

EXPERIMENTAL CONCRETE AND
BITUMINOUS SHOULDERS

(Work Plan No. 13)



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

EXPERIMENTAL CONCRETE AND
BITUMINOUS SHOULDERS

(Work Plan No. 13)

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Research Laboratory Section
Testing and Research Division
Research Project 72 F-126
Research Report No. R-943

Michigan State Highway Commission
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Lansing, October 1974

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Introduction

Over the last few years, there has been increased interest in experimentation with stronger surfaces for freeway shoulders. Several experimental installations of improved shoulder design have been made, such as the project on I 69 southwest of Charlotte, where two improved bituminous shoulder types and a portland cement concrete shoulder are being compared with the standard freeway shoulder. Performance of the experimental shoulders to date shows a marked improvement over the standard 170 lb/sq yd bituminous aggregate shoulders on that project.

Construction details, procedures, initial costs, instrumentation, and methods of measurement have been previously reported for the I 69 shoulders in MDSHT Research Reports R-844 (January 1973) and R-898 (February 1974).

The purpose of this study is to determine the relative cost of the portland cement concrete and improved bituminous stabilized shoulders on several projects.

Qualitative evaluations of the condition and performance of the two types of shoulders in the various locations will be made and reported at a later date. The shoulders will be evaluated by condition surveys, noting the amount of cracking, and other observable deterioration.

Scope

Twenty-nine projects had been tentatively selected for installation of experimental shoulders, including 16 bituminous and 13 portland cement concrete. Of the 29 projects, this report will cover only 16, eight bituminous and eight portland cement concrete, as shown in Table 1. The remaining 13 projects will not be reported on at this time since the contracts have not been let as of this date.

Design details for the shoulders are shown in Figures 1 and 2.

Cost

The purpose of this study is to collect cost information, since the bituminous shoulders are considered to be experimental from a cost standpoint only.

Unit bid prices for the shoulders have been determined and tabulated for each project in Table 1. Since there are no control sections, as such, in each project, direct quantitative comparisons will not be made.

The cost of portland cement concrete shoulders averaged approximately \$6.50/sq yd, including hookbolts, longitudinal, and transverse joints.

Bid prices for the bituminous shoulders are given by the ton, so necessary conversions were made to give a sq yd cost for comparison. The bituminous shoulders averaged approximately \$4.00/sq yd. Individual unit prices for both types are shown in Table 1.

Conclusion

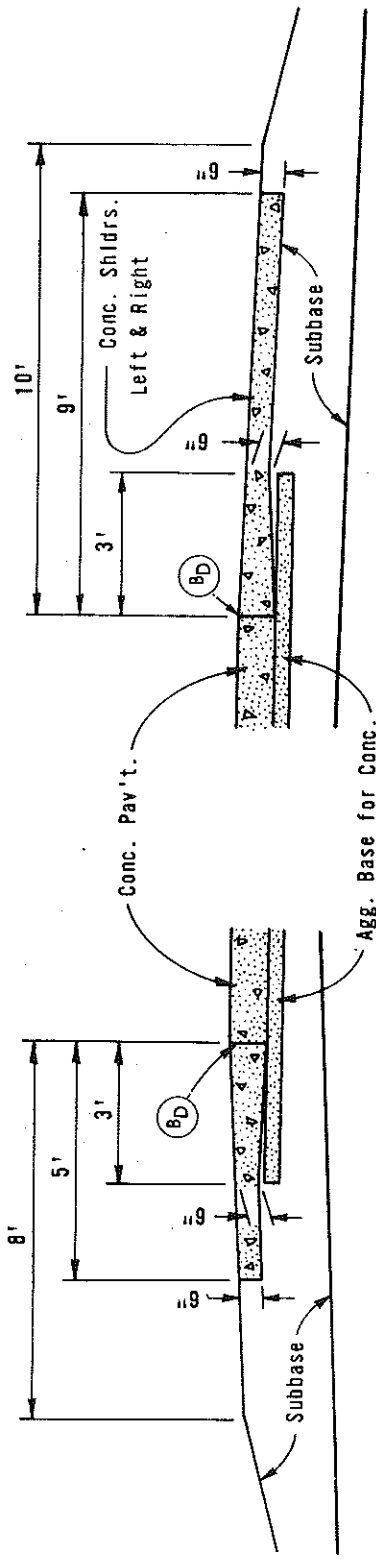
The average cost of concrete shoulders was more than 60 percent higher than the experimental bituminous shoulders, for the 16 projects covered by this report. The latest bid shows the effect of recent price increases for bituminous materials.

Future reports will be issued to cover the projects soon to be let, as well as the performance of all the experimental shoulders.

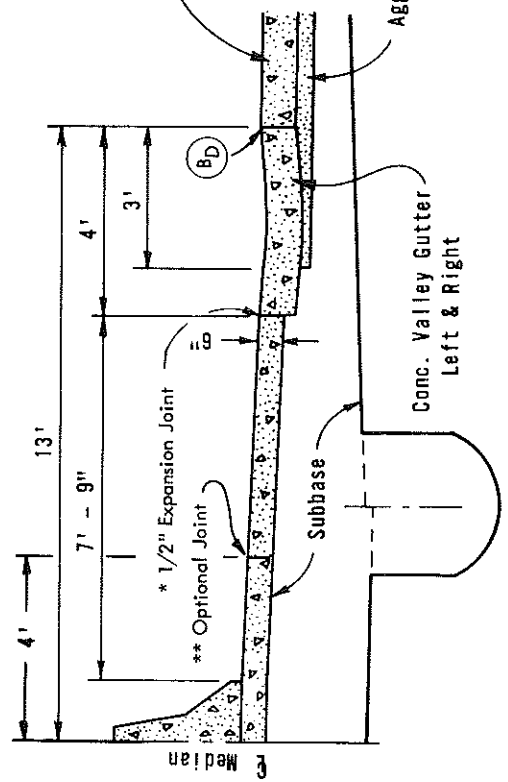
TABLE 1
PROJECTS SELECTED FOR IMPROVED SHOULDER DESIGN

Project	Job No.	Description	Letting Date	Shoulder Material	Approximate Quantity, sqyd	Cost, sqyd
I-03035	00024A	I 196, 144th Ave to SE of Ottawa Co Line	4-19-72	Bituminous	52,000	\$3.30
I-82022	04280A	I 94, E of Haggerty to E of Ozra Rd	5-17-72	Bituminous	51,000	4.60
I-03035	00023A	I 196, N of 142nd St to SW of 144th Ave, Allegan	7-19-72	Bituminous	68,000	3.10
I-82191	02800A	I 75, Huron R to Gibraltar Rd	10-18-72	Bituminous	24,000	4.40
I-82021	05126A	I 94, W of Borgman Rd to W of Morton, I 275, C&O RR to S of Huron River Dr	1-17-73	Bituminous	52,000	3.90
I-82021	05125A	I 94, W of Rawsonville Rd to W of Borgman Rd	3-28-73	Bituminous	66,000	3.90
I-82021	05127A	I 94, W of Morton Rd to E of Haggerty Rd	5-16-73	Bituminous	38,000	4.00
I-82293	04742A	I 275, M 153 to Plymouth Rd	2-20-74	Bituminous	70,000	5.10
I-25031	04213A	I 75, Maple Rd to N of Arlene Dr, Flint	12-20-72	Concrete	13,000	6.50
I-25032	04215A	I 75, Grand Trunk W RR to Pasadena Ave	12-20-72	Concrete	23,000	8.50
I-25032	04691A 04990A	I 75, S of M 57 to N of M 54 and M 83	12-20-72	Concrete	61,000	5.90
I-25032	04991A	I 75, Pasadena to S of M 57	12-20-72	Concrete	95,000	5.90
I-82123	04229A	I 96, M 39 E to St. Mary Ave	4-18-73	Concrete	38,000	6.40
I-82122	04533A	I 96, E of US 24 to E of Outer Drive	10-17-73	Concrete	23,000	6.00
I-82122	04534A	I 96, E of Outer Dr to Evergreen Ave	10-17-73	Concrete	46,000	5.90
I-82123	01270A	I 96, St. Mary Ave E	10-24-73	Concrete	65,000	7.30

CONCRETE PAVED SHOULDERS

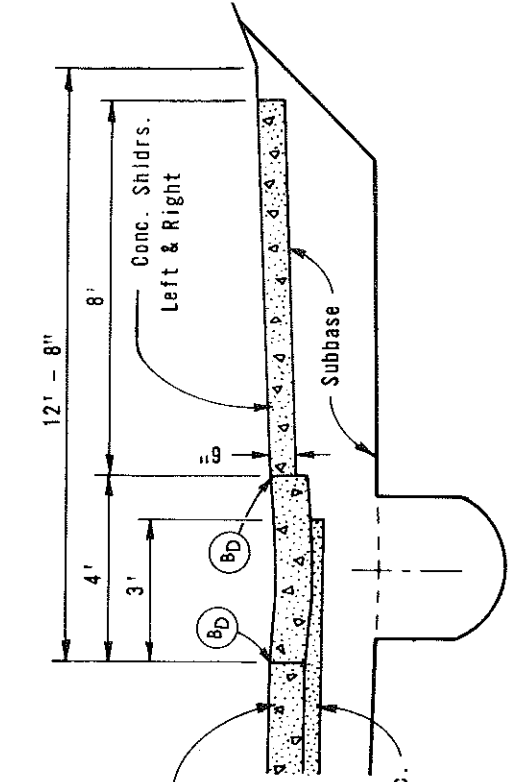


RURAL DUAL CONCRETE ROADWAY



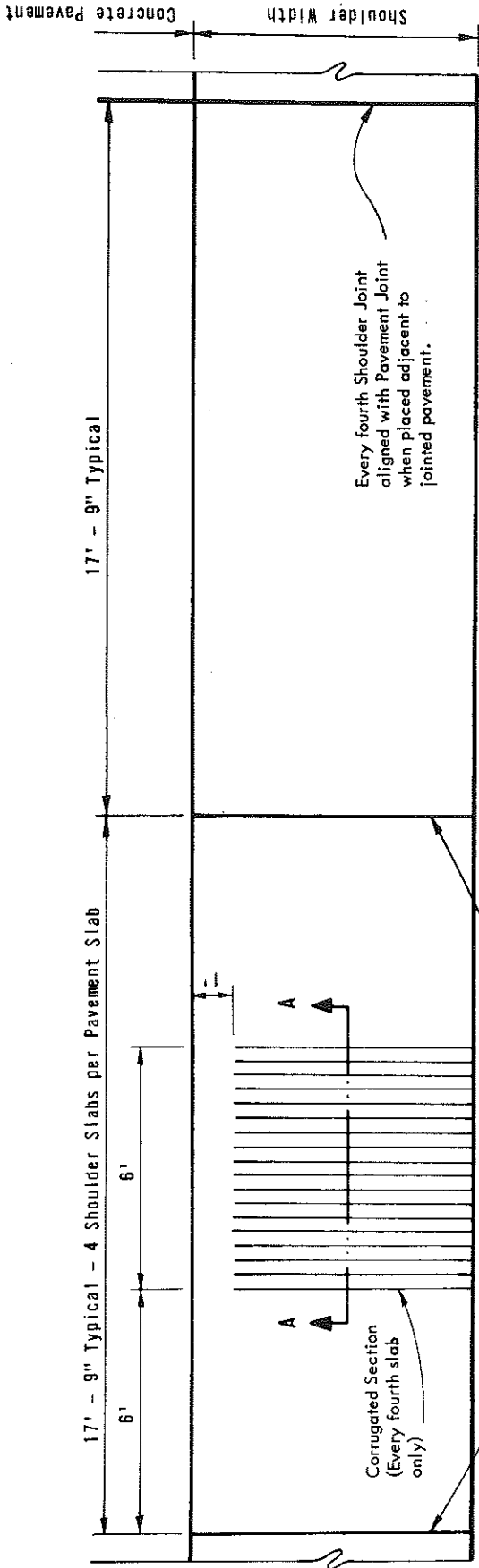
* If contractor elects to pour shoulder monolithically with concrete valley gutter, expansion joint may be omitted where shown and placed at 4' either side of median ξ

** For wider medians, construct bulkhead or plane of weakness joints as shown. For median width shown or narrower, this joint is optional. No hook bolts or lane tie bars required.



URBAN DUAL CONCRETE ROADWAY SECTION FOR CURB & GUTTER SIMILAR

Figure 1. Design details for concrete paved shoulders.



Transverse Joints
 3/8" x 2" Sawed or Formed & Sealed
 (Place Expansion Joints in Shoulder to match those in Pavement)

Corrugated Section
 (Every fourth slab only)

CONCRETE SHOULDER JOINT & CORRUGATED SECTION

NOTE: For medians, stop corrugation 6" from Median Barrier.

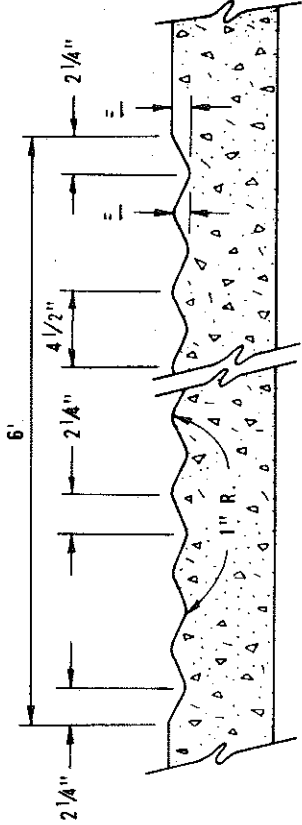


Figure 1 (Cont.). Design details for concrete paved shoulders.

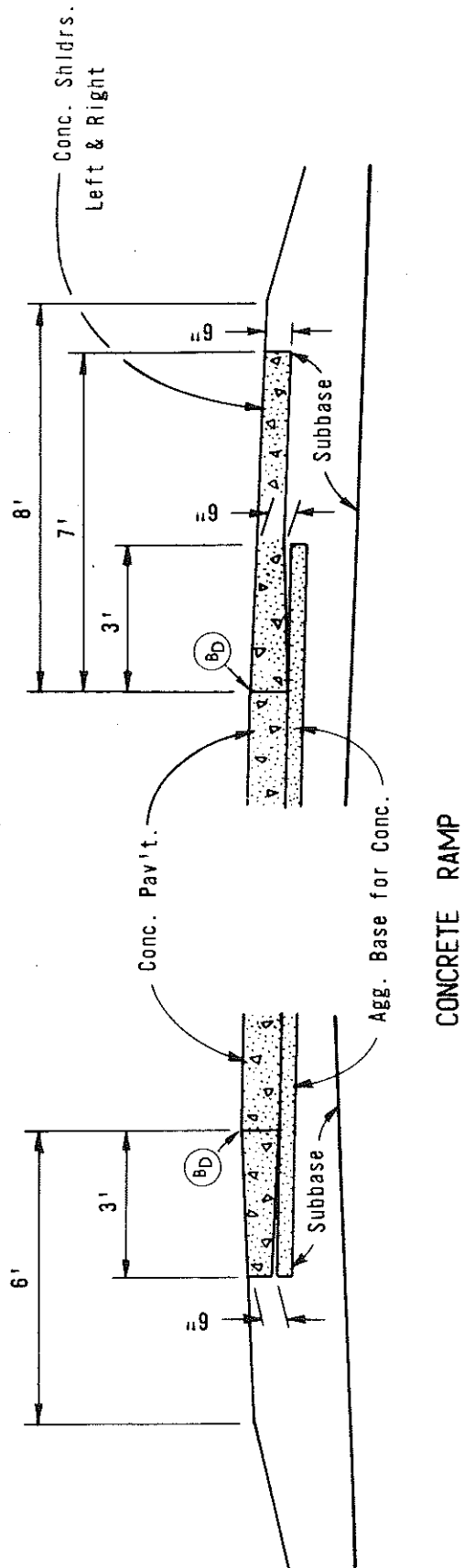


Figure 1 (Cont.). Design details for concrete paved shoulders.

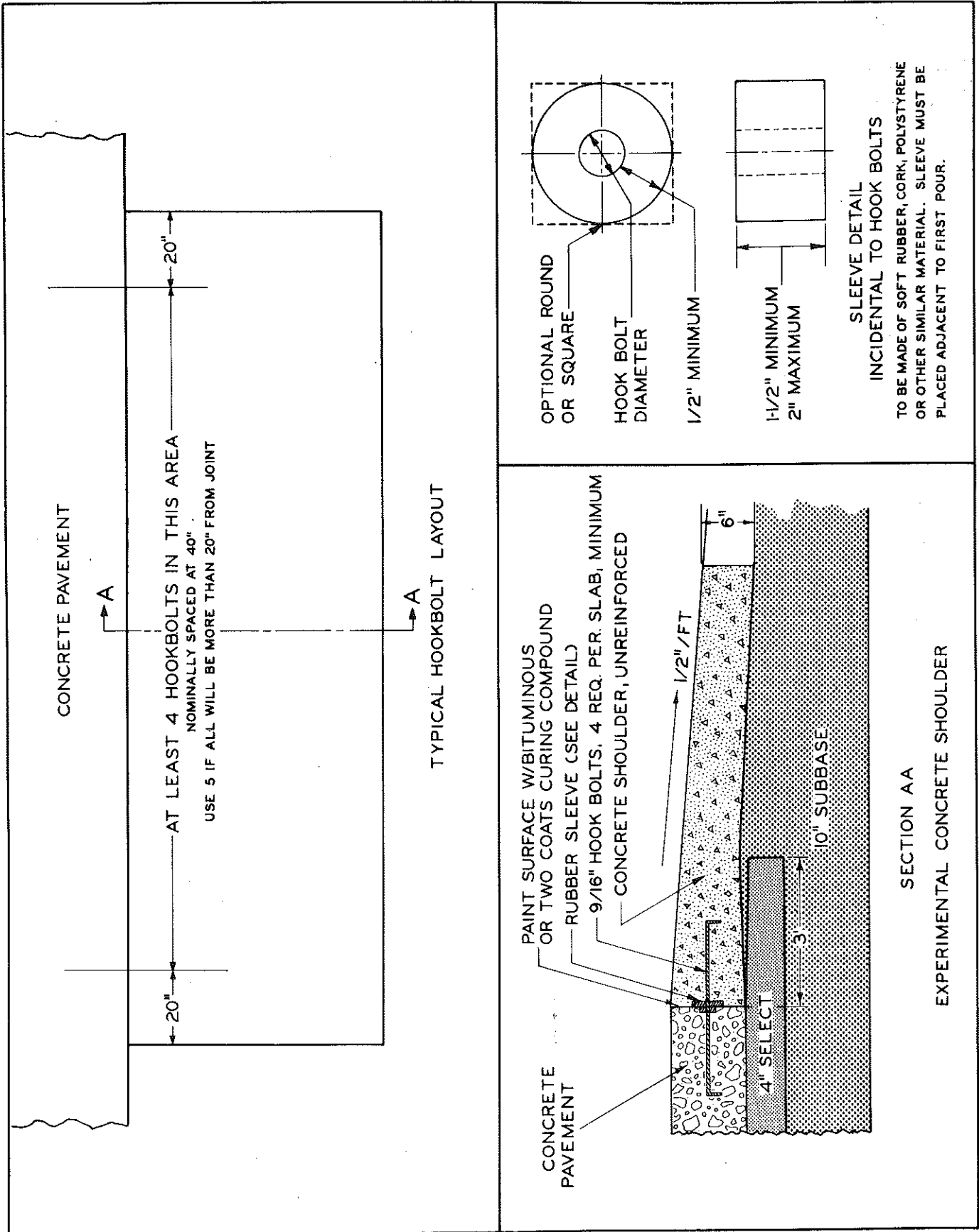
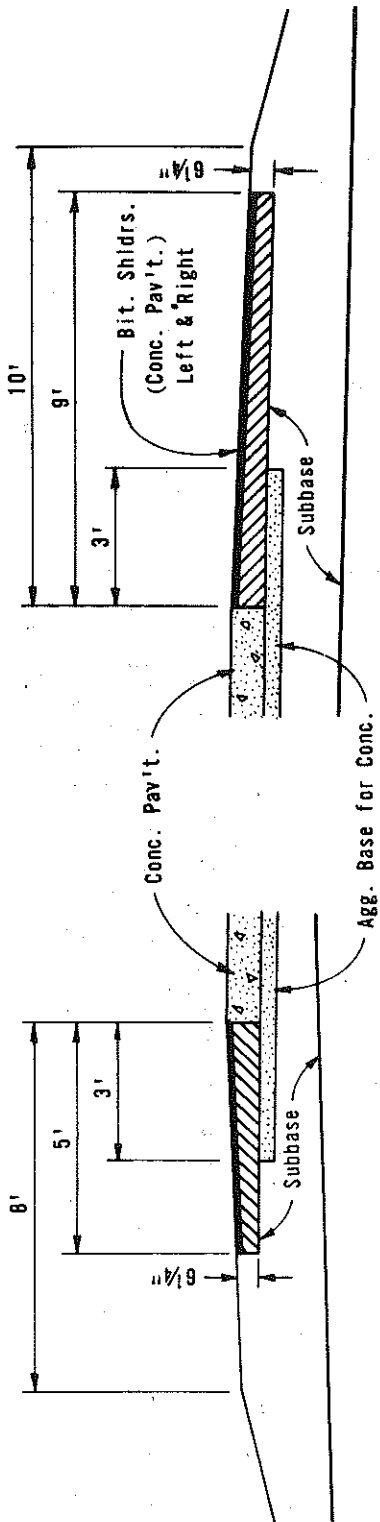
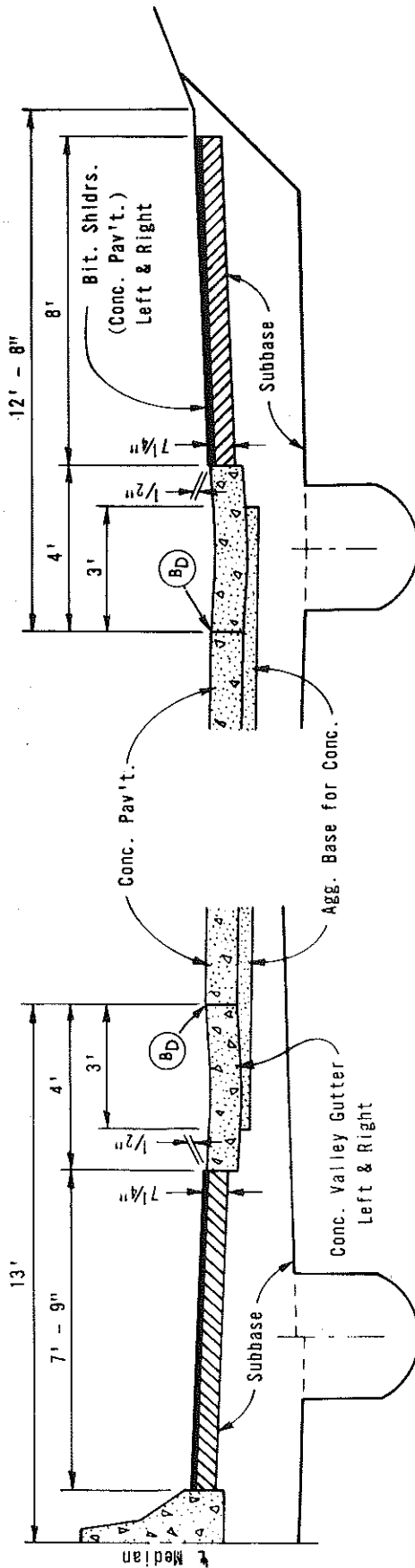


Figure 1 (Cont.). Design details for concrete paved shoulders.

BITUMINOUS PAVED SHOULDERS

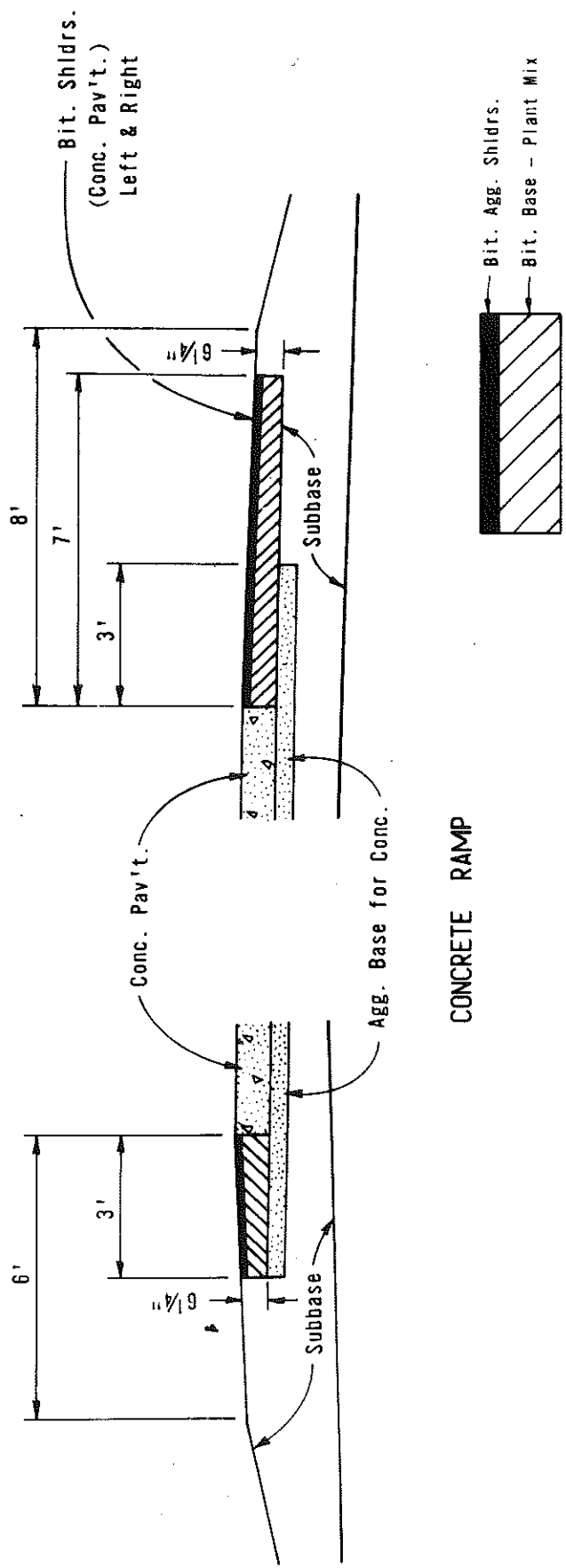


RURAL DUAL CONCRETE ROADWAY



URBAN DUAL CONCRETE ROADWAY SECTION FOR CURB & GUTTER SIMILAR

Figure 2. Design details for bituminous paved shoulders.



KEY FOR
BITUMINOUS SHOULDERS

Figure 2 (Cont.) Design details for bituminous paved shoulders.