Appendix I: Trail Classification, Use Matrix and Construction Standards

TRAIL CONSTRUCTION DESIGN STANDARDS Standards (minimum)	Width Under Foot	Clearing (Width)	Surface	Clearing (Height)	Description
Class I	At least 8 feet	4-feet on either side of trail	(base course thickness = 6 inches) Native, pit-run fines, gravel mixture, asphalt, concrete, wood decking	At least 10 feet	Most developed trail that can accommodate any use.
Class II	At least 6 feet	2-feet on either side of trail	(base course thickness = 6 inches) Native, pit-run fines, gravel mixture, wood decking	At least 10 feet	Somewhat developed trail that can accommodate any use.
Class III	At least 28 inches	No clearing required	Native	At least 7 feet	Most basic trail that can accommodate any use.
TRAIL CONSTRUCTION DESIGN STANDARDS Standards (minimum)	**Width Under Foot**	**Clearing (Width)**	**Surface**	**Clearing (Height)**	**Description**
Pedestrian (built to Class III Standards)	At least 4 feet	1-foot on either side of trail	(base course thickness = 6 inches) Native, pit-run fines, gravel mixture, asphalt, concrete, wood decking	At least 7 feet	These trails will be constructed when a separated pedestrian only pathway is needed.
Bike (built to Class I Standards)	At least 4 feet	2-feet on either side of trail	(base course thickness = 6 inches) Native, pit-run fines, gravel mixture, asphalt, concrete, wood decking	At least 10 feet	When built by a road, a bike lane shall be marked by striping. The bicycle lane contains pavement markings indicating it is for bicycle travel. The lanes may be created by narrowing existing lanes, removing a travel lane, or widening a roadway.
Horse	At least 4 feet	2-feet on either side of trail	Native	At least 10 feet	These are the minimum standards for equestrian-specific trails. See http://www.fhwa.dot.gov/environment/fspubs/07232816/page10.htm

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					for equestrian bridge construction standards.
Snowmobile	At least 4 feet	2-feet cleared on either side of trail	Groomed	At least 7 feet	These may be on an existing trail due to seasonal use.
OHV	At least 4 feet	2-foot cleared on either side	(base course thickness = 6 inches) Native, pit-run fines, gravel mixture, asphalt, concrete, wood decking	At least 10 feet	These are the minimum standards for OHV-specific trails.
ADA	Dependent on grade of ADA access needed				See http://www.access-board.gov/adaag/html/adaag.htm for ADA construction standards
Cross-Country Ski	At least <4 feet	2-feet on either side of trail	Groomed	At least 7 feet	These may be on an existing trail due to seasonal use.
Transit	Provides adequate turn-out lanes for bus stop	Provides adequate signage and shelter	Paved asphalt, concrete, native	N/A	See Greater Bozeman Area Transportation Plan for specs…?

Design/Class- basic minimums

1. **Class I** - Heavily used, generally full access, multiple use, main corridor trails designed for recreational and commuter use. Designed to permit two-way traffic using a wide surfaced tread, or parallel treads; one surfaced and the other unsurfaced. ADA degree of access: easy
    a. Single surfaced tread with a minimum width of eight feet. Parallel treads (surfaced and unsurfaced will have minimum widths of eight feet and four feet, respectively). Tread width may be reduced to 36 inches for a maximum distance of 10 feet to pass or preserve significant features such as rock formations, important vegetation, etc.
    b. Tread surface will be asphalt, concrete, pavers set on concrete, wood decking, natural fines, or a well maintained compacted crushed gravel mixture meeting the aggregate specification in 5 below. The tread material including any base course will have a total minimum thickness of six inches. Wood deck planks must be run perpendicular to the direction of travel and joints must not exceed 36 inches. Planks must be securely fastened so they do not warp.
    c. The minimum cleared zone will be tread width plus 2 feet to either side of the tread and 10 feet vertical.
    d. Maximum sustained running grade is 5%. A 10% maximum grade is allowed for a maximum distance of 30 feet.

e. Tread will be raised above adjacent surfaces and have a 1 to 2 inch crown. Where this requirement is not possible, the tread will have a 1 to 20 cross slope and/or side ditches outside the cleared zone. Stream crossings will be over culverts or bridges. Only dips or slot-entrance drainpipe will be used for crosstread water stops.
f. Wood chips are not an acceptable tread material for Class I trails.
g. Geo-textile material as specified in 5 below, will be placed beneath the tread material in poorly drained, boggy or marshy areas, or wet meadows and on any of the following soil types; clays, clayey loams, silts, silty loams, or loess.
h. Adequate visibility for safety.
i. The minimum acceptable trail easement width is 25 feet.
j. Trail entrances will be signed describing the degree of ADA access.
k. All above items may be modified to meet current ADA specifications.

2. **Class II** - Moderate use, multiple use, local and connector trails designed for commuter and recreational use. Class II trails are not specifically designed for full access and may or may not be surfaced. ADA degree of access: moderate.
    a. Single surfaced or unsurfaced tread, six foot minimum width. Tread width may be reduced to 32 inches for a maximum distance of 30 feet to pass or preserve significant features such as rock formations, important vegetation, etc.
    b. A gravel or particulate tread surface will be a minimum of six inches thick. Native soil tread is acceptable only where the soil will allow all-weather use with minimal environmental impact. Class II trails or portions of trails designed for ADA access will be surfaced with a minimum of wood decking as described under Class I, natural fines, or with a well maintained compacted crushed gravel meeting the aggregate specifications below.
    c. The minimum cleared zone will be tread width plus one foot horizontal, and ten feet vertical.
    d. Grades will be 15% or less. Class II trails or portions of trails designed for ADA access will have a maximum sustained running grade of 8% and a 14% maximum grade is allowed for a maximum distance 50 feet.
    e. Tread will be raised above the adjacent surfaces and have a 4 inch crown. Where this requirement is not possible the tread will have a 1 to 20 cross slope and/or side ditches outside the cleared zone. Stream crossings will be over culverts or bridges.
    f. Only dips, slot-entrance drain pipe, or rubber belting will be used for cross-tread water stops.
    g. Wood chips are not an acceptable tread material for Class II trails.
    h. Geo-textile material as specified in Appendix L-1, Part 5 will be placed beneath any gravel or particulate tread material in poorly drained, boggy or marshy

areas, or wet meadows and on any of the following soil types; clays, clayey loams, silts, silty loams, or loess.

i. Adequate visibility for safety.
j. The minimum acceptable trail easement width is 25 feet.
k. Trail entrances will be signed describing the degree of ADA access.
l. All above items may be modified to meet current ADA specifications.

3. **Class III** - Low use, long distance connector trails designed primarily for recreational use. Trails limited to pedestrian traffic in sensitive locations, such as wetland nature education areas. Trails are designed to minimum standards striving for low maintenance and minimal disturbance to the natural setting. ADA degree of access: difficult to most difficult.
    a. Single tread of a minimum 18 inch width. Class III trails or portions of trail designed for ADA access will be a minimum width of 28 inches.
    b. No surfacing is required except in erosion prone poorly drained, boggy or marshy areas, or wet meadows.
    c. The minimum of cleared zone will be the tread width horizontally and seven feet vertically.
    d. Maximum of 20% grades unless restricted by erosive soils, etc. Class III trails or portions of trails designed for ADA access will have a maximum sustained running grade of 12% and a 20% maximum grade is allowed for a maximum distance of 50 feet.
    e. Utilize grade dips, cross sloping, and water bars to minimize erosion.
    f. Blending the trail into the setting is emphasized in trail routing.
    g. The minimum acceptable trail easement width is 25 feet.
    h. Wood chip tread materials are acceptable when traffic is limited to pedestrian traffic in sensitive locations such as in wetland nature education areas.
    i. All above items may be modified to meet current ADA specifications.
4. Signage at Intersections-
    a. MDoT rec: Multi-use trails should be at least 10' wide and are safest when at-grade crossings with streets and driveways can be minimized. (http://mdt.mt.gov/research/toolkit/m1/pptools/ds/pbf.shtml)
    b. Sidewalks should be supported by curb ramps at intersections and driveways, and crosswalks and pedestrian signals at intersections, as required by federal ADA guidelines.
5. Trail Construction & Material Specifications
    a. Aggregates for Class I Trails will meet the following requirements:
        i. Aggregate surfacing materials shall be free from injurious quantities of vegetable matter, balls of clay, frozen lumps, or other extraneous matter.
        ii. No combination of shale, clay, coal, or soft particles shall exceed 3.5% by weight.

iii. The material shall be evenly graded.

iv. The material shall contain enough binder fines for good compaction.

v. The liquid limit for that portion of the fine aggregate passing the No. 40 sieve shall not exceed 25 and the plasticity index shall be between 5 and 10.

vi. f. A tolerance of 5%, by weight, up to the next above specified gradation (for example: 1/2 inch for 3/8 inch max) will be allowed.

vii. Upon approval of the Engineer, small quantities of gravel which contain oversize material may be placed on the trail surface. The gravel so placed shall then be mechanically worked (raked) to remove the oversize rock which shall be gathered and removed from the project or used for erosion control.

viii. h. All material shall be furnished with a written certification from an approved testing laboratory stating that the material proposed for use meets or exceeds the requirements of these specifications.

ix. i. The material will meet the following gradations

Percentage by Weight Passing Square Mesh Sieves

Passing	Crushed Top Surfacing	Crushed Base Course	Pit Run Gravel Base Course
3 inch sieve			
2 inch sieve			100 %
1 inch sieve		100%	
1/2 inch sieve			
3/8 inch sieve	100 %		
No. 4 sieve	50-80 %	25-60%	
No. 10 sieve	35-70%		
No. 200 sieve	8-15 %	6-12%	10-15%

1. Asphalt for Class I Trails: (to be completed as needed)
2. Concrete for Class I Trails: (to be completed as needed)
3. Acceptable aggregate or particulate surfacing materials for Class II and Class III Trails are:

a. Preferred - "Natural fines", "3/8 inch minus with binder fines".

b. Acceptable - Well graded road mix with a maximum particle size of ½ inch and a maximum 15% by weight of fines passing the No. 200 sieve.

- Railroad cinders.
- Crushed brick with a maximum particle size of 1/4 inch.
- Old existing gravel roads and railway beds with greater than 3/4 inch oversize removed from the surface.