

From: Scott Bounds <
Sent: Thursday, May 20, 2021 3:33 PM
To: Susan Blevins <susan.blevins@hilshirevillagetexas.com>
Subject: RE: Parking Pad requirements

Road shoulder or parking pad?

A highway shoulder is a necessary part of all highways. It is included in the New York State Department of Transportation definition of a road section.

A highway shoulder serves several functions:

It serves as a lateral support to the highway pavement.

It provides a means of protecting the highway surface from the intrusion of water, one of the great destroyers of our highways.

It serves as a safety feature by providing refuge room off the highway pavement surface for disabled vehicles and in emergencies for vehicles to avoid head on collisions by oncoming vehicles out of control. It provides a partial storage area for snow which we must remove from the pavement to provide the traveling public with an acceptable pavement at all times.

A wide shoulder provides a temporary parking area for people who wish to stop and enjoy the scenic vistas so readily available throughout the state.

Shoulders provide an auxiliary pavement for vehicles where the pavement is narrow. Many of our pavements have lanes 10 or 11 feet wide and some of them even narrower.

Many of our highways have dirt shoulders and we tend to forget they are an important part of the road section. These shoulders are no less important to the highway than with higher type pavements because our less heavily traveled highways are narrower and the need for an adequate shoulder is even more important than with a wider pavement.

Shoulders are often composed of earth as it comes from the surrounding area; from graded materials and from graded materials stabilized or held together with a binding agent such as a bituminous material, calcium chloride or cement.

The design of a shoulder must be based upon the available material to be used in the shoulder. This availability is often a matter of economics. How much can we spend?

The design must also be based upon the traffic volume of the highway; the pavement width and the drainage requirements of the highway. We are frequently limited by available right of way. The right of way width on most of our highways is about three rods; however, original dedication records must be consulted to verify each highway width. In the cut or fill sections of an average town highway we are frequently severely limited by inadequate right of way.

To provide the necessary width for a shoulder in a cut or fill highway section the desirable solution is to acquire additional right of way. This preferred solution is sometimes beyond our available funds. A desirable minimum transverse cut or fill slope is one vertical to two horizontal. This slope is dependent upon materials available. Where this is unattainable we can use a steeper slope. To provide the steeper slope we may have to resort to rock protection and in extreme cases to walls of a bin type; to gabions or even to concrete or masonry retaining walls.

The width of a shoulder varies with the demands made of the shoulder. This width is usually from 2 to 10 feet. The transverse slope varies with the type of material in the shoulder. When we refer to transverse slope we mean the rate at which the shoulder slopes away from the pavement surface. This slope is measured as a ratio of height in inches to a foot of width of the shoulder. Many shoulders are of grass and this slope for a properly maintained and mowed surface should be about an inch per foot (8 %).

A shoulder surface of a graded material treated or maintained in good condition should be about three quarters of an inch per foot (6 percent). A high type shoulder having an all-weather treated surface may have a transverse slope of about one-half inch per foot (4 %).

Many of our highways have greater slopes than suggested, but for present day higher vehicle speeds they are dangerous, for a driver may lose control and be forced off the road section completely.

A shoulder should be composed of material which will allow transverse drainage of the pavement foundation. If we provide a dense relatively impervious shoulder we create a bath tub under the highway pavement. This can be disastrous as the pavement foundation is inadequate to support vehicular traffic. In sub-freezing times we can expect frost heave and frequent total destruction of the pavement itself.

In some areas of our State excellent granular material, which drains very well, is readily available but it does not possess sufficient internal strength to support the pavement or to provide a surface strong enough to support a vehicle. It is too clean. We must provide a material clean enough to drain but dirty enough to have the internal structural strength to support the pavement laterally and the vehicle wheels on it. Probably not less than ten percent of the material in the shoulder should pass a 200 mesh sieve on a gravel shoulder. The gravel under a paved shoulder should have the same gradation as the gravel under the main line of the highway.

Most of you do not have the technical facilities to make a gradation determination so I would suggest that you must rely on your good common sense. If you have a pavement which has broken up or heaved, observe the moisture content of the earth under the pavement foundation and if you notice free water you probably have a shoulder which is too dense. The inclusion of gravel in the shoulder should improve the shoulder's ability to drain the pavement foundation. Complete removal and replacement of the shoulder may sometimes be necessary to provide proper drainage.

The importance of proper drainage of shoulders and pavements cannot be overemphasized. Failures of any portion of a highway structure are usually attributable to a foundation failure caused by erosive water. Adequate ditches alongside shoulders must always be provided preferably not less than four feet in depth below the pavement surface. Water may apparently be drained from a shoulder but with many of our soils capillary action under the action of traffic will bring water up into the shoulder and pavement foundations. This capillary action in some of our soils may be in excess of four feet. Records exist of this capillary action in soils of ten or twelve feet.

Vegetation is used to maintain many of our shoulders from erosion. There is a danger in this as the vegetation may keep water from draining off the pavement. If this water is allowed to form puddles a hazard is developed, a vehicle may skid. In freezing weather ice on the pavement may form and vehicular skidding occurs. We have trouble as the courts have consistently found us liable for improper

maintenance of our shoulders. If we are found liable a very unpopular tax increase will be necessary to pay the judgment against the town, county or State we serve.

We must maintain our shoulders to provide adequate transverse drainage and yet at slopes flat enough to be safe for vehicular traffic.

With our earthen shoulders we usually have a problem with finer material washing away to leave stones in the surface which gives us a rough undesirable shoulder surface.

The shoulder surface is composed of materials to meet the demands we place upon it. If we want an all-weather surface which is one which will support the vehicles using the highway at all times, we must usually provide a graded and often treated surface. These shoulders reduce the frequency of maintenance but we must realize that their maintenance requires a different and more expensive maintenance program. This is similar to the problems we face when we upgrade the pavement surface.

A quarry run stone or graded gravel surface of from 2" to 6" in thickness is usually required. Thickness is dependent upon the supporting material in the shoulders. Soft clays require more thickness than better draining granular soils