

Remote Sensing at the Randolph County Asylum

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Background: The Randolph County Asylum functioned roughly between 1840 and 2006. The asylum is on record for being the final resting place of some of its residents, but the exact number of individuals buried on the property is unknown. Attempts to establish a Minimum Number of Burials (MNB) are quickly proven impossible by a distinct lack of records. The purpose of this paper is to establish a more accurate MNB of $\sim 444(\pm 12)$, using geospatial and geophysical data, including satellite, historical aerial, LiDAR, DEM models, plat maps, as well as to remember the stories of the people who were laid to rest in the cemetery found through census records, death records, and genealogical data.

LiDAR Elevation Model: LiDAR was applied through the 2017-2020 Indiana LiDAR DEM program, offered by the Department of Environmental Services' "Indiana Map" database. The primary (top) and secondary (bottom) layers were set to 100 and 50% opacity respectively and colored in contrasting scales. Both layers were configured to hill shade functions, the primary layer with base level hill shade functions and a standard deviation set to 8, and the secondary set to an azimuth configuration. Similar approaches have been utilized in the past for identifying burial locations such as these and were referenced. (Downs, C., Rogers, J., Collins, L., & Doering, T., 2020; Lunga, D. et al., 2022).

Data Processing: Establishing an MNB of $\sim 444 (\pm 12)$ revolved around Neff Cemetery. The area of Neff Cemetery with the fence surrounding it contains the recorded burials of 34 individuals. The area of this cemetery was divided by the number of individuals buried there to create a ratio. This ratio was applied to the area directly behind the asylum and estimated ~ 236 internments. Ground penetrating radar provided by the asylum's caretakers from earlier in the year provided a similar number of 247 burials in the area. That places the margin of error at around 12 burials or 5.084%, and a 95% confidence level. With such a high confidence level,

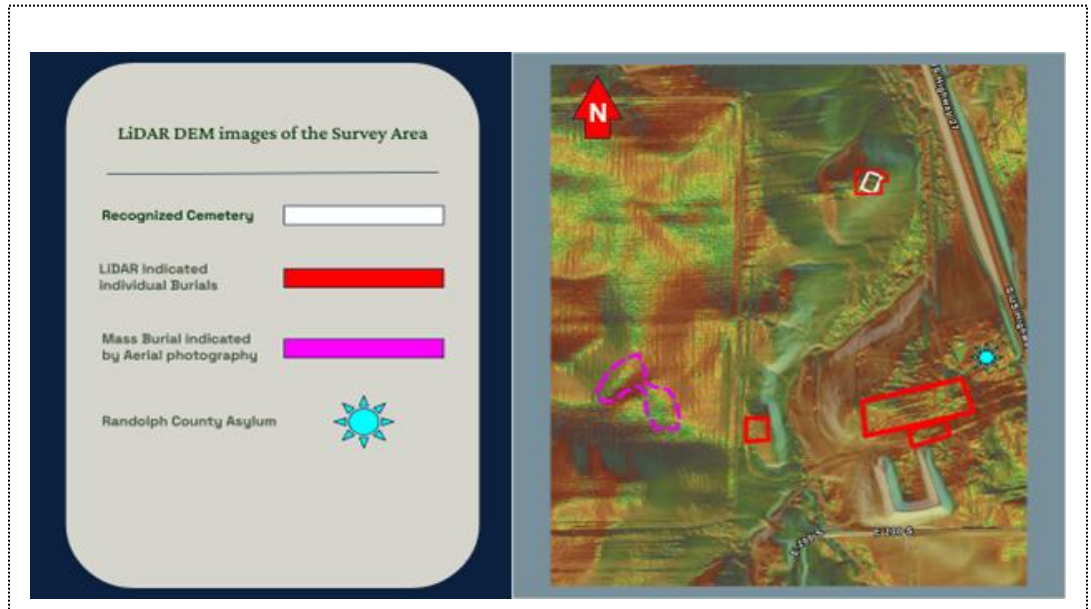


Figure 1. Map and interpretation guide for the Randolph County Asylum LiDAR elevation model.

the same approach was taken with subsequent areas around the asylum, bringing the total estimate to $\sim 444(\pm 12)$. This number does not include the mass burials indicated in pink, which should be investigated independently.

Recommended next steps:

- Perform a non-invasive GPR survey over the suspected burial areas to determine their extent.
- Initiate the process of establishing the burial ground as a cemetery to provide protection under the National Historic Preservation Act (1966).
- Begin the process of placing the property on the National Register of Historic Places.

Further reading:

- Chetverikov, B., Babiy, L., Kuzyk, Z., & Zayats, I. (2022, October). Comparison of 3D models of mass graves created on the basis of aerial survey data in 1944 and 2015. «GeoTerrace-2022» (Vol. 2022, No. 1, pp. 1–5). European Association of Geoscientists & Engineers.
- Downs, C., Rogers, J., Collins, L., & Doering, T. (2020). Integrated approach to investigating historic cemeteries. *Remote Sensing*, 12(17), 2690. <https://doi.org/10.3390/rs12172690>
- Lunga, D., Dhamdhare, R., Walters, S., Bragg, L., Makkar, N., & Urban, M. (2022). Learning to count grave sites for

cemetery observation models with satellite imagery. IEEE Geoscience and Remote Sensing Letters, 19, 1–5.