

NATIONAL HISTORIC LANDMARK NOMINATION

NPS Form 10-900

USDI/NPS NRHP Registration Form (Rev. 8-86)

OMB No. 1024-0018

STAPLE BEND TUNNEL

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United States Department of the Interior, National Park Service

National Register of Historic Places Registration Form

1. NAME OF PROPERTY

Historic Name: STAPLE BEND TUNNEL

Other Name: Allegheny Portage Railroad Tunnel

2. LOCATION

Street: Near State Rt. 3035 & Mineral Point

Not for publication: N/A

City/Town: Conemaugh Township

Vicinity: N/A

State: PA

County: Cambria

Code: 021

Zip Code: 15942

3. CLASSIFICATION

Ownership of Property
 Private: X
 Public-local:
 Public-State:
 Public-Federal:

Category of Property
 Building(s):
 District:
 Site:
 Structure: X
 Object:

Number of Resources within Property
Contributing

 1

 1

Noncontributing
 buildings
 sites
 structures
 objects
 Total

Number of Contributing Resources Previously Listed in the National Register: 1

Name of Related Multiple Property Listing:

Historical and Archeological Resources of the Allegheny Portage Railroad

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4. STATE/FEDERAL AGENCY CERTIFICATION

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this _____ nomination _____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property _____ meets _____ does not meet the National Register Criteria.

Signature of Certifying Official

Date

State or Federal Agency and Bureau

In my opinion, the property _____ meets _____ does not meet the National Register criteria.

Signature of Commenting or Other Official

Date

State or Federal Agency and Bureau

5. NATIONAL PARK SERVICE CERTIFICATION

I, hereby certify that this property is:

- _____ Entered in the National Register _____
- _____ Determined eligible for the National Register _____
- _____ Determined not eligible for the National Register _____
- _____ Removed from the National Register _____
- _____ Other (explain): _____

Signature of Keeper

Date of Action

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6. FUNCTION OR USEHistoric: TransportationSub: Rail-relatedCurrent: VacantSub: Not in Use**7. DESCRIPTION**ARCHITECTURAL CLASSIFICATION: Other: Tunnel**MATERIALS:**

Foundation: sandstone
Walls: sandstone
Roof: sandstone
Other Description: sandstone (portals)

Describe Present and Historic Physical Appearance.

The Staple Bend Tunnel is located on a 2-1/2 mile bend in the Little Conemaugh River in the Conemaugh Township of Cambria County, Pennsylvania.¹ The Tunnel carried the Allegheny Portage Railroad through 900' of a sandstone, siltstone, and shale promontory. It is located approximately 60' east of Incline Plan No. 1, the westernmost end of the Portage Railroad. The tunnel is most clearly described as it was originally constructed. Decorative stone portals marked the east and west ends. The first 150' of tunnel from either end were lined with dressed stone. Since the central 600' of tunnel was unlined, that portion of tunnel is comprised of the irregular face of the excavated rock. The portals and the tunnel have a broad, round (horseshoe-shaped) arch, measuring 20' wide at the bottom, and a little wider near the mid-point. The tunnel is 16' tall at the crown of the arch. A more detailed description, noting the few alterations which have occurred since the tunnel's completion, appears below.

¹The descriptive section was prepared by Robie S. Lange, History Division, National Park Service, Washington, D.C. For a more detailed description and analysis of the tunnel, see Sellardse Grigg, Inc., Historic Structure Report, Architectural Data Section, Staple Bend Tunnel, Denver Service Center: National Park Service, 1991.

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Portals: The western (or southern) portal is faced with a 40' wide, 22' tall decorative cut stone facade.² [See Photograph #1] Twin Doric pilasters flank each side of the portal opening. The 20' wide, 16' tall portal opening is currently sealed by a concrete block wall with large dual steel doors. These doors are welded closed. Despite some minor damage to several stones, and the movement of a few others, the western portal is in good condition. The eastern (or northern) portal has suffered the greatest damage since the tunnel was taken out of use in the 1850s. [See Photograph #2] The principal feature of the east portal is the exposed ends of the stones which make up the original tunnel lining. Immediately beneath (inside) the stone lining is an additional 12" to 18" thick concrete lining. This lining projects 50' into the tunnel to reinforce the original stone lining after the dressed stone portal facing was removed. The remaining 16' wide, 14' tall tunnel opening is currently sealed with a concrete block wall with large dual steel doors. The concrete block on either side of the doors is sheathed with steel plate to the height of the steel doors.³

Tunnel Linings: While the longest portion of the tunnel is the central 600' of bare rock, the western and easternmost ends of the tunnel were lined with a dressed stone arch.⁴ This was done to compensate for the shallower and less supportive layer of overhead rock as the tunnel approached grade level. At some point after the tunnel went out of service a 12" to 18" thick concrete lining was added to the easternmost 50' of the tunnel.⁵ Although it does not relate to the period of national significance, this additional tunnel lining served as a critical structural support after the removal of the stonework at the eastern portal. In many places the central, unlined portion of the tunnel exceeds the height and width of the lined portion due to the irregular fracturing of the rock during construction. Original drill hole scars are visible at several places within the unlined area.

Although owned by Bethlehem Steel, the Staple Bend tunnel is administered by the Allegheny Portage National Historic Site.

²This is the above ground height. Another 3' of stone portal lies beneath the surface.

³The remains of the original dry-laid stone retaining walls beside each portal are in poor condition and are not included within the proposed NHL boundary.

⁴The first 40' of the lining (from the portal inward) is constructed of dressed stones which are 10" to 12" wide. The remaining 110' of lining is comprised of narrower 5-1/2" stones. Since the first 40' of lining at the east end is obscured by the additional concrete lining, these stone dimensions can not be visually verified for the eastern lining. Historic Structure Report, Architectural Data Section, Staple Bend Tunnel, 4, 7, 8, & 16.

⁵One source speculates that the concrete lining was added in the early 1940s. Ibid., 21.

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The National Park Service is currently negotiating to purchase the tunnel. The tunnel is not easily accessible and is not open for visitation.

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8. STATEMENT OF SIGNIFICANCE

Certifying official has considered the significance of this property in relation to other properties: Nationally:___ Statewide:___ Locally:___

Applicable National Register Criteria: A X B___ C X D___

Criteria Considerations (Exceptions): A___ B___ C___ D___ E___ F___ G___

NHL Criteria: I & IV

NHL Theme(s): XIV-C Transportation-Canals
XIV-E Transportation-Railroads
XVIII-B Technology-Transportation
XVIII-H Technology-Construction

Areas of Significance: Engineering
Transportation

Period of Significance: 1831-1853

Significant Dates: 1833 & 1853

Significant Person(s): N/A

Cultural Affiliation: N/A

Architect/Builder: Sylvester Welch (Chief Engineer) /
J. & E. Appleton (Builders)

State Significance of Property, and Justify Criteria, Criteria Considerations, and Areas and Periods of Significance Noted Above.

SUMMARY STATEMENT OF SIGNIFICANCE

Constructed between November 1831 and June 1833, the Staple Bend Tunnel served as the first railroad tunnel in the United States.⁶ As part of the Allegheny Portage Railroad, the tunnel and that transportation line were viewed as an engineering marvel in their day.⁷ Constructed only a dozen years after the first

⁶The text of this section of the nomination is based on the Historic Data Section of a Historic Structure Report prepared by the author in July 1990.

⁷In 1962, the Staple Bend Tunnel was identified as a contributing resource of the larger Allegheny Portage Railroad of the Pennsylvania Canal National Historic Landmark (NHL). In recognition of its national significance in the history of tunneling, the Staple Bend Tunnel is nominated for NHL

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transportation (canal) tunnel, the Staple Bend Tunnel was the first of many railroad tunnels in the United States. Regionally, its link with the eastern seaboard helped to bring a redirection of trade and commerce away from shipping down the Ohio and Mississippi rivers and thus maintained Philadelphia as a major port.

BACKGROUND

In the larger context of Pennsylvania transportation, the Staple Bend Tunnel on the Allegheny Portage Railroad formed only a small, but significant, segment of the total canal and railroad network developed by that state. It served on a communication route which connected Philadelphia with Pittsburgh. The tunnel's completion signaled the end of a long desired goal to link the state's western area to Philadelphia, although a general movement to develop such a transportation system began only 10 years prior to its attainment.

The earliest suggestion for the development of a route to western Pennsylvania was advanced before the American Revolution. The discussion reached sufficient magnitude by the fall of 1790 that one promoter, Daniel McClay, began to look for a water route from the mouth of Stony Creek (Johnstown) to Poplar Run on the Franktown branch of the Juniata River. In 1791, based upon his survey, a committee in the state legislature recommended that the Juniata, Little Conemaugh, and Kiskiminitas rivers be made navigable and that a portage road be built over the Allegheny Mountains. The suggestions were not taken seriously, however, until 1823 when large sections of New York's Erie Canal opened.⁸

Fearful that the Erie Canal would mean a loss of trade and passenger business for the state, Pennsylvanians prevailed upon their state assembly for their own canal. Although popular sentiment throughout the state favored a canal, there was little agreement on the canal route. As a result of petitions from various areas of the state, the legislature passed an act which became law on April 11, 1825. It established a five member Board of Canal Commissioners. Organized in July, this board was

designation as an individual listing.

⁸Julius Rubin, "Canal or Railroad? Imitation and Innovation in the Response to the Erie Canal in Philadelphia, Baltimore, and Boston," vol. 51, part 7 of Transactions of the American Philosophical Society (Philadelphia: The American Philosophical Society, 1961), 19; Earl J. Heydinger, "Comprehensive History of the Pennsylvania Canal System, with Particular Attention to the Allegheny Portage Railroad, Portion: Plane #1, Staple Bend Tunnel and Long Level," (June 1966), IV:1-2, typescript in the Allegheny Portage National Historic Site library.

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charged with examining seven possible canal routes between the east and west areas of the state and selecting one route for construction.⁹

The 1826 legislative session opened with a great desire to begin construction on a canal. Although the canal board had not made its report on the survey of the seven routes, the legislature passed a canal construction act which became law on February 25, 1826. It called for an uninterrupted waterway from Philadelphia to Pittsburgh to be built at state expense and to be called the Pennsylvania Canal. Over three months later, on June 3, the canal commissioners reported to Governor Schulze that a passage along the Juniata and Conemaugh rivers was their choice for a canal route. They proposed a portage railroad over the Allegheny Mountain to connect with these two river valleys. This type of rail system, usually composed of a double track, was commonly used to transport (or portage) canal boats on specially designed rail cars over mountainous terrain between canal segments.¹⁰

Although canal construction began on July 4, 1826, engineers continued to recommend various means to traverse the Allegheny Mountain. It was not until early 1831 that an agreement was reached to build a portage railroad with a tunnel approximately 1,000' long. As a result, the legislature passed "An Act to Continue the Improvement of the State by Canal and Railroads" which Governor Wolf signed on March 21, 1831. The final portage route, however, still had not been settled. This was not established until after Chief Engineer Sylvester Welch and his assistant Moncure Robinson began work with their crew on April 8, 1831. They finalized a route on May 20 that was 36.65 miles long.¹¹

CONSTRUCTION

On March 30, 1831, nine days after Governor Wolf signed the act to construct the Allegheny Portage Railroad, that segment was annexed to the western division of the Pennsylvania Canal. As

⁹Cummings, Pennsylvania Board of Canal Commissioners' Records, 2; Rubin, "Canal or Railroad?" 25; Wilson, "The Evolution, Decadence and Abandonment of the Allegheny Portage Railroad," xliiii; Jenkins, Pennsylvania: Colonial and Federal, III:280; Logue, "History of Old Portage Railroad."

¹⁰Wilson, "The Evolution, Decadence and Abandonment of the Allegheny Portage Railroad," xliiii; Tenth Census of the United States: Transportation, 737; Cummings, Pennsylvania Board of Canal Commissioners' Records, 2; McCullough and Leuba, The Pennsylvania Main Line Canal, 20; Logue, "History of Old Portage Railroad;" Jacobs, "The Old Juniata Canal and Portage Railroad," 159; William B. Sipes, The Pennsylvania Railroad: Its Origins, Construction, Condition, and Connections (Philadelphia: The Passenger Department, 1875), 6.

¹¹Wilson, "The Evolution, Decadence, and Abandonment of the Allegheny Portage Railroad," xlix-1; Johnson, Giles, and Michael, "Johnstown and the Pennsylvania Canal," 216; McCullough and Leuba, The Pennsylvania Main Line Canal, 30, 62; Logue, "History of Old Portage Railroad;" Cummings, "The Allegheny Portage Railroad," 2; Rubin, "Canal or Railroad?" 58; Jacobs, "The Old Juniata Canal and Portage Railroad," 160.

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principal engineer for this area, Sylvester Welch, with his assistant Moncure Robinson, soon proceeded to locate a line for the railroad from Johnstown to Hollidaysburg. Upon determining the route, the state appropriated to itself a strip of land 120' wide along the entire length of the railroad. Welch divided the 36.65-mile distance into 35 sections and began to prepare contracts for the part which ran from Johnstown to the summit.

Welch located the proposed tunnel at the Staple Bend of the Little Conemaugh River and assigned it to section seven at the head of incline plane No. 1. He described it as:

The tunnel is to be 900 feet long. Its transverse section to equal a prism 16 by 20 feet. The width at bottom to be 20 feet. At the ends of the tunnel, some masonry will be required, but appearances indicate that the rock is sufficiently hard and strong within not to require arching.

The form of the roof or top of the vault will be determined by the character of the rock. The hill at the summit is 195.77 feet above the floor of the tunnel or grade of the road.¹²

Welch also noted that the remainder of the section going north from the tunnel would require a heavy embankment for about 400'. He concluded that the material for this embankment would come partly from the tunnel.¹³

Contractors submitted their bids and awards were made at Ebensburg on May 25, 1831. Corruption often proved a factor in contractor selection, for the canal commissioners frequently awarded contracts to political party supporters or to friends.¹⁴ J. and E. Appleton won the contract to construct section seven. The Canal Board specified that the tunnel be completed by May 1, 1832. This unrealistic date was later changed. Samuel Jones, the immediate superintendent of construction, chose Solomon Roberts, an engineer, to oversee the work on that section. In June, the Appletons began work on the section leading to the

¹²Sylvester Welch to the Board of Canal Commissioners of Pennsylvania, May 23, 1831.

¹³Ibid.

¹⁴Sylvester Welch to the Board of Canal Commissioners of Pennsylvania, May 23, 1831, Reports and Miscellaneous Documents, Board of Canal Commissioners, Allegheny Portage Railroad, Box 8, Reports and Miscellaneous Documents 1829-43, Record Group 17, Records of the Bureau of Land, Pennsylvania Historical and Museum Commission, Harrisburg, Pennsylvania (hereafter cited as RG 17); The Sky (Ebensburg, Pennsylvania), December 31, 1831; Bishop, "Corrupt Practices Connected with the Building and Operation of the State Works of Pennsylvania," 400-402; Logue, "History of Old Portage Railroad," Wilson, "The Evolution, Decadence and Abandonment of the Allegheny Portage Railroad," L.

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tunnel.¹⁵ It was not until November 21, 1831, however, that work began on the tunnel with excavation occurring at both ends. The following day it snowed and the weather turned intensely cold. Despite the inclement conditions, the men continued to work.¹⁶

At the time Staple Bend Tunnel was constructed, tunnel driving was in its infancy in the United States. Although it was the first railroad tunnel in the country, two other transportation tunnels had preceded it.¹⁷ Both of these earlier structures were canal tunnels. The first one, 820' long, was dug for the Schuylkill Canal at Auburn, Pennsylvania in 1820-21. The second tunnel, 720' long, was on the Union Canal near Lebanon, Pennsylvania. It was built in 1827.¹⁸ Without a skilled tunnel construction corps, the contractors had to rely on miners for their workforce. The skilled men who did the drilling and set the powder charges would commonly have been Welsh immigrants, who often made up the skilled mining force at the time. The common laborers who removed the muck, as the blasted rock was called, were probably Irish immigrants, who comprised the preponderance of the area's unskilled workers in that period.¹⁹ The men were paid \$13.00 per month plus board and room.²⁰

Before beginning to drill holes in the face, the man in charge of blasting would study the face to ascertain where to place the holes. Advantage was taken of all irregularities and joints as a

¹⁵Prior to construction, the Appletons built a housing facility at the tunnel site for their workforce. Its location has not been determined.

¹⁶Wilson, *The Evolution, Decadence and Abandonment of the Allegheny Portage Railroad*, liv; Work Estimate for Section 7 by J. and E. Appleton, July 27, 1831, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 3, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, April 7-November 11, 1831, Record Group 17, Records of the Bureau of Land, Pennsylvania Historical and Museum Commission, Harrisburg, Pennsylvania; Work Estimate for Section 7 by J. and E. Appleton, December 1, 1831, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 4, Allegheny Portage Railroad, Engineers Accounts, Estimates Work Receipts, November 25, 1831-May 21, 1832, RG 17; *The Sky* (Ebensburg, Pennsylvania), December 8, 1831; Logue, "History of Old Portage Railroad."

¹⁷At least one non-transportation tunnel predated the Staple Bend Tunnel. The Montgomery Bell Tunnel near Nashville, Tennessee was built ca. 1820 to divert water for industrial power generation. See: Robie S. Lange, "Montgomery Bell Tunnel National Historic Landmark Nomination," History Division, NHL Files, National Park Service, Washington, D.C.

¹⁸See: Robie S. Lange, "Union Canal Tunnel National Historic Landmark Nomination," History Division, NHL Files, National Park Service, Washington, D.C.

¹⁹One notable exception to this rule relates to the use of slave labor for the Montgomery Bell Tunnel.

²⁰Henry S. Drinker, *Tunneling, Explosive Compounds, and Rock Drills* (N.Y.: John Wiley and Sons, 1882), 27; Heydinger, "Comprehensive History of the Pennsylvania Canal System," V:8.

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means to eliminate or reduce the number of holes.²¹ All holes were drilled by hand with either a single-jacked or double-jacked method. A single jack was a hammer weighing about four pounds. It was swung with one hand while the drill was held by the other hand. The double jack was a six to eight-pound sledge held with both hands. Generally, two men struck with double jacks, while a third man held the drill and turned it a quarter-turn after each blow. Theoretically, the drill was turned on a center in the middle of the hole. The successive cuts crossed each other and the hole was broken a little wider in diameter than the drill diameter. A curved bit on the end of the drill had, for centuries, proved best for two reasons. Curved bits gave the most uniform wear. In addition, drills were not usually held straight and the hammer blow was usually not directly on center. As a result, a curved drill bit was found to transfer an off-center hammer blow more directly to the center of the drill bit. Thus, more energy from the force of the blow went into drilling the hole. Since metallurgy had not reached modern standards in the 1830s, the softer drill bits of those days required frequent sharpening. Consequently, a temporary blacksmith shop would have been located at Staple Bend Tunnel, where blacksmiths would have been kept constantly busy sharpening drill bits.²²

Drilling was time consuming work. Holes were usually 1" in diameter and seldom deeper than 3'. A three-man double jack team could drill about 1' of hole per hour. This depth per hour, however, varied with the density of the rock. The sandstone encountered throughout much of Staple Bend Tunnel probably allowed a team to drill the average of 1' per hour.²³

Once the proper number of holes had been drilled, the tunnel face was ready for blasting. Each hole was charged with black powder. Staple Bend workers used an average of 200 pounds of powder per week. The powder was contained in a one-pound, paper wrapped cartridge. It was pushed to the bottom of the hole by using a wood or copper pole. A copper needle, which was a small rod, was inserted into the hole and then the hole was filled with clay and tamped with the wood or copper rod. After tamping, the copper needle was withdrawn leaving a small hole through which the fuse was introduced. Fuses of the day consisted of reeds, straws, or small round paper tubes filled with powder. In 1831, a safety fuse, the Bickford fuse, was invented in England. It comprised a cord around a thin vein of powder. The cord was covered with tar or pitch. The advantage of this fuse was its steady uniform

²¹Harold W. Richardson and Robert S. Mayo, Practical Tunnel Driving (N.Y.: McGraw-Hill Book Co., 1941), 300, 333; Drinker, Tunneling, Explosive Compounds, and Rock Drills, 108.

²²Drinker, Tunneling, Explosive Compounds, and Rock Drills, 114-16; Richardson and Mayo, Practical Tunnel Driving, 332-333.

²³Richardson and Mayo, Practical Tunnel Driving, 333.

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burn. Whether this fuse was used at Staple Bend Tunnel remains unknown, but it could have been used toward the end of the digging.²⁴

Blasts tended to be somewhat dangerous, since the fuses burned unevenly. The force of the blast would leave a cone-shaped hole in the tunnel face. Rarely did the blast penetrate to the depth of the drill hole. The average explosion would remove rock to about 18" less than the hole depth. Since the average hole was drilled to a depth of 3', the average blast removed 18" of rock. This corresponded with Sylvester Welch's report in May 1832 that 18" of rock was removed from the tunnel face in a 24 hour period.²⁵

Blasts were usually set just before meal time so that the dust could settle while the workforce ate. After the dust settled, several men entered the tunnel to carefully inspect the walls and roof before the others entered. Inspection was both visual and by using a hand hammer. Any spot which sounded hollow under a hammer blow needed investigation. Timbers were then placed in appropriate locations. Then the heading and tunnel face had to be scaled of loose rock before mucking could begin.²⁶

Muckers had the most exhausting job in tunnel driving. This work was accomplished by hand labor. A 20' wide tunnel like Staple Bend could accommodate no more than eight men shoveling at one time. These men shoveled the rock into a cart pulled by a horse. At the same time, two to four men were employed with a pick to pull down the rock pile in front of the shovelers. These laborers periodically alternated with the shovelers to give them relief from the fatiguing work. The amount of rock a man could shovel was usually figured at one-half to two-thirds cubic yard per hour.²⁷ While mucking or removal of the blasted rock occurred, the skilled labor returned to drilling holes in the cone-shaped area so that the tunnel face could be blasted flush.

The greatest danger in tunnel driving came from natural causes and the failure to realize what could happen when the rock structure was disturbed. The soft rock encountered in one area of Staple Bend Tunnel undoubtedly gave safety concerns; however, no reports or newspaper articles have surfaced about any deaths

²⁴Gösta E. Sandström, Tunnels (N.Y.: Holt, Rinehart and Winston, 1963), 282; Drinker, Tunneling, Explosive Compounds, and Rock Drills, 108-109; David W. Burton and John A. Davis, Modern Tunneling (N.Y.: John Wiley & Sons, 1914), 295.

²⁵Richardson and Mayo, Practical Tunnel Driving, 333.

²⁶Ibid., 65-66.

²⁷Richardson and Mayo, Practical Tunnel Driving, 90; Burton and Davis, Modern Tunneling, 261.

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or maimings that occurred during the tunnel's construction. The soft rock area was undoubtedly covered by the stone tunnel lining constructed at either end of the tunnel.

Work on the tunnel progressed with increasing cubic yards of rock removed each month until March 1832. In November 1831, 140 cubic yards of rock had been taken from the tunnel. This figure increased to 560 cubic yards the next month, followed by 740 cubic yards in January 1832. February 1832 saw 900 cubic yards removed. Then, in March, the men excavating at one end encountered a softer rock than anticipated. A portion of this rock would crumble when exposed to the atmosphere. While one author, in writing about the tunnel, stated that it was cut through slate, another stated that the rock was sandstone. The latter individual was undoubtedly correct considering that the geology of the area indicated more sandstone than slate. The soft area encountered probably had its cohesiveness leached from it by water. At any rate, work slowed as more timbering was required to support the roof. Only 370 cubic yards of material were removed from the tunnel in March. Still encountering soft rock in part of April, the excavations proceeded at a slower pace with 550 cubic yard of rock removed.²⁸

Although the original plan called for placing a stone arch extending 150' on each end of the tunnel, the soft rock caused a temporary change in plans. Sylvester Welch felt that they should be prepared to arch the remaining area with brick. This situation would make the tunnel more costly. It would require additional excavation, which Welch estimated would cost \$4,924.50, to admit the additional brick arch. He thought it would require another \$13,132.50 for the arch itself. He, however, noted that "if in the further prosecution of the work, the rock should become harder and less liable to fall to pieces, a part of the arch may be dispensed with, and the expense of construction reduced."²⁹

About the time that Welch wrote to James Clark in May 1832 expressing his concern over the soft rock, the construction crew again encountered firmer rock and digging once more increased. In that month 50 men were employed in the tunnel working round the clock. They cut about 18" from the tunnel face each 24 hours. The cubic yards dug for May more than doubled over the

²⁸Work Estimates for Section 7 by J. and E. Appleton, December 1, 1831, December 31, 1831, February 1, 1832, March 7, 1832, April 4, 1832, and May 10, 1832, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 4, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, November 25, 1831-May 21, 1832, RG 17; Sylvester Welch to James Clarke, President of the Board of Canal Commissioners of Pennsylvania, May 16, 1832, Board of Canal Commissioners, Allegheny Portage Railroad Reports and Miscellaneous Documents, Box 8, Reports and Miscellaneous Documents 1829-43, RG 17; Drinker, Tunneling, Explosive Compounds, and Rock Drills, 27; Chevalier, Historie et Description des Voies de Communication, I:402.

²⁹Sylvester Welch to James Clarke, President of the Board of Canal Commissioners of Pennsylvania, May 16, 1832.

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previous month, reaching 1,360. By May 23 the tunnel reached 184' on the west end. At that point Solomon Roberts decreed that work should begin on the dressed stone arch. This work, however, did not begin until July.³⁰

Although work slowed in June 1832, probably due to more soft rock, it began with ever increasing excavation in July. While June found only 670 cubic yards removed, July's output was boosted to 1,290 cubic yards. August's production increased even more to 1,470 cubic yards only to be exceeded with 1,604 cubic yards for September as the inner portion of the tunnel proved to be of sufficiently hard rock to eliminate problems. Again, excavation dipped in October to 1,134 cubic yards, but it reached its greatest extent in November with 1,872 cubic yards. On December 21, 1832, the workmen broke through the final barrier and opened the tunnel. Samuel Jones notified the canal commission of the event and observed that "the shafts have met with great precision."³¹

Having opened the tunnel, the amount of cubic yards of rock removed began to drop and the focus turned toward completing the arch and the portal. The December 1832 rock removal amounted to 1,104 cubic yards. Aggregate cubic yardage dropped to 886 in January 1833 and to 150 the next month as excavation was almost completed. No rock was removed in March, and only a final 100 cubic yards were removed in April as cleanup occurred.³²

Although the tunnel excavation was completed in April 1833, the arch and portals remained incomplete. Work had begun to arch or line the tunnel for 150' from each entrance in July 1832, but it progressed slowly for the first several months. The source of this dressed stone remains unknown, but it undoubtedly came from the area. The arch work continued into April 1833. Upon its completion, the cut stone portals were begun. As constructed,

³⁰Work Estimate for Section 7 by J. E. Appleton, July 5, 1832, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 5, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, May 30, 1832-November 17, 1832, RG 17; Heydinger, "Comprehensive History of the Pennsylvania Canal System," V:8.

³¹Work Estimates for Section 7 by J. and E. Appleton, July 5, 1832, August 3, 1832, September 1, 1832, October 1, 1832, October 31, 1832, December 10, 1832, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 5, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, May 20, 1832-November 17, 1832, RG 17; Samuel Jones to James Clarke, President of the Board of Canal Commissioners, December 22, 1832, Board of Canal Commissioners, Allegheny Portage Railroad, Reports and Miscellaneous Documents 1829-43, RG 17; Heydinger, "Comprehensive History of the Pennsylvania Canal System," V:9; The Ebensburg Sky (Pennsylvania), December 27, 1832.

³²Work Estimates for Section 7 by J. and E. Appleton, January 3, 1833, February 11, 1833, March 11, 1833, April 9, 1833, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Box 6, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, December 20, 1832-August 30, 1833, RG 17.

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both ends of the tunnel had the same facade design. It was described as a Roman Revival style with a low relief lintel supported by Doric pilasters on each side.³³ They were completed in June, and with the end of that work, Staple Bend Tunnel was finished. Three years after its completion, Solomon Roberts, the engineer who oversaw its construction, wrote a book about the tunnel. He described the tunnel with these words:

There is a tunnel through a spur of the Allegheny, at the head of inclined plane No. 1, about four miles from Johnstown near which the Conemaugh makes a bend of two miles and a half. This tunnel is 901 feet long, and 20 feet wide by 19 feet high within the arch. It is arched for 150 feet in length at each end, and the entrances are finished off with ornamental facades of cut stone. The whole cost of the tunnel, including arching, was \$37,498.85.³⁴

Of that figure, \$21,903 was paid for the removal of 14,900 cubic yards of rock during excavation. The contractor received \$1.47 per cubic yard. The remaining cost of \$15,595.85 was paid for the dressed stone, installation of the arch, and building the two portals.³⁵

The Appleton Brothers' contract for building section seven did not include the railroad track. At first, a single track was constructed on the line. The contractor for the tunnel track was Riddle and Sweats. By the spring of 1835, an additional track had been laid. The rails consisted of wooden stringers topped with iron straps which were laid with a 4'9" gauge. At first, the cars were pulled through the tunnel by horse, but in 1836 locomotives replaced the animal power. This situation produced a fear that the smoke and steam from the engine produced unhealthy air in the tunnel. To calm the fright, Charles DeHass, then principal engineer, produced a report on January 14, 1837 in which he assured that the air was pure and no evil effect would come from it.³⁶

³³Jacobs, "The Old Juniata Canal and Portage Railroad," 169; Henry Wilson Storey, History of Cambria County, vol. I (N.Y.: Lewis Publishing Co., 1907), 361; Johnson, Giles, and Michaels, "Johnstown and the Pennsylvania Canal," 220.

³⁴Roberts, An Account of the Portage Railroad Over the Allegheny Mountains in Pennsylvania, 8.

³⁵Work Estimates for Section 7 by J. and E. Appleton, August 1832-July 1833, Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts, Boxes 4-6, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts, RG 17; Solomon W. Roberts, An Account of the Portage Railroad over the Allegheny Mountains in Pennsylvania (Philadelphia: Nathan Kite, 1836), 8.

³⁶Heydinger, "Comprehensive History of the Pennsylvania Canal System," v:19; Peregrin Prolix, A Pleasant Peregrination through the Prettiest Parts of Pennsylvania (Philadelphia: Crigg and Elliot, 1836), 37; Logue, "History of Old Portage Railroad;" McCullough and Leuba, The Pennsylvania Main Line

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During the period from the time the portage railroad opened in April 1834 until the Staple Bend Tunnel was abandoned in December 1852, repair records do not indicate any work was needed on it. In 1837, a lead pipe was laid through the tunnel to carry water from the east side to the canal on the west. In this manner, additional water was supplied for the canal's western division.³⁷

Although proposals were made in the 1830s and 1840s to develop a planeless portage railroad, nothing came of these overtures until 1850. On May 10 of that year, the state legislature passed an act to make a survey for a planeless portage. Construction on this new portage railroad began in June 1851. Work progressed so quickly that by the end of 1852 the first three planes on the old portage were no longer needed. Staple Bend Tunnel, which fell within this area of the old portage railroad, was abandoned. On July 1, 1855, the new portage line came into use and the entire route of the old portage was forsaken. Just prior to its completion, however, Pennsylvania governmental leaders decided to sell the canal and portage railroad. Consequently, the legislature passed and the governor signed an act on May 8, 1855, which authorized the sale of the canal and old portage railroad. No bids were made to purchase this transportation system. Another act for its sale was approved on May 16, 1857. The Pennsylvania Railroad Company, which by this time had completed its line across the state, bought the property on June 25, 1857 as the only bidder. It took possession on August 1 of that year.³⁸

The Pennsylvania Railroad made no use of Staple Bend Tunnel. In 1858, it removed the rails. The portage route, including the tunnel, became a roadway for area residents. By 1889, this use, by and large, had been discontinued. Sometime before 1889, the facade on the east portal of the tunnel was removed for building purposes.

Since no photographs exist of the tunnel's east portal with a facade, some have questioned whether or not that entrance had a facade. The written evidence indicates clearly that it did. In a May 16, 1832 communique, Sylvester Welch indicated the tunnel plan called for facades at each end.³⁹ Solomon Roberts, the engineer who oversaw construction, wrote in a book in 1836 that

Canal, 62.

³⁷Heydinger, "Comprehensive History of the Pennsylvania Canal System," V:14.

³⁸Jacobs, "The Old Juniata Canal and Portage Railroad," 169; Wilson, "The Evolution, Decadence and Abandonment of the Allegheny Portage Railroad," xcv; Jenkins, Pennsylvania: Colonial and Federal, III:295; Davis, A History of Blair County, I:57.

³⁹Sylvester Welch to James Clarke, President of the Board of Canal Commissioners of Pennsylvania, May 16, 1832.

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"the entrances are finished off with ornamental facades of cut stone."⁴⁰ He also gave the same description in an 1837 newspaper article and in his 1882 reminiscences. An account in the Johnstown Mountain Echo of 1851 mentioned the portal facades. In 1907, Henry Storey wrote that the east entrance facade had been removed for building purposes, but he gave no indication of a date or the building on which the stones were used. The oldest dated photograph, taken in 1889, shows the east portal without a facade.⁴¹

The Pennsylvania Railroad did not own the tunnel property for any length of time after acquiring it in 1857. By 1867, it had sold a parcel of land which included about half of the area above the tunnel from its east side to Robert King. Another parcel, which included the ground above the tunnel from its west end, was purchased by the Cambria Iron Company. It used the area adjacent to the tunnel as a dump site for slag from its smelters. In the early 1920s, Bethlehem Steel leased the Cambria Iron Company's property. On September 21, 1942, Bethlehem Steel purchased Cambria Iron. With this takeover, Bethlehem Steel acquired that portion of the tunnel in Cambria's ownership. In the meantime, Bethlehem Steel purchased the King property and thereby gained control of the entire tunnel. Staple Bend Tunnel is still in the possession of the Bethlehem Steel Corporation.⁴²

Aside from general deterioration since its abandonment in 1852 and the loss of the facade from the east portal, Staple Bend Tunnel has sustained other changes. Around the turn of the century, the American Pipe Line Company ran a water pipe through the tunnel. To protect the pipe, it sealed each entrance with a concrete wall. A small doorway was constructed in the center of each wall which contained a wooden header and frame. A wooden door with slating prevented the public from entering the tunnel. In 1951, the Bethlehem Steel Corporation laid its own water pipe system through the tunnel. The pipes from both eras still exist. At the same time, it removed the upper portion of the concrete walls, and cut a larger doorway area. The wooden doors were replaced with larger, double metal doors which have been welded shut. Concrete blocks were used to replace the concrete removed

⁴⁰Roberts, An Account of the Portage Railroad Over the Allegheny Mountains in Pennsylvania, 8.

⁴¹Hollidaysburg (Pennsylvania) Register, January 18, 1837; Solomon W. Roberts, "Reminiscences of the First Railroad Over the Allegheny Mountains," Pennsylvania Magazine of History and Biography 2 (1878), 376; Johnstown (Pennsylvania) Mountain Echo, September 30, 1851; Storey, History of Cambria County, I:361.

⁴²Atlas of Cambria County, Pennsylvania (Philadelphia: Atlas Publishing Co., 1867); Atlas of Cambria County, Pennsylvania (Philadelphia: Atlas Publishing Co., 1890); information gathered at the Cambria County Courthouse, Ebensburg, Pennsylvania. Unfortunately, incorrect information filed in the Cambria County Courthouse on property ownership made it impossible to have exact dates for land purchases.

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from the upper space below the portal arches. Closing the tunnel has helped to protect its interior. As a result, the dressed stone arch in each end remains.⁴³

⁴³Information obtained from the rear of an Ira Stouffer photograph taken ca. 1910 which is located in the Pennsylvania State Archives, Harrisburg, Pennsylvania; Tribune-Democrat (Johnstown, Pennsylvania), February 2, 1975.

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9. MAJOR BIBLIOGRAPHICAL REFERENCES**PRIMARY SOURCES****Pennsylvania Historical and Museum Commission, Harrisburg, Pennsylvania**

Board of Canal Commissioners. Allegheny Portage Railroad. Reports and Miscellaneous Documents 1829-43. Record Group 17, Records of the Bureau of Land. This group of documents contained correspondence between the engineers who oversaw the railroad construction and the Board of Commissioners.

Work Estimates for Section 7 by J. and E. Appleton. July 27, 1831-July 8, 1833. Check Rolls, Work Estimates, Receipts, and Miscellaneous Accounts. Boxes 3-6, Allegheny Portage Railroad, Engineers Accounts, Estimates, Work Receipts. Record Group 17, Records of the Bureau of Land. The contractor, who constructed section 7 of the Allegheny Portage Railroad including the Staple Bend Tunnel, filed monthly reports detailing the progression of work. These reports included the monthly amount of cubic yards of rock removed from the tunnel and work on the tunnel arch and facades.

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The Sky (Ebensburg, Pennsylvania), December 31, 1831.

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Previous documentation on file (NPS):

- Preliminary Determination of Individual Listing (36 CFR 67) has been requested.
- Previously Listed in the National Register.
- Previously Determined Eligible by the National Register.
- Designated a National Historic Landmark. (Allegheny Portage Railroad of the Pennsylvania Canal)
- Recorded by Historic American Buildings Survey: #PA-1233
- Recorded by Historic American Engineering Record: # _____

Primary Location of Additional Data:

- State Historic Preservation Office
- Other State Agency
- Federal Agency (Allegheny Portage Railroad NHS & Denver Service Center, National Park Service)
- Local Government
- University
- Other (Specify Repository):

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10. GEOGRAPHICAL DATAAcreage of Property: approx. 2 acres

UTM References: Zone Northing Easting
 A 17 4469620 682120

Verbal Boundary Description:

The boundary of the nominated property is indicated by the dotted line printed on the attached Geistown Quadrangle USGS map, and its approximate center point is indicated by the above listed UTM reference point.

Boundary Justification:

The boundary of the nominated property includes the 900' long tunnel, from portal to portal. The remains of the dry laid retaining walls located beside each portal are not included within the boundary.

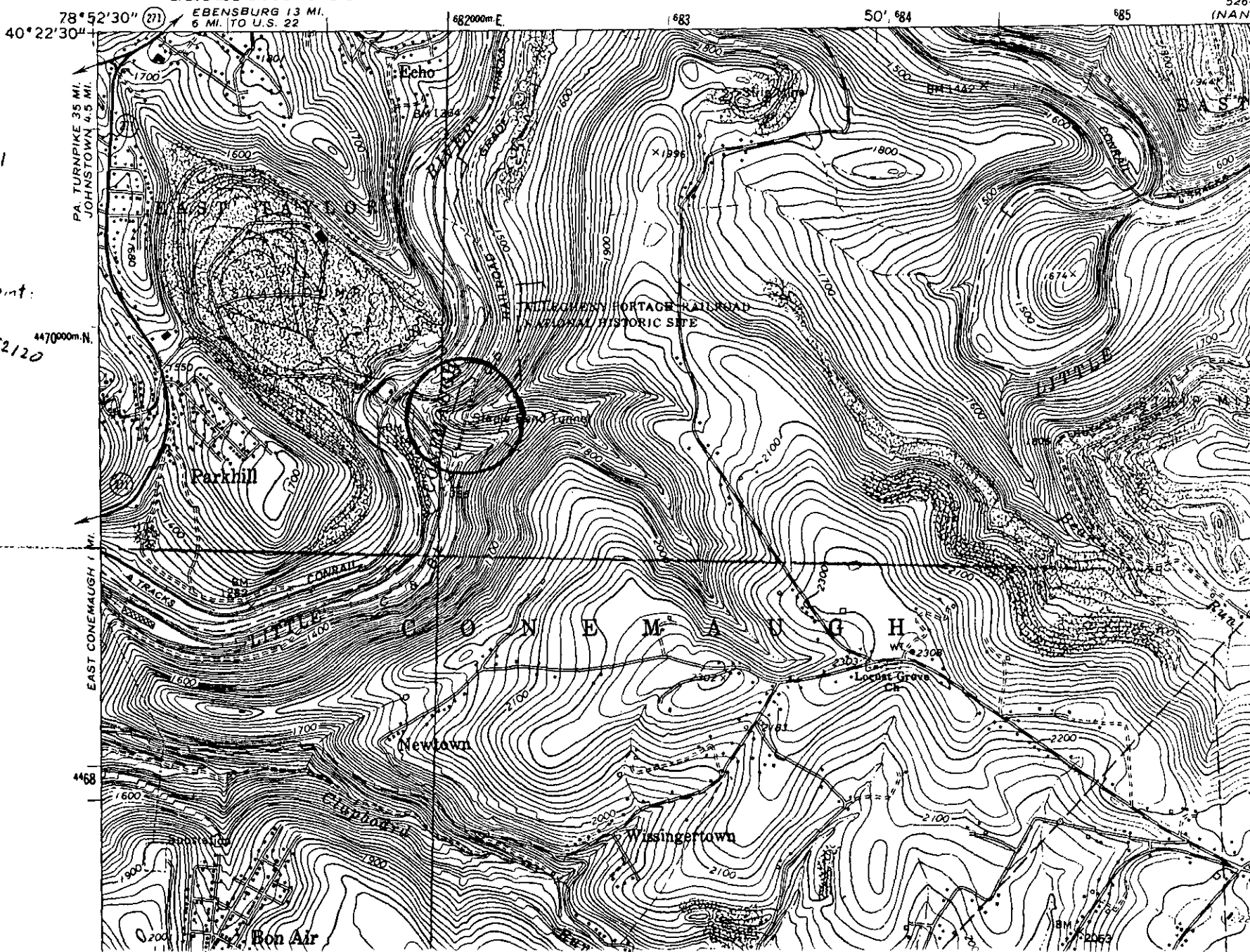
11. FORM PREPARED BY

Name/Title: Berle Clemensen/Historian Org.: Denver Service Center, NPS
Street: 12795 W. Alameda Parkway City/Town: Denver State: Colorado
ZIP: 80225-0287 Telephone: 303-969-2358 Date: October 1993

528° 14' NW
(WINTONDALE)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH
DEPARTMENT OF ENVIRONMENTAL
TOPOGRAPHIC AND



Staple Bend Tunnel
Conemaugh Twp
Cambria County, PA
Geistown Quad
USGS Reference Point:
17/4469620/682120