

Cross Vermont Trail SIGNS

revision history:

- 2011-01-11
- 2013-01-11

I.) TYPES OF SIGNS

Four types of signs.

Regulatory	Placed along side the travelled way, facing traffic. Short, standard message. Meant to be read on the move.
Warning	
Wayfinding	
Expository	Longer, detailed message; or multiple messages. Meant to be read while stopped and out of the travel way.

Signs are used in four types of locations.

Type of location:	Basic standards governing how signs look and where they are placed (see reference docs attached for full copy of each standard):	Types of signs that CVTA is responsible for in each location:
simple trails	Varies. May use MUTCD and VTrans standards as well as trail specific standards adopted by trail managers. Use FHWA for Accessibility signage.	All four types. (If trail is managed in partnership with municipality or other trail organization, responsibility may be shared.)
Shared Use Paths (complying with <i>VTrans Standard A-7</i>) ("SUP")	MUTCD; and FHWA for Accessibility signage.	All four types. (If trail is managed in partnership with municipality or other trail organization, responsibility may be shared.)
town roads	MUTCD	In cooperation with the town, CVTA responsible for Cross Vermont Trail specific Wayfinding signs and Warning signs at intersections of road and trail
state highways	MUTCD and VTrans standards	In cooperation with VTrans, CVTA responsible for Cross Vermont Trail specific Wayfinding signs and Warning signs at intersections of road and trail

More detailed description of sign types.

Type	Sub-type	Notes:
Regulatory	stop	Standard octogan, red background, white letters. 18" diameter on SUPs.
Regulatory	yield	Standard triangle with point down, white background, red letters and border. 18" on a side on SUPs.
Regulatory	other prescribed action	e.g. "Push Button for Greenlight" or "Bike Yield to Ped" etc
Regulatory	other restricted use	e.g. "No Motorvehicles" etc

Warning	condition changes	Path condition changes to something unexpected/atypical. Condition changes addressed by standard "off the shelf" warning signs: <ul style="list-style-type: none"> • tight curve, change in direction • width becoming narrower/height clearance becoming lower • grade becoming steeper • surface condition becoming less firm, less smooth, or more slippery.
Warning	regulatory sign ahead	Use if regulatory sign cannot be seen far enough ahead. (If a stop sign is around a blind corner, then put warning sign ahead of the corner, etc.)
Warning	intersection	Can be used ahead of intersection or crossing, at the intersection or crossing to identify the exact location, or both. MUTCD: Only use intersection warning sign if there is no stop or yield sign at the intersection itself.
Warning	different users ahead	Different users ahead who may be unexpected or conflicting; e.g. "Children Playing" or "Snowmobiles on Trail" etc
Wayfinding	route sign	CVTA has two standard route signs: 1.) "Route Sign" is MUTCD compliant sign for roads and SUP's. 12"x18" with bicycle logo and "Cross Vt Trail" and 2.) "Trail Markers" are smaller sign for use on simple trails. 8"x8" with "Cross Vermont Trail" and CVTA logo, summary of mission statement, web address. Route signs are placed at significant points along the state wide route, sufficient to reassure travelers that they are still on the route. (Primary guidance for following the route, though, will be with written guide and maps.) Since the Cross Vermont Trail is usually coaligned with local trails or roads, our route signs will be coordinated with signs for these other routes as well. (See longer discussion of wayfinding sign placement below.)
Wayfinding	trail marker	CVTA has two standard route signs: 1.) "Route Sign" is MUTCD compliant sign for roads and SUP's. 12"x18" with bicycle logo and "Cross Vt Trail" and 2.) "Trail Markers" are smaller sign for use on simple trails. 8"x8" with "Cross Vermont Trail" and CVTA logo, summary of mission statement, web address. Route signs are placed at significant points along the state wide route, sufficient to reassure travelers that they are still on the route. (Primary guidance for following the route, though, will be with written guide and maps.) Since the Cross Vermont Trail is usually coaligned with local trails or roads, our route signs will be coordinated with signs for these other routes as well. (See longer discussion of wayfinding sign placement below.)
Wayfinding	named destination	e.g. "parking" or "view" etc
Wayfinding	directional marker (i.e. arrow)	Used in conjunction with route or destination sign; never alone. Indicated in sign database by "Placard" attribute.
Expository	map area trail network	Map that describes area trail network. Placed at trailhead or entry point into trail

		system. Also, can be used ahead of confusing portion of route.
Expository	map clarify route ahead	Map that clarify how to navigate upcoming section of the route. Placed ahead of confusing point. For example, when route quickly switches from railbed, to state road, to private road, and back to railbed. Can explain/map the way through on one summary sign rather than large number of wayfinding signs in close succession.
Expository	accessibility compliance	Provide prospective users enough information so that they can determine whether or not this trail is appropriate for them. At a minimum, in addition to the standard information including the name and length of the trail, these signs shall include the typical and maximum trail grade, typical and maximum cross slope, typical and minimum tread width, surface type and firmness, and obstacles. Placed at trailhead or entry point into trail system.
Expository	etiquette list	List of rules and instructions ("trail etiquette"). Post rules only when need is clear. Assume that the more rules listed, the less likely they will be read. However, if there are many rules, then a single list of rules at trailhead or entry point into trail system can help reduce clutter of individual regulatory signs. (Regulatory sign is single short statement of a restriction or prescribed action placed along side the travelled way and meant to be read on the move.) Placed at trailhead or entry point into trail system.
Expository	etiquette interp	Interpretive sign that explains rules or instruction (rather than just listing them). Explain the reasons behind a rule, so that trail users can better understand it and so be motivated to comply with it. (For example, rather than just say "dogs on leash", teach about the wildlife that live near the trail and how free running dogs impact them.) Placed at entry point to the regulated area. If needed, reinforce the regulation with actual regulatory signs (short statement of rule) placed along travelled way beyond the initial interpretive sign.
Expository	educational interp	Interpretive sign that is purely educational. Subjects like natural wonder, historic interest, etc. Placed at the interpreted feature. Be careful that the sign does not obscure or detract from the feature itself! (Such as a sign describing a view blocking the actual view.)

Sign types re-sorted by triggers:

If this trigger:	Then consider the need for these possible signs:
intersection	<ul style="list-style-type: none"> • stop • yield • warning • named destination wayfinding sign (possibly with arrow)
route decision point	<ul style="list-style-type: none"> • route sign/trail marker (possibly with arrow) • expository clarify how to navigate upcoming section of the route, map
rule or "how-to" that is not obvious or standard, or that otherwise needs to be explicitly stated	<ul style="list-style-type: none"> • regulatory - prescribed actions • regulatory - restricted actions • expository - list of rules or instructions • expository - interpretation of rules or instructions
path condition changes to something unexpected/atypical: <ul style="list-style-type: none"> • tight curve, change in direction • width becoming narrower/height clearance becoming lower • grade becoming steeper • surface condition becoming less firm, less smooth, or more slippery. • other 	<ul style="list-style-type: none"> • warning signs - with "off the shelf" message for typical triggers • warning signs - with a custom made message, made using the standard warning sign template, for a condition not covered by any of the standard signs
Trailhead/entry point into trail network	<ul style="list-style-type: none"> • expository - describe area trail network, map • expository - accessibility compliance • expository - rules or instructions
Regulatory sign that is hidden, does not have good sight lines on approach	<ul style="list-style-type: none"> • warning - tailored to specific regulatory sign, following standard template
different users ahead who may be unexpected or conflicting	<ul style="list-style-type: none"> • warning - tailored to specific conflicting use, following standard template
natural wonder, historic feature, and such	<ul style="list-style-type: none"> • expository - interpretive sign that is purely educational

Color, Size, and Shape

Standards for color, size and shape for each type of sign are clearly spelled out in reference documents (authoritative source is MUTCD, nice summary in *Trails for the 21st Century*, and signs unique to Cross Vermont Trail described in CVTA custom sign detail document.)

Some specifics pulled out for quick reference:

- MUTCD: On SUP, if need customized wording on regulatory sign, then template is: color = black letters on white background; size and shape = 12" wide x 18" tall.

Material

material	gauge	sign
aluminum	.063	CVTA standard signs for "simple trail"
aluminum	.080	All standard signs on roads and SUP's
plastic	.050	"Off the shelf" simple trail signs; various generic versions of regulatory and warning signs. (Lucky for us, because of demand from skiing and snowmobiling trails, many vendors keep these signs in stock.)

II.) HOW TO PLACE SIGNS

Position relative to feature described by sign (in advance of, at, or following) and distance from feature.

type of sign	typical relative position to feature described
Regulatory	Typically at the feature (stop sign at the spot where stop is required), or at the beginning of a longer feature ("Bikes Yield to Ped" at the beginning of the trail.)
Warning	Typically ahead of the feature. Sometimes at the feature to point out exactly where it is ("Dip" or "Crosswalk")
Wayfinding	Any. Signs ahead of or immediately at confusing points in the route (with an arrow pointing the correct way). Also, following confusing portions of the route to reassure users they are still on the route.
Expository	Typically at the feature (interpretive sign at the spot that is being interpreted), or at the beginning of a longer feature ('park rules' at the beginning of the trail through a park.)

Within this broad outline, a few specifics have been developed:

- MUTCD: Requires that on bike paths, warning signs shall be placed at least 50 feet in advance of the feature described.
- Rails to Trails Conservancy: Suggest that warning signs should at least 125' in advance of the condition they address.
- VAST: Warning signs intended for snowmobilers should be 150' to 500' ahead of hazard, depending on speed limit (see VAST guidelines.)
- VTrans: CVTA wayfinding sign on state highways must follow intersections to reassure users (but cannot be placed ahead of intersections.)

Placement of Route Signs/Trail Markers:

Placed along the travelled way at three types of locations:

- Ahead of decision points with arrow pointing which way to go. Works best at simple "intersection ahead: turn left, right or continue straight".
- At or following decision points to reassure users that they are still on the route. If decision point is not just a simple turn, a reassuring sign at or after may be more clear than an arrow ahead. Also called a "beckoning" sign, since it is just beyond and within sight of the decision point. When the user slows to decide which way to go, they see the route sign and are beckoned towards it. *NB: On state roads, VTrans standards require CVTA route signs can only be placed following intersections.*
- If long stretch between decision points, can place route sign at halfway point between them to reassure users that still on route. This tells them to continue forward and to not start worrying "it's been a while, did we miss a turn?"

Decision points are any location where a typical user would slow down or stop and make a conscious decision about how to follow the route.

Important qualifying statement: For the state wide route of the Cross Vermont Trail, primary guidance is by written route description and maps. CVTA standard is **not** to place so many wayfinding signs that a user could easily follow the entire route relying only on signs. There are three reasons for this: need to coordinate signage with partner organizations, desire to minimize sign clutter along trail, and need to be efficient with sign expenses. CVT route is usually coaligned with local trails and roads. Often, these already have their own signage. CVTA's policy in these situations is to place CVT route signs where possible to reassure users, but to not place them at every decision point. In places where CVTA has primary responsibility for trail signs, they are limited to "significant" decision points. The location of significant points will be based on ongoing feedback from trail users, but there will always be stretches of trail with no sign in sight.

Clearance from other signs. Can it be grouped on the same post with other signs.

The underlying principle is that signs not obscure each other. Ideally, employ the minimum number of signs spaced the maximum distance apart.

Within this broad goal, a few specifics have been developed:

- Clearance - on trails, Rails to Trails Conservancy recommends at least 75' between posts.
- Clearance - on state roads, VTrans asks that as a general rule CVTA wayfinding signs be placed a minimum of 200 feet from any regulatory or warning sign.
- Grouping - is OK for wayfinding signs. On trails, wayfinding signs can be grouped in advance of diverging trails (i.e. trail A goes right, trail B goes left.) VTrans and most towns prefer that CVTA wayfinding signs be grouped with existing road wayfinding signs, so as to minimize the total number of posts along the road.
- Grouping - warning and regulatory signs should not be grouped. Ideally, present one message per sign and keep the message simple. CVTA wayfinding signs cannot be grouped with these on any road or SUP.
- Grouping - however, on simple trails it sometimes does make sense to group a regulatory, warning, or expository sign with a wayfinding sign (such as a route sign and a "narrow trail ahead" sign together; or a route sign with a map of upcoming confusing portion of route.) Traffic is lower volume and lower speed. Signs are smaller and fit easily on a single post. Extra posts are more intrusive in the natural setting.

Lateral Clearance

"How far off to the side of the trail or road should the sign post go?"

For signs that are facing traffic and meant to be read on the move:

Location			Clearance measured from:	Clearance measured to:	Clearance (ft)
trail	simple	other	edge of traveled way	nearest edge of widest sign	Varies
trail	simple	If signs also intended for snowmobilers	edge of travelled way	farthest edge of widest sign	Must be at least 3' plus width of widest sign but not greater than 8' total
trail	SUP	Any	edge of travelled way	nearest edge of widest sign	Must be at least 3' but not greater than 6'
road	any	With guardrail	back side of guardrail posts (side away from road)	nearest edge of post	Deflection distance per <i>VTrans Standard 160</i> (usually 3')
road	rural	With shoulder	outside edge of shoulder	nearest edge of widest sign	6'
road	rural	No shoulder	outside edge of travelled way	nearest edge of widest sign	12'
road	urban (i.e. curb and sidewalk)	If clearance between curb and sidewalk is equal to or greater than 2' plus width of widest sign on post.	curb (start measuring at the edge of the curb which is away from road)	nearest edge of widest sign	2'
road	urban (i.e. curb and sidewalk)	If clearance between curb and sidewalk is less than 2' plus width of widest sign on post.	sidewalk (start measuring at the edge of the sidewalk which is away from road)	nearest edge of post	6'

Notes:

- If clearance is measured to nearest edge of widest sign, then calculate location of center of post by adding clearance distance plus half the width of the widest sign that will be placed on the post.
- If clearance is measured to nearest edge of post, then calculate location of center of post by adding clearance distance plus half the width of the post. (Usually 3.5 inches - which is width of 3#/ft flange channel posts and also of 4x4 wooden posts.)

Expository signs are meant to be read while stopped and out of the travelled way. No specific standard to cite here. Obviously look for place where room to stand apart from travelled way, such as trailhead parking. When placed along the route of the trail, often placed parallel to it, rather than facing traffic.

Vertical Clearance

"How tall should the sign post be?"

All are measured from elevation of travelled way to base of lowest sign on post.

Location		Clearance if one sign on post	Clearance if more than one sign on post
road	rural	At least 6'	At least 5'
road	urban (i.e. curb and sidewalk)	At least 7'	At least 6'
trail	SUP	At least 4' but not greater than 5'	At least 4' but not greater than 5'
trail	If signs also intended for snowmobilers	At least 2' but not greater than 7' minus height of all signs on post.	At least 2' but not greater than 7' minus height of all signs on post.
trail	sign board or kiosk	for accessibility, max 40" to start of text, max 60" to top of text.	n/a
trail	other	Varies	Varies

III.) SIGN POSTS

Selecting post:

Material	Size	Selection Value*	Notes on where to select.
steel	1.75" square	63	Not typically used in any CVTA application.
steel	2" square	81	Common on roads. State highways require this or 3#/ft flanged channel.
steel	2.5" square	177	Not typically used in any CVTA application.
steel	1.12#/ft flanged channel	? (low)	Not typically used in any CVTA application. Otherwise, often seen used as stakes.
steel	2#/ft flanged channel	32	Allowed on town roads and SUP's for smaller signs.
steel	3#/ft flanged channel	101	Common on roads. State highways require this or 2" square.
wood (pressure treated)	4x4	Enough for one or two trail sized signs. (?)	Common on simple trails. Assumed strong enough for small signs in low stress setting (sheltered, slow traffic.) Desirable for aesthetics when trail is distant from roads or development.
wood (pressure treated)	4x6 or larger	Calculate based on size of lumber.	If wood post is desired for larger sign because of aesthetics, then calculate size post needed. In addition, sometimes small signs are placed on wide posts so that the post also acts as backing for the sign.

wood	2x2	very low (used for light weight plastic signs.)	Never used by CVTA. May be used by snowmobilers on trail for seasonal signs.
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* *VTrans Standards 160 and 164* say how to calculate size post needed for size signs. Formula is (sign area in square feet) * (height from ground to top of post in feet) = "Selection Value" of the post, which must be less than or equal to the selection value of the post.

Examples:

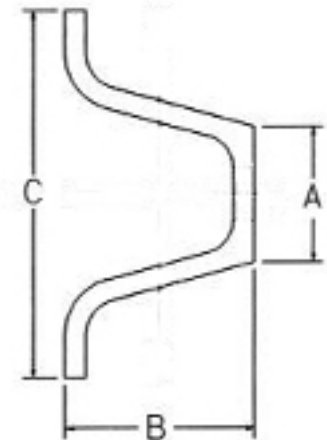
- An 18" x 18" Stop sign on a 6 foot tall post would have a selection value = $(1.5' * 1.5')(6') = 13.5$; which means that any post would be plenty strong to support the sign.
- A 12" x 18" Cross Vermont Trail route sign and a 12"x9" turn arrow are mounted on a 12' tall post (which needs to be so tall because the shoulder drops off steeply) = $[(1 * 1.5) + (1 * .75)] * 12 = 27$; which again means any size post would be plenty strong.
- A 24"x24" cross walk warning sign where trail crosses road and a 24"x12" downward pointing arrow mounted on a 8 foot tall post = $[(2 * 2) + (2 * 1)] * 8 = 64$; which means need to select one of the larger sized posts.

Post hardware:

- hardware for Flanged Channel steel posts:

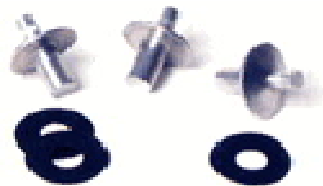
Use 3/8" diameter by 2.5" long stainless steel hex head bolts. Peen the ends of the bolts to make it harder for vandals to remove sign. Mounting holes are 7/16" diameter and spaced 2" center to center along the full length.

Posts are shaped like the letter U. Signs are placed against the open face of the post (labeled C in diagram.)



Post Size (lb/ft)	Dimensions		
	A	B	C
2	1 9/32"	1 31/64"	3 1/16"
3	1 5/16"	1 7/8"	3 1/2"

- hardware for Square steel posts:



Aluminum Drive Rivet. Material - Aluminum; Finish - Plain; Diameter - 3/8; Length 3/4; Head Diameter - 1". Mounting holes are 7/16" diameter and spaced 1" center to center along the full length.

With a simple hit from a hammer, these rivets attach metal signs to square posts. (To remove, use a hammer and punch to drive the center of the rivet all the way through, then crimp the flared ends on the inside of the post, and pull out.)

- hardware for Wooden posts:

3/8" stainless steel lag bolts for larger signs. For smaller signs, simple nails or screws will work.

Post holes: Metal posts along roads and SUP's installed in compliance with *VTrans Standards 160 and 164* shall be buried at least 3.5'. If the side slope is steeper than 1 rise to 2 run, then bury 5.5'. However, if within deflection distance of a guardrail, then bury 3.5' regardless of slope. Wooden posts along simple trails would benefit from being buried that deep, but often are not. However, they should be buried at least 2' (along with deadmen for support). All post holes shall be backfilled with compacted, solid mineral material free of organic matter.

Deadmen: Posts along trails typically have "deadmen". These are cross pieces fastened to the lower part of the post and buried. They reduce chance of posts being pulled out or twisted to face the wrong direction. Dig the post hole at least 12" in diameter. Fasten cross pieces to the post so that they will be buried at least 12". Backfill tightly around the cross pieces.

Expository signs are often placed on sign boards, bulletin boards, or kiosks. The basic principle for selecting posts is the same as for single signs: as the square feet of the board gets larger, the post gets larger and/or multiple posts are used. There are many standard designs that can be built with basic carpentry. Also, many manufactured styles available for sale. When CVTA installs boards or kiosks, details will be referenced here.

References:

CVTA

- Detail of signs custom made for Cross Vermont Trail.

Manual on Uniform Traffic Control Devices (MUTCD)

- Part 1, General
- Part 2D.50 Trail Signs
- Part 9, Traffic Controls for Bicycle Facilities

Vermont Agency of Transportation

- *Pedestrian and Bicycle Facility Planning and Design Manual; Chapter 8: Signs, Pavement Markings and Signals* December, 2002
- *Standard A-78: Shared Use Path Typical* March 31, 2004
- *Standard E-121: Standard Sign Placement Conventional Road* August 8, 1995
- *Standard E-164: Square Steel Sign Post* May 20, 1999
- *Standard E-160: Flanged Channel Steel Sign Post* May 20, 1999
- *Standard E-131B: Bicycle Guide Sign Details* May 30, 2003
- Memo, Nancy Avery, Regional Traffic Investigator, 5/1/2007.
- *Guidelines for Scenic Byway Trailblazer Sign Design and Placement* December 2006

Federal Highway Administration

- *Designing Sidewalks and Trails for Access* September, 2001; pages 14.15-17; 15.6-7; 15.39-42.

Rails to Trails Conservancy

- *Trails for the Twenty-First Century* Flink, Olka, Searns; Island Press, 2001 Second Edition; pages 88 - 91, 147-149.

Vermont Association of Snow Travelers

- *Guidelines for Snowmobile Trail Signing and Placement* Revised 10/09