# Illinois Tollway Base Sheet Revisions

## Section M

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### Effective: 2019-03-01

**Pole Assembly (ITS)-Series 1000**
- M-ITS-1000: Elevation Views Pole Mounted ITS Element Assembly
  - Changed disconnect switch to unfused.
- M-ITS-1003: ITS Concrete Service Pad (2 sheets)
  - New drawing with three types of service pads for ITS poles for flat and slope installation.
- M-ITS-1004: Cabinet Wiring Diagram - ITS Pole Mounted Enclosure (Solar Powered MVDS) (2 sheets)
  - New cabinet layout separating ITS enclosure and dedicated co-located solar generator/battery cabinet with four 6 V batteries.

### Dynamic Message Sign (ITS)-Series 1100
- M-ITS-1108: DMS Cabinet Wiring Diagram
  - Changed to Cisco 4900 series switch.
  - Changed IP Relay to DIN IV.

### Cabinet Wiring (ITS)-Series 1200
- M-ITS-1200 to M-ITS-1217: Cabinet Wiring Diagrams
  - 18 new ITS enclosure drawings replace old 56 ITS enclosure drawings for clarification.
  - Consolidated equipment configurations.
  - Standardized to scale equipment layout.
  - Changed to Cisco 4900 series switch.
  - Eliminated 24 VAC transformer and 24 VAC CCTVs. Additional 24 VDC power supply.
  - Cat6 Ethernet surge protectors revised to PoE++ compatible models.

### Roadway Weather Information System (ITS)-Series 1300
- M-ITS-1300: RWIS Pole, Sensor Mounting Detail
  - Pole height changed to 50 feet as standard pole for ITS with 17.5 inch bolt circle.
- M-ITS-1301: RWIS Cabinet Wiring Diagram
  - Changed to Cisco 4900 series switch. Not connected to RWIS controller, for future use.
  - Added IP Relay. Disconnected, for future use.
  - Added secondary sensor pole cabinet wiring diagram. Cabinet is part of the design but was omitted in last year release.

### Solar Powered Generator (ITS)-Series 1400
- M-ITS-1402: Pole Mounted Solar MVDS Assembly
  - Co-located solar generator cabinet redesigned as M-ITS-1004.

### Tower Mounted CCTV (ITS)-Series 1500
- M-ITS-1500: Tower Mount Camera Details
  - Cameras shown at offset height to avoid view obstruction. Pole mounting arm revised to Axis Q6155-E IP camera.
- M-ITS-1503: Cabinet Wiring Diagram - Tower Mounted CCTV
  - Revised to show 24 VDC power supply, drawing drawn to scale.

### Flashing Beacon (ITS)-Series 1700
- M-ITS-1701: Flashing Sign Beacon Installation Wiring Diagram
  - Revised to show full cabinet layout accommodating flasher beacon. Re-drawn to scale.
  - Added flashing beacon, new surge suppressor.

### IPDC Facility (ITS)-Series 1800
- M-ITS-1802, 1803, 1805, 1806, 1809, 1810: IPDC Facility
  - Building modified to accommodate larger generator room door, door stoppers.
  - Additional exterior CCTV cameras.
  - Added bird deterrent.
  - Added exterior GFCI outlets.

### Conduit Details at Integral Abutment Bridge (ITS)-Series 1900
- M-ITS-1900: Conduit Details at Integral Abutment Bridge with MSE Wall (Sheet 3)
  - Removed note stating concrete encasement to be placed monolithic with the approach slab.
  - Added 0.5” PJF at the back of the approach and approach bent.
  - Added 0.75” PJF between the approach slab and encasement.
  - Added detail for deflection and expansion fittings at the encasement and pile bent.
  - Added detail for deflection fitting at encasement and abutment.

### 100 FT. Monopole (ITS)-Series 2000
- M-ITS-2000: 100 FT. Monopole Closed Circuit Television (CCTV) Camera Tower
  - Sheet 4: Added sheet 4 of 4 showing hexagonal service pad.

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**New Sheet** **Retired Sheet**
GENERAL NOTES:

1. DESIGNING SYSTEM SHALL BE PLACED WITHIN ILLINOIS TOLLWAY RIGHT-OF-WAY.
2. GROUND MOUNTED CONTROL CABINET SHALL BE PLACED UPHILL OF THE STRUCTURE AT THE LOCATION SHOWN ON THE PLAN VIEWS.
3. INSTALL WIRE MESH DIRECTLY ABOVE GROUND CONDUIT CONDUCTORS.
4. THE COST OF ALL MATERIALS, GROUND BUS, GROUND WELD, GROUND WELL, GROUND BUS, AND ALL OTHER ITEMS TO COMPLETE THE GROUNDING SYSTEM SHALL BE INCLUDED IN PAY ITEM JT132621 - DMS ELECTRICAL.
5. REFER TO SHEET M-ITS-1102 FOR DMS TYPICAL SITE WIRING DETAIL.

NOTE TO DESIGNER:

THE DESIGNER PRIOR TO INSERTION INTO A CONTRACT. MICROSTATION FILES AND THE "CADD STANDARDS MANUAL" ARE AVAILABLE ON THE ILLINOIS TOLLWAY WEBSITE. THE DESIGNER SHALL ACCEPT THE RESPONSIBILITY OF THE DESIGN OF THE SHEET UPON ITS COMPLETION AND INSERTION INTO A CONTRACT. ALL NOTE TO DESIGNER NOTES SHALL BE HANDLED PRIOR TO INSERTION OF THE DRAWING INTO THE PLAN SET.

DMS TYPE 1
SITE GROUNDING PLAN

M-ITS-1101

DATE 3-01-2018
DMS SITE GROUNDING DETAIL

**NOTES:**

1. Additional ground rods shall be added to grounding electrode conductor as required until resistance to ground is 5 ohms or less, for clock and power service locations. If additional ground rod electrodes are required in order to achieve required resistance they shall be installed in standing ground rods, all ground rod electrodes shall be connected with #2/0 tinned bare stranded copper conductor and shall be 20 feet from connected ground rod. All communication equipment grounding conductors shall be tested for resistance to ground using the three-point fall-of-potential test procedure or see its element site grounding special provision for procedures.

2. Ground rods shall not be routed through foundations.

3. Fences and other metallic structures within 20 feet of ground shall be connected to equipment ground if they are located within 20 feet of the grounding electrode system or any object grounded to the grounding electrode system.

4. Ground rods shall be installed in ground wells in finished grade unless installed under sidewalks or pavement.

5. All equipment grounds shall be properly connected to a chassis, all painted and other coatings, including galvanization, shall be removed prior to termination of a ground. After the ground is terminated a non-grounding coating shall be painted over the exposed metal surfaces.

6. Grounding electrode system conductors to fencing shall be made using tinned stranded pipe clamps designed for grounding and stainless steel hardware.

7. All grounding diagrams are schematic only.

8. All metallic members of the DMS truss and the DMS sign within 6 feet of each other shall be bonded together. All members shall be considered an acceptability bonding method. J-bolt connections shall not be considered an acceptable bonding method.

9. At least an 8-inch minimum bending radius shall be maintained on all grounding conductor. The angle of any bending shall not be less than 90 degrees.

10. Grounding conductors shall always route as straights as possible. "U" form jumpers shall be acceptable only for gates and doors.

11. The quantity of grounding electrode conductors connected to a ground rod or electrode shall be limited to three.

12. Whenever possible, ground rod electrodes shall be installed no closer than 11 feet from a foundation.

13. Every ground conductor or cable entering or leaving a DMS enclosure shall be protected, with a surge protection device.

14. Diagram shows equipment grounding inside enclosures.

15. Grounding conductor shall be #2/0 tinned bare stranded copper. Contractor shall install ground rod as necessary to ensure resistance at DMS cabinet is 5 ohms or less.

16. If there is a metal wall within 20 feet of control cabinet connect mankind to grounding system with #2/0 tinned bare stranded copper conductor.
NOTE TO DESIGNER
30A-2P NEMA 4X DISC MTD ON SUPPORT DETAIL (NOT TO SCALE)

POWER WIRING SCHEMATIC FOR 100A PANEL
120/240V LOAD CENTER OF DMS CABINET

DMS TYPE 2 - CANTILEVER
ELECTRICAL PLAN

GENERAL NOTES:
1. DESIGN AND INSTALL SERVICE DISCONNECT ON WAYS SUPPORT.
2. 120V 480V 120/240V 240V SINGLE PHASE TRANSFORMERS.
3. THIS IS A DIAGRAMATIC SCHEMATIC, ALL BREAKERS, TRANSFORMER LOAD CENTER SHALL
   BE SIZED AND RATED AS PER MANUFACTURER RECOMMENDATIONS.
4. ENTIRE ELECTRICAL SYSTEM SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH
   NATIONAL ELECTRICAL CODE AND THE APPROPRIATE ARTICLES OF SECTION 250 OF THE
   NATIONAL ELECTRICAL CODE.
5. ALL UNDERGROUND CONDUITS SHALL BE NON-METALLIC PVC AND ABOVE GRADE CONDUITS
   SHALL FOLLOW THE TABLE ABOVE.
6. ALL ELECTRICAL WORK FOR DMS TYPE 2 SHALL BE PAID UNDER PAY ITEM JT132622 - DMS
   ELECTRICAL WORK - TYPE 2.
7. THIS SCHEMATIC IS FOR GUIDANCE ONLY. CONTRACTOR SHALL WIRE THE DMS CABINET AS PER
   MANUFACTURER RECOMMENDATIONS AND INDUSTRY STANDARDS.
8. ALL UNDERGROUND CONDUITS SHALL BE NON-METALLIC PVC AND ABOVE GRADE CONDUITS
   SHALL FOLLOW THE TABLE ABOVE.
9. THIS SCHEMATIC IS FOR GUIDANCE ONLY. CONTRACTOR SHALL WIRE THE DMS CABINET AS PER
   MANUFACTURER RECOMMENDATIONS AND INDUSTRY STANDARDS.
10. ALL ELECTRICAL WORK FOR DMS TYPE 2 SHALL BE PAID UNDER PAY ITEM JT132622 - DMS
    ELECTRICAL WORK - TYPE 2.
11. THIS SCHEMATIC IS FOR GUIDANCE ONLY. CONTRACTOR SHALL WIRE THE DMS CABINET AS PER
    MANUFACTURER RECOMMENDATIONS AND INDUSTRY STANDARDS.
12. ALL UNDERGROUND CONDUITS SHALL BE NON-METALLIC PVC AND ABOVE GRADE CONDUITS
    SHALL FOLLOW THE TABLE ABOVE.
1. Grounding system shall be placed within Illinois Tollway right-of-way.
2. Ground mounted control cabinet shall be placed at the structure at the elevation shown on the plan view.
3. Install marker tape directly above grounding electrodes and conductors.
4. The cost of all materials, all ground busbars, exothermic welding, ground well, and items to complete the grounding system shall be included in pay item JT1362 - DMS Electrical Work - Type 2.
5. CA-11, a quality, in accordance with SSRBC 1004.

NOTE TO DESIGNER

This typical DMS Type 2 ground plan is applicable to both DMS Type 2 cantilever and butterfly signs. This type 2 cantilever sign is shown on this drawing for clarity. Designers shall modify and complete this drawing into the plan set.

NOTE TO CONSTRUCTION

This typical sheet shows a DMS Type 2 foundation but it is not a standard drawing. It requires completion by the designer prior to insertion into a contract. Authorization shall be obtained from the Illinois Tollway prior to insertion into a contract. All work to satisfy the requirements of this typical sheet shall be completed prior to insertion of the design into the plan set.

GROUNDING SCHEMATIC

DMS TYPE 2

NOTE TO DESIGNER

This typical DMS Type 2 grounding plan is applicable to both DMS Type 2 cantilever and butterfly signs. This type 2 cantilever sign is shown on this drawing for clarity. Designers shall modify and complete this drawing for DMS Type 2 multiple sign.

NOTE TO CONSTRUCTION

This typical sheet shows a DMS Type 2 foundation but it is not a standard drawing. It requires completion by the designer prior to insertion into a contract. Authorization shall be obtained from the Illinois Tollway prior to insertion into a contract. All work to satisfy the requirements of this typical sheet shall be completed prior to insertion of the design into the plan set.

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DMS TYPE 2
DMS SITE GROUNDING DETAIL

NOTES:
1. Additional ground rods shall be added to grounding electrode conductor as required. The ground resistance to ground shall be 5 ohms or less, for device and power service locations. Any additional ground rod electrodes are required to achieve the required resistance. These shall be connected with 2/0 Tinned Bare Stranded Copper conductor and shall be 25 feet from connected ground rod. All communication equipment grounding system shall be tested for resistance to ground using the three-point fall-of-potential test per ANSI/IEEE STD 94. See the Illini State Grounding special provisions for procedures.
2. Ground rods shall not be bonded to foundations.
3. Fences and other metallic structures within 25 feet of ground shall be connected to equipment grounding system if they are located within 8 feet of the grounding electrode system.
4. Ground rods shall be installed in ground wells in finished grade.
5. All equipment grounds shall be properly connected to a chassis, all paint and other coatings, including galvanization, shall be removed prior to termination of a ground except the ground is maintained as a non-floating coating shall be painted over the exposed metal surfaces.
6. Grounding system connections to fencing shall be made using heavy duty tinned copper jumper strips designed for grounding and stainless steel hardware.
7. All grounding diagrams are schematic only.
8. All metallic members of the DMS truss and the DMS site within 6 feet of each other shall be bonded together. Joints shall be considered an acceptable bonding method. Joints connections shall not be considered an acceptable bonding method.
9. At least one 6-inch minimum spacing plate shall be maintained on all grounding electrode conductors. The angle of any bending shall not be less than 90 degrees.
10. Grounding conductors shall always route as straight as possible. "U" form jumpers may be acceptable only for gates and doors.
11. The quantity of grounding electrode conductors connected to a ground rod electrode shall be limited to three.
12. Wherever possible, ground rod electrodes shall be installed no closer than 10 feet from a foundation.
13. Every copper conductor or cable entering or leaving a DMS enclosure, the DMS controller, or the CCTV electronics enclosure shall be protected with a surge protection device.
15. Grounding system connections to fencing shall be made using heavy duty tinned copper jumper strips designed for grounding and stainless steel hardware.
16. Grounding system shall be 2/0 Tinned Bare Stranded Copper conductor, shall install ground rods as necessary to ensure ground resistance at DMS cabinet is 5 ohms or less.
17. If there is a metal wall between 20 feet of control cabinet connect bonding to grounding system with 2/0 Tinned Bare Stranded Copper conductor.

NOTE TO DESIGNER
This data sheet shows typical new construction but it is not a standard design. The designer must consult the contract drawings for details of the design. The designer shall accept the responsibility of the design of this sheet upon its completion and insertion into a contract. All notes to designer shall be removed prior to insertion of the drawing into the contract.

M-ITS-1106
ILLINOIS TOLLWAY
DMS TYPE 2
SITE WIRING DETAIL

DATE
3-01-2018
1. Pad mount configuration
2. 0.125" aluminum 5052-H34 construction with continuously welded external seams
3. Three point latch with SST handle
4. Double flanged door seal with 2" x 2" closed cell neoprene gasket
5. Full length EIA gage for 19" equipment
6. Adjustable pull out drawer
7. Door opening: 21.50" x 54.75"
8. Full length stainless steel hinge
9. All stainless steel hardware
10. Corbin #2 lock
11. NEMA 3R enclosure
12. Shipped on wood pallet
13. Mount layer 2 Ethernet switch (DIN-Rail mount) using DIN-Rail mount
14. Batteries and UPS shall be placed on a sliding shelf
15. Cabinet dimensions 24" x 30" x 67"

DMS Cabinet Notes:

- Not to scale
- All dimensions shown are typical. This drawing may not be complete, and it requires completion by the designer prior to insertion into a contract document. The designer accepts responsibility for the design of the sheet upon its completion and insertion into a contract. All notes to designer should be removed prior to insertion of the drawing into the plan set.

DMS Cabinet Notes:

- Not to scale
- All dimensions shown are typical. This drawing may not be complete, and it requires completion by the designer prior to insertion into a contract document. The designer accepts responsibility for the design of the sheet upon its completion and insertion into a contract. All notes to designer should be removed prior to insertion of the drawing into the plan set.

DMS Controller Foundation Notes:

- Not to scale
- All dimensions shown are typical. This drawing may not be complete, and it requires completion by the designer prior to insertion into a contract document. The designer accepts responsibility for the design of the sheet upon its completion and insertion into a contract. All notes to designer should be removed prior to insertion of the drawing into the plan set.

DMS Cabinet Foundation Notes:

- Not to scale
- All dimensions shown are typical. This drawing may not be complete, and it requires completion by the designer prior to insertion into a contract document. The designer accepts responsibility for the design of the sheet upon its completion and insertion into a contract. All notes to designer should be removed prior to insertion of the drawing into the plan set.