### Removal of Organic and Plastic Material

**GENERAL NOTES**

1. All details shown on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.

2. Utilization of excavated materials shall be in accordance with Index No. 505.

3. Where organic or plastic material is undercut, backfill shall be of suitable material in accordance with Index No. 505, unless otherwise shown on the plans.

4. The term "Plastic Material" used in this index in conjunction with removal of plastic soil is as defined under soil classifications for Plastic (P) and High Plastic (H) in Index No. 505.

5. The term "Organic Material" as used on this index is defined as any soil which has an average organic content greater than five (5.0) percent, or an individual organic content test result which exceeds seven (7.0) percent. Organic material shall be removed as shown on this index and the plans unless directed otherwise by the District Geotechnical Engineer. Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.

6. The normal depth of side ditches shall be 3' below the shoulder point except in special cases.

7. In municipal areas, where underground is to be constructed beneath the proposed pavement, the grade of the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade. Gradation of the filter material shall conform to FDOT specifications. Minimum grade on underdrain pipe shall be 0.2%.

8. See Index No. 506 for miscellaneous earthworks details.

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### DESIGN NOTES

1. At locations where organic material or other soil deposits persists to such depth that removal is impractical, the construction of a geosynthetic foundation over those soils should be considered. The Engineer of Record should request guidance from the District Geotechnical Engineer and make a geosynthetic foundation design in accordance with Index No. 501 when pursuing geosynthetic alternates.

2. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated specify in the plans the limits of removal of organic and plastic materials necessary to accommodate anticipated widening.

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**FDOT 2014 DESIGN STANDARDS**

**INDEX NO. 500**

**REMOVAL OF ORGANIC AND PLASTIC MATERIAL**
REMOVAL OF PLASTIC MATERIAL ON DIVIDED FREEWAYS, ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS, AND ON UNDIVIDED ARTERIALS AND MAJOR COLLECTORS

TYPICAL CUT SECTION

Note: When this detail is applied to minor collectors and local facilities, the undercut may be reduced to 18".

REMOVAL OF PLASTIC MATERIAL ON INTERSTATE FACILITIES, FREEWAYS, DIVIDED ARTERIALS AND MAJOR COLLECTORS HAVING DEPRESSED MEDIANS

TYPICAL CUT SECTION ON TANGENT

HALF SECTION

Cut Limit For Minimum Removal Of Plastic Material

Undercut Plane

Inner And Outer Cut Limit For Preferable Removal Of Plastic Material: Where Preferable Method Of Removal Governs And It Is Impossible To Place The Underdrain At The Outer Cut Limit Due To Conflict With Storm Drain Trunk Lines, Remove To Inner Limit And Place Underdrain At Location Shown For Minimum Removal.

REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN URBAN CONSTRUCTION

REMOVAL OF PLASTIC MATERIAL

Note: For GENERAL NOTES see Sheet 1.
1. All designs shall meet the requirements shown on this sheet and the contract documents.

2. $T_a = \frac{T_{ult}}{R_f R_T CRF}$

3. Intermediate reinforcement shall be rolled out parallel to slope face.
REINFORCED EMBANKMENT

GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS

- Maximum vertical spacing between reinforcement layers is 36 inches.
- Minimum vertical spacing between reinforcement layers is 6 inches.
<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIRED TEST METHOD</th>
<th>MIRAFI GEOLON HD 110</th>
<th>MIRAFI MIRAMAX10 GR</th>
<th>CONTRAC 72.75</th>
<th>GEOTEX 33/50</th>
<th>GEOTEX 2x3HFF</th>
<th>GEOTEX 3x3HF</th>
<th>GEOTEX 4x4</th>
<th>GEOTEX 4x4HF</th>
<th>GEOTEX 4x8</th>
<th>TenCate RS580i</th>
<th>TenCate RS5860</th>
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**TABLE OF WOVEN GEOTEXTILE VALUES**

**APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOTEXTILE)**

**APPLICATION AND PROPERTIES**

**DESIGN STANDARDS**

**INDEX NO. 501 SHEET NO. 3 of 11**
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<th>PROPERTY</th>
<th>REQUIRED TEST METHOD</th>
<th>TENCATE HP270</th>
<th>TENCATE HP370</th>
<th>TENCATE HP465</th>
<th>TENCATE HP770</th>
<th>TENCATE MMES/GR</th>
<th>TENCATE MMES/SG</th>
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Approved Application Usage: 1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Embankment

TABLE OF WOVEN GEOTEXTILE VALUES

**Approved Geosynthetic Products (Woven Geotextile)**

**Application and Properties**

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**Approved Application Usage:**

1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap
# Table of Woven Geogrid Values

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**Approved Application Usage:**

1. = Steepened Slopes
2. = Reinforcement of Foundations over Soft Soils
3. = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4. = Reinforced Embankment
5. = Construction Expedient

*Minimum 3 Overlap

---

**Approved Geosynthetic Products**

(Woven Geogrid)

**Application and Properties**

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**Last Revision:**
07/01/13  
**Description:**
FDOT 2014 Design Standards  
**Index No.:** 501  
**Sheet No.:** 6 of 11
## TABLE OF WOVEN GEOGRID VALUES

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<th>STRATAGRID SG 550</th>
<th>STRATAGRID SG 600</th>
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### APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID)

#### APPLICATION AND PROPERTIES

**Approved Application Usage:**
1. Steepened Slopes
2. Reinforcement of Foundations over Soft Soils
3. Steepened Slopes & Reinforcement of Foundations over Soft Soils
4. Reinforced Embankment
5. Construction Expedient

"* Minimum 3 Overlap"
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**Approved Application Usage:**
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Embankment

* Minimum 3 Overlap

**APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID)**

**APPLICATION AND PROPERTIES**

---

**INDEX NO.**
501

**SHEET NO.**
8 of 11

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**LAST REVISION**
07/01/13

**DESCRIPTION:**
FDOT 2014 DESIGN STANDARDS

---

**Geosynthetic Reinforced Soils**
| PROPERTY                        | REQUIRED TEST METHOD | TENCATE/ MIRAGRID 20XT | TENCATE/ MIRAGRID 22XT | TENCATE/ MIRAGRID 24XT | TENCATE/ MIRAGRID 26XT | TENCATE/ MIRAGRID 10XT | TENCATE/ MIRAGRID 12XT | TENCATE/ MIRAGRID 18XT | TENCATE BKG 10D | TENCATE BKG 1200 | TENCATE BKG 2000 | TENSAR BX 4000 | TENSAR BX 4200 | TENSAR BX 5000 | TENSAR BX 1120 | TENSAR BX 1200 |
|--------------------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| UV Stability (Min. Retained Strength @ 500 hr.) | ASTM D 4355 | 70% | 70% | 70% | 70% | 100% | 100% | 95% | 90% | 90% | 100% | 90% |
| Tensile Strength (lb./ft.) | ASTM D 6637 | 13705 | 17760 | 27415 | 9360 | 850 | 280 | 370 | 1270 | 850 | 1310 | 1200 | 11955 | 18500 | 14092 | 11600 | 14000 | 14000 |
| Ultimate (MPa) | ASTM D 6637 | -- | 5340 | 6700 | 7000 | 2600 | 3000 | 3000 | 2800 | 3000 | 2800 | 3000 | 2800 | 3000 | 2800 | 3000 | 2800 | 3000 |
| Strain @ Ultimate Tensile Strength | ASTM D 6637 | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% | 10% |
| Soak @ Ultimate Tensile Strength | ASTM D 6637 | -- | 106800 | 138000 | 140000 | 65000 | 11600 | 11600 | 5956 | 14092 | 11600 | 14000 | 14000 | 14000 | 14000 | 14000 | 14000 | 14000 |
| Junction Strength (lb./ft.) | ASTM D 6706 | 0.8 | 0.8 | 0.8 | 0.8 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Creep Reduction Factor (C) | | 1.58 | 1.58 | 1.58 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 |
| Creep Resistance (lb./ft.)/Junction | | 1.05 | 1.05 | 1.05 | 1.05 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| Soak @ Junction Strength | | 1.25 | 1.25 | 1.25 | 1.25 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 | 1.35 |
| Creep Resistance (lb./ft.)/Mechanical | | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| Overlap * | ASTM D 6706 | -- | -- | -- | -- | 1.7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Approved Application Usage | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

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**APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID) APPLICATION AND PROPERTIES**

1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedition

*Minimum Y Overlap

**APPROVED GEOSYNTHETIC PRODUCTS (EXTRUDED GEOGRID) APPLICATION AND PROPERTIES**

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**DESCRIPTION:** FDOT 2014 DESIGN STANDARDS

**INDEX NO.** 501

**SHEET NO.** 9 of 11
<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIRED TEST METHOD</th>
<th>TENSAR BX 1220</th>
<th>TENSAR BX 1500</th>
<th>TENSAR UX 1500 HS</th>
<th>TENSAR UX 1600 HS</th>
<th>TENSAR UX 1600 HS</th>
<th>TENSAR UX 1700 HS</th>
<th>TENSAR MS 220</th>
<th>TENAX MS 330</th>
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<td>90%</td>
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**Approved Application Usage:**

1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

**Minimum 3" Overlap**

**APPROVED GEOSYNTHETIC PRODUCTS (EXTRUDED GEONET)**

**APPLICATION AND PROPERTIES**
### Table of Extruded Geogrid Values

<table>
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<tr>
<th>Property</th>
<th>Required Test Method</th>
<th>Secugrid 20/20 Q1</th>
<th>Secugrid 30/30 Q1</th>
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<td>90%</td>
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<td>Tensile Strength (lb./ft.)</td>
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<td>Ultimate (T&lt;sub&gt;ult&lt;/sub&gt;)</td>
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<td>10% Strain</td>
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<td>Strain @ Ultimate Tensile Strength</td>
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<td>Junction Strength (lb./ft.)</td>
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</table>

**Approved Application Usage:**

1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

*Minimum 3 Overlap

**Approved Geosynthetic Products (Extruded Geogrid)**

**Application and Properties**
DIVIDED ROADWAYS

GENERAL NOTES
1. Roadway dimensions are representative. Subgrade dimensions and control lines are standard. The details shown on this Index do not supersede the details shown in the plans or an Index Nos. 500 or 506.

2. Plastic (P) soils may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.

3. High Plastic (H) soils excavated within the project limits may be used in embankment construction as indicated on this Index. High Plastic soils are not to be used for embankment construction when obtained from outside the project limits.

4. Select (S) soils having an average organic content of more than two and one-half (2.5) percent, or having an individual test result which exceeds four (4) percent, shall not be used in the subgrade portion of the roadbed. Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment inside the control line, unless written authorization is provided by the District Geotechnical Engineer; these soils may be used for embankment construction outside the control line, unless restricted by the plans or otherwise specified in the plans. They should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.

5. Highly organic soils, which are dark brown or black in color with an odor of decay, and sometimes fibrous, shall be designated as muck. Any stratum or soil which contains particles of highly organic material may be designated as muck (M). Highly organic soils shall not be used within the subgrade or embankment portion of the roadbed, with the exception of muck used as a supplement to construct a finish soil layer as described in Section 162 of the FDOT Standard Specifications.

DESIGN NOTES
1. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated, specify in the plans the location of the future widening control line for utilization of High Plastic (H) soils and/or soils classified as organic material in the embankment.

2. The designer shall take into consideration the position of the drainage swales in the portion of the embankment where Plastic (P) soils, High Plastic (H) soils, or soils classified as organic material would be allowed. The designer shall limit the use of Plastic (P) soils, High Plastic (H) soils, and/or soils classified as organic material to locations that will not inhibit the infiltration of stormwater from the swales.
**DESIGN NOTE**

1. Concrete pavement is to be placed over 4" of Asphalt Treated Permeable Base (ATPB) or Cement Treated Permeable Base (CTPB) as identified in the plans. This will be placed on a separator layer using 2" Type SP. This will be placed on a working platform using 12" of Type B Stabilization.

**rimed note**

Classification listed left to right in order of preference.

- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

- Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadway when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

- For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

**RIGID PAVEMENT - TREATED PERMEABLE BASE OPTION**
DIVIDED ROADWAYS

DESIGN NOTE

1. Concrete pavement is to be placed over Optional Base Group 1 Type B-12.5 only Asphalt Base as identified in the plans. This will be placed on a working platform using 12" of Type B Stabilization.

UNDIVIDED ROADWAY

SYMBOL  SOIL  CLASSIFICATION (AASHTO M 145)

S  Select  A-1, A-3, A-2-4 **
H  High Plastic  A-2-5, A-2-7, A-5 or A-7 (ALL WITH LL > 50)
M  Muck  A-8

Classification listed left to right in order of preference.

See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

See General Notes Nos. 2 & 4 for utilization of soil as organic material or muck.

For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT - ASPHALT BASE OPTION

FDOT 2014
DESIGN STANDARDS

EMBANKMENT UTILIZATION

INDEX NO. 505
SHEET NO. 3 of 4
RIGID PAVEMENT - SPECIAL SELECT SOIL OPTION

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

**Classification (AASHTO M 145)**

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<thead>
<tr>
<th>SYMBOL</th>
<th>SOIL CLASSIFICATION</th>
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<td>Plastic</td>
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<td>H</td>
<td>High Plastic</td>
</tr>
<tr>
<td>M</td>
<td>Muck</td>
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</table>

**Classification listed left to right in order of preference.**

**SYMBOL**

- **S**: Select
- **S+**: Special Select
- **P**: Plastic
- **H**: High Plastic
- **M**: Muck

**SOIL CLASSIFICATION**

- **A-1, A-3, A-2-4**
- **A-3**: With Minimum Average Lab Permeability of $5 \times 10^{-5}$ cm/sec (0.14 ft./day) as per FM 1.721S
- **A-8**: (ALL WITH LL>50)
- **A-1, A-3, A-2-4**: (ALL WITH LL<50)

**Note:** When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be nonplastic, and not exceed 12% passing the No. 200 U.S. Standard sieve.

**Classification listed left to right in order of preference.**

**U.S. Standard sieve.**

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

**Classification listed left to right in order of preference.**

**UNDIVIDED ROADWAY**

**DIVIDED ROADWAYS**

**SYMBOL**

- **S**: Select
- **S+**: Special Select
- **P**: Plastic
- **H**: High Plastic
- **M**: Muck

**SOIL CLASSIFICATION**

- **A-1, A-3, A-2-4**
- **A-3**: With Minimum Average Lab Permeability of $5 \times 10^{-5}$ cm/sec (0.14 ft./day) as per FM 1.721S
- **A-8**: (ALL WITH LL>50)
- **A-1, A-3, A-2-4**: (ALL WITH LL<50)

**Note:** When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be nonplastic, and not exceed 12% passing the No. 200 U.S. Standard sieve.

**Classification listed left to right in order of preference.**

**U.S. Standard sieve.**

**Note:** SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.
NOTES

1. All material in the shaded area is excess base to be removed.

2. The cost for removal of excess base material shall be included in the contract unit price for base.

3. Payment for base shall be calculated using normal width.

REMOVAL OF EXCESS BASE MATERIAL

MEDIAN STABILIZING DETAILS

1. When the median has curb or curb and gutter, stabilize 4" back of curb.

2. When the median has shoulder with no curb or curb and gutter, stabilize to normal shoulder width.

3. See the details above for stabilizing requirements at crossroads.

4. Stabilize entire area under all paved traffic islands.

5. Stabilize full width under all traffic separators.

6. Select material as defined on Index No. 505. For minor collectors and local facilities the depth of select material thickness may be reduced from 24" to 18".
SHOULDER CONSTRUCTION WITH SUPERELEVATION

DESIGN SUPERELEVATION RATES FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

NOTE: These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.

SHOULDER ON HIGH SIDE: A shoulder slope of 0.06 downward from the edge of pavement will be maintained until a 0.01 break in slope at the pavement edge is reached due to superelevation of the pavement. As the pavement superelevation increases, the 0.01 break in slope will be maintained and the shoulder flattened until the shoulder reaches the minimum of 0.02 downward from the edge of pavement. Any further increase in pavement superelevation will necessitate sloping the inside half of the shoulder toward the pavement and the outer half outward, both at 0.02 for superelevation 0.06-0.09 and both at 0.03 for superelevation 0.10.

SHOULDER ON LOW SIDE: Maintain 0.06 drop across inside shoulder until pavement cross slope reaches 0.06. For pavement cross slopes greater than 0.06, shoulder to have same slope as pavement.

These slopes are the same as those shown pictorially on sheet 2.

GENERAL NOTES:
1. For curves in Urban Highways and high speed Urban Streets, see Index No. 511.
### SUPERELEVATION RATES ($e$) FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

#### $e_{\text{max}} = 0.05$

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<th>Design Speed (mph)</th>
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<td>2,865</td>
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</tr>
</tbody>
</table>

#### CHARTED VALUES

- **Degree of Curve (D)**: The degree of curve at which the pavement is to be superelevated.
- **Radius (R) (Ft.)**: The radius of the curve.
- **Design Speed (mph)**: The design speed for which the super-elevation is calculated.

**Notes**:

- For urban highways and high-speed urban streets, the maximum rate of super-elevation shall be 0.05.
- Super-elevation shall be obtained by rotating the plane successively about the break points of the section until the plane has attained a slope equal to that required by the chart. Should the rotation traverse the entire section and further super-elevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane. Crown is to be removed in the auxiliary lane to the outside of the curve only when the adjoining travel lanes require positive super-elevation.
- When positive super-elevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the super-elevated pavement.
- In construction, short vertical curves shall be placed at all angular profile breaks within the limits of the super-elevation transition.
- The variable super-elevation transition length "L" shall have a minimum value of 30 feet for design speeds under 40 MPH and 75 feet for design speeds of 40 MPH or greater.
- Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be super-elevated in a similar manner.
- For super-elevation of lower speed urban streets, see the FDOT Manual of Uniform Minimum Standards for Design, Construction And Maintenance For Streets And Highways. For super-elevation of curves on rural highways, urban freeways and high-speed urban highways, see Index No. 510.
SUPERELEVATION URBAN HIGHWAYS AND STREETS

FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

TWO TRAVEL Lanes EACH DIRECTION

TWO TRAVEL Lanes EACH DIRECTION WITH MEDIAN

TWO TRAVEL Lanes EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

THREE TRAVEL Lanes EACH DIRECTION WITH MEDIAN

UNDIVIDED FACILITIES

DIVIDED FACILITIES

PARABOLIC SECTION

SUPERELEVATION TRANSITION SECTIONS

See notation 'U' under CHARTED VALUES Sheet 1.

Maximum Superelevated Section

Normal Crowned Section

Rotation Points (Typ.)

Line 1 - Max. Superelevation Rate (0.05)

Line 2 - Slope Of Parabola At Inside Edge Of Pavt.

Line 3 - Positive Superelevation Rate Less Than Max. Slope Of Parabola.

Line 4 - Adverse Superelevation.

Superelevation rates obtained from the chart or table on Sheet 1 are also applicable to a parabolic crown section. When this section is used, superelevation is established by rotating a tangent about the arc of the parabolic crown until the desired slope is attained (points A & B on sketch). The normal parabolic crown will be maintained outside the limits of the plane thus formed.

Rotation Points (Typ.)

Line 1 - Max. Slope Of Parabola.

Line 2 - Positive Superelevation Rate Less Than Max. Slope Of Parabola.

Line 3 - Negative Superelevation Rate Less Than Max. Slope Of Parabola.

Line 4 - Adverse Superelevation.

Superelevation rates obtained from the chart or table on Sheet 1 are also applicable to a parabolic crown section. When this section is used, superelevation is established by rotating a tangent about the arc of the parabolic crown until the desired slope is attained (points A & B on sketch). The normal parabolic crown will be maintained outside the limits of the plane thus formed.
EXAMPLE SUPERELEVATION SECTIONS AND PROFILES
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

SECTION 0-A to 0-D
TWO LANES EACH DIRECTION

SECTION 0-A to 0-E
TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE

Profile Grade Refers To This Point
Profile Grade Refers To This Point

LINE DESCRIPTION
A Inside Travel Lane
B Inside Lane Line
C Inside Median Edge Pavement
D Edge Construction
E Outside Median Edge Pavement
F Outside Lane Line
G Outside Travel Lane

INSIDE AND OUTSIDE ARE RELATIVE
TO CURVE CENTER

PROFILE

NORMAL SECTION

SUPERELEVATION TRANSITION "L" (Varies, See Note Below)

SUPERELEVATED SECTION

LINE A
Line B & F
Line A & G

LINE B
Line B & F

LINE C

LINE D

PROFILE

1:150
1:125
1:100

Note: Runoff rate "d" is to be applied to the outside edge of travel lane.

Note: Similar schemes should be used for roadways having other sections.
### GENERAL NOTES

1. On new construction and reconstruction projects, when an entirely new base is to be built, the design engineer may specify the Base Group and any unrestricted General Use Optional Base shown in that base group. Note, however, that some thick granular bases are limited to widening which prevents their general use.

2. Where base options are specified in the plans, only those options may be bid and used.

3. The designer may require the use of a single base option, for instance Type B-12.5 in a high water condition. This single base option will be bid and used as Optional Base.

### GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

#### Base Options

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<th>Structural Range</th>
<th>Base Group Pay Item Number</th>
<th>Base Group Type</th>
<th>Subbase</th>
<th>LBR 100</th>
<th>RCA Base at LBR 120</th>
<th>Bank Run Shell</th>
<th>Limerock, Cemented Coquina, Shell Rock, RCA Base at LBR 120, Graded Aggregate Base at LBR 100</th>
<th>Type B-12.5</th>
<th>RAP Base</th>
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* For granular subbase, the construction of both the subbase and Type B-12.5 will be bid and used as Optional Base. Granular subbases include Limerock, Cemented Coquina, Shell Rock, RCA Base at LBR 120, Bank Run Shell, and Graded Aggregate Base at LBR 100. The base thickness shown is Type B-12.5. All subbase thicknesses are 4" minimum.

Ø To be used for widening, three feet or less.

Based on minimum practical thicknesses.

For restrictions on the use of RAP Base – see Specifications Section 283.
**BASE THICKNESS AND OPTION CODES**

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<th>Limestone Rock Stabilized L 75</th>
<th>Sand-Cement L 70</th>
<th>Sand-Cement L 75</th>
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<th>Limestone Base (600 psi) (Plant Mixed)</th>
<th>Soil Cement (50 psi) (Plant Mixed)</th>
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Not Recommended For 20 Year Design. Accumulated 18 kip Equivalent Single Axle Loads (ESAL) Greater Than 1,000,000

Note: These base materials may be used on FDOT projects when approved in writing by the District Materials Engineer and shown in the plans.

© Based on minimum practical thicknesses.

**LIMITED USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS**
SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS

URBAN (CURB & GUTTER)

<table>
<thead>
<tr>
<th>ELEMENT DESCRIPTION</th>
<th>1-20 Trips/Day or 1-5 Trips/Hour</th>
<th>21-400 Trips/Day or 6-60 Trips/Hour</th>
<th>401-2000 Trips/Day or 61-400 Trips/Hour</th>
<th>2001-6000 Trips/Day or 61-400 Trips/Hour</th>
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<td>12 Min. 24 Min. 24 Max.</td>
<td>12 Min. 24 Min. 24 Max.</td>
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<tr>
<td>DIVISIONAL ISLAND (Throat Median)</td>
<td>2-2 Wide</td>
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RURAL

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<th>1-20 Trips/Day or 1-5 Trips/Hour</th>
<th>21-400 Trips/Day or 6-60 Trips/Hour</th>
<th>401-2000 Trips/Day or 61-400 Trips/Hour</th>
<th>2001-6000 Trips/Day or 61-400 Trips/Hour</th>
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<td>12 Min. 24 Min. 24 Max.</td>
<td>12 Min. 24 Min. 24 Max.</td>
<td>12 Min. 24 Min. 24 Max.</td>
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<tr>
<td>FLARE (Drop Curb) F</td>
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<td>N/A</td>
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<tr>
<td>RETURNS (Radius) R &amp; U</td>
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<tr>
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<tr>
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<td>2-2 Wide</td>
<td>2-2 Wide</td>
<td>4-2 Wide</td>
<td>4-2 Wide</td>
</tr>
</tbody>
</table>

NOT INTENDED FOR FULL INTERSECTION DESIGN

GENERAL NOTES

1. For definitions and descriptions of access connection 'Categories' and access 'Classifications' of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway Connection Permits Administrative Process", and Rule Chapter 14-97, "State Highway System Access Management Classification System And Standards."

2. For this index the term 'turnout' applies to that portion of driveways or side roads adjoining the outer roadway. For this index the term 'connection' encompasses a driveway or side road and their appurtenant islands, separators, transition taper, auxiliary lanes, travelway flares, drainage pipes and structures, crossovers, sidewalks, curb cals ramps, signage, pavement marking, required signalization, maintenance of traffic or other means of access to or from controlled access facilities. The turnout requirements set forth in this index do not provide complete intersection design, construction or maintenance requirements.

3. The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.

4. On Department construction projects all driveways not shown on the plans shall be reconstructed at their existing location in conformance to these standards, or, in conformance to permits issued during the construction project.

5. Driveways shall have sufficient length and size for all vehicle queueing, stopping, maneuvering, standing and parking to be carried out completely beyond the right of way line. Except for vehicles stopping to enter the highway, the turnout areas and driveways within the right of way shall be used only for moving vehicles entering or leaving the highway.

6. Connections with expected daily traffic over 4000 vpd shall be constructed as intersecting side roads. The design requirement of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department. For connections with expected daily traffic less than 4000 vpd, the Department will determine if drop curbs or radius returns are required in accordance with existing or planned connections. Where radius returns apply, the design requirements of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department.

7. Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have radius returns.

8. Where a connection is intended to align with a connection across the highway, the through lanes shall align directly with the corresponding through lanes.

9. For new connections and for connections on all new construction and reconstruction projects, pavement materials and thicknesses shall meet the requirements applicable to that detailed for "Urban Flared Turnouts", or that described in Table 515-1 for connections with radial returns and/or auxiliary lanes.

10. The responsibility for the cost of construction or alteration to an access connection shall be in accordance with FDOT Rule Chapter 14-96.

DESIGN NOTES

1. Prior to the adoption of FDOT Rule Chapters 14-96 and 14-97, connections to the State Highway System were defined and permitted by Classes. Connections have since been redefined by Categories under Rule 14-96, and the term 'Class' has been applied to highway segments of the State Highway System as defined under Rule 14-97.
Footnotes:

All "I" joints shall be constructed with preformed joint filler.

* All "open" joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.

When connecting to side road curb and gutter sections, the no drop curb limits should extend back to the side road radial point. With or without curb and gutter, no driveway should encroach on the corner radius.

Driveways (6" concrete) shall be of a uniform width (W) to the right of way line.

Alpha-numeric identification of a flared driveway type specifically called for in the plans, see sheets 3 and 4.

SPECIAL NOTES FOR URBAN FLARED TURNOUTS

1. Drop curb, concrete sidewalks (6" thick) and driveways (6" thick) shall meet Specification Sections 320 and 322. The driveway foundation shall meet the requirements of Subarticle 522-4.

2. For details of drop curb and sidewalk curb ramps refer to Indexes Nos. 300 and 304 respectively.

3. Where turnouts are constructed within existing curb and gutter, the existing curb and gutter shall be removed either to the nearest joint beyond the flare point or to the extent that no remaining section is less than 3' long; and, drop curb constructed in accordance with Notes Nos. 1 and 2.

4. For turnouts with radial returns see the requirements under the "Summary Of Geometric Requirements For Turnouts", the "General Notes", the details of "Rural Turnout Construction" and the detail of "Limits Of Clearing & Grubbing, Stabilization And Base At Intersections".

5. Maintenance of pavement shall extend out to the right of way or 2' beyond the back of sidewalk, whichever distance is less.

6. The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.

7. All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.

8. All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permitting agency.

9. All sidewalk surfaces crossing driveways with a cross slope shown in this Index to be 0.03 shall be 0.03 Maximum.

DESIGN NOTES FOR URBAN FLARED TURNOUTS

1. Driveways indicated as "Adverse Applications" are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions; or, those with slopes that can cause drivers who are leaving the roadway to slow or pause to the extent that traffic demand volumes will be impeded.

2. The standard flared driveways on this index may not accommodate vehicles with low beds, low undercarriage or low appendage features. Such vehicles are design vehicles, driveways shall have site specific flare designs or Category III designs.

3. When specific flare type driveways shall be constructed, the type shall be designated in the plans using the assigned alpha-numeric designation.
MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS

SIDEWALK ADJACENT TO CURB
SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

* See DESIGN NOTES FOR URBAN FLARED TURNOUTS.
TURNOUTS

RURAL TURNOUT CONSTRUCTION

Drive Entrances Notes:
- Drainage pipe size and length shall be that shown on the plans, or as stipulated by permit, or as determined by the Engineer during construction. The size shall be at least that established by the FDOT District, but not less than 15" diameter or equivalent. For minimum cover over drainage pipe see Index No. 205. Pipe arch or elliptical pipe may be required to obtain necessary cover. At minimal cover applications a modified pavement apron is permitted. See PERMISSIBLE PAVEMENT MODIFICATION Index No. 273. For spacing between adjacent pipe end treatments see Index No. 205. Pipe arch or elliptical pipe may be required to obtain necessary cover. At minimal cover applications a modified pavement apron is permitted. See PERMISSIBLE PAVEMENT MODIFICATION Index No. 273. For spacing between adjacent pipe end treatments see Index No. 205.
- Stable material may be required for graded turnouts to private property as directed by the Engineer in accordance with Section 102-8 of the Standard Specifications.
- The 9" pavement at graded connections is not required where there is paved shoulder 4' or more in width. The 9" pavement requirement may be waived for connections serving one or two homes or field entrances with less than 20 trips per day, or 5 trips per hour as approved by permit or by the Engineer, or when not itemized in the plans.
- Paved turnouts shall be constructed for all paved connecting facilities. The connecting point will be determined by the Engineer.
- Paved turnouts shall be constructed for all business, commercial, industrial or high volume residential graded connecting facilities. The connecting point shall be 30' from edge of travel way or at R/W line, whichever is less.
- Paved turnouts shall be constructed for all connecting facilities over 4000 vehicles per day. The connecting point shall be at the R/W line.
- See "Summary Of Geometric Requirements For Turnouts" chart for return radii lengths and supplemental information.
- Return Radius Point or flare point.

Intersections Notes:
- Return radius point or transition point.
- 8" Or Miter End Stabilization Limits (8" Min.).

DRAINAGE SECTION

TRAVEL WAY

点点点点点

RETURN TO TOP
### MATERIAL TYPES AND THICKNESSES IN DRIVING AREAS FOR RURAL AND URBAN CONNECTIONS

<table>
<thead>
<tr>
<th>Course</th>
<th>Materials 1</th>
<th>Thickness (in.) 2</th>
<th>Connections 3</th>
<th>Roadway 4</th>
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<tr>
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<td>Asphaltic Concrete</td>
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<td>19''</td>
<td>0.B.G. 1</td>
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<td>Optional Base</td>
<td>O.B.G. 2</td>
<td>0.B.G. 2</td>
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</table>

1. Minimum thickness.
2. All materials shall be approved by the Department prior to being placed.
3. Connection structure other than traffic lanes. See Notes 2 and 3 below.
4. Travel way flares (bypass lanes), auxiliary lanes serving more than a single connection, and all median crossovers including their auxiliary lanes and/or transition tapers. See Notes 2 and 3 below.

### NOTES

1. The pavement should be structurally adequate to meet the expected traffic loads and should not be less than that shown above, except as approved by the Department for graded connections. Other Department approved equivalent pavements may be used at the discretion of the Engineer. For additional information see Index No. 514.
2. Auxiliary lanes and their transition tapers shall be the same structure as the abutting travel way pavement thickness or any of the roadway structures tabulated above, whichever is thicker.
3. If an asphalt base course is used for a turnout, its thickness may be increased to match the edge of travel way pavement thickness in lieu of a separate structural course. 6" of Portland cement concrete will be acceptable in lieu of the asphalt base and structural courses. See Notes 4 and 5 below.
4. A structural course is required for flexible pavements when they are used for auxiliary lanes serving more than a single connection.
5. Connections paved with Portland cement concrete shall be Class NS concrete at least 6" thick. The Department may require greater thickness when called for in the plans or stipulated by permit. Materials and construction shall conform with FDOT Standard Specifications Sections 347, 350 and 522.
6. The Department may require other pavement criteria where local conditions warrant.

### PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES

**TABLE 515-1**

- **RESIDENTIAL OR LOW VOLUME COMMERCIAL**
- **SMALL/MEDIUM COMMERCIAL**
- **LARGE COMMERCIAL**

### NOTES

1. Auxiliary lane pavements and crossover pavements shall be maintained by the Department.
2. Department maintenance of turnout pavement shall extend out to 5' from edge of the travel way or limits of paved shoulders, and, extend to include auxiliary lanes. The remainder of a turnout paved area on the right of way shall be maintained by the owner or his authorized agent. As a function of routinely reworking shoulders, the Department may grade and shape existing material on unpaved areas beyond the maintained pavement.
3. Control and maintenance of drainage facilities within the right of way shall be solely the responsibility of the Department, unless specified differently by Department permit.
4. The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
5. All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
6. All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

### LIMITS OF CONSTRUCTION AND MAINTENANCE FOR RURAL CONNECTIONS
Definitions

G - Grade (%) 
A - Algebraic Difference In Grades (%) 
L - Transition (See Tabulated Lengths): 
A ≥ 14% - Transition Not Required
A > 14% - Straight Or Rounded Transition Required

MAXIMUM GRADES

Commercial = 10% 
Residential = 28%

URBAN TURNOUT PROFILES

When restoring or reconstructing existing commercial turnout connections on
new construction and reconstruction projects, the maximum 10% commercial
grade may be exceeded provided this does not create adverse roadway
operational or safety impacts. This shall be approved by the District
Design Engineer and supported by documented site specific findings.

STORMWATER RUNOFF AND PROFILE OPTION NOTES

1. Turnouts shall not cause water to flow on or across the roadway pavement,
not cause water ponding or erosion within the State right of way. On all rural
turnouts the transition (L) nearest the roadway shall be sloped or crowned
to direct stormwater runoff to the roadside ditch. Inlets, flumes or other appropriate
runoff control devices shall be constructed when runoff volumes are
sufficient to cause erosion of the shoulder. Similar runoff control devices shall be constructed as
necessary to properly direct and control the stormwater runoff on urban turnouts.

2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane
stormwater runoff volumes are relatively large. The Option 2 profile is intended for locations
where runoff volumes are relatively small and where there is no roadside ditch.

RECOMMENDED TURNOUT PROFILE

ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (Gj)

SUPERELEVATION SECTIONS

TURNOUTS

INDEX 
NO. 515

SHEET NO. 7 of 7
TURNOUTS RESURFACING PROJECTS

**Pavement Structure for 5' Deep Turnouts**

<table>
<thead>
<tr>
<th>Drive Width (ft)</th>
<th>Intersection</th>
<th>Normal</th>
<th>Skewed</th>
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<tbody>
<tr>
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<td>Type I</td>
<td>Type II</td>
<td>Type I</td>
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**Notes:**
1. Turnout structural course to be the same material as roadway leveling or structure course. Structural course not required if asphalt base course and its thickness increased to match edge of roadway pavement.
2. Any Department approved pavement structure equivalence may be used at the discretion of the Engineer.
3. Additional structural strength may be required if heavy truck loads are anticipated.

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**GENERAL NOTES**

1. Turnouts are to be constructed or resurfaced for low volume (single family, duplexes, farm, etc.) residential connections as directed by the Engineer.
2. Turnout construction is not required for low volume residential connections where roadway shoulders are paved.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. The contract unit price for Turnout Construction includes the cost for excavation and base.
5. Payment for structural course is to be included in roadway resurfacing pay item.
6. Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering is not required for FC-S friction course.

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**For Drainage Pipe and Mitered End Section Requirements See Index No. 513.**

See "Summary of Geometric Requirements for Turnouts" Index No. 515 for return radii lengths.

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**SECTION AA WITH WIDENING**

**SECTION AA**

**RESURFACING EXISTING TURNOUT**

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**TURNOUT CONSTRUCTION**

---

**SECTION AA**
RAISED RUMBLE STRIPS

1. Raised rumble strips shall be constructed on all paved shoulders approaching intersections, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strips at intersections shall be constructed only when specified in the plans.

See Index 17359 for rumble strip placement on approaches to narrow bridges.

2. Raised rumble strips are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limits of rumble strips shown in these details, additional rumble strip sets spaced at 200 feet shall be constructed throughout the remainder of the approaching curve.

4. Raised rumble strips shall be paid for per set under the contract unit price for Rumble Strip Sets. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strips or length of strips.

** May be decreased in urban areas with low operating speeds.

GENERAL NOTES FOR RAISED RUMBLE STRIPS

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** May be decreased in urban areas with low operating speeds.
**ISOMETRIC - TRANSVERSE CUT**

**ISOMETRIC - LONGITUDINAL CUT**

**LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)**

**SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT**

**HALF PLAN**

**LIMITED ACCESS FACILITIES**

**SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT**

**GENERAL NOTES FOR SHOULDER GROUND-IN RUMBLE STRIPS**

1. Ground-in rumble strips shall be constructed on limited access facilities.

2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for mainline interchange bridges; and constructed at other specific locations as called for in the plans.

3. Ground-in rumble strips are to be constructed in accordance with Section 546 of the Specifications.

4. When friction course extends more than 8" beyond the edge of the travel lane, the extended friction course shall be bladed off back to the 8" line, prior to rumble strip grinding.

5. Both arrays shall be paid for under the contract unit price for Rumble Strips (Ground-in), PM. Such price and payment shall be full compensation for all work and materials required.

**DESIGN NOTE**

1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 6" from any pavement joint. When specifying ground-in rumble strips on an existing course, their location and array shall be detailed in the plans.

2. Other methods and types of applications shall not be used unless approved in writing by the State roadway Design Engineer. Approval will be considered only with sufficient documented justification for deviation from this standard.
Rumble Strips

**RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER**

**RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER**
CONCRETE STEPS

**CONCRETE STEPS**

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NO. SHEET

INDEX

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**DESCRIPTION:**

Rev. 1

STAIR TREAD AND RISER DETAILS

- The greatest riser height within the flight of steps shall not exceed the smallest by more than 1/8
- The greatest tread depth within the flight of steps shall not exceed the smallest by more than 1/8

**Tread Finish:** Broom finish parallel to steps unless otherwise shown in Plans.

**Concrete:** Class NS, Specification 347.

**Construct steps in accordance with Section 522 of the FDOT Standard Specifications.**

**Pedestrian Railing:** See Index Nos. 852, 862, 870, 880 or Project Specific Design.

**NOTES:**

1. Do not use this Index for suspended (structural) steps or stairways.
2. Construct steps in accordance with Section 522 of the FDOT Standard Specifications.
3. Concrete: Class NS, Specification 347.
4. Tread Finish: Broom finish parallel to steps unless otherwise shown in Plans.
5. Pedestrian Railing: See Index Nos. 852, 862, 870, 880 or Project Specific Design.
6. Cost of concrete steps, landings and cheekwalls shall be paid for under the contract unit price for Concrete (Concrete Steps), CY. Cost of reinforcing steel shall be paid for under the contract unit price for Reinforcing Steel (Miscellaneous), LB.

**PLAN AT JUNCTION OF STEPS & LANDING** (Bottom Landing shown, Top Landing similar)
GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.

2. a. PCC Pavement Projects:
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.

b. Flexible Pavement Projects:
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.

3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.

4. Shoulder gutter applications will be determined by drainage design.

DETAIL C
TAPER-TYPE ENTRANCE

FLEXIBLE PAVT. THICKNESS TRANSITION

DETAIL D
PARALLEL-TYPE ENTRANCE

ENTRANCE TERMINALS
SINGLE-LANE RAMPS

LIMITS OF PAY FOR RAMP THICKNESS
LIMITS OF PAY FOR MAINLIE THICKNESS

GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.

2. a. PCC Pavement Projects:
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.

b. Flexible Pavement Projects:
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.

3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.

4. Shoulder gutter applications will be determined by drainage design.

DETAIL C
TAPER-TYPE ENTRANCE

FLEXIBLE PAVT. THICKNESS TRANSITION

DETAIL D
PARALLEL-TYPE ENTRANCE

ENTRANCE TERMINALS
SINGLE-LANE RAMPS

LIMITS OF PAY FOR RAMP THICKNESS
LIMITS OF PAY FOR MAINLIE THICKNESS

GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.

2. a. PCC Pavement Projects:
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.

b. Flexible Pavement Projects:
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.

3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.

4. Shoulder gutter applications will be determined by drainage design.
THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS
TWO-LANE RAMPS

SECTION WHEN SHOULD GUTTER USED
SECTION AA
ACCELERATION LANE WITH SHOULDER GUTTER

ACCELERATION LANE WITHOUT SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT
AT SPEED CHANGE LANES AT FREEWAY RAMP TERMINALS

FREEWAY RAMP TERMINALS
Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.

Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

Standard cross road exit terminal. To be used when roadway alignment is tangent.

Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

**FOOTNOTES:**

- Normal shoulder pavement width.
- Adjust for grades if greater than 2% (See Exhibit 10-71, AASHTO).

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**UNIVERSAL ENTRANCES**

See Exhibit 10-73, AASHTO.

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**UNIVERSAL EXITS**

See Exhibit 10-73, AASHTO.

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**CROSSROAD TERMINALS**

RAMP TERMINALS ON CURVES

---

**For Median Widths Greater Than 27'**

Curb is to be used only as required for channelization of traffic.

---

**SIGNALIZED OR UNSIGNALIZED**

LEFT TURN CONTROL
4-LANE WITH TWO-WAY LEFT-TURN LANES

GENERAL NOTE
1. For pavement markings refer to Index No. 17346.

4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE
FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS

**DESIGN SPEED (mph)**

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>$L_a$ (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>180</td>
</tr>
<tr>
<td>40</td>
<td>220</td>
</tr>
<tr>
<td>50</td>
<td>250</td>
</tr>
<tr>
<td>60</td>
<td>280</td>
</tr>
</tbody>
</table>

For Deceleration Length ($L_a$), See Index No. 301

Queue Length

Varies

**LEFT SIDE WIDENING**

**CENTERED WIDENING**

**RIGHT SIDE WIDENING**
4-LANE DIVIDED TO 4-LANE UNDIVIDED

\[ L = \frac{WS}{2} \geq 45 \text{ mph} \]

\[ L = \frac{WS^2}{120} < 45 \text{ mph} \]

4-LANE DIVIDED TO 2-LANE UNDIVIDED

\[ L = 125 \geq 45 \text{ mph} \]

\[ L = \frac{S^2}{S} < 45 \text{ mph} \]

4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS

\[ L = \frac{S^2}{5} < 45 \text{ mph} \]
CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS

CONNECTING SIMILAR WIDTH PAVEMENTS

CONNECTING DIFFERENT WIDTH PAVEMENTS

FLARED - PAVED SHOULDERS

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS

S = Design speed (mph)
LEFT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION

NOTES FOR SHEETS 5 THRU 8

1. The transition details as represented on sheets 5 thru 8 are intended as guidelines only. The transition lengths, curve data, nose radii and offsets are valid only for tangent alignment, design speeds ≤ 45 mph, the median widths and lane widths shown.

2. Approach lane departures (Δ = 5°) are suitable for design speeds up to 80 mph. Interior curves (Δ = 3°) are suitable for normal crown for design speeds up to 50 mph. Merging curves (Δ = 5°) will require superelevation.

3. The geometrics of these schemes are associated with the standard subsectional spacing for side roads, but in any case will require modification to accommodate side road location, multilane/and/or divided side roads, oblique side roads, crossover widths, storage and speed change lane requirements, and other related features.

Technical Details:

- L = WS for speeds ≤ 45 mph
- L = WS² for speeds > 45 mph

Where:

- W = Width of lateral transition in feet
- S = Design speed
- L = Width of side road
- Δ = Approach lane departure
- D = Design curve
- T = Transition length

Examples:

- 22' MEDIUM
  - Δ = 4°
  - D = 1°
  - T = 200.08'
  - L = 400'

- 40' MEDIUM
  - Δ = 4°
  - D = 1°
  - T = 200.08'
  - L = 400'

- 64' MEDIUM
  - Δ = 5°
  - D = 1°
  - T = 200.08'
  - L = 400'

Design Standards for Roadway Transitions

FDOT 2014

ROADWAY TRANSITIONS
S = Design speed.
W = Width of lateral transition in feet.

Where:
W = Width of lateral transition in feet.
S = Design speed.

**22' MEDIAN**

**40' MEDIAN**

**64' MEDIAN**

LEFT ROADWAY CENTERED ON THRU ROADWAY

FOUR LANE TO TWO LANE TRANSITION
RIGHT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION
RIGHT ROADWAY CENTERED ON THRU ROADWAY

FOUR LANE TO TWO LANE TRANSITION

L = WS for speeds = 45 mph
L = \frac{WS^2}{60} for speeds = 40 mph
Where:
W = Width of lateral transition in feet.
S = Design speed

FDOT 2014
DESIGN STANDARDS
ROADWAY TRANSITIONS

INDEX NO. 526 SHEET NO. 8 of 8
DIRECTIONAL MEDIAN OPENINGS

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 6' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semi-trailer.

RETURNS:

Returns Depicted:
Three Centered Compound Curves For All Returns Depicted:
120'-40'-200' Radii, 2 And 8' Offsets
Single Curve With Tapers Not Shown:
40' Radius; 1:15 And 1:8 Tapers With 2 And 8' Offsets Tested (Practical Fit)

SWEPT PATH LEGEND:

WB 40
SU

40' MEDIAN • 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTO SU & WB-40

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semi-trailer.
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4'-minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 WB-50 tractor-semitrailer.

>Returns Depicted:
Simple Curve With Tapers For Returns Nos. 1, 2, 3 & 4 (Best Configuration):
70' Radii; 1:15 And 1:12 Tapers
2' And 6' Offsets
Three Centered Compound Curves For Return No. 3.
120'-60'-200' Radii; 2' And 6' Offsets

RETURN NO. 3

RETURN NO. 4

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 WB-50 tractor-semitrailer.

40' MEDIAN 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTO WB-50
NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Sweep paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semitrailer.

SWEPT PATH LEGEND:

RETURNS:

Three Centered Compound Curves For All Returns Depicted:

Simple Curve With Tapers Not Shown:

120'-40'-200' Radii; 2 And 8' Offsets

40' Radius; 1:15 And 1:8 Tapers With

2 And 8' Offsets Tested (Practical Fit)

NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Sweep paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semitrailer.

40' MEDIAN • 4-LANE DIVIDED • TAPERED TURN BAY • 2001 AASHTO SU & WB-40
Picnic tables and benches shall be 6'x6' with heavy galvanized pipe frames and recycled plastic wood seats and table tops. All tables shall be walk thru design suitable for exterior locations. Pavilions shall meet the requirements of the "Americans With Disabilities Act (ADA) accessibility guidelines. A minimum of 20% of picnic tables to meet ADA specifications.

Picnic pavilions shall be constructed according to the requirements of the appropriate sections of the "Florida Building Code", current, adopted edition.

Structure, deck and roofing shall be designed to withstand 130 mph wind load.

Standing seam metal roof (24 GA Steel or 0.032 Alum.) w/ Kynar 500 finish.

30# asphalt impregnated fiberglass underlayment.

3" x 6" T&G wood decking.

Wood Post (Typ.)

Foundation (Below)

Concrete Slab

Wood Post (Typ.)

Picnic Tables (Typ.)

FLOOR PLAN

SMALL PAVILION

LARGE PAVILION

NOTES

Keys to sheet 2.

FLOOR

6" roof concrete slab w/ WWR 6x6-W1.4xW1.4

Drop footing at slab perimeter & interior posts see keys.

Harden & broom finish slab surface.

STRUCTURE

Posts: 8 x 8 PT

Beams: 4 x 6 PT

Framing: 4x PT as described.

Misc members: 1x and 2x as described.

ROOF

3WM T&G wood decking.

30# asphalt impregnated fiberglass felt underlayment.

FLOOR

Concrete Slab

Wood Post (Typ.)

Foundation (Below)

FLOOR PLAN
**SPECIFICATIONS**

Keynotes On Sheet 2.

**CONCRETE**
Concrete: FDOT Class II.

Reinforcing Bars: ASTM A615, Grade 60.


Vapor Barrier: Black 6-Mil Polyethylene.

**STEEL**
Galvanized Steel Plate: Steel Plate ASTM A59 or A578.

Provide galvanizing in accordance with the requirements of ASTM A123.

Galvanized Fasteners: High-Strength bolts and nuts, ASTM A325 in accordance with Specification Section 962.

Galvanize shapes after fabrication, make field repairs to galvanizing in accordance with Specification Section 562.

**WOOD**
Comply with American Institute For Timber Construction AITC 108, "Standard For Heavy Timber Construction."

For solid wood decking, comply with AITC 112, "Standard For Tongue And Groove Heavy Timber Standard."

Species: Douglas Fir, Hem-fir, or Southern Pine, at fabricator's option.

Preservative Treatment: Pressure treat fabricated members with waterborne solution for above ground use, complying with AWPA U1, category UC3B above ground exposed.

Wood Decking: Predrill decking at 30" centers for lateral spiking to adjacent units. Spikes to be 8" spikes galvanized common.
GENERAL NOTES

1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.

2. Mailboxes will not be permitted on Interstate highways, freeways, or other highways where prohibited by law or regulation.

3. The contractor shall give the Postmaster of the delivery route(s) written notice of project construction 7 days prior to the beginning of work, with Saturdays, Sundays and Holidays excluded.

   The Contractor shall furnish and install one mailbox in accordance with this design standard at each mail patron delivery location and maintain the box throughout the contract period. The Contractor shall apply box numbers to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U. S. Postal Service; where local street names and house numbers are authorized by the Postmaster as a postal address, the Contractor shall inscribe the house number on the box; if the box is located on a different street from the patrons residence, the Contractor shall inscribe the street name and house number on the box.

   The Contractor shall coordinate removal of the patrons existing mailboxes. Immediately after installing the new mailboxes the Contractor must notify each Mailbox Delivery Patron by Certified Mail that removal of the existing mailboxes must be accomplished in 21 days after receipt of notice. Patrons shall have the option of removing their existing mailboxes or leaving the mailboxes in place for removal by the Contractor; removal by the Contractor shall be included in the contract unit price for Mailbox, Each. The Contractor shall dispose of mailboxes and supports in areas provided by him.

   Reuse of existing mailboxes by the Contractor will not be a requirement under any construction project; however where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the Contractor at its option may elect to reuse the existing mailboxes in lieu of constructing a new mailbox. Any use of existing mailboxes must be approved by the Engineer.

4. Mailboxes shall be light sheet metal or plastic construction, in traditional style. Reuse of existing mailboxes by the Contractor will not be a requirement under any construction project; however where an existing mailbox meets the design standard at each mail patron delivery location and maintain the box throughout the contract period. The Contractor shall give the Postmaster of the delivery route(s) written notice of project construction 7 days prior to the beginning of work, with Saturdays, Sundays and Holidays excluded.

   The Contractor shall apply box numbers to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U. S. Postal Service; where local street names and house numbers are authorized by the Postmaster as a postal address, the Contractor shall inscribe the house number on the box; if the box is located on a different street from the patrons residence, the Contractor shall inscribe the street name and house number on the box.

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   Reuse of existing mailboxes by the Contractor will not be a requirement under any construction project; however where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the Contractor at its option may elect to reuse the existing mailboxes in lieu of constructing a new mailbox. Any use of existing mailboxes must be approved by the Engineer.

5. Mailboxes shall be located on the right-hand side of the roadway in the direction of the delivery route, except on one-way roads and streets where they may be placed on the left-hand side.

   Mailboxes on rural highways shall be set with the roadside face of the box offset from the edge of the traveled way a minimum distance of the greater of the following:
   a. Shoulder width plus 8' to 12'.
   b. 1.0 for ADT over 10,000 vpd.
   c. 8' for ADT 100 to 10,000 vpd.
   d. 6' for ADT under 100 vpd.
   e. 2'-6' for low speed and ADT under 100 vpd

   When a mailbox is installed within the limits of guardrail it should be placed behind the guardrail whenever practical.

   Mailboxes on curbed highways, roads and streets shall be set with the face of the box between 6' and 12" back of the face of curb. If the sidewalk abuts the curb or if an unusual condition exists which makes it difficult or impractical to install or serve boxes at the curb, the Contractor with concurrence of the local postal authority may be permitted to install all mailboxes at the back edge of the sidewalk, where they can be served by the carrier from the sidewalk.

6. Mailboxes shall be set with the bottom of the box between 42" and 48" above the mail stop surface, unless the U.S. Postal Service establishes other height restrictions.

   No more than two mailboxes may be mounted on a support structure unless the support structure and mailbox arrangements have been shown to be safe by crash testing in accordance with NCHRP Report 350.

   Neighborhood Delivery and Collection Box Units (NDCBU) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NDCBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

7. Lightweight newspaper receptacles may be mounted below the mailbox on the side of the support post in conformance with the USPS Domestic Mail Manual. The mail patron shall be responsible for newspaper receptacle installation and maintenance.

8. Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.

Concrete, brick, block, stone or other rigid foundation structure or encasement, either above or below the shoulder groundline, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailbox support posts are set within rigid pavement back of curb, the support posts shall be separated from the pavement by a minimum of 1" of expansion material.

Support posts shall not be tilted nor installed with surface mount base plates.

9. At driveway entrances mailboxes shall be placed on the far side of the driveway in the direction of the delivery route.

   At intersecting roads mailboxes shall be located 100' or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 200' when the route volume exceeds 400 vehicles per day.

10. Support posts shall be in conformance with the material and dimensional requirements of Section 952 and the treatment requirements of Section 953 of the Standard Specifications.

Steel support posts shall have an external finish equal to or better than two coats of weather resistant, air dried or baked, paint or enamel. Surfaces(s) shall be sanded of all loose scale prior to finishing. The Postal Service prefers that posts be painted white, but other colors may be used when approved by the Engineer. When galvanized posts are used painting is not required.

Mounting brackets, plates, platforms, shelves and accessories hardware surface finishes are to be suited to support post finish.

11. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each. Payment shall be limited to one mailbox per patron address whether the mailbox is installed, resetting or relocation.

12. Payment shall be limited to one mailbox per patron address whether the mailbox is new, round, salvaged, reset or relocated. Payment shall be per mailbox regardless of the number of mailboxes per support or grouping arrangement.

The above compensation shall include any work and cost incurred by the contractor for removal and disposal of existing mailboxes.

There shall be no payment participation for NDCBU furnishing, assembly, installation, resetting or relocation.
TRACTOR CROSSINGS

PLAN

SECTION AA

Note: Class I concrete is to be used unless otherwise noted in plans or special provisions.

REINFORCED CONCRETE

TYPE A

General Notes

1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

TRACTOR CROSSINGS

FDOT 2014 DESIGN STANDARDS

INDEX NO. 535

SHEET NO. 1 of 1
**STEM AND PLATE OPTIONS**

**TIMBER PLATE**
- 6-2"x8" Treated Timbers
- 2"x6" Treated Timber
- ½" Dia. Hole, Nut & Washer
- (Bolt thread end up)

**STEEL PLATE**
- Iron Pipe Cap
- Oakum Seal
- ½" Dia. Hex Head Bolt, Nut & Washer
- (See Detail Above)

**INSTALLATION**

**NOTES:**
1. Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.
2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.
3. Oakum used to construct seal should not have a mesh covering (plastic or other synthetic material).
4. The settlement plates shall be paid for under the contract unit price for Settlement Plate Assembly, AS.
### 1" - 3 1/2" CALIPER TREE PLANTING

1. All dimensions 6" and less are exaggerated for illustrative purposes only.
2. Plant containers shall be removed prior to planting. If plants are not container grown, remove a minimum of the top 1/3 of burlap, fabric, or wire mesh. Never lift or handle the tree by the trunk.
3. The uppermost root on all trees shall be covered by less than 1" of soil. Use hand tools to carefully remove all excess soil. The top of root ball shall be set 1"-2" above finished grade and set plumb to the horizon. If planting pit is too deep, remove the tree and firmly pack additional soil in the bottom of the planting pit to raise the rootball. After positioning the tree in the planting pit, slice through rootballs with 3 or 4 vertical slices (top to bottom) equally distributed around the tree.
4. Backfill shall be loasened existing soil. Remove rocks, sticks, or other deleterious material greater than 1" in any direction prior to backfilling. Water and tamp to remove air pockets. If existing soils contain excessive sand, clay, or other material not conducive to proper plant growth, contact engineer prior to planting.
5. Soil rings shall be constructed of existing soil at the outer edge of the planting pit, with a height of 3' and gently sloping sides. Do not pile soil on top of rootball.
6. Mulch shall be a 3" deep layer placed to the edge of the trunk flare, around the base of shrub, or solidly around groundcover. Never pile mulch against the tree trunk.

### 4" AND LARGER CALIPER TREE PLANTING WITH UNDERGROUND BRACING

1. All dimensions 6" and less are exaggerated for illustrative purposes only.
2. Plant containers shall be removed prior to planting. If plants are not container grown, remove a minimum of the top 1/3 of burlap, fabric, or wire mesh. Never lift or handle the tree by the trunk.
3. The uppermost root on all trees shall be covered by less than 1" of soil. Use hand tools to carefully remove all excess soil. The top of root ball shall be set 1"-2" above finished grade and set plumb to the horizon. If planting pit is too deep, remove the tree and firmly pack additional soil in the bottom of the planting pit to raise the rootball. After positioning the tree in the planting pit, slice through rootballs with 3 or 4 vertical slices (top to bottom) equally distributed around the tree.
4. Backfill shall be loasened existing soil. Remove rocks, sticks, or other deleterious material greater than 1" in any direction prior to backfilling. Water and tamp to remove air pockets. If existing soils contain excessive sand, clay, or other material not conducive to proper plant growth, contact engineer prior to planting.
5. Soil rings shall be constructed of existing soil at the outer edge of the planting pit, with a height of 3' and gently sloping sides. Do not pile soil on top of rootball.
6. Mulch shall be a 3" deep layer placed to the edge of the trunk flare, around the base of shrub, or solidly around groundcover. Never pile mulch against the tree trunk.

### GENERAL NOTES:

1. Never pile soil on top of rootball.
2. Soil rings shall be constructed of existing soil at the outer edge of the planting pit, with a height of 3' and gently sloping sides. Do not pile soil on top of rootball.
3. The uppermost root on all trees shall be covered by less than 1" of soil. Use hand tools to carefully remove all excess soil. The top of root ball shall be set 1"-2" above finished grade and set plumb to the horizon. If planting pit is too deep, remove the tree and firmly pack additional soil in the bottom of the planting pit to raise the rootball. After positioning the tree in the planting pit, slice through rootballs with 3 or 4 vertical slices (top to bottom) equally distributed around the tree.
4. Backfill shall be loasened existing soil. Remove rocks, sticks, or other deleterious material greater than 1" in any direction prior to backfilling. Water and tamp to remove air pockets. If existing soils contain excessive sand, clay, or other material not conducive to proper plant growth, contact engineer prior to planting.
5. Mulch shall be a 3" deep layer placed to the edge of the trunk flare, around the base of shrub, or solidly around groundcover. Never pile mulch against the tree trunk.

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**FDOT 2014 DESIGN STANDARDS**

**LANDSCAPE INSTALLATION**

**INDEX NO.** 544

**SHEET NO.** 1 of 3

**LAST REVISION** 07/01/07

**DESCRIPTION:**

**REV ISIO N**
CABBAGE PALM PLANTING
FOR UP TO 24" CLEAR TRUNK

- 2 x 4 Wood Brace
- Existing Soil Backfill
- Planting Pit 2 Times Width Of Rootball

NOTE: For all other palms, use detail provided by landscape architect in contract plans.

CABBAGE PALM PLANTING ON SLOPE
FOR UP TO 24" CLEAR TRUNK

- 2 x 4 x 12 Wood Batten
- Safety Flags
- See Wood Batten Detail

NOTE: Slope provided as rise:run. For all other palms, use detail provided by landscape architect in contract plans.

WOOD STAKING DETAIL

- 2 x 4 Wood Brace
- Existing Soil
- With boards positioned face to face, nail brace securely to wood stake below finished grade

NOTE: Stake into firm, existing soil.

WOOD BATTEN DETAIL

- 2 x 4 Wood Brace
- Existing Soil
- Mastic
- See Wood Batten Detail

NOTE: For all other palms, use detail provided by landscape architect in contract plans.

4" AND LARGER CALIPER TREE PLANTING ON SLOPE

- 1 x 6 x 6 Wood Stake
- Planting Pit 3 Times Width Of Rootball Plus 6" On Both Sides

NOTE: Slope provided as rise:run.

LANDSCAPE INSTALLATION

FDOF 2014
DESIGN STANDARDS

INDEX NO. 544 SHEET NO. 2 of 3
**DESCRIPTION:**

- **GROUND COVER/SHRUB PLANTING ON SLOPE**
  - Planting Pit 2 Times Width of Rootball
  - Depth of Rootball
  - Maximum Mature Maintained Spacing Per Plans
  - Existing Soil Backfill
  - Mulch
  - Soil Ring For Water Collection
  - Shrub Or Ground Cover Planting
  - Bedline Or Edge Of Sidewalk
  - Maximum Nature Maintained Spread Of Plants
  - Spacing Per Plans

**GROUNDCOVER/SHRUB LAYOUT DETAIL**

- **GROUND COVER/SHRUB PLANTING**
  - Existing Soil Backfill
  - Mulch
  - Existing Soil
  - Shrub Or Ground Cover Planting

**TREE PROTECTION BARRICADE**

- **NOTE:** Slope Provided As Rise:Run.

**NOTES:** Critical Protection Zone: The Area Surrounding A Tree Within A Circle Described By A Radius Of One Foot For Each Inch Of The Tree Trunk Diameter At 54" Above Finished Grade. For Groups Of Trees, Place Barricades Between Trees And Construction Activity. Tree Protection Barricades Shall Be Located To Protect A Minimum Of 75% Of The Critical Protection Zone.

*Dimension Varies Per Critical Protection Zone*
DESIGN NOTES

1. The information shown on this index is intended solely for the purpose of clear sight development and maintenance at intersecting highways, roads, and streets, and is not intended to be used in connection with roadway or roadside safety except as related to clear sight corridors. An analysis of sight distance shall be documented for all intersections.

2. Details are based on the AASHO A Policy On Geometric Design Of Highways And Streets, 2001, CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B and F, and Department practices for channeled median openings (left turns from major roadways).

3. The minimum driver eye setback of 14.2’ from the edge of the traveled way may be adjusted on any intersection leg only when justified by a documented, site-specific field study of vehicle stopping position and driver eye position.

4. For SIGNALIZED INTERSECTIONS sight distances should be developed based on AASHO 'Case D-Intersections With Traffic Signal Control'. At signalized intersections, the first vehicle stopped on one approach shall be visible to the driver at the first vehicle stopped on each of the other approaches. Left-turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Apart from these sight conditions there are generally no other approach or departure sight triangles needed for signalized intersections. However, if the traffic signal is to be placed on two -way flashing operation (i.e. flashing yellow on the major -road approaches and flashing red on the minor -road approaches) under off -peak or nighttime conditions, then the appropriate departure sight triangles for Case B, both to the left and to the right, should be provided for the minor -road approaches. In addition, if right turns on a red signal are to be permitted from any approach, then the appropriate departure sight triangle to the left for Case B2 should be provided to accommodate right turns from that approach.

5. Where curvature, super-elevation, adverse split profiles or other conditions preclude the use of standard tree sizes and spacing, proof-of-view and shadowing restraints must be documented and the size and location of trees in medians detailed in the plans.

6. Intersection sight distance values are provided for Passenger Vehicles, 50 Vehicles and Combination Vehicles. Intersection sight distance based on the Passenger Vehicle is suitable for most intersections. Where substantial volumes of heavy vehicles enter the Combination Vehicles. Intersection sight distance based on the Passenger Vehicle is suitable for most intersections. Where substantial volumes of heavy vehicles enter the Combination Vehicles. Intersection sight distance values are provided for Passenger Vehicles, SU Vehicles and Combination Vehicles.

7. Proof of view and shadowing restraints must be provided for the minor-road approaches. In addition, if right turns on a red signal is permitted, no trees shall be located to a point on the edge of the near side outer traffic lane on the major roadway. Distance 'd' is measured from the centerline of the entrance lane of the minor roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.

8. A. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.

9. Barriers systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.

10. The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roadway and vehicles on the major roadway must be able to see each other clearly throughout the limits of 'd' and 'd' in the Engineer’s judgment, landscaping interferes with the line of sight corridor prescribed by these standards the Engineer may reject, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

   a. Species within the restricted areas are limited to selections as follows:

   b. High speed facilities (design speed 50 mph or greater), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

   c. For safety, these additional setbacks are required:

      1. When no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

   d. Where left turns from the major road are permitted, no trees shall be located within the distance of 'd', Sheet 2 of 6, and not less than the distances called for in (c) (c) (c) as applicable.

   e. For safety, these additional setbacks are required:

      1. When no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

   f. Where left turn lanes are present, the following requirements apply.

      - For low speed facilities (design speed less than 50 mph), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 200' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

      - For high speed facilities (design speed 50 mph or greater), no trees shall be permitted within 200' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

11. Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No 4. At intersections listed in the Department’s High Crash Intersection Record, in addition to keeping to a minimum, objects that distract or affect sight distance are prohibited.

12. Sight distance 'd' applies to normal and skewed intersections (intersecting angles between 60° and 120°, and where vertical and horizontal curves are not present. Sight distance 'd' is measured along the major roadway from the center of the entrance lane of the minor roadway to the center of the near approach lane (left or right) of the major roadway. Distances 'd' and 'd' are measured from the centerline of the entrance lane of the minor roadway to a point on the edge of the near side outer traffic lane on the major roadway. Distance 'd' is measured from the centerline of the entrance lane of the minor roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.

13. Trunked Plants – Plant selection of a mature trunk diameter 8" or less measured at 6’ above the ground. Canopy or high borne foliage shall never be lower than 5’ above the sight line datum. Those selections shall be spaced no closer than 21’.

   a. Trunks – Trunks can be installed with sod, pavers, gravel, mulch, ground covers or other Department approved material. The clear sight window must be in conformance with the WINDOW DETAIL modified to attain the height requirements listed in Ground Covers above.

   b. Size and spacing shall conform to the Tree Spacing Table.

   c. Requirements for placement within medians at median openings and at unsignalized and signalized intersections:

   a. Horizontal clearance for the mature specimen shall be maintained as specified in Index 100. Specimens whose mature trunk diameter is greater than 18 inches shall not be permitted.

   b. Where left turns from the major road are permitted, no trees shall be located within the distance of 'd', Sheet 2 of 6, and not less than the distances called for in (c) (c) (c) as applicable.

   c. For safety, these additional setbacks are required:

      1. Where no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

   d. Where left turn lanes are present, the following requirements apply:

      - For low speed facilities (design speed less than 50 mph), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 200' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.

      - For high speed facilities (design speed 50 mph or greater), no trees shall be permitted within 200' of the restricted median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.
**SIGHT DISTANCE AT INTERSECTIONS**

**CHANNELIZED DIRECTIONAL MEDIAN OPENINGS**

<table>
<thead>
<tr>
<th>Design Speed (MPH)</th>
<th>1 Lane Crossed</th>
<th>2 Lanes Crossed</th>
<th>3 Lanes Crossed</th>
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<tbody>
<tr>
<td>P</td>
<td>SU Comp</td>
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<td>SU Comp</td>
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<tr>
<td>50</td>
<td>145</td>
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<td>235</td>
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</table>

*The *d*₂* values in this table were established by the method referenced in Design Note 2, and are applicable to urban, predominantly curved roadways with design speeds of 45 mph or less and meeting the restricted conditions defined in Index No. 700. For horizontal clearance (HC) of six feet (6'), the values for *d₃* may be determined by the equation *d₃* = *d₂*(w/(w+12)). For roadways with nonrestricted conditions, *d₂* and *d₃* should be based on the geometry for the left turn storage and on clear zone widths (See Index No. 700).

For wide medians where the turning vehicle can approach the through lanes at or near 90°, use *d₃* values from tables on sheets 3 or 6. (The clear sight line origin is assumed to be 14.5' from the edge of the near lane.)

**LIMIT OF CLEAR SIGHT**

- R/W Line: Right of Way Line
- Corner Clip: For Development and Maintenance of Clear Sight Window
- Limit of Clear Sight: Origin of Clear Sight Line on Minor Road
- Origin of Clear Sight Line: 3.5' (See General Note 3c)
- Top of Ground Cover: 5'-0" (2 Sec. Min.)
- Min. Spacing When Caliper in 21'-18'
- Min. Spacing When Caliper in 11'-18'
- Max. Trunk Dia.: 8" (2 Sec. Min.)
- Min. Spacing When Caliper > 11" = 18"
### SIGHT DISTANCE AT INTERSECTIONS

**Vehicle**
- Passenger Vehicle
- SU Vehicle
- Combination Vehicle

**SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_F) (FEET)**

#### 2 LANE UNDIVIDED

<table>
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<td>810</td>
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- **Passenger Vehicle**
- **SU Vehicle**
- **Combination Vehicle**

**Legend**
- Areas Free Of Sight Obstructions

**NOTE:** See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.

---

**Speed Design Limited Domain**

- **Domain:** d
- **Domain:** d_L
- **Domain:** d_F

---

**PICTORIAL**

- **2 LANE UNDIVIDED**

---

**PICTORIAL**

- **2 LANE 2 WAY • FLARED FOR OPPOSING LEFT TURN CENTERED ON ALIGNMENT**

---

**PICTORIAL**

- **2 LANE 2 WAY • FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT**
SIGHT DISTANCE AT INTERSECTIONS

4 LANE UNDIVIDED

PICTORIAL

4 LANE UNDIVIDED FLARED - SYMMETRICAL

PICTORIAL

4 LANE UNDIVIDED WITH OPTIONAL LANE

LEGEND

Areas Free Of Sight Obstructions

NOTE: See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.
### SIGHT DISTANCES AT INTERSECTIONS

**PLAN**

**PICTORIAL**

**INSET A**

**INSET B**

**LEGEND**

Areas Free Of Sight Obstructions

### NOTES FOR 4-LANE DIVIDED ROADWAY

1. See Sheet 2 for origin of clear sight line on the minor road.

2. Values shown in the tables are the governing (controlling) sight distances calculated based on AASHTO Case B - Intersection with Stop Control on the Minor Road.

### PASSENGER VEHICLE (P)

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<th>Sight Distance (d)</th>
<th>Sight Distance (d)</th>
<th>Sight Distance (d)</th>
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### SINGLE-UNIT TRUCK (SU)

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<th>Sight Distance (d)</th>
<th>Sight Distance (d)</th>
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### INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

<table>
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<tr>
<th>Median Width</th>
<th>Sight Distance (d)</th>
<th>Sight Distance (d)</th>
<th>Sight Distance (d)</th>
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<td>50</td>
<td>2600</td>
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<td>250</td>
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### 4-LANE DIVIDED ROADWAY

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>Vehicle Length (ft)</th>
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<tbody>
<tr>
<td>Passenger (P)</td>
<td>19</td>
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<tr>
<td>Single Unit (SU)</td>
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<tr>
<td>Large School Bus</td>
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<tr>
<td>WB-40</td>
<td>45.5</td>
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<tr>
<td>WB-50</td>
<td>55</td>
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</table>
**NOTES FOR 6-LANE DIVIDED ROADWAY**

1. See Sheet 2 for origin of clear sight line on the minor road.

2. Values shown in the tables are the governing (controlling) sight distances calculated based on AASHTO Case B - Intersection with Stop Control on the Minor Road.

---

**SIGHT DISTANCES** (d), (dv) & (dx) AND RELATED DISTANCES (dL, dL, dM & dVL) (FEET)

**6 LANE DIVIDED**

---

**PLAN**

**PICTORIAL**

---

**INSET B**

---

**DESCRIPTION:**

**INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)**

---

**INDEX NO.** 546

**SHEET NO.** 6 of 6

---

**FDOT 2014 DESIGN STANDARDS**

---

**SIGHT DISTANCE AT INTERSECTIONS**

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**LAST REVISION 07/01/10**
GENERAL NOTES

1. The Railroad Company will furnish and install all track bed (ballast), crossings, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.

2. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

3. The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.

4. The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the List of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.

5. Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.

6. All asphalt shall be installed in accordance with Index No. 514 and Section 300 of the Standard Specifications.

7. The Department will participate in crossing work, that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.

CROSSING SURFACES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
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<tbody>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Rubber/Asphalt</td>
</tr>
<tr>
<td>TA</td>
<td>Timber/Asphalt</td>
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</table>

STOP ZONE FOR RUBBER CROSSING

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<th>Design Speed (mph)</th>
<th>Zone Length (Distance From Stop)</th>
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<tr>
<td>50 - 55</td>
<td>350'</td>
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<td>60 - 65</td>
<td>500'</td>
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<tr>
<td>70</td>
<td>600'</td>
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</table>

Notes:

1. Type R Crossings are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Single Track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.
**HARDER PLAN**

**ROADWAYS WITH FLUSH SHOULDERS**

**SECTION VIEW**

**TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS**

**VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING**

---

**Curb Details**

- **Concrete Curb and Gutter**
- **Utility Strip**
- **Sidewalk**

**Shoulder Pavement**

- Varieties (2' Min.)
- See 'Crossing Shoulder Pavement' Above

**Railroad Signal, Gate or Signal and Gate**

- Varieties (2' Min.)
- See 'Crossing Shoulder Pavement' Above

**Filter Fabric (Optional)**

- With RR Company

**Pavement**

- Types SP Asphalt (500 Lb/YS)
- Cap or Expansion Material (When Required)

**Grade**

- Level
- 30'

**Rail& Track**

- Level
- 30'

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**Notes:**

- For location of railroad signals, gates or signals and gates see Index No. 17882

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**Railroad Clearances**

- To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same plane as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track superelavation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are superelavated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.