CHAPTER 18
TEMPORARY ROADS AND BRIDGES

18.0 INTRODUCTION

These guidelines are to be used to design temporary roads and bridges where traffic will be maintained at the construction site of a bridge replacement or rehabilitation project on a two-lane highway. These guidelines are not recommended for four-lane highways or situations which require high speed transitions.

Temporary roads and bridges do not have to be designed as a permanent facility since they will only be in use for a short time (often only a few months or one construction season).

Each temporary road and bridge is to be designed to be compatible with the existing site conditions, the volume and composition of the traffic being maintained and an acceptable operating speed for the temporary condition.

Designs must consider the location of existing utility facilities and their proposed relocations to avoid or reduce interference with these utility facilities.

Any temporary right-of-way or easements required for temporary roads and bridges are to be determined and included in the project Right-of-Way Plan so it can be acquired as part of the overall right-of-way.

Public Utility Commission approval will be required for construction of temporary roads or bridges across railroads.

Engineering judgement is to be used with these guidelines. If the existing site readily lends itself to a temporary road design with design features higher that the minimums of these guidelines, do not force the design down to these minimums.

Thorough consideration of the composition of the maintained traffic is important. Logging trucks, large coal trucks or large recreational vehicles, for example, can impose requirements that will dictate the design.

Dimensions given in these guidelines are to be considered minimums, which may have to be increased to provide a design compatible with specific project conditions.

The decision to maintain traffic at the site of a bridge project or to provide a detour or other option is to be made in accordance with Publication 10C, Design Manual, Part 1C, Transportation Engineering Procedures, Chapter 3, Section 3.3.B.13.

Environmental evaluation of temporary roads and bridges is to be performed as part of the evaluation of the permanent bridge construction project. Current Department policy regarding environmental evaluations of temporary roads and bridges is to be followed (see Publication 10C, Design Manual, Part 1C, Transportation Engineering Procedures, Chapter 3, Section 3.3.B.13.)

Each project that requires a temporary road or bridge will include temporary road and bridge special provisions in the proposal, specifically prepared for that project.

18.1 DEFINITIONS

For the purpose of these guidelines, the following definitions apply:

1. Temporary Stream Crossing. A temporary crossing of a stream with multiple pipes, pipe arches or similar conduits covered with fill material.

2. Temporary Bridge. A temporary crossing of a stream or other topographic feature consisting of a bridge superstructure with an appropriate substructure.
3. Temporary Road. A temporary roadway forming the approaches to a temporary stream crossing or temporary bridge.

18.2 TRAFFIC CONTROL

Adequate advance warning signs and informational and regulatory signing on the temporary road itself is very important. If warranted, rumble strips, additional signing, regulatory speed control, painted pavement edge lines, warning lights, temporary lighting (dusk to dawn or generator-driven construction lights) or similar devices should be specified. Appropriate narrow bridge or bridge posting signs must be incorporated, as required.

The transition from the existing highway to the temporary road is highly critical. Drivers should not be surprised by an unexpected situation where there is insufficient time to make a proper decision or maneuver.

A Traffic Control Plan shall be prepared as required by Publication 212, *Official Traffic Control Devices*, and Publication 213, *Temporary Traffic Control Guidelines*, and made a part of the Plans, Specifications, and Estimate (PS&E) for the project. Coordination with the District Traffic Unit during design is important to insure that proper traffic control devices are incorporated.

18.3 TEMPORARY ROAD

Temporary roads can be single-lane or two-lane. Single-lane temporary roads can be used if they provide adequate capacity to handle the traffic.

A. Single-Lane Temporary Road. Single-lane temporary roads can be considered when a study/capacity analysis indicates that any resultant traffic backup (queue) will be acceptable.

Traffic on single-lane temporary roads can be controlled by stop signs or traffic signals.

Obtain peak hour traffic counts to use with the Highway Capacity Manual to perform capacity analyses, when necessary.

1. Stop Sign Control. Consider controlling traffic with stop signs, placed at both ends of the single lane, when the Average Daily Traffic (ADT) is approximately 1500 vehicles per day or less and the length of temporary road is approximately 45 m (150 ft) or less.

Use stop signs only if sight distance is available so that vehicles stopped at each end of the temporary road can clearly see each other.

In fog-prone areas, do not use stop sign control, use traffic signal control.

For ADTs slightly under or above 1500 vehicles per day and/or temporary road lengths greater than 45 m (150 ft), perform a study/capacity analysis to determine if traffic queues will be acceptable.

2. Traffic Signal Control. Consider using traffic signals for traffic control of single lanes, where stop sign control is not acceptable.

Perform a study/capacity analysis, using hourly volumes, to determine if traffic queues will be acceptable.

If traffic signal control cannot be used, a two-lane temporary road should be provided.
3. Geometry. Abrupt, sharp curvature in the transition area from the existing highway to the temporary road is to be avoided.

Clear sight distance to the stop sign or traffic signal, on the approach to these traffic control devices, is essential. Sight distance and adequate length of roadway to bring a vehicle to a complete stop from its operating speed must be provided. Consider the placement of any guide rail, barrier or temporary signing when checking for clear sight distance.

Any vertical curves must provide headlight stopping sight distance to satisfy this requirement.

The entire length of the temporary road, between the stop signs, should be visible to a driver stopped at the stop sign.

Where traffic signals are used, a study should be performed by the designer (in coordination with the District Traffic Unit) to determine the acceptable operating speed through the temporary road area. It is recommended that a minimum operating speed of 25 km/h (15 mph) be provided.

4. Pavement and Shoulder Width. The minimum pavement width recommended for single-lane roadways is:

- ADT of 500 or less = 3.0 m (10 ft)
- ADT greater than 500 = 3.6 m (12 ft)

Minimum shoulder widths of 0.6 m (2 ft) are recommended.

When selected material surfacing is specified for pavement material, paving should be provided for the entire pavement and shoulder width. Minimums would be:

- ADT of 500 or less = 4.2 m (14 ft)
- ADT greater than 500 = 4.8 m (16 ft)

When higher-type pavement material is specified, consider paving the entire pavement and shoulder width, if this is more economical than constructing separate shoulders of different material.

Pavement widths may have to be widened, through horizontal curves, to provide adequate turning radii for trucks.

B. Two-Lane Temporary Road. When a single-lane temporary road cannot adequately handle the traffic, two-lane temporary roads will be used.

1. Geometry. In the transition area from the existing highway to the temporary road, the horizontal curvature should be designed so that the operating speed of a vehicle will be reduced by no more than 25 km/h (15 mph).

Clear sight distance that permits the driver to see the transition and appropriate advance signing is important.

Provide appropriate superelevation for the operating speed within the transition curvature.

2. Pavement and Shoulder Width. The minimum pavement width recommended for two-lane roadways is:

- ADT of 8,000 or less = 6.0 m (20 ft)
- ADT greater than 8,000 = 6.6 m (22 ft)

Minimum shoulder widths of 0.6 m (2 ft) are recommended.

When selected material surfacing is specified for pavement material, paving should be provided for the entire pavement and shoulder width (a minimum of 7.2 m (24 ft)).
When a higher-type pavement material is specified, consider paving the entire pavement and shoulder width if this is more economical than constructing separate shoulders of different material.

Pavement widths may have to be widened, through horizontal curves, to provide adequate turning radii for trucks.

C. Guide Rail. Guide rail is to be provided on temporary roads when required for embankment protection, protection at roadside obstacles (especially where the obstacles are potentially hazardous because of roadway geometry) and non-traversable hazards (such as permanent bodies of water). Refer to Chapter 12.

Guide rail connection to bridge railing of temporary bridges and appropriate runout of the guide rail is to be provided.

Concrete median barrier may be used for guide rail, especially if temporary stream crossings have a minimum fill (cover) over the pipes which would cause interference with driving guide rail posts. If concrete barrier is used, the effect on sight distance must be checked carefully to ensure that it is acceptable.

If there is a concern that concrete median barrier would act as a dam if high water overtopped a temporary stream crossing, an alternative is to use guide rail attached to a concrete slab as per Publication 72M, Roadway Construction Standards, for use over buried or underground structures.

D. Side Slopes. Generally, side slopes, in cut or fill sections on temporary roads, are to be as steep as feasible, based on the stability of the soil and rock involved. Slopes of 1V:1H are considered maximum, with flatter slopes to be used if necessary.

Gabions may be specified to retain slopes, but not as a bridge abutment.

E. Pavement Type and Shoulder Type. Pavement and shoulders of temporary roads are to be maintained in a smooth condition during use. Special provisions for adequate maintenance and dust control must be included in the PS&E.

1. Selected material surfacing is recommended as the pavement material for temporary roads with low ADTs and/or low speeds.

2. Consideration can be given to using adequately compacted milled bituminous material as the pavement material to control potholes and dust and for medium ADTs.

3. For higher ADTs, consideration should be given to using bituminous material as the pavement material. Bituminous concrete base course, without a top material, will normally be adequate for the short period of time the temporary road will be in use.

4. Selected material shoulders are recommended as a minimum. Compacted milled bituminous material and higher type shoulders should be considered if a high-type pavement is used.

5. Pavement and shoulder thicknesses should be determined based on ADT, percent of trucks, expected life of the temporary road and stability of the subgrade, in consultation with the District Materials/Geotechnical Engineer and Pavement Engineer.

18.4 TEMPORARY BRIDGE

Temporary bridges will be designed using current Department bridge design methodology found in Publication 15M, Design Manual, Part 4, Structures, Volume 1, Part A, Chapter 5, including consideration of geometric constraints (truck turning patterns, etc.) as per this Manual.
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18.5 WATERWAY OPENING - PA DEP PERMIT

The application for the Pennsylvania Department of Environmental Protection's (PA DEP) Waterway Obstruction Permit must include the proposed waterway opening for the temporary bridge or crossing. This required waterway opening is to be designed so that the temporary condition will not cause any significant damage by flooding adjacent property.

A. Temporary Stream Crossing (Pipes). The minimum flood that can be used is for the 2.33-year design storm (Q_{2.33}). A greater recurrence interval (such as the 10-year design storm (Q_{10})) shall be used if warranted by site conditions and engineering analysis.

B. Temporary Bridge. Refer to Publication 15M, Design Manual, Part 4, Structures, Volume 1, Part A, Chapter 5 for guidelines to size the waterway opening.