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Spill Retention and Runoff Filtration Structures on Interstate 65 in the Vicinity of Mammoth Cave National Park

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Abstract

In the early 70's, I conducted an ecological study on the Doghill-Donahue Cave System in Southern Indiana. This cave remained relatively un-impacted until Highway 37 was widened near Bedford, and the cave was engineered to be a storm sewer for highway runoff. The consequences of facilitated water entry and easy access for spelunkers via an ungated culvert entrance were severe. Sediments washed into the cave smelled like putrid rubber when disturbed, habitat for cave life was trampled, and beautiful delicate mineral features were smashed. Anticipating that I-65 would someday be widened, I was concerned about possible consequences to Mammoth Cave, and took the following actions to protect aquatic cave life in particular.

In December of 1994, following a meeting with Kentucky Transportation Cabinet (KTC) staff, a letter was written for our Park Superintendent to the KTC. It outlined ecological justifications for retention and filtration structures designed to mitigate pollution from I-65. In 1995 the National Cave Management Symposium was held near Mitchell, Indiana and a field trip showcasing highway runoff filtration structures was led by Senior Ecologist Jim Keith of Earth Tech Environmental Consulting in Bloomington, Indiana. At this same symposium, there was increasing recognition of impacts to cave biota from surface land use of many types (Hobbs 1995). Two years later, hearing from KTC about advancing plans to widen I-65, Jim was invited to Mammoth Cave National Park (MCNP) for discussions with KTC on runoff mitigation structures in May of 1997. To build support for highway runoff retention structures, the South-Central Kentucky Karst was successfully nominated for inclusion on the Karst Waters Institute's global list of the "Ten Most Endangered Karst Communities for 1998."

In June of 1998, a meeting was organized with KTC and Federal Highway Administration staff at MCNP. Agreed upon were basic measures to filter routine runoff and temporarily contain major spills. These were to be low crushed rock check dams originally built as silt checks needed during construction. Basin capacity was to be 10,000 gallons with grass waterways to and through retention basins underlain with geotextile fabric to minimize soil piping. The basins were designed to slowly filter routine runoff while greatly retarding spill entry into the cave aquatic ecosystem. The planned check dams were indicated on I-65 Grade and Drain plans, and were sent to MCNP for review.

Once plans for retention/filtration structures along I-65 were finalized (Figure 1), a paper was jointly written by park and KTC staff for an upcoming National Cave and Karst Management Symposium (Olson and Schaefer 2001). I am glad to report that the first of the retention/filtration structures along I-65 were completed in February of 2011 (Figure 2), seventeen years after the first letter was written to KTC.

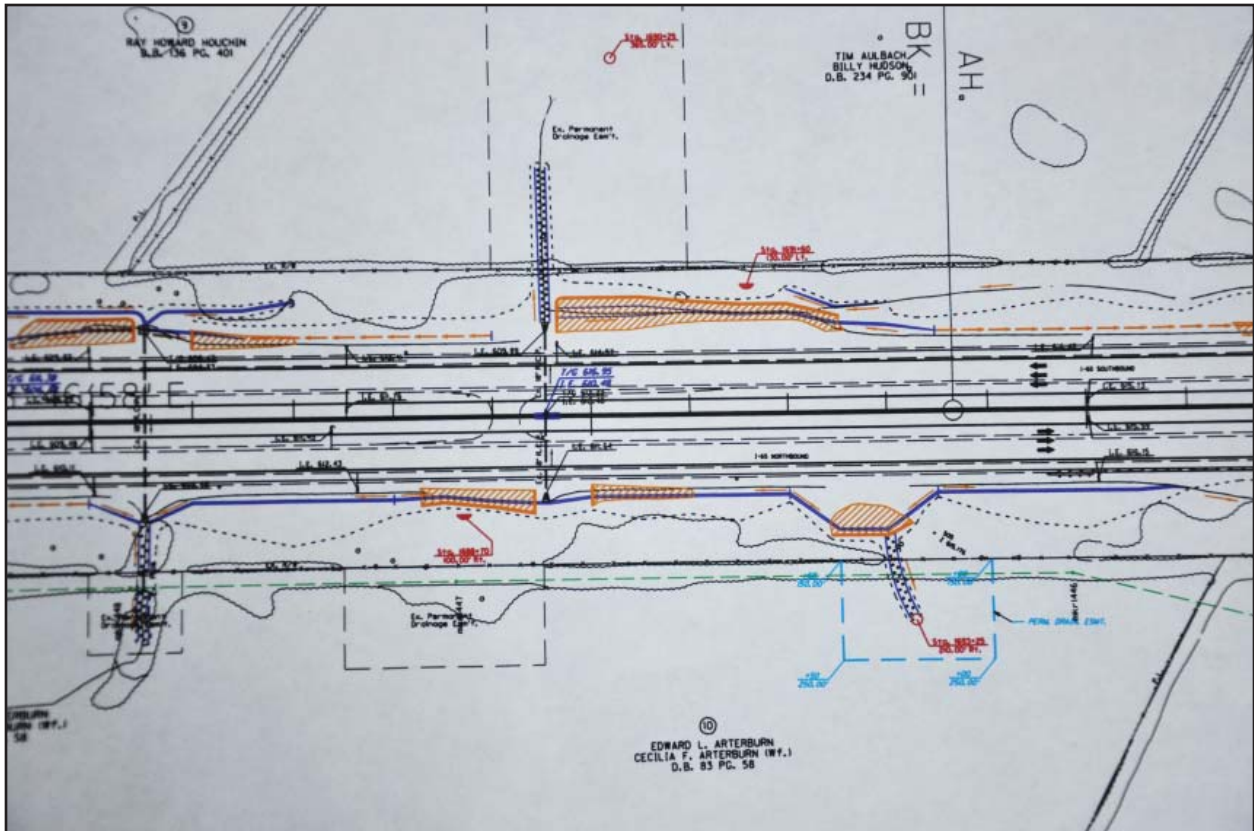


Figure 1: Detail from I-65 drainage plans south of Park City. Planned retention/filtration structures are shown as hachured enclosures.



Figure 2: Photograph of a retention/filtration structure shown in Figure 1

Literature Cited

Hobbs, H. H. 1995. Impacts of Surface Perturbations in Karst Areas in the Southeastern United States: A Biologist’s Perspective. 1995 National Cave Management Symposium Proceedings, Spring Mill State Park, Indiana, P. 163.

Olson, R., and J. Schaefer. 2001. Planned Spill Retention and Runoff Filtration Structures on Interstate 65 in the South-Central Kentucky Karst. 15th National Cave and Karst Management Symposium Proceedings, Tucson, Arizona, p. 190.