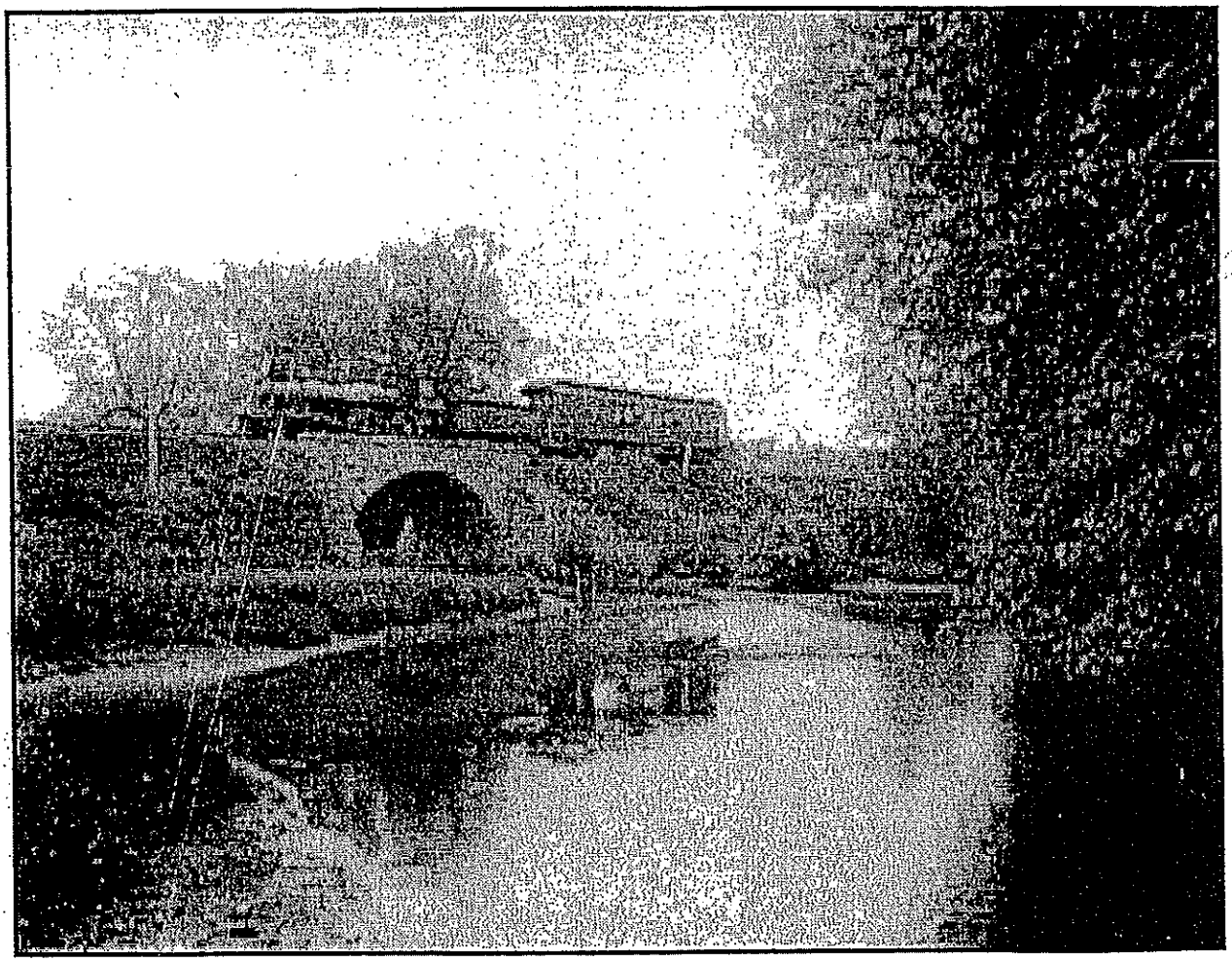
May 2002

The Wallkill Valley Heritage Trail Management Plan



A train on the Sussex Branch of the Delaware, Lackawanna & Western Railroad crosses the Wallkill in Franklin on a stone bridge erected in 1869. [Photo between 1890 and 1901] Detroit Publishing Co., State Historical Society of Colorado; 1949. Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA

Northern Region Office
20 Route #23, Franklin, NJ 07416
Division of Parks and Forestry,
NJ Department of Environmental Protection
May 2002

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Our Vision

We, as stewards of New Jersey's historical and natural resources,
are dedicated to protect and interpret
the unique geological, biological and cultural features
of the proposed Wallkill Valley Heritage Trail
for the enjoyment, education and inspiration
of present and future generations.

Our Legacy, Our Responsibility

- Historic Sites since 1903
- State Forests since 1905
- State Parks since 1915

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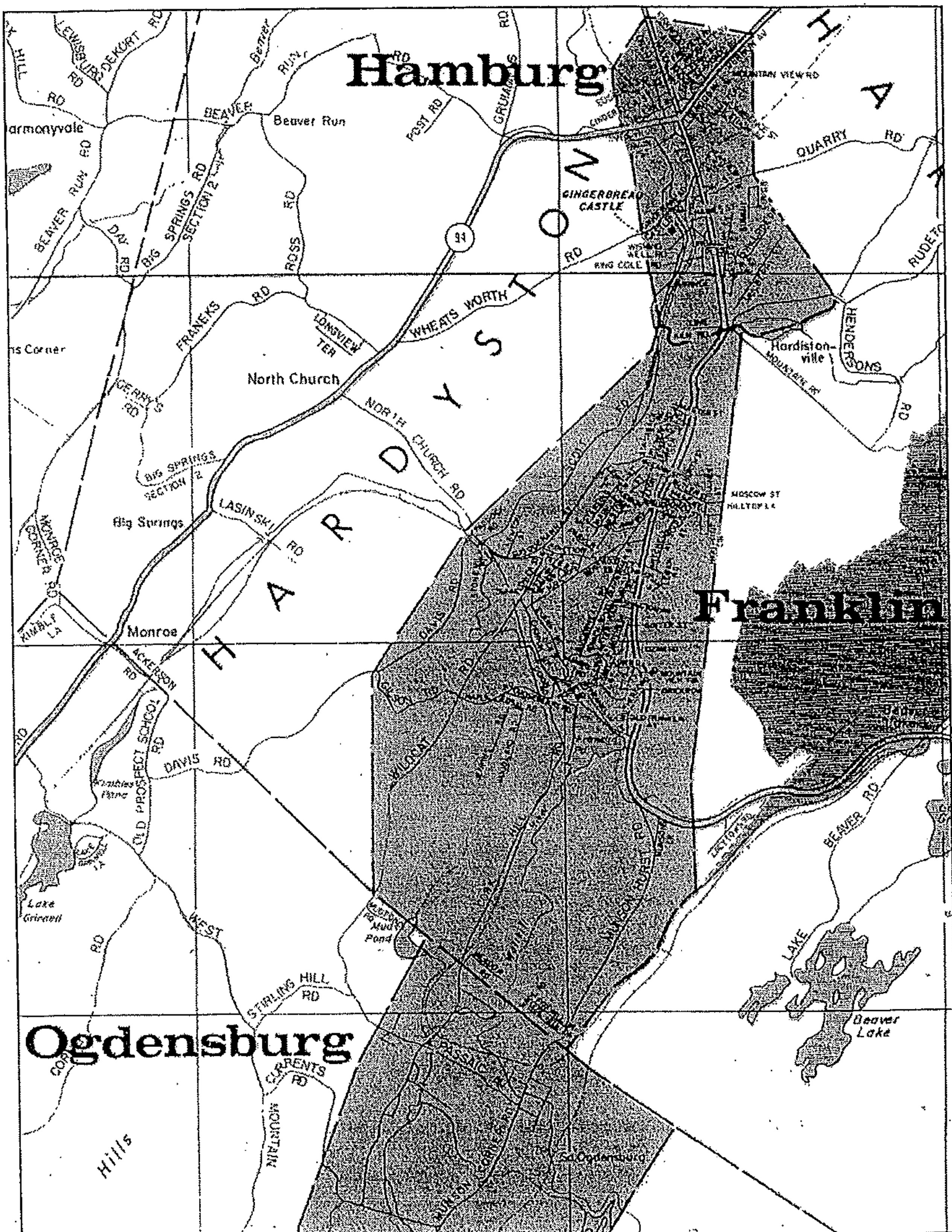
Hamburg
Franklin
Ogdensburg
HARDYSTON
Beaver Run
North Church
Big Springs
Monroe
Hardiston-ville
GINGERBREAD CASTLE
WHEATS WORTH
LONGVIEW TER
NORTH CHURCH RD
LASINSKI RD
ACKERSON RD
OLD PROSPECT SCHOOL RD
DAVIS RD
STIRLING HILL RD
QUARRY RD
BEAVER RD
BEAVER RUN RD
ROSS RD
POST RD
FRANEKS RD
CURRENTS RD
MOUNTAIN
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Mud Pond
Lake Grinnell
Beaver Lake
LAKE
Hills
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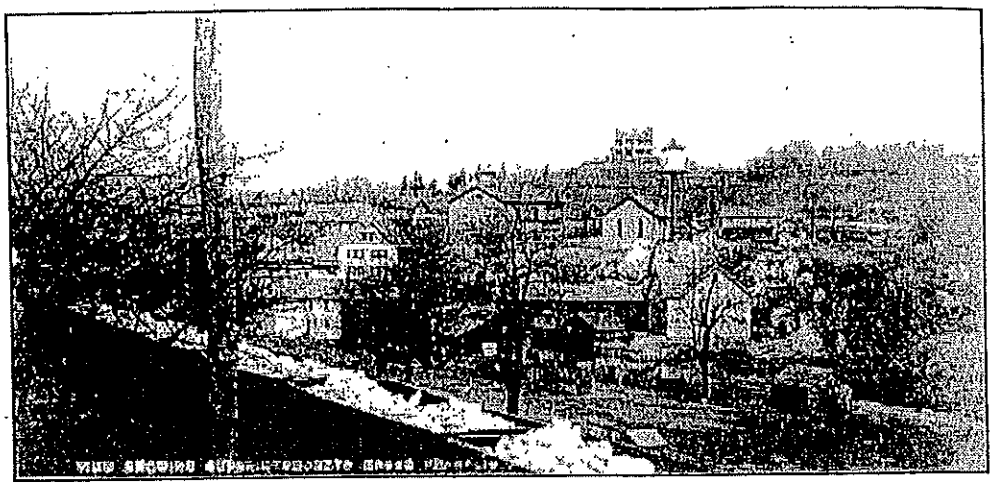
"Zinc dominates the land here; in the rocks, underground, and in row after row of gray shingled company houses. The highway itself is built over a maze of underground tunnels where 75 miles of electric railway connect mining operations. Owned by the New Jersey Zinc Co., the region contains one of the largest supplies of zincite, franklinite, and oxide of zinc in the world; about 500,000 tons of zinc ores are extracted annually. Franklin was a mining town before the discovery of zinc. A hundred years ago it was a pig-iron center with two forges and a blast furnace."



New Jersey: A Guide to its Present and Past, Federal Writers' Project, June 1939.

1.0 Introduction and Summary

Rail-trails recycle transportation corridors as linear parks, not only opening opportunities for safe recreation and scenic enjoyment, but linking fragmented wildlife habitats, while building appreciation for the protection of historic and natural resources through heritage interpretation. Converting Rails-to-Trails, the New Jersey Trails System continues the public benefit of abandoned railroad rights-of-way as multiuser pathways for the conservation, appreciation and quiet enjoyment of their fascinating wayside scenery, geology, history, and ecology.

The proposed Wallkill Valley Heritage Trail will follow the abandoned right-of way of the Midland Railroad, built in 1871-72 (which became the New York, Susquehanna & Western Railroad in 1881), and link significant geological and historical resources associated with the world-renowned mineral heritage of the Franklin Formation along the Wallkill River in Sussex County, New Jersey. This trail purposes to enlarge the audience for this unique mineral heritage beyond mineralogists, geologists, and local enthusiasts, thereby tapping into the potential economic effects of heritage tourism.

To achieve the maximum public benefit compatible with the nature and purposes of the trail, it is intended that a segment of the Wallkill Valley Heritage Trail, running parallel with Cork Hill Road between Sterling Hill and the Wallkill in Franklin, shall become the first fully accessible ADA trail, managed by the State Park Service, in northern New Jersey. This will extend the recreational benefits and inspirational experience of our outdoor heritage to those who are limited by circumstances but unbounded in their potential.

This Trail Management Plan designs a program of development, management, and heritage interpretation, that will protect the scenic values of the trail environment and enhance its safe enjoyment, while minimizing any potential adverse effects upon its neighbors (who may benefit most from a well-managed public resource). In seeking to define the public interest, this Trail Management Plan opens the deliberative process to the scrutiny and participation of local governments, adjacent landowners, as well as potential users, whether they participate as individuals or as an organized interest.

1.1 Rails-to-Trails Initiatives in Northwestern New Jersey

The Wallkill Valley Heritage Trail is one of three projects actively being considered for addition to the 47 miles of existing rail-trails in northwestern New Jersey. The State Park Service currently administers the 20-mile Sussex Branch Trail on the former rail bed of the Sussex Branch of the Delaware, Lackawanna & Western Railroad, running north from the Musconetcong River in Byram Township to Branchville (with the exception of 1 1/2 miles within the limits of the Town of Newton). The section south of Andover was acquired in 1979 and the remainder in 1982. The Paulinskill Valley Trail utilizes 27 miles of the abandoned New York, Susquehanna & Western Railroad, acquired for trail purposes in 1992. It crosses the Kittatinny Valley between Knowlton Township in Warren County and Sparta Junction in Sussex County. (For map, see 10.0 Appendices, p. 49)

The proposed Iron Horse Heritage Trail will occupy 9.25 miles of the abandoned right-of-way of the Franklin Extension of the Sussex Railroad (D. L. & W.), opening a connection between the Sussex Branch and Paulinskill Valley Trails in Lafayette Township and the proposed Wallkill Valley Heritage Trail in Franklin. The remaining segment of the Sussex Branch of the Delaware, Lackawanna & Western Railroad, extending a half mile through the Borough of Branchville, is also being discussed for development as a heritage rail-trail.

Additional abandoned rail lines being considered for acquisition include 18.5 miles of the Lehigh & New England Railroad, 31 miles of the Lehigh & Hudson Railway, 19 miles of the Warren Branch of the Delaware, Lackawanna & Western Railroad (including the Oxford and Bel-Del branches), and the 7 remaining miles of the Hanford Branch of the New York, Susquehanna & Western, running between the Wallkill Wildlife Refuge and the State line. When complete, the New Jersey Trail System could make 137 miles of rail-trails in Sussex and Warren Counties available for non-motorized public use.

1.2 Rail-Trails and Heritage Interpretation

Our historical and natural heritage enriches us by its mere presence, evoking wonder and demanding explanation. Interpretation makes the bridge between curiosity and understanding, between observation and insight.

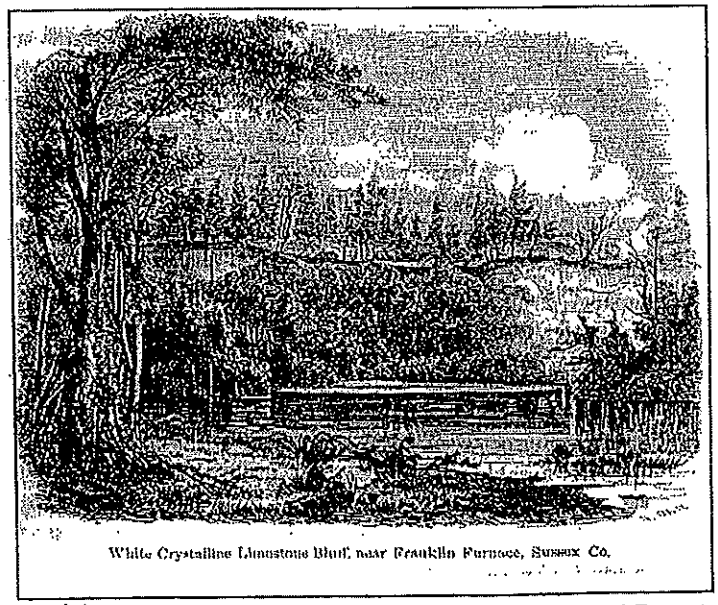
Although nothing in the New Jersey Trail System Act of 1974 (P. L. 1974. c. 159) officially recognizes the interpretive value of rail-trails per se, this trail has such significant historic and natural resources along its route that the functional designation of a heritage trail is more than appropriate. After all, heritage interpretation strives to enlighten people as to their interesting and significant surroundings, preparing the foundation for true resource stewardship.

A recent study on projected visitor trends in the northeastern United States notes that the programmatic and experiential aspects of tourist visitation "will become increasingly important in visitor satisfaction and the creation of memorable experiences will become the most important variable in determining the level of visitor satisfaction." To meet this challenge, heritage interpretation will become an important component of tourism, addressing an aging, better educated, and more diverse audience.

As stewards of the land, of its natural diversity and its splendor, of its scenic wonders and historic places, the Division of Parks and Forestry offers an inclusive interpretive program, providing opportunities for people to connect with the historic and natural resources in its care, using heritage interpretation to create meaningful, memorable experiences for the broadest possible audience. The proposed Wallkill Valley Heritage Trail uniquely showcases the important link between the land and the people, between natural resources and history.

1.3 The Wallkill Valley Heritage Trail

The Franklin Formation of the Wallkill Valley, famed for its unique stock of minerals, is a geologic wonder that has long incited international scientific curiosity. Franklin and Sterling Hill have yielded 10% of all presently known mineral species. Exploitation of the vast mineral wealth of this region progressed from flaked and ground stone tools, water-driven trip hammers, through a sequence of technological innovations, culminating with Thomas Edison's process of electromagnetic ore separation at the Edison Concentrating Works. Likewise, under the demands of conveying raw ores, bulk fuel and refined products over rough hills, transportation advanced from pack animals on wilderness paths, to wagon roads, turnpike roads, canal navigation, mine tramways and steam locomotion. This remarkable journey might be revisited and enjoyed by a wide audience through a coordinated effort at identification, interpretation and marketing.



Limestone Bluff, near Franklin Furnace, *Second Annual Report of the Geological Survey of the State of New Jersey*, Trenton: 1856

The Franklin Formation is a resource base that has been centrally linked to patterns of human settlement and activity for several centuries. The earliest human incursions into this region made use of its lithic resources, especially flint, starting over 7,000 years ago. The valuable Franklinite and zinc deposits at Franklin and Sterling Hill are located in the white crystalline limestone, at or near its conjunction with the gneiss rock, on the west side of the marble belt, extending for several miles north and south of Franklin Furnace. The zinc deposits, hosting a remarkable variety of rare and interesting minerals, some not found at any other locality, inevitably attracted the attention of leading mineralogists and geologists throughout the world. Located within the Route #23 corridor of eastern Sussex County, these ore loads and their development communicate a complex and layered history of mining, technology, transportation, commerce, and nature, made vivid to residents by remnant mine openings, industrial buildings, and the towns of Ogdensburg, Franklin, and Hamburg, each named for pioneer iron forges or their proprietors.

Along the right-of-way of the Midland Railroad between Ogdensburg and Hamburg, the Wallkill Valley Heritage Trail will connect the Sterling Hill Mine Museum, the Ogdensburg Fen and Glade, the Homestead Lime Kilns, Franklin Pond, the Franklin Mineral Museum, views of the Wallkill River and its wetlands, NJ Zinc Mill No. 2, the Windsor Lime Kilns, the Sparks Paper Mill site, and proximous geologic, biotic and historical features of note within its view shed. The host towns retain a small-scale character, preserving the housing stock and cultural traditions of mining and water-power industrial communities. This Heritage Trail can convey the complex history of the area, while also establishing a community of interest for the cooperative public and private sector partnerships to preserve and interpret such internationally-significant natural and cultural resources. The Northern Region Office of the State Park Service, New Jersey Division of Parks and Forestry, working cooperatively with local citizens and municipal officials, is hereby developing a conceptual framework for the proposed Wallkill Valley Heritage Trail, that will accelerate the process and progress of our cooperative efforts, serving as a catalyst for ongoing commitments.

The Wallkill Valley Heritage Trail links physical remnants of lands and structures possessing significant historic, cultural, and scenic values, associated with a unique mineral heritage of international interest, for their educational and inspirational benefits. The natural, geologic, historic, and scenic features that may be enjoyed along this section of the abandoned right-of-way of the Midland-N. Y., S. & W. Railroad combine to form a cohesive, distinctive landscape arising from patterns of human activity shaped by a common resource base.

Offering a wealth of attractions, wayside places to contemplate nature, and a neighborly, safe corridor for exercise and relaxation, the Heritage Trail will strengthen a sense of community, combine opportunities for recreational and educational experiences, promote heritage tourism, and help to revitalize downtown business districts through a system of connecting walking tours. Appreciation of the meaning and lasting value of its many significant resources will promote their appreciation and preservation for future generations.

This Management Plan identifies the natural and historical significance of the trail corridor, inventories key resources, develops management concepts and guidelines, and proposes developmental alternatives for general consideration. This information is made available to all stakeholders and municipal leaders, as well as to others with an interest in the future of these resources. The data collected is commensurate with a broad-based management plan; but is not intended to be exhaustive. The State Park Service, NJ Division of Parks and Forestry, needs to build a working partnership with residents, businesses, and local governments, to coordinate public access to these resources, to link and promote them with consistent wayside exhibits, to implement complementary educational programs, and to cooperate in management issues for the safe, protective enjoyment of the resources by a wide audience.

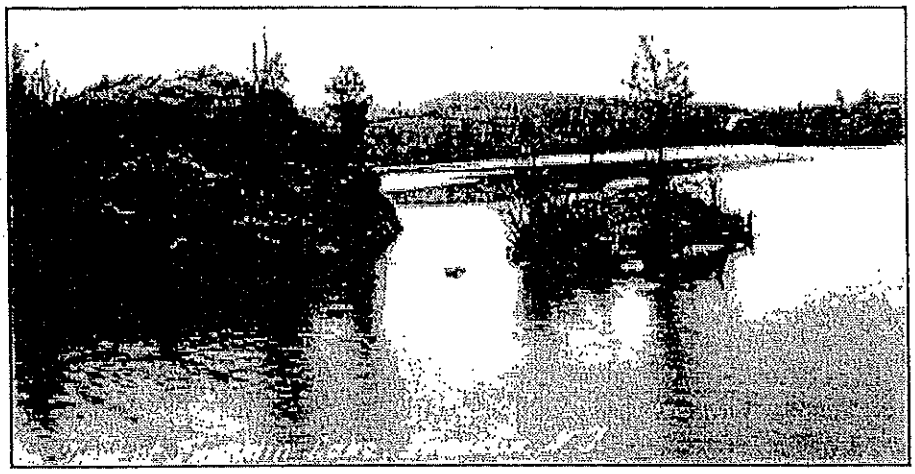
2.0 Background

The State of New Jersey is negotiating to purchase in fee the former railroad right-of-way of the New York, Susquehanna & Western Railroad Company, through a portion of Ogdensburg, Franklin, and Hamburg, for the purpose of developing and managing a scenic trail as part of the New Jersey Trails System. Either Kittatinny Valley State Park, which already operates the connective Paulinskill Valley and Sussex Branch Trails, or a new management unit, will manage and maintain the Wallkill Valley Heritage Trail.

The Wallkill Valley Heritage Trail occupies 5.45 miles of the abandoned right-of-way of the Midland-New York, Susquehanna & Western Railroad (.57 mile in Ogdensburg, 3.5 miles in Franklin, 1.38 miles in Hamburg).

Local officials and community supporters have actively worked with the Northern Region Office of the State Park Service and with Kittatinny Valley State Park to create and secure the benefits of a rails-to-trails heritage corridor, linking significant resources of scenic, recreational and interpretive value.

3.0 The Trail Environment



In passing from Sterling Hill through Ogdensburg and Franklin, the abandoned right-of-way of the Midland-New York, Susquehanna & Western Railroad occupies an artificial embankment of trapezoidal cross-section, 66 feet wide at its base, tapering to a width at its crown of approximately 10 to 12 feet (used for the actual rail bed). To maintain an easy gradient between Sterling Hill and a point just north of the intersection of Maple and Cork Hill Roads, the Midland engineers surveyed and constructed their line of track along the foot of Wildcat Ridge, a granite hill faced east with the Franklin marble. The track in this section runs upon the white limestone (Franklin marble) terrace that forms the hill's eastern slope, west of the Wallkill, running alongside Cork Hill Road (which it twice crosses). In this vicinity, the rail bed offers scenic views of Franklin Furnace Pond and Mine Hill. From the former intersection of the main line with the switch to Franklin Furnace, just north of Maple Avenue, the track crosses the granite apex of Wildcat Ridge. Both Franklin Avenue and the railroad cross the Wallkill where the granite abuts an elongated exposure of sandstone, bordering the blue limestone floor of the Kittatinny Valley to the northwest. Intersecting the Franklin Extension of the Sussex Railroad, the Midland (N. Y. S. & W.) continues north along the Wallkill, crossing northwest of the stream for .625 of a mile, culminating at the head of the Paper Mill Pond, where the railroad again passes southeast of the river, throwing off a switch to the Windsor Lime Kilns.

The Wallkill Valley Heritage Trail holds the potential to connect a thematic community of heritage resources, including: many significant geologic formations and features; Natural Heritage Priority sites; remnants of the Sharpsborough Ironworks; sites and landmarks associated with the Fowler family; the Homestead Lime Kilns and the NJ Calcite Company limestone quarries on Cork Hill Road; the sites of two Franklin Furnaces and associated ironworks, Mine Hill; the Franklin Mineral Museum; the Sterling Hill Mine Museum; the double-arch stone trestle and embankment on the Midland Railroad across the Wallkill and road at Ogdensburg; the site of the NJ Zinc Company's Mill No. 2; the Hamburg Paper Mill site; the Windsor Lime and Cement Kilns at Hamburg; and the Stone Mill and Gingerbread Castle at Hamburg. Remote attractions include the Ogdensburg Schoolhouse Museum; the site of the Edison Concentrating Works on Sparta Mountain above Ogdensburg; remnants of the Ogden Mine Railroad atop Hopewell Mountain; limestone quarries at Rudeville and McAfee; the Andover Furnace and Mine in Andover; the site of the Andover Forge at Waterloo; Wawayanda Furnace in Vernon; ruins of the New Andover Bloomery at the confluence of Lubber's Run and the Musconetcong River in Byram Township; the sites of anchor works and bloomeries along the Wallkill in the Sparta Valley; and remnants of the Sussex Mine Railroad, including the Iron Hotel at the White Hall Summit; and trails on the abandoned tracks of railroads that carried anthracite, mineral ores, and farm products.

3.1 Major Topographic and Geologic Features

The Wallkill, tributary to the Hudson River, heads in a swampy basin, originally called Brogden's Meadow, but impounded in 1929 to form Lake Mohawk. The stream descends a narrow marble trough along the southeast margins of the Kittatinny Valley, always seeking the path of least resistance amidst lobes and isolated masses of the Highlands, intervening slate ridges, and a thick bed of glacial debris. The stream exits its narrow valley at Franklin Furnace, descending 128 feet before it reaches Hamburg. A most fortunate natural combination of rich ores, limestone for flux, forested hills for charcoal, and convenient waterpower, encouraged metallurgic industries along its banks. North of the Hamburg, the river melts into a flat expanse of meadows, the head of the so-called Drowned Lands.

The Highlands embody the plutonic roots of ancient mountains, elevated by tectonic compression along the North American coast during the Mesoproterozoic assembly of the Rodinia supercontinent. This episode of mountain-building, called the Grenville Orogeny, occurred as an ocean basin closed between 1.1 to 1.0 billion years ago. Upwelling domes of molten granite intruded and lifted overlying sedimentary rocks of marine origin, raising an alpine range between Texas and the Adirondacks. Deep burial subjected older rocks and sediments to metamorphic alteration. Relics of an ancient sea bed are now exposed as a low ridge of limestone and marble, known as the Franklin Formation, which extends for nearly twenty-five miles along the western margin of the Wallkill Valley. Outcrops of dolomite occur near Sparta and Ogdensburg.

From 300 to 286 million years ago, in the Alleghenian Age, the southeastern margins of North America buckled in another collision with the southern supercontinent of Gondwanaland, rumpling concentric arcs of fold mountains. The Appalachian Orogeny compressed 100 miles of terrain into a width of about 65 miles, lifting the Kittatinny Mountains, Walpack Ridge and the Green Pond Mountains. Some geologists believe that the Proterozoic Highlands were broken from their roots and shoved tens of miles inland, pushing mountain blocks over the eastern margins of the limestone valleys. Shedding 5 to 15 km of overlying sediments, basement rock comprising the present Highlands was exposed at the surface during Late Triassic time.

Six sharp Pleistocene drops in sea level over the past 1.8 million years correspond with polar ice sheets reaching the middle latitudes of North America, covering northern New Jersey at least three times. During the Wisconsin Stade, blue ice spread from the Laurentide Plateau of Quebec, Canada, to inundate one-third of North America. Marking its onset, sea level fell about 235 feet between 124,000 and 115,000 years ago. The Hudson-Champlain Lobe of this ice sheet reached its maximum about 21,750 years ago. This glacier began to waste away from its southern limits between 18,000 and 17,430 years ago.

The Wallkill Valley Heritage Trail crosses a rolling landscape of ice-contact deltas and meltwater lake deposits and so discloses the remarkable deglacial history of the Wallkill Valley. Stagnation of the ice led to the formation of the largest and best marked recessional moraine in New Jersey, which extends between Ogdensburg and Culvers Gap. Writing on *The Glacial Geology of New Jersey* in *Volume V of the Final Report of the State Geologist* (1902), Rollin Salisbury postulated (on page 272) that the large embankment of stratified drift in the Wallkill valley at Ogdensburg was "deposited in a huge crevasse in the stagnant ice of the valley." The ridge crests at 660 feet above sea level, standing about 100 feet above the valley to the south. It provided a natural causeway for the Midland Railroad (N. Y. S. & W.), requiring only a double-arch stone bridge and artificial fill to cross the narrow gap where the Wallkill passes.

Rollin Salisbury also described (on page 351) a small moraine area, lying across the Wallkill from the great crevasse-ridge of sand and gravel upon which the village of Ogdensburg stands. Its topography is best developed just north of the Four Corners near the Sterling Hill mines, on both sides of the New York, Susquehanna & Western Railroad. The hillocks and depressions are sharply defined, with changes in elevation of twenty feet or more, and the surface strewn with boulders.

The fascinating geologic and natural features of the Wallkill Valley are evident in several key sites. Several geologically unique sites are considered for Green Acres or partnership preservation:

1. Zero fault, Route 23, Franklin, NJ. (Easement on Block 70, Lot 1.01) Named for a mine survey grid coordinate at the Sterling Hill mine, the Zero Fault is a major regional fault in the Highlands, where it bounds the Wallkill River valley along the west side. The fault has a width of about 25 feet and a continuous length of 14.5 miles. In addition to being an ancient fault (over one billion years), it is significant in being one of the few places in the State where one can see and touch a fault. There is a difference of 600 million years between the Precambrian marble on the west side of the fault and the Paleozoic dolomite on the east side. The Zero fault was exposed in the Sterling Hill mine where it cut the zinc ore body. This outcrop is an outstanding location and exposure for anyone interested in learning about faults and their impact on the environment.

2. Pikes Peak (Franklin) mine, Cork Hill Road, Franklin, NJ. (Partial purchase of Block 64, Lots 38.01 and 40)This mine was opened before 1855 and worked almost continuously until 1881, producing Bessemer grade iron in the form of the mineral magnetite. During and after the Civil War, the mine supplied iron for cladding gunboats. The mine is located near the Wallkill River, south of the Franklin zinc ore deposit, but the iron ore band extends for about 1.25 miles and actually occurs in two separate veins that are thought to have formed at the same time as the zinc deposit, making

the association of the zinc and iron unique in the State. There are only two places where the magnetite veins can be seen, at this mine and at the Buckwheat pit in Franklin where they occur just beneath the zinc ore body.

3. Franklin zinc ore deposit, High Street, Franklin, NJ. (Easement on or partial purchase of Block 45, Lot 1.01) Perhaps no other mines in the State are as world renowned or historically important as the companion zinc deposits at Franklin and Sterling Hill in Ogdensburg. These mines are quite old and date back to the late 1700s. They are also unique in that no other zinc ore deposit like them exists anywhere in the world. Between them, these deposits have produced more than 330 different minerals, 33 of which occur only in NJ. The mineral Franklinite was named after the Franklin mine, where it is one of the three principal ore minerals in the zinc deposit. Recent excavation in the vicinity of High Street has exposed the only remaining pillar of the original zinc ore deposit. The importance of its preservation from the scientific perspective, as well as for historic posterity is unquestionable. In fact, the enclosing area of the Buckwheat pit is equally significant in that it exposes a rare occurrence of the iron vein that lies just beneath the zinc deposit (See Pikes Peak mine above). In addition, the marble hosting the zinc deposit is intruded by a 435 million-year old igneous rock known as a dike that is related to the nepheline syenite body at Beemerville (see no. 7 below). The dike contains fragments of the marble and of the zinc ore deposit that were broken off when the dike was emplaced. Acquisition of, or other protective measures for, the Buckwheat pit from Evans Road north to High Street represents a logical extension of the protected Franklin Mineral Museum and Parker shaft and dump.

4. Precambrian gneiss, Route 94, McAfee, NJ. (Easement on or partial purchase of Block 231, Lot 14.03) This unique outcrop best displays the concept of cross-cutting relationships, perhaps better than any other in the Highlands. A geologic feature in an outcrop that cuts across one another enables the relative age and timing of its origin to be determined by comparing it to other features in the outcrop that it crosses or that cross it. This 1 billion-year old outcrop displays a variety of features that are easily interpreted and quite intrusive for earth science students and teachers, as well as the general public. An abandoned marble quarry to the northwest (White Rock Quarry) contains a network of caves that have been explored and surveyed by the New Jersey Grotto.

5. Unconformity, Wildcat Road, Franklin, NJ. (Easement on Block 61, Lot 17) This exceptional outcrop has been an important stop for geologists and earth science students for many decades. The rock ledge extends along the east side of Wildcat Road and along the wooded west edge of a golf course. It preserves evidence for the covering of the State by a shallow sea at about 560 million years ago. The rocks on top are 560 to 500 million-year old fossil beach sand and overlying limestone that rests directly on 1.1 billion year old Precambrian gneiss. The contact beneath them, which is exposed here, is known geologically as an unconformity. It represents a long period of erosion (in this case about 550 million years) between the rocks above and below the contact. This type of geologic feature is seldom seen in this State, making this outcrop both rare and unique.

6. Glacially sculptured outcrops, Hamburg, NJ. (Total purchase of Block 11, Lot 30; previously offered to Green Acres) These exceptional outcrops of 500 million-year-old dolomite preserve a veritable museum of geologic features. Some features formed during the time the sediment making up the rock was deposited in a shallow sea and these easily observed features tell an interesting story. Large colonies of fossil algae lived in this shallow sea and their remains are beautifully preserved in the bedrock here. All of the features are enhanced by the fact glacial ice has polished the outcrops smooth. Grooves, or striations, were carved into the bedrock by rocks carried at the base of the glacial ice. They are well developed here and tell the direction of movement of the glacier. These outcrops are quite interesting and educational and would make a wonderful interpretive park for the general public.

7. Nepheline syenite, Beemerville area, Wantage Township, NJ. Located northwest of the Rutgers University 4-H camp (Lusscroft / Northern Station, Experimental Dairy Farm), this site contains one of only two exposures in the State of nepheline syenite, a very rare type of igneous rock. Questions still exist as to the origin of this rock even after a century of scientific investigation. Old, eroded volcanic necks that are the remains of the volcano (similar to the spectacular one at Rutan Hill) occur on the farm to the north of the nepheline syenite body. This site offers a unique opportunity to

see sedimentary rock that has been thermally altered by baking due to high temperature of the nepheline syenite that intrudes it. It is also the only place in the State to see the remains of volcanoes, in this case dating back about 440 million years in age.

These seven locations (and numerous others) will each be interpreted by one or more wayside exhibits and are part of a project by the New Jersey Geological Survey to preserve and interpret New Jersey's bedrock and surficial geology.

3.2 Natural Heritage Priority Sites

Natural Heritage Priority Sites contain some of the best and most viable occurrences of endangered and threatened species and natural communities. The boundaries of each are drawn to encompass critical habitat. Often the boundaries extend to include additional buffer lands to protect the habitat. Each site is ranked according to its significance for biological diversity. The scale ranges from B1 to B5, with sites ranked B1-B3 being of global significance and sites ranked B4-B5 being of state significance: B1 (outstanding significance, generally the "last of the least" in the world"); B2 (very high significance, such as the most outstanding occurrence of any natural community); B3 (high significance, such as any other viable occurrence of an element that is globally imperiled); B4 (moderate significance, such as a viable occurrence of a globally rare element); B5 (of general biodiversity interest). Five Natural Heritage Priority Sites are located along the route of the proposed Wallkill Valley Heritage Trail (See 10.0 Appendices, pp. 43-47). To ensure their preservation, some of these sites have been recommended for acquisition by Green Acres and others are being preserved by private individuals or organizations.

1. Franklin Mine

Description of Site

The site is an abandoned limestone quarry with 3-5 acres of remnant limestone glade vegetation present in several locations along rims of two quarry pits and in some adjacent disturbed areas, and more than 20 acres of limestone hardwood forest present in less disturbed areas.

Boundary Justification

The boundaries were drawn to include existing populations of rare plants and the limestone glade natural community and to include some adjacent buffer of limestone forest. The boundaries follow existing roads on the south, west, and eastern sides, and follows the forest edge on the northern boundary.

Biodiversity Rank (B4)

The site contains the State's best occurrence of a globally rare natural community and a concentration of state significant plant species.

2. Ogdensburg Fen

Description of Site

A limestone fen adjacent to an intermittent stream, surrounded by young successional forest (dominated by red cedar). The largest fen patch is on the western side of the site, with smaller fen openings present on the eastern end of the drainage.

Boundary Justification

Primary bounds follow the boundary of the limestone fen habitat known currently. Secondary bounds incorporate topographic drainage basin east of Cork Hill Road and north of Kennedy Avenue. Although the majority of the topographic drainage basin is outside of the secondary bounds, preliminary field investigation suggests that the fen may receive most of its overland runoff from east of Cork Hill Road. More detailed hydrological investigations may justify extending this boundary to incorporate more land needed for protection of groundwater seepage.

Biodiversity Rank (B2)

Contains a good example of a globally rare wetland natural community, a State-listed threatened animal species, a globally rare State endangered plant species, and several other State rare plant species.

3. Ogdensburg Glades

Description of Site

Two grassy herb dominated openings on limestone hillsides surrounded by and partially invaded by red cedar. One under powerline right-of-way, the other on the hillside.

Boundary Justification

Boundary drawn close to enclose rare natural community and rare plant species populations.

Biodiversity Rank (B4)

A critically imperiled community supporting several elements including four State critically imperiled elements.

4. Sterling Mine

Description of Site

Former zinc mine, now privately owned and operated as historical tour. Rare plant species occurring on narrow rims, ledges, and crests ringing the abandoned quarry pits. These are open, xeric areas with thin, to no soil, and dominated by *Juniperus virginiana*, *Quercus*, and *Populus*.

Boundary Justification

Boundaries are preliminary; full extent of rare plants not known. Current boundaries are drawn to contain known extent of elements.

Biodiversity Rank (B3)

Best occurrence of NJ limestone glade. Concentration of State listed endangered plant species and plants of special concern.

5. Wildcat Ravine and Bog

Description of Site

The headwaters of a tributary to the Wildcat Branch of the Wallkill River. The site contains a rich wooded limestone ravine, a limestone fen/marsh, and forested and nonforested lands draining towards the wetlands.

Boundary Justification

Bounds include limestone ravine and limestone marsh/fen, which are habitat for rare plant species, and forested and nonforested lands draining towards the habitat.

Biodiversity Rank (B4)

The site contains good populations of two State-listed endangered plant species, and several plant species of concern.

4.0 Prehistoric Resources

The prehistoric Minisinks were a dialectal grouping and loose alliance of families, who inhabited the ridges and valleys from the Hudson Palisades and interior Highlands northwest to the Catskill-Pocono Plateau, between the tidal heads of the Schuylkill and Hudson Rivers. Though widely dispersed along the principal streams of this rugged, deglaciated hill country, the largest groups resorted to seasonal resource-stations, mainly fall/winter hunting camps and spring fishing stations, in the Upper Delaware Valley.

At least three affiliated groups of Minisinks are historically identifiable as residing inland of the first range of Highlands, within the present boundaries of New Jersey: the Minisinks, Pequannocks, and Tohockonetcong. The Minisinks inhabited several large villages, in the Upper Delaware Valley, centering in the vicinity of the river island called Minisink. The name "Minisink" may derive from *minne* (a corruption of mbi, meaning "water") or from *minnisais*, meaning "the smaller island." The Pequannock resided east of Lake Hopatcong , along the stream that still bears their name, extending southeast to the Watchung Ranges.

"Pequannock" is probably an approximation of *pequen-ittuk*, referring to a place "cleared of trees." Eastward, between the Ramapo Mountains and the Saddle River, their territory blended into the domain of their relations and allies, the Machkentiwomi (Kakiat) and Tappans.

The Tohockonetcong band of the Minisinks dwelt upon the river and subvalley of that name, later called the Paulinskill. Their principal habitations were probably on the southern margins of the Paulinskill Meadows in and around present-day Newton, and on the shores of Swartswood Lake. Their name may be a corruption of Pokhakenikan, meaning "grave."

The Wallkill was first known as the "Tweskfawkin." West-Jersey surveyor John Reading mentioned "a great meadow called Tweskfawkin," lying about six miles northeast of Allamuchy, in his journal entry for May 27, 1715. He surveyed a lot at the headwaters of the Wallkill for Charles Brogden. Brogden's Meadow was inundated to form Lake Mohawk in 1929. On June 3, 1716, John Reading lodged for the night in an Indian wigwam located downstream from Brogden's Meadow. The word "Tweskfawkin" is probably an approximation of Tschoskin, meaning "to ford, to wade."

The loose, nearly egalitarian, social organization of the Minisinks and Lenape suggests small bands of hunter-gatherers repeating a seasonal circuit of family territories sufficient to their nourishment, harvesting the natural bounty of fish, game and wild plant foods (only supplemented by small-scale horticulture). Seasonal resource stations, whether hunting camps or fishing places, were often sited near the debouchment of tributary streams, suggesting that watersheds demarcated family territories. Usually dispersed according to the carrying-capacity of their lands, related families seasonally congregated in larger alliances. Foot paths marked the pattern of seasonal migrations among resource stations and the network for trade, facilitating the diffusion of cultural traits.

Rock shelters were located along frequented routes of travel and trade. Wild Cat Rock is structurally one of the best rock houses found in Sussex County, being 25 feet long with a western exposure. In 1913, Professor Max Schrabrisch excavated two fireplaces, one close to the rear wall and another in the center. Stone chips, bones, turtle shells, a notched arrow point, and a triangular flint point were found. Many fragments of pottery, some of them cord-marked and others plain, were also uncovered. There is a smaller rock house, located about 15 feet up the face of the lower cliff. Schrabrisch also identified a small camp site, west of the rock shelter, on the bank of the brook.

4.1 The Sharpsborough Ironworks

The water power of the Wallkill was first developed by the Sharpsborough Iron Works. The heirs of West Jersey Proprietor Anthony Sharp received title to 494 acres on the Wallkill in 1750, known as the "Mine Hill Tract." Grandson Isaac Sharp emigrated to West Jersey in 1730, settling in Salem County. In 1767, the real estate of Anthony Sharp, the Elder, were formally devised to his grandsons, Isaac and Joseph Sharp. Their property extended along the Wallkill from the State line south to the Ogden Tract near Franklin Furnace. Isaac and Joseph Sharp established the Sharpsborough Iron Works in 1768.

The Sharpsborough furnace stood upon on a branch of the Wallkill within a mile of the mine that supplied its ore. It was described as a "small furnace," with a casting and bridge house, capable of producing 4½ to 6 tons weekly. In 1782, its annual output was estimated at 200 tons. Charcoal, made from the surrounding woodlands, was stored in a large coal house, measuring 62 by 64 feet. Limestone on the premises provided an excellent flux. Matching contemporary descriptions to the topography, the small Sharpsborough furnace probably stood upon a tributary stream which flows south of Green Street in Franklin, entering the Wallkill upstream from Scotts Road.

Mine Hill, *Second Annual Report of the Geological Survey of the State of New Jersey*, Trenton: 1856

A large stone forge, containing two hearths and one trip-hammer, was built in 1769 on the furnace-pond dam, 50

yards distant from the furnace. It manufactured 150 tons of bar iron in 1781. A saw mill, also built in 1769, operated on the same fall of water. The ironmaster resided in a frame dwelling house and several stone houses for the workmen surrounded the works. The iron company owned several stores, a blacksmith's shop, a large barn, stables, teams of draught animals, cattle, and all utensils necessary to the trade.

The Furnace Tract encompassed 1,200 acres of land, including 60 acres of timothy meadow, a like quantity of cleared upland, and the remainder woodland. In March 1770, there was 30 acres of meadow, 400 acres of rich swamp, and two good farms within a mile, yielding 100 acres of grain annually. By October 1774, five farms supplied the ironworks, producing 850 bushels of winter grain annually. Fenced meadow produced hay sufficient to supply all the teams necessary to carry on the business. Woodlands within three miles of the furnace satisfied the heavy demand for charcoal. There was also 300 acres of ash swamp (now Lake Wildwood) on Hamburg Mountain.

The Sharpsborough Ironworks included a second large stone forge, equipped with four fires and two hammers, built in 1768, which stood along the Wallkill, about a mile from the furnace. A stone dwelling house for the forgemaster, a stone coal-house, a store-house, a blacksmith's shop, stables, and several workmen's stone houses, accompanied this second forge. A tanyard, curry shop, shoemaker's shop, and a bark mill, also stood within a mile and a half radius of the forge and within a mile of the mine hole. This forge probably occupied the water power site, later occupied by the Hamburg Paper Mill.

The Sharpsborough Ironworks included a small gristmill, built of stone in 1768, which probably stood along Stoll's Mill Stream, at the outlet of the Hardystonville mill-pond. This mill was outfitted with "bolting tackling" for sifting flour. Isaac Sharp died in 1770, devising his half-interest in the ironworks and gristmill upon the Wallkill to his sons Anthony, Samuel, Isaac and Edward, and to his daughters Mary, Sarah, Rachel and Elizabeth. Joseph Sharp retained a half interest in the properties. In 1771, Abia Brown, the husband of Isaac Sharp's daughter, Margaret, offered a 10-year lease upon his third part of the Sharpsborough Ironworks and his quarter interest in the forge and gristmill.

Abia Brown, residing on the premises, offered to lease the Sharpsborough Ironworks in October 1774 and again in January 1775. Joseph Sharp's lands, slaves, horses, cattle, sheep and swine, pig and bar iron, wagons, carts, plows and harrows, blacksmith's tools, and a variety of implements used in the iron-making business, were offered at Sheriff's sale in January 1775. Isaac Sharp, of Salem County, left his share in the Sharpsborough Ironworks to his only son, Isaac, in 1780. After the war, Joseph Sharp, junior, and William Sharp occupied the property. When William reportedly became deranged, Joseph engaged his brother-in-law, Abia Brown, as a partner. Colonel John Hashorn, of Warwick, was superintendent.

Jesse Potts and his brother arrived from Trenton in 1792 to operate the Sharps' forge on the Wallkill, naming their forge the Hamburgh Iron Works after Hamburg, Germany. When a post office was established in October 1792, with Thomas Lawrence as postmaster, it also was called Hamburg. When a flood breached their dam, they abandoned the works, leaving Joseph Sharp, junior, to reclaim the property. In 1808 Colonel Joseph Sharp built a stone flouring mill and a commodious house nearby (later the residence of Governor Daniel Haines).

In May 1797, Joseph Sharp offered to lease his four-fire forge, occupied by Thomson, Darrah & Co., together with a frame dwelling-house, out-kitchen, new stables, a coal-house, a dam lately repaired, and 1500 acres of woodland. In 1800, Samuel Sharp advertised the furnace and forge, with 5,000 acres of land, for sale. It then had a weekly output of 25 to 30 tons of iron.

4.2 The Fowler Era

Samuel Sharp's son, Edward Sharp, sold 4,000 acres to Dr. Samuel Fowler and John Odell Ford in 1810. Ford spent considerable sums at the Fountain Bridge (now Scotts Road) forge in unsuccessful attempts to smelt iron from the Franklinite ore. He transferred his interest to Dr. Fowler in 1816, who then renamed the hamlet for the scientific Benjamin Franklin. Dr. Fowler rebuilt an old dwelling on the North Church Plains, where he lived for the remainder of his life. He raised a dam across the stream near his house and erected a grist mill, fulling mill, store house, blacksmith shop, a tannery, and several small dwellings. He operated forges at Hamburg and later at Franklin Furnace. He also purchased a large tract of land, several miles in extent, including Sterling Hill, from his father-in-law, Robert Ogden, for $9,000 in 1820. Fowler's old fulling mill was outfitted with a trip hammer for crushing zinc ore. A life-long Democrat, Dr. Fowler was twice elected to Congress. Celebrated as a mineralogist, he brought the remarkable deposits of zinc and Franklinite, located upon his lands, to wide notice.

Colonel Joseph E. Edsall took over the lower Hamburg forge (on the site of the Hamburg Paper Mill), and erected another on the same water power in 1822, processing ore from the Ogden mine. Haines & Brodrick operated the Lower Forge in 1833. The Hamburg Manufacturing Company was organized in 1834, building a charcoal blast furnace on the site of Colonel Edsall's forges. John F. Winslow, the company's president and manager, was also proprietor of the Clinton Manufacturing Company, of Passaic. They employed miners, wood-cutters, coalers and foundrymen, who occupied every available dwelling in the neighborhood. Edsall's mills ran at full capacity, grinding flour and feed.

The Hamburg Manufacturing Company went bankrupt in 1838. On December 7, 1838, Dr. Elias L'Hommedieu purchased the entire mine tract, consisting of 109 acres, at Sheriff's sale. Joseph Edsall reclaimed ownership of the Hamburg Furnace at a foreclosure sale. The partnership of Edsall & L'Hommedieu operated the ironworks until L'Hommedieu moved to Newark in April 1846. Colonel Edsall continued until 1850. In December 1859, he offered to sell the lands of the Hamburg Manufacturing Company, advertising the Hamburg Furnace property, including the blast furnace, saw mill, and several other buildings, standing on about 50 acres; another tract of 1.55 acres, whereon the old store house stood; and six wood lots on the mountain. A post office was established at Franklin Furnace in April 1838. The Franklin Manufacturing Company, largely owned by Oliver and Oakes Ames, started a shingle-and-lath mill in August 1838. They rebuilt the old charcoal blast furnace in 1839, manufacturing castings of all kinds. In July 1841, Oakes Ames offered to exchange goods for grain at higher prices than any other store in the county. He sold four-boiler cooking stoves for $24 in 1842, guaranteeing to replace all stove plates that cracked with heat at no cost.

William L. Ames took over the business in February 1844. Dr. Samuel Fowler died on February 26, 1844, aged 65 years. His mineral lands passed to Oakes Ames in 1845, who sold one-half of all the minerals, except iron ores not combined with zinc, to Colonel Cyrus Alger, of Boston. In 1849, Ames sold the other half of the minerals to Colonel Samuel Fowler. Fowler bought Alger's share in 1850. Oakes Ames announced on July 27, 1850, that the low price of iron compelled the closing of the Franklin Furnace.

4.3 The Zinc Era

The narrow belt of white crystalline limestone, known as the Franklin Formation, was the repository of two great bodies of high-grade zinc ore, one at Franklin and another at Sterling Hill. The ore had little practical value before 1780, when it was first discovered that zinc became malleable after being raised to a high temperature and could be used to coat sheet iron, producing "galvanized iron." A French scientist named Ballon attempted to separate iron from zinc by exposing powdered ore to a series of magnets arranged upon a wheel, but the method did not prove economical.

Although Dr. Samuel Fowler never perfected a method of making iron from the commingled iron and zinc ores, he did succeed in separating zinc oxide for use as a base for white paint — in 1830, his house at Franklin was the first to be painted with this substitute for white lead. On June 6, 1836, the *Sussex Register* reported that "a zinc mountain, 200 feet high, has been discovered in the town of Sterling, Sussex County, N. J. The metal is reported to be of excellent quality and much superior to the imported." Congressman Dr. Fowler provided zinc ore from Franklin for experimental smelting at the United States Arsenal in Washington, D. C., in 1838. The zinc thus obtained was of fine quality, but the expense of the reduction was so great that it was not continued. The metal obtained at that time was used in the formation of brass, of which Congress ordered the standard weights and measures of the United States to be made. This focused considerable attention on a very promising zinc vein, which outcropped on the east face of Sterling Hill, about 660 feet west of the Wallkill, and about 100 feet above the level of the stream.

In 1845, Colonel Cyrus Alger, Esq., exposed the outcrop for a distance of 600 feet and a width of 4 feet, and made several small openings at different points. He and others only removed small quantities of ore, sufficient for experimental purposes and cabinet specimens. A conditional offer for the whole property was made to a French company. They sent an engineer from the School of Mines to cut a small gallery through the limestone to the vein, about 50 feet below its outcrop.

Richard Jones, of Philadelphia, discovered how to manufacture zinc paint directly from the red oxide in 1850, using zinc ore from Sterling Hill. Zinc paint was produced from the ashes derived from the combustion of zinc metal with oxygen. In the American method of manufacture, the zinc ore with appropriate fluxes was put into furnaces of such intense heat that the metal was not only reduced but sublimed, that is to say, changed into a vapor. This metallic vapor passed through the top of the

furnace and was ignited by contact with oxygen in the air, creating a new compound. Air blasts forced the vapor through long ducts to a cooling chamber, where it aggregated and fell as flakes. Zinc paint immediately became popular in both America and foreign countries.

Colonel James L. Curtis, of New York, and Col. Samuel Fowler, of Port Jervis, formed the Sussex Zinc and Copper Mining and Manufacturing Company, purchasing 240 acres from Oakes Ames for $40,000 in 1849, including the most valuable zinc mines. Colonel Fowler purchased Alger's mineral rights in 1850. Fowler released all the Franklinite and other ores to James L. Curtis, as trustee, and in 1853 Ames also released all his mineral interests to Curtis. These transactions were to produce litigation over the mineral rights to the zinc and iron ores for a generation.

Colonel Samuel Fowler made two deeds to the Sussex Zinc and Copper Mining and Manufacturing Company in 1848, for which he received as payment two-thirds of the company's stock. The first deed conveyed all the ores, except the Franklinite and iron ores, that existed separately from the zinc, in the whole property known as Mine Hill. By the second deed he conveyed the right to mine Franklinite ore in a small portion of Mine Hill, known as the Curtis Vein. Franklinite, a species of iron ore, was mingled chemically and mechanically with the red oxide of zinc. Its separation long proved difficult. The beds of zinc ore and Franklinite were not separated by a seam, which complicating the extractive rights to both minerals, each being claimed separately by different mining companies.

The Sussex Zinc and Copper Company commenced the manufacture of red oxide of zinc at Franklin Furnace on May 19, 1849. The company also experimented with a variety of furnaces before succeeding in separating zinc and iron by heating the ore to a moderate red heat, reducing the red oxide of zinc to a pasty consistency, forcing it through a sieve, thereby separating the zinc from the iron. The iron was then sent to the rolling mill. The zinc was manufactured into spoons, forks, covers, and other utilitarian forms. It was also rolled as thin as foil or drawn into a fine wire.

The New Jersey Exploring and Mining Company was incorporated on January 13, 1849, with a capital of $625,000. The incorporators exhibited rolled zinc from Sussex County, and claimed that they could produce steel directly from the Franklinite ore. They operated twelve furnaces at Newark for making white, brown and black paint. They commenced regular mining operations in March 1850, working the south end of Sterling Hill. This company perfected a method of roasting and pulverizing the ore, which reduced the zinc to a red powder, capable of being sifted apart from the coarser iron particles. The zinc powder produced a cheap and durable paint for fences and out-houses. Calcination, however, was used to produce the white oxide of zinc, a compound which promised to supersede the use of white lead as a pigment. The alloy of zinc with a small portion of tin and lead produced so-called German Silver, used to manufacture such silver-plated tableware as dish-covers, forks, and spoons.

The largest lump of zinc ore ever mined arrived at Newark on December 28, 1850, on its way to the World's Fair in London. Weighing 16,400 lbs., a very heavy wagon transported it from the Franklin mines to Dover, whence the Morris & Essex Railroad conveyed it to Newark, for transshipment by boat to the Brooklyn Navy Yard.

In 1852 the Sussex Zinc and Copper Mining and Manufacturing Company sold all the ores in Mine Hill, except Franklinite and iron ores, to the New Jersey Zinc Company. The Passaic Zinc Company commenced mining at Sterling Hill in 1856, working two veins of red oxide of zinc, called the front and back veins, which pitched east and west, from the summit of the hill to an opening at its base. The rich ore was carted away in the lump, while leaner ore passed through the crushing and separating works at the opening of the mine, where it passed through crushing rollers and revolving screens to separate limestone from the heavier zinc particles. For this purpose, the Passaic Zinc Company invented and patented jigs with the capacity to separate 400 tons of ore monthly. The separated ore was carted up the mountain to the Ogden mine and thence to Nolan's Point on Lake Hopatcong. Morris Canal boats shipped the ore to Jersey City for manufacture into white oxide of zinc, which was barreled and sold to make zinc paint.

The coal used at Franklin and Ogdensburg also came by way of Woodport, on Lake Hopatcong, where it was unloaded from Morris Canal boats directly onto the wagon of the purchaser. When a farmer in the neighborhood found his coal bin getting low, he would take his team to the Franklin or Ogdensburg zinc mines to pick up a load of ore. The money he was paid for carting the ore to Woodport or Henderson Rocks would pay for a load of coal. John Mumford, editor of the *Tri-States Union*, encountered the growing stream of ore in transport in May 1851:

"We passed twenty wagons loaded with the ore in the short ride from the bed to Sparta, on its way to Woodport, to

go by the Morris Canal to the Company's furnaces at Newark. Each wagon contained 30 cwt. Hitherto the Company has not been able to meet the demand for its paints alone, but at the rate at which the ore is now blasted, and with the present facilities of transportation, the furnaces must be speedily increased in number and size to meet the demand."

In 1852 the Sussex Zinc and Copper Mining and Manufacturing Company conveyed all the ores at Mine Hill, except the Franklinite and iron ores, to the New Jersey Zinc Company, but including the Franklinite in the Curtis vein.

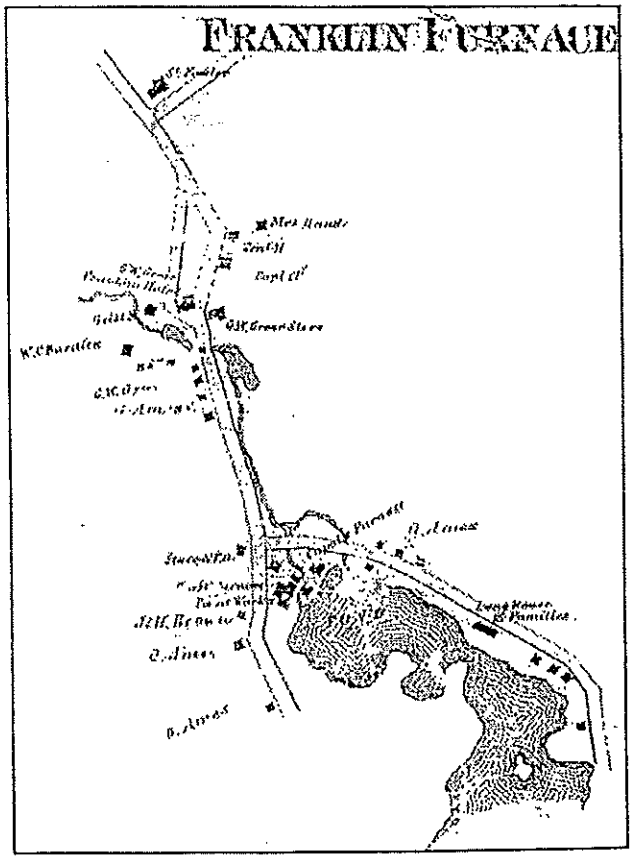
4.4 Franklinite versus Zinc

In 1853, Thomas Selleck, a widely known iron master, perfected a new apparatus and process for fusing Franklinite ore and separating its mineral contents, that produced iron worth $50 per ton, while condensing zinc into a yellowish white oxide or powder, worth about $100 per ton. In February 1853, Edwin Post, of Stanhope, obtained a patent for manufacturing pig iron and zinc paint by the same process and organized a company, with a capital of $500,000, to prosecute the business on a large scale. Stanhope Furnace No. 4 was built to smelt Franklinite ore by the ingenious process of collecting zinc fumes in large reservoirs at the tunnel head. According to a contemporary description, "the iron collects in the hearth of the furnace, while the sublime zinc oxide rises to the flue of the chimney, where it is collected in suitable vessels and thus the expense of obtaining the zinc is but a little additional, so that the zinc obtained, when sold, nearly pays the whole cost of the iron." Only about 100 tons of white lamellar iron and several tons of zinc paint were manufactured before an explosion of the gas reservoir destroyed this experimental furnace.

The New Jersey Franklinite Company spent $160,000 in 1854 (also unsuccessfully as it turned out) to redesign the Franklin Furnace to overcome the difficulty of extracting both iron and zinc from the ore load at Mine Hill. The company also purchased the store stock of Oakes Ames. In May 1854, John L. Bonnell announced the opening of the Franklin Hotel, with accommodations for 100 guests.

In February 1855, Robert Howell, agent for the Franklinite Company, displayed specimens of Franklinite iron, recently made at Franklin Furnace, which he advertised as the best iron in the world, particularly for making steel. Despite the first-ever trial on a large scale, the company could not claim success. Their process yielded flowers of zinc with a yellow tinge, which some blamed on the copious use of yellow clay in smelting. On February 12, 1856, the Boston stockholders of the New Jersey Franklinite Company recommended a general subscription of $70,000 to liquidate small debts and to advance the work of the Company.

Col. Sam Fowler revived Franklin Furnace in July 1858, opening the Taylor (or Open Cut) Mine. He sold his property in Port Jervis and moved his family to Franklin Furnace in December 1858. The profits of the New Jersey Zinc Company, at Franklin and at Newark, for the year 1858 amounted to $81,000.



Franklin Furnace, Inset, 1860 Hopkins' *Map of Sussex County, NJ*

Oakes Ames, Phineas E. Gray, John Rutherfurd, John H. Brown and Robert H. Howell organized the Boston Franklinite Company at Franklin Furnace in May 1860. At this time, the mines produced 12,000 tons of ore annually, which cost on average $2 per ton for wagons to deliver over a distance of ten miles to the Morris Canal, at an annual expenditure of $30,000. A post office was established at Ogdensburg in September 1860.

The battle between the ironclad gunboats at Hampton Roads in 1862 predicated "a complete revolution in the construction of naval vessels ...." The British War Department experimented upon two ironclad targets — one of the same thickness as the American Monitor and the other built to the specifications of the British man-of-war Warrior — proving that either could be riddled at a distance of 200 yards. A single bar of Franklinite, tested by order of the French government at the National Forges

of the Cussade, proved that its tenacity exceeded that of the best irons of England, Spain, Sweden or Siberia, all of which were tested at the same forges. The *New Jersey Herald* urged the Federal government to experiment with Franklinite as the best article for use in iron cladding its ships, for manufacturing cast and wrought iron for large caliber guns, and for covering forts. The *New York Herald* promoted a railroad extension to the Sussex County mines on May 17, 1862, noting that "as the franklinite cures both the red and cold short qualities of other irons, the amount that might be used on the North [Hudson] river would soon reach one hundred thousand tons per annum."

With James L. Center as president and George W. Savage as secretary, the Franklin Steel Company was organized to manufacture Franklinite paint for use on ironclad steamers, tin roofs, iron railings and the bottoms of wooden vessels. After six months' trial, the paint also proved successful in preventing oxidation on the paddle wheels of ocean steamers. It was said to galvanize iron, to destroy worms, and to keep vessel bottoms free from grass. As soon as the required capital was raised, the company planned to manufacture Franklinite iron for gunboats and armor-plated men-of-war. The Herald rightly asked "when is ground to be broken for the Franklin spur of the Sussex Railroad?"

Locked up since in August 1851 by a Chancery injunction over competing claims to mineral rights, the rich mineral treasures at Franklin were released to the Boston Franklinite Company in May 1862. They immediately commenced mining under John H. Brown's supervision. The percentage of zinc contained in the ore was not saved, but the iron was extracted from the Franklinite to meet the Federal government's demand for an iron casing on its warships. On November 25, 1862, the Court of Errors and Appeals reversed the decision of Chancellor Green in the great Zinc and Franklinite Case, deciding that the ores in dispute instead belonged to the New Jersey Zinc Company. The value of the property in question was estimated between $800,000 and $1,000,000.

The Ogden Mine Railroad Company was incorporated in 1863 to carry ore from Richard R. Morris's mine atop Hopewell Mountain to Nolan's Point on Lake Hopatcong, whence it was carried by canal to the Musconetcong Iron Works at Stanhope. Bulk ore from Franklin and separated zinc ore from Sterling Hill was also hauled up the mountain, using stone steps or terraces, for transshipment over the Ogden Mine Railroad. Morris Canal boats carried the Passaic Company's ore from Nolan's Point to Jersey City, where it was processed and sold to paint manufacturers. But, with the Civil War pressing all means and routes of transportation to their limits, the Sussex Railroad contracted with Mr. Noble, proprietor of the Mercer County Zinc Works, in January 1864 to forward 60 tons of zinc ore brought weekly by wagon from Franklin to Newton for rail shipment to their Trenton mills. This amount was usually sent down by canal in summer and by rail in winter.

Only a day after being put in operation, the crushing plant of the New Jersey Zinc Company at Ogdensburg was destroyed by a boiler explosion at 4:00 A. M. on September 13, 1865. The nightwatchmen discovered steam escaping from the boiler, but failing to check it, retired but a short distance before the explosion occurred. The loss was estimated at 10 to 15 thousand dollars.

Colonel Samuel Fowler died on January 14, 1865, at 48 years of age. He had just taken his seat as representative of the First Assembly District of Sussex County, when he was fatally stricken by illness. Though unwell before his departure, he went to Trenton in order to preserve the tie between the parties (30 Unionists and 30 Democrats) in the General Assembly. Governor Parker and many legislators attended his burial in Franklin, riding in sleighs from Newton, despite the intense cold weather.

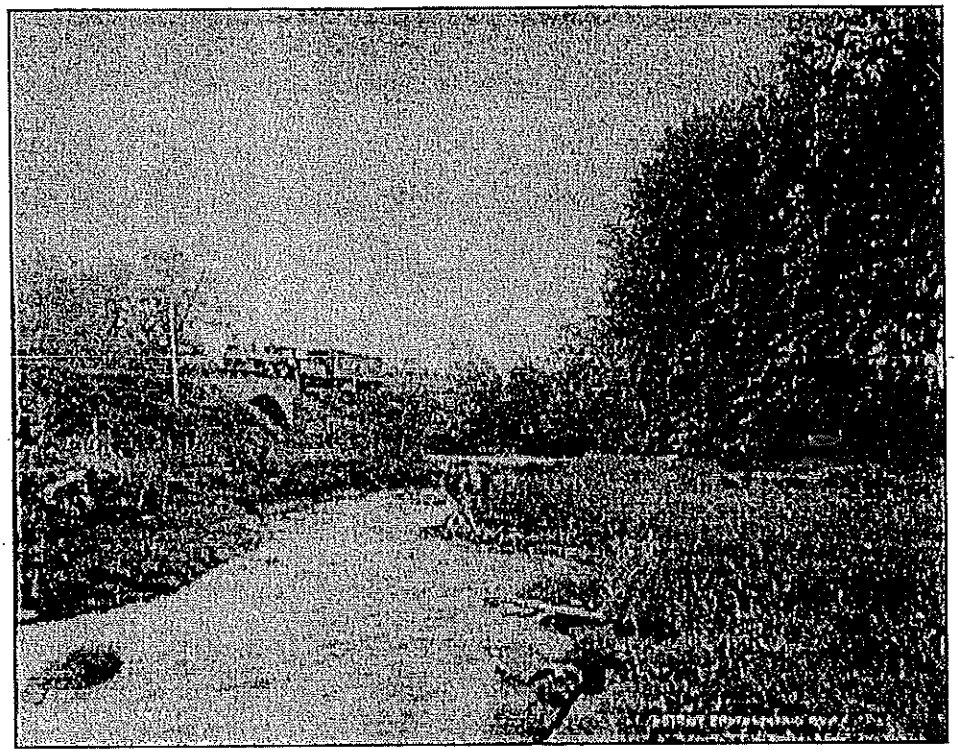
Industrialists Moses Taylor, John I. Blair, Seldon T. Scranton, Joseph H. Scranton, Charles Scranton, and William E. Dodge , proprietors of the Lackawanna Iron and Coal Company, of Pennsylvania, purchased the Boston Franklinite Company's mineral properties and ironworks in May 1867. They also purchased control of the Sussex Railroad, fully intending to extend it to their mines.

The Passaic Zinc Company began to work a deposit of silicate ore in the valley, between the back and front veins, which Mine Superintendent T. A. Marshall discovered in 1869. A steam engine and inclined plane was built to hoist out the ore. The company erected another building in 1871, using screens and jigs to separate the fine ore from sand. This mill produced five different grades of ore, most of which was sold to a company in Bethlehem, Pennsylvania, for manufacture into sheet zinc.

4.5 The Stimulus of Railroads

An extension of the Sussex Railroad through Lafayette to Branchville was begun in 1867, with the further intention of extending its tracks to the Delaware River via Culvers Gap, but the work proceeded slowly. The joint-owners of the Franklin mines

and the Sussex Railroad held several meetings in December 1867 to promote an extension of their line to Franklin. Having adopted a route through Lafayette, the Directors of the Sussex Railroad authorized the Franklin branch on May 1, 1868. John Blair, president of the Sussex Railroad, and Chief Engineer Charles Noble let contracts to grade the nine miles of proposed track. The Sussex Railroad Company also purchased the entire interest of William H. Bell, one of the principal stockholders in the Branchville extension and spent $14,000 to make it ready for the superstructure. After delays occasioned by a pressing nationwide demand for railroad iron, a shipment of iron rails finally arrived in September 1868 for use on the extensions to Branchville and Franklin. The contract for laying these iron rails was awarded in November 1868 to Isaac L. Overton. Preparations were also made to extend the Sussex Railroad beyond Franklin to Hamburg.



Stone bridge over the Wallkill, built by the Sussex Railroad in 1869.
Photo credit: Near Franklin, N.J. [between 1890 and 1901] Detroit Publishing Co., No. 012024. Gift; State Historical Society of Colorado; 1949. Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA

In January 1869, Messrs. Blair, Dodge, and the other owners of the Lackawanna Iron Company, purchased Jonas Crisman's hotel and mill property in Franklin for $30,000 and Philip Brady's house and lot for $5,000. They also purchased 32 acres of the Fowler property in February 1869, paying $187 per acre. The rails reached within a mile of Franklin in April 1869, when the extension was described as "a well laid and well ballasted road, having a firm and solid bed, and being built of iron and ties of the best material." In May 1869, a new locomotive, named the *Franklin*, made by the Danforth works at Paterson, made its appearance on the Sussex Railroad.

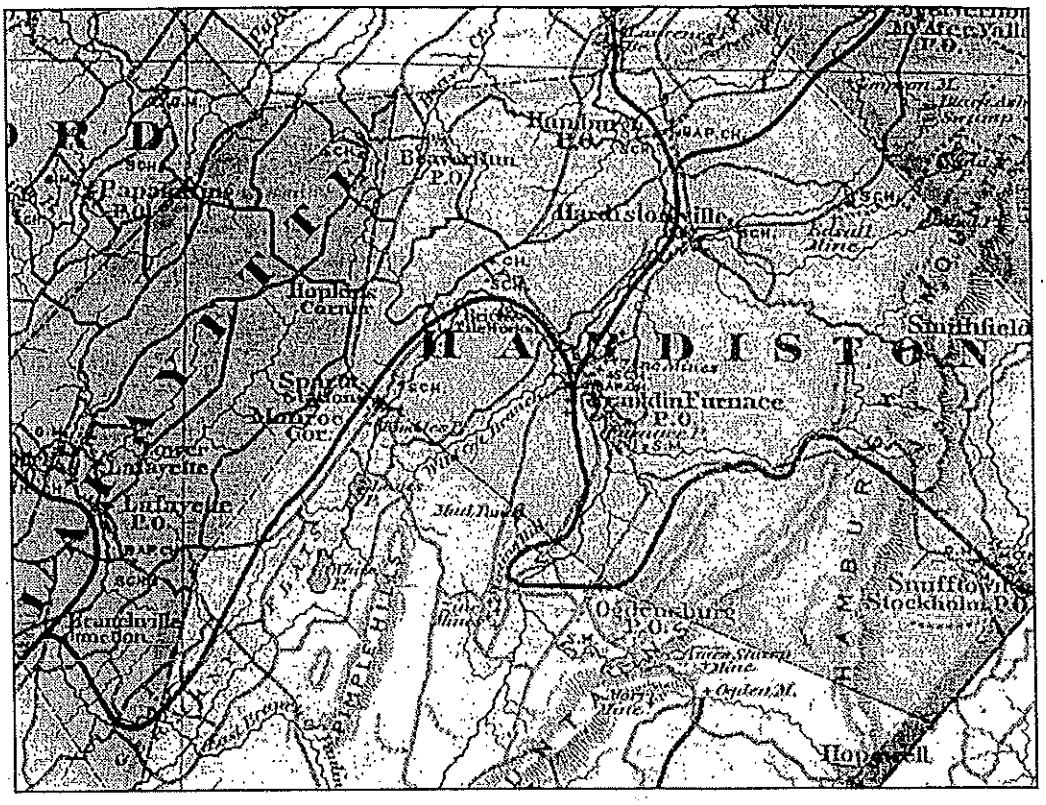
Daily trains began running over the Franklin branch of the Sussex Railroad, to within half a mile of Franklin, on July 16, 1869. By this time, the line was completed to the Fowler Mansion, near the Wallkill, over which a bridge costing $5,000 was being constructed. The railroad was to be further extended to Hamburg and Vernon, with the ultimate hope of connecting with the Warwick Valley Railroad, a branch of the Erie. A spur from Hamburg, running about two and a half miles northeast to the Pochuck hematite mine, was graded in December 1868.

The New Jersey Zinc and Mining Company, of Newark, shifted their operations from Sterling Hill to Franklin Furnace in September 1869, where the ore was found in its purest state and in vast quantities. John George, the Mine Superintendent, was also responsible for shipping ores for the Passaic Zinc Mining and Manufacturing Company, of Paterson, having it drawn up the mountain from Ogdensburg by mule teams to the Ogden Mine Railroad. About 100 miners and teamsters were employed in removing about 20,000 tons of ore annually, worth about $30 per ton when delivered on the banks of Lake Hopatcong. The Passaic Zinc Mining Company employed about 30 men at Sterling Hill and shipped nearly 10,000 tons of ore to their works at Jersey City.

By November 1869, a hundred tons of magnetic ore from the Franklin mines passed daily on the Sussex Railroad en route to Scranton, Pennsylvania. In November 1869, contractors Smith, Towell and Irwin finished grading the road bed as masons put the final touches on the stone abutments of the Wallkill bridge. Nothing further remained to be done, except to build a bridge of one span, to fill a portion of the heavy embankment and to lay the track. The Sussex Railroad Company erected a temporary engine house, near Franklin, to accommodate their engines during the winter. They planned to build a brick engine house, as well as a depot, in the Spring. The Franklinite Company planned to erect a new store and a large blast furnace near the new depot.

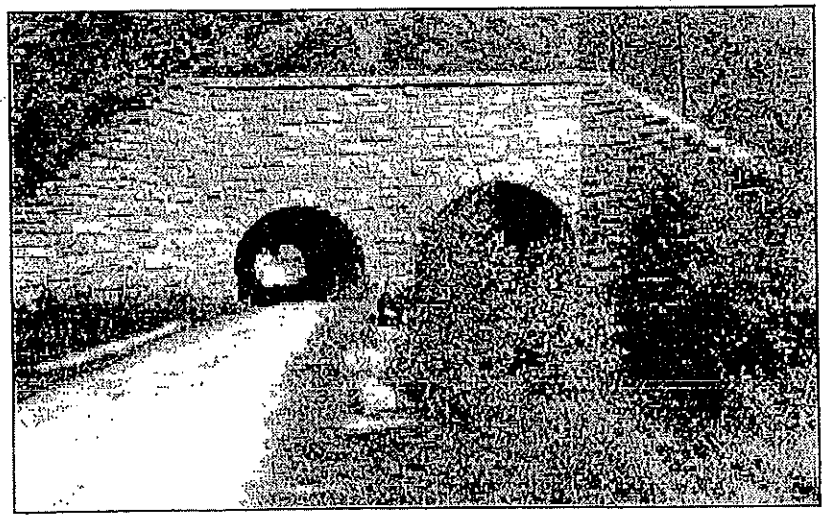
The Midland Railroad

As workmen finished the Franklin extension of the Sussex Railroad, prospects for a competing line of rail communication developed rapidly. About 700 persons assembled at Deckertown on February 16, 1870, to witness the groundbreaking for the New Jersey, Hudson & Delaware Railroad, which was to be built between Middletown, New York, and Deckertown (now Sussex). They marched to Augustus Wilson's farm, about a half mile north of the village, where Elish P. Wheeler, President of the Middletown, Unionville & Water Gap Railroad, congratulated everyone upon breaking ground for the great Midland Railroad, which would extend from the Great Lakes to tidewater. Judge Low, representing the New York & Oswego Midland Railroad, promised that the railroad would be finished from Unionville, New York, to Franklin by the November 1870, and that remainder to New York by May 1871. On July 13, 1870, the New Jersey Western Railroad Company consolidated with the New Jersey, Hudson & Delaware Railroad Company and the Sussex Valley Railroad, to form the New Jersey Midland Railroad.



Detail of Sussex County, NJ, from F. W. Beers' *State Atlas of New Jersey*, Published by Beers, Comstock, & Cline, 1872. The Sussex Valley Railroad, built from Deckertown to Franklin, NJ, became part of the Midland Railroad. The route of the Franklin extension of the Sussex Railroad is also shown. The Sussex and Midland Railroads shared a union station at Franklin.

With the imminent arrival of the railroad, the Lanterman brothers, who operated the store in Ogdensburg, were determined to build up the place. John D. Lanterman opened a new hotel in November 1870, with Jacob Struble as innkeeper. Lanterman also erected three tenement houses near the zinc company's works. As push engines would be needed at this location to assist heavy trains in climbing the mountain, the Midland Company purchased 12 acres on the west side of the village, near the Wallkill River, for a depot, machine shops and engine houses. John Lanterman immediately surveyed his farm into building lots. In July 1873, Simeon Simpson Cook, a Newton carpenter, and Absolom Price, a Newton mason, began to build a new brick schoolhouse, 30 by 60 feet, with two classrooms and a hall on the first floor and an audience and recitation room above, at a cost of $7,000. It was completed in May 1874.



By June 1871, masonry work on the Midland Railroad was nearly completed between Franklin and Bloomingdale, but four months' work remained on grading this section. Justin Arnold, the original contractor on the Ogdensburg section, transferred his interest to Oscar Simpson, his former partner, in June 1871, reportedly for $20,000. Twenty carts, loaded with Swedes employed by Mr. Simpson, arrived in the village to complete the work. The last 15 miles of track from Deckertown to Unionville was completed by July 1871. The greatest masonry con-

struction was needed to fill the "yawning gulch" at Ogdensburg, requiring the largest rock cut, widest arch bridge and highest embankment along the line. In July 1871, contractor Oscar Simpson received a large boiler and steam drill to facilitate the heavy rock cut near the river. Fifty stone cutters, under John Bond's supervision, built a double-arch, stone bridge with a 180-foot span over the river and road near Sterling Hill; a 20-foot arch, 16 feet high, spanned the river and a 16-foot arch, 15 feet high, spanned the road. A 60-foot embankment to the railroad grade was piled above the masonry arches. The keystone was placed in December 1871, as work progressed rapidly upon the embankment.

The Passaic Zinc Mining & Manufacturing Company, of Paterson, and the New Jersey Zinc Company, of Newark, owned mines at Sterling Hill, but in 1871, only the Passaic Zinc Company was active at the site. Oscar Marshall was their manager. In October 1871, John Lanterman sold 16 acres to the Zinc Company for construction of a new zinc works, capable of separating five grades of ore to furnish zinc silicate. Ore was crushed and zinc separated from the limestone by a system of jigs, screens and rotating circular tables, patented by the company. The company built a spur from the Midland Railroad to their mines in December 1871.

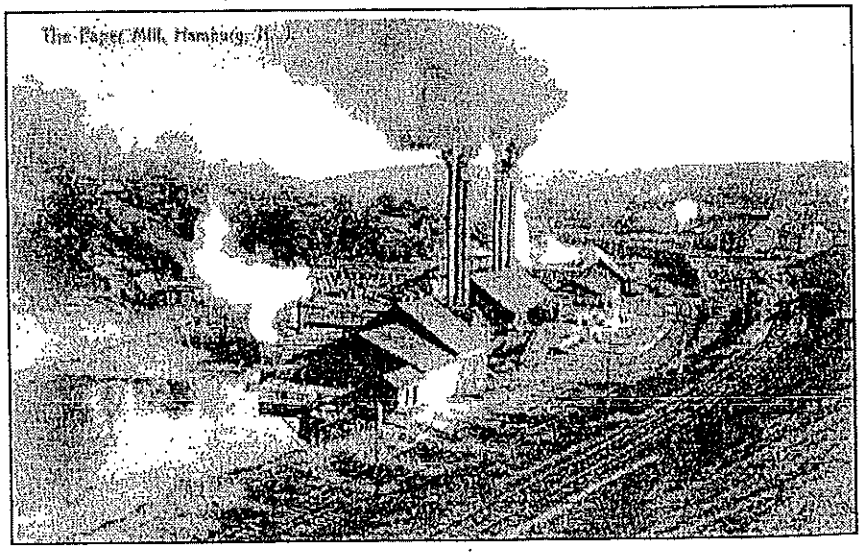
Zinc Silicate from their new mill was shipped to Franklin and carried by railroad to Bethlehem, Pennsylvania, for manufacture into sheet zinc. The New Jersey Zinc Company shifted their base of operations to Franklin in 1869 to mine purer ore. However, with the advent of rail communications in November 1870, hundreds of loads of white crystalline sand, washed from zinc during the process of separation at the old Sterling Zinc Mines, was shipped for use as a flux in separating silicate from carbonate at the works of the New Jersey Zinc Company in Newark.

On March 28, 1872, the last rail was spiked into place in the gap on the New Jersey Midland below Franklin and the two sections joined. A milk train soon began to run over the line from Middletown, New York, to New Durham in Hudson County. In June 1872, the Midland Railroad connected with the Sussex Railroad at Franklin and the Sussex Railroad obtained trackage rights over the Midland between Franklin and Hamburg. The Midland Company erected a railroad-car repair shop and machine shop with four forges at Ogdensburg in December 1872.

The village of Hamburg also grew rapidly under the influence of the railroads. At that time, John L. Brown had a residence in the southern part of the village. Westfall & Hendershot's new hotel, near the Hamburg depot, measured 44 by 48 feet, three stories tall, under a mansard roof. In August 1871, Newman E. Benjamin had the cellar dug for William H. Edsall's new hotel, 36 by 40 feet, on a site nearly opposite Senator Richard E. Edsall's new brick store. By May 1874, the village grew to include three dry-goods stores, one hardware store, a tin shop, two grocery stores, two hotels, one large boarding house, two wheelwright shops, two blacksmith shops, a harness shop, and two coal-and-lumber yards, kept by John L. Brown & Company. The Wallkill Lime & Cement Company, under management of Robert H. Howell, employed about thirty men. J. B. Davenport had a paper mill under construction, adjacent to the saw mill and steam-bending works of A. B. Pelloubet & Sons. Pelloubet & Brown were busy preparing ground for a brickyard. The village also boasted four churches (Baptist, Presbyterian, Methodist and Episcopal), a Temperance Society, and a Public Library and Reading Room.

The Hamburg Paper Mill

A. B. Pelloubet & Sons operated a saw-and-planing mill, on the former site of the Edsall blast furnace, just above the Stone Mill at Hamburg, where they produced wagon timber, bent stuff and rims. They added a scroll machine in August 1873. In October 1873, they raised their mill dam some eight feet in height for the purpose of furnishing additional power for a new paper mill, which they erected just below their works. The size of the original building was 30 by 150 feet. The machinery was driven by two 100-horsepower Whalen Turbine water wheels, with a 50-horsepower boiler for heating the pulp. Twelve thousand-gallon tanks were installed. As work progressed on the new mill in February 1874, the



dam sprung a leak just as it was raised in height and workmen had difficulty stemming repeated breaches.

The new Hamburg Paper Mill employed about 40 hands in the daily manufacture of about 12,000 pounds of newspaper, wrapping, and bag paper. It offered local farmers a steady market for their surplus straw. In March 1874, the company employed a team and a large shelving to cart straw from the surrounding country. The paper mill ran around the clock, turning out a ton of paper every twelve hours. They got their rags from New York at a half cent per pound.

In June 1878, James M. Davenport, proprietor of the Hamburg paper mill, was manufacturing paper bags; the manufacture of wrapping paper from straw having ceased a year earlier. Mr. Davenport was busy perfecting a machine for making paper flour sacks when the mill was destroyed by fire. In November 1879, the paper mill was sold at Assignees' Sale. Under the control of Tompkins & White, the factory started at work again in June 1880, employing seven or eight hands. Their manufacture was devoted exclusively to tissue paper, although a quantity of dark heavy wrapping paper, sufficient for their own use, was also made. They turned out 1,500 pounds of paper daily.

The Hamburg Paper Mill resumed operations in September 1885, having erected a new building on the site of the one which burned seven years earlier. In July 1887, J. B. Davenport sold the Hamburg paper mill to a partner from Whippany, Morris County, who had plans to make straw cardboard. By August 1888, the output was reported at four and a half tons of paper board weekly. In July 1890, the Fitzgibbon Company of New York leased the paper mill for five years from the Hon. A. J. Cutler. In January 1891, the *New Jersey Herald* reported that "the Hamburg paper mill is still shut down with no prospect of starting up."

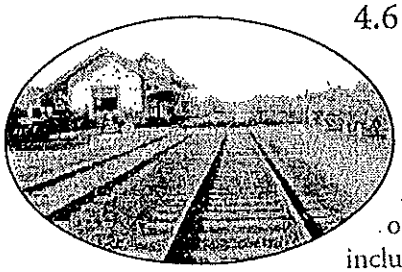
Samuel and Edward Sparks, of Peekskill, New York, became proprietors, re-opening the mill on June 2, 1891. In September 1891, a large force of workers prepared the grounds for the erection of suitable buildings. In April 1892, the Sparks Manufacturing Company engaged contractor Dimmick to build a large stock house. Their trade in the sale of waxed papers rapidly increased and the company reported orders from all parts of the United States, besides some sales to foreign buyers. Carpenters under supervision of contractor Dimmick began work on the new printing building, 40 by 60 feet, in January 1895. In 1900, it became the Union Waxed & Parchment Paper Company. The company purchased 40 acres between its plant and the Ingersoll mill (later Wheatsworth Mill) in October 1909 to enlarge its works.

In May 1920, the Hamburg mill was sold to the Charles G. Walsey Co., of New York. In February 1922, the company fell into receivership. It reorganized as the Hercules Paper Company. In 1929, the Diamond Match Company purchased the plant. It ceased operations on March 4, 1933, at which time part of the machinery from the waxing-and-printing department was moved to Plattsburg, New York.

For many years, the paper mill was the largest employer of labor in Hamburg. In the last twenty years of its operation, the plant produced many varieties of wrapping paper, including wrappers for bread , candy, fruit, and soap, as well as plain waxed paper and tissue papers. For a long time, the wrappers used for Oregon apples were made and printed in Hamburg. At the time of its closing, it was regarded as the largest plant of its kind in the United States.

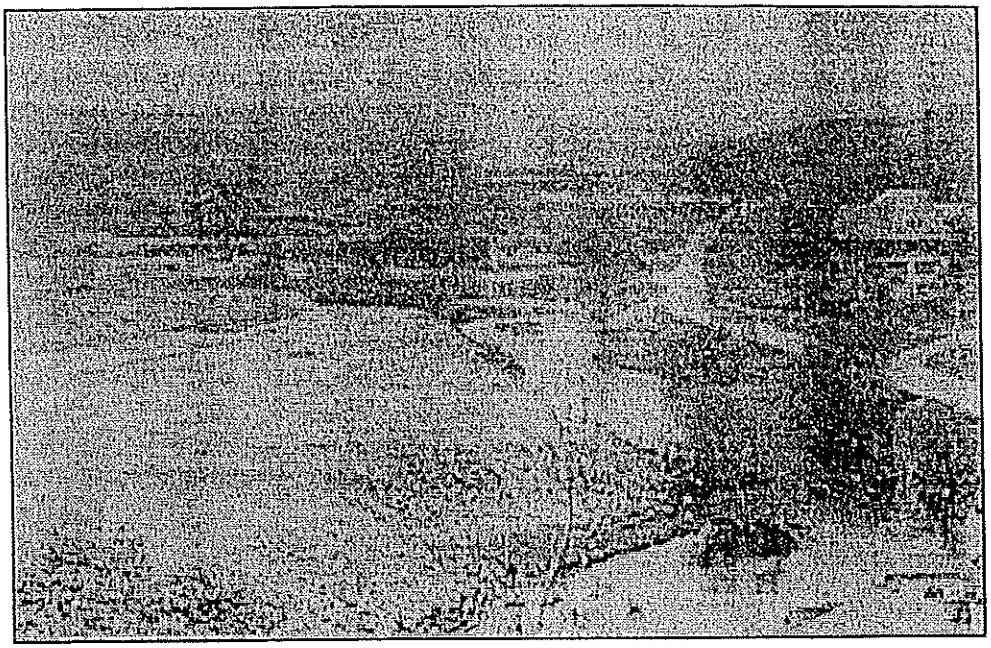
All of the buildings and machinery of the Union Waxed & Tissue Paper Company, along the Wallkill and below the New York, Susquehanna & Western Railroad, were destroyed by fire on December 31, 1934. Several men were working in the building when the fire was discovered beneath the stock-room floor in its north end. Before the firemen arrived, the entire plant was engulfed in flames. Only the two-story office building and the large mill used as a waxing-and-printing department, standing east of the Lehigh & Hudson River Railway tracks, were spared.

4.6 The Long Depression 1873-1879



A new "Y" was constructed in August 1871 to connect the Midland and Sussex Railroads near the Fowler place in Franklin. J. L. Quick, of Deckertown, supervised the grading. When this connection was completed in June 1872, Moses Taylor, William E. Dodge, John I. Blair, Seldon T. Scranton, John H. Brown, E. T. Hatfield, Jr., and Joseph C. Platt, Jr., organized the Franklin Iron Company, with mineral rights to 12,000 acres in Sussex County, including one mountain tract of 7,000 acres. Controlling the Sussex Railroad, the directors of the Franklin Iron Company built a railroad spur several miles in length, running to the foot of Pochuck

Mountain, where their mine was located, tunneling the hill and erecting a stationary engine to bring down the ore.



The intersection of Franklin Avenue, Church Street and Cork Hill Road in Franklin, circa 1896. The older charcoal blast furnace, cupola furnace and paint works stand at the outlet of the furnace pond dam. The 1874 anthracite furnace is behind them.

Work on a large new furnace at Franklin, purportedly "the first one built [in Sussex County] on scientific principles," neared completion in August 1873. The crucible was 67 feet high, 23 feet in the bosh, and 10 feet in the hearth. It was surrounded by three brick buildings: an engine house, a stock house, and casting house. The engine house was 68 by 80 feet on the ground, and 30 feet high. Its three engines were "ponderous pieces of machinery," each with a steam cylinder 54 inches in diameter and a blowing cylinder 84 inches in diameter, with a nine-foot stroke. The engine's two flywheels weighed 40,000 pounds apiece and the working beams weighed 30,000 pounds each. Six boilers, 46 inches in diameter and 70 feet long, generated steam, through 30-inch heaters running the entire length of the boiler's underbelly. Running at full capacity, Franklin Furnace would produce between 250 and 300 tons of pig iron weekly. The casting house was 146 by 60 feet, with walls 30 feet high. The stock house measured 200 by 50 feet, with 20-foot dumpage, encompassing three tracks all supported on iron.

The New Jersey & Oswego Midland Railway became operational along its entire route on August 18, 1873. Finding its way over the Highlands by way of natural gullies, the Midland Railroad not only opened a new route to the Great Lakes, but it reduced the travel time between Franklin and Jersey City from over five hours to an hour and ten minutes. The New York and Oswego Midland Railroad originally utilized the terminus of the Pennsylvania Railroad, at the foot of Montgomery Street, Jersey City, but its future terminus was to be at Weehawken, where the Company purchased 1,000 feet of water front, nearly opposite 42nd Street in New York City. To reach their destination, the Midland planned to build a new tunnel through the Palisades.

The New York & Oswego Midland Company executed a consolidated mortgage with the Mercantile Trust Company, trustee, on September 1, 1873, which allowed the company to issue and sell mortgage bonds worth $35,000,000, for the purpose of funding the company's indebtedness, completing the unfinished parts of their railroad, and purchasing better equipment. As collateral, it conveyed all of the company's property.

A panic on Wall Street in September 1873 brought on wide-spread economic stagnation, causing an unprecedented shrinkage of values and bankruptcy among the manufacturing, farming and producing classes. The New York & Oswego Midland Railroad declared bankruptcy on September 18, 1873. On October 1, 1873, the New Jersey Midland resumed control over its line between Jersey City and the State line at Unionville, claiming possession on account of the failure of the New York & Oswego Midland Railroad Company to comply with the terms of their lease, which called for a payment of about $2,000 per day for three months, or until the floating debt, about $200,000, was retired.

While former panics came and went within a few months, these hard times lengthened into the Long Depression. The Passaic Zinc Company discharged 25 men in October 1873. The Midland Railroad discharged its section men. Large numbers of workers at Franklin Furnace and the neighboring limestone quarries joined the ranks of the unemployed. By November 1873, 18 out of 40 blast furnaces in the Lehigh Valley had suspended operations. The new Franklin Furnace was put in blast on February 3, 1874, producing pig iron for conversion to Bessemer steel in Scranton, Pennsylvania. It suspended operations after only five months on account of the depressed condition of the iron business. In March 1874, the Midland Railroad fell into receivership, having "failed to meet its running expenses."

In March 1875, trustees for the New York & Oswego Midland Railroad Board re-organized as the New York Midland Railroad Company, purchasing the railroad under foreclosure. Preferred gold bonds amounting to two million dollars were to take precedence over all other securities and six million dollars in new preferred stock was to be issued. Bondholders were to receive these new financial offerings for the principal of their bonds. The balance of the new bonds were sold to pay liens and to make necessary repairs. Consequently, by April 1875, the receiver of the Midland Railroad began replacing old rails along its entire route. Economic recovery was slow, but in February 1877, a new mine was opened near Sterling Hill, from which large quantities of zinc silicate were shipped to Elizabethport. In March 1877, Charles Mackerly, of Lafayette, remodeled the Ogdensburg Hotel.

A general revival of mining and manufacturing interests spread during the summer of 1879. In May 1879, a steam shovel began removing earth to fill the Ogdensburg and Snake Den trestles. Franklin Furnace was put in blast on July 5, 1879, after a suspension of five years. By October 1879, the daily wage of miners at Franklin and Ogdensburg and of laborers at the Windsor Lime Quarries at Hamburg increased from $1.00 to $1.25. In November 1879, the frame of a new Presbyterian church was raised at Ogdensburg. The new storehouse of Decker & Titman was completed in March 1880.

4.7 The Lime and Cement Industry

Lime was the essential ingredient in cement mortar, white wash and plaster. It was used as a fertilizer or soil-dressing. Limestone burned in a kiln loses almost half its weight. When burned lime is "slacked" with water, it swells and crumbles into a dry, white powder.

A white dolomitic limestone outcrops on steep slopes and hill crests near Hamburg and Franklin. Writing in 1844 about the highly crystalline limestone in this vicinity, mineralogist Dr. Samuel Fowler noted that:

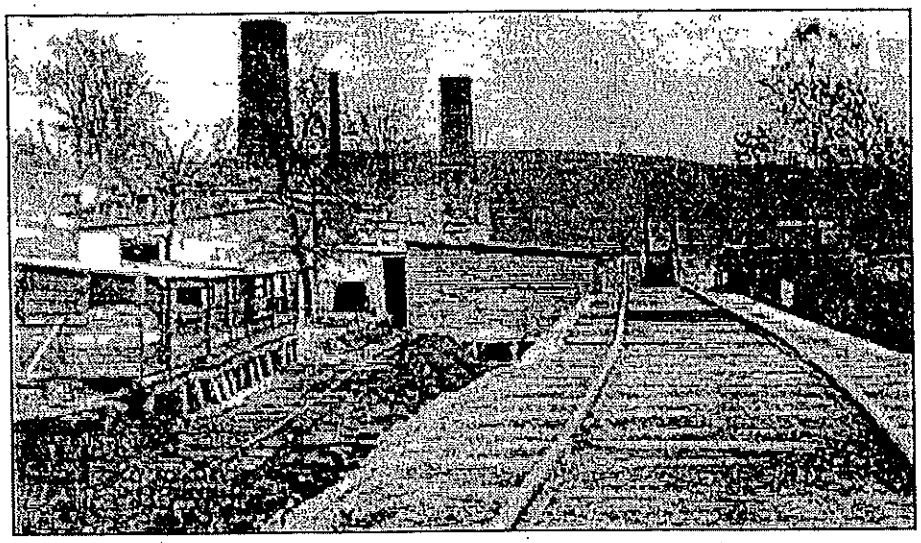
> "A considerable quantity of this stone is burned into lime, near Hamburg; and, when carted to the towns below, as Paterson, Newark, &c., is sold for $1 per bushel. It is principally used in masonry — for whitewashing, cornice-work, and wall of fine, hard finish; and is considered superior to the best Rhode Island lime. Some varieties, particularly the granular, furnish a beautiful marble. It is often white, with a slight tinge of yellow, resembling the Parian marble, from the island of Paros; at other times clouded black, sometimes veined black, and at other times arborescent."

The railroads stimulated lime manufacture. Henry W. Edsall made a kiln of wood-burned lime in August 1871. It was said to be better than lime burned with coal in that, not being subjected to such an intense heat, it slacked perfectly and did not afterwards "pop out" in swells on the outer surface of finished walls and ceilings.

Near Franklin Furnace, the Homestead Company built two large perpetual kilns in 1876. One was a Page's patent kiln, 40 feet high and 10 feet in diameter, using wood for a fuel, with fire chambers at the side. The company burnt 100 barrels of lime daily, selling most of their product for building purposes. At Hamburg, the Wallkill Cement & Lime Company burnt the white limestone. At McAfee Valley, Rosewall & Beardslee also used this stone for lime-burning. These manufacturers thus introduced the crystalline limestone, or "white marble Lime," to the market, selling their output along the line of the railroads.

On November 1, 1876, John H. Brown, of Hardyston, agreed to let Marcus Sayre, of Newark, erect lime kilns on 1.92 acres of land bordering the Stoll Mill Stream, at Hardystonville. He also permitted Sayre to remove limestone from his 12-acre Quarry Lot, located on the road leading from the old storehouse to the Hardystonville School House, together with the necessary right-of-way for building a tram railroad from the Quarry Lot to the kiln. Sayre also obtained the right-of-way for building a road or street from the turnpike (now Route #23) to the kiln lot, and the right-of-way for building a switch from the Midland Railroad. Sayre was to pay $100 per year for the limestone required for one kiln, and $50 per year for each additional kiln. On November 11, 1876, Brown sold an additional .5 acre along the mill stream to Sayre.

Marcus Sayre & Peter Vanderhoof, of Newark, constructed their first kiln near Hamburg in October 1876. Joseph Sheldon was the manager. By February 1877, their new kiln was shipping four railcar loads weekly. On March 23, 1877, the late Caleb Rude's heirs agreed to let Marcus Sayre and Peter Vanderhoof quarry limestone on 40 acres of land, situated in Hardyston, on the west side of Sand Pond Brook, bounded by the quarry lot of the Wallkill Cement & Lime Company. On April 21, 1877, the Wallkill



The Windsor Lime Kilns, c. 1915, viewed from railroad spur.

Cement & Lime Company also conveyed the right and privilege to remove limestone from their quarry.

Sayre & Vanderhoof completed a second kiln, with the capacity of producing 250 barrels of lime daily, in September 1877. These kilns were built with separate fire chambers, two on the sides of each kiln, so that the flame came in direct contact with the limestone. Each kiln produced 100 barrels every 24 hours. In November 1877 the Windsor Lime Company placed a tram road in running operation, conveying white limestone from their quarry on the Rude farm, two and a half miles distant. In January 1878, the lime company of Sayre & Vanderhoof had about 500 cords of wood on hand and were increasing the amount daily. In June 1878, during the so-called Long Depression, the business was very dull and only twelve men were employed, whereas the works usually engaged thirty laborers. Limestone was quarried on William H. Edsall's farm.

Marcus Sayre, Elias Taylor, and Frank Van Ness incorporated the Windsor Lime Company on October 18, 1888, with a capital stock of $30,000. On November 8, 1888, Marcus and Henrietta Sayre, of South Orange, sold their interest and holdings to the Windsor Lime Company. On December 16, 1889, Emma and Richard Edsall, and Martha Linn, of Hardyston, conveyed the timber and wood standing on two woodlots in Hardyston to the Windsor Lime Company.

In January 1891, the *New Jersey Herald* reported that several lime kiln companies at Hamburg were only operating one or two kilns each, when their full capacity was four kilns each. According to description made in March 1892, the Windsor Lime Works, under the superintendency of Richard Vanderhoof, operated four kilns, directly along the lines of the New York Susquehanna & Western and the Lehigh & Hudson Railroads. These kilns produced over 2,000 barrels of lime weekly. A tramway, laid with steel rails, descending by a gentle incline, connected the quarries to the kilns, over a distance of three miles. Horses or mules powered twenty-eight rail cars daily to supply the kilns with limestone. The manufacturing plant included a storage house with a capacity of 10,000 barrels, a blacksmithy and a cooper shop. Besides a large force of laborers employed at the quarry and kilns, between fifteen and twenty woodchoppers in the nearby mountains kept teams constantly engaged in hauling the vast quantity of wood needed for burning the lime. Additional supplies of cordwood were brought by rail cars. The lime and cement found a ready market among masonry contractors in New York, Brooklyn, Philadelphia, Paterson, Newark, Passaic and the major cities of New England. Thousands of bushels of ashes were sold to farmers and onion growers in the neighborhood.

The Windsor Lime Company plant at Hamburg was sold to Cornelius H. Vanderhoof, of Newark, in January 1910. Cornelius H. Vanderhoof, Harry R. Vanderhoof and Mary E. Vanderhoof, incorporated the Vanderhoof Lime Company, with a capital stock on $100,000 on January 26, 1910.

On June 19, 1914, the *Sussex Independent* reported that limestone worker Matthew Woods, of Hamburg, had been severely bruised when a car of stone jumped the track. As Woods was letting down some cars of limestone at the Vanderhoof kilns, one car in crossing a switch point jumped the track and turned over, pitching Mr. Woods to the ground. Every piece of stone was dumped from the car and Mr. Woods landed several feet away, striking with his shoulders and hips on the rail.

In July 1918, the Lime and Stone Products Company, successor to the Vanderhoof Lime Company, had on the ground about 6,000 ties with which it was intended to build a switch from the Atlas quarry at Rudeville, a distance of about two miles. Machinery was arriving daily for the crushing plant which was being erected. There were plans to extend the railroad spur to McAfee, a distance of two miles, and thereby do away with the heavy grade this side of McAfee and with several bad curves on that route. The Lime and Stone Products Company reportedly ceased business operations at Hamburg in 1921.

4.8 Litigation and Growth

Moses Taylor obtained a decree against the New Jersey Zinc Company in 1877, claiming title to the Franklinite ore in the northern portion of Mine Hill. Colonel James L. Curtis, of New York, leased 500 feet of the west vein of Franklinite in the northern section of Mine Hill to Charles W. Trotter for thirty years. Trotter then opened the mine that became a bone of contention and the cause of litigation. On April 10, 1878, Curtis leased the rest of the West Franklinite vein to Trotter for the term of fifteen years. On May 1, 1879, Trotter also brought suit against the New Jersey Zinc Company for trespass, they having started to mine on the side of the property nearest the Hamburg road.

The large furnace at Franklin was blown out on July 3, 1880, for re-lining and repairs. The company discharged all single men, but furnished employment for married men. Moses Taylor and the New Jersey Zinc Company consolidated their interests in 1880 and formed the New Jersey Zinc & Iron Company, each taking half of the stock. Charles Trotter was paid $3,000 in 1883, which he had won as a judgement. A motion was then made for a new trial in the United States Supreme Court. In November 1882, the New Jersey Zinc & Iron Company secured an injunction restraining Trotter from mining Franklinite on the parallelogram. The controversy ended in 1884 when Trotter agreed to the location of the boundary line and accepted the description of the property as "the west vein of Franklinite on Mine Hill."

Trotter assigned his property to August Hecksher in 1887, who in turn assigned it to the Lehigh Zinc & Iron Company. They began paying a royalty to Charles Trotter for the ore they mined. The New Jersey Company brought legal suit in April 1889 against the Lehigh Company, charging that they had mined and converted to their own use 300 tons of zinc ore, valued at $1,900. A verdict was rendered in its favor for $1,650. A writ of error was then taken from the judgment, keeping the case in the courts for many years to come.

After several weeks of negotiation, John I. Blair, president of the Sussex Railroad, sold control of the Sussex Railroad to the Delaware, Lackawanna & Western Railroad in July 1881. The Lehigh & Hudson River Railway Company purchased that portion of the Sussex Railroad extending from Hamburg Junction to McAfee Valley, to form part of their main line. John Blair also sold the Blairstown Railroad to the New York, Susquehanna & Western, who intended to use that road from Blairstown to Columbia as part of their new main line.

The New Jersey Central Railroad Company negotiated the purchase of the Ogden Mine Railroad in September 1881, with a view to connecting it with their High Bridge Branch at Port Oram (now Wharton). To accomplish this purpose, an engineer corps located a route from Port Oram, up the valley to a point at the base of the mountain, beyond Berkshire Valley. Construction of this branch obviated the necessity of transferring ore from the mine railroad to Morris Canal boats at Nolan's Point, thus allowing the large and productive mines along the Ogden Mine Railroad to ship their ore directly in cars from the mines to the Pennsylvania furnaces with only one handling.

Kennedy G. White, of New York, purchased the New York Midland, consisting of 345 miles of track, at public sale on November 14, 1879, for $4,600,000. In 1882, the Midland Railroad built an extension to Stroudsburg, Pennsylvania, and the old company became the New York, Susquehanna & Western Railroad. The new line was built from both ends simultaneously, work proceeding from the two bridges on the mountain above Franklin, down towards Sparta, at which place a heavy fill was constructed, and from Blairstown towards Stillwater. Slate cuts were made at Emmons and near Washingtonville. Contractors also made a large limestone rock cut, 50 feet deep and 400 yards in length, near Columbia. The section of the Lehigh & Hudson Railroad, between Houses Corner and Franklin, was also built at this time. When the new main line opened to Stroudsburg, the old route of the Midland Railroad, between Two Bridges near Beaver Lake to Middletown, New York, became a branch (dead-ending at the State line when the N. Y. S. & W. ended its lease of the Middletown, Unionville & Water Gap Railroad in 1913).

4.9 The Modern Era

The village of Edison rose in 1890 around an ingenious magnetic ore separator, located at the old Ogden Mine on the mountain, two and a half miles back of Ogdensburg. Seventeen buildings were constructed within a half mile, one of them being 500 feet long and 100 feet high. Twenty 1200-candle-power arc lights enabled night and day shifts to work. A water tower, standing 123 feet high, supplied the entire operation by gravity feed. Long-distance telephones enabled the superintendent to converse from his office with any one of the buildings or even an agent in Chicago. The carpenter shop measured 100 feet in length.

Here electric-powered circular saws were suspended overhead to cut mortises in heavy beams. The table holding the beam was raised so that the saw mill cut the mortise to the proper depth. The adjoining stock house stored $100,000 worth of hardware, including everything from a large bolt to a small paper of pins.

Four mine tuyeres, each 216 feet in length, spanned the mine. These were high suspension bridges, whose ends rested upon trucks which ran along car tracks. An immense scoop, carried along this bridge, raised the ore and dumped it into a car at the end. Each tuyere had a daily capacity of 1,600 tons. Large lumps of ore were first fed between rollers, six feet in diameter, then dropped to rollers, four feet in diameter, and so on until the ore was crushed into half-inch lumps. Belts, elevators and buckets conveyed the small chunks of ore to a dryer and thence to the stock house, 280 feet distant. The moisture remaining in the ore amounted to only 0.1%.

Rubber belts conveyed the fine ore into a building, 160 feet in height, where it was fed into the separator through boxes containing magnets, which separated the ore from the country rock. The separated ore was dumped into cars ready to receive it, while the rock dust was dumped onto the tailing banks. These tailings, being free from dirt, made excellent building sand and was shipped to Jersey City and New York, where it sold for 50 cents per ton.

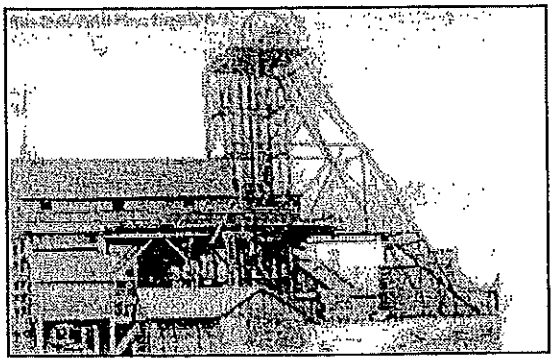
The Edison magnetic separator produced a concentrated ore that was molded into briquettes that would fuse fifteen feet higher than in the ordinary furnace, thereby saving largely in fuel costs. The iron was 69% metallic, while the purest then known was 72% to the ton. The daily capacity under the old system was 1,000 tons, while under the new it was 5,000 tons. The Edison method allowed 300 men to do the work previously requiring 1,200 men. Improvements to the new system cost $250,000.

Thomas Edison spent $2,500,000 to prove the practicability of electro-magnetic ore crushing separators for low grade iron ores. Convinced that Edison's inventions were mechanically and commercially successful, thirty-four British investors formed the Edison Ore Milling Syndicate in 1898, purchasing a partnership with Thomas Edison in his patents. Metallurgical and mining experts in their employ sampled a vast iron deposit along the Dunderland River in Norway, shipping a large quantity of lean ore to Edison for crushing and concentrating. One element that had barred utilization of this ore was the existence of a large proportion of specular hematite combined with magnetite. Edison solved the problem of separating specular hematite early in 1901 and the syndicate consequently exercised their option and acquired the Norwegian property. They were able to concentrate one ton of high-grade Bessemer ore, averaging 65% metallic iron, from two tons of lean ore by the combined Edison processes. It became their object to erect a plant and to ship the concentrated ore to British ironmasters.

In December 1898, 200 men were discharged at Edison in anticipation of the works closing by the following spring. The buildings were dismantled or moved, the Edison school house being relocated to Franklin and converted to the Hungarian Church in 1909.

New Jersey Zinc Company

The Sterling Iron & Zinc Company, assignee of the Lehigh leases, opened the Parker Shaft in 1893, but were greatly hampered by water. All the wells in the village, including the spring that gave Green Spot its name, apparently drained into that mine, for all became dry. They drilled down 580 feet before striking water, which afterward came within 60 feet of the top, although they pumped 30,000 gallons an hour; they pumped for thirteen months without gaining an inch. The difficulty was eventually overcome by a large cistern, 60 by 80 feet, located on the first level, which collected water to be pumped out by a large steam pump.



The Parker Mine Shaft

Having solved the problem of drainage, the Sterling Iron & Zinc Company engaged the Wetherell Concentrating Company to build an extensive concentrating and separating mill at the Parker Shaft in 1896 for processing ores from Sterling Hill and the Lehigh mines. By this process, the Franklinite, garnet tephroite and Fowlerite, and other iron or manganese-bearing minerals, were separated from the willemite and zincite, which was then smelted in the Belgian furnace for the manufacture of a high-grade spelter metal. The Wetherell plant was capable of separating 250 tons of ore daily, until it was dismantled in 1911.

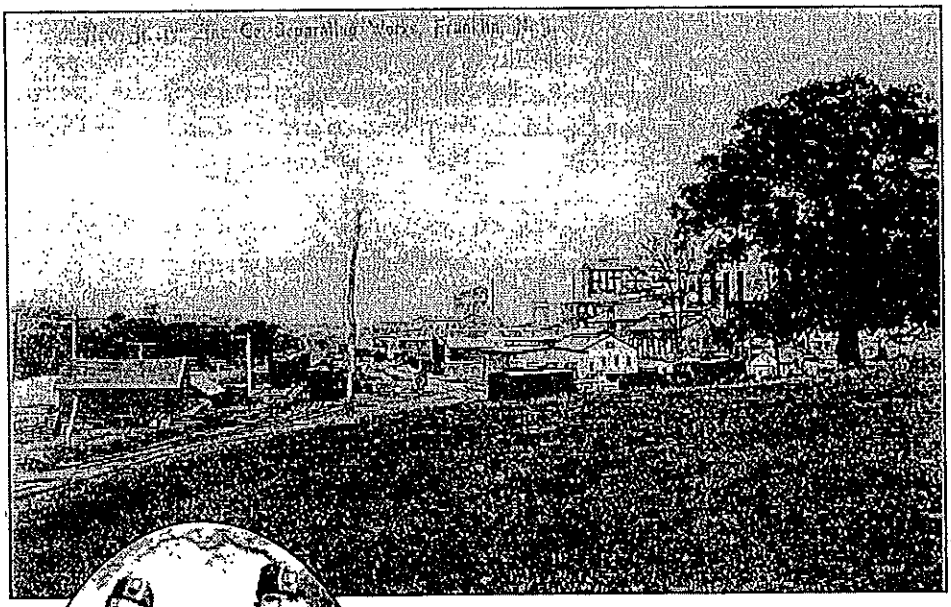
The use of dynamite, steam and air drills, and the introduction of electric drilling, pumping and hoisting equipment, revolutionized the mining industry. Litigation between the Lehigh Zinc & Iron Company and the New Jersey Zinc & Iron Company

over mining rights at Mine Hill persisted for many years, reaching the Court of Chancery in October 1893. The various corporations owning mining rights at Franklin and Ogdensburg, and operating smelting plants at several locations, consolidated in 1897 to form the New Jersey Zinc Company. These included the Passaic Zinc Company, the New Jersey Zinc & Iron Company, the Lehigh Zinc & Iron Company, and the Sterling Iron & Zinc Company. Mining was halted at Sterling Hill.

The New Jersey Zinc Company employed electromagnetic separation, revolutionizing the handling of its ores. Smelting was done at its plant in Palmerton, Pennsylvania. Appointed mine superintendent in 1906, Robert M. Catlin was instrumental in adopting the Stope slicing and top slicing methods to efficiently extract the ore from the ground. The Palmer Shaft began to yield ore in 1910. Shortly thereafter, the Parker Shaft was abandoned.

Mill No. 2 opened in 1901 to process all the ores from Mine Hill, receiving ore from the Parker Shaft via a railroad switch about a mile and a half in length. This mill stood at Franklin Junction, alongside the Lehigh & Hudson River Railway. It eventually reached the daily capacity to separate 1,500 tons of ore, through the installation of electric power plants, dryers, elevators and conveyors.

Franklin Furnace was shut down four different times from various causes, before being abandoned in October 1893, due to competition from Lake Superior ores. The wages of employees of the Passaic and Lehigh Zinc & Iron Company were cut from 10% to 15%. In 1903, the company combined with a syndicate, thereafter shipping all their ore to Buffalo, New York. Franklin Furnace was demolished in 1905 and its machinery sold for scrap. The New Jersey Zinc Company erected a general repair shop, 40 by 100 feet, of brick, at Greenspot in 1904. At this time, the Lehigh & Hudson Railway received from 85 to 100 cars of zinc ore daily at Franklin Junction. Only the Parker and the Taylor Mines were used in 1906.



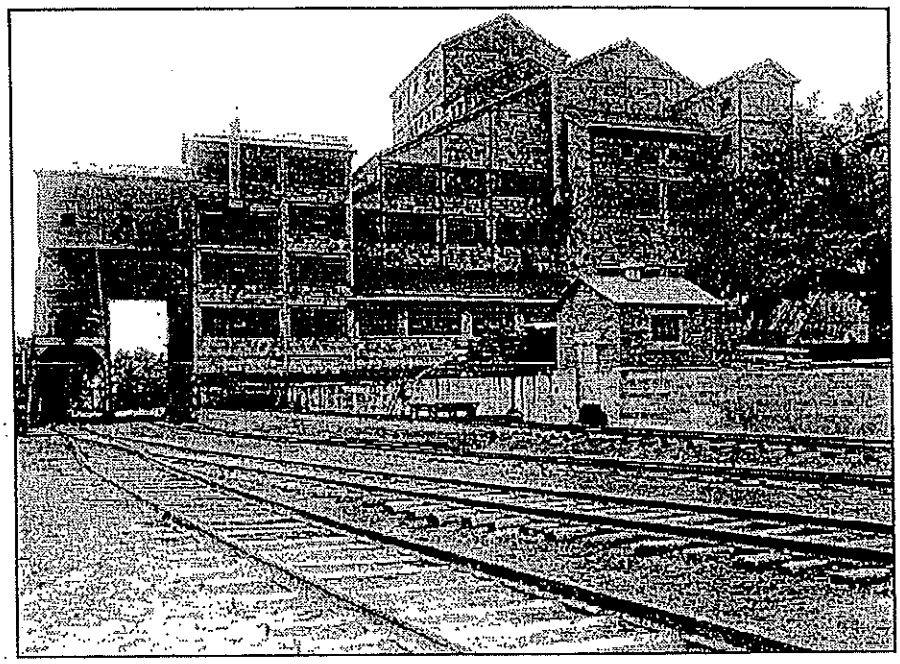
By 1905, a thousand men were employed in the Franklin mines, mostly Hungarians (27%), Russians (23%), Slavs (11%), and Poles (4%). By this time, compressed air operated all the drills and engines (using the largest air compressor east of the Mississippi River). The company operated their own crushing mill for concentrating the zinc from the refuse material. The company owned many patents for innovations perfected in their plant.

Crushed ore first passed through huge electromagnets to separate the iron. As the fine ore passed over the magnet on a constantly moving belt, the iron particles were drawn to one side in a steady stream. After this, the ore went through the jigs, which separated the rock from the willemite and oxide, leaving ore averaging 50% zinc. A jig was a long table kept by machinery in a constant state of agitation in a lateral movement. Running water passing over its entire surface caused the separation of the crushed ores. The useless rock was quickly detached from the willemite and oxide and passed into a trough at one side. The others separated on the table into layers of their respective elements, into a variety of colored beds, the willemite being green, the oxide red, and the calcite white. Two 500-horsepower engines drove the works. Two 250-horsepower dynamos supplied electricity to operate the separating house. One hundred tons of coal were consumed daily.

The finest quality paint, called the Lily White Paint, was made in Germany, and 2,500 tons of the Franklin willemite was exported monthly for that purpose. Two-thirds of the Lily white Paint was imported into the United States. The part of the ore known as spelter was made into sheet zinc for pails and other utensils.

A thousand tons of ore were removed daily from the Franklin mines in 1906, and was valued at $20 to $60 a ton after separation, the concentrated product being valued at $80 to $120 per ton. The ore consisted of Franklinite, Willemite, with various forms of zincs known as red oxide of zinc, white, green and yellow silicates.

Many of the most beautiful forms of these minerals were originally mined by the hundreds of tons and sold as common zinc ore. By the end of the nineteenth century, however, they were only occasionally found and were appraised at $1 to $5 per pound. Mineral collectors the world over sought them for their rarity and beauty. Single specimens of the rarest kind were valued as high as $500 in 1906, their great value being determined not only by their rarity, but also by their size, perfection and beauty of the crystals.

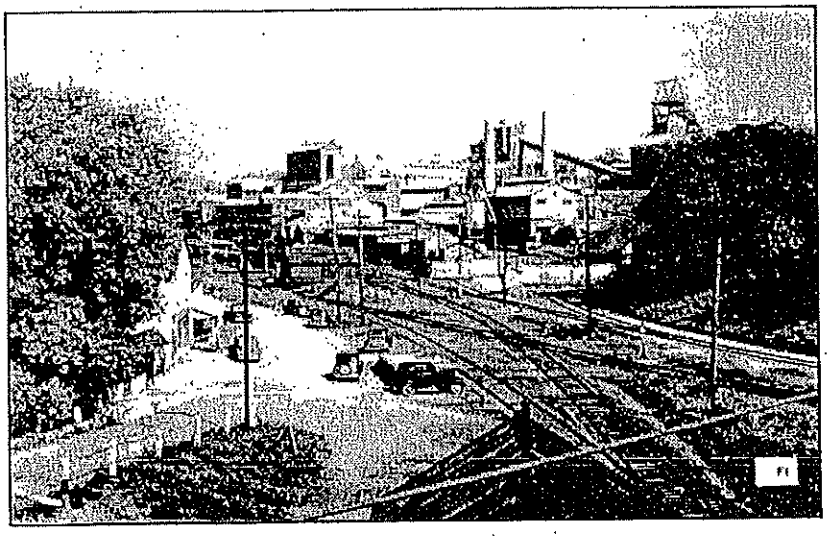


The New Jersey Zinc Company's Sterling Hill Separating Works

Newton contractors O'Donnell and McManiman began construction of a new house for Superintendent Cutler, of the New Jersey Zinc Company, at Greenspot in June 1907, located near the company's club house.

The Franklin mine came to be regarded as the greatest zinc mine in the world. The mines of the New Jersey Zinc Company yielded 15 million tons of zinc ore between 1880 and 1930. The Borough of Franklin became a company mining town, incorporated as a borough in 1913, where the Zinc Company provided a Community House and a modern hospital. The New Jersey Zinc Company resumed operations at the Sterling Hill Mine in 1912, constructing a modern mill of 450 tons daily capacity in 1917 to receive ore hoisted directly from the mine.

The American consumption of zinc declined rapidly in 1930. Exports decreased nearly 50%, causing stocks to accumulate and the price of zinc to decline to the lowest levels in thirty years. Robert M. Catlin retired as Mine Superintendent in 1930, being succeeded by R. L. McCann.



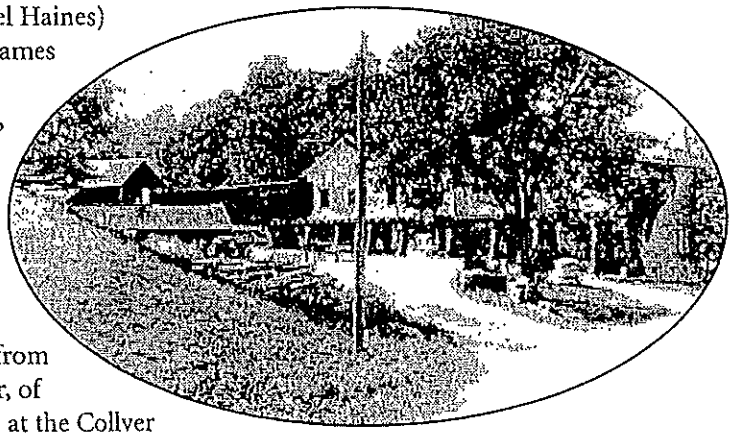
The Lehigh & Hudson Railway handled nearly all zinc traffic from Franklin. When the Hamburg Paper Mill closed in 1933, freight transfers to the Franklin branch of the D. L. & W. from the New York, Susquehanna & Western Railroad diminished. Automotive transport of farm products stole business and passenger service was discontinued, as a majority of the passengers preferred to use buses. The number of railroad passengers dwindled to one or two per day. Stockholders of the Sussex Railroad Company, a subsidiary of the D. L. & W. Railroad Company, voted in February 1934 to abandon its nine miles of track between Branchville Junction and Franklin branch as a matter of economy.

The New Jersey Zinc Company ended operations at the Franklin Mines in 1954. Fire destroyed the Franklin Depot on January 1, 1958. The Hanford branch of the N. Y. S. &W., running to Unionville, was abandoned in 1958, and the line west of Sparta Junction in 1962. Mining at Ogdensburg ceased in

1978. The line of the Lehigh & Hudson Railway running north of Sparta Junction became part the the N. Y. S. & W. in 1982, while the line south of that point was abandoned in 1986.

The Stone Mill and Gingerbread Castle at Hamburg

Colonel Joseph Sharp built the Stone Mill at Hamburg in 1808, a few yards distant from his mansion house (later the residence of Governor Daniel Haines) on the turnpike. He sold the property on February 4, 1833, to James R. Murray, who transferred it to John G. Bunting. It next came into the possession of Joseph E. Edsall, for on January 26, 1839, a storm surge in the Wallkill reportedly destroyed J. E. Edsall's mill dam at Hamburg.



Fire, supposed to have originated from friction, destroyed Col. Joseph E. Edsall's large stone flouring mill on September 11, 1846, burning an estimated 800 bushels of grain and the miller's book. This was the fifth loss that Edsall had sustained from fire within the course of a few years. Millwright George Collver, of Lafayette, supervised reconstruction, utilizing mill gearing cast at the Collver & Kays Foundry. On February 10, 1854, Theodore Durling, aged 30 years, was killed at Edsall's grist mill, which he operated. The water wheel had been frozen for two days, and during some repairs, the workmen had used the buckets as if they were steps of a stairway. As Mr. Durling stepped upon the wheel, it suddenly broke loose and began to revolve, throwing Durling into a narrow space between the wheel and the flume, where he was crushed to death.

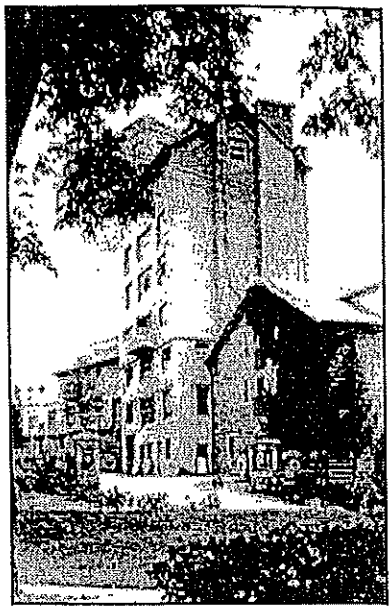
In 1860, Frank M. Ward, millwright, supervised construction of a distillery, adjacent to the Stone Mill, for Thomas D. Edsall. In 1867, John L. Brown purchased the property, which he afterwards sold to the Wallkill Cement & Lime Company. They added a turbine wheel and two run of stone for grinding cement. Cement kilns were then erected on the premises. Limestone was quarried at Rudeville. After processing, it was packaged and sold for white wash. In December 1872, lime kilns were added to the cement and brick kilns at the Stone Mill.

In August 1873, the milling firm of Beardslee & Brown dissolved, its successors being John L. Brown, A. W. Cross and W. H. Ingersoll. Samuel A. Beardslee, the retiring partner, formed a partnership with M. B. Duvall in a new store, located near the Stone Mill. The new milling firm, under the style of John L. Brown & Company, refitted their flour mill and prepared to do custom work at the regular toll rates. John Brown also organized the Wallkill Cement & Lime Company for the manufacture of hydraulic and other limes. Robert H. Howell was president and manager; John L. Brown, treasurer; and S. G. Tuttle, secretary.

Brown sold the Stone Mill to the Wallkill Cement & Lime Company in August 1873. They quarried limestone out of the cut just east of the mill, on the side of the Midland Railroad. Analysis showed the rock to be an impure magnesium limestone, containing more magnesia than most cements then in common use. Experience proved that it did not slake when burned, and then, when ground and made into mortar, it quickly set and became hard. For grinding and burning the material was taken to the Stone Mill, where a small kiln was erected in March 1874, producing fifty barrels per day.

The raw material was first burned, using coal dust and screening, after which it was ground fine by machinery of the latest pattern, located in the old distillery building adjoining the mill. Two run of stone had a grinding capacity of 250 barrels each, per ten hours' run. Three coopers were engaged in making barrels, putting up 35 apiece each day. As late as March 1874, the manufacture had "an experimental character, and very little of the cement has been put in the market." The Wallkill Lime & Cement Company built an additional kiln in April 1875. By June 1878, the Wallkill Lime Works were the largest of its kind in Sussex County, the kilns having an output of 100 barrels per day.

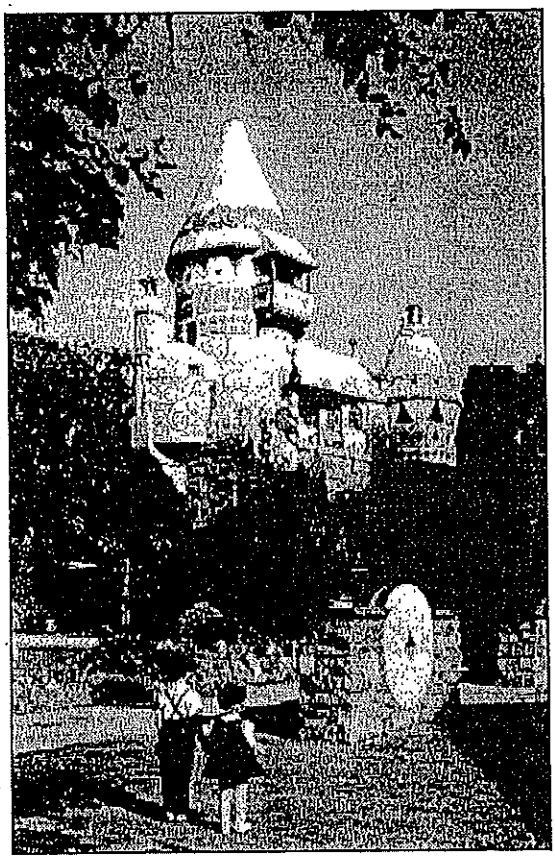
Daniel Haines' son, the Rev. Alanson A. Haines, conveyed the Stone Mill and mansion lot to W. H. Ingersoll on May 12, 1879. He added machinery for processing buckwheat and the cement mills were outfitted for grinding animal feed. The flour mill included four run of stones for grinding wheat, rye and buckwheat flours. Ingersoll also ground plaster. Passing within a hundred yards of the mill, both the Midland Railroad and the Sussex Railroad offered convenient shipping facilities; the Midland Railroad built a switch for its special accommodation. In September 1891, W. H. Ingersoll undertook extensive repairs to his flour mill.



The F. H. Bennett Biscuit Company, of New York, became owner of the old Stone Mill on June 10, 1921. Bennett believed in the health value of natural foods in the diet and deliberately sought out an old mill to advertise and practice his beliefs. Accordingly he formed the Wheatsworth Company, grinders of whole wheat and producers of whole wheat products. He made a concrete addition to the old Stone Mill, giving the "Appearance of Futuristic or Cubist Style of Architecture." The Control Room of the mill enclosed a twenty-foot diameter water wheel.

Bennett attended a production of Humperdinck's operetta *Hansel and Gretel* in 1928 and was taken by Joseph Urban's stage sets, particularly the gingerbread house in the second act. He employed Urban to design the Gingerbread Castle, which was built of poured concrete on the foundation of an abandoned lime kiln at a cost of $250,000.

The Gingerbread Castle took two years to build, being made of poured cement, colored inside and out. A life-size horse and rider in full armor galloped in the direction of the wind from its roof-tree, and a giant black cat arched its back on a candy stick shaft that rose beside the domelike exterior of one of the mystic rooms. The exterior stone staircase at the entrance was balustraded by elephants, appearing like giant animal crackers. Hansel and Gretel, holding each other by the hand and dressed in their quaint costumes, were used for the staircase banisters. The cauldron in which the giant was brewing his dinner from the bones of his victims when Jack slew him was also reproduced faithfully. The castle boasts a snow roof, looking like cake icing, six inches thick, studded with sugar hearts, with a huge black cat crouching on a peppermint candy stick, and a giant metal plum pudding on the second floor.



The Gingerbread Castle

The Ginger Bread Castle opened in August 1930, featuring characters from Hans Christian Anderson's fairy tales. Mr. and Mrs. Thomas Edison were counted among the weekend visitors on September 27, 1930. On the following day, a record crowd of 4,000 guests kept eighteen guides busy "showing visitors through the castle of goblins, toads, and other creatures of lifelike semblance to those in Anderson's stories." In the first month of operation, tourists came from 36 States, 10 foreign countries, and the District of Columbia.

Bennett also intended to faithfully restore the Haines Mansion to its original condition and to exhibit relics associated with the early history of Hamburg. On January 26, 1931, the National Biscuit Company acquired the Stone Mill, but soon closed down milling operations. The Haines Mansion was sold and became a restaurant under separate ownership. The National Biscuit Company ceased operations here in 1936. Peter J. Swarze, of the Century Milling Company, purchased the former Wheatsworth flour mill in January 1938, choosing the name "Ginger Bread Castle" as the trademark of his products, which included wheat, whole wheat, rye, soy bean flour, and corn meal. This was the only mill in the East that produced soy bean flour, used for diabetic foods and foods for babies. Because the machinery purchased from the National Biscuit Company had to be re-installed, there was a slight delay in opening the mill. Samples were ground in the second week of February 1938, and full production commenced on March 1st.

The incorporators of the Century Milling Company were: Joseph A. Abel, of Montclair; Peter J. Swarze, of Ham,burg; and Michael J. Gillis, of Maplewood. The company had a storage capacity of 75 carloads of wheat in its mill, which he received from Buffalo, New York. The Gingerbread Castle also re-opened in April 1938, but under separate management.

The Plastoid Corporation purchased the mill property on January 1, 1943, and manufactured wire and cable for the

Department of Defense. A steep rise in the price of copper forced the company to close on December 13, 1989. The Gingerbread Castle closed in 1978.

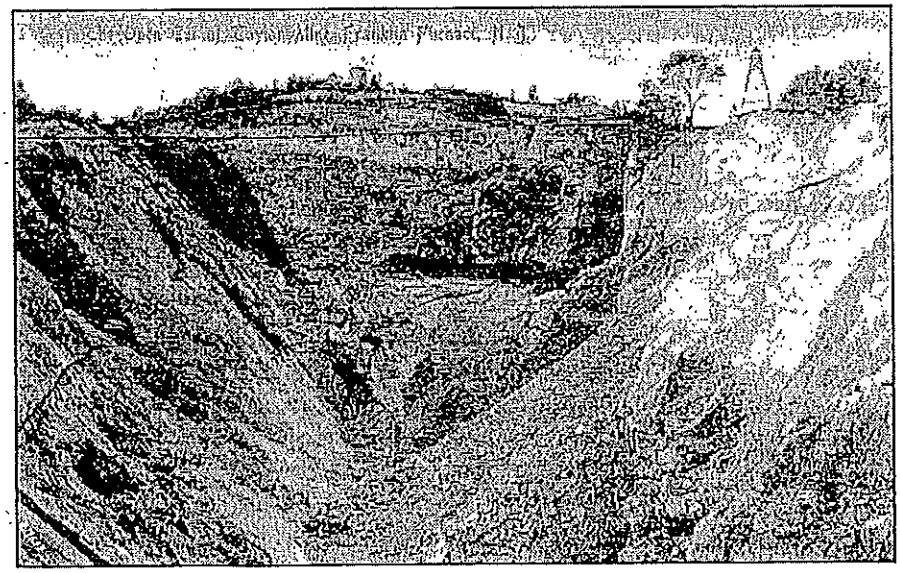
Key Settings and Resources Associated with the Wallkill Valley Heritage Trail

The Sterling Hill Mining Museum in Ogdensburg is a world-famous underground zinc mine open for tours to all. (Not recommended for anyone under 6 years of age.) The museum is a non-profit foundation in furtherance of mining preservation, scientific research and earth science education, open to the public since August, 1990. Listed on the Register of Historic Sites since 1991, the Sterling Hill Mine is a member of the "Mines, Metal and Men Sites" in New Jersey.

The Thomas S. Warren Museum of Fluorescence, founded in 1999, offers exhibits, lectures, and workshops to reveal both the beauty and utility of fluorescence and to serve as an educational facility for teachers. A nonprofit institution, the museum is on the same grounds as the Sterling Hill Mining Museum and is managed by the same foundation. More than 550 objects are currently on display. Thirteen cases of brightly glowing mineral specimens illustrate the diverse causes of fluorescence in the natural world, and an exhibit of such everyday items as drinking glasses, golf balls, plastic toys, and postage stamps reveals that fluorescence is a property shared by a wide range of common materials. Historic ultraviolet lamps are exhibited in a separate room.

The Warren Museum currently occupies three rooms of the old (1916) ore mill at Sterling Hill, and is expanding into a fourth room. New exhibits on bioluminescence, triboluminescence, phosphorescent minerals, fluorescent art, fluorescent crystals, and the many commercial and industrial uses of fluorescence and ultraviolet light are either in planning or under construction. The museum also houses a substantial reference collection of fluorescent minerals and is developing a library and a photograph archive.

The Franklin Mineral Museum, Inc., at 32 Evans Street, in Franklin, New Jersey, is a unique science learning center for geologists, mineralogists, and historians, displaying the largest systematic collections of over four thousand Franklin-Sterling Hill and world-wide mineral specimens, including the most comprehensive display of the world's most brilliant, fluorescent minerals, found at Franklin and Sterling Hill. All display specimens are identified, including local gemstones, colorful crystals and mineral species of great rarity. Related exhibits explain the mining methods employed and the concentration methods used in the preparation of the ore for smelting. The bi-level Replica Mine shows the operation of mining zinc ore. All mining equipment was donated to the museum by the New Jersey Zinc Company. and was the actual equipment used to operate the Franklin Mines.



The new Jensen wing of the Museum contains the Wilfred Welsh natural history collections of fossils, native American relics, rocks and minerals, assembled by a science teacher for instruction of his classes. The rock collection covers the principal types, while the mineral display, with well over 4200 specimens, is noted for its beauty. Scientific aspects of mineralogy are featured. The Fossils include fish, dinosaur footprints, shells, bones, skulls and beautiful petrified wood. The native American section features New Jersey finds, Western bead work and pottery.

Numerous rocks and minerals characteristic of the area can be found on the famous Buckwheat Dump, the mine waste pile dating from the 1870's. Facilities are available for the testing of specimens under ultra-violet light. A museum exhibit shows what to look for. Carrie Boone Nelson's sculpture of "The Zinc Miner," standing on the Museum lawn, is dedicated to the men who mined the ore in Franklin and Ogdensburg, New Jersey.

5.0 Interpretive Themes

The Wallkill cuts its path through a narrow belt of limestone and dolomite, descending from the hills into a vast meadow known as the Drowned Lands. The enclosing Highlands are the roots of an ancient system of high mountains, formed nearly 1.1 billion years ago. The movements of the earth's plates over vast ages have elevated and reworked mountains occupying this ground, leaving long intervals for their erosion and even inundation by the sea.

The Franklin marble hosts adjacent deposits of zinc and iron ores that are thought to have formed at the same time, making the association of the zinc and iron unique in the State of New Jersey. The unique zinc ore deposits at Franklin and Ogdensburg have produced more than 330 different minerals, 33 of which occur only in New Jersey.

The Wallkill Valley Heritage Trail discloses the remarkable deglacial history of the Wallkill valley, with its rolling landscape of ice-contact deltas and a proglacial lake basin, extending between the sand and gravel hills of ice-recessional moraines. Stagnation of the ice led to the formation of the largest and best marked recessional moraine in New Jersey, which extends across the Kittatinny valley between Ogdensburg and Culvers Gap. The large embankment of stratified drift in the Wallkill valley at Ogdensburg, deposited in a huge crevasse in the stagnant glacial ice, provided a natural passage for the Midland Railroad (N. Y. S. & W.), requiring only a double-arch stone bridge and artificial fill to cross the Wallkill.

The Franklin Formation is a remarkable geologic feature that has been centrally linked to the patterns of human settlement and activity for several centuries. The earliest human incursions into this region made use of its lithic resources, especially flint, starting over 7,000 years ago. The Wild Cat Rock, structurally one of the best rock houses found in Sussex County, has yielded stone chips, bones, turtle shells, a notched arrow point, a triangular flint point, and shards of pottery, evidencing the earliest use of local resources in manufacture. The people who inhabited this shelter also used many other natural materials for objects of utility and ornament, which, being perishable, have not survived.

The Sharpsborough Iron Works, established in 1768 at three locations along the Wallkill and its tributary brooks, was the first industrial outpost to take advantage of the fortunate natural combination of rich ores, limestone for flux, forested hills, and abundant water power.

Transportation of the products of furnace and forge to market across difficult terrain presented a considerable difficulty and expense, which was not resolved until the advent of the railroads, which reached Franklin in 1870. Prior to the locomotive, muscular power provided the only means of mining and transporting ores and refined products.

Samuel Fowler, a self-taught, yet celebrated mineralogist, brought the value of the minerals of the Franklin Formation, with their wealth of zinc and Franklinite, to wide notice. Through his influence, the first zinc produced in the United States used ore from Sterling Hill in 1838 for the manufacture of the brass standard weights and measures of the United States. The first zinc paint, made directly from red oxide, used zinc ore from Franklin in 1850 and the New Jersey Zinc Company began manufacturing zinc paint at Newark.

Beginning in 1848, several companies were organized to mine iron and zinc ores from Mine Hill and Sterling Hill, to smelt iron from Franklinite ore, or to produce white and red oxide of zinc for paint manufacture. The Passaic Zinc Company commenced mining operations at Sterling Hill in 1856, operating a large crushing and separating plant.

During the Civil War, experiments conducted both here and abroad indicated that Franklinite produced the best article for use in iron-cladding ships, for manufacturing cast and wrought iron for large caliber guns, and for covering forts. Franklinite paint was also sought for use on ironclad steamers, tin roofs, iron railings and the bottoms of wooden vessels.

The Ogden Mine Railroad Company was incorporated in 1863 to carry ore from the Ogden mines atop Hopewell Mountain to Nolan's Point on Lake Hopatcong, for transshipment via the Morris Canal. Bulk ore from Franklin and separated zinc ore from Sterling Hill in Ogdensburg was also hauled up the mountain, using stone steps, for transshipment over the Ogden Mine Railroad.

The opening of the Sussex Railroad to Franklin in 1870, followed almost immediately by the opening of the Midland Railroad in 1872, resolved the long-standing difficulty and great expense of transporting bulk ores and burned lime to manufacturers. The opening of rail communications facilitated the large-scale manufacture of lime for cement mortar, white wash, plaster, and a soil-dressing, as evidenced by the Homestead Kilns along Cork Hill Road in Franklin, the kilns of the Wallkill Cement and Lime Company at the Stone Mill in Hamburg, and the Windsor Lime Kilns along Lime Kiln Road in Hamburg. The railroads also stimulated the construction and operation of a paper mill at Hamburg in 1873, utilizing the water power of the Wallkill. For many years before its closing in 1933, the Union Waxed & Tissue Paper Company was Hamburg's largest employer.

The use of dynamite, steam and air drills, and the introduction of electric drilling, pumping and hoisting equipment, revolutionized the mining industry. New mills were erected and more efficient methods of mining introduced. Inventor Thomas A. Edison tested his ingenious magnetic ore separator at the village of Edison in 1890, but the enterprise proved short-lived.

The various competing corporations who owned mining rights at Franklin and Ogdensburg consolidated in 1897 to form the New Jersey Zinc Company. By the dawn of the twentieth century, Hungarians, Russians, Slavs, and Poles made up most of the labor force. The New Jersey Zinc Company resumed operations at the Sterling Hill Mine in 1912, constructing a modern mill of 450 tons daily capacity in 1917.

In one of the last great and most flamboyant use of water power along the Wallkill, the F. H. Bennett Biscuit Company purchased and enlarged the old Stone Mill in Hamburg in 1921, forming the Wheatsworth Company. As an advertisement for Wheatsworth products, the Gingerbread Castle was built of poured concrete on the foundation of an abandoned lime kiln at a cost of $250,000. It opened in August 1930, after two years' construction.

The Franklin mine came to be regarded as the greatest zinc mine in the world, yielding 15 million tons of zinc ore between 1880 and 1930. The Great Depression decreased the demand for zinc and also withered many local industries and the railroads that depended upon them. The New Jersey Zinc Company halted operations at Franklin in 1954. Mining at Sterling Hill continued for another three decades.

5.1 Interpretive Resources and Presentation Strategies

The following sites hold interest and meaning, relative to the interpretive themes of the Wallkill Valley Heritage Trail, and should be highlighted through a variety of interpretive media, including brochures, wayside exhibits, talks, digital media, and personal services:

1. Interpretive resources located along the Wallkill Valley Heritage Trail:
   - Geology of the Franklin formation
   - Sterling Hill
   - Ogdensburg Fen
   - Ogdensburg Glades
   - Site of Franklin Furnace Depot, jointly used by the Sussex Railroad (D. L. & W.) and the Midland Railroad (N. Y. S. & W.)
   - Historical background of the Midland/New York, Susquehanna & Western Railroad
   - Historical Background of the Franklin Extension of the Sussex Railroad (Delaware, Lackawanna & Western Railroad after 1881)
   - Midland double-arch stone bridge over Cork Hill Road and the Wallkill
   - Site and ruins of the (Sparks') Union Waxed & Tissue Paper Company Mill, Hamburg
   - Wildlife viewing stations on the Paper Mill Pond
   - Species identification for plants and animal life, using wayside markers.

2. Interpretive resources located within the viewshed of the Wallkill Valley Heritage Trail:
   - The Sterling Hill Mining Museum
   - Homestead Kilns along Cork Hill Road in Franklin

New Jersey Calcite Company Limestone Quarries, west of Cork Hill Road
Wildlife viewing stations on Franklin Pond
Views of the original village surrounding Franklin Furnace
Mine Hill
Walkill Golf Course (where Babe Ruth played) and the site of a World War I military encampment
The Franklin Mineral Museum
The New Jersey Zinc Co. Mill No. 2
Hot & Cold - swimming spot at warm-water discharge of Mill No. 2 into Wallkill
The Sharpsborough Ironworks
Windsor Lime Kilns along Lime Kiln Road in Hamburg
Wallkill Cement and Lime Company, Stone Mill, Hamburg
Gingerbread Castle
Wheatsworth Mills
SCMUA

3. Remote interpretive resources related to the Wallkill Valley Heritage Trail:

Andover mines
Buckwheat & Taylor Mines
Franklin zinc ore deposit, High Street, Franklin, NJ
Glacially sculptured outcrops, Hamburg, NJ
Ogden Mine Railroad
Pikes Peak (Franklin) mine, Cork Hill Road, Franklin, NJ
Wildcat Ravine and Bog
Wildcat Rock Shelter
Remains of the village of Edison
Edison School House (Hungarian Church after 1909)
Unconformity, Wildcat Road, Franklin, NJ
Wawayanda Furnace, Wawayanda State Park
Zero fault, Route 23, Franklin, NJ

4. Other places of significance related to the Wallkill Valley Heritage Trail:

Individuals, businesses, organizations, governmental units or agencies may want to mark or interpret other local landmarks or places of interest located within their boundaries, in cooperation and coordination with the Wallkill Valley Heritage Trail. Spur or side trails could provide downtown walking tours.

6.0 Legislative and Administrative Background

The New Jersey Trails System Act of 1974 (L. 1974, c. 159) established a State trails system consisting of scenic, recreation and connecting or side trails, "in order to provide for the ever-increasing outdoor recreation needs of an expanding population, and in order to promote public access to, travel within, and enjoyment and appreciation of the outdoor, natural and remote areas of this State ..." The Legislature authorized the institution of a Statewide system of trails "both in natural and scenic areas of New Jersey, and in and near the urban areas of this State."

Scenic trails were to be "extended trails so located as to provide maximum potential for the appreciation of natural areas and for the conservation and enjoyment of the significant scenic, historic, natural, ecological, geological, or cultural qualities of the areas through which such trails may pass." These trails were to be limited exclusively to foot use, except that the use by horses or non-motorized bicycles may be permitted on segments of scenic trails where deemed appropriate by the Department of Environmental Protection. State recreation trails provide a variety of outdoor recreation uses in or reasonably accessible to urban areas. Connecting or side trails provide additional points of public access to, or connections between, State scenic or recreation trails.

The Department of Environmental Protection is required to consult with appropriate Federal, State, and local government agencies and public and private organizations, to establish a uniform marker for the State trails system, and to coordinate the State trails system with the National trails system.

The selected route of a State trail shall be compatible with the preservation or enhancement of the environment it traverses, and the boundaries of the right-of-way established in such a manner that they protect the scenic values of the trail. In selecting rights-of-way, the Department of Environmental Protection shall give full consideration to minimizing the adverse effects upon the adjacent landowner or user and his operation. Development and management of each segment of the trails system shall be designed to harmonize with and complement any established multiple-use plans for that specific area in order to insure continued maximum benefits from the land.

To promote non-interference with nature within the external boundaries of the right-of-way, the natural vegetation shall be kept undisturbed except for any clearing required for construction of the trail, occasional vistas, or trail-use facilities. Every effort shall be made to avoid uses incompatible with the purposes for which the trails were established. The Department of Environmental Protection may permit other uses along the trail which will not substantially interfere with the nature or purposes of the trail. When deemed to be in the public interest, the Department may enter into written cooperative agreements with local governments, landowners, private organizations or individuals to operate, develop and maintain any portion of a recreation or scenic trail.

The Legislature authorized the NJDEP to make studies for the purpose of determining the feasibility and desirability of designating additional scenic or recreation trails. It was also to review all formal declarations of railroad right-of-way abandonments for possible inclusion into the State trails system.

7.0 Statement of Purpose

As part of the New Jersey Trails System, the Wallkill Valley Heritage Trail shall provide public access to, and travel within, the abandoned right-of way of the Midland Railroad (which became the New York, Susquehanna & Western Railroad in 1881), a 5.45-mile line of rail bed extending from Sterling Hill in Ogdensburg through Hamburg, as a scenic heritage trail, for the conservation, appreciation and quiet enjoyment of its significant scenic, historic, natural, ecological, geological, and cultural qualities.

8.0 Statement of Significance

The Wallkill Valley Heritage Trail preserves the original route and engineering marvels of 5.45 miles of the New Jersey Midland Railroad, built in 1871-72, from Sterling Hill through Franklin and onto Hamburg. This right-of-way served the needs of several world famous mines, limestone kilns and quarries, iron and zinc works, as well as passenger and general freight service.

8.1 Scenic Quality

The Scenic Quality of the Wallkill Valley Heritage Trail is enhanced by a diversified and heavily glaciated landscape of exceptional geological interest, as it passes the Ogdensburg Fen alongside Wallkill, running along the west rim of Franklin Pond, through the historic mining town of Franklin, known as the "Fluorescent Mineral Capital of the World." The largely deciduous vegetative cover changes with the terrain, suiting marshy depressions in the thick drift, well-drained gravel hills, as well as shale slope and limestone terrace environments.

8.2 Public Support

RESOLUTION ENDORSING THE FINAL REPORT OF FINDINGS AND RECOMMENDATIONS RELATIVE TO GREEN ACRES AND RAILS-TO-TRAILS INITIATIVES INVOLVING PROPERTIES LOCATED WITHIN FRANKLIN BOROUGH, SUSSEX COUNTY, OFFERED BY THE FRANKLIN BOROUGH GREEN ACRES AND RAILS-TO-TRAILS AD HOC COMMITTEE:

WHEREAS, the Borough of Franklin had also been advised of the State of New Jersey's interest in acquiring various land parcels within the Borough that had significant historic or environmental resource value; and

WHEREAS, the Borough of Franklin had been advised of the State of New Jersey's interest in acquiring the authority to use existing railroad track located within the Borough's municipal boundaries to be utilized as part of their rails-to-trails system; and

WHEREAS, the Borough of Franklin, balancing its appreciation of the borough's historical and environmental resources and interest in open space preservation with their obligation to its residents to act prudently with respect to major decisions affecting its citizenry, proceeded to appoint a Rails-To-Trails and Green Acres Initiative Ad Hoc Committee, whose purpose was to do an in-depth analysis of the impact of the proposed acquisition plans; and

WHEREAS, the Borough of Franklin has received the comprehensive report compiled by the Ad Hoc Committee (a copy of which is attached hereto and included as part of this resolution), which is the product of three months of intensive study of the subject matter; and

WHEREAS, based on the finding of fact and information presented to the Mayor and Council, it is evident that several sites referred to in the Green Acres Acquisition initiative, namely, the Palmer Shaft and Former Zinc Mill site property located on Main Street, the area known as the Open Cut located on Buckwheat Road and Evans Street, the Lime Kiln located on Cork Hill Road, the Ball's Mountain Iron Mines, and pre-Columbian Indian Shelters located on wildcat Road are all sites that have significant historic value; and

WHEREAS, it is further evident that the aforementioned acquisition sites, together with the Ogdensburg Fen, the wildcat Bog and Ravine located between Cork Hill and Wildcat Roads, and the marshy/wetland tract located between Wildcat and Davis Roads have significant environmental resource value, while the former Church Street bakery property will provide needed facilities to enhance permitted State recreational activity in the area; and

WHEREAS, the Ad Hoc Committee report has determined the following with respect to the Rails-To-Trails Initiative:

1. The trail would provide a source of recreation that would be easily accessible by a majority of residents in Franklin;
2. It would provide safer means of access for Borough children to travel to get to the Borough's established recreation areas at the pond, as an alternative to transiting on public roads;
3. The community at large would benefit from learning from the numerous historically and culturally sensitive sites along the trail;
4. The trail would lend itself to educational purposes in addition to recreational uses;
5. The trail in conjunction with the Green Acres project could have a positive impact on the re-establishment of positive foot traffic on Main Street;
6. With respect to adjacent property owners who have expressed concerns relative to privacy issues, the State should attempt to install buffers using fencing and landscaping where quality of life and privacy issues are of concern;
7. Where the trail is next to contiguous lots, the trail should not encroach onto existing properties, driveways, gardens, yards, etc; and

WHEREAS, the Ad Hoc Committee has made a formal recommendation that the Borough Council endorse all of the noted Green Acres acquisition projects, as well as the Rails-To-Trails initiative, further recommending that where possible the State consider alternatives such as fencing or redirection of the trail where appropriate and feasible; and

WHEREAS, the Borough of Franklin recognizes the importance of protecting the water quality of the Wallkill River, the adjacent lands and the stream corridors leading into the River through developing a critical mass of open space via a network of paths and corridors and the linking of environmentally sensitive areas along ponds, streams, wetlands, bogs, marshes, and floodplains, their associated transitional areas, grasslands, steep slopes, woodlands, viewsheds, and mature vegetation, to ensure environmental quality, habitat, protection and active and passive recreational opportunities; and

WHEREAS, the Borough of Franklin recognizes the need to preserve its rich historical heritage so that future generations can understand the culture, contributions and impact this area's forefathers had on industry and life in Franklin Borough, the County of Sussex and beyond; and

WHEREAS, the Borough of Franklin recognizes the possible benefits to be gleaned from a trail that has the potential of connecting three towns, namely, Franklin, Hamburg and Ogdensburg, providing a means of recreational passage that does not include roadways traveled by vehicular traffic.

NOW, BE IT RESOLVED, by the Mayor and Council of the Borough of Franklin, that the Borough's remaining noteworthy historic structures and sites should be preserved and restored and that the open space areas, as noted, should be preserved. The acquisition and use of the abandoned NYS&W rail bed for the purpose of conversion to a rails-to-trails system for both active and passive recreation and open space conservation will promote a healthy sense of community among its residents by connecting the residents of the past, the roots of Franklin Borough, and the residents of the future.

AND, THEREFORE, BE IT RESOLVED, that the Mayor and Council of the Borough of Franklin endorse the acquisition of the properties enumerated herein and in the attached report, by the State of New Jersey for the purposes of historic and environmental preservation and enhancement of passive and active recreational opportunities.

BE IT FURTHER RESOLVED, that the Mayor and Council of the Borough of Franklin recognize the issues raised by the Ad Hoc Committee relative to specific aspects of the proposals that will require additional consideration and attention in order to properly implement these initiatives. While more fully described in the report, the following issues should be addressed by the State of New Jersey:

1. That the Board of Public Works or SCMUA shall have the opportunity to review the formal acquisition prior to the transfer of property to insure that easements are in place to provide for the possibility of future sewer lines that may need to run through the slated acquisition site. Further that specific easements determined to be necessary by the BPW and/or SCMUA will be granted and recorded prior to or simultaneously with the filing of the deeds of transfer of the property from the present owner to the State of New Jersey.

2. That the Borough will have an active role in the development of the Management Plan for the properties slated for acquisition.

3. That dialogue will continue between the State of New Jersey and the Immaculate Conception Church/School representatives to try to develop a plan which will best protect the safety of children, as well as provide for the needs of the school's future expansion, in view of the close proximity of the existing rail bed.

4. That the parcel hosting the Palmer Shaft and Mill site located on Main Street will continue to be considered as a key component to this initiative, due to its significant historical value and the willingness of the Franklin Historical Society to manage the site.

BE IT FURTHER RESOLVED, by the Mayor and Council of the Borough of Franklin that a copy of this resolution be forwarded to the State of New Jersey, Division of Parks and Forestry, State Park Service, Northern Region, the U. S. Fish and Wildlife Service, Wallkill River National Wildlife Refuge, the Office of Natural Lands Management, Division of Parks and Forestry, the New Jersey Department of Environmental Protection, Green Acres Program, the Sussex County Department of Planning, the State Planning Commission, the Honorable Christine Todd Whitman, the Honorable Robert E. Littell, the Honorable E. Scott Garrett, the Honorable Guy Gregg, the Sussex County Board of Chosen Freeholders, the New Jersey League of Municipalities, the Sussex County Strategic Growth Committee, the Sussex County League of Municipalities and all Sussex County Municipalities.

CERTIFICATION: I, Rachel Heath, hereby certify the foregoing to be a true and correct copy of a resolution duly adopted by the Mayor and Council of the Borough of Franklin at a meeting held in the Franklin Borough Municipal Building, 46 Main Street, at 7:00 p. m. on the date of June 13, 2000.

9.0 Alternatives to Consider

The bed of the abandoned New York, Susquehanna, & Western Railroad, through the Borough of Franklin, is a de facto trail. It is well-defined already by people using it for hiking, horses, and ATVs. At present, its use is unregulated, unsupervised, and unmanaged. If it weren't for the exposed railroad ties, there would probably be more foot and horse traffic. Given the historical relationship of the railroads to the development of the world-renowned mineral deposits of this vicinity, converting the abandoned rail bed through Ogdensburg, Franklin and Hamburg from Rails-to-Trails offers a unique opportunity to add an educational context to outstanding cultural attractions, including the Sterling Hill Mine Museum and the Franklin Museum, as well as to numerous significant sites that are not otherwise identified for the public.

As the Wallkill Valley Heritage Trail would utilize, almost entirely, the extant surface of the abandoned right-of-way of the Midland-N. Y. S. & W. Railroad, environmental impacts would be minimal. The rail bed is firm, elevated for most of its length, screened by vegetation on its slopes, but with a cinder bed requiring little clearing. Areas where endangered plant or animal species may be identified will not be developed or disturbed.

The Division of Parks and Forestry recommends that the proposed Wallkill Valley Heritage Trail be classified as a scenic heritage trail, which will also provide additional points of public access to, or connections with, State scenic or recreation trails (namely, the proposed Iron Horse Trail). The New Jersey Trails System Act of 1974 (L. 1974, c. 159) defines scenic trails as "extended trails so located as to provide maximum potential for the appreciation of natural areas and for the conservation and enjoyment of the significant scenic, historic, natural, ecological, geological, or cultural qualities of the areas through which such trails may pass." The Wallkill Valley Heritage Trail may also intersect, or provide access to, downtown walking tours to be developed by the municipality.

As a scenic trail, the Wallkill Valley Heritage Trail would be managed to protect, maintain and interpret its natural, historic and scenic qualities for non-motorized trail uses, including horseback riding. Hunting, of any type, will not be allowed in the trail corridor.

The Division of Parks and Forestry in the New Jersey Department of Environmental Protection would be responsible for administration of the Wallkill Valley Heritage Trail. Kittatinny Valley State Park (or some new management unit to be designated) would be directly responsible for the development and maintenance of the trail, and for enforcement of trail regulations. All Park Service rules and regulations under N. J. A. C. 7:2-1.1 et seq. will apply to the Wallkill Valley Heritage Trail. The Northern Region Office of the State Park Service shall prepare and implement this Trail Management Plan in cooperation with the Superintendent and staff of Kittatinny Valley State Park (or some new management unit to be designated). The Bureau of Forest Fire Management will enforce regulations under the New Jersey Forest Fire Laws, Title 13, as well as inspect and insure accessibility for emergency fire vehicles. The Office of Resource and Development shall oversee development through the capital budget and construction programs. The Division of Fish, Game and Wildlife will enforce regulations under the New Jersey Fish Code, N. J. A. C. 7:25-6.1 et seq. as they apply to fishing in the Wallkill.

Any illegally dumped trash, consisting of household items, tires, construction materials, or animal waste, would be routinely removed from along the trail, by, or under the direction of, the New Jersey State Park Service. Volunteers and Clean Communities grants will also help to keep the trail free from litter, vegetation, and debris. Since most of the Wallkill Valley Heritage Trail is easily visible from frequented roadways and streets, frequent monitoring and periodic cleanup will be relatively easy.

Permanent as well as hourly staff will be required to perform vegetation management, litter control, monitoring law enforcement and general maintenance. Existing staff at Kittatinny Valley State Park (or some new management unit to be designated) will provide the necessary personnel to accomplish these tasks. Additional seasonal funds will be provided to extend the current seasonal forces to the Wallkill Valley Heritage Trail.

Management of the Wallkill Valley Heritage Trail would adhere to the following objectives:

- To manage and maintain the Wallkill Valley Heritage Trail in a manner compatible with the preservation or enhancement of the environment it traverses.

- To establish the boundaries of the right-of-way in such a manner that they protect its scenic values.
- To give full consideration to minimizing the adverse effects upon the adjacent landowners.
- To develop and manage the Wallkill Valley Heritage Trail system as a harmonious extension of established multiple-use plans governing connective trails in order to insure continued maximum benefits from the land.
- To promote non-interference with nature within the external boundaries of the right-of-way, by leaving the natural vegetation undisturbed, except for any clearing required for construction of the trail, occasional vistas, or trail-use facilities.
- To avoid uses incompatible with the purposes for which the Wallkill Valley Heritage Trail and its connective scenic trails were established.
- To permit only those non-conflicting uses which shall not substantially interfere with the nature or purposes of the trail. Conflicting uses, such as hunting and motorized vehicles, will not be permitted.
- To provide safe access and off-road parking for trail users.
- To maintain artifacts associated with the Midland Railroad (later the New York, Susquehanna & Western Railroad) to the fullest extent possible.
- To interpret its natural and historical qualities through appropriate interpretive media.
- To identify parking and access areas suitable for handicapped use, and to modify the trail surface and other sup porting amenities, to meet ADA standards.

9.1 The Preferred Alternative

The Preferred Alternative envisions the development of the abandoned rail bed, through Franklin, in two sections. The Ogdensburg Section extends from the vicinity of the Sterling Hill Mine Museum to the point where the rail bed crosses Cork Hill Road near the Ogdensburg-Franklin border. The Franklin-South Section extends from Cork Hill Road, near the Ogdensburg-Franklin border, to the midspan of the stone railroad bridge over the Wallkill, behind Ferrell Gas in Franklin. The Franklin-North Section extends along the rail bed from the west side of Wildcat Road to the south side of the Scotts Road bridge, via the section of the railroad right-of-way owned by the Borough of Franklin. The Hamburg section continues from the Scotts Road bridge, through Hamburg, ending at the Wallkill in Hardyston Township, across the river from the end of the Wood Duck Nature Trail in the Wallkill National Wildlife Refuge.

Through full implementation, the Preferred Alternative would develop the Wallkill Valley Heritage Trail on 5.45 miles of the abandoned right-of-way of the Midland-New York, Susquehanna & Western Railroad (.57 mile in Ogdensburg, 3.5 miles in Franklin, 1.38 miles in Hamburg). Connecting with the proposed Iron Horse Trail and Sussex Branch Trails, it would allow both short or long distance trail use. The flat, cinder base would safely accommodate various trail uses, such as hiking, bird-watching, nature walks, horseback riding, cross-country skiing, and bicycling, along its entire length. A paved surface on half the width of the trail bed between Cork Hill Road, near the Ogdensburg-Franklin border, and the stone arch railroad bridge over the Wallkill in Franklin will provide barrier-free, ADA use.

Implementation of the Preferred Alternative will allow for the continuation of the Wallkill Valley Heritage Trail into Hamburg and the inclusion of access and interpretation to such important heritage sites as the Windsor Lime Kills, the Paper Mill site, the Stone Mill and the Gingerbread Castle. The Hamburg Section was planned in ways consistent with this Trail Management Plan, in consultation and cooperation with officials and interested citizens of Hamburg. The portion within the Borough of Ogdensburg was similarly developed in ways consistent with the Wallkill Valley Heritage Trail Management Plan, in consultation and cooperation with officials and interested citizens of Ogdensburg.

Under the Preferred Alternative, the primary general parking areas shall be at the old New Jersey Zinc Company parking lot at Sterling Hill, already owned by the State of New Jersey; in the vicinity of the Franklin Viaduct; on the south side of the Scotts Road bridge; on a parcel of land along Wheatsworth Road, already owned by the State of NJ, located near the boundary between Hamburg and Hardyston Township; and a parking lot owned by the U. S. Fish & Wildlife Service at the extreme southern end of the Wallkill National Wildlife Refuge. The ADA section shall extend from the trail-head where Cork Hill Road intersects the rail bed, near the Ogdensburg-Franklin border, to midspan of the stone railroad bridge over the Wallkill, behind Ferrell Gas in Franklin

The municipalities or other interested groups may develop walking tours that intersect the Wallkill Valley Heritage Trail, thereby benefiting downtown businesses with additional foot traffic from heritage tourists and recreational users.

Basic Proposals and Policies

The Wallkill Valley Heritage Trail will be barrier free and paved with an approved surface for half its width along the Franklin-South Section, providing the only ADA trail, managed by the State Park Service, in northern New Jersey. Gates installed at the access points will supply sufficient at-grade clearances so that people with disabilities will be able to circumvent the gate with support equipment without interference. All interpretive wayside exhibits will accommodate ADA accessibility standards.

Trail bed improvements shall include:

The removal of vegetation from the trail bed to a minimum width of 12 feet.
Regrading any side drainage ditches to augment drainage.
Replacement or repair of clogged culverts.
Addition of sub base materials where needed to increase elevation to prevent ponding of water.
Resurfacing of half the width of the Franklin-South Section with an appropriate surface for ADA accessibility.
The installation of signs showing permitted uses of the trail as well as interpretive wayside exhibits at select locations.
Repairs to existing bridges as needed and the replacement of two missing bridges.

Routine maintenance and repair shall include: the removal of downed trees or broken branches in the trailway; clearing the trail of encroaching vegetation; repairing the trail surface and washouts; replacing or installing necessary drainage structures such as drainage dips or culverts; replacing deteriorated or damaged parts of bridges, or wayside exhibits.

All road crossings will require gating to prevent motor vehicles from gaining access to the Wallkill Valley Heritage Trail. Sufficient room will be provided to allow pedestrian and bicycle use to bypass the gates for uninterrupted travel. Secure bicycle parking will be provided at trail heads.

Trail boundaries will be determined through acquisition surveys and acquisition title research. The installation of boundary markers will depend upon the type of ownership that the State of New Jersey obtains: standard State Park Service boundary markers at the minimum frequency of one marker per one-tenth mile will identify property, if full ownership in fee is obtained. Their frequency may increase at select locations to enhance resource-protection activities or goals.

Existing native vegetation in those areas outside the tread of the trail or outside those areas needed for clear sight for the trail users' distances will be encouraged to mature and increase in density, except where scenic vistas or interpretive views are desired.

The State Park Service will not construct fencing on property borders, but will not object if adjacent landowners construct fences on their property at their expense.

Visitor orientation or the interpretation of the themes and resources identified and inventoried in this Plan, as well as other cultural or natural features that are deemed appropriate for interpretation, will mainly be accomplished through interpretive wayside exhibits and a heritage trail brochure. Locations to view wildlife on Franklin Pond will require the negotiation of a Memorandum of Understanding between the State Park Service and the Borough of Franklin and the purchase of the necessary right-of-way. Trailside wildlife viewing stations will also be developed on the Paper Mill Pond in Hamburg.

A promotional trail brochure will be drafted, printed and distributed, providing a brief history of the Midland-New York, Susquehanna & Western Railroad and its role in the development of the region's mineral resources. The brochure will describe interesting natural and historic features along the path, permitted and prohibited uses, and a map showing the path, parking areas, road intersections, and the trail's connection to other public recreational areas and cultural opportunities.

In addition to a trail brochure, a historical interpretation program will be developed for the Wallkill Valley Heritage Trail, in cooperation with the Office of Historic Sites in the State Park Service, the State Geological Survey, and with local associations and individuals who are interested and knowledgeable about the region's geological, natural and historical heritage.

Ogdensburg Section

The Ogdensburg Section extends from the vicinity of the Sterling Hill Mine Museum to the point where the rail bed crosses Cork Hill Road near the Ogdensburg-Franklin border. Parking shall be provided at the old New Jersey Zinc Company parking lot at Sterling Hill, already owned by the State of New Jersey. The abandoned railroad right-of-way is interrupted by the removal of a portion of the glacial embankment of sand and gravel at the east end of the double-arch stone railroad bridge. A safe route and method of connecting the elevated trail bed to the level of the parking area needs to be resolved at this location. The possibility of acquiring and using the former railroad spur that served the Sterling Hill Mine shall be investigated.

Franklin-South Section

The Preferred Alternative envisions the development of the Franklin-South Section as a multi-use trail with full ADA accessibility. It is proposed to make this whole section accessible to as many people as possible, on hoof or foot, and particularly for wheel chairs, but not for motorized vehicles. It will be paved with a firm and stable surface along its entire length for only half its width; the width of the paved trail-tread shall be a minimum of five (5) feet. Edge protection, at least 3 inches in height, may be installed along a portion of the trail to facilitate use by people with limited vision who use canes. Signs identifying the accessible segment of the trail shall include the total distance of the accessible segment and the location of the first point of departure. To allow every opportunity for persons with disabilities to experience the attractions, unobstructed views of all points of interest shall be provided.

If a Memorandum of Understanding can be negotiated between the State Park Service and the Borough of Franklin (and the necessary easement obtained), a toilet, designed for ADA accessibility, will be placed at the southernmost section of the borough garage and the State Park Service may salary a public works employee for its cleaning and maintenance. This toilet will be located near an ADA-accessible wildlife viewing-station. There will be a paved turn-around and a cul-de-sac, outfitted with benches, right on top of the eastern half of the arched stone bridge over the Wallkill at the end of this section. Additionally, a fence may be placed on the bridge to prohibit access onto that portion of the railroad right-of-way now in private ownership.

Four to six roadside parking spaces (two or three on each side, including handicapped spaces) will be located at the trail-heads where the railroad bed crosses Cork Hill Road, near the Ogdensburg-Franklin border. Four to six parking spaces will be created near the Lime Kiln, west of Cork Hill Road. Six roadside parking spaces (three on each side, including handicapped spaces) will be located at the trail-heads abutting Maple Avenue, near the intersection of Cork Hill Road. No less than half, and up to two-thirds, of the parking spaces at each above-mentioned area shall be designated and clearly marked for use by disabled visitors, expectant mothers, or parents with toddlers.

Franklin-North Section

The Franklin-North Section extends along the railroad right-of-way from the west side of Wildcat Road to the Scotts Road bridge. This section will intersect the proposed Iron Horse Trail in two locations (on each leg of the wye formed by the intersection of the former right-of-way of the Sussex Branch of the Delaware, Lackawanna & Western Railroad with the Midland-New York, Susquehanna & Western Railroad, which provided for east and west-bound rail traffic).

The Franklin-North Section, from Junction Street to the Scotts Road bridge, will require acquisition of trail rights to the railroad bed from the Borough of Franklin. In this regard, it is recommended that the municipality include a deed restriction prohibiting motorized recreational vehicles and uses. It is further recommended that the State of New Jersey acquire any and all parcels of land lying between the rail bed trail and the Wallkill, to provide fishing access and to minimize trespassing on private property.

This section is most scenic, but will require removal of vegetative growth from the rail bed. One bridge over the Wallkill needs to be reconstructed on the railroad right-of-way (concrete abutments are extant), with the capacity to pass emergency and maintenance vehicles.

Parking (ten to twelve parking spaces, including handicapped) will be developed on the flat piece of ground at the west abutment of the Scotts Road bridge over the Wallkill. Sanitary facilities will be made available at this parking area.

The area bordering the Wallkill, in and around the triangle formed by the intersecting lines of the New York, Susquehanna &

Western Railroad and the Delaware, Lackawanna & Western Railroad (See 10.0 Appendices, p. 50), contains a wealth of historic and natural resources, as well as outstanding scenic value, and therefore deserves special consideration. Since the intentions of the County of Sussex as to the use of the former right-of-way of the Delaware, Lackawanna & Western Railroad for a public recreational trail (the proposed Iron Horse Trail) are still unknown and some lands in this vicinity are still in private and borough ownership, several options are presented. These options are listed from the simple to the complex, based on the probability of land ownership by the State of New Jersey.

Option #1: The trail will be confined to the N. Y. S. & W. rail bed, which forms the base (eastern leg) of the triangle. Trail use will be as otherwise described for the Franklin-North Section. Six to eight parking spaces will be constructed on the rail bed in the vicinity of the viaduct; the exact location of the parking lot to be determined by an accurate survey of the area.

Option #2: With approval from the County of Sussex (which owns the rail bed of the Delaware, Lackawanna & Western), the trail will utilize all three (3) legs of the triangle and will incorporate the stem of the wye, extending west along the rail bed to Davis Road. Trail use will be as otherwise described for the Franklin North Section. Six to eight parking spaces will be constructed on the rail bed in the vicinity of the viaduct; the exact location of the parking lot to be determined by an accurate survey of the area. Fill will be applied, as needed, to stabilize and restore the trail surface, wherever it has been disturbed by the SCMUA sewer line.

Wayside exhibits shall interpret: mineralogist Samuel Fowler and his former Stone Mill Road homestead; the 1869 Sussex Railroad stone-arch railroad bridge over the Wallkill; the purpose of the triangle (wye) and the history of the Franklin extension of the Sussex Railroad (Delaware, Lackawanna & Western after 1881) and the Midland Railroad (New York, Susquehanna & Western after 1882); the former Hungarian Bottling works; and the stone arch road bridge. There shall also be wayside exhibits identifying plant and wildlife and designated wildlife viewing stations.

Option #3: The trail will utilize all three (3) legs of the triangle formed by the intersection of the rail beds and will incorporate the stem of the wye, extending west along the rail bed to Davis Road. Fill will be applied, as needed, to stabilize and restore the trail surface, wherever it has been disturbed by the SCMUA sewer line. The State of New Jersey will also attempt to acquire a number of private lots in and around the triangle. Priorities for acquisition shall be: Lots #26, #27, #23, and #22 in Block 40 of the Tax Map of the Borough of Franklin. A small picnic area (Fowler Grove) may be located on a portion of the Borough-owned property along the Wallkill, with the abandoned road bed and stone bridge as a focal point. This would require an expanded parking lot, accommodating twelve cars, and a trail-head sanitary facility.

Wayside exhibits shall interpret: mineralogist Samuel Fowler and his former Stone Mill Road homestead; the 1869 Sussex Railroad stone-arch railroad bridge over the Wallkill; the purpose of the triangle (wye) and the history of the Franklin extension of the Sussex Railroad (Delaware, Lackawanna & Western after 1881) and the Midland Railroad (New York, Susquehanna & Western after 1882); the former Hungarian Bottling works; and the stone arch road bridge. There shall also be wayside exhibits identifying plant and wildlife and designated wildlife viewing stations.

Trail Interruption

The Franklin-South and Franklin-North Sections shall be treated as two separate and distinct segments of the Wallkill Valley Heritage Trail, with no plans presently being developed to circumvent a privately-owned section of the rail bed with a connective link. For this reason, it may be necessary to find a spot for additional general parking in the vicinity of the northern terminus of the Franklin-South Section.

Hamburg Section

The Hamburg Section extends along the railroad right-of-way from the Scotts Road bridge, 2.25 miles through Hamburg, ending at Old Route #23 in Hardyston Township, on land being part of the Wallkill National Wildlife Refuge.

The rail bed is largely intact and passable for .375 of a mile north from the Scotts Road bridge to the Wallkill at the head of the

Paper Mill Pond, where a railroad bridge, approximately 100 feet long, is missing. On the other side of the Wallkill, the rail bed continues for approximately 330 feet in Franklin Borough, entering Hamburg where Stolls Mill Creek passes under the railroads. At this point, a spur leads eastward to where the four impressive Windsor Lime Kilns stand in the hollow, alongside Stolls Mill Creek, like abandoned industrial stone temples in the forest. The main line of the rail bed runs north for 0.75 of a mile, along the east side of the mill ponds and gorge, passing the scenic remains of the Paper Mill, Wheatsworth Mill and Gingerbread Castle to Gingerbread Castle Road. The rolling hills of the ice-age North Church Delta bind the western horizon, while tulip trees, white oak, maples and hemlocks ornament the steep enclosing banks of the pond. The concrete ruins of the Paper Mill, with its curious raceways and lone chimney stack (marked with the initials of the Union Waxed & Tissue Paper Company), add considerable interest to a picturesque gorge, where the river tumbles out of the Highlands, from one mill pond to the next, and finally enters the Drowned Lands below.

From the north side of Gingerbread Castle Road, the rail bed runs near the Wallkill for about 0.50 of a mile to Wallkill Avenue. The railroad embankment has either been washed out in places, or excavated for fill, or disturbed while laying the sewer trunkline, but the right-of-way remains passable, crossing through wetlands for most of this distance. SCMUA manholes are visible along the route. A concrete bridge carries Ames Boulevard (State Route #94) over the former railroad right-of way. The fence around the electric substation blocks the right-of-way between the north side of the concrete highway bridge and the south side of Wallkill Avenue. From the other side of Wallkill Avenue, the former railroad right-of-way runs .375 of a mile northward to the northern boundary of Hamburg Borough, continuing for about .875 of a mile through the northeastern tip of Hardyston Township, passing under Route #23, near the intersection of Blair Road. From the northeast side of Route #23, the rail bed continues for .375 of a mile Old Route #23. An existing parking lot in the Wallkill National Wildlife Refuge, adjacent to Old Route #23, will accommodate parking for trail visitors. The Wood Duck Nature Trail, part of the Wallkill National Wildlife Refuge, runs on the former rail bed of the Hanford Branch of the New York, Susquehanna & Western Railroad for approximately 2 miles between the Wallkill and a trailhead located on Route 565, a few hundred yards beyond the turnoff from Route 23.

The Hamburg Section will require acquisition in fee or by easements of the trail rights to the railroad bed from various owners. A list of the relevant lot and block numbers for properties required for restoration of the railroad right-of-way is being developed.

One bridge over the Wallkill, at the head of the Paper Mill Pond, needs to be reconstructed on the railroad right-of-way (concrete abutments are extant), with the capacity to pass emergency and maintenance vehicles.

Wayside exhibits shall interpret: the Windsor Lime Kilns, the Sparks Paper Mill site, waterpower; Wheatsworth Mill and the Gingerbread Castle, the history of the Midland Railroad (part of the Hanford Branch of the New York, Susquehanna & Western after 1882, until it was abandoned in 1958); the Susquehanna depot in the village of Hamburg; and proximous geologic, biotic and historical features of note within its view shed. There shall also be wayside exhibits identifying plant and wildlife and designated wildlife viewing stations.

Funding Opportunities

Funding for the development, maintenance and interpretation of the Wallkill Valley Heritage Trail will come from a variety of sources:

- Americans with Disabilities Act funding
- National Rails-to-Trails grants
- Federal Surface Transportation funding
- State Park Service Capital funding
- State Park Service Operational funding
- Green Acres Bonds
- Private or public donations

9.2 The Second Alternative

The Second Alternative envisions only the completion of the Franklin-South Section of the Preferred Alternative as an ADA heritage trail and the Ogdensburg and Hamburg Sections. The Franklin North section would be deferred pending construction

of a one-way road on the rail bed by the Borough of Franklin from Junction Street to Scotts Road.

9.3 The Third Alternative

The Third Alternative envisions no action other than land acquisition.

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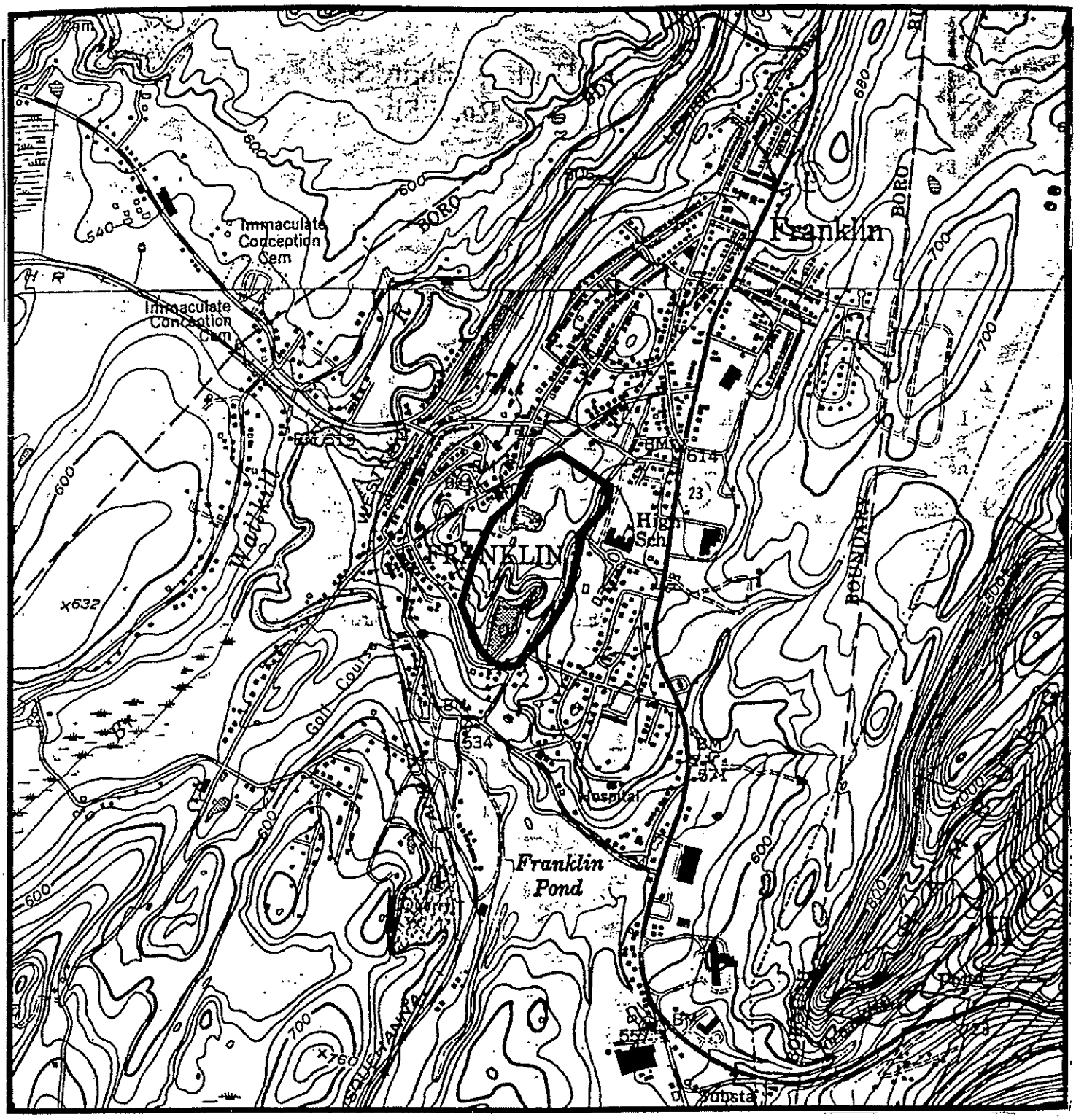
10.0 Appendices



Natural Heritage Priority Site
Franklin Mine
Sussex County
NJDEP, Division of Parks and Forestry
Natural Lands Management

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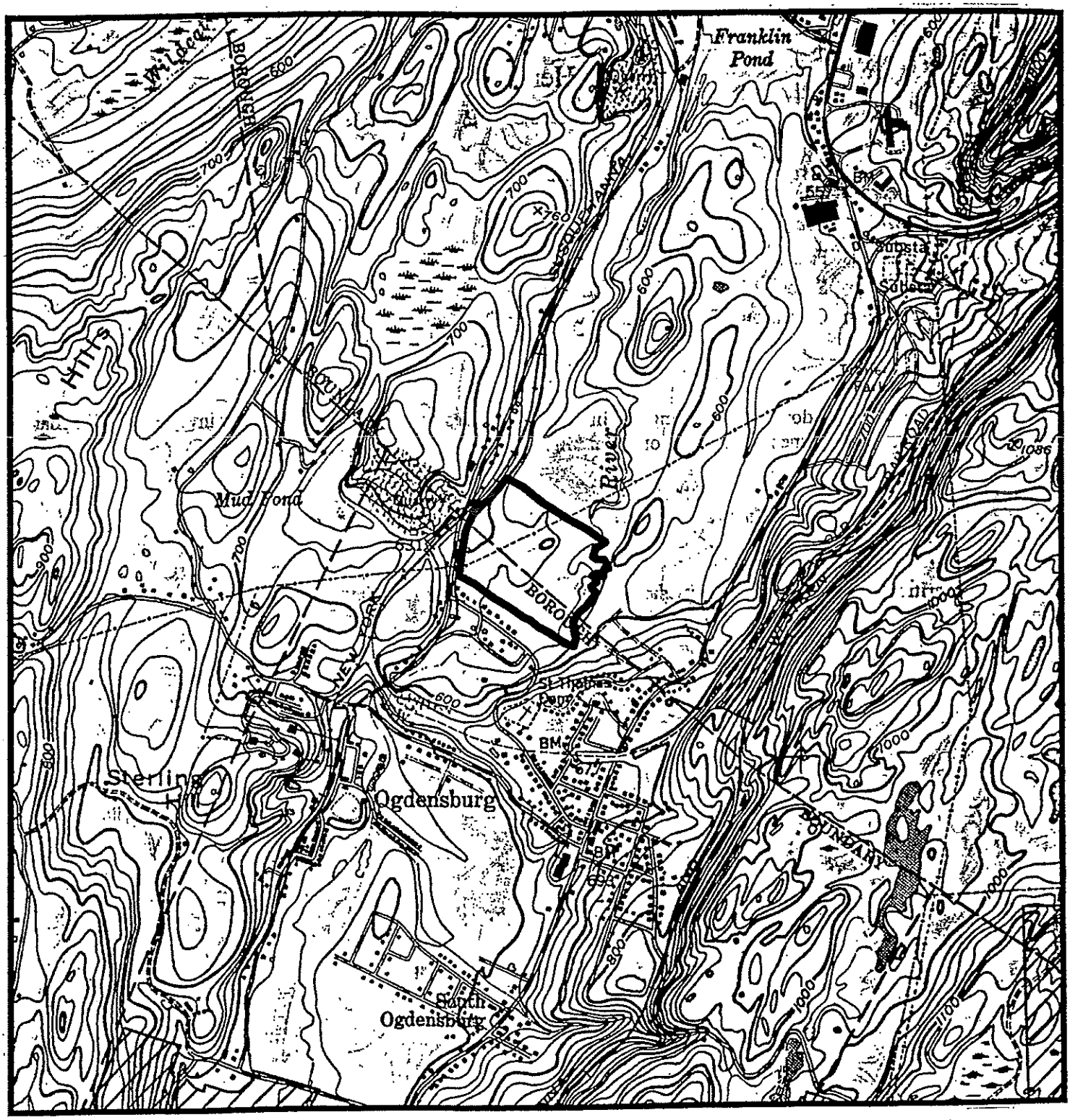
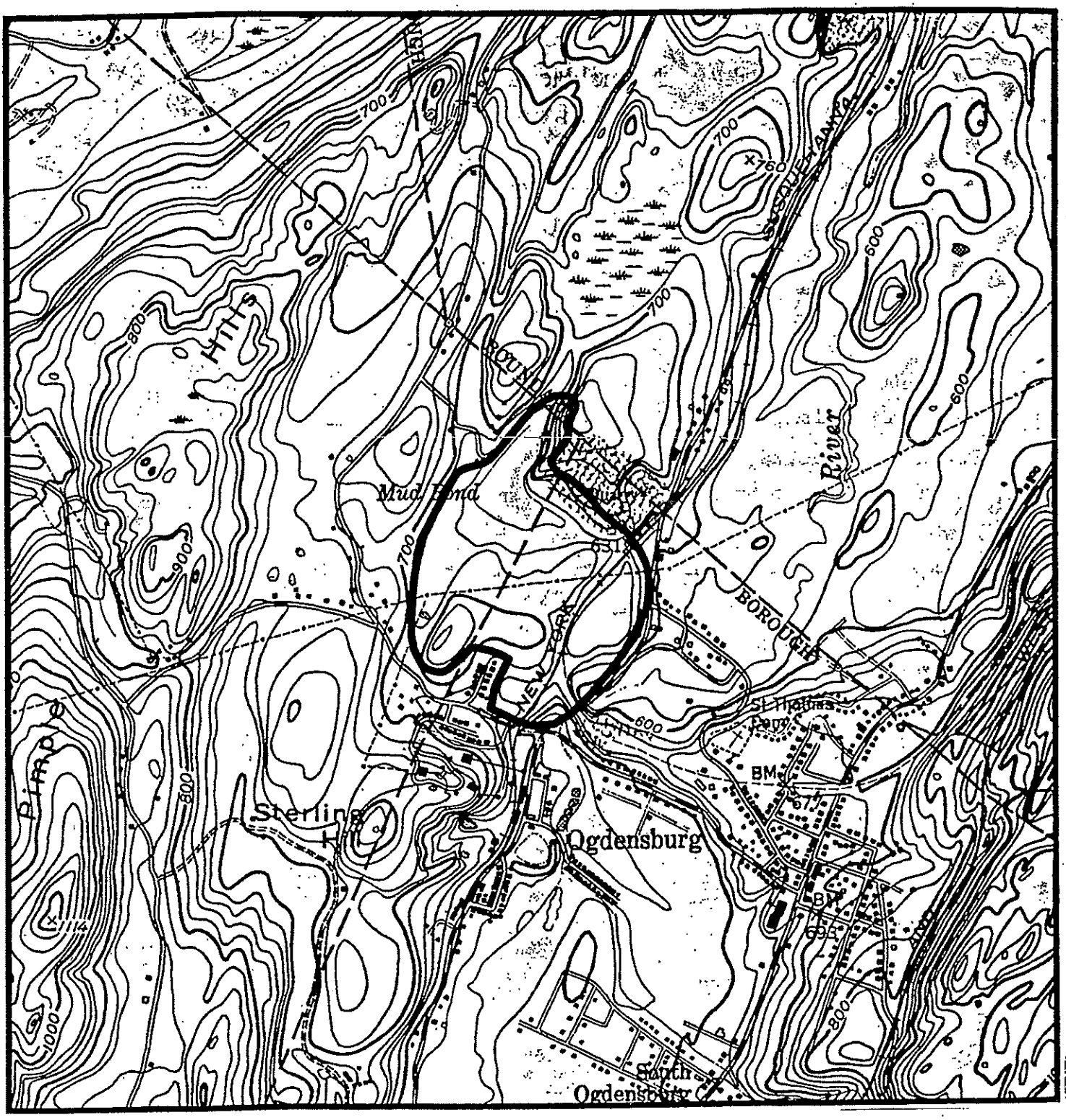


Natural Heritage Priority Site
Ogdensburg Fen
Sussex County
NJDEP, Division of Parks and Forestry
Natural Lands Management



Natural Heritage Priority Site
Ogdensburg Glades
Sussex County
NJDEP, Division of Parks and Forestry
Natural Lands Management

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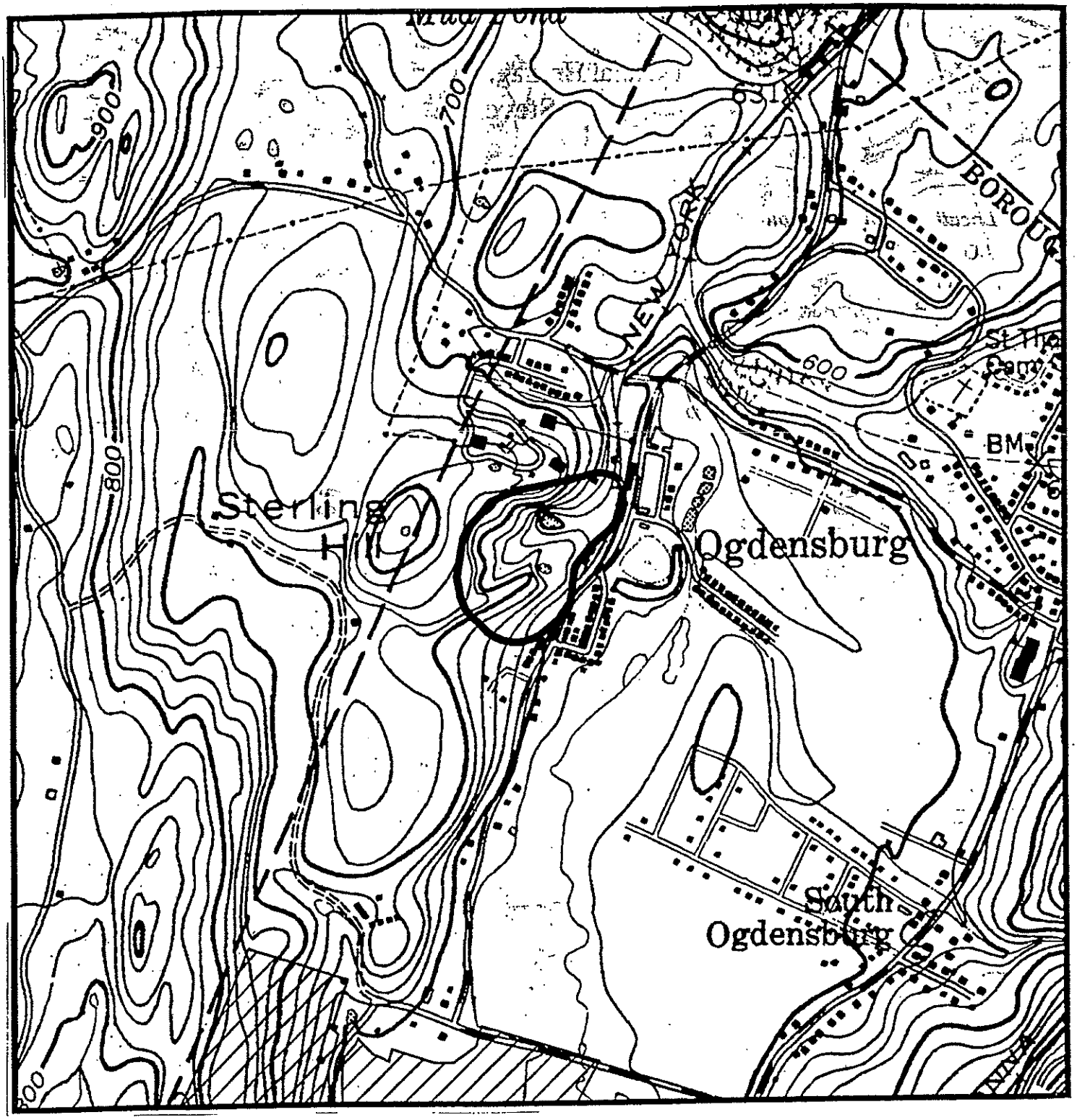


Natural Heritage Priority Site
Sterling Mine
Sussex County
NJDEP, Division of Parks and Forestry
Natural Lands Management

Natural Heritage Priority Site

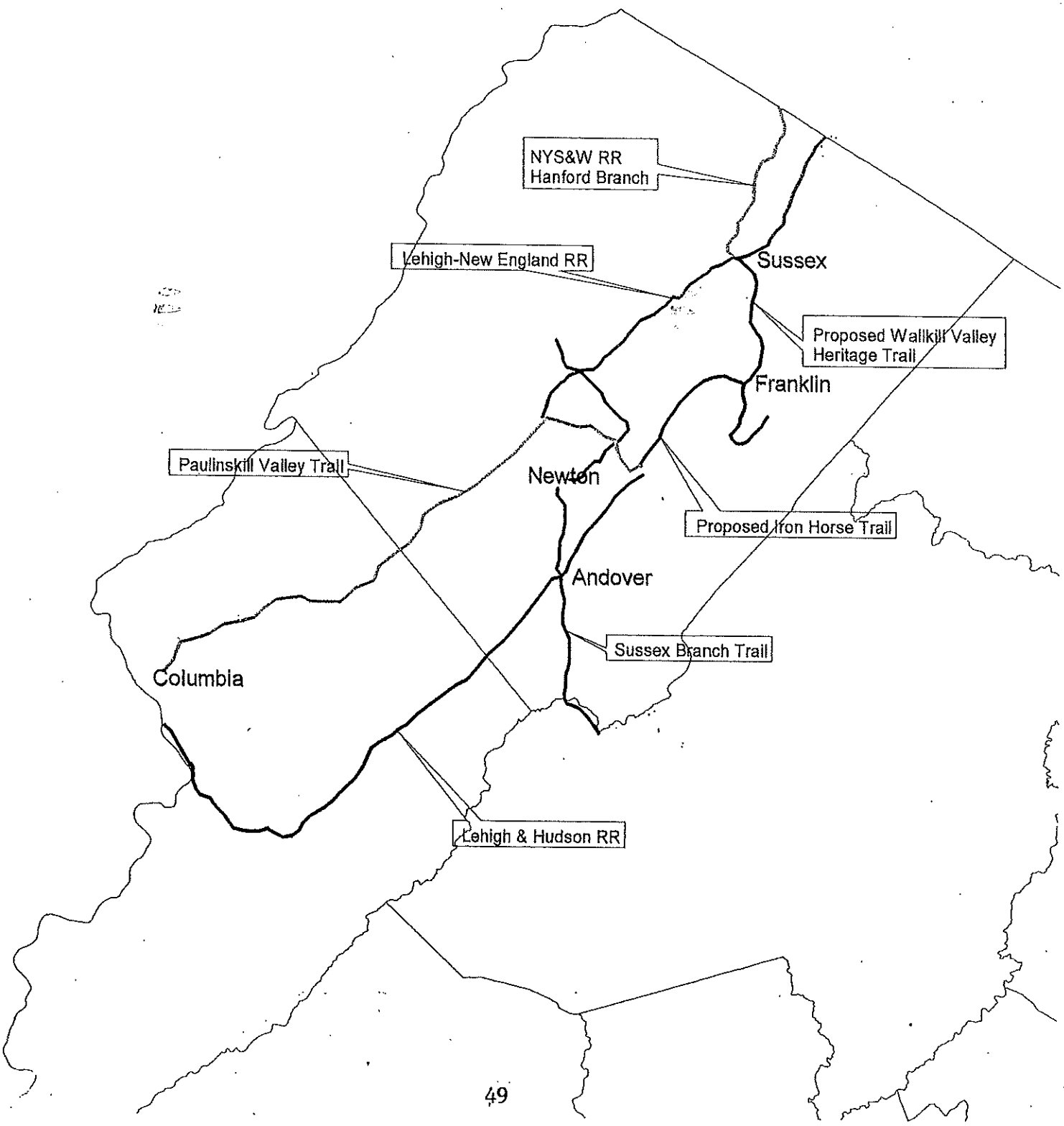
Wildcat Ravine and Bog

Sussex County

NJDEP, Division of Parks and Forestry

Natural Lands Management

Rail Trail Initiatives On Abandoned Rail Beds In Sussex and Warren Counties



Wallkill Valley Heritage Trail
Franklin Boro Triangle Option