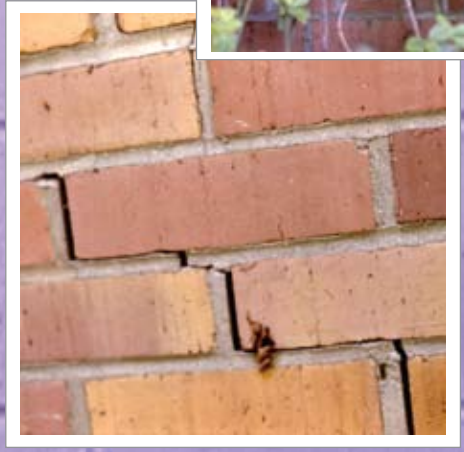

The Scotlandville, Denham Springs, and Baton Rouge Faults—

A Map Guide for Real Estate Buyers, Sellers, and Developers in the Greater Baton Rouge Area

Public Information Series No. 13
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LSU
Louisiana State University

Louisiana Geological Survey
3079 Energy, Coast & Environment Building
Baton Rouge, Louisiana
70803
Tel: 225 578 5320
Fax: 225 578 3662
www.lgs.lsu.edu

Front cover: Damage to structures built on and near faults of the Baton Rouge system in East Baton Rouge Parish, selected from photographs on file at the Louisiana Geological Survey taken during field work for the investigation by H. L. Roland, T. F. Hill, P. Autin, C. O. Durham, and C. G. Smith, *The Baton Rouge and Denham Springs–Scotlandville faults: mapping and damage assessment*, prepared for the Louisiana Department of Natural Resources by the Louisiana Geological Survey and Durham Geological Associates Consultants (1981). Photos by P. Autin and F. K. Kring.

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The Scotlandville, Denham Springs, and Baton Rouge Faults—

A Map Guide for Real Estate Buyers, Sellers, and Developers in the Greater Baton Rouge Area

by:
Richard P. McCulloh

Faults of the Baton Rouge system have been shown to cause damage to road, pavement, and building structures gradually, over periods of decades, even though the case can be made that the rate of movement along them has increased in connection with human activities such as drainage alteration and groundwater withdrawal.

The format of this document is designed to resemble that of a map book used by realtors, but only in a very general way. The actual map pages of the reference document used by realtors in the Baton Rouge area, which are copyrighted, are not used here; rather, quarters of 7.5-minute topographic quadrangle sheets, corresponding to the same areas as those in which LIDAR (LIght Detection And Ranging) digital elevation models (DEMs) available from the Atlas Web site (http://atlas.lsu.edu/lidar/) are formatted, are used as base maps. These map excerpts are combined with images of the relevant LIDAR DEMs, on which interpreted surface fault traces are drawn. The area covered is a block of six quadrangles encompassing greater Baton Rouge. Within this area, only those quarter-quadrangles traversed by known surface faults are included.

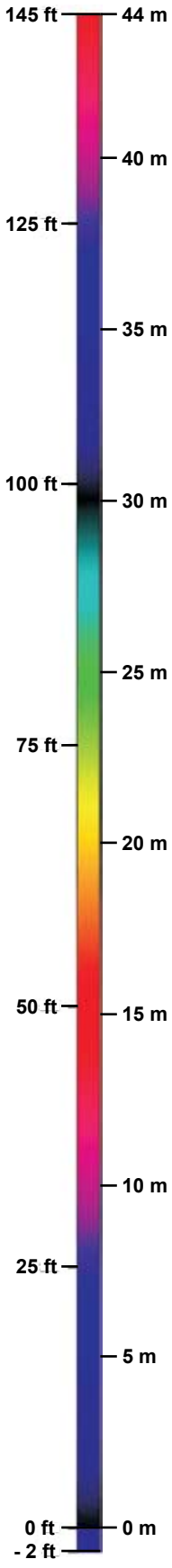
This format is also analogous to that used in the first detailed rendering of surface faults throughout East Baton Rouge Parish (Roland et al., 1981), in which interpreted fault traces were depicted on lot and block maps at a scale of 1 inch = 400 ft (1:4,800), permitting users to view the traces in relation to individual lots. A participant in this mapping was Durham Geological Associates Consultants, comprising the two co-compilers C. O. Durham, Jr. and C. G. Smith. Durham, who in the 1960s had been both the Chairman of the Louisiana State University Department of Geology and the Director of Research of the Louisiana Geological Survey, first revealed the Baton Rouge fault to the geological community and the Baton Rouge citizenry based on work he and his students had conducted. [Fisk (1944) had earlier sketched the fault trace on an aerial photograph of the area directly east of where it crosses the present Amite River flood plain, but his interpretations of the fault's origin and characteristics were entirely different, i.e., from the current perspective he failed to recognize the type of structure it is and instead included it with another type that he was investigating.]

An extended abstract by Durham and Peeples (1956) contained the first appearances in published literature of distinguishing characteristics, recognition criteria, and probable origin of the Baton Rouge fault essentially as would be agreed upon today. Although this abstract never was followed by a more in-depth treatment by its authors, it marks the debut of the Baton Rouge fault as we presently perceive it, and has influenced in some way virtually all subsequent works relating to this and other faults of the Baton Rouge fault system.

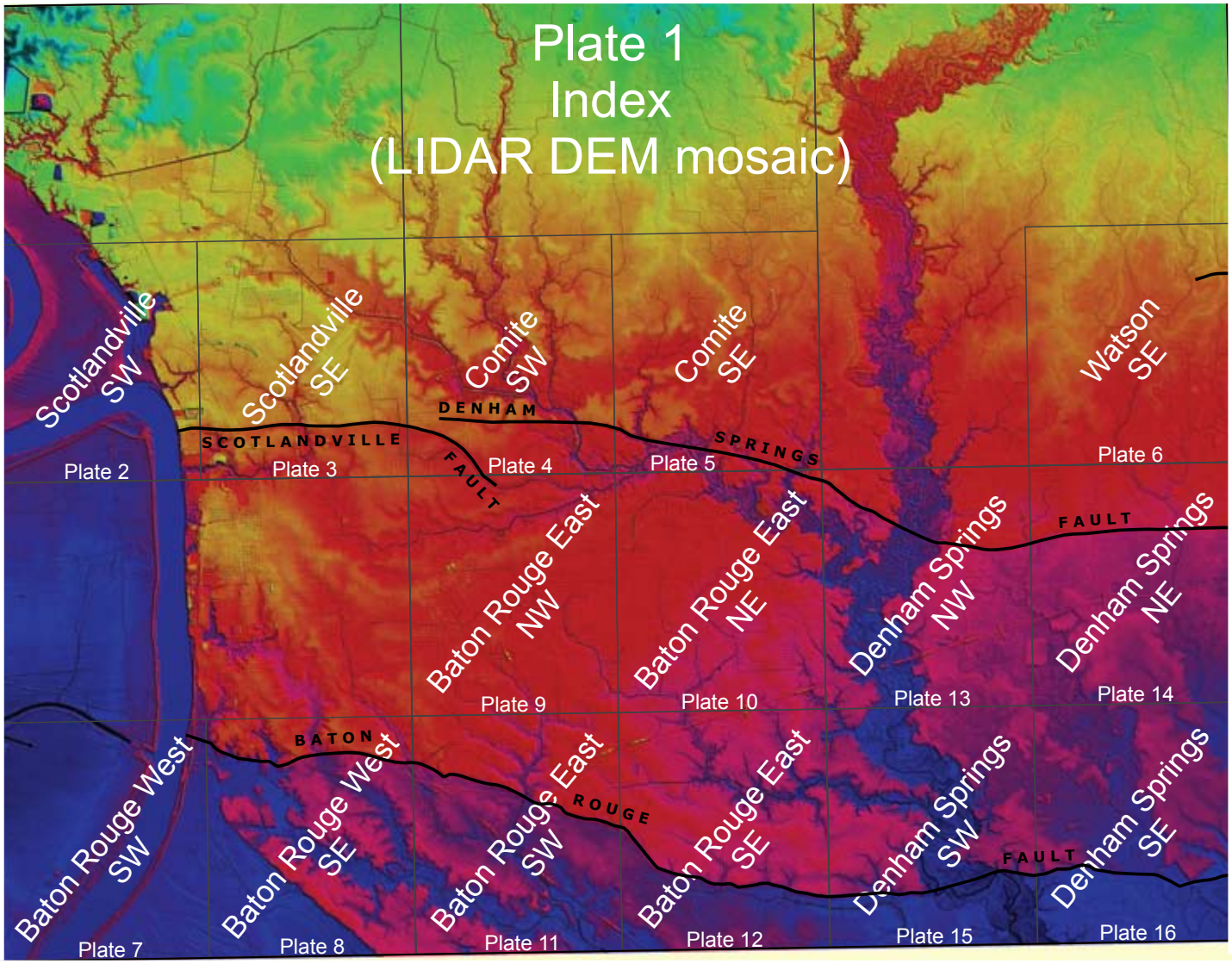
Although the traces of the Baton Rouge and Denham Springs–Scotlandville faults have been known with essential accuracy for some decades (cf. Roland et al., 1981; Durham, 1982; McCulloh, 1991), the advent of LIDAR-based imagery has made possible the rendering of their traces with hitherto unmatched precision. This has eliminated some ambiguities in previous interpretations based on topography represented by elevation contours at a 5-ft (1.5-m) interval and on structural damage patterns. For example, since their discovery the Scotlandville and Denham Springs faults have been interpreted alternately as distinct fault traces separated by a gap, and as differently named segments of one continuous fault trace. The LIDAR images make clear that the former interpretation is correct, and that the two form discrete, discontinous, and *en echelon* traces within the Denham Springs–Scotlandville fault zone.

Faults of the Baton Rouge system in East Baton Rouge Parish are active but have not been demonstrated to be seismic, i.e., to generate detectable earthquakes. Rather, they have been shown to cause damage to road, pavement, and building structures gradually, over periods of decades, even though the case can be made that the rate of movement along them has increased in connection with human activities such as drainage alteration and groundwater withdrawal.

A map rendering of engineering-geologic hazards for East Baton Rouge Parish (Autin and McCulloh, 1991) depicts a 200-ft (approximately 60-m) zone on either side of the interpreted fault trace as potentially susceptible to damages to developments, though this was and remains little more than a guess. Given the unknowns and the faults' proven capacity to generate expensive damages to structures along their traces in places, public awareness of them needs to be comparable to that for flood zones: we are well advised to remain mindful of proximity to them and to consider their potential to cause damage, and to understand that discounting or ignoring such potential may entail unacceptable risks. It is hoped that this document will make the basis for such awareness more accessible to the public.



Elevation scale for views of LIDAR (LIght Detection And Ranging) digital elevation models (DEMs) depicted in Plates 1–16.



Index consisting of mosaicked LIDAR DEMs covering the areas of the Scotlandville, Comite, Watson, Baton Rouge West, Baton Rouge East, and Denham Springs 7.5-minute quadrangles. LIDAR DEMs in quarter-quadrangle format mosaicked in this plate, and those presented separately along with corresponding excerpts of topographic quadrangle sheets (available as "digital raster graphics," or DRGs) in following plates, are from the Atlas Web site (http://atlas.lsu.edu/lidar/).

Plates 2–16: Quarter-quadrangles traversed by known active surface faults, with interpreted fault traces drawn: (a) views of LIDAR DEMs of quarter-quadrangles, and (b) views of LIDAR DEMs of quarter-quadrangles combined with excerpted quarters of 7.5-minute topographic-quadrangle DRGs.

Solid lines = fault traces

Dashed lines = inferred fault traces

U = upthrown block

D = downthrown block

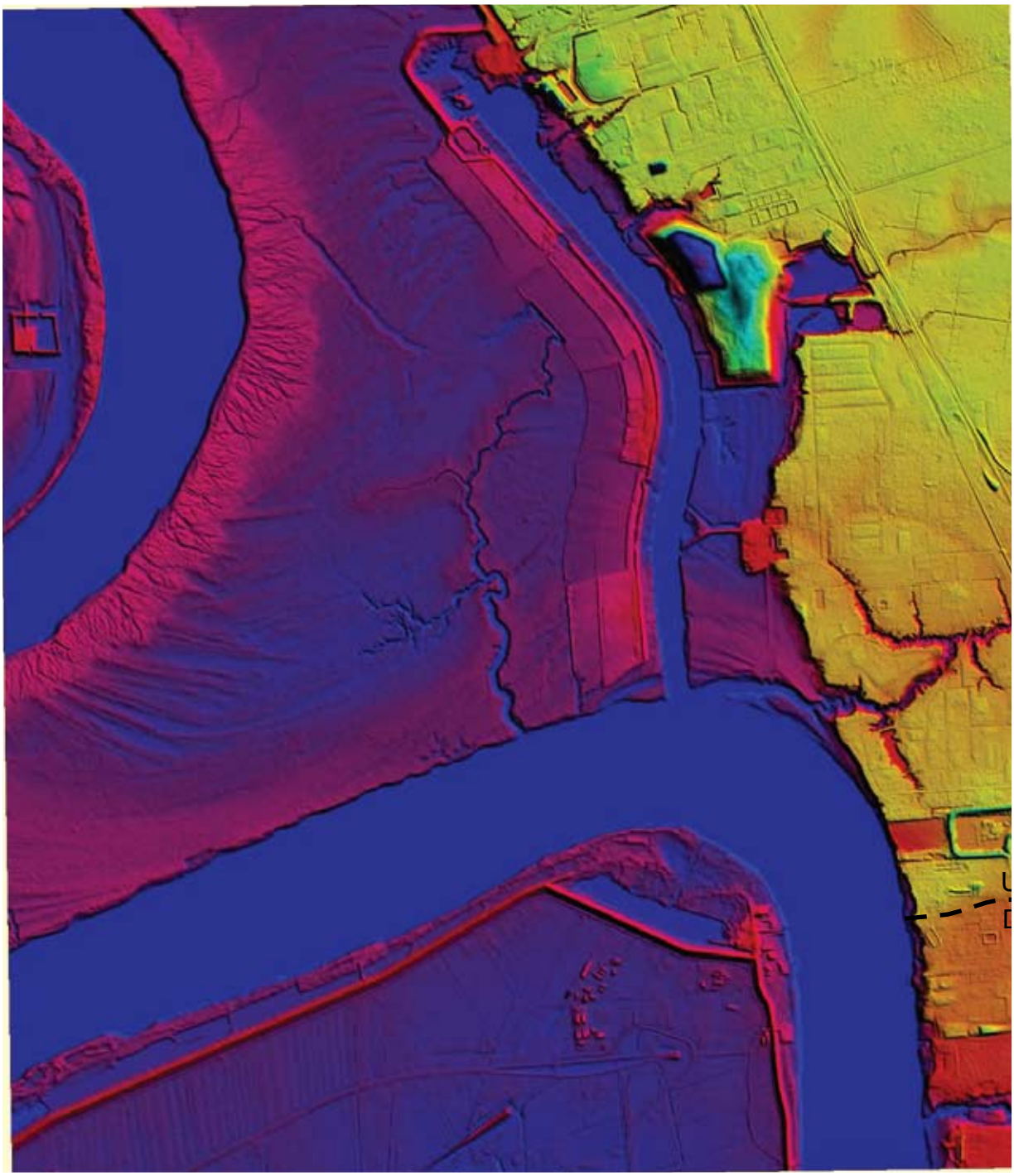


Plate 2a
Scotlandville SW
(LIDAR DEM)

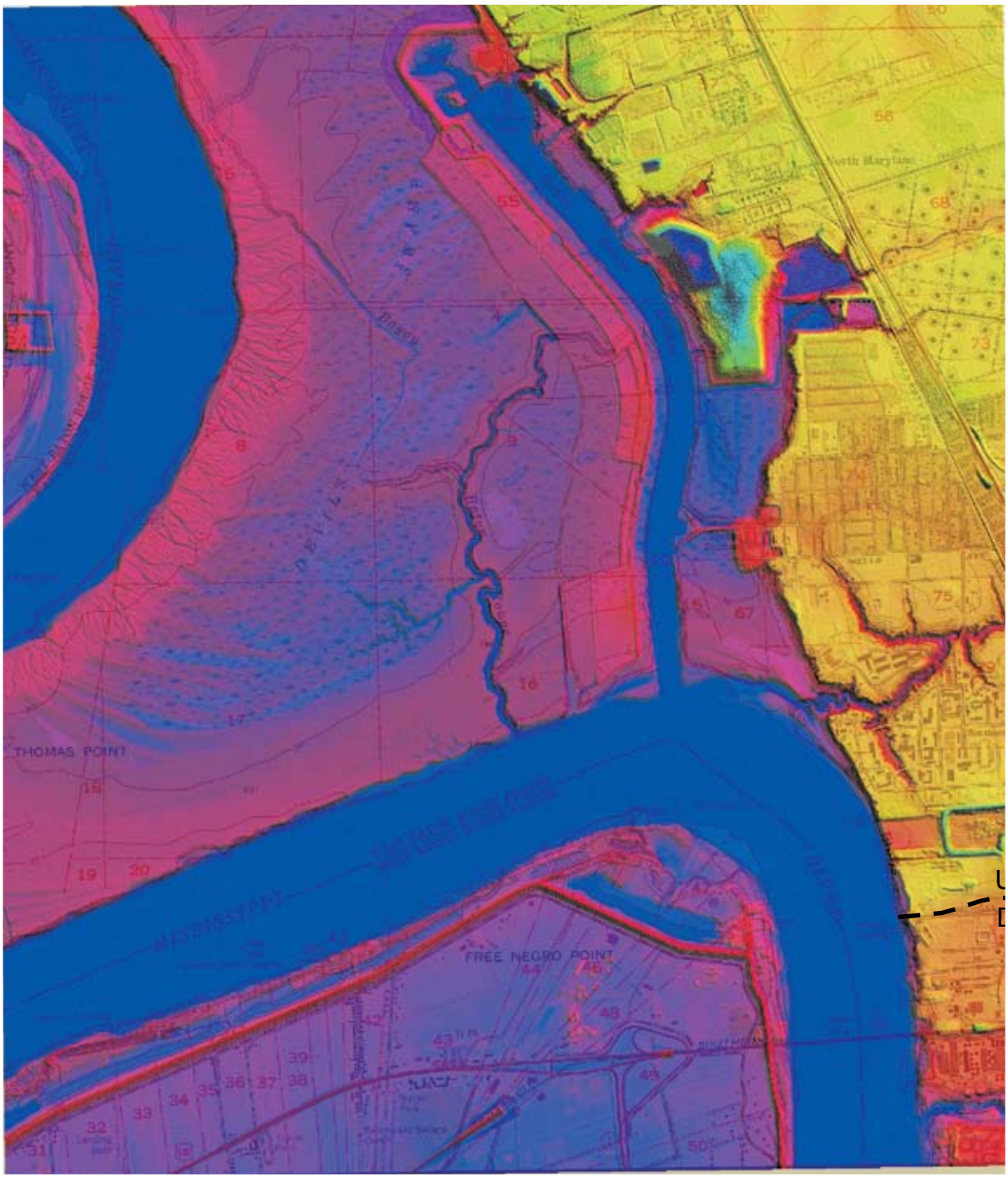


Plate 2b
Scotlandville SW
(LIDAR DEM + DRG)

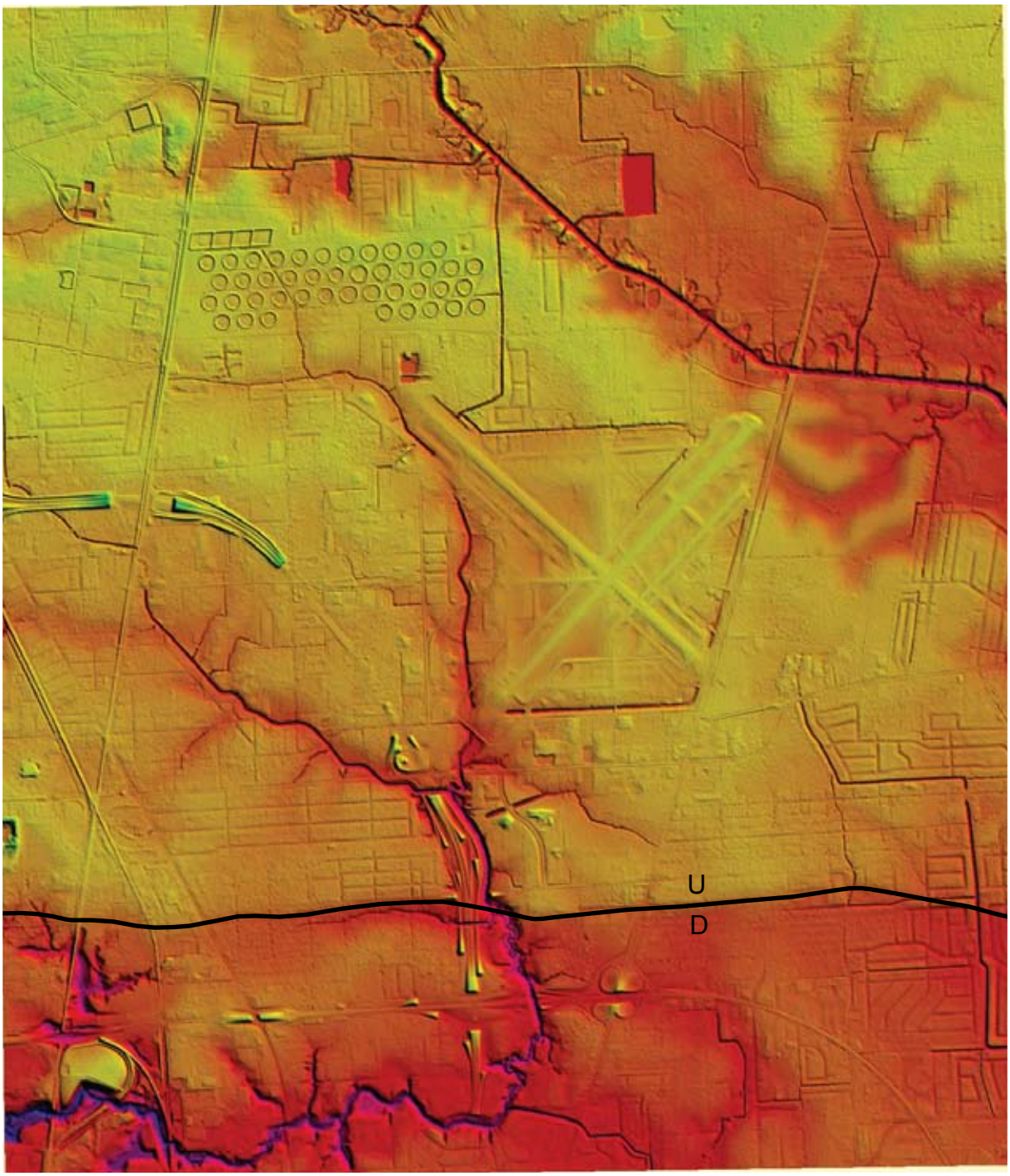
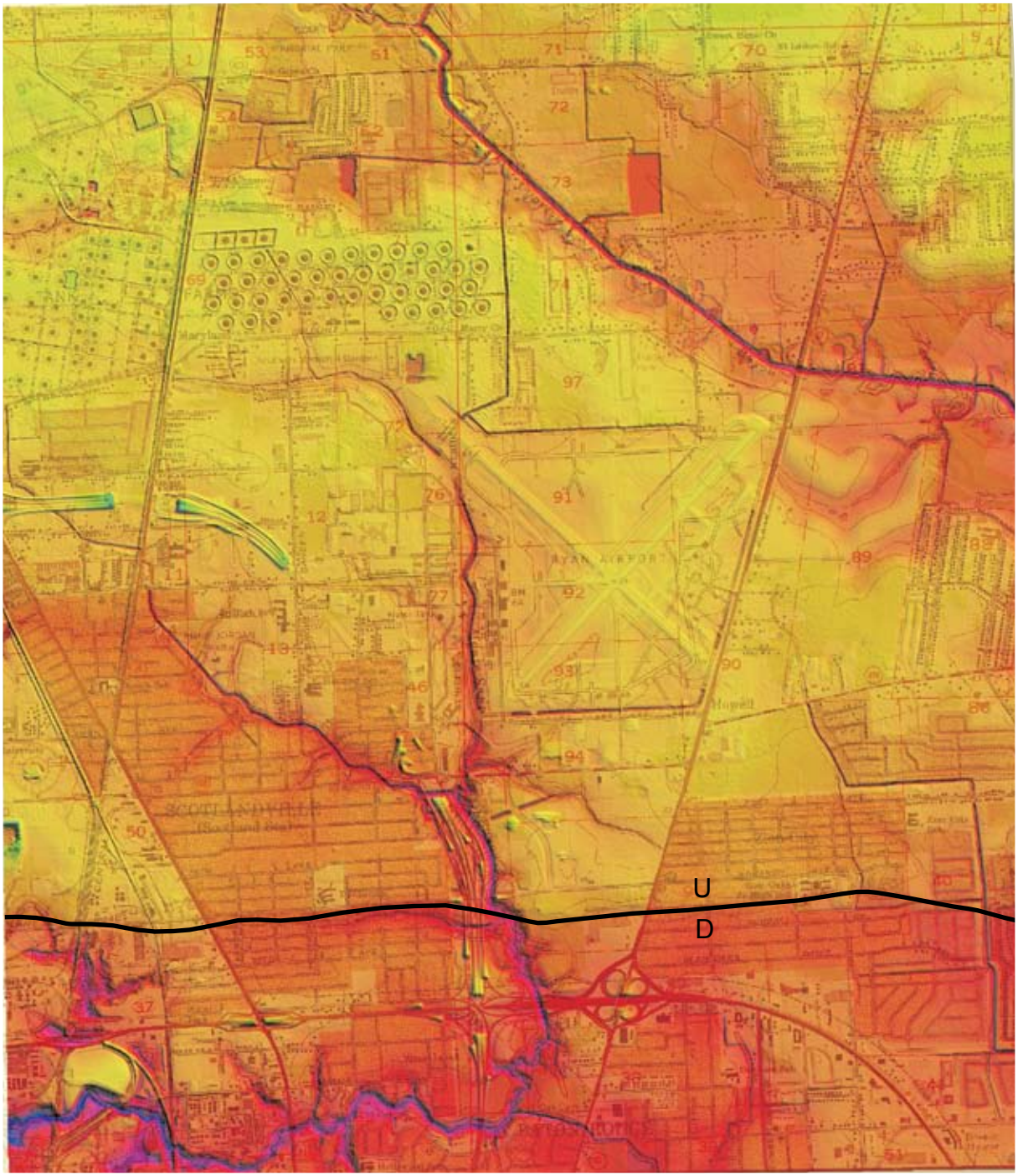


Plate 3a
Scotlandville SE
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 3b
Scotlandville SE
(LIDAR DEM + DRG)

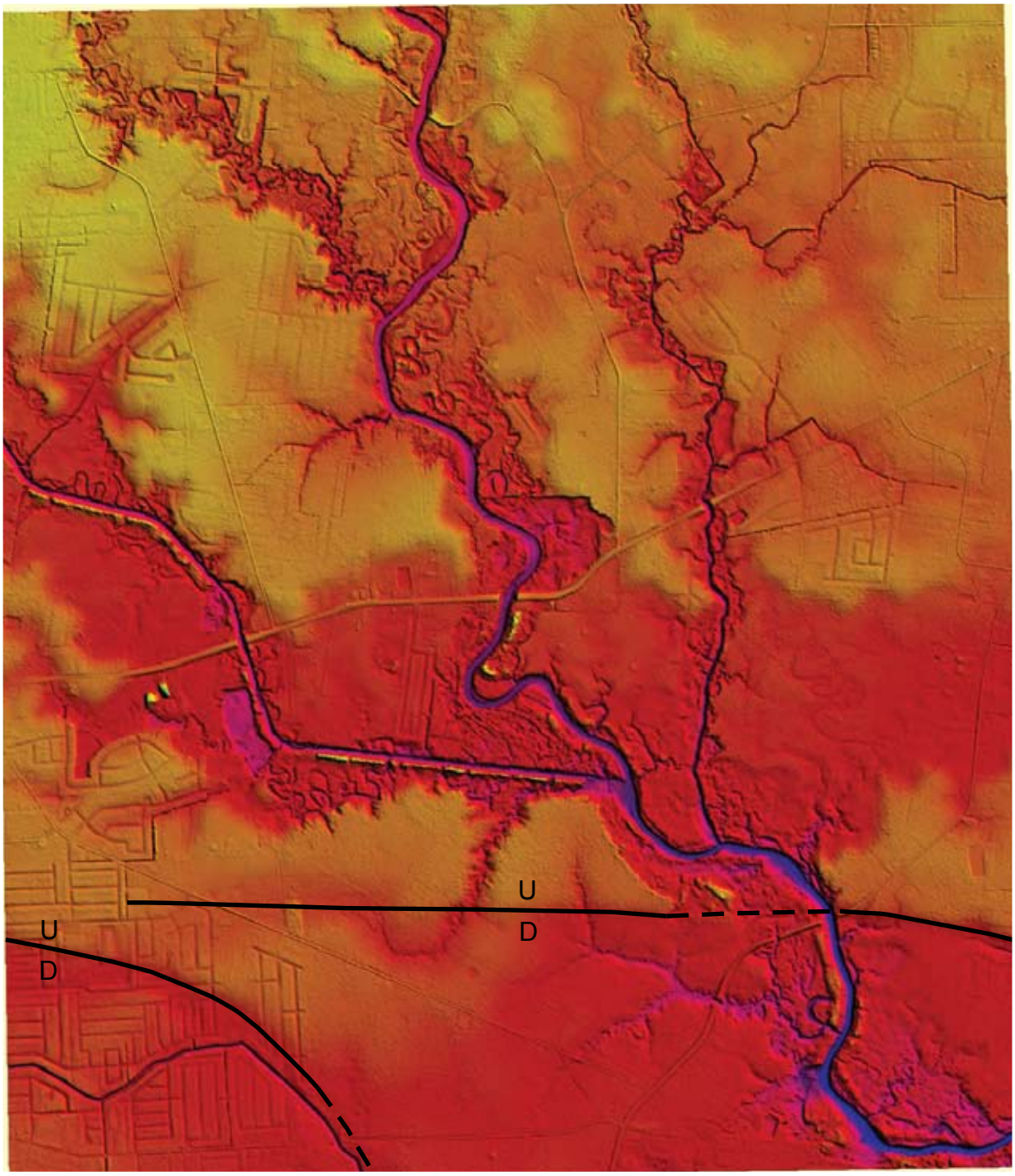


Plate 4a
Comite SW
(LIDAR DEM)

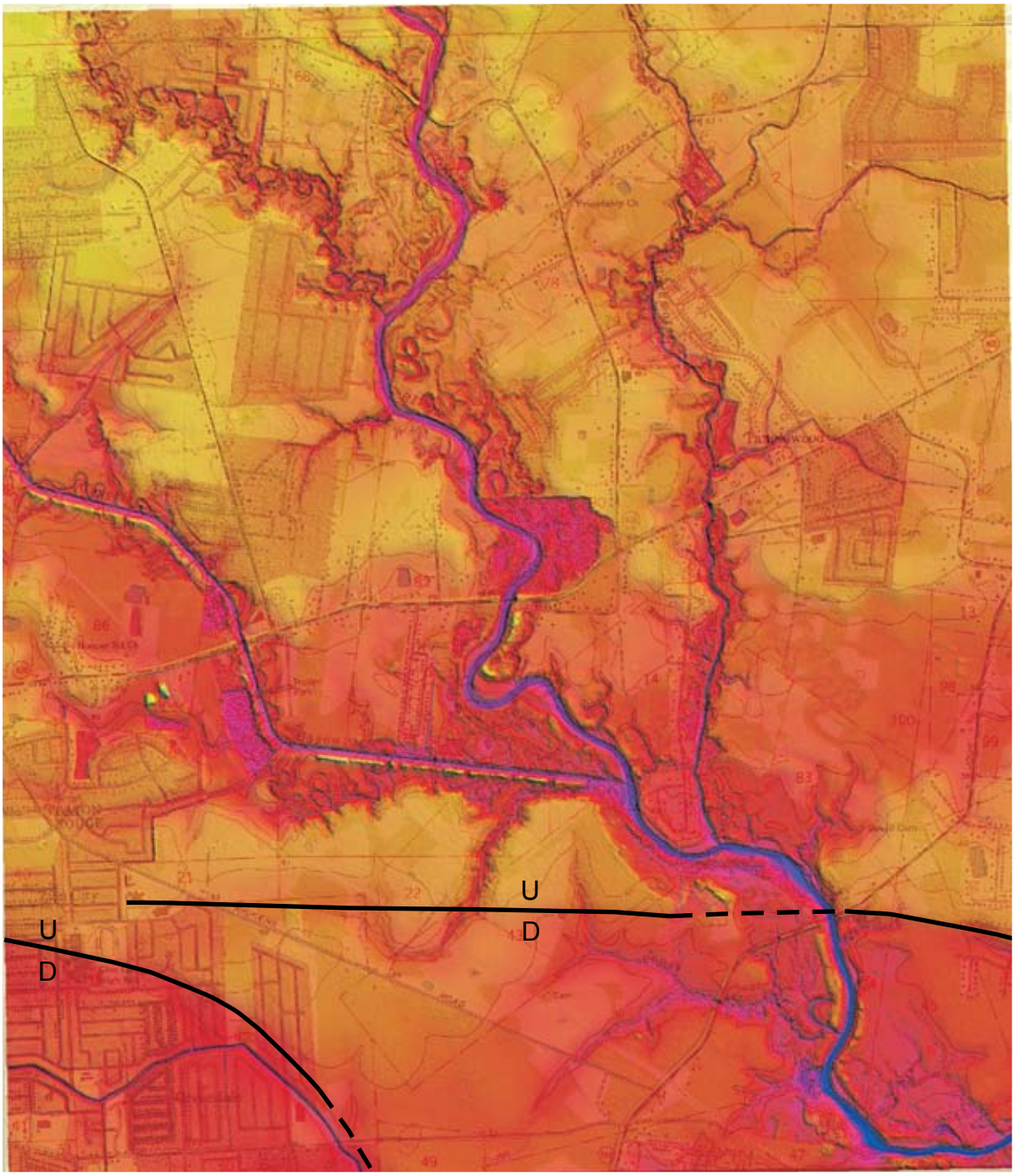


Plate 4b
Comite SW
(LIDAR DEM + DRG)

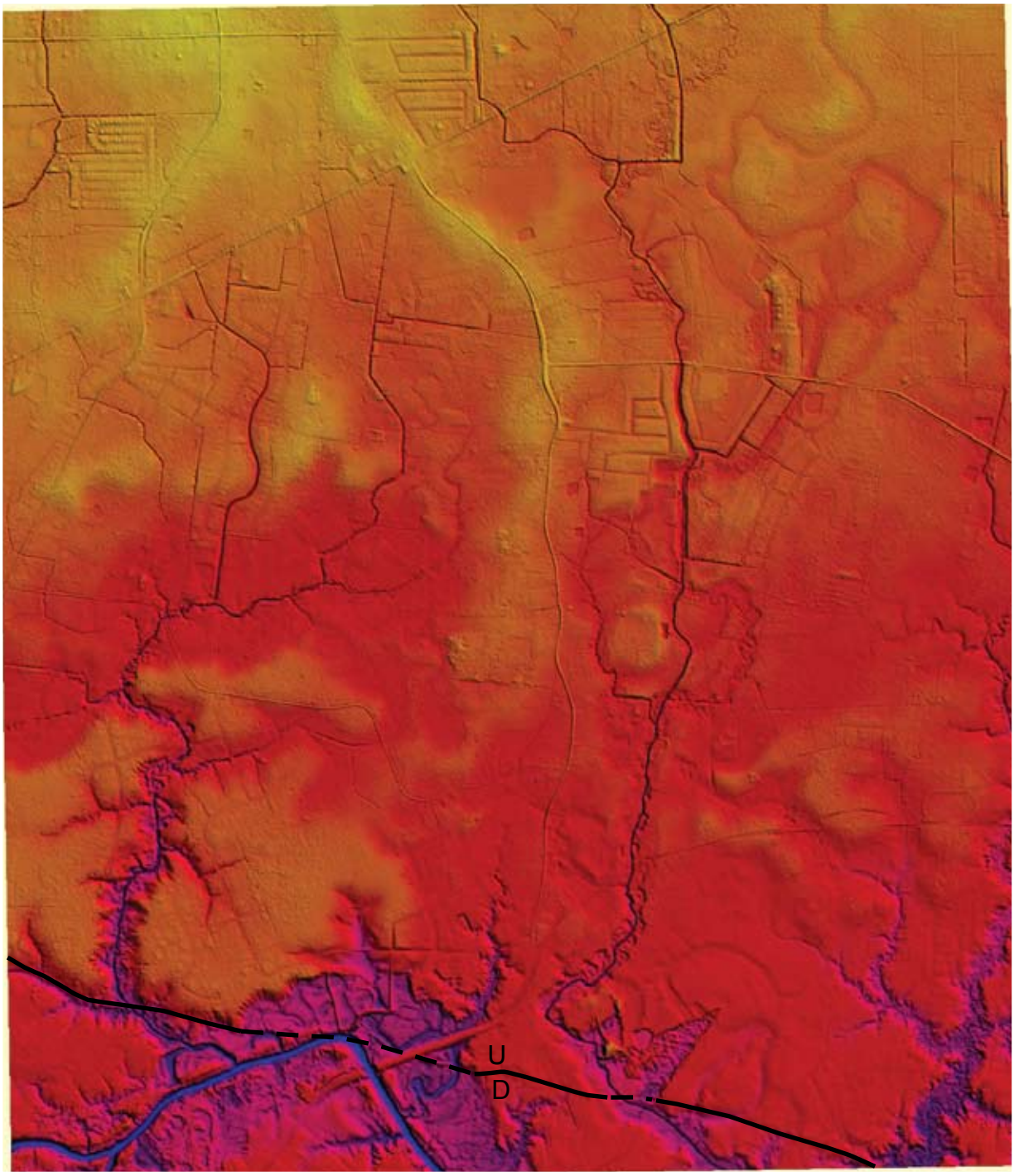


Plate 5a
Comite SE
(LIDAR DEM)

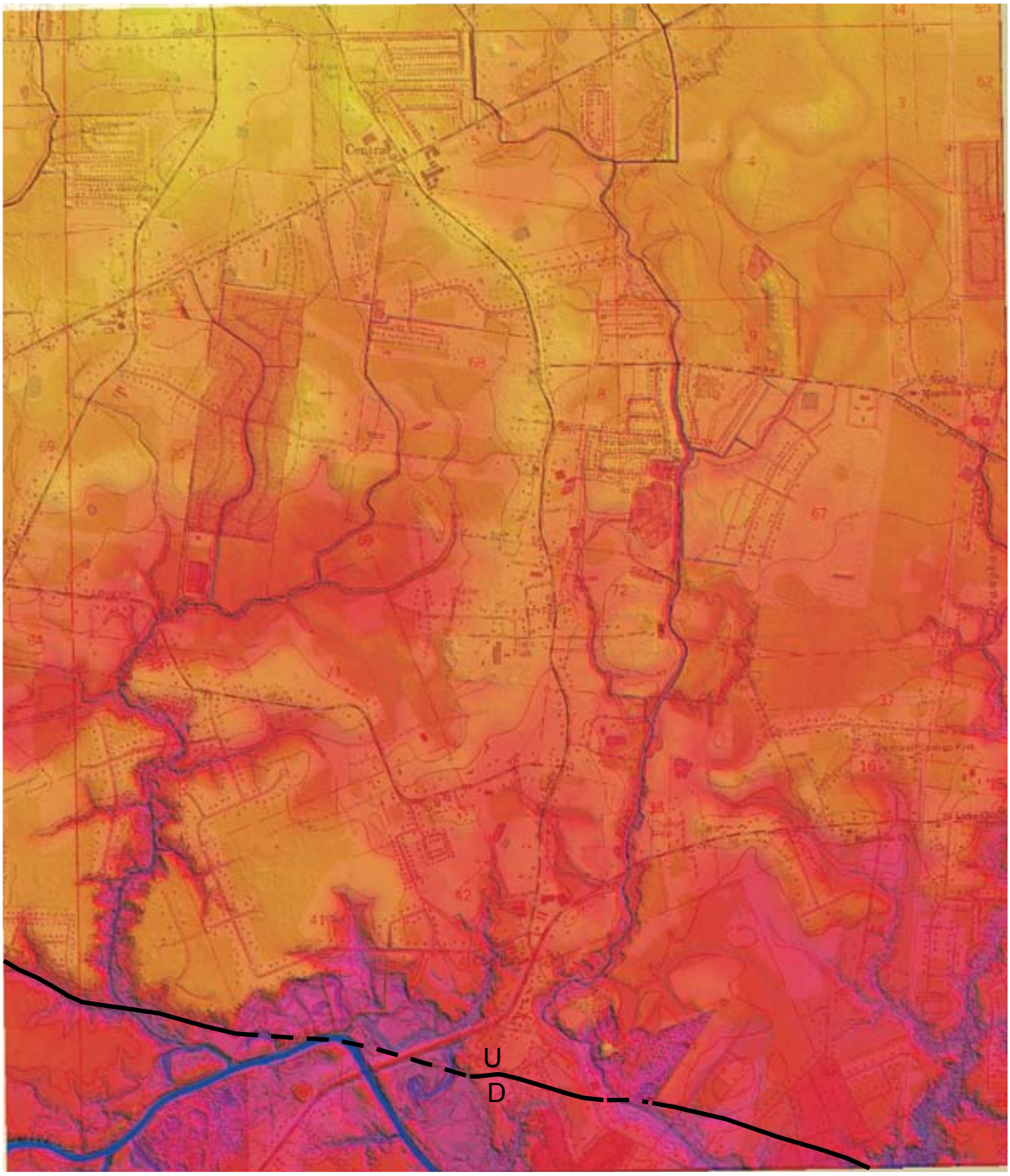


Plate 5b
Comite SE
(LIDAR DEM + DRG)

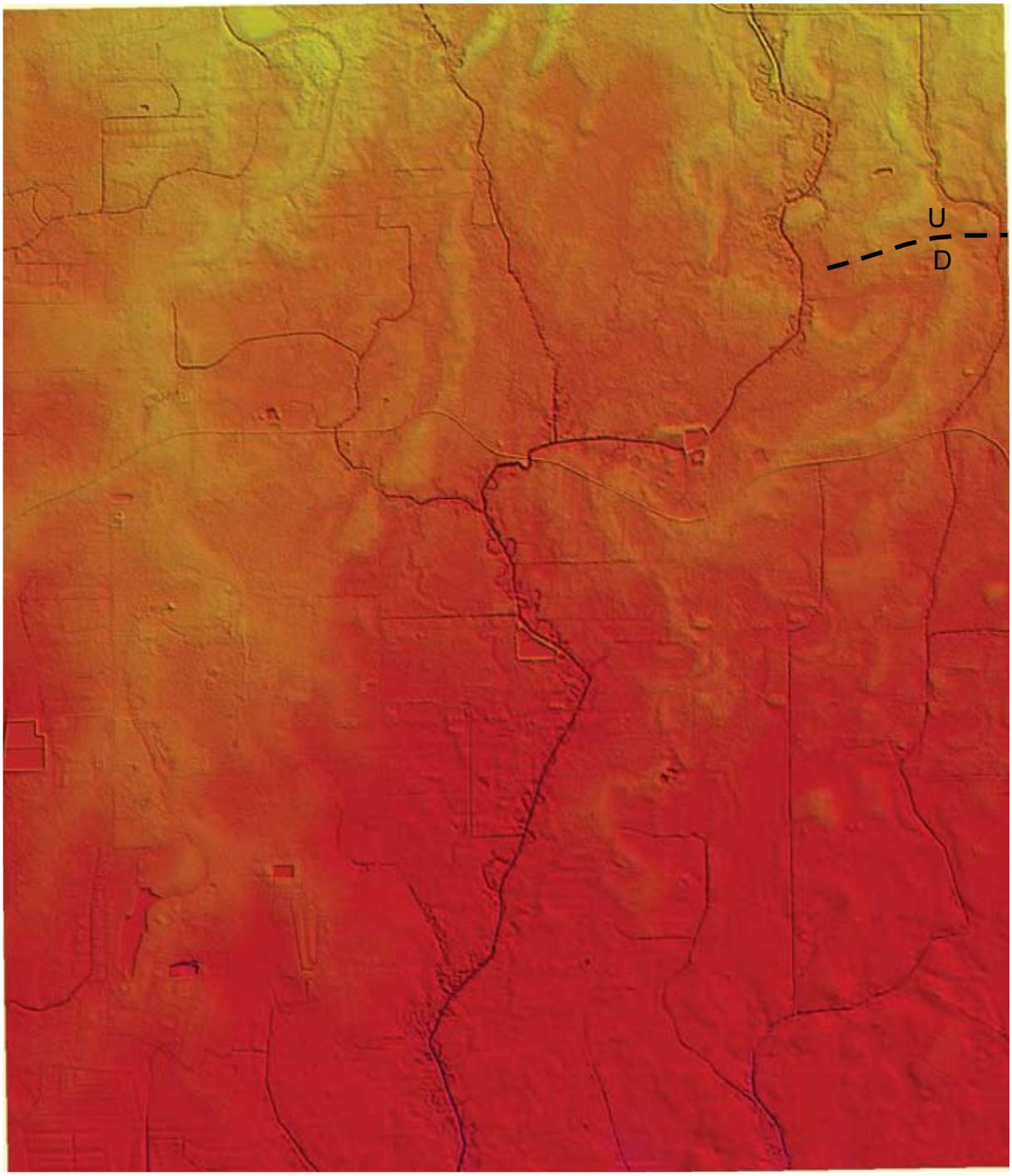


Plate 6a
Watson SE
(LIDAR DEM)

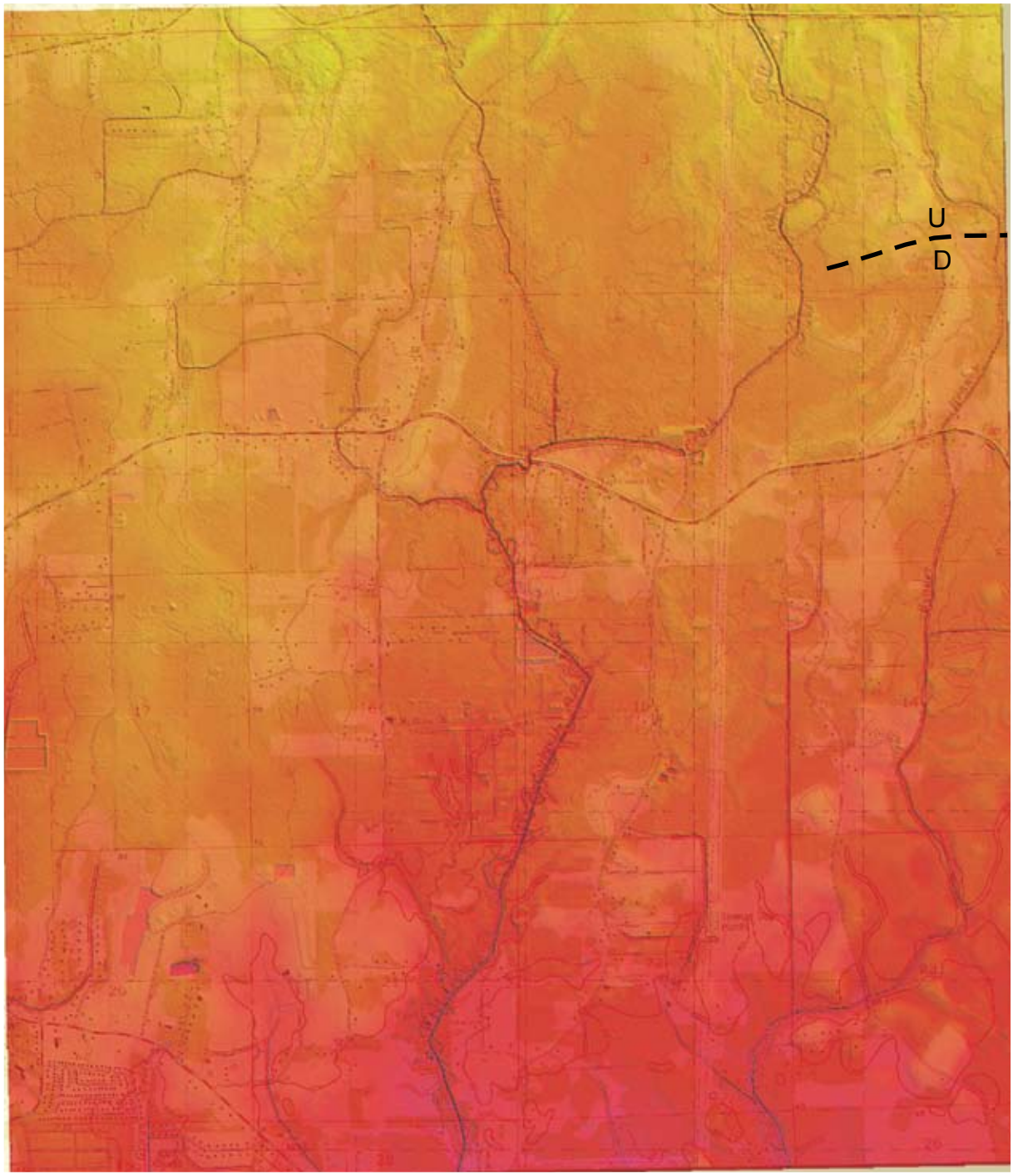


Plate 6b
Watson SE
(LIDAR DEM + DRG)

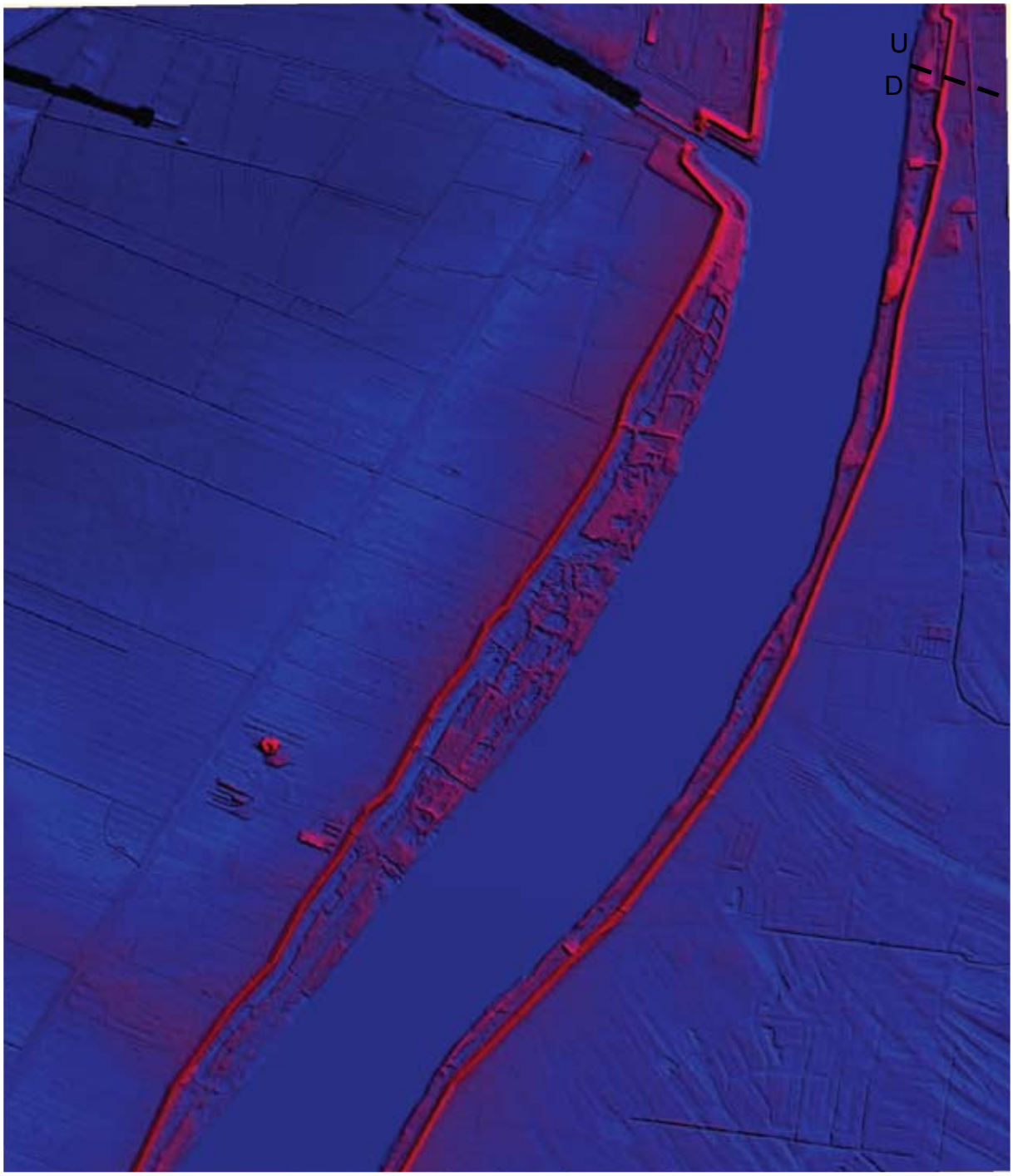


Plate 7a
Baton Rouge West SW
(LIDAR DEM)

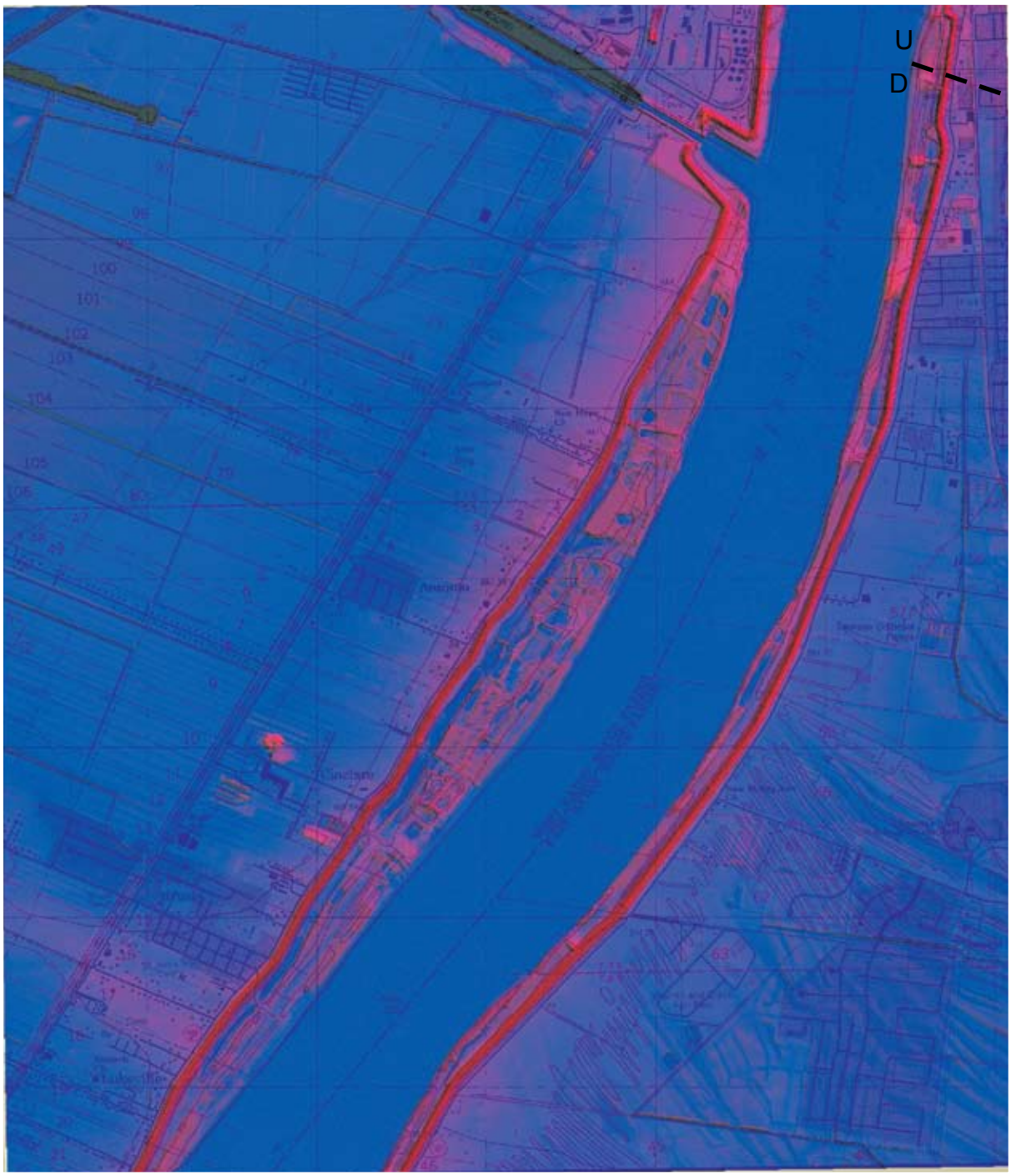


Plate 7b
Baton Rouge West SW
(LIDAR DEM + DRG)

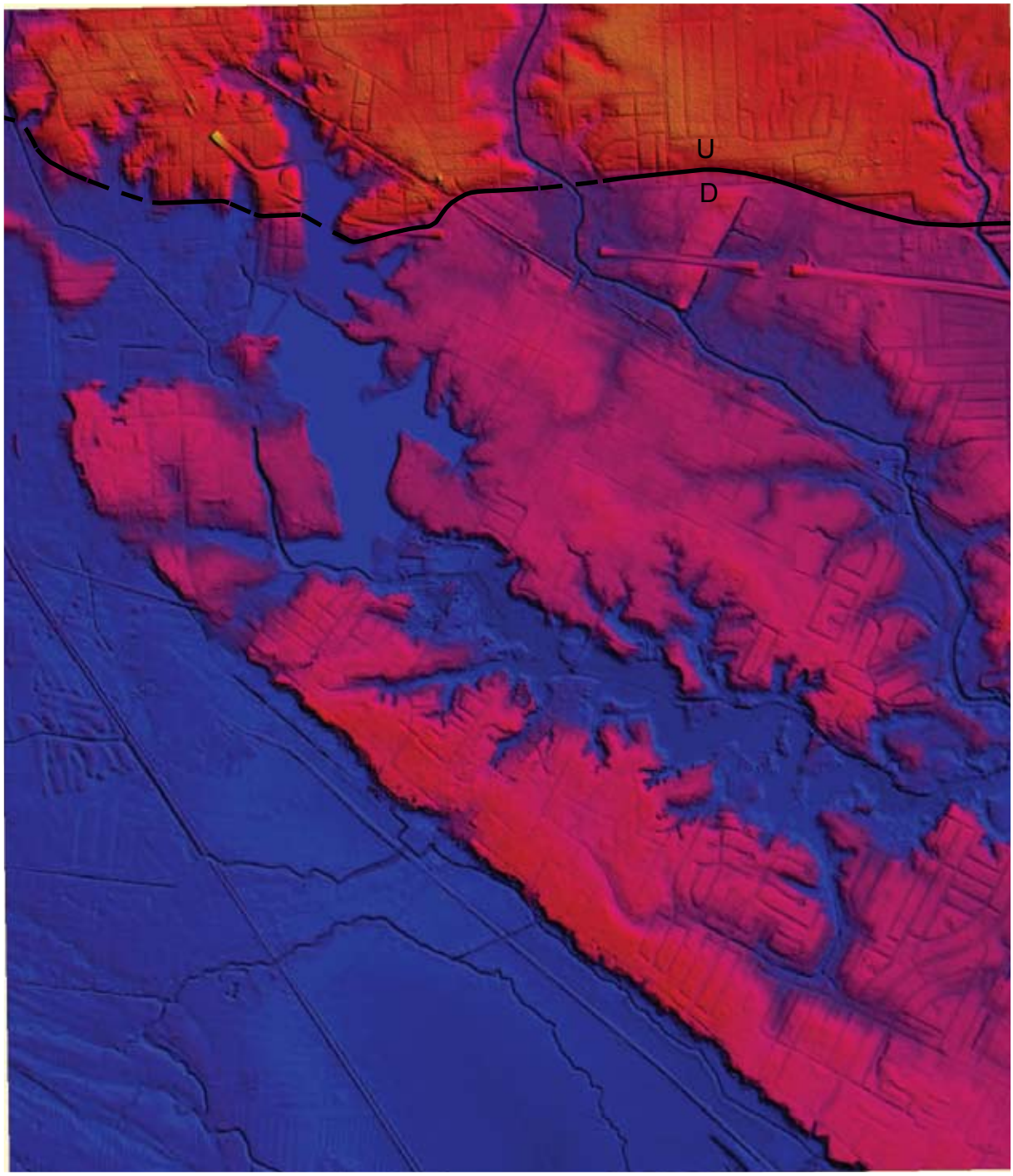
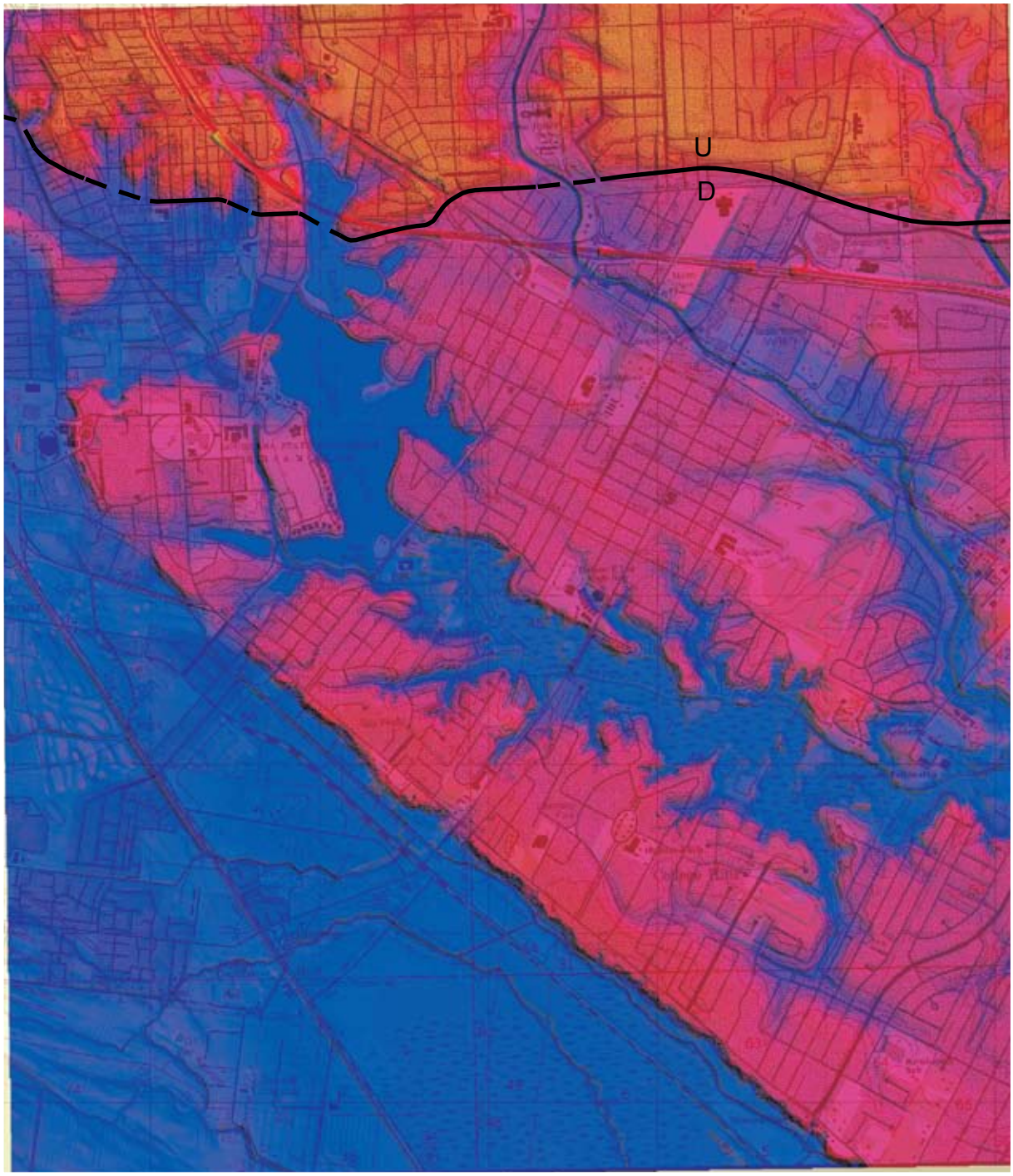


Plate 8a
Baton Rouge West SE
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 8b
Baton Rouge West SE
(LIDAR DEM + DRG)

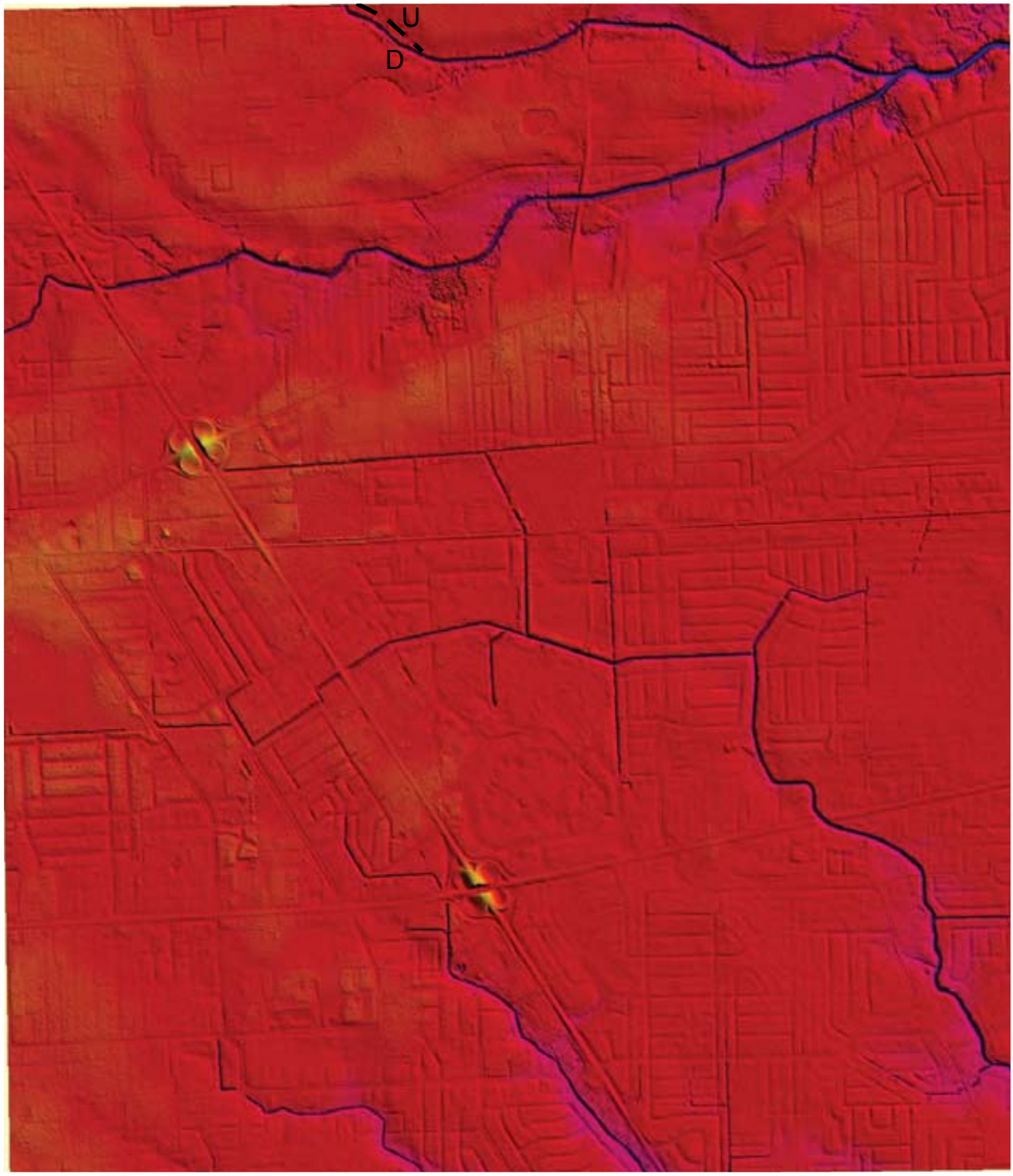


Plate 9a
Baton Rouge East NW
(LIDAR DEM)

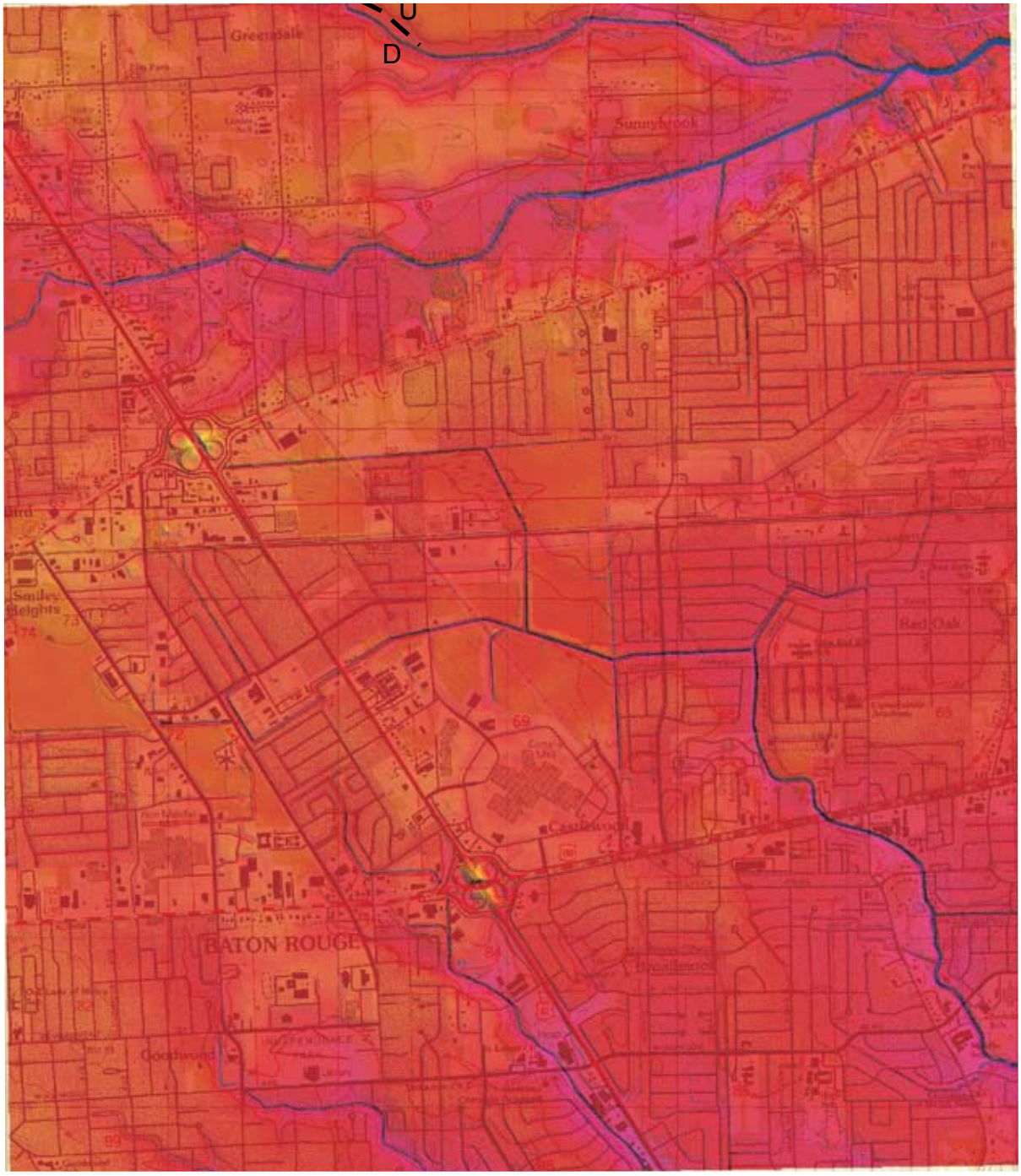


Plate 9b
Baton Rouge East NW
(LIDAR DEM + DRG)

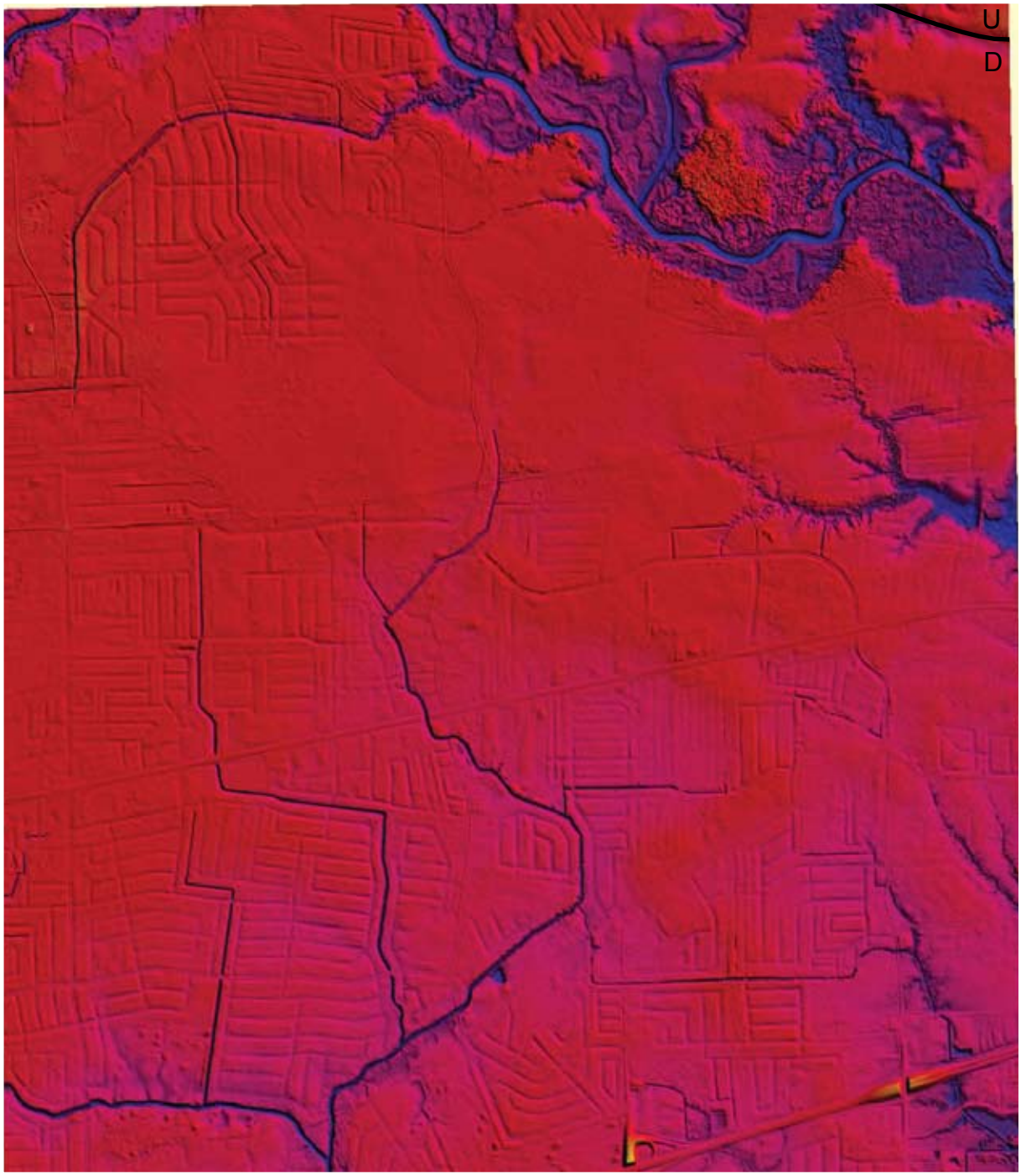
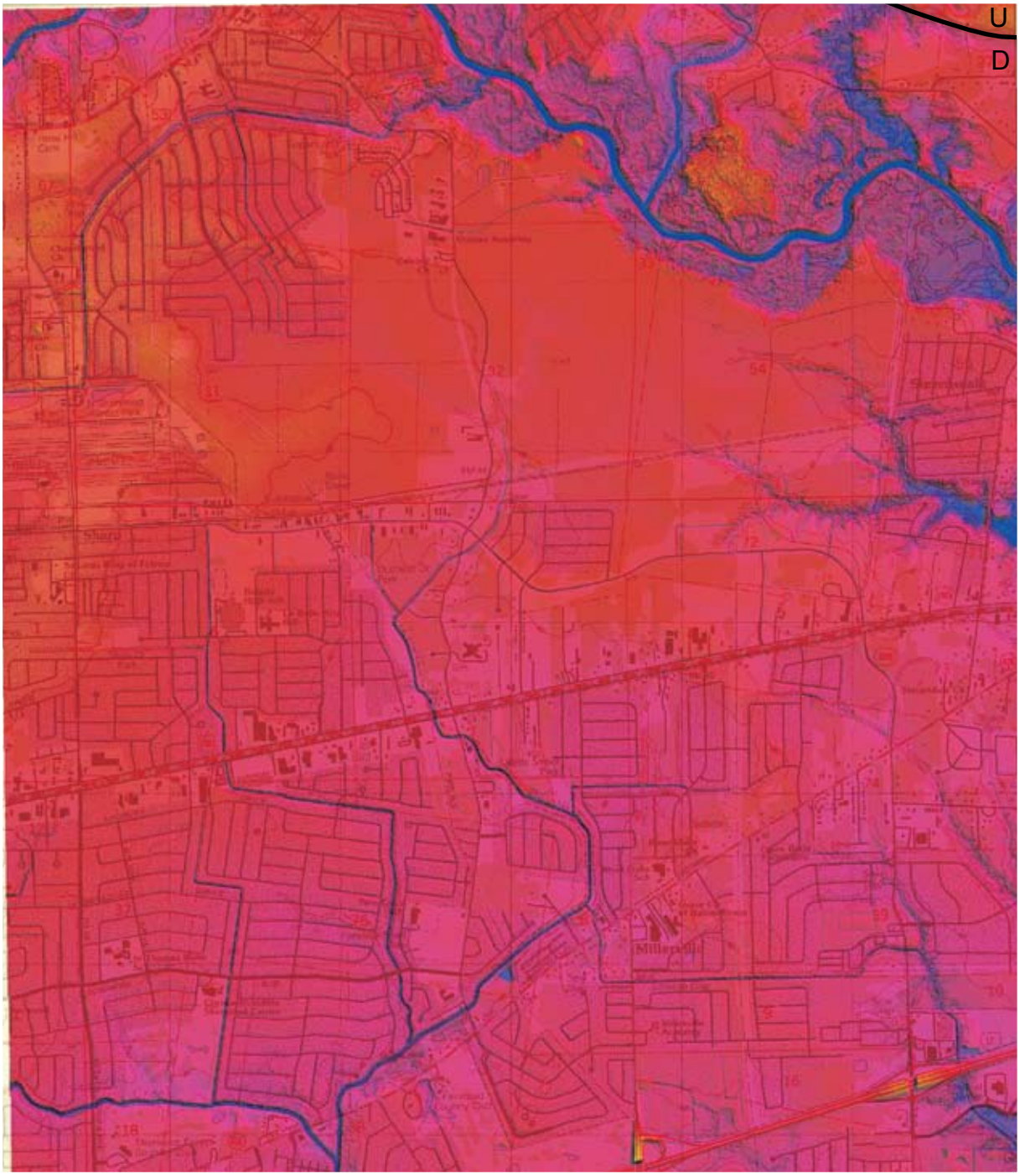


Plate 10a
Baton Rouge East NE
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 10b
Baton Rouge East NE
(LIDAR DEM + DRG)

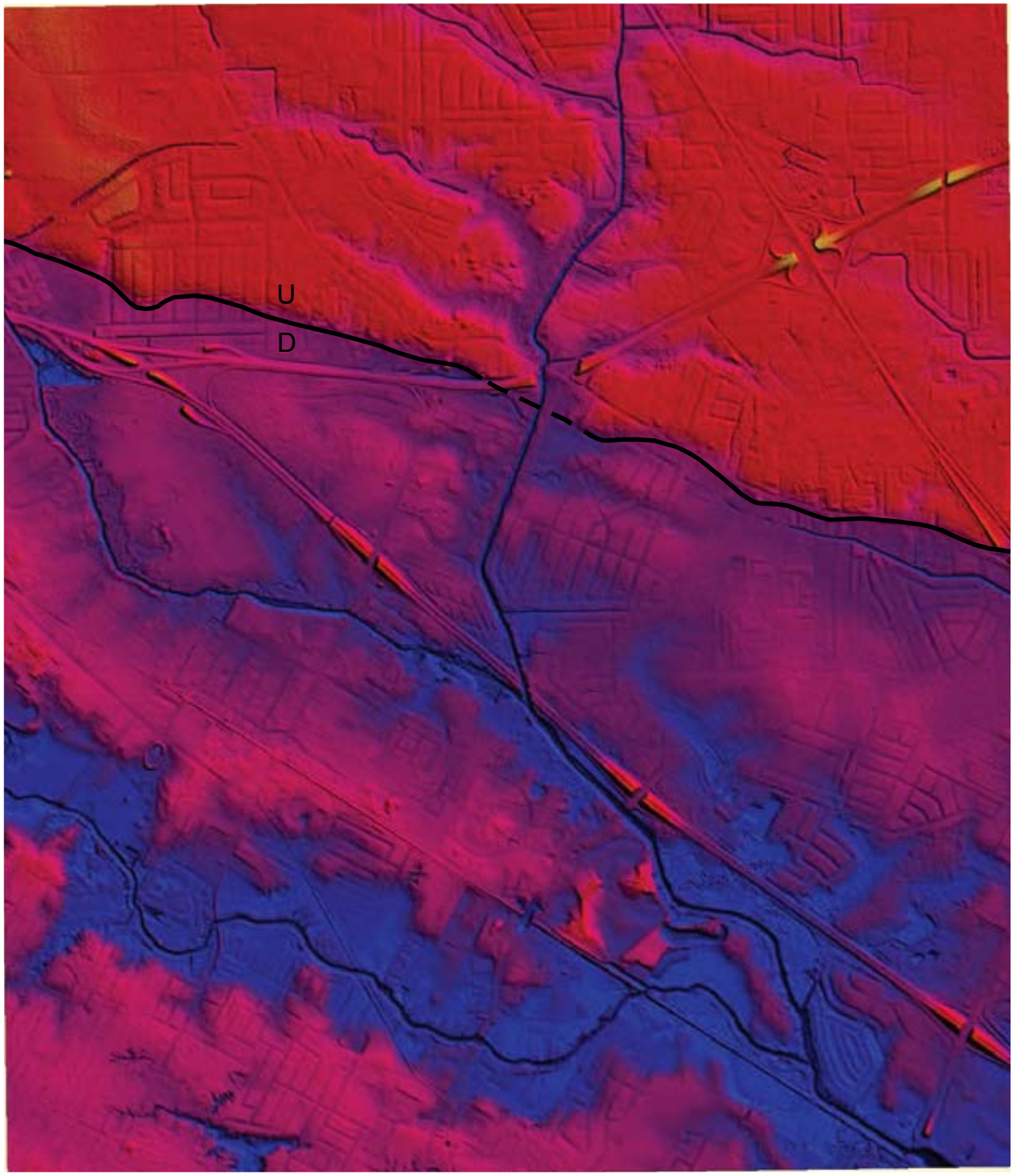
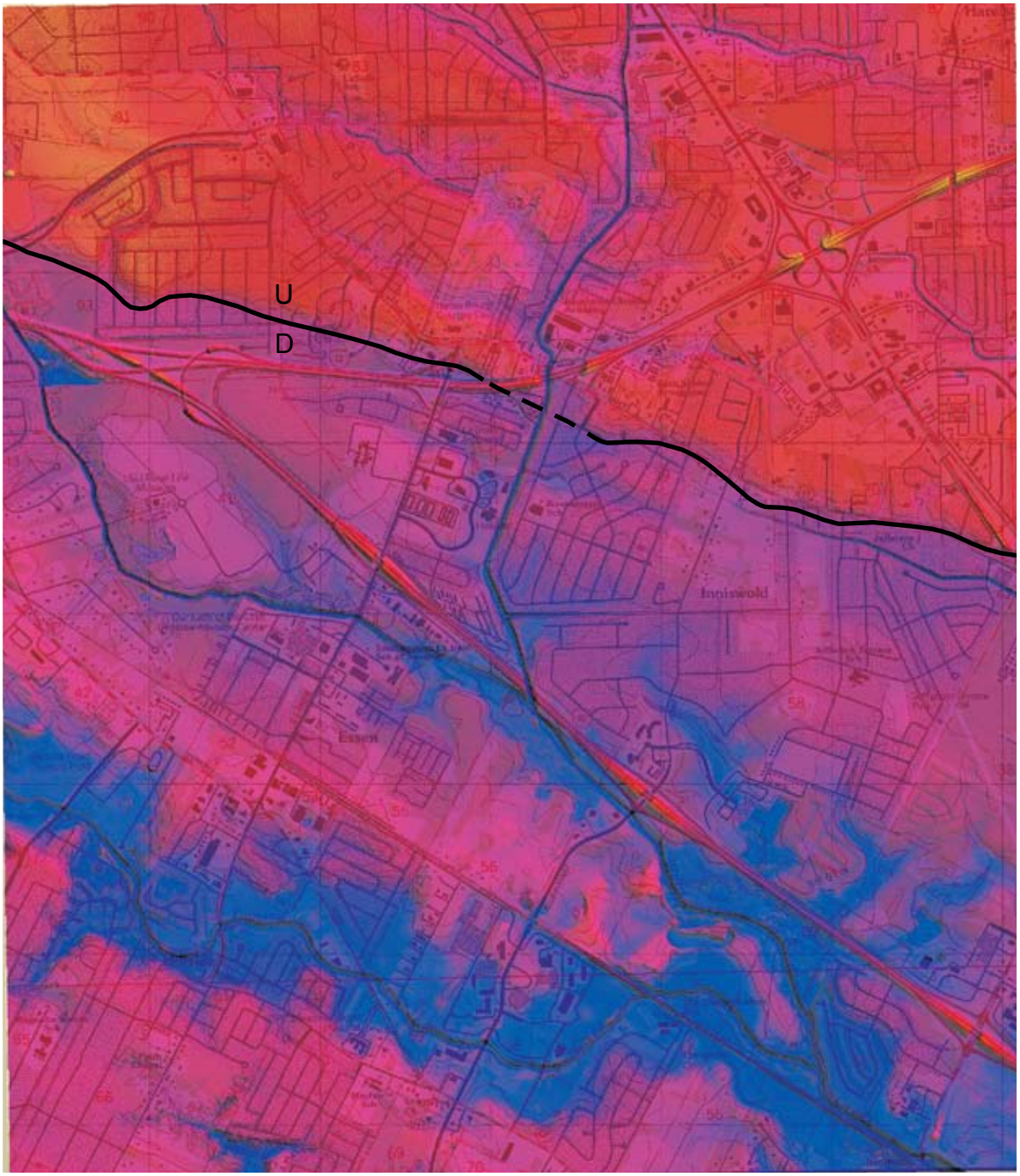


Plate 11a
Baton Rouge East SW
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 11b
Baton Rouge East SW
(LIDAR DEM + DRG)

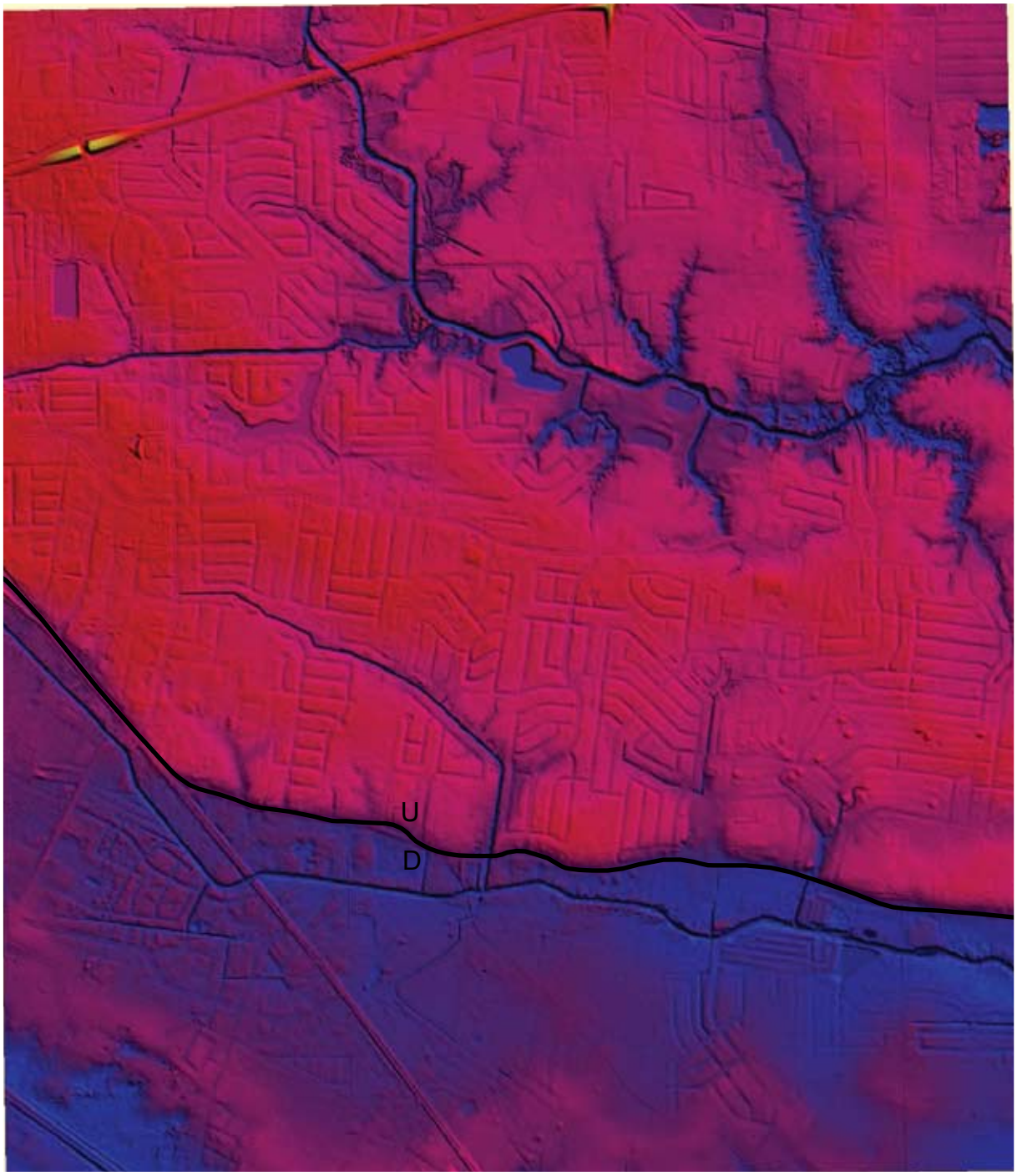
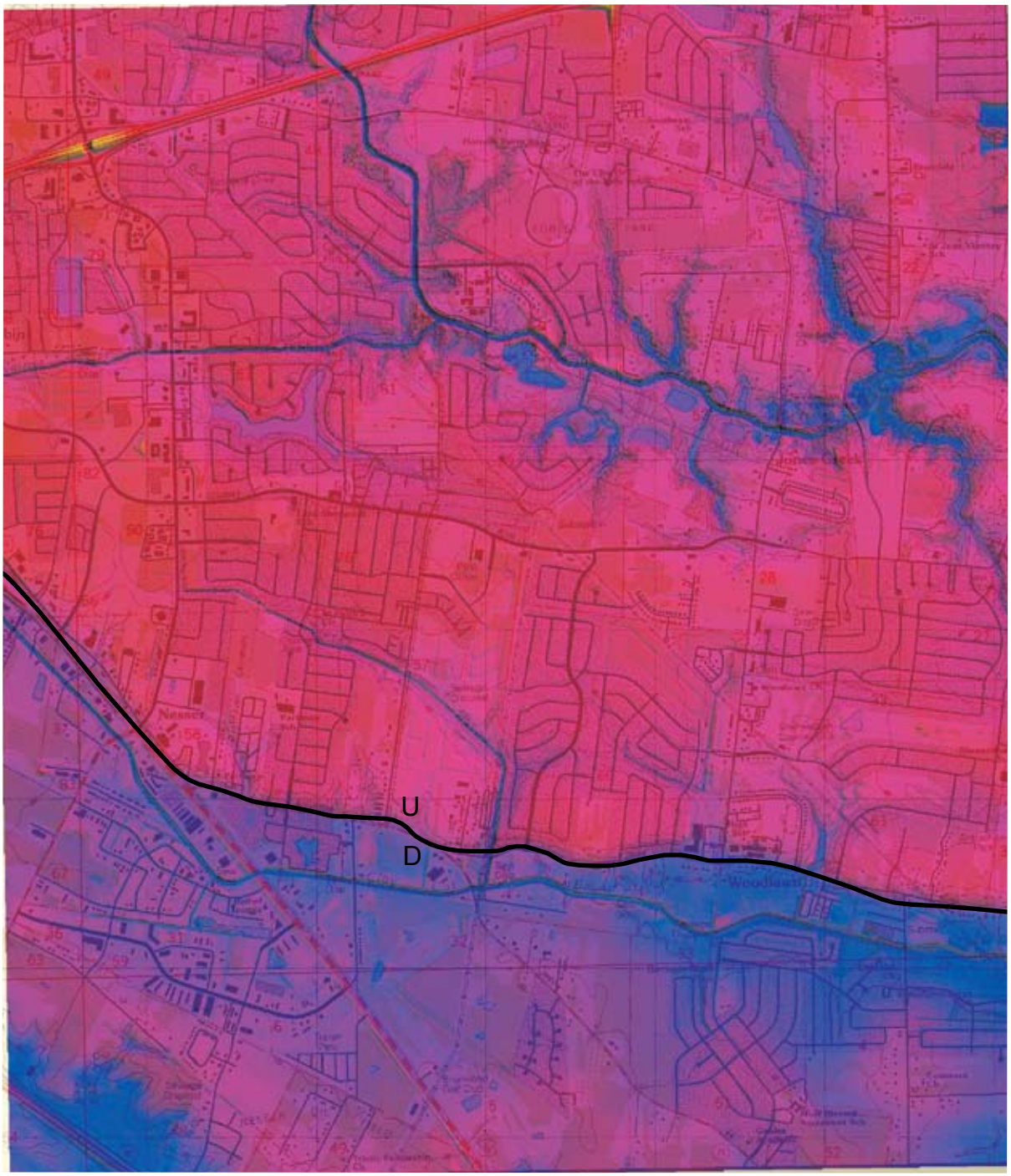


Plate 12a
Baton Rouge East SE
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 12b
Baton Rouge East SE
(LIDAR DEM + DRG)

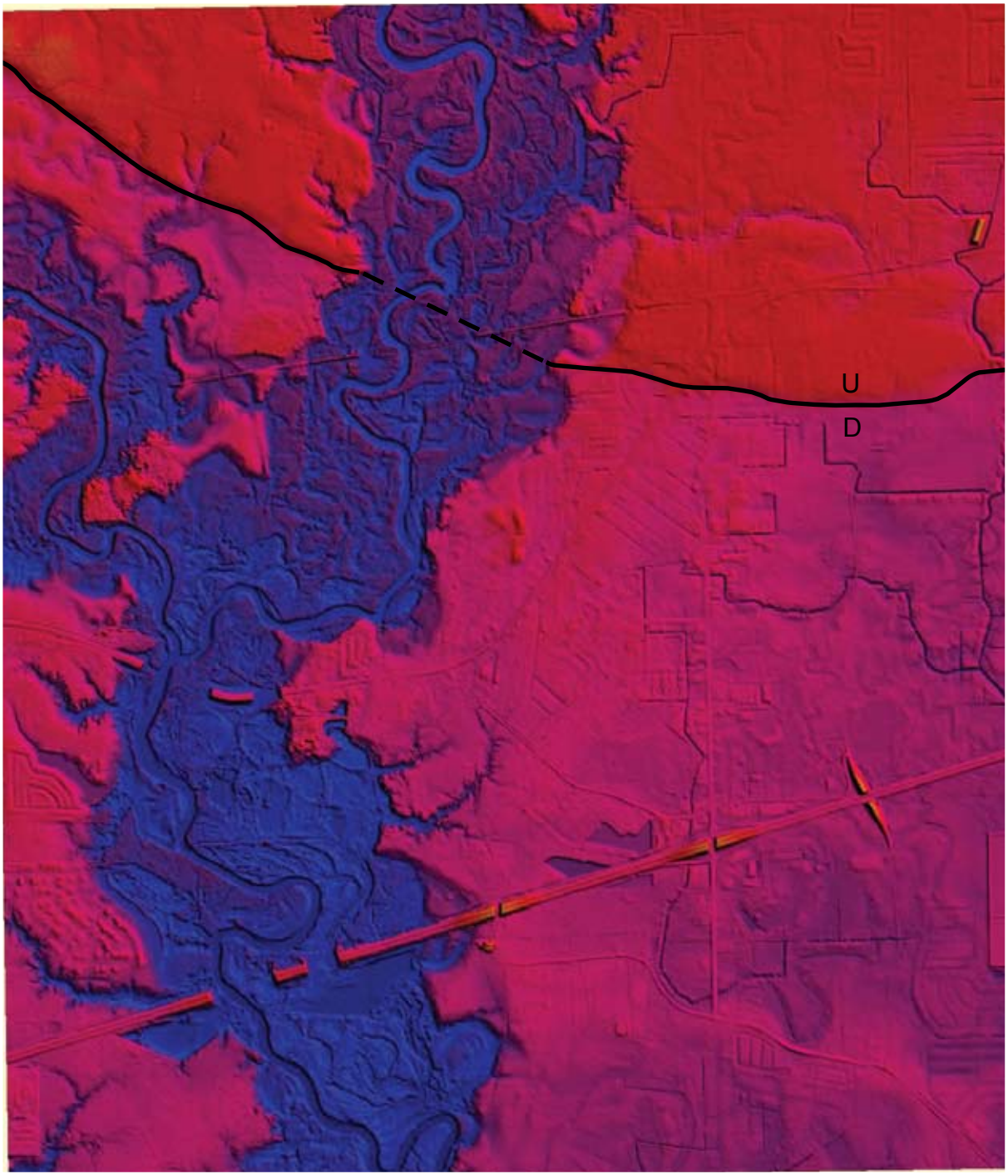
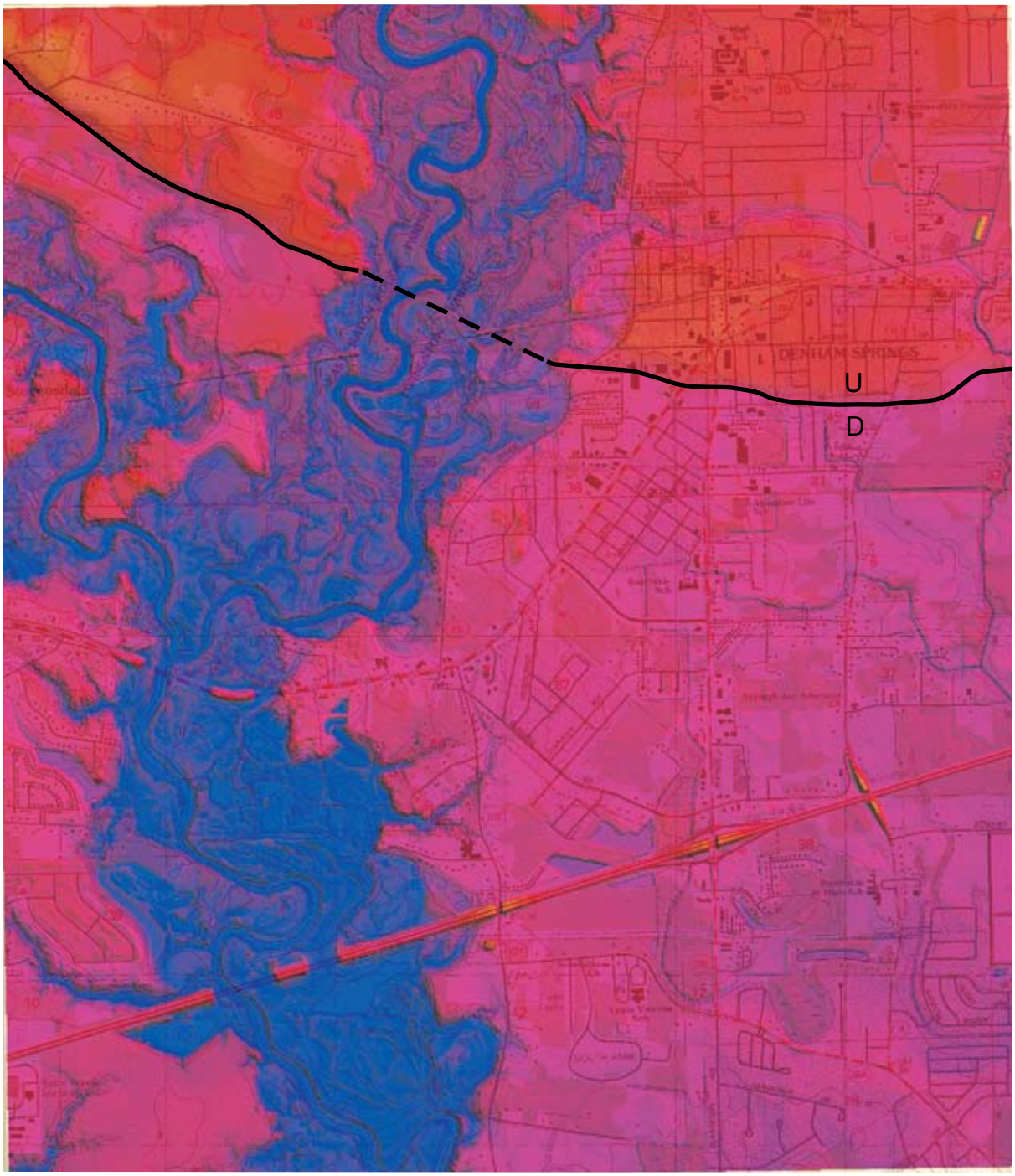


Plate 13a
Denham Springs NW
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 13b
Denham Springs NW
(LIDAR DEM + DRG)

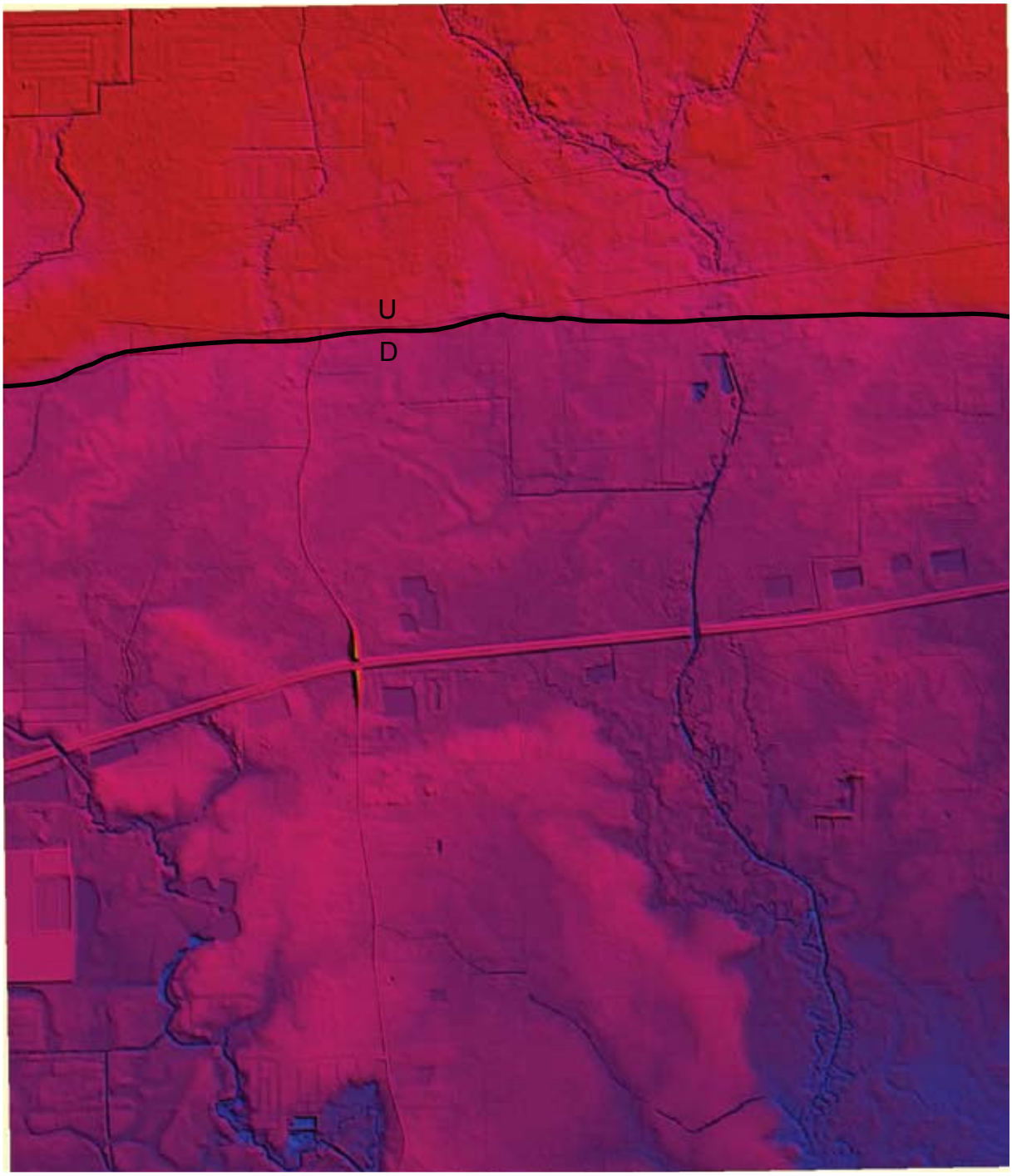


Plate 14a
Denham Springs NE
(LIDAR DEM)

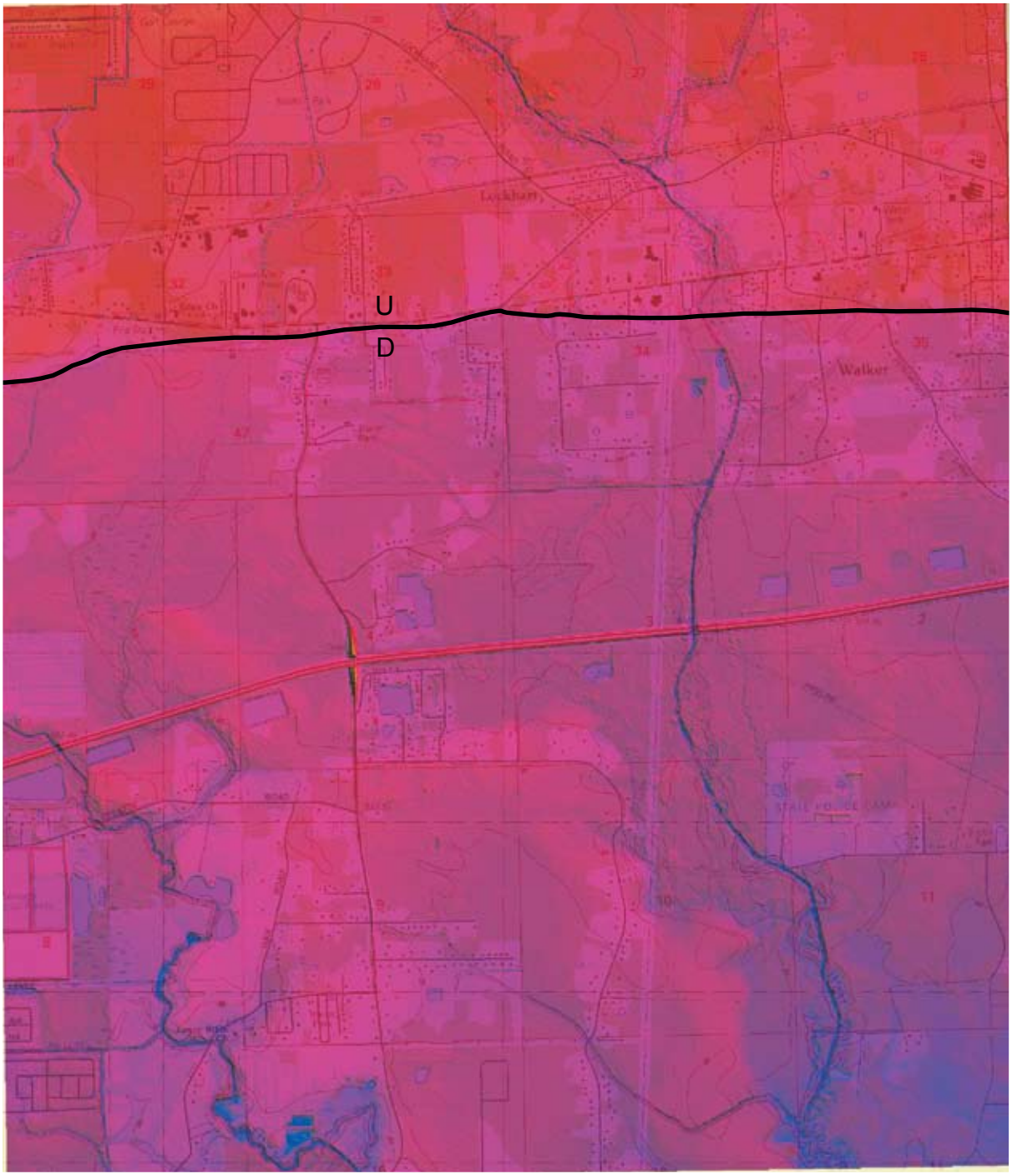


Plate 14b
Denham Springs NE
(LIDAR DEM + DRG)

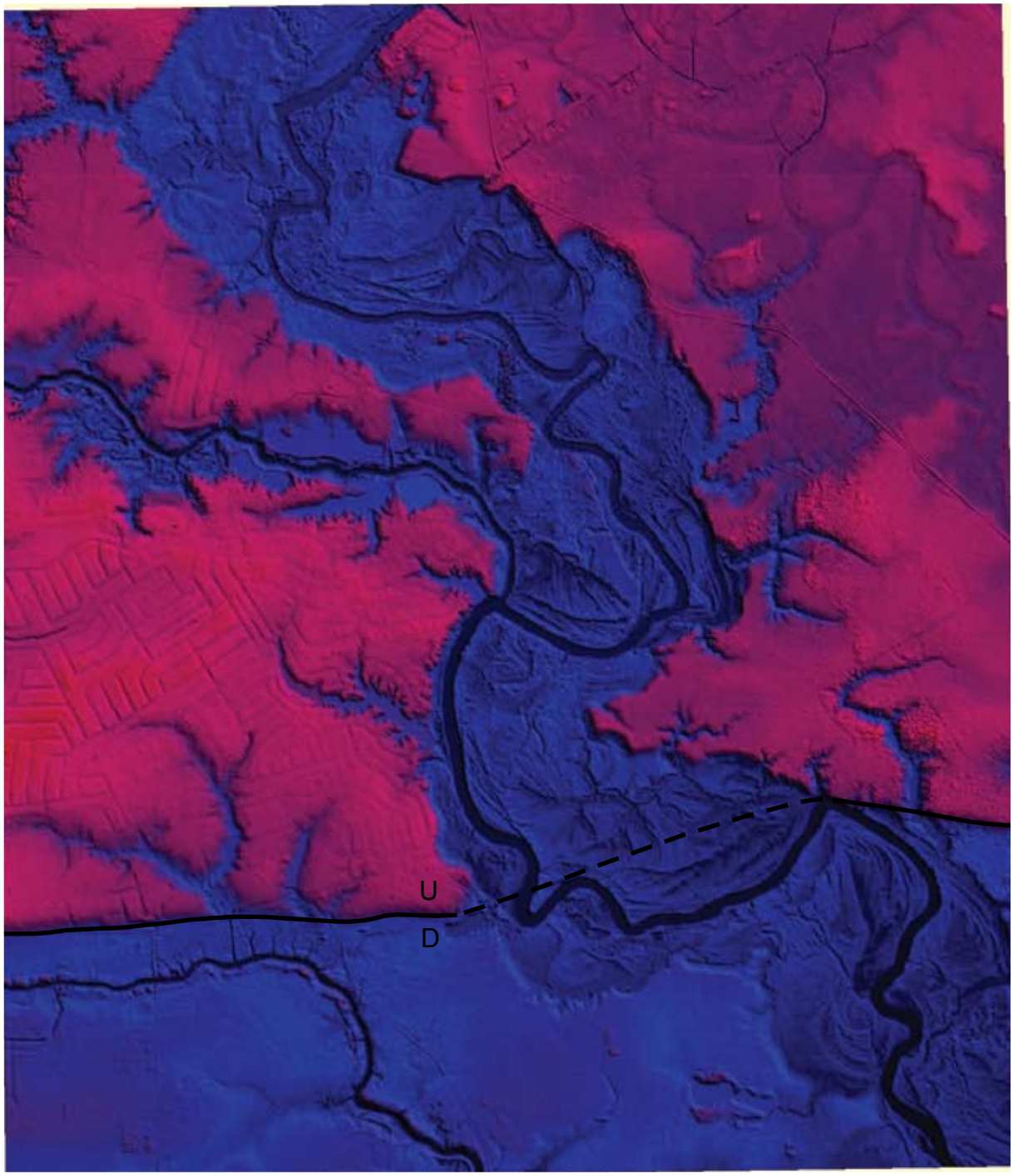
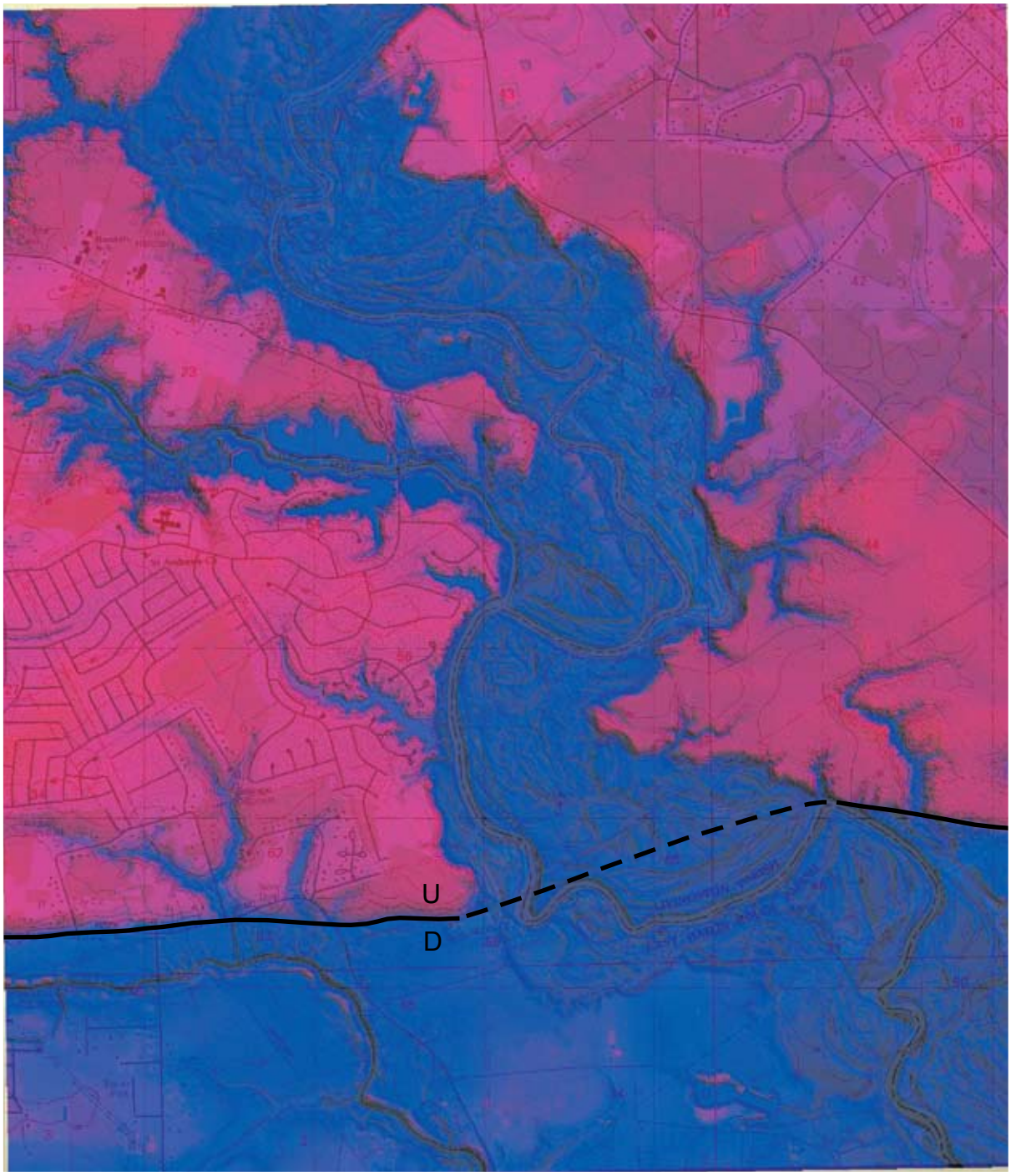


Plate 15a
Denham Springs SW
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 15b
Denham Springs SW
(LIDAR DEM + DRG)

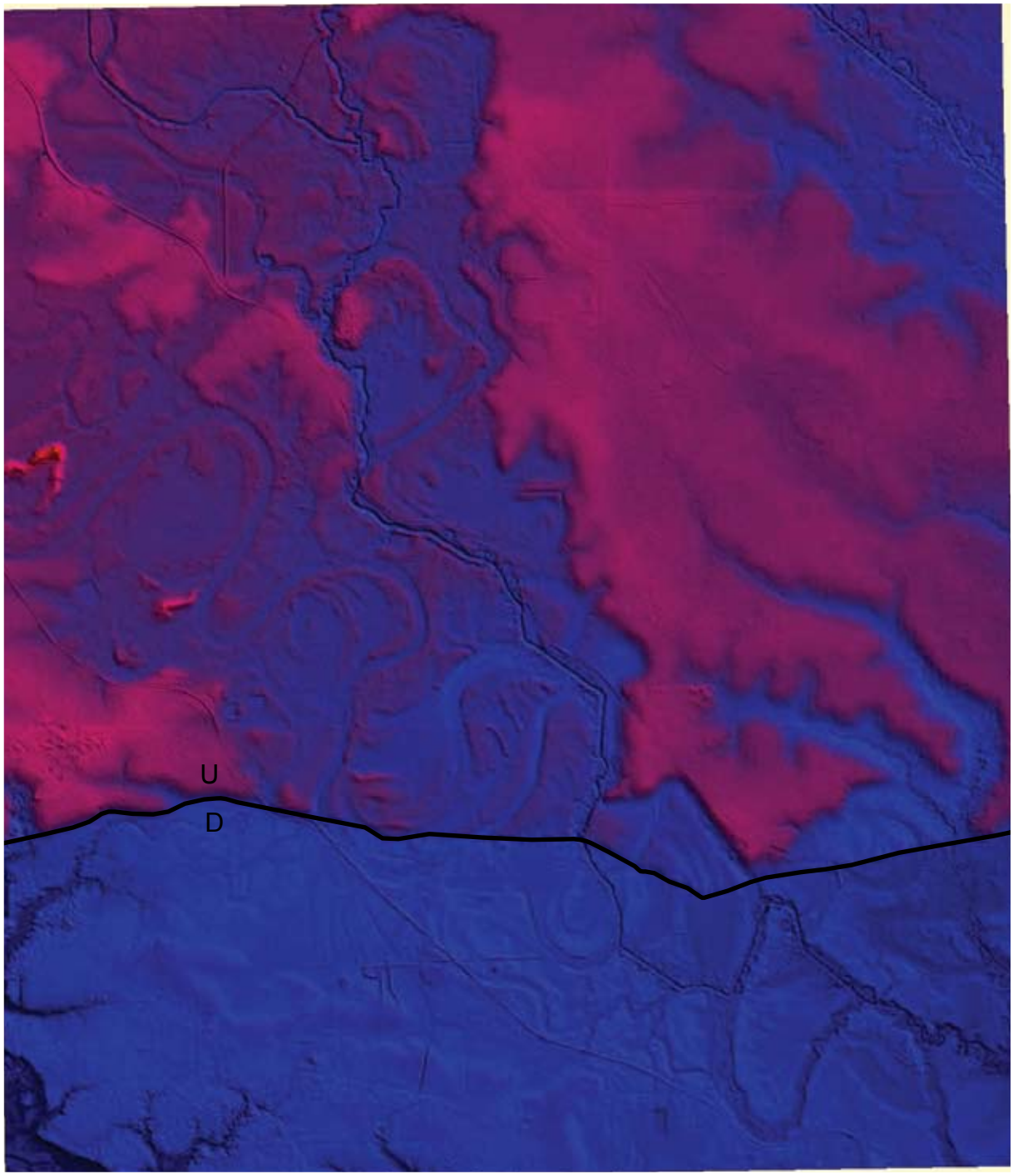
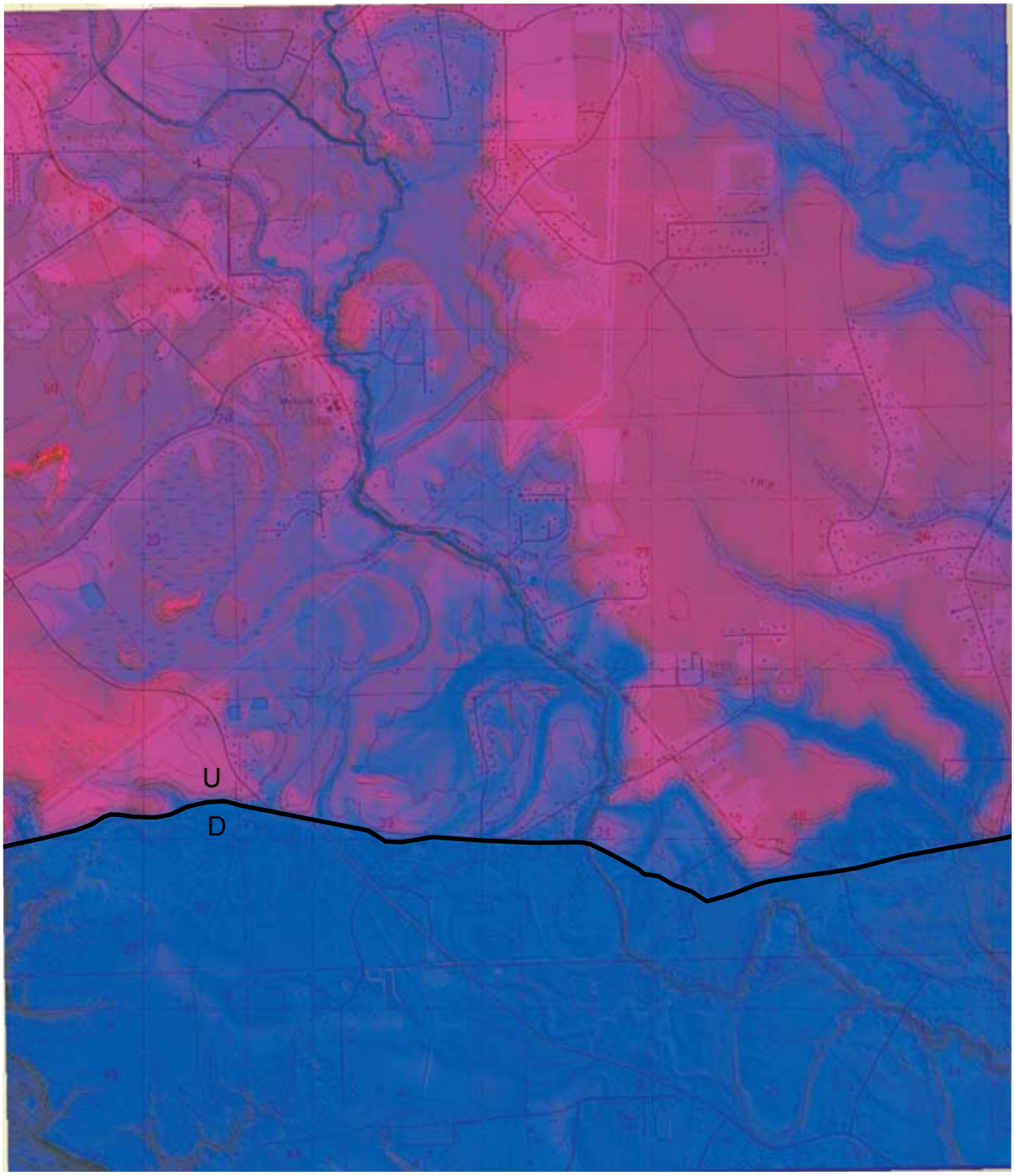


Plate 16a
Denham Springs SE
(LIDAR DEM)



1 .5 0 1 Mile

1 5 0 1 Kilometer

Plate 16b
Denham Springs SE
(LIDAR DEM + DRG)

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