LA-UR-08-05177

Historic Preservation Assessment and Recommendation Report for the Gun Site Restoration Project

Ecology and Air Quality Group, Los Alamos National Laboratory
August 2008

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August 7, 2008

Historic Building Report No. 281

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Section 1 – Intent & Overview

It is not within the scope of this report to provide an in-depth discussion of the specific use or historic context of the Gun Site Facility; the primary intention is to provide a structural assessment and recommendations for phased restoration. Identification of contributing and non-contributing components in relation to the period of significance (1943 to 1946) is also discussed. The site and buildings remain significantly intact, with a high level of integrity. The site is currently dominated by the two concrete retaining walls, which also serve as the façade of the three underground buildings. All three properties are covered by approximately six feet of soil. Originally, this low-lying, monolithic structure would have been dramatically contrasted by a 45-foot-tall vertical periscope tower that allowed remote observation of gun tests during the period of significance.

The Gun Site at Technical Area (TA) 8 was used during the Manhattan Project to design and test components of the uranium gun device, the weapon design known as "Little Boy," which was exploded over Hiroshima. The buildings at TA-8 included standard proving ground facilities that were designed with a central control area for explosives operations. Three concrete "bombproof" buildings were built into a ravine and were designed to be partially underground. Placing the buildings lower in the ravine allowed for gun emplacements to be positioned above the roof level of the control building (Figure 1).

Figure 1. Gun Site (December 1946; note ravine, center, and covered gun emplacements with targets, at right)

This unique proving ground layout shown in Figure 2 lessened the hazards associated with firing the high-alloy tubes in free recoil. The Anchor Ranch Proving Ground at TA-8 was completed and in active use by mid-September 1943.

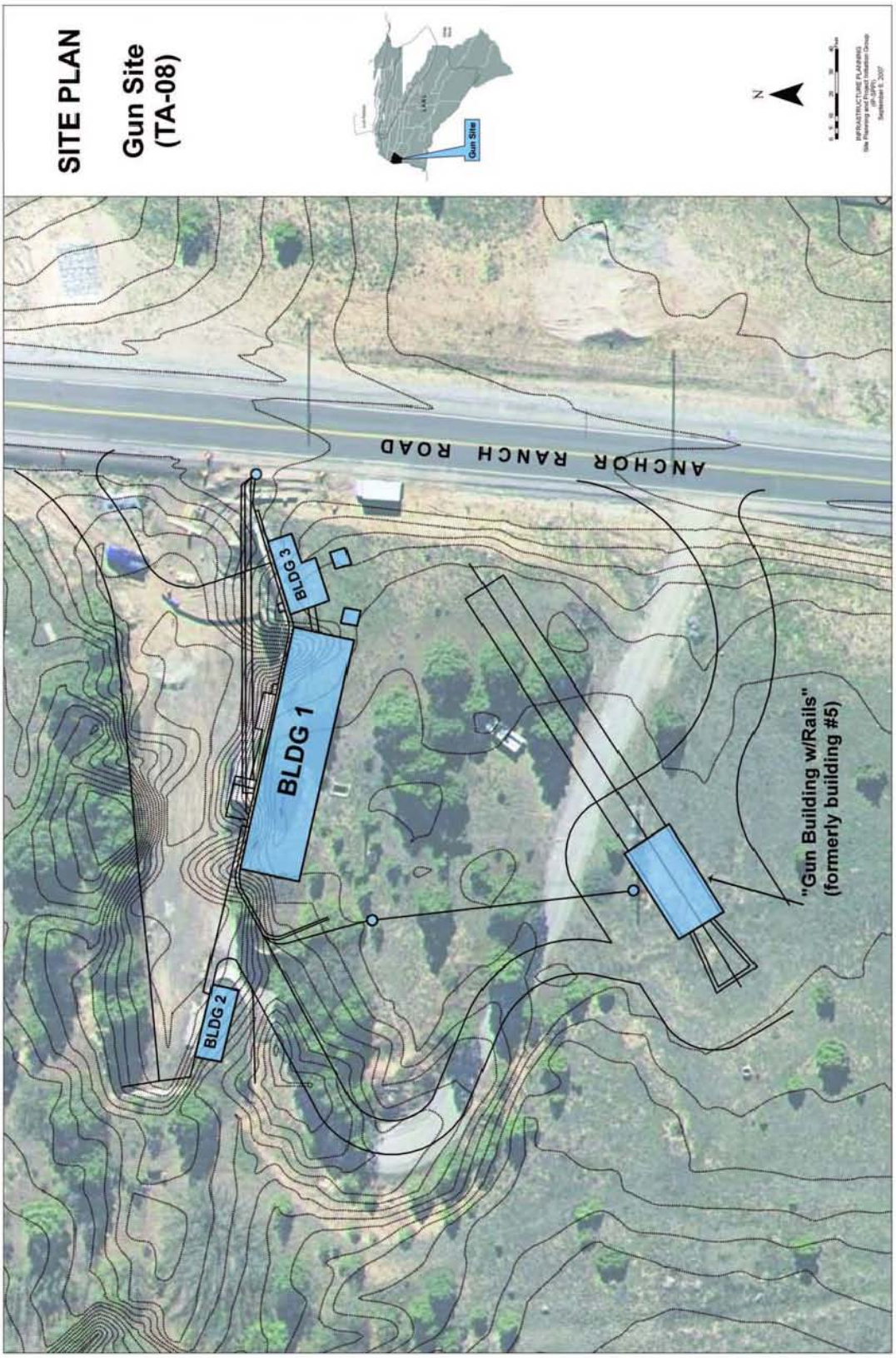


Figure 2. Site Plan of Gun Site (TA-8)

Section 2 – Structural Assessment

The site currently contains three properties. Building 1, the largest, is located in the center. This building served as the primary facility, containing the tower periscope, darkroom, loading docks, ventilation systems, and work areas. Building 2, the "process building" is located on the west end of the site and, based on the existence of explosion-proof fixtures and four-inch water supply to the "deluge" fire suppression system, appears to have been used for handling volatile materials. Building 3 is located on the east end and contained the diesel fuel storage and the diesel-powered electrical generators for operations (Figure 3 and Figure 4).

Figure 3. Aerial view of Gun Site (1991)

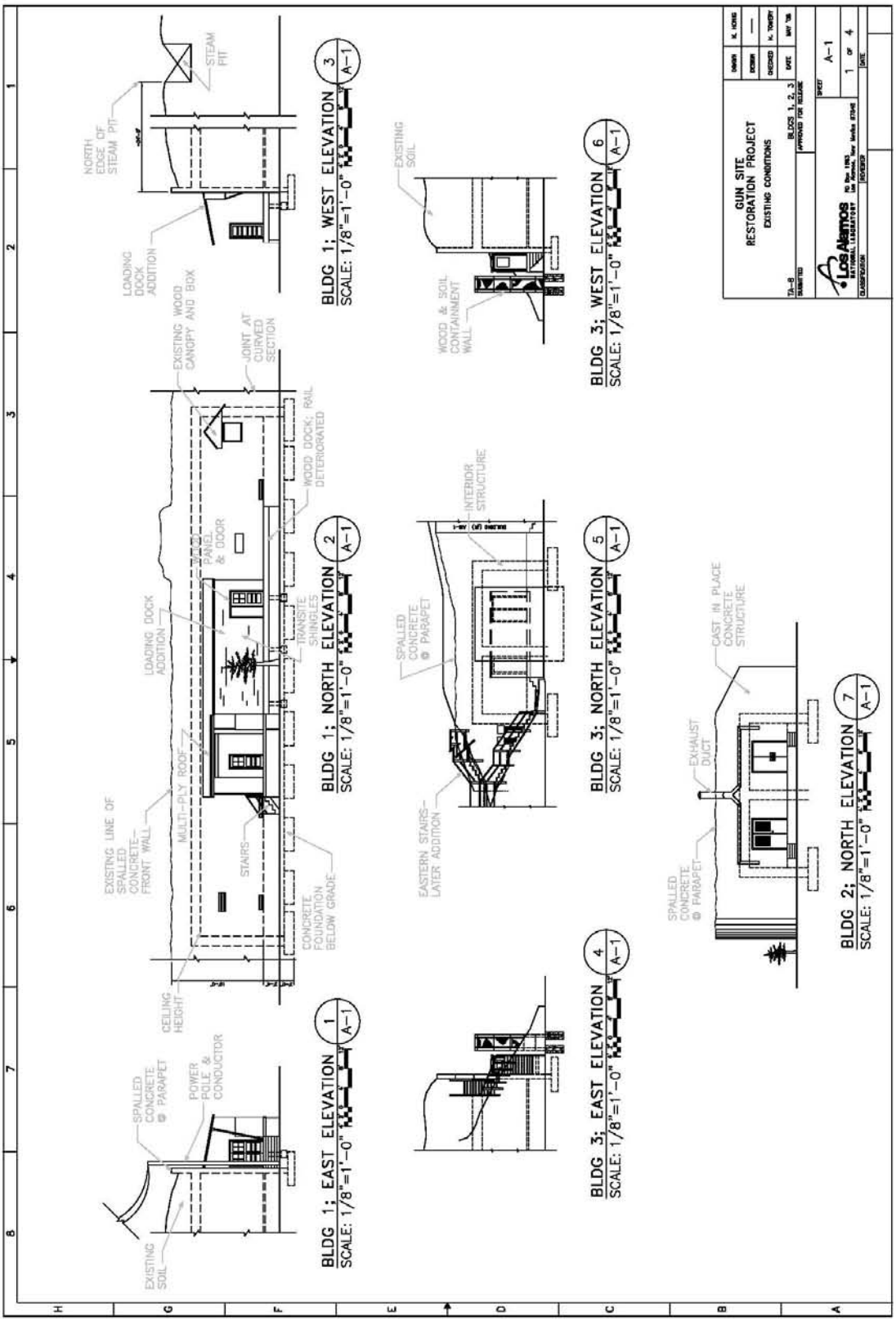


Figure 4. Gun Site (existing conditions)

Building 1

Interior – Building 1

At approximately 3,200 square feet, Building 1 covers the largest area and is currently configured into eight rooms (ENG-R2610 August 25, 1983) (Figure 5a–d). It extends approximately 28 feet back from the concrete façade. All interior finishes are painted cast concrete unless otherwise noted. All electrical and mechanical systems are surface mounted. Original architectural documents (ENG-C 12307 May 30, 1943) indicate that the building contained five rooms, numbered east to west, and the tower structure, which was referred to as Room 6.[1] Descriptions of original rooms 1-5 are as follows.

- Room 1 contained extensive air-handling equipment and does not appear to have been altered significantly since its original construction.
- Room 2 is the largest room and appears to have been a general work area. This room is accessed through the loading dock and a large overhead door that is serviced by a ceiling-mounted rail. This door is one of only two exterior doors on Building 1. The overhead door is noted on original drawings as "2-inch plank door--no glazing" (ENG-C 12307 May 30, 1943). It appears that the existing door is original. A framed partition wall that was consistently specified with a soundproof wall and door separates Rooms 2 and 3. It is not known whether this was intended for site safety, site security, or both.
  - A smaller room, referred to as the "X-Ray Room," was constructed within Room 2 some time before September 8, 1959, when it first appears on plans to modify the electrical system (ENG-C 21128 September 8, 1959).[2] The X-Ray Room currently exists.
- Room 3, the Camera Room, sits centered to the south of the original tower location. For the most part, all original equipment that resided in Room 3 has been removed. The remaining indication of its significance is the small slot window that separates Room 3 and the tower. A smaller room referred to as the "Office" was constructed within Room 3 some time between October 1943 and October 7, 1948, when it first appears on plans to modify the exhaust system (ENG4-C 493 October 7, 1948).
- Room 4 contains the second of the two egresses from Building 1 and was originally labeled "Darkroom." Original architectural documents (ENG-C 12317 October 1943 and ENG-C 12318 October 1943) detail the ventilation system for this room and indicate darkroom fixtures, including a lead-lined tub. Room 4's light-tight environment was maintained through simple systems, typical of the wartime Laboratory's ingenious problem-solving capabilities.
- Room 5 contains the last of Building 1's interior features: the restroom, shower facilities, and lockers.

[1] All referenced drawings are included in the appendix.

[2] It appears the "X-Ray Room" in Room 2 and the "Office" in Room 3 were created at the same time. As this subdivision into smaller units indicates the original uses of Rooms 2 and 3 were modified, these two room subdivisions (i.e., X-Ray Room and Office) should be considered non-historic.

Figure 5a. Interior TA-8-1, current Room 5 looking west towards current Room 3

Figure 5b. Interior TA-8-1, current Room 5 looking southwest into current Room 6

Figure 5c. Interior TA-8-1, current Room 3 looking east through windows into current Room 4 (a portion of original Room 3)

Figure 5d. Exterior of TA-8-1, center right, and TA-8-3, left

Exterior – Building 1

There are 11 openings in the primary face of Building 1 that are considered significant:

- one large air intake located in Room 1
- one exhaust pipe located in Room 1
- five ventilation louvers along the lower portion of the primary north wall
- one exhaust outlet in Room 5
- one overhead door in Room 2
- one pedestrian door in Room 3
- the slot window in Room 3 providing a view of the tower

These openings are detailed in original drawings ENG-C 12317 October 1943 and ENG-C 12309 June 30, 1943. All of the original openings appear intact with the exception of the exhaust outlet in Room 5, which was reworked during scopes of work detailed in 1948 (ENG4-C 493 October 7, 1948).

Original drawings show that in addition to the tower, the primary face of Building 1 contained a concrete loading dock in front of the overhead door and a wood plank walkway that led from this loading dock to the tower. Site inspections indicate that the concrete foundations and loading dock still exist, although much of the wooden construction has been removed or significantly altered since original construction.

Exterior Alterations – Building 1

Drawing ENG4-C 494 October 14, 1948 shows what appears to be the first generation of alterations to the primary façade since 1943. At this point the existing wooden canopy over the loading dock was added, as well as the existing room that extends from the loading dock to just shy of the tower. The enclosed addition contained long narrow "storage bins." Both of these additions currently exist.

The next alteration was the addition of a mounted platform to hold an exhaust fan for new work being done. This platform, along with its roof structure, currently exists. Drawings indicate that this exhaust fan was intended to exhaust the "Office" in Room 3 (ENG4-C 493 October 7, 1948), which would indicate that the originally intended purpose of the facility had changed by this time.

Based on original drawings, the next generation of construction appears to be the construction of pedestrian steps from the interior floor elevation to ground level, connecting the tower and storage bin addition (ENG4-C 576 June 19, 1949).

Building 2

Interior – Building 2

Building 2 is comprised of two side-by-side, non-adjoining symmetrical rooms of approximately 126 square feet each (ENG-R2611) (Figure 6a–b). Like Building 1, the building is completely covered with soil. It is constructed of cast concrete, with the exception of the room walls that adjoin the loading dock on the north side of the building. These infill walls were frame construction. These were originally specified as "triple sealed gypsum," which matches the construction of the V-Site. These walls have been removed and are currently replaced with CMU block. Very little hardware remains on the interior. The deluge sprinkler system and non-sparking floor covering provide some indication of the building's use.

Original architectural drawings do not call out room numbers, but LANL as-built drawings created August 24, 1983, label the west room as Room 1 and east room as Room 2.

- Room 1 and Room 2 both contain deluge sprinkler hydrants as well as a few vents and indications of previously installed electrical equipment. Lighting fixtures are also intact in both rooms.

Figure 6a. Interior TA-8-2

Figure 6b. Exterior TA-8-2

Exterior – Building 2

Original architectural drawings (ENG-C 12321 October 1943 and ENG-C 12322 October 1943) indicate that the basic configuration and opening layouts remain intact. The remaining surface-mounted electrical equipment and loading dock appear to be the original historic fabric.

Exterior Alterations – Building 2

The drawings specify that the double doors on each room were originally built-up diagonal plank (similar to original doors found at V-Site buildings TA-16-516 and TA-16-517). The current doors in Building 2 are steel slab. Another significant alteration appears to be the framed walls. These were originally specified as "triple sealed gypsum," as match the construction at V-Site. These walls have been removed and are currently replaced with CMU block. Two shed additions were constructed on the east, rounded face of the building sometime between 1947 and 1949. In 1949, an addition enclosed the concrete pad that separated the two small equipment and storage sheds. These sheds were removed at some unknown date.

Building 3

Building 3, referred to as the "Engine Room" (ENG-C 12324 October 1943), appears to be primarily an electrical and mechanical support structure for Buildings 1 and 2 (Figure 7a–c). As with all the Gun Site buildings, it is underground with a single north face exposed. It originally

contained two main rooms with a small restroom. The only room numbers are noted on LANL as-built drawings dated August 25, 1983, naming the east room as 101 and the west room as 102 (ENG-R2612).

Interior – Building 3

The interior of Building 3 is not accessible because of health safety concerns, so condition and as-built status have not been assessed.

- Original architectural drawings (ENG-C 15005 June 1943 and ENG-C 12324 October 1943) indicate that Room 102 originally held two extremely large diesel generators. This room is accessed by double doors in the center of the north wall of the room. Original drawings indicate that these doors were specified as diagonal built-up plank doors, similar to ones specified on Building 2 and those found at the V-Site. Rooms 101 and 102 communicated by way of a single door in a simple two-by-four frame wall with ½-inch sheetrock on both sides.
- Room 101 appears to have originally been two rooms, with a small water closet and sink on the east side and a ventilation system that supplied combustible air to the generators on the west side.

Figure 7a. Interior TA-8-3, enclosed dock

Figure 7b. Interior TA-8-3

Figure 7c. Exterior TA-8-3

Interior Alterations – Building 3

Architectural drawings created in 1948 indicate that the frame wall separating Rooms 101 and 102 was removed and a two-foot-thick "adobe brick & sand" wall was built (ENG4-C 499 December 20, 1948). This wall was then sandwiched by one-inch-thick steel plate and held together by one-inch steel thru-bolts. The wall contained several sleeves, one of which is referred to as a "periscope." This work was evidently completed, as later as-built drawings confirm. The building's two rooms are denoted as "control room" and "press room" in 1948, and a hydraulic press is indicated on additional drawings. Apparently, the generators had been removed by this time.

Further alterations appear in 1957 when the building was used as a "Plastic Scintillator Facility" (ENG-C 19303 September 27, 1957). Two years later the facility was again altered by the installation of a "plasmatron power supply" (ENG-C 19035 October 19, 1959).

Exterior Alterations – Building 3

The dominant architectural aspects on the exterior of Building 3 were

- two wood plank doors
- two large mufflers from the generators
- the combustible-air vent
- four large louvered vents
- wooden loading dock with concrete foundation that contained access steps leading down on the west end

This elevation has been significantly altered. In 1949, a large barricade was built, directly centered on the doors to Room 102, along with a set of long wooden steps that lead up to the east (ENG-C 1058 October 19, 1949). The mufflers were most likely removed during the 1957 alteration (ENG-C 19303, September 27, 1957).

Further alterations to the exterior occurred in 1966 with the addition of a "dock enclosure" that currently exists (ENG-C 34041 April 6, 1966). These additions are considered non-contributing and are recommended for removal.

Section 3 – Scope of Work for Phased Restoration

The recommended phasing will address each phase individually and will discuss current pathologies in descending order of importance.

Phase I – Accessibility

From a health and safety perspective, accessibility—that is, the ability to move safely in and around the facility—must be addressed as a priority. Safe access is necessary for ongoing assessments and project cost estimating, as well as any abatement that is required. In addition to primary accessibility concerns for each building detailed below, general activities to be completed during Phase I include removing all asbestos materials and loose wood from the site. When Phase I work results in accessibility issues, such as the removal of the loading dock steps to Building 1, temporary replacements shall be constructed until permanent reconstruction from original specifications takes place (Phase III). To facilitate access to the demolition areas, all vegetation close to the project site shall be removed, including two trees located next to Building 1 and Building 2 (Figure 8).

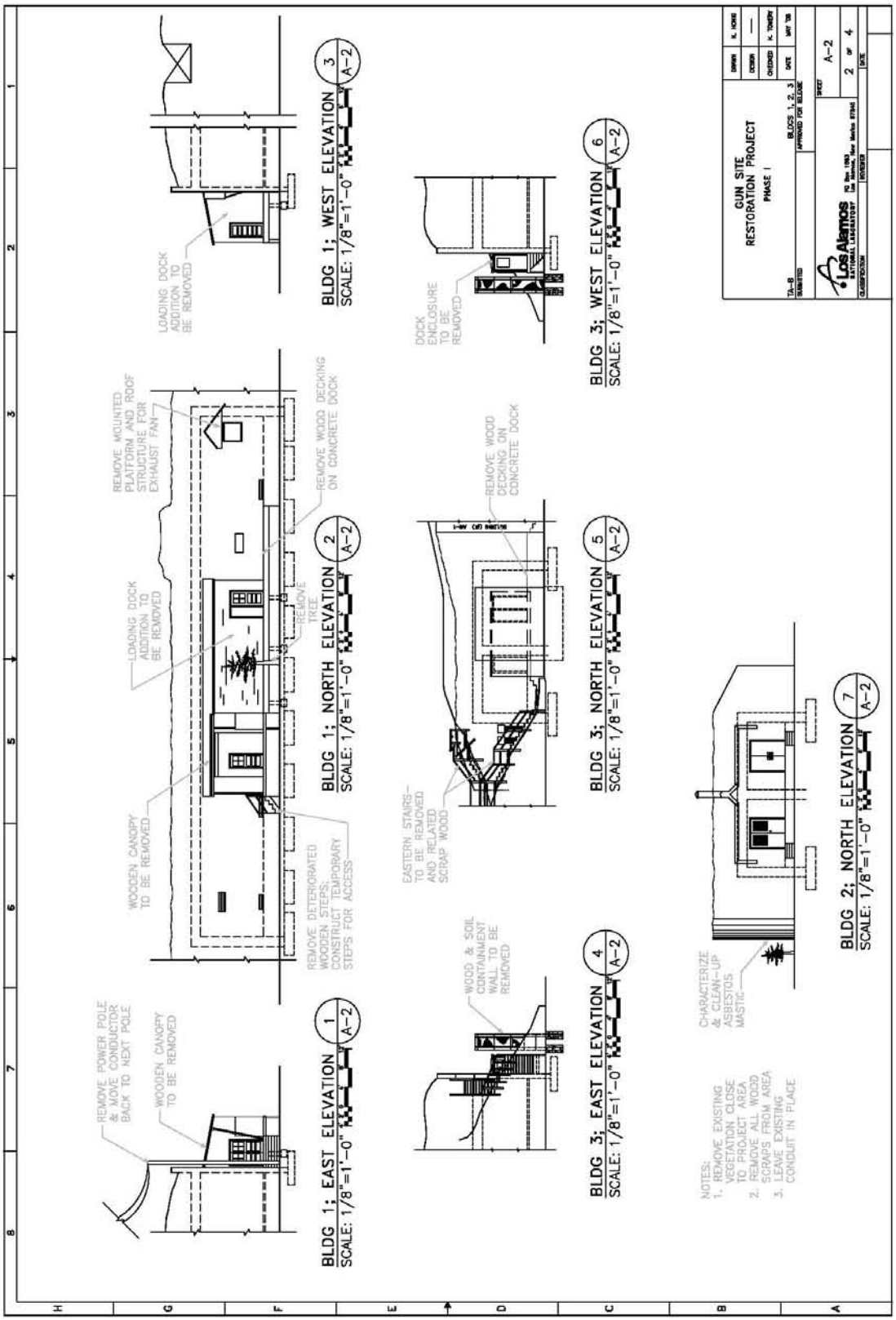


Figure 8. Phase I of restoration project

Building 1 – Phase I

Loading Dock Steps: The wood frame loading dock steps are rotten and deteriorated. These steps should be documented then removed. Temporary steps should be constructed until a permanent replacement can be built following the completion of concrete work in Phase II.

Loading Dock Addition: The 1948 addition to the exterior face of the loading dock (canopy and dock addition) is not structurally stable and is non-contributing to the historic status of the facility (ENG4-C 494 October 14, 1948) (Figure 9). This addition should be removed. However, because removal of these elements will result in increased exterior exposure of the original historic doors and woodwork now protected by the addition, measures should be taken to protect the original wooden elements until restoration efforts are made. If safety concerns are met, all concrete foundations should remain to document historic foundation sections. Any non-contributing concrete work associated with the loading dock addition should be removed.

Figure 9. TA-8-1 (entrance steps and wooden canopy to be replaced at left; deteriorated dock addition, storage bins, and tree to be removed at right)

Power Pole: Remove power pole and move conductor back to next pole.

Abatement: The interior and exterior materials should be characterized for hazardous materials and the risk from exposure to these materials should be abated.

Building 2 – Phase I

Additions: Although the existing wall and doors on the primary façade are non-historic, these should remain until full restoration is implemented in Phase III. Otherwise, the interior of the building would be exposed and subject to deterioration.

Abatement: The interior and exterior materials should be characterized for hazardous materials and the risk from exposure to these materials should be abated, including the possible asbestos mastic on the east side of the building.

Building 3 – Phase I

Additions: As recommended on Building 1, all non-historic additions addressed earlier should be removed. These include the barricade, the dock enclosure, the existing platform with the exception of the foundation, and the wooden steps leading up to the east (Figure 10).

Figure 10. TA-8-3 (green barricade and stairs to be removed)

Accessibility: As described, providing safe access to each building is critical. In Phase I, new steps and a platform should be built as per original specifications, or temporary steps should be installed at each door.

Abatement: The interior and exterior materials should be characterized for hazardous materials and the risk from exposure to these materials should be abated.

Phase II – Stabilization

Phase II is designed to address remediation of major structural issues and/or active pathologies that are causing ongoing deterioration (Figure 11).[3]

[3] Any mechanical and electrical supply lines required for the ultimate re-use of the facility should be installed during Phase Two excavation to ensure these new services will be hidden from view.

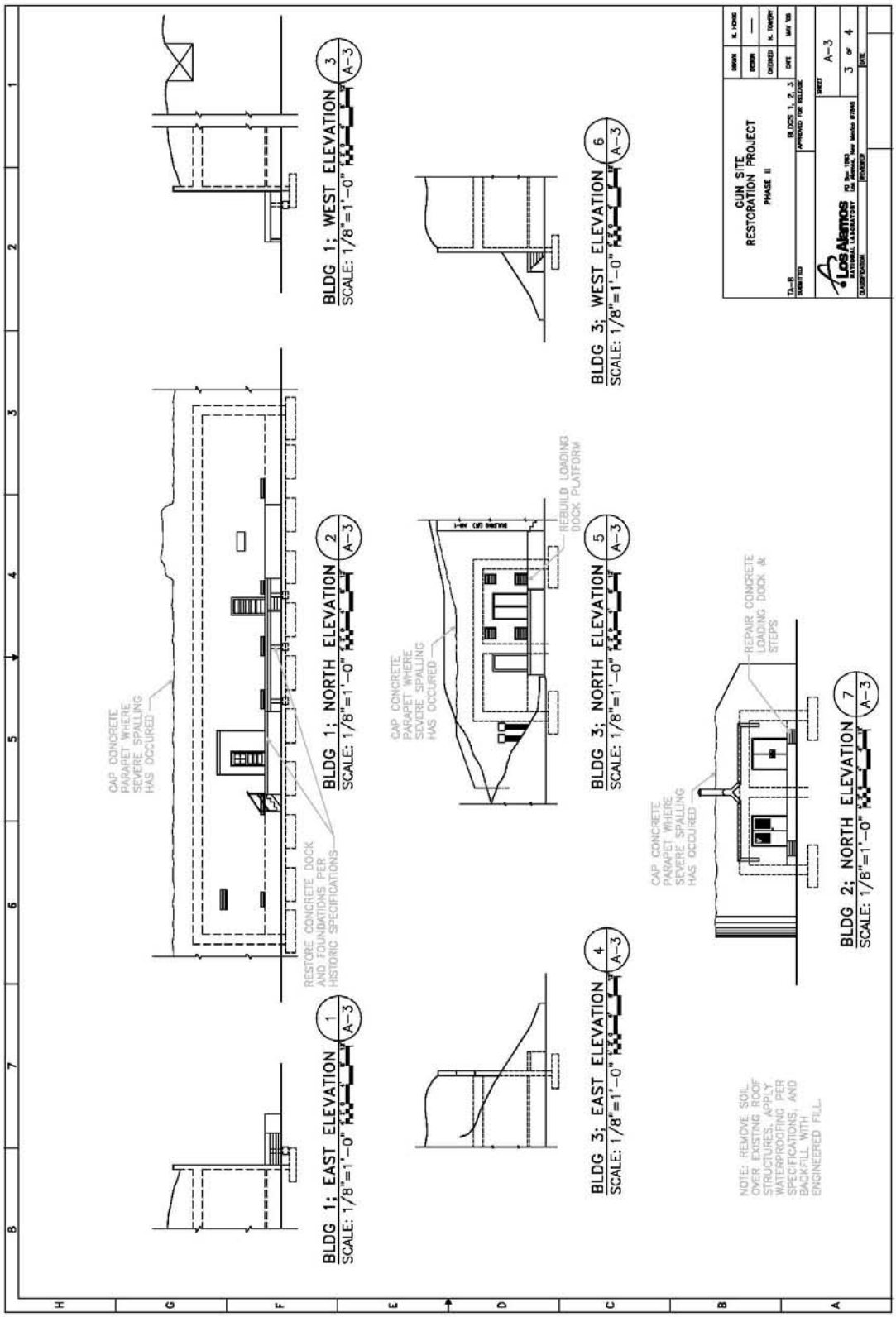


Figure 11. Phase II of restoration project

Building 1 – Phase II

Interior: Several areas on the interior of the building show evidence of moisture intrusion from the surrounding soils (Figure 12). Most of these areas run along the top of the north wall, where cracking and moisture seepage are visible. The severely deteriorated or spalled areas should be consolidated and new cast concrete applied. Smaller areas of deterioration should be cleaned and allowed to remain in their current state as an acceptable characterization of the materials used at the time. Patched areas will most likely be visibly distinguishable from the original concrete, a beneficial outcome for interpretation.

Figure 12. TA-8-1 interior water damage

Concrete: The primary structural concern with the entire compound is the decay of the concrete because of moisture infiltration, both at the top parapet and in general. Severe spalling along the top section, within contraction cracks, and at cold joints is a common observation (Figure 13a–b).

Figure 13a. TA-8-1, concrete spalling at parapet, looking southwest

Figure 13b. TA-8-1, concrete spalling at parapet, looking northeast

For much of the concrete that forms the vertical north face, the mix had a high alkali content (based on its sensitivity to moisture and the high levels of efflorescent deposits), as well as extremely large aggregate. There are some sections of concrete retaining walls—sections not structurally tied to the buildings—that appear to be much more stable than others. These sections were likely poured separately from the buildings. The structural walls appear to have been poured monolithically using the high alkali, large aggregate concrete mix. This observation lifts the overall protection and waterproofing of the buildings to an elevated priority, because one may assume that the visible damage along the face of the wall is also occurring within non-visible areas. However, the spalling should have been minimized by the reduced freeze/thaw cycles below the frost line.

Drainage: The grading of the earth covering the building is likely causing the relatively high concentration of moisture in this area. The hillside is currently draining several thousand square feet of runoff against the retaining wall. This negative drainage is also likely responsible for the increased spalling visible on the north wall. Additional signs of moisture infiltration exist in approximately seven areas along the ceiling at the south end, although the damage in these areas is less severe.

The concrete buildings should be waterproofed. All soil on top of the buildings would be removed and modern waterproofing installed. The specific type and technique to be used will depend on engineered specifications and field conditions. The finished grade should provide for positive drainage away from the back of the concrete retaining wall for at least 12 feet. Original architectural plans indicate that two 2,000-gallon diesel fuel oil tanks are buried in the hillside. One is buried six feet to the east of Building 1 with six feet of cover, and the other is approximately six feet directly behind Building 3 with 10 feet of cover.

Loading Dock: The historic concrete dock and foundations should be repaired and protected concurrently with other concrete work. The loading dock will be restored per historic specifications (ENG-C 12317 October 1943).

Building 2 – Phase II

Loading Dock Steps: The concrete loading dock steps are severely deteriorated and, in some areas, covered with debris. All debris should be removed and a new, level concrete surface be installed to provide safe access to the loading dock and concrete steps.

Concrete: The concrete condition and recommended Phase II repair is the same for Building 2 as for Building 1. A large portion of the retaining wall on the north side of Building 2 is in good condition and does not appear to require repairs.

Drainage: As with Building 1, Building 2 exhibits evidence of moisture penetration on the interior of the cast concrete. Building 2 should also be excavated and waterproofing installed. Once the excavated areas are backfilled, the upper section of grade covering the building or against all retaining walls should be sloped away to the northwest of the site, where a large drain exists. The drainage management trench should contain a slotted pipe or other mechanism for efficiently directing the runoff to the site drain.

Building 3 – Phase II

Concrete: The concrete condition and recommended Phase II repair on Building 3 is the same as described for Buildings 1 and 2. The interior condition of the building and amount of moisture penetration, if any, are currently unknown due to inaccessibility.

Drainage: As with Buildings 1 and 2, Building 3 should be excavated and waterproofing installed. Once the excavated areas are backfilled, the upper section of grade covering the building or against all retaining walls should be sloped away from the building. The drainage management trench should contain a slotted pipe or other mechanism for efficiently directing the runoff to a detainment area.

Loading Dock: The loading dock platform should be rebuilt. Original specifications indicate a concrete stem wall parallel to the north wall and a wooden deck with steps to the west.

Phase III – Exterior Restoration

Phase III is designed to rebuild historically significant portions of the facility that were removed previously and to restore all exterior building components. Current recommendations do not address interior restoration, as ultimate end-use will determine restoration (Figure 14).

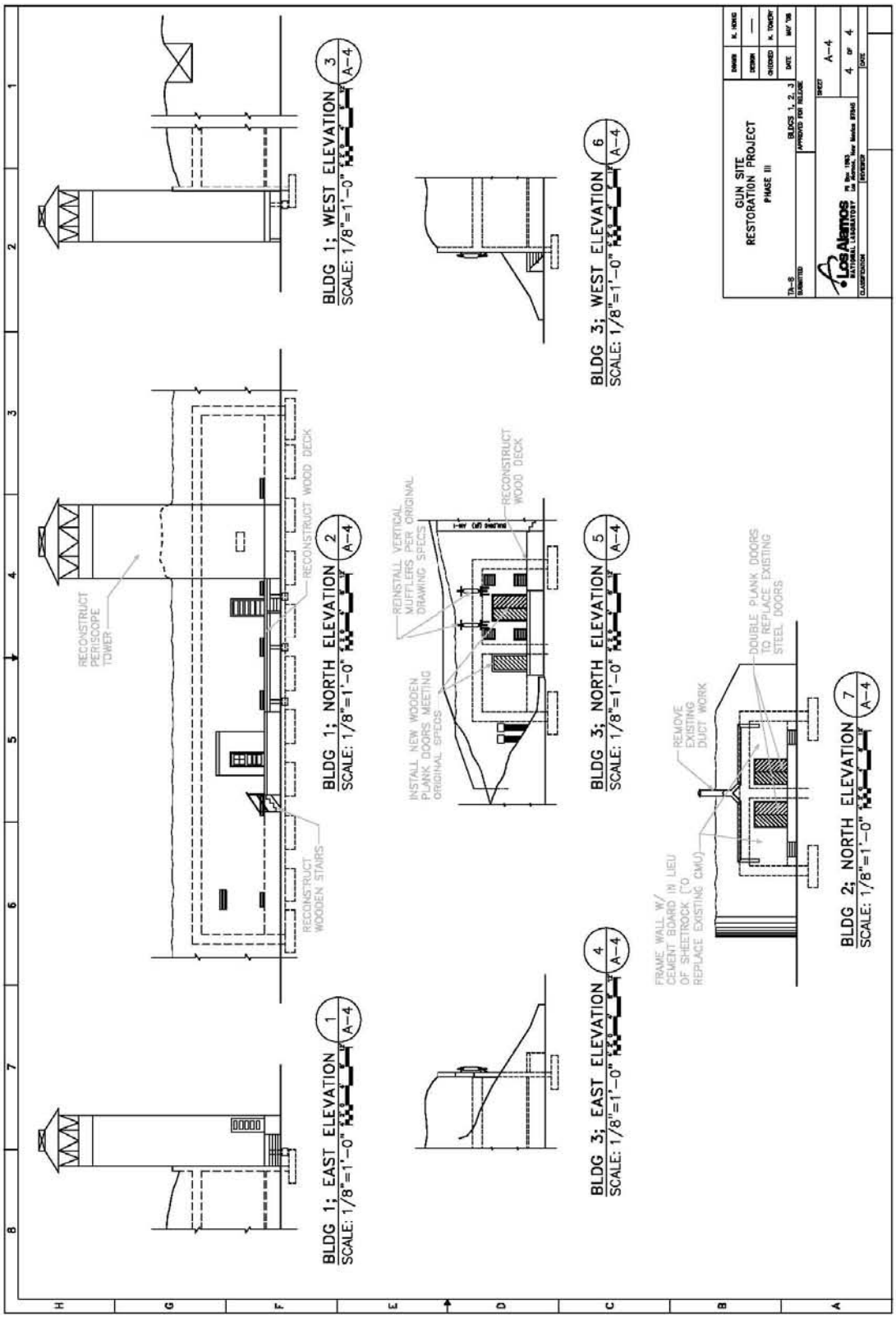


Figure 14. Phase III of restoration project

Building 1 – Phase III

Tower Reconstruction: The only remaining physical evidence of the periscope tower are the foundations and the anchor bolts running vertically up the north face of the retaining wall. However, excellent historic architectural documents detail the specifications, dimensions, and materials for the tower. A reliable reconstruction is possible given the reliability of the construction documents and the physical evidence that remains at the facility. The tower had an all-wood frame approximately 18 feet wide, nine feet deep, and 45 feet high. Steps wound around the perimeter of the tower leading to the top of the berm and up to the top of the tower. The periscope ran through the center of the tower. Every effort should be made to comply with the original specifications when reconstructing the tower, but occupancy estimates and current code requirements may dictate re-evaluation of some structural details.

Electrical and Mechanical: As detailed earlier, the north elevation is aesthetically very simple, and all original openings for electrical and mechanical systems should be considered highly significant. The existing historic exterior ductwork, electrical equipment, and metal fixtures should be inspected to ensure they are securely affixed to the building. All openings should be sealed to prevent moisture damage or animal infestation. The weatherproofing techniques employed should not indicate that the buildings are no longer in use.

Wooden Components: With the exception of the loading dock, woodwork is isolated to existing historic doors and several louvered vents. These should be preserved and protected per standard preservation practice. The balance of this scope of work lies in the loading dock steps and the wooden deck that connects the concrete loading dock to the tower. Based on visual inspection, a significant portion of the original deck still exists under the storage room addition, which should be removed during Phase I work. Once the storage room has been removed, the deck material will be exposed and a full assessment will be possible. A thorough assessment will determine if in-situ use is possible. Replacement of loading dock steps and any portion of the wooden deck shall be built per original specifications. Any reconstruction of the walkway should follow historic construction documents as much as possible within the framework of current code requirements.

Historic architectural documents ENG-C 12307 May 30, 1943, ENG-C 12318 October 1943, ENG-C 12317 October 1943, and ENG-C 12309 June 30, 1943 are recommended for restoration references.

Building 2 – Phase III

Infill Wall Section: As stated earlier, the original frame wall that contained two double plank doors on the north elevation of Building 2 has been replaced with a CMU wall with two steel doors. These non-historic elements should be removed and the original construction detailing be rebuilt following the historic drawings.

The original drawings indicate that the exterior finish of the frame wall was sheetrock. As the strict implementation of these specifications would not allow for a reliable product long-term, cement board should be used as an alternative. The doors are clearly detailed in original

architectural drawings and should be rebuilt per historic specifications.

Mechanical: The 1947 installation of symmetrical duct work is a non-contributing element to the historic status of the facility and should be removed (ENG4-422 September 18, 1947).

Electrical: It appears that the lighting fixtures are original and, as such, are highly significant. We recommend that the existing historic electrical equipment and metal fixtures be inspected to ensure they are securely affixed to the building. All openings should be sealed to prevent moisture damage or animal infestation. The weatherproofing techniques employed should not indicate that the buildings are no longer in use.

LANL architectural documents ENG-C 15015 June 1943, ENG4-422 September 18, 1947, and ENG-C 12322 October 1943 are recommended for restoration reference.

Building 3 – Phase III

Wooden Components: The original doors—diagonal wooden plank doors—were removed during previous remodels to the building. New doors that meet original specifications should be installed. The louvered vents within the doors and on the building façade should be considered significant.

Electrical and Mechanical: The existing mechanical fixtures on the exterior of the building are non-historic additions and should be removed. As stated previously, the original façade contained two large vertical mufflers from Room 102 and a combustion air intake at Room 101. These should be reinstalled based on original drawing specifications.

Site: Past modifications to the site surround have created a ponding area on the north side of the facility. A major site drain inlet that catches runoff from the hillside on the west directs this water to the primary exterior area for the facility. However, revised grading on the east side leaves this runoff without an outlet. A sub-grade storm water retention system should be installed to allow runoff management without damaging the original historic character of the facility. The system should be designed to permit vehicular traffic.

LANL architectural documents ENG-C 15005 June 1943 and ENG-C 12324 October 1943 are recommended for restoration reference.

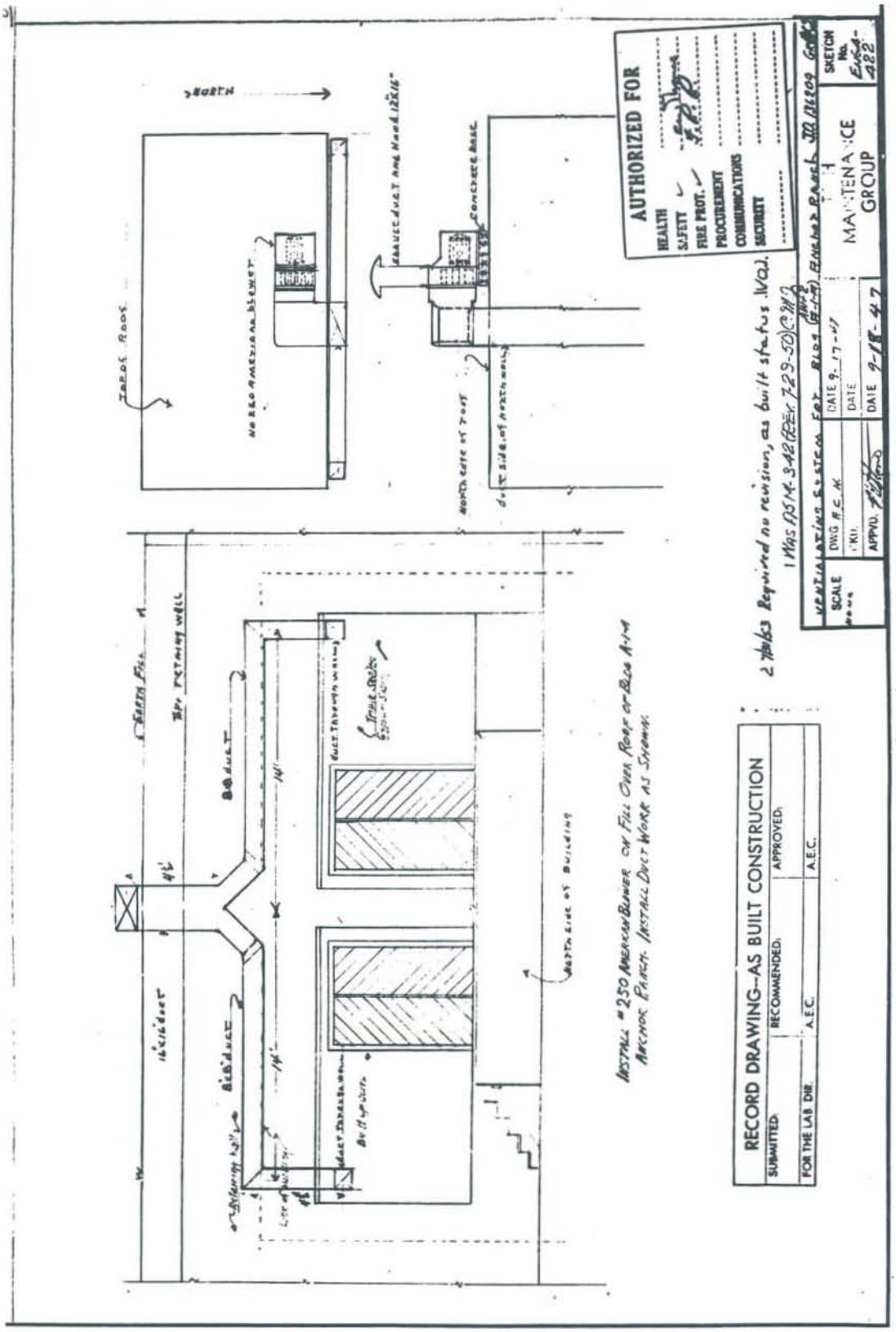
Section 4 – Synopsis

The protection of the Gun Site buildings and site is of paramount importance. The first priority must be to establish safe access by abating dangerous components and removing or stabilizing damaged wooden structural elements. The next step is intercepting and managing moisture at the site and protecting the existing concrete from further damage and rebuilding missing historical elements. Once the facility is protected, the final appearance may resemble the schematic design shown in Figure 15, but the end-use for the facility should guide final restoration plans.

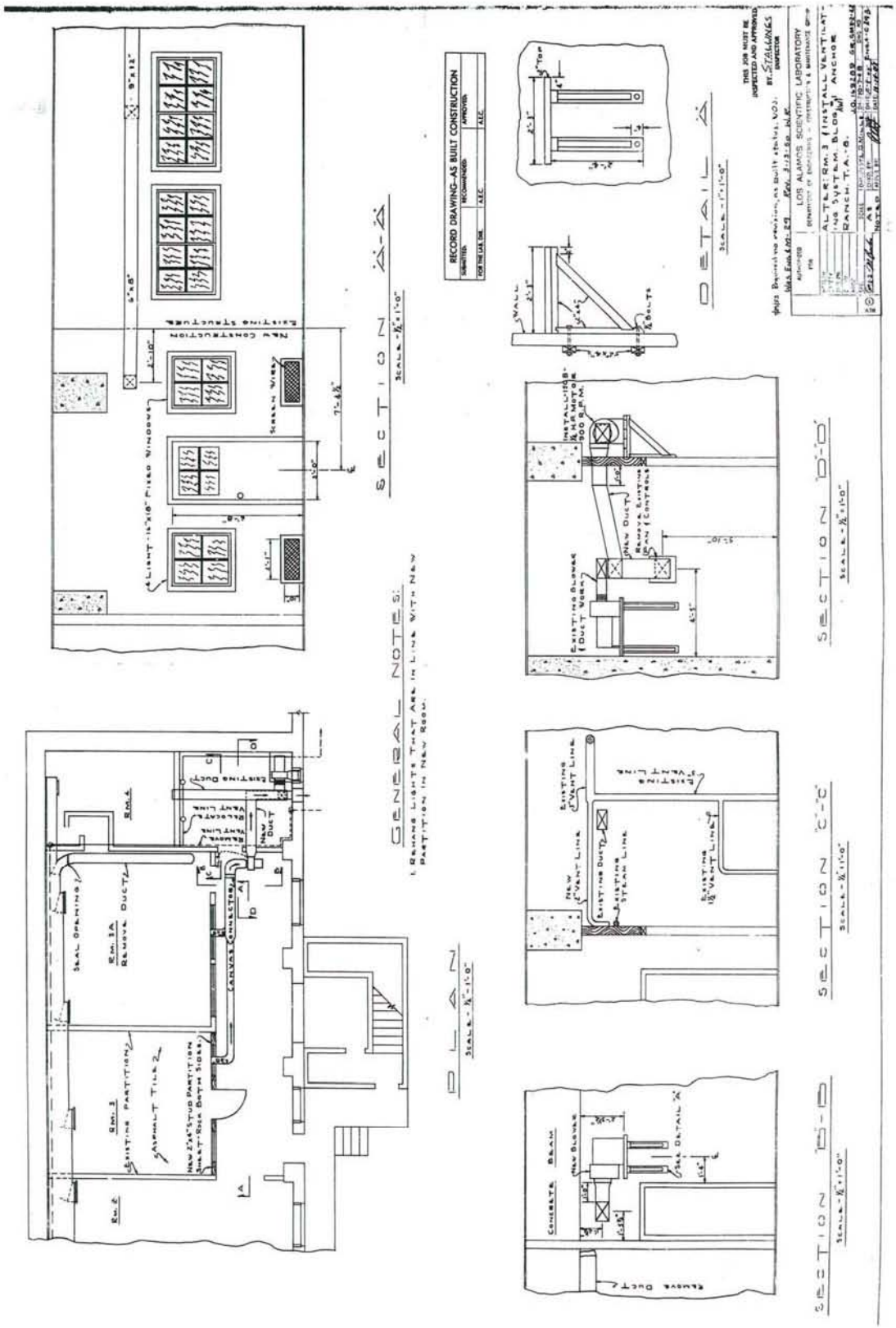
Figure 15. 2003 Design Workshop schematic design (note: this design shows a roof over the loading dock; this roof is not included in current restoration plans)

Appendix – Drawings in Numerical Order

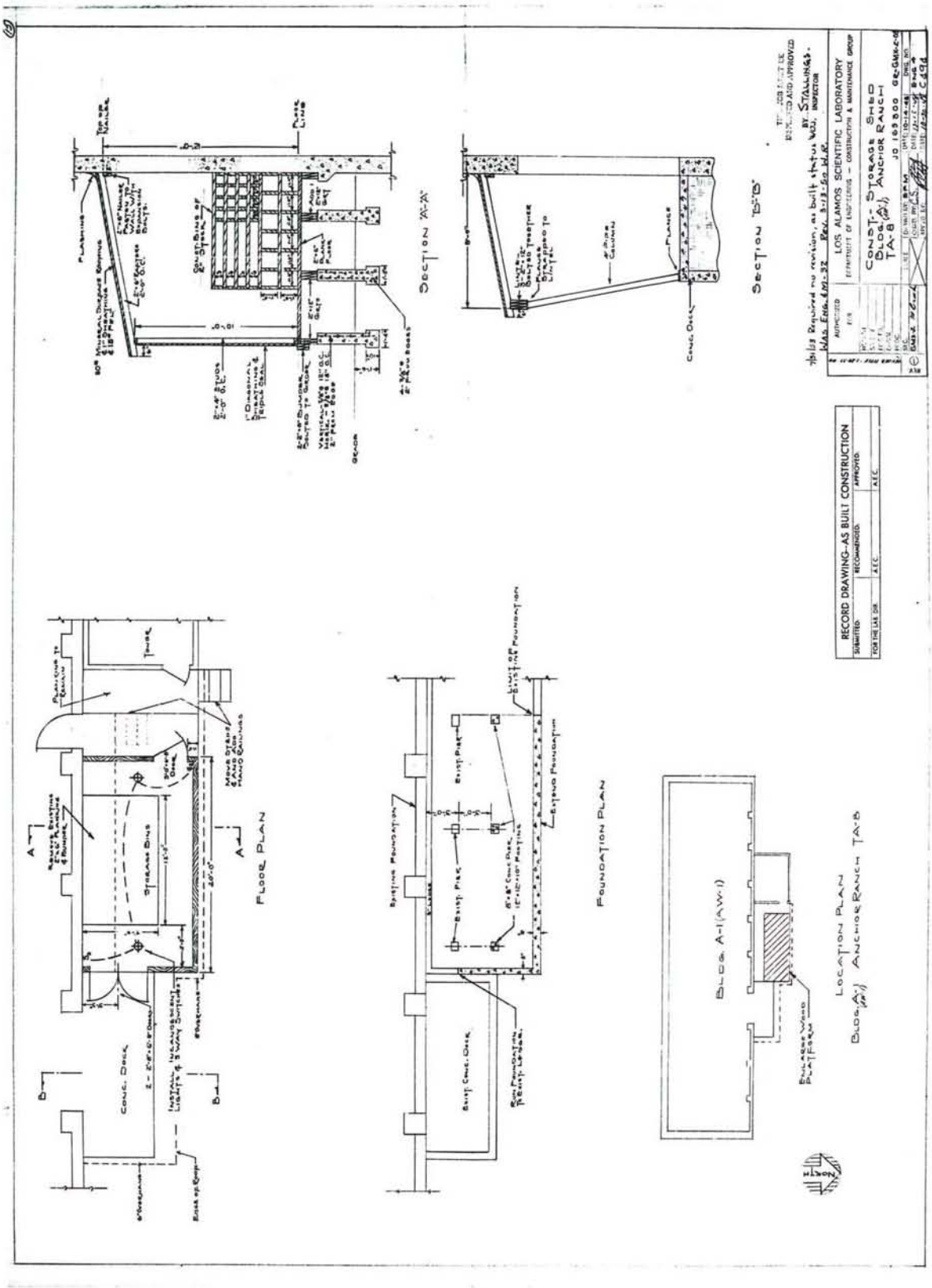
Drawing Number	Title
ENG4-422 September 18, 1947	Ventilating System for Bldg A-1-A (AW-2)
ENG4-C 493 October 7, 1948	Alter: Rm 3 & Install Ventilating System Bldg #1 (AW-1)
ENG4-C 494 October 14, 1948	Const.- Storage Shed Bldg. A-1 (AW-1)
ENG4-C 499 December 20, 1948	Alter Building A-1-B (AW-3)
ENG4-C 576 June 19, 1949	Enclose Loading Dock Bldg. (A-1) (AW-1)
ENG-C 1058 October 19, 1949	Alterations to Bldg. AW-3
ENG-C 12307 May 30, 1943	Anchor Ranch West Building No. AW-1 (A-1)
ENG-C 12309 June 30, 1943	Heating & Ventilating Plan Building No. (A-1) AW-1
ENG-C 12317 October 1943	Foundation & Floor Plan: Elevation, Sections & Details (AW-1)
ENG-C 12318 October 1943	Plumbing & Steam Heating Layout Building No. (A-1) AW-1
ENG-C 12321 October 1943	Plans & Sections Building No. (A-1A) AW-2
ENG-C 12322 October 1943	Heating & Deluge System Layouts Building No. 1A (AW-2)
ENG-C 12324 October 1943	Diesel Engine - Electrical & Ventilating Layout Building No. A-1B (AW-3)
ENG-C 15005 June 1943	Plans & Details Building No. 1B (AW-3)
ENG-C 15015 June 1943	Deluge System Layout Building No. 1-A (AW-2)
ENG-C 19035 October 19, 1959	Plasmatron Power Supply Location Plan, General Notes, Scope and Bill of Materials Bldg AW-3
ENG-C 19303 September 27, 1957	Plastic Scintillator Facilities Plan and Details Building AW-3
ENG-C 21128 September 8, 1959	Modifications to Electrical System electrical – East End – Bldg AW-1
ENG-C 34041 April 6, 1966	Dock Enclosure, Structural: Plan, Section, Detail & General Notes Building AW-3
ENG-R2610 August 25, 1983	Lab. & Shop Bldg. Floor Plan, Bldg. AW-1
ENG-R2611 August 24, 1983	Storage Bldg. Floor Plan, Bldg. AW-2
ENG-R2612 August 25, 1983	Laboratory Bldg. Floor Plan, Bldg. AW-3



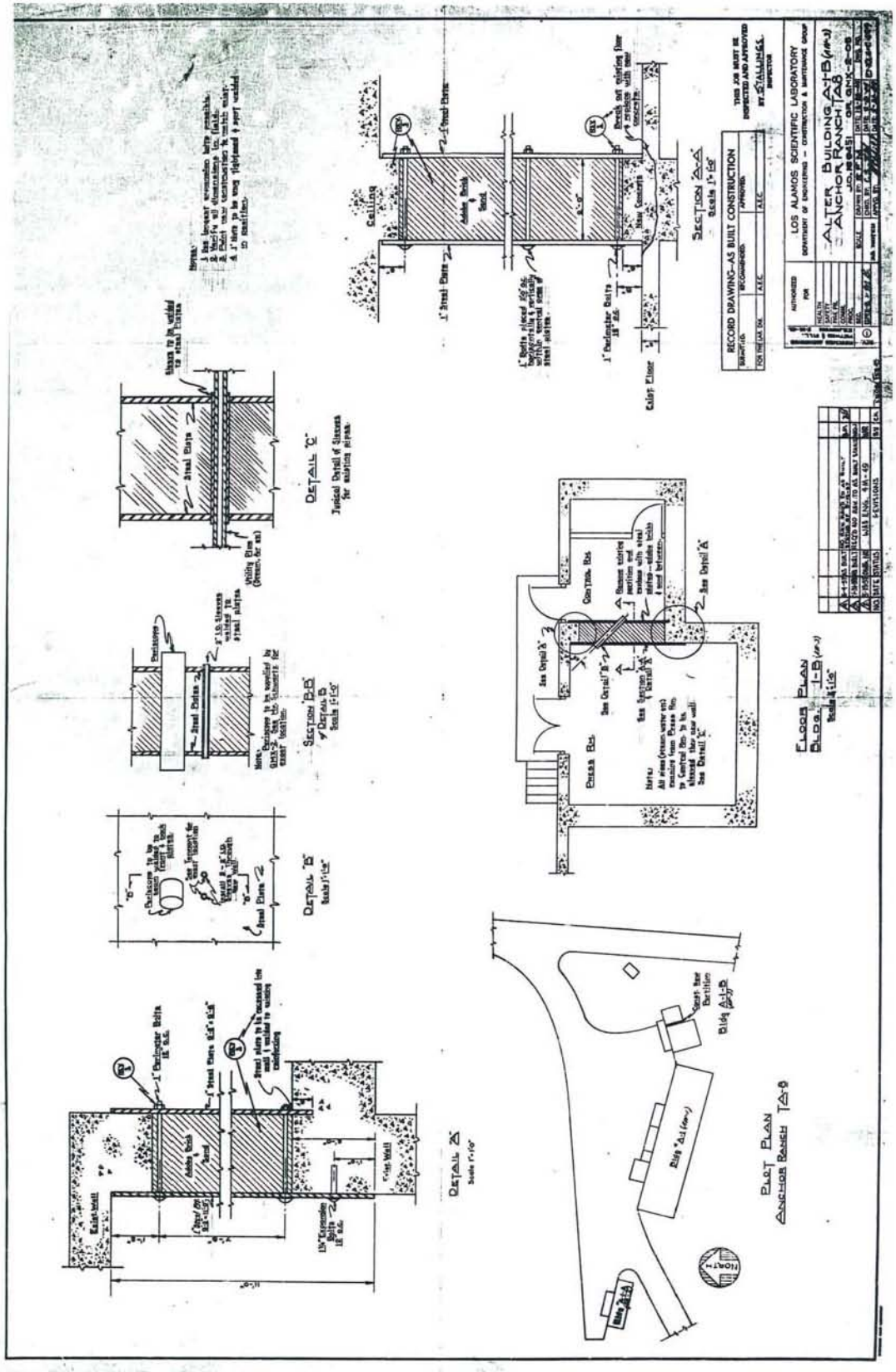
ENG4-422 September 18, 1947 Ventilating System for Bldg A-1-A (AW-2)



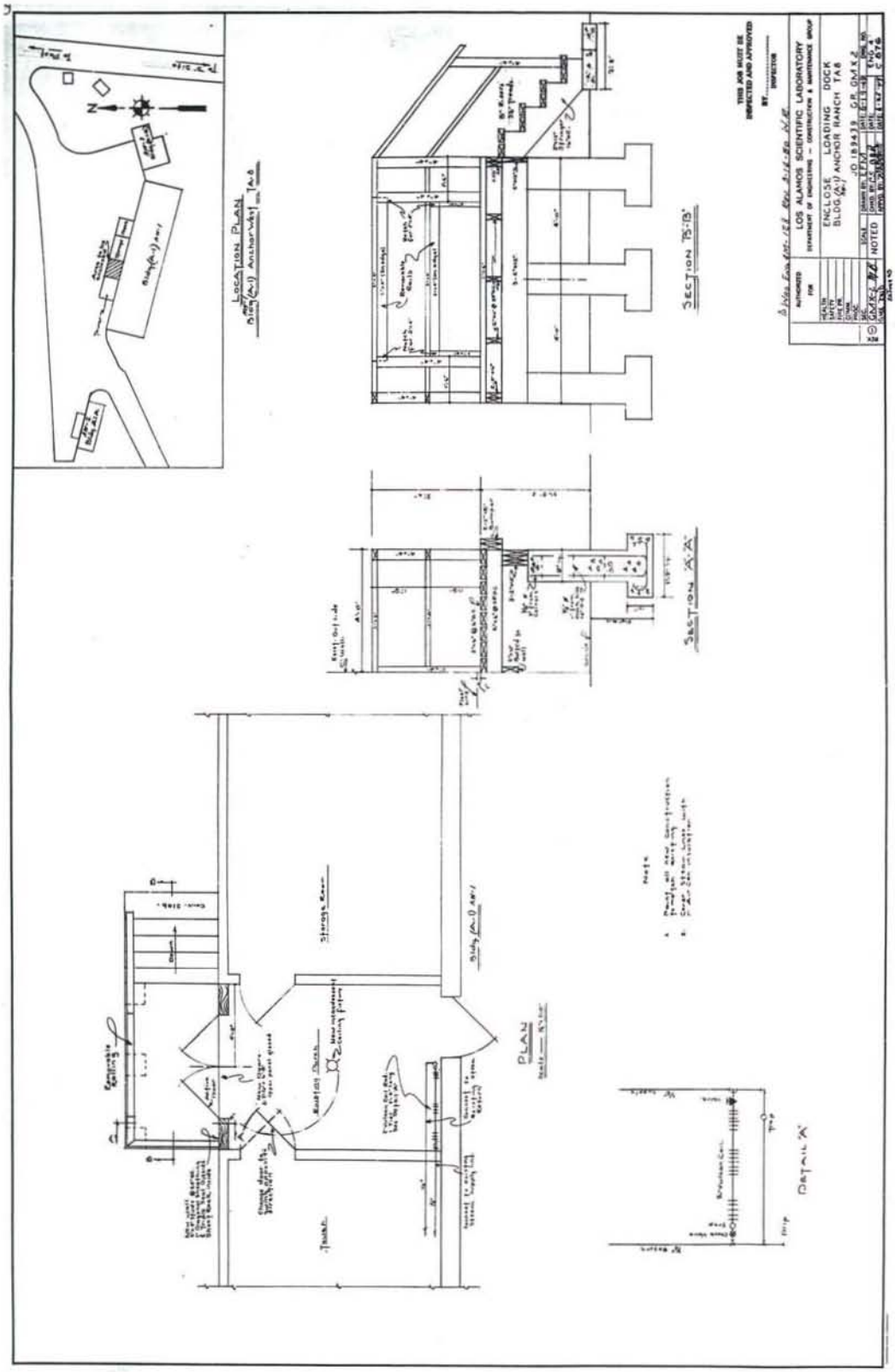
ENG4-C 493 October 7, 1948 Alter: Rm 3 & Install Ventilating System Bldg #1 (AW-1)



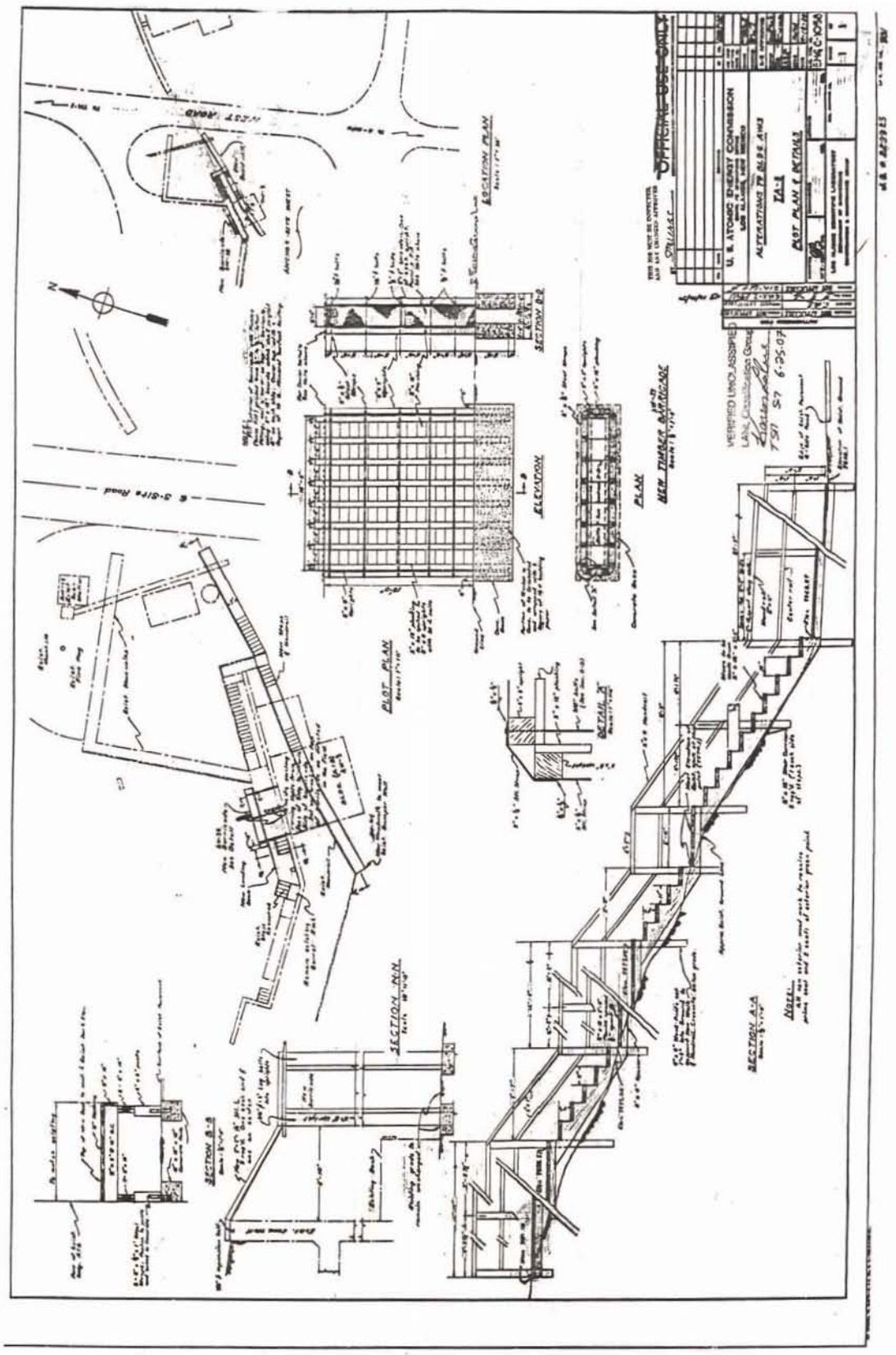
ENG4-C 494 October 14, 1948 Const. - Storage Shed Bldg. A-1 (AW-1)



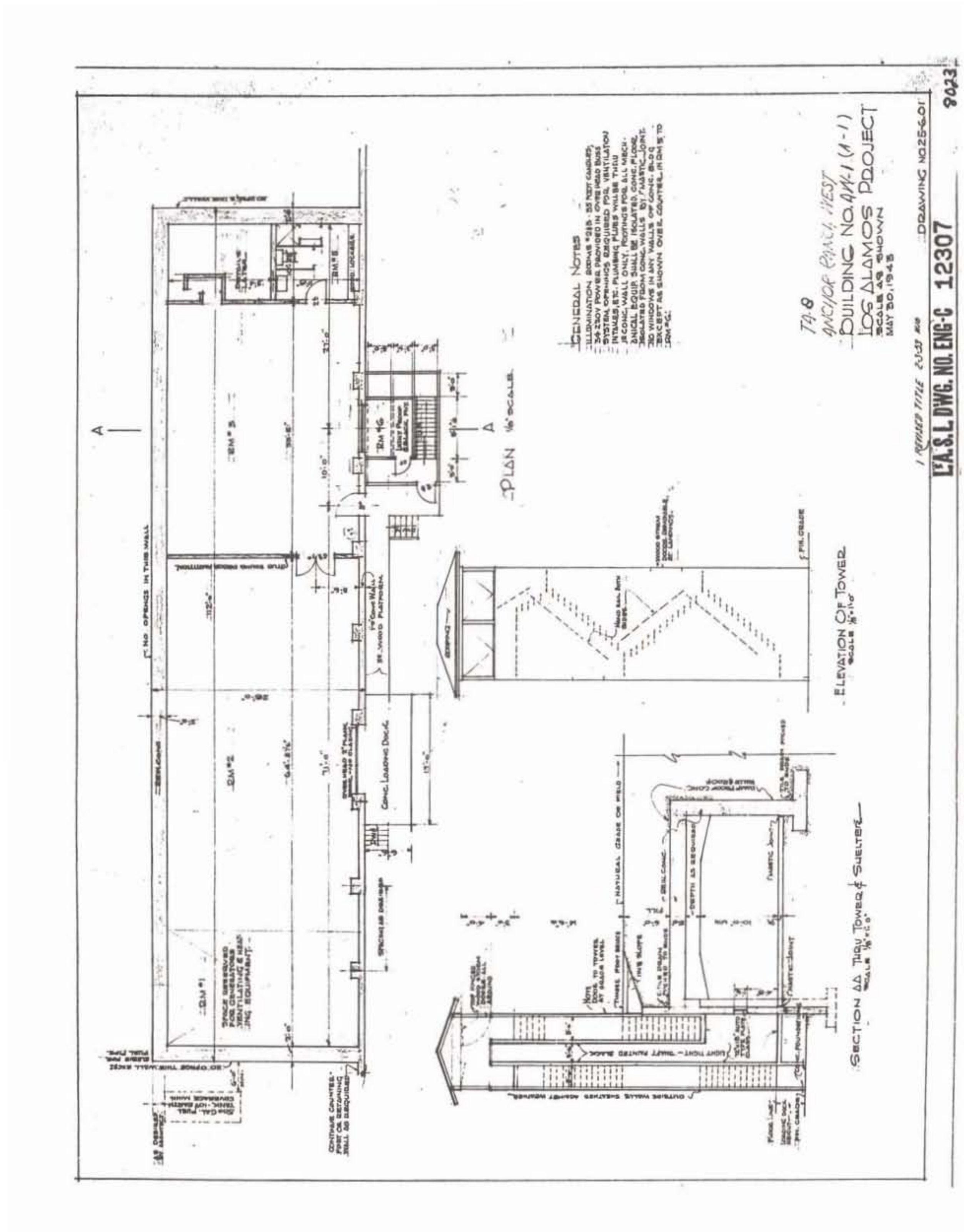
ENG4-C499 December 20, 1948 Alter Building A-1-B (AW-3)



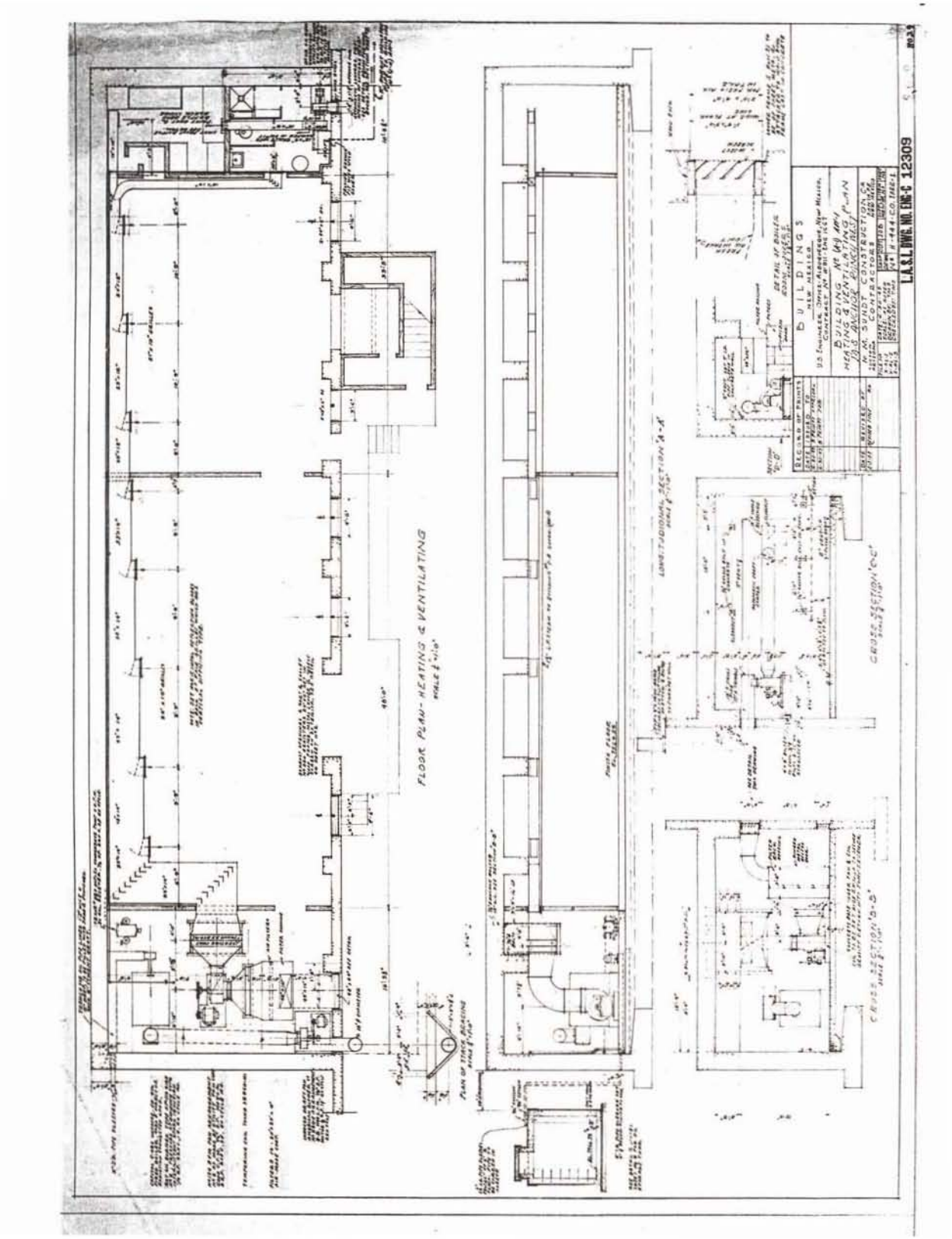
ENG4-C 576 June 19, 1949 Enclose Loading Dock Bldg. (A-1) (AW-1)



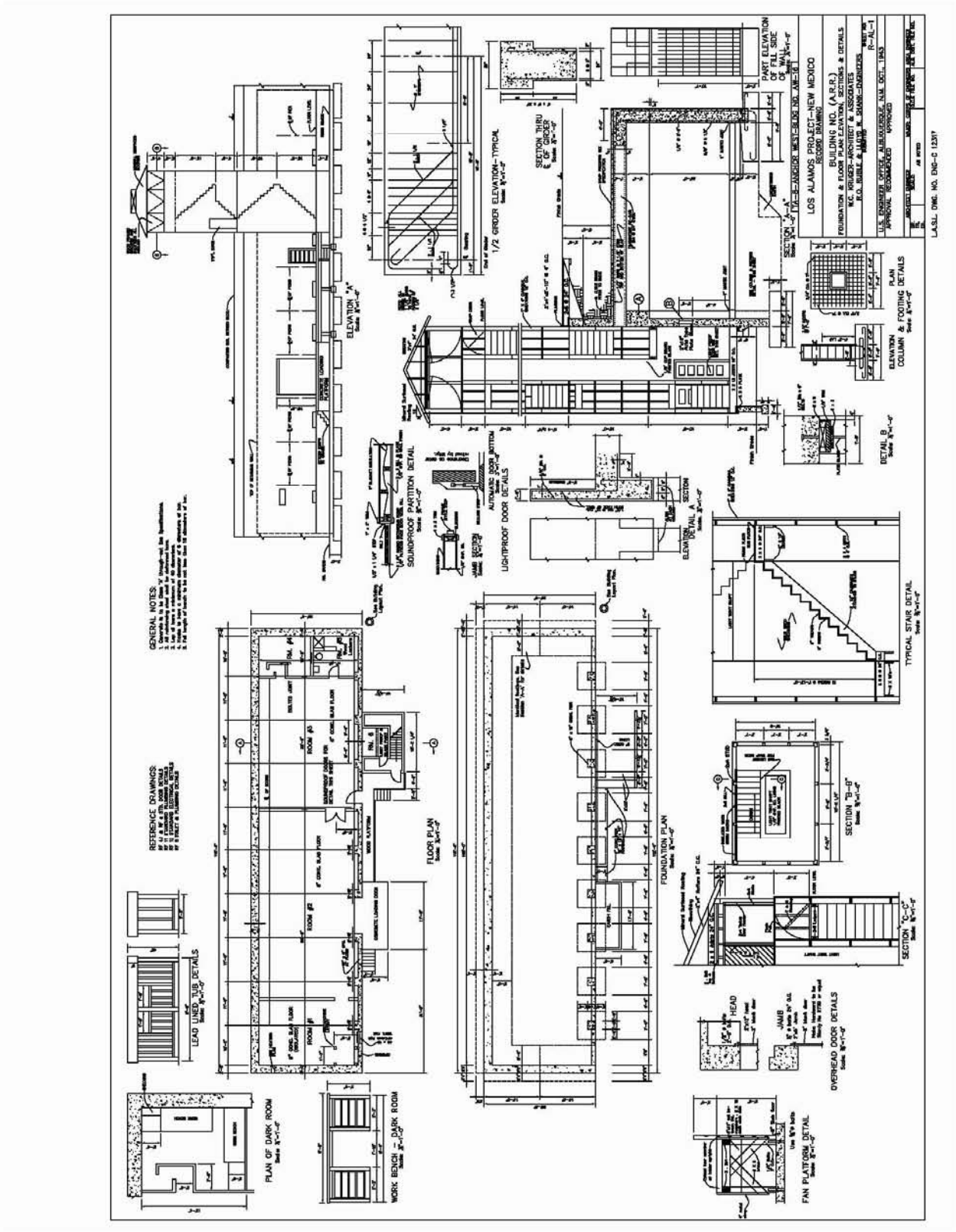
ENG-C 1058 October 19, 1949 Alterations to Bldg. AW-3



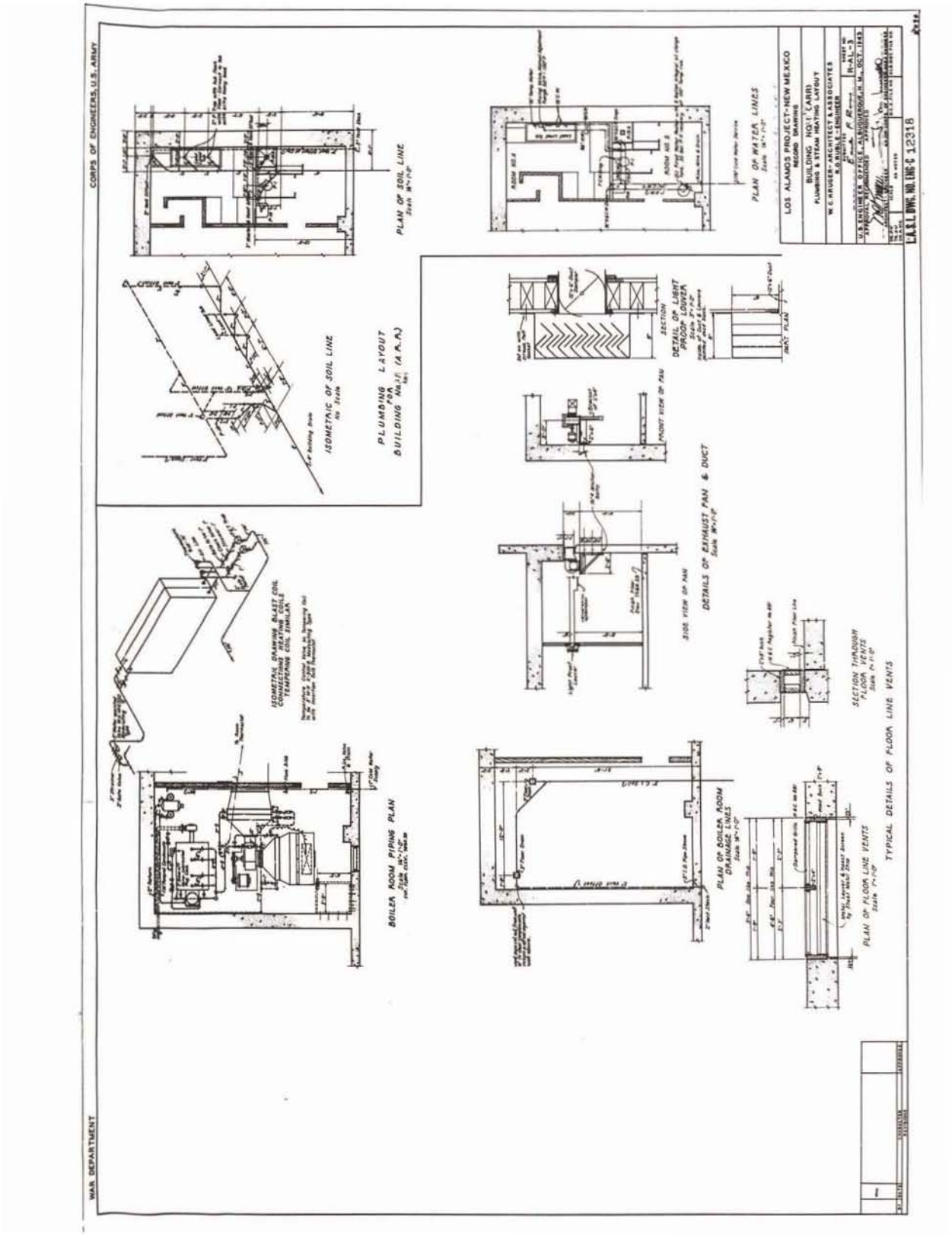
ENG-C 12307 May 30, 1943   Anchor Ranch West Building No. AW-1 (A-1)



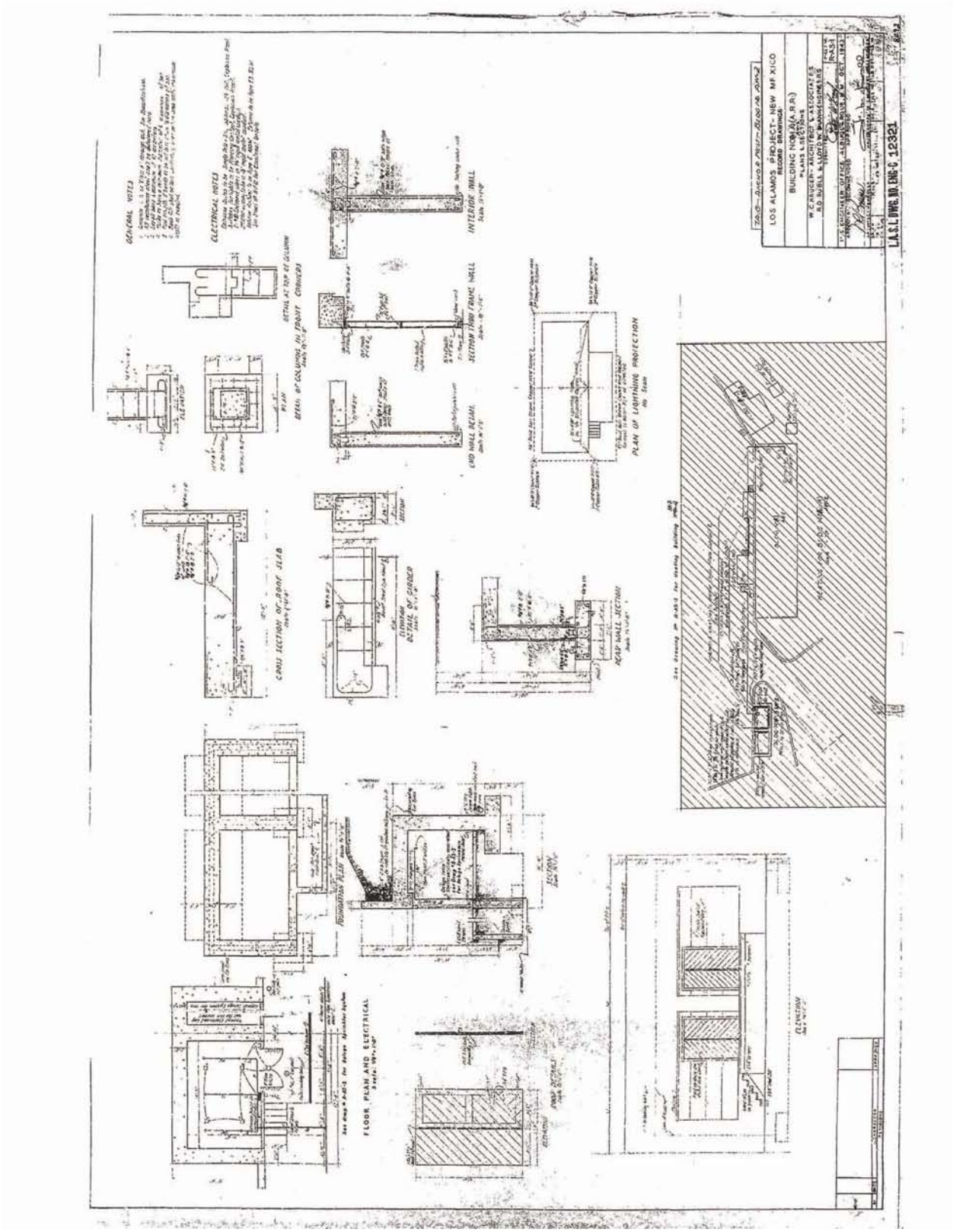
ENG-C 12309 June 30, 1943 Heating & Ventilating Plan Building No. (A-1) AW-1



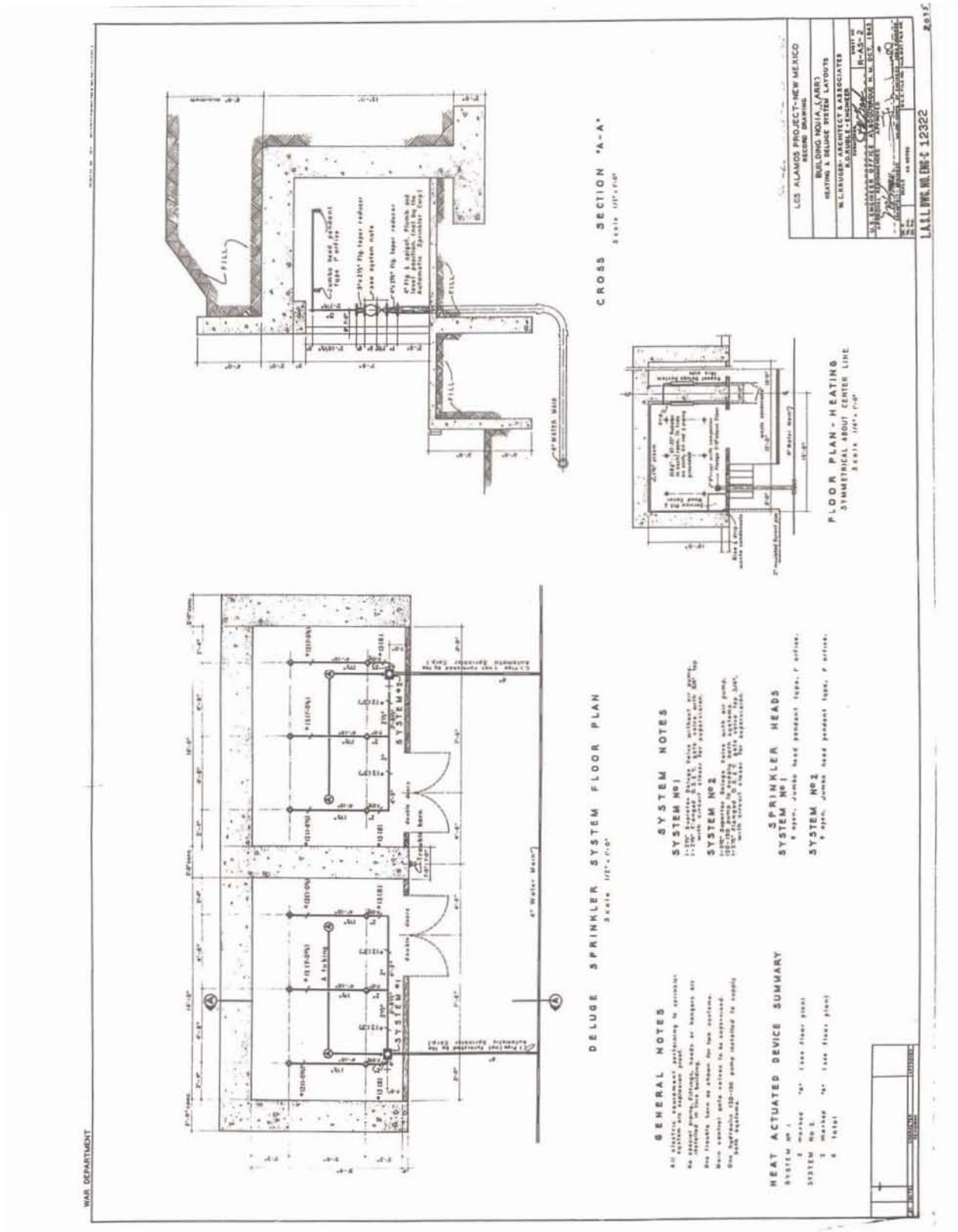
ENG-C 12317 October 1943 Foundation & Floor Plan: Elevation, Sections & Details (AW-1)



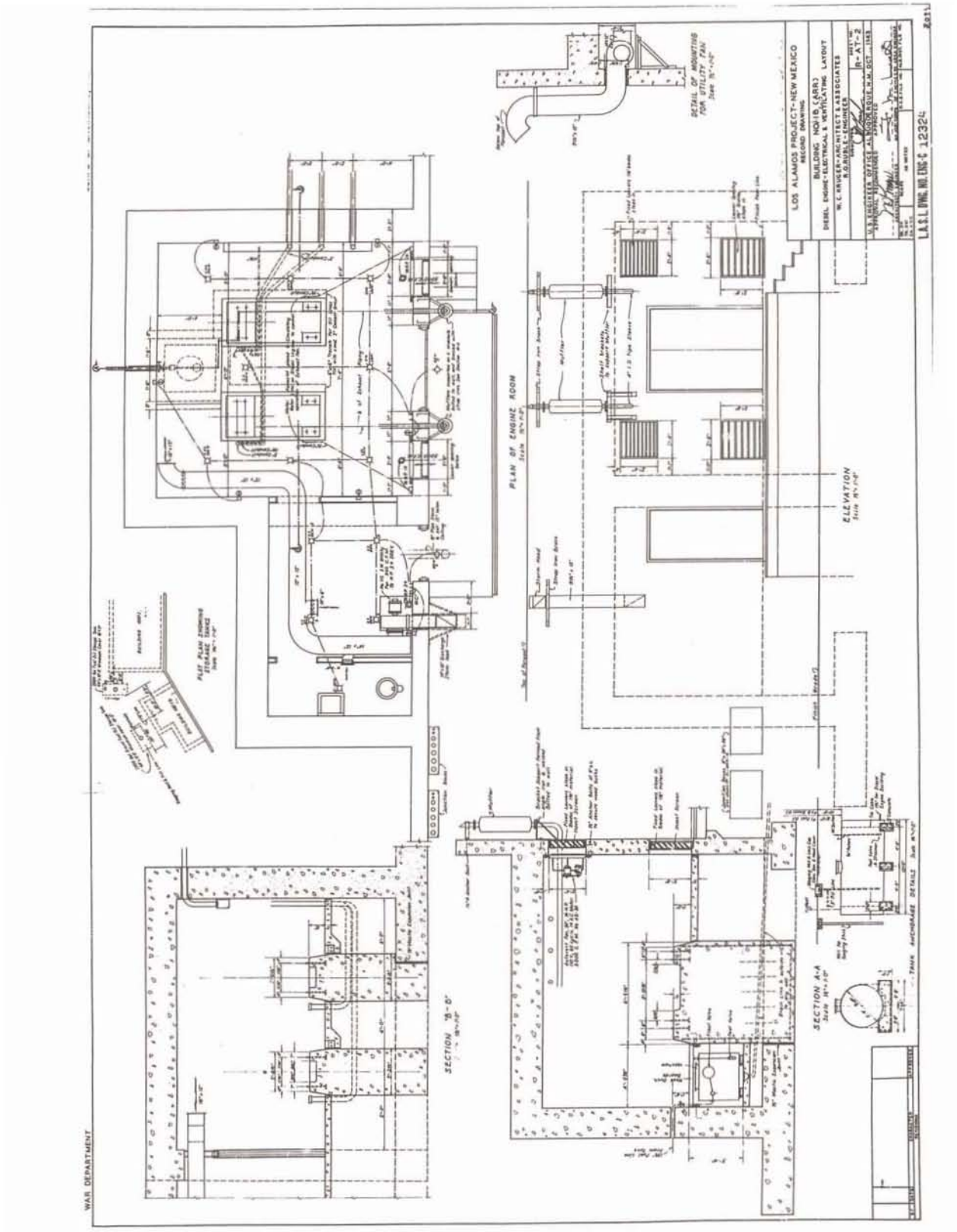
ENG-C 12318 October 1943 Plumbing & Steam Heating Layout Building No. (A-1) AW-1



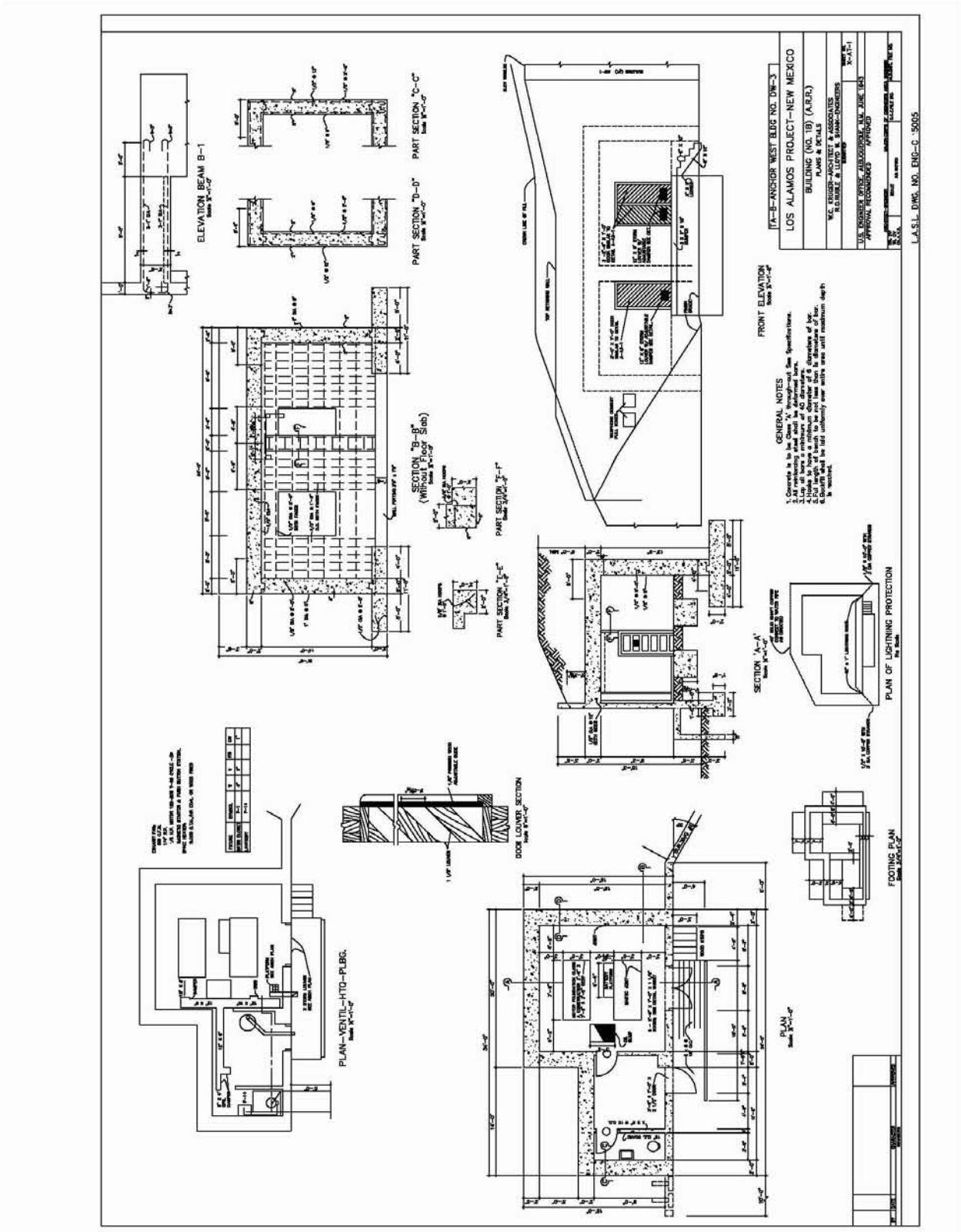
ENG-C 12321 October 1943 Plans & Sections Building No. (A-1A) AW-2



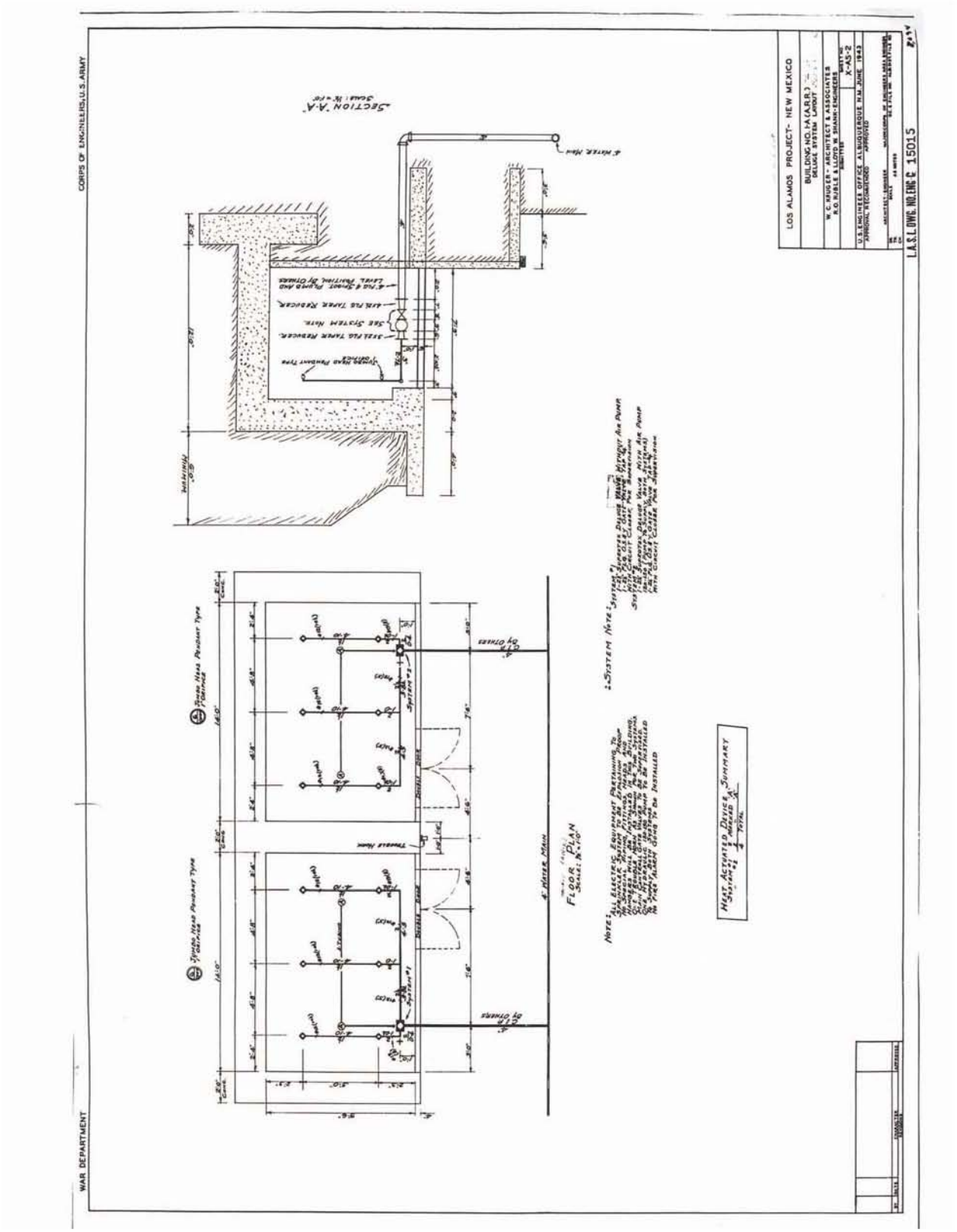
ENG-C 12322 October 1943 Heating & Deluge System Layouts Building No. 1A (AW-2)



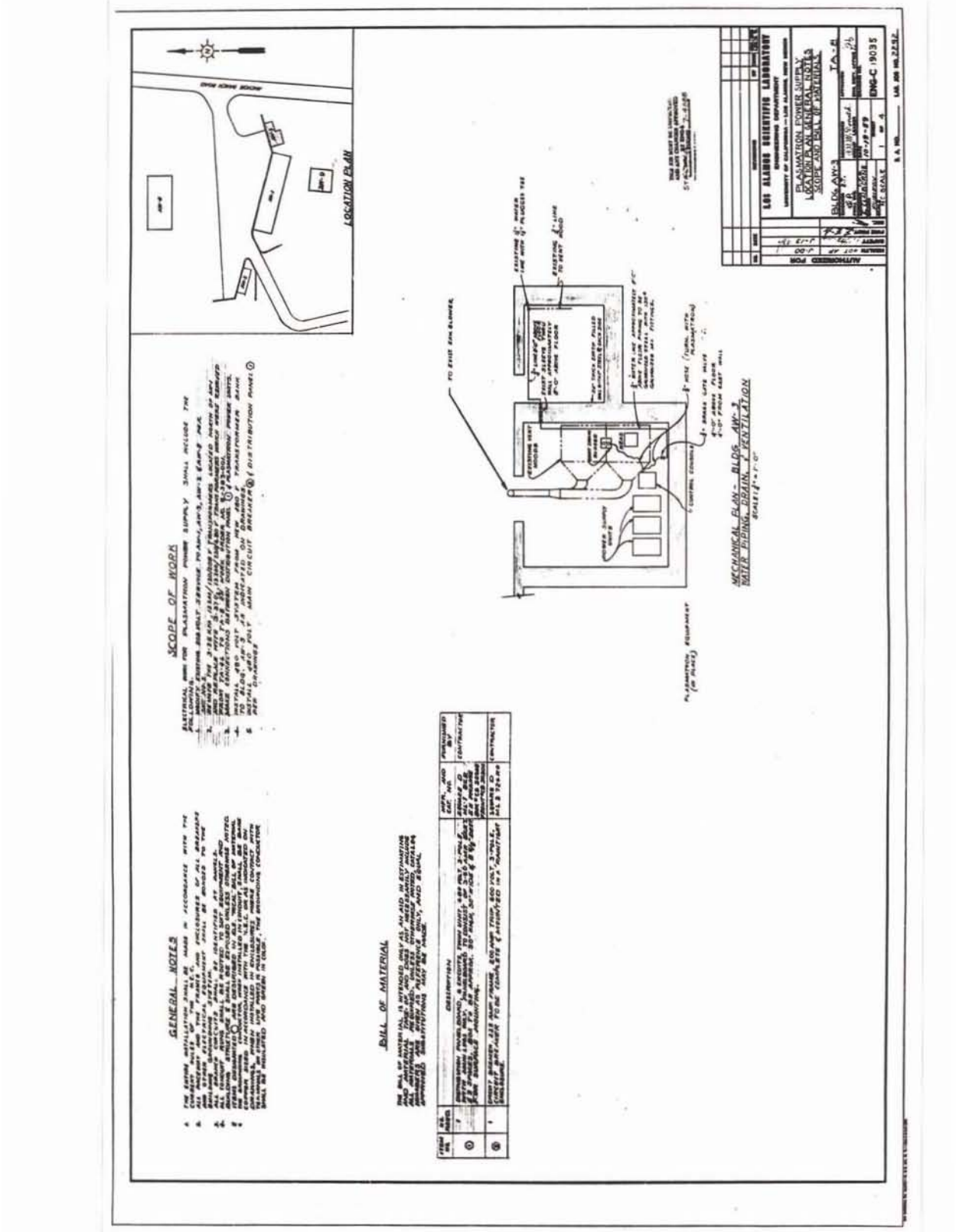
ENG-C 12324 October 1943 Diesel Engine - Electrical & Ventilating Layout Building No. A-1B (AW-3)



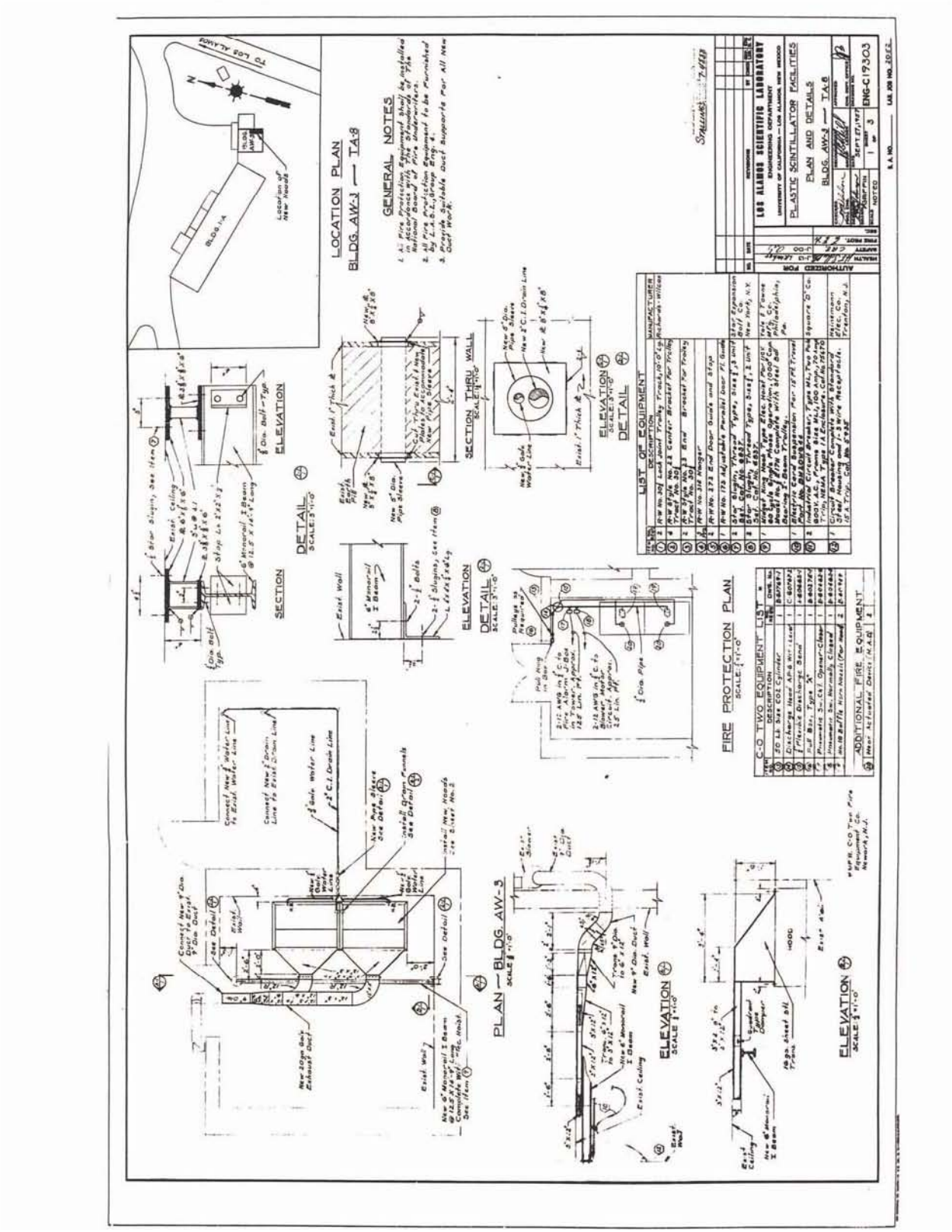
ENG-C 15005 June 1943 Plans & Details Building No. 1B (AW-3)



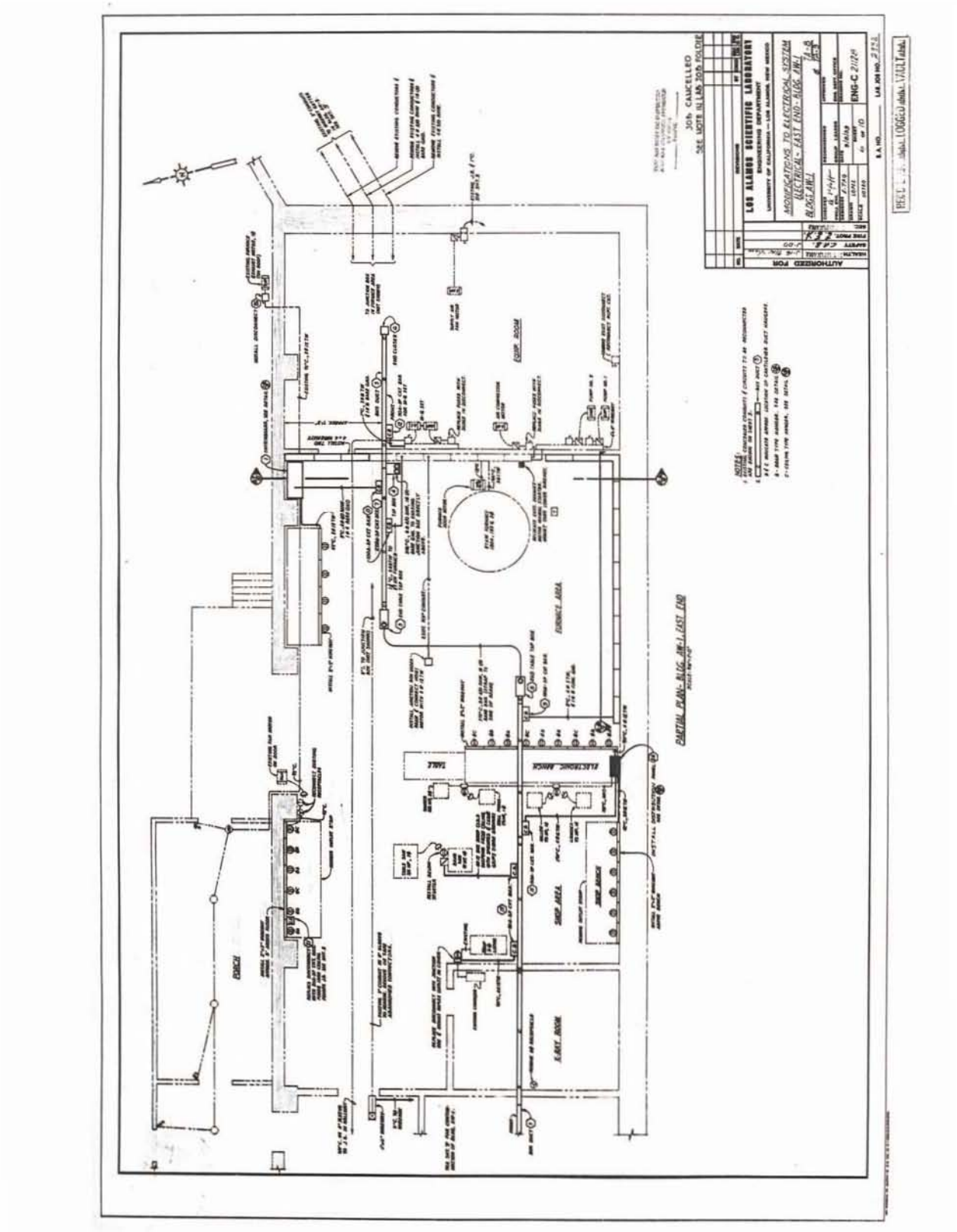
ENG-C 15015 June 1943 Deluge System Layout Building No. 1-A (AW-2)



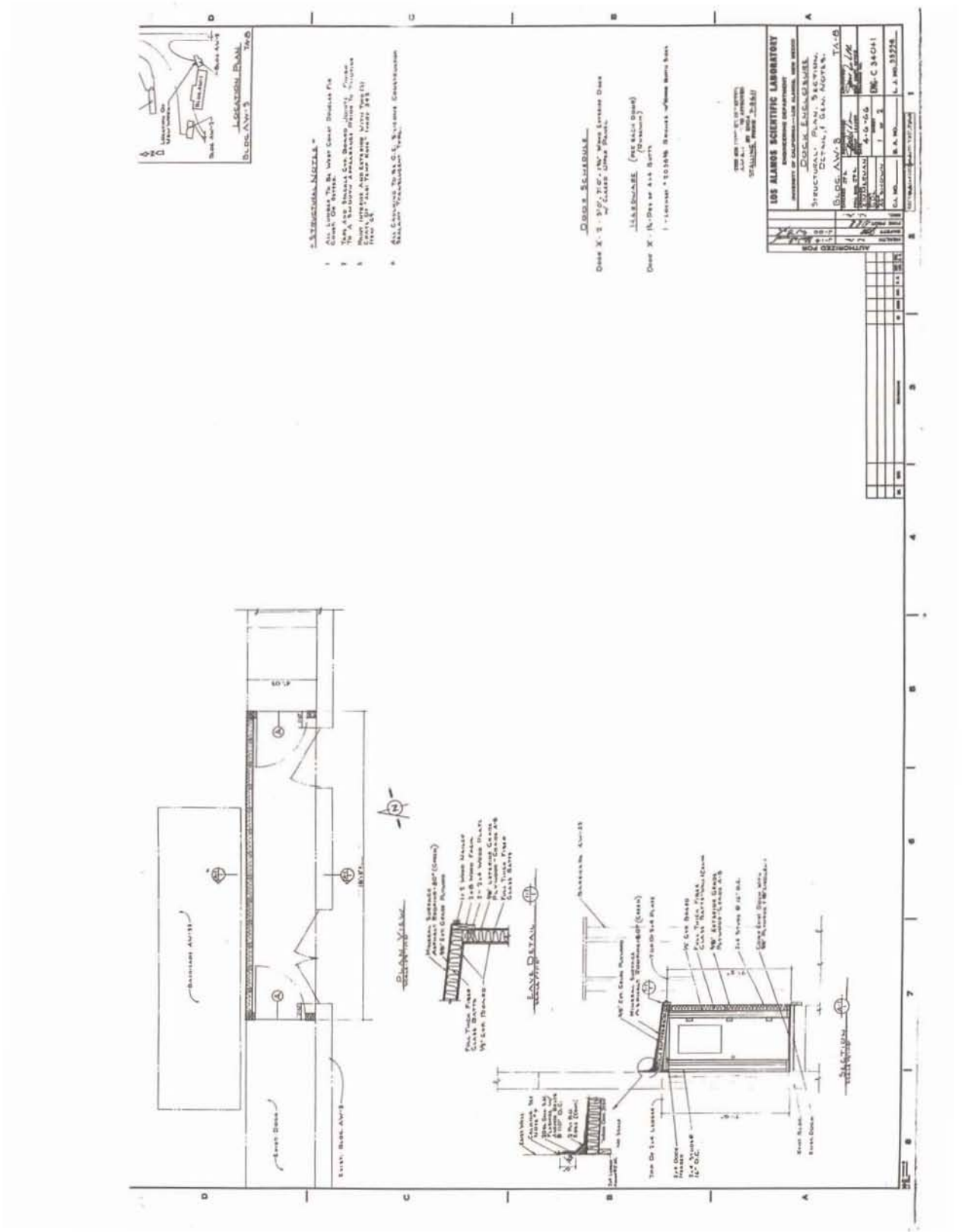
ENG-C 19035 October 19, 1959 Plasmatron Power Supply Location Plan, General Notes, Scope and Bill of Materials Bldg AW-3



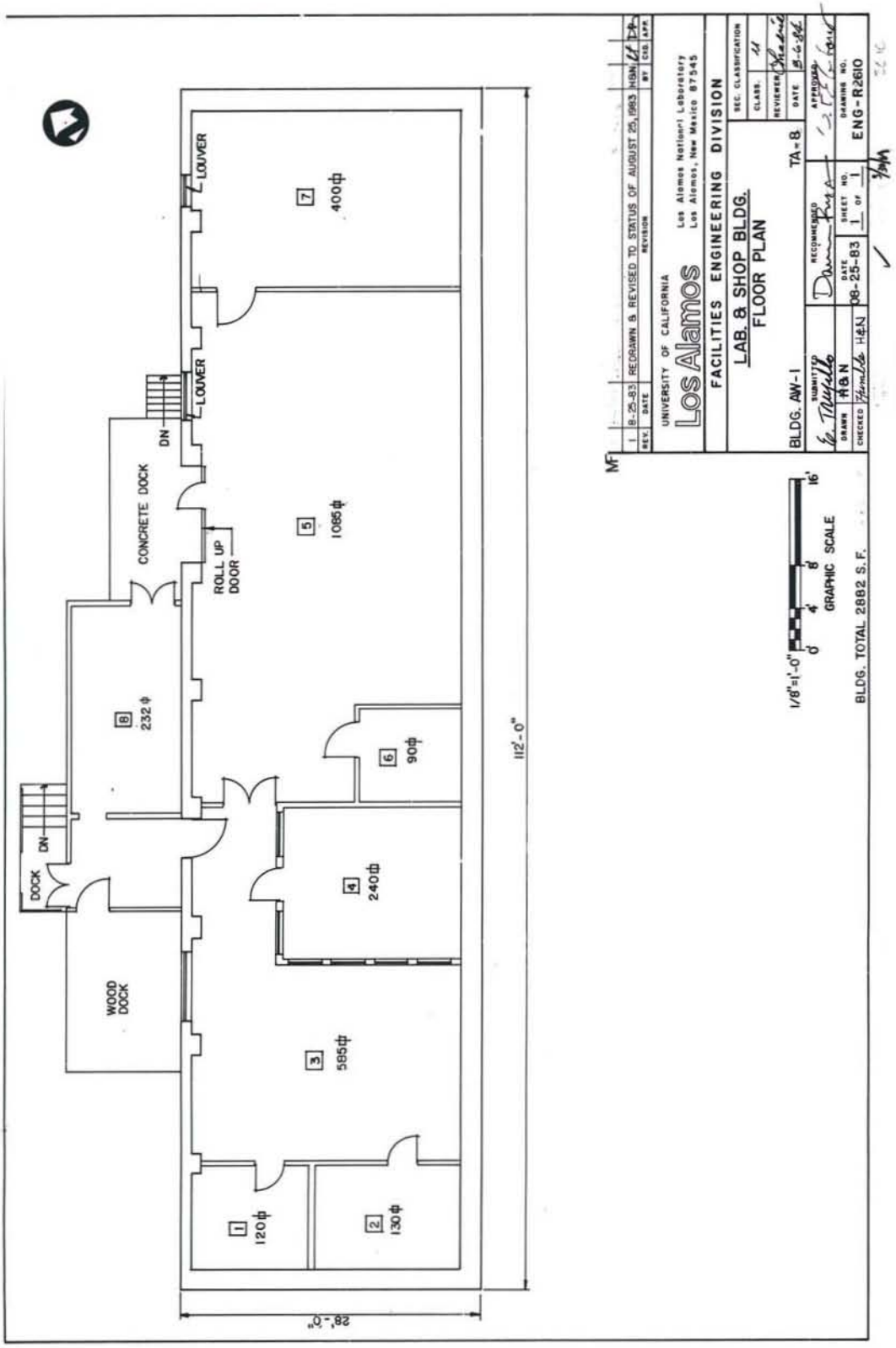
ENG-C 19303 September 27, 1957 Plastic Scintillator Facilities Plan and Details Building AW-3



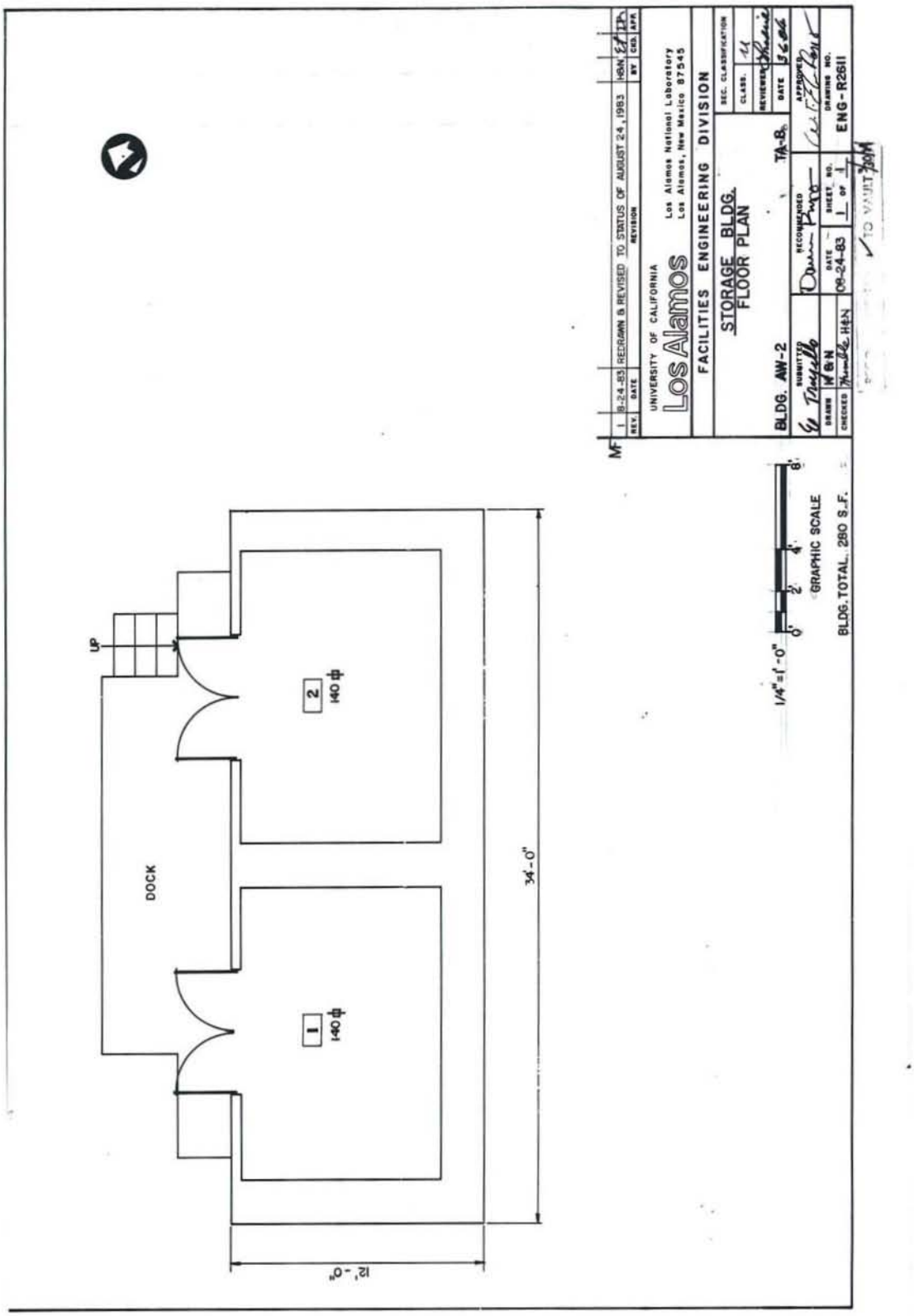
ENG-C 21128 September 8, 1959 Modifications to Electrical System Electrical – East End – Bldg AW-1



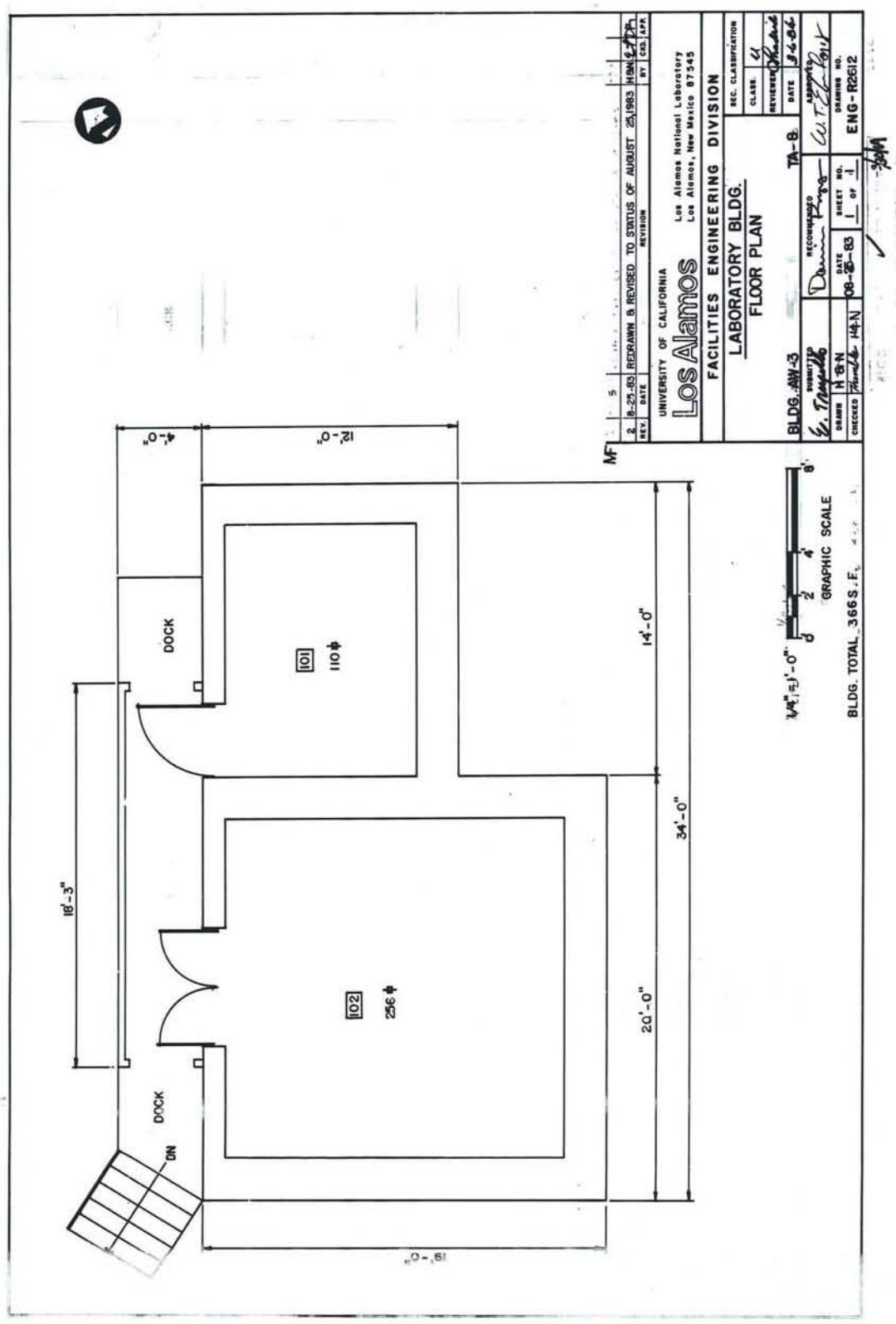
ENG-C 34041 April 6, 1966 Structural: Plan, Section, Detail & General Notes Building AW-3



ENG-R2610 August 25, 1983 Lab. & Shop Bldg. Floor Plan, Bldg. AW-1



ENG-R2611 August 24, 1983 Storage bldg. Floor Plan, Bldg. AW-2



ENG-R2612 August 25, 1983 Laboratory Bldg. Floor Plan, Bldg. AW-3