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REVISION INFORMATION SHEET

ONTARIO PROVINCIAL STANDARDS FOR ROADS AND PUBLIC WORKS

VOLUME 4 MUNICIPAL AND PROVINCIAL COMMON DRAWINGS FOR ELECTRICAL WORK

MANUAL REVISION #33

NOVEMBER 2015

UPDATING ONTARIO PROVINCIAL STANDARDS FOR YOUR USE

Each roads and public works owner (Owner) is responsible for determining implementation dates and directions for use of Ontario Provincial Standards; therefore, manual holders are cautioned about immediately discarding superseded and cancelled standards.

ACCESSING AND OBTAINING ONTARIO PROVINCIAL STANDARDS

The Ontario Provincial Standards for Roads and Public Works (OPS) manuals and the latest published updates for each of the eight OPS manuals are available as follows:

- Available electronically on the OPS/MTO website. Online access to the current, updated, and archived standards; indexes; OPS User Notes; and publication Revision Information Sheets are available free of charge at the site.
(<http://www.raqs.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>)
- Hard-copy format available from Publications Ontario by telephone at 1-800-668-9938 or online. Updates and OPS manuals are available for a cost-recovery fee.
(www.publications.serviceontario.ca)
- The eight OPS manuals of standards are available on one CD in PDF format. The OPS drawings published in Volumes 3 and 4 are available in AutoCAD format on a separate CD. These CDs are available from Publications Ontario or by telephone at 1-800-668-9938 or online for a cost-recovery fee. The updates are not available on CDs as an update package.
(www.publications.serviceontario.ca)

At the Publications Ontario web page, you can type "Ontario Provincial Standards," "OPS," "OPSS," or "OPSD" in the search box, and all related products for the Ontario Provincial Standards will be listed, click on the item you wish to purchase, add the item to your cart, then follow the instructions to complete your order. If trying to order an OPS product online from Publications Ontario and it is shown as Out of Stock, you can backorder the product by telephone at 1-800-668-9938.

In order to receive the Municipal Engineers Association (MEA) purchase price, MEA members should visit the MEA website (www.municipalengineers.on.ca/) for the MEA Publications Ontario order form for hard-copy manuals and CDs.

MTO employees should contact Simon Leung, Account Representative at Publications Ontario, by email (simon.leung@ontario.ca) to set up an account in order to receive the MTO purchase price for technical publications, including the Ontario Provincial Standards.

Links to Publications Ontario and the Ontario Provincial Standards on the MTO Library website are available on the OPS website (www.ops.on.ca). Also on this site under News and Activities are notices for updates and changes in OPS.

Questions should be directed by email to Ontario.Prov.Standards@ontario.ca.

YOU SHOULD REGISTER YOUR OPS MANUALS AND CDs

Users of OPS do not receive notices of OPS updates as they had in the past. Methods of notification from Publications Ontario for the future are being investigated, and you will be informed of them as they become available. In the interim, an email will be sent to OPS users who have registered their OPS manuals and CDs with OPS.

Owners of OPS manuals, who have not yet done so, are requested to register their OPS hard-copy manuals and CDs with Ontario.Prov.Standards@ontario.ca. The registration form and submission instructions are available on the OPS website (www.ops.on.ca), Miscellaneous Info, OPS Forms.

WAITING TO HEAR FROM YOU

If you have a suggestion to revise a standard or you have a standard that works in your ministry, municipality, or area, send it to the Head, OPS Administration, for review and possible inclusion into the Ontario Provincial Standards.

THIS MANUAL IS REVISED AS FOLLOWS:

Index Pages Volume 4

Please remove the entire index and replace with the attached revised index.

Standard Drawings Volume 4

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
2100.06	1	2100.06	2	“RIGID DUCTS ENCASED IN CONCRETE” This drawing has been reaffirmed. No changes to technical information.
		2102.020	0	“UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE WITHOUT EXPANSION JOINT” This is a New Drawing.
2103.01	-	2103.010	0	“RIGID DUCT TERMINATION FOR HIGH VOLTAGE CABLES AT UTILITY POLES” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.010.
2103.02	-	2103.02	1	“DUCT INSTALLATION PROFILES” This drawing has been reaffirmed. No changes to technical information.
2103.030	-	2103.030	1	“RIGID DUCT INSTALLATION IN EXISTING PAVED AREA, UNSHRINKABLE BACKFILL METHOD” This drawing has been reaffirmed. No changes to technical information. Title revised.
2103.04	-	2103.040	0	“RIGID DUCT INSTALLATION IN EXISTING PAVED AREA, GRANULAR BACKFILL METHOD” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.040.
2103.05	-	2103.050	0	“DUCT INSTALLATION AT UTILITY CROSSINGS” See Summary of Revisions. Renumbered to OPSD 2103.050.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
2103.06	-	2103.060	0	“AUGERING PITS FOR SUBSURFACE INSTALLATION OF DUCTS AND ENCASEMENTS” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2103.060.
2110.010	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1200mm X 1200mm” This drawing has been cancelled.
2110.050	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 600mm X 1450mm” This drawing has been cancelled.
2110.060	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1800mm X 2440mm” This drawing has been cancelled.
2110.070	-			“ELECTRICAL MAINTENANCE HOLE CAST IN PLACE, 1200mm X 1650mm” This drawing has been cancelled.
2111.020	-	2111.020	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 600 x 1450mm” See Summary of Revisions.
2111.030	-	2111.030	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200mm DIA” See Summary of Revisions.
2111.040	-	2111.040	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200 x 1650mm” Plan view, drain hole knock-out label revised.
2111.050	-	2111.050	1	“ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1800 x 2400mm” Section B-B, drain hole knock-out label revised.
2215.02	3	2215.02	4	“ANCHORAGE ASSEMBLY FOR LIGHTING AND SIGNAL POLES” See Summary of Revisions.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		2215.025	0	“ANCHORAGE ASSEMBLY FOR HEAVY CLASS STEEL POLE AND SECTIONAL STEEL POLE” This is a New Drawing.
2216.010	1	2216.010	2	“ANCHORAGE ASSEMBLY FOR POLE FOOTING IN CONCRETE BARRIER” Plan view, hole diameter revised from 33 to 38mm.
		2414.010	0	“3.3m ALUMINUM AND SECTIONAL STEEL POLES, BASE MOUNTED” This is a New Drawing.
2442.01	-	2442.010	0	“DUCT HANGER” This drawing has been reaffirmed. No changes to technical information. Renumbered to OPSD 2442-010.
2529.010	0	2529.010	1	“SIGNAL WIRING FOR PEDESTRIAN FACILITIES” Wire size #18 revised to #14 throughout drawing.
2532.010	0			“FLASHER BEACON AND DOWNLIGHT FOR ROADWAY SIGN AND WIRING DIAGRAM” This drawing has been cancelled.
2534.010	1			“SIGN LIGHT ASSEMBLY FOR KEEP RIGHT SIGN AND WIRING DIAGRAM” This drawing has been cancelled.
2536.010	1	2536.010	2	“FLASHER BEACONS FOR ROADWAY SIGN AND DOWNLIGHT AND WIRING DIAGRAM” Sectional steel pole revised to metal pole.
		2536.030	0	“SOLAR POWERED LED FLASHER BEACON AND WIRING DIAGRAM FOR ROADWAY SIGN, BASE MOUNTED POLE” This is a New Drawing.

Superseded/Cancelled (Remove)		Revised/New (Insert)		Remarks
OPSD	Revision	OPSD	Revision	
		2536.032	0	“SOLAR POWERED LED FLASHER BEACON AND WIRING DIAGRAM FOR ROADWAY SIGN, DIRECT BURIED POLE” This is a New Drawing.
		2902.322	0	“ADVANCED TRAFFIC MANAGEMENT SYSTEM, SUPPLY CONTROL CABINET, 120/240V, 100A, 1-PHASE, 3 WIRE” This is a New Drawing.

SUMMARY OF REVISIONS TO OPSD 2103.050

DUCT INSTALLATION AT UTILITY CROSSINGS

- Renumbered to OPSD 2103.050.
- Loose fill revised from Styrofoam to expanded polystyrene foam.

SUMMARY OF REVISIONS TO OPSD 2111.020

ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 600 X 1450mm

- Section A-A, WWF 250mm²/m revised to WWR 254mm²/m.
- Section B-B, drain holes labelled.
- New Notes A and B added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 2111.030

ELECTRICAL MAINTENANCE HOLE, PRECAST CONCRETE, 1200mm DIA

- Drain hole knock-outs labelled throughout drawing.
- Section A-A, WWF 250mm²/m revised to WWR 254mm²/m and stranded copper wire label converted into Note 3.
- New Notes A and B added. Other note reordered.

SUMMARY OF REVISIONS TO OPSD 2215.02

ANCHORAGE ASSEMBLY, FOR LIGHTING AND SIGNAL POLES

- Title revised.
- Table, Stud Length and Ferule Length columns added.
- Existing Notes 1 and 3 deleted and new Note B added. Other notes reordered.
- Note 1 revised.

MANUAL REVISION RECORD

Municipal and Provincial Common

Volume 4 – Drawings for Electrical

This record should remain in the manual at all times. Revisions are numbered sequentially. This sheet should be filled in after each revision has been placed into the manual. It will quickly indicate to users whether the contents of the manual are up-to-date.

REVISION NUMBER	REVISION DATE	ENTERED BY	REVISION NUMBER	DATE	ENTERED BY
19	NOV 2004	Included in new manuals	45		
20	NOV 2005	Included in new manuals	46		
21	NOV 2006	Included in new manuals	47		
22	APRIL 2007	Included in new manuals	48		
23	NOV 2007	Included in new manuals	49		
24	NOV 2008	Included in new manuals	50		
25	APR 2009	Included in new manuals	51		
26	NOV 2009	Included in new manuals	52		
27	APR 2010	Included in new manuals	53		
28	NOV 2010	Included in new manuals	54		
29	NOV 2011	Included in new manuals	55		
30	NOV 2012	Included in new manuals	56		
31	NOV 2013	Included in new manuals	57		
32	NOV 2014	Included in new manuals	58		
33	NOV 2015	Included in new manuals	59		
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DATE	OPSD NO.	REV.	TITLE
DIVISION 2000 - ABBREVIATIONS			
2009 11	2000.001	0	Abbreviations, General
2009 11	2011.101	0	General Symbols, Ducts and Cables
2009 11	2011.201	0	General Symbols, Maintenance Holes, Junction Boxes, Pads, and Footings
2009 11	2011.401	0	General Symbols, Poles and Guying
2009 11	2011.501	0	General Symbols, Power Supply Equipment
2013 11	2011.601	1	General Symbols, Control Equipment
2014 11	2011.701	2	General Symbols, Traffic Actuation Devices
2009 11	2012.101	0	Highway Lighting Symbols, Luminaires
2009 11	2013.101	0	Electrical Traffic Control Symbols, Traffic Control Devices
2009 11	2013.201	0	Electrical Traffic Control Symbols, Traffic Signal Displays
2009 11	2014.101	0	Wiring Symbols, Wiring Diagrams 1
2009 11	2014.102	0	Wiring Symbols, Wiring Diagrams 2
2009 11	2015.201	0	Advanced Traffic Management Symbols, Universal Traffic Management System, Equipment Identifier 1
2009 11	2015.202	0	Advanced Traffic Management Symbols, Universal Traffic Management System, Equipment Identifier 2
2009 11	2015.301	0	Advanced Traffic Management Symbols, Layout Drawings
2009 11	2015.302	0	Advanced Traffic Management Symbols, Wiring Diagrams
2009 11	2016.301	0	Communications Symbols, Fibre Optic Communications Schematic 1
2009 11	2016.302	0	Communications Symbols, Fibre Optic Communications Schematic 2
DIVISION 2100 - UNDERGROUND WORK, ETC.			
2013 11	2100.010	0	Cable Installation in Trenches
2013 11	2100.050	0	Cable and Duct Protection and Marking
2015 11	2100.06	2	Rigid Ducts Encased in Concrete



DATE	OPSD NO.	REV.	TITLE
2013 11	2101.01	1	Duct Installation in Trenches
2013 11	2101.020	0	Extension of Existing Rigid Ducts Encased in Concrete
2013 11	2102.01	1	Underground Rigid Duct Connection at Concrete Structure
2015 11	2102.020	0	Underground Rigid Duct Connection at Concrete Structure Without Expansion Joint
2015 11	2103.010	0	Rigid Duct Termination for High Voltage Cables at Utility Poles
2015 11	2103.02	1	Duct Installation Profiles
2015 11	2103.030	1	Rigid Duct Installation in Existing Paved Area, Unshrinkable Backfill Method
2015 11	2103.040	0	Rigid Duct Installation in Existing Paved Area - Granular Backfill Method
2015 11	2103.050	0	Duct Installation at Utility Crossings
2015 11	2103.060	0	Augering Pits for Subsurface Installation of Ducts and Encasements
92 12 15	2104.01	-	Re Ducts Surface Mounted on Structures
2015 11	2111.020	1	Electrical Maintenance Hole - Precast Concrete - 600 x 1450 mm
2015 11	2111.030	1	Electrical Maintenance Hole - Precast Concrete - 1200 mm Dia.
2015 11	2111.040	1	Electrical Maintenance Hole - Precast Concrete - 1200 x 1650 mm
2015 11	2111.050	1	Electrical Maintenance Hole - Precast Concrete - 1800 x 2400 mm
2009 11	2112.01	2	Electrical Handhole, Precast Concrete with Cover, 300 mm Dia.
2009 11	2112.02	2	Electrical Handhole, Precast Concrete with Cover, 460 mm Dia.
2004 11	2112.030	0	Electrical Handhole Precast Concrete - 675 mm Dia.
2004 11	2112.040	0	Electrical Handhole Precast Concrete - 600 x 600 mm
2009 11	2112.05	1	Electrical Handhole, Precast Concrete with Cover, 300 x 500 mm
2004 11	2113.010	0	Electrical Handhole, Non and Semi-Concrete, General Requirements



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DATE	OPSD NO.	REV.	TITLE
2013 11	2116.01	1	Drainage Facilities for Electrical Maintenance Holes
2013 11	2116.02	1	Electrical Maintenance Hole, Drains to Drainage Pockets, Embankment Outlets, and Ditches
2013 11	2116.03	1	Electrical Maintenance Hole, Drains to Storm Sewer Systems
2013 11	2117.01	2	Electrical Maintenance Holes, General Installation Requirements
2013 11	2117.02	3	Electrical Handholes, General Installation Requirements
2009 11	2118.010	0	Electrical Chamber Installation in Median
2009 11	2118.020	0	Electrical Chamber Installation in Slope
2013 11	2123.01	1	Electrical Maintenance Holes, Entry of Direct Buried Ducts
2013 11	2123.02	1	Electrical Maintenance Holes, Entry of Encased Ducts
2013 11	2123.03	2	Electrical Handholes, Entry of Direct Buried and Encased Ducts
2010 11	2126.010	2	Distribution Assembly, Concrete Pad and Ducts, Plan and Section A-A
2010 11	2126.020	2	Distribution Assembly, Concrete Pad and Ducts, Section B-B
2013 11	2130.010	0	Supply Control Cabinet Installation Overhead Services, Top Entry Metering
2013 11	2130.011	0	Supply Control Cabinet Installation, Underground Services, Bottom Entry Metering
2013 11	2130.012	0	Supply Control Cabinet Installation, Overhead Services, Bottom Entry Metering

DIVISION 2200 - FOUNDATIONS, ETC.

2012 11	2200.01	2	Concrete Footing for Base Mounted Lighting and Signal Poles
2010 11	2200.011	0	Raised Concrete Footing for Base Mounted Lighting Poles
2013 11	2200.02	1	Concrete Foundation for Direct Buried Lighting Poles Where Rock is Encountered
2012 11	2200.03	2	Concrete Foundation for Base Mounted Lighting Poles Where Rock is Encountered
2014 11	2200.04	2	Concrete Footing and Anchorage Assembly for 3.3 m Base Mounted Metal Pole



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DATE	OPSD NO.	REV.	TITLE
2014 11	2200.041	0	Concrete Footing for 1.5 m Base Mounted Pedestrian Push Button Pole
2001 11	2200.070	0	Pole Footing in Earth for Cast-In-Place Concrete Barrier
2001 11	2200.080	0	Pole Footing in Rock for Cast-In-Place Concrete Barrier
2013 11	2210.010	0	Local Grading at Pole Foundations
2007 04	2210.020	1	Installation of Direct Buried Poles in Slopes
2005 11	2210.030	0	High Mast Lighting Pole, Apron
2015 11	2215.02	4	Anchorage Assembly for Lighting and Signal Poles
2015 11	2215.025	0	Anchorage Assembly for Heavy Class Steel Pole and Sectional Steel Pole
2014 11	2215.03	4	Pole Mounting Details for Base Mounted Metal Pole
2015 11	2216.010	2	Anchorage Assembly for Pole Footing in Concrete Barrier
2003 11	2218.010	0	High Mast Lighting Pole Anchorage Assembly Placement
2010 11	2220.01	1	Pole Handhole Locations
2006 11	2225.010	0	Concrete Lighting Pole, Direct Buried
2006 11	2228.010	0	Metal Lighting Pole, Base Mounted
2006 11	2232.010	0	Sectional Steel Pole with Brackets, Luminaire, and Traffic Signal Head
2012 11	2235.01	2	Pole Guying Details
2013 11	2236.010	0	Wooden Pole and Anchorage Settings in Solid Rock 1
2013 11	2236.020	0	Wooden Pole and Anchorage Settings in Solid Rock 2
2010 11	2238.01	1	Wooden Pole in Earth
2013 11	2239.010	0	Cribbing for Wood Poles in Muskeg
2013 11	2239.020	0	Log Anchor for Guy in Muskeg
2006 11	2240.01	2	Wood Pole with Elliptical Bracket, Overhead and Underground Circuits
2013 11	2242.01	1	Wooden Pole with Neutral Supported Cable



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DATE	OPSD NO.	REV.	TITLE
2013 11	2242.02	2	Wooden Poles with Aerial Signal Cables Lashed on Messenger
2004 11	2245.01	2	Installation of Aerial Cable Systems
2011 11	2245.020	1	Minimum Vertical Clearances for Aerial Cable Systems
2006 11	2250.01	5	Aluminum Tapered Elliptical Brackets on Metal and Concrete Poles, Mounting Details
2013 11	2255.010	1	Pole Wiring Diagram - 120V System
2013 11	2255.020	1	Pole Wiring Diagram - 120/240V System
2013 11	2255.030	1	Pole Wiring Diagram - 347/600V System
2013 11	2255.040	1	Pole Wiring Diagram, Lighting Pole on Bridge Structure

DIVISION 2300 - WORK ON STRUCTURE

2013 11	2300.010	1	Rigid PVC Junction Box, Type P1
2013 11	2300.020	1	Rigid PVC Junction Box, Type P2
2013 11	2300.030	1	Rigid PVC Junction Box, Type P4
2010 11	2302.010	1	Embedded Work Detail for Rigid PVC Junction Box, Type P3-1, for Use in Concrete Barrier Wall
2013 11	2302.020	0	Expansion and Deflection Fitting Assembly for 50 and 75 mm Rigid Ducts
2013 11	2302.040	1	Embedded Work in Structure, New Jersey Type Concrete Barrier Wall
2014 11	2302.045	0	Embedded Work in Structure, Parapet Wall
2001 11	2305.020	1	Underpass Luminares Wall Mounted Installation
2001 11	2310.010	0	Underpass Luminaire Ceiling Mounted Installation with Tee Bracket
2009 11	2310.020	1	Tee Bracket for Ceiling Mounted Underpass Luminaire
2001 11	2310.030	0	Wedge Mounting Bracket for Underpass Luminaire
2001 11	2310.040	0	Support Bracket for Column Mounted Underpass Luminaire
2002 11	2315.010	0	Underpass Luminaire Wiring Detail



DATE	OPSD NO.	REV.	TITLE
DIVISION 2400 - PURCHASING STANDARDS			
2013 11	2400.000	2	Distribution Assembly Legend
2010 11	2400.010	2	Distribution Assembly, Cabinet
2008 11	2400.020	1	Distribution Assembly, Equipment Layout
2013 11	2400.030	2	Distribution Assembly Wiring Schematic
2008 11	2400.100	0	Warning Signs for Electrical Equipment
2010 11	2400.101	0	Warning Signs Outside Electrical Equipment
2012 11	2410.01	3	Spun Concrete Pole
2012 11	2410.020	0	18.3 m Spun Concrete Pole for TV Camera Mounting
2015 11	2414.010	0	3.3m Aluminum and Sectional Steel Poles, Base Mounted
93 12 15	2415.010	-	Steel Pole - Base Mounting
2010 11	2415.011	0	Steel Pole, Base Mounted Without Gussets
93 12 15	2416.010	-	Steel Pole - Concrete Barrier Mounting
2010 11	2416.011	0	Steel Pole, Concrete Barrier Base Mounted Without Gussets
2007 04	2418.010	1	1.8 m and 2.7 m Steel Truss Bracket for Steel Poles
2007 04	2420.01	4	1.8 m and 2.7 m Aluminum Tapered Elliptical Bracket
2005 11	2421.010	0	Lamp Wattage Label for Luminaire
2010 11	2428.01	3	Frangible Bases
2010 11	2432.010	1	Aluminum Pole - Base Mounted
2014 11	2440.010	1	Supply Control Cabinet Assembly Type 1, 120/240V, 100A, 1-Phase, 3-Wire
2014 11	2440.020	1	Supply Control Cabinet Assembly Type 2, 120/208V, 100A, 3-Phase, 4-Wire
2014 11	2440.021	0	Supply Control Cabinet Assembly Type 2, 347/600V, 100A, 3-Phase, 4-Wire
2014 11	2440.030	1	Supply Control Cabinet Assembly Type 1 and 2, Enclosure
2014 11	2440.04	1	Pole Mounting Bracket for Supply Control Cabinet Assembly



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2014 11	2440.050	1	Supply Control Cabinet Assembly Type 1 and 2, Dead Front Panels
2014 11	2440.060	1	Supply Control Cabinet Assembly Type 1 and 2, 3-Point Door Latch
2014 11	2440.061	0	Supply control Cabinet Assembly Type 1, 2, and 3, 3-Point Stainless Steel Door Handle
2014 11	2441.000	1	Supply Control Cabinet Assembly Type 3, 120/240V, 100A, 1-Phase, 3-Wire
2014 11	2441.010	1	Supply Control Cabinet Assembly Type 3, Enclosure
2014 11	2441.020	1	Supply Control Cabinet Assembly Type 3, Dead Front Panels
2014 11	2441.030	0	Supply Control Cabinet Assembly Type 3, 3-Point Door Latch
2015 11	2442.010	0	Duct Hanger
2003 11	2450.010	0	High Mast Lighting, 25, 30, and 35 m Octagonal Pole with Double Base Plate
2003 11	2450.011	0	High Mast Lighting Pole, 25, 30, and 35 m 8-Sided Pole
2003 11	2450.020	0	High Mast Lighting, 40 and 45 m Octagonal Pole with Double Base Plate
2003 11	2450.021	0	High Mast Lighting Pole, 40 and 45 m 12-Sided Pole
2003 11	2452.010	0	High Mast Lighting, 25, 30, and 35 m Round Pole with Double Base Plate
2003 11	2452.020	0	High Mast Lighting, 40 and 45 m Round Pole with Double Base Plate
2004 11	2453.000	0	High Mast Lighting Pole, Luminaire and Handhole Orientation
2003 11	2453.010	0	High Mast Lighting Pole, Cable Holder, and Storage Hook Details
2004 11	2453.020	0	High Mast Lighting Pole, Handhole Cover Hinges, Latches, and Padlock
2003 11	2453.050	0	High Mast Lighting Pole, Nameplate Details
2005 11	2453.060	0	High Mast Lighting Pole, Flood Light Luminaire Mounting Details
2006 11	2453.070	1	High Mast Lighting Pole, Luminaire Support Ring
2009 04	2453.080	1	High Mast Lighting Pole, Head Frame and Ring Assembly
2005 11	2453.090	0	High Mast Lighting Pole, Luminaire Shroud



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DATE	OPSD NO.	REV.	TITLE
2005 11	2453.091	0	High Mast Lighting Pole, Luminaire Shroud Details
2004 11	2453.140	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment - List of Components
2004 11	2453.150	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment - Layout
2004 11	2453.160	0	High Mast Lighting Pole, Internal Motor and Winch Details
2005 11	2453.170	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment, 347/600V, 3-Phase, Wiring Diagram
2005 11	2453.180	0	High Mast Lighting Pole, Internal Drive Raising and Lowering Equipment, 120/240V, 1-Phase, Wiring Diagram
2004 11	2453.190	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment - List of Components
2004 11	2453.200	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment - Layout
2005 11	2453.210	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment, 347/600V, 3-Phase, Wiring Diagram
2005 11	2453.220	0	High Mast Lighting Pole, External Drive Raising and Lowering Equipment, 120/240V, 1-Phase, Wiring Diagram
2003 11	2454.010	0	High Mast Lighting Pole, Double Base Plate Details
2003 11	2456.010	0	High Mast Lighting Pole Anchorage Assembly Details for Double Base Plate
2003 11	2456.011	0	High Mast Lighting Pole Anchorage Assembly Details
DIVISION 2500 - TRAFFIC SIGNALS			
2011 11	2500.010	1	600 mm Signal Arm and Signal Head
2009 11	2500.020	1	600 mm Signal Arm Attachment to Poles
2011 11	2501.01	2	Single Member Arm and Signal Head
2011 11	2501.02	2	Aluminum Single Member Arm Attachment Details
2007 11	2502.010	0	Traffic Signal, Adjustable Mid-Section Hanger
2007 11	2502.011	0	Traffic Signal, Dual-End Hanger
2014 11	2505.010	1	Traffic Signal, Pedestrian Head and Push Button Mounted on Pole
2011 11	2508.010	0	Traffic Signal, Sectional Steel Poles with Primary and Secondary Signal Heads for Ramp Metering
2012 11	2510.010	0	Pole Mounted Controller Cabinet



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STANDARD
SPECIFICATION**

**VOLUME 4 INDEX
MUNICIPAL AND PROVINCIAL COMMON
DRAWINGS FOR ELECTRICAL WORK**

DATE	OPSD NO.	REV.	TITLE
2011 11	2510.020	0	Mounting Bracket for Pole Mounted Controller Cabinet
2012 11	2514.010	0	Controller Cabinet on Pad
2012 11	2514.020	0	Concrete Pad for Controller Cabinet
2012 11	2516.102	0	Traffic Data Collection, Data Station, Traffic Counting Station Type 2
2012 11	2518.101	0	Prefabricated Detector Loop
2012 11	2518.102	0	Traffic Data Collection, Detector Loops, Heavy Duty Rubber
2012 11	2520.010	0	Loop Detector Installation Details I
2012 11	2520.02	4	Loop Detector Installation Details II
2007 11	2522.010	0	Traffic Signal, Cushion Hanger
2009 11	2524.01	1	Traffic Signal, Double Arm Bracket
2012 11	2526.01	1	Traffic Signal Bracket for Mounting Pedestrian Instruction Sign on Pole
2010 11	2528.01	2	Traffic Signal Equipment, Pole Wiring Diagram
2015 11	2529.010	1	Signal Wiring for Pedestrian Facilities
2012 11	2529.020	0	Signal Wiring Using 4/C Cable Connected Radially, 2 Phase
2012 11	2529.030	0	Signal Wiring Using 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.040	0	Signal Wiring Using 4/C and 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.050	0	Signal Wiring Using 4/C Cable Connected Radially, 2 to 8 Phase
2012 11	2529.060	0	Signal Wiring Using 4/C Cable Connected Radially, and 12/C Cable Tapped, 2 to 8 Phase
2012 11	2529.070	0	Signal Wiring Using 19/C Cable Tapped, 2 to 8 Phase
2012 11	2529.080	0	Signal Wiring Using 7/C Cable Connected Radially T-Intersection, 2 to 3 Phase
2012 11	2529.090	0	Signal Wiring Using 4/C Cable Connected Radially T-Intersection, 2 Phase
2013 11	2530.01	1	Splices for Traffic Signal Cable and Extra Low Voltage Cable
2015 11	2536.010	2	Flasher Beacons for Roadway Sign and Downlight and Wiring Diagram



**ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION**

**VOLUME 4 INDEX
MUNICIPAL AND PROVINCIAL COMMON
DRAWINGS FOR ELECTRICAL WORK**

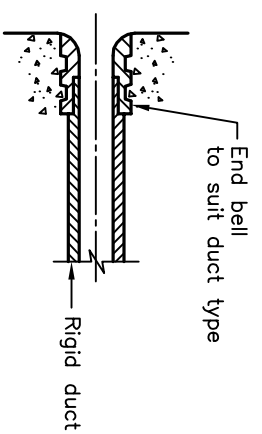
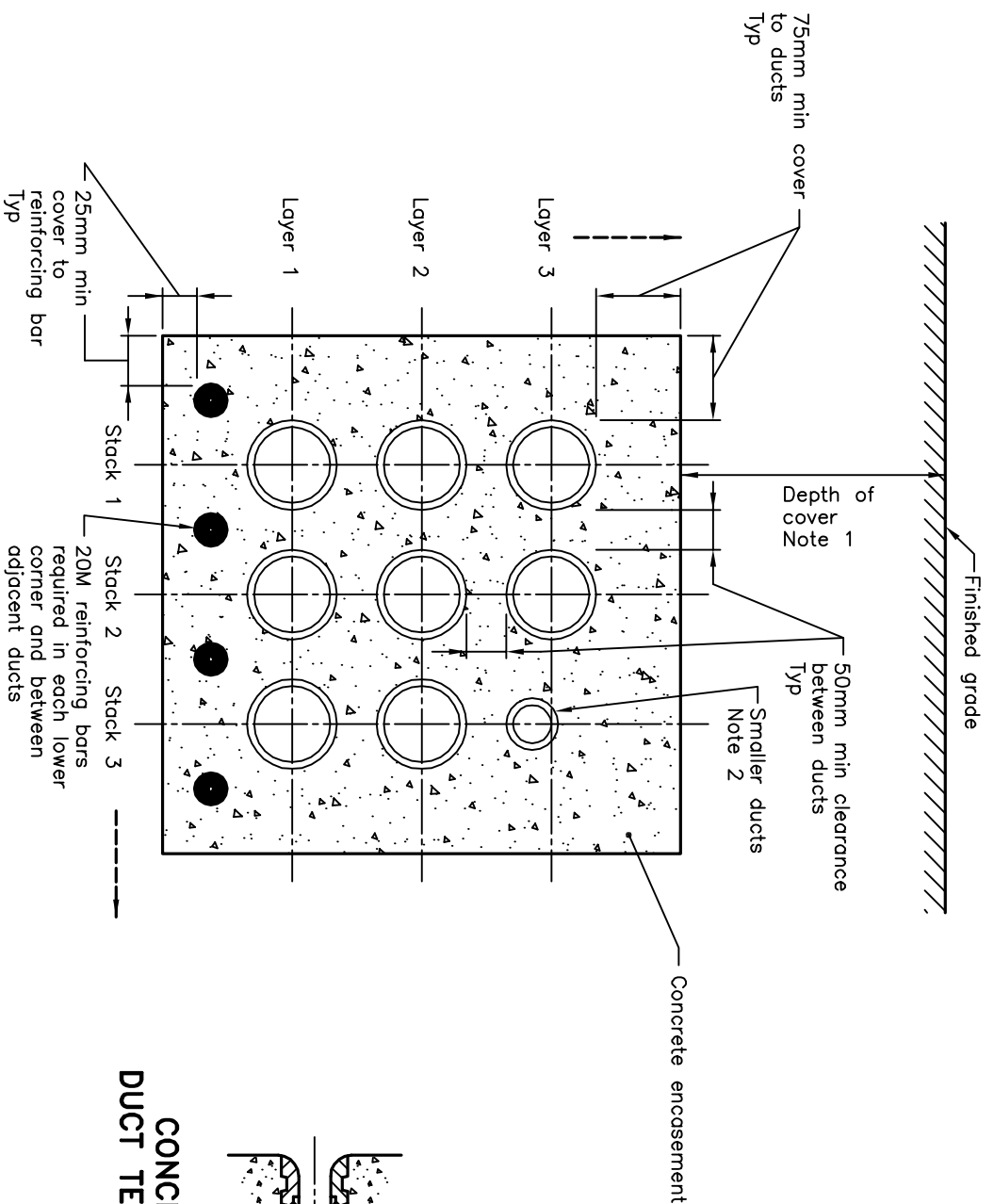
DATE	OPSD NO.	REV.	TITLE
2015 11	2536.030	0	Solar Powered LED Flasher Beacon and Wiring Diagram for Roadway Sign, Base Mounted Pole
2015 11	2536.032	0	Solar Powered LED Flasher Beacon and Wiring Diagram for Roadway Sign, Direct Buried Pole
2013 11	2540.01	4	Aerial Traffic Signal Installation
2013 11	2540.02	2	Aerial Flasher Beacon Installation
2013 11	2540.030	0	Aerial Suspension Mounting Bracket, Signal Heads and Flashing Beacons
2009 11	2540.100	0	Aerial Suspension Mounting Bracket, Emergency Pre-Emption Unit
2012 11	2545.01	1	PVC Junction Box for Signal Cable Splicing
2014 11	2547.010	1	Traffic Signal and Illumination Grounding System
2011 11	2552.01	2	Traffic Signal System Equipment on Wooden or Concrete Poles, Overhead Wiring Installation
2011 11	2554.010	0	Traffic Signal System Equipment on Wooden or Concrete Poles, Underground Wiring Installation
2014 11	2558.000	0	Pole for Accessible Pedestrian Signal Push Button

DIVISION 26 - SIGN LIGHTING

CURRENTLY NO DRAWINGS

DIVISION 29 – ADVANCED TRAFFIC MANAGEMENT SYSTEM (ATMS)

2015 11	2902.322	0	Advanced Traffic Management System, Supply Control Cabinet, 120V, 100A, 1-Phase, 3 Wire
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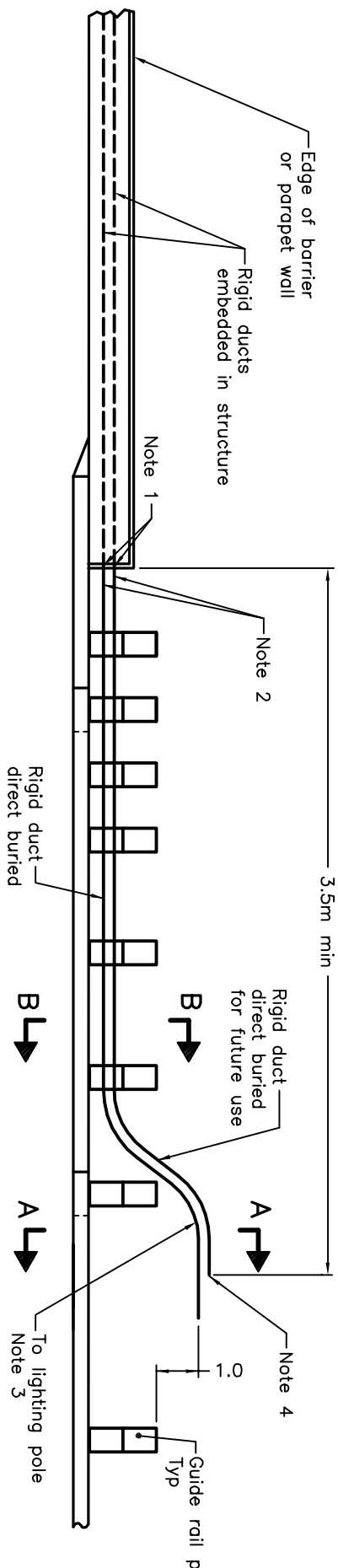


NOTES:

- 1 For depth of cover see OPSD 2103.02.
- 2 Smaller ducts shall be installed in uppermost layers.
- A Maximum number of layers shall be 4, maximum number of stacks shall be 4.
- B All dimensions are in millimetres unless otherwise shown.

SECTION

ONTARIO PROVINCIAL STANDARD DRAWING			
RIGID DUCTS ENCASED IN CONCRETE		Nov 2015	Rev 2
OPSD 2100.06		OP ONTARIO PROVINCIAL STANDARDS ASSOCIATION	

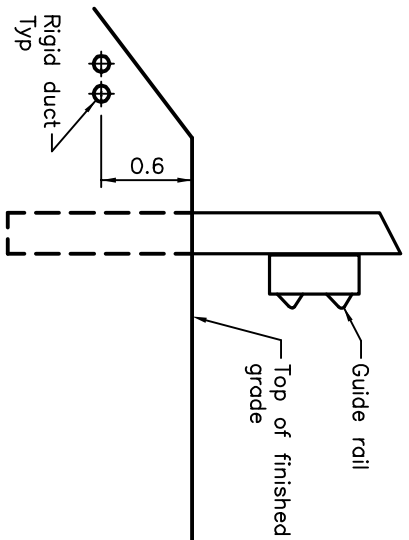


PLAN

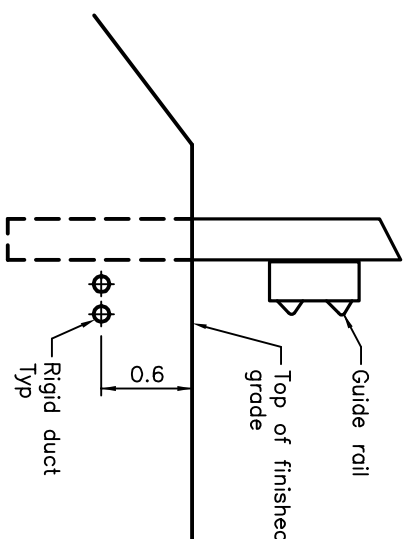
DUCT EXTENSION AT END OF STRUCTURE

NOTES:

- 1 Buried ducts shall be connected to the embedded ducts at end of structure. Refer to Contract Documents for the termination detail of the embedded ducts. Hand dig or hydrovac to expose termination of embedded ducts.
 - 2 Expansion and deflection fitting assemblies shall be installed along straight section of buried ducts within 0.3m of structure. Provide local loose expanded polystyrene foam fill bedding for the fitting assembly.
 - 3 Extend the fish wire and trace wire through the duct to the pole handhole.
 - 4 Terminate the rigid duct direct buried behind the guide rail, 600mm below grade. Extend the fish wire and trace wire through and plug the end of the duct.
- A All dimensions are in metres unless otherwise shown.

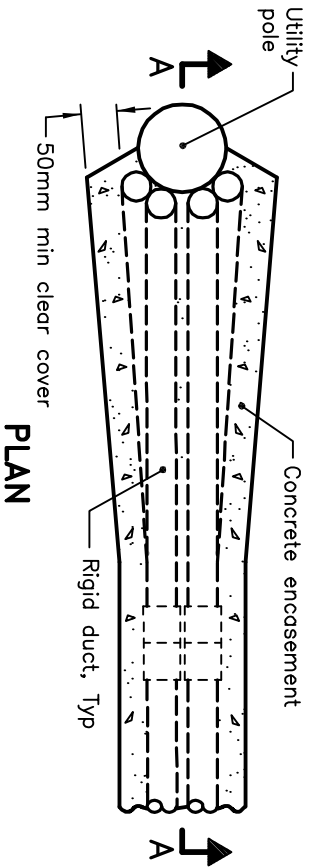


SECTION A-A

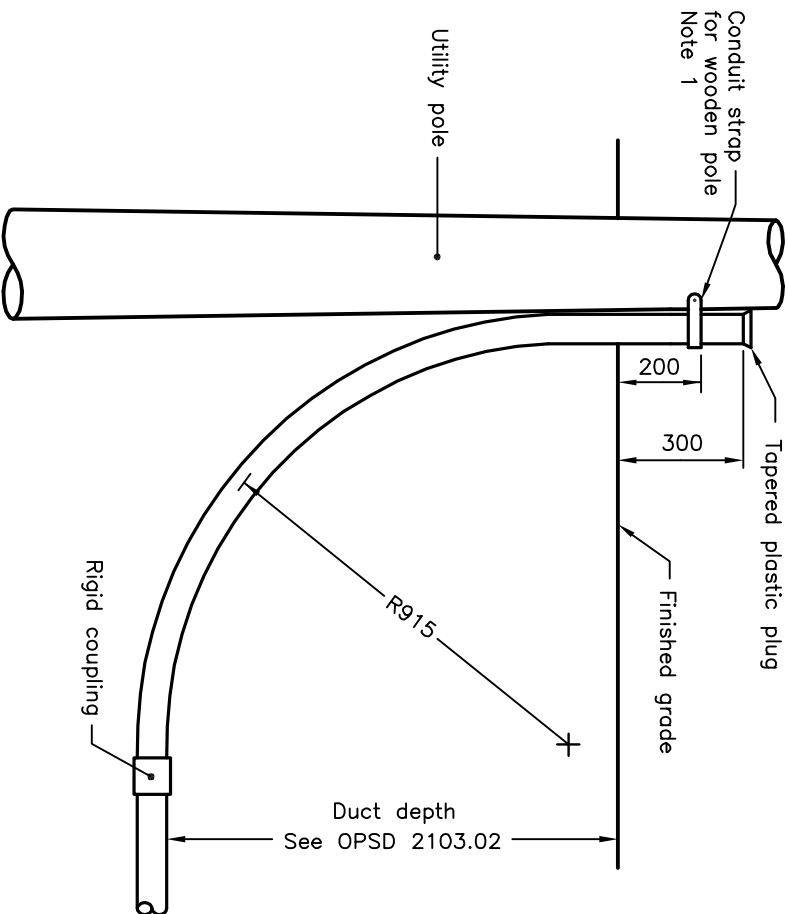
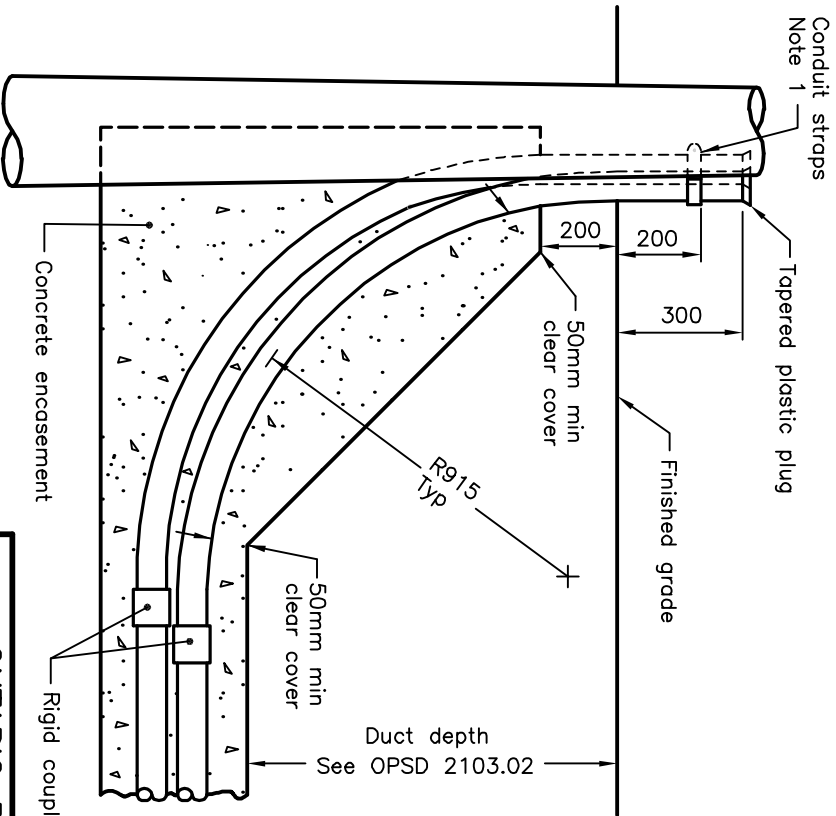


SECTION B-B

ONTARIO PROVINCIAL STANDARD DRAWING			Nov 2015	Rev 0		
UNDERGROUND RIGID DUCT CONNECTION AT CONCRETE STRUCTURE WITHOUT EXPANSION JOINT						
OPSD 2102.020						



PLAN



DIRECT BURIED DUCT

NOTES:

- 1 For other than wooden poles, stainless steel banding shall be used.
- A Size and number of ducts shall be as specified.
- B This OPSD shall be read in conjunction with OPSD 2100.06 and 2101.01.
- C All dimensions are in millimetres unless otherwise shown.

SECTION A-A
CONCRETE ENCASED DUCT

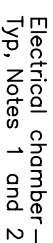
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015 Rev 0

RIGID DUCT TERMINATION
FOR HIGH VOLTAGE CABLES
AT UTILITY POLES

OPSD 2103.010





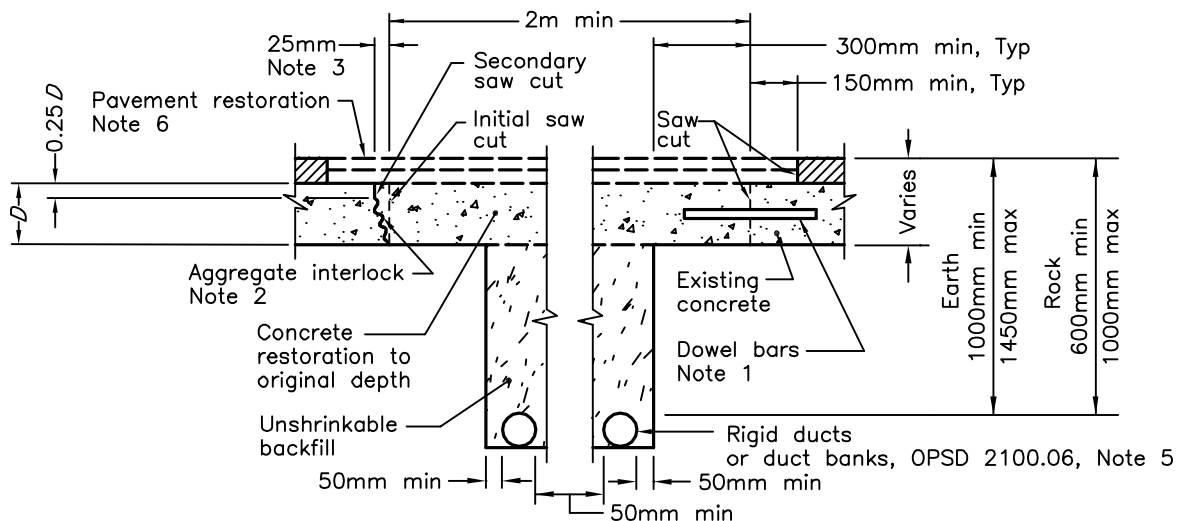
NOTE 5

1 Type and size of electrical chambers shall be as specified.

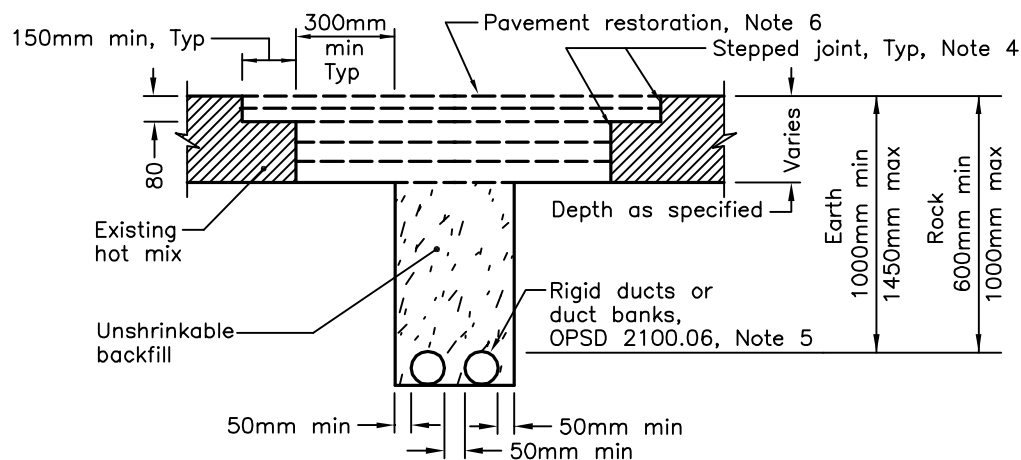
- A All dimensions are in millimetres unless otherwise shown.

Nov 2015	Rev	1	

OPSD 2103.02



UNDOWELLED TREATMENT, NOTE 2 DOWELLED TREATMENT, NOTE 1
COMPOSITE OR CONCRETE PAVEMENT



NOTES:

BITUMINOUS PAVEMENT

- 1 Dowelled treatment is only required in existing concrete pavement or concrete base that contains load transfer devices. Dowels shall be 32mm diameter, 450mm long, epoxy coated, installed at 300mm intervals at mid depth of the concrete slab, in plane to the pavement surface, parallel to the centre line of the road, and set 225mm in 35mm holes with epoxy grout.
- 2 Undowelled treatment is only required in existing concrete pavement or concrete base that is constructed without load transfer devices at joints. Aggregate interlock is created by chipping the vertical concrete face with a light 15kg maximum pneumatic hammer.
- 3 The initial saw cut shall be full depth. The secondary saw cut shall be 1/4 of existing pavement depth with 25mm of chipping for aggregate interlock.
- 4 Where existing pavement depth is between 80 and 120mm, the 150mm wide stepped joint shall be 40mm deep.
- 5 In rock, the ducts shall be placed on 150mm sand bedding.
- 6 Bituminous pavement restoration shall match existing type unless otherwise specified. The surface and top binder courses shall be placed in 40mm lifts with other lifts placed at 80mm maximum.

A All voids below the pavement shall be filled with unshrinkable backfill.

B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

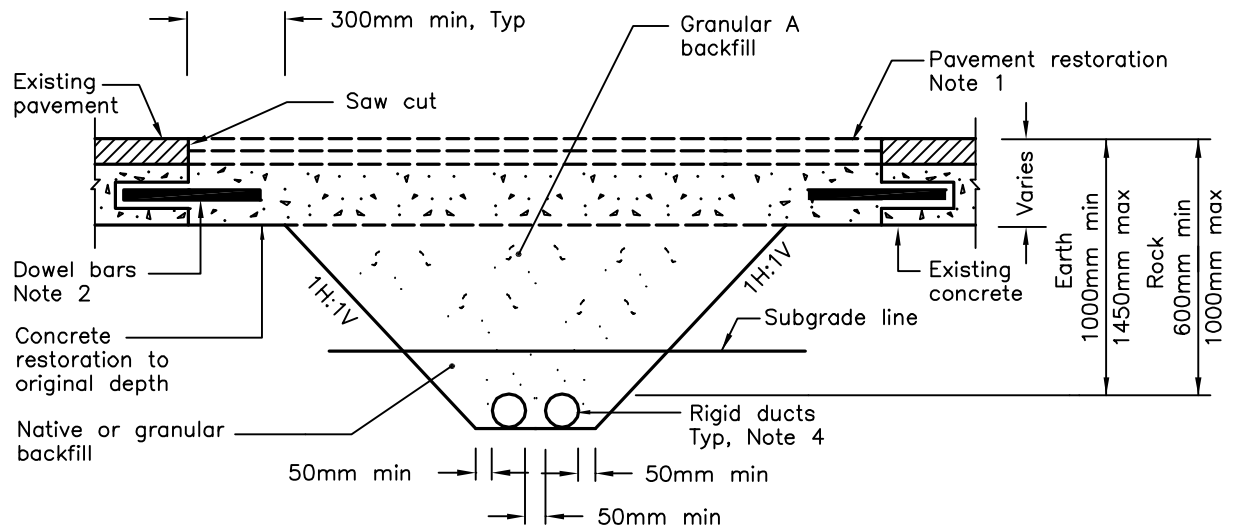
Nov 2015

Rev 1

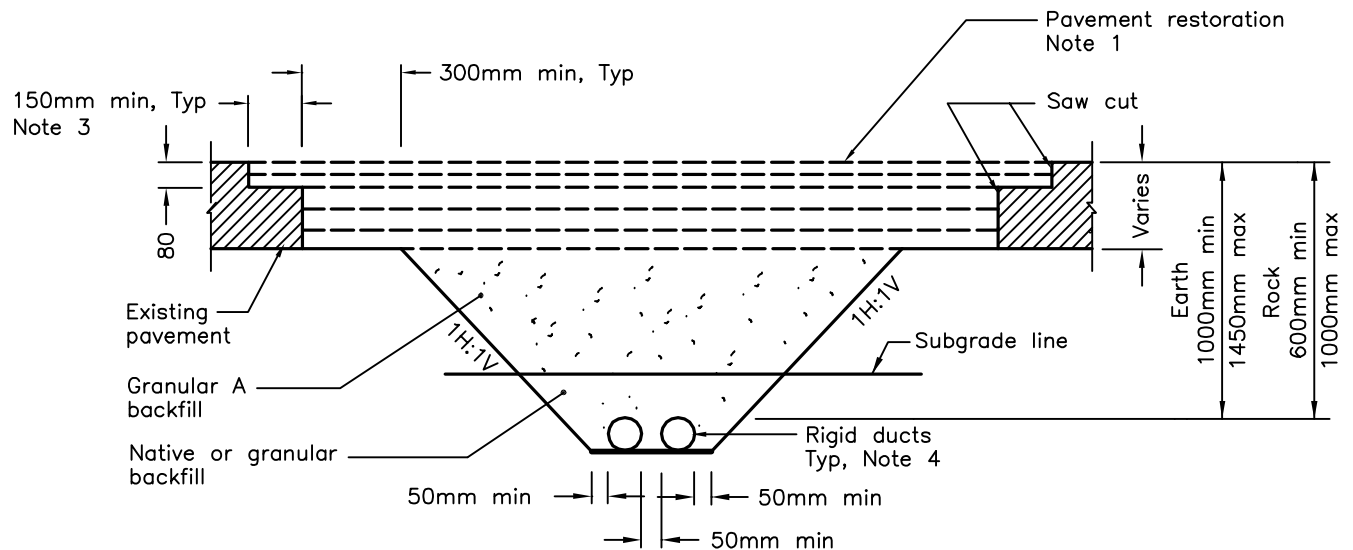
**RIGID DUCT INSTALLATION
 IN EXISTING PAVED AREA
 UNSHRINKABLE BACKFILL METHOD**

OPSD 2103.030





COMPOSITE OR CONCRETE PAVEMENT



BITUMINOUS PAVEMENT

NOTES:

- 1 Bituminous pavement restoration shall match existing type unless otherwise specified. The surface and top binder courses shall be placed in 40mm lifts with other lifts placed at 80mm maximum.
 - 2 Dowel bars are required only in concrete base or pavement with load transfer devices at joints. Dowels shall be 32mm diameter, 450mm long, epoxy coated, installed at 300mm intervals, centred vertically in concrete base, and set 225mm in 35mm holes with epoxy grout. Dowels shall be aligned parallel to the longitudinal axis of the pavement.
 - 3 Where existing pavement depth is between 80 and 120mm, the 150mm wide step joint shall be 40mm deep.
 - 4 In rock, the ducts shall be placed on 150mm sand bedding.
- A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

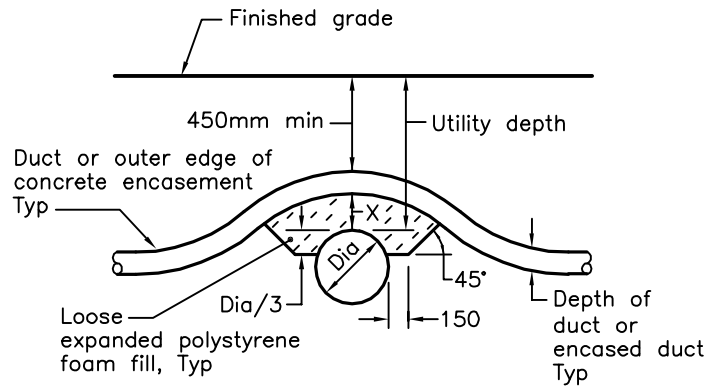
Nov 2015

Rev 0

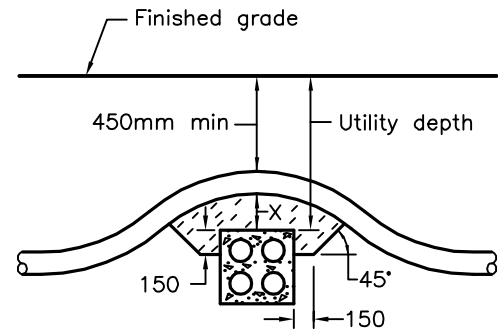
**RIGID DUCT INSTALLATION
IN EXISTING PAVED AREA
GRANULAR BACKFILL METHOD**



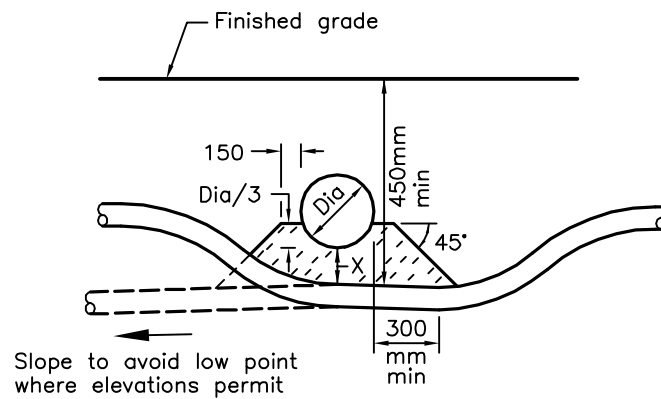
OPSD 2103.040



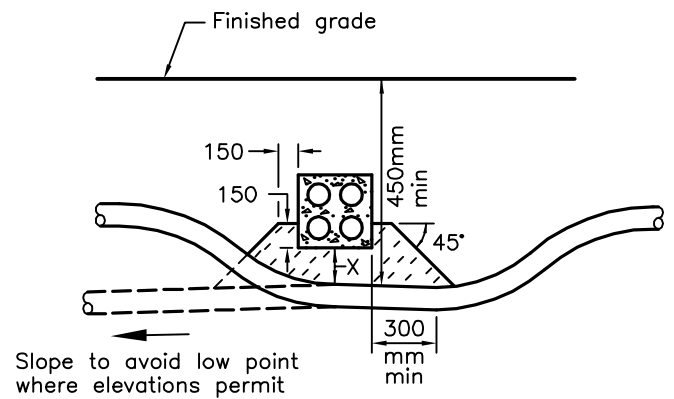
CROSSING OVER UTILITY



CROSSING OVER CONCRETE ENCASED UTILITY



CROSSING UNDER UTILITY



CROSSING UNDER CONCRETE ENCASED UTILITY

NOTES:

A The required clearance between the utility and the ducts or concrete encasement shall be as follows:

UTILITY	X mm min
Ducts, direct buried or encased	100
All other pipes	300
High voltage cables	300
All other cables	300

B Trench widths shall be kept to the minimum required for working space. Manual excavation and backfill methods shall be used with the utility supported in place, when required, when crossing under a utility is necessary.

C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

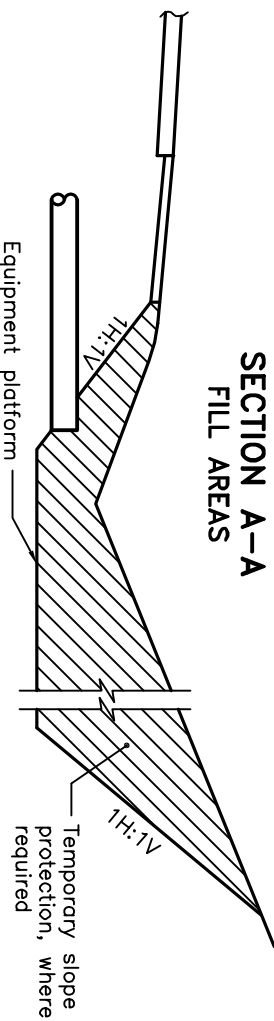
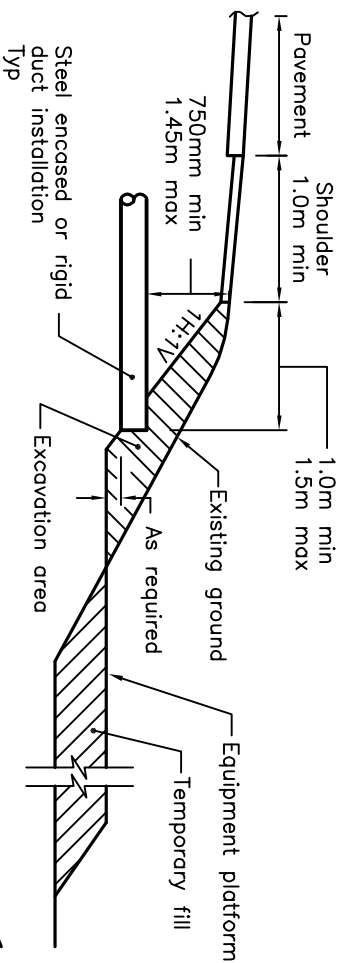
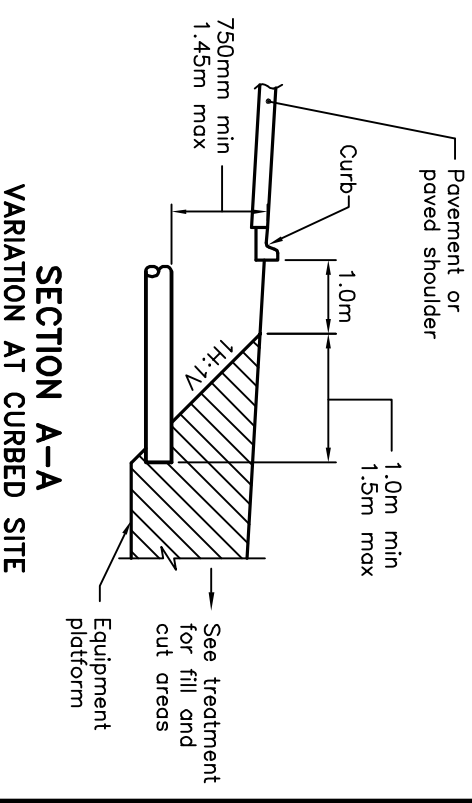
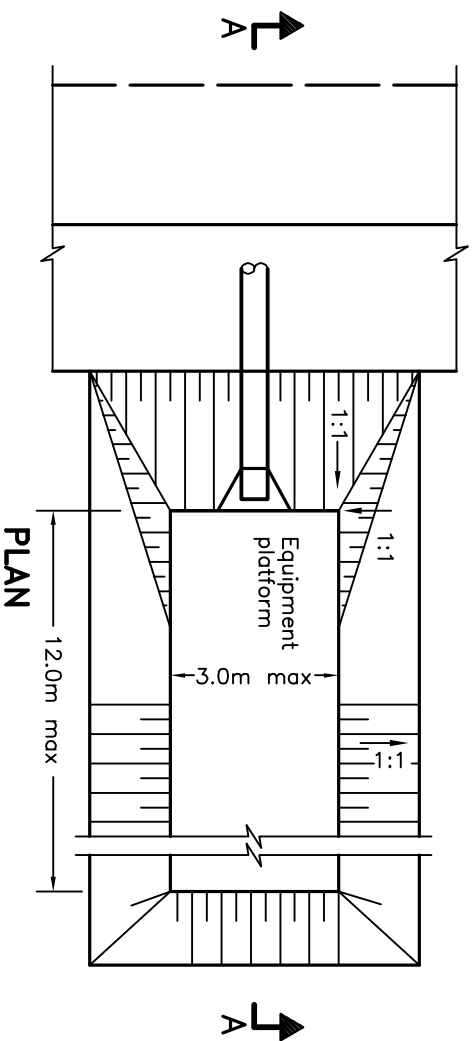
Nov 2015

Rev 0

**DUCT INSTALLATION
AT UTILITY CROSSINGS**



OPSD 2103.050



NOTES:
A All dimensions are in millimetres unless otherwise shown.

SECTION A-A CUT AREAS

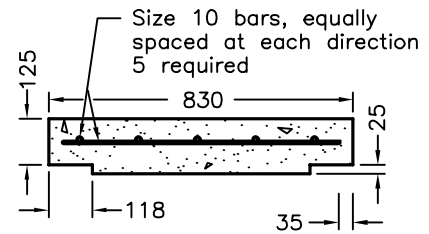
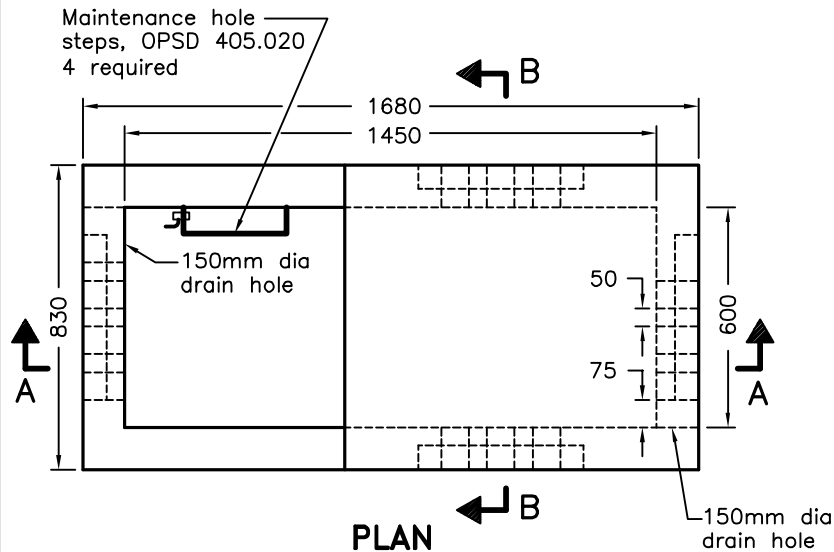
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015 Rev 0

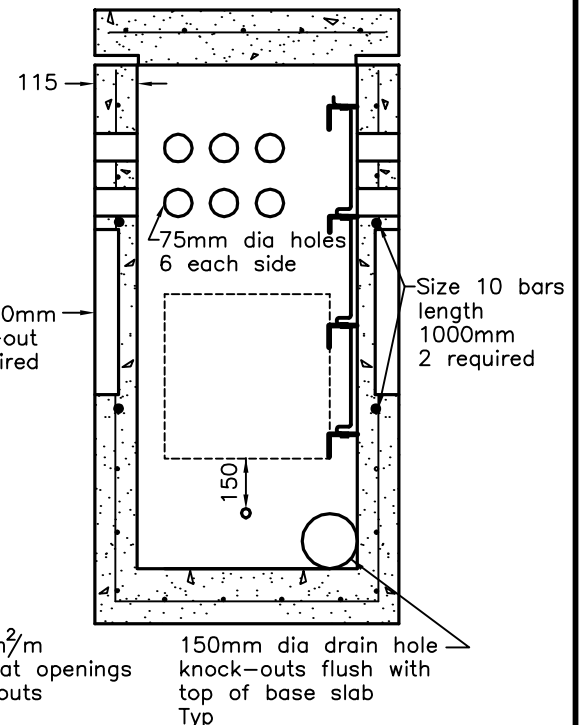
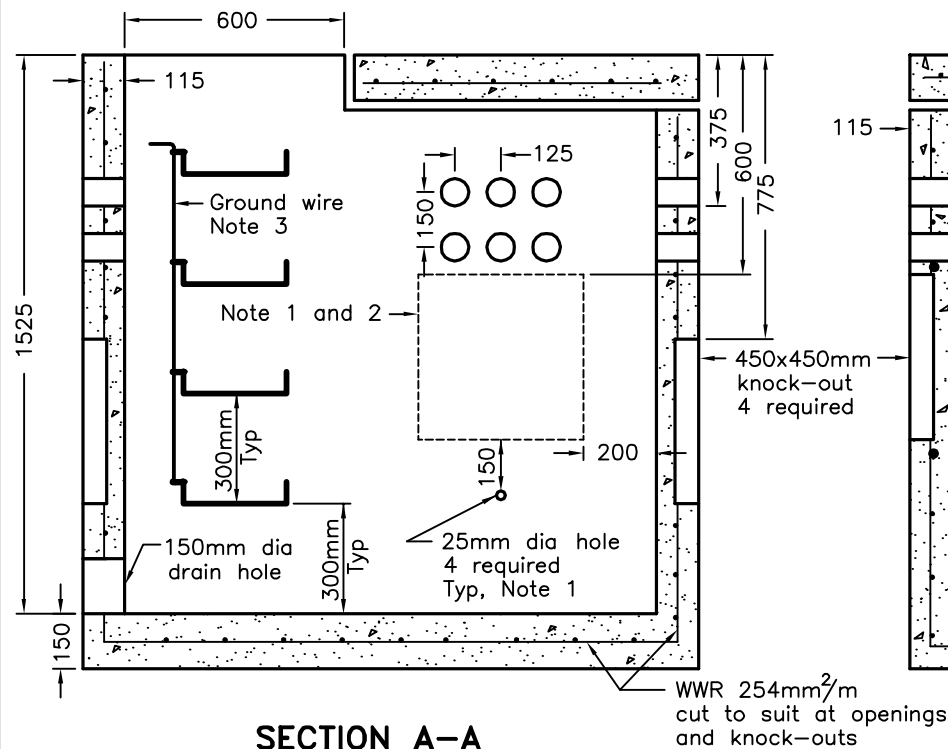
AUGERING PITS FOR SUBSURFACE INSTALLATION OF DUCTS AND ENCASEMENTS

OPSD 2103.060





CAP DETAIL



NOTES:

- 1 For general installation details see OPSD 2117.01.
- 2 For duct installation profiles see OPSD 2103.02.
- 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

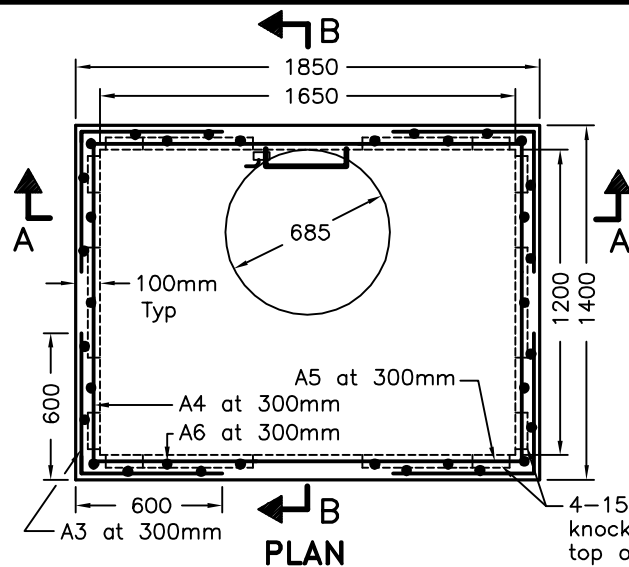
Nov 2015

Rev 1

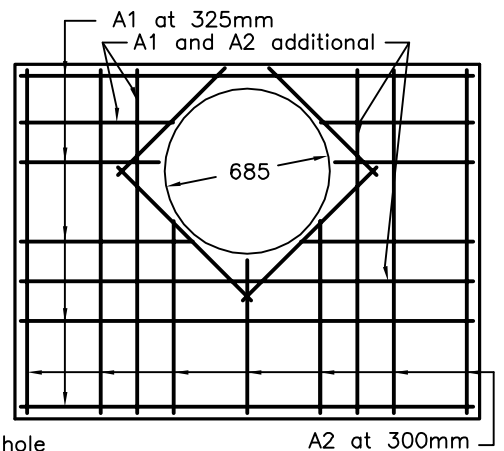
**ELECTRICAL MAINTENANCE HOLE
PRECAST CONCRETE
600 x 1450mm**

OPSD 2111.020

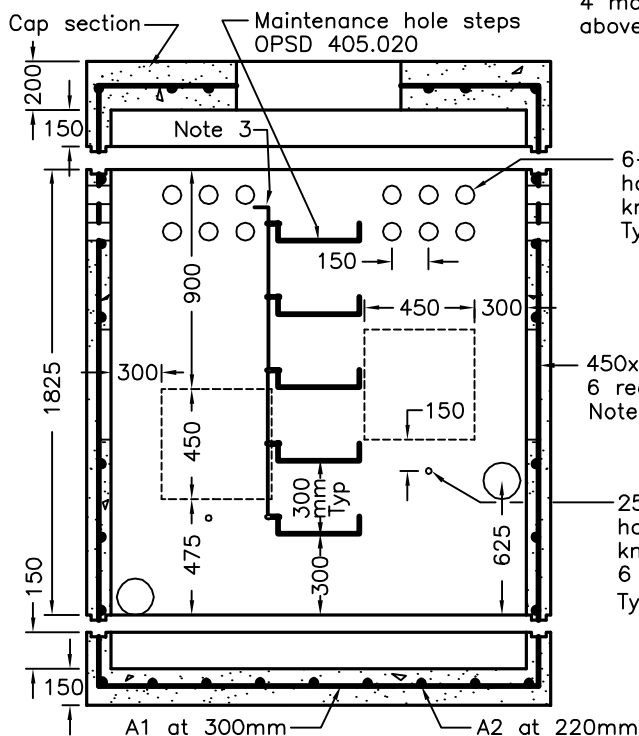




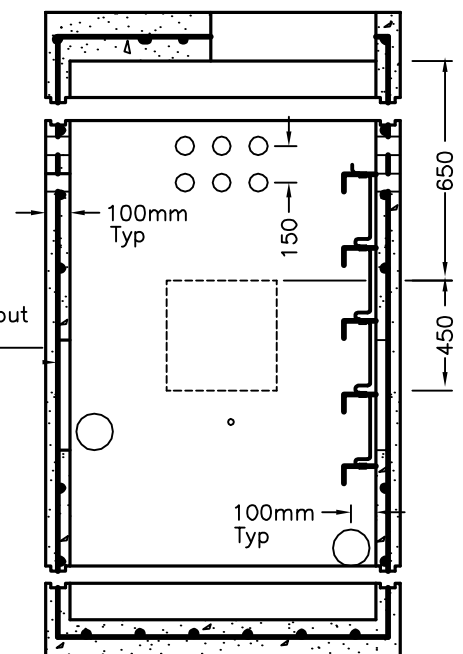
PLAN



**PLAN
CAP SECTION**



SECTION A-A



SECTION B-B

NOTES:

- 1 For general installation details see OPSD 2117.01.
 - 2 For duct installation profiles see OPSD 2103.02.
 - 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

REINFORCING TABLE					
Mark	Quant	Size	Length m	Mass kg	Detail
A1	13	10	2.15	21.94	
A2	18	10	1.68	23.74	
A3	24	15	1.2	45.21	
A4	12	10	1.83	17.24	
A5	12	15	1.72	32.40	Straight
A6	34	10	1.77	47.24	Straight

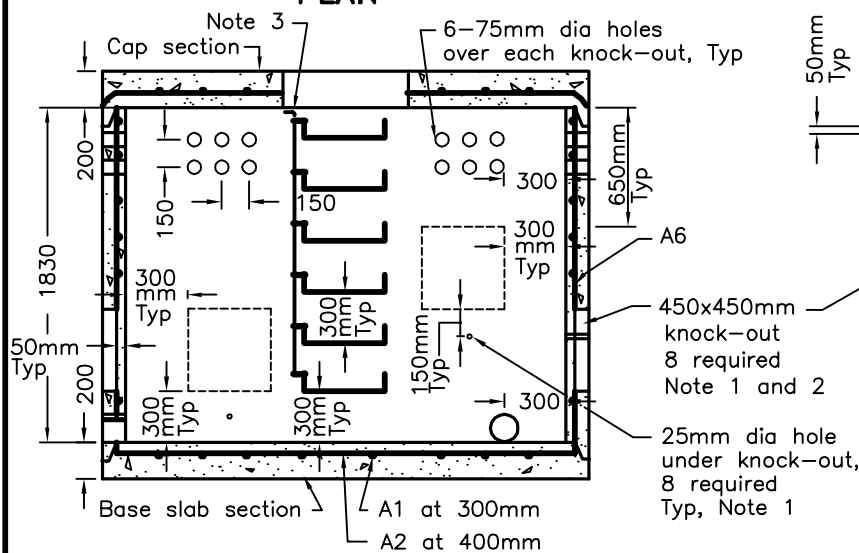
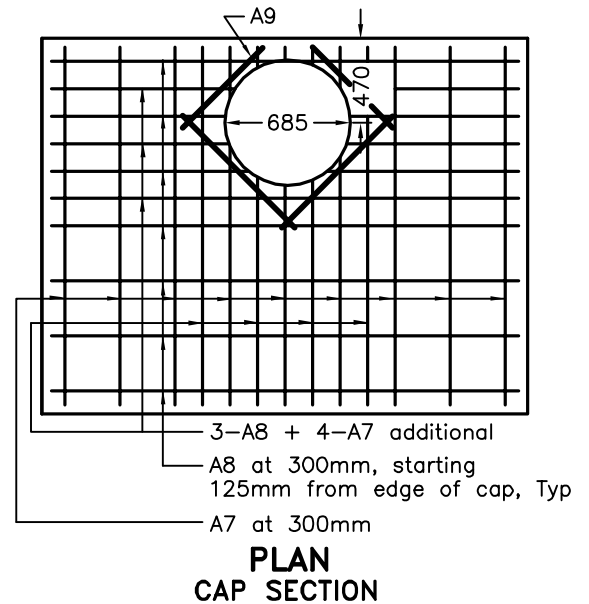
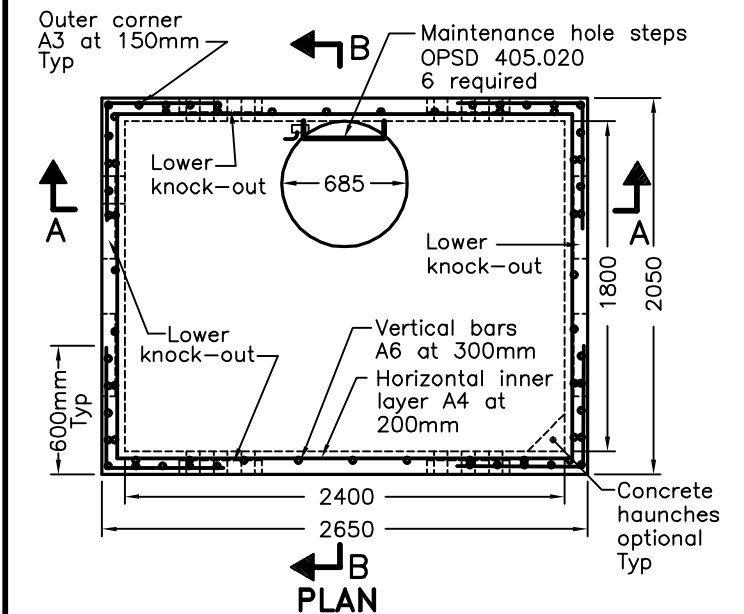
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015 Rev 1

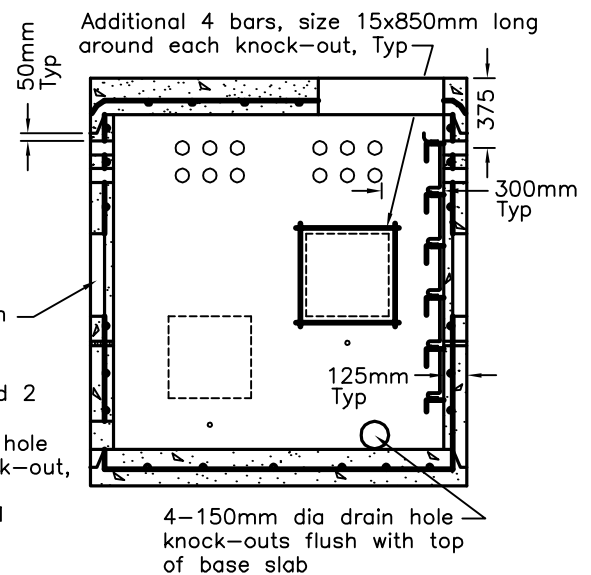
**ELECTRICAL MAINTENANCE HOLE
PRECAST CONCRETE
1200 x 1650mm**

OPSD 2111.040





SECTION A-A



SECTION B-B

NOTES:

- 1 For general installation details see OPSD 2117.01.
 - 2 For duct installation profiles see OPSD 2103.02.
 - 3 1/0 AWG stranded copper bare wire shall be fastened to steps using aluminum parallel groove clamps and anti-oxidant component.
- A Minimum cover for reinforcing steel shall be 35mm external surface, 25mm internal surface.
- B All reinforcing bars shall be cut to suit openings.
- C All dimensions are in millimetres unless otherwise shown.

REINFORCING TABLE					
Mark	Quant	Size	Length (m)	Mass (kg)	Detail
A1	10	15	2.48	38.62	Straight
A2	6	15	1.86	17.52	Straight
A3	52	15	1.2	17.97	
A4	20	20	2.45	115.4	Straight
A5	20	20	2.51	118.22	
A6	36	10	1.78	50.3	Straight
A7	13	15	2.82	57.55	
A8	10	15	2.22	34.85	
A9	4	15	1.0	6.28	Straight

ONTARIO PROVINCIAL STANDARD DRAWING

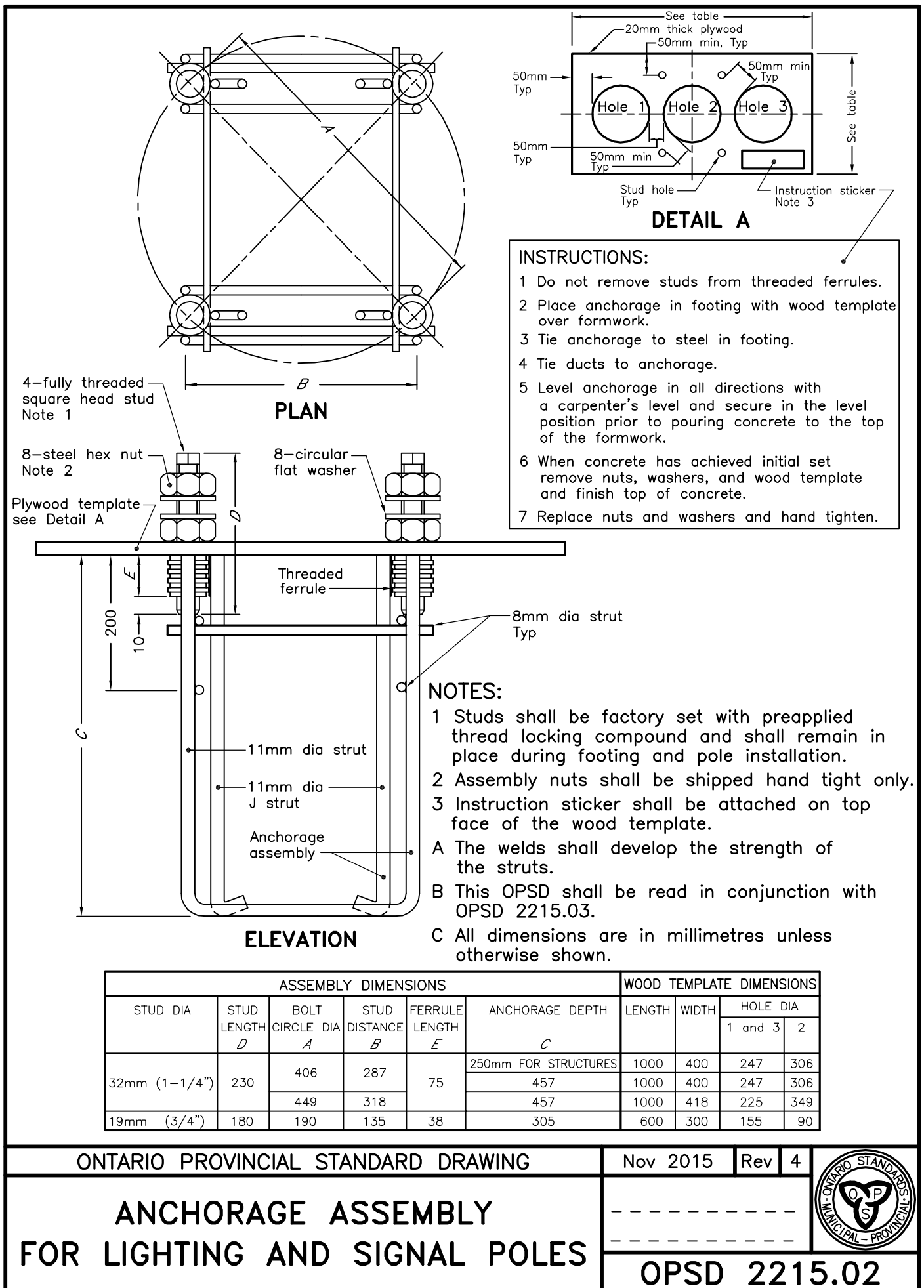
Nov 2015

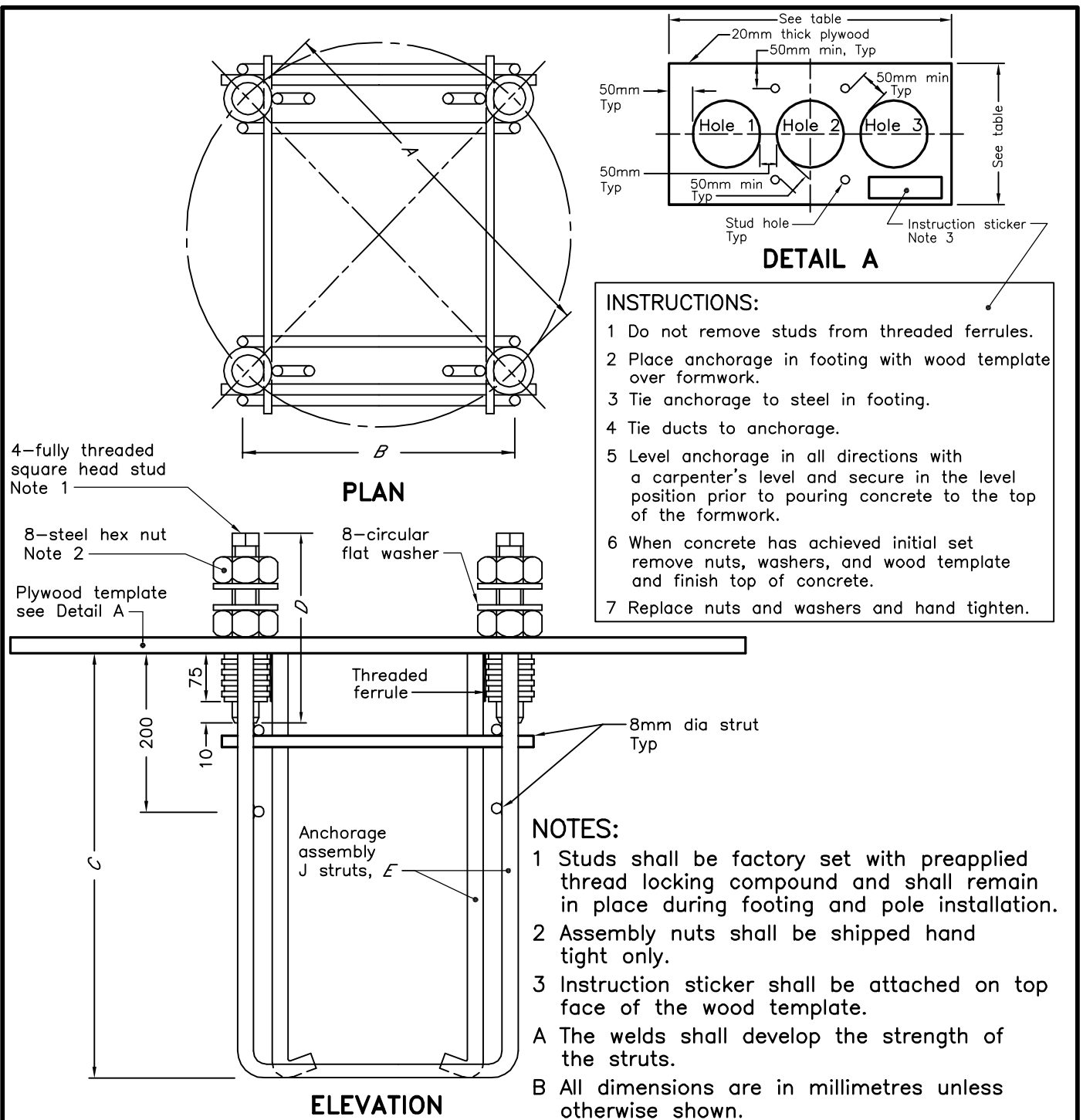
Rev 1

ELECTRICAL MAINTENANCE HOLE
PRECAST CONCRETE
1800 x 2400mm



OPSD 2111.050





POLE		ASSEMBLY DIMENSIONS					WOOD TEMPLATE DIMENSIONS			
LENGTH m	STUD DIA	BOLT CIRCLE DIA A	STUD DISTANCE B	ANCHORAGE DEPTH C	STUD LENGTH D	J STRUT DIA E	LENGTH	WIDTH	HOLE DIA	
10.5	38mm (1-1/2")	449	318	457	285	12.7	1000	418	1 and 3	2
9.0									225	349
7.5	32mm (1-1/4")	449	318	457	265	11	1000	418	225	349
6.0									225	349

ONTARIO PROVINCIAL STANDARD DRAWING

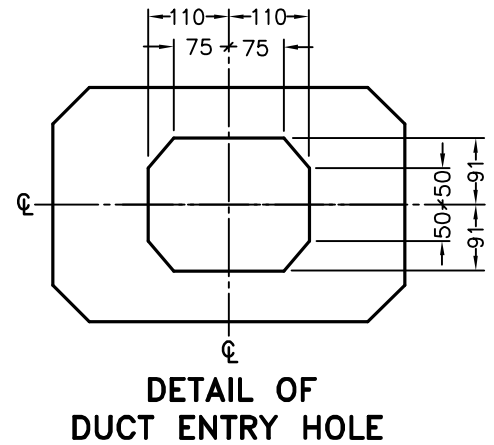
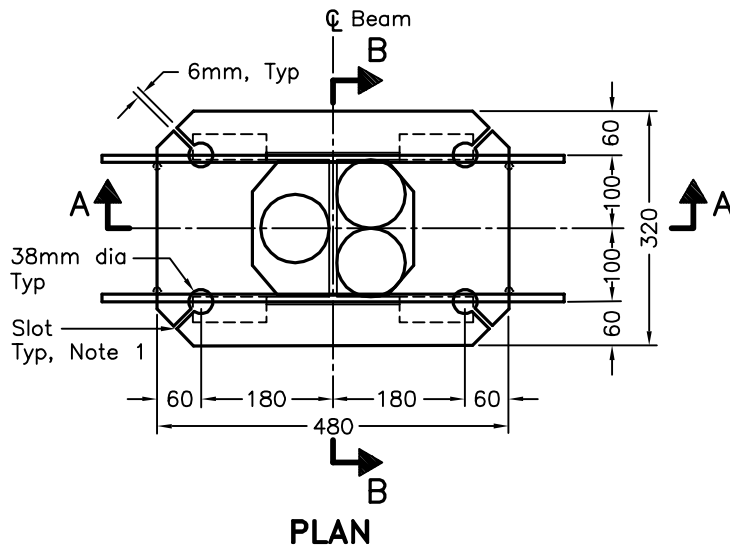
Nov 2015

Rev 0

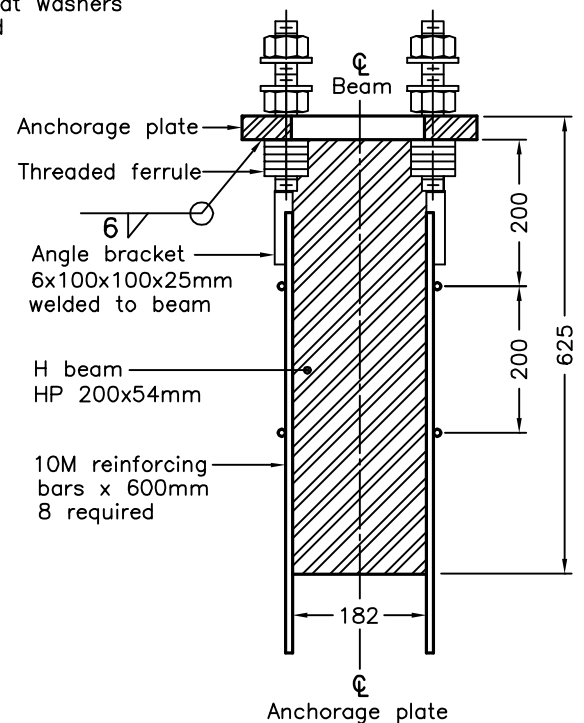
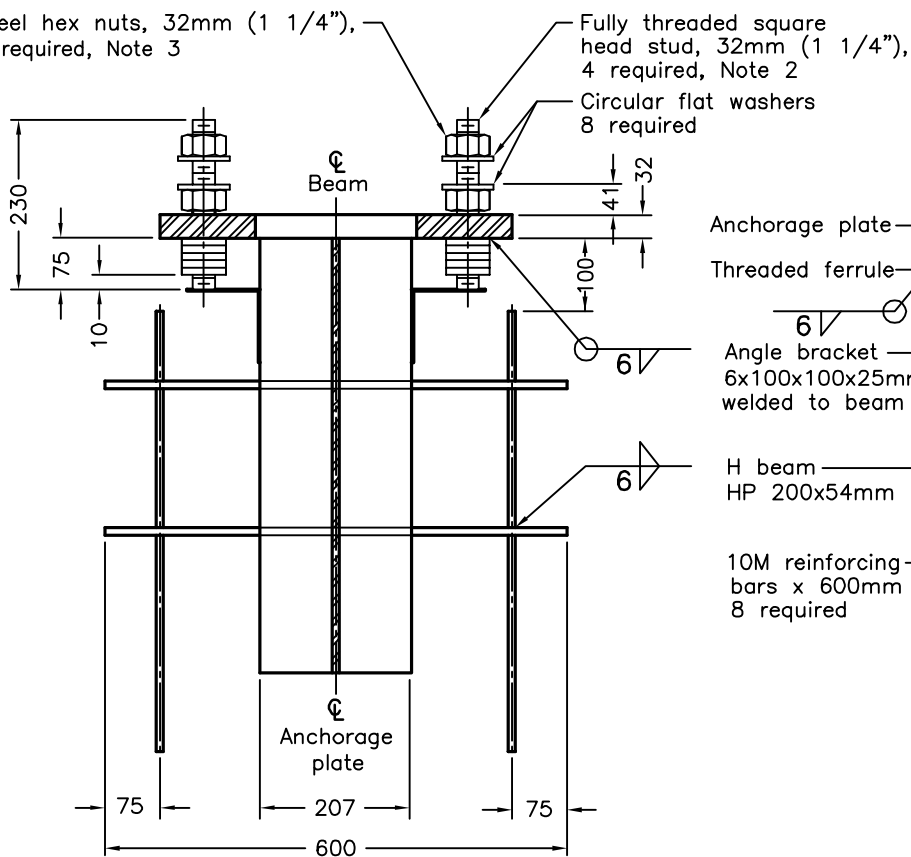
**ANCHORAGE ASSEMBLY
FOR HEAVY CLASS STEEL POLE AND
SECTIONAL STEEL POLE**



OPSD 2215.025



Steel hex nuts, 32mm (1 1/4"),
8 required, Note 3



NOTES:

- 1 6mm slots to bolt holes, when required, for steel cutting purposes only.
- 2 Studs shall be factory set in ferrule with preapplied thread locking compound.
- 3 Assembly nuts shall be shipped hand tightened only.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING

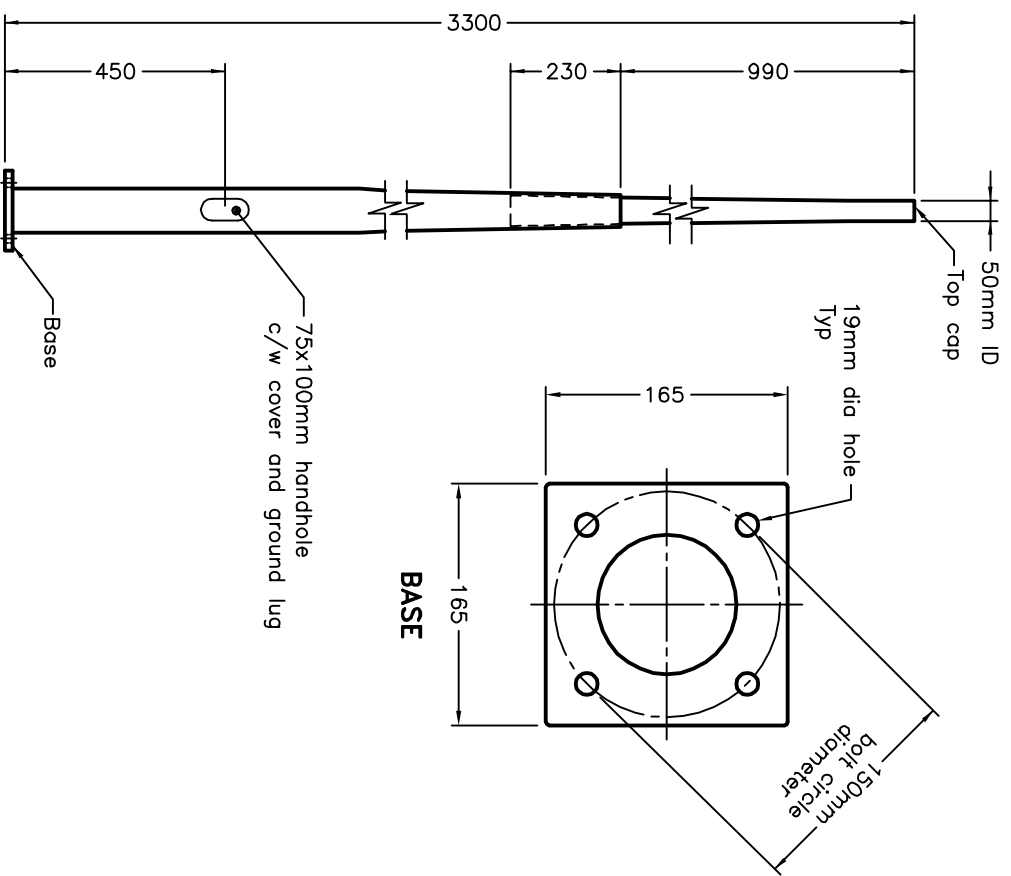
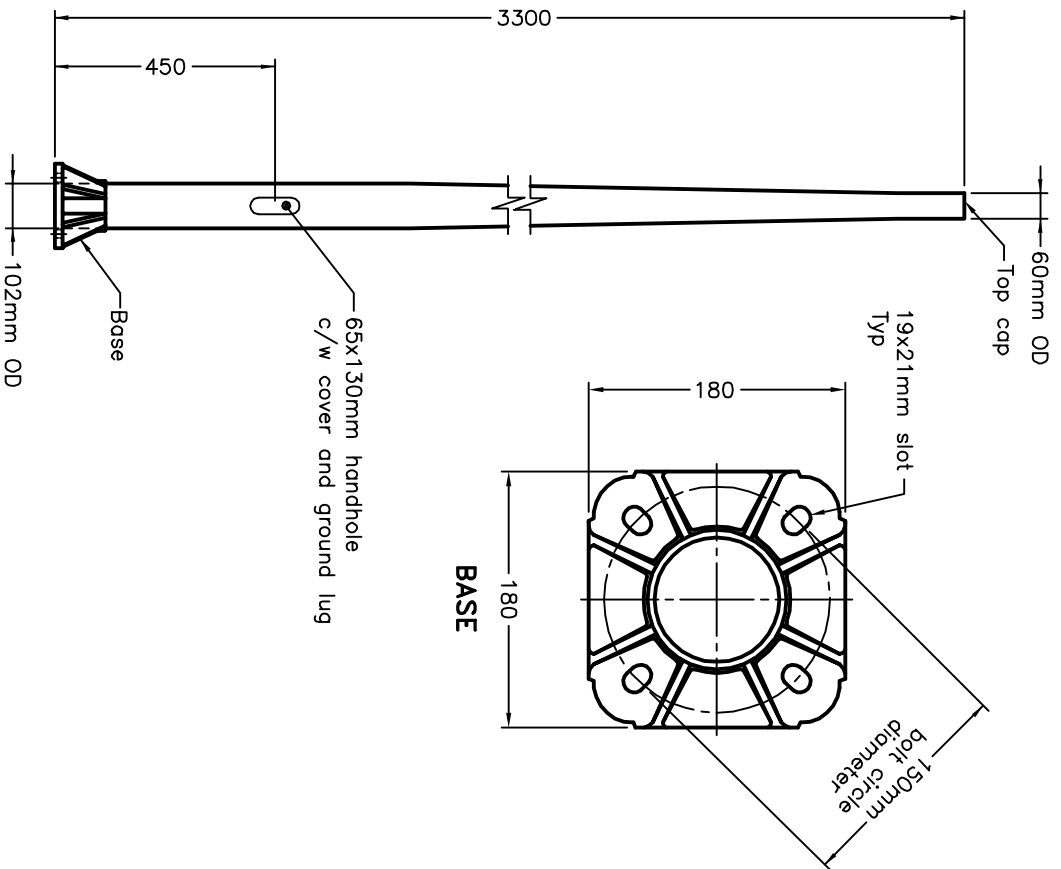
Nov 2015

Rev 2

ANCHORAGE ASSEMBLY
FOR
POLE FOOTING IN CONCRETE BARRIER

OPSD 2216.010





ALUMINUM POLE

SECTIONAL STEEL POLE

NOTES:

- A This OPSP shall be read in conjunction with OPSP 2200.04.
B All dimensions are in millimetres unless otherwise shown.

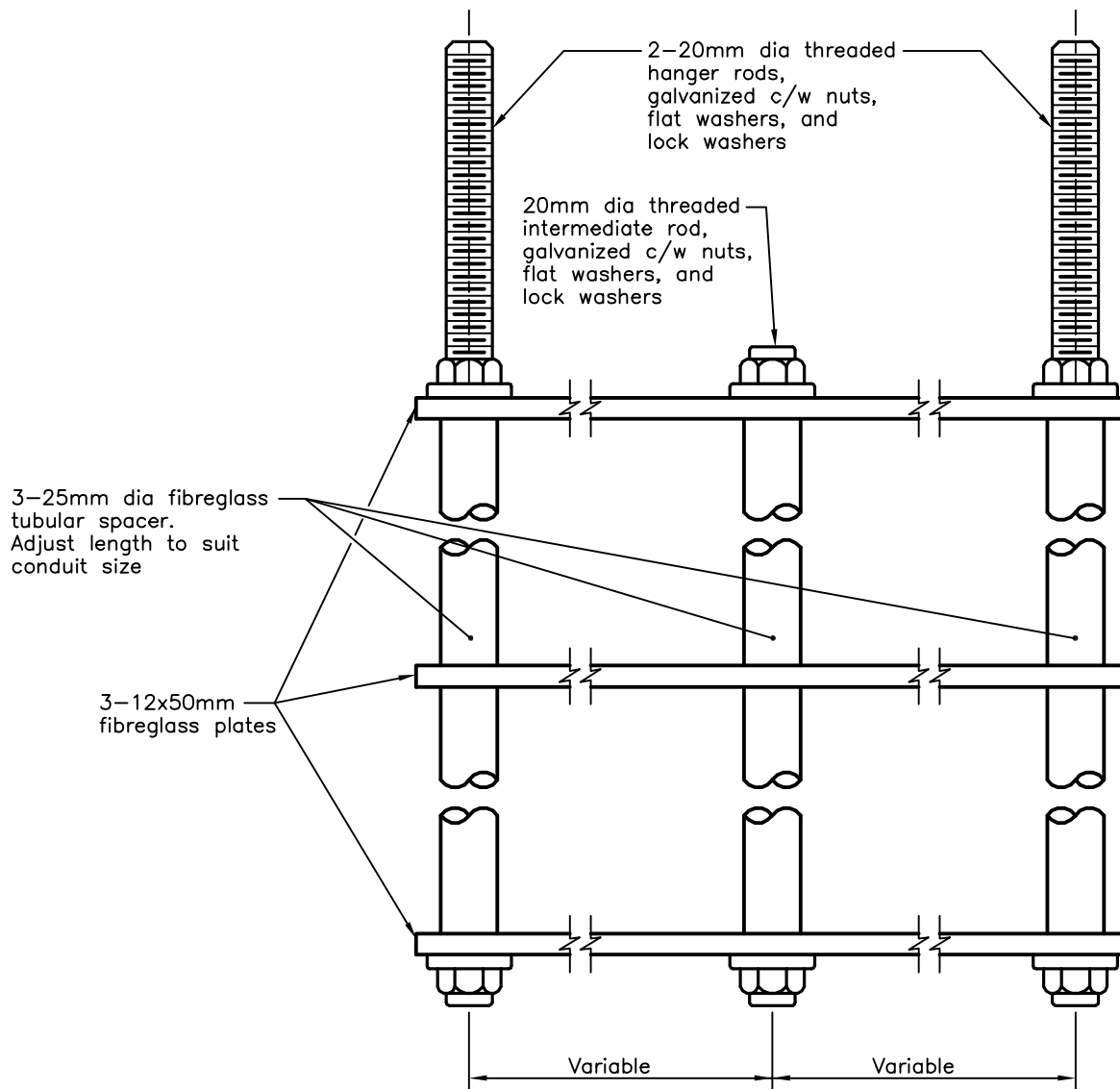
ONTARIO PROVINCIAL STANDARD DRAWING

Nov 2015 Rev 0

3.3m ALUMINUM AND SECTIONAL
STEEL POLES, BASE MOUNTED

OPSP 2414.010





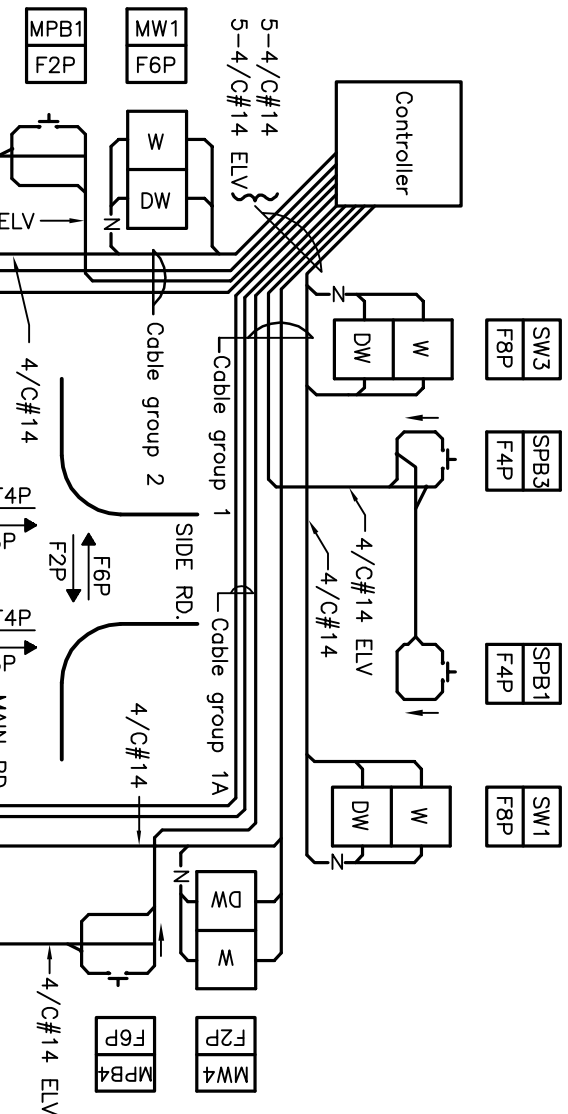
NOTES:

- A Arrange hanger system to accommodate duct arrangement in trench.
- B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev	0	
DUCT HANGER		-----			

		OPSD 2442.010			

Cond #	Colour/Mark	Cable Group 1	Cable Group 2	Cable Group 1A
1	White	Neutral	Neutral	
2	Red	DW[MW2,MW4]	DW[MW3,MW1]	
3	Yellow	Not Used, Note 1	Not Used, Note 1	
4	Blue	W[MW2,MW4]	W[MW3,MW1]	
1	White	Neutral	Neutral	
2	Red	DW[SW3,SW1]	DW[SW2]	DW[SW4] Note 3
3	Yellow	Not Used, Note 1	Not Used, Note 1	Not Used, Note 1&3
4	Blue	W[SW3,SW1]	W[SW2]	W[SW4] Note 3
1	White	MPB2,MPB4	MPB1,MPB3	
2	Black	MPB2,MPB4	MPB1,MPB3	
3	Red	Spore	Spore	
4	Green	Spore	Spore	
1	White	SPB1,SPB3	SPB2	SPB4, Note 3
2	Black	SPB1,SPB3	SPB2	SPB4, Note 3
3	Red	Spore	Spore	
4	Green	Spore	Spore	



NOTES:

- 1 Conductors shown as 'Not Used' shall be left unconnected and designated as spares.
 - 2 Opposing faze pedestrian movements are normally concurrent and can normally be connected in parallel in the controller cabinet.
 - 3 If ducts are available across the far side road leg, cable group 1A may be eliminated by extension of group 2 cable through the duct to wire SW4 in parallel with SW2 and SPB4 in parallel with SPB2.
- A Connections shown are general and typical and shall be adjusted to suit intersection layout.

LEGEND:

- DW - 'DON'T WALK' display
W - 'WALK' display
MW# - Main Road pedestrian head No. #
SW# - Side Road pedestrian head No. #
MPB# - Main Road pedestrian push button No. #
SPB# - Side Road pedestrian push button No. #
F#P - Faze # pedestrian movement, Note 2
MP# - Main Road Primary No. #
MS# - Main Road Secondary No. #
MA# - Main Road Auxiliary No. #
SP# - Side Road Primary No. #
SS# - Side Road Secondary No. #
SA# - Side Road Auxiliary No. #

- M - Main Road S
S - Side Road
LT - Left Turn
RT - Right Turn
SL - Side Road Left Turn cable
ML - Main Road Left Turn cable

ONTARIO PROVINCIAL STANDARD DRAWING

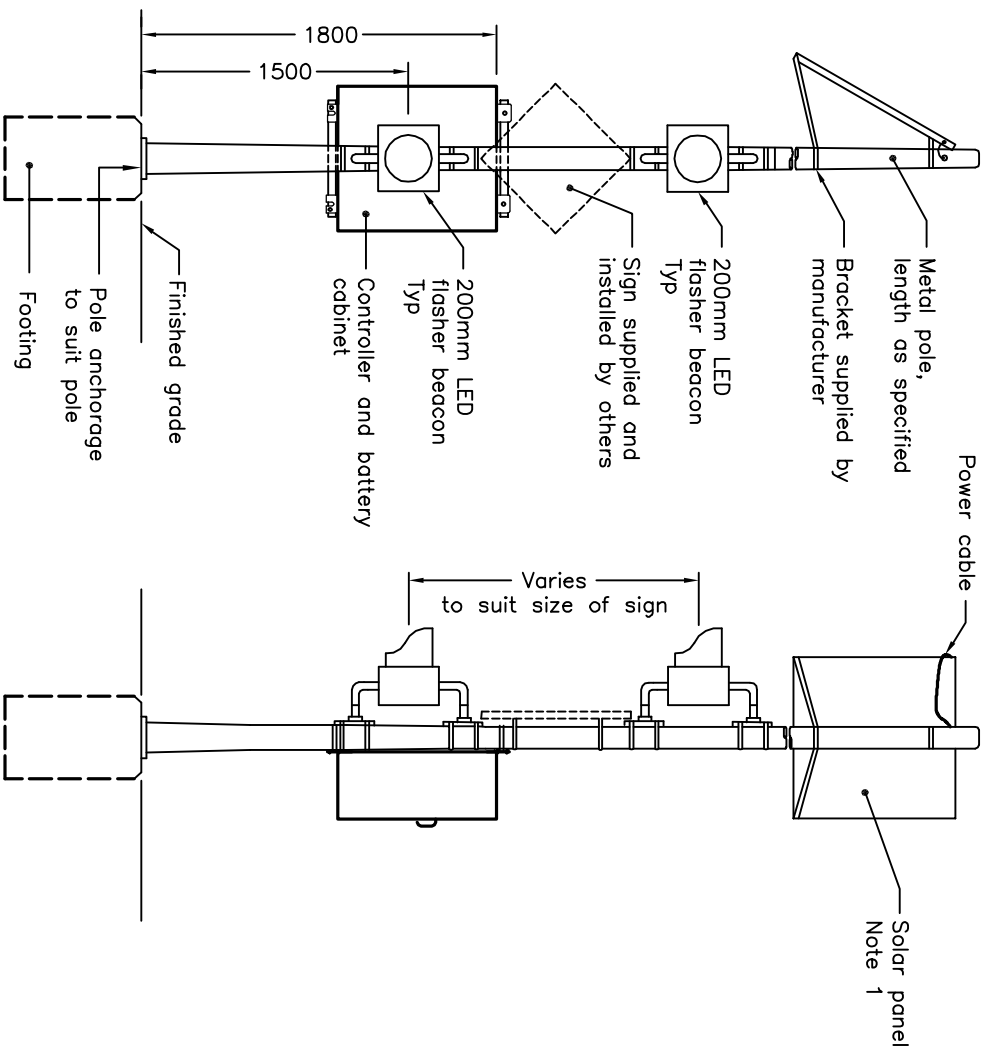
Nov 2015

Rev 1

SIGNAL WIRING FOR PEDESTRIAN FACILITIES

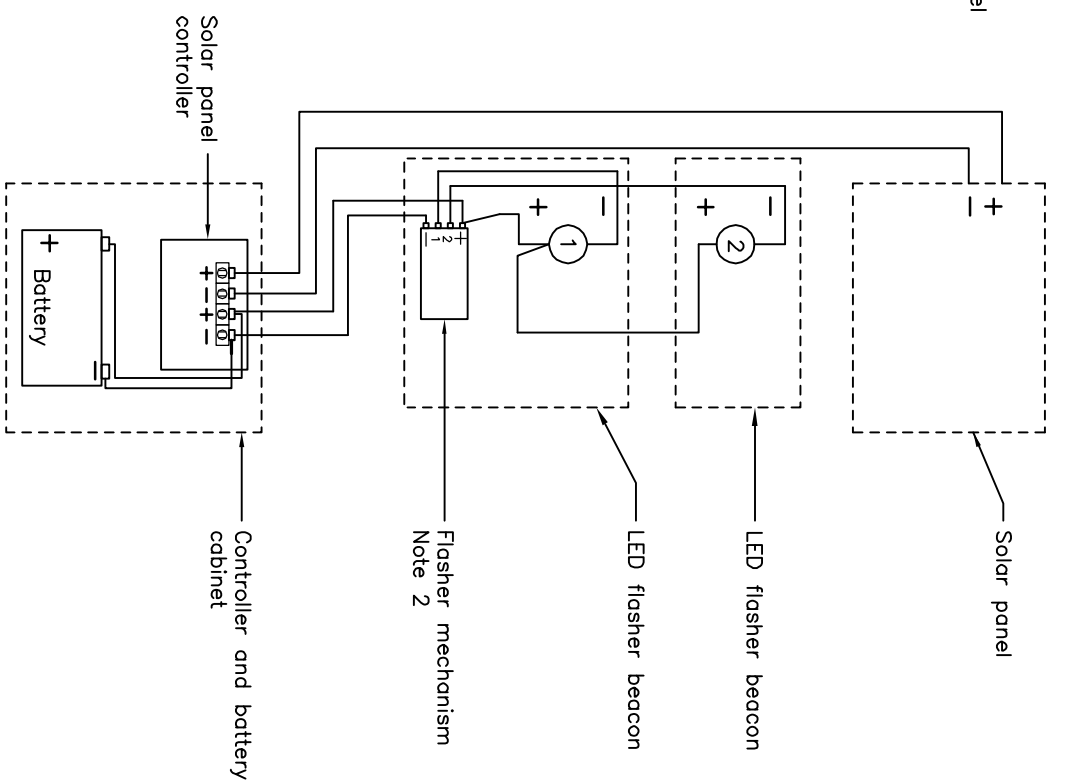
OPSD 2529.010





NOTES:

- 1 The solar panel and equipment shall be installed and oriented according to manufacturer's recommendations and as specified.
- 2 The flasher mechanism shall be attached in one of the flasher beacons.
- A LED flasher beacons and downlights shall be extra low-voltage DC to suit battery.
- B All field cuts, threads, and holes shall be deburred and coated with zinc rich paint.
- C All dimensions are in millimetres unless otherwise shown.



ONTARIO PROVINCIAL STANDARD DRAWING

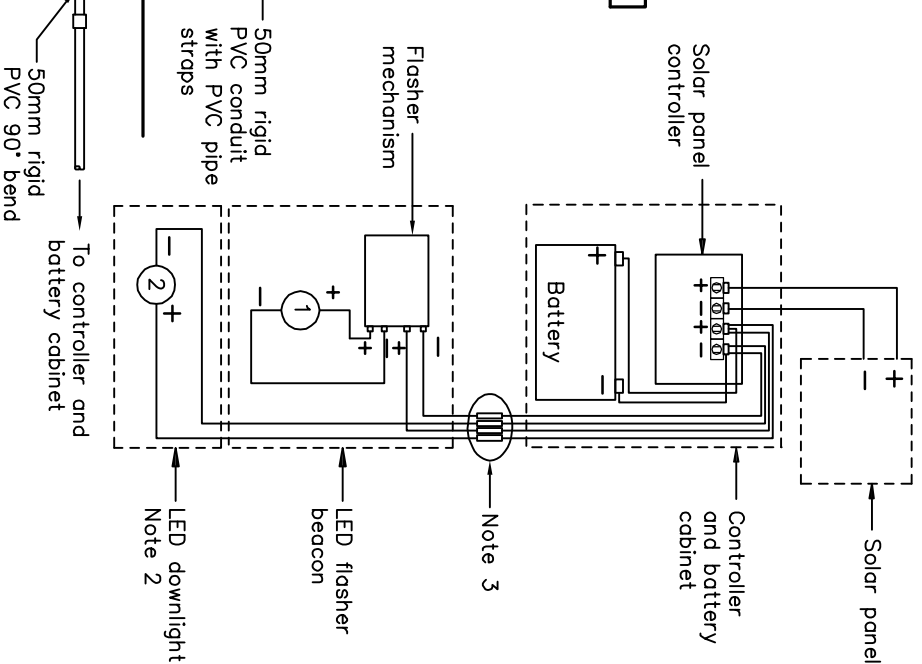
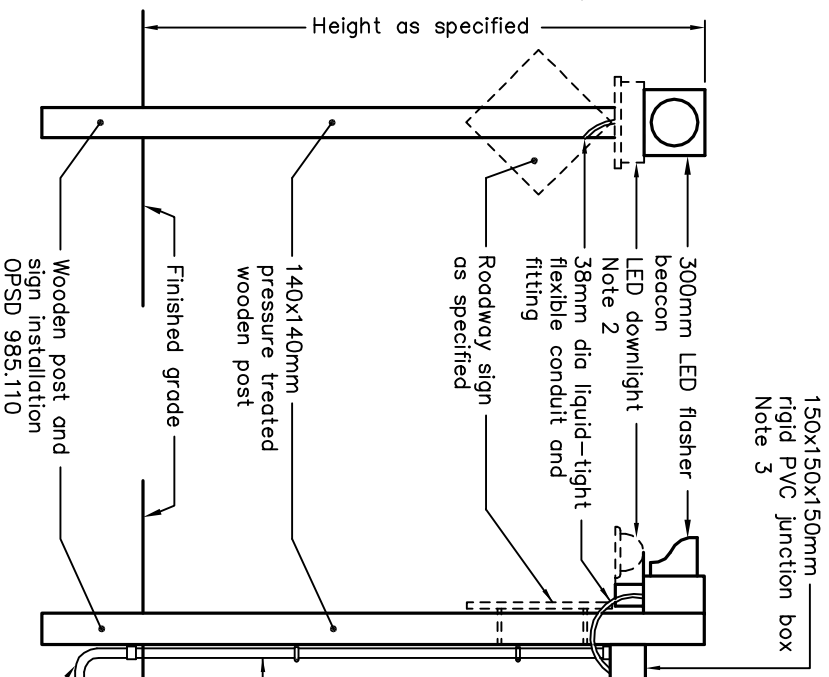
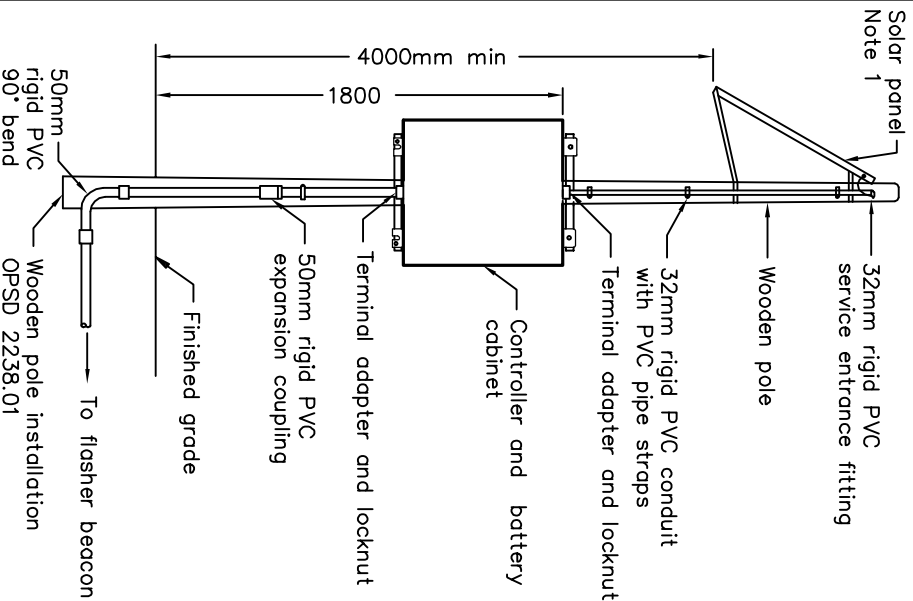
Nov 2015

Rev 0

**SOLAR POWERED LED FLASHER BEACON
AND WIRING DIAGRAM FOR ROADWAY SIGN
BASE MOUNTED POLE**

OPSD 2536.030





SOLAR POWER ASSEMBLY

FRONT VIEW

SIDE VIEW

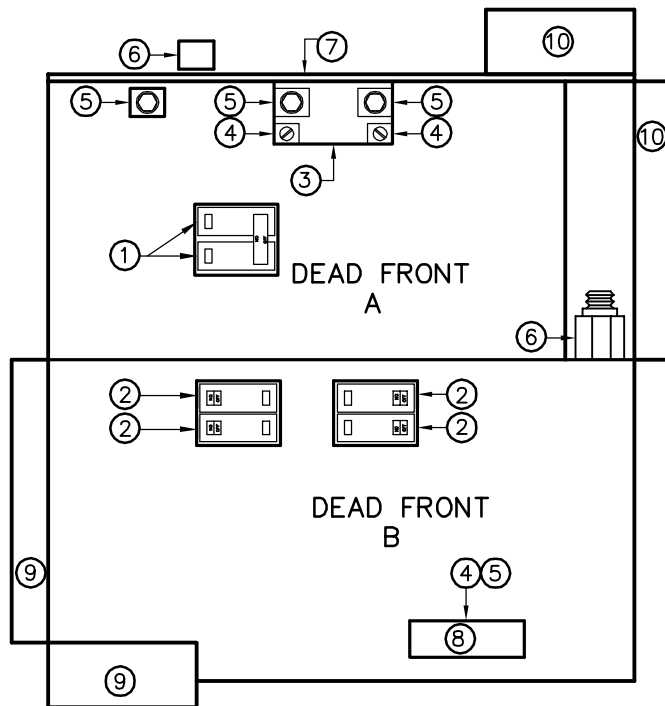
WIRING DIAGRAM

- NOTES:**
- 1 The solar panel and equipment shall be installed and oriented according to manufacturer's recommendations and as specified.
 - 2 LED downlight included when specified.
 - 3 A break-away in-line fuse holder shall be installed for each circuit to a flasher beacon and each circuit to a downlight.
- A LED flasher beacons and downlights shall be extra low-voltage DC to suit battery.
- B All field cuts, threads, and holes shall be deburred and coated with zinc rich paint.
- C All dimensions are in millimetres unless otherwise shown.

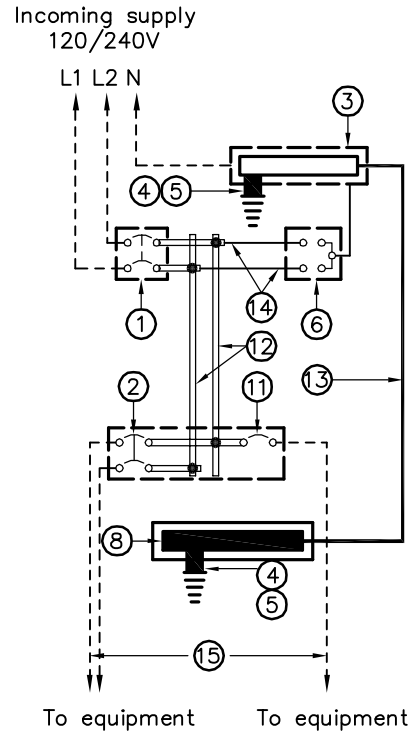
ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015		Rev	0
SOLAR POWERED LED FLASHER BEACON AND WIRING DIAGRAM FOR ROADWAY SIGN DIRECT BURIED POLE					
OPSD 2536.032					



EQUIPMENT LAYOUT



SCHEMATIC WIRING DIAGRAM



ELECTRICAL EQUIPMENT LIST

- ① Main circuit breaker – 100A, 2–pole
- ② Branch circuit breaker – 2–pole and 1–pole, number of breakers and ampacity as specified
- ③ Solid neutral assembly – 100A minimum, copper
- ④ Ground lug for No. 6 AWG stranded copper ground wire
- ⑤ Ground lug for No. 2/0 AWG stranded copper ground wire
- ⑥ Secondary lightning arrester – 650V, 2–pole
- ⑦ Drip shield
- ⑧ Secondary neutral and ground bus according to CSA and as specified
- ⑨ Primary barrier
- ⑩ Secondary barrier
- ⑪ Circuit breaker for equipment
- ⑫ Copper bus bar
- ⑬ No. 6 AWG RWU90 wire
- ⑭ No. 12 AWG RWU90 wire
- ⑮ Field wiring

NOTE:

A This OPSPD shall be read in conjunction with OPSPD 2441.010, 2441.020 and 2441.030.

ONTARIO PROVINCIAL STANDARD DRAWING		Nov 2015	Rev	0
ADVANCED TRAFFIC MANAGEMENT SYSTEM SUPPLY CONTROL CABINET 120/240V, 100A, 1–PHASE, 3–WIRE		-----		

		OPSD 2902.322		

