SITE SPECIFIC

TRAFFIC CONTROL PLAN

FOR

Waitsfield BRF 013-4(39)

Bridge 177

(State of Vermont, Agency of Transportation
VT Route 100, Waitsfield, VT)

FOR

A.L. ST. ONGE CONTRACTOR, INC.

PO Box 65
Montgomery, VT 05470

February, 2016

STATE OF VERMONT
BRIAN P. SICARD
No. 53831
Civil
LICENSED
PROFESSIONAL ENGINEER

Rev. 3/10/16

Prepared by:

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SECTION 1 – GENERAL INFORMATION

1.1 Purpose:

The purpose of this Traffic Control Plan is to present site specific construction methods for work zone traffic control. This work shall consist of furnishing, installing, maintaining and removing traffic control devices necessary to provide reasonable protection & advanced warning for motorists and construction workers. The road surface will be maintained and will be free of defect or imperfections that would inhibit safe travel.

Traffic control devices include but are not necessarily limited to signs, signals, lighting devices, markings, barricades, channeling and hand signaling devices and flaggers.

This plan is intended to comply with the Traffic Control Plan Requirements and the VTrans Work Zone Safety & Mobility Guidance Document, Appendix "A" Temporary Traffic Control Devices. All traffic control devices shall conform to the requirements of Part VI of the 2009 edition of the MUTCD, Rev. 2 (Manual on Uniform Traffic Control Devices) and comply with the NCHRP 350 guidelines and the requirements of this Traffic Control Plan. This plan will be used in conjunction with the Contract Plans, Special Provisions and Notice To Bidders.

A copy of this section of the manual and this Traffic Control Plan will be available at the construction site through the Key Personnel listed in section 1.5. All subcontractors working on this project along with our project superintendent, paving foreman, site work foreman and sign foreman will be provided with a copy of this Traffic Control Plan in addition to the field office copy.

1.2 Description of Project:

The project includes the replacement of an existing bridge (No. 177) with a new bridge on the existing alignment with necessary roadway and channel work. The project is located on VT Route 100 in the Town of Waitsfield, approximately 0.8 miles south of the junction of VT Route 100 with VT Route 17 and extends southerly 576 feet along the highway. The project will use a 3 week closure period. The construction zone will include a pre-closure, closure and post closure period. The closure will require an offsite detour. The project also includes limited night work.

SECTION 2 – SITE SPECIFIC REQUIREMENTS

2.1 Work Zone Limitations

a. Work Restrictions

The work on this project will be performed during daylight hours , Monday through Friday except during the bridge closure period. The project allows a 35 day bridge closure period where work will continue 7 days per weeks and into the early night hours. The Resident Engineer will be notified in advanced of any proposed changes.

b. Permanent Signs

Permanent signs will be in place before the project starts. Any signs that are not required for the phase will be covered. Permanent signs will be installed as shown on the figures in section 3.

c. Lane Width

12 foot wide lanes will be open for passage by vehicle traffic at all times except when the road is closed. This may be reduced to one (1) 12 foot lane during working hours.

d. Traffic Impact

Construction phasing and sequencing will be used to minimize traffic impacts.

i. Delay Time

1. Delay will be limited to less than 10 minutes during active construction when one lane roads are required.
2. During the closure, through traffic will be detoured on VT 17, German Flats Road and Sugarbush Access Road. The detour is 7.3 miles. This route will add approximately 7 minutes to the North-South route.

ii. Portable Changeable Message Signs (PCMS)

PCM Signs will be used as required in the Contract to warn motorists of expected construction or detours. All sign locations shall be laid out prior to installation as shown on this Plan with final approval from the Onsite Engineer. Signs have been relocated from the Contract Plan recommendations based on site specific conditions.

e. Speed Reduction

The speed limit on VT100 north of the project area is reduced from 50 MPH south of the bridge to 40 MPH into Waitsfield. No speed reduction is proposed.

f. Lane Closure

Lane closures will only be during active daytime construction and will include mobile/portable work zone signs and flaggers.

Work Zone Lane Closure:

Signs not applicable to current work area conditions will be laid down as required by

VTrans or removed as needed.

g. Roadway Surface Conditions

The road surface maintained and open to traffic shall be free of defect or imperfections that would inhibit safe travel. There will be periods where the road will be maintained with gravel or dense graded stone. Signs for "Pavement Ends" and "Bump" will be used as shown on the phase 3 plan. Standards T-36 will also need to be used when lanes are uneven.

h. Temporary Pavement Markings

Temporary pavement markings will not be installed since paving courses will be installed during consecutive days. It is our intention to delineate the centerline and edge line with the appropriate color, retro-reflective temporary RPM's or Line Striping Targets (LST) as the work commences. Reflectors will be spaced at 10 foot increments.

i. Detours

This project includes a 35 day closure to install the new bridge. The official detour route is VT 17 to German Flats Road to Sugarbush Access Road. Use of the detour will include local roadway maintenance including pre-closure, post closure and pavement maintenance. There are other local roads that will inherently be used by locals for detoured routes as these routes are shorter than the official highway route. The other routes will not be signed.

j. Signage

- Permanent signs will be located in along approach areas as shown on the site specific plans in Section 3. Signs will not be placed such that they are obscured by existing signs or objects. The height of permanent signs will be as shown on Permanent Sign detail in Appendix A, the bottom of the sign will be no less than 7 feet above the edge of the roadway. Sign locations will not be placed such that they would interfere with existing signs. Vegetation that interferes with the visibility of the signs will be removed. When signs are placed behind Guardrails, the sign face will be above the top of the rail.

- Portable signs will be placed on the edge of the roadway and a minimum of 1 foot above the travel way.

- Permanent signs will be mounted on two steel posts, complying with NCHRP 350 and manufacturers installation procedures. The steel post installation procedure requires a lap splice breakaway system. The installation details have been included in Appendix A. In addition to the post installation methods, the top of the steel posts will not protrude above the signs when installed.

- Portable signs will be mounted on aluminum “Tri Buster” easels or “Little Buster” Steel sign stands labeled NCHRP 350/MASH and 2009 MUTCD compliant. These easels maybe tethered using a sand bag resting on the ground.

- Signs meeting the NCHRP Report 350 can continue to be used however newer sign hardware may be certified from the AASHTO Manual for Assessing Stafety Hardware (MASH).

k. <u>Nearby Projects</u>

VTransparency identifies STP SRIN(42). A sign project on German Flats Road for Safe Routes to School under construction in 2016.

2.2 Flaggers and UTO’s utilized in the Work Zones

Flaggers:

a. Flaggers will be utilized when the project is limited to one lane traffic.

b. A subcontractor or personnel that have been trained and certified for flagging in a work zone will be used. Whenever flaggers are used the FLAGGER AHEAD sign or symbol will be incorporated in the work zone sign package for proper advance notice of the presents of the flagger. Sufficient certified flaggers will be available onsite to provide for continuous flagging operations during break periods as needed. These flaggers will be informed in advance of the traffic plan and their responsibilities during the daily construction on the project. Any changes throughout the day during construction will be relayed to the flaggers to provide a safe working environment for the construction personnel and the traveling public.

c. Additional flaggers may be utilized as per the Resident Engineer.

d. All flaggers will have a supervisor and they will have two way radio communications. See **Appendix A** for hand signals in case of radio failure & for emergencies only.

Uniform Traffic Officers (UTO)

a. UTO’s will be utilized in the work zones including;

- as required by the Resident Inspector.

2.3 Night Time Traffic Control

A. General

This section has been developed to account for nighttime work that is expected from dusk to early evening hours. No overnight work is planned. This section details how work will be performed in accordance with the Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance and Construction (NCHRP Report 476). This plan has also been developed to comply with the Illumination Guidelines for Nighttime Highway Work. Generally this nighttime traffic control includes specific sections of the NCHRP Report 476.

The use of this plan and the referenced guidelines is to address the special problems that night work presents which are not covered in the Manual on Uniform Traffic Control Devices (MUTCD). The most obvious problem is that nighttime brings a reduction in visibility for both workers and drivers. The loss of visibility for workers results in the need for supplemental lighting that satisfies the visibility requirements of workers. The loss of visibility for drivers results not only from the absence of daylight and the inefficiency of headlighting, but also from the negative effects of glare and work zone lighting.

The nighttime traffic control design for the project includes advanced warning signs, detours, ramp closure, warning lights for closure, safeguards for intrusion, other devices, lane entry, pedestrian traffic, steady burn lighting, worker protection during setup and takedown, vehicle protection, worker protection and lighting requirements.

B. Night Time Traffic Control Design

1. Advanced Warning Signs

Because drivers are often less alert and are more likely to be impaired at night, the use of advanced warning signs in advance of roadway closures and detours is understood as very important

2. <u>Detours</u>

Detour signs and markers will be a critical component of nighttime detours to guide drivers along the temporary route and back to the highway beyond the temporary traffic control zone.

3. <u>Warning Lights for Closure</u>

Flashing warning lights will be used on Type III barricades at closure points to attract attention to the closure. One flasher will be on each end of the barricade. Site lighting will also be used in the closure areas.

When warning lights are used, they will be mounted on signs or channelizing devices in a manner that if hit by an errant vehicle, they will not be likely to penetrate a windshield.

Type A warning lights will be used when warning periods include 24 hour periods.

4. Additional Safeguards to Prevent Intrusion.

Type III barriers will be used to block direct traffic from entering the work area during the closure.

5. Pedestrian Traffic

Pedestrian traffic could exist while work is performed. There are no specific pedestrian facilities. Pedestrians can be guided through by flaggers during the temporary daily lane closures. Pedestrians will be turned away during the period that the road is closed.

6. Worker Protection During Setup and Takedown

Night work will occur during the closure. Detour's will remain in place during this prior and will not be modified at night. Workers will need full body high vis, ANSI 107-2004 Class 3 approved clothing and flashing lights on all work vehicles.

7. Lighting

Work vehicles will be adequately visible and identifiable at night. Individual rotating or flashing lights will be used when available as they are preferred to flashing light bars. The rotating and flashing lights perform better in terms of conveying distance information and closure rates.
Warning lights will be in operation whenever needed, but turned off when not needed to reduce the potential for driver confusion and to maintain the credibility of the lights when needed. In addition to the rotating or flashing beacons, the four-way emergency flashers will be activated on vehicles when appropriate to provide additional warning and closure rate information to the other drivers or the make parked vehicles visible when in an exposed location. To minimize distraction and driver confusion, warning lights and four-way flashers will be turned off when the vehicles are moving at normal speeds in the traffic stream for substantial distances. For this night closure, operation in the traffic stream will be for short distances and the lights will remain on to reduce the risk of the driver forgetting to turn the lights on.

8. Reflective Tape

Dump trucks and other large trucks will have reflective tape on the rear of the truck. Rollers and other equipment will have reflective tape on the front, rear and sides.

9. Worker Protection

Highway construction and maintenance work are recognized as high-risk activities for workers and those risks are generally greater at night. Apparel will be used including "whole body" Hi-Vis, ANSI 107-2004 Class 3 approved.

Informal on-site training, “tailgate safety programs” will be used to address safety issues for workers.

10. Lighting Requirements

Research has shown that lighting is one of the most important factors to nighttime construction. The smaller the object to be seen is and the less contrast the object has with its background, the more light is needed for adequate visibility.

Lighting will follow the guidelines in the NCHRP Report 498 Illumination Guidelines for Nighttime Highway Work. The three basic levels of lighting are Level I, Level II and Level III. Level I will provide a minimum of 5 foot candles, Level II will provide a minimum of 10 foot-candles and Level III will provide a minimum of 20 foot candles.

a. Construction Equipment:
Level II illumination will be used around construction equipment.

b. Glare Control:
At a minimum, the following will be met to avoid objectionable glare on roadways open to traffic.
- Portable light towers will be aimed parallel or perpendicular to the roadway.
- Portable light towers will not be aimed more than 60 degrees above the vertical (straight down).
- None of the Portable light towers will provide intensity greater than 20,000 candela at an angle of 72 degrees above the vertical.
- Mounting of shields may be used if glare is unacceptable.
- Balloon lighting is not proposed for this project.

c. Portable Light Tower Specifications
Portable light tower specifications have been included in the appendix which include acceptable fuel capacity and electrical requirements.

C. Implementation and Operation of Nighttime Traffic Control

Implementation and Operation of the Nighttime Traffic Control Plan will include work crew staffing planning, worker training, project site patrol, material availability, setup and takedown procedures, overhead power line review, emergency and contingency planning, administrative and technical oversight and supervision, trial run of night procedures, operational procedures and operational adjustments and shifts.

1. Work Crew Staffing and Planning
The full time supervisor will be responsible for managing adequate levels of staffing for night shifts.

2. Worker Training
Worker training will include making workers on nighttime projects aware of the

special risks inherent to nighttime work, along with safeguards and procedures to be followed to compensate for the risks.

3. Project Site Patrol
   Proper maintenance of traffic control devices is most critical at night. Devices are more likely to be subject to damage and disruption by impaired drivers. Staff will patrol the project at night to ensure that all devices and safety features are in good working order, making adjustments and changes as needed.

4. Material Availability
   All materials needed for the night work will be preplanned.

5. Setup and Takedown Procedures
   Night work will only occur during the closure period and within the closure.

6. Emergency and Contingency Planning

   a. Spare Parts for Contingency.
      Spare parts, spare lighting equipment and replacement traffic control items will be available for all traffic control items and other safety features that are critical at night. These will include signs, barricades, lamps and batteries.

   b. Emergency Flares
      Emergency Flares will be available onsite for nightwork emergency situations.

   c. The road will be closed during the majority of the night work.

2.4 Key Personnel and Contact Info*:

A.L. St. Onge Contractors, Inc.

Office	(802) 326-4792
Carl Gleason	(802) 782-3978

Plan Preparer:

Ruggles Engineering Services, Inc. St. Johnsbury, VT 05819
Nathan P. Sicard, P.E. (802) 748-5898, nate.res@myfairpoint.net

*FOR NON-WORKING HOUR ISSUES OR EMERGENCIES SEE EMERGENCY CONTACT INFO.

The Project Superintendent listed above have the authority to correct issues and to shut down the project if the traffic control items are not in place or not up to the standards as set forth in the MUTCD manual or as dictated in the plan. He will be responsible for reviewing work zone signs during periods of time that work is progressing on the project.

Any significant changes needed for the traffic control plan will be provided to Plan Preparer, prior to forwarding to VTrans for approval. This plan does not account for unknown miscellaneous projects within or adjacent to the work area which might affect the implementation of this traffic control plan.

2.5 Emergency Contact Information – BRF 013-4(39) Waitsfield Bridge 177

The following is a list of contact numbers for notifying the Resident & local emergency officials, and local government officials whenever significant traffic impacts are anticipated or an emergency occurs.

EMERGENCY PHONE NUMBERS:

FIRE – POLICE – AMBULANCE …… ….911

Carl Gleason (802) 782-3978

Town of Waitsfield (Town Clerk) ……..……..(802) 496-2218
waitsfld@madriver.com

Town of Waitsfield (Administrator) ……..……..(802) 496-2218
townadmin@madriver.com

Town of Warren (Clerk) …….…..…… (802) 496-2709
clerk@warrenvt.org

Town of Warren (Administrator) …….……..……..…(802) 496-2709
selectboard@warrenvt.org

Town of Fayston ……(802) 496-2454
faystonsb@madriver.com

VTrans District 5 (Colchester) …….....……....….. (802) 655-1580
David.Blackmore@vermont.gov

Vermont State Police
(Troop A Middlesex) …….…...……. (802) 229-9191

SECTION 3 – CONSTRUCTION PHASING AND SEQUENCING

3.1 GENERAL:

Construction phasing or sequencing that reasonably minimizes traffic impacts and provides a safe work area will be used. The phasing of the traffic control plan will be coordinated with the CPM Project Schedule. Although no issues or conflicts are expected, weekly meetings will be held as required to discuss any issues that may arise, to resolve any conflicts on this portion of the project and to ensure the least possible disruption to the traveling public as possible.

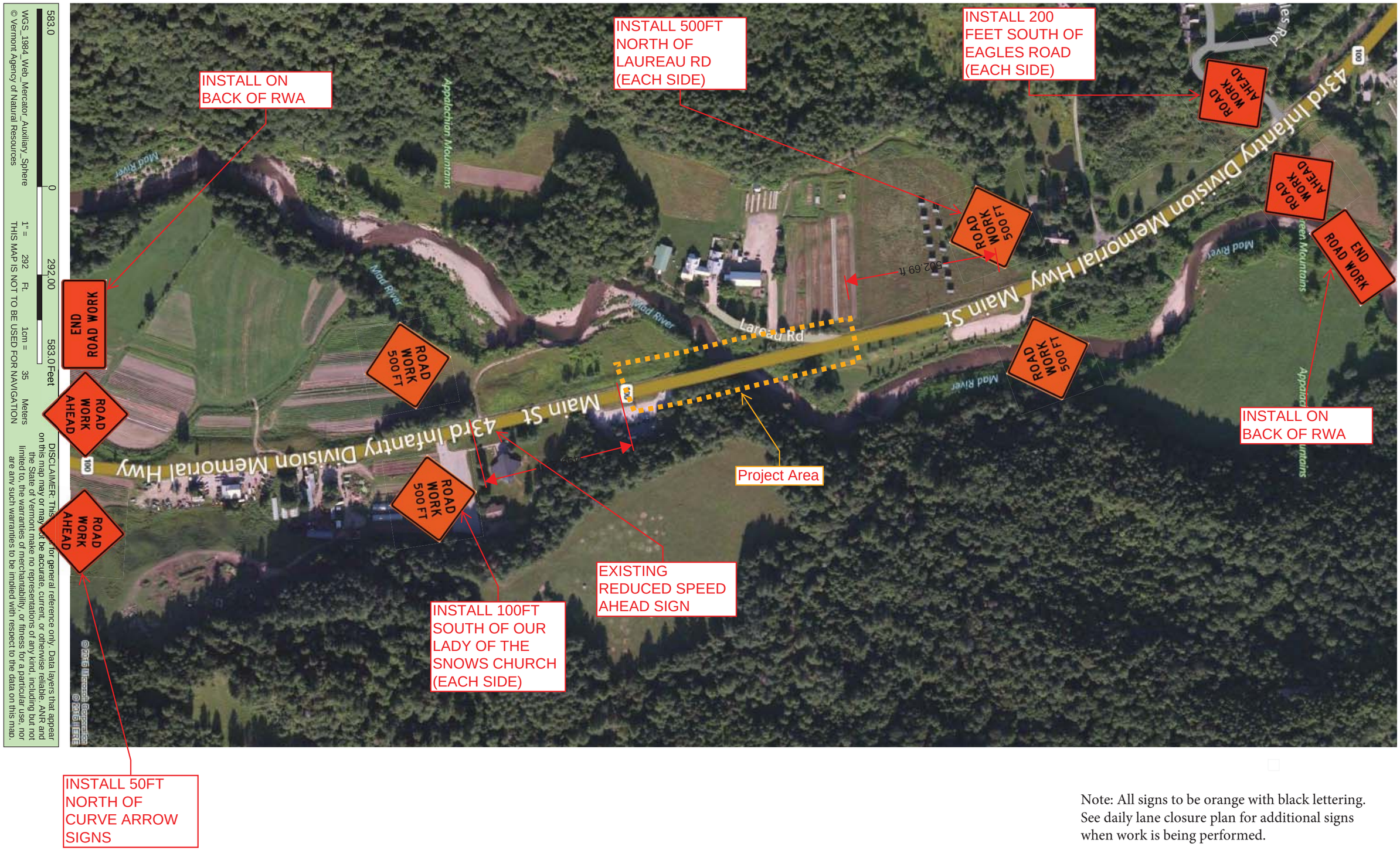
Construction workers will follow this plan and all supplemental safety plans for working in traffic.

3.2 PHASE 1 – Installation of Permanent Signage

Phase 1 will include the installation of Permanent Project Approach Signing. Signs not in use during a phase will be removed or covered. Signs will be installed as described in the following Figures. Prior to installing the signs, PCMS will be installed to warn motorists of the upcoming work.

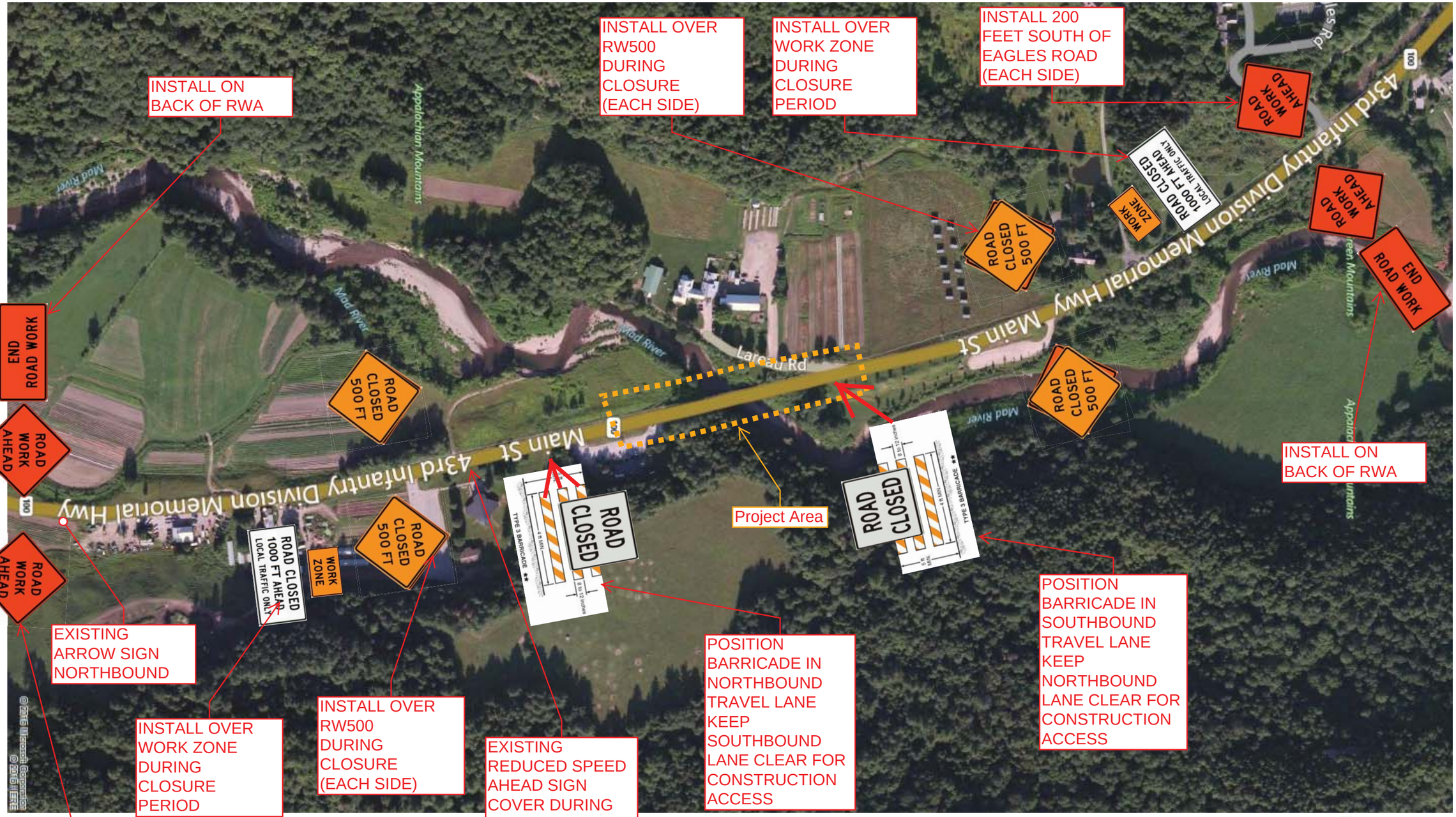
Workers will use rotating or flashing lights on the installation trucks. .

See the following figures for permanent signage locations:



Note: All signs to be orange with black lettering.
See daily lane closure plan for additional signs
when work is being performed.

PERMANENT SIGN PLAN - PRE CLOSURE PHASE 1



583.0 0 292.00 583.0 Feet

1" = 292 Ft. 1cm = 35 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

WGS_1984_Web_Mercator_Auxiliary_Sphere

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CLOSURE NOTES:

1. ROAD CLOSED SIGN TO BE MOUNTED ON TYPE III BARRICADE.

2. OTHER LIGHTING MAY BE REQUIRED FOR WORKER SAFETY THAT IS NOT SPECIFIC TO TRAFFIC CONTROL SYSTEMS AND ARE NOT PART OF THIS PLAN.

3. ALL WORK ZONE WARNING SIGNS TO BE BLACK TEXT ON AN ORANGE BACKGROUND AS DETAILED IN MUTCD

3.3 PHASE 2 – Install Temporary Controls and Stage

Phase 2 will require daily mobile/portable work zone signs for a lane closure. These signs will be placed on the shoulder in advance of the work zone. Signs will be placed at 500 foot increments and will include "Road Work Ahead", "One Lane Road Ahead" (OLRA), and "Flagger Ahead".

See Site Daily Signs in the Appendix.

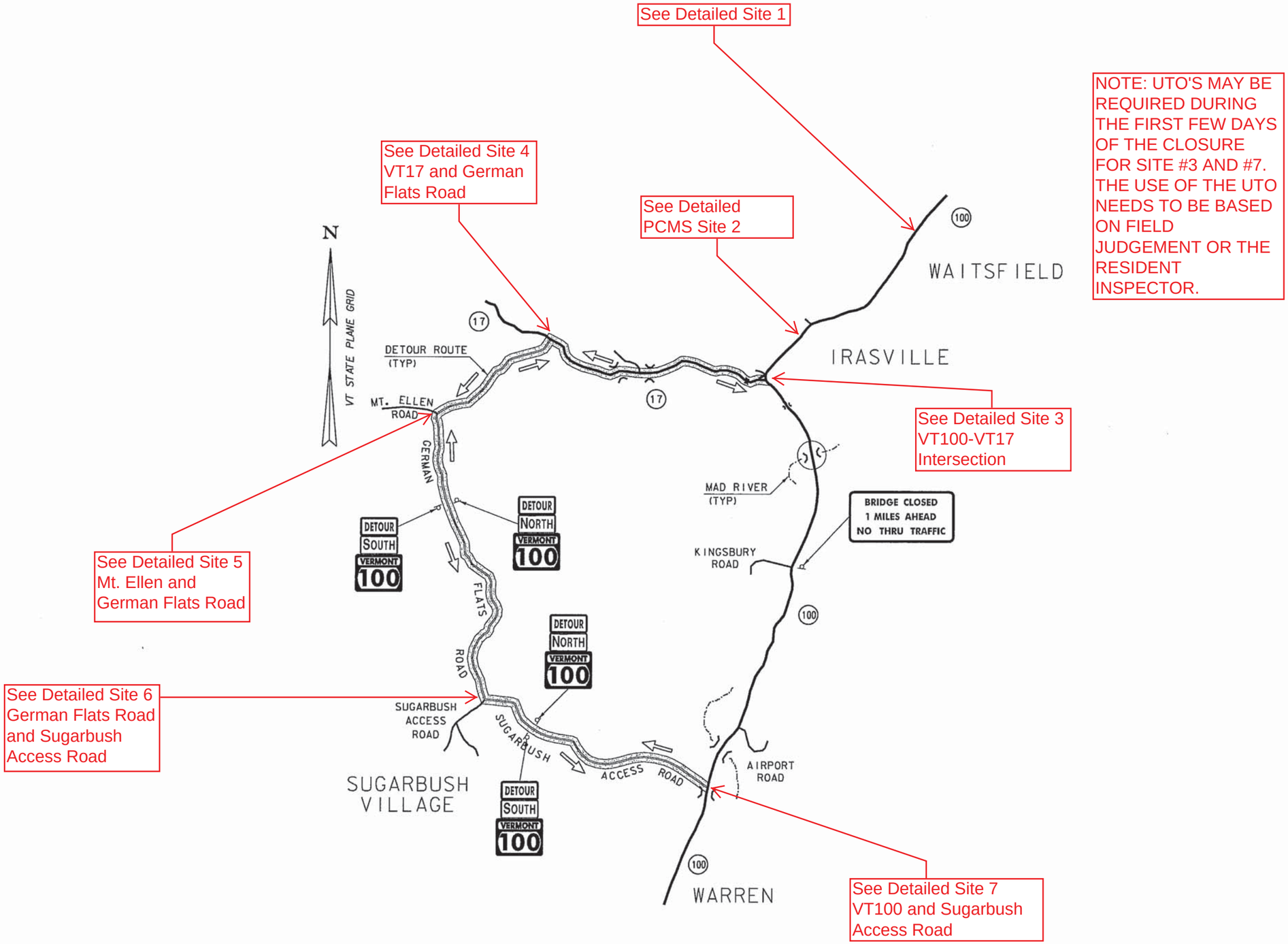
3.4 PHASE 3 – Bridge Closure Period

The bridge closure phase initiates the major construction to remove the old bridge and install the new bridge. The highway will be closed and the detour will be activated. See detour plans as follows.

This period will include 35 days as allowed in the contract. This phase will require the temporary detour to be initiated as shown on the detour plans. It will also require the installation of the road closed plan on each side of the project. Since this work is an accelerated closure, work will occur during night time hours and will also require the nighttime components for traffic control. Generally the nighttime work requirement will be additional illumination and retro-reflective requirements.

See detour Plans as follows:

OVERALL DETOUR PLAN



NOTE: UTO'S MAY BE REQUIRED DURING THE FIRST FEW DAYS OF THE CLOSURE FOR SITE #3 AND #7. THE USE OF THE UTO NEEDS TO BE BASED ON FIELD JUDGEMENT OR THE RESIDENT INSPECTOR.

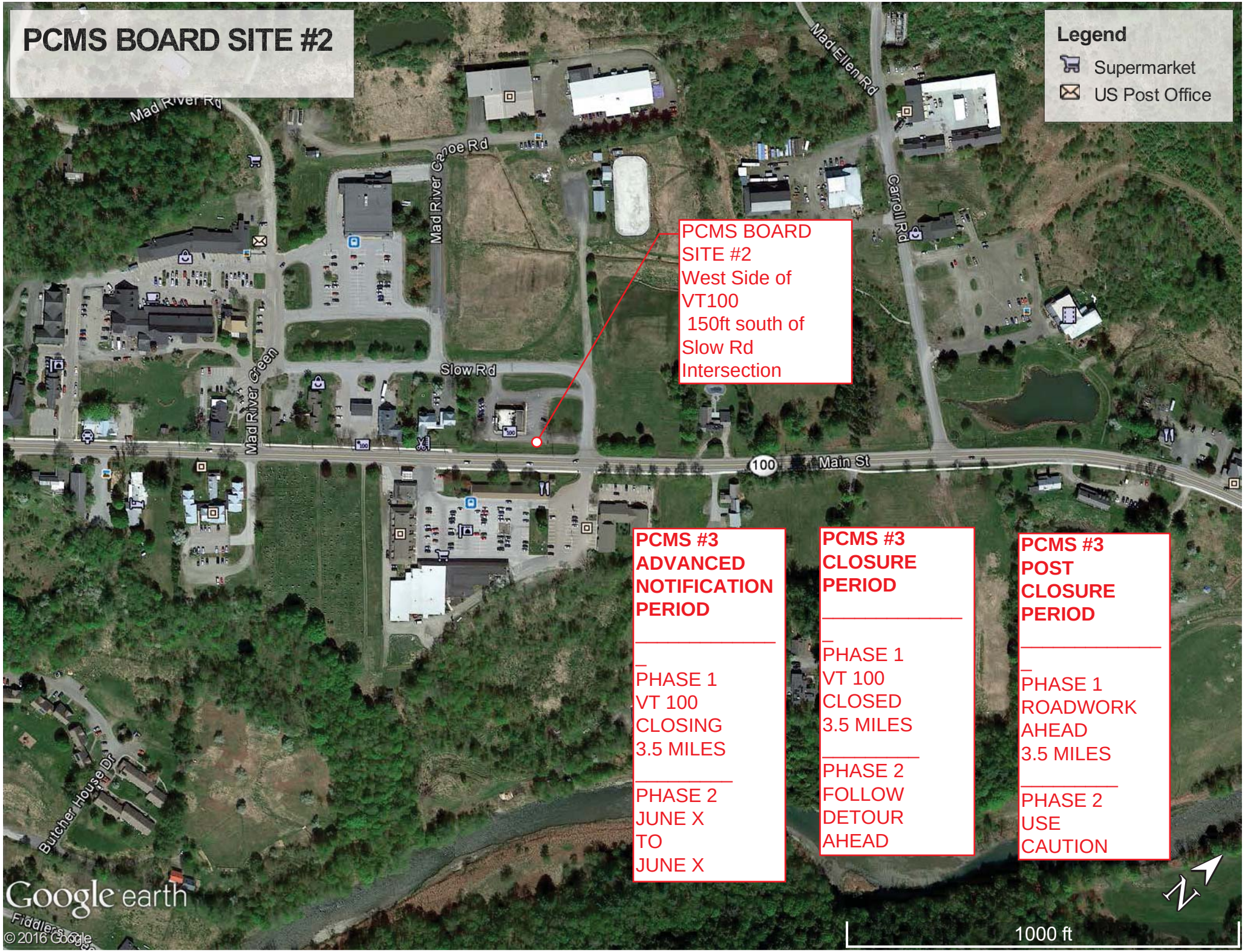
ADVANCED NOTIFICATION SITE

Legend

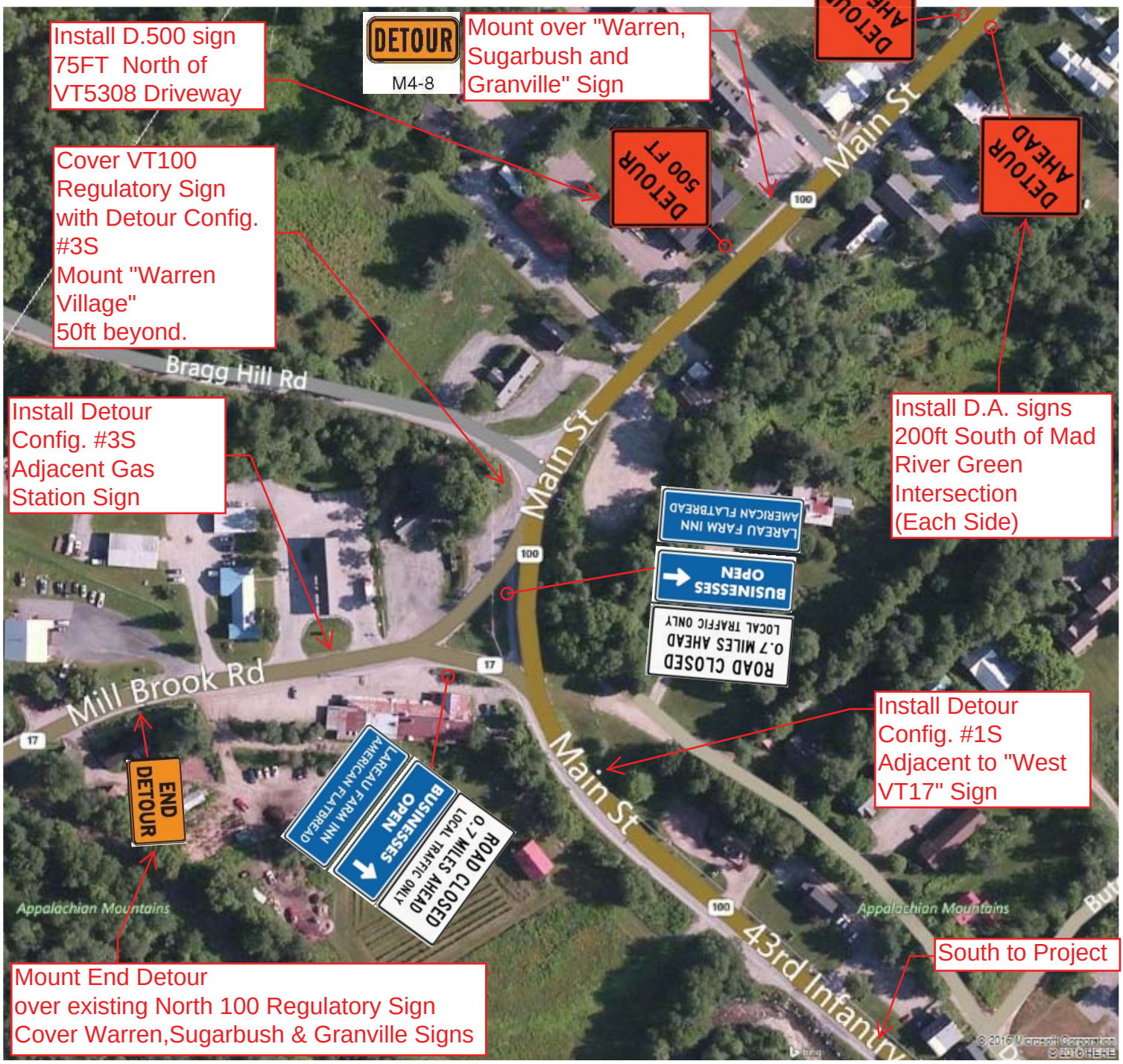
BRIDGE CLOSED
2 MILES AHEAD
NO THRU TRAFFIC

Install 100' south of Old Country Road intersection.

PCMS BOARD SITE #2



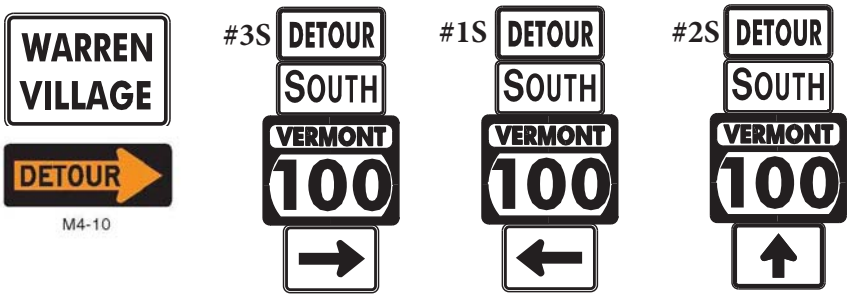
DETOUR PHASE SIGNS- VT100 (MAIN ST.) / VT17 WAITSFIELD



Notes:

Existing regulatory, business signs and driveways impact placement of temporary signs. Additional field changes may be required.

Detour and Arrow signs to be on orange with black lettering (typ.)



350.0 0 175.00 350.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 175 Ft. 1cm = 21 Meters

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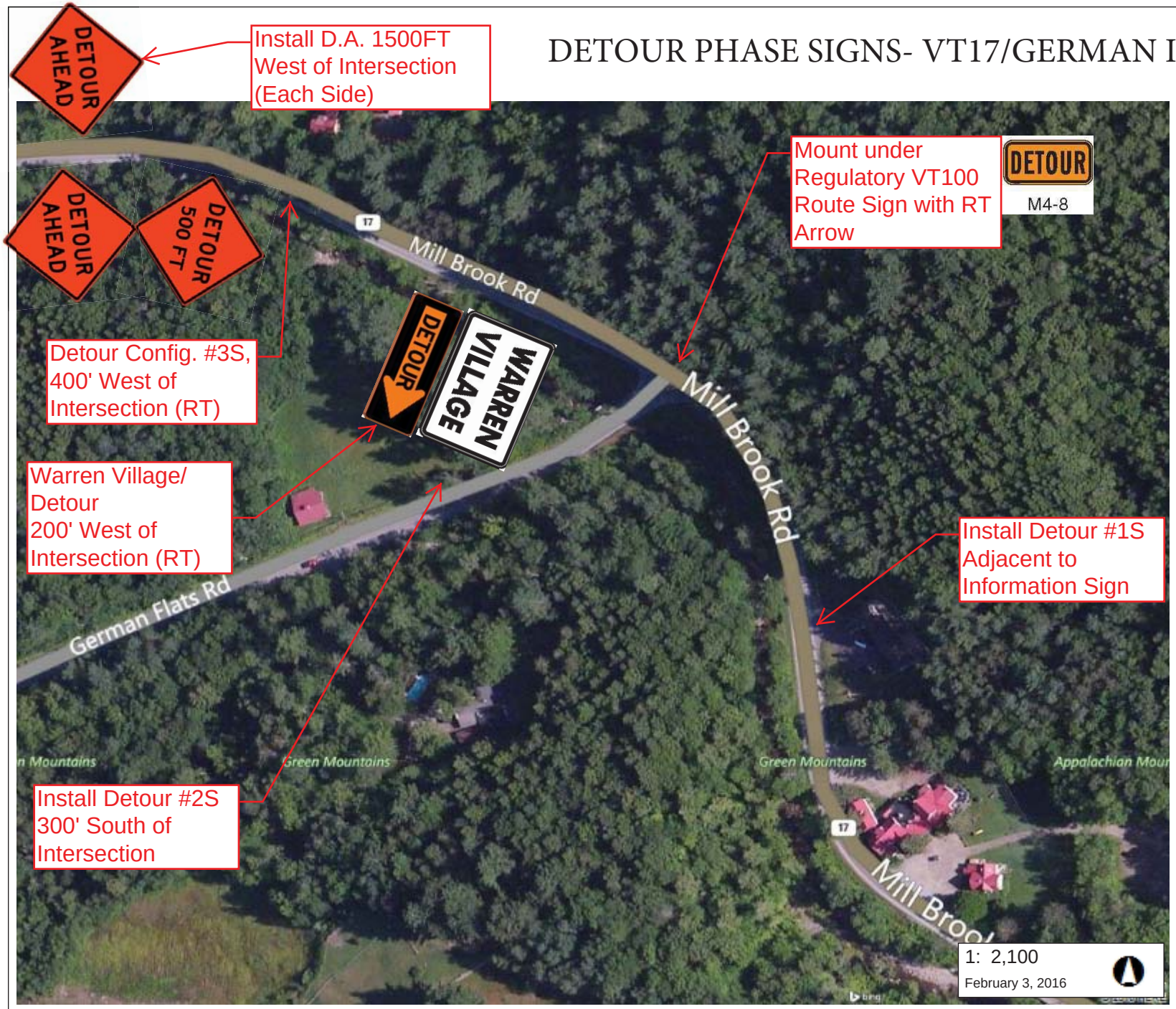
DETOUR PHASE SIGNS- VT17/GERMAN INTERSECTION



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Note: Detour and arrow signs to be on orange signs wih black lettering (typ.)

CONFIGURATION #1S

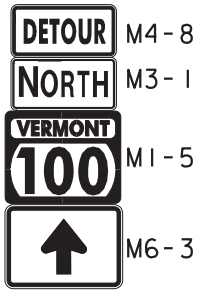
CONFIGURATION #2S

CONFIGURATION #3S

Note:
Speed Limit 40MPH on VT17. 35 MPH on German Flats Rd.

DETOUR PHASE SIGNS- MT ELLEN /GERMAN INTERSECTION

CONFIGURATION #2N



CONFIGURATION #2S

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DETOUR PHASE SIGNS- SUGARBUSH /GERMAN INTERSECTION

583.0 0

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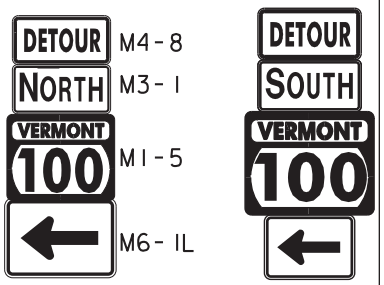
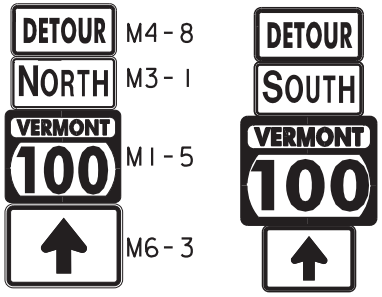
CONFIGURATION #1



#1N #1S

CONFIGURATION #2



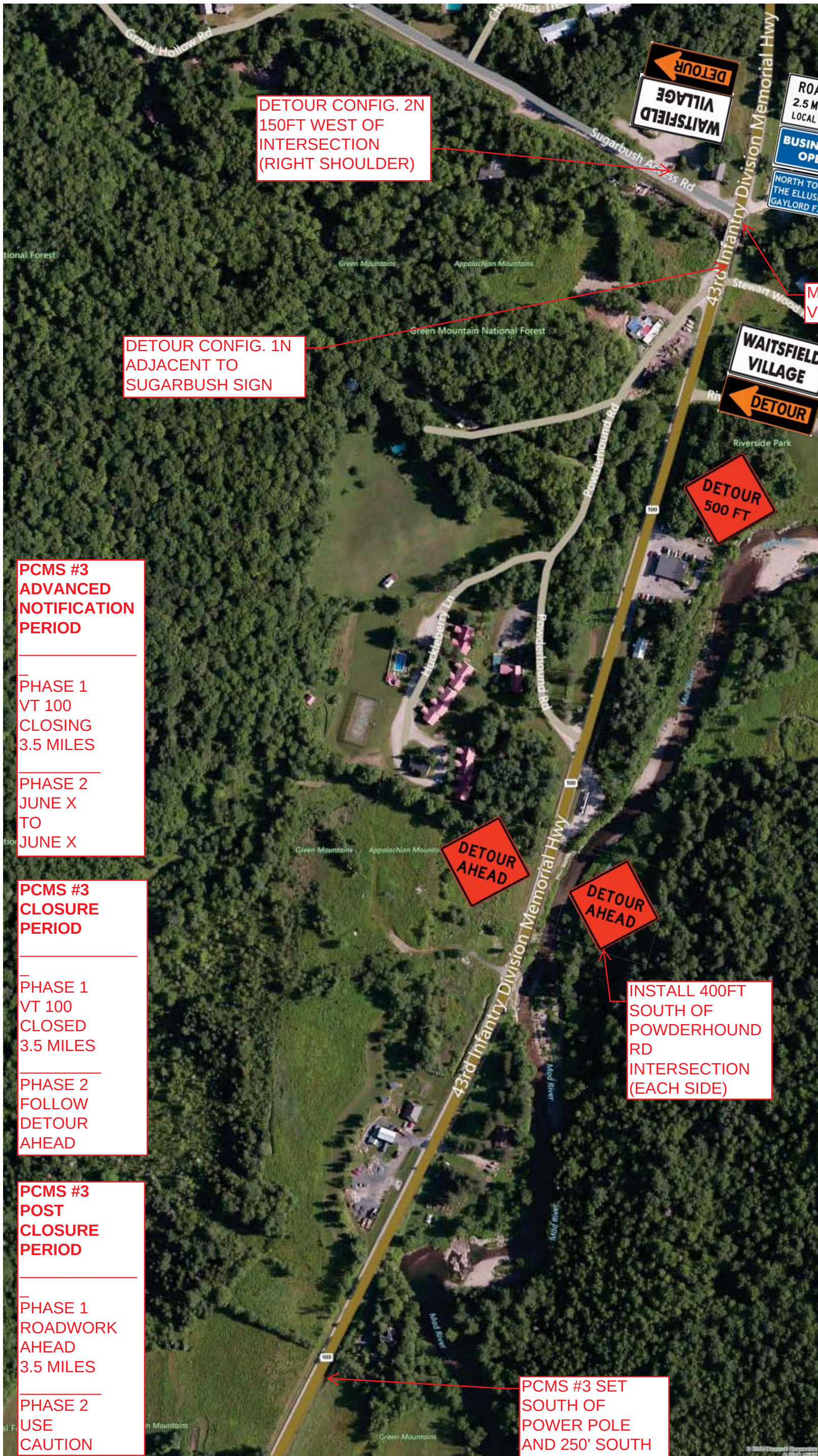
#2N #2S

CONFIGURATION #3

#3N

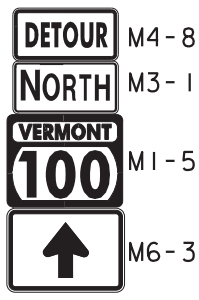
Note: Detour and arrow signs to be on orange signs wih black lettering (typ.)

DETOUR PHASE SIGNS- SUGARBUSH / VT 100 INTERSECTION



CONFIGURATION #1

CONFIGURATION #2



467.0 0 234.00 467.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 233 Ft. 1cm = 28 Meters

© Vermont Agency of Natural Resources

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

3.5 PHASE 4 – Miscellaneous finishes, channel work, removal of temporary access.

All remaining work has been included in phase 4 after the bridge closure period has ended and traffic is routed back through the project. Work will include curbing, miscellaneous guardrail, channel work, removal of piers, temporary structures, install top pavement, striping, guardrails, vegetation establishment and sign replacement. This phase will require daily mobile/portable work zone signs for a lane closure. These signs will be placed on the shoulder in advance of the work zone. Signs will be placed at 500 foot increments and will include "Road Work Ahead", "One Lane Road Ahead" (OLRA), and "Flagger Ahead".

3.6 PHASE 5 – Removal of Permanent Construction Signs

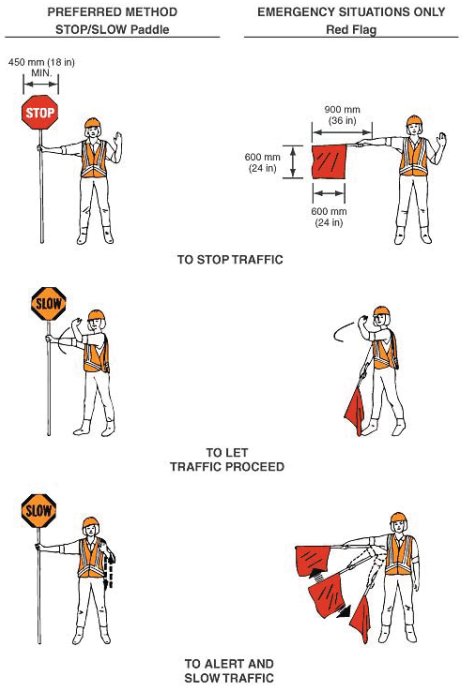
Permanent Signs and PCMS Boards will be completely removed. Workers will use trucks with rotating or flashing lights on the installation trucks.

Appendix A – Schedules and Supporting Information

Flagger Hand Signals

Sign Details

Figure 6E-1. Use of Hand-Signaling Devices by Flaggers



Standard: The following methods of signaling with paddles shall be used:

A. To stop road users, the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm shall be held with the palm of the hand above shoulder level toward approaching traffic.

B. To direct stopped road users to proceed, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed.

C. To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body.

Option: To further alert or slow traffic, the flagger holding the SLOW paddle face toward road users may motion up and down with the free hand, palm down.

Standard: The following methods of signaling with a flag shall be used:

A. To stop road users, the flagger shall face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm shall be held with the palm of the hand above the shoulder level toward approaching traffic.

B. To direct stopped road users to proceed, the flagger shall stand parallel to the road user movement and with flag and arm lowered from the view of the road users, and shall motion with the free hand for road users to proceed. Flags shall not be used to signal road users to proceed.

C. To alert or slow traffic, the flagger shall face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger shall keep the free hand down.

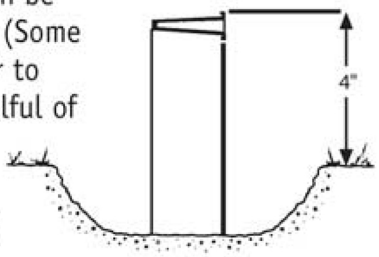
THE LAP SPLICE™ U-CHANNEL BREAKAWAY SYSTEM

Patent No. 5125194

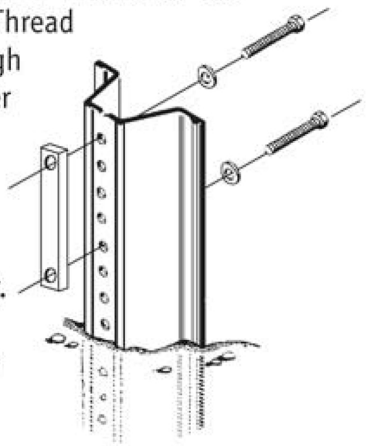
Installation

The LAP SPLICE system consists of two each of these components: cut washers, specially designed Grade 9 bolts, self-locking flange nuts; and a single bar spacer. This system is FHWA approved only when used to lap splice Nucor Steel Marion RIB-BAK® U-channel sign and base posts.

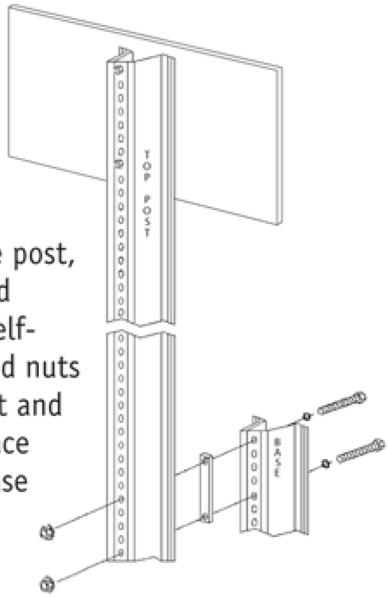
1 Drive base post so that no more than 4" is above the ground. Remove enough soil around base so that the fifth hole is exposed and can be easily reached. (Some installers prefer to remove a shovelful of soil prior to installation of the base post.)

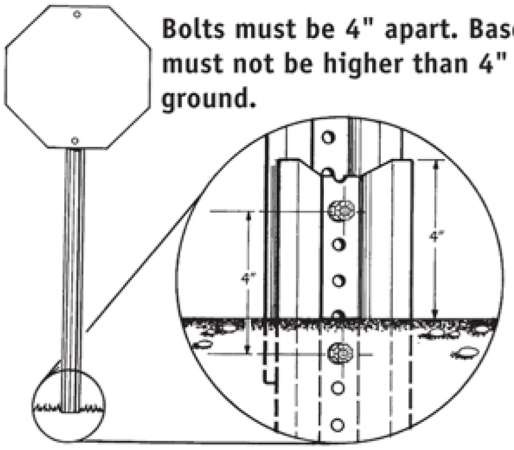


2 Put flat washer on bolt and insert into top hole of base post. (If first hole on top post is less than 1" from end, use second hole.) Thread top bolt through threaded spacer bar. Put flat washer on second bolt and thread into spacer bar. Tighten both bolts in spacer securely.



3 Nest the bottom hole of the top post onto the bottom hole of protruding bolts of the base post. (If the bottom hole of the top post is less than 1" from the end of the post, use the second hole.) Place self-locking flanged nuts onto each bolt and tighten. Replace soil around base post.





Bolts must be 4" apart. Base post must not be higher than 4" above ground.

BAR SPACER SIZE CHART		
Post Size (lbs./ft.)	Bar Color	Bar Size
2 & 2.5	Silver	3/8" x 3/4" x 5"
3 & 4	Gold	1/2" x 3/4" x 5"

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General Permanent Sign Installations

Figure 6F-1. Height and Lateral Location of Signs—Typical Installations

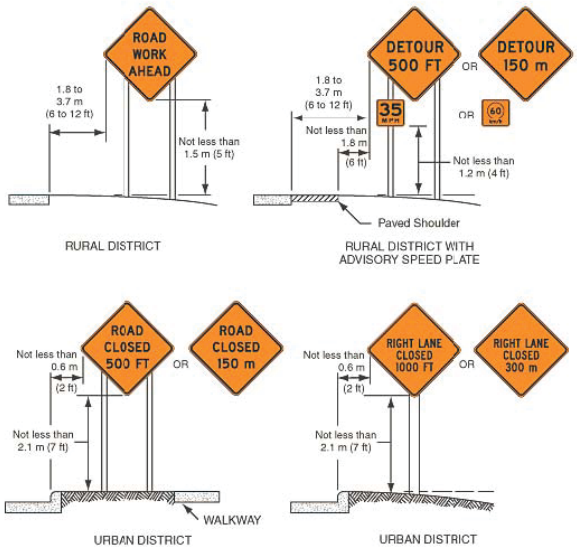


Figure 6F-1. Height and Lateral Location of Signs—Typical Installations

This figure shows four examples of the height and lateral location of signs for typical installations.

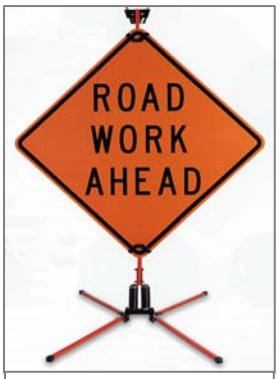
The first illustration is labeled "Rural District." The roadway is shown with no shoulder. The sign in this example is a diamond-shaped Road Work Ahead sign. The distance between the edge of the pavement and the near edge of the sign is shown as a dimension of 1.8 to 3.7 m (6 to 12 ft). The distance from the bottom edge of the sign to the level of the edge of the pavement is shown as a dimension not less than 1.5 m (5 ft).

The second illustration is labeled "Rural District with Advisory Speed Plate." The roadway is shown with a paved shoulder. The sign in this example is a diamond-shaped Detour sign with an advisory speed plaque mounted below it, with the metric alternate signs shown to the right. The distance between the outside edge of the roadway and the near edge of the sign is shown as a dimension of 1.8 to 3.7 m (6 to 12 ft). The distance between the outside edge of the paved shoulder and the near edge of the sign is shown as a dimension not less than 1.8 m (6 ft). The distance from the bottom edge of the advisory speed plaque to the level of the edge of the roadway at the inside edge of the shoulder is shown as a dimension not less than 1.2 m (4 ft).

The third illustration is labeled "Urban District." The roadway is shown with a curb along the outside edge of the pavement and a walkway to the right of the sign. The sign in this example is a diamond-shaped Road Closed sign with a metric alternate shown to the right. The distance from the edge of the roadway to the near edge of the sign is shown as a dimension no less than 0.6 m (2 ft). The distance from the bottom edge of the sign to the surface of the curbing is shown as a dimension no less than 2.1 m (7 ft).

The fourth illustration is labeled "Urban District." The roadway is shown with a curb along the outside edge of the pavement. The sign in this example is a diamond-shaped Right Lane Closed sign with a metric alternate shown to the right. The distance from the edge of the roadway to the near edge of the warning sign is shown as a dimension not less than 0.6 m (2 ft). The distance from the bottom edge of the sign to the level of the edge of the travel lane at the top of the curbing is shown as a dimension not less than 2.1 m (7 ft).

TYPICAL SIGN STAND -1



Series 24000

LITTLE BUSTER SIGN STAND

PRODUCT INFORMATION

- Step-n-Drop leg feature enables you to quickly set-up the stand without having to bend over or stoop down. Simply place your foot on the release levers, step down and two legs will drop into position
- Dual spring sign stand is designed to hold 30”, 36” and 48” aluminum, wood or roll up signs in high wind conditions
- All steel construction with powder coated paint to resist rusting
- Rigid signs can achieve bottom heights of 12 to 18 inches. Roll up signs can achieve bottom heights of 12 inches to 5 feet and a 7 foot height can be achieved with optional 77 inch inner mast (RU7)
- A two position leg adjustment allows all four legs to be individually adjusted for uneven terrain
- Ideal for both roll up and rigid signs for city, utility and highway applications
- NCHRP-350 approved when used with Safe Sleeve-350 for .080 aluminum signs
- NCHRP-350 approved with roll up signs and plastic Safe Sign 350

TrafFix Devices, Inc. 160 Ave. La Pata, San Clemente, CA 92673 (949) 361-5663 Fax (949) 361-9205
www.traffixdevices.com

TYPICAL SIGN STAND - 2

93000 Series

TRI-BUSTER SIGN STAND

PRODUCT INFORMATION

- Constructed of corrosion resistant heavy duty galvanized tubing and can be folded for compact storage
- Accommodates 48” x 48” or smaller; plywood, aluminum, aluminum poly laminate, plastic and roll up sign materials
- Three leg design is very stable in windy conditions. Ballasting hook allows sand bags or weights to be hung from sign stand for added stability
- Safety engineered with guards to protect fingers from dangerous “pinch points”
- Optional roll-up sign bracket and leg extending leveling kit may be ordered to enhance Tri-Busters performance
- NCHRP 350 approved with rigid and roll up signs

TrafFix Devices, Inc. 160 Ave. La Pata, San Clemente, CA 92673 (949) 361-5663 Fax (949) 361-9205
www.traffixdevices.com

Appendix B – Traffic Control Plans

T-1 – Traffic Control General Notes.

T-17 – Miscellaneous Traffic Control.

T-28 - Construction Sign Details

T-35 – Construction Zone Longitudinal Drop-Offs

T-36 – Construction Zone Longitudinal Drop-Offs for Paving

DAILY CLOSURE PACKAGE (Non Closure)

1. TRAFFIC CONTROL DEVICES NOT DETAILED IN THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ''STANDARD DRAWINGS'' OR THE PROJECT PLANS SHALL BE IN ACCORDANCE WITH THE "MANUAL ON TRAFFIC CONTROL DEVICES" (MUTCD) AND THE ''STANDARD HIGHWAY SIGNS AND MARKINGS'' BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

2. CONSTRUCTION SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER.

3. CONSTRUCTION SIGN COVERS SHALL CONSIST OF A PANEL, PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.

4. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.

5. NO CROSS-BRACING OR BACK-BRACING TO KEEP POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED. CONSTRUCTION SIGNS SHALL BE PLACED ON TWO POSTS.

6. CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST FIVE FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL, OR TWO FEET OUTSIDE CURBING OR SIDEWALK. THE INSTALLATION OF SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER. IN URBAN AREAS, THE BOTTOM OF THE SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE SIDEWALK OR EDGE OF PAVEMENT, WHICHEVER IS HIGHER.

7. PORTABLE SIGNS SHALL BE PLACED ON THE EDGE OF ROADWAY AND A MINIMUM OF ONE FOOT ABOVE THE TRAVELED WAY. ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.

8. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.

9. ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VI AND TYPE VII UNLESS OTHERWISE NOTED.

10. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VIII OR IX REQUIREMENTS UNLESS OTHERWISE NOTED.

11. WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS. WHEN ANCHORS ARE INSTALLED, STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.

12. ROADWAY AND SHOULDER WIDTHS DEPICTED ON THE STANDARD DRAWINGS MAY VARY.

13. THESE STANDARD DRAWINGS ARE INTENDED TO SERVE AS VTRANS STANDARD OPERATING PROCEDURE. IT IS NOTED THAT COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL WORK ZONE MAY BE MODIFIED DUE TO FIELD CONDITIONS, AT THE DISCRETION OF THE ENGINEER.

OTHER STDS. REQUIRED: **NONE**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

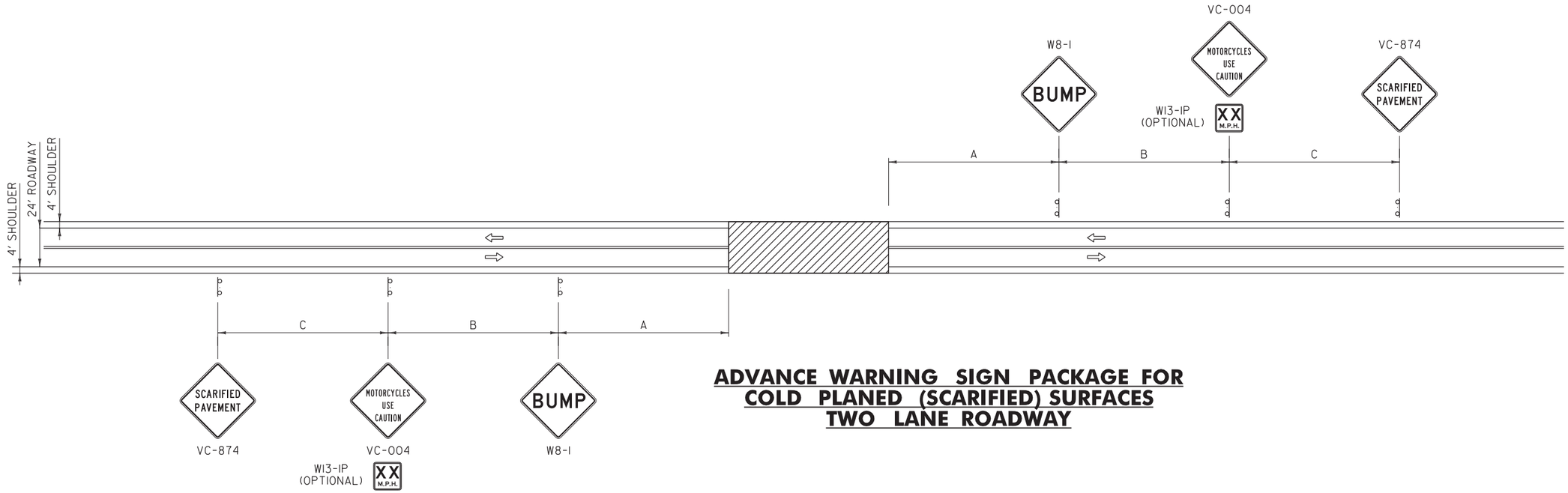
FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL GENERAL NOTES

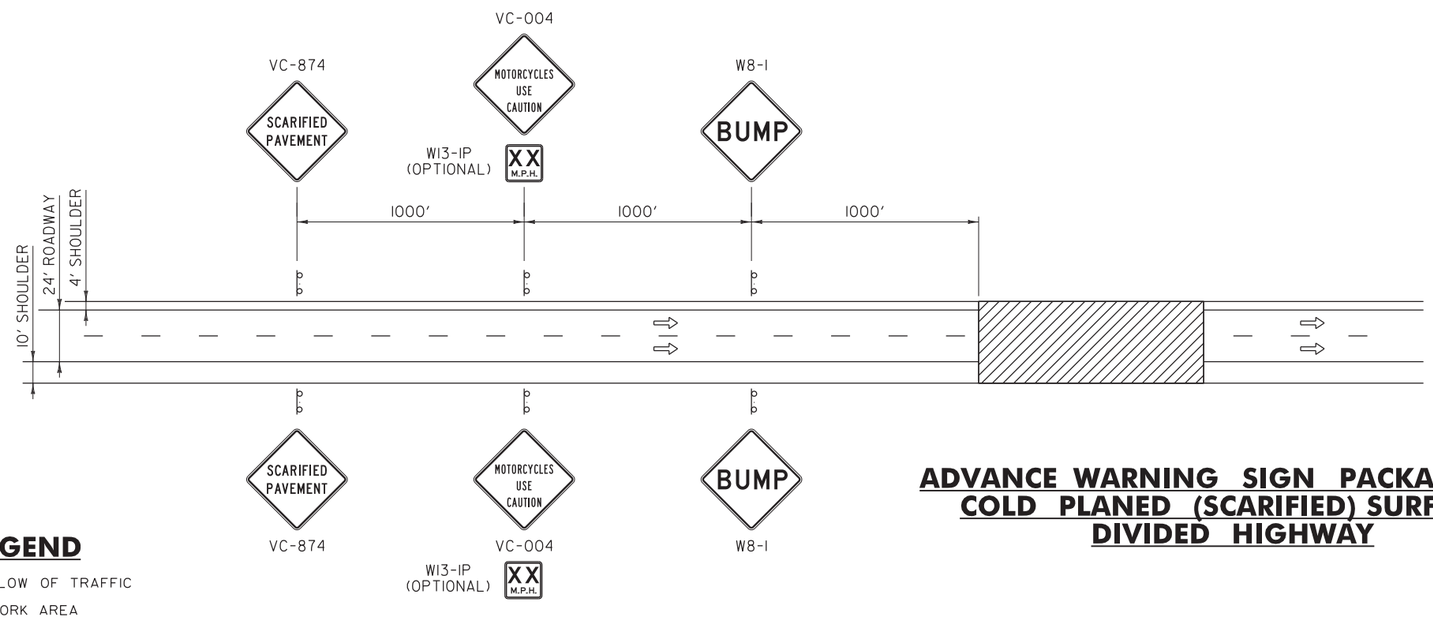
VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-1



ADVANCE WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES TWO LANE ROADWAY



ADVANCE WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES DIVIDED HIGHWAY

LEGEND

⇨ FLOW OF TRAFFIC

WORK AREA

GENERAL NOTES:

1. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA, THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED. SEE THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) FOR ADDITIONAL INFORMATION.
2. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE ENGINEER FOR TWO LANE ROADWAY WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY.
3. FOR DIMENSIONS A, B AND C, REFER TO THE MUTCD. USE TABLE 6C-1 (RECOMMENDED ADVANCE WARNING SIGN MINIMUM SPACING), FOR SIGN SPACING.

OTHER STDS. REQUIRED: **T–1, T–28**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

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HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

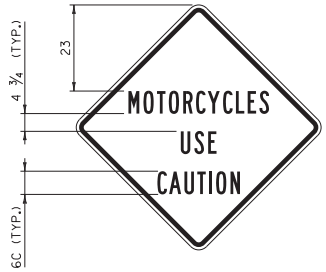
FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL MISCELLANEOUS DETAILS

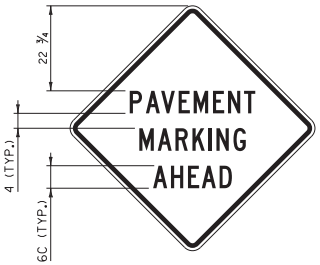
VERMONT AGENCY OF TRANSPORTATION

STANDARD

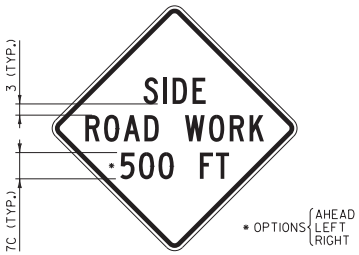
T-17



VC–004



VC–813



VC–869

VC–874

GENERAL NOTES:

1. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND.
2. CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A THREE INCH RADIUS.
3. SIGNS SHALL HAVE 1 1/4 INCH WIDE BORDERS THAT ARE INDENTED 3/4 INCH FROM THE EDGE OF THE SIGN.
4. SIGNS SHALL HAVE THE LEGEND CENTERED HORIZONTALLY AND VERTICALLY ON THE SIGN UNLESS OTHERWISE INDICATED.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **T–1**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

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HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

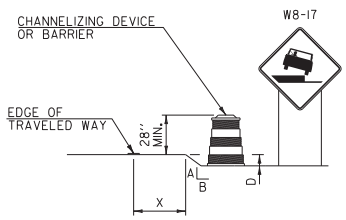
CONSTRUCTION SIGN DETAILS

VERMONT AGENCY OF TRANSPORTATION

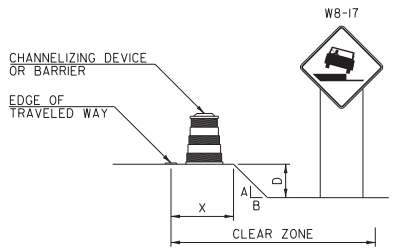
STANDARD

T - 28

DROP-OFF ADJACENT TO TRAVELED WAY



TYPE 1

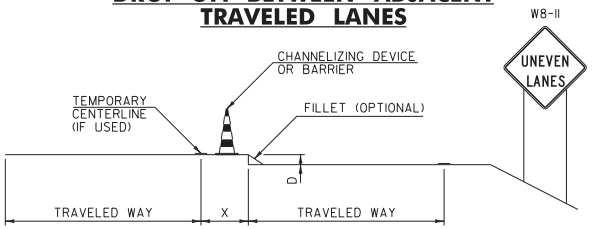


TYPE 2

NOTES:

1. CHANNELIZING DEVICES OR BARRIER SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
2. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.
3. IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT, THEN "SHOULDER DROP-OFF SYMBOL" (W8-17) SIGNS SHOULD BE INSTALLED.

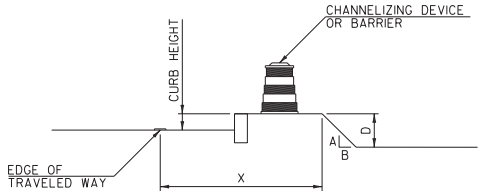
DROP-OFF BETWEEN ADJACENT TRAVELED LANES



NOTES:

1. WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT, THEN "UNEVEN LANES" (W8-11) SIGNS AND CHANNELIZING DEVICES SHOULD BE INSTALLED.
2. IF REQUIRED, THE CHANNELIZING DEVICES USED SHOULD BE THOSE WHICH MAXIMIZE THE WIDTH OF THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
3. A BITUMINOUS CONCRETE FILLET WITH A 1.5:1 SLOPE MAY BE USED IN PLACE OF CHANNELIZING DEVICES, HOWEVER THE "UNEVEN LANES" (W8-11) SIGNS SHOULD STILL BE INSTALLED.
4. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.

DROP-OFF BEYOND SHOULDER OR CURB



NOTES:

1. USE CHART "A" FOR VERTICAL CURBS UNDER SIX INCHES, MOUNTABLE CURBS OR ROADWAYS WITH A POSTED SPEED ABOVE 40 MPH.
2. USE CHART "B" FOR VERTICAL CURBS SIX INCHES OR GREATER.

CHART "A"
ALL SPEEDS WITH NO CURB OR MOUNTABLE CURB

X (FEET)	DROP (D) (INCHES)	A:B SLOPE	RECOMMENDED DEVICE
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1:1.5 OR FLATTER	NONE
		STEEPER THAN 1:1.5	CHANNELIZING DEVICE
	GREATER THAN 6"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
	GREATER THAN 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
10' TO CZ	LESS THAN OR EQUAL TO 12"	ANY	NONE
	GREATER THAN 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER

NOTES:

1. THE MINIMUM CLEAR ZONE FOR FREEWAYS IS TO BE DETERMINED PER THE CURRENT AASHTO ROADSIDE DESIGN GUIDE. ALL OTHER HIGHWAYS WILL BE DETERMINED PER THE CURRENT "VERMONT STATE STANDARDS" BOOK.
2. CHANNELIZING DEVICES MAY BE USED INSTEAD OF BARRIER FOR SHORT TERM OPERATIONS.
3. ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

CHART "B"
40 MPH OR LESS WITH VERTICAL CURB

X (FEET)	DROP (D) (INCHES)	DEVICE REQUIRED
0-10'	LESS THAN OR EQUAL TO 12"	NONE
0-10'	GREATER THAN 12"	CHANNELIZING DEVICE
GREATER THAN 10'	ANY	NONE

GENERAL NOTES:

1. THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
2. THE FOLLOWING ARE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) COMPLIANT CHANNELIZING DEVICES:

   A. VERTICAL PANEL
   B. TYPE I OR TYPE II BARRICADE
   C. PLASTIC DRUM
   D. CONE - WHERE APPLICABLE
   E. TUBULAR MARKERS

   IF CHANNELIZING DEVICES ARE REQUIRED TO STAY IN PLACE DURING NIGHTTIME HOURS, THEY SHALL BE STABILIZED WHILE UNATTENDED IN ACCORDANCE WITH THE MUTCD.
3. WHERE BARRIER IS NECESSARY, THE BARRIER SHALL BE TAPERED BEYOND THE CLEAR ZONE. WHEN THE BARRIER CANNOT BE TAPERED BEYOND THE CLEAR ZONE, A MUTCD COMPLIANT END TREATMENT SHALL BE USED. BARRIER AND END TREATMENT SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
4. CHANNELIZING DEVICE SPACING ALONG A LONGITUDINAL DROP-OFF (TANGENT) SHALL BE AS FOLLOWS:

   TANGENT - CHANNELIZING DEVICES SHALL BE SPACED "2S" ("S" IS EQUAL TO THE POSTED SPEED LIMIT IN FEET) APART.
5. "LOW SHOULDER" (W8-9) AND "SHOULDER DROP-OFF SYMBOL" (W8-17) SIGNS, WHEN USED, SHOULD BEGIN PRIOR TO THE DROP-OFF CONDITION AND SHOULD BE REPEATED EVERY 1500 FEET.

OTHER STDS. REQUIRED: **T-1**

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark B. Richter

FEDERAL HIGHWAY ADMINISTRATION

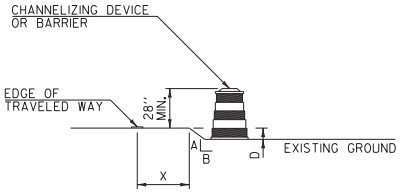
CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-35

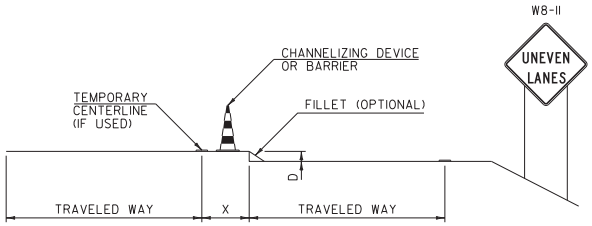
DROP-OFF ADJACENT TO TRAVELED WAY



NOTES:

1. CHANNELIZING DEVICES SHOULD BE PLACED TO MAXIMIZE THE WIDTH OF THE TRAVELED WAY.
2. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.
3. IF THE DROP-OFF REQUIRES CHANNELIZING DEVICES TO REMAIN IN PLACE OVERNIGHT, THEN "LOW SHOULDER" (W8-9) OR "SHOULDER DROP-OFF SYMBOL" (W8-17) SIGNS SHOULD BE INSTALLED.

DROP-OFF BETWEEN ADJACENT TRAVELED LANES



NOTES:

1. WHENEVER A LONGITUDINAL DROP-OFF BETWEEN ADJACENT TRAVELED LANES IS TO BE LEFT OVERNIGHT, THEN "UNEVEN LANES" (W8-11) SIGNS AND CHANNELIZING DEVICES SHOULD BE INSTALLED.
2. IF REQUIRED, THE CHANNELIZING DEVICES USED SHALL BE THOSE WHICH MAXIMIZE THE WIDTH OF THE TRAVELED LANE (I.E. CONES, VERTICAL PANELS OR TUBULAR MARKERS).
3. A BITUMINOUS CONCRETE FILLET WITH A 1.5:1 SLOPE MAY BE USED IN PLACE OF CHANNELIZING DEVICES, HOWEVER THE "UNEVEN LANES" (W8-11) SIGNS SHOULD STILL BE INSTALLED.
4. SEE CHART "A" FOR SPECIFIC REQUIREMENTS.

CHART "A"
ALL SPEEDS WITH NO CURB

X (FEET)	DROP (D) (INCHES)	A:B SLOPE	DEVICE REQUIRED
0 TO 4'	LESS THAN 2"	ANY	NONE
	2" TO 6"	1:1.5 OR FLATTER	NONE
		STEEPER THAN 1:1.5	CHANNELIZING DEVICE
	GREATER THAN 6"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER
4' TO 10'	LESS THAN 6"	ANY	NONE
	6" TO 12"	1:3 OR FLATTER	NONE
		STEEPER THAN 1:3	BARRIER

NOTE:

1. ON BORDERLINE CONDITIONS, THE ENGINEER SHOULD DETERMINE WHICH TREATMENT IS ADEQUATE FOR THE EXISTING CONDITIONS.

GENERAL NOTES:

1. THESE CONDITIONS AND TREATMENTS ARE ONLY PART OF THE TRAFFIC CONTROL SYSTEM AND SHOULD BE USED IN ADDITION TO THE PROPER WORK ZONE SIGNING.
2. THE FOLLOWING ARE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) COMPLIANT CHANNELIZING DEVICES:

   A. VERTICAL PANEL
   B. TYPE I OR TYPE II BARRICADE
   C. PLASTIC DRUM
   D. CONE - WHERE APPLICABLE
   E. TUBULAR MARKERS

   IF CHANNELIZING DEVICES ARE REQUIRED TO STAY IN PLACE DURING NIGHTTIME HOURS, THEY SHALL BE STABILIZED WHILE UNATTENDED IN ACCORDANCE WITH THE MUTCD.
3. WHERE BARRIER IS NECESSARY, THE BARRIER SHALL BE TAPERED BEYOND THE CLEAR ZONE. WHEN THE BARRIER CANNOT BE TAPERED BEYOND THE CLEAR ZONE, A MUTCD COMPLIANT END TREATMENT SHALL BE USED. BARRIER AND END TREATMENT SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
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DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION ZONE LONGITUDINAL DROP-OFFS FOR PAVING

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-36

583.0 0 292.00 583.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 292 Ft. 1cm = 35 Meters

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DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

INSTALL 50FT NORTH OF CURVE ARROW SIGNS

PORTABLE / DAILY TRAFFIC CONTROL SIGNS FOR LANE CLOSURE AND SURFACES UNDER CONSTRUCTION

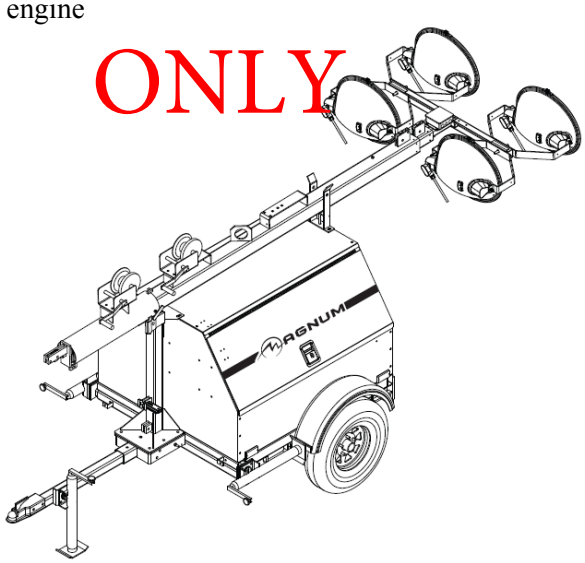
NOTES

1. SIGNS TO BE INSTALLED ON STAND
2. WHEN PAVEMENT IS REMOVED, ADD VC-874 AND VC-004 BETWEEN DAILY CLOSURE SIGNS. SEE STANDARD T-17.

Appendix C – Night Work Lighting System

Magnum Light Tower – MLT4150 Specifications

TYPICAL ONLY



ENGINE

- Mitsubishi® S4L2-W461ML - liquid cooled, diesel engine
  - Standby - 24.7 hp @ 1800 rpm
  - Prime - 23.5 hp @ 1800 rpm
  - 4 cylinder
  - 1.76 L displacement
- Fuel consumption (prime) – 1.30 gph (4.92 Lph)
- 60 Hz engine/generator
- Industrial engine exhaust system
- Rubber vibration dampers isolate engine/generator from frame
- Cooling system capable of operating at 120°F ambient
- Full flow oil filter, spin on type
- Fuel filter with replaceable element
- Dry type cartridge air filter
- Polyethylene fuel tank with large diameter opening
  - 56 gal. capacity
  - 43 hr. run capacity
  - 3 ½" fill port

ENGINE CONTROLS

- Engraved, aluminum punched and anodized control panel
- Four position keyed switch – glow plugs (preheat, off, run, start)
- Hour meter
- Automatic low oil/high temperature shutdown system

GENERATOR

- Marathon Electric®
  - Brushless
- 15 kW standby output
- 120/240 VAC – 125/63A
- +/-1% voltage regulation

ELECTRICAL SYSTEM AND CONTROLS

- Individual floodlight circuits with 15A breakers
- Ballast indicator lights
- 70A start limit breaker (assures no load condition exists before starting)

- Standard individually breakered convenience outlets:
  - (2) 120 VAC 20 Amp GFCI duplex outlets (Nema 5-20R type)
  - (2) 240 VAC 30 Amp twistlock outlets (Nema L6-30R type)
  - (2) 240 VAC 50 Amp twistlock outlets (Non Nema 6369)
- 440 CCA wet cell battery

FLOODLIGHTS

- Four light fixtures – 1000 watts each - metal halide
- Oval aluminum reflector
- Tempered glass lens
- Silicone gaskets for moisture and dust protection
- Individual floodlight On/Off switches

WIRING

- All wiring is sized to the amperage draw required
- AC & DC wiring diagrams are provided

MAST

- 30′ maximum extension, 3-section, tubular steel
- Urethane guides on all sides of mast tubes
- Industrial black powder coat finish
- Automatic locking system in horizontal position for travel
- 1500 lb. automatic self-braking winches
- 360° rotation with locking system
- Coiled mast cord
- Dual winch system located at ergonomic height allowing single person operation
- Equipped with single lifting eye and fork pockets

ENCLOSURE

- Steel enclosure – 14-gauge
  - UV& fade resistant, high temperature cured, white polyester powder paint
  - 68 dB(A) at 23 feet – prime power
- Stainless steel hinges on doors
- Multi-lingual operating/safety decals
- License plate holder with light
- Manual holder with operating manual

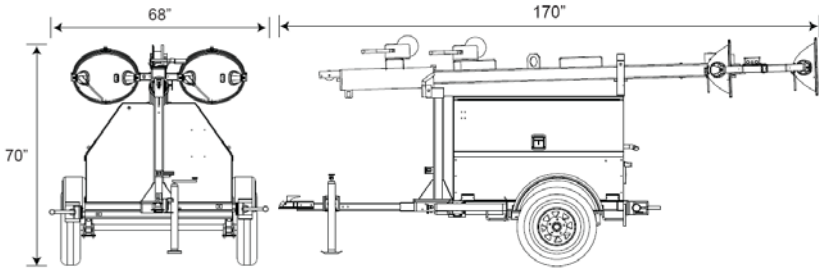
TRAILER

- Mast support - 3” square tube, ¼” wall
- Removable tongue - 48” long
- Tubular steel frame - 3/16” wall
- Four, 2000 lb. adjustable leveling jacks – 4 point stance
- All jacks transport and lock in horizontal position for storage
- Side outriggers - 11’ 8” span
- Safety chains with spring loaded safety hooks
- 2” ball hitch
- Single wall polyethylene fenders

- DOT approved tail, side, brake, and directional lights
    - Recessed rear lights
- 3000 lb. leaf spring axle
- P205/75R15 – 6 ply
- 58 in. axle span

WEIGHTS & DIMENSIONS

- Dry weight: 2015 lbs (914 kg)
- Operating weight: 2413 lbs (1095 kg)
- Mast stowed: 170 x 68 x 70 in (4.32 x 1.73 x 1.78 m)



WARRANTY

- Engine and generator covered under OEM warranty – consult factory for details.

CERTIFICATIONS

- CSA certified

MLT4150 Options

COOLANT OPTIONS

- 60/40 Coolant, 60% Ethylene glycol

ENGINE OPTIONS

- Heated fuel filter
- Oil drain valve kit
- Lower radiator hose – engine heater

ELECTRICAL CONTROLS OPTIONS

- 720 CCA wet cell battery
- 720 CCA AGM sealed battery (Optima)
- 775 AGM sealed battery
- Battery disconnect
- Battery charger – 2A trickle
- Autolight controller
- Alternative receptacle panel – consult factory for configurations

CABINET OPTIONS

- Interior cabinet light
- Level indicator

HITCH OPTIONS

- 2.5” lunette ring
- 3” lunette ring
- 3” HD lunette ring
- 2 5/16” ball
- Combination hitch – 2.5” lunette ring / 2” ball

TRAILER OPTIONS

- Tube and sleeve jack
- 6 pin or 7 spade connectors
- Spare tire and carrier
- Parking brake
- Electric brakes
- Surge brakes

LIGHT OPTIONS

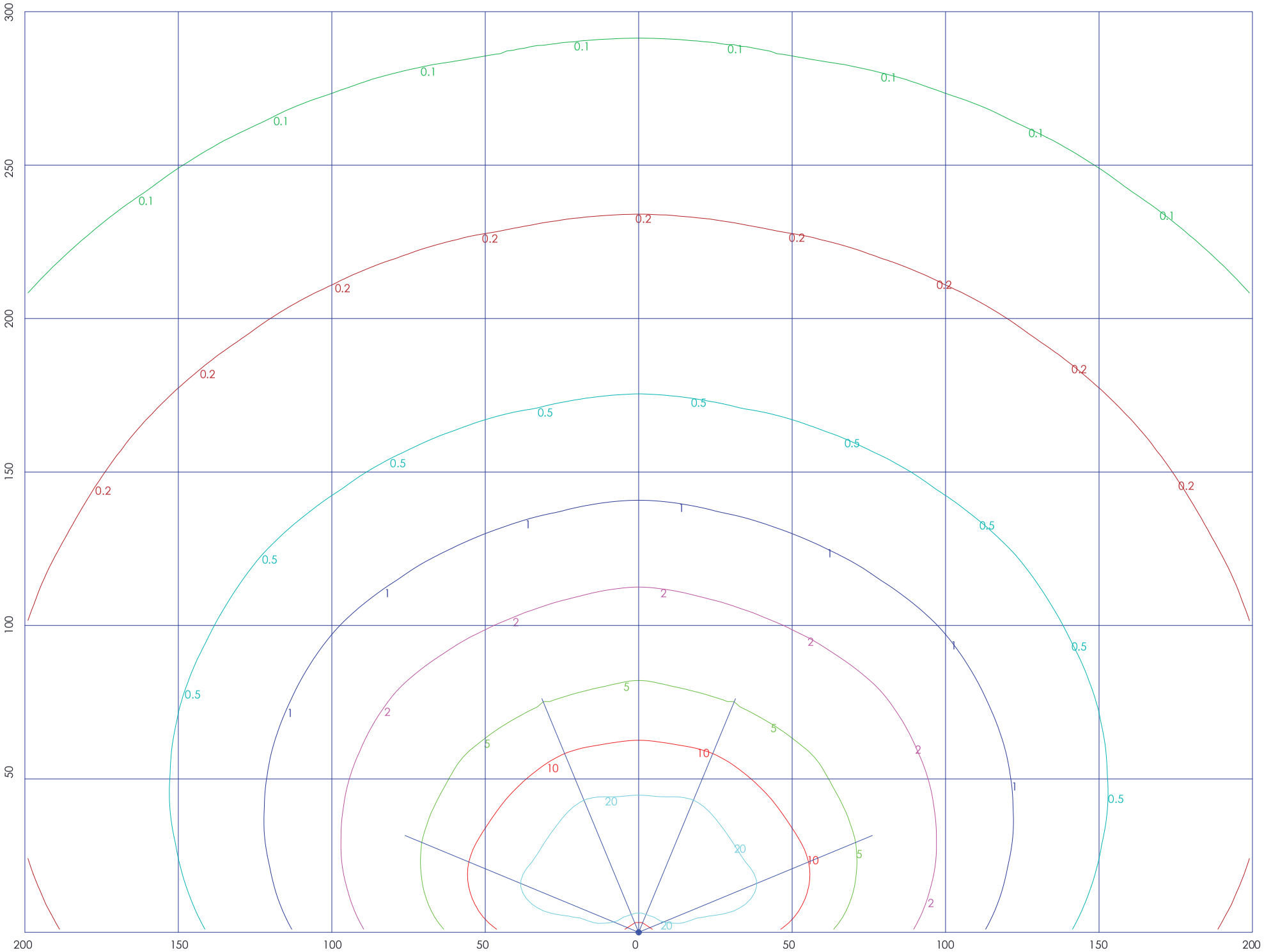
- Tubelight™ Diffused Light accessory
- High pressure sodium, quick disconnect lights

MAST CORD OPTIONS

- Drape cord

MAST, WINCH, & FINISH OPTIONS

- Galvanized, manual, dual winch
- Galvanized, electric, dual winch
- Galvanized, electric, dual winch, quick disconnect
- Black, electric, dual winch
- Black, electric, dual winch, quick disconnect



PROPRIETARY TO MAGNUM PRODUCTS

TABLE 7 Recommended minimum illuminance levels and categories for nighttime highway construction and maintenance

Category	Min. Illuminance Level lx (fc)	Area of Illumination	Type of Activity	Example of Areas and Activities to be Illuminated
I	54 (5 fc)	general illumination throughout spaces	performance of visual task of large size; or medium contrast; or low desired accuracy; or for general safety requirements	• Excavation • Sweeping and cleanup • Movement area in the work zone • Movement between two tasks
II	108 (10 fc)	general illumination of tasks and around equipment	performance of visual task of medium sizes; or low to medium contrast; or medium desired accuracy; or for safety on and around equipment	• Paving • Milling • Concrete work • Around paver, miller, and other construction equipment
III	216 (20 fc)	illuminance on task	performance of visual task of small sizes; or low contrast; or desired high accuracy and fine finish	• Crack filling • Pot filling • Signalization or similar work requiring extreme caution and attention

TABLE 10 Recommended illuminated distance in the direction of travel for various types of construction equipment

Type of Equipment	Working Speed, mph (km/h)	Reaction Distance [a], ft (m)	Braking Distance, ft (m)	Distance to be Illuminated in Front and Back of Equipment [b,c], ft (m)
Slow-moving Equipment Paver Milling Machine	4–5 (6.4–8)	11 (3.4)	5 (1.5)	16 (4.9)
Fast-moving Equipment Backhoe Loader Wheel Tractor Scraper Wheel Loader Compactor/Roller Motor Grader	10–15 (16.1–24.2)	33 (10.1)	15–25 (4.6–7.6)	58 (17.7)

[a] Reaction distance = 2.2 x working speed
[b] Distance to be illuminated = reaction distance + braking distance
[c] Minimum illumination level of 10.8 lx (1 fc) at maximum distance