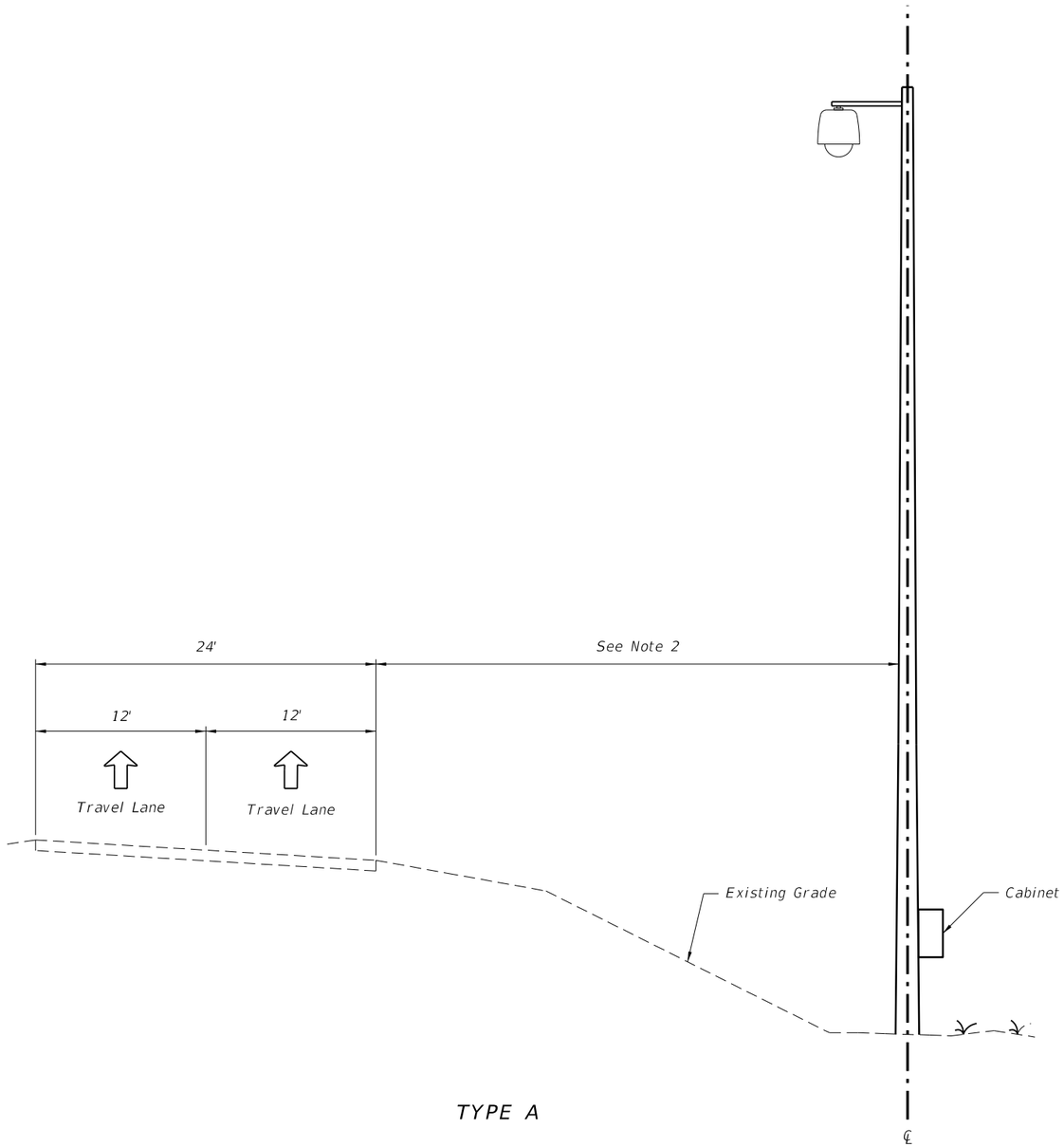
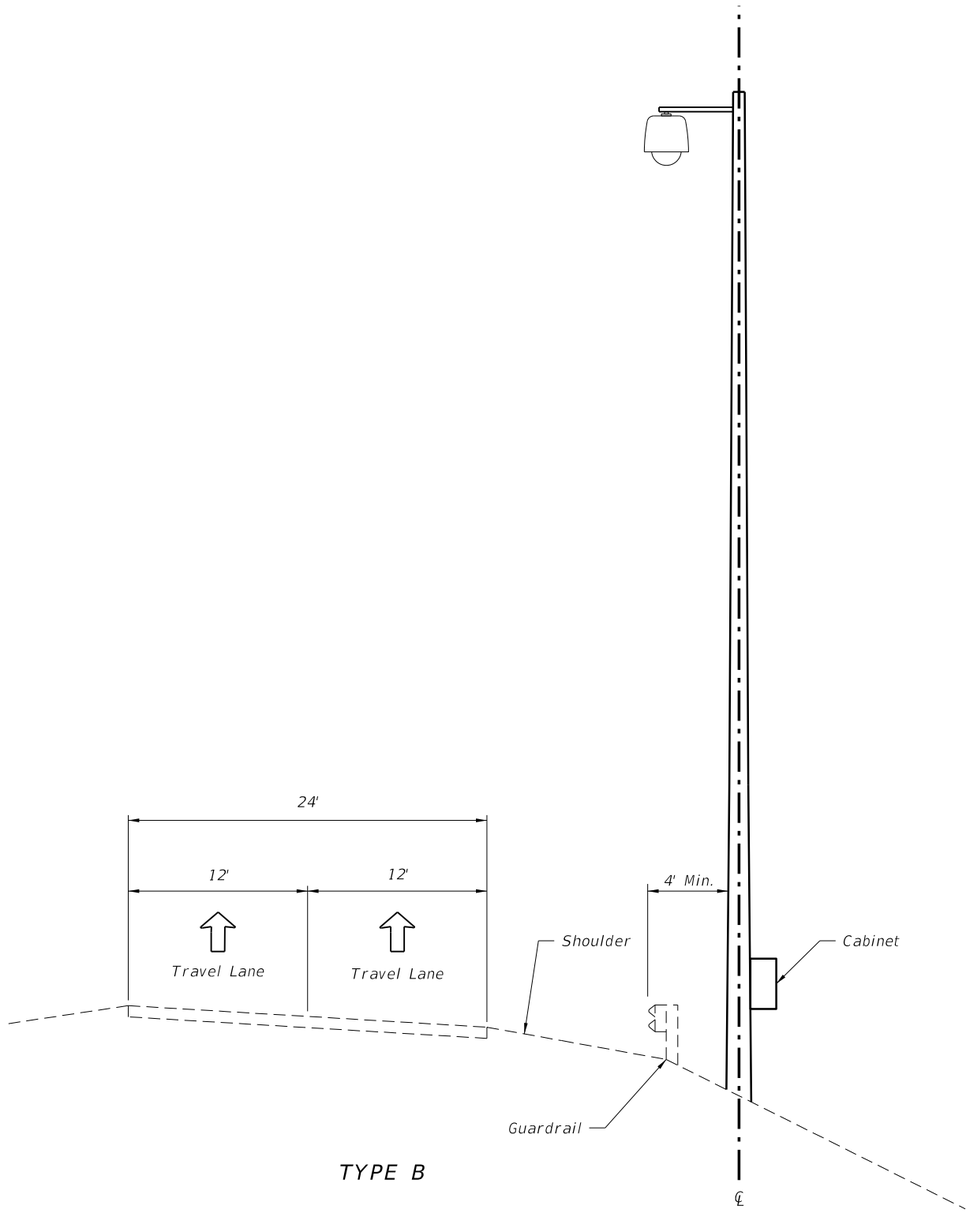


TYPE A



TYPE B

GENERAL NOTES:

1. For location where pole foundation is lower than roadway, mount CCTV cabinet on pole. Clear zone shall be measured to the edge of drilled shaft if drilled shaft is more than 4" above adjacent grade.
2. Distance must be in accordance with project design documents and greater than or equal to minimum clear zone requirements.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CCTV POLE PLACEMENT	INDEX NO.	SHEET NO.
07/01/07						18100	1

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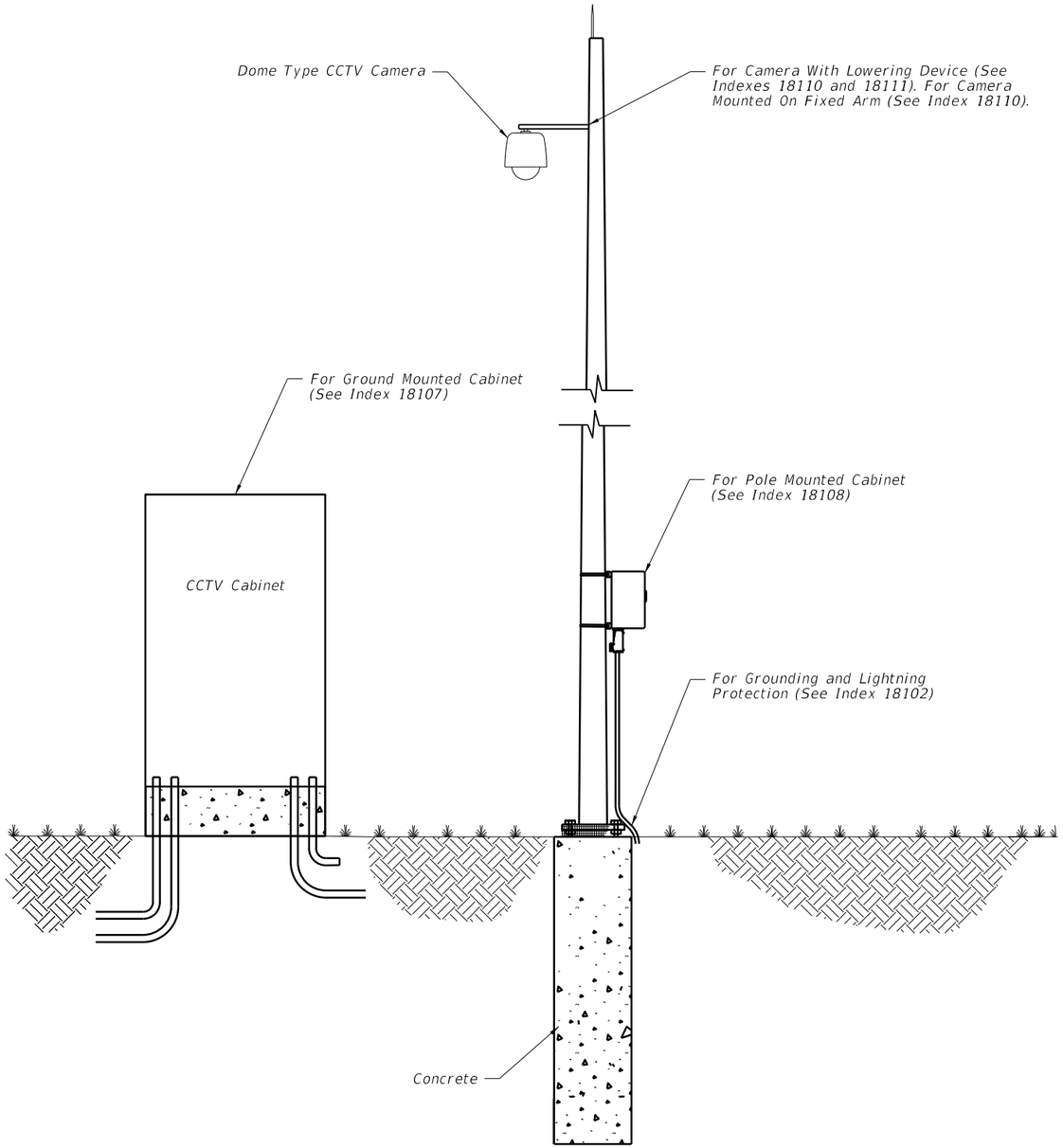
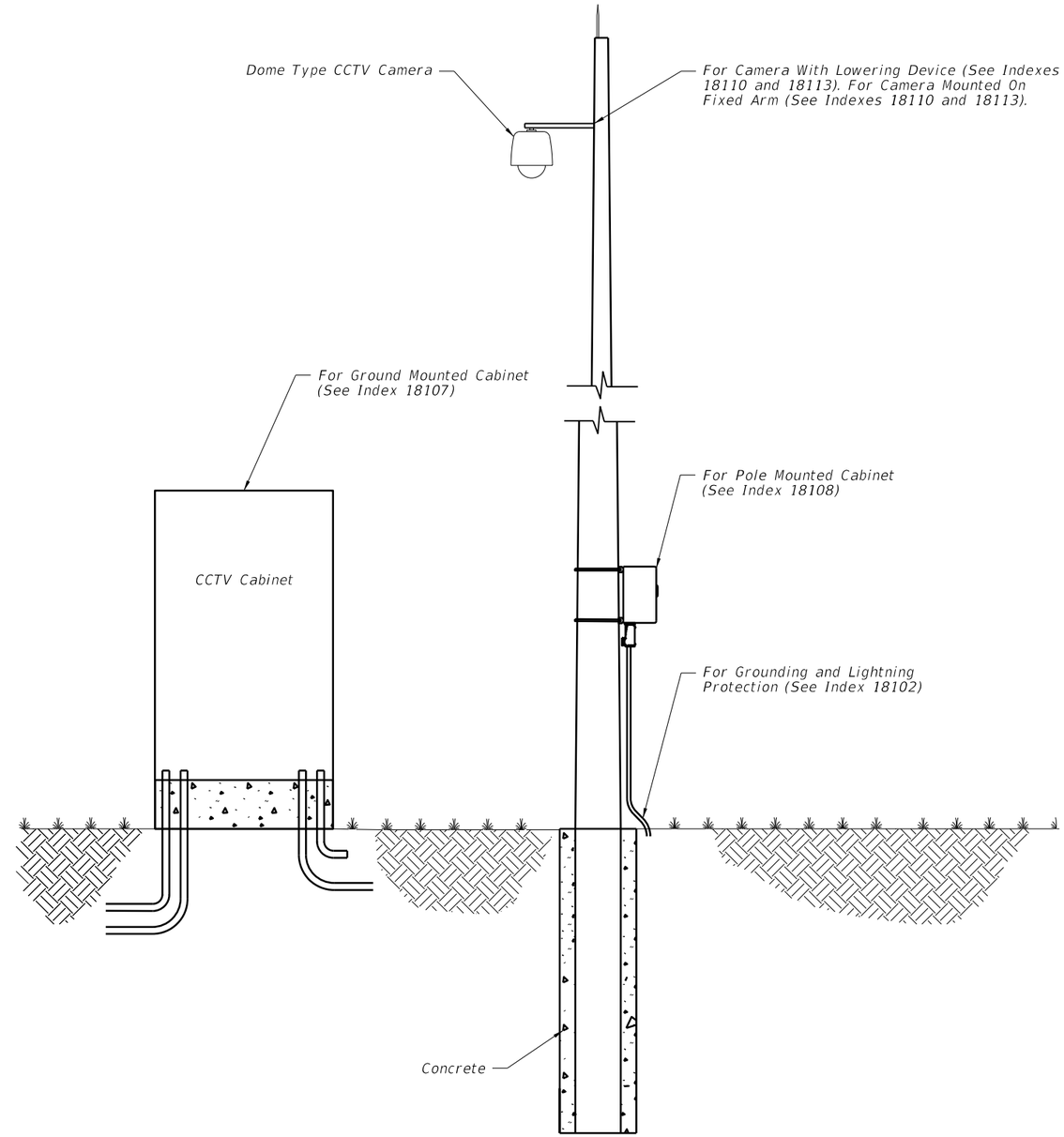


STEEL POLE



CONCRETE POLE

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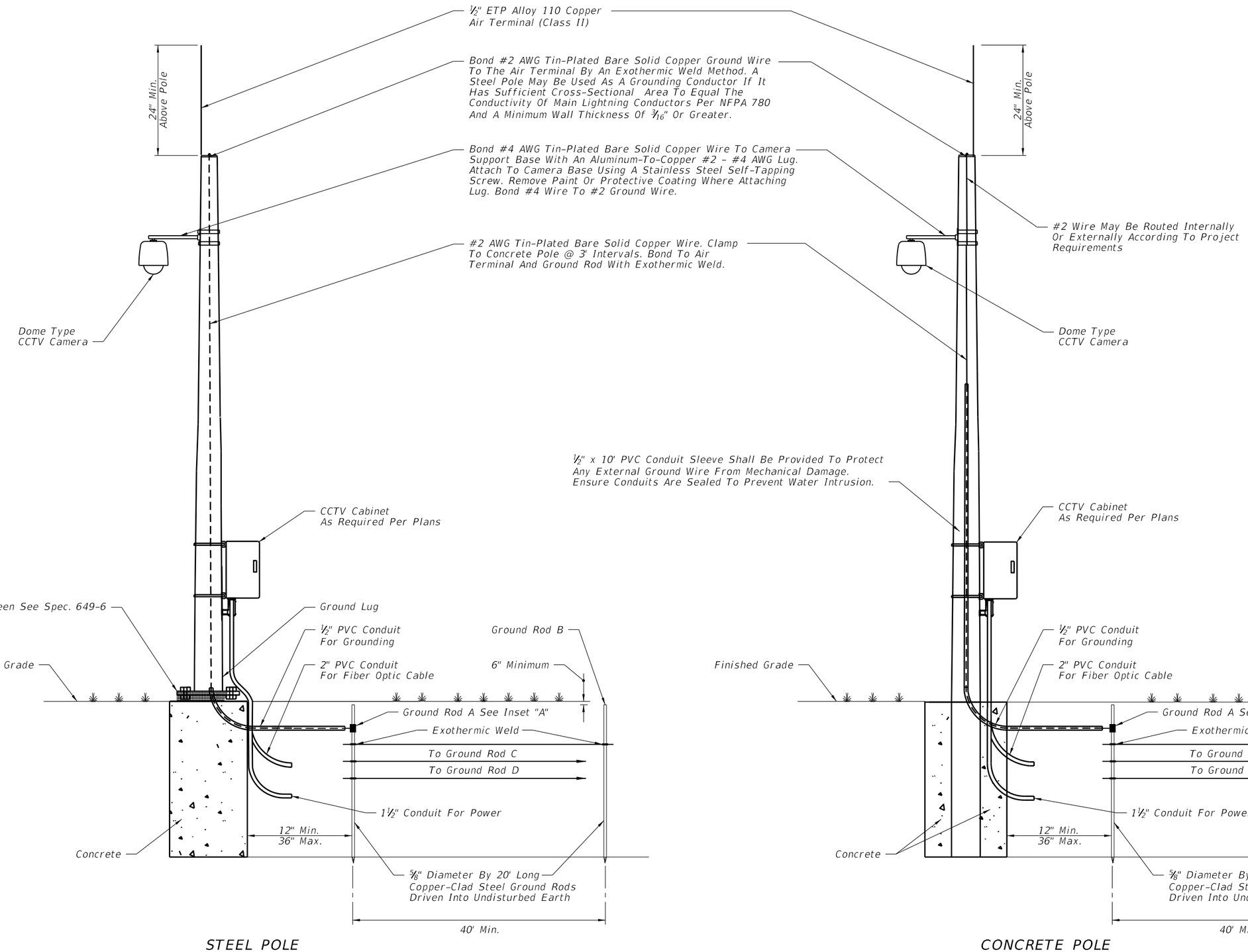
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/10			FDOT DESIGN STANDARDS 2013	TYPICAL CCTV SITE	18101	1



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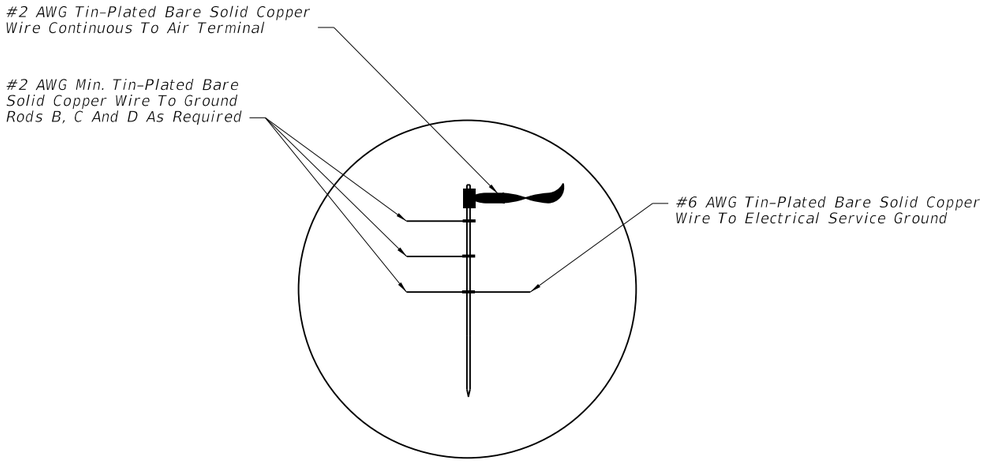
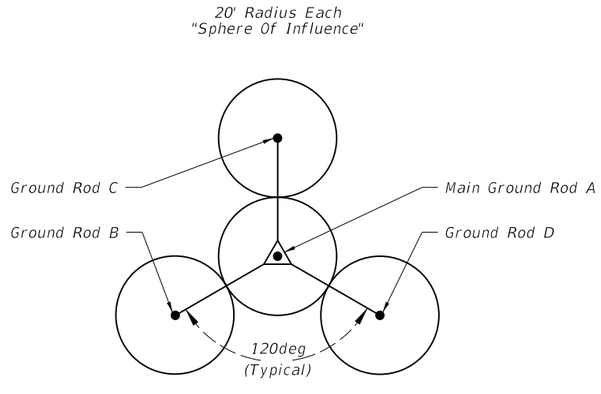
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/10			FDOT DESIGN STANDARDS 2013	CCTV POLE GROUNDING	18102	1



INSET "A"

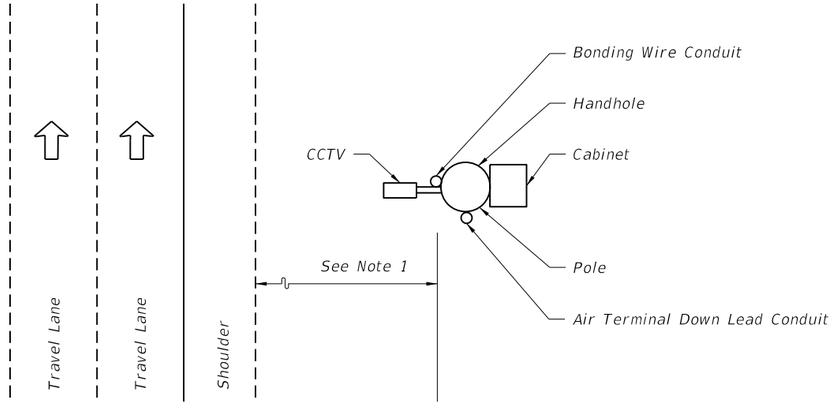
GENERAL NOTES:

1. Distance must be in accordance with project design documents and greater than or equal to minimum clear zone requirements.
2. Exothermically weld all connections to ground rods.
3. Install marker tape directly above all grounding electrodes and conductors at a depth of 6".
4. All data, coaxial and power cables to the camera shall be completely concealed.
5. All air terminals must meet UL-96A.
6. Ground rod A is required. Ground rods B, C and D will be required as necessary to meet the ground resistance requirements in the contract documents.
7. Place ground system within right of way.
8. Route all camera cables inside arm of mounting bracket.
9. Main ground rod to be placed immediately adjacent to pole.



GROUND ROD PLACEMENT DETAIL

(Typical Each Pole)



ORIENTATION OF CONDUITS AND DEVICES ON POLE

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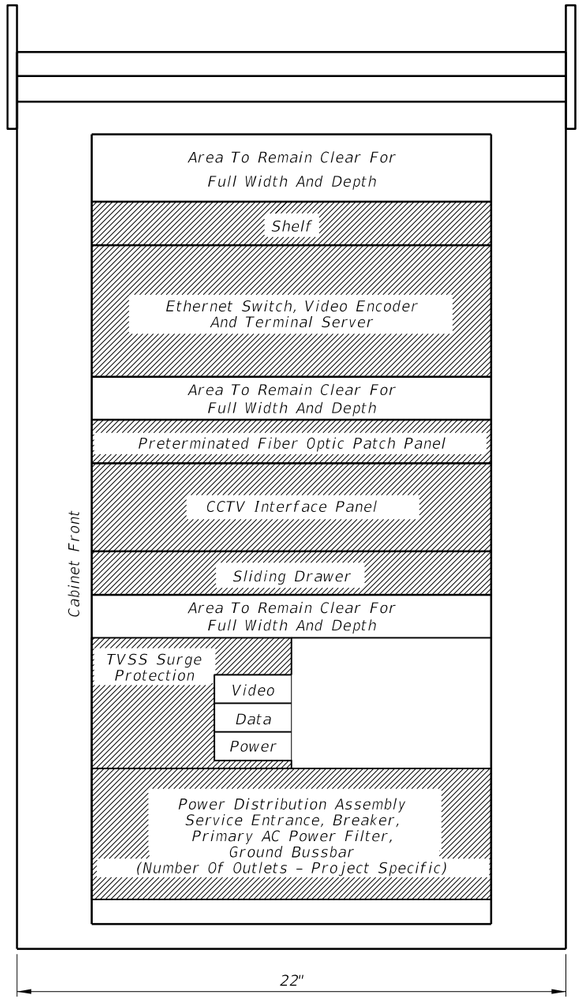
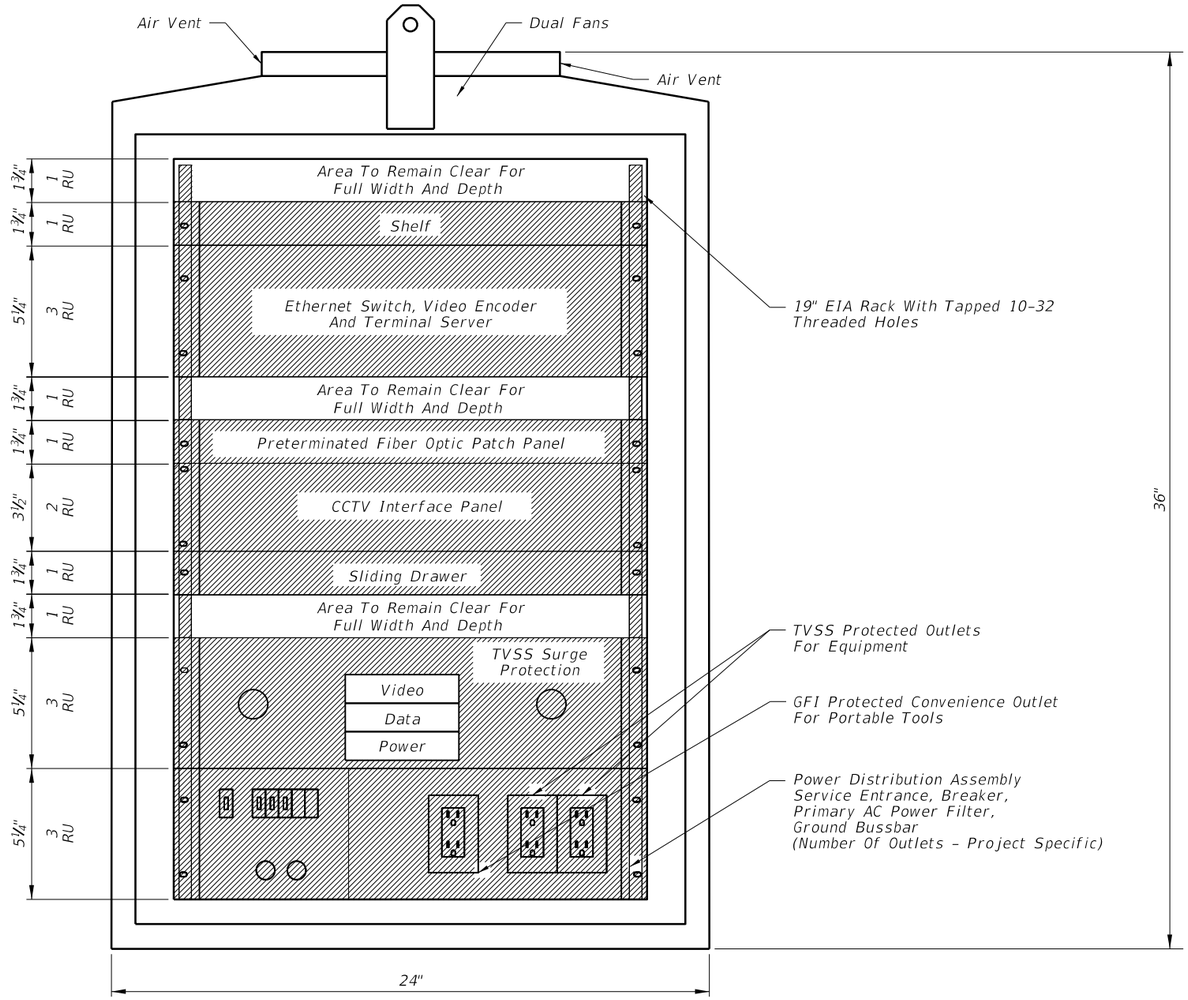
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CCTV POLE GROUNDING	INDEX NO.	SHEET NO.
07/01/07						18102	2



SIDE VIEW



FRONT VIEW

GENERAL NOTES:

1. Cabinet layout is for pole or base mounted installations.
2. All dimensions and scale are approximate.
3. The minimum CCTV cabinet dimensions shall be 36"H X 24"W X 22"D.
4. Conduit entrances are in bottom of cabinet.
5. There shall be front and rear doors. Both doors shall have the hinged side next to the pole when pole mounted.
6. Cabinet layout represents preferred placement of typical devices. Project-specific designs may not include all components illustrated here.

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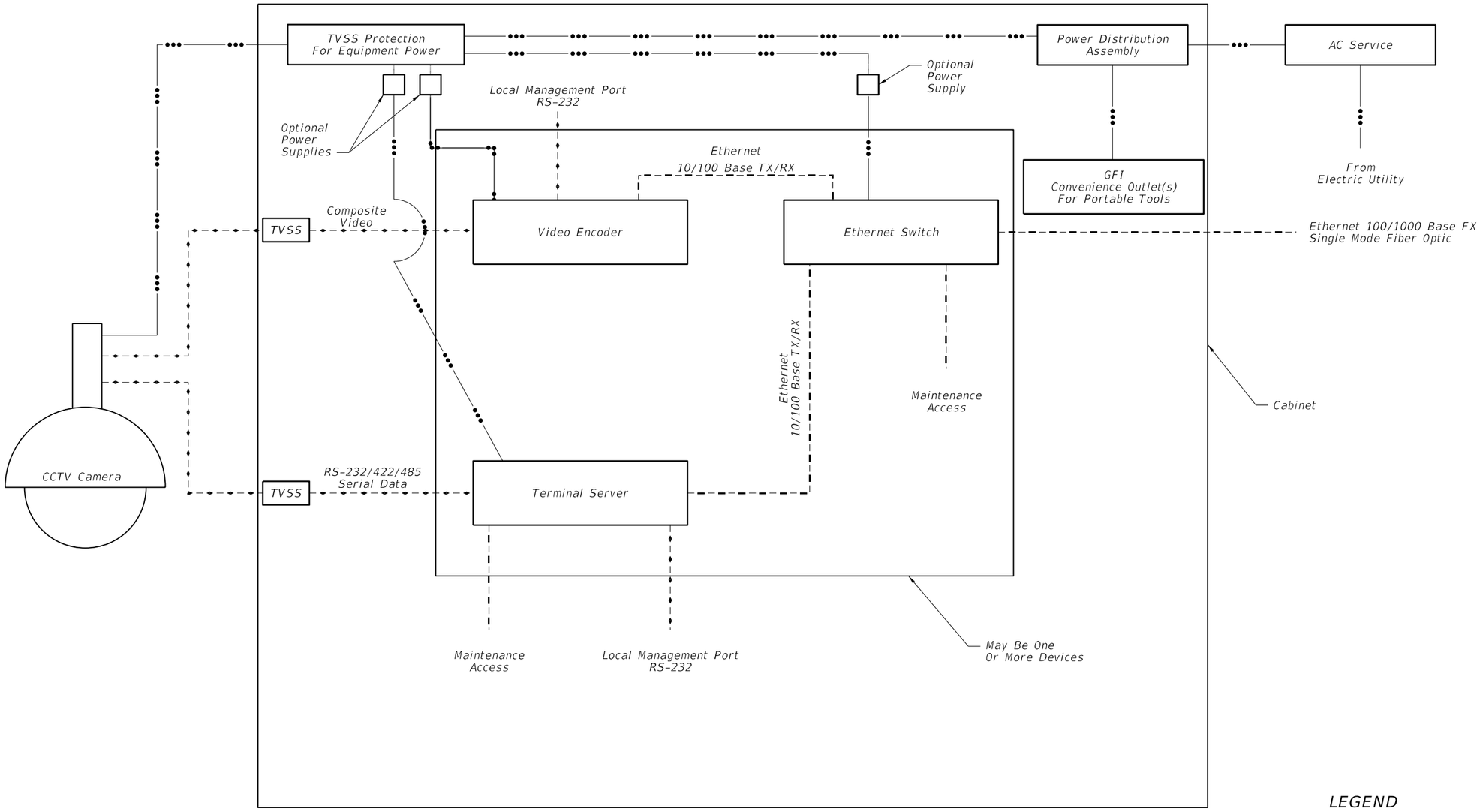
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	TYPICAL CCTV CABINET EQUIPMENT LAYOUT	INDEX NO. 18104	SHEET NO. 1



LEGEND

Data

Ethernet

Power

TVSS — Transient Voltage Surge Suppressor

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	CCTV BLOCK DIAGRAM	18105	1

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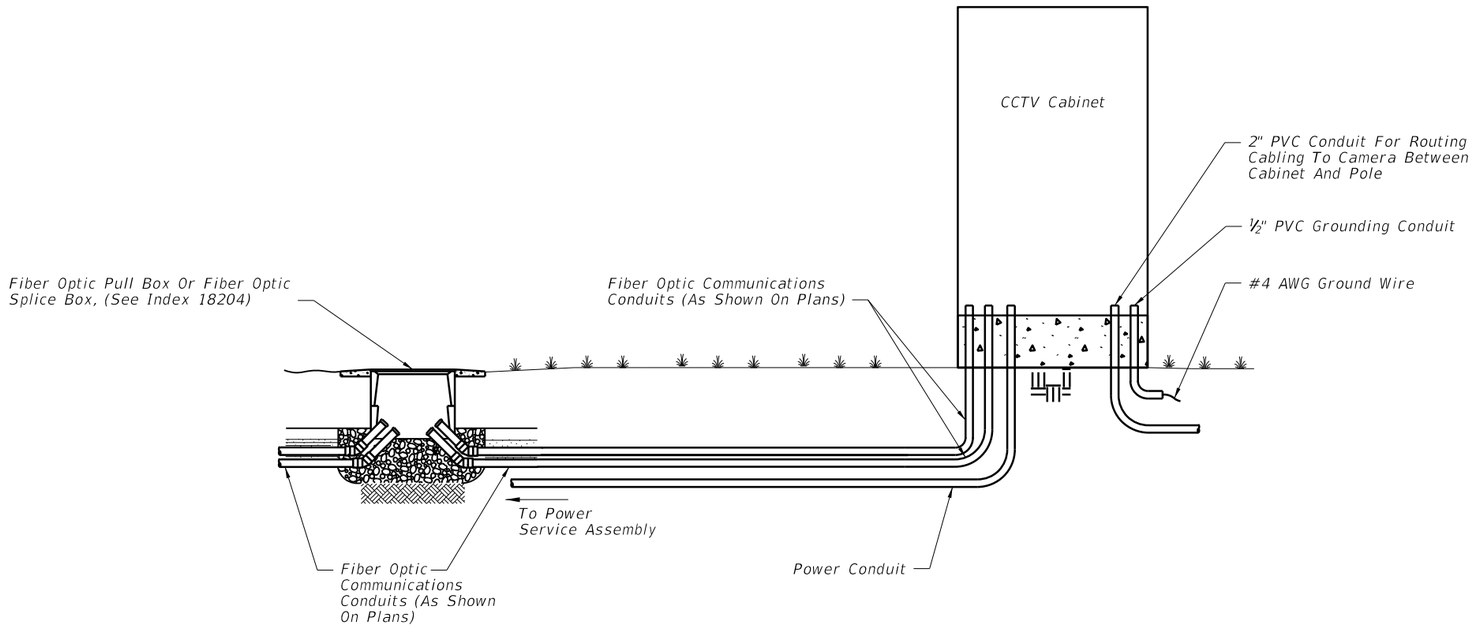

GENERAL NOTES:

1. Contractor shall splice fiber optic cables in cabinet to preterminater patch panel.
2. Furnish and install TVSS protection on all video, data, and power cabling in cabinet.
3. Ensure that all electronic equipment power is protected and conditioned with TVSS devices.
4. Sizes and types of conduits and innerducts for network communications between the pullbox and cabinet are stated in the contract documents.
5. See Index 18102 for grounding requirements.
6. All network communications conduits and ducts shall be sealed with approved waterproof duct plugs and seals.

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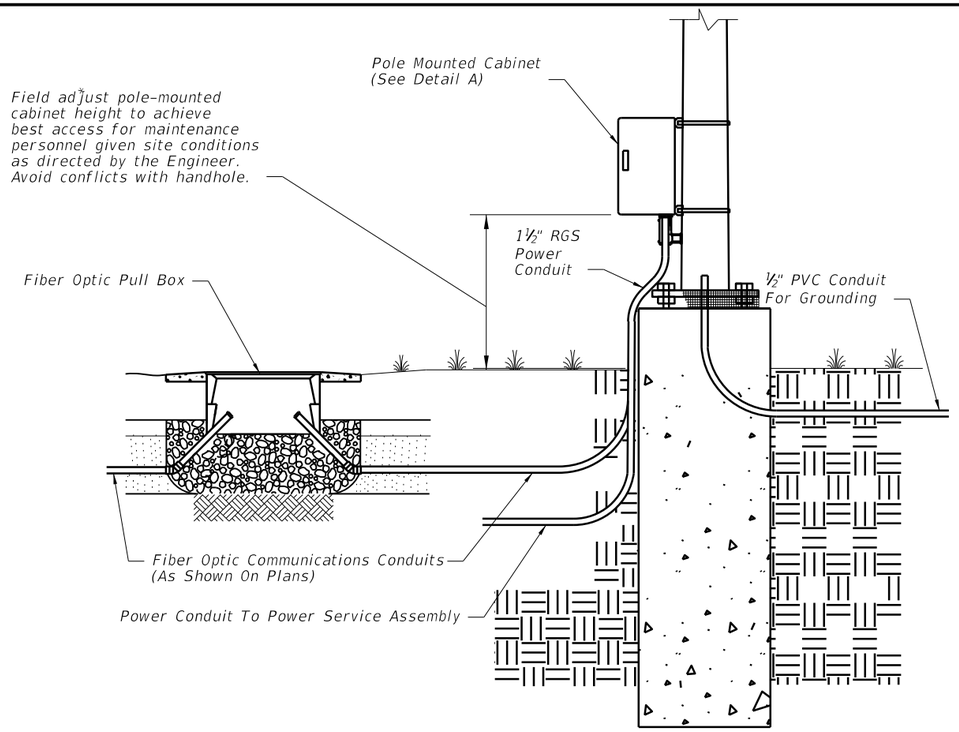
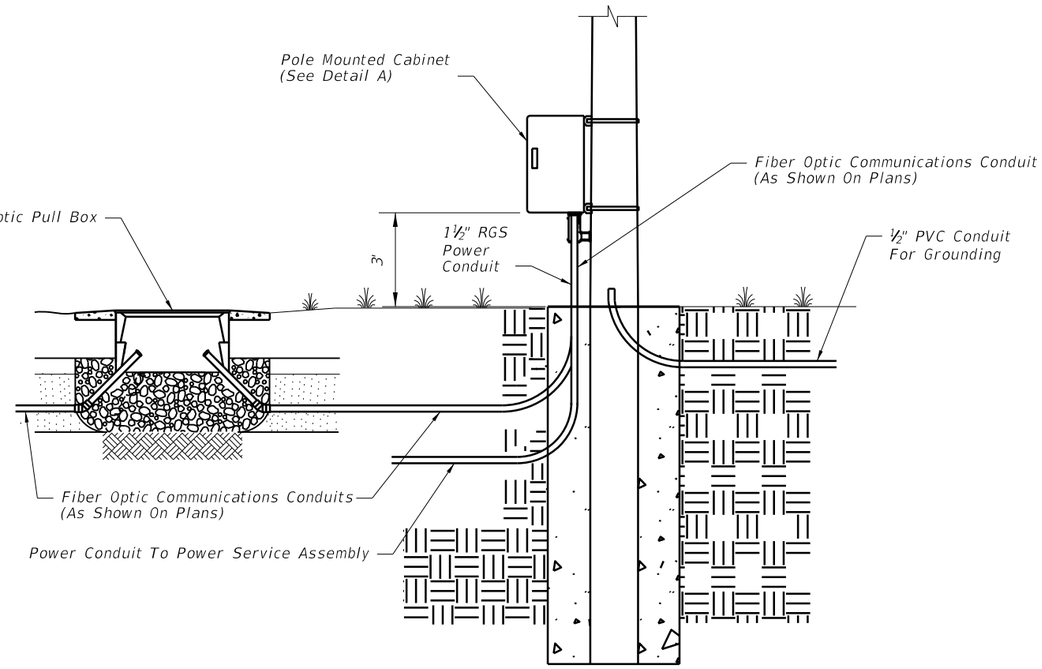
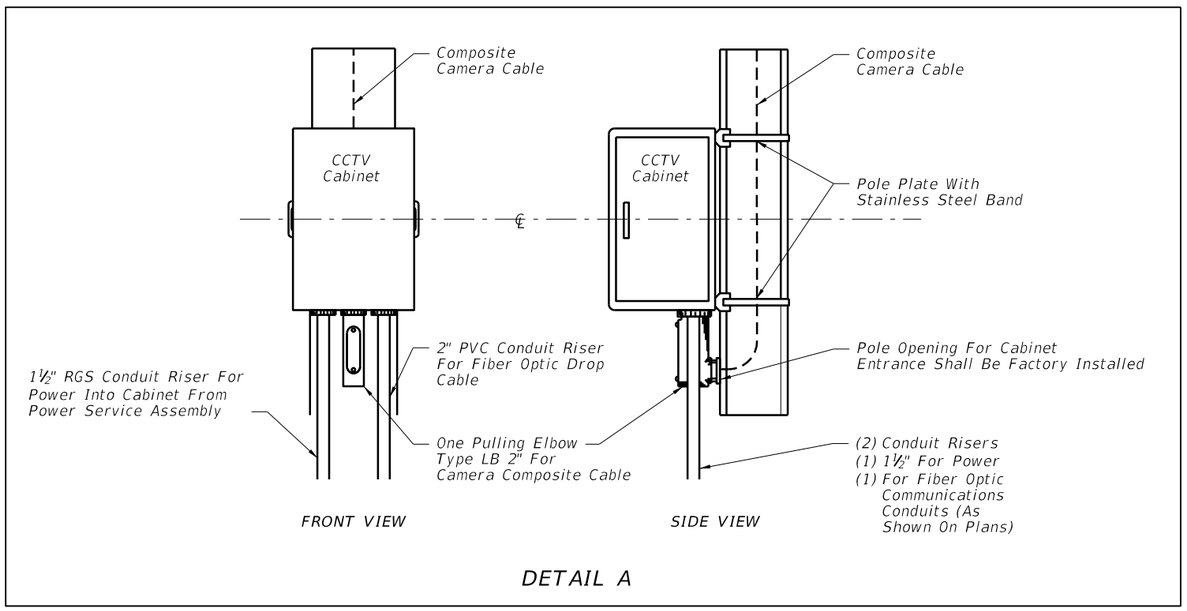
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GROUND MOUNTED CCTV CABINET	INDEX NO.	SHEET NO.
07/01/07						18107	1



STEEL POLE



CONCRETE POLE



DETAIL A

GENERAL NOTES:

1. Contractor shall splice fiber optic cables in cabinet to preterminated patch panel.
2. Furnish and install TVSS protection on all cabling in cabinet.
3. Furnish and install secondary TVSS protection on outlets for equipment in cabinet.
4. Sizes and types of conduits and innerducts for network communications between the pull box and cabinet are stated in the contract documents.
5. Ensure that equipment cabinet is bonded to CCTV pole grounding system.
6. All network communications conduits and ducts shall be sealed with approved waterproof duct plugs and seals.
7. Pole mounted cabinets shall be mounted with hinges next to the pole.

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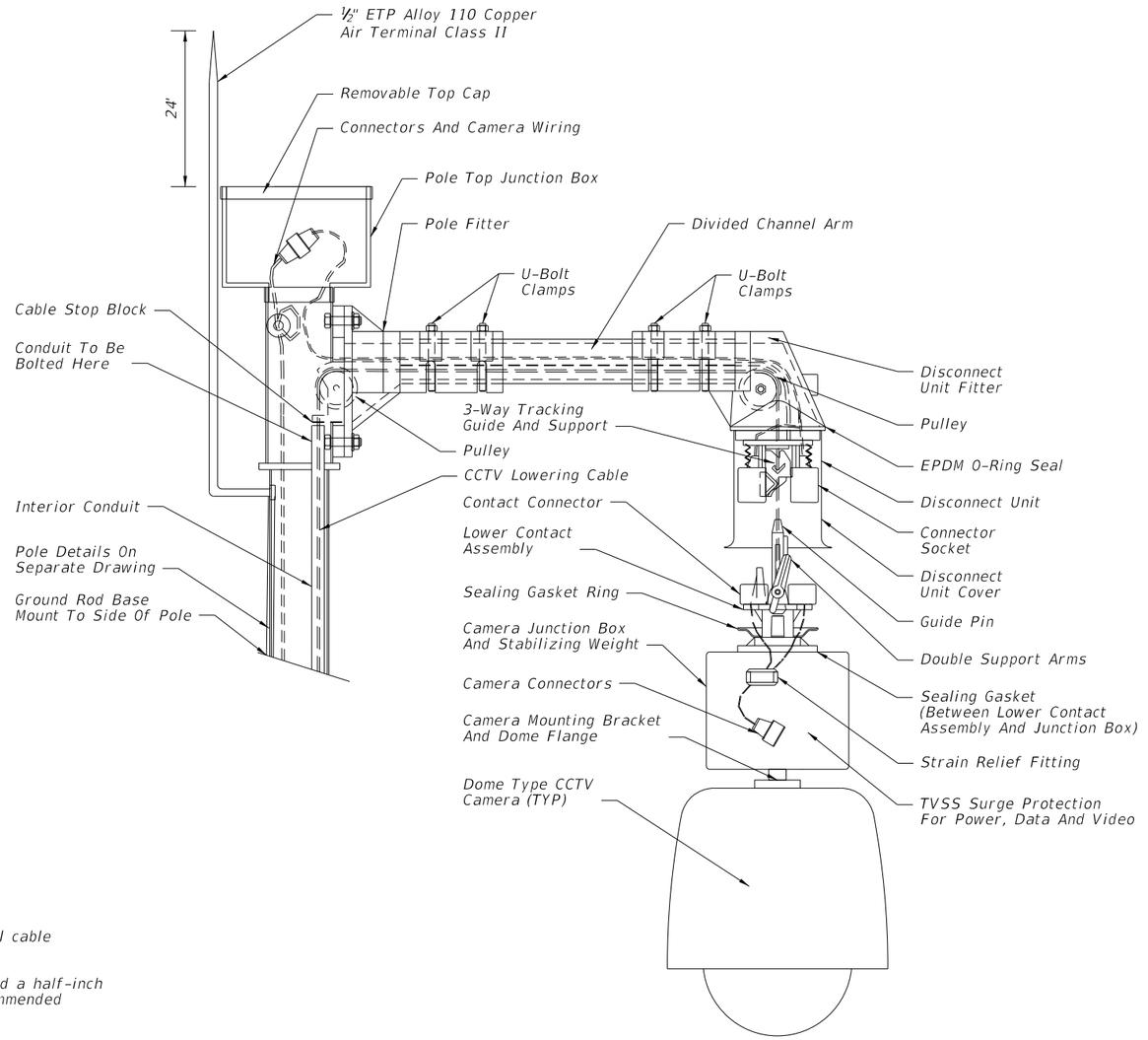
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	POLE MOUNTED CCTV CABINET	18108	1



CAMERA LOWERING DEVICE DETAIL

GENERAL NOTES:

1. Lowering device to be shipped ready for pole attachment to include 100 ft. of composite power and signal cable prewired to lowering device at the factory.
2. The lowering device manufacturer shall supply both a portable lowering tool with a manual hand crank and a half-inch chuck variable-speed reversible industrial-duty electric drill that matches the winch's manufacturer-recommended revolutions per minute. One lowering tool per every 10 lowering devices is required.
3. The lowering device manufacturer shall provide an on-site installation inspection and operator instruction and certification. This ensures the product is assembled correctly and that all necessary persons are trained in the proper, safe operation of the system. Before erecting the first pole the contractor must contact the lowering device supplier and schedule a manufacturer's representative to be on-site.
4. Design camera mounting arm and connection to tenon according to FDOT Structures Manual (current edition).
5. Camera to be mounted to camera junction box and stabilizing weight via 1½" Standard NPT Pipe Thread.
6. Use air terminal extension when the pole top junction box is wider than top of pole.
7. The stainless steel device lowering cable shall be installed inside the pole within a 1 ¼" diameter PVC conduit.
8. All communication and power cables must be neatly bundled and secured.
9. Use a Camera Lowering Device listed on the Approved Product List (APL).
10. See Index 18113 for concrete pole details and Index 18111 for steel pole details.

CAMERA MOUNTING WITH LOWERING DEVICE

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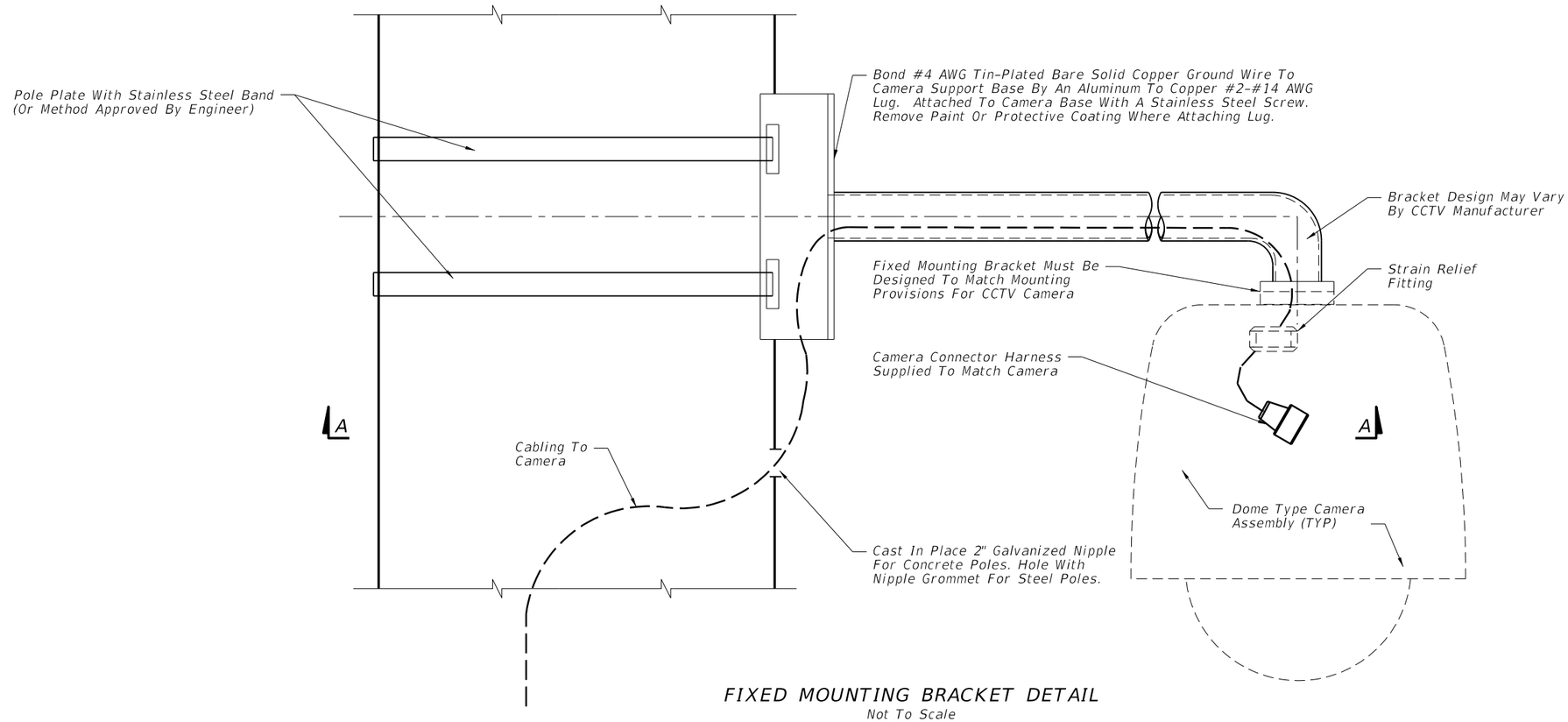
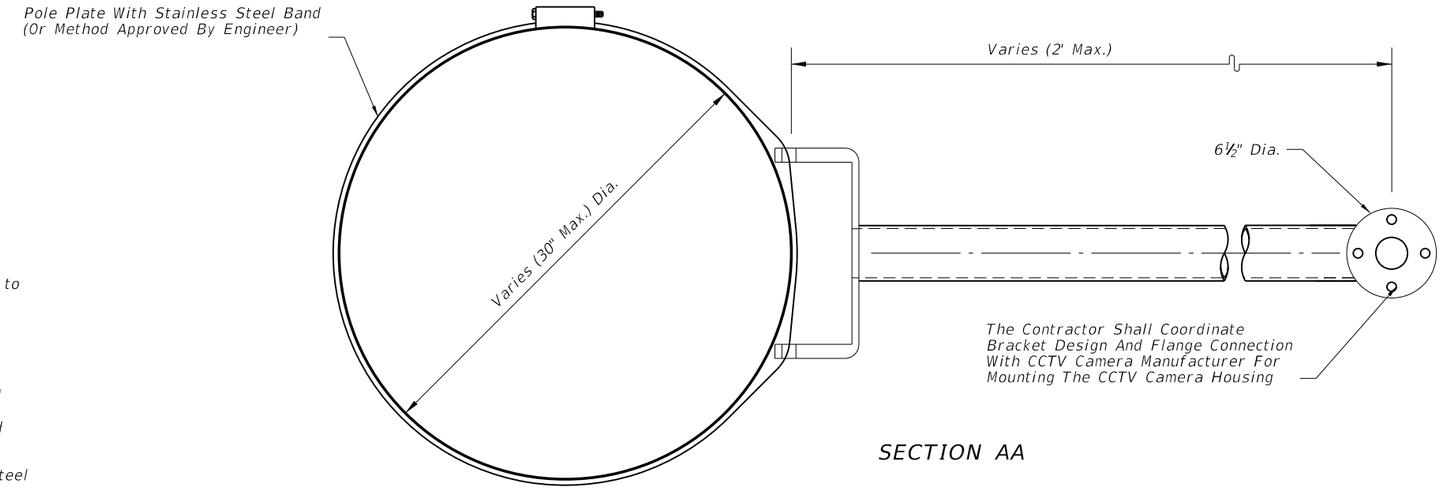
LAST REVISION	REVISION	DESCRIPTION:				
01/01/10			FDOT DESIGN STANDARDS 2013	CAMERA MOUNTING DETAILS	INDEX NO. 18110	SHEET NO. 1



FIXED MOUNTING BRACKET DETAIL

Not To Scale



SECTION AA

GENERAL NOTES:

1. Verify the pole type, the dimensions of the pole at the point of installation of the camera mount, and angle with respect to the roadway before manufacturing camera mount assembly.
2. Design camera mounting arm and connection to the pole according to FDOT Structures Manual (current edition).
3. No field welding shall be permitted.
4. Mounting bracket arm shall be level after installation.
5. The contractor shall submit shop drawings for the proposed fixed mounting arm, signed and sealed by a Professional Engineer registered in the State of Florida, to the Engineer for review and approval.
6. See Index 18113 for concrete pole details and Index 18111 for steel pole details.
7. Galvanized pipe connections and conduit entry points shall be sealed in accordance with Section 630 of the Standard Specifications.

CAMERA MOUNTING WITH FIXED BRACKET

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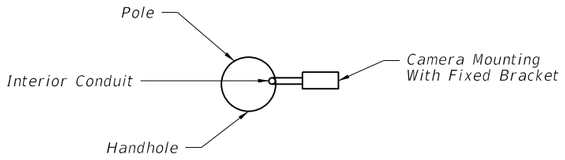
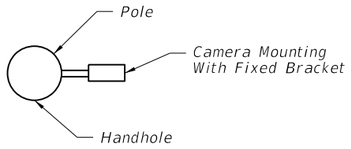
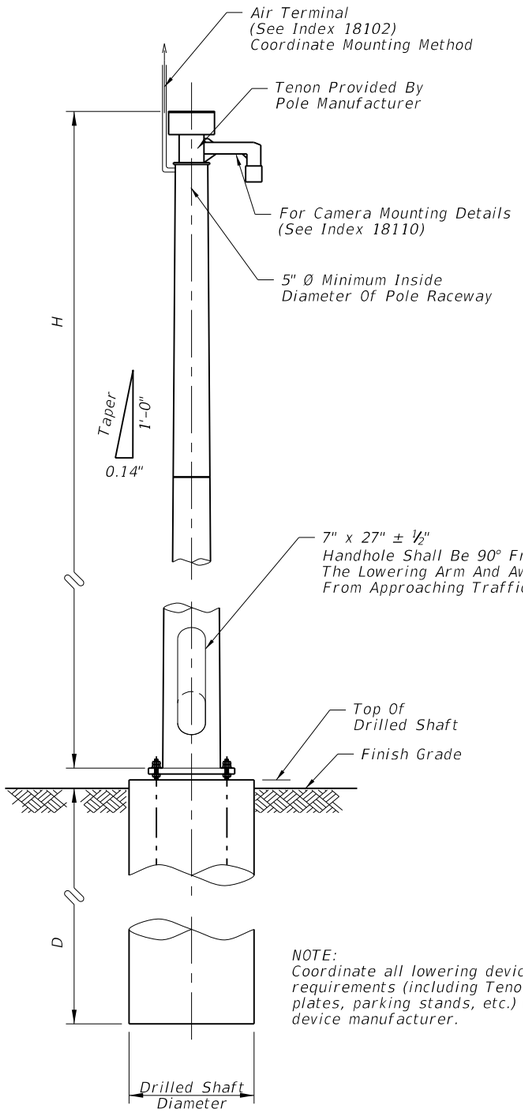


ORIENTATION VIEW

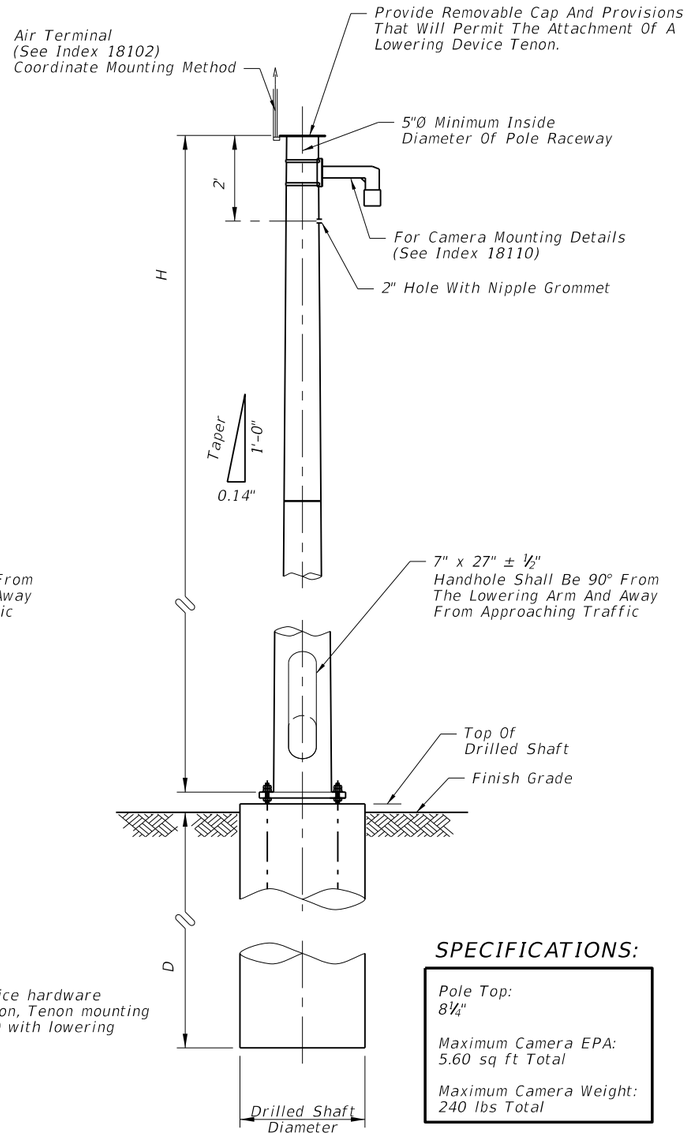


ORIENTATION VIEW



NOTE:
Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stands, etc.) with lowering device manufacturer.

WITH LOWERING DEVICE



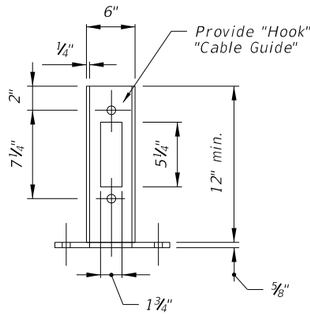
WITHOUT LOWERING DEVICE

SPECIFICATIONS:

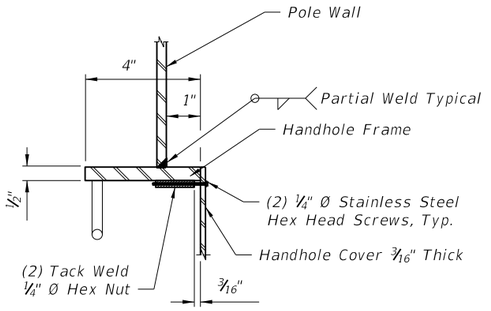
Pole Top:
8¼"

Maximum Camera EPA:
5.60 sq ft Total

Maximum Camera Weight:
240 lbs Total

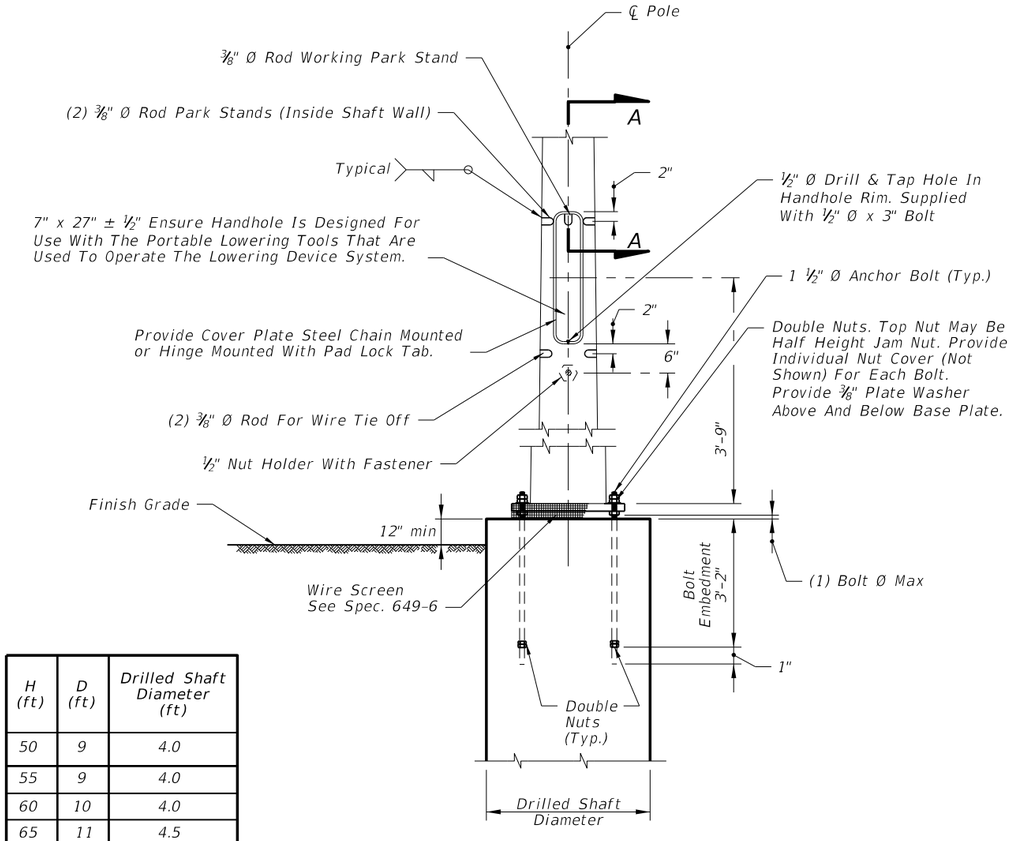


TENON DETAIL



SECTION A-A

H (ft)	D (ft)	Drilled Shaft Diameter (ft)
50	9	4.0
55	9	4.0
60	10	4.0
65	11	4.5
70	11	4.5



FOUNDATION AND HANDHOLE DETAIL

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LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	STEEL CCTV POLE	INDEX NO. 18111	SHEET NO. 1

DESIGN NOTES:

Design according to FDOT Structures Manual.

Maximum 1" deflection in 40mph wind (3 second gust).

Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

Foundation materials:

Reinforcing Steel: ASTM A615 Grade 60

Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environment classifications.

Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts.
- ASTM F436 Type 1 washers.
- ASTM F2329 galvanization.

Foundation design based upon the following soil criteria:
- Classification = Cohesionless (Fine Sand)
- Friction Angle = 30 Degrees (30°)
- Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required.

Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

POLE GENERAL NOTES:

16 sided or more or round.

Tapered 0.14 inches per foot.

Transverse welds only allowed at the base.

One or Two sections (with telescopic field splice) is allowed.

No laminated tubes.

Up to two longitudinal seam welds are permitted.

Longitudinal seam welds within 6" of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches. All other areas, size the partial penetration welds to at least 60% of the pole tube thickness.

Identification tag:

- Aluminum, secured to pole with stainless steel screws.
- Locate inside pole and visible from handhole.
- Provide Financial Project ID, pole height, manufacturer's name, pole base (Fy of steel) and pole base wall thickness.

Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

Refer to Index No. 18108 for conduit and cabinet mounting details.

Provide fourteen #11 longitudinal bars for 4'-0" diameter drilled shafts and sixteen #11 longitudinal bars for 4'-6" diameter drilled shafts. Provide seven #5 stirrups spaced at 4" from the top of the drilled shaft and #5 stirrups spaced at 1'-6" (max.) for the rest of drilled shaft. Provide 4" cover for the top of drilled shaft and 6" cover for sides and bottom. Coordinate anchor bolt design with the shaft reinforcement and CSL tube details.

INSTALLATION NOTES:

Cable Supports: Electrical Cable Guides and Eyebolts.

Locate top and bottom electrical guides within the pole aligned with each other.

Position one cable guide 2" below the handhole.

Position other cable guide 1" directly below the top of the tenon.

Position eyebolt 2-3/4" below the top of the handhole.

Install pole plumb.

Lowering Device Installation Notes:

Design tenon dimensions to facilitate lowering device component installation. Locate slots parallel to the pole centerline for mounting the lowering device. Bolt a tenon to the pole top with mounting holes and slot as required for the mounting of the lowering device.

Place the lowering cable that moves within the pole in an interior conduit to prevent it from tangling or interfering with any electrical wire that is in the pole. Ensure that any electrical wire within the pole is routed securely and free from slack.

Mount lowering arm perpendicular to the roadway or as shown in the plans. Position CCTV pole so that the camera can be safely lowered without requiring lane closures.

POLE SPECIFICATIONS:

ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4")or

ASTM A572 Grade 50, 60 or 65 (greater than 1/4")or

ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).

Steel Plates and Pole Cap: ASTM A36.

Weld Metal: E70XX.

Bolts: ASTM A325, Type 1.

Handhole frame: ASTM A709 Grade 36 or ASTM A36.

Handhole cover: ASTM A1011 Grade 50, 55, 60 or 65.

Stainless steel screws: AISI Type 316.

Galvanization:
- Nuts, bolts and washers: ASTM F2329.
- All other steel: ASTM A123.

One hundred percent of full-penetration groove welds and a random 25% of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

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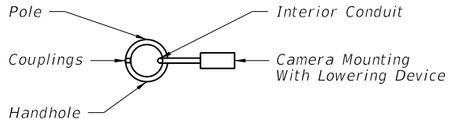
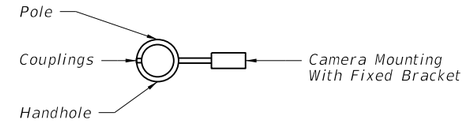
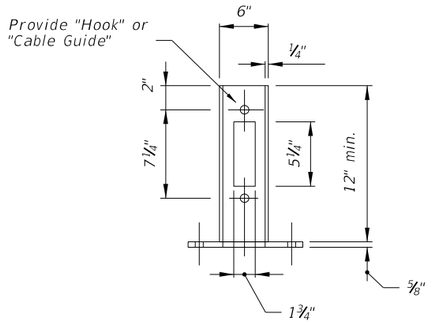
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	STEEL CCTV POLE	INDEX NO.	SHEET NO.
01/01/12						18111	2



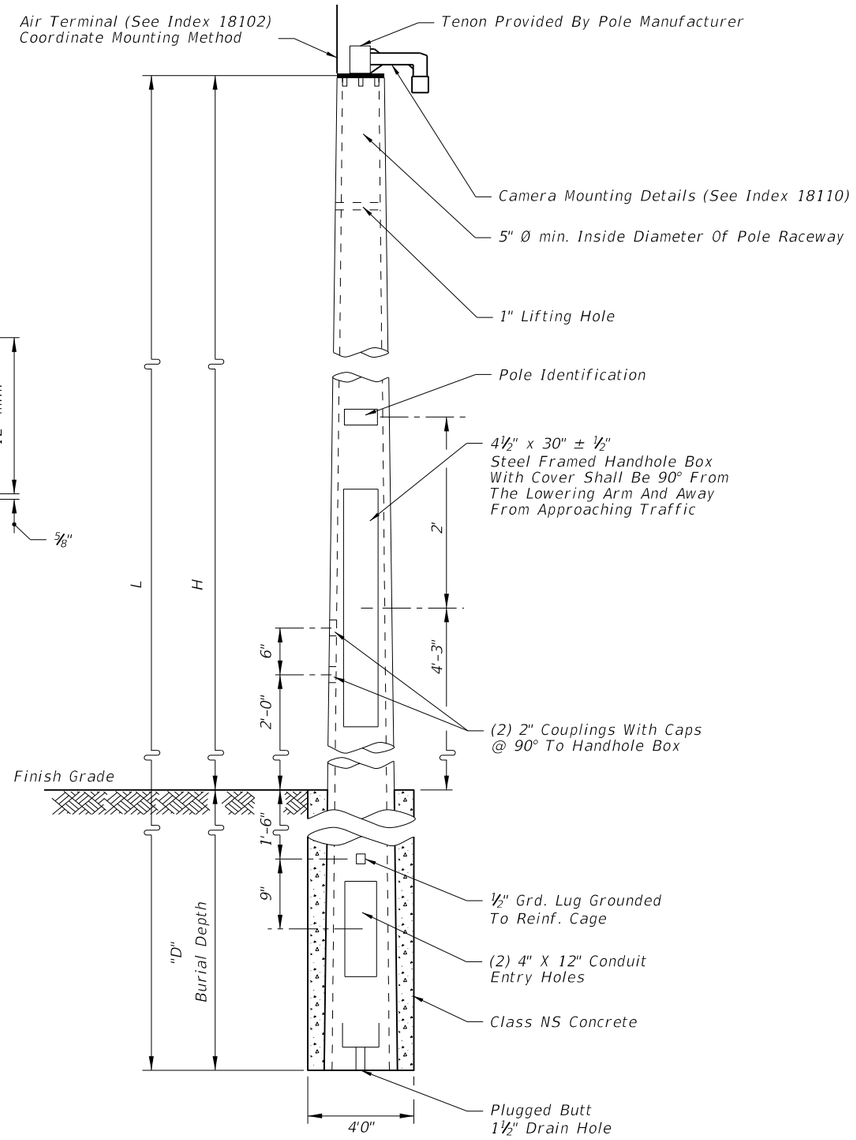
ORIENTATION VIEW



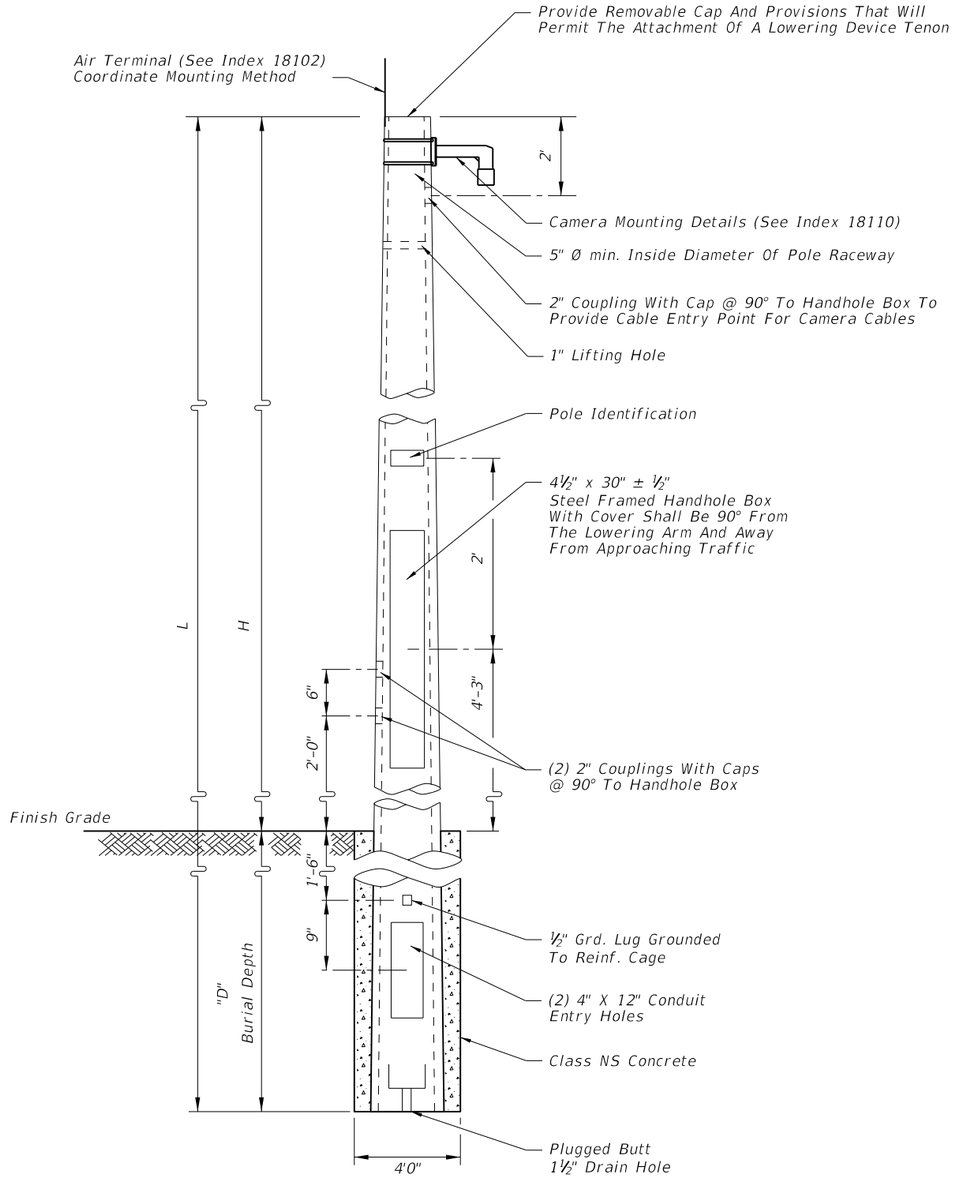
ORIENTATION VIEW



TENON DETAIL



WITH LOWERING DEVICE



WITHOUT LOWERING DEVICE

NOTE:
Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stand, etc.) with lowering device manufacturer.

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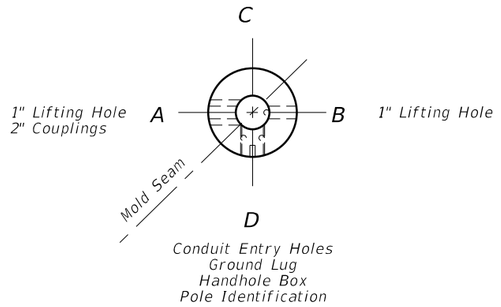
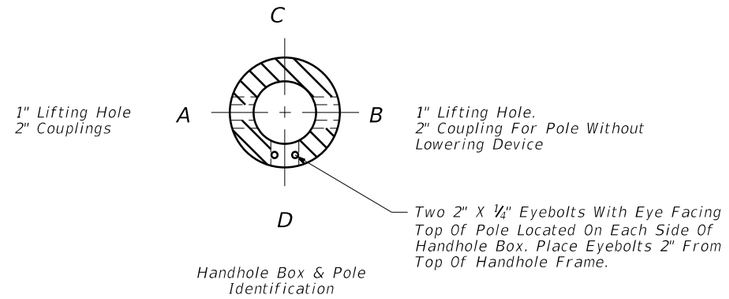
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/11			FDOT DESIGN STANDARDS 2013	CONCRETE CCTV POLE	18113	1



TOP VIEW



SECTIONAL VIEW THROUGH HAND HOLE BOX

GENERAL NOTES:

Design according to FDOT Structures Manual current edition.

Manufacturers seeking approval for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Standard. Provide documentation that certifies and demonstrates that the pole is designed to accommodate and be compatible with a lowering device listed on the Approved Product List.

Place prestressing symmetrically about both axis.

Use Class V Special Concrete or Class VI Concrete with 4 ksi minimum strength at transfer.

Use ASTM A615 Grade 60 reinforcing steel. Provide a minimum of non-prestressed reinforcement equal to 0.33% of the concrete area.

Use ASTM A416 Grade 270 stress relieved or low-lax prestressing strands.

One turn required for spiral splices and two turns required at the top and bottom of poles. Manufacture spirals from cold-drawn ASTM A82 steel wire.

Identify poles as to manufacturer, pole length, certification number and QPL qualification number by inset numerals 1" in height inscribed on the same face of the pole as the handhole and ground wire.

Provide a Class 3 surface finish.

Provide a 1" minimum cover.

Foundation design based upon the following soil criteria:

Classification	=	Cohesionless (Fine Sand)
Friction Angle	=	30 Degrees (30°)
Unit Weight	=	50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

SPECIFICATIONS:

Pole Top:	10 1/2" Diameter minimum
Pole Taper:	0.2 in/ft nominal
Defl Spec:	1" max. In 40 mph Wind (3 second gust)
Max. Camera EPA:	5.60 sq. ft Total
Max. Camera Wgt:	240 lbs Total

LOWERING DEVICE INSTALLATION NOTES:

Design tenon dimensions to facilitate lowering device component installation. Locate slots parallel to the pole centerline for mounting the lowering device. Bolt a tenon to the pole top with mounting holes and slot as required for the mounting of the lowering device.

Place the lowering cable that moves within the pole in an interior conduit to prevent it from tangling or interfering with any electrical wire that is in the pole. Ensure that any electrical wire within the pole is routed securely and free from slack.

Mount lowering arm perpendicular to the roadway or as shown in the plans. Position CCTV pole so that the camera can be safely lowered without requiring lane closures.

L (ft)	H (ft)	D (ft)
63	50	13
69	55	14
75	60	15
80	65	15
86	70	16

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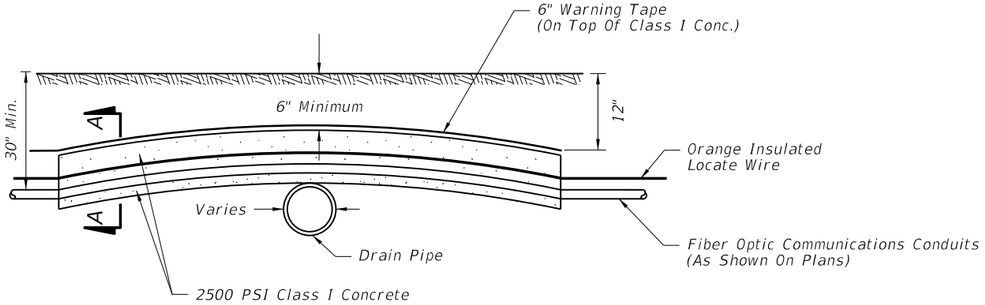
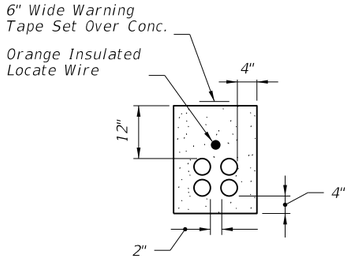
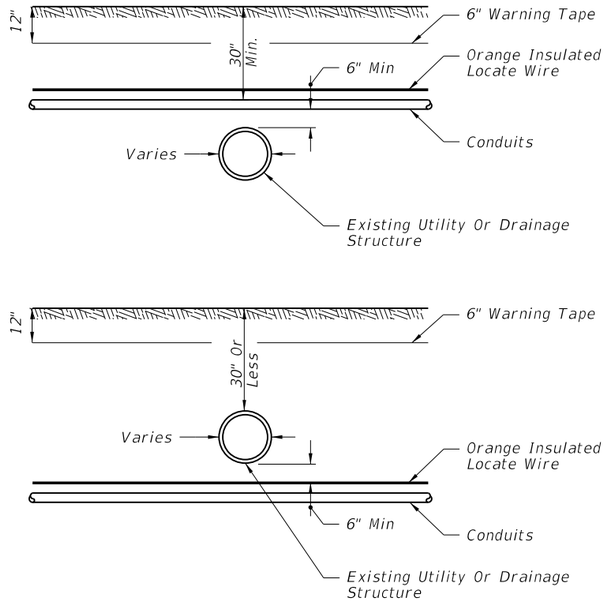




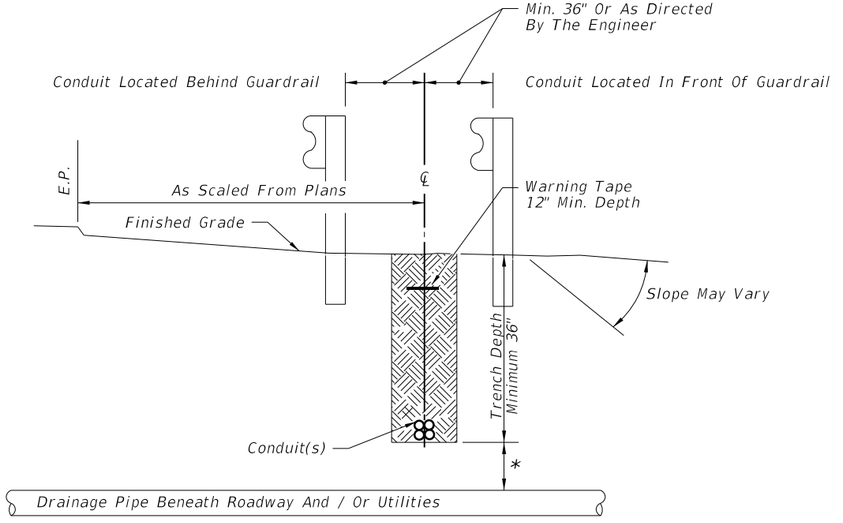
SECTION AA



CONDUIT INSTALLATION DETAILS ACROSS EXISTING DRAIN PIPES OR UTILITIES

GENERAL NOTES:

1. The contractor, with approval from the Engineer, may adjust the final burial depth of the conduit(s) in order to transverse nonmovable object conflicts.
2. Backfill with excavated material and compact the soil until firm and unyielding. Remove rock and debris from backfill material.
3. Where conduits are to be installed over existing underground structures (e.g., drain pipes or utility lines) which are less than 30" deep, the contractor shall encase the conduit in 2500 PSI Class I concrete for the entire length of conduit that is installed at a depth of less than 30".
4. If the amount of cover over the encasement is less than 6", the contractor shall install the conduit to pass below the underground structures (e.g., drain pipes).
5. Size and type of fiber optic conduits shall be shown on plans.



* Maintain 12" Minimum Vertical Clearance When Crossing Over Pipe And / Or Utilities. If Minimum Vertical Clearance Cannot Be Maintained, Then Conduit Is To Be Routed Under Pipe Maintaining 12" Minimum Vertical Clearance.

CONDUIT INSTALLATION TYPICAL DETAIL

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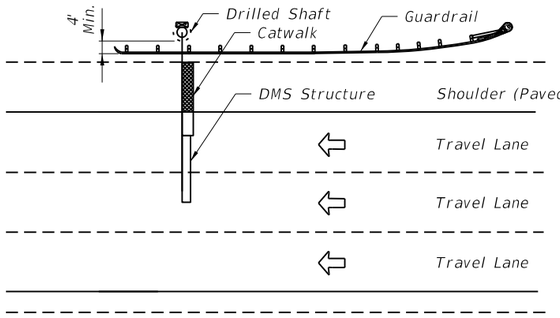
LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT DESIGN STANDARDS 2013	FIBER OPTIC TRENCH DETAILS	INDEX NO. 18202	SHEET NO. 1

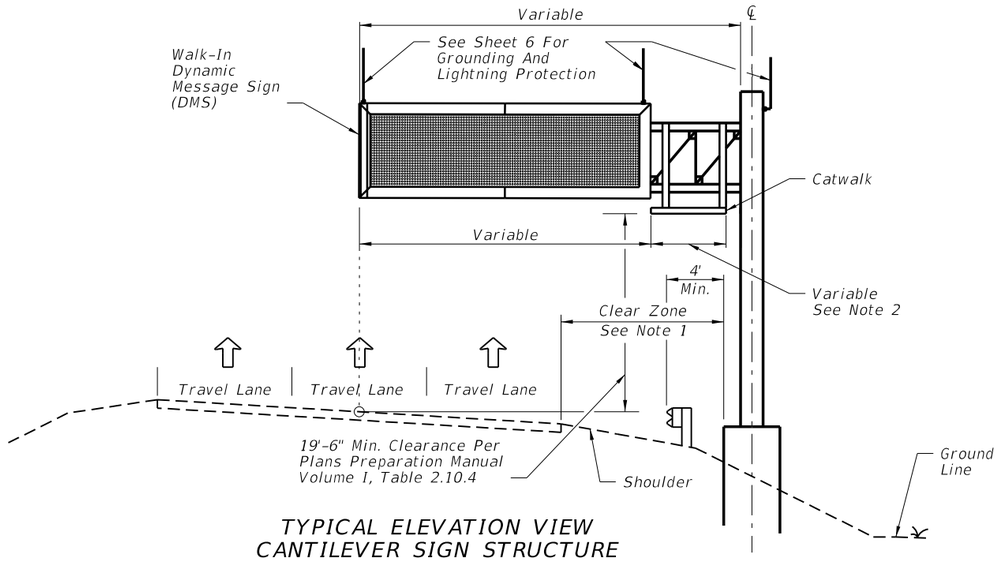
GENERAL NOTES:

1. If no guardrail or barrier wall exists, structure shall be outside the clear zone. Clear zone shall be measured to edge of the drilled shaft if drilled shaft is more than 4" above adjacent grade.
2. Extend Catwalk from DMS to outer edge of paved shoulder but not less than four feet in length.
3. Clear zone distance and setbacks from edge of travel lane shall be in accordance with Plans Preparation Manual Volume I, Chapters 2 and 4.

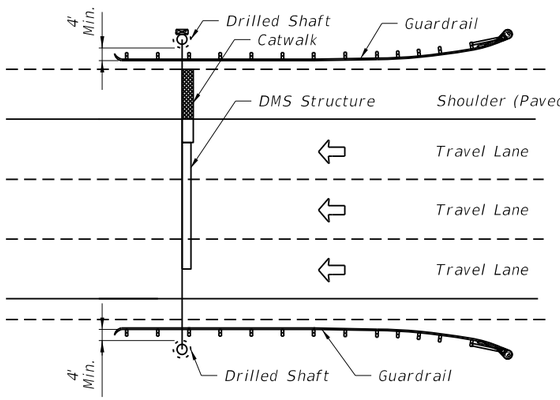


Note: Actual number and direction of travel lanes varies.

TYPICAL PLAN VIEW
DMS CANTILEVER SIGN STRUCTURE

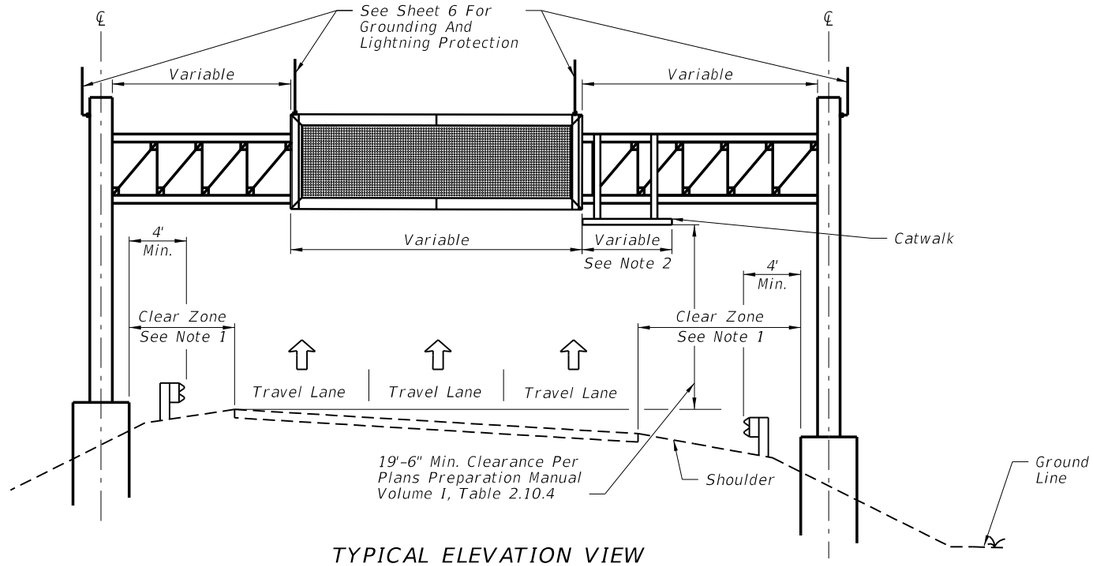


TYPICAL ELEVATION VIEW
CANTILEVER SIGN STRUCTURE



Note: Actual number and direction of travel lanes varies.

TYPICAL PLAN VIEW
SPAN SIGN STRUCTURE



TYPICAL ELEVATION VIEW
SPAN SIGN STRUCTURE

GENERAL LAYOUT

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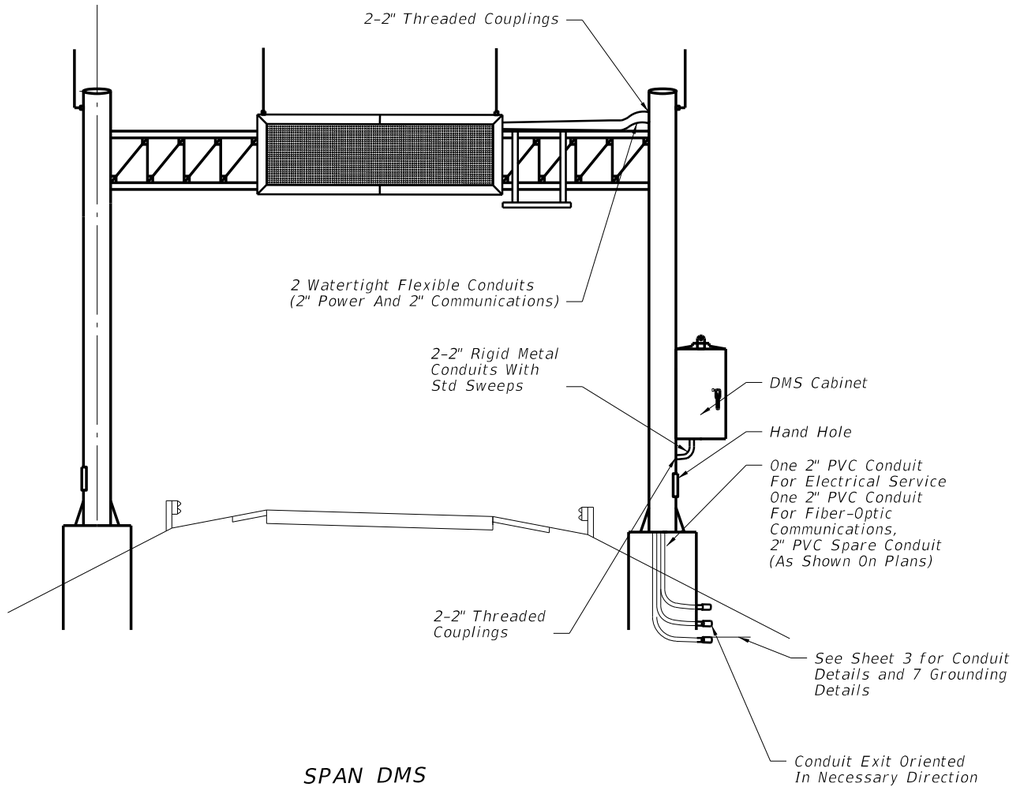
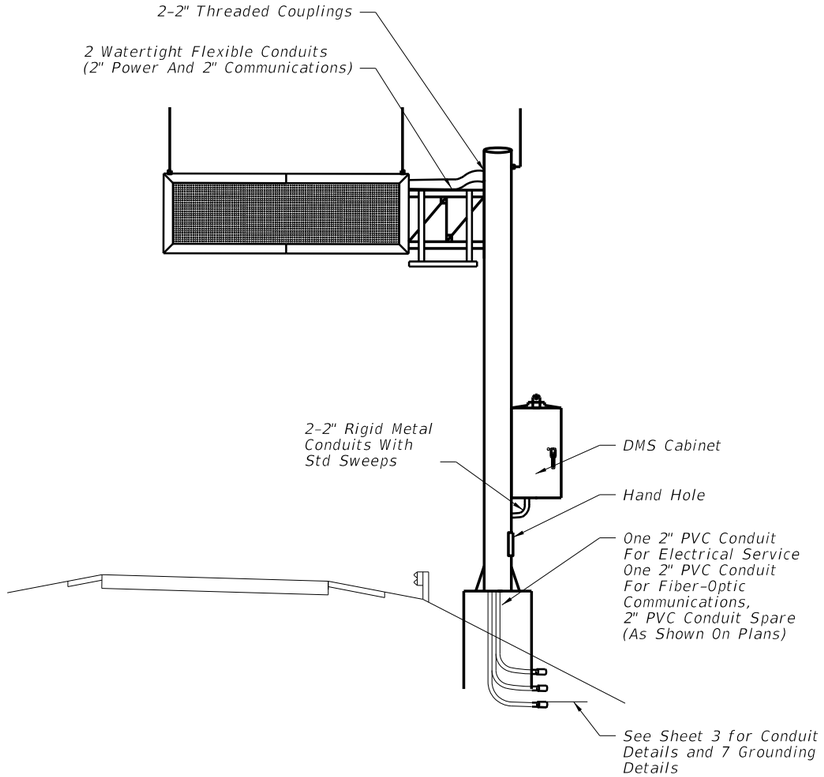
01/01/12						18300	1



SPAN DMS



CANTILEVER DMS

GENERAL NOTES:

1. Conductors for grounding shall be connected to steel framework that have been cleaned to base metal, by use of bonding plates having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure to accept a threaded connector is also an acceptable method.
2. If steel framework is to be drilled and tapped to accept threaded connector, the threaded connector shall have at least 5 threads fully engaged and secured with a jam nut to the steel framework.
3. Bends in the conduit shall not be less than the minimum bending radius for the cable contained in the conduit.
4. Catwalk and handrail design and installation shall comply with AISC, AASHTO, and OSHA requirements as applicable.
5. All data, fiber-optic and power cable for the DMS shall be completely encased within the sign structure or in conduit.
6. Permanently stamp/mark foundation to conduit locations.
7. Transition conduit in foundation to underground conduit with appropriate reducer outside the limits of the foundation.

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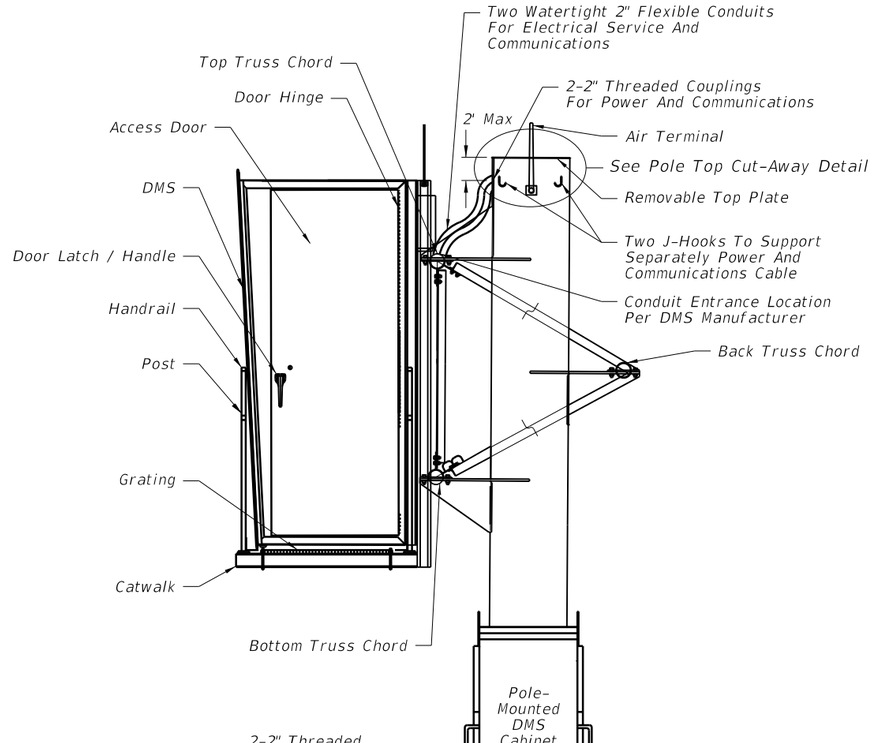
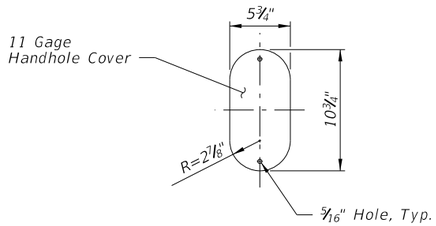
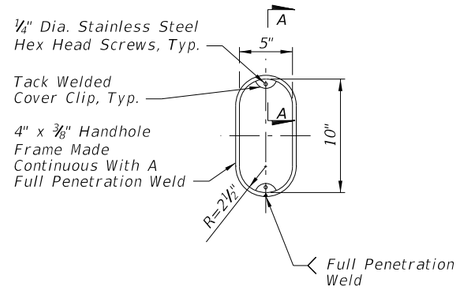
GENERAL NOTES:

1. DMS Cabinet may be pole or ground mounted depending on project requirements.
2. See sheet 7 for additional conduits for grounding. The number and placement of conduits are approximate.
3. Field adjust pole-mounted DMS cabinet height to achieve best access for maintenance personnel given site conditions as directed by the Engineer. Avoid conflicts with stiffeners, hand-hole and maintenance of anchor bolts.

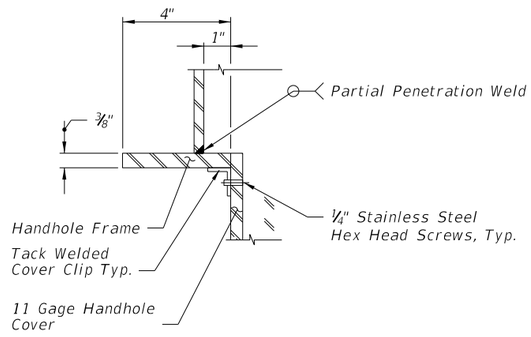




HANDHOLE COVER



HANDHOLE FRAME



SECTION A-A
(Thru Handhole)

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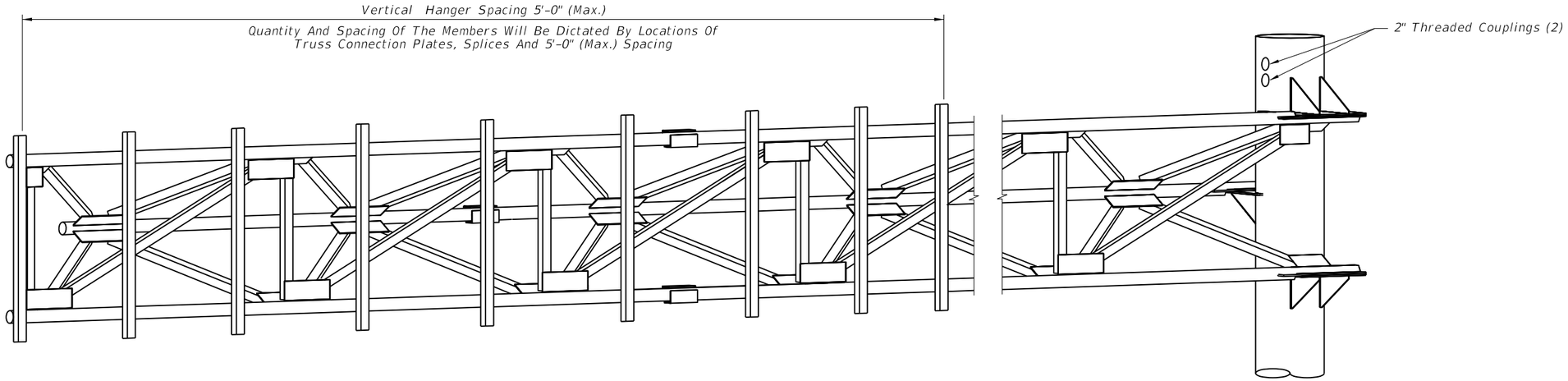

HANGER LOCATION DETAIL

(Cantilever Sign Structure Shown, Span Sign Structure Similar)

GENERAL NOTES

1. Design Specifications: FDOT Structures Manual (current edition) and AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.
2. Design Wind Speed: 150 miles per hour. Maximum DMS weight for design: 4500 lb.
3. Shop drawings including the DMS connection are required and fabrication shall not begin until these shop drawings are approved.
4. Locate the sign laterally on the structure as shown in the plans. Vertically center the sign enclosure with the centerline of the truss.
5. Before erection, after both the delivery of the DMS and the steel truss, the contractor shall carefully measure the exact locations for field drilling the ½" bolt holes in the vertical hangers and horizontal mounting member attached to the sign enclosure. Field locate holes to allow vertical hanger placement as shown on the plans with no conflicts with gusset or splice plates.
6. All steel items shall be galvanized as follows:
   All nuts, bolts and washers ASTM F2329
   All other steel items ASTM A123
7. All bolt holes shall be equal to the bolt diameter plus 1/16", prior to galvanizing.
8. All bolts shall have single self-locking nuts, or locking nut system, installed in accordance with the manufacturer's recommendations.
9. Cost of the installation of the DMS on truss including the vertical hanger, associated members, and hardware shall be incidental to the cost of the sign structure.
10. Threaded couplings shall be located on sign side of column above the sign truss.

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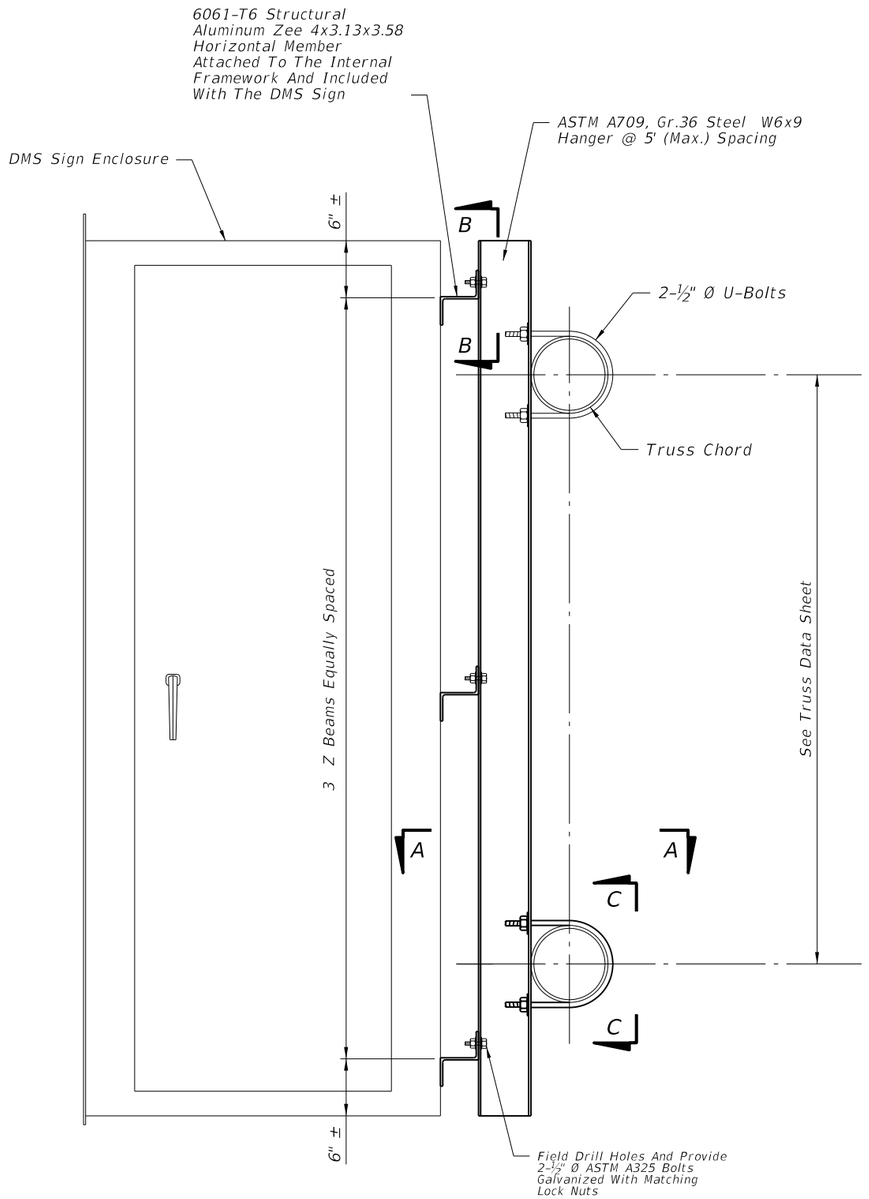
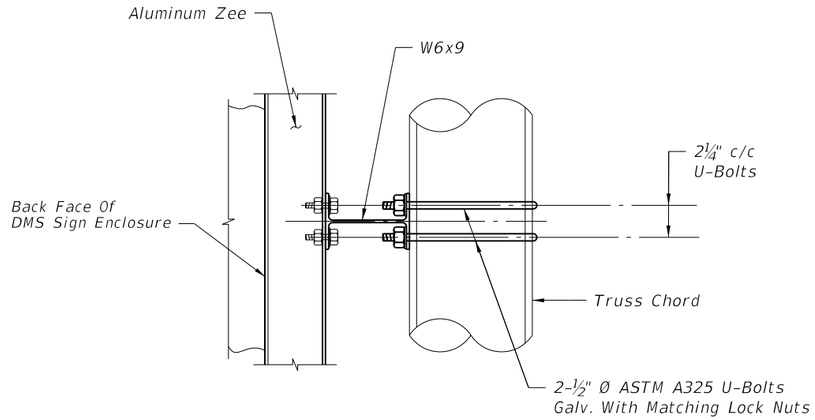
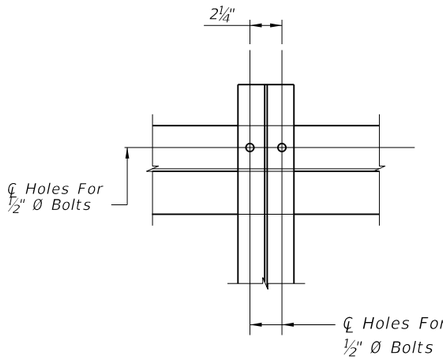
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	DYNAMIC MESSAGE SIGN WALK-IN	INDEX NO.	SHEET NO.
07/01/10						18300	4



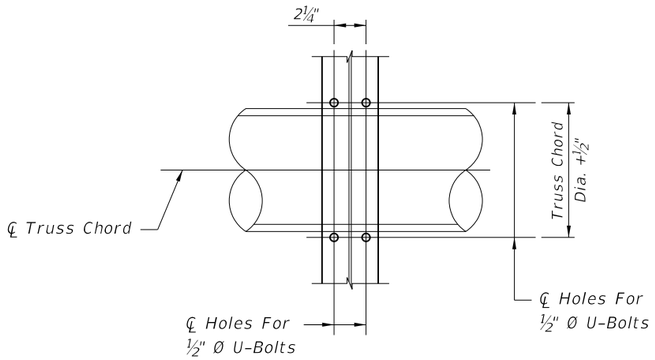
END VIEW



SECTION A-A



SECTION B-B



SECTION C-C

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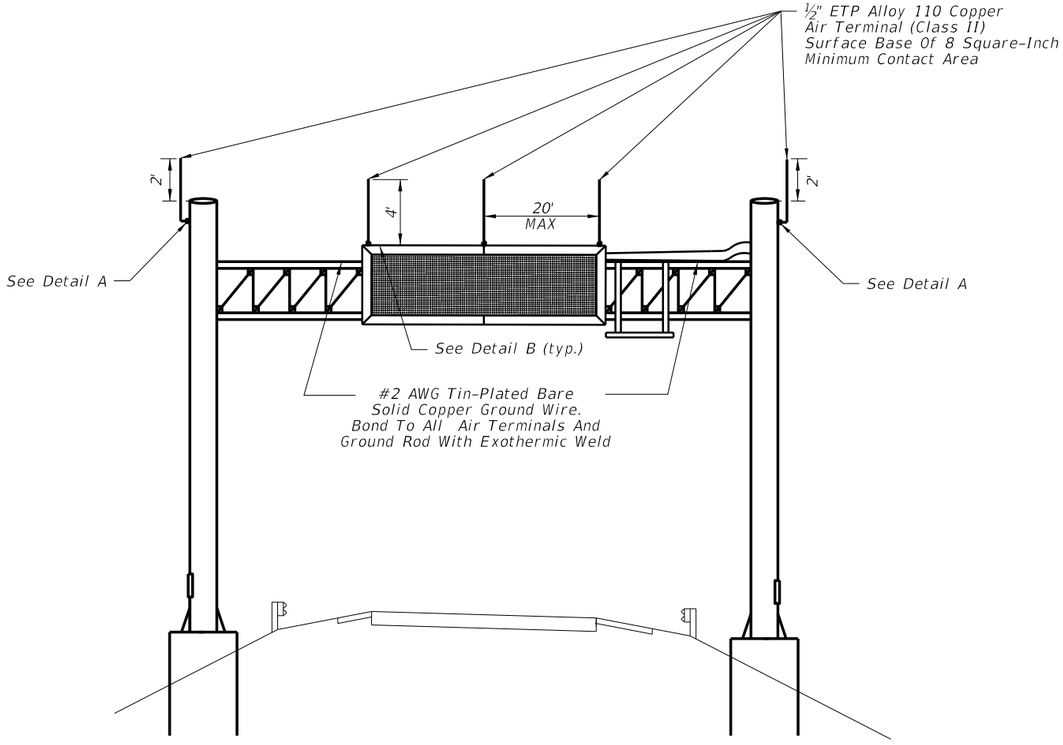
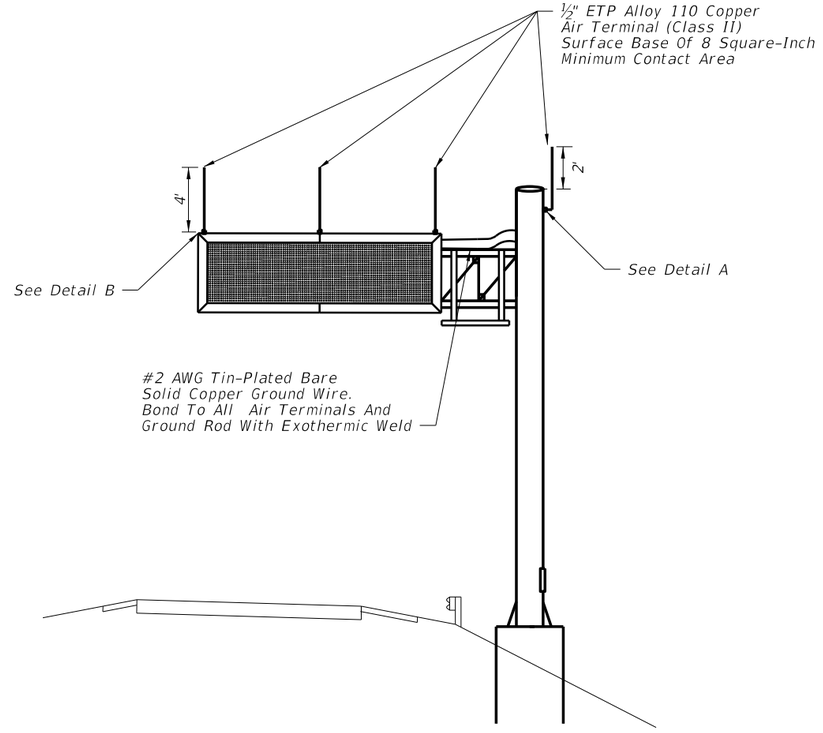
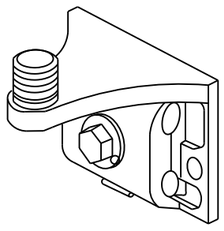
07/01/10			FDOT DESIGN STANDARDS 2013	DYNAMIC MESSAGE SIGN WALK-IN	18300	5



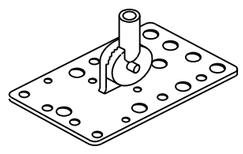
SPAN DMS



CANTILEVER DMS



DETAIL A



DETAIL B

GENERAL NOTES:

1. All grounding materials shall meet the requirements of Section A620 of the current Minimum Specifications For Traffic Control Signal Devices (MSTCSD), except as noted.
2. Exothermically weld all connections to ground rods.
3. The contractor may, upon approval of the Engineer, install a 30-foot sectional ground rod for instances when conditions will not allow for the installation of the 3 auxiliary ground rods.
4. Install marker tape directly above all grounding electrodes and conductors.
5. Copper flat surfaces shall be bolted, welded, or brazed securely to framework to maintain electrical continuity.
6. All air terminals must meet UL-96A.
7. Grounding system shall be placed within right of way.
8. See Sheet 7 for ground rod placement detail.
9. Lightning protection shall conform to NFPA 780. Spacing between air terminals shall not exceed 20 feet.

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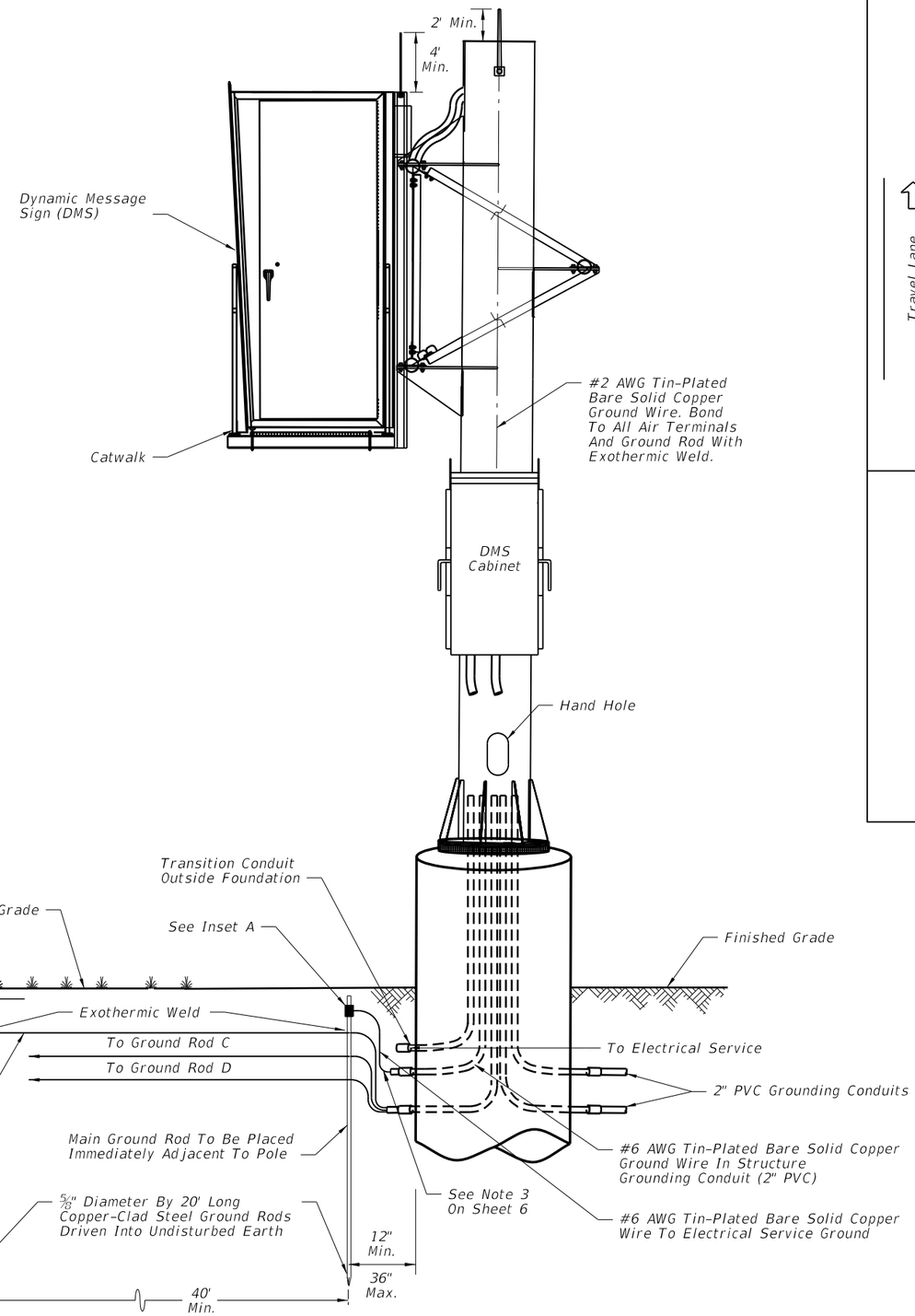
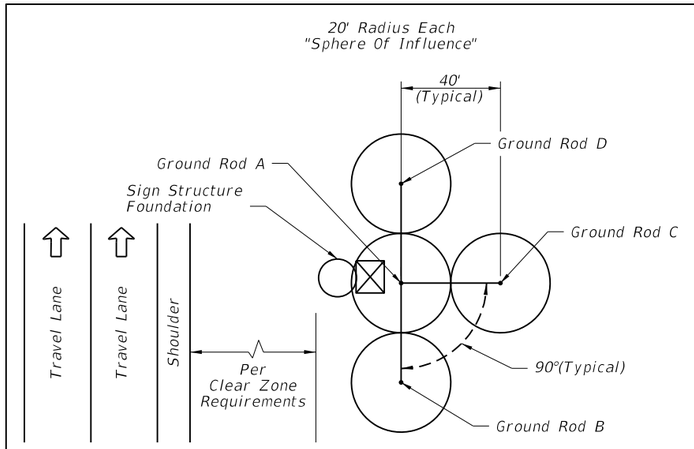
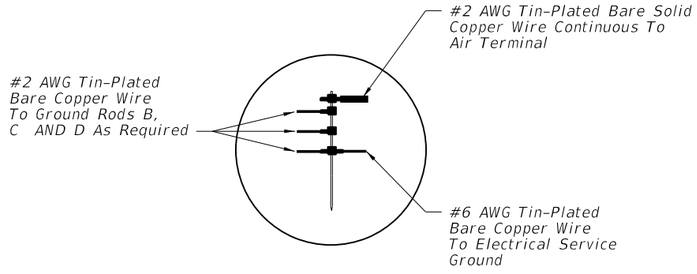




GROUND ROD PLACEMENT DETAIL (TYPICAL)



INSET 'A'

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LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
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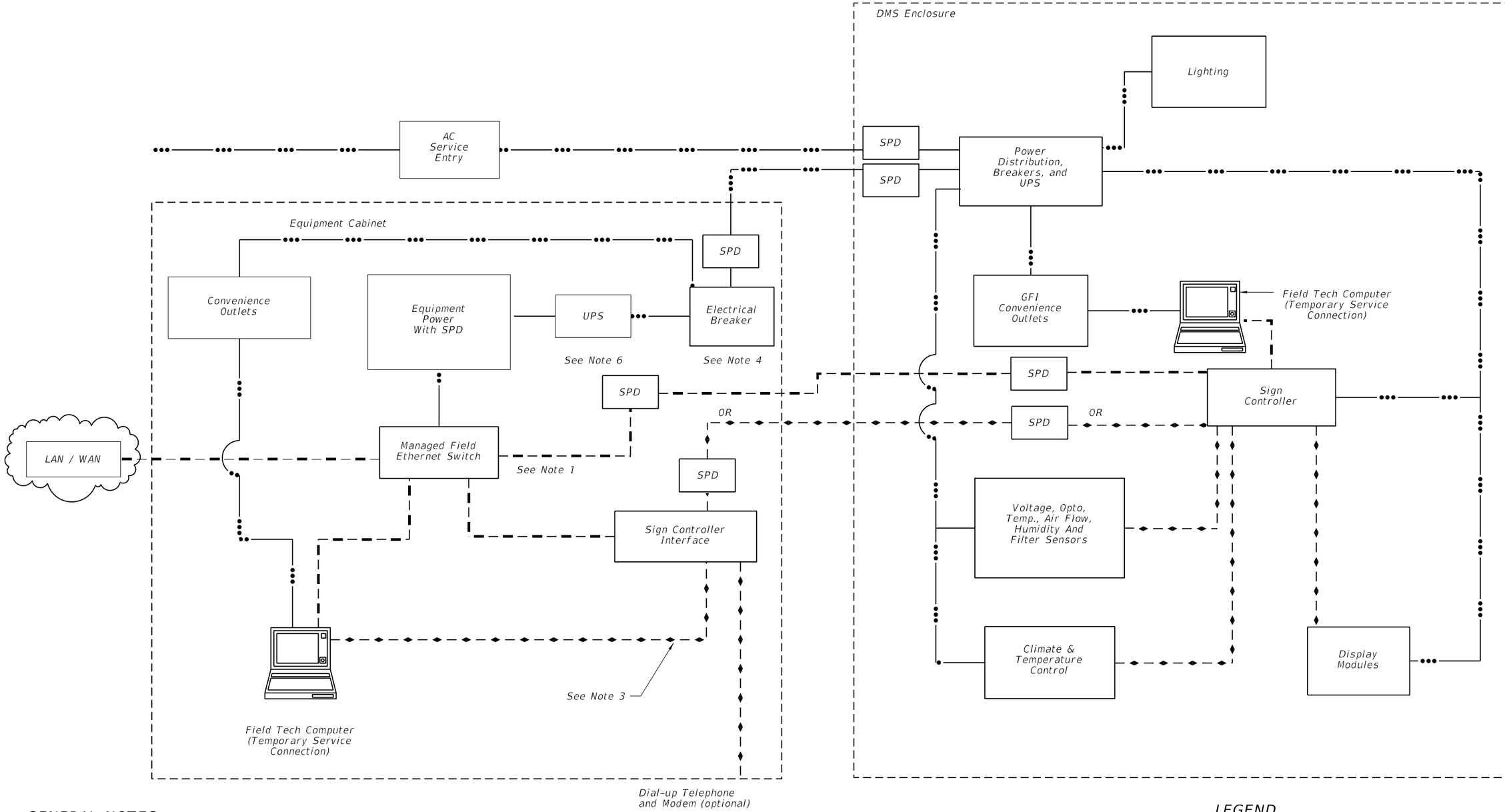

GENERAL NOTES:

1. Provide single ethernet connection from the managed field ethernet switch to either the sign controller interface in cabinet or sign controller in sign enclosure.
2. Locate cabinet as shown in plans.
3. Serial data link is for communications directly to the DMS controller.
4. Cabinet must include at least one breaker to control all cabinet power.
5. AC service entrance may be located in cabinet or sign housing.
6. UPS equipment location may vary. Diagram indicates functional requirements that uninterrupted power must be available in cabinet and sign housing.

LEGEND

Data

Ethernet

Power

SPD — Surge Protection Device

SIGN AND CABINET WIRING DIAGRAM

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07/01/10			FDOT DESIGN STANDARDS 2013	DYNAMIC MESSAGE SIGN WALK-IN	18300	8

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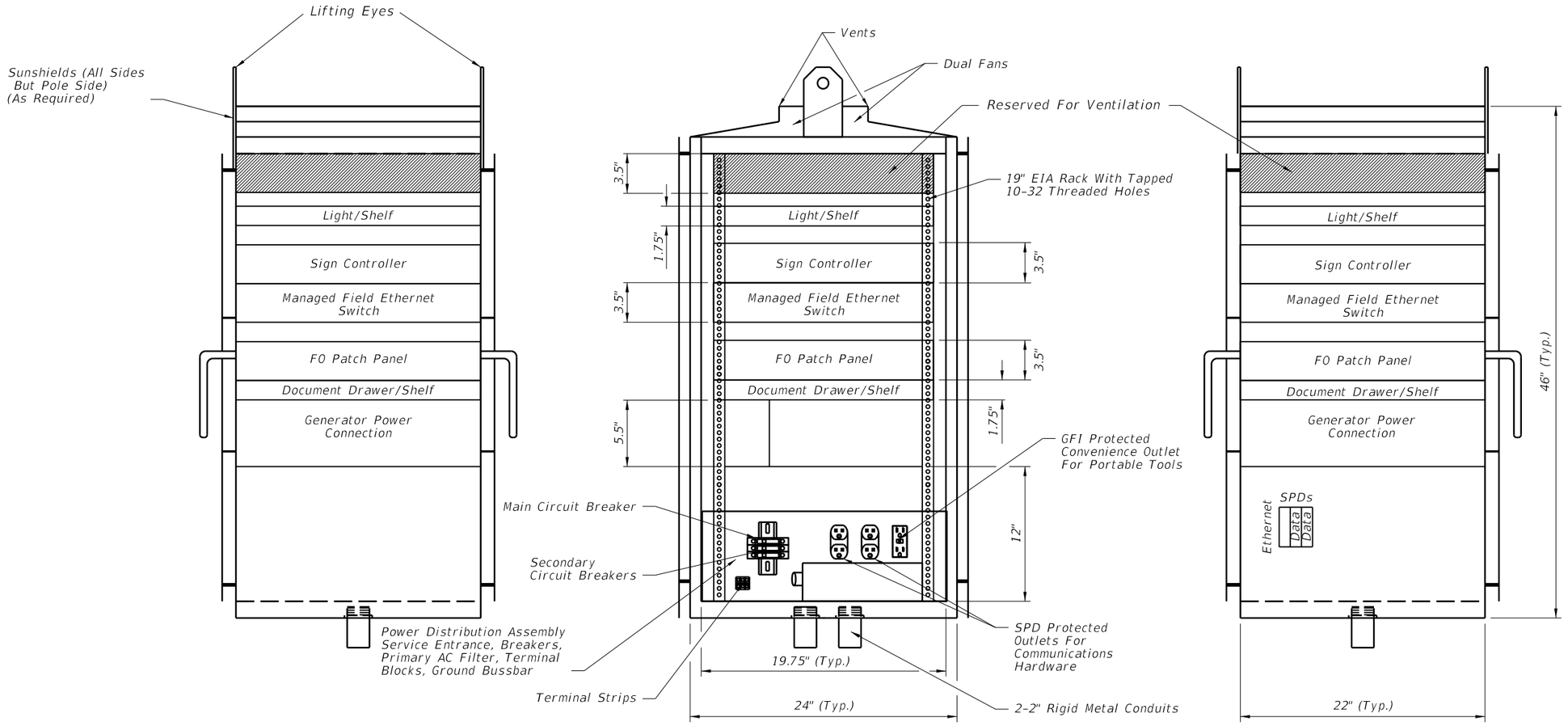

LEFT SIDE VIEW

FRONT VIEW
POLE MOUNTED DMS CABINET

RIGHT SIDE VIEW

GENERAL NOTES:

1. Cabinet layout is for pole or ground mounted installations.
2. All dimensions and equipment locations are approximate.
3. Conduit entrances are at bottom of cabinet.
4. Minimum number of duplex outlets is three, (2) SPD protected and (1) GFI protected.
5. Either an access controller or local access panel shall be provided to provide full access to DMS sign for control, programming and troubleshooting.
6. Load center shall be sized for connected equipment and convenience outlets with at least one main disconnect and three circuit breakers.
7. Batteries and UPS may be located in sign housing or cabinet.
8. Power Distribution Assembly component layout, orientation and location may vary.

CABINET LAYOUT 1

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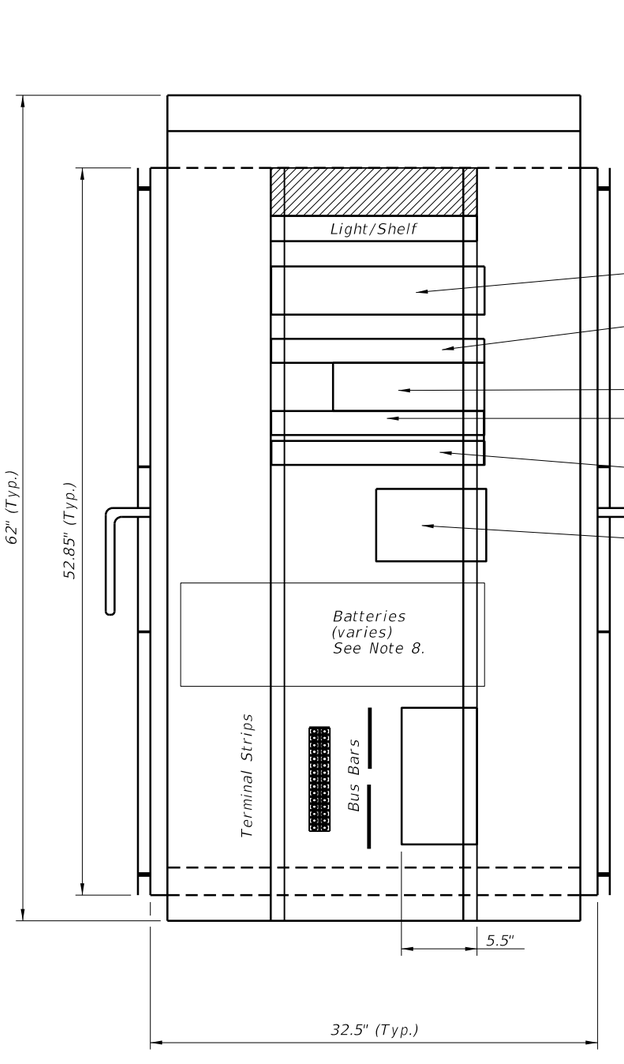
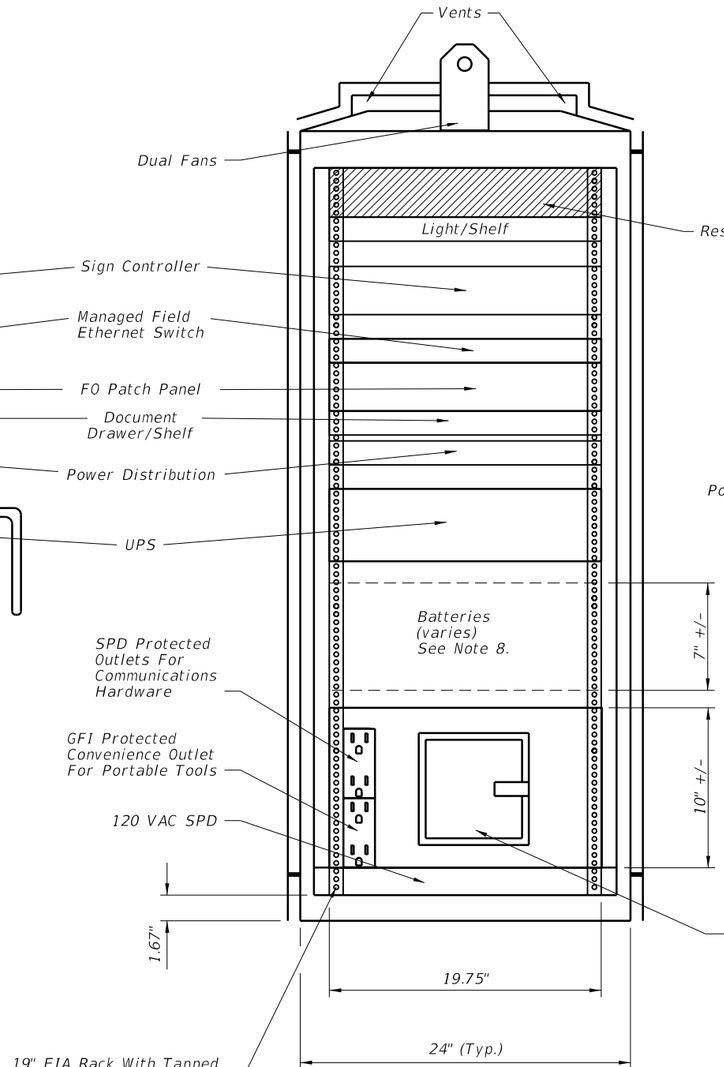
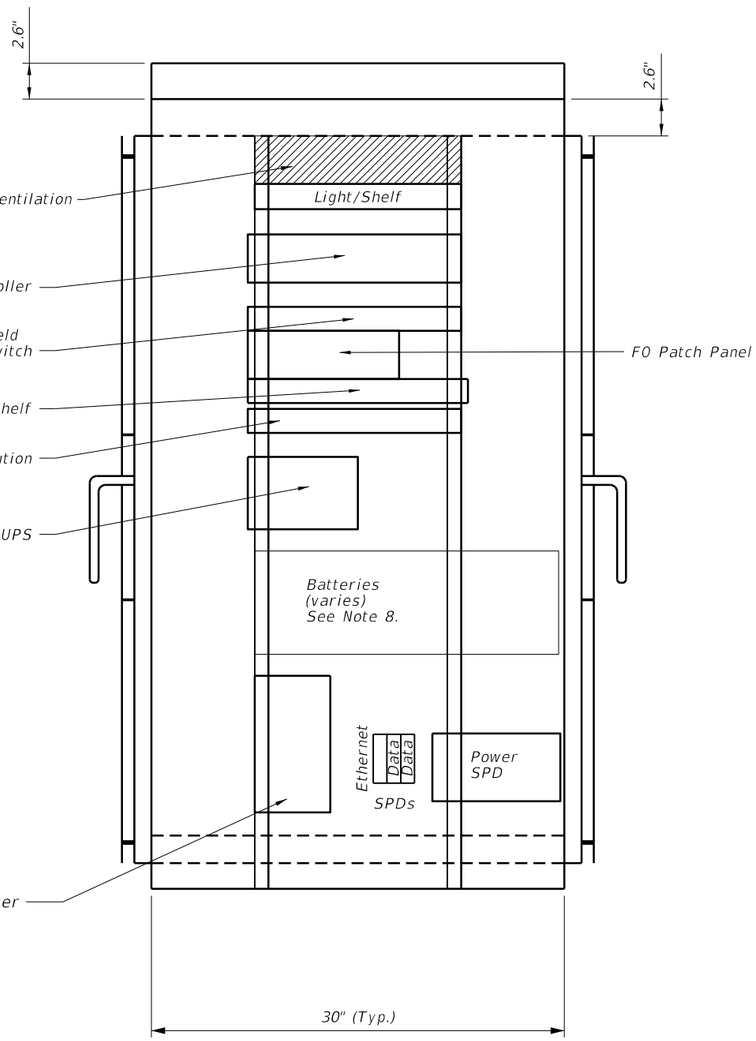


LEFT SIDE VIEW



FRONT VIEW
GROUND MOUNTED DMS CABINET



RIGHT SIDE VIEW

CABINET LAYOUT 2

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/10			FDOT DESIGN STANDARDS 2013	DYNAMIC MESSAGE SIGN WALK-IN	18300	10

6/28/2012 3:12:07 PM rd960rh C:\d\projects\standards\its\18000-s\18300-10.dgn