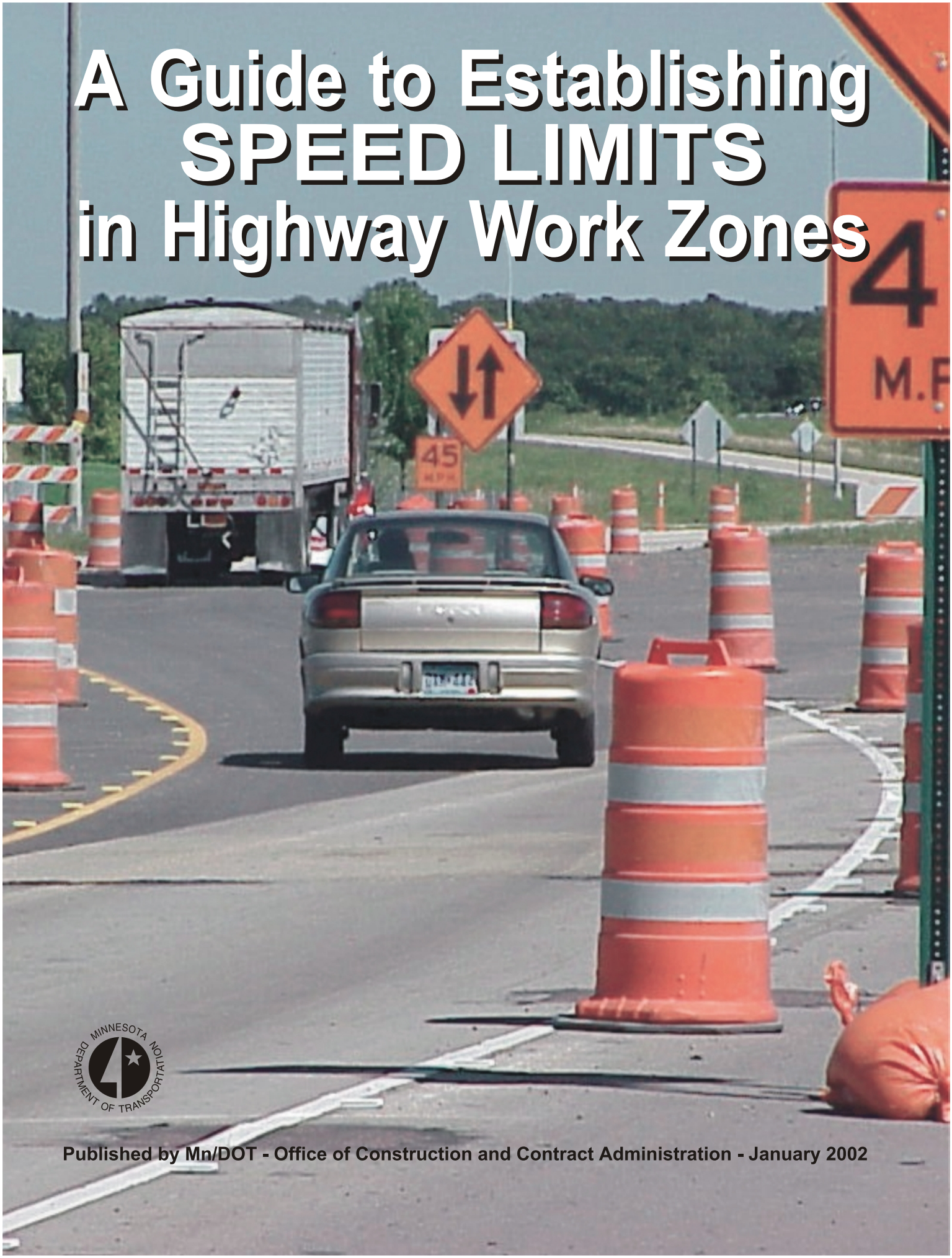
A Guide to Establishing SPEED LIMITS in Highway Work Zones



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A GUIDE TO ESTABLISHING SPEED LIMITS IN HIGHWAY WORK ZONES

January 2002

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The information contained within is the preferred practice for Mn/DOT personnel.

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A SUMMARY FOR ESTABLISHING A SPEED LIMIT IN A HIGHWAY WORK ZONE

There are several methods to provide speed control in work zones. These methods are Advisory Speeds Limits, Work Zone Speed Limits and Temporary Speed Limits in a Construction Zone. The following is a field application summary.

METHOD	DESCRIPTION	EXAMPLES	AUTHORITY
Advisory Speed Limits (Road Conditions) **(See page 5)**	For driver safety, warning signs with speed advisory speed plates, call for the reduction of speed by the driver to safely negotiate a potentially hazardous condition caused by the work activity. **Advisory speed limits should be the first consideration.**	Bump, low shoulders, drop-offs, bypass indicating the curve, narrow lanes, no shoulders, sight distance restrictions or poor road surface.	Established by the District or Local Road Authority.
Advisory Speed Limits (Worker) **(See page 5 and Layout 1)**	For worker safety at spot locations and under temporary conditions. Warning signs alerts motorists that there are workers ahead.	Maintenance or construction operations at spot locations.	Established by the District or Local Road Authority.
Work Zone Speed Limits **(See page 6 and Layout 2)**	For worker safety, work zone speed limits are established in short-term projects <u>during continuous worker activity</u> when the workers are present and are adjacent to moving traffic.	Pavement repair, bridge repair, loop detector installation and turn lanes, mill and overlay projects, concrete joint repair and crack sealing with multiple operations.	Established by the District or Local Road Authority.
Temporary Speed Limits in a Construction Zone **(See Page 7 and Layout 3)**	Temporary speed limits in construction zones are regulatory speed zones intended for a <u>24 hour continuous posting</u> established in long term projects where it is <u>imperative</u> for the motorist to reduce speeds in order to safely navigate through hazards over the length of the project.	Bypasses, shoulder drop-offs, narrow lanes, grade separations, and pavement repair.	Established by the Commissioner as recommended by the District Traffic Engineer.

INTRODUCTION

BACKGROUND

Safety in street and highway work zones is an area of emphasis for Mn/DOT (Minnesota Department of Transportation). Therefore many improvements in work zone safety are being implemented. One of these improvements is the increased use of speed limits to control vehicle speeds through street and highway work zones. Proper and uniform application of these speed limits should improve the safety of the highway worker and the traveling public.

PURPOSE

The purpose of this document is to provide a uniform guideline for the proper application of speed limits in street and highway work zones. This booklet outlines the guidelines, proper layouts and procedures for implementing work zone speed limits primarily for use by Mn/DOT personnel. Although it is usually desirable to provide all traffic controls as shown in the layouts, situations arise where this becomes impractical. Engineering judgment may dictate modifications to the typical layouts. When modifications are made, factors such as traffic volume, speed, sight distance, type of work, etc. must be considered.

SCOPE

The provisions of Minnesota Statutes 169.14, "Speed Restrictions" and MN MUTCD (Minnesota Manual on Uniform Traffic Control Devices), including the Field Manual, apply to all road authorities in the State of Minnesota (M.S. 169.06), and must be properly applied to provide all traffic controls in Minnesota.

OVERVIEW

It has been shown that vehicle speeds are reduced by the placement of speed limit signs, and the presence of active enforcement results in the best compliance to the posted limit. The work zone speed limit should not be considered a "cure-all" for work zone safety problems, but only a portion of the overall project control plan. Speed advisories should be considered prior to instituting a regulatory work zone speed limit. Studies have shown a high level of compliance with the advisory signs and that there is little difference in traffic performance between regulatory and advisory signing.

It must be stressed that the safest work zone is one that minimizes the worker and motorist accident probability and does not present roadway conditions that violate driver expectations. This safe environment is created by strict and uniform adherence to the MN MUTCD (Minnesota Manual on Uniform Traffic Control Devices), including the Field Manual. Reduced speed in a work zone is only one of the many traffic control techniques that can be used to safely guide the motorist through highway work zones.

AUTHORITY

Modification of traffic controls or working conditions may be required to expedite safe traffic movement and to promote worker safety. The engineer or their representative has the authority to control the progress of work on the project with respect to obtaining safe conditions, including the authority to modify conditions or halt work until applicable or remedial safety measures are taken. This authority is supported by the specifications and additionally by State Statute. Each person whose actions affect temporary traffic control zone safety, from upper-level management personnel to field personnel, should receive training appropriate to the job decisions each is required to make. Only those who are trained in safe traffic control practices, and who have a basic understanding of the principles established by applicable standards and regulations (including those of the MN MUTCD), should supervise the selection, placement and maintenance of traffic control devices in work zones.

RELATION TO OTHER DOCUMENTS
Other documents that are important to engineering personnel in selecting and providing safe work zones include:

- Minnesota Manual on Uniform Traffic Control Devices (MN MUTCD) including the Field Manual, "Temporary Traffic Control Zone Layouts";
- Minnesota Statutes Section 169.14;
- Mn/DOT Traffic Engineering Manual Section 8-5; and
- Mn/DOT Contract Administration Manual.
- Mn/DOT Standard Signs Summary

THE LAW

Minnesota Statutes Section 169.14 Subdivision 4 reads:

Subd. 4. ***Establishment of zones by commissioner.*** *On determining upon the basis of an engineering and traffic investigation that any speed set forth in this section is greater or less than is reasonable or safe under the conditions found to exist on any trunk highway or upon any part thereof, the commissioner may erect appropriate signs designating a reasonable and safe speed limit there at, which speed limit shall be effective when such signs are erected. Any speeds in excess of such limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. On determining upon that basis that a part of the trunk highway system outside a municipality should be a zone of maximum speed limit, the commissioner may establish that part as such a zone by erecting appropriate signs showing the beginning and end of the zone, designating a reasonable and safe speed therefore, which may be different that the speed set forth in this section, and that it is a zone of maximum speed limit. The speed so designated by the commissioner within any such zone shall be a maximum speed limit, and speed in excess of such limit shall be unlawful. The commissioner may in the same manner from time to time alter the boundary of such a zone and the speed limit therein or eliminate such zone.*

Minnesota Statutes Section 169.14 Subdivision 5 reads:

Subd. 5. ***Zoning within local areas.*** *When local authorities believe that the existing speed limit upon any street or highway, or part thereof, within their respective jurisdictions and not a part of the trunk highway system is greater or less than is reasonable or safe under existing conditions, they may request the commissioner to authorize, upon the basis of an engineering and traffic investigation, the erection of appropriate signs designating what speed is reasonable and safe, and the commissioner may authorize the erection of appropriate signs designating a reasonable and safe speed limit thereat, which speed limit shall be effective when such signs are erected. Any speeds in excess of such limits shall be prima facie evidence that the speed is not reasonable or prudent and that it is unlawful; except that any speed limit within any municipality shall be a maximum limit and any speed in excess thereof shall be unlawful. Alteration of speed limits on streets and highways shall be made only upon authority of the commissioner except as provided in subdivision 5a.*

Minnesota Statutes Section 169.14 Subdivision 5d reads:

Subd. 5d. ***Speed zoning in work zones.***

(a) The commissioner, on trunk highways and temporary trunk highways, and local authorities, on streets and highways under their jurisdiction, may authorize the use of reduced maximum speed limits in highway work zones. The commissioner or local authority is not required to conduct an engineering and traffic investigation before authorizing a reduced speed limit in a highway work zone.

(b) *The minimum highway work zone speed limit is 20 miles per hour. The work zone speed limit must not reduce the established speed limit on the affected street or highway by more than 15 miles per hour, except that the highway work zone speed limit must not exceed 40 miles per hour. The commissioner or local authority shall post the limits of the work zone. Highway work zone speed limits are effective on erection of appropriate regulatory speed limit signs designating the beginning and end of the affected work zone. The signs must be removed or covered, when they are not required. A speed greater than the posted highway work zone speed limit is unlawful.*

(c) Notwithstanding paragraph (b), on divided highways the commissioner or local authority may establish a highway work zone speed limit that does not exceed 55 miles per hour.

(d) For purposes of this subdivision, "highway work zone" means a segment of highway or street where a road authority or its agent is constructing, reconstructing, or maintaining the physical structure of the roadway, its shoulders, or features adjacent to the roadway, including underground and overhead utilities and highway appurtenances, when workers are present.

(e) Notwithstanding section 609.0331 or 609.101 or other law to the contrary, a person who violates a speed limit established under paragraph (b), or (c), or who violates any other provision of this section while in a highway work zone, is assessed an additional surcharge equal to the amount of the fine imposed for the speed violation, but not less than $25.

DOCUMENTATION

For enforcement and legal claims, it is necessary to accurately document the application of all work zone speed limits. This documentation should accurately describe sign locations, direction of travel the signs face, times the signs were installed and removed, and the numerical value of the limit. The sign locations should be referenced to physical features of the roadway, such as the distance from an intersection or reference (milepost) marker. It is suggested that each road authority adopt a proper method of documentation so these records may be used to establish the existence of the speed limit.

ADVISORY SPEED LIMITS

DESCRIPTION

Warning signs with speed advisories should be used whenever an unexpected change in geometrics is caused by the work activity. This section addresses the use of advisory speed plates in stationary work zones. In summary, the advisory speed plate is intended to supplement warning signs. Warning signs, with speed advisory plates, call for the reduction of speed by the driver to safely negotiate a hazard or potentially hazardous condition. Drivers will reduce their speed if they clearly perceive a hazard. **ADVISORY SPEED LIMITS SHOULD BE THE FIRST CONSIDERATION WHEN ESTABLISHING SPEED LIMITS IN ANY WORK ZONE.**

Warning signs with speed advisories should be determined in advance. Prior work zones with similar activities should be used as a base in determining the necessary speed plates. The work zone site should be test driven by the supervisor to confirm that the advisory speed is set at a reasonable value for the activity being performed. Advisory speed plates (W13-1) are further detailed in Part VI of the MN MUTCD. The most common application of Advisory Speed Limits is on curve warning signs at crossovers for two-way bypasses. These speed limits also work well on bump signing often used on bituminous mill and overlay projects.

Although Advisory Speed Limits are usually used to alert motorists to hazards to themselves, there is one special advisory speed limit in which this is not the case. The Advisory Speed Limit (Worker) is used to alert motorists to workers ahead and is used in conjunction with the “Worker Ahead” W21-1a warning sign, which is outlined in Layout No. 1. Unlike other worker speed limits, the “Advisory Speed Limit” (Worker) is meant to be used only at spot locations. Additional signs may be used in very long work zones.

AUTHORITY

A speed limit authorization from the Commissioner of Transportation is **not** required to establish an advisory speed limit. The district engineer and/or responsible local road authority is authorized to determine the use of advisory speed plates. When this authority has been delegated down to front line supervisors, it is important that the same person always establish the speed limit. Experienced judgment is sometimes the only indicator of the reasonable speed to be posted. Traffic Engineering personnel should be contacted whenever there is any doubt as to what the posted value should be.

SIGN SIZE AND MOUNTING

The speed advisory plate (W13-1) shall be black legend on orange background when used in construction and/or maintenance work zones. Advisory speed plates shall be minimum 18" x 18". When used with 36" or larger warning signs, advisory speed plates shall be minimum 24" x 24". When used, the plate shall be mounted below the warning sign on the same assembly. The bottom of the speed advisory plate shall be at least one foot above the pavement elevation. The standard sizes described above are the minimum sizes allowed for application on high-speed streets or highways as defined in the MN MUTCD. However, applications on higher volume and higher speed highways, such as freeways and expressways, should use larger signs to provide adequate target value and legibility.

LOCATION (Layout No. 1)

If a work zone advisory speed limit is located within a regulatory speed zone, it is not necessary to lower the regulatory speed to conform to the advisory speed limit. However, care should be taken not to erect an advisory speed limit so near the regulatory speed limit sign that the motorist may become confused by two different speed values. If it is physically impossible to prevent this, then the regulatory speed sign should be covered or removed for the duration of the work zone advisory speed limit. An advisory speed zone within a regulatory speed zone should not be posted for a value higher than the in place posted regulatory speed zone.

WORK ZONE SPEED LIMITS

DESCRIPTION

Work zone speed limits are regulatory speed zones generally established in short-term stationary construction or maintenance work zones. These limits are intended for use where the work area and workers are adjacent to traveled lane(s) open to vehicular traffic. This usually occurs in lane closures on multi-lane streets or highways. Work zone speed limits are **not** to be used on mobile or moving operations, bypasses or detours. Also, when flaggers are used to provide control on a lane closure on two-lane two-way streets or highways, work zone speed limits should **not** be used.

The speed limit signs shall only be posted in the traffic control zone **during continuous worker activity** while performing construction or maintenance operations. Overuse of the work zone speed limit will reduce the effectiveness; therefore, these must be prudently applied where the motorist can perceive the need to reduce speeds. During periods of no activity or when the traffic controls are removed from the roadway, the speed limit signs shall be covered or removed. This means installing signs at the beginning of a work shift and removing signs at the end of the shift. The speed limit is only in effect when the signs are installed and visible to traffic.

The use of the work zone speed limit should be determined in advance. Prior work zones with similar activities should be used as a base in determining the necessary speed limits. As a general rule, posting the work zone speed 10 miles per hour below the in place limit is a good beginning point. On divided roads with established 70 MPH zones, the work zone speed limit must be dropped 15 mph to be in compliance with the 55 MPH maximum ceiling as specified in law. The work zone site should be test driven by the supervisor to confirm that the speed limit is set at a reasonable value for the activity being performed.

Some hazards near the work area still require warning signs but it is intended that the regulatory speed limit reduce drivers' speed such that the majority of hazards can be safely negotiated. Severe hazards at spot locations may still require an additional speed advisory to slow the motorist even more.

AUTHORITY

The work zone speed limit contained in Minnesota Statutes Section 169.14, Subd. 5d allows the governing road authority to authorize the use of reduced **maximum** speed limits in highway work zones without conducting an engineering and traffic investigation.

The statute states that the work zone speed limit must not reduce the established speed limit on the affected street or highway by more than 15 miles per hour and cannot be below 20 miles per hour. On any divided highway, the maximum work zone speed limit shall not exceed 55 miles per hour. On other roads, the work zone speed limit shall not exceed 40 miles per hour. The work zone speed limit shall be effective upon erection of appropriate signs. The law further states that the signs must be removed or covered or when they are not required.

SIGN SIZE AND MOUNTING

All regulatory speed limit signs (R2-1) consist of black legend on white reflectorized background. The "FINES DOUBLE" plaque (R2-X8P) consists of a black legend on reflectorized orange background and should be the same width as the speed limit sign. The plaque should be mounted above the speed limit sign. Applications on higher volume and higher speed roadways, such as freeways and expressways, should use larger signs to provide for adequate target value and legibility. See the chart on Layout No. 2.

When the work zone speed limit calls for a reduced speed that results in a difference of 15 MPH from the preceding zone, then a "REDUCED SPEED AHEAD" (R2-5a) sign should be used. The sign is not required for reductions of 5 - 10 MPH but may be used. When this sign is posted with the temporary mounted advance warning sign series, it must be mounted at least one foot above the pavement. If the advance warning series is mounted on post driven structures or attached to other fixtures, all signs should be mounted at the same height. In rural areas this requires the bottom of sign to be 5 feet above the pavement and 7 feet in urban areas. If the work zone speed limit is not in effect then the " REDUCED SPEED AHEAD" sign should be covered or removed.

The work zone speed limit signs may be mounted on temporary stands such that they can be easily removed or may be mounted on posts driven into the ground and covered when not needed. The bottom of any sign assembly should be least 5 feet above the pavement in rural areas and at least 7 feet above the pavement in urban areas. Do not use flashers on the signs but orange flags may be used if additional target value is desired.

LOCATION (Layout No. 2)
The signs should be placed in the shoulder or ditch area on the side of the road open to thru traffic. Signs should not be erected in the closed lane since equipment and channelizers may obstruct visibility of the signs. Typically, a work zone speed limit sign is placed by the area where the workers are working. An advance speed limit sign should be placed a minimum of 300 feet in advance of the work area to notify drivers of the necessary reduced speed. If the work activity proceed downstream, it is important that the advance speed sign does not exceed a distance of 2500 from the active work area where workers are present. If that happens, the sign shall be relocated closer to the crew. If the work activity is rather stationary, studies have shown that optimum speed reduction and compliance occurs when this advance speed sign is approximately 1200 feet in front of the active work crew. Subsequent confirming sign locations for long work crews are also specified on Layout No. 2.

TEMPORARY SPEED LIMITS IN A CONSTRUCTION ZONE

DESCRIPTION
Temporary speed limits in a construction zone are regulatory speed zones established in long-term construction and/or maintenance projects where there are continuous hazards to the motorist. The Temporary speed limit in a construction zone is intended for a **24 hour continuous posting** so, unlike the Work Zone Speed Limit, they cannot be taken down at the end of the work shift. The speed limit goes into effect when the signs are posted.

Temporary speed limits in construction zones should be used when the roadway construction environment will continuously dictate a reduced speed and it is imperative for the motorist to reduce speed in order to safely navigate hazards that may be encountered over the length of the project. Since the signs will be posted 24 hours a day, the primary reasons to establish the limit should also be present 24 hours a day. Conditions that would warrant temporary speed limits in construction zones are bypasses, lane drops, drop-offs, narrow lanes, no shoulders, and sight distance restrictions or poor road surface. Some of these hazards still require warning signs but it is intended that the regulatory speed limit will reduce drivers' speed such that the majority of hazards can be safely negotiated. Severe hazards at spot locations may still require an additional speed advisory to slow the motorist even more.

AUTHORITY
All temporary speed limits in construction zones must be authorized by the Commissioner of Transportation. On trunk highways, a request should be made to the Mn/DOT District Traffic Office. A complete layout of the traffic control plan sheets for the project and any other relevant data should also be submitted. The traffic staff will conduct a traffic investigation to determine the safe speed. The results of the investigation, along with the recommended speed, will be submitted to Central Office-Traffic Engineering. An authorization to erect the signs will be issued by Central Office-Traffic Engineering.

On local roads, the road authority should follow the same procedures as requesting a normal speed limit authorization. A formal written request, traffic control plan sheets and any other relevant data should be submitted to the Mn/DOT District Traffic Engineer. The traffic staff will perform a traffic investigation and submit the results to Central Office Traffic Engineering. An authorization will be issued to the road authority from there.

The local road speed limit authorization will be issued with the following contingencies:
1.The District Traffic Engineer shall be notified when the signs are erected.
2. The road authority should monitor and verify that the correct speed is posted for the work activities involved.
3. If changes are necessary, the District Traffic Engineer should be notified immediately.
4. The District Traffic Engineer shall be notified when the signs are removed.

SIGN SIZE AND MOUNTING

MINIMUM SIGN SIZES FOR TEMPORARY SPEED LIMITS

SIGN	**POSTED SPEED LIMIT PRIOR TO WORK STARTING**	
	0-40 MPH	45-70 MPH
SPEED LIMIT SIGNS (R2-1)	24" x 30"	24" x 30"
REDUCED SPEED AHEAD (R2-5a)	36" x 48"	48" x 60"

All signs consist of black legend on reflectorized white background. Applications on higher volume and higher speed highways, such as freeways and expressways, should use larger signs to provide adequate target value and legibility.

Temporary speed limits shall be regulatory "SPEED LIMIT" signs (R2-1) and ground mounted. A second speed limit sign should be posted within 750 feet of the first one to confirm the posted value. The spacing of the succeeding speed limit signs shall be according to the "Chart for Typical Spacing for Speed Limit Signs in Work Zones." These signs may be supplemented with orange flags but not flashers. The bottom of any sign assembly should be least 5 feet above the pavement in rural areas and at least 7 feet above the pavement in urban areas.

When the Temporary Speed Limit calls for a reduced speed that results in a difference of 15 MPH or greater from the preceding zone, then a "REDUCED SPEED AHEAD" (R2-5a) sign should be used. The sign may be used for a difference of 10 MPH when deemed necessary by engineering judgment. When this sign is posted with the advance warning sign series, it must be mounted at least 1 foot above the pavement. When ground mounted or attached to some other permanent fixture on the roadway, it must be mounted a minimum of 5 feet (rural) or 7 feet (urban) above the roadway elevation.

The concluding sign should be a regulatory "SPEED LIMIT" (R2-1) sign with the in place speed limit for the roadway ahead. This is to inform the drivers that the temporary construction zone speed limit has ended.

LOCATION (Layout No. 3)
The signs should be placed in the shoulder or ditch area on the side of the road open to thru traffic. Signs should not be erected in the closed lane since equipment and channelizers may obstruct visibility of the signs. Erect the first sign where drivers need to reduce speed and erect confirming speed limit signs as specified in the following chart:

TYPICAL SPACING FOR TEMPORARY SPEED LIMITS IN CONSTRUCTION ZONES

Construction speed limit	Confirming speed limit sign spacing
20 – 25 mph	¼ mile
30 – 35 mph	½ mile
40 – 45 mph	¾ mile
50 mph or over	1 mile

SPEED LIMITS ON DETOURS

DESCRIPTION
Construction projects may involve detouring traffic onto a local road or onto roads designated as Temporary Trunk Highways. The increased traffic and varying designs of the affected detour roads may require the establishment of different speed limits. These detours are typically not under construction therefore work zone speed limits are not appropriate. It is also not appropriate to double fines on speeding citations in these areas since there are no workers or construction involved. Authorization of a normal regulatory speed limit, for a temporary time frame, should be used in these instances.

AUTHORITY / JUSTIFICATION
Authorization from the Commissioner of Transportation is required for a temporary speed limit. A complete layout of the proposed detour route and an estimated increase in the ADT should be submitted to the District Traffic Office. The District Traffic Office shall perform a traffic investigation on the detour and submit a recommendation to the central office of traffic engineering. Justification of the proposed speed limit should follow the same guidelines for establishing regulatory speed limits as defined in Chapter 13 of the Traffic Engineering Manual. Increased ADT can cause progressive deterioration in lower design roads and is important that a commitment is made to maintain the road in a safe condition for the recommended speed limit. Speed limit authorizations will be sent to the applicable road authorities with a beginning date and an ending date of the temporary speed limit. The speed limits will be in effect when the signs are posted.

SIGN SIZE AND LOCATION
All signs shall be regulatory black legend on white reflectorized speed limit signs (R2-1) and the bottom of the sign shall be mounted at least 5 feet (rural) or 7 feet (urban) above the pavement elevation. The standard size sign is 24" x 30". Signs should be located frequently enough to reasonably notify drivers of the speed limit as they enter and travel along the detour. The use of additional orange flags or batten boards is not recommended since this may confuse enforcement and the motorists about the type of speed zone in effect. Speed limit signs shall be removed before the termination date listed on the authorization.

EXTRA ENFORCEMENT

BACKGROUND

Speed limit signs alone do not always reduce vehicle speeds in the work zone. In many cases, special efforts must be taken to enforce speed limits and reduce the risk of traffic accidents within the work zone. Law enforcement officials provide the means for enforcing work zone speed limits. Mn/DOT employs the Minnesota State Patrol (MSP) for extra enforcement on federally funded construction projects.

Mn/DOT has procedures for obtaining funding of extra enforcement on Mn/DOT State Projects (S.P.). Federal funding for these enforcement services is available if approved in advance by the State Construction Engineer. These requests are considered on a project-by-project basis.

EXTRA ENFORCEMENT POLICY

It is the policy of the Minnesota Department of Transportation (Mn/DOT) and the Federal Highway Administration (FHWA) to employ extra enforcement and surveillance efforts when it is reasonably expected to increase the safety of the traveling public or construction personnel. Local road authorities are also encouraged to use extra enforcement to increase work zone safety. The need for extra enforcement should be identified early in the project development process.

TRUCK INSPECTIONS

Truck inspections may also be included in the extra enforcement effort. MSP personnel, either Troopers or Law Compliance Representatives (LCR), can provide truck inspection support on a contract basis. Obtaining funding and support follows basically the same procedure as that used for extra enforcement. A major difference is that truck inspection requires more flexibility in its planning and operation.

PLANNED VS. IMMEDIATE REQUESTS

Planned use for extra enforcement and truck inspection ensures enough time for processing and provides better coordination between Mn/DOT and the MSP. Prior planning provides efficient use of safety and enforcement resources. A planned request is always preferable to an immediate request.

Immediate requests are requests that take less than one week to process before enforcement is desired. Procedures for immediate requests are the same as those for planned requests.

PROCEDURE

It is important that requests, and their approval, precede contracting for extra enforcement and truck inspection services. This is a major stipulation in receiving federal funding for these types of activities. Also important is that a Mn/DOT representative be readily available to sign the MSP Weekly reports, and to check that the Weekly identifies the correct S.P. It is a good practice to provide the MSP Trooper with a cell phone or pager number to call at the conclusion of the service.

Extra Enforcement

The following outlines the extra enforcement process:

Responsible Organization	**Action**
Mn/DOT District	1. Analyze the phases of your project to find which may require extra enforcement.
	2. Contact the local State Patrol District Office and request assistance in the enforcement plan, and in an estimate of its cost. Base estimates on the current hourly rate for contracted services.
	3. Submit a request for extra enforcement services funding to the State Construction Engineer; send a copy to the Work Zone Safety Coordinator.
State Patrol District	4. Assists in the development of the Work Zone Enforcement Plan, and provides an estimate of the cost.
Construction Office, C.O.	5. Evaluates the District request for enforcement services. Send approval, or reason for denial, to requesting district. Allocate funds if approved.
Mn/DOT District	6. If the request is approved, contract with the MSP for extra enforcement services. Coordinate provisions of the extra enforcement plan, and modify as needed.
State Patrol District	7. Provides extra enforcement services. Coordinates with Project Engineer, or designated representative.
Mn/DOT District	8. Validate MSP Weekly Report; log construction diary.
State Patrol District	9. Submits Weekly Reports, with MN/DOT official's signature, and S.P. number, to State Patrol Headquarters.
State Patrol Headquarters	10. Submits invoices, with appropriate S.P. number, to MN/DOT Construction Office. Ensures Weekly Report has MN/DOT official's signature, and S.P..
Office of Construction, C.O.	11. Audits and tracks invoices and supporting documents. Submits MSP invoices for payment.
Finance Office	12. Makes payment to MSP.
MN/DOT District	13. Monitor the continued need and appropriateness of the enforcement effort; modify as needed.

In the case of immediate requests, fax an information copy of the request to: (651) 296-3811, Work Zone Safety and Training Manager, Office of Construction and Contract Administration.

COMPENSATION
Compensation for extra enforcement services will be on a flat fee basis. Fees are determined by the enforcement agency. The MSP uses the current fee for contracted services when contracting for extra enforcement.

Eligible Costs:

1. All contracted costs associated with extra enforcement services on a Mn/DOT State Construction Project.
2. Travel time for enforcement personnel to and from the construction work zone, as allowed by current enforcement agency labor contract.
3. Minimum payments, as provided by current enforcement agency labor contract.

The following activities do no qualify as extra enforcement:

1. Patrolling outside of the work zone, except as provided by the extra enforcement plan, the project engineer or designated representative.

2. Time spent on bookings, warrants, etc., beyond the scope of extra enforcement duties.

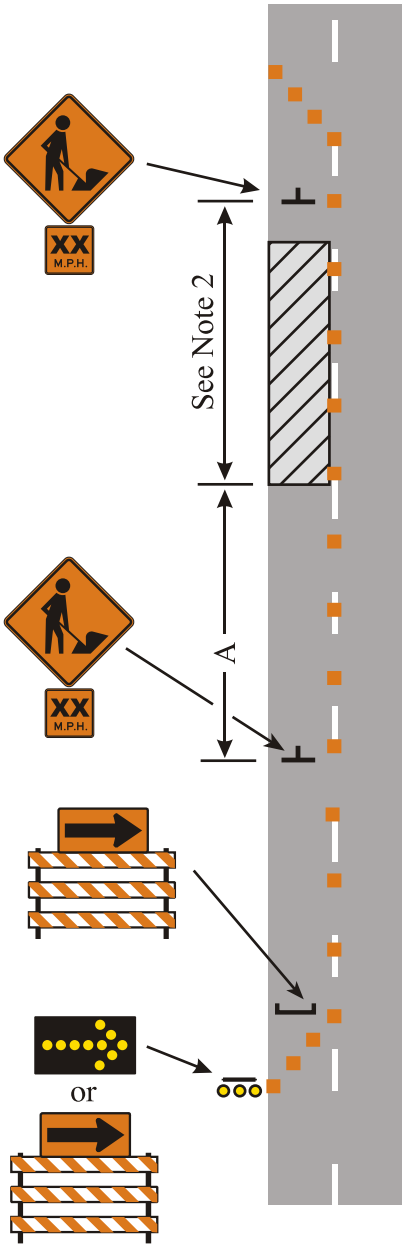
3. When engaged in services not directly associated with extra enforcement, e.g., escorting contractor equipment, motorist assistance, etc. This applies even if these activities are conducted within the work zone.

4. Travel and incidental costs above those allowed by contract.

5. Maintenance projects not funded with construction monies.

6. Locally initiated projects, which are done under the authority of a city or county.

Posted Speed Limit Prior to Work Starting (mph)	Spacing of Advance Warning Signs (A) meters	feet
0 - 30	80	250
35 - 40	100	325
45 - 50	180	600
55	210	700
60 - 65	300	1000
70 - 75	370	1200



Notes:

1. Use the appropriate layout for advance signing and spacing.
2. In long work zones, this sign assembly should be repeated at 1.6 km (1 mile) intervals.

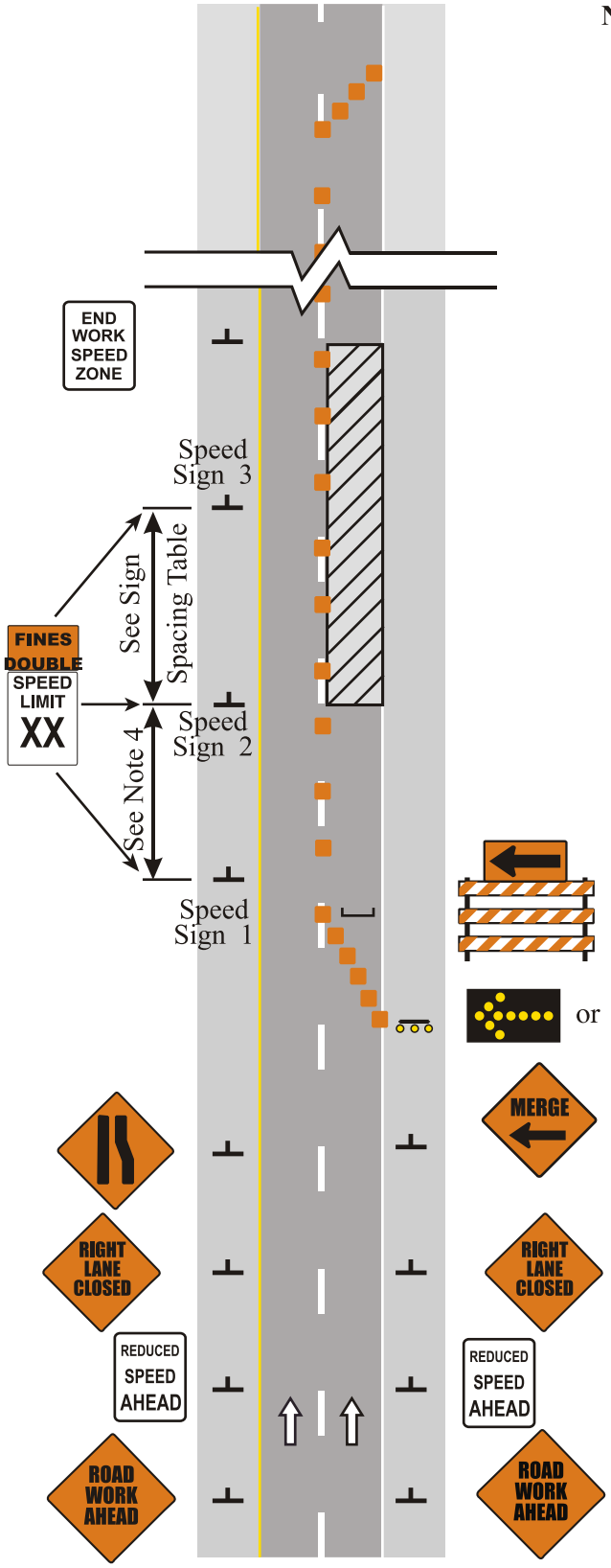
MINIMUM SIGN SIZES FOR ADVISORY SPEED LIMIT SIGNING

Sign	Posted Speed Limit Prior to Work Starting	
	0 - 40 mph	45 - 75 mph
WORKER AHEAD (W21-1a)	900 x 900 mm **(36" x 36")**	1200 x 1200 mm **(48" x 48")**
ADVISORY SPEED PLAQUE (W13-1)	450 x 450 mm **(18" x 18")**	600 x 600 mm **(24" x 24")**

■ - Retroreflective channelizing device.

ADVISORY SPEED LIMIT
MULTI-LANE ROAD

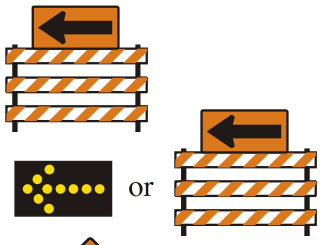
LAYOUT 1



NOTES:

1. Use the appropriate layout for advance signing and spacing.
2. All inplace Speed Limit signs shall be removed or covered when the reduced work zone speed limit is implemented.
3. Work zone speed limit signs should be removed when workers are not present.
4. Speed Sign 1 should be located at least 90 m (300 ft) in advance of Speed Sign 2. Speed Sign 2 should be located directly across from the first active work area (where the workers are present). As workers proceed downstream through the work area, Speed Sign 1 shall be no more than 760 m (2500 ft) from an active work area.
5. The "REDUCED SPEED AHEAD" sign shall be used when there is a speed reduction of 15 mph or greater between the normal speed limit and the work zone speed limit.

■ - Retroreflective channelizing device.



*TYPICAL SPACING FOR WORK ZONE SPEED LIMIT SIGNS

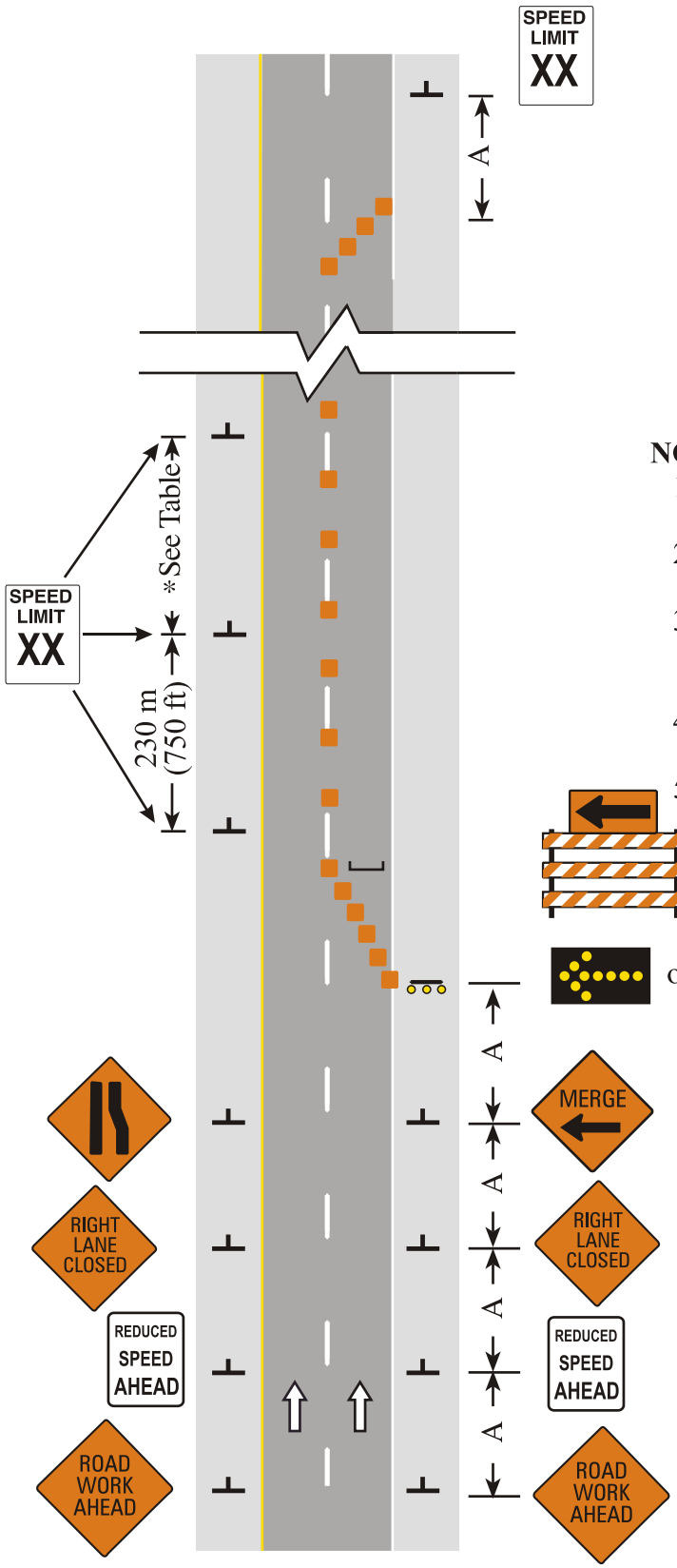
Work Zone Seed Limit (mph)	Confirming Speed Limit Sign Spacing (meters)	(feet)
20 - 35	400	1300
40 - 55	760	2500

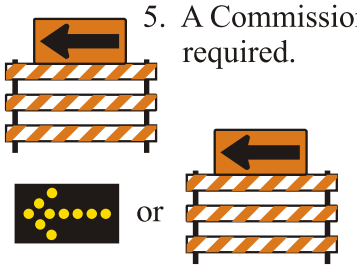
MINIMUM SIGN SIZES FOR WORK ZONE SPEED LIMIT SIGNING

Sign	Posted Speed Limit Prior to Work Starting	
	0 - 40 mph	45 - 75 mph
END WORK SPEED ZONE (R2-6a)	600 x 750 mm **(24" x 30")**	600 x 750 mm **(24" x 30")**
FINES DOUBLE (R2-X8P)	600 x 450 mm **(24" x 18")**	900 x 600 mm **(36" x 24")**
REDUCED SPEED AHEAD (R2-5a)	600 x 750 mm **(24" x 30")**	900 x 1200 mm **(36" x 48")**
SPEED LIMIT (R2-1)	600 x 750 mm **(24" x 30")**	900 x 1200 mm **(36" x 48")**

WORK ZONE SPEED LIMIT
MULTI-LANE ROAD

LAYOUT 2





Posted Speed Limit Prior to Work Starting	Spacing of Advance Warning Signs (A)	
(mph)	meters	feet
0 - 30	80	250
35 - 40	100	325
45 - 50	180	600
55	230	750
60 - 65	300	1000
70 - 75	370	1200

NOTES:

1. Use the appropriate layout for the advance signing and spacing.
2. All inplace Speed Limit signs shall be removed or covered.
3. The REDUCED SPEED AHEAD and the first SPEED LIMIT sign shall be 900 x 1200 mm (36” x 48”).
4. The minimum size of all regulatory speed limit signs is 600 x 750 mm (24” x 30”).
5. A Commissioners Authorization is required.

***TYPICAL SPACING FOR TEMPORARY SPEED LIMIT SIGNS**

Temporary Speed Limit	Confirming Speed Limit Sign Spacing	
(mph)	meters	mile
20 - 25	400	1/4
30 - 35	800	1/2
40 - 45	1200	3/4
50 - 75	1600	1

TEMPORARY SPEED LIMIT ON
MULTILANE DIVIDED ROAD

LAYOUT 3