

So You Want To Build an ATV Trail

A Practical Guide for Evaluating Potential for Trail Grant Sponsors



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So You Want to Build an All Terrain Vehicle Trail

A Practical Guide to Evaluating Trail Potential for Trail Grant Sponsors

Building an ATV trail is a challenging proposition for you as the trail sponsor. Your interest, just like the Department of Natural Resources and the all-terrain vehicle trail rider, is to design and construct a trail that is both safe, enjoyable and sustainable.

What do we mean by sustainable? The trail design should minimize the ecological impact of the trail and should retain the trail's basic stability and shape though time without abrupt changes recognizing that there are both the human and natural forces at work on the trail surface. The concept of sustainability also recognizes that appropriate maintenance and management are also necessary. To these ends, we have developed a modest checklist for trail sponsors to help you through the process of considering, laying out and constructing an all-terrain vehicle trail. The Department uses a checklist similar to this one when developing trails on DNR owned property.

There are six areas of consideration that you should be aware of as you begin to consider providing this trial opportunity. Each trail proposal goes through a variety of reviews by regional Department resource professionals, so it will pay big dividends to appropriately plan and document your choice of trail corridor locations. This focus on the front-end planning of a trail corridor will result in a more efficient trail review and ultimately a safe, enjoyable and sustainable trail for ATV enthusiasts.

➤ Property Limitations

- ❑ Are there any property limitations on parcels of property through which the trail corridor will pass? Some of these might include statutory designations, such as natural areas, or restrictions imposed because of a state or federal funding source that may have been used in the acquisition or management of the property, such as wildlife or fisheries areas.

➤ Potential Effects on the Resource

- ❑ Does the proposed trail corridor take advantage of existing upland travel corridors? Using existing upland corridors will minimize fragmentation of the property and habitat. Simply using existing corridors without relationship to the soils and topography may, however, lead to a trail corridor that is unsuitable, both from an environmental perspective and a constant maintenance problem, e.g. use of a corridor established for winter logging purposes.
- ❑ What is the durability of the underlying soils? The impact of tires on the surface of proposed corridor will break through the vegetative cover and expose the native soil surface. Is the soil durable to traffic wear or will it quickly degrade causing rutting and gross movements of soil particles? Are there areas that will require armoring to attain a stable surface? Your local county Land Conservation Department can provide valuable assistance on local soil characteristics and suitability.
- ❑ What is the potential impact of the project on sensitive wildlife habitat, unique aquatic or terrestrial habitats, or endangered/threatened species? Utilize large scale GIS based maps, topographic maps (1:24,000 scale or larger) or similarly scaled air photos to identify the trail corridor and geographic features allows resource specialists to identify

- ❑ the potential impact on sensitive or protected flora and fauna (NHI) and identify alternative corridors of travel where necessary.
- ❑ Does the proposed corridor go within ½ mile of an eagle, osprey, heron or cormorant nest?
- ❑ Does the proposed corridor pass through any areas designated for non-motorized or wilderness uses?
- ❑ Does the proposed corridor enter deer yards, nurseries or plantations?
- ❑ Does the proposed corridor pass through any known area of archeological or cultural significance? Your regional Community Services Specialists can assist you with this question.
- ❑ Does the proposed corridor pass through wetlands? Are there wetlands immediately adjacent to the proposed corridor that might be damaged as a result of off-trail use? Does the proposed corridor pass through a wetland that has been previously filled for road use? Again, utilizing good mapping tools is important in identifying potential wetland conflicts and alternatives. The best wetland protection is avoidance.
- ❑ Does the proposed corridor require stream crossings or lie adjacent to a waterway? Are there better alternatives to crossing streams or locating the trail tread in an area that has potential to drain to a waterway? Does the proposed corridor dead end at a lake, river, pond or spring hole? What is the potential for adverse impact to these types of water resources as a result of unauthorized off-trail use? As part of the waterways permitting process, the trail sponsor will be asked to identify alternative trail locations that eliminate or reduce impact to water resources in the trail corridor area.

The following list is a partial summary of the waterway and wetland protection requirements that project sponsors must follow:

Environmental Issue	Authority	Contact
Waterway Crossings and Modifications	Chapter 30 Stats	DNR Water Management Specialist
Wetland Crossings and Modifications	NR 103 (Chapter 281, Stats)	DNR Water Management Specialist
	Federal Clean Water Act, Section 404	US Army Corps of Engineers
Stormwater and Grading – 1 Acre or greater	NR 216 (Chapter 283, Stats)	DNR Water Management and Wastewater Specialists
Shorelands and Floodplain	County Shoreland and Floodplain Zoning Ordinances Pursuant to Chapters NR 115, (Chapter 59, Stats) and NR 116 (Chapter 87, Stats)	County Zoning office Also check with local jurisdiction (township, village, city)

To facilitate the types of reviews mentioned in the previous paragraphs, it is important that you indicate the trail corridor on appropriate maps or GIS layers, e.g. topographic maps scaled 1:24,000 (7.5 min. quadrangle) or similarly scaled air photos. While plat maps are useful, they are not a satisfactory substitute for topographic maps or aerial photos. A resource for these maps is found at the Department's mapping website: www.maps.dnr.state.wi.us

The Department has trail design standards that serve as best management practices for many of these resource impact issues. While these standards are directed at establishing and maintaining ATV trails on state property, they serve as a useful resource for ATV trail design and construction on other lands. These standards appear at the end of this document.

- Safety
 - ❑ Are there conditions that pose potential safety problems for trail users on the proposed corridor? Are there terrain features that pose potential hazards to trail riders such as steep drop-offs, rocky outcroppings, or unstable native tread surfaces?
 - ❑ Are there existing infrastructure situations that may pose safety concerns, e.g. necessity to cross highways, utilize highway rights-of-way or highway bridge structures to cross streams or rivers?
 - ❑ Are there alternative corridors that can be sited or constructed to avoid or minimize these situations?

- Social
 - ❑ Is there any known controversy with the proposed trail project?
 - ❑ What alternatives (including other sites) did you consider before selecting the proposed corridor location?
 - ❑ What other user groups will be sharing this corridor? Will others be using the corridor in different seasons?
 - ❑ What impacts to other recreational users are anticipated and what alternatives have been considered to minimize these conflicts?
 - ❑ Does the proposed corridor pass close to residences making dust or noise a problem?
 - ❑ Has public input been sought on this trail proposal?

- Cooperation with Partners
 - ❑ Is there a local organized club that will assist in the siting, development and maintenance of the trail?
 - ❑ Is there general support from the communities on near the proposed trail corridor?
 - ❑ Is there a volunteer trail patrol in the area that will "adopt" the trail?

- Management and Administrative Concerns
 - ❑ Do you, as the sponsor, have enough administrative staffing available to manage the trail? This staffing requirement extends to not only inspecting and maintaining the trail but also extends to such activities as answering public inquiries for information and providing trail maps
 - ❑ What are the local and DNR law enforcement resources available to patrol the trail?

To review, these are the types of questions and issues that will be reviewed and analyzed by resource professionals within the regional office of the Department after you have made application for trail development.

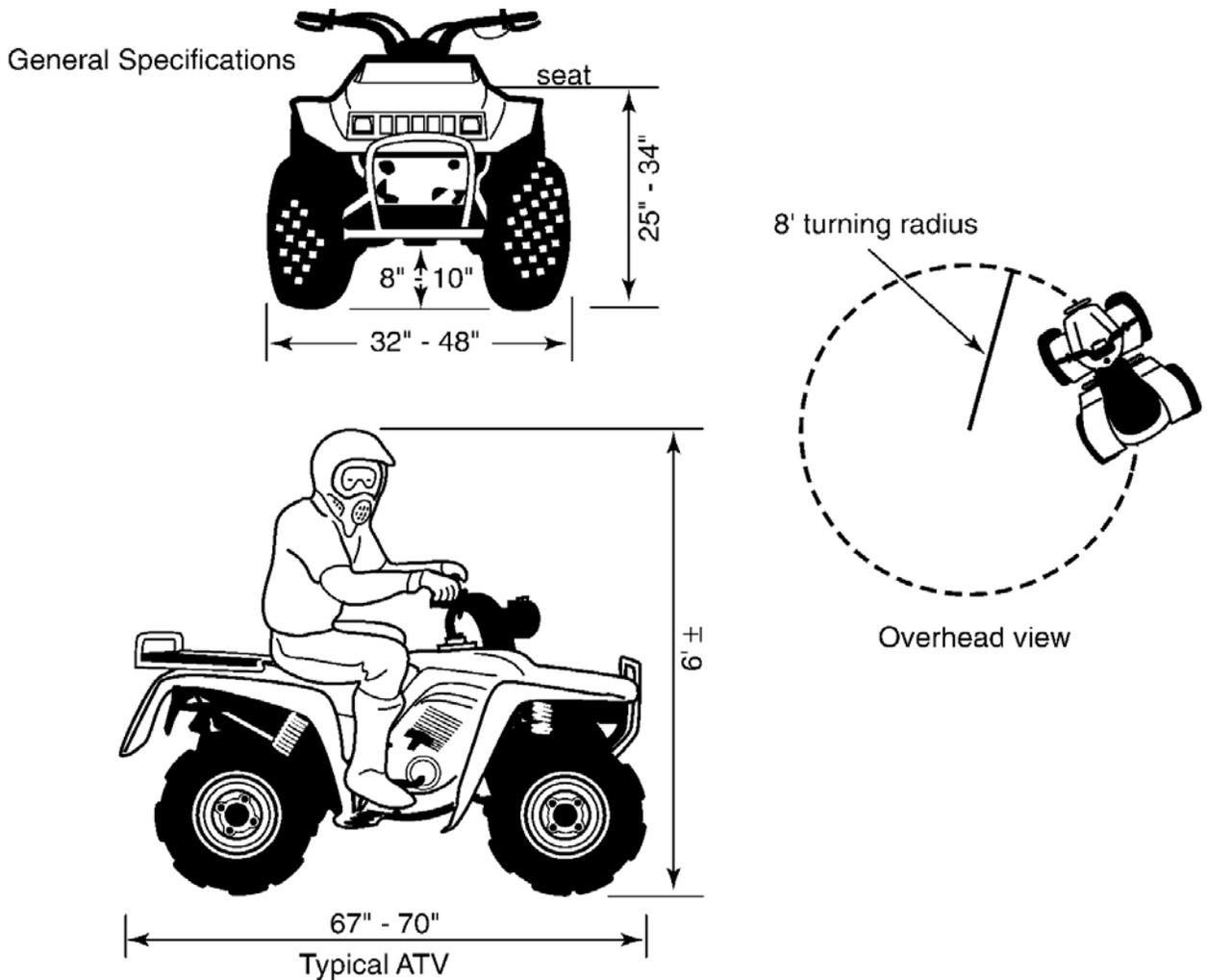
The following pages are an excerpt from the Department's trail design standards that focus on all-terrain vehicle trails. They are what the Department uses as "best management practices" in the design and construction of all-terrain vehicle trails.

ATV TRAIL DESIGN

Definition of All Terrain Vehicle (ATV)

Wisconsin has a state statute that defines an ATV. It is an engine-driven vehicle, travels on three or more wheels, is straddled by the rider, is less than 48 inches wide, weighs less than 900 lbs., and runs on special six inch-wide, low-pressure tires (6psi) (See Chapter 340 Wis. Stats.). See attached graphic of ATV with Rider for design specification. The graphic provides technical information about ATVs to give the reader information to deal with special design problems that may arise with ATV trail construction and maintenance.

GRAPHICS OF ATV WITH RIDER

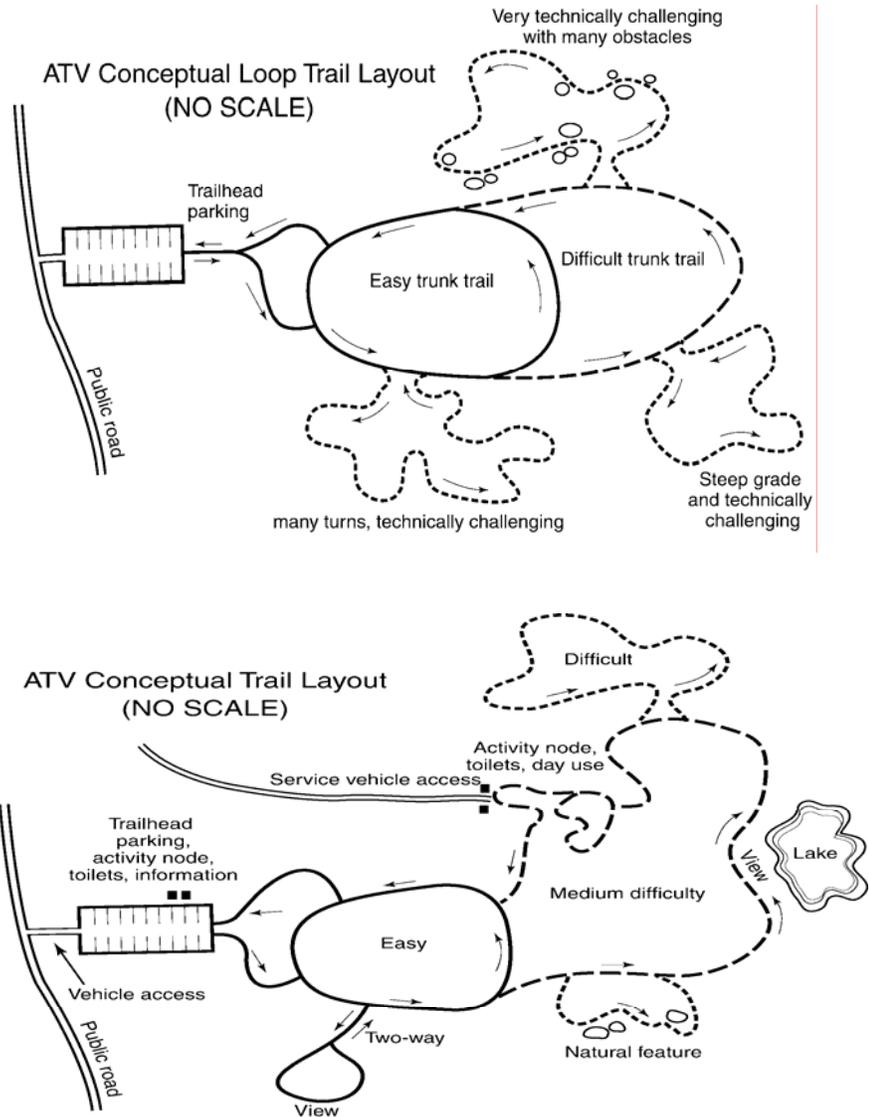


In general, there are two types of ATV trails: Loop Trails and Regional Trails.

Loop ATV Trails

Loop ATV trails are typically 8-to-10 miles long or more and are composed of a series of looped trails (see attached graphics). These types of trails are designed to provide for a range of recreational riding experiences, with the first loop for beginner skill level, second loop for moderate skill level, and third loop for advanced riding experience. The layout allows the rider to loop back to the trailhead on a trail he/she judges to be appropriate for his/her skill level. This type of trail system will be designed principally for ATV use and will usually have a trailhead with support facilities, including toilets, drinking water and car trailer parking dedicated to ATV use. In addition, this type of trail can be modified to provide scenic corridors with vistas and/or overlooks and provide activity nodes that include day use, camping, fishing, etc., in addition to a riding recreational experience.

Two Conceptual Loop Trails



Regional ATV Trails

Regional ATV Trails are long trail systems that can be several hundred miles in length and cross multiple jurisdictions—often a combination of private lands and county, state, and federal ownerships. Because regional trails require a very large geographic area, ATV trails may share the trails with other motorized—and even some non-motorized—recreational uses, e.g., winter snowmobile trails, utilities corridors, ORV roads, logging roads, and abandoned railroad corridors.

Public access is provided at strategic points—usually at 20-to-50-mile intervals along the trail. This can consist of a gravel parking area that can accommodate cars and ATV trailers but may also include information kiosks, drinking water, and toilet facilities. However, these support facilities may more typically be provided by private sector businesses in towns and villages on or near the ATV trail. Short spur ATV trails from the main trail may be needed to access services. A typical regional trail network will cross public roads at grade with some high-volume, high-speed roads usually having either above-grade or below-grade crossings.

Generally, regional ATV trails are designed to accommodate ATV riders of basic-to-average skill and do not usually provide the advanced ATV rider with a challenging recreational riding experience.

EVALUATING ATV TRAILS

The construction of an ATV trail has many of the design considerations typical of laying out a light-duty road. The principal difference is that ATV trails are often designed to provide a recreational experience.

The following are major items to consider in the analysis of a potential ATV trail:

Topography

Topographic maps USGS (maps) at 1:24,000 scale are the single most useful tool in laying out and evaluating an ATV trail. The maps provide preliminary information on an overall trail system, water features, elevation change, roads, railroads utility corridors, and cultural features.

Another useful source of information is recent air photos. They can provide information about current vegetation, wetlands, local development, and, in some cases, evidence of abandoned road or rail corridors that can prove useful for ATV use. The proposed trail and alternatives should be plotted on these maps.

In addition, historic railroad maps may prove useful in locating abandoned railroad corridors. In Wisconsin, many short spur railroad lines were built and abandoned during the logging era of the late 1800's and early 1900's.

Soils

To evaluate soil conditions along a proposed trail corridor, consult county soil maps and/or contact USDA or County Ag officials. University or public libraries may also have county soil maps.

The soil conditions along a proposed trail are an important indicator of the cost of development of a particular trail.

The ideal ATV trail would be located on upland well-drained soils; coarse, gravelly soil would be least expensive to develop for an ATV trail.

The second most desirable soil types are sandy and loamy soils. They may require gravel fill and/or limestone screenings, along with armoring to prevent erosion, especially on heavily used trails and moderate slopes that might exceed 6%.

The least desirable soil types are peat and other wet organic soils that are water saturated at least part of the year. These will always be the most expensive to develop and will require bridging or some types of special construction (see wetland and water crossing section). In Wisconsin, crossing a wetland will require state and sometime federal permits along with special construction to mitigate impacts to the wetland.

Solid ledge rock can be found at or near the surface in some parts of Wisconsin. It can make a desirable trail, provided the area is reasonably smooth—free of fissures or faults. A word of caution: some rock surfaces can become quite slippery when wet. However, with cautionary signing these areas may still be appropriate for ATV trail use.

Almost all soil conditions can be developed into ATV trails with the expenditure of money, but development of these difficult areas will also require long-term maintenance costs. In short, these trail segments with adverse conditions should be kept to a minimum for both long-term cost and environmental reasons.

Slopes

The slope conditions along an ATV trail are also a good indicator of development costs—and, to some extent, long-term maintenance cost.

A quick way to check slope conditions is to use a 1: 24,000 scale topo map for quick evaluation of the slopes along the trail, i.e., 10-foot rise over 100 feet equals 10% slope on a topo map (see below slope graphic). However, there is no substitute for direct field measurement; in that case, use an “Abney Hand Level” to recheck areas with critical slope conditions. The following slope conditions are divided into three broad categories: mild, moderate and steep slopes.

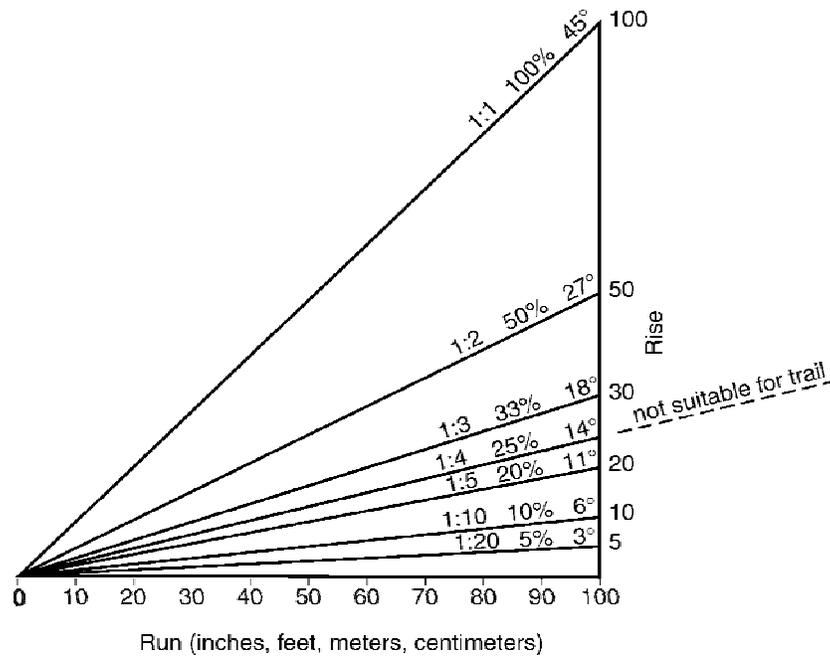
Flat to mild slopes of **1% to 5%** are easy to develop into ATV trails and are even desirable to provide some drainage.

Moderate slopes in the **6% to 12%** ranges are workable and will require additional protective measures depending on soil types—and these slopes also provide a moderate challenge for the ATV rider. The maximum sustained grade on ATV trails will be 12%.

Steep slopes from **13% to 25%** become problematic for development. Great care should be used in developing trails on steep slopes. A steep trail over even a brief distance can provide a high degree of difficulty for the ATV rider. If a steep slope must be crossed, it would be best to incorporate steep slopes in short duration, a few hundred feet at a time, mainly to provide diversity and rider challenge. Steep slopes with light sand or organic soil type may require extensive armoring with gravel, frequent water bars, culverts, pavers, GeoBlock®, and even pavement to prevent erosion.

Extended slopes in excess of **25%** should not be considered for ATV trail development.

Run and Rises Chart



WATER FEATURES

Many trail users highly value proximity or access to lakes, streams and wetlands. These resources are easily degraded, however, and a comprehensive set of federal, state, county, and local requirements must be taken into consideration when considering trail development.

Water access is a magnet for trail users. Access points should be carefully identified and designed to prevent erosion and sedimentation problems and unauthorized off-trail operation on banks or beds of waterways and wetlands. Where any of these potential impacts are likely, the trail should be routed away from water features.

Here is a brief summary of water laws and requirements. DNR Water Management Specialists should be consulted regarding water law issues related to trail development. Additional details and recommendations for trail development are provided in following sections.

WATERWAY AND WETLAND PROTECTION REQUIREMENTS (PARTIAL LIST)

Environmental Issue	Authority	Contact
Waterway Crossings and Modifications	Chapter 30 Stats.	DNR Water Management Specialist
Wetland Crossings and Modifications	NR 103 (Chapter 281, Stats.) Federal Clean Water Act, Section 404	DNR Water Management Specialist US Army Corps of Engineers
Stormwater and Grading	NR 216 (Chapter 283, Stats.)	DNR Storm Water and Water Management Specialists
Shorelands and Floodplain	County Shoreland and Floodplain Zoning Ordinances Pursuant to Chapters NR 115, (Chapter 59, Stats.) and NR 116 (Chapter 87, Stats.)	County Zoning office Also check with local jurisdiction (township, village, city)

Water Crossings

In Wisconsin, permits are needed to cross all navigable waterbodies and wetlands including marshes, ponds, lakes, streams, rivers, some intermittent streams, and even some drainage ditches that may be navigable only part of the year. The permit will require a detailed review of alternatives and may require rerouting the trail if an alternative can be found that would not impact water features.

If the permit process indicates that no suitable alternatives exist and that a water feature must be crossed, the crossing should be designed to minimize impacts on the water feature. Bridges are recommended for open water crossings. Culverts are less desirable but may be acceptable in certain circumstances. Water fords are the least desirable type of water crossing and should only be used in limited circumstances.

Trail managers and designers should anticipate that trail users may be tempted to go off-trail at water crossings. Techniques such as additional signs, design considerations such as boulders or brush next to a bridge for example and law enforcement will be needed to prevent damage.

Bridges: Bridges are the most effective and environmentally friendly way to cross a water feature (see Bridge Guidelines WDNR PUB-CF-005 2003).

Things to consider in siting a bridge on an ATV trail:

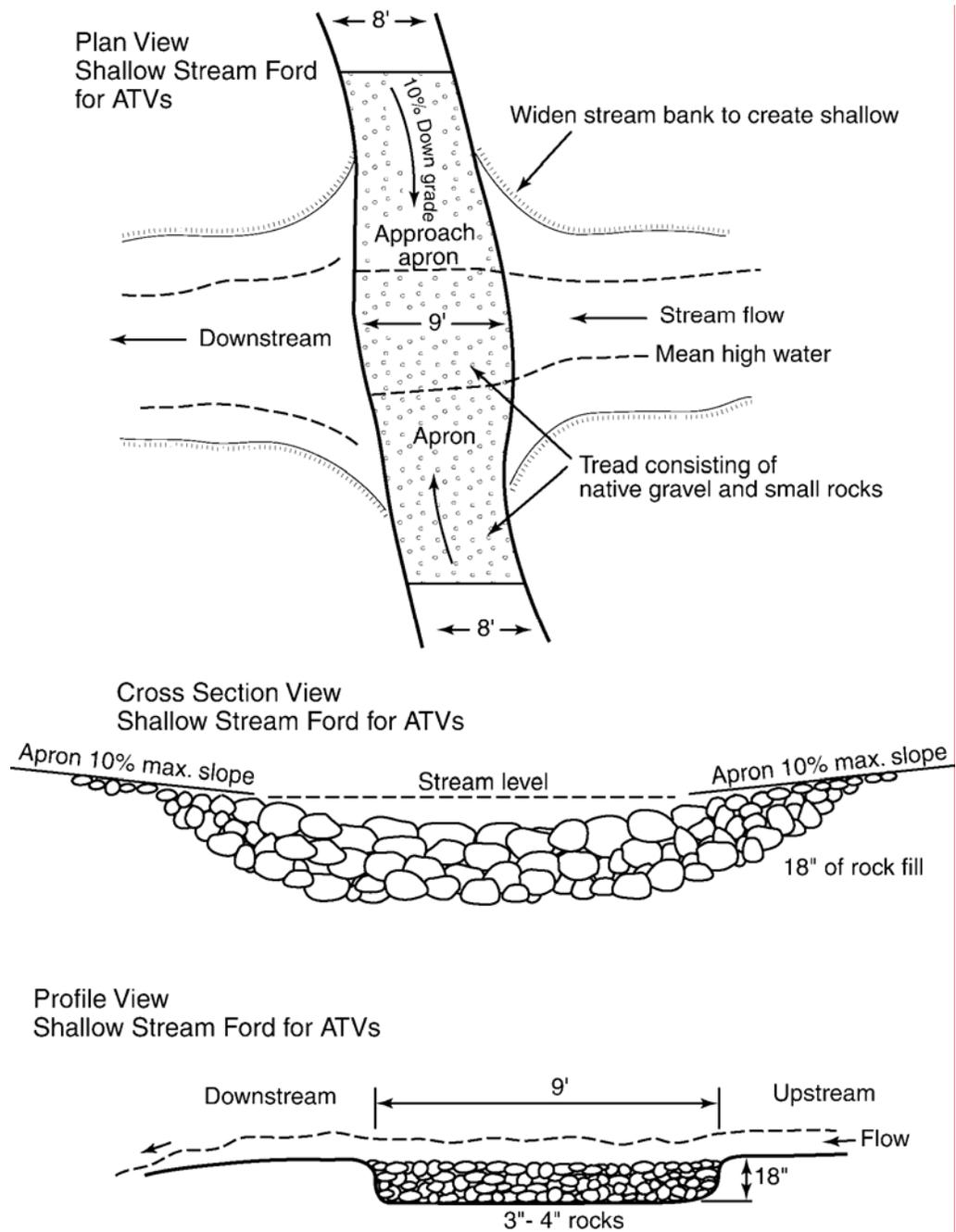
- All bridges and fords should cross at right angles, if at all possible, to the water feature or flow to minimize environmental impact, provide a safe crossing, and reduce costs.

- Bridge should not be located near a sharp bend in the stream of a river channel. Look for a straight section with natural narrowing with moderate flows.
- If possible, choose a site with upland (higher) bank as opposed to a section with a wetland edge. This will minimize the impacts to wetland along the stream.
- Navigable waters require five feet of boat navigation clearance for normal water levels to bottom of the bridge. This will also be required on relatively small waters suitable for canoe and kayak use, even though canoe use may not be common. This may mean that the bridge and approaches will be raised, arched, or elevated above the normal bank height.
- Bridge carrying capacity should allow for mowing equipment (tractor and mower)—10,000 lbs at mid span. In addition, in some situations, larger capacity (14,000 lbs) may be needed to do development and maintenance (e.g., gravel truck). In place of heavy bridge construction, a water crossing ford may be used on small to mid-sized streams to provide maintenance access, or means of access other than the ATV trail that would not involve a bridge crossing could provide the appropriate access.

Culverts: Culverts can be an effective means of crossing on only small to moderate streams. Some analysis of the watershed is needed to provide properly sized and placed culverts. Culverts of corrugated steel, plastic or concrete usually require considerable amounts of fill on both sides and one foot of fill above the top of the culvert to provide structural strength. In addition, culverts can be a barrier to some types of fish and aquatic invertebrate migrations. The minimum size culvert should be 18" in diameter to facilitate maintenance, even though a smaller culvert might suffice. See Culvert Placement Diagram in Trail Drainage and Erosion Protection section.

Water Fords: Water fords will be considered only on very small streams where ATV use or other vehicle use would be infrequent; otherwise a bridge will be required on most navigable water and intermittent drainage ways that will receive frequent use (more than six crossings per day). The graphic below details the proper construction of a small stream ford.

Construction Detail of a Water Ford



Wetland Crossings

In Wisconsin, wetland crossings and modifications (including filling) are regulated activities. In addition to the state review, a federal permit is required for wetland fills. The permit application process will require a detailed review of alternatives that would avoid wetland impacts, including a "no action" alternative. Trails may require rerouting if an alternative can be found that would not impact wetlands.

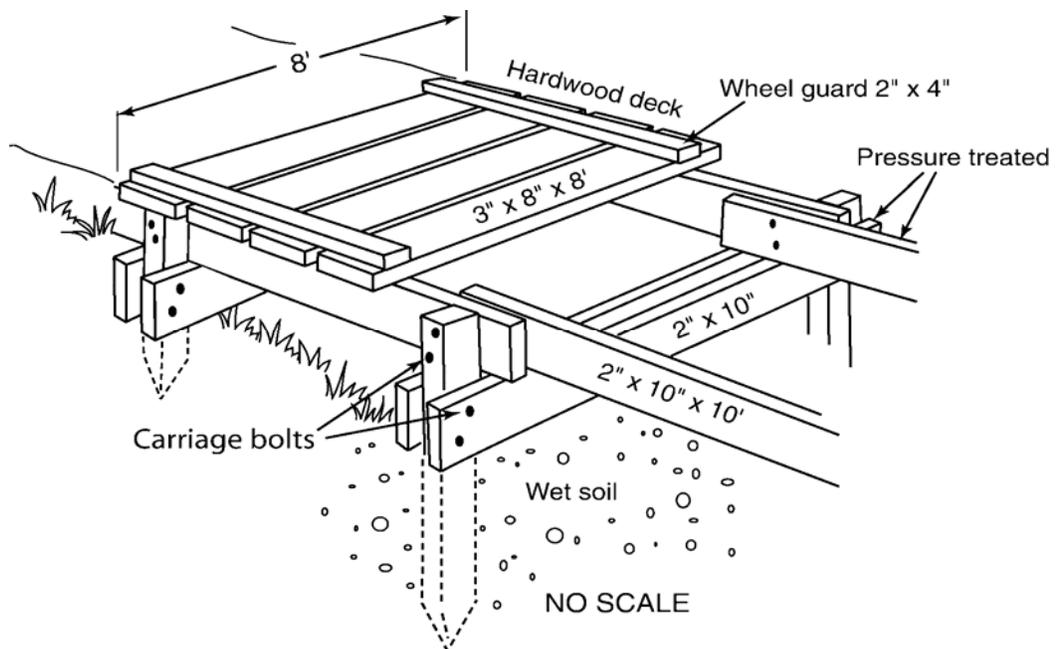
Wetland maps are available through the WDNR. Be aware that dry and wet weather cycles of 7-to-10 years are common in Wisconsin and can influence local water tables. In dry years, it may not be obvious that a trail is passing through a wet area. Some of the more reliable indicators of wetland conditions are the presence of wetland plants, mottling in the subsoil, or the presence of very dark organic soils and dry peat soils.

If the permit process indicates that no alternatives exist and that a wetland must be crossed, the Department will require use of special construction techniques to help reduce the impacts. Elevated boardwalks (raised plank decking) are preferred; they are considered an avoidance alternative depending on how they are constructed and may be unregulated. Other wetland crossing methods such as puncheons and turnpikes or raised fill would be subject to a detailed state and federal review. Puncheons are preferred over turnpikes and fills. Turnpikes and fills will require a permit from the U.S. Army Corps of Engineers in most cases.

Again, trail managers and designers should anticipate that trail users will be tempted to go off-trail at water and wetland crossings. Techniques such as additional signs, design considerations boulders, dense shrub planting next to a bridge, along with enforcement will be needed to prevent damage.

Raised Plank Decking: Raised Plank Decking consists of heavy wood deck planks supported by a low piling. This type of construction minimizes impacts to the wetland but can only be used where underlying soil will support upright pilings. The big advantage of this type of construction is that it utilizes wooden planks and beams that are readily available at commercial lumberyards; they can all be precut and are easy to assemble and fasten in place. However, transportation to remote trail sites can be costly.

ATV Raised Plank Decking Diagram

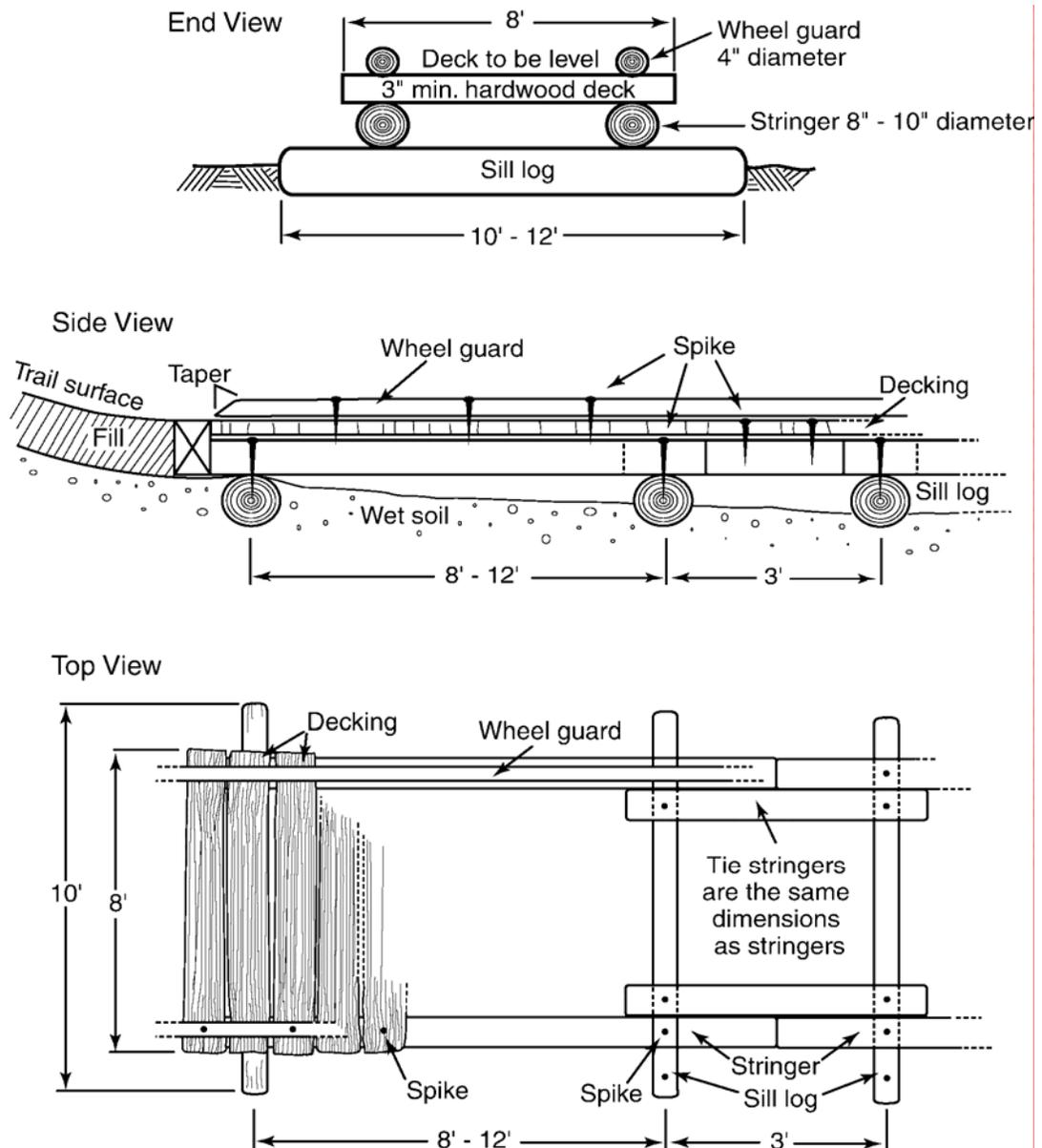


Puncheons: Puncheons are structures made up of rough-cut logs. The bottom members consist of sill log base placed horizontally on a wet area to provide a base for a log stringers that support a deck of rough-cut planks (see Puncheon detail). This construction technique is useful where soil conditions will not support upright pilings. The softer the soil conditions, the greater the frequency and length of horizontal sill support logs that will be needed to support the stringers and deck.

Considerable judgment is needed in the use and placement of this type of construction; in flood ways and flood plain areas, this type of construction can be washed away because these are unanchored structures. The big advantage of this type of construction is that it utilizes rough-cut local timber at relatively low cost in remote areas where transportation can be costly.

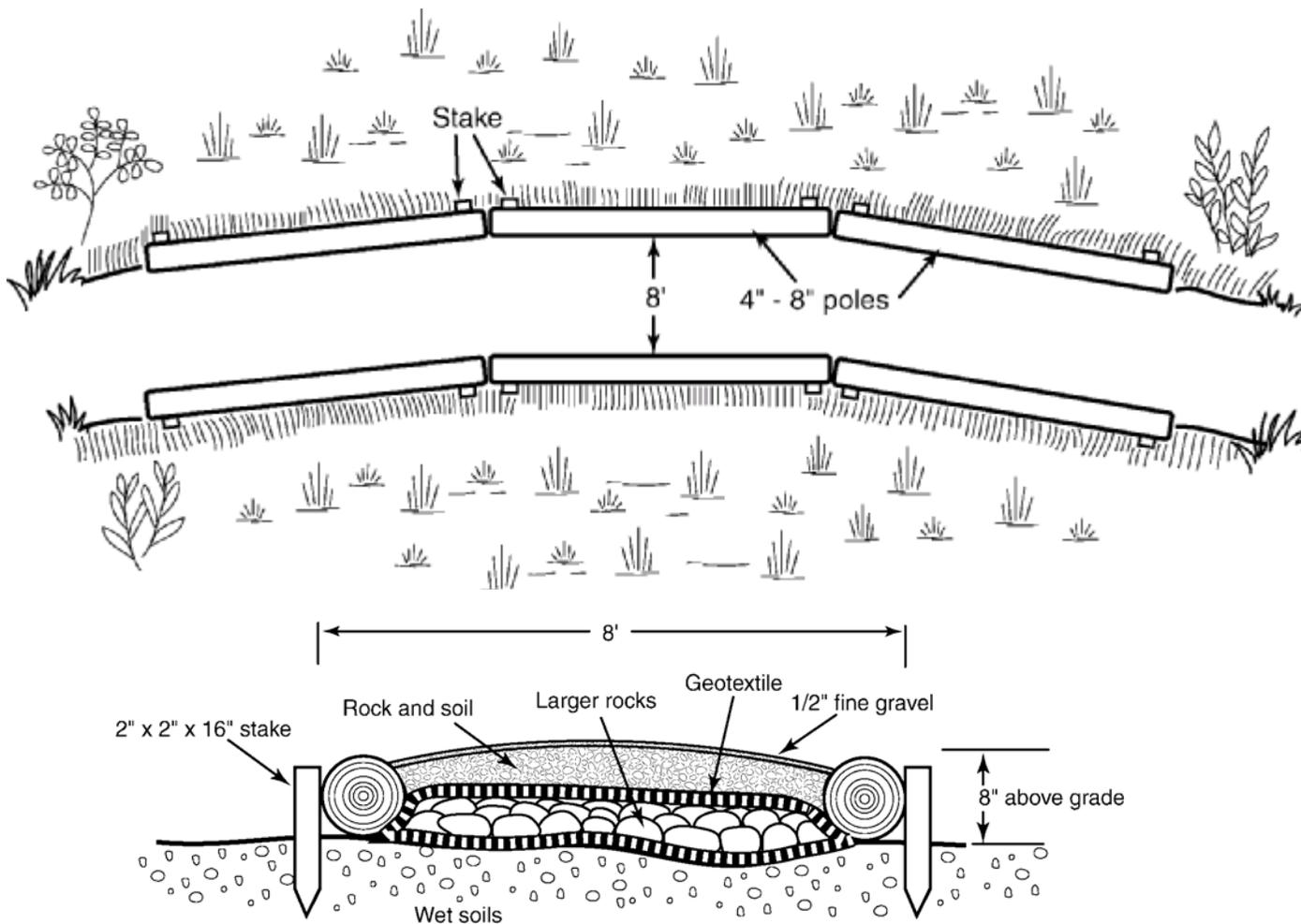
Typical Puncheon Construction Detail

Not to Scale



Turnpike or Raised Fill: The use of a long, narrow raised bed of fill to cross wetland should be avoided if possible. In wetlands, they can collect water and alter the natural surface flows, even with the use of culverts, and can cause significant changes in the surrounding vegetation. It is possible with the use of special geo-textiles with larger rock base to design a pike that better accommodates modest water flowing through the base of the structure. See Turnpike or Raised Fill Construction diagram.

Turnpike or Raised Fill Construction



SHORELAND, FLOODPLAIN AND OTHER LOCAL ZONING ORDINANCES AND REGULATIONS

Towns, cities, villages and counties regulate activities through zoning ordinances. All counties, except Milwaukee County, have shoreland zoning ordinances in place that regulate activities within:

- 1,000 feet of the ordinary high water mark of a lake, pond or flowage; or
- 300 feet of the ordinary high water mark of rivers and streams or to the landward side of the floodplain, whichever distance is greater.

Floodplain zoning ordinances and shoreland-wetland zoning ordinances are also typical in many locations and apply in those areas mapped as floodplains or shoreland-wetlands. General zoning ordinances apply to the entire area within a governmental unit.

Under Wisconsin common law, state agencies are not subject to local zoning ordinances except when constructing buildings, structures or facilities to be used by state employees instead of for use by the general public. However, the DNR has a policy of trying to comply with local ordinance regulation as much as possible and still achieve the goal of a project. DNR's "good neighbor" policy is to try to comply with the substantive standards that would apply to similar projects completed by a private entity.

DNR staff should not be applying for zoning permits (except when constructing buildings, structures or facilities to be used by state employees instead of for use by the general public), paying fees, or appearing before boards of adjustment/appeals or planning and zoning committees to apply for conditional use permits or variances. Regardless of whether a project and its design will or will not meet local ordinance requirements, the procedure outlined below should be followed.

1. The property manager should advise local zoning officials about the proposed project. Provide zoning officials with detailed information about the proposed project so they can give us their comments and suggestions on how the proposed project might be improved.
2. If the local zoning officials do not agree with the plans for the proposed project, the property manager needs to inform his/her immediate supervisor. The supervisor, with assistance from the regional DNR zoning specialist, should work with the property manager to seek resolution with the local zoning officials.
3. If the local zoning official still does not concur, a letter should be drafted for signature by the regional land and/or water media leaders advising the local zoning official in writing of the reasons for proceeding with the project without local zoning acceptance.

In Wisconsin, storm water construction site discharge permit coverage is required where the trail construction will disturb one or more acres of land. This permit requires the development and implementation of an erosion control plan to keep sediment from eroding into waters of the state during construction until the trail is stabilized from erosion. For example, if a 10-foot-wide path is graded for a length of 4,356 feet or more, then construction site permit coverage is required. A Notice of Intent (application for construction site permit coverage) must be submitted to the Department a minimum of 14 working days prior to the anticipated start of construction.

DEVELOPING AN ATV TRAIL

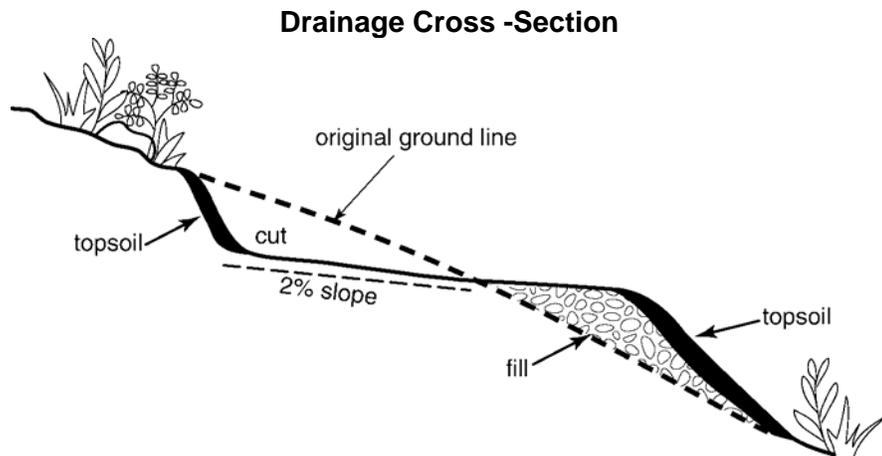
Trail Alignment

Assuming you have secured appropriate land rights to construct an ATV trail, the first step in laying out the trail is to walk the trail you have mapped out on the 1:24000 scale USGS map and stake and flag the centerline of the trails. The process will require minimal clearing of the centerline—this is the best time to make final field adjustments in the centerline to avoid large trees and other obstacles, taking care that the trail is still properly aligned. A combination of wooden stakes at the centerline and plastic flagging to mark the extent of the clearing of the ATV trail should be used. The goal is to align the trail along a smooth arc so as to provide visibility ahead of and behind the rider.

ATV Trail Width

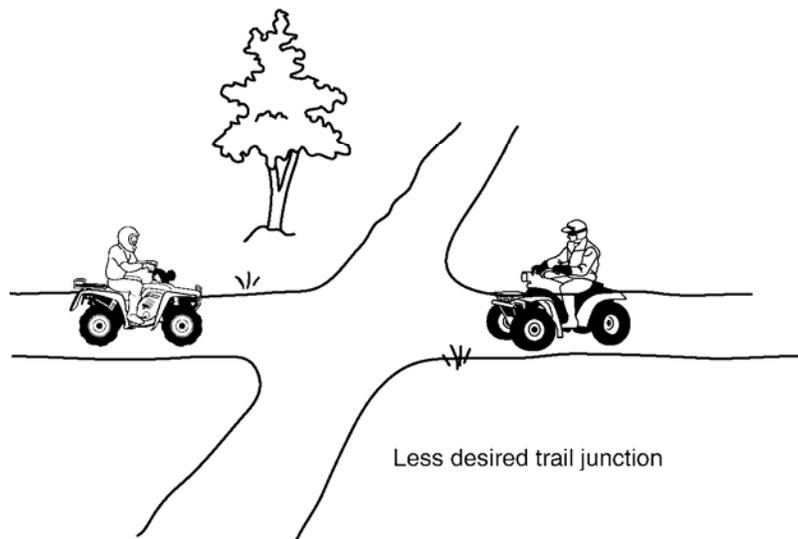
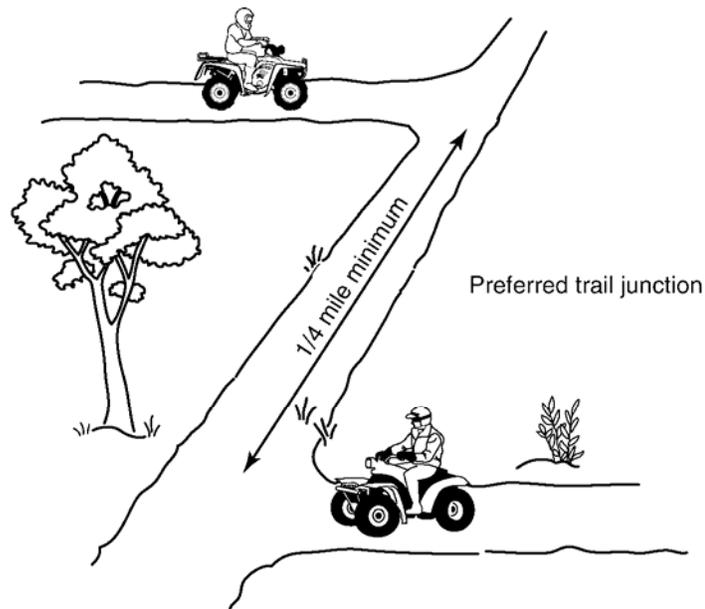
The normal straight or slightly curved trail tread for a one-way ATV trail should be a minimum of 8 feet wide for a one-way trail and 12 feet wide for two-way ATV trail. The trail tread will require additional widening of the tread at turns, bridges, water crossings, and intersections

On level ground trails will be crowned from the center to provide drainage. With ATV trails that cross a slope, the trail tread should be pitched toward the downhill side with a 2% slope to facilitate natural sheet drainage. See trail drainage cross-section below.



Intersecting trails should be at right angles to the main trail and avoid a direct crossing; instead, stagger the crossing if possible by $\frac{1}{4}$ mile (See attached detail below).

Intersecting ATV Trails Crossing



Vegetation Clearing

The next step in construction of the actual trail will require clearing of vegetation and removal of stumps and root tangles, loose stones, and other debris for the trail corridor. The area to be cleared should be a minimum of 12 feet wide on straight-a-ways and 16 feet wide on turns; at intersecting ways, additional clearing may be needed to provide clear visibility in several directions.

Additional clearing but not grading may be needed along trails to remove hazard trees, create aesthetic views, wildlife openings, or restore some native plant community type and manage water runoff.

If the trail construction activity will disturb one or more acres, a DNR stormwater permit and other requirements will apply. See information above.

Please note that any construction activity on the banks or slopes adjacent to navigable water and wetlands (including grading of less than one acre) are regulated. Contact DNR water staff before proceeding.

Grading

Grading will be required on most new ATV trails. This involves clearing topsoil; usually the darker organic soils are bladed to one side to be used in finish grading of side slopes and shoulders of the trail. The grading out of a trail usually involves taking down higher spots to be used in nearby low spots of the trail—a process called “balancing out cut and fill.” The goal is to minimize the movement of soil and create a trail that blends with the topography and create generally smooth arcing trails designed for the average ATV rider.

If the trail construction activity will disturb one or more acres, a DNR stormwater permit and other requirements will apply. See information above.

Please note that any construction activity on the banks or slopes adjacent to navigable waters and wetlands (including grading of less than one acre) is a regulated activity. Contact DNR water staff before proceeding.

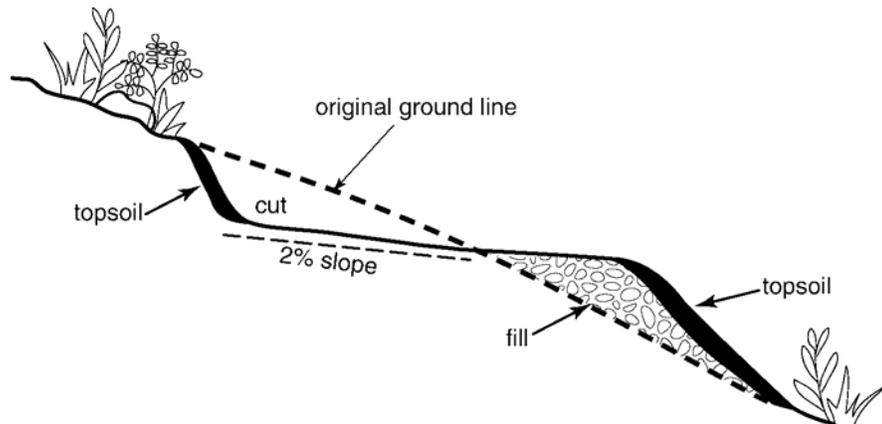
Trail Surface

The final top dressing of the trail will often be of local subsoil. However, if local soil conditions are unfavorable and trail surfacing must be ordered --crush gravel or crushed stone in gradation #3 WDOT mix (3/8- inch sieve) is recommended for the trail surface.

TRAIL DRAINAGE AND EROSION PROTECTION

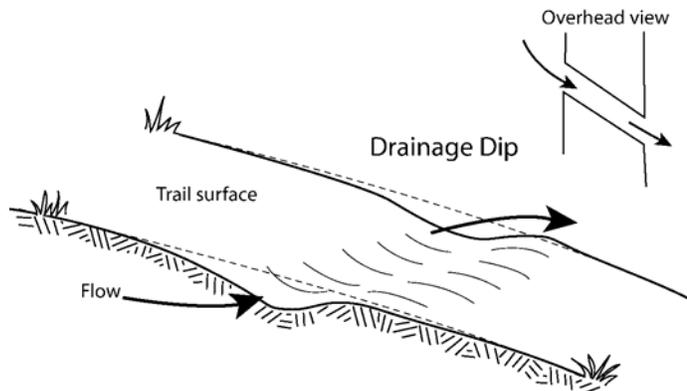
The surface water runoff is one of the significant impacts of trail development. The more recent thinking is to minimize the collection or concentration of surface water to the greatest extent possible. The following are techniques that can help minimize water problems by the maintenance of natural surface flow across the trail, the frequent use of drainage dips, and proper use and placement of culverts. See details below.

Drainage Cross Section



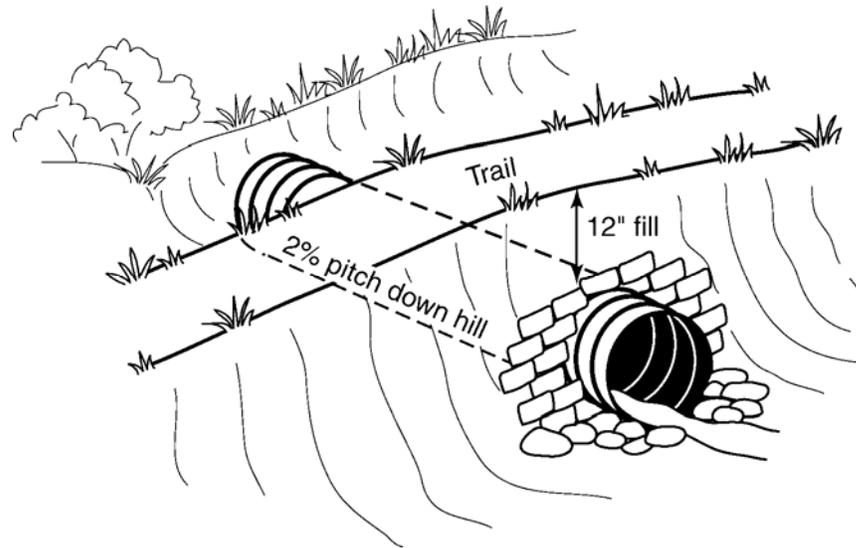
Drainage dips are shallow diagonal depressions in the trail surface that are used to move small amounts of surface water across the trail. They should be used at frequent intervals, i.e., every six feet on the steeper sections of the trail to avoid the collection of water on the uphill side of the trail.

Shallow Drainage Dip 1"–2" Depth



Culverts are effective in moving water under the trail surface but work best with slight pitch of 2% and need 12" of fill over the top of culvert for load bearing for vehicles. This may mean raising the trail bed as much as 30" above the surrounding grade to accommodate the 18" culvert (see below).

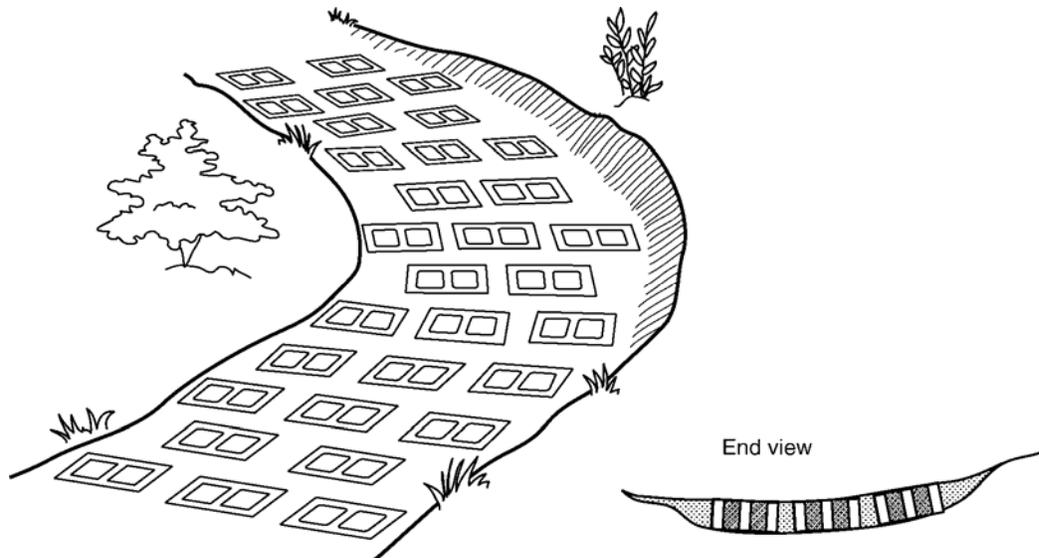
Culvert Placement Diagram



Armoring ATV Trails

Even modest turns on level ground are subject to a significant degree of rutting action over time and potential erosion. The cutting action is compounded on sloping ground and if left unchecked can lead to serious erosion. To deal with this situation, it is possible to use cinder blocks or other deeply bedded pavers laid out in a banking pattern to greatly reduce the normal cutting action and reduce long-term maintenance costs (see drawing below).

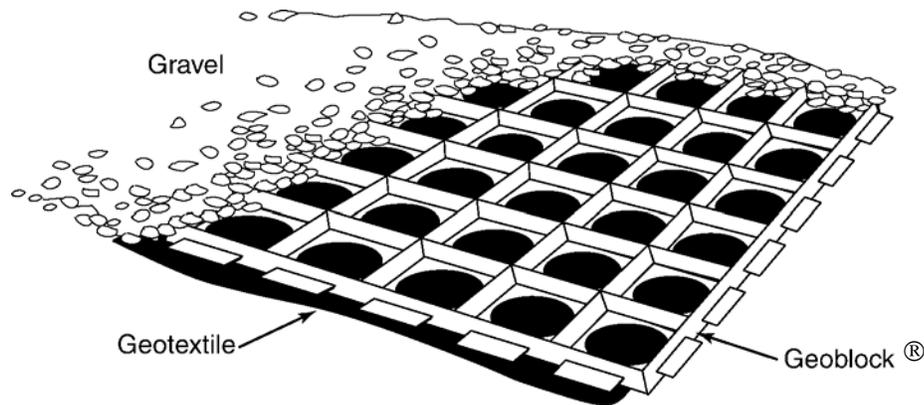
Cinder Block Armoring of a Turn



GeoBlock®

In addition, the placement of GeoBlock® ridged, plastic web materials placed over geofabric layer can be use in some light soil conditions, steep slopes and seasonally wet areas. (See drawing below.) Early test results of GeoBlock® by U.S. Forest Service seem to indicate good durability in armoring sensitive trail sites. However, costs of the product and its installation can be quite high.

GeoBlock® Armoring of a Trail Detail for 8'-Wide Trail.



HIGHWAY AND ROAD CROSSINGS:

State and local permits are required to cross state and local highway right-of-ways. ATV trails should be aligned to cross at approximately right angles (90 degrees +/-) to the roadway at a point that provides clear visibility in both directions for both the highway motorist and the ATV rider.

ATV trails crossing major highways with traffic counts of 3,500 vehicles per day or higher or highways or with other road alignment or visibility problems may have to under go a warranting process established by DOT. The process could result in relocation of an ATV crossing or and may require a grade separation, such as an underpass or overpass.

Contract District DOT Offices well in advance of any proposed ATV road crossings.

SIGHT DISTANCE

At Highway Crossings

A minimum sight distance from the shoulder of the highway should be 10 x posted highway limit i.e. on 55mph highway the site distance should be 550' feet down the roadway in both directions.

At ATV Trail Intersections

A minimum sight distance from the intersecting trails should be 150 feet down the trail in both directions.

ATV Trails

On ATV trails, forward minimum sight distance on the trail will increase with the design speed of the ATV trail. The following are suggested sight distances related to operating speed on the ATV trail.

ATV Braking Chart

Speed - MPH	Traveling Feet Per Second	Braking Time in Seconds with Distance Traveled in Feet		
		.75 Sec	1.5 Sec	3 Sec
20	29.33	22	44	88
30	44.00	33	66	132
40	58.67	44	88	176
50	73.33	55	110	220
60	88.00	66	132	264
70	102.67	77	154	308

ATV TRAIL SUPPORT FACILITIES

The following support structures and facilities may be needed at major access point on an ATV trail system. Support facilities can be provided by private sector businesses or other units of government especially on regional trail networks.

Entrance Sign

These may be needed along public access road leading to mark the ATV Trailhead. In addition, State and Federal highway directional signs may be needed on major approach roads.

Signing at Access Points

Kiosks will be needed at key access points along an ATV trail. They will usually contain user information such as emergency numbers, trail maps, and any information about trail conditions. Informational signing should be placed in one designated area at each trail access point. Usually, a kiosk will be used at the trailhead to help reduce sign clutter and help visitors find crucial information.

Trail Signing

Standard trail signing will be required on all Department-designated trails. See Department Trail Signing Handbook PUB-CF-023-2003.

The following are the minimum types of signs (see Department Sign Handbook for ordering and mounting details):

Directional Signs: Directional signs and arrows will be placed along the trail as needed at all intersections or at directional changes in the trail.

Mile Markers: Trail mile markers will be posted at one-mile intervals to facilitate emergency rescue and trail maintenance.

Stop Signs: Stop signs will be placed on ATV trails at all public road crossings.

Warning Signs: Warning signs will be posted as needed to give advanced warning on the trail to reduce speed at bridges, fords, turns, wetland crossing, and changes in speed due to trail conditions.

Speed Limit: Speed limit signs will be posted as appropriate for existing condition but will not exceed 40 mph. on state ATV trails.

Gates: Trail gates are critical to the operation of ATV trail systems and will be installed on all trail systems on department lands. Weather conditions, construction, and maintenance activity may require temporary closing of ATV trails.

Parking: Parking for cars and trailers with ATVs will be needed at access points. The parking lot design will be similar to boat launch parking standards. (See Department Design Standards Chapter 90.)

Toilets: Toilet facilities will be required at only major ATV trail access points. Regional trail networks may use private facilities provided appropriate trail links can be made.

Drinking Water: Drinking water will only be required at major ATV trail access points.

Waste: Trash disposal containers will not be provided at trailheads on Department lands. Instead, carry-in and carry-out trash policy will be used on all state ATV trails, similar to other types of state recreational trails.

MANAGEMENT AND MAINTENANCE AND MONITORING OF ATV TRAILS

Trail Inspections

On Department-managed lands, all trails require biannual safety inspections with a report filed by the inspector. Environmental inspections and monitoring of trail conditions should be recorded at that time, as well.

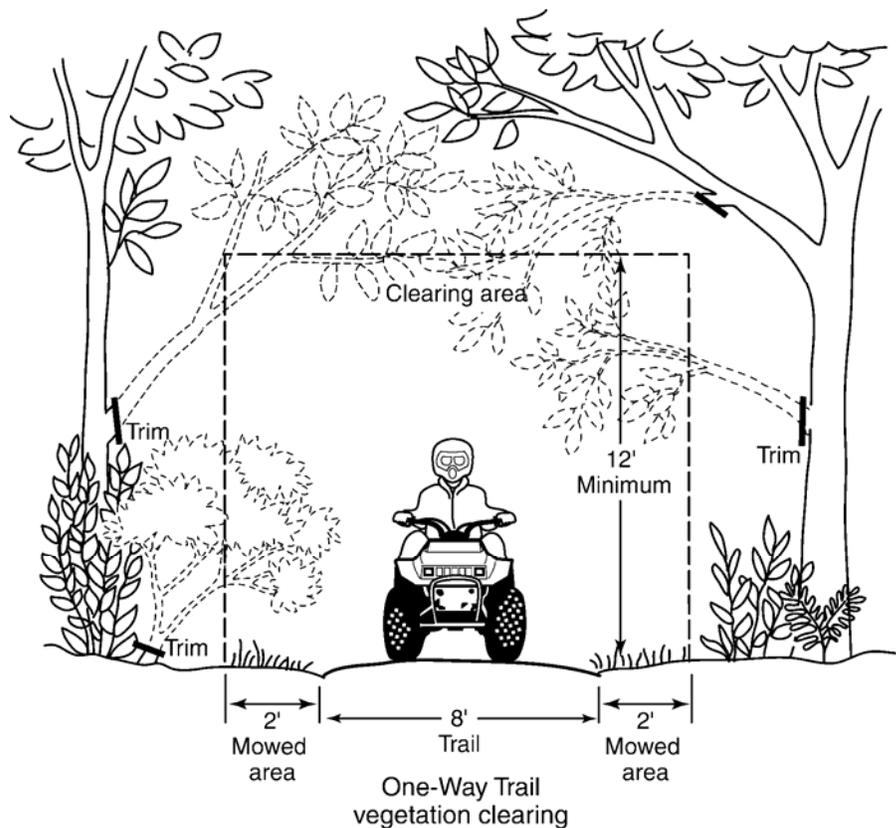
Trail Closure

The property manager will be responsible for making a determination of when an emergency, weather conditions, or repair and maintenance warrant trail closure. On state lands, a combination of legal notice (newspaper) for a non-emergency, posted notice signing, along with gate closure will be used to officially close an ATV trail to public use.

Trail Vegetation Maintenance

All ATV trails will require yearly vegetation maintenance. The work is best accomplished in the dormant seasons of late fall or winter. Vegetation should be cleared to twelve feet over the trail and two feet on either side of the trail. Particular attention should be paid to hazard trees and limbs along the trail. Overhead and side limbs clearing should take into account the wet and ice-covered limb vegetation that may block the trail. See diagram below.

Standard Trail Vegetation Clearances



TRAIL ABANDONMENT AND RESTORATION

Occasionally, it may be necessary to abandon all or parts of an established ATV trail. ATV trails on Department lands that are no longer in an approved recreational use will be restored to complement the surrounding natural landscape conditions or as in the case of an abandoned railroad or roadway corridor to the conditions prior to the development of the original ATV trail. Restoration will normally include the removal of all built structures such as fords, bridges, culverts, gates, and signing, including proper disposal of material from these structures into approved landfills or approved recycling processes.

Trail tread and corridors should be re-graded to blend into surrounding slopes and terrain. All disturbed areas will be covered with minimum of 3" of topsoil, preferably from the local area, and re-seeded and planted with native vegetation that includes grasses, forbs, shrubs, and trees consistent with the ecosystem type for that site. See Ecological Landscapes of Wisconsin Handbook 1805.1 for additional guidance.