SECTION 805

WORK ZONE TRAFFIC CONTROL AND SAFETY

805.1 DESCRIPTION

Provide, erect, maintain and remove traffic control devices as shown in the Contract Documents.

BID ITEMS	UNITS
Work Zone Signs (0 to 9.25 Sq. Ft.)	Each Per Day
Work Zone Signs (9.26 to 16.25 Sq. Ft.)	Each Per Day
Work Zone Signs (16.26 Sq. Ft. and over)	Each Per Day
Work Zone Sign (Special) (**)	Each
Work Zone Barricades (Type 3 – 4 to 12 Lin. Ft.)	Each Per Day
Work Zone Barricades (Pedestrian)	Each per Day
Arrow Display	Each Per Day
Portable Changeable Message Sign	Each Per Day
Channelizer (Fixed)	Each Per Day
Channelizer (Portable)	Each Per Day
Channelizer (Pedestrian)	Each per Day
Work Zone Warning Light (Type “A” Low Intensity)	Each Per Day
Work Zone Warning Light (Red Type “B” High Intensity)	Each Per Day
Pavement Marking (Temporary)	
4" Solid (*)	Sta./Line
4" Broken (8 ft.) (*)	Sta./Line
4" Broken (3 ft.) (*)	Sta./Line
4" Dotted Extension (*)	Sta./Line
Broken (Line Masking Tape)	Sta./Line
Solid (Line Masking Tape)	Sta./Line
Symbol (*)	Each
Flexible Raised Pavement Marker (4" Broken (8 ft.))	Sta./Line
Flexible Raised Pavement Marker (4" Broken (3 ft.))	Sta./Line
Rigid Raised Pavement Marker (*)	Each
Flagger (Set Price)	Hour
Traffic Signal Installation (Temporary)	Lump Sum
Traffic Control	Lump Sum
Traffic Control (Initial Setup)	Lump Sum

*Type (Type I or II)
**Size

805.2 MATERIALS

Provide materials as shown in the Contract Documents that comply with the following requirements.

Retroreflective Sheeting ……..…….	**DIVISION 2200**
Portable Changeable Message Signs……	**DIVISION 1700**
Work Zone Warning Lights……..	**DIVISION 1700**
Temporary Pavement Marking/Line Masking Tape……	**DIVISION 2200**
Traffic Line Paint……..	**DIVISION 2200**
Raised Pavement Markers……..……..	**DIVISION 2200**

a. General. The size, shape, color, placement, installation, and maintenance of all traffic control devices and appurtenances shall comply with the details shown in the Contract Documents and the Manual on Uniform Traffic Control Devices (MUTCD).

Use crashworthy supports used for mounting signs or devices for temporary conditions that comply with AASHTO MASH. All traffic control devices shall be tested and found acceptable using test methods compliant with

MASH testing requirements. Devices that were accepted under the NCHRP 350 testing requirements prior to the adoption of MASH criteria may remain in place and continue to be used. Provide the following to the Engineer for a case by case approval of traffic control devices not addressed in the Contract Documents:

(1) A copy of the manufacturer's self certification stating that the Category 1 devices to be used on the project are crashworthy.

(2) A copy of the entire FHWA acceptance letter for the Category 2 devices to be used on the project.

(3) A copy of the entire FHWA acceptance letter for the Category 3 truck mounted attenuators (TMAs) to be used on the project and certification stating that the Category 3 items to be used on the project meet crashworthy specifications, as defined above.

b. Work Zone Signs. The size and layout of the sign message shall comply with the Contract Documents and the "Standard Highway Signs and Markings", latest edition. Use fluorescent orange Type IV or better sheeting for all work zone orange signs. Use standard colors in Type III sheeting or better for all other work zone signs. Opaque, fluorescent orange Type IV or better, roll up signs may be used in approved situations. Do not use mesh signs.

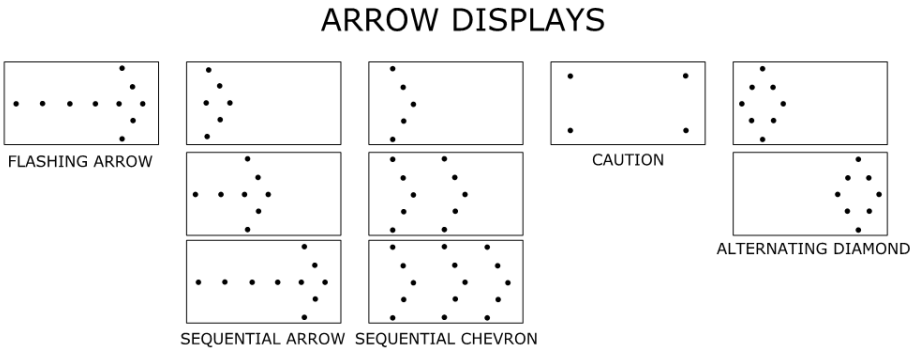
c. Work Zone Barricades. Size and design of all work zone barricades, including those used for pedestrian closures, shall comply with the Contract Documents. Provide Type 3 barricades with ASTM Type III orange and white retroreflective sheeting, as shown in the Contract Documents. Provide pedestrian barricades with orange and white high contrast sheeting as shown in the Contract Documents.

d. Flashing or Sequencing Arrow/Warning Display Signs. When specified, provide, install and maintain a flashing or sequencing arrow/warning display sign that complies with the Contract Documents and the MUTCD.

Provide a display that is capable of being legible for a minimum of ½ mile. Displays shall have an automatic control for lamp intensity, backed up by a manual switch and be capable of dimming 50% from the rated lamp voltage for nighttime operation. The display shall be capable of flashing lamps at a rate between 25 and 40 flashes per minute.

The minimum lamp "on time" shall be 50% for the flashing arrow and 25% for the sequential chevron. Display lamps or lenses shall be recessed or alternately equipped with a minimum 180° upper hood. The color of light emitted shall be yellow or orange.

The following are allowable displays:



e. Channelizers. Channelizers, fixed or portable or pedestrian, shall comply with the Contract Documents. Provide non-metallic drums, conical delineators, tubular markers, cones, Type 2 barricades, vertical panels and direction indicator barricades as shown in the Contract Documents.

Provide drums, tubular markers, cones, Type 2 barricades, and direction indicator barricades with Type III orange and white retroreflective sheeting, as shown in the Contract Documents. Provide Type IV fluorescent orange sheeting on conical delineators and on the directional indicator barricade arrow panel. The orange and white stripes on the direction indicator barricade and the white sheeting on the conical delineators will be Type III sheeting.

Provide drums and conical delineators that have at least 2 orange and 2 white Type III (or better) retroreflective sheeting stripes. Additional stripes may be non-retroreflective with a maximum width of 3 inches.

Provide tubular markers 28 - 42 inches tall that have at least 2 white Type III retroreflective sheeting stripes.

Provide pedestrian channelizers with Type III orange and white retroreflective sheeting on the side meant to face vehicular traffic. The side facing pedestrians must have high contrast orange and white sheeting that may be Type III retroreflective sheeting.

f. Automated Flagger Assistance Devices (AFADs). At Contractor's option, provide an AFAD that complies with the MUTCD.

805.3 CONSTRUCTION REQUIREMENTS

a. General. The safe and satisfactory movement of traffic through the project is a high priority and is the responsibility of the Contractor. Use reasonable and appropriate devices and methods to safeguard the persons and property of the traveling public on roads on which construction work is in progress. Failure of the Engineer to notify the Contractor to maintain such devices or use such methods does not relieve the Contractor of responsibility.

Traffic Control must be in place and in acceptable condition as shown in the Contract Documents for work to progress.

While working within the right-of-way limits on KDOT projects, all workers shall wear high visibility garments which comply with ANSI Class II during Daylight Hours and ANSI Class E retroreflectorized pants with an ANSI Class II vest during all other times.

Obtain the Engineer's approval before erecting, changing or removing traffic control devices, except if an emergency situation requires immediate action. Erect signs and traffic control devices as shown in the Contract Documents or Traffic Control Plan, unless directed otherwise by the Engineer. When directed by the Engineer, move any traffic control devices from one location to another and re-erect it. The Engineer may require additional traffic control devices or flaggers at any time, or at any place. When the Contract Documents provide that traffic be carried through construction, routing of traffic on a detour is prohibited without written approval from the Engineer.

At all times during the progress or temporary suspension of work, provide, erect, remove, relocate, clean, replace and maintain acceptable signs, barricades, channelizers or other necessary traffic control devices and pavement marking shown in the Contract Documents. With the Engineer, determine the frequency of inspections based on the needs of every project. Designate an employee who can be contacted 24 hours a day and can be on site within an agreed upon amount of time to repair, replace, remove, relocate, clean and maintain any traffic control device required as directed by the Engineer. Advise the Engineer of the name, address and telephone number of the person given this responsibility. Compliance with minimum inspections and providing a person to be contacted does not relieve the Contractor of the responsibility to inspect and maintain all required traffic control devices.

If traffic control issues come to the attention of the Engineer, the Engineer will notify the Contractor of any required repairs or replacements, which shall be addressed within the time specified in the notification. KDOT Rejected stickers may be used to identify unacceptable traffic control devices. When the Engineer determines an immediate repair or replacement is required, and the Contractor is unable to make the repair or replacement, the work may be performed by KDOT, and the associated cost deducted from the contract. This in no way relieves the Contractor of responsibility to inspect and maintain traffic control.

Immediately upon discovering or receiving notification of unacceptable traffic control devices, either repair or remove and replace the unacceptable traffic control devices. Record unacceptable traffic control devices and when the condition has been corrected.

Perform all work during Daylight Hours unless otherwise approved.

In order to minimize inconvenience for the traveling public and to increase the effectiveness of signs and traffic control devices, move the devices ahead as the work allows. When no work is in progress, remove from the road or completely cover all devices that are required only when work is actually being performed.

An alternate traffic control plan may be developed. Such plan requires approval from the District Office or the Bureau of Transportation Safety & Technology before installation. Such approval may take up to 10 business days.

Provide access (including the use of temporary surfacing, **SECTION 840**) for field accesses, driveways, business accesses, and side roads that tie into the work area on roads closed to through traffic. When 2-way access is required, provide sufficient width to maintain 2-way traffic as shown in the Contract Documents or as directed by the Engineer.

Park and store all vehicles, equipment, tools, debris and materials off the right-of-way or 30 feet from the edge of the travelled way, whichever is less. When this cannot be achieved, place appropriate signs, use positive

protection or delineate with channelizers, as designated by the Engineer. Temporary traffic control devices required for this condition will be considered subsidiary to other bid items.

b. Work Zone Signs. Work Zone Signs (Special) are signs whose legends are specific to the project for which they are fabricated, and if used, will be designated in the Contract Documents. Do not place signs that restrict pedestrian and bicycle traffic on sidewalks or other areas designated for pedestrian or bicycle use. Signs that are anticipated to remain in place for 3 days or less are considered "portable". Mount portable signs on an approved support at least 12 inches above the edge of the traveled way. When directed by the Engineer, mount portable signs on an approved support at least 5 feet above the traveled way for increased visibility. Do not use the legend "Travel at Your Own Risk" on any sign.

When an existing Stop condition changes to a new location, or when a new Stop condition is created, attach 2 fluorescent-red flags and a Type "B" red high intensity warning light to the Stop sign posts. Leave flags and lights in place for at least 30 days after installation. Install or relocate the symbolic Stop Ahead sign (W3-1) an "A" distance in advance of the Stop sign if the Stop sign is not visible for a minimum "A" distance. See standard drawings to determine "A".

Remove, store and reset existing signs that interfere with the work, but are intended to remain in place after the project is complete. This work will be considered subsidiary to other bid items. Remove, turn away from all traffic or cover traffic signs or signals that conflict with or are not applicable to the traffic operations.

When existing signs need to be covered, use an opaque, breathable material. Do not use plastic bags, burlap or similar materials. Hanging or bolting rigid material to the sign is acceptable when approved by the Engineer and spacers are used to minimize contact between the rigid material and the sign face. Rigid components of the cover, such as a handle for lifting, shall not hang below the minimum sign height. Do not place tape directly to the face of any existing sign.

Install sign posts as shown in the Contract Documents. Mount signs that are anticipated to remain in place for more than 3 days on approved posts. Posts should extend to the top edge of the sign, but no more than 6 inches above the sign. In the case of hitting rock, or otherwise not being able to drive posts to comply with Contract Documents, shift sign location without violating minimum sign spacing or use a crashworthy sign stand, with the Engineer's approval.

The Engineer will establish all work zone speed limits, except for pilot car operations. Only use the Reduced Speed Ahead (W3-5) sign if the Engineer determines that a reduced speed is required on the project. Install Work Zone plaques (KM4-20) above all existing and temporary Speed Limit (R2-1) signs located between the Road Work Ahead (W20-1) and the End Road Work (KG20-2). Do not allow the plaque to overlap any portion of the Speed Limit sign.

Where two work zones are less than a mile apart in rural areas, or less than ¼ mile apart in urban areas, eliminate the End Road Work (KG20-2) for the first work zone and the Road Work Ahead (W20-1) for the second work zone.

c. Work Zone Barricades. To fully close a road, place Type 3 barricades end-to-end from pavement edge to pavement edge with striping sloped downward toward the center of the road. When Contractor access is required, stagger barricades longitudinally far enough apart that the intended vehicles can safely weave through while still maintaining the appearance of a full closure from the approach. Realign barricades end-to-end to fully close the road when construction activity has ceased for the day. When barricades are placed end-to-end or staggered, mount a Type "A" light to the top of the outside vertical post of each of the end barricades using crashworthy hardware.

Place winged Type 3 barricades in a level position off the pavement or on the shoulders when shown in the Contract Documents. Mount a Type "A" light to the top of each outside vertical post of each winged barricade using crashworthy hardware.

To fully close a sidewalk or other pedestrian pathway, place pedestrian barricades or pedestrian channelizers on the pathway from edge to edge.

d. Flashing or Sequencing Arrow/Warning Display Signs. Where specified, provide, install and maintain a lighted sign capable of displaying flashing or sequential arrows/warnings as shown in the Contract Documents. Mount on a portable chassis and operate continuously when required to divert or warn traffic. Adjust the lamp intensity for the display to prevent a blinding effect and to compensate for daytime and nighttime light conditions.

Use the arrow panel in Caution Mode or Alternating Diamonds Mode only for shoulder work, roadside work near the shoulder, blocking the shoulder or for temporary closure of 1-lane on a 2-lane 2-way roadway.

e. Portable Changeable Message Sign (PCMS). Where specified, provide, install and maintain a PCMS as shown in the Contract Documents. Mount on a portable chassis and operate continuously when required. Adjust the lamp intensity for the display to prevent a blinding effect and to compensate for daytime and nighttime light conditions. When feasible, place the PCMS behind guardrail or barrier, or delineate with channelizers. Messages must be approved by the Engineer prior to use.

f. Channelizers. Install the individual devices used for the channelization of traffic through the work area, as shown in the Contract Documents.

Channelizers (Fixed) are devices that are physically adhered to the road surface with an adhesive or mounting hardware, or are embedded into the ground.

Channelizer (Portable) devices are those that are self-standing and are held in place with deformable ballast material that is either integral with the device or is applied on or around the base of the device. When the Contract Documents specify Channelizer (Fixed), only fixed channelizers may be used. When the plans specify Channelizer (Portable), the Contractor has the option to use either fixed or portable devices, as approved by the Engineer.

Keep the devices clean and bright for maximum target value.

Traffic cones may be used as channelizing devices for daytime operations only.

Place channelizers according to the following:

(1) Tapers. Space devices in merging and shifting tapers so they do not exceed a distance in feet equal to ½ the posted speed limit (mph) prior to work starting.

(2) Advanced Warning Area and Activity Area. Space devices in the advanced warning area and the activity area so they do not exceed a distance in feet equal to 2 times the posted speed limit (mph) prior to work starting. Spacing should be reduced in some situations, such as to delineate access points or to maintain positive guidance when traffic regularly moves slowly in the work zone.

(3) Visibility. Place channelizing devices for optimum visibility, normally at right angles to the traffic flow.

(4) Diagonal Striping. Alternating diagonal orange and white striping must slope downward in the direction that traffic is expected to pass.

(5) Directional Barricades. Place direction indicator barricades in series to direct traffic onto the new path.

(6) Pedestrian Channelizers. Place pedestrian channelizers, as shown in the Contract Documents, along entire intended route, and end to end so that there are no gaps in the detectable edging or in the hand trailing surfaces.

g. Automated Flagger Assistance Devices (AFADs). The Contractor may choose to use a trained flagger operating an AFAD in lieu of a flagger at any time. Such use of AFADs will be subsidiary to other contract items.

h. Warning Lights. Use the required type warning lights as shown in the Contract Documents.

Provide, install, and maintain Type “A” warning lights which are lighted from sunset to sunrise. Use Type “A” warning lights on all post mounted action warning signs greater than 5 feet high. Do not use lights on portable signs.

Provide, install, and maintain red Type “B” (high intensity) lights lighted 24 hours per day. Use Type “B” lights on all changed and new Stop conditions.

Maintain lights so they are visible on a clear night from a distance of 3000 feet.

Mount warning lights on action warning signs, as shown in the Contract Documents, on the top of the sign post nearest to the traveled way such that moving flags will not interfere with the visibility of the warning light.

Mount the battery case, for warning lights whose batteries are located in a separate case, no higher than 1 foot above the ground and on the back side of the post holding the light.

Signs that require warning lights also require 2 flags. Flags are made of 18-inch square fluorescent red-orange cloth-like material. Do not use rigid material for the flags. Mount the flags as shown on the Contract Documents on flag staffs that are long enough to allow the flag to flutter without obscuring the warning light or sign.

i. Temporary Pavement Marking and Temporary Raised Pavement Markers (RPMs). When traffic is carried through construction, provide and maintain temporary pavement marking and temporary RPMs as shown in the Contract Documents. When work will occupy a location more than 3 days, remove or mask all conflicting pavement marking and any markings specified in the Contract Documents, according to **SECTION 808**, and mark all transition tapers, crossovers, relocated lane lines and relocated edge lines with temporary pavement marking. Use temporary pavement markings according to **TABLE 805-1**.

TABLE 805-1: TEMPORARY PAVEMENT MARKING ***	
Type	**Use**
Type I	Final surface (new pavement or any surface that will remain when the project is complete). When Type I is specified and in areas where permanent pavement marking will be placed in the same layout/location as the temporary markings, the Contractor has the option to use either Type I tape or paint. Do not use paint on final surfaces where the markings will not follow the same layout/location.
Type II	Any surface that is to be removed or covered by future construction. When Type II is specified, the Contractor has the option to use Type I tape, Type II tape, or paint.

***Do not use paint on Ultrathin Bonded Asphalt Surfaces to remain in place.

(1) Configuration. The following are general guidelines for temporary pavement marking and temporary RPM configurations. Use **TABLE 805-2** and **TABLE 805-3** to determine broken pavement marking dimensions.

- Solid and Broken (8 ft.) markings are intended for use on expressways, freeways, and for traffic configurations in place longer than 45 days, where the markings are different from the original or final pavement markings.
- Broken (3 ft.) markings are intended for use on intermediate lifts of asphalt surfacing projects where movement of traffic through the project is required, and on final surfaces that are opened to traffic prior to placing the permanent pavement markings.
- Flexible Raised Pavement Markers (Broken (8 ft.)), for use on expressways and freeways, and Flexible Raised Pavement Markers (Broken (3 ft.)) are for use in place of tape or paint for resurfacing projects where the permanent pavement marking is expected to be in place within 14 days.
- Dotted extension lines may be used to provide extra guidance through intersections or interchanges.
- Use the severe curve pattern on curves with less than a 1000-foot radius.
- Rigid Raised Pavement Markers (Type II) with Tubular Markers (Channelizer (Fixed)) in a repeating cycle according to the Contract Documents are used to separate opposing traffic in a normally divided roadway that is head to head during construction.

TABLE 805-2: BROKEN MARKING DIMENSIONS			
Type	**Approximate Length (ft.)**	**Gap (ft.)**	**Repeating Cycle (ft.)**
Broken (8 ft.)	8	24	32
Broken (3 ft.)	3	29	32
Dotted Extension	2	4	6
Severe Curve	2	14	16

TABLE 805-3: TEMPORARY RPM DIMENSIONS					
Condition	**Approximate Length (ft.)**	**Number of Devices**	**Approximate Device Spacing (ft.)**	**Gap (ft.)**	**Repeating Cycle (ft.)**
Broken (8 ft.)	8	6	1.5	24	32
Option	10	6	2	22	32
Broken (3 ft.)	3	3	1.5	29	32
Option	4	3	2	28	32
Severe Curve	2	3	1	14	16

(2) Placement. Place temporary pavement marking and temporary RPMs as close as practical to the intended alignment and parallel to the intended line. On HMA surfacing projects when traffic is being carried through the project, place temporary marking after each lift of HMA has been placed and before traffic is allowed on the new lift. Place temporary marking on intermediate HMA lifts within approximately 12 inches of the intended alignment. Place temporary markings on the final surface within approximately 6 inches of the intended alignment.

Place either temporary or permanent pavement markings or temporary RPMs the same day the existing markings are removed, and before opening to traffic, at the following locations: yellow skip line on undivided roads, white skip lines on multi-lane sections, white gore lines, white intersection dotted extension lines, and solid yellow ramp edge lines. Fixed tubular markers or conical delineators may be placed, and if used shall be maintained, in lieu of temporary gore lines with the Engineer's approval. If used, space the devices at 5-foot intervals on the gore edge line. They are subsidiary to other temporary pavement marking bid items.

(3) Maintenance. Maintain all temporary pavement markings and temporary RPMs for the duration of the project and for 14 days after the work is complete. Temporary pavement marking and temporary RPMs must be in an acceptable condition and location, as described in the Contract Documents.

When temporary pavement markings or temporary RPMs are deemed deficient by the Engineer (no longer retroreflective, damaged, displaced, etc.), the Engineer will notify the Contractor in writing of areas requiring replacement.

Replacement of temporary pavement marking or temporary RPMs could be required as soon as 24 hours from notification and will be noted in the notification. Failure to replace the temporary pavement marking or temporary RPMs within the allotted time could result in a deduct of $500 per day. Deduct assessments are cumulative until deficiencies are corrected, and could be assessed even if the project is in liquidated damages for failure to complete work within the specified time.

Conditions considered for deduct include, but are not limited to the following:

- Visibility less than 300 feet in daytime or nighttime conditions.
- Retroreflectivity less than what is specified for the specific type of pavement marking (**SECTIONS 806** and **807**) or temporary RPM (**DIVISION 2200**).
- Loss of material.

Temporary pavement marking or temporary RPMs exceeding the following loss thresholds are subject to the indicated daily deduct:

- Continuous markings cannot have deficiencies of more than 10% of the total feet of pavement marking. Also, no more than 50 consecutive feet can be deficient nor can any deficiency be within 10 feet of another deficiency.
- Intermittent markings, including but not limited to RPMs and broken markings, cannot have deficiencies of more than 10% of the total number of devices (or 10% of the broken markings required) and no more than 2 consecutive devices or markings can be deficient.
- No more than 10% of any temporary marking or temporary RPMs in a curve can be deficient.

(4) Temporary Pavement Marking Tape. Apply pavement marking tape according to the manufacturer's recommendations. If solid lane markings are required, cut through the entire width and thickness of the tape at approximately 100-foot intervals after it is applied to the pavement.

When shown in the Contract Documents, or with the Engineer's approval, apply line masking tape to the surface to temporarily cover the existing pavement markings in widths or sizes sufficient to extend approximately 1 inch beyond the edges of the existing pavement markings.

(5) Traffic Line Paint. When paint is approved, comply with **SECTION 807**.

(6) Flexible Raised Pavement Markers. With the Engineer's approval, the Contractor may place flexible RPMs in lieu of temporary skip lines and solid lines as shown in the Contract Documents. Adhere according to manufacturer's recommendations.

When used on asphalt seals, place the flexible RPMs on the roadway prior to the sealing operation and remove the cover protecting the retroreflective material after the sealing operation.

The adhesive used shall allow the markers to be removed without damage to the roadway surface. Acquire the Engineer's approval before using epoxy as an adhesive.

(7) Rigid Raised Pavement Markers (Type I or Type II). Install and maintain rigid RPMs at locations shown in the Contract Documents. Install and maintain according to the manufacturer's recommendations.

j. One Way Traffic. Provide 2-way traffic and avoid 1-way traffic, where reasonable. When 1-way traffic is required, do so according to the following:

(1) Flaggers. Provide courteous, competent flaggers, able to communicate with the traveling public, to direct traffic in a one-way traffic operation. Flaggers must be trained once every 3 years on the flagger procedures outlined in Part VI of the MUTCD and on the flagger procedures outlined in the KDOT Flagger Handbook, latest

version. Trained flaggers are expected to behave in accordance with the previously stated flagger procedures regardless of the source of the training. Once trained, flaggers shall carry certification cards showing the flagger's name and date of training. Copies of the KDOT Flagger Handbook are available on the KDOT website, from the Engineer or from the Bureau of Transportation Safety and Technology.

In addition to being trained in flagger procedures, flaggers shall have and use the following equipment:

- Stop/Slow Paddles: Equip flaggers with a minimum 18-inch wide Stop/Slow sign mounted on a rigid staff that is a minimum of 60 inches long from the end to the bottom of the sign.
- Flags: In emergency situations, equip flaggers with flags that are bright red, a minimum of 24 inches square, and attached to a minimum 36-inch long staff. Flags used at night shall be retroreflective.
- Apparel: Flaggers shall wear high visibility headgear and an ANSI Class II vest while on duty during daytime operations. When nighttime work is required, flaggers shall wear ANSI Class E retroreflectorized pants in addition to the high visibility headgear and ANSI Class II vest.
- Illumination: When nighttime work is required, illuminate flagger stations and equipment crossings with temporary lighting. Place all lighting so that it does not create a disabling glare for approaching road users, flaggers or workers. To determine if lighting is adequate and if disabling glare exists, drive toward the flagger station from all approaches at night.

(2) Law Enforcement. The Contractor may use uniformed enforcement officers as flaggers. When used as a flagger by the Contractor, law enforcement officers shall wear their official uniform with badge and meet the requirements for Flagger Apparel as shown in the Contract Documents.

(3) Traffic Signal Installation (Temporary). Install temporary traffic signals as shown in the Contract Documents. Place temporary signals on the shoulder when feasible, and in all cases, delineate with channelizers.

Temporary traffic signals may be used in lieu of flaggers and left unattended when each approach is visible to the other, and when approved by the Engineer. When each approach is not visible to the other, or if unattended signals are not approved by the Engineer, then the signal shall be manually operated, directly or by remote, by a Flagger trained in the operation of the signal. Temporary signals may be used at night. When signals are controlled by flaggers at night, comply with all nighttime flagger requirements. A single flagger may simultaneously operate multiple signals when:

- The flagger has an unobstructed view of the signals
- The flagger has an unobstructed view of approaching traffic in each direction; and
- The flagger is accurately able to read the signals' indicators.

(4) Automated Flagger Assistance Device (AFAD). AFADs may be used in the same manner as temporary traffic signals, except that they cannot be left unattended. Manually operate the AFAD directly or by remote, by a Flagger trained in the operation of the AFAD. AFADs may be used at night when the AFAD station is illuminated with temporary lighting and all other nighttime flagger requirements are met. A single flagger may simultaneously operate multiple AFADs when:

- The flagger has an unobstructed view of the AFADs;
- The flagger has an unobstructed view of approaching traffic in each direction; and
- The flagger is accurately able to read the AFADs' indicators.

(5) Pilot Cars. A pilot car may be used to assist and lead traffic between flaggers or flagger-manned AFADs. Maintain pilot car operations continuously, causing no delay to traffic for reasons such as refueling and breaks. The maximum time for a pilot car round trip is 15 minutes. Coordinate the work accordingly. Do not use the pilot car for other purposes.

Equip the pilot car with signs reading "Pilot Car Follow Me," complying with Contract Documents as they pertain to sign sheeting and lettering requirements. Mount signs a minimum of 1 foot above the top of the vehicle and clearly visible from the front and rear. Display the Contractor's company logo and contact information on pilot car vehicles.

Maintain one-way traffic and use the pilot car to restrict speeds to a maximum of 40 miles per hour in the work zone and restrict speeds in the vicinity of workers to 20 miles per hour until the last car in the pilot queue exits the vicinity of the workers.

k. Height Differential Treatment. On projects that carry traffic through construction, the following criteria shall be considered a minimum for treatment of height differentials adjacent to traffic lanes. A height

differential is defined as the vertical distance between the top of the surface being constructed (or the riding surface) to the top of the adjacent pavement. Use **TABLE 805-4** to determine what treatment is required for the given situations.

When **TABLE 805-4** indicates the use of signs as part of the Traffic Control Plan, place the signs at the beginning of the condition and at each intersecting crossroad or approximately half mile intervals and remove or cover the signs when not applicable.

When the table indicates the use of a wedge, use hot mix asphalt or other material that will remain intact under anticipated traffic as approved by the Engineer.

TABLE 805-4: HEIGHT DIFFERENTIAL TREATMENT

Condition	Height Differential ("D")	Treatment
Nominal height differential between driving lanes open to traffic	1 inch < D ≤ 2 inches	Use the Uneven Lanes signs (W8-11) as part of the Traffic Control Plan.
	2 inches < D ≤ 4 inches	Use the Uneven Lanes signs (W8-11) as part of the Traffic Control Plan. Construct a 3:1 or flatter slope wedge against the pavement edge.
	D > 4 inches	This condition is not permitted unless otherwise indicated by the contract documents.
Nominal height differential between driving lane and shoulder or adjacent pavement that is closed to traffic	D ≤ 2 inches	Use the Shoulder Drop-Off sign (W8-17 and W8-17P) as part of the Traffic Control Plan.
	2 inches < D ≤ 4 inches	Use Shoulder Drop-Off signs (W8-17 and W8-17P) signs as part of the Traffic Control Plan. Construct a 1:1 or flatter slope wedge against the pavement edge. Channelizing devices may be used instead of a wedge if approved by the Engineer and when placed so the maximum device spacing, measured in feet, is equal to the posted speed limit prior to construction. height differential is expected to last longer than 2 weeks, the use of a 3:1 or flatter slope wedge against the pavement edge is required and the use of channelizing devices instead of a wedge is not permitted unless otherwise indicated in the Contract Documents.
	D > 4 inches	To the extent feasible, provide an obstruction free recovery area between the channelizing devices and height differential. Use Shoulder Drop-Off signs (W8-17 and W8-17P) as part of the Traffic Control Plan. **Construct a 3:1 or flatter slope wedge against the pavement edge.** Channelizing devices may be used instead of a wedge as approved by the Engineer when the channelizers are placed so the maximum device spacing, measured in feet, is equal to the posted speed limit prior to construction and no height differentials greater than 4 inches are left overnight without a wedge, unless otherwise indicated in the Contract Documents.

l. Weather and Increased Traffic Volume Conditions. During periods of inclement weather, or during periods of unusually heavy traffic, from any cause, the Engineer may require construction operations to cease in order to adequately handle traffic. The Engineer reserves the right to require the suspension or delay of certain operations, or the speeding up of specific operations, to obtain a sequence of operations that will aid the movement of traffic.

805.4 MEASUREMENT AND PAYMENT

a. General. No Adjustments in the contract unit price will be made regardless of the amount of underruns or overruns.

b. Traffic Control (Lump Sum). When traffic control is shown in the Contract Documents as a lump sum it will be measured as such. The Engineer will not measure Uneven Lane signs (W8-11), Shoulder Drop Off signs (W8-17 and W8-17P), or wedge material for separate payment.

TABLE 805-5: TRAFFIC CONTROL (LUMP SUM) PARTIAL PAYMENTS

Percent of Original Contract Amount Completed*	Pay Lesser of the Two	
	% of Traffic Control	% of Original Contract Amount
10	50	5
80	100	10
100	100	NA

*The Percent of Original Contract Amount Completed = the amount earned by the Contractor** divided by the total dollar value of the original contract (all bid items).
**Do not include monies earned for "Mobilization", "Traffic Control (Lump Sum)", "Contractor Construction Staking" and "Stored Materials".

c. Individual Devices and Pavement Marking.

(1) General. When bid items are shown in the Contract Documents for individual traffic control devices, the Engineer will measure each item by the designated unit when the device is required and in acceptable condition and position. Once the Contractor has been notified, payment will not be made for any traffic control devices that remain in an unacceptable condition beyond the time specified in the notification.

Measurement for payment of traffic control devices will begin on the day they are installed for traffic control and direction. When traffic control devices are not needed, they shall be removed or covered and will not be measured. During non-working periods such as Sundays and holidays, the list of devices in satisfactory condition and location will be measured for payment on the day following, to determine the measurement for pay. During suspended periods, measurement of the devices used will be based on periodic checks conducted by the Engineer. These periodic checks do not relieve the Contractor of responsibility for traffic control. Units used for only a portion of a day will be paid for as one full day's use, regardless of the length of time they are used during the day and number of times the unit is moved and re-erected.

The following items are subsidiary to other items when specified by the Traffic Control Plan, shown in the Contract Documents, or used in an approved alternate Traffic Control Plan: barrier delineators, traffic cones, pilot cars, flaggers, temporary traffic signals used in addition to flaggers, AFADs, and wedges at the pavement edge, or channelizing devices used in lieu of wedges. Traffic cones and all traffic control devices used to delineate vehicles, equipment, tools, debris and materials stored within the right-of-way or 30 feet from the edge of the travelled way, whichever is less, are subsidiary to other items. The temporary removal, storage, and final placement of existing signs that conflict with construction work, but are intended to remain in place after the project is complete, is subsidiary to other items and signs damaged while in the Contractor's possession will be replaced at the Contractor's expense.

(2) Work Zone Signs (Size). The Engineer will measure each Work Zone Signs (Size) per each calendar day the device is required in acceptable condition and position.

(3) Work Zone Sign (Special)(Size). The Engineer will measure each Work Zone Signs (Special) when the sign is first installed and in place for traffic control and direction. No additional measurement will be made for relocating, repairing or maintaining the special signs. On the first estimate following the initial installation of a Work Zone Sign (Special), the price bid per sign will be paid for each sign installed.

(4) Barricades. The Engineer will measure each Work Zone Barricade per each calendar day the device is required in an acceptable condition and position. Quantities shown in the Contract Documents are for estimating purposes only. Quantities for barricades are estimated using 8-foot barricades.

(5) Arrow Displays and Portable Changeable Message Signs. The Engineer will measure each flashing warning or sequential arrow display and PCMS each calendar day the device is required and in an acceptable condition and position.

(6) Channelizer (Fixed, Portable, or Pedestrian). The Engineer will measure each channelizer, except traffic cones, per each calendar day the device is required in an acceptable condition and position.

(7) Work Zone Warning Lights (Type "A" or red Type "B"). The Engineer will measure each warning light per each calendar day the device is required in an acceptable condition and position.

(8) Temporary Pavement Marking and Temporary Raised Pavement Markers. The Engineer will measure temporary pavement marking and flexible RPMs used on HMA or other asphalt type surfaces per line of pavement marking per lift per station line. When double yellow centerline marking is required, the Engineer will measure both

lines for payment. The Engineer will measure temporary pavement marking and flexible RPMs used on other types of surfacing construction per station per line. If the Contractor elects to use Type I temporary pavement marking tape in place of Type II tape, the Type I marking will be measured and paid for as Type II temporary pavement marking. Required removal of all types of temporary pavement marking is subsidiary to other items in the contract.

When necessary, removal of existing permanent pavement markings will be measured and paid for according to **SECTION 808**. Required removal of all types of temporary pavement marking is subsidiary to other items in the contract.

The Engineer will measure each rigid RPM. No additional measurement will be made for cleaning or replacement of markers.

Contract Deduct assessments are cumulative until deficiencies are corrected.

(9) Flaggers (Set Price). When flaggers are specified in the Contract Documents or approved Traffic Control Plan, they will not be paid for separately, but will be considered as subsidiary to other bid items. If the Contractor is allowed to use temporary traffic signals in lieu of flaggers, temporary signals will not be paid for separately, but will be considered subsidiary to other items of the contract. If the Contractor elects to use AFADs in addition to flaggers, AFADs will not be paid for separately, but will be considered subsidiary to other items of the contract. If the Engineer determines that additional flaggers are required, each additional flagger will be measured for each hour they are required.

(10) Traffic Signal Installation (Temporary). The Engineer will measure temporary traffic signals by the Lump Sum, when shown in the Contract Documents as part of the Traffic Control Plan. The Engineer will make payments as follows:

Pay 75% of the contract unit price after the traffic signals are initially installed and operational.

Pay 100% after the traffic signals are no longer needed for the movement of traffic and have been removed or stockpiled, as specified.

(11) Traffic Control (Initial Set Up). If the amount bid for this item is less than 25% of the sum of amounts bid for all traffic control items, 100% of the amount bid for this item will be paid on the first estimate following the beginning of any traffic control set up done on the project. If the bid amount for this item is 25%, or greater, than the sum of the amounts bid for all traffic control items, the amount equal to 25% of the sum of the amounts bid for all traffic control items will be paid on the first estimate following any traffic control set up done on the project. Upon completion of all work on the project, 100% of the amount bid for this item will be paid.

(12) Uneven Lane and Shoulder Drop Off Signs. When individual traffic control bid items are shown in the Contract Documents, the Engineer will measure the Uneven Lane signs (W8-11) and the Shoulder Drop Off signs (W8-17 and W8-17P) each per day. See **subsection 805.4b.** when traffic control is bid lump sum.

(13) Liquidated Damages. Once the Contractor is being assessed liquidated damages according to **SECTION 108**, no traffic control devices will be measured for payment. This does not relieve the Contractor from the responsibility for providing and maintaining all necessary traffic control on the project until it has been completed and accepted. Such traffic control will be at the Contractor's expense.

On calendar completion date projects with interim completion dates, no traffic control devices will be measured other than those required between the interim completion date and the next beginning work period. This does not relieve the Contractor from the responsibility for maintaining all necessary traffic control on the project until it has been completed and accepted.

Contract Deducts may be assessed while the contract is in liquidated damages.

d. Payment. Payment for all individual traffic control devices, "Pavement Marking (Temporary)", "Flexible Raised Pavement Markers", "Rigid Raised Pavement Markers", "Traffic Signal Installation (Temporary)", "Traffic Control" and "Traffic Control (Initial Set Up)" at the contract unit prices is full compensation for the specified work. Payment for "Flaggers (Set Price)" at the contract set price is full compensation for the specified work.

If any deductions are assessed due to the Contractor's failure to complete required corrective actions, the Engineer will deduct any such assessment from the date the assessment is first made until corrective action is performed using the bid item Contract Deduct.

No payment will be made while Contractor is assessed liquidated damages for failure to comply with winter shutdown period or project completion date in other Project Special Provisions included in the Contract Documents.