July 21, 2004

MEMORANDUM

To: All Holders of the Virginia Department of Transportation’s 2001 Road and Bridge Standards

The following is a list of standards contained in the 2001 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An insertable sheet will not be required in plan assemblies.

<table>
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<tr>
<th>PAGE</th>
<th>STANDARD</th>
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<tr>
<td>N/A</td>
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</table>

The following is a list of revised standards to the 2001 Road and Bridge Standards that do require an insertable sheet to be included in your plan assembly until the next edition of the imperial standards is published. Please add these pages to your copy of the standards. The respective insertable sheet number has been placed with the revised standard. An insertable sheet is available for each of these revised standards. The insertable sheets are available on VDOT’s web site on the FTP server and in Falcon DMS for VDOT personnel. These insertable sheets will be required in plan assemblies for projects utilizing the standard items listed below that have not been to advertisement prior to January, 26 2005.

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<td>DI-9</td>
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<td>PG-2A</td>
<td>Revised concrete surface area for TY A1 D=8&quot; from .0759 to 0.0759.</td>
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<td>501.08</td>
<td>A133</td>
<td>GR-3</td>
<td>Clarified anchor dimensions, revised notes.</td>
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<td>501.10</td>
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<td>501.11</td>
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<td>Revised notes and clarified details.</td>
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<td>A152</td>
<td>FE-6</td>
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<td>A68</td>
<td>HR-1</td>
<td>Revised handrail height, added grounding details.</td>
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<td>Revised general notes.</td>
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<td>A149</td>
<td>RFD-1</td>
<td>Revised notes, and table to specify dimensions.</td>
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<td>A156</td>
<td>SSP-VA</td>
<td>Revised sign panel installation details.</td>
</tr>
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<td>Revised sign panel installation details.</td>
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<tr>
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<td>Revised sign panel erection details and sign lighting details.</td>
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<tr>
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<td>OSS-1</td>
<td>Revised sign panel erection details and sign lighting details.</td>
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<td>1301.79</td>
<td>A157</td>
<td>SPD-1</td>
<td>Revised sign panel installation details.</td>
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</table>

If you have any questions or comments regarding the listed revisions to this publication, please contact Mr. Steve Van Cleef of the Engineering Services Section at (804) 786-2543.

Sincerely,

Mohammad Mirshahi, P.E.
State Location and Design Engineer
NOTES:

1. TYPICAL ENDWALL TO BE PLACED AT THE ENDS OF ALL UNDERDRAIN OUTLETS, BARRING LOCATIONS WHERE UNDERDRAIN IS TIED INTO OTHER DRAINAGE STRUCTURES. ENDWALL TO BE INSTALLED PERPENDICULAR TO ROADWAY AND FLUSH WITH THE SLOPE.

2. OUTLET PIPES SHALL BE RIGID NONCORRODED, SMOOTH-BORE PIPE, MEETING THE REQUIREMENTS OF 7D PSI TESTED ACCORDING TO ASTM 2412.

3. EXPANDED STEEL MESH (FLATTENED) SHALL HAVE OPENINGS OF APPROX. 1/8" X 1/4" AND WEIGH APPROX. 0.92 LBS PER SQ. FT. MESH SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-723. THE MESH SHALL EXTEND A MINIMUM OF 1" ABOVE THE O.D. OF THE PIPE, AND IS A BARRIER FOR RODENTS, ETC. THE SLOT FOR THE STEEL MESH IS TO BE CONSTRUCTED SO THAT THE MESH CAN BE REMOVED FOR CLEANOUT PURPOSES.

4. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

5. STEEL POSTS AND PLATES TO BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS. IF PAINTED, THE FINAL COAT SHALL BE NO. 13 ALUMINUM PAINT OR NO. 11 WHITE PAINT.

6. MARKER TO BE PLACED AT ALL EW-12 UNDERDRAIN INSTALLATIONS.

7. MARKER WILL BE PAID FOR IN ACCORDANCE WITH SECTION 501 OF THE ROAD AND BRIDGE SPECIFICATIONS.

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<table>
<thead>
<tr>
<th>PIPE I.D.</th>
<th>SLOPE</th>
<th>DIMENSIONS</th>
<th>CLASS A3 CONCRETE CUBIC YARDS</th>
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<tr>
<td></td>
<td>L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>4&quot;</td>
<td>2:1</td>
<td>2'-5-1/2&quot;</td>
<td>1'-2-1/4&quot;</td>
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<td>2:1</td>
<td>2'-8-1/2&quot;</td>
<td>1'-5-1/4&quot;</td>
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<tr>
<td>8&quot;</td>
<td>4:1</td>
<td>5'-3&quot;</td>
<td>1'-3-1/2&quot;</td>
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</table>
NOTES

1. PRECAST PIPE PLUG SHALL BE SET IN FRESH MORTAR.
2. PRECAST PLUG SHALL CONFORM TO PIPE MANUFACTURER'S JOINT DESIGN AND SHALL HAVE A MINIMUM THICKNESS NOT LESS THAN PIPE WALL THICKNESS.
3. THIS INLET IS TO BE USED ONLY IN LOCATIONS NOT SUBJECT TO TRAFFIC.
4. FRAME IS TO BE SECURELY MORTARED TO TEE SECTION.
5. FRAME AND GRATE SHALL BE GRAY IRON, ASTM A-998, CLASS 30S.
6. THE PRECAST TEE UNIT IS TO CONFORM TO THE REQUIREMENTS OF AASHO M-70 FOR 15" CLASS III REINFORCED CONCRETE PIPE.
NO PROJECTION OF PIPE ABOVE GROUND LINE

NORMAL EARTH FOUNDATION

R + 12"

TOP OF FILL

GROUND LINE

R / 2

MIN. 1 / 10 R

X

X

S 1

S 2

BEDDING MATERIAL

4" EARTH

ROCK OR UNYIELDING SOIL

MIN. 1 / 10 R

1 / 6" PER 1' OF H

MIN. 6"

MAX. 24"

NORMAL EARTH FOUNDATION

ROCK FOUNDATION

FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

PIECE PROJECTION ABOVE GROUND LINE

NORMAL EARTH FOUNDATION

ROCK FOUNDATION

FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

BEDDING MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

EMBANKMENT

INSTALLATION OF PIPE CULVERTS AND STORM SEWERS

ELLiptical PIPE BEDDING AND BACKFILL - METHOD "A"

Virginia Department of Transportation

302

303
OUTSIDE ROAD DITCHES

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<th>D</th>
<th>FRONT SLOPE</th>
<th>BACK SLOPE</th>
<th>W1</th>
<th>W2</th>
<th>K</th>
<th>SQ. YDS. SURFACE AREA PER LIN. FT.</th>
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<td>6&quot;</td>
<td>6:1</td>
<td>3:1</td>
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<td>2'-7&quot;</td>
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<td>8&quot;</td>
<td>6:1</td>
<td>3:1</td>
<td>2'-9&quot;</td>
<td>2'-7&quot;</td>
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<td>3'-0&quot;</td>
<td>1'-2&quot;</td>
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<td>1'-6&quot;</td>
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<td>2:1</td>
<td>2'-9&quot;</td>
<td>2'-7&quot;</td>
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<td>2'-7&quot;</td>
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</table>

PLAN FOR TRANSITION OF PAVED MEDIAN DITCH TO MEDIAN DROP INLET GUTTER

ALTERNATE METHOD OF FORMING DITCHES

NOTE: ALL DITCHES MAY BE CONSTRUCTED WITH VERTICAL SIDES AT THE OPTION OF THE CONTRACTOR.

STANDARD PAVED DITCHES

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

502

REV. 7/04

109.01
SUGGESTED METHOD OF TEMPORARILY PLACING RIPRAP FOR EROSION CONTROL IN CHANNELS, DITCHES, & AT TOE OF FILL SLOPES

NOTES:
1. The depth of protection will depend on whatever depth is attainable, with the riprap being evenly spread with the quantity shown on these plans. Riprap may be added or deleted as found necessary by the engineer.
2. Side slopes and bottom width (of trapezoidal) shown in typical section of proposed ditch or channel.

MINIMUM REQUIREMENTS FOR STABILIZED CONSTRUCTION ENTRANCE

1. Coarse aggregate cap (min 1' to closest edge of existing pavement with #88 or #78 aggregate.

PLAN

PROFILE

1. Surface water shall be piped under the construction entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
2. The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public right of way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed, or tracked onto public right of way shall be removed immediately.
3. Wheels shall be cleaned to remove sediment prior to entrance onto public right of way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
4. Periodic inspection and needed maintenance shall be provided after heavy use and each rain.

TEMPORARY EROSION & SILTATION CONTROL

SHEET 1 OF 3
HALF SECTION ON EXISTING CONCRETE PAVEMENT

Class A3 Concrete
2' R

1/4"-1" Slope

Dowels

Existing Concrete Pavement

Dowel spacing Longitudinally at 2'-0" c-c from nose to first joint.

Note: Existing Asphalt Surface Course and Binder Course, if any, to be removed under median strip.

Where design speed is greater than 40 MPH on Rural Highways and 45 MPH in developed Urban and Suburban areas, median curb is to be in accordance with Standard CG-3.

12" square hole for sign post to be formed into introduced median noses a minimum of 5' from the nose.

W = 4' Min.

When median is installed over existing pavement, hole for sign post is to be extended to the subbase.

Additional holes of adequate size to be provided for sign posts, delineator posts, etc. as shown on the plans or directed by the Engineer.

HALF SECTION ON EXISTING FLEXIBLE PAVE.

Class A3 Concrete
2' R

1/4"-1" Slope

Proposed Asphalt Surface Course

EXISTING MEDIAN CURB

3' Max.

Existent Asphalt Base

HALF SECTION ON EXISTING FLEXIBLE PAVE.

TO BE RESURFACED

STANDARD SOLID CONCRETE RAISED MEDIAN STRIP

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION

REFERENCE

502

Rev. 7/04
202.02
SUGGESTED CONSTRUCTION METHOD IF TOP SLAB IS POURED SEPARATELY

- # 5 x 7” Dowels @ 12” c.c.
- 2” x 2” preformed Key

ALTERNATE CONSTRUCTION METHOD IF TOP SLAB IS POURED SEPARATELY

- The depth of curb may be reduced as much as 3” (9’ depth) or increased as much as 3” (19’ depth) in order that the bottom of curb will coincide with the top of a course of the pavement substructure. Otherwise the depth is to be 12” as shown. No adjustment in the price bid is to be made for a decrease or an increase in depth.

- Additional holes of adequate size to be provided for sign posts, delineator posts, etc. as shown on the plans or directed by the Engineer.

ALTERNATE WITH EXTRUDED CURB

- When median width is 3 feet or greater a longitudinal contraction joint shall be provided along the median strip.
NOTES:
1. DETECTABLE WARNING TO BE CLASS A-3 CONCRETE (CLASS A-4 IF PRECAST) WITH SLIP RESISTANT INTEGRAL SURFACE COVERING THE FULL WIDTH OF THE RAMP FLOOR BY 2 FOOT IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL OTHER TYPES OF MATERIAL WITH THE TRUNCATED DOME DETECTABLE WARNING MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
2. THE DETECTABLE WARNING SHALL BE PROVIDED BY TRUNCATED DOMES. TRUNCATED DOMES TO BE STAMPED IF CAST-IN-PLACE OR PRECAST IN TOP SURFACE. THE COLOR OF THE DETECTABLE WARNING SECTION SHALL BE A CONTRASTING COLOR WITH THE ADJACENT SURFACES (ADJACENT SURFACES INCLUDES FLARED SIDES) OR FEDERAL SAFETY YELLOW.
3. SLOPING SIDES OF CURB RAMP MAY BE Poured MONOLITHICALLY WITH RAMP FLOOR OR BY USING PERMISSIBLE CONSTRUCTION JOINT WITH REQUIRED BARS.
4. IF RAMP FLOOR IS PRECAST HOLES MUST BE PROVIDED FOR BOWEL BARS SO THAT ADJOINING FLARED SIDES CAN BE CAST IN PLACE AFTER PLACEMENT OF PRECAST RAMP FLOOR. PRECAST CONCRETE SHALL BE CLASS A-4.
5. REQUIRED BARS ARE TO BE NO. 5 X 8" PLACED CENTER TO CENTER ALONG BOTH SIDES OF THE RAMP FLOOR. MINIMUM DEPTH OF CURB FLOOR. MINIMUM CONCRETE COVER 1/2".
6. CURB/CURB AND GUTTER SLOPE TRANSITIONS ADJACENT TO CURB RAMPS ARE INCLUDED IN PAYMENT FOR CURB/CURB AND GUTTER.
7. CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THEY ARE TO BE PROVIDED AT INTERSECTIONS INSIDE OF THE RIGHT OF WAY OF A HIGHWAY FACILITY CROSSING A CURB REGARDLESS OF WHETHER SIDEWALK IS EXISTING. PROPOSED, OR NONEXISTENT. THEY MUST BE LOCATED WITHIN PEDESTRIAN CROSSWALKS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER, AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES. EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. ACCESSIBLE ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, SLIP AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.
8. RAMPS MAY BE PLACED ON RADIAL OR TANGENTIAL SECTIONS PROVIDED THAT THE CURB OPENING IS PLACED WITHIN THE LIMITS OF THE CROSSWALK AND THAT THE SLOPE AT THE CONNECTION OF THE CURB OPENING IS PERPENDICULAR TO THE CURB.
9. TYPICAL CONCRETE SIDEWALK IS 4" THICK, WHEN THE ENTRANCE RADIO CANNOT ACCOMMODATE THE TURNING REQUIREMENTS OF ANTICIPATED HEAVY TRUCK TRAFFIC THE CONCRETE SIDEWALK DEPTH SHOULD BE INCREASED TO 7".

NOTES: THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.

<table>
<thead>
<tr>
<th>ROADWAY GRADE</th>
<th>MINIMUM RAMP LENGTH IN FEET</th>
<th>MINIMUM RAMP LENGTH IN FEET</th>
<th>MINIMUM RAMP HEIGHT</th>
<th>MINIMUM RAMP HEIGHT</th>
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<tbody>
<tr>
<td>IN PERCENT</td>
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<td>6</td>
<td>6</td>
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</tr>
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<td>0</td>
<td>4</td>
<td>6</td>
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<td>6</td>
<td>14</td>
<td>15</td>
<td>15</td>
<td>15</td>
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</tbody>
</table>
THE SELECTION OF CURB TYPE AND THE CONFIGURATION OF THE UTILITY STRIP MAY VARY TO MEET EXISTING FIELD CONDITIONS AND ROADWAY GEOMETRICS PROVIDING THE DIMENSIONS AND SLOPES ARE AS NOTED.

NOTES:

1. DETECTABLE WARNING TO BE CLASS A-3 CONCRETE (CLASS A-4 IF PRECAST) WITH SLIP RESISTANT INTEGRAL SURFACE COVERING THE FULL WIDTH OF THE RAMP FLOOR BY 2 FOOT IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. OTHER TYPES OF MATERIAL WITH THE TRUNCATED DOME DETECTABLE WARNING MAY BE USED WITH THE APPROVAL OF THE ENGINEER.

2. THE DETECTABLE WARNING SHALL BE PROVIDED BY TRUNCATED DOMES. TRUNCATED DOMES TO BE STAMPED IF CAST-IN-PLACE OR PRECAST IN TOP SURFACE. THE COLOR OF THE DETECTABLE WARNING SECTION SHALL BE A CONTRASTING COLOR WITH THE ADJACENT SURFACES. ADJACENT SURFACES INCLUDES FLARED SIDES OR FEDERAL SAFETY YELLOW.

3. SLOPING SIDES OF CURB RAMP MAY BE POURED MONOLITHICALLY WITH RAMP FLOOR OR BY USING PERMISSIBLE CONSTRUCTION JOINT WITH REQUIRED BARS.

4. IF RAMP FLOOR IS PRECAST, HOLES MUST BE PROVIDED FOR DOWEL BARS SO THAT ADJOINING FLARED SIDES CAN BE CAST IN PLACE AFTER PLACEMENT OF PRECAST RAMP FLOOR. PRECAST CONCRETE SHALL BE CLASS A-4.

5. REQUIRED BARS ARE TO BE NO. 5 X 8" PLACED CENTER TO CENTER ALONG BOTH SIDES OF THE RAMP FLOOR. MINIMUM CONCRETE COVER 1/2".

6. CURB/CURB AND GUTTER SLOPE TRANSITIONS ADJACENT TO CURB RAMPS ARE INCLUDED IN PAYMENT FOR CURB/CURB AND GUTTER.

7. CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THEY ARE TO BE PROVIDED AT INTERSECTIONS WHEREVER AN ACCESSIBLE ROUTE WITHIN THE RIGHT OF WAY OR OF A HIGHWAY FACILITY CROSSES A CURB REGARDLESS OF WHETHER SIDEWALK IS EXISTING, PROPOSED, OR NONEXISTENT. THEY MUST BE LOCATED WITHIN PEDESTRIAN CROSSWALKS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER, AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES. EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. ACCESSIBLE ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, FIRM, AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.

8. RAMPS MAY BE PLACED ON RADIAL OR TANGENTIAL SECTIONS PROVIDED THAT THE CURB OPENING IS PLACED WITHIN THE LIMITS OF THE CROSSWALK AND THAT THE SLOPE AT THE CONNECTION OF THE CURB OPENING IS PERPENDICULAR TO THE CURB.

9. TYPICAL CONCRETE SIDEWALK IS 4" THICK. WHEN THE ENTRANCE RAMP CANNOT ACCOMMODATE THE TURNING REQUIREMENTS OF ANTICIPATED HEAVY TRUCK TRAFFIC THE CONCRETE SIDEWALK DEPTH SHOULD BE INCREASED TO 7".

### ROADWAY GRADE IN PERCENT

<table>
<thead>
<tr>
<th>ROADWAY GRADE IN PERCENT</th>
<th>MINIMUM RAMP LENGTH IN FEET, 4&quot; CURB HEIGH</th>
<th>MINIMUM RAMP LENGTH IN FEET, 6&quot; CURB HEIGH</th>
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NOTES: THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET REGARDLESS OF THE SLOPE.
**CONCRETE GRAVITY RETAINING WALLS**

**INFINITE SURCHARGE AND DECK SURCHARGE - LOADED**

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**SAFE BEARING CAPACITY OF SOIL**

- **Rock Minimum**: 10,000 - 20,000 lbs. sq. ft.
- **Gravel and Coarse Sand, Well Cemented**: 16,000 - 20,000 lbs. sq. ft.
- **Clay in Thick Beds, Always Dry**: 8,000 - 12,000 lbs. sq. ft.
- **Clay, SPT 1**: 2,000 - 4,000 lbs. sq. ft.
- **Sand, Dry, Compact, and Well Cemented**: 4,000 - 8,000 lbs. sq. ft.
- **Sand, Clean, Dry**: 4,000 - 8,000 lbs. sq. ft.
- **Alluvial Soils, Etc.**: 1,000 - 2,000 lbs. sq. ft.

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**NOTE:** If compression at toe exceeds safe bearing capacity of soil, a special footing is to be used.
TERMINAL TREATMENT FOR W BEAM GUARDRAIL

NOTE:
1. 5/8" STEEL PLATE MAY BE WELDED OR BOLTED TO POST. IF PLATE IS BOLTED TO POST USE 4 5/8" X 1/2" LG. HEX HEAD BOLTS W/ HEX NUTS. 5/8" PLATE IS WELDED TO POST DO NOT DRILL 5/8" HOLES IN PLATE OR IN POST FLANGES.
2. CONCRETE END ANCHORAGE MAY BE USED IN PLACE OF STEEL POST AT 8'-0" OFFSET.

PAGE 3 OF 2
NOTES:

1. GUARDRAIL TERMINAL, STD. GR-7 IS TO BE SRT 350 (SIMILAR TO AS SHOWN) MANUFACTURED BY TRINITY INDUSTRIES. THE FLEX 350 MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NOHRP 350 TESTING CRITERIA.

2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:
   A. ALL STANDARD GR-7 TERMINALS SHALL BE INSTALLED WITH A 4 FT. OFFSET.
   B. YELLOW 6" X 36" REFLECTIVE SHEETING IN ACCORDANCE WITH VDOT SPECIFICATIONS, SHOULD BE APPLIED IN TERMINALS EMPLOYING H-BEAM END SECTIONS. FOR TERMINALS EMPLOYING IMPACT EXTRUDER HEADS, AMBER (YELLOW) REFLECTIVE SHEETING WITH BLACK DIAGONAL STRIPES SHOULD BE APPLIED TO THE FULL AREA INSIDE THE IMPACT HEAD WITH THE DIRECTION OF THE BLACK DIAGONAL STRIPES CONFORMING TO CURRENT MUTCD APPLICATION FOR TYPE 3 OBJECT MARKERS (DM-3).
   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS.

3. IF YOU CANNOT GET THE NECESSARY CLEAR RUNOUT AREA FOR THE GR-7 TERMINAL, CONSIDER ALTERNATIVE TERMINAL OPTIONS.

4. FOR DETAILS OF GUARDRAIL TERMINAL INSTALLATION SITE PREPARATION REQUIREMENTS, SEE STANDARD GR-SP.

5. THIS DRAWING IS REPRESENTATIONAL ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER, SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.

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BREAKAWAY CABLE TERMINAL
4' FLARE

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

REV. 7/04
501.11
221
505
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NOTES

1. The cross slope of the grade approaching the guardrail terminal, and adjacent to for its full length, must be 10:1. If the existing grade is flat or is a positive slope due to the superelevation of the roadway pavement, the min. offset from behind the post to the hinges, point as shown, is required.

2. The area immediately behind and beyond the terminal should be traversable and free from fixed objects. If a clear run out is not attainable the area should at least be similar in character to the upstream un-sheared roadside areas.

3. For new construction, reconstruction, and 3r work the 10:1 slope grading must extend a minimum of 3'-3" behind the end post.

SPECIFICATION
REFERENCE

GUARDRAIL TERMINAL INSTALLATION SITE PREPARATION
REQUIREMENTS FOR GR-7

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/04
501.16
NOTES:

1. ALTERNATE BREAKAWAY CABLE TERMINAL (GR-9) IS TO BE ET-2000 (SIMILAR TO AS SHOWN), OR CAT (STD. MB-3 TERMINAL OPTION) AS MANUFACTURED BY SYRO STEEL COMPANY, BRKMAST3R (STD. MB-3 TERMINAL OPTION) AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC., THE SKT-350 AS MANUFACTURED BY ROAD SYSTEMS, INC., OR OTHER VDOT APPROVED EQUAL MEETING NCHRP 350 TESTING CRITERIA.

2. ALL TERMINALS SHALL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE FOLLOWING VDOT REQUIREMENTS:

   A. ALL STANDARD GR-9 TERMINALS (SIMILAR TO AS SHOWN ABOVE) SHALL BE INSTALLED WITH A 1 FT. OFFSET ACCOMPANIED WITH A 50 FT. FLARE TO PREVENT THE GUARDRAIL EXTRUDER FROM ENCROACHING ON THE SHOULDER FOR 36 WORK WHERE RIGHT OF WAY IS LIMITED, THE OFFSET CAN BE DECREASED AS DIRECTED BY THE ENGINEER.

   B. DIRECTION OF THE REFLECTIVE TAPE ON THE EXTRUDER SHALL CONFORM TO MUTED APPLICATION FOR DIAGONAL STRIPES ON OBJECT MARKERS AND RIDGE END PANELS. COLOR OF TAPE SHALL BE AMBER (YELLOW).

   C. DO NOT CHANGE THE LAPPING OF TERMINAL FOR ANY INSTALLATIONS, INSTALL AS TESTED.

   3. IF THE CALCULATED LENGTH OF NEED CANNOT BE MET FOR THE SITES OF RETROFIT, MAINTENANCE, OR UPGRADE OF TERMINALS, PROVIDE AS MUCH DISTANCE AS POSSIBLE TO THE HAZARD.

   4. THIS DRAWING IS REPRESENTATION ONLY. DETAILS, DIMENSIONS, QUANTITIES, AND OTHER INFORMATION NOT SHOWN WILL VARY FOR EACH MANUFACTURER. SEE INDIVIDUAL MANUFACTURER'S PLANS FOR THIS INFORMATION.
CONCRETE MEDIAN BARRIER (TALL WALL)

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

105
502
**Wood Post**

- Corners:
  - Pay lines (exclusive of wire)
  - 3/4" x 4" galvanized steel dowel, min. 4" long, for each side.

- Posts:
  - 6" x 6" concrete footing
  - 8" x 6" corner post

**Metal Post**

- 12.5 x 2 x 6 x 1/4" post with 2 x 2 x 3/4 x 7" - 0" brace or 2 1/2" OD post @ 3.65 x 5.2 LBS./FT.

- With 1 3/4" O.D. braces @ 2.715/5 LBS./FT.

- Corner post
- Concrete footing

**Notes:**
- See general notes, fencing for additional details and instructions.
- Line posts are to be of the types shown or equivalent meeting the approval of the engineer.
- All posts are to have a minimum weight of 1.25 lbs./ft.
- A minimum of five clamps for attaching fabric to post are to be included in cost of each line post.

**Standard Fence Barbed Wire**

- Virginia Department of Transportation

**Specifications Reference**

- 242
- 507
- 236

Rev. 7/04

502.03
NOTES:
APPROXIMATE MATERIALS PER INSTALLATION:
1. 1-3/4" DIAMETER BY 10'-0" LONG COPPER CLAD GROUNDING ELECTRODE
2. GROUNDING ELECTRODE CLAMP
3. 1-7/8" #6 AWG SOLID COPPER CONDUCTOR
4. 3" COMPRESSION CONNECTORS (SUITABLE FOR COPPER AND ALUMINUM)

MINIMUM 3 CONNECTORS FOR 42" FENCE FABRIC TO BE SECURED TO TOP, BOTTOM AND ONE INTERMEDIATE HORIZONTAL WIRE STRAND. ONE ADDITIONAL CONNECTOR TO BE FURNISHED FOR EACH STRAND OF BARBED WIRE.

ON BARBED WIRE INSTALLATIONS, ONE CONNECTOR TO BE FURNISHED FOR EACH STRAND.

GROUNDING CONDUCTOR IS TO BE IN CONTACT WITH HORIZONTAL WIRE OF FENCE BY COMPRESSION CONNECTORS AS SHOWN.

GROUNDING ELECTRODE TO BE LOCATED ON POST SIDE OF FENCE AND AS CLOSE AS POSSIBLE TO POST AND FENCE.

UNLESS OTHERWISE CALLED FOR IN THE PLANS OR DIRECTED BY THE ENGINEER, FENCE GROUNDING WILL BE REQUIRED FOR METAL FENCES INCLUDING PLASTIC COATED FENCE FABRIC AT THE FOLLOWING LOCATIONS:
- WHEN HIGH VOLTAGE LINES CROSS ABOVE THE FENCE, GROUNDING SYSTEMS SHALL BE INSTALLED 50' BEYOND THE OVERHEAD CROSSING POINT OF THE OUTER MOST CONDUCTORS OF THE HIGH VOLTAGE LINES.
- WHEN THE HIGH VOLTAGE LINES ARE PARALLEL TO AND WITHIN 50' HORIZONTALLY OF THE FENCE, GROUNDING SYSTEMS SHALL BE INSTALLED AT 50' INTERVALS ALONG THE PARALLEL SECTIONS OF FENCE AND HIGH VOLTAGE LINES.

COST FOR FURNISHING AND PLACING ALL GROUNDING MATERIALS IS TO BE INCLUDED IN PRICE BID PER LINEAR FOOT OF FENCE.

DETAILS SHOWN HEREIN ARE TO APPLY TO ALL METAL FENCES AND HANDRAILS. FENCES WILL BE GROUNDED ONLY WHEN INDICATED ON THE PLANS OR AS RECOMMENDED BY THE ENGINEER.

DETAIL FOR GROUNDING STEEL POST OF CHAIN LINK FENCE & HANDRAIL (HR-1)

STANDARD METHOD OF FENCE & HANDRAIL GROUNDING

SPECIFICATION REFERENCE
507 238

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 7/04
502.07
HANDRAIL INSTALLATION ON WALLS

- CONCRETE
- MORTAR RUBBLE
- CONCRETE

HANDRAILS SHALL BE GROUNDED AND EFFECTIVELY BONDED.
GROUNDING MATERIALS INSTALLATION TO BE IN ACCORDANCE WITH STD.FE.6.

FOR ALL DETAILS AND DIMENSIONS NOT SHOWN SEE STD.FE.CL.

ALTERNATE INSTALLATION ON WALLS

NOTES:
THIS HANDRAIL IS TO BE USED ONLY AS A PROTECTION FOR PEDESTRIANS AND SHOULD NOT BE PLACED IN ANY LOCATION WHERE IT MIGHT BE SUBJECT TO ANY VEHICULAR IMPACT FOR VEHICULAR PROTECTION STANDARD GUARDRAIL SHOULD BE USED.

HANDRAIL TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE.
NOTES:
1. MAILBOXES SHALL BE OF LIGHT SHEET METAL OR PLASTIC CONSTR. CONFORMING TO THE REQUIREMENTS OF THE U.S. POSTAL SERVICE.

2. MAILBOX SUPPORTS SHALL NOT BE SET IN CONCRETE UNLESS THE SUPPORT DESIGN HAS BEEN SHOWN TO BE SAFE BY CRASH TESTS WHEN SO INSTALLED.

3. POSTS MAY BE 4" X 4" OR 4½" DIAMETER WOOD POST. 2½" DIAMETER STANDARD STRENGTH STEEL PIPE, OR OTHER STEEL OR ALUMINUM POST SHAPES OF EQUAL STRENGTHS.

4. THE POST-TO-BOX ATTACHMENT DETAILS SHOULD BE OF SUFFICIENT STRENGTH TO PREVENT THE BOX FROM SEPARATING FROM THE POST TOP IF THE INSTALLATION IS STRUCK BY A VEHICLE. HARDWARE SHOWN IS SUGGESTED ONLY, ALL GUIDELINES AS REQ'D. BY THE U.S. POSTAL SERVICE MUST BE FOLLOWED.

* DIMENSIONS VARY ACCORDING TO THE SIZE OF THE MAIL BOX.
### TURNOUT DETAIL

**NOTES:**

1. If there is a need to provide for increased access, the following may be considered in conjunction with the local postmaster:
   
   A. Provide a level clear floor space 30" x 48" centered on the box for either side or forward approach.
   
   B. Provide an accessible passage to and from the mailbox and projection into a circulation route (no more than 4" if between 25" and 80" aff) so that the mailbox does not become a protruding object for pedestrians with impaired vision.

2. Strive for a 6 foot min.; however, in some situations this may not be practical. In those cases, provide as much as possible.

3. If a turnout is provided, this may reduce to zero.

4. Behind traffic-face of curb.

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<table>
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<tr>
<th>HIGHWAY TYPE AND ADT, (vpd)</th>
<th>WIDTH (W) OF ALL-WEATHER SURFACE TURNOUT OR AVAILABLE SHOULDER AT MAILBOX, (FT.) (SEE NOTE 1)</th>
<th>DISTANCE (X) FROM FACE OF MAILBOX TO BE OFFSET FROM EDGE OF TURNOUT OR USEABLE SHOULDER, (FT.)</th>
<th>SPECIFICATION REFERENCE</th>
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<tr>
<td>RURAL HIGHWAY OVER 1,500 to 10,000</td>
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<td>RURAL HIGHWAY UNDER 400</td>
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<td>10 (SEE NOTE 3)</td>
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<td>RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER</td>
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<td>6 (SEE NOTE 4)</td>
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<td>CURBED RESIDENTIAL STREET</td>
<td>NOT APPLICABLE (SEE NOTE 4)</td>
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ADT = AVERAGE DAILY TRAFFIC VPD = VEHICLES PER DAY

**INSERTABLE SHEET A149**
POST CLAMP DETAIL

Galvanized Gray - Iron or Aluminum Casting

Centerline hole for \( \frac{3}{8}'' \) diameter
Square Head Stainless Steel Bolt
\( \times 2\frac{1}{4}'' \) long with Self-locking Nut and one Flat Washer.

Furnish 2 \( \theta 0.03'' \) thick and 2 \( \theta 0.032'' \) thick shims per post. Shims shall be fabricated from brass conforming to ASTM B360M or from stainless steel with a minimum chromium content of 11.50%. No more than 2 shims shall be used per bolt with a maximum of 4 shims per post.

\( \frac{3}{16}'' \) or \( \frac{1}{8}'' \) Leg of Clamp is for adjustment to Post Flange

TYPICAL DETAILS FOR TYPE VA
SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 4/04
1301.63
The spacing between sign posts shall be a minimum of B center to center. 

**Signs shall be located to provide optimum viewing and safety within the indicated view limits for lateral placement.**

In cut slopes, the minimum clearance between the bottom of the sign and the ground shall be 7'. for any portion of the sign within the clear zone. This requirement will not apply to signs or portions of signs located more than 10' up a slope greater than 3:1.

For Sign Panel Designs see Standard SPD-1

Max Slope 2:1

For Sign foundation details see standard 1301.70

Edge of shoulder

ISOMETRIC VIEW

Zee Bar
Backer Strip
Tee Bar
Sign Post
Post clamp

SHIM DETAIL

Furnish 2 each .063± and 2 each .032± mm thick shims per pole. Shims shall be fabricated from brass conforming to ASTM B36 or from stainless steel with a minimum chromium content of 11.50 %. No more than 2 shims shall be used per bolt with a maximum of 4 shims per pole.

Bolt Diameter +.15

STIFFENER PLATE DETAIL

TYPICAL DETAILS FOR TYPE VIA
INTERSTATE SIGN STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 4/04

1301.67
SPAN STRUCTURE

CANTILEVER STRUCTURE

NOTES:

1. 1/2" diameter wire inlets shall be provided at the following locations:
   A. On span structures on the front leg of end pole 12" below bottom chord.
   B. On cantilever structures on pole 12" below bottom chord.
   C. On span structures below bottom chord at centerline behind first sign panel from each end pole.
   D. On cantilever structures below bottom chord at centerline behind first sign panel from pole.
   E. At unused wire inlets shall be capped water tight.

2. Distance shall be no less than the minimum indicated in Standard CR-INS.

3. No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

4. Vertical clearance for overhead and bridge mounted sign structures shall be no less than 15 feet 6 inches from the bottom of the lowest mounted sign panel to the crown of the roadway. For sign structures having a minimum diameter of 1 1/2", the maximum clearance at the bottom of the assembly shall be 17 feet 6 inches from the bottom of the assembly to the crown of the roadway.

TYPICAL DETAILS FOR OVERHEAD
SIGN STRUCTURES
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 4/04
1301.72
ELECTRIC DETAILS FOR SIGN LIGHTING

SPAN SIGN STRUCTURE

FRONT VIEW

$\frac{3}{8}''$ hole through pole for eye bolt for overhead service only.

SECTION A-A

Photoelectric Control
Service Entrance Head
Rigid Metal Conduit
Safety Switch
Contactor
Liquid Tight Flexible Conduit

CANTILEVER SIGN STRUCTURE

FRONT VIEW

$\frac{3}{8}''$ hole through pole for eye bolt for overhead service only.

SECTION B-B

Photoelectric Control
Service Entrance Head
Rigid Metal Conduit
Safety Switch
Contactor
Rigid Metal Conduit

Note:
A safety switch shall be installed on all sign structures requiring electrical power. Electrical service for sign structures not controlled by a control center shall be have a photocell and a photocell-controlled contactor to control the electrical power to luminaires. The contactor shall be in a NEMA 3R enclosure within 24 inches of the safety switch.

All conduit located in or on an overhead sign structure shall be $\frac{3}{8}''$ minimum.

TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

Rev. 4/04
SIGN HANGER ERECTION DETAIL WITH LUMINARE RETRIEVAL SYSTEM

Note:
Luminare Retrieval System, including electrical system, shall be equal to "LUM-TRACK" and designed for the number of luminaires indicated on the plans. Spacing of hangers used to support the retrieval system shall be in accordance with manufacturer's recommendations. Terminal end shall be sufficient length to align with the vertical edge of the outside paved shoulder (18") or shall be extended 3 feet beyond the vertical edge (18") of the outermost sign luminaire whichever is greater. The opposite end of retrieval system shall extend a minimum of 6 inches past the outermost vertical edge of the sign hanger arm.

Luminaires and Luminare Retrieval System required only where indicated on the plans.

Signs fabricated using the SPD-1 Alternate Sign Panel Design shall be attached to the sign hangers in accordance with the method shown for Alternate Details for Type VIA Interstate Sign Structures except post clamps will not be allowed for attachment of the top and bottom stiffeners. Post clamp bolts shall be inserted through holes drilled into the sign hangers and secured using a stainless steel flatwasher and nut for these stiffeners.

SECTION A-A

1/8" diameter Aluminum bolts, nuts and flatwashers

SECTION B-B

3/8" 5/8" U-Bolts, nuts and flatwashers

1/8" Aluminum bolts, nut and flatwasher.

VIRGINIA DEPARTMENT OF TRANSPORTATION
SIGN ATTACHMENT TO TRUSS-TYPE STRUCTURES

SECTION A-A

SECTION B-B

SECTION D-D

TYPICAL DETAILS FOR OVERHEAD SIGN STRUCTURES

VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 4/04
105.15
TYPICAL SIGN FOOTING DETAIL WITH CONDUIT

NOTES:

The type, size, number and orientation of conduits entering and exiting footings vary per sign location.

In addition to the conduits specified on the plans, one - 1" conduit required for ground wire and two - 2" PVC heavy wall conduits required for future use. Future use conduits shall be stubbed out and capped.

Future use conduits shall be oriented to run parallel to the roadway.

For location of future use conduits in foundations for double end pole structures, see drawing at right.

Each foundation shall be permanently marked to indicate of sides from which conduits pass. This mark shall be made with a trowel when finishing the concrete and shall be 1/4" deep and 4" to 6" long. Locations of empty conduits shall have an additional 2" long mark made perpendicular to and centered on this mark.

Foundations above finished grade shall be chamfered 1/4" on all edges.

Grounding bushings shall be installed on each end of metal conduits.

Bellends shall be installed on each end of PVC conduits.

Bellends & bushings of empty conduits shall be plugged to prevent moisture and rodent entry.

Voids remaining after conductors exit or enter bellends or bushings of conduits shall be sealed with silicone to prevent moisture and rodent entry.

No mortar, grout, or concrete shall be placed between bottom of base plate and top of pedestal.

LOCATION OF FUTURE USE CONDUITS FOR DOUBLE END POLE STRUCTURES

* Future use conduits placed parallel to the roadway.

** Future use conduits placed at an angle to miss the back foundation or anchor bolts in a spread footing foundation.

The maximum space between the bottom of the base plate and the top of the foundation shall be no greater than the diameter of the anchor bolt plus one inch.

Overhead sign structures including "butterfly" structures shall have a minimum of six anchor bolts, each having a minimum diameter of 1/2".
SECTION A-A
ALL INSTALLATIONS EXCEPT TOP AND BOTTOM ZEE BARS ON OVERHEAD SIGNS

SECTION B-B
TOP AND BOTTOM ZEE BAR INSTALLATION ON OVERHEAD SIGNS

SIGN PANEL DESIGN
VIRGINIA DEPARTMENT OF TRANSPORTATION

REV. 4/04
1301.79