

**Comments by:** Patrick J. Munson (6707 W. Rock East Road, Bloomington, IN 47403), Samuel S. Frushour, Staffan D. Peterson, and Cheryl Ann Munson

**Date:** February 12, 2004

**RE:** Karst data known by BLA and INDOT in 1994, but excluded from the FEIS for proposed I-69

In the spring of 1994 Bernardin, Lochmueller and Associates (hereafter BLA) conducted an intensive, on-the-ground study of karst features (sinkholes, swallowholes, karst windows, and springs) in study areas that in two cases either straddle or fall entirely within the present corridor of proposed I-69 Alt. 3C. This study recorded large numbers of karst features that were evaluated as significant or potentially significant. There is no reference to this study nor any indications that the data and recommendations that resulted from it are included in either the 2001 Draft Environmental Impact Study (2001 DEIS) or the 2003 Final Environmental Study (FEIS). Instead one finds that all information on karst features and karst areas in these documents came from a digitized version of an Indiana Geological Survey map entitled "Areas of Sinkholes . . . in Central Southern Indiana." It is noteworthy that the metadata on this map includes the statement: "*This map is not a substitute for an actual survey.*" We begin our comments with the question: Why are the results and recommendations of BLA's 1994 *actual survey* excluded from the FEIS?

The 1994 BLA study covered five segments along what were then called Alternatives C and D of proposed I-69. The findings of this study, with evaluations and recommendations, was prepared as a report entitled:

Karst Features in the Bloomington to Evansville Highway  
Report Number: FHWA-IND-EIS-92-1-D  
Project No. – HDP 9222 (0001)  
December 30, 1994  
Prepared for: Indiana Department of Transportation  
From: Bernardin, Lochmueller and Associates

This report (hereafter referred to as BLA94) was stripped of Exhibits 1 through 5B (which are listed in its Table of Contents) and included as Appendix G in the 1996 Draft Environmental Impact Statement for I-69.

Although difficult to decipher, BLA94 contains a great deal of information that is directly relevant to the FEIS as it pertains to karst features within and near the present Alternative 3C Corridor and Working Alignment. The most relevant parts of BLA94 are Figure 1 and Table 1.

BLA94 Figure 1 shows outline maps of four USGS Topographic Quadrangles, which, with the exception of State Plane coordinates, give no other details that would allow the viewer to determine locations. On these maps are five clusters of small dots, with the clusters labeled SA (Study Areas) 1 through 5. Each dot represents a karst feature or studied outcrop within the Study Areas.

BLA94 Table 1 lists each karst feature and studied outcrop, with its location (in State Plane coordinates), and evaluates each as significant (S), potentially significant (PS), adjacent significant (AS), adjacent potentially significant (APS), or non-significant (N). As noted in the text (BLA94, p. 35), the non-significant data-points pertain only to some of the outcrop locations (i.e., non-karst features).

As presented in BLA94 Figure 1 and Table 1, it is very difficult for the reader to determine where these data-points lie relative what was, in 1994, Alternatives C and D, and even more difficult to relate them to the present Corridor of proposed I-69 Alt. 3C. Therefore, we have used the data in Table 1 to remap the 1994 data with respect to the present preferred Corridor.

Our map labeled "BLA 1994 fig. 1 – Study Areas" was generated by entering all significant, potentially significant, adjacent significant and adjacent potentially significant data-points from BLA94 Table 1, first by converting the coordinates from State Plane to UTM (NAD 83), then correcting for consistent errors that probably resulted from the mis-positioning of the template (compared to known points, the consistent error is about 200 feet west for Study Areas 2 through 5, and about 300 feet west and 260 south for Study Area 1), and then re-plotting. Onto this re-plotting is overlaid the proposed I-69 Alt. 3C Corridor and Sinkhole Areas as shown on the FEIS Environmental Atlas Maps, pages 11 through 13 (i.e., the area from the proposed intersection of I-69 and existing SR-37 southwestward to the town of Kolen).

BLA94 Study Areas 4 and 5 pertain to what was in 1994 Alternative D (subsequently abandoned) and Study Area 3 pertains to a 1994 segment of Alternative C in Greene County (this segment was subsequently moved). None of these three Studies Areas is now directly relevant (nonetheless, they do demonstrate that there are numerous and substantial areas with moderate to very high densities of karst features that lie outside the bounds of the Sinkhole Areas that are shown on the FEIS maps). BLA94 Study Areas 1 and 2 are directly relevant to the presently defined I-69 Alt. 3C Corridor: Study Area 1 is entirely within the Corridor; and Study Area 2 straddles the Corridor

Our map "BLA 1994 – Study Area 1" is a blow-up of their Study Area 1. We suspect the data shown here are considered in detail in BLA94 Exhibit 1 (which has been omitted from 1994 DEIS Appendix G). We have overlaid on our map the Alt. 3C Corridor and Working Alignment and FEIS Sinkhole Areas. Study Area 1 is at the proposed junction of I-69 with existing SR-37, as shown on page 13 of the FEIS Environmental Atlas Maps. BLA94 data show 14 sinkholes in Study Area 1, all evaluated as potentially significant and all of which are within the proposed Alt. 3C Corridor. These sinkholes occur within a 109 acre area, which substantially exceeds the "greater than 80 acres" criterion for

"Sinkhole Areas" used in the FEIS (p. 5-237), and the density of sinkholes (1 per 7.8 acres) substantially exceeds the average density demonstrated by BLA surveys elsewhere in what they do show as Sinkhole Areas (see below). This area is not indicated as a Sinkhole Area nor otherwise mentioned in the FEIS.

Our map "BLA 1994 – Study Area 2" is another blow-up, in this case of their studied area from just east of Lodge Road to just east of Harmony Road and, mostly, south of Koontz Road (see FEIS Atlas Maps 12 and 13). The data-points here are all karst features (mostly sinkholes) that are evaluated in BLA94 as significant, potentially significant, adjacent significant or adjacent potentially significant. We suspect that data shown here are considered in detail in the omitted BLA94 Exhibits 2A and 2B. Again we have overlaid the Alt. 3C Corridor and Working Alignment and Sinkhole Areas as shown in the FEIS. Both the Corridor and Alignment intersect many of the karst features that were known to exist in 1994. It is also noteworthy that with the exception of one very small area (about 2 acres) at the southern margin of the Corridor, the FEIS shows the Corridor avoiding mapped Sinkhole Areas (as defined and shown in the FEIS).

BLA's 1994 study is also interesting in that they surveyed all or parts of four areas outside the present Corridor that were subsequently classified as Sinkhole Areas. In aggregate, the surveyed parts of these Sinkhole Areas cover 196 acres, in which they recorded 18 significant or potentially significant karst features, or a density of 1 per 10.9 acres. In contrast, but *not* shown as a Sinkhole Area in the FEIS, there is *within* the Corridor in Study Area 2 a 326 acre cluster of 39 significant or potentially significant karst features, or a density of 1 per 8.4 acres. Remarkably, this is a density that, like that in their Study Area 1 (above), is substantially higher than they show for areas *outside* the Corridor that BLA has classified as Sinkhole Areas.

On the basis of their own 1994 study, BLA (and INDOT) knew that a three mile segment of the I-69 Alt. 3C Corridor crossed more than 400 acres that contain large numbers of significant or potentially significant sinkholes, swallowholes, karst windows and springs. This three mile segment represents only about 15 per cent of the karst belt to be crossed by the new terrain portion of Alt. 3C. Yet the 2003 FEIS states that Alt. 3C Corridor will cross only 50 acres of Sinkhole Areas, a figure that could be arrived at only by excluding data that were available to BLA and INDOT. Because of the excluded data the public and perhaps many agency reviewers will likely remain uninformed (if not misled) as to the substantial density of karst features in the proposed Alt. 3C Corridor, and consequently cannot adequately evaluate potential environmental impacts and construction costs.





