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July 6, 2001

VIA OVERNIGHT MAIL

Mr. Robert Shea
Acting Administrator, Federal Insurance Administration and Mitigation
Federal Emergency Management Agency
500 C Street SW
Washington, DC 20472

Re: Congaree Flood Insurance Rate Mapping, Richland and Lexington Counties, South Carolina

Dear Administrator Shea:

Please find enclosed a corrected copy of the Citizen Appellant Summary, submitted on behalf of [redacted] and the South Carolina Wildlife Federation in the above matter. Please direct all correspondence regarding this final administrative phase to me. I look forward to hearing more about the process and to participating in all aspects, including oral presentations July 24 in Atlanta, Georgia.

If you have any questions, please contact me at (919) 967-1450.

Very truly yours,

[redacted]

SOUTHERN ENVIRONMENTAL LAW CENTER

JBH/dml
Enclosure

cc: Mr. Buford Mabry, Chief Counsel, SCDNR
[redacted]

Congaree Floodplain Appeal Resolution

Citizen Apellant Summary

This Summary is submitted on behalf of [redacted] and the South Carolina Wildlife Federation (the "Citizen Appellants"). As discussed in more detail, we generally support FEMA's revised preliminary flood insurance rate map ("FIRM") published September 26, 2000. The September 2000 map is far more accurate than its predecessor, the August 1999 map, and contains a more realistic estimation of the likely 100-Year flood stage and flood elevations. However, correct analytical methods and full consideration of the available historical record supports a higher 100-Year flow of at least 340,000 cfs. Furthermore, the administrative record and applicable FEMA procedure firmly support use of the equal conveyance method for delineating the regulatory floodway on the Congaree River, which forms the border of the adjoining communities of Richland and Lexington Counties, South Carolina.

I. THE 100-YEAR CONGAREE RIVER FLOW IS AT LEAST 340,000 cfs.

A. The Available Historic Record Demonstrates That the Congaree's 100-Year Event Will be At Least 340,000 Cubic Feet Per Second.

FEMA has the benefit of a exceptionally detailed, thoroughly documented record of the Congaree's historical floods in the Columbia area. Federal Flood Flow Frequency Guidelines (Bulletin 17B) state that "all available information" should be considered in developing a flow frequency curves, with the first source being systematic records of annual peak discharges recorded by the United States Geological Survey ("USGS").[1] Because it "assures that estimates fit community experience and improves the frequency determinations," historic flood information "should be obtained and documented whenever possible."[2] Bulletin 17B specifically envisions the us of "newspaper files" and "intensive inquiry and investigation near the site for which the flood information is needed."[3]

In this case, the historical record that reaches back to at least year 1852, when an early fall tropical depression caused a peak discharge of 330,000 cfs on August 30. Detailed information concerning this flood and those that occurred in 1886, 1888, 1908, 1912 and 1916 was published by the National Weather Service as were reliable accounts of their destructive flows in Richland County. That data, along with detailed calibration documentation for the Columbia flood gage (Gervais Street Bridge), is in the administrative record. FEMA is aware of the following eight largest floods:

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[1] Guidelines For Determining Flood Flow Frequency, Hydrology Subcommittee Bulletin 17B, Interagency Advisory Committee on Water Data, at 5 (U.S. Dept. of Interior, 1982 ed.) ("Bulletin 17B").
[2] Id.
[3] Id.

Water Year	Date	Stage (ft)	Peak Flow (cfs)
1852	August 30, 1852	38.4	330,400
1886	May 22, 1886	35.5	260,800
1888	September 12, 1888	37.7	313,600
1908	August 27, 1908	39.8	364,000
1912	March 17, 1912	34.7	256,000
1916	July 17, 1916	35.5	272,000
1928	August 18, 1928	37.5	311,000
1930	October 2, 1929	37.1	303,000

These flood volumes accord with prior federal agency calculations of the 100-Year flood at Columbia:

Peak Discharge 100-Year (cfs)	Previous Report
401,000	FEMA – May, 1981
401,000	FEMA – Revised, December, 1989
364,000	USGS – 1992

FEMA's August 1999 and September 2000 preliminary maps fail – in contravention of Bulletin 17B – to adequately consider this historical record. The August 1999 map ignored six of the eight largest floods on record and produced a 252,900 cfs 100-Year estimate. The September 2000 map reaches back only until year 1892, fails to consider three of eight of the largest floods on record, and improperly discounts the largest floods due to errors in adjustment method and weighting. As discussed in more detail below, FEMA needs to honor the remarkably detailed historic record in this case by realistically estimating adjusted flows for the Saluda River and by modelling tropical depressions as discrete, flood-causing events. At a bare minimum, the flood events of 1852, 1886, and 1888 must be included in the analysis.

B. The FIRM Should Not Assume Attenuation By the Lake Murray Dam.

Construction of the Lake Murray Dam on the Saluda River in the late 1920s does not provide a basis for disregarding the historical record of Congaree flooding before that date. To the contrary, the record since construction shows that dam operation will not significantly attenuate the largest Congaree floods. The Saluda River typically contributes only 30% of the Congaree's volume at confluence of the Saluda and the Broad, while the Broad river contributes 70% of that volume. SCANA, the Lake Murray Dam operator, has made it clear that, pursuant to its FERC license, a maximum normal pool elevation of 360 feet will be maintained.[4] Information provided to FEMA by USGS shows that Lake Murray is generally kept at its highest levels (i.e., near 360 feet) in the warm summer months – precisely when the largest floods historically strike the Congaree.

[4] SCANA letter to M. Buckley, FEMA (November 17, 2000).

Given that SCANA's "primary concern is the continued safe operation of the Saluda Dam,"[5] and given that the Dam is operated primarily for purposes other than flood control, FEMA's mapping Guidelines specifically prohibit consideration of the Dam's attenuation capacity in a FIS.[6] Should FEMA decide to adjust historical flows to account for Dam operation, it must use methods that accurately represent the Dam's flood attenuation function in known floodgate events. So far, however, FEMA's methods clearly *overestimate* the Dam's attenuation function, even in relatively minor flooding events. The method used for the 2000 map relies on comparing the behavior of the Congaree versus the Broad since the dam was built. With only four or five exceptions (1964, 1965, 1969, 1936), a large majority of the events relied upon are ones in which the floodgates were not opened. That is, the adjustment factor for large flood events – events where floodgate operation is most likely to decrease the Dam's attenuation function – is based mainly on small flood situations. The result is an overstatement of the Dam's likely (and historically demonstrable) flood attenuation function. As the table below shows, the difference between FEMA's estimates of flows during post-dam spillway events and the actual recorded Congaree river flows shows that spillway events after 1930 were underestimated by 10,000-35,000 cfs.

Saluda Dam Adjustment Error – Sept. 2000 FIRM (~ denotes error)

Date	Broad River	Actual Congaree River Flow	Difference: Congaree – FEMA (1)	Difference: Congaree-FEMA (2)	Difference: Congaree-MOVE.1
4/8/36	157,000	231,000	~35,000	~27,000	~12,000
4/10/64	99,500	142,000	~21,000	~19,000	~10,000
6/16/65	29,800	68,400	~35,000	~36,000	~34,000
4/19/69	52,700	94,200	~33,000	~33,000	~30,000

Applied to a large flood (e.g., the 1908 flood), the error would likely be even greater, meaning that FEMA's method substantially underestimates the Saluda's contribution to the 100-Year Flood. Not only are the "adjusted" estimates biased on the low side, they are still only "estimates," adding further reliability concerns. Unless and until FEMA corrects its adjustment method, it should use original data instead of these demonstrably poor estimates. Notably, SCANA appears to concur that a 105,000 cfs figure is appropriate for the 100-Year Saluda flow at the mouth of the Congaree, which corresponds well to the historical record. Combined with the existing 100-Year flood estimate for the Broad River (298,000 cfs, based on the Richtex gage),[7] a 105,000 cfs Saluda flow yields a Congaree flow of 403,000 cfs. At a bare minimum, the estimated Congaree stage (292,000 cfs) must not be set lower than projected for the Broad River (298,000 cfs).

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[5] SCANA letter to M. Buckley, FEMA (October 4, 2000).

[6] Flood Insurance Study Guidelines and Specifications for Study Contractors, 4-1,4-2 (FEMA, 1999 ed.). An exception to the normal prohibition is allowed only where several conditions are met, for example a "commitment to dedication of the flood-storage capacity" and an "approved water control plan" that "must be assured through a mandatory condition of Federal or State licensing . . . ." Lake Murray Dam appears to meet none of the conditions, and does not qualify for an exception for FIS purposes.

[7] The Richtex gage, which spans years 1926-1983, does not include two very large Broad River floods in 1908 and 1916.

II. FEMA MUST MAP CONVEYANCE BEHIND THE MANNING DIKES.

A. FEMA May Not Consider Uncertified Levees As Flood Control Devices In Mapping.

Under 44 CFR 65.10, for the purposes of the National Flood Insurance Program, "FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards" defined by the regulation. 44 CFR 65.10(a). Furthermore, as conceded by Columbia Venture's own consultant, FEMA's Study Contractor Guidelines state that "floodway widths will be computed for the 'without levee' condition if the levees do not meet the requirements of 44 CFR 65.10."[8] That the uncertified Manning agricultural levees fail the requirements of 44 CFR 65.10 is undisputable, and is undisputed.[9] Accordingly, the Manning levees cannot be recognized in the agency's "flood hazard and risk mapping effort" and FEMA's floodway widths must be computed assuming a "without levee" condition.

These requirements and prohibitions are a sensible means of keeping people and investments out of harm's way given the unknowns of hazard mapping and levee performance. "The degree of protection afforded by a levee system is never known precisely because of the uncertainties involved in establishing the base flood elevations and the structural stability of the levee itself. Therefore, levee systems must meet certain requirements to be recognized by the NFIP as providing protection from the base flood." 51 Fed. Reg. 30290, 30301 (Aug. 25, 1986). As the agency itself has acknowledged, "[i]t would be irresponsible of FEMA to proceed with map revisions in the absence of such certifications." 51 Fed. Reg. at 30303.

B. All Parties Agree That the Manning Dikes Will Fail – the Only Question is How.

Columbia Venture concedes that "it is true that a Manning Levee breach is expected during the 1% event, and that such a breach will will allow up to 9% of the flood waters to pass through Richland County," yet claims only a small area behind the breached levees should be mapped as floodway.[10] In fact, the evidence shows that a levee break during a true 100-Year Congaree flood will be far worse than the most recent breach, which occurred in 1976. That breach (which occurred during a 155,000 cfs, ten-year flood event) spawned a lawsuit in which the City of Columbia was made to pay [redacted], a Columbia Venture L.L.C. investor, over $4 million for flood damages. In comparing the 1976 flood to FEMA's September 2000 estimated event, S&ME submitted information to FEMA showing that a 292,000 cfs flood would overtop the levee separating levee sections one and two.[11] Because "[o]nce overtopped, a

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[8] [redacted] & [redacted] "Model Review and Clarification," at 1 (April 24, 2001), quoting Flood Insurance Study Guidelines and Specifications for Study Contractors, 7-1 (FEMA, 1999 ed.).
[9] See id.
[10] Id. at 10.
[11] S&ME, letter to Lockwood Greene Engineers, at 11 (October 25, 2000). This is in the same area (south of I-77) conceded as floodway by another, subsequent Columbia Venture consultant, using 2-D modeling. As discussed infra, the subsequent consultant's floodway mapping is seriously flawed.

levee will fail,"[12]the potential for catastrophic levee failure is real, and FEMA must conduct a thorough review of the overtopping failure mode using realistic 100-Year flood events.

The likelihood of another mode of failure – piping – is far higher than stated by S&ME, which used an obviously flawed statistical method for calculating multiple section breaks during a single flood event. S&ME's reliability calculation takes into account only the six sections of the levees most recently tested and tests only a two-breach scenario. It also assumes that levee failures are independent. Both FEMA and Columbia Venture have postulated that failure in one area of the levee makes failures in other areas less likely because the water that fills in behind the levees helps to stabilize them, which could suggest that levee failures are negatively correlated. However, the experience of 1976, in which the upstream levee break contributed to the downstream levee break, indicates that failures may be positively correlated.

Even ignoring this positive correlation, S&ME's probability analysis understates the likelihood of one or more failures. The July 12, 2000 technical review by FEMA's independent expert identifies 10 questionable levee sections. S&ME's reliability curves shows the chance of failure on surveyed sections as being typically 20%-30% for a 292,000 cfs flood. The probability of at least one failure and the probability of two or more failures should assume that failures for each of the 10 questionable sections are equally likely. Information previously submitted to FEMA by [redacted] shows that calculations assuming three different common failure probabilities of (20%, 25% and 30%) for the 10 levee sections result in high failure probabilities, and would be even higher if *all* levee sections were considered.

S&ME makes the additional assumption that exactly one failure would occur in the upper section and exactly one failure would occur at the lower section. There is no reason to consider only this single scenario when making reliability calculations. The events of 1976 stand in flat contradiction to S&ME's notion that multiple breaches are unlikely and demonstrate that the breaches will occur at 155,000 cfs or lower.

C. The Historic Record Demonstrates Destructive Flow Behind the Manning Dikes.

FEMA has a remarkable historic record of with numerous dependable accounts demonstrating dangerous floodwater conveyance on the Richland County side of the Congaree. These conveyances occurred despite the existence of extensive agricultural dikes and levees. Below are a few accounts of that history:

<u>Hampton, Singleton (1840)</u>

- "The immense dams at Col. Hampton's and Col. Singleton's were broken, and their whole plantations inundated." (Carolina Planter, June 3, 1840).

<u>Hampton, Singleton, Taylor (1852)</u>

- "The plantations below have suffered severely. Col. Hampton, Col. Singleton, and Mrs. Taylor are among the heaviest sufferers." (Charleston News and Courier, Sept. 3, 1852.)

[12] Memorandum, "Richland County Levee, SC Geotechnical Review," prepared for FEMA (July 12, 2000).

Griffin/Debruhl (1888, 1852)

- "Superintendent Lipschomb had several boats hurriedly made at the Penitentiary yesterday, sent in wagons to Griffin's place. The work of the rescuers was very perilous as the **fields were swept by a furious torrent.**" (Charleston News and Courier, Sept. 13, 1888.).

- "On the plantation of Mr. Jesse De Bruhl, now belonging to Col. J.F. Marshall and Dr. Samuel Fair, the river broke through the cotton-fields in several places, **making new channels for its surplus waters, and scooping out the earth to the depth of from three to five feet.** Numerous Indian graves were thus exposed to view, the earth being carried away down to the surface of the graves . . . . Some were buried less deep, and were washed up and broken in pieces, by the violence of the waters. Indeed, the whole plantation along the river banks was strewed with fragments of broken pottery, bones, and teeth." Rev. George Howe, "An Essay on the Antiquities of the Congaree Indians of South Carolina," Rev. Henry R. Schoolcraft, Indian Tribes of the United States (1854).

Seegers (1888)

- "This morning the beautiful corn and cotton fields of yesterday were tranformed into a **sea of rushing yellow water** . . . . All the crops on the bottom lands on the big plantations of Aughtry, Griffin, Seegers and others are submerged and destroyed." (Charleston News and Courier, Sept. 8, 1888.)

- "The ruin of the river planters in lower Richland is complete. Take for instance the two State plantations owned by Mr. John C. Seegers. His crops, which were magnificent, are utterly ruined . . . ." (Charleston News and Courier, Sept. 12, 1888.)

- "The swamp was full of water, running like a mill race." (Charleston News and Courier, Sept. 13, 1888.)

Quarries (1908)

- "The Morris quarry is one vast lake. The dams and dikes have been obliterated, tools and machinery are under water and the power house has caved into the water. . . . The dikes at the Ross quarry have held so far but they are giving way now and will go under the increased stage of water that is due." (August 27, 1908.)

Jackson Drowning (1928)

- "Frank Hampton, of ``Millwood," near Columbia, member of the House of Representatives from Richland County, came near being drowned yesterday, in a vain effort to save the life of Dan Jackson, 61, Negro farm hand living on Mr. Hampton's place, who lost his footing in **flood waters of the Congaree Swamp**. The accident occurred a few hundred yards from the Bluff Road, on the road to the Beckham pasture. . . . **Water was rushing** across the road in several places. One of these had been negotiated and a second one reached, which was not as deep as the first, but in which the **water was running very swiftly**. . . . Jackson suddenly threw down the paddle and flung himself into the water being **carried into deep water by the torrent**. . . . [Mr. Hampton] twice attempted to swim to the Negro, but was **unable to make any progress against**

the fierce current, and swallowed quantities of water. . . ." (The State, August 14, 1928) (See Attachment 1 for a full account of this incident.)

- "The swamps of Congaree river below Columbia yesterday resembled **a swiftly flowing lake several miles in width**, or like an immense river bespecked with trees, houses, tops of corn stalks and **broadly beaming unbroken expanses of hurtling muddy water -- in short it was like Congaree river on flood** . . . the **raging waters**, which in many places, though traveling through miles of trees, **travel at such rapid speed** that progress in a rowboat, with auxiliary paddles, could not be negotiated without superhuman effort. (The State, August 18, 1928.)

Because some of the areas identified in the accounts are on large estates, the precise location of the observed water flows cannot be identified. However, the accounts make clear that the destructive flows were not limited to a small area, but instead extended over a broad portion of the "swamp" in Richland County. The attached map illustrates the location of documented Richland floodwater conveyance in relation to FEMA's map of September 26, 2000. (See Attachment 2.) The map, drawn based on property records, shows that FEMA's floodway delineation corresponds well to documented destructive flows in Richland County.

Notably, the destructive conveyances occurred despite the extensive system of levees and dams that has existed in the area since at least the mid-1800's. While the dimensions and engineering characteristics of the individual levees and dams cannot be known with precision, property records and news accounts show that these flood control structures were substantial and were maintained at considerable expense for agricultural protection. Indeed, the Manning levees are a modification of pre-existing structures. Two points should be made in this connection. First, using Columbia Venture's 2-D mapping techniques (discussed below), the historic levees would likely be mapped as impediments to flow (meaning the areas behind them would not be mapped as floodway). That result contradicts the historic record, which shows floodwaters along Gills Creek and Congaree River causing property damage and loss of life. A second point to be remembered is that destructive flows have occurred even *after* Manning modified the preexisting levees. Those flows occurred during a relatively minor flood in 1976.

D. The Required Equal Conveyance Method Is Far Superior To the Proposed "1-Foot-Per-Second, Parallel-the-Channel" Method.

FEMA's Guidelines and Specifications for Study Contractors clearly state that, when "the stream forms the border between contiguous communities, and the floodway designation affects both of them, equal reduction of conveyance must be used."[13] This point was made to FEMA by none other than Lexington County, which lies on the west bank of the Congaree River.[14] Lexington has an obvious interest in not being made to shoulder more than its fair share of the floodway burden. Cognizant of that reality, FEMA's September 2000 map properly allocates the Congaree floodway across Richland and Lexington Counties by means of the equal conveyance method.

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[13] Flood Insurance Study Guidelines and Specifications for Study Contractors, 5-3 (FEMA, 1999 ed.) (emphasis in original).

[14] Letter from I. Ozbek, Lexington County, to M. Miller, FEMA (December 6, 1999).

Columbia Venture has sought to upend this equitable solution in two ways. First, it tried to convince FEMA that Lexington County communities *wanted* more floodway. This came about when several Lexington-side municipalities passed resolutions supporting FEMA's September 2000 maps, including the BFEs and the floodway delineations contained therein. The resolutions included a statement about the "Lexington County HEC-2 BFE" that, according to attorneys for Columbia Venture, showed community support for using the Lexington HEC-2 model to calculate the "Lexington County portion of the floodway."[15] In fact, the resolutions supported the HEC-2 BFE *only* if the "configuration of the floodway will not change in Lexington County" from that shown on the September 2000 map. Of course, use of the Lexington County BFE HEC-2 model (as opposed the Richland County BFE HEC-2 model, which FEMA used in September 2000), would shift *more* floodway onto Lexington County. The resolutions obviously did not support that result, and FEMA correctly decided not to process a premature "letter of map revision" based on these resolutions.

The second attack on the equal conveyance floodway has come in the form of a 2-D model introduced to these parties February 15, 2001 -- a month and a half past the established January 2 deadline for new information. These parties have not had sufficient time to review that infrormation in detail and reserve the right to analyze it should FEMA decide to base its decision on this new model. As presented in summary form at the April 27, 2001 meeting in Columbia, however, the 2-D model appears to offer a far less defensible map drawing tool than that used by FEMA in September, 2000. First, use of the proposed model would shift a significant amount of floodway onto Lexington County, which that County has not agreed to. Second, the proposed model apparently limits floodway delineation to contiguous, 1-foot-per-second flows that are parallel to the main river channel. That is, the model maps as floodway only that water which is (1) moving at 1 fps; (2) moving parallel to the main channel; and (3) is contiguous to other water segments also moving 1 fps. If water were to blast through the Manning levees at 10 feet per second – but did so perpendicular of the river channel – that water would not be mapped as floodway. Further, if the same water were to move down and "pool" in the southern section of levee ring 1 before overtopping the dike and travelling at 10 feet per second into levee ring 2, it would not be considered as floodway because it would no longer be contiguous to other 1 fps sections.

The unacceptability of this floodway definition is fairly plain. Not only is it based on an arbitrary 1 fps cut-off (without regard to water depth), it excludes destructive flows above 1 fps if those flows are not "parallel" to the river. This crabbed definition is based on the notion that for an area to be floodway, it must "efficiently convey" water downstream, and water moving non-parallel to a river channel is not conveying efficient enough. The regulations, however, have a much broader definition. "Regulatory Floodway" is defined to mean that "area regulated by federal, State or local requirements to provide for the discharge of the base flood so the cumulative increase in water surface elevation is no more than a designated amount" (one foot) as set by the National Flood Insurance Program. 44 C.F.R § 9.4; see also 44 C.F.R. 59.1 ("'Regulatory floodway' means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.")

[15] Winston & Strawn, Memorandum (February 13, 2001).

There is nothing in the regulatory definition that supports limiting regulatory floodway areas to a one dimensional channel; the key feature of a floodway is that it has sufficient capacity to keep area BFEs from rising. Beyond the lack of regulatory basis, the proposed re-definition of floodway to include only those water segments that move "parallel" to the channel regardless of speed is inherently problematic. How long must the parallel portion be? What if there is a tributary? Why is quick moving water only dangerous when it moves parallel to the main channel? Why is a floodway ineffective if water in it is temporarily or momentarily out of alignment with the main channel? Rather than adopting a last-minute model contrived to displace floodway on landowners across the river, FEMA should stick with a consistent, safe means of mapping floodways that accounts for local communities and is required by FEMA regulatory guidelines - the equal conveyance method.

III. THE BASE FLOOD ELEVATIONS SHOWN ON THE AUGUST 1999 AND SEPTEMBER 2000 MAPS WERE ERRONEOUSLY LOW.

A. Use of Correct Flow Numbers Will Increases BFEs Above Those Shown On the August 1999 an September 2000 FIRMs.

The Base Flood Elevations for Lexington and Richland County should be recalculated using a 100-Year flood estimate of 340,000 cfs at Columbia. This would significantly increase BFEs over those shown on the September 2000 map, which assumes a 100-Year flood of 294,000 cfs.

B. The September 2000 FIRM, by Incorrectly Assuming the Manning Dikes Would Not Break, Drew Lexington County BFEs Too High.

The September 2000 appeals resolution report states that Congaree River base flood elevations were determined assuming a two-step flooding scenario. In step one, flood waters rise on the riverward side of the Manning levees until flood elevations in Lexington County reach their maximum height and Lexington BFEs are marked. In step two, the levees are assumed to breach and floodwaters flow into Richland County, causing a significant reduction in the Lexington County flood levels, but resulting in maximum Richland BFEs. The September 2000 report describes of the two-step rationale:

> As water flows through the breaches, it will fill the Richland County floodplain, and eventually the water level on both sides of the dike will equalize. Hydraulic analyses indicate that water-surface elevations are expected to decrease 2- to 4-feet in Lexington County after a breach occurs. Therefore, the worst flooding in the riverbed area and in Lexington County will occur before the dike breaches, while the worst flooding in Richland County will occur after the dike breaches.[16]

[16] "Appeal Resolution for Congaree River in Richland and Lexington Counties, South Carolina," at 27 (FEMA, September 26, 2000).

In light of what is known about the Manning levees, the assumption that these dikes will be intact at 292,000 cfs is factually unsupportable, scientifically incorrect and results in erroneously high BFEs on the Lexington County side. Because Lexington County BFEs were calculated assuming "*no conveyance* behind the Manning's dike in Richland County,"[17] and because "roughly 10 percent of the total flow through the Congaree River will be conveyed through Richland County following a breach of Manning's dike,"[18] the no conveyance assumption adds 10 percent more flow (ca. 29,200 cfs) on the Lexington County side than would be present if the dikes breached prior to the River reaching maximum 100-year flow.

More important, it is clear that the *Manning dikes will breach well before 292,000 cfs.* On page 24 of the appeal resolution, FEMA states that HEC-2 backwater model sensitivity tests indicate that "Manning's levee along the left overbank of the Congaree River was overtopped for peak flow discharges of more than 200,000 cfs." Well before overtopping occurs, however, the levees will suffer structural failure, as in fact happened in the 1976 flood. That flood had a peak flow of 155,000 cfs.[19] But the historical record shows the Manning levee failed *before* the 155,000 cfs peak was reached - the levees broke between 10 PM, October 10, 1976 and 1 AM, October 11, 1976, when the Congaree River was still rising (see flood stage table, Attachment 3).

FEMA should calculate BFEs in Lexington County assuming that the Manning levee will breach at 155,000 cfs or lower, as supported by the 1976 data. After that breach, flood surface elevations "on both sides of the dike will equalize" and elevations can be expected to "decrease 2- to 4- feet in Lexington County" from the levels that would occur if the Manning levee stayed intact until 292,000 cfs. Using FEMA's own analysis, use of a 155,000 cfs failure trigger would lower Lexington County BFEs in the Congaree Creek area by two to four feet.

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[17] Id. (emphasis added).
[18] Id.
[19] Id. at 24.

When Apparently Saved, Dan Jackson Gives Up and Is Lost
(The State, August 14, 1928)

Frank Hampton, of "Millwood," near Columbia, member of the House of Representatives from Richland County, came near being drowned yesterday, in a vain effort to save the life of Dan Jackson, 61, Negro farm hand living on Mr. Hampton's place, who lost his footing in flood waters of the Congaree Swamp. The accident occurred a few hundred yards from the Bluff Road, on the road to the Beckham pasture.

Mr. Hampton, with Jackson and James Davis, another Negro employee, was en route to the swamp to see about his cattle and take provisions to men there. Water was rushing across the road in several places. One of these had been negotiated and a second one reached, which was not as deep as the first, but in which the water was running very swiftly. Mr. Hampton was in front and Jackson in the rear, about 20 yards from him. Suddenly, Jackson was heard to exclaim, "Some get me, Jimmie," (as printed) but as the water was only about half way from the knee to the thigh it was not thought he was in any immediate danger.

Mr. Hampton told him to brace himself with a boat paddle he was carrying and he would be all right. Apparently losing his head, Jackson suddenly threw down the paddle and flung himself into the water being carried into deep water by the torrent.

Mr. Hampton immediately plunged in, but before he could reach Jackson, the Negro went down once. Mr. Hampton seized him and after both had gone under once more succeeded in reaching a small sapling. As this appeared to be not sufficiently substantial to hold both, Mr. Hampton left the Negro there and swam to a larger tree a few yards down the current, calling to the Negro, who could swim a little, to make for the same refuge. However, Jackson continued to hold to the sapling at arms' length, his head becoming submerged.

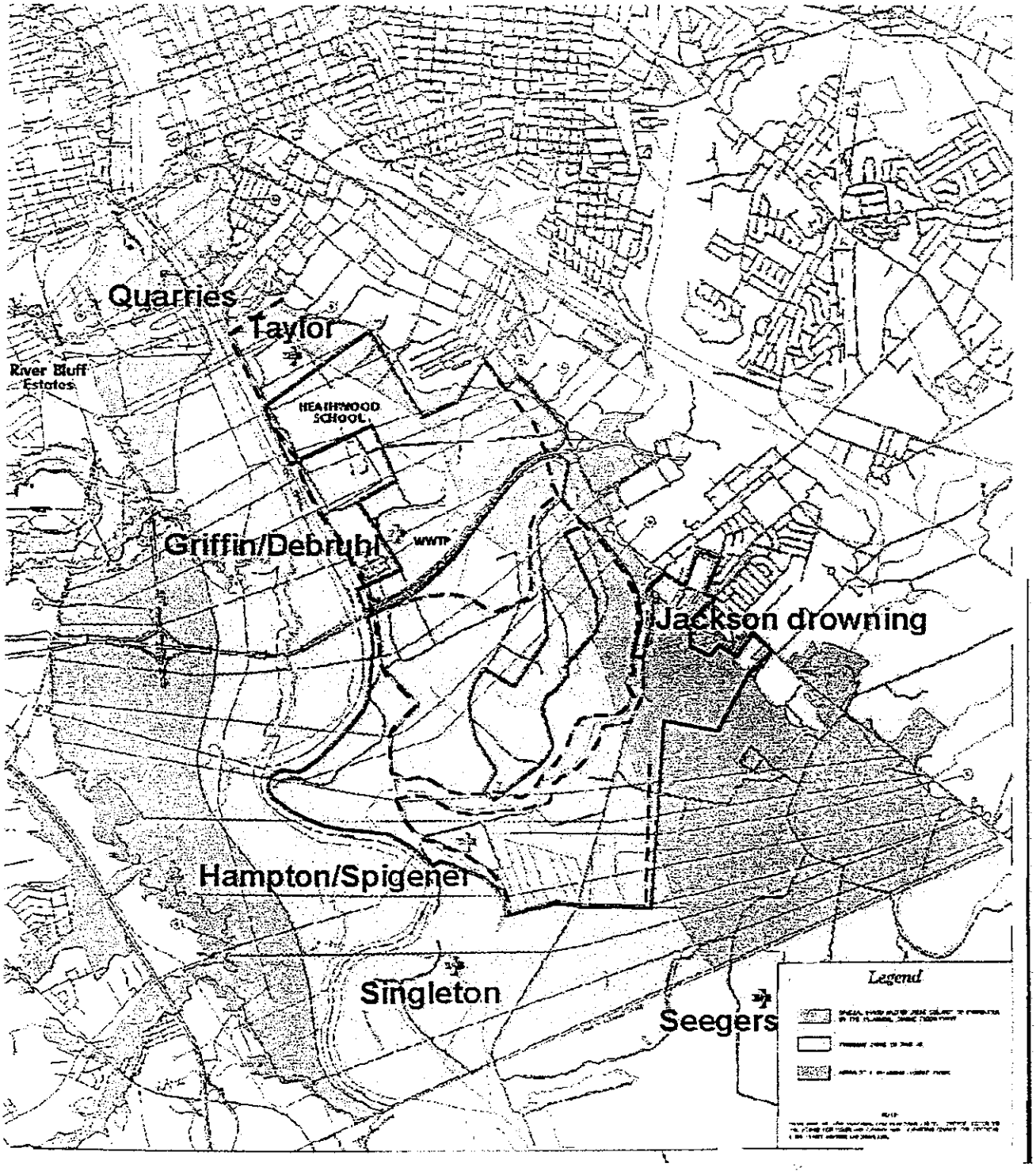
Mr. Hampton called to George Hardy, substantial Negro farmer, and a companion who were in a boat a short distance away, to come to the rescue, and himself twice attempted to swim to the Negro, but was unable to make any progress against the fierce current, and swallowed quantities of water. The boat arrived in a few seconds, but Jackson had released his hold on the sapling and been carried down by the flood.

Several hours' search failed to disclose the body, though Mr. Hampton offered a substantial reward if it could be found during the day.

Mr. Hampton was deeply moved by the incident, and says "Old Dan" was a good and reliable hand.

Jackson leaves 5 young orphan children, the mother having died a year ago.

Attachment 2



Historic events — — — Current levees ——— B&C property boundary

1 0 1 2 Miles

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Attachment 3

Congaree River Flood Stages, 1976 Flood
(Times nearest levee failure indicated in bold)

Day	Time	Stage
October 10, 1976	10 AM	21.7
	12 AM	22.61
	2 PM	23.73
	4 PM	24.82
	6 PM	25.62
	8 PM	27.03
	10 PM	**28.02**
October 11, 1976	**12 PM**	**28.13**
	2 AM	**28.62**
	4 AM	28.93
	6 AM	29.13
	8 AM	29.32
	10 AM	29.52
	12 AM	29.74
	2 PM	29.58
	4 PM	29.4
	6 PM	29.2
	8 PM	28.9
	10 PM	28.6
October 12, 1976	12 PM	28.3
	2 AM	28
	4 AM	27.55
	6 AM	26.96
	8 AM	25.9
	10 AM	25.08
	12 AM	24.91
	2 PM	24.18
	4 PM	22.8