Transportation

Kentucky Transportation Center Research Report

University of Kentucky

Year 1968

Proposed Experimental Design and Construction Features

Kentucky Department of Highways

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PROPOSED EXPERIMENTAL DESIGN AND CONSTRUCTION FEATURES

Project: Boyd County, F 1(10), SP 10-165-23L
Cannonsburg-Ashland Road (US 60)

Length: 5.648 miles

Location:

Exp. Subsections:
1) Sta. 128+00 to 155+33 (right)
2) Sta. 155+33 to 182+66 (right)
3) Sta. 182+66 to 210+00 (right)
4) Sta. 210+00 to 245+00 (right)
5) Sta. 245+00 to 285+00 (right)
6) Sta. 285+00 to 321+50 (right)
7) Sta. 321+50 to 347+50 (both)
8) Sta. 347+50 to 373+50 (both)
9) Sta. 373+50 to 399+50 (both)

Control Subsection: Sta. 399+50 to 425+68.15 (both)
PURPOSE AND OBJECTIVES: The experimental features proposed in connection with this project are three-fold: the first pertains to subsurface drainage of the pavement system, the second pertains to the feasibility of constructing full-depth, asphaltic concrete pavement sections directly on subgrade material—rock or soil; the third pertains to the structural design and performance of pavement sections employing designated substitutions of bituminous concrete for dense-graded aggregate base.

1. Full-Depth Designs in Relation to Subsurface Drainage - Current notions concerning full-depth bituminous paving are somewhat in conflict with concepts and practices which have prevailed for some time in the past. For instance, so-called trench-type construction was customary during an earlier epoch, and this was followed by prolific use of French drains for relief of captive water in pavement substructures. Then, granular base courses were extended full width across the embankment and even daylighted on the slopes to provide continuous lateral drainage. Even so, the concept that granular base courses comprise a "condensation chamber" is not disputed. Whereas granular bases extending to great depths may act as a "dry well" and otherwise limit the free water rise beneath the pavement, other arrangements which minimize capacity for water would therefore minimize condensation and infiltration. Moreover, if capacity were limited to such an extent that the capillary suction of surrounding soil would imbibe any free water occurring in the system, a more favorable moisture balance would be assured. In times of deluge, the entire system would likely be quite saturated; but, since capacity is minimal, the recovery time may be lessened. Hence, the mechanism of "wicking soils" is an adjunctive concept to that of full-depth paving. So-called impervious soils cannot possibly dispose of significant quantities of water by mere percolation mechanisms but may do so through strong capillary attraction.

2. Feasibility of Full-Depth Construction - Whereas the feasibility of constructing "thick lifts" of bituminous concrete has been demonstrated and is currently practiced in some areas of the country, two divergent points of view have emerged: one is the employment of "thick lifts" in situations where a firm foundation is not realized—such as "quickings" soils; and the other is solely an economic or convenience consideration. Undoubtedly, the first-mentioned case demands a greater thickness of bituminous concrete to compensate for the deficient foundation and is, therefore, an expedient measure only. It is still quite logical to build up from a firm foundation. However, there remains an abiding reluctance to forsake granular base courses and to rely upon subgrade soils to provide the "working platform" and compaction reactance for the construction of high-type bituminous concrete base courses.

Whereas, soil subgrades are susceptible to dusting and "muddying" and would have to be maintained at or prepared to the proper temper ahead of paving, granular bases are much less sensitive to disturbing
influences and would be expected to withstand construction equipment and material deliveries more competently than soil. Hence, latent problems attendant to construction are matters for concern. Such methods of construction have not been "...sufficiently tested under actual service conditions to merit acceptance without reservation in normal ... construction...".

3. Structural Design and Performance - Both the WASHO and AASHO test roads, and other case studies, disclosed the merits of thick asphalt layers. The Asphalt Institute translated these findings into their "Deep Strength" concept. Others persisted in the notion that the structural integrity of a pavement system was inherently imbued by unbound granular bases--thereby, relegating the function of the bituminous surfacing to that of preserving or protecting the granular base. Kentucky's design criterion and practices allocate nominally one-third of the thickness to bituminous concrete. This has been practiced somewhat intuitively and judiciously. Departures therefrom have employed significantly greater proportions and even full-depth designs--in no instance has bituminous concrete been placed directly upon subgrade soil. Nominally one-and-one-half inches to two inches of crushed stone have been spread beforehand. To cite others, sections of 9 on 4, 12 on 4, etc. have been built.

A compulsive digression follows. Full-depth asphalt paving, as it is now termed, is really only a revival of a former concept that has been practiced to some extent since the beginning. An interesting account of "black base" paving--including full-depth sections--is recorded in the Proceedings of the Fifth Asphalt Paving Conference, published by The Asphalt Association (now the Asphalt Institute), 1926. The specific reference is to a paper entitled: "Black Base' (Asphaltic or Bituminous Concrete Base) and Its Place on Standard Specifications," by Hugh W. Skidmore, President of Chicago Paving Laboratory. A sequel, entitled: "Black Base' as a Time Saver in Mercer County, New Jersey," by Harry F. Harris, is found in the same issue. The 1927 Proceedings contains two reports: one by Warren H. Booker, entitled: "Black Base In the Southern States" and one by W. P. Cottingham, entitled: "Black Base at Gary, Indiana". These articles attest the favorable performance of designs ranging between four and six inches in thickness.

From a mechanistic point of view, load-deflection relationships outwardly portray the composite stiffness or rigidity of pavement systems. Contrary to general impressions, surface deflection is not a discrete, limiting parameter. Stresses and strains in the subgrade soil and in the extreme fibers of the bituminous concrete layers may (do) constitute overriding, fundamental limits. Therefore, thickness design criteria cannot be based upon deflection spectra alone. In other words, two different pavements having equal, 18-kip deflections are not necessarily equal designs unless all accompanying stresses and strains are also equal. Recent computations employing multi-layer theory indicate that Kentucky's empirically derived, design curves more closely approximate lines of equal subgrade strain than lines of equal deflection. This type of investigation is being pursued currently in connection with HPR study KYHPR-64-20. Some preliminary results therefrom are shown superimposed on Kentucky's current design chart (Fig. 1). As a matter of additional interest a line of
equal, tensile strain in the asphalt layer is also shown; it has a specific magnitude of \(1.88 \times 10^{-4}\). All of the superimposed curves are based on 60°F. Similar curves derived for full-depth asphalt sections are shown in Fig. 2. New, theoretical insights are provided by these companion figures. Layer equivalency ratios are evident—but only with respect to specific values of design parameters—that is, for given ordinate and abcissa values. Confirming correlations between theory and reality continue to be sought through deflections. Deflection data, when arrayed in superposition over Fig. 1 and statistically analyzed, will undoubtedly provide a rigorous test of the attendant theories and hypotheses. These analyses, supplemented with fatigue considerations, will be forthcoming from KYHPR-64-20 inasmuch as they exceed the scope of PPM 60-2. The discussion here merely emphasizes the importance of and need for deflection measurements on full-depth, asphaltic concrete pavement sections—which this experimental project will provide, in part. Extensive deflection data from normal sections are already at hand. Few deflections representing full-depth designs are in record.

DESIGNS AND TYPICAL SECTIONS

Designs and typical sections are shown on Sheets 1 through 14 (Appendix I).

For design purposes, the projected EWL was 80 million, the design CBR is 9 (credited to rock subgrade) on subsections 1, 2, and 3 and is 3 on subsections 4 through 10. The several subsections and thicknesses are summarized in the following table.

### SUMMARY OF EXPERIMENTAL SUBSECTIONS

<table>
<thead>
<tr>
<th>Design</th>
<th>CBR 9 (Conventional)</th>
<th>Exp. Subsections</th>
<th>CBR 3 (Rock Subgrade)</th>
<th>Exp. Subsections</th>
<th>CBR 3 Control Subsection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Class I Surf.</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Class I Base</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Class I Base</td>
<td>2.5</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Class I Base</td>
<td>3</td>
<td>2.75</td>
<td>4.75</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Class I Base</td>
<td>3.25</td>
<td>2.75</td>
<td>3.25</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Class I Base</td>
<td>4</td>
<td>3</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| DGA Base | 12 |

| Total (ins.) | 18.5 | 13.25 | 12.5 | 11.75 | 17.25 | 16 | 15 | 17.25 | 16 | 15 |

| Substitution Ratio | 1.78 | 2.00 | 2.29 | 1.77 | 2.00 | 2.24 | 1.77 | 2.00 | 2.24 |

| Length (ft.) | 2733 | 2733 | 2733 | 3500 | 4000 | 3650 | 2600 | 2600 | 2600 |

|                | 2600 | 2600 | 2600 | 2618 |

|                | 2618 | 2618 | 2618 | 2618 |
FLEXIBLE PAVEMENT DESIGN CURVES

Fig. 1: Revised Flexible Pavement Design Curves.
FLEXIBLE PAVEMENT DESIGN CURVES

Fig. 2: Revised Flexible Pavement Design Curves.
EVALUATION OF EXPERIMENTAL FEATURES

Construction of the pavement subsections will be observed. No extraordinary control of standard materials or standard construction methods is anticipated. Details not covered by existing standards and Special Provisions will be included in plans as Special Notes (see Appendix II). The experimental features involved in the project have been estimated to cost approximately $240,000 less than conventional design (cf, letter to Division Engineer, September 30, 1968, from E. B. Gaither, Jr., Director of Design).

Pavement condition inspections will be made from time to time. No specific schedule seems necessary. Laboratory CBR tests will be made on routine samplings of subgrade soils in subsections 4 through 10--samplings are normally made at 500-ft. intervals.

Evaluations of the pavement structures will be based principally upon deflection measurements. These will be augmented by simultaneous, determinations of subgrade moduli--either directly by in-place CBR tests or by non-destructive methods yet to be resolved. Conformity with rational theory--such as has been illustrated in Figures 1 and 2, hereof--is of compelling interest. Long-term performance will provide demonstrative proof of structural adequacy.
September 30, 1968

Mr. R. E. Johnson
Division Engineer
Bureau of Public Roads
Frankfort, Kentucky

SUBJECT: Boyd County
F 1 (10)
SP 10-165-23L &
SP 10-145-3L
Cannonsburg-Ashland Road
Sections 1 and 2

Dear Mr. Johnson:

Attached hereto and submitted for your approval is a recommended pavement design for the subject project. As you will note, this is proposed as an experimental project to be constructed in accordance with PPM 60-2.

The intent of this proposal is to experiment with various design and construction features for full-depth bituminous concrete pavement. Substitutions of bituminous concrete in lieu of dense-graded aggregate base are proposed in the range of 1.75, 2.00 and 2.25. Mr. Havens of the Research Division is to submit a preconstruction report outlining in more detail the many variables to be studied.

A cost analysis has been prepared comparing the proposed design to our conventional design procedure and this analysis indicates that these experimental designs are approximately $240,000 less than the conventional design. Approximately 27 per cent of this project has a rock subgrade which permits a very high stability shoulder design. The remainder of the project has a CBR of 3, and in order to provide this same level of service in the shoulder design it would be necessary under the conventional design to
Mr. Johnson  
Page 2  
September 30, 1968

construct full-depth dense-graded aggregate shoulders. Therefore, the comparison to the conventional design was on the basis of full-depth and sealed dense-graded aggregate shoulders through the earth subgrade portion. It is very desirable on this project to provide a shoulder of equal structural support throughout the length of this project and the adjacent project connecting to I-64. The approved shoulder design for project F 1 (10), Section 3, is Rock Subgrade with 5-inch Dense-Graded Aggregate and Class A2 Surface. The Department is using this shoulder design for projects that have substantial rock excavation available for subgrade construction. It is requested that the total cost of all items be participated in by the Bureau of Public Roads.

As this project is being performed under a Consultant agreement and the Consultant is now ready for the pavement design, your early approval of this proposal is requested. This office or Mr. Havens' office will be glad to furnish any additional supporting data that is necessary in order to make this project conform to the requirements of PPM 60-2.

Very truly yours,

E. B. Gaither, Jr.
Director of Design

EBG:EBD:phg
Attachment
cc: Dept. "B.P.R." File  
J. H. Havens  
W. B. Drake
PAVEMENT DESIGN

County: Boyd  F.P. F 1 (10)  10-165-23L
Road Name: Cannonsburg-Ashland Road (US 60)  S.P. 10-145-3L

From: Intersection with US 60 approximately 1500' East of Ky. 180 Intersection (Section 3) at approximate Station 128+00
To: The S.W.C.L. of Ashland, 175' S.W. of State TB Hospital approximately Station 425+68.15

Traffic: 6740  19 66; 13,500  19 87  E.W.L. 80+ Million
Existing: Type Bit. Conc. on N.R. Base Thickness 4½ on 11 inches
Length: 5.648 miles. Design CBR 9 & 3*

FOR TYPICAL SECTION SEE ATTACHED SHEET

For Pavement Designs see the attached sheets.

*CBR-9 -- Sta. 128 to Sta. 210
*CBR-3 -- Sta. 210 to Sta. 425+68.15

SUBMITTED  E.B. Drake  DATE 9/26/68
RECOMMENDED  DATE 7/20/68 Director of Design
APPROVED  DATE 10-1-68 Asst. State Highway Engineer
APPROVED  DATE For Division Engineer B.P.R.
BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 128+00 to Station 155+33
(Right side of Roadway)

1" Cl. I Surface
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
3¼" Cl. I Base
0.1 gal./s.y. RC-250
or 0.05 gal./s.y. SS-1h (Tack)

Shoulders
One lift of rock subgrade
3" compt. depth Cl. I Base
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
**0.20 gal./s.y. PAC-7
**15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

**The last application of PAC-7 and stone shall be extended
down the slope for erosion control.

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.
BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 155+33 to Station 182+66
(Right side of Roadway)

1" Cl. I Surface
3" Cl. I Base

Shoulders
One lift of rock subgrade
3" comp. depth Cl. I Base
Bit. surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 7 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
**0.20 gal./s.y. PAC-7
**15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

**The last application of PAC-7 and stone shall be extended down the slope for erosion control.

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.
BOYD COUNTY
F 1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 182+66 to Station 210+00
(Right side of Roadway)

Median

2/1 NORMAL TYPICAL SECTION

1" Cl. I Surface
3" Cl. I Base
3" Cl. I Base
4 3/4" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders
One lift of rock subgrade
3" comp. depth Cl. I Base
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
**0.20 gal./s.y. PAC-7
**15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

**The last application of PAC-7 and stone shall be extended
down the slope for erosion control.

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.
BOYD COUNTY

P-1 (10), SP 10-165-23L, & SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 210+00 to Station 245+00
(Right side of Roadway)

1" Cl. I Surface
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
3½" Cl. I Base
4" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders
6" comp. depth Cl. I Base (2-3" courses)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended
down the slope for erosion control.
BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 245+00 to Station 285+00
(Right side of Roadway)

1" Cl. I Surface
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders
6" comp. depth Cl. I Base (2-3" courses)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended
down the slope for erosion control.
BOYD COUNTY

F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 285+00 to Station 321+50
(Right side of Roadway)

1" Cl. I Surface
3" Cl. I Base
3" Cl. I Base
3" Cl. I Base
2½" Cl. I Base
2½" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders

6" comp. depth Cl. I Base (2-3" courses)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
4½" Cl. I Base
5" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.5 gal./s.y. RT-2 or AE Primer L (prime)
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders
7" comp. depth Cl. I Base (4" + 3" course)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
BOYD COUNTY

F 1 (10), SP 10-165-23L, and SP 10-145-3L
Ca. Ionsburg-Ashland Road (US 60)
Station 347+50 to Station 373+50

Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
4" Cl. I Base
4" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.05 gal./s.y. RT-2 or AE Primer L
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders
7" comp. depth Cl. I Base (4" + 3" course)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 3 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
BOYD COUNTY
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 373+50 to Station 399+50

Pavement
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base
3½" Cl. I Base
3¾" Cl. I Base
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h (Tack)

Median
0.05 gal./s.y. RT-2 or AE Primer, L
1" Cl. I Surface
3" Cl. I Base
4" Cl. I Base

Shoulders
7" comp. depth Cl. I Base (4" + 3" course)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
BOYD COUNTY

F 1 (10). SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 399+50 to Station 425+68.15

Pavement
19" comp. depth D.G.A. Base
5\(\frac{3}{8}\)" comp. depth Cl. I Base (2 - 2 3/4" courses)
1" comp. depth Cl. I Surface
0.1 gal./s.y. RC-250 or 0.05 gal./s.y. SS-1h

Median
Full depth D.G.A. Base
3" comp. depth Cl. I Base
1" comp. depth Cl. I Surface
0.1 gal./s.y. RC-250 or 0.05 gal./s.y. SS-1h

Shoulders
Full depth D.G.A. Base
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
Bit. Surface Class A-2
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. 57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
**NORMAL TYPICAL SECTION**
(Left Side of Roadway)

**BOYD COUNTY**
F 1 (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 128+00 to Station 210+00

**Pavement**

- **Widening (trench)**
  - 11" compt. depth D.G.A. Base
  - 4½" compt. depth Cl. I Base

- **Overall Surfacing**
  - 0.1 gal./s.y. RC-250 or 0.05 gal./s.y. SS-1h Tack
  - Add sufficient tonnage of Cl. I Base and/or Surface for correcting adverse crown and add 500 ton/mile for leveling
  - 2½" compt. depth Cl. I Base
  - 1" compt. depth Cl. I Surface
  - 0.1 gal./s.y. RC-250 or 0.05 gal./s.y. SS-1h Tack

**Shoulders**

- One lift of rock subgrade
  - 5" compt. depth D.G.A. Base
  - Bit. Surface Class A-2
  - 0.5 gal./s.y. RT-2 or AE Primer L (Prime)
  - 0.45 gal./s.y. PAC-7
  - 50 lbs./s.y. Size No. 57 (spread immediately)
  - Roll immediately with steel wheel and pneumatic rollers
  - 0.15 gal./s.y. PAC-7
  - 20 lbs./s.y. Size No. 8 (spread immediately)
  - Roll immediately with steel wheel and pneumatic rollers
  - **0.20 gal./s.y. PAC-7**
  - **15 lbs./s.y. Size No. 8 (spread immediately)**
  - Roll immediately with steel wheel and pneumatic rollers

*This shoulder portion shall be constructed with rock subgrade in accordance with Special Provision No. 41.

**The last application of PAC-7 and stone shall be extended down the slope for erosion control.**
BOYD COUNTY
F.1. (10), SP 10-165-23L, and SP 10-145-3L
Cannonsburg-Ashland Road (US 60)
Station 210 to Station 321+50

Pavement:

Widening (trench)
11" compct. depth D.G.A. Base
4½" compct. depth Cl. I Base
Overall Surfacing
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack
Add sufficient tonnage of Cl. I
Base and/or Surface for correcting adverse crown and add 500 ton/mile for leveling
2½" compct. depth Cl. I Base
1" compct. depth Cl. I Surface
0.1 gal./s.y. RC-250 or
0.05 gal./s.y. SS-1h Tack

Shoulders:

Full depth D.G.A. Base
Bit. Surface Class A-2
0.5 gal./s.y. RT-2 or AE Primer L (Prime)
0.45 gal./s.y. PAC-7
50 lbs./s.y. Size No. .57 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
0.15 gal./s.y. PAC-7
20 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers
*0.20 gal./s.y. PAC-7
*15 lbs./s.y. Size No. 8 (spread immediately)
Roll immediately with steel wheel and pneumatic rollers

*The last application of PAC-7 and stone shall be extended down the slope for erosion control.
LIP CURB & GUTTER
I. Subgrade Preparation: When Class I Base is required to be constructed directly on prepared, earth subgrade, the preparation shall be in accordance with the applicable provisions of Section 103 of the Standard Specifications except as hereinafter modified.

1. In addition to the normal compaction and grading requirements, pneumatic tire rolling (108.3.5,B,2) shall be performed within 24 hours preceding placement of the first course of Class I base. In the event of intervening rain, the subgrade shall be allowed to dry to an optimum condition for compaction and shall be re-rolled. Soft areas shall be conditioned to withstand rolling. The subgrade shall be considered to be satisfactorily compacted when rolling does not cause tire marks or noticeable ruts. Blade-grading may be performed in conjunction with pneumatic rolling. In the event of dryness and the presence of dust on the subgrade, the dry areas shall be moistened and tempered preparatory to rolling. Excessive dust may be removed, and moist soil of a quality equal to the prevailing subgrade material may be used to restore the section.

2. Transitions in subgrade elevation, as required by differences in paving templates, shall be made within a distance of 100 feet.

3. Shoulder subgrades shall be constructed and prepared as described in Paragraph 1, above, and in accordance with applicable requirements of Section 109. Due care shall be taken to compact earth firmly against the contiguous sides of Class I base previously paved in the traveled lanes. Lateral drains under the shoulders shall not be required.

II. Construction of Class I Base Courses: Class I base courses which are continuous with respect to both shoulders and the traveled lanes shall not be joined at the edge of traveled lanes but paving widths may be selected to abut not less than 6 inches within the limits of the traveled lanes. Successive courses shall abut not closer than ± 6 inches laterally from an underlying joint.

III. Paving Raised Medians Surrounded by Curbs: When Class I base courses and subsurface courses are to be constructed on earth subgrade within raised median sections surrounded by concrete curbs, the prepared earth subgrade shall be primed immediately following its preparation. The primer application shall consist of 0.4 to 0.5 gallons of Primer L per square yard. Sufficient primer shall be applied to the lower portion of the back face of the curb and at the juncture between the curb and subgrade to insure adequate sealing.

IV. The bitumen content of Class I base course to be placed directly on earth subgrade shall be increased 0.5 percentage points above job-mix formula requirements established for succeeding courses.