NOVA SCOTIA

Public Works
Highway Engineering Services Division

ACCESS MANAGEMENT GUIDELINES (December 2023)

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SECTION ONE - INTRODUCTION

1.1 Background

1.1.1 Highway Function - Access versus Mobility

Highways serve a dual purpose of providing a means of transporting people and goods between places and providing access to adjacent property. The intent of the Access Management Guidelines is to balance the need for land access while preserving highway functionality in terms of safety, capacity and speed.

1.1.2 Impacts of Poorly Managed Access

As development occurs along a highway and traffic volumes increase many highways become congested resulting in increased delays and collisions. This deterioration of highway functionality is often due in part to poorly managed access including improperly spaced and designed driveways and intersections.

The consequences of not managing access can be seen throughout the province and include the proliferation of private driveways, poorly planned commercial strip development, increased traffic conflicts, and the deterioration of highway safety. Poor access management may result in the need for expensive highway improvements including widening and the construction of highway bypasses.

1.1.3 Benefits of Access Management

The proven benefits of good access management include increased safety for motorists and pedestrians, improved traffic flow, increased highway life spans, decreased vehicle emissions, improved aesthetics, increased property values and an improved business environment.

1.2 Access Rights and Departmental Authority

1.2.1 Landowner Rights

The Department of Public Works, herein referred to as "the Department" or "DPW", recognizes that property owners have certain rights of access to the provincial highway system. Except where specifically denied by legislation, landowners have a legal right of safe and reasonable access to the provincial highway system.

The access rights of landowners are however subject to regulation in the interest of public health, safety, and welfare and are subordinate to the public's right to a safe and efficient highway. The right of a landowner to have access to the provincial highway system, or to a particular means of access, may be restricted if a reasonable alternative access is available or can be obtained.

1.2.2 Department Rights and Obligations

The Department has both a right and obligation to protect the public investment in highways by properly managing direct vehicular access to preserve highway capacity and improve safety. It is the intent of the Access Management Guidelines to provide access standards that recognize and consider impacts on public and private land uses. It is also the intent of the Department to work cooperatively with property owners to provide reasonable access that is safe and enhances the movement of traffic.

1.2.3 Departmental Authority

The Department's authority to develop and enforce access management standards is granted by Section 73 of the Public Service Act and Section 4 of the Public Highways Act.

1.3 Purpose of the Access Management Guidelines

1.3.1 Primary Goals

Nova Scotia's highway system constitutes a valuable resource and a major public investment. The primary goals of the Access Management Guidelines are to improve public safety, maintain efficient traffic flow, and protect the overall functional integrity of provincial highways while at the same time balancing the need for access to adjacent property. These goals are accomplished by providing appropriate access location and design standards for accesses to the provincial highway system and by providing guidance on the administration of the access permitting and approval process.

1.3.2 Stakeholder Information

Stakeholders in the land development approval process have seen the need for Department access standards for some time. Previous guidelines were not well defined and often created confusion within the Department and for the public. The Access Management Guidelines help to provide consistency and uniformity in the development approval process along with clear expectations of property owners and developers when requesting access to the provincial highway system.

1.4 Implementation

1.4.1 Effective Date and Exemptions

After January 1, 2024, all vehicular access to the provincial highway system shall be permitted in accordance with the Access Management Guidelines. All access connections in use, or approved, prior to January 1, 2024 shall be considered access connections exempt from the permitting process contained in the Access Management Guidelines. This exemption shall remain in effect until a new access permit is required due to a significant land use change or an alteration to an access within the highway right-of-way.

1.4.2 Access Guidelines and Precedence

The Access Management Guidelines replace Chapter 8, Section 2 (Controlled Access Highways) and Chapter 8, Section 11 (Building Permits) of the "Old" Manual 23. After January 1, 2024, Chapter 8, Sections 2 and 11 of "Old" Manual 23 shall not be used for reference in the access approvals process.

The Department's Driveway Procedure PR 5000 contains information related to the installation of new private driveways. In the event of a conflict between the access requirements contained in the Access Management Guidelines and those contained in Manual 23, Driveway Procedure PR 5000, or any other approved Department design manuals, policies, or specifications, the more stringent requirements must take precedence.

1.5 References and Sources

The following documents (latest editions) have been used as references to assist in the development of standards and specifications contained in the DPW Access Management Guidelines.

a.) **Geometric Design Guide for Canadian Roads**, Transportation Association of Canada, Ottawa, Ontario.
b.) **Access Management Manual**, Transportation Research Board, Washington, DC.
c.) **Work Within Highway Right-of-Way Permit**, Nova Scotia Department of Public Works, Halifax, NS.
d.) **TIR Manual of Policies, Processes, and Procedures Procedure PR 5000 Driveway Entrances**, Nova Scotia Department of Public Works, Halifax, NS.

e.) **TIR Manual of Policies, Processes, and Procedures Policy PO 1018 Traffic Impact Analysis**, Nova Scotia Department of Public Works, Halifax, NS.
f.) **TIR Manual of Policies, Processes, and Procedures Procedure PR 5066 Traffic Impact Policy Process,** Nova Scotia Department of Public Works, Halifax, NS.
g.) **TIR Manual of Policies, Processes, and Procedures Policy PO 1022 Service Roads**, Nova Scotia Department of Public Works, Halifax, NS.
h.) **Provincial Subdivision Regulations**, Province of Nova Scotia, Halifax, NS.
i.) **Nova Scotia Public Highways Act**, Province of Nova Scotia, Halifax, NS.
j.) **Geometric Design Standards for Ontario Highways**, Ministry of Transportation, Toronto, Ontario.
k.) **Ohio State Highway Access Management Manual**, Ohio Department of Transportation, Columbus, Ohio.
l.) **Nevada State Access Management System and Standards**, Nevada Department of Transportation, Carson City, Nevada
m.) **Vermont Access Management Program Guidelines**, Vermont Agency of Transportation, Montpelier, Vermont
n.) **Florida Driveway Handbook**, Florida Department of Transportation, Tallahassee, Florida
o.) **Nova Scotia Temporary Workplace Traffic Control Manual**, Nova Scotia Department of Public Works, Halifax, NS.
p.) **TIR Manual of Policies, Processes, and Procedures Procedure 5071 Community Mailboxes**, Nova Scotia Department of Public Works, Halifax, NS.

SECTION 2 - PERMITTING AND APPROVALS

2.1 General

2.1.1 Purpose

This section sets forth requirements governing the approval of access by the Department for private and public highway connections and for the construction of structures adjacent to highways.

2.1.2 New Private and Public Accesses

The Department has the authority to require Departmental approval for any use or occupancy of provincial highway right-of-way for the purpose of constructing and/or using private roads, driveways, and public road intersections via a. "*Work Within Highway Right-of-Way Permit*" WWHROW permit, Information about permit applications can be found here: Permit Info or in the local Area offices.

2.1.3 Change of Land Use, Structures, and Access Modifications

A new WWHROW permit shall be required prior to:

a.) a significant change in land use that will affect the type or volume of traffic using an existing access;

b.) erection or expansion of a structure within 100 m of the centreline of a provincial highway;

c.) the erection or expansion of a structure within 60 m of the limit of a controlled access highway;

d.) the reconstruction or relocation of an access or any significant alterations to an access connection within the highway right-of-way.

e) temporary access for any construction purposes.

2.1.4 Supporting Documentation

The information and level of detail required to assess a permit application varies based on the type and use of the access requested. Higher density developments have greater impacts on the highway system and may require supporting information in addition to what is listed on the permit application. Supporting documentation may include, but is not limited to, some or all of the following:

a.) location of adjacent accesses and intersections on both sides of the highway;

b.) location of any easements;

c.) a site plan drawing (see detailed requirements in Section 7.4.1);

d.) stormwater impacts, including site grading, pre and post-development flows, and, if required, a stormwater management plan.

e.) property mapping showing the location of property lines and adjacent land ownership;

f). geometric design plans for the proposed access or required road improvements including AutoTURN or similar turning template analysis;

g.) traffic volumes and vehicle types accessing the site;

h.) a traffic impact study (TIS) if the development is expected to generate 100 or more peak hour 2-way trips. A TIS may still be required with fewer than 100 peak hour trips, reasons include: existing traffic issues adjacent to the development, limited residual capacity on nearby roads, proximity of proposed driveway to intersections or major driveways, or direct development access to arterials or collectors. Triggers for typical development types and sizes are shown below:

Table 2.1.4 TIS Triggers

Residential	
Type	Size
Single Family Detached	> 100 units
Duplex	> 190 units
Apartment/Condo	> 160 units
Commercial	
Type	Size
Fast Food	> 2,200 sqft
Gas Station	> 7 fueling stations
Grocery Store	> 10,440 sft
Big Box Store	> 22,750 sqft
Hardware Store	> 22,000 sqft

An application may be refused if, in the opinion of the Department, necessary and essential information is missing. The applicant will be notified in writing of any omissions in the application submission that needs correction.

2.1.5 Preliminary Meeting

Prior to submitting a permit application, applicants may choose to contact the appropriate Local DPW Office for information about the application process and the type of information they may be required to submit. It is strongly recommended that applicants seeking access permits for large/high-volume residential, industrial, or commercial developments request a preliminary meeting with appropriate Department staff prior to submission of an access permit application. Applicants should bring sufficient materials to the meeting such as preliminary maps, plans, and documents to illustrate the site, the size and type of proposed land use, estimated traffic volumes and vehicle types generated by the site, adjacent public roads and highways, and any existing or available access.

A preliminary meeting provides Department personnel an early opportunity to examine the feasibility of the access proposal with the applicant, to consider whether it is permissible under the Access Management Guidelines, and whether a Traffic Impact Study (TIS) is warranted.

2.1.6 Access Permits for Highway Construction

Highway construction projects undertaken by DPW do not require WWHROW permit approval from the local Area Manager. But are still subject to the same supporting documentation listed in Section 2.1.4 plus the approved traffic control plans. The coordination of any necessary supporting document review is the responsibility of the Project Engineer assigned to the construction project. If supporting documentation requires approval, that must also be coordinated by the Project Engineer.

2.1.7 Temporary Access

A Temporary Highway Access Permit included with an approved WWHROW Permit may be granted for a period of time as specified on the permit, not to exceed one year. A temporary access permit may be extended or reissued by the Department. Conditions for temporary accesses will typically include, but are not necessarily limited to, the following:

a.) a permit for a construction only temporary access shall not be issued until a permanent access location and design has been approved by the Department and a funding guarantee has been provided for the permanent access and any necessary highway improvements.

b.) temporary accesses must have adequate stopping distance and intersection sight distance as required based on entrance volumes in Table 6.2.1;

c.) backing from and to the highway is not permitted;

d.) no work/activity within the highway right-of-way;

e.) no storing or stockpiling of materials within the highway right-of-way;

f.) off- highway equipment is not permitted on the road surface, shoulder or ditches;

g.) the road surface must be kept free of mud and debris at all times;

h.) any damage to the road surface, shoulder, or drainage system, resulting from the work activity, must be repaired as soon as possible after it occurs;

i.) signage for the use of the temporary access must, at a minimum, be in accordance with the Application Guide for Haul Roads in the Temporary Workplace Traffic Control Manual

j.) the applicant must remove the access and restore the site, to the satisfaction of the Department, within 3 days of the permit expiry date;

2.2 Access Construction

2.2.1 Notification

Access construction must not begin until a permit has been issued by the Department. The applicant must notify the Department at least one working day prior to any construction within the provincial highway right-of-way and the access must be completed in an expeditious and safe manner.

2.2.2 Construction Procedures and Funding

Accesses are to be constructed in accordance with the permit conditions, DPW Procedure PR 5000, and approved design plans if applicable. Applicants are responsible for supplying materials, traffic control, and environmental measures. The local office must be notified 24 hours prior to starting installation.

2.2.3 Traffic Control

All work within the highway right-of-way must adhere to traffic control requirements as contained in the latest version of the *"Nova Scotia Temporary Workplace Traffic Control Manual"*.

2.3 The Department's Right to Modifications

2.3.1 Access Modifications

If it is necessary in the future for improved safety and/or operation of the highway, the Department may reconstruct, relocate, modify, repair, or remove any access or any features or fixtures thereof located within the highway right-of-way, provided reasonable access to the property is maintained.

2.3.2 Highway Modifications

The Department may reconstruct the highway for improved safety and operation for the benefit of the travelling public. Resulting changes in highway design shall not require permission from, or compensation to, the landowner since the Access Permit confers no private rights to the applicant over the control of the highway design and operation.

2.3.3 Access Restrictions

The Department has the authority to restrict operations at an access connection if reasonable access to a property is maintained. Such restrictions may include, but are not limited to:

a.) turn restrictions (e.g. right in/right out only);

b.) truck only or no trucks;

c.) entrance only or exit only.

2.4 Variances

2.4.1 Process

If an applicant wishes to seek a variance from these guidelines, a written request must be submitted to the Area Manager with the permit application. A variance is granted by the District Director and documentation of the reason(s) for approving the variance must be included in the Department files and records pertaining to the permit.

The Department shall make every reasonable effort to decide on the request within 10 working days of receipt of required information. The terms and conditions of the approved permit and variance must state that the applicant may

be required to improve, modify, eliminate, or correct the condition responsible for the variance when it is evident that the justification for the variance is no longer valid.

2.4.2 Limitations

A variance request will not be considered for the following:

a.) to reduce sight distance requirements;

b.) to reduce the spacing between a ramp terminal and a permanent entrance to less than 60 m or to allow access between interchange ramps; or

c.) to allow permanent direct at-grade private access to a controlled access highway or ramp.

2.4.3 Documentation

The request for a variance must specify why the variance is appropriate and necessary and must document the unique conditions or special circumstances that make it impractical and unfeasible to meet the applicable requirements of the Access Management Guidelines. The documentation must show that the applicant has considered all practical and reasonable alternatives to mitigate the unique conditions or special circumstances, that the alternatives are not feasible or practical, that the variance requested meets acceptable engineering standards for operation and safety, and that without the variance the applicant will be deprived of reasonable access. A detailed traffic study may be required to support a variance request.

2.4.4 Retrofit Projects

On an existing developed site or a heavily developed corridor (a "retrofit project") where additional access management is being introduced, the Department will strive to achieve standards contained in the Access Management Guidelines. However, it may not be possible to incorporate or attain all access standards due to existing development, economic, physical, or other constraints. In these cases, Department staff will work to provide a reasonable solution under existing conditions. Variances will be considered as per the process outlined in this section.

2.4.5 Appeals

When an applicant objects to the denial of a variance request the applicant may submit an appeal in writing to the Executive Director Maintenance and Operations. The Executive Director shall determine whether the Department's action is consistent with the requirements of the Access Management Guidelines, or whether the Department erred in application of these Guidelines. The decision of the Executive Director is the final Department action on the permit request. The applicant shall be notified in writing of the final decision within twenty working days of receipt of the appeal by DPW.

2.5 Use of Access

2.5.1 Responsibility of the Landowner or Applicant

It is the responsibility of the landowner to ensure that the construction and use of the access to the property is not in violation of the permit terms and conditions. The terms and conditions of any permit are binding upon all assigns, successors-in-interest, heirs and occupants.

If any significant changes are planned in the use of the property which will affect access operation, traffic volume, or vehicle type, the applicant or landowner must contact the Department to determine if a new access permit and modifications to the access are required.

2.5.2 New Permit Requirements

When a change in use of the property results in a significant change in the type or nature of access operation, the property owner may be required to apply for a new permit. If the land use change requires the access to be reconstructed or relocated in order to conform with the Access Management Guidelines a new access permit shall be required. A change in use may include, but is not limited to, a change in the type of business conducted, expansion of an existing business, a change in zoning, or a division of property creating new parcels. The following are some examples of land use changes that may warrant a new permit:

a.) a change in use that increases overall trip generation by 20 percent or more or by 10 or more two-way trips in the peak hour;

b.) a change in use that increases the number of heavy vehicles (exceeding 14,000 kilograms gross vehicle weight) by 20 percent or more or by 10 or more two-way trips per day;

c.) any change in use which results in a change in the nature of access operation or vehicle types.

2.5.3 Access Maintenance

Except as outlined in Driveway Procedure PR 5000, the property owner shall be responsible for the repair and maintenance of the access including the portion located within the highway right-of-way. Maintenance includes the removal or clearance of snow and ice even when deposited in the course of Departmental snow removal operations.

On-going maintenance of any regulatory signage or traffic signals within the highway right-of-way shall be the responsibility of the Department. Maintenance of all other signage and traffic control devices associated with the access, including pavement markings within the access, shall be the responsibility of the property owner.

Maintenance, repair, and replacement of any access related culverts within the highway right-of-way shall be in accordance with procedures contained in Driveway Entrances PR 5000.

A permit from the Department is not required for minor or routine access maintenance such as mowing, pothole repairs, or repairing minor erosion damage.

2.6 Traffic Impact Studies (TIS)

2.6.1 TIS Policy and Procedures

The Department's Policy and Procedures for traffic impact studies (TIS) apply to all proposed developments accessing the Provincial highway system. TIS policies and procedures are located in Traffic Impact Analysis Policy PO1018 and Traffic Impact Analysis Procedure PR 5066. The TIS policy PO1018 contains the Department's *"Guide for the Preparation of Traffic Impact Studies"* which provides detailed information related to traffic impact study warrants and methodologies to be used in completing a TIS. Access requirements identified in a traffic impact study that are more stringent than those contained in the Access Management Guidelines shall take precedence.

2.6.2 Mitigation

The Department may require mitigation of the effects of traffic generated by a proposed development on the adjacent highway network. Any mitigation identified by a completed TIS must be completed as outlined in Traffic Impact Analysis Policy PO1018.

2.6.3 Right-of Way Acquisition

All costs associated with acquisition of additional right-of-way to accommodate highway improvements required as a direct result of traffic generated by a proposed development must be the responsibility of the proponent. This shall include, but not necessarily be limited to, land costs, appraisal fees, registration fees and legal fees. If expropriation of land is required, the proponent is financially responsible for all associated costs. Any property owned by the proponent that is required for highway improvements shall be provided to the Department at no cost.

2.6.4 Presumed Access Approval

The Department's request for a TIS or the applicant's performance of a TIS does not presume the subsequent approval of an access request or issuance of a permit by the Department. Issuance of a permit for access is based on the results of the TIS showing to the Department's satisfaction that the access proposal or its modification will not degrade the traffic operation and function of the highway to unacceptable levels as described in the Department's "*Guide for the Preparation of Traffic Impact Studies*", that highway improvements or modifications required due to the development are consistent with the Access Management Guidelines, and that they are feasible and can be implemented.

2.6.5 Site Plan Review

A site plan review may be required for developments that don't require a traffic impact study and shall consist of a project description and submission of a detailed site plan as outlined in Section 4.1 of the Department's *"Guide for the Preparation of Traffic Impact Studies"*.

2.7 Subdivision of Land

2.7.1 Consistency with Access Management Guidelines

The Department shall work with local municipal staff in the review of subdivision plans to ensure future access requirements of subdivided properties are consistent with the Access Management Guidelines. Subdivision plans not compatible with the Access Management Guidelines should not be supported by the Department.

2.7.2 Access to Local Road System

In general, direct access to new parcels of land should be obtained from a local road. The development of a local road system is encouraged such that traffic access to highways of higher classification is minimized and better managed.

2.7.3 Sight Distance

For all proposed street access locations and new lot frontages along the Provincial highway, a Nova Scotia Land Surveyor will complete, and submit to the Department, Schedule "G" (Appendix E) from the *Provincial Subdivision Regulations* confirming that sight distance requirements contained in Section 6 of the Access Management Guidelines are met.

2.7.4 Controlled Access Frontage

Subdivision of lands resulting in a new land parcel with frontage only on a controlled access highway is not permitted under the "*Provincial Subdivision Regulations*".

2.7.5 Frontage on High Speed Arterials

On high speed arterial highways (≥70km/h) no additional access rights shall accrue and no additional accesses shall be provided upon the splitting or dividing of existing parcels of land or contiguous parcels under the same ownership or controlling interest. All access to newly created properties shall be provided internally from the existing access or a new access determined by the permit application or subdivision procedures. An exception may be made to allow a second access to subdivided lands where required by local development by-laws for emergency purposes.

2.7.6 Departmental Approvals/Comments

Local authorities must be advised in writing of the Department's position regarding a subdivision application including details of any access related deficiencies. Where subdivision plans do not provide confirmation of required sight distances, or a proposed public street access to the Provincial highway system does not meet spacing requirements, local authorities must be advised in writing that access permit requests will not be approved by the Department.

SECTION 3 - CONTROLLED ACCESS HIGHWAYS

3.1 Controlled Access Designation

3.1.1 Public Highways Act

Section 21 of the Public Highways Act grants authority to the Governor in Council to designate a provincial highway and lands reserved for highways as a controlled access highway. Section 22 of the Act describes prohibited activities and permit requirements for access to a controlled access highway.

3.1.2 Report and Recommendation

A Report and Recommendation (R&R) to Executive Council recommending controlled access highway designation or rescinding of access control must be prepared by Policy and Planning.

3.1.3 New 100 Series Highways

An R&R to Executive Council recommending controlled access highway designation is required for all new 100 Series highway infrastructure including any interchange ramps, new connector roads, and provincial crossing or intersecting highways for a minimum distance of 100 m either side of the 100 Series highway. For new 100 Series highway construction the R&R recommending controlled access highway designation shall typically be prepared for submission to Executive Council upon approval of right-of-way plans for the alignment.

3.1.4 Order in Council

Section 21 of the Public Highways Act specifies where the Order-in-Council designating a highway as controlled access is contained is to be filed. In addition, a copy must be filed with the Department's Highway Engineering Services section.

3.2 Land Access

3.2.1 Farm Operations

The movement of livestock and farm machinery across a controlled access highway should not be permitted. A farm underpass should be considered during the highway planning process where, in the opinion of the Department, farm

operations will be significantly impacted by highway construction and an underpass is required to mitigate negative impacts. Underpass construction and maintenance is the responsibility of the Department. Cash settlement in lieu of an underpass should be avoided.

3.2.2 Service Roads

The Department has a policy for service roads (PO1022 Service Roads) that outlines the use, construction, maintenance and operation of service roads. Developments of property adjacent to service roads may be permitted, but only if the requirements described in the policy can be met.

3.2.3 Land Acquisition

Generally, it is not the intention of the Department to acquire lands or make cash settlements to eliminate the need for access along a controlled access highway. However, land purchase or cash settlements may be considered when:

a.) small, isolated blocks of land are involved; or

b.) the cost of land purchase or cash settlement is considerably less than providing land access via service roads, grade separated crossing, or other means.

3.2.4 Structures and Accesses

The Public Highways Act requires Ministerial approval for any structure within 60 m of the ROW limits of a controlled access highway. This approval authority has been delegated to the District Director. New structures to be located within 60 m of a controlled access highway, and any new access to a controlled access highway, must not be constructed without a permit approved by the District Director. All structures must be a minimum of 10 m from the right-of-way limits. If there is any concern with respect to a proposed development's impact on future expansion or realignment plans for a 100 Series controlled access highway or interchange, the development plans must be forwarded to the Executive Director Highway Engineering and Construction for comments and/or recommendations.

SECTION 4 - ACCESS AND ENTRANCE CATEGORIES

4.1 Purpose

This section describes the highway access categories for provincial highways. For each category there is a description of the function of the highway along with general access and operational standards that are applied to maintain the highway's function in terms of capacity, traffic flow, and safety. This section also describes access categories to which all driveway entrances are assigned based on projected traffic volumes using the access.

4.2 Highway Access Categories

4.2.1 General

Access management standards are based on the following highway access categories. These categories reflect the Department's functional highway classifications. Operational standards are provided for each category to ensure that the highway will function at the level assigned. Within each category highways are further divided based on the posted speed limit. Highways with a posted speed limit of 60km/h or less are considered "*low speed*", and those posted 70km/h or above are considered *"high speed"*. Highway access categories are:

a.) Freeways - (divided, controlled access highways)

b.) Major Arterial - (undivided, controlled access highways)

c.) Minor Arterial - (100 Series, non-controlled access; connector or interchange ramps to a Freeway/Major Arterial; trunk highway in an area not served by a Freeway/Major Arterial; and other named arterial highways)

d.) Collector - (trunk highways parallel to a 100 Series highway, routes, and other named collector roadways)

e.) Local - (all un-numbered highways)

4.2.2 Freeways

Freeways are designed for high volume and high speed traffic over long distances. They serve major inter-provincial, intra-provincial, and inter-regional travel demand for through traffic. In urbanized and metropolitan areas, they may also serve high volumes of intra-city travel at high speeds. This category includes all 100 Series Highways that are both divided and controlled access.

All opposing movements are separated by a non-traversable median and crossing traffic is grade-separated by structures. Access to a freeway is limited to interchanges. Direct private at-grade access to a freeway is not permitted except for gated access for emergency purposes or to facilitate maintenance of municipal infrastructure when no other means of access is feasible. At-grade temporary access for emergencies, or directly associated with a freeway construction project, may be permitted and must receive approval of the District Director.

4.2.3 Major Arterial

Highways in this category are designed and intended to provide mobility for relatively high speed, high volume, long distance, through traffic for intra-provincial, inter-regional, inter-city, and some intra-city travel. This category includes controlled access, undivided, 100 Series highways intended to become freeways when warranted by traffic volumes and as funding and priorities allow. Crossing traffic is typically grade separated by structures and access limited to directional ramps.

Although not desirable, at-grade public highway access may be permitted on lower volume (AADT<3000VPD) sections. This is the highest category of highway allowing at-grade intersections. Plans for removal of at-grade public highway access, or replacement with a grade separated interchange, should be in place at the time of at-grade access construction in the event traffic on the major arterial increases above 3000VPD or safety concerns at the access warrant mitigative actions.

Direct private access shall not be permitted unless the property retains deeded rights and has no reasonable alternative access to the rest of the public highway system. When direct private access must be provided, the permit condition shall stipulate that the access shall be closed when other reasonable access to a lower access category street or highway becomes available and permitted or at such time as the highway is improved to a freeway and access is provided via service roads or other such means. Direct private access shall be limited to field entrances and low volume accesses used for resource extraction or recreational land uses.

At-grade temporary access may be permitted for emergencies, highway construction projects, and for resource extraction activities. Temporary access must receive approval of the District Director and shall only be permitted if there is no reasonable alternative access to a public highway of lower classification. Temporary accesses may only be located within the limits of an interchange ramp, climbing lane or intersection auxiliary lane for interchange structure construction. Temporary access permits shall have a maximum duration determined prior to

construction and shall be restricted to right in/out movements and daytime use only. Additional conditions may apply as indicated in Section 2.1.7 Temporary Access.

4.2.4 Minor Arterial

Highways in this category are designed and intended to provide mobility at moderate to high speeds, volumes, and distances for inter-regional, inter-city, and intra-city travel. This category includes undivided non-controlled access 100 Series highways and trunk highways located in areas of the province not serviced by a freeway or major arterial highway. This category also includes 100 Series connector roads and other named arterial highways, connector roads may also be controlled access and divided by a curbed median.

At-grade public highway access may be considered on a minor arterial. Access to lands abutting a minor arterial is subordinate to providing service to through traffic movements.

Typically, at-grade public highway access to a 100 Series connector will be limited to one location only, and the access connection shall be planned and designed to service as much land as possible in the vicinity of the interchange. On 100 Series connectors in excess of 1km in length more than one public highway access location may be permitted, however spacing between accesses must be a minimum of 500 m.

On a high-speed minor arterial direct private access shall not be permitted if the property has other reasonable alternative access to a public highway of lower classification. Notwithstanding the above, if the Department determines that access at an alternative location causes unacceptable safety or traffic operation problems for overall traffic flow, direct access to the minor arterial may be considered.

4.2.5 Collector

Highways in this category are designed and intended to provide access and mobility at moderate to high speeds and volumes for moderate to short distances in rural areas and low to moderate speeds and volumes in urban areas for inter-city, intra-city, and intra-community travel. This category includes trunk highways in areas of the province serviced by a freeway or major arterial highway, numbered routes, and other named collector roads. At-grade public and private highway access may be considered on a collector road.

4.2.6 Local Roads

This category applies to roads designed and intended to provide local land access. This category includes all secondary (unnumbered) highways. At grade public highway access may be considered on a local street.

4.3 Entrance Categories

4.3.1 General

To assist in the development of access and design standards, all private entrances are categorized based on projected traffic volumes at full site buildout.

4.3.2 Entrance Categories

Private entrance categories are as indicated in Table 4.3.2.1. Projected traffic volumes are to be determined in accordance with the trip generation procedures outlined in the Department's *"Guide for the Preparation of Traffic Impact Studies"*.

Table 4.3.2.1 Access Categories

Category	Volume
Field Entrance	AADT[1] < 1 vpd
Low Volume Entrance	2-Way DHV[2] 1 to 10 vph
Moderate Volume Entrance	2-Way DHV 11 to 100 vph
High Volume Entrance	2-Way DHV > 100 vph

[1] Average Annual Daily Traffic (total yearly volume /365)

[2] Design Hour Volume = Peak Hour Volume of Generator

Table 4.3.2.2 Development Size for Entrance Categories

	Low	Moderate	High
Residential			
Single Family Detached	< 10 units	11 - 99 units	> 100 units
Duplex	< 19 units	19 - 190 units	> 190 units
Apartment/Condo	< 16 units	16 - 160 units	> 160 units
Commercial			
Fast Food	None	< 2,200 sqft	> 2,200 sqft
Gas Station	None	< 7 fueling stations	> 7 fueling stations
Grocery Store	None	< 10,440 sqft	> 10,440 sft
Big Box Store	None	< 22,750 sqft	> 22,750 sqft
Hardware Store	None	< 22,000 sqft	> 22,000 sqft

SECTION 5 - ACCESS LOCATION AND SPACING STANDARDS

5.1 Introduction

5.1.1 Benefits of Access Location Standards

Each new access introduces conflicts and friction into the traffic stream. With more conflicts comes a higher potential for collisions and the resulting friction reduces capacity and increases travel times. Establishing minimum spacing requirements for access is a proven and effective technique commonly used to reduce conflict points and improve safety and traffic flow.

5.1.2 General Basis for Standards

Access spacing criteria are generally based on speed and highway classification, with shorter access spacings permitted on lower class highways in urban areas and longer spacings on rural arterial highways. The spacing criteria contained in this document apply to all accesses including those with turn restrictions.

The access spacings are minimum acceptable values, spacings greater than those contained in this section are desirable and may be required based on the results of a Traffic Impact Study or at the discretion of the Department. Meeting the minimum spacing requirements does not mean access will be granted.

Unless otherwise specified, speed, for the purpose of spacing standards, refers to the posted speed limit at the time of permit approval. A proposal for access may not presume a lower speed limit than currently posted.

5.1.3 Measurement of Access Spacing

Unless otherwise specified, access spacing requirements are to be measured between the end of curb return or curb drop at one access to the beginning of curb return or curb drop at the adjacent access. If there is no curbing (i.e. open ditches) measurements shall be from the end of curve radii at one access to the beginning of curve radii for the adjacent access. If the access is a roundabout, the spacing shall be measured from the outside (inscribed circle) diameter of the roundabout.

5.2 Un-signalized Access Spacing

5.2.1 General

Access spacing standards reduce the potential for collisions along a highway by separating conflict areas where drivers are entering and exiting the highway and encouraging shared accesses, thereby reducing the number of conflict points. Direct land access should be onto local roads whenever possible. Particularly, access for corner lots should be located on the road frontage of lower classification.

5.2.2 Private Driveway Spacing

Minimum private driveway spacing requirements for each highway category are contained in Table 5.2.2. When turning lanes are present, or will be needed in the future, accesses must be separated by a sufficient distance so that turning lanes, including tapers, do not overlap. Semi-detached, multi-unit homes (duplex, triplex) may not be able to have a shared access or achieve the minimum access spacing, these types of dwellings may be exempt to the minimum spacing at the discretion of the Area Manager.

TABLE 5.2.2 - MINIMUM DRIVEWAY SPACING

Highway Classification	Low Speed (<70km/h)	High Speed (70km/h +)
Minor Arterial	30 m	75 m
Collector	20 m	50 m
Local	10 m	30 m

Notes:
1. High volume private accesses shall be treated as public road intersections.

It is generally desirable to align driveways on opposite sides of the highway. If alignment is not possible, safety can be improved by spacing driveways on opposite sides of undivided highways as indicated in Table 5.2.2 to minimize jog maneuvers, overlapping left turns, and other maneuvers that may result in safety hazards or operational problems.

5.2.3 Flag Lots

Access problems often occur as the result of land development techniques that produce lots shaped like flags with long narrow accesses. Landowners often stack flag lots when dividing land parcels to provide interior lots with direct access to the provincial highway system, thereby avoiding the expense of building a public or private road. To reduce the potential for access problems and improve safety, the practice of constructing one access per flag lot should be avoided. Instead, flag lots should be served by an internal street or road system that provides access to the highway system at one location. All shared private accesses/roads require a deeded easement before DPW will approve access to a property.

Flag lots will be permitted only if they achieve all required spacing, separation, and geometric requirements listed in these guidelines. A property with less than 15.5m frontage should not be permitted a point of access.

5.2.4 Corner Clearance

Corner clearance is the distance between an intersection and the nearest driveway. It is important to provide enough distance between the corner and the first driveway to effectively separate conflict points and to allow drivers enough time to make safe maneuvers. Inadequate corner clearances can result in traffic operation, safety and capacity problems caused by blocked driveways, conflicting turns, insufficient weaving distances, and backups into the intersection. Proper access management near intersections helps to preserve highway efficiency, enhances safety, and reduces the need for expensive improvements.

Low and Moderate Volume Access corner clearance requirements must be applied for the following intersections:

a.) the intersection of two public roads;

b.) any signalized access; and

c.) High-volume accesses (see **Table 4.3.2.1**).

Corner clearance requirements contained in this section do not apply to intersections at the end of interchange ramps (see Section 5.4.3 Access Spacings Near Interchange Ramps). Accesses should not be permitted within the longitudinal limits of intersection turning lanes or the limits of typical intersection approach queues during peak hours. Minimum corner clearance requirements are contained in Table 5.2.4. Corner clearances in Table 5.2.4 apply to both the

approach and departure side of the intersection. A minimum 60 m corner clearance must be provided on any approach to an intersection with a controlled access highway.

Corner clearance requirements contained in Table 5.2.4 apply to low and moderate volume entrances as defined in Table 4.3.2.1. Intersection spacing requirements as indicated in Section 5.2.5 apply to for high volume entrances. Corner clearance requirements may be reduced to as low as 15m at the intersection of two low speed local roads.

TABLE 5.2.4 - MINIMUM CORNER CLEARANCE FROM AN INTERSECTION (For Low and Moderate Volume Accesses)

Approach Road Classification	Corner Clearance Low Speed (<70km/h)	Corner Clearance High Speed (70km/h +)
Arterial	50 m	100 m
Collector	30 m	60 m
Local	20 m	30 m

Notes:

1. If the intersection is a roundabout, or the approach is controlled by a stop or yield sign, low speeds are to be assumed when determining corner clearances regardless of the posted speed limit on the approach road.
2. For interchanges, see 5.4.2

5.2.5 Spacing of Public Street Connections

In general, the spacing of public street connections shall adhere to the standards specified for signalized accesses contained in Section 5.3.3. However, if there is a very low probability of signalization the minimum spacing of adjacent public street connections may be reduced to the spacings indicated in Table 5.2.5.

TABLE 5.2.5 MINIMUM STREET SPACING (Unsignalized)

Road Classification	Low Speed (<70km/h)	High Speed (70km/h +)
Arterial	200 m	400 m
Collector	100 m	200 m
Local	75 m	150 m

Notes:
1. High volume private accesses shall be treated as public road intersections.
2. For interchanges, see 5.4.2

5.2.6 Number of Accesses Per Property or Development

Regulating the maximum number of driveways per property frontage or development limits the number of conflict points and is an effective way of ensuring reasonable spacings between adjacent driveways. Single family residential properties must be limited to one entrance, regardless of frontage.

Access shall generally be limited to one per property or development. Additional accesses as indicated in Table 5.2.6 may be considered along local roads and on low speed (<70km/h) collectors and minor arterials provided the development size or trips generated requires an additional access to maintain good highway traffic operations or land use design and the additional accesses will not adversely impact highway safety, operations, or access to adjacent properties. Additional accesses must meet all access spacing requirements as contained in Section 5.

If a property has frontage on two highways (corner lot), access should only be provided to the highway of lower classification. One additional access to the highway of higher classification may be permitted for larger developments provided the following criteria are met:

a) the highway of higher classification is low speed (<70km/h);
b) minimum corner clearances as identified in Section 5.2.4 are met; and
c) the access is required to maintain good traffic operation or to reduce negative impacts on residential areas.

TABLE 5.2.6 - ADDITIONAL DRIVEWAYS PER PROPERTY/DEVELOPMENT

Property Frontage (m)	Number of Additional Driveways
<50 m	0
50 m to 150 m	1
>150 m	2

5.2.7 Driveway Offset to Property Line

A minimum offset of 5m or a distance equal to the entrance curve radii, whichever is larger, must be provided between the property line and the edge of driveway throat. Driveways must be located so that the entrance curve radii are completely within the frontage of the property being served and impacts to adjacent property access are minimized.

5.2.8 Shared Driveways

Driveways should serve as many properties and interests as possible to reduce the need for additional accesses. Shared driveways and interconnection within and between developments is strongly encouraged, particularly for commercial properties under common ownership or properties consolidated for development. Shared access is an option to be considered for narrow frontage lots and other properties unable to conform to spacing standards for driveway access.

If an access is intended to be shared, a copy of a shared access agreement/easement must be submitted to the Department, signed by all involved property owners, as part of the WWHROW permit application. This agreement must be registered with the Registry of Deeds by the proponent.

5.3 Signalized Access Location and Spacing

5.3.1. Traffic Signal Warrants and Approvals

Traffic signals are a regulatory traffic control device used to ensure orderly and predictable assignment of right of way to all users. Traffic signal installation requires the approval of the Traffic Authority.

Traffic signals are typically considered only when warranted by the most current TAC traffic signal warrant procedure used by the Department. Traffic signals are

the most invasive level of traffic control and should considered for use after all other options have been exhausted. Alternative forms of traffic control, including roundabouts, should be considered before installing traffic signals.

5.3.2 Need for Properly Located/Spaced Traffic Signals

Long and uniform signal spacings improve traffic flow and reduce delay. Closely spaced traffic signals result in frequent stops, reduced capacity, and high collision rates. Traffic signals account for most of the delay motorists experience on urban highways. To minimize the number of traffic signals, and to provide the maximum benefit to road users and to adjacent lands, traffic signals should be planned and designed to service as large a catchment area as is practical. Traffic signals to access one property or development, with no allowance for future connection to adjacent lands, are undesirable and are strongly discouraged.

Traffic signals on high speed minor arterial highways are undesirable and should be avoided if possible. If a proposed development accessing a high-speed arterial highway warrants signalization, the scope of the development or allowable movements at the entrance may have to be adjusted such that traffic signal warrants are not met.

5.3.3 Traffic Signal Spacing Requirements

Minimum traffic signal spacing requirements are contained in Table 5.3.3. Traffic signal spacings are to be measured from the centreline of intersecting highways. Traffic signal spacings less than minimum values contained in Table 5.3.3 may be considered if adjacent traffic signals are coordinated and a detailed traffic analysis is performed indicating minimal effects on safety and highway operations including progression speed and flow rates along the corridor. A variance to allow signal spacings less than 200 m is generally not permitted and shall only be considered in exceptional circumstances. Traffic signals spacing requirements do not apply to adjacent signalized ramp terminal intersections.

TABLE 5.3.3 - MINIMUM TRAFFIC SIGNAL SPACING

Road Classification	Signal Spacing Low Speed (<70km/h)	Signal Spacing High Speed (70km/h +)
Arterial	400 m	800 m
Collector	300 m	600 m
Local	200 m	400 m

5.4 Interchanges

5.4.1 Interchange Location and Spacing

Interchanges should be located where arterial or collector highways intersect a freeway or major arterial, forming part of the rural or urban road system serving the local community or region. Adequate spacing of interchanges is needed to preserve smooth traffic flow and allow traffic to safely and efficiently enter and exit the freeway system. Minimum interchange spacing is determined by the distances required along the freeway for weaving, speed change lanes (ramps) and the appropriate placement of directional signs. Interchange spacings are measured from the centre line of adjacent crossroads.

All interchange spacing decisions must be subject to operational and level of service analysis considering connectivity, speed and safety. The minimum desirable spacing of interchanges is 5km in rural areas and 2km in urban areas. Interchanges spaced less than 2km apart typically require connection of adjacent entrance and exit ramps via auxiliary lanes to improve safety by minimizing merging/diverging and reducing speed differential between through and local traffic. Interchange spacings between 1.5km and 2.0km may be considered in exceptional circumstances if supporting by a detailed traffic analysis. Interchange spacings less than 1.5km are generally not permitted.

5.4.2 Access Near Interchanges (General)

Interchanges tend to attract highway commercial, high density residential and other land uses that generate high volumes of traffic. Adding to the importance of access management in interchange areas is the fact many drivers exiting the freeway to use the services offered are unfamiliar with the area. An uncluttered environment with well-spaced, consolidated and clearly identifiable access points reduces driver confusion and improves safety. Adequate spacing of accesses to crossroads in the vicinity of interchange ramps avoids traffic backup onto the mainline and preserves safe and efficient traffic operations in the vicinity of ramp terminals.

5.4.3 Access Spacing Near Interchange Ramps

The minimum spacing between an interchange ramp terminal and the nearest access along the crossroad must be;

a) **60 m** (field entrances, low volume entrances)

b) **100 m** (moderate volumes entrances, service roads, and roundabouts)

c) **200 m** (high-volume accesses, signalized accesses and public highway intersections)

The minimum spacing requirements contained in this section generally apply to two lane cross roads with lower speeds. At the discretion of the Department, larger spacings may be required along multilane or higher speed cross roads to address public safety or operational concerns or as required based on the results of a detailed traffic impact study. The spacing requirement for signalized accesses also includes un-signalized accesses that have a high probability of requiring signalization in the future.

5.4.4 Access Within the Interchange Area

Access to the crossroad will not be permitted in the interchange area between ramp terminals. An entrance directly opposite a ramp terminal, or a direct connection to a ramp terminal with a roundabout, may be permitted for a public highway if supported by a detailed traffic impact study. Entrances directly onto an interchange ramp will not be permitted.

5.4.5 Transit Facilities

Direct access to a ramp or reduced spacing requirements from a ramp terminal may be approved by the District Director for public transit facilities (buses only) if supported by a comprehensive traffic study considering the operational and safety impacts of the proposal.

5.5 Access Spacing Variances

It may not always be possible to provide minimum access spacings contained in these guidelines due to frontage restrictions, sight distance restrictions or topographic constraints. A variance may be granted allowing an access that does not meet minimum spacing requirements if there is no reasonable alternative access to the property and in the opinion of the Department the access will not have significant negative impacts to highway operations, safety, or maintenance activities. Accesses not meeting minimum spacing requirements, if permitted, must be located as far as possible from adjacent intersections or driveways and may be restricted to right turn movements. The variances process is described in Section 2.4.

SECTION 6 - SIGHT DISTANCE

6.1 Introduction

6.1.1 Need for Adequate Sight Distance

The provision of adequate sight distance at highway accesses is essential for the safe movement of motorists using or passing by the access. Stopping sight distance (SSD) along the intersected highway is necessary to provide drivers sufficient time to anticipate and avoid potential collisions. In addition, sight distance is required to allow drivers of vehicles entering the highway a sufficient view in each direction in order to select a gap in the traffic and decide when its safe to enter or cross. This is referred to as intersection sight distance (ISD).

6.1.2 Sights Distance Requirements Prior to January 1, 2024

Department sight distance policies in use prior to the effective date of the Access Management Guidelines are contained in the "Old" Management Manual 23 Chapter 8 Section 11.03. Previous sight distance standards did not address intersection sight distance requirements and contained several outdated clauses which are not compatible with current engineering best practices. Sight distance requirements contained in the Access Management Guidelines replace those contained in the "Old" Management Manual 23.

6.1.3 Speed

The speed used to determine required sight distance must be based on the posted speed limit. The reasonable approach speed (RAS), as determined by means of a radar survey (85^{th} percentile) or trial test runs, may be used in place of the posted speed limit at the discretion of the Area Manager.

6.2 Sight Distance Requirements

6.2.1 Stopping Sight Distance – All Entrances

Minimum stopping sight distance (SSD) as indicated in Section A1 in Appendix "A" must be provided along the intersected highway approach in both directions at all highway entrances.

6.2.2 Moderate Volume (11 to 100 vph) Entrances

In addition to stopping sight distances described in 6.2.1, intersection sight distance (ISD) is also required for moderate volume entrances based on AADT criteria in Table 6.2.1.

TABLE 6.2.1 – AADT Requirements for ISD

Access Volume (vph)	Main Road AADT
>100 (high volume)	<5000
>50	>5000
>10 (moderate volume)	>10000

6.2.3 High-Volume (>100 vph) Entrances

In addition to stopping sight distances described in 6.2.1, intersection sight distance as indicated in Section 6.3 is required for high volumes entrances based on AADT criteria in Table 6.2.1 and must be provided along the intersected highway approach in both directions.

6.2.4 Measuring Stopping Sight Distance

The centre of the proposed entrance must be clearly marked with a stake or by other acceptable means. SSD measurements will be conducted by qualified Department staff or a licensed surveyor, based on a driver's eye height of 1.05m and a target located on the edge of travel lane at the centre of the entrance. Object height criteria is specified in Table 6.2.3.

TABLE 6.2.4 – SSD OBJECT HEIGHT CRITERIA

Type of Roadway Access	Object Height (min.)
Residential driveway, such as houses, apartments, condos	0.60 m
Commercial driveway, such as retail, offices, and services	0.60 m
Institutional driveway, such as schools, hospitals, churches, libraries	0.60 m
Recreational, such as playgrounds, arenas, ballparks, beaches	0.60 m
Industrial driveway, such as plants, warehouses, trucking, storing, processing	0.60 m
Agricultural driveway	0.60 m
Marked crosswalk and active transportation trail crossing locations[1, 4]	0.15 m
Off highway vehicle crossing location[2, 4]	0.15 m
Temporary driveway for resource extraction, such as logging and quarries[3, 4]	0.15 m

Notes:

1 Considers the presence of a fallen person within the roadway
2 Considers the presence of a fallen person within the roadway. For motorized trails, other sight distance requirements will apply
3 Considers the presence of trees, rocks, and logs dropped within the roadway
4 Object to be located at the centreline and edge of travel lane in the direction of conflict.

6.2.5 On-Street Parking

On-street parking close to a driveway can negatively impact visibility. On-street parking is not permitted within 10 m of intersection traffic control or 5 m of a fire station entrance. If it is desirable for the function of the access to prohibit parking more restrictively or at other locations, then signs may be erected to prohibit parking.

6.2.6 Mitigation

If required sight distances are not attainable at the proposed access location, the access must be moved to a location which can attain adequate sight distance, or mitigation measures must be implemented to improve the sight distance at the proposed location. An access that does not meet sight distance requirements must not be approved. The proponent is responsible for the cost of any highway reconstruction or any other mitigation measure necessary to provide adequate sight distance at the access location. The lowering of the posted speed limit is not permitted to mitigate insufficient stopping sight distance.

6.3 Intersection Sight Distance

6.3.1 Preface

This section presents the method for calculating intersection sight distances and reflects the most current approach adopted by TAC and AASHTO. The text in this section has been adapted, and in some cases used verbatim, from TAC's Geometric Design Guide for Canadian Roads.

6.3.2 Departure Sight Triangles

Areas along intersection approaches and across their corners should be free of obstructions that might block a driver's view of conflicting vehicles. Departure sight triangles provide sufficient sight distance for a stopped driver on a minor road approach and should be provided for each intersection leg managed by traffic control. The length of each sight triangle leg differs based on the design speed of the intersecting roads, the turning maneuver, and the intersection traffic control. Figure 6.3.2 shows a typical departure sight triangle to the left and right of a stopped vehicle.

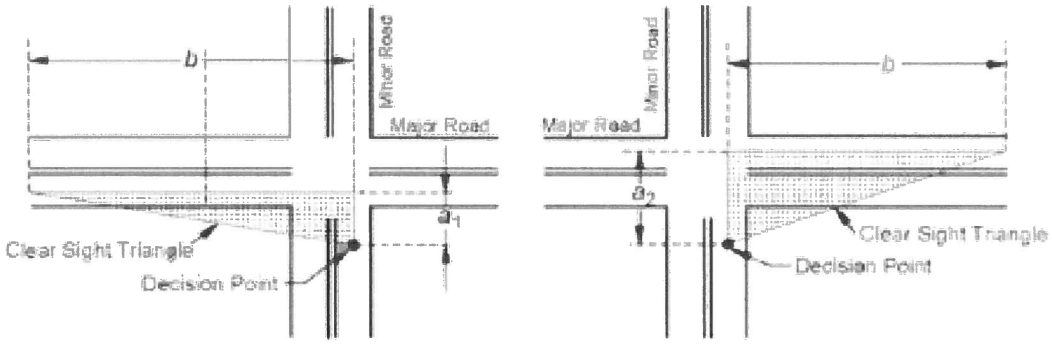


Figure 6.3.2 (Figure 9.9.2 from the TAC GDG)

6.3.3 Measuring Intersection Sight Distance

Intersection sight distance measurements will be conducted by qualified Department staff or a licensed surveyor for both approaches based on a driver's eye height (stopped vehicle) of 1.05m at the centre of the entrance, located 4.4m from the edge of travel lane with a 1.15m high target located in the centre of the approach lane in each direction. On multilane approaches the target is assumed to

be in the lane closest to the stopped vehicle. When measuring ISD for heavy trucks a driver's eye height of 2.3m is to be used.

6.3.4 Stop Control on Minor Road

Departure sight triangles for intersections with stop control on the minor road should be considered for three situations: 1) Left turn from minor road 2) Right turn from minor road 3) Crossing major road from minor road.

Intersection sight distance at stop-controlled intersections is greater than minimum stopping sight distance so intersections can operate smoothly. Minor road vehicles should wait until it is safe to proceed without forcing a major road vehicle to slow below 70% of their initial speed.

6.3.4.1 Left Turn from Minor Road

Departure sight triangles, like the ones shown in Figure 6.3.2, must be provided for left turns at all stop-controlled approaches. Distance b is the length of the major road leg of the sight triangle and is the minimum intersection sight distance for left turns from a stop.

The length of the sight triangle on the minor road (distance a, Figure 6.3.2) is the sum of the decision point distance plus half a lane width when looking left, or the decision point distance plus one and a half lanes width when looking right. Minor road decision point distance should be at least 4.4 m from the edge of the major road travelled way. This represents the driver's eye position when a vehicle is stopped near the major road.

Intersection sight distance (distance b) is a function of the major road design speed (or posted speed) and the time it takes to complete a turning maneuver without forcing a major road vehicle to slow below 70% of its speed. Table 6.3.4.1 contains the minimum intersection sight distances for left turns from stop for different vehicles and design speeds. This table contains values for flat approach legs, road grades and other site-specific variations impact the required ISD and corresponding values are not included in Table 6.3.4.1. Additional information on the calculation of ISD in these situations can be found in Section A2 of Appendix A.

Design Speed (km/h)	Stopping Sight Distance (m)	ISD for Passenger Cars (m)		ISD for Single Unit Truck		ISD for Combination Truck	
		2-Lane	4-Lane	2-Lane	4-Lane	2-Lane	4-Lane
40	50	85	90	105	115	130	140
50	65	105	115	135	145	160	170
60	85	130	135	160	170	195	205
70	105	150	155	185	200	225	240
80	130	170	180	215	230	260	275
90	160	190	200	240	255	290	305
100	185	210	225	265	285	320	340
110	220	230	245	290	315	355	375
120	250	255	270	320	340	385	410

Table 6.3.4.1 Intersection Sight Distance for Left Turn from Stop

6.3.4.2 Right Turn from Minor Road

Right turns from stops require only a departure sight triangle for minor road vehicles looking to the left. Right turning traffic tends to accept smaller gaps than left turning traffic, and therefore, time gaps and ISD are lower for right turn maneuvers. The intersection sight distance for left turning traffic is longer than for right turning traffic and will typically govern the minimum intersection sight distance measurement. However, for right-out only intersections, the right turn from stop control distances are used.

Design Speed	Stopping Sight	ISD for Passenger Cars (m)	ISD for Single Unit Truck (m)	ISD for Combination Truck (m)
40	50	75	95	120
50	65	95	120	150
60	85	110	145	180
70	105	130	170	205
80	130	145	190	235
90	160	165	215	265
100	185	185	240	195
110	220	200	260	325
120	250	220	285	355

Table 6.3.4.2 Intersection Sight Distance for Right Turn from Stop

6.3.4.3 Crossing Maneuver from Minor Road

Departure sight triangles for left and right turns onto major roads usually provide adequate sight distance for crossing maneuvers. But there are situations where sight distance for crossing maneuvers should be checked:

- Where left or right turns, or both are not permitted from a particular approach and the crossing maneuver is the only legal maneuver.
- At locations with substantial volumes of heavy vehicles crossing the highway that also have steep grades that slow the vehicle while its back portion is still present in the intersection

In these situations, the time gaps and sight distances used for crossings are calculated using the information contained in Section A2 of Appendix A.

6.3.5 Yield from Minor Road

6.3.5.1 Right Turns

The length of the sight triangle needed on a minor road is 25 m to accommodate a right turn without stopping (distance a_1 in Figure 6.3.2). The length of the approach sight triangle along the major road (distance b, Figure 6.3.2) is similar to the one for stop-controlled intersections, however, the gaps accepted by drivers are increased slightly and the resulting ISD is larger. The table below contains the required sight distances for right turns at yields for various posted speeds and vehicle types and represent the required sight distances for vehicles making a right turn manoeuvre without stopping.

Design Speed	Stopping Sight	ISD for Passenger Cars (m)	ISD for Single Unit Truck (m)	ISD for Combination Truck (m)
40	50	90	115	135
50	65	115	140	170
60	85	135	170	200
70	105	160	195	235
80	130	180	225	270
90	160	205	250	300
100	185	225	280	335
110	220	245	310	370
120	250	270	335	400

Table 6.3.5.1 Intersection Sight Distance for Right Turns from Yield

6.3.5.2 Crossing and Left Turn

Nova Scotia does not permit new intersections with yield control for crossings or left turns and they do not need to be checked for sight distance. Right turns from yield are included because they are present at right turn channels. If intersection sight distance needs to be checked for a left turn or crossing at an existing yield control intersection, these movements are subject to the same ISD as right turns.

6.3.6 Intersection Sight Distance at Roundabouts

Like other intersections, a sight triangle is required to measure ISD at roundabouts. However, there are some key differences when comparing roundabouts to the typical ISD measurement. Minimum ISD needs to be provided

on all approaches. Two sight triangles are also needed for each approach, one 15 m in advance of the yield bar (minor road approach leg of the sight triangle) and another at the yield bar. The major road approach leg is replaced by a distance called the visibility distance, which is determined by a roundabout's inscribed circular diameter (ICD). Driver's eye height and object height remain the same. Visibility distances and sight triangle diagrams for roundabouts are provided below.

Inscribed Circle Diameter (m)	Visibility Distance, 'a' (m)
<40	Entire intersection
40-60	40
60-100	50

Table 6.3.6 Visibility Distances for Roundabouts

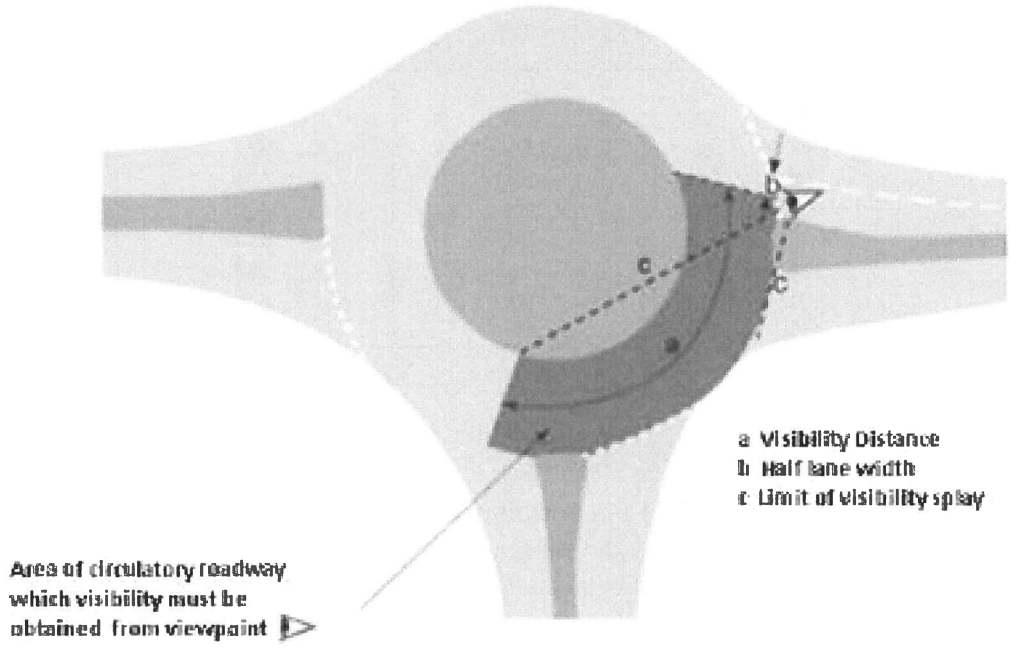


Figure 6.3.6.1 Visibility to the Left Along Circulating Roadway at Entry from Yield Line

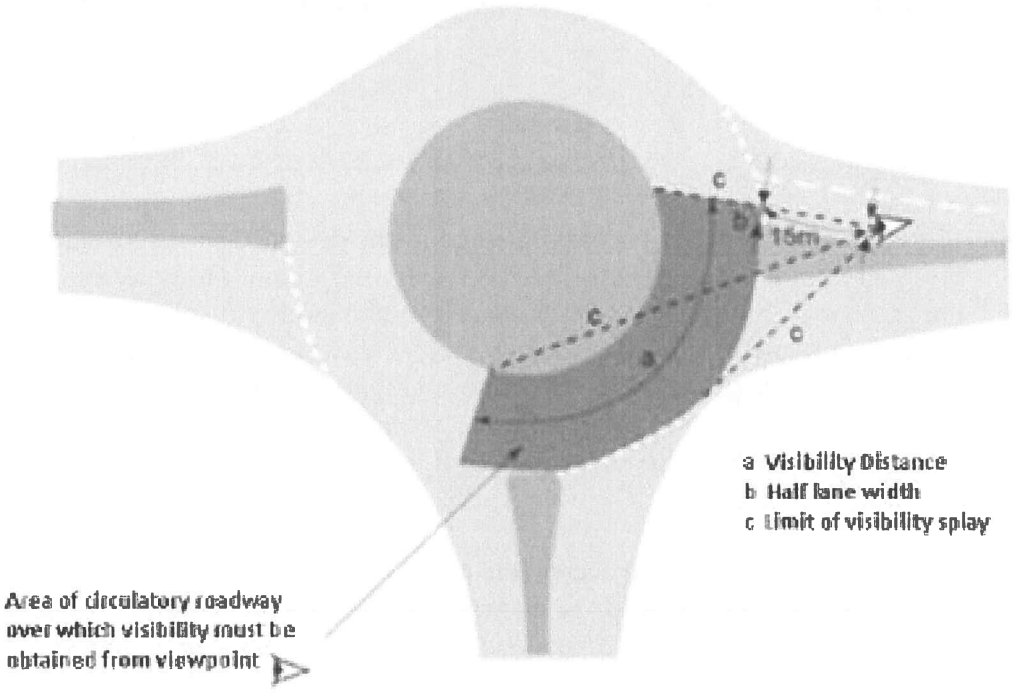


Figure 6.3.6.2 Visibility to the Left Along Circulating Roadway 15 m in Advance of the Yield Line

SECTION 7 - ACCESS DESIGN AND CONSTRUCTION

7.1 Introduction

7.1.1 Private Accesses

It is essential that private access connections be designed to ensure safe and efficient ingress and egress for developments and to minimize adverse impacts to the highway. The following criteria are intended to provide basic guidance for the design of private entrances to the public road network. Detailed designs, including profiles, must be provided for all proposed high-volume accesses and may also be requested for moderate and low volume accesses. Key considerations in driveway geometric design include identification of the design vehicle, sight distance, throat width and turning radii, driveway profile, and throat length.

In addition to providing an acceptable access design following the design criteria laid out in this section, property owners are also required to construct the access as per the approved design. In some cases, the approved design will extend beyond the ROW limit.

For multi-phased developments or developments with intermittent construction, it is advisable to design and construct the access to accommodate the planned full development build. If this is not feasible, then an agreement to upgrade the access upon reaching development milestones should be done. This can be done using either a development agreement with a Municipality or permit conditions.

7.1.2 Public Accesses

Proposed public road accesses must adhere to the Department's intersection design requirements. Private entrances requiring signalization or with a peak hourly volume in excess of 100vph shall be treated as public road intersections for design purposes. All public intersection designs must be approved by the Manager of Highway Planning and Design.

7.1.3 Design Vehicle

Maneuvering characteristics of different types of vehicles are important in the design of accesses. Larger vehicles, such as trucks and buses have larger turning radii and need more maneuvering room. In addition, their acceleration and braking capabilities are lower than those of passenger cars. Access connections need to safely and efficiently accommodate the largest vehicle expected to use the

connection on a regular basis (once a week or more). The developer is responsible for providing appropriate design vehicle information.

7.1.4 Off-Tracking

Swept path templates for the largest design vehicle must be shown on design plans for all movements at the entrance. Wheel off-tracking outside the physical limits of the entrance onto the gravel shoulder, sidewalks etc. must not be permitted. Off-tracking of large vehicles onto opposing highway lanes, including turning lanes, is typically not allowed, however may be permitted on low speed highways (60km/h or less) when the expected number of large vehicles accessing the development is fewer than one vehicle per day or where large vehicles only use the entrance at times of the day when traffic volumes are very low. Off-tracking onto opposing lanes of the driveway may be permitted on moderate and low volume entrances provided the expected number of large vehicles accessing the site is fewer than 5 per day and the entrance is not located on a high-speed collector or arterial highway.

7.2 Access Geometric Features

Driveway Entrance Categories

The geometric features of an access are dependent on the entrance category. Table 4.3.2.1 is reproduced below to enhance readability.

Category	Volume
Field Entrance	AADT[1] < 1 vpd
Low Volume Entrance	2-Way DHV[2] 1 to 10 vph
Moderate Volume Entrance	2-Way DHV 11 to 100 vph
High Volume Entrance	2-Way DHV > 100 vph

7.2.1 Angle of Intersection

Public and private entrances should have an angle of intersection with the public road at or near 90°. The minimum acceptable angle is 70° for two-way entrances and 60° for entrances serving right-out or right-in only traffic. The minimum

entrance tangent distance, measured from the edge of nearest travel lane, is 10 m for low volume entrances and 20 m for moderate/high volume entrances and all public road intersections. Tangent distances greater than 10 m may be required for low volume entrances with a high volume of large trucks.

7.2.2 Driveway Throat Width and Turning Radii

Driveway throat width and turning radii are interdependent. A larger turning radius permits the use of a smaller throat width and vice versa. Generally, throat widths and turning radii shall be designed such that the expected design vehicle can enter and exit the site without encroaching onto curbed areas, gravel shoulders, or opposing lanes on the adjacent highway.

For moderate and high-volume entrances and any access to a high-speed arterial, the combination of throat width and turning radii must be adequate to accommodate one entering passenger car and one exiting passenger car with no turning conflicts in the driveway and no encroachment into opposing lanes on the highway.

If multi-unit trucks are expected to use the access on regular basis (> 5 two-way trips per day) the use of larger radius channelized turns with traffic islands should be considered, particularly in areas with pedestrians or if signalization is anticipated. The use of three-centered compound curves, rather than simple radii, is encouraged when designing for larger vehicles.

Table 7.2.2 provides combinations of driveway throat widths and radii that may be used for some specific design conditions. This table assumes the driveway intersects the highway at or near a 90-degree angle and that right turning vehicles are positioned 1m from the curb or edge of highway. Driveway widths are measured at the point of tangency. Two-lane commercial driveway widths less than 8m and in excess of 12m should be discouraged. Three lanes (two lanes entering the highway) may be considered for high volume driveways where left or through movements from the development significantly impedes right turning traffic exiting the development. With the exception of low volume driveways and curb drop accesses, no access shall have a turning radius less than 5m.

Curb drop entrances shall only be permitted for low and moderate volume entrances and when the design vehicle is no larger than a single unit truck. Curb drops must be 3.5m to 7m wide for low volume one-way only entrances and 10 m to 12m wide for two-way moderate and high-volume entrances. Overly wide driveways provide poor positive guidance for drivers of passenger cars and reduce safety for bicyclists and pedestrians. Driveway widths and turning radii should be the minimum size required to safely accommodate the design vehicle.

TABLE 7.2.2 - ENTRANCE THROAT WIDTH AND RADIUS

Entrance Design Condition	Radius (m)	Width (m)
Low volume entrance	0 m to 3 m	5.5 m – 7 m
Single lane, entering cars must wait for exiting vehicles	5 m	7.5 m
Simultaneous entry and exit by passenger cars	5 m	10 m
Simultaneous exit by a passenger car and entry by a single unit truck	7.5 m	12 m
Separate left and right exit lanes for passenger cars and simultaneous entry by a passenger car	5 m	13 m
Simultaneous entry and exit by a single unit truck	10 m	12 m
Separate left and right exit lanes for passenger cars and simultaneous entry by a single unit truck	10 m	13 m

7.2.3 Clear Throat Length

Clear throat length is the no conflict and storage area within the driveway between the highway and the first conflict location on site such as a parking stall or internal travel lane/aisle. Clear throat length is important for safe and efficient traffic operations on the site as well as the abutting highway. A sufficient clear throat length enables the driver to enter the site and clear the highway intersection before encountering any conflicts with on-site traffic circulation. The provision of appropriate clear throat lengths is particularly important for drive-through service developments. Failure to provide sufficient clear throat distance may result in blockage of entering vehicles, queues extending onto the highway, and increased conflicts and collision rates. A queuing study may be required to determine the appropriate amount of storage to be provided.

The clear throat length is measured from the end of curve radii at the highway to the first conflict location on site. At entrances with a curb drop, the clear throat distance is measured from the edge of travel lane or the back of sidewalk if present. Clear throat length requirements generally do not apply to low volume accesses. For moderate volume accesses with low truck volumes, sufficient clear throat distance is required to provide storage for one passenger car between the edge of travel lane and the first conflict on site (minimum 8m). For larger developments, the appropriate clear throat length is best determined by a detailed

traffic impact analysis. Table 7.2.3 provides minimum required clear throat distance for several common types of developments. Larger clear throat distances may be required, particularly on higher speed highways. A minimum clear throat of 60 m must be provided on any access to a controlled access arterial highway.

TABLE 7.2.3 - MINIMUM DRIVEWAY CLEAR THROAT LENGTH

Development Type and Size	Minimum Clear Throat Length (m)
Light Industrial 10,000 - 50,000 m^2	15
Light Industrial > 50,000 m^2	30
Commercial 5,000 - 25,000 m^2	15
Commercial 25,001 - 50,000 m^2	30
Commercial > 50,0000 m^2	60
Supermarket > 2000 m^2	15
Residential 100 - 200 units	15
Residential >200 units	25
General Office 10,000 - 20,000 m^2	15
General Office >20,000 m^2	30
Institutional/Recreational > 10,000 m	15

Notes:
1. Development sizes are based on gross floor area as defined in the ITE Trip Generation Manual.

7.2.4 Driveway Profile

The ease of entry and exit from a driveway is influenced by the change in grade between the highway cross slope and the slope of the driveway. For higher category roads it is desirable to minimize the grade change at the highway edge in order to encourage higher speed turns and reduce interference with through traffic. This is particularly important on high volume accesses. Where a shoulder exists, the grade of the driveway from the edge of the pavement shall slope at the same rate as the highway shoulder for the full width of the shoulder.

To facilitate ease of ingress and egress, and to ensure adequate sight distances, all accesses should have a relatively flat area where the driveway meets the public highway, referred to as the "apron". In order to provide adequate drainage, the apron area must have a minimum grade of 0.5%. The driveway apron area should slope away from the road, however an apron area sloped towards the highway may be considered where there is curb and gutter or where an on-site property drainage system is provided that can adequately control drainage from the driveway. Where a sidewalk crosses a driveway the cross slope on the sidewalk should not exceed 2%.

Table 7.2.4 provides information on required apron lengths, maximum allowable grades, maximum allowable grade changes between the highway cross slope and the driveway apron, and maximum allowable grade changes between the apron and the rest of the driveway. On high volume entrances with larger grade changes, it may be desirable to use vertical curves.

TABLE 7.2.4 - DRIVEWAY GRADES

Road Classification	Min. Apron Length (m)	Max. Apron Grade[2]	Max. Grade Change (road cross section to apron)	Max. Grade Change (apron to driveway)
Arterial	10 m	+/- 3%	2%	3%
Collector	7.5m	+/- 4%	4%	6%
Local	5m	+/- 6%	6%	controlled by vehicle clearance[1]

Notes:
1. A maximum grade change of 12% over 3m satisfies clearance requirements for most vehicles.
2. Grade where driveway crosses sidewalk should not exceed 2%

7.3 Turning Lanes

7.3.1 General

Left and right turning lanes should be used in situations where turning conflicts at an access are high enough to impede through traffic, resulting in the potential for large speed differentials between through traffic and traffic entering or exiting the highway. The design of turning lanes, including required lengths and tapers, shall

consider the results of a traffic impact study and the Department's Standard Highway Drawings.

Warrants for the installation of turning lanes at un-signalized intersections are provided in Appendix C and D. It should be noted that turning lanes may be required when these warrants are not met based on the results of a traffic impact study or as deemed necessary by the Department to address safety and/or operational concerns.

7.3.2 Right Turn Acceleration Lanes

Right turn acceleration lanes allow right turn traffic from an access to accelerate before entering the through traffic flow on the highway. A right turn acceleration lane should be provided at accesses along arterial highways where speeds are posted at or above 90km/hr, the highway has 100 vehicle trips per hour in the direction of the right turn, and the egress right turning design hourly volume is greater than 25vph or where there is a high percentage of heavy vehicles exiting right from the access. Acceleration lanes must be of sufficient length that the entering vehicle can reach highway speed before merging.

7.3.3 Left Turn Acceleration Lanes

A left turn acceleration lane with taper may be considered at accesses to an arterial highway with a posted speed limit at/above 90km/hr, the highway has greater than 150 total vehicle trips per hour, and the egress left turn design hourly volume is greater than 25vph or there is a high percentage of heavy vehicles exiting the access to the left. Assessment of the safety and operational benefits resulting from the installation of a left turn acceleration lane needs to consider potential negative impacts resulting from lack of driver familiarity with this design which is not commonly used.

7.3.4 Right Turn Deceleration Lanes

A dedicated right turn deceleration lane is needed if vehicles slowing to make a right turn start to impede through traffic and can be determined using nomographs that consider highway speed, the number of right turning vehicles per hour, and advancing traffic. Advancing traffic is the right turn volume plus through traffic travelling in the same direction as the right turn. Right turn deceleration warrants are contained in Appendix "D".

7.3.5 Left Turn Deceleration/Storage Lanes

Left turn deceleration lanes are intended to separate the turning vehicle from through traffic. Left turn deceleration lanes reduce the frequency of rear-end collisions at locations where there is considerable left turn activity. The requirement for a left turn lane is determined by Warrants in Appendix "C". The Warrants consider hourly volumes for turning, advancing, and opposing traffic. If warranted, left turn lanes must be long enough to accommodate safe deceleration and provide adequate storage for queued vehicles during the peak hour.

7.3.6 Two Way Left Turn Lanes

Two-way left turn lanes (TWLTL) are typically located on three lane highways with the middle lane accommodating left turning traffic in both directions. TWLTL can be an access management tool in certain situations and are proven to increase safety and reduce travel delay when properly implemented. TWLTL work best in urban environments with no signals or widely spaced signals and where travel speeds are slower, traffic volumes are moderate (AADT less than 15,000 vpd for 3 lanes), the percentage of left turning traffic is high, and access density is moderate. TWLTL should be avoided in rural areas with higher speeds and are not permitted where the speed limit exceeds 70 km/h. Highways with 4 or 5 lanes should have a raised median to prevent left turns instead of a TWLTL.

7.3.7 Other Considerations

In addition to the warrants previously described, dedicated left and right turn deceleration/storage lanes should also be considered where operating speeds are >= 90km/hr, or there is a high percentage of heavy vehicles turning. The need for left and right turn lanes at a signalized intersection or stopped controlled approaches should be based on the results of a level of service analysis using Synchro/Sim Traffic or other Department approved micro-simulation software packages.

7.4 Site Design

7.4.1 Site Plans

Site plans must be provided for all developments meeting the warrants for a traffic impact study (TIS). For developments that don't warrant a TIS, site plans may be requested at the discretion of the Area Manager. Site plans submitted for review and approval must include information as outlined in Section 4.1 of the Department's *Guide for the Preparation of Traffic Impact Studies*.

Site plans must include adequate on-site circulation and storage to ensure safe ingress and egress of the site and to prevent any overflow of queued/waiting traffic onto the adjacent highway. Sites shall be designed so that all vehicles can enter and exit without reversing onto the highway.

7.4.2 Features Within the Highway Right-of-Way

Gates, fences, signage, landscaping, or other decorative or access-control features should not be located within the highway right-of-way and must be removed if deemed unacceptable by the Area Manager.

7.4.3 Gated Accesses

A gated access must be designed such that a minimum of 15m is provided for storage outside the limits of the highway right-of-way. This distance may be reduced for low volume or field entrances provided the gate is set back far enough to allow storage outside the limits of the road shoulder for one vehicle of the type that typically uses the entrance.

7.4.4 Vulnerable Road Users

Site plans and access designs should consider pedestrian and bicycle facilities. For developments expected to generate significant pedestrian activity the developer may be required to provide sidewalks (to be maintained by developer/Municipality) on the adjacent highway and pedestrian pathways on site. Site designs should minimize pedestrian/vehicle conflicts.

The minimum practical width of driveway should be used and the design should provide the shortest possible path for pedestrians to cross. Where a driveway is four or more lanes across it should be designed such the pedestrians have a refuge between entering and exiting traffic.

7.4.5 Parking Requirements

Development sites must include adequate on-site parking to accommodate anticipated peak parking demands. Parking on the adjacent highway shall not be permitted on high speed arterial and collector highways. If a proposed development encourages parking on a high-speed arterial or collector highway the access permit must be denied. Highway parking may be considered on lower speed highways provided the smooth flow of traffic and public safety are not compromised. The construction of on-site parking areas that encroach upon the highway right-of-way shall not be permitted.

7.4.6 Setback Requirements

All permanent structures (buildings, foundations, retaining walls, signs, underground tanks, fences, decks, asphalt/concrete parking areas, or driveways) shall be set back a minimum distance of 5m from the edge of highway right-of-way for non-controlled access highways and 10 m for controlled access highways. Setback requirements apply to any structure that is not easily relocated or that may potentially interfere with sight lines and includes such things as parking lots, driveways, and large signs. Setback requirements also apply to underground storage tanks for fuel and other products.

Setbacks are measured as the shortest distant between the edge of right-of-way and the nearest point on the structure. If additional right-of-way is needed for highway improvements required as a direct result of traffic generated by a proposed development, the setback distance shall be measured from the relocated right-of-way boundary.

In heavily urbanized "downtown" or "central business district" areas where buildings are typically located at or near the edge of highway or back of sidewalk a variance to the 5m setback requirement may be considered.

7.4.7 Drainage

Culvert sizes, proposed elevations, and proposed slopes must be approved by the Department prior to issuance of an access permit. The Department may require a site drainage study to be completed at the expense of the applicant. Typically, post-development flow rates from the site into the highway drainage system must not exceed pre-development rates.

7.4.8 Access Restrictions

In order to ensure public safety and efficient highway operations the Department may apply restrictions to an access. Right in/right out only restrictions are often difficult to enforce and should generally be avoided on highways without a non-traversable median due to problems with driver violations. When right in/right out restrictions are used the entrance design, supported by required signage, should clearly convey required guidance to motorists in order to prevent errant left turns. Entrance and exit only restrictions require careful consideration of access and site design, including signage and pavement markings, to ensure wrong way movements by motorists do not take place.

7.4.9 Traffic Control Devices and Pavement Markings

Any regulatory signage, pavement markings, or other traffic control device located within the Department's right-of-way at a private access location must be approved by the Traffic Authority and the cost of installation shall be funded by the developer. Pavement markings must be provided for driveways designed for 3 or more lanes of traffic.

7.4.10 Driveway Surfacing

The apron area of driveways (see Section 7.2.4 Driveway Profiles) must be hard surfaced on all medium and high-volume accesses located on a paved highway. Hard surfacing typically means a bituminous asphalt surface designed to withstand expected vehicle loadings. Concrete may be used at the discretion of the Area Manager. Driveway surfacing requirements may be waived for temporary accesses.

Hard surfacing must be designed and installed according to the Department's current standard specifications based on the projected use of the access. Access surfacing must be completed prior to opening for use. A delay in the installation of hard surfacing may be permitted due to seasonal restrictions. Asphalt overlay requirements as indicated in Section 7.4.11 may be required for larger entrances.

7.4.11 Asphalt Overlay Requirement

If a proposed entrance design includes widening of a paved highway, or significant changes or additions to existing pavement markings, the proponent may be required to provide a 50 mm asphalt overlay of the intersection area at the discretion of the Department. The overlay area will typically include the full width of all paved approaches extending to the limits of construction as indicated on design plans. The asphalt mix design and installation must be to DPW standard specifications. Milling of the existing asphalt surface may be required to match grades.

Approved:

Michael Croft — Manager Traffic Engineering Services — Dec. 8/2023 — Date

Director, Highway Engineering and Capital Programs — Dec. 11/2023 — Date

Executive Director, Engineering and Construction — Dec 11, 2023 — Date

Executive Director, Maintenance and Operations — Dec 19, 2023 — Date

Chief Engineer — Jan. 9/24 — Date

APPENDIX "A" SIGHT DISTANCE REQUIREMENTS

Section A1 - Stopping Sight Distances

Stopping Sight Distance on level roadways for Automobiles

Design speed (km/h)	Brake reaction distance (m)	Braking distance on level (m)	Stopping sight distance	
			Calculated (m)	Design (m)
20	13.9	4.6	18.5	20
30	20.9	10.3	31.2	35
40	27.8	18.4	46.2	50
50	34.8	28.7	63.5	65
60	41.7	41.3	83.0	85
70	48.7	56.2	104.9	105
80	55.6	73.4	129.0	130
90	62.6	92.9	155.5	160
100	69.5	114.7	184.2	185
110	76.5	138.8	215.3	220
120	83.4	165.2	248.6	250
130	90.4	193.8	284.2	285

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s^2 used to determine calculated sight distance.

Source: 2017 TAC Geometric Design Guide

Stopping Sight Distance on Grades

Design Speed (km/h)	Stopping Sight Distance (m)					
	Downgrades (%)			Upgrades (%)		
	3	6	9	3	6	9
20	20	20	20	19	18	18
30	32	35	35	31	30	29
40	50	50	53	45	44	43
50	66	70	74	61	59	58
60	87	92	97	80	77	75
70	110	116	124	100	97	93
80	136	144	154	123	118	114
90	164	174	187	148	141	136
100	194	207	223	174	167	160
110	227	243	262	203	194	186
120	263	281	304	234	223	214
130	302	323	350	267	254	243

Source: 2017 TAC Geometric Design Guide

Section A2 - Intersection Sight Distance

ISD can be calculated using: $ISD=0.278V_{major}t_g$.

Where V_{major} is the design speed of the major road in km/h and t_g is the time gap for minor road vehicles. Posted speed or 85th percentile speed can be used if design speed information is unavailable.

Table A2 contains time gap information for some vehicle types. These values have been observed by TAC and confirmed to provide sufficient time for a minor road vehicle to accelerate from a stop and complete a left turn without forcing a vehicle on the major road to slow below 70% of their initial speed. The time gap does not change with approach speed and is used as a basis for intersection sight distance calculations. The intersection sight distance along the major road should be equal to the distance travelled at the design speed of the major road for a time period equal to the time gap.

Table A2 also includes information about time gap adjustments for the number of lanes on the major road, the approach grade for the minor road, and vehicles larger than a passenger car.

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Notes: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.2 s for each percent grade for left turns.
- Some road authorities use higher values for certain specialized vehicles (e.g., Alberta uses 22 s for very long log trucks).

Table A2 (Table 9.9.3 from TAC GDG)

APPENDIX "B"
Summary of Minimum Access Management Requirements

DPW Access Management Minimum Requirements (meters)									
	Driveway Spacing (5.2.2)		Corner Clearance (5.2.4)		Unsignalized Street Spacing (5.2.5)		Signalized Street Spacing (5.3.3)		Additional Access Provisions (5.2.6)
Highway Classification (4.2)	Low Speed (<70 km/h)	High Speed (>=70 km/h)	Low Speed (<70 km/h)	High Speed (>=70 km/h)	Low Speed (<70 km/h)	High Speed (>=70 km/h)	Low Speed (<70 km/h)	High Speed (>=70 km/h)	- SFD residential properties limited to one entrance regardless of frontage - One additional access may be considered on local roads and low speed collectors/arterials if frontage >= 50 m. Two additional may be considered if frontage > 150 m - Corner lots shall be accessed from lower classification street only. One additional access to higher classification street may be considered if it is low speed and is required to maintain good traffic operations
Arterial	30	75	50	100	200	400	400	800	
Collector	20	50	30	60	100	200	300	600	
Local	10	30	20	30	75	150	200	400	
Other Notes	- Driveways on opposite side of road should be aligned where possible or separated based on values above; does not apply to low volume driveways (<10 vph) - Existing/future turn lane/tapers should not overlap		- Distance between driveway & intersection (public/private road or signalized access) - Driveways should not be permitted within limits of intersection turn lanes/tapers or typical queues - Does not apply to interchange ramps (see 5.4.3) - May be reduced to 15 meters for low volume driveways adjacent to intersection of two low speed local roads		- Only applies if there is a very low probability of either street requiring signals in future		- Lower values may be considered if traffic signals are coordinated and detailed traffic analysis indicates minimal effect on highway safety/operations. Signal spacing less than 200 meters not considered.		

APPENDIX "C"

LEFT TURNING LANE WARRANT NOMOGRAPHS

(Source - Ministry of Ontario Highways Manual 1986)

E.A.1 LEFT TURN LANE WARRANTS AND STORAGE LANE LENGTHS FOR TWO-LANE HIGHWAYS; UNSIGNALIZED INTERSECTIONS

Left turn lane warrants and storage lane lengths for unsignalized intersections are based on turning, advancing and opposing design hour volumes, which are shown on the example of the DHV turning volume diagram, see Figure EA-1, and are determined from the warrant graphs in Figures EA-2 to EA-29.

The design charts have been based on passenger car dimensions and operating characteristics.

The minimum storage length that should be provided is 15 m from practical design considerations alone. 15 m would provide adequate storage for two vehicles.

USE OF GRAPHS

Select proper graph by percentage of left turns in Advance Volume, V_A, and design speed in kilometres per hour.

If the intersection of lines projected from Advancing Volume, V_A, and Opposing Volume, V_O, fall to the left of the warrant line, a left turn lane is not required.

Right of the warrant line, 'S', indicates the length of the storage lane in metres. If the percentage of trucks in the left turning traffic is more than 10% see Table E9-3 and add the table value to storage lane length.

The charts also indicate conditions where the combination of advancing and opposing traffic may warrant traffic signals. A warrant for traffic signals may occur when no warrant for left turn storage lanes exist due to the requirements of the side road traffic.

On approaches where a separate turning lane is provided for right-turning traffic, the right turns are not included in the determination of V_A or V_O as the case may be.

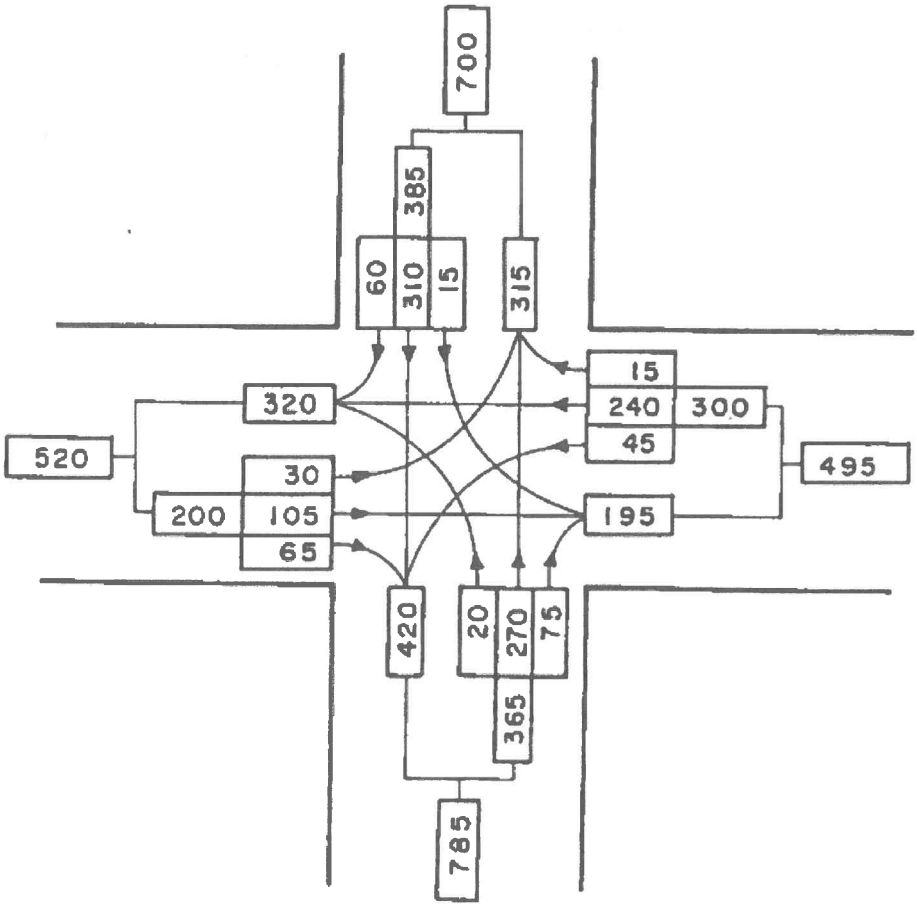


Figure EA-1

Design Hour Volume (DHV)
Turning Volume Diagram

The following example 1 relates to the turning volume diagram in Figure EA-1 and left turn storage lane chart Figure EA-3.

EXAMPLE 1

Design Speed = 50 km/h
Advancing Traffic Volume, V_A = 300 vph
Opposing Traffic Volume, V_O = 200 vph
Left Turn Traffic Volume, V_L = 45 vph

Percentage of Left Turning Traffic:

$$\frac{45 \times 100}{300} = 15(\%)$$

The projected lines intersect to the left of the warrant line and hence no left turn lane is needed. Also the lines intersect to the left of the traffic signal warrant line indicating that traffic signals are not required.

Example 2. The traffic volumes and derived left turning traffic percentage of 30% are applied to Figure EA-24.

EXAMPLE 2

Design Speed = 100 km/h
Advancing Traffic Volume, V_A = 400 vph
Opposing Traffic Volume, V_O = 300 vph
Left Turning Traffic Volume, V_L = 120 vph

Percentage of Left Turning Traffic:

$$\frac{120 \times 100}{400} = 30(\%)$$

The value in the graph indicates that the length of the left turn storage lane 'S' should be 25 m.

If the percentage of trucks in the left turn lane is 20%, see table E9-3 for additional storage length and add the value to the left turn lane; 25 m + 10m = 35 m.

Since the lines intersect to the right of the short dash line and to the left of the long dash line, therefore traffic signals may be warranted in "free-flow" urban areas only.

E.B.1 LEFT TURN LANE WARRANTS AND STORAGE LANE LENGTHS FOR FOUR-LANE UNDIVIDED HIGHWAYS; UNSIGNALIZED INTERSECTIONS

USE OF GRAPH

1. Select the appropriate figure for left turning volumes from the bottom of the graph and extend a line upward.

2. Select the appropriate figure for the opposing volumes from the left hand side of the graph and extend a line across.

3. Locate the point of intersection of the extended lines. If the point falls to the left of the warrant line, a left turn lane is not warranted.

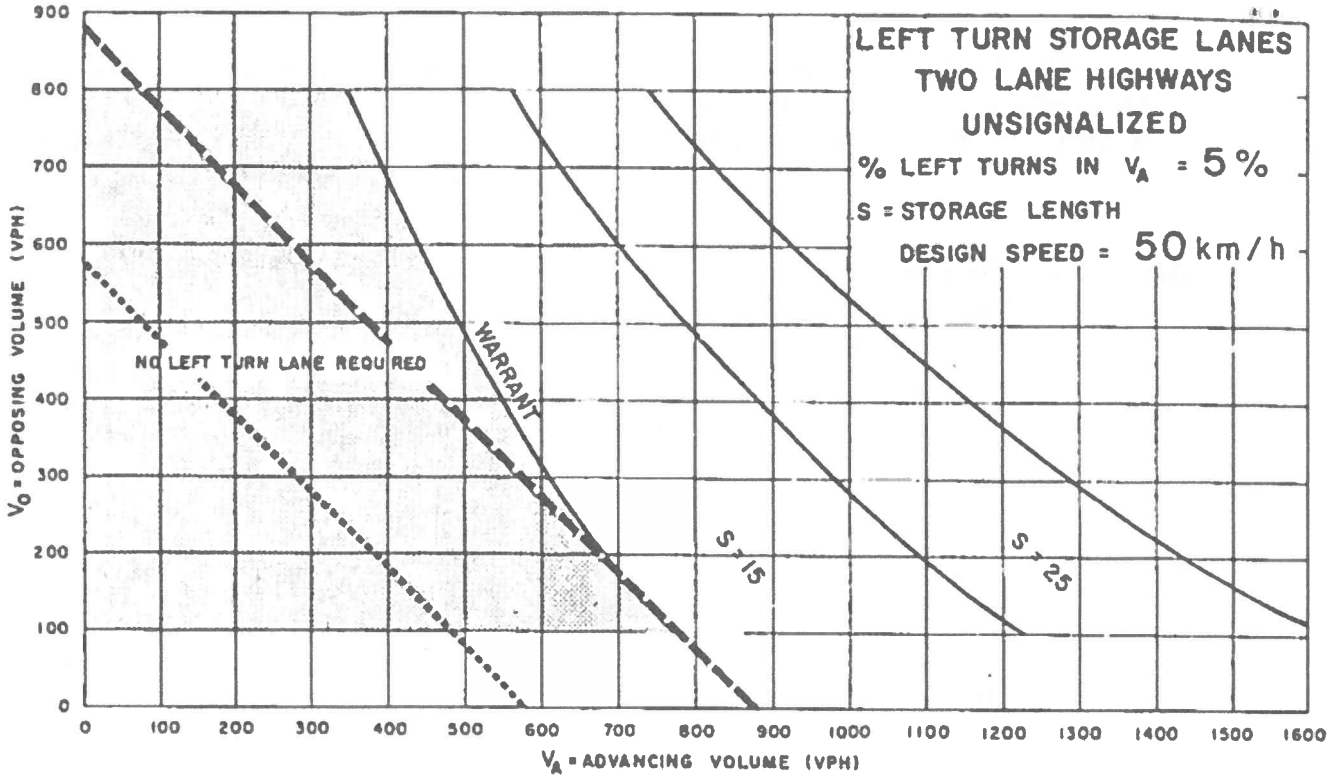
4. If the point falls to the right of the warrant line, a left turn lane is warranted and its storage length is indicated by the value of 'S' shown on the graph.

An example of applying the graph in Figure EB-1 is illustrated below:

Left turning Volume V_L = 100 vph
Opposing Volume V_O = 400 vph

Projected line from these values intersect to the right of the warrant line and within the area marked 'S' - 15 m - a left turn lane is warranted and the storage length should be 15 m.

Note: All at-grade crossings on controlled access divided highways where left turns are permitted, shall have a minimum left turn lane consisting of the taper and parallel lane due to the high operating speeds. See Figure E10-10.



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

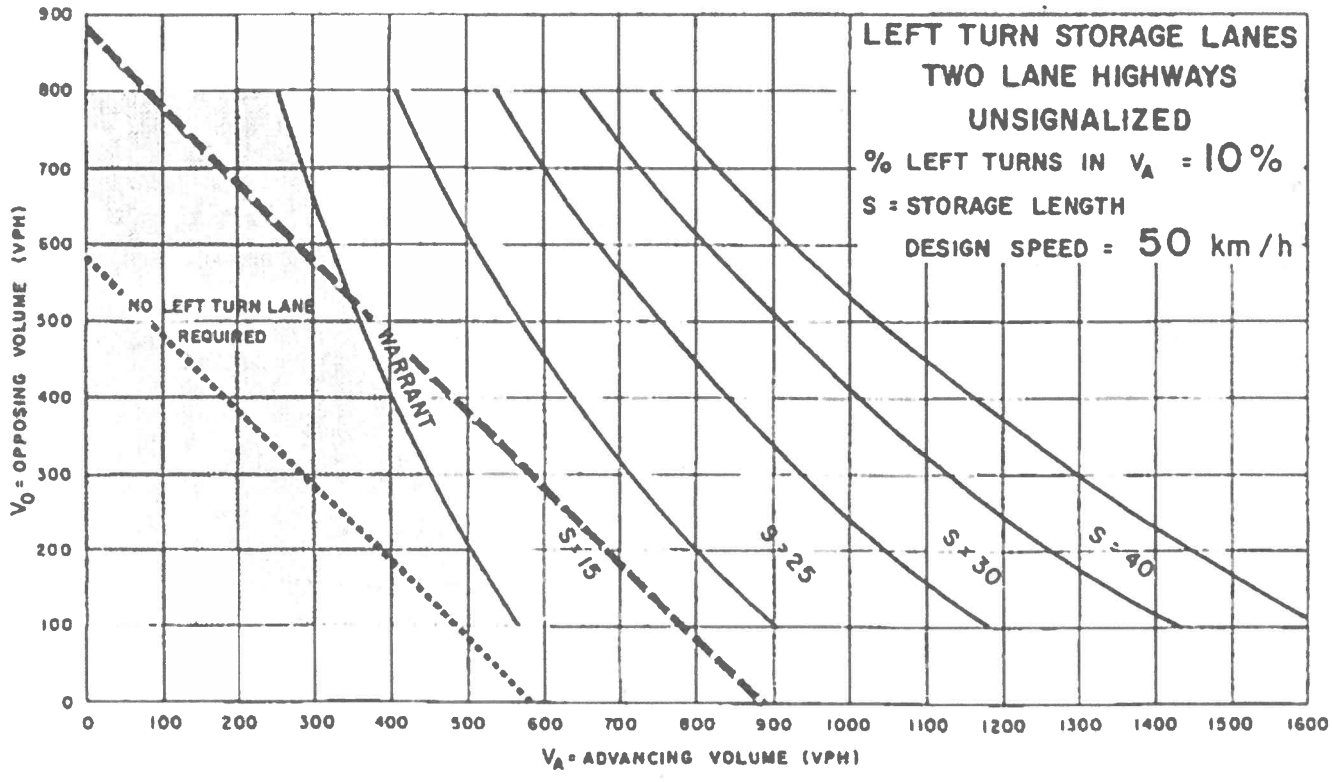
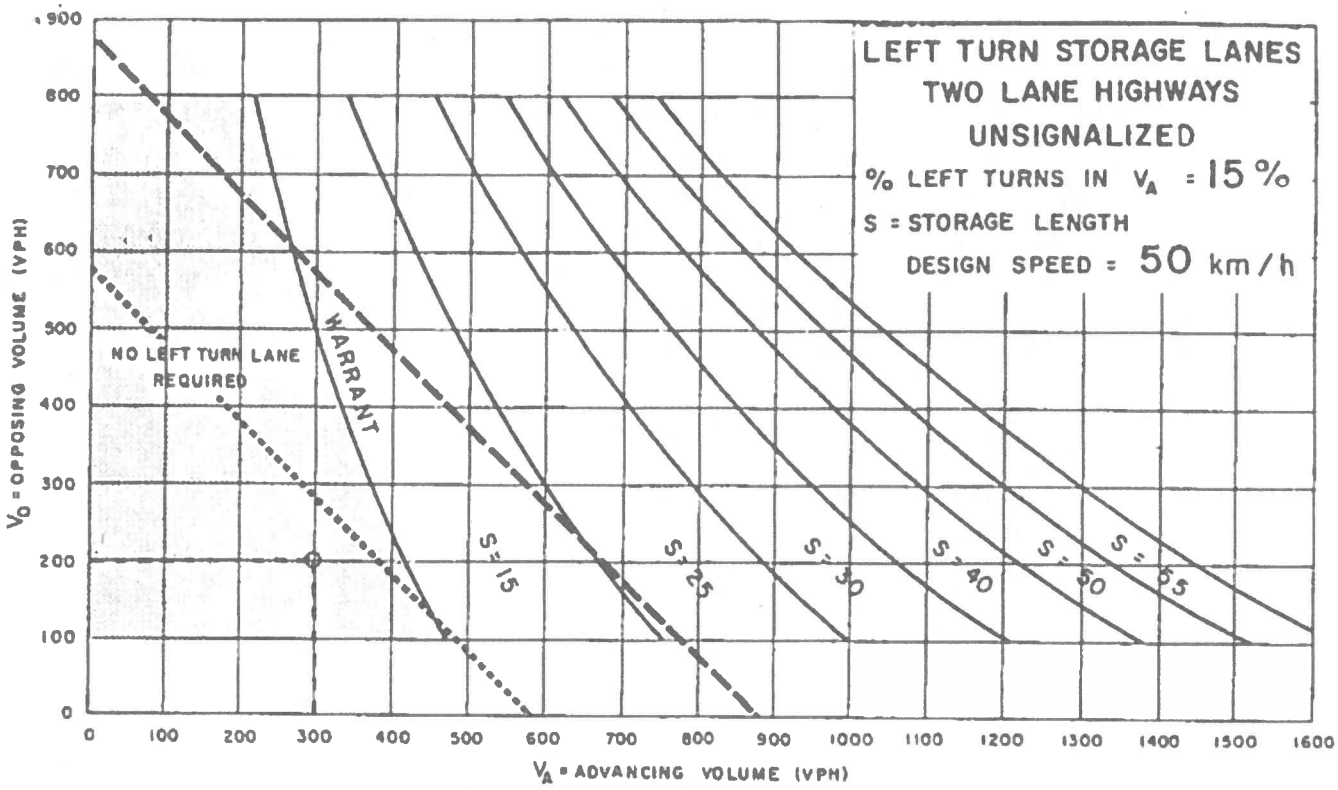


Figure EA-2



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

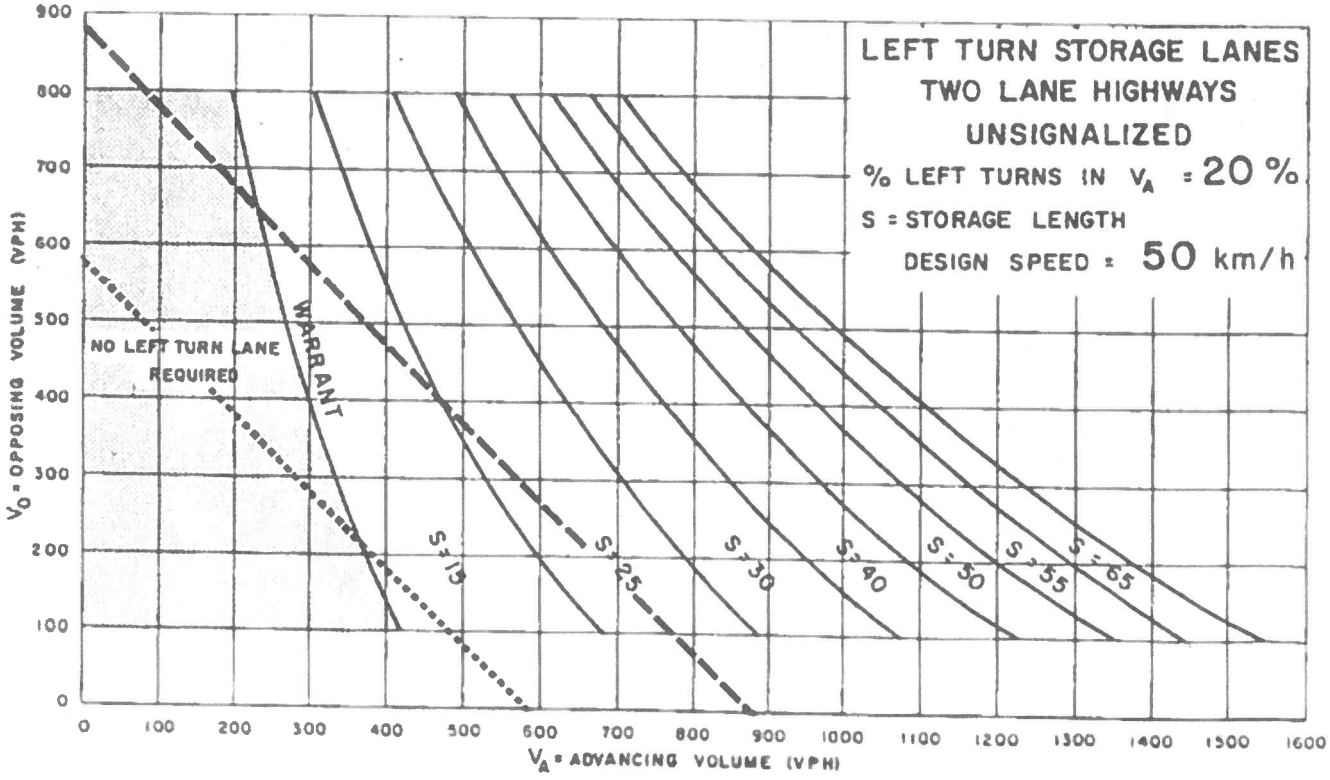
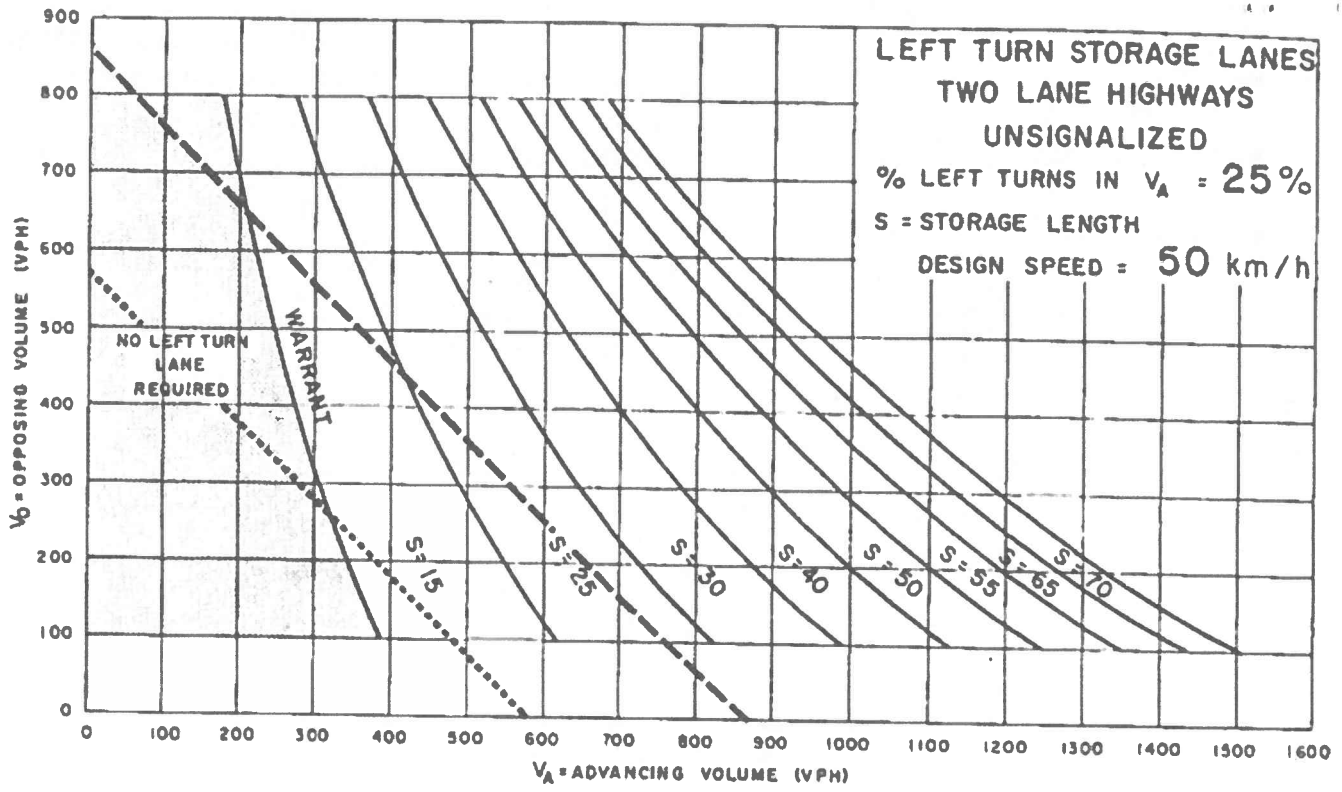


Figure EA-3



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

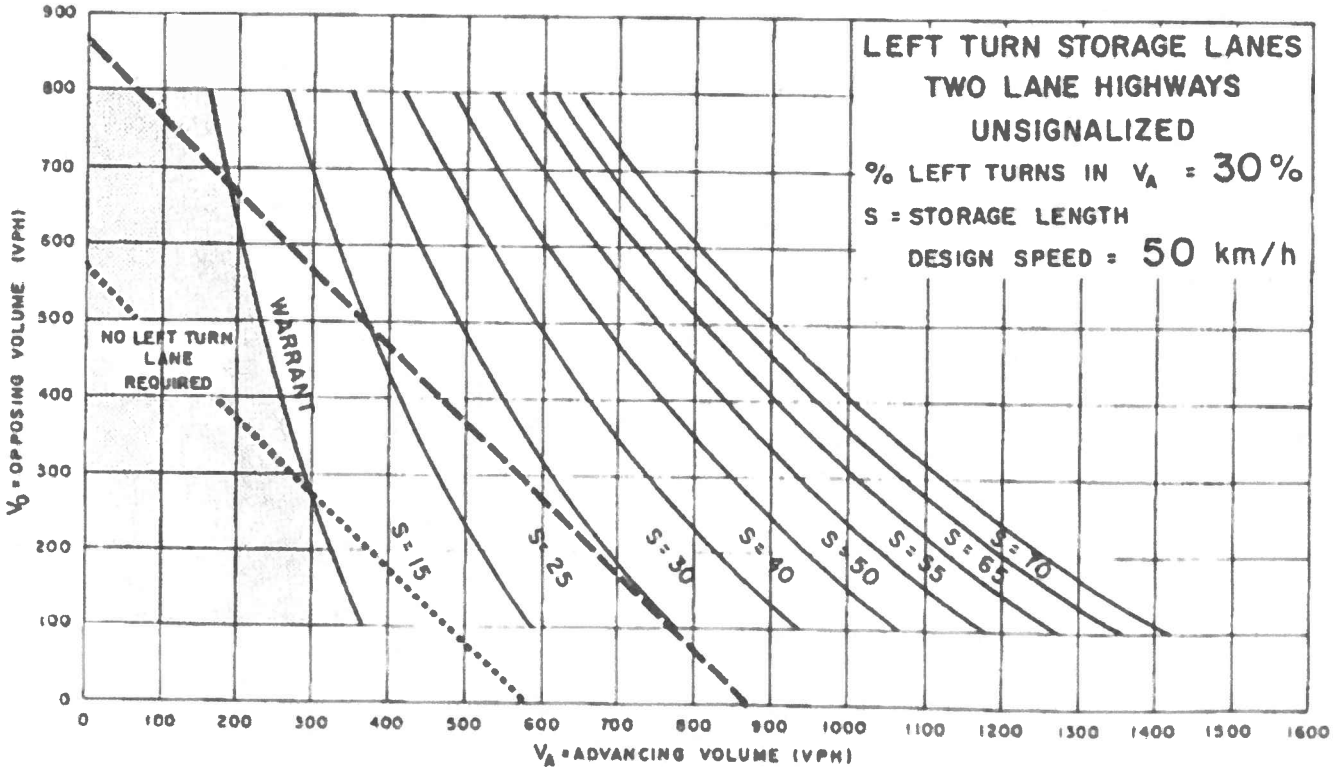
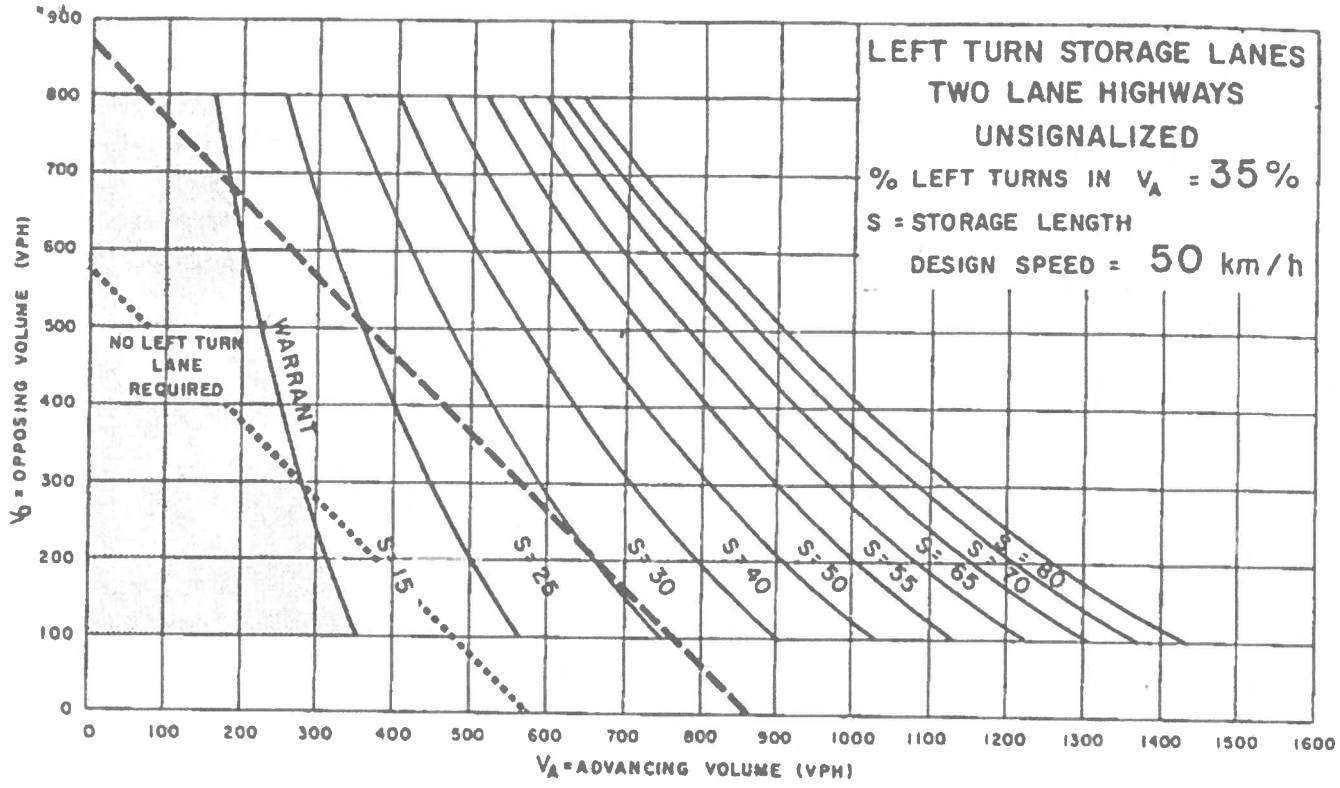
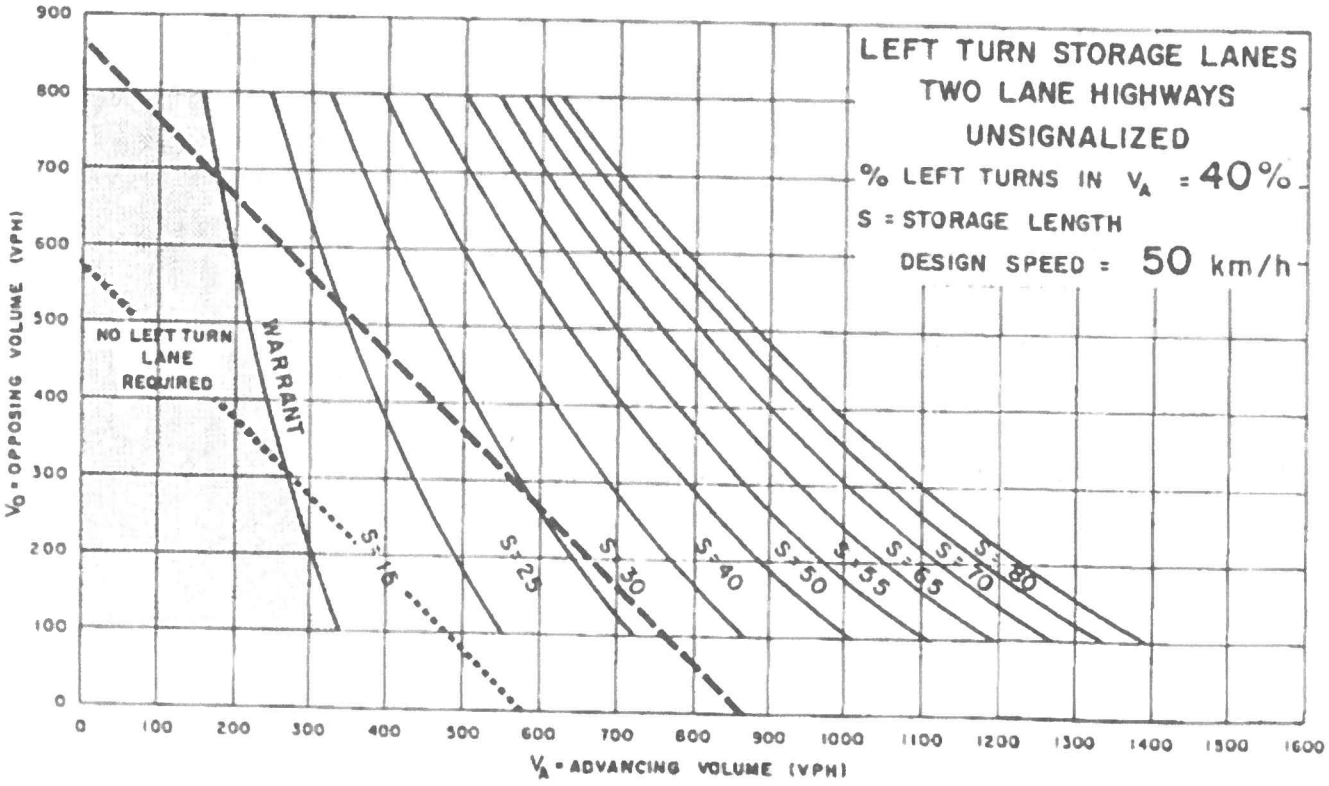


Figure EA-4



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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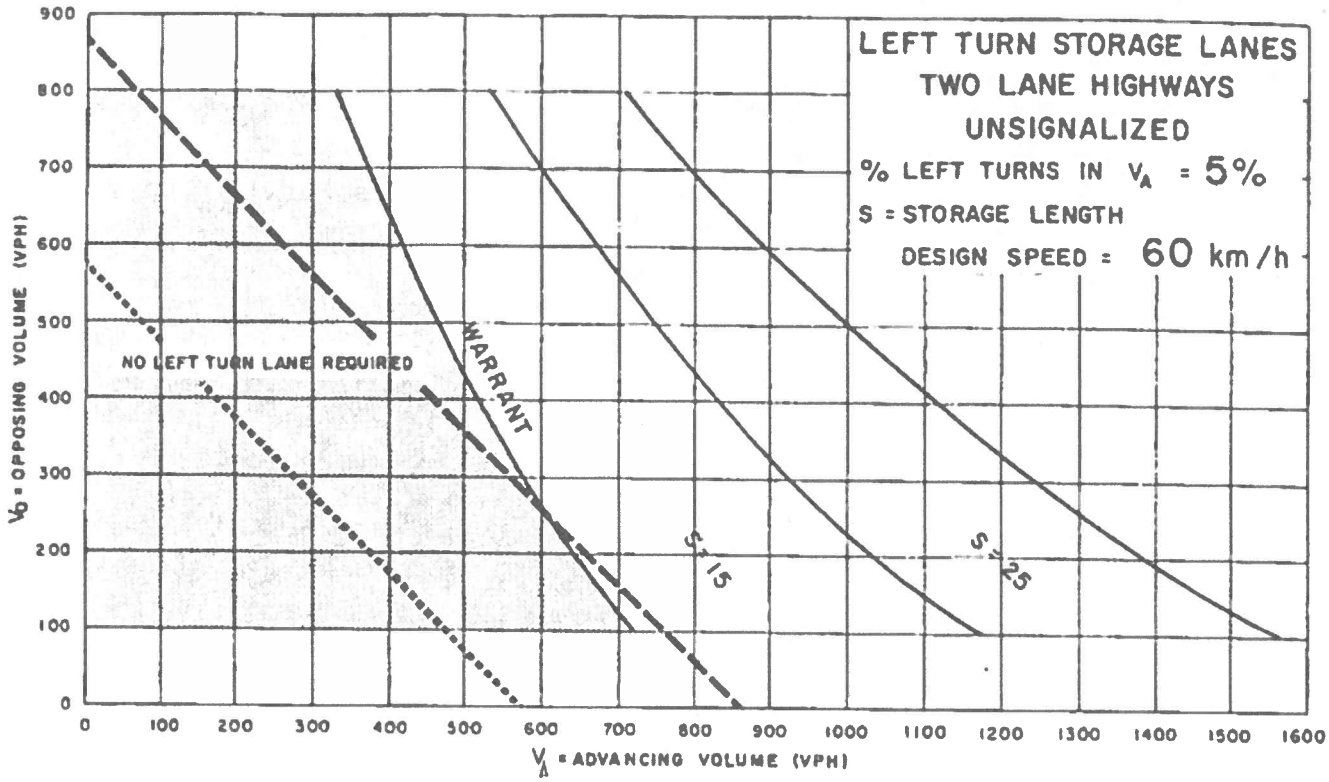
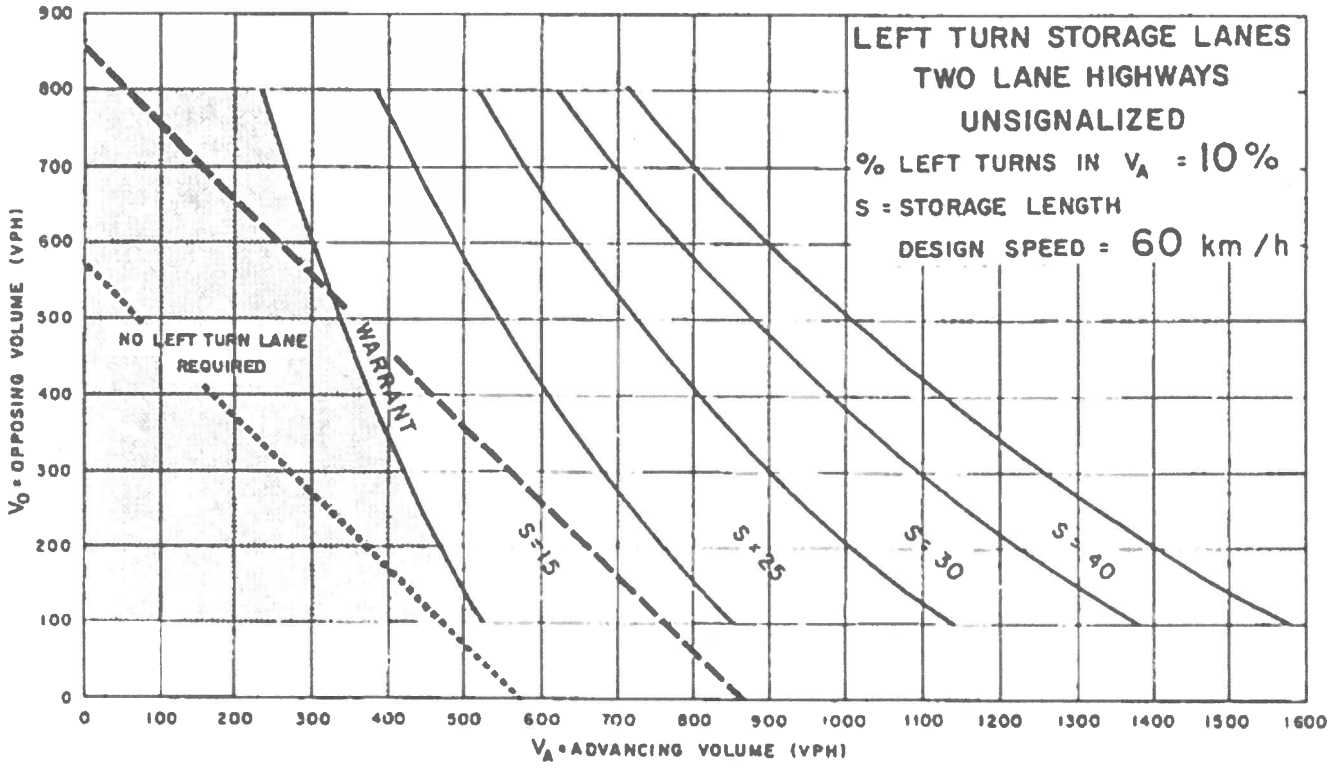


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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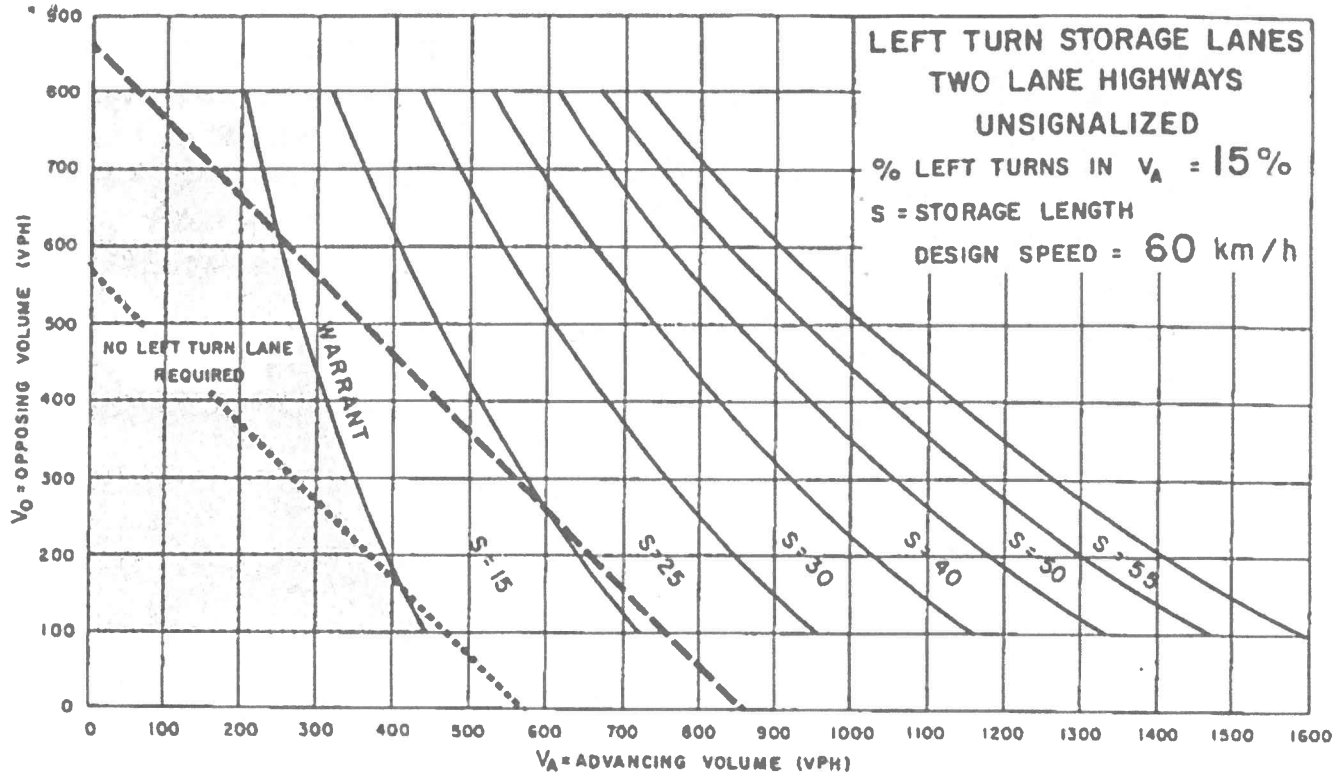
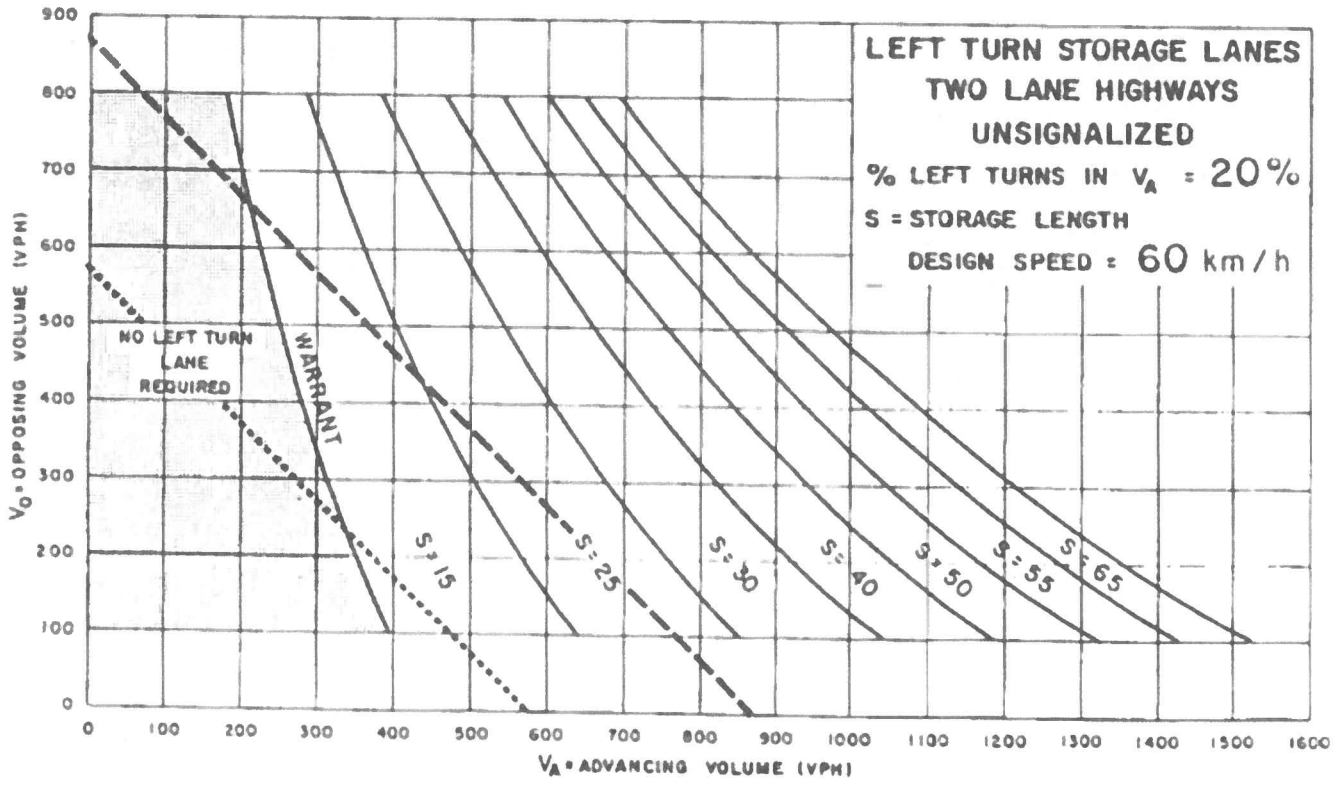


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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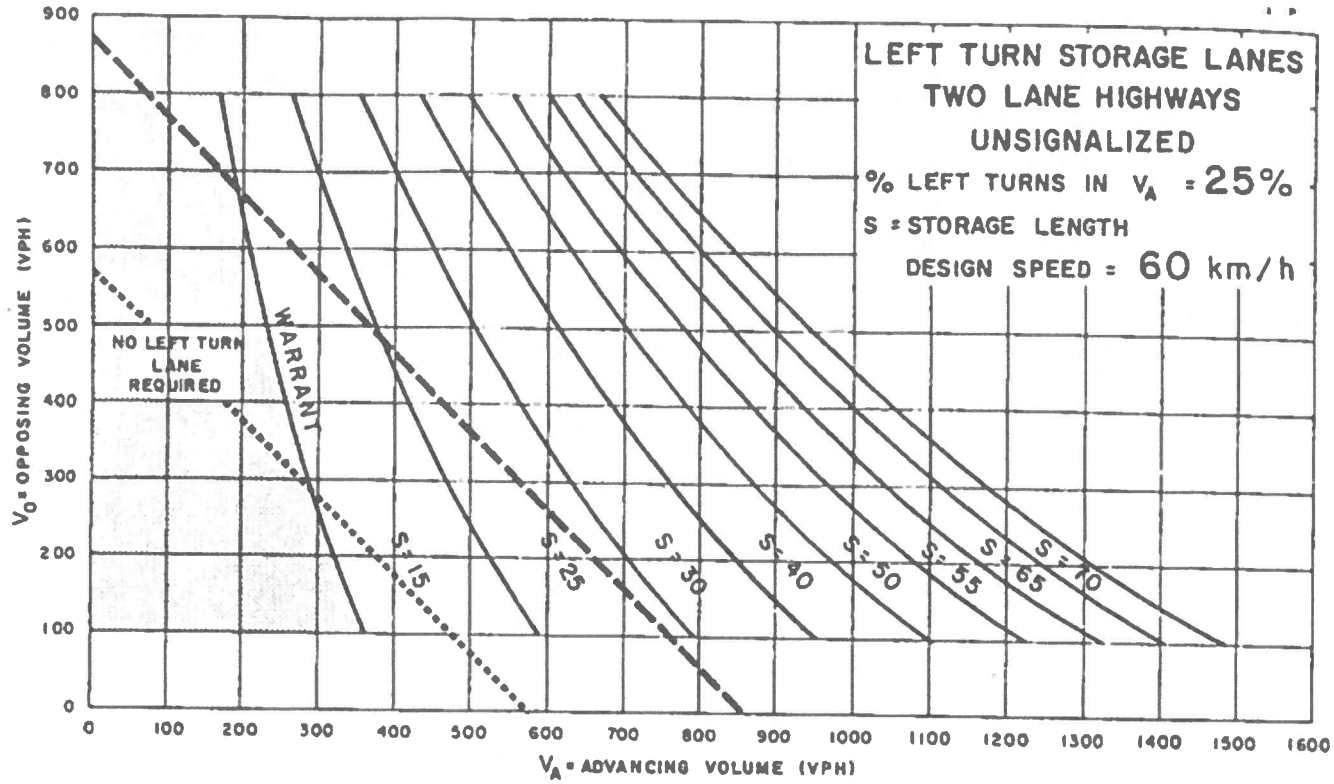
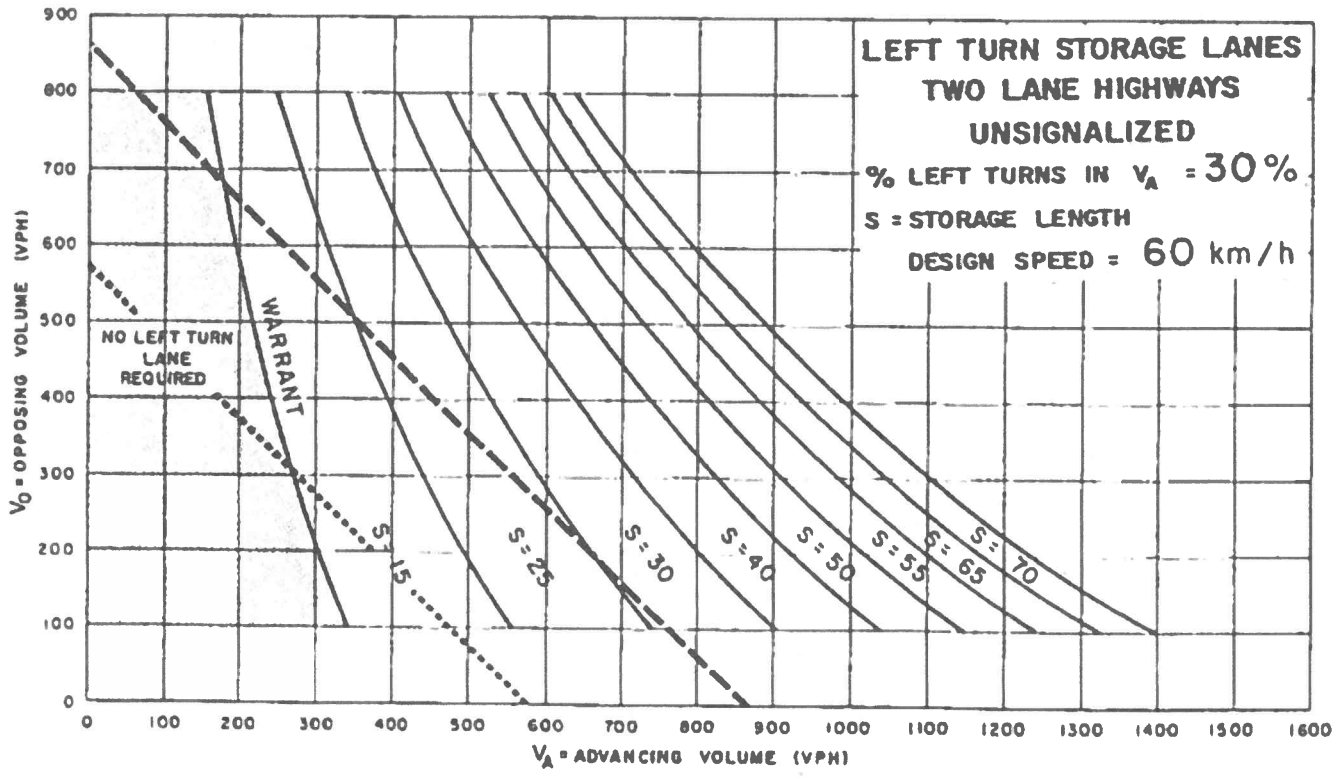


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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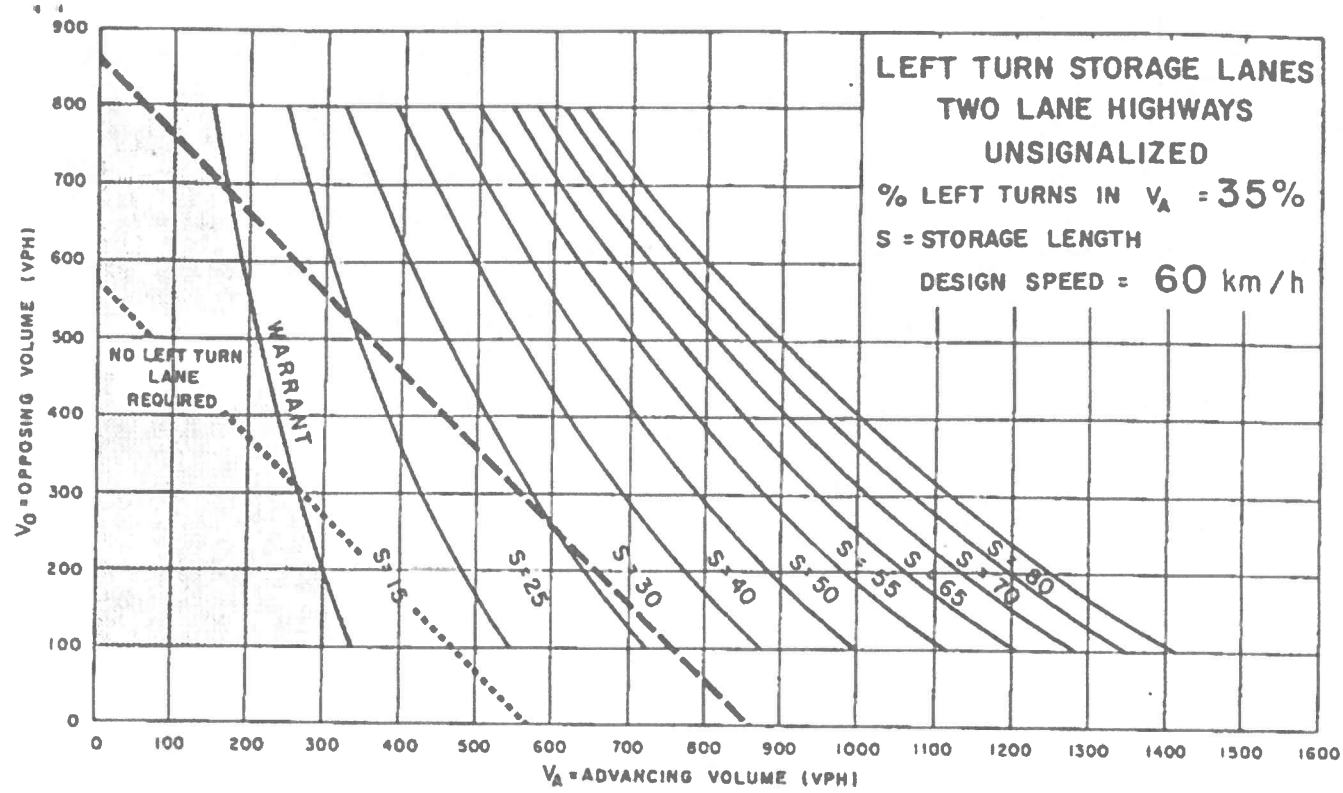
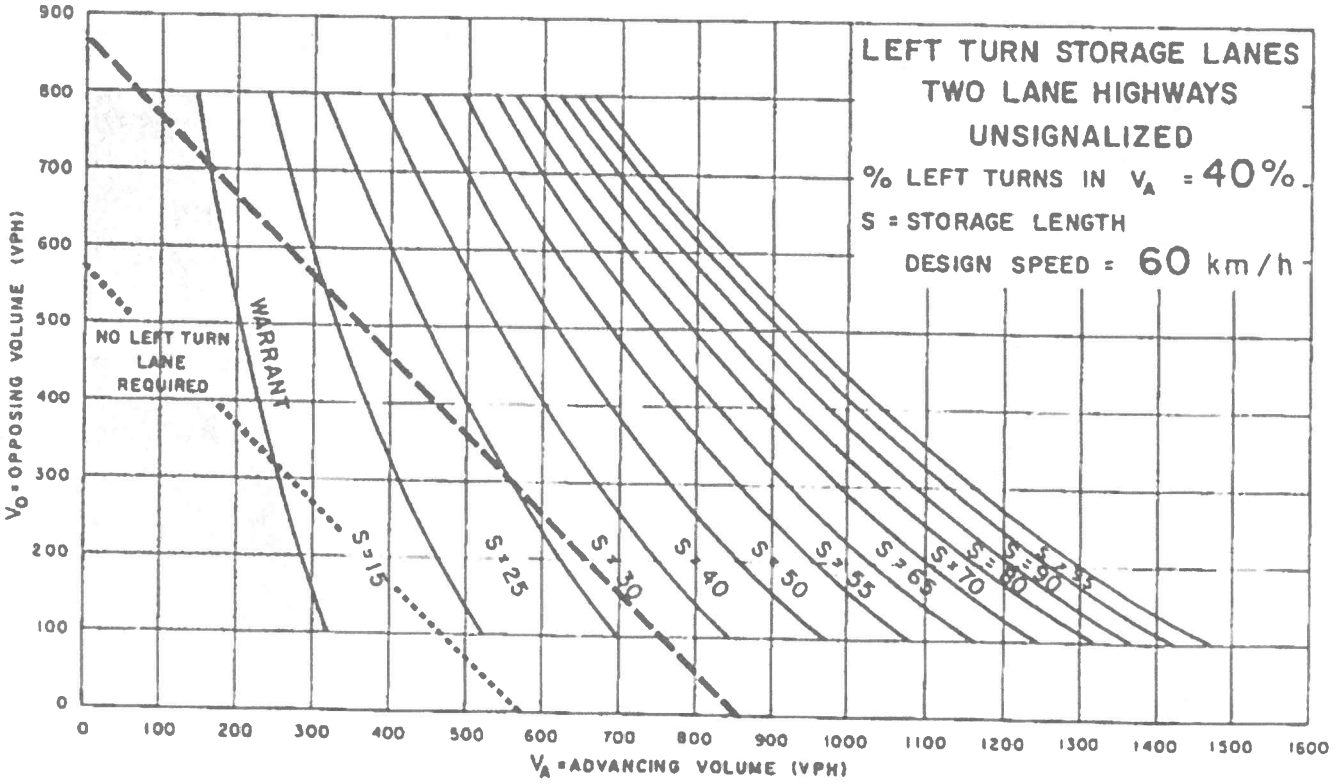


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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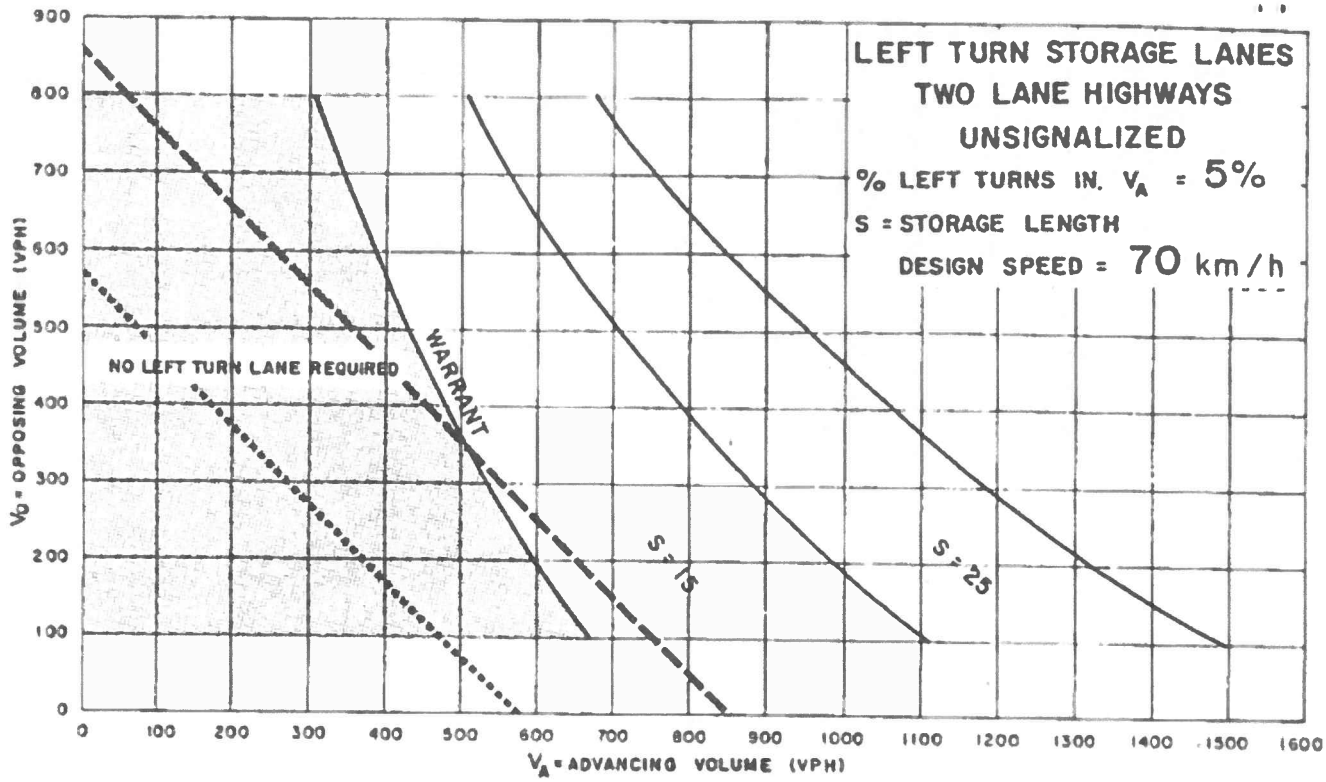
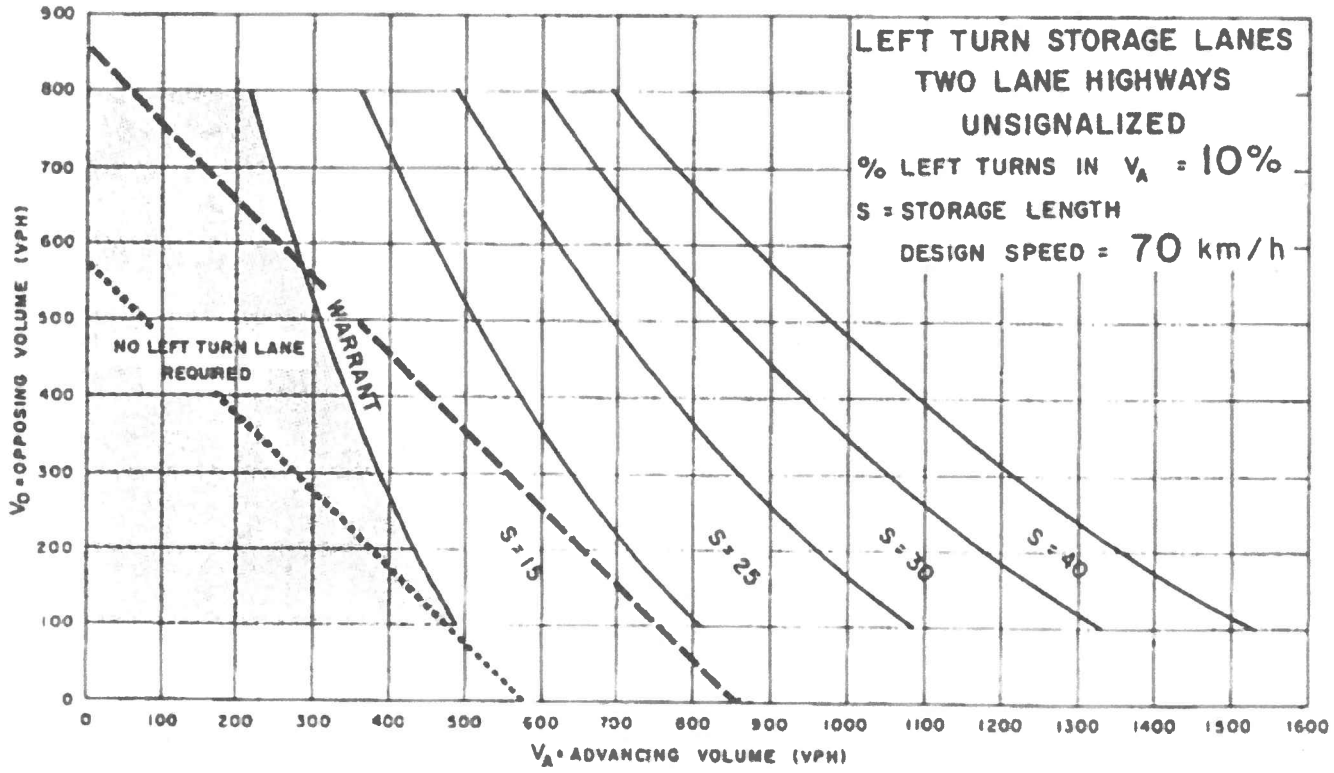


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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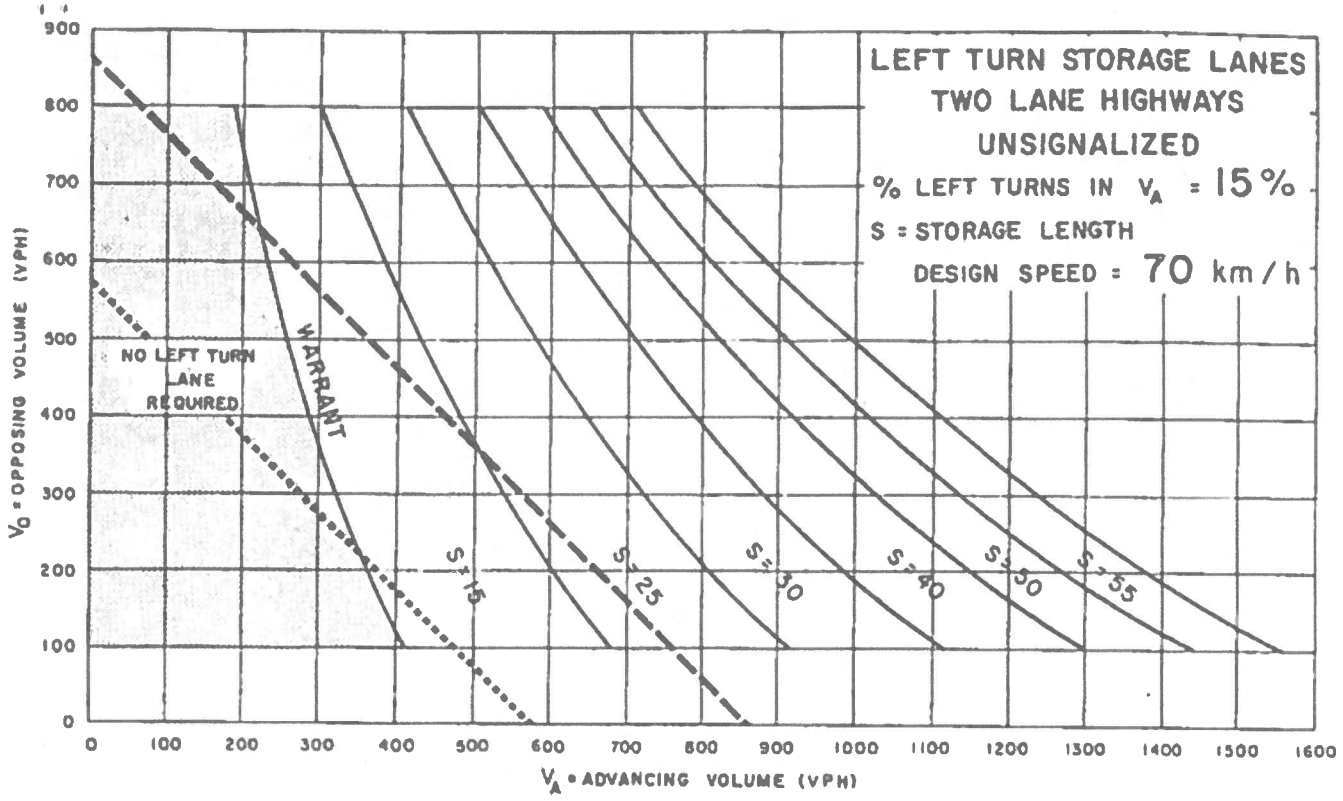
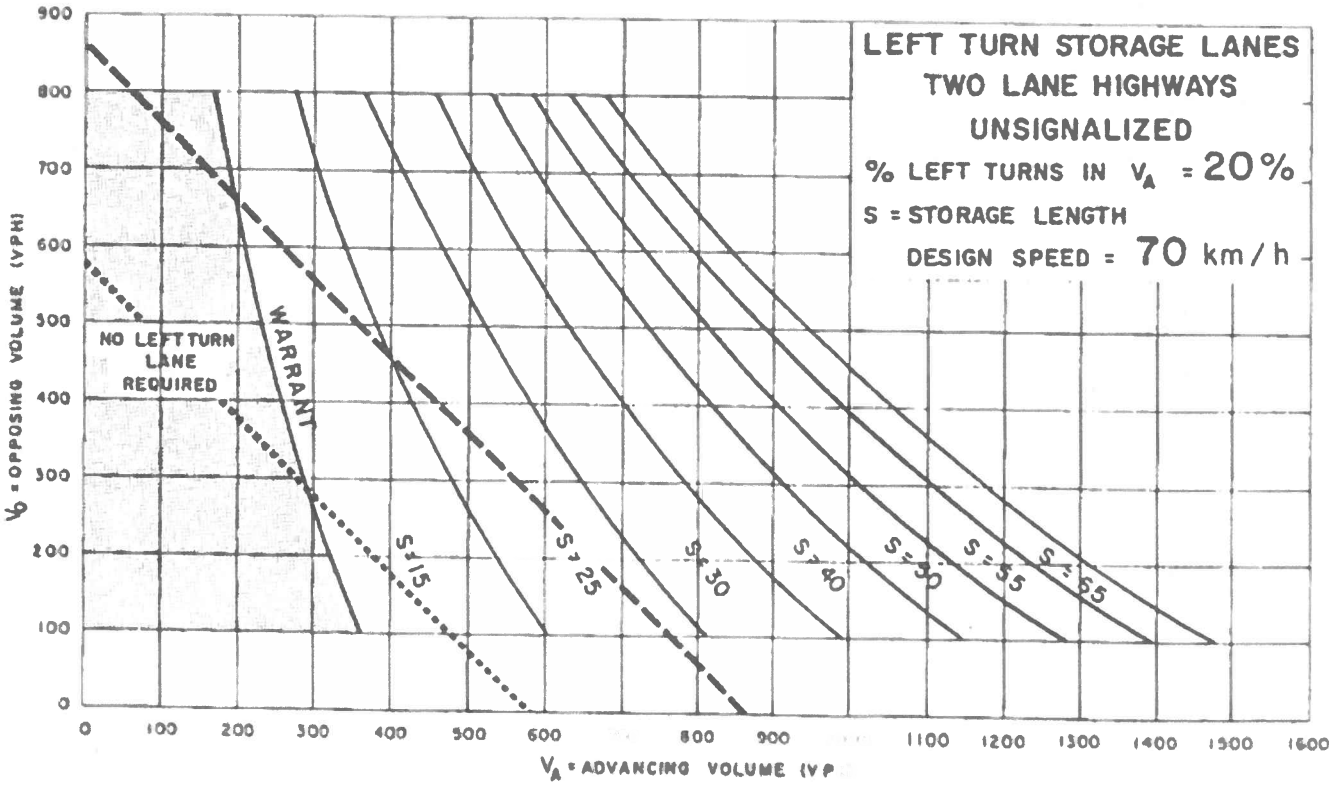


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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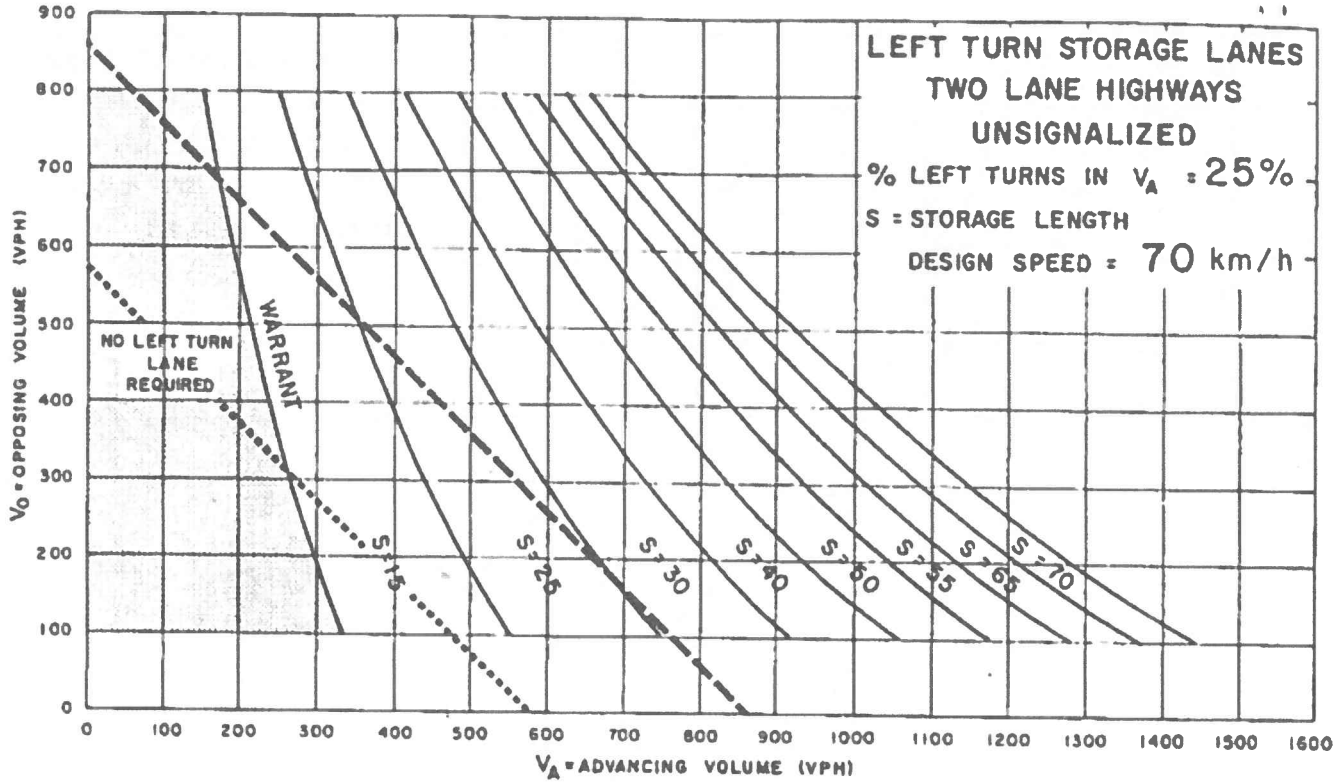


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

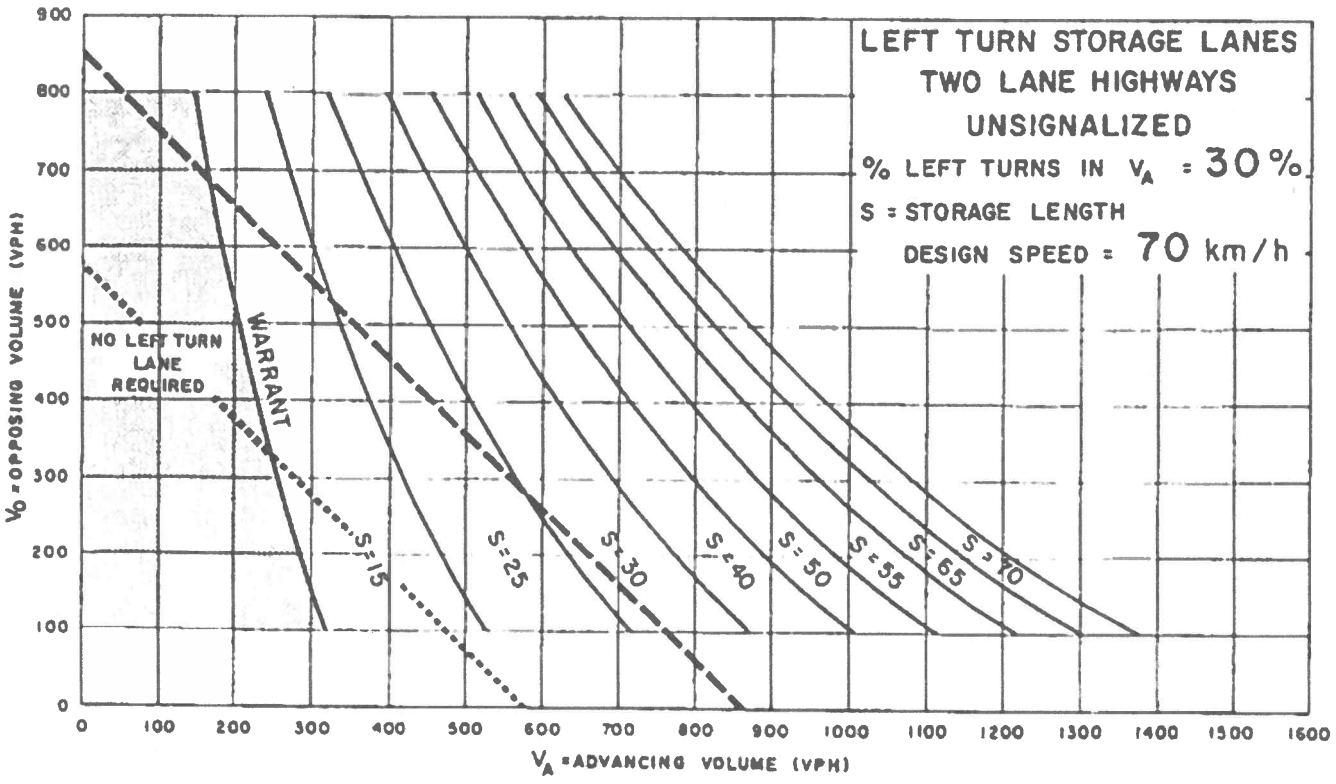
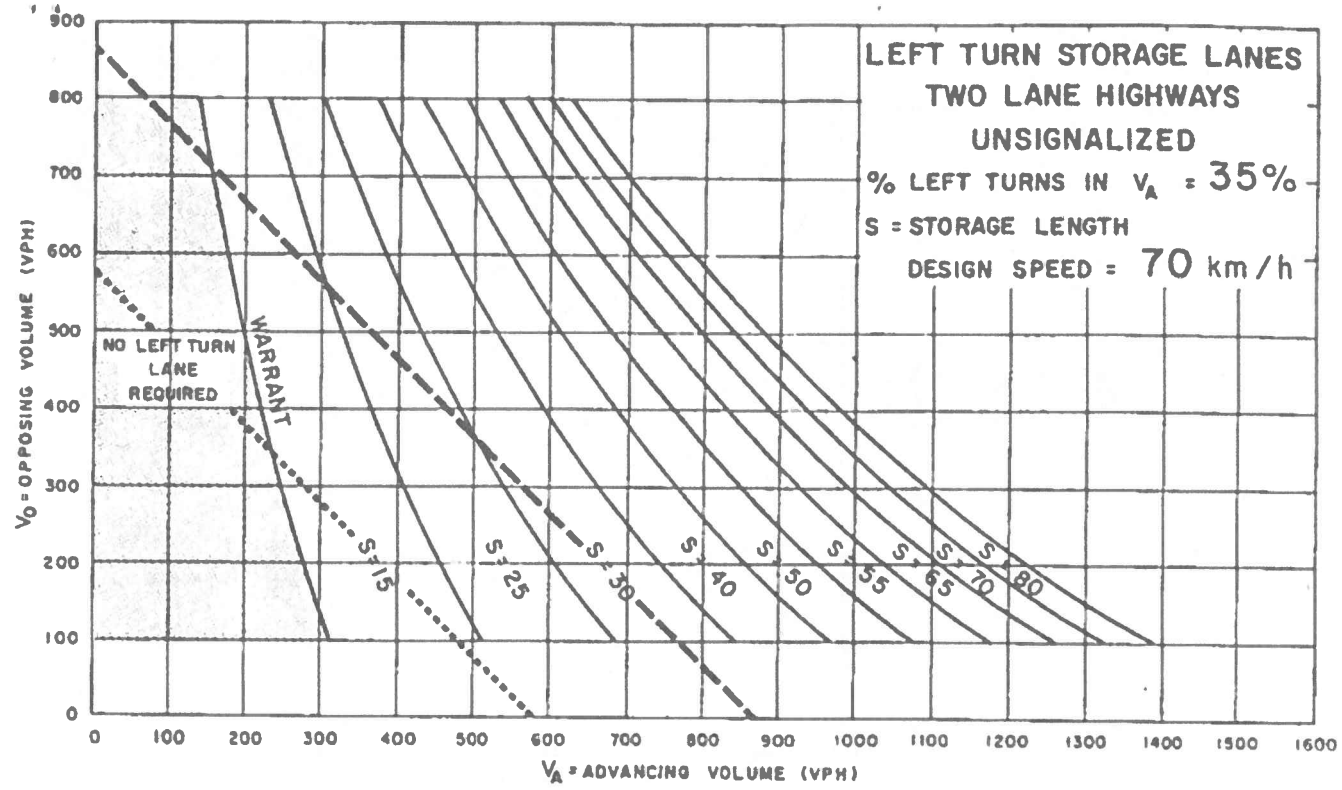
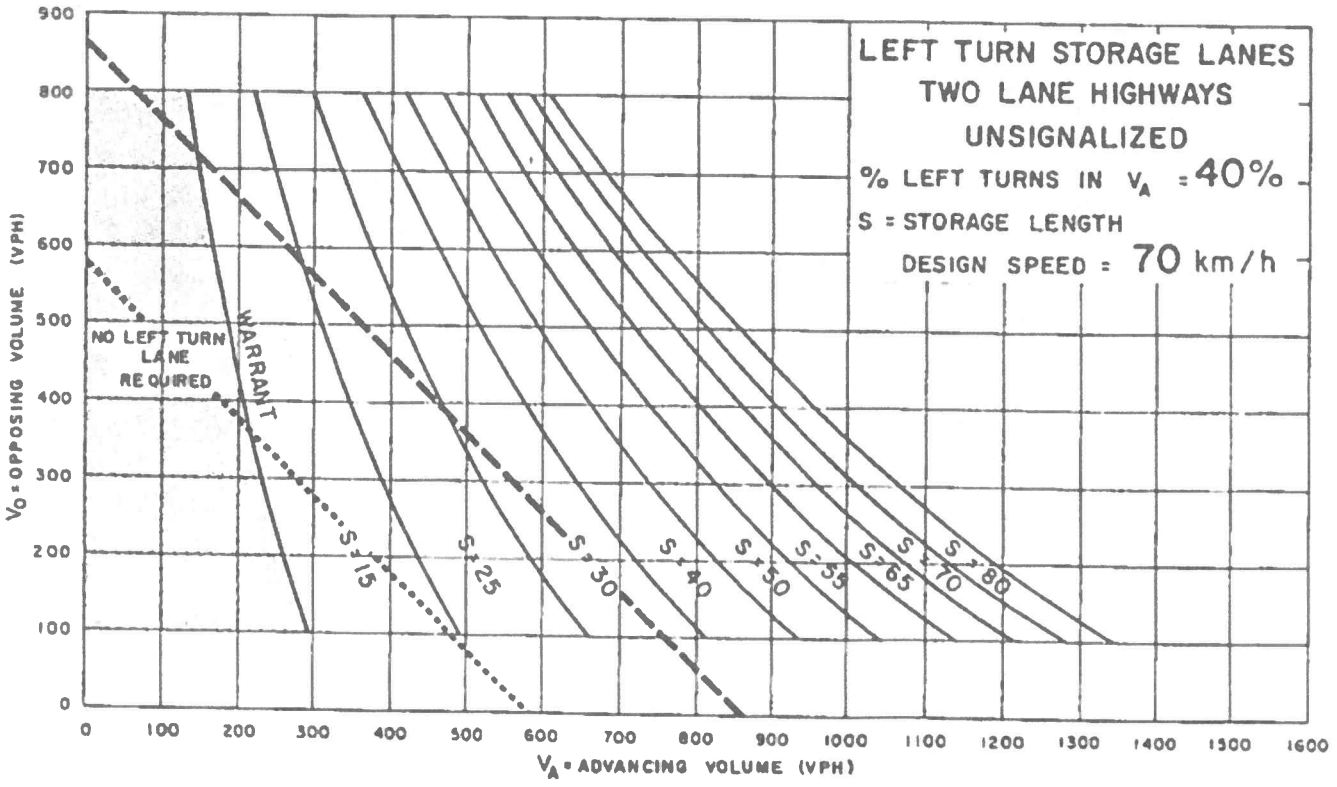


Figure EA-12



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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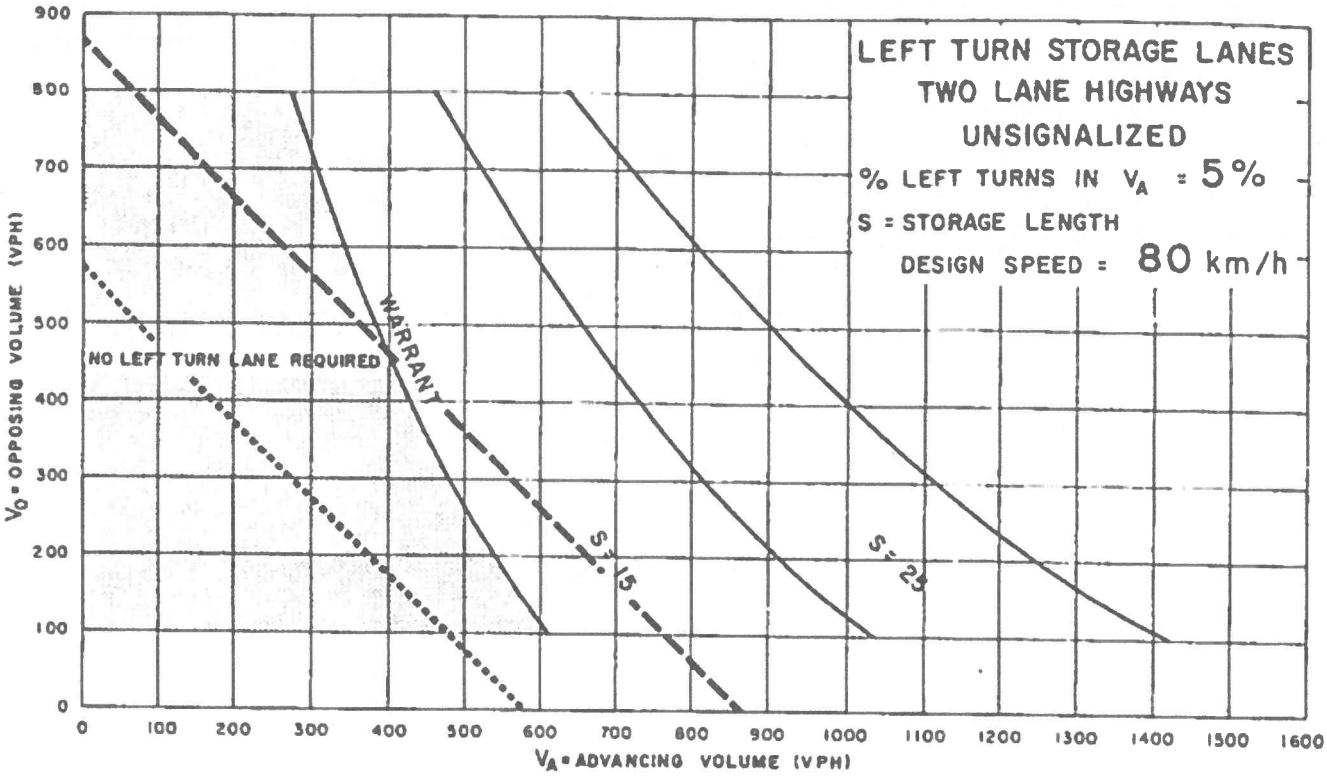
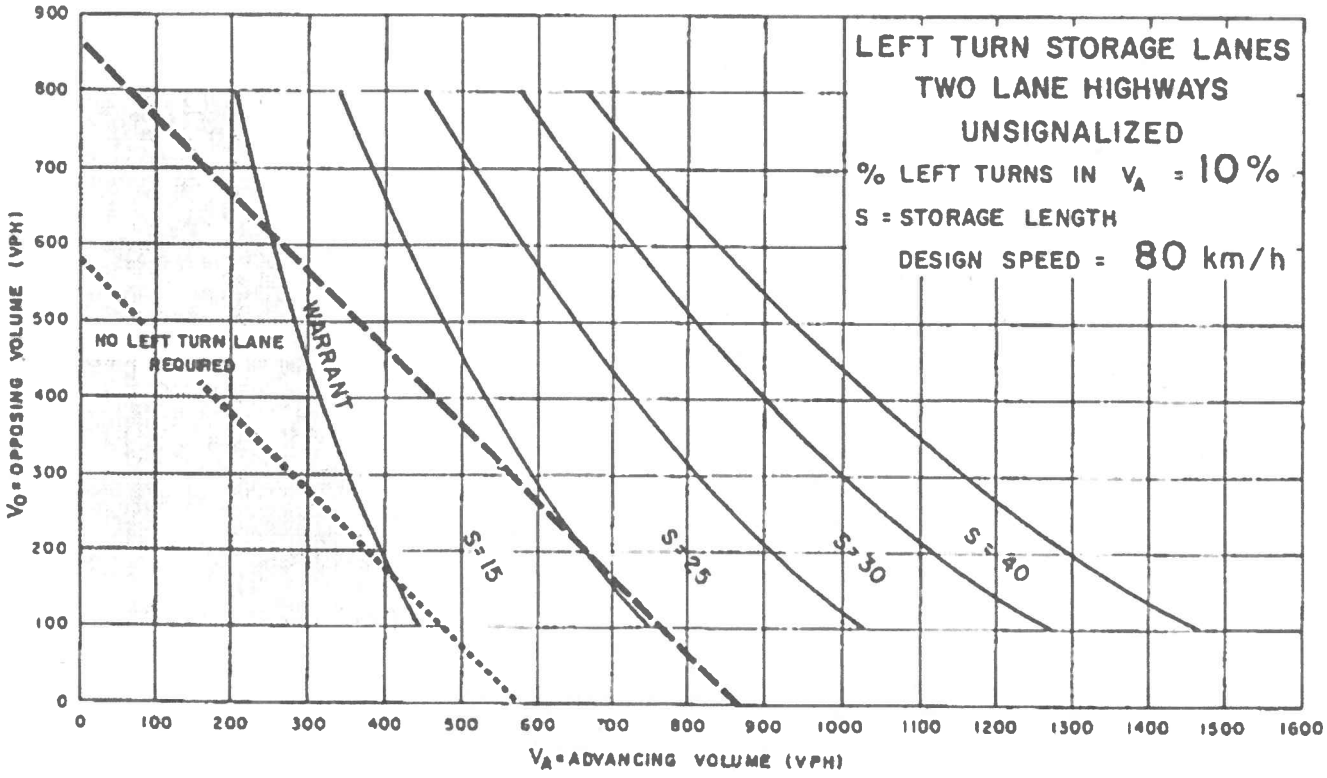


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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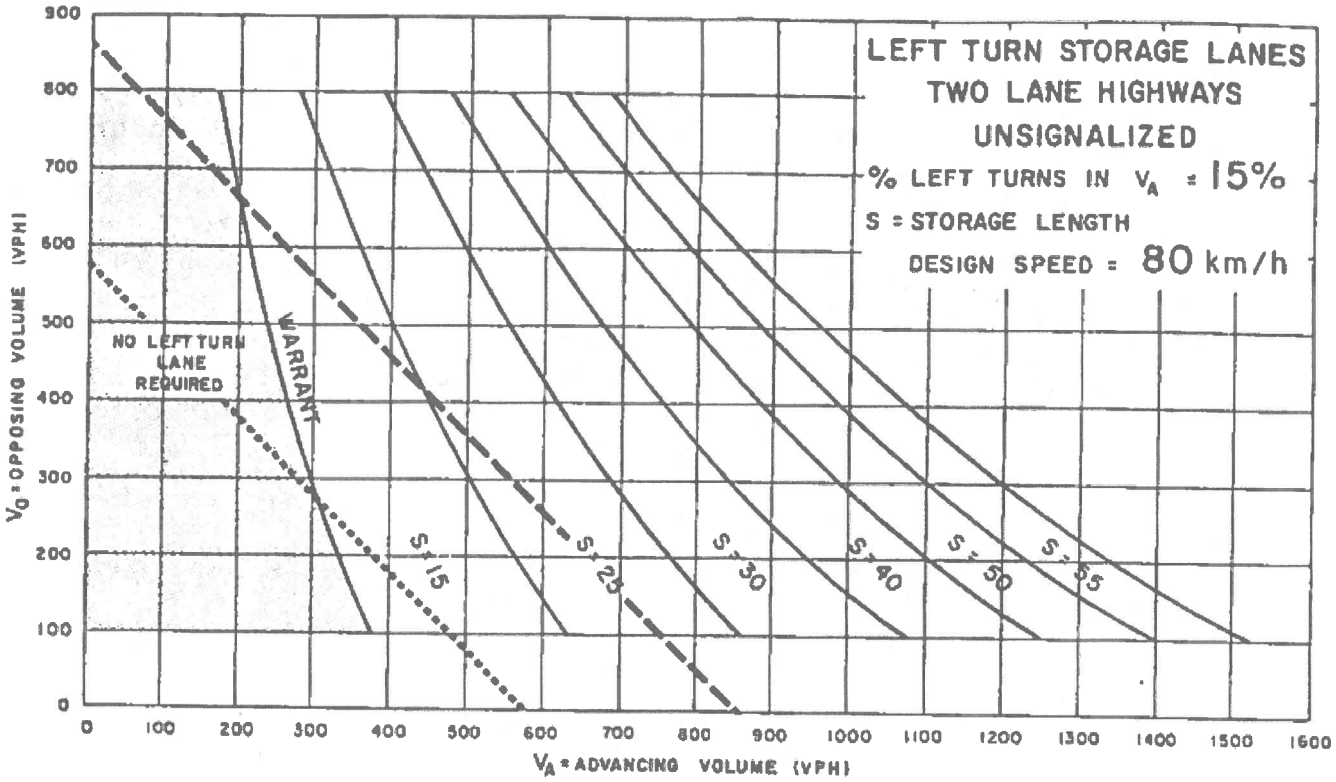
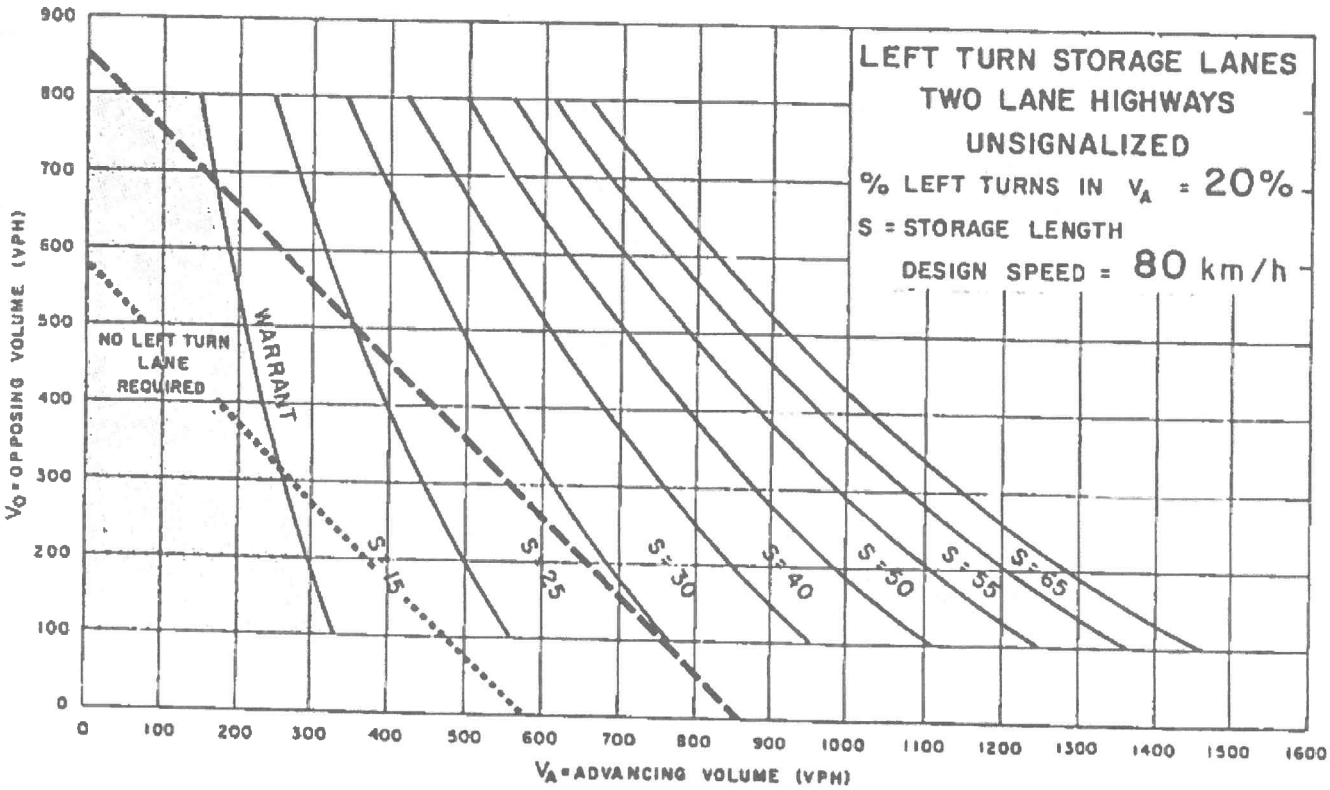


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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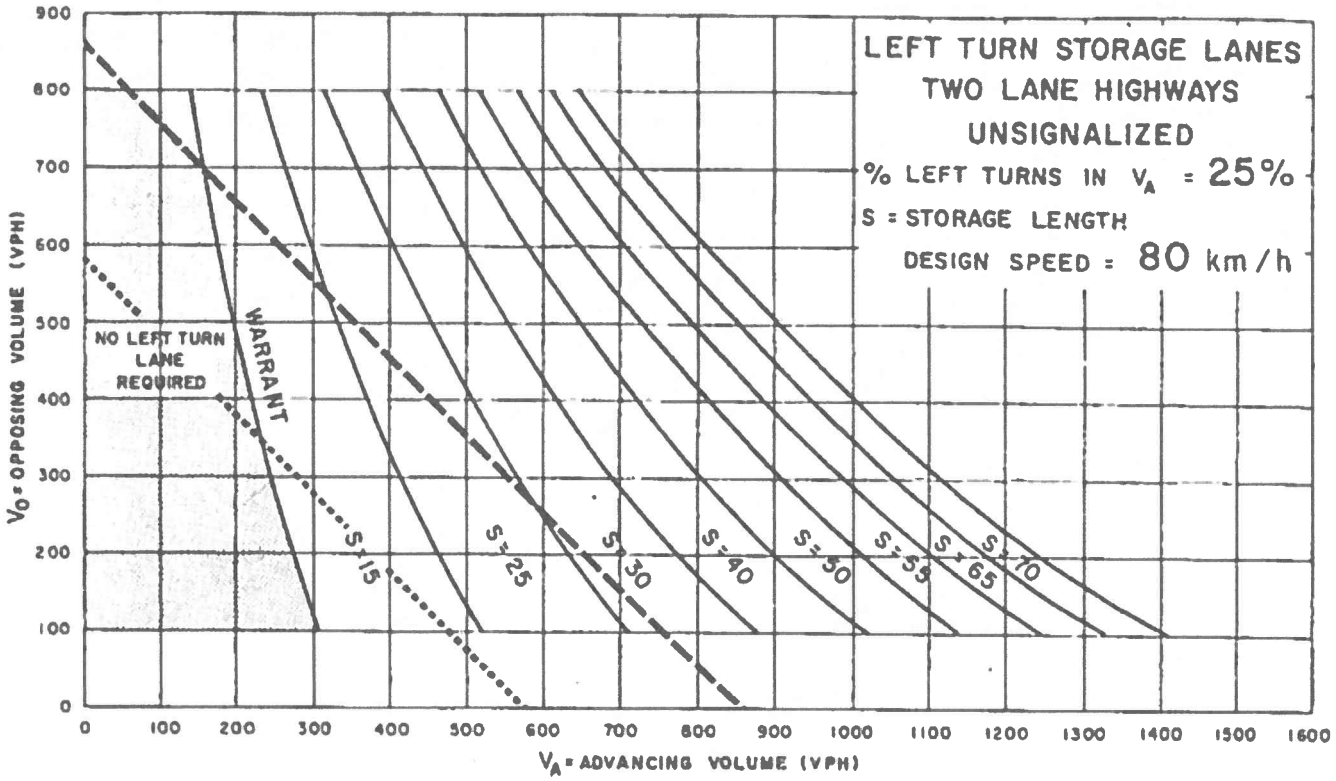
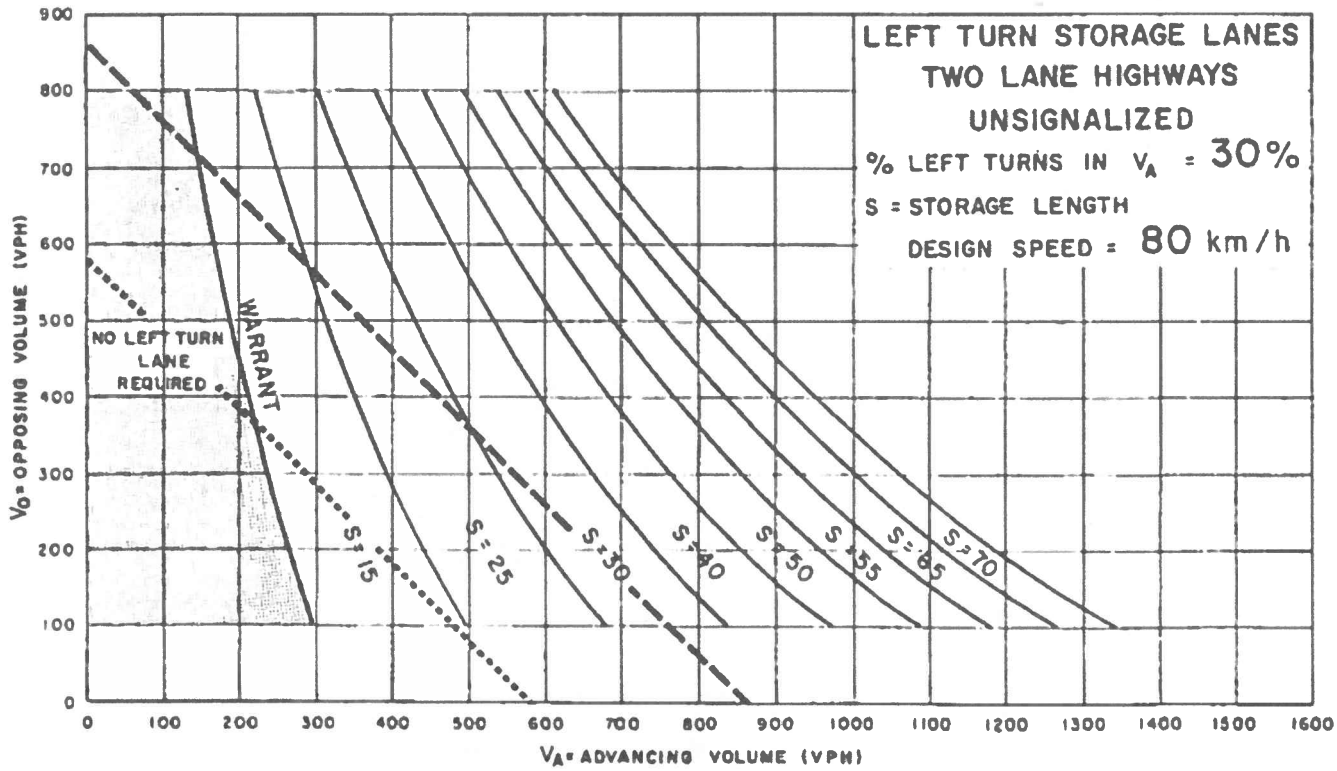


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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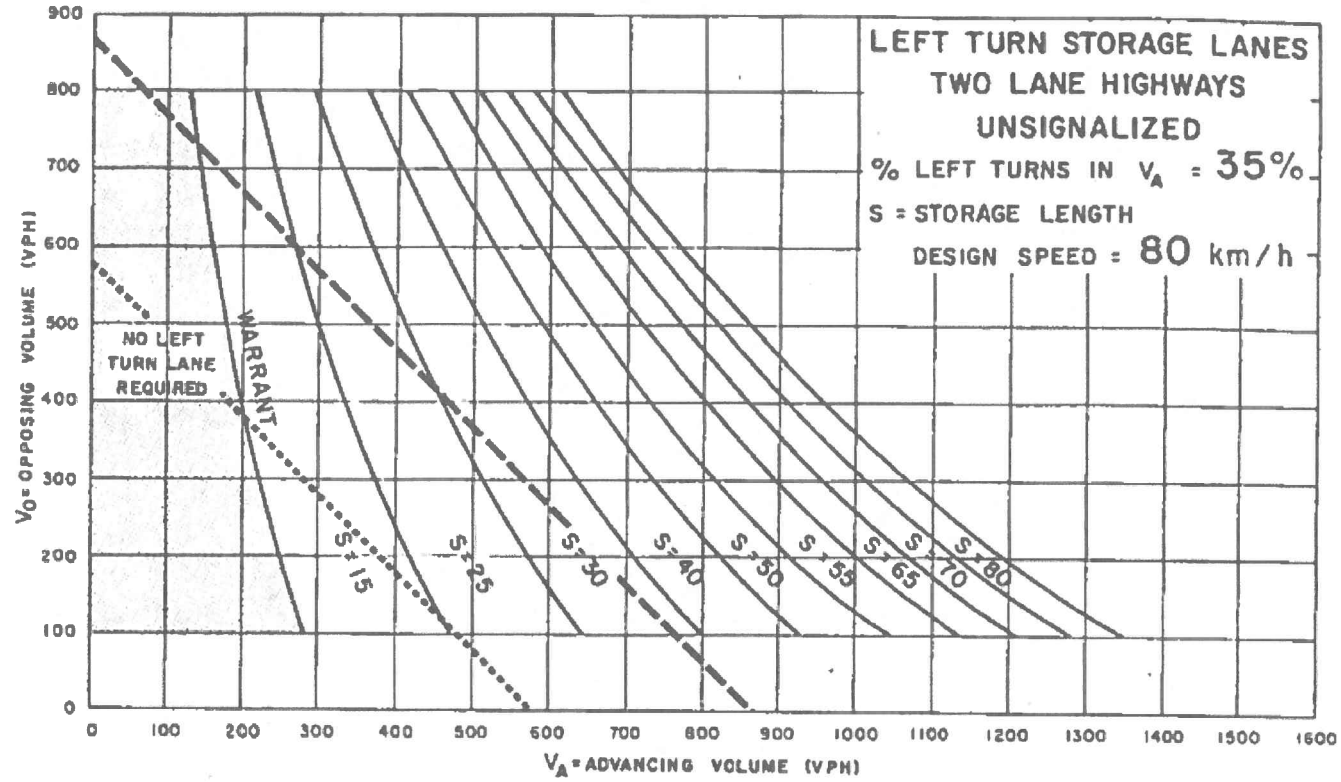
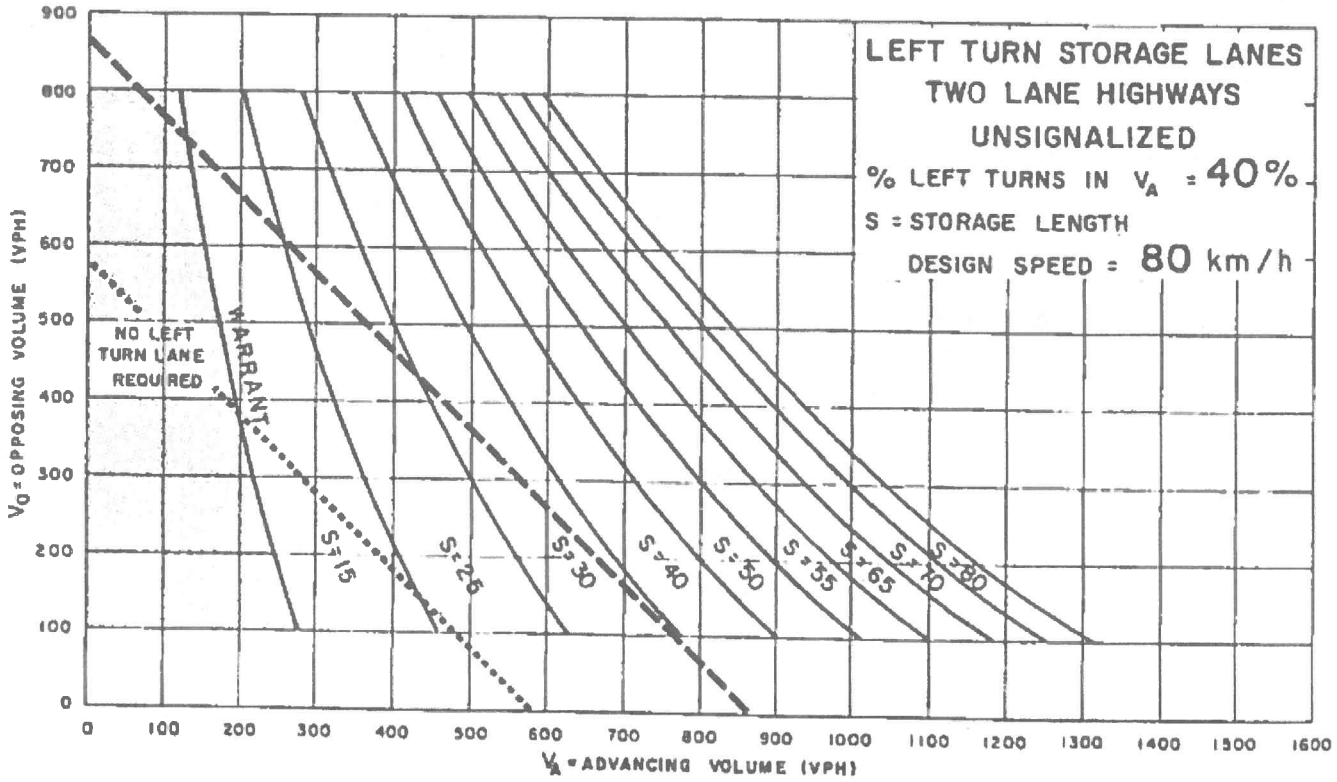


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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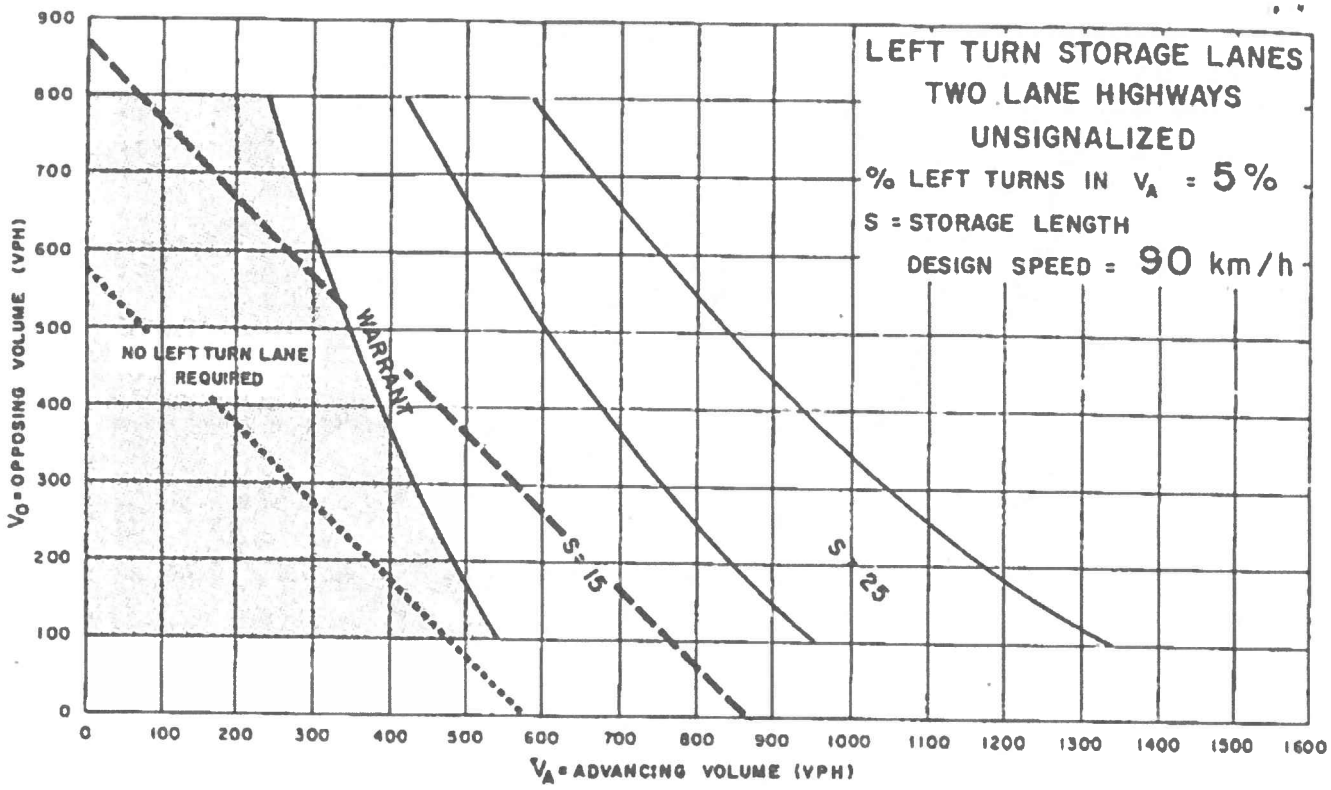
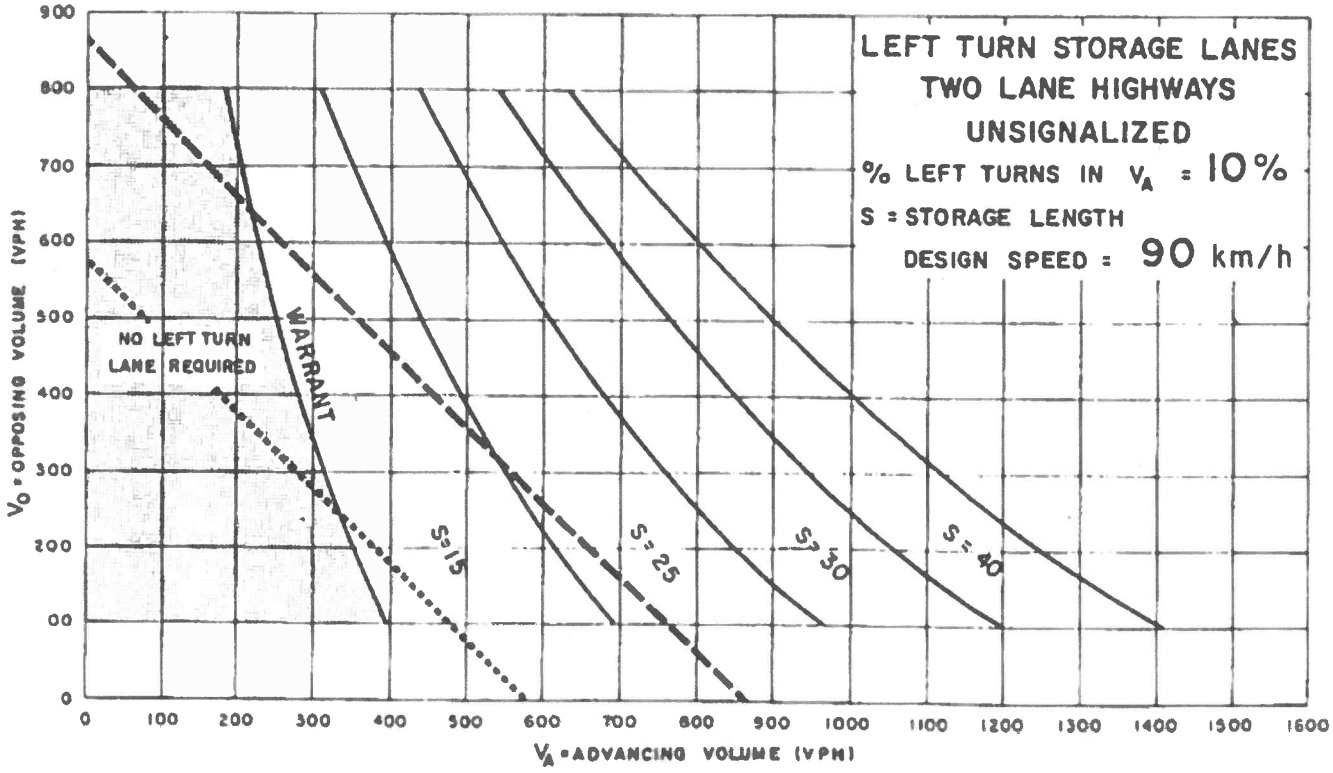


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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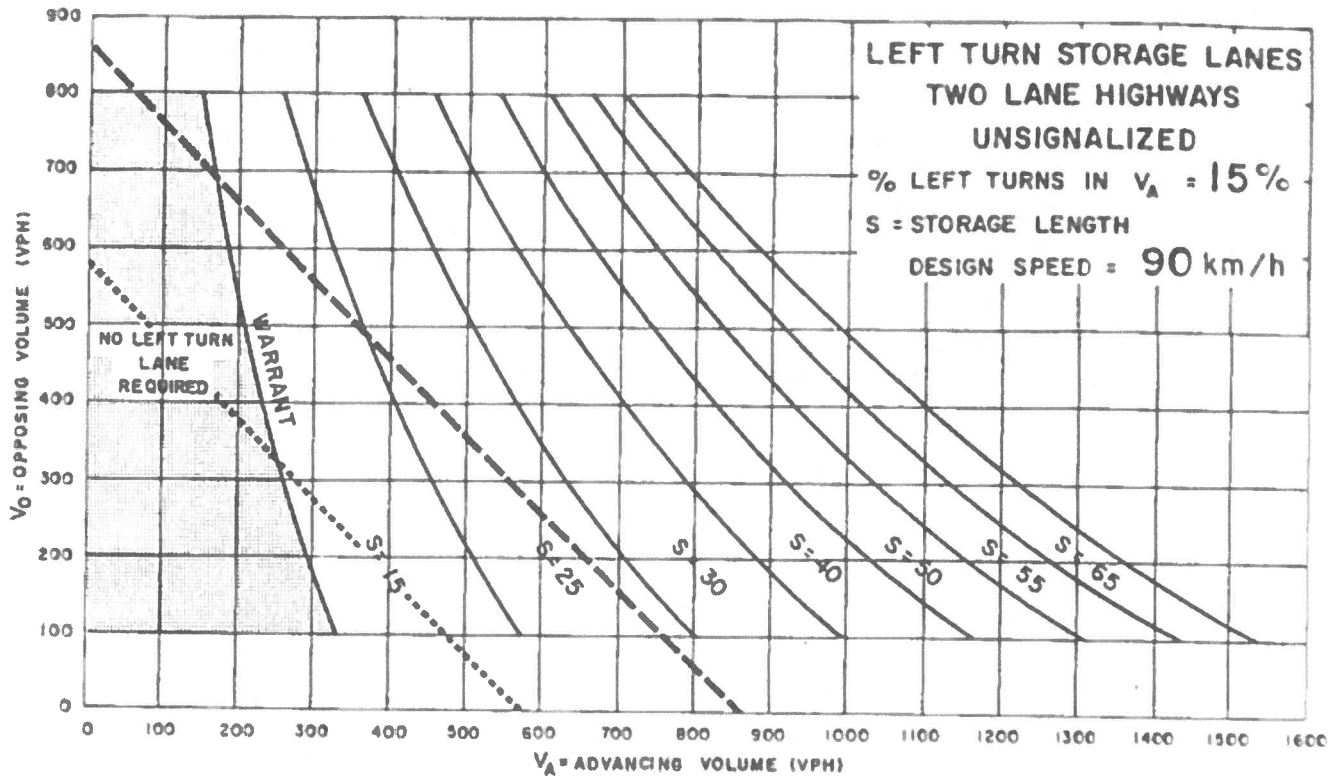
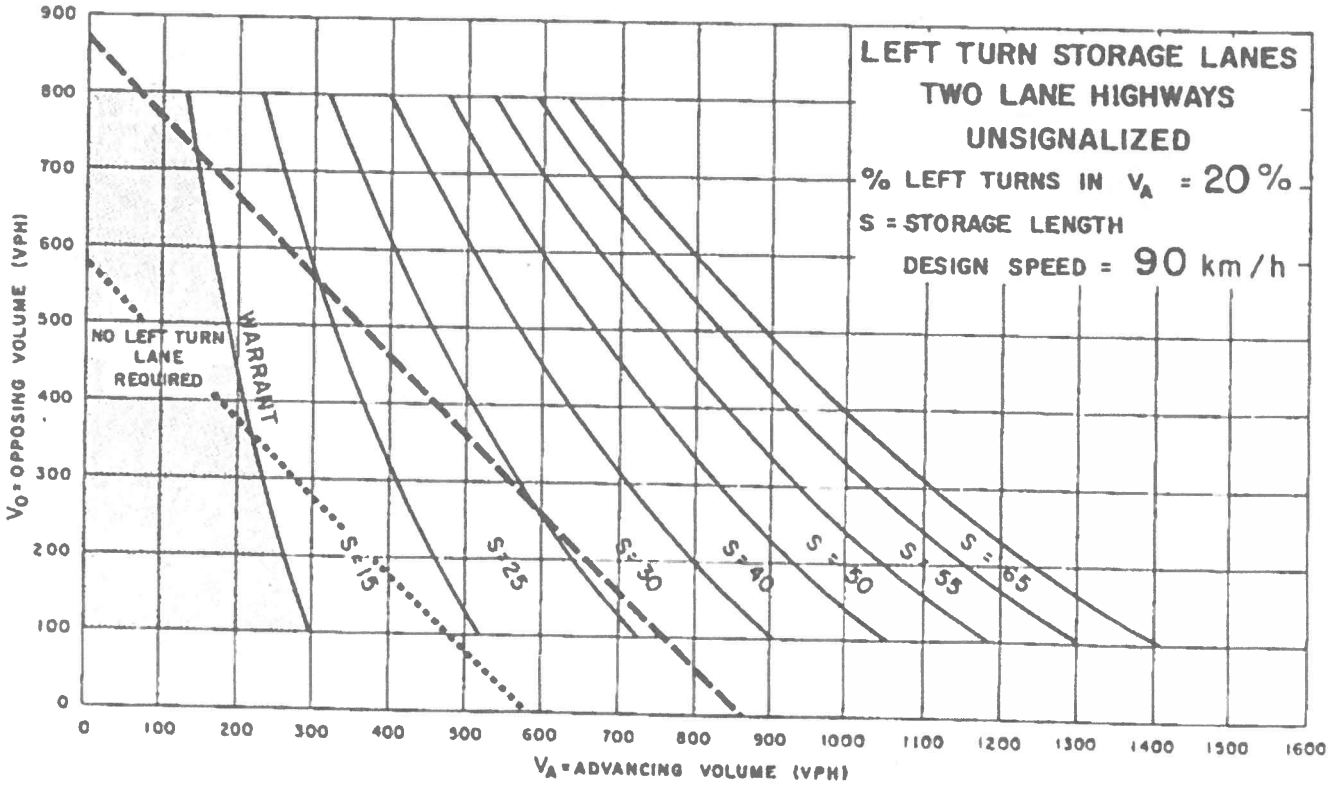


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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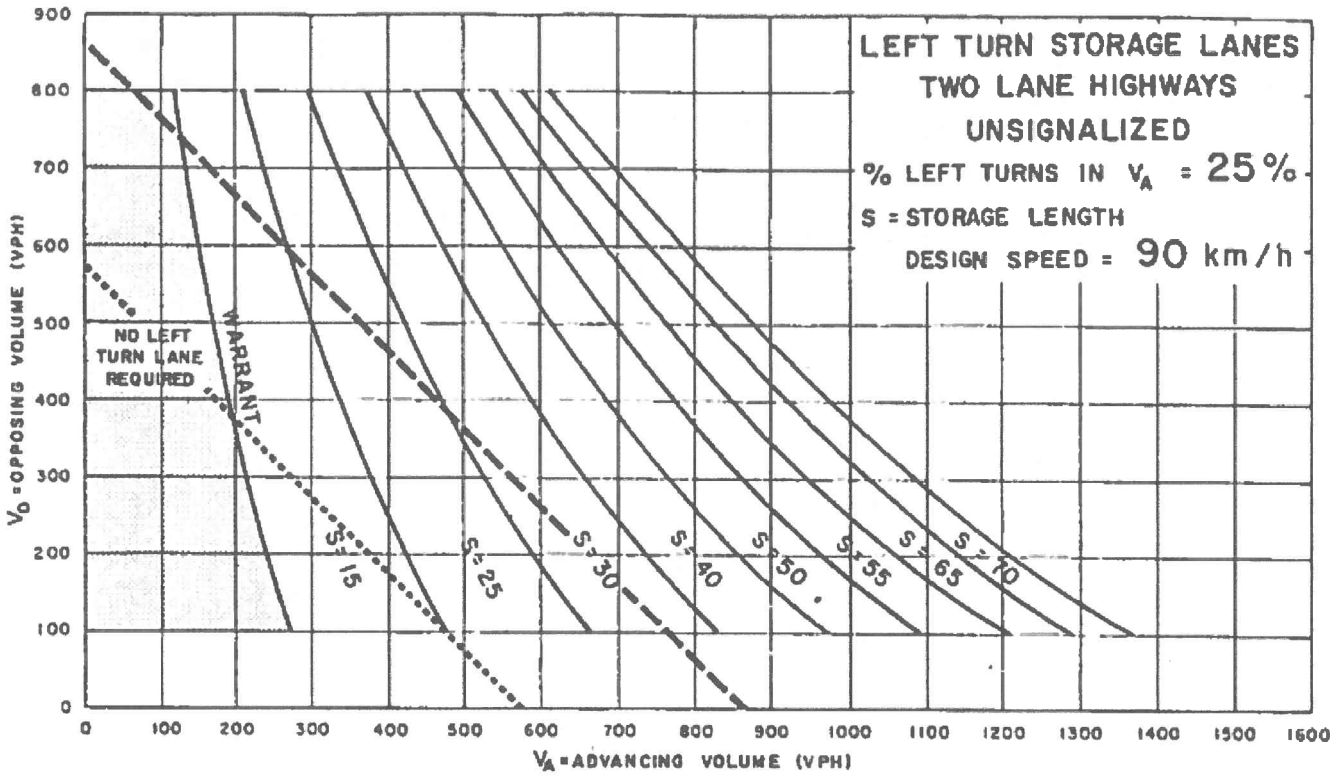
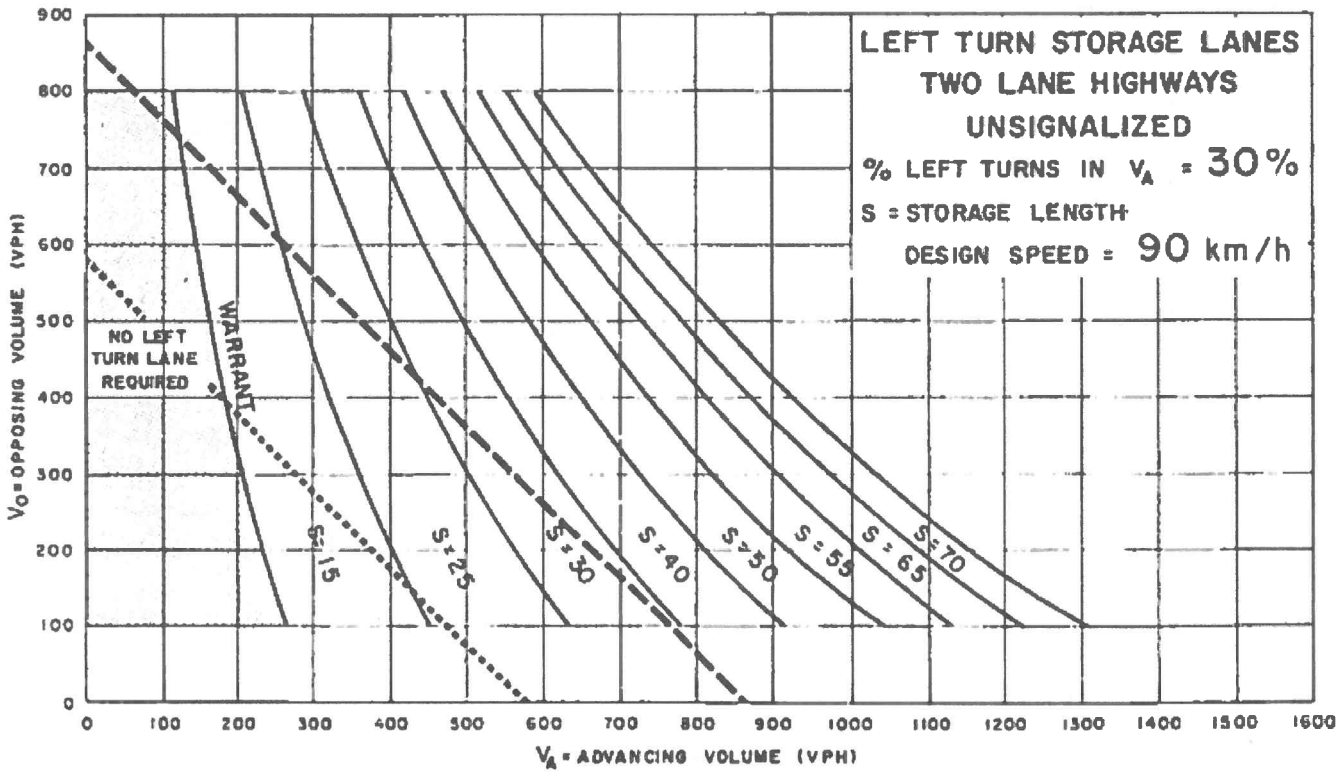


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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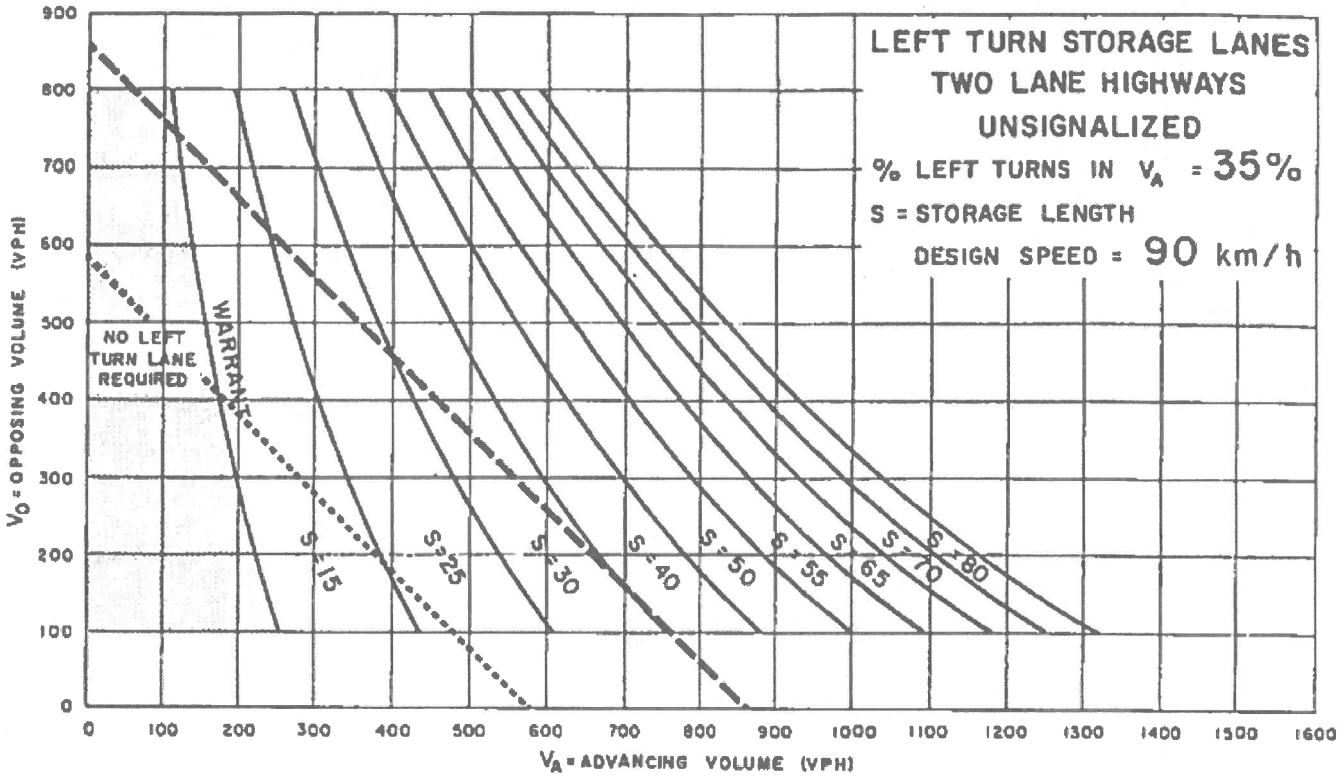
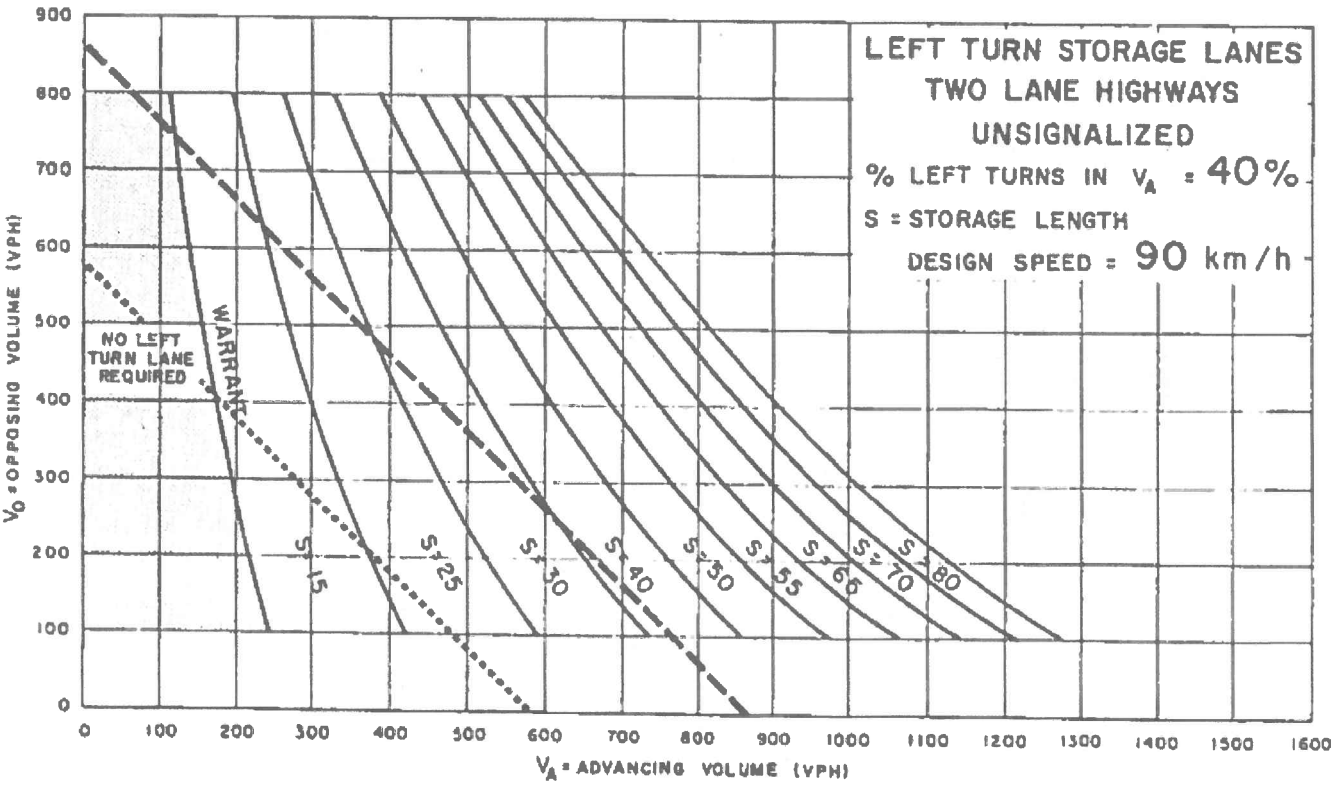


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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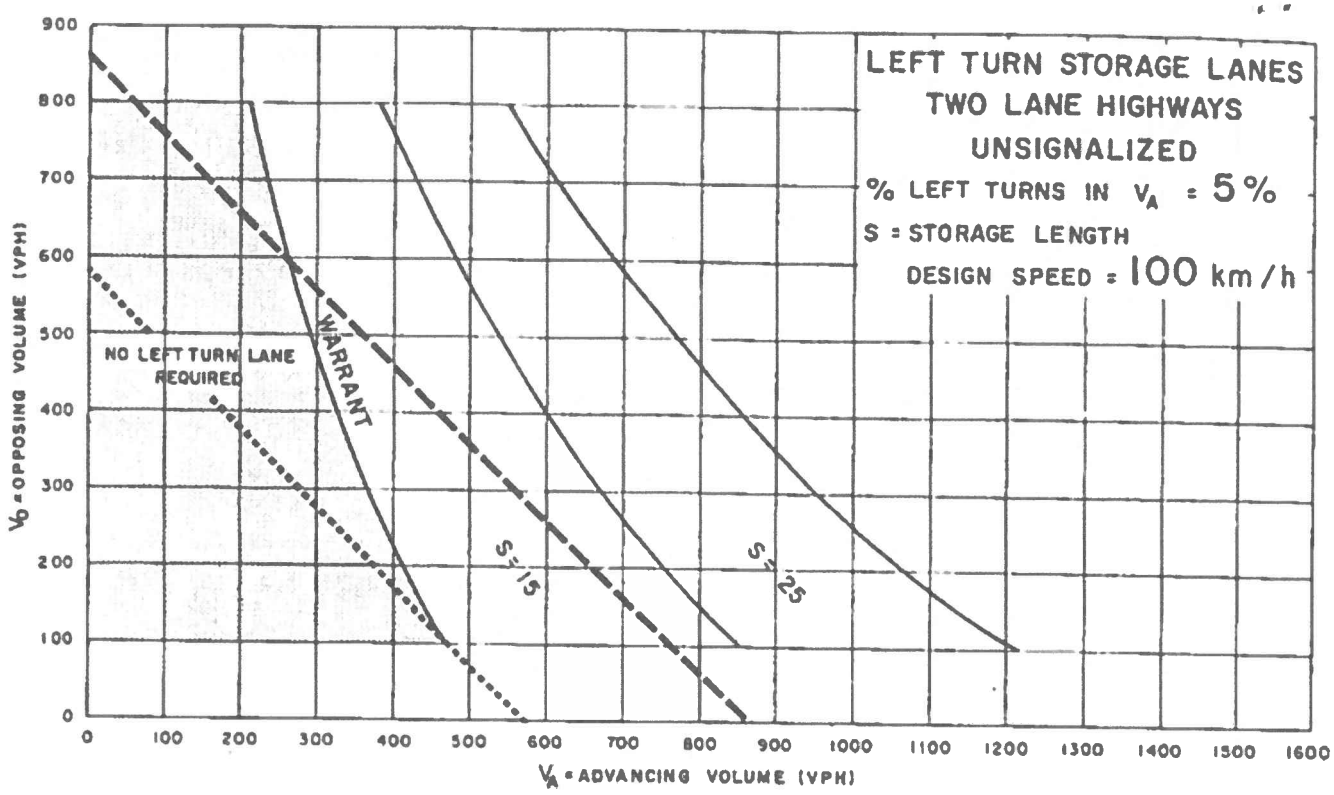
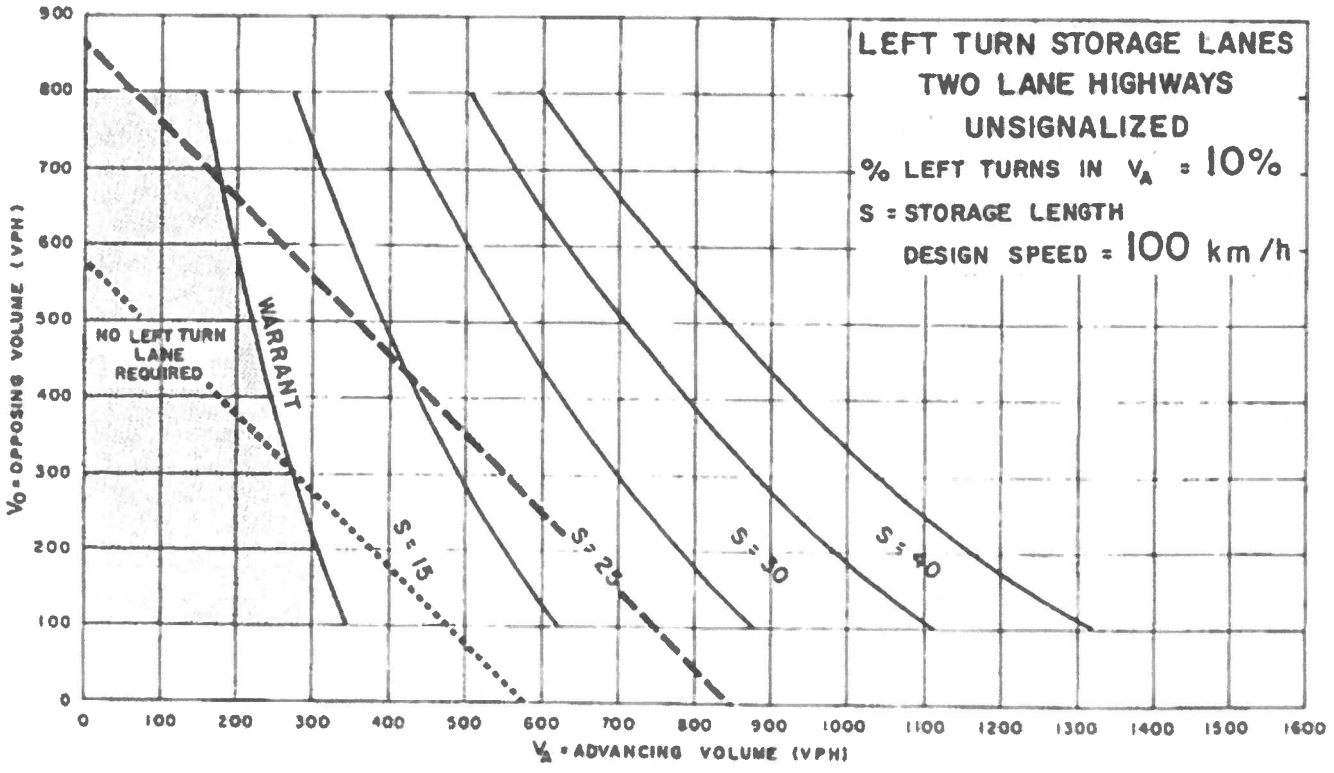


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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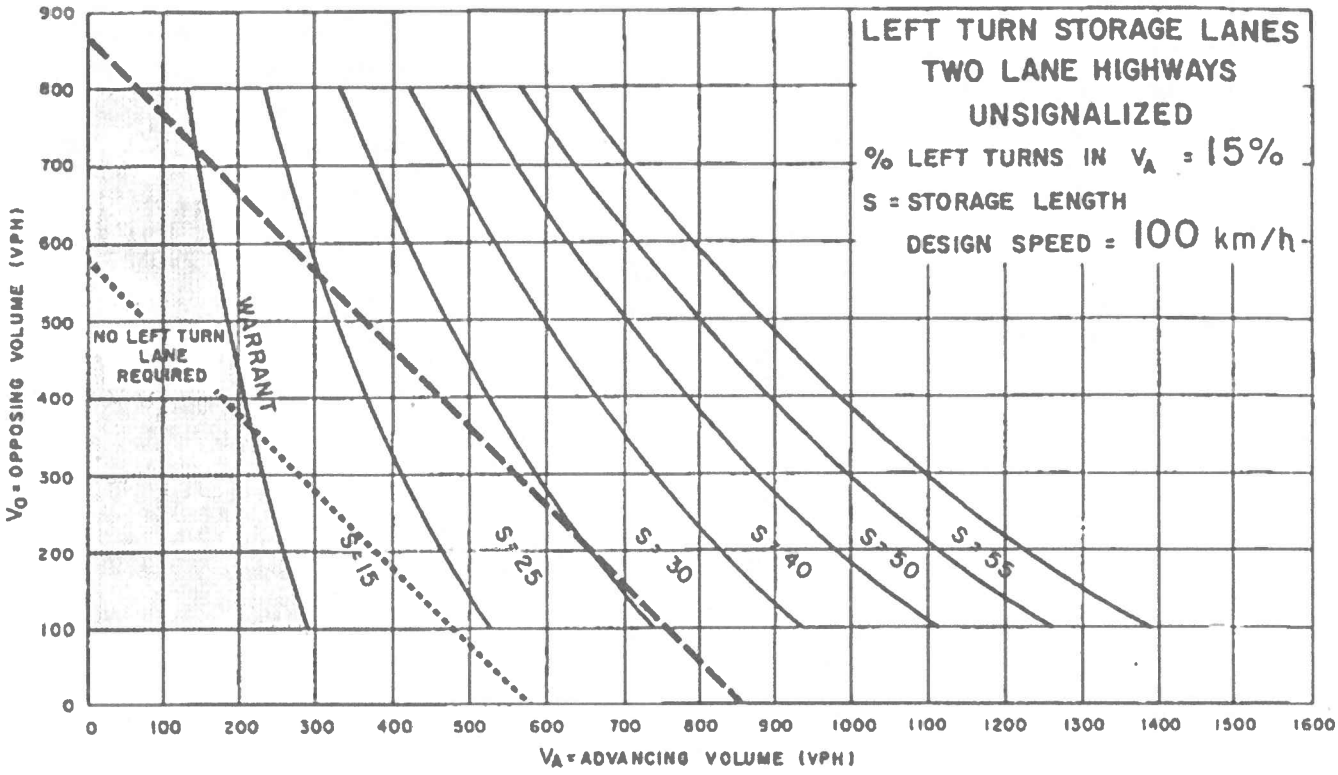
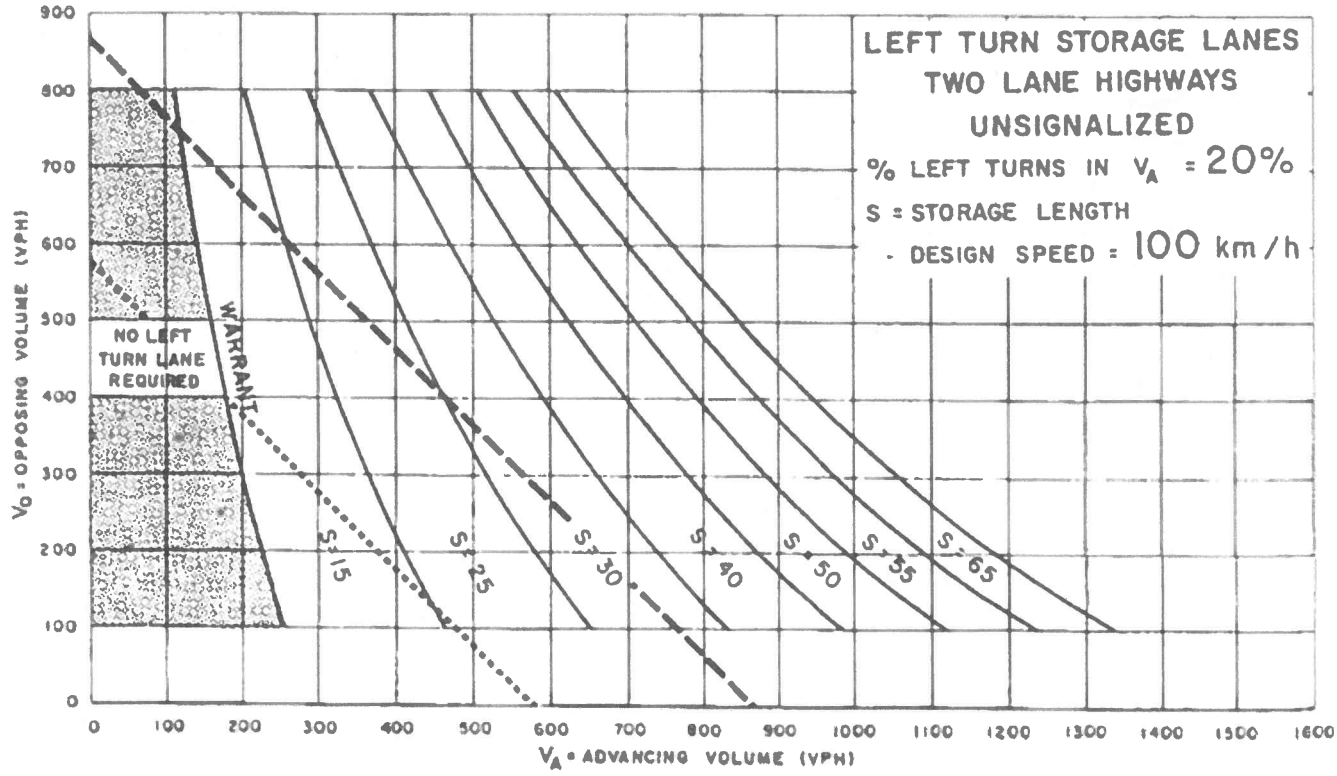


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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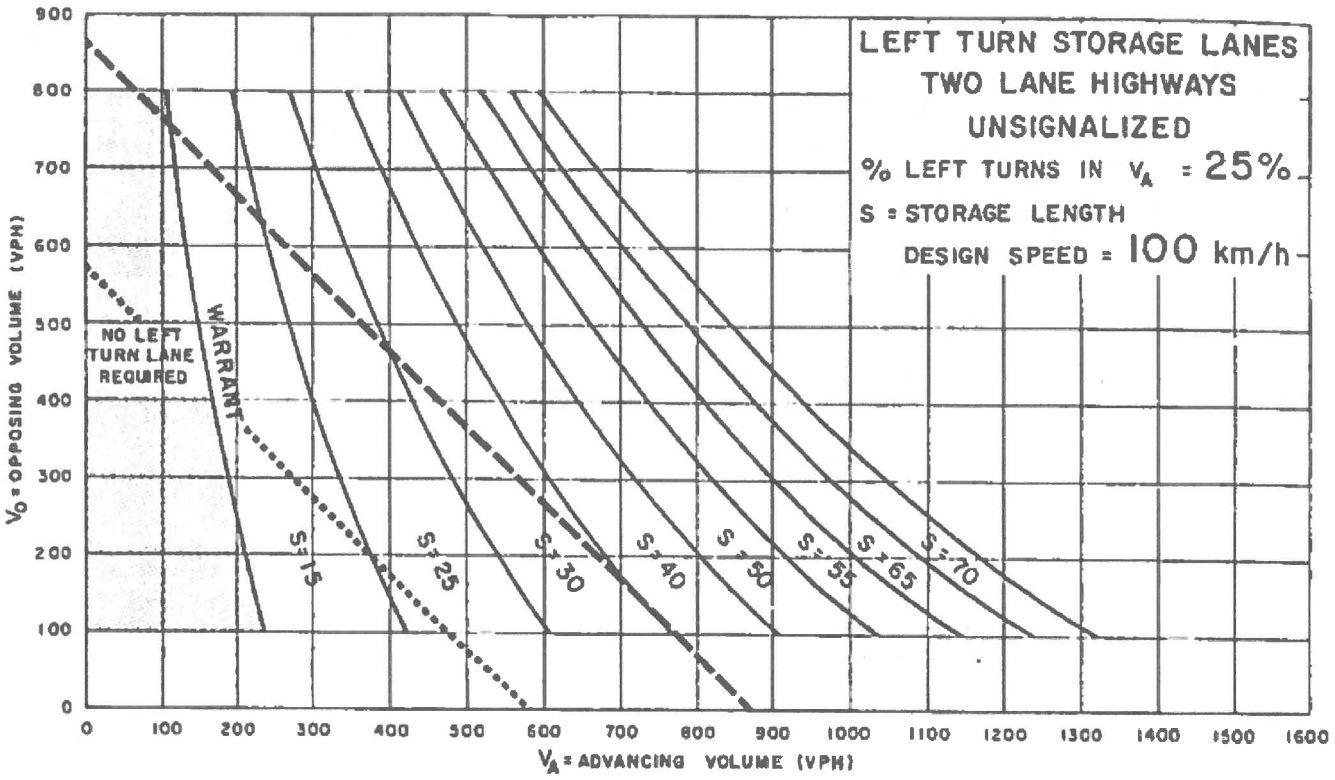
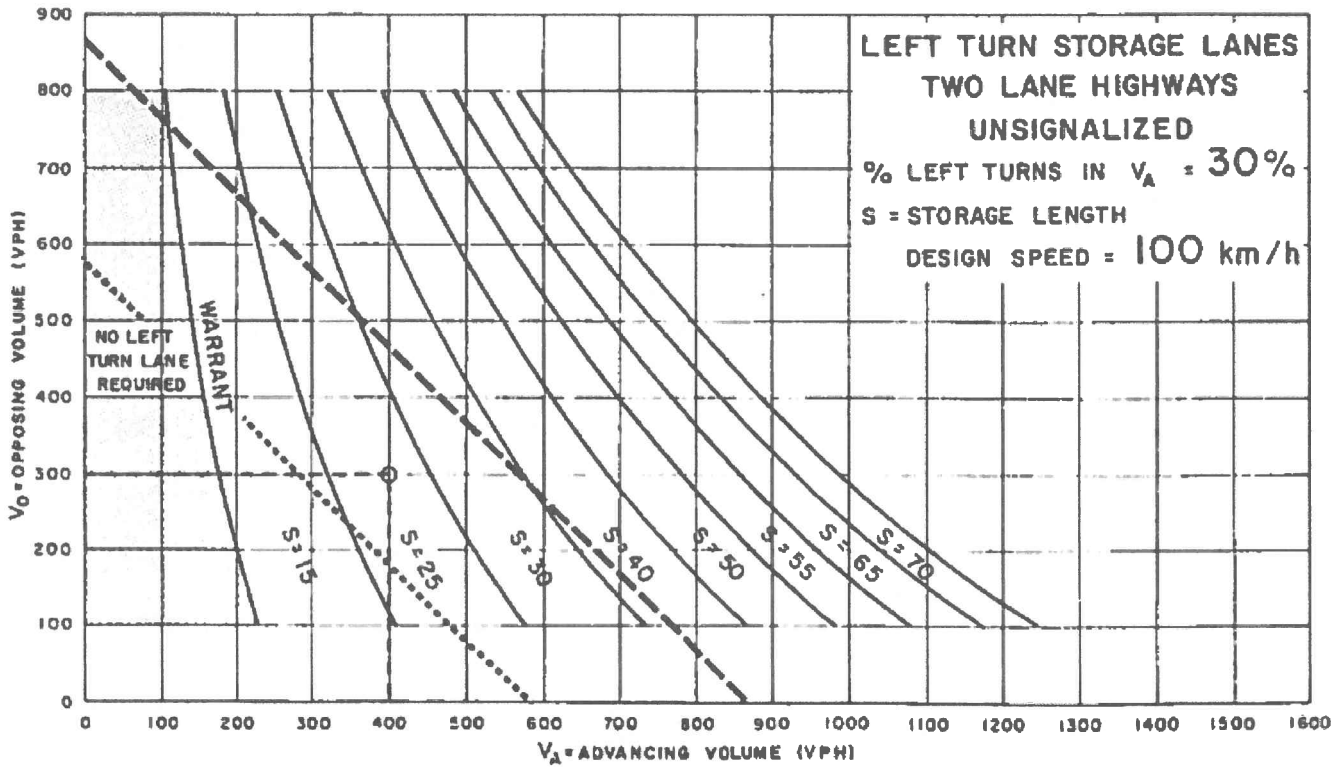


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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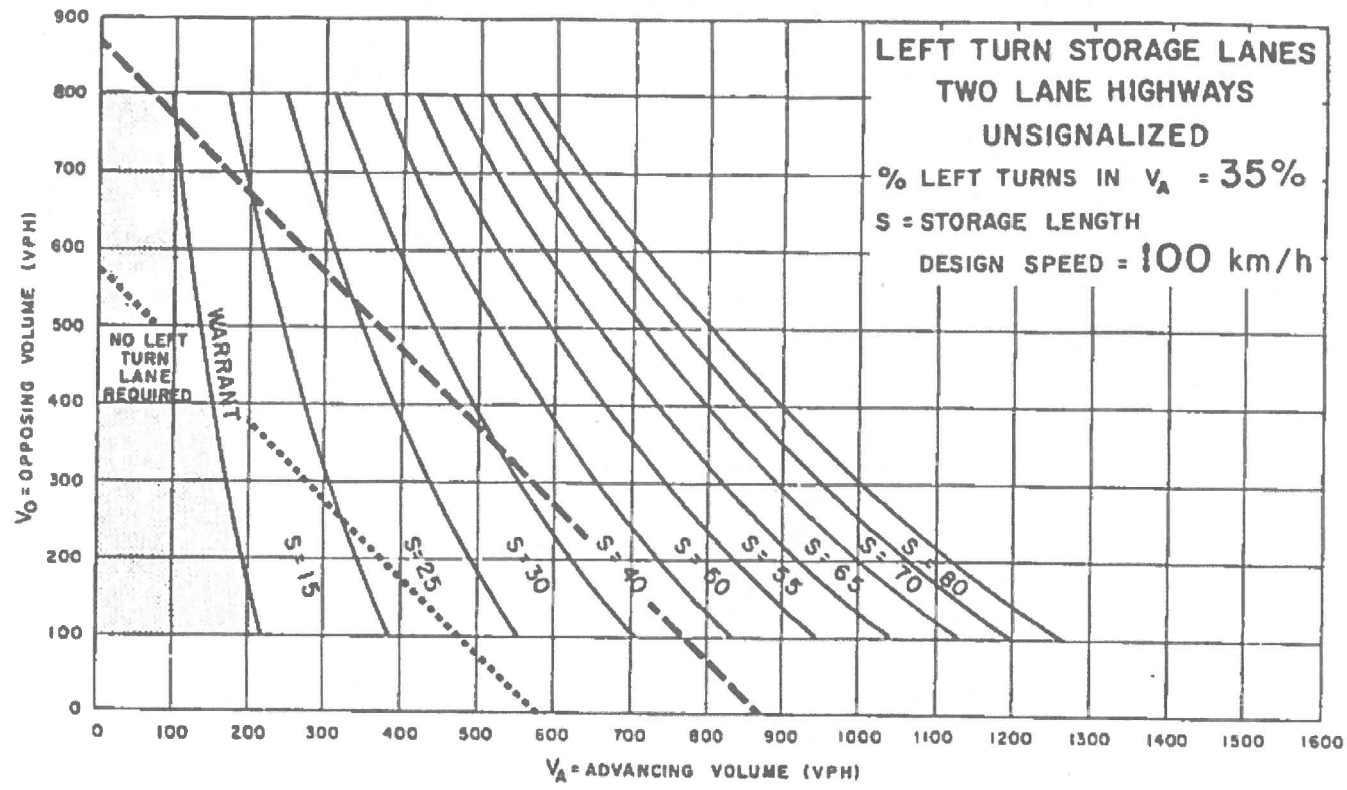
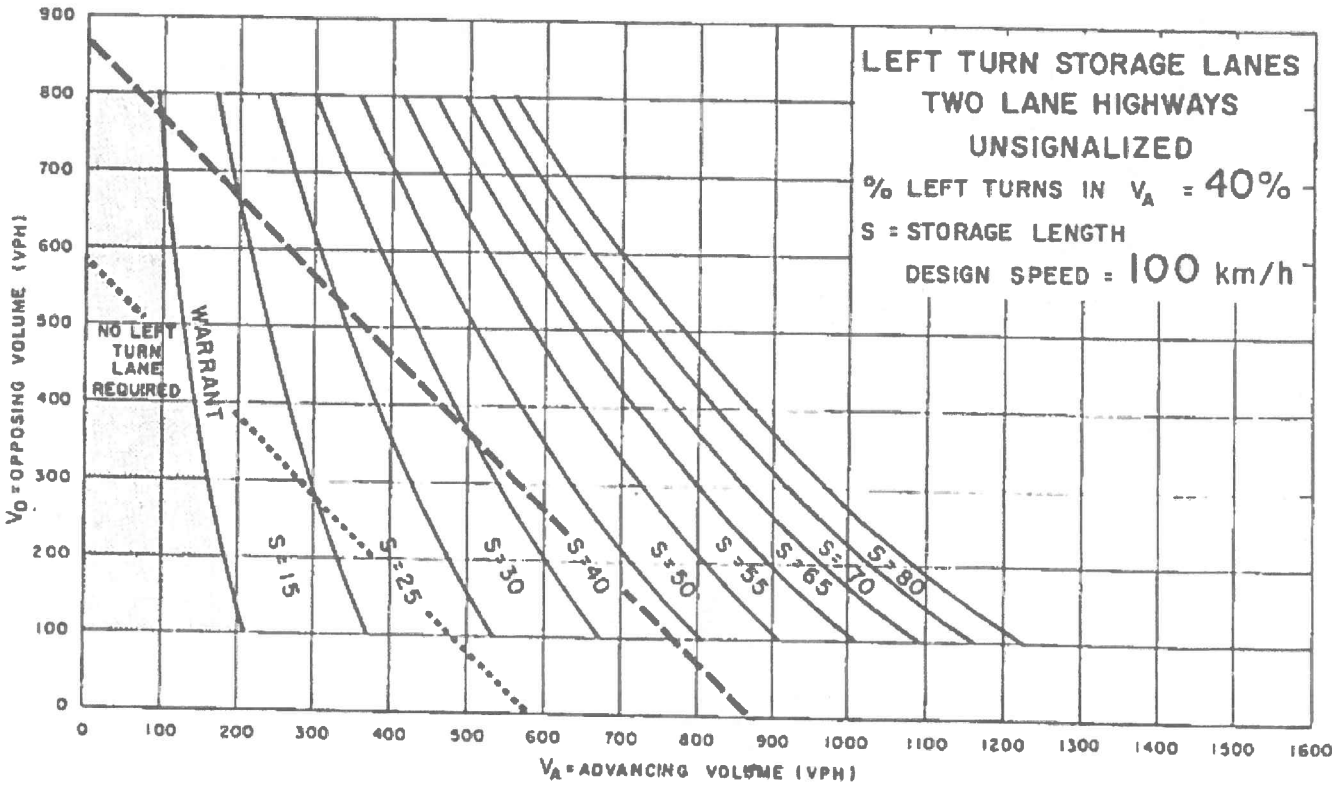


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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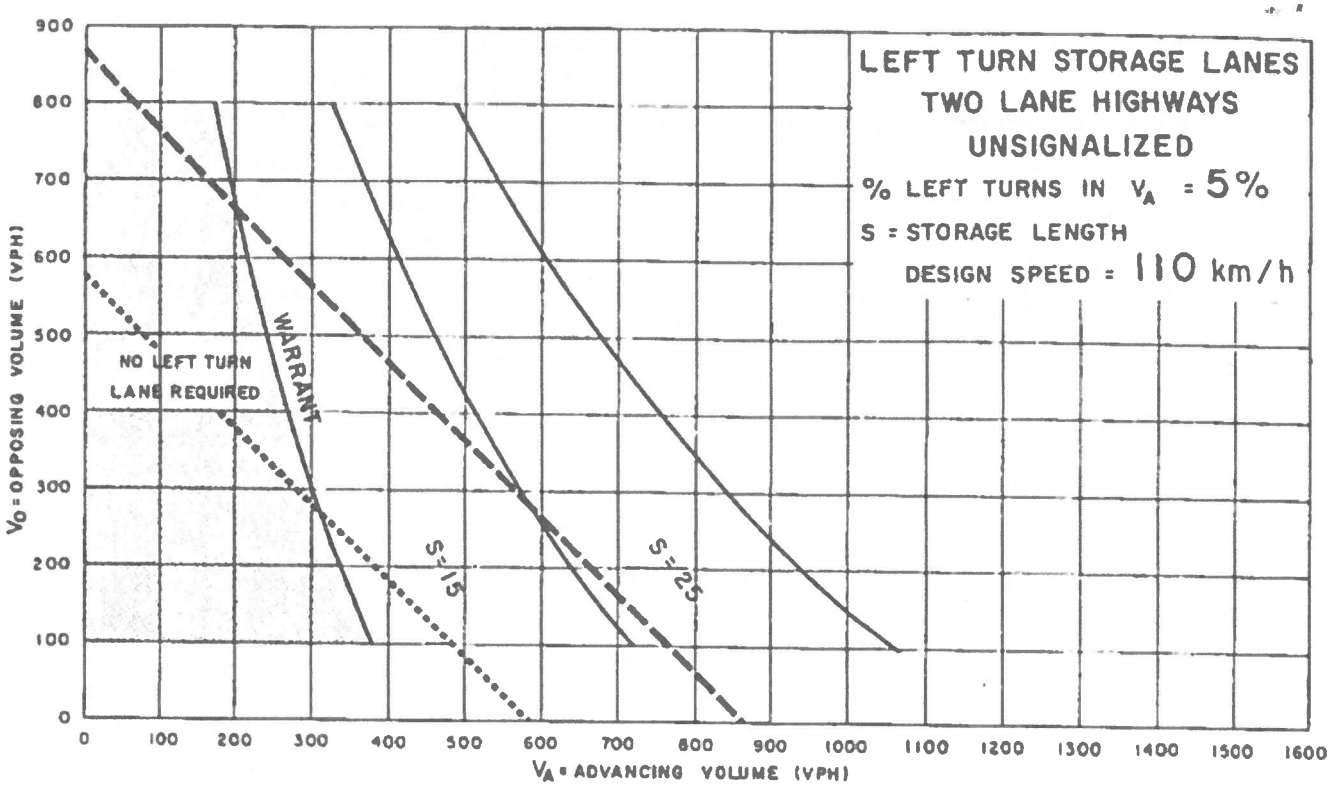
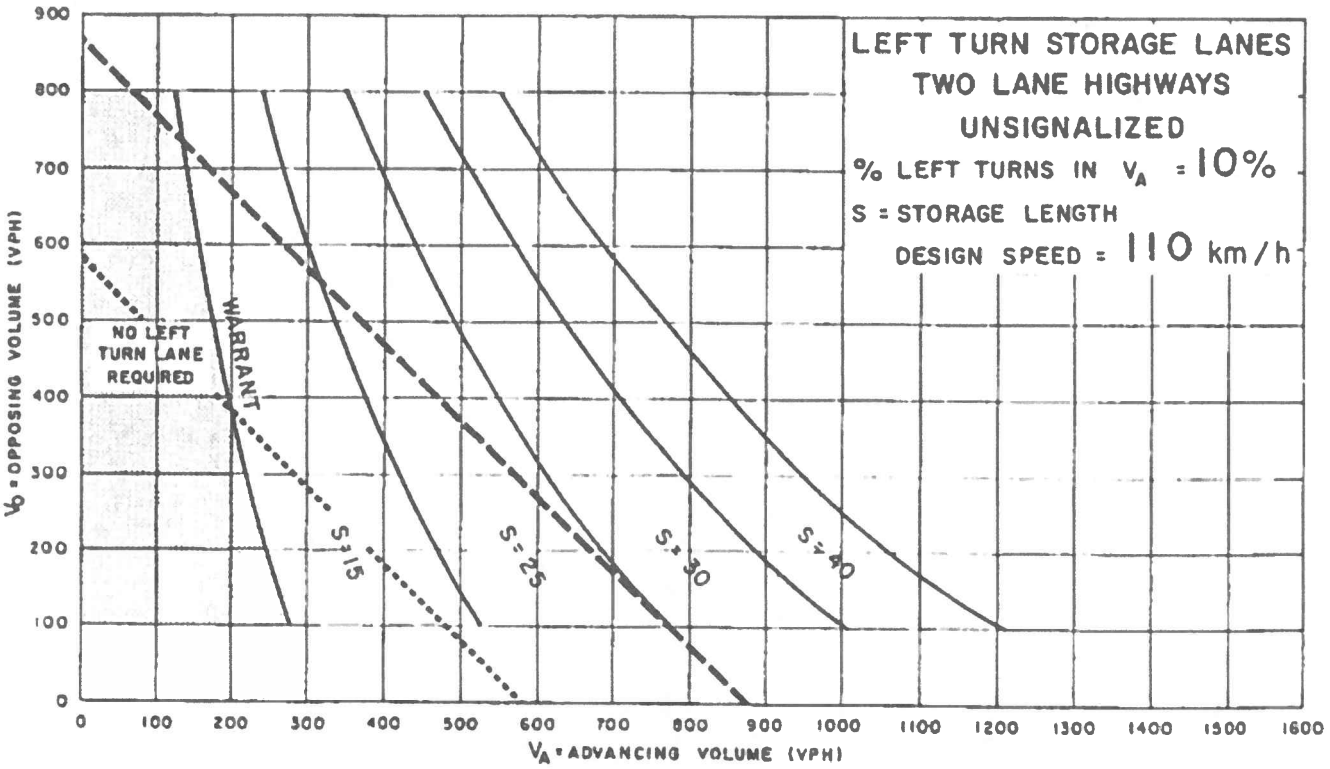


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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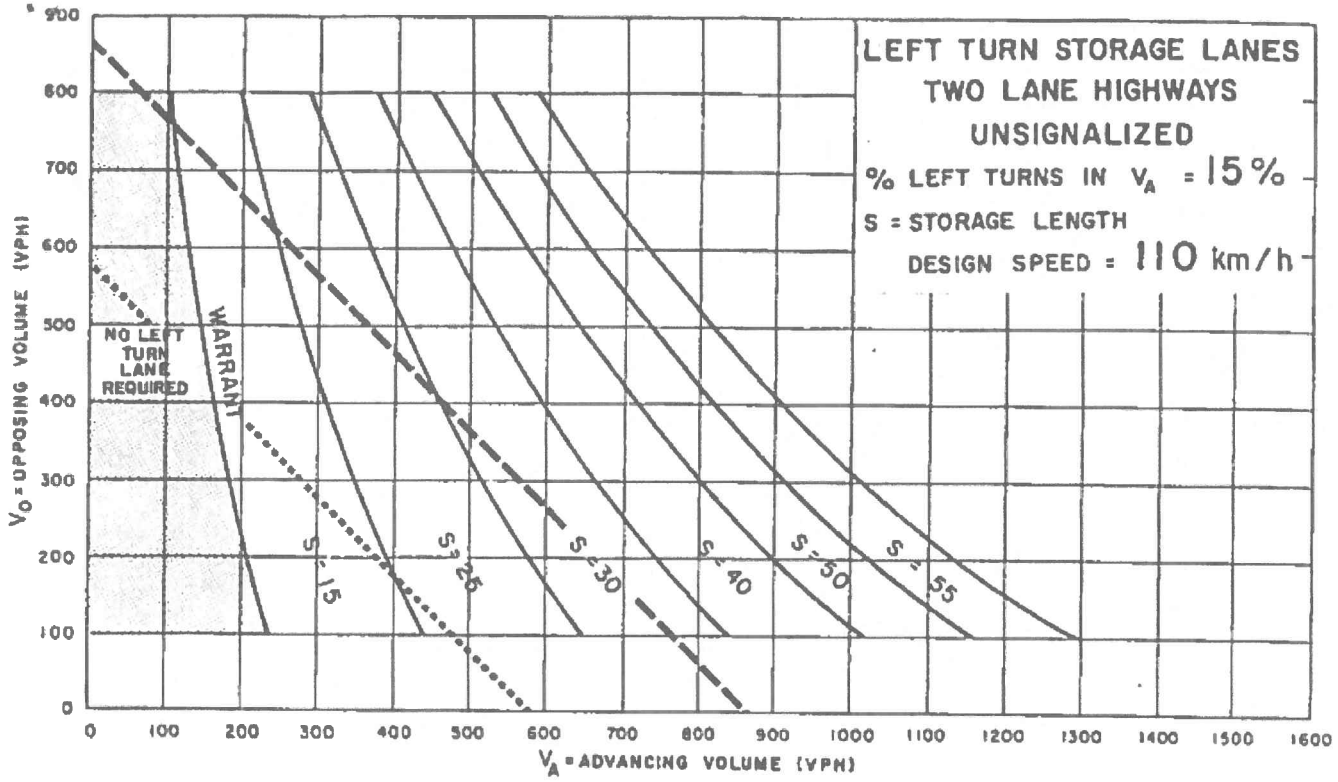
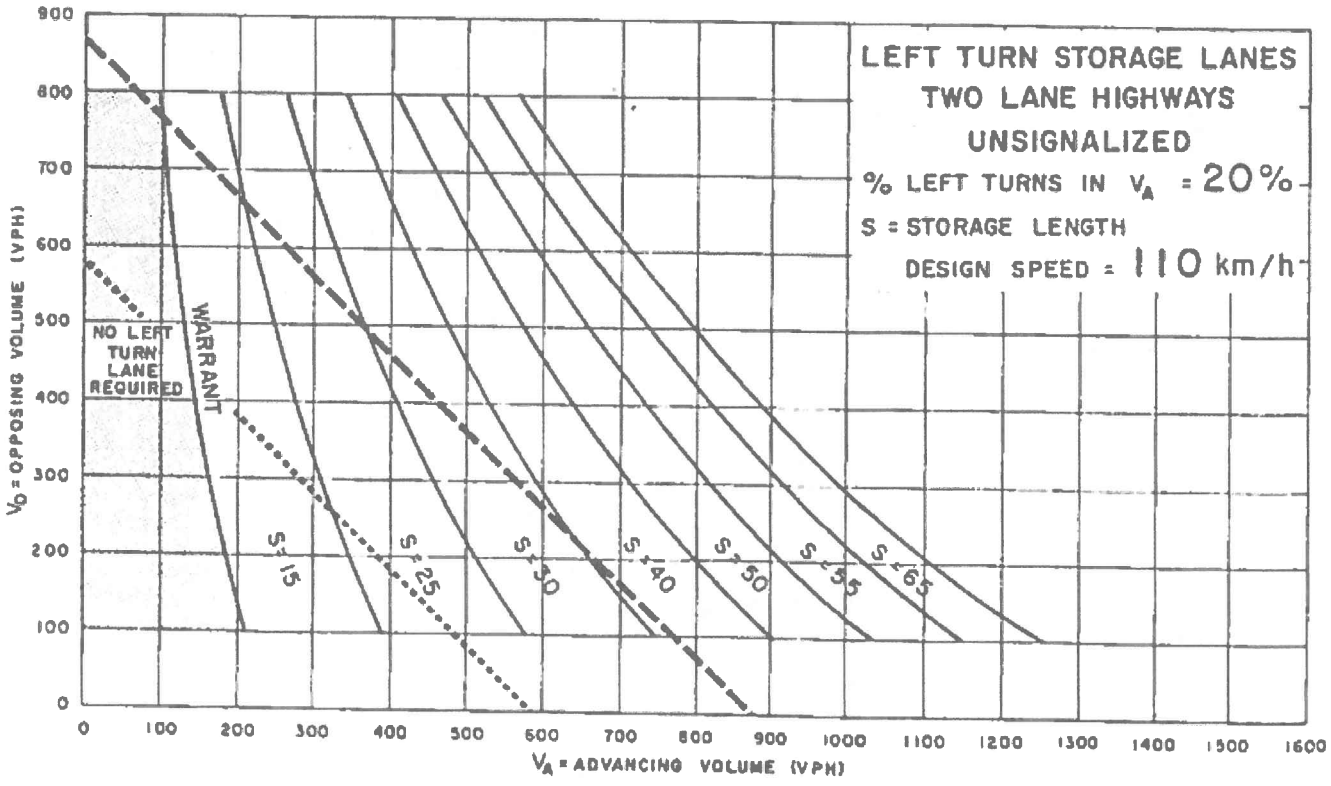


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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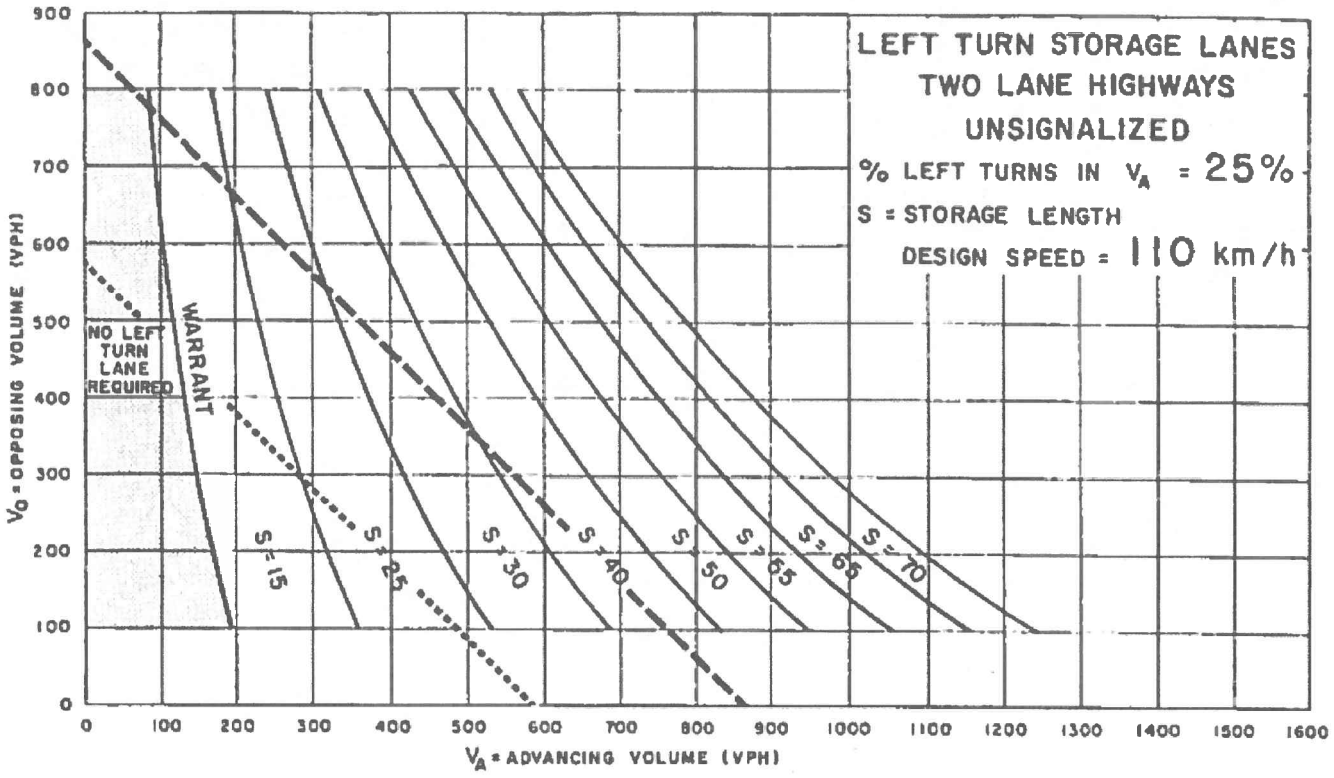
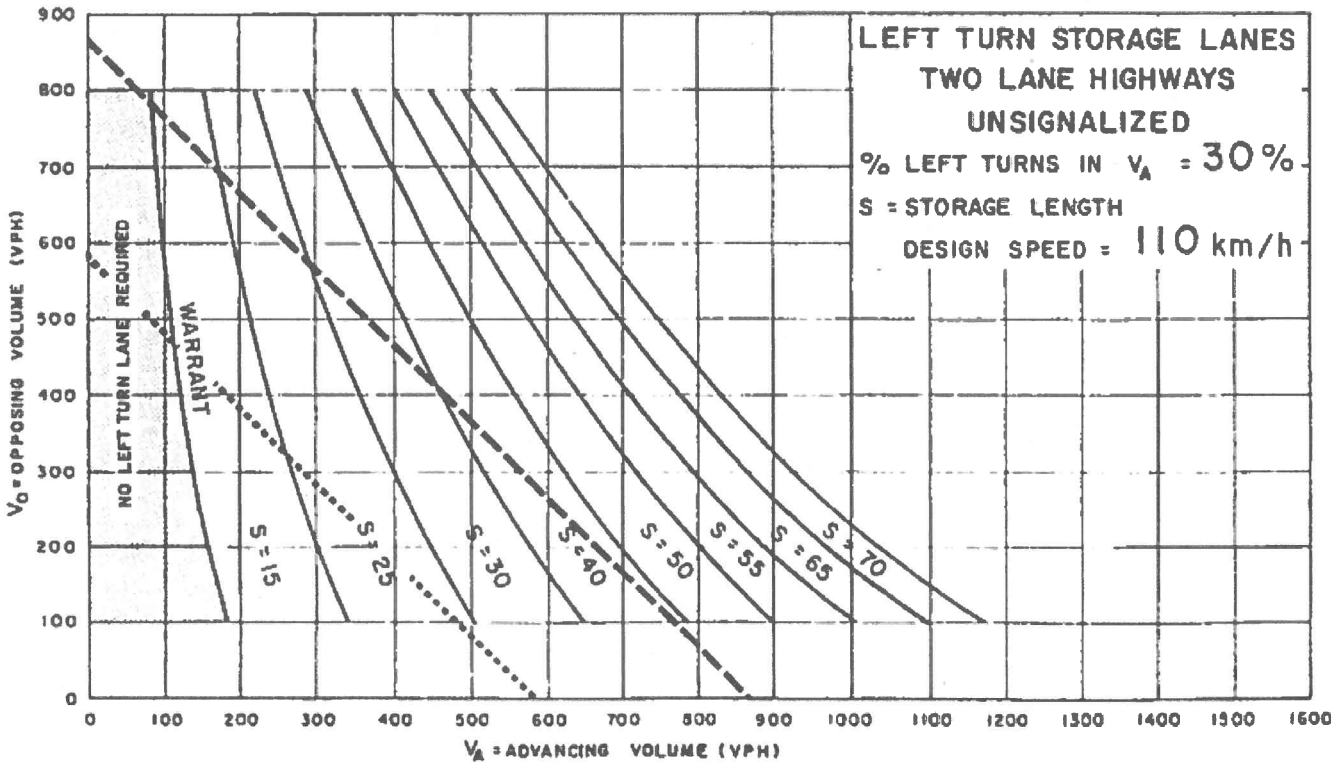


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



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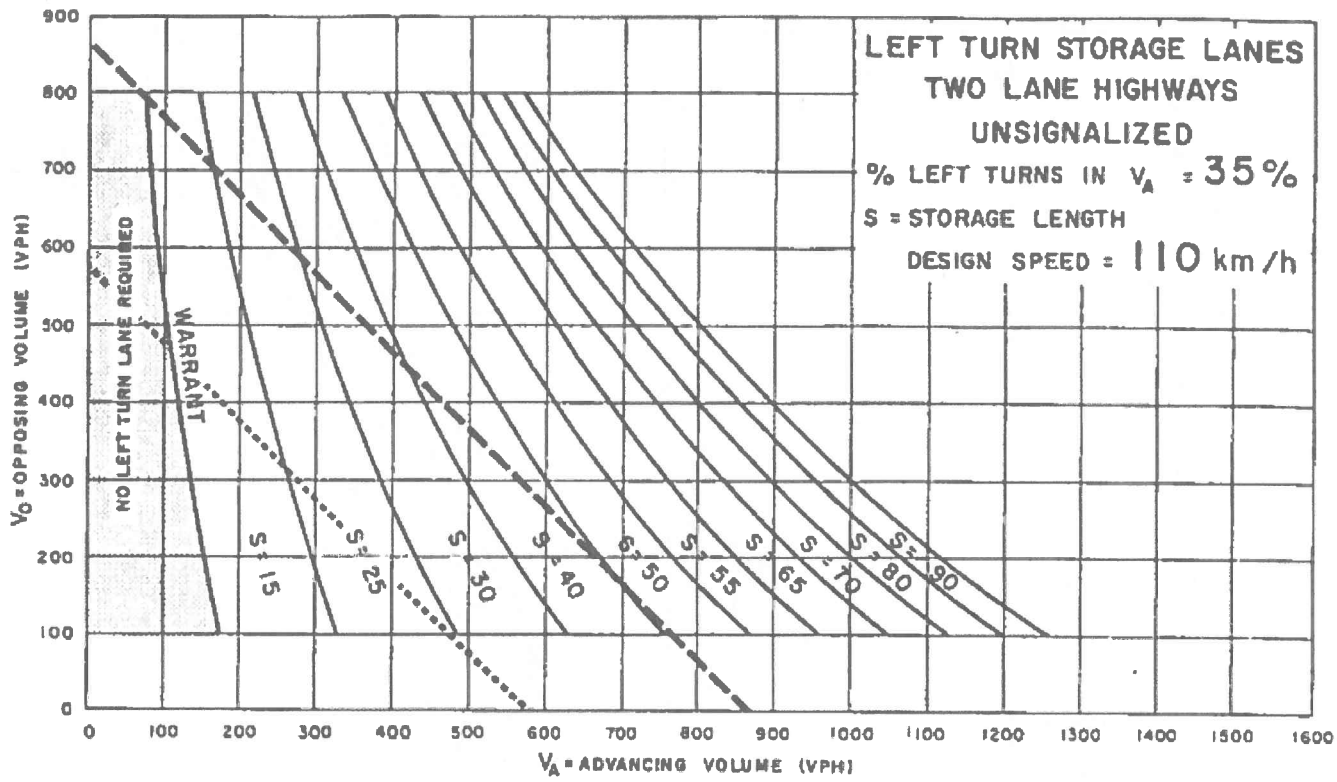


TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

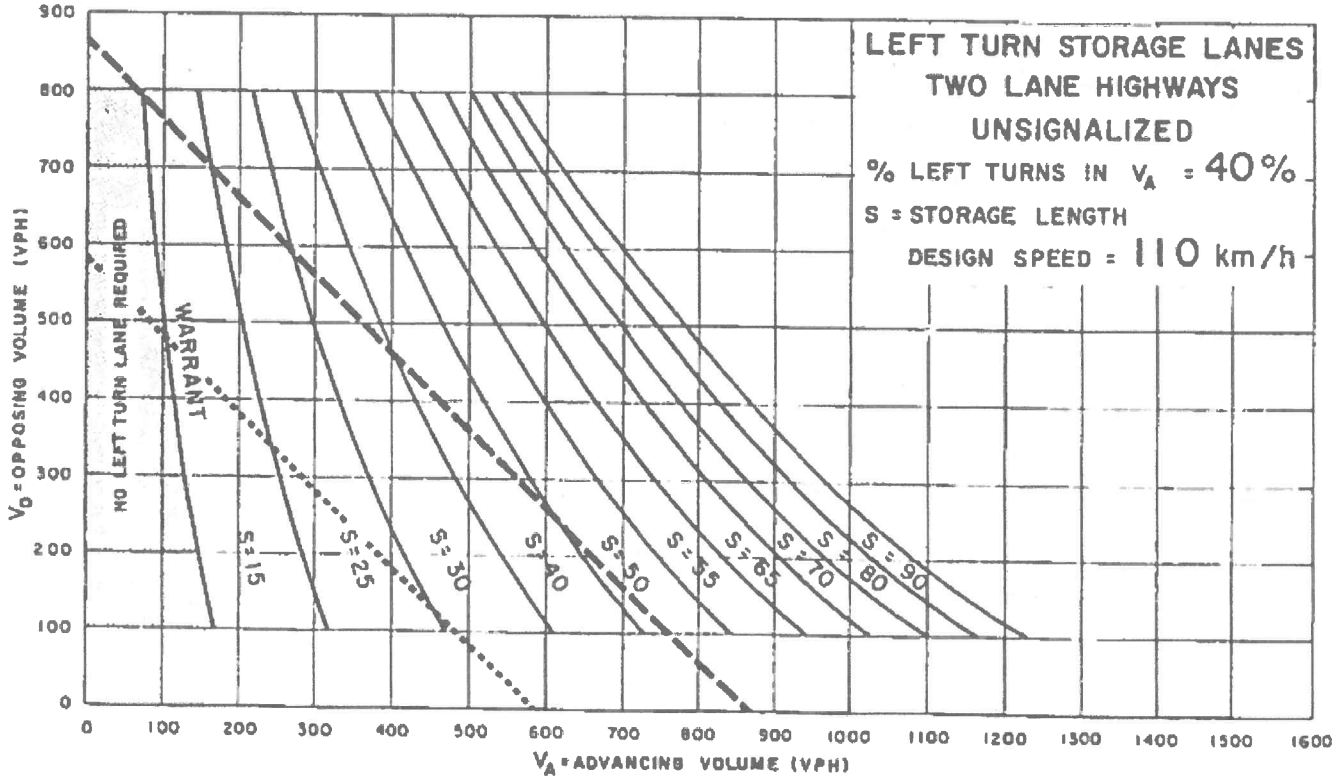


Figure EA-29

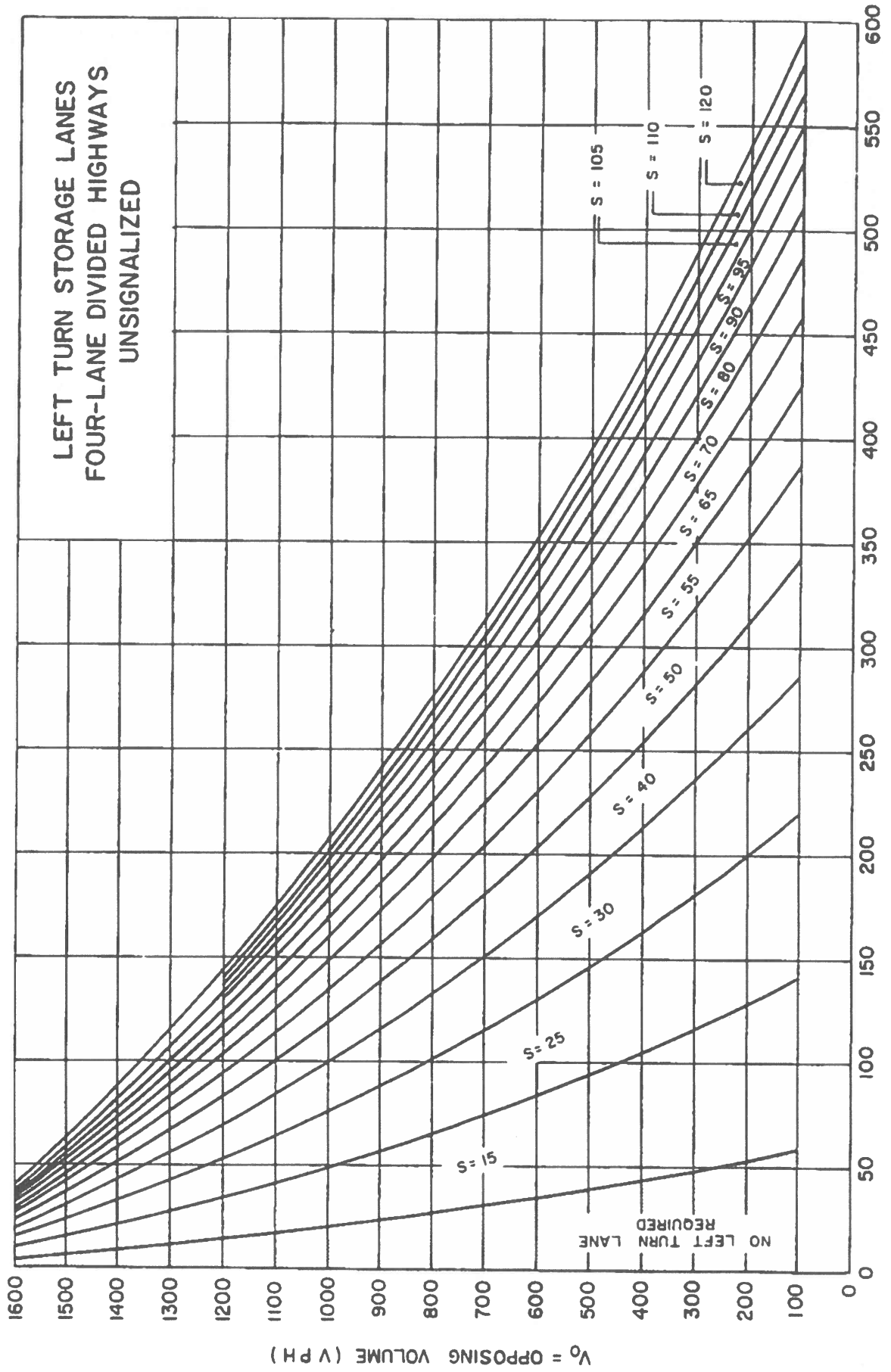

LEFT TURN STORAGE LANES
FOUR-LANE DIVIDED HIGHWAYS
UNSIGNALIZED
S = 120
S = 110
S = 105
S = 95
S = 90
S = 80
S = 70
S = 65
S = 55
S = 50
S = 40
S = 30
S = 25
S = 15
NO LEFT TURN LANE REQUIRED
V_L = LEFT TURNING VOLUME (V P H)
V_O = OPPOSING VOLUME (V P H)
0
50
100
150
200
250
300
350
400
450
500
550
600
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

Figure EC-1

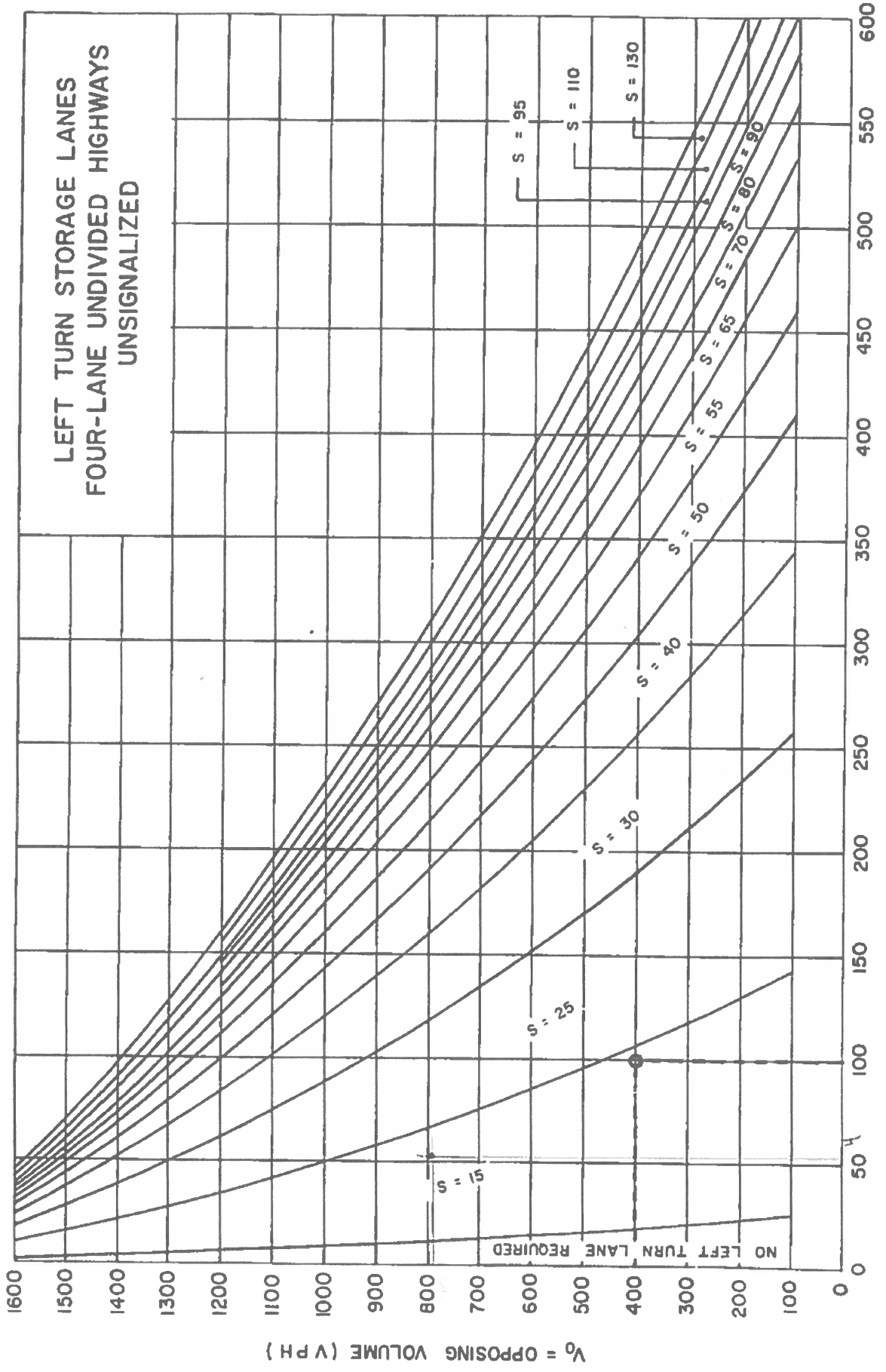
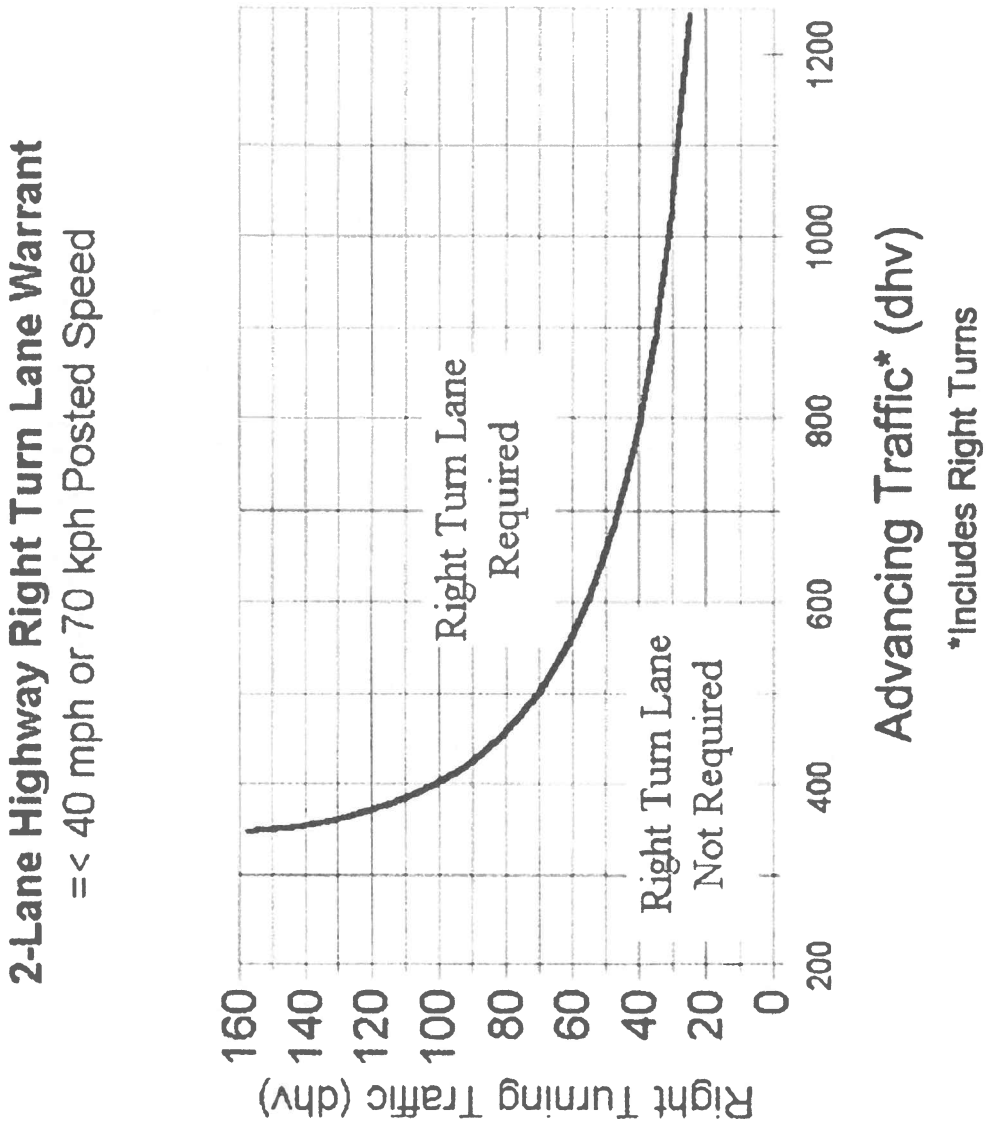

LEFT TURN STORAGE LANES
FOUR-LANE UNDIVIDED HIGHWAYS
UNSIGNALIZED
S = 95
S = 110
S = 130
S = 90
S = 80
S = 70
S = 65
S = 55
S = 50
S = 40
S = 30
S = 25
S = 15
NO LEFT TURN LANE REQUIRED
V_L = LEFT TURNING VOLUME (VPH)
V_O = OPPOSING VOLUME (VPH)
0
50
100
150
200
250
300
350
400
450
500
550
600
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600

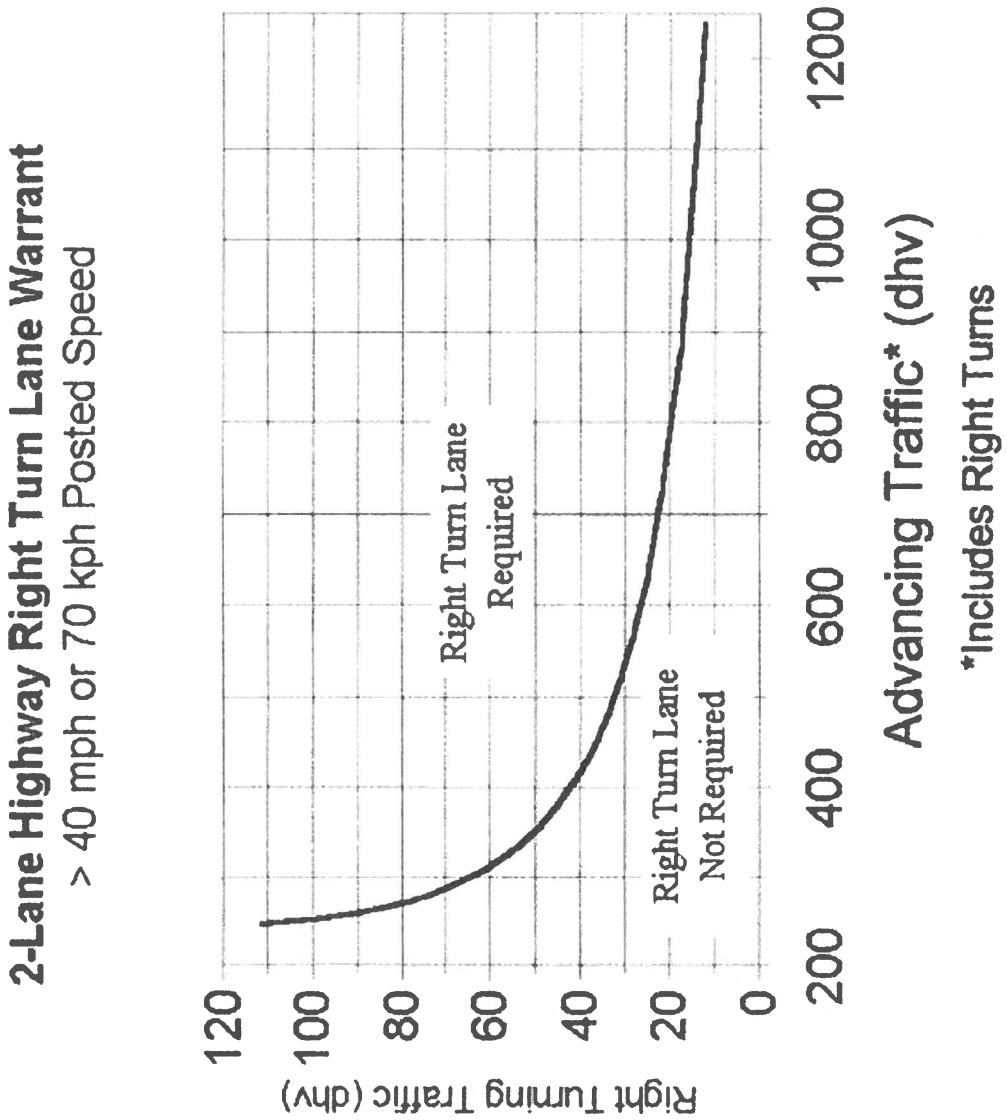
Figure EB-1

APPENDIX "D"
RIGHT TURN LANE WARRANT NOMOGRPAHS
(Source - State of Ohio Highway Access Management Manual 2001)

2-LANE RIGHT TURN LANE WARRANT (LOW SPEED)	401-6aE
	REFERENCE SECTION 401.6.3



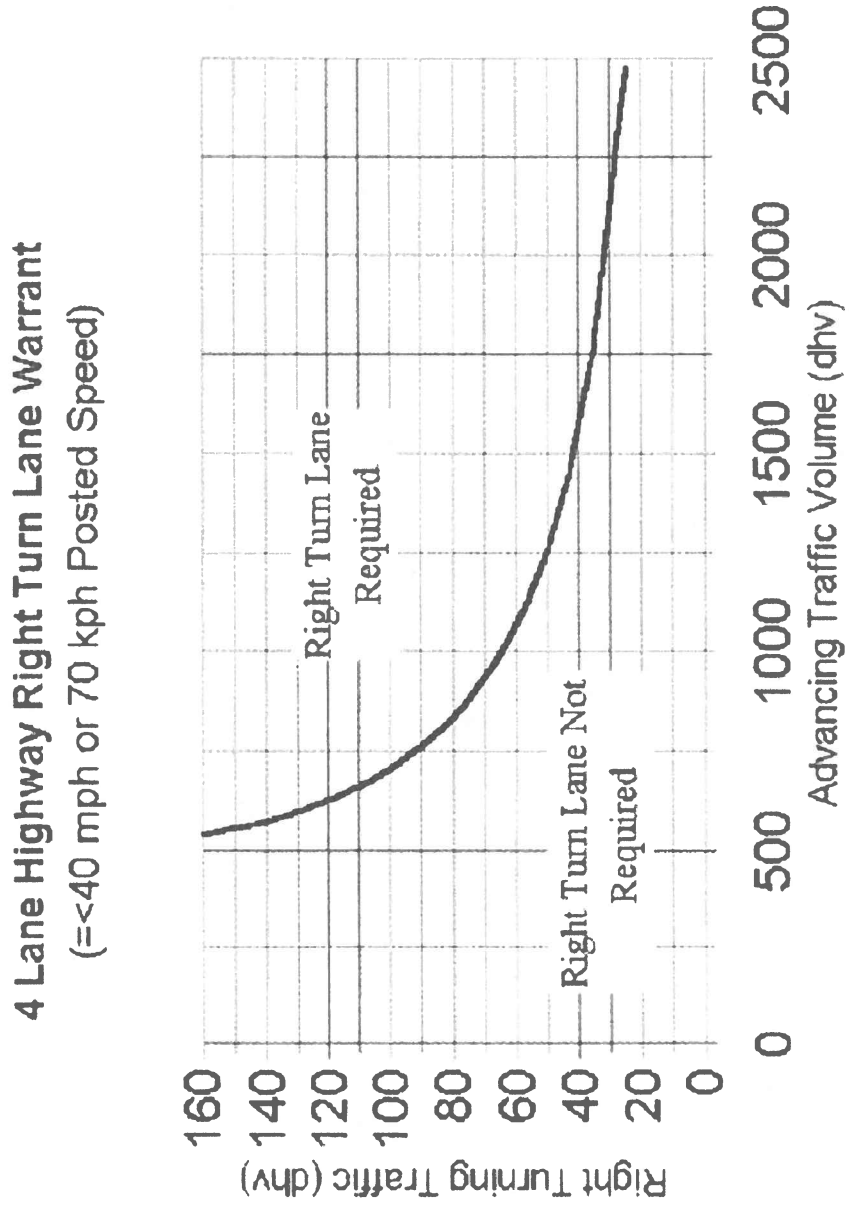
2-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)	401-6bE
	REFERENCE SECTION 401.6.3



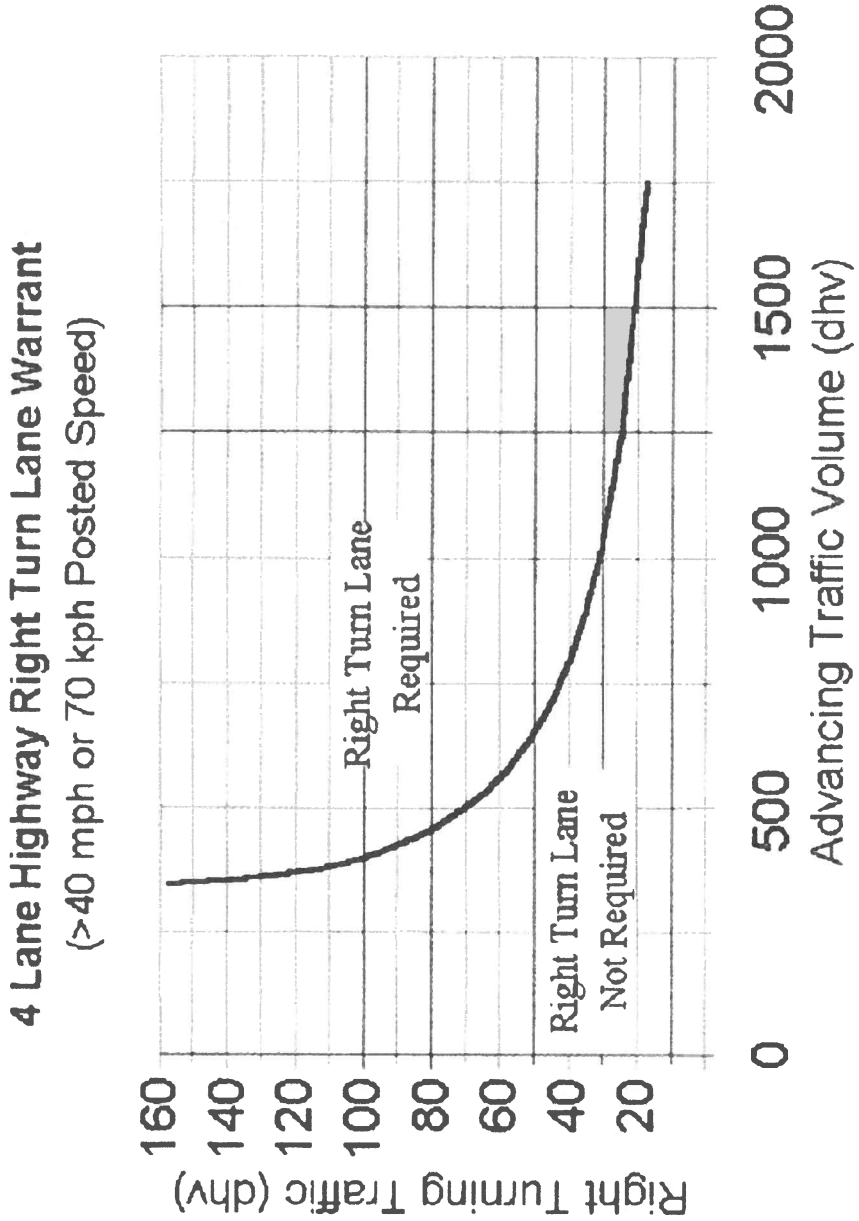
4-LANE RIGHT TURN LANE WARRANT (LOW SPEED)

401-6cE

REFERENCE SECTION
401.6.3



4-LANE RIGHT TURN LANE WARRANT (HIGH SPEED)	401-6dE
	REFERENCE SECTION 401.6.3



APPENDIX "E"
Provincial Subdivision Regulations Schedule G

Schedule "G" - Stopping Sight Distances

STOPPING SIGHT DISTANCES								
LOT NO.	SPEED ZONE	DISTANCE FROM LOT CORNER LEFT/RIGHT	LEFT		RIGHT		PASS OR FAIL*	COMMENT
			GRADE	DISTANCE	GRADE	DISTANCE		

* According to the Government of Nova Scotia Management Manual 23, Department of Transporation and Infrastructure Renewal Management, Chapter 8, Construction and Maintenance.

Signed: _____

Nova Scotia Land Surveyor

Schedule "G" added: N.S. Reg. 111/2003.