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Final Report

HISTORICAL AND ARCHAEOLOGICAL ASSESSMENT

VALLEY FALLS HERITAGE PARK

TOWN OF CUMBERLAND, RHODE ISLAND

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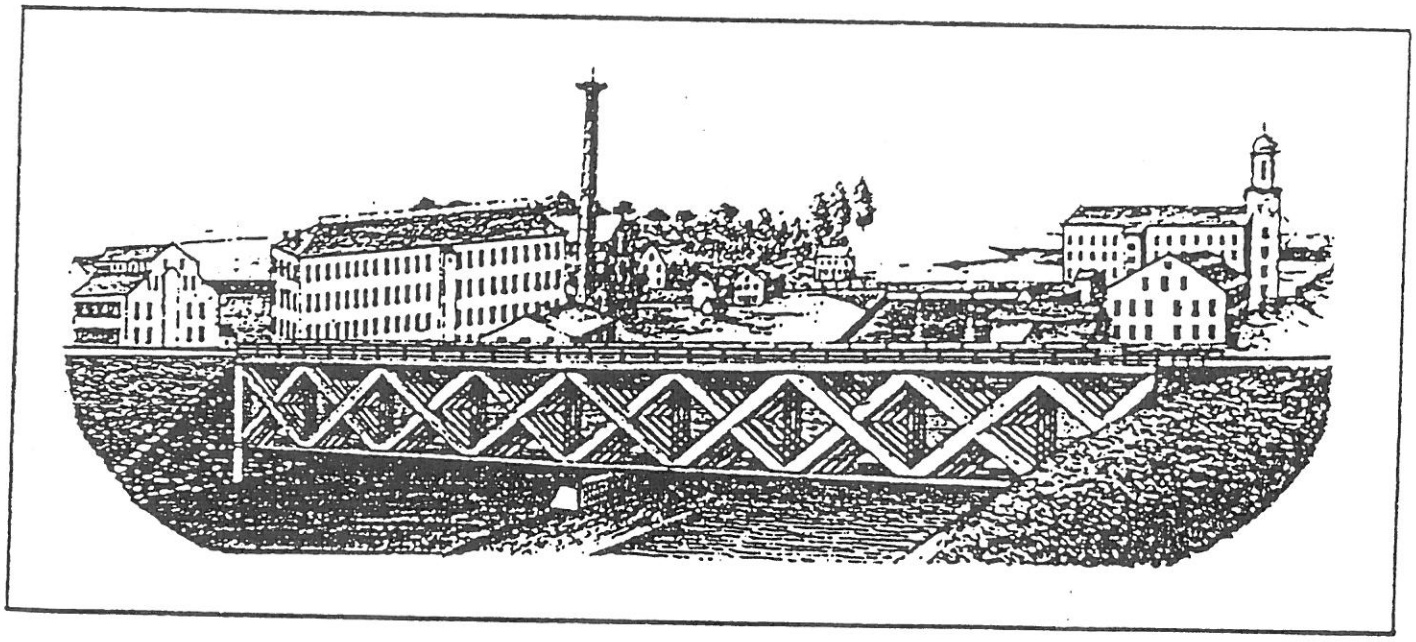

View Upstream of Valley Falls Mills c1851; Cumberland at Right

prepared for:

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I. INTRODUCTION

The Town of Cumberland, Rhode Island, proposes to develop the Valley Falls Heritage Park, on property currently owned by the Rhode Island Department of Environmental Management (DEM), using some DEM and town funding. This project falls under the purview of the Rhode Island Historic Preservation Act (RIGL 42-45.1 et seq.), requiring assessment of project effects on cultural resources which might be eligible for the State Register of Historic Places. Although no park area resources are currently listed on the State Register, there are obvious surface and subsurface remains of historic waterpowered industrial activity. The Rhode Island Historical Preservation Commission (HPC) identified initial assessment needs as preparation of a site history, an archaeological assessment of the integrity and significance of site resources, and mapping of historical site features. Park development will also proceed in conjunction with the framework and objectives of the Blackstone River Valley National Heritage Corridor, and will include preparation of a master and design plan. Basic park plans call for passive interpretation of the site's industrial remains, and of the ethnic heritage of former site workers.

To meet these varied objectives, the town retained Raber Associates to conduct an archaeological research and investigation study with the following goals:

identify the site's historical significance and value for possible interpretation, through development of an analytical site history;

assess the nature and integrity of site resources, above and below ground;

recommend phased future actions needed to interpret the site appropriately, or to protect significant site resources, in conjunction with park planners;

discuss pertinent park development problems with park planning consultants, and interested city and state personnel.

We conducted documentary, informant, and field research between November 1990 and March 1991. During this period, we also presented some research results and interpretative recommendations in meetings with town officials and residents, staff of the town Department of Planning and Community Development, and staff of the DEM, the HPC, and the Blackstone River Valley National Heritage Corridor Commission (BRVCC). Patrick M. Malone and Michael S. Raber acted as co-principal investigators, assisted by research assistant Beth Parkhurst, field director Stephen P. Carini, and field technician Gifford Fogle. Lyn Malone prepared several maps summarizing research conclusions.

This report of our study describes the park area and our research methods (sections II and III), analyzes park site hydrogeography and historical development (sections IV and V), presents results and interpretations of field research (sections VI and VII), assesses the significance and park design implications of all historic site resources (section VIII), and presents recommendations for site protection, development, and interpretation (section IX).

II. PROJECT AREA

The site consists of approximately 2.5 heavily-overgrown acres on the north side of the Blackstone River in the Valley Falls section of Cumberland, bounded north by Mill Street, west by Broad Street, and east by the Providence & Worcester Railroad (Figures 1 and 2). The west and east site boundaries extend visually across the river as, respectively, the stone-faced concrete Broad Street Bridge and the stone-piered, steel-plate-girder Providence and Worcester Railroad Bridge. Masonry walls define the entire riverside edge of the property, from which the masonry Valley Falls/Samoset dam extends across the river about 110 feet east of the Broad Street Bridge. This dam, and two earlier ones slightly upstream, formed the basis of 19th-century water privileges developed on both sides of the river for extensive Valley Falls textile-making operations in the present towns of Cumberland and Central Falls. While much of the southern component of this privilege in Central Falls survives in restored condition, the Cumberland component is often referred to as the Valley Falls Ruins. Surviving remains include gate structures and operators, parallel and converging masonry-lined raceways which define two "islands" along the river, a turbine base, and foundation remnants of stone, brick, and concrete structures (Figure 2).

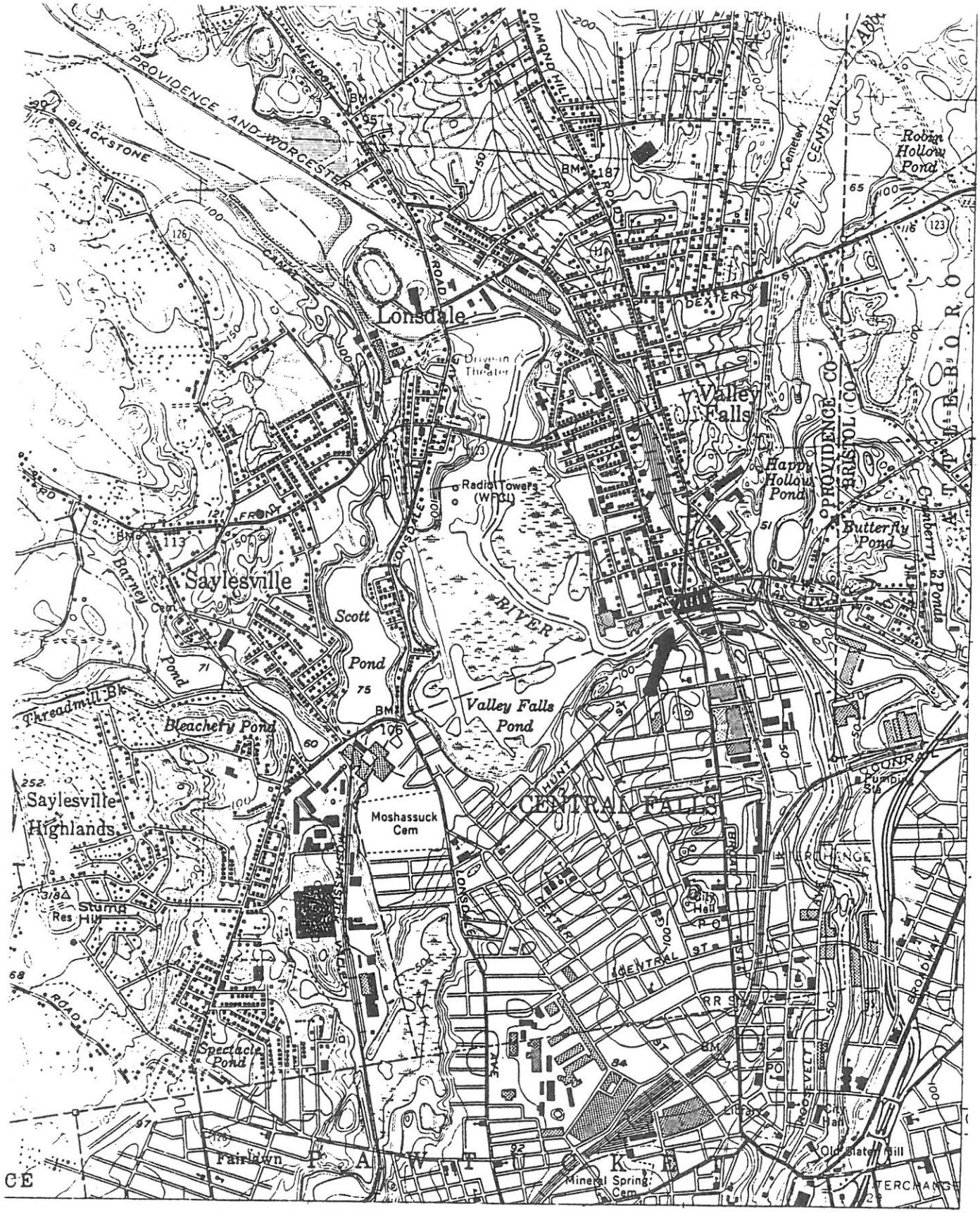

Figure 1. VALLEY FALLS HERITAGE PARK LOCATION

0 2000 ft.

base map: U.S.G.S. Pawtucket Quadrangle

III. RESEARCH METHODS AND PREVIOUS STUDIES

Although once the site of major local industries, the Valley Falls Ruins have received little detailed attention in historical or archaeological research, and their unusual raceway configuration has defied any previous, preliminary attempts at interpretation. Most readily accessible literature does not address basic questions of site chronology and use in any detail. The most recent compilation of historic resource data on Cumberland barely mentions the site, and includes an erroneous assertion that it burned in the 1930s (Fitch 1990: 12). In addition to industrial or social historical information, site management also requires sufficient grasp of hydraulics and historic river hydrology to deal with such issues as floods, gate controls, or watered raceways. Study needs thus included a broad base of previously uncollected data, which we created by combining a variety of documentary, informant, and field research methods:

extensive research in primary and secondary sources, including local, regional and family histories, Cumberland deeds and assessment data, an unpublished study of the Valley Falls Mills in Central Falls (Cleary 1977), property inventory and other corporate data in the Sayles Finishing Plants business records at the Rhode Island Historical Society, federal census returns, textile directories and other material at the Museum of American Textile History, studies in regional textile history, and a report on the Samoset Dam filed in the dam section at the Rhode Island Department of Environmental Management (Jenks and Ballou 1952), in which a crucial 1939 map had incidentally been inserted;

preliminary collection of informant and oral history data;

detailed inspection and description of existing surface conditions, with preliminary 35-mm. photographic documentation;

compilation of data from surface inspection, and a large number of historical maps, insurance drawings, postcards, photographs, and descriptions, on a detailed topographic survey prepared for the park planning project (National Engineers-Land Surveyors, Inc. 1990);

archaeological testing to locate site features not defined by the general steps outlined above.

We also used our own substantial personal libraries and document collections on water power, industrial archeology, textile history, and industrial architecture. Included in the authors' personal materials were engineering studies and notes relating to the hydroelectric development at Valley Falls by Blackstone Hydro Associates in the late 1970s.

We summarized most of our chronological and field research results on several maps included with this report (Figures 2-4, and 9).

IV. HYDROGEOGRAPHIC SETTING

The Valley Falls Ruin is situated on the Blackstone River, at a point seven miles from its mouth. This famous industrial stream, the birthplace of the American industrial revolution, is the largest river in Rhode Island. It begins at the junction of the Middle River and Mill Brook in the southern part of Worcester, Massachusetts. From there it flows 49 miles and falls 438 feet before entering the Narragansett Bay in Providence, Rhode Island. The total drainage area is 540 square miles. Most of the river system's elongated basin (46 miles long and an average of twelve miles wide) is hilly, particularly the northern and western sections (Corps of Engineers 1975: 16-17).

The Blackstone and the other principal rivers of Rhode Island were exploited for almost all their potential power in the nineteenth century. In 1832, Samuel Slater, founder of the American textile industry, commented on the value of water power in this small state:

> Yet these streams, more steady in their volumes than those of the western country, and descending, in their short courses, an elevation of from two to four hundred fifty feet to the tide waters of the bay and sound, furnish, with their tributaries, innumerable cascades, and a power of propelling machinery almost incalculable in amount (McLane 1833).

As Slater wrote, some 12,000 horsepower was already harnessed in Rhode Island. By 1880, the total had reached 22,240 horsepower, and the federal census reported that "Every available site has long since been utilized". Of the 438 foot drop in the Blackstone River, for example, 400 feet were used for power generation. "It would be hard, in fact, to find another stream in the country so utilized" (U.S. Census Office 1885: 15).

The vertical drop of 438 feet in 49 miles would have made the pre-industrial Blackstone an extremely fast-running stream. If one discounts the short Niagara River (with its Niagara Falls), no major river in the United States, including the Colorado, drops as many feet per mile (Ackerman 1990). The Blackstone had a number of steep rapids and waterfalls that were ideal for water power development.

The present dam at Valley Falls produces only part of the 14 foot maximum "head" or drop recorded for the site. That maximum figure was available only at the mills on the Central Falls side, and is explained by the continuing drop (indicated by rapids) in the river between the dam and the end of the long tailrace in Central Falls. The recorded head on the Cumberland side is only 11 feet 7 inches (Steere 1881: 112). The tailrace on the Cumberland side is considerably shorter than the one on the Central Falls side and does not extend to the end of the rapids. As noted in section V below, there have been three dams across the river at Valley Falls. Each time a new dam was built, the previous one was used as a cofferdam to divert water from the new construction. The dam site with the best hydrographic and geological characteristics was the first one (c1813). The highest dam was the second one (c1828), which was lowered slightly in 1835 because of a legal dispute with the Lonsdale Company upstream (Jenks & Ballou 1952: 19). The second and third (1853) dams created an extensive pond which made water power at Valley Falls unusually reliable.

The other water-powered mills on the Blackstone River in Rhode Island have always operated on a "run of the river" basis. The steep banks of the river, and the relatively short distances between dams, did not allow ponding of substantial volumes of water. Mills could not store water at night for the next day's operation; they could only use what was coming down the river. In dry seasons, that flow was seldom enough to run mills at full capacity for an entire workday. At Valley Falls, however, the exceptionally large pond held a substantial volume of water in storage, part of which could be used each day to augment the river's flow during working hours. Even if the pond was "drawn down" a foot or more by the end of the work day, it would fill up again while the Valley Falls mills (and their raceways) were closed at night.

The Valley Falls site was, in fact, better than almost anyone realized. Although there were Blackstone River mills with more "head," and although the sites below Valley Falls had more flow (additional water entered at Abbott Run), the potential at Valley Falls was the greatest on the river. Were it not for the objections of the Lonsdale Company and other property owners upstream, it would have been possible to raise the dam (or add flashboards above it) and greatly increase the storage capacity of the Valley Falls Pond. Jenks & Ballou, consulting engineers, stated categorically that "We consider the site of the Valley Falls Dam the most remarkable natural dam site for a good sized mill pond that we know of in Rhode Island; and it seems a pity that interference with the Lonsdale tailwater [backing water into the wheel pits of the Lonsdale mills and thus damaging their generating capability] has always prevented the utilization of this much more effective dam site....very much more water could be stored than ever has been stored by the Valley Falls Dam" (1952: 67).

For many reasons, including concerns about increasing flood hazards, the dam will never be raised. The England River Basins Commission (1980: RI-1-CL) conservatively estimates the drainage area for the dam to be 446 square miles. Blackstone Hydro Associates uses a larger figure of 475 square miles. Rainfall and snow melt from this area have caused a number of catastrophic floods. A photograph we identified at the Rhode Island Historical Society shows the Valley Falls Mill complex during the great flood of 1886, when water was said to be 9.77 feet deep on the dam (Jenks & Ballou 1952: 46). In 1927, 1936, 1938, and 1968, there were floods that came close to the intensity of the 1886 one; they measured over 15,000 cubic feet per second (cfs) at the gaging point in Woonsocket (with a drainage area of 369 square miles). By far the worst Blackstone flood on record was caused by Hurricane Diane in 1955, which produced a maximum flow rate of approximately 29,000 cfs in Woonsocket (it actually peaked artificially at 32,900 cfs when an upstream dam collapsed - Charles A. Maguire & Associates 1965).

Originally, the flow at the Valley Falls Dam was evenly distributed c1813 (in theory and legal obligation) between mill privileges on both sides of the river (Cumberland Book of Deeds 10:393). This would have meant that slightly more power was generated on the Smithfield, or Central Falls, side because of its greater head. The consolidation of water rights under the Chace family by the mid-nineteenth century meant that it was no longer necessary to divide the water evenly, but the practice probably continued into the twentieth century. The available horsepower at Valley Falls is listed as a combined total in all the water power statistics that the authors have found. The 1880 census noted that the "fall used" was 13 feet, providing "...about 600 horse-power during

nearly the whole year" (U.S. Census Office 1885:14). A 1935 study reported 14.1 feet of head and 754 horsepower (New England Regional Planning Commission 1935: 9). During periods of increased flow, such as spring run-off, the potential power was greater on some days, but there was a limit to the generating capacity of the turbines.

Using the average monthly flow recorded from 1929 to 1978 at Woonsocket, and factoring in the larger drainage area for Valley Falls, engineers working for Blackstone Hydro Associates in 1978 determined that the average daily flow rate over the dam at Valley Falls was 865 cfs. If one assumes that half the water historically went to the Cumberland side with a recorded drop of 11 feet seven inches, it is possible to calculate the potential power on that side: the daily average was 559 horsepower. In practice, turbines could only capture about eighty five percent of that potential power, or 475 effective horsepower. This is still a high figure, because it is based on average flow rate (including floods), not the minimum rate that had to be guaranteed for most of the year. On thirty percent of the days in an average year, the flow rate in the river dropped below 350 cfs, a rate which should have provided less than 200 horsepower from turbines on the Cumberland side. However, it is important to remember the storage capacity of the Valley Falls Pond, which would have allowed the mills to use more power than the average flow in the river suggests. By ponding for ten hours out of twenty four, these mills could have stored enough water to generate more than 300 horsepower (half the 600 h.p. listed c1880 for both sides) in all but the driest months of the year.

A 1939 plan apparently lists all of the turbines in place in the early twentieth century (Sayles Finishing Plants 1939 [maps]). Sayles Finishing Plants based this drawing on earlier plans made before the 1934 demolition of the mills on the Cumberland side. Three turbines shown in Cumberland have a total capacity of 466 horsepower. That is very close to the 475 horsepower figure calculated above, using a turbine efficiency rating of 85 percent and the average flow rate at this site.

V. HISTORICAL DEVELOPMENT

This section discusses two important contexts of Valley Falls Ruins history: the growth and decline of industrial textile manufacture at this site; and the social and cultural effects of these developments on the local community.

A. Site History and Industrial Development

1. Summary

The Valley Falls Mill Ruin is an industrial site with significant historic features that may date back to the second decade of the 19th century. Adjacent to the site are an 1853 stone dam and the submerged remains of two earlier wooden dams, built c1813 and c1828. Water power was divided equally between the Smithfield and Cumberland sides of the river. William Harris erected a cotton mill on his Cumberland property by 1820. Crawford Allen bought Harris' "cotton factory" and all its machinery in 1833 and built a new stone factory, probably west of the Harris mill and across the raceway leading to it. Allen failed in 1837, and Oliver Chace purchased Allen's stone mill and picker house in 1839. The Harris mill was apparently gone by 1839, but may be represented by existing foundation walls on the site. The original Allen mill and picker house remained in place into the 1930s.

Oliver Chace also bought mill property directly across the river in Smithfield in 1839, thus creating a mill complex which spanned the political and hydrological divide in Valley Falls. His heirs named their enterprise the Valley Falls Company in 1853. The complex, which produced cotton yarn and cloth under various company names, was controlled by Chace family members until 1912. The mills on the Cumberland side were expanded and altered many times, most notably by Samuel Chace in 1868. At that time, he probably added a second raceway in Cumberland and replaced waterwheels with turbines. In 1894, the Valley Falls Company took over the manufacturing plant and worker housing in Albion, while the Albion Company took over the holdings in Valley Falls. Control remained within the Chace family, and when the Samoset Company bought the Valley Falls complex in 1901, the new president was a Chace.

Frank Sayles, president of the enormous Sayles Finishing Plants, bought the Samoset Company in 1912. In Sayles company records and publications, mills in Valley Falls were called by various names: River Spinning Plant, Samoset Mills, Plant D, Valley Falls Property, and Glenlyon Dye Works. It was one of the locations where the company bleached cotton linters for use in World War I explosives. A number of companies rented out space in the Sayles-owned mills on the Cumberland side after Frank Sayles death in 1920. In the 1920s, the Cumberland mills housed manufacturers of narrow fabric, plush, woolens, silk, and cotton goods. Hydroelectric generation apparently began in 1922, with sales to tenants, other Sayles plants, and the local electrical company.

The New England textile industry went into fatal decline beginning in the 1920s, and by the beginning of the Great Depression only a few tenants remained at the Cumberland site; sales of electricity had ceased. In 1934, Sayles Finishing Plants, Inc. contracted for the demolition of its Cumberland mills and auxiliary buildings at Valley Falls, probably to reduce Cumberland tax liabilities. In 1939, the company altered and cleaned some of the raceways to improve their capacity as spillways for the dam.

2. The Pre-industrial Years: to 1800

The Valley Falls Ruins in Cumberland are located beside the site of a natural falls, or steep rapids, in the Blackstone River. Before the arrival of the first European settler in 1635, most of the area we know as Cumberland was controlled by bands of the Wampanoag (also called Pokanoket) tribe. It was, however, at or near the northeastern limits of Narragansett tribal territory and the southeastern limits of Nipmuck tribal territory. All of these Native American groups were Algonquian speaking, but there were often contested boundaries between tribes. European diseases had seriously weakened the Wampanoags by the 1620s, leaving the Narragansetts in a strong position. It is possible that the Narragansetts had taken over Valley Falls by 1635 (Fitch 1990; Rider 1904; Gibson 1980). The falls would have been a valuable fishing spot during seasonal runs of salmon, shad, and alewives; and the marsh above them would have been good hunting grounds for wildfowl. These conditions persisted for thousands of years of prehistory as well. No Amerindian archaeological sites are reported for this immediate vicinity, however, and none are likely to have survived with much integrity given the intensive industrial development of the 19th and 20th centuries.

The European colonists who settled the Cumberland area in the seventeenth century were primarily small farmers. King Philip's War (1675-76) destroyed almost every house and outbuilding in the region, but rebuilding began when hostilities ceased. A shallow ford in the Blackstone River at Valley Falls was apparently the site of one of the worst defeats by colonial forces in that war. Captain Michael Pierce, who was moving up the eastern side of the river with sixty five colonial soldiers and a number of Indian allies, was surrounded by a large war party of Narragansetts on March 26, 1676, and lost more than forty men in this military disaster (Leach 1958: 167; Fitch 1990: 6; Malone 1991: 87).

3. The Years of Early Industrial Development: 1800-1820

Settlement near Valley Falls increased in the eighteenth century, but water-powered industry using the sharp drop in the Blackstone River did not appear until after the construction of a dam c1813. The first textile factory in Cumberland was built on Abbott Run at Robin Hollow in c1800. Crawford Titus erected another cotton mill at Happy Hollow, closer to the mouth of Abbott Run, in c1818. This Titus mill was in Valley Falls, east of the present Valley Falls Mill Ruins, but it drew no power from the Blackstone (Fitch 1990, 12).

The first dam at Valley Falls was built by Abraham and Isaac Wilkinson, who bought the entire water privilege in 1812, along with sixteen acres of land. They built their timber-framed dam by 1813 and erected a mill on the Central Falls side c1820 (Steere 1886: 110-111; Cumberland Record of Deeds 10:393). Abraham and Isaac Wilkinson were twin sons of Pawtucket machinist and manufacturer Oziel Wilkinson, and were brothers of the noted machinist and inventor David Wilkinson. In addition to their Valley Falls interests, they were associated with cotton mills in Pawtucket and Albion. They had an iron business in Pawtucket, Providence, and Fall River (Biographical 1881: 59).

The artificial stimulation of American manufacturing during the Embargo and the War of 1812 did not last past the peace of 1815. It is not surprising that many disappointed entrepreneurs waited until after the depression of 1816-1817 to begin new construction of industrial buildings.

4. The Harris Years: c1820-1833

In 1813, the Wilkinsons sold a mill lot on the Cumberland side and 1/12 of the "main river dam" to William, Samuel B., and Daniel Harris. The ownership pattern of the Valley Falls property for most of its history was family-based, as was typical of much of Rhode Island enterprise. The Wilkinsons also sold the Harrises rights to 1/6 of the raceways that they promised to dig on that side (Cumberland Record of Deeds 10:393). We have found no map showing that dam or the raceways (meaning a head and tail race), but a race was clearly in place by c1831 on the Cumberland side, running from a dam upstream of Broad Street (then a turnpike built by the Wilkinsons) and proceeding under the turnpike into the site of the present Valley Falls Mill Ruins (Figure 3; Anonymous c1831 [maps]; Jenks and Ballou 1952).

The Harrises built a mill on the proposed park area site by c1820 (Steere 1881: 111). There is no contemporary evidence for its exact location, but it may be the "small mill" which is discussed below in an 1835 lease. Foundation data discussed in section VII suggest the Harris mill interior may have been 66 x 24 feet, with its long axis parallel to the headrace (see Figs. 3 and 9). It was more common in early Rhode Island to place a mill across, or perpendicular to, a race (as in the 1833 Allen Mill discussed below), but bringing water parallel to a mill and then drawing it off at 90 degrees to pass through a wheel pit was also an established New England pattern. It was, in fact, the method used at Waltham, Massachusetts, in 1813 for supplying more than one mill from a single race (Pierson 1978). One should note that the Wilkinsons intended to build other water-powered mills on the Cumberland side, and that the Harrises purchased rights to only 1/6 of the water (Cumberland Book of Deeds 10: 393). Perhaps a line of mills between parallel head and tail races was envisioned, a popular scheme in corporate mill towns.

Two Harris brothers, William and Samuel B., descendants of early Rhode Island settlers, managed the mill. By the first half of the 19th century, a number of members of the extensive Harris clan had become involved in Rhode Island industry. A cousin, Dr. Stephen Harris, was one of the owners of the Greene Manufacturing Company, a textile operation at River Point. Another, Elisha Harris, founded the textile mill village of Harrisville. William A. Harris owned a steam engine company in Providence. Members of the Harris family were presidents or members of the boards of directors of a number of Rhode Island banks and industrial insurance companies. Perhaps the most prominent member of the family was William and Samuel B.'s nephew, Edward Harris. Edward Harris was one of the leading Rhode Island textile manufacturers of the 19th century. The woolen mills he founded in Woonsocket made him a millionaire. He was known as a philanthropist and social reformer. Edward Harris got his start in the Rhode Island textile industry in Valley Falls, coming to work in his uncle William's counting house in 1823. The next year he moved to the Albion mill, also owned by his uncles William and Samuel B. in partnership with Isaac Wilkinson. Within a few years Edward was superintendent. From there he went on to found his woolen company in Woonsocket (Biographical 1881).

Confidence in manufacturing grew during the 1820s. In 1828, the Wilkinsons--who retained land and water rights on both sides of the river--built a second dam five or six feet higher than their first one, slightly higher than a limit established in an 1826 agreement with property owners upstream. Photographs and measurements taken by Sayles Finishing Plants show that this dam was about 40 feet downstream of the one built c1813, also constructed with a timber frame. Wooden members from both dams were exposed during a 1940 dewatering effort to allow examination of the present dam (Jenks & Ballou 1952: 1, 19-21, 57-59).

This new dam substantially increased the total drop at the site and the size of the pond upstream. It also caused a lawsuit that was not decided until 1835. The Court of Common Pleas forced the owners of the dam (no longer the Wilkinsons) to lower its crest 1.37 feet to match the agreed limit of 1826 and made them give the Lonsdale Company an annual payment of $251.45 for flooding its land (November term, 1835 - copy in Jenks and Ballou 1952: 19, 57-59). That payment is still made each year.

5. The Allen Years: 1833-1839

The Wilkinsons were not defendants in the court action, because they had already lost their industrial properties and water rights at Valley Falls during the severe economic depression that began in 1829. The Harrises may also have gotten into financial difficulties during this period. In 1833, they sold their "cotton factory" on the Cumberland side (with all its water rights, waterways, and machinery) to Crawford Allen (Cumberland Record of Deeds 14: 434-436). Crawford Allen was the brother of Zachariah Allen, a prominent Rhode Island textile manufacturer and mill engineer, and Philip Allen, who served as Rhode Island's governor from 1851 to 1853 (Biographical 1881: 260).

Allen continued to purchase additional water rights and property on both sides of the river for several more years. In 1833, he began a stone mill on the Cumberland side, later described as "44 x 112, and four stories in height" (Steere 1881: 111). We know more about this mill because of a lease that Allen gave to George Nightingale in 1835. Nightingale rented the third and fourth floors "together with sufficient space in the south end of the room on the fifth floor [the attic space] in said mill to contain and operate six mules of three hundred & two spindles each, all to be carried and driven by the wheel in said mill, as they are presently geared off..." He also got enough space in "the small mill" to use and operate one whipper, one lapper, three dressers and a repairing bench (Cumberland Record of Deeds 16:176)." There is no mention in the lease of a separate wheel in the small mill, which is probably the Harris Mill. Nelson's 1838 map shows two mills on the site with a raceway running under them, but cannot be relied on for accurate placement of the mills and raceways.

Crawford Allen probably built his stone mill across the existing race that led to the former Harris cotton mill, which cartographic data suggest was demolished c1838-40, perhaps by Allen's successor on the site, Oliver Chace (cf. Nelson 1838 and Aldrich 1876 [maps]; see Figures 3 and 5). If Allen placed his stone mill as suggested above, he probably wanted all of the flow of the race for his prime mover, which was almost certainly a high breast type. Despite the reference to a "wheel" (singular) in the 1835 lease, there may have been more than one in his mill, which probably needed more than 40 horsepower

to operate. There were many cases in which two or three wheels, each in its own pit, were all linked together by gearing and described as a single wheel. The larger Valley Falls Mill of 1849, in Central Falls, had three wheels in line, each almost 17 feet wide (from measurements of the pits by Patrick Malone during renovation of the mill). The discharge from Allen's "wheel" is shown on the 1840 plan as exiting directly out the far side of his mill, with no change in direction--the most efficient path. If the Harris Mill (or some other "small mill") was east of Allen Mill in 1835, it would not get any water power in this scheme. The lease to George Nightingale does not mention any wheel in the "small mill." What Allen probably did was to remove the wheel from that mill and use its empty wheelpit as a path for the discharge from his more powerful wheel. He could have run power into the rooms of the small mill with shafts or belts from his stone mill's power system next door.

Allen built both the mill and a stone picker house on the Cumberland site, but his industrial operations here were brief. He was already leasing part of it out by 1835, and he went bankrupt by 1837. His brothers, Zachariah and Philip, together with Isaac Brown took possession of and liquidated his property for him. In 1839 they sold his stone cotton mill and a picker house on the Cumberland side, as well as three quarters of the water rights at the falls. Oliver Chace, an industrialist from Massachusetts, bought Allen's extensive holdings on both sides of the river (Cumberland Record of Deeds 15:323, 17:35-37; Cleary 1977).

After his connection with the Valley Falls site ended, Crawford Allen remained active in Rhode Island industry and associated with other manufacturing families. For many years he operated the Allen Print Works in Providence. In the 1860s, along with George Nightingale and Sullivan Dorr, both members of Rhode Island textile-manufacturing families, Allen was one of the owners of the Woonsocket Company. A member of the Wilkinson family, also the treasurer of the Abbott Run Cotton Mill, was for a time Allen's employee in that company. The Woonsocket Company was dissolved at the time of Crawford Allen's death in 1872 (Grieve 1891; Herndon 1896).

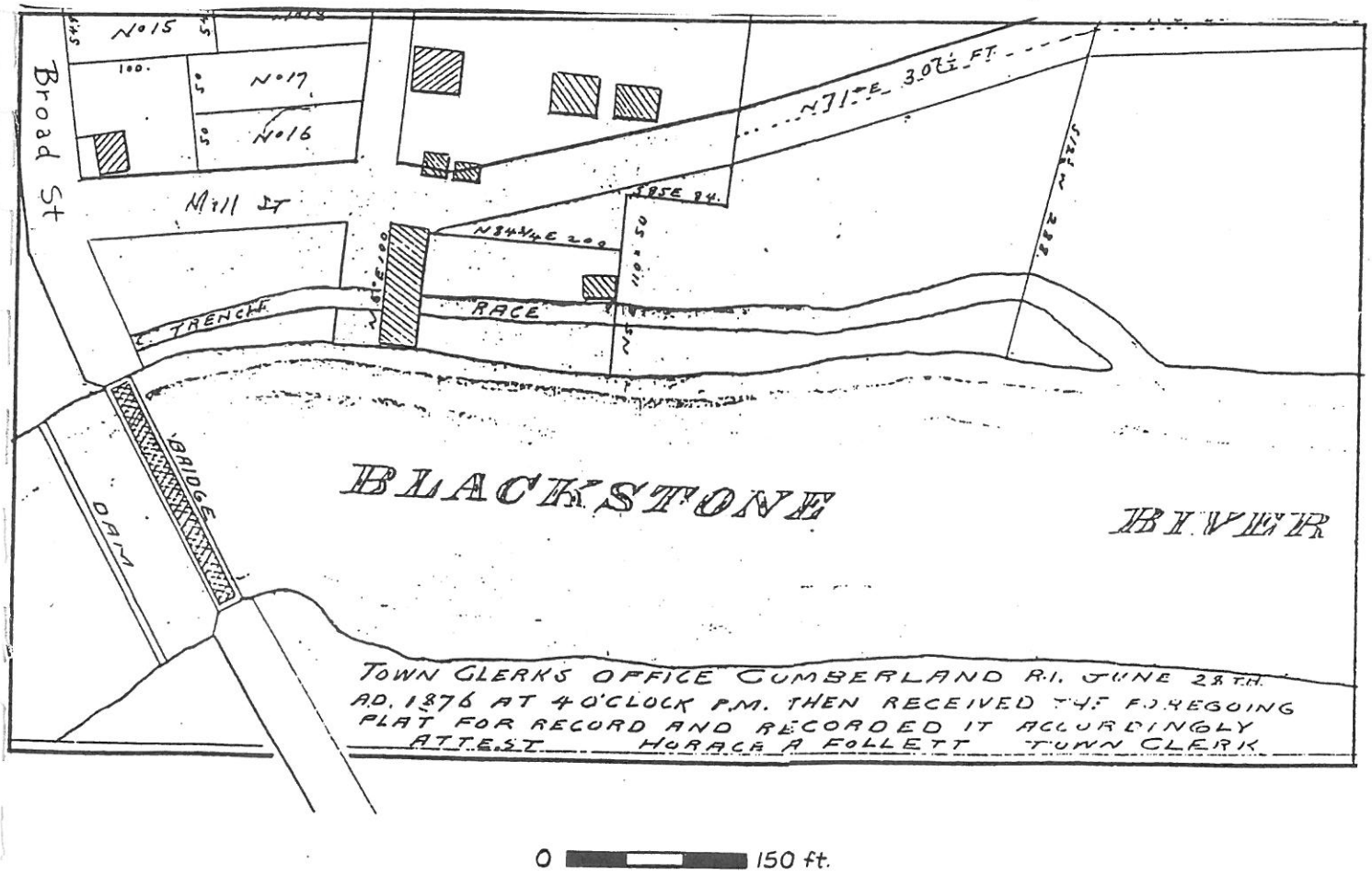

Figure 5. CUMBERLAND SIDE OF VALLEY FALLS PRIVILEGE, c1840

A portion of a Map of the North Part of the Valley Falls Village, copied by C.E. Aldrich in 1876, and rediscovered by the principal investigators in a Cumberland City Hall vault. The numerical and chronological order of this map in the earliest Cumberland Book of Plats, as well as the absence of prominent historical features such as the Providence & Worcester Railroad, strongly suggests that Aldrich copied an original with the same title, drawn in 1840 by S.B. Cushing (cf. Cumberland Record of Deeds 23: 224). The map accurately shows the relative positions of the Allen mill and the picker house south of Mill Street, and is particularly important as the earliest firm indication that the Harris mill was no longer standing in 1840. The dam west of the Broad Street bridge is the second of the three Valley Falls dams, built c1828. There are several inaccurate or overly stylized features: the Allen mill almost certainly never extended to the edge of the river; High Street never continued south of Mill Street; and all available data indicate the raceway through the mill site turned about 90 degrees east of the Allen mill, so that while most of the tailrace is accurately shown on this map, the headrace ("trench") entered the mill further north than shown.

6. The Chace Years: 1839-1912

The Chace family association with the site of the Valley Falls Mill Ruins began in 1839, when Oliver Chace leased his newly-purchased mills on both sides of the river to his sons Harvey and Samuel B. Chace. The Chace family, like the Harris family, descended from early Rhode Island and Massachusetts settlers. The Chaces had been Quakers for generations. Oliver Chace, born in 1769 to a farming family, had been a carpenter and millwright before operating his own textile mill. He learned textile operations working for Samuel Slater in Pawtucket, at America's first successful textile mill. In 1806 he built and was co-proprietor of a spinning mill in Swansea, Massachusetts. In 1813, again with partners, he established the Troy Mill, the first cotton mill in Fall River, Massachusetts (Unless otherwise noted, information about the Chace family is drawn from Biographical 1881, Representative 1908, and Wyman 1914).

The younger Chaces were already seasoned textile industry managers when took over in Valley Falls. Harvey, born in 1797, had gone to work for his father as a bobbin boy at the age of six. At the age of fifteen, he installed the machinery in a spinning mill in Burrillville, Rhode Island, in which his father had an interest, and was responsible for getting the mill into operation. He went on to serve as cotton buyer, yarn seller, and finally agent and treasurer of his father's Fall River mill. Samuel B., like his brother, went to work for his father as a young boy. In 1828 he acquired an interest in a Fall River textile mill.

In the late 1820s Harvey and Samuel B. Chace, along with a partner, Joseph C. Luther, acquired a textile mill in the Massachusetts portion of the Blackstone Valley, in Grafton. That business failed in the Panic of 1837. The partners settled with their creditors for seventy or eighty cents on the dollar. It was a point of family pride that a few years later, having prospered at Valley Falls, the brothers sought out their old creditors and repaid them in full, with interest. The brothers moved the machinery from the defunct Grafton mill to the Valley Falls mills, purchased in 1839 by their father.

Oliver Chace's purchase of Crawford Allen's mills marked the beginning of more than eighty years of ownership by members of the Chace family. Oliver visited his sons' mills regularly, and thought it his duty to advise the middleaged brothers on their operations. Samuel B. Chace moved to Valley Falls in 1839. His brother Harvey followed him in 1843, finally leaving employment in his father's Fall River mill.

The two Chace brothers added a number of buildings which show in an 1851 drawing (Walling 1851 [map]; see Figure 6). The value of their property must have been enhanced by the routing of the Providence and Worcester Railroad, which crossed the Blackstone River and the Chace tailraces in 1847. Having a railroad at the eastern end of the Cumberland millyard would have made it easy to receive and ship goods by rail. At least one building abuts the rail line in the 1851 drawing. The 1850 federal census says that the Chaces' mills at Valley Falls were making cotton print goods at a rate of 2,400,000 yards per year. It lists 11,000 spindles and 252 looms in operation. Ninety men and 120 women worked for the Chaces at that time. That closely matches the figures given in an 1849 directory (New England Mercantile Union Business Directory 1849: 276; U.S. Census Office 1850).

In 1853, after their father's death, they brought their brother, also named Oliver, into the growing firm and incorporated as the Valley Falls Company. They also built a new stone dam at Valley Falls. The 1853 dam was a gravity type, 186 feet long and constructed with a slight arch, or curve. Steere calls it "a stone dam of the most substantial kind...one of the finest and perhaps the handsomest dam on the river (Steere 1881: 111)" The Chaces kept its crest at the same level established in the 1835 court decision. Probably because there was insufficient room to build a new structure between the 1828 dam and the Broad street bridge, it was placed downstream of the bridge, in a less desireable location. The new dam needed massive abutments, which Steere described as "remarkable for their solidity." Since 1853, there has been considerable amount of erosion, or scour, in the rock below the face of the dam, but it is still considered safe. The location of this dam required the Chaces to modify their raceways on both sides of the river. At the same time new headgates were installed and gatehouses probably erected over them. The headgates on the Cumberland side have been replaced at least once since 1853.

In 1854 Harvey and Samuel B. Chace bought the Albion Mills, a few miles upriver from Valley Falls, and soon thereafter the nearby Manville Mills. By buying these other Blackstone Valley mills, they were better able to arrange the use of waterpower to suit their needs, thus avoiding some of the disputes over water-rights so common in the Blackstone Valley and elsewhere. In 1856 the brothers added a Connecticut mill, the Moodus Cotton Factory, to their growing textile empire.

Members of the Chace family of Valley Falls were quite active in Rhode Island industry. Harvey Chace was involved in maintaining the Blackstone's reservoirs, and was one of the earliest promoters of the Providence & Woonsocket Railroad, of which he was also a director. He also was responsible for establishing rail connections between Valley Falls and Franklin, Massachusetts. He was a founder of the Pawtucket Gas Company. He was also involved in banks and turnpikes in southeastern Massachusetts. As discussed in section V.B below, Chace family interests in civic affairs had strong influences on the Valley Falls community.

Chace family holdings were divided in 1868. Samuel B. Chace was left in sole possession of the Valley Falls Company, which spanned the river and included extensive holdings in two towns. Harvey took the Albion Mills, Moodus Mills, and some of the Fall River property. At that time Harvey also brought his sons, James H. and Jonathan Chace, into business with him as agents and treasurers of the Albion Company.

The biggest changes on the Cumberland side after the 1853 dam and headgate construction probably took place when Samuel B. Chace gained control in 1868. The company's Cumberland real property valuation, which had risen modestly in 1865 and 1866, jumped dramatically between 1867 and 1869. Steere says that the company added two brick mills in 1868 and refers to "improvements...on a large scale" under Samuel B. Chace's management (Steere 1881: 111). It is difficult to tell exactly when a second headrace (see Figure 4) was added, but the evidence strongly suggests that it was part of the 1868-1869 improvements. The first map to show two headraces was printed in 1870 (Beers 1870; see Figure 7); only one appears on an 1862 map (Walling 1862). It also seems probable that a switch from breastwheels to turbines took place at the same time as the headrace addition. The superiority of turbines was clearly established

by the 1860s and many patented models were becoming available at reasonable cost. Steere (1881: 111) reports that "These mills [apparently meaning the company's mills on both sides of river] are now run by turbine wheels, four doing the work of eleven breast wheels."

In the early twentieth century, there were three turbines on the Cumberland side (Sayles Finishing Plant 1939). One was in the 1833 Allen Mill, one was in the northeast addition, and the largest was in the southeast addition, which received its water from the second headrace (See Figure 4). The largest was a 54-inch Holyoke turbine purchased from the Joly Company in 1901 (Associated Factory Mutual 1929); it must have replaced an earlier turbine in the same wheel pit of the southeast addition. An iron base for that vertical Holyoke turbine is still in place and its interior diameter closely matches the size specified for a 54-inch wheel. By using a J. & W. Jolly catalog for McCormick Holyoke Turbines (1909), one can find the power a 54-inch model should have generated with a head of between 11 and 12 feet (Steere 1881: 112). A figure of approximately 11 feet was suggested by surveyed elevations at the site[1]. Joly's tables list 180.1 horsepower for eleven feet of head and 206.1 horsepower for twelve feet; Sayles records list 178 horsepower for this particular turbine (Sayles Finishing Plant 1939).

The other two turbines, both undated and unidentified 48-inch turbines (Sayles Finishing Plant 1939), may also have been replacements but there is less certainty. The one in the northeast addition used water which passed through the basement of the Allen mill. Its discharge went out a stone arch in the northern wall of the tailrace. That arch, as noted in the early industrial section above, may have been part of the power system of the c1820 Harris Mill.

The annual Blue Book, that provided information on textile manufacturers beginning in 1888, traces the late 19th-century operations of the Valley Falls Company. The first listing (Blue Book 1888: 194) says that the company has 40,000 spindles and 1300 looms. A. B. Chace was treasurer and agent of both the textile mills and a bleachery. The company did bleaching and dyeing as well as manufacturing of ginghams (printed cotton fabric). By 1895, there were 1300 looms but still 40,000 spindles at Valley Falls. Equipment also included five turbines and eight boilers [for steam power, heat, and bleaching and dyeing processes].

The Valley Falls Mills must have produced high quality goods in this period. They were planning to exhibit products at the Columbian Exposition of 1893 (Board of Trade Journal March 1892: 375) although there is no evidence that they did so. The new bleach and dye works building constructed on the Central Falls side in the late 1880s was considered a very fine plant (Board of Trade Journal February 1891: 66).

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[1] By using recent survey data of relative turbine base and dam crest elevations, and scaling off the Jolly diagram for placement of the turbine above tailwater (a draft tube must have been part of this installation), the authors calculated a head of approximately 11 feet. This is slightly less than the 11 feet 7 inches given by Steere (1881: 112).

In 1894, the Albion Company and the Valley Falls Company traded property, so that the site located at Valley Falls was actually owned by the Albion Company, and the Albion mill was owned by the Valley Falls Company (Cumberland Record of Deeds 42:569 and 42:575; Grieve 1897: 170-171). A year later the Albion Company at Valley Falls bought a cross-compound steam engine, 18 x 28 inches with a 42-inch stroke, from the famous Corliss Steam Engine Company in Providence. A slightly smaller engine went to the Albion Mill of the Valley Falls Company (Board of Trade Journal July 1895: 15). It is very hard to tell how much steam power was at Valley Falls and where it was used. The bleach and dye works on the Central Falls side had three Sullivan boilers and a forty horsepower engine in 1891 (Board of Trade Journal February 1891: 66). Steam is noted as one type of power on the Cumberland side in 1918 (Sanborn Map Company 1918 [map]), but there is no indication of engine characteristics. A 1929 inventory (Associated Factory Mutual 1929) lists four boilers and a blower run by a small horizontal steam engine (8 x 8 inches) in the boiler house on the Cumberland side. By then a larger engine, or engines, might have been scrapped. No engine foundations have been located to date in any of the mill ruins.

In 1900 another business re-organization occurred, with the mill at Valley Falls and a small part of the village becoming the property of the Samoset Company (Cumberland Record of Deeds 51:518). Jonathan Chace was president, and brother James H. Chace vice-president, although not actively engaged in the operation (Board of Trade Journal 1901: 228).

Jonathan Chace was a president of the Providence Board of Trade, a director and long-time president of Mechanics National Bank, and a trustee of the People's Savings Bank in Providence. He was a director of the Fireman's Mutual Fire Insurance Company, the "Hope and What Cheer," the Worcester Manufacturer's Mutual, and the Union Mutual Insurance Company. He was also one of the original directors of the Providence Telephone Company. James H. Chace was a member of his town council, a State Senator, and U.S. Senator for Rhode Island from 1884 to 1889. He was associated with a number of insurance companies, railroads, and banks. He was also a director of the Pawtucket Gas Company and long-time president of the Phoenix Bank.

The Chace period of manufacturing at Valley Falls ended in 1912, when the Samoset Company was sold to the Sayles Finishing Plants (Cumberland Record of Deeds 58:116 and 58:119; Sayles News March 15, 1920). Figure 8 shows the appearance of the property soon after this sale: the 1915 perspective drawing can be compared with the structures identified and dated on Figures 3 and 4 to see what the Chaces did to alter the property during their 73 years of management.

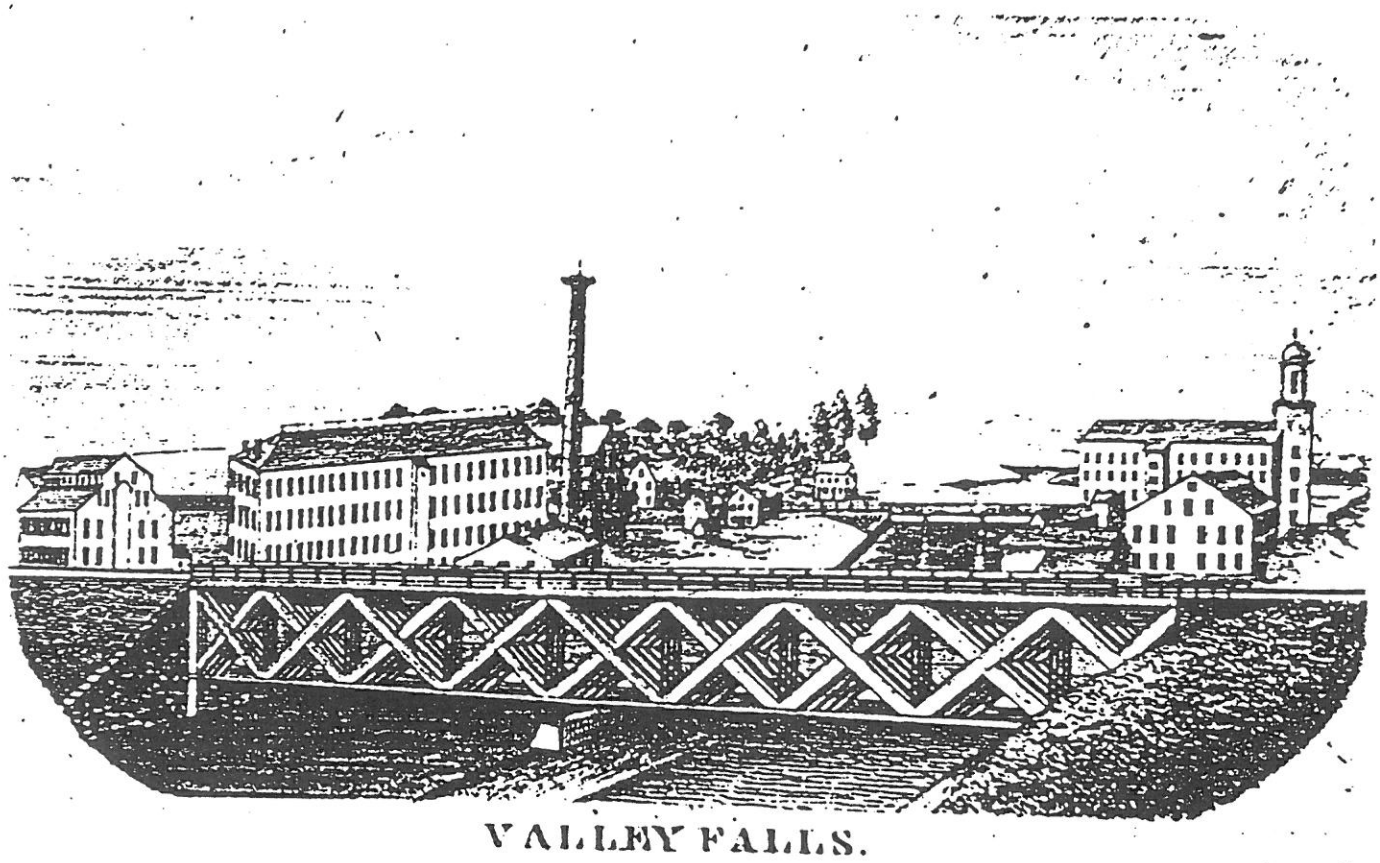

Figure 6. THE VALLEY FALLS TEXTILE MILLS c1851

This vignette from Walling's 1851 map of Providence County looks west past the Providence & Worcester Railroad's first bridge over the Blackstone River at Valley Falls. Cumberland is on the right, with the cupola of the Allen mill's stair tower prominently shown. The seven-bay structure in front of the Allen mill is almost certainly the Northeast Addition, based on the width of the addition relative to the Allen mill's known length of 110 feet. The addition was among the first brick structures on this site. The addition's width and bays match all later data on this structure, and is well illustrated by the view of the addition shown in Figure 8. At some point before 1915, the roof of the Northeast Addition was raised and made less steep, with the original clerestory removed.

Left of the Northeast Addition, the longer gable-roofed building parallel to the railroad is probably the stone picker house, while the shorter gable-roofed building nearest the railroad appears to be the brick storage house (see figures 3 and 4). Nearest the river and perpendicular to the Allen mill, a third gable-roofed auxiliary building remain unidentified as to function, location, or size; it appears to have been south of the main tailrace.

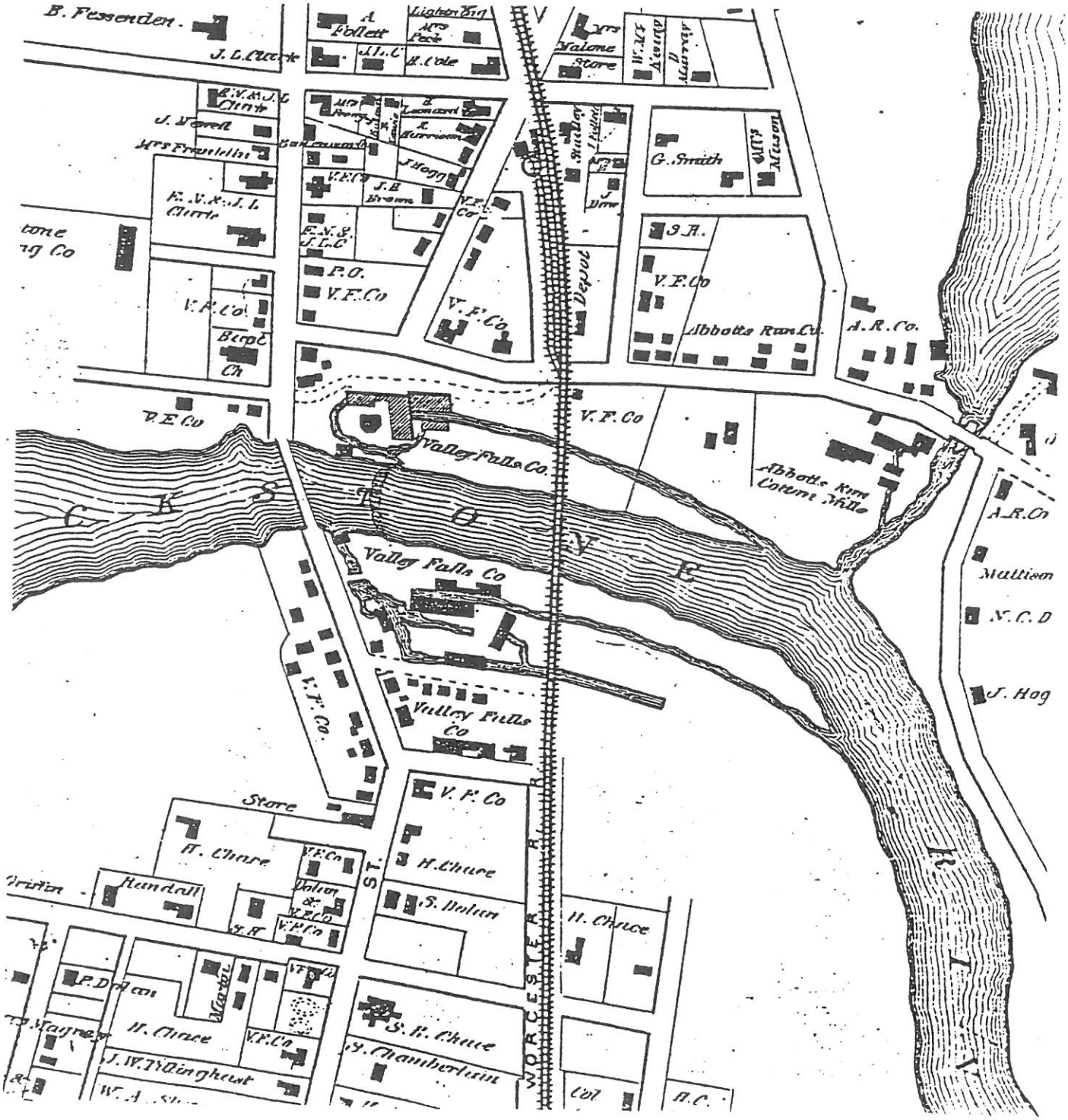

Figure 7. VALLEY FALLS c1870

This section from the Beers 1870 atlas of Rhode Island shows the final form of the Valley Falls Company raceway system in Cumberland, together with the Allen mill, the West, Southeast, and Northeast additions, and the gatehouse. A number of auxiliary structures in place by this time, such as the picker house and the railside storage building, do not appear. It is not clear if the black shape directly west of the Allen mill is an early version of the boiler house later confirmed in this location; no other evidence supports such an early date for this structure. This map mislocates the 1853 dam downriver, with attendant confusion as to where water entered the Cumberland headraces.

7. The Sayles Years: 1912-1940

The Valley Falls site became part of Sayles Finishing Plants, one of America's largest textile concerns. Like the Chace operation, the Sayles industrial empire was family-owned. It was established in the mid-19th century, when William F. Sayles acquired a small printworks in what is now Saylesville, Rhode Island. Within a few years he converted the small printworks into a major bleachery. William's brother, Frederick C., became a partner in 1864. William died in 1894. His son, Frank A. Sayles, inherited his father's share and, within a few years, bought his uncle's share, to become sole proprietor. In 1912, when Frank Sayles bought the Samoset property at Valley Falls, Sayles Finishing Plants had extensive operations in Saylesville and Phillipsdale, Rhode Island. Processes included bleaching fine cloth, dyeing, and printing. The company was at the forefront of American textile firms in adopting the newest textile finishing technology, and was one of the largest firms of its kind in the world.

Frank Sayles purchased the mills on both sides of the river in Valley Falls with the intention of using them for dyeing cotton yarn, since that operation was outgrowing its Saylesville home (Foster 1916, 2:350). During World War I, the site, along with several other Sayles plants, was used for bleaching cotton linters used in explosives manufacture (Sayles News March 15, 1920; Norman 1988:165-166). An unusually detailed map (Sanborn Map Company 1918) shows exactly what was done in the mills on the Cumberland side. Bales of cotton were opened and their contents subjected to various washing, boiling, and bleaching processes. Prominent concrete vats within the foundations of the former picker house probably date from this period, when chemicals and process water would have been very important. The listed product on the 1918 map was bleached cotton. Davison's Blue Book (1919) specifies bleached cotton linters, almost certainly for the munitions industry. There were no longer any spinning or weaving processes.

Frank Sayles, like other Rhode Island industrialists, was involved in a number of corporations. He operated several other textile companies in the Blackstone Valley: the Hamlet Textile Company of Woonsocket and Pawtucket, the Slater Yarn Company of Pawtucket, and the River Spinning Company, headquartered in Woonsocket. His mills in Valley Falls were actually called River Spinning Plant B in 1918 and 1919. He was associated with the Lorraine Manufacturing Company and the Slater Trust Company in Pawtucket, the Moshassuck Railroad, and the Blackstone Valley Gas and Electric Company. He was also prominent in a number of companies outside Rhode Island. He died in 1920.

After the war, Sayles Finishing Plants leased portions of Cumberland's Valley Falls mills to other manufacturing companies. The tenants appear in the Sanborn maps of 1921 and 1923, in annual listings of textile manufacturers in Davison's Blue Books for the 1920s, and in leases recorded in the Cumberland Record of Deeds. There was an amazing range of textile production or processing in the buildings on the Cumberland side: it included the manufacture of woolens, silks, cotton and silk corset cloth, cotton yarn, wool yarn, narrow fabrics (webbing, ribbons, and tapes), and pile fabrics (plush). The 1924 Sanborn map of Valley Falls shows the following firms on the site: Anchor Webbing Company, Valley Falls Woolen Company, Devontex Fabric Inc., Rhode Island Plush Company, and Nedra Silk Company. The Anchor and Rhode Island Plush operations were satellites of main plants elsewhere in Rhode Island.

These tenants in the 1920s were using electric power, some of it generated from the falls. The 1929 inventory and appraisal by Associated Factory Mutual lists a 150 KW generator, purchased in 1922 and located in the Allen Mill (identified as Mill #4). It also lists a "water wheel governor" purchased in the same year and located with the 1901 Holyoke turbine in the southeast addition. The logical conclusion is that the governor and generator were purchased simultaneously to allow generation of AC power with a turbine that was already in place. The other two turbines were inactive by then. The 150 KW generator is close to the right size for the 178 horsepower Holyoke turbine, which theoretically should have been producing close to 200 horsepower at the 11 feet 7 inches of head reported for the site (three kilowatts is roughly equal to four horsepower). The 1939 Sayles Finishing Plants plan of the site says that the turbine "Stopped in March 1925" and "only ran 3 to 4 years." This must refer to its operation with the governor and generator, which could only have begun with their purchase in 1922. Glenlyon Dye Works (part of Sayles Finishing Plants) records of electrical sales by "Samoset Power" begin with entries in 1922. Power generated in Valley Falls (on both sides of the river) went to tenants in the mills, to other Sayles plants, and to the Blackstone Valley Gas & Electric Company. The electric company could also supply current as needed, to supplement or replace power generated in Valley Falls. The availability of cheap electric power from utility companies led many mills in Rhode Island to idle their own generating equipment when major repairs or replacements became necessary. The end of electrical generation on the Cumberland side came in 1925; two Sayles turbines on the Central Falls side generated power for the last time in 1938 (Sayles Finishing Plant 1939 [map]).

In the 1920s, the conversion from mechanical to electric motor drive was still underway, or had not yet begun, in many textile mills. Electric lighting and electric-driven elevators had been received much more enthusiastically than electric motors, which had difficulty driving some types of textile machinery. A common way to begin electrical generation in an older mill was to connect a generator by belting to a pulley on one of the main shafts driven by a turbine. The turbine might be a considerable distance from the generator. Thus, it is not surprising that the turbine and governor here were in the southeast addition and the generator was in the Allen mill. In early applications of electric power for manufacturing, mills usually connected motors to isolated shafts that ran groups of machines. In the 1920s, this "group drive" was still more common than the use of individual motors on machines (Bonham 1979: Chapter IV). Much of the historic shafting and belting in the Valley Falls Mills may have remained in use after electricity had become the only power available.

The New England textile industry was in decline by the late 1920s. There was growing competition from the south, where cheap, unorganized labor, loose regulations, and low taxes provided strong advantages for manufacturers. Many northern firms were already moving all or part of their operations to southern states. Much of the new machinery in the industry was being installed in new southern plants, not in the decaying mills of New England. In addition, vast quantities of textiles were being made all over the world, glutting international markets and driving prices down.

Sayles Finishing Plants no longer looked at Valley Falls as a possible site for industrial expansion. As the Great Depression struck, the manufacturers who rented space in the mills began to close their satellite operations or go under entirely. By 1932, Davison's Blue Book lists only Nedra Silk on the Cumberland side. Tenants might leave but Cumberland taxes continued. In 1934, Sayles Finishing Plants contracted for the demolition of the complex on the Cumberland side. United Building wrecking company was "to have the roofs off all buildings prior to the Fifteenth of June, 1934." He had until September to finish the leveling of structures and the removal of "all material and contents" (Cumberland Record of Deeds 83:350). It is surely no coincidence that the beginning of the Cumberland tax year was June 15. The buildings, which had become a bad investment for Sayles Finishing Plants, were apparently destroyed to avoid tax payments to the town of Cumberland. The Sayles company, by this time, was having serious labor problems. In September 1934, Sayles workers went on strike, and the largest labor conflict in Rhode Island history began. The Valley Falls Mills in Cumberland were already in ruins.

A description of the site two years after the demolition serves as an epitaph: " Now it is a sad sight indeed, standing on the Broad Street Bridge and looking down stream, to view the desolate remains of what was once one of the most prosperous manufacturing enterprises in the State" (Haley 1936: 116).

The last alteration of the site (other than natural deterioration and revegetation) took place in 1939-1940. The serious floods of 1927, 1936, and 1938 forced Sayles Finishing Plants to examine their dam in Valley Falls and to take steps to improve its stability and flood resistance. The openings at the headgates on the Cumberland side had been blocked with concrete in 1932, but they were (partially?) reopened in 1940 to allow spilling of excess water into the old raceways. This would reduce the force of water on the dam in a flood and take some of the flow out of the main channel. A suggested plan to rebuild the southern headrace in Cumberland for service as a spillway was rejected, probably because of costs. Instead, the two headraces were cleaned of fill left from the demolition and their connections with the tailrace were "improved" by bulldozing or excavating open channels (Sayles Finishing Plants 1939 [map]). The channel created between the end of the northern headrace and the beginning of the tailrace runs diagonally through the foundations (and turbine pit area) of the 1833 Allen Mill. This channel shows clearly in the recent survey of the site (see figures 2 and 9). The other channel, which runs directly over the base of the Holyoke turbine in the southeast addition, did less damage to the features that were still on the site and is not as obvious in Figure 9.

8. The Forgotten Years, c1940-1990

The period from about 1940 to 1990 saw the site ruined and largely ignored, but not entirely forgotten. The best statement on these years is George Monteiro's eloquent poem (1983):

The Blackstone

The ruined mill had once a name,
and a post-office address visited
at least twice a day by a factotum
entrusted with checks, bills, orders
and the personal letters that grease
the gears of management. But the
name was not, in my time at least,
bruited about, for a decade after
the plant's destruction—blown-up
in lieu of taxes in the early years
of the century's Great Depression—
no one cared to remember what the
whole shebang had called itself.
In my childhood it was a ground-
level network of cavities, brick-
walled, roofless rooms and
passageways, one, two, and three
levels below the tuft-grassed
surface closed off (but not to the
growing child) by chain-linked fence.
It was, though I did not know it for
a decade after decade, my image for the
beast's place. It was my dangerous
dominion, hard by the river that had
powered the mill and still, with
no further need to empower, ran
through channels that the well-placed
explosives had not touched. It was
my place, river and weird space
that mesmerized me—bird to snake—
to make my visits time and time again.

Then, too, the railroad, high trestle over the
often too-rapid waters seasonally swelling,
upstream, over squat and broad falls,
offered the daring crosser of ties and
spaces that, moonlit, exposed the fearsome
magic of air and water, heighth and fall,
machine and river through the primal forest,
a view of his mortality and his breathless
transcendence. There were challenges to
face in that landscape. Risks by daylight,
and greater risks at night. By day walk the
parapets of unroofed rooms, rubbled brick
and mortar, until one descended to the deep,
just before the river water, diverted in
the heydays of textile manufacture, would
swerve to rejoin the natural current of the
river, to a spring running out of the bottom
of the last brick-faced barrier just below
the high-hung trestle serving rumbling,
rushing, truculent all-day trains. At night,
for a child out and where he should not be,
the fearful challenge was to cross, under
moon and stars, or in the pitch blackness,
planning against the crossing of the "Owl,"
the eerie freight that whistled its way
north, shaking the very rails and spiked
ties till every dozer, every insomniac
on either side of the tracks acknowledged
its right to intrude, invade, and divide.
And so the span and the delve and the breathy
walks through never-to-be familiar landscapes
of river, mill, water, air, and gleam.

9. The Park Years, c1990-21st Century

This study is part of a new era in which the mill's name and story will come alive, preserving some of Monteiro's thrill, if not all of his danger.

B. Social and Cultural Effects of Valley Falls Industrialization

1. Introduction

The history of the Valley Falls mill site exemplifies the social history of Blackstone Valley industry, and provides valuable insight into American industry's social history. Developments at Valley Falls illuminate a basic theme in the history of industry: the growing divergence between the entrepreneurial and the working classes. The implications of this divergence have been a matter of concern in America since Thomas Jefferson raised the debate. More traditional analysis would address this divergence in strictly economic terms; however, the history of the Valley Falls site suggests that cultural issues intertwined with the economic.

The Valley Falls site's social history can best be understood by comparing three key periods. The first is the early nineteenth century, when the site was being developed by the Wilkinsons, Crawford Allen, and the Chaces. In this period we can see an entrepreneurial culture beginning to emerge in the context of a rural Yankee mill village set in an industrializing and mercantile region. The second is the mid-nineteenth century, when the mill was well established under the Chaces. This is the period in which Irish immigrant labor became an important feature, with consequences for the growing social distinction between entrepreneurs and workers and the establishment of a system of paternalism. The last is the early twentieth century, when the site was part of the flourishing Sayles textile empire. By the end of this period, the "new immigrants" had made the Valley Falls workforce polyglot. Long forgotten were the days in which the social gap between the entrepreneurial and operative classes was bridgeable. The system of paternalism reached its full development, with acculturation and Americanization as focuses. At the same time, however, immigrant workers were supporting their own institutions to promote their welfare and preserve their culture.

2. The Early Years

Valley Falls, before textile production came, was a cluster of farmhouses in a section of small farms stretching out from the village. A few craftsmen -- wheelwrights, carpenters, and others serving an agricultural economy -- also lived in the village. The village, spanning the Blackstone River, was divided between the towns of Cumberland and Smithfield. The two halves of the village were too small to individually support a full set of institutions, yet, perhaps because of the political division, seemed unable to unite to develop a shared set. This lack of a corporate identity lingered through the century. In comparison to other Blackstone Valley villages, Valley Falls was lacking in schools, libraries, churches, and sources of public entertainment (Wyman 1914: (I)72-73).

The village population, hence the textile workforce, in these early years was entirely Yankee. A descendent of the Chaces described it in the following terms (Wyman 1914: (I)74):

> The old settlers were still a dominant village race when the Chaces descended into their valley, and they were a strong and typical Yankee people. How shall I describe them, and do justice to all their fine, obstinate, glorious, narrow-minded, true-hearted, lovable and hateful qualities? There was one family whose fair, delicate beauty of face passed from generation to generation. There were some uneducated yet intellectual yeoman gentry among them. There were a few wild and rough folk. There were some of the slovenly New England sort, which is a very slovenly sort indeed. There were numberless good, sturdy men and women. On the whole, they were a people who did not know the world well enough to know their own limitations, but there were one or two who knew and had moved in a larger life. There was one graduate from Harvard College and its Divinity School resident in the village.

There was no ethnic division between the workforce and the entrepreneurs, who were also Yankee. The Wilkinson, Allen, and Chace families were all descendants of English colonists who came to New England in the first half of the seventeenth century, as was the Sayles family, twentieth-century owners of the site.

Social distinctions between entrepreneurs and operatives, although they existed, were not nearly as profound as they were in later years. Several of the entrepreneurial families associated with the site had but recently emerged from a social milieu similar to that of the villagers.

The Wilkinson brothers were sons of Oziel Wilkinson, a skilled artisan who had made his fortune producing nails and tools. It was said of Oziel that "though he had become wealthy, he was not purse proud, and could carry his own nails to Boston, and sell them in quantities to serve purchasers" (Biographical 1881: 59). One of the brothers, David, had been set to work heading nails for his father at the age of six, and by thirteen was an accomplished blacksmith.

Crawford Allen, the next owner, came from a more elite background. His father had been a merchant and calico printer, and on his mother's side was an ancestor who had founded the first three Episcopal churches in Rhode Island. One of his brothers, Philip, was governor of Rhode Island; the other, Zachariah, was a prominent industrialist (Biographical 1881: 259-260; Herndon 1896: (III)1). However, Crawford Allen was not long associated with the site. The Panic of 1837 led him to sell out to the Chace family; he went on to regain his fortunes in Woonsocket.

The Chace family, like the Wilkinsons, came from a skilled artisan background. Oliver Chace, who bought the site for his sons Harvey and Samuel B. to operate, was a farmer, carpenter, and millwright. He was a founding partner of several cotton mills, one in Swansea, Massachusetts, in 1806, and the first cotton mill in Fall River, Massachusetts, in 1813. His sons received little formal education. Harvey went to work for his father as a bobbin boy at the age of six; at fifteen, he was in charge of installing the machinery and putting a textile mill in Burrillville, Rhode Island, into operation; the next year he came to work in his father's Fall River mill. Samuel B. Chace also went to work for his father at a very early age; it was written of him, "His education was such as the common schools of the town and the time afforded" (Biographical 1881: 293).

Given the Chace family background, and their adherence to the egalitarian Quaker faith, it is not surprising Samuel B. Chace's wife, Elizabeth Buffum Chace, chose a mill operative as her best friend in Valley Falls. Dorcas Harmon, was described as "an American spinster . . . an intellectual, stiffly well-mannered, high-featured woman" (Wyman 1914: (I)72). The two women maintained their friendship for life, although the friendship became much less close when Harmon moved a few miles away to Pawtucket.

Some social distinctions between entrepreneurs and workers did exist. For example, Elizabeth Buffum Chace opposed the construction of the mill's barn near the family house, because she did not want her sons exposed to the stablemen's profanity (Wyman 1914: (I)99). Members of Blackstone Valley entrepreneurial families also revealed their identity as a social class through their marriage patterns: a study of nineteenth-century Rhode Island biographical encyclopedias reveals numerous intermarriages.

In this early period, then, although the beginnings of a separate entrepreneurial class were evident, distinctions were not always clear-cut. The shared Yankee ethnic identity helped maintain what remained of a common identity between entrepreneurs and workers.

3. The Middle Years

The Chace family owned the Valley Falls site from 1839 to 1912. The period was one of important social reform movements, and also of massive immigration. Both of these trends influenced the Chace family's life in Valley Falls.

Both Samuel B. Chace and his brother Harvey were early and deeply committed to a number of reform movements, most notably abolitionism. Samuel B.'s wife, Elizabeth Buffum Chace, was a prominent supporter of the anti-slavery movement. They assisted the black community of southern New England in the "Underground Railway," hosting fugitive slaves en route from the port of New Bedford (a center of the black population, and a common debarkation point for Southern stowaways) to Canada (Biographical 1881:268). Elizabeth Buffum and Samuel B. Chace also regularly hosted dignitaries visiting the Blackstone Valley to lecture on abolitionism and other moral reforms. Elizabeth Buffum Chace counted among her acquaintances William Lloyd Garrison, Wendell Phillips, Margaret Fuller, and Lucy Stone (Wyman 1914).

In supporting abolitionism, the Chaces risked ostracism not only in the largely Baptist, pro-slavery village of Valley Falls, but in the mainstream Quaker community. William Lloyd Garrison made these remarks at Samuel B. Chace's funeral in 1870 (Biographical 1881:293-4):

> It is an easy matter to be an abolitionist at the present day, because it is to be on the winning side. But it was a very different affair to assume that title even only ten years ago. Yet, not ten, but thirty-five years since, our departed friend, in the darkest and stormiest period of the anti-slavery conflict, gave in his adhesion to the cause. From that day his door and heart were open to the proscribed advocates of the oppressed; and, in the face of the iniquitous Fugitive Slave Law, his home was converted into a station-house on the branch of the underground railroad, running from New Bedford to Canada; and no efforts were wanting on his part to make it a safe retreat. What a blending of moral courage with rare gentleness of disposition!

Despite opposition, the Chaces did not waver in their support of the movement. Elizabeth Buffum Chace's commitment to abolitionism led her to resign her membership in her Quaker meeting. She was one of the rare white New Englanders willing to walk down the street in the company of a black person. She organized anti-slavery tableaux for presentation in the small Public Hall of Valley Falls. A letter that she wrote not long after moving to Valley Falls, to an escapee who had stayed in the Chace home in Fall River (probably James Curry), reveals her basic feeling of social commonality with African-Americans, in that she wrote as to a friend and social equal (Wyman 1914: (I)70-71):

> When thou left us at Fall River more than one year ago I intended to write to thee very soon and I expected to hear before now much more particularly from thyself than we have ever yet done.
>
> Death has twice entered our dwelling and removed from us our two first-born, whom I doubt not thou wilt remember well! They were interested for thee.
>
> We feel that they are happy, although our grief seems sometimes greater than we can bear. Our little one is left and we fear we love him too well . . .
>
> My sister Lydia desires to be remembered to thee.

Elizabeth Buffum Chace's egalitarian impulses, however, did not carry over to the Irish immigrants who populated Valley Falls and staffed the mill in increasing numbers from mid-century on.

The Irish, at present the largest single ethnic group in Rhode Island, began arriving in great numbers in the wake of the famine years of the late 1840s in Ireland. By 1865, three out of eight Rhode Islanders was Irish-born; by 1885, more than forty percent of Rhode Islanders were Irish immigrants and their children (Conley 1982: iv-v). The town of Cumberland was an area of particularly great Irish concentration (Conley 1983:1).

The Catholic Church was a center of religious and social support for the Irish community. St. Patrick's parish, Valley Falls, was organized in 1859 to serve Blackstone Valley textile workers, sending missions to other villages. As the Irish population grew in the Blackstone Valley, other parishes were established to serve it, the next being in Ashton in 1872 (Conley 1982: iv). Various Irish benevolent societies, for example the Immigrant Aid Society, had a loose association with the Church (Conley 1976: 109). Moral reform movements were also centered around the Church: St. Patrick's in Valley Falls, for example, sponsored a total abstinence society open to males ages twelve and over (Constitution 1879).

The religious and ethnic differences between the Irish and the Yankee millowners were too great for the Yankees to bridge. Elizabeth Buffum Chace's daughter and biographer acknowledged that "It cannot be claimed for Mrs. Chace that in the 1850 decade she made any great effort to prevent the growth in the village of a caste distinction between the employers and employees connected with the cotton mills" (Wyman 1914, I: 115). The distinction in employer attitudes between Yankee and Irish workers is illustrated by an occurrence while Elizabeth Buffum Chace and her daughter were travelling out of town. Their driver

was James Whipple, an "sturdy, high-hearted, strong-handed, noble Yankee villager" and long-time teamster for the mill; they were accompanied also by Mrs. Chace's Irish maid, Isabel. As the daughter recounts (Wyman 1914: (ii)54-55):

> A curious incident illustrating the peculiarities of caste distinction occurred on the journey. Mrs. Chace had her waiting maid with her, a nice, young Irish girl named Isabel . . . The party stopped over night at a wayside tavern. James Whipple attended to the proper stabling of the horses. Isabel accompanied us to our rooms. Mrs. Chace tactfully managed the matter concerning which "James" had probably never had a thought. She and I and he met and went together to the supper table. After we had seated ourselves the fine old gentleman asked simply, "Why, where is Isabel?" Some response indefinitely expressed was made, for we were half abashed by his unconscious and superior nobility.

Yankee attitudes about Irish millworkers' religion, character, and acceptance of female employment are revealed directly in this excerpt from an article Elizabeth Buffum Chace wrote in 1881, "Factory Women and Girls of New England" (Wyman 1914: (II)146-148):

> Thus, it is a fact, that a very large number of women and girls, from ten years old to forty or fifty, are employed in the cotton and woolen mills of the northern and middle states of this country, mostly in New England. It is, therefore, a subject of grave concern as to what is their actual condition, and, what are the duties of other women toward them. Many of those born in England, Ireland and Canada cannot read or write; and of those who have had a chance in our public schools, most of them have gone to work so early, that their schooling has been of the most rudimentary character, and is easily forgotten. They are excluded from the society of their own sex outside of the factory, by a variety of barriers -- chief of which are their foreign birth or extraction, their poverty, their want of eduction, and the necessity that they should be always at work. Two other causes also contribute largely to this exclusion. These people are mostly Catholic in their religion, and this excludes them from Protestant companionship, as well as excludes Protestant companionship from them; and the other cause is, the growing tendency in our civilization, toward class distinctions.
>
> Many of these operatives live a floating life. Trifling circumstances, and the hope of improving their condition, lead them to move about, and thus they continue unthrifty and poor; and, whatever unfortunate results follow, they all bear with most hardship upon the women. On the contrary, those who remain in one place, if they cultivate habits of industry and sobriety, do constantly improve their circumstances, and become more and more assimilated to the native inhabitants. But, with rare exceptions, they have brought with them the inherited improvidence, which comes from many generations in hopeless poverty, under old world oppression...The vice of intemperance is a terrible curse to these people; and, though drunkenness is far less common among women than among men, still, it is they who suffer most severely from its effects. The operatives are mostly women and young persons of both sexes; the men are not always able to find employment at anything they can do, and so, they often get into the habit of depending on their children for support, and, in their idleness, they indulge in drinking, which renders them a torment as well as a burden in their homes..

drinking, which renders them a torment as well as a burden in their homes..

Much of the poverty which we find in families who have been long employed in the factory is due to the constant employment of young girls therein, because they are thus left ignorant of all proper management of household affairs...

A girl who goes into the mill at twelve years of age, and I am sorry to have to say they often do when younger, and works there till she marries; and, as is frequently the case, continues to work there until she has children, and often afterwards leaves some old woman to care for the little ones while she goes to the factory for ten or eleven hours a day, cannot, in the nature of things, become a wise and prudent housewife.

The question of the employment of young children in the factories is of so difficult solution that one meets with great discouragement at the outset in any undertaking to prevent it. The first obstacle which strikes the humane student of factory life, after the conviction that young children should not work there, is the apparent necessity that they must do so or be worse off than they are. They often belong to large families, in which there are several children younger than themselves; the mother has her hands full, with the nursing and the housework; the wages of the father will not support the family, even if he dispenses with the expense of tobacco and rum...

For all this, the employer is not wholly responsible. Partly in charity and kindness, partly because such labor is cheaper, partly because some work in factories can best be done by children, and partly from indifference and inattention, it is seldom that the employers themselves take any decisive measures to secure obedience to (child labor) laws...

One employer response to the emergence of a largely immigrant workforce was to institute a system of paternalism, not only providing tidy village housing, but also supporting those enterprises which would encourage their employees to lead well-ordered lives: education, religious observance, and such healthful amusements as music and sports. In his later years, Samuel B. Chace became greatly interested in factory workers' education, and supported evening schools for workers (Biographical 1881: 293). Another Chace family holding in the Blackstone Valley, the Albion mill, sponsored village beautification, a nondenominational chapel, a baseball team, and a band.

Valley Falls was a particularly handsome village when the Chace family was in control:

Broad street is a quiet, pleasant street, upon which are numerous charming residences with ample grounds, fine trees and shrubbery, and an air of neatness and elegance which speaks well for their owners. That of Mr. Samuel B. Chace is the largest and most modern, and is surrounded by flower gardens and all the insignia of refined taste. On the opposite side of the street is a vacant lot laid down in a beautiful lawn, giving what so many seem indifferent to, but which is so important, an attractive prospect from the front windows of the dwellings. Other places are rich in grass and trees and ample space and that air of retirement, which is so grateful to the busy or the cultivated man (Steere 1881: 111-112).

It was in this period that the Sayles family, who were to be the next owners of the Valley Falls site, began organizing a highly paternalistic system in Saylesville. A nineteenth-century contribution to this system was an evangelical Protestant church, the Sayles Memorial Chapel, with its associated Sunday school (conducted for years by William Sayles, one of the firm's founders) and library. The zenith of the Sayles system of paternalism was to come in the twentieth century, when the Valley Falls site was part of the Sayles empire (Foster 1916: passim).

The middle period, then, was one in which distinctions between employer and employee became clear-cut. Ethnic and religious differences encouraged these distinctions. The system of paternalism, typical of the Blackstone Valley, emerged as one of the products of this distinction.

4. The Later Years

The Valley Falls site was acquired by Sayles Finishing Plants, a leading textile processing firm based in Rhode Island, in 1912. The site remained part of the Sayles empire until it was demolished in 1934.

Sayles Finishing Plants was wholly owned by Frank Sayles, who inherited his father's share and bought his uncle's share in the textile enterprise they had founded in the mid-nineteenth century. The Sayles family was well established in Rhode Island. Frank's grandfather, Clark Sayles, had been a merchant, architect, and bank president. During the period that Sayles Finishing owned the Valley Falls site, the firm's and its proprietor's interests were national in scope. Sayles Finishing built a plant in North Carolina during this period, and Frank Sayles was involved in a number of concerns both within and outside Rhode Island (Sayles News 3/15/20: 2). This era also included one of the two peak periods of employment in the Sayles Empire, in the late 1920s. (The second peak was after the Valley Falls site was demolished: World War II through the early 1950s) (Goodrich 1971).

At the start of the Sayles period, Valley Falls was still largely composed of Irish immigrants and their children, along with a number of Yankees, English, French-Canadians, and British-Canadians (U.S. Census, 1900, 1910). The Irish maintained the institutions they had established in the middle years: both the pastor and curate of St. Patrick's Church were sons of Irish immigrants, as was the proprietor of the local saloon.

As the period progressed, the population trends affecting most of Rhode Island had a profound influence on Valley Falls. In 1930, more than two-thirds of all Rhode Islanders were immigrants or the children of immigrants (U.S. Federal Writers' Project, 1937: 98). The Valley Falls population in the 1930s included more than twenty nationalities, including French-Canadian, Polish, and Portuguese.

The Portuguese were in many respects typical of these "new immigrants." Portuguese immigration was heavy from the 1890s until U.S. law curtailed immigration in the 1920s. Valley Falls was one of the areas of Portuguese concentration in Rhode Island. In Valley Falls, unlike most of the rest of Rhode Island, immigrants were likelier to come from continental Portugal than from the Azores (Conley 1983: 9-10).

The "new immigrants", like the Irish before them, established their own cultural and beneficial institutions. In the Portuguese community, for example, the extended family provided such services as emergency financial support and care for the elderly. Numerous Portuguese-American clubs and societies provided not only such mutual aid benefits as health and accident insurance and funeral benefits, but also a sense of community. The Catholic Church provided not only religious service, but through parish feasts and the associated holy processions maintained Portuguese traditions in such areas as music, food, and crafts (Cunha 1985). The influx of Portuguese during the later years of the Valley Falls site was to eventually contribute to the establishment of the parish of Our Lady of Fatima in Cumberland in 1953 (Conley 1982).

During this period of immigration and immigrant community-building, the Sayles organization provided a parallel set of services, offering benefits, entertainment, and a sense of community through the workplace rather than through the ethnic group. The Sayles firm's commitment to paternalism was no doubt strengthened during the 1920s and 1930s, a time of growing labor unrest and union organization. The company, directly through its employees' association, or through the Sayles-sponsored church and Sunday school, provided a wide variety of activities and services. Sports teams included soccer, baseball, tennis, and men's and ladies' bowling leagues. Coal and wood were offered for sale at cut rates. Numerous parties, amateur theatricals, dances, and outings to recreation areas such as Rocky Point or cultural events such as opera performances in Providence were offered. The company sponsored all sorts of musical performances, from a concert band to a minstrel show. The company newspaper, the Sayles News, reported gossip about engagements, showers, and employee social life. All these company-sponsored activities were "American" in character, by early twentieth century concepts (Sayles News, passim).

The company promoted "Americanization" more directly, as well. Articles in the company paper promoted immigrant naturalization and taught American history (concentrating on such mainstream topics as the Constitution). Interethnic cooperation was encouraged, while at the same time ethnic stereotypes were sharpened, by a series of cartoons about "Olaf and Pete," Swedish and French-Canadian workers.

This paternalism also encompassed the Sayles plant in North Carolina, added to the company's holdings in the late 1920s, when many New England textile firms were moving operations south. Construction of the plant and workers' cottages was presented with pride in the Sayles News. The establishment of a baseball team at the North Carolina plant was reported as a major event.

The paternalistic tradition evidently faltered toward the end of the period, a time when the union movement, hotly contested by employers, was gaining strength in Rhode Island. The Sayles News ceased publication in 1928. The mill at Valley Falls was demolished in 1934, several months before a massive strike supporting a national textile union representing both northern and southern workers rocked the Sayles organization and other Rhode Island firms. The Sayles textile organization continued to operate in Rhode Island until the early 1970s, experiencing a boom in the period from World War II through the early 1950s (Goodrich 1971).

The last period in the site's operation (1912-1934), then, was one in which forces that were only beginning to be felt in the early 1800s reached their full fruition. The distinctions between entrepreneurial and working families were already entrenched at the beginning of this period, and were reinforced by the arrival of numbers of immigrants who were not only largely Catholic, but also mostly non-English speaking. The system of paternalism, which would have seemed inappropriate when directed at a native Yankee workforce but which began to emerge with the growth of immigration into the Blackstone Valley, was in full force in the last period. The latest immigrants, however, like their nineteenth-century predecessors, maintained their own welfare and cultural organizations.

VI. FIELD RESEARCH

The cartographic and other documentary research summarized in section V explained most visible site features. Relatively little additional on-site research was required to meet the objectives of this study. Our field research methods began with detailed walkover survey, including preliminary written and photographic recording of site features, to describe present site conditions fully and assist in historic interpretation (Figure 2). We also conducted three types of limited subsurface archaeological tests:

short, shallow, hand-excavated trenches to locate and define selected, previously unlocated foundation limits;

two deeper, machine-excavated trenches to locate a buried component of the original, pre-1853 headrace and confirm the waterpower development sequence outlined in section V;

removal of small amounts of post-1933 fill or demolition debris from Allen mill walls to assess the nature, location, and condition of raceway openings predicted from background research.

Figure 9 locates, and summarizes results from, the archaeological tests. These tests focused on location of structural remains, which were photographed and sketched as found. We recorded transit-controlled locations and elevations of most investigated features, and mapped all such features on the recent detailed topographic plan (National Engineers-Land Surveyors, Inc. 1990). We did not attempt to recover portable artifacts from excavated strata, all of which were full of demolition debris consistent with documented building materials. Section VII incorporates all field research results for interpretation of existing site features. Briefly, these results were:

discovery of intact buried components of the pre-1853 headrace (Figures 9-10), suggesting substantial surviving remains of this feature;

location of demolished, graded, and buried foundation remains from the Allen mill and the boiler house;

discovery of the buried, partially-intact headrace arch in the west Allen mill wall (Plate 1), and of a buried, lintel tailrace opening in the east wall of this mill.

VII. INTERPRETATION OF EXISTING SITE FEATURES

Our assessment investigations indicate the following major site conditions:

1. Some exposed foundations, and additional buried foundations, survive from all major structures built on this site c1833-1920, as do possible fragments of the c1820 Harris mill

2. All basements are filled with at least several feet of demolition debris, as are all surviving wheelpits or turbine bays, except in the Southeast Addition where the turbine forebay and much of the remaining basement remain exposed at approximately c1930 levels

3. Except where filled under the former Northeast Addition and the former Storehouse/Anchor Webbing Company building, modified raceways survive from all periods of hydropower development within site limits

4. Both headraces retain their approximate, c1930 bottom elevations, but the tailrace (east of Crawford Allen's mill) is filled with approximately 6-7 feet of demolition debris, at least at its western end

5. Site demolition and associated scrap salvaging probably removed all operating equipment except the headgates in the river wall and the turbine base in the Southeast Addition

6. There has been no substantial degradation of the demolished site since 1934, other than the c1939 excavation of the earthen channel through the Allen mill and its turbine bay

Figure 9 interprets how historic features survive at or near the present surface of the site. Summaries of site feature conditions and possible historic modifications follow.

A. Waterpower Structures and Equipment

The most likely waterpower system prior to 1853 included a stone-lined, approximately 20-foot-wide headrace which passed under Broad Street, through the north half of the Allen mill, and through or north of the Harris mill. The original c1820 race probably turned south in the Harris mill, passing through the wheelpit and two 13-foot arches to meet a tailrace, of unknown original width, which ran southeast off the site parallel to the river (Figure 3). Although the two right angle turns in the raceway system do not appear efficient by modern hydrological standards, they are not inconsistent with the vernacular arrangements seen at many early 19th-century mills. As we noted in section V, it is possible the Valley Falls layout was part of a system of parallel races planned by the Wilkinson brothers; other possible factors include limited funds and the topographic constraints of the steep slope to the east.

Surviving elements of the pre-1853 system probably include:

the exposed, 20-foot-wide northern headrace, and some or all of the buried headrace east of Broad Street (figures 9-10);

remains of an arch with granite voussoirs, originally at least 18 feet across, in the west wall of the Allen mill (Figure 9; Plate 1);

springline fragments of a 13-foot granite arch, destroyed and filled by a concrete insert in the 3-foot-thick wall running through the Northeast Addition, with the wall a possible part of the Harris Mill as noted below (Plate 2);

parts of the north tailrace wall at the Northeast Addition and near the railroad bridge, and, in this latter wall, the 13-foot rubblestone arch which may have first been built for tailwater from the Harris mill.

The visible headrace width west of the Allen mill matches the dimension given in the 1813 deed stipulating construction of this "sluiceway" (Cumberland Record of Deeds 10: 393). North of the possible Harris mill wall, another all-concrete wall was added at or near the north side of a 12-foot-wide, partly buried channel east of the Allen mill. This apparent, buried 12-foot-wide race represents a narrowing of the headrace which we believe was original, and may be reflected in an ambiguous reference to a "twelve foot sluiceway through the mill lot" in the deed cited above. The point of narrowing is today found in the Northeast Addition, where a post-1853 concrete wall runs northeast from the Allen mill, and probably represents a replacement of part of the pre-1840 headrace. Immediately to the south and east, a low rubble stone buttress adjacent to this wall may also pre-date 1840. Cartographic data and extant masonry suggest the entire north tailrace wall alignment, beginning at the Northeast Addition, was in place by no later than 1840, and may date to the Harris period (Aldrich 1876; Sayles Finishing Plants, Inc., 1939; figures 2 and 9).

The pre-1853 wheelpits are generally deeply buried or demolished, as are race sections within the mill(s) from this period, or west of the visible north headrace. One surviving, fragmentary rubble wall within the Allen mill may be part of the original wheel pit. Surviving, visible pre-1853 races were lined with several types of unmortared, uncoursed rubble masonry, which generally contrast with several types of granite ashlar masonry found in most post-1853 raceway work at this site (see Figure 2). The granite blocks found in the mixed-size rubble masonry of the north headrace, seen virtually nowhere else on this site, may represent post-1853 repairs but could also include some original components, as suggested by archaeological results. Two buried sections of wall along the south side of the original headrace were located during field research, beginning 5-6 feet below present surfaces (figures 9-10). Elevational comparisons noted below, between the buried race walls and the visible masonry in the north headrace, indicate that the buried features are at approximate original heights. The better-preserved buried section, in Trench 1, had a granite block cap on which a brick pier for a later storehouse foundation rested. However, the wall in Trench 2, which could not be more thoroughly documented because of dangerous trench wall conditions, consisted only of mixed-size rubble masonry with an upper surface 1.5 feet higher than the wall top in Trench 1.

The smaller-size rubble found along the uppermost 1.5 feet of the north headrace's south wall, east of the double-arched West Addition wall, probably represents a post-1853 addition to the original wall. Spot elevations taken on either side of the north headrace about 20 feet east of the double arch, at the *bottom* of the smaller-size rubble, are very similar to the buried wall top elevations: Trench 1 (53.2); Trench 2 (54.7), north visible wall (53.7); south visible wall (54.1). We do not know if the raceway wall top was altered to seat the West Addition's wall c1868, or to allow for increased high water capacity against floods. It is also unclear if the modification post-dates the addition's construction.

Openings in the Allen mill's east and west wall, through which the original headrace passed, survive in buried condition. The granite arch in the west wall, noted above, is probably part of the mill's original construction c1833. Much of the arch may remain intake beneath fill and demolition debris (Plate 1). The original east wall opening, through which the Allen mill tailrace passed, was probably altered at an unknown date: a large stone lintel at least 6 feet long, partially uncovered during field research, appears at a corresponding point in the east wall, but several feet lower in elevation, and beneath what may be remnants of granite voussoirs.

Most other waterpower remains were initially built c1853-68, probably in two stages as discussed above. An undated turbine installation in the Allen mill and the Northeast Addition included construction of a new tailrace in the Allen mill, perpendicular to the old headrace, requiring westward extension of the major tailrace (cf. figures 2, 3, and 9). A fragmentary brick wall survives within the Allen mill where these new tailraces met at a right angle. Other post-1853 remains include the headgates, the west and south headraces, the river wall and a spillway off the south headrace, intake components and turbine bay remains associated with the Southeast Addition, a tailrace arch fragment from the first generation of this addition's waterpower c1868-1901, and the south wall of the tailrace to the east.

The headgates, set in arches within coursed granite ashlar walls, have apparently been removed and replaced by sheet metal and wood barriers. They were partly sealed with concrete in 1932 and partly reopened c1940, and retain some components of one S. Morgan Smith Company operator which cannot be dated with available records (personal communication, Charles Allen and Allen Roth). The west headrace and the existing tailrace may be contemporary: the large, irregularly-coursed, unmortared granite ashlar walls of the west headrace are similar to those seen along the south tailrace wall and about a third of the north tailrace wall, and are seen nowhere else on site. The tailrace was widened to about 35 feet after 1853. The river wall and about half of the south headrace walls remain coursed granite ashlar, and are probably original, c1853-68 construction. Rubble sections of the south headrace may represent later low-cost repairs. The north side of the south headrace is the only raceway section on the site with any significant loss of stone lining, near the junction with the north headrace, perhaps reflecting high-water episodes. The bottom of the south headrace is lined with concrete east of a low spillway in the race (Figure 2).

Of the site's power-generating facilities, foundation components at the Southeast Addition are the only survivors yet confirmed. Most of these components represent the installation or maintenance of the 1901 turbine, with some modifications of earlier features probably built c1868. Beginning about 15 feet southwest of the addition's wall, a pair of brick-lined notches, running the full height of the headrace wall, supported an undocumented intake gate structure or trashrack. The lack of any more substantial remains suggests that an intake structure here could have been operated with stop logs. Surviving, foot-square pockets in the walls immediately above these notches probably held support timbers for a pedestrian bridge (Figure 4). Just below the intake site, a timber-and-concrete floor at the bottom of the headrace extends about 10 feet, stopping near the fragmented remains of a stone arch in the Southeast Addition's corner. Water passing through this arch entered the turbine forebay, a concrete-floored area of about 450 square feet in the building's southwest corner, originally defined by rubble walls within the Southeast Addition basement. The turbine bay wall was probably lined with common brick laid in American common bond, visible today at the northwest corner of the surviving forebay wall. Within the turbine bay lies the cast-iron base of the 54-inch Holyoke wheel installed in 1901. The 2-inch-thick base, with four flanges, has an 82-inch internal diameter, and is part of a single enormous casting covering the entire turbine bay floor. Below the base, the deep layer of demolition debris in the tailrace obscures other, probably well-preserved, turbine foundation elements and tailrace openings. The tailrace for the 1901 turbine probably passed through the building's north wall, replacing the original c1868 tailrace through the northeast corner, where three granite voussoirs of an approximately 10-foot-diameter arch remain.

B. Building Foundations and Other Surviving Built Features

1. Foundations

E.J. McCall's 1934 demolition contract with Sayle's Finishing Plants, Inc., called for removal of "...all walls down to the ground level," and grading of "...the stone and debris over the building sites in such manner as to follow the grade of the ground [and] fill in all holes and excavations..." (Cumberland Record of Deeds 83: 350). McCall did his work well: these specifications accurately describe most structures and related supports or retaining walls, as well as the reason most basement floor levels are inaccessible. A large number of visible basement or foundation wall tops survive from the Allen mill, the three adjacent additions to the northeast, southeast, and west, the storehouse/Anchor Webbing Company building built over the original headrace, the picker house/Nedra Silk Company building, the gatehouse, and storage/supply buildings along the railroad and the riverfront, along with buried boiler house foundations (figures 2 and 9). Most of these walls are uncoursed, unmortared rubble of several varieties, and match building outlines expected from historic maps. Some building walls are mortared and/or stuccoed, including Crawford Allen's mill, a style promoted by Allen's brother, Zachariah, as demonstrated by the latter's Allendale, RI mill (Greenwood 198: 123). Along the railroad, parallel rubble walls delimit a partial basement under the earliest storage building (c1847-50), a split in level allowing for material movements between the north or east sides of the picker house and the railroad (figures 2 and 9).

The rubble foundations characterize all the documented remains built before c1870. Later foundations or building modifications used a variety of materials. In the picker house/Nedra Silk Company building, the east wall includes remains of two arched brick openings, one with ashlar granite quoins, almost certainly representing later insertions in the original rubble wall. Such functional modifications were common in industrial structures: similar brick entry insertions can be seen at the 1810-11 Wilkinson Mill in Pawtucket. At the West Addition (1868), the north wall of the north headrace supports a poured concrete wall, punctuated by brick pins or footings for presumed, longitudinally-centered columns. We believe this wall is a modification or addition to the original West Addition. The foundation of the storehouse/Anchor Webbing Company building (c1870-98), built over the abandoned portion of the original headrace, includes sections of irregularly-coursed, unmortared granite ashlar and an unmortared, uncoursed combination of rubble and granite ashlar topped with granite slabs. Trench 1 revealed a brick pier on the original headrace wall, along the storehouse's longitudinal center line, indicating partial re-use of the headrace as foundation for probable storehouse framing (Figure 10). A thick concrete slab supported the one-story riverfront storage building (c1915-20), and concrete blocks immediately north of the Allen mill supported columns or I-beams for the elevated wooden loading shed structures (c1910-20) which extended to Mill Street (figures 2 and 9).

The Southeast Addition's position over part of the raceway system required different treatment to maintain adequate flows of high water through the vacant site. Although McCall probably filled the building in, documentary evidence noted above suggests that the Sayles company paid for extensive clearing of the raceways and excavation of a new channel through the Allen mill by 1940, after several disastrous floods. It was probably at this time that the turbine forebay and turbine bay were cleared to present levels, and the north wall removed to its large granite footings. These footings are the lowest building components exposed on the site. In the southeast portion of the building's basement, high water has exposed all or parts of three rows of pedestals on about 8-foot centers, each about 4 feet square. The pedestals, installed to support columns carrying very heavy floor loads above, are of three types: brick, cut stone slabs, or a combination of monolithic cut stone set within brick.

Within the Northeast Addition (c1840-50), the 3-foot-thick, 66-foot-long wall along the presumed pre-1853 headrace may include part of the Harris mill foundation, although this feature is difficult to interpret. The north side of the wall consists of stretcher-bond common brick, while the southern, 2-foot-thick side is small-sized, uncoursed, mortared rubble. Two 4-foot-wide, stretcher-bond-brick-lined openings with irregular vertical slots penetrate this wall. A 12-foot-wide concrete wall section near the east end, punctured by two reinforced-concrete, 18-inch culverts, clearly represents a modification of the raceway system above the surviving tailrace arch to the south, perhaps when a turbine in this building was decommissioned. The need for bleaching or dyeing process water by Sayles Finishing Plants operators probably explains the modified but continued use of this raceway. We do not know if the brick openings were doors or small spillway openings; the vertical slots and the relative elevation of the culverts suggest the latter.

It is possible that the rubble wall was simply extended up from an original, lower raceway wall to support the Northeast Addition, built over the race after the complete demolition of the Harris mill. Fragmentary concrete and brick remains atop the rubble were probably part of first-floor Northeast Addition walls. However, if our reconstruction of raceway history is correct, and if one assumes that the Harris mill was east of the Allen mill, then the rubble portions of this wall could be part of the Harris mill's north wall. Identical, adjacent masonry to the south forms part of the Northeast Addition's east wall, and a corresponding 5-foot-long wall to the west, built against the headrace wall buttress noted above. In this reconstruction, these would appear to be fragments of the east and west Harris mill walls. The east wall may survive for its full length, and includes window openings with angled vertical sides unlike any seen elsewhere on site (personal communication, Richard Greenwood). The rubble masonry along this part of the Northeast Addition's east wall has consistently smaller stones than those seen on the same line of wall to the north of the possible north Harris mill wall, providing further support for this hypothesis.

The data just reviewed would make the Harris mill about 24 feet wide, with the tailrace wall to the south once supporting the mill's south wall. The surviving 66-foot rubble wall may approximate the original length of the Harris mill. In this reconstruction, raceways would thus have passed north and then through the Harris mill.[1] Although these dimensions do not define a large structure, they are in scale with some contemporary textile mills, notably Zachariah Allen's original 1822 mill at Allendale, which was 66 by 36 feet (Greenwood 1988: 123). Even smaller contemporary mills were built, such as the demolished, 1806-07 Hope Mill in Scituate, which was 44 x 24 feet (Kulik and Bonham 1978: 222). It should be noted that a "small" mill was referred to in Crawford Allen's 1835 lease to George Nightingale (Cumberland Record of Deeds 16: 196).

2. Superstructures or Equipment

E.J. McCall's thorough demolition left virtually no first floor walls standing. Fragments of stretcher-bond brick walls, sometimes set on concrete or granite foundation wall capping, are visible at the sites of the Northeast and West addition, and the storehouse/Anchor Webbing Company building. For unknown reasons, however, McCall did not level two large reinforced concrete tanks inserted in the original picker house. Perhaps chemicals stored in these tanks were not removed prior to McCall's work, which called for extension of undocumented sewer pipes into the river. Another possibility is that the strength of these tanks made McCall hesitant to assault them: reinforced concrete structures can be extremely difficult to demolish.

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[1] This reconstruction leaves unexplained the continuation of the presumed headrace *east* of the arch in the north Harris mill wall. A fragment of what may be another granite arch appears at the junction of this wall and the Northeast Addition's east wall, raising the possibility that the Wilkinsons actually began a headrace extension to accommodate more mills.

We have already noted the cast-iron turbine base in the Southeast Addition. An 11-foot-square stone base for the main boiler house stack survives, along with a nearby 5-foot-square concrete column which may have supported a smaller, probably metal stack (cf. Figure 8).

3. Other Features

Several broken concrete pads or floors survive, in or adjacent to the boiler house, the Northeast Addition, and the chemical storage building built c1912-15 near the railroad, adjacent to the earlier split-level storage or supply house. The one-story chemical storage building was floored completely by a concrete pad, which extended west of the building towards a gently sloping, earthen terrace north of the picker house/Nedra Silk Company building's first floor level. An ell-shaped rubble retaining wall northeast of the latter building supported this terrace, which allowed for smooth movement of chemicals from the railroad to the tanks in the (by c1915) former picker house (figures 2 and 9).

At least three pedestrian bridges crossed raceways on the site by the early 20th century: over the west headrace immediately south of the storehouse/Anchor Webbing Company building; over the south headrace just southwest of the Southeast Addition; and over the main tailrace east of the picker house/Nedra Silk Company building (cf. Figure 8). The latter bridge site retains concrete sills notched to receive steel or wood floor beams. One wood sill in the headrace wall marks the site of the Southeast Addition bridge. There are no obvious signs of the third bridge except a slight depression in the west headrace wall top, where a sill could once have sat.

As indicated by the interpretative discussion above, the complex relationship of races and buildings on this compact site led to construction of many arches. Visible evidence, historic maps, and archaeological testing suggest that most of the arches ever built here survive in some form. All but one arch, in the north tailrace wall, had granite voussoirs, creating a consistent treatment of site infrastructure which cut across all periods of site development. On the north headrace, surviving arch remains include a pair of intact, approximately 9-foot arches which supported the West Addition's west wall, an exposed springline fragment on the line this building's former east wall, the buried and partially intact arch in the Allen mill west wall, and the springline fragments intercepted by the concrete infill in the possible Harris mill north wall. On the south headrace, there are arch fragments visible at the southwest and northeast corners of the Southeast Addition. The status of the opening in the east Allen mill wall remains unclear.

C. Non-Surviving Features

A number of very small auxiliary structures, such as hose houses and a dust tower, have left no visible traces (Sanborn Map Company 1921, 1923). Three suspended structures were completely removed in 1934: two wooden bridges connecting the storehouse/Anchor Webbing Company building with the West Addition, and the Northeast Addition with the Southeast Addition; and a wooden drainer house built over the main tailrace between these latter additions (Figure 4).

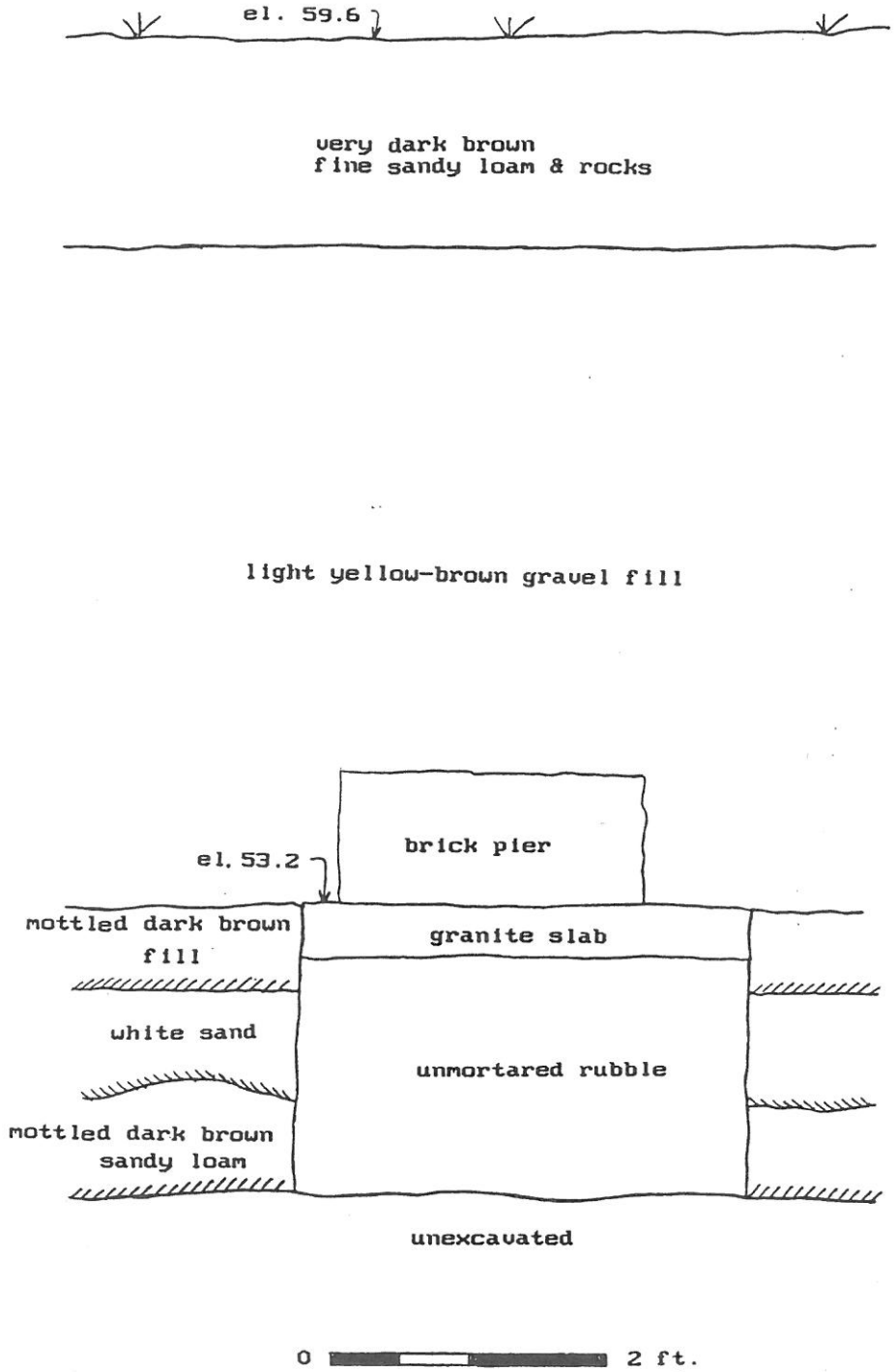

Figure 10. SECTION OF TRENCH 1 WITH BURIED HEADRACE WALL TOP AND BRICK PIER

This section of pre-1853 headrace wall was on the longitudinal center of the c1870-1900 storehouse, and was re-used to support the brick pier on which a storehouse column probably rested.

Plate 1. VIEW EAST OF HEADRACE ARCH FRAGMENT, WEST WALL OF ALLEN MILL

Exposed fragment includes two granite voussoirs in place (left), and one dis-articulated (center). At least one other in-place voussoir survives on the north side of the arch. Exposed portion is about three feet high.

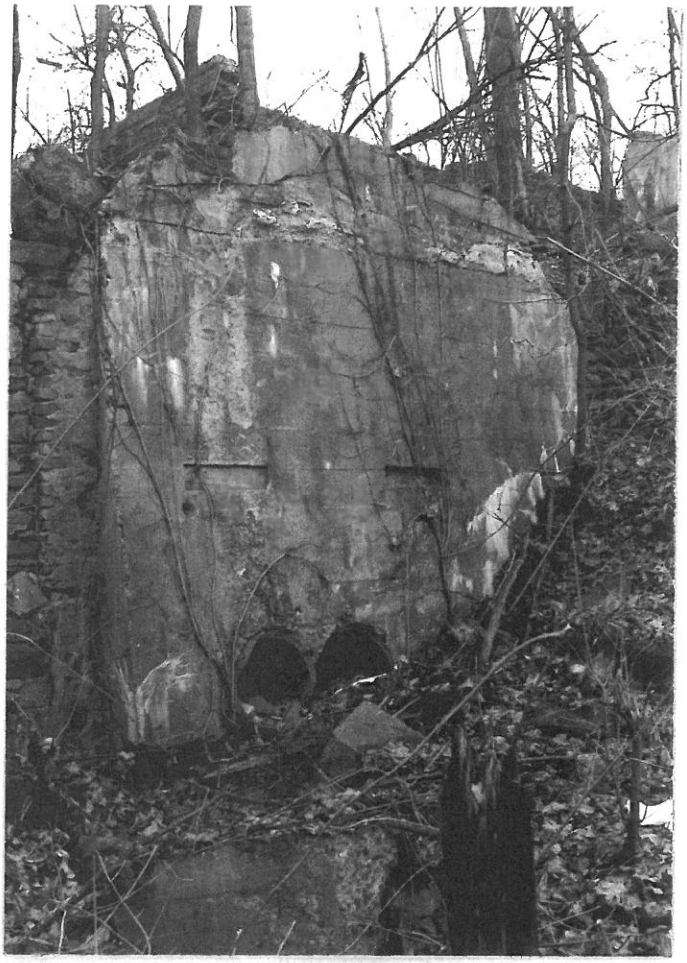

Plate 2. CONCRETE IN-FILL AT PROBABLE HEADRACE ARCH SITE, HARRIS MILL
Concrete section about twelve feet wide; surviving springline voussoir at extreme left center. View is to northeast.

Plate 3. HEADGATES & RIVER WALL (RIGHT), WEST & SOUTH HEADRACES, TO SOUTHEAST
Central Falls side of Valley Falls mill complex at right, across Blackstone River. Richard Greenwood (right) and author Raber on west wall of west headrace.

VIII. ASSESSMENT OF HISTORIC RESOURCES FOR PARK PLANNING

Assessment of Valley Falls Heritage Park historic resources involves two somewhat separate analyses:

discussion of project effects on potentially significant properties eligible for the State Register of Historic Places, in compliance with the Rhode Island Historic Preservation Act;

evaluation of historic resources for future park planning and public interpretation, in the context of Blackstone Valley National Heritage Corridor objectives.

A. Compliance with the Rhode Island Historic Preservation Act

1. State Register Eligibility

Eligibility for the State Register is based on criteria of significance developed for the National Register of Historic Places, which usually requires integrity of location, design, setting, materials, workmanship, feeling, association, plus one or more of the following, paraphrased qualities:

A. association with significant events in American history;

B. association with significant persons in American history;

C. distinctive characteristics of a type, period, method of construction, work of a master, or significant entity whose components may lack individual distinction;

D. known or likely important information in American prehistory or history.

Blackstone Valley industrial textile manufacturing was one of the most important developments in Rhode Island history for over a century. Although the Heritage Park site is hardly the best preserved textile mill in the valley, it was a component of one of the largest developed mill privileges on the Blackstone. By the mid 1830s, both sides of the Valley Falls privilege were developed in tandem, with unified ownership of the entire privilege after 1852. The Cumberland side of the privilege was particularly unusual in having been associated with virtually every type of textile product ever made in New England, including cotton yarn and cloth, wool yarn and woolens, silk, plush, narrow fabrics, and cotton linters for explosives. The Chace family, largely responsible for full use of the site c1839-1912, were not only important regional industrialists but outspoken abolitionists. During the approximately 115 years of textile manufacture at the Valley Falls site, the Chaces and the other Valley Falls mill owners related to their workers in a progressive pattern of social distinctions characteristic of many New England textile complexes. The better-preserved south portion of this large complex, in Central Falls, is already listed on the National Register of Historic Places, but the nomination does not include the Cumberland component (Kennedy 1977). A more complete nomination for this industrial complex, including the dam and the archaeological remains, would better define the significance of this important regional industrial center. In this framework, the Cumberland ruins would be

an archaeological component of the complex, and would be eligible for the State or National registers under criteria A and B. An even more comprehensive framework would include housing and other sites associated with Valley Falls industrial sites, as suggested in the recent Cumberland resource survey (Fitch 1990: 67-8).

Although devoid of intact buildings, the archaeological remains of the northern Valley Falls mill privilege retain considerable integrity of original plant design and arrangement, with unusually well-defined raceways. The raceway system, which includes partially filled and possible buried components, evolved to include two headraces on the same level, probably used for some time in simultaneous power transmission. This system is probably unique among Rhode Island mill complexes, and reflects a versatile use of the confined site conditions which limited linear arrangement of mill buildings with unified power trains. Visible and possibly buried raceways, along with the hydropower remains associated with the Southeast Addition, provide a basis for full interpretation and historical analysis of this unusual system. Such interpretation could not only help explain the history of this site, but could inform understanding of contemporary historic industrial waterpower planning by providing a somewhat extreme case against which to measure more typical examples. The well-preserved, exposed, and in places unfilled raceways allow for readier access and analysis than many sites with extensive intact buildings, or largely-filled raceways. The Valley Falls site could also yield additional archaeological information on raceways and wheelpits in the Allen and, perhaps, Harris mill sites. For these reasons, the site appears to meet criterion D for State Register eligibility.

2. Project Effects

From the beginning of this study, there has been weekly, sometimes daily, communication and collaboration between the historical/archeological researchers and the landscape architects who are designing the park in the Valley Falls Mill Ruins. The park envisioned by the architects will do very little damage to the historic fabric of the site: it will make part of the ruins accessible to the public (including handicapped individuals), safe for visitation, and capable of interpretation with signage or tour programs. The park will make the outlines of historic buildings more obvious than they are presently, but it will not destroy any of the foundations that are still in place. An overlook to be created near the turbine pit of the southeast addition will allow people to see where a turbine was seated and (if an interpretive panel is added) to comprehend the complex water power system at this site.

The only apparent effects of the proposed design (February 22, 1991) on the historic integrity of the site will be the placement of paths over some of the buried foundation walls, the construction of one or more pedestrian bridges at earlier bridge locations, and the erection of safety fencing near historic raceway walls. Fencing of open raceways will generally involve placement of posts or uprights directly behind visible wall tops, requiring little if any alteration of raceway walls. Along the south side of the north raceway, where the uppermost wall sections are small-sized rubble which may be insufficient to retain new fencing, it may be necessary to remove this rubble to create a short slope above the wall and restrict wall top access beyond a fence set somewhat further back. Since the small-size rubble appears to be a modification of, and structurally distinct from, the original wall, this design should

prove neither visually disruptive nor unnecessarily destructive of historical fabric. In some places where raceway walls have collapsed or where they are considered unstable, the architects plan to stabilize and restore them using historic materials (and perhaps some hidden mortar or cement). The very real benefits of creating a public park in these historic mill ruins more than compensate for the modest changes that are necessary to provide safe access. Other plans will require no removal or excavation of historical features, and minimal maintenance or restorative operations to enhance wall stability, such as unobtrusive mortaring or repointing.

There appear to be no adverse anticipated effects of park development on significant historical resources. Unanticipated adverse effects can be monitored and avoided or mitigated, as discussed in section IX.

B. Implications of Site Resources for Heritage Park and Corridor Planning

Valley Falls Heritage Park planning and interpretation can partake of regional historic patterns, as well as local history and close-grained reconstruction of site development, making the park an important locus for the Blackstone River Valley National Heritage Corridor. Industrial activity has had a profound influence on the formation and preservation of the Blackstone Valley's cultural resources. Physical evidence of industrial development at Valley Falls illustrates the BRVCC's interpretive concepts of "the river at work" and "people at work." The textile industry was long the basis of the Blackstone Valley's economy, and put the Valley at the forefront of national industrial development (Blackstone River Valley National Heritage Corridor 1989).

The mill ruins and abandoned raceways at Valley Falls link a number of specific themes identified in the inventory of historic cultural resources done for the Blackstone River Valley National Heritage Corridor (Malone et al. 1989). The obvious themes are industrial development, industrial decline, and technology. Stone foundations indicate the placement and modification of textile mills and auxiliary structures as this manufacturing plant expanded over time. The circumstances surrounding the 1934 demolition of the entire complex in Cumberland make it the valley's most evocative symbol of the industrial decline that so negatively effected this region in the second and third quarters of the twentieth century. The exposed elements of a sophisticated power system, including headgates and the base of a turbine, offer great possibilities for the interpretation of water power technology. It is often more difficult to understand the movement of water through industrial sites with intact buildings and partially covered raceways.

Less obvious but important connections can also be made to such themes as labor-management relations, ethnicity, immigration, architecture, commerce, community development, and social reform (Malone and Parkhurst 1989). For instance, the role of Elizabeth Buffum Chace, wife of a Valley Falls mill owner, in the abolition, women's suffrage, and prison reform movements should be noted with pride. Her now-demolished home in Valley Falls was part of the underground railway which moved escaped slaves to freedom. In a region infamous for its many "Negro cloth" mills (making coarse fabric for slave clothing) and its close ties with southern slave owners, Chace family members were outspoken in their support of abolition (Stachiw 1983).

IX. CONCLUSIONS AND RECOMMENDATIONS

Historic industrial resources in the proposed Valley Falls Heritage Park area appear to be eligible for the State and National registers of historic places. No adverse effects on these resources are currently anticipated from park plans. We recommend review of evolving park plans to assure continued lack of adverse effects. For any plans requiring excavation or removal of historic fabric other than as outlined above, we recommend assessment of possible effects based on research completed for this study, and archaeological field monitoring of construction with recording as necessary of any significant new uncovered information. These steps should assure continued compliance with the Rhode Island Historic Preservation Act.

Park development can incorporate results of this study, plus additional research, into various types of active and passive interpretative frameworks. Passive interpretation should utilize two basic park-related areas, suitable for different types of exhibits: the riverfront parcel, where people can explore the historic industrial landscape with the assistance of signage; and the Cumberland Town Hall where people can see more detailed presentations and exhibits of park site history, while enroute to or from designated restrooms or other facilities. Active interpretation can include walking tours of the riverfront site and incorporation of modified tour material into railway tours being developed by the Blackstone Valley Tourism Council. The Providence & Worcester Railroad bridge east of the site is an excellent vantage point.

Most on-site signage can focus on site chronology, industrial usage, and community development, building on the results of this study. Signage should place the site in the larger context of the Blackstone River Valley National Heritage Corridor. Less detailed signs on the Broad Street Bridge, and at nearby points on the river used by anticipated canoeists, can highlight the identity and importance of the site and its series of three dams. Limited underwater investigations could confirm the location and condition of the two timber dams last photographed in 1940. Selective defoliation or excavation of site features may enhance interpretation of waterpower history for passive or active interpretation. In particular, we recommend considering excavation, and stabilized exposure or reconstruction, of the buried arch in the west wall of the Allen mill. This arch is close to the slope of the c1939 channel dug through the mill, and hence potentially accessible with machine-assisted excavation. Exposure of this large, dramatic feature would visually carry the original headrace through the mill, help explain the evolution of site hydropower, and act as a strong visual focus around which to identify the many other arches on the site.

For fuller interpretation of the people, work environments, and products associated with industrial Valley Falls, as well as the place of Valley Falls in the historical context of the Blackstone River Valley, we recommend additional research including fuller use of informants, population censuses, historical newspaper accounts, and historical photographs. This research, together with the results of this study, could be developed into passive interpretative displays in Town Hall, including a multi-media slide show, as well as components of walking and railroad tours. The site already appears to have a wealth of historical images, which additional research in untapped sources is likely to increase.

Few industrial sites in the Blackstone Valley National Heritage Corridor have received detailed interpretative attention. To enhance local and regional awareness of the richness and depth of corridor themes as expressed through the Valley Falls site, we recommend preparation of a monograph on the entire Valley Falls privilege. This monograph could be based on results of this study, the additional research outlined above, previous work on the Central Falls side of the privilege plus any additional primary research needed to unravel ownership patterns there, and an overview of regional hydropower development.

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1895. Everts & Richards. New Topographic Atlas of Surveys.

c1900. Anonymous. Copy of untitled plan of the Valley Falls mill complex. Slater Mill Historic Site.

1915. Associated Mutual Insurance Companies. "Sayles Finishing Plants, Frank A. Sayles, Proprietor," Serial Number 12179, Index Number 15222-3. Originally called "Frank A. Sayles, Samoset Property" (from still visible erased title). Linen original on loan from Factory Mutual Engineering, to be deposited in a suitable historical archive. We are grateful for the generous assistance of Factory Mutual Engineering in finding this original sheet.

1918. Sanborn Map Company. Valley Falls. In RIHS bound collection.

1921. Sanborn Map Company. Valley Falls. In RIHS bound collection.

1924. Sanborn Map Company. Valley Falls. On microfilm.

1939. Sayles Finishing Plants, "Plats, Samoset."

1990 National Engineers-Land Surveyors, Inc. Property Line and Topographical Survey owned by Town of Cumberland, Mill Street and Broad Street, Cumberland, Rhode Island.

4. Personal Communications

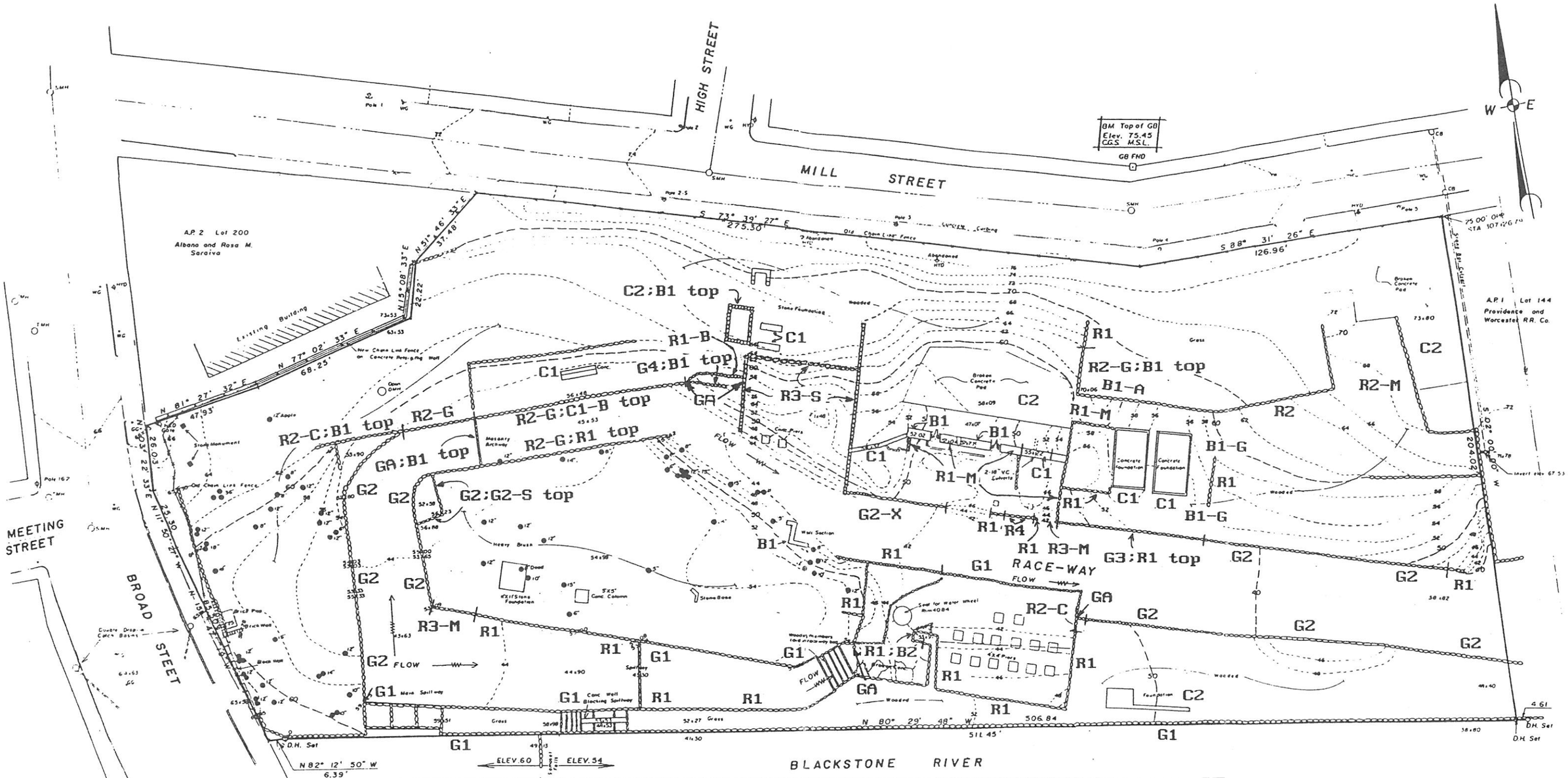
Roger Allard, Factory Mutual Engineering, Norwood, MA

Charles Allen, Voith Hydro, York, PA

Richard Greenwood, Rhode Island Historical Preservation Commission

Allen Roth, Voith Hydro, York, PA

Elizabeth Stevens, doctoral researcher on Elizabeth Buffum Chace, Brown University



LEGEND

- Existing Contors
- Stone Wall
- Fence
- Utility Pole
- Fire Hydrant
- Water Gate
- Gas Gate
- Sewer Manhole
- Telephone Manhole
- Tree / Trunk Diameter

Stone Foundation, Raceway, or Retaining Walls

R1: small-sized, uncoursed, unmortared rubble
R1-M: same, but mortared
R1-B: same, but mortared, & brick inserts
R2: mixed-size, uncoursed, unmortared rubble
R2-M: same, but mortared
R2-G: same, with granite ashlar inserts
R2-C: R2-G with granite caps
R3: large-sized, uncoursed, unmortared rubble
R3-M: same, but mortared
R3-S: same, but mortared & stuccoed
R4: rough-cut fieldstone arch in raceway wall
G1: coursed, mortared, large granite ashlar
G2: irregularly-coursed, unmortared, large granite ashlar
G2-S: same, but smaller sized
G2-X: same, but mixed sized
G3: uncoursed, mortared, large granite ashlar
G4: uncoursed, mortared narrow granite slabs
GA: granite arch or arch remains

Brick

B1: stretcher-bond, common brick wall fragments or wall openings
B1-A: same, arched
B1-G: same, with granite quoins
B2: American-common-bond, common brick facing on rubble wall

Concrete

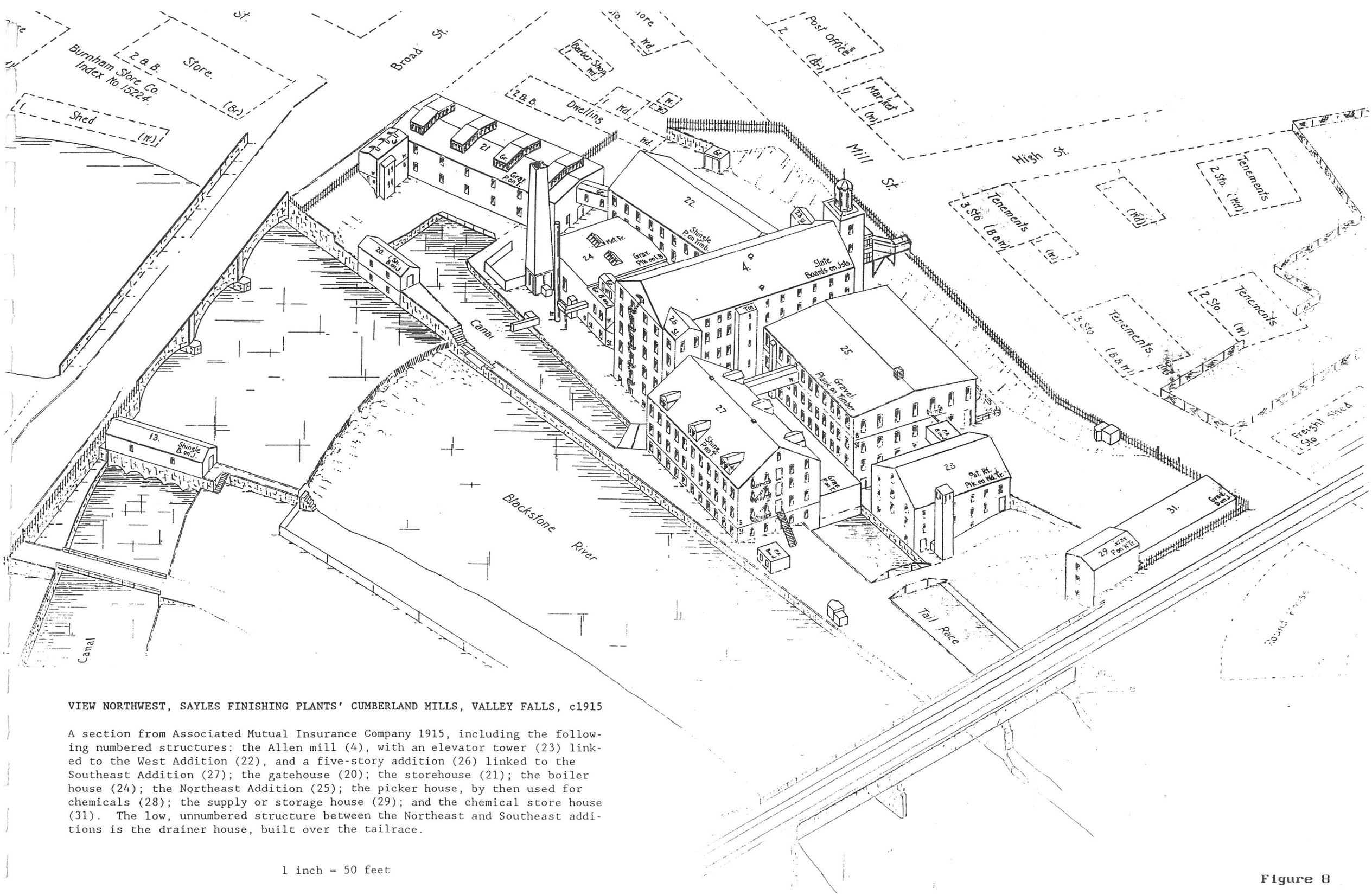
C1: reinforced concrete wall or footing
C1-B: same, punctuated with brick pins/column footings
C2: unreinforced concrete pad or footing

base map: National Engineers-Land Surveyors, Inc. 1990

EXISTING CONDITIONS AND MASONRY TYPES

20 0 20 40 60 80 100 FEET
10 0 10 20 METERS

Figure 2

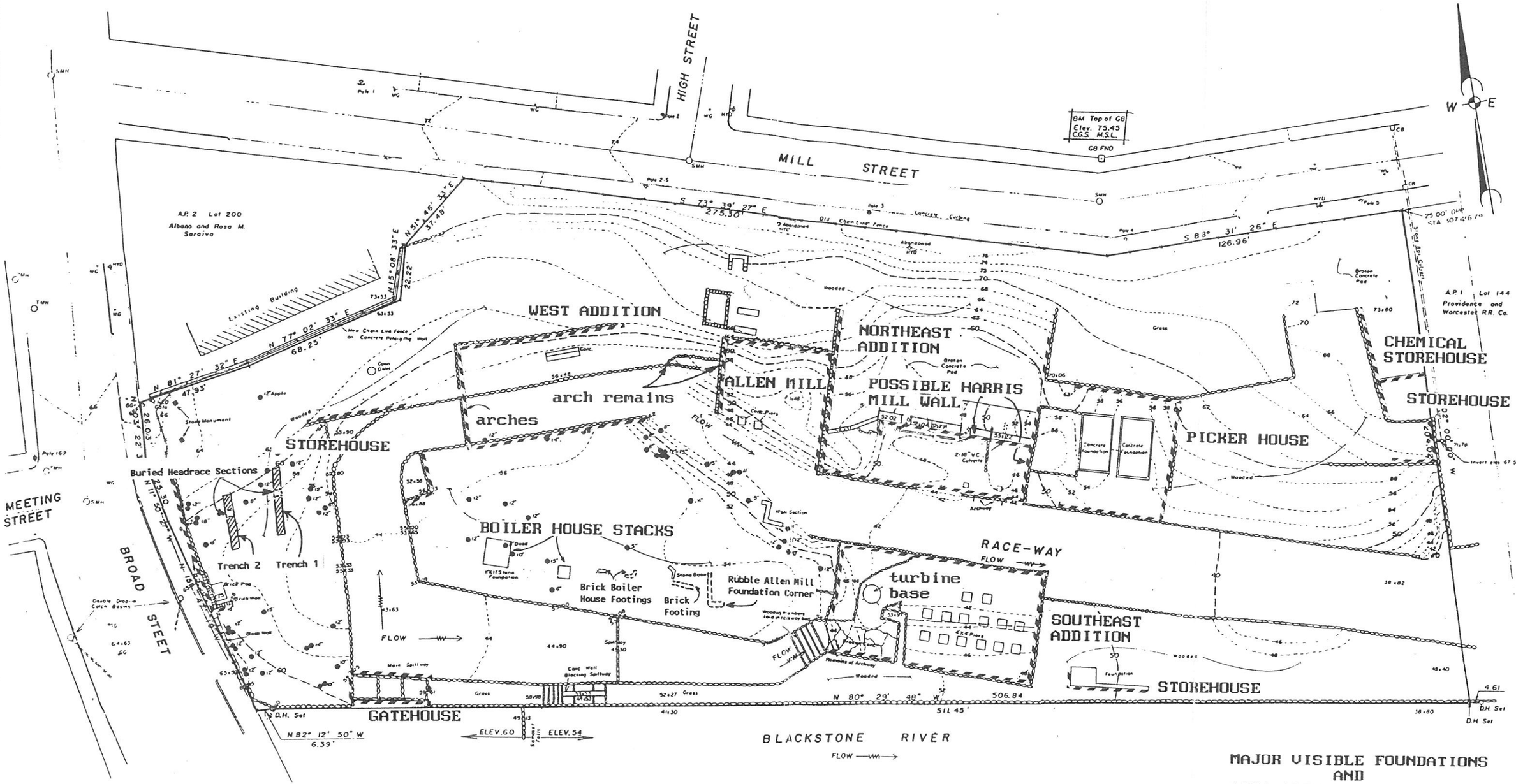


VIEW NORTHWEST, SAYLES FINISHING PLANTS' CUMBERLAND MILLS, VALLEY FALLS, c1915

A section from Associated Mutual Insurance Company 1915, including the following numbered structures: the Allen mill (4), with an elevator tower (23) linked to the West Addition (22), and a five-story addition (26) linked to the Southeast Addition (27); the gatehouse (20); the storehouse (21); the boiler house (24); the Northeast Addition (25); the picker house, by then used for chemicals (28); the supply or storage house (29); and the chemical store house (31). The low, unnumbered structure between the Northeast and Southeast additions is the drainer house, built over the tailrace.

1 inch = 50 feet

Figure 8



LEGEND

- Existing Contors
- Stone Wall
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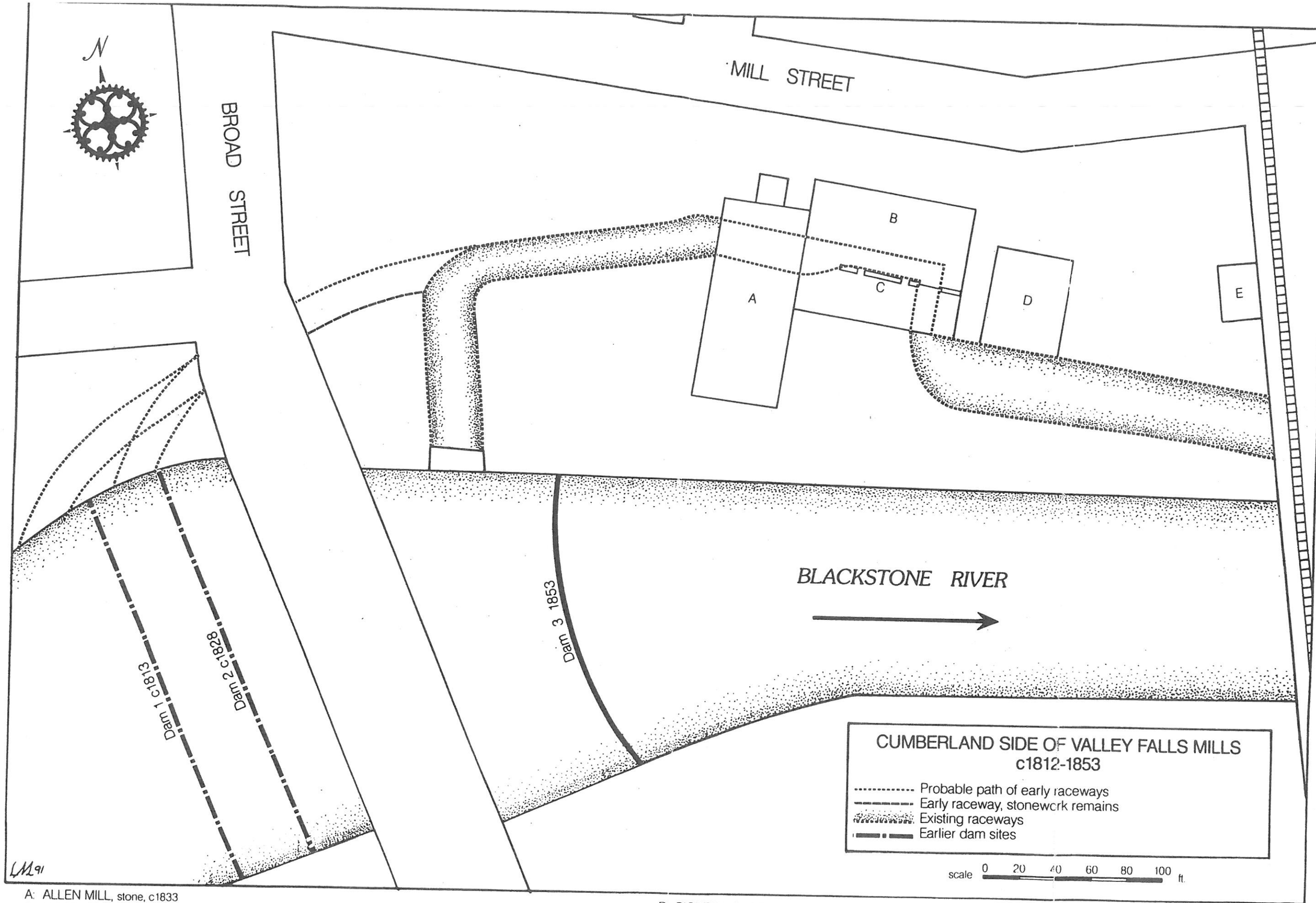
MAJOR VISIBLE FOUNDATIONS AND 1991 ARCHAEOLOGICAL TESTS

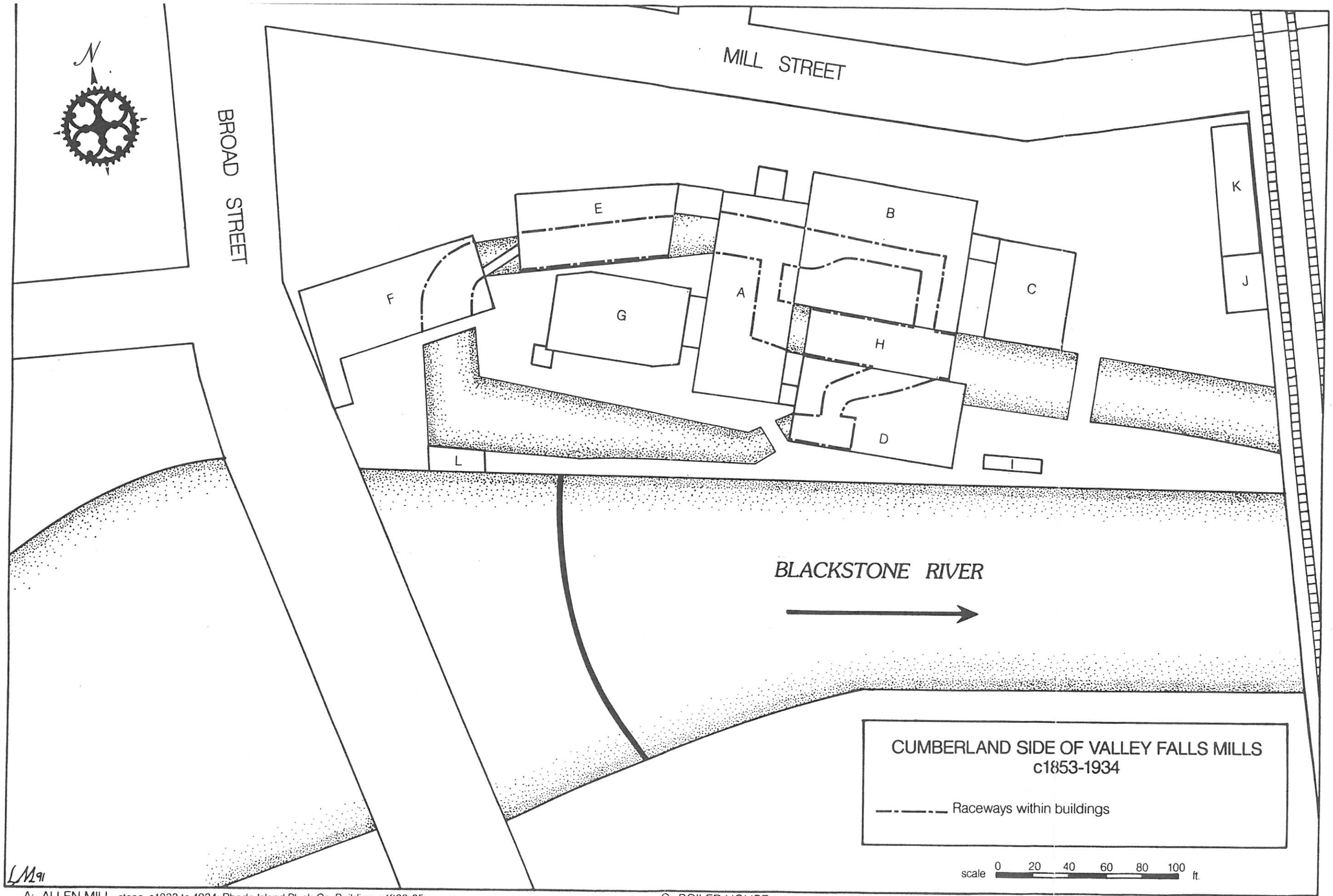
- Outline of Major Foundations
- Foundations Exposed in Archaeological Tests
- Machine-excavated Trenches

base map: National Engineers-Land Surveyors, Inc., 1990

Figure 9

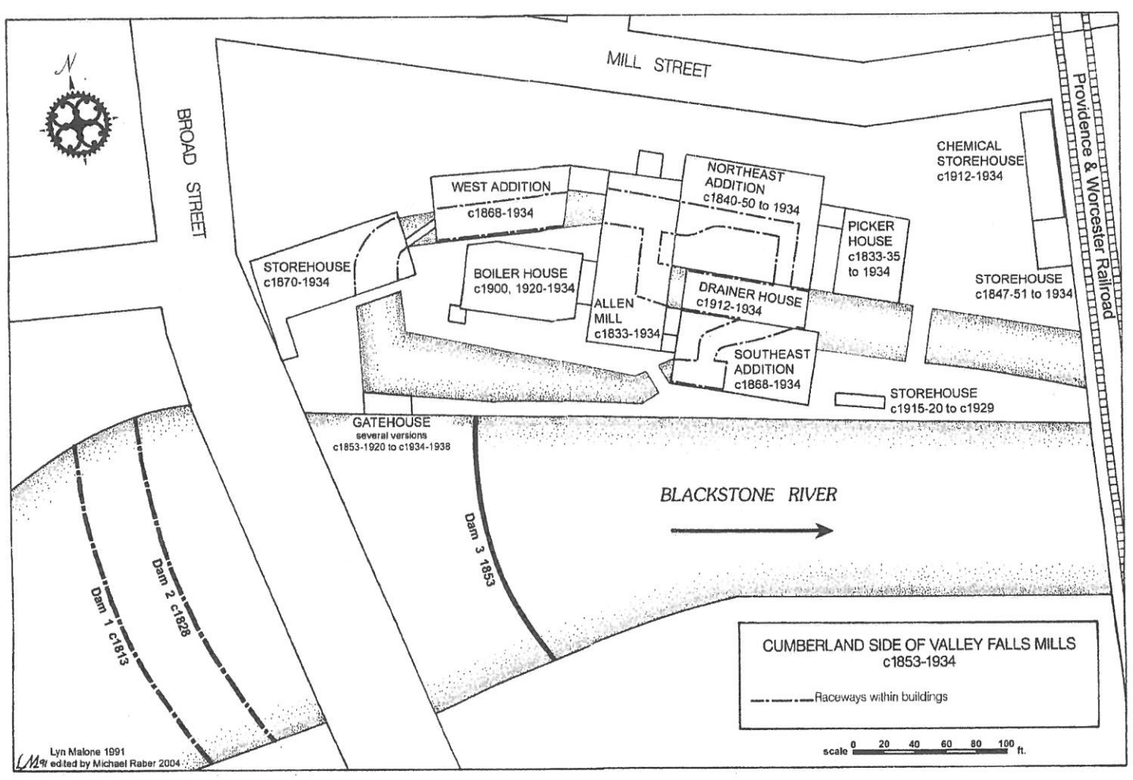


A: ALLEN MILL, stone, c1833
B: NORTHEAST ADDITION, brick with stone foundation, c1840-50
C: POSSIBLE NORTH WALL OF HARRIS MILL, probably frame with stone foundation, c1813-20 to c1838-39
D: PICKER HOUSE, stone, c1833-35
E: STOREHOUSE, brick with stone foundation, c1847-51

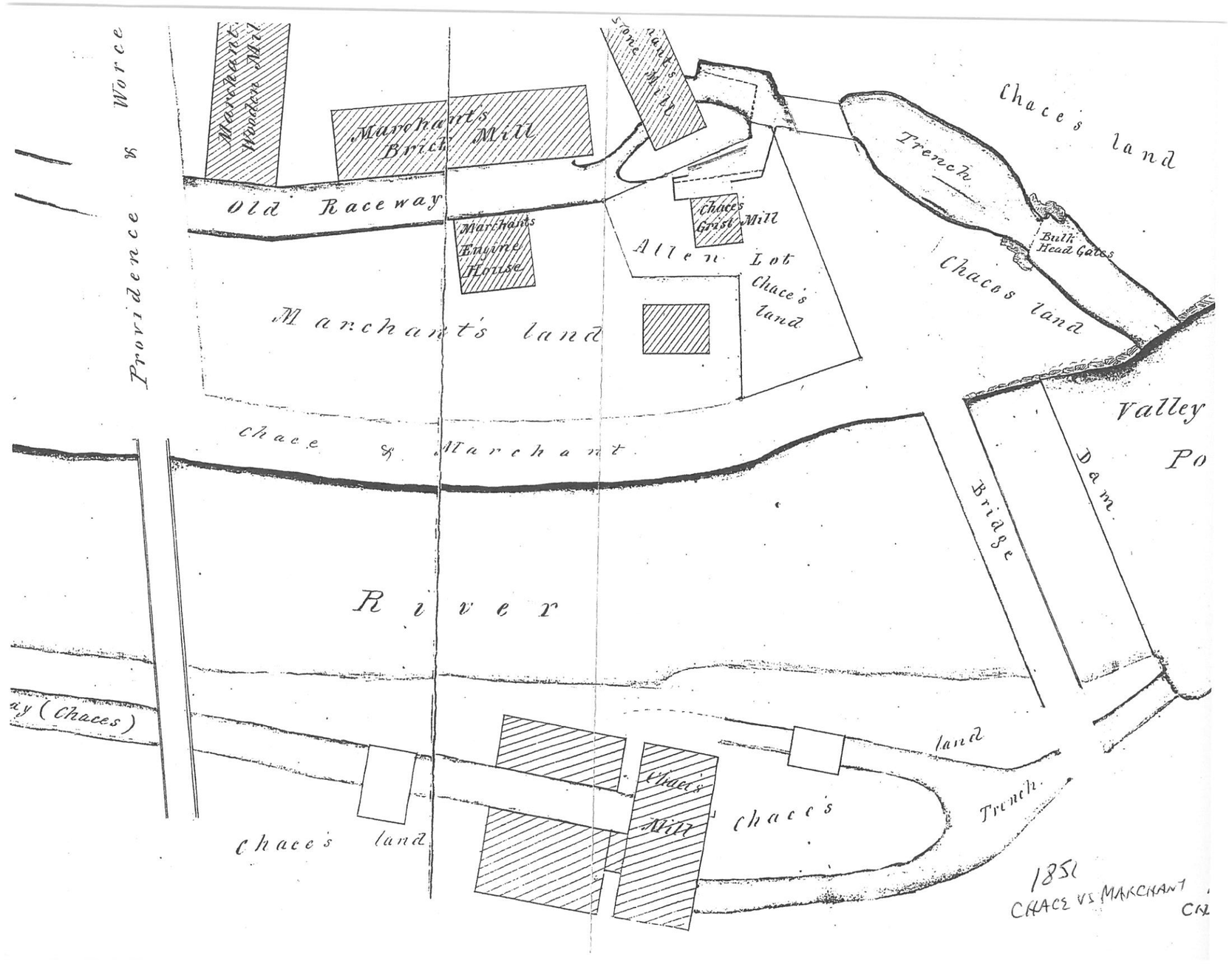


A: ALLEN MILL, stone, c1833 to 1934; Rhode Island Plush Co. Building, c1923-25
B: NORTHEAST ADDITION, brick with stone foundation, c1840-50 to 1934; Valley Falls Woolen Co. & Devontex Fabric, Inc., Building, c1922-32
C: PICKER HOUSE, stone, c1833-35 to 1934; Nedra Silk Co. Building, c1922-32
D: SOUTHEAST ADDITION, brick with stone foundation, c1868 to 1934; Valley Falls Woolen Co. Building c1922-32
E: WEST ADDITION, brick with stone foundation, c1868 to 1934; Valley Falls Woolen Co. Building, c1922-32
F: STOREHOUSE, brick and frame with stone foundation, c1870-1900 to 1934; Anchor Webbing Co. Building, c1920-32
G: BOILER HOUSE, brick with stone foundation, c1900, 1920 to 1934
H: DRAINER HOUSE, frame, c1912 to 1934
I: STOREHOUSE or OILHOUSE, frame with concrete foundation, c1915-20 to c1929; earlier, undated smaller versions
J: STOREHOUSE, brick with stone foundation, c1847-51 to 1934
K: CHEMICAL STOREHOUSE, frame with stone and concrete slab foundation, c1912 to 1934
L: GATEHOUSE, frame, one or more versions, c1853-1920 to c1934-38

FIGURE 4



BY MIKE RABER
FOR SIA


Providence & Worce
Merchant
Woolen Mill
Merchants
Brick Mill
Old Raceway
Stone Mill
Chace's land
Trench
Chaces
Grist Mill
Bulk Head Gates
Marchants
Engine
House
Allen Lot
Chace's
land
Chaces land
Merchant's land
Valley
Po
Chace & Marchant
Bridge
Dam
River
land
Trench
Chace's
Mill
chace's
land
1851
CHACE VS MARCHANT