

REJECTED LOCATION OF INTERSTATE  
HIGHWAY FORTY, CALIFORNIA

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Despite convincing "geographic" reasons for routing Interstate highway 40 (I-40) through Twentynine Palms, a proposal to do so was abandoned by the California Division of Highways. This paper explores the reasoning behind the decision. It is intended as a study of the successes and failings in route location decision making.

Southern California's population spills toward Twentynine Palms and natural openings through the Mojave Desert's rough terrain which lead straight to the principal eastward highway. Yet this obvious route has gone unused (Figures 1, 2, and 3). If I-40 passed through the populated area to Twentynine Palms and on to Topock it would serve more people than if routed from I-15 to Topock. It would also provide the shortest connection (Figures 1 and 3).

The open terrain that offers a direct route via Twentynine Palms is composed essentially of broad alluvial basins and broad passes between low mountains (Figure 2). Although the topographic trend of this part of the desert is generally north or northwest and the highway would have run southwest and west, the arrangement of gaps between

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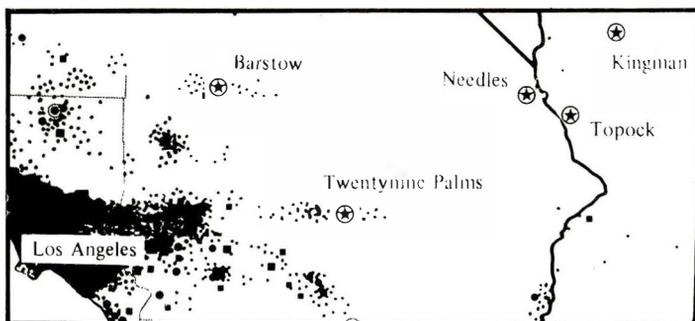


Figure 1. Population distribution of southern California and part of the Mojave Desert.

Source: U.S. Bureau of the Census (map) *Population Distribution, Urban and Rural, in the United States: 1960* (Washington: Government Printing Office, 1963).

mountains allows such a highway alignment. South of Morongo Valley the natural route changes in that the only openings are narrow canyons across the southwestern extremity of the Little San Bernardino Mountains. Beyond this three-mile interruption the natural route of broad, open passes and basins continues to Los Angeles. With the exception of the 83 miles in which the highway would have run across the grain of the country, highways did run through these natural openings from the Arizona-California state line to Los Angeles. From Morongo Valley to Los Angeles these old roads had been proposed as freeway routes (Figure 3).<sup>1</sup>

*Advantages of the Twentynine  
Palms Route*

U.S. Highway 66, the principal predecessor to I-40, connected the large populations in southern California and eastern North America. It also served as a link between the more lightly populated northern California and the southern

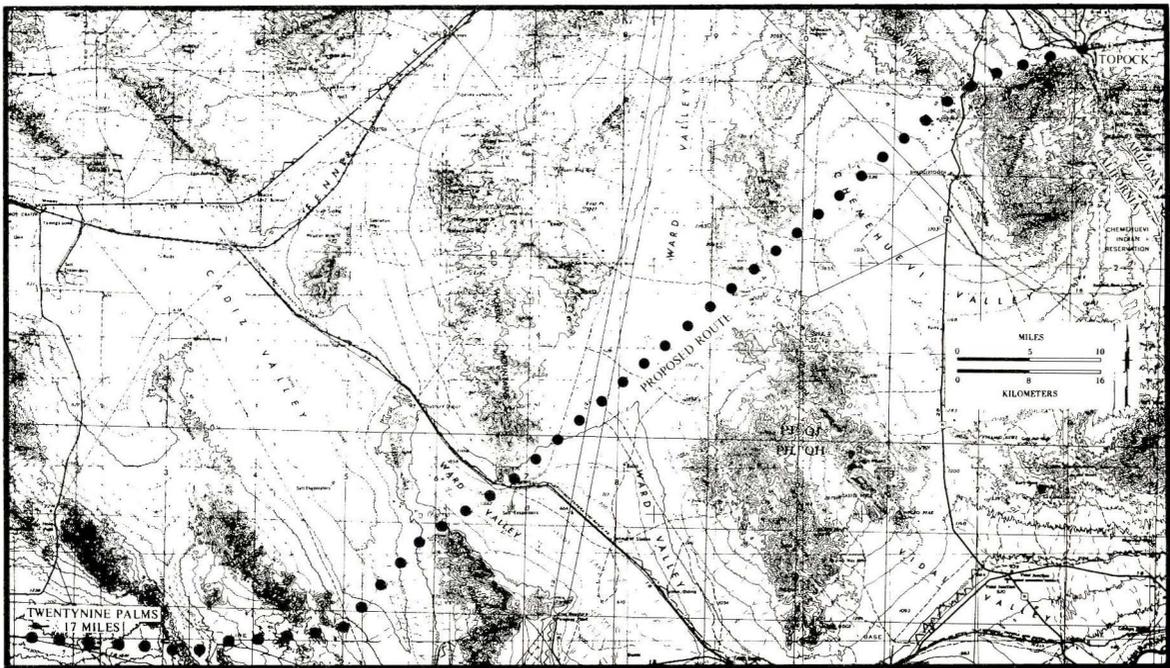


Figure 2. The proposed route between Topock, Arizona, and a point 17 miles east of Twentynine Palms, and its relationship to landforms.

Source: U.S. Geological Survey, Needles contour map, original scale 1:250,000.

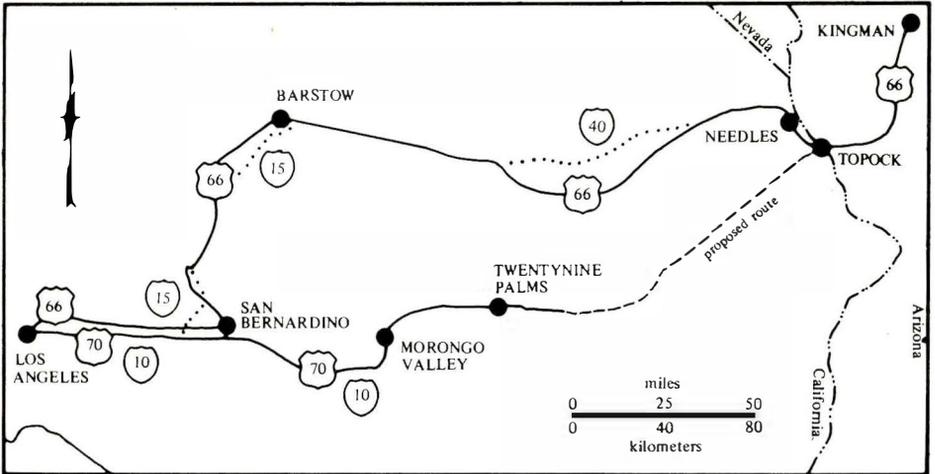


Figure 3. The options, 1956. The proposed Twentynine Palms route is shown by dashed line. The road from U.S. 70 to Twentynine Palms had no sign number. Eventual locations of Interstate highways are shown by dotted lines.

tier of states. In spite of these locational and demographic facts, the California Division of Highways concluded that U.S. 66 principally served northern California.

Old U.S. 66 was circuitous. Its successors, I-40, 15, and 10, are also circuitous. Since there is usually no need to go north to Needles, west to Barstow, and south to San Bernardino, it should be possible to go directly from Topock to Los Angeles (Figures 1 and 3). According to California highway officials, the saving offered by the Twentynine Palms route would have been 57 miles when the routing decision was made in 1956, and 49 miles in comparison with U.S. 66 as modified by plans that already had been adopted; the saving would have been 22 miles in comparison with completed I-40-15-10.<sup>2</sup> The decision was made in the context of the 49-mile difference.

The proposed route would have provided a freeway for local traffic in the corridor between U.S. 70 (I-10) and Twentynine Palms, a volume equal to the through-traffic carried by U.S. 66 between Barstow and Needles (Figure 3).<sup>3</sup>

The Twentynine Palms route would have provided a shorter and cooler route to San Diego. From Flagstaff, Arizona, where the routes diverge, to San Diego via Phoenix, was 495 miles--all to be Interstate freeway except the 37 miles of U.S. 80 southwest of Phoenix. Taking into account the eventual 17-mile saving on I-40 between Kingman and Seligman, Arizona, the proposed route would have been 467 miles via four-lane routes 60 and 395 west of Beaumont, or 451 miles via two-lane roads between Beaumont and Temecula (Figure 4). The contrast in mileage for various elevation ranges, on the Colorado Plateau and in the desert are shown in Table 1.

Table 1  
Colorado Plateau and Desert Mileages  
for Twentynine Palms and Phoenix  
Routes, by Elevation

Elevation	Twentynine Palms	Phoenix
7,000-7,334	19	0
6,000-7,000	23	28
5,000-6,000	61	6
4,000-5,000	20	17
3,000-4,000	32	36
2,000-3,000	49	19
1,000-2,000	126	53
500-1,000	32	78
0-500	0	137
-30-0	0	23



The proposed route would have been 25 miles shorter from Ash Fork, Arizona, to Los Angeles than U.S. 89 and U.S. 60/70 via Prescott and Blythe (Figure 5). The latter route was 28 miles shorter than U.S. 66. Despite having curvy, slow, mountainous sections south of Prescott, it was taking a significant minority of U.S. 66's long-distance traffic.<sup>5</sup>

The Twentynine Palms route would have reduced road distance between public hospitals in Needles and Twentynine palms to 109 miles, compared with 154 miles on U.S. 66 in 1956 and the present 144-mile distance on I-40 between the Needles and Barstow hospitals. The distance between major services (e.g., banking and automobile repairing) would have been similarly reduced.

The proposed route would have brought the Topock-Needles and Havasu Lake portions of the Colorado River as close to southern California as Parker reach, the principal recreation area on the river.

#### *District Eight's Evaluation*

District Eight, California Division of Highways, representatives considered the Twentynine Palms route. The District's Relocation Report, in which it recommended against the proposed route, and the Traffic Study from which it derived data, were approved by the Division and the United States Bureau of Public Roads.<sup>6</sup> All the pros and cons stated in the two reports are summarized here.

District Eight clearly recognized that landforms allow for a marked reduction in distance:<sup>7</sup>

Relocation of U.S. 66 as suggested is physically feasible and would effect a desirable saving of 57 miles for travel between Topock and the Los Angeles area. Construction of the adopted relocation on present U.S. 66 will reduce this savings to 49 miles.

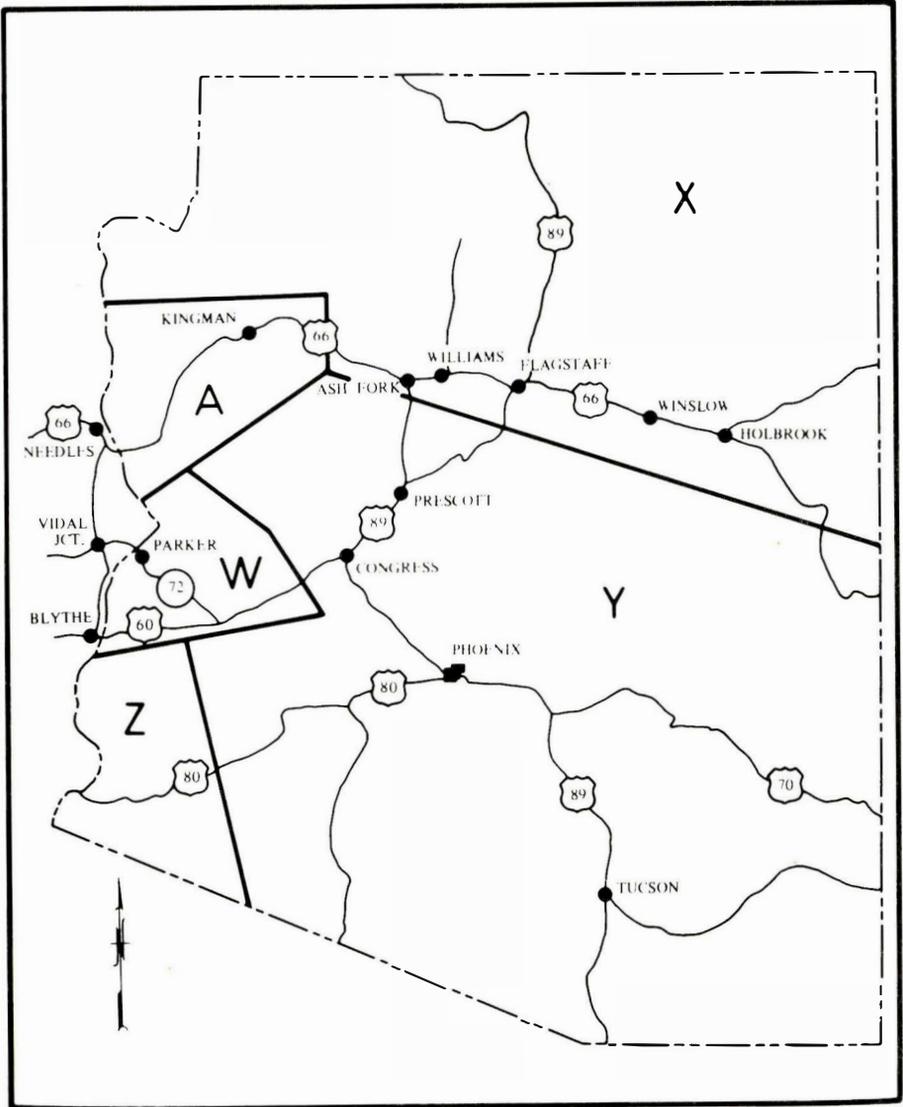


Figure 5. The Blythe survey's Arizona zone map.

Source: California Division of Highways, untitled Blythe traffic survey report (1950).

District Eight underscored the feasibility in December 1955 by recommending "full freeway development" between U.S. 70 and Morongo Valley, and by stating that "Seventy-mph design standards can be obtained without difficulty easterly of Morongo Valley."<sup>8</sup> The District estimated the Twentynine Palms route would provide, in comparison with a freeway along the existing route, a \$13,000,000 saving in users' costs between 1956 and 1976.<sup>9</sup>

Although not stated in the Relocation Report or the Traffic Study, it was considered important to keep the route through Needles because of the need for services in the 214-mile gap between Kingman and Barstow (Figures 1 and 3). Services supplied to the traveling public by Needles "represented a real need in view of the distances between Kingman, Arizona and California cities to the west."<sup>10</sup>

District Eight further states:

The Twentynine Palms routing would have improved traffic service to the Twentynine Palms Marine Base, whereas the constructed routing serves the Barstow Marine Supply Center, George Air Force Base, Edwards Air Force Base and Inyokern Naval Ordinance Test Station. The constructed route provides dual traffic service for traffic desiring to go to the industrial areas of northern California as well as southern California.<sup>11</sup>

The same source also stated that "Special legislative action would have been required to take FAI-40 away from the cities of Barstow and Needles. Statutory provisions require that Route 40 go through Barstow and Needles."<sup>12</sup>

The proposed route "would facilitate travel between the Los Angeles area and the Twentynine Palms area."<sup>13</sup> As noted earlier, the District had recommended a freeway between U.S. 70 and Morongo Valley.

It was recognized that "Redesignation of the Interstate System would afford a reduction of Interstate mileage of 18 miles."<sup>14</sup>

District 8 concluded that only 22 percent of the traffic entering California on U.S. 66 would use the proposed route.

The need to improve U.S. 66 weighed against the Twentynine Palms route, especially as it was unlikely that funds for the new highway and for improvement of the old would be available at the same time, and construction of the Twentynine Palms route would have required spending public funds to maintain duplicate facilities.<sup>15</sup>

The final recommendation reaffirmed plans to improve the existing route to adequate standards.<sup>16</sup> That plans already were established is specified:<sup>17</sup>

U.S. 66 is rapidly being developed by stage construction to freeway standards between San Bernardino and Daggett [Figure 4]. Plans are well advanced on unconstructed segments which will permit early construction, subject to availability of highway funds.... Right of way is substantially acquired and construction is budgeted for freeway development between Needles and 3 miles west of the Colorado River.

*Examination of Reasons  
for Rejection*

Because distance, terrain, users' cost benefits, and reduction in Interstate mileage were all favorable, they presumably were not reasons for rejection of the Twentynine Palms route.

District Eight thought service would be better if the route were kept in Needles. However, keeping southern California traffic was more important to Needles than Needles was to the highway. The distance between Kingman and Twentynine Palms (156 miles) would have been practically the same as between Needles and Barstow (154 miles). The distance between Needles and Twentynine Palms would have been 109 miles, although a side trip of 16 miles would be necessary for medical or other major services in Needles.

The midpoint would have been 55 miles by road from the two towns and about the same distance by air to the Blythe and Twentynine Palms Marine Corps Base hospitals. The middle stretch would have been as close as 32 air miles to the clinic at the Kaiser Steel Company mine north of Desert Center (Figure 4). All of these facilities accept general emergency cases.<sup>18</sup>

The advantages and disadvantages to defense and economic welfare lie in the accessibility of the population to be defended and to defense establishments and military bases. The latter already were served by U.S. 66, and an Interstate route similarly placed would have provided only the advantage of a four-lane freeway over a two-lane highway. In contrast, the Twentynine Palms route would have created a direct, 49-mile shorter, connection to over half the state's population and to the defense industries and military bases associated with it. The existing route would provide the military and civil benefits claimed for it, and have the advantage of carrying less than half its former traffic.

Indeed, the defense and economic welfare argument is the rationale for the Twentynine Palms route in contrast with the adopted route. Separate highways to two different areas would provide better service than one route serving both, but at a cost of 49 miles to the larger traffic flow.

The contention that legislative action would have been required to take I-40 away from Needles and Barstow may or may not be a realistic reflection of politics. At the time, the Needles-Barstow highway was state legislative route 58, not 40. The former designation was used in the Traffic Study, and was in effect until July 1, 1964.<sup>19</sup> The legislature could as well have established an entirely new route through Twentynine Palms as it did from Sacramento to south of Bakersfield (I-5). A search of all federal highway

laws since the original one in 1916 reveals no authorization of state legislative action in locating federal-aid highways. The decision lies with the state highway departments and the federal highway authority.<sup>20</sup>

Traffic in the corridor between U.S. 70 and Twentynine Palms averaged 1,800 vehicles per day in 1955, a volume equal to that carried by U.S. 66 between Barstow and Needles.<sup>21</sup> Whereas the latter was almost entirely through-traffic, very little of the former was and thus constituted an additional traffic flow to benefit from a freeway. If the freeway were not built as part of the Interstate system, it eventually would require funding that was less advantageous to the state than the 90 percent-federal funding of the Interstate system.

Five reasons favoring a single freeway along the existing route were interrelated: The need for improvement of U.S. 66, the lack of funds to improve it and at the same time build a new highway, the light traffic involved, the cost of maintaining two roads, and the existence or prior plans. Grouped together, they add up to a practical reason for locating I-40 along the route of U.S. 66. Combined with the idea that only 22 percent of the traffic would use the Twentynine Palms route, they make a rational case. But the traffic flow information used by District Eight was woefully deficient and poorly analyzed.

#### *The Traffic Study*

For traffic entering California on U.S. 66, the 1953 Needles traffic survey reportedly showed a 78:22 use ratio between the existing and proposed routes. The survey was conducted by District Eight personnel from 7 a.m. to 5 p.m., December 1, 1953, and yielded interviews with 1,326 drivers (Table 2).<sup>22</sup>

Table 2

Interview Results from California Division of  
Highways Traffic Study, 1956\*

Zone	A	B	C	D	E	F	G	H	J	K	L	M	N	Total
<u>Interview Station #1 - Westbound</u>														
A	-	-	10	10	10	111	6	7	7	15	83	26	-	285
B	-	-	-	53	3	28	1	2	-	-	2	-	-	89
C	-	-	161	66	55	29	1	3	3	1	22	1	-	342
TOTAL			171	129	68	168	8	12	10	16	107	27		716
<u>Interview Station #3 - Eastbound</u>														
A	-	-	146	30	62	115	6	3	4	13	51	18	-	448
B	-	-	33	41	10	21	1	-	-	-	2	2	-	110
C	-	-	51	-	1	-	-	-	-	-	-	-	-	52
TOTAL			230	71	73	136	7	3	4	13	52	20		610

\*Actual interviews, 7:00 a.m. to 5:00 p.m.

It was inadequate in several ways, and each inadequacy caused an error in favor of the existing route. Had none of the errors occurred, the results would have been less counter to those of the three largest, best-executed surveys of U.S. 66 traffic (Table 3).<sup>23</sup> The latter surveys showed a 2:1 ratio between traffic for the proposed and existing routes, in traffic entering California on U.S. 66. Over half the traffic on the Needles-Barstow stretch would have found the proposed route shorter.<sup>24</sup>

One day in December was not representative of an entire year's highway use. The ratio between the traffic flows is closer to 1:1 in winter (1.6:1) than in summer (2.5:1).<sup>25</sup>

Table 3  
Vehicle Trip Distribution

Survey	Number of Vehicle Trips That Would Have Been Shorter Via:	
	Twentynine Palms	Needles and Barstow
December 1, 1953, Needles Survey	161	166
December 2, 1953, Needles Survey	187	151
1957-1958 Arizona Survey	1,829	933
May, 1968, Truck Survey	91	66
June, 1970, Survey		
Trucks	70	85
California Cars	340	164
Other Cars	521	267
Agricultural Interception Survey		
California Vehicles	1,508	855
Other Vehicles	4,543	2,164

Local traffic within Needles consisted of 212 of the 1,326 vehicle trips (Figure 5). It was counted as part of the 78 percent that "would have to continue to use the existing route between Topock and Barstow."<sup>26</sup>

The 200 vehicles traveling on U.S. 95 to and from zone D should have nothing to do with the location of a route connecting California with the East (Figures 4 and 6).

Of the 146 vehicles listed as originating in Needles (zone C) and headed for zone A, 28 almost certainly originated elsewhere (Figure 5).<sup>27</sup> They had destinations east of Arizona, and were reported on the field interview sheets with such entries as "Needles--West End Service Station--Kansas City, Mo." Eighty-eight of the remainder

had destinations no farther than Topock. In contrast, zone C is listed as the destination for only 10 vehicles from zone A.

Similarly, the 62 trips listed as originating in zone E and headed for zone A cannot be used because the reverse flow is only 10.

Clearly, the 28 trips from zone C and the 62 from zone E must have represented long-distance traffic with varied origins. Yet the traffic from these unknown origins was counted as having to use the existing route even though a substantial part of it probably originated in southern California and would have been better served by the proposed route.

The interview stations missed some of the traffic that turned south on U.S. 95. The omission of traffic to southern California via Vidal Junction and Indio, although numerically small, would have contributed to the poor showing of potential traffic for the proposed route.

The area between Riverside and U.S. 95 was not designated a zone (Figure 4). The seven vehicles that were headed to or from it should have been counted under the proposed route, but were assigned to other zones.

Even cursory review of the Traffic Study by state or federal highway authorities should have revealed several of the weaknesses. The published 78:22 ratio was incorrect; a less-misleading impression could have been gained from destination data alone, leaving out the obviously incongruous origin data.<sup>28</sup> The only certain information was for traffic with destinations in zone F (168 vehicles), for the existing route, and in zones H through M (172 vehicles), for the proposed route (Figures 4 and 5). With nearly equal flows based on only 340 usable responses, a need for more survey work was indicated.

*Comparison With Other Surveys*

Seven other surveys were examined.<sup>29</sup> The results of the two smallest, the December 2, 1953, and May, 1968 surveys, contradict each other (Table 2). The former is most intriguing. In the Traffic Study it is stated that "data from two interview stations of the Needles O and D Survey which was made on December 1 and 2, 1953 was used."<sup>30</sup> Only data from the first survey's two stations were used; the December 2 data were not used. Analysis of westbound destinations on the December 2 interview sheets shows results opposite to those of the previous day's survey (151 vehicles for the existing route and 187 for the proposed). Although not submitted to the Division of Highways, the information on the interview sheets was partly reviewed by District Eight.

In March, 1956, in connection with the study on relocating U.S. 66, the Division requested that a survey be conducted at Blythe to determine how much traffic was diverging from U.S. 66 in northern Arizona to take U.S. 89 and U.S. 60/70 (Figure 5).<sup>31</sup> Detailed instructions for ascertaining origin and destination information were issued for the survey conducted late that month. The results show none of the erroneous information exhibited by the Needles survey, but rather a correspondence in zone-to-zone traffic flows with those of the Arizona survey's 10,464-vehicle sample taken opposite Blythe.<sup>32</sup> Had the diverted volumes (12 vehicles for zone F, 170 for zones H through M) been added to the flows indicated by destination data in the Needles survey, a clear majority of traffic for the proposed route would have been shown.<sup>33</sup> The area between U.S. 95 and Riverside was given designation, showing that District Eight was aware of it about the same time the Needles survey was submitted without data about it.<sup>34</sup>

The Amboy-Topock study of August, 1956, was made for a proposed route that would have run directly from Amboy to Topock and thus widely missed Needles (Figure 4). It used the data collected in the December 1, 1953, traffic survey. In the resulting report it is stated that local traffic "is not pertinent to this study" and that local trips "were discarded since they would have no effect on this study."<sup>35</sup> Five months earlier, District Eight had included Needles traffic in its total for northern California.

#### *Conclusion*

District Eight recognized that distance, terrain, and reduction in Interstate mileage were favorable to the Twentynine Palms route. It estimated that the proposed route would cost \$31,000,000 and that, even with only a 22 percent share of the traffic, it would save users \$13,000,000 over 20 years.<sup>36</sup> The District made no point with these figures, made no estimate of the time needed for the saving to equal the cost, and did not point out that the adopted route would provide no user-saving based on reduced mileage. It did not place the two estimates in juxtaposition, one appearing in the Relocation Report and the other in the Traffic Study, and made no additional comment in either.

Medical and other major services have been shown to be closer together on the proposed route.

The location of I-40 so as to better serve four military bases rather than one does not justify poorer service to over half of California's population with its associated military and defense establishments.

The final alignment of I-40 left 134 miles of former U.S. 66 between Barstow and Topock as a duplicate

facility to be maintained at public expense, and improvements had to be made on it before funding allowed completion of I-40 in 1973.<sup>37</sup> Traffic in the desert has grown substantially, but is still slight for justification of a freeway. Nevertheless, a freeway was mandated as part of the Interstate system. The light traffic remaining on U.S. 66 would have found that two-lane highway, with its lack of side- and cross-traffic, nearly as serviceable as a freeway. A by-pass had been proposed for the Amboy area, one of the few short stretches with significant side-traffic, and similar plans could have been made for the others.<sup>38</sup>

The main conflict is found in traffic flows. Here, clearly, the responsible highway department had wrong information--information that was interpreted as showing the overwhelming majority of traffic going to northern California. A freeway built to serve such traffic could serve southern California traffic, too, as U.S. 66 always had. However, a distinct majority was headed for southern California and would have been better served by the Twentynine Palms route. The minority for northern California could have continued to be served, but with the advantage of contending with less traffic. Today, I-40 affords a 10-mile saving to 5,900 vehicles per day; the Twentynine Palms route would have afforded a 22-mile saving for over half that traffic, a greater saving overall, and one that could only increase with southern California's share of the traffic generated in Needles and its Arizona hinterland.<sup>39</sup>

A secondary conflict is in regard to traffic in the corridor between I-10 and Twentynine Palms. On present California highway 62, essentially local traffic, 6,100 vehicles per day in the least-traveled section between towns, and 16,900 in Yucca Valley) is greater than through-traffic on I-40 in the Needles-Barstow

stretch (5,900 vehicles) (Figure 4).<sup>40</sup> It would have been served at far less cost to the state than if the freeway, still unplanned, were built years later under a different funding arrangement.

Two lesser opportunities were lost: Traffic between the East and San Diego would have had a shorter and cooler route; and the Havasu Lake and Needles reaches of the Colorado River might have become competitive with the Parker area for river recreation business.

Without the 78:22 ratio that formed the rationale, the entire location decision would have been open to question and to the kind of review presented here. Without the knowledge that a distinct majority of traffic would use the Twentynine Palms route, it was unlikely that prior plans to construct freeway along the existing route would be rejected.

Today highway planners are required to consider more aspects of highway location in making route decisions than was the case two decades ago. The question remains as to whether or not a geographic viewpoint results in the eventual determination of where the concrete ribbon will go.

#### NOTES

<sup>1</sup>California, Division of Highways, District Eight, "Report on Suggested Relocation 'US 66' between Colton and Topock via Twentynine Palms," March 1956, p. 2. Hereafter referred to as the Relocation Report.

<sup>2</sup>California, op. cit., footnote 1, p. 3. Calculation of the saving compared with the successor routes is the writer's.

<sup>3</sup>California, Division of Highways, District Eight, "Traffic Study of the Feasibility of Relocating U. S. Sign Route 66 between Topock and San Bernardino via Twentynine Palms," March 1, 1956, Plate A (Traffic Flow Diagram). Hereafter referred to as the Traffic Study.

<sup>4</sup> California, Department of Transportation, District Eight, internal memorandum, November 28, 1973, p. 2.

<sup>5</sup> Of 3,926 vehicles per day on U.S. 66 passing through zone X or starting or ending trips in it, 593 (15 percent) crossed Arizona's western border on U.S. 60/70 (Fig. 5). Arizona, Highway Department, *Interstate Travel Characteristics* (February 1965), p. 25, and Arizona, Highway Department, *Travel Characteristics* (1967), pp. 70 and 74. The data are 1961 average daily traffic volumes, expanded from data of the 109,000-interview Arizona survey of 1957 and 1958. Although some of the drivers may have used a route other than U.S. 89, such as a connection through Phoenix, at least a substantial minority likely took U.S. 89. Specifically, in District Eight's survey at Blythe in March 1956, 61 of 182 drivers who had made the shift from U.S. 66 to U.S. 60/70 gave shortness or quickness as their reason. The remainder gave reasons that could apply to other routes or to U.S. 89, and 84 specified scenery. Untitled Blythe traffic survey report, p. 3, transmitted with California, Division of Highways, District Eight, letter to the Division, April 18, 1956.

<sup>6</sup> The Division submitted District Eight's reports to the Bureau on June 14, 1956, and the latter approved the Topock-Barstow route on July 9, 1956. U.S., Department of Transportation, Federal Highway Administration, Region Seven, California Division, letter to the writer, July 1, 1971, p. 2. The Federal Highway Administration is the successor to the Bureau of Public Roads.

<sup>7</sup> California, op. cit., footnote 1, p. 4.

<sup>8</sup> California, op. cit., footnote 1, p. 2.

<sup>9</sup> California, op. cit., footnote 3, p. 15.

<sup>10</sup> California, op. cit., footnote 4, p. 2.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> California, op. cit., footnote 1, p. 4.

<sup>14</sup> Ibid.

<sup>15</sup> California, op. cit., footnote 1, p. 5. The statement, Recommendations, is quoted in full:

"Inasmuch as the suggested new route would provide improved service to only 22 percent of the interstate traffic, and since the outstanding majority (78 percent) of the traffic must be served along the existing route, coupled with the necessity for expenditure of public funds to maintain duplicate facilities,

it is recommended that present plans to improve the existing route to adequate standards be reaffirmed and that there be no further reconsideration of the suggested additional highway."

<sup>16</sup>California, op. cit., footnote 1, p. 5.

<sup>17</sup>California, op. cit., footnote 1, p. 1.

<sup>18</sup>E. L. Smith, letter to the writer, April 22, 1972, p. 1, is the source in regard to the Base hospital. Dr. Smith practiced medicine in Twentynine Palms. Robert Dale, Administrative Manager, Kaiser Steel Company, Eagle Mountain, California, telephone conversation with the writer, December 10, 1976, is the source in regard to the clinic.

<sup>19</sup>California, Highway Transportation Agency, *1963 Classified Vehicle Census on California State Highways* (June 1964), unnumbered second page.

<sup>20</sup>The law in effect at the time said:

"The routes of the National System of Interstate Highways shall be selected by joint action of the State highway departments of each State and the adjoining States, as provided by the Federal Highway Act of November 9, 1921, for the selection of the Federal-Aid system."

*Federal-Aid Highway Act, Statutes at Large, LVIII, sec. 7, 842 (1944).* The 1921 act authorized federal approval. *Federal Highway Act, Statutes at Large, XLIII, sec. 5, 213 (1921).*

<sup>21</sup>California, op. cit., footnote 3, Plate A.

<sup>22</sup>California, op. cit., footnote 3, p. 6.

<sup>23</sup>The Arizona survey; the June 1970 survey; and the survey of agricultural quarantine interceptions. The Arizona survey included a 10,173-vehicle sample on U.S. 66 southwest of Kingman. The source of that datum is *Interstate Travel Characteristics*, cited in full in footnote 5, p. 65. The June 1970 survey was conducted by District Eight at the California Agricultural Inspection Station on I-40 south of Needles. It yielded interviews with 1,447 drivers for whose destinations either the proposed or adopted route would be more direct. The volumes are derived from data accompanying California, Division of Highways, Urban Planner, letter to the writer, June 24, 1971. The survey of agricultural interceptions was conducted by the writer at the same inspection station between March and July 1971. It included the data from seven months between 1968 and 1971. Each interception entry listed the state of registration of the vehicle and its destination. The survey yielded 9,070 vehicle-destinations to which either the proposed or adopted route would be shorter.

<sup>24</sup>Traffic is added between the junctions with U.S. 95 south and north of Needles (Fig. 4). As a result, the 2:1 ratio at the state line is reduced for traffic between the latter junction and Barstow. Some of the traffic is gained from U.S. 95 and connecting routes in Arizona, and is headed for northern California; some is gained from Needles or the Arizona side of the Colorado River Valley north of Needles. The shares provided by U.S. 95 and by Needles and its Arizona hinterland have not been determined by any survey. Neither is it known how much of the traffic from Needles and neighboring parts of Arizona would take advantage of the seven-mile reduction to Los Angeles that the proposed route would have afforded. The volumes involved can only reduce that route's share of through-traffic to less than two-thirds, but not to as little as half.

<sup>25</sup>As shown in the agricultural interception survey.

<sup>26</sup>California, op. cit., footnote 1, p. 4.

<sup>27</sup>Data derived from the field interview sheets.

<sup>28</sup>Destination information also was poorly ascertained; zone E's total of 68 vehicle-destinations is too large in contrast with its 14 in the well-executed 1,447-vehicle June 1970 survey and thus cannot be counted for the existing route. The eight vehicles headed for zone G would have been about equally well served by either U.S. 66 or the proposed route and connecting roads; they are excluded.

<sup>29</sup>The three largest surveys were remarked in footnote 23.

<sup>30</sup>California, op. cit., footnote 3, p. 3.

<sup>31</sup>California, op. cit., footnote 5, letter, p. 1, states the connection with the U.S. 66 study. The accompanying "O & D Traffic Survey Instructions," p. 1, states the purpose.

<sup>32</sup>Arizona, op. cit., footnote 5, *Interstate Travel Characteristics*, p. 65.

<sup>33</sup>California, op. cit., footnote 5, untitled Blythe traffic survey report, p. 1.

<sup>34</sup>The zones are "the same as those for the Needles Survey, with the addition of Zones P and Q," California, op. cit., footnote 5, untitled Blythe survey report, p. 1.

<sup>35</sup>California, Division of Highways, District Eight, "Traffic Study of the Feasibility of Relocating U.S. Sign Route 66 between Amboy and Topock," August 10, 1956, pp. 1 and 4.

<sup>36</sup>California, op. cit., footnote 1, p. 4, is the source for the cost. California, op. cit., footnote 3, p. 15, is the source for the saving.

<sup>37</sup> California, Department of Transportation, District Eight, letter to the writer, March 1, 1976.

<sup>38</sup> California, Division of Highways, District Eight, "Project Report on State Highway 58 in San Bernardino County through Amboy," January 14, 1955.

<sup>39</sup> California, Department of Transportation, *1976 Traffic Volumes on California State Highways* (Sacramento), p. 63.

<sup>40</sup> California, *op. cit.*, footnote 43, p. 79.

