SPICER MANUFACTURING COMPANY, SOUTH PLAINFIELD WORKS, BUILDINGS 14-16
(Welding, Assembly & Shipping Buildings)
333 Hamilton Avenue
South Plainfield
Middlesex County
New Jersey

HAER NJ-144-C

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

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SPICER MANUFACTURING COMPANY, SOUTH PLAINFIELD WORKS, BUILDINGS 14-16

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HAER No. NJ-144-C

Location: 333 Hamilton Avenue
Borough of South Plainfield
Middlesex County
New Jersey

U.S. Geological Survey Plainfield Quadrangle
UTM Coordinates 18.549712.4491934

Dates of Construction: c1917-1923

Present Owners: DSC of Newark Enterprises, Inc.
70 Blanchard Street
Newark, NJ 07105

Present Use: Demolished

Significance: The South Plainfield Works, originally developed by the Spicer Manufacturing Company beginning in 1910, was a nationally-significant center for the manufacture of universal joints and propeller shafts for automobiles and aircraft. The Welding Building (Building 14) was built early in the final phase of plant expansion for welding and testing components of propeller shafts, and reflected increased division of labor among the plant's various shops. The Shipping Building (Building 15), which may have originated as a smaller structure, was completed during or immediately after World War I to accommodate greater output, as was the Assembly Building (Building 16).

Project Information: Surviving structures of the former South Plainfield Works were part of the Cornell-Dubilier Electronics Superfund Site, and were demolished in 2007-2008 as part of site remediation activities outlined in the September 2004 Record of Decision as administered by the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers. Federal authority brought the project under the purview of federal acts and regulation protecting significant cultural resources from adverse project effects.* Prior to demolition, the Spicer Manufacturing Corporation structures were determined eligible for inclusion on the National Register of Historic Places by the New Jersey State Historic Preservation Office, because of the South Plainfield Works' significance in American transportation history. Documentation of the plant to standards of the Historic American Engineering Record was completed to mitigate the removal of the significant resources.

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* National Historic Preservation Act of 1966 (PL 89-655), the National Environmental Policy Act of 1969 (PL 91-190), the Archaeological and Historical Preservation Act (PL 93-291), Executive Order 11593, Procedures for the Protection of Historic and Cultural Properties (36 CFR Part 800).

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Buildings 14, 15, and 16 were separate but contiguous structures, each approximately 122 feet wide and together extending 264 feet. The building numbers reflect a relatively rapid sequence of construction rather than location, with the earliest (Building 14) located between the second in the series (Building 15, to the southeast) and the last (Building 16, to the northwest). The function, arrangement, and to some extent design of the three structures also reflected response to rapid increases in production which plant managers met by adding new, relatively small buildings at the perimeters of earlier factory space. This approach allowed for enlargement of particular operations in the older and newer buildings, but did not necessarily enhance production flow through the plant. Buildings 15 and 16 are perhaps the most obvious examples of this problem at the South Plainfield Works. The Shipping Building (15) was separated from the Assembly Building (16) by the earlier Welding Building (14). Since all final product assembly evidently occurred in Building 16, the lay-out appears to have required moving assembled propeller shafts through or past the welding operations in Building 14 to reach the shipping area, and perhaps the conversion of part of Building 14 for shipping purposes. As discussed below, this material flow may explain the placement of doors or openings between the buildings (Figure 1).

Welding Building

The Welding Building, approximately 85 feet long from southeast to northwest, was built c1917-1918 for storage of prepared tubular shafts, electrical welding of universal joint yokes and splined slip-joint stub shafts to opposite shaft ends, and torsional testing of the welded shafts. Resting on a nearly 4-foot-high concrete foundation extending under all three contiguous structures, Building 14 was a wood-roofed, primarily wood-framed structure with horizontal wood siding later covered with vertical-lined textured plywood on the exposed exteriors, shed-roofed side bays, and a 30-foot-wide full-length central gable-roofed monitor reaching approximately 32 feet above the concrete floor. The monitor was framed with steel angles, supported by 16.5-foot-high 8-by-8-inch I-beam columns at 12.3-foot longitudinal centers, and originally had steel sash windows approximately 6 feet high on all sides. Windows on the long sides of the monitor had chain-operated tilt sections. The wood-framed sections flanking the monitor bay each had 8.2-foot-high side walls, two longitudinal rows of 8-by-8-inch wood columns 12 and 14.5 feet high creating three 14.5-to-15.5-foot-wide longitudinal bays, 6-by-10-inch wood roof joists and 3-by-8-inch purlins at 7.5-foot centers (Figures 1-5; Dunham-Clarin Company 1917; Spicer Manufacturing Corporation 1920: 15, 1923, 1926; Day 1929; Photographs HAER Nos. NJ-144-C- 1, NJ-144-3).

Historical maps and photographs indicate the welding was done in the monitor bay, with extensive use of corrugated metal sheets to shield wooden building sections from sparks. This arrangement may reflect the haste with which some or all of the Welding Building was constructed. One photograph indicates the torsional testing was done in one of the side, wood-framed sections, and a 1926 map shows much of the northeastern wood-framed section was used to store steel tubes (shaft sections) probably prior to welding. By 1926, the northeast-most longitudinal bay was used for shipping, suggesting it was a corridor between Buildings 16 and 15. There were no windows in building walls documented in 2007. Door arrangements during Spicer Manufacturing Corporation operations are somewhat unclear. There were two 8-foot-high wood sliding doors in the southwest wall, but none in the northeast wall through which movement of tubes from Building 1 (HAER No. NJ-144-A) might have been expected. One 7.7-foot-high wood sliding door into the southwest wood-framed section of Building 14 from Building 15 may pre-date Building 15 construction, but was on the opposite side of the monitor bay from the area used for tube storage. This same door is at the opposite end of a longitudinal bay with a large opening in the wall to Building 16, but construction of

Building 16 c1917-1923 involved removing virtually the entire northwest wall of Building 14 and supporting the older structure's monitor end with a steel beam; hence some original door arrangements may have been removed. There was also no door in the northeast corner of Building 14 to allow movement of tubes into this building, or movement of finished propeller shafts between Buildings 16 and 15. This corner, inset several feet into Building 14, may represent undated construction associated with installation of a door and loading platform in the northeast wall of Building 15 (Figure 5; Spicer Manufacturing Corporation n.d.: 6-7, 1926; Photographs HAER Nos. NJ-144-C-3, NJ-144-C-4).

Many wood columns in the side bays had 12-inch-high triangular notches on north and/or south sides, 74 inches above the floor, which may once have supported cross timbers as seen in the southeast wall (Photograph HAER No. NJ-144-C-4). Given the low height of the notches, such timbers within the interior of the structure would have inhibited movement somewhat. It is possible that timbers were sometimes set in place as part of platforms to hold material related to welding operations, or that the notches post-dated Spicer Manufacturing Corporation operations.

Shipping Building

The Shipping Building, approximately 63 feet long from southeast to northwest, was a low, wood-framed, gable-roofed structure with a 12.2-foot-high roof peak, 9.3-foot-high walls on the short sides, and original horizontal novelty wood siding covered by horizontal metal siding. One historical photograph showing Building 15 complete and Building 16 under construction, along with other maps and views, suggests the Shipping Building was completed c1917-19. An earlier, smaller frame building of similar length, built c1916, may have been incorporated into the Shipping Building, but the earlier structure was not centered on the Building 15 roof peak and would have been much altered if re-worked c1917-19. Shipping Building framing included chamfered 8-by-8-inch wood columns on the concrete floor at 10-foot transverse and 15.3-foot longitudinal centers, composite 6-by-12-inch roof joists running southeast to northwest, and 2-by-6-inch purlins at 16-inch centers. Two shallow 12-inch-wide trenches, covered with metal plates, ran across the concrete floor from the wall of Building 14, and may reflect drainage for undocumented industrial activities. Eleven covered 2.4-by-3-foot wood-sash windows may have been original construction, along with three man-door on the southwest and southeast walls. At the north corner of the building, a 7-foot-wide, 8-foot-high metal roll-up may be an original, or reconfigured, feature for movement of finished products to an adjacent former rail spur. As noted above, construction of this door involved moving part of the southeast wall of Building 14, and created an asymmetrical plan at the northeast end of the Shipping Building. Recent wood-framed office enclosures occupied part of the otherwise vacant space in 2007 (Figures 1-5; Dunham-Clarin Company 1917; Spicer Manufacturing Corporation 1923, 1926; Day 1929; Photographs HAER Nos. NJ-144-C-1, NJ-144-C-5).

Assembly Building

The 117-foot-long Assembly Building, probably built c1919-1923, was a largely open, concrete-floored space during Spicer Manufacturing Company operations, with an inspection or production control office along part of the northwest wall, and lavatory and shower facilities along part of the northeast wall for the women who did much of the final assembly work. The steel-framed structure had an end-gable wood roof with a 27-foot-high peak, approximately 6-inch-thick brick southwest and northwest walls, a similar brick wall from the northeast corner to the adjacent shed-roofed addition of Building 2 (HAER No. NJ-144-B), a wood-framed

wall common to this addition but extending to the 21-foot height of the northeast and southwest walls, and a concrete- and tile-block party wall with Building 14. Brick piers in the brick wall sections aligned with the approximately 30-foot-wide transverse and 23-foot-wide longitudinal interior bays, which were defined by three longitudinal rows of 8-by-8-inch I-beam columns, 21.8 feet high near the northeast and southwest walls and 25.8 feet high under the roof peak. These columns, similar columns in the wood-framed wall section, and the brick walls supported four transverse trusses of riveted angles, with bottom chords 15.7 feet above the floor. An off-center, 46-foot-long, 30.3-foot-wide steel-framed monitor with a wood gable roof extended approximately 10 feet above the main roof, supported by vertical extensions of three columns and associated trusses with bolted connections at gusset plates. The monitor sides were wood framed, with continuous fixed lights on the long and southeast sides. The main and monitor roofs had 7-by-15-inch I-beam purlins, at 7.5-foot centers except in the monitor where they were at 15-foot centers. The steel columns and purlins were built into the party wall with Building 14, which replaced the latter structure's original wood-framed wall. Horizontal 5-by-7-inch I beams, 7 and 12.8 feet above the floor, extended between the columns and formed the tops of three openings and a door between Buildings 14 and 16 (Figures 1, 3-5; Spicer Manufacturing Corporation 1923, 1926; Photographs HAER Nos. NJ-144-C-2, NJ-144-C-6).

Extensive metal-sash, concrete-sill windows on the southwest and southwest sides, respectively 9.4 and 10.3 feet high and varying from 17.8 to 27.5 feet long, provided additional daylight. Most had fixed lights, and were obscured by vertical-lined textured plywood in 2007. On the wood-sided wall section, 3.8-foot-high two-light fixed-sash windows ran continuously beginning 14.3 feet above the floor, between horizontal 6-by-10-inch and 6-by-12-inch I-beams set approximately 2 feet above and below the windows. These narrow windows provided light for wood-framed office and lavatory spaces, some of which appear to date from the Spicer Manufacturing Corporation period of occupation. There were no other signs of past industrial activity (Figure 5; Spicer Manufacturing Corporation 1923, 1926)

Aside from openings into Building 14, exterior doorways included two man-doors, probably with original openings, on the northwest wall; one had a 9-foot-wide set of concrete steps and likely led to the production or inspection office. On the northeast wall, a 10-foot-square roll-up door led to the 12-foot-wide loading dock between Buildings 16 and 2, and a closed 8.7-foot-high opening provided access to the alley between these structures in front of the loading dock. A 10.3-foot-high wood sliding door built into a window opening, and another 12-foot-square roll-up door probably built original as a slider, provided access through the southwest wall for delivery of components for final assembly or truck delivery of finished products (Figure 5).

SOURCES OF INFORMATION/BIBLIOGRAPHY

A. Historical Photographs

One photograph (No. 1146) in the collections of The History Factory, Chantilly, Virginia shows Buildings 14 and 15 complete with Building 16 under construction. At least one other (Spicer Photographs 1906-1923, negative No. 36-5090, Archive Number 05050000100700518) shows welding operations in Building 14. Two other views show welding and torsion testing (Spicer Manufacturing Company n.d.: 6-7).

B. Bibliography

Day, Joseph P.

1929 3 Factories for Sale Formerly Occupied by Spicer Mfg. Co. Joseph P. Day Real Estate Agent, New York, New York. Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 11-0-0-8-4 (827).

Dunham-Clarin Company

1917 Map of Property Situated at South Plainfield, Middlesex County, New Jersey, Property of Spicer Manufacturing Corporation, July, 11, 1917. Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 11-0-0-6-3942.

Spicer Manufacturing Company

1915 Bird's Eye View of the Spicer Manufacturing Company." Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 1-5-6-3-1 (741).

Spicer Manufacturing Corporation

n.d. Spicer Propeller Shafts for Motor Cars. Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 5-3-0-1-6 (401).

1920 Spicer Universal Joints and Propeller Shafts. Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 5-3-0-1-6 (401).

1923 South Plainfield Works of the Spicer Manufacturing Corporation, South Plainfield, New Jersey. Copy in the collections of The History Factory, Chantilly, Virginia. Archive Number 05050000102021301.

1926 Department and Building Location Plan, Spicer Manufacturing Corporation, South Plainfield, New Jersey. Original in the collections of The History Factory, Chantilly, Virginia. Archive Number 5-4-0-0-(432).

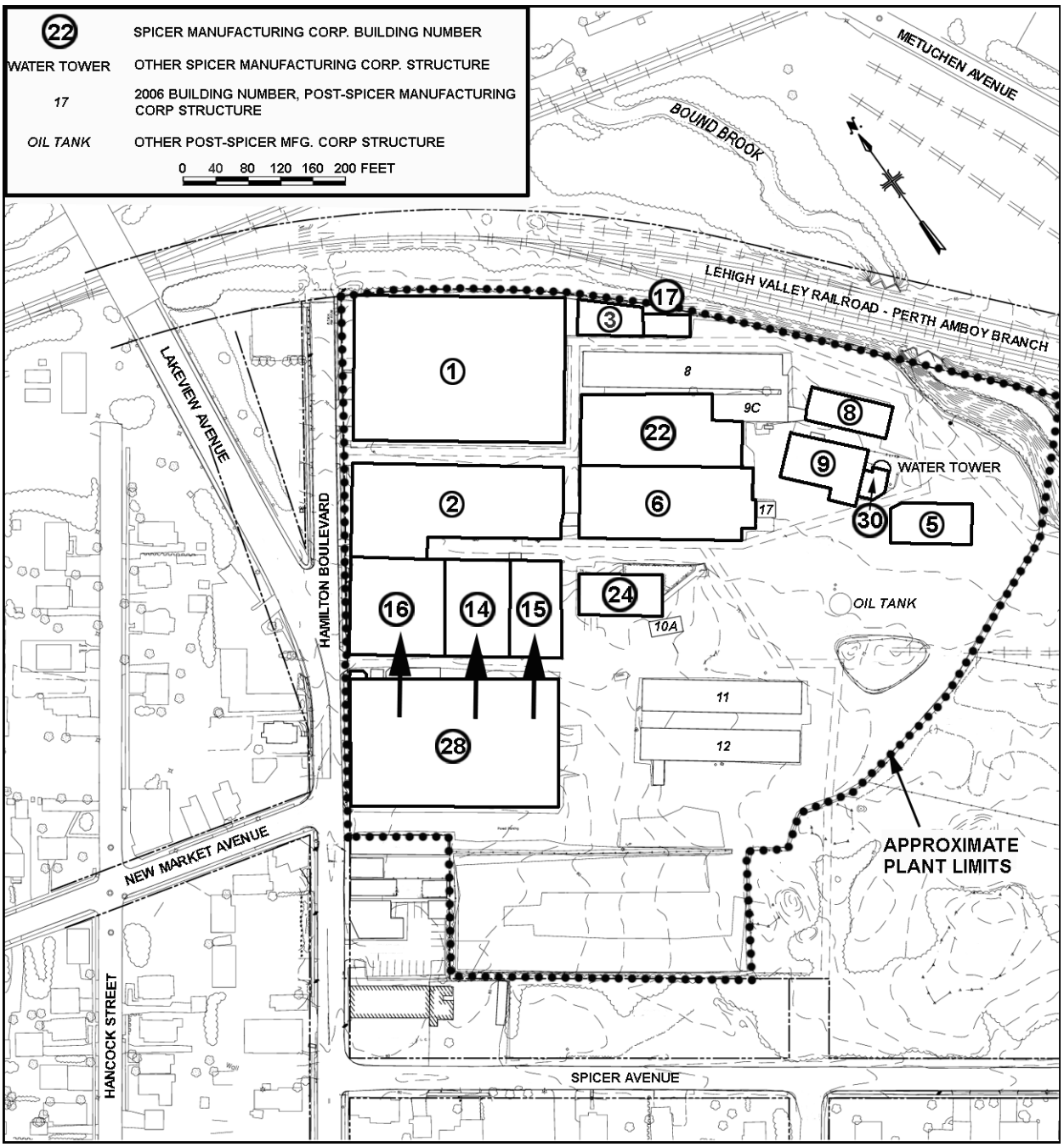

Figure 1. BUILDINGS 14-16 LOCATION AT FORMER SPICER MANUFACTURING CORP. PLANT

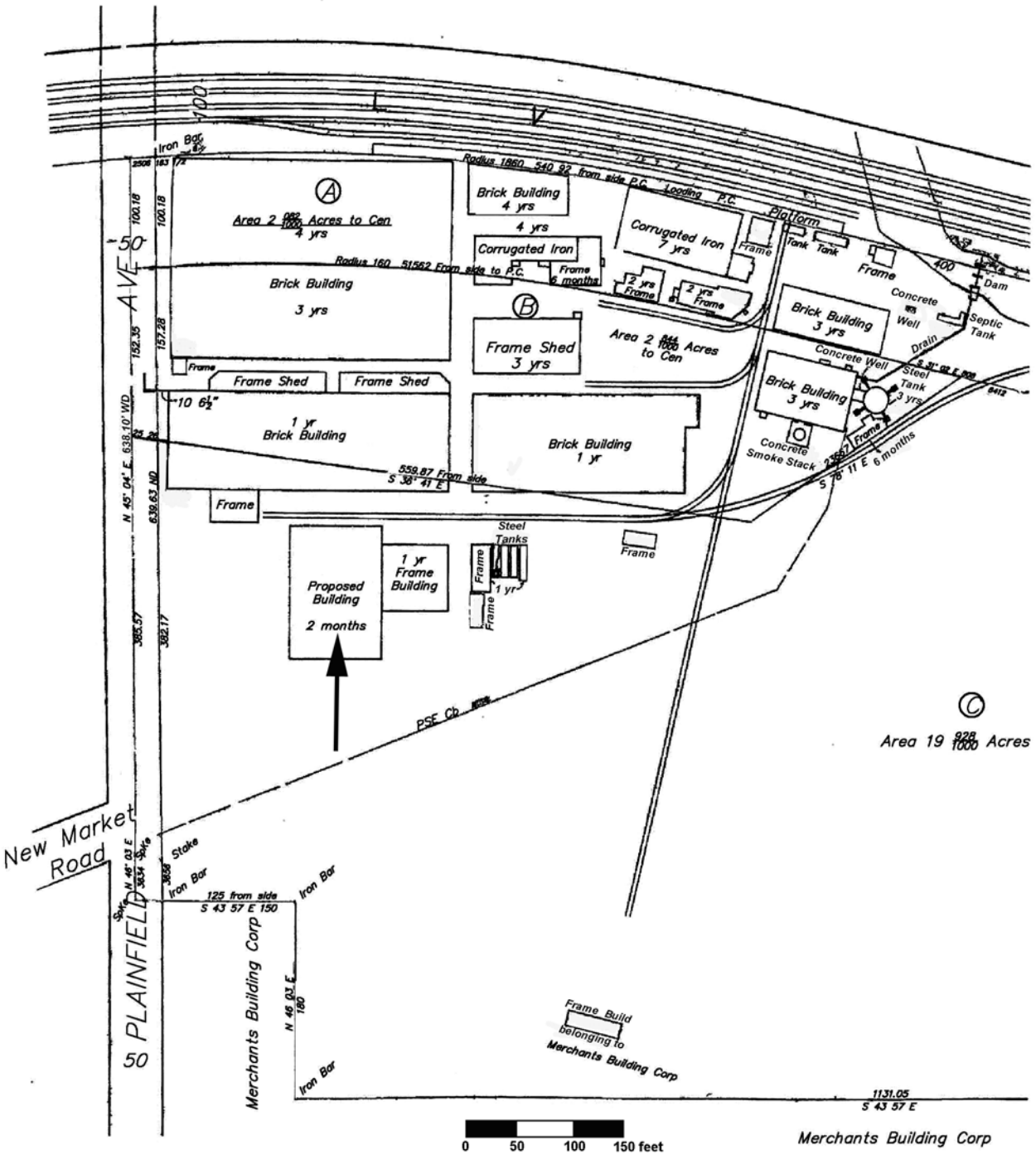

Figure 2. BUILDING 14 AND 1917 SOUTH PLAINFIELD WORKS
Source: Dunham-Clarin Company 1917, with re-lettering

DEPARTMENT			BUILDING		
No.	NAME	AREA	No.	NAME	AREA
1	Office	11640	1	Administration	49800
2	Eng. & Drafting		2	Machine Shop	25922
3	Stores	37760	3	Receiving & Misc.	7340
4	Dies	4120	4	Heat Treat & Sand Blast	5300
5	Forge	10280	5	Maintenance and Millwright	8870
6	Sleeves & Balls	8100	6	Stamping	19968
7	Flanges	14100	7	Forge	8640
8			8	Die Shop	4120
9			9	Power House	6000
10	Shafts	5800	10	Shear Shed and Wash House	1425
11					
12	Heat Treat	9600	12		
13	Inspection	700	13	Shipping	780
14	Finished & Semi-Finished Stores	6810	14	Welding and Storage	13190
15	Assembly, Welding, Receiving, & Shipping	35072	15	Shipping	9025
16			16	Assembly & Prod Office	16920
17			17	Trim Shed	1700
18	Tool Room	960	18	Pump House	220
19	Machine Repair	8310			
20			20		
21	Power House	6850	21	Blacksmith Shop	1000
22	Stamping	19270	22	Machine Shop & Heat Treat	16800
23					
24	Service	1800	24	Oil House	5200
25		1600	25	Forge	1620
26	Plumbing	1020	26	Well Pump House	170
27	Electrical	1925			
28	Guards	22	28	Storage & Garage	41600
29			29	Well Pump & Guard House	182
30			30	Water Softener Bldg	560
31	Millwrights	8150			
32	Factory Stores	5228			
33	Blacksmith	1000			
34				Forging Shed	3650
35	Tool Crib	1360			
36	Experimental	1600			
37	Spring	1600			
38					
39	Service Stores	2400			
40	Clutch	13490			
41	Filing and Burring	300			
42	Broach	3540			
43	Special Parts	3200			
44	Shear & Trim	2425			
69	Chemical	670			
70	Hospital	550			
71	Restaurant	2400			
75	Journal	3600			
	Lavatories–General	1800			
	Garage	9600			
00	Elect. Truck Charging	1200			
		Total 250002		Total	250002

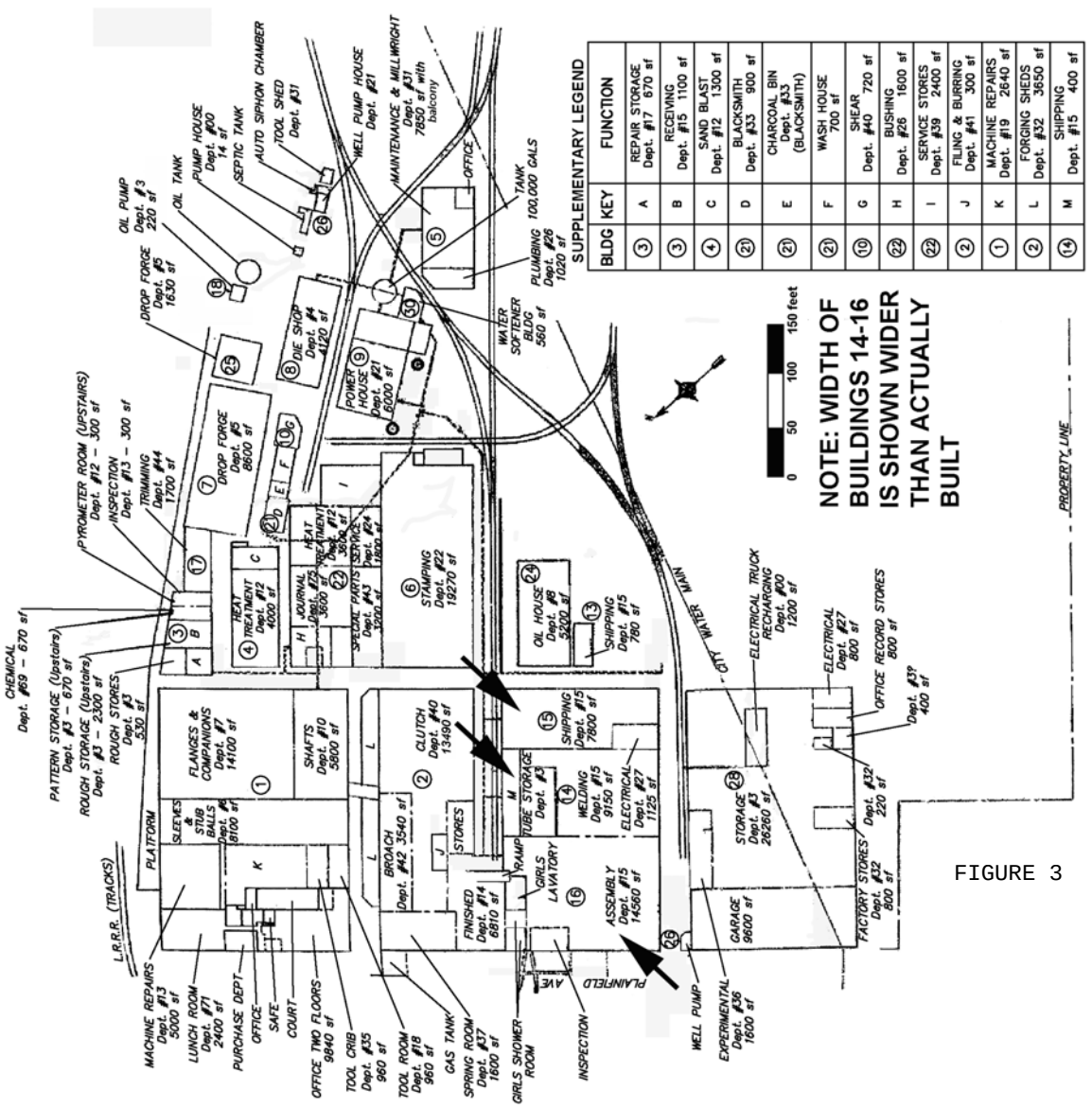

FIGURE 3

Figure 5. BUILDINGS 14-16 AT 1926 SOUTH PLAINFIELD WORKS
Source: Spicer Manufacturing Corporation 1926, with re-lettering

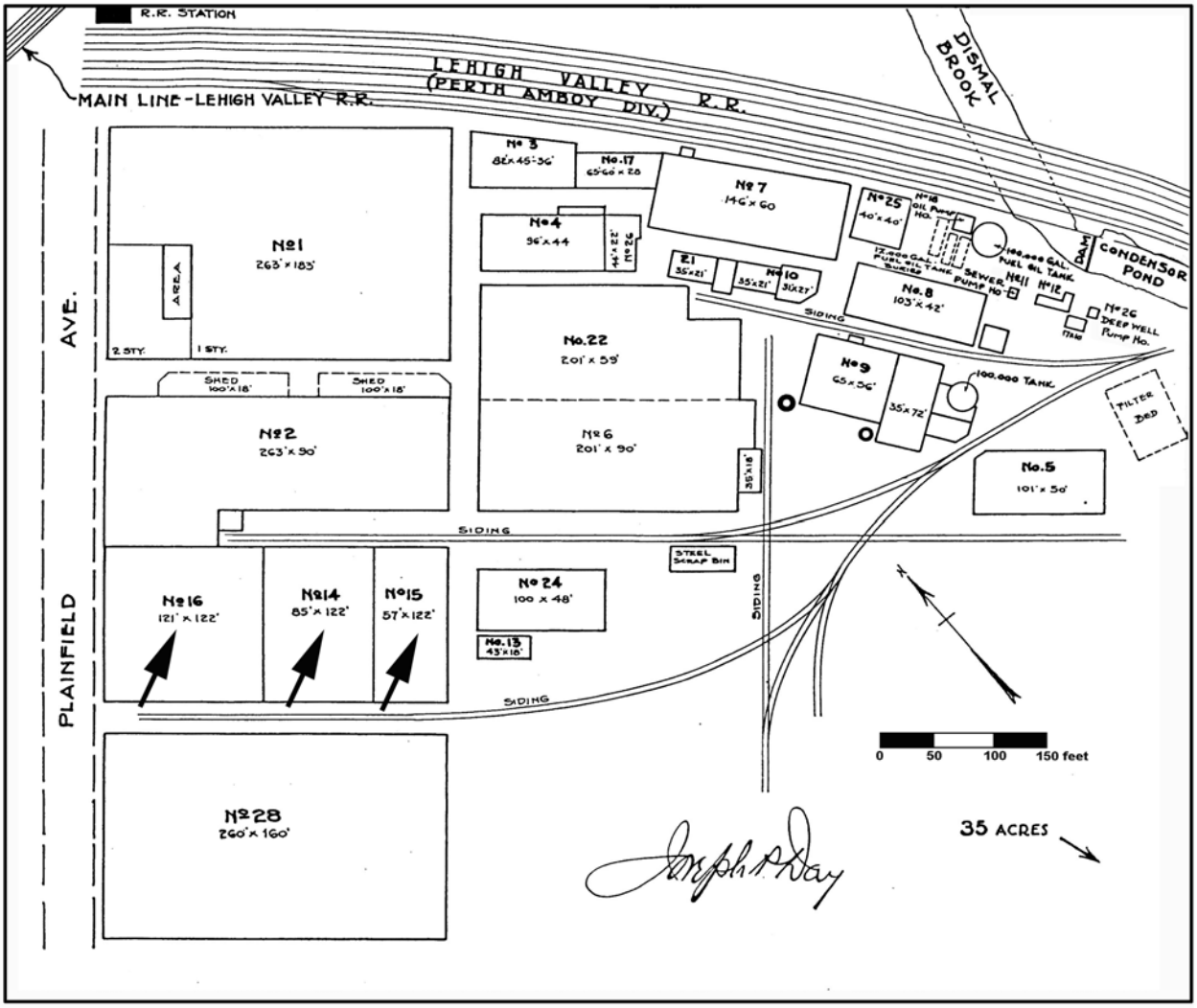

Figure 4. BUILDINGS 14-16 AT 1929 SOUTH PLAINFIELD WORKS
Source: Day 1929

Figure 7. SKETCH PLAN OF 2007 CONDITIONS

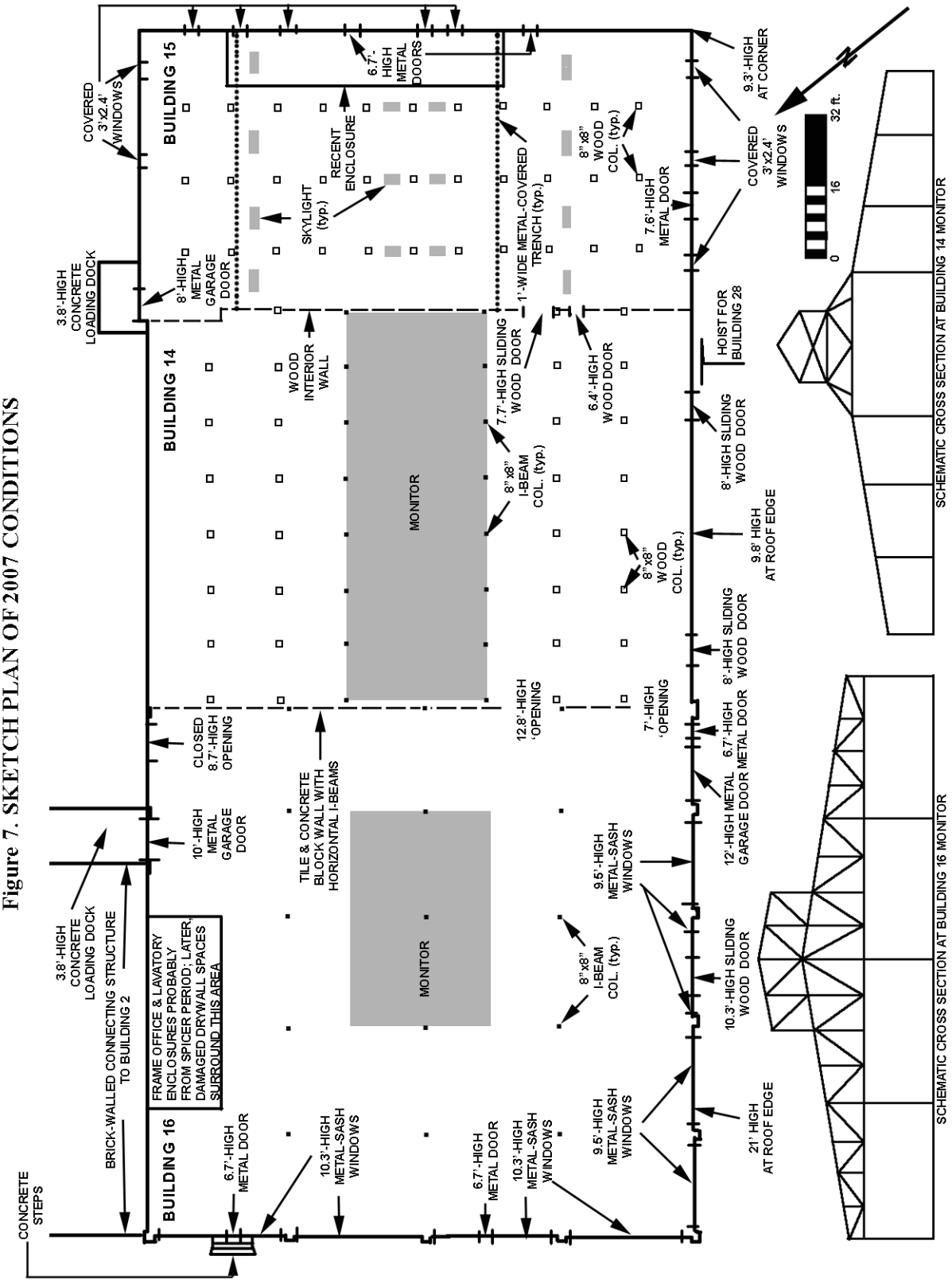

FIGURE 5