LA-UR-05-5704

TA-8-21 Roof Repairs

Historic Building Survey Report No. 248

Los Alamos National Laboratory

July 22, 2005
Survey No. 966

Prepared for the U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Site Office

prepared by

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ENV-ECO Cultural Resources Team
Environmental Stewardship Division

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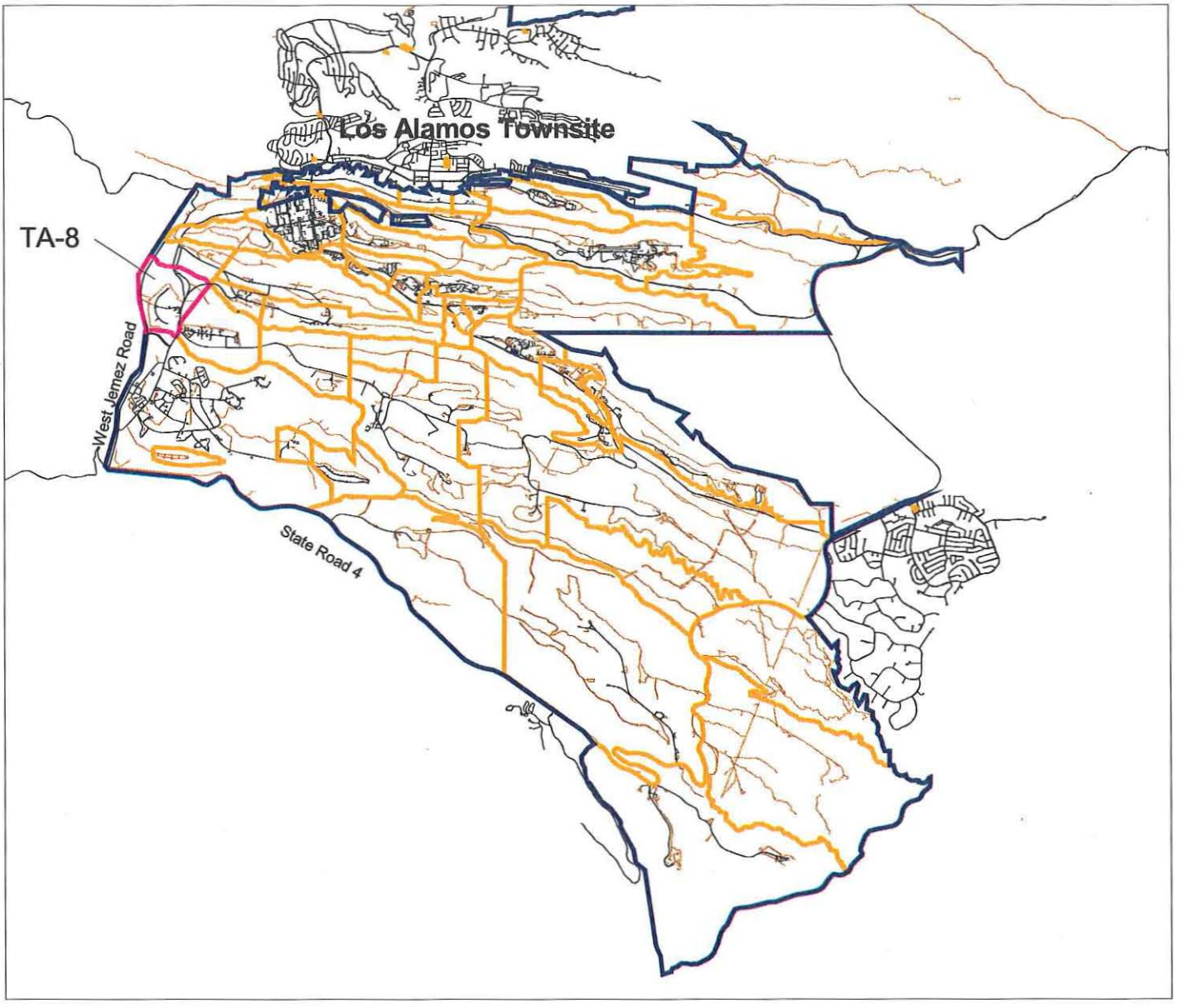
INTRODUCTION

The U.S. Department of Energy (DOE), National Nuclear Security Administration, Los Alamos Site Office (LASO) proposes to repair the roof and drainage system on TA-8-21, a historic Los Alamos National Laboratory (LANL) property located on DOE land at Technical Area (TA) 8 (Map 1). The re-roofing project may affect the exterior appearance of the building, thereby impacting qualities that make TA-8-21 eligible for the National Register of Historic Places (Register). TA-8-21 was built in 1950 and supported Early Cold War high explosives testing activities related to the development of post-World War II (WWII) weapons designs. Historically, laboratory operations housed in TA-8-21 supported radiography and inspection activities. The building currently serves as the main administration building for the Dynamic Experimentation (DX) Division.

The following information has been prepared as part of a notification of potential adverse effect to a property that is eligible for the Register and is intended to provide the background information necessary to initiate the Section 106 consultation process. This report contains a description of the proposed action, historical background information, a property description, integrity information, and a recommendation for Register eligibility. Selected drawings and photographs are included in the Appendix.

In verbal consultation between representatives of LANL and the State Historic Preservation Officer (SHPO), all parties agreed that the property was eligible for the Register under Criterion A and that adverse effects to the buildings from the re-roofing project would be resolved by implementing the terms of LASO's standard Memorandum of Agreement regarding the demolition or modification of buildings.

The SHPO is requested to concur with the eligibility determination contained in this report and to concur that the proposed roof repairs will adversely affect TA-8-21.



Los Alamos
National Laboratory
Cultural Resources Team
ENV-ECO Ecology Group

1:110000

7000 0 7000 14000 Feet

1000 0 1000 2000 3000 Meters

N
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Technical Area 8
LANL boundary
Technical Areas
Roads
Roaddirt
Parkpave
Parkdirt

LANL Boundary

Technical Area 8

Map 1

PROJECT DESCRIPTION

TA-8-21, a DX Division property, was originally surveyed in 2001 and 2003 by Shelia McCarthy, Historical Architect, Benchmark Consulting Group; John Ronquillo, Sigma Science, Inc.; Ken Towery, Site and Project Planning Group, LANL; and Kari Garcia and Ellen McGehee, Ecology Group, LANL. The building survey was accomplished by first conducting a field visit to TA-8-21. Digital photographs and architectural and engineering notes were taken during the initial field visit. Records research at LANL was also carried out, and representative drawings were compiled (Appendix).

Roof repairs are proposed for TA-8-21 due to major leaking and roof drainage problems. These repairs include removing and replacing the built-up roof, metal roof edge and wall flashing, gutters, downspouts, and portions of the lightning protection system. An electric ice melting system will be installed in the gutters and downspouts. In addition to re-roofing the building, the underside of the concrete overhang will be repaired. Defective concrete will be removed and replaced with a concrete patch material. Additionally, the roof curb will be raised to accommodate an 8 in. flashing height.

DX Division

Many properties under the administrative control of DX Division are located within TAs that were established during WWII's Manhattan Project. Historical operations included the development, fabrication, and testing of components used in the United States' first nuclear devices: the "Trinity" test and the two atomic bombs dropped on Japan during WWII ("Fat Man" and "Little Boy"). Post-WWII operations included the development of components for the Cold War nuclear stockpile and for atmospheric tests in the Pacific and at the Nevada Test Site (NTS). DX Division's current operations are situated in TAs that are functionally connected and share a common scientific history; however, each TA has its own unique history.

Today, DX Division's primary mission is research, development, and testing in support of nuclear weapons and Department of Defense (DOD) programs (LANL 2005). Specifically, DX Division is a leader in the area of nuclear stockpile stewardship, having certification responsibility for the substantial majority of the nation's active nuclear weapons stockpile (LASO 2003). DX Division manages several key elements of LANL's nuclear weapons program: the dynamics of materials, the Joint DOD/DOE Munitions Technology program, subcritical experiments (SCEs), and weapons hydrodynamic experiments. Important programs include explosively driven pulsed-power physics and high-energy-density physics, detonator production, high explosive science, and advanced conventional munitions development for DOD programs. Principal facilities include 11 multipurpose firing sites, detonator production facilities, and the PHERMEX (Pulsed High-Energy Radiographic Machine Emitting X-rays), and DARHT (Dual-Axis Radiographic Hydrodynamic Test) facilities. At NTS, DX Division also coordinates SCEs and oversees activities at U1A, an underground experimental complex (LANL 2005).

HISTORICAL OVERVIEW

Manhattan Project (1942–1946)

In 1939, Albert Einstein wrote a letter to President Franklin Roosevelt warning him of a possible German atomic bomb threat (Rothman 1992). President Roosevelt, acting on Einstein's concerns, gave approval to develop the world's first atomic bomb and appointed Brigadier General Leslie Groves to head the "Manhattan Project." Groves, in turn, chose Robert Oppenheimer to coordinate the design of the bomb.

A single isolated and secret research facility was proposed. General Groves had several criteria: security, isolation, a good water supply, an adequate transportation network, a suitable climate, an available labor force, and a locale west of the Mississippi located "at least 200 miles from any international border or the West Coast" (Rothman 1992). In 1942, Oppenheimer, who had visited the Pajarito Plateau on a horseback trip, suggested the Los Alamos Ranch School. Oppenheimer and his staff moved to Los Alamos in early 1943 to begin work. The recruitment of the country's "best scientific talent" and the construction of technical buildings were top priorities (LANL 1995:8). The University of California agreed to operate the site, code name "Project Y," under contract with the government (an arrangement that has continued to this day). Although the fission bomb was conceptually attainable, many difficulties stood in the way of producing a usable weapon. Technical problems included timing the release of energy from fissionable material and overcoming engineering challenges related to producing a deliverable weapon. Nuclear material and high explosive studies were of immediate importance (LANL 1995).

Two bomb designs appeared to be the most promising: a uranium "gun" device and a plutonium "implosion" device. The gun device involved shooting one subcritical mass of uranium-235 into another at sufficient speed to avoid pre-detonation. Together, the two subcritical masses would form a supercritical mass, which would release a tremendous amount of nuclear energy (Hoddeson *et al.* 1998). This method led to the development of the "Little Boy" device. Because it was conceptually simple, "Little Boy" was never tested before its use at Hiroshima. Scientists were less confident about the implosion design, which used shaped high explosives to compress a subcritical mass of plutonium-239. The symmetrical compression would increase the density of the fissionable material and cause a critical reaction.

In 1944, the uncertainties surrounding the plutonium device necessitated a search for an appropriate test site for the implosion design, later used in the "Fat Man" device. Manhattan Project personnel chose the Alamogordo Bombing Range in south-central New Mexico for the location of the test. A trial run involving 100 tons of trinitrotolulene (TNT) was conducted at the test site ("Trinity Site") on May 7, 1945. This dress rehearsal provided measurement data and simulated the dispersal of radioactive products (LANL 1995). The Trinity test was planned for July and its objectives were "to characterize the nature of the implosion, measure the release of nuclear energy, and assess the damage" (LANL 1995:11). The world's first atomic device was successfully detonated in the early morning of July 16, 1945. Little Boy, the untested uranium gun device, was exploded over the Japanese city of Hiroshima on August 6, 1945. On August 9, 1945, Fat Man was exploded over Nagasaki, essentially ending the war with Japan.

Early Cold War Era (1946–1956)

The future of the early Laboratory was in question after the end of WWII. Many scientists and site workers left Los Alamos and went back to their pre-war existences. Norris Bradbury had been appointed director of the Laboratory following Oppenheimer's return to his pre-WWII duties (LANL 1993a). Bradbury felt that the nation needed "a laboratory for research into military applications of nuclear energy" (LANL 1993a:62). In late 1945, General Groves directed Los Alamos to begin stockpiling and developing additional atomic weapons (Gosling 2001). Post-war weapon assembly work was now tasked to Los Alamos's Z Division, which had been relocated to an airbase (now Sandia) in nearby Albuquerque, New Mexico (Gosling 2001).

In 1946, Los Alamos became involved in "Operation Crossroads," the first of many atmospheric tests in the Pacific. Later, also in 1946, the U.S. Atomic Energy Commission (AEC) was established to act as a civilian steward for the new atomic technology born of WWII. The AEC formally took over the Laboratory in 1947, making a commitment to retain Los Alamos as a permanent weapons facility.

With the beginning of the Cold War—the term "Cold War" was first coined in 1947—weapons research once again became a national priority. Weapons research at Los Alamos, spearheaded by Edward Teller and Stanislaw Ulam, focused on the development of the hydrogen bomb, the feasibility of which had been discussed seriously at Los Alamos as early as 1946. The simmering Cold War came to a full boil in late 1949 with the successful test of "Joe I," the Soviet Union's first atomic bomb. In January 1950, President Truman approved the development of the hydrogen bomb; Truman's decision led to the remobilization of the country's weapons laboratories and production plants. The year 1950 also marked the first meeting of Los Alamos's "Family Committee"—a committee tasked with developing the first two thermonuclear devices (LANL 2001). In 1951, the Nevada Proving Ground (now the NTS) was established and the first Nevada atmospheric test, "Able," was conducted. In the same year, Los Alamos directed "Operation Greenhouse" in the Pacific and successfully conducted both the first thermonuclear test, "George," and the first thermonuclear "boosted" test, "Item." In 1952, the first thermonuclear bomb, known as "Mike," was detonated at Enewetak Atoll[1] in the Pacific (LANL 1993a). In short order, the Soviet Union responded with a successful demonstration of the use of fusion in August 1953, followed by a test of a hydrogen bomb in 1955. The arms race was on. By 1956, Los Alamos had successfully tested a new generation of high explosives (plastic-bonded explosives) and had begun to make improvements to the primary stage of a nuclear weapon (LANL 2001).

Although weapons research and development has always played a major role in the history of LANL, other key themes for the years 1942–1956 include supercomputing advancements, fundamental biomedical and health physics research, high explosives research and development, reactor research and development, pioneering physics research, and the development of the field of high-speed photography (McGehee and Garcia 1999). The Early Cold War era at Los Alamos ended in 1956, a date that marks the completion of all basic nuclear weapons design at LANL;

[1] A better understanding of the Marshall Islands language has permitted a more accurate transliteration of Marshall Island names into English. Enewetak is now the preferred spelling (formerly Eniwetok).

later research at Los Alamos focused on the engineering of nuclear weapons to fit specific delivery systems. The year 1956 was also the last year that Los Alamos was a closed facility—the gates into the Los Alamos town site came down in 1957.

Late Cold War Era (1956–1990)

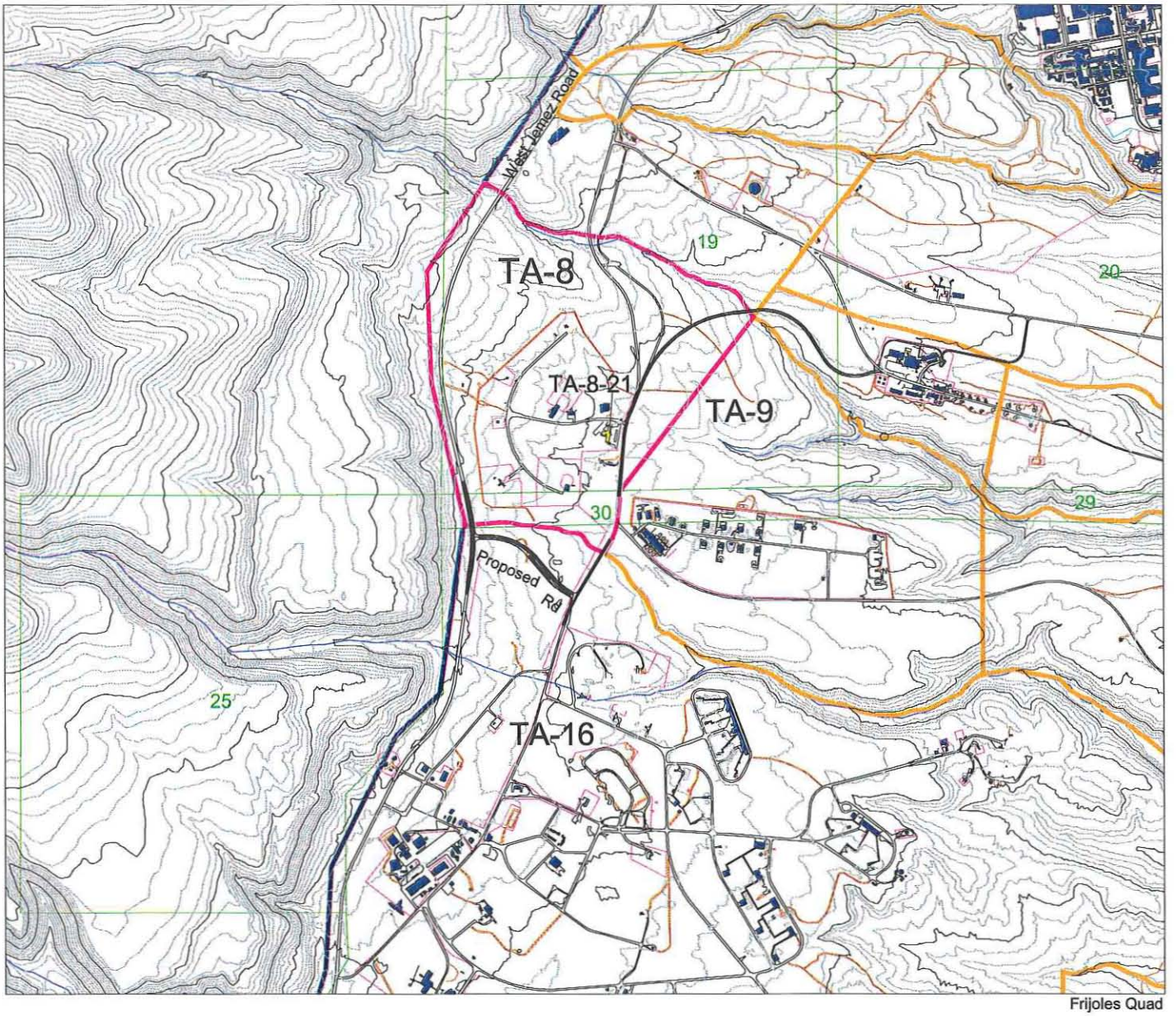
The Late Cold War era saw Los Alamos's continued support of the atmospheric testing programs in the Pacific and at NTS. In 1957, the first of many underground tests at NTS was conducted. Other defense mission undertakings during this time included treaty and test ban verification programs (such as using satellite sensors to detect nuclear explosions), research and development of space-based weapons, and continued involvement with stockpile stewardship issues. Non-weapons undertakings supported nuclear medicine, genetic studies, National Aeronautics and Space Administration collaborations, superconducting research, contained fusion reaction research, and other types of energy research (McGehee and Garcia 1999).

DESCRIPTION OF TECHNICAL AREA

Current Function

TA-8—now known as GT-Site—supports non-destructive testing and evaluation activities (Figure 1; Map 2). In addition to standard office space, TA-8 contains laboratory areas that house high-intensity radiography equipment used for studies of high explosives, plutonium, uranium, arsenic, lithium hydride, and titanium oxide. Other diagnostic and scientific capabilities include photography laboratories, darkrooms, a SEM instrument room, and a machine shop. Complete X-ray developing is also available in this facility (MacRoberts n.d., LANL 1993b).

Figure 1. 1991 Aerial of TA-8



Frijoles Quad

Los Alamos
National Laboratory
Cultural Resources Team
ENV-ECO Ecology Group

1:24000

1000 0 1000 2000 3000 Feet

200 0 200 400 600 800 1000 Meters

N
W E
S

TA-8-21
20 Foot Contours
100 Foot Contours
Technical Area 8
LANL boundary
Technical Areas
Drainage
Twonship, Range, Section
USGS 7.5 Minute Quad
Roads
Roaddirt
Fences
Structures

Technical Area 8

Map 2

Historical Background

TA-8—historically known as Anchor West Site—was used during WWII to conduct gun tests in support of the gun device. 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 (Figure 2). Placing the buildings lower in the ravine allowed for gun emplacements to be positioned above the roof level of the control building. This unique proving ground layout lessened the hazards associated with using high-alloy tubes and with firing the tubes in free recoil. The Anchor Ranch Proving Ground was completed and in active use by mid-September 1943. Special test guns were ordered from the Naval Gun Factory at the end of 1943, but were not ready until March 1944. During the four-month waiting period, personnel at TA-8 conducted practice tests, perfected gun testing operations, and established high-speed photographic techniques for documenting the test data. In May 1944, the first industrial-type radiograph was made at Anchor West Site using a medical X-ray unit (U.S. DOE 1986). This early radiographic work was carried out in one of the log guesthouses that were part of the pre-war Anchor Ranch. In August 1944, these operations were moved to T-Site, another early TA (U.S. DOE 1986).

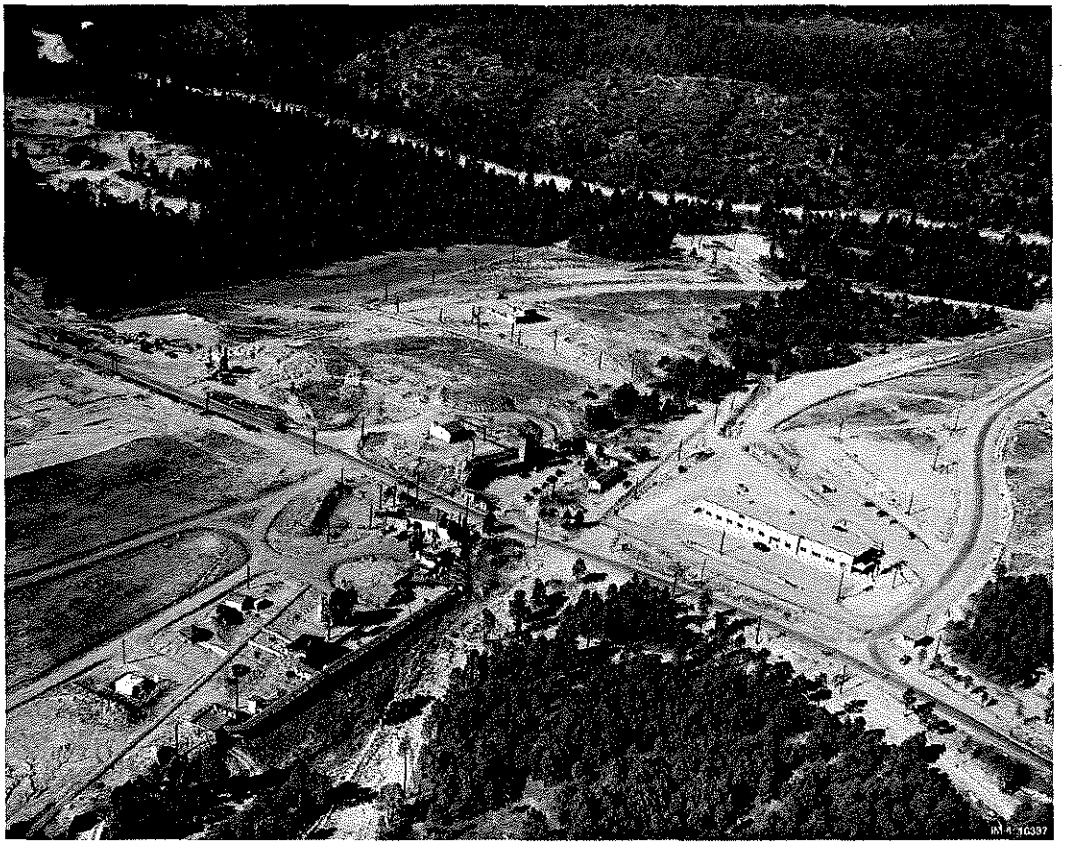


Figure 2. Anchor West Site (TA-8) (1950)
(Gun Site facilities located in upper half of aerial view, above main road in center of photo, TA-8-21 to the right side of photo.)

Beginning in the fall of 1945, TA-8 was used by Laboratory explosives personnel for high explosives research and development. In July 1949, construction of a new radiographic complex was begun. The new "GT-Site" was completed by 1950, the same year that some of the older wartime facilities at Anchor West Site were being removed (Figure 3). Early GT-Site contained a storage vault, source rooms, high explosives magazines, and X-ray, betatron, and film processing equipment. During the Cold War years, facilities at TA-8 were used for ultrasonic and electromagnetic testing. Research involving high explosives, plutonium, uranium, arsenic, lithium hydride, and titanium oxide was also conducted. In 1953, J Division personnel used some of the remaining Anchor West buildings for crystal growing experiments (U.S. DOE 1986).

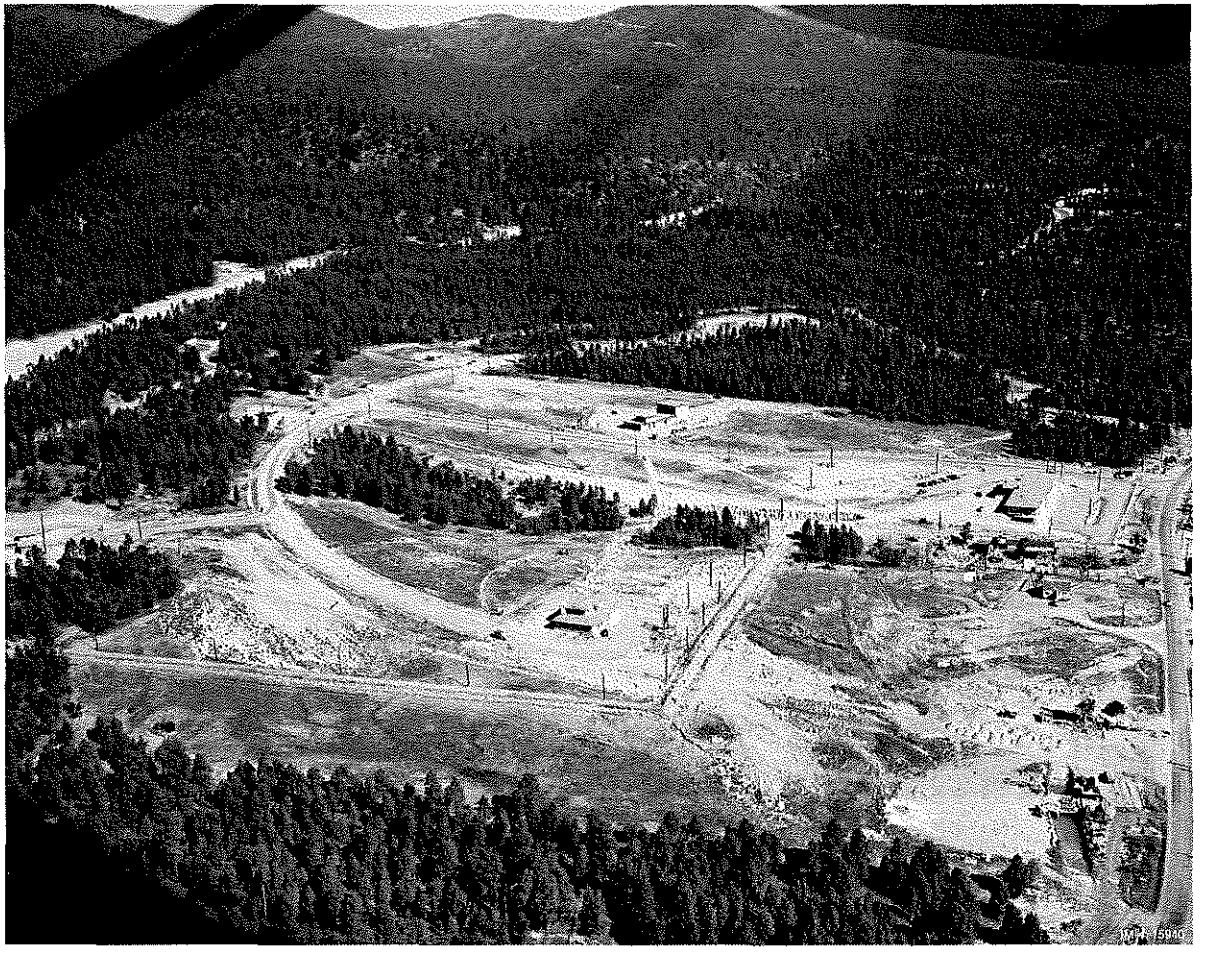


Figure 3. TA-8, New Construction (1950)

PROPERTY DESCRIPTION

Properties located at TA-8 are identified using the current LANL system of placing the TA prefix before the building number. Historically, however, the "AW" prefix (for Anchor West Site) was used as the TA designator for TA-8. Some of the drawings included in this report may use the old system of building identification. For example, the term "AW-21" may be used in place of TA-8-21.

TA-8-21

Architectural Description

TA-8-21 is a two-story office building, approximately rectangular in structure, measuring 195 ft 5 in. by 42 ft 4 in. (Photos 1a–d; Map 3). The building was constructed partially below grade so that the building's east side is a full two stories in height (Photo 1a) while only the upper floor is exposed on the west side (Photos 1b and c). The lower grade on the east side contains the main entrance and parking. The main entrance consists of a pair of steel and half-glass doors with three-light transom, two concrete steps with wing walls, and a cantilevered concrete roof. Additional parking and secondary entrances are located on the west side of the building.

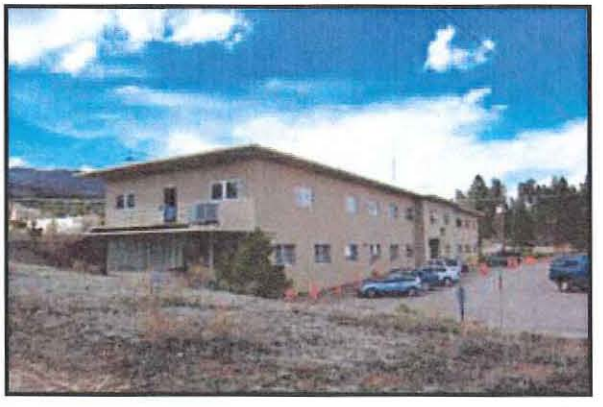


Photo 1a: Oblique view of south and east sides and lower parking area

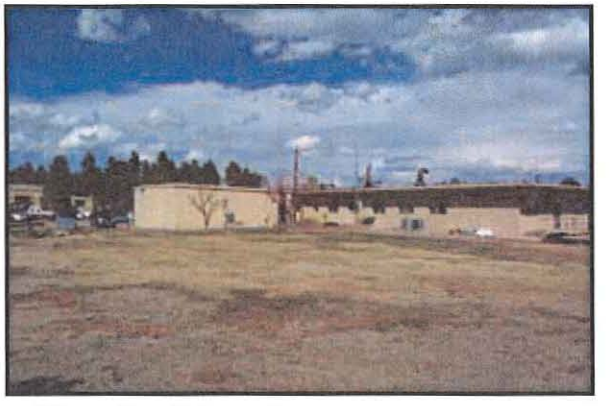


Photo 1b: Oblique view of west and south side (Note addition at left)

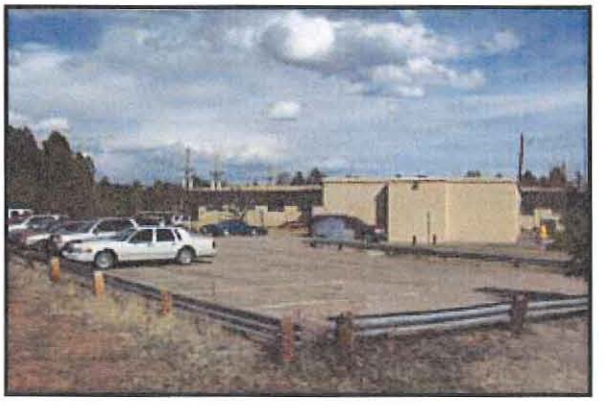
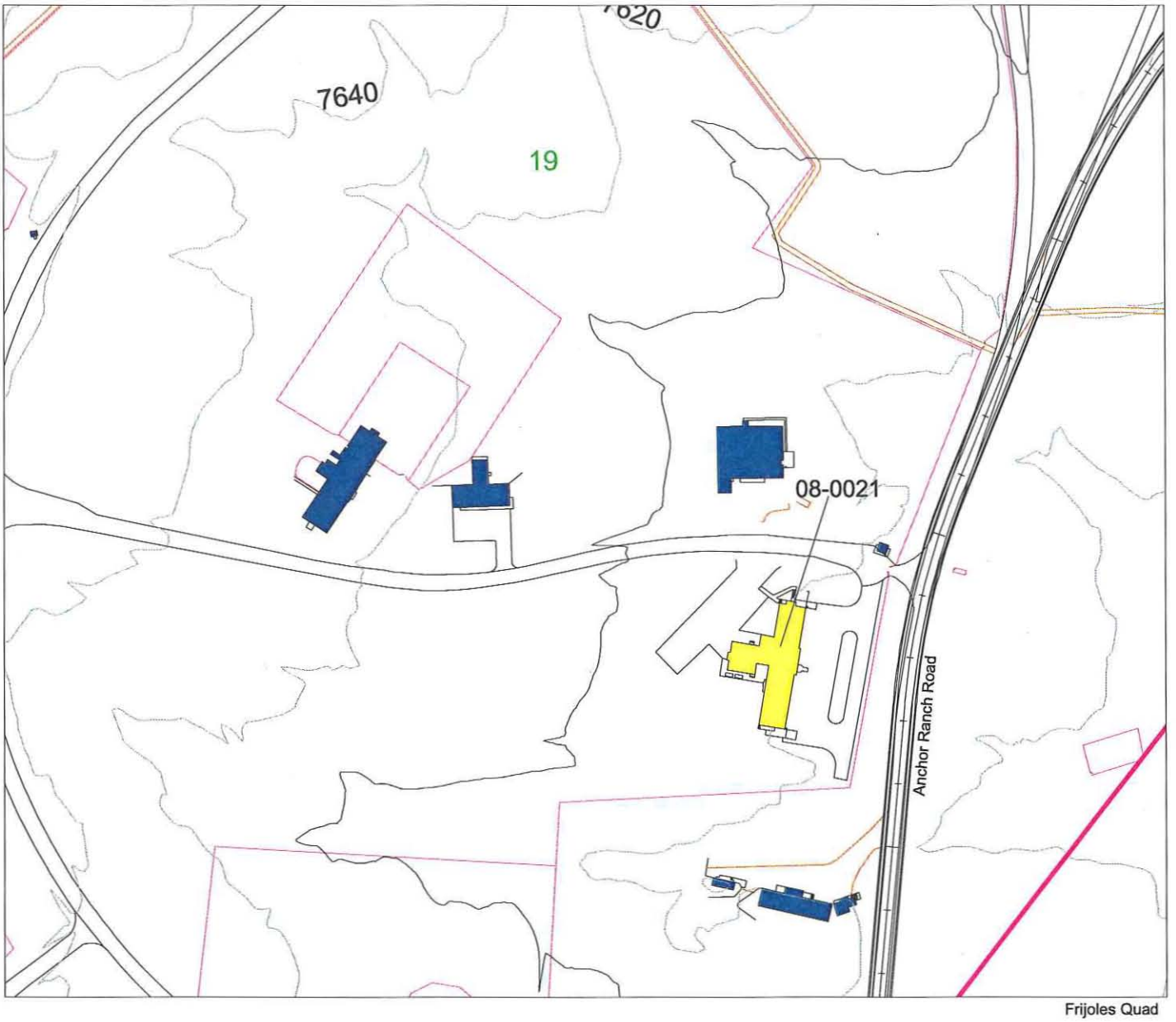


Photo 1c: View of west side and upper parking area

Photo 1d: View of north side



Frijoles Quad

Los Alamos
National Laboratory
Cultural Resources Team
ENV-ECO Ecology Group

1:3000

200 0 200 400 Feet

30 0 30 60 90 Meters

N
W E
S

- TA-8-21
- Technical Area 8
- 20 Foot Contours
- 100 Foot Contours
- Technical Areas
- LANL boundary
- Drainage
- Twonship, Range, Section
- USGS 7.5 Minute Quad
- Roads
- Roaddirt
- Fences.shp
- Structures

Closeup TA-8-21

Map 3

The building was constructed with a reinforced concrete foundation and floor slab, 14 in. thick concrete walls, and a flat concrete roof with cantilevered overhangs. The flat roof has lightning rods, a large vent stack, and exterior perimeter lighting. The exterior of the building is a light tan color, and several large through-the-wall ventilators are located on the east side of the building.

Photo 1e: Detail view of north entry vestibule and metal stairs to lower entrance

Two identical loading docks are located on both the north and south ends of the building. The covered docks are approximately 3 ft high, are equipped with wooden bumpers and steel steps, and are enclosed with concrete half-walls. Double doors access the interior of the building from each dock. Steel columns support the flat concrete roofs that also serve as entry/exit platforms for the second floor doors. Above the lower level docks are pairs of metal doors. The south set of doors opens onto the dock roof with concrete stairs extending off the roof to the west to grade. The north set of doors is enclosed with a wood-framed vestibule sheathed with plywood siding and glass panels. A pair of glass storefront doors access the vestibule from the west. The north dock now serves as the visitor and worker entrance to the area (Photo 1e). Steel stairs access the upper parking level to the west of the building.

Windows, located on both the east and west sides of the building, are a combination of one-light and three-light steel-framed awning style units. For security reasons, a metallic reflective material coats the windows. Windows have been replaced by air conditioning units. In 1995, one-light aluminum framed windows replaced several windows on the south end.

A rectangular addition was constructed in 1988 on the west side of the original building. The one-story addition, measuring 45 ft 6 in. by 43 ft 8 in., has a concrete slab foundation, concrete masonry unit walls, and a low-pitched shed roof. A steel ladder provides access to the roof from the north side. Access into the addition was possible from the north side through a pair of steel and half-glass doors with concrete steps and a metal canopy roof. The west end of the addition has a second pair of metal doors.

Historical Background

Historically, TA-8-21 was part of TA-8's post-war radiography operations that included studies of high explosives, plutonium, uranium, arsenic, lithium hydride, and titanium oxide. Laboratory operations housed in TA-8-21 supported Cold War radiography and inspection activities. The building currently serves as the main administration building for DX Division.

INTEGRITY AND NATIONAL REGISTER ELIGIBILITY

Integrity

The LANL Cultural Resources Team has developed four integrity codes to assess potentially eligible properties. The integrity requirements for properties eligible under Criterion A are less stringent than for those properties eligible under Criterion C. For example, a historically significant property with a level 3 integrity could still be eligible, especially if an element of historic uniqueness is involved. Properties eligible solely under Criterion C should have no lower than a level 2 integrity. Level 4 integrity properties are not eligible for the Register.

1. Excellent Integrity – the property is still closely associated with its primary context and retains integrity of location, design, setting, workmanship, materials, feeling, and association. Little or no remodeling has occurred to the property and all remodeling is in keeping with its associated historic context/significant use periods.

2. Good Integrity – the property's interior and exterior retain historic feeling and character but some of the original significant equipment may be gone. The property may have had minor remodeling.

3. Fair Integrity – a property in this category should retain original location, setting, association, and exterior design. All associated interior machinery/equipment may be absent but the essential question is "Is this property still recognizable to a contemporary of the building's historic period?"

4. Poor Integrity – the property has no connection with the historically significant setting, feeling, and context. Major changes to the property have occurred. The property would be unrecognizable to a contemporary.

Eligibility Criteria

Laboratory-Processing, Administration, and Security Properties

Laboratory-processing buildings, administration buildings, and security buildings and structures do not need to possess an integrity of both exterior and interior features in order to be eligible for the National Register under Criterion A. In cases where original equipment has been removed, a property can still be considered significant for its historical associations. Laboratory-processing, administration, and security properties need only retain original location, setting, association, feeling, and exterior design to maintain significant historical integrity under Criterion A. Properties eligible under Criterion C have to meet a more stringent standard of physical integrity. Additions and remodeling that reflect changing scientific missions are acceptable under Criterion C (Hanford Site 1999).

Support Buildings and Structures

In order to be eligible under Criterion A, support buildings and structures must have functioned as significant facilities within an associated historical context (Hanford Site 1999). "First tier" support properties, if linked to a historically significant context and 50 years old or older, may be eligible for the Register. If less than 50 years old, support properties must be exceptionally significant. "Second tier" support properties, primarily structures, are usually not eligible for the Register (even if they are 50 years old or older) because of the minor role they played in history.

Eligibility Recommendations

TA-8-21 has level 2 integrity. This laboratory-processing and administration building supported the Laboratory's Cold War high explosives testing activities and is deemed eligible for the Register under Criterion A for its association with Early Cold War nuclear weapons development. Although the original equipment associated with radiographic inspection operations has been removed, TA-8-21 continues to function as an office building and currently houses DX Division's administrative functions. TA-8-21 has had interior office modifications over the years and, in 1988, a small addition was added to the north side. In spite of the mission-related modifications at TA-8-21, the building has excellent physical integrity and has retained its original Cold War setting, feeling, and design.

The State Historic Preservation Office is requested to concur with the eligibility determination contained in this report and with a determination of adverse effect to TA-8-21. As a result of this historic building survey, this project complies with the National Historic Preservation Act of 1966 (as amended).

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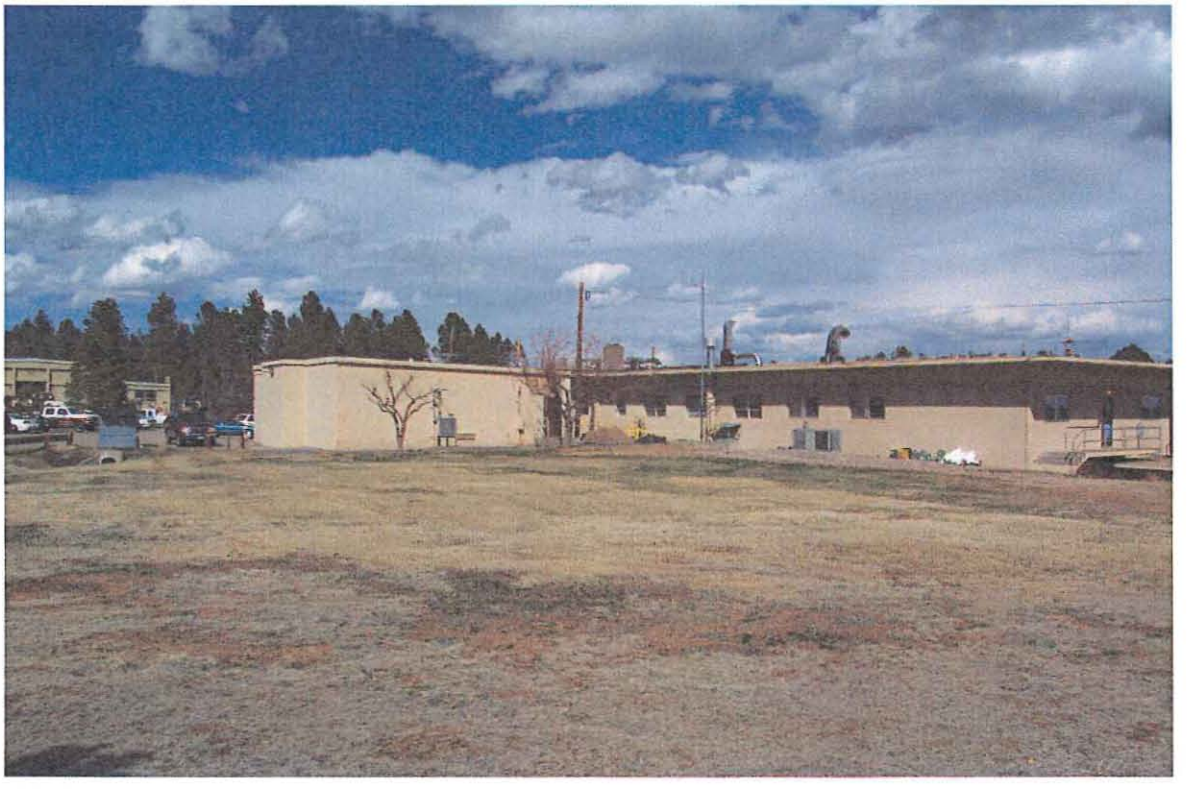
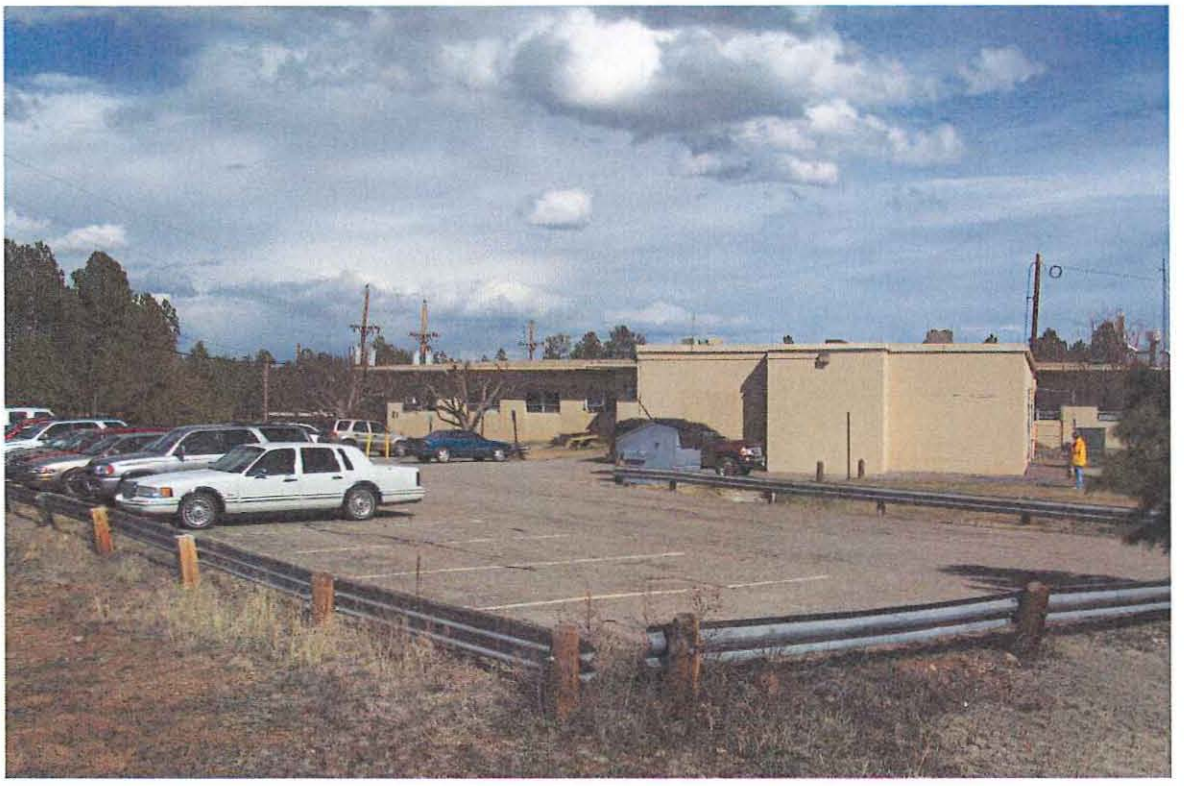
APPENDIX

Selected Photographs and Drawings:
TA-8-21

TA-8-21, South and east sides



TA-8-21, West and south sides

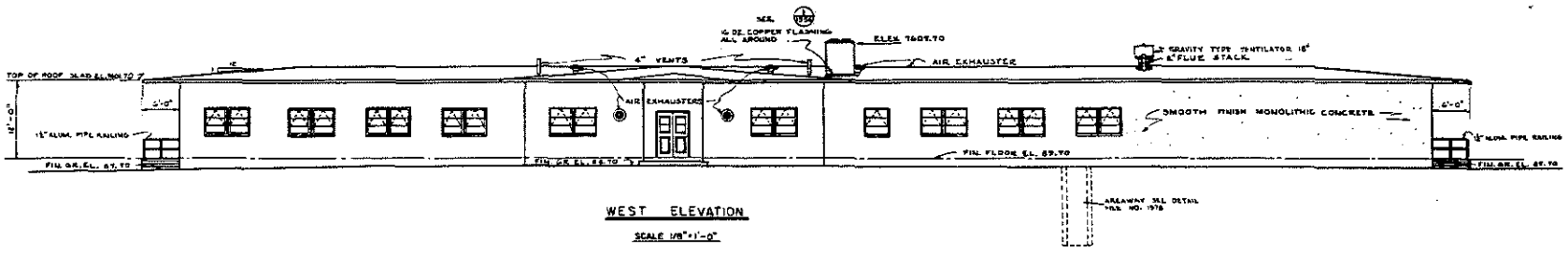


TA-8-21, West side

TA-8-21, North and west sides

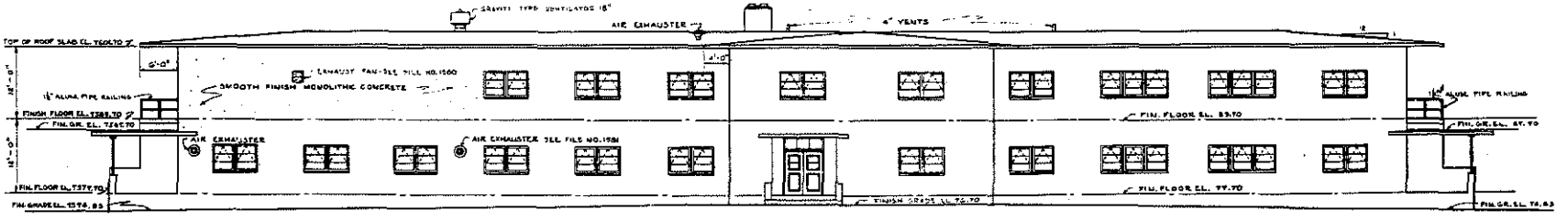
TA-8-21, North side

TA-8-21, East and north sides



WEST ELEVATION

SCALE 1/8"=1'-0"



EAST ELEVATION

SCALE 1/8"=1'-0"

Unclassified/Not UCNI

LANL Class. Group

5/12/03
date

AS CONSTRUCTED DRAWING

FOR OFFICIAL USE ONLY

ARCHITECTURAL – BLDG. NO. (88)AX-21
ELEVATIONS

PROJECT – "B"
TA – 8

LOS ALAMOS NEW MEXICO

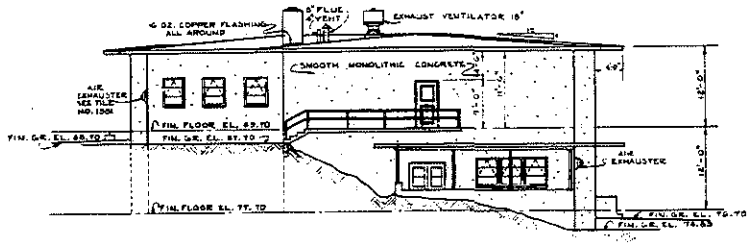
BLACK & VEATCH — CONSULTING ENGINEERS

FILE NO. 1555

SHEET 26

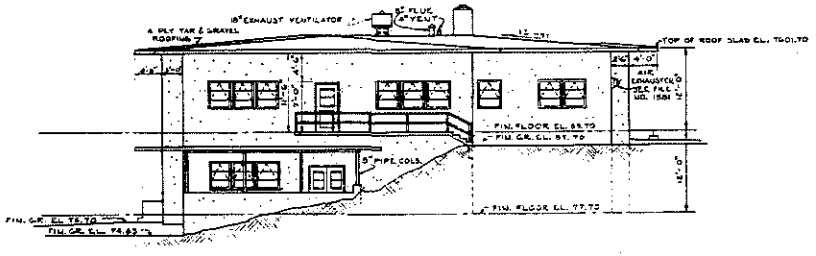
LL PMT. NO. CNC-C 12484

SFA-FG-26



SOUTH ELEVATION

SCALE 1/8"=1'-0"



NORTH ELEVATION

SCALE 1/8"=1'-0"

Unclassified Per UCNI
LANL Class. Group
5/12/03
date

AS CONSTRUCTED DRAWING
CONSTRUCTION CONTRACT NO. 11103-1644
SUBMITTED
RECOMMENDED
APPROVED

ARCHITECTURAL – BLDG. NO. (88) AND 21
ELEVATIONS
PROJECT "B"
LOS ALAMOS TA – 8 NEW MEXICO
BLACK & VEATCH — CONSULTING ENGINEERS

FILE NO. 1556
C.P.R.
SHEET 27

U.S. DWG. NO. ENG-C 12485

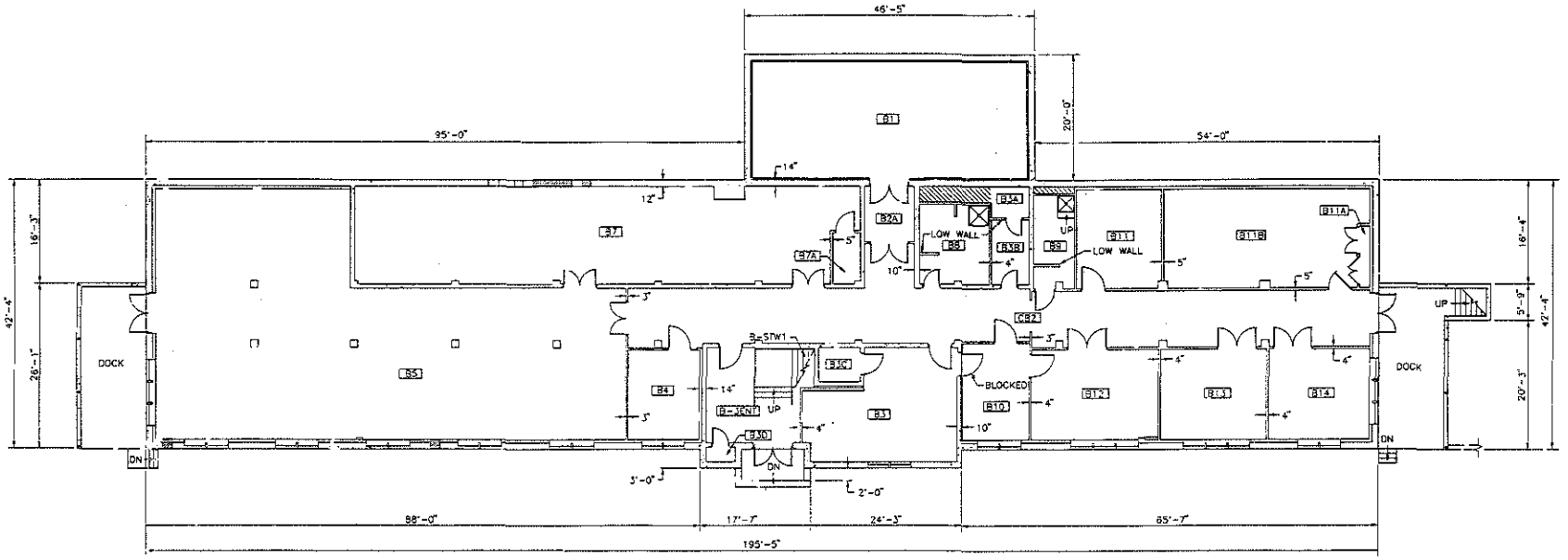
SEA-F6-27

ROOM INFORMATION CHART

RM NO	NET SQ FOOTAGE	RM NO	NET SQ FOOTAGE	RM NO	NET SQ FOOTAGE
B1	849	B-JENT	182	B11	212
CB2	1153	B4	175	B11A	18
B2A	32	B5	2278	B11B	498
B3	395	B7	1233	B12	285
B3A	17	B7A	43	B13	243
B3B	39	B8	153	B14	213
B3C	47	B9	104	B-STW1	75
B3D	12	B10	171	UTILITY	46

TOTAL ROOM NET SQUARE FOOTAGE = 8,585

GROSS SQUARE FOOTAGE = 9,291



NOTES:

1. ALL EXTERIOR WALLS ARE 18" THICK UNLESS OTHERWISE NOTED.
2. ALL INTERIOR WALLS ARE 8" THICK UNLESS OTHERWISE NOTED.
3. REFERENCE DRAWING ENG-R2616.
4. ROOM NET SQUARE FOOTAGE IS COMPUTED BY MEASURING FROM THE INSIDE FACE OF EXTERIOR WALLS TO THE CENTERLINE OF ALL OTHER WALLS.
5. GROSS SQUARE FOOTAGE IS EQUAL TO ALL FLOOR AREA (INCLUDING ALL OPENINGS IN FLOOR SLABS) MEASURED TO THE OUTER SURFACES OF EXTERIOR OR ENCLOSING WALLS, AND INCLUDES ALL FLOORS, MEZZANINES, HALLS, VESTIBULES, STAIRWELLS, SERVICE AND EQUIPMENT ROOMS, PENTHOUSES, ENCLOSED PASSAGES AND WALKS, FINISHED USABLE SPACE WITH SLOPING CEILINGS (SUCH AS ATTIC SPACES) HAVING 5 FEET OR MORE HEADROOM, AND APPENDED COVERED SHIPPING OR RECEIVING PLATFORMS AT TRUCK OR RAILROAD CAR HEIGHT. ALSO INCLUDED IN GROSS FLOOR AREA, BUT CALCULATED ON ONE-HALF OF ACTUAL FLOOR AREA, ARE COVERED OPEN PORCHES, PASSAGES AND WALKS, WITH APPENDED UNCOVERED RECEIVING AND SHIPPING PLATFORMS AT TRUCK AND RAILROAD HEIGHT.

LEGEND

BRICK
CONCRETE
CONCRETE BLOCK
LOUVER
UTILITY SPACE
WINDOW
WOOD OR METAL STUD
COLUMNS

BASEMENT FLOOR PLAN

SCALE: 1/8" = 1'-0"

8 5 4 2 0 8 16 32
GRAPHIC SCALE

N

FIELD VERIFIED 12-17-93

NO	DATE	CLASS/ REV	DESCRIPTION	DWN	VER	CHKD	REL	SUB	REC	APP

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
EXPLOSIVES TECHNOLOGY AND APPLICATIONS
ARCH: BASEMENT FLOOR PLAN

DRAWN S. DOUGLOUS
VERIFIED T.G. 1-6-97
CHECKED C. SANDOVAL
RELEASED H. SALAZAR
DATE 01-13-94

BLDG 21 1A-B

SUBMITTED JERRY FORTE
RECOMMENDED FRED STOMPSON
APPROVED FRED THOMPSON

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 1 OF 2

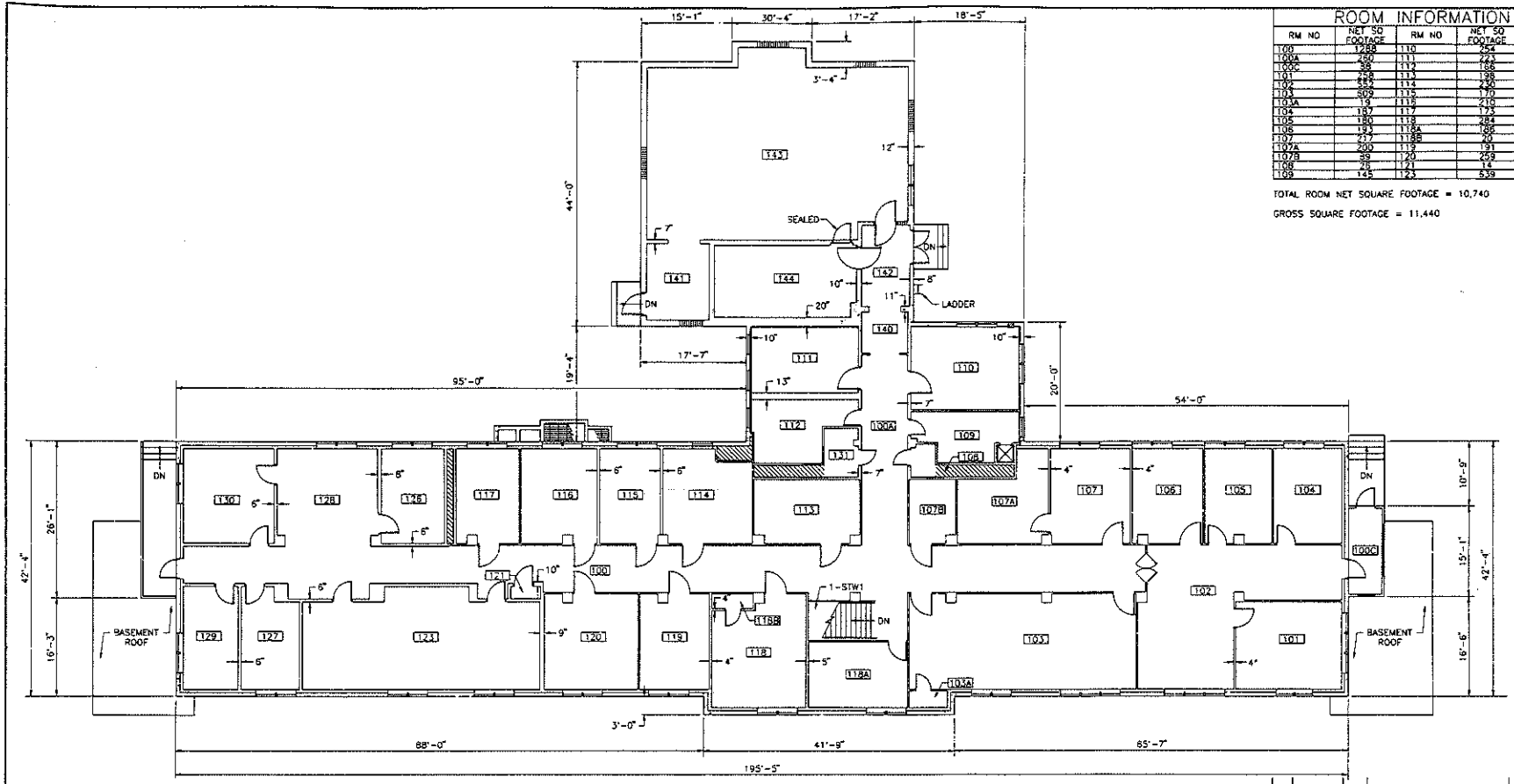
CLASSIFICATION U REVIEWER H. SALAZAR DATE

PROJECT ID 7556

DRAWING NO AB226

REV

JCI NO 9-11-3



ROOM INFORMATION CHART

RM NO	NET SQ FOOTAGE	RM NO	NET SQ FOOTAGE	RM NO	NET SQ FOOTAGE
100	1288	110	254	126	178
100A	260	111	223	127	169
100C	38	112	168	128	274
101	758	113	198	129	163
102	885	114	230	130	248
103	509	115	170	131	52
103A	19	116	210	140	81
104	187	117	173	141	141
105	180	118	284	142	120
106	193	118A	186	143	1278
107	217	118B	20	144	520
107A	200	119	191	1-STW1	111
107B	59	120	259	UTILITY	97
108	26	121	14		
109	145	123	539		

TOTAL ROOM NET SQUARE FOOTAGE = 10,740

GROSS SQUARE FOOTAGE = 11,440

NOTES

1. ALL EXTERIOR WALLS ARE 14" THICK UNLESS OTHERWISE NOTED.
2. ALL INTERIOR WALLS ARE 3" THICK UNLESS OTHERWISE NOTED.
3. REFERENCE DRAWING ENG-R2616.
4. ROOM NET SQUARE FOOTAGE IS COMPUTED BY MEASURING FROM THE INSIDE FACE OF EXTERIOR WALLS TO THE CENTERLINE OF ALL OTHER WALLS.
5. GROSS SQUARE FOOTAGE IS EQUAL TO ALL FLOOR AREA (INCLUDING ALL OPENINGS IN FLOOR SLABS) MEASURED TO THE OUTER SURFACES OF EXTERIOR OR ENCLOSING WALLS, AND INCLUDES ALL FLOORS, MEZZANINES, HALLS, VESTIBULES, STAIRWELLS, SERVICE AND EQUIPMENT ROOMS, PENTHOUSES, ENCLOSED PASSAGES AND WALKS, FINISHED USABLE SPACE WITH SLOPING CEILINGS (SUCH AS ATTIC SPACES) HAVING 5 FEET OR MORE HEADROOM, AND APPENDED COVERED SHIPPING OR RECEIVING PLATFORMS AT TRUCK OR RAILROAD CAR HEIGHT. ALSO INCLUDED IN GROSS FLOOR AREA, BUT CALCULATED ON ONE-HALF OF ACTUAL FLOOR AREA, ARE COVERED OPEN PORCHES, PASSAGES AND WALKS, WITH APPENDED UNCOVERED RECEIVING AND SHIPPING PLATFORMS AT TRUCK AND RAILROAD HEIGHT.

LEGEND

BRICK
CONCRETE
CONCRETE BLOCK
LOUVER
UTILITY SPACE
WINDOW
WOOD OR METAL STUD
COLUMNS

FIRST FLOOR PLAN

SCALE: 1/8" = 1'-0"

8 6 4 2 0 8 16 32
GRAPHIC SCALE

N

FIELD VERIFIED 02-06-96

NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	REL	SUB	REC	APP
MF 1	02/06/96	TAG	FLOOR PLAN REV. SOUTH SIDE OF BLD.	PS	YTS	LS	CS	DV	LB	LJ

JOHNSON CONTROLS WORLD SERVICES INC.

AS-BUILT RECORD FLOOR PLAN
EXPLOSIVES TECHNOLOGY AND APPLICATIONS
ARCH: FIRST FLOOR PLAN

BLDG 21 TA-8

DRAWN	S. CALLEGOS
VERIFIED	C.E.S / S.G.
CHECKED	C. SANDOVAL
RELEASED	H. SALAZAR
DATE	01-13-94

SUBMITTED	RECOMMENDED	APPROVED
JERRY FORTE	FRED THOMPSON	FRED THOMPSON

Los Alamos — Los Alamos National Laboratory, Los Alamos, New Mexico 87545

SHEET 2 OF 2

CLASSIFICATION — REVIEWER H. SALAZAR — DATE 9-20-96

PROJECT ID	DRAWING NO	REV
7556	AB226	1

JCI NO 01 011