COAL AND COAL MINING AT FUNDAMENTAL DATA'S PROPOSED RIDGELINE DEVELOPMENT PROJECT

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EXECUTIVE SUMMARY

The proposed Fundamental Data Ridgeline Development Project is a roughly 315-acre plot ("Project Area") located on a ridge between Pendleton and Beaver creeks about 1.2 miles north of Davis, West Virginia. Two coal beds, the Bakerstown and the underlying Upper Freeport have been mined in surface and underground mines in the area. Both beds are present beneath the Project Area, as determined by using publicly available information.

Whereas the Upper Freeport coal was not mined beneath the Project Area, the Bakerstown coal was mined from the Davis Coal and Coke Mine No. 23, which closed in about 1949. The publicly available mine map is undated, so the final areal extent of mining and amount of coal removed is uncertain.

The principal hazard of building infrastructure over old mine works is subsidence: surface instability due to collapse of coal pillars and overburden. Thomas, which is about 2.2 miles from the Project Area, has at least 20 subsidence sites that are documented in the inventory maintained by the Office of Abandoned Mine Lands and Reclamation. In June 2026, a portion of Brown Street previously damaged by mine subsidence collapsed again. No subsidence events or features are publicly documented within the Project Area, but overburden depths calculated for selected sites within the Project Area vary from 15 to 175 feet, very similar values to the subsidence sites in Thomas.

The proposal for constructing three, large diesel fuel storage tanks above the abandoned mine on potentially unstable surfaces is of particular concern. The underground mine works beneath the Project Area are likely relatively dry, drained by the surrounding surface mining. Some of the precipitation that infiltrates into them may flow downdip beyond the surface mined areas, accumulate there, seep into underlying rocks, or flow to lower elevation areas of the mine. Fuel spills or leaks, either accidental or subsidence-induced, could enter the mine works and travel through the interconnected tunnels and rooms away from the Project Area, potentially polluting surface and groundwater.

Methane may be accumulating in the Bakerstown and Upper Freeport mines, sourced from collapse of coal pillars and overburden and seepage from unmined coal. Subsidence within the Project Area could create pathways for escape of methane gas to the surface and into a confined space, potentially creating an explosive environment.

Uncovering and removing all the coal in the underground mine prior to construction would prevent the hazards of mine subsidence and methane gas. Minimally, any construction should be preceded by a thorough geotechnical investigation including drilling and inspection of mine voids designed to inform a grouting program to fill them. Nevertheless, the experience in Thomas suggests subsidence may continue even after a grouting project.

A small area of Bakerstown coal within the Project Area was surface mined along Pendleton Creek after closure of the underground mine. The coal remaining within the underground mine beneath the bulk of the Project Area has not been uncovered ("daylighted") and removed by surface mining.

PURPOSE

The purpose of this report is to place Fundamental Data's proposed Ridgeline Development Project in a geologic context, particularly as to the occurrence of coal beds and mining and the risks to development posed by legacy coal mining. This report is based on publicly available information.

GEOGRAPHIC AND GEOLOGIC SETTING

The southernmost point of the Fundamental Data's proposed Ridgeline Development Project (herein after the "Project Area") lies about 1.2 mile north of Rt. 32 in Davis, West Virginia[1]. The Project Area is about 315 acres in size and lies on a ridge bounded by Pendleton Creek on the northwest, and Beaver Creek to the southeast (Figure 1).

The Project Area is on the southeastern limb of the Georges Creek Syncline[2]. Two coal beds that have been mined in the area, the Bakerstown and Upper Freeport, underlie the Project Area. A northwest to southeast cross-section spanning the Project Area from Pendleton Creek to Beaver Creek along the line shown on Figure 1 shows the two beds inclined (dipping) to the northwest (Figure 2). The coal beds are about 200 feet apart. The blue line representing the variation in elevation of the land surface along this line, runs through the highest point (elevation 3290 feet) on the Project Area, and illustrates the depth of the coal beds below the land surface.

COAL MINING

Upper Freeport Coal

The Upper Freeport coal has been mined in surface mines and large, underground mines in the area from Thomas-Davis to Mt Storm in Grant County[3] (Figure 3). All of the mines are closed except for Mountain View Mine (Mettiki E Mine on Figure 3) which was idled in April, 2026.

The maximum depth of the Upper Freeport coal below the Project Area is about 380 feet. The Upper Freeport Coal has not been mined below the Project Area (Figure 3). Where this coal has been mined, the bed thickness varies from 6 to 8 feet and thicker, while under the project area it is 1 to 3 feet thick[3].

Bakerstown Coal

The Bakerstown coal has also been mined on the surface and underground in the region[4] and underground mine works are below the Project Area (Figure 4).

A map of the Bakerstown mine works from the Thomas-Davis region is on file at the West Virginia Geological and Economic Survey (mine document 905742_01)[5]. The entire Project Area and the proposed infrastructure are underlain by these mine works (Figure 5). While labeled as "Unknown" on Figure 4, these works are part of the Davis Coal and Coke Mine No. 23[6,7]. The first report of 1897 by the West Virginia Department of Mines (now WV Miners' Health, Safety and Training) includes a listing of this mine[7], although it may have produced coal even earlier. The 1949 report includes the last record of production from this mine[7]. The mine map is undated, therefore it is unknown if it reflects the areal extent of mining and amount of coal removed at closure in 1949. It is also important to note the continuity and connectivity of the works beyond the boundaries of the Project Area. The thickness of the Bakerstown coal beneath the Project Area varies from 5.5 to 7.5 feet[4].

The Bakerstown coal was surface mined to the east, south, and west of the Project Area (Figures 4 and 5). First reports of surface mining in the Bakerstown coal in Tucker County date from 1946 to 1948 then from 1952 and beyond[7]. The surface mining occurred after the underground mining, recovering coal close to the outcrop not mined underground and some from the old mine works (Figure 5). This surface mining removed only a small area of coal from the underground mine within what is now the footprint of the Project Area on the east side of Pendleton Creek (Figure 5).

The coal remaining within the underground mine beneath the bulk of the Project Area has not been uncovered ("daylighted") and removed by surface mining (Figure 5). This conclusion is supported by examination of topographic maps through time. The USGS 7½ minute topographic quadrangle maps undergo periodic revisions. Features added or changed from the previous version are printed in a purple color. Some revised, additional surface mining in purple is seen on Figure 1 to the east of the Project Area. Note that no such revisions are evident in surface mining near or within the Project Area. In fact, the surface mining depicted on Figure 1 and captured as a polygon on Figures 4 and 5 are seen on the first version of the Davis 7½ minute topographic quadrangle dated 1967[8].

In addition, a comparison of the topographic contours within the Project Area among versions of topographic maps from the present to as far back as 1919, show them essentially unchanged, differing only because of advancements in mapping technology and techniques. If the entire Project area had been surface mined, the contours on subsequent topographic maps would look very different than previous versions.

As it occurred before the 1977 passage of the federal Surface Mine Control and Reclamation Act (SMCRA), this surface mining went un-reclaimed. As a result, it is now on the West Virginia Department of Environmental Protection, Abandoned Land Mines (WVDEP AML) inventory[9]. Reclamation under the AML program has focused on Pendleton Creek. Under phase 1, surface mining from the 1940s on the west-northwest side of Pendleton Creek (Figure 4) was reclaimed in 2012[6]. The surface mines on the east side of Pendleton Creek and adjacent to the Project Area (Figures 4 and 5) were reclaimed in 2024 (2026 personal communication, AML personnel). The pre-SMCRA surface mines on the east-southeast side of the Project Area (Figure 5) are not yet scheduled for reclamation (2026 personal communication, AML personnel). The shapes of these areas on the AML inventory[9] match those shown on Figure 4.

HAZARDS OF BUILDING ABOVE ABANDONED UNDERGROUND MINES

Mine Subsidence

The principal hazard of building over an old mine such as the one under the Project Area is surface instability due to collapse of coal pillars supporting overlying overburden and collapse of overburden spanning mined voids. This is termed mine subsidence. Subsidence over room and pillar mining is less predictable than above modern longwall mining where very large areas of coal are removed in a relatively short period of time. In a room and pillar mine, the area of rooms with high percentage of pillar removal are much smaller (e.g. Figure 5). The occurrence of subsidence and the severity depends on a number of variables such as 1) the type of mining and percent of coal extraction, 2) the thickness and strength characteristics of the overburden strata, and 3) the age of the mining. Depth of overburden is defined as the distance from the surface to the roof of the mine (top of the coal). Depth of overburden categories do not accurately predict where subsidence will or will not occur over older room and pillar mines. However, less depth of overburden increases the likelihood of surface subsidence.

Subsidence occurrences above this mine are well documented in the town of Thomas with 20 sites within the AML inventory[9] (Figure 6A). Many of these events occurred in the 1970s and 80s. Subsidence features can include open sinkholes or cracks, sinking or shifting ground, and in some cases bulging ground. All of these features can damage homes, buildings, roads and other infrastructure, creating general hazards. The WVDEP AML program conducted extensive subsidence remediation in the 1990s by pumping grout into the mine voids beneath the town. Since then, subsidence events are less common but still occur sporadically. For example, a sink hole previously sealed on Brown Street (Figure 6A) near the intersection with Rt. 32 recently reopened (June 2026). Even with remediation, such as the grouting done in Thomas, events may continue to occur.

No subsidence events or features are known within the Project Area, which does not imply they have not occurred or will not occur in the future. Depth of overburden calculated for each of the 20 AML mine subsidence sites in Thomas varies from 10 to 150 feet (Figure 6A). Depth of overburden calculated for selected sites in the Project Area varies from 15 to 175 feet (Figure 6B), very similar values to those in Thomas (Figure 6A). Overburden depths are even thinner in the northwestern part of the Project Area where proposed infrastructure is located, varying from 50 to 75 feet (Figure 6B). This comparison suggests subsidence may have taken place in the Project Area and/or will occur in the future, as in Thomas.

The proposal for constructing three large diesel fuel storage tanks[1] over these abandoned mine works and potentially unstable surfaces are of particular concern (Figures 5 and Figure 6B). It is conceivable a large fuel leak or spill, either accidental or induced by subsidence, could make its way into these old mine works, travel through the interconnected passageways away from the Project Area, and potentially pollute surface and groundwater.

Methane Gas

Deadly explosions of methane gas in coal mines are well known in West Virginia. Hazardous conditions and even explosions occur from methane migration to the land surface via subsidence-induced fracturing during active mining[10,11]. There is no publicly available information documenting the presence or absence of methane in the abandoned Bakerstown and Upper Freeport coal mines in the report area, nor documenting the amount of methane within the unmined coal. Historically, the presence of methane in the Bakerstown coal was confirmed by a deadly explosion in a coal mine near Thomas in 1907[7]. Methane may be accumulating in the Bakerstown and Upper Freeport mines, sourced from collapse of coal pillars and overburden and seepage from unmined coal. It is prudent to recognize this hazard.

The Bakerstown coal mine beneath the Project Area is connected to larger areas of mined and unmined coal. Some of those areas are underlain by mining in the Upper Freeport coal (Figures

3 and 4). Fractures created by collapses in the Upper Freeport mines may facilitate upward migration of methane into the Bakerstown mine and unmined coal. Subsidence within the Project Area could create pathways for escape of methane gas to the surface and into a confined space, potentially creating an explosive environment.

Remediation or Prevention of Hazards

The most effective prevention for subsidence and methane gas buildup is to uncover and remove the remaining coal from an underground mine before constructing anything on the surface. Another approach to prevention of subsidence is thorough geotechnical investigation to include drilling and inspection with cameras, or other techniques to detect voids. This would inform a program to fill the voids with grout, stabilizing the surface. This is commonly done in advance of commercial or industrial development or to abate further subsidence after an initial event. Nevertheless, the experience in Thomas suggests subsidence may continue even after a grouting project.

WATER IN THE BAKERSTOWN MINE BENEATH THE PROJECT AREA

Mines or parts of mines that are below the level of local streams (“below drainage”) are located within the water table and will fill with water when abandoned. A coal mine is comprised of a combination of open passages and void-filled broken rock, readily accessible to infiltrating water.

Before mining around and under the Project area, there likely was groundwater present in fractures in the coals and sandstones. Once the Bakerstown coal beneath the Project Area was mined underground and along the surface outcrop on three sides, infiltrating precipitation has been draining from the area. It is possible that some of the precipitation that falls on the Project Area infiltrates into the underground mine works, flows downdip beyond the surface mined areas, and either accumulates there, seeps into the rocks below, or flows to lower elevation areas in the mine works (Figure 5).

ACKNOWLEDGEMENTS

The authors thank Jack Spadaro for his thorough review and endorsement of the report findings and bringing the potential hazard of methane gas in abandoned mines to our attention.

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List of Figures

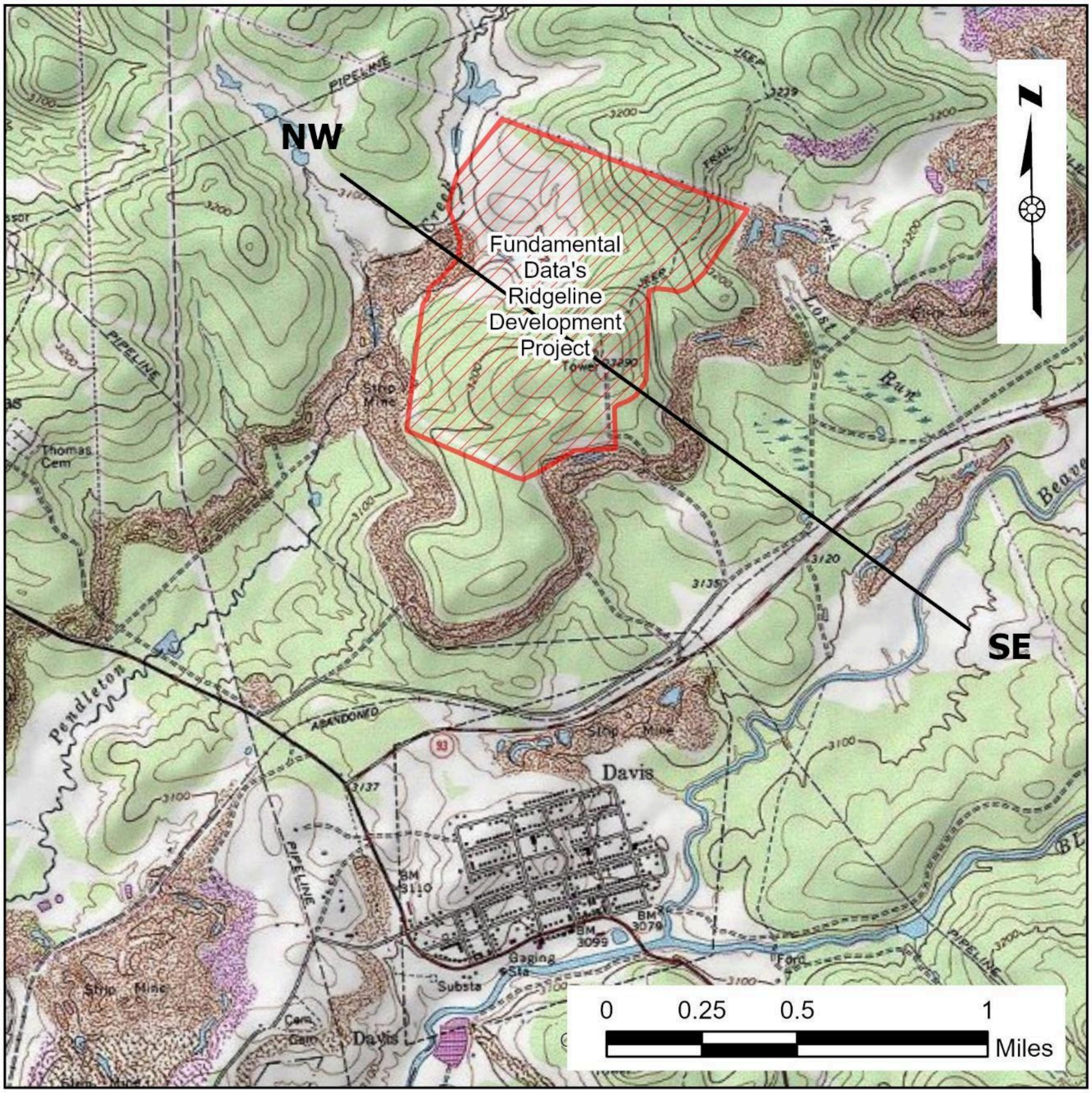

Figure 1. Location and topography of Fundamental Data's proposed Ridgeline Development Project (Project Area) north of the town of Davis, West Virginia. Line NW-SE is the location of the cross section shown in Figure 2. The project footprint was accessed from Fundamental Data's Air Quality Permit Application on the West Virginia Department of Environmental Protection website[1], geographically referenced using latitude-longitude information on the map[1], then digitized using ESRI ArcGIS. The footprint of Fundamental Data's proposed Ridgeline Development Project was then overlain on publicly available information from the West Virginia Geological and Economic Survey Coal Bed Mapping Project[3,4], which is also in ESRI ArcGIS format. Base map source: ESRI. "Topographic". *Scale Not Given. "USA_Topo_Maps". No Date Given. https://services.arcgisonline.com/ArcGIS/rest/services/USA_Topo_Maps/MapServer. Date viewed June 15, 2026.*

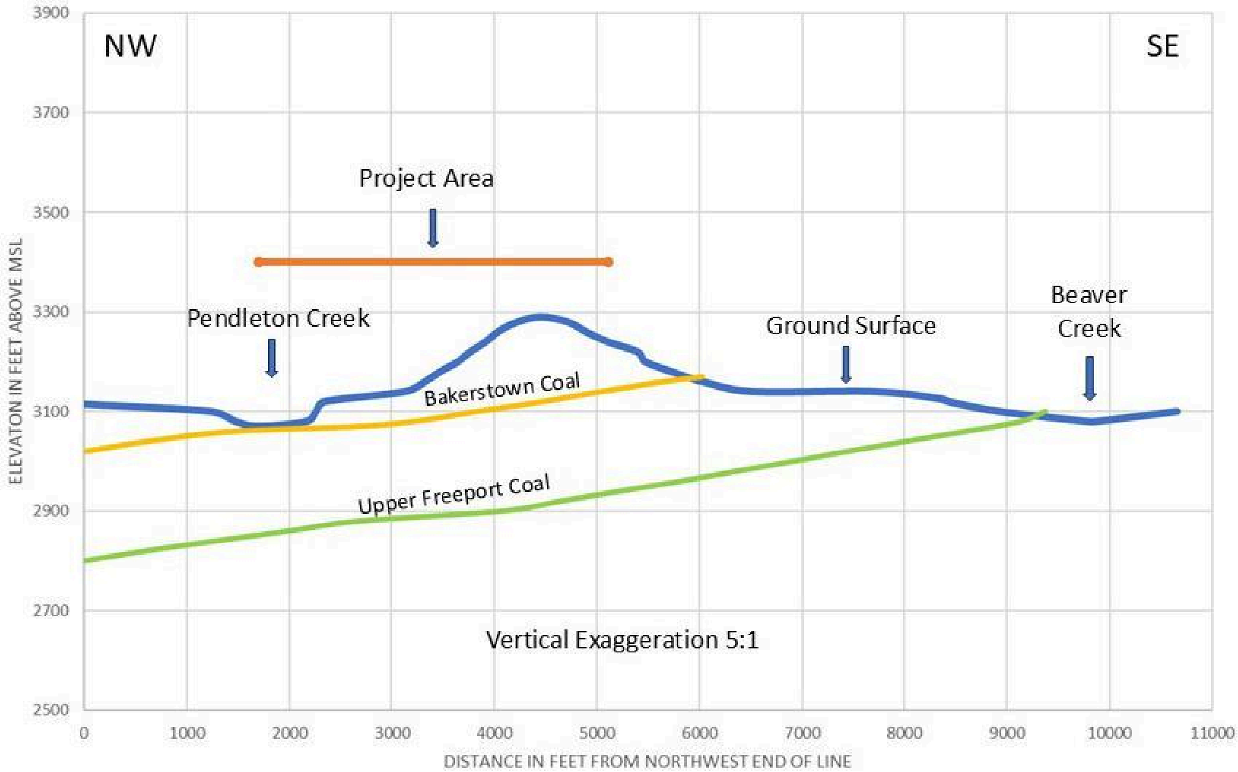

Figure 2. Northwest to southeast cross-section showing relationship of the Project Area to topography and underlying coal beds. Coal elevations are from the West Virginia Geological and Economic Survey, Coal Bed Mapping Project[3,4]. Topographic information source: ESRI. "Topographic". *Scale Not Given. "USA_Topo_Maps". No Date Given. https://services.arcgisonline.com/ArcGIS/rest/services/USA_Topo_Maps/MapServer. Date viewed June 15, 2026.*

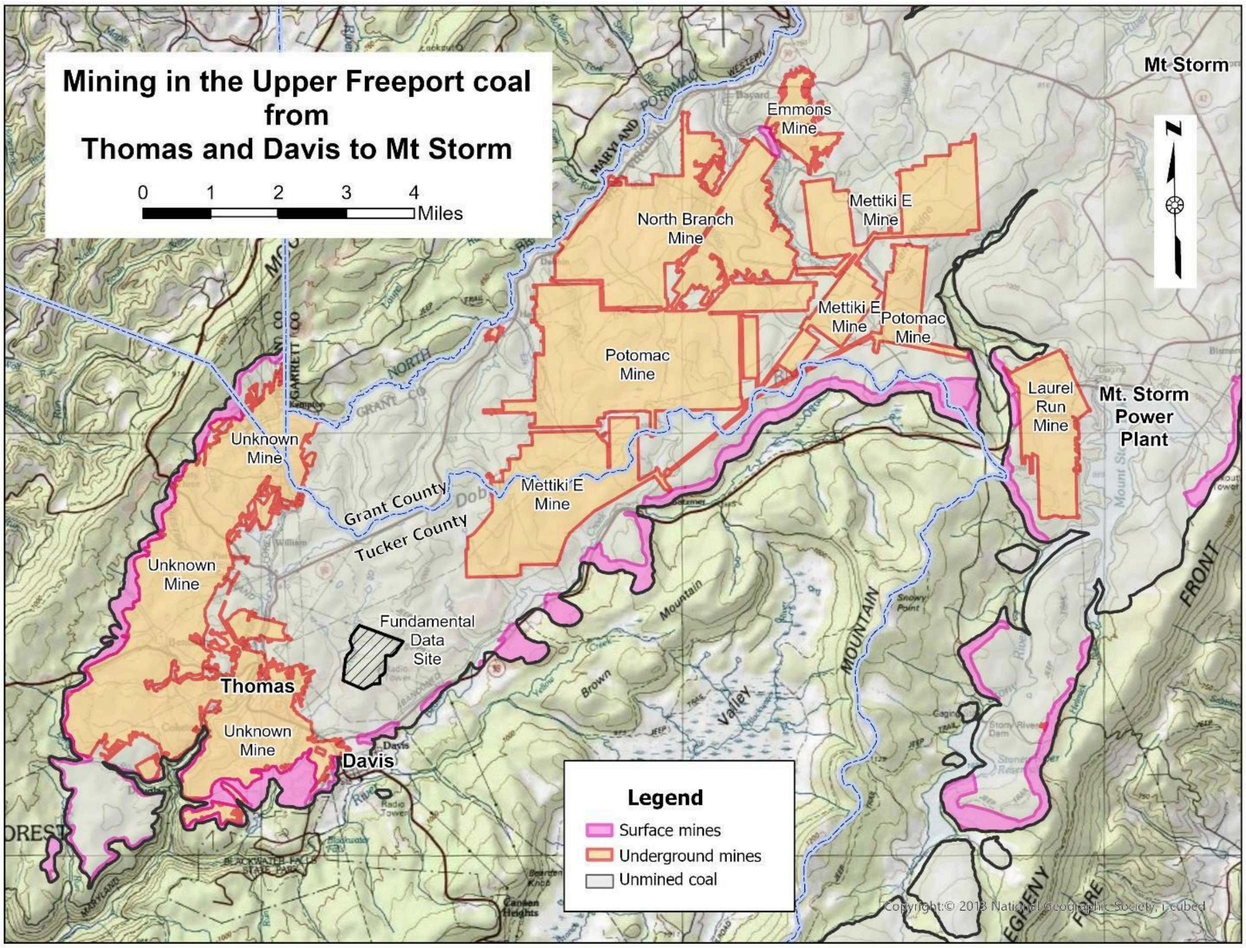

Figure 3. Location of the Project Area in relation to underground and surface mining in the Upper Freeport coal. Mapping of the Upper Freeport coal is from the West Virginia Geological and Economic Coal Bed Mapping Projec[3]. Base map source: ESRI. "Topographic". *Scale Not Given. "USA_Topo_Maps". No Date Given. https://services.arcgisonline.com/ArcGIS/rest/services/USA_Topo_Maps/MapServer. Date viewed June 15, 2026.*

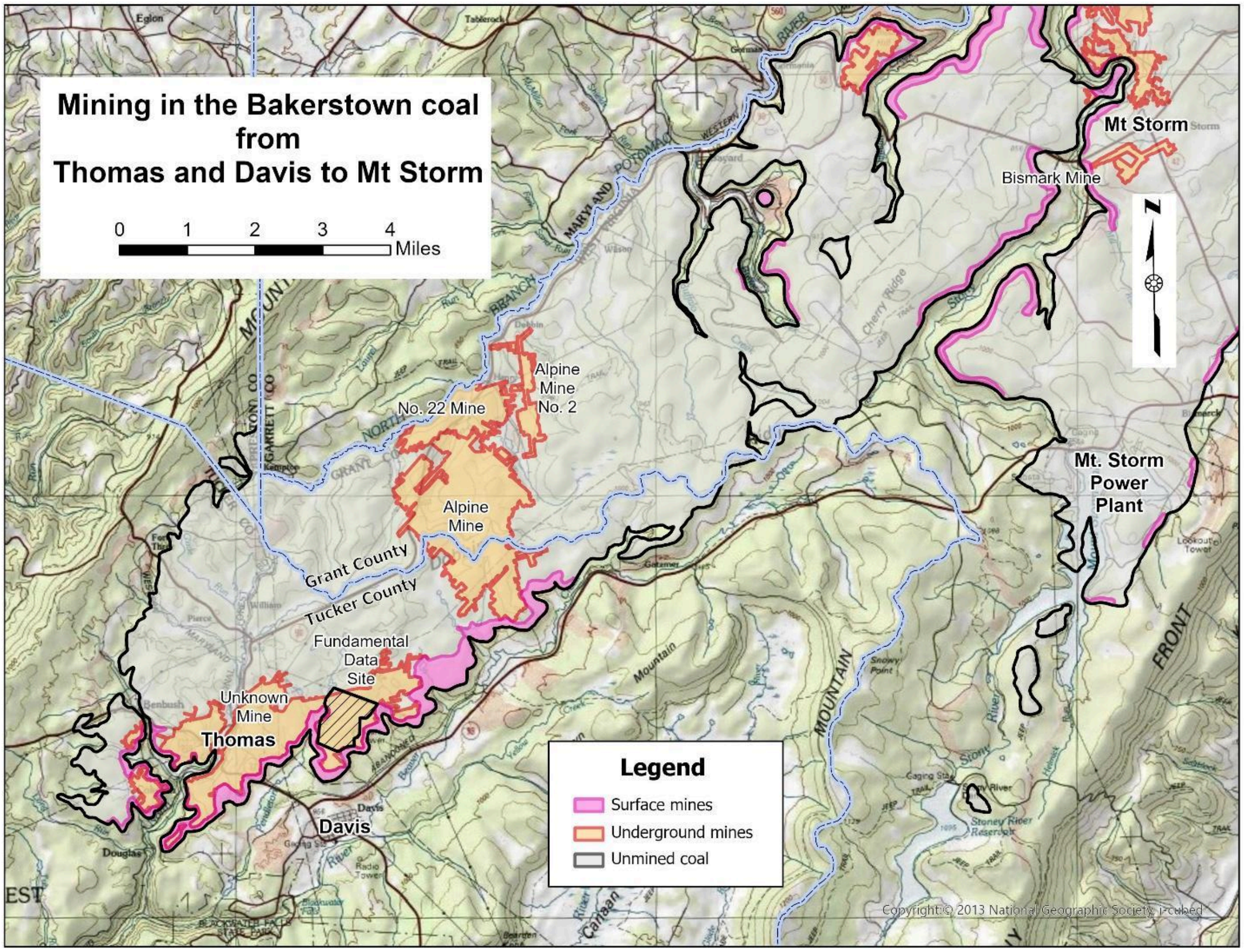

Figure 4. Location of the Project Area in relation to underground and surface mining in the Bakerstown coal. Mapping of the Bakerstown coal is from the West Virginia Geological and Economic Survey, Coal Bed Mapping Project[4]. Base map source: ESRI. "Topographic". Scale Not Given. "USA_Topo_Maps". No Date Given. https://services.arcgisonline.com/ArcGIS/rest/services/USA_Topo_Maps/MapServer. Date viewed June 15, 2026.

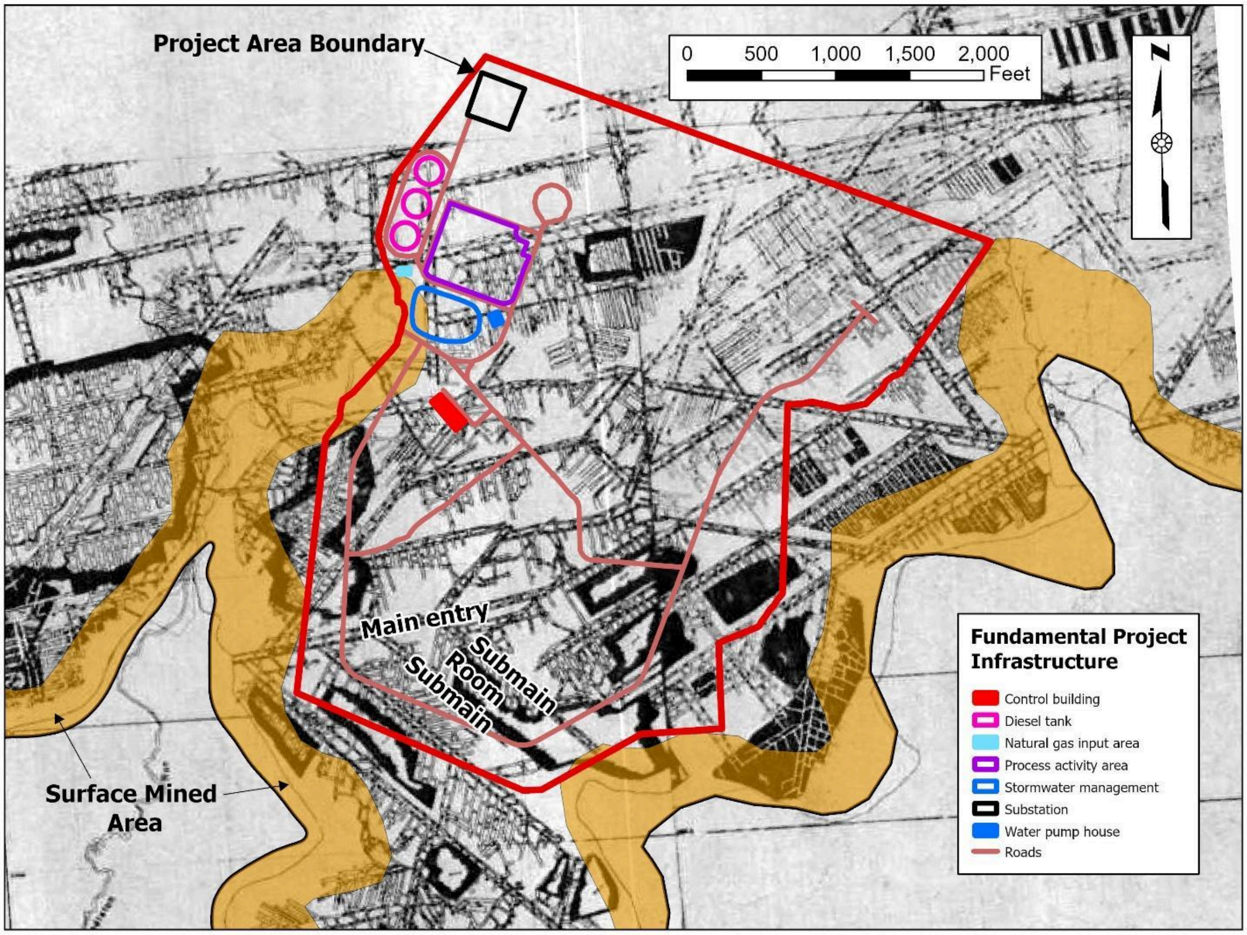

Figure 5. Map of the underground mine works[5] in the Bakerstown coal beneath the Project Area and the proposed infrastructure. The style of room and pillar mine shown here dates to the early 20th century. The distinctive, long and straight, double main entries (tunnels) seen in this mine (example labeled) were the transportation routes in and out of the mine during its life. Sub-headings, some driven off the main entries at a perpendicular or greater angle in this mine (examples labeled) defined blocks of coal between them called rooms (example labeled). The coal in the rooms was excavated into pillars in the somewhat irregular patterns seen here. Once the outer reaches of the mine were reached, the pillars in these rooms were systematically bifurcated and sliced in order to recover as much coal as possible. The roof strata cave in during the process relieving stress on the remaining pillars and mains. This was called "pillaring" or retreat mining. Heavily shaded areas on this map likely indicate pillared areas.

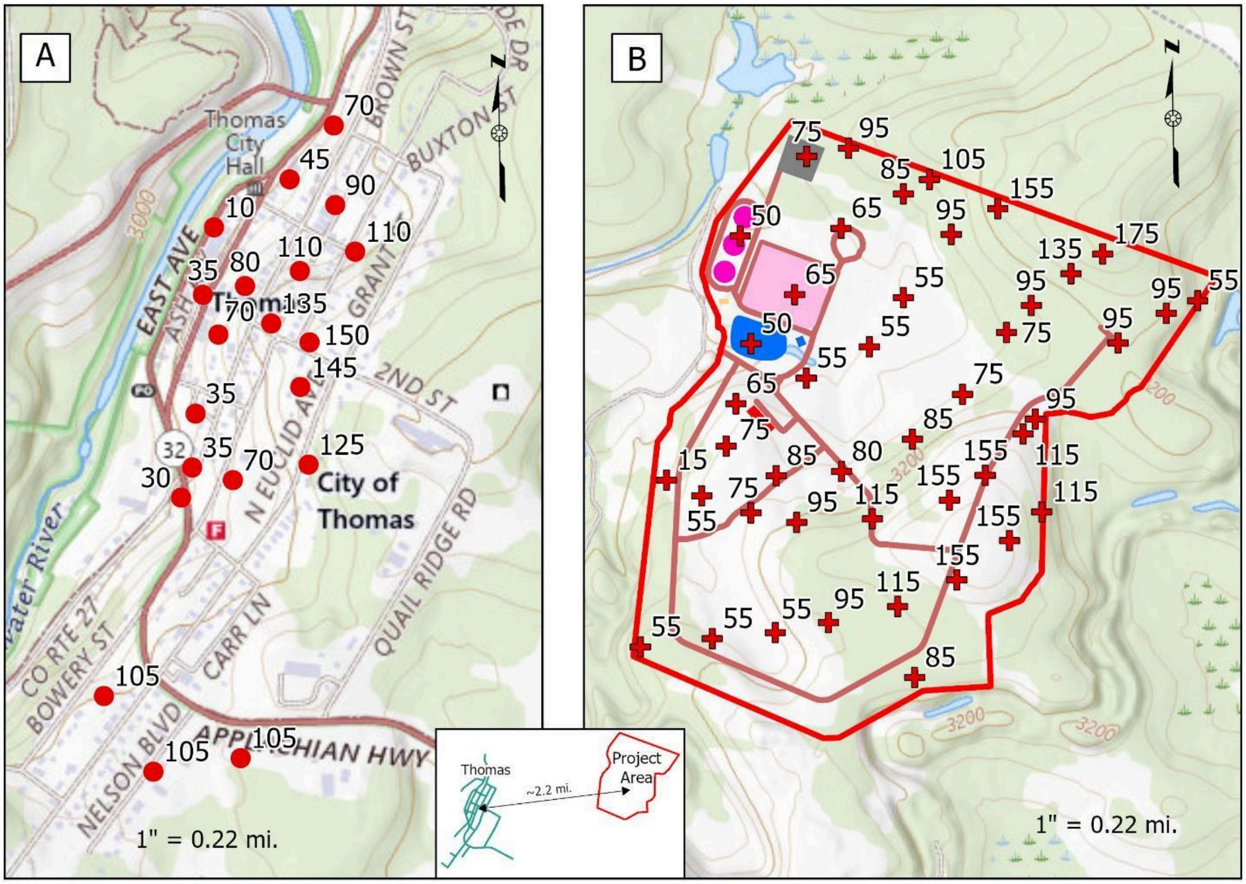

*Figure 6. **A**. Historical subsidence events (red dots) in Thomas[8] labeled with the estimated depth of overburden. **B**. Selected surface locations (red crosses) labeled with estimated depth of overburden. See the legend on Figure 5 for the Project Area proposed infrastructure shown here. Depth of overburden was calculated as follows. At each location, the elevation of the base of the Bakerstown coal[4] was subtracted from the surface elevation (see below). Coal thicknesses in this mine varies from 5.5 to 7.5 feet[4]. For a conservative estimate, we subtracted 5 feet from the elevation difference to arrive at depth of overburden. Given the variation in coal thickness, we then rounded each number to the nearest 5. ESRI. "Topographic". Scale Not Given. "USGS Topo Maps". No Date Given. https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer. Date viewed June 15, 2026.*