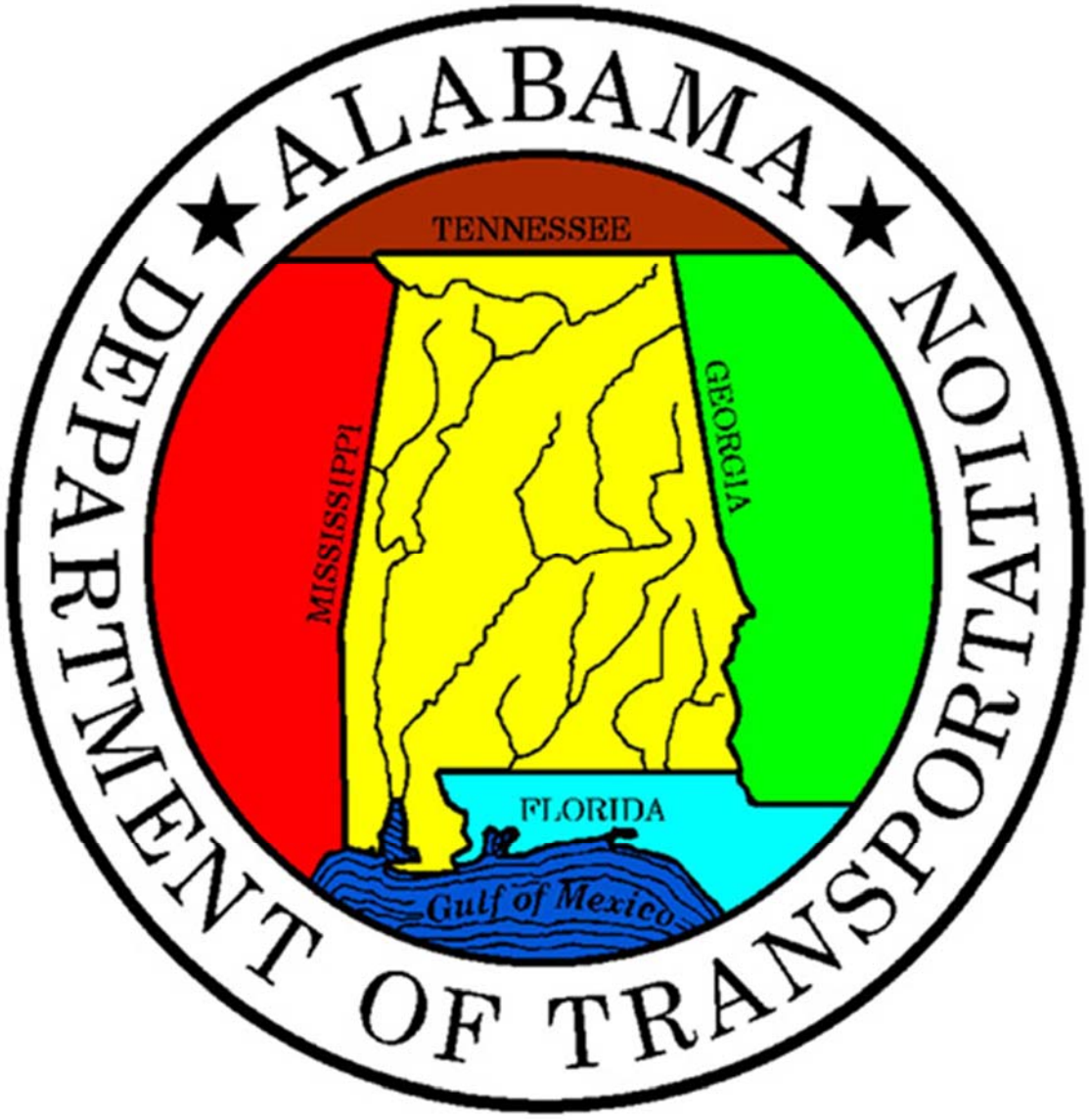

STANDARD OPERATING PROCEDURE
FOR DETERMINING SPEED LIMIT(S) IN A WORK ZONE

ALABAMA DEPARTMENT OF TRANSPORTATION

STANDARD OPERATING PROCEDURE FOR DETERMINING SPEED LIMIT(S) IN A WORK ZONE

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1. INTRODUCTION

1.1. BACKGROUND

All state department of transportation (DOT) agencies receiving Federal-aid funds are required to perform a biennial Work Zone Process Review. These reviews are an opportunity for a DOT to evaluate its work zone safety and mobility related policies and procedures as well as the effectiveness of its work zone impact analysis and monitoring efforts. ALDOT was given the opportunity to choose the scope and focus of the review. The ALDOT chose to focus on determining appropriate speed limits through work/construction zones.

The objectives of the Process Review were to answer the following:

1. How does ALDOT currently determine the appropriate speed limits for work/construction zones?
2. How do other states determine their speed limits for work/construction zones?
3. Is it necessary to change the speed limit in a work/construction zone?

An ALDOT team comprised of Design, Construction, and Maintenance personnel reviewed all current Guidelines for Operation (GFOs) to determine if there was a policy already established. The team sent out three questionnaires. One was to ALDOT pre-construction personnel to see if they had a written policy within their respective Region/Area and if not, what rationale did they use to set the speed limits through work zones. Another was sent out to other state DOTs to see if they had a written policy to determine what the speed limit should be through a work/construction zone. The final questionnaire was sent to the 10 Area offices' most experienced project managers to get their perspective on work/construction zone speed limits.

The team discovered that the ALDOT Central and Region/Area offices had no formal written policy to use throughout the state to determine what the appropriate speed limit should be through a work/construction zone. The team also discovered the Area offices mostly agreed to circumstances the speed limit needs to be reduced (workers adjacent to an open travel lane, lane closures, lane shifts etc.), however the reduction varied from 5-20 mph. Pre-construction personnel and design consultants stated throughout the questionnaire that they used engineering judgment and prior experiences to determine what the speed limit should be through a work/construction zone. The team is aware that engineering judgment across the state can vary and due to retirements and promotions, prior experience is always changing.

A questionnaire was sent to all other states. The team discovered from the 13 responding states that they had some type of written policy or procedure. These policies or procedures varied from state to state as some were more thorough than others. The states expressed that having a written policy has been an advantage. Each state concluded that if the speed reduction was consistent for a particular type of project throughout the state it improved credibility with motorists and made them more adaptive to obeying the regulatory speed limit.

The team recommended that ALDOT adopt some type of formal written policy to use throughout the state to make the regulatory speed limit the same for each particular type of work/construction zone. A task force comprised of Design Bureau, Construction Bureau, and Maintenance Bureau Personnel would be the appropriate ones to write this formal written policy.

Process reviews should cover an agency's entire project development sequence, as well as maintenance operations. The ALDOT established a multi-disciplinary team (includes Design, Construction, and Maintenance) to conduct the current review. A report from the work zone process review identified the need for ALDOT to determine and establish a standard operating procedure to promote uniformity at a statewide level.

1.2. PURPOSE

The purpose of this document is to provide a uniform procedure for the proper application of speed limits in work zones. This document lays out the procedures for implementing speed limits in work zones. Although it is usually desirable to provide all traffic control devices 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. shall be considered.

1.3. GOVERNING DOCUMENT(S)

Federal regulation 23 CFR 630 Subpart J (the Work Zone Safety and Mobility Rule, established September 2004) requires each state's Department of Transportation (DOT) have a policy for the systematic consideration and management of work zone impacts on all Federal-aid projects. The policy should include state-level and project-level processes and procedures to address work zone impacts throughout the various stages of project development and implementation. One important activity included in the Work Zone Safety and Mobility Rule is a requirement that DOTs perform work zone process reviews every two years. Although the completion of process reviews are necessary to maintain compliance with the Rule, it is also an opportunity for a DOT to re-examine and take a holistic look at how well its work zone safety and mobility management practices are working.

The Following Laws, Guidelines for Operation, and Plan Details should be used as references when determining the appropriate speed limit(s) in a work zone:

- Code of Alabama Section 32-5A-176.1, “Speed Limits in Construction Zones”
- Guideline for Operation (GFO) 3-49 & 4-9
- General Traffic Control Plan Notes

1.4. OVERVIEW

It has been shown that the placement of appropriate speed limit signs and the presence of active enforcement results in the best compliance to the posted speed limit. Speed limits in work zones should not be considered a “cure-all” for work zone safety problems, but only a portion of the overall temporary traffic control plan.

It must be stressed that the safest work zone is one that minimizes the worker and motorist crash probability and does not present roadway conditions that violate driver expectations. This safe environment is created by strict and uniform adherence to the Manual on Uniform Traffic Control Devices (MUTCD).

Traffic control in work zones should be designed on the assumption that road users will only reduce their speeds if they clearly perceive a need to do so; therefore, reduced speed zoning should be avoided as much as practicable.

1.5. AUTHORITY

Modifications of traffic control 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 Standard Specification for Highway Construction, Article 105.01 and Item 740.03(a)1. 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, should supervise the selection, placement, and maintenance of traffic control devices in a work zone.

1.6. DEFINITIONS

Clear Zone – The total roadside border area, starting at the edge of the traveled way, that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a non-recoverable, transverse slope with a clear run-out area at its toe.

Contractor – The individual, partnership, firm, corporation, or any acceptable combination thereof, contracting with the State for performance of prescribed work.

Department – Alabama Department of Transportation (ALDOT), as constituted under the laws of Alabama for administration of highway work.

Engineer – A qualified Department staff member designated by the Director, acting either directly or through his authorized assistants or representatives, who is responsible for engineering supervision of construction activities.

Engineering Judgement – The evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required.

GFO – (Guideline for Operation) the policies, guidelines, and procedures under which the Department operates.

MUTCD – Manual on Uniform Traffic Control Devices for Streets and Highways, published by the U.S. Government Printing Office (Federal Highway Administration).

Project – The specified section of the highway together with all appurtenances and construction to be performed thereon under the contract.

Project Manager – The personnel in charge of a designated project for the Department.

PTCI – (Project Traffic Control Inspector) The person designated to be responsible for reviewing traffic control devices on a particular project for the Department.

Regulatory Sign – A sign that gives notice to road users of traffic laws or regulations.

Speed Limit – The maximum (or minimum) speed applicable to a section of highway as established by law, regulation, project plans, or this standard operating procedure.

Temporary Traffic Control Zone – An area of a highway where road user conditions are changed because of a work zone or incident by the use of temporary traffic control devices, flaggers, uniformed law enforcement officers, or other authorized personnel.

Traffic Control Device – A sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, private road open to public travel, pedestrian facility, or shared-use path by authority of a public agency or official having jurisdiction, or, in the case of a private road open to public travel, by authority of the private owner or private official having jurisdiction.

Warning Sign – A sign that gives notice to road users of a situation that might not be readily apparent.

Worker – A person on foot whose duties place him or her within the right-of-way of a street, highway, or pathway, such as street, highway or pathway construction and maintenance forces, survey crews, utility crews, responders to incidents within the street, highway, or pathway right-of-way, and law enforcement personnel when directing traffic, investigating crashes, and handling lane closures, obstructed roadways, and disasters within the right-of-way of a street, highway, or pathway.

Work Zone – Is an area of a traffic way with highway construction, maintenance, or utility-work activities. A work zone is typically marked by signs, channelizing devices, barriers, pavement markings, and/or work vehicles.

2. DESIGN - PROCESS FOR ESTABLISHING SPEED LIMIT(S) IN A WORK ZONE

Safety in work zones begins in the design phase. Establishing the speed limit in a work zone is determined by taking into account the type of work and impact on the traveling public and using that to decide if the speeds should be advisory or regulated, and to what extent the speed should change. Traffic control in work zones should be designed on the assumption that drivers will only reduce their speeds if they clearly perceive a need to do so; therefore, reduced speed zoning should be avoided as much as practical.

Title 32-5A-176.1 Code of Alabama – 1975 (as amended) authorizes the Alabama Department of Transportation to establish speed limits in work zones along state and interstate highways. The act requires the work zone speed limits to be posted on the Department's standard size speed limit signs (black and white) at least 100' in advance of the entrance to the work zone.

2.1. REGULATORY WORK ZONE SPEED LIMIT(S)

Regulatory work zone speed limits should be used only for sections of work zone projects where speed control is of major importance. Regulatory work zone speed signs (R2-1) must be removed or covered during periods when they are not needed to minimize interference with traffic and to uphold the integrity of the speed reduction. All work zone speed signs shall comply with the MUTCD. (See GFO 4-9 and General Traffic Control Plan Notes).

R2-1 SPEED LIMIT signs shall be used for signing work zone speed zones. R2-1 signs are rectangular in shape, with a white background and a black legend/border. Refer to the Standard Highway Signs in the Standard and Special Drawings for the recommended sizes.

Speed limit signs shall be erected only for the limits of the section of roadway where speed reduction is necessary for the safe operation of traffic and protection of work zone personnel. In most cases, this will involve only a short section of roadway where work is in progress, but in some cases, it will involve partially completed sections extending for some distance.

It is imperative that proper speed limits be posted in construction work zones. Improperly posted work zone speed limits adversely affect the flow of traffic by encouraging driver disrespect for all speed limits and endangering the driver who observes an unreasonably low posted speed limit.

2.2. SELECTION/LOCATION OF WORK ZONE SPEED LIMIT(S)

The type of work and its impact on the traveling public can help determine the speed limit within work zones. The proximity of a work zone related activity from the travel lane and positive barriers may allow for fewer speed reductions, while lane closures, transition areas, and decreasing lane widths may require larger speed reductions.

The location of work zone speed limits shall be an adequate distance in advance of the work zone so that the traveling public has time and distance to reach the desired speed. If the speed reduction is in excess of 10 mph, the reduced speed will be posted in maximum of 10 mph increments. Table 6C-1 in the 2009 MUTCD can help determine the distance between advance warning signs. When a reduction in the speed limit is deemed to be necessary, the designer should select the typical detail for traffic control that provides the required type of reduced speed limit signing.

2.3. DECISION MATRIX

The purpose of the decision matrix is to provide guidance on the selection of speed limits in work zones. The selection of an appropriate speed limit is vital to providing a safe work zone for both workers and motorists. The need for a speed reduction will vary based on the roadway. Speed reduction tables are provided for two lane highways, multi-lane highways, multi-lane divided highways (non-interstate), and interstate highways. Each table includes typical speed reductions in work zones depending on the type of work being performed, but there are additional factors that could exist within a work zone that may require further reduction of the speed. Therefore, the process for using the decision matrix to determine the speed limit will be detailed below.

When determining the speed limit for a work zone, examine the typical reductions in the appropriate speed reduction table for the roadway. The speed reduction can be obtained from the table based on the posted speed limit and type of work. Further reductions to the speed limit can be made if any of the additional factors listed below exist within the work zone, but the decision to reduce beyond what is provided in the table will be left up to engineering judgement. If no further reduction is needed, the speed limit will be set based on the value determined directly from the table. If further reduction is needed, the speed can be reduced by an additional 5 mph for each factor present. However, the maximum reduction from the posted speed limit will not exceed 15 mph, unless otherwise noted in the chart(s).

Type of Work

1. Roadside Activity – Work performed next to the roadway that may fall within the clear zone but does not require the adjacent lane be closed to finish the task.
2. Lane/Paved Shoulder Closure – Work within or adjacent to the roadway that will require the closure of a travel lane(s) or paved shoulder in order to complete it. Work performed within two feet of the edge of pavement shall require a lane closure.
3. Temporary Roadway Diversion – Work that requires rerouting of traffic onto a temporary or permanent roadway/alignment around the work area. This type of work would include, but is not limited to bridge replacements, bypasses, etc.

Additional Factors

1. Presence of a lane shift
2. Lane width reduced to less than 11 feet
3. Pavement condition – Surface conditions that might affect a driver's ability to maintain control of their vehicle such as metal or grated surface on bridge.
4. Urban area
5. Pedestrian Traffic
6. Flagging Operation
7. Crash History
8. Barrier Rail located within 2 feet of travel lane

2-LANE HIGHWAY*		
Type of Work	**Posted Speed Limit**	**Work Zone Speed Limit**
1	All	No Reduction
2	55 MPH 50 MPH ≤ 45 MPH	45 MPH 45 MPH No Reduction
3	55 MPH 50 MPH ≤ 45 MPH	45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum)

***Refer back to the "Decision Matrix" Section if further speed reduction should be considered for the "Type of Work" being performed**

MULTI-LANE HIGHWAY*		
Type of Work	**Posted Speed Limit**	**Work Zone Speed Limit**
1	All	No Reduction
2	65 MPH 60 MPH 55 MPH 50 MPH ≤ 45 MPH	55 MPH 50 MPH 45 MPH 45 MPH No Reduction
3	≥ 55 MPH 50 MPH ≤ 45 MPH	45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum)

***Refer back to the "Decision Matrix" Section if further speed reduction should be considered for the "Type of Work" being performed**

MULTI-LANE DIVIDED HIGHWAY (NON-INTERSTATE) *		
Type of Work	**Posted Speed Limit**	**Work Zone Speed Limit**
1	All	No Reduction
2	65 MPH 60 MPH 55 MPH 50 MPH ≤ 45 MPH	55 MPH 50 MPH 45 MPH 45 MPH No Reduction
3	≥ 55 MPH 50 MPH ≤ 45 MPH	45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum)

***Refer back to the "Decision Matrix" Section if further speed reduction should be considered for the "Type of Work" being performed**

INTERSTATE HIGHWAY*		
Type of Work	**Posted Speed Limit**	**Work Zone Speed Limit**
1	All	No Reduction
2	70 MPH 65 MPH 60 MPH 55 MPH 50 MPH	55 MPH 55 MPH 50 MPH 50 MPH No Reduction
3	70 MPH 65 MPH 60 MPH ≤ 55 MPH	55 MPH (Desirable), 45 mph (Minimum) 55 MPH (Desirable), 45 mph (Minimum) 55 MPH (Desirable), 45 mph (Minimum) 45 MPH (Desirable), 35 mph (Minimum)

*Refer back to the "Decision Matrix" Section if further speed reduction should be considered for the "Type of Work" being performed

3. CONSTRUCTION - WORK ZONE SPEED LIMIT(S)

3.1. REVIEW AS LET DESIGN/PLANS VS EXISTING SIGNAGE

The Engineer shall review the plans and locations of all signs to confirm the original design has included covering existing permanent signs that are not relevant during the construction project. If any changes are needed, they should be discussed and resolved prior to the Contractor's initial installation so as to avoid any confusion to the traveling public. See applicable Traffic Control Notes and Standard Specification for Highway Construction, Section 740.

3.2. VERIFY INSTALLATION IS IN ACCORDANCE WITH PLANS/SPECIFICATIONS

After the Contractor has installed all construction signs, the Engineer shall do an initial inspection to confirm all have been installed in accordance with the plans, specifications and current MUTCD. Additional inspections will be performed throughout the duration of a project to ensure applicable signs are covered and uncovered based on the phase of the project and "Type of Work" being performed.

3.3. DAILY INSPECTION OF TRAFFIC CONTROL DEVICES (FORM C-25)

The Project Traffic Control Inspector (PTCI) performs a daily inspection of traffic control signs and devices for each project and documents these findings on the Department's Form C-25. If deficiencies are noted, they are brought to the Contractor's attention immediately for corrections/repairs. The PTCI should also note on the C-25 if he/she observes any issues with the posted speed limits and traveling public. If changes/modifications to the existing speed limits are merited, please see Section 3.5 CHANGES/MODIFICATIONS TO WORK ZONE SPEED LIMITS below. The PTCI shall also review existing permanent signs daily and after each traffic control phase change to confirm there are no conflicting directions provided to the traveling public.

3.4. ENFORCEMENT OPTIONS

The Engineer has many options to enforce work zone speed limit(s) and to require compliance of work zone speed limit(s) on construction and maintenance projects. The enforcement and compliance options include, but are not limited to the following: State Troopers (ticketing and/or blue lights), Local Police Officers (ticketing and/or blue lights) – Reference CIM 3-2019, Portable Changeable Message Signs, Variable Speed Message Signs, Rumble Strips, Advisory Speed Limits Signs, Regulatory Speed Limit Signs, Temporary Concrete Barrier, etc.

If the Engineer determines any of these options are needed to enforce the work zone speed limits, they shall discuss their suggestions/request with their Area Construction Engineer for further action.

3.5. COVERING/UNCOVERING SIGNS

When speed limit reduction signs are installed in a work zone, the Traffic Control Plan Notes will state that the Contractor shall immediately cover or remove these signs at end of the work shift and prior to other periods of inactivity, i.e., weekends or holidays; however, unanticipated conditions may exist on the roadway that justify a continued speed limit reduction for some period of time. These conditions will include, but not be limited to, temporary surfaces (surface treatment in urban areas, etc.), differences in elevation between lanes greater than two inches, edge of pavement drop offs greater than three inches, etc. Under these conditions, the Engineer should direct the Contractor to leave the signs in place until such time that the condition is resolved, at which time the signs shall be covered or removed.

3.6. CHANGES/MODIFICATIONS TO WORK ZONE SPEED LIMIT(S)

In addition to the daily inspections, the Engineer should continually monitor the speed reduction locations to confirm they are appropriate for the type of work and the location of the active construction activities.

If the Engineer determines an adjustment to the existing work zone speed limit is necessary, they shall obtain concurrence from the Region Engineer prior to submitting a formal request to the Construction Bureau. Construction Bureau will review the request along with the State Traffic Design Engineer. The Construction Bureau will provide the official response to the Region, Area and project staff. (See GFO 4-9)

One example would be a longer project (i.e. 10 miles or more) has active construction activities for a smaller section of the project, the Engineer shall verify the speed limit is not unnecessarily being reduced outside of the active construction activities.

STATE OF ALABAMA

DEPARTMENT OF TRANSPORTATION

GUIDELINES FOR OPERATION

SUBJECT: **STANDARD OPERATING PROCEDURE FOR DETERMINING SPEED LIMIT(S) IN A WORK ZONE**

The "Standard Operating Procedure for Determining Speed Limit(s) in a Work Zone" shall be referenced and applied during the design phase of projects that require temporary traffic control.

This Standard Operating Procedure establishes the Alabama Department of Transportation's process and procedure for determining if the speed limit(s) in a work zone should be reduced based on the type of work being performed.

A copy of the "Standard Operating Procedure for Determining Speed Limit(s) in a Work Zone" is available on the Design, Construction, and Maintenance Bureau's Webpage.

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APPROVAL:

TRANSPORTATION DIRECTOR

9-26-2019
DATE

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STATE OF ALABAMA

DEPARTMENT OF TRANSPORTATION

GUIDELINES FOR OPERATION

SUBJECT: **PROPER USE OF REGULATORY SPEED LIMIT SIGNS IN CONSTRUCTION WORK ZONES**

The "Standard Operating Procedure for Determining Speed Limit(s) in a Work Zone" shall be referenced and applied during the construction phase of projects that require temporary traffic control.

This Standard Operating Procedure establishes the Alabama Department of Transportation's process and procedure for determining if the speed limit(s) in a work zone should be reduced based on the type of work being performed.

A copy of the "Standard Operating Procedure for Determining Speed Limit(s) in a Work Zone" is available on the Design, Construction, and Maintenance Bureau's Webpage.

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