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RDA-TR-187400-003

**FINAL REPORT ON JESS FACILITY MODIFICATION  
AND ENVIRONMENTAL/POWER PLANS**

(NASA-CR-175685) JESS FACILITY MODIFICATION  
AND ENVIRONMENTAL/POWER PLANS Final Report  
(H and D Associates, Marina Del Rey, Calif.)  
30 p HC A03/MF A01 CSCI 14B

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G3/09 21038

By:  
T. AUSTIN BORDEAUX

JUNE 1984

Sponsored By:  
JET PROPULSION LABORATORY  
California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, CA 91109

Contract No. 956885



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## PREFACE

This is the final report on work performed for JPL under Contract No. 956885 to develop JESS Installation Plans. It consists of two reports: RDA-TR-187400-001R.1 "JESS Computer Laboratory Facility Modification and Environmental/Power Plans" and RDA-TR-187400-002R.1 "Facility Modification and Environmental/Power Plans for Freedom Hall". These previously were submitted in preliminary form for JPL review as RDA-TR-187400-001 and RDA-TR-187400-002. They have been revised in accordance with JPL's review comments.

RDA-TR-187400-001R.1

**JESS COMPUTER LABORATORY FACILITY MODIFICATION  
AND ENVIRONMENTAL/POWER PLANS**

By:  
T. AUSTIN BORDEAUX

JUNE 1984

This report was prepared for the Jet Propulsion Laboratory,  
California Institute of Technology, sponsored by the  
National Aeronautics and Space Administration.

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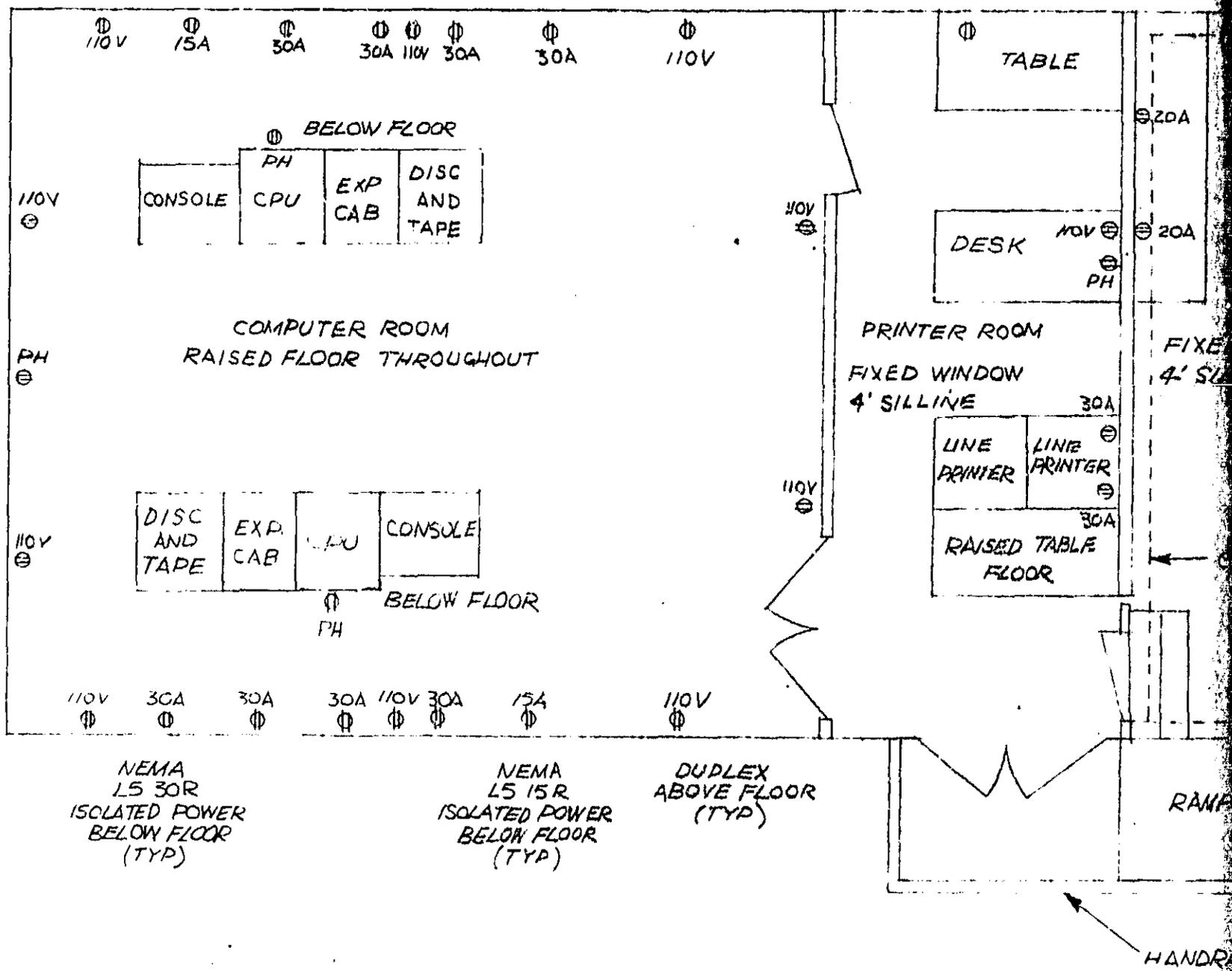
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## 1. INTRODUCTION

JPL is developing the Joint Exercise Support System (JESS) for the Readiness Command (REDCOM). It is planned that JESS will be operated full-scale for the first time during exercise Bold Venture 85 at Ft. Lewis, WA in October of this year. RDA is assisting JPL in planning modifications to the Ft. Lewis simulation facility to support the JESS installation and conduct of the exercise.

This is the first of a series of reports on the RDA support effort. It contains a preliminary Facility Modifications Plan and a preliminary Environmental/Power Plan for the JESS Computer Laboratory. Figure 1 is a sketch of the modifications to Building 11A12 adjacent to Freedom Hall. It also is the Power Distribution Plan for the facility. The figure shows the amount of power required as well as the locations of outlets. The placement of equipment and work tables is shown for reference. Section 2 of the report contains an estimate of the air conditioning requirements for the facility.

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FOLDOUT FRAME

Figure

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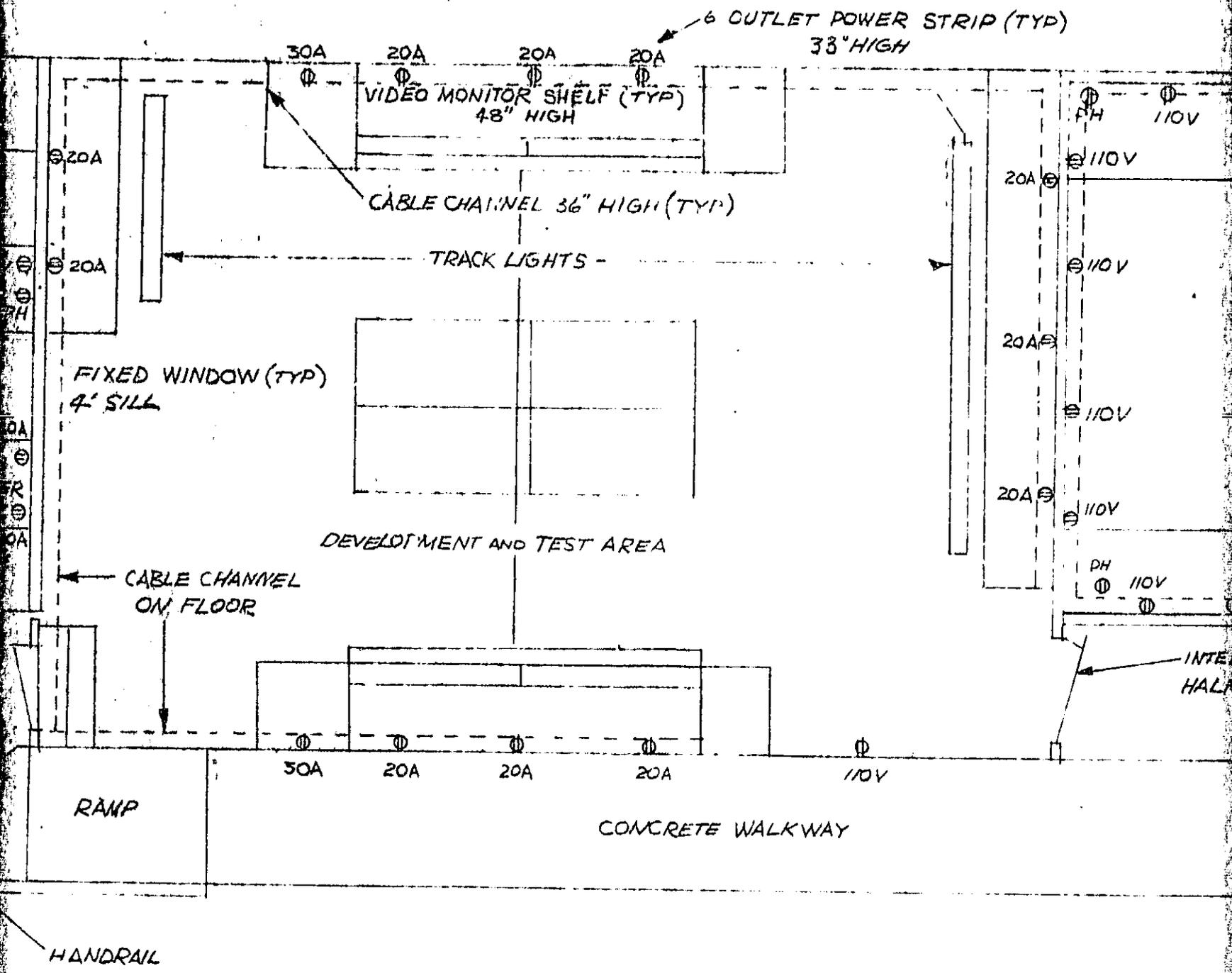
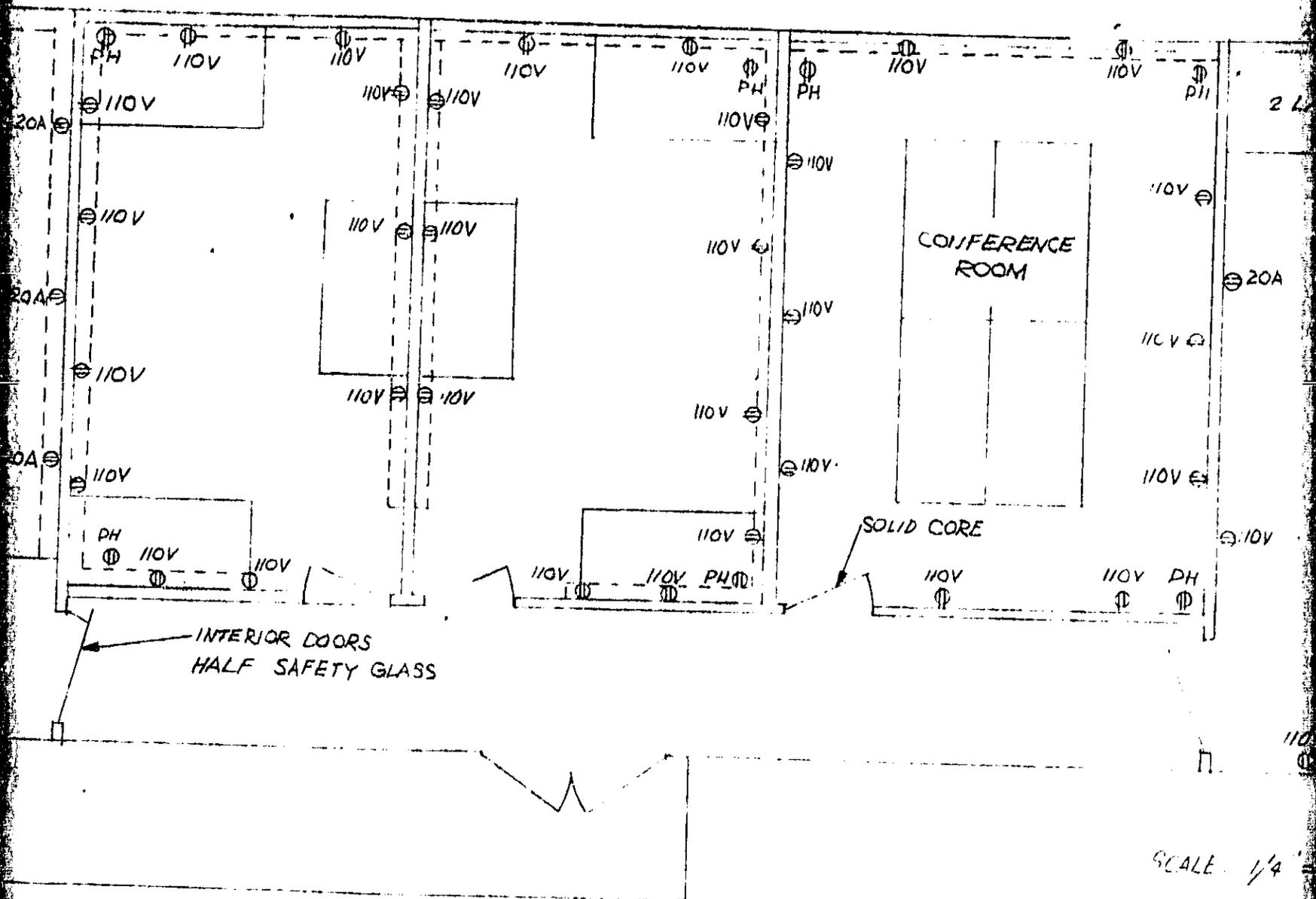


Figure 2. - 2nd Floor Computer Lab - Fort Leis, Washington Facility Modification and Power Plan

2

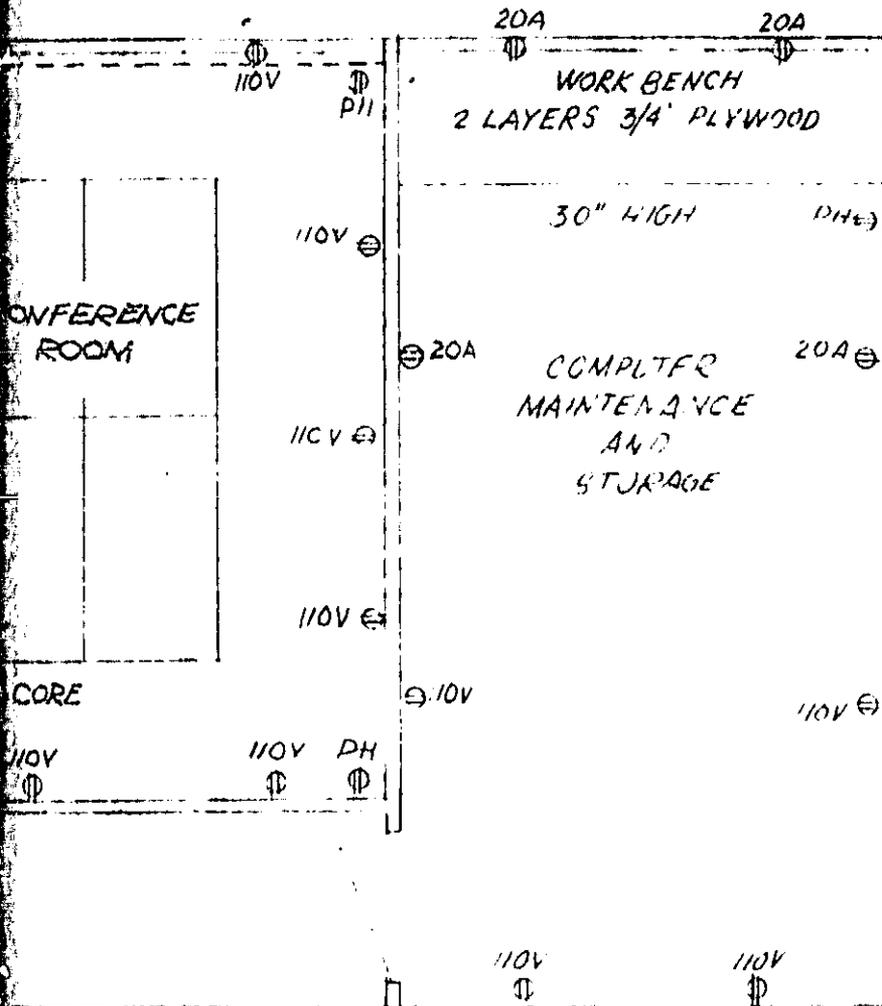
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And Power Plan - 22 June 1974

3 FOLDCUT FILMS



SCALE: 1/4" = 1'

4 FOLDOUT FRAME

## 2. ESTIMATE OF AIR CONDITIONING REQUIREMENTS

The estimates of the air conditioning requirements contained herein are made up of two parts: the load generated by dissipation of heat by the computer equipment and peripherals and that generated by occupants of the facility. The estimate of the equipment thermal dissipation was developed by RDA directly. RDA also developed the number of occupants and provided that data to the Ft. Lewis Base Engineers who will apply their standard factors for that geographical locale in arriving at the total heat load to be handled.

### 2.1 THERMAL DISSIPATION OF EQUIPMENT

The estimates of equipment thermal dissipation are based upon the "VAX Systems Site Preparation Guide" by Digital Equipment Corp. dated April 1982, supplemented by data contained in Jet Propulsion Laboratory Interoffice Memorandum CAF: 363-84-CAF004 dated 13 March 1984. Estimates were made separately for each of the rooms in the laboratory.

#### 2.1.1 Computer Room

The "largest" 11/750 packaged system listed in the Site Preparation Guide has only three MBytes of RAM and a 256 MByte disk. It has a thermal dissipation of 21,000 Btu/h. Another four MBytes of RAM adds only 170 Btu/h. Two of the example 750 packaged systems together would be about 42,000 Btu/h; thus, it was considered conservative to use a planning figure of 50,000 Btu/h for the Computer Room.

### 2.1.2 Printer Room

The DEC LF-11A Lineprinter has a thermal dissipation of about 1200 Btu/h. In addition, though not specified, the operator also could have one or more terminals. The total equipment heat load in the printer room was estimated to be on the order of 4000 Btu/h.

### 2.1.3 Development and Test Area

The heat load in this area was based on having up to two 11/730s dissipating approximately 2700 Btu/h each (CPU System Cabinet with two RLO2 disk drives) plus six color monitors at 1000 Btu/h each and 10 terminals, 8 printers, three Graphovers and three videodisc players for a total of 24 items of equipment all at about 250 Btu/h each. The total heat dissipation is approximately 20,000 Btu/h for the Development and Test Area.

### 2.1.4 Office Area

There is no equipment specified for the two offices in this area. However, they could be occupied by up to eight or more people. Some or all of them could be using videoterminals and perhaps other equipment. In order to accommodate reasonably foreseeable circumstances, a thermal dissipation of 8000 Btu/h is estimated.

### 2.1.5 Conference Room

There is no equipment specified for this area. However, it is possible that some meetings/conferences could involve use or demonstration of JESS displays and/or outputs. To accommodate such situations it is estimated that the thermal dissipation of possible hardware involved may be on the order of 4000 Btu/h.

#### 2.1.6 Computer Maintenance and Storage Room

It is visualized that as many as two 11/730s and associated peripheral devices including color monitors, videoterminals, printers, etc. could be operating simultaneously during equipment checkout and maintenance activities. Based upon the thermal dissipation of that equipment discussed in 2.1.3 (above), it is estimated that an allowance should be made for a heat load of 15,000 Btu/h.

#### 2.1.7 JESS Computer Laboratory Occupancy

The nominal number of people using the Computer Lab were estimated on a basis of the amount of equipment involved and the activities to be carried out. Because of the newness of the system and its developmental nature it was considered prudent to project a somewhat heavier traffic load than would be expected in a less intense environment.

It is projected that the numbers of people active in each of the Laboratory areas would be approximately:

| <u>Area</u>          | <u>Number of People</u> |
|----------------------|-------------------------|
| Computer Room        | 3                       |
| Printer Room         | 3                       |
| Development & Test   | 25                      |
| Offices (each)       | 10                      |
| Conference Room      | 25                      |
| Computer Maintenance | 6                       |

RDA-TR-187400-002R.1

FACILITY MODIFICATION AND ENVIRONMENTAL/POWER  
PLANS FOR FREEDOM HALL

By:  
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JUNE 1984

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## 1. INTRODUCTION

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This is the second of a series of reports on the RDA support effort. It contains a preliminary Facility Modification Plan and a preliminary Environmental/Power Plan for Freedom Hall. Figure 1 is a sketch of the modifications to Freedom Hall. It also is the Power Distribution Plan for the building. The Figure shows the amount of power required as well as the locations of outlets. Section 2 of the report contains an estimate of the air conditioning requirements for the facility.

## 2. ESTIMATE OF AIR CONDITIONING REQUIREMENTS

The estimates of the air conditioning requirements contained herein are made up of two parts: the load generated by dissipation of heat by the computer equipment and peripherals and that generated by occupants of the facility. The estimate of the equipment thermal dissipation was developed by RDA directly. RDA also developed the number of occupants and provided that data to the Ft. Lewis Base Engineers who will apply their standard factors for that geographical locale in arriving at the total heat load to be handled.

### 2.1 THERMAL DISSIPATION OF EQUIPMENT

The estimates of equipment thermal dissipation are based upon the "VAX Systems Site Preparation Guide" by Digital Equipment Corp. dated April 1982, supplemented by data contained in Jet Propulsion Laboratory Interoffice Memorandum CAF: 363-84-CAF004 dated 13 March 1984. A tentative allocation of various items of equipment to Freedom Hall rooms was made based on participating unit room assignments provided by REDCOM. These are shown on Table 1. However, it has been indicated by I Corps that future exercises after Bold Venture may require different arrangements of types of units and their requisite equipment. Therefore, a conscious attempt has been made to provide for as much flexibility as possible in unit room locations. Thus, it was not practicable to isolate the thermal load by individual rooms. Instead, an overall estimate of the thermal dissipation for Freedom Hall was made based on the equipment indicated in Table 1 except that provision was made for the possible future substitution of VAX 11/730s for the 11/725s. The estimated total equipment thermal dissipation is shown below.

TABLE 1. FREEDOM HALL LOCATIONS

| <u>Room</u>                        | <u>Terminals</u> | <u>Printers</u> | <u>Monitors</u> | <u>11/725</u> |
|------------------------------------|------------------|-----------------|-----------------|---------------|
| A-1 9 I.D. Bde & DCS               | 2                | 1               | 2*              | 1             |
| A-2 9 I.D. Bde                     | 2                | 1               | 2*              | -             |
| A-3 40 Mech Bde & DCS              | 2                | 1               | 2*              | 1             |
| A-4 40 Mech Bde                    | 2                | 1               | 2*              | -             |
| A-5 (SPARE)                        | 2                | 1               | 1               | 1             |
| A-6 40 Mech Bde                    | 2                | 1               | 2*              | 1             |
| A-7 81 Bde, CCS                    | 2                | 1               | 2*              | -             |
| A-8 COSCOM, Theater Logistics      | 6                | 6               | 1               | 2             |
| A-9 DISCOMs                        | 8                | 8               | -               | 2             |
| A-10 OPFOR Ground & Air            | 6                | 6               | 4               | 2             |
| A-11 (Briefing Room)               |                  |                 |                 |               |
| A-12 (Office)                      |                  |                 |                 |               |
| A-13 (Office)                      |                  |                 |                 |               |
| A-14 (Office)                      |                  |                 |                 |               |
| A-15 JECG                          | 2                | 2               | 2               | 1             |
| A-16 9 I.D. Bde                    | 2                | 1               | 2*              | 1             |
| A-17 9 I.D. Bde                    | 2                | 1               | 2*              | -             |
| A-18 J-2                           | -                | -               | -               | -             |
| B-1 25 I.D. Bdes                   | 2                | 1               | 2*              | 1             |
| B-2 25 I.D. Bde & DCS              | 2                | 1               | 2*              | -             |
| B-3 Corps & Divisions Fire Support | 5                | 5               | 5               | 2             |
| B-4 BDA/TACC/ASOC                  | 3                | 3               | -               | 1             |
| B-7 7 I.D. Bdes                    | 2                | 1               | 2*              | 1             |
| B-8 7 I.D. Bde & DCS               | 2                | 1               | 2*              | -             |

\*Driven by one Graphover

| <u>Equipment</u> | <u>Number</u> | <u>Dissipation,<br/>Btu/h</u> | <u>Total Btu/h</u> |
|------------------|---------------|-------------------------------|--------------------|
| VAX 11/730       | 17            | 2700                          | 45900              |
| Color monitor    | 37            | 1000                          | 37000              |
| Graphover 9500   | 24            | 350                           | 8400               |
| Terminal         | 56            | 350                           | 19600              |
| Printer          | 43            | 350                           | <u>15050</u>       |
|                  |               | Freedom Hall Total            | 125950             |

## 2.2 FREEDOM HALL OCCUPANCY

It was estimated by REDCOM that approximately 350-400 exercise personnel would be located in Freedom Hall during Bold Venture. Based on observations of previous exercises of similar magnitude, we consider it reasonable to anticipate that up to 50 more people including JPL/Contractor personnel and official visitors could be present in Freedom Hall at various times during the exercise for a total occupancy of up to 450 people.