Architecture and Landscape of a Mined Environment:
Reading the Traces

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ABSTRACT:

This study focuses on the coal company town of Everettville, WV in north-central West Virginia and, at its center, a former mined landscape, Federal No. 3, that is currently being reintegrated into the community as a culture/nature park. The mine began operation in 1921 and a town was established which included hierarchically and racially ordered residences, segregated churches and schools, and a company store. The mine site's significance as a cultural landscape is grounded in an explosion that occurred in the spring of 1927 when 151 miners were killed under suspicious circumstances.

Examining historical maps, photos, and other records of the town and mine site reveals spatial patterns and structures in existence during the area's formative years. Analyzing current conditions through overlay mapping seeks to uncover remnants of the town's form and its current ability to communicate the conditions of the 1920s. LiDAR (Light Detection and Ranging) was used to document current conditions of the mine site: topography, vegetation, spatial organization and architectural forms as a framework for mapping and measuring cultural landscape characteristics and to guide the development of context sensitive interpretive designs.

Overlay mapping depicts substantial landscape change especially related to the development of mine-related infrastructure. While the number of buildings in the town remained relatively constant, new spatial organization was seen especially with evolving infrastructure. The collected point cloud data at the mine site reveals much of the original spatial organization which will guide park development including rail beds and a bench road on which original structures were sited. The point cloud did not however reveal those structures, likely because of re-grading of the site during reclamation and colluvial erosion over time. As the park evolves further documentation will continue to create a four-dimensional model as longitudinal studies examine change over time in landscape forms, patterns and processes.

CONFERENCE THEME: Digital Approaches to the Real World
KEYWORDS: LiDAR, Cultural Landscape Analysis, Interpretive Design, Industrial Landscapes

CONTEXT: SOCIAL, CULTURAL, ENVIRONMENTAL

In cultural landscape analysis and planning, researchers seek to recognize the genesis of places through the lens of human land development over time. While landscapes can be read as text they are also referred to as palimpsests, or multiple texts partially erased written in layers over time. Continuing the metaphor of text, design is often considered 'writing' on the landscape. Cultural landscapes reflect the integration of human developments with the natural environment. They may be interpreted as expressing a particular culture's values, economic conditions, social structure, crafts and traditions.

> A cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area is the medium. The cultural landscape the result.
> (Sauer 1963, 343)

This study focuses on the coal company town of Everettville a small unincorporated hamlet in north-central West Virginia and, at its center, a twenty-five acre mined landscape, Federal No. 3, that is currently being reintegrated into the community as a culture/nature park. Land for the park was donated by Consol Energy to the Everettville Historical Association (EHA) with the goals of creating a place that tells the multi-layered stories of the community and the mine; and creating partnerships, particularly with West Virginia University (WVU), through educational programs.

The Federal No. 3 mine site is found within the Fairmont Field of the Pittsburgh coal seam, an extraordinarily rich mineral deposit in the Allegheny Plateau physiographic region, a prehistoric carbon rich swampland. Three hundred million years of fluvial erosion cut deep, steep valleys in the plateau revealing the layers of coal. Subsistent settlers mined individually in the 18th century and word spread to corporate interests causing massive development and immigration in the late 19th and early 20th century. The mine is one of hundreds of underground mines with miles of tunnels established in Monongalia County during the period and reflects many typical characteristics of company-owned mines within the region.

The mine site's local, regional and potential national significance as a cultural landscape is grounded in an explosion that occurred in the spring of 1927 when 151 miners were killed during a labor dispute. A spark from an electric locomotive ignited methane gas causing a ball of fire to move through the mine and out at the tipple portal destroying much of the enormous structure. Occurring relatively early in the time of the Northern Mine War (1924-1933) the cause of the explosion was attributed, by divergent parties, to scab workers' mistakes, the union workers sabotage tactics (union barracks were sited across Indian Creek from the mine site), an act of God punishing the scab miners; and the faults of managers not providing enough rock dust to mitigate methane gas accumulation in the tunnels (as was determined by the mine's superintendent). In reference to the tensions in the area this quote from Howard B. Lee, then the Attorney General of West Virginia, spoken after visiting the explosion site in May 1927, describes the rancorous social environment:

> It was there that I saw exhibited that snarling animal hatred felt by members of the miners' union for nonunion miners…Apparently, these former workers believed that the explosion was a form of divine punishment meted out to the scab miners who had taken their jobs. And, with a heartlessness akin to savagery, they and their wives would pass nearby and curse and jeer the grief-stricken women and children as they hopefully waited; nor did the death announcement calm their fury or abate their hatred. As bodies were brought to the surface, they sang ribald songs, and frequently used such vile utterances as 'There's another goddamned strikebreakin' scab son-of-a-bitch gone straight to hell'. (Lamarre 1994)

The narratives for interpretation in the site design for the culture park include the social context of Everettville; the establishment and spatial organization of Everettville as an example of a company town; the formal layout of the industrial workings of the mine; and the labor relations that may or may not have been at the heart of the disaster. Historic documents have been accessed to determine the cultural landscape characteristics of the town and mine site and a methodology developed to better understand the town and site's ability to express the narratives.

1.1 TOWN FORM AND CHANGE OVER TIME

Between 1880 and 1930, industrialists transformed West Virginia from a predominately individualistic agrarian mountaineer society, in which centralized towns were not necessary, to an industrial society reshaping its social and cultural landscape. Many company towns were developed haphazardly with the buildings occupying lowlands in hollows along rivers and streams. The pattern of development followed linearly the water course and was limited by very steep topography with most development along floodplain terraces as is the case in Everettville, along Indian Creek a tributary of the Monongahela River. The railroad and road following the river further reinforced the linear character of the town. Towns were racially and economically segregated and a hierarchy was established with the workers occupying low ground in the dust and wetness and noise of the machines and the managers' homes built high above out of the melee.

The company towns were isolated physically because of the locations of the coalfields they sought, so the company provided housing, stores, churches and schools to the workers. (Walker and Cobb, 2008) Company towns were subject to the boom and bust cycle of the coal and timber industries. Because of the economic cycles of the industry the towns were necessarily transient and were considered temporary to developers. Many of the company towns today suffer from neglect and dereliction and may soon be erased from the cultural landscape. These remnants speak to the lowly conditions of the miners and the strict social hierarchy enforced in company towns.

Everettville's basic layout included churches, schools, and a company store. There were separate churches and schools for the purposes of racial segregation, but only one company store. Pick Handle Hill where the Friendship Baptist Church is today was the 'old black section,' with their church dual purposed as the school (Armstead 2001). The housing for the miners was located across Indian Creek adjacent to the tipple. When the mine first went into operation one-story barracks was established until the company grew assured of their investment and more substantial buildings were constructed. The housing for the white mine workers was primarily located at the base of the slope across the creek. Between 1920 and 1927, more than 200 housing units were built as the community of workers increased in number (New England Fuel and Transportation Company, 1927). Many of the homes and other buildings remain from the original construction, and the overall town form, limited by topography, is still intact.

Historical documents accessed for study of the town of Everettville include aerial photos, USGS topographic maps, and photographs; as well as reclamation documents that reveal site conditions post-abandonment; and pre- and post-reclamation. This analysis sets a base line for current studies of the company town. Comparative analysis of aerial photos and maps sought to distinguish between contemporary spatial organization and the period around the time of the explosion. USGS maps from 1925 were digitized and used to document locations of structures, roads, and natural features. The digitized maps were then compared to USGS maps that were created using high resolution digital aerial photos from 2002 in order to determine change over time and the integrity of the town's form. Aerial LiDAR data will further determine integrity of the town's spatial organization.

Change observed from 1925 to 2002 was quite dramatic. The number of structures in 1925 (95) is similar to the number of structures in 2002 (99), however, many of the 1925 structures had been removed with new structures added. Road alignments also shifted with additions to highway infrastructure over time. The Indian Creek and Northern Railroad connecting Federal No.3 to the Monongahela Railroad and points north was abandoned. New roadway alignments took the place of the abandoned Indian Creek and Northern routes and included traveled way widening and sub base reconstruction. With this abandonment and transition to a new roadway many of the structures and buildings associated with the railroad were removed. A new area for collecting mine drainage was also added post 1925 as an embayment, dramatically shifting the course of Indian Creek as it entered the Monongahela River. In residential areas some new subdivisions were added as extensions to the existing roadways.

Figure 1: This image shows the structures (white) mapped in the 1924 USGS map and those extant in 2002 (black). Many contemporary structures relate to 1924 locations though they are shifted because of inaccuracies in the 1924 survey.

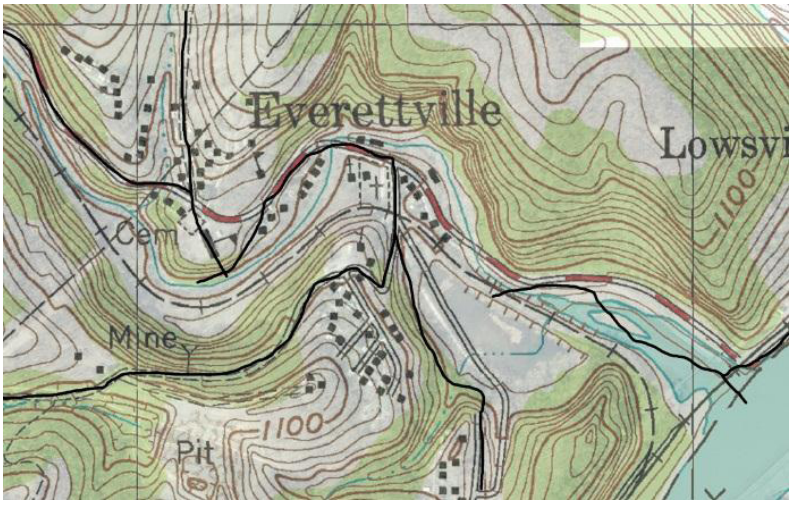

Figure 2: The black line is the 1924 roads layer. Shifts in infrastructure in Everettville occurred after 1924 with expanded development of mining along Indian Creek.

1.2 MINE SITE SPATIAL ANALYSIS AND CHANGE OVER TIME

The area now known as Everettville Miners Memorial Park was once designated as the Everettville Refuse and Portals (WVDEP) and was previously known as the Federal No. 3 Mine, a facility originally owned and operated by the New England Fuel and Transportation Company (NEFTCo). The Everettville mine began operation in 1919. During the functioning of the mining operations the entire twenty-five acres was transformed purely for industrial uses. It is known from historic photographs that the spatial organization of the district consisted of typical mining constructions: rail line and tipple as transportation infrastructure, a hydrologic installation accessing a nearby stream, company offices and housing. While many of these elements of the district have been substantially erased over time, some are still legible and may guide future site interventions. Other evidence suggests that the footings of the tipple structure are extant below ground and could provide an important interpretive opportunity.

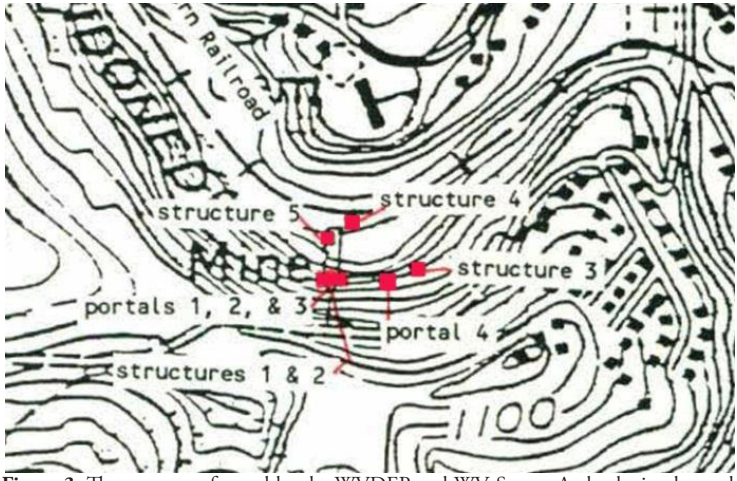

Figure 3: The survey performed by the WVDEP and WV Survey Archeologist shows the locations of mine related structures on the mine site as observed in 1994.

Figure 4: A panoramic photograph of the mine site taken December 31st 2010 showing the LiDAR unit and existing site conditions.

Descriptive data was collected from aerial photographs, site plans and maps (USGS Rivesville Quad), oral histories and historic photographs from the time of the mine's operation from. The pre-reclamation report (WVDEP) guided the search for specific forms in the landscape. Forms that were identified in a survey by a WV Survey Archeologist (Lamarre) in 1994 are described in the environmental review documents pre-reclamation. Lamarre describes the scene approximately forty three years after mining was stopped in 1951.

> This area is in ruins; briars and secondary growth forest have overrun the decaying facilities, and all of the remaining structures are in some state of collapse. The Indian Creek and Northern Railroad grade is still intact, but the track has been removed, and ties are scattered everywhere…and, of course, the original wood tipple, which was at least partially destroyed in the 1927 explosion, no longer exists. Of the five structures identified during the field visit, only two appear to date from the original operation. Structure 1. The remains of a cut stone foundation, believed to be a part of the original facilities, are located just outside and to the east of portal 1. The stones are covered with a thick layer of colluvial soil deposits, moss and other vegetation, and appear to abut the original mine face-up. It is possible that this foundation contained the fan house, and that, through portal 1, provided ventilation for the mine. Structure 2. A second foundation is situated between portals 2 and 3. This one is constructed of glazed clay hollow tiles, and like the first foundation, seems to adjoin the original mine face-up. It is also believed to date to the years of NEFTCo's operation, and may be the site of the original lamp house. (Lamarre 1994)

A bench approximately sixty feet above the road running east to west from Friendship Baptist Church along the south ridge of the site ordered the original structures and portals mentioned in the archeologist's report. Walking today the road is legible though landslides and dumping from Pickhandle Road have covered much of the alignment. A large slide nearing the portals has decimated the roadway. None of the footings are visible though the portals are clearly distinguished. One of the portals' facades, Portal #3, still bears the inscription 'Federal No. 3 Mine'. In descriptions of the 1927 explosion, the blast was reported as coming from the middle portal, number 2.

LiDAR (Light Detection and Ranging) technology was applied to the documentation of topography, vegetation, social usage patterns and architectural forms as a framework for mapping and measuring cultural landscape characteristics of the mine site and to guide the development of context sensitive interpretive design proposals. The LiDAR unit uses laser pulses and time of flight of the laser to create a highly accurate digital three-dimensional model of the scanned space. The resulting point cloud may then be geo-referenced and used in landscape analysis. Additionally, the point cloud may be photo-realistically rendered in order to provide an environment for design visualization.

Data was collected in early winter in a leaf-off vegetation condition. Snow was minimal and many of the grasses were prostrate. Because the instrument used is ground-based obstructions to the documentation of landform by vegetation were avoided to the extent possible. With the accuracy of the three-dimensional model the discovery and revelation of former structures and spatial patterns within the study area became possible (Gleason 2010 and Harmon, et al 2006). The model

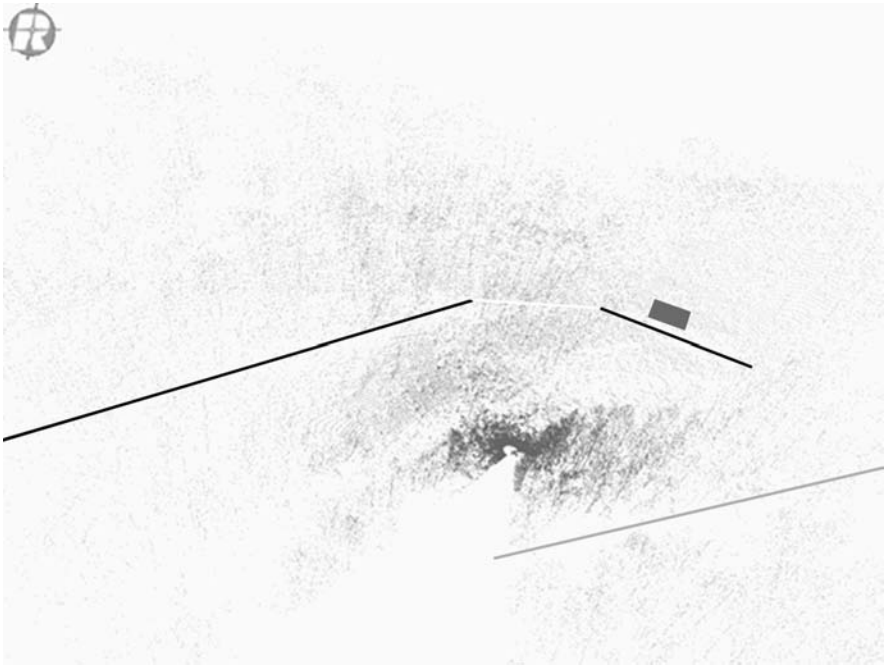

Figure 5: Point cloud image of Everettville mine site. The bench road on which mine structures were formerly sited is marked by a black line. The area marked by a white line is where colluvial erosion has covered the bench road. The gray line shows the rail bed of the Indian Creek and Northern Railroad. The gray square depicts the location of Portal #3. The circle at the center of the image is the location of the LiDAR instrument.

allowed for automatic analysis of collected point cloud data. The identification and documentation of structures was partially achieved through programmed recognition of line, pattern and form. Automatic analysis using processing software (Riegl RiProfile v1.5.5) revealed patterns within the landform that could not be read with the naked eye during site visits. Identification of slope break lines, subtle shifts in topography and colluvial erosion, vegetative anomalies, and former building site footings and walls within a contoured landscape became visible and interpreted through trained eye analysis. Point cloud data was analyzed with different view types: amplitude (linear scaled and histogram), reflectance (linear scaled), false color (range, height, and plane), true color (linear scaled and logarithmic scaled), and single color. The view parameters assisted in distinguishing spatial relationships in the point cloud and allowed for the discrimination of different forms.

1.3 CULTURAL LANDSCAPE ANALYSIS AND PLANNING

Spatial Organization and Land Patterns: The alignment of Indian Creek created the overall spatial organization of Everettville and the mine site. Many of the structures that lined the creek during the heaviest industrial use periods are now gone and have been replaced primarily with prebuild homes. The constraints of surrounding topography restrict development within the former spatial pattern. This will remain constant over time. Mining operations followed the flow of Indian Creek on a west to east tangent. The landform created by the flow of the river follows directionally sweeping towards the Monongahela River. The mine site in particular still maintains gross spatial organization from the 1920s. The main rail bed of the Indian Creek and Northern Railroad is still legible, as well as the spur that led to the Federal No. 3 tipple. The bench road is still partially traversable, though sections have been obliterated over time.

The mine site's topography was impacted by the reclamation process in the 1990s. The removal of debris and shifting of gob piles obliterated much of the cultural forms built into the operations of the site. The re-grading of the site did not change the major topographic components: the rail beds and bench road. Hundreds of yards of soil were laid over the mine waste to encourage the growth of seeded grasses. Contemporary illicit dumping on the site pre and post-reclamation has left new topographic forms within the boundaries of the site.

As was common practice in the early 20th century, the site of the mine was clear cut of vegetation. Only one remnant tree that may date back to the time of the mining operations remains on the site. A single massive Sycamore (Platanus occidentalis) stands opposite the mine Portal #3 as a witness to the years of industrial development and the explosion of April 30, 1927. Its exact location was recorded with the LiDAR data and will be a component of the interpretation of the site.

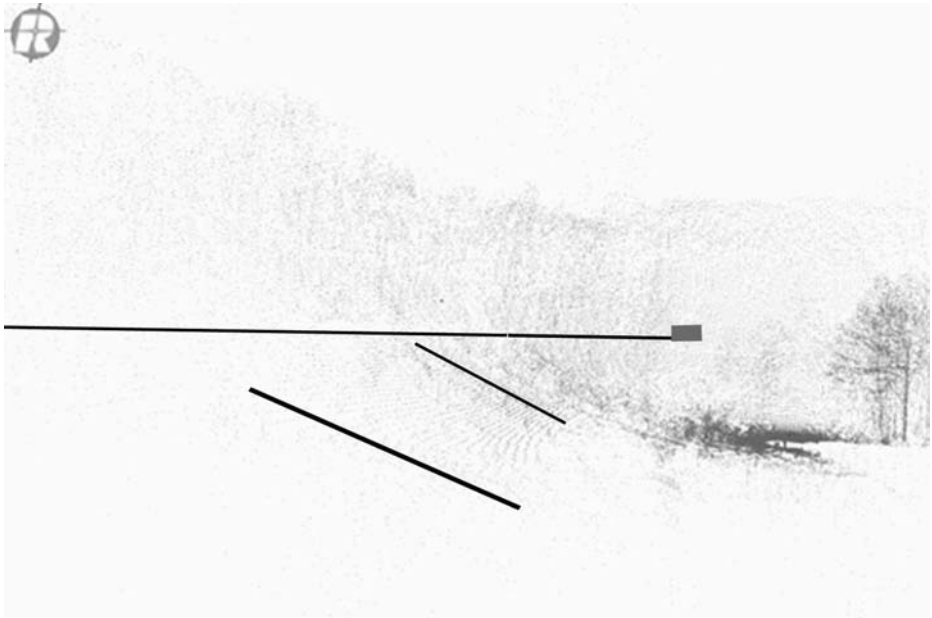

Figure 6: Point cloud image showing drainage swales (diagonals) and bench road (horizontal) with Portal #3 as viewed from the east.

The circulation patterns of the railroad, bench road, and the access bridge crossing Indian Creek with remnant cut limestone footings are suitable for interpretation and will become components of future pedestrian circulation routes. The theme of 'paths to work' has been determined to be a guiding concept in the culture/nature park development. The circulation patterns are also ingrained with the racial segregation narrative of site interpretation. Connecting a trail along the rail corridor to the Monongahela River along the embayment drainage pond is also a key component to the future park.

While there are no standing structures on the site their locations will be determined. With the uncovering of foundations, the identification of the tipple footings and the facades remaining at the portals, structural elements will be a component of future plans. The concise alignment of the tipple will guide development as well as it creates a strong connection between the slope of the valley wall and the creek. A remnant tipple footing has been found on the site and will be used for interpretation. Walls of the original structures when uncovered will become mnemonic devices along the bench road path. And as site surveying continues in the coming years uncovered objects will be collected for interpretation.

CONCLUSIONS

The cultural landscape analysis of the town of Everettville shows extensive change in the spatial organization and structure layout over time. The change seen after 1924 with the development of the mine and subsequent water, road and rail infrastructure may be suitable for interpretation though further research is needed. The analysis of existing conditions at the mine site reveals much of the former spatial organization especially in regards to the bench road and the rail beds. These patterns, though degraded, are legible and would be suitable for a newly introduced spatial organization in the development of a culture park. The use of the LiDAR data in documenting and analyzing existing conditions reveals the former patterns and further excavations or explorations may disclose building locations along the bench road, specifically the lamp house and vent house, though they were not observed in the point cloud. With an uncovering of the slumped area of the bench road these forms would likely be exposed.

Programmatically, the community of Everettville, with a lack of a community core public space for recreation as a result of the 'company town' development, is in the process of planning and constructing a community focused memorial park on the historic site. While many of the elements of the district have been substantially erased over time, some are still legible and will guide future site interventions. The rehabilitation, or supporting of new uses, and interpretation of the significant elements of the site create challenges in envisioning its future development.

As the culture/nature park is developed the three-dimensional digital model will become four-dimensional as longitudinal studies examine change over time (Burnett 2003) in landscape forms, patterns and processes. Restoration of ecological communities, mitigation of acid mine drainage, and physical responses to periodic flooding will be observed to track the evolution of the relationship between extant and introduced natural and cultural systems in the development in the park. As the park becomes integrated with the community, programmatic interrelationships between pre-development subversive site uses and post-park establishment activities may be measured as site/community interaction (Ward Thompson, Aspinall and Bell 2010) and response to landscape interventions.

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