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 National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. **Place additional certification comments, entries, and narrative items on continuation sheets if needed (NPS Form 10-900a).**

1. Name of Property

Historic name Curtiss-Wright Aeroplane Factory

Other names/site number McDonnell Aircraft, McDonnell-Douglass, Boeing

Name of related Multiple Property Listing N/A

2. Location

Street & number 130 Banshee Road | N/A | not for publication

City or town Hazelwood | N/A | vicinity

State Missouri Code MO County Unincorporated St. Louis Code 189 Zip code 63042

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 at the following level(s) of significance:

___ national ___ statewide ___local

Applicable National Register Criteria: ___ A ___ B ___ C ___ D

Signature of certifying official/Title Toni M. Prawl, Ph. D., Deputy SHPO Date

Missouri Department of Natural Resources
State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official Date

Title State or Federal agency/bureau or Tribal Government

4. National Park Service Certification

I hereby certify that this property is:

_____ entered in the National Register _____ determined eligible for the National Register

_____ determined not eligible for the National Register _____ removed from the National Register

_____ other (explain:) _____

Signature of the Keeper Date of Action

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5. Classification

Ownership of Property
(Check as many boxes as apply.)

X	private
	public - Local
	public - State
	public - Federal

Category of Property
(Check only **one** box.)

X	building(s)
	district
	site
	structure
	object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
1	0	buildings
2	0	sites
		structures
		objects
2	0	**Total**

Number of contributing resources previously listed in the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions.)

INDUSTRY/Manufacturing Facility
TRANSPORTATION/Air-Related/Airplane Hangar
COMMERCE/TRADE/Business/Aviation
COMMERCE/TRADE/Professional/Engineering

Current Functions
(Enter categories from instructions.)

VACANT

7. Description

Architectural Classification
(Enter categories from instructions.)

MODERN MOVEMENT

Materials
(Enter categories from instructions.)

foundation: Concrete
walls: Brick
Metal/Steel
roof: Asphalt
other: Glass
Steel

X **NARRATIVE DESCRIPTION ON CONTINUTATION PAGES**

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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.)

[X] 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 old or achieving significance within the past 50 years.

Areas of Significance
MILITARY

Period of Significance
1941-1946

Significant Dates
1941

Significant Person
(Complete only if Criterion B is marked above.)
N/A

Cultural Affiliation
N/A

Architect/Builder
Kahn, Albert, Associated Architects
Morrison Knudson Corp. (Engineers)

[X] **STATEMENT OF SIGNIFICANCE ON CONTINUTATION PAGES**

9. Major Bibliographical References

Bibliography (Cite the books, articles, and other sources used in preparing this form.)

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 # _____
____recorded by Historic American Landscape Survey # _____

Primary location of additional data:

_X_State Historic Preservation Office
_X_Other State agency
_X_Federal agency
_X_Local government
_X_University
_X_Other
Name of repository: **Boeing St. Louis**

Historic Resources Survey Number (if assigned): N/A

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10. Geographical Data

Acreage of Property 75.99 (total site)

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)

	Latitude:	Longitude:		Latitude:	Longitude:
1	38.758621	-90.367858	2	38.758465	-90.363888
3	38.758549	-90.363791	4	38.757465	-90.361532
5	38.756804	-90.361544	6	38.756289	-90.362873
7	38.756176	-90.366848	8	38.756241	-90.368067

UTM References
(Place additional UTM references on a continuation sheet.)
_____ NAD 1927 or _____ NAD 1983

	Zone	Easting	Northing		Zone	Easting	Northing
1				2			

Verbal Boundary Description (On continuation sheet)

Boundary Justification (On continuation sheet)

11. Form Prepared By

name/title Matt Bivens/Historic Preservation Director
organization Lafser & Associates, Inc. date 2/16/16; 3/28/16
street & number 1215 Fern Ridge Pkwy., Suite 110 telephone 314-560-9903
city or town St. Louis state MO zip code 63141
e-mail msbivens@lafser.com

Additional Documentation

Submit the following items with the completed form:

- **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 resources. Key all photographs to this map.
- **Continuation Sheets**
- **Photographs**
- **Owner Name and Contact Information**
- **Additional items:** (Check with the SHPO or FPO for any additional items.)

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

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Estimated Burden Statement: Public reporting burden for this form is estimated to average 18 hours per response including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Office of Planning and Performance Management. U.S. Dept. of the Interior, 1849 C. Street, NW, Washington, DC.

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log:

Name of Property: Curtiss-Wright Aeroplane Factory

City or Vicinity: Hazelwood (Unincorporated)

County: St. Louis State: Missouri

Photographer: Matt Bivens

Date Photographed: January 30, 2016

Photograph Log:

Description of Photograph(s) and number, include description of view indicating direction of camera:

1 of 15: Primary elevation of administration division (A) facing south; camera facing north.
2A of 15: Factory B (right), Administrative A (background), Annex F (left); camera facing west.
2B of 15: Primary elevation of annex division (F); camera facing northeast.
3 of 15: Primary elevation of high bay (C) facing south; camera facing northwest.
4 of 15: Detail of high bay hangar doors (C); camera facing northwest.
5 of 15: West side elevation of (C); camera facing northeast.
6 of 15: Banshee Road, rear or north elevation of (B); camera facing southeast.
7 of 15: East elevation of (B); camera facing southwest.
8 of 15: Interior lobby of A, first floor; camera facing west.
9 of 15: Interior typical office of A, 1st floor; camera facing south.
10 of 15: Interior of engineering department in A, 1st floor; camera facing west.
11 of 15: Interior of high bay (C); camera facing west.
12 of 15: Interior of high bay (C) looking into low bay (B) (background); camera facing east.
13 of 15: Interior of low bay (B) looking farther east; camera facing east.
14 of 15: Interior of low bay (B); camera northeast.

Photo key is included on page 41.

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Figure Log:

Figure 1 (page 3): Site plan illustrating nominated complex and surrounding site. Several aviation-associated businesses still occupy the surrounding sites. Buildings marked with corresponding letters for easy identification as well as construction timeframe. Source: Google Earth verified with Lambert-St. Louis International Airport facilities management, 2012 and 2015.

Figure 2 (page 4): Context plan illustrating nominated complex (oval) and surrounding site; Lambert International Airport is marked for reference. Source: Google Earth, 2016.

Figure 3 (page 5): Portion A as originally designed with flat limestone front (top image, center). A later modification (date currently unknown but between 1981 and 1997) retained the vertical limestone piers and imitated their placement within the projection (bottom picture). Although a modification, it was done in a sympathetic way and did not cause physical harm to the original design preserved within (Photo 8, right side shows original vertical piers now wallpapered). Top source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941. Bottom source: Matt Bivens, 2-16, 2016.

Figure 4 (page 6): Portion A is comprised of a projecting front section and a slightly recessed section behind corresponding to interior functions. Source: Albert Kahn Associated, Basement Floor Plan, Job No. 1868, sheet 2, November 22, 1940 showing revisions to February 14, 1941.

Figure 5 (page 7): Portion A as originally designed with basement access to secure garage with shipping under portion B. Also see Photo 2. Source: Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to March 25, 1941. Note division of spaces: office, engineering/garage.

Figure 6 (page 7): West elevation of portion A (right side) showing projecting front and skylights. The south-facing elevation of portion C (AKA High Bay) is at left. Source, Matt Bivens photograph, January 2016.

Figure 7 (page 8): Low Bay (B) and High Bay (C) relative to the complex. Source: Google Earth and MSB, 2016.

Figure 8 (page 9): High bay design south-facing elevation; abutment to portion A is at right. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to March 25, 1941.

Figure 9 (page 9): High bay design west-facing elevation; abutment to portion A is at right. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to March 25, 1941.

Figure 10 (page 10): North elevation of factory with High Bay (C-right) & Low Bay (B-left); the Low Bay is set back from the street and High Bay to accommodate the railroad spur. Source, Matt Bivens photograph, 1-2016.

Figure 11 (page 10): North elevation of factory High Bay with small projection to accommodate the railroad spur; the spur continues through the building and to the east. Source, Matt Bivens photograph, 1-2016.

Figure 12A (page 11): Portion B as originally designed with High Bay (C-at right) and Low Bay (B-at left) facing later Banshee Road. Also see Photo 6. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941. The dotted line represents connection of building.

Figure 12B (page 12): North-facing elevation (foreground) with Lambert in background. Source: Google Earth, 2016.

Figure 13 (page 13): East-facing elevation. Source: Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to February 14, 1941. Note employee entrance to factory basement in dotted line; entrance is enlarged below in Figure 14A and a photo of today's condition is in Figure 14B.

Figure 14A (left) and 14B (right) (page 13): East-facing elevation showing employee entrance to factory basement. Source (left): Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to February 14, 1941. Right source: Google Earth, 2016.

Figure 15 (page 14): East-facing elevation showing employee entrance to factory basement. Source (left): Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941.

Figure 16 (page 15): Portion F, ancillary building containing the engineering department annex before 1945. Top is south elevation; bottom is north. Source: Photographs by Matt Bivens, 2016.

Figure 17A (original) (page 17): Basement floor plan of complex (portions A, B, C), not to scale. Source: Albert Kahn Associated, Detroit, Michigan. Job No. 1868, Factory and Office Building for the Curtiss Aeroplane Division of Curtiss-Wright Corporation of Robertson, Missouri. Sheet No. 2, November 22, 1940.

Figure 17B (current) (page 18): Basement floor plan of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003.

Figure 18A (original) (page 19): Ground floor of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: McDonald Douglas 1978 drawing after original Kahn design; very little was changed during their occupation.

Figure 18B (current) (page 20): Ground floor of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003.

Figure 19 (page 21): Second floor plan of administrative portion. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003. No historic drawing of the 2nd floor of A has been discovered to date however, it was similar to the 1st floor overall.

Figure 20 (page 21): Second floor engineering department skylights. Matt Bivens 3-16.

Figure 21A (large pic) and 21B (small pic) (page 22): Portion C, interior of High Bay area (21A) and assembly line tracks (21B). Source: Matt Bivens, photograph 1-2016.

Figure 22 (Page 23): Portion C, interior of High Bay area (21A) and assembly line tracks (21B). Source: Matt Bivens, 1-2016.

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Figure 22 (page 24): Portion F, interior of 1st floor (left), 2nd 2nd floor (right). Source: Photograph by Matt Bivens, 3-2016.
Figure 23 (page 24): Portion F, interior of 1st floor (left), 2nd floor (right), stair (bottom). Source: Matt Bivens, 3-2016.
Figure 22A (top) and 22B (bottom) (page 25): Sites at top (D) and bottom (E) Source: Matt Bivens, 3-2016.
Figure 23 (page 27): Site evolution between 1937 (top) & 1955 (bottom). Source: St. Louis County Parcel Viewer, 2016.
Figure 24 (page 28): Site evolution between 2015 (top) and 1955 (middle) with proposed boundary (outlined in red). Source: St. Louis County Parcel Viewer, 2016. Despite some perspective and shadow considerations, the boundary encases the major contributing components that have been there since construction and functionally-related to Curtiss-Wright's occupation on site.
Figure 25 (page 35): Ceremonial ground breaking for the new Curtiss-Wright factory and offices at Lambert Field, 19 November 1940. The original factory can be seen in the background; behind it is the future Banshee Road. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30445.
Figure 26 (page 36): Original factory of Curtiss-Robertson (later Curtiss-Wright) is situated at top of photo; ongoing construction of the new factory and administrative buildings can be seen below. Day unknown but photo was taken in early to mid-June, 1941. Source: Betty Burnett. "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987), page 24.
Figure 27 (page 37): Aerial view of new Curtiss-Wright factory buildings as their construction nears completion, 29 July 1941. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30447.
Figure 28 (page 37): Aerial view of newly constructed Curtiss-Wright factory buildings, 4 December 1941. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30448.
Figure 29 (page 40): Top, women doing electrical sub-assembly work at Curtiss-Wright; bottom, woman grinding machined part; 12 March 1943. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30461 (top); ID# N34371 (bottom).
Figure 30 (page 41): Period photograph of full complex showing final historic construction in July, 1945. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 28, July 13, 1945.
Figure 31 (page 42): Period photograph of C-46 Commando at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), top: volume 5, number 3, January 19, 1945; bottom image: volume 4, number 43, October 27, 1944).
Figure 32 (page 43): Period photograph of XP-55 developed and built at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 6, January 9, 1945.
Figure 33 (page 44): Period photograph of Commando section in "pre-flight" at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 14, April 6, 1945.
Figure 34 (page 45): Period photograph of the 1st Curtiss Commando to be completed at the St. Louis plant; here flying over the St. Louis zoo at Forest Park. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 15, April 13, 1945.
Figure 35 (page 46): Curtiss-Wright Helldiver (SB2C) produced at Lambert Field factory 1928 through the 1940s. Source: Betty Burnett. "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987), page 69. Smaller photo (bottom) from "Curtiss Aircraft" catalogue.
Figure 36 (page 47): Curtiss employees listen intently to General Manager C. W. France as he announced that President Truman had proclaimed V-E day and then followed by telling them to continue to "Work, work, work!" Source: *Curtiss Fly Leaf*. Volume 5, number 19, May 11, 1945.
Figure 37 (page 48): Kahn was classified as the "No. 1 National Defense Architect" by architectural and engineering critics worldwide. Source: *Architectural Forum*, November 1940, volume 73, front page. (New York: Time Inc.).
Figure 38 (page 49): Floorplan as designed for factory for Curtiss-Wright in St. Louis. Source: *Architectural Forum,* June 1942, *v. 76,* page *374.*
Figure 39 (page 50): Interior of low-bay (B) manufacturing area. Source: *Architectural Forum,* June 1942, *v. 76, p* 375.
Figure 40 (page 50): Interior of high-bay sub-assembly area. Source: *Architectural Forum,* June 1942, *v. 76, page* 374.
Figure 41 (page 51): Interior of high-bay final assembly area. Source: *Architectural Forum,* June 1942, *v. 76, page* 374.
Figure 42 (page 52): "Mass production airplane plant," St. Louis (middle and bottom) showing exterior of high bay with massive hangar doors (middle) and interior of same portion (bottom). Albert Kahn, architect. Source: *Architectural Forum*, June 1942, V 76, P 373. Top right photograph by Matt Bivens, January 2016.
Figure 43 (page 53): Exterior of administrative building (middle) and interior floorplans of 1st and 2nd floors. Source: *Architectural Forum,* June 1942, *v. 76, page* 376.
Figure 44 (page 54): Interior of administrative building engineering department drafting room 2nd floor. Source: *Architectural Forum,* June 1942, *v. 76, page* 377.
Figure 45 (page 59): "Curtiss-Wright Aeroplane Factory & Office complex Boundary Map." Source: Google Earth map created by Matt Bivens, 2016.
Figure 46 (page 60): Photo Key. Source: Ground floor of complex. Source: McDonnell Douglas Corporation, St. Louis Plant Engineering Department. Drawn by L. Pfaff, April 18, 1978. Drawing No. Manual 1 & 2-A-5. Black arrow points north.
Appendix 1 (page 61): 40 Years of Aviation History as illustrated by Curtiss-Wright. "Aviation History is Curtiss-Wright History." Source: *The Curtiss-Wright-ER*. December 17, 1943.

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ARCHITECTURAL DESCRIPTION

Summary

The Curtiss-Wright Aeroplane Factory, located at 130 Banshee Road in Hazelwood, unincorporated St. Louis County, Missouri, is an industrial complex designed and built in 1940-1944 comprised of managerial, engineering, and manufacturing functions built to serve American and Allied Forces military aviation during World War II. Included within the complex is a two-story and basement administrative department constructed of reinforced concrete and steel with buff brick veneer walls; an adjoining brick department designed as an engineering annex of similar design is attached via a two-story brick pedestrian connector. Behind these portions is a massive manufacturing department comprised of a High Bay and a Low Bay portion with overhead heights of 40 and 20 feet respectively; the structures are framed with a structural steel skeleton and have Gunite-finished metal panels and horizontal windows at the exterior. Each department has a spare Modern appearance; as a war time factory, they were designed with maximum efficiency in mind. The factory was constructed upon the site of Curtiss-Wright's original factory which was strategically located just north of Lambert Field (St. Louis International Airport). The site had direct access to the runways (allowing for expedited delivery of complete aeroplanes) at the south in addition to a railroad spur (built to enable railroad access for delivery and shipping of materials) which passed alongside and then inside the north elevation; these attributes are extant.

Offices, conference areas, storage, and mechanical areas were contained within the front half of the administrative department while design teams including engineering and drafting departments were located in between the offices and main factory; roof skylights on the second floor allowed maximum light (extant but hidden by drop ceiling). The factory portion was divided into three separate functions including general manufacturing of parts, a sub-assembly area, and a final assembly area—each situated within an appropriately-scaled interior space. The railroad spur could delivery or receive materials from either portion along their northern walls. Staff and worker shift changes were directed to multiple access points located at the exterior (most below ground) in order not to congest the factory floor; this design enabled smooth and constant production without interruption. Assess to the factory was via extant stair cases which were located at several points within the factory; the subterranean level included a cafeteria, restrooms, lockers, offices, maintenance areas, and multi-purpose rooms (many extant). During wartime, aeroplane parts were designed, engineered, tested, fabricated, assembled into sections, and then completed; finished aeroplanes were taxied out of the High Bay hangars and then flown into the skies for delivery to military bases across the country. Eventually, the

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system was perfected and Curtiss-Wright was able to mass produce entire aeroplanes as well as manufacture parts for other companies engaged in the war effort.

The complex was featured in the prominent industry journal *Architectural Forum* as a highly successful "mass production airplane plant" as well as a representative example of the work (and one of the last designs) of Albert Kahn.[1] Today, the complex appears much as it did when it was originally completed and in production. The nominated complex includes 1 contributing building (comprised of four portions) as well as 2 contributing structures (a parking lot at the east and an airplane taxi lot to the west). Alterations including replacement windows, a modified primary entrance, interior factory space mezzanines, and subterranean office modifications, do not detract from the historical significance of the complex. Otherwise, the complex has integrity of location, design, setting, materials, workmanship, feeling and association.

Site

For clarification of architectural description within the complex, the site plan on the next page illustrates the buildings and sites associated with the nominated factory (Figure 1). The complex is comprised of four inter-connected portions (A, B, C, F) comprising 1 building, an historic parking lot (E), and a portion of the original aeroplane taxi/maneuvering space (D); together these components comprise the National Register property. Based on research, letters corresponding to portions of the complex also act as a timeline for construction—"A" was constructed first, then "B," and so on. Portion A is the original administrative department. The Low Bay factory (B) was constructed immediately behind A; at the same time the High Bay factory (C) was being constructed. Factory B was essential to complete quicker than A because it replaced the original factory which sat north of the site; as portions of B were constructed, the old factory was demolished (see Figures 26-27). Ceiling heights within B were comparable to those of the old factory; now with the addition of C, larger aeroplanes were possible and production could be increased. The aeroplane taxi/maneuvering lot (D) to the southwest was established flanking C as this was the portion where final assembly of aeroplanes took place; once completed, aeroplanes were taxied out to D and onto the main runways at Lambert and then flown to the military bases. At the same time, lot E at the east was constructed to provide employee parking. Mass pedestrian access into the building was via two ramps (extant) extending below grade adjacent the parking area; doors at the exposed basement level of B greeted workers. Higher staff and engineer supervisors accessed

[1] *Architectural Forum*, June 1942, V 76, P 373.

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the building from its main doors or at various points at ground level. Shortly after construction of A-C and during the war years, portion F (earlier conceived) was constructed by demand; it was completed before 1945 and was adjoined to portion A at its eastern wall via a two-story interconnected pedestrian link.

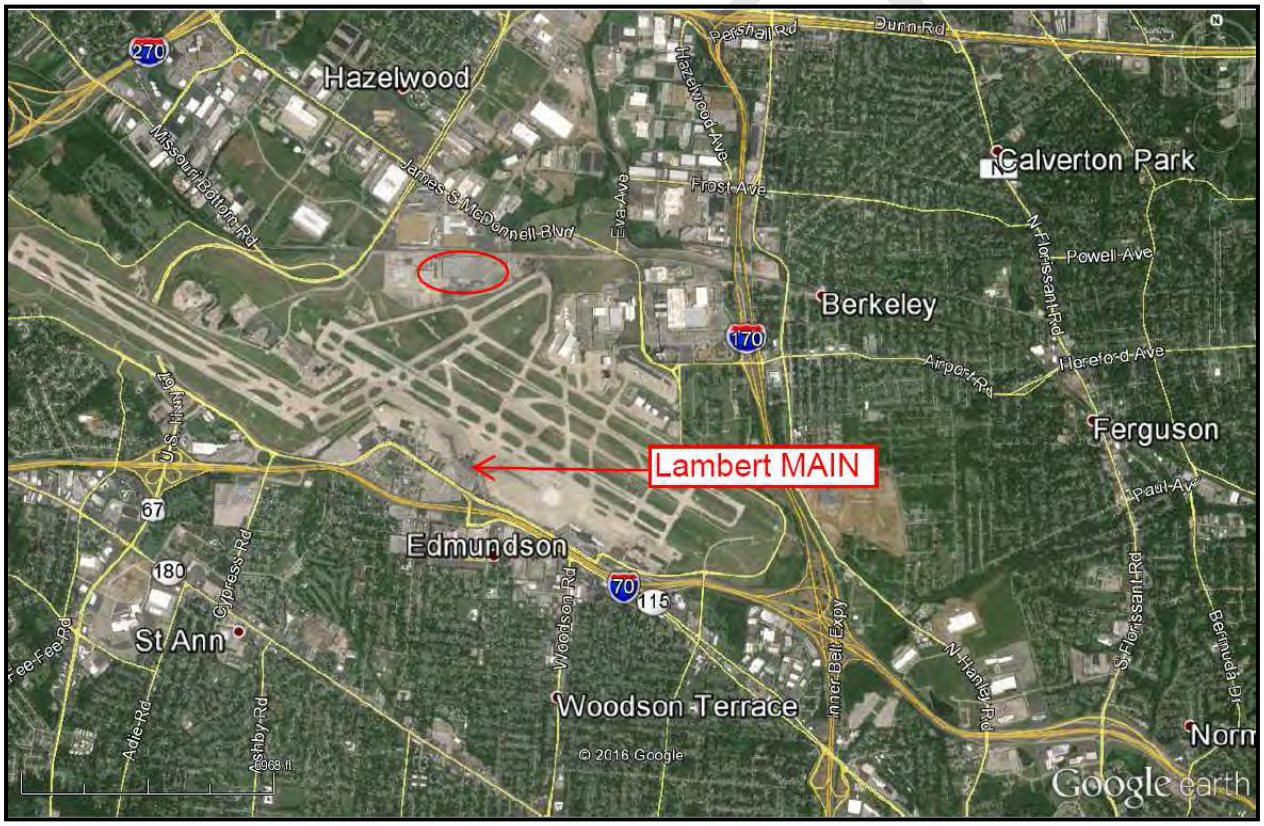
Figure 1: Site plan illustrating nominated complex and surrounding site. Several aviation-associated businesses still occupy the surrounding sites. Buildings marked with corresponding letters for easy identification as well as construction timeframe. Source: Google Earth verified with Lambert-St. Louis International Airport facilities management, 2012 and 2015.

The complete complex is situated to the north of the landing strips and runways and the main terminal of the Lambert-St. Louis International Airport (Figure 2). Facing Banshee Road, which runs east and west, the Low Bay (B) and High Bay (C) potions occupy the site of the original Curtiss factory (discussed later in Section 8) and are situated among other airport buildings to the west and east owned by private parties and not related to the complex. Access to these portions is restricted and no information has been available on their historic uses or ownership. Based on their design the buildings to the west of the complex appear to have served as hangars for airplane storage. The smaller buildings to the east and have some power equipment

visible and could have served as generator structures or small industrial sites; research on Curtiss-Wright did not mention these nearby structures.

To the north of Banshee Road is an elevated railroad and several aircraft-related buildings. Once former farm land, the area was disturbed beginning in the late 1920s and has continually seen construction and demolition of factory and office buildings associated with the airplane industry. The topography is flat with the majority of the ground paved in concrete or asphalt.

Figure 2: Context plan illustrating nominated complex (oval) and surrounding site; Lambert International Airport is marked for reference. Source: Google Earth, 2016.



Exterior – Portion A

The primary façade of A faces south towards the main airport runways (Photo 1). The building is rectangular in shape and symmetrical in design with a projecting central entrance bay (slightly modified from the original). Constructed with a steel frame and reinforced concrete with buff brick veneer wall, horizontal bands of replacement windows puncture the first and second floors and are framed with grey limestone. That

same limestone comprises the central entry projection as well as the parapet. Building edges are slightly curved and the roof is flat with four projecting skylights located nearest the rear or north of the roof and corresponding to the drafting and engineering spaces which required more light.

Comprised of a projecting trapezoidal mass, the primary entry assemblage of the administrative portion contains seven bays that are separated and framed by vertical limestone piers that imitate the original entry design (Figure 3; top image shows original design, bottom shows today). Within the center-most bay is an entry with full light, metal framed, double doors; four aluminum-framed, fixed lights are above. The six remaining bays in the trapezoid contain six similar aluminum-framed, fixed lights set on limestone bases (Photo 1). Behind the projecting mass and against the main building mass can be seen the original flat limestone entrance surround, still with mounting evidence of the original Curtiss-Wright signage. Flanking the entrance at both sides are full length, horizontal bands of windows at the first and second floors. Although modern replacements, these windows fully fill the openings and respect the fenestration patterns of the initial design (Photo 1 and Figure 3). Windows may be cut in the basement below ground level however the ground has been regraded and no window wells have been discovered; the interior wall is furred out and not visible.

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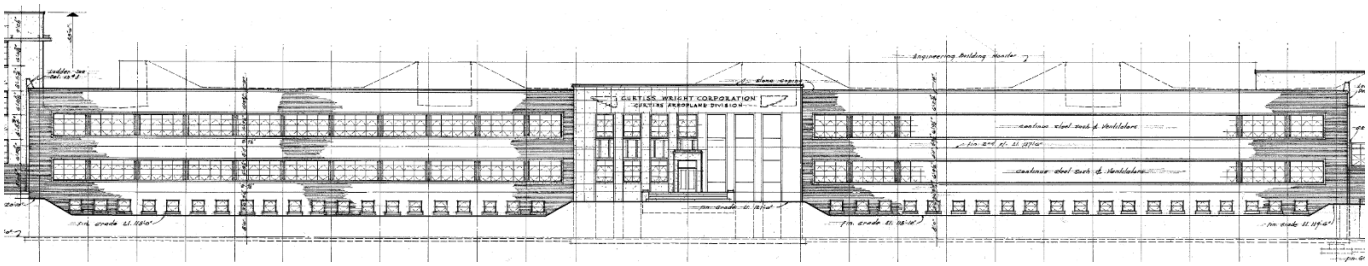
Figure 3: Portion A as originally designed with flat limestone front (top image, center). A later modification (date currently unknown but between 1981 and 1997) retained the vertical limestone piers and imitated their placement within the projection (bottom picture). Although a modification, it was done in a sympathetic way and did not cause physical harm to the original design preserved within (Photo 8, right side shows original vertical piers now wallpapered). Top source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941. Bottom source: Matt Bivens, 2-16, 2016.



The main mass of A, including the first three bays of both the east and west elevations, project from the larger mass (Figure 4). The east elevation contains three first floor bays comprised of two windows and an access door which is contained within a small metal entrance addition. Above, windows are similar to the primary elevation. A two-story brick connector (identified in Figure 5) adjoins portions A and F at two floors; the link is set back from the third bay of the east elevation. According to this drawing, portion F was at least conceived; it would be built later but during the period of significance. On the other side of the connector, along the remainder of the east elevation, is full length, horizontal bands of windows at the first and second floors (Photo 2). The ground level (basement) is also lit with windows and contains a pair of wide, wood garage doors and a small one-story addition which acted as a guard station. A concrete ramp leads downward to this area. The wide doors may have also served employee access but it is most likely that the access provided secure entry for military commanders, presidents (JFK visited several times), and for higher management. Limestone frames the windows and parapet. Four sawtooth skylights project from the roofline (Photo 2); these skylights originally lit the drafting and engineering departments (extant but hidden by drop ceiling).

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Figure 4: Portion A is comprised of a projecting front section and a slightly recessed section behind corresponding to interior functions. Source: Albert Kahn Associated, Basement Floor Plan, Job No. 1868, sheet 2, November 22, 1940 showing revisions to February 14, 1941.

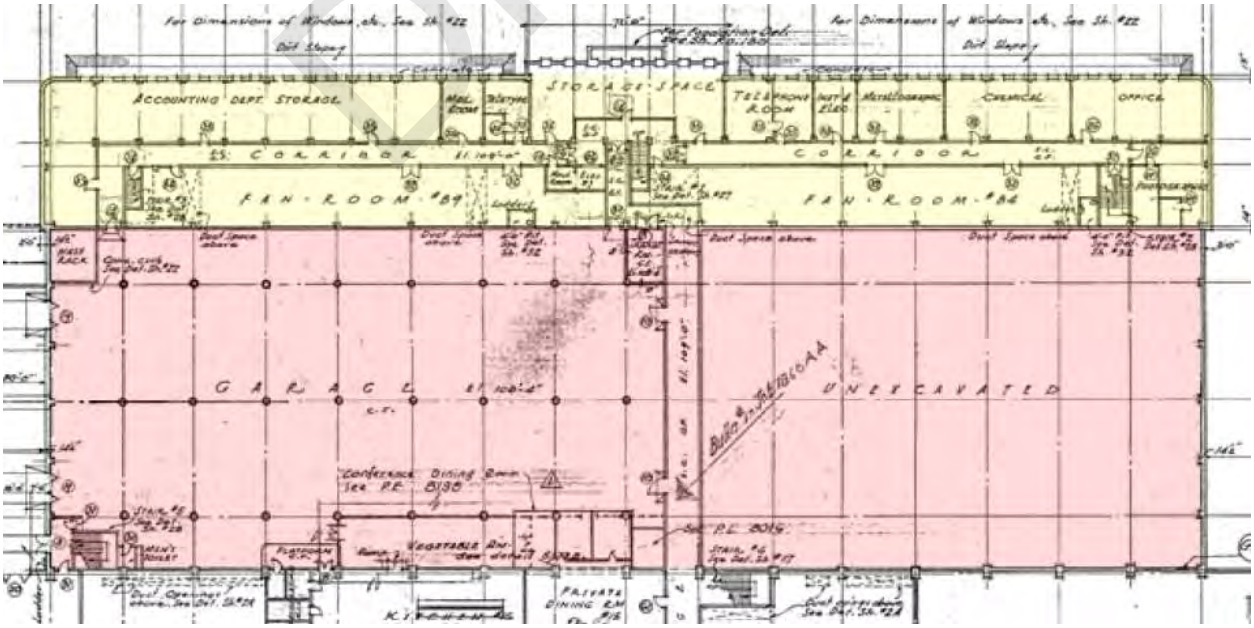
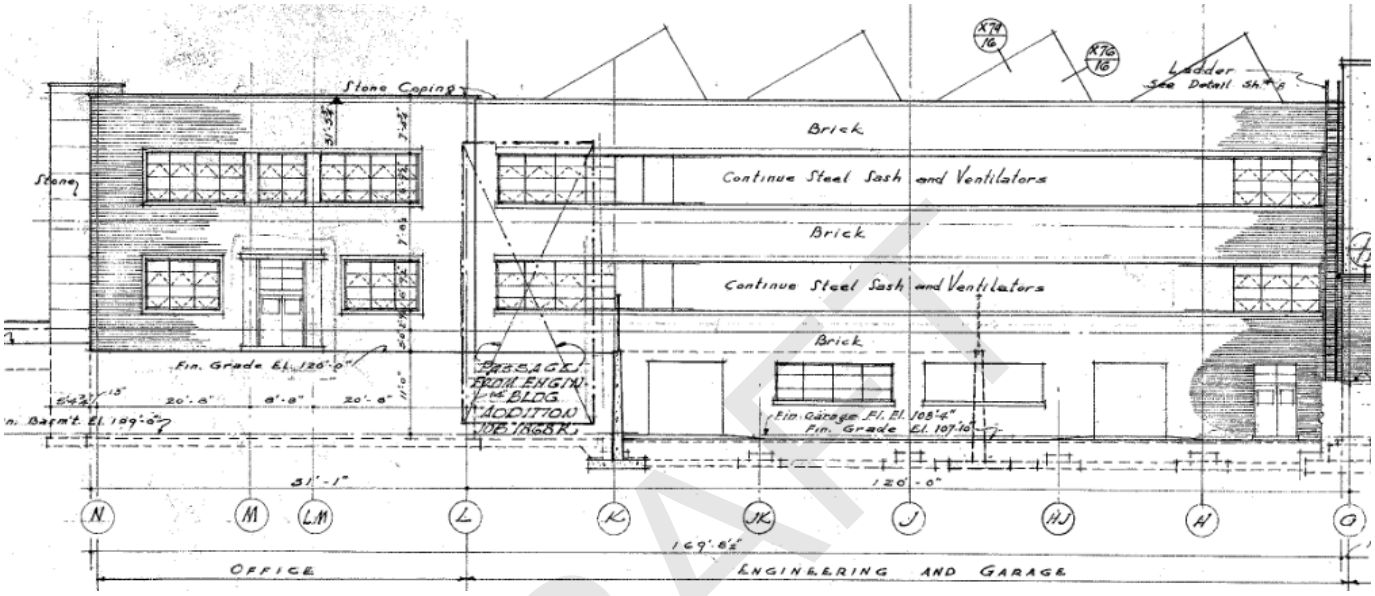


Figure 5: Portion A as originally designed with basement access to secure garage with shipping under portion B. Also see Photo 2. Source: Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to March 25, 1941. Note division of spaces: office, engineering/garage.



Portion A is adjoined to Portion B at the north (right side of Figure 5). The west-facing elevation of A projects from the main mass three bays (like the east); an entrance at the center of a pair of windows is framed by projecting brick and sheltered with a small flat roof (Figure 6). The metal, one-half light doors are newer as are the windows which contain three fixed sash opposite the entry at the first floor and a five-light bay at the second; these windows are framed in limestone. The remainder of the elevation contains horizontal bands of windows with limestone sills and metal lintels similar to the south and east. A pedestrian access door is located at the far corner (behind the metal frame smoke break station in between A and C in Figure 6).

Figure 6: West elevation of portion A (right side) showing projecting front and skylights. The south-facing elevation of portion C (AKA High Bay) is at left. Source, Matt Bivens photograph, January 2016.

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Exterior – Portions B and C

The factory portion (B and C) is a massive rectangular structure which is constructed with steel columns, beams, and trusses and then faced in-between bands of windows with painted Gunite-clad metal panels; some buff brick is nearest the ground on each elevation (Photos 3, 5-7). The factory has two primary sections comprised of a Low Bay (B) and a High Bay (C); (Figure 7: C is to left, B is to right; also see Photos 3-5 for High Bay and 6-7 for Low Bay). The High Bay is framed with structural steel mounted through a concrete slab. Steel truss framework connects the walls to vertical steel columns (exposed on the interior) and are clad with the painted Gunite-clad metal panels at the exterior (Figure 8). Nearest portion A and facing south, is a lower building wall with buff brick at the ground level; a continuous band of horizontal one-over-one, metal replacement windows sits on the brick. Two similar window bands above are separated by painted metal panels. A flat parapet roof is above. Five butterfly/monitor skylights penetrate the flat roof and contain replacement windows (Photo 3). Along that same elevation and connected to the lower portion is a slightly higher wall—built to contain the massive original metal airplane hangar doors that were raised upward and into a cavity at the roofline (Photos 3 and 4). All of the exterior cladding and hangar doors are original; doors are still operational but in need of repair and repainting. Fenestration appears to be original in the hangar doors (Photo 4).

Figure 7: Low Bay (B) and High Bay (C) relative to the complex. Source: Google Earth and MSB, 2016.

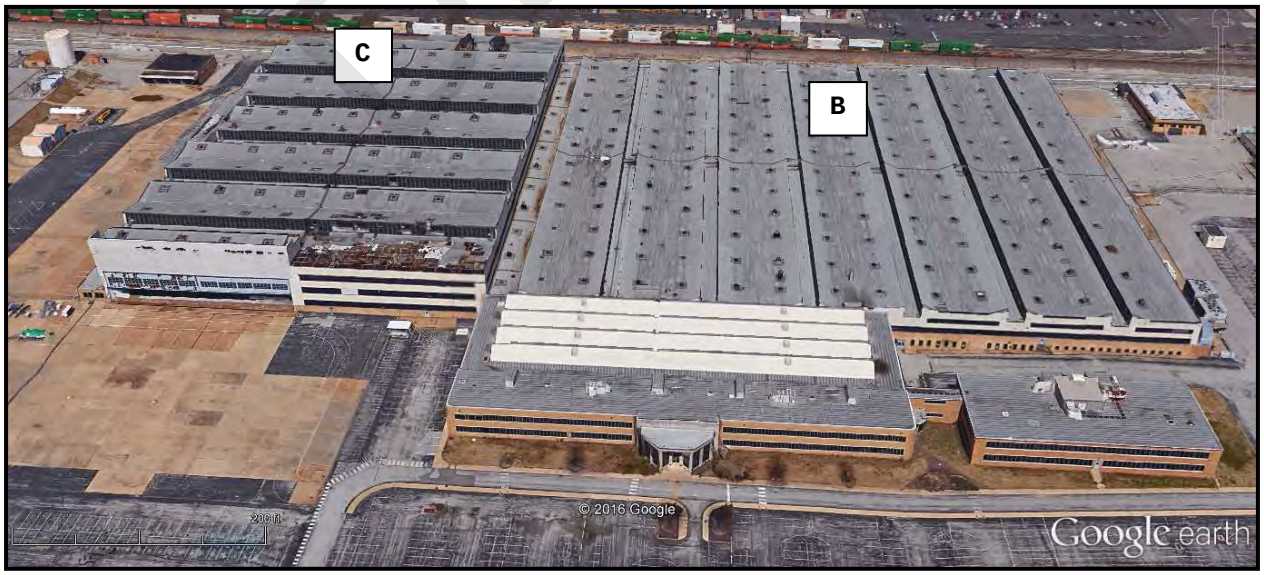

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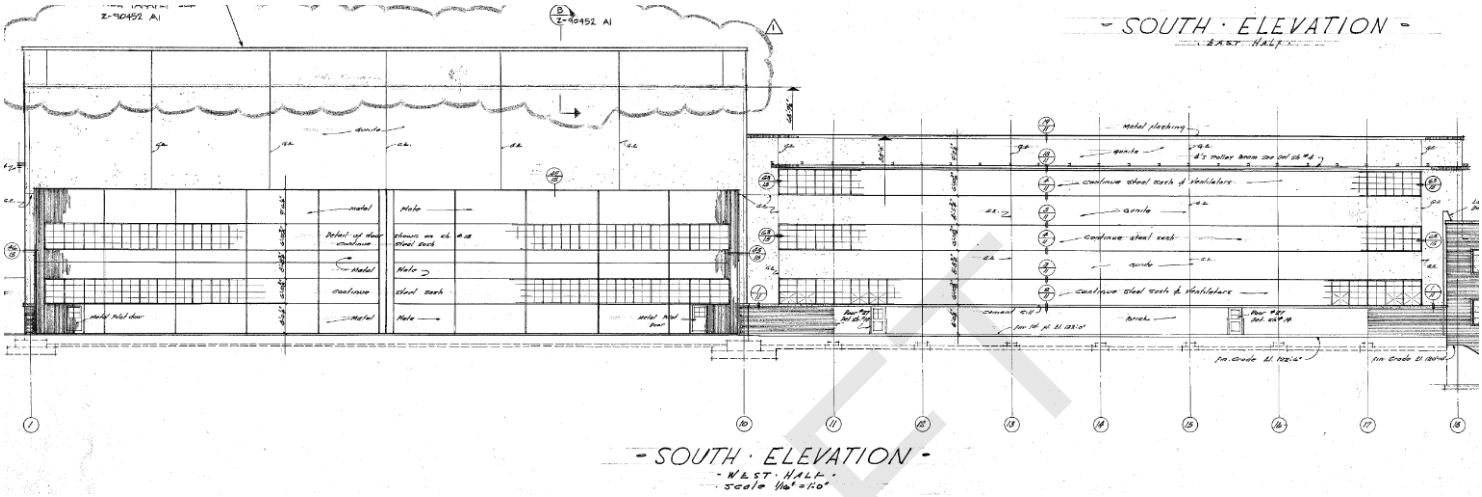
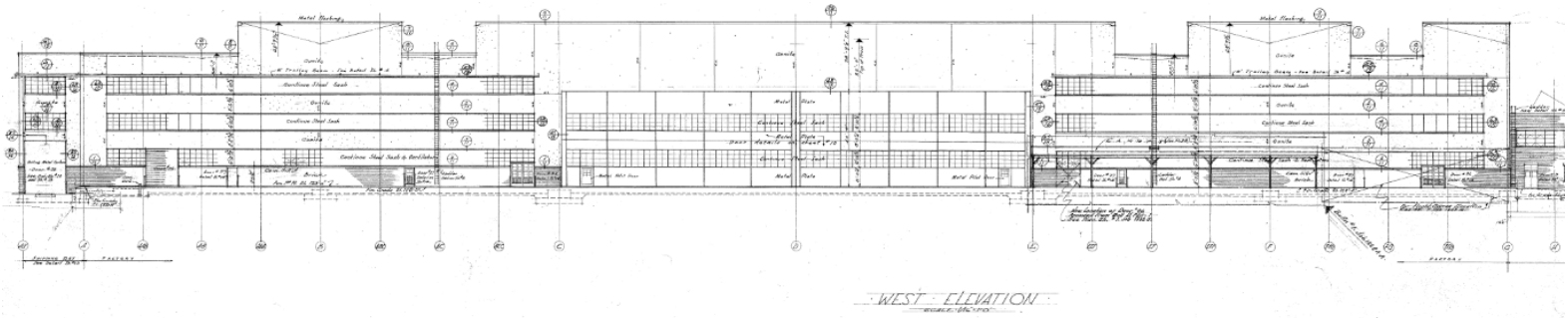
Figure 8: High bay design south-facing elevation; abutment to portion A is at right. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to March 25, 1941.



The west-facing elevation contains at the farthest south, an ancillary one-story brick addition; its construction date and historic use is unknown. Based on data the structure was a freight office; it contains a front office with six pairs of replacement windows (one is converted to a door), a loading office window, door, and then five functional and two closed-in loading dock doors and finally a pedestrian door set within a loading door (Figure 9 and Photo 5). A second set of massive hangar doors is situated within the center of the elevation. The walls contain buff brick at portions near the ground, horizontal bands of continuous windows, and painted Gunite-clad metal panels. Five large and one small skylight structures project from the roofline (Photo 5). The final section of the elevation at the farthest north contains brick at the first floor which supports a horizontal band of continuous windows. The span is interrupted by a loading door and a pedestrian entrance. Three small brick structures are adjoined to the wall with a fourth is set out on the site. Two additional horizontal bands of continuous windows extend up the wall (Figure 9).

Figure 9: High bay design west-facing elevation; abutment to portion A is at right. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to March 25, 1941.



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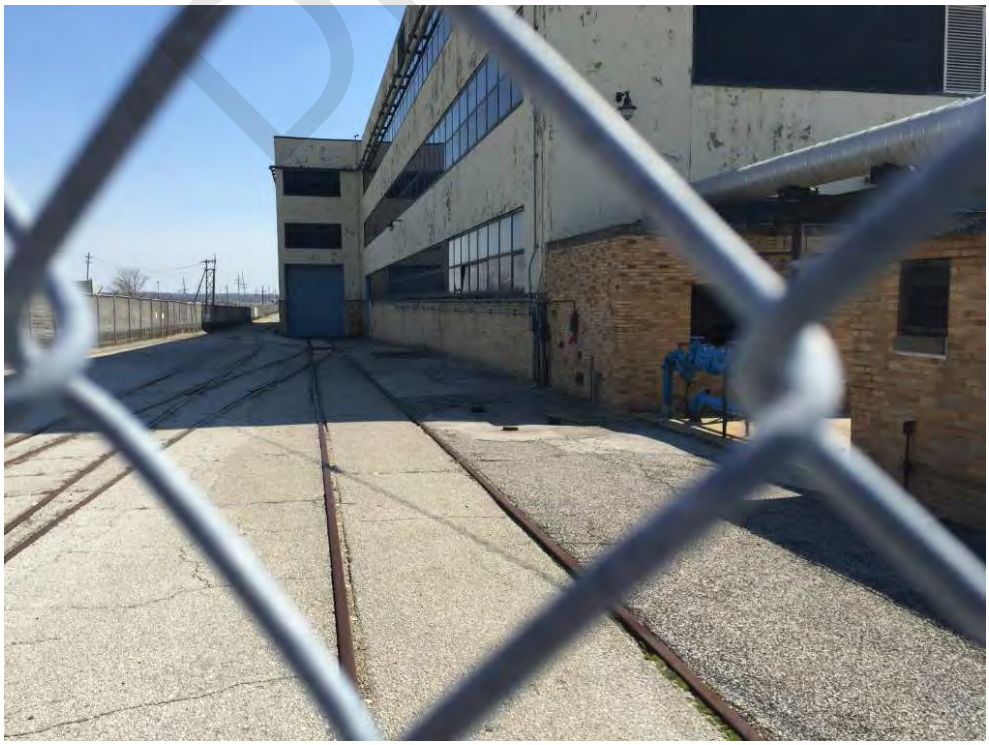
As one turns the northwest corner of the High Bay (C) along Banshee Road, the north-facing elevation shows the combination of the high and low bays (Figure 10). The historic railroad spur also follows this elevation and then enters the High Bay via two points facing north and west (Figure 11).

Figure 10: North elevation of factory with High Bay (C-right) & Low Bay (B-left); the Low Bay is set back from the street and High Bay to accommodate the railroad spur. Source, Matt Bivens photograph, 1-2016.

Figure 11: North elevation of factory High Bay with small projection to accommodate the railroad spur; the spur continues through the building and to the east. Source, Matt Bivens photograph, 1-2016.



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The full north-facing elevation continues eastward for over 1,100 feet (Photo 6 and Figures 12A and B) and contains seven butterfly/monitor roof projections. Of mention is the intact railroad spur line from the original design which is situated alongside the elevation and passes through portion C (foreground behind fence in Photo 6). Again comprised of buff brick at the ground level supporting a continuous band of horizontal windows, the wall of the building above is painted Gunite-clad metal panels. A second band of horizontal windows, broken in between five skylight projections, penetrates the otherwise spare wall and allows additional light within the structure (Photo 6 and Figure 6). Then, a wide section with flat parapet flanking the street (Figure 12, bottom image) contains the two additional skylights (hidden from street view). Additional pedestrian doors and loading bays penetrate the wall above ground level and are reached by concrete or metal stairs. At the flat parapet section; the 1st floor has buff brick that supports a continuous band of horizontal windows (Figure 6, bottom).

Figure 12A: Portion B as originally designed with High Bay (C-at right) and Low Bay (B-at left) facing later Banshee Road. Also see Photo 6. Source: Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941. The dotted line represents connection of building.

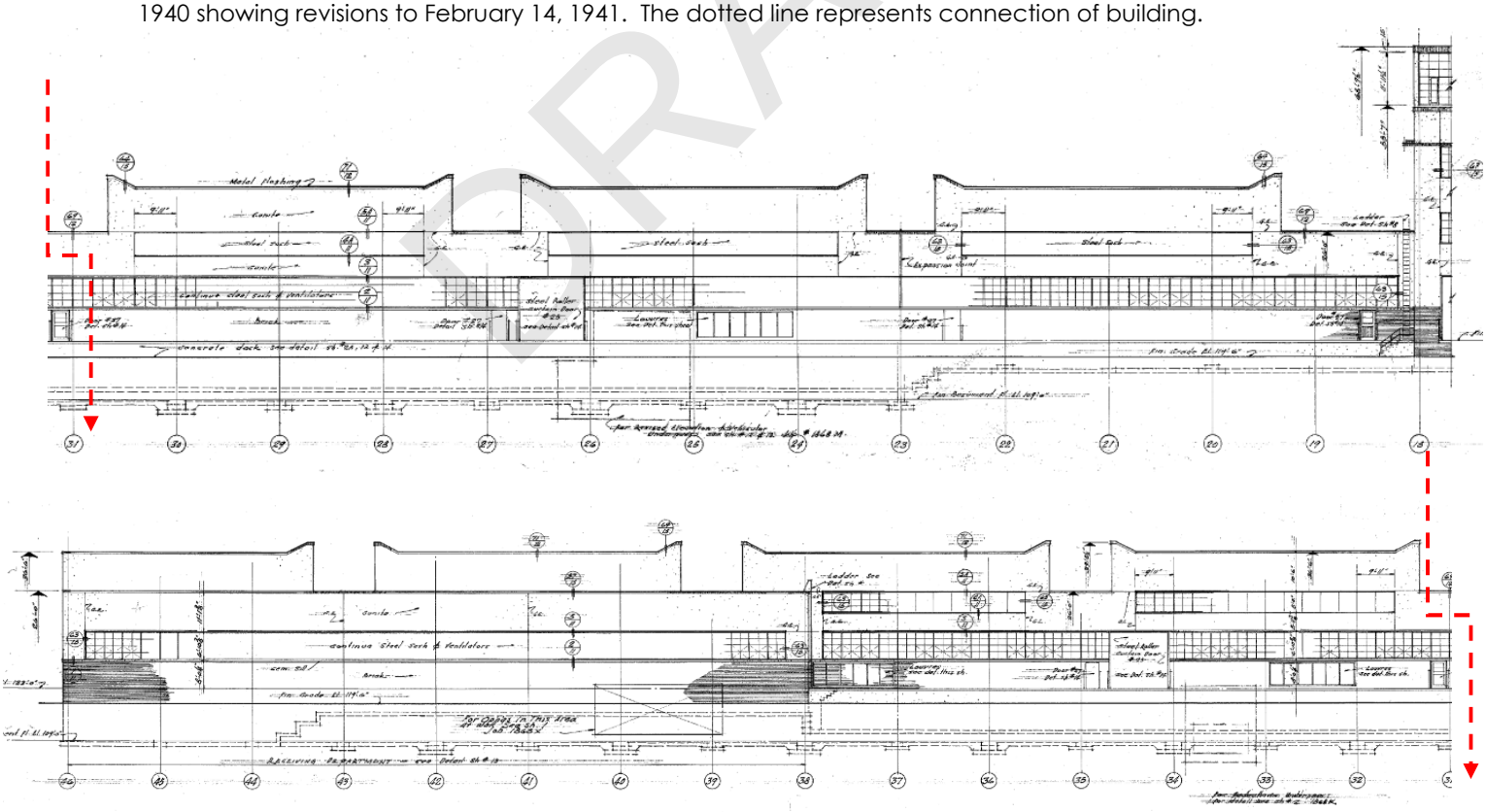

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Figure 12B: North-facing elevation (foreground) with Lambert in background. Source: Google Earth, 2016.

Along the north elevation, the railroad spur splits to include two spurs: one runs within the High Bay (C) mentioned earlier and then terminates within; the second runs parallel and down along the Low Bay (B). An additional loading door within the High Bay (C) is at the north elevation within the bump out. The Low Bay (B) contains four pedestrian doors and three large loading doors. The spur line terminates at a west-facing loading dock set within a second bump out projection with flat parapet but splits prior and continues to run parallel to the north wall of the Low Bay (B-Photo 6). Sections of horizontal continuous windows (replacements which fill the original openings) are set above a buff brick base interrupted only by the access points and three vent systems (which interrupt the brick only). Painted Gunite-clad metal panels complete the facades. The skylights also contain similar window bands facing north; the east and west exposures contain full height and width windows.

Turning the northeast corner, the building's east elevation (Figure 13) continues to the south under a flat parapet roof (Photo 7). A total of seven truck loading bays are situated closest the northeast; a short loading dock is sheltered by an overhanging roof (original or early). Again, buff brick supports a continuous band of horizontal, metal replacement windows; the windows are broken in a section by an additional loading bay (Photo 7, near center). A second band of similar windows are unbroken above just below the skylight projection; said skylights have windows in the west-facing exposure. The elevation includes a pedestrian door at ground level adjacent the loading dock, a pair of additional loading dock doors, and then at least five supplemental pedestrian doors. Mechanical equipment is situated on top of a poured concrete slab which projects above ground. Situated nearest the elevation center is a portion of a ramp

which originally led into the underground level—this was the original, primary employee entrance (Figures 14A and B). The structure continues around to the south elevation where it intersects with the administrative portion (AKA A; Photo 2, right side).

Figure 13: East-facing elevation. Source: Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to February 14, 1941. Note employee entrance to factory basement in dotted line; entrance is enlarged below in Figure 14A and a photo of today's condition is in Figure 14B.

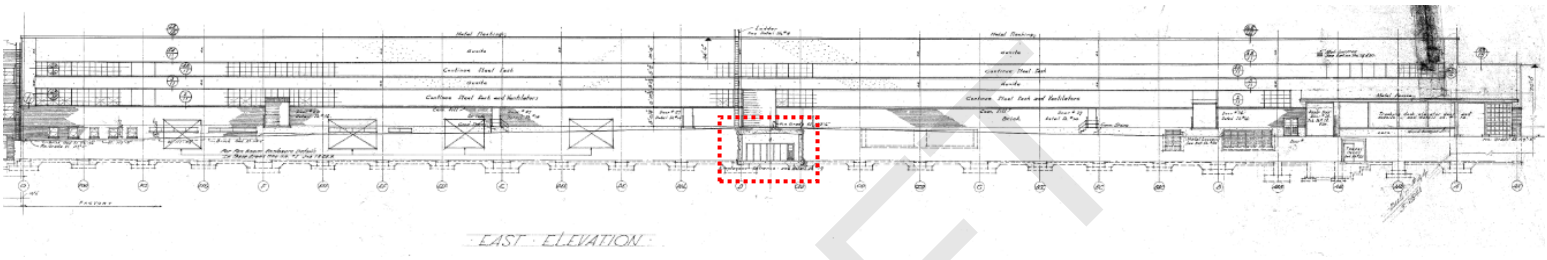
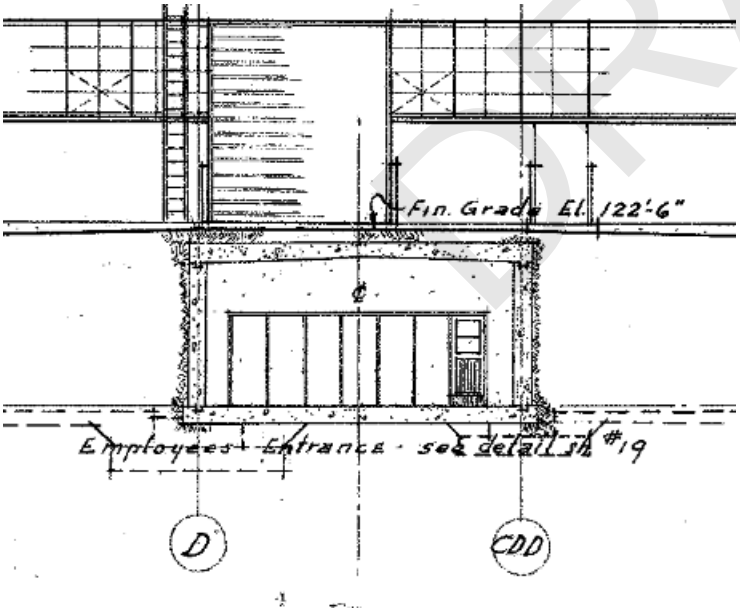


Figure 14A (left) and 14B (right): East-facing elevation showing employee entrance to factory basement. Source (left): Albert Kahn Associated, Job No. 1868, sheet 6, November 22, 1940 showing revisions to February 14, 1941. Right source: Google Earth, 2016.



The contributing parking lot to the east of the building (partially visible in Figure 12B) is badly worn but still contains traces of parking lines and surface treatment (non-historic) which is similar to the original design.

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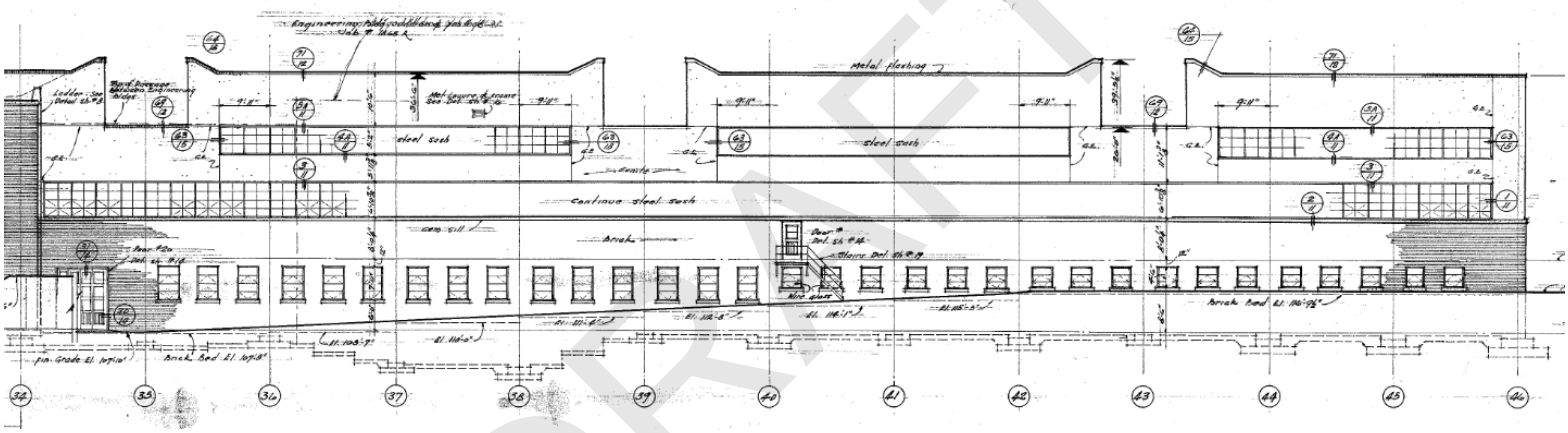
The south-facing elevation of portion B has small rectangular windows cut just above the ground to allow light into the basement (Photo 2). Above, is a continuous band of horizontal, metal replacement windows; just above that is a second band which again is broken by the skylight sections (Photo 2; similar to the north elevation, Photo 6). A pedestrian door is reached via a steel stair system near the center of the elevation while a wider accordion-style wood door (original) is at the far side where the portion abuts the garage portion of the administrative department (Figure 15).

Figure 15: East-facing elevation showing employee entrance to factory basement. Source (left): Albert Kahn Associated, Job No. 1868, sheet 5, November 22, 1940 showing revisions to February 14, 1941.



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The final component of the building complex is the engineering annex which was completed before 1945 (portion F-Figure 16), was constructed with identical color brick before 1945 flanking the Low Bay to the south (Photo 2A, right side and Photo 2B); it is connected to the east wall of portion A via a two-story brick pedestrian corridor (Figure 16, left side). The south-facing primary elevation has horizontal bands of continuous windows at two stories but is divided into two sections at the first floor flanking the building middle in order to accommodate a metal pedestrian access door with transom above and reached by concrete steps; it is otherwise unadorned (Figure 16, top image). The west and east elevations are similar and contain horizontal bands of continuous windows at two stories. The north-facing elevation flanks the south wall of portion B and contains access nearer the center of the elevation including a double door leading to a partial basement level and a pedestrian door which accesses the internal stairwell (Figure 16, bottom image). A high window allows light into the stairwell. Flanking the entry point is a horizontal band of continuous windows at two stories (left side); at the far right side is a similar set. Nearer the entry points are two additional sets of wide windows. Windows have concrete sills and bands of metal which wrap the

steel lintels. The roof overhangs slightly and is capped with a metal parapet. A penthouse with access to the roof is at the rear elevation, building center.

Figure 16: Portion F, ancillary building containing the engineering department annex before 1945. Top is south elevation; bottom is north. Source: Photographs by Matt Bivens, 2016.

Interior: Portions A, B, C

Portion A (Administrative) has a total interior square footage of 66,000 which is contained within a basement, ground floor, and second floor. Portions B and C (Manufacturing) have a total interior square footage of 1,071,400 which is contained within a full and a partial basement as well as a ground floor. As originally designed, the underground portion of Portion A (Figures 17 A and B) had three stair access points (extant) with a central stair adjoined to the back hall behind the main lobby. Generally comprised of storage areas, the building maintenance and facilities manager

occupied a corner office flanking the circulation corridor (which runs west to east). A second circulation corridor (running north to south) adjoins the other and allows access to the underground portion of the Low Bay factory in portion B (Figures 17 A and B). This portion is comprised of an underground garage, cafeteria and employee dining room, private dining rooms, a kitchen, employee locker and restroom areas, and mechanical rooms. This subterranean level was designed with a generally open plan with divisions for these aforementioned spaces so that the plan could be changed as needs arose. (many of the original walls are still in place; however the majority of significant historic activities occurred in the factory which is remarkably intact). Additional restrooms and storage areas were situated within the larger open space underneath the Low Bay (B) structure (Figures 17A and B, left side). Adjacent the Low Bay structure sits the generally unexcavated High Bay underground (portion C)—its underground areas are reached by separate sets of stairs which are accessed from the ground floor and simply contain employee restrooms and lockers with no access to other spaces (Figures 17A and B, right side). Interiors underground have drop ceilings, carpet and tile flooring, and drywall walls throughout. Portions are filed with surface water and mold and materials are in average to poor condition.

The ground floor area of portion A (Figures 18A and B) was reached by the primary stair (then still the original flat limestone entrance); beyond the lobby (Photo 8) and reception area was the circulation hall. Smaller offices (extant) were situated along the south-facing wall (Photo 9) while the larger engineering department (Photo 10) was left mostly open (extant). The second floor of Portion A (Figure 19) is similar with the exception of the drafting areas being lit by the sawtooth skylights (extant but covered with drop ceiling; see Figure 20). Again, interiors have drop ceilings throughout (the bulk were historically covered to hide the raw concrete), carpet and tile flooring, and drywall walls throughout. Conditions on the second floor are average with some damage to certain offices. Most of the interior furniture was removed after vacancy.

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Figure 17A (original): Basement floor plan of complex (portions A, B, C), not to scale. Source: Albert Kahn Associated, Detroit, Michigan. Job No. 1868, Factory and Office Building for the Curtiss Aeroplane Division of Curtiss-Wright Corporation of Robertson, Missouri. Sheet No. 2, November 22, 1940.

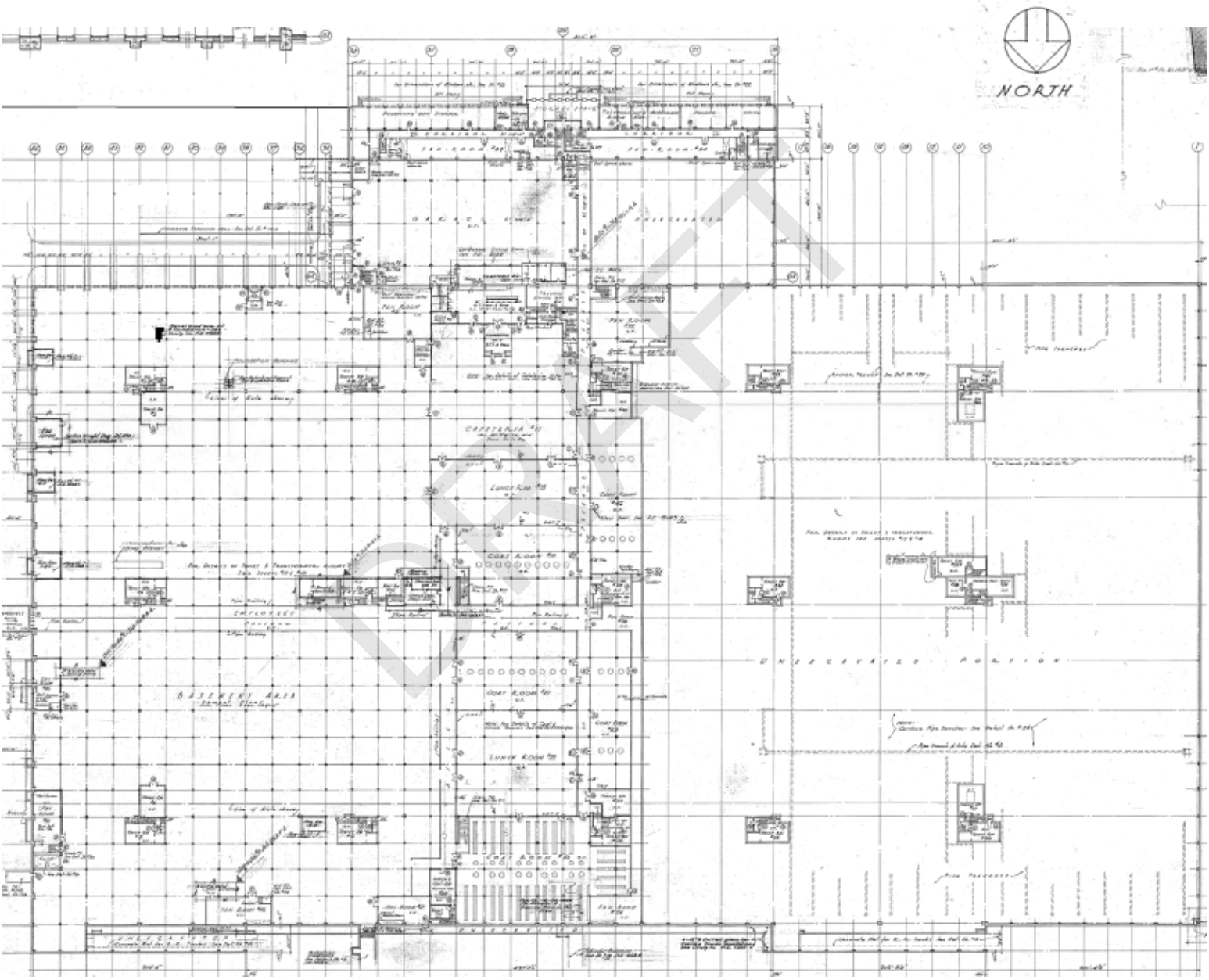

Figure 17B (current): Basement floor plan of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003.

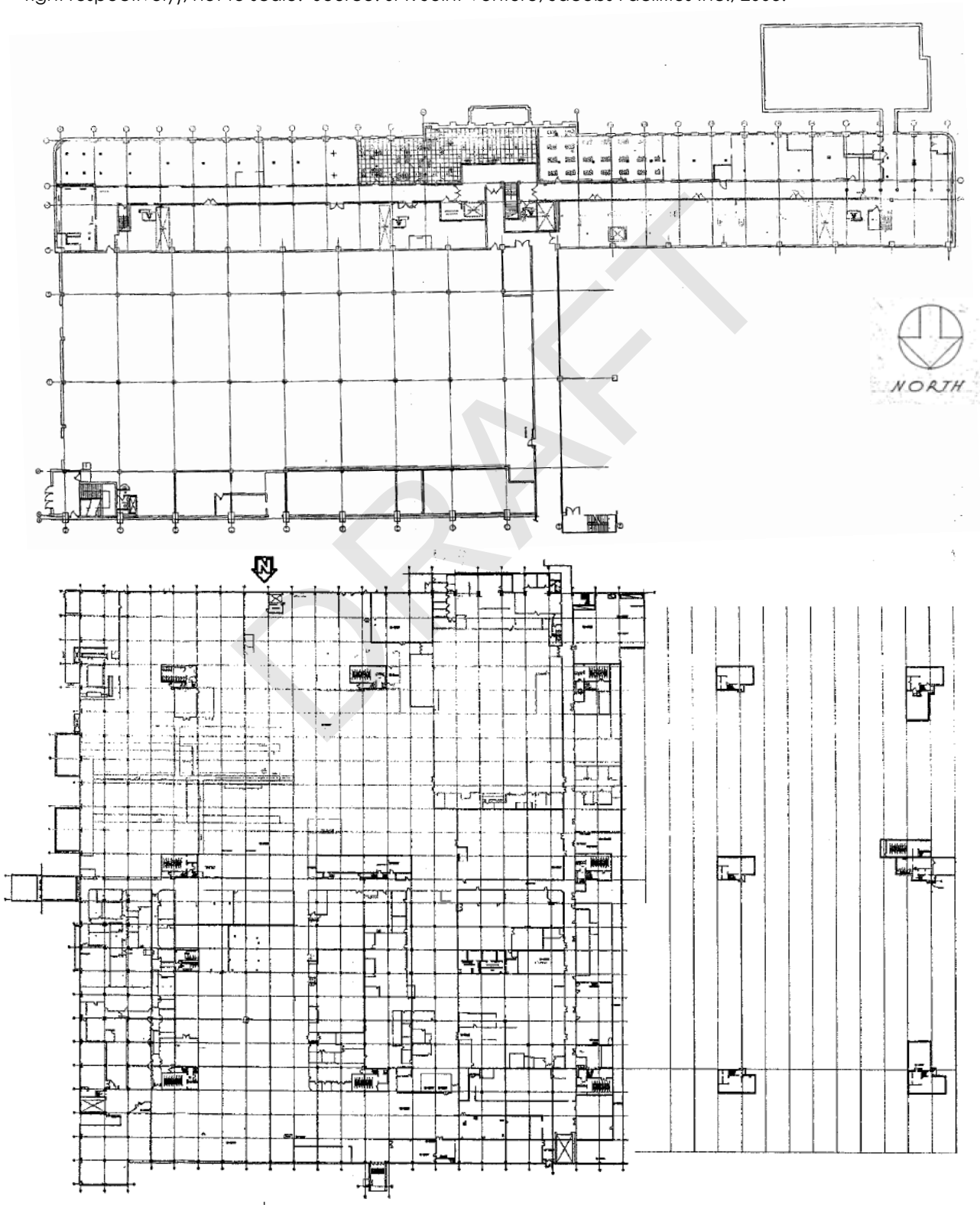

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Figure 18A (original): Ground floor of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: McDonald Douglas 1978 drawing after original Kahn design; very little was changed during their occupation.

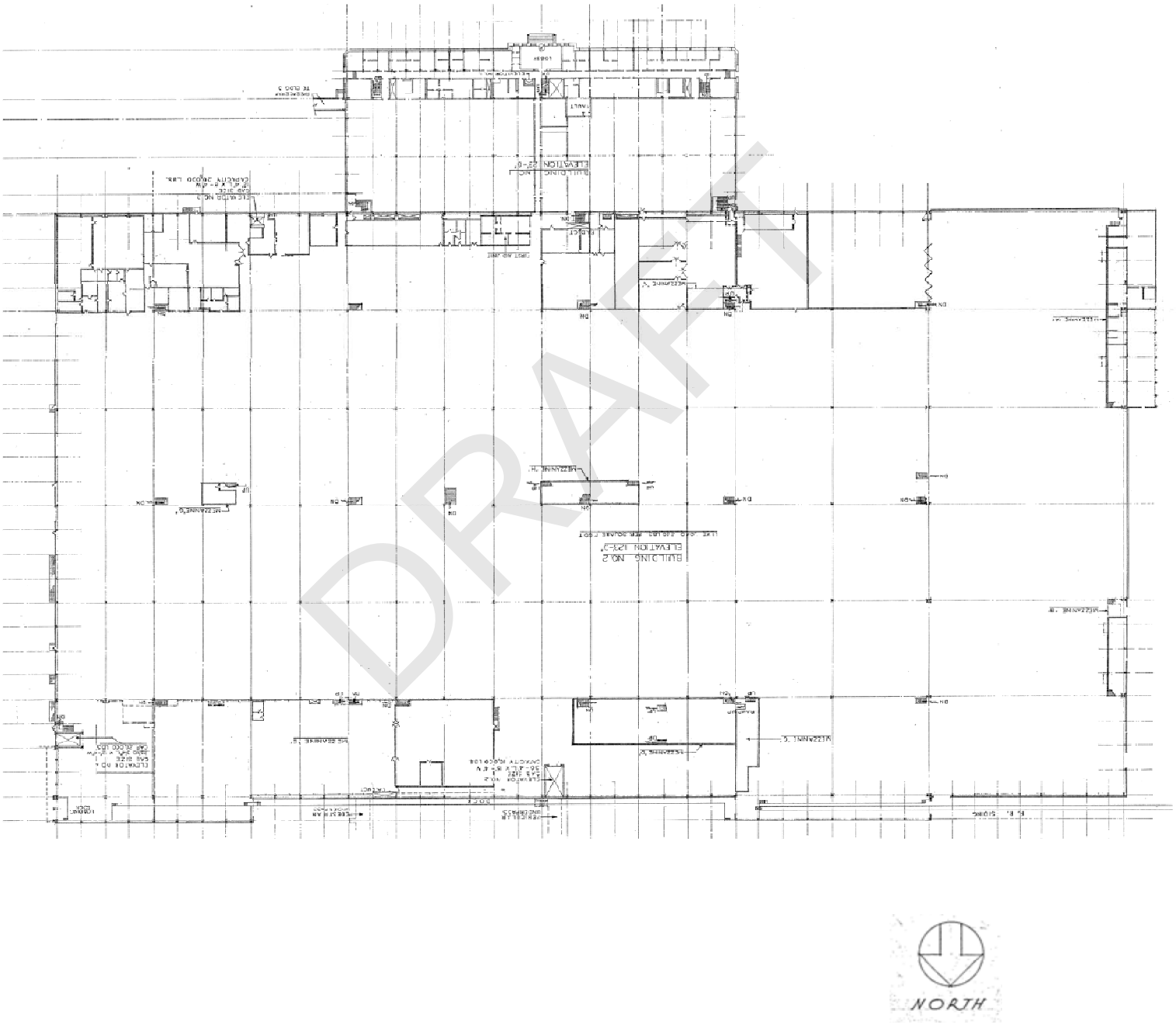
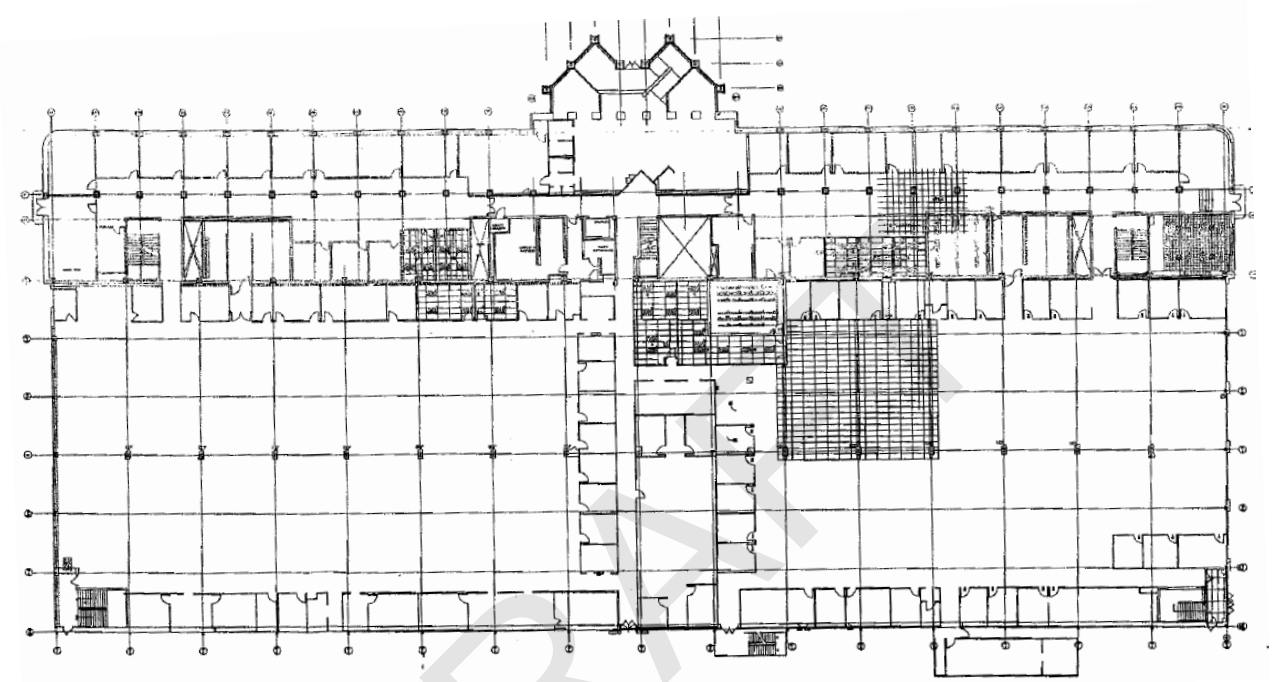


Figure 18B (current): Ground floor of complex (portion A at top; portions B and C at bottom left and right respectively), not to scale. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003.



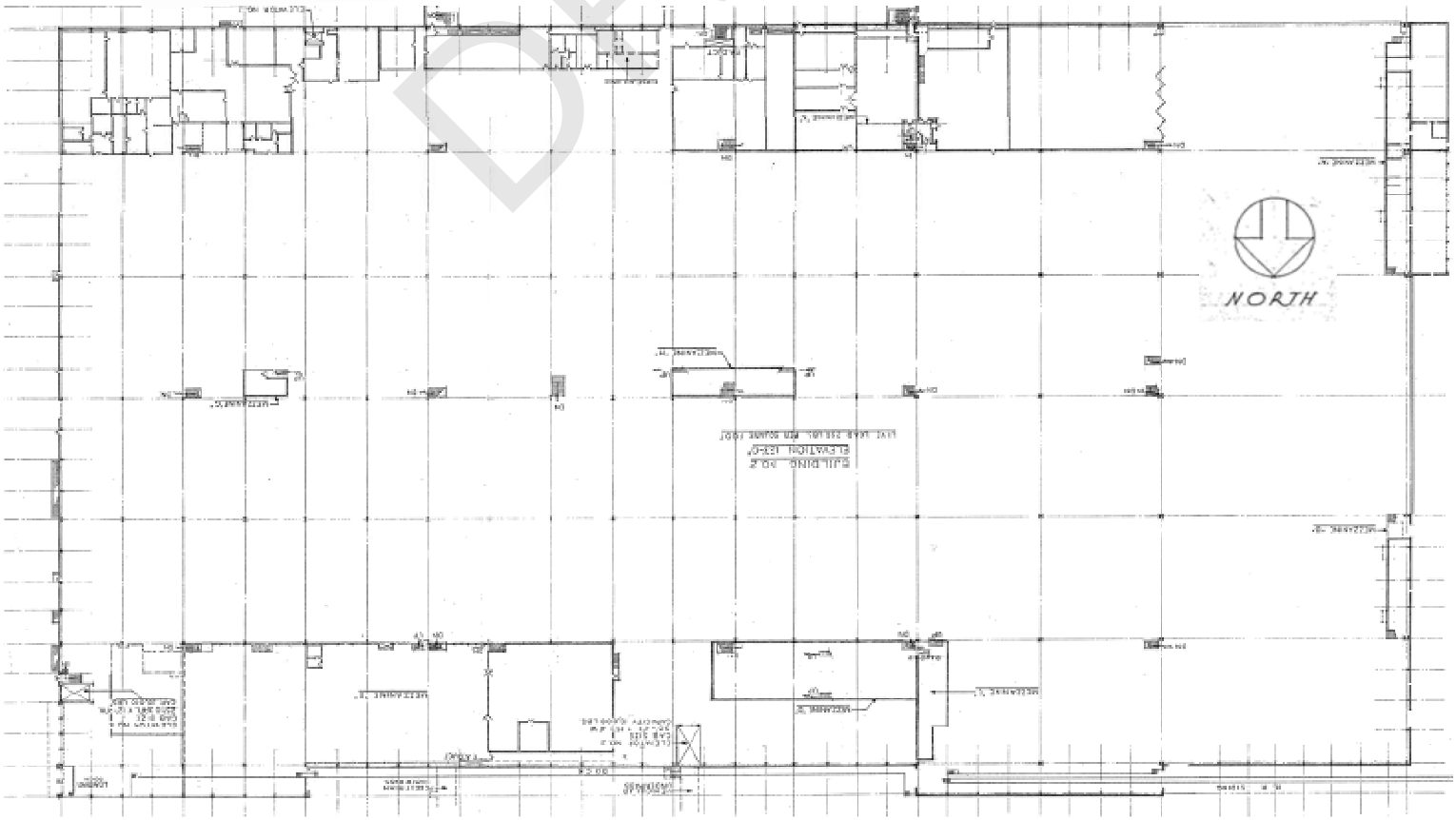


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Figure 19: Second floor plan of administrative portion. Source: SPK Joint Venture, Jacobs Facilities Inc., 2003. No historic drawing of the 2nd floor of A has been discovered to date however, it was similar to the 1st floor overall.

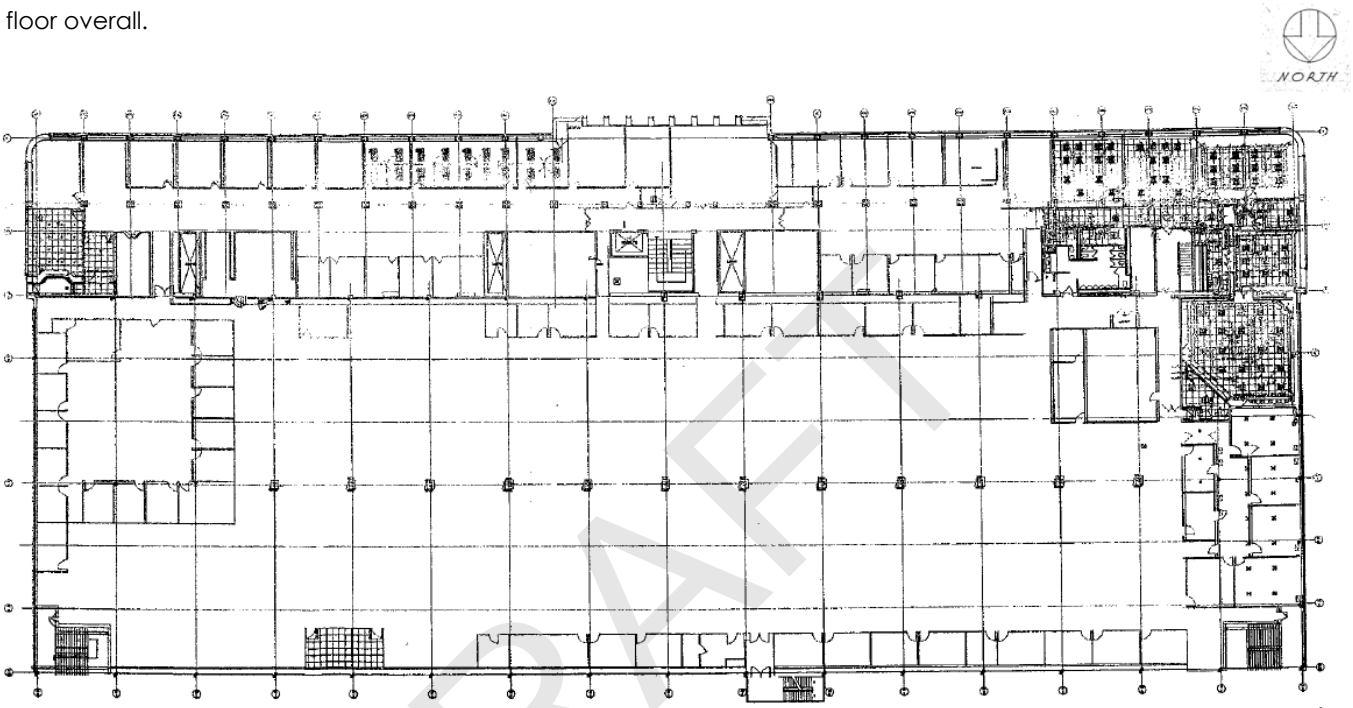

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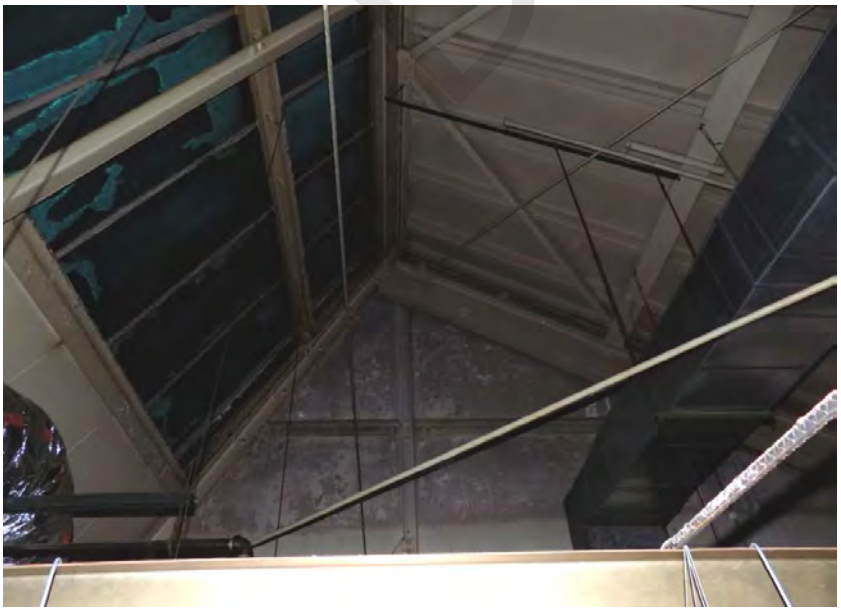
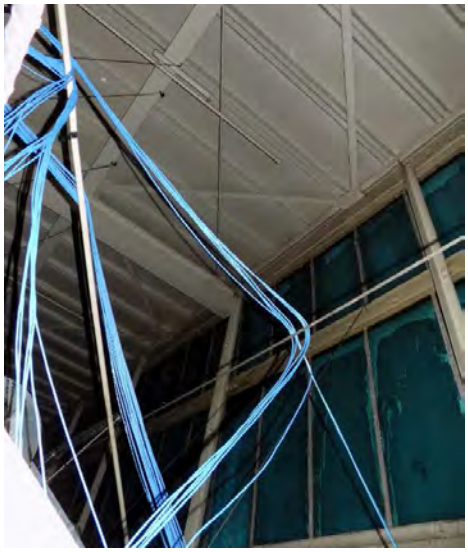
Figure 20: Second floor engineering department skylights. Matt Bivens 3-16.





Interiors: B and C

Through portion A, or accessed separately from multiple points at the exterior, portions B and C are comprised of mostly wide-open floor space (Photo 11 and Figures 18A and B) which was the original historic condition. At the High Bay section (C), overhead clearance is at 40 feet high; multiple spans of metal trusses support both the ceiling as well as interior tracks for moving heavy objects. The interior structure is exposed (Figure 21). In the High Bay area the floor is thick concrete with portions having limited accessibility to the underground; although the basement is only partially excavated, it contains multiple mechanical and restroom spaces accessible from stairs on the main floor (Figures 18A and B). Smaller floor hatches provide access to electric (since deactivated); assembly line tracks are extant under metal plates (Figure 22).

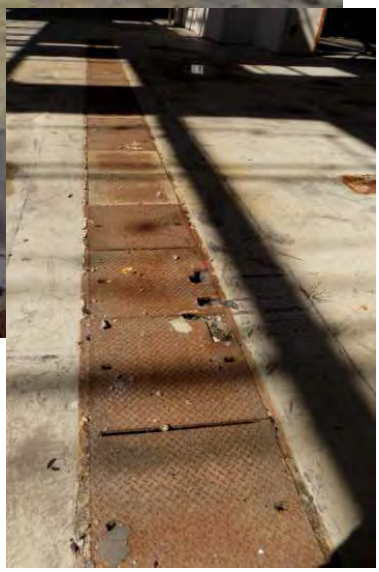


Figure 21A (large pic) and 21B (small pic): Portion C, interior of High Bay area (21A) and assembly line tracks (21B). Source: Matt Bivens, photograph 1-2016.

The Low Bay area (portion B) is connected to the High Bay where the passage drops to 20 feet overhead clearance (Photo 12 shows transition with Low Bay in background; Photos 13 and 14 are Low Bay areas; Figure 22 shows transition). Smaller mezzanines and walled structures were built within the Low and High Bay areas to provide temporary facilities for changing uses (visible in Photos 13 and 14; Figure 22). The floor of the Low Bay area is concrete, however the majority is excavated and provides usable underground space. The original design intent was to provide a separate circulation space for the plant employees underground in order that shift changes and general traffic would not inhibit manufacturing during wartime demand. Placing all of the necessary human-need facilities in the basement (bathrooms, lunch rooms, locker rooms, etc.) allowed for maximum utility and efficiency on the main factory floor (portions B and C). The multiple portions of the factory are remarkably intact and the building's former use as a combined office (A, F) and factory (B and C) is clearly evident today. Condition is generally good with some obvious concerns being environmental hazards (lead and asbestos) as well as wear-and-tear including peeling and flaking paint, broken sash, damaged stairs, and worn interior finishes (drop ceiling, carpet and tile, drywall, etc.).

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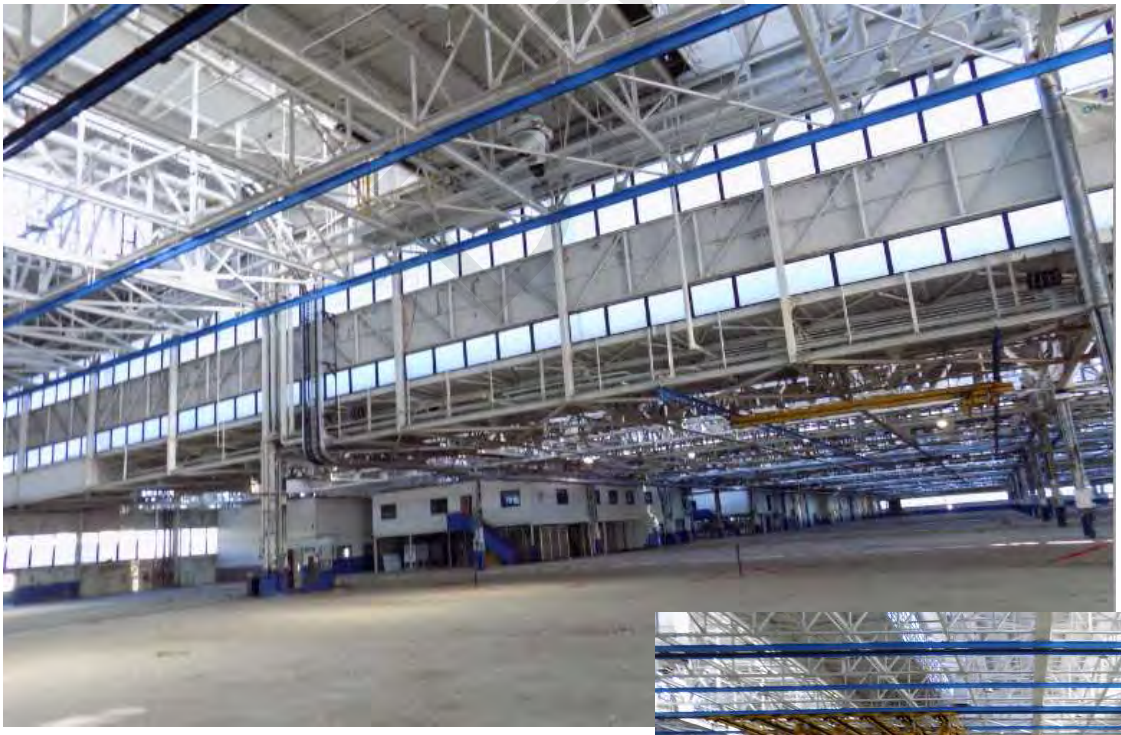
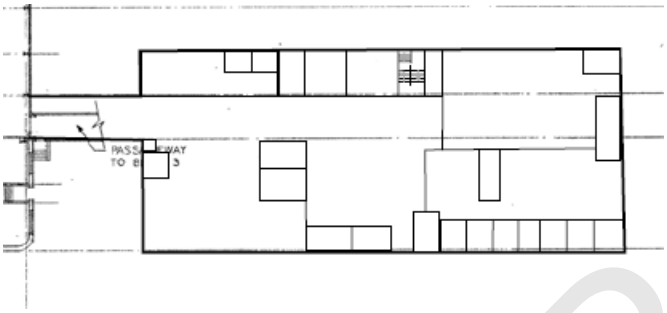


Figure 22: Portion C, interior of High Bay area (21A) and assembly line tracks (21B). Source: Matt Bivens, 1-2016.

Interior: F ***(D and E are sites)***

Portion F was constructed as an annex to the administrative and engineering departments (A) sometime between 1942 and 1944; it contains an additional 16,000 square feet on two levels (Figure 22). Interiors are similar to the original administrative portion (A) and contain individual offices, storage and mechanical areas and restrooms (Figure 23). A single loaded stair allows access into a partial basement, the second floor, and the roof. Ceilings are drop, floors are carpeted or tiled, and walls have drywall finishes. Condition is average throughout.

Figure 22: Portion F, interior of 1st floor (left), 2nd 2nd floor (right). Source: Photograph by Matt Bivens, 3-2016.



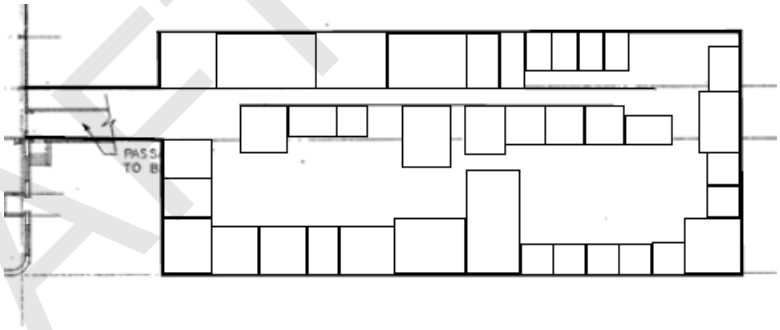


Figure 23: Portion F, interior of 1st floor (left), 2nd floor (right), stair (bottom). Source: Photograph by Matt Bivens, 3-2016.

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Sites D and E (contributing sites)

The associated site "D" corresponds to the original aeroplane taxi/maneuvering area accessible from the High Bay (C; Figure 24A). It contains original or early concrete paving and few obstructions (partly visible in Photos 3 and 4). Site "E" corresponds to the original Curtiss-Wright employee parking lot (Figure 24B). Both of these sites form portions of the nominated complex boundary lines at the west and south (D) and east and south (E). Other non-historic paved areas adjacent the complex were not included in the boundary because they are owned separately, have been altered severely, and little information is available relative to their original use or construction.

Figure 22A (top) and 22B (bottom): Sites at top (D) and bottom (E) Source: Matt Bivens, 3-2016

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Integrity

The Curtiss-Wright Aeroplane Factory & Office complex is remarkably intact from its 1940-1945 design and construction and its active use in association with its support of the Allied Forces and United States military in the effort to win World War II (discussed in Section 8). The relatively intact original design of a separated, yet unified, administrative, design, and manufacturing complex, is highly visible in what appears today. Although no longer functioning, the complex occupies its original site in association with the larger Lambert Field which completes the setting; historic paving connects to runways and an image of how Curtiss-Wright moved the finished aeroplanes from the factory to the runway is still visible. The exterior grounds have changed little over time to accommodate subsequent construction of other aviation-related properties, parking lots, and roadways. The most drastic change was done by Curtiss-Wright itself when it demolished its original factory (Figure 23, top) in order to accommodate for its war-time factory (Figure 23, bottom). The factory that remains extant today is the significant historic property. The nominated complex includes one building comprised of multiple functions, one historic parking lot, and a portion of the aeroplane taxi lot; all elements have been associated with the complex since construction and have changed very little over time (Figure 24).

Besides some interior changes to walls and materials, perhaps the most obvious alteration is the primary entrance projection at the south wall of the Administrative department. The original entry projection (changed between 1970 and 1981) is still visible behind the new projection; on the interior the vertical limestone piers are also intact and visible, however clad in wall paper. The later entry imitated the locations of the original piers and created a trapezoid extending from the flat wall plane; limestone was also used to achieve a similar, but more contemporary look. The second modification is the replacement of the mutli-light steel sash windows with single and multiple-light fixed and operable windows (potentially changed in the 1970s). The third modification is limited to changing minor walls within the underground spaces—a process which likely began as early as upon completion of construction; the space below ground is secondary to the factory space. And the fourth is the addition of interior mezzanines and anciliary structures within the factory; these are associated with the aviation industry later significance under subsequent owners and are minor in the scheme of the property's significance.

Although completed after the period of significance, the change to the entry has little impact on the historical significance of the complex for two primary reasons: 1, that the significance occurred primarily within the factory and design areas (extant and intact)

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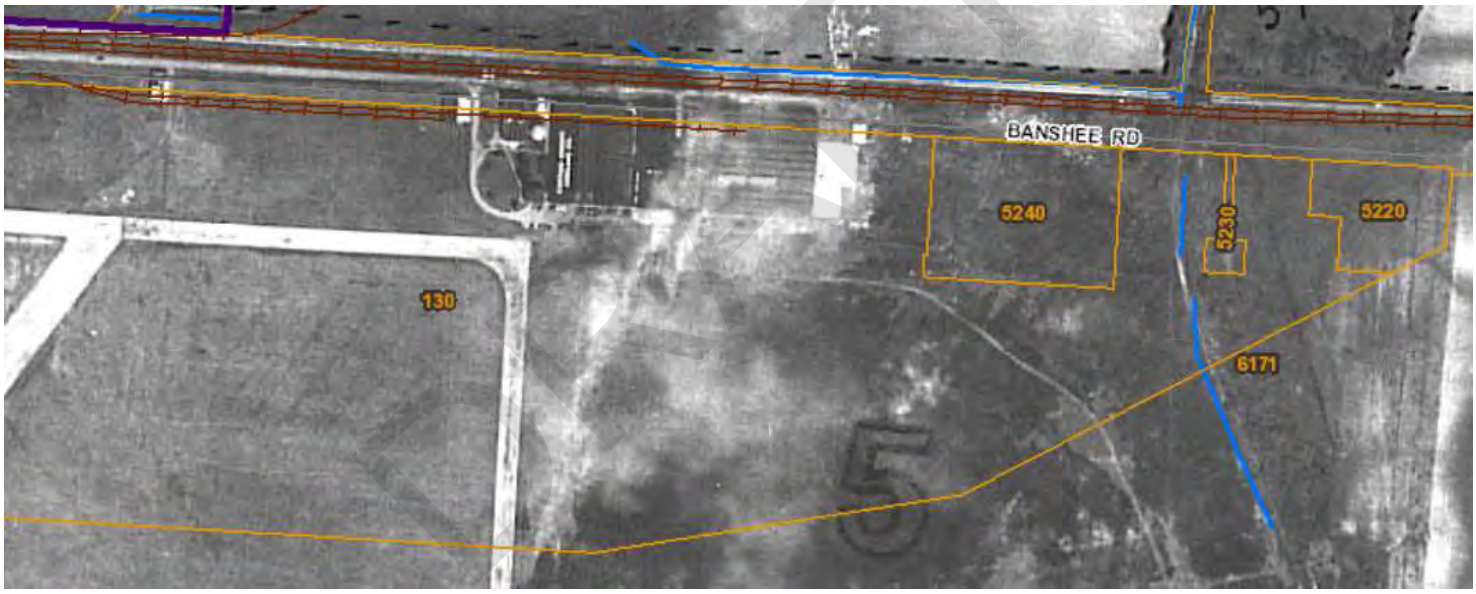
of the complex, and 2, that the appearance of the bulk of the complex is actually intact and still reflects the building's appearance during the period of significance. The window replacements also have little impact on the integrity as they fully fill each opening, especially the horizontal bands of continuous sash, and imitate the original as best as they can. Mezzanine structures within the factory provided space for additional functions within the factory during later occupation; they are easily removable and do not detract from the feeling within the space. Overall, the feeling within the spaces is preserved. The massive hangar doors in portion C immediately draw the viewer within a massive Cathedral-like space which to this day clearly reflects its historical use.

Figure 23: Site evolution between 1937 (top) & 1955 (bottom). Source: St. Louis County Parcel Viewer, 2016.



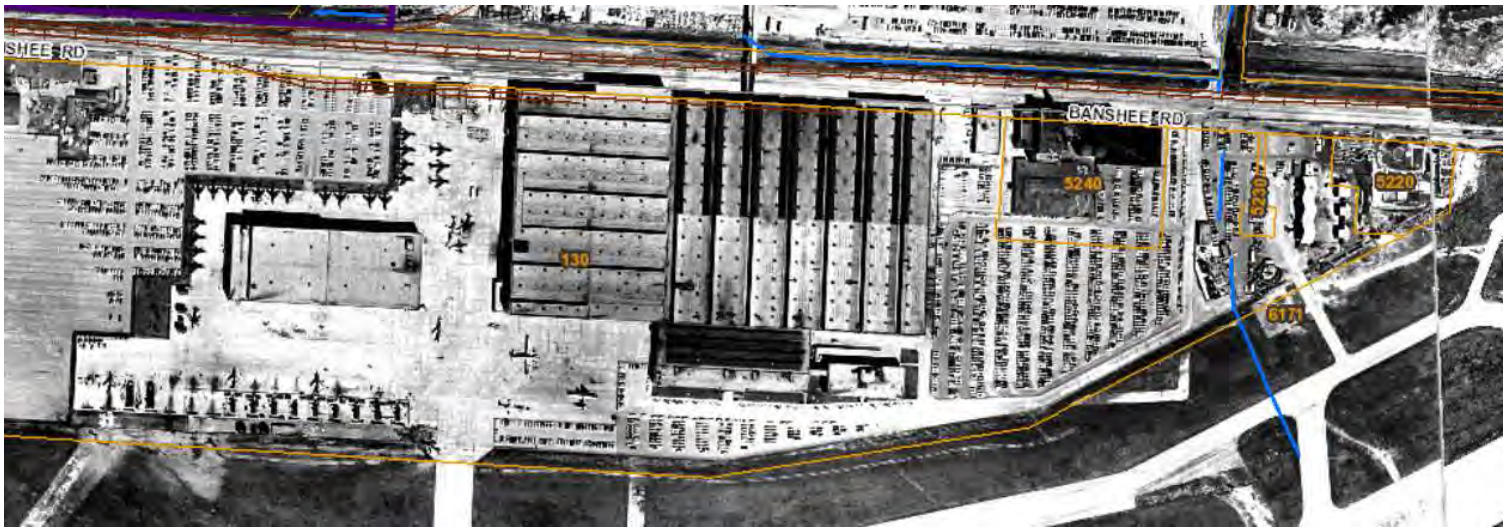


Figure 24: Site evolution between 2015 (top) and 1955 (middle) with proposed boundary (outlined in red). Source: St. Louis County Parcel Viewer, 2016. Despite some perspective and shadow considerations, the boundary encases the major contributing components that have been there since construction and functionally-related to Curtiss-Wright's occupation on site.

STATEMENT OF SIGNIFICANCE

Summary

The Curtiss-Wright Aeroplane Factory located at 130 Banshee Road in Hazelwood, unincorporated St. Louis County, Missouri, is eligible for local listing in the National Register of Historic Places (NRHP) under Criterion A in association with MILITARY relative to the mobilization of the United States Army and Air Forces in preparation for and participation within World War II. The property is primarily significant in the context of World War II Aviation as an excellent example of an "Aviation Development Facility and Production Plant"[2] where engineering research and design occurred and subsequently the development and technology of air power for military aviation purposes was perfected and implemented with complete aeroplanes during its active use between 1941 and 1946. In addition, the property is associated with the larger United States context of "World War II and the American Home Front" as developed by the National Park Service.[3] Aeroplanes were designed, built, and flown directly out of the building and into the field—contributing immensely to the mobilization effort on the home front for both the Allied Forces and U.S. military. The story of the primary historic occupant, Curtiss-Wright (C-W), *IS* the story of American aviation itself (Appendix 1). Rooted in the barnstorming tradition of renowned pilot, Glenn Hammond Curtiss, as well as with the inventors of manned-flight, Orville and Wilbur Wright, heads of each successor firm ultimately came together in an effort to harness that genius when it combined the two and formed C-W in 1929. Curtiss's airframe inventions coupled with the superior engine designs of Wright, elevated the company to national prominence by World War II and they became the largest defense contractor in the world.

C-W had established itself from the beginning at St. Louis's historic Lambert Field where it produced aircraft and parts from a decent-sized factory during the early 1930s; C-W also provided flight instruction and trained pilots on site. When the United States military regained an interest in developing aircraft technology in 1939, C-W received one of the nation's largest contracts for production of complete aircraft as well as parts for other companies; the small factory was over-extended and subsequently expanded in order to supply the demand. C-W looked to renowned industrial plant genius architect Albert Kahn to design a new factory and administrative building that could be built on and around the existing plant in order to continue operation; the finished plant (extant today) was completed in 1941 with a final annex before 1945. Because of the great

[2] Anne Milbrooke, et all. "National Register Bulletin: Guidelines for Evaluating and Documenting Historic Aviation Properties." U. S. Department of the Interior, Natural Park Service, Cultural Resources, 1998.
[3] Marilyn H. Harper,, et. all. "World War II & the American Home Front: A National Historic Landmarks Theme Study." (Washington, D. C.: National Historic Landmarks Program, U. S. Department of the Interior, 2007).

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demands of reliable and trusted aeroplanes associated with war mass-production, C-W slipped behind the new technology curve during the war and afterwards was superseded by other aviation firms—subsequently leading to their ultimate demise. The story was recorded and placed on a shelf and the name almost vanished entirely. The period of significance corresponds to the construction and occupancy of nationally-prominent Curtiss-Wright in the St. Louis complex beginning in 1941 and ends a year after the war during a period identified with restocking America's military aircraft in 1946. By 1948, C-W dissolved their aeroplane division and subsequently transferred the property to McDonnell Aircraft Company. McDonnell-Douglas evolved and finally Boeing took over the property; it has sat vacant for over a decade. Without the contributions of Curtiss-Wright prior to and during the war, the outcome could have been drastically different—hardly an airplane flying during World War II lacked a piece of equipment developed and built by Curtiss. The thousands of aeroplanes manufactured and flown out of the nominated complex dominated the skies over Europe and at home and for our freedom we must honor them.

Background – Aviation in St. Louis and the Impact of World War I

The story of airborne autonomy in St. Louis has a rich history that spans over 150 years. Charles Lindberg needs no introduction here. The earliest interest in local flight is said to have begun in May of 1836—a day when a travelling hydrogen-gas balloon pilot named Richard Clayton demonstrated a flight which began in downtown St. Louis and landed six miles away (without harm).[4] Then in 1859, John Wise's *Atlantic* gas balloon ascended from St. Louis in an attempt to cross the Atlantic Ocean. In 1874, a St. Louis sheet music publisher named Richard Compton and his partner Camille Dry, a wandering mechanical drafstman, joined forces in rising to the St. Louis skies in a balloon to draw every building, street and even tree within the city limits.[5] Manned "flights" in balloons "took off" during the early 1900s and in particular with the coming of the 1904 World's Fair. One of these balloons was the *California Arrow*, an airship powered by a Curtiss motorcycle engine and demonstrated at the Fair.[6]

Historical events including the *James Gordon Bennett Cup International Balloon Race* was held in the United States for the first time in 1907 and was hosted by St. Louis.[7] Balloons in the race were filled by a "gasometer," a natural gas storage tank, likely the

[4] Jeremy R. C. Cox. "Images of Aviation: St. Louis Aviation." (Charleston, South Carolina: Arcadia Publishing, 2011), page 8.
[5] Richard Compton and Camille Dry. "Pictorial St. Louis." 1874-75.
[6] Jeremy R. C. Cox, page 10.
[7] Ibid, page 12.

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one formerly situated along the 4400 block of Chouteau (NR listed Laclede Gas Light Co. Pumping Station 2/8/07; gasometer since demolished) in proximity to the park. Records and aviation firsts in the early 1900s in St. Louis include the nation's first aeronautical supply company in 1908 (Thomas W. Benoist at 3932 Olive Street), a balloon speed record in 1909 of 44 miles an hour, the 1910 flight which included the first U. S. President Theodore Roosevelt to soar the skies, and the first parachute jump from an aircraft in 1918.[8] The 1920s were also filled with new advances in aircraft and especially in airplanes. St. Louis boasted the likes of Benoist Air Craft Company (1908), the St. Louis Aircraft Corporation (1918), Robertson Aircraft Corporation (1926), and Curtiss-Wright (1929).

Prior to merging as Curtiss-Wright, both companies had established themselves in their own right. The company founded by Glenn Curtiss became renowned as a designer and manufacturer of airplanes and the company that became the legacy of the Wright brothers began manufacturing airplane engines, achieving equal if not greater success.[9] Prior to World War I, the fragile wood-and-fabric aircraft built by the two had very little practical applications and most often such craft were simply exhibited at fairs and special events in support of the magic of flight. At the onset of America's entry into that war, only the Curtiss company had any experience in "mass production" of any kind; Curtiss was at the time the largest airplane manufacturer in America and had received massive orders of seaplanes and training planes for England as well as the United States Army and Navy.[10] At the same time, Wright-Martin—successor firm to the original Wright Company—were building aircraft engines for the French. St. Louis Aircraft Corporation formed in 1917 to construct the Curtiss JN-4D Jenny for the U. S. Government—becoming one of six companies to do so to meet delivery in 1918.[11]

After the war, Curtiss and Wright-Martin had a great advantage over any other aviation-related firm in the country. Besides obtaining invaluable experience in mass production and organization of processes (despite the more common bulk of American aircraft manufactures having only modest standardization of parts and little knowledge of mass production),[12] both companies created a core group of highly talented engineers and design staff. Unfortunately however, after the demand for

[8] Ibid, pages 13-18. Benoist's company discussed on page 107.
[9] Louis R. Eltscher and Edward M. Young. "Curtiss-Wright: Greatness and Decline." (New York: Twayne Publishers, 1998), page 1.
[10] Ibid, page 2.
[11] Website source: (https://en.wikipedia.org/wiki/St._Louis_Aircraft_Corporation), accessed 3-2016.
[12] Maury Klein. "A Call to Arms: Mobilizing America for World War II." (New York: Bloomsbury Press, 2013), page 84.

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military aircraft waned, both companies took a direct hit—this coupled with the lack of popular interest in commercial aviation at the time brought Curtiss close to bankruptcy. At the same time the American aircraft industry in general took a hit after the war. When the Armistice was signed, the Allied forces cancelled their current orders forcing many companies out of business and leaving 175,000 workers into unemployment.[13]

Enter financier Clement Keys, an investment banker and Curtiss's vice president for finance during World War I. Keys personally supported the company's research and development during the first half of the 1920s—ultimately seeing the Curtiss D-12 engine, the "finest liquid-cooled engine of the decade—"come to fruition.[14] Planes powered by the D-12 broke several international speed records and facilitated the United States to a prominent world position in aviation technology.[15]

In a timely event in 1926, the American government began to address the deterioration of military aviation and established five-year expansion programs for the army and navy.[16] Curtiss benefitted immediately and received large orders for fighter and attack aircraft. Wright-Martin had reorganized as the Wright Aeronautical Corporation and stuck to what they were best at—the manufacturing of airplane engines. The excitement around Charles Lindbergh's 1927 flight to Paris stimulated aviation efforts and ultimately investors soon began to purchase aviation stocks on Wall Street. Within a few years, Clement Keys pondered the combination of the powers of the Curtiss and Wright companies with Wright's chairman, Richard F. Hoyt, and by 1929, a merger was complete and Curtiss-Wright (C-W) was born.

The new C-W company brought together at least a dozen separate companies including manufacturing interests as well as private airlines; at its peak shortly after the merger, C-W had a capital of $170 million, second only to the United Aircraft Corporation.[17] With the stock market crash and subsequent Depression, that aviation empire was ultimately crushed. C-W was reorganized and its business enterprises were reduced to a reasonable "supply-and-demand" model which would remain in place into the early 1930s.

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[13] Ibid.
[14] Louis R. Eltscher and Edward M. Young, page 2.
[15] Ibid.
[16] Ibid, page 3.
[17] Ibid. UAC formed in 1929 by members of Boeing and Pratt & Whitney to address both civilian and military aviation. Eventually the U.S. Government dissolved the "anti-competitive" company when it determined anti-trust laws must be passed after the Air Mail Scandal of 1934 (from Arthur Herman. *Freedom's Forge: How American Business Produced Victory in World War II,* p. 6, Random House, New York, NY, 2012).

Elaboration – Curtiss-Wright & Lambert Field

The earlier firm of Curtiss-Robertson Airplane Company built their first factory at St. Louis's Lambert Field in 1927; equipped to construct and repair airplanes, the factory had immediate access to adjacent runways as well as a railroad spur of the Wabash Railroad. After the merger of the Curtiss-Wright Corporation (C-W) by 1929, activity at the field increased. During the 1930s, the original factory was used to fabricate small military and civilian airplanes as well as provide pilot training and flight instruction; the factory had been pushed to full capacity by 1940. With a government interest in increasing defense in the United States at the onset of WWII, and with special financing awarded to C-W to help fulfill that mission, expansion of the factory now became conceivable. The government interest was influenced by an inventory it had recently completed which showed that there was a major shortage of military aircraft that included only 2,755 planes used by the Army Air Corps—many of which were trainers or obsolete combat models.[18] Now was an opportunity for C-W to take action.

On April 27, 1939, the United States War Department announced a $12,872,898 contract awarded to C-W for 524 Curtiss P-40 planes—the largest single contract since the end of World War I.[19] Of the 84 American plants making planes, only 23 (including Curtiss-Wright) produced military models.[20] In order to expedite production, the Allies advanced funds to a handful of companies including Curtiss, Douglas, Bell, Lockheed, Martin, Boeing, and others.[21] At this time C-W managed two other factories in Buffalo, New York, and Columbus, Ohio (Louisville, Kentucky would open in 1942); the work was split among the three. Then in May of 1940, at the original St. Louis factory, the first P-40s left the production line with 200 delivered to the United States Army by September; the remaining 324 were deferred so that C-W could complete 140 H81As (export P-40s) for Allied Forces in France.[22] With the subsequent German invasion of France during the summer of 1940, those planes were sent to England to help the Allied cause. C-W's role in supplying military aircraft was essential, and ultimately, a government subsidy was allocated in November of 1940 to provide the funding to construct a new factory (Portions B and C) and administrative (Portion A) complex on the site of the original C-W factory above Lambert Field (an annex to the engineering department would follow AKA "Portion F" shortly thereafter). By December of 1940, Pratt & Whitney (Kansas City)

[18] Maury Klein, page 60.
[19] Murray Rubenstein and Richard M. Goldman. "To Join with the Eagles: Curtiss-Wright Aircraft: 1903-1965." (Garden City, New York: Doubleday and Company, 1974), page 162.
[20] Maury Klein, page 66.
[21] Ibid, page 69.
[22] Murray Rubenstein and Richard M. Goldman, page 162.

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and Wright Aeronautical continued to churn out air-cooled engines—hoping to meet 900 engines per month.[23]

The timely subsidy was provided by the Defense Plant Corporation of the federal government's Reconstruction Finance Corporation; it allowed the seven major airframe manufacturers including Curtiss-Wright, Douglas, Consolidated, Boeing, Martin, Lockheed, and North American to enlarge their production space from some 8 million square feet to more than 18 million at a cost of a little over $83 million.[24] A total of $3 billion was planned by Washington to either construct new plants for defense production or to enlarge existing ones throughout the nation.[25] Disputes over plant locations ensued as Midwestern representatives demanded more factories in their states as opposed to the seaboards since the Midwest already housed most of America's war industry and claiming that inland plants would be safer from enemy attack.[26] As a result, the expansion of Curtiss-Wright was the nation's largest and included a plant in St. Louis, one in Buffalo, one in Columbus, and the final in Louisville (1942). The St. Louis expansion was one of the most vital as it had access to a major airport (for the time) where finished aircraft could be taxied and sent into the skies for delivery. Also, it was located at an extant factory site that had already been active in churning out military aircraft; practically in the center of the country, the St. Louis factory would be heavily protected from attack by land, sea, or air.

Design & Groundbreaking of the Curtiss-Wright Factory

Curtiss-Wright (C-W) had contracted with noted architect and "war factory expert" Albert Kahn to design each of its factories and had called upon him again in mid-1940 to design its St. Louis plant. Kahn was responsible for 19% of all architect-designed U.S. industrial buildings by 1938 and was called upon by the government to expand in order to help make America the "Arsenal of Democracy" at the advent of World War II—as he would design most of the principal airplane factories at the time, he was best suited to get C-W up and running.[27]

Groundbreaking for the new C-W factory and administrative offices (Figure 25) commenced with great celebration on November 19, 1940.[28] At the site of the original

[23] Maury Klein, page 70.
[24] Louis R. Eltscher and Edward M. Young, page 89.
[25] Maury Klein, page 110.
[26] Ibid.
[27] W. Hawkins Ferry. "The Legacy of Albert Kahn." (Detroit: Wayne State University, 1987), page 25. Kahn increased his staff from 400 to 600 and hours were expanded to meet war schedules. Sadly it would be war work which ultimately wore him down to his deathbed in 1942.
[28] Louis R. Eltscher and Edward M. Young, page 89.

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factory, the new facilities were literally constructed around and then on top of the old one. This construction method allowed for airplane production to continue without interruption. Once portions of the new factory were finished they were immediately placed in service and the corresponding portion of the earlier factory was then dismantled. With the new factory also came the latest technological innovations in mass production of airplanes and parts; tracks within the concrete floor (extant) allowed constant movement of pieces and ultimately mostly-complete aircraft. The construction of the new massive factory provided an economic boost for the community and provided thousands of new jobs—at its peak of production there were over 12,000 workers at the St. Louis factory alone.[29]

Figure 25: Ceremonial ground breaking for the new Curtiss-Wright factory and offices at Lambert Field, 19 November 1940. The original factory can be seen in the background; behind it is the future Banshee Road. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30445.

Earlier in June of 1940, C-W reorganized its aircraft manufacturing operations. The St. Louis Airplane Division and the Curtiss Aeroplane Division were combined to form the Airplane Division of the C-W Corporation with a forth assembly plant planned for completion in Louisville, Kentucky by 1942.[30]

By December of 1940, work had commenced on the new complex in St. Louis. Although the future factory would elevate St. Louis in housing the "world's largest airplane manufacturer," construction had begun to impact the available landing

[29] Betty Burnett, page 66.
[30] Louis R. Eltscher and Edward M. Young, page 90.

space at Lambert—in fact a shortage of 50% was reported there.[31] Private pilots and flying school operators were affected the most. St. Louis had boasted its Municipal Airport at Lambert—being one of the few available in the country that combined both private plane and commercial airline traffic. As a response, the operators of Lambert stated that with the increase in military production and commercial travel that the improvements were deemed necessary if St. Louis was "to retain its place in aviation."[32] By late June, 1941 the complex was nearing completion (Figure 26) and production continued to commence on a grand scale. A month later the old factory had been practically removed (Figure 27) and by December, 1941 the new factory had been fully operational (Figure 28).

Figure 26: Original factory of Curtiss-Robertson (later Curtiss-Wright) is situated at top of photo; ongoing construction of the new factory and administrative buildings can be seen below. Day unknown but photo was taken in early to mid-June, 1941. Source: Betty Burnett. "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987), page 24.

[31] *St. Louis Globe-Democrat*. "Airport Faces Landing Problem: New Construction Cuts Available Space in Half." December 8, 1940, page 20.
[32] *Ibid*.

Figure 27: Aerial view of new Curtiss-Wright factory buildings as their construction nears completion, 29 July 1941. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30447.

Figure 28: Aerial view of newly constructed Curtiss-Wright factory buildings, 4 December 1941. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30448.

St. Louis Goes to War!

Having just survived the Depression, Curtiss-Wright (C-W) expanded its operations in response to increased military demands and by World War II had rose to become one of the most prominent airframe, engine, and propeller manufacturers as well as one of the largest aviation companies in the world.[33] In 1941, Curtiss's Airplane Division expanded its production facilities by 400% to a little over 4,268,410 square feet and employed some 45,000 individuals.[34] At this time the original St. Louis plant (1 of 3 total active plants) had been expanded to a working area of 1,210,450 square feet with a daily output of six planes per day.[35]

Announcement that the Japanese had bombed Pearl Harbor on December 7, 1941 signaled that the United States was about to enter war. With general fear that the attack would spread inland, St. Louis armed itself with troops guarding the ammunition plant at Goodfellow and Bircher Avenues (since demolished); fully-armed soldiers surrounded Lambert Field and the C-W aircraft plant.[36] The next day on December 8, armed forces recruiting offices were established at the Federal Building downtown; hopeful enlistees waited in lines around the corner. America needed men but most importantly she needed pilots and aviation cadets.[37] With great distances to Europe and lack of time to mobilize on the ground there, aircraft in large numbers was the solution; fill the skies with planes and attack from above. In December, 1941, a total of 3,600 combat planes were available in the United States—companies such as C-W were called upon to meet the increased demand of ten times that amount.[38] Among those craft constructed at the time within the nominated factory were AT-9 trainers, C-46 cargo transports and Navy SNC-1 combat trainers.

The original U.S. estimates called for 28,600 aircraft, 20,400 tanks, 6,300 anti-aircraft guns, and 6 million deadweight tons of merchant ships—then, during his State of the Union address in January 6, 1942, President Roosevelt announced the need for 60,000 planes (45,000 combat) for 1942 and 125,000 (100,000 combat) for 1943![39]

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[33] Louis R. Eltscher and Edward M. Young, page xi.
[34] Murray Rubenstein and Richard M. Goldman, page 166.
[35] Ibid.
[36] Betty Burnett. "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987), pages 1-2.
[37] Ibid.
[38] Ibid.
[39] Maury Klein, page 292.

C-W had begun to produce war material earlier in March of 1941 for France and ultimately Great Britain in an effort to gear up production for the Allied forces.[40] St. Louis as a city however started considering how to assist the Allied forces a year previous. In early 1940, the St. Louis Chamber of Commerce initiated a census of manufacturers in the metropolitan area; under the leadership of Chamber President Thomas N. Dysart, a detailed survey followed.[41] The survey provided a thorough analysis of the machinery, equipment, floor space, and manpower available in each St. Louis factory. To give St. Louis a jump ahead of other cities, the Chamber made copies of the five-volume survey and sent it to each of over 1,000 prime defense contractors in the nation.[42] In an effort to increase the skills and mindset of St. Louis workers, the Chamber even went as far as establishing a "training within industry" program in cooperation with several local schools including Hadley Vocational, Ranken, St. Louis University, Washington University (NR listed portions 1/12/79; NHL 3/9/87), Alton Vocational School and the Booker T. Washington Technical School (NR listed 3/9/05 as Franklin School; 814 N 19th St.). Focusing in on increasing general production skills in multiple industries, courses also centered in on the burgeoning aviation industry.[43] The Chamber's scheme worked as planned and the C-W aircraft plant at Lambert Field was awarded a $16 million order for training and cargo planes in June 1940 (original factory demolished but work commenced in nominated buildings).[44] Nearby Weldon Spring was established with a $14 million contract to build a high-explosives plant in October and quickly became the nation's largest plant producing 800 tons of TNT daily.[45]

Meeting both the nation's production needs as well as the requirements of the military required major efforts in mobilizing men and women during wartime; the result was an expansion of the federal government's role to ensure an adequate supply of both military and civilian labor supply.[46] Increases in factory production required an increase of skilled workers. Formerly sanctioned for white males, C-W was one of the first companies to train women as riveters, inspectors, and electric assembly workers to meet the increased need (Figure 29). C-W went as far as recruiting a 1,000 college

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[40] Betty Burnett, page 4.
[41] Ibid, page 21.
[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Ibid.
[46] Marilyn H. Harper,, et. all, page 19.

women for training as engineers in eight universities at the company's expense.[47] Coupled with the federal government's directive forbidding discrimination in the work place, companies were pressed to hire more women, African-Americans, elderly, and handicapped workers than ever before. During the summer of 1942, C-W (and one of the first companies to do so) began training African-American men and women for skilled jobs in its factory—going as far as instituting "all-Negro production units."[48] In September of 1942, President Roosevelt had announced that war production must increase tremendously and he urged workers and employers to follow suit. In an effort to enhance the efficiency of assembly line work, C-W assembly methods engineer Burnell E. Stewart was one of just seventeen war plant workers in the United States who was commended for such an idea—using wood fiber punching jigs instead of steel jigs which cut operating time by one half![49]

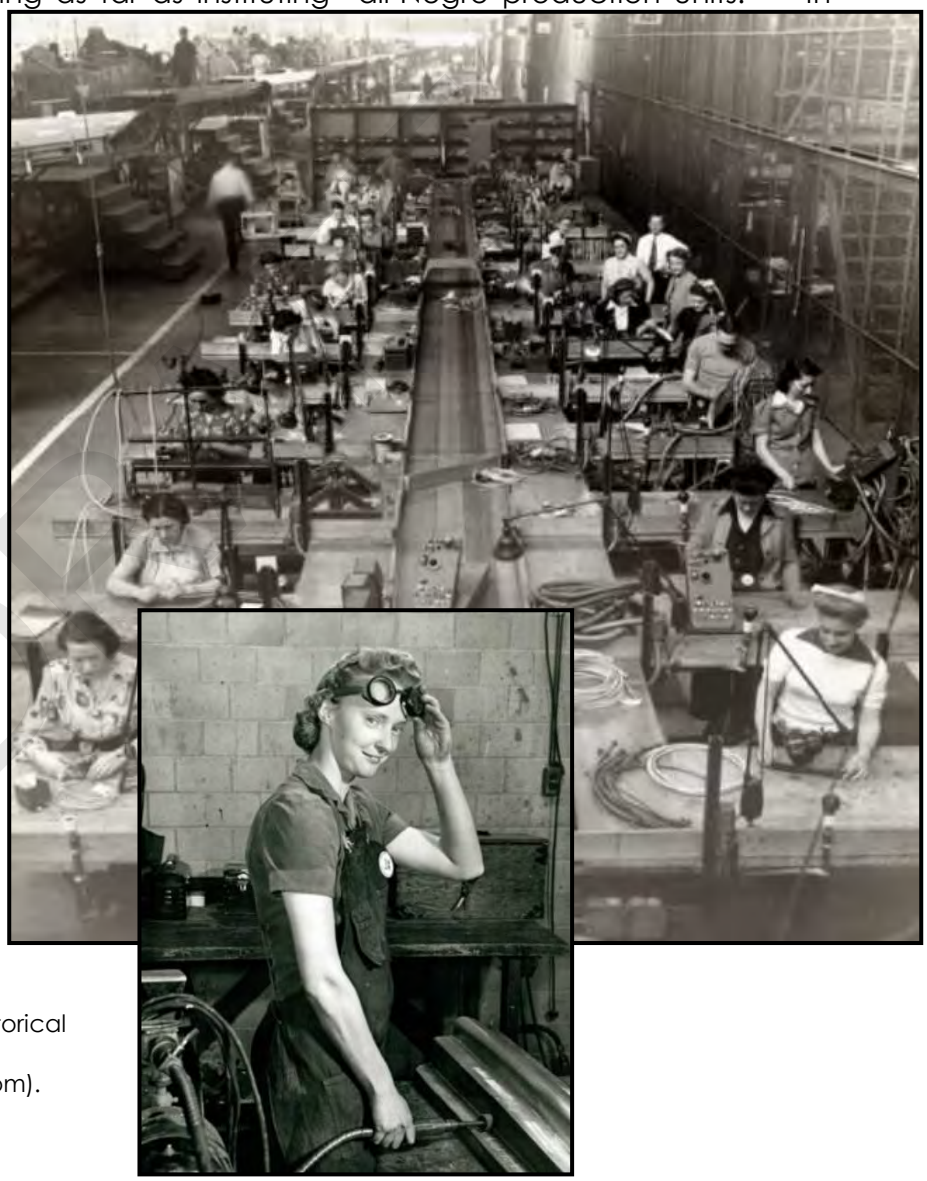

Figure 29: Top, women doing electrical sub-assembly work at Curtiss-Wright; bottom, woman grinding machined part; both 12 March 1943. Source: Missouri Historical Society, F. Dale Smith Collection, ID# N30461 (top); ID# N34371 (bottom).

[47] Maury Klein, page 632. Publications including Time (October 26, 1942, page 82), Newsweek (November 23, 1942, page 72 and December 14, 1942, page 98-99) touted Curtiss-Wright's efforts.
[48] Betty Burnett, page 43.
[49] Ibid, page 45.

Seeing a backlog of nearly $9 billion in aircraft orders in 1942, the Aircraft War Production Council (AWPC) was founded with the intention that if the big guys worked together (sharing technology and techniques) that great things could be accomplished.[50] A concerted effort within individual companies to lessen the struggle of others allowed processes to be streamlined and orders to be met.

As a result of the war, production of other products such as small electrical appliances, automobiles, refrigerators, and stoves were curtailed and factories were converted to manufacture bombs, tanks, and military planes. Defense production peaked in St. Louis in 1943 with over 200,000 workers employed in such plants—C-W employing some 12,000 of them.[51] In February of 1943 when the War Manpower Commission (WMC) had announced that a 48-hour week would become standard for centers of defense production, C-W had already instituted a 60-hour work week![52] The goals of the WMC to increase and support production were clear: to keep all workers in critical war industries on their jobs; to find ways to transfer noncritical workers to war industries desperate for people; and to supply men to the military without cutting into production.[53] Unfortunately, these ideals proved difficult to realize.

Curtiss-Wright Expansion

Sometime between 1942 and 1944 expansion of the St. Louis plant occurred. Although conceived earlier by Kahn and C-W, an annex to the administrative and engineering department was ultimately completed (Portion F; Figures 16, 22-23, 30 and Photo 2B). The addition supplied C-W an additional 16,000 square feet of offices and conference rooms on two levels (Figure 22) and connected to the main administrative offices.

Figure 30: Period photograph of full complex showing final historic construction in July, 1945. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 28, July 13, 1945.

[50] Maury Klein, page 459.
[51] Betty Burnett, page 66.
[52] Ibid, page 67.
[53] Maury Klein, page 547.

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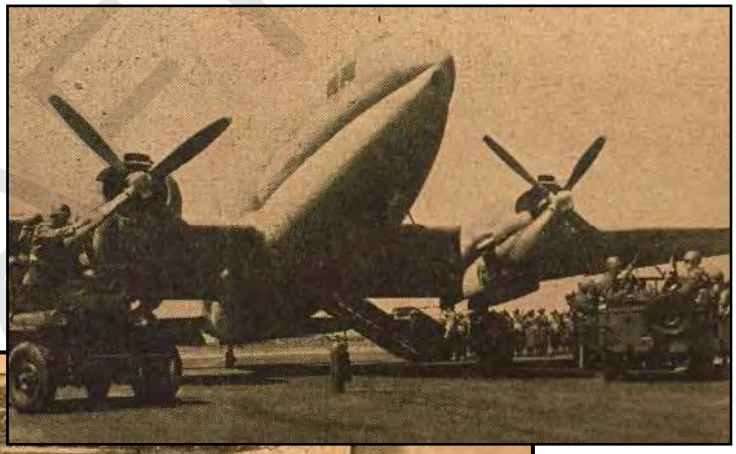
The expansion allowed some opportunity to provide space for experimental design as well as provide new department spaces. It was well-timed as the Army would call for a 50% increase in production of Curtiss's C-46 Commando (Figure 31; AKA Nany R5C) transport plane in 1945; additional staff was required to work out the details.[54] The company announced that the St. Louis and Buffalo plants would take on the task of supplying these massive aircraft then considered "the world's largest and fastest twin-engine transports."[55] The numbers ensured that the contract would extend well into 1946. Up until 1945, the St. Louis plant was making major assemblies of the Commando and then shipping them to Louisville for final assembly—now C-W's St. Louis plant implemented complete assembly.[56] Meanwhile, Louisville would change scope to begin modification of C-W's B-22 bombers.



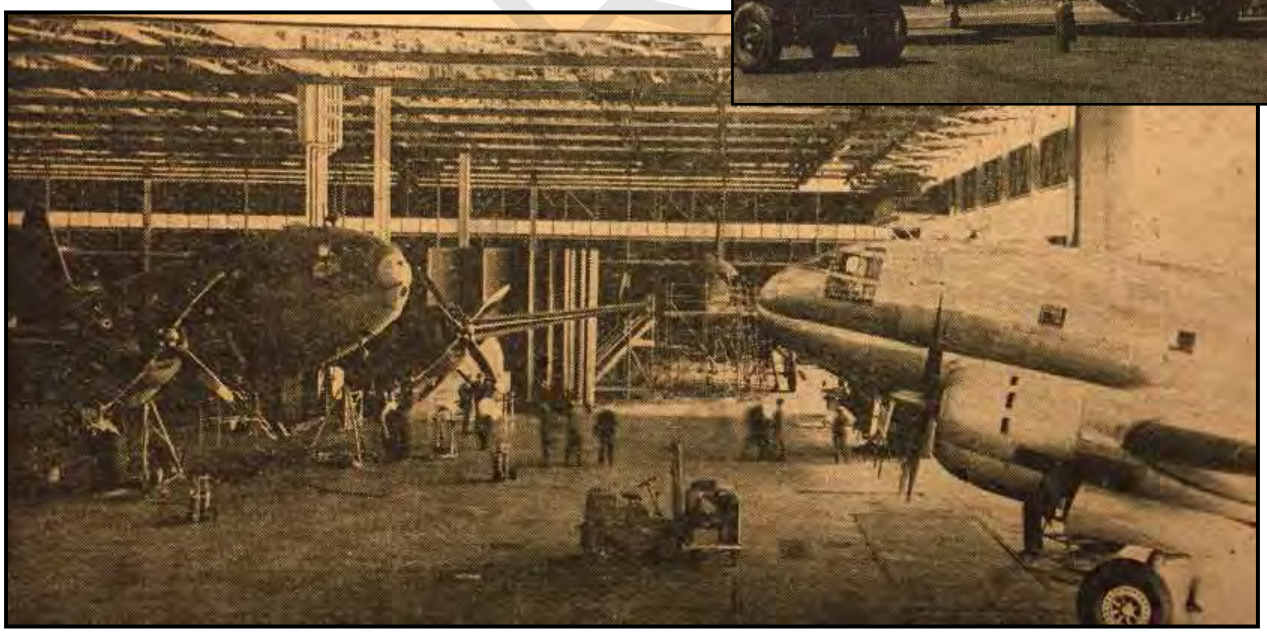


Figure 31: Period photograph of C-46 Commando at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), top image : volume 5, number 3, January 19, 1945; bottom image: volume 4, number 43, October 27, 1944).

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[54] *The Curtiss-Wright-ER*. "Army Contract for Commandos Extended." (St. Louis: Lambert Field), volume 5, number 3, January 19, 1945.
[55] Ibid. January 19, 1945.
[56] Ibid.

In tandem with the Commando production during January of 1945, C-W built and tested its XP-55 'Ascender' in the St. Louis plant (Figure 32). An experimental design began in St. Louis during the spring of 1939 and touted as "one of the world's most unusual fighter plane designs," the XP-55 had its power plant and wing surfaces mounted to the rear of the plane—directly opposite of conventional aircraft.[57] The XP-55 was a revolutionary type developed for the Army-Air Forces that was not intended to go into mass-production but rather would contribute to the future design of aircraft. Advantages of such a design were numerous and included: speed equal to or greater than conventional-design airplanes of the same horsepower; improved longitudinal control and maneuverability; improved forward visibility and search view; it was quieter because the engine was behind the pilot; guns located at the front could fire straight ahead without needing to be synchronized to fire through the propeller; increased rudder effectiveness from spins; less danger to the pilot from a fire in the engine; and better handling characteristics on the ground and in the air (due to 'elevators' being in the front versus the wings).[58]

Figure 32: Period photograph of XP-55 developed and built at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 6, January 9, 1945.

[57] Ibid. "News Released on Curtiss Wright's XP-55 'Ascender'." (St. Louis: Lambert Field), volume 5, number 6, February 9, 1945.
[58] Ibid. The first full-length flight of the Ascender took place at Scott Field, Illinois on July 13, 1943 although short runs had been done at Lambert-St. Louis while the aircraft was being developed. The choice of airport was wise given the unpopulated periphery around Scott at the time.

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By March of 1945, it was estimated that Curtiss-Wright had delivered more than 25,000 aircraft as well as airframes, engines or propellers for another 100,000 more during the war.[59] The St. Louis and Louisville plants took the lead of the company's four factories. While many Commandos had been built in and flown from St. Louis, many had been fabricated in portions at St. Louis and were shipped to Louisville for final assembly to expedite completion. Parts were manufactured and assembled in sections and then larger sections were hoisted for further assembly within the High Bay of the St. Louis plant (Figure 33); the first Commando built in St. Louis was launched in April (Figure 34).

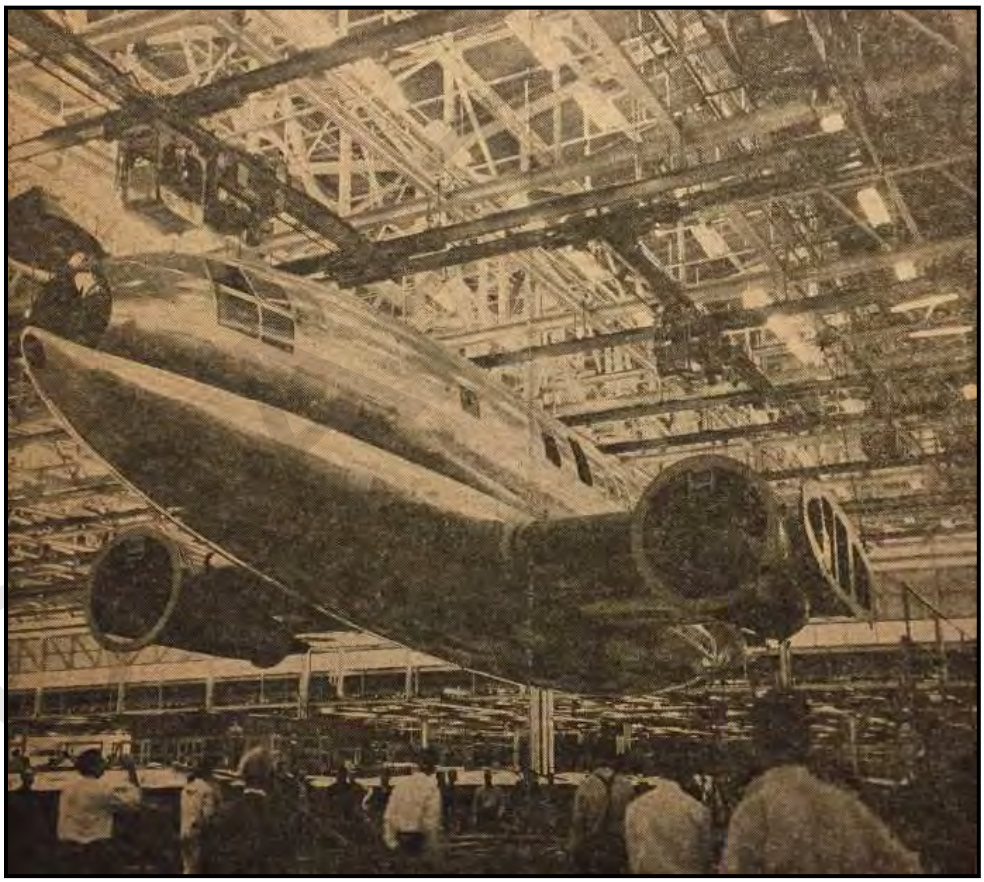

Figure 33: Period photograph of Commando section in "pre-flight" at the St. Louis C-W plant. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 14, April 6, 1945.

Figure 34: Period

[59] *The Curtiss-Wright-ER*. "More than 25,000 Planes Produced by Curtiss-Wright During World War II." (St. Louis: Lambert Field), volume 5, number 12, March 23, 1945. The contribution is immense: during 1944 the Curtiss Commando transport plane, already a standby in the Army Transport Command and Marine Transport Air Group operation, was also sent into service with the Army Troop Carrier Command and served daily in the overocean operation; the Curtiss Helldiver, standard dive bomber of the U.S. Navy, was a major factor in naval air assaults on the Japanese in all parts of the Pacific; the Curtiss SC Seahawk, a radically new and fast scout plane joined the U. S. Navy's air arm; the sturdy Curtiss P-40 Washawk fighter went out of production late in that year but continued to play a vital role in China; Wright Cyclone engines powered almost daily raids on the Japanese homeland by Boeing's giant B-29 super-fortress and continued to provide power for victory for such other famed aircraft as the Boeing B-17 Flying Fortress, North American Mitchell, Grumman Avenger, Douglas Dauntless and Havoc, Martin Marauder and Mars, Lockheed's Constellation, and the Boeing C-97; Curtiss electric propellers provided thrust for Martin Marauder, Mariner and Mars, Grumman Wildcat, Lockheed Lightning, Republic Thunderbolt, Consolidated Coronado, and the Northrop Black Widow.

photograph of the 1st Curtiss Commando to be completed at the St. Louis plant; here flying over the St. Louis zoo at Forest Park. Source: *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 15, April 13, 1945.

By July of 1945 it was announced that Curtiss-Wright's shipments of aircraft, engines and propellers during 1944 had totaled $1,716,935,176; 32.5% higher than 1943, that amount exceeded the dollar volume output of any other aircraft company and had marked a new all-time high for the industry.[60] The Aircraft Industries Association of America had reported that the total output of Curtiss-Wright in 1944 represented slightly more than 10% of the dollar output of the country's entire aircraft industry.[61]

The Wanning of Curtiss-Wright

Curtiss-Wright had maintained a long-standing relationship with the U.S. military and was instrumental in developing combat aircraft for two World Wars. It began designing and testing dive-bombers as early as 1928 at Lambert Field—its Helldiver (SB2C) was credited as the fastest and most deadly aircraft of its time (Figure 35).[62] Curtiss-Wright ingenuity in design, specifically as it related to the wings being able to be folded, allowed a pair of Helldiver planes to be carried on an aircraft carrier elevator at one time. Curtiss-Wright, along with the St. Louis Aircraft Corporation, provided over 700 training planes (PT-19s and PT-23s) to the United States military; these companies' contributions quickly placed St. Louis in a prominent role within the "Midwest Aircraft Production Triangle" along with Pratt & Whitney in Kansas City and Boeing in Wichita.[63] St. Louis Aircraft Corporation, founded in 1917 and defunct in 1945, primarily built high capacity gliders and gondolas for army balloons during the World War II.[64] The shared responsibility to supply training planes helped to meet the demand.

Figure 35: Curtiss-Wright Helldiver (SB2C) produced at Lambert Field factory 1928 through the 1940s. Source: Betty Burnett. "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987), page 69. Smaller photo (bottom) from "Curtiss Aircraft" catalogue.

[60] Ibid. (St. Louis: Lambert Field), volume 5, number 28, July 13, 1945.
[61] Ibid.
[62] Betty Burnett, page 67.
[63] Ibid.
[64] Ibid, 168

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Curtiss-Wright is also credited with one of the earliest attempts at mass production; the first true production line set up in the St. Louis plant for the construction of the "Robin"—a three piece sportsman plane—resulted in a total of 749 being built and sold in a little over one year.[65] During World War I, Curtiss established a record that stood for 20 years by building nearly 5,000 JN-4D "Jenny" trainers for the Army.[66]

With the announcement of V-E day in June of 1945, "Curtiss City" took the news in stride; Curtiss continued to push aircraft out of the hangar doors headed to the Pacific (Figure 36).[67] However two months later the feeling was not the same. With the announcement of V-J day on August 14, 1945, St. Louis war plants ceased operations abruptly. Layoffs began almost immediately with over 20,000 workers receiving termination notices within a week's time.[68] Curtiss-Wright began layoffs earlier on May 26, 1945, despite its continued contracts for its Commando and Helldiver airplanes; at least 11,000 employees were notified in June that they would soon be jobless and that the plant would ultimately be closed.[69] Post-war St. Louis however refused to shut down and began to implement a public works program which was developed a few years earlier by the city fathers. Plans for this over $63 million scheme included trunk line sanitary sewers, levee improvements, land use changes, new streets and "highways," a rapid transit system (not implemented), a new downtown airport (not built), and finally new housing was announced by Mayor Kaufmann earlier in January of 1945.[70]

Many Curtiss-Wright employees found new hope in rebuilding St. Louis after the war while a workforce was

[65] *Curtiss Fly Leaf*. Volume XXV, number 3, July-August, 1942.
[66] Ibid.
[67] Ibid. Volume 5, number 19, May 11, 1945.
[68] Betty Burnett, page 145.
[69] Ibid.
[70] Ibid.

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maintained in the St. Louis plant to complete orders through 1946 (corresponds to the period of significance). Leading up to 1948, Curtiss-Wright separated its airplane division and sold the property to McDonnell Aircraft company. McDonnell converted the factory to produce military fighter jets into the 1960s and by 1968 had merged to form McDonnell-Douglas. Along with a final merger into Boeing Company in 1997 the use of the original Curtiss-Wright factory was drastically reduced and then ultimately abandoned by 2001. The site was sold to the City of St. Louis and has sat vacant since 2002.

Figure 36: Curtiss employees listen intently to General Manager C. W. France as he announced that President Truman had proclaimed V-E day and then followed by telling them to continue to "Work, work, work!" Source: *Curtiss Fly Leaf*. Volume 5, number 19, May 11, 1945.

Curtiss-Wright Factory – Legacy of Albert Kahn, Master of Modern Industrial Design

Speaking on behalf of improved industrial design, the June 1942 issue of the *Architectural Forum* featured the St. Louis Curtiss-Wright facility for its "maximum coordination of operations" and efficiency of production.[71] Built over and around the existing factory while it was still operational, the mass production of military trainers and practical planes was implemented without interruption. Completed within a year, the new Curtiss-Wright plant was eventually comprised of three separate, but interconnected functions including an engineering and administrative department (A) and a huge manufacturing department (B and C); an engineering annex (F) was completed prior to 1945 but according to archives may have been conceived during the original design. Touted as a "mass production airplane plant," the complex was designed by modern principals devised and perfected by Albert Kahn in November of 1940 (Figure 37).

Figure 37: Kahn was classified as the "No. 1 National Defense Architect" by architectural and engineering critics worldwide. Source: *Architectural Forum*, November 1940, volume 73, front page. (New York: Time Inc.).

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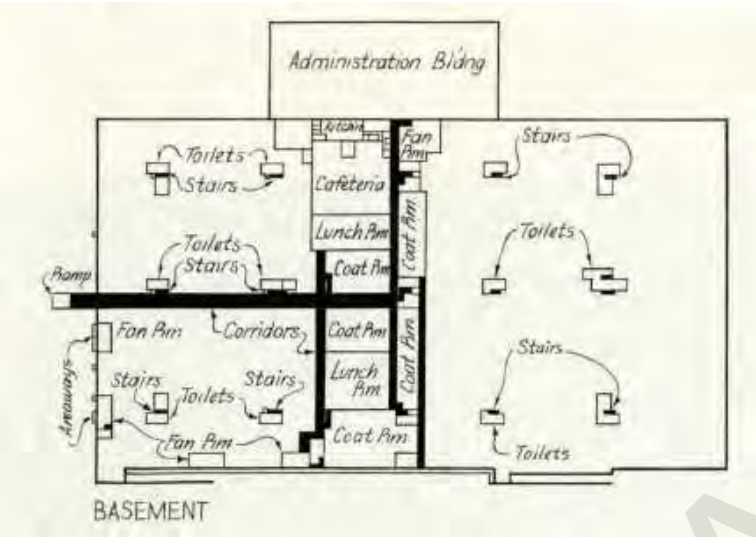
[71] *Architectural Forum*, June 1942, V 76, P 373. (New York: Time Inc.).

The key component of the complex—the manufacturing department—was designed and built on a two-level plan that included factory and assembly space on the ground floor while employee circulation, restrooms, lunch and locker rooms were built below ground (Figure 38). The production floor was divided into three sections including: manufacturing, sub-assembly, and final assembly. Primary employee traffic below ground allowed for minimum disturbance on the ground floor and allowed for greater ease at shift-changing times. The underground rooms also allowed for ready-made air-raid or bomb shelters as needed. The manufacturing department included a "low-bay" area (extant) which contained the manufacturing space (B; Figure 39); occupying approximately 2/3 of the total floor area, the space was divided into 50 by 100 foot wide bays with 20 feet of headroom above. An adjacent "high-bay" (C) area (extant) at one end of the plant was designed with a 40-foot overhead clearance with areas designated for sub-assembly (within a 200 foot wide section containing 100 by 100 foot wide spans; Figure 40) as well as a final assembly area which was open the full 200 feet width (Figure 41). Huge hangar doors (extant) 40 by 200 feet (figure 42) communicated between the plant and the airport.

Figure 38: Floorplan as designed for factory for Curtiss-Wright in St. Louis. Source: *Architectural Forum,* June 1942, *v. 76,* page 374.



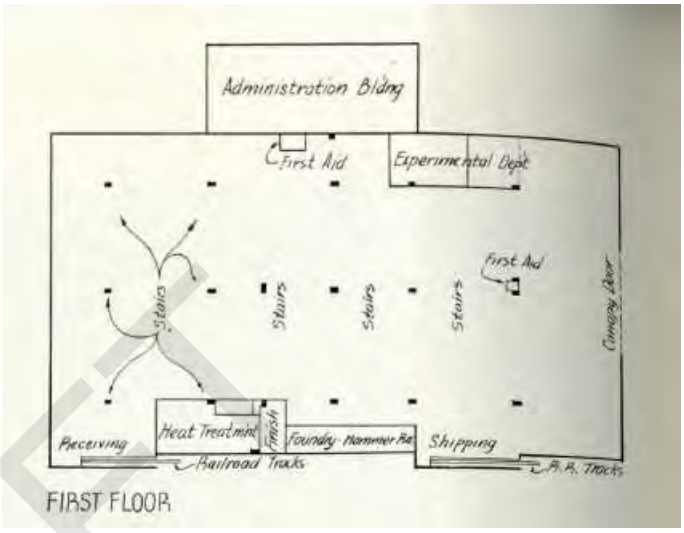


Figure 39: Interior of low-bay (B) manufacturing area. Source: *Architectural Forum,* June 1942, *v. 76, p* 375.

Figure 40: Interior of high-bay sub-assembly area. Source: *Architectural Forum,* June 1942, *v. 76, page* 374.

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Figure 41: Interior of high-bay final assembly area. Source: *Architectural Forum,* June 1942, *v. 76, page* 374.

Figure 42: "Mass production airplane plant," St. Louis (middle and bottom) showing exterior of high bay with massive hangar doors (middle) and interior of same portion (bottom). Albert Kahn, architect. Source: *Architectural Forum*, June 1942, V 76, P 373. Top right photograph by Matt Bivens, January 2016.

The administrative department (Figure 43) was constructed of concrete and steel with reinforced concrete floors and roof with buff brick walls (exterior and exposed within portions of the interior). Ribbon windows at the first and second floors originally contained continuous steel sash (since replaced but mimicking the pattern of the original) allowing for maximum light conditions within. The building included offices as well as an engineering department (Figure 44); it connected to the manufacturing division at the north. Kahn divided the design by function and created a twin structure which was divided into smaller offices for executives and staff while allowing the engineering department and planning rooms to be of larger scale. To enhance the light on the second floor within the engineering department, Kahn designed four sawtooth monitors on the roof (intact but covered with drop ceiling and metal panels).

Figure 43: Exterior of administrative building (middle) and interior floorplans of 1st and 2nd floors. Source: *Architectural Forum,* June 1942, *v. 76, page* 376.

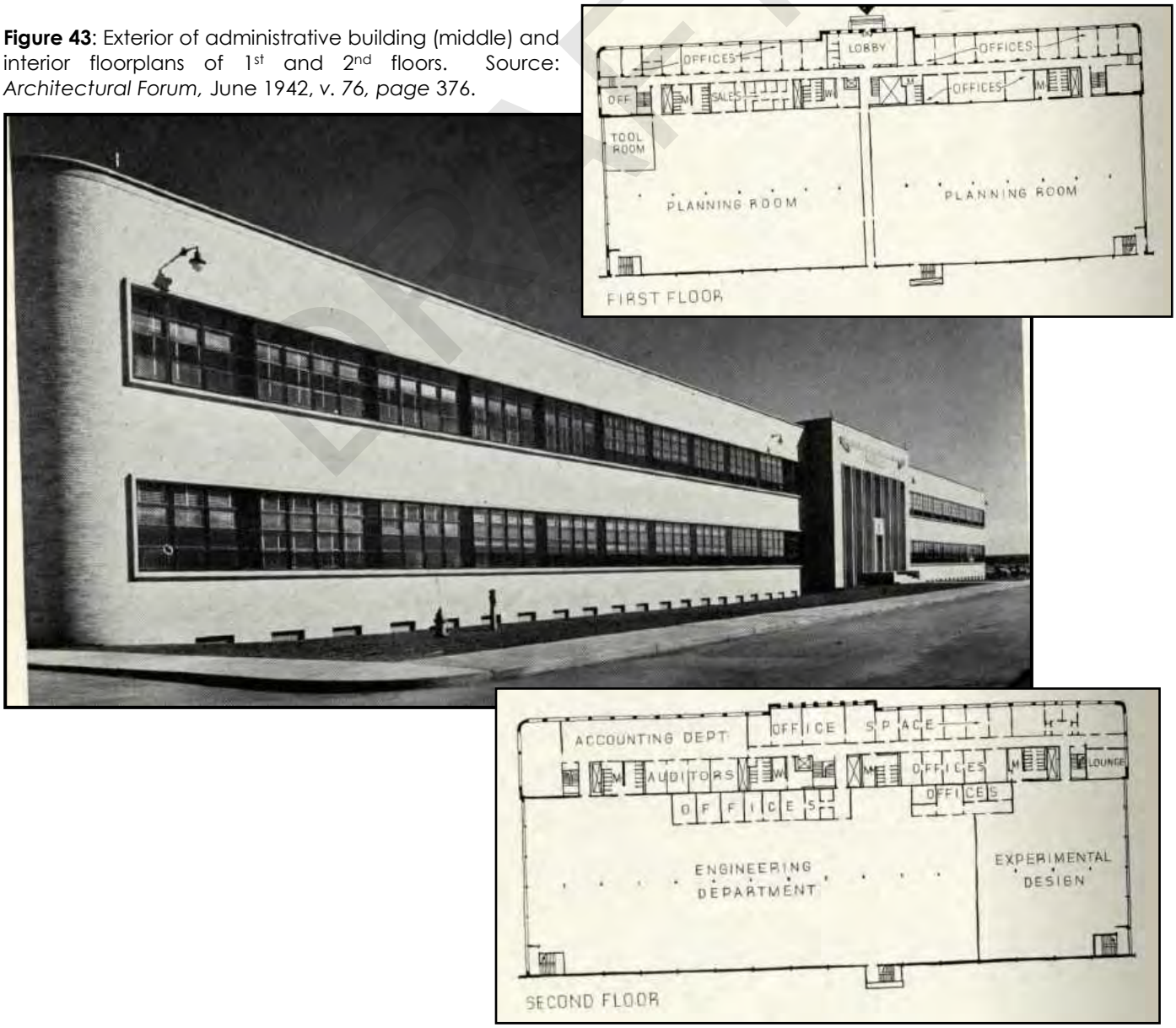

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Figure 44: Interior of administrative building engineering department drafting room 2nd floor. Source: *Architectural Forum,* June 1942, *v. 76, page* 377.

Classified as the "United Nations' No. 1 War Plant Designer" by the American Institute of Architects (AIA) in 1942, Albert Kahn was presented with a special medal by the AIA on behalf of his work on the Curtiss-Wright plant in St. Louis as well as his overall contribution to the war effort.[72] The St. Louis Curtiss-Wright Aeroplane Factory & Office complex stands as one of Kahn's last factory buildings in the United States and the final Missouri building he designed. Kahn would die in 1942.

[72] *Architectural Forum*, June 1942, V 76, P 373. As described in the November 1940 issue of *Architectural Forum*, This stamp was in part due to the increase in building for national defense which was at its highest in United States history beginning in 1939. Both the War and Navy Departments had signed at least 90 construction contracts totaling $480 million between August and October, 1939. Towards the end of 1939 and beginning of 1940, Kahn had received $45.5 million in Pacific Island contracts as well as $24.4 million at the Quonset Point, Rhode Island Naval Air Station.

Historical Properties Associated with Aviation

The Curtiss-Wright Aeroplane Factory & Office complex is directly related to the broader theme of "World War II Aviation" as illustrated within the National Register Bulletin "Guidelines for Evaluating and Documenting Historic Aviation Properties."[73] Although both the Curtiss and Wright descendant companies are immersed in additional aviation contexts including "Early Experiments in Aeronautics," "World War I Aviation," "Post-War Developments," "Aeronautical Research," "Air Mail Service," "General" and "Commercial Aviation," and later successor firms including McDonnell-Douglas and finally Boeing, contributed to advanced technology and the associated contexts of "Rocketry" and "The Space Race" as well as being associated with "Changes in the Aeronautical Community,"[74] it is the earlier historic context that the building is closest and most significantly identified with.

Based on the broader context of World War II Aviation, after the attack on Pearl Harbor, the use of air power to deliver a devastating blow achieved powerful results. Analysis of the situation brought military aviation to the forefront and the race for the biggest, toughest machine was on. As a direct result, increases in technology, methods of production, and types of goods produced had changed within the plants. Former peace time factories, especially in St. Louis,[75] were later converted for wartime manufacturing of goods most closely associated with the original products…for example, Angelica Uniform Company produced military uniforms and Huttig Sash made ammunition boxes. Curtiss-Wright had already been in the military production industry; however, with war on the horizon they had received large contracts to help the Allied forces beginning in 1939 and then saw subsequent aircraft contracts through 1946. As the NPS bulletin suggests: the nature and magnitude of production was changed and military aviation operations expanded.[76]

Curtiss-Wright was no exception. In 1938, Curtiss-Wright had shipped close to $35 million worth of finished products and by 1940 that amount had jumped to $135 million; by the end of 1941 (after the attack on Pearl Harbor) that number rose to almost $375 million.[77]

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[73] Anne Milbrooke et all. "National Register Bulletin: Guidelines for Evaluating and Documenting Historic Aviation Properties." U. S. Department of the Interior, Natural Park Service, Cultural Resources, 1998.
[74] Ibid, pages 8-12. The continued use of the building began by the historic owner and constructor Curtiss-Wright in 1940 through world-wide known McDonnell-Douglas and Boeing, touch on each specific context which comprise the history and development of American aviation and would take multiple volumes to describe in any detail those accomplishments.
[75] Betty Burnett's "St. Louis at War: The Story of a City, 1941-1945." (St. Louis: The Patrice Press, 1987) provides an excellent list of local company participation in the war effort.
[76] Anne Milbrooke et all, page 11.
[77] Louis R. Eltscher and Edward M. Young, page 91.

As mentioned earlier, Curtiss-Wright's shipments of aircraft, engines and propellers during 1944 had totaled $1,716,935,176; 32.5% higher than 1943, that amount exceeded the dollar volume output of any other aircraft company and had marked a new all-time high for the industry.[78] Curtiss-Wright was a national leader in aircraft production during the war. The end and aftermath of World War II also saw great advances in aircraft technology as well as the development of experimental aircraft—as the NPS bulletin explains, Curtiss-Wright manufactured the "versatile" P-40 during this period.[79] Curtiss-Wright also developed the "unusual" XP-55 in the nominated complex. During and after the war, such research and technology led to the founding of jet-powered aircraft (perfected by later occupants of the nominated complex) and ultimately manned space travel.

Conclusion

The Curtiss-Wright Aeroplane Factory built in 1940-1941 and completed prior to 1945 historically served as an engineering and manufacturing facility in the development of aircraft technology in association with United States military history. The complex is historically significant in association with important industrial events in the development of air power for military purposes during World War II. Curtiss-Wright not only mass-produced reliable and powerful aircraft which undoubtedly helped the Allied forces win the war, the company evolved from founders associated with the origins of manned flight in addition to the transportation of airmail at a time when flight was experimental and communication options were letters carried by land or sea. Curtiss-Wright had been instrumental in aviation employment during the Great Depression, and had been a national leader in providing air power during both World Wars as well as being responsible for new scientific and engineering research activities associated with the period before, during, and after the war. The administrative and manufacturing buildings appear much as they appeared after placed in service and operated between 1941 and 1946 and the feeling within each space clearly inspires the complexes' historical association to aircraft production. There are no other buildings of similar historical magnitude with this level of integrity either locally or statewide associated with Curtiss-Wright; the buildings are also of the last (and potentially the final) designed by Kahn prior to his death.

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[78] *The Curtiss-Wright-ER*. (St. Louis: Lambert Field), volume 5, number 28, July 13, 1945.
[79] Anne Milbrooke et all, page 11.

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2. Curtiss-Wright history.
3. Vertical Files on Aviation.
4. Historic Photograph collections: F. Dale Smith Collection.

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Verbal Boundary Description

The Curtiss-Wright Aeroplane Factory located at 130 Banshee Road in Hazelwood, unincorporated St. Louis County is identified by locator number 11L630033 as recorded in assessor book 08, page 0055 including approximately 50 acres of lot number 4. A dotted line on the accompanying map entitled "Curtiss-Wright Aeroplane Factory Boundary Map" indicates the boundary of the nominated property (Figure 45).

Boundary Justification

The nominated property includes a large portion of the legal parcel comprised of the administrative building, annex, and factory in addition to two contributing sites: a historic parking lot and historic aeroplane taxi lot. An altered roadway and land belonging to Lambert Airport marks the southern boundary; the historic parking lot marks the southeast while the aeroplane taxi lot marks the southwest. Banshee road and the historic railroad spur line marks the northern boundary. Buildings owned by private parties flank the east and west. Non-historic parking lots and later runways flank the boundary. All of the resources within the boundary are contributing.

Figure 45: "Curtiss-Wright Aeroplane Factory & Office complex Boundary Map." Source: Google Earth map created by Matt Bivens, 2016.

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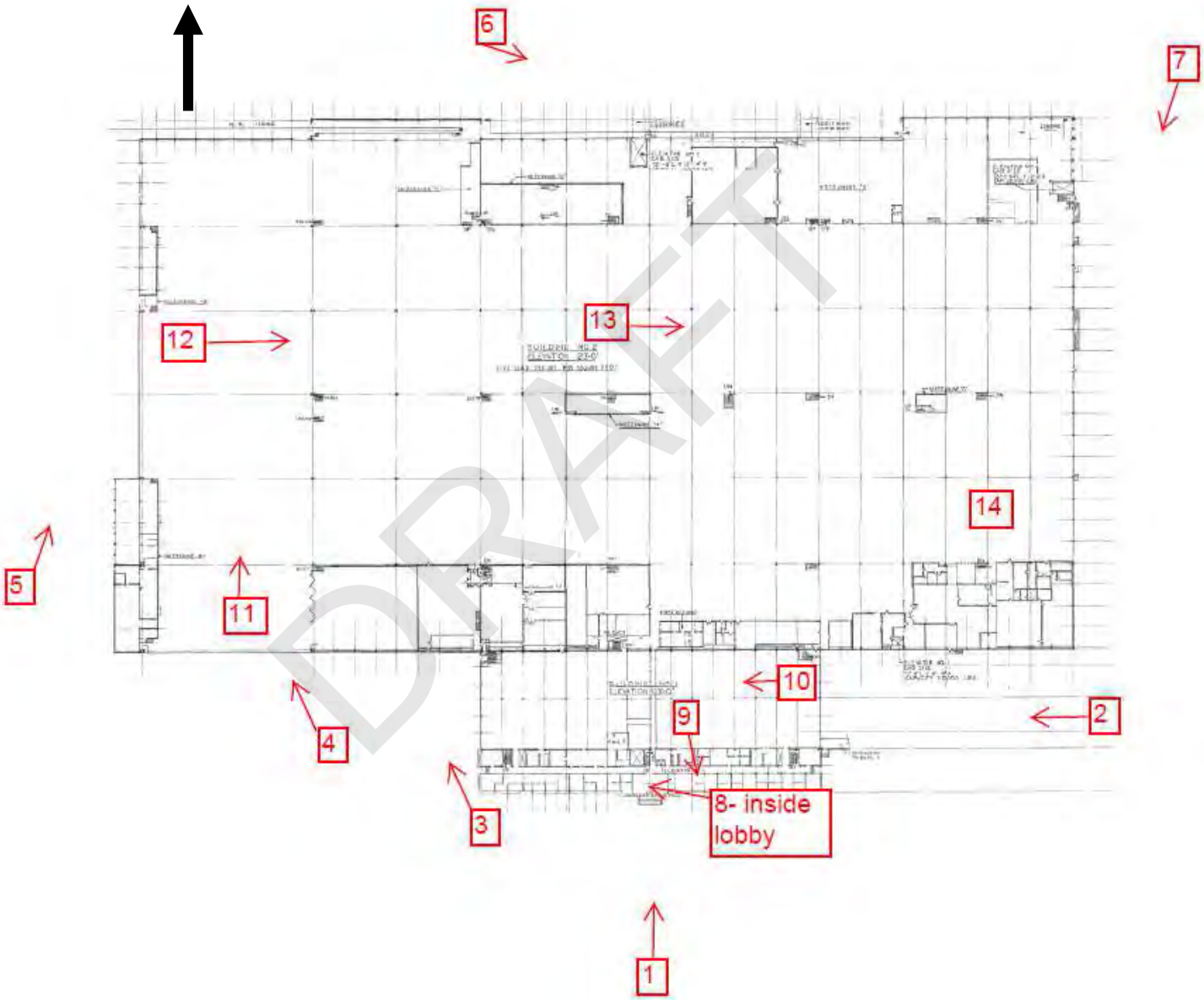
Figure 46: Photo Key. Source: Ground floor of complex. Source: McDonnell Douglas Corporation, St. Louis Plant Engineering Department. Drawn by L. Pfaff, April 18, 1978. Drawing No. Manual 1 & 2-A-5. Black arrow points north.



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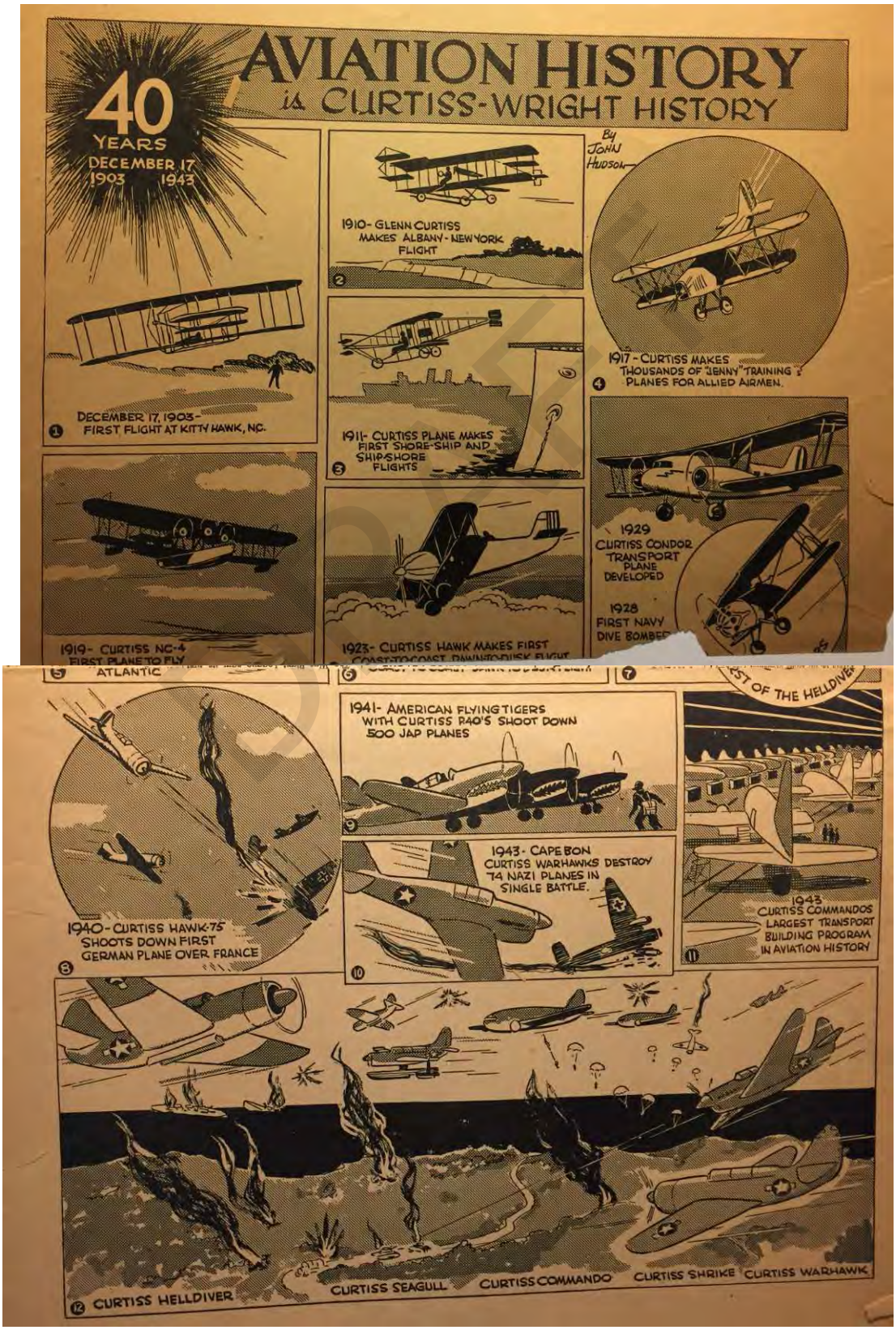
Appendix 1: 40 Years of Aviation History as illustrated by Curtiss-Wright. "Aviation History is Curtiss-Wright History." Source: *The Curtiss-Wright-ER*. December 17, 1943.



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