# KENTUCKY TRANSPORTATION CABINET
## AET REFERENCE DRAWINGS

### Typical All-Electronic Tolling (AET) Toll Zone Guidelines

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### Abbreviations

- **AET** - All-Electronic Tolling
- **AVC** - Automatic Vehicle Classification
- **AVI** - Automatic Vehicle Identification
- **C** - Conduit
- **C/L** - Centerline
- **DMS** - Dynamic Message Sign
- **EOP** - Edge of Pavement
- **E.O.** - Equal Distance
- **FON** - Fiber Optic Network
- **ITS** - Intelligent Transportation Systems
- **LPS** - Lightning Protection System
- **NEC** - National Electrical Code
- **NFPA** - National Fire Protection Association
- **R/W** - Right-of-Way
- **SOW** - Scope of Work
- **SPD** - Surge Protection Device
- **TYP** - Typical
- **UL** - Underwriters Laboratories
- **UPS** - Uninterruptable Power Supply

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All design and installation shall conform to the latest published edition/Version of the State Standard Specifications, Roadway Drawings, and, as applicable, the NFPA 70 (NEC) and UL standards.  

REVISION DATE - 4/10/2013
Notes:
1. The YDN tunnel is shown as approximate.
2. Lane width and configuration may vary.
3. For all conduit runs entering Toll Zone Vault, place conduit boxes as needed to ensure test box before entering Toll Zone Vault is below level of sidewalk concrete slab.
4. Locations and length of steel beam guardrail and location of end terminals shall be determined during design in accordance with AASHTO medallion safety design guidelines and State standards.
5. Stairway wall or guardrail shall protect toll equipment and maintenance areas at each tolling zone.
6. Provide concrete aprons for all junction boxes as per the AET Scope of Work.
7. Toll Zone Vaults may be combined with the nearest Mainline Toll Vault if it is in close proximity. Additional roadbed cabinets may be assembled if Toll Vaults are combined.

Legend:
- Communications Junction Box
- Power Junction Box
- Loop Spt BOX
- Box with 18" concrete apron; 1" above grade
- Cast-In-Place Concrete Barrier Wall
- Structure Foundation
- Stairway Wall or Guardrail

KENTUCKY TRANSPORTATION CABINET
AET REFERENCE DRAWINGS
Typical 2 Lane Ramp AET Toll Zone Plan View

ATKINS

KENTUCKY TRANSPORTATION CABINET
AET REFERENCE DRAWINGS
Typical 2 Lane Ramp AET Toll Zone Plan View

Not For Construction
Sample Pull-off Design

Signing Notes:

1. TSI shall add required signing to AET Toll Zones with and without buildings. Coordinate signing with the Design Build Contractor and Developer. Sign locations are shown as sample for bidding.
2. Signing applies to both mainline and ramp AET Toll Zones.
3. Sign spacing shall be in accordance with State and MUTCD standards.
4. Sign sizes shall be in accordance with MUTCD Table 2B-1.
5. U-channel support design shall be in accordance with State standards.

Notes:

1. AET Toll Zone Vault and concrete pad may vary in size.
2. Locations and length of steel beam guardrail and location of end terminals shall be determined during design in accordance with AASHTO guardrail safety design guidelines and State standards.
3. Acceleration and deceleration lengths shall be determined based on the design criteria included in the Roadway Scope of Work.
4. Center Toll Zone Vault between galleries.
5. Provide driveway whether vault is present or not.
**Notes:**

1. All loops are by the Toll System Integrator.
2. Loop layout shown is typical for 2 travel lane mainline section, Toll System Integrator is responsible for actual loop dimensions for each AET role and coordination with the Design Build Contractor and the Developer.
3. Notes Title layout for toll zones with concrete only.

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**Section 'B-B'**

- C/L Downstream Gantry
- C/L Upstream Gantry

**12' Shoulder (Typical)**

- 12' Travel Lane (Typical)

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**Section 'A-A'**

- Metallic Dowel Bar (Typical 18")

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- No Metallic Bars In This Area
- Metallic Dowel Bar (Typical 18")
- Loop Sawcut

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**Notes:**

1. All loops are by the Toll System Integrator.
2. Loop layout shown is typical for 2 travel lane mainline section, Toll System Integrator is responsible for actual loop dimensions for each AET role and coordination with the Design Build Contractor and the Developer.
3. Notes Title layout for toll zones with concrete only.
Not For Construction

Concrete Slab for Toll Zone Vault

Motion Activated Security Light

Generator

NTP

Integral Disconnect

Ramp Up to Finished Floor

3'

2% Slope

Concrete Slab for Toll Zone Vault

Motion Activated Security Light

HAC

Integral Disconnect

2% Slope

Finished Grade

Not to Scale

Side Elevation

Note: Precast Building/Shelter shall be built in accordance with the RFP details.

Not to Scale

Front Elevation
Upstream (First) Mainline Gantry Rear Elevation View, Single Direction
(Cameras and Antennas Omitted for Clarity)

Notes:
1. Location of vertical supports to be coordinated by Toll System Integrator with Design Build Team and Developer.
2. Mounting pipes are horizontal.
3. Curator service walkways on gantry to minimize obstructions for maintenance.
Downstream (Trailing) Mainline Gantry Front Elevation Single Direction

Not to Scale

Notes:
1. Location of vertical supports to be coordinated by Toll System Integrator with Design Build Team and Developer.
2. Mounting pipes are horizontal.
3. Consider minor washouts on gantry to minimize closures for maintenance.

Not For Construction
Upstream (First) Mainline Gantry Rear Elevation Single Direction
(Cameras and Antennas Omitted for Clarity)

Not to Scale

Notes:
1. Location of vertical supports to be coordinated
   by Toll System Integrator with Design Build Team and Developer.
2. Mounting pipes are horizontal.
3. Consider settle walkways on gantry to minimize closures for maintenance.
Upstream (First) Mainline Gantry Rear Elevation View, Bi-Directional
(Cameras and Antennas Omitted for Clarity)
Not to Scale

Notes:
1. Location of vertical supports to be coordinated by Toll System Integrator with Design Build Team and Developer.
2. Mounting pipes are horizontal.
3. Consider sensor walkways on gantry to minimize obstructions for maintenance.
24' x 24' x 12' Watertight Box

12' x 12' EMT/Conduit Tray

AVC/Poller Support Structure

AVC/Poller (by TSI if Needed)

A-3

A-6

A-4

A-7

A-9

Camera (by Others)

Mounting Pipe

A-8

A-10

Antenna (by Others)

A-2

A-1

2" NPT Mounting Pipe to Bottom of Gantry

NOT TO SCALE

Notes:
1. All mounting heights are to the centerline of the mounting pipe.
2. Heights are typical for both ganties.
3. Mounting pipe:
   - Camera/Antenna 2" Rigid Galvanized Pipe
   - AVC/Poller 3" Rigid Galvanized Pipe (if mounting pipe is used)
4. EMT/Conduit tray shall be watertight (NEA 3R) and grounded on both ends per NEC.
5. All conduit from the EMT/Conduit tray to the top of the columns shall be concealed behind drilling or earslips.
6. Top of ganties' waterproofing shall be higher than top of cable tray and watertight box.

Gantry Side Elevation Single Direction

AET Lane Traffic Flow

Finished roadway

KENTUCKY TRANSPORTATION CABINET
AET REFERENCE DRAWINGS
Typical AET Toll Zone Gantry Side Elevation Single Direction

SCUCI NIA SHEET
Ver 1.1 3/2/2013 SHEET A-12
Ver 1.1 4/12/2013

ATKINS
US EARTHWORK MATERIALS OF EASTERN KENTUCKY L.L.C.
P.O. BOX 899
LEXINGTON, KY 40504

Not For Construction
Not For Construction
**Notes:**

1. Site junction boxes to fit conduit needs.
2. For all conduit runs entering Toll Zone Vault, please conduit boxes as needed to ensure least loss before entering Toll Zone Vault is below level of sidewalk concrete slab.
3. Protect any electrical equipment installed adjacent to driveway with concrete ballasts.
4. Provide concrete aprons for all junction boxes.
5. Provide 2" conduit for Lightning Protection System grounding.

**Legend:**
- Communications Junction Box (36" x 24" x 24" M)
- Power Junction Box (30" x 17" x 24" M)
- Loop Splitter Box (36" x 17" x 20" M)
- Box with 18" concrete apron, 1" above grade
- Structure Foundation
- Cast-In-Place Concrete Starter Wall (or Guard Rail)

**Conduit from Last Box to Vault:**
- Communications: (7) - 2" Conduits
- Power: (4) - 2" Conduits

**Duct Bank Detail:**
- Power, Communication & FON (As Needed)
- Roadway Crossing Duct Bank: 6-2" Conduits, 3-4" Conduit
- Encased In Concrete
- Linkage Under Existing Roadway

**Concrete Pad - Typical "C"**
- For upstream location, number of conduits typically = 2 x number of tolded lanes
- For downstream location, number of conduits typically = number of tolded lanes (shoulders greater than 4' wide count as tolded lanes)