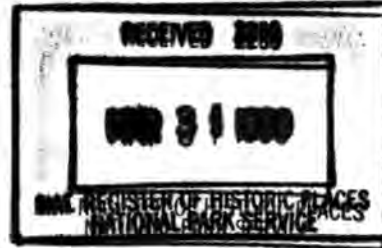


United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form



This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classifications, and areas of significance, enter only the categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer to complete all items.

1. Name of Property

historic name Watertown Arsenal Historic District

other names/site number Army Materials Technology Laboratory

2. Location

street and number Arsenal Street ☐ not for publication

city or town Watertown ☐ vicinity

state Massachusetts code MA county Middlesex code 025 zip 02172

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this _____ nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property _____ meets _____ does not meet the National Register criteria. I recommend that this property be considered significant _____ nationally _____ statewide _____ locally. (_____ See continuation sheet for additional comments.)

Raymond J. Fatz
Signature of certifying official/Title

Jan 28, 1999
Date

Raymond J. Fatz Deputy Assistant Secretary of the Army,
(Environment, Safety and Occupational Health)

In my opinion, the property X meets _____ does not meet the National Register criteria. (_____ See continuation sheet for additional comments)

Judith B. McDonough
Signature of certifying official/Title

10/9/97
Date

Judith B. McDonough, State Historic Preservation Officer
State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☒ entered in the National Register

☐ See continuation sheet

☐ determined eligible for the National Register

☐ See continuation

☐ determined not eligible for the National Register

☐ removed from the National Register

☐ other, (explain) _____

Signature of the Keeper

Patrick Andrews

Date of Action

5/12/99

5. Classification**Ownership of Property**

(Check as many boxes as apply)

- ☐ private
☐ public-local
☐ public-State
☒ public-Federal

Category of Property

(Check only one box)

- ☐ building(s)
☒ district
☐ site
☐ structure
☐ object

Number of Resources within Property

(Do not include previously listed resources in count)

Contributing	Non-Contributing	
15	7	building(s)
1	0	sites
3	4	structures
1	0	objects
20	11	Total

Name of related multiple property listing

(Enter "N/A" if property is not part of a multiple property listing)

N/A

Name of contributing resources previously listed in the National Register

1

6. Function or Use**Historic Functions**

DOMESTIC: single dwelling, multiple dwelling;
INDUSTRY: manufacturing facility; DEFENSE: military facility; LANDSCAPE: garden

Current Functions

DEFENSE: military facility; VACANT: NOT IN USE;
LANDSCAPE: garden

7. Description**Architectural Classification**

MID 19TH CENTURY; LATE VICTORIAN; OTHER:
Early 20th Century Industrial, No Style

Materials

foundation Stone; concrete

walls Brick

roof Slate; asphalt

other Wood trim; Concrete trim; Copper gutters and downspouts

Narrative Description

(Describe the historic and current condition of the property on one or more continuation sheets)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 1

Description

The Watertown Arsenal Historic District encompasses the U.S. Army site commonly referred to as the Army Materials Technology Laboratory (AMTL) and is located on the south side of Arsenal Street, overlooking North Beacon Street and the northern bank of the Charles River in Watertown, Massachusetts. The district is comprised of masonry buildings and an Olmsted-designed landscape on 45 acres of land surrounded by brick posts and wrought iron fencing. Constructed between the mid-nineteenth and mid-twentieth centuries, these industrial, residential, research laboratory, and support structures historically comprised slightly less than half of the Watertown Arsenal which was established in 1816 as an ordnance supply depot. The building types and arrangement reflect the Arsenal's industrial function, and their red brick construction and spare classically-inspired designs from different periods create a visual cohesiveness. Grass areas, trees, and parking lots surround the buildings. The Arsenal is roughly bounded by Arsenal Street (north), Watertown Mall and Arsenal Park (former Arsenal property; east), North Beacon Street (south), and Prospect Street (west). The Watertown Arsenal Historic District contains 15 contributing buildings, 3 contributing structures, one contributing site, and one contributing object, as well as 7 noncontributing buildings and 4 noncontributing structures. One individual building, the Commanding Officer's Quarters (Building 111) was individually listed in the National Register of Historic Places in 1976.

At one time, the Watertown Arsenal, including the historic district, occupied approximately 125 acres stretching one half mile along the north bank of the Charles River. Sawin's Brook, a spring-fed tributary of the river flowed along the northeastern edge of the old Watertown Arsenal (Dincauze 1973). The brook joins Sawin's Pond, east of the AMTL facility, and still drains into the Charles River. The AMTL parcel, once bordered to the south by a large marshland and mudflats zone associated with the Charles River, is currently bordered by North Beacon Street, a public roadway, and a recreational area to the river's edge. North Beacon Street has been enlarged and upgraded since its historic period use as an eighteenth-century cart path to the river and nineteenth-century military use as an Arsenal access road.

The roughly triangular shape historic district contains differentiated use zones (industrial production, research, administration, residential) linked by a shared road circulation system, architectural characteristics, and landscaping. The industrial complex which occupies the north and west portions of the district is characterized by a utilitarian appearance, while the Talcott Avenue entrance drive with the elaborate Italianate-style Commanding Officer's Quarters (Building 111) and the Colonial Revival-style Administration Building (Building 131) and residential Buildings 117 and 118 in the west and southeast portion of the district possess a sylvan setting designed by the Olmsted firm. The cluster of buildings referred to as the gun carriage manufacturing complex is a compact architecturally and functionally related group of four, long, brick, gable-roof industrial buildings that illustrate changes in industrial design in the second half of the nineteenth century: Building 37, West Timber Storehouse, 1851 et seq.; Building 313, Carriage and Machine Shop, 1862 et seq.; Building 43, Smith Shop, 1862 et seq.; and Building 312, Erecting Shop, 1894 et seq.. Research facilities constitute an architecturally diverse group of buildings located in the

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 2

west portion of the facility, including the laboratories in Building 39, Piano Factory/Research Laboratory, 1922 et seq.; Building 97, Locomotive Repair Shop/Laboratory, 1920 et seq.; Building 100, Horace Hardy Lester Reactor, 1960/62, demolished 1993; and Building 292, Bar Stock House/Laboratory, 1920 et seq.

Located to the east of, and not included within, the historic district is the former Watertown Arsenal area referred to as the Formerly Used Defense Site (FUDS) which the Army turned over to the Town of Watertown in 1968 (Glover 1991). FUDS encompasses approximately 55 acres of land that were originally part of the Watertown Arsenal. A total of 87 structures were erected at the FUDS by the Arsenal from 1816 until its closing in 1967. These structures included the 12 buildings that formed the original nineteenth-century depot facility of 1816. From the mid-nineteenth century until about the mid-1940s, 75 additional structures were erected at the site. These structures consisted of principal industrial and maintenance buildings, auxiliary industrial buildings and structures, storehouses and storage yards, office and laboratory buildings, and other features such as tennis courts and a swimming pool.

Since the Town of Watertown bought 55 acres of the Watertown Arsenal for \$5.5 million in August 1968, nearly all of the FUDS buildings were torn down. Approximately 10 structures were remodeled for use as a shopping center, housing, a retirement home, and a health care clinic. FUDS structures still standing as part of this mixed retail-housing complex consist of Building 32 (presently Ann & Hope), Building 331 (Marshalls Shopping Center), Building 51 (Farmer's Market), Building 121 (Civic Use), Buildings 71, 72, 73, and 212 (Housing Complex), and Building 215 (Offices). The northeast area continues to be used by the General Services Administration (GSA). All other structures and ground features such as guard houses, generators and other utilities, rail tracks, etc. were removed during the rehabilitation of the property.

Inventory

The following is an inventory of the buildings included in the historic district. Contributing buildings are listed first, in order of building number, followed by noncontributing buildings. Buildings demolished in the last few years are discussed at the end. Contributing buildings are those that are major or support buildings integral to the activities of the Arsenal during its period of significance from 1816 to 1947. It should be noted, however, that some buildings possess modern additions that are not critical components of their historical function or architectural character [e.g., center wing of Building 313, lean-to additions to Buildings 312 and 37 (1969)]. Please also refer to the District Data Sheet, and for more detailed descriptions of principal buildings and the Olmsted Landscape, consult the Historic American Buildings Survey/Historic American Engineering Record documentation for the HABS/HAER numbered buildings (Adams 1992; Adams and Cavanaugh 1995).

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 3

*Contributing***37 West Timber Storehouse (Iron and Brass Foundry; Maintenance Shop), Talcott Avenue, 1851; (1892; 1893; 1918)(HAER No. MA-20-D)**

Building 37, also known as the West Timber Storehouse, Foundry, and Maintenance Shop, is the southeasternmost building of the Watertown Arsenal gun carriage manufacturing complex. Paved roads surround the building on four sides. As it stands today, Building 37 is a red brick, high-bay, rectangular building (302 feet (ft) by 55 ft), with its main roof ridge line running east-west, its primary elevation oriented east facing Talcott Avenue, and additions along the south and north elevations. Due to its history of multiple uses, the building has undergone numerous exterior and interior changes. Its massing, regular fenestration arrangement, masonry materials, and its physical relationship to associated buildings, however, remain largely intact.

As originally constructed in 1851, Building 37 was a two-story, brick structure, measuring 189 ft 8 inch (14 bays) long by 55 ft (3 bays) wide, with a timber truss, slate gable roof. An arcaded first story formed by tall round-arch windows with fanlights and second-story segmental-arch windows provided ventilation. The east and west ends were originally identical with a three-bay arrangement of round-arch openings, consisting of a central large doorway, windows to either side, and three windows in the upper level. The roof was most likely a timber truss sheathed in slate. An identical building, the East Timber Storehouse of 1847, now demolished, stood to the east (outside of the district).

Building 37 today consists of the original east section, constructed in 1851, and a matching 119-ft west extension erected in 1896. Both rest on granite foundations and have a brick header dentil course with returns on the east and west gable ends. The east gable end facade contains a sandstone stringcourse on the first story and a sandstone date stone inscribed "1851," in the gable peak. The gable roof of the main building is riveted steel Fink trusses with a nearly full length clerestory monitor, sheathed in corrugated cement asbestos (installed ca. 1919). The present roof truss system most likely replaced the original timber trusses in 1896 and may have been covered with reused slate shingles. A one-story, one-bay-deep, shed-roof, lean-to addition on a granite foundation, added in 1909 as a pattern storage area, extends the full length of the north elevation. Its design repeats the arcaded wall treatment, and at the east end, the brick dentil course of the main building. A series of four additions cover the full length of the south elevation. East-to-west and chronologically they are: a one-story, shed-roof lean-to (foundry furnace, 1892) with segmental-arch openings (now bricked in); two, two-story gabled pavilions with dentil cornices and Fink truss roofs sheathed in galvanized metal (furnace and materials storage, 1894 and 1911) with segmental-arch openings (now bricked in); and an 11-bay, one-story, shed-roof garage (maintenance garage, 1969) with flat-top garage bay openings.

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 4

Doors and windows throughout the building and in all but the most recent addition were altered in 1968. At that time, arched openings were either fully or partially bricked up; original wood doors and window sash were removed, and new fixed or projecting steel windows with new concrete sills; and new rolling steel, hollow metal, or plate glass doors were installed. The original sills were left in place below the new second story windows. The east elevation retains its arched door opening, now fitted with a rolling steel shutter door. On the west end, the doorway has been heightened and rebuilt with a flat top and a massive steel-and-concrete lintel.

The interior of Building 37 reflects modifications associated with changes in use. The main block consists of two large, unfinished open spaces separated by a concrete block partition wall constructed in 1968 between the original 1851 section and the 1896 extension. The steel girder crane rails along the north and south walls and two 10-ton Whiting cranes with cabs, which were installed in 1918 in the west and east sections for use in equipment maintenance during World War I, remain in place. The north lean-to contains offices, the southeast lean-to was used for storage; the southwest lean-to is a modern garage.

Several chimneys and three additions to the south elevation were removed in 1968. They include Building 37 South (furnace, circa 1911 to 1918) a two-story, gable-roof, brick-and-corrugated metal addition with a clerestory roof located along the west section of the south side; the site is now occupied by the 1969 garage addition. Attached to Building 37 South was Building 292 (motor pool vehicle storage and maintenance, circa 1917), a one-story, shed-roof, brick garage sited parallel to Building 37. An associated motor pool structure, Building 291, sat perpendicular to the southwest corner of Building 292.

39 [Piano Factory; Mattress Factory] Research Laboratory, Wooley Avenue, 1922; purchased 1941 (1953; 1955) (HAER No. MA-20-U)

Building 39, the Laboratory, is located at the southwest corner of AMTL. The building rises five stories from a concrete foundation to a flat, tar and gravel roof with a shallow parapet. The original structure was the rectangular southern portion of the building. It is 11 by 4 bays (229 ft by 83 ft), with two service towers on the north (rear) elevation. The reinforced concrete and brick veneer, pier and spandrel walls are divided into 20-ft bays, with the spandrels recessed slightly behind the piers. The bays contain multi-light metal casement windows with concrete slip sills. Cast concrete weatherings crown the piers at the top of the fourth story, and the entire fifth floor is slightly recessed. A cast concrete stringcourse, flush with the wall, is located just below the roof line. The main entry occupies two bays (bays 7 and 8 from the southwest corner) on the south facade, and consists of a concrete canopy and plate glass doors. In 1955, an extensive two-story brick addition (88 ft by 203 ft) was constructed along all but the end bays of the north elevation, nearly doubling the size of the first two floors. The rear (north) is excavated into a slope, and only the second floor is visible on Wooley Avenue. The addition contains a freight entrance corridor on the west side leading to an open central court. The distinction between the original building and addition is readily apparent from

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 5

the exterior. In 1971, the exterior brickwork of the main block was repointed, steam cleaned, and silicone sealed.

Because the building was built for industrial purposes, the original interior plan of the main block consisted mostly of open space. The reinforced concrete structural systems consist of 20-ft typical bays of column caps with drop panels supporting slab floors. The column diameter decreases with each floor and reduced bearing load. Currently, each floor is divided into a maze of laboratory and office space, created beginning in World War II and continuing throughout the history of building use. The typical arrangement on each floor has offices along the south and north end walls and laboratories located on the windowless interior.

43 Forge, Smith Shop, Talcott Avenue, 1862; (1917; 1918; 1968) (HAER No. MA-20-C)

Building 43, also known as the Forge or Smith Shop, and part of the gun carriage manufacturing complex, is sited at the northeast corner of the present-day AMTL property just south of the facility perimeter fence west of the main entrance gate on Arsenal Street. Building 43 is a two-story, brick, gable-roof industrial building, 300 ft (24 bays) by 56 ft (3 bays) in size, exclusive of two twentieth-century additions on the north side. It was originally constructed in 1862 as a one-story forge with its slate gable roof running parallel to Building 313, the Machine Shop and Powerhouse, also built in 1862, directly to the south. The current appearance of Building 43 is the result of changes made in the early twentieth century, principally the addition of a second story and two, one-story north additions, to accommodate additional equipment and functions. The first level of the building remains largely as originally constructed, with the exception of modifications to windows and doors and their openings, as well as removal and reuse of the original cornice.

Then, as now, the walls rose from a granite ashlar foundation and finished granite water table, and the red brick bearing walls were laid in 5/1 common bond with recessed panels between shoulder arched brick piers.

In 1917, a 21-bay second story and a full-length clerestory monitor were added to all but the eastern three bays of the building. The expansion was designed to accommodate a 27 ft 6 inch-high, 10-ton, Shaw rail crane for maneuvering heavier equipment and metal products and to improve the building's ventilation. Its red brick pier and spandrel construction repeats the fenestration arrangement of the first floor, but has 20-light steel window sash set in deep openings with cast-concrete sills and brick lintels. The brownstone and brick dentil cornice was reused from the original first floor cornice. Brick parapet end walls created by the clerestory monitor intersect the gable peak at either end of the building, and a double brick stringcourse runs between the first and second stories. The roof is a riveted steel Fink truss, spaced 12 ft 4 inches, and was initially sheathed in slate that was probably reused from the original roof. A six-bay, one-story, flat-roof, brick addition on a granite foundation was made on the north side at this time. It provided space for billet and forging furnaces, a tool room, office space, and toilets. These changes were designed by the Boston architectural and engineering firm of Monks & Johnson.

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 6

In 1919, the second story and monitor were extended over the remaining three eastern bays. The chimney was removed, and a second, one-story, brick, flat-roof, 13-bay addition on a concrete foundation was made to the north side. In 1935, the 1917 slate roof sheathing was removed and replaced with corrugated cement asbestos.

The final series of major alterations to Building 43 occurred in 1968. Original first story sash and brownstone sills were removed and replaced with modern steel sash and concrete sills; the second story windows were not replaced. In the late 1980s, the main roof was resheathed in standing seam extruded aluminum and the monitor in rubber membrane. The clerestory monitor steel sash was replaced with translucent fiberglass panel windows. The only arched first floor opening retaining an original granite surround and fanlight is located in the north bay of the east end. The three granite linteled doorways on the south side are also extant, but somewhat altered.

The interior of Building 43 is a high-bay single space, with smaller rooms in the north additions. Equipment in Building 43 has been replaced numerous times throughout its history. Among the equipment most recently in use in the building were a 2,000-ton press, an annealing oven, and a small rolling mill.

60 Power House/Boiler Room, Kingsbury Avenue, 1913-1914; (1915; 1917) (HAER No. MA-20-V)

The Power and Boiler House, Building 60 sits at the southern end of Kingsbury Avenue. The roughly square footprint with a semi-attached chimney at the west end is the result of three phases of construction. The one-story building measures 126 ft (with an eight-bay front on the north) by 97 ft. The building rests on a reinforced concrete foundation and has red brick pilaster construction of Flemish bond curtain walls with glazed headers, a stepped cornice, and a cross-gable, standing seam metal roof. The chimney is a semi-attached cylindrical, brick stack, 150 ft tall with a nine ft diameter, hexagonal, brick base. Two primary street level entrances with metal doors are located on the north elevation and one in the center of the east end gable section and in the center bay of the gable flank wing. A third entrance is located below grade on the south elevation in a large areaway. An original entrance in the center bay of the east end gable section on the south elevation has been filled in with brick and covered with high voltage electrical boxes. Each of the other recessed bays were once filled by large multi-pane steel sash windows. All were removed in 1978, and four-light metal commercial sash windows were installed in bricked down openings with infill brick matching the original construction.

The oldest part of Building 60, erected in 1913, is the center and eastern thirds, originally constructed as a 83 ft 9 inch by 63 ft cross-gable building with a three-bay (north and south) by four-bay (east) block with a north-south oriented roof ridge, and a three-bay (north and south) by five-bay (west) wing with a east-west oriented roof ridge. The 150 ft-tall chimney stood 15 ft from the west wall. Coal was supplied

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 7

from the southwest corner of the building from an exterior Coal Pocket (Structure 295) demolished in 1995. A one-story office addition was attached to the south elevation at the west corner. The original design included decorative architectural details such as glazed header bricks and bronze medallions in the gable peaks (not extant). The building originally housed Corliss steam engines for electrical power generation in the upper level (east half) and three 180 HP high pressure, coal-fired, water tube Keeler boilers in the lower level (west half). In 1915, the west section was extended 41 ft (two bays) to accommodate two additional Keeler boilers, enclosing the chimney within the boiler room. A 1917 extension of the boiler room, 9 ft 9 inches by 5 ft, designed by Monks & Johnson was added to the south elevation and six Heine 400 HP boilers were installed. Stone & Webster designed the fan room layout for these modifications. In 1919, electrical power generation ceased, and the plant was used to provide steam heat exclusively. The existing boilers were converted to oil fuel in 1935, although coal continued to be used. A second, 150 ft-tall brick chimney was added to the west end exterior some time before 1944, and in 1947, the two gable peaks in the west section were joined by a new roof truss. The original truss work is visible on the interior of the boiler room, and the earlier roof configuration can be read in the brick work of the west end elevation.

In 1952-1953, all the old Heine boilers, the original chimney, and other equipment was removed and replaced by three Erie City Iron Works boilers built in place in the west half of the boiler room. In 1978, a smaller #4 Cleaver Brooks boiler was added for light loads. A toilet room and office were added to the center of the boiler room at that time. The equipment continued to provide steam heat and compressed air, delivered by tunnels to facility buildings until recently. Building 60 no longer operates and equipment has been removed, with the exception of the boiler casings.

**97 Locomotive Repair Shop (Reactor Research Laboratory), Wooley Avenue, 1920; (1959)
(HAER No. MA-20-S)**

Building 97, originally the Locomotive Repair House, is flanked by Building 292 (west), and the site of Building 100 - the Lester Nuclear Reactor - (east) (demolished). It retains much of its original architectural appearance despite extensive interior modifications during its conversion to a reactor Research Laboratory in 1959. The rectangular building, 60 ft by 180 ft, sits on a reinforced concrete foundation, and rises one story to a gable roof with a high clerestory monitor which stops two bays short of the south end. The roof is likely original and is a riveted steel Fink truss covered in corrugated cement asbestos. The load bearing masonry walls consist of red brick pilasters which separate wide, full-story, 20-ft bays. The three-bay north (front) facade originally had double hinged wooden doors in the central bay, now accessed through a roll-up steel shutter door. The bays along the entire length of the east and west elevations originally contained multi-light steel windows, as did the south elevation, but many are now bricked over. Several windows in the central bays on the east side have been modified with air vents, and the windows along the south (rear) elevation and two southern bays along the west elevation have their bottom halves bricked over. Ornamentation is minimal on this utilitarian building, consisting mainly of corbeled brick header and

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 8

stretcher courses in all bays, and triangular pilaster and corbeled brick cornice detail at the north and south gable ends.

The interior was constructed as a single large open space with interior pits and railroad tracks. Short sections of track are visible in front of the central bay, but no longer enter the building, which has been divided into a series of small laboratories accessed from a long central hallway. Single story passageways connected this laboratory with Building 292 on the west and Building 100, the Lester Nuclear Reactor (demolished 1993), on the east. The main entrance to Building 97 is through the passageway from Building 292. Building 97 served as the main entrance to the reactor.

111 Commanding Officer's Quarters, Talcott Avenue, 1865, (Individually NR listed 1976; HABS No. MA-1009-F)

Building 111, the Commanding Officer's Quarters at the Watertown Arsenal is a highlight among the Arsenal's buildings and occupies a prominent site along the west side of the main drive, Talcott Avenue. Erected in 1865, the elaborate Italianate-style dwelling remains virtually unaltered after nearly 130 years of occupancy by a long line of commanding officers. Its landscape setting was designed in part by the Olmsted Brothers landscape architects in 1919 (described below).

The two-story building rises from a granite rubble foundation with a smooth granite block sill to red brick bearing walls in stretcher bond, trimmed in brownstone. The T-plan residence is composed of a rectangular 62 ft (five-bay east front) by 46 ft-8 inch (three-bay sides) main block under a slate hip roof with a wooden balustrade, and a perpendicular rear (west) wing measuring 47 ft-4 inch (four-bay) by 29 ft-6 inch (three-bay) capped by a slate gable roof. The profile of the large structure is enlivened by one-by-one-bay, two story, projecting pavilions at the center of the south and east elevations and two one-story, square bays on the north elevation of the main block; richly ornamented one-story porches on the east facade and south side; and four massive, brick paneled chimneys. The wall treatments include brick paneled corner pilasters with corbeled caps at the building and pavilion corners, a brownstone stringcourse between the first and second stories on the north and south sides of the main block, and a heavy brownstone modillion cornice with end returns. The windows, with few exceptions, are six-over-six, double-hung wood sash set within brownstone lug sills and brownstone molded and bracketed cornices. The rear ell contains segmental-arch dormers with console corner brackets and paired one-over-one, double-hung wood sash.

The facade faces east and is composed of a two-story, central projecting bay framed by paneled corner pilasters and a gable end with returns. The main entrance is set in the pavilion and is comprised of a paneled brownstone door surround with floral motif corner blocks, paired wood paneled doors with narrow, beveled glass lights, and a single-light transom. The entrance is sheltered under an open porch supported on two delicate cast-iron Corinthian columns and two wall brackets with ornate, lace-like iron work in the

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 9

spandrels. The flat roof is trimmed with modillion-like brackets and topped with a balustrade. The current balustrade is a replacement that replicates the original. The podium is of finished granite steps and low buttresses.

At the second story, above the porch are paired eight-light french doors with a brownstone segmental-arch lintel and brackets. A trefoil arch lunette with a heavily molded brownstone surround and bracketed sill sits in the gable peak. At the first floor pavilion north and south sides, there are narrow french doors with paneling in the lower sections. Typical windows are set in the side bays at the second story. Two symmetrically placed chimneys in the front roof slope and the roof crest balustrade finish the entrance frontispiece.

The two bays to either side of the pavilion contain two sets of french doors on the first floor and two typical windows on the second floor. An ornate, hip-roof porch with single and paired Corinthian columns and lace-like infill extends across the east front on either side of the pavilion and wraps the southeast corner to cover one bay on the south side. The underside of the porch roof is finished in beaded board with a diminutive modillion-like bracketed edge molding. The porch base is finished granite block, and the floor surface is red and buff concrete tile in a checkerboard pattern, added after 1938.

The south elevation of the main block contains a gabled central bay with an oculus in the gable peak and a secondary entrance door leading to the south porch. The four-bay south elevation of the rear wing contains a regular arrangement of windows and one roof dormer. The three-bay north elevation of the main block has two square one-story, projecting bays with brick corner pilasters and a modillion cornice. A one-car garage was added to the basement in 1938 with concrete retaining walls and ramp giving access under the western of the two bays. The four-bay north elevation of the rear wing contains a regular arrangement of typical windows and a side entrance in the easternmost bay. The west elevation of the rear wing contains an enclosed rear entrance porch with paneled doors on the north and south. The south steps have been removed, and the north steps have been rebuilt.

The interior of the Commanding Officer's Quarters is arranged on a central hall plan and is richly ornamented with heavy moldings, polychromatic hardwood floors, ceiling medallions, built-in cabinetry, and marble fireplaces. The rear service ell has a sidehall plan and is more simply finished. All windows and french doors on the first and second floors of the main block have hinged pocket shutters with louvered upper central sections and silvered knobs. The eight marble mantels in the main block share basic proportions and round-arch firebox openings, yet each is carved in a different motif. The three marble mantles in the service wing are simpler and identical to one another.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 10

117 Cow Stable (Warrant Officers' Quarters – 4 units), Kingsbury Avenue, 1906; (1938) (HABS No. MA-1009-B)

Building 117, a Cow Barn erected ca. 1906 and converted to a picturesque cottage for officer housing in 1938, is located immediately south of the Stable (Building 118) on the western edge of a large open lawn that was formerly an orchard. The facade faces east with its gable ridge line running north-south. The one-and-one-half-story building rests on a granite ashlar foundation and has red brick bearing walls laid in 5/1 common bond with a brick dentil cornice and eaves, and a brick stringcourse at the half story. The footprint is rectangular, measuring 32 ft (three-bay front) by 30 ft (two-bay sides) under a slate gable roof. Three slate gable dormers (front) and two identical rear dormers pierce the cornice line in the gable flanks. An exterior brick chimney rises against the south end-gable wall.

The former six-over-six, wood, double-hung sash windows have all been replaced with one-over-one, aluminum double-hung sash with snap-in, six-light muntin grids. Windows are paired on the first story of the facade. All have red tinted concrete lug sills and brick soldier-course lintels. The main entrance, centered in the facade, has a brick soldier-course lintel, wood sill, and wood molded panel door with diamond-pane glazing. The one-bay, one-story, open entrance porch has two square, brick corner posts and two brick pilasters with wood capitals that support a plain frieze and a flat, built-up roof. A second entrance at the rear center bay has an identical door under a slate pedimented-gable-roof porch on narrow, square, wood posts. The floors of both porches are cast concrete and checkered pattern concrete tiles. A steel basement bulkhead on a brick foundation is located on the north side.

The interior of Building 117 is laid out as single-family quarters with a central hall, parlor, dining room, and kitchen on the first floor and bedrooms and bath on the second floor. Most original features and finishes remain.

118 Horse Stable (Firehouse; Officers' Quarters), Kingsbury Avenue, 1851; (moved 1893; 1938) (HABS No. MA-1009-C)

Building 118, a Stable erected in 1851, moved to its present site in 1893, and converted to a picturesque five-unit apartment building for officer family housing in 1938, is located immediately north of the Cow Barn (Building 117) on the western edge of a large open lawn that was formerly an orchard. The facade faces east with its gable ridge line running north-south. The rectangular, two-and-one-half-story building measures 90 ft (eight-bay front) by 32 ft (two-bay sides) and rests on a rubble foundation with a smooth granite block sill. Sill sections in filled with cast concrete indicate the location of former stable openings. The red brick bearing walls are laid in 7/1 common bond with a brick dentil cornice and eaves, and a brick stringcourse below. The building is capped by a slate gable roof. Three slate gable dormers (front) and three identical rear dormers rise from the roof slopes.

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 11

The former three-over-three gable windows and six-over-six, wood, double-hung sash windows have all been replaced (1980s) with one-over-one, aluminum double-hung sash with snap-in, six-light muntin grids. Windows are paired in the end bays on the first and second stories of the facade and on the east bay of both stories in the end elevations. All windows have red tinted concrete lug sills and brick soldier-course lintels. Each gable end peak has a bricked-up elliptical lunette pierced by a square louver vent. The south sill is brick; the north sill is brownstone. The two identical front entrances, near center on the east facade, have a brick soldier-course lintel, wood sill, and wood molded panel door with diamond-pane glazing. The one-bay, one story, open entrance porches have two square, brick corner posts and two brick pilasters with wood capitals that support a plain frieze and a slate hip roof. At the rear (west), the center two bays are occupied by a one-story, one-bay-deep extension with a slate hip roof and two wood molded paneled doors that lead to the basement. Flanking bays contain rear entrances with diamond-pane glazed doors under open porches with narrow, square wood posts supporting a slate, hip roof. The floors of all porches are cast concrete and checkered pattern concrete tiles. A brick chimney rises on the exterior wall adjacent to the south corner of the center one-story extension.

The interior of Building 118 is laid out as multi-unit family quarters with two units on the first story and three units on the second story. Each main entrance at the facade leads to a small vestibule with a first-floor apartment door on one side and a straight run, enclosed stair to a landing. The two first floor apartments are laid out with living room, dining room, kitchen, two bedrooms, and bath around a central hall. The three upper apartments are similarly arranged, but have smaller dimensions, fewer closets, and a dinette space rather than a dining room. Window and door trim throughout the units is simple, comprised of flat board flanking molding and plain board tops with molded cornices.

131 Administration Building, Talcott Avenue, 1900; (1917; 1918; 1943), (HABS No. MA-1009-D)

Building 131, the Administration Building, is sited at the historic center of the Watertown Arsenal, facing east across an elliptical drive to Talcott Avenue. The two-story, thirteen-bay, red brick building designed in the Georgian Colonial Revival style ca. 1900 by Charles H. Alden, Jr. was expanded in 1918 (Stone & Webster, engineers) and 1943 (Chester Lindsay Churchill, architect). It now stands as a large rectangular mass with a small central courtyard. The building rises from a coursed, pene-hammered, granite block foundation with raised basement and brick water table, to red brick bearing walls of Flemish bond with glazed headers and with corner quoins. A raking cornice and plain frieze outline the slate hip and gable roof. Windows throughout the ca. 1900 and 1918 section of the building are six-over-six, double-hung wood sash set in brick jack arches with stone keys and limestone slip sills.

The thirteen-bay facade of the original building is flanked by slightly projecting, two-bay end pavilions added in 1918 and anchored at the center by a two-story, projecting, pedimented, entrance frontispiece. Set in a segmental brick arch with a stone key, the entrance surround has an elliptical single-light fanlight, large

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 12

single sidelights with heavily molded wood panels below, and a heavily molded wood panel door with a single light in the upper half. The leaded fanlight and sidelights of the original entrance have been relocated (1943) to the interior hall door behind the main entrance. The entrance approach consists of a podium of pene-hammered granite steps and buttresses. Surmounting the entrance is a three-part window in a brick jack arch with stone key at the second level and a lunette with tracery and brick round arch with stone key in the gable pediment. Rising from the center of the roof is an octagonal cupola with gold domed roof and louver-filled round-arch arcade on a square balustraded base with classical corner pilasters, modillions, and Roman face clock. This cupola was erected in 1943 replacing the four-sided original which had a balustraded base, a round-arch arcade with classical pilasters, and a copper clad cross-round-arch section with curved roof, Roman face clock, and spire finial. The end pavilions are framed with quoins and cornice returns and lit at the attic level by oculus windows with tracery and four stone keys. Decorative copper down spouts bear Watertown Arsenal insignia of crossed cannon and stack of cannon balls in low relief.

In 1918, in order to gain more office space, the end pavilions and a two-story, thirteen-by-five-bay addition at the center of the rear elevation were added. The construction of the end pavilions matched the original construction and probably reused materials. In the rear addition, the brick walls and slate gable roof match the earlier construction and the overall effect is similar, although the foundation is poured concrete, the jack arches have no keys, and the trim material is cast concrete. In 1943, the building was again substantially enlarged by a thirteen-by-five-bay, three-story with raised basement, rear (west) addition south of the 1918 addition, a three-by-four-bay, two-story addition at the southeast corner of the building with two, two-bay, two-story connectors to the 1918 south end pavilion and the new rear wing, and a broad, two-story, three-bay connector at the rear between the 1918 and 1943 wings. The south rear addition has six-over-nine double-hung wood sash windows set in jack arches. A molded wood stringcourse runs between the second and third stories, and a narrow molded cornice trims the slate hip roof. The raised entrance is in a central, projecting, gabled pavilion with recessed double-leaf doors and five-light transom, surmounted by a heavy molded frieze and cornice. The steps are concrete with brick buttresses. Above the entrance, flushboard paneling surrounds an oculus in the gable pediment.

The west elevation of the slate gable roofed rear cross connector has a prominent central entrance. It is composed of a pedimented projecting pavilion with a massive pedimented overhang shielding recessed and paneled double-leaf doors with paneling and transoms in the recess surrounds. A three-part window in the second level and flushboard paneling and oculus in the gable pediment repeat motifs elsewhere on the building. Original iron and glass lanterns flank the entrance. North of the main entrance a ramp leads down to a double-leaf utility entrance at the basement level below grade. The small connectors near the southeast corner of the building have uneven fenestration with upper windows breaking the cornice line, simple treatment, and wood window sills. The completion of the building programs created a small inner courtyard which contains a subterranean meeting room.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 13

While the exterior of the building is little altered, the interior has undergone numerous changes and little remains of original spatial arrangements or finishes. The interiors are arranged as double loaded corridors with small offices on either side. Only the third floor of the 1943 addition is an open space with no partition walls.

An important component of the 1943 additions was the southeast addition which was designed with a commanding officer's suite on the first floor. Highly intact, it includes a wood-paneled outer office, a large inner office with partially paneled walls, and a broad jack arch opening with modillion cornice leading to paneled doors accessing a conference room, rear hall, and bathroom. Finishes are a combination of oiled wood and paint, as they were originally. The spaces are configured to allow circulation in and out of the office by the rear, and to allow direct access to the subterranean conference room.

142 Sentry Station at South Gate, Talcott Avenue at North Beacon Street, 1939, (HABS No. MA-1009-E)

Building 142, Sentry Station is located at the South Gate at the intersection of Talcott Avenue and North Beacon Street with its facade facing west. The nine ft by eight ft, one-by-one-bay, one-story, red brick building was constructed in 1939 and is essentially unaltered. It rests on a concrete slab foundation and rises to a slate-sheathed, slightly flared hip roof with projecting eaves, a copper finial, and copper gutters. Down spouts have been removed. The red brick walls are laid up in running bond with corner pilasters, a soldier course water table, and a single corbel course at the top and bottom of the recessed bay on each elevation. The single entrance, facing west, has a wood door with two lower panels and four-light glazing in the upper half, topped with a soldier course lintel. A metal gooseneck lamp overhangs the entrance. The three other elevations each contain one nine-light, fixed sash, metal frame window with brick lug sills and soldier course lintels.

The interior of the building consists of a single room with painted concrete floor and brick walls. A small, wood, slant-top desk is attached to the north wall at the east corner, and a rounded, wood shelf is set in the northwest corner.

292 Bar Stock House (Laboratory), 1920; (1959), (HAER No. MA-20-T)

Located near the southwest edge of the historic district with the main entrance on Welch Avenue (west), Building 292, originally the Bar Stock Storage Building, is attached to Building 97 (east). Building 292 retains its original shape and size despite extensive alterations which were made in 1959 when the original one-story warehouse structure was converted into a two-story laboratory.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 14

The 202 ft by 67 ft gable-roof building sits on a reinforced concrete foundation. Load bearing brick pilasters divide all four walls into 20 ft wide bays. The gable roof is a riveted steel Fink truss system with 20 ft bays. It is sheathed in corrugated cement asbestos and has two long rows of corrugated obscure glass skylights which are set flush to the roof and run the length of the north-south roof line. The original main entry facade, located on the building's north side, consisted of four bays: two narrow side bays with full-story multi-light windows with granite sills, and two wide central bays. One of these central bays (west side) had full-story multi-light windows interrupted only by a centrally located door, and the other (east side) had a narrow band of windows above a full width opening accessed by railroad tracks. The east and west elevations consisted of recessed, bricked in bays and the south elevation had three full-story multi-light window bays of equal size. Ornamentation is minimal on this one-story shed-type building, consisting of a circular window with four concrete perimeter keystones in each gable and brick corbeling under the roof eaves and between pilasters.

In 1959, the building was modified to contain two stories in its new function as a Materials Testing Laboratory for the new Horace Lester nuclear reactor, Building 100 (demolished). The structural system is steel and reinforced concrete, tied into the former crane rail columns and a new central row of steel columns. The original windows were replaced with the present system, consisting of three-light windows located between pilasters on both first and second story levels, with white stucco concrete panels separating the levels. The new front entrance in a central bay of the west facade has granite steps leading up to a double glass doorway with a cantilever aluminum overhang. This doorway serves as the main entry to the reactor complex (Buildings 97, 100, and 292). It opens onto a hallway which provides a direct access to the reactor through Building 97 and intersects the central spine hallways of Buildings 292 and 97. The interior of Building 292 has been divided into small laboratory/office spaces along a central hallway on both floors.

311 Erecting Shop, Thornton Avenue, 1917; (1942), (HAER No. MA-20-E)

Building 311, also known historically as the Erecting Shop, is located at the north edge of the historic district, directly west of the nineteenth-century gun carriage manufacturing complex, and is sited along Arsenal Street (north). Minor landscaping elements consist of a grass strip between the building and the perimeter fence (north), and a grass sidewalk edging on the south side. Building 311 was erected in 1917 as a 20-bay-long, 462 ft by 158 ft structure. It was intended principally for the erection of carriages for 16-inch seacoast guns. In 1942, it was doubled in size with a 24-bay west addition that matched the original design and reused original cornice trim. It is the largest building and among the least altered structures within AMTL.

Building 311 is a rectangular, high-bay structure, oriented west-east, with a total length of 924 ft and width of 158 ft. Rising from a foundation of reinforced concrete, the pier and spandrel walls are constructed of a steel frame (20-ft bays) faced in common-bond-laid, red brick with cast-stone trim. The flat roof is a

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 15

riveted, steel Warren truss sheathed in tar and gravel over precast gypsum-concrete panel decking. The building is composed of two similar and parallel sections of different height. The taller, southern half (3 bays wide) has two tiers of windows to accommodate huge rail cranes, while the lower, northern half (4 bays wide), terminates above the first level of windows. An entablature composed of a brick stringcourse, brick dentil course and cast-stone cornice above the first level of windows is located on the west and east ends and continues one-bay on the north and south elevations. It is repeated in one bay near the center of each of the long elevations, indicating the original west end of the building. The roof line parapets are flat on the north section and low-gabled on the south section, with cast-stone coping. The exterior brickwork and cast-stone was repointed and repaired about 1964.

Expanses of multi-light steel sash windows with hoppers fill the bays between the piers. They have cast-stone lug sills and a surround of one brick course. Slight variations exist between the 1917 and 1942 windows, the former being 14x16 lights and the latter 13x16 lights. The original entrances consisted of several various sized doorways for pedestrians, gun carriages, and railroad cars. The smaller had wood-and-glass-panel doors and the larger had vertical rolling doors. In 1968, changes were made to some of the doorway openings and most doors were replaced.

The interior of Building 311 is essentially a single open space, divided along the east-west center line by column lines of steel I-beams at the 20-ft structural bay spacing. The 1917 section has a double row, 25 ft apart, and the 1942 section has a single line. The interior surfaces are painted brick walls, concrete floor, and exposed roof trusses. Interior partitioned off structures are constructed of wood or concrete block. At the present time, several original platens and the x-ray enclosure structures remain in the west extension. The heavy equipment has been removed, the erecting pits have been filled in, and some of the railroad tracks have been dismantled. Several recent modular buildings include a composites and ceramics machine shop and a hut. Extant cranes include: five Shaw cranes from 5- to 160-tons installed in 1918; five P & H cranes from 45 to 85-tons installed in 1942; and a 6-ton Conco x-ray crane erected in 1952.

312 Erecting Shop (large Machine Tool Shop), Wooley Avenue, 1894; (ca. 1917; 1941), (HAER No. MA-20-F)

Building 312, also known historically as the gun carriage Erecting Shop, is located in an industrial setting at the southwest section of the Watertown Arsenal gun carriage manufacturing complex near the center of AMTL. Adjacent land use includes asphalt-paved roads and industrial buildings to the west, north, and east, and a parking lot to the south. Landscaping is confined to a grass sidewalk strip on the east side of the building. Erected in 1894 specifically to provide a larger and better suited facility for erecting and assembling gun carriages, Building 312's siting and orientation was functionally linked to the existing gun carriage manufacturing complex buildings. It sits perpendicular to and directly west of Building 37 (the Foundry); and Building 313 (the Machine Shop), and southwest of Building 43 (the Smith Shop). Railroad

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 16

tracks linked Building 312 from these openings to the other gun carriage manufacturing complex buildings. Alterations since its original construction consist primarily of two similar, early-twentieth-century additions to the west elevation, and, in 1961-62, a series of interior changes, and the replacement of windows and doors associated with changes in use. Overall, however, Building 312 retains its late-nineteenth-century industrial architectural character and its sense of relationship to associated buildings.

Building 312 is a rectangular, brick structure, 280 ft long by 80 ft wide, with a gable roof running north-south and two one-story, shed-roof, west additions (1917 and 1941). The main building is 24 bays along each side, five bays on the north end elevation, and six bays on the south end elevation. It was constructed as a high-bay, one-story structure. The building rises from a rock-faced granite foundation with walls of common bond-laid, load-bearing brick pilaster construction that terminate above the brick spandrels in a brick stringcourse and dentil cornice. Each of the gable ends is pedimented and has sandstone weatherings on the pilasters. The building retains its original roof, a cambered riveted steel Fink truss sheathed in slate over wood decking.

The segmental-arch window openings, with sandstone lug sills, are set in recessed brick curtain walls between the load-bearing pilasters. The typical windows originally consisted of two sets of twenty-over-twenty, double-hung wood sash, one directly above the other, to provide maximum light for intricate gun carriage assembly tasks. Each gable pediment contained a pair of double-hung sash, round-arch windows with a round-arch upper sash. In 1968, all windows were removed and replaced with white stuccoed cement panel infill, some of which have explosion-proof, small, fixed commercial steel windows. The north gable pediment windows are in filled; the south end's were rebuilt as rectangular vent openings. One remaining section of original window sash is located on the west elevation between the north high-bay part of the main building and the 1941 west lean-to addition. The original primary doorways consisted of at least five wide, segmental-arch openings. Three were located on the east elevation and corresponded with similar openings in Buildings 37 and 313; one was on the north elevation with convenient access to Building 43; and one was near the center of the west elevation.

The west one-story, shed-roof lean-to additions were added about 1917 (north section) and 1941 (south section). The design and materials of the additions are compatible with the original structure, and similar dimensions, fenestration, and a continuous brick dentil cornice blend the two sections. The riveted steel truss roof is sheathed in continuous membrane rubber, which replaced the original corrugated cement-asbestos covering about 1988.

At its construction, the interior of Building 312 contained a single high-bay space designed for the erection of the larger gun carriages being built by the end of the nineteenth century. Its exact layout is not known, but later photographs and plans indicate it contained erecting pits, platens, and heavy machinery arranged along the rail tracks that communicated with adjacent buildings. In 1961-1962 the southern half of the building was reconfigured as two stories for a beryllium-uranium research laboratory. The construction of

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 17

this modification is a concrete slab and steel system, tied into the crane girder and two new internal rows of steel columns. A concrete block wall divides the north and south halves of the building. The first floor contains the labs, with concrete block walls, acoustical tile ceilings and vinyl tile floor. The second floor contains offices, finished with wire lathe and plaster walls, acoustical tile ceilings, and vinyl tile floors. The attic story houses air filtering equipment. In the early 1970s, plating shop functions were installed in the south end of the west lean-to. The north, remaining high-bay half of the main building now contains several freestanding crystals and ballistics laboratory structures. With the exception of the rail crane, which is no longer used, all machine tools have been removed.

**313 Carriage & Machine Shop (Laboratory/Offices), Talcott Avenue, 1862; (ca. 1920; 1941),
(HAER No. MA-20-G)**

Building 313, also known historically as the Carriage and Machine Shop, consists of three wings (Buildings 313S (south), 313C (center), and 313N (north)) and an east connector. The wings are oriented west-east and are connected at the east end, forming an "E", and by two north-south corridors near the center of the wings. Building 313 is located near the northeast corner of AMTL in an industrial setting. Adjacent land use includes tree-lined Talcott Avenue, the main entrance road to the east; and, on the south, west, and north sides, paved roads abutted by the other three buildings of the nineteenth-century gun carriage manufacturing complex.

The original construction of Building 313, in 1862, was laid out in a U-plan composed of 313S, 313N, the east connector, and a small, square powerhouse structure at the base of the "U" on the west side of the connector section. This structure has been rebuilt and enlarged to the present configuration of 313C. While changes have been made to the windows and doors, the major massing characteristics of the north, south, and east sections, and the relationship of the building to surrounding structures is well preserved.

Building 313 is a two-story, brick, E-plan building. The east front connector section measures 175 ft (12 bays) long by 50 ft (3 bays) wide, and the wings are 250 ft (24 bays) long by 50 ft (3 bays) wide. The original sections (313S, 313N, and the connector) have red brick bearing walls laid up in common bond. They rest on a smooth-face granite ashlar foundation and water table, and 313N has an accessible basement, revealing a subfoundation of drylaid tabular fieldstone. The gable roof of each section was originally a timber truss sheathed in slate. The present roof of 313N and the connector, a riveted steel Fink truss sheathed in slate, was installed in 1919. 313S retains its original timber truss and slate roof. 313C is a brick and concrete block structure, with a flat roof sheathed in tar and gravel. The foundation of 313C is granite and concrete.

The brick wall treatment of the oldest sections consist of a rhythmic arrangement of ornamental brick pilasters with sandstone capitals, which separate the window bays and rise to a raking sandstone cornice with

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 18

a brick dentil course. At either end of the east facade elevation, the wings of 313S and 313N form slightly projecting, three-bay, pedimented pavilions. The west and east end elevations of both 313S and 313N were originally identical. They consisted of a trabeated, full-width entrance in the central bay flanked by pairs of narrow six-over-six double-hung windows. The grouped windows were repeated in the three bays of the second story, and the pediments originally contained paired round-arch windows (now bricked-up) set in a segmental wall arch.

The original windows in the east connector and along the north and south elevations of the wings were tall, twelve-over-twelve double-hung sash. Window openings were trimmed with sandstone lintels and lug sills. As a result of a major window replacement program in 1968, all window openings have been partially or completely bricked up and all sash has been replaced with multi-light steel sash, some with hopper sections.

Door openings were located at either end of the main wings and along the sides. Due to Building 313's central position within the gun carriage manufacturing complex, most doorways corresponded with similar openings in adjacent buildings. Lintels were granite, and possibly, sandstone. All original openings have been altered; however, two bays on the north side of 313N contain what appear to be original granite lintels above bricked-up openings, directly opposite similar doorways in Building 43, the Smith Shop.

A notable feature of the building's exterior is a series of exposed cast iron wall plates tied into floor supports on the east elevation of the connector section and along the north and south elevations of both 313S and 313N. The brick powerhouse chimney and a line shaft, pulleys, and rope driver power system that were associated with the powerhouse and transmitted power to adjacent buildings were removed by the 1930s.

The present-day interior plan of Building 313 consists of a single, high-bay space in 313S; two floors with central corridors flanked by offices and laboratories in 313N and the east connector; a high-bay space at the east end of 313C, and two floors at the west end. Finishes in 313S are a concrete floor, painted brick walls, and exposed roof framing. The partitioned laboratory and office spaces in 313N, 313C, and the connector are finished with plaster and wire lathe walls, vinyl tile floors, and acoustical tile ceilings. The simple door and window trim was installed in the twentieth century. A basement is located under 313N.

The interior of Building 313 originally contained two stories. The south wing, 313S, was used as a woodworking and carpenter shop. The north wing, 313N, contained a Machine Shop, powered by the steam engine in the central powerhouse section. The first substantial changes occurred in the 1890s. The second floor of the south wing was removed about 1890 in order to accommodate rail cranes when the carpenter and pattern shop were moved to Building 72. The wood roof truss system was thus exposed and remains visible today. It contains a pulley and wooden shaft hoisting mechanism attached to the center ridge line at the midpoint of the wing. 313S also contains two 10-ton rail cranes, a Whiting and a Milwaukee, installed in 1918. In the north wing and east connector, the wood framing and floors were replaced with steel and concrete in 1919.

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 7

Page 19

The central wing, 313C, has been expanded several times. About 1920, or shortly after the Arsenal ceased generating power in 1918, a one-story addition was built westward from the powerhouse to Thornton Avenue. It gained a second floor in 1941. In 1968, the roof of the powerhouse portion was rebuilt creating a high-bay structure in this area abutting the east connector of the main building. The brick gable ends of the powerhouse still exist within the interior of this newer structure.

Two water supply features exist below ground in Building 313. A brick cistern, constructed in 1862 and rediscovered in 1942, is located beneath 313C. It consists of a cluster of ten vaulted chambers and measures overall 26 ft by 70 ft, with a depth of 21 ft. It was part of a water supply system fed by gutters and distributed via four holding tanks in the attic of 313N. It was connected by underground pipes to other cisterns in the Arsenal.¹ The basement of 313N contains a circular dug well. It is located within a brick vault alcove built into the south foundation wall of 313N near the east connector. The original function of this feature is not known.

652 Water Pump House, North Beacon Street, 1918, (HAER MA-20-W)

Building 652, the Pump House erected in 1918, is sited on the southwestern boundary of the AMTL, three ft from the fence line along North Beacon Street. The rectangular, 10 ft by 20 ft, one-by-two-bay building is oriented with its facade facing northwest. It is set into the hill slope at the rear (northeast) with only 2 ft 8 inch of the southeast elevation visible about grade. Concrete retaining wing walls fan out along the steep slope from the rear corners of the building. The building's red brick walls laid up in Flemish bond with black glazed headers rise from the concrete foundation to a flat, built-up roof with concrete coping, copper flashing, and a small, square ventilation opening. Two corbeled courses edge the top and bottom of recessed bays on three elevations. The entrance, facing northwest, has a wood door with three panels in the lower half and four-light glazing above. The three windows, two on the southwest and one on the southeast, are 12-light, metal frame with wire mesh glazing, concrete lug sills, and concrete lintels. The doors and windows are now boarded up. The interior is a single room with painted concrete and brick walls and a plastered ceiling pierced by three square, steel framed openings that once held ventilation equipment. The roof rafters have been sistered. Electrical switch boxes on the northeast wall are all that remain of equipment on this level. In a pit below the floor, the building contains intake cribbing and once held pumping machinery.

— Olmsted Landscape, Talcott Avenue, 1919-1920, (HABS No. MA-1009-G)

The portion of the AMTL which reflects 1919 design work of the Olmsted Brothers landscape architecture firm (Olmsted Project #6672) comprises approximately 10 acres in the southeast section and along the east edge of the 48-acre U.S. Army property. The designed landscape encompasses the areas around Building

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 20

131, Administration Building; Building 111, Commander Officer's Quarters; the main entrance drive connecting the North Gate at Arsenal Street and the South Gate and Guard House, Building 142 at North Beacon Street; as well as the south embankment overlooking North Beacon Street and the Charles River. The site topography is generally level, sloping gently downward from north to south, with a steeper elevation drop at the southern end. The scope of the original design included 55 acres of land to the east that was sold by the Army in 1967 and is outside of the historic district. Little if anything remains of the landscape in that section. Project correspondence (Manuscript Division, Library of Congress, Washington DC) and plans (National Park Service, Frederick Law Olmsted National Historic Site, Brookline, MA), however, indicate that the principal areas of concern were the entrance drive and the setting of Buildings 111 and 131.

Today's landscape is the result of multiple phases of development since the founding of the Arsenal in 1816. It contains a basic structure reflecting the Arsenal's nineteenth-century layout, many elements of the 1919 Olmsted plan, and changes that have occurred between ca. 1920 and the present. Comparison of archival materials with modern conditions indicates that the Olmsted plans for site design and plantings were not entirely implemented. The framework of roadways and walkways in the 1919 plans as built remains largely intact, although post-1920 plant material types and location do not conform in many instances to Olmsted's design. Three structures, a tennis court, a grape arbor, and a large "victory garden" arbor were added in the 1940s, and two propellant storage bunkers, Buildings 244 and 245, were constructed into the south embankment near the South Gate. In general, the landscape is well preserved and adequately maintained, retaining strong echoes of its nineteenth-century and Olmsted-era development phases.

In the broadest sense, the purpose of the Watertown Arsenal design project as conceived by Brigadier General Tracy C. Dickson, Commanding Officer, and as interpreted by Frederick Law Olmsted in early project correspondence and meeting notes, was "a simplification of the road arrangement and systematic tree and shrub planting" (Olmsted Site Visit Notes, 25 March 1919) in order to "make the grounds more attractive" (Dickson Letter to Olmsted, 25 February 1919). Refinement of the basic concept and formation of specific design recommendations took place between February 1919 and the submittal of final drawings and specifications on 1 December 1919.

Within the current AMTL property, the principal components of the Olmsted plan pertained to the relocation of the main road from the South Gate to Building 131 and simplification of the service roads in connection with Building 111, both of which were partially carried out, as well as treatment of grounds and vegetation. The latter consisted of five classes of areas with different distinctive treatments. The overall plan combined park-like treatments characterized by sweeping curves, walkways, and interesting trees and shrubs in the tradition of Andrew Jackson Downing with tight evergreen and loose, flowing perennial and annual beds adjacent to Buildings 111 and 131. An important effect was to be created by generous use of flowering trees (dogwood, magnolia, etc.) and shrubs (viburnum, spiraea, honeysuckle, forsythia, etc.) along the grounds, dotting the lawn and framing the buildings, and the use of broadleaf evergreens (rhododendron, mountain laurel, etc.) on the south embankment.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 21

Improvements to the south embankment overlooking the river were intended to retain an open wooded effect of existing trees and new flowering shrubs with a graded walkway to create a beautiful spot when seen from the North Beacon Street parkway, and a pleasant retreat for Arsenal employees. The extent of implementation of this portion of the plans seems quite limited. Today the embankment remains wooded with pines, maples, and oaks, in filled by an understory and naturalized plants. There is no evidence that the extensive shrub planting scheme or the walkway were ever achieved; any regrading of the slope for a pathway is not discernible. The area between the bottom of the slope and the fence is a lawn with oak, pine, and maple trees planted all across it.

In addition to circulation patterns and the southern embankment, work included improvements adjacent to main buildings, lawn areas; adjacent to industrial buildings; and utilitarian spaces (Olmsted Letters to Dickson, 2 June 1919 and 1 December 1919).

The Main Road circulation patterns considered by Dickson and Olmsted had evolved over 100 years of Arsenal history prior to 1919, but did not coherently address early-twentieth-century needs in the south entrance area. The major site plan feature recommended by the Olmsted plans, and implemented by the Arsenal, was the relocation and reconstruction of the new road connecting the South Gate and Commanding Officer's Quarters. At the same time, the old road leading north to the 1816 quadrangle (outside district) was abandoned. The new alignment, staked by Arsenal engineers and checked by Olmsted staff, was a more direct line, a wider roadbed, and had improved grades. A distinction was also made between the road and the Building 111 entrance drive. South and north of Building 111, Olmsted proposed sidewalk paths on the west side of the road. These apparently were never built, and the area south of Building 111 is lawn today. The design of the south area used broad sweeping road and walkway curves and a variety of plant material to enhance the park-like qualities of the area. Few trees were planned along the road edge in order to link the lawns on both sides of the road.

Contrary to Olmsted's plan of 1919, north of Building 111, an existing, nineteenth-century path of brick laid in herringbone pattern was retained and remains today. It runs from the Building 111 front entrance straight north to the north end of the Building 111 driveway. In the area of the main drive between Building 131 and the North Gate, most of Olmsted's suggestions appear to have been carried out including widening, sidewalk, and planting of Linden trees.

The entrance treatment proposed by Olmsted for Building 111, Commanding Officer's Quarters, slightly Victorian in flavor, comprised reworking the entrance oval drive and the addition of walkways and new plantings. The minor changes to the oval configuration were carried out, but not all the walkways were removed or installed as was recommended. Olmsted's planting plan for the oval and the front of the house called for Japanese yews and dwarf English yews anchoring beds of geranium and cannas in the oval with a mix of foxglove, phlox, and other flowers near the house. Olmsted's recommendations for realigning the service road connecting the main road to the north rear of Building 111 were not implemented, nor were

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 22

most planting suggestions. Olmsted's plans called for eliminating the turn-around in favor of a larger rear stopping area and relocating the road to a gently curving east-west alignment just north of the house. Lilac hedges were to be moved and privet hedges installed to better define laundry area and utilitarian spaces at the rear of the house. Although the service road reconstruction did not occur, the lilac hedge was relocated eastward, and at the southern end near Building 111 a curved hedgeline was created to follow the line of the service road turn-around.

The park-like lawn area south of Building 111, between the building and the south embankment, was laid out in the Olmsted plan with a revised system of paths in order to achieve two purposes:

... first, to get the maximum use and enjoyment out of this area as a recreation ground for Arsenal employees, and second, to secure a reasonable amount of privacy for the Commanding Officer and his family (Olmsted Letter to Dickson, 1 December 1919).

For the enjoyment of the employees, the plan included relocating an existing path closer to the top of the embankment. Along it would be erected a summer house and a terminal seat with views to the river for the use of Arsenal employees. Olmsted's plan shows view lines from the seat, summer house, and porch. No trace of the path exists, and the area remains lawn. The site shown for the terminal seat on the plans is definitely marked by some old plantings including two dwarf *Chamaecyparis*, but lacks the flowering shrubs and trees such as *Leucothoes*, *Highbush Cranberry*, *Flowering Dogwood*, and *Arrowwood* noted on the Olmsted plan. A low stone wall that was to incorporate the viewing seat was apparently not executed. The presence of the *Chamaecyparis* on the bank edge and the existence of an early-twentieth-century concrete bench, unique at AMTL, located in a grove of trees nearby, suggests that the concept of the terminal seat was carried out, but in a different way than Olmsted had intended. No information exists on whether the summer house was ever built. In the 1940s, two propellant storage bunkers, Buildings 244 and 245, were constructed into the hillside at this location, destroying the earlier landscape. This section is now recontoured and contains a grove of pine trees.

Other elements included reworking of the path system and new plantings. The lawn today contains no evidence that the proposed paths were installed, and none of the screening flowering trees and shrubs, if they were planted, survive. The lawn today is planted with scattered trees, some of which appear as existing trees (with calipers of 10 to 13 inches in 1919) to be retained on the Olmsted plan. Most notable is a cluster of four large sugar maples immediately south of the main block of the house. At Olmsted's suggestion, minor changes were made to the steps of the house piazza. Other features based in Olmsted's design are the hedge enclosure at the west end of the lawn.

Historic views indicate that the elliptical drive at the front (east) entrance of Building 131 was established sometime after construction (ca. 1900) and the Olmsted involvement (1919). Olmsted's contribution to the site was to rationalize the sidewalk system. The planting was simple. A narrow shrub and perennial bed was

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 23

proposed along the front of the building, except the end pavilions added in 1919, with upright Japanese yew flanking the entrance. Starry Magnolia were to be planted in front of the end pavilions and at either side of the sidewalk in the elliptical island across from the main entrance. Larger trees were envisioned northeast and southeast of Building 131.

Today, this area retains the sidewalks as laid out by Olmsted, but none of the plantings remain. This area also retains an early-twentieth-century cast-iron sign post.

Based on examination of the Olmsted 1919 plans, the Watertown Arsenal fruit orchard contained approximately 100 regularly spaced trees located west of Buildings 111 and 131 and extending south to the embankment, west to a rocky knoll, and north to a line midway between Buildings 111 and 131. Apple trees predominated, although peaches and other varieties were represented. A path led from the rear of Building 111 in a northwest direction through the orchard. At the northwest corner of this open orchard area, historic maps show a small farming complex including several poultry houses, a cow barn, now Building 117, and a stable, now Building 118. Olmsted's proposal entailed removing portions of the orchard to better define the use area and to promote privacy for the Commanding Officer and his family by discouraging public access.

Today this area is a large grassy lawn covering nearly the entire space between Buildings 111, 131, 117, 118, and a parking lot on the north. Six or seven scattered apple and pear trees remain of the original orchard. A large beech tree, which was apparently not part of the Olmsted scheme, stands near the northwest corner of this open area. Some of the hedge work was done, and removal of trees at the south edge seems to have occurred. The path was not removed and remains in place. It is paved in brick laid in running bond and is visible at the east end for a short distance; most of its length is covered with grass, but contrasting grass materials distinguish its location from its surroundings.

The major change to this area, aside from the loss of the fruit trees, is the addition of two garden features and a tennis court at the east end of this open area in the 1940s. The tennis court is northwest of Building 111 with a lilac hedge screen on the east side.

The landscape treatment of the industrial buildings at Watertown Arsenal was confined to trees and grass, "except that here also climbers could be advantageously used on the buildings much more extensively than in the past" (Olmsted Letter to Dickson, 2 June 1919). Olmsted's plans included drawings for trellises and sidewalk vine planting pockets along the south side of the Machine Shop Shed. This building stood south of Building 37 and has been demolished. The general types of plantings around the industrial buildings at AMTL today consist of grass and trees, as specified by Olmsted, although the plant material is more recent. None of the trellised treatments survive.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 24

— **Perimeter Fence, Arsenal Street and North Beacon Street, ca. 1945**

A fence surrounds the Watertown Arsenal. Along Arsenal and North Beacon Streets, the fence is comprised of large brick posts with granite caps and, at most gate entrances, iron ball finials.

— **Grape Arbor, off Talcott Avenue, ca. 1945**

A grape arbor just south of Building 131 is a wood structure with grape vines growing on it.

— **'Victory Garden', off Talcott Avenue, ca. 1945**

The "victory garden" is a wood, double-walled arbor, with north and south entrance breaks, enclosing a rectangular area. The enclosure may have been a vegetable garden at one time, but is now lawn. Two fruit trees from the original orchard remain within the grapevine covered arbor.

— **Sign Post, Talcott Avenue, ca. 1910**

Located on the east edge of the main drive opposite the Building 131 entrance, the cast-iron post has a fluted shaft, ball finial, sign brackets, and the patent date, 22 July 1910. An early-twentieth-century photograph reveals that a similar post appeared on the building side of the ellipse.

Noncontributing

36 Gun Carriage Storehouse, Wooley Avenue, 1900

Building 36 is a one-and-one-half-story, gable-roof, red brick building. Originally erected in 1900 as a 237 ft by 50 ft building for the storage of parts for gun carriages and for carriage assembly. In 1910, a north addition doubled the size of the building. It was equipped with machine tools for making projectiles in 1918. The building was reburbished in 1968 when all window openings were blocked down and replaced with panels inset with small windows. It most recently contained a photo lab, cafeteria, auditorium, library, publications and reports offices, and a basement fallout shelter.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 25

46 Main Gate Security Post, Arsenal Street, ca. 1950s

This is a one-by-one-bay, one-story, flat-roof building constructed of brick with aluminum windows.

147 Vehicle Access Gate, North Beacon Street, ca. 1950s

This is a small, one-by-one-bay brick building with a flat overhanging roof. It functioned as the guard house for the gate and adjacent parking area at the southwest corner of AMTL.

226 Concrete Bunker, Arsenal Strteet, ca. 1950s

Located between Building 43 and Arsenal Street, this is an underground concrete bunker housing two 10,000-gallon fuel oil tanks.

229 Storage Tank Shed, Wooley Avenue, ca. 1941

This concrete bunker structure adjacent to Building 39 was constructed to house cooling oil pumping equipment and a 1,000-gallon oil tank.

244 Propellant Storage Bunkers, North Beacon Street, 1950s & 245

This property is two, adjacent, underground, concrete propellant storage bunkers, located near the South Gate at North Beacon Street in the wooded embankment area.

241 Storage Shed, Wooley Avenue, ca. 1980

Located in the northwest corner of AMTL, this is a one-story, metal-sheathed, prefabricated shed with a low-pitch gable roof and no windows. It was erected to replace a fenced area for storage of surplus radioactive material awaiting shipment.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 26

243 Storage Shed, Wooley Avenue, 1950s; 1970s

Located in the northwest corner of AMTL, this is a one-story, flat-roof, two-by-two-bay, brick building (late 1950s) with a prefabricated, gable-roof, metal addition (late 1970s). It stands between Buildings 39 and 292 and was constructed to store laboratory chemicals.

246 Storage Shed, Wooley Avenue, ca. 1970

Located in the northwest corner of AMTL, this is a prefabricated, high, two-bay metal storage building with a lower, one-bay extension. It was constructed to store sand and sand/salt mixtures.

654 Pump Station, North Beacon Street, 1940s

A one-story brick building housing pump equipment formerly associated with cooling operations in Building 60, Power House.

656 Cooling Equipment Building, 1960/1962

This single-story, brick building is located between Buildings 39 and 292 and houses cooling equipment.

Demolished since 1993:

100 Horace Lester Reactor, Wooley Avenue, 1959, demolished 1993, (HAER No. MA-20-R)

Building 100, the Horace Hardy Lester Reactor, was located near the southwest corner of AMTL. It operated until 1970 and continued to be used as a research laboratory until demolished in 1993. The reactor was accessed through two support buildings (Building 97 and Building 292) located to the west. Originally constructed in 1920, they were refurbished and connected to the reactor in 1959/1960.

Completed in 1960 at an approximate cost of \$1,300,000, Building 100 was a completely enclosed, cylindrical, tank-type reactor containment shell with an elliptical domed top. Its design was based, with modifications, on that of an existing Bulk Shielding Facility at Oak Ridge National Laboratory, Illinois. The gas-tight, pressure-vessel structure measured 80 ft in diameter and was approximately 69 ft high. It had a

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 27

2 ft thick concrete wall lining and welded-steel-plate exterior. The reactor shell was entered and exited via two double door airlocks, one consisting of a short connector corridor to Building 97 to the west, and one to the outside on the south side.

On the interior, the central, high-density and normal-density concrete reactor tank ("swimming-pool" type) and biological shield was an octagonal structure. It was an open-top, tank-type, thermal, heterogeneous, water-cooled and moderated neutron reactor for conducting ferrous-based materials research. The reactor had a 21 ft outside diameter and 10½ ft inside diameter, laid on a 5 ft slab. It was 30 ft deep, with an 40,000 gallon capacity. When active, fuel was stored in an annular well cast into the upper perimeter wall sections, and the core was immersed in 22 ft of water. The combination of concrete walls and water provided protection against the escaping of harmful radiations from the core.

The reactor core fuel elements consisted of a thin layer of aluminum uranium 235 alloy sandwiched between aluminum plates, 3 inches wide, 24 inches tall, and 0.060 inches thick. The reactor design called for 18 plates per elements and between 20 (minimum loading) and 35 (maximum loading) fuel elements for powering at one megawatt. Light (demineralized) water was used as the coolant. Access to the core was from the reactor top where removable metal plates covered the pool. The rate of reaction was regulated by control rods (three shim-safety boron carbide rods and one stainless steel regulating rod) driven by a motor at the top of the reactor. The reactor initially operated at one megawatt of power, but was subsequently increased to five megawatts in 1968.

Segregated internal research facilities included a series of aluminum-lined neutron beam tubes that extended from the core area to the exterior of the reactor: 16 horizontal tubes (6 inch diameter) located on two levels; six slant beam 6-inch tubes; and one through beam 6-inch tube running adjacent to the core. In addition, there were two pneumatic "rabbit" tubes (2 inch diameter) which allowed small samples to be passed through the core when the reactor was operating.

The interior arrangement of working space consisted of an open ground floor (operating or experiment floor) level around the reactor core and two platform levels in the south portion of building. The first platform was used for experiments, and the second, narrower, top, platform contains the reactor control room situated against the south perimeter wall of the containment shell. Access to the revolving crane and the reactor top was from this level. Beam tube ports were located on the ground level and first platform level. A Shepard-Niles 10-ton overhead, pendant-type, polar bridge crane operated on a circular track around the perimeter of the dome with a radius of 40 ft.

A gamma ray facility in the basement extended some 9 ft below foundation level and was located on the north side of the reactor, east of the door connecting to Building 97. When active, it was filled with water and accessed via a hatch in the ground floor level. Pumps, heat exchangers and other ancillary equipment were also located in the lower basement level.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 7

Page 28

- 242 Storage Tank, 1960/62, demolished 1993
- 619 Cooling Tower, 1960/62, demolished 1985

External equipment associated with Lester Reactor (all demolished) included pumping equipment and transformers (west); an approximately 150 ft tall cooling tower (Structure 619, installed in 1965 and dismantled in 1984); a 30,000-gallon, low-level, radioactive waste storage tank for reactor pool water during maintenance (southwest, Structure 242); overflow tanks under Building 97.

- 295 Coal Pocket/Tank Farm, 1913-1914; ca. 1920, demolished 1995
- 227 Oil Pump House, 1940s, demolished 1996

Two structures associated with Building 60, Power House, have recently been removed. Structure 295 (removed 1995), the coal pit, later converted to oil tank storage was located southeast of the building. Building 227 (removed 1996), a one-half-story, red brick building with a composition, shallow-pitch gable roof and concrete foundation was located immediately north of Building 60 covering below-grade fuel oil service tanks.

(end)

8. Statement of Significance**Applicable National Register Criteria**

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

- ☒ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- ☒ **B** Property is associated with the lives of persons significant in our past.
- ☒ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- ☐ **D** Property has yielded or is likely to yield information important in prehistory or history.

Criteria Considerations

(mark "x" in all the boxes that apply.)

Property is:

- ☐ **A** owned by a religious institution or used for religious purposes.
- ☐ **B** removed from its original location.
- ☐ **C** a birthplace or grave.
- ☐ **D** a cemetery.
- ☐ **E** a reconstructed building, object or structure.
- ☐ **F** a commemorative property.
- ☐ **G** less than 50 years of age or achieved significance within the last 50 years.

Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References**Bibliography**

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

- ☒ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☒ recorded by Historic American Buildings Survey
- ☒ recorded by Historic American Engineering Record

Areas of Significance

(Enter categories from instructions.)

Architecture; Engineering; Industry; Invention;
Landscape Architecture; Military

Period of Significance

1816-1947

Significant Dates

1816-Arsenal established; 1851-West Timber Storehouse; 1865-Commanding Officer's Quarters; 1893-gun carriage manufacturing; 1917-Erecting Shop; 1919/20-Olmsted landscape; 1941-last land purchase

Significant Person

Rodman, Thomas J.

Cultural Affiliation

N/A

Architect/Builder

See continuation sheet

Primary location of additional data:

- ☒ State Historic Preservation Office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☒ Other
- Name of repository Army Materials Technology Laboratory

**United States Department of the Interior
National Park Service**

**National Register of Historic Places
Continuation Sheet**

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 1

Architect/Builder (continued)

Alden, Charles H., Jr. (A)
Churchill, Chester Lindsay (A)
Coolidge, Shepley, Bulfinch & Abbott (A)
Densmore and Leclear (A)
Giffels and Vallet (A)
Monks & Johnson (A)
Olmsted Brothers (Landscape Architects)
Rodman, Thomas J. (A)

Bendix Aviation Corporation (Engineers)
Stone & Webster (E)

French, Capt. Thomas L. (Mason)
O'Donnell, J. William (Stonecutter)
Vara Construction Co. (B)

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 2

Significance

The Watertown Arsenal Historic District is highly significant as an early ordnance facility, begun in 1816 and one of 12 in the United States, that evolved by 1900 into the main U.S. manufacturing plant of seacoast fortifications gun carriages and into an important and pioneering laboratory for the research, testing, and development of materials, primarily metals, for military and industrial applications. The district's buildings and layout, and alterations to the buildings and site over time, document the growth and evolution of the installation's mission and productivity. This uneven history is marked by periods of exceptional growth and relative inactivity, in response to changes in national politics and economics and the personalities of ordnance chiefs and commanding officers between 1816 and 1968. The Watertown Arsenal derives architectural and engineering significance from its well-designed and executed buildings — several the work of prominent architects, engineers, and designers — that are characterized by shared materials and a coherent arrangement of visually compatible elements. The district's setting, which incorporates aspects of nineteenth-century land use, overlain with an early-twentieth-century landscape design by the Olmsted Brothers, is significant in the area of landscape architecture. The period of significance for the district is defined as 1816 when the Watertown Arsenal was established, to 1947, 50 years from the present. The district includes one building, the Commanding Officer's Quarters (Building 111), that was individually listed in the National Register of Historic Places in 1976. About 1970 the facility was designated a historical landmark by the American Society for Metals, and the gun carriage manufacturing complex was honored as a national historical civil engineering landmark by the National Society of Civil Engineering. The Watertown Arsenal Historic District retains integrity of location, design, setting, materials, workmanship, feeling, and association. The district meets National Register of Historic Places Criteria A, B, and C at the national level.

Watertown Context

Little is known regarding the specific European settlement history of the Watertown Arsenal lands prior to 1816. The "Dorchester Field" area, where settlers from Dorchester landed in 1630 may have included the Arsenal tract (Dobbs 1977:3). A Revolutionary War period account by colonist Roger Clapp was interpreted by nineteenth-century historian Francis S. Drake to suggest that at that time the Arsenal area had been "an encampment of about fifty friendly Indians of the Stockbridge tribe" (quoted in Dobbs 1977:3).

The approximately 4.1 square miles which Watertown has occupied since the mid-nineteenth century were originally part of a larger area (including Waltham and Weston) encompassed in the 1630 Massachusetts Bay Colony grant. The region, a primary area of early westward expansion out of Boston, and Watertown, located at the head of navigation on the Charles River, was an important early example of the East Anglican dispersed settlement system (MHC 1980:3; 1982:44). Over 100 families settled in the town during the

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 3

second quarter of the seventeenth century. Settlers were primarily engaged in agriculture, cattle grazing and fishing (MHC 1980:1-3). During the Colonial Period (1676-1776) Watertown expanded along the settlement and economic patterns established by the mid-seventeenth century. The town's population experienced moderate growth in the Federal Period (1776-1830), from 1,057 in 1776 to 1,641 in 1830. A town center began to emerge at Watertown Square where, by 1800, several mills were located. Early docks may have been built at Watertown Square for shipping goods. As Watertown's industrial presence grew along the Charles, the upland areas to the north developed as an affluent Boston suburb with large estates (MHC 1980:4).

During the latter part of this period, in 1816, the Watertown Arsenal was established on approximately 40 acres east of Watertown square. The Arsenal development included buildings and docking facilities and was instrumental in construction of the Boston Turnpike (1816, Arsenal Street).

Arsenal Military Background

The establishment of the Arsenal at Watertown grew out of many decades of Colonial period military history as it evolved into a set of U.S. Government policies after the Revolutionary War. During the Colonial period, militiamen had been required to be self-equipped with arms and principally used the smoothbore musket, and later the Pennsylvania (or Kentucky) rifle (Weigley 1984:9, 10). Each militia district maintained public gunpowder supplies. Only fortifications and large communities had artillery. In response to the British Act of 1774 prohibiting export of firearms to the Colonies and ensuing events of the Revolutionary War, the Continental Congress authorized the first public arms factories to begin operations in Massachusetts, Virginia and Pennsylvania, and established armories in Pennsylvania and New Jersey (Huston 1966:21). Domestic foundries produced artillery, cannon balls, and shot from locally extracted iron.

In 1794, Congress authorized establishment of two national armories, which were federal arms factories — Springfield Armory (1794-95) and Harpers Ferry (1796) —, as well as the creation of an arsenal at Charlestown, Massachusetts. Approved by the Massachusetts State Legislature in 1800, the Charlestown Arsenal supplied ordnance to the Army and organized militia in the New England States. The Arsenal operations were, however, fairly short-lived. Maritime military operations during the War of 1812 required a naval repair yard in Boston Harbor. Thus Charlestown Arsenal was turned over to the Navy Department, to become the Charlestown Navy Yard, and a new arsenal location to serve New England was sought (Burns and Bahr 1982:20).

At the same time, on 14 May 1812, Congress created the Ordnance Department, which, after 1815, was responsible for supervision of government armories and private arms contracts and training of personnel

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 4

(Huston 1966:15). The Ordnance Department remained in existence until the 1960s, aside from a brief merger with the Artillery Department from 1821 to 1832.

By 1820, a total of 12 arsenals had been established, and only two more were added after mid-century, until the twentieth century (Green et al. 1955:15; Huston 1966:114). The major arsenals for production were: Springfield and Harpers Ferry (small arms), Watervliet (artillery equipment and ammunition), Watertown (small arms ammunition and gun carriages), and Frankford (ammunition). Harper's Ferry was destroyed early in the Civil War (Green et al. 1955:15). Established after the Civil War, Rock Island manufactured small arms and, later, tanks, and Picatinny, originally built as a powder depot, manufactured large caliber ammunition, fuzes, and high explosives. All powder used by the U.S. Army was purchased until 1907 (Green et al. 1955:19) and was stored at depots around the country.

Throughout the nineteenth century responsibility for overseeing the national arsenals alternated between the military and private sectors. Up to 1841, there were civilian superintendents at arsenals; in the period from 1841 to ca. 1852 ordnance officers took over; from ca. 1852 to 1861, civilians were in charge; and from 1861 to the present, ordnance officers have overseen operations.

Watertown Arsenal Site Selection, Plan, and First Buildings

The search for a new arsenal site in New England proceeded under Captain George Talcott, Commander of the Charlestown Arsenal. Locations in the vicinity of Portsmouth, New Hampshire, on the Kennebec River in Maine, and in the Boston area were considered. Talcott recommended Watertown to Colonel George Bumford, Chief of Ordnance, on the grounds of its proximity to Boston; navigable waterway; and secure, elevated, and inland location. In 1816 the Commonwealth of Massachusetts authorized purchase of land at Watertown for establishment of an ordnance depot. That same year purchases were made and site work and building construction began, immediately east of the historic district (Burns and Bahr 1982:20, 21).

Talcott oversaw the design and construction of the Arsenal. As architect, he selected Alexander Parris, a well-qualified designer formerly of the Corps of Artificers, trained in the office of Charles Bullfinch, and then a practicing architect in Boston. Parris may have used the Arsenal at Gibbonsville, New York (later Watervliet Arsenal), erected in 1813 as a model.

The Watertown Arsenal plan as it was first executed east and outside of the historic district in the area now referred to as the Formerly Used Defense Site (FUDS)(Glover 1992), combined function and formality. The arrangement consisted of twelve buildings aligned on a north/south axis around a central parade ground and set on a rise above the Charles River. At either end was a two-story, Federal-style military store (north) and a similarly designed arsenal building (south). On the west and east sides were two, two-story officers'

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 5

quarters; two, two-story barracks; and six, one-story shops for artificers. A formal entrance road led from Market Street (a pre-existing road) northward up the incline to the arsenal building. A fifteen-ft high brick wall surrounded the complex.

The buildings were constructed of hard brick, originally painted white, with granite, freestone, and rough stone foundations and trim. The low-pitched gable roofs were of slate. Two stylistic vocabularies were represented: the Federal style used for the arsenal buildings, and the Greek Revival, used for officers' quarters (Burns and Bahr 1982:26).

By 1819, the first buildings were completed and occupied. The north and south arsenal buildings and magazines comprised the ordnance depot, housing arms, and ammunition. The machine, blacksmith, and carpenter's shops contained work space for artillery repair and manufacture of small arms cartridges. Officers quarters and barracks housed men stationed at the Arsenal. Captain Talcott noted in a letter to Colonel Wadsworth dated January 4, 1817 that the design was intended to reflect the mature stature of the country and that he had, "endeavored to combine ability, neatness, and durability in every part..." (quoted in Burns and Bahr 1982:28).

Mid-Nineteenth-Century Expansion

In its early period of history from 1816 to 1860, Watertown Arsenal operated primarily for the receipt, cleaning, storage, and issue of small arms and ordnance supplies and for light manufacturing. The productive output of the Arsenal from 1820 to 1830, primarily in small arms cartridges, was limited in comparison to that of other contemporary ordnance posts. Between 1835 and 1860, manufacturing expanded to include wooden field, siege, and seacoast guns and carriages (Burns and Bahr 1982:74).

In the nineteenth century, field carriages and their limbers (detachable, wheeled, front sections for field mobility) and caissons (ammunition wagons), were constructed of oak timbers with wrought iron reinforcement and were relatively small and simply designed. Seacoast carriages, by contrast, needed to be larger and more complex to accommodate the more massive guns, which were pivot mounted on stationary bases. Carriages were constructed of cast iron, wood, wrought iron, and, at the end of the nineteenth century, steel. In all cases, carriage assembly consisted of numerous parts that were individually fabricated and not interchangeable. While the materials and methods of production of gun carriages changed, manufacturing at the Watertown Arsenal has always been characterized by small quantity and variety of products, assembled from many specialized parts, rather than large-scale mass production.

During the late 1830s, the Watertown Arsenal began to evolve from an ordnance depot to a construction facility. By 1839, two additional abutting land purchases were made: ten acres to the west, from Thomas

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 6

Learned, and three acres to the northeast, from Jonathan Child, et al. The west parcel including Town Road, (Bank Lane), is the central area of the historic district; a small triangular piece of the northeast acquisition, including a segment of Bank Lane, forms the northeast corner of the Arsenal today. The prior use of this land is not known.

By 1830 Building 71 in the FUDS (demolished), originally used as a blacksmith shop, was functioning as a laboratory for mixing paints, preparing lubricants used in cannon balls, waterproofing paper cartridges and preparing ingredients for fuses, torches, fire-balls, and signal rockets.

A wood-frame, Greek Revival-style laboratory, the first major deviation from the original design, was the first building erected on the west parcel in 1842 as a facility for preparing paints and lubricants used in cleaning and maintaining equipment. It was razed in 1917 (Dobbs 1977:18). By the 1840s, increased production of wooden field and siege gun carriages and their limbers and caissons necessitated new facilities for lumber storage. The existing rough-board-sheathed sheds provided inadequate ventilation for drying, and the carriages made from the unseasoned wood were subject to warping. Two large, brick structures, the East Timber Storehouse (1847, Building 51, in the FUDS, demolished) and West Timber Storehouse (1851, Building 37) in the historic district were constructed on either side of the original complex. Although their presence established a new east-west axis and marked the first direct and consciously designed addition to the 1816 site plan, their arcaded design and brick materials were compatible with the earlier buildings (Burns and Bahr 1982:32, 33, and 35).

Other new construction in this period within the historic district included a brick Stable (Building 118) located immediately west of the West Timber Storehouse. The Stable was relocated 100 yards south to its present site in the 1890s and converted to officers' quarters. Two magazines and a third (Projecting Traverse) building were built in a group west of the stable. A small quarters' building, possibly constructed prior to Arsenal acquisition, was sited at the southwest corner of the property at Prospect and Market streets. A final change in this period was the construction of a new entrance on Arsenal Street and Main Avenue (present-day Talcott Avenue), running south from the entrance toward the river between the West Timber Storehouse and the 1816 quadrangle (Burns and Bahr 1982:35).

Civil War (1860-1865)

The Civil War (1860-65) brought greatly increased activity and considerable physical expansion at the Arsenal. Operations and new construction at the Watertown Arsenal during the Civil War occurred in response to the government's decision to equip arsenals for production as the private sector could not be reliably expected to fulfill war-time ordnance demands. Watertown was one of several arsenals selected for improvements.

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 7

In addition to its ongoing responsibilities, the Arsenal was instructed to manufacture seacoast gun carriages of wrought iron, rather than wood. Erection of a large Machine Shop (Building 313) and a Smith Shop (Building 43) to the north of the West Timber Storehouse (Building 37) in 1862 housed the Arsenal's expanded metal working capacities in an integrated locus of production. These three buildings (and later the Carriage Erecting Shop, Building 312, erected 1894) constituted the core of a manufacturing plant that began as an auxiliary function of making gun carriages for seacoast fortifications, but eventually evolved into a full-scale industrial operation by 1900 (Burns and Bahr 1982:75).

The design of Buildings 43 and 313 introduced new, yet compatible designs that were the precursors to later industrial forms at the Arsenal. Comparable scale, gable roofs, brick construction, round arched windows, and brick dentil cornices linked the existing and new buildings (Burns and Bahr 1982:37-39).

The 1860s expansion was executed under Thomas J. Rodman, Watertown Arsenal Commanding Officer from 1859 to 1865. Thomas J. Rodman developed a highly innovative and successful iron casting process used in manufacture of the large 15-inch (190-inch-long) guns, known as the Rodman Gun, during the Civil War period. With the introduction of increasingly larger caliber seacoast defense guns such as this, modifications in gun carriage design and material to accommodate the heavier guns were also required.

Rodman's last construction project at the Watertown Arsenal was a new imposing brick, Italianate-style Commanding Officer's Quarters (1865, Building 111, listed in the National Register, Corbett 1976) which Rodman designed. Controversy developed over the final design due to its architectural extravagance and cost, although the final figure proved to be much less. This and other charges of mismanagement, possibly unfounded, brought against Rodman resulted in his departure from Watertown before the house was completed. The master mason for the house was Capt. Thomas L. French, a Watertown leader and an employee at Watertown Arsenal for more than 25 years. Capt. French was, by trade, a mason and builder in Holliston and Watertown. The stone cutter was J. William O'Donnell.

Thomas J. Rodman's concept for creation of a manufacturing center at Watertown greatly influenced the Arsenal's later growth. Rodman went on to oversee extensive construction at Rock Island Arsenal, Illinois where the more fully realized expression of his design and functional vision has clear precedents at Watertown (Burns and Bahr 1982:40-43).

The output of the Arsenal's workforce was impressive during the Civil War: almost 10,100 small arms cartridges; a million buck shot and ball cartridges; 8½ million 594 caliber musket cartridges; 100 seacoast carriages, each for 10-inch and 15-inch Rodman guns; 100 limbers for 3-inch guns; 30 carriages for 12 powder guns; and 100 8-inch and 50 10-inch mortar beds, along with caissons, artillery munition, small arms ammunition, shot, bayonet scabbards, cap pouches, cartridge boxes, waist belts, gun slings, and related materials (Burns and Bahr 1982:75, 79; Dobbs 1977:25).

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 8

The Arsenal drew largely from the local Watertown labor supply, hiring both skilled carpenters and machinists and semi-skilled and unskilled men and women for more routine tasks. Watertown's population increased dramatically during this period from 1,641 in 1830 to 4,326 in 1870; Irish immigrants represented as much as one quarter of the total. Residents found skilled and unskilled employment in a growing local industrial base. The Arsenal was a significant local wartime employer. At peak employment in 1864, 809 persons were employed, including 101 women (Burns and Bahr 1982:76).

Late-Nineteenth-Century Improvements (1865-1890)

Relative inactivity in physical development characterized the years following Rodman's departure and the end of the Civil War. Other industrial improvements, no longer extant, included a new bronze foundry (site of Building 312), and a later iron and brass foundry (1867) and gas lighting fuel house (1865), both located near the Charles River Wharf at the southeast corner of the Arsenal. All were razed in 1906-1907. A secondary older and smaller wharf was located at the end of Magazine Avenue. At that time a channel ditch existed paralleling the southwest side of Market Street across a projecting curve of the Charles River bank. The function of this channel is not known.

In 1867, the Arsenal purchased 44 acres of land to the east from Willard Sears (east of the historic district). The purchase was a precautionary measure in light of potential future Arsenal growth and rising local land costs. This purchase formed the majority of the FUDS parcel which bordered the Charles River to the south. Structures erected on this land during the second half of the 1800s consisted of an octagonal magazine, an iron and brass foundry, and a gas house/gasometer. Two farmhouse structures that were on the land at the time of its purchase were also put to use by the Arsenal, one of them (Building 124, later Building 115) serving as the Post Hospital until World War I. The laboratory facility, housed in Building 71 of the FUDS at that time also expanded to include conducting experiments to determine the best quality of iron for casting into guns. The remainder of the property was not developed until World War I.

Production slowed in the early 1870s; employment dropped to 16 workmen in 1870. In the 1870s and 1880s, employment numbers stayed below 100. As part of the national military system, Watertown experienced the effects of low appropriations during these years. [Its primary function continued to be as an ordnance supply, maintenance, and issuance facility]. During the 1870s, Watertown Arsenal continued to manufacture, at a much reduced scale, seacoast carriages for 8-inch, 10-inch, and 15-inch cast iron guns as well as experimental wire-wrapped guns. The use of wood for gun carriages declined after 1865, and in 1879, installation of the Emery Testing Machine at Watertown Arsenal reflected the government's interest in resolving controversy surrounding the relative merits of cast iron and steel. The establishment, in the 1880s, of a new national seacoast defense program included provisions to enhance fortifications and update

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 9

armaments. New carriage designs for field and siege breechloading steel guns, as well as the fabrication of barbette and disappearing carriages for 6-inch to 16-inch seacoast guns, was initiated.

Major Industrial Expansion (1890-1917)

Between 1890 and 1900, the Watertown Arsenal formally shifted from an ordnance depot to a manufacturing plant. New national armament policies changed Watertown Arsenal's status when, in 1891 the Department of War designated Watertown Arsenal as the Army's gun carriage manufacturing plant, a counterpart to Watervliet Arsenal, New York which had been designated the Army gun factory in 1887. In 1892, Congress authorized modernization of the Arsenal to accommodate production of new model disappearing carriages for large guns. The conversion required both new construction and modification of existing facilities (Burns and Bahr 1982:46).

By the 1890s the Watertown Arsenal Laboratories had been officially established in Buildings 71, 72, and 73 of the FUDS. These laboratories consisted of a physical testing branch, and a chemical laboratory for testing and experimenting on ferrous metals.

In 1894, Watertown Arsenal's foundry facility was expanded. It contained an 18-ton air reverberatory furnace, two cupola furnaces, core ovens, five brass casting furnaces and associated storage facilities and cranes and was the only foundry maintained by the Department of Ordnance, United States Army. That year, the foundry made all the bronze and iron castings required in the manufacture of 8-inch, 10-inch, and 12-inch barbette carriages, and used in alterations of 15-inch and 8-inch converted rifle carriages (Burns and Bahr 1982:85).

Production of enlarged gun carriages continued. Related improvements included reequipping of the main machine shop and the blacksmith shop, along with erection of a new carriage erecting shop (Building 312, 1894) and a carriage storehouse (Building 36) by 1900. The volume and demand for carriage work increased steadily during the Spanish American War (1898) through 1915. Changes in guns and gun carriage design required new buildings and modifications to existing buildings.

The Carriage Erecting Shop (1894, Building 312) completed the gun carriage manufacturing complex. Six years later, a Carriage Storehouse (1900, Building 36) was constructed, allowing full use of Building 312 for gun carriage erection.

This new construction and modification work, particularly as seen in Building 312, was transitional in design; it was both compatible with and sensitive to earlier buildings and incorporated modern industrial design elements more fully realized in subsequent buildings. Rectangular form, gable roofs, brick pilaster

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 10

construction, arched openings and dentil cornices were the primary design features. Construction techniques also reflected a transition from traditional slowburning timber and masonry to increased use of steel structural and roof framing.

The siting of the buildings along with the addition of an interconnecting rail system linked to the Boston and Fitchburg Railroad transformed the Arsenal from its earlier campus-like, bucolic appearance to an efficient industrial compound.

The classically-inspired Administration Building (Building 131), the highlight of the 1900 building campaign, cost \$15,000 and shifted the administrative center of the Arsenal away from the historic quadrangle for the first time. This was the most ornate building to have been constructed at the Arsenal since the erection of the Commanding Officer's Quarters, Building 111 and introduced the Georgian Revival Style. It was loosely modeled after Philadelphia's Independence Hall, symbolizing the Arsenal's commitment to safe-guarding the nation's freedom and was a form later used in buildings at Picatinny and Frankford Arsenals. The architect, Charles H. Alden, Jr., was based in Boston.

Several other buildings were erected in the historic district shortly after 1900. These buildings included a brick Cow Stable (1906, Building 912, later 117) for cattle kept at the Arsenal and grazed on the river bank until the 1930s, and a brick Power House/Boiler Room (1913, Building 60) which replaced the heating function and pulley and shaft power generation system formerly in Building 313. Building 36 was enlarged to twice its size after 1912. Four additional structures were built in the early 1900s on the FUDS for use as a magazine, a barracks, non-commissioned officers' quarters, and a powder magazine.

Efforts to improve operational efficiency culminated with introduction of the Taylor System of scientific management in 1909 (Aitken 1960). As a measure to increase efficiency and improve the complex industrial operations, Watertown Arsenal's Commanding Officer, Charles B. Wheeler (Commander 1908 to 1917), initiated a review of the Watertown plant. Wheeler invited Frederick Winslow Taylor and his associate Carl Barth to study the manufacturing procedures at the Arsenal and make recommendations for improvements in accordance with the Taylor System of Scientific Management. Watertown Arsenal led other arsenals in the adoption of the system, which planned every operation of administration, management, and production work according to a scientific plan. No enlargement of the foundry was determined necessary, although shop organizational changes were recommended. Some of Taylor's recommendations were successfully applied at Watertown Arsenal, particularly in the machine shop which served as a model for other manufacturing arsenals. However, the reticence of foundry workers and a week-long founders' strike led to the passage of congressional legislation in 1915 that prohibited time studies and related wage systems at Government installations (Aitken 1966; Burns and Bahr 1982:97-102). Watertown led all other arsenals in the country in the adoption of such a system which enabled the installation to reduce costs and increase productivity, thus

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 11

installations (Aitken 1966; Burns and Bahr 1982:97-102). Watertown led all other arsenals in the country in the adoption of such a system which enabled the installation to reduce costs and increase productivity, thus making it more competitive with private manufacturers. Col. Wheeler was also responsible for introducing the manufacture of armor piercing projectiles at Watertown.

World War I (1917-1919)

During World War I, the production capacity of Watertown Arsenal was substantially expanded, and the Arsenal nearly tripled in size with 23 buildings added between 1917 and 1920. The Arsenal's Commanding Officer through the War and post-War periods was Lt. Col. (later Brigadier General) Tracy C. Dickson, from 1917 to 1932. Watertown Arsenal's primary output was the manufacture of steel gun carriages for 16-inch seacoast guns, although smaller gun carriages, armor-piercing projectiles, and other ordnance supplies were also produced. The gun carriage manufacturing complex was supplemented by a new erecting shop, Building No. 311, to the west, that was built in 1917 specifically for assembling heavy 16-inch seacoast gun carriages. Building No. 311 was among those contracted to Monks & Johnson, a Boston architectural firm noted for their industrial designs. The building's unusual size was dictated by the spatial demands of the industrial equipment, some of which was the largest in the world, and the carriages themselves. The movement of these heavy pieces required crane ways and train rails. As a result, Building 311 utilized a newly emerging industrial architecture. A steel frame and Warren roof truss enabled the creation of a large open space of great height which could accommodate machining equipment, rail cranes and the carriages. Large expanses of glass between brick-faced piers provided an abundance of natural lighting. Building 311 received parts for disappearing, barbette, and railway carriages for guns up to 16-inch in caliber from the nearby forge, foundry, and machine shops, to which it was linked by rail. As had earlier been the case, carriage assembly consisted of numerous parts that were individually fabricated and not interchangeable. Building 312, the earlier Erecting Shop, was converted to a machine shop in support of the new assembly activities. Standard gauge railroad track ran through the building connecting with railroad spurs throughout the Arsenal, and to the main Boston and Fitchburg Railroad line directly to the north across Arsenal Street, facilitating the receipt of raw materials and the shipment of finished products (Burns and Bahr 1982:59).

The majority of World War I-era construction, with the exception of Building 311, took place in the FUDS east of the historic district in 1919. These constructions focused on manufacturing and storage facilities, along with the laboratories, to make the Arsenal a full-time industrial plant. Two of the Arsenal's more important structures, a foundry (Building 41) and a recuperator shop (Building 34) were erected during this period. Both buildings were used extensively for the manufacture of machines and assembly of ordnance materials. During World War I activities at the FUDS consisted of primarily manufacturing ordnance materials such as anti-aircraft carriages, 240 mm howitzer carriages, forgings for guns and howitzers, 14-inch high explosive shells, and trench mortar tubes.

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 12

Construction of the new, larger foundry (Building 41) erected into FUDS resulted in the conversion of Building 37 in the historic district to maintenance and service functions. Also in the historic district, the carriage storehouse (Building 36) was enlarged and converted to accommodate a variety of projects. Building 60, the Power House, was enlarged in 1917 to support expanded industrial activities, and an underground coal storage pocket (Structure 295, demolished) was also constructed.

Interwar Period (1919–1941)

Following World War I, new buildings within the historic district, west of Talcott Avenue included the Locomotive House (1920, Building 97) to service engines and trains on the Arsenal's standard gauge railway, and the Bar Stock Storehouse (1920, Building 292), for storage of raw materials, both located with direct access to the Boston and Maine Railroad. In general, however, production and personnel declined sharply from a high of 5,093 workers in 1918 to a low of 235 in 1928 (Burns and Bahr 1982:107–111).

As part of the major expansion of the Arsenal's physical plant under Lt. Col./Brig. Gen. Tracy C. Dickson, the nationally known landscape architecture firm, Olmsted Brothers, was engaged to assist in planning improvements to roads, walkways, and plantings at Watertown Arsenal. Two important projects influenced the landscape design of certain areas of the Arsenal in the early twentieth century. In 1906, the Secretary of War granted the Metropolitan Park Commission an 11.14-acre right-of-way through the Arsenal grounds for construction of Charles River Road. Completed in 1909, it was designated for pleasure vehicles only as part of Boston's "Emerald Necklace." The gasometer, gas house and old foundry were demolished at this time (Dobbs 1977:40–41). In 1919, The Olmsted Brothers landscape architectural firm prepared a park-like plan proposal for roadway and walkway improvements and landscaping at the Arsenal (Olmsted 1919). Major components of the plan included widening Main Avenue and relocating its southern half; addition of sidewalks; elimination of paths; and an extensive planting program along Main Avenue and North Beacon Street and around the Administration and Commandants' Headquarters buildings. Portions of the structural and planting scheme improvements were carried out and are readable today.

In the years following World War I, ferrous metallurgical research and testing by the Watertown Arsenal laboratories developed as ordnance manufacturing declined. The peacetime advancements benefited both ordnance and commercial industry, and contributed to the military success of World War II. Many of the solutions achieved to ordnance work problems focussed on the behavioral properties and manufacture of iron and steel.

Watertown Arsenal's contributions to metallurgy began in the nineteenth century, particularly with the development of the Rodman cast-iron cannon in 1849 and installation of the Emery Testing Machine, which tested the strength of metals, in 1879. Technological developments at Watertown Arsenal in the twentieth

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 13

century continued to take place not only in industrial production processes, but in laboratory research geared towards improving both products and processes. Major accomplishments occurred in the 1920s and 1930s under Brigadier General Tracy C. Dickson: cold-working, or autofrettage, of steel guns (1921); use of radiography (x-ray) as a method for the identification and elimination of casting defects in steel foundry control and for welding control (1922); centrifugal casting of steel gun tubes which increased efficiency by 700 percent (1925); successful introduction of the all welded gun carriage (1929); development of molybdenum high speed tool steels to replace strategic tungsten tool steels (1930); use of spectrographic analyses of the chemical components of foundry metals (1934); development of cast armor plate for vehicles and other large applications (1935); along with development of impact testing for high velocity ruptures of metal and macro etching for inspection of forgings and of centrifugally cast guns. During this period, Watertown Arsenal's commitment to integrated research with private industrial and university laboratories was reflected in the formation of the Ferrous Metallurgical Advisory Board (Lester 1941; Burns and Bahr 1982:148-154).

The updated forge facility in Building 43 not only enhanced production, but also contributed to the ongoing experimental metal work research, including the use of new nondestructive techniques such as macro etching for examination and quality control of forgings, at the Watertown Arsenal. The forge produced a variety of steel samples for systematic qualitative and quantitative scientific analysis. FUDS buildings involved in this research included the development of centrifugal casting for steel gun manufacture (conducted in Building 41), the method of cold-working steel known as "autofrettage" (conducted in Building 331), and the development of stronger and tougher gun steels resulting from research performed in the laboratories (Buildings 71, 72, and 73).

In 1938, the Cow Stable (1906, Building 117) and Horse Stable (1851, moved, Building 118) were renovated as officers' quarters under the Works Service Administration continuing the Arsenal's trend of building reuse. The South Gate Sentry Station (1939, Building 142) illustrates a picturesque aspect of the Arsenal's design from this period.

World War II (1941-1945)

The Japanese invasion of Pearl Harbor in the fall of 1941 spurred a nationwide push for production of war materiel to supply U.S. troops. Little attention had previously been given to commercial production of howitzers and other artillery guns. Consequently, the Watertown and Watervliet arsenals were under great pressure to expand facilities, produce weapons, and provide instruction to private companies until machine tools were available for commercial manufacture. Tank and antitank guns, aircraft and antiaircraft guns, and self-propelled guns and howitzers comprised by far the greatest share of artillery weapons. Two major

(continued)

United States Department of the Interior
National Park ServiceNational Register of Historic Places
Continuation SheetProperty name Watertown Arsenal Historic District, Watertown, Middlesex County, MassachusettsSection number 8

Page 14

metal-working techniques developed in the interwar period at Watertown and Watervliet were employed for the first time on a large scale: cold-working and centrifugal casting (Huston 1966:477).

With no room for expansion, in 1941 the Arsenal purchased seven acres to the west. This was the Arsenal's final property purchase, although nearby lands were later leased. The acquisition included a large industrial building owned by the Simmons Mattress Company, but originally built in 1922 as a piano factory for Vose Sons Piano Company. During the 1940s and early 1950s the building served various functions. It contained a machine shop and was the headquarters for the machine tool section of the Arsenal's Apprentice School, as well as housing several government agencies, including the U. S. Atomic Energy Commission, the U. S. Air Force Geophysics Laboratory, and the U. S. Army Corps of Engineers Soils Laboratory and Engineering Warehouse. Extending on to this same property, the Erecting Shop (Building 311) was enlarged westward, doubling its size in 1941. The addition was identical in design to the original structure and reused architectural ornamentation from the original west end elevation (Burns and Bahr 1982:65). Also included in the acquisition was a grant from the Town of Watertown for School Street, a north-south street referred to as Town Road, Bank Lane in the early nineteenth century. School Street was discontinued, as its alignment bisected the enlarged building. The addition contained x-ray facilities, the most advanced method for non-destructive materials testing.

The construction of new buildings at Watertown Arsenal was limited. Extensions were made to the Administration Building (Dobbs 1977:54). The forge in Building 43 continued to support Watertown Arsenal's principal role as a pilot plant, providing technological guidance to commercial industries assigned to the war production effort, in addition to manufacture of gun carriages and other armaments. Only one new structure was constructed at the FUDS during World War II. This consisted of Building 74, added to the laboratories facilities in 1942 for the testing of armor and projectiles as well as experiments with cold-working processes. The northeast area of the FUDS may also have been added either during or immediately following the war. This area contained three major storage structures, and by the 1950s was also being used as a disposal area for the burning and/or shipment of uranium waste.

Post World War II to the Present (1945 – 1997)

Little site development followed the World War II period, as the Watertown Arsenal's mission, like other arsenals shifted from manufacturing to materials research testing and development. In 1953, Building 39 was officially designated the Watertown Arsenal Laboratories, and the interior space was reconstructed to serve as the Arsenal's mechanical and metallurgical laboratories. Its basic function as a materials research laboratory remained unchanged up until 1995 when the Arsenal closed. Specific information about the activities of the Metals and Ceramics, Organic Materials, and Mechanics and Structural Integrity laboratories has been designated classified. The last major addition to the Arsenal was the Horace Hardy Lester Reactor,

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 15

Building 100 constructed adjacent to Building 97 in 1959–1960. Named in honor of a pioneer in the field of industrial radiography employed at the Arsenal from 1922 to 1953, the Lester Reactor was based on the design of the Bulk Shielding Facility at Oak Ridge National Laboratory and contained one of the earliest circular bridge cranes. It was intended to meet the technical needs of the Arsenal as well as those of academic scientists and industries in the Boston area. Upon completion, it was the only facility of its type operated by the U.S. Army and opened up new areas of nondestructive materials testing and laboratory research for all Army programs. Research conducted at the Watertown Arsenal was basic to the work at all other Army testing locations and arsenals.

At the same time, several of the older buildings were reoutfitted for new assignments. Buildings 97 and 292 were converted to reactor support and laboratory buildings. Building 43 was equipped for melting, forging, and machining DU (depleted uranium); Building 312 was refitted as a center for testing and machining beryllium and uranium; the machine shop in Building 313 operated a specimen shop producing metal samples for materials analyses.

No construction occurred within the FUDS during the 1950s or 1960s. Following World War II as the Arsenal's mission shifted from that of a manufacturing facility to a center for materials testing, the laboratories at the FUDS undertook the development and heat treatment of high strength gun tubes by the centrifugal process along with other ordnance manufacturing techniques until their 1953 relocation in Building 39 at the west end of the Arsenal. Three of the former laboratories (Buildings 72, 73, and 74) were transformed to offices, while the Physical Testing Branch (housed in Building 71) continued to perform acceptance tests on all Ordnance components and materials used by the Arsenal until the 1966 Phase Down. The FUDS also contained two other laboratories following World War II. These consisted of the Gage Laboratory (housed in Building 211), used for checking and designing all gage equipment used by the Arsenal, and the Rodman Laboratory, dedicated in Building 421 in 1954. The Rodman Laboratory was charged with studying the principles of metallurgical processes such as various types of melting, alloying, casting, hot and cold forming, heat treating, machining, development and use of sintered metals, ceramics and refractory materials, and their application to industrial manufacture of ordnance material.

The rest of the property remained in the possession of Army Materials Research Agency (AMRA) until 1967 when it was turned over to the Army Materials and Mechanics Research Center (AMMRC). In the same period, the Lester Reactor technology was considered outmoded, and the reactor was shut down in 1970. It continued to be used as a laboratory space until it was demolished in 1993.

Under AMMRC ownership after 1968, numerous modifications were made to many of the buildings with the intent of saving energy. Many original windows and doors were removed and replaced with more efficient contemporary industrial sash and aluminum frame doors. Many openings were bricked or stuccoed in and original stone lintels and sills were removed. These changes had a negative impact on the integrity

(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 8

Page 16

of individual buildings, but as a group of buildings which constitute the only remaining, relatively unaltered surviving portion of the Watertown Arsenal, the Watertown Arsenal Historic District possesses heightened significance in terms of both its present physical qualities and setting and its place in industrial history (Burns and Bahr 1985:68).

Since 1985, the facility has been known as the Army Materials Technology Laboratory (AMTL). Up until 1995 when AMTL closed, it employed approximately 600 people and occupied buildings, continuing to function as the lead Army laboratory for materials, materials testing technology, light weight armor, solid mechanics, and manufacturing testing technology (E.G. & G. 1988:16).

(end)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 1

9. Major Bibliographic References

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United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 2

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United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 3

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United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 4

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United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 5

Watertown Arsenal

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(continued)

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 9

Page 6

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- | | |
|------|--|
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|------|---|

(end)

10. Geographical DataAcreage of Property 45**UTM References**

(Place additional UTM references on a continuation sheet.)

1	1	9	3	2	1	2	7	0	4	6	9	2	2	6	0
	Zone		Easting			Northing									
2	1	9	3	2	1	8	4	0	4	6	9	2	1	6	0

3	1	9	3	2	1	9	0	0	4	6	9	1	7	3	0
	Zone		Easting			Northing									
4	1	9	3	2	1	2	6	0	4	6	9	2	1	1	0

☐ See continuation sheet**Verbal Boundary Description**

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared Byname/title Virginia H. Adams, Director of Architectural Projectsorganization The Public Archaeology Laboratory, Inc.date May 1997street and number 210 Lonsdale Avenuetelephone (401) 728-8780city or town Pawtucketstate RIzip code 02860**Additional Documentation**

Submit the following items with the completed form:

Continuation Sheets**Maps****A USGS map** (7.5 or 15 minute series) indicating the property's location**A Sketch map** for historic districts and properties having large acreage or numerous resource**Photographs**Representative **black and white photographs** of the property.**Additional items**

(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO)

name _____

street and number _____ telephone _____

city or town _____ state _____ zip code _____

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number 10

Page 1

Verbal Boundary Description

The boundaries of the Watertown Arsenal Historic District, Watertown, Suffolk County, Massachusetts are shown on the attached sketch map and follow the legal boundaries of the property owned by the U. S. Army. The district is bounded by Arsenal Street (north); Arsenal Mall and Arsenal Park (east); North Beacon Street (south), and private land (west).

Boundary Justification

The boundaries of the Watertown Arsenal Historic District conform to the current and historic boundaries of this 45-acre portion of the Watertown Arsenal. The buildings and setting of the district, enclosed in wrought iron fencing, form a cohesive entity, distinct from their surroundings. On the east side, modern residential construction separates the Historic District from other buildings, formerly part of the Arsenal, that were sold to the City of Watertown in 1968 and rehabilitated for other, commercial uses.

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Property name Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts

Section number Photographs

Page 1

Photographs

Watertown Arsenal Historic District
Watertown, Middlesex County,
Massachusetts

Photographer: Virginia H. Adams, PAL Inc.
Date: April 1997
Negatives: New England Division, U.S. Army Corps of Engineers

1. Buildings 37 and 313 (l-r), looking northwest.
2. Building 37, looking northeast.
3. Building 313, looking northwest.
4. Building 43, looking northwest.
5. Buildings 43, 313, and 37 (l-r), looking northeast.
6. Building 312, looking northwest.
7. Buildings 313, 37, and 312 (l-r), looking south.
8. Building 311, looking northwest.
9. Buildings 313, 312, 311, and 43 (l-r), looking west.
10. Building 60, looking northwest.
11. Buildings 97 and 292, looking southwest.
12. Buildings 117, 60, and 118 (l-r), looking northwest.
13. Building 131, looking southwest.
14. Building 131, entrance detail, looking west.
15. Building 111, looking southwest.
16. Olmsted Landscape, south of Building 111, looking east.
17. Building 142 and North Beacon Street/Talcott Avenue Gates, looking south.
18. Building 39, looking northwest.

**WATERTOWN ARSENAL NATIONAL REGISTER HISTORIC DISTRICT
WATERTOWN, MASSACHUSETTS
DISTRICT DATA SHEET**

Page 1 of 3

BLDG No.	MHC No.	HISTORIC NAME (Later Functions)	LOCATION	DATE (Additions)	STYLE	C/NC STATUS	RESOURCE TYPE	HABS/HAER NUMBER
36		Gun Carriage Storehouse (Offices and Cafeteria)	Wooley Avenue	1900; 1910		NC	B	
37		West Timber Storehouse (Iron and Brass Foundry; Maintenance Shop)	Talcott Avenue	1851; (1892; 1893; 1918)		C	B	HAER No. MA-20-D
39		[Piano Factory; Mattress Factory] Research Laboratory	Wooley Avenue	1922; purchased 1941 (1953; 1955)		C	B	HAER No. MA-20-U
43		Forge, Smith Shop	Talcott Avenue	1862; (1917; 1918; 1968)		C	B	HAER No. MA-20-C
46		Main Gate Security Post	Arsenal Street	1950s/1960s		NC	B	
60		Power House/Boiler Room	Kingsbury Avenue	1913-1914; (1915; 1917)		C	B	HAER No. MA-20-V
97		Locomotive Repair Shop (Reactor Research Laboratory)	Wooley Avenue	1920; (1959)		C	B	HAER No. MA-20-S
111		Commanding Officer's Quarters	Talcott Avenue	1865	Italianate	C Individually NR listed 1976	B	HABS No. MA-1009-F
117		Cow Stable (Warrant Officers' Quarters - 4 units)	Kingsbury Avenue	1906; (1938)		C	B	HABS No. MA-1009-B
118		Horse Stable (Firehouse; Officer's Quarters)	Kingsbury Avenue	1851; (moved 1893; 1938)		C	B	HABS No. MA-1009-C
131		Administration Building	Talcott Avenue	1900; (1917; 1918; 1943)	Georgian Revival	C	B	HABS No. MA-1009-D

**WATERTOWN ARSENAL NATIONAL REGISTER HISTORIC DISTRICT
WATERTOWN, MASSACHUSETTS
DISTRICT DATA SHEET**

Page 2 of 3

BLDG No.	MHC No.	HISTORIC NAME (Later Functions)	LOCATION	DATE (Additions)	STYLE	C/NC STATUS	RESOURCE TYPE	HABS/HAER NUMBER
142		Sentry Station at South Gate	Talcott Avenue at North Beacon Street	1939		C	B	HABS No. MA-1009-E
147		Vehicle Access Gate	North Beacon Street	ca. 1950s		NC	St	
226		Concrete Bunker	Arsenal Street	ca. 1950s		NC	St	
229		Storage Tank Shed	Wooley Avenue	ca. 1941		NC	B	
244 & 245		Propellant Storage Bunkers	Talcott Avenue	1950s		NC	St	
241		Storage Shed	Wooley Avenue	1980s		NC	B	
243		Storage Shed	Wooley Avenue	1970s		NC	B	
246		Storage Shed	Wooley Avenue	1970s		NC	B	
292		Bar Stock House (Laboratory)	Wooley Avenue	1920; (1959)		C	B	HAER No. MA-20-T
311		Erecting Shop	Thornton Avenue	1917; (1942)		C	B	HAER No. MA-20-E
312		Erecting Shop (large Machine Tool Shop)	Wooley Avenue	1894; (ca. 1917; 1941)		C	B	HAER No. MA-20-F
313		Carriage & Machine Shop (Laboratory/Offices)	Talcott Avenue	1862; (ca. 1920; 1941)		C	B	HAER No. MA-20-G
652		Water Pump House	North Beacon Street	1918		C	B	HAER No. MA-20-W
654		Water Pump House	North Beacon Street	1940s		NC	St	

**WATERTOWN ARSENAL NATIONAL REGISTER HISTORIC DISTRICT
WATERTOWN, MASSACHUSETTS
DISTRICT DATA SHEET**

Page 3 of 3

BLDG No.	MHC No.	HISTORIC NAME (Later Functions)	LOCATION	DATE (Additions)	STYLE	C/NC STATUS	RESOURCE TYPE	HABS/HAER NUMBER
656		Cooling Equipment Building	Wooley Avenue	1960/62		NC	B	
---		Olmsted Landscape	Talcott Avenue	1919-1920		C	Si	HABS No. MA-1009-G
---		Perimeter Fence	Arsenal Street and North Beacon Street	1940s		C	St	
---		Grape Arbor	Talcott Avenue	ca. 1945		C	St	
---		Victory Garden	Talcott Avenue	ca. 1945		C	St	
---		Sign Post	Talcott Avenue	ca. 1910		C	O	

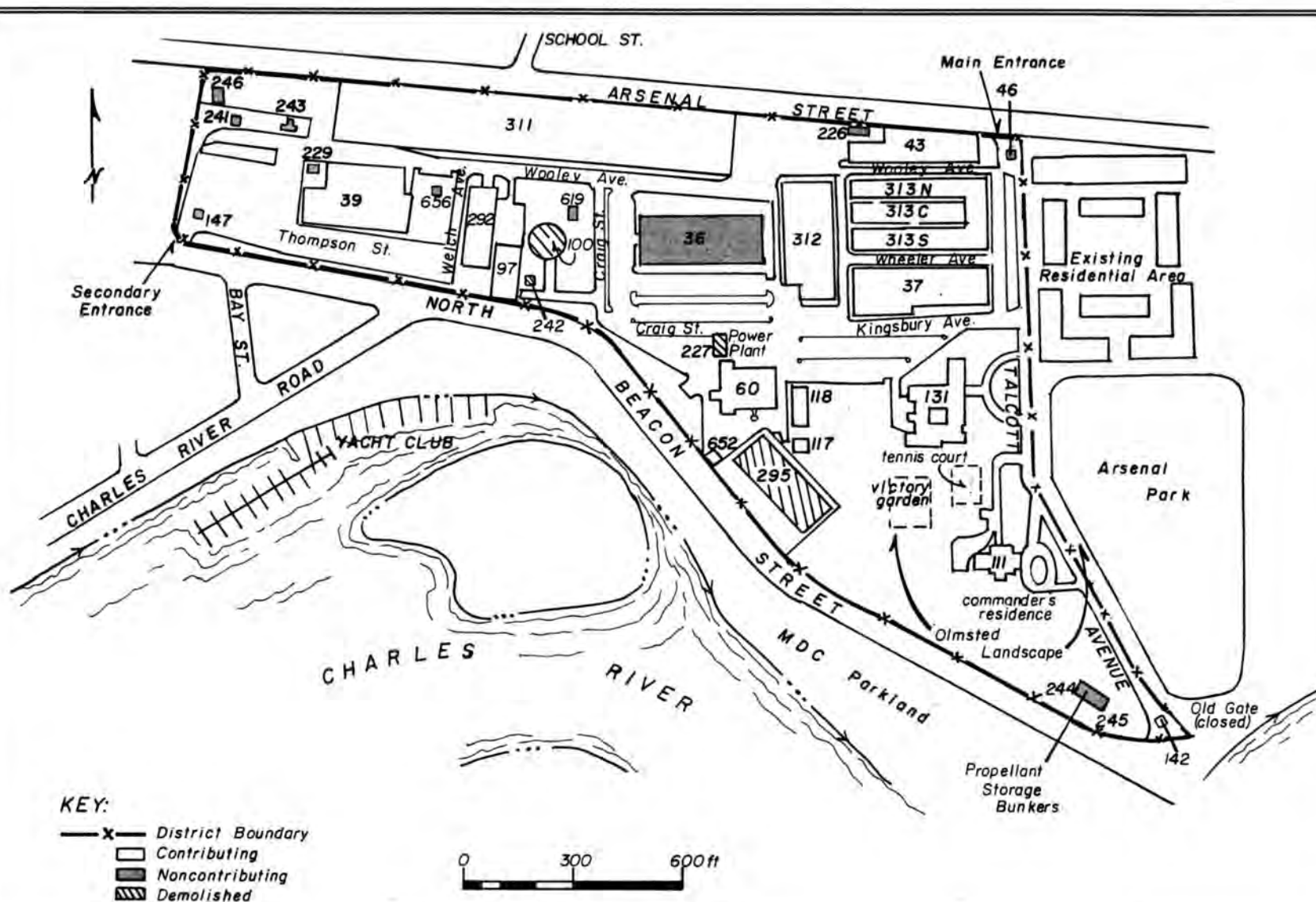
Demolished since 1995:

619 Cooling Tower, 1960/62, demolished 1985
 100 Horace Lester Reactor, 1959, demolished 1993
 242 Storage Tank, 1960/62, demolished 1993
 295 Coal Pocket/Tank Farm, 1913-1914; ca. 1920, demolished 1995
 227 Oil Pump House, 1940s, demolished 1996

Key:

15 Contributing Buildings
 3 Contributing Structures
 1 Contributing Sites
 1 Contributing Objects
 7 Noncontributing Buildings
 4 Noncontributing Structures

B - Building
 St - Structure
 Si - Site
 O - Object



Watertown Arsenal Historic District, Watertown, Middlesex County, Massachusetts.
 National Register of Historic Places, May 1996 (source: USATHAMA 1988).

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: NOMINATION

PROPERTY NAME: Watertown Arsenal Historic District

MULTIPLE
NAME:

STATE & COUNTY: MASSACHUSETTS, Middlesex

DATE RECEIVED: 3/31/99 DATE OF PENDING LIST: 4/13/99
DATE OF 16TH DAY: 4/29/99 DATE OF 45TH DAY: 5/15/99
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 99000498

REASONS FOR REVIEW:

APPEAL: N DATA PROBLEM: N LANDSCAPE: N LESS THAN 50 YEARS: N
OTHER: N PDIL: N PERIOD: N PROGRAM UNAPPROVED: N
REQUEST: N SAMPLE: N SLR DRAFT: N NATIONAL: Y

COMMENT WAIVER: N

___ ACCEPT ___ RETURN ___ REJECT ___ DATE

ABSTRACT/SUMMARY COMMENTS:

RECOM./CRITERIA accept A, B, C

REVIEWER Patricia Anderson

DISCIPLINE Historian

TELEPHONE _____

DATE 5/12/99

DOCUMENTATION see attached comments Y/N see attached SLR Y/N



Watertown Arsenal Historic District
Watertown, Suffolk County
Massachusetts

Buildings 37 and 313 (l-r), looking northwest.

Photo 1 of 18



Watertown Arsenal Historic District
Watertown, Suffolk County
Massachusetts

Building 37 looking northeast.

Photo 2 of 18



Watertown Arsenal Historic District
Watertown, Suffolk County
Massachusetts

Building 313 looking northwest

Photo 3 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 43 looking northwest

Photo 4 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Buildings 43, 313 and 37 (l-r) looking northeast

Photo 5 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 312 looking northwest

Photo 6 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Buildings 313, 37 and 312 (l-r) looking south

Photo 7 of 10



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 311 looking northwest

Photo 8 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Buildings 313, 312, 311 and 43 (l-r) looking west

Photo 9 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 60 looking northwest

Photo 10 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Buildings 97 and 292 looking southwest

Photo 11 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Buildings 117, 60 and 118 (l-r) looking northwest

Photo 12 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 131 looking southwest

Photo 13 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 131, entrance detail, looking west

Photo 14 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 111 looking southwest

photo 15 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Olmsted Landscape, south of Building 111, looking east

Photo 16 of 18



Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 142 and North Beacon Street / Talcott Avenue Gates, looking south

Photo 17 of 18



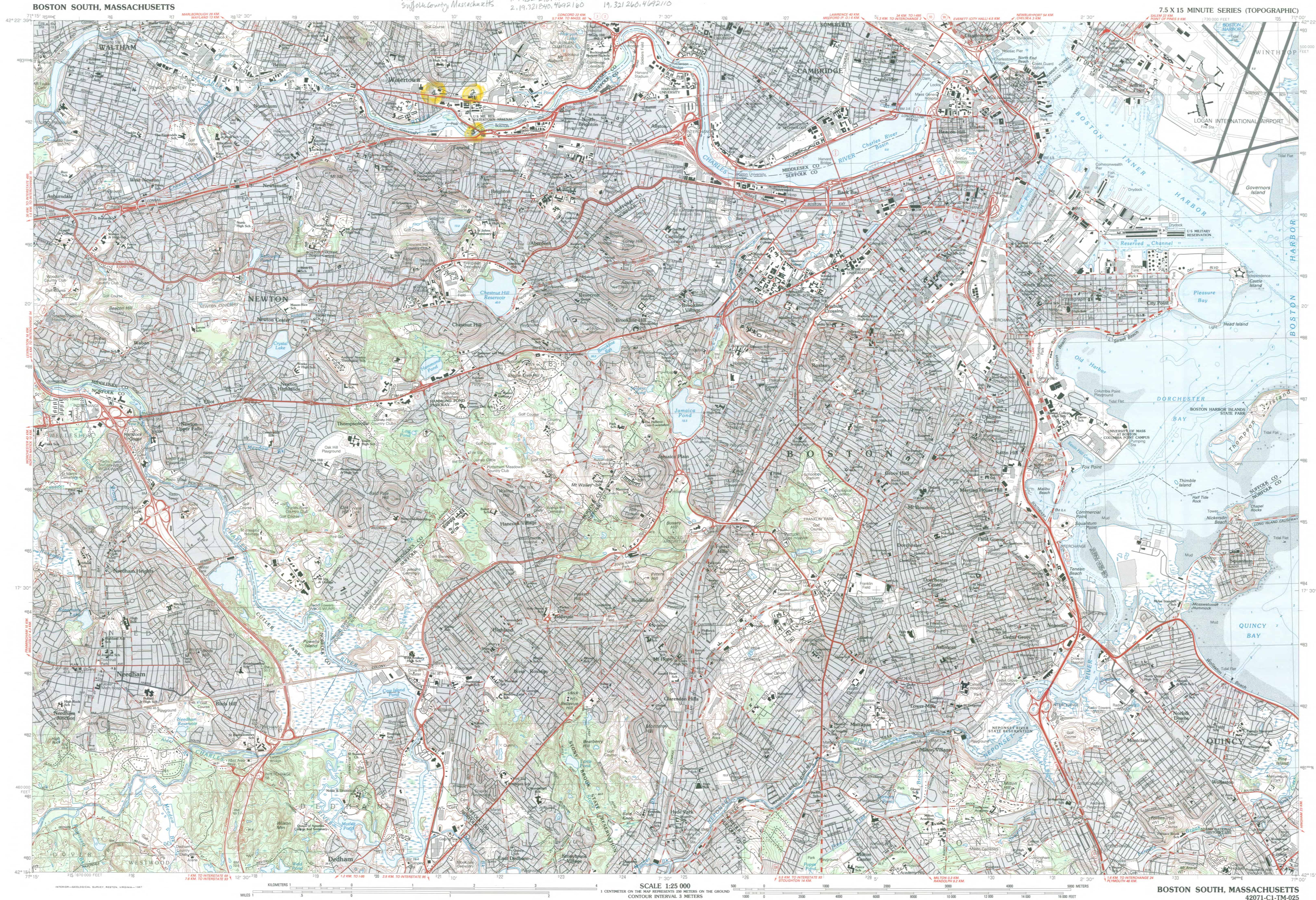
Watertown Arsenal Historic District

Watertown, Suffolk County

Massachusetts

Building 39, looking northwest

Photo 18 of 18



Boston South
MASSACHUSETTS

1:25 000-scale metric
topographic map

7.5 X 15 MINUTE QUADRANGLE
SHOWING

- Contours and elevations in meters
- Highways, roads and other manmade structures
- Water features
- Woodland areas
- Geographic names

U.S. GEOLOGICAL SURVEY

1987

Produced by the United States Geological Survey in cooperation with Massachusetts Department of Public Works

Control by USGS, NOS/NOAA, and Commonwealth of Massachusetts agencies

Compiled by photogrammetric methods from aerial photographs taken 1978. Field checked 1979. Map edited 1987

Supersedes Newton and Boston South 1:25,000-scale maps dated 1970

Selected hydrographic data compiled from NOS charts 13270 (1982) and 13272 (1982). This information is not intended for navigational purposes

Projection and 1000-meter grid: Universal Transverse Mercator, zone 19

10,000-foot grid ticks based on Massachusetts coordinate system, midland zone

1967 North American Datum

To place on the predicted North American Datum 1983, move the projection lines 6 meters south and 42 meters west as shown by dashed corner ticks

There may be private inholdings within the boundaries of the National or State reservations shown on this map

CONTOUR INTERVAL 3 METERS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METER

OTHER ELEVATIONS SHOWN TO THE NEAREST 0.3 METER

DEPTH CURVES AND SOUNDINGS IN METERS

DATUM IS MEAN LOW WATER

THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE

SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER

THE MEAN RANGE OF TIDE IS APPROXIMATELY 2.6 METERS

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

Meters	Feet
1	3.2808
2	6.5617
3	9.8425
4	13.1234
5	16.4043
6	19.6852
7	22.9660
8	26.2469
9	29.5278
10	32.8084

To convert meters to feet multiply by 3.2808

To convert feet to meters multiply by 0.3048

UTM grid convergence (G) and 1987 magnetic declination (M) at center of map

Diagram is approximate

1	2	3
1	2	3
4	5	6
7	8	9

1. Needham
2. Boston North
3. Lynn
4. Framingham
5. Hatt
6. Medford
7. Norwood
8. Weymouth

ISBN 0-607-00135-6

9 780607 001356

Topographic Map Symbols

Primary highways, hard surface

Secondary highway, hard surface

Light-duty road, hard or improved surface

Unimproved road, trail

Route marker: Interstate, U.S. State

Railroad: standard gage; narrow gage

Bridge: drawbridge

Footbridge; overpass; underpass

Bathys area: only selected bathymetric buildings shown

House; barn; church; school; large structure

Boundary

National, with monument

State

County, parish

Civil township, precinct, district

Incorporated city, village, town

National or State reservation; small park

Land grant with monument; found section corner

U.S. public lands survey: range, township, section

Range, township, section line: location approximate

Fence or field line

Power transmission line, located tower

Dam; dam with lock

Cemetery; grave

Campground; picnic area; U.S. location monument

Windsail; water well; spring

Mine shaft; prospect; adit or cave

Control: horizontal station; vertical station; spot elevation

Contours: index, intermediate; supplementary; depression

Distorted surface: strip mine, low, sand

Soundings; depth curve

Parental lake and stream; intermittent lake and stream

Rapids, large and small; lake, large and small

Submerged marsh, marsh, water

Land subject to controlled inundation; woodland

Scrub; mangrove

Orchard; vineyard

A pamphlet describing topographic maps is available on request

FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092

1987



The Commonwealth of Massachusetts

William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

October 9, 1997

Carol Shull
Keeper
National Register of Historic Places
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127



Dear Ms. Shull:

The Massachusetts Historical Commission staff has reviewed the National Register nomination for the **Watertown Arsenal Historic District, Watertown (Suffolk County), Massachusetts**, in accordance with 36 CFR 60.9 (c). The MHC is satisfied that this nomination thoroughly documents the significance of this property and justifies its eligibility for listing in the National Register.

Sincerely,

A handwritten signature in cursive script that reads "Judith B. McDonough".

Judith B. McDonough
Executive Director
State Historic Preservation Officer
Massachusetts Historical Commission

cc: cc: Commander, U.S. Army Engineer District, Fort Worth
ATTN: CESWF-PL-RC (Mr. Austin)
P.O. Box 17300
Fort Worth, TX 76102-0300

Army Research Laboratory
ATTN: AMSRL-CT-WK-RK (Mr. Robert Chase)
CARETAKER FORCE
395 Arsenal Street
Watertown, MA 02172-2700

Mr. Mark Boyle, Director
Watertown Department of Community Development
Administration Building
Watertown, MA 02172

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