
FINAL

**Building 160
Foundry and Plaster Shop**

**Historic American Buildings Survey
Level I**

**2701 North Harbor Drive,
San Diego, California 92101**

Prepared for
**San Diego Unified Port District (SDUPD)
San Diego County Regional Airport Authority**

April 2010

CH2MHILL

HISTORIC AMERICAN BUILDINGS SURVEY
RYAN AERONAUTICAL COMPANY HISTORIC DISTRICT
BUILDING 160 - FOUNDRY AND PLASTER SHOP

Location:	2701 North Harbor Drive, San Diego, CA 92101, USA
Present Owner/Occupant:	San Diego County Regional Airport Authority
Present Use:	Vacant
Significance:	<p>Building 160 is located within the boundaries of the Ryan Aeronautical Company Historic District, a 46-acre complex containing 17 contributing resources and 30 non-contributing resources. The district is eligible on the national and local levels for the National Register of Historic Places (NRHP) under Criteria A, B, and C and for the California Register of Historical Resources (CRHR) under Criteria 1, 2 and 3. The historic district is eligible under NRHP Criterion A (CRHR 1) for its association with the contribution of aircraft manufacturers at Lindbergh Field to World War II defense production. It is also eligible for its association with Cold War research, development projects, and defense manufacturing. Under Criterion NRHP B (CRHR 2) the district is eligible for its association with aviation pioneer T. Claude Ryan and his aircraft aerospace manufacturing businesses. Ryan Aeronautical Company, under Mr. Ryan’s leadership, made significant contributions to national defense production during World War II, as well as important developments in aerospace research and development in the 1950s and 1960s. The historic district is eligible under NRHP Criterion C (CRHR 3) for its representation of industrial architecture associated with the 1930s and World War II. The district embodies the distinctive architectural characteristics of aircraft manufacturing buildings of the period in Southern California. The building and structures in the district illustrate the design fabrication concepts common to aircraft manufacturing plants from the 1930s to the 1960s. During this period, the aerospace industry played a dominant role in the economy of the region (URS Corporation, 2008).</p> <p>Building 160 is a contributing resource to the Ryan Aeronautical Company Historic District under NRHP Criterion C/CRHR Criterion 3 because of its distinctive architectural characteristics of a type, period, and method of construction for industrial/aviation use.</p>

Historian: Megan Venno

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: 1940
2. Architect: Unknown

3. Original and subsequent owners: Ryan Aeronautical Company signed a 50-year lease in 1939. Ryan Aeronautical Company sold to Teledyne Inc. in 1969, and the combined company became Teledyne-Ryan Aeronautical Company (TDY Industries). TDY Industries merged with Allegheny Ludlum Corporation in 1996, and Northrop Grumman Corporation acquired TDY Industries from Allegheny in 1999. Presently, the property is leased by the San Diego County Regional Airport and is under the Jurisdiction of the San Diego Unified Port District.
4. Original plans and construction: Building 160 is a one-story rectangular building measuring approximately 40 feet by 165 feet. The building sits on a concrete floor and footing with walls constructed of 2-inch-by-6-inch stud framing. Five-inch-by-7-inch steel “I”-beam posts are placed approximately 12 feet apart along the east and west elevations and hold arched steel roof trusses that support 2-inch-by-12-inch roof joists covered with 1-inch-by-6-inch sheathing. The roof is covered with rolled asphalt roofing material. Rows of multi-paned steel-framed windows are located along the east and west elevations of Building 160. Sliding doors are located on the west elevation (URS Corporation, 2009).
5. Alterations and additions: Building 160 is attached to the west elevation of Building 168. The buildings share a common wall but are independently framed (URS Corporation, 2009).

B. Historical Context:

1. San Diego’s Aviation History:

During the first three decades of the 20th century, the aviation industry was established in San Diego and it became a focal point of San Diego’s activities and reputation. In 1912, the Army founded an air base and the first year-round military aviation school at Rockwell Field on Naval Air Station North Island, San Diego (Macaulay, 1928; Moore, 1960). The creation of the military air bases helped establish aviation in the region during the industry’s pioneering years. In 1928, the Army and Navy had invested \$5,500,000 in the air bases at North Island (Macaulay, 1928). The high profile attained by aviation in the local community during these years resulted in an awareness of the potential future of the industry by the inhabitants of the region. San Diego became the first U.S. city to establish a Municipal Board of Air Control in 1926, and was also the first to issue a complete set of air ordinances (Macaulay, 1928).

In 1922, T. Claude Ryan, an aviation pioneer who began his career as an Army pilot, left the Army and moved to San Diego, where he began giving airplane rides and flying instructions. He soon established the Ryan Flying Company at the Dutch Flats Airfield in San Diego, which later became Ryan Airport. Dutch Flats Airfield was located at present-day Barnett Avenue and Midway Drive, off the current San Diego airport site and not within the current historic district boundaries. In the 1920s, Ryan Airport was the focal point for Ryan’s expanding aeronautical enterprises (flying school, flying service, and an airplane manufacturing company). In the late 1920s, the use of the airport expanded as civil aviation came of age with other companies using Ryan’s field to operate air services. With the help of T. Claude Ryan, civilian aviation flourished in San Diego County during these decades.

In the mid-1920s, the Chamber of Commerce promoted San Diego as the “Air Capital of the West.” The development of what is now Lindbergh Field would be the central effort in this campaign. The committee realized that in order to maintain a leadership role in aviation, San Diego must have an adequate municipal airport. They wanted the location of the airport to be a place that would combine facilities for the operation of land and seaplanes, and be as near to the

city of San Diego as possible. They selected an area at the north end of San Diego Bay on City-owned tideland; however, this area did not contain enough area to meet government requirements. Negotiations were made with the United States Navy to provide portions of the Marine Corps-owned tidelands for the airport expansion (URS Corporation, 2009).

Ryan was instrumental in the development of Lindbergh Field, San Diego’s nascent municipal airport, which was established in 1928. In 1929, 4,755 planes and over 20,000 passengers arrived or departed from the Dutch Flats Airfield (Leiser, 2000). Within a few years, the majority of these activities would move to Lindbergh Field. In 1939, Ryan established a manufacturing site on airport grounds, which is the location of the historic district.

2. Ryan Aeronautical Company:

T. Claude Ryan was born in Parsons, Kansas in 1898, but moved with his family to Orange, California in 1912. Ryan began a lifelong relationship with the aviation industry when, around the age of 19, he enrolled at the American School of Aviation in Los Angeles. In 1919, Ryan began studying mechanical engineering at Oregon State College. While in school, he applied to the Army for aviation cadet training and was accepted, but left the Army by January 1922 in hopes of flying as a civilian (National Aviation Hall of Fame, 2009). Ryan moved to San Diego to establish the Ryan Flying Company. The Ryan Flying Company changed its name to Ryan Airlines, Inc. when it was reorganized in 1924 to begin operating the first year-round, scheduled airline service in the United States from Dutch Flats (URS Corporation, 2009). Around the same time, in the mid-1920s, Ryan entered the aircraft manufacturing business with partner Frank Mahoney and created the Ryan M-1 Monoplane, which became one of the best-known air mail carriers in the country. A modified Ryan Monoplane became the *Spirit of St. Louis*, the plane Charles Lindbergh flew from New York to Paris in May 1927 on the first solo flight across the Atlantic Ocean. Ryan sold the company to Mahoney in 1926 and established the Ryan Aeronautical Corporation for the sale and manufacture of aircraft engines. The company changed its name to the Ryan Aeronautical Company in 1934.

Ryan Aeronautical Company signed a 50-year lease, starting in 1939, on land at the southeastern edge of Lindbergh Field along North Harbor Drive. Three buildings from the site of the previous company were relocated to this new location. The Ryan plant was one of several aircraft manufacturers located at Lindbergh Field that contributed to the nation’s war effort in the 1940s. At peak wartime production, the Ryan plant had 8,500 employees and annual production exceeded \$55 million. Following the war, workforce was reduced to 1,200 and annual production to \$8 million (URS Corporation, 2009).

The Korean conflict provided the Ryan Aeronautical Company the opportunity to work with electronics for aerospace applications. The role in aerospace electronics led to the development of a variety of aircraft navigation and positioning equipment, including helicopter hovering devices, altimeters, and remote sensors (URS Corporation, 2009).

In 1947, the United States Navy awarded Ryan a contract to research the feasibility of reaction controls for jet aircraft. With jet engines and reaction controls handled by remote control, a Ryan vertical test rig lifted itself off the ground for the first time in 1950. In 1953, the Air Force awarded Ryan a contract to design and build two manned vertical takeoff jet research planes and 2 years later, the Ryan X-13 Vertijet was constructed. In the 1960s, Ryan continued target

drone and electronic systems production and vertical takeoff and landing research (URS Corporation, 2009).

In 1969, the company was sold for \$128 million to Teledyne Inc. and became known as Teledyne-Ryan Aeronautical Company (TDY Industries). T. Claude Ryan remained with the company as chairman until his death in 1982. In 1996, TDY Industries merged with Allegheny Ludlum Corporation, and then later became a subsidiary of that company. In 1999, Northrop Grumman Corporation acquired TDY Industries from Allegheny and relocated the plant to a site in Ranch Bernardo, California, leaving the former plant site vacant. The site continues to be mostly vacant, with only a small portion of Building 100 used for administrative offices and several other buildings used for storage.

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural Character: Building 160 is an industrial-style building and is characterized by its utilitarian construction, low-pitched barrel roof, corrugated sheet metal cladding, multi-pane steel-framed rectangular windows, wood and fiberglass hanging doors, and ventilators on the roof (URS Corporation, 2009).
2. Condition of Building Material: Building 160 is in good condition.

B. Description of Exterior:

1. Overall Dimensions: Building 160 is a 9,352-square-foot, one-story rectangular building measuring approximately 40 feet by 165 feet.
2. Foundations: Building 160 sits on a concrete floor and footing.
3. Walls: Building 160 has walls constructed of 2-inch-by-6-inch stud framing and covered in corrugated aluminum siding.
4. Structural System: Building 160 is a steel- and wood-framed building.
5. Openings:
 - a. Doorways: Building 160 has sliding doors on the east, west, and south elevations, and personnel doors on the west elevation.
 - b. Windows: Building 160 has rows of multi-paned steel-framed awning windows located along the east and west elevations of the building.
6. Roof: The barrel roof of Building 160 is covered with rolled asphalt roofing material.

C. Description of Interior:

Floor Plans: Building 160 is a one-story rectangular building measuring approximately 40 feet by 165 feet. It has an open floor plan with one partition wall built at the southern end of the building. The partition previously had a large rectangular opening that has been covered with plywood.

D. Site:

Historic Landscape Design: None

PART III. SOURCES OF INFORMATION

- A. Early Views: N/A
- B. Interviews: N/A
- C. Bibliography

1. Primary and Unpublished Sources:

San Diego County Regional Airport Authority (SDCRAA). 2005. Teledyne Ryan Facility Study. January 1.

San Diego Unified Port District (SDUPD). 2009. 2701 North Harbor Drive Demolition Project Environmental Impact Report. April.

URS Corporation. 2008. Department of Parks and Recreation Primary Record form for the Ryan Aeronautical Company Historic District (P-37-028619, CA-SDI-18401H). January.

URS Corporation. 2009. *Appendix B. Cultural Resources Assessment Report. 2701 North Harbor Drive Demolition Project Draft EIR (UPD #83356-EIR-713)*. April.

Van Wormer, Stephen. 2005. Department of Parks and Recreation Primary Record form for the Ryan Aeronautical Company Historic District (P-37-028619, CA-SDI-18401H). Prepared by Walter Enterprises. December.

Van Wormer, Stephen, Mary Robbins-Wade. 2006. *Historic Architectural Survey Report: San Diego International Airport Master Plan*. Prepared for San Diego County Regional Airport Authority. May.

2. Secondary and Published Sources:

Leiser, Edward. 2000. "San Diego Flying Days." Copies of manuscripts on file at the San Diego Historical Society and San Diego Aerospace Museum, San Diego, CA.

Macaulay, Major T. 1928. *"The Story of Lindbergh Field, San Diego's 'Triple A' Municipal Airport Lindbergh Field."* Dedication brochure, Lindbergh Field Vertical Files, San Diego Aerospace Museum Library, San Diego, CA.

Moomjian, Scott A. and Wendy L. Tinsley. 2001. *Historic Survey Report of the Former Teledyne-Ryan Aeronautical Complex, 2701 North Harbor Drive, San Diego, California, 92101*. Prepared by Office of Maria Burke Lia, Attorney at Law, 427 C Street, Suite 416, San Diego, CA 92101. Prepared for Jones Lang La Salle, 2701 North Harbor Drive, Building 100, San Diego, California 92101. Copy on file with the San Diego Regional Airport Authority.

Moore, Floyd Roscoe. 1960. San Diego Airport Development. Thesis, Political Science, San Diego State College, San Diego, CA.

National Aviation Hall of Fame. T. Claude Ryan- Biography.
http://nationalaviation.blade6.donet.com/components/content_manager_v02/view_nahf/htdocs/menu_ps.asp?NodeID=-2144693577&group_ID=1134656385&Parent_ID=-1 (accessed November 5, 2009)

San Diego Unified Port District. 1966. *San Diego Unified District Annual Report: 1965-66*. Carl Reupsch Collection, San Diego Historical Society, San Diego, CA.

San Diego Union. Various Dates. Issues cited in text from Lindbergh Field Vertical Files, San Diego Historical Society, San Diego, CA.

San Diego Unified Port District. 1968. *San Diego Unified District Annual Report: 1967-68*. Carl Reupsch Collection, San Diego Historical Society, San Diego, CA.

San Diego Unified Port District. 1971. *San Diego Unified District Annual Report: 1970-71*. Carl Reupsch Collection, San Diego Historical Society, San Diego, CA.

San Diego Unified Port District. 1977. *San Diego Unified District Annual Report: 1976-77*. Carl Reupsch Collection, San Diego Historical Society, San Diego, CA.



Building 160 – Foundry and Plaster Shop, South Elevation, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop, juncture with Building 168, facing Northwest, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop, Southwest Oblique, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop, juncture with Building 168, Northeast Oblique, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop, juncture with Building 168, Northwest Oblique, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop Interior, front room, facing Northeast, San Diego, California, October 2009.



Building 160 – Foundry and Plaster Shop, window detail on West Elevation, San Diego, California, October 2009.



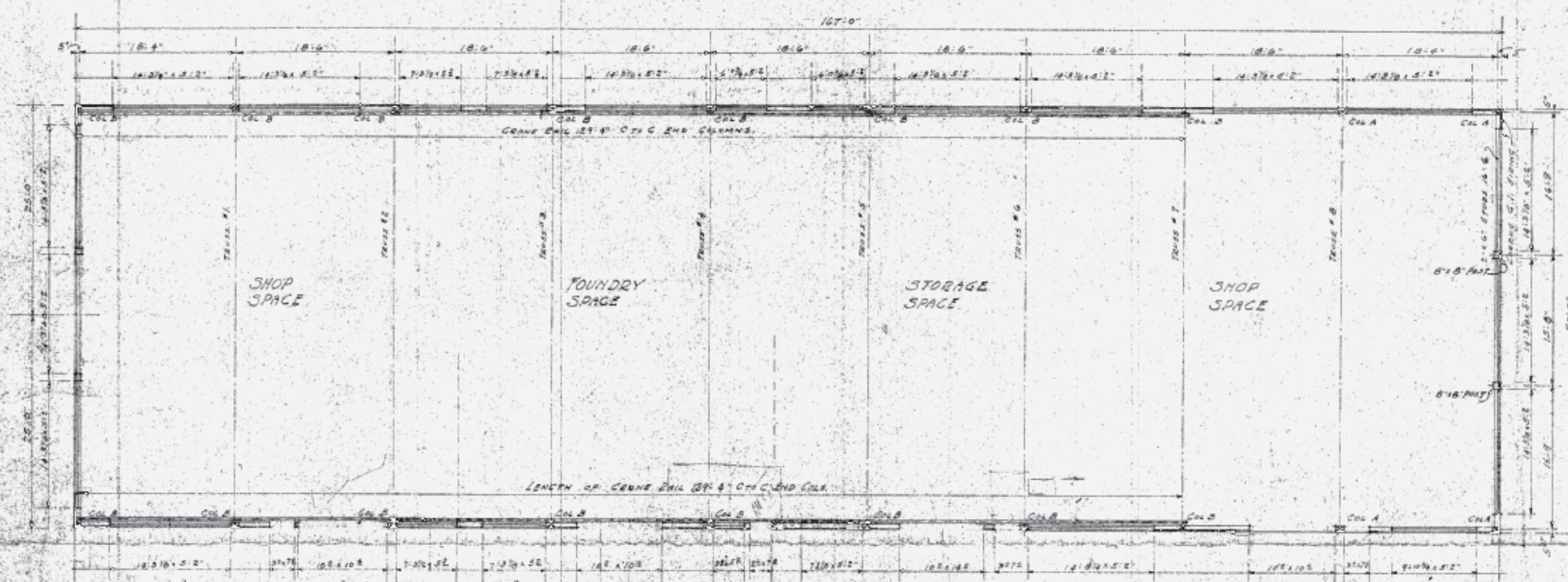
Building 160 – Foundry and Plaster Shop Interior, back room, facing Northeast, San Diego, California, October 2009.



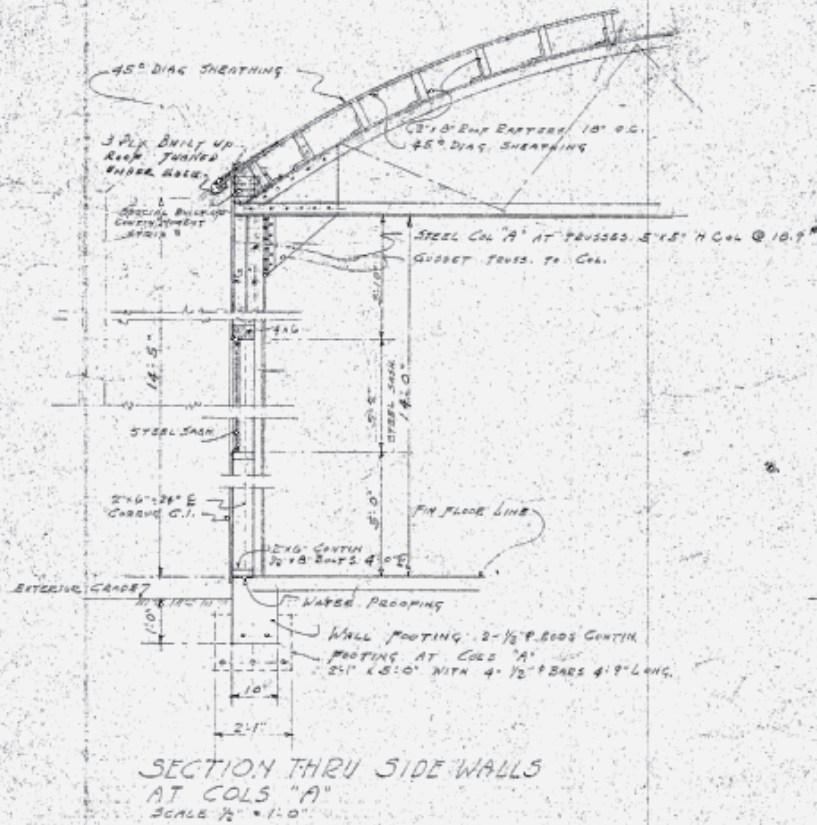
Building 160 – Foundry and Plaster Shop Interior, ceiling detail, facing South, San Diego, California, October 2009.



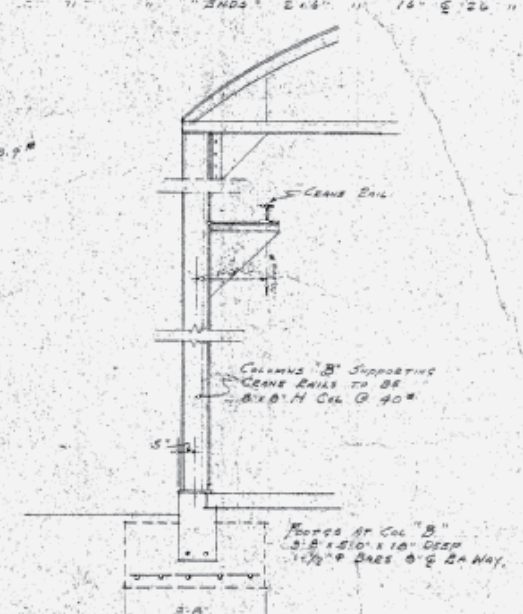
Building 160 – Foundry and Plaster Shop, Interior, east wall, facing East, San Diego, California, October 2009.



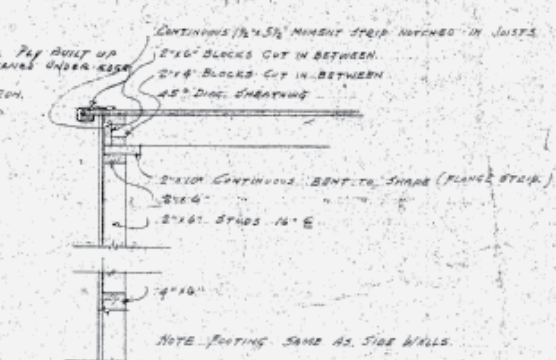
FLOOR PLAN
SCALE 1/8" = 1'-0"



SECTION THRU SIDE WALLS
AT COLS 'A'
SCALE 1/8" = 1'-0"



SECTION THRU SIDE WALLS
AT COLS 'B'
SCALE 1/8" = 1'-0"



SECTION THRU END WALLS
SCALE 1/8" = 1'-0"

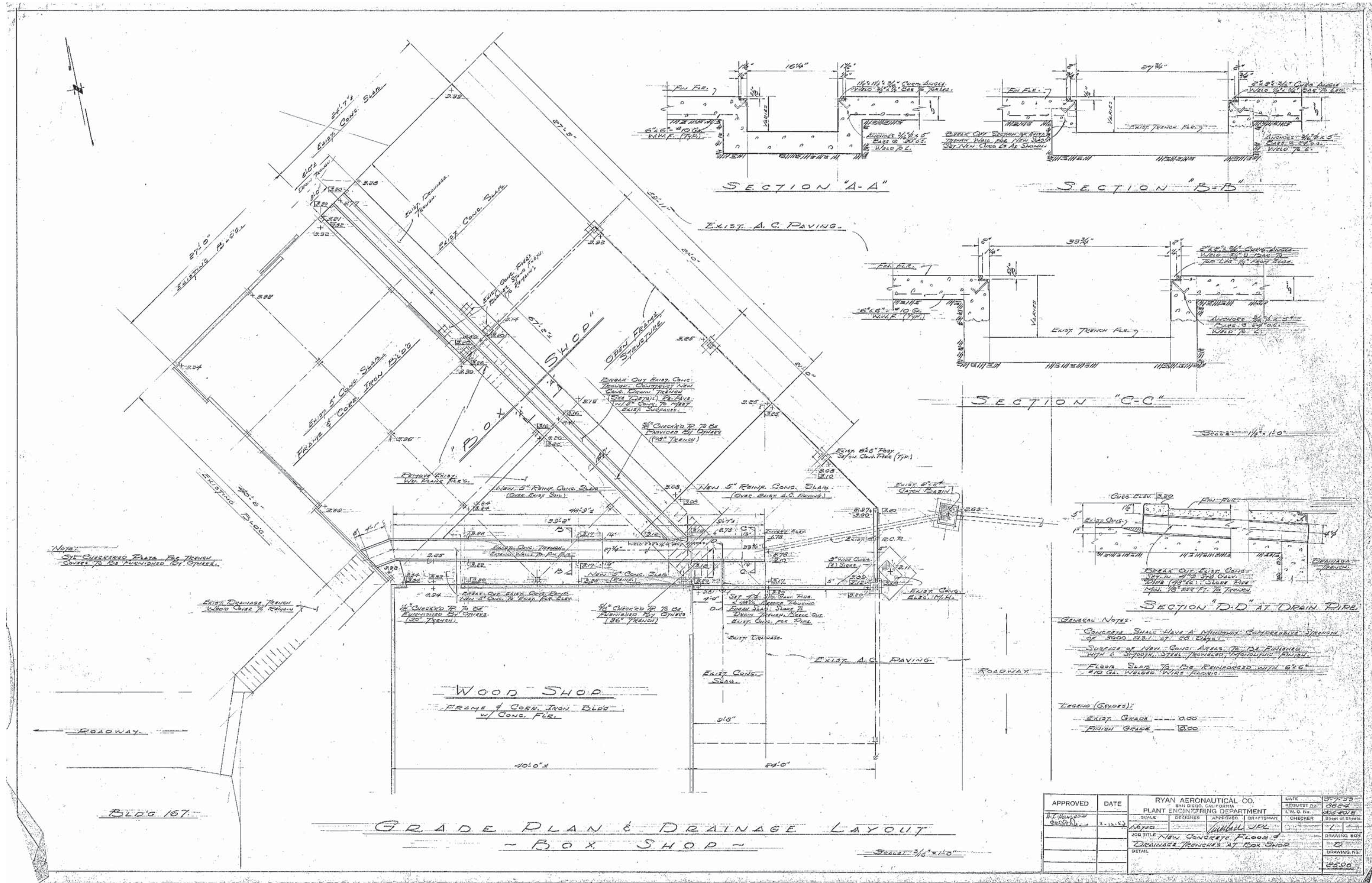
COMBINED STRESS IN COLS "NOT SUPPORTING CRANE" COLS 'A':
 ASSUME A PARTIAL HORIZONTAL FORCE PANEL LOAD OR
 $1000' M = \frac{1000 \times 14 \times 12}{8} = 21,000'$
 TRUSS LOAD E ON COL $A = 19 \times 25 \times 30 = 14,250'$ COLS 'A'
 ASSUME $5' \times 5' \times 10.4' H$ COL AREA = $5.47' \times 9.5$
 ALLOWABLE STRESS ON $14'-0"$ HEIGHT = $\frac{21,000}{5.47} = 3,839'$
 STRESS DUE TO $M = \frac{21,000}{9.5} = 2,210'$
 STRESS DUE TO TRUSS LOAD = $\frac{14,250}{5.47} = 2,605'$
 USE $5' \times 5' \times 10.4' H$ COL - TOTAL COMB = $4,815'$
 FOOTING AREA UNDER COL A $\frac{14,250}{1,400} = 10.18'$
 USE $25' \times 5'-0"$ FOOT'G $18"$ DEEP
 $4 \times \frac{1}{2}"$ BARS $5'-0"$ LONG

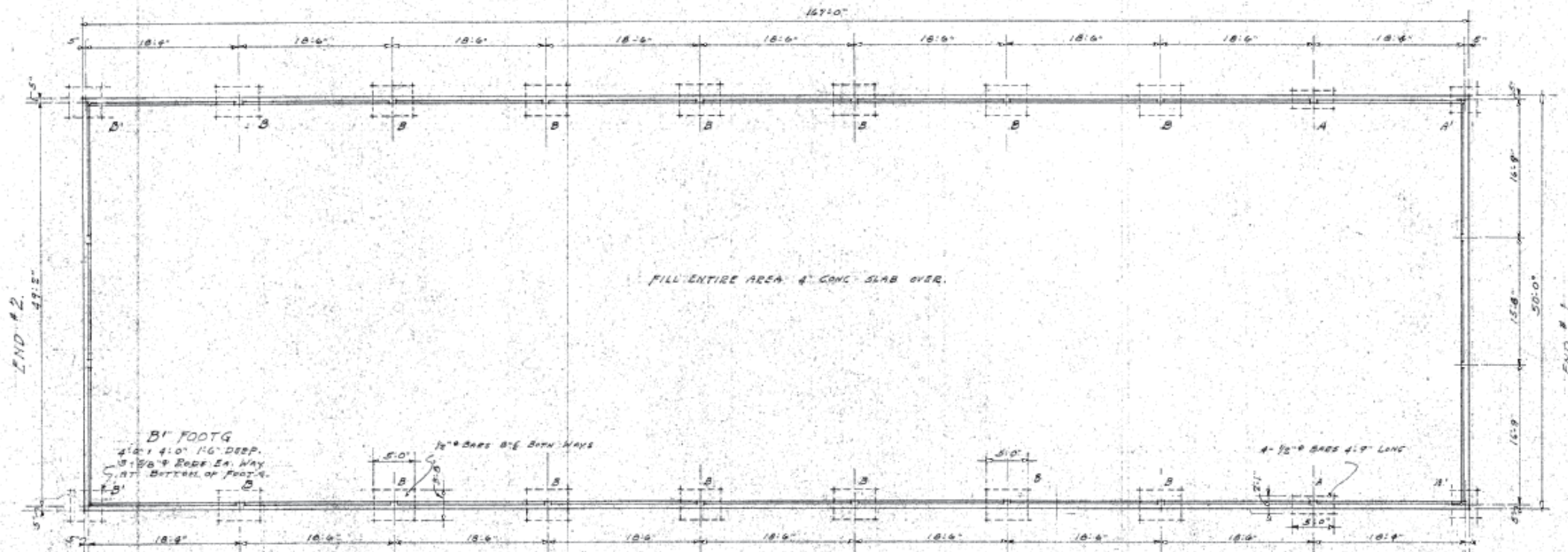
COMBINED STRESS ON CRANE SUPPORTING STEEL COLS 'B':
 ROOF LOAD FROM TRUSS $14,250'$
 LOAD FROM CRANE $10,000'$
 $24,250'$
 M DUE TO CRANE LOAD $10,000 \times 20 = 200,000'$
 BENDING FACTOR $\frac{1}{3} = .33 \times 200,000 = 66,000'$
 $66,000 \text{ PLUS } 24,250 = 90,250'$
 USE $8' \times 8' \times 40' H$ COL AREA 11.76 SQ. IN.
 FOOT'G AREA = $\frac{24,250}{1,400} = 17.3'$
 USE $3' \times 8' \times 5'-0" \times 18"$ DEEP FOOT'G
 $\frac{1}{2}"$ BARS $8' \times 8'$ BOTH WAYS

BLOG 160
160

W. H. R. 1960
 STORAGE BUILDING
 FOR
 RYAN AERONAUTICAL CO
 LINDBERG FIELD SAN DIEGO CALIF

SHEET # 2 OF 2
4-11-61



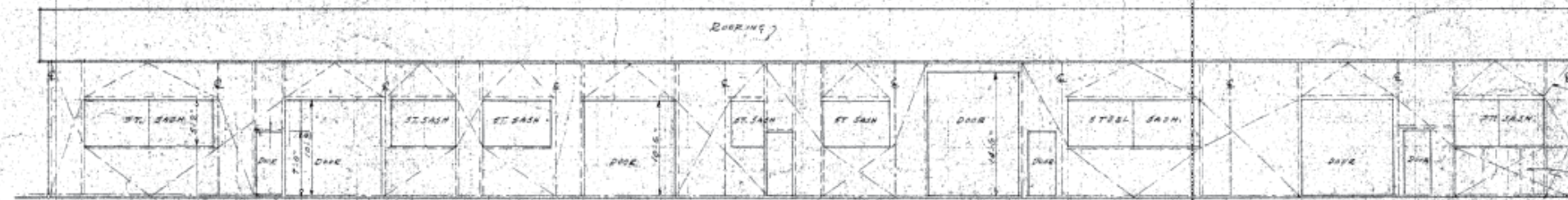
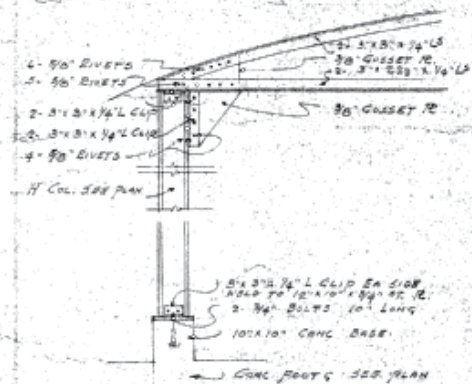
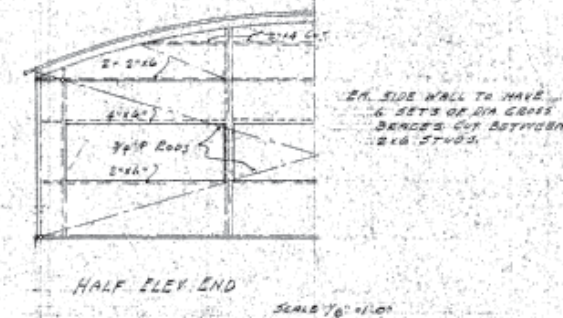
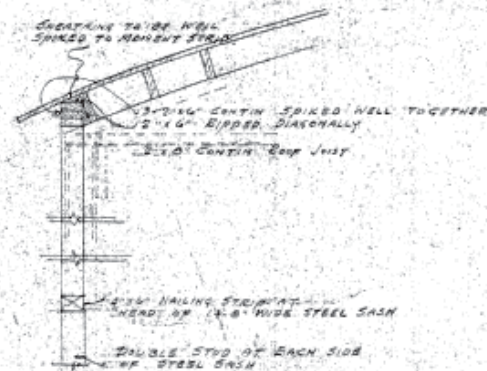
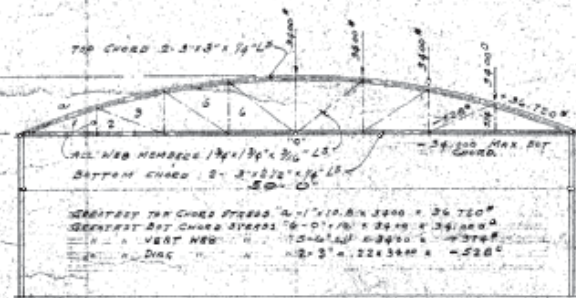


PROJECTED SIDE WALL AND ROOF SURFACE TAKING SIDE WIND THRUST
 $(14' + 6') \times 10' = 14.2'$
 M. FOR ROOF DIAPHRAM = $14.2 \times 15 \times 107 = 35,600$
 M. ON ROOF DIAPHRAM = $35,600 \times 107 = 23,000$
 NET AREA OF MOMENT STRIP = 36.0'

SECTION FOR DIA. BRACING SIDE WALLS
 SIDE WALLS 18' x 25' x 14' x 14' x 14' x 14'
 NUMBER OF EFFECTIVE DIA. BRACES FOR SIDE WALL
 $\frac{7,900}{800} = 10$ 1" x 3/8" DIA. BRACES
 EA. SIDE IN WAY

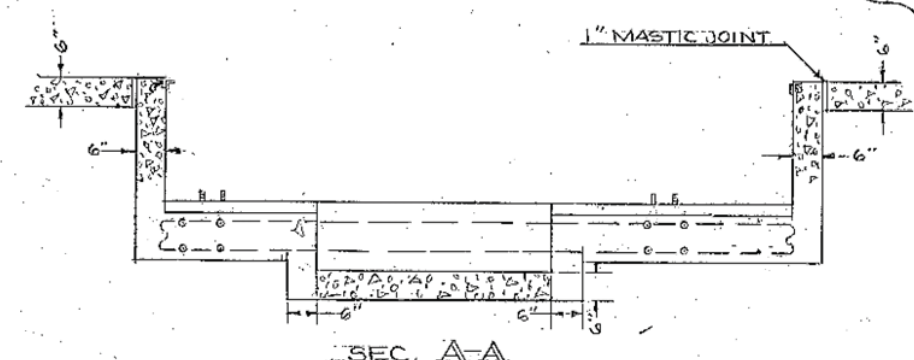
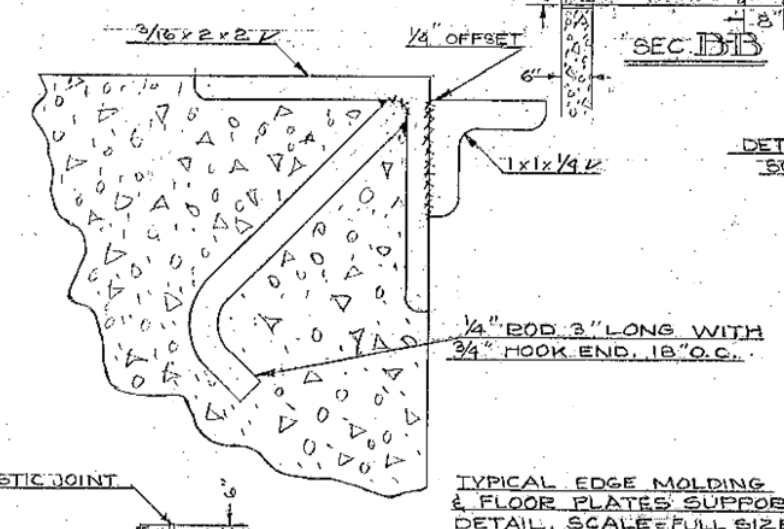
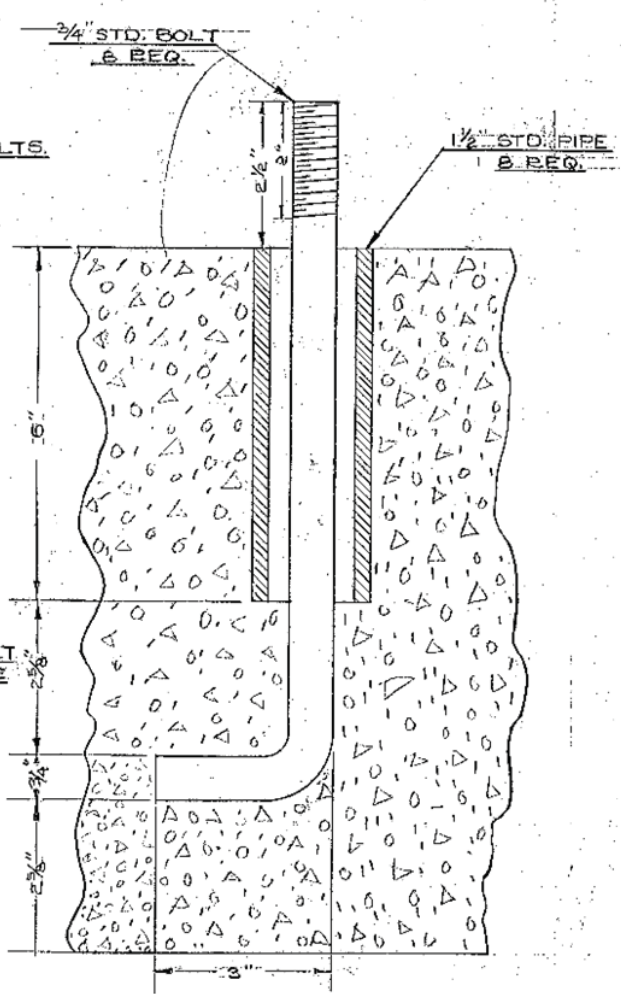
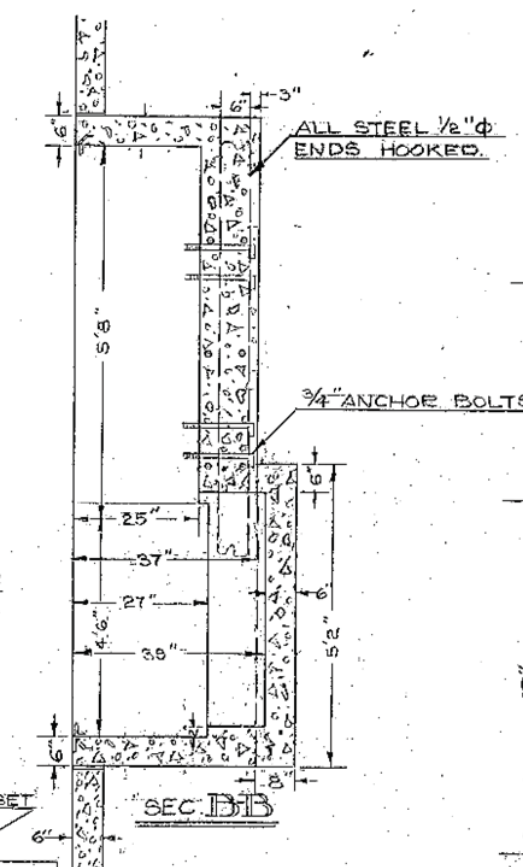
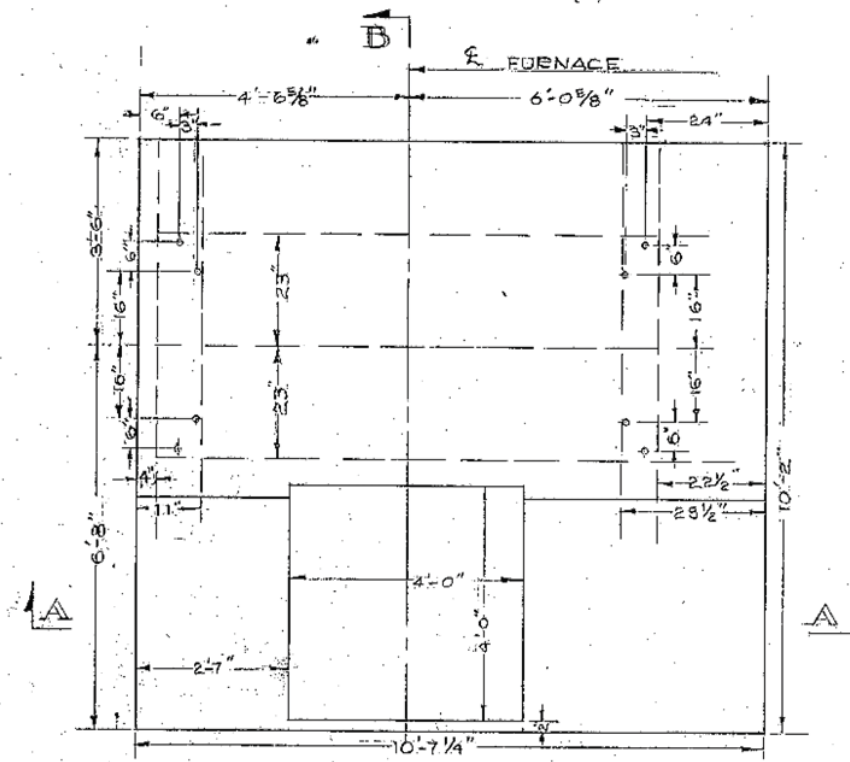
DIA. BRACING END WALLS
 $35,600 \div 17,000 = 1.4 \times 17,000 = 23,900$
 30% ABSORBED BY GUSSET PL.
 USE 2" x 3/4" RODS EA. END.

FOUNDATION PLAN
 SCALE 1/8" = 1'-0"



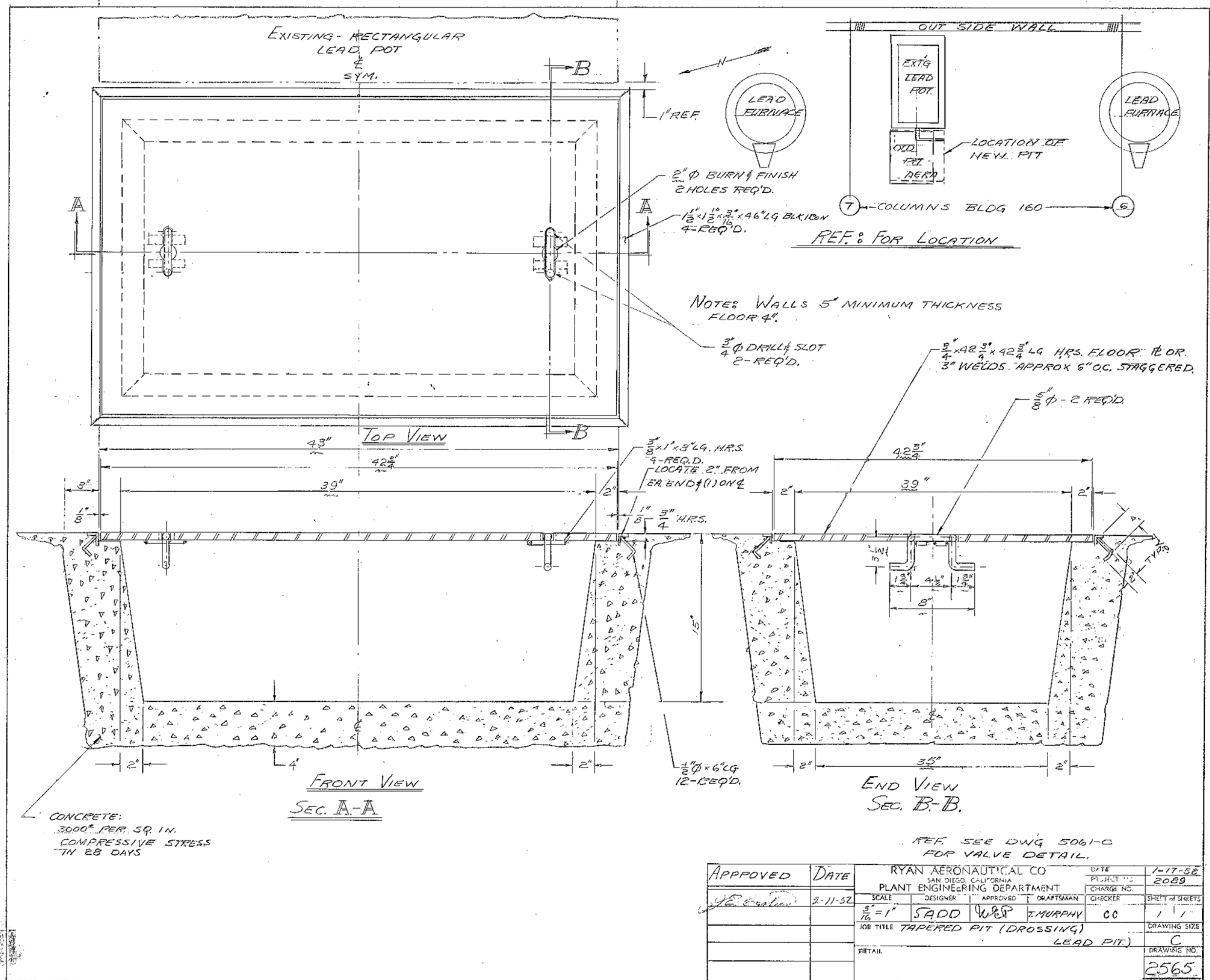
BLOG 160
 16C

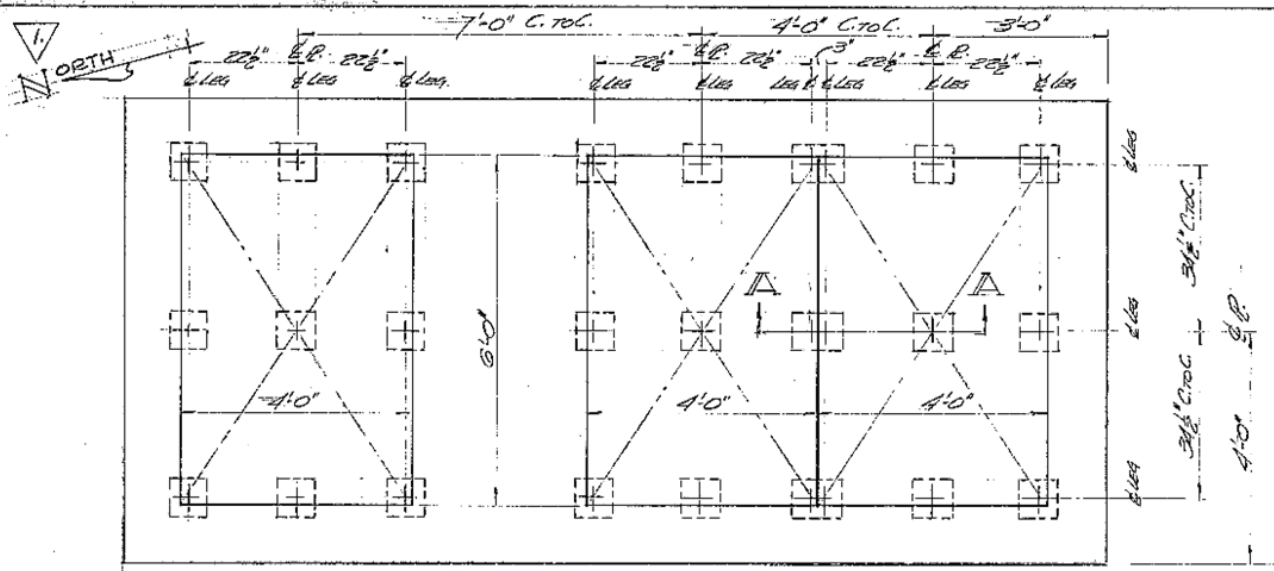
Robert H. Kelley
 Architect
 1000 Broadway
 San Francisco, Calif.
 SHEET # 1 of 2
 STORAGE BUILDING
 FOR
 DYAN AERONAUTICAL CO.
 LINDBERGH FIELD SAN DIEGO, CALIF.



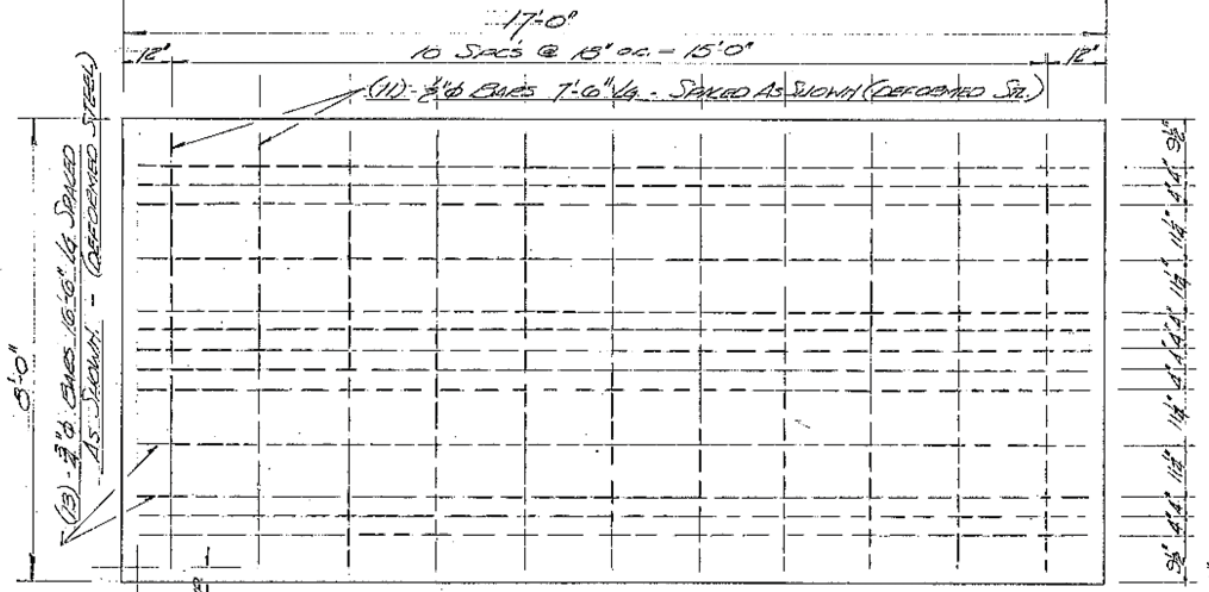
NOTE: FIREBRICK TO BE INSTALLED IN BOTTOM OF 4' 60" PIT.

			RYAN AERONAUTICAL CO.	
			SAN DIEGO, CALIFORNIA	
			PLANT ENGINEERING DEPT.	
			DATE 7-8-43	DRAFTSMAN B.P.
CHANGES	DATE	BY	SCALE NOTED	CHECKED BY
LEAD MELTING POT			DRAWING NO.	
FOUNDATION			2516	
			C	





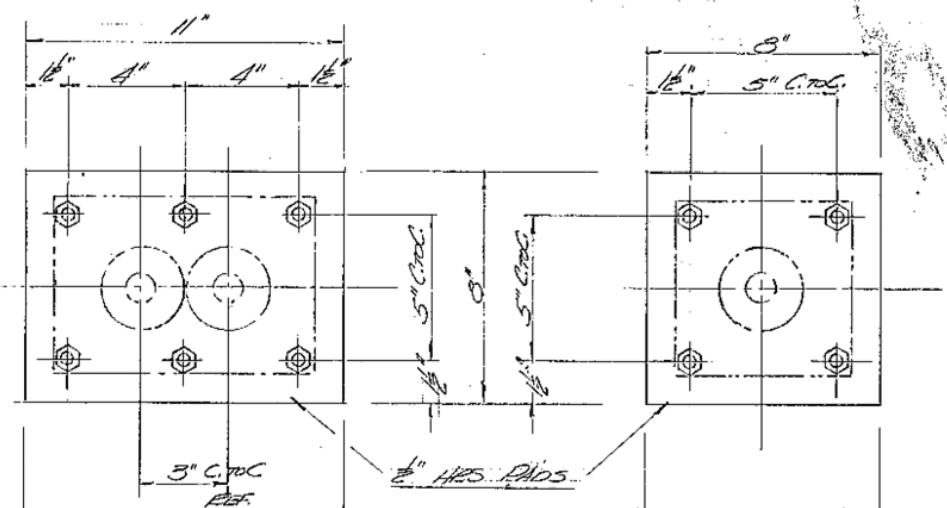
PLAN - POURING PLATES



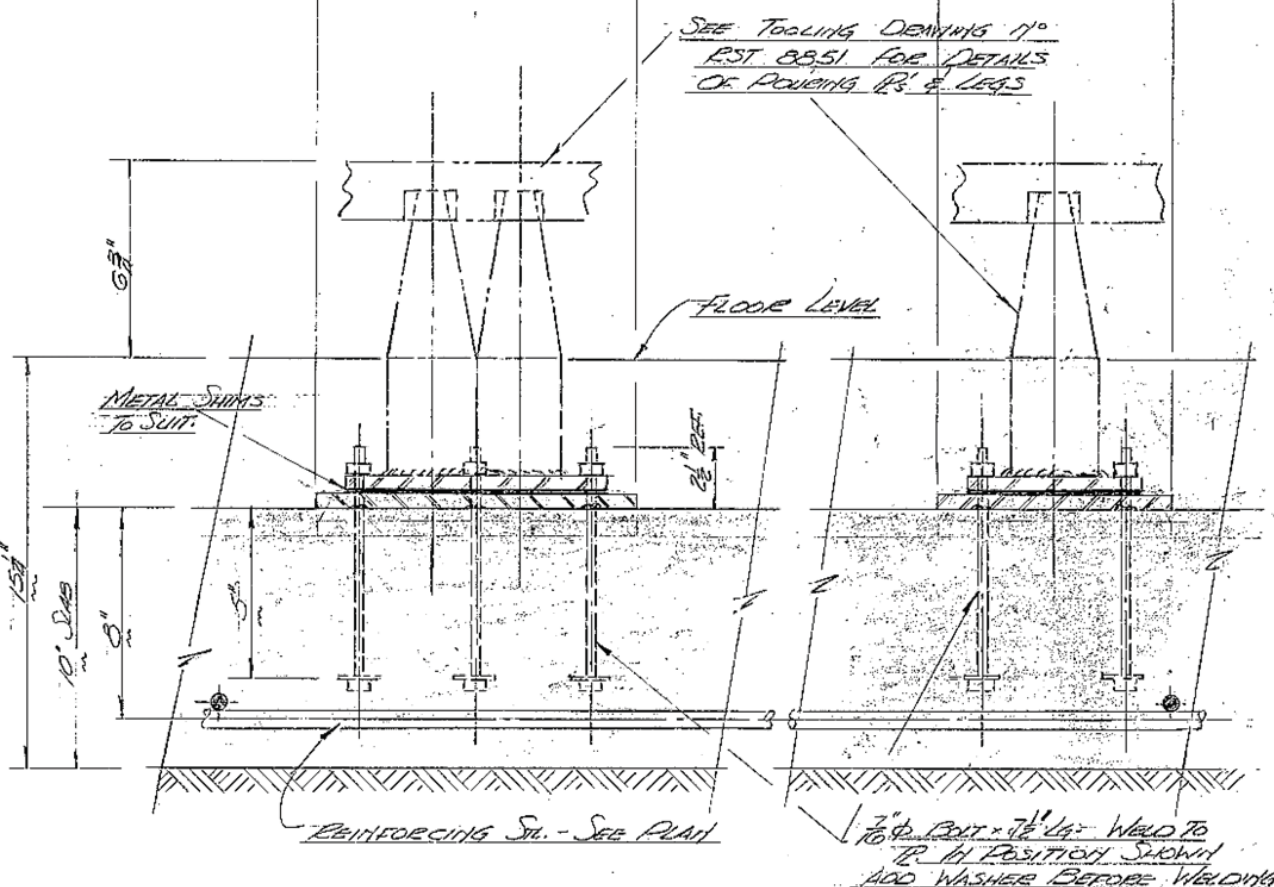
PLAN - REINFORCING STEEL
SCALE ~ 1/2" = 1'0"

NOTES
 BASE TO BE INSTALLED IN SEQUENCE:-
 1ST SEQUENCE - EXCAVATE, FORM, PLACE REINFORCING STEEL, PLACE LEVELING PADS, & POUR 10" SLAB.
 2ND SEQUENCE - INSTALL LEGS (FURNISHED BY RYAN). - LEGS SHALL BE SHIMMED (METAL) TO A COMMON ELEVATION. - LEGS SHALL BE LEVEL, PLUMB, & TRUE.
 3RD SEQUENCE - POUR CONCRETE AROUND LEGS & ON FOOTING TO FLOOR ELEVATION.
 HARD TROWEL FINISH.

CONCRETE SHOULD BE 3000 P.S.I. COMPRESSIVE STRESS AT 28 DAYS.
 POURING PLATES TO BE SAME ELEVATION & ARE TO BE LEVEL.



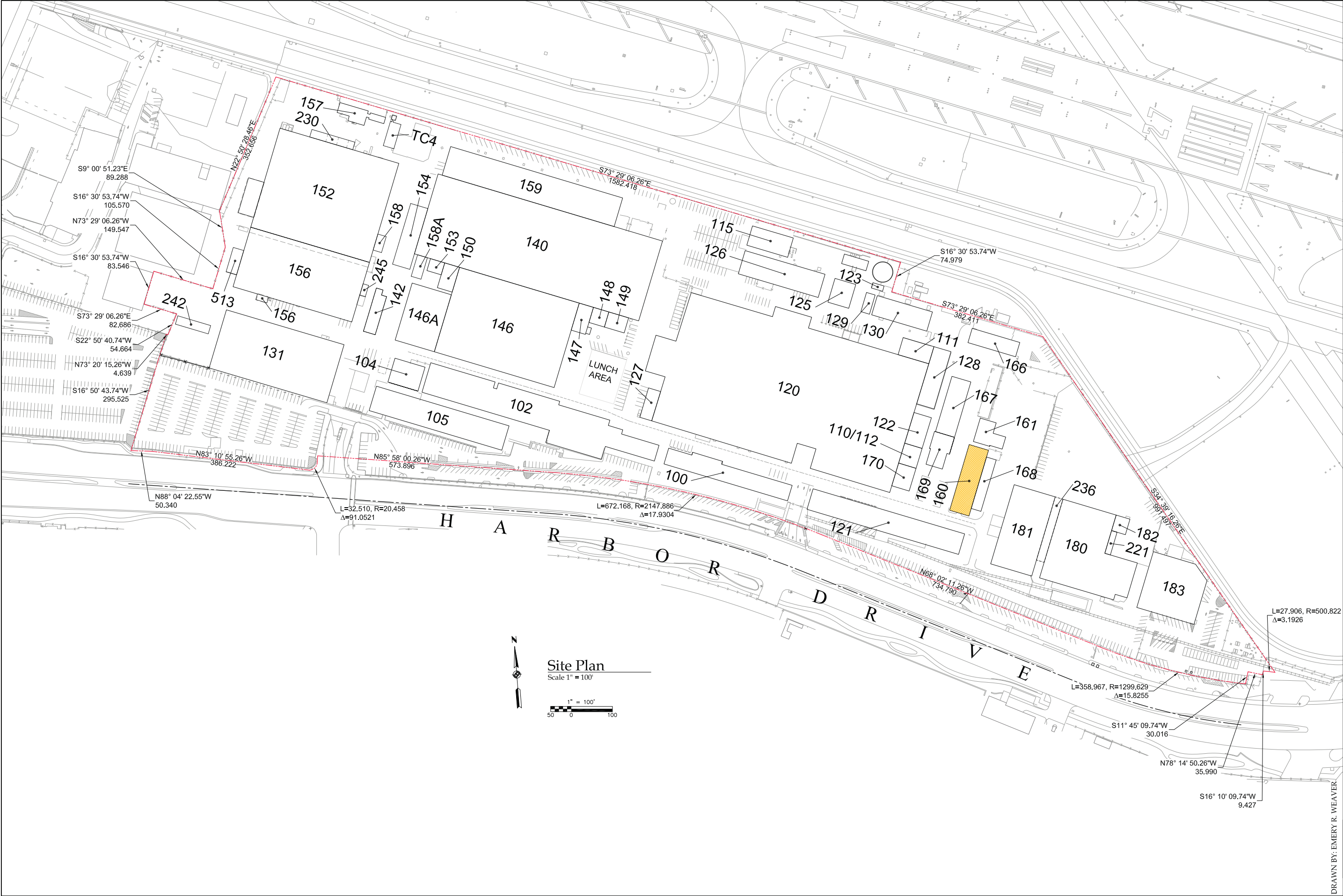
(3) P's REQ'D THUS (21) P's REQ'D THUS



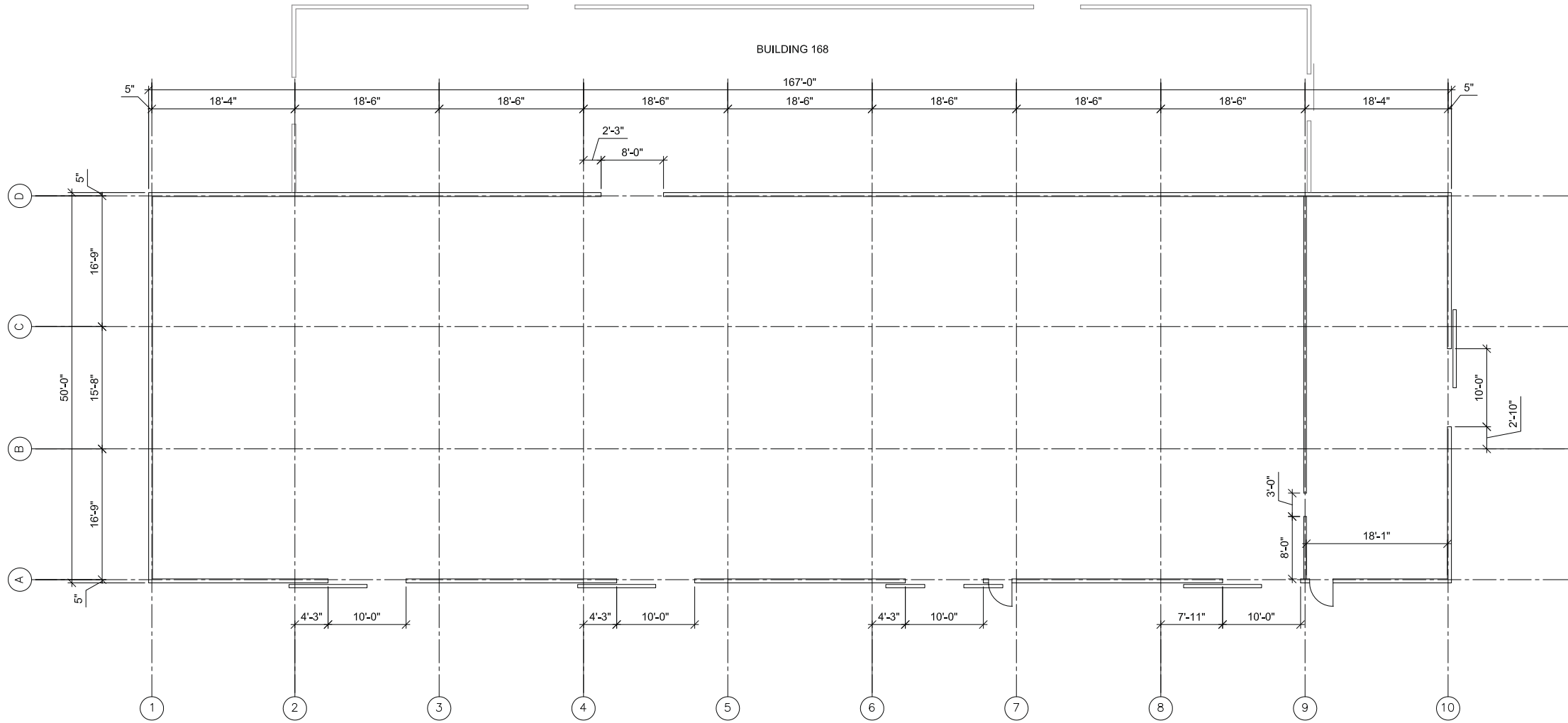
SECTION AA
SCALE ~ 1/2" = 1'0"

APPROVED	DATE	RYAN AERONAUTICAL CO.	DATE	3-17-52
J. Garton	3-17-52	SAN DIEGO, CALIFORNIA	CHARGE NO.	14250
J. Garton	3-17-52	PLANT ENGINEERING DEPARTMENT	CHECKER	403-1001
SCALE	DESIGNER	APPROVED	DRAFTSMAN	C.C.
1/16" = 1"	SADD		D.M.L.	
JOB TITLE				
BASE FOR FOUNDATION POURING				
REMARKS				
PLATES - BUDS 160 - DEPT 190				

NO. 1	CHANGE	DRAFTSMAN	CHECKED	DATE



DRAWN BY: EMERY R. WEAVER	RYAN AERONAUTICAL COMPANY HISTORIC DISTRICT JANUARY 2010	NAME AND LOCATION OF STRUCTURE		SURVEY NO.	HISTORIC AMERICAN BUILDINGS SURVEY	Library of Congress Index Number
		BUILDING 160 - FOUNDRY AND PLASTER SHOP				
		SAN DIEGO, CALIFORNIA				
		2701 N. HARBOR DRIVE				
		SAN DIEGO COUNTY				
				SHEET 1 OF 4 SHEETS		



Floor Plan
Scale 1/8" = 1'-0"

DRAWN BY: EMERY R. WEAVER

RYAN AERONAUTICAL COMPANY
HISTORIC DISTRICT
JANUARY 2010

NAME AND LOCATION OF STRUCTURE

BUILDING 160 - FOUNDRY AND PLASTER SHOP

2701 N. HARBOR DRIVE

SAN DIEGO, CALIFORNIA

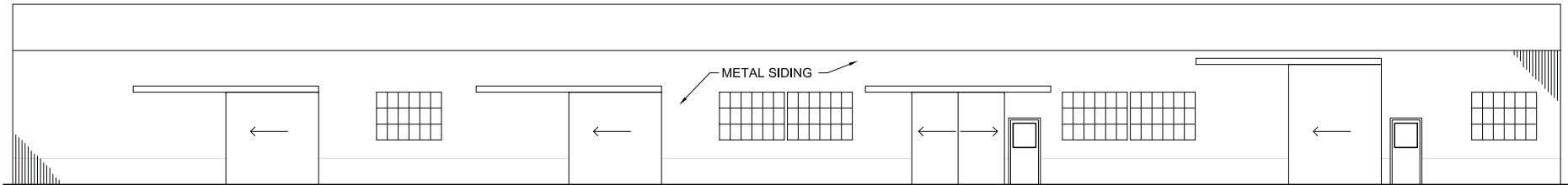
SAN DIEGO COUNTY

SURVEY NO.

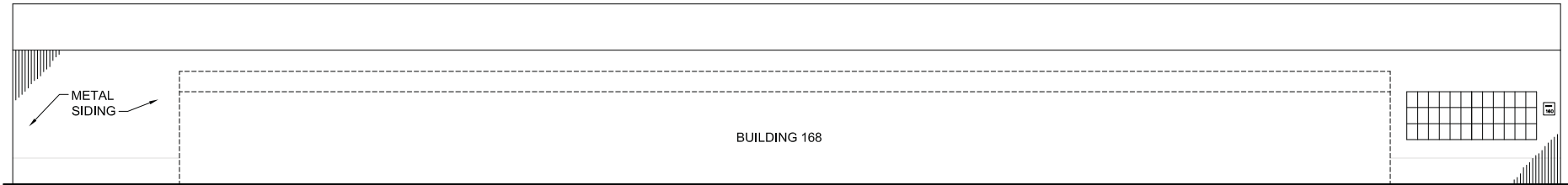
SHEET 2 OF 4 SHEETS

HISTORIC AMERICAN
BUILDINGS SURVEY

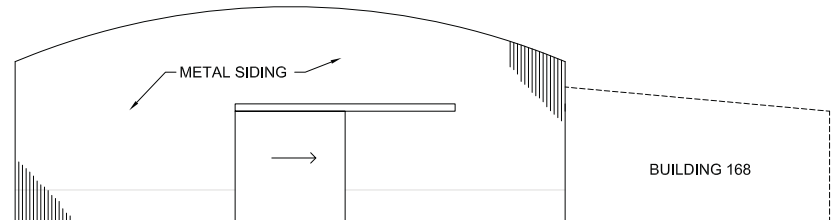
Library of Congress
Index Number



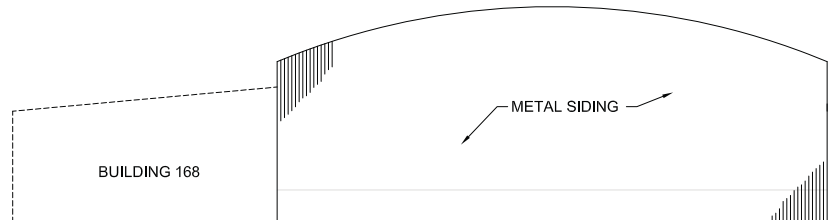
West Elevation
Scale 1/8" = 1'-0"



East Elevation
Scale 1/8" = 1'-0"



South Elevation
Scale 1/8" = 1'-0"



North Elevation
Scale 1/8" = 1'-0"

DRAWN BY: EMERY R. WEAVER

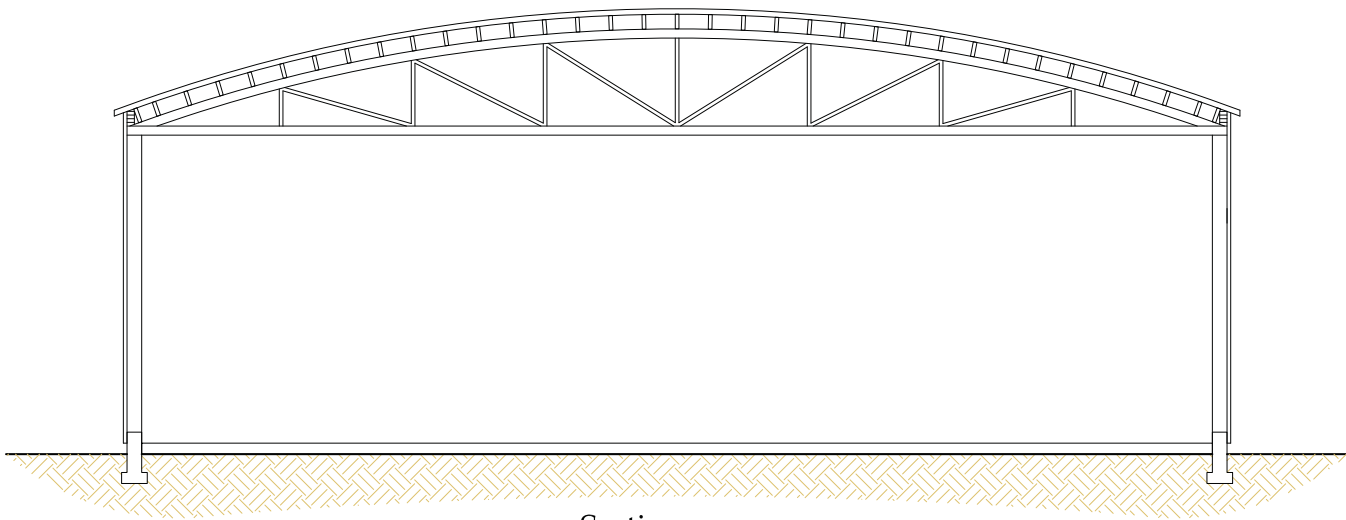
RYAN AERONAUTICAL COMPANY
HISTORIC DISTRICT
JANUARY 2010

NAME AND LOCATION OF STRUCTURE
BUILDING 160 - FOUNDRY AND PLASTER SHOP
2701 N. HARBOR DRIVE
SAN DIEGO, CALIFORNIA
SAN DIEGO COUNTY

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Scale 1/4" = 1'-0"

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RYAN AERONAUTICAL COMPANY
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JANUARY 2010

NAME AND LOCATION OF STRUCTURE
BUILDING 160 - FOUNDRY AND PLASTER SHOP

2701 N. HARBOR DRIVE SAN DIEGO, CALIFORNIA SAN DIEGO COUNTY

SURVEY NO.
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