Administrative Code
Board of County Commissioners

CATEGORY: Transportation and Traffic Management	CODE NUMBER: AC-11-4
TITLE: TURN LANE POLICY	ADOPTED: 10/19/88 AMENDED: 10/16/91 3/24/98, 08/17/21 ORIGINATING DEPARTMENT: TRANSPORTATION

PURPOSE/SCOPE:

GENERAL

I. SCOPE

Deceleration, left turn, and right turn lanes are desirable for the safe execution of speed change maneuvers and for storage and protection of left and right turning vehicles. These additional lanes for exit or entrance maneuvers shall be provided in accordance with County Design Standards herein. The pavement width and cross slopes of such lanes shall meet minimum requirements; however, special designs may be allowed when deemed necessary by the Director of the Department of Transportation for County maintained facilities and the Manager of the Department of Community Development's Development Services Division for privately-maintained facilities. Shoulders and recovery areas should be provided in accordance with the same requirements for other travel lanes; wherever possible.

It should be realized that deceleration, left turn, and right turn lanes constitute an integral part of the geometric design of streets and highways and shall be included in the design for all new and replacement construction projects. Deceleration, left turn, and right turn lanes may need to be installed at an existing intersection or access point to improve the existing or outdated design, if and when a traffic analysis shows that the travel time or safety is being degraded by the proposed project traffic, or the turning movements at the intersection are being created by the proposed project's traffic. This Policy addresses the warrants and design features for both cases.

II. POLICY AND PROCEDURE

Deceleration, left turn, and right turn lanes shall be provided at all intersections and/or access points on county-maintained and privately-maintained facilities as required by this policy. Deceleration, left turn, and right turn lane requirements shall not apply to a single family residence, a duplex residence, or two (2) family residence. When an existing development increases trip generation by expanding facilities or by change in use, a one-time deviation may be granted whereby only the increased trip generation is considered in determining if the warrants for requiring deceleration, left and right turn lanes are satisfied providing such deviation does not create a new or increased existing hazard which is detrimental to the health, safety and welfare of the traveling public.

This policy shall not be used to deny access to county maintained facilities for property which otherwise has the right of access; and for which it is not possible to provide deceleration, left and right turn lanes without acquiring additional Right-of-way (ROW) beyond the limits of the subject property. Nothing in this policy shall be construed to place an obligation upon the County to permit left turn lanes into or out of any development via either any existing or proposed street or access point driveway from any street or highway facility where the Director of the Department of Transportation or the Manager of the Division of Development Services (hereinafter referred to as the "Directors") has determined it is not in the best interests of the health, safety and general welfare of the traveling public to allow such left turning movement.

III. DEFINITIONS

1. Deceleration Lane(s)

   The primary function of a deceleration lane is to provide a safe travel path and sufficient distance for exiting vehicles to decelerate from the operating speed on the through lanes of a roadway prior to exiting from the facility.

2. Turn Lane(s)

   a. Left Turn

      The primary function of a left turn lane is to provide a protected area separated from the flow of through traffic in the same direction where left turning vehicles can slow to a stop and wait until a suitable gap occurs or is provided in the opposing flow of traffic to allow the turning maneuver to be safely completed. A secondary function is to eliminate the delay and congestion that would affect the through traffic movement in the same direction while the left turning vehicles slowed down and waited for a safe and adequate gap in the opposing flow of traffic to complete the turning maneuver.

   b. Right Turn

      The primary purpose of a right turn storage lane is to provide a protected area separated from the flow of through traffic in the same direction where right turning vehicles can slow to turning speed or stop and wait until the turning maneuver can be safely completed. A secondary purpose is to eliminate the delay and congestion that would occur for through traffic moving in the same direction while turning vehicles slowed down and completed the right turn movement.

3. Design Speed

   The design speed is the speed noted on the roadway construction plans, or if plans are not available, it is the posted speed limit plus five miles per hour.

4. Two-way peak season volume

   Two-way peak season peak hour volumes to be derived from the AADT estimates in the most recent Lee County Traffic Count Report or if County counts are not available, from developer's counts adjusted using the peak season and peak hour factors from an appropriate nearby permanent count station or combination of count stations. The volumes should also be adjusted to the appropriate horizon year per the TIS requirements.

5. FDOT Design Manual (FDM)

   The latest version of the Florida Department of Transportation Design Manual.

IV. WARRANTS

The need for deceleration and turn lanes are generally determined by the following factors:

1. Street classification of any particular street or road as identified in the adopted County Administrative Code entitled "County Road Functional Classification Map and List".
2. Posted Roadway Speed
3. Number of Turning Movements during the Peak Hour of both the development and the adjacent roadway
4. Opposing and same direction peak hour through volumes.
5. Intersection and/or Stopping Sight Distance
6. Access Control

7. Crash history

Turn lane warrant reviews shall be required by developers at all project site access points, all intersections interior to planned developments open to public traffic, and all access points at the boundaries of planned developments at time of project plan review. Warrant reviews at all intersections interior to planned developments and all access points at the boundaries of planned developments must include all cumulative approved development traffic associated with the planned development.

LEFT TURN DECELERATION AND LEFT TURN LANES

A deceleration and left turn lane will be required when any two (2) or more of the following warrants are satisfied:

A. Arterial Street

1. Posted speed limit of the arterial street is equal to or greater than thirty-five (35) mph.

2. Estimated traffic volume:

   a. Two-way peak season, peak hour through and right turn volume on the facility for either the peak hour of the roadway or the peak hour of the development is equal to or greater than 1000 vehicles and the left turn volume is greater than or equal to 10 vehicles; or
   b. Two-way peak season, peak hour through and right turn volume on the facility for either the peak hour of the roadway or the peak hour of the development is between 500 and 1000 vehicles and the left turn volume is greater than or equal to 15 vehicles; or
   c. When the left turn volume for any hour is greater than 20 trips regardless of through and right turn volumes on the facility.

3. Available Sight Distance for left turning vehicles to observe approaching traffic or for approaching traffic moving in either direction to observe the left turning vehicle is less than the value shown in Table A-I for the design speed, or posted speed limit plus 5 miles per hour if the design speed is not available, of the arterial street.

4. The arterial street has been designated as a controlled access facility by the BOCC.

5. The arterial street intersection is an arterial street or collector street.

6. Traffic Control of the intersecting street or access paint connection is by a traffic signal or is anticipated to meet MUTCD traffic signal warrants in the next five years.

7. Five or more crashes reported at the intersection in a 12-month period during the past three years that could have been mitigated by a left turn lane.

8. It is determined by the Lee County Department of Transportation that a turn lane is required for the health, safety, and welfare of the road users.

Table A-1				
Stopping Sight Distance for Approach to Stops				
Design Speed (mph)	< or = 30	40	50	> or = 60
Required sight distance (ft)	200	310	430	570

B. Collector Street

1. Posted speed limit of the collector street is equal to or greater than thirty-five (35) mph.

2. Number of Left Turning Movements

   a. On multi-lane collector facilities the number of left turning vehicles from the collector roadway is equal to or greater than twenty (20) during either the A.M. or P.M. peak hour of the collector street or the peak hour of the development.

   b. On two-lane two way collector streets:

i. Two-way peak season, peak hour through and right turn volume for either the peak hour of the roadway or the peak hour of the development is equal to or greater than 500 vehicles and the left turn volume is equal to or greater than 20 vehicles for that same hour; or

ii. When the left turn volume for any hour is greater than 30 vehicles regardless of through and right turn volume.

3. Available Sight Distance for left turning vehicles to observe approaching traffic or for approaching traffic moving in either direction to observe the left turning vehicle is less than the value shown in Table A-I for the design speed, or posted speed limit plus 5 miles per hour if the design speed is not available, of the collector street.

4. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants in the next five years.

5. The collector street is intersecting an arterial or collector street.

6. Five or more crashes reported at the intersection in a 12-month period during the past three years that could have been mitigated by a left turn lane.

7. It is determined by the Lee County Department of Transportation that a turn lane is required for the health, safety, and welfare of the road users.

C. Local Streets

1. Posted speed limit on the local street is equal to or greater than thirty (30) mph and the peak hour left turning movement is sixty (60) or more.

2. Number of Left Turning Movements

   a. On multi-lane facilities the number of left turning vehicles exceeds one hundred (100) during the peak hour of the local street.

   b. On two-lane, two way facilities the number of left turning vehicles from the local street exceeds sixty (60) during the peak hour of the local street and the opposing through plus right turn traffic volume exceeds five hundred (500) vehicles during either the A.M. or P.M. peak hour of the local street.

3. Available Sight Distance for left turning approaching traffic or for approaching traffic moving in either direction to observe the left turning vehicle is less than the value shown in Table A-I for the posted speed limit of the local street.

4. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants in the next five years.

5. It is determined by the Lee County Department of Transportation that a turn lane is required for health, safety, and welfare of the road users.

D. Intersecting Streets

Separate left turn lanes are required on an intersecting street or access point connection when any two (2) or more of the following warrants are satisfied:

1. Intersecting Street/Connection to Arterial Streets

   a. Posted speed limit of the intersecting street or access point connection is equal to or greater than thirty-five (35) mph.

   b. When the Number of left turning vehicles from the intersecting street or access point connection is equal to or greater than thirty (30) vehicles during either A.M. or P.M. peak hour of the arterial street.

   c. The arterial street which is being entered has been designated as a controlled access facility by the BOCC.

d. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants by the build-out year.

e. It is determined by the Lee County Department of Transportation or the Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

2. Intersecting Street/Connection to Collector Street

a. Posted speed limit of the intersecting street or access point connection is equal to or greater than thirty five (35) mph.

b. Number of left turning vehicles from the intersecting street or access point connection is equal to or greater than sixty (60) vehicles during either the A.M. or P.M. peak hour of the collector street.

c. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants by the build-out year.

d. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

3. Intersecting Street/Connection to Local Street

a. Posted speed limit of the intersecting street or access point connection is equal to or greater than thirty (30) mph.

b. Number of left turning vehicles from the intersecting street or access point connection is equal to or greater than ninety (90) vehicles during either the A.M. or P.M. peak period of the local street.

c. Traffic Control of the intersecting street or access point connection is a traffic signal.

d. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

DECELERATION AND RIGHT TURN LANES

A deceleration and right turn lane will be required when any two (2) or more of the following warrants are satisfied:

A. Arterial Street

1. Posted speed limit of the arterial street is equal to or greater than thirty-five (35) mph.

2. Number of right turning movements from the arterial street is equal to or greater than thirty (30) during either the A.M. or P.M. peak hour of the arterial street or the peak hour of the development when the arterial street AADT is less than 6,000 vpd or equal to or greater than twenty (20) vph during either the A.M. or P.M. peak hour of the arterial street or peak hour of the development when the arterial street AADT is equal to or greater than 6,000 vpd.

3. Available Sight Distance of a right turning vehicle to be seen by through traffic traveling in the same direction is less than the value shown in Table A-I for the design speed of the arterial street.

4. Arterial Street has been designated as a controlled access facility by the BOCC.

5. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants by the build-out year.

6. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

B. Collector Street

1. Posted speed limit of the collector street is equal to or greater than thirty-five (35) mph.

2. Number of right turning movements from the collector street is equal to or greater than forty-five (45) during either the A.M. or P.M. peak hour of the collector street when the collector street AADT is less than 6,000 vpd or equal to or greater than thirty (30) vph during either the A.M. or P.M. peak hour of the collector street or peak hour of the development when the collector street AADT is equal to or greater than 6,000 vpd.

3. Available Sight Distance for a right turning vehicle to be seen by through traffic traveling in the same direction is less than the value shown in Table A-I for the design speed of the collector street.

4. Traffic Control of the intersecting street or access point connection is a traffic signal or is anticipated to meet MUTCD traffic signal warrants by the build-out year.

5. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

C. Local Street

1. Posted speed limit of the local street is equal to or greater than thirty (30) mph.

2. Number of right turning movements from the local street is equal to or greater than sixty (60) during either the A.M. or P.M. peak hour of the local street.

3. Available Sight Distance for a right turning vehicle to be seen by through traffic traveling in the same direction is less than the value shown in Table A-I for the design speed of the local street.

4. Traffic Control of the intersecting street or access point connection is a traffic signal.

5. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

D. Separate Right Turn Lanes are required on an intersecting street or access point connection when any two (2) or more of the following warrants are satisfied.

1. Intersecting Street/Connection to Arterial Street

   a. Posted Speed Limit of the intersecting street or access point connection is equal to or greater than forty five (45) mph.

   b. Number of right turning vehicles from the intersecting street or access point connection is equal to or greater than sixty (60) during either the A.M. or P.M. peak hour of the arterial street.

   c. Arterial street which is being entered has been designated as a controlled access facility by the BOCC.

   d. Traffic control of the intersecting street or access point connection is by a traffic signal.

   e. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

2. Intersecting Street/Connection to Collector Street

   a. Posted speed limit of the intersecting street or access point connection is equal to or greater than thirty five (35) mph.

   b. Number of right turning movements from the intersecting street or access point connection is equal to or greater than ninety (90) during either the A.M. or P.M. peak hour of the collector street.

   c. Traffic control of the intersecting street or access point connection is by a traffic signal.

   d. It is determined by the Lee County Department of Transportation or Department of Community Development that a turn lane is required for the health, safety, and welfare of the road users.

3. Intersecting Street/Connection to Local Street

   a. Posted speed limit of the intersecting street or access point connection is equal to or greater than thirty (30) mph.

   b. Number of right turning movements from the intersecting street or access point connection is equal to or greater than one hundred and twenty (120) during either the A.M. or P.M. peak hour of the local street.

   c. Traffic control of the intersecting street or access point connection is a traffic signal.

V. DESIGN

I. Deceleration lanes consist of two distinct sections. The transition section is the distance needed for vehicles to achieve transfer from the through lane to the turn lane. The deceleration section is the distance needed to slow to a stop.

FDOT has tabulated standards for these distances, but those apply to typical rural highways. Under county urbanized conditions drivers begin deceleration immediately upon entry into the transition section and arrive at the deceleration section at lower speeds than the posted speed. Under urbanized conditions AASHTO recommends a deceleration rate of 10 ft. per sec. per sec. The table below represents a set of calculated County standards which differ from the FDOT standards except for those roads with a posted speed of 45 mph or above. County standards shall be used on County roads, except controlled access roadways which will utilize the FDOT standards. FDOT will specify requirements on State Highways. FDOT standards are found in the Florida Design Manual.

Design Speed (mph)	Transition Distance (ft)	Deceleration Distance (ft)	Total Distance (ft)
30	75	50	125
35	80	75	155
40	85	100	185
45	See FDM Section 212	See FDM Section 212	See FDM Section 212
50		See FDM Section 212	
55		See FDM Section 212	

The initial 50 feet (100 feet for a dual turn lane) of the transition length shall consist of pavement taper and the remaining length shall be the full width of the deceleration lane (see Figures FB-1 and FB-2).

II. DESIGN OF LEFT AND RIGHT TURN LANES

Where left and right turn lanes are required, storage lanes shall be used in conjunction with deceleration lanes and their lengths shall be added to the required transition and deceleration length.

A. For calculating the storage requirements for unsignalized intersections:

   a. For left turn lanes use the number of vehicles that will arrive in two minutes during the design peak hour:

$$N = \frac{V}{30} * L$$

Where:
N= length of storage required (round to the next full vehicle length)
V = Number of turning vehicles during the peak hour of generator in the design year
L = length of vehicle, including headway (use 25 feet as a minimum). A longer average vehicle length may be required if the vehicle mix includes a large number of trucks or buses.

   b. For right turn lane storage length, use the number of vehicles that will arrive in one minute during the design peak hour:

$$N = \frac{V}{60} * L$$

Where:
N= length of storage required (round to the next full vehicle length)
V = Number of turning vehicles during the peak hour of generator in the design year
L = length of vehicle, including headway (use 25 feet as a minimum). A longer average vehicle length may be required if the vehicle mix includes a large number of trucks or buses.

B. For calculating the storage requirements for signalized intersections, the storage lengths should be based on the following calculations but not less than 100 feet:

a. For left turn lanes, the storage requirement shall be:

$$N = \frac{V}{(\frac{3600}{C})} * L * 2$$

Where:
N= length of storage required (round to the next full vehicle length)
V = Number of turning vehicles during the peak hour of generator in the design year
C = Cycle length (use 120 sec unless other data is available)
L = length of vehicle, including headway (use 25 feet as a minimum). A longer average vehicle length may be required if the vehicle mix includes a large number of trucks or buses.

b. For right turn lanes, the storage requirement shall be:

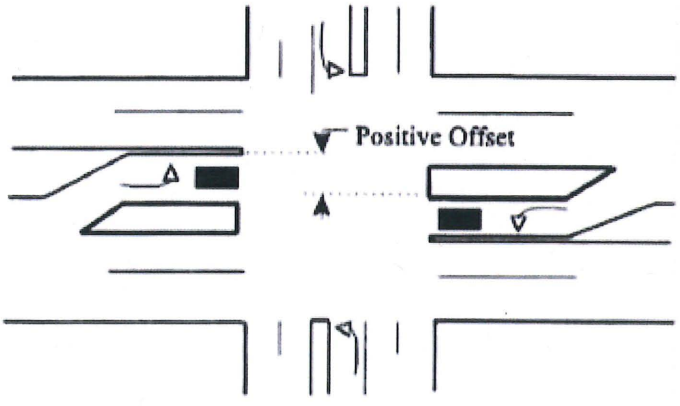
$$N = \frac{V}{(\frac{3600}{C})} * L * 1.5$$

Where:
N= length of storage required (round to the next full vehicle length)
V = Number of turning vehicles during the peak hour of generator in the design year
C = Cycle length (use 120 sec unless other data is available)
L = length of vehicle, including headway (use 25 feet as a minimum). A longer average vehicle length may be required if the vehicle mix includes a large number of trucks or buses.

C. The total turn lane length (storage plus transition plus deceleration distances) must be at least as long as the standing queue for the adjacent through lane during the peak hour of the roadway.

D. Alternative methods of determining required queue storage lengths will be considered by the County in the event of geometric constraints or for unusual conditions that would require a variance from these guidelines.

E. Left turn lanes shall be constructed to provide a positive offset so that queued vehicles in an opposing left turn lane do not restrict each other's views of on-coming traffic.



F. If a "free flow" right turning movement will be made into an added lane from the right turn lane, the storage length may be omitted. The "free flow" condition shall be documented in the Traffic Impact Statement (TIS) and/or the Traffic Impact Mitigation Plan (TIMP).

G. Turning movement calculations shall be in accordance with the procedures outlined in the Traffic Impact Statement Guidelines.

III. WIDTH OF TURN LANES

Turn lanes must be of sufficient width to provide safe usage for prevailing speeds on the road being exited. The minimum width will be 11 feet. A wider lane may be required if traffic so requires, such as a large percentage of trucks.

For right turn lanes on arterial and collector streets, a minimum 5-foot keyhole lane for bicycles will be included between the turn lane and the through lane. If there is a wider bike lane on the street, the keyhole lane will be the width of the bike lane.

IV. OVERLAPPING TURN LANES

Circumstances can result in the overlap or close spacing of turn lanes. If left unmitigated, this phenomenon can create undesirable shifts in alignment, or "jogs". These jogs not only create operational problems for the turn lanes, but can negatively impact the adjacent through traffic by creating unnecessary side friction. Mitigative measures shall be taken, which consist of extending the full pavement width between the adjacent turn lanes, thereby creating a continuous turn lane. Advance signing and pavement markings shall be required.

V. TURN LANES WHICH INTERSECT EXISTING ACCESS POINTS

Whenever a proposed turn lane or its taper intersects an existing access point, street or driveway to an adjacent property, the transition and deceleration segments shall be moved upstream of the existing access point, street or driveway a distance equal to the required deceleration lane and transition length. A full width lane shall be provided between the two (2) access points and the deceleration lane will serve both properties.

VI. LANE SHIFTS FOR LEFT TURN LANES

Through traffic lanes occasionally must be shifted from existing alignment to facilitate construction of left turn lanes because there may not be a median of sufficient width to accommodate a left turn lane of the required width. It is essential that through traffic be enabled to travel through at the posted speed limit. The approach taper of the through lane must be sufficient to accommodate this flow.

The road should be widened equally to each side of the centerline. If geometric or right-of-way constraints prohibit that, the road should be widened towards the side that is being developed.

The lateral shift of the through lane must be equal to the width of the turn lane or it may be lessened by the amount the centerline can be shifted to the left in situations where that is an acceptable solution. The alternate lane shift arrangements are shown in Figure FB-3.

The following formula shall be used to determine the required length of the approach taper:

Design Speed < 45 mph, use

$$Approach\ Taper\ Length\ (ATL) = \frac{WS^2}{60}$$

Design Speed ≥ 45 mph, use

$$Approach\ Taper\ Length\ (ATL) = W * S$$

Where: W = Lateral Shift, ft
S = Posted speed, mph

It is sometimes not desirable to achieve complete lateral shift before beginning the taper into the transition portion of the turn lane. This taper, sometimes known as the Bay Taper, and set at 50 feet, shall start at the point where 2/3 of the lateral shift has been achieved. This serves to shorten the overall length of the reconstructed area and minimize the tendency of left turn drivers to overlap the markings.

NOTE: Lane shift through a curve shall be based on the above, but may require additional transition.

A final surface course shall overlay the limits of changed travel lanes to obliterate old markings and joints.

VII. DEVIATIONS

The Directors may grant a deviation from this policy in part or in whole after finding that any of the following conditions make compliance infeasible.

1. Roadway and driveway geometry does not permit the installation of a left or right turn lane or dictates deviations from design standards; or
2. Right-of-way constraints do not permit the installation of a left or right turn lane, or dictate deviations from design standards; or
3. Land uses, such as churches or unconventional developments, where the traffic generation patterns do not make the lane warrants applicable; or
4. Existing topographic features would cause construction of a turn lane to be prohibitively expensive, or dictate deviations from design standards; or
5. Unusual roadway features would cause a turn lane to be detrimental to the health, safety and general welfare of the traveling public.

Deviation will be granted in writing.

VIII. VARIANCES

Variances shall be applied for and processed in accordance with section 10-104 of the Land Development Code.

FIGURE FB-1

RIGHT TURN LANE -ELEMENTS

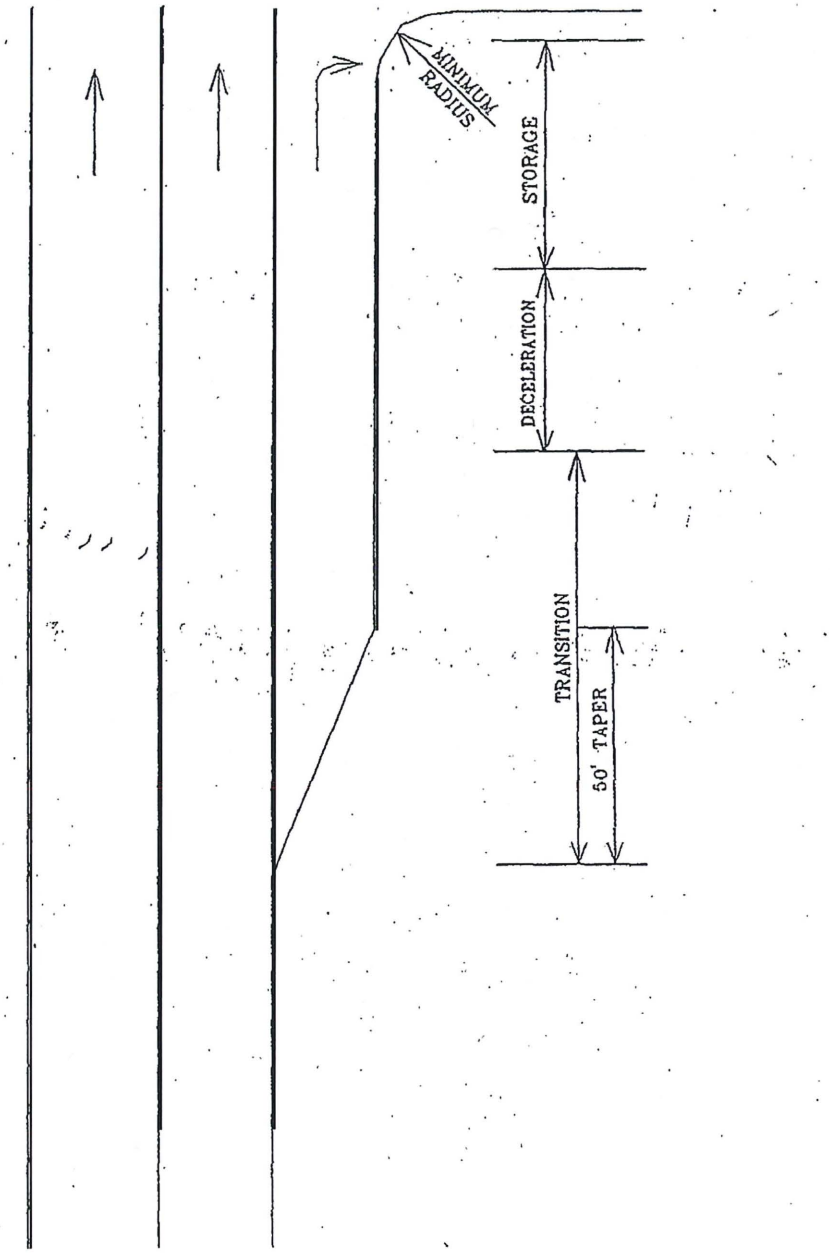


FIG JRE FB-2

LEFT TURN LANE ELEMENTS

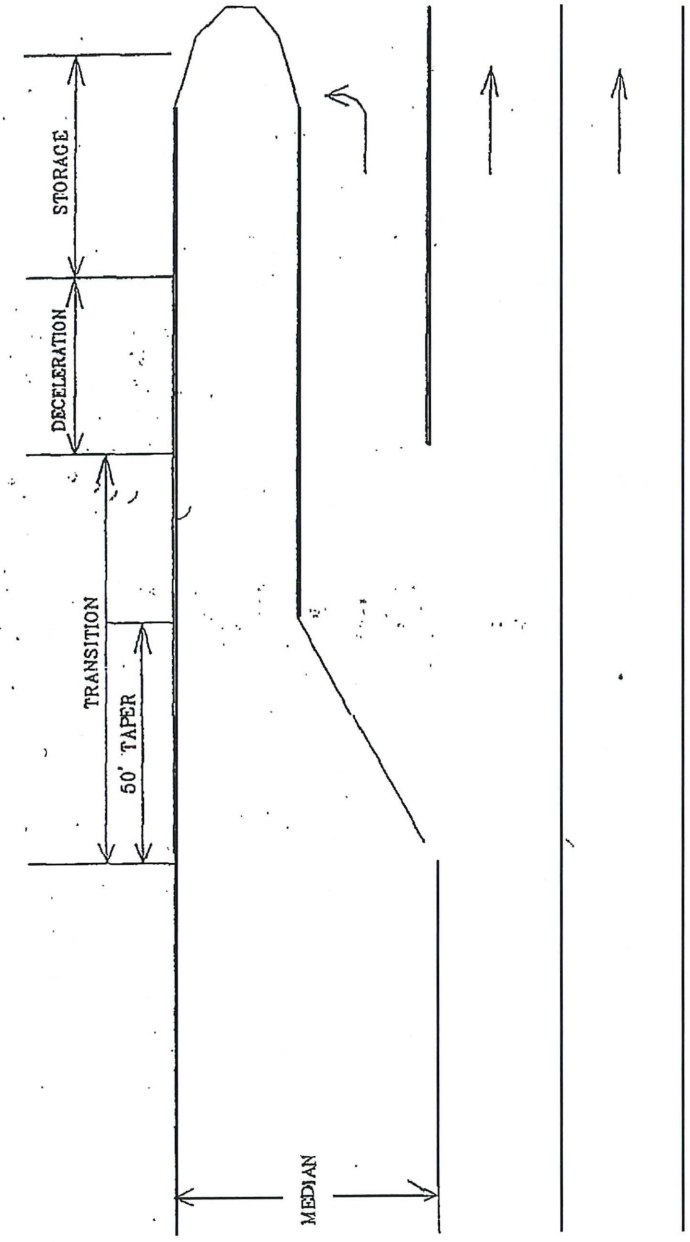


Figure FB-3

AC-11-4 Continued