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Rockfall Mitigation Measures

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University of Kentucky University of Kentucky University of Kentucky
Research Report
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ROCKFALL MITIGATION MEASURES

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in cooperation with the
Kentucky Transportation Cabinet
The Commonwealth of Kentucky
and
Federal Highway Administration

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March 1996

Dear Mr. Toussaint:

Many highway routes in Kentucky under the jurisdiction of the Kentucky Transportation Cabinet are aging. Ages of many of these roadways are greater than forty years. Several sections of these roadways contain many rock slopes. Rockfall from these slopes represents hazards to the traveling public. As the roadway system ages, these highway rock cut slopes deteriorate because of weathering. Consequently, the potential for rockfall and rockslides increases. Large sums of money are spent each year removing fallen rock from roadways and drainage ditches. Stability of these rock slopes is a major concern of the Kentucky Transportation Cabinet because of the aging and weathering of these slopes.

Some bodily injuries and traffic fatalities have been reported in past years. The average amount of rockfall, or rockfall-related, claims filed with the Kentucky Board of Claims was about 157,000 dollars per year. This amount is small because Kentucky is one of a few states in the nation that still has sovereign immunity—in most states this immunity has been thrown out by the courts.

This study represents the start of an effort by the Cabinet to develop a proactive stance—in contrast to a reactive stance—and policy toward preventing, minimizing, or mitigating the rockfall problem on roadways under the jurisdiction of the Kentucky Transportation Cabinet. This effort was undertaken in an attempt to make our highways in Kentucky safer to motorists. The general aims of this study were to establish a highway rock cut slope policy and devise a statewide system of dealing with this problem. This study also represents an effort by the Cabinet to establish a highway rockfall risk management system. The objectives of this study were accomplished.
The vast majority of rockfall and rockfall problems in Kentucky, as shown by this study, occur in counties located east of Interstate 75. Differential weathering and structural characteristics (and aging) -- jointing and unfavorable orientations -- were the major causes of rockfall on Kentucky's highways. Preliminary ratings of all rock cut slopes -- some 5,270 slopes -- on the Interstates, Parkways, most Primary routes, and some secondary routes in Kentucky were performed using the Rockfall Hazardous Rating System (RHRS) -- devised by Pierson and Van Vickle of Oregon DOT. The intention here was to develop firsthand experience and to test the reliability of the Pierson-Van Vickle rating system. Based on this experience, this rating method appears to be a good system for rating the potential for rockfall at a given highway rock cut location. For example, rockfall occurred at two rock cut slopes, which scored the highest values (664 and 660) of all slopes rated, a short time after the slopes had been rated. It was much beyond the scope of this study to rate all rock cut slopes on 27,000 miles of roadway under the jurisdiction of the Cabinet. During the study, we sent several of our engineers of the mountainous Highway Districts to a training session, which was arranged by personnel of the University of Kentucky Transportation Center, to learn the Rockfall Hazardous Rating System.

In this study, some 181 "A" slopes -- a designation used in the RHR System -- which visually appeared hazardous, were identified. A detailed, numerical rating of those slopes was performed using the RHR System. Some 1264 of the 4894 slopes were rated in a preliminary survey as "B" slopes. Only about 30 of those slopes were rated numerically. When money becomes available, it is our intention to perform detailed ratings of all of the "B" slopes identified in this study. We believe this could be accomplished by using engineering college students trained and supervised by the personnel of the Kentucky Transportation Center. Moreover, we have intentions to perform surveys of our secondary routes. It is also our intention to estimate the mitigation measures, or repair methods, necessary to correct the 181 hazardous rock cut slopes identified in this study when money becomes available.

The rock cut slope design guidelines used by the Cabinet's geologists and geotechnical engineers generally seem sound. For the sedimentary rock strata in Kentucky, benching of rock slopes appears to be very effective in preventing, or mitigating, rockfall on Kentucky's highways. The basic problem is not design standards, but the fact that many highway rock slopes are aging, weathering, and deteriorating. With aging, rockfall problems will continue to increase with time.

The rockfall computer simulation program devised by Colorado engineers is a very powerful analytical tool for assessing the stability and safety of existing rock slopes and newly designed rock slopes. In this study, several rockfall case studies were examined using this computer program. Results obtained from this program seem reasonable. This program will be extremely useful in devising remedial and mitigating plans at rockfall sites. We are considering using this program routinely when analyzing problem rock slopes and in the design of new slopes.

We believe that the establishment of a rockfall risk management system will provide a good approach for allocating funding for mitigating, or repairing, rockfall problem sites and will aid in long-range planning. A program of this type will provide a proactive stance for the Cabinet and will provide some legal protection -- since it will show that the state does not have the total amount of money required at once to deal with all repairs and safety related rock slope issues.
Implementation Statement

The effort described in this study is a good example of the start of assessing the state and conditions of the highways under the jurisdiction of the Cabinet. Consequently, when money becomes available, we intend to continue these efforts to establish a permanent highway rock cut slope risk management program in Kentucky. To **insure the success of this program, we are seeking permanent funding for these efforts.** By establishing a permanent program, data obtained periodically can be used to determine maintenance funding levels for repairing, or mitigating hazardous sites. This type of information will be useful for determining budget requests. The conditions of our aging highways in Kentucky and the need to provide sufficient maintenance funds to repair our highways are also major concerns.

When funding becomes available, we believe that a research study is needed to evaluate, in more detail, the *long-term effectiveness* of present rock cut slope design standards and to develop a correlation between the rate of weathering of different types of problem shales that are often found in rock cuts and some type of geotechnical index, such as slake durability. To avoid rockfall from long-term, differential weathering, this correlation is needed so that rock cut slopes may be designed effectively.

Sincerely,

J. M. Yowell, P.E.
State Highway Engineer
**Rockfall Mitigation Measures**

**Abstract**

Highways in Kentucky contain numerous rock slopes and rockfall from these slopes represent potential dangers to motorists. As these highway rock cut slopes age and deteriorate because of weathering, the potential for rockfall and rockslides increases. Some bodily injuries and traffic fatalities have been reported in past years. The general aims of this study were to establish a highway rock cut slope policy and devise a statewide system of dealing with this problem. This study represents the start of an effort by the Kentucky Transportation Cabinet to develop a proactive stance and policy toward preventing, minimizing, or mitigating the rockfall problem on the Cabinet’s highways and to establish a rockfall risk management program. As this study shows, the vast majority of rockfall problems in Kentucky occur in counties located east of Interstate 75. Preliminary rockfall hazardous ratings of all rock cut slopes—some 5270 slopes—on the Interstates, Parkways, and most Primary routes were performed using the rockfall hazardous rating system (RHRS) devised by Pierson and Vickle of Oregon DOT. This approach appears to be a good system for rating the potential for rockfall at a given highway rock cut location. Some 180 slopes were identified as hazardous. Detailed numerical ratings were performed at those locations. Differential weathering and structural characteristics—jointing and unfavorable orientations—were the major cause of rockfall. Few mitigation measures have been used on Kentucky’s highways. For the sedimentary rock strata in Kentucky, benching of rock slopes appears to be very effective in preventing, or mitigating, rockfall on Kentucky’s highways. The rock cut slope design guidelines used by the Cabinet appear to be sound. The basic problem is not design standards, but the fact that many of the highway rock slopes are aging, weathering, and deteriorating. With aging, rockfall problems will continue to increase with time. The computer rockfall simulation program devised by Colorado engineers was used to analyze several case studies of rockfall. This program appears to be a very good analytical tool for assessing the stability and safety of existing rock slopes and newly designed rock slopes and will be useful in devising remedial and mitigating plans at rockfall sites.

**Key Words**

Stability, Rockfall, Rockslides, Rating System, Mitigation, Case Histories

**Distribution Statement**

Unlimited, with the approval of the Kentucky Transportation Cabinet
### SI (Modern Metric) Conversion Factors

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## CONCLUSIONS

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EXECUTIVE SUMMARY

Highways in Kentucky contain numerous rock slopes and rockfall from these slopes represent potential hazards to the traveling public. As these highway rock cut slopes age and deteriorate due to weathering, the potential for rockfall and rock slides increases. Large sums of money are spent each year removing fallen rock from roadways and drainage ditches. Some bodily injuries and traffic fatalities have been reported in past years. The general aims of this study were to establish a highway rock cut slope policy and devise a statewide system of dealing with this problem. This study represents the start of an effort by the Cabinet to develop a proactive stance and policy toward preventing, minimizing, or mitigating the rockfall problem on the Cabinet’s highways instead of continuing a policy of taking a reactive stance.

The objectives of this study were to identify and classify the common types of rockfall and rock slides, which occur in Kentucky, identify the common causes of rockfall, collect and examine historical records of rockfall, identify and document litigation cases (including traffic fatalities), formulate guidelines and methods for effectively dealing with rockfall for any locality, develop, or acquire, methods of analyzing the stability of rock cut slopes so that mitigation measures can be implemented at hazardous sites in Kentucky, review current design practices, and, finally, establish the framework for implementing a statewide rockfall hazardous rating system and a rock slope policy. These objectives were essentially met.

To develop a statewide rock slope risk management system for Kentucky, this study was divided into two major phases. The first phase consisted of examining a large number of rock slopes in Kentucky. A portion of this phase consisted of performing a preliminary survey of numerous rock slopes. Some 5,270 rock cut slopes on all Interstates, Parkways, Primary routes, and some secondary routes in Kentucky were examined. The majority of hazardous locations on those routes were identified. In the second part of Phase 1, a detailed examination was made of several rock slopes that were deemed hazardous, or the risk of rockfall was identified as high. These slopes were rated numerically using a rockfall hazardous rating system. In the second phase, detailed rock slope analyses of selected sites were performed using a rock slope computer simulation program developed by Pfeiffer (1993) of Colorado. Several case histories—cases submitted by the Cabinet’s District personnel—were analyzed using the rockfall computer simulation program. At two sites, which scored the highest hazardous rating scores in Kentucky, rockfall occurred a few months after they were rated. These two slopes were repaired at a cost in excess of 350,000 dollars. Computer rockfall simulation analyses of the repaired slopes showed that the slopes were not safe. The rating system and simulation program had targeted the slopes as likely to fail.

Based on extensive observations of rockfall and rockfall problems on Kentucky’s highways, the following conclusions were made:

- The rock cut slope design guidelines used by the Cabinet appear to be sound. The basic problem is not design standards, but the fact that many of the
highway rock slopes are aging, weathering, and deteriorating. With aging, rockfall problems will continue to increase with time.

- Preliminary rockfall hazardous ratings of all rock cut slopes on the Interstates, Parkways, and most Primary routes were performed.

- The vast majority of rockfall and rockfall problems in Kentucky occur in counties located east of Interstate 75.

- The average amount of a rockfall, or rockfall-related, claim filed with the Kentucky Board of Claims was about 157,000 dollars per year (this amount is relatively small because Kentucky is one of the few states in the nation that still has sovereign immunity—in most states this immunity has been thrown out by most courts.)

- Differential weathering and structural characteristics—jointing and unfavorable orientations—were the major causes of rockfall on Kentucky’s highways.

- The Rockfall Hazardous Rating System (RHRS) — devised by Pierson and Vickle of Oregon DOT— is a good system for rating the potential for rockfall at a given highway rock cut location.

- Few mitigation measures have been used on Kentucky’s highways.

- For the sedimentary rock strata in Kentucky, benching of rock slopes appears to be very effective in preventing, or mitigating, rockfall on Kentucky’s highways.

- Detailed scores, based on the RHRS procedure, of potentially hazardous highway rock slopes on interstates and parkways ranged from about 280 to 520.

The following recommendations were made:

- Preliminary ratings of all rock cut slopes on secondary routes under the jurisdiction of the Kentucky Transportation Cabinet should be performed.

- The Rockfall Hazardous Rating System should be implemented statewide. Whenever a rockfall occurs on a roadway under the jurisdiction of the Cabinet, the rock slope should be rated using the RHRS procedure. Detailed ratings on all slopes that classified as “B” should be completed—this was not within the scope of this study. Also, all “A” and “B” slopes identified on secondary routes should be detail rated. All rated slope data should be maintained, including updates, in a central file.

- The computer rockfall simulation program devised by Colorado engineers is a
very powerful analytical tool for assessing the stability and safety of existing rock slopes and newly designed rock slopes. This program appears to be extremely useful in devising remedial and mitigating plans at rockfall sites. It is recommended that this program be used when analyzing problem rock slopes.

- **There is a need to devise remedial, or mitigation, solutions for the most hazardous rock cut slopes identified in this study.** After these measures have been identified for each site, *cost estimates should be determined*. Ratios of estimated cost of the remedial, or mitigation, measures for each site to the RHRS scores of the sites need to be determined. Using these ratios, a priority list can be devised.

- A permanent, highway rock slope risk management program should be established by the Kentucky Transportation Cabinet. *To insure the success of this program, permanent funding should be established*. Data in this program should be reviewed annually and updated when appropriate. All hazardous sites should be detailed rated about every five years. *(The establishment of rockfall risk management system will provide the means to make good decisions on allocating funding for mitigating or repairing, rockfall problem sites. It will provide a proactive stance for the Cabinet and will provide some legal protection -- since it will show that the state does not have money necessary to repair all slopes at one time and deal with all safety related rock slope issues.)*

- After cost estimates of remedial, or mitigation, measures of the most hazardous rock slopes and the establishment of a priority list has been made, the Cabinet should provide yearly funds for implementing rockfall mitigation and rock slope remedial measures should be earmarked or established for the most hazardous sites. This may require making a request to the Kentucky Legislators for such funding. It should be noted that there are instances where several slopes could be grouped into one contract and repaired or mitigated. In these instances, savings in repair, or mitigation, costs can be realized.

- At all sites where remedial, or mitigating, measures have been used, the effectiveness of these measures should be monitored. Appropriate funding should be made available for this purpose.

- Appropriate measures should be established to monitor the effectiveness of Ritchie ditches.

- In using the Colorado rockfall computer simulation program, there is a need to check the coefficients -- used in the program -- of Kentucky rocks. Also, surface roughness for different situations should be evaluated. This would involve observing actual trajectories of rocks for different situations at selected sites.

- **A research study is needed to evaluate the long-term effectiveness of present rock cut slope design standards and to develop a correlation between the rate of**
weathering of different types of problem shales that are often found in rock cuts and some type of geotechnical index, such as slake-durability. This correlation is needed to effectively design rock cut slopes against differential weathering.
INTRODUCTION

Problem Statement

Highways in Kentucky contain numerous rock slopes and rockfall from these slopes represents potential hazards to the traveling public. As these rock cut slopes age and deteriorate, due to weathering, the potential for rockfall and rock slides increases. Large sums of money are spent each year removing fallen rock from roadways and drainage ditches. Some bodily injuries and fatalities have been reported in past years (Agent and Pigman, 1990). However, the scope of this problem and the money required each year to clear highways of fallen rock debris in the state are largely unknown. Currently, the state lacks a highway rock slope policy and a statewide system of dealing with this problem. The present practice may be described as somewhat reactive, that is, measures are performed after rockfall has occurred. There is a need to develop a proactive stance and policy in an effort to prevent, minimize, or mitigate the rockfall problem.

Objectives

The objectives of this study are as follows:

- to identify and classify the common types of rockfall and rock slides that occur in Kentucky;
- to identify causes of rockfall which include stress relief, joints, fractures, angles of joints, and their relationship to physiographic and geological structures;
- to collect and examine the historical record of rockfall in Kentucky so that the scope of this problem may be defined and document annual maintenance costs, if possible;
- to identify and document any litigation cases, bodily injuries, and fatalities that may have been caused by rockfall;
- to establish the framework for implementing a statewide rockfall hazardous rating system and a rock slope policy and review current design practices;
- to implement certain mitigation measures at selected sites that have been identified as particularly hazardous to the traveling public and
observe the long-term performance of new rockfall mitigation measures to be introduced as well as observe the performance of mitigation measures that have been constructed at sites in Kentucky, and

- to formulate guidelines for dealing effectively with rockfall for any given locality.

Scope

To develop a statewide rock slope risk management system for Kentucky, this study was divided into two major phases. The first phase consisted of examining a large number of rock slopes in Kentucky. The first part of this phase consisted of performing a preliminary survey of numerous rock slopes. In the second part of Phase 1, a detailed examination was made of several rock slopes that were deemed hazardous, or the risk of rockfall was identified as high. In the second phase, detailed rock slope analyses of selected sites were performed using a rock slope computer simulation program developed by Pfeiffer (1993).

BACKGROUND

Rockfall may be defined as the movement of rock of any size from a slope or cliff that is so steep that the rock fragment(s) continues to move down a slope. Since the beginning of the highway system, rockfall has occurred. Rockfall problems exist at numerous locations in the state. A large number of rockfall sites occur in the Eastern and Knobs physiographical regions. Many rock-cut slopes have been constructed in the past in the state without the benefit of a geological study that might have foreseen future rockfall problems. In some instances, massive rock slope slides have occurred. Historically, rockfall removal and control measures have been applied by maintenance forces. The annual cost of this type of maintenance and the scope of the problem in the state are unknown. However, it is very sizable based on a review of the costs of repairs.

Rock Type and General Geology of Kentucky

Bedrock materials in Kentucky consist mainly of sedimentary rocks, Figure 1. Sedimentary rocks were formed by consolidation, or cementation, of sediment, or fragments, of other rocks deposited in water. Occasional partings filled by metamorphic rock or unconsolidated material are sometimes present. Examples of sedimentary rock are limestone, sandstone, dolomite, and shale. These rocks were formed during the Ordovician, Silurian, Devonian, Mississippian, and
Pennsylvanian geological periods. Except for unconsolidated deposits of the Tertiary and Cretaceous geological periods, and deep alluvium deposits found in large streams, the vast majority of Kentucky consists of shallow overburden (residual) soils that typically range in thicknesses from a few centimeters to 9 meters (30 feet). Hence, in most instances, highway cuts are usually composed of sedimentary rocks. In many instances, the cut slope may consist of several different materials. For example, the cut slope may consist of limestone, shale, coal seams, and sandstone geological formations.

Traffic Accidents and Rockfall Legal Claims

Data (Agent 1994; Turner and Agent, 1995) compiled by the Traffic and Safety Section of the Kentucky Transportation Center indicate that the traffic claims due to rockfall filed with the Board of Claims averages about 157,661 dollars per year. Traffic fatalities due to falling rock have averaged about one every three years. Total dollar
amounts of rockfall claims per year from 1981 to 1994 (claims of $50,000 dollars or more) are shown in Figure 2. Only about 20 percent of those claims have been paid each year. As shown in Figure 3, the number of claims related to rockfall increases throughout the period 1981-1994. These claims are, perhaps, small because the Commonwealth of Kentucky is one of the few states in the country that still retains sovereign immunity. The principles of sovereign immunity became well established by 1812 in the United States. This concept essentially states that "no one can sue the government without the government's permission and even if the government could be sued, it is not responsible for the acts of the employees." Although, by 1978 this concept was a valid defense in only 16 states, the courts have nullified, or weakened this defense in many other locations. The majority of states have lost this immunity. In the future, this method of defense may be cast out by the courts.

Recently, there has been a trend for victims and their lawyers to sue individual state employees for negligence. Therefore, to minimize risk to the state and to individuals, a proactive stance is recommended. According to Turner and Agent(1995), risk management involves four steps. These are as follows:

- **Identify and evaluate** the frequency, probability, etc., of the involved risks of a particular highway problem;
Determine the most appropriate risk management methods (that is, suitable control techniques, risk finance technique, policies, and financial commitments necessary to administer the method);

Implement the appropriate methods; and

Monitor the methods and adjust as necessary.

The intent of this study was to establish a rockfall risk management program. The purpose of such a program is to minimize liability by using risk management procedures to limit exposure to the extent possible. Although the program proposed herein will help identify hazardous rockfall locations, the Kentucky Transportation Cabinet faces a major difficulty in that mitigation, cannot be performed instantly because of the great expense involved and the time required to implement control measures. However, the intent here is to provide the mechanism for redressing these problem slopes. Consequently, because of the lack of funding to mitigate, or repair those sites, the only course of action available to the Cabinet is to warn the traveling public of the relative dangers of a particular site, appeal to legislators for appropriate funding, establish a program to analyze each situation, and implement measures as funding becomes available.

Highway Design Guidelines for New Rock Cut Slopes

Guidelines for designing cut slopes in rock in Kentucky have been formulated by the Geotechnical Branch of the Division of Materials, Kentucky Transportation Cabinet, and are contained in the 1993 Geotechnical Manual. Current policies regarding rock cut slopes are contained in that manual and pertinent sections have been reproduced below in Table 1 and Figures 4 through 11. Designing rock cut slopes is an art and varies from state to state. Methods that may be successful in one state may not be appropriate for conditions in another state. Methods used are very dependent on the types of materials present in the slope, the number and inclination of joints, and the continuity of the joints. The design is also influenced by the lithology, or the structure and composition of a rock formation. The basic principle guiding the design of rock slopes is that each cut slope must be designed independently using all subsurface information and field information at a given site.

Because there are many different types of rock formations, jointing patterns, and layer orientations, specific rules cannot be formulated for designing rock cut slopes. Rather, only general guidelines can be formulated based on local experiences. Rock cut design in Kentucky has evolved over a considerable period of time based on the past experiences of geologists and geotechnical engineers. Consequently, some general guidelines based on past Kentucky experiences have evolved as summarized in Table
Table 1. Suggested, typical rock slope configurations are based on the types of rocks that may exist in a cut slope.

<table>
<thead>
<tr>
<th>Type of Materials</th>
<th>Slake Durability Index (Percent)</th>
<th>Jar Slake Number</th>
<th>Typical Cut Slope Recommendations</th>
<th>Lift Thickness</th>
<th>Typical Intermediate Benches</th>
<th>Roadside Benches</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class III</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nondurable Shale</td>
<td>49 ≤</td>
<td>1 or 2</td>
<td>2:1</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nondurable Shale</td>
<td>50 - 79.</td>
<td>3 or 4</td>
<td>1:1 to 1/2:1</td>
<td>9.14 m (30 ft Max.)</td>
<td>5.5 m (18 ft)</td>
<td>yes</td>
</tr>
<tr>
<td>Nondurable Shale</td>
<td>80 - 89.</td>
<td>4 or 5</td>
<td>3/4:1 to 1/4:1</td>
<td>9.14 m (30 ft)</td>
<td>5.5 m (18 ft)</td>
<td>yes</td>
</tr>
<tr>
<td>Durable Shale</td>
<td>≥90</td>
<td>6</td>
<td>1/2:1 to 1/4:1</td>
<td>9.14 m (30 ft) to 13.72 m (45 ft)</td>
<td>5.5 m (18 ft) to 6.1 m (20 ft)</td>
<td>yes</td>
</tr>
<tr>
<td>Massive Limestone or Sandstone</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaley Limestone or Sandstone</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Examples of typical slope configurations described in Table 1 are illustrated in Figures 4 through 7. As shown in Figures 4 through 6, the guidelines recognize three different classes of nondurable shales. Class I shales are defined as shales that have a slake-durability index (Hopkins 1986) — performed according to KM-64-513 (Kentucky Methods 1993) — equal to or less than 49 percent. Classes I and II are defined as shales that have slake-durability indexes ranging from 80 to 89 and 50 to 79 percent, respectively. Durable shales are defined as those shales that have a slake-durability index equal to or greater than 90 percent.

Other guidelines pertaining to the design of cut slopes in massive limestone, or sandstone, and in shaley limestone, or sandstone, are shown in Figures 8 and 9, respectively. Provisions are also in the guidelines for using serrated slopes. This
Figure 4. Typical cut slope recommendation for a Class III nondurable shale with or without laminations.

Figure 5. Typical cut slope recommendation for a Class II nondurable shale.
Rockfall Mitigation Measures-Hopkins, Beckham, and Puckett

Typical Slope Configuration
Class I Nondurable Shale
(Typical slope varies from 3/4: 1 to 1/4:1)

Original Groundline

Base of RDZ

18' (5.5m) IB

18' (5.5m) IB

15' (4.57m) OB

Roadside Ditch Bench

Class I Nondurable Shale

Maximum lift = 30 feet (9.14m)

NOTE:
IB = Intermediate Bench
OB = Overburden Bench

Figure 6. Typical cut slope recommendation for a Class I nondurable shale.

Typical Slope Configuration
Class I Durable Shale
(Typical slope varies from 1/2:1 to 1/4:1)

Original Groundline

Base of RDZ

15' (4.57m) OB

18' (5.5m) IB

18' (5.5m) IB

Roadside Ditch Bench

30' (9.14m)

30' (9.14m)

Class I Nondurable Shale

NOTE:
IB = Intermediate Bench
OB = Overburden Bench

Figure 7. Typical cut slope recommendation for a durable shale.
Figure 8. Typical cut slope configuration used in massive limestone or sandstone.

Figure 9. Typical slope configuration recommended for shaley limestone or sandstone.
Rockfall Mitigation Measures—Hopkins, Beckham, and Puckett

A technique is sometimes used in soft rock formations, shale, or other material that can be excavated by bulldozing or ripping to control erosion by aiding in the establishment of vegetation. A typical slope configuration of a serrated slope is illustrated in Figure 10.

![TYPICAL SLOPE CONFIGURATION 1:1 SERRATED SLOPE](image)

**Figure 10. Typical Configuration for a 1:1 serrated slope.**

A roadside ditch bench is recommended in the guidelines when a cut slope is steeper than 1 1/2: 1 and the 9.14- m (30-ft) safety clear zone, which is measured from the edge of a pavement to the cut slope, is not required. If the cut slope is less than about 9.14 m (30 ft) in height, then the width of the roadside ditch bench, as measured from a pavement edge to the cut slope, is usually 3.66 m (12 ft). When the cut slope is greater than 9.14 m (30 ft) in height, the bench width is 4.27 m (14 ft).

When the cut slope design does not contain intermediate benches, the guidelines
specify that a ditch-catchment area be constructed. The criteria used to design the continuous cut slope and catchment area are illustrated in Figure 11. Conditions when continuous cut slope design may be considered are as follows:

- Rock in the cut slope is homogenous;
- Joints are discontinuous and massive failures are unlikely;
- Intermediate benches will accumulate debris and become ineffective;
- Rock consists of limestones of low RQD numbers that are interbedded with shale of low slake-durability (SDI) numbers.

![Design Criteria for Roadside Ditch Catchment Area](image)

Figure 11. *Design criteria for roadside ditch catchment area (modified after Richie's design criteria in FHWA Rock Slope Engineering Manual)*
ROCKFALL HAZARDOUS RATING PROGRAM

Description of Rating System

Preliminary rating

To build a statewide rockfall risk management program and define the scope of this problem in Kentucky, a survey of rock slope problems was performed. In performing this survey, the rockfall hazard rating system (RHRS) devised by Pierson and Vickle (1993) of the Oregon Department of Transportation was used. This system is a rather simple procedure for evaluating the potential for rockfall to occur at a selected rock cut slope. The system provides a uniform means of identifying potentially dangerous rockfall slopes and a means of developing a priority list of sites where protective measures, or repairs, may be needed. The numerical rating system provides a means of allocating maintenance money.

The rating system consists of two parts. The potential for rockfall at a rock slope is initially classified, subjectively, and assigned to one of the three following categories:

- **A slope**—High
- **B slope**—moderate
- **C slope**—low, or none.

By classifying a rock cut slope according to one of these categories, a quick assessment of each slope on a highway may be made. Slopes that are classified as "C" are not considered dangerous and no further attention need be devoted to those types of slopes. A slope that classifies as "A" or "B" is considered potentially dangerous. In these cases, future attention and action should be considered for these types of slopes.

Detailed numerical rating

Slopes that were classified as "A" or "B" were rated numerically using the RHRS approach. Nine parameters are considered vital in this system for rating the rockfall potential at a given location. These parameters include slope height, ditch effectiveness, average vehicle risk, sight distance, roadway width, geologic character of slope, block size, rockfall history, and climate. Definitions and descriptions of each of these terms are given by Pierson and Vickle (1993). A field coding sheet for rating numerically the rockfall potential of a slope is shown in **APPENDIX A**. The
parameters, height of slope, ditch effectiveness, average vehicle risk, sight distance, roadway width, block size, and rockfall history are quantities that may be measured fairly objectively. In Kentucky, the climate across the state is fairly uniform, that is, temperature and rainfall are essentially the same across the state. Therefore, eight of the nine parameters can be evaluated fairly objectively. Rating the geologic character of a rock slope is somewhat subjective. Generally, the conditions that cause rockfall fit into two categories, as noted by Pierson and Vickle. Case one sites are those where joints, bedding planes, or other discontinuities are the dominant structural features that lead to rockfall. Case two sites are those where differential erosion or over steepening is the dominant condition that controls rockfall. In examining each of these parameters devised by Pierson and Vickle, it appeared that this system was readily adaptable to rock slope conditions in Kentucky.

**Rated Highway Rock Slopes in Kentucky**

To test the reliability of the system devised by Pierson and Vickle and to develop firsthand experience with this rockfall rating system, several highway routes containing numerous rock slopes were selected. Additionally, a large of number of slopes was selected in an attempt to obtain an indication of the range of numerical values of rock slopes in Kentucky. The highway routes selected for some potential rockfall ratings included all interstates passing through Kentucky, parkways, most primary routes, and some secondary routes. Not all secondary routes were surveyed because this task was beyond the scope of this study.

Two teams of college students were used to perform the ratings. These students included three civil engineering students (Sophomores and Juniors) and a nontechnical student. Each team member had completed at least one college course in basic geology. Each team was trained for two weeks by a registered (PG) professional geologist. Several slopes were initially rated by the two teams under the auspices of the

![Figure 12. Total number of observed slopes and percentages of slopes identified as “A”, “B”, and “C”.](image)
professional geologist.

As of June of 1995, some 5,270 rock cut slopes were rated by the two teams of students. Results of the preliminary survey of the 5,270 rock slopes are illustrated in Figure 12. Some 72.6 percent of the slopes were classified as “C” slopes while some 24.0 percent were classified as “B” slopes. Only 181 of the 5,270 slopes were classified as “A” slopes.

As shown in Figure 13, the majority (about 90 percent) of all slopes classified as “A” and “B” were located in the portion of Kentucky located east of Interstate 75—mainly the mountainous areas of eastern Kentucky. Only about 10 percent of the “A” and “B” slopes were located west of Interstate 75.

Distribution of the “A” and “B” slopes according to the highway districts of Kentucky is shown in Figures 14 and 15. Basically, the rock slope problems in Kentucky are concentrated in Highway Districts numbered 7 through 12. About 99 percent of the problem rock slopes are located in Highway Districts 7, 8, 9,
10, 11, and 12. Approximately one-third of the most hazardous slopes were located in District 12.

Numerical hazardous rating scores of 181 slopes initially assigned to the “A” category and 36 slopes initially labeled “B” are shown in Figure 16. Scores of the slopes initially identified as “A” ranged from 239 to 664. A listing of the slopes identified as “A” is given in APPENDIX B. Detailed RHRS coding sheets of the 181 slopes are given in APPENDIX C. The RHRS scores of the majority of the slopes initially identified as “A” slopes were equal to or greater than 350 (85th percentile test

Figure 15. Highway District Percentages of slopes identified as “A”

Figure 16. Detailed numerical scores of 181 “A” slopes and about 36 slopes identified as “B”.
value), as shown in Figure 17. For the 36 slopes initially identified as "B," the RHRS scores ranged from about 228 to 438, as shown in Figure 18. At the 22\textsuperscript{nd} percentile test value (RHRS score), the score was about 350. That is, 78 percent of the slopes identified as "B" could be expected to score below 350. Therefore, in the majority of cases, "A" could be expected to score above 350 while a "B" could be expected to score below 350.

Figure 17. Percentile test value as a function of the numerical values of slopes initially identified as "A" slopes.

Figure 18. Percentile test value as a function of numerical values of slopes identified initially as "B".
Geological Character of Rated Rock Cut Slopes

One of the parameters used in establishing a numerical rating of a rock cut slope is the geological character of the rock formations in the rock cut. In the RHR system, the geological character is predominantly described as a structural problem, or a differential weathering problem. In the slopes where detailed ratings were obtained, structural condition--unfavorable jointing and fracturing--was predominantly the major feature causing instability in about 60 percent of the rated slopes. In 40 percent of the observed cases, the primary cause of instability was differential weathering--a condition where a softer layer was eroding much faster than a harder layer founded on top of the weaker layer. In many cases, both structural conditions were present.

Because many cut slopes in Kentucky contain rock layers of different engineering properties, which leads to differential weathering, and considering that many formations are jointed and fractured, the use of continuous slopes in Kentucky may be limited to the situations listed above on page 11. For example, the use of a continuous slope, as illustrated in Figure 11, in situations where rock formations are highly susceptible to different erosional rates would lead frequently to the situation depicted in Figure 20.
CASE HISTORIES

Rockfall Computer Simulation Analysis

Data entry parameters

The analyses of several rockfall case histories described below were performed using the Colorado Rockfall Simulation Program--CRSP-- (Pfeiffer and Bowen, 1989). In performing rockfall analysis using this rockfall computer simulation program, four types of data input are required. These include a slope profile (line segments called cells), an estimation of the roughness of the slope profile within each cell, coefficients that portray the frictional and elastic properties of the slope, and the size, shape, and the starting location of the rocks involved in the rockfall. Rockfall is influenced by slope geometry, slope properties, rock geometry, and rock materials properties (Ritchie, 1963). Details of this program are given by Pfeiffer (1993).

The surface roughness is defined as the perpendicular variation of the slope within a slope distance equal to the radius of the rock, as shown in the left portion of Figure 21. The maximum allowable variation in the slope angle ($\theta_{\text{max}}$) is defined as:

\[
\theta_{\text{max}} = \tan^{-1}(S/R)
\]

The impact angle is a function of rock trajectory, slope angle, and slope variation, as shown in Figure 21. According to Pfeiffer (1993), the surface roughness may be...
obtained by stretching a string parallel to the slope and measuring the distance to the slope perpendicular to the string, as shown in Figures 21 and 22. If cells, or areas of the slope that contain uniform conditions, are inaccessible, then surface roughness for each cell is estimated. If more than one size of rock is being considered in the analysis, then different surface roughness values must be measured, or estimated. Other data that may be entered into the program include the tangential and normal coefficients. The tangential coefficient is dependent on the vegetation on the slope and the slope material. Values of this coefficient, as suggested by Pfeiffer (1993), range from 0.7 (a brush-covered slope) to a high value of 0.90 (a smooth hard surface, such as a pavement or smooth bedrock). The normal coefficient is a function of the rigidity of the slope surface. Suggested values range from a low of 0.25 (a soft soil slope) to a high of 0.4 (a smooth hard surface, such as a pavement). Various categories of these coefficients are given by Pfeiffer (1993).

**Sensitivity analysis**

To obtain some indication of the effect of surface roughness, the tangential coefficient, and the normal coefficient on the percentage of rock that could enter a roadway, the example slope shown in Figure 23 was analyzed. The normal coefficient was ranged from a value of 0.25 to 0.40. The value of the tangential coefficient was ranged from about 0.70 to 0.90. The surface roughness coefficient was varied from a value that was slightly larger than zero to one. Results of this analysis are shown in Figure 24. The percentage of rockfall that moves beyond the point of analysis ranges from about 5 percent to 51 percent when values of surface roughness are ranged from about zero to one. When the surface roughness is equal to or greater than 0.5, the percentages of rock going beyond the point of analysis ranges from only five to 16. In this case, the slope is approaching a rough condition. However, when the surface roughness is less than, or equal to 0.5-- the slope is approaching a smooth condition-- the percentages
of rock reaching beyond the point of analysis ranges from about nine to 51. Therefore, for this condition, the percentage of rock reaching the roadway is very dependent on the value of surface roughness. At any selected value of surface roughness, and for values of tangential and normal coefficients ranging from the minimum to maximum suggested values, the difference in percentages of rock reaching beyond the point of analysis does not exceed a value of 12. When the surface roughness is equal to, or greater than 0.5, the percentage difference is equal to, or less than, about five. Therefore, variation in the coefficients has a small effect on the percentage of rock going beyond the point of analysis.
Rockfall Sites

**KY Route 1098 Breathitt County**

A hazardous slope (Figure 25) near mile marker 0.25 on KY Route 1098 in Breathitt County was rated in June 1994. The total score for the rating was 664, making it the highest rated slope in the state using the Rockfall Hazard Rating System (RHRS). This slope was also selected by District Operations’ personnel as the most hazardous slope in District 10. Cross sections were submitted to the University of Kentucky Transportation Center for rockfall computer simulation analysis. The Study Advisory Committee of the Kentucky Transportation Cabinet had previously recommended that the mountainous Highway Districts submit dangerous rock slopes for analyses. The slope consisted of interbedded shale, siltstone, and coal reaching from the ditch line to a height of approximately 12.2 m (40 ft). Above the interbedded layers was a thick sandstone unit—approximately 15.2 m (50 ft). Differential weathering of the interbedded shale, siltstone, and coal caused the more resistant sandstone unit to overhang. As seen in Figure 25, the sandstone was situated directly above the eastbound driving lane.

![Rock slope, KY Route 1098, Breathitt County, before failure in November 1994.](image)

Analysis of the slope using the Colorado Rockfall Simulation Program (CRSP) showed that all rocks falling from the sandstone unit would reach the roadway as shown in Figure 26. In those analyses, the diameters of the falling rocks were assumed to be 0.3, 0.6, and 1.6 m (1, 2, and 5 ft), respectively. Results of additional analyses of various design scenarios are shown in Table 2. Also, the shapes of the rocks were assumed to be spherical. The bench in the analysis represents a distance at the base of the sandstone unit.
A large failure, as shown in Figure 27, occurred on November 24, 1994 at approximately 7:40 A.M. and blocked both lanes of the two-lane roadway. Large blocks measuring up to 3.0 m (10 ft) long and 0.9 m (3 ft) thick of the overhanging sandstone fell entirely and blocked the roadway. The fall was heard by personnel at the county maintenance headquarters located across the valley from the site. Operations' personnel immediately went to the site to investigate. Upon arrival at the site, an additional fall occurred just before cleanup operations began. A large amount of rock was still hanging over the roadway after the

**Table 2. Results of rockfall simulations for KY Route 1098, Breathitt County.**

<table>
<thead>
<tr>
<th>Remedial Measure</th>
<th>Percent of Rocks Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5 m (5 ft) Diameter</td>
</tr>
<tr>
<td>Original Slope</td>
<td>100</td>
</tr>
<tr>
<td>6.1 m (20 ft) Bench</td>
<td>76.0</td>
</tr>
<tr>
<td>12.2 m (40 ft) Bench</td>
<td>97.5</td>
</tr>
<tr>
<td>9.1 m (30 ft) Bench with 3.0 m (10 ft) drop zone and a Jersey Barrier</td>
<td>99.3</td>
</tr>
<tr>
<td>9.1 m (30 ft) Bench with 3.0 m (10 ft) drop zone. No Jersey Barrier</td>
<td>19.1</td>
</tr>
</tbody>
</table>

falls. Joints and tension cracks in the rock unit indicated more falls were likely to occur. An emergency cleanup and slope restoration contract was required to clear the roadway and repair the slope. Cost of the repairs exceeded $100,000 and the road was closed for several days. Repairs were completed in early January 1995.
A view of the repaired slope is shown in Figure 28. Rockfall computer simulation analyses of the repaired slope show that no 0.3-m (1-ft) diameter rocks will fall into the traffic lanes. This analysis is based on dropping 500 rocks from the top of the slope. If the diameters of the falling rocks are assumed to be 0.6 m (2 ft), then 1.6 percent of 500 falling rocks of that size would enter the roadway. When the diameters of the falling rocks are assumed to be 1.5 m (5 ft), 2.6 percent of the assumed number of falling rocks enter the roadway. Cross sections of the original and repaired slopes are compared in figure 29.
Figure 29. Comparison of the original and reconstructed cross sections at Station 1 + 39, KY 1098, Breathitt County.

Figure 30. Existing profile of slope at Station 48 + 50, KY Route 32, Rowan County.

**KY Route 32 Rowan County**

A cross section of a rock cut, Figure 30, near mile marker 6.2 on KY Route 32 and located between I-64 and downtown Morehead, was submitted for analysis by personnel of Highway District 9. The cross section selected for analysis was located at station 48+50. The slope was rated using the
Rockfall Hazardous Rating System by Transportation Center personnel in August 1994. The RHRS score of the slope was 454.

Geology of the slope consisted of interbedded shale and siltstone. Weathering of the shale, as shown in Figure 31, allows the more durable siltstone to overhang and eventually fail.

Two mitigation measures were also submitted for analysis. Results of the rockfall computer simulation analysis, as shown in Figure 32, indicated that 5.8 percent of falling rocks, measuring 0.3 m (1 ft) in diameter, on the “as is” slope would reach the roadway. These analyses were based on an assumed value of 500 falling rocks. Constructing a concrete barrier at the edge of the pavement reduced the amount of rock reaching the roadway to 0.8 percent. The barrier created a catchment zone for the falling rocks. This approach is similar to the concept of a Ritchie (Ritchie 1963) catchment ditch. The addition of a 3-m (10-ft) fence on top of the barrier reduced the percent of falling rocks reaching the roadway to 0.1. The slope was mitigated with a concrete barrier as shown in Figures 33 and 34.

Figure 31. Slope analyzed on KY Route 32 before mitigation.

Figure 32. Results of rockfall computer simulation analysis.
US Route 119 Bell County (Varilla Hill)

A geotechnical investigation (Kentucky Transportation Cabinet, 1987) was performed at this site (Figure 35) in 1987 by the Geotechnical Branch, Division of Materials, Kentucky Transportation Cabinet to formulate rockfall mitigation designs. Design measures were performed for a stretch of roadway extending from Station 390 + 50 to 413 + 00 (686 m or 2,250 ft).

Bedrock in the slope consisted of shale layers founded below a sandstone unit. Differential weathering of the underlying shales and large joints in the sandstone contributed to large rockfall that impacted the highway. Forty-six joints, three areas with unstable wedges due to the intersection of joints and weathering of shales, four areas of unstable sandstone blocks due to jointing and undercutting, and 11 areas of slaking shales were identified in the report. The slope was rated by the Transportation Center in July 1994 and divided into three slopes for rating purposes. The slope at mile point 6.92 was scored 660 which ranked this slope as the second most hazardous highway rockfall site in Kentucky. At mile point 6.97, the rating was 638, and at mile point 7.16, the rating was 570. These two slopes ranked 7th and 24th, respectively, statewide.
The geotechnical report, and three critical cross sections at stations 398+00 (Figure 36), 402+50 (Figure 37), and 410+00 (Figure 38), were submitted to the Transportation Center by District 11 officials for analysis. The following four alternatives and estimated 1987 costs were proposed in the geotechnical report conducted by the Transportation Cabinet to mitigate the rockfall problem:

1. Redesign the entire cut. $3,148,367
2. Shift the alignment to create a rockfall area. $1,853,856
3. Partial redesign with trimming and scaling $968,557
4. Install a warning system $25,000

Alternative number 1 specified a reconstruction of the slope using 5.5- and 6.1-m (18- and 20-ft) wide benches, which were to be located at the base of the unstable sandstone units. A 3-m (10-ft) shoulder and a 4.3-m (14-ft) ditch to collect fallen rocks also was included in the plan. The second proposed alternative consisted of shifting the highway 14.3 m (47 ft) right by constructing five retaining walls in existing drains and excavating material on the right side. A 4.6-m (15-ft) barrier wall would be constructed from station 393+00 to 411+00 creating a fallout zone. Sandstone caps located between stations 395+00 to 399+50 would be removed. An intermediate bench, stretching from station 408+50 to 410+50 at the base of the sandstone, would be constructed. Trimming and scaling of loose material throughout the cut were also recommended. This solution would provide a new roadway with passing lanes, shoulders, and a 12.2-m (40-ft) fall-out zone.

The third proposed alternative was a combination of a partial redesign of the slope and trimming and scaling of the slope. The upper sandstone unit would be removed between the following stations and elevations:
- 395+00 to 396+50 Elevation 378.9 - 394.1 m (1243 - 1293 ft)
- 397+00 to 399+50 Elevation 386.8 - 401.7 m (1269 - 1318 ft)
- 401+50 to 403+50 Elevation 387.7 - 424.6 m (1272 - 1393 ft)
- 404+50 to 406+50 Elevation 395.3 - 424.9 m (1297 - 1394 ft)
- 408+50 to 410+50 Elevation 395.6 - 424.3 m (1298 - 1392 ft)

Figure 36. Cross sections of original slope and slopes of alternative plans identified as numbers one, two, and three, Station 398+00, US 119, Bell County.
Figure 37. Cross sections of the original slope and slopes of alternative plans identified as numbers one, two, and three, station 402+50, US 119, Bell County.
Figure 38. Cross sections of original slope and slopes of alternative plans identified as numbers one, two, and three, Station 410+00, US 119, Bell County.
Any unstable wedges caused by intersecting joints and potential shale failures would be removed. The lower sandstone unit would be scaled, trimmed, and blasted. In this alternate solution, no fallout zone is provided. This plan is more of a temporary solution to minimize immediate hazards of falling rocks.

A fourth proposed alternative consisted of the erection of lights and signs which would warn the traveling public of the occurrence of rock and debris in the roadway. This solution requires motorists to assume some responsibility for traveling the area safely.

Analyses using CRSP were performed to evaluate the original slope and the first three alternative mitigation measures. As seen graphically in Figures 39, 40, and 41 and in Table 3, design alternative number 2 prevents all rocks from reaching the roadway.
Table 3. Results of rockfall simulations for US Route 119, Bell County.

<table>
<thead>
<tr>
<th>Station</th>
<th>Design</th>
<th>Percent of Rocks Reaching the Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternate</td>
<td>Rock Diameter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.2 m(0.5ft)</td>
</tr>
<tr>
<td>398+50</td>
<td>Original</td>
<td>74.8</td>
</tr>
<tr>
<td></td>
<td>Alternate #1</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #2</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #3</td>
<td>1.3</td>
</tr>
<tr>
<td>402+50</td>
<td>Original</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #1</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #2</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #3</td>
<td>0.2</td>
</tr>
<tr>
<td>410+00</td>
<td>Original</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #1</td>
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</tr>
<tr>
<td></td>
<td>Alternate #2</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Alternate #3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

In February 1995, a large failure occurred in the upper sandstone unit. A contract was issued to remove the remaining unstable blocks of sandstone near the top of the cut between approximate stations 394 +50 to 396+50 and 397+00 to 399+00. The cost for removing the sandstone and repairing the roadway was approximately $250,000.

This emergency repair work was similar to the proposed alternative number 3. As shown in figures 36 through 38, the rockfall computer simulation analyses show that if additional rock falls in the future, then some of this rock, potentially, may enter the roadway. However, the work performed at the site during the emergency was limited because sufficient funding was not available to execute more appropriate plans. More corrective actions may be required in the future at this site and close monitoring of this situation will be required.
KY 1426 Pike County

A cut extending from mile marker 6.03 to 6.24 (Figure 42) on State Route 1426 (Old US Route 23) in Pikeville was selected by District 12 personnel to rate during the RHRS training seminar held in Pikeville in May 1994. Several incidents of rockfall had previously occurred at the site including one in 1979 and one in June 1983 when claims were filed against the Transportation Cabinet.

The slope was rated and scored 606 (ranked 13th in the state for the highest score). The predominant cause of large rockfall is the differential weathering of shale beneath a more resistant sandstone unit. Jointing in the sandstone unit increases the chances for failure.

Many small falls occur almost constantly. Rocks are removed semimonthly to weekly, depending on weather conditions, from the site.

Shotcreting of the shale located beneath the sandstone was one suggested, mitigation method. This technique would reduce further differential erosion provided adequate drainage is installed to insure a good bond between the shotcrete and shale. Adequate drainage would be installed and any loose material scaled before installation of shotcrete. However, to date, sufficient funding was not available to implement this plan.

KY Route 1274 Menifee County

Seven slopes along route 1274 in Menifee County were rated by the Transportation Center in June 1994. The ratings were performed after discussions with District Operations' personnel noted that daily checks were conducted to monitor falling rocks.
at this location. RHRS scores ranged from a high of 605 (14th statewide) to 477 (66th). Five slopes ranged from 467 to 352 (75th to 161st). Twenty-six additional slopes (11 in Rowan County) have been identified as “B” slopes along this route. A “B” rating means the potential for rockfall exists but not to the degree of an “A” slope. The “B” slopes along this route were not given detailed (scored) ratings during the study.

Most of the falling rocks are due to differential erosion between shale and siltstone units, and along fractures, as shown in Figure 43. The fractures are present in cut sections throughout the length of the roadway, which indicates that over blasting occurred during construction. The cuts are nearly vertical with very small fallout areas.

Arrangements were made through the Transportation Cabinet to perform rockfall computer simulation analyses on four cut sections being designed to mitigate rockfall problems. Critical sections of the cuts were located at stations 138+00, 142+00, 170+00, and 179+00 (Figures 44 through 47). The mitigation measure consisted of relocating

Figure 43. Differential weathering and joints of a rock cut on KY Route 1274, Menifee County, in December 1994.

Figure 44. Original and design cross sections of KY Route 1274, Station 138+00.
the existing alignment 7.3 m (24 ft) right to create a fallout zone. The slope at station 170+00 was designed with a Brugg® impact fence (Figure 48) in addition to the realignment. An impact fence is designed to prevent falling rocks from entering the roadway by using a cable braking system. As falling rocks impact the fence, large cables with loops for braking, located in the top and bottom of the fence, allow the fence to flex. When the loops in the cables fully tighten, the cables act as a brake to stop the fence and rock from moving further. A large amount of energy created by the falling rocks is absorbed when the fence flexes.

Results of rockfall simulation analysis are shown in Figures 49 through 52 and Table 4. Shifting the alignment reduced the
percentage of falling rocks reaching the roadway to zero at three sites without an impact fence. The addition of an impact fence further reduced the percentage of falling rocks reaching the highway to zero and 0.04, respectively, for 0.3-m (1-ft) and 0.6-m (2-ft) diameter rocks.

A contract was awarded in October 1995 to realign the roadway and install approximately 152.4 m (500 linear feet) of impact fence at the cut near station 170+00. Installation of the impact fence is expected in the summer of 1996.
Table 4. Results of rockfall simulations for KY Route 1274, Menifee County

<table>
<thead>
<tr>
<th>Station Number</th>
<th>Percent of Falling Rocks Reaching Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&quot;As Is&quot; Section</td>
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<tr>
<td></td>
<td>0.3 m (1 ft)</td>
</tr>
<tr>
<td>138+00</td>
<td>15.6</td>
</tr>
<tr>
<td>142+00</td>
<td>1.8</td>
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<tr>
<td>170+00 with Brugg® Fence</td>
<td>21.2</td>
</tr>
<tr>
<td>170+00 without Brugg® Fence</td>
<td>21.2</td>
</tr>
<tr>
<td>179+00</td>
<td>4.4</td>
</tr>
</tbody>
</table>

Figure 51. Computer rockfall simulation results, station 170 + 00.

Figure 52. Computer rockfall simulation results, Station 179 + 00.
Interstate Route 64 Franklin County

The Kentucky Transportation Center was requested to perform computer rockfall simulations on slopes being designed for reconstruction of I-64 in Franklin County. In the proposed plan, the number of lanes of this route will be increased from four to six. Ten slopes had previously been rated by Center personnel. Two of the ten slopes had previously been identified as “A” slopes. The other eight slopes had been identified as “B” slopes. Detailed numerical rating scores of the ten slopes ranged from 406 to 239 (statewide rankings of 119th to 213th). An additional 39 “B” slopes were identified along I-64 in Franklin County but those slopes were not rated. Original and design cross sections at three stations, identified as 102+300, 104+820, and 104+880 (in meters), were submitted for rockfall computer simulation analyses.

In the rockfall computer simulation analyses, different slope configurations were evaluated at Stations 101+580 and 102+300. At Station 101+580, analyses were performed on the existing slope and a continuous slope, as illustrated in Figures 53 and 54, respectively. Results of these analyses are shown in Figure 55. Some 24 and 45 percent, respectively, of rocks of 0.30-m (1-ft) and 0.61-m (2-ft) diameters reach the roadway, according to the computer simulation analyses. When a continuous slope is used, some seven and 53 percent of the rockfall, respectively, reach the roadway.
In Figures 56 through 58, different slope configurations of Station 102+300 are shown. The intent of the different design analyses at this station was to determine the benefits of using intermediate benching. The existing slope configuration at Station 102 +300 (a left-hand side) is shown in Figure 56. A continuous slope design is illustrated in Figure 57. A benched slope design is considered in Figure 58. Results of the rockfall computer simulation analyses of the three different slope configurations are shown in Figure 59. In these analyses, spherical rocks, which had diameters of 0.30 m (1 ft) and 0.61 m (2 ft), were used. Also, in the analyses, some 500 rocks were dropped. The analyses show that some 23 and 31 percent, respectively, of 500 dropped rocks of 0.30-m (1-ft) and 0.61-m (2-ft) diameters would enter the roadway of the existing slope. When the configuration of the slope is continuous, some 17 and 73 percent of the 0.30-m (1-ft) and 0.61-m (2-ft) diameter rocks, respectively, would enter the roadway. However, when the slope is benched, as shown in Figure 59, no rocks enter the roadway.
Rockfall computer simulation analyses of benched sections at Stations 104+820 and 104+880 were also performed. Original and design sections at those two locations are shown in Figures 60 through 63, respectively. Results of the computer analyses of the design cuts are shown in Figures 64 and 65 and in Table 5. At Station 104 + 820, the percentage of rock entering the roadway was zero for the three different sizes of rock.
Table 5. Results of rockfall simulations for I-64, Franklin County.

<table>
<thead>
<tr>
<th>Station</th>
<th>Diameter</th>
<th>Percent of Falling Rocks Reaching the Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.15 m (0.5 ft)</td>
<td>0.3 m (1 ft)</td>
</tr>
<tr>
<td>102+300 R</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>104+820 R</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>104+880 R</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Filled Ditches and Benches

When highway ditches become filled with fallen rock, or when rock debris accumulates on benches of rock cut slopes, the rock debris may act as a launching pad for rock that may fall in the future. To illustrate these conditions, a slope was analyzed using the rockfall simulation program. Four cases were analyzed, as shown in Figure 66. In the first case, a clean slope was considered while in the second case, the ditch founded at the toe of the slope, was assumed to be filled. In the third case, the bench of the slope was assumed to be filled. In the fourth case, the bench and ditch were assumed to be filled. Results of the analyses are shown in Figure 67. When the slope is clean and no rock debris is present, no rocks enter the roadway. When the ditch fills, about 2
percent of the dropped rocks enter the roadway. If the bench fills with rock debris, then some 17 percent of the dropped rocks enter the roadway. When both the bench and ditch become filled with rock debris, then about 19 percent of the dropped rocks enter the roadway. This case study illustrates the need to keep ditches and benches clean of rock debris. Otherwise, the accumulated debris acts as launching pads for future rockfall.

Figure 66. Cross sections used to illustrate the effects of ditches and benches filled with rock debris.

Figure 67. Cross sections used in the rockfall computer simulation analysis to illustrate the effects of rock debris-filled ditches and benches.
Analysis of Typical Design Slopes

Rockfall computer simulation analyses were performed to evaluate the general effectiveness of the typical cut slope configurations shown in the section on guidelines, Figures 5 through 9. The analyses were not performed for the slope shown in Figure 4 because the class III non-durable will tend to degrade fairly rapidly. In this case, vegetation will usually become established on the 2 horizontal to 1 vertical slope, which lessens the potential for rockfall. In those analyses, some 400 rocks were dropped--a very severe test. Surface roughness was assumed to be about 0.25--a very severe test value and one that treats all surfaces as fairly smooth. Results of the analyses for the different slopes are shown in Figures 68 and 69. In those analyses, three different sizes of spherical rocks were assumed. Rock
diameters of 0.15 m (0.5 ft), 0.30 m (1.0 ft), and 0.61 m (2 ft) were used. The percentages of different sizes of rock reaching beyond the point of analysis in cases involving classes I and II and the durable shales ranged from zero to 11. For the massive limestone, or sandstone cut slopes, the percentages ranged from 2.6 to 6.1.

Cylindrical-shaped rocks are considered in Figures 70 and 71. In those analyses, the diameters of the falling rocks were assumed to be 0.3 and 0.46 m (1 and 1.5 ft), respectively. Lengths of the cylindrical-shaped rocks were assumed to be 0.30 and 0.6 m (1 and 2 ft), respectively. Generally, except for the typical shaley limestone, or sandstone, cut slope, the percentages of rockfall moving beyond the point of analyses ranged from zero to about 11. For the shaley limestone, or sandstone, cut slopes, the percentage was about 27 for the larger rock. As these analyses indicate, the percentages of rockfall entering the roadway only begin to increase as the sizes of the rocks increase.
SUMMARY AND CONCLUSIONS

Based on extensive observations of rockfall and rockfall problems on Kentucky's highways, the following conclusions are made:

- Preliminary rockfall hazardous ratings of all rock cut slopes on the interstates, parkways, and most primary routes were performed. Some preliminary ratings were performed on some secondary routes. Some 5,270 slopes were observed. About 3.4 percent of these slopes were classified as "A" slopes and some 24 percent were classified as "B" slopes. Detailed rockfall hazardous ratings of all "A" slopes were obtained. Detailed ratings on some "B" slopes were obtained.

- The vast majority of rockfall and rockfall problems in Kentucky occur in counties located east of Interstate 75. Some ninety percent of highway rock cuts that were classified as "A" slopes and 88 percent that were classified as "B" slopes were found on roadways located east of Interstate 75.

- The average amount of a rockfall, or rockfall-related, claim filed with the Kentucky Board of Claims was about 157,000 dollars per year. This claim amount per year is believed to be exceptionally small because Kentucky is one of the few remaining states that retains sovereign immunity. Only about 22 of the rockfall claims are paid by Kentucky.

- Differential weathering and structural characteristics-- jointing and unfavorable orientations-- were the major causes of rockfall on Kentucky's highways. Rockfall occurs because rock slopes are subjected to freezing and thawing cycles, wetting and drying cycles, runoff over slopes, and differential erosion.

- The Rockfall Hazardous Rating System (RHRS) -- devised by Pierson and Vickle-- is a good system for rating the potential for rockfall at a given highway rock cut location. This system, when used statewide, can be very effective in identifying dangerous rockfall locations. Where repairs, or mitigation measures are needed, the rating system provides a very valuable means of developing a priority list. Moreover, the system provides uniformity in ranking the hazardous nature of rock slopes. During this study, two rock slopes that scored the top two highest scores-- over 660-- (out of some 5000 slopes) failed shortly after the slopes were rated using the RHRS system.
few mitigation measures have been used on Kentucky's highways. During this study, two locations where fences had been used as a mitigation measure were identified. At six sites, the so-called Ritchie ditch had been used. Near the end of this study, a concrete retaining structure was used at one site as a barrier, or containment, wall.

- For the sedimentary rock strata in Kentucky, benching of rock slopes is very effective in preventing, or mitigating, rockfall on Kentucky's highways. However, some consideration should be given to removing debris from slopes on occasions.

- Detailed scores, based on the RHR system, of potentially, hazardous highway rock slopes on interstates and parkways ranged from about 280 to 520.

**RECOMMENDATIONS**

The following recommendations are made:

- Preliminary ratings of all rock cut slopes on secondary routes under the jurisdiction of the Kentucky Transportation Cabinet should be performed.

- The Rockfall Hazardous Rating System should be implemented statewide. Whenever a rockfall occurs on a roadway under the jurisdiction of the Cabinet, the rock slope should be rated using the RHR System. Detail ratings on all slopes that classified as "B" should be completed. Also, all "A" and "B" slopes identified on secondary routes should be detailed rated. All rated slope data should be maintained, including updates, in a central file.

- The computer rockfall simulation program devised by Colorado engineers is a very powerful analytical tool for assessing the safety of existing rock slopes and newly designed rock slopes. This program is extremely useful in devising remedial and mitigating plans at rockfall sites. It is recommended that this program be used when analyzing problem rock slopes.

- There is a need to devise remedial, or mitigation, solutions for the most hazardous rock cut slopes identified in this study (see APPENDIX B). After these measures have been identified for each site, cost estimates
should be determined. Ratios of estimated cost of the remedial, or mitigation, measures for each site to the RHRS score of the site need to be determined. Using those ratios, a priority list can be devised.

- A permanent, highway rock slope risk management program should be established by the Kentucky Transportation Cabinet. To insure the success of this program, permanent funding should be established. Data in this program should be reviewed annually and updated when appropriate. All hazardous sites should be detail rated about every five years. (The establishment of a rockfall risk management system will provide the means to make good decisions on allocating funding for mitigating or repairing, rockfall problem sites. It will provide a proactive stance for the Cabinet and will provide some legal protection.)

- After cost estimates of remedial, or mitigation, measures of the most hazardous rock slopes and the establishment of a priority list has been made, the Cabinet should provide yearly funds for implementing rockfall mitigation and rock slope remedial measures. Money should be earmarked, or established, for the most hazardous sites. This may require making a request to the Kentucky Legislators for such funding. It should be noted that there are instances where several slopes that need repairs, or mitigation measures, could be grouped together under one contract. In these instances, savings in repair, or mitigation, costs could be realized.

- At all sites where remedial, or mitigating, measures have been used, the effectiveness of these measures should be monitored. Appropriate funding should be made available for this purpose.

- Appropriate measures should be established to monitor the effectiveness of Ritchie ditches.

- In using the Colorado rockfall computer simulation program, there is a need to check the coefficients -- used in the program -- of Kentucky rocks. Also, surface roughness for different situations should be evaluated. This would involve observing actual trajectories of rocks for different situations at selected sites.
ACKNOWLEDGMENTS

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Also, the authors express their appreciation to members of the Research Study Advisory Committee who participated at several committee meetings. These committee members were very enthusiastic and supportive of this research. They made several valuable suggestions during the study. Members of the committee were as follows:

- Earl Wright Chairperson, KY DOT, Division of Materials, Geotechnical Branch
- Richard Wilson KY DOT, Division of Materials, Geotechnical Branch
- Bill Pfalzer KY DOT, Division of Materials, Geotechnical Branch
- Henry Mathis Branch Manager, KY DOT, Division of Materials, Geotechnical Branch
- David Craft KY DOT, Division of Design
- Gary Kitchen Federal Highway Administration (FHWA), Frankfort, Ky
- Tom Jobe, Jr. KY DOT, District 4, Operations
- John Bowlin Branch Manager, District 12, KY DOT
- Denton Biliter Chief District Engineer, District 12, KY DOT
- Charles Reichenbach Branch Manager, District 12, Preconstruction, KY DOT
- John Cornett Branch Manager, District 11, Construction, KY DOT
- Jack Young Assistant Chief District Engineer, District 11, KY DOT
- Mark Wireman Branch Manager, District 10, Operations, KY DOT
- Doyle Hicks Branch Manager, District 9, Preconstruction, KY DOT
- J. B. Keith Chief District Engineer, District 9, KY DOT
- Ron Rister KY DOT, Central Office, Operations

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REFERENCES


Hopkins, T.C.; (January 1988), *Shear Strength of Compacted Shales*, University of Kentucky Transportation Center, College of Engineering, Research Report UKTRP-88-1.


APPENDIX A

Rockfall Hazardous Rating System
Coding Forms
# RHRS Field Data Sheet

<table>
<thead>
<tr>
<th>Highway No.</th>
<th>Beginning Milepost</th>
<th>L / R</th>
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<th>Date</th>
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<th>Rated By</th>
<th>Class</th>
<th>ADT</th>
<th>Update</th>
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</table>

## CATEGORY

<table>
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<th>CATEGORY</th>
<th>REMARKS</th>
<th>CATEGORY SCORE</th>
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<tr>
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</tr>
<tr>
<td>Ditch Effectiveness</td>
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<td>Average Vehicle Risk</td>
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<td>Sight Distance</td>
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<tr>
<td>Percent Decision Site Distance</td>
<td>%</td>
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<tr>
<td>Roadway Width</td>
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</table>

### Geologic Character

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<td>Structural Condition</td>
<td>Structural Condition</td>
</tr>
<tr>
<td>Rock Friction</td>
<td>Rock Friction</td>
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<tr>
<td>Differential Erosional Features</td>
<td>Differential Erosional Features</td>
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<td>Difference in Erosional Rates</td>
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<tr>
<td>Rockfall History</td>
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### Remarks:

- **Total Score**
**APPENDIX A - RHRS Numerical Coding Sheet**

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<th>Feet</th>
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**AVR Score**

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<th>%</th>
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<td>65</td>
<td>45</td>
<td>61</td>
<td>35</td>
<td>49</td>
</tr>
</tbody>
</table>

**Slope Height**

\[ X = \frac{(\sin\alpha)(\sin\beta)}{\sin(\alpha - \beta)} \]

**AVR(\%) = \frac{(100)(ADT/24)Slope Length (miles)}{Speed Limit}**

**Slope Height**

- H.I. = Height of Surveying Instrument.
- X = distance between angle measurements.
- A = Angle of Ditch
- B = Angle of Highway

**Table for Slope Height**

<table>
<thead>
<tr>
<th>Score</th>
<th>Code</th>
<th>Yr.</th>
<th>Score</th>
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**Where:**

- ADT = Average Daily Traffic
APPENDIX B

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Listing and Scores of "A" Rock Cut Slopes--APPENDIX B

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* Repairs were made after ratings due to slope failures.
** Portions of Route 1274 in Menifee County (County No. 83) have been relocated, some slopes have been reconstructed and a rockfall impact fence has been constructed at one slope.
APPENDIX C

Rockfall Hazardous Rating System Sheets Showing Detailed Numerical Rating Scores of Slopes Identified as "A"
### Slope No. 1

- **HWY #:** 1098
- **DISTRICT #:** 10
- **COUNTY #:** 13
- **BMP:** 0.25
- **EMP:** 0.03
- **TOTAL SCORE:** 660
- **PRELIMINARY COST ESTIMATE:** $0
- **AVERAGE DAILY TRAFFIC:** 1650

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<tr>
<td><strong>Vehicle Risk Score:</strong></td>
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<td><strong>Width Score:</strong></td>
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**Remarks:**
- Average vehicle risk score 1. Percent of time:.
- AASHTO decision site distance score 100. Actual site distance (ft):.
- Width score 47. Actual width (ft):.

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE):**
- **(A) Structural Condition Score:** 0
- **Features:** Major fractures: 0
- **Orientations:**

**Remarks:**
- Structural condition score 0. Features: Major fractures: 0. Orientations:

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE):**
- **(A) Structural Condition Score:** 83
- **Features:** Sandstone/soft siltstone bedding
- **Rate:** Extreme

**Remarks:**
- Structural condition score 83. Features: Sandstone/soft siltstone bedding. Rate: Extreme.

**ADDITIONAL REMARKS AND COMMENTS:**
- Very dangerous slope.
- Overhangs above center line.

---

### Slope No. 2

- **HWY #:** U119
- **DISTRICT #:** 11
- **COUNTY #:** 7
- **BMP:** 6.92
- **EMP:** 6.95
- **TOTAL SCORE:** 660
- **PRELIMINARY COST ESTIMATE:** $0
- **AVERAGE DAILY TRAFFIC:** 5460

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<th>Factor</th>
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<td><strong>Width Score:</strong></td>
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**Remarks:**
- AASHTO decision site distance score 100. Actual site distance (ft):.
- Width score 5. Actual width (ft):

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE):**
- **(A) Structural Condition Score:** 0
- **Features:** Major fractures: 0
- **Orientations:**

**Remarks:**
- Structural condition score 0. Features: Major fractures: 0. Orientations:

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE):**
- **(A) Structural Condition Score:** 83
- **Features:** Major fractures: 0
- **Rate:** Extreme

**Remarks:**
- Structural condition score 83. Features: Major fractures: 0. Rate: Extreme.

**ADDITIONAL REMARKS AND COMMENTS:**
- Very dangerous slope.
- Overhangs above center line.

---
ROCKFALL HAZARD RATING SYSTEM

Slope No. 3

HWY #: 7 EMP: 0.00
DISTRICT #: 10 EMP: 0.24 SPEC. CASE. = "LAKESIDE DRIVE"
COUNTY #: 10
TOTAL SCORE: 656

DESIGN CODE: REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 270 POSTED SPEED LIMIT: 25

SLOPE HEIGHT SCORE: 81 ACTUAL HEIGHT (FT): 100

REMARKS:
- DITCH EFFECTIVENESS SCORE: 60 CATCHMENT: LIMITED
- ROCKS ON AND ACROSS ROAD
- AVERAGE VEHICLE RISK SCORE: 2 PERCENT OF TIME:
- AASHTO DECISION SITE DISTANCE SCORE: 62 ACTUAL SITE DISTANCE (FT): 0
- PERCENT OF LOW DESIGN VALUE: 45
- WIDTH SCORE: 62 ACTUAL WIDTH (FT): 22.0
- GELOGIC CHARACTER - CASE 1 (IF APPLICABLE)
  (A) STRUCTURAL CONDITION SCORE: 98 FRACTURES: CONTINUOUS
  ORIENTATIONS: ADVERSE
  REMARKS: 40 JOINTS
  (B) ROCKFRICTION SCORE: 85 DESCRIPTION: CLAY-SLICK
  REMARKS: 40 JOINTS WITH 2" CLAY INFILLING

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES: SOME
(B) DIFFERENCE IN EROSION RATES SCORE: 0 RATE: LARGE
- BLOCK SIZE/QUANTITY SCORE: 100 BLOCK SIZE: 10
- QUANTITY OF MATERIAL (CU YDS): 5
- CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27 PRECIPITATION: FREEZING PERIODS:
- PRESENCE OF WATER ON SLOPE:
- ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE: CONSTANT
- ADDITIONAL REMARKS AND COMMENTS:
  >>> ENTIRE ROAD BLOCKED BY FALL LAST YEAR
  >>> ROAD MANGLED BY PAST FALLS

>>>

Slope No. 4

HWY #: 80 EMP: 12.80
DISTRICT #: 12 EMP: 12.80 SPEC. CASE. = EAST
COUNTY #: 36
TOTAL SCORE: 654

DESIGN CODE: REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 14300 POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0

REMARKS:
- DITCH EFFECTIVENESS SCORE: 81 CATCHMENT: LIMITED
- AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 216
- AASHTO DECISION SITE DISTANCE SCORE: 3 ACTUAL SITE DISTANCE (FT): 875
- PERCENT OF LOW DESIGN VALUE: 100
- WIDTH SCORE: 1 ACTUAL WIDTH (FT): 82.0
- GELOGIC CHARACTER - CASE 1 (IF APPLICABLE)
  (A) STRUCTURAL CONDITION SCORE: 81 FEATURES: SOME
  REMARKS: 40 JOINTS
  (B) ROCKFRICTION SCORE: 27 DESCRIPTION: CLAY-SLICK
  REMARKS: 40 JOINTS WITH 2" CLAY INFILLING

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 70 FEATURES: SOME
(B) DIFFERENCE IN EROSION RATES SCORE: 68 RATE: LARGE
- BLOCK SIZE/QUANTITY SCORE: 63 BLOCK SIZE: 10
- QUANTITY OF MATERIAL (CU YDS): 8
- CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION: FREEZING PERIODS:
- SOME
- PRESENCE OF WATER ON SLOPE: INTERMITTANT
- ROCKFALL HISTORY SCORE: 70 FALL OCCURRENCE: MANY
- ADDITIONAL REMARKS AND COMMENTS:
  >>> A LARGE NUMBER OF ROCKS WERE IN THE MEDIAN. THEY
  >>> WERE NOT GOAT BUT MATERIAL THAT MATCHED WHAT COULD
  >>> BE FOUND ON THE SLOPE.
ROCKFALL HAZARD RATING SYSTEM

Slope No. 5

HWY #: 15  BMP: 14.60  L OF CENTERLINE
DISTRICT #: 10  SPEC. CASE:  = SOUTH
COUNTY #: 53
TOTAL SCORE: 641
REPAIR CODE:  0
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 1540
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (ft): 0
DITCH EFFECTIVENESS SCORE: 53
CATCHMENT:  
AVERAGE Vehicle Risk Score: 100
PERCENT OF TIME:  
AASHTO Decision Site Distance Score: 16
ACTUAL SITE DISTANCE (ft): 587
PERCENT OF LOW DESIGN VALUE: 67
WIDTH SCORE: 47
ACTUAL WIDTH (ft): 24.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:  
ORIENTATIONS:  
REMARKS:  
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:  
REMARKS:  

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85  FEATURES:  
REMARKS:  
(B) DIFFERENCE IN EROSION RATES SCORE: 61  RATE:  
REMARKS:  

BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE:  
QUANTITY OF MATERIAL (CU YDS): 11
REMARKS:  
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:  
FREEZING PERIODS:  
PRESENCE OF WATER ON SLOPE:  
REMARKS:  
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:  
REMARKS:  
ADDITIONAL REMARKS AND COMMENTS:  

Slope No. 6

HWY #: 80  BMP: 1.10  R OF CENTERLINE
DISTRICT #: 12  SPEC. CASE:  = EAST
COUNTY #: 60
TOTAL SCORE: 641
REPAIR CODE:  0
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 4150
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (ft): 0
DITCH EFFECTIVENESS SCORE: 55
CATCHMENT:  
AVERAGE Vehicle Risk Score: 100
PERCENT OF TIME: 121
AASHTO Decision Site Distance Score: 47
ACTUAL SITE DISTANCE (ft): 440
PERCENT OF LOW DESIGN VALUE: 50
WIDTH SCORE: 1
ACTUAL WIDTH (ft): 82.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:  
ORIENTATIONS:  
REMARKS:  
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:  
REMARKS:  

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85  FEATURES:  
REMARKS:  
(B) DIFFERENCE IN EROSION RATES SCORE: 61  RATE:  
REMARKS:  

BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE:  
QUANTITY OF MATERIAL (CU YDS): 8
REMARKS:  
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:  
FREEZING PERIODS:  
PRESENCE OF WATER ON SLOPE:  
REMARKS:  
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:  
REMARKS:  
ADDITIONAL REMARKS AND COMMENTS:  

APPENDIX C - R-HRS Scores
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<td>GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
<td>GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
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<td>(A) STRUCTURAL CONDITION SCORE: 81</td>
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<td>FEATURES: MAJOR</td>
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<td>(B) DIFFERENCE IN EROSION RATES SCORE: 61</td>
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<tr>
<td>RATE: LARGE</td>
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<td>PRESENCE OF WATER ON SLOPE:</td>
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<td>ROADS AT GORILLA HILL</td>
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</tbody>
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Slope No. 7

Slope No. 8
ROCKFALL HAZARD RATING SYSTEM

Slope No. 9

HWY #: U127  BMP: 1.25  L OF CENTERLINE
DISTRICT #: 8  EMP: 1.30 SPEC. CASE.  = EAST
COUNTY #: 104  TOTAL SCORE: 815  RATE DATE: 07/13/93  RATER: FARMER
DESIGN CODE: PRELIMINARY COST ESTIMATE:$ 0  REPAIR CODE: CUT CLASS: A
AVERAGE DAILY TRAFFIC: 1350  POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
REMARKS: GREATER THAN 105 FEET
DITCH EFFECTIVENESS SCORE: 38  CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 3  PERCENT OF TIME: 91
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100  ACTUAL SITE DISTANCE (FT): 138
PERCENT OF LOW DESIGN VALUE: 15
REMARKS:
WIDTH SCORE: 62  ACTUAL WIDTH (FT): 22.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 80  FRATURES:
ORIENTATIONS:
REMARKS:

(B) ROCK FRICTION SCORE: 81  DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) DIFFERENCE IN EROSION RATES SCORE: 60  RATE: LARGE
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:

BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE: 4
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: MODERATE  FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTENT
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: COMMON
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> SHOULDERS IN BAD CONDITION, LARGE SECTIONS LEANING
>>> TOWARDS ROAD.
>>>
### Slope No. 11

- **HWY #:** 15  **BMP:** 2.70  **L OF CENTERLINE = EAST
- **DISTRICT #:** 10  **EMP:** 2.90  **SPEC. CASE. = SOUTH
- **COUNTY #:** 26  **TOTAL SCORE:** 612  **RATER:** FARERMAN/ANDERSON
- **DEISGN CODE:** REPAIR CODE: CUT CLASS: A
- **PRELIMINARY COST ESTIMATE:** $2.20  **POSTED SPEED LIMIT:** 55
- **TOTAL SCORE:** 612  **DESIGN CODE:** RATE
- **DATE:** 06/16/93  **RATER:** FAA EMER!ANDERSON
- **REPAIR CODE:** 0  **CUT CLASS:** A
- **PRELIMINARY COST ESTIMATE:** $2.20  **AVERAGE DAILY TRAFFIC:** 2160
- **SLOPE HEIGHT SCORE:** 9  **ACTUAL HEIGHT (FT):** 51
- **REMARKS:** DITCH EFFECTIVENESS SCORE: MEDIUM  CATCHMENT: MODERATE
- **REMARKS:** RACK ON OTHER SIDE OF THE ROADWAY, FULL DITCH
- **AVERAGE VEHICLE RISK SCORE:** 4  **PERCENT OF TIME:** 33
- **REMARKS:** AASHTO DECISION SITE DISTANCE SCORE: 100  **ACTUAL SITE DISTANCE (FT):** 321
- **PERCENT OF LOW DESIGN VALUE:** 37
- **WIDTH SCORE:** 8  **ACTUAL WIDTH (FT):** 20.0
- **REMARKS:**

### Slope No. 12

- **HWY #:** 15  **BMP:** 21.70  **L OF CENTERLINE = SOUTH
- **DISTRICT #:** 10  **EMP:** 21.60  **SPEC. CASE. = EAST
- **COUNTY #:** 13  **TOTAL SCORE:** 606  **RATER:**
- **DEISGN CODE:** REPAIR CODE: CUT CLASS: A
- **PRELIMINARY COST ESTIMATE:** $0  **POSTED SPEED LIMIT:** 55
- **TOTAL SCORE:** 606  **DESIGN CODE:** RATE
- **DATE:** 06/16/93  **RATER:**
- **REPAIR CODE:** 0  **CUT CLASS:** A
- **PRELIMINARY COST ESTIMATE:** $0  **AVERAGE DAILY TRAFFIC:** 5370
- **SLOPE HEIGHT SCORE:** 100  **ACTUAL HEIGHT (FT):**
- **REMARKS:** DITCH EFFECTIVENESS SCORE: MODERATE  CATCHMENT: MODERATE
- **REMARKS:**
- **AVERAGE VEHICLE RISK SCORE:** 50  **PERCENT OF TIME:** 89
- **REMARKS:** AASHTO DECISION SITE DISTANCE SCORE: 96  **ACTUAL SITE DISTANCE (FT):** 321
- **PERCENT OF LOW DESIGN VALUE:** 37
- **WIDTH SCORE:** 8  **ACTUAL WIDTH (FT):** 37.0
- **REMARKS:**

### Geologic Character - Case 1 (If Applicable)

(A) **STRUCTURAL CONDITION SCORE:** 81  **FRACTURES:**

- **REMARKS:** ORIENTATIONS:

(B) **ROCK FRICTION SCORE:** 25  **DESCRIPTION:**

### Geologic Character - Case 2 (If Applicable)

(A) **STRUCTURAL CONDITION SCORE:** 81  **FEATURES:** CONT

(B) **DIFFERENCE IN EROSION RATES SCORE:** 81  **RATE:** LARGE

- **REMARKS:** CASE 2 CONTROLS FOR THIS SLOPE

### Additional Remarks and Comments

>>>
ROCKFALL HAZARD RATING SYSTEM

Slope No. 13

ROCKFALL HAZARD RATING SYSTEM

Slope No. 14

APPENDIX C - RHRIS Scores
ROCKFALL HAZARD RATING SYSTEM

Slope No. 15

HWY #: 80  BMP: 1.70  DISTRICT #: 12  COUNTY #: 60
TOTAL SCORE: 588  PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 4150

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 200
REMARKS:
DITCH EFFECTIVENESS SCORE: 39  CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 11  PERCENT OF TIME: 54
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 21  ACTUAL SITE DISTANCE (FT): 72
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FL): 82.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 80  FEATURES:
REMARKS:
(B) ROCK FRICTION SCORE: 78  DESCRIPTION: PLANER
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 80  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 50  RATE: CASE 1 CONTROLS FOR THIS SLOPE.
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 26  BLOCK SIZE: 2
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  FREEZING PERIODS: SOME
PRECIPTATION: MODERATE  PRECIPITATION: MODERATE
REMARKS:
ROCKFALL HISTORY SCORE: 61  FALL OCCURRENCE: COMMON
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:

Slope No. 16

HWY #: 80  BMP: 6.00  DISTRICT #: 12  COUNTY #: 36
TOTAL SCORE: 585  PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 10000

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
REMARKS:
DITCH EFFECTIVENESS SCORE: 31  CATCHMENT: LOW
REMARKS:
AVERAGE VEHICLE RISK SCORE: 37  PERCENT OF TIME: 82
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 1257
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FL): 82.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 80  FEATURES:
REMARKS:
(B) ROCK FRICTION SCORE: 32  DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 61  FEATURES: SOME
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 61  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE: 4
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  FREEZING PERIODS:
PRECIPITATION: MODERATE  PRECIPITATION: MODERATE
REMARKS:
ROCKFALL HISTORY SCORE: 80  FALL OCCURRENCE: COMMON
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:

APPENDIX C-RHRS Scores
ROCKFALL HAZARD RATING SYSTEM

HWY #: 123 BMP: 2.50
DISTRICT #: 12
COUNTY #: 56
TOTAL SCORE: 585
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 6900
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (Ft): 0
REMARKS: GREATER THAN 105 FEET
DITCH EFFECTIVENESS SCORE: 12
CATCHMENT: GOOD
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME: 105
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 18
ACTUAL SITE DISTANCE (Ft): 616
PERCENT OF LOW DESIGN VALUE: 70
REMARKS:
WIDTH SCORE: 12
ACTUAL WIDTH (Ft): 34.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 94
FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 50
DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100
BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 21
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 17

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80 BMP: 7.70
DISTRICT #: 12
COUNTY #: 36
TOTAL SCORE: 584
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 9660
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (Ft): 0
REMARKS:
DITCH EFFECTIVENESS SCORE: 12
CATCHMENT: GOOD
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME: 146
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 18
ACTUAL SITE DISTANCE (Ft): 586
PERCENT OF LOW DESIGN VALUE: 67
REMARKS:
WIDTH SCORE: 1
ACTUAL WIDTH (Ft): 82.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 83
FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 28
DESCRIPTION: PLANAR
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 40
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 45
RATE:
REMARKS: CASE ONE CONTROLS FOR THIS SLOPE
BLOCK SIZE/QUANTITY SCORE: 60
BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: MODERATE
FREEZING PERIODS:
DIFFERENT PRESENCE OF WATER ON SLOPE:
INTERMITTANT
REMARKS:
ROCKFALL HISTORY SCORE: 70
FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 18
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<th>Slope No. 20</th>
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<td><strong>ROCKFALL HAZARD RATING SYSTEM</strong></td>
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<tr>
<td>HWY #: 600 BMP: 6.80</td>
<td>HWY #: 1274 BMP: 4.80</td>
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<td>RATE DATE: 06/02/94</td>
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<td>AVERAGE DAILY TRAFFIC: 3670</td>
<td>POSTED SPEED LIMIT: 55</td>
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**Slope Height Score:** 100  
**Actual Height (FT):** 112

**Ditch Effectiveness Score:** 60  
**Catchment:** LIMIT NON

**Remarks:** DINE NEED OF CLEANING

**Average Vehicle Risk Score:** 3

**Remarks:**

**AASHTO Decision Site Distance Score:** 81

**Actual Site Distance (FT):** 0

**Remarks:**

**Average Daily Traffic:** 3670

**posted Speed Limit:** 55

**Slope Height Score:** 100  
**Actual Height (FT):** 112

**Ditch Effectiveness Score:** 10  
**Catchment:** MODERATE

**Remarks:**

**Average Vehicle Risk Score:** 2

**Remarks:**

**AASHTO Decision Site Distance Score:** 86

**Actual Site Distance (FT):** 0

**Remarks:**

**Average Daily Traffic:** 390

**posted Speed Limit:** 55

**Slope Height Score:** 100  
**Actual Height (FT):** 107

**Ditch Effectiveness Score:** 10  
**Catchment:** MODERATE

**Remarks:**

**Average Vehicle Risk Score:** 2

**Remarks:**

**AASHTO Decision Site Distance Score:** 86

**Actual Site Distance (FT):** 0

**Remarks:**

**Average Daily Traffic:** 390

**posted Speed Limit:** 55

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

**(A) Structural Condition Score:** 81  
**Fractures:** CONTINUOUS  
**Orientations:** ADVERSE

**Remarks:**

**(B) Rock Friction Score:** 27  
**Description:** PLANAR

**Remarks:**

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

**(A) Structural Condition Score:** 39  
**Features:** LARGE

**Remarks:**

**(B) Difference in Erosion Rates Score:** 81  
**Rate:** EXTREME

**Remarks:**

**Block Size/Quantity Score:** 100  
**Block Size:** 7-8

**Remarks:**

**Climate & Presence of Water on Slope Score:** 30  
**Precipitation:** 0  
**Freezing Periods:** 0

**Remarks:**

**Rockfall History Score:** 81  
**Fall Occurrence:** CONSTANT

**Remarks:**

**Additional Remarks and Comments:**

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### Rockfall Hazard Rating System

**Slope No. 21**

- **HWY #:** 15
- **BMP:** 17.63
- **DISTRICT #:** 10
- **COUNIY #:** 13
- **TOTAL SCORE:** 571
- **PRELIMINARY COST ESTIMATE:** $0
- **AVERAGE DAILY TRAFFIC:** 16000
- **SLOPE HEIGHT SCORE:** 100
- **DITCH EFFECTIVENESS Score:** 50
- **CLIMATE & PRESENCE OF WATER ON SLOPE Score:** 27
- **ROCKFALL HISTORY Score:** 81
- **FALL OCCURRENCE:**
- **ADDITIONAL REMARKS AND COMMENTS:**
  - WEEKLY CLEANING IS NEEDED
  - ACROSS FROM MOUNTAIN MOTORS IN JACKSON

**Remarks:**
- DUE TO EXTREMELY ADVERSE ORIENTATION

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE):**
- **STRUCTURAL CONDITION Score:** 94
- **ROCK FRICTION Score:** 15
- **BLOCK SIZE/QUANTITY Score:** 100
- **CLIMATE & PRESENCE OF WATER ON SLOPE Score:** 27
- **ROCKFALL HISTORY Score:** 81

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE):**
- **FEATURES:** MANY
- **DIFFERENCE IN EROSION RATES Score:** 0

**ADDITIONAL REMARKS AND COMMENTS:**
- WEEKLY CLEANING IS NEEDED
- ACROSS FROM MOUNTAIN MOTORS IN JACKSON

**Slope No. 22**

- **HWY #:** U119
- **BMP:** 7.16
- **DISTRICT #:** 11
- **COUNIY #:** 7
- **TOTAL SCORE:** 570
- **PRELIMINARY COST ESTIMATE:** $0
- **AVERAGE DAILY TRAFFIC:** 5460
- **SLOPE HEIGHT SCORE:** 100
- **DITCH EFFECTIVENESS Score:** 83
- **CLIMATE & PRESENCE OF WATER ON SLOPE Score:** 27
- **ROCKFALL HISTORY Score:** 81

**Remarks:**
- WEEKLY CLEANING IS NEEDED
- ACROSS FROM MOUNTAIN MOTORS IN JACKSON

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE):**
- **FEATURES:** LARGEL
- **DIFFERENCE IN EROSION RATES Score:** 67

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE):**
- **DIFFERENCE IN EROSION RATES Score:** 67

**ADDITIONAL REMARKS AND COMMENTS:**
- WEEKLY CLEANING IS NEEDED
- ACROSS FROM MOUNTAIN MOTORS IN JACKSON
Slope No. 23

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80  EMP:  6.10  L OF CENTERLINE EMP: 6.20
DISTRICT #: 12  SPEC. CASE:  EAST
COUNTY #: 36  TOTAL SCORE: 569
DESIGN CODE:  PRELIMINARY COST ESTIMATE: 0
REPAIR CODE:  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 9860

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
REMARKS: GREATER THAN 106 FEET
DITCH EFFECTIVENESS SCORE: 50  CATCHMENT: LARGE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME: 126
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 13
ACTUAL SITE DISTANCE (FT): 647
PERCENT OF LOW DESIGN VALUE: 74
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES: DISTRICT CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 49  DESCRIPTION: PLANAR
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 78  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 53  RATE:
REMARKS: CASE ONE CONTROLS FOR THIS SLOPE.
BLOCK SIZE/QUANTITY SCORE: 10  BLOCK SIZE: 1
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: MODERATE
FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTENT
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: COMMON
REMARKS: FALLEN ROCK ZONE
ADDITIONAL REMARKS AND COMMENTS
>>> HIGH LAUNCH POINTS ON THIS SLOPE.
>>>

Slope No. 24

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80  EMP:  12.40  L OF CENTERLINE EMP: 12.60
DISTRICT #: 10  SPEC. CASE:  EAST
COUNTY #: 97  TOTAL SCORE: 566
DESIGN CODE:  PRELIMINARY COST ESTIMATE: 0
REPAIR CODE:  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 14300

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 44  CATCHMENT: REMARKS:
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME: 199
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE:
REMARKS: >675'
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES: ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 78  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 70  RATE:
REMARKS: BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 6
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 45  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>

APPENDIX C - RHRS Scores
**Rockfall Hazard Rating System**

**Slope No. 23**

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<th>BMP: 20.50</th>
<th>L OF CENTERLINE</th>
<th>EMP: 20.65</th>
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<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
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<td>COUNTY #: 13</td>
<td>PRELIMINARY COST ESTIMATE: $0</td>
<td>AVERAGE DAILY TRAFFIC: 5370</td>
<td>POSTED SPEED LIMIT: 55</td>
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<td>DISTANCE: 20.50</td>
<td>DISTANCE: NORTH</td>
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<tr>
<td>TOTAL SCORE: 563</td>
<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
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<td>SPEC. CASE.</td>
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<td>TOTAL SCORE: 563</td>
<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
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<td>REPAIR CODE:</td>
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<tr>
<td>SPEC. CASE.</td>
<td>RATE:</td>
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**Slope No. 24**

<table>
<thead>
<tr>
<th>HWY #: 15</th>
<th>BMP: 22.70</th>
<th>R OF CENTERLINE</th>
<th>EMP: 22.80</th>
<th>SPEC. CASE.</th>
<th>= NORTH</th>
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<tbody>
<tr>
<td>DISTRICT #: 10</td>
<td>TOTAL SCORE: 563</td>
<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
<td></td>
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<tr>
<td>COUNTY #: 13</td>
<td>PRELIMINARY COST ESTIMATE: $0</td>
<td>AVERAGE DAILY TRAFFIC: 5370</td>
<td>POSTED SPEED LIMIT: 55</td>
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</tr>
<tr>
<td>EMP: 22.80</td>
<td>DISTANCE: 20.50</td>
<td>DISTANCE: NORTH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE: 563</td>
<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DESIGN CODE:</td>
<td>REPAIR CODE:</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>SPEC. CASE.</td>
<td>RATE:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL SCORE: 563</td>
<td>RATE DATE: 05/16/94</td>
<td>RATER: CUT CLASS: A</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>DESIGN CODE:</td>
<td>REPAIR CODE:</td>
<td></td>
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<tr>
<td>SPEC. CASE.</td>
<td>RATE:</td>
<td></td>
<td></td>
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</tbody>
</table>

**Geologic Character - Case 1 (if applicable)**

| STRUCTURAL CONDITION SCORE: 81 | FRACtURES: CONTINUOUS | ORIENTATIONS: ADVERSE |
| REMARKS: | | |

**Geologic Character - Case 2 (if applicable)**

| STRUCTURAL CONDITION SCORE: 0 | FEATURES: |
| REMARKS: | | |

**Climate & Presence of Water on Slope Score: 27**

**Rockfall History Score: 55**

**Additional Remarks and Comments**

>>> >>> >>>
ROCKFALL HAZARD RATING SYSTEM

HWY #:U119  BMP: 6.80  L OF CENTERLINE
DISTRICT #:11  EMP: 7.00 SPEC. CASE.
COUNTY #:7
TOTAL SCORE: 562
RATE DATE:11/27/95  RATE: BECKHAM
DESIGN CODE:  REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 0
SLOPE HEIGHT SCORE: 71  ACTUAL HEIGHT (FT): 97
REMARKS: DITCH EFFECTIVENESS SCORE: 81  CATCHMENT: REMARKS:
SEASONAL VELOCITY:
AVERAGE VEHICLE RISK SCORE: 2  PERCENT OF TIME:
REMARKS: AASHTO DECISION SITE DISTANCE SCORE: 100
PERCENT OF LOW DESIGN VALUE:
REMARKS: 223 FEET
WIDTH SCORE: 5  ACTUAL WIDTH (FT): 41.0
REMARKS: GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81  FEATURES:
FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 27  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
(B) DIFFERENCE IN EROSION RATES SCORE: 60  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 90  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:
>>> UPDATE RATING AFTER BENCHING IN SPRING 1995.
>>> COMBINATION OF 2 EXISTING SLOPES.
>>>
ROCKFALL HAZARD RATING SYSTEM

HWY #: 15
BMP: 12.50
DISTRICT #: 10
COUNTY #: 13
TOTAL SCORE: 555
DESIGN CODE: 0
PRELIMINARY COST ESTIMATE: 5
AVERAGE DAILY TRAFFIC: 10,000
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 37
REMARKS:
DITCH EFFECTIVENESS SCORE: 24 CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 88
ACTUAL SITE DISTANCE (FT): 360
PERCENT OF LOW DESIGN VALUE: 39
REMARKS:
WIDTH SCORE: 47
ACTUAL WIDTH (FT): 24.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRATURES: 0
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 25
FEATURES: OCCASIONAL
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 35
RATE: MODERATE
REMARKS:
BLOCK SIZE QUANTITY SCORE: 100
BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS): 10
REMARKS: BLOCKS HANGING @ 87
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:
>> EYEWITNESS HAS SEEN ROCKS ROLL INTO ROADWAY AND
>> BEYOND FOR 14 YEARS
>>

Slope No. 29

ROCKFALL HAZARD RATING SYSTEM

HWY #: L50W
BMP: 2.50
DISTRICT #: 11
COUNTY #: 118
TOTAL SCORE: 551
DESIGN CODE: 0
PRELIMINARY COST ESTIMATE: 0
AVERAGE DAILY TRAFFIC: 2,700
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 97
REMARKS:
DITCH EFFECTIVENESS SCORE: 63 CATCHMENT: L
REMARKS:
AVERAGE VEHICLE RISK SCORE: 2
PERCENT OF TIME: 12
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 292
PERCENT OF LOW DESIGN VALUE: 33
REMARKS:
WIDTH SCORE: 54
ACTUAL WIDTH (FT): 23.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRATURES: G-A
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 30
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES: 0
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE QUANTITY SCORE: 17
BLOCK SIZE: 2
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 87
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:
>>
>>
>>

Slope No. 30
### Slope No. 31

**Rockfall Hazard Rating System**

<table>
<thead>
<tr>
<th>Highway</th>
<th>BMP</th>
<th>District</th>
<th>County</th>
<th>Total Score</th>
<th>Design Code</th>
<th>Repair Code</th>
<th>Catchment</th>
<th>Average Daily Traffic</th>
<th>Average Vehicle Risk Score</th>
<th>Percent of Time</th>
<th>AASHTO Decision Site Distance Score</th>
<th>Actual Site Distance (ft)</th>
<th>Percent of Low Design Value</th>
<th>Width Score</th>
<th>Actual Width (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWY # 80</td>
<td>6.00</td>
<td>R of Centerline</td>
<td>= East</td>
<td>547</td>
<td>ROCKFALL HAZARD RATING SYSTEM</td>
<td>R</td>
<td>EMP: 6.20 SPEC. CASE.</td>
<td>= EAST</td>
<td>COUNTY #: 36</td>
<td>REMARKS: GREATER THAN 10 FEET</td>
<td>RATE DATE: 07/01/93</td>
<td>RATER: CUT CLASS: A</td>
<td>PRELIMINARY COST ESTIMATE: $</td>
<td>AVERAGE DAILY TRAFFIC: 6960</td>
<td>POSTED SPEED LIMIT: 55</td>
</tr>
</tbody>
</table>

- **GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**
  - **STRUCTURAL CONDITION SCORE**: 87
  - **FRACTURES**: CONTINUOUS
  - **ORIENTATIONS**: ADVERSE
  - **REMARKS**: PLANAR W/ UNDULATING

- **ROCK FRICTION SCORE**: 23
  - **DESCRIPTION**: PLANAR
  - **REMARKS**: PLANAR W/ UNDULATING

### Slope No. 32

**Rockfall Hazard Rating System**

<table>
<thead>
<tr>
<th>Highway</th>
<th>BMP</th>
<th>District</th>
<th>County</th>
<th>Total Score</th>
<th>Design Code</th>
<th>Repair Code</th>
<th>Catchment</th>
<th>Average Daily Traffic</th>
<th>Average Vehicle Risk Score</th>
<th>Percent of Time</th>
<th>AASHTO Decision Site Distance Score</th>
<th>Actual Site Distance (ft)</th>
<th>Percent of Low Design Value</th>
<th>Width Score</th>
<th>Actual Width (ft)</th>
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</thead>
<tbody>
<tr>
<td>HWY # 80</td>
<td>6.00</td>
<td>R of Centerline</td>
<td>= East</td>
<td>547</td>
<td>ROCKFALL HAZARD RATING SYSTEM</td>
<td>R</td>
<td>EMP: 6.20 SPEC. CASE.</td>
<td>= EAST</td>
<td>COUNTY #: 36</td>
<td>REMARKS: GREATER THAN 10 FEET</td>
<td>RATE DATE: 07/01/93</td>
<td>RATER: CUT CLASS: A</td>
<td>PRELIMINARY COST ESTIMATE: $</td>
<td>AVERAGE DAILY TRAFFIC: 6960</td>
<td>POSTED SPEED LIMIT: 55</td>
</tr>
</tbody>
</table>

- **GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**
  - **STRUCTURAL CONDITION SCORE**: 87
  - **FRACTURES**: CONTINUOUS
  - **ORIENTATIONS**: ADVERSE
  - **REMARKS**: PLANAR W/ UNDULATING

- **ROCK FRICTION SCORE**: 23
  - **DESCRIPTION**: PLANAR
  - **REMARKS**: PLANAR W/ UNDULATING

- **DIFFERENCE IN EROSION RATES SCORE**: 43
  - **RATE**: MODERATE
  - **REMARKS**: CASE ONE CONTROLS FOR THIS SLOPE

- **CLIMATE & PRESENCE OF WATER ON SLOPE SCORE**: 20
  - **PRECIPITATION**: FREEZING PERIODS
  - **REMARKS**: PRESENCE OF WATER ON SLOPE: INTERMITTANT

- **ROCKFALL HISTORY SCORE**: 60
  - **FALL OCCURRENCE**: MANY
  - **REMARKS**: PRESENCE OF WATER ON SLOPE: INTERMITTANT

# Appendix C - R-HRS Scores
ROCKFALL HAZARD RATING SYSTEM

Slope No. 33

HWY #: U23  BMP: 12.10  LOC OF CENTERLINE = NORTH
DISTRICT #: 12  EMP: 12.30  SPEC. CASE. = NORTH
COUNTY #: 64  BEG: 12.30  SPEC. CASE.
TOTAL SCORE: 546  RATE DATE: 07/01/93  RATER: FARMER/ABSHER
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: 0  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 7810
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 105
REMARKS:
AVERAGE EFFECTIVENESS SCORE: 15  CATCHMENT: MODERATE
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 13
ACTUAL SITE DISTANCE (FT): 847
PERCENT OF LOW DESIGN VALUE: 74
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 50.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 59  FEATURES: SOME
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 78  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 4
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: MODERATE
FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: SOME
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: COMMON
REMARKS: FALLEN ROCK ZONE SIGN PRESENT.
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 34

HWY #: 80  BMP: 10.90  LOC OF CENTERLINE = EAST
DISTRICT #: 12  EMP: 11.00  SPEC. CASE. = EAST
COUNTY #: 67  TOTAL SCORE: 539  RATE DATE: 06/02/93  RATER:
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: 0  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 14300
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100  PERCENT OF TIME: 184
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 11
ACTUAL SITE DISTANCE (FT): 847
PERCENT OF LOW DESIGN VALUE: 78
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81  FEATURES:
REMARKS:
(B) ROCK FRICTION SCORE: 50  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 65
QUANTITY OF MATERIAL (CU YDS): 4
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: MODERATE
FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: SOME
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: COMMON
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
### Rockfall Hazard Rating System

**HWY #:** 60  
**BMP:** 6.00  
**DISTRICT #:** 12  
**COUNTY #:** 36  
**TOTAL SCORE:** 524  
**REPAIR CODE:** 0  
**PRELIMINARY COST ESTIMATE:** $  
**SLOPE HEIGHT SCORE:** 100  
**ACTUAL HEIGHT (FT):** 0  
**REMARKS:** GREATER THAN 105 FEET

**DISTANCE:** L OF CENTERLINE  
**EMP:** 6.20  
**SPEC. CASE.:** EAST  
**RATE:** 07/01/93  
**RATER:** = EAST  
**TOTAL SCORE:** 524  
**REPAIR CODE:** 0  
**PRELIMINARY COST ESTIMATE:** $  
**AVERAGE DAILY TRAFFIC:** 9660  
**POSTED SPEED LIMIT:** 55  
**REMARKS:**

- AVERAGE VEHICLE RISK SCORE: 100  
- PERCENT OF TIME: 146

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**  
(A) STRUCTURAL CONDITION SCORE: 76  
FRACtURES: CONTINUOUS  
ORIENTATIONS: ADVERSE  
REMARKS:

- (B) ROCK FRICTION SCORE: 22  
DESCRIPTION: PLANAR  
REMARKS:

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**  
(A) STRUCTURAL CONDITION SCORE: 45  
FEATURES: MANY  
REMARKS:

- (B) DIFFERENCE IN EROSION RATES SCORE: 28  
RATE: SOME  
REMARKS: CASE ONE CONTROLS FOR THIS CASE

- BLOCK SIZE/QUANTITY SCORE: 12  
- BLOCK SIZE:  
- QUANTITY OF MATERIAL (CU YDS): 1  
REMARKS:

- CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  
- PRECIPITATION: MODERATE  
- FREEZING PERIODS: SOME  
PRESENCE OF WATER ON SLOPE: INTERMITTENT  
REMARKS:

- ROCKFALL HISTORY SCORE: 60  
FALL OCCURRENCE: MANY  
REMARKS:

**ADDITIONAL REMARKS AND COMMENTS**

---

**Slope No. 37**

---

### Rockfall Hazard Rating System

**HWY #:** 80  
**BMP:** 6.00  
**DISTRICT #:** 12  
**COUNTY #:** 36  
**TOTAL SCORE:** 524  
**REPAIR CODE:** 0  
**PRELIMINARY COST ESTIMATE:** $  
**SLOPE HEIGHT SCORE:** 100  
**ACTUAL HEIGHT (FT):** 0  
**REMARKS:** GREATER THAN 105 FEET

**DISTANCE:** L OF CENTERLINE  
**EMP:** 6.20  
**SPEC. CASE.:** EAST  
**RATE:** 07/01/93  
**RATER:** = EAST  
**TOTAL SCORE:** 524  
**REPAIR CODE:** 0  
**PRELIMINARY COST ESTIMATE:** $  
**AVERAGE DAILY TRAFFIC:** 9660  
**POSTED SPEED LIMIT:** 55  
**REMARKS:**

- AVERAGE VEHICLE RISK SCORE: 100  
- PERCENT OF TIME: 146

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**  
(A) STRUCTURAL CONDITION SCORE: 45  
FEATURES: MANY  
REMARKS:

- (B) DIFFERENCE IN EROSION RATES SCORE: 28  
RATE: SOME  
REMARKS: CASE ONE CONTROLS FOR THIS CASE

- BLOCK SIZE/QUANTITY SCORE: 12  
- BLOCK SIZE:  
- QUANTITY OF MATERIAL (CU YDS): 1  
REMARKS:

- CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  
- PRECIPITATION: MODERATE  
- FREEZING PERIODS: SOME  
PRESENCE OF WATER ON SLOPE: INTERMITTENT  
REMARKS:

- ROCKFALL HISTORY SCORE: 60  
FALL OCCURRENCE: MANY  
REMARKS:

**ADDITIONAL REMARKS AND COMMENTS**

---

**Slope No. 38**
### Slope No. 39

**Rockfall Hazard Rating System**

- **HWY #:** 1274
- **BMP:** 6.35
- **L of Centerline:***
- **DISTRICT #:** 10
- **EMP:** 6.41
- **SPEC. CASE.:** = EAST
- **COUNTY #:** 83
- **TOTAL SCORE:** 520
- **RATE DATE:** 06/20/94
- **RATER:**
- **DESIGN CODE:**
- **REPAIR CODE:**
- **PRELIMINARY COST ESTIMATE:**
- **AVG. DAILY TRAFFIC:** 390
- **POSTED SPEED LIMIT:** 55

**Slope Height Score:** 9
**Actual Height (ft):** 51
**Remarks:**

**Ditch Effectiveness Score:** 50
**Catchment:** LIMITED
**Remarks:** FLAT

**Average Vehicle Risk Score:** 1
**Percent of Time:**
**Remarks:**

**AASHTO Decision Site Distance Score:** 100
**Actual Site Distance (ft):** 0
**Percent of Low Design Value:** 31
**Remarks:** 272

**Width Score:** 81
**Actual Width (ft):** 20.0
**Remarks:**

**Geologic Character -- Case 1 (if applicable):**
- **A) Structural Condition Score:** 0
- **Fractures:**
- **Orientations:**
- **Remarks:**

**Rock Friction Score:** 0
**Description:**
**Remarks:**

**Geologic Character -- Case 2 (if applicable):**
- **A) Structural Condition Score:** 75
- **Features:** MANY
- **Remarks:**

**Difference in Erosion Rates Score:** 27
**Rate:** LARGE
**Remarks:**

**Block Size/Quantity Score:** 100
**Block Size:** 5
**Quantity of Material (cu yds):**
**Remarks:**

**Climate & Presence of Water on Slope Score:** 27
**Precipitation:**
**Freezing Periods:**
**Remarks:**

**Rockfall History Score:** 50
**Fall Occurrence:**
**Remarks:**

**Additional Remarks and Comments:**

---

### Slope No. 40

**Rockfall Hazard Rating System**

- **HWY #:** MTPK
- **BMP:** 33.00
- **R of Centerline:***
- **DISTRICT #:** 10
- **EMP:** 32.90
- **SPEC. CASE.:** = WEST
- **COUNTY #:** 83
- **TOTAL SCORE:** 520
- **RATE DATE:** 06/08/93
- **RATER:**
- **DESIGN CODE:**
- **REPAIR CODE:**
- **PRELIMINARY COST ESTIMATE:**
- **AVG. DAILY TRAFFIC:** 3650
- **POSTED SPEED LIMIT:** 65

**Slope Height Score:** 100
**Actual Height (ft):** 0
**Remarks:**

**Ditch Effectiveness Score:** 75
**Catchment:**
**Remarks:**

**Average Vehicle Risk Score:** 4
**Percent of Time:** 29
**Remarks:**

**AASHTO Decision Site Distance Score:** 1
**Actual Site Distance (ft):** 1300
**Percent of Low Design Value:** 100
**Remarks:**

**Width Score:** 8
**Actual Width (ft):** 37.0
**Remarks:**

**Geologic Character -- Case 1 (if applicable):**
- **A) Structural Condition Score:** 0
- **Fractures:**
- **Orientations:**
- **Remarks:**

**Rock Friction Score:** 0
**Description:**
**Remarks:**

**Geologic Character -- Case 2 (if applicable):**
- **A) Structural Condition Score:** 75
- **Features:** MANY
- **Remarks:**

**Difference in Erosion Rates Score:** 78
**Rate:** LARGE
**Remarks:**

**Block Size/Quantity Score:** 78
**Block Size:**
**Quantity of Material (cu yds):**
**Remarks:**

**Climate & Presence of Water on Slope Score:** 27
**Precipitation:**
**Freezing Periods:**
**Remarks:**

**Rockfall History Score:** 81
**Fall Occurrence:**
**Remarks:**

**Additional Remarks and Comments:**

---

**APPENDIX C: R-HRS Scores**
ROCKFALL HAZARD RATING SYSTEM

HWY #: 142B
DISTRICT #: 12
COUNTY #: 36
TOTAL SCORE: 519
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 0/760
SLOPE HEIGHT SCORE: 57
SLOPE EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS: WILL BE TOTALLY INEFFECTIVE IN LARGE FALLS

TOTAL SCORE: 519
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 0/760
SLOPE HEIGHT SCORE: 57
SLOPE EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS: WILL BE TOTALLY INEFFECTIVE IN LARGE FALLS

ROCKFALL HAZARD RATING SYSTEM

HWY #: U23
DISTRICT #: 12
COUNTY #: 36
TOTAL SCORE: 519
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 0/760
SLOPE HEIGHT SCORE: 57
SLOPE EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS: WILL BE TOTALLY INEFFECTIVE IN LARGE FALLS

TOTAL SCORE: 519
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 0/760
SLOPE HEIGHT SCORE: 57
SLOPE EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS: WILL BE TOTALLY INEFFECTIVE IN LARGE FALLS

Slope No. 41

Slope No. 42
### Slope No. 43

<table>
<thead>
<tr>
<th>ROCKFALL HAZARD RATING SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWY #: 1274</td>
</tr>
<tr>
<td>DISTRICT #: 10</td>
</tr>
<tr>
<td>TOTAL SCORE: 517</td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE: $</td>
</tr>
<tr>
<td>SLOPE HEIGHT SCORE: 9</td>
</tr>
<tr>
<td>DITCH EFFECTIVENESS SCORE: 60</td>
</tr>
<tr>
<td>AVERAGE VEHICLE RISK SCORE: 1</td>
</tr>
<tr>
<td>AASHTO DECISION SITE DISTANCE SCORE: 109</td>
</tr>
<tr>
<td>ACTUAL WIDTH (FT): 0.0</td>
</tr>
<tr>
<td>GEOL O GIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
</tr>
<tr>
<td>STRUCTURAL CONDITION SCORE: 87</td>
</tr>
<tr>
<td>DIFFERENCE IN EROSION RATES SCORE: 5</td>
</tr>
<tr>
<td>BLOCK SIZE/QUANTITY SCORE: 100</td>
</tr>
<tr>
<td>QUANTITY OF MATERIAL (CU YDS):</td>
</tr>
<tr>
<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 27</td>
</tr>
<tr>
<td>PRECIPITATION: FREEZING PERIODS:</td>
</tr>
<tr>
<td>ROCKFALL HISTORY SCORE: 65</td>
</tr>
<tr>
<td>FALL OCCURRENCE: MANY</td>
</tr>
<tr>
<td>ADDITIONAL REMARKS AND COMMENTS:</td>
</tr>
</tbody>
</table>

### Slope No. 44

<table>
<thead>
<tr>
<th>ROCKFALL HAZARD RATING SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWY #: 1274</td>
</tr>
<tr>
<td>DISTRICT #: 10</td>
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<tr>
<td>TOTAL SCORE: 515</td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE: $</td>
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<tr>
<td>SLOPE HEIGHT SCORE: 9</td>
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<tr>
<td>DITCH EFFECTIVENESS SCORE: 60</td>
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<tr>
<td>AVERAGE VEHICLE RISK SCORE: 1</td>
</tr>
<tr>
<td>AASHTO DECISION SITE DISTANCE SCORE: 109</td>
</tr>
<tr>
<td>ACTUAL WIDTH (FT): 22.0</td>
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<tr>
<td>GEOL O GIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
</tr>
<tr>
<td>STRUCTURAL CONDITION SCORE: 70</td>
</tr>
<tr>
<td>DIFFERENCE IN EROSION RATES SCORE: 35</td>
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<tr>
<td>BLOCK SIZE/QUANTITY SCORE: 100</td>
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<tr>
<td>QUANTITY OF MATERIAL (CU YDS):</td>
</tr>
<tr>
<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 29</td>
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<tr>
<td>PRECIPITATION: FREEZING PERIODS:</td>
</tr>
<tr>
<td>ROCKFALL HISTORY SCORE: 60</td>
</tr>
<tr>
<td>FALL OCCURRENCE: MANY</td>
</tr>
<tr>
<td>ADDITIONAL REMARKS AND COMMENTS:</td>
</tr>
</tbody>
</table>

---

**APPENDIX C - R-RHS Scores**
ROCKFALL HAZARD RATING SYSTEM

HWY #: 1274  BMP: 7.85  L of CENTERLINE
DISTRICT #: 7  EMP: 7.96  SPEC. CASE: EAST
COUNTY #: 83  TOTAL SCORE: 308  RATE DATE: 06/20/94  RATER: CUT CLASS: A
REPAIR CODE: 7.85 l OF CENTERLINE
PRELIMINARY COST ESTIMATE: $0  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 340
SLOPE HEIGHT SCORE: 27  ACTUAL HEIGHT (FT): 75
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
DITCH EFFECTIVENESS SCORE: 35  CATCHMENT: LIMITED
REMARKS:
SLOPE HEIGHT SCORE: 27  ACTUAL HEIGHT (FT): 75
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
DITCH EFFECTIVENESS SCORE: 35  CATCHMENT: LIMITED
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 26  DESCRIPTION: UNDULATING
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 103  BLOCK SIZE: 7.8
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: FREEZING PERIODS: PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 68  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> FALL RECENTLY PUSHED OFF ROAD (EARTH-MOVER TRACKS)
>>> PRESENT

Slope No. 45

ROCKFALL HAZARD RATING SYSTEM

HWY #: 1108  BMP: 1.99  L of CENTERLINE
DISTRICT #: 7  EMP: 1.98  SPEC. CASE: EAST
COUNTY #: 11  TOTAL SCORE: 208  RATE DATE: 06/01/94  RATER: CUT CLASS: A
REPAIR CODE: 0  POSTED SPEED LIMIT: 35
AVERAGE DAILY TRAFFIC: 170
SLOPE HEIGHT SCORE: 4  ACTUAL HEIGHT (FT): 30
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
DITCH EFFECTIVENESS SCORE: 40  CATCHMENT: LIMITED
REMARKS:
SLOPE HEIGHT SCORE: 4  ACTUAL HEIGHT (FT): 30
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
DITCH EFFECTIVENESS SCORE: 40  CATCHMENT: LIMITED
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION: UNDULATING
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27  FEATURES: MANY
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81  RATE: EXTREME
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 47  BLOCK SIZE: 3.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: FREEZING PERIODS: PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> FALL RECENTLY PUSHED OFF ROAD (EARTH-MOVER TRACKS)
>>> PRESENT

Slope No. 46

APPENDIX C - R-HRS Scores
ROCKFALL HAZARD RATING SYSTEM

Slope No. 47

HWY #: MTPK  BMP: 47.10  SPEC. CASE: = WEST
DISTRICT #: 10  EMP: 47.20  RATER: FARMER/ANDERSON
COUNTY #: 119  RATE DATE: 06/07/93  CUT CLASS: A
TOTAL SCORE: 508  POSTED SPEED LIMIT: 55
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 3460
SLOPE HEIGHT SCORE: 55  ACTUAL HEIGHT (FT): 91
REMARKS:
DITCH EFFECTIVENESS SCORE: 45  CATCHMENT:
AVERAGE VEHICLE RISK SCORE: 3
REMARKS:
PCT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 38
ACTUAL SITE DISTANCE (FT): 460
REMARKS:
WIDTH SCORE: 24  ACTUAL WIDTH (FT): 42.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85
REMARKS:
(B) ROCK FRICTION SCORE: 70  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE:
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:  FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 90  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 48

HWY #: U33  BMP: 6.90  SPEC. CASE: = NORTH
DISTRICT #: 12  EMP: 7.10  RATER: ABSHEA/CAUDILL
COUNTY #: 64  RATE DATE: 07/04/93  CUT CLASS: A
TOTAL SCORE: 478  POSTED SPEED LIMIT: 55
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 7810
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 105
REMARKS: GREATER THAN 105 FEET
DITCH EFFECTIVENESS SCORE: 37  CATCHMENT: LOW
AVERAGE VEHICLE RISK SCORE: 100
PERCENT OF TIME: 116
REMARKS: THE SLOPE LENGTH IS 766 FEET
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 875
PERCENT OF LOW DESIGN VALUE: 113
REMARKS:
WIDTH SCORE: 24  ACTUAL WIDTH (FT): 29.0
REMARKS: LARGE SHOULDERS
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 61
REMARKS: A MODERATE AMOUNT OF FEATURES
(B) DIFFERENCE IN EROSION RATES SCORE: 60  RATE: LARGE
REMARKS: TYPICAL EASTERN KY SLOPE
BLOCK SIZE/QUANTITY SCORE: 27  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 18-18
REMARKS: MODERATE SIZE STONES
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:  FREEZING PERIODS: 8
REMARKS: SOME VISIBLE WATER
ROCKFALL HISTORY SCORE: 78  FALL OCCURRENCE: MANY
REMARKS: FALLEN ROCK ZONE SIGN PRESENT
ADDITIONAL REMARKS AND COMMENTS
PHOTO TAKEN OF SLOPE NO. 15 ATTACHED TO RATING SHEET.
<table>
<thead>
<tr>
<th>ROCKFALL HAZARD RATING SYSTEM</th>
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</thead>
<tbody>
<tr>
<td>HWY #: U119 BMP: 7.02 L OF CENTERLINE</td>
</tr>
<tr>
<td>DISTRICT #: 11 EMP: 7.01 SPEC. CASE. = NORTH</td>
</tr>
<tr>
<td>COUNTY #: 7 TOTAL SCORE: 95 RATE DATE: 07/21/94 RATER:</td>
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<tr>
<td>DESIGN CODE: REPAIR CODE:</td>
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<tr>
<td>PRELIMINARY COST ESTIMATE: $ PRELIMINARY COST ESTIMATE: $</td>
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<tr>
<td>AVERAGE DAILY TRAFFIC: 5400 POSTED SPEED LIMIT: 55</td>
</tr>
<tr>
<td>SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 170</td>
</tr>
<tr>
<td>REMARKS: DITCH EFFECTIVENESS SCORE: 70 CATCHMENT: LIMITED</td>
</tr>
<tr>
<td>AVERAGE VEHICLE RISK SCORE: 2 PERCENT OF TIME: 34</td>
</tr>
<tr>
<td>REMARKS: AASHTO DECISION SITE DISTANCE SCORE: 96 ACTUAL SITE DISTANCE (FT): 323</td>
</tr>
<tr>
<td>WIDTH SCORE: 3 ACTUAL WIDTH (FT): 45.0</td>
</tr>
<tr>
<td>REMARKS: GEOSTRUCTURAL CONDITION SCORE: 25 FRACTURES: MANY</td>
</tr>
<tr>
<td>DESCRIPTION: GEORGEOLOGIC CHARACTER CASE 1 (IF APPLICABLE)</td>
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<tr>
<td>(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES: ORIENTATIONS:</td>
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<tr>
<td>REMARKS: (B) ROCK FRICTION SCORE: 26 DESCRIPTION:</td>
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<tr>
<td>REMARKS: (B) DIFFERENCE IN EROSION RATES SCORE: 25 RATE: MODERATE</td>
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<td>BLOCK SIZE/QUANTITY SCORE: 70 BLOCK SIZE: 0.5</td>
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<tr>
<td>QUANTITY OF MATERIAL (CU YDS):</td>
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<td>REMARKS: CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 27</td>
</tr>
<tr>
<td>PRECIPITATION: FREEZING PERIODS:</td>
</tr>
<tr>
<td>REMARKS: ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE: COMMON</td>
</tr>
<tr>
<td>REMARKS: ADDITIONAL REMARKS AND COMMENTS</td>
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<td>&gt;&gt; &gt;&gt; &gt;&gt;</td>
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Slope No. 49

<table>
<thead>
<tr>
<th>ROCKFALL HAZARD RATING SYSTEM</th>
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</thead>
<tbody>
<tr>
<td>HWY #: U119 BMP: 5.30 L OF CENTERLINE</td>
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<tr>
<td>DISTRICT #: 12 EMP: 5.60 SPEC. CASE. = EAST</td>
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<tr>
<td>COUNTY #: 50 TOTAL SCORE: 93 RATE DATE: 07/12/93 RATER: ABSHER</td>
</tr>
<tr>
<td>DESIGN CODE: REPAIR CODE:</td>
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<tr>
<td>PRELIMINARY COST ESTIMATE: $ PRELIMINARY COST ESTIMATE: $</td>
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<tr>
<td>AVERAGE DAILY TRAFFIC: 4150 POSTED SPEED LIMIT: 55</td>
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<tr>
<td>SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0</td>
</tr>
<tr>
<td>REMARKS: GREATER THAN 105 FEET DITCH EFFECTIVENESS SCORE: 21 CATCHMENT: GOOD</td>
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<tr>
<td>AVERAGE VEHICLE RISK SCORE: 4 PERCENT OF TIME: 34</td>
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<tr>
<td>REMARKS: AASHTO DECISION SITE DISTANCE SCORE: 96 ACTUAL SITE DISTANCE (FT): 323</td>
</tr>
<tr>
<td>WIDTH SCORE: 1 ACTUAL WIDTH (FT): 62.0</td>
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<tr>
<td>REMARKS: GEOSTRUCTURAL CONDITION SCORE: 25 FRACTURES: FEW</td>
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<tr>
<td>DESCRIPTION: GEORGEOLOGIC CHARACTER CASE 1 (IF APPLICABLE)</td>
</tr>
<tr>
<td>(A) STRUCTURAL CONDITION SCORE: 25 FRACTURES: ORIENTATIONS:</td>
</tr>
<tr>
<td>REMARKS: (B) ROCK FRICTION SCORE: 26 DESCRIPTION:</td>
</tr>
<tr>
<td>REMARKS: (B) DIFFERENCE IN EROSION RATES SCORE: 28 RATE: SOME</td>
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<tr>
<td>BLOCK SIZE/QUANTITY SCORE: 78 BLOCK SIZE:</td>
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<tr>
<td>QUANTITY OF MATERIAL (CU YDS): CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 20</td>
</tr>
<tr>
<td>PRECIPITATION: FREEZING PERIODS:</td>
</tr>
<tr>
<td>REMARKS: ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE: COMMON</td>
</tr>
<tr>
<td>REMARKS: ADDITIONAL REMARKS AND COMMENTS</td>
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</table>

Slope No. 50

APPENDIX C: R-RHS Scores
ROCKFALL HAZARD RATING SYSTEM

HWY #: U123
DISTRICT #: 12
COUNTY #: 98
TOTAL SCORE: 502
PRELIMINARY COST ESTIMATE: $500
AVERAGE DAILY TRAFFIC: 5045

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 0
DITCH EFFECTIVENESS SCORE: 25  CATCHMENT: LIMITED
AVERAGE VEHICLE RISK SCORE: 55  PERCENT OF TIME: 91
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 100
WIDTH SCORE: 31  ACTUAL WIDTH (FT): 27.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 83  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81  RATE:
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 25  BLOCK SIZE: 2-3
QUANTITY OF MATERIAL (CU YDS):
REMARKS: LARGE SHALE BLOCKS NEAR ROAD
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:

ROCKFALL HISTORY SCORE: 65  FALL OCCURRENCE:
REMARKS: ROCK FALL ZONE
ADDITIONAL REMARKS AND COMMENTS

Slope No. 51

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ROCKFALL HAZARD RATING SYSTEM

HWY #: U119
DISTRICT #: 11
COUNTY #: 7
TOTAL SCORE: 499
PRELIMINARY COST ESTIMATE: $400
AVERAGE DAILY TRAFFIC: 5460

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 160
DITCH EFFECTIVENESS SCORE: 25  CATCHMENT:
AVERAGE VEHICLE RISK SCORE: 2
PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 0
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 54.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27  FRACTURES: CONTINUOUS
ORIENTATIONS: RANDOM
REMARKS:
(B) ROCK FRICTION SCORE: 35  DESCRIPTION: PLANAR
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 8.5
QUANTITY OF MATERIAL (CU YDS):
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 37
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
ROCKFALL HISTORY SCORE: 65  FALL OCCURRENCE: MANY
ADDITIONAL REMARKS AND COMMENTS

Slope No. 52
Rockfall Hazard Rating System

HWY #: 80
BMP: 2.00
DISTRICT #: 12
COUNTY #: 20
TOTAL SCORE: 497
PRELIMINARY COST ESTIMATE: 0
AVERAGE DAILY TRAFFIC: 7320
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 100
REMARKS: GREATER THAN 105 FEET.

DITCH EFFECTIVENESS SCORE: 14
CATCHMENT: LOW
REMARKS:

AVERAGE VEHICLE RISK SCORE: 42
PERCENT OF TIME: 85
REMARKS:

AASHTO DECISION SITE DISTANCE SCORE: 62
ACTUAL SITE DISTANCE (FT): 396
PERCENT OF LOW DESIGN VALUE: 45
REMARKS:

WIDTH SCORE: 1
ACTUAL WIDTH (FT): 82.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)

(A) STRUCTURAL CONDITION SCORE: 38
FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:

(B) ROCK FRICTION SCORE: 35
DESCRIPTION: PLANAR
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)

(A) STRUCTURAL CONDITION SCORE: 33
FEATURES: SOME
REMARKS:

(B) DIFFERENCE IN EROSION RATES SCORE: 30
RATE: LARGE
REMARKS: CASE ONE CONTROLS FOR THIS SLOPE.

BLOCK SIZE/QUANTITY SCORE: 10
BLOCK SIZE: 1
QUANTITY OF MATERIAL (CU YDS):
REMARKS:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 80
PRECIPITATION: MODERATE
FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTANT
REMARKS:

ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE: COMMON
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>> SOME LAUNCHING POINTS UP HIGH.

Slope No. 53

---

Rockfall Hazard Rating System

HWY #: 123
BMP: 5.60
DISTRICT #: 12
COUNTY #: 39
TOTAL SCORE: 496
PRELIMINARY COST ESTIMATE: 0
AVERAGE DAILY TRAFFIC: 4450
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (FT): 0
REMARKS: GREATER THAN 105 FEET.

DITCH EFFECTIVENESS SCORE: 12
CATCHMENT: LOW
REMARKS:

AVERAGE VEHICLE RISK SCORE: 2
PERCENT OF TIME: 18
REMARKS:

AASHTO DECISION SITE DISTANCE SCORE: 34
ACTUAL SITE DISTANCE (FT): 488
PERCENT OF LOW DESIGN VALUE: 56
REMARKS:

WIDTH SCORE: 71
ACTUAL WIDTH (FT): 21.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)

(A) STRUCTURAL CONDITION SCORE: 0
FRACTURES: 0
ORIENTATIONS:

(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)

(A) STRUCTURAL CONDITION SCORE: 82
FEATURES: 0
REMARKS:

(B) DIFFERENCE IN EROSION RATES SCORE: 65
RATE: LARGE
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 9
BLOCK SIZE: 5-1
QUANTITY OF MATERIAL (CU YDS):
REMARKS: LARGER POSSIBLE

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 80
PRECIPITATION: 0
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:

ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE: COMMON
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>> <<<

Slope No. 54
**Slope No. 55**

**Rockfall Hazard Rating System**

<table>
<thead>
<tr>
<th>HWY #: U23 BMP: 22.60</th>
<th>HWY #: U421 BMP: 7.10</th>
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<tr>
<td>DISTRICT #: 12</td>
<td>DISTRICT #: 7</td>
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<tr>
<td>COUNTY #: 88</td>
<td>COUNTY #: 98</td>
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<tr>
<td>TOTAL SCORE: 493</td>
<td>TOTAL SCORE: 491</td>
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<tr>
<td>R OF CENTERLINE</td>
<td>R OF CENTERLINE</td>
</tr>
<tr>
<td>EMP: 22.67</td>
<td>EMP: 7.15</td>
</tr>
<tr>
<td>SPEC. CASE. = NORTH</td>
<td>SPEC. CASE. = EAST</td>
</tr>
<tr>
<td>RATER:</td>
<td>RATER:</td>
</tr>
<tr>
<td>REPAIR CODE:</td>
<td>REPAIR CODE:</td>
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<tr>
<td>DESIGN CODE:</td>
<td>DESIGN CODE:</td>
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<tr>
<td>PRELIMINARY COST ESTIMATE: $3</td>
<td>PRELIMINARY COST ESTIMATE: $3</td>
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<tr>
<td>AVERAGE DAILY TRAFFIC: 13400</td>
<td>AVERAGE DAILY TRAFFIC: 5980</td>
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</table>

**Remarks:**
- SLOPE HEIGHT SCORE: 100
- DITCH EFFECTIVENESS SCORE: 55
- ROCKS FREQUENT THE ROAD
- ACTUAL HEIGHT (FT): 117
- REMARKS: CATCHMENT: LIMITED
- AVERAGE VELOCITY RISK SCORE: 23
- PERCENT OF TIME: 71
- REMARKS: ALMOST NONE
- ACTUAL SITE DISTANCE (FT): 1200
- REMARKS: DIFFERENCE IN EROSION RATES SCORE: 0
- RATE: LARGE
- REMARKS: BLOCK SIZE/QUANTITY SCORE: 100
- BLOCK SIZE: 1
- QUANTITY OF MATERIAL (CU YDS): 1
- CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
- PRECIPITATION: MODERATE
- FREEZING PERIODS: INTERMITTANT
- REMARKS: FALLEN ROCK ZONE
- ADDITIONAL REMARKS AND COMMENTS: LISTED AS TROUBLE SPOT BY MAINTENANCE

---

**Slope No. 56**

**Rockfall Hazard Rating System**

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<thead>
<tr>
<th>HWY #: U421 BMP: 7.10</th>
<th>HWY #: U421 BMP: 7.10</th>
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<td>DISTRICT #: 7</td>
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<tr>
<td>COUNTY #: 98</td>
<td>COUNTY #: 98</td>
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<tr>
<td>TOTAL SCORE: 491</td>
<td>TOTAL SCORE: 491</td>
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<tr>
<td>R OF CENTERLINE</td>
<td>R OF CENTERLINE</td>
</tr>
<tr>
<td>EMP: 7.15</td>
<td>EMP: 7.15</td>
</tr>
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<td>SPEC. CASE. = EAST</td>
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**Remarks:**
- SLOPE HEIGHT SCORE: 3
- DITCH EFFECTIVENESS SCORE: 86
- CATCHMENT: LOW
- ACTUAL HEIGHT (FT): 24
- REMARKS: ALMOST NONE
- AVERAGE VELOCITY RISK SCORE: 4
- PERCENT OF TIME: 4
- REMARKS: ALMOST NONE
- ACTUAL SITE DISTANCE (FT): 973
- REMARKS: DIFFERENCE IN EROSION RATES SCORE: 54
- PRECIPITATION: MODERATE
- FREEZING PERIODS: INTERMITTANT
- REMARKS: FALLEN ROCK ZONE
- ADDITIONAL REMARKS AND COMMENTS: LISTED AS TROUBLE SPOT BY MAINTENANCE
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**Slope No. 58**

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**Slope No. 57**
ROCKFALL HAZARD RATING SYSTEM

Slope No. 59

HWY #: U20 BMP: 22.80
DISTRICT #: 12
COUNTY #: 36
TOTAL SCORE: 484
PRELIMINARY COST ESTIMATE: $
AVERAGE DAILY TRAFFIC: 7590
SLOPE HEIGHT SCORE: 100
DITCH EFFECTIVENESS SCORE: 27
AVERAGE VEHICLE RISK SCORE: 40
WIDTH SCORE: 10
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
(B) ROCK FRICTION SCORE: 0
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
(B) DIFFERENCE IN EROSION RATES SCORE: 81
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
CLIMATE & PRESENCE OF WATER ON SLOPE: PRECIPITATION;
PRESENCE OF WATER ON SLOPE:

Slope No. 60

HWY #: 80 BMP: 6.00
DISTRICT #: 12
COUNTY #: 36
TOTAL SCORE: 483
PRELIMINARY COST ESTIMATE: $
AVERAGE DAILY TRAFFIC: 9860
SLOPE HEIGHT SCORE: 100
DITCH EFFECTIVENESS SCORE: 59
AVERAGE VEHICLE RISK SCORE: 100
WIDTH SCORE: 1
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 59
(B) ROCK FRICTION SCORE: 49
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
(B) DIFFERENCE IN EROSION RATES SCORE: 0
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
CLIMATE & PRESENCE OF WATER ON SLOPE: PRECIPITATION;
PRESENCE OF WATER ON SLOPE:

ADDITIONAL REMARKS AND COMMENTS

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ADDITIONAL REMARKS AND COMMENTS

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ADDITIONAL REMARKS AND COMMENTS

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ADDITIONAL REMARKS AND COMMENTS

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ADDITIONAL REMARKS AND COMMENTS

>>>
ROCKFALL HAZARD RATING SYSTEM

HWY #: 20 BMP: 11.40 DISTRICT #: 10 EMP: 11.60 SPEC. CASE. = EAST
COUNTY #: 97 DISTRICT#: 10 COUNTY#: ff/
TOTAL SCORE: 479 RATE DATE: 08/04/93 RATER: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0 POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 5270

SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 21 CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 145
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 47 ACTUAL SITE DISTANCE (FT): 440
PERCENT OF LOW DESIGN VALUE: 50
REMARKS:
WIDTH SCORE: 1 ACTUAL WIDTH (FT): 82.0
REMARKS:

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81 FRACTURES:
ORIENTATIONS:
REMARKS:

(B) ROCKFRICTION SCORE: 35 DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES:
REMARKS:

(G) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 30 BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 44 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 61

ROCKFALL HAZARD RATING SYSTEM

HWY #: 123 BMP: 28.00 DISTRICT #: 12 EMP: 28.50 SPEC. CASE. = NORTH
COUNTY #: 20 DISTRICT#: 12 COUNTY#: 98
TOTAL SCORE: 476 RATE DATE: 08/28/93 RATER: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0 POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 3000

SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 15 CATCHMENT:
REMARKS: FACE >20' FROM ROAD
AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 410
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1 ACTUAL SITE DISTANCE (FT): 1000
PERCENT OF LOW DESIGN VALUE: 113
REMARKS:
WIDTH SCORE: 31 ACTUAL WIDTH (FT): 27.0
REMARKS:

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 87 FRACTURES:
ORIENTATIONS:
REMARKS:

(B) ROCK FRICTION SCORE: 30 DESCRIPTION:
REMARKS: PLANAR
W/ LARGER FREE-FALL POTENTIAL

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES:
REMARKS:

(G) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 13 BLOCK SIZE: 1-2
QUANTITY OF MATERIAL (CU YDS):
REMARKS: MUCH LARGER POSSIBLE
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

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**Slope No. 62**

**Slope No. 64**
### Slope No. 65

**Rockfall Hazard Rating System**

| HWY #: 15 | BMP: 16.10 |
| DISTRICT #: 10 | EMP: 16.21 |
| COUNTY #: 13 | L OF CENTERLINE |
| TOTAL SCORE: 476 | SPEC. CASE. = NORTH |
| PRELIMINARY COST ESTIMATE: $0 | RATE: NORTH |
| AVERAGE DAILY TRAFFIC: 9200 | POSTED SPEED LIMIT: 55 |

- **Slope Height Score:** 16  
- **Actual Height (FT):** 60
- **Remarks:** Ditch effectiveness score: Limited; Ditches need clearing; rocks on roadway

**Average Vehicle Risk Score:** 29  
**Percent of Time:**

**AASHTO Decision Site Distance Score:** 100  
**Actual Site Distance (FT):** 0  
**Percent of Low Design Value:** 32  
**Remarks:**

**Width Score:** 3  
**Actual Width (FT):** 43.0

**Geologic Character - Case 1 (If Applicable)**

(A) **Structural Condition Score:** 64  
**Fractures:**

(B) **Rock Friction Score:** 58  
**Description:**

**Remarks:**

**Geologic Character - Case 2 (If Applicable)**

(A) **Structural Condition Score:** 80  
**Features:** Many

(B) **Difference in Erosion Rates Score:** 77  
**Rate:** Extreme

**Remarks:**

**Climate & Presence of Water on Slope Score:** 27  
**Precipitation:** Freezing periods; Presence of water on slope

**Remarks:**

**Rockfall History Score:** 81  
**Fall Occurrence:** Constant

**Remarks:** Consistent falls while rating

**Additional Remarks and Comments:**

### Slope No. 66

**Rockfall Hazard Rating System**

| HWY #: 15 | BMP: 18.96 |
| DISTRICT #: 8 | EMP: 83.70 |
| COUNTY #: 100 | L OF CENTERLINE |
| TOTAL SCORE: 476 | SPEC. CASE. = EAST |
| PRELIMINARY COST ESTIMATE: $0 | RATE: EAST |
| AVERAGE DAILY TRAFFIC: 4560 | POSTED SPEED LIMIT: 55 |

- **Slope Height Score:** 35  
- **Actual Height (FT):** 81
- **Remarks:** Ditch effectiveness score: Moderate

**Average Vehicle Risk Score:** 17  
**Percent of Time:** 65

**AASHTO Decision Site Distance Score:** 1  
**Actual Site Distance (FT):** 0  
**Percent of Low Design Value:**

**Width Score:** 27  
**Actual Width (FT):** 28.0

**Remarks:**

**Geologic Character - Case 1 (If Applicable)**

(A) **Structural Condition Score:** 84  
**Fractures:**

(B) **Rock Friction Score:** 55  
**Description:**

**Remarks:**

**Geologic Character - Case 2 (If Applicable)**

(A) **Structural Condition Score:** 66  
**Features:** Many

(B) **Difference in Erosion Rates Score:** 77  
**Rate:** Extreme

**Remarks:**

**Climate & Presence of Water on Slope Score:** 20  
**Precipitation:** Moderate

**Remarks:**

**Climate & Presence of Water on Slope:** Intermittent

**Remarks:**

**Rockfall History Score:** 32  
**Fall Occurrence:** Occasional

**Remarks:**

**Additional Remarks and Comments:**
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<td>REMARKS:</td>
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<td>PERCENT OF TIME:</td>
<td>PERCENT OF TIME: 47</td>
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<tr>
<td>AASHTO DECISION SITE DISTANCE SCORE: 8</td>
<td>AASHTO DECISION SITE DISTANCE SCORE: 21</td>
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<td>ACTUAL SITE DISTANCE (FT): 537</td>
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<td>PERCENT OF LOW DESIGN VALUE: 65</td>
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<tr>
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<td>ACTUAL WIDTH (FT): 37.0</td>
<td>ACTUAL WIDTH (FT): 82.0</td>
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<tr>
<td>REMARKS:</td>
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<tr>
<td>GELOGIC CHARACTER – CASE 1 (IF APPLICABLE)</td>
<td>GELOGIC CHARACTER – CASE 1 (IF APPLICABLE)</td>
</tr>
<tr>
<td>(A) STRUCTURAL CONDITION SCORE: 36</td>
<td>(A) STRUCTURAL CONDITION SCORE: 30</td>
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<tr>
<td>FEATURES: DISTRICT CONTINUOUS</td>
<td>FEATURES:</td>
</tr>
<tr>
<td>ORIENTATIONS: ADVERSE</td>
<td>ORIENTATIONS:</td>
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<td>REMARKS:</td>
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<tr>
<td>(B) ROCK FRICTION SCORE: 54</td>
<td>(B) ROCK FRICTION SCORE: 54</td>
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<tr>
<td>DESCRIPTION: PLANER</td>
<td>DESCRIPTION:</td>
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<td>REMARKS:</td>
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<td>GELOGIC CHARACTER – CASE 2 (IF APPLICABLE)</td>
<td>GELOGIC CHARACTER – CASE 2 (IF APPLICABLE)</td>
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<td>(A) STRUCTURAL CONDITION SCORE: 30</td>
<td>(A) STRUCTURAL CONDITION SCORE: 36</td>
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<td>FEATURES:</td>
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<td>REMARKS:</td>
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<td>(B) DIFFERENCE IN EROSION RATES SCORE: 63</td>
<td>(B) DIFFERENCE IN EROSION RATES SCORE: 65</td>
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<td>RATE: CASE ONE CONTROLS FOR THIS SLOPE</td>
<td>RATE:</td>
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<td>REMARKS:</td>
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<td>BLOCK SIZE/QUANTITY SCORE: 82</td>
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<td>BLOCK SIZE:</td>
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<td>QUANTITY OF MATERIAL (CU YDS): 9</td>
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<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 20</td>
<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 20</td>
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<td>PRECIPITATION: FROZEN PERIODS: SOME</td>
<td>PRECIPITATION: MODERATE FROZEN PERIODS:</td>
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<td>REMARKS:</td>
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<td>ROCKFALL HISTORY SCORE: 78</td>
<td>ROCKFALL HISTORY SCORE: 81</td>
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<td>FALL OCCURRENCE: COMMON</td>
<td>FALL OCCURRENCE: COMMON</td>
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<td>ADDITIONAL REMARKS AND COMMENTS</td>
<td>ADDITIONAL REMARKS AND COMMENTS</td>
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</tbody>
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ROCKFALL HAZARD RATING SYSTEM

HWY #: CUPK DISTRICT #: B
COUNTY #: 100 TOTAL SCORE: 489
PRELIMINARY COST ESTIMATE: $ EMP: 84.80
AVERAGE DAILY TRAFFIC: 4500 POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
DITCH EFFECTIVENESS SCORE: 68 CATCHMENT: LOW
AVERAGE VEHICLE RISK SCORE: 14 PERCENT OF TIME: 60
REMARKS: DITCH > 105 FEET
AASHTO DECISION SITE DISTANCE SCORE: 1 ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 18 REMARKS: 109'
WIDTH SCORE: 27 ACTUAL WIDTH (FT): 23.0
REMARKS: WIDTH > 18'
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 59 FRACTURES: CONTINUOUS ORIENTATIONS: ADVERSE
REMARKS: STRUCTURAL CONDITION SCORE: 0 FEATURES:
(B) ROCK FRICTION SCORE: 25 DESCRIPTION: PLANAR
REMARKS: ROCK FRICTION SCORE: 0 DESCRIPTION: UNDULATING
REMARKS: DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS: BLOCK SIZE QUANTITY SCORE: 28 DESCRIPTION: MODERATE
QUANTITY OF MATERIAL (CU YDS): 14
REMARKS: CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION: MODERATE FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTENT
REMARKS: ROCKFALL HISTORY SCORE: 77 FALL OCCURRENCE: COMMON
REMARKS: ADDITIONAL REMARKS AND COMMENTS

Slope No. 69

ROCKFALL HAZARD RATING SYSTEM

HWY #: U119 DISTRICT #: C
COUNTY #: 67 TOTAL SCORE: 489
PRELIMINARY COST ESTIMATE: $ EMP: 6.54
AVERAGE DAILY TRAFFIC: 1330 POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 3 ACTUAL HEIGHT (FT): 28
DITCH EFFECTIVENESS SCORE: 73 CATCHMENT: LIMITED
AVERAGE VEHICLE RISK SCORE: 1 PERCENT OF TIME:
REMARKS: DITCH > 18" DITCH: INADEQUATE FOR BLOCK AND VOLUME
AASHTO DECISION SITE DISTANCE SCORE: 100 ACTUAL SITE DISTANCE (FT): 9
PERCENT OF LOW DESIGN VALUE: 18 REMARKS: 109'
WIDTH SCORE: 54 ACTUAL WIDTH (FT): 23.0
REMARKS: WIDTH > 18'
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 59 FRACTURES: DISTRICT CONTINUOUS ORIENTATIONS: ADVERSE
REMARKS: STRUCTURAL CONDITION SCORE: 2 FEATURES:
(B) ROCK FRICTION SCORE: 25 DESCRIPTION: PLANAR
REMARKS: ROCK FRICTION SCORE: 25 DESCRIPTION: UNDULATING
REMARKS: DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS: BLOCK SIZE QUANTITY SCORE: 14 DESCRIPTION: MODERATE
QUANTITY OF MATERIAL (CU YDS): 14
REMARKS: CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27 PRECIPITATION: MODERATE FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTENT
REMARKS: ROCKFALL HISTORY SCORE: 27 FALL OCCURRENCE: MANY
REMARKS: ADDITIONAL REMARKS AND COMMENTS

Slope No. 70
Slope No. 71

ROCKFALL HAZARD RATING SYSTEM

HWY #: 1274  BMP:  6.80  L OF CENTERLINE
DISTRICT #:  10  EMP:  6.84  SPEC. CASE:  = EAST
COUNTY #:  83  RATE DATE:06/20/94  RATER:
TOTAL SCORE:  497  RATE DATE:06/20/94  RATER:
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  0  POSTED SPEED LIMIT:  55
AVERAGE DAILY TRAFFIC:  340
SLOPE HEIGHT SCORE:  15  ACTUAL HEIGHT (FT):  62
DITCH EFFECTIVENESS SCORE:  27  CATCHMENT: LIMITED
REMARKS:

AVERAGE VEHICLE RISK SCORE:  1
PERCENT OF TIME:
REMARKS:

AASHTO DECISION SITE DISTANCE SCORE:  100
ACTUAL SITE DISTANCE (FT):  0
PERCENT OF LOW DESIGN VALUE:  30
REMARKS:  264
WIDTH SCORE:  62  ACTUAL WIDTH (FT):  22.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE:  50  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE:  35
REMARKS:
BLOCK SIZE/QUANTITY SCORE:  100  BLOCK SIZE:  6
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:  27
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE:  50  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>  

Slope No. 72

ROCKFALL HAZARD RATING SYSTEM

HWY #: 1274  BMP:  6.80  L OF CENTERLINE
DISTRICT #:  10  EMP:  6.84  SPEC. CASE:  = EAST
COUNTY #:  83  RATE DATE:06/20/94  RATER:
TOTAL SCORE:  497  RATE DATE:06/20/94  RATER:
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  0  POSTED SPEED LIMIT:  55
AVERAGE DAILY TRAFFIC:  340
SLOPE HEIGHT SCORE:  15  ACTUAL HEIGHT (FT):  62
DITCH EFFECTIVENESS SCORE:  27  CATCHMENT: LIMITED
REMARKS:

AVERAGE VEHICLE RISK SCORE:  1
PERCENT OF TIME:
REMARKS:

AASHTO DECISION SITE DISTANCE SCORE:  100
ACTUAL SITE DISTANCE (FT):  0
PERCENT OF LOW DESIGN VALUE:  30
REMARKS:  264
WIDTH SCORE:  62  ACTUAL WIDTH (FT):  22.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE:  81  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE:  61  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE:  15  BLOCK SIZE:  1-2
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:  23
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE:  61  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>  

Slope No. 71
Slope No. 73

ROCKFALL HAZARD RATING SYSTEM

HWY #: 114 BMP: 4.30
DISTRICT #: 10 EMP: 4.40 SPEC. CASE: = EAST
COUNTY #: 77 R OF CENTERLINE BMP: 4.30
TOTAL SCORE: 466 RATE DATE: 06/29/93 RATER:
DESIGN CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0 REPAIR CODE:
AVERAGE DAILY TRAFFIC: 7650 POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 12 CATCHMENT:
AVERAGE VEHICLE RISK SCORE: 15 REMARKS:
PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 65 REMARKS:
ACTUAL SITE DISTANCE (FT): 389 PERCENT OF LOW DESIGN VALUE: 44
REMARKS:
WIDTH SCORE: 3 ACTUAL WIDTH (FT): 43.0 REMARKS:
GEOLeGIC CHARACTER - CASE 1 {IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 75 FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 75 DESCRIPTION:
REMARKS:
GEOLeGIC CHARACTER - CASE 2 {IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 20 BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:
DITCH FULL IN PLACES, VEGETATION COVERED BENCHES

Slope No. 74

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80 BMP: 12.40
DISTRICT #: 10 EMP: 12.58 SPEC. CASE: = EAST
COUNTY #: 97 R OF CENTERLINE BMP: 12.40
TOTAL SCORE: 466 RATE DATE: 06/30/93 RATER:
DESIGN CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0 REPAIR CODE:
AVERAGE DAILY TRAFFIC: 6370 POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
REMARKS:
DITCH EFFECTIVENESS SCORE: 22 CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 24 PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 24 ACTUAL SITE DISTANCE (FT): 389
PERCENT OF LOW DESIGN VALUE: 44 REMARKS:
WIDTH SCORE: 1 ACTUAL WIDTH (FT): 86.0 REMARKS:
GEOLeGIC CHARACTER - CASE 1 {IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0 DESCRIPTION:
REMARKS:
GEOLeGIC CHARACTER - CASE 2 {IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85 FEATURES: MAJOR
REMARKS: EXTREME OVERHANGS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81 RATE: EXTREME
REMARKS: SANDSTONE/SHALE BEDDING:
BLOCK SIZE/QUANTITY SCORE: 100 BLOCK SIZE: 10+
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 32
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS: HYDROSTATIC HEAD PRESENT
ROCKFALL HISTORY SCORE: 20 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS:
DITCH FULL IN PLACES, VEGETATION COVERED BENCHES

APPENDIX C - R-HRS Scores
ROCKFALL HAZARD RATING SYSTEM

HWY #: U23  BMP: 2.54  R OF CENTERLINE
DISTRICT #: 12  EMP: 2.72  SPEC. CASE. = NORTH
COUNTY #: 58

TOTAL SCORE: 465  RATE DUE: 08/09/94  RATER: C2T CLASS: A
PRELIMINARY COST ESTIMATE: 0  POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 12/100

SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 112
REMARKS:

DITCH EFFECTIVENESS SCORE: 8  CATCHMENT: GOOD
REMARKS: 3' DITCH

AVERAGE VEHICLE RISK SCORE: 100
REMARKS:

AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
REMARKS: >>100' PERCENT OF LOW DESIGN VALUE: 90

WIDTH SCORE: 14  ACTUAL WIDTH (FT): 33.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85  FEATURES: MAJOR
REMARKS:

(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE: LARGE
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:

ROCKFALL HISTORY SCORE: 8  FALL OCCURRENCE: MANY
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
ROCKFALL HAZARD RATING SYSTEM

Slope No. 77

HWY #: US06 BMP: 8.80 R OF CENTERLINE
DISTRICT #: 9 EMP: 6.87 SPEC. CASE. = EAST
COUNTY #: 22 TOTAL SCORE: 466 DESIGN CODE:
PRELIMINARY COST ESTIMATE: $0 REPAIR CODE:
AVERAGE DAILY TRAFFIC: 3670 POSTED SPEED LIMIT: 55

- SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 111
- DITCH EFFECTIVENESS SCORE: 27 CATCHMENT: LIMITED
- AVERAGE VEHICLE RISK SCORE: 3
- PERCENT OF TIME:
- AASHTO DECISION SITE DISTANCE SCORE: 61
- ACTUAL SITE DISTANCE (FT): 0
- PERCENT OF LOW DESIGN VALUE: 40
- WIDTH SCORE: 3 ACTUAL WIDTH (FT): 45.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES:
ORIENTATIONS:
REMARKS;
(B) ROCK FRICTION SCORE: 0 DESCRIPTION:
REMARKS;

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 45 FEATURES: MAJOR
REMARKS;
(B) DIFFERENCE IN EROSION RATES SCORE: 27 RATE: LARGE
REMARKS:

ADDITIONAL REMARKS AND COMMENTS

Slope No. 78

HWY #: US06 BMP: 69.00 R OF CENTERLINE
DISTRICT #: 10 EMP: 69.00 SPEC. CASE. = WEST
COUNTY #: 77 TOTAL SCORE: 463 DESIGN CODE:
PRELIMINARY COST ESTIMATE: $0 REPAIR CODE:
AVERAGE DAILY TRAFFIC: 4150 POSTED SPEED LIMIT: 65

- SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 0
- DITCH EFFECTIVENESS SCORE: 42 CATCHMENT:
REMARKS;
- AVERAGE VEHICLE RISK SCORE: 3
- PERCENT OF TIME: 23
- AASHTO DECISION SITE DISTANCE SCORE: 61
- ACTUAL SITE DISTANCE (FT): 726
- PERCENT OF LOW DESIGN VALUE: 83
- WIDTH SCORE: 1 ACTUAL WIDTH (FT): 59.0

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES:
ORIENTATIONS:
REMARKS;
(B) ROCK FRICTION SCORE: 0 DESCRIPTION:
REMARKS;

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 55 FEATURES:
REMARKS;
(B) DIFFERENCE IN EROSION RATES SCORE: 73 RATE:
REMARKS:

ADDITIONAL REMARKS AND COMMENTS

>>>

>>>

>>>

APPENDIX C - RUSI Scores
### Slope No. 79

**ROCKFALL HAZARD RATING SYSTEM**

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<thead>
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<th>HWY #: 80</th>
<th>BMP: 2.00</th>
<th>L.OF CENTERLINE</th>
<th>EMP: 2.20</th>
<th>SPEC. CASE. = EAST</th>
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<tbody>
<tr>
<td>DISTRICT #: 12</td>
<td>COUNTY #: 45</td>
<td>TOTAL SCORE: 458</td>
<td>RATE DATE: 07/12/03</td>
<td>RATER: ABISHER</td>
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<td>DESIGN CODE:</td>
<td>REPAIR CODE:</td>
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<td>POSTED SPEED LIMIT: 55</td>
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<td>AVERAGE DAILY TRAFFIC:</td>
<td></td>
<td>TOTALSCORE: 458</td>
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<td>SLOPE HEIGHT SCORE: 100</td>
<td>ACTUAL HEIGHT (FT): 0</td>
<td>REMARKS: GREATER THAN 105 FEET.</td>
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<td>DITCH EFFECTIVENESS SCORE: 39</td>
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<td>REMARKS:</td>
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<td>AVERAGE VEHICLE RISK SCORE: 38</td>
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<td>REMARKS:</td>
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<td>AASHTO DECISION SITE DISTANCE SCORE: 36</td>
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<td>WIDTH SCORE: 1</td>
<td>ACTUAL WIDTH (FT): 82.0</td>
<td>REMARKS:</td>
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**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

(A) STRUCTURAL CONDITION SCORE: 30 | FRACTURES: DISTRICT CONTINUOUS ORIENTATIONS: ADVERSE |

(B) ROCK FRICTION SCORE: 38 | DESCRIPTION: PLANAR |

**GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)**

(A) STRUCTURAL CONDITION SCORE: 30 | FEATURES: |

(B) DIFFERENCE IN EROSION RATES SCORE: 33 | RATE: CASE ONE CONTROLS FOR THIS SLOPE. |

**BLOCK SIZE/QUANTITY SCORE: 12** | BLOCK SIZE: 1 |

**CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20** | PRECIPITATION: MODERATE | FREEZING PERIODS: INTERMITTENT |

**ROCKFALL HISTORY SCORE: 81** | FALL OCCURRENCE: COMMON |

**ADDITIONAL REMARKS AND COMMENTS**

### Slope No. 80

**ROCKFALL HAZARD RATING SYSTEM**

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<th>HWY #: 15</th>
<th>BMP: 22.72</th>
<th>L.OF CENTERLINE</th>
<th>EMP: 22.79</th>
<th>SPEC. CASE. = NORTH</th>
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<tbody>
<tr>
<td>DISTRICT #: 10</td>
<td>COUNTY #: 13</td>
<td>TOTAL SCORE: 457</td>
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<td>AVERAGE DAILY TRAFFIC:</td>
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<td>TOTALSCORE: 457</td>
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<td>SLOPE HEIGHT SCORE: 100</td>
<td>ACTUAL HEIGHT (FT): 0</td>
<td>REMARKS:</td>
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<tr>
<td>DITCH EFFECTIVENESS SCORE: 27</td>
<td>CATCHMENT: LIMITED</td>
<td>REMARKS:</td>
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<td>AVERAGE VEHICLE RISK SCORE: 4</td>
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<td>REMARKS:</td>
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<td>PERCENT OF LOW DESIGN VALUE: 41</td>
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<td>ACTUAL WIDTH (FT): 24.0</td>
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**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

(A) STRUCTURAL CONDITION SCORE: 81 | FRACTURES: CONTINUOUS ORIENTATIONS: ADVERSE |

(B) ROCK FRICTION SCORE: 22 | DESCRIPTION: UNDULATING |

**GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)**

(A) STRUCTURAL CONDITION SCORE: 0 | FEATURES: |

(B) DIFFERENCE IN EROSION RATES SCORE: 0 | RATE: |

**BLOCK SIZE/QUANTITY SCORE: 27** | BLOCK SIZE: 3 |

**CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27** | PRECIPITATION: MODERATE | FREEZING PERIODS: PRESENCE OF WATER ON SLOPE: |

**ROCKFALL HISTORY SCORE: 45** | FALL OCCURRENCE: MANY |

**ADDITIONAL REMARKS AND COMMENTS**

>>> >>

>>> >>

>>> >>
ROCKFALL HAZARD RATING SYSTEM

Slope No. 81

HWY #: 83 BMP: 7.70
DISTRICT #: 12
COUNTY #: 3B
TOTAL SCORE: 457
REPAIR CODE: 0
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 16800

SLOPE HEIGHT SCORE: 17 ACTUAL HEIGHT (FT): 66
REMARKS:
DITCH EFFECTIVENESS SCORE: 10 CATCHMENT: GOOD
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 160
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 18 ACTUAL SITE DISTANCE (FT): 1587 PERCENT OF LOW DESIGN VALUE: 67
REMARKS:
WIDTH SCORE: 1 ACTUAL WIDTH (FT): 62.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 83 FRACTURES: CONTINUOUS ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 42 DESCRIPTION: PLANAR
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 40 FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 41 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 15 BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 1
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION: MODERATE FREEZING PERIODS: SOME PRESENCE OF WATER ON SLOPE: INTERMITTANT
REMARKS:
ROCKFALL HISTORY SCORE: 70 FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 82

HWY #: 175 BMP: 23.70
DISTRICT #: 11
COUNTY #: 118
TOTAL SCORE: 455
REPAIR CODE: 0
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 13250

SLOPE HEIGHT SCORE: 100 ACTUAL HEIGHT (FT): 129
REMARKS:
DITCH EFFECTIVENESS SCORE: 18 CATCHMENT: GOOD
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 157
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 3 ACTUAL SITE DISTANCE (FT): 1086 PERCENT OF LOW DESIGN VALUE: 100
REMARKS:
WIDTH SCORE: 10 ACTUAL WIDTH (FT): 35.0
REMARKS:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 78 FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 27 DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 18 BLOCK SIZE: 1.2 QUANTITY OF MATERIAL (CU YDS):
REMARKS: MUCH LARGER POTENTIAL
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION: FREEZING PERIODS: PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

APPENDIX C - R-HRS Score
ROCKFALL HAZARD RATING SYSTEM

HWY #: 1119  BMP: 7.40  L OF CENTERLINE
DISTRICT #: 11  EMP: 7.43  SPEC. CASE:  = NORTH
COUNTY #: 7  TOTAL SCORE: 445  RATE DATE: 07/21/94  RATER:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 5460  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 115
REMARKS: DITCH EFFECTIVENESS SCORE: 27  CATCHMENT: LIMITED
REMARKS: AVERAGE VEHICLE RISK SCORE: 2
REMARKS: PERCENT OF TIME:
REMARKS: AASHTO DECISION SITE DISTANCE SCORE: 100  ACTUAL SITE DISTANCE (FT): 0
REMARKS: PERCENT OF LOW DESIGN VALUE: 31
REMARKS: WIDTH SCORE: 1  ACTUAL WIDTH (FT): 52.0
REMARKS: CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
REMARKS: PRECIPITATION: FREEZING PERIODS:
REMARKS: ROCKFALL HISTORY SCORE: 30  FALL OCCURRENCE: MANY
REMARKS: ADDITIONAL REMARKS AND COMMENTS
>> LISTED AS TROUBLE AREA BY REGIONAL FOREMEN
>>
>>
Slope No. 86
ROCKFALL HAZARD RATING SYSTEM

HWY #: 755 BMP: 90.50 L OF CENTERLINE = NORTH
DISTRICT #: 7 EMP: 90.50 SPEC. CASE.: = NORTH
COUNTY #: 10 TOTAL SCORE: 443
DESIGN CODE: EMP: 90.50 SPEC. CASE.: = NORTH
PRELIMINARY COST ESTIMATE: 0 POSTED SPEED LIMIT: 65
AVERAGE DAILY TRAFFIC: 21010

SLOPE HEIGHT SCORE: 55 ACTUAL HEIGHT (FT): 91
REMARKS:
DITCH EFFECTIVENESS SCORE: 50 CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 100 PERCENT OF TIME: 217
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
REMARKS: >1300'
WIDTH SCORE: 18 ACTUAL WIDTH (FT): 37.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81 FRACITURES:
ORIEN?ATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 28 DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 10 BLOCK SIZE: 1
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20 PRECIPITATION:
FREZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 80 FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 87

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ROCKFALL HAZARD RATING SYSTEM

HWY #: MTPK BMP: 47.40 L OF CENTERLINE = EAST
DISTRICT #: 10 EMP: 47.45 SPEC. CASE.: = EAST
COUNTY #: 119 TOTAL SCORE: 442
DESIGN CODE: EMP: 47.45 SPEC. CASE.: = EAST
PRELIMINARY COST ESTIMATE: 0 POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 3660

SLOPE HEIGHT SCORE: 29 ACTUAL HEIGHT (FT): 77
REMARKS:
DITCH EFFECTIVENESS SCORE: 40 CATCHMENT: LIMITED
REMARKS:
AVERAGE VEHICLE RISK SCORE: 2 PERCENT OF TIME:
REMARKS:
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ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 47
REMARKS: 419'
WIDTH SCORE: 4 ACTUAL WIDTH (FT): 43.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85 FRACITURES:
CONTINUO? ORIEN?ATIONS: ADVERSE
REMARKS: SOME CLAY INFILLING
(B) ROCK FRICTION SCORE: 30 DESCRIPTION: PLANAR
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(B) DIFFERENCE IN EROSION RATES SCORE: 0 RATE:
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BLOCK SIZE/QUANTITY SCORE: 100 BLOCK SIZE: 6
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27 PRECIPITATION:
FREZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 70 FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 88

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<td>POSTED SPEED LIMIT: 65</td>
</tr>
<tr>
<td>AVERAGE DAILY TRAFFIC:</td>
<td></td>
<td>SLOPE HEIGHT SCORE: 44</td>
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<tr>
<td></td>
<td></td>
<td>ACTUAL HEIGHT (FT): 86</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REMARKS: DITCH EFFECTIVENESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AVERAGE VEHICLE RISK SCORE: 60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AASHTO DECISION SITE DISTANCE SCORE: 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WIDTH SCORE: 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REMARKS: GEOLOGIC CHARACTER - CASE 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(A) STRUCTURAL CONDITION SCORE: 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ORIENTATIONS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FRACTURES:</td>
</tr>
<tr>
<td></td>
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<td>DESCRIPTION:</td>
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<td></td>
<td></td>
<td>REMARKS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DIFFERENCE IN EROSION RATES SCORE: 90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RATE: E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>REMARKS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SLIP RISK ZONE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ROCKFALL HISTORY SCORE: 81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FALL OCCURRENCE:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ADDITIONAL REMARKS AND COMMENTS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOILIMITE, SOFT SHALE, MED. SHALE, SOFT SHALE, LAYERED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MED. SHALE MAKES LAUNCHING FEATURE FOR JOINTED</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOILIMITE WHICH FALLS</td>
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APPENDIX C- RHRS Score

108
### Slope No. 93

**ROCKFALL HAZARD RATING SYSTEM**

<table>
<thead>
<tr>
<th>HWY #: 123</th>
<th>BMP: 21.80</th>
<th>DISTRICT #: 9</th>
<th>EMP: 22.10</th>
<th>COUNTY #: 99</th>
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<tbody>
<tr>
<td>TOTAL SCORE: 425</td>
<td>RATE DATE: 06/28/93</td>
<td>RATER: NORTH</td>
<td>TOTAL SCORE: 435</td>
<td>RATE DATE: 06/28/93</td>
</tr>
</tbody>
</table>

**PRELIMINARY COST ESTIMATE:** $0  
**POSTED SPEED LIMIT:** 55  
**AVERAGE DAILY TRAFFIC:** 7930  
**SLOPE HEIGHT SCORE:** 100  
**ACTUAL HEIGHT (ft):** 0  
**REMARKS:**

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

<table>
<thead>
<tr>
<th>STRUCTURAL CONDITION SCORE: 0</th>
<th>ORIENTATIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAMKNS:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ROCK FRICTION SCORE: 0</th>
<th>DESCRIPTION:</th>
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</thead>
<tbody>
<tr>
<td>REMARKNS:</td>
<td></td>
</tr>
</tbody>
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**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

<table>
<thead>
<tr>
<th>ORIENTATIONS:</th>
<th>DESCRIPTION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADVERSE</td>
<td>UNDULATING</td>
</tr>
<tr>
<td>REMARKNS:</td>
<td></td>
</tr>
</tbody>
</table>

**ADDITIONAL REMARKS AND COMMENTS:**

- SMALL ROCKS (1-3) FOUND ON MEDIAN.

---

### Slope No. 95

---

### Slope No. 96

**ROCKFALL HAZARD RATING SYSTEM**

<table>
<thead>
<tr>
<th>HWY #: 164</th>
<th>BMP: 144.20</th>
<th>DISTRICT #: 9</th>
<th>EMP: 144.36</th>
<th>COUNTY #: 103</th>
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<tr>
<td>TOTAL SCORE: 434</td>
<td>RATE DATE: 07/06/93</td>
<td>RATER: EAST</td>
<td>TOTAL SCORE: 434</td>
<td>RATE DATE: 07/06/93</td>
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</tbody>
</table>

**PRELIMINARY COST ESTIMATE:** $0  
**POSTED SPEED LIMIT:** 55  
**AVERAGE DAILY TRAFFIC:** 9980  
**SLOPE HEIGHT SCORE:** 100  
**ACTUAL HEIGHT (ft):** 198  
**REMARKS:**

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

<table>
<thead>
<tr>
<th>STRUCTURAL CONDITION SCORE: 27</th>
<th>ORIENTATIONS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMARKNS:</td>
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</tr>
</tbody>
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<table>
<thead>
<tr>
<th>DESCRIPTION:</th>
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<td>UNDULATING</td>
<td>UNDULATING</td>
</tr>
<tr>
<td>REMARKNS:</td>
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</table>

**ADDITIONAL REMARKS AND COMMENTS:**

- SMALL ROCKS (1-3) FOUND ON MEDIAN.
ROCKFALL HAZARD RATING SYSTEM

Hwy #: U23 BMP: 6.00
DISTRICT #: 12 EMP: 6.20 SPEC. CASE. = NORTH
COUNTY #: SB DESIGN CODE:
TOTAL SCORE: 434 PRELIMINARY COST ESTIMATE:
DISTRICT #: 12 BMP: 6.00
COUNTRY #: SB RATE DATE: 06/28/93

RATE: SPEC. CASE.
RATER: CUT CLASS: A
TOTAL SCORE: 434
RATE DATE: 06/28/93
RATER: CUT CLASS: A
PRELIMINARY COST ESTIMATE:

AVERAGE DAILY TRAFFIC: 7215
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 12
CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 17
PERCENT OF TIME: 64
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 23
ACTUAL SITE DISTANCE (FT): 550
PERCENT OF LOW DESIGN VALUE: 63
REMARKS:
WIDTH SCORE: 5
ACTUAL WIDTH (FT): 41.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRAC TURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 18
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 16
BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 5-8
REMARKS: SMALL, TALUS MATERIAL
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECESSION:
PRESENCE OF WATER ON SLOPE
REMARKS:
ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 97

ROCKFALL HAZARD RATING SYSTEM

Hwy #: U23 BMP: 22.40
DISTRICT #: 12 EMP: 22.50 SPEC. CASE. = NORTH
COUNTY #: SB TOTAL SCORE: 433
RATER: CUT CLASS: A
PRELIMINARY COST ESTIMATE:

AVERAGE DAILY TRAFFIC: 5645
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (FT): 0
REMARKS: >105'
DITCH EFFECTIVENESS SCORE: 20
CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 8
PERCENT OF TIME: 46
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 23
ACTUAL SITE DISTANCE (FT): 1000
PERCENT OF LOW DESIGN VALUE: 113
REMARKS:
WIDTH SCORE: 31
ACTUAL WIDTH (FT): 27.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRAC TURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 16
BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 5-8
REMARKS: MUCH LARGER POSSIBLE
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECESSION:
PRESENCE OF WATER ON SLOPE
REMARKS:
ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE:
REMARKS: ROCK FALL ZONE
ADDITIONAL REMARKS AND COMMENTS

Slope No. 98
### Slope No. 99

**Rockfall Hazard Rating System**

<table>
<thead>
<tr>
<th>HWY #: 50</th>
<th>BMP: 5.00</th>
<th>R of Centerline</th>
<th>DISTRICT #: 12</th>
<th>EMP: 5.30 SPEC. CASE. = EAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNTY #: 60</td>
<td>TOTAL SCORE: 431</td>
<td>RATE DATE: 09/12/93</td>
<td>RATER: ABSHER</td>
<td>DESIGN CODE: REPAIR CODE: CUT CLASS: A</td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE: $ 0</td>
<td>POSTED SPEED LIMIT: 55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average Daily Traffic:** 4150

- **Slope Height Score:** 100
- **Actual Height (ft):** 113
- **Ditch Effectiveness Score:** 44
- **Catchment:** Low
- **Remarks:**

**Average Vehicle Risk Score:** 12
**Percent of Time:** 87

**Remarks:**

**AASHTO Decision Site Distance Score:** 6
**Actual Site Distance (ft):** 763
**Percent of Low Design Value:** 87

**Remarks:**

**Width Score:** 41
**Actual Width (ft):** 82.0

**Remarks:**

**Geologic Character - Case 1 (If Applicable)**

- **Structural Condition Score:** 73
- **Fractures:** Continuous
- **Orientations:** Adverse

**Remarks:**

- **Geo-Geologic Character - Case 2 (If Applicable)**
  - **Structural Condition Score:** 35
  - **Features:**
  - **Difference in Erosion Rates Score:** 43
    - **Rate:**
      - **Block Size/Quantity Score:** 15
        - **Block Size:** 2
        - **Quantity of Material (cu yds):**
  - **Remarks:**
  - **Climate & Presence of Water on Slope Score:** 20
    - **Precipitation:** Moderate
    - **Freezing Periods:** Some
    - **Presence of Water on Slope:** Common
  - **Remarks:**
  - **Rockfall History Score:** 46
    - **Fall Occurrence:** Many
  - **Remarks:**
  - **Additional Remarks and Comments:**
  - Water Present on Slope
  - **Remarks:**

### Slope No. 100

**Rockfall Hazard Rating System**

<table>
<thead>
<tr>
<th>HWY #: 123</th>
<th>BMP: 5.60</th>
<th>R of Centerline</th>
<th>DISTRICT #: 12</th>
<th>EMP: 5.65 SPEC. CASE. = NORTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNTY #: 58</td>
<td>TOTAL SCORE: 429</td>
<td>RATE DATE: 09/28/93</td>
<td>RATER: ABSHER</td>
<td>DESIGN CODE: REPAIR CODE: CUT CLASS: A</td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE: $ 0</td>
<td>POSTED SPEED LIMIT: 55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Average Daily Traffic:** 4450

- **Slope Height Score:** 10
- **Actual Height (ft):** 0
- **Ditch Effectiveness Score:** 9
- **Catchment:** Low

**Remarks:**

**Average Vehicle Risk Score:** 3
**Percent of Time:**

**Remarks:**

**AASHTO Decision Site Distance Score:** 6
**Actual Site Distance (ft):** 33
**Percent of Low Design Value:** 292

**Remarks:**

**Width Score:** 41
**Actual Width (ft):** 25.0

**Remarks:**

**Geologic Character - Case 1 (If Applicable)**

- **Structural Condition Score:** 75
  - **Features:**
  - **Difference in Erosion Rates Score:** 81
    - **Rate:**
      - **Block Size/Quantity Score:** 9
        - **Block Size:** 1
        - **Quantity of Material (cu yds):**
  - **Remarks:**
  - **Climate & Presence of Water on Slope Score:** 20
    - **Precipitation:** Freezing
    - **Freezing Periods:** Some
    - **Presence of Water on Slope:**
  - **Remarks:**
  - **Rockfall History Score:** 46
    - **Fall Occurrence:** Many
  - **Remarks:**
  - **Additional Remarks and Comments:**
  - Mostly Small, Talus Material Falling
  - **Remarks:**
  - **Ditch Catching All:**
  - **Remarks:**

**APPENDIX C - RHRS Score**
ROCKFALL HAZARD RATING SYSTEM

Slope No. 101

HWY #: 1431  BMP: 13.20  L OF CENTERLINE
DISTRICT #: 3  EMP: 13.20  SPEC. CASE: = NORTH
COUNTY #: 89  TOTAL SCORE: 425
DESIGN CODE:  PRELIMINARY COST ESTIMATE: $0
REPAIR CODE:  AVERAGE DAILY TRAFFIC: 4660
RATER:  POSTED SPEED LIMIT: 55
CUT CLASS: A

SLOPE HEIGHT SCORE: 8  ACTUAL HEIGHT (FT): 48
DITCH EFFECTIVENESS SCORE: 14  CATCHMENT: MODERATE
AVERAGE VEHICLE RISK SCORE: 5  REMARKS:
PERCENT OF TIME: 36
AASHTO DECISION SITE DISTANCE SCORE: 58
ACTUAL SITE DISTANCE (FT): 403
PERCENT OF LOW DESIGN VALUE: 46
WIDTH SCORE: 31  ACTUAL WIDTH (FT): 27.0

GEOLLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  REMARKS:
FRACTURES: CONTINUOUS
ORIENTATIONS:
(b) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:

GEOLLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 78  REMARKS:
FEATURES:
(b) DIFFERENCE IN EROSION RATES SCORE: 69  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 73  BLOCK SIZE: 2
QUANTITY OF MATERIAL (CU YDS):
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 61  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>  >>>  >>>

Slope No. 102

HWY #: 1274  BMP: 12.50  L OF CENTERLINE
DISTRICT #: 10  EMP: 12.63  SPEC. CASE: = EAST
COUNTY #: 83  TOTAL SCORE: 424
DESIGN CODE:  PRELIMINARY COST ESTIMATE: $0
REPAIR CODE:  AVERAGE DAILY TRAFFIC: 340
RATER:  POSTED SPEED LIMIT: 55
CUT CLASS: A

SLOPE HEIGHT SCORE: 7  ACTUAL HEIGHT (FT): 44
DITCH EFFECTIVENESS SCORE: 15  CATCHMENT: MODERATE
AVERAGE VEHICLE RISK SCORE: 1  REMARKS:
PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 58
ACTUAL SITE DISTANCE (FT): 403
PERCENT OF LOW DESIGN VALUE: 3
WIDTH SCORE: 61  ACTUAL WIDTH (FT): 20.0
REMARKS:

GEOLLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81  REMARKS:
FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
(b) ROCK FRICTION SCORE: 25  DESCRIPTION: UNDULATING
REMARKS:

GEOLLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  REMARKS:
FEATURES:
(b) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 73  BLOCK SIZE: 6
QUANTITY OF MATERIAL (CU YDS):
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 29
PRECIPITATION: FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 27  FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>  >>>  >>>  >>>  >>>
ROCKFALL HAZARD RATING SYSTEM

Slope No. 103

HWY #: CR9
BMP: 83.60
COUNTY #: 100
TOTAL SCORE: 423
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 293
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 10
DIAMETER EFFECTIVENESS SCORE: 26
CATCHMENT: MINIMUM
AVERAGE VEHICLE RISK SCORE: 9
PERCENT OF TIME: 54
AASHO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 875
PERCENT OF LOW DESIGN VALUE: 113
WIDTH SCORE: 31
ACTUAL WIDTH (FT): 28.0

GEOLOGIC CHARACTER — CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRAC TURES:

(B) ROCK FRICTION SCORE: 81
DESCRIPTION:

ADDITIONAL REMARKS AND COMMENTS
>>>

Slope No. 104

HWY #: US9
BMP: 22.30
COUNTY #: 12
TOTAL SCORE: 423
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 5645
POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100
DIAMETER EFFECTIVENESS SCORE: 26
CATCHMENT: MINIMUM
AVERAGE VEHICLE RISK SCORE: 7
PERCENT OF TIME: 43
AASHO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 1000
PERCENT OF LOW DESIGN VALUE: 113
WIDTH SCORE: 31
ACTUAL WIDTH (FT): 27.0

GEOLOGIC CHARACTER — CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRAC TURES:

(B) ROCK FRICTION SCORE: 81
DESCRIPTION:

ADDITIONAL REMARKS AND COMMENTS
>>>

ROCKFALL HAZARD RATING SYSTEM

APPENDIX C - RHRS Score

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### ROCKFALL HAZARD RATING SYSTEM

**Slope No. 105**

<table>
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<tr>
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<tr>
<td>DISTRICT #: 8</td>
<td>COUNTY #: 102</td>
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<tr>
<td>TOTAL SCORE: 422</td>
<td>RATE DATE: 06/17/93</td>
</tr>
<tr>
<td>EMP: 13.40</td>
<td>RATER, SPEC. CASE.: EAST</td>
</tr>
<tr>
<td>REPAIR CODE: 0</td>
<td>CUT CLASS: A</td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE:</td>
<td>AVERAGE DAILY TRAFFIC: 6850</td>
</tr>
<tr>
<td>TOTAL SCORE: 422</td>
<td>POSTED SPEED LIMIT: 55</td>
</tr>
<tr>
<td>DESIGN CODE:</td>
<td></td>
</tr>
<tr>
<td>REPAIR CODE:</td>
<td></td>
</tr>
<tr>
<td>PRELIMINARY COST ESTIMATE:</td>
<td></td>
</tr>
<tr>
<td>AVERAGE DAILY TRAFFIC: 11100</td>
<td></td>
</tr>
<tr>
<td>SLOPE HEIGHT SCORE: 100</td>
<td>ACTUAL HEIGHT (FT): 180</td>
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<tr>
<td>DITCH EFFECTIVENESS SCORE: 5</td>
<td>CATCHMENT: GOOD</td>
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<tr>
<td>AVERAGE VEHICLE RISK SCORE: 100</td>
<td>PERCENT OF TIME: 155</td>
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<td>AASHTO DECISION SITE DISTANCE SCORE: 38</td>
<td>ACTUAL SITE DISTANCE (FT): 625</td>
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<td>PERCENT OF LOW DESIGN VALUE: 54</td>
<td>PERCENT OF LOW DESIGN VALUE: 71</td>
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<tr>
<td>WIDTH SCORE: 14</td>
<td>ACTUAL WIDTH (FT): 33.0</td>
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<tr>
<td>GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
<td></td>
</tr>
<tr>
<td>(A) STRUCTURAL CONDITION SCORE: 0</td>
<td>FEATURES:</td>
</tr>
<tr>
<td>(B) DIFFERENCE IN EROSION RATES SCORE: 0</td>
<td>RATE:</td>
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<tr>
<td>BLOCK SIZE/QUANTITY SCORE: 50</td>
<td>QTY. OF MATERIAL (CU YDS):</td>
</tr>
<tr>
<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 20</td>
<td>PRECIPITATION:</td>
</tr>
<tr>
<td>FREEZING PERIODS:</td>
<td>PRESENCE OF WATER ON SLOPE:</td>
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<tr>
<td>ROCKFALL HISTORY SCORE: 27</td>
<td>FALL OCCURRENCE:</td>
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<tr>
<td>FALL OCCURRENCE: MANY</td>
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<td>ADDITIONAL REMARKS AND COMMENTS:</td>
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**Slope No. 106**

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<tr>
<td>DISTRICT #: 8</td>
<td>COUNTY #: 102</td>
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<td>TOTAL SCORE: 422</td>
<td>RATE DATE: 06/17/93</td>
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<tr>
<td>EMP: 13.40</td>
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<tr>
<td>REPAIR CODE: 0</td>
<td>CUT CLASS: A</td>
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<td>PRELIMINARY COST ESTIMATE:</td>
<td>AVERAGE DAILY TRAFFIC: 6850</td>
</tr>
<tr>
<td>TOTAL SCORE: 422</td>
<td>POSTED SPEED LIMIT: 55</td>
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<td>DESIGN CODE:</td>
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<td>PRELIMINARY COST ESTIMATE:</td>
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</tr>
<tr>
<td>AVERAGE DAILY TRAFFIC: 11100</td>
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</tr>
<tr>
<td>SLOPE HEIGHT SCORE: 100</td>
<td>ACTUAL HEIGHT (FT): 180</td>
</tr>
<tr>
<td>DITCH EFFECTIVENESS SCORE: 5</td>
<td>CATCHMENT: GOOD</td>
</tr>
<tr>
<td>AVERAGE VEHICLE RISK SCORE: 100</td>
<td>PERCENT OF TIME: 155</td>
</tr>
<tr>
<td>AASHTO DECISION SITE DISTANCE SCORE: 38</td>
<td>ACTUAL SITE DISTANCE (FT): 625</td>
</tr>
<tr>
<td>PERCENT OF LOW DESIGN VALUE: 54</td>
<td>PERCENT OF LOW DESIGN VALUE: 71</td>
</tr>
<tr>
<td>WIDTH SCORE: 14</td>
<td>ACTUAL WIDTH (FT): 33.0</td>
</tr>
<tr>
<td>GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)</td>
<td></td>
</tr>
<tr>
<td>(A) STRUCTURAL CONDITION SCORE: 0</td>
<td>FEATURES:</td>
</tr>
<tr>
<td>(B) DIFFERENCE IN EROSION RATES SCORE: 0</td>
<td>RATE:</td>
</tr>
<tr>
<td>BLOCK SIZE/QUANTITY SCORE: 50</td>
<td>QTY. OF MATERIAL (CU YDS):</td>
</tr>
<tr>
<td>CLIMATE &amp; PRESENCE OF WATER ON SLOPE SCORE: 20</td>
<td>PRECIPITATION:</td>
</tr>
<tr>
<td>FREEZING PERIODS:</td>
<td>PRESENCE OF WATER ON SLOPE:</td>
</tr>
<tr>
<td>ROCKFALL HISTORY SCORE: 27</td>
<td>FALL OCCURRENCE:</td>
</tr>
<tr>
<td>FALL OCCURRENCE: MANY</td>
<td></td>
</tr>
<tr>
<td>ADDITIONAL REMARKS AND COMMENTS:</td>
<td></td>
</tr>
<tr>
<td>&gt;&gt;&gt;</td>
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<td>&gt;&gt;&gt;</td>
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<td>&gt;&gt;&gt;</td>
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</tr>
</tbody>
</table>
ROCKFALL HAZARD RATING SYSTEM

HWY #: U21
DISTRICT #: 7
COUNTY #: 76
TOTAL SCORE: 422
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 2700
SLOPE HEIGHT SCORE: 12
ACTUAL HEIGHT (FT): 57
REMARKS:
DITCH EFFECTIVENESS SCORE: 75
CATCHMENT: LIMITED
REMARDS: LARGE AMOUNT OF MATERIAL ACROSS ROAD
AVERAGE VEHICLE RISK SCORE: 3
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 13
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 74
REMARKS: 492
WIDTH SCORE: 71
ACTUAL WIDTH (FT): 21.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRAClURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 25
DESCRIPTION: UNDULATING
REMARKS: PLANAR PRESENT
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100
BLOCK SIZE: 8-10
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: MODERATE
FREEZING PERIODS: SOME
PRESENCE OF WATER ON SLOPE: INTERMITTANT
REMARKS:
ROCKFALL HISTORY SCORE: 15
FALL OCCURRENCE: CONTINUOUS
REMARKS: ROCKS ACROSS ROAD
ADDITIONAL REMARKS AND COMMENTS
>>> DITCH NEEDS ENLARGING
>>>
>>>

Slope No. 107

ROCKFALL HAZARD RATING SYSTEM

HWY #: U21X
DISTRICT #: 12
COUNTY #: 67
TOTAL SCORE: 418
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 2900
SLOPE HEIGHT SCORE: 2
ACTUAL HEIGHT (FT): 15
REMARKS:
DITCH EFFECTIVENESS SCORE: 10
CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 4
PERCENT OF TIME: 31
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 51
PERCENT OF LOW DESIGN VALUE: 6
REMARKS:
WIDTH SCORE: 71
ACTUAL WIDTH (FT): 21.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRAClURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 30
DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 17
BLOCK SIZE: 1-2
QUANTITY OF MATERIAL (CU YDS):
REMARKS: MUCH LARGER POSSIBLE
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81
FALL OCCURRENCE:
REMARKS: ROCK FALL ZONE
ADDITIONAL REMARKS AND COMMENTS
>>> SLOPE OVERHANGS THE ROAD.
>>> CLOSERNESS OF SLOPE TO ROAD IS REAL DANGER.
>>>

Slope No. 108
ROCKFALL HAZARD RATING SYSTEM

HWY #: 52  BMP: 21.90  L OF CENTERLINE  = EAST
DISTRICT #: 7  EMP: 22.90  SPEC. CASE.  = EAST
COUNTY #: 70  RATE: 06/29/93  RATER: BECKHAM
TOTAL SCORE: 415  REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 5180
SLOPE EFFECTIVENESS SCORE: 5  POSTED SPEED LIMIT: 55
ACTUAL HEIGHT (FT): 26
REMARKS:
DITCH EFFECTIVENESS SCORE: 40  CATCHMENT: M-I
REMARKS:
AVERAGE VELOCITY RISK SCORE: 5  PERCENT OF TIME: 36
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 77  ACTUAL Site DISTANCE (FT): 555
PERCENT OF LOW DESIGN VALUE: 41
REMARKS:
WIDTH SCORE: 5  ACTUAL WIDTH (FT): 41.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION: PLANAR
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81  FEATURES: M
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81  RATE: E
REMARKS: SOFT ROCK UNDER LARGE BLOCKS
BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE: >6
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: M-H  FREEZING PERIODS: 5-L
PRESENCE OF WATER ON SLOPE: I
REMARKS:
ROCKFALL HISTORY SCORE: 20  FALL OCCURRENCE: 0
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 109

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80  BMP: 10.80  R OF CENTERLINE  = EAST
DISTRICT #: 10  EMP: 10.98  SPEC. CASE.  = EAST
COUNTY #: 97  RATE: 06/29/93  RATER: CUT CLASS: A
TOTAL SCORE: 413  REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 5370
SLOPE EFFECTIVENESS SCORE: 100  POSTED SPEED LIMIT: 55
ACTUAL HEIGHT (FT): 0
REMARKS:
DITCH EFFECTIVENESS SCORE: 8  CATCHMENT: GOOD
REMARKS:
AVERAGE VELOCITY RISK SCORE: 20  PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 29  ACTUAL Site DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE:
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 82  FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS: 10' BLOCK AT TOP OF SLOPE
(B) ROCK FRICTION SCORE: 29  DESCRIPTION: PLANAR
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES: M
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE: E
REMARKS: BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 10+
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: M-H  FREEZING PERIODS: PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 9  FALL OCCURRENCE: OCCASIONAL
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 110
ROCKFALL HAZARD RATING SYSTEM

Slope No. 111

HWY #: U25W  BMP: 12.00  R OF CENTERLINE
DISTRICT #: 11  EMP: 12.00  SPEC. CASE.  >> = NORTH
COUNTY #: 118
TOTAL SCORE: 411
RATE DATE: 09/15/03  RATER:  
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 11300  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 18  ACTUAL HEIGHT (FT): 66
REMARKS:  DITCH EFFECTIVENESS SCORE: 12  CATCHMENT: M
REMARKS: NEEDS CLEANING, FULL
AVERAGE VEHICLE RISK SCORE: 4  PERCENT OF TIME: 34
REMARKS:  AASHTO DECISION SITE DISTANCE SCORE: 13
ACTUAL SITE DISTANCE (FT): 649
PERCENT OF LOW DESIGN VALUE: 74
REMARKS:  WIDTH SCORE: 41  ACTUAL WIDTH (FT): 25.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) DIFFERENCE IN EROSION RATES SCORE: 0
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE: E
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 0  BLOCK SIZE: 0
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 0
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 0  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 112

HWY #: U200  BMP: 6.70  L OF CENTERLINE
DISTRICT #: 9  EMP: 6.80  SPEC. CASE.  = EAST
COUNTY #: 103
TOTAL SCORE: 411  RATE DATE: 07/21/93  RATER: ABSHER
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
AVERAGE DAILY TRAFFIC: 5860  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 8  ACTUAL HEIGHT (FT): 46
REMARKS:  DITCH EFFECTIVENESS SCORE: 67  CATCHMENT: L-N
REMARKS:
AVERAGE VEHICLE RISK SCORE: 5  PERCENT OF TIME: 37
REMARKS:  AASHTO DECISION SITE DISTANCE SCORE: 65
ACTUAL SITE DISTANCE (FT): 369
PERCENT OF LOW DESIGN VALUE:
REMARKS:  WIDTH SCORE: 36  ACTUAL WIDTH (FT): 26.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) DIFFERENCE IN EROSION RATES SCORE: 0
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE: E
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 0  BLOCK SIZE: 0
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 0
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 0  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

APPENDIX C - RFRS Scores

118
ROCKFALL HAZARD RATING SYSTEM

HWY #: 80  BMP: 0.10  R OF CENTERLINE  EMP: 0.15 SPEC. CASE: = EAST
DISTRICT #: 12
COUNTY #: 30
TOTAL SCORE: 409
PRELIMINARY COST ESTIMATE: $ 0.10
AVERAGE DAILY TRAFFIC: 4980
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 36  ACTUAL HEIGHT (FT): 83
REMARKS:
DITCH EFFECTIVENESS SCORE: 56  CATCHMENT: LOW
REMARKS:
AVERAGE VEHICLE RISK SCORE: 8  PERCENT OF TIME: 30
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 35  ACTUAL SITE DISTANCE (FT): 7875
PERCENT OF LOW DESIGN VALUE: 150
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:

GEOLLOGIC CHARACTER -- CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 65  FRAC TURES: DISTRICT CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
REMARKS:
(B) ROCK FRICTION SCORE: 48  DESCRIPTION: PLANAR
REMARKS:

GEOLLOGIC CHARACTER -- CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 35  FRAC TURES: OCCASIONAL
ORIENTATIONS:
REMARKS:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 46  RATE: LARGE
REMARKS:
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>> DITCH COULD BE MADE LARGER. AREAS OF FRACTURE THAT
>>> COULD BE POSSIBLE FUTURE SLIDE HAZARDS.
>>>
ROCKFALL HAZARD RATING SYSTEM

HWY #: MTPK
DISTRICT #: 10
COUNTY #: 77
TOTAL SCORE: 408
AVERAGE DAILY TRAFFIC: 4,120
PRELIMINARY COST ESTIMATE: $ 0
SLOPE HEIGHT SCORE: 100
DITCH EFFECTIVENESS SCORE: 20
AVERAGE VEHICLE RISK SCORE: 8
PERCENT OF TIME: 47
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 130
PERCENT OF LOW DESIGN VALUE: 100
WIDTH SCORE: 21

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81
FRAC TURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 30
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 37
BLOCK SIZE: 2.3
QUANTITY OF MATERIAL (CU YDS):
REMARKS: LARGER POSSIBLE
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 51
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> DITCH NEEDS CLEANING. LARGE SANDSTONE OVERHANGS
>>> 100'-127' ABOVE ROADWAY

Slope No. 115

ROCKFALL HAZARD RATING SYSTEM

HWY #: U127
DISTRICT #: 8
COUNTY #: 104
TOTAL SCORE: 408
AVERAGE DAILY TRAFFIC: 1,300
PRELIMINARY COST ESTIMATE: $ 0
SLOPE HEIGHT SCORE: 100
DITCH EFFECTIVENESS SCORE: 20
AVERAGE VEHICLE RISK SCORE: 2
PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 20
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 53
WIDTH SCORE: 62

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 61
FRAC TURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 22
DESCRIPTION: UNDULATING
REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 27
BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS):
REMARKS: LARGER POSSIBLE
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 27
FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> DITCH NEEDS CLEANING. LARGE SANDSTONE OVERHANGS
>>> 100'-127' ABOVE ROADWAY
>>>
### ROCKFALL HAZARD RATING SYSTEM

**Slope No. 117**

| HWY #: 184 | BMP: 53.80 | L OF CENTERLINE | SPEC. CASE: L | = WEST |
| DISTRICT #: 5 | EMP: 54.80 | = CENTERLINE | SPEC. CASE: 5 | = CENTERLINE |
| COUNTY #: 37 | TOTAL SCORE: 405 | RATE DATE: 03/02/93 | RATER: ABSCALIFAR | |
| DESIGN CODE: | REPAIR CODE: | CUT CLASS: A | |
| PRELIMINARY COST ESTIMATE: $ 0 | AVERAGE DAILY TRAFFIC: 11550 | POSTED SPEED LIMIT: 65 |
| SLOPE HEIGHT SCORE: 20 | ACTUAL HEIGHT (FT): 66 |
| STREAM EFFECTIVENESS SCORE: 36 | CATCHMENT: M TO L |
| REMARKS: DITCH NEEDS CLEANING |
| AVERAGE VEHICLE RISK SCORE: 100 |
| PERCENT OF TIME: 421 |
| REMARKS: |
| AASHTO DECISION SITE DISTANCE SCORE: 18 |
| ACTUAL SITE DISTANCE (FT): 687 |
| PERCENT OF LOW DESIGN VALUE: 67 |
| REMARKS: |
| WIDTH SCORE: 9 | ACTUAL WIDTH (FT): 82.0 |
| REMARKS: |
| GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE) |
| (A) STRUCTURAL CONDITION SCORE: 45 |
| FRACTURES: CONTINUOUS |
| ORIENTATIONS: ADVERSE |
| REMARKS: |
| (B) ROCK FRICTION SCORE: 27 |
| DESCRIPTION: PLANER |
| REMARKS: |
| GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE) |
| (A) STRUCTURAL CONDITION SCORE: 33 |
| FEATURES: |
| (B) DIFFERENCE IN EROSION RATES SCORE: 34 |
| RATE: |
| BLOCK SIZE/QUANTITY SCORE: 32 |
| BLOCK SIZE: 3 |
| REMARKS: |
| QUANTITY OF MATERIAL (CU YDS): |
| STRATA & PRESENCE OF WATER ON SLOPE SCORE: 20 |
| PRECIPITATION: FREEZING PERIODS |
| REMARKS: |
| ROCKFALL HISTORY SCORE: 61 |
| FALL OCCURRENCE: |
| REMARKS: PROBABLE FALLING ROCK ZONE |
| ADDITIONAL REMARKS AND COMMENTS |
| >>> DITCH NEEDS CLEANING |
| >>> |
| >>> |

### ROCKFALL HAZARD RATING SYSTEM

**Slope No. 118**

| HWY #: 80 | BMP: 11.30 | L OF CENTERLINE | SPEC. CASE: 111 | = EAST |
| DISTRICT #: 12 | EMP: 11.50 | = CENTERLINE | SPEC. CASE: 111 | = CENTERLINE |
| COUNTY #: 60 | TOTAL SCORE: 405 | RATE DATE: 07/12/93 | RATER: ABSCALIFAR | |
| DESIGN CODE: | REPAIR CODE: | CUT CLASS: A | |
| PRELIMINARY COST ESTIMATE: $ 0 | AVERAGE DAILY TRAFFIC: 4470 | POSTED SPEED LIMIT: 55 |
| SLOPE HEIGHT SCORE: 100 | ACTUAL HEIGHT (FT): 0 |
| STREAM EFFECTIVENESS SCORE: 36 | CATCHMENT: MODERATE |
| REMARKS: | |
| AVERAGE VEHICLE RISK SCORE: 8 |
| PERCENT OF TIME: 47 |
| REMARKS: |
| AASHTO DECISION SITE DISTANCE SCORE: 18 |
| ACTUAL SITE DISTANCE (FT): 587 |
| PERCENT OF LOW DESIGN VALUE: 87 |
| REMARKS: |
| WIDTH SCORE: 1 | ACTUAL WIDTH (FT): 82.0 |
| REMARKS: |
| GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE) |
| (A) STRUCTURAL CONDITION SCORE: 45 |
| FRACTURES: CONTINUOUS |
| ORIENTATIONS: ADVERSE |
| REMARKS: |
| (B) ROCK FRICTION SCORE: 27 |
| DESCRIPTION: PLANER |
| REMARKS: |
| GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE) |
| (A) STRUCTURAL CONDITION SCORE: 33 |
| FEATURES: |
| (B) DIFFERENCE IN EROSION RATES SCORE: 34 |
| RATE: |
| BLOCK SIZE/QUANTITY SCORE: 32 |
| BLOCK SIZE: 1 |
| REMARKS: |
| QUANTITY OF MATERIAL (CU YDS): |
| STRATA & PRESENCE OF WATER ON SLOPE SCORE: 20 |
| PRECIPITATION: FREEZING PERIODS |
| REMARKS: |
| ROCKFALL HISTORY SCORE: 62 |
| FALL OCCURRENCE: COMMON |
| REMARKS: FALLEN ROCK ZONE |
| ADDITIONAL REMARKS AND COMMENTS |
| >>> DITCH NEEDS CLEANING |
| >>> |
| >>> |
Slope No. 119

ROCKFALL HAZARD RATING SYSTEM

HWY #: 68 BMP: 119.50 DISTRICT #: 9 COUNTY #: 57
TOTAL SCORE: 405 PRELIMINARY COST ESTIMATE: 0 AVERAGE DAILY TRAFFIC: 7150
POSTED SPEED LIMIT: 65 SLOPE HEIGHT SCORE: 8 ACTUAL HEIGHT (FT): 46 

Slope No. 120

ROCKFALL HAZARD RATING SYSTEM

HWY #: 68 BMP: 0.89 DISTRICT #: 7 COUNTY #: 57
TOTAL SCORE: 405 PRELIMINARY COST ESTIMATE: 0 AVERAGE DAILY TRAFFIC: 2840
ROCKFALL HAZARD RATING SYSTEM

Slope No. 121

HWY #: U421  BMP: 0.52  L OF CENTERLINE
DISTRICT #: 7  EMP: 0.55 SPEC. CASE. = NORTH
COUNTY #: 76  TOTAL SCORE: 402  RATE DATE: 09/13/94  RATER: CUT CLASS: A
DEBRIS CODE:  REPAIR CODE: PRELIMINARY COST ESTIMATE: 0  AVERAGE DAILY TRAFFIC: 2700
PRELIMINARY COST ESTIMATE: 0  POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 31  ACTUAL HEIGHT (FT): 78
REMARKS:
DITCH EFFECTIVENESS SCORE: 27 CATCHMENT: LIMITED
REMARKS: ALMOST NONE
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 6
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 87
REMARKS: 504'
WIDTH SCORE: 54  ACTUAL WIDTH (FT): 23.0
REMARKS:
GELOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 61  FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 50  DESCRIPTION: UNDULATING
REMARKS: CLAY INFILLING
GELOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(3) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 5.7
QUANTITY OF MATERIAL (CU YDS): 25
REMARKS: BIGGER BLOCKS FOUND
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 25
FREEZING PERIODS: SOME
PRESENT OF WATER ON SLOPE: TEMPORARY
REMARKS:
ROCKFALL HISTORY SCORE: 27  FALL OCCURRENCE: OCCASIONAL
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> SURVEYED WITH CLINOMETER FOR SIMULATION
>>> 0
>>> 0

ROCKFALL HAZARD RATING SYSTEM

Slope No. 122

HWY #: 1274  BMP: 13.30  L OF CENTERLINE
DISTRICT #: 10  EMP: 13.38  SPEC. CASE. = EAST
COUNTY #: 83  TOTAL SCORE: 401  RATE DATE: 09/21/94  RATER: CUT CLASS: A
DEBRIS CODE:  REPAIR CODE: PRELIMINARY COST ESTIMATE: 0  AVERAGE DAILY TRAFFIC: 340
PRELIMINARY COST ESTIMATE: 0  POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 150
REMARKS:
DITCH EFFECTIVENESS SCORE: 35 CATCHMENT: LIMITED
REMARKS:
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 87
REMARKS: >1000'
WIDTH SCORE: 71  ACTUAL WIDTH (FT): 21.0
REMARKS:
GELOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 55  FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 23  DESCRIPTION: UNDULATING
REMARKS:
GELOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 21  BLOCK SIZE: 2.5
QUANTITY OF MATERIAL (CU YDS): 27
REMARKS: MUCH LARGER POTENTIAL
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
FREEZING PERIODS: SOME
PRESENT OF WATER ON SLOPE: OCCASIONAL
REMARKS:
ROCKFALL HISTORY SCORE: 37  FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> 0
>>> 0
>>> 0
ROCKFALL HAZARD RATING SYSTEM

HWY #: L68  BMP: 1.02  LOCATION: R OF CENTERLINE  DISTRICT #: 7  EMP: 0.98 SPEC. CASE.  = EAST
COUNTY #: 37  RATE DATE:06/01/94  RATER:  REPAIR CODE:  RES:  1 TOTAL SCORE: 401  AVERAGE DAILY TRAFFIC: 2040  POSTED SPEED LIMIT: 35
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 2940  POSTED SPEED LIMIT: 35
SLOPE HEIGHT SCORE: 3  ACTUAL HEIGHT (FT): 28  REMARKS:
DITCH EFFECTIVENESS SCORE: 73  CATCHMENT:  REMARKS: NEEDS CLEANING
AVERAGE VEHICLE RISK SCORE: 2  PERCENT OF TIME: 16  REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100  ACTUAL SITE DISTANCE (FT): 0  REMARKS: 84
WIDTH SCORE: 41  ACTUAL WIDTH (FT): 25.0  REMARKS:
GEOLOGIC CHARACTER - CASE 1  (IF APPLICABLE)  (A) STRUCTURAL CONDITION SCORE: 81  FRAC- TURES: CONTINUOUS  ORIENTATIONS: ADVERSE  REMARKS:
(G) ROCK SLIDE SCORE: 15  DESCRIPTION: UNDULATING  REMARKS:
GEOLOGIC CHARACTER - CASE 2  (IF APPLICABLE)  (A) STRUCTURAL CONDITION SCORE: 0  FEATURES:  REMARKS:
(G) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:  REMARKS:
BLOCK SIZE/QUANTITY SCORE: 9  BLOCK SIZE: 2  QUANTITY OF MATERIAL (CU YDS):  REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27  PRECIPITATION:  FREEZING PERIODS:  REMARKS:
ROCKFALL HISTORY SCORE: 50  FALL OCCURRENCE:  REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> >>>

Slope No. 123

ROCKFALL HAZARD RATING SYSTEM

HWY #: L14  BMP: 2.60  LOCATION: R OF CENTERLINE  DISTRICT #: 12  EMP: 2.70 SPEC. CASE.  = EAST
COUNTY #: 38  RATE DATE:06/09/93  RATER:  REPAIR CODE:  RES:  0 TOTAL SCORE: 400  AVERAGE DAILY TRAFFIC: 7560  POSTED SPEED LIMIT: 55
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 7580  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 52  ACTUAL HEIGHT (FT): 90  REMARKS:
DITCH EFFECTIVENESS SCORE: 35  CATCHMENT:  REMARKS:
AVERAGE VEHICLE RISK SCORE: 5  PERCENT OF TIME: 36  REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 1000  REMARKS:
WIDTH SCORE: 14  ACTUAL WIDTH (FT): 33.0  REMARKS:
GEOLOGIC CHARACTER - CASE 1  (IF APPLICABLE)  (A) STRUCTURAL CONDITION SCORE: 81  FRAC- TURES:  ORIENTATIONS: ADVERSE  REMARKS:
(G) ROCK SLIDE SCORE: 85  DESCRIPTION:  REMARKS:
GEOLOGIC CHARACTER - CASE 2  (IF APPLICABLE)  (A) STRUCTURAL CONDITION SCORE: 0  FEATURES:  REMARKS:
(G) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:  REMARKS:
BLOCK SIZE/QUANTITY SCORE: 26  BLOCK SIZE: 1.5  QUANTITY OF MATERIAL (CU YDS):  REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  PRECIPITATION:  FREEZING PERIODS:  REMARKS:
ROCKFALL HISTORY SCORE: 61  FALL OCCURRENCE:  REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> >>>

Slope No. 124

APPENDIX C--RWS Scores
ROCKFALL HAZARD RATING SYSTEM

Slope No. 125

HWY #: U19  BMP: 6.30  L OF CENTERLINE = NORTH
DISTRICT #: 11  EMP: 6.40 SPEC. CASE.
COUNTY #: 7  TOTAL SCORE: 400  RATE DATE: 06/14/93  RATE: CAUDIL/LABBASHER
DESIGN CODE: REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 4520  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 22  ACTUAL HEIGHT (FT): 70
REMARKS:
DITCH EFFECTIVENESS SCORE: 70  CATCHMENT: NONE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 25  PERCENT OF TIME: 73
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 16  ACTUAL SITE DISTANCE (FT): 634
PERCENT OF LOW DESIGN VALUE: 69
REMARKS:
WIDTH SCORE: 18  ACTUAL WIDTH (FT): 31.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 70  FEATURES: LARGE
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 46  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 20  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 4
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  PRECIPITATION: MODERATE
FREZING PERIODS: SOME PRESENCE OF WATER ON SLOPE: OCCASIONAL
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: COMMON
REMARKS: FALLEN ROCK ZONE
ADDITIONAL REMARKS AND COMMENTS
>>> ROCKS FOUND ON OPPOSITE SIDE OF THE ROAD.
>>>

Slope No. 126

HWY #: 1274  BMP: 13.30  L OF CENTERLINE = EAST
DISTRICT #: 10  EMP: 13.38 SPEC. CASE.
COUNTY #: 83  TOTAL SCORE: 399  RATE DATE: 06/21/94  RATE: CUT CLASS: A
DESIGN CODE: REPAIR CODE: 0
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 340  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 122
REMARKS:
DITCH EFFECTIVENESS SCORE: 25  CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 1  PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE:
REMARKS: >1300'
WIDTH SCORE: 71  ACTUAL WIDTH (FT): 21.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27  FRACTURES: DISTRICT CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 12  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 4.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27  PRECIPITATION:
FREZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 35  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>

APPENDIX C - RHS Scores

125
Slope No. 127

ROCKFALL HAZARD RATING SYSTEM


Slope No. 128

ROCKFALL HAZARD RATING SYSTEM

Slope No. 129

ROCKFALL HAZARD RATING SYSTEM

HWY #: 64  BMP: 118.30  OF CENTERLINE = EAST
DISTRICT #: 9  EMP: 118.50  SPEC. CASE.:
COUNTY #: 8  RATE: CAUDILL
TOTAL SCORE: 397  RATE DATE: 06/03/93
DESIGN CODE: 0  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 7150
POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 9  ACTUAL HEIGHT (FT): 50
REMARKS: DITCH DOES WELL, NEEDS TO BE CLEANED
AVERAGE VEHICLE RISK SCORE: 29
REMARKS:
AASHO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
REMARKS: SITE DISTANCE >1500, PERCENT > 100
WIDTH SCORE: 9  ACTUAL WIDTH (FT): 39.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES: CONTINUOUS
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 81  FEATURES: M
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81  RATE: E
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 81  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 12
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 0
PRECIPITATION: FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:
REMARKS: PROBABLE FALLING ROCK ZONE
ADDITIONAL REMARKS AND COMMENTS
>>> FOUR PEOPLE ANALYZED THE SLOPE - THE RESULTS
>>> ABOVE ARE FROM THE PERSON CLOSEST TO THE AVG.

Slope No. 130

ROCKFALL HAZARD RATING SYSTEM

HWY #: 60  BMP: 1.74  OF CENTERLINE = WEST
DISTRICT #: 12  EMP: 1.90  SPEC. CASE.:
COUNTY #: 8  RATE: CAUDILL
TOTAL SCORE: 395  RATE DATE: 08/09/94
DESIGN CODE: 0  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $0  AVERAGE DAILY TRAFFIC: 4150
POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 205
REMARKS:
DITCH EFFECTIVENESS SCORE: 0  CATCHMENT: MODERATE
REMARKS: BENCHES CATCHING MANY FALLS
AVERAGE VEHICLE RISK SCORE: 9
REMARKS:
AASHO DECISION SITE DISTANCE SCORE: 15
ACTUAL SITE DISTANCE (FT): 0
REMARKS: SITE DISTANCE >1500, PERCENT > 100
WIDTH SCORE: 9  ACTUAL WIDTH (FT): 36.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 71  FRACTURES: CONTINUOUS
REMARKS:
(B) ROCK FRICTION SCORE: 29  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS): 12
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 0
PRECIPITATION: FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:
REMARKS: PROBABLE FALLING ROCK ZONE
ADDITIONAL REMARKS AND COMMENTS
>>> FOUR PEOPLE ANALYZED THE SLOPE - THE RESULTS
>>> ABOVE ARE FROM THE PERSON CLOSEST TO THE AVG.
<table>
<thead>
<tr>
<th>Slope No. 131</th>
<th>Slope No. 132</th>
</tr>
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</table>

**ROCKFALL HAZARD RATING SYSTEM**

<table>
<thead>
<tr>
<th>HWY #: 52</th>
<th>BMP: 22.30</th>
<th>HWY #: 184</th>
<th>BMP: 167.80</th>
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<tbody>
<tr>
<td>R O F CENTERLINE</td>
<td>EMP: 22.40</td>
<td>SPEC. CASE.</td>
<td>EMP: 165.80</td>
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<tr>
<td>DISTRICT #: 7</td>
<td>COUNTY #: 76</td>
<td>DISTRICT #: 9</td>
<td>COUNTY #: 22</td>
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<tr>
<td>TOTAL SCORE: 393</td>
<td>RATE DATE: 06/06/94</td>
<td>TOTAL SCORE: 392</td>
<td>RATE DATE: 06/07/93</td>
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<tr>
<td>PRELIMINARY COST ESTIMATE: 0</td>
<td>POSTED SPEED LIMIT: 55</td>
<td>PRELIMINARY COST ESTIMATE: 0</td>
<td>POSTED SPEED LIMIT: 65</td>
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</table>

**SLOPE HEIGHT SCORE:** 35  
**ACTUAL HEIGHT (FT):** 81  
**REMARKS:**

**DITCH EFFECTIVENESS SCORE:** 9  
**CATCHMENT:**

**AVERAGE DAILY TRAFFIC:** 5180  
**POSTED SPEED LIMIT:** 55  
**AVERAGE VELOCITY:** 140  
**PRELIMINARY COST ESTIMATE:** $100,000  
**TOTAL SCORE:** 393  
**DESIGN CODE:** REPAIR CODE: CUT CLASS: A

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

(A) **STRUCTURAL CONDITION SCORE:** 81  
**FRACtURES:** CONTINUOUS  
**ORIENTATIONS:** ADVERSE  
**REMARKS:**

(B) **ROCK FRICTION SCORE:** 81  
**DESCRIPTION:** CLAY-SLICK  
**REMARKS:**

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

(A) **STRUCTURAL CONDITION SCORE:** 0  
**FEATURES:**

(B) **DIFFERENCE IN EROSION RATES SCORE:** 0  
**RATE:**

**BLOCK SIZE/QUANTITY SCORE:** 9  
**BLOCK SIZE:** 2  
**QUANTITY OF MATERIAL (CU YDS):**

**CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:** 27  
**PRECIPITATION:** FREEZING PERIODS:

**PRESENCE OF WATER ON SLOPE:**

**ROCKFALL HISTORY SCORE:** 65  
**FALL OCCURRENCE:**

**ADDITIONAL REMARKS AND COMMENTS**

<table>
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**ROCKFALL HAZARD RATING SYSTEM**

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<tr>
<th>HWY #: 184</th>
<th>BMP: 167.80</th>
<th>HWY #: 184</th>
<th>BMP: 167.80</th>
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<tbody>
<tr>
<td>R O F CENTERLINE</td>
<td>EMP: 165.80</td>
<td>SPEC. CASE.</td>
<td>EMP: 165.80</td>
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<td>DISTRICT #: 9</td>
<td>COUNTY #: 22</td>
<td>DISTRICT #: 9</td>
<td>COUNTY #: 22</td>
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<tr>
<td>TOTAL SCORE: 392</td>
<td>RATE DATE: 06/07/93</td>
<td>TOTAL SCORE: 392</td>
<td>RATE DATE: 06/07/93</td>
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<tr>
<td>PRELIMINARY COST ESTIMATE: 0</td>
<td>POSTED SPEED LIMIT: 65</td>
<td>PRELIMINARY COST ESTIMATE: 0</td>
<td>POSTED SPEED LIMIT: 65</td>
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</tbody>
</table>

**SLOPE HEIGHT SCORE:** 42  
**ACTUAL HEIGHT (FT):** 85  
**REMARKS:**

**DITCH EFFECTIVENESS SCORE:** 13  
**CATCHMENT:**

**AVERAGE DAILY TRAFFIC:** 6250  
**POSTED SPEED LIMIT:** 65  
**AVERAGE VELOCITY:** 140  
**PRELIMINARY COST ESTIMATE:** $100,000  
**TOTAL SCORE:** 392  
**DESIGN CODE:** REPAIR CODE: CUT CLASS: A

**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

(A) **STRUCTURAL CONDITION SCORE:** 81  
**FRACtURES:** CONTINUOUS  
**ORIENTATIONS:** ADVERSE  
**REMARKS:**

(B) **ROCK FRICTION SCORE:** 47  
**DESCRIPTION:**

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

(A) **STRUCTURAL CONDITION SCORE:** 0  
**FEATURES:**

(B) **DIFFERENCE IN EROSION RATES SCORE:** 0  
**RATE:**

**BLOCK SIZE/QUANTITY SCORE:** 8  
**BLOCK SIZE:** 1-2  
**QUANTITY OF MATERIAL (CU YDS):**

**CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:** 20  
**PRECIPITATION:** FREEZING PERIODS:

**PRESENCE OF WATER ON SLOPE:**

**ROCKFALL HISTORY SCORE:** 81  
**FALL OCCURRENCE:**

**ADDITIONAL REMARKS AND COMMENTS**

| Slope No. 132 |
### Rockfall Hazard Rating System

**Slope No. 133**

<table>
<thead>
<tr>
<th>Parameter</th>
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<td>Average Daily Traffic</td>
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<td>Posted Speed Limit</td>
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<tr>
<td>Slope Height Score</td>
<td>11</td>
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<tr>
<td>Average Vehicle Risk Score</td>
<td>2</td>
</tr>
<tr>
<td>AASHTO Decision Site Distance Score</td>
<td>36</td>
</tr>
<tr>
<td>Width Score</td>
<td>54</td>
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<td>Preliminary Cost Estimate</td>
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<td>Design Code</td>
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<td>Rate Date</td>
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<tr>
<td>Rater</td>
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<tr>
<td>Repair Code</td>
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</tr>
<tr>
<td>Rate Class</td>
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</tbody>
</table>

**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

- **Structural Condition Score**: 0
- **Features**: 
- **Difference in Erosion Rates Score**: 0
- **Rate**: Large

- **Block Size/Quantity Score**: 100
- **Quantity of Material (cu yds)**: 5.0
- **Climate & Presence of Water on Slope Score**: 25
- **Presence of Water on Slope**: 

**REMARKS**: 

Additional Remarks and Comments

---

**Slope No. 134**

<table>
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<th>Parameter</th>
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<tr>
<td>Posted Speed Limit</td>
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<td>Slope Height Score</td>
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<tr>
<td>Average Vehicle Risk Score</td>
<td>1</td>
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<tr>
<td>AASHTO Decision Site Distance Score</td>
<td>33</td>
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<tr>
<td>Width Score</td>
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<tr>
<td>Preliminary Cost Estimate</td>
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<td>Design Code</td>
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<tr>
<td>Rate Date</td>
<td>07/05/94</td>
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<td>Rater</td>
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<td>Repair Code</td>
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</tr>
<tr>
<td>Rate Class</td>
<td>A</td>
</tr>
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</table>

**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

- **Structural Condition Score**: 0
- **Features**: Occasional
- **Difference in Erosion Rates Score**: 27
- **Rate**: Large

- **Block Size/Quantity Score**: 100
- **Quantity of Material (cu yds)**: 15
- **Climate & Presence of Water on Slope Score**: 27
- **Presence of Water on Slope**: 

**REMARKS**: 

Additional Remarks and Comments

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**APPENDIX C - RHRS Scores**

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ROCKFALL HAZARD RATING SYSTEM

Slope No. 135

HWY #: I-64 BMP: 177.80 R OF CENTERLINE
DISTRICT #: 0 EMP: 177.90 SPEC. CASE. = EAST
COUNTY #: 22 TOTAL SCORE: 587 RATE DATE: 06/04/93 RATER:
DESIGN CODE: 0 PRELIMINARY COST ESTIMATE: $0 AVERAGE DAILY TRAFFIC: 6200
AVERAGE DAILY TRAFFIC: 6200 POSTED SPEED LIMIT: 65

SLOPE HEIGHT SCORE: 62 REMARKS:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 0 CATCHMENT:
REMARKS:
PROMISE OF TIME: 0
AVERAGE VEHICLE RISK SCORE: 5
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 50 CATCHMENT:
REMARKS:
DIFFERENCE IN EROSION RATES SCORE: 50 CATCHMENT:
REMARKS:
WIDTH SCORE: 5 ACTUAL WIDTH (FT): 40.0
REMARKS:

GEOLGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0 DESCRIPTION:
REMARKS:

GEOLGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27 FEATURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 20 RATE: MODERATE
REMARKS:

Slope No. 136

HWY #: I-15 BMP: 2.06 R OF CENTERLINE
DISTRICT #: 10 EMP: 2.18 SPEC. CASE. = NORTH
COUNTY #: 13 TOTAL SCORE: 368 RATE DATE: 06/04/94 RATER:
DESIGN CODE: 0 PRELIMINARY COST ESTIMATE: $0 AVERAGE DAILY TRAFFIC: 4080
AVERAGE DAILY TRAFFIC: 4080 POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 100 REMARKS:
ACTUAL HEIGHT (FT): 105
PERCENT OF TIME:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 5
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100 CATCHMENT:
REMARKS:
DIFFERENCE IN EROSION RATES SCORE: 20 RATE: MODERATE
REMARKS:

GEOLGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0 DESCRIPTION:
REMARKS:

GEOLGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27 FEATURES:
REMARKS:
ORIENTATIONS:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 20 RATE: MODERATE
REMARKS:
### Rockfall Hazard Rating System

**HWY #: U119**  
**BMP: 23.00**  
**L OF CENTERLINE**  
**DISTRICT #: 12**  
**EMP: 23.10**  
**SPEC. CASE. = NORTH**  
**COUNTY #: 67**  
**TOTAL SCORE: 386**  
**RATE DATE: 06/28/93**  
**RATER: FARMER/ABSHER**  
**PRELIMINARY COST ESTIMATE: $0**  
**AVERAGE DAILY TRAFFIC: 5695**  
**POSTED SPEED LIMIT: 55**

**Slope Height Score:** 100  
**Remarks:** Greater than 105'

**Ditch Effectiveness Score:** 24  
**Catchment:** Moderate

**Average Vehicle Risk Score:** 24  
**Percent of Time:** 43

**AASHTO Decision Site Distance Score:** 8  
**Actual Site Distance (FT):** 720  
**Percent of Low Design Value:** 83

**Width Score:** 7  
**Actual Width (FT):** 35.0

**Geologic Character – Case 1 (If Applicable)**

(A) **Structural Condition Score:** 81  
**Fractures:** Continuous  
**Orientations:** Adverse

**Remarks:***

(B) **Rock Friction Score:** 0  
**Description:** Undulating

**Remarks:***

**Geologic Character – Case 2 (If Applicable)**

(A) **Structural Condition Score:** 0  
**Features:**

(B) **Difference in Erosion Rates Score:** 0  
**Rate:**

**Remarks:***

### Additional Remarks and Comments

- Low A Score.
- **Block Size/Quantity Score:** 81  
  **Block Size:** 41  
  **Quantity of Material (CU YDS):**

**Remarks:***

- **Climate & Presence of Water on Slope Score:** 20  
  **Precipitation:** Moderate  
  **Freezing Periods:** Some  
  **Presence of Water on Slope:** Intermittent

**Remarks:***

- **Rockfall History Score:** 49  
  **Fall Occurrence:** Occasional

**Additional Remarks and Comments:***

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### Slope No. 137

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### Slope No. 138

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## Slope No. 139

**Rockfall Hazard Rating System**

**Hwy #: U421**

**District #: 7**

**County #: 78**

**Total Score: 282**

**Design Code: 0.90 L of Centerline**

**Repair Code:**

**Preliminary Cost Estimate:** $0

**Average Daily Traffic:** 2700

### Slope Height Score

- **Score:** 3
- **Actual Height (ft):** 32

**Remarks:**

### Ditch Effectiveness Score

- **Score:** 75
- **Catchment:**

**Remarks:**

### Average Vehicle Risk Score

- **Score:** 1
- **Percent of Time:**

**Remarks:**

### AASHTO Decision Site Distance Score

- **Score:** 100
- **Actual Site Distance (ft):** 0

**Remarks:**

### Width Score

- **Score:** 54
- **Actual Width (ft):** 22.0

**Remarks:**

#### Geologic Character - Case 1 (If Applicable)

- **Structural Condition Score:** 20
  - **Fires:** Continuous
  - **Orientations:** Random

**Remarks:**

#### Rock Friction Score

- **Score:** 70
- **Description:** Clay-Slick

**Remarks:**

#### Geologic Character - Case 2 (If Applicable)

- **Structural Condition Score:** 0
  - **Features:**

**Remarks:**

#### Difference in Erosion Rates Score

- **Score:** 0
- **Rate:**

**Remarks:**

- **Block Size/Quantity Score:** 27
  - **Block Size:** 3
  - **Quantity of Material (cu yds):**

**Remarks:**

- **Climate & Presence of Water on Slope Score:** 27
  - **Precipitation:** Freezing Periods
  - **Presence of Water on Slope:**

**Remarks:**

- **Rockfall History Score:** 50
  - **Fall Occurrence:**

**Remarks:**

### Additional Remarks and Comments

>>>

### Slope No. 140

**Rockfall Hazard Rating System**

**Hwy #: 1965**

**District #: 7**

**County #: 120**

**Total Score: 319**

**Design Code: 0.10 L of Centerline**

**Repair Code:**

**Preliminary Cost Estimate:** $0

**Average Daily Traffic:** 510

### Slope Height Score

- **Score:** 3
- **Actual Height (ft):** 27

**Remarks:**

### Ditch Effectiveness Score

- **Score:** 90
- **Catchment:**

**Remarks:**

### Average Vehicle Risk Score

- **Score:** 1
- **Percent of Time:**

**Remarks:**

### AASHTO Decision Site Distance Score

- **Score:** 100
- **Actual Site Distance (ft):** 0

**Remarks:**

### Width Score

- **Score:** 54
- **Actual Width (ft):** 22.0

**Remarks:**

#### Geologic Character - Case 1 (If Applicable)

- **Structural Condition Score:** 20
  - **Fires:** Continuous
  - **Orientations:** Random

**Remarks:**

#### Rock Friction Score

- **Score:** 70
- **Description:** Clay-Slick

**Remarks:**

#### Geologic Character - Case 2 (If Applicable)

- **Structural Condition Score:** 0
  - **Features:**

**Remarks:**

#### Difference in Erosion Rates Score

- **Score:** 0
- **Rate:**

**Remarks:**

- **Block Size/Quantity Score:** 27
  - **Block Size:** 3
  - **Quantity of Material (cu yds):**

**Remarks:**

- **Climate & Presence of Water on Slope Score:** 27
  - **Precipitation:** Freezing Periods
  - **Presence of Water on Slope:**

**Remarks:**

- **Rockfall History Score:** 27
  - **Fall Occurrence:**

**Remarks:**

### Additional Remarks and Comments

>>>
ROCKFALL HAZARD RATING SYSTEM

HWY #: 114  BMP: 7.10  R OF CENTERLINE
DISTRICT #: 12  EMP: 7.20  SPEC. CASE.  = EAST
COUNTY #: 35  RATE DATE: 06/09/93  RATER:
TOTAL SCORE: 377  DESIGN CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: 0  AVERAGE DAILY TRAFFIC: 4530
AVERAGE DAILY TRAFFIC: 4530  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 37  ACTUAL HEIGHT (FT): 54
REMARKS:
AVERAGE VELOCITY RISK SCORE: 10
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 0
ACTUAL SITE DISTANCE (FT): 450
PERCENT OF LOW DESIGN VALUE: 74
REMARKS:
WIDTH SCORE: 0
ACTUAL WIDTH (FT): 45.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 28  FEATURES:
REMARKS:
B) ROCK FRICTION SCORE: 27  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 0  BLOCK SIZE: 2
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE: OCCASIONAL
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> Bench
>>> Siltstone/shale layered bedding

Slope No. 142

ROCKFALL HAZARD RATING SYSTEM

HWY #: 69  BMP: 2.00  L OF CENTERLINE
DISTRICT #: 12  EMP: 2.20  SPEC. CASE.  = EAST
COUNTY #: 35  RATE DATE: 08/09/94  RATER:
TOTAL SCORE: 378  DESIGN CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: 0  AVERAGE DAILY TRAFFIC: 7320
AVERAGE DAILY TRAFFIC: 7320  POSTED SPEED LIMIT: 55
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 108
REMARKS:
AVERAGE Vehicle RISK SCORE: 190
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 24
ACTUAL SITE DISTANCE (FT): 450
PERCENT OF LOW DESIGN VALUE: 62
REMARKS: 540
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 60.
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27  FRACTURES: DISTRICT CONTINUOUS
ORIENTATIONS: RANDOM
REMARKS:
B) ROCK FRICTION SCORE: 26  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 27  BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 20  FALL OCCURRENCE: OCCASIONAL
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>> 6 BENCHES
>>> Siltstone/shale layered bedding

Slope No. 141
Slope No. 143

ROCKFALL HAZARD RATING SYSTEM

HWY #: 114  BMP:  4.90  R OF CENTERLINE
DISTRICT #: 12  EMP:  4.78  SPEC. CASE:  = WEST
COUNTY #: 38  TOTAL SCORE:  368  RATE DATE: 08/04/94  RATER:  CUT CLASS: A
DESIGN CODE:  REPAIR CODE:  PRELIMINARY COST ESTIMATE: 0  AVERAGE DAILY TRAFFIC: 7560
PRELIMINARY COST ESTIMATE:  POSTED SPEED LIMIT: 65
AVERAGE DAILY TRAFFIC: 7560
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 154
REMARKS:
DITCH EFFECTIVENESS SCORE: 20  CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 18  PERCENT OF TIME: 88
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 27  ACTUAL SITE DISTANCE (FT): 0
REMARKS: 529
WIDTH SCORE: 2  ACTUAL WIDTH (FT): 46.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 25  FRACITIONS: DISTINCT CONTINUOUS
ORIENATIONS: RANDOM
REMARKS: SILTSTONE/SHALE BEDDING
(B) ROCK FRICTION SCORE: 26  DESCRIPTION: UNCONSOLIDATED
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 5
QUANTITY OF MATERIAL (CU YDS): 1
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:  FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 24  FALL OCCURRENCE: OCCASIONAL
REMARKS: FALLEN ROCK ZONE
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>
### Slope No. 145

**Rockfall Hazard Rating System**

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<th>EMP:</th>
<th>BMP:</th>
<th>DISTRICT #</th>
<th>COUNTY #</th>
<th>TOTAL SCORE</th>
<th>RATING DATE</th>
<th>RATER</th>
<th>SPEC. CASE</th>
<th>Ditch Effectiveness Score</th>
<th>Actual Height (ft)</th>
<th>SLOPE HEIGHT SCORE</th>
<th>Actual Site Distance (ft)</th>
<th>AASHTO Site Distance Score</th>
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**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

- **A** STRUCTURAL CONDITION SCORE: 81
- **B** ROCK FRICTION SCORE: 24

**Remarks:**
- CONTINUOUS FRACTURES
- ADVERSE ORIENTATIONS
- PLANAR DESCRIPTION
- MASSIVE POTENTIAL FOR FAILURE

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

- **A** STRUCTURAL CONDITION SCORE: 0
- **B** DIFFERENCE IN EROSION RATES SCORE: 0

**Remarks:**
- LARGER POSSIBLE
- FREEZING PERIODS
- PRESENCE OF WATER ON SLOPE

**ADDITIONAL REMARKS AND COMMENTS**

---

### Slope No. 146

**Rockfall Hazard Rating System**

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<th>HWY #</th>
<th>EMP:</th>
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<th>TOTAL SCORE</th>
<th>RATING DATE</th>
<th>RATER</th>
<th>SPEC. CASE</th>
<th>Ditch Effectiveness Score</th>
<th>Actual Height (ft)</th>
<th>SLOPE HEIGHT SCORE</th>
<th>Actual Site Distance (ft)</th>
<th>AASHTO Site Distance Score</th>
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**GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)**

- **A** STRUCTURAL CONDITION SCORE: 87
- **B** ROCK FRICTION SCORE: 27

**Remarks:**
- CONTINUOUS FRACTURES
- ADVERSE ORIENTATIONS
- PLANAR DESCRIPTION
- MASSIVE POTENTIAL FOR FAILURE

**GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)**

- **A** STRUCTURAL CONDITION SCORE: 0
- **B** DIFFERENCE IN EROSION RATES SCORE: 0

**Remarks:**
- LARGER POSSIBLE
- FREEZING PERIODS
- PRESENCE OF WATER ON SLOPE

**ADDITIONAL REMARKS AND COMMENTS**

---
Slope No. 147

ROCKFALL HAZARD RATING SYSTEM

HWY #: USB BMP: 0.67
DISTRICT #: 7
COUNTY #: 57
TOTAL SCORE: 363
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 2940

SLOPE HEIGHT SCORE: 2
ACTUAL HEIGHT (FT): 19
Remarks:

DITCH EFFECTIVENESS SCORE: 75
CATCHMENT: LIN-NONE
Remarks:

AVERAGE VEHICLE RISK SCORE: 1
Remarks:

PERCENT OF TIME: 4
Remarks:

AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 0
Remarks: 121

WIDTH SCORE: 81
ACTUAL WIDTH (FT): 20.0
Remarks:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
Remarks:

FRACTURES:
Remarks:

ORIENTATIONS:
Remarks:

(G) ROCK FRICTION SCORE: 0
DESCRIPTION:
Remarks:

GELOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 9
Remarks:

FEATURES:
Remarks:

(G) DIFFERENCE IN EROSION RATES SCORE: 9
Remarks:

RATE:
Remarks: MODERATE

BLOCK SIZE/QUANTITY SCORE: 9
BLOCK SIZE: 2
Remarks:

QUANTITY OF MATERIAL (CU YDS): 0.00
Remarks:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: FREEZING PERIODS:
Remarks:

PRESENCE OF WATER ON SLOPE:
Remarks:

ROCKFALL HISTORY SCORE: 60
FALL OCCURRENCE:
Remarks: FALLEN ROCK ZONE

ADDITIONAL REMARKS AND COMMENTS

Slope No. 148

ROCKFALL HAZARD RATING SYSTEM

HWY #: MTPK BMP: 33.30
DISTRICT #: 10
COUNTY #: 99
TOTAL SCORE: 357
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 3500

SLOPE HEIGHT SCORE: 26
ACTUAL HEIGHT (FT): 73
Remarks:

DITCH EFFECTIVENESS SCORE: 76
CATCHMENT: LIN-NONE
Remarks:

AVERAGE VEHICLE RISK SCORE: 4
Remarks:

PERCENT OF TIME:
Remarks:

AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 1300
Remarks: 128

WIDTH SCORE: 0
ACTUAL WIDTH (FT): 37.0
Remarks:

GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
Remarks:

FRACTURES:
Remarks:

ORIENTATIONS:
Remarks:

(G) ROCK FRICTION SCORE: 0
DESCRIPTION:
Remarks:

GELOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 85
Remarks:

FEATURES:
Remarks:

(G) DIFFERENCE IN EROSION RATES SCORE: 55
Remarks:

RATE:
Remarks:

BLOCK SIZE/QUANTITY SCORE: 78
BLOCK SIZE:
Remarks:

QUANTITY OF MATERIAL (CU YDS):
Remarks:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20
PRECIPITATION: FREEZING PERIODS:
Remarks:

PRESENCE OF WATER ON SLOPE:
Remarks:

ROCKFALL HISTORY SCORE: 25
FALL OCCURRENCE:
Remarks:

ADDITIONAL REMARKS AND COMMENTS

>>>
>>>
Slope No. 149

ROCKFALL HAZARD RATING SYSTEM

HWY #: 80  BMP: 15.20  R OF CENTERLINE  SPEC. CASE. = EAST
DISTRICT #: 10  EMP: 15.30  SPEC. CASE. = EAST
COUNTY #: 97  TOTAL SCORE: 355
DESIGN CODE: 0  PRELIMINARY COST ESTIMATE: $
AVERAGE DAILY TRAFFIC: 5370  POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 100  ACTUAL HEIGHT (FT): 106
REMARKS:
DITCH EFFECTIVENESS SCORE: 26  CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 5  PERCENT OF TIME: 37
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 0
REMARKS:
WIDTH SCORE: 1  ACTUAL WIDTH (FT): 82.0
REMARKS:
GEOLOGIC CHARACTER -- CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 78  FRAC TURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 68  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER -- CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 12  BLOCK SIZE:
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 44  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 150

ROCKFALL HAZARD RATING SYSTEM

HWY #: 84  BMP: 137.40  R OF CENTERLINE  SPEC. CASE. = EAST
DISTRICT #: 9  EMP: 137.10  SPEC. CASE. = EAST
COUNTY #: 103  TOTAL SCORE: 354
DESIGN CODE: 0  PRELIMINARY COST ESTIMATE: $
AVERAGE DAILY TRAFFIC: 5550  POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 11  ACTUAL HEIGHT (FT): 54
REMARKS:
DITCH EFFECTIVENESS SCORE: 9  CATCHMENT: MODERATE
REMARKS: CATCHING MOST RUBBLE FALLING
AVERAGE VEHICLE RISK SCORE: 60  PERCENT OF TIME: 94
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 1300
PERCENT OF LOW DESIGN VALUE: 100
REMARKS:
WIDTH SCORE: 6  ACTUAL WIDTH (FT): 39.0
REMARKS:
GEOLOGIC CHARACTER -- CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER -- CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 70  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 81  RATE: EXTREME
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 16  BLOCK SIZE: 2
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 20  PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 81  FALL OCCURRENCE:
REMARKS: FALLING ROCK ZONE AREA
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

APPENDIX C - RHRS Scores

137
ROCKFALL HAZARD RATING SYSTEM

HWY #: U110
BMP: 7.45 L OF CENTERLINE
DISTRICT #: 11
EMP: 7.51 SPEC. CASE. = NORTH
COUNTY #: 7
TOTAL SCORE: 353
RATE DATE: 07/21/1994
RATER: REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 5660

SLOPE HEIGHT SCORE: 100
ACTUAL HEIGHT (FT): 140
REMARKS:
DITCH EFFECTIVENESS SCORE: 22
CATCHMENT: MODERATE
REMARKS:
AVERAGE VEHICLE RISK SCORE: 3
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 100
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 35
REMARKS: 305'
WIDTH SCORE: 8
ACTUAL WIDTH (FT): 54.0
REMARKS:
SLOPE HEIGHT SCORE: 7
ACTUAL HEIGHT (FT): 43
REMARKS:
DITCH EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS:
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 6
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 87
REMARKS: 763'
WIDTH SCORE: 81
ACTUAL WIDTH (FT): 20.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 90
FRACTURES: DISTRICT CONTINUOUS
ORIENTATIONS: RANDOM
REMARKS: 6" WIDE JOINTS
(B) ROCK FRICTION SCORE: 18
DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 47
BLOCK SIZE: 3.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 15
FALL OCCURRENCE: OCCASIONAL
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 151

ROCKFALL HAZARD RATING SYSTEM

HWY #: 1274
BMP: 12.60 L OF CENTERLINE
DISTRICT #: 10
EMP: 12.91 SPEC. CASE. = EAST
COUNTY #: 83
TOTAL SCORE: 352
RATE DATE: 06/20/1994
RATER: REPAIR CODE: CUT CLASS: A
PRELIMINARY COST ESTIMATE: $ 0
POSTED SPEED LIMIT: 55
AVERAGE DAILY TRAFFIC: 340

SLOPE HEIGHT SCORE: 7
ACTUAL HEIGHT (FT): 43
REMARKS:
DITCH EFFECTIVENESS SCORE: 27
CATCHMENT: LIMITED
REMARKS:
AVERAGE VEHICLE RISK SCORE: 1
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 6
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 87
REMARKS: 763'
WIDTH SCORE: 81
ACTUAL WIDTH (FT): 20.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 90
FRACTURES: CONTINUOUS
ORIENTATIONS: ADVERSE
REMARKS:
(B) ROCK FRICTION SCORE: 70
DESCRIPTION: CLAY INFILLING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0
RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 16
BLOCK SIZE: 2.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
FREEZING PERIODS:
REMARKS:
ROCKFALL HISTORY SCORE: 27
FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 152
**ROCKFALL HAZARD RATING SYSTEM**

**Slope No. 153**

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<th>BMP: 20.93</th>
<th>R OF CENTERLINE</th>
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**Slope No. 154**

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**ADDITIONAL REMARKS AND COMMENTS**

- DITCH INADEQUATE FOR POTENTIAL ROCKFALLS

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**APPENDIX C: RHRS Score**

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### Slope No. 155

**ROCKFALL HAZARD RATING SYSTEM**

| HWY #: U23 | BMP: 13.00   | L OF CENTERLINE |
| DISTRICT #: 12 | EMP: 13.20 | SPEC. CASE: NORTH |
| COUNTY #: 64 | TOTAL SCORE: 348 | RATE DATE:07/01/93 |
| DESIGN CODE: | PRELIMINARY COST ESTIMATE: $0 | RATER: FARMER/ABSENHE |
| REPAIR CODE: | AVERAGE DAILY TRAFFIC: 7610 | POSTED SPEED LIMIT: 55 |

- **SLOPE HEIGHT SCORE:** 60  
  **ACTUAL HEIGHT (FT):** 94
- **DITCH EFFECTIVENESS SCORE:** 14  
  **CATCHMENT:** MODERATE
- **AVERAGE VEHICLE RISK SCORE:** 100  
  **PERCENT OF TIME:** 116
- **AASHTO DECISION SITE DISTANCE SCORE:** 4  
  **ACTUAL SITE DISTANCE (FT):** 847
- **WIDTH SCORE:** 1  
  **ACTUAL WIDTH (FT):** 88.0
- **REMARKS:** PAVED NOT GOOD WITH SMALL DITCH.

**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

1. **(A) STRUCTURAL CONDITION SCORE:** 92  
   **FRACTURES:** CONTINUOUS  
   **ORIENTATIONS:** ADVERSE
   **REMARKS:** THE SLOPE IS FRACTURING INTO LARGE BLOCKS.
2. **(B) ROCK FRICTION SCORE:** 32  
   **DESCRIPTION:** PLANAR
   **REMARKS:** THE STONES ARE SMOOTH FACED

**GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)**

1. **(A) STRUCTURAL CONDITION SCORE:** 0  
   **FEATURES:**
   **REMARKS:**
2. **(B) DIFFERENCE IN EROSION RATES SCORE:** 0  
   **RATE:**
3. **(C) BLOCK SIZE/QUANTITY SCORE:** 5  
   **BLOCK SIZE:** 1.0 FT  
   **QUANTITY OF MATERIAL (CU YDS):** 6
   **REMARKS:** IF A FAILURE WERE TO OCCUR A 20' X 1.0 FT SIZE  
   **CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:** 20  
   **PRECIPITATION:** LOW  
   **FREEZING PERIODS:** SOME
   **PRESENCE OF WATER ON SLOPE:** SOME
   **REMARKS:**
4. **ROCKFALL HISTORY SCORE:** 30  
   **FALL OCCURRENCE:** OCCASIONAL
   **REMARKS:**

**ADDITIONAL REMARKS AND COMMENTS**

- Could become a potentially dangerous based on  
- The way the slope is fracturing and the size of the slabs.

### Slope No. 156

**ROCKFALL HAZARD RATING SYSTEM**

| HWY #: MTPK | BMP: 33.80   | R OF CENTERLINE |
| DISTRICT #: 10 | EMP: 33.70 | SPEC. CASE: WEST |
| COUNTY #: 99 | TOTAL SCORE: 346 | RATE DATE:06/01/93 |
| DESIGN CODE: | PRELIMINARY COST ESTIMATE: $0 | RATER: CUT CLASS: A |
| REPAIR CODE: | AVERAGE DAILY TRAFFIC: 3650 | POSTED SPEED LIMIT: 65 |

- **SLOPE HEIGHT SCORE:** 88  
  **ACTUAL HEIGHT (FT):** 102
- **DITCH EFFECTIVENESS SCORE:** 50  
  **CATCHMENT:** MODERATE
- **AVERAGE VEHICLE RISK SCORE:** 4  
  **PERCENT OF TIME:** 30
- **AASHTO DECISION SITE DISTANCE SCORE:** 1  
  **ACTUAL SITE DISTANCE (FT):** 1300
- **WIDTH SCORE:** 8  
  **ACTUAL WIDTH (FT):** 27.0
- **REMARKS:**

**GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)**

1. **(A) STRUCTURAL CONDITION SCORE:** 0  
   **FRACTURES:**
   **ORIENTATIONS:**
   **REMARKS:**
2. **(B) ROCK FRICTION SCORE:** 0  
   **DESCRIPTION:**
   **REMARKS:**
3. **(C) DIFFERENCE IN EROSION RATES SCORE:** 70  
   **RATE:**
4. **(D) BLOCK SIZE/QUANTITY SCORE:** 30  
   **BLOCK SIZE:**
   **QUANTITY OF MATERIAL (CU YDS):** 5
   **REMARKS:**
5. **CLIMATE & PRESENCE OF WATER ON SLOPE SCORE:** 20  
   **PRECIPITATION:** LOW  
   **FREEZING PERIODS:** SOME
   **PRESENCE OF WATER ON SLOPE:** SOME
   **REMARKS:**
7. **ROCKFALL HISTORY SCORE:** 25  
   **FALL OCCURRENCE:** OCCASIONAL
   **REMARKS:**

**ADDITIONAL REMARKS AND COMMENTS**

- Could become a potentially dangerous based on  
- The way the slope is fracturing and the size of the slabs.
ROCKFALL HAZARD RATING SYSTEM

Slope No. 157


GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES: ORIENTATIONS: REMARKS:
(B) ROCK FRICTION SCORE: 0 DESCRIPTION: REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 35 FEATURES: MANY ORIENTATIONS: REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 40 RATE: LARGE DESCRIPTION: REMARKS:

BLOCK SIZE/QUANTITY SCORE: 58 BLOCK SIZE: QUANTITY OF MATERIAL (CU YDS): 9-11 REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 29 PRECIPITATION: FREEZING PERIODS: REMARKS: WATER PRESENT AFTER SUMMER DROUGHT ROCKFALL HISTORY SCORE: 48 FALL OCCURRENCE: MANY REMARKS:
ADDITIONAL REMARKS AND COMMENTS

>>> SURVEYED FOR ROCKFALL SIMULATION
>>> >>>

Slope No. 158

DITCH EFFECTIVENESS SCORE: 9 CATCHMENT: MODERATE REMARKS:
AVERAGE VEHICLE RISK SCORE: 1 PERCENT OF TIME: REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 4 ACTUAL SITE DISTANCE (FT): 0 PERCENT OF LOW DESIGN VALUE: 96 REMARKS: 83' WIDTH SCORE: 36 ACTUAL WIDTH (FT): 20.0 REMARKS:

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0 FRACTURES: ORIENTATIONS: REMARKS:
(B) ROCK FRICTION SCORE: 0 DESCRIPTION: REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 30 FEATURES: MANY REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 31 RATE: LARGE REMARKS:

BLOCK SIZE/QUANTITY SCORE: 100 BLOCK SIZE: QUANTITY OF MATERIAL (CU YDS): REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27 PRECIPITATION: FREEZING PERIODS: REMARKS: WATER PRESENT ON SLOPE: ROCKFALL HISTORY SCORE: 22 FALL OCCURRENCE: MANY REMARKS:
ADDITIONAL REMARKS AND COMMENTS

>>> >>> >>>
ROCKFALL HAZARD RATING SYSTEM

Hwy #: 30  BMP: 5.20  E of Centerline
District #: 9  EMP #: 5.25  Spec. Case: = East
County #: 13  TOTAL SCORE: 344
Design Code: = Rockfall

Preliminary Cost Estimate: $ 0
Average Daily Traffic: 950
Slope Height Score: 6
Remarks:

Ditch Effectiveness Score: 30  Catchment: Limited
Remarks:

Average Vehicle Risk Score: 1
Remarks:

AASHTO Decision Site Distance Score: 100
Remarks: 145'

Width Score: 62  Actual Width (ft): 22.0
Remarks:

Geologic Character - Case 1 (if applicable)
(A) Structural Condition Score: 40  Fractures: District Continuous
Orientations: Adverse
Remarks:

(B) Rock Friction Score: 0  Description: Undulating
Remarks:

Geologic Character - Case 2 (if applicable)
(A) Structural Condition Score: 27  Features: Many
Remarks:

(B) Difference in Erosion Rates Score: 27  Rate: Large
Remarks:

Block Size/Quantity Score: 27  Block Size: 3
Remarks:

Climate & Presence of Water on Slope Score: 27
Precipitation: Freezing periods
Remarks:

Rockfall History Score: 37  Fall Occurrence: Many
Remarks:

Additional Remarks and Comments

Slope No. 159

ROCKFALL HAZARD RATING SYSTEM

Hwy #: U80  BMP: 7.60  E of Centerline
District #: 9  EMP #: 8.00  Spec. Case: = East
County #: 22  TOTAL SCORE: 334
Design Code: = Rockfall

Preliminary Cost Estimate: $ 0
Average Daily Traffic: 3670
Slope Height Score: 16
Remarks:

Ditch Effectiveness Score: 9  Catchment: Moderate
Remarks:

Average Vehicle Risk Score: 12
Remarks:

AASHTO Decision Site Distance Score: 100
Remarks: 145'

Width Score: 54  Actual Width (ft): 22.0
Remarks:

Geologic Character - Case 1 (if applicable)
(A) Structural Condition Score: 40  Fractures: District Continuous
Orientations: Adverse
Remarks:

(B) Rock Friction Score: 15  Description: Undulating
Remarks:

Geologic Character - Case 2 (if applicable)
(A) Structural Condition Score: 27  Features: Many
Remarks:

(B) Difference in Erosion Rates Score: 0  Rate: Large
Remarks:

Block Size/Quantity Score: 100  Block Size: 5
Remarks:

Climate & Presence of Water on Slope Score: 45
Precipitation: Freezing periods
Remarks:

Rockfall History Score: 37  Fall Occurrence: Many
Remarks:

Additional Remarks and Comments

Slope No. 160
ROCKFALL HAZARD RATING SYSTEM

Slope No. 161

ROCKFALL HAZARD RATING SYSTEM

Slope No. 162

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 25
RATE: MODERATE
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 5
QUANTITY OF MATERIAL (CU YDS): 1.5
REMARKS:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:

ROCKFALL HISTORY SCORE: 35
FALL OCCURRENCE: MANY
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>>
>>>

GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRACTURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27
FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 25
RATE: MODERATE
REMARKS:

BLOCK SIZE/QUANTITY SCORE: 5
QUANTITY OF MATERIAL (CU YDS): 1.5
REMARKS:

CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION: FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:

ROCKFALL HISTORY SCORE: 35
FALL OCCURRENCE: MANY
REMARKS:

ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
ROCKFALL HAZARD RATING SYSTEM

HWY #: UGK  BMP: 83.54  L OF CENTERLINE
DISTRICT #: 8  EMP: 83.70  SPEC. CASE: = EAST
COUNTY #: 130  TOTAL SCORE: 332  RATE DATE: 07/15/93  RATER:
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 3210
POSTED SPEED LIMIT: 65

SLOPE HEIGHT SCORE: 22  ACTUAL HEIGHT (FT): 70
DITCH EFFECTIVENESS SCORE: 9  CATCHMENT: MODERATE
AVERAGE VEHICLE RISK SCORE: 4  PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 1  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE:
WIDTH SCORE: 27  ACTUAL WIDTH (FT): 28.0
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACtURES:
ORIENATATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 60  FEATURES: MANY
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 55  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 100  BLOCK SIZE: 7
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 27  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 163

ROCKFALL HAZARD RATING SYSTEM

HWY #: LSD  BMP: 6.80  L OF CENTERLINE
DISTRICT #: 9  EMP: 6.68  SPEC. CASE: = EAST
COUNTY #: 103  TOTAL SCORE: 328  RATE DATE: 06/02/94  RATER:
DESIGN CODE:  REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 6660
POSTED SPEED LIMIT: 55

SLOPE HEIGHT SCORE: 5  ACTUAL HEIGHT (FT): 38
DITCH EFFECTIVENESS SCORE: 60  CATCHMENT: LIM-NON
REMARKS: ROCKS ACROSS ROAD
AVERAGE VEHICLE RISK SCORE: 4  PERCENT OF TIME:
AASHTO DECISION SITE DISTANCE SCORE: 82  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 45
WIDTH SCORE: 31  ACTUAL WIDTH (FT): 27.0
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACtURES:
ORIENATATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:

GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 27  FEATURES: MANY
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 45  RATE: LARGE
REMARKS: SHALE/DOLomite BEDDING
BLOCK SIZE/QUANTITY SCORE: 27  BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 40  FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

Slope No. 164
ROCKFALL HAZARD RATING SYSTEM

Slope No. 165

ROCKFALL HAZARD RATING SYSTEM

Slope No. 166
ROCKFALL HAZARD RATING SYSTEM

Slope No. 167

HWY #: 175
BMP: 20.12
DISTRICT #: 11
COUNTRY #: 118
TOTAL SCORE: 349
REPAIR CODE: OUT CLASS: A
PRELIMINARY COST ESTIMATE: $0
AVERAGE DAILY TRAFFIC: 12590
POSTED SPEED LIMIT: 65
SLOPE HEIGHT SCORE: 8
REMARKS:
DITCH EFFECTIVENESS SCORE: 15
CATCHMENT: LIMITED
AVERAGE VEHICLE RISK SCORE: 97
PERCENT OF TIME: 104
AASHTO DECISION SITE DISTANCE SCORE: 1
ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 18
WIDTH SCORE: 7
ACTUAL WIDTH (FT): 38.0
REMARKS:
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0
FRATURES:
ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 0
DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 76
FEATURES: MANY
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 37
RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 27
BLOCK SIZE: 3
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 28
PRECIPITATION:
FREEZING PERIODS:
PRESENCE OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 27
FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>
ROCKFALL HAZARD RATING SYSTEM

Hwy #: U421  BMP: 19.92  L OF CENTERLINE
District #: 11  Emp: 19.97  Spec. Case. = NORTH
County #: 42
Total Score: 308  Rate Date: 07/19/94  Rater: Cut Class: A
Design Code: 0  Repair Code: 0
Preliminary Cost Estimate: 0  Average Daily Traffic: 2890  Posted Speed Limit: 55

Slope Height Score: 22  Actual Height (FT): 70
Remarks: Ditch Effectiveness Score: 55  Catchment: Limited
Average Vehicle Risk Score: 1  Percent of Time:
Remarks: AASHTO Decision Site Distance Score: 100
Actual Site Distance (FT): 0  Percent of Low Design Value: 20
Remarks: 172
Width Score: 62  Actual Width (FT): 22.0
Remarks: Geologic Character -- Case 1 (If Applicable)
(A) Structural Condition Score: 15  Fractures: District Continuous
Orientations: Random
Remarks: (B) Rock Friction Score: 12  Description: Undulating
Remarks:
Geologic Character -- Case 2 (If Applicable)
(A) Structural Condition Score: 0  Features:
Remarks: (B) Difference in Erosion Rates Score: 0  Rate:
Remarks: Block Size/Quantity Score: 4  Block Size: 1
Remarks: Climate & Presence of Water on Slope Score: 27
Precipitation: Freezing Periods: Presence of Water on Slope: 0
Remarks: Rockfall History Score: 10  Fall Occurrence:
Remarks: Additional Remarks and Comments
>>>

Slope No. 169

ROCKFALL HAZARD RATING SYSTEM

Hwy #: MTPK  BMP: 47.60  R OF CENTERLINE
District #: 10  Emp: 47.60  Spec. Case. = WEST
County #: 119
Total Score: 307  Rate Date: 06/08/93  Rater: Cut Class: A
Design Code: 0  Repair Code: 0
Preliminary Cost Estimate: 0  Average Daily Traffic: 3460  Posted Speed Limit: 65

Slope Height Score: 55  Actual Height (FT): 91
Remarks: Ditch Effectiveness Score: 19  Catchment:
Remarks: Average Vehicle Risk Score: 3  Percent of Time: 25
Remarks: AASHTO Decision Site Distance Score: 1
Actual Site Distance (FT): 190  Percent of Low Design Value: 100
Remarks:
Width Score: 4  Actual Width (FT): 37.0
Remarks: Geologic Character -- Case 1 (If Applicable)
(A) Structural Condition Score: 8 1  Fractures:
Orientations: Remarks: (B) Rock Friction Score: 24  Description:
Remarks: Geologic Character -- Case 2 (If Applicable)
(A) Structural Condition Score: 0  Features:
Remarks: (B) Difference in Erosion Rates Score: 0  Rate:
Remarks: Block Size/Quantity Score: 20  Block Size: 2
Remarks: Climate & Presence of Water on Slope Score: 20
Precipitation: Freezing Periods: Presence of Water on Slope: 0
Remarks: Rockfall History Score: 81  Fall Occurrence:
Remarks: Additional Remarks and Comments
>>> Sandstone Overhangs. Larger Block Potential
>>>

Slope No. 170
ROCKFALL HAZARD RATING SYSTEM
HWY #: U421  L OF CENTERLINE
DISTRICT #: 17  EMP: 0.67 SPEC. CASE. = NORTH
COUNTY #: 47  TOTAL SCORE: 301  RATE DATE: 07/19/94  RATER:
DESIGN CODE: REPAIR CODE:  CUT CLASS: A
PRELIMINARY COST ESTIMATE: $  0  POSTED SPEED LIMIT: 35
AVERAGE DAILY TRAFFIC: 2890
SLOPE HEIGHT SCORE: 6  ACTUAL HEIGHT (FT): 46
DITCH EFFECTIVENESS SCORE: 30  CATCHMENT: LIMITED
AVERAGE VEHICLE RISK SCORE: 2  PERCENT OF TIME: 17
AASHTO DECISION SITE DISTANCE SCORE: 100  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 23
WIDTH SCORE: 47  ACTUAL WIDTH (FT): 22.0
GEOLOGIC CHARACTER – CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 15  FRACTURES: ORIENTATIONS:
REMARKS:
(B) ROCK FRICTION SCORE: 9  DESCRIPTION: PLANAR
REMARKS:
GEOLOGIC CHARACTER – CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS

Slope No. 172
### Slope No. 173

**Rockfall Hazard Rating System**

| HWY #: 90 | BMP: 2.00 | R OF CENTERLINE: EAST |
| DISTRICT #: 12 | EMP: 2.20 | SPEC. CASE: |
| COUNTY #: 36 | RATE DATE: | RATE: |
| TOTAL SCORE: 289 | REPAIR CODE: CUT CLASS: A |
| PRELIMINARY COST ESTIMATE: 0 | POSTED SPEED LIMIT: 55 |

**Slope Height Score:** 100  
**Actual Height (FT):** 205

**Remarks:**  
Ditch Effectiveness Score: 25  
Catchment: Moderate  
Remarks: Rocks in Median  
Average Vehicle Risk Score: 10  
Percent of Time:  
Remarks:  
AASHTO Decision Site Distance Score: 24  
Actual Site Distance (FT): 0  
Percent of Low Design Value: 62  
Remarks:  
Width Score: 47  
Actual Width (FT): 82.0  
Remarks:  
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)  
(A) Structural Condition Score: 0  
Features:  
(B) Difference in Erosion Rates Score: 0  
Rate: Moderate  
Remarks:  
Block Size/Quantity Score: 27  
Block Size: 3  
Remarks:  
Climate & Presence of Water on Slope Score: 29  
Freezing Periods:  
Remarks:  
Rockfall History Score: 20  
Fall Occurrence: Occasional  
Remarks:  
Additional Remarks and Comments: Benches provide many launch points

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**Slope No. 174**

**Rockfall Hazard Rating System**

| HWY #: 1421 | BMP: 2.70 | R OF CENTERLINE: NORTH |
| DISTRICT #: 11 | EMP: 2.70 | SPEC. CASE: |
| COUNTY #: 26 | RATE DATE: | RATE: FARMER |
| TOTAL SCORE: 289 | REPAIR CODE: CUT CLASS: A |
| PRELIMINARY COST ESTIMATE: 0 | POSTED SPEED LIMIT: 55 |

**Slope Height Score:** 13  
**Actual Height (FT):** 58

**Remarks:**  
Ditch Effectiveness Score: 25  
Catchment: Moderate  
Remarks:  
Average Vehicle Risk Score: 1  
Percent of Time:  
Remarks:  
AASHTO Decision Site Distance Score: 44  
Actual Site Distance (FT): 0  
Percent of Low Design Value: 51  
Remarks:  
Width Score: 47  
Actual Width (FT): 24.0  
Remarks:  
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)  
(A) Structural Condition Score: 0  
Features:  
(B) Rock Friction Score: 0  
Description: Undulating  
Remarks:  
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)  
(A) Structural Condition Score: 55  
Features: Many  
Remarks:  
(B) Difference in Erosion Rates Score: 25  
Rate: Moderate  
Remarks:  
Block Size/Quantity Score: 27  
Block Size: 0  
Remarks:  
Climate & Presence of Water on Slope Score: 25  
Freezing Periods:  
Remarks:  
Rockfall History Score: 27  
Fall Occurrence: Many  
Remarks:  
Additional Remarks and Comments: Rocks evident across road

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ROCKFALL HAZARD RATING SYSTEM

Slope No. 175

HWY #: 52  BMP: 21.00  R OF CENTERLINE = EAST
DISTRICT #: 7  COUNTY #: 76
TOTAL SCORE: 208  RATE: 06/03/94  RATER: SPEC. CASE. = EAST
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 5180
EMP: 22.00  OF CENTERLINE
SPEC. CASE. = EAST
SLOPE HEIGHT SCORE: 5  ACTUAL HEIGHT (FT): 38
REMARKS:
DITCH EFFECTIVENESS SCORE: 6  CATCHMENT:
REMARKS:
AVERAGE VEHICLE RISK SCORE: 4
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 62  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 45
REMARKS: 994
WIDTH SCORE: 6  ACTUAL WIDTH (FT): 39.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FRACTURES: CONTINUOUS
ORIENTATIONS; RANDOM
REMARKS:
(B) ROCK FRICTION SCORE: 0  DESCRIPTION:
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 9  FEATURES: OCCASIONAL
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 40  RATE: LARGE
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 47  BLOCK SIZE: 3.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 27
PRECIPITATION:
PRESERVATION OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 9  FALL OCCURRENCE:
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
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ROCKFALL HAZARD RATING SYSTEM

Slope No. 176

HWY #: 421  BMP: 1.20  R OF CENTERLINE = NORTH
DISTRICT #: 11  COUNTY #: 26
TOTAL SCORE: 267  RATE: 07/19/94  RATER: ANDERSON
PRELIMINARY COST ESTIMATE: $  AVERAGE DAILY TRAFFIC: 2160
EMP: 1.25  SPEC. CASE. = NORTH
SLOPE HEIGHT SCORE: 17  ACTUAL HEIGHT (FT): 65
REMARKS:
DITCH EFFECTIVENESS SCORE: 27  CATCHMENT: LIMITED
REMARKS:
AVERAGE VEHICLE RISK SCORE: 2
PERCENT OF TIME:
REMARKS:
AASHTO DECISION SITE DISTANCE SCORE: 3  ACTUAL SITE DISTANCE (FT): 0
PERCENT OF LOW DESIGN VALUE: 99
REMARKS: 129
WIDTH SCORE: 41  ACTUAL WIDTH (FT): 25.0
REMARKS:
GEOLOGIC CHARACTER - CASE 1 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 60  FRACTURES: CONTINUOUS
ORIENTATIONS: RANDOM
REMARKS:
(B) ROCK FRICTION SCORE: 18  DESCRIPTION: UNDULATING
REMARKS:
GEOLOGIC CHARACTER - CASE 2 (IF APPLICABLE)
(A) STRUCTURAL CONDITION SCORE: 0  FEATURES:
REMARKS:
(B) DIFFERENCE IN EROSION RATES SCORE: 0  RATE:
REMARKS:
BLOCK SIZE/QUANTITY SCORE: 47  BLOCK SIZE: 3.5
QUANTITY OF MATERIAL (CU YDS):
REMARKS:
CLIMATE & PRESENCE OF WATER ON SLOPE SCORE: 25
PRECIPITATION:
PRESERVATION OF WATER ON SLOPE:
REMARKS:
ROCKFALL HISTORY SCORE: 27  FALL OCCURRENCE: MANY
REMARKS:
ADDITIONAL REMARKS AND COMMENTS
>>>
>>>
>>>

S/ope No. 176
### Rockfall Hazard Rating System

**Slope No. 177**

**Highway #:** U421  
**BMP:** 22.20  
**EMP:** 22.25  
**Special Case:** NORTH  
**District #:** 11  
**County #:** 48  
**Total Score:** 256  
**Preliminary Cost Estimate:** $0  
**Average Daily Traffic:** 1980  
**Posted Speed Limit:** 40

- **Slope Height Score:** 9  
- **Ditch Effectiveness Score:** 15  
- **Average Vehicle Risk Score:** 2  
- **AASHTO Decision Site Distance Score:** 100  
- **Geologic Character - Case 1:**  
  - **Structural Condition Score:** 12  
  - **FRACTURES:** DISTRICT CONTINUOUS  
  - **Orientations:** RANDOM  
- **Remarks:**

**Geologic Character - Case 2:**  
- **Structural Condition Score:** 0  
- **Features:**

**Remarks:**

- **Remarks:**

**Remarks:**

**Remarks:**

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**Slope No. 178**

**Highway #:** U114  
**BMP:** 3.00  
**EMP:** 3.84  
**Special Case:** WEST  
**District #:** 12  
**County #:** 36  
**Total Score:** 244  
**Preliminary Cost Estimate:** $0  
**Average Daily Traffic:** 7660  
**Posted Speed Limit:** 55

- **Slope Height Score:** 85  
- **Ditch Effectiveness Score:** 28  
- **Average Vehicle Risk Score:** 4  
- **AASHTO Decision Site Distance Score:** 26  
- **Geologic Character - Case 1:**  
  - **Structural Condition Score:** 25  
  - **FRACTURES:** DISTRICT CONTINUOUS  
  - **Orientations:** RANDOM  
- **Remarks:**

**Geologic Character - Case 2:**  
- **Structural Condition Score:** 0  
- **Features:**

**Remarks:**

- **Remarks:**

**Remarks:**

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**Additional Remarks and Comments**

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### Rockfall Hazard Rating System

**ROCKFALL HAZARD RATING SYSTEM**

**Slope No. 179**

| HWY #: U119 | BMP: 14.12 | R OF CENTERLINE |
| DISTRICT #: 12 | EMP: 13.86 | SPEC. CASE. = NORTH |
| COUNTY #: 57 | TOTAL #: 241 | RATE DATE: 08/10/93 |
| DESIGN CODE: | REPAIR CODE: | CUT CLASS: A |
| PRELIMINARY COST ESTIMATE: | 0 | POSTED SPEED LIMIT: 55 |
| AVERAGE DAILY TRAFFIC: | 1380 |
| EMP: 13.86 | SPEC. CASE. = NORTH |
| DISTRICT #: 12 | COUNTY #: 57 |
| TOTAL #: 241 | RATE DATE: 08/10/93 |
| DESIGN CODE: | REPAIR CODE: | CUT CLASS: A |
| PRELIMINARY COST ESTIMATE: | 0 | POSTED SPEED LIMIT: 55 |
| AVERAGE DAILY TRAFFIC: | 1380 |
| EMP: 13.86 | SPEC. CASE. = NORTH |
| DISTRICT #: 12 | COUNTY #: 57 |
| TOTAL #: 241 | RATE DATE: 08/10/93 |
| DESIGN CODE: | REPAIR CODE: | CUT CLASS: A |
| PRELIMINARY COST ESTIMATE: | 0 | POSTED SPEED LIMIT: 55 |
| AVERAGE DAILY TRAFFIC: | 1380 |

**Slope No. 180**

| HWY #: U119 | BMP: 22.40 | L OF CENTERLINE |
| DISTRICT #: 7 | EMP: 22.60 | SPEC. CASE. = EAST |
| COUNTY #: 76 | TOTAL #: 244 | RATE DATE: 06/02/93 |
| DESIGN CODE: | REPAIR CODE: | POSTED SPEED LIMIT: 65 |
| PRELIMINARY COST ESTIMATE: | 0 | POSTED SPEED LIMIT: 55 |
| AVERAGE DAILY TRAFFIC: | 5180 |

**Remarks:**
- Ditch appears to fill with rock regularly. About every 3 months it is cleaned.
- Ditch effectiveness score: 90
- Catchment: Moderate
- Average vehicle risk score: 18
- Percent of time: 89
- AASHTO decision site distance score: 22
- Actual site distance (ft): 421
- Percent of low design value: 64
- Width score: 16
- Actual width (ft): 28.0
- Additional remarks and comments:
  - Ditch appears to fill with rock regularly. About every 3 months it is cleaned.

**GEOLOGIC CHARACTER — CASE 1 (IF APPLICABLE)**
- (A) Structural condition score: 10
- Fractures: 0
- Orientation: Random
- Remarks:
- Rock friction score: 27
- Description: Planar
- Remarks: Dolomite w/in clay medium

**GEOLOGIC CHARACTER — CASE 2 (IF APPLICABLE)**
- (A) Structural condition score: 10
- Fractures: 0
- Orientation: Random
- Remarks:
- Rock friction score: 27
- Description: Planar
- Remarks: Dolomite w/in clay medium

**ADDITIONAL REMARKS AND COMMENTS**
- Ditch appears to fill with rock regularly. About every 3 months it is cleaned.
### Rockfall Hazard Rating System

- **BMP:** 83.35
- **Emp:** 83.50
- **Rate:** 83.50
- **Rate Date:** 07/15/19
- **Repair Code:** 0
- **Rater:** CUT CLASS: A

#### Slope Height Score
- **Score:** 22
- **Actual Height (ft):** 70
- **Remarks:**

#### Average Vehicle Risk Score
- **Score:** 2
- **Percent of Time:** 19
- **Remarks:**

#### AASHTO Decision Site Distance Score
- **Score:** 1
- **Actual Site Distance (ft):** 900
- **Percent of Low Design Value:** 100
- **Remarks:**

#### Width Score
- **Score:** 27
- **Actual Width (ft):** 28.0
- **Remarks:**

#### Geologic Character - Case 1 (if applicable)
- **(A) Structural Condition Score:** 36
- **Fractures:** C
- **Orientations:** A
- **Remarks:**

#### Rock Friction Score
- **Score:** 59
- **Description:** P
- **Remarks:**

#### Geologic Character - Case 2 (if applicable)
- **(A) Structural Condition Score:** 0
- **Features:**
- **Remarks:**

#### Difference in Erosion Rates Score
- **Score:** 0
- **Remarks:**

#### Block Size/Quantity Score
- **Score:** 21
- **Remarks:**

#### Climate & Presence of Water on Slope Score
- **Score:** 20
- **Remarks:**

#### Rockfall History Score
- **Score:** 28
- **Remarks:**

#### Additional Remarks and Comments

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*Slope No. 181*