

Traffic Engineering Instructions (TEI)

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Approved: **APPROVED**
By Joshua Schultz at 2:29 pm, Dec 18, 2018 **Date:** _____
Joshua Schultz, PE
Director of Operations and Safety Bureau

Subject: **Rolling Roadblock Temporary Traffic Control Plan Guidance**

Administrative Information:

Effective Date: TEI 18 - 601 shall be effective from the date of approval.

Superseded TEI: TEI 16 - 601.

Exceptions: Not applicable.

Disposition of TEI Content: The content of TEI 18 - 601 will be incorporated into future revisions to the Vermont Agency of Transportation Standard Drawings, Traffic Design Manual and/or other applicable design guidance documentation.

Purpose:

The purpose of this TEI is to provide guidance in the development and implementation of traffic control plans for rolling roadblocks on limited access highways, for construction projects and utility permits.

Technical Information:

The content of TEI 18 - 601 is to be implemented beginning immediately for all work zones on the State Highway System for which guidance set forth in this Traffic Engineering Instruction is applicable.

General Information:

Rolling roadblocks are used when short-duration roadway construction activities are taking place in or above all lanes of a limited access highway, thus requiring traffic to be temporarily slowed rather than completely stopped. Traffic is paced at a safe speed (preferred pace speed 20 mph on freeways/expressways) to provide a gap in traffic that allows the work activities to be performed. The pace of traffic is controlled by pilot vehicles (law enforcement vehicles with blue lights flashing) driven by uniformed law enforcement personnel. Any on-ramps between the beginning point of the pacing area and the work area shall be blocked until the pilot vehicle has passed. Two-way radio contact is necessary to provide constant communication between the pilot vehicle, contractor's workers, flaggers stationed at the on-ramp locations, and the project engineer. Advance warning signs are necessary to provide adequate notice to the motorist of the traffic pacing area and the potential for a stopped condition.

Activities which may warrant the use of rolling roadblocks:

- Setting bridge beams and girders
- Pulling wires or cable across the roadway
- Placing overhead or cantilever signs
- Installing sign structures
- Blasting
- Other types of construction where the entire travel way must be temporarily closed to traffic.

Traffic Control Requirements including but not limited to:

- Obtain proper permission and approval to work within the State right-of-way.
- Rolling roadblocks shall only be conducted on limited-access highways within the State of Vermont.
- All traffic control devices used to warn or guide traffic shall comply with the latest version of the Manual on Uniform Traffic Control Devices (MUTCD), Vermont State Standards, and their latest revisions or any additional traffic control deemed necessary by the Project Manager. Failure to utilize proper measures shall be considered sufficient grounds to order cessation of the work immediately.
- All diamond-shaped signs shall be 48"x48", black legend and border on fluorescent orange background.
- All roll-up sign material shall have retroreflective sheeting equal to or exceeding the [American Association of State Highway and Transportation Officials (AASHTO) M 268 American Society of Testing and Materials (ASTM) D 4956] Type VI and Type VII, unless otherwise noted.
- All sign stands shall meet National Cooperative Highway Research (NCHRP) Report 350 or the AASHTO Manual for Safety Hardware (MASH). The appropriate resources shall be determined as described in the MASH publication.

- Portable signs shall be placed on the edge of the roadway a minimum of one (1) foot above the travelled way. All vegetation that interferes with the visibility of the sign shall be removed. When placed behind guardrail, the bottom of the sign face shall be installed above the top of the guardrail.
- If it is anticipated that traffic will back-up beyond the lead warning sign, then a uniform traffic officer (UTO) with operating lights shall be parked one half mile or more prior to where the traffic is expected to back-up. (During design, the anticipated queue length shall be checked to verify if stopping sight distance is adequate to the anticipated back-of-queue; additional traffic control devices may be necessary to ensure back-of-queue vehicular safety.)
- All traffic control personnel and personnel that are present to work within the highway right-of-way shall wear high-visibility apparel that meets the Performance Class 3 requirements of the ANSI/ISEA 1007-2004 publication entitled “American National Standard for High-Visibility Apparel and Headwear” and is labeled as meeting the ANSI 107-2004 standard performance for Class 3 risk exposure. Uniformed law enforcement officers (UTO) may wear high-visibility apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled “American National Standard for High-Visibility Public Safety Vest” and is labeled as ANSI 207-2006 for the duration of the operation.

Typical Special Conditions – to be included in the 1111 permit or adapted for use in the project plans (in which case the term Contractor should be substituted for Permit Holder, and notes that are not applicable should be omitted).

- All work shall be accomplished in accordance with the attached plan dated _____.
- Failure to complete all the work approved under this permit by the “work completion date” may result in suspension of the permit (by separate correspondence) until work is completed and approved by the Vermont Agency of Transportation.
- Permit Holder shall perform work *within a set area, at a specified time*, only during off-peak hours when traffic volumes are at their lowest and not during inclement weather. (*Provide specific information*).
- All local emergency service providers and local law enforcement shall be notified of the planned closure and notified immediately following the reopening of the highway to traffic.
 - All on-call emergency response vehicles (i.e. fire, police, ambulance, etc.) shall be allowed unrestricted passage through the Work Zone or an agreed upon alternative route will be developed by the emergency responders and the Permit Holder.

- A plan shall be in place and communicated with all parties involved, prior to the event to determine how emergency vehicles will be provided passage through the active rolling roadblock.
- The Permit Holder shall provide the District Transportation Administrator (DTA) and the Work Zone Traffic Management Engineer with a traffic control plan showing the method to control traffic. This plan must be approved by the DTA before work can commence.
- The length of the rolling roadblock should be designed to accommodate the planned work period without stopping traffic. If this is not viable then traffic shall **NOT** be stopped for more than ten (10) minutes.
- A pre-construction/preparation meeting with all parties involved must be held prior to the Permit Holder's beginning work, to discuss how the project will be completed. All logistics including communication issues and scheduling issues shall be resolved during this meeting. Note that the Permit Holder is required to notify the District Transportation Administrator five (5) working days in advance of such a meeting.
- The Permit Holder shall provide uniform traffic officers (State Police, local authorities, or sheriffs) to stop traffic during the closure.
- The District Transportation Administrator and the appropriate unit for the State Police/ Sheriff's department are to be notified a minimum of 72 hours prior to commencement of work.
- Except by special permission from the District Transportation Administrator, the only vehicles allowed within the highway right-of-way for construction purposes will be necessary to support the work that is being performed. All other vehicles will need to be parked off premises.
- Prior to construction, it is the responsibility of the Permit Holder to verify that the appropriate safety measures needed are in place, to ensure proper traffic control devices and/or personnel are available when the work activity is performed.
- Additional restrictions and conditional requirements necessary to achieve the work associated with the rolling roadblock can be found in 19 VSA Section 1111 authorized state highway access and work permit and/or the special provisions from the contract document for the project.

Typical Implementation Sequence

1. The Contractor shall submit a Traffic Control Plan (TCP) to the Agency for approval 21 days in advance of implementing the plan. The TCP shall include:
 - Project overview
 - General traffic control notes
 - Special provisions
 - Utilizing flaggers and UTOs within the Work Zone
 - Miscellaneous Information
 - Emergency & Key Personnel contact info
 - Construction Phasing & Sequencing
 - A narrative description of the work to be performed
 - A layout (map) of each phase of construction showing:
 - Existing lane configurations,
 - Existing site-specific features: ramps, rest areas/weigh stations, U-turns
 - Location of all temporary traffic control devices
 - Flagger and UTO locations
 - All pertinent dimensions shall be labelled
2. A contingency plan shall be coordinated for concerns that could stop the rolling roadblock or delay the operation (Contractors, planners and designers should pay special attention to possible ways to detour or clear traffic if needed. This plan should be developed as part of the Traffic Control Plan (TCP) as part of the rolling roadblock).
3. Once permit work has been completed, the roadway will return to normal conditions. If additional work is required on the shoulder, then additional traffic control devices and signs will be required to be added to the traffic control plan.
4. Portable Changeable Message Signs (PCMS) shall be installed seven (7) days in advance of the closure. These signs shall be placed at or in advance of the beginning of the rolling roadblock.
5. Prior to the start of work, place all necessary signs face-down or turned away from traffic's view on the shoulder, as per the approved traffic control plan, in advance of implementing the rolling roadblock.
6. Prior to the start of work all U-turns within the length of the rolling roadblock shall be closed with barrels, Type 3 barricades, or with contractor's vehicles equipped with operating yellow high-intensity rotating, flashing, oscillating, or strobe light.
7. The day of the event, all signs placed face-down or turned earlier are to be installed as to be visible to the approaching traffic.
8. At the beginning of the rolling roadblock, one UTO (blue lights flashing) per lane of travel shall begin escorting traffic toward the work area, stopping 1500 feet in advance of the work area if necessary.

9. Prior to the release of the blue-light escort, all Flaggers stationed at on-ramp locations will stop all traffic from entering the main line of traffic flow.
10. Once the blue lights begin escorting the traffic to the work area the contractor shall provide a sweep vehicle in each direction of travel displaying an activated high-intensity rotating, flashing, oscillating, or strobe light to follow the last vehicle traveling in advance of the rolling roadblock to ensure that there are no parked vehicles and no open ramps or other access points, and that the roadway is clear before the work is to begin.
11. Activated PCMS boards are to be changed to their event message once the sweep vehicle travel begins.
12. All uniform traffic officers, sweep vehicles, flaggers stationed on the ramps, and on-site supervisors shall be in direct radio contact in case something unexpected should happen. Cell phones or walkie-talkies, if radios are not workable, shall be used to communicate during the rolling roadblock implementation.
13. When work is completed, the PCMS board message shall be changed to the after-event message or be turned off.
14. Deployment and pick-up of all traffic control devices shall conform to the current MUTCD, Part 6 guidance.
15. If multiple closures are required, a successive rolling roadblock should not be started until the traffic from the preceding rolling roadblock has been sufficiently clear from the work location and traffic flows are normal.

Pacing Design Considerations

The rolling roadblock design shall evaluate the actual distance required for the pacing operation based on site-specific features, such as the following: roadway geometrics, pacing speeds, regulatory speeds, interchanges spacing, work duration, availability of traffic control officers, traffic volumes, and maximum queue lengths.

The starting point of a traffic-pacing operation must consider the following factors: the speed of the pacing vehicles, the location of entrance ramps, and horizontal and vertical alignment of the facility.

In some cases it may be necessary to close a lane at the work area to position a crane(s) and the materials to be lifted. All materials to be installed shall be on-site before the traffic pacing operation begins.

It may be necessary to install temporary barrier walls to protect pre-positioned and assembled materials in the right-of-way.

The **minimum speed allowed** for a pacing operation is 10 mph, with a 20 mph speed preferred. The **maximum allowed work duration** is ½ hour (30 minutes). The **maximum practical pacing operation length** is 10 miles.

S_r = Regulatory Speed Limit (mph) S_p = Pacing Speed (mph) t_w = work duration (min)

L = Total distance in miles

L_c = distance pace vehicles must travel before the vehicles at regulatory speed have cleared the work zone

L_w = distance pace vehicles travel while work is performed

L_b = buffer space length before the work area where traffic would be required to stop if work was not completed as scheduled covered to miles

$$L = L_c + L_w + L_b$$

$$L = \frac{t_w}{60} S_p \left(\frac{S_p}{S_r - S_p} + 1 \right) + \frac{1500}{5280}$$

| Traffic Pacing Distances (miles) – (L) | | | | | | |
|--|--|-----------|-----------|------------|-----------|-----------|
| Regulatory Speed (MPH)- (S_r) | Total Time Allowed for Work (minutes) – (t_w) | | | | | |
| | 5 | 10 | 15 | 20 | 25 | 30 |
| 70 | 2.6 miles | 5.0 miles | 7.3 miles | 9.6 miles | * | * |
| 65 | 2.7 miles | 5.1 miles | 7.5 miles | 9.9 miles | * | * |
| 60 | 2.8 miles | 5.3 miles | 7.8 miles | 10.3 miles | * | * |
| 55 | 2.9 miles | 5.5 miles | 8.2 miles | * | * | * |
| 50 | 3.1 miles | 5.9 miles | 8.5 miles | * | * | * |

*Site Specific Design Required.
Pace speed (S_p) calculated as 20 MPH for table above

Notes: The time allowed for work activity starts just after the last vehicle traveling at the pre-pacing regulatory speed clears the work area and ends just as the pacing operation reaches the work area. The time allowed for work must include the time required to clear the roadway of equipment, materials, and personnel.

The selection of the speed of the roadblock should consider the work duration and the location of upstream on-ramps which need to be closed, should generally be 15-mph or greater. Example: a 15-minute(t_w) duration would require the pace vehicle to travel 5 miles(L_w) while the work is performed at a 20-mph(S_p) pace plus an additional 2.2 miles(L_c) must be traveled to include buffer space, set-up and deceleration distance before the vehicles traveling at the regular speed have cleared the work zone. This distance noted above includes the 1500 feet before the work area where traffic would be required to stop if work was not completed as scheduled.

Sample Portable Changeable Message Sign Phases
All messages should be centered within each line of the legend

Example of PCMS message one week prior to the work activity:

| | | | |
|---------|---------|----|-----------------------|
| Phase 1 | Phase 2 | or | Phase 1 - Alternative |
| UTILITY | SUNDAY | | ROLLING |
| WORK | NOV 12 | | RD BLOCK |
| PLANNED | 7AM-9AM | | PLANNED |

Example of PCMS message while closure is in progress:

| | |
|---------|----------|
| Phase 1 | Phase 2 |
| TRAFFIC | KEEP |
| STOPPED | SAFE |
| AHEAD | DISTANCE |

Example of PCMS message when closure is completed and work activities continue:

| | | | |
|---------|----------|----|-----------------------|
| Phase 1 | Phase 2 | or | Phase 1 - Alternative |
| UTILITY | BE | | STAY |
| WORK | PREPARED | | ALERT |
| AHEAD | TO STOP | | |

Sample Sign Progression

Gate-post signs – place one assembly directly across from each other

| | |
|--|--|
| Option 1 | Option 2 |
| ROAD WORK AHEAD TRAFFIC STOPPED 2.0 MILES REDUCE SPEED AHEAD TRAFFIC STOPPED 1.0 MILE BE PREPARED TO STOP STOP AHEAD SYMBOL | UTILITY WORK AHEAD UTILITY 2 MILES UTILITY WORK 1.0 MILE UTILITY WORK ½ MILE BE PREPARED TO STOP UTILITY WORK 1500 FT |

Sign spacing will be set at half mile increments from the work area and will be set in a gate-posted position (signs installed on either side of the highway across from each other).

The work area begins a distance of 1500 feet from the pull site. This location would be the required stopping point for traffic if work was not completed as scheduled.



Rolling Roadblock Planning Checklist

Note that rolling roadblocks shall not be performed during periods of fog, rain, snow, or other inclement weather conditions. Rolling roadblocks are preferred to occur only during off-peak hours when traffic volumes are at their lowest.

Purpose

Description where, when, and why work is to take place.

| | |
|-------------------------------|--|
| Town | |
| Route | |
| Direction (NB, SB, EB, WB) | |
| When (early AM, nighttime) | |
| Date | |
| Day(s) of the week | |
| Time(s) of the day | |
| Number of lanes to be blocked | |
| Vehicle volume | |
| Entity performing work | |
| Brief description of work | |

Communication Plan

Contractor to coordinate an advance planning meeting to be held 1-2 weeks prior to event to define everyone’s responsibilities and make sure work activities required are accomplishing and all traffic control devices are in place for the event.

| | |
|--|--|
| Advance planning meeting conducted on | |
| Lead coordinator | |
| Press release (responsible party) | |
| Date of press release | |
| Newspaper(s) | |
| Television station(s) | |
| Web page | |
| Traffic Management Center (contact date) | |
| Other | |

Resources

Essential tools for successful event.

| | |
|---|--|
| Portable Changeable message sign - (Quantity) | |
| PCMS – Before message | |
| PCMS – During message | |
| PCMS – After message | |
| Traffic control pan (attach layout) | |
| # of law enforcement vehicles | |
| # of sweep vehicles with proper lights | |
| # of contractor vehicles with proper lighting to assist in closing off U-turns within pace area | |
| # of flaggers to assist in managing on-ramp traffic within pace area | |
| # of individuals with radios to communicate event plan | |
| Other | |

Emergency Management

Notification to emergency management (person responsible; a list of contacts; and written notification is recommended).

| | |
|-----------|--|
| Fire | |
| Ambulance | |
| Police | |
| Other | |

Project Contact list

Essential personnel necessary coordinate with for this event.

| | |
|---|--|
| Contractor | |
| AOT – Project manager | |
| AOT – District transportation administrator | |
| Person coordinating work area | |

Event Operations

Pace vehicles provided by law enforcement only. Means of communication with each entity at the time of the event and a list of contact information.

| | |
|---|--|
| Contractor | |
| Sub-Contract | |
| AOT – District transportation administrator | |
| AOT – Designer | |
| AOT – Construction personnel | |
| AOT – Other | |
| Law enforcement officer(s) | |
| Traffic control provider | |
| Other | |