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1.0 TRAFFIC DISCIPLINE

1.1 OVERVIEW

These guidelines are provided as an overview of the Port Authority’s design standards. Design details and associated documents outlined in these documents will be provided to the designer as required. The Guidelines shall not replace professional design analyses nor the Guidelines are intended to limit innovative design where equal performance in value, safety, and maintenance economy can be demonstrated. The design team shall be responsible for producing designs that comply with the Guidelines in addition to all applicable codes, ordinances, statutes, rules, regulations, and laws. Any conflict between the Guidelines and an applicable code, ordinance, statute, rule, regulation, and/or law shall be addressed with the respective functional chief. The use and inclusion of the Guidelines, specifications, or example drawing details as part of the Contract Documents does not alleviate the design professional from their responsibilities or legal liability for any Contract Documents they create. It is also recognized that the Guidelines are not universally applicable to every project. There may be instances where a guideline may not be appropriate. If the design professional believes that a deviation from the Guidelines is warranted, such a deviation shall be submitted in writing for approval to the respective functional chief. The Traffic Engineering Discipline is part of the Engineering/Architecture Design Division (EADD) of the Engineering Department. As expanded upon below, the Traffic Engineering Discipline is organized into five functional groups: Traffic Planning, Traffic Design, Traffic Operations, Traffic Safety, and Intelligent Transportations Systems. Roadway Access Management is a technical tool that is included within the first four of these functional groups.

1.1.1 TRAFFIC PLANNING

Perform transportation planning services and the functional planning of new infrastructure investments and improvements to existing vehicular and pedestrian facilities by performing surveys and developing and maintaining state-of-the-art traffic forecasting, simulation, and trip assignment computer models.

1.1.2 TRAFFIC DESIGN

Perform traffic engineering design services to support the Engineering Department’s commitment to capital and operating major works programs by serving as a Lead Engineer/Architect or in a support (Task Leader) capacity to other engineering disciplines.

Tasks include:

- Contract preparation.
- Stage IV construction coordination.
- Shop drawing reviews.
- Field support in auditing and implementing Maintenance of Traffic plans during construction.
- Traffic Signal turn-on and Final inspection checklist in coordination with the Construction Management Division (CMD) and Electrical Facility.
- TAA reviews.

1.1.3 TRAFFIC OPERATIONS

Perform day-to-day traffic engineering services to provide a safe and reliable transportation system through the practice of Service Engineering. Work with facility staff to resolve traffic flow, control, capacity, levels of service, access, egress, and parking issues. Determine the design, type, size, and location of all traffic signs, signals, pavement markings, roadside appurtenances, and similar devices.
1.1.4 Traffic Safety
Perform traffic engineering services through a Traffic Safety Improvement Program to plan, implement, and evaluate traffic safety improvements to minimize the frequency, severity, and risk of vehicle crashes. Ensure due diligence on the part of the Port Authority of New York & New Jersey to provide a safe environment for vehicles and pedestrians.

1.1.5 Intelligent Transportation Systems
Manage the agency’s ITS program in accordance with the implementation roadmap to help deliver the ITS Strategic Plan mission through the use of transportation technologies. Perform ITS planning, design, and construction and operational support services to improve operational efficiency and help optimize the use of available transportation system network capacity.
2.0 **TECHNICAL AND CODE STANDARDS/REGULATIONS**

- Standard Highway Signs, FHWA, 2004
- Highway Capacity Manual (HCM), Transportation Research Board (TRB), 2010
- Public Right of Way Accessibility Guidelines (PROWAG), 2013
- Americans with Disabilities Act Standards for Accessible Design
- Pedestrian Planning and Design, John Fruin, Ph.D., 1971
- NYC CEQR Technical Manual, NYC Mayor’s Office of Environmental Coordination, 2014
- Station Planning and Design Guidelines, MTA New York City Transit, 2006
- CADD Standard Manual (PA)
- Tenant Construction Review Manual (PA)
- Sustainable Design Guidelines (PA)
- Traffic Signal Design and Preparation Guidelines (PA)
- Airport Roadway Sign Design Manual (PA)
- Roadside and Median Barrier Design Guide (PA) DRAFT
- ITS Design Guidelines (PA)
- Roadway Access Management Guidelines (PA)
3.0 DESIGN CRITERIA AND SPECIAL REQUIREMENTS

3.1 PLANNING

3.1.1 TRAFFIC ANALYSIS

The design team should familiarize themselves with the material in *Port Authority Roadway Access Management Guidelines* (See Section 3.2.3.11). Of particular importance is chapter 2, “The Role of Roadway Access Management in Port Authority Business Practices.”

3.1.1.1 FUNCTIONAL PLAN DEVELOPMENT

Generally Produced in Stages I and II:

1. Determine design year (usually 20 years into future).
2. Determine design hourly volume (DHV).
3. On existing roads obtain current traffic volume and factor in growth factors. Consider:
   - Local traffic
   - PA facility traffic
   - New facilities
   - Local
   - PA
   - For new facilities or roadways determine trip generations
4. Select level of service for design (usually C or D).
5. Compare DHV to existing capacity (for not only the ultimate configuration but also for intermediate construction stages):
   - Open road
   - Weaving areas
   - Intersections
     - Signalized
     - Unsignalized
6. Develop conceptual plan to overcome capacity shortfall:
   - Improved traffic management systems (improve existing conditions)
     - Rerouting traffic
     - Improved signing and striping
     - Traffic/parking restrictions
   - Widening
   - Signalization
     - Revise existing
     - New
7. Prepare functional plan to show:
   - Existing major elements (curbs, barriers, signals, etc.) to remain, to be relocated, and to be changed
   - New elements
   - Existing elements to be relocated
   - Pavement marking to clearly show number of traffic lanes
   - Roadway layout throughout the area of concern and where it meets existing
   - North arrow

8. Finalize functional plan to show:
   - Traffic volumes (DHV)
   - Roadway widths
   - Traffic signals
   - Traffic signs (regulatory, warning, directional)
   - North arrow

In general, before proceeding into the next phase, secure Line Department/ Facility concurrence with results so far.

3.1.2 PEDESTRIAN ANALYSIS
Under Development

3.1.3 PARKING ANALYSIS
Under Development

3.2 DESIGN

3.2.1 CONSTRUCTION STAGING
Under Development

3.2.2 MAINTENANCE AND PROTECTION OF TRAFFIC (MPT)

3.2.2.1 TYPICAL CLOSURES
A work zone is an area where road user conditions are changed by the use of temporary traffic control devices, flaggers, or other authorized personnel due to construction activity. Standards and guidelines for the maintenance and protection of traffic (MPT) in work zones are found in the Manual on Uniform Traffic Control Devices (MUTCD) and the Port Authority Standard Details Section TD 100.

All roadway construction projects shall include a plan for the MPT. These plans shall provide:
   - A high level of safety for workers and the traveling public.
   - Acceptable levels of service and minimize congestion.
   - An acceptable work area for the contractor.
   - Cost efficiency while maintaining safety at all times.
Guidelines for the design, use, installation, and operation of traffic control devices are established by the MUTCD. The latest edition of the MUTCD is available online at www.mutcd.fhwa.dot.gov. All traffic control devices shown in the Port Authority Standard Details may be used for work zone traffic control.
Traffic control devices include but are not limited to:

- Signs
- Signals
- Pavement Markings
- Delineation Devices
- Hand-Held Signaling Devices
- ITS Elements

### 3.2.2.1.1 Construction Signs

When choosing signs for work zones, the following should be considered:

A. Choose signs that are appropriate and that accurately describe the roadway conditions.
B. Choose the message signs according to what action the driver needs to take.
C. Use larger signs when greater visibility is desired. For example, high speeds or large volumes.
D. Consider using smaller signs in narrow medians if larger signs will overhang the adjacent travel lane.

### 3.2.2.1.2 Sign Placement

A. Location of advance warning signs should consider exiting and entering traffic. It is generally not desirable to start a warning sign series upstream from a major exit or intersection, except when it is desirable to divert traffic off the route at that point.
B. Advance warning signs must be adequately spaced to provide recognition and legibility. On roadways with high speeds and volumes, signs must be spaced at least 500 feet apart.
C. Warning signs must be located to provide adequate visibility distance to drivers. They must not be blocked by foliage, roadway features, or other signs and traffic control devices nor interfere with other signs.
D. Warning signs should not be located where glare from light sources behind the sign may reduce visibility.
E. Actual distance from a warning sign to the condition should be close to the stated distance on the sign and in accordance with the MUTCD. However, positioning of the sign to enhance visibility and avoid conflicts with other traffic control devices and roadway features is more important than precise agreement with the stated distance.

### 3.2.2.1.3 Portable Variable Message Signs

Portable variable message signs (VMS) are to be used as supplemental, temporary work zone warning devices and for lane and roadway closures. VMS may supplement signing in a work zone but cannot be used to replace regulatory or warning signs. They may also be used in lieu of or to supplement guide signs.

The following guidelines are provided to help the designer determine whether or not to select VMS for use in work areas:

A. Variability—The flexibility of the VMS allows various messages to be displayed rather than providing an equal number of fixed-message signs.
B. Real Time Information—VMS can be reprogrammed to provide real-time traffic information, such as changes in detour routes and diversions.

C. Attention—VMS command more attention than standard signs. This aspect may be especially useful in complicated detour routes and diversions as well as night time work. VMS also stand out if a large number of signs are already present in the area.

D. Type—The specified VMS must be a light emitting diode (LED) type.

3.2.2.1.4 Work Area Details

A. The maximum work area length L occupied by workers on foot shall not exceed 2S as shown in Work Area Detail. Additional contractor vehicles (tightly grouped) may be parked in the closed lane immediately beyond the occupied work area.

B. Signs reading “[RIGHT, CENTER or LEFT] LANE(S) CLOSED,” as appropriate, shall be installed in the closed lane(s) adjacent to traffic at 500 ft intervals after the initial drum line taper, except between work areas that are not more than 500 ft apart.

C. For work areas that occupy two or more contiguous lanes, each occupied lane must be closed with its own back-up vehicle, at such a location, only the back-up vehicle(s) adjacent to an open traffic lane are required to be equipped with a flashing arrow sign unit (FASU).
### Regulatory Approach Speed of Traffic

<table>
<thead>
<tr>
<th>Regulatory Approach Speed of Traffic (miles/hour)</th>
<th>Recommended Sight Distance To Beginning of Channelizing Tapers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Desirable (Feet)</td>
</tr>
<tr>
<td>25</td>
<td>525</td>
</tr>
<tr>
<td>30</td>
<td>625</td>
</tr>
<tr>
<td>35</td>
<td>725</td>
</tr>
<tr>
<td>40</td>
<td>825</td>
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<tr>
<td>45</td>
<td>925</td>
</tr>
<tr>
<td>50</td>
<td>1025</td>
</tr>
<tr>
<td>55</td>
<td>1150</td>
</tr>
<tr>
<td>60</td>
<td>1275</td>
</tr>
</tbody>
</table>

### Recommended Taper Length and Spacing for Channelizing Tapers

<table>
<thead>
<tr>
<th>Regulatory Approach Speed of Traffic (Miles/hour)</th>
<th>Minimum Taper Ratio in Length Per Foot of Width</th>
<th>Minimum Taper Length</th>
<th>Maximum Device Spacing Along Tapers* (Feet)</th>
<th>Maximum Device Spacing Along Tangents (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>10.5:1</td>
<td>105</td>
<td>125</td>
<td>25</td>
</tr>
<tr>
<td>30</td>
<td>15:1</td>
<td>150</td>
<td>180</td>
<td>30</td>
</tr>
<tr>
<td>35</td>
<td>20.5:1</td>
<td>205</td>
<td>245</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>27:1</td>
<td>270</td>
<td>325</td>
<td>40</td>
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<td>45</td>
<td>45:1</td>
<td>450</td>
<td>540</td>
<td>45</td>
</tr>
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<td>50</td>
<td>50:1</td>
<td>500</td>
<td>600</td>
<td>50</td>
</tr>
<tr>
<td>55</td>
<td>55:1</td>
<td>550</td>
<td>660</td>
<td>55</td>
</tr>
<tr>
<td>60</td>
<td>60:1</td>
<td>660</td>
<td>720</td>
<td>60</td>
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<tr>
<td>65</td>
<td>65:1</td>
<td>650</td>
<td>780</td>
<td>65</td>
</tr>
</tbody>
</table>

* The maximum device spacing along curves shall be as defined for tapers shown in the table above.

### 3.2.3 TRAFFIC (PERMANENT CONSTRUCTION)

#### 3.2.3.1 SIGNING

All roadway signs shall be in accordance with the latest version of the MUTCD. Guide signing on airport roadway facilities shall be in accordance with the [PA Airport Roadway Sign Design Manual](#).
### 3.2.3.2 Pavement Markings

#### 3.2.3.2.1 Typical Parking Layouts

- **Notes:**
  - Angles between 76° and 89° are not recommended. These angles permit drivers of smaller vehicles to back out and exit the wrong way.
  - To maintain the same level of service with wider stalls, reduce the Module (M) by 3 inches for each 1 inch additional stall width.
  - Columns and light poles may protrude into the parking module a combined maximum of 2 ft as long as they do not affect more than 25% of the stalls in that bay.
Small car only stalls (7'-6" wide x 15'-0" long) should only be used at constrained locations or in remnants of space. The number of these stalls should not exceed 15% of the total capacity.

### 3.2.3.2 Accessible Parking Spaces

The minimum number of spaces in compliance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG), September 2002 is:

<table>
<thead>
<tr>
<th>Total Spaces in Lot</th>
<th>Minimum Number of Accessible Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 25</td>
<td>1</td>
</tr>
<tr>
<td>26 to 50</td>
<td>2</td>
</tr>
<tr>
<td>51 to 75</td>
<td>3</td>
</tr>
<tr>
<td>76 to 100</td>
<td>4</td>
</tr>
<tr>
<td>101 to 150</td>
<td>5</td>
</tr>
<tr>
<td>151 to 200</td>
<td>6</td>
</tr>
<tr>
<td>201 to 300</td>
<td>7</td>
</tr>
<tr>
<td>301 to 400</td>
<td>8</td>
</tr>
<tr>
<td>401 to 500</td>
<td>9</td>
</tr>
<tr>
<td>501 to 1000</td>
<td>2% of Total</td>
</tr>
<tr>
<td>1001 and Over</td>
<td>20 plus 1 for each 100 over 1000</td>
</tr>
</tbody>
</table>

Exception: Parking areas on the premises of, or immediately adjacent to, medical services facilities providing treatment for mobility-impaired persons and other similar locations may require a greater number of accessible parking spaces than indicated above. Refer to the applicable accessibility standard.

Parking spaces for use by persons with disabilities shall be the spaces closest to the nearest accessible building or facility entrance on an accessible route.

Two accessible 90° angle parking spaces may share a common access aisle. For acute angled parking, such as 60° parking, or where one-way driveway aisles would prevent vans with passenger side lifts from backing into accessible spaces, an accessible access aisle must be provided for each accessible parking space. Width of access aisles and parking spaces are measured perpendicular to the striping.

For typical layouts of accessible parking spaces see Traffic Standard Details.

### 3.2.3.3 GUiderail

All guiderail design shall be in accordance with the Roadside and Median Barrier Design Guide (PA)

### 3.2.3.4 BARRIERS

Traffic barrier design shall be in accordance with the Roadside and Median Barrier Design Guide (PA)

### 3.2.3.5 IMPACT ATTENUATORS

Under Development

### 3.2.3.6 DELINEATION DEVICES AND MARKERS

#### 3.2.3.6.1 Delineator Spacing Guidelines
Delineators mounted on roadside or median barrier shall be spaced to allow the maximum benefit to the driver under all types of weather conditions. The following guide is recommended:

<table>
<thead>
<tr>
<th></th>
<th>Side Mounted</th>
<th>Top Mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Straight Road</td>
<td>Left Curves</td>
</tr>
<tr>
<td></td>
<td>75-100 Ft</td>
<td>40-50 Ft</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

3.2.3.7 ITS

All ITS design shall be in accordance with the ITS Design Guidelines (PA)

3.2.3.8 DYNAMIC MESSAGE SIGNS

All dynamic message signs shall be in accordance with the ITS Design Guidelines (PA)

3.2.3.9 TRAFFIC SIGNALS

All traffic signal design shall be in accordance with the Traffic Signal Design and Drawing Preparation Guidelines (PA)

3.2.3.10 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

All pedestrian and bicycle facilities design shall be in accordance with the Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO, and Guide for the Development of Bicycle Facilities, AASHTO

3.2.3.11 ROADWAY ACCESS MANAGEMENT

All site design shall be in accordance with the Port Authority Roadway Access Management Guidelines

3.3 COST ESTIMATE

3.3.1 MAINTENANCE AND PROTECTION OF TRAFFIC

Under Development

3.3.2 PERMANENT TRAFFIC

Under Development
4.0 **DETAILS, NOTES, AND CUSTOM SPECIFICATIONS**

4.1 **TRAFFIC STANDARD DETAILS**

4.1.1 **TD010 – LEGEND, NOTES AND ABBREVIATIONS**

- TD 010.01 Traffic General Notes
- TD 010.02 Traffic Signal General Notes
- TD 010.03 Maintenance of Traffic General Notes
- TD 010.04 Traffic Symbols Legend
- TD 010.05 Traffic Signal Symbols Legend
- TD 010.06 Maintenance of Traffic Symbols Legend

4.1.2 **TD020 – TRAFFIC SIGNALS**

- TD 020.01 Typical Aluminum Traffic Signal Installation
- TD 020.02 Aluminum Traffic Signal Pole Foundation (SFT, SPF, SFK)
- TD 020.03A Type "S-A" Steel Traffic Signal Pole, Arm and Base
- TD 020.03B Type "S-A" Steel Traffic Signal Pole, Arm and Base
- TD 020.04 Type "S-B" Steel Traffic Signal Pole, Arm and Base
- TD 020.05 Type "S-B" Steel Traffic Signal Pole, Arm and Base
- TD 020.06 Pull Box, Frame, Cover, and Loop Detector Splice Box
- TD 020.07 Conduit Installation
- TD 020.08 Steel Traffic Signal Pole Foundation STF-A
- TD 020.09 Steel Traffic Signal Pole Foundation STF-B
- TD 020.10 Controller Cabinet Foundations (P, P-SME, P-2SME)
- TD 020.11 Type "T" and "K" Poles - Elevation, Shoe Base, Cable Outlet and Cap
- TD 020.12 Aluminum "T" Pole Transformer Base
- TD 020.13 Aluminum "K" Pole Transformer Base
- TD 020.14 "T" Pole Truss Type Mast Arm, Clamp and End
- TD 020.15 "K" Pole Truss Type Mast Arm, Clamp and End
- TD 020.16 Traffic Signal Pedestal Assembly
- TD 020.17 Pole Clamp Mounting Assemblies
- TD 020.18 Signal Head Pole Top and Bracket Mounting
- TD 020.19 Universal Joint, Wire Outlet, Elevation Plumbizer and Mast Arm Slip Fitter
- TD 020.20 Signal Head Mid Mast-Arm and Safety Chain Mounting
- TD 020.21 Hollow Spider Assembly
- TD 020.22 Signal Heads and Back Plates
4.1.3 **TD030 – SIGN MOUNTING DETAILS**

- TD 030.01 Breakaway Sign Supports and U-Post Assembly Details (1 of 2)
- TD 030.02 Breakaway Sign Supports and U-Post Assembly Details (2 of 2)
- TD 030.03 Breakaway Support System For Sign Post Break - Safe Model AP
- TD 030.04 Breakaway Support System For Sign Post Break - Safe Model AS4-H
- TD 030.05 Breakaway Support System For Sign Post Break - Safe Model B525
- TD 030.06 Sign Mounted on Concrete Barrier and Sidewalk
- TD 030.07 Standard Sign Assembly Details (1 of 3)
- TD 030.08 Standard Sign Assembly Details (2 of 3)
- TD 030.09 Standard Sign Assembly Details (3 of 3)
- TD 030.10 Standard Height and Lateral Location for Traffic Sign Assembly
- TD 030.11 J-Channel and H-Channel Details
- TD 030.12 Sign Height and Lateral Positioning to Minimize Specular Glare
- TD 030.13 Flashing Beacon Sign Assembly
- TD 030.14 Buckle Strap, Clamp and Clip Mounting Detail
- TD 030.15 Square Post Base Plate For Sidewalk Sign Mounting
- TD 030.16 Suspended Ceiling Mounting Detail
- TD 030.17 Concrete Wall, Wire Cage and Steel Column Mounting Details
- TD 030.18 Pipe Column Floor Mounting Detail
- TD 030.19 Fire Standpipe Sign Mounting Details
- TD 030.20 Overhead Sign Bridge Clearance Mounting Details
- TD 030.21 Floor Mounted Directory Sign Details
TD 030.22 CMS Sign Mounting Details
TD 030.23 Alternative Double Posted Mounting Details
TD 030.24 Large Guide Sign Assembly Details
TD 030.25 Temporary Wood Sign Post Details
TD 030.26 (NJ Breakaway) Typical Large Guide Sign Support Details (1 of 5)
TD 030.27 (NJ Breakaway) Typical Large Guide Sign Support Details (2 of 5)
TD 030.28 (NJ Breakaway) Typical Large Guide Sign Support Details (3 of 5)
TD 030.29 (NJ Breakaway) Typical Large Guide Sign Support Details (4 of 5)
TD 030.30 (NJ Breakaway) Typical Large Guide Sign Support Details (5 of 5)
TD 030.31 (NJ Non-Breakaway) Typical Large Guide Sign Support Details (1 of 2)
TD 030.32 (NJ Non-Breakaway) Typical Large Guide Sign Support Details (2 of 2)
TD 030.33 (NY State) Typical Large Guide Sign Assembly (1 of 4)
TD 030.34 (NY State) Typical Large Guide Sign Assembly (2 of 4)
TD 030.35 (NY State) Typical Large Guide Sign Assembly (3 of 4)
TD 030.36 (NY State) Typical Large Guide Sign Assembly (4 of 4)

4.1.4 TD040 – SIGN LAYOUT DATA
TD 40.01 MUTCD Warning Signs (1 of 5)
TD 40.02 MUTCD Warning Signs (2 of 5)
TD 40.03 MUTCD Warning Signs (3 of 5)
TD 40.04 MUTCD Warning Signs (4 of 5)
TD 40.05 MUTCD Warning Signs (5 of 5)
TD 41.01 MUTCD Regulatory Signs (1 of 4)
TD 41.02 MUTCD Regulatory Signs (2 of 4)
TD 41.03 MUTCD Regulatory Signs (3 of 4)
TD 41.04 MUTCD Regulatory Signs (4 of 4)
TD 42.01 MUTCD Object Markers
TD 43.01 PA Standard Signs Sign Data Sheet 1 of 4
TD 43.02 PA Standard Signs Sign Data Sheet 2 of 4
TD 43.03 PA Standard Signs Sign Data Sheet 3 of 4
TD 43.04 PA Standard Signs Sign Data Sheet 4 of 4
TD 44.01 Typical JFK Airport Pedestrian And Vehicular Wayfinding Signs
TD 44.02 Typical JFK Airport Guide Sign Standard Details
TD 45.01 Typical LGA Airport Guide Sign Standard Details
TD 46.01 Typical EWR Airport Guide Sign Standard Details
TD 47.01 Standard Arrow Details
4.1.5 **TD 050 – PAVEMENT MARKINGS**
- TD 050.01 Longitudinal Markings
- TD 050.02 Transverse Markings (1 of 2)
- TD 050.03 Transverse Markings (2 of 2)
- TD 050.04 Symbol And Arrow Markings For Bicycle Lane
- TD 050.05 Arrow Markings
- TD 050.06 Word Markings (1 of 2)
- TD 050.07 Word Markings (2 of 2)
- TD 050.08 Route Shields and Word Markings
- TD 050.09 Lane and Ramp Pavement Markings
- TD 050.10 Parking Lot Markings
- TD 050.11 Accessible Parking for People with Disabilities
- TD 050.12 Intersection Markings
- TD 050.13 Miscellaneous Markings
- TD 050.14 Airside Markings and Sign Placement

4.1.6 **TD060 – DELINEATION DEVICES AND MARKERS**
- TD 060.01 Delineator Details and Mounting (1 of 2)
- TD 060.02 Delineator Details and Mounting (2 of 2)
- TD 060.03 Reflectorized Pavement Markers, Legend and Placement Detail (1 of 2)
- TD 060.04 Reflectorized Pavement Markers, Legend and Placement Detail (2 of 2)

4.1.7 **TD070 – PERMANENT IMPACT ATTENUATORS**
- TD 070.01 Quadguard Impact Attenuators with Tension Strut Backup
- TD 070.02 Quadguard Impact Attenuators with Concrete Backup
- TD 070.03 REACT 350
- TD 070.04 TRACC
- TD 070.05 CAT-350
- TD 070.06 Inertial Sand Filled Barrel Arrays
- TD 070.07 Nose Cover Marker for Attenuator End Treatment

4.1.8 **TD100 – MAINTENANCE OF TRAFFIC DEVICES**

4.1.8.1 **CHANNELIZING DEVICES TD100**
- TD 100.01 Traffic Cones, Plastic Drums and Barricades Types I, II, & III
- TD 100.02 Curb System and Delineator Guide Post Details
4.1.8.2 TEMPORARY BARRIER TD110
- TD 110.01 Precast Concrete Construction Barrier Type I
- TD 110.02 Precast Concrete Construction Barrier Type 4 (Alternates A & B)
- TD 110.03 Precast Concrete Construction Barrier Type 4 Joint Connection and Reinforcement Details
- TD 110.04 Precast Concrete Construction Barrier Tapered End Section
- TD 110.05 Precast Concrete Construction Barrier with Chain Link Fence, Sign Mount and Glare Screen Details
- TD 110.06 Water Filled Traffic Barrier
- TD 110.07 Timber Barricades Type I and II

4.1.8.3 TEMPORARY IMPACT ATTENUATORS TD120
- TD 120.02 Quad guard CZ, TRACC and NEAT Crash Cushions
- TD 120.03 ADIEM II Crash Cushion

4.1.8.4 CONSTRUCTION SIGNS TD130
- TD 130.01 Construction Sign Data (Sheet 1 of 2)
- TD 130.02 Construction Sign Data (Sheet 2 of 2)

4.1.8.5 TYPICAL LANE CLOSURE AND REDUCTION DETAILS AND NOTES TD140
- TD 140.01 Typical Lanes Closures and Reduction
- TD 140.02 Crosswalk Closing and Access Details
- TD 140.03 Traffic Control Device Placement, Ramping and Work Area Details

4.1.8.6 MISCELLANEOUS DEVICES TD150
- TD 150.01 Stop/Slow Paddle
- TD 150.02 FASU
- TD 150.03 Portable Sign Support Details
- TD 150.04 Video Detection System Details
- TD 150.06 Temporary Roadway Plates

4.1.9 TD200 – PERMANENT BARRIERS
- TD 200.01 Type A Concrete Barrier Curb, Dowelled
- TD 200.02 Variable Width Median Barrier
- TD 200.03 On Bridge Concrete Barrier Curb
- TD 200.04 Median Concrete Barrier Curb
- TD 200.05 Concrete Barrier Precast
- TD 200.06 Concrete Barrier Cast-in-Place
- TD 200.07 Concrete Barrier Machine Formed
- TD 200.08 Concrete Barrier Single Slope
4.1.10 TD300 – GUIDERAIL AND END TREATMENTS

- TD 300.01 W-Beam Guide Rail
- TD 300.02 Dual Faced W-Beam Guide Rail
- TD 300.03 Thrie-Beam Guide Rail
- TD 300.04 Modified Thrie-Beam Guide Rail
- TD 300.05 Guide Rail Attachments General Notes and Rub Rail Detail
- TD 300.06 W-BEAM BARRICADE TYPE A AND TYPE B
- TD 300.07 Guiderail Post Installation Detail
- TD 300.08 W-Beam Guide Rail Installation Layout Detail
- TD 300.09 W-Beam Median Guide Rail Installation Layout Detail
- TD 300.10 W-Beam Guide Rail Anchorages
- TD 300.11 Thrie-Beam & W-Beam Guide Rail Terminal Connection & End Section
- TD 300.12 Box Beam Median Barrier Details
- TD 300.13 Box Beam Tangent Section and Treatment for Buried End Detail
- TD 300.14 Box Beam Type I End Assembly
- TD 300.15 Box Beam Type II End Assembly
- TD 300.16 Box Beam End Assembly Type III Grading and Layout Details
- TD 300.17 Box Beam Guide Rail Transition to W-Beam Guide Rail
- TD 300.18 Box Beam Connections (On-End & Off-End) To Concrete Barrier and Anchor Bolt Detail
- TD 300.19 Box Beam Transition To Parapet or Barrier Connection
- TD 300.20 Box Beam Transition to Pylon and to Railing Transition Wall
- TD 300.21 Box Beam Transition to Variable Width Concrete Barrier
- TD 300.22 Flared Guide Rail Terminal and Tangent Terminal
- TD 300.23 Parallel Type Gating End Terminals (ET PLUS)
- TD 300.24 Transition Between W-Beam Guide Rail and Half Section Concrete Barrier (Sheet 1 of 2)
- TD 300.25 Transition Between W-Beam and Half Section Concrete Barrier (Sheet 2 of 2)
TD 300.26 Transition Between Dual Faced W-Beam Guide Rail & Concrete Median Barrier (Sheet 1 of 2)

TD 300.27 Transition Between Dual Faced W-Beam Guide Rail and Concrete Median Barrier (Sheet 2 of 2)

TD 300.28 Transition Between Dual Faced W-Beam Guide Rail and Single Slope Concrete Median Barrier

TD 300.29 Transition Between Dual Faced W-Beam Guide Rail and Concrete Median Barrier

TD 300.30 Guide Rail Attachment To Sidewalk, Footing and Parapet

TD 300.31 W-Beam Guide Rail Attachment to Jersey Shape Parapet (No Roadway Curbing on Approach)

TD 300.32 W-Beam Guide Rail Attachment to Jersey Shape Parapet (With Roadway Curbing on Approach)

TD 300.33 W-Beam Guide Rail Attachment (Sidewalk With Parapet)

TD 300.34 W-Beam Guide Rail Attachment (Sidewalk with Steel Railing)

TD 300.35 Transition Between Box Beam Guide Rail and Single Slope Half Section Concrete Barrier (Sheet 1 of 3)

TD 300.36 Transition Between Box Beam Guide Rail and Single Slope Half Section Concrete Barrier (Sheet 2 of 3)

TD 300.37 Transition Between Box Beam Guide Rail and Single Slope Half Section Concrete Barrier (Sheet 3 of 3)

TD 300.38 Transition Between Box Beam Median Barrier and Single Slope Concrete Median Barrier (Sheet 1 of 3)

TD 300.39 Transition Between Box Beam Median Barrier and Single Slope Concrete Median Barrier (Sheet 2 of 3)

TD 300.40 Transition Between Box Beam Median Barrier and Single Slope Concrete Median Barrier (Sheet 3 of 3)

TD 300.41 Non-Vegetative Surface Details

4.1.11 TD410 — TRAFFIC CALMING DEVICES

TD 410.01 Speed Hump

TD 410.02 Rumble Strips and Toll Plaza Approach Rumble Strips

TD 410.03 Shoulder Grooving For Rumble Strips

4.1.12 TD 500 — INTELLIGENT TRANSPORTATION SYSTEMS

TD 500.01 ITS General Notes, Legend, Abbreviations, and List of Manufacturers

TD 500.02 Gantry DMS Details - 1

TD 500.03 Gantry DMS Details – 2

TD 500.04 Gantry Hybrid Drum Sign Details - 1

TD 500.05 Gantry Hybrid Drum Sign Details - 2

TD 500.06 DMS/Hybrid Sign Equipment Platform
- TD 500.07 Cantilever DMS Details
- TD 500.08 Butterfly DMS Details
- TD 500.09 Cantilever/Butterfly DMS Equipment Pad Details
- TD 500.10 DMS Power Distribution Diagrams
- TD 500.11 DMS Communications Diagram
- TD 500.12 Hybrid Drum Sign Power Distribution Diagrams
- TD 500.13 Hybrid Drum Sign Communications Diagram
- TD 500.14 Systems Control Cabinet Details
- TD 500.15 Power/Communications Cable and Conduit Schedules
- TD 500.16 DMS Configurations - 1
- TD 500.17 DMS Configurations - 2
- TD 500.18 DMS Configurations - 3
- TD 500.19 Variable Speed Limit Sign Details
- TD 500.20 Lane – Use Control Signal Details - 1
- TD 500.21 Lane – Use Control Signal Details - 2
- TD 500.22 Magnetometer Vehicle Detection subsystem - 1
- TD 500.23 Magnetometer Vehicle Detection subsystem - 2
- TD 500.24 Travel Time Subsystem Details - 1
- TD 500.25 Travel Time Subsystem Details - 2
- TD 500.26 Travel Time Subsystem Details - 3
- TD 500.27 Travel Time Subsystem Details - 4
- TD 500.28 Travel Time Subsystem Details - 5
- TD 500.29 Microwave Radar Vehicle Detector Subsystem
- TD 500.30 Weigh-In-Motion Details – 1 (Piezoelectric Sensor)
- TD 500.31 Weigh-In-Motion Details – 2 (Single Load Cell Sensor)
- TD 500.32 Road Weather Information Subsystem Details - 1
- TD 500.33 Road Weather Information Subsystem Details - 2
- TD 500.34 Road Weather Information Subsystem Details - 3
- TD 500.35 Highway Advisory Radio Details -1 (Sign Details)
- TD 500.36 Highway Advisory Radio Details – 2 (Transmitter Details)
- TD 500.37 Over Height Detection Details - 1
- TD 500.38 Over Height Detection Details - 2
- TD 500.39 CCTV Surveillance System Details (Pole Mount)
- TD 500.40 CCTV Surveillance System Details (Structure/Gantry Mount)
- TD 500.41 CCTV Surveillance System Details (Pole Mount w/Lowering Device -1)
- TD 500.42 CCTV Surveillance System Details (Pole Mount w/Lowering Device -2)
4.2 **DIVISION 1 MOT SPECIFICATION**

Maintenance of Traffic and Work Area Protection Under “General Provisions” (Division 1) of the Specifications.

4.3 **STANDARD SPECIFICATIONS**

The List of Specifications is as follows:

- 02580 THERMOPLASTIC REFLECTORIZED PAVEMENT MARKINGS (A 11/17/11)
- 02582 PREFORMED REMOVABLE RETROREFLECTIVE PAVEMENT MARKING TAPE (A)
- 02840 BOX BEAM GUIDE RAIL (N 05/01/01)
- 02841 W-BEAM AND THRIE BEAM GUIDE RAIL (N 05/01/01)
- 02842 TEMPORARY TRAFFIC BARRIERS (A 05/01/01)
- 02844 TEMPORARY CONCRETE BARRIERS (P 08/07/96)
- 02845 TEMPORARY TIMBER CURB (N 05/01/01)
- 02846 TEMPORARY WATER FILLED BARRIER (N 05/01/01)
- 02849 TEMPORARY TRAFFIC SIGNAL EQUIPMENT (A 01/03/07)
- 02850 PLYWOOD SIGN PANELS AND WOOD SIGN POSTS (N 09/16/13)
- 02851 ALUMINUM SIGN PANELS (N 09/16/13)
- 03100 CONCRETE FORMWORK (P 09/29/95)
- 03200 CONCRETE REINFORCEMENT (P 09/29/95)
- 03301 PORTLAND CEMENT CONCRETE, LONG FORM (A 05/12/09)
- 03302 PORTLAND CEMENT CONCRETE, SHORT FORM (A 10/22/09)
- 16000 ELECTRICAL GENERAL REQUIREMENTS (A REVISED 07/20/00)
- 16115 UNDERGROUND CONDUIT SYSTEMS (N 07/13/01)
- 16125 TRAFFIC SIGNAL CABLES (A 01/30/07)
- 16571 VEHICULAR TRAFFIC SIGNAL HEADS AND MOUNTING HARDWARE (A 01/30/07)
- 16572 TRAFFIC SIGNAL POLES, MAST ARMS, SPAN WIRE AND POLE FOUNDATIONS (A 01/30/07)
- 16680 INDUCTIVE DETECTION CABLE AND DETECTOR SENSOR UNIT (A 01/30/07)
4.4  C-SPECIFICATIONS

02581  WET REFLECTIVE THERMOPLASTIC REFLECTORIZED PAVEMENT MARKINGS (C 12/20/13)
02583  PREFORMED RETRO-REFLECTIVE PAVEMENT MARKINGS (HIGH PERFORMANCE WET REFLECTIVE TAPE) (C 09/06/13)
02588  TRAFFIC PAINT PAVEMENT MARKING (C 05/12/09)
16125  TRAFFIC SIGNAL CABLES (C 10/04/14)
16573  PEDESTRIAN TRAFFIC SIGNALS, PUSHBUTTONS AND MOUNTING HARDWARE (C 10/04/14)
16571  VEHICULAR TRAFFIC SIGNAL HEADS AND MOUNTING HARDWARE (C 10/04/14)
16572  TRAFFIC SIGNAL POLES, MAST ARMS, SPAN WIRE AND POLE FOUNDATIONS (C 04/26/14)
16574  TRAFFIC SIGNAL CONTROLLER (C 10/04/14)
16611  UNINTERRUPTED POWER SOURCE (C 10/04/14)
16680  INDUCTIVE DETECTION CABLE AND DETECTOR SENSOR UNIT (C 10/04/14)
16715  VIDEO DETECTION SUBSYSTEM (C 11/20/14)
16792  INTELLIGENT TRANSPORTATION SYSTEM (C 07/26/13)
16793  MAGNETOMETER VEHICLE DETECTION SUBSYSTEM (C 07/26/13)
16794  ROAD WEATHER INFORMATION SUB SYSTEM (C 07/26/13)
16795  TRAVEL TIME SUB SYSTEM (C 07/26/13)
16794  ROAD WEATHER INFORMATION SUBSYSTEM (C 07/26/13)
16795  TRAVEL TIME SUBSYSTEM (C 07/26/13)
16796  MICROWAVE RADAR VEHICLE DETECTOR SUBSYSTEM (C 07/26/13)
16799  OVERHEIGHT VEHICLE DETECTION SUBSYSTEM (C 07/26/13)

4.5  HOURS OF WORK

Under Development

4.6  WORK RESTRICTION/CONDITIONS AND PRECAUTIONS

Under Development

4.7  GENERAL NOTES

Under Development

4.8  PERMANENT TRAFFIC ITEMS

Under Development
5.0  **REFERENCE MATERIALS**

- Standard Alphabet & Symbols for Pavement Markings
- Transportation Research Board

5.1  **OPERATING AND MAINTENANCE STANDARDS**

5.1.1  PABT WORK AREA PROTECTION (O&M 73)

5.1.2  ROADWAY AREA PROTECTION (O&M 20)

5.1.3  TESTING ROADWAYS FOR SKID RESISTANCE (O&M 46)

5.1.4  TUNNEL ROADWAY AREA PROTECTION (O&M 37)

5.2  **LANE CLOSURE GUIDELINES**

5.2.1  AVIATION

5.2.2  TB&T

5.2.3  PORT COMMERCE

5.3  **STANDARD HIGHWAY SIGNS**

5.4  **USDOT ITS STANDARDS**

5.5  **TRAFFIC ENGINEERING HANDBOOK**
Under Development

5.6  **FLAGGER’S HANDBOOK**
Under Development

5.7  **PORT AUTHORITY ROADWAY ACCESS MANAGEMENT GUIDELINES**