

Bureau of Mines Boulder City Experimental **HABS No.** NV-35-E  
Station, Electrolytic Manganese Building  
(Building No. 500)  
Date Street North of U.S. Highway 93  
Boulder City  
Clark County  
Nevada

HABS  
NEV  
2-BOUC,  
1E-

**PHOTOGRAPHS**

**WRITTEN HISTORICAL AND DESCRIPTIVE DATA**

**Historic American Buildings Survey  
National Park Service  
Western Region  
Department of the Interior  
San Francisco, California 94107**

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**HISTORIC AMERICAN BUILDINGS SURVEY**

**BUREAU OF MINES BOULDER CITY EXPERIMENTAL STATION (Date Street Complex)  
ELECTROLYTIC MANGANESE BUILDING (Building No. 500)**

**HABS No. NV-35-E**

**Location:** Date Street Complex, bordered by U.S. Highway 93 Truck Route, and Elm and Date streets  
Boulder City, Clark County, Nevada

Building 500 is located near the center of the complex. It is northwest of Building 400 and northeast of Building 600.

*Boulder City, Nev., 7.5' Topographic Quadrangle, U.S.G.S., 1958, Photorevised 1983, Universal Transverse Mercator Coordinates: 11.694490.3983390 (approximate center of building)*

**Present Owner:** U.S. Department of the Interior, Bureau of Reclamation

**Present Use:** Abandoned

**Significance:** Building 500, as part of the Date Street Complex, was a component of the Bureau of Mines Electrometallurgical Research Facility located in Boulder City. As such, it is within the designated Boulder City Historic District. One of five buildings considered eligible that is to be demolished, this building retains sufficient integrity of form despite the removal of the cooling towers on the exterior and considerable interior remodeling. In a report of a survey of the Date Street Complex, Christine Pfaff (1992:4) of the Bureau of Reclamation determined Building 500 to be a contributing element to the District because it was constructed during the period of significance (1931-1945) for the District, contributed to the functioning of the Research Facility, and is significant as part of the complex under National Register Criterion a.

The significance of the Boulder City Historic District is tied to the Boulder Canyon Project (Hoover Dam) and to the history of American City Planning. This was the first community constructed following the federal New Towns model, as well as the "first fully-developed experience in new town planning as promoted by the Community Planning Movement, a movement which is recognized as the force which most influenced contemporary community planning practices" (Woodward et al. 1983:8.1).

## HISTORICAL INFORMATION

### A. Physical History

**Date of erection:** Building 500, a steel frame building with corrugated sheet metal cladding, was built in 1941 as part of the manganese pilot plant complex. As the Electrolytic Manganese Pilot Plant, the purpose of Building 500 was for testing the operation for cost estimates and the process for feasibility on several ores. It had a daily capacity of producing one ton of electrolytic manganese metal. One room was used for generating the power needed to run the electrolytic cells, located in an adjacent room. Included in the process was an ammonia cell-cooling system with an external cooling tower (Metallurgical Division 1952:7). A two-story addition was built on the north end of the building after 1941 but prior to January 1945 (NV-35-6). A c. 1949 aerial photograph (NV-35-2) suggests the presence of a tower at the northwest corner of the building that is not present in a 1965 aerial photograph (NV-35-4). A c. 1953 map (NV-35-12) of the entire Bureau of Mines complex shows two cooling towers present on the west side of the building at the north and south ends of the central mass. The transformer located at the south end of the building was present in a 1953 aerial photograph (NV-35-3), and the c. 1953 map, but was gone by 1965. An early photograph (NV-35-7) of the complex, showing the Hydrometallurgical Pilot Plant, Carpenter Shop, and Building 500, does not include the electrical equipment at the south end of the building, suggesting a later date of erection. The original building had a construction cost of \$121,030, including equipment.

**Discussion of building use:** As noted above, Building 500 was originally part of the manganese research complex, functioning as the electrolytic pilot plant. Equipment included eight electrolytic cells in the center of the building, a "twin-motor generator set driven by a 700-horsepower synchronous motor" in a separate room, a 450 kv.-a. generator, and the ammonia cooling system with tower (Metallurgical Division 1952:7). Renovations made to the building in the late 1950s and early 1960s are associated with the Alumina Research. In 1973, research began on finding ways of extracting alumina from non-bauxite sources (bauxite is the primary source of quality alumina and has to be imported). Initially, there were to be six mini-plants, one each for the raw material and/or process technology under research. However, it was discovered that four of the processes were flawed and best examined on a laboratory scale to determine their possible commercial success. The remaining two processes were taken to the mini-plant stage. These both involved clay, one with hydrochloric acid and the other with nitric acid ([Stephens] c. 1983:13-14). Peterson (*Nevadan* 29 July 1979:27J) described the clay and hydrochloric acid process in an article about the work being done at the Boulder City station. The alumina research, directed by Dwight L. Sawyer, did not actually produce aluminum. For the last three years the station operated, alumina research changed focus to evaluating existing methods and developing technique for the extraction of alumina from coal ash and coal shale ([Stephens] c. 1983:15).

Other projects conducted in the building were not associated with the Bureau of Mines. In the 1970s, the Desert Research Institute and University of Nevada, Las Vegas both used portions of the building to conduct a number of research projects. These included seismic studies, and lake and well water contamination tests.

**B. Description of Building 500:**

Although this building is oriented on a northwest/southeast axis, the description of the elevations will be addressed as north, south, east, and west.

**Condition of fabric:** Building 500 has been abandoned since 1984, and has been subject to damage by pigeons. A few broken windows allow entry into the building's interior. The area most heavily impacted by the birds appears to be the second-story laboratory in the addition. The exterior of the building is in fair to good condition.

**Description of exterior:** This is a two-story, steel- and wood-framed building that follows a simple rectangular plan with a partial two-story wood-framed addition at the north end. The primary mass measures 62 (north/south) by 52 (east/west) feet. At the south end is a shorter room, measuring 24 (north/south) by 41 (east/west) feet. The addition measures 18 (north/south) by 29 (east/west) feet. The total building length is 104 feet. The roof of the primary mass is a low pitch (16°) end-gable, with shed roofs on the two ends; all are covered with corrugated sheet metal. Exposed metal rafters with a slight overhang are present on the primary mass and south mass. The addition has exposed wood rafters and a slight overhang. There are four cylindrical ventilation fans on the ridge, each with wire meshing to keep birds out. A vent pipe is on the west slope of the roof in the south half of the primary mass. Possible evaporative cooling units are on the east slope of the roof, near the center, and on the addition roof near the north wall of the primary mass. Wall cladding for the entire building is corrugated iron sheet metal. There are two types of window present: metal-framed, 25-part divided-light with a central 6-part divided awning on the original building, and wood-framed, fixed 6-part divided-light on the addition. The doors vary from cut corrugated metal to metal with fixed light and panel. All are metal framed. The building stands on a poured concrete foundation, with the addition foundation below ground surface. Exterior lights are over the two main entries (north and east).

The primary elevation (front) faces east. Three varied sized patches of sheet metal suggesting either vents or windows are located on the south end of the second level. However, most of the east elevation of the southern end of the building is occupied by an overhead coiling metal door. In the central mass, there are two vent openings under the roof, one on the south end and one near the center. A smaller vent opening is below and to the south of the center one. At the south end is a metal patch over a former window opening and above a pipe that runs the length of most of the building. Below this to the north is a cut, corrugated metal door in a metal frame. Near the center is a set of replacement double metal half-glass (6-light, 2/2/2, over inset panel) doors. The three outside lights on each door have been painted over. An evaporative cooling unit is at the north end of the central mass above the pipe. The addition has a window in the center, also above the pipe. A set of cut corrugated double doors is below this. One historic photograph (Pfaff 1992:48), taken during construction in 1941, shows three windows on the east elevation. All are 25-part divided-light with a central possible 6-part divided awning. Two were south of the primary entrance, an overhead coiling door, and the other was to the north. A possible metal door was on the ground level below the southernmost windows. Another historic photograph (NV-35-7) shows the east elevation from the south. It appears that at least two of the patches on the south mass may have

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been louvered wall vents. On the south end of the primary, a second level opening was smaller, and either a wall vent or window. Beside it was the window with the door below it. Immediately to the north of the window was a second level door, accessed by a set of stairs (facing north). An evaporative cooling unit was just above and to the north of the door. The second window was to the north of the evaporative cooling unit. The third window had an evaporative cooling unit above it, and the window space in the addition was filled with an evaporative cooling unit. The cut metal double doors were present in the addition, although they are not present on a c. 1953 plan drawing of the building (NV-35-E-7).

The north elevation of the addition has four windows symmetrically placed on the first and second levels. These are all divided 6-light (2/2/2). Near the center is a vent pipe from the second floor seated on a metal brace. On the west elevation of the addition are metal stairs leading to a second level metal stoop and entry to the primary mass. This entry has a metal half-glass door with a metal lintel. West of the door is a 25-part divided-light with an exhaust vent in the center where the awning was located. Below this is an evaporative cooling unit on a metal frame. The 1941 construction photograph shows the north elevation originally had four of these large windows. The exterior door apparently replaced the west center window. The east center window possibly became the second level entry into the addition. Neither the c. 1953 plan drawing of the building nor a c. 1951 photograph (Pfaff 1992:49) shows the stairway on the north elevation, suggesting that this may have been added during the period of remodeling and renovation (1957-1965). The c. 1951 photograph does include the north addition.

The west elevation of the addition has a centered evaporative cooling unit. The primary mass has one closed off or painted over window near the south end above a duplicate horizontal pipe. A vent pipe is near the north end level with the top of the door located off-center in the south half. The door is a half-glass metal. Along the north half of the west elevation is a 4-inch extension of the concrete foundation from the wall. At the southeast corner of the primary mass is a concrete pad for a "*CLARACE FAN COMPANY/KALAMAZOO, MICH., U.S.A.*" fan pump and motor with a vertical exhaust stack extending above the building roof. It is attached to the roof at the corner. Historic photographs do not show this, suggesting it was added after 1965. On the c. 1953 building plan a second stairway is present at the southwest corner for a second level entry. The south half of the building has a similar arrangement of metal patches and overhead coil door as on the east elevation. The c. 1951 photograph (Pfaff 1992:49) shows that the north addition had windows in the center on both levels. Cooling towers, described as "spray-type" in a caption, were present on the north and south ends of the primary mass. A possible opening in the exterior appears to be in front of the north tower. Between the towers was an extended awning that apparently was associated with a "mechanized evaporative cooler." A structure extended to the west from the south cooling tower and may have been part of the evaporative cooler.

The south elevation of the building has a window above a cut metal door offset to the west end. The window is a 25-part divided-light with a central 6-part divided awning type with a grilled hood (covering the top row of lights). A symmetrically placed metal patch is offset to the east end, and a horizontal patch is near the center. East of the remaining window is an evaporative cooling unit on a metal shelf with wire cable bracing. An historic photograph (NV-35-7) indicates the present

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metal patch covers an original window opening with a grilled hood and a smaller opening, also hooded, where the smaller patch is located. The lower level of the elevation is not visible in the photograph. The 1965 aerial photograph (NV-35-4) shows only the one window on the west end. Its presence in the 1953 aerial photograph (NV-35-3) indicates that the center and east windows/openings were covered during the remodeling period.

Concrete pads are present on the east and west entries of the south mass, on the east half of the south elevation on the south mass, and up to the east entry on the central mass. The pad at the south end of the building was for a transformer that was removed after 1965. Part of the asphalt drive curves around the north end of the building.

**Description of the interior:** The earliest plan drawing (Pier Detail, Electrolytic Mn Plant Cell Room 1941:X-300-1328) of the building is of the central and south masses. It shows the placement of concrete piers for the basic wall structure, as well for the electrolytic cells near the center of the main room. The c. 1953 floor plan (NV-35-E-7), which is of the first floor (upper level), provides the floor space for both levels. The lower level, or basement, has 3,700 square feet, and the upper or first floor has 4,800 square feet. The rooms on the first floor are the *D. C. Generator Room* in the south mass, *Shop, Laboratory* (southwest corner), and *Office* (northwest corner) on the west side of the primary mass, *Electrolytic Cells* in the center, *Rest Rm* (southeast corner), and second *Laboratory* (northeast corner), with a third *Laboratory* in the north addition. Room dimensions are provided for all but the *Rest Rm.* and central area. A photograph taken in c. 1940 (NV-35-E-6) shows the *Electrolytic Cell Room* complete with brick wall on the south end. There were three electrical banks in the wall tied to the *Generator Room*, and a wood-framed opening near the east end of the wall. The room was open to the rafters with hanging incandescent lights.

On the c. 1953 floor plan, prior to remodeling, the interior stairs down to the first floor were on the west wall north of the laboratory. The only remodeling plan available is of the space on the east side of the first floor (Alumina Bldg., Water, Gas, Air Lines & Sump Drain Details, c. 1961:X-300-1332). The original laboratory was retained, but the entry was changed from the southeast corner to one on the southwest corner leading into the corridor area. The second room, roughly the same size (15 by 15 feet), also had a southwest exit. The last room measured approximately 25 feet long and had a southwest exit. All of the rooms were connected by a door near the west wall. The plans also show where windows were placed along the corridor, or west, wall. The two smaller laboratories each had one, whereas the longer laboratory had two. Placement of laboratory furniture and fixtures were noted, as well. A *Storage RM* with lockers was at the south end with access to the existing *Wash RM.* The room configuration remains unchanged, including the placement of sinks in two of the laboratories. The laboratory space was for Alumina Research.

Renovation work done to Building 500 began in 1957, although no specifics were mentioned. A laboratory was completed in 1958, possibly the one in the addition. Other work accomplished that year included the dismantling and removal of equipment and concrete footings that probably were associated with the electrolytic cell room. Lastly, the second floor renovations were completed. In 1960, the cooling towers were removed and a second laboratory was completed on the second

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floor. An office was converted into a laboratory in 1963, and the transformer yard was renewed in 1964.

A second plan drawing (Bldg. 500, Plan - 1st Floor & Sump Details, Remodeling 1961:X-300-1334) of the basement level of the primary mass shows some of the renovation work done. After the removal of the electrolytic cells, the floor required repouring in the center, covering a total area of 2,116 square feet. The stairs may have been moved at this time, although the drawing shows them in the same spot. The new pouring apparently was to bring the level of the center floor area even to the exterior portions of the original floor, while maintaining a slope to the sump in the northwest corner, and a drain in the southeast corner. It was noted that footings were to be "FORMED & POURED TO RECEIVE EXISTING COLUMNS & POSTS....," which were both wood and steel, then the floor was to be poured. The concrete pad on the north end of the basement was to be removed to a depth of 3½ inches below the finished floor elevation. The existing drain that led to the sump was to be tiled in. A sectional view of the sump area shows that the floor level was raised, with a portion of the sump area filled-in with sand and course stone.

The south mass has poured concrete flooring and steel-framed walls with wood furring and particle board sheathing, which also was used on the ceiling. The roof has wood framing. The north wall is a combination of concrete on the lower portion (approximately 10 feet above floor surface) and brick (American bond) on the upper (to the roof). Although no longer present, there is an outline of a stairway along the wall, with a platform just below three door-sized recessed areas, a second set of steps, and a platform in front of a recessed, wood-framed, wood paneled (five) door. The recessed areas are 4 to 6 inches deep, bricked-in (stretcher bond) with electrical conduits and metal supports. Below is more brick patching. These are the *Generator Room* side of the electrical boards for the electrolytic cells. An entry into the basement area of the primary mass is in the northwest corner of the room. Based on the c. 1953 drawing and the outline of the stairway/platform, this opening probably was cut during the remodeling period after the generator was removed. Hanging incandescent lights illuminate the room.

The primary mass has three defined rooms. The first, entered from the old *Generator Room*, is a laboratory that occupies most of the west wall. The floor is about 8 inches below the old *Generator Room* floor, and approximately 18 inches below the exterior entrance. There is a sink on the north wall with a slightly sunken work space, all made from wood and not similar to the usual laboratory furniture used elsewhere (black epoxy surface, grey cabinets and drawers). One metal beam lies against the west wall, and wood and steel beams provide ceiling support. The south wall is concrete. The east wall is wood studs covered with wallboard; however, it is not flush with the south wall. A wood door frame leads into the main area.

The main room has steel (central area of room) and 8x8 wood (north and south walls) support posts, and wood and steel beams. A plywood walled restroom is located in the southeast corner. It sits on a concrete pad approximately 10 inches above the floor surface. A hollow core door is in the north wall. The interior has plywood walls. The room contains a toilet, sink, and shower. The cut metal exterior door opens out from the restroom. The interior east wall has insulation fragments between wood studs with partial plywood cladding. The stairway (metal) to the first

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floor is located in the center of the north half of the room. A trench is near the north wall, leading into the sump area in the northwest corner of the room. The floor level in this area is varied, due to the slope to the sump area. The north interior wall is corrugated metal. The entry into the addition is metal-framed. The floor is sunken about 6 inches below the opening. Inside, the wood framing is present on the east and west walls with wood shelving along the north wall. On the west wall there is evidence of a window in the center that has been covered with plywood. A detached metal sink is in the northeast corner of the room. The metal doors on the east elevation are wood framed with wood bracing. The ceiling is wood beam and plank. Lighting in the laboratory and main room was hanging incandescent. A heating and cooling or pump system is on the north wall near the west corner. It may be associated with the sump pump.

The first floor has an open central area, probably where the electrolytic cells were once located. A metal railing surrounds this area. On the west side are two rooms, and the east has four, with one room in the addition. The floor is plywood covered wood planks (2x12). The first room, at the top of the stairs, has wood clapboard exterior walls, plywood interior walls, and tiled floor. There are two fixed single-light windows in the east and south walls. The 25-part divided-light window is in the north wall. The ceiling is tiled and has a vent system. The door in the northeast corner is a third-glass (single-light over two inset panels) wood in a wood frame. Letters on the window indicate that this was the *Geology Field* office. The room height is about 8 feet with open space to the roof.

The second room on the west side has an unfinished tiled floor and wood studs with no wallboard. The wood-framed wood door (southeast corner) is third-glass with a filter type panel at the bottom. A cabinet/work surface with two sinks on the south wall indicate that this was a laboratory. The remaining floor space on the west side is open with a plywood platform at the south end in front of the brick wall where the electrical banks were located.

In the southeast corner is the *Rest Rm*. It contains a sink, urinal, toilet, and mirror. It has a linoleum covered floor, wallboard clad walls and ceiling, and a wood-framed wood door.

The next room on the east side is the largest of the laboratories, built in 1961. It has a sheet-tile covered floor, a wood-framed plywood ceiling, wall studs, a doorway with no door in the southwest corner, and a horizontal, fixed divided-light centered on the west wall. An opening to the roof over the *Rest Rm* ceiling is visible in the southeast corner. Laboratory furniture is limited to a cabinet with sinks on the south wall and a work space/cabinet near the northeast corner. Gas fixtures are on the west wall. The room has an air vent. A wood-framed doorway with no door is in the northwest corner and opens into the next room.

As is the previous room, the floor is covered with sheet-tile, has a plywood ceiling, two air vents, wall studs, and a horizontal, fixed divided-light on the west wall. Laboratory furniture consists of a cabinet/work space area on the north and east walls, complete with gas fixtures and a double sink. There are two wood-framed doorways into the room. The one in the southwest corner is lacking a door, but the one in the northwest corner is a wood with third-glass.

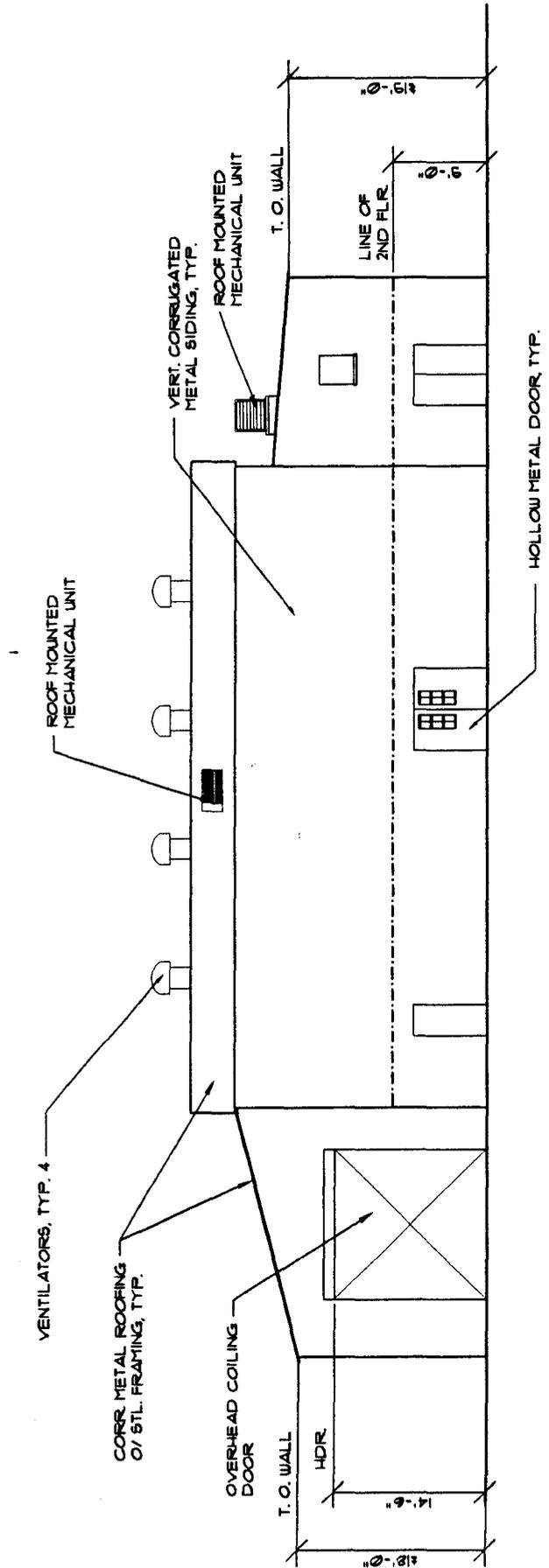
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The last room in the primary mass, located in the northeast corner, was a fourth laboratory, but is lacking any of the major furnishings associated with these rooms. In other ways, the room is the same as the two previous laboratories. All have wood studs, but the interior wall cladding has been removed. Exterior wall cladding on the west side is corrugated aluminum. The rooms have an approximate 12-foot ceiling above which the area is open to the gabled roof. The exterior door into the fourth laboratory is exactly like the one connecting it to the third laboratory. All of the laboratories, including the one on the east side and in the addition, have fluorescent baffle lighting.

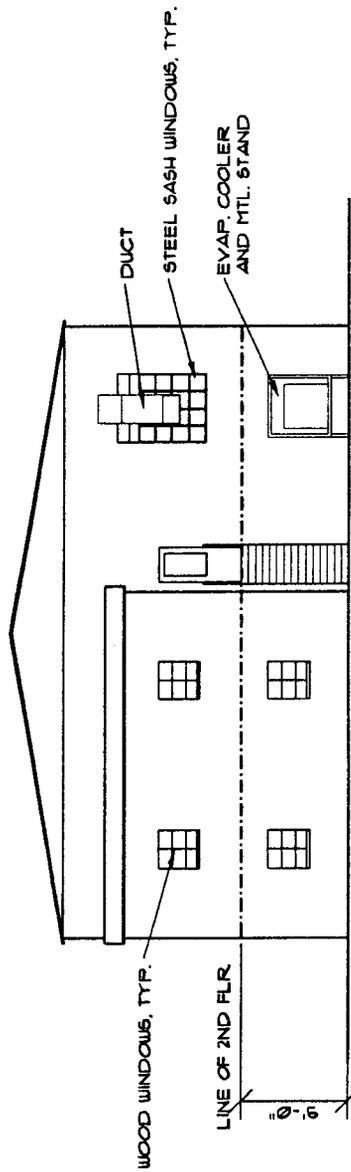
The laboratory in the addition is entered through a wood-framed door on the north wall and is similar to the others. The floor is tiled, but unlike the other rooms contains all of the original and/or upgraded laboratory furnishings. These include a sink, shelf, work space with gas fixtures in the central area; work space with a sink, drawers and shelves on the west and east walls; and a fume hood and work space area on the north wall between the two windows. An exhaust vent hole is in the wall inside the hood. The south wall is clad with corrugated metal, but the other walls have been clad with plywood, as well as the ceiling, which also has wood beams. There is a wood beam along the top of the south wall, too. In the center of the south wall is a possible vent system. The area shows indications of scorching or rusting where a machine or other device was once located. An open area on the south wall in the east corner has been partially filled with corrugated sheet metal. This room exhibits the most evidence of the disturbance by the pigeons, probably because it is well-lit by natural light.

**Additional Documentation:**

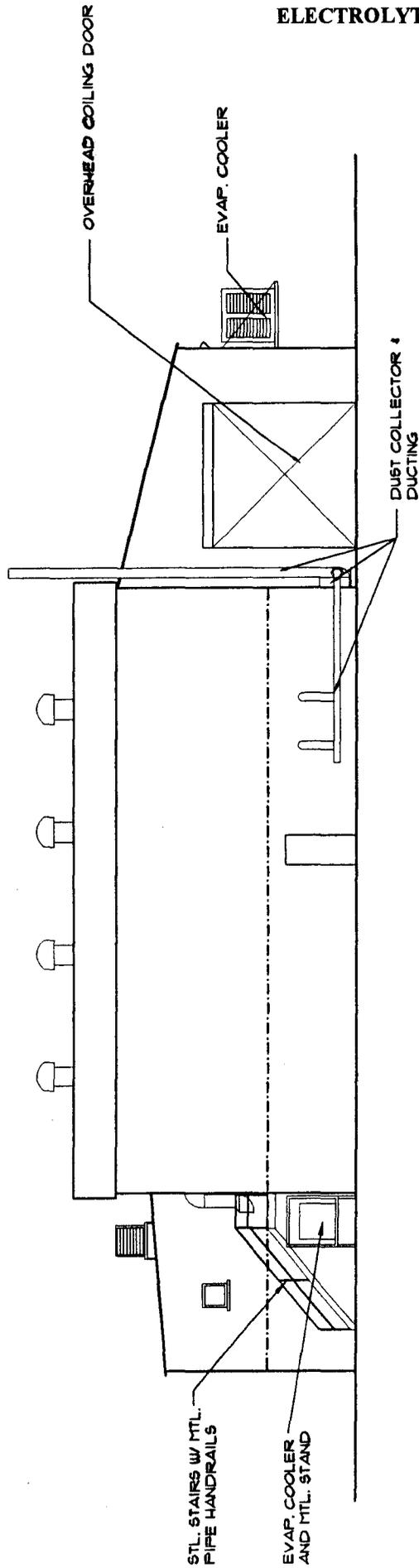
Building Elevations and Floor Plans (Attachment 1: 7 pages)



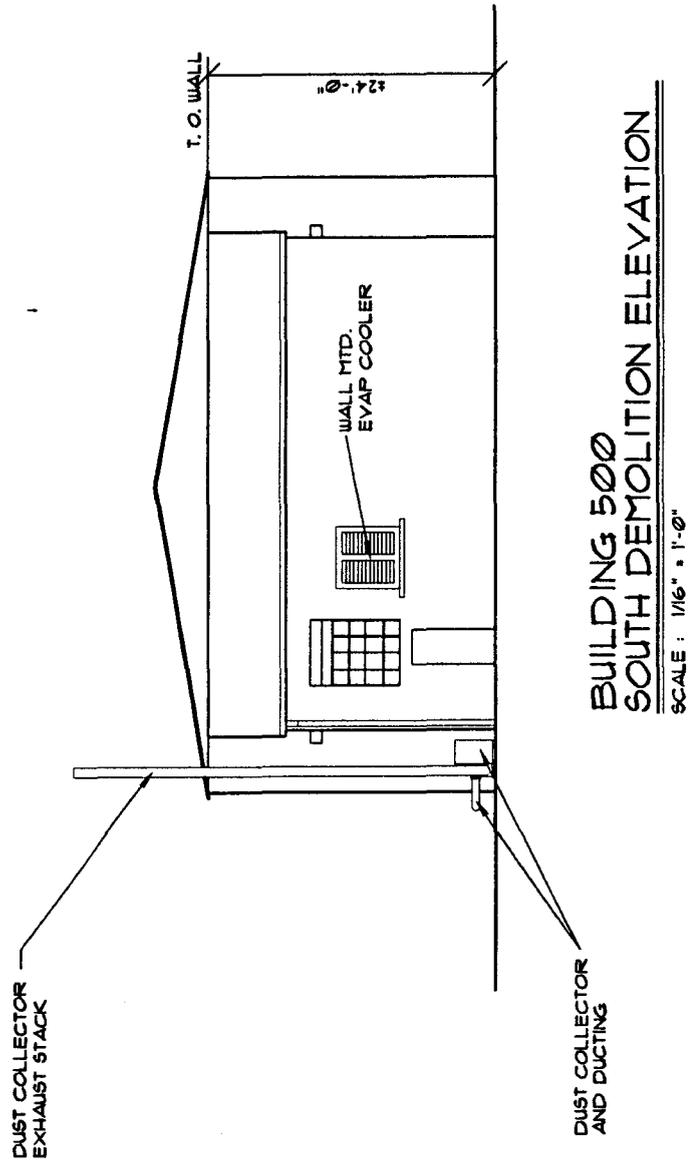
**BUILDING 500**  
**EAST DEMOLITION ELEVATION**  
SCALE: 1/16" = 1'-0"

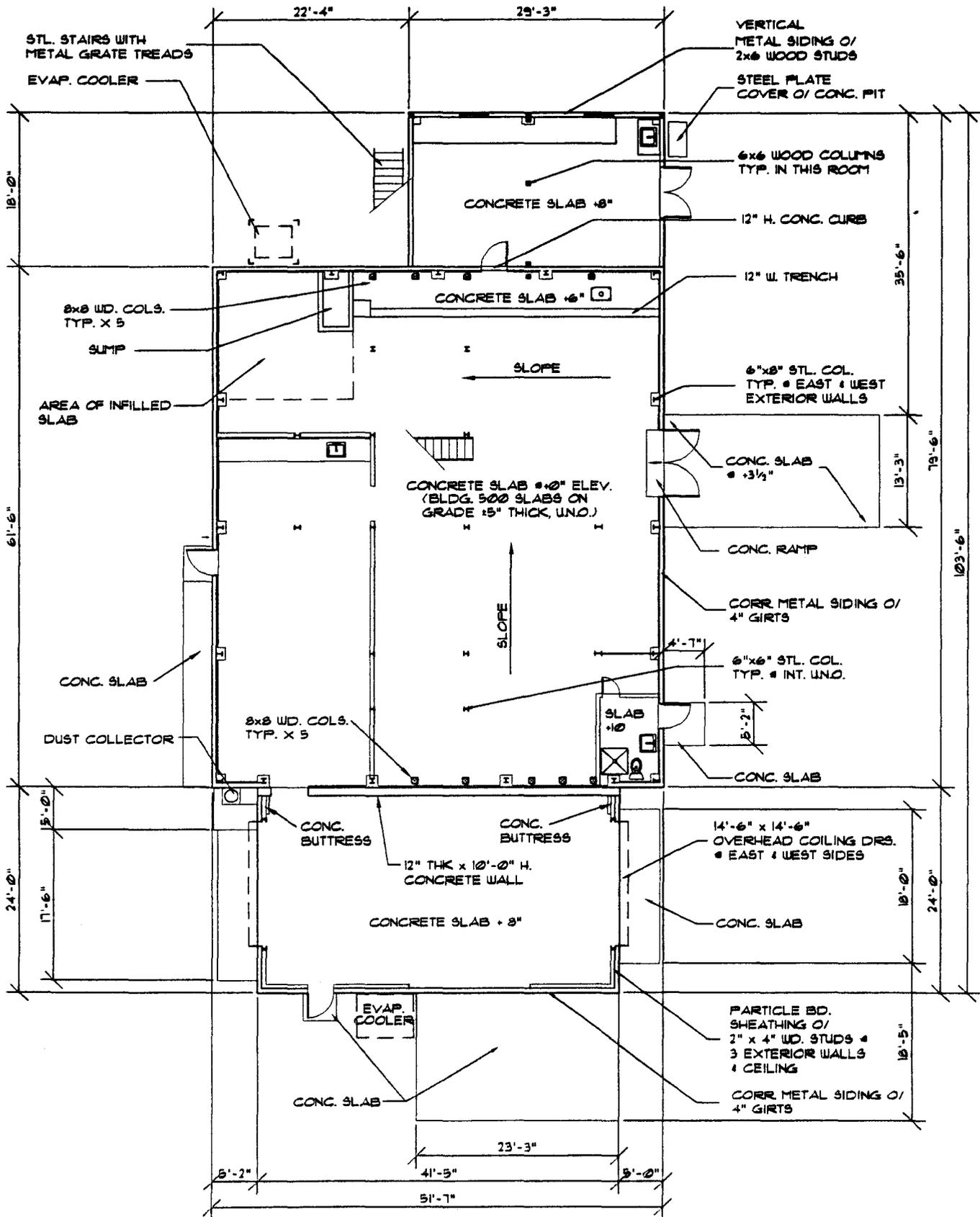


**BUILDING 500**  
**NORTH DEMOLITION ELEVATION**  
SCALE : 1/16" = 1'-0"



**BUILDING 500**  
**WEST DEMOLITION ELEVATION**  
SCALE: 1/16" = 1'-0"

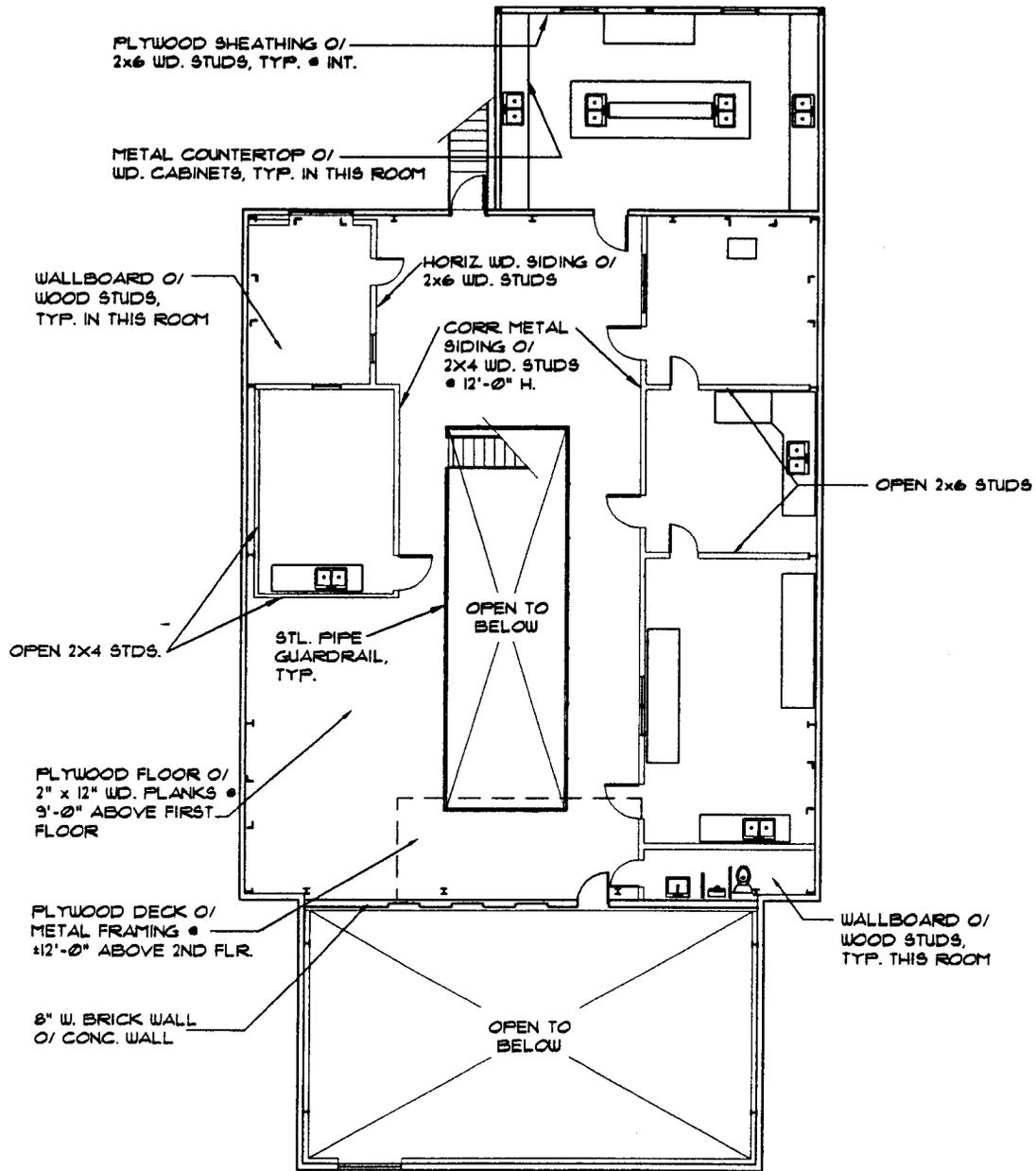




**BUILDING 500  
 FIRST FLOOR DEMOLITION PLAN**

SCALE: 1/16" = 1'-0"

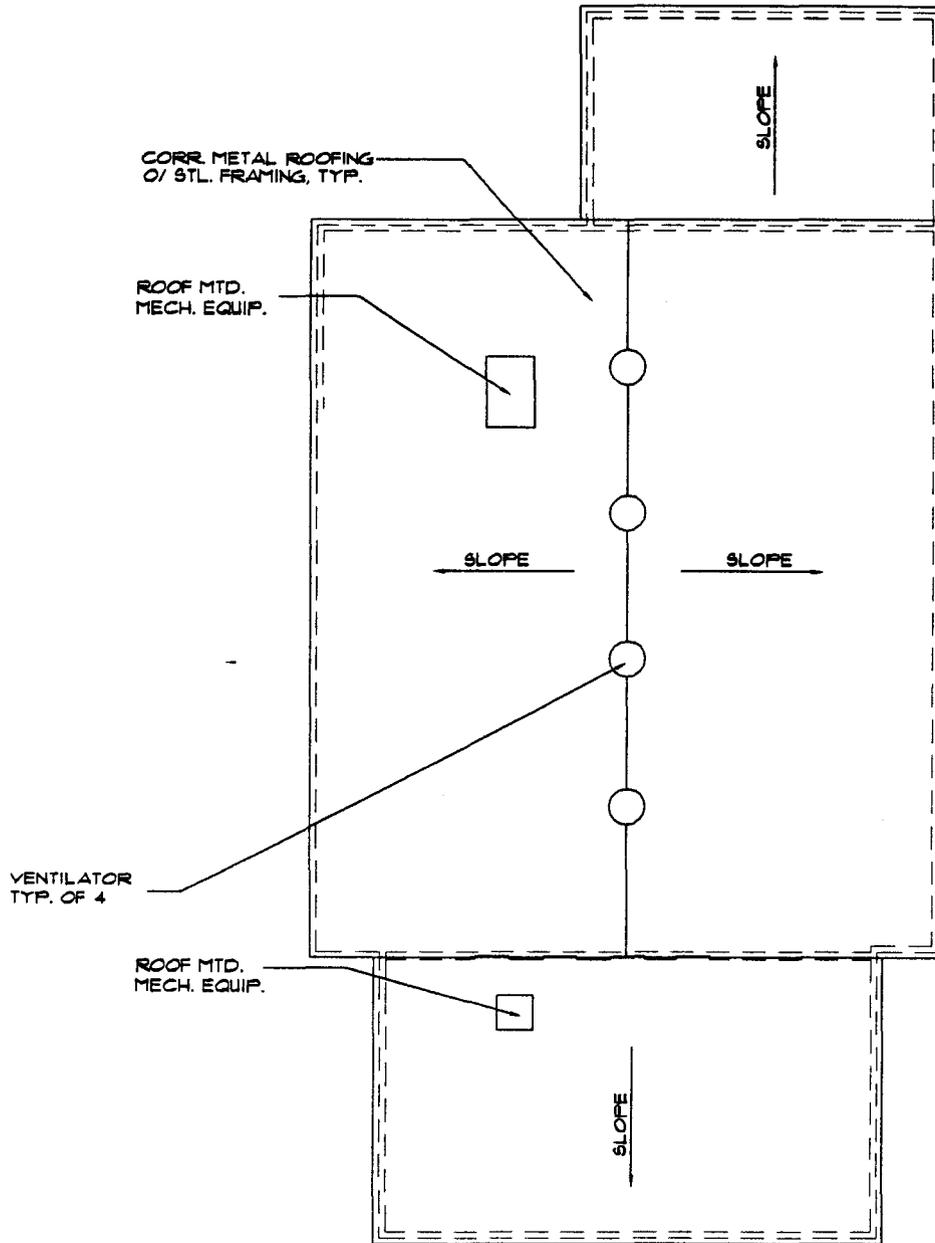




**BUILDING 500  
 SECOND FLOOR DEMOLITION PLAN**

SCALE : 1/16"=1'-0"

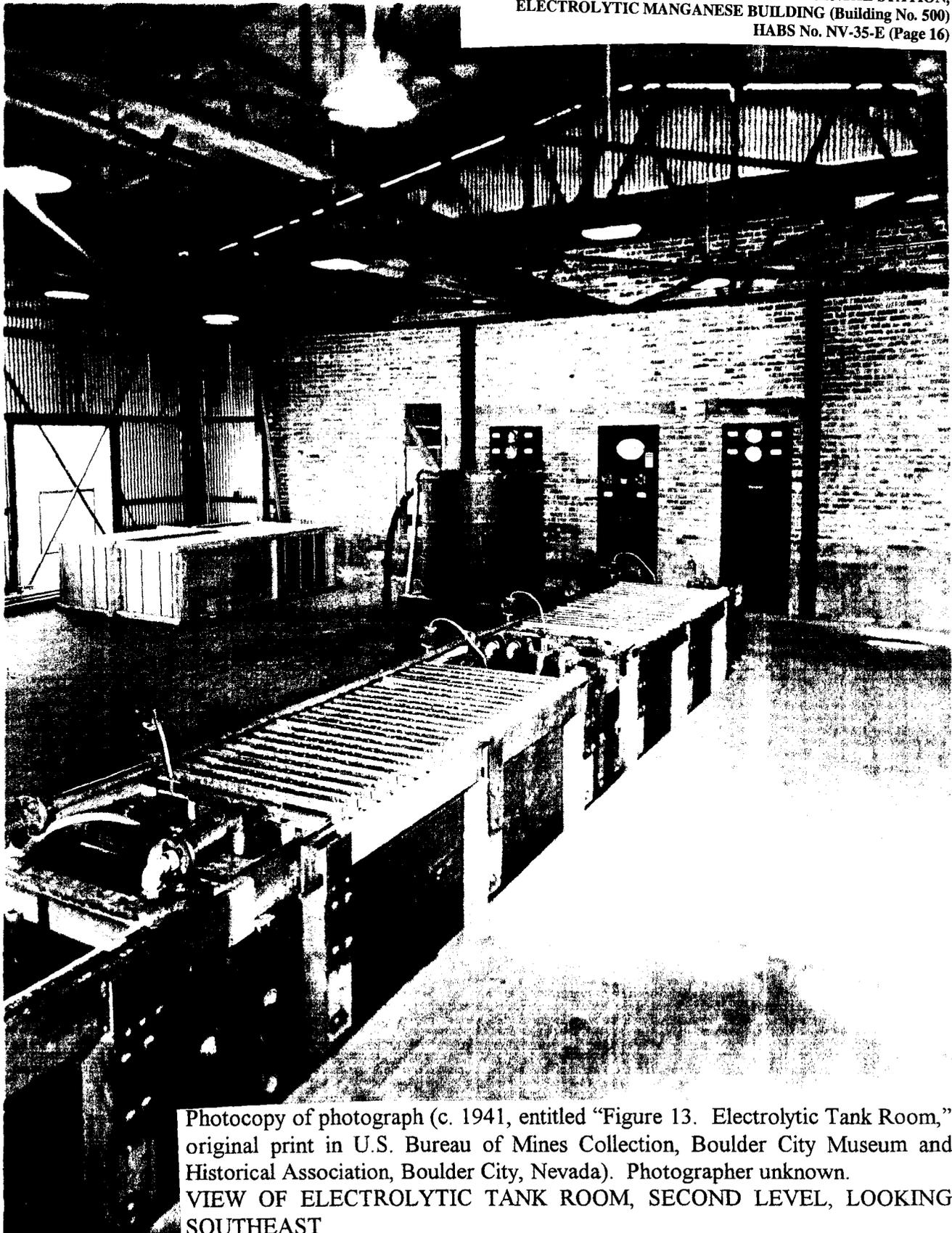




**BUILDING 500**  
**ROOF DEMOLITION PLAN**

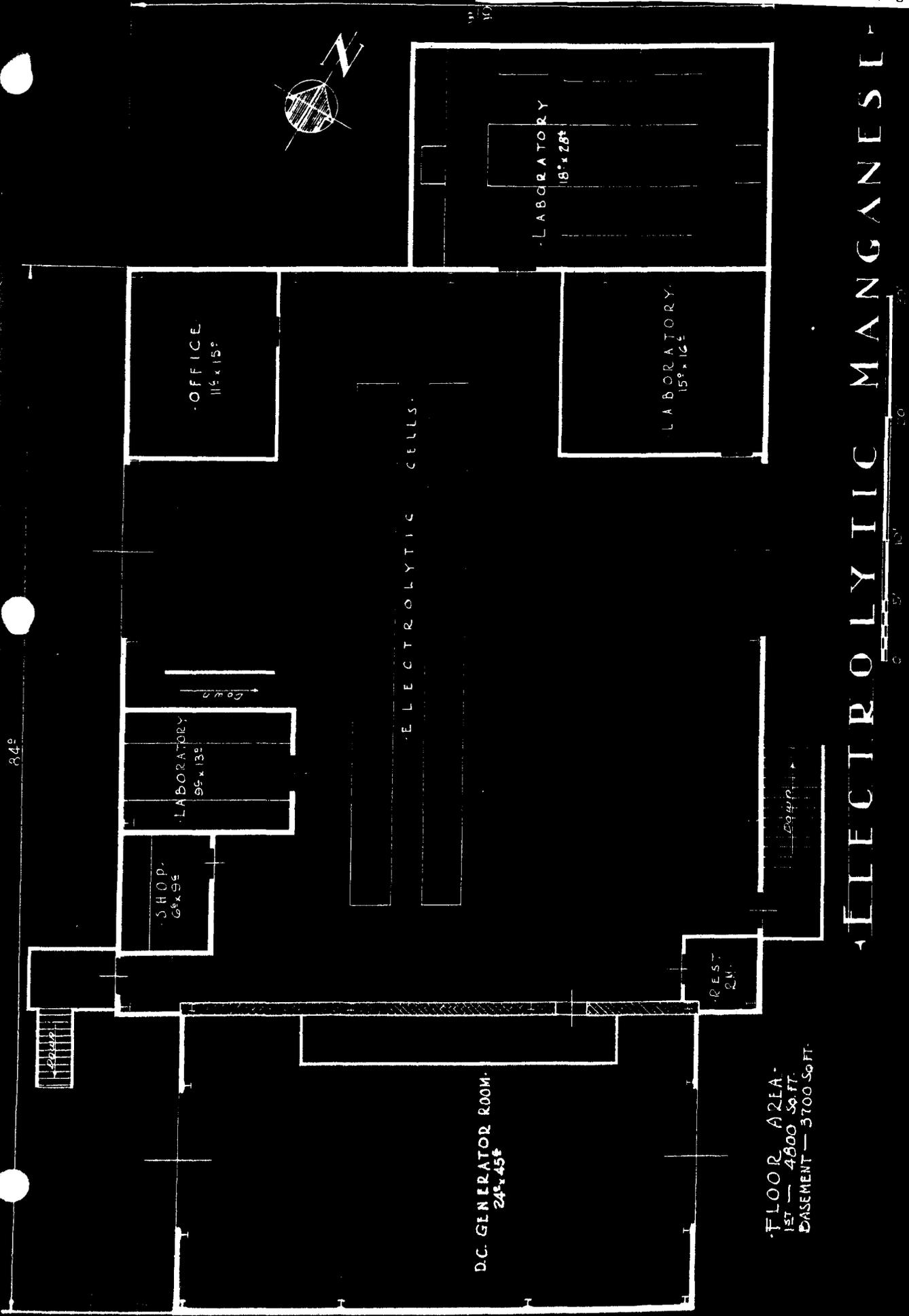
SCALE : 1/16" = 1'-0"





Photocopy of photograph (c. 1941, entitled "Figure 13. Electrolytic Tank Room," original print in U.S. Bureau of Mines Collection, Boulder City Museum and Historical Association, Boulder City, Nevada). Photographer unknown.  
VIEW OF ELECTROLYTIC TANK ROOM, SECOND LEVEL, LOOKING SOUTHEAST

Figure 13. Electrolytic tank room.



# ELECTROLYTIC MANGANESE

FLOOR AREA -  
1ST - 4800 SQ. FT.  
BASEMENT - 3700 SQ. FT.

Photocopy of plan drawing (c. 1953, photocopy in U.S. Bureau of Mines Lab Collection, MS-18, Department of Special Collections, Leid Library, University of Nevada, Las Vegas). ELECTROLYTIC MANGANESE