



NEW YORK - NEW JERSEY TRAIL CONFERENCE

TRAIL DESIGN STANDARDS PRACTICE

Approved by the Policy Council on December 13, 2016

1 INTENT AND OVERVIEW

The intent of the standard is to have measurable trail characteristics such that a trail can be compared with other similar trails or itself over time to determine that it meets the assigned standard. Since it is done in consultation with the land manager, it will meet their expectations. The goal is to bring consistency and agreement to the desired character outcomes of trail maintenance and construction. In other words, this is a guide to establish the class of development or building, maintenance, and repairs, i.e. is a repair or construction a) “overbuilt,” b) “built just right,” or c) “underbuilt.” These three differences in perception can become the source of debate when it comes to maintaining or repairing a trail segment while trying to keep a trail’s character intact.

Not all trails are built to the same standards which typically depend on the available terrain, costs, user experience expectations, and intended usage. Trail “character” is a fairly subjective classification of how “developed” a particular trail is. This document attempts to make the classification less subjective by specifying particular characteristics typical for a trail of a particular character.

Trail Conference standards apply specifically to hiking trails but generally, with some modifications, are suitable for mountain bike usage, and with significant modifications for horse usage. The Trail Conference generally prefers Universal Design where practical.

2 APPLICABLE POLICIES

This practice implements the Trail Design Standards section of the Trail Management Policy.

3 DEFINITIONS

Boardwalk	Raised decking perpendicular to the direction of travel on stringers - typically in wet or fragile areas
Bog bridge	Long boards or flattened logs in the direction of travel on horizontal supports (sleepers) perpendicular to the trail - typically in wet areas
Character (of a trail)	One of: Minimally developed, Moderately developed, Developed, Highly developed, Fully developed, Special
Clearing Height	The height of the clearing measured vertically from the trail tread.
Clearing Width	The width of the clearing measured perpendicular to the trail, equal to or wider than the tread width.
Cross Slope (Out Slope)	The percentage of rise to length when measuring the trail tread from edge to edge perpendicular to the direction of travel.
Design Parameters	Technical guidelines for the survey, design, construction, maintenance, and assessment of a trail, based on its Designed Use and Trail Class.

New York – New Jersey Trail Conference

Designed Use	The construction and maintenance parameters that, in conjunction with the applicable Trail Class, determine which Design Parameters will apply to a trail.
Developed	The level of development refers to the amount of construction used to modify the natural environment, typically waterbars, steps, grading, etc.
Fall line	The steepest route down a slope, the path water follows down the hill.
Grade reversal	A dip in a continuing slope - for water control
Hardened	The manipulation of the trail tread surface to withstand the designed use type (see “surface type: stable”), e.g. armoring, paving, causeways, turnpikes...
Managed Use	A mode of permitted travel that is actively managed and appropriate on a trail, based on its design and management.
MDBR	Maximum Distance Between Reversals Changes with soil: loam with gravel shown (infinite for 5% assuming 6-10% outslope). Maximum grades typically: 15% if rocky/durable, 10% if loamy, 5% if sandy.
Maximum Pitch Density	The maximum percentage of a trail with grades that exceed the Target Grade and that are less than or equal to the short pitch maximum, based on the Managed Uses of the trail.
NR	Not Recommended
Short Pitch Maximum	The steepest grade that is determined to be appropriate based on the Managed Uses of a trail, that generally occurs for a distance of no more than 200 feet.
Surface Obstacles	Trail tread imperfections, such as rocks, roots, holes, stumps, steps, downed logs, and structures, that are <i>beyond the acceptable range</i> of tread roughness and challenge level for the trail and <i>that obstruct</i> one or more Managed Uses of the trail.
Surface Protrusions	Trail tread imperfections, such as rock, roots, holes, stumps, steps, and structures, that are <i>within the acceptable range</i> of tread roughness and challenge level for the trail and that <i>do not obstruct</i> the Managed Uses of the trail.
Surface Type	A characteristic of the tread expressed in terms of material type, grading, compaction, and roughness. <ol style="list-style-type: none"> 1. Native: A surface composed of soil, rock or other naturally occurring materials found on or near the trail. 2. Firm: A surface that is not noticeably distorted or compressed during the seasons for which it is managed, under normally occurring weather conditions, by the passage of a device that simulates a trail user in a wheelchair. 3. Stable: A surface that is not permanently affected by normally occurring weather conditions and able to sustain normal wear and tear caused by the uses for which the trail is managed between planned maintenance cycles.
Trail Class	The prescribed scale of development for a trail, representing its intended design and management standards.
Trail Grade	The ascent or descent of a trail segment expressed as a percentage of its length. It is

	typically expected to be less than ½ the fall line grade.
Trail Management Objective	Documentation of the intended purpose and management of a trail based on management direction, including access objectives.
Tread Width	The width of the walkable surface.
Universal Design (UD)	Designing programs and facilities to be usable by all people, to the greatest extent possible, without separate or segregated access for people with disabilities.
Very Durable Surface (VDS)	A surface such as rock or with sufficient rock content to prevent wear and erosion.

4 DESCRIPTION OF PRACTICE

All trails in the database will be assigned a Class and recorded in the trail database by one of the following mechanisms:

1. Assign the appropriate Class based on Land Manager preferences and technical parameters from the planning process arrived at during the trail approval process for new or relocated trails.
2. Assign the appropriate Class based on an a trail assessment done by a trained trail assessment team during their scheduled assessment update process. The LTC Chair must vet this assignment through the land manager unless there are prior agreements in place.
3. Use the Class that most closely reflects the management intent for the trail, which may or may not reflect current conditions.

4.1 Roles

Any individual performing a trail assessment in accordance with Trail Assessment process (TBD) is responsible for assigning classification to a trail.

4.2 Trail Classification

The Trail Classifications specified in the following table are based on USFS Trail Classes ([Trail Fundamentals for National Forest System](#) p.33, 34- Trail Class Matrix (FSH 2353.142, Exhibit 01)).

A special Character (6) classification is used for trails which do not fit into any of these classes. For example, Breakneck Ridge Trail which is much steeper and has higher traffic than any of these classes allow.

Attribute	Character 1 Minimally Developed	Character 2 Moderately Developed	Character 3 Developed	Character 4 Highly Developed	Character 5 Fully Developed
Tread & Traffic Flow	<ul style="list-style-type: none"> • Tread may be minimally defined • Single lane, with no allowances constructed for passing • Predominantly 	<ul style="list-style-type: none"> • Tread continuous and discernible, but narrow and rough • Single lane, with minor allowances constructed for passing 	<ul style="list-style-type: none"> • Tread continuous and obvious • Single lane, with allowances constructed for passing where required by traffic 	<ul style="list-style-type: none"> • Tread wide and relatively smooth, with few irregularities • Single lane, with allowances constructed for 	<ul style="list-style-type: none"> • Tread wide, firm, stable, and generally uniform • Single lane, with frequent turnouts where traffic volume is low to moderate

New York – New Jersey Trail Conference

	native materials	<ul style="list-style-type: none"> • Typically native materials • May be hardened 	<p>volume in places where there is no reasonable opportunity to pass</p> <ul style="list-style-type: none"> • Native or imported materials • May be hardened 	<p>passing where required by traffic volume in places where there is no reasonable opportunity to pass</p> <ul style="list-style-type: none"> • Wider where traffic volume is moderate to high and passing is frequent • Native or imported materials • May be hardened 	<ul style="list-style-type: none"> • Wider where traffic volume is moderate to high and passing is frequent • Commonly hardened with imported material
Obstacles	<ul style="list-style-type: none"> • Obstacles common, naturally occurring, often substantial, and intended to provide increased challenge • Narrow passages; brush, steep grades, rocks and logs present 	<ul style="list-style-type: none"> • Obstacles may be common, substantial, and intended to provide/maintain increased challenge • Blockages cleared to define route and protect resources • Vegetation may encroach into clearing width 	<ul style="list-style-type: none"> • Obstacles may be common, but not substantial or intended to provide challenge • Vegetation cleared outside of clearing width 	<ul style="list-style-type: none"> • Obstacles infrequent and insubstantial • Vegetation cleared outside of clearing width 	<ul style="list-style-type: none"> • Obstacles not present • Running grades typically < 8%
Constructed Features & Trail Elements	<ul style="list-style-type: none"> • Structures minimal to nonexistent • Drainage typically provided without structures • Natural fords • Typically no bridges 	<ul style="list-style-type: none"> • Structures of limited size, scale, and quantity; typically constructed of native materials • Structures adequate to protect trail infrastructure and resources • Bridges as needed for resource protection and appropriate access (usually natural fords) 	<ul style="list-style-type: none"> • Structures may be common and substantial; constructed of imported or native materials • Natural or constructed fords • Bridges as needed for resource protection and appropriate access 	<ul style="list-style-type: none"> • Structures frequent and substantial; typically constructed of imported or native materials • Constructed or natural fords • Bridges as needed for resource protection and user convenience • Trailside amenities may be present 	<ul style="list-style-type: none"> • Structures frequent or continuous; typically constructed of imported materials • May include bridges, boardwalks, curbs, handrails, trailside amenities, and similar features
Blazing	Maintenance Manual				
User type considerations	<ul style="list-style-type: none"> • Very experienced • Has maps, way finding skills, 	<ul style="list-style-type: none"> • Experienced • Has maps, way finding skills, 	<ul style="list-style-type: none"> • Moderately experienced • May have maps, 	<ul style="list-style-type: none"> • Inexperienced • Maps and wayfinding skills 	<ul style="list-style-type: none"> • Totally inexperienced • No maps or

	knowledge of resources and trail information • Capable of independent hiking • Able to handle severe conditions- rugged terrain, significant obstacles, rock outcrops, steep and long inclines and declines, hand and foot rock climbs, long trips • Has appropriate outdoor/hiking gear	knowledge of resources and trail information • Self-directed or with a few companions • Able to handle uneven terrain, moderate obstacles, steep inclines and declines, hand and foot rock climbs, long trips • Has appropriate outdoor/hiking gear	some wayfinding skills, somewhat familiar with some access areas and associated trail sections • Possibly self-directed or with hiking groups • Able to handle obstacles, moderate inclines and declines, moderate trips • Has appropriate footwear	unlikely, may not understand trail blaze standards • Interested to try hiking or nature adventure but relatively new • Able to handle minor obstacles, short inclines and declines, short trips, not prepared for varied and rough terrain • Has street shoes at best	wayfinding skills, totally inexperienced off of paved pathways • New to the concept of hiking • Limited ability, questionable balance, minimal endurance, prefers short, leisurely walks, may have physical limitations • May not have appropriate footwear
Volume of use considerations	Minimal	Low	Medium	High	Very High

4.3 Design Standards

Design Standards are technical guidelines for the survey, design, construction, maintenance, and assessment of trails, based on their Designed Use and Trail Development Level and consistent with their management intent. Local deviations from any Design Standard may be established based on trail-specific conditions, topography, or other factors, provided that deviations are consistent with the intent of the Development Class. The determination of trail-specific Grade, Surface, and other Design Standards should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Designed Use HIKER/PEDESTRIAN		Minimally Developed Character 1	Moderately Developed Character 2	Developed Character 3	Highly Developed Character 4	Fully Developed Character 5
Tread	Width	0 - 12"	6 - 18"	18 - 36"	24 - 60 - 72"	36 - 72 - 120"
	Passing Space (Minimum)	N/A	N/A	60"x 48" every 1000'	60"x 60" every 1000'	60"x 60" every 1000'
Surface	Type	<ul style="list-style-type: none"> • Native, ungraded • May be continuously rough • Some scrambles 	<ul style="list-style-type: none"> • Native, limited grading • May be continuously rough • Some scrambles 	<ul style="list-style-type: none"> • Native, with some onsite borrow or imported material where needed for stabilization and occasional grading 	<ul style="list-style-type: none"> • Native with improved sections of borrow or imported material, and routine grading • Minimal roughness 	<ul style="list-style-type: none"> • Likely imported material, and routine grading • Uniform, firm, and stable

New York – New Jersey Trail Conference

				● Intermittently rough		
	Protrusions	24" Likely common and continuous	10" May be common and continuous	3" May be common, not continuous	3" Uncommon, not continuous	No protrusions
	Obstacles (Maximum Height)	no limit	24"	10"	8"	2"
	Gaps perpendicular to travel	N/A	N/A	Less than 0.5" in constructed features	Less than 0.5" in constructed features	Less than 0.5" in constructed features
Grade/Running Slope	Target Grade	5% - 25%	5% - 18%	3% - 12%	2% - 10%	2% - 5%
	MDBR	5% - 25% 70ft - 15ft	5% - 18% 70ft - 25ft	3% - 12% 100ft - 35ft	2% - 10% infinite, 120ft - 40ft	2% - 5% infinite, 120ft - 70ft
	Short Pitch Maximum	40% on VDS	35% on VDS	25% on VDS	15%	12%
	Maximum Pitch Density	20% - 40% of trail or 1000-2000 ft/mi	20% - 30% of trail or 1000-1500 ft/mi	10% - 20% of trail or 500-1000 ft/mi	5% - 20% of trail or 250-1000 ft/mi	0% - 5% of trail or 0-250 ft/mi
	60" min. Desired Resting Interval	N/A	N/A	every 200' if 5-8.3%, every 30' 8.3-10%, every 10' 10-12%	every 200' if 5-8.3%, every 30' 8.3-10%, every 10' 10-12%	every 200' if 5-8.3%, every 30' 8.3-10%, every 10' 10-12%
	Resting Interval Width	N/A	N/A	Trail Tread Width	Trail Tread Width	Trail Tread Width
Cross/Outslope	Target Cross/Outslope	Natural side slope	Natural side slope - 20%	5% - 10%	3% - 7%	2% - 5%
	Cross/Outslope (Maximum)	Natural side slope	25%	15%	10%	5%
Clearing/Corridor	Height (Minimum)	6'	6'	8'	8'	8'
	Width	24" vegetation may encroach into clearing area	24 - 48" vegetation may encroach into clearing area	36 - 60"	48 - 72"	60 - 120"

			(light)			
	Constructed Feature Overhanging Tread	N/A	N/A	4" overhang between 27 - 80" above tread	4" overhang between 27 - 80" above tread	4" overhang between 27 - 80" above tread
Structures	Stairs	N/A	12 - 24"	18 - 36"	24" min	36" min
	Wood Stiles	N/A	12 - 24"	18 - 36"	24" min	N/A
	Ladders	N/A	12 - 24"	18 - 36"	24" min	N/A
	Bridges	N/A	8" min	18" min	24" min	36" min
	Bog bridge/ Puncheon/ boardwalk	N/A	8" min	12" min	16" min	Trail Tread Width
	Stepping Stones	N/A	12" x 12" min	12" x 12" min	16" x 16" min	N/A

This table is based on USFS Design Parameters (FSH 2309.18, Section 23.11, Exhibit 01)

Trail Classes 4, and 5, in particular, have the potential to provide accessible passage. If assessing or designing trails for accessibility, refer to the Federal Accessibility Guidelines for Outdoor Developed Areas

4.4 Forms Supporting the Practice

The trail class and exceptions to the class for any particular trail will be recorded in the trail database. For example, the Xyz Trail is Moderately Developed but has much higher usage than normally associated with Moderately Developed. This is ok because the soils on that trail can sustain the high usage without extra hardening but the grades are much higher than Developed allows. Alternately the Xyz Trail could be described as Developed, but with much steeper grades than allowed. It is an assessor’s judgement call as to which way to describe the exceptions.

5 CONTACTS

This practice is supported by the Policy Council.

6 PROCESS EFFECTIVE DATE AND PRIOR PRACTICE

This process is effective upon Policy Council approval, but the implementation will be opportunistic and applied as we build or relocate existing trails, accompanied by a systematic incremental approach doing about 20% of unclassified trails every year.

This is a new practice. It will be reviewed periodically, but at least every 5 years, by the Policy Council.