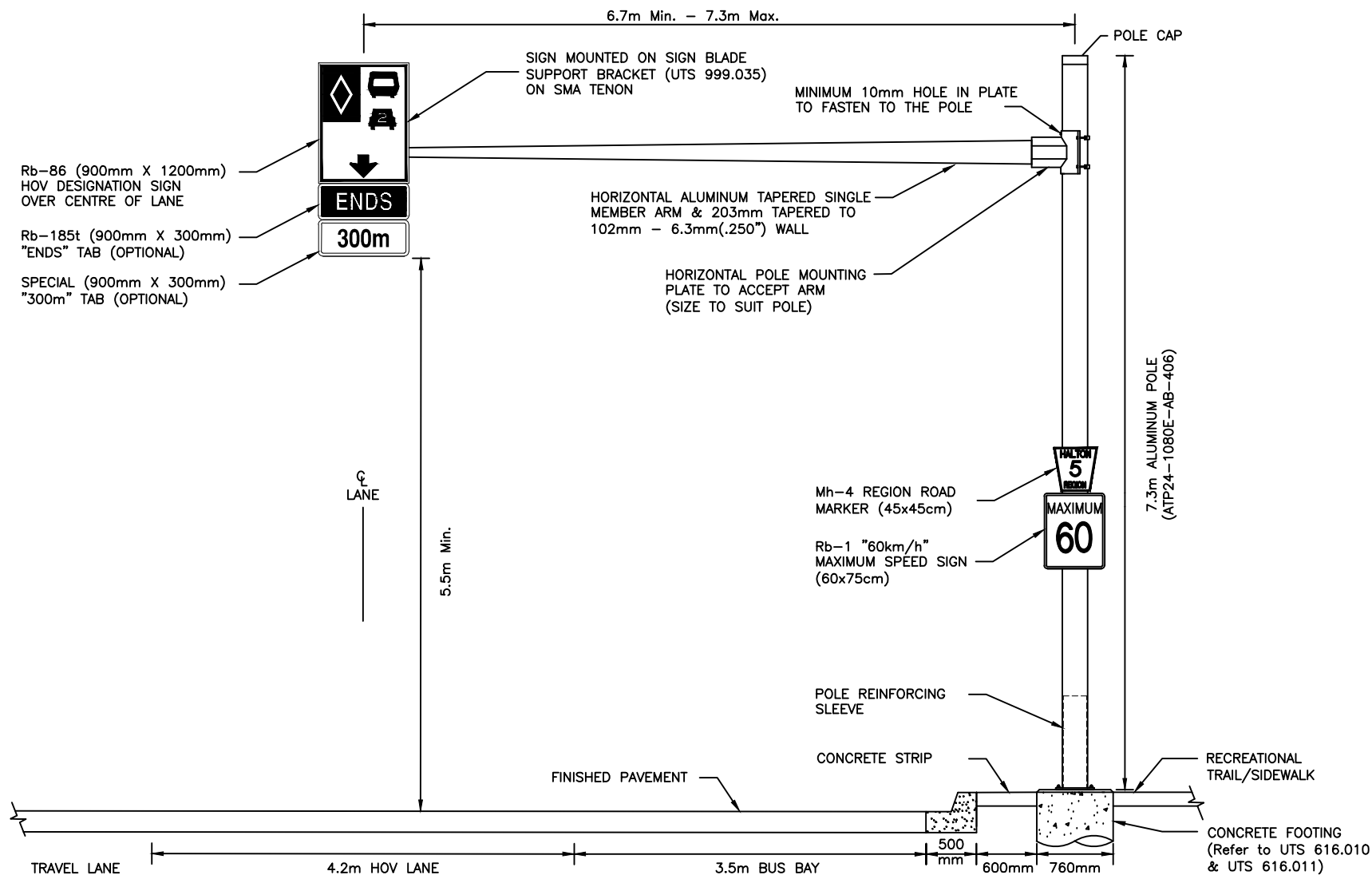
Modified By: McCORMICK RANKIN	
Date: FEBRUARY 2014	
STANDARD No. UTS 999.055	



UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

OVERHEAD HIGH OCCUPANCY VEHICLE LANE DESIGNATION SIGNS 5.5m HORIZONTAL SINGLE MEMBER ARM

Rev. Date	Rev. No. <u>0</u>
Modification: _____	
Modified By: <u>McCORMICK RANKIN</u>	
Date: <u>FEBRUARY 2014</u>	
STANDARD No. <u>UTS 999.060</u>	



UNIFORM TRAFFIC SIGNAL STANDARD HALTON REGION AND LOCAL MUNICIPALITIES

OVERHEAD HIGH OCCUPANCY VEHICLE LANE DESIGNATION SIGNS 6.7m to 7.3m HORIZONTAL SINGLE MEMBER ARMS

Rev. Date

Rev. No. 0

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Date: FEBRUARY 2014

STANDARD No. UTS 999.062