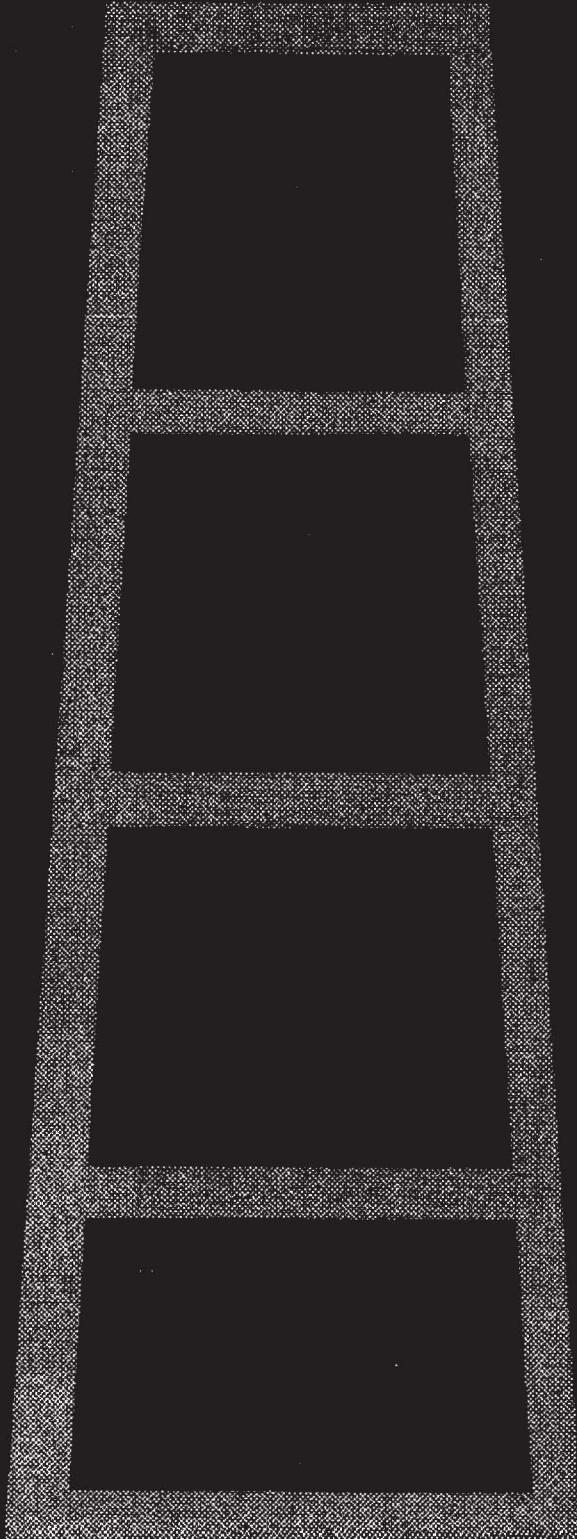
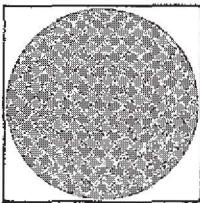


Master Plan  
Proposed  
**SAUGUS**  
**IRON**  
**WORKS**



D 2



MASTER PLAN

**PROPOSED SAUGUS IRON WORKS  
NATIONAL HISTORIC SITE • MASSACHUSETTS**



1968

U. S. DEPARTMENT OF THE INTERIOR  
National Park Service

**SAUGUS IRON WORKS  
MASTER PLAN**

**recommended**

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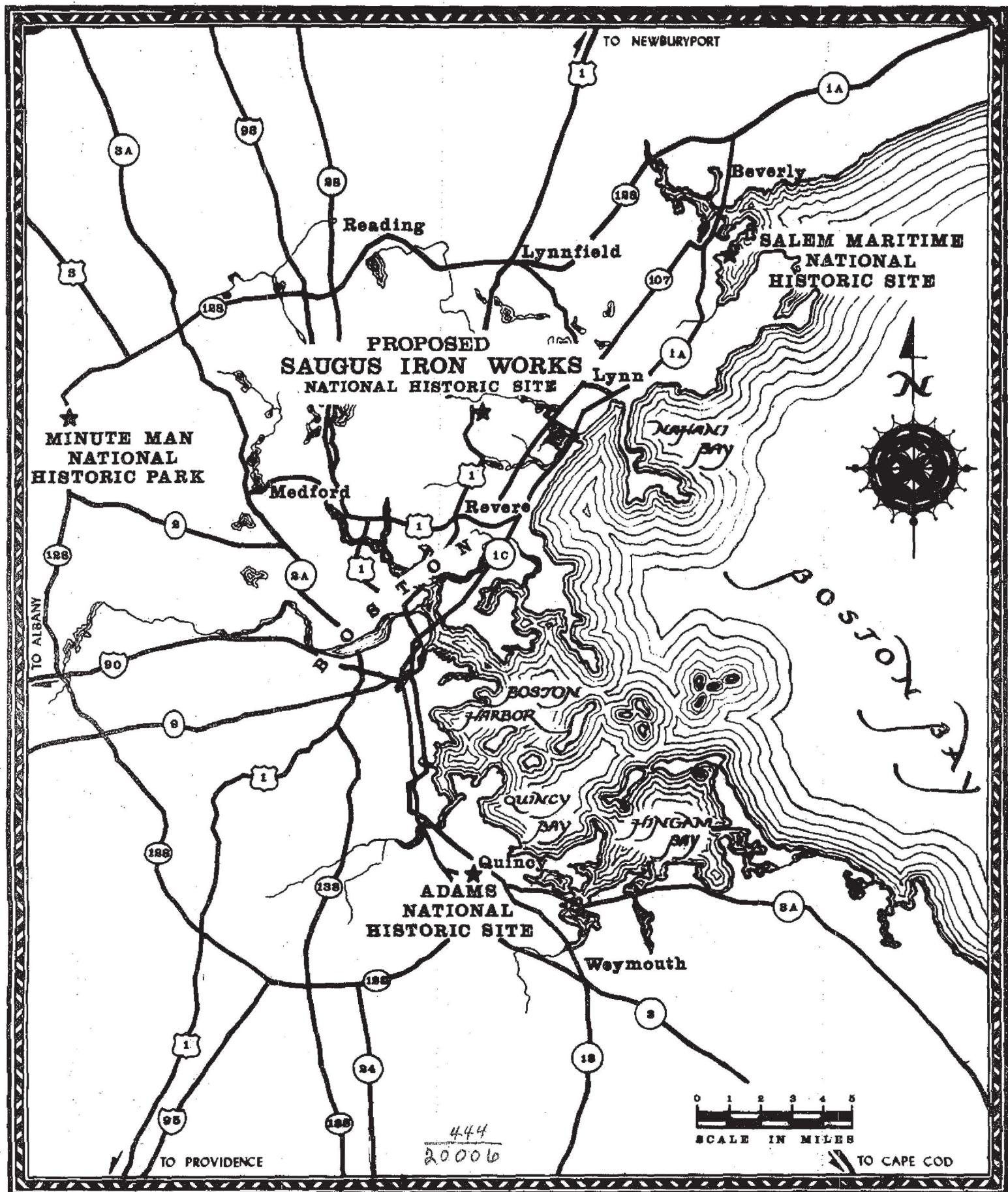
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ON MICROFILM

## INTRODUCTION

When the American Iron and Steel Institute, which had financed the restoration and assisted in the operation of Saugus Iron Works, announced in 1961 its withdrawal of financial support, several persons suggested that Saugus would be a suitable addition to the National Park System. In September 1963, as part of the National Survey of Historic Sites and Buildings, Saugus was evaluated under the theme of Commerce and Industry and an area investigation report was prepared. Later that fall the Secretary of the Interior's Advisory Board on National Parks, Historic Sites, Buildings and Monuments found the site eligible for Registered National Historic Landmark status and recommended that Saugus be added to the National Park System. On June 20, 1964, the plaque and certificate were formally presented at the site. A March 1967 planning report verified the suitability and feasibility of adding Saugus to the System.

As discussed at length elsewhere in this plan, the purpose of the proposed Saugus Iron Works National Historic Site is to preserve the reconstructed 17th-century buildings of America's first successful, sustained, and integrated ironworks and to communicate its history and significance to the public. This master plan is based largely on existing developments, which have been found to be generally suitable and well done. It proposes only minimum additional developments, mainly to facilitate use by visitors and maintenance activities: more visitor parking, a new contact station with restrooms, and a new maintenance building. Two other important recommendations are an expanded interpretive program for local school groups, and a water recirculation system to supply sufficient water to the waterwheels for more frequent demonstrations.

## OBJECTIVES

### 1. Primary Pattern of Use

Interpretation under the National Park Service will continue to center on the restored buildings and machinery. Only those additional facilities required for effective orientation and interpretation and efficient management and maintenance will be added to the National Historic Site.

### 2. Extended Use

The Park Service will offer a range of interpretive programs to local schools, thereby encouraging greater off-season use of Saugus.

### 3. Architectural Theme

New structures will be compatible with the restorations in scale and texture.

### 4. Maintenance of Facilities

The best available technical advice and assistance will be used to maintain the restored buildings and machinery in operating condition.

### 5. Scope of Collections

Artifacts already at the site will be retained. Only those objects related to the site or required for effective interpretation will be acquired in the future.

### 6. Interpretive Theme

Saugus was the first successful, sustained, and integrated American iron-works. The NPS will interpret the origins, development, and operation of this 17th-century ironworks and its significance as a prototype for today's iron and steel industry.

### 7. Demonstrations

Demonstrations of the machinery will be continued, and, to the extent practicable, conducted more often.

## SAUGUS IRON WORKS: A DESCRIPTION AND EVALUATION

Saugus is nationally significant because it was the first successful ironworks in the United States. The American iron and steel industry grew out of this and other pioneering ironworks.

The Atlantic coast of the American colonies, with its numerous deposits of bog iron and abundant forests from which to make charcoal, appeared to offer excellent opportunities to develop an iron industry. The first experiments were made in Virginia in 1608. In 1619 an iron foundry was established at Falling River in that colony, but this work was destroyed by Indians in 1622.

Saugus Iron Works, the first successful works in the colonies, was erected in 1647 by an English partnership called the Company of Undertakers for the Iron Works in New England. This company, formed through the initiative of John Winthrop, Jr., obtained a grant of special privileges from the Massachusetts General Court and employed one Richard Leader to direct operations.

Standing on the south bank of the Saugus River at tidewater, the works consisted of a blast furnace and casting house, a forge with two refineries and a chafer, a rolling and slitting mill (believed to be the first erected in the colonies), and such associated structures as a charcoal storage house, an ironmaster's residence, and workers' cottages. Iron ore came from swamps, some nearby and some as distant as Reading and Hingham, Mass. Charcoal came from the nearby forests. Gabbro, a dense, igneous rock used as flux, was hauled in from Nahant, Mass. A dam across the Saugus fed

water through a 1,600-foot-long canal to a reservoir above the works, from which wooden flumes delivered it to the seven or eight waterwheels that powered the bellows, forge hammers, and slitting mill. Saugus was more than a blast furnace producing pig iron and cast ware. It was a sustained, integrated operation. From its forge came bars of wrought iron to be made into tools and hardware, and such finished tools as hoes and shovels. Its slitting mill produced rod iron from which nails would be made.

By August 1648 the furnace was producing 8 tons of pig iron a week. From 1650-53, estimated output was 96 tons of bar (wrought) iron, 12 tons of rod iron, and 20 to 25 tons of cast and hollow ware. During the years 1658-63 production reached a level of more than 300 tons of bar iron, cast ware, and tools.

Yet even this production did not make the Saugus Iron Works a financial success. High costs, management problems, competition from imported iron, and seemingly endless lawsuits plagued the enterprise. Production ceased sometime after 1665.

By 1900 the remains of the Saugus Iron Works were for the most part buried under later development. A city street ran directly over the main waterwheel and part of the furnace stack. On one side of the street a slope overgrown with grass, shrubs, and trees covered the slag pile. Across the street stood the ironmaster's house, so altered as to be almost unrecognizable. Part of the old canal remained, though nearly filled with earth. All other evidence was gone.

In 1917 the noted antiquarian Wallace Nutting restored the ironmaster's house. A later attempt to move this structure to Henry Ford's Greenfield Village in Dearborn, Mich., aroused local opposition. The Parson Roby Chapter of the Daughters of the American Revolution bought the furnace site and marked it. In 1943 the First Iron Works Association, Inc., was formed, and the American Iron and Steel Institute agreed to support a

program of investigation and reconstruction of the old works. Archeological, architectural, and historical research began in 1948. This research provided data on which to base reconstruction of the major features of the Saugus Iron Works--the furnace, forge and slitting mill--as well as 6 tons of artifacts, including part of a waterwheel and the 500-pound head of the forge hammer.

Today the condition of the various buildings, furnishings, artifacts, facilities, and grounds are as follows:

1. The Ironmaster's House is one of New England's oldest homes. It was restored in 1917. Furnished with period pieces, including many valuable antiques, the house has long been a tourist attraction. Present condition is fair.
2. The Ironworks Museum consists of two units: a modern frame structure housing exhibits and artifacts recovered during archeology, and a connecting frame barn, moved to the site from Newburyport by Wallace Nutting during his restoration of the ironmaster's house. The latter may well be an 18th-century structure. It houses larger artifacts, including the forge hammerhead, the remains of a waterwheel, and a long section of an original wooden millrace. Both units are in fair condition.
3. The Blast Furnace was the key unit of the ironworks. Here charges of charcoal, bog iron ore, and rock ore were smelted to produce iron. The molten metal was poured directly into molds to make cast iron bars and utensils. This stone and timber structure is in good condition.
4. The Forge Building housed the fineries and the chafer, where cast iron bars or "pigs" were reheated and converted into wrought iron "merchant bars" under the blows of the giant hammer. This building, made of timber frame with four waterwheels, is in excellent condition.
5. The Rolling and Slitting Mill completed the processing at Saugus. Here wrought iron bars were reheated and rolled into flats. Some flats were slit into rods, which were chiefly used to make nails. The open building, made of frame with two waterwheels, is in excellent condition.

6. From the Warehouse and Wharf iron and iron products were shipped to Boston, other colonies along the coast, and overseas customers. The small frame warehouse and the wooden pier and bulkhead are all in fairly good condition.

All the reconstructed buildings and their machinery were built of untreated wood. The buildings are still in good to excellent condition, though streaks of dampness are visible here and there on roofs. Signs of rot are present, especially on those portions exposed to cyclical wetting and drying, and mildew coats parts of a few of the waterwheels. Machinery is in fair condition.

In addition to the historic buildings, there are four residences, a frame contact station, and a frame maintenance building within the proposed boundary. The contact station is in good condition but the maintenance building is in poor shape. Two residences stand on land to be acquired. These are modern structures and appear to be in excellent shape. Of the remaining residences, one is the much altered 18th-century Mansfield House, now unoccupied and in poor condition. The other, though it is under life lease, has been vacant for 3 years. It is in fair condition but is deteriorating.

All utilities are available from service lines in the immediate site area. No difficulty is anticipated in the event further service connections become necessary. Plans of the existing utilities are available at the offices of Perry, Shaw, Hepburn, Kehoe, and Dean of Boston (Architects).

## CURRENT USE

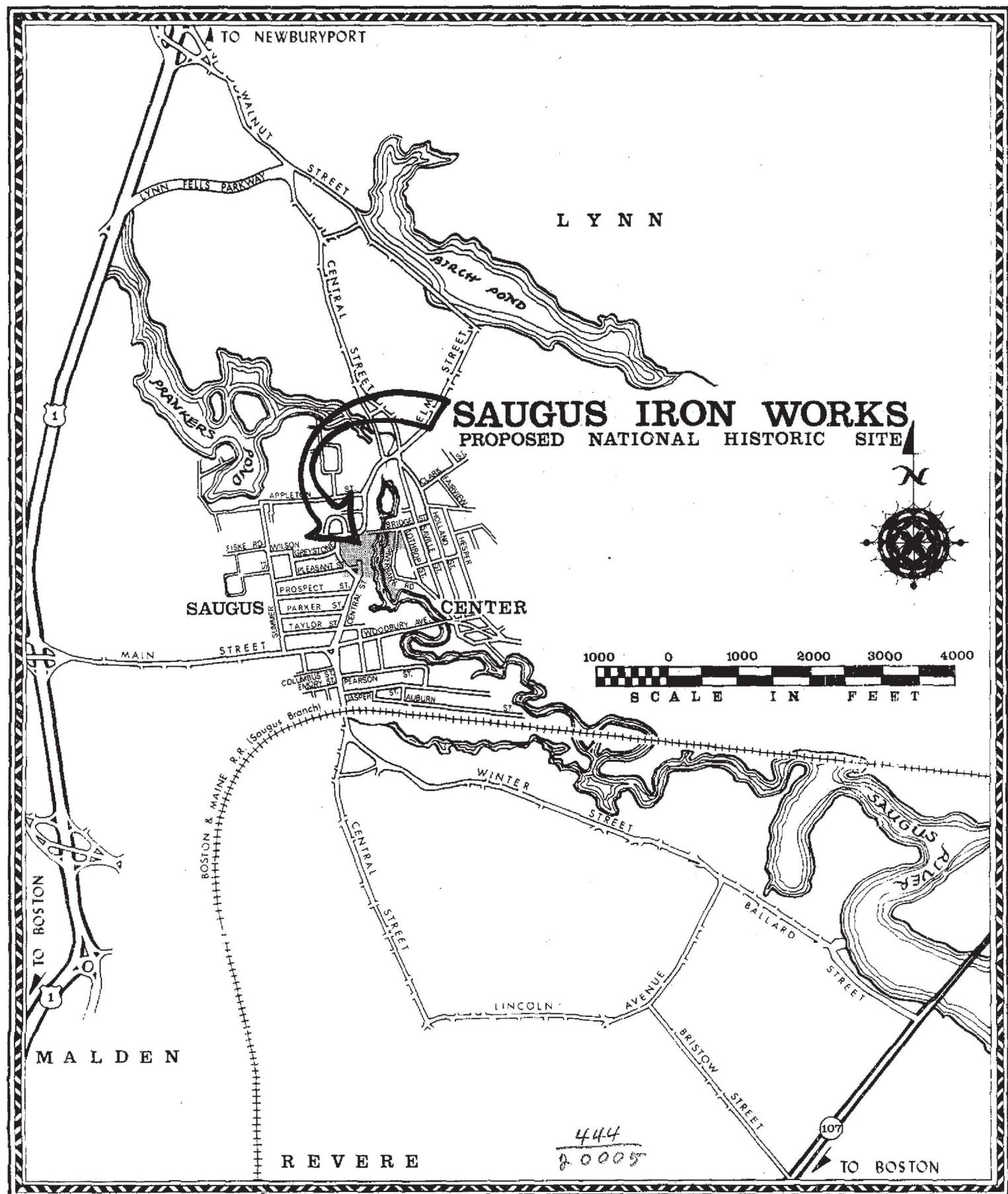
At present Saugus Iron Works is open from 9 a.m. to 4 p.m. daily, except Monday, from May 15 to October 15. Typical visitor patterns are described under the heading "Interpretation" in the plan section of this report.

Pertinent visitor statistics are as follows:

<u>Year</u>	<u>No.</u>
1958*	18,583
1959*	17,640
1960*	15,020
1961*	11,754
1962	9,506
1963	8,726
1964	9,738
1965	9,613
1966	12,237
1967	14,444

The most visits during a single month occurred in July 1966, when 2,706 visitors were counted. The busiest single day was August 10, 1966, when 199 visitors were counted. By 1971 it is estimated that annual visits should reach 45,000.

\*From 1958 to 1961 organized groups were admitted free. Since then, only members of the First Iron Works Association, Inc., and their families have been admitted free.



ON MICROFILM  
ACCESS AND CIRCULATION MAP

## A PLAN FOR THE NATIONAL HISTORIC SITE

### Optimum Carrying Capacity

The estimated optimum carrying capacity of the proposed National Historic Site is 1,600 visitors a day, based on a capacity of 200 visitors an hour over an 8-hour day.

### Interpretation

Today visitors enter through an entrance station, pay an admission fee, and (sometimes) purchase interpretive literature and souvenirs. They then usually go to the museum and see the exhibits and slide programs on iron making and the development of the steel industry. From the museum, visitors proceed to the buildings of the reconstructed works, where trained guides explain how Saugus operated.

This interpretive method works well, but the means for implementing it should be upgraded. The entrance station, dominated by the dilapidated Mansfield House, is small and cramped on busy days. It commands a panoramic view of the entire works, but has no devices to orient the visitor to the works or to introduce him to their significance. The museum building is an inadequately heated, frame structure, vulnerable to fire. The artifact displays are effective, but some of the exhibits and the cabinet slide programs show signs of age and do not fully prepare the visitor for the complex technological story told in the reconstructed works.

This plan recommends a new contact station near the existing entrance station, perhaps incorporating the existing structure. Here, the entrance fee will be collected, information on what to see and do provided, and

interpretive literature sold. Here, or perhaps on an adjacent terrace, the visitor will be oriented to the restoration before him and to the significance of Saugus Iron Works.

The plan also recommends that the museum provide more effective interpretation, through improved and modernized exhibits, audiovisual programs, a motion picture or other media as determined by the interpretive prospectus. The wiring of the museum building should be checked and replaced as necessary, and the installation of a sprinkler system considered.

Following his visit to the museum, the visitor will tour the restored works. Self-guide devices, supplemented by guided tours and fixed-point interpretation, will be provided. The guided tours are a must for effective communication of this complicated technological story. Actual demonstrations of the machinery at work are equally essential, and will be provided at more frequent intervals, if feasible.

This program will require:

1. Preparation of an interpretive prospectus.
2. Demolition of the much altered 18th-century Mansfield House.
3. Construction of a new visitor contact and orientation facility, modernization of the museum, and implementation of the interpretive prospectus.

#### Education Program

The site is open from May 15 to October 15. None of the reconstructed buildings are heated and the flumes which supply water to the wheels freeze, precluding demonstrations during freezing weather. The operating season could, however, be extended somewhat. A program should be worked out with regional school systems to incorporate field trips to Saugus as part of the curriculum. If this program is sufficiently popular, the operating season should then be extended.

## Boundary Adjustments

Two private residential properties stand at the northwest corner of the site (see Area "B" on Boundary Map). These properties should be acquired in accordance with the provisions set forth in the legislation for the proposal.

On the other hand, Area "C" is an isolated tract east of Riverbank Road which contains no historic features. It is not needed and should not be included with the property transferred to the Federal Government by the First Iron Works Association, Inc.

## Development and Operational Considerations

1. Parking. The present unpaved, 20-car parking area is inadequate. On weekends during the peak visitor use season, tour buses and private cars overflow the parking area and park on adjacent residential streets. An enlarged and paved visitor parking area is recommended. This new parking area should be located and designed in such a manner as to minimize its intrusion on the view of the ironworks as the visitor approaches the area from the south.

2. Removal of Intrusions. The two privately owned residences (Area "B" on the Boundary Map), standing on the highest point within the proposal, are an intrusion upon the historic scene. These properties should be acquired, the houses removed, and the sites landscaped. Because of its location and general appearance, the house in the vicinity of the entrance road does not mar the scene. After termination of the present life-tenancy lease, it should be used as a park residence, or one of the two houses in Area "B" moved to its site for this use. The Mansfield House, near the site proposed for the contact facility, should be analyzed structurally to determine whether it incorporates a 17th-century building. If it does not contain such a building, the house should be demolished.

3. Luncheon Area. The existing picnic area is substandard, but serves as a place where school groups can eat their lunches. It should be redeveloped for this use.

4. Administrative Facilities. An office, heated during the winter by a space heater, is provided in the Ironmaster's House. Since onsite administrative staff will be small, this space should be adequate. Locker space for uniformed employees should be provided, if possible, and a safer method of heating the office should be sought.

5. Maintenance. Maintenance storage and work space is now provided in a nonfire-resistant, inadequate frame shed. This shed should be replaced by an adequate facility, as shown on the General Development Plan.

Only pressure-treated wood should be used in repairing the reconstructed buildings and machinery. If needed, a small timber storage shed should be provided on the east side of the river.

6. Water Supply and Utilities. Water purchased from the town is used to power the wheels for demonstrations. These demonstrations occur twice each weekday and four times a day on weekends and holidays. Water consumption for this purpose totalled 1,579,000 cubic feet in 1967. The town charged for this water at the rate it pays the Metropolitan District Commission for it--\$180 per million cubic feet. At the rate usually charged by the town, this volume of water would have cost over \$6,000.

More frequent demonstrations are highly desirable to support the interpretive program. A constant flow of water through the machinery, by eliminating alternate wetting and drying, might also prolong the life of the wooden parts.

More frequent demonstrations or a constant flow of water or a combination of both will require far more water than is now used. Whether the town charges the National Park Service only the cost price or the usual rate, a recirculation system should be installed to reduce the amount of water used to a minimum.

Water for normal use and electricity and gas are supplied by the town or local utility companies. Sewage is disposed of by septic tank. This is an inadequate method, and we recommend a connection with the town's sewage system.

7. Tidal Basin. Over the years, the tidal basin around the wharf has filled up, so that the wharf over which iron products were shipped is surrounded by marshland and a luxuriant growth of cattail. Interpretive benefits do not entirely justify the cost of dredging this basin. The Park Service should, however, work with the town, the Corps of Engineers, and other interested groups to get the dredging done to make the site accessible to boaters. Before dredging is undertaken, the ecological values of the present marsh should be determined. Thus, any ecological values would be balanced against the historical values to be gained by dredging.

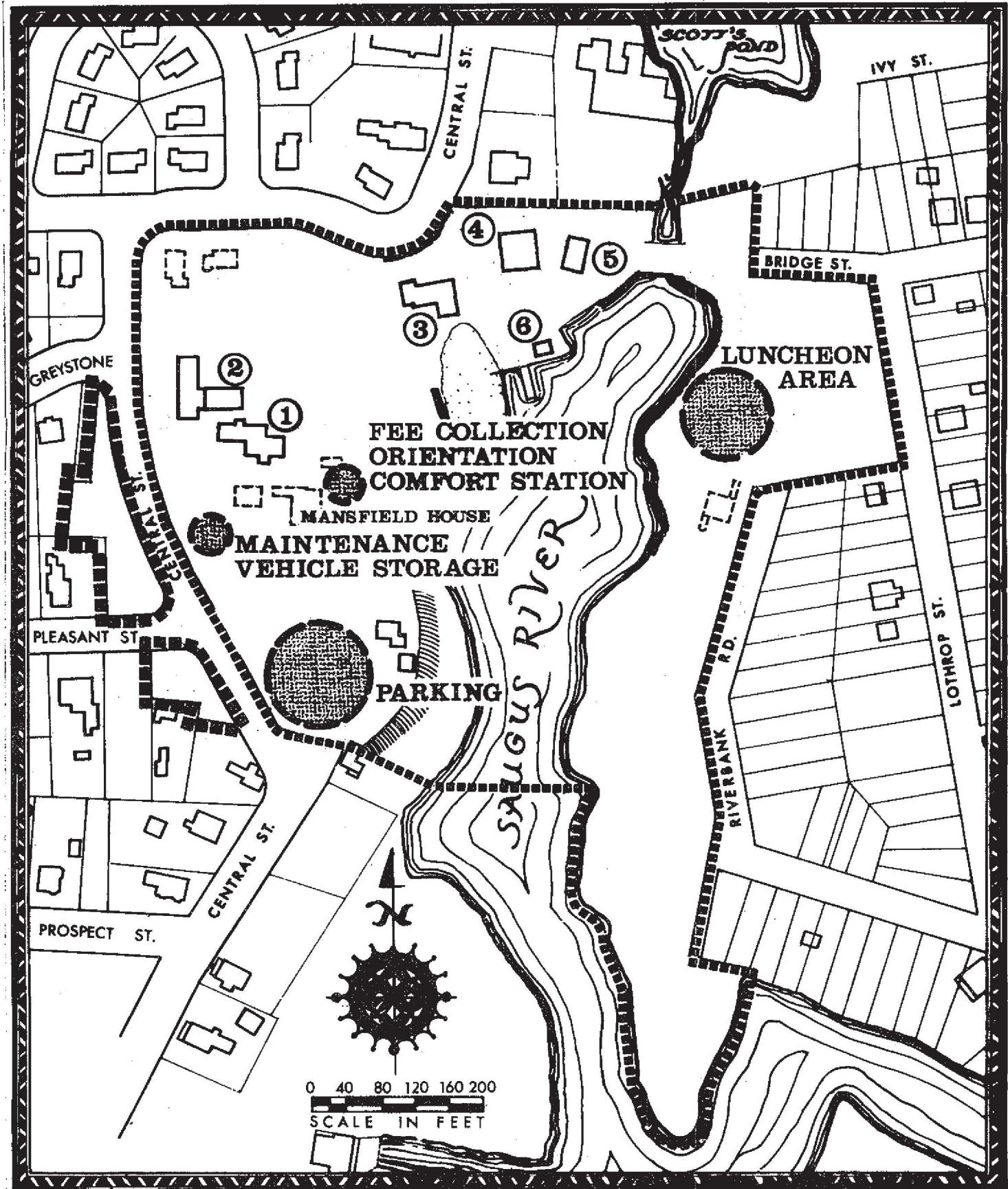
PRIORITY OF NEEDS

The House bill authorizes an appropriation of not to exceed \$400,000 for land acquisition and development. This ceiling will require careful programming and a high degree of cost consciousness to assure effective development.

Priority of needs is as follows:

- PHASE:
1. Transfer of First Iron Works Association lands \_\_\_\_\_
  2. Preparation of interpretive prospectus \_\_\_\_\_
  3. Removal of Mansfield House \_\_\_\_\_
  4. Construct contact facility and maintenance facility,  
and make utility connections \_\_\_\_\_
  5. Construct parking area \_\_\_\_\_
  6. Install signs and interpretive devices \_\_\_\_\_
  7. Study water supply problem \_\_\_\_\_
  8. Necessary repairs to historic buildings, reconstructions,  
and residence \_\_\_\_\_
  9. Implement recommendations on water supply \_\_\_\_\_
  10. Acquisition of Unit "B" \_\_\_\_\_
  11. Surface trails and improve grounds \_\_\_\_\_

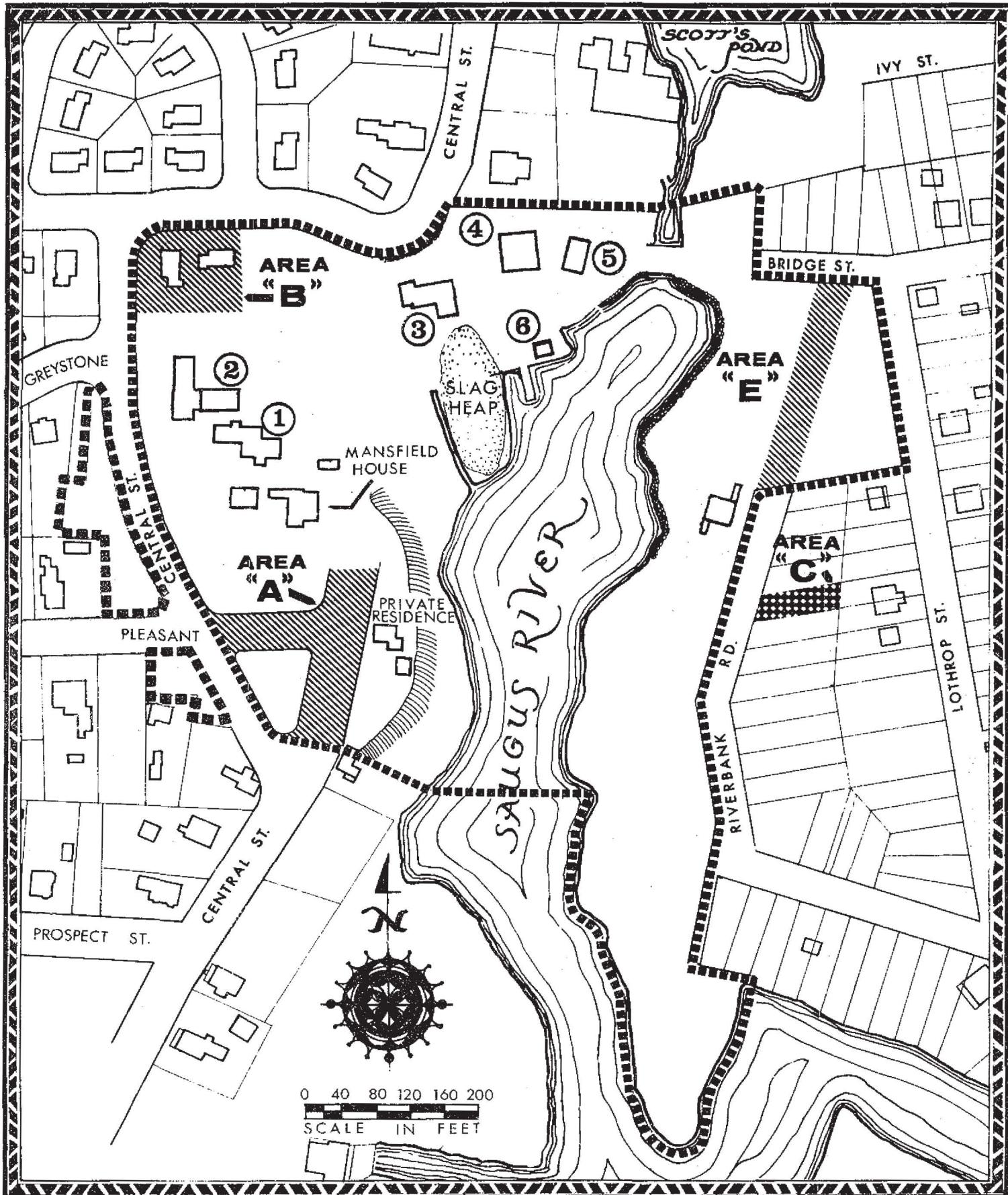
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**KEY**

- BUILDING TO BE RETAINED
- BUILDING TO BE REMOVED
- PROPOSED PARK BOUNDARY

**GENERAL  
DEVELOPMENT PLAN**



**BOUNDARY MAP**

## APPENDIX

### I REGIONAL CHARACTERISTICS AND ANALYSIS

#### Regional Analysis

The proposed Saugus Iron Works National Historic Site is one of many historic sites in the region. It is significant and unique from all other historic sites in the Boston area because it is an authentic reproduction of the 1650 Saugus Iron Works, the birthplace of America's iron and steel industry.

#### Access and Circulation

The site is located in the town of Saugus, Essex County, Mass. Saugus is approximately 10 miles north of downtown Boston, via U.S. 1, which passes to the west, and proposed Interstate 95, which passes to the east. City streets lead directly to the site from these highways. The site contains about 9 acres of land along the banks of the Saugus River; 6 acres situated on the west bank and 3 on the east bank. The perimeter of these lands is broken by streets and residences.

Public transportation from Boston is provided by the Eastern Massachusetts Bus Service, from Haymarket Square, and by the Boston and Maine Railroad, from North Station in Boston to Lynn. Bus service is available from Lynn to the center of Saugus. It is only a quarter-mile walk from the center of Saugus to the site.

#### Population Data

Saugus, an urban town in Essex County, had a population of 17,162 in 1950 and 20,666 in 1960, an increase of 20 percent in 10 years. It is located near the northeastern corner of urbanized Boston, which had a 1960 population of 2,413,236, an increase of 7.9 percent over the 1950 figure of 2,223,448. These increases have had little effect on the proposed site.

## Park and Recreation Facilities

No facilities are available in the urban town of Saugus. Within the surrounding region the following are available:

1. Harold Parker North Reading State Forest--Provides boating, tent sites, and swimming.
2. Ames-Nowell State Park--Fishing.
3. Lynn, Nantasket and Salisbury Beaches--Provide swimming and picnicking.

Historical features include:

1. Salem Maritime National Historic Site and the many other historic houses in Salem.
2. Minute Man National Historical Park in Concord, and the many historic sites and houses in Concord, Lexington and vicinity.
3. The many sites and structures in Boston.
4. Many other historic sites and structures within the region. Virtually every town in the region boasts one or more such sites or structures.

## Surrounding and Existing Use

Existing use of lands surrounding the site are shown on the Surrounding Land Use Map. With the exception of the industrial plant immediately north of the site, all the land immediately surrounding it is occupied by single-family residences. As one proceeds farther away, private residences, businesses, industry and light industry follow throughout Saugus. No specific land use trends or changes which would exert a strong influence on the park are noticeable.

Since the Saugus Iron Works is already developed and in use, creation of the national historic site will have little effect on regional land use.

## II FACTORS AFFECTING RESOURCES AND THEIR USE

### Legal Factors

Public Law 90-282 authorizes the establishment of Saugus Iron Works National Historic Site. This legislation authorizes the Secretary of the Interior to acquire lands within the boundary depicted on drawing NHS-SI 7100B by donation, or purchase with donated or appropriated funds. It is understood that the First Iron Works Association, Inc., will donate the ironworks property together with portions of streets within the boundary, transferred to the association by the County of Essex for the purpose of this donation. The remaining three-tenths of an acre will be purchased. Legislation authorizes a maximum appropriation of \$400,000 for land acquisition and development.

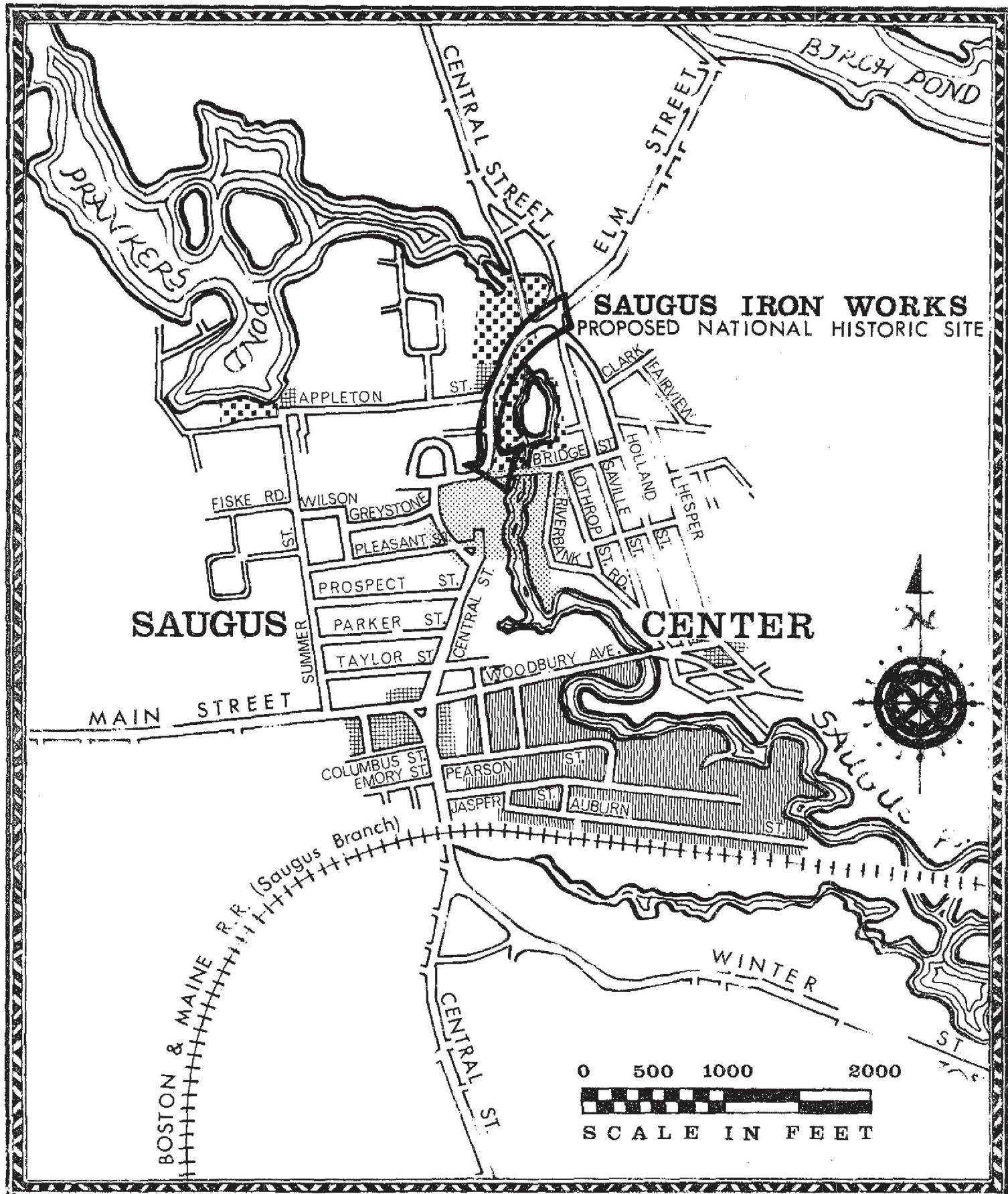
### Land Status

First Iron Works Association, Inc. - 8.6 acres

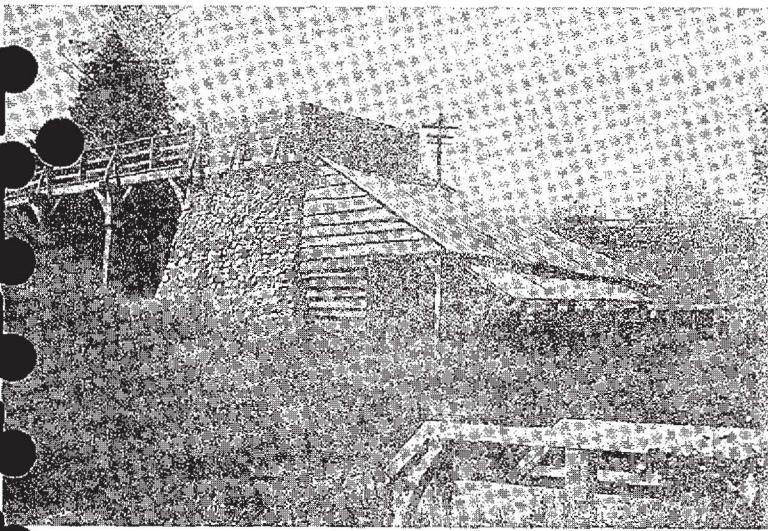
Private - .3 acre

### Climate

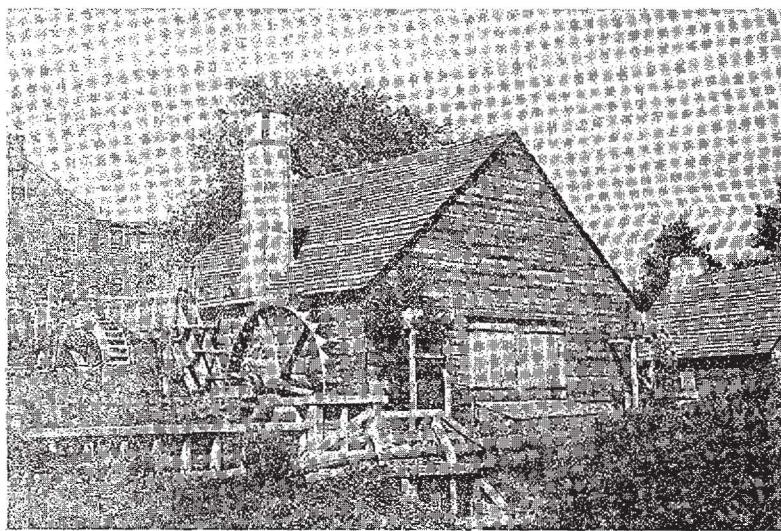
The climate of Saugus is typical of the New England coastal States. The summers are warm and humid, with a maximum temperature of 80° in July and a record high of 104°. Winters are cold and dry, with an average minimum temperature of 21.6° in January and a record low of minus 18°. Precipitation is evenly distributed throughout the year and totals 39 inches. Snowfall averages 42 inches a year. Average wind velocity is about 12 m.p.h. Water to operate the waterwheels is delivered through wooden flumes. Freezing conditions during the winter months preclude operation of the machinery.



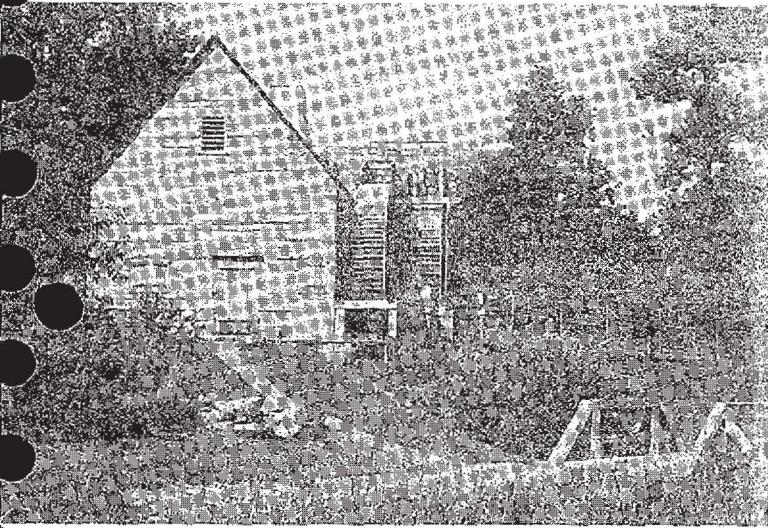
**SURROUNDING LAND USE MAP**



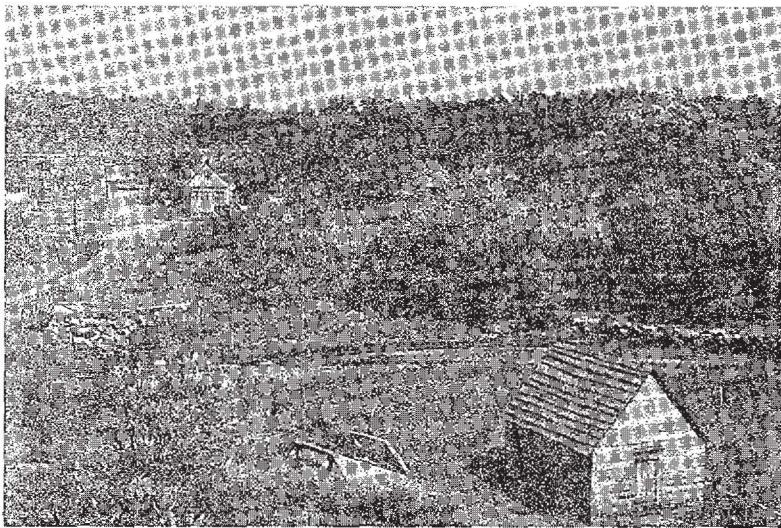
Charging bridge and furnace.



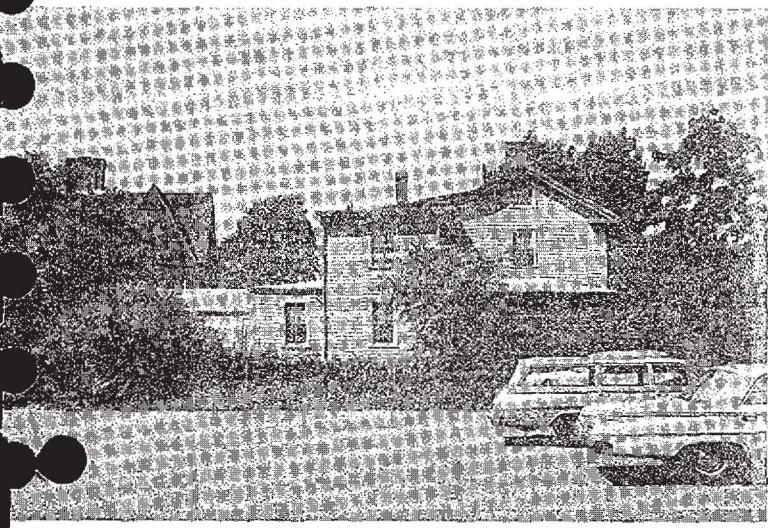
The forge.



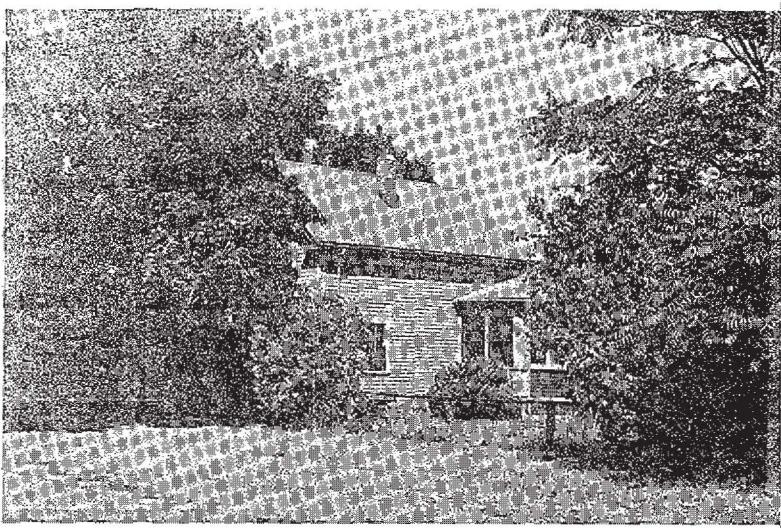
Slitting mills.



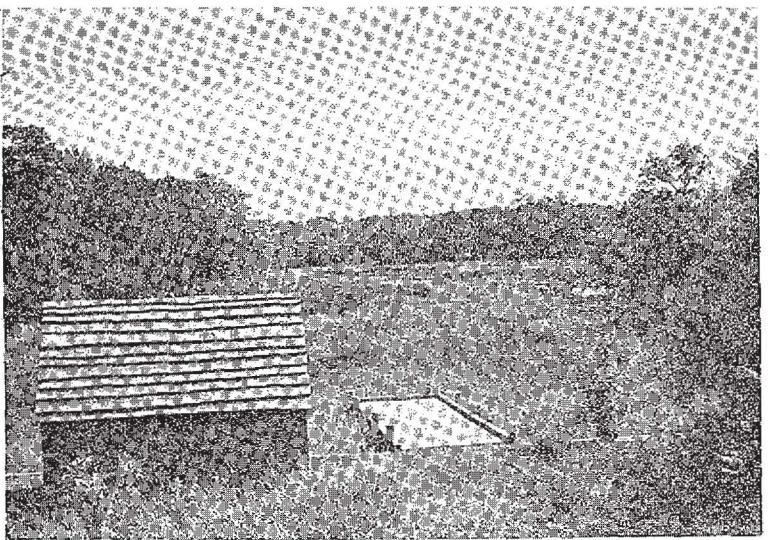
The neighborhood west of the parking area.



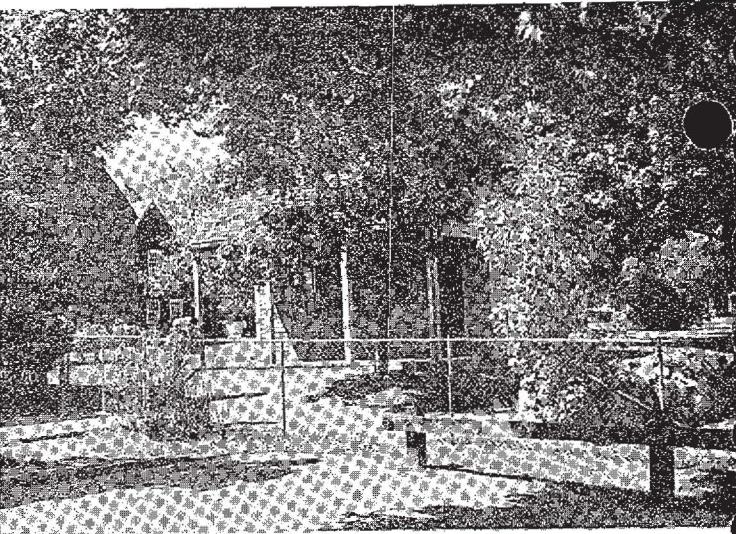
Private residence, owned by the Association.



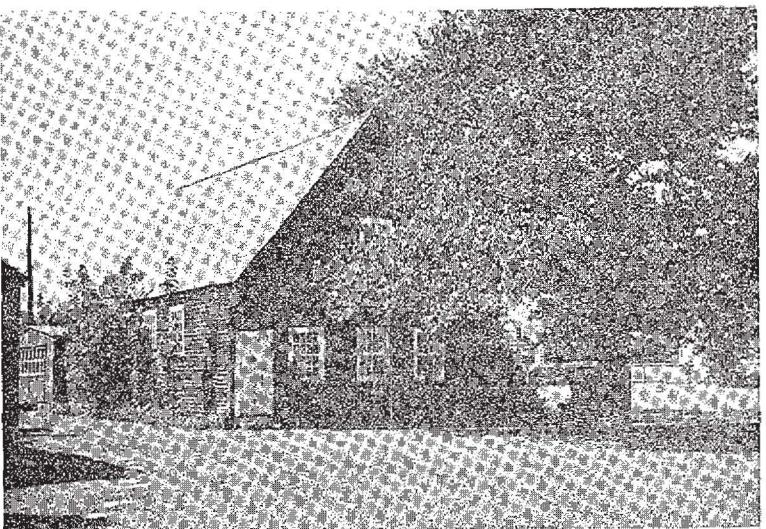
Private residence, owned by the Association.



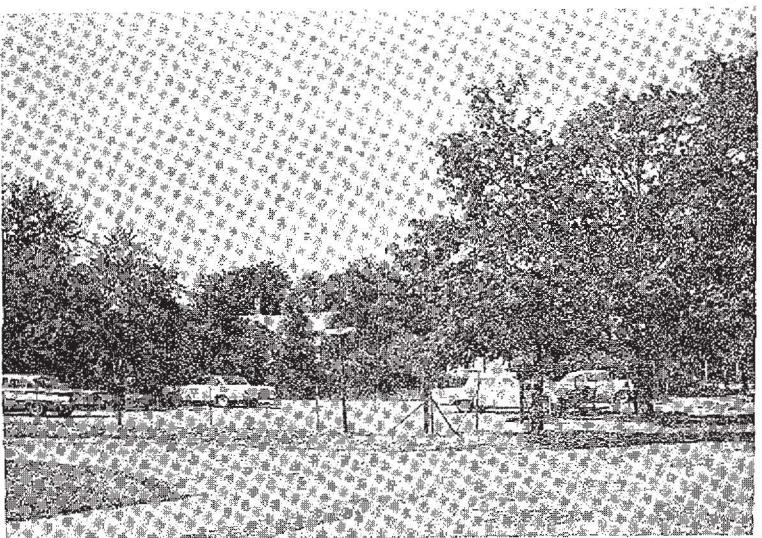
The warehouse and pier.



The museum adjacent to the ironmaster's house.



The entrance gate and contact station.



The 20-car parking lot.

