

NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS URBAN MANUAL
PRACTICE STANDARD

TEMPORARY STREAM CROSSING

(no.)
CODE 975



(Source: IN Drainage Handbook)

DEFINITION

A bridge, ford, or temporary structure installed across a stream or watercourse for short-term use by construction vehicles or heavy equipment.

PURPOSE

The purpose of this practice is to provide a means for construction vehicles to cross streams or watercourses without moving sediment into streams, damaging the streambed or channel, or causing flooding.

CONDITIONS WHERE PRACTICE APPLIES

Where heavy equipment must be moved from one side of a stream channel to another, or where light-duty construction vehicles must cross the stream channel frequently for a short period of time. Generally, a temporary stream crossing is applicable to flowing streams with drainage areas less than 1 square mile. More exacting engineering methods should be used on larger drainage areas.

CRITERIA

In addition to erosion and sediment control, structural stability, utility, and safety must also be taken into consideration when designing temporary stream crossings. Bridge designs in particular, should be completed by a qualified engineer.

The anticipated life of a temporary stream crossing structure is usually considered to be 1 year or less. Remove the structure immediately after it is no longer needed.

As a minimum, design the structure to pass bank full flow or peak flow, whichever is less, from a 2-year frequency, 24-hour duration storm without over topping. Ensure that no erosion will result from the 10-year peak storm.

Ensure that design flow velocity at the outlet of the crossing structure is nonerosive for the receiving stream channel.

Consider overflow for storms larger than the design storm and provide a protected overflow area.

A water diverting structure such as a swale shall be constructed (across the roadway on both roadway approaches) 50 feet maximum on either side of the waterway crossing. This will prevent roadway surface runoff from directly entering the waterway. The 50 feet is measured from the top of the waterway bank. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.

The aggregate for the roadway shall be a minimum of 6 inches thick stone or recycled concrete meeting one of the following IDOT coarse aggregate gradations: CA-1, CA-2, CA-3 or CA-4.

The aggregate will be placed on geotextile fabric meeting the requirements in material specification 592 GEOTEXTILE Table 1 or 2, class I, II, or IV.

CONSIDERATIONS

Careful planning can minimize the need for stream crossings. Try to avoid crossing streams, whenever possible, complete the development separately on each side and leave a natural buffer zone along the stream. Temporary stream crossings are a direct source of water pollution; they may create flooding and safety hazards; they can be expensive to construct; and they cause costly construction delays if washed out.

Select locations for stream crossings where erosion potential is low. Evaluate stream channel conditions, overflow areas, and surface runoff control at the

site before choosing the type of crossing. When practical, locate and design temporary stream crossings to serve as permanent crossings to keep stream disturbance to a minimum.

Plan stream crossings in advance of need, and when possible, construct them during dry periods to minimize stream disturbance and reduce cost. Ensure that all necessary materials and equipment are on-site before any work is begun. Complete construction in an expedient manner and stabilize the area immediately.

When construction requires dewatering of the site, construct a bypass channel before undertaking other work. If stream velocity exceeds that allowed for the in-place soil material, stabilize the bypass channel with riprap or other suitable material. After the bypass is completed and stable, the stream may be diverted.

Unlike permanent stream crossings, temporary stream crossings may be allowed to overtop during peak storm periods. However, the structure and approaches should remain stable. Keep any fill needed in floodplains to a minimum to prevent upstream flooding and reduce erosion potential. Use riprap to protect locations subject to erosion from overflow.

Where appropriate, install in-stream sediment traps immediately below stream crossings to reduce downstream sedimentation. When used, excavate the basin a minimum of 2 feet below the stream bottom and approximately two times the cross-sectional flow area of the existing channel. Ensure that the flow velocity through the basin does not exceed the allowable flow velocity for

the in-place soil material; otherwise it should not be excavated. In locations where trees or other vegetation must be removed, the sediment trap may be more damaging to the stream than if it was not installed.

Stream crossings are of three general types: bridges, culverts and fords. Consider which method best suits the specific site conditions.

Bridges - Where available materials and designs are adequate to bear the expected loading, bridges are preferred for temporary stream crossing.

Bridges usually cause the least disturbance to the streambed, banks, and surrounding area. They provide the least obstruction to flow and fish migration. They generally require little or no maintenance, can be designed to fit most site conditions, and can be easily removed and materials salvaged. However, bridges are generally the most expensive to design and construct. Further, they may offer the greatest safety hazard if not adequately designed, installed, and maintained, and if washed out, they cause a longer construction delay and are more costly to repair.

In steep watersheds it is recommended to tie a cable or chain to one corner of the bridge frame with the other end secured to a large tree or other substantial object. This will prevent flood flows from carrying the bridge downstream where it may cause damage to property.

Culvert crossings - Culverts are the most common stream crossings. In many cases, they are the least costly to install, can safely support heavy loads,

and are adaptable to most site conditions. Construction materials are readily available and can be salvaged. However, the installation and removal of culverts causes considerable disturbance to the stream and surrounding area. Culverts also offer the greatest obstruction to flood flows and are subject, therefore, to blockage and washout.

Fords - Fords made of stabilizing material such as rock are often used in steep areas subject to flash flooding, where normal flow is shallow (less than 3 inches deep) or intermittent. Fords should only be used where crossings are infrequent. Fords are especially adapted for crossing wide, shallow watercourses.

When properly installed, fords offer little or no obstruction to flow, can safely handle heavy loading, are relatively easy to install and maintain, and, in most cases, may be left in place at the end of the construction.

Problems associated with fords include the following: 1) approach sections are subject to erosion. Generally do not use fords where bank height exceeds 5 feet, 2) excavation for the installation of the riprap-gravel bottom and filter material causes major stream disturbance. In some cases, fords may be adequately constructed by shallow filling without excavation, 3) the stabilizing material is subject to washing out during storm flows and may require replacement, 4) mud and other contaminants are brought directly into the stream on vehicles unless crossings are limited to no flow conditions.

PLANS AND SPECIFICATIONS

Plans and specifications for temporary stream crossing shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. At a minimum include the following items:

1. The location of the crossing.
2. Required material specifications.

All plans shall include the installation, inspection, and maintenance schedules with the responsible party identified.

Standard drawing IL-675 TEMPORARY STREAM CROSSING PLAN may be used as the plan sheet.

OPERATION AND MAINTENANCE

Inspect temporary stream crossings after runoff-producing rains to check for blockage in channel, erosion of abutments, channel scour, riprap displacement, or piping. Make all repairs immediately to prevent further damage to the installation.

Remove temporary stream crossings immediately when they are no longer needed. Restore the stream channel to its original cross-section, and smooth and appropriately stabilize all disturbed areas.

Leave in-stream sediment traps in place to continue capturing sediment.

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