A I R F O R C E M A N U A L

Rescinded by RO-2, 3 Oct 75

NEW CONSTRUCTION

NAVIGATIONAL AIDS

CONSTRUCTION DESIGN INFORMATION

1 AUGUST 1958

D E P A R T M E N T O F T H E A I R F O R C E

AIR FORCE MANUAL }
No. 88-16 }

DEPARTMENT OF THE AIR FORCE
WASHINGTON, *1 August 1958*

Foreword

1. *Purpose and Scope.* This manual is intended to assist in planning and constructing electronic navigational aids facilities. It will be used by Air Force personnel, architect-engineers, and construction agencies responsible for Air Force construction.

2. *Contents.* The manual contains drawings and allied requirements for navigational aids facilities. Details of functions and characteristics of these facilities are furnished in a form which should suffice for budgetary and constructional planning as well as for phasing operational and construction requirements. Only those air-ground communication facilities used in programed navigational aids are included. As new facilities are added, insertion sheets will be distributed. Figure 1 illustrates a hypothetical installation comprising all NAVAIDS facilities. Point-to-point or long range air-ground communication facilities are *not* included.

3. *Responsibilities.* The designated engineering or installing agency is the agency, designated in the PC document, that performs the installation engineering or installs a particular facility.

4. *Pertinent Information:*

a. *Definitions.* Definitions applicable to this type of construction are contained in AFR 100-46 and TO 31-1-8.

b. *Siting Criteria.* Information regarding details of siting criteria should be requested from the appropriate Installation and Maintenance Activity.

c. *Working Drawings.* Complete detailed reproducibles of standard AW working drawings for navigational aids facilities are distributed to all major air commands and Air Force installations representatives. Requests for copies of these drawings should be directed to Director of Installations, DCS/O, Headquarters USAF, ATTENTION: Engineering Division.

5. *Recommendations.* Recommendations or suggestions for the improvement of this manual are invited. Such recommendations or suggestions should be forwarded to the Director of Installations, DCS/O, Headquarters USAF, ATTENTION: Engineering Division, Washington 25, D. C.

BY ORDER OF THE SECRETARY OF THE AIR FORCE:

THOMAS D. WHITE
Chief of Staff

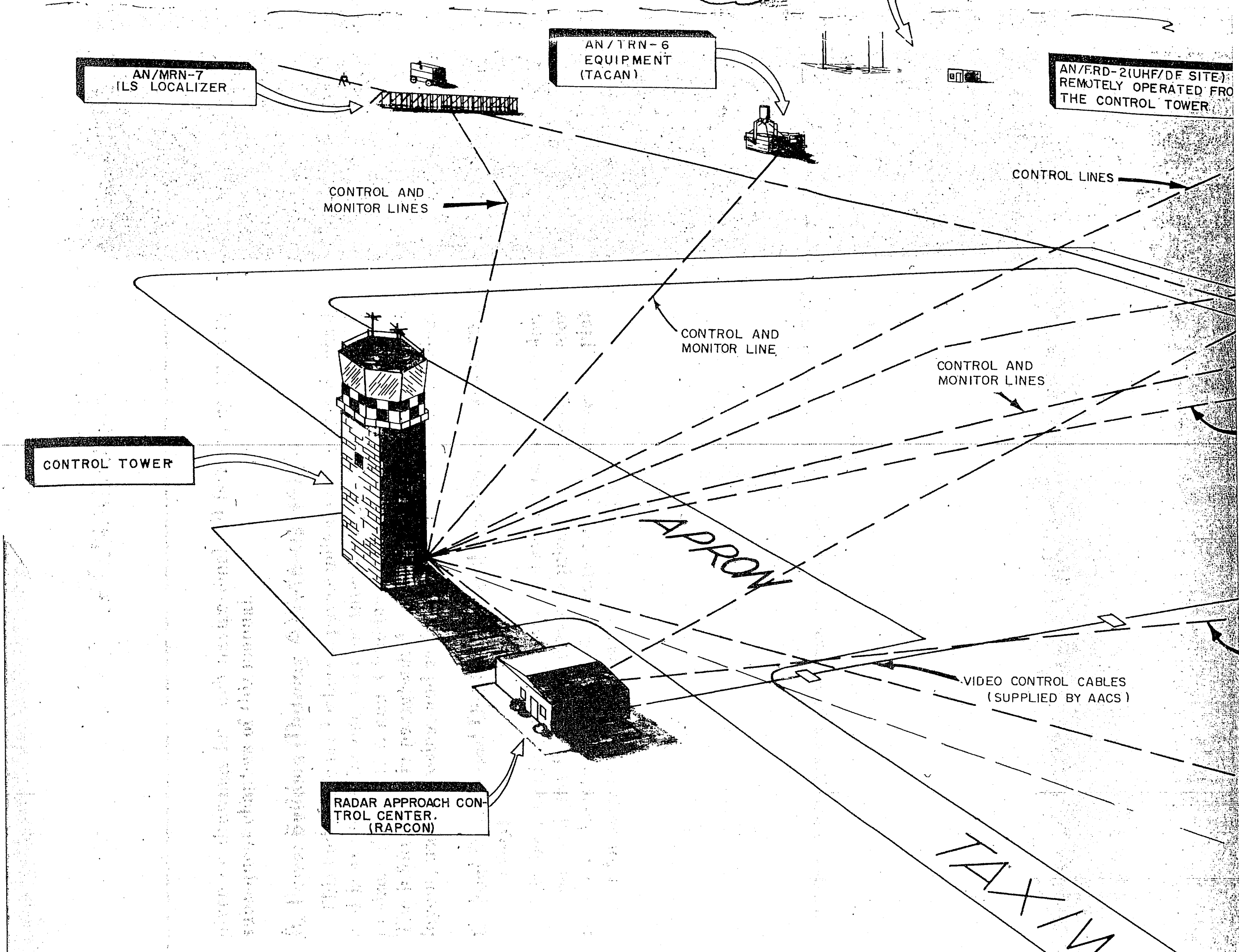
OFFICIAL:
J. L. TARR
Colonel, USAF
Director of Administrative Services

* This manual supersedes AFM 88-16, 1 October 1955.

Contents

ILLUSTRATIONS

DRAWINGS

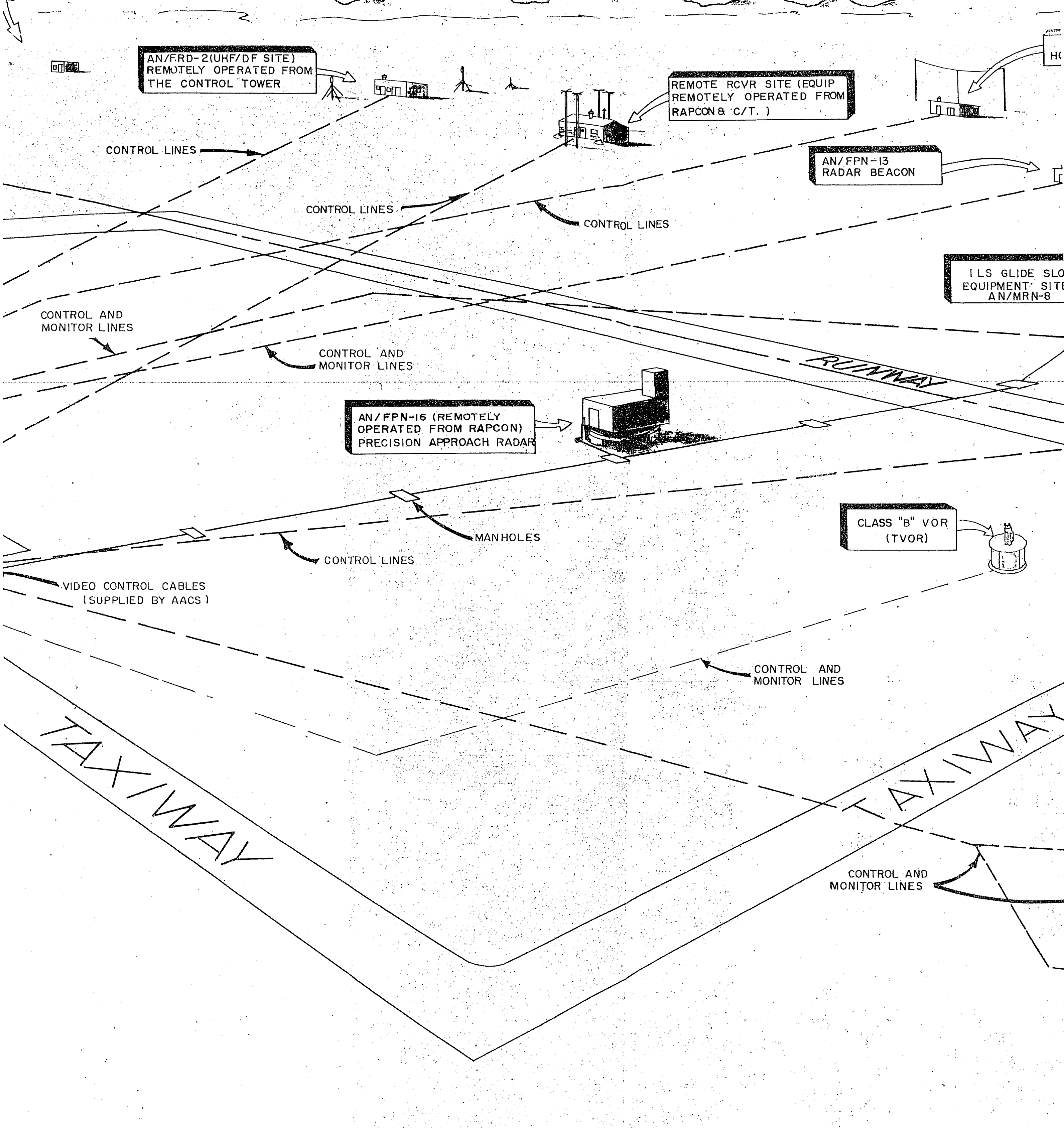


NOTE :

CABLE ROUTING IS SYMBOLIC ONLY. LOOP CIRCUITS USING ONE CABLE FOR SEVERAL FACILITIES IS DESIRABLE, WITH ONE AUDIO PHONE LINE HAVING DROPS AT EACH FACILITY, WHEN POSSIBLE.

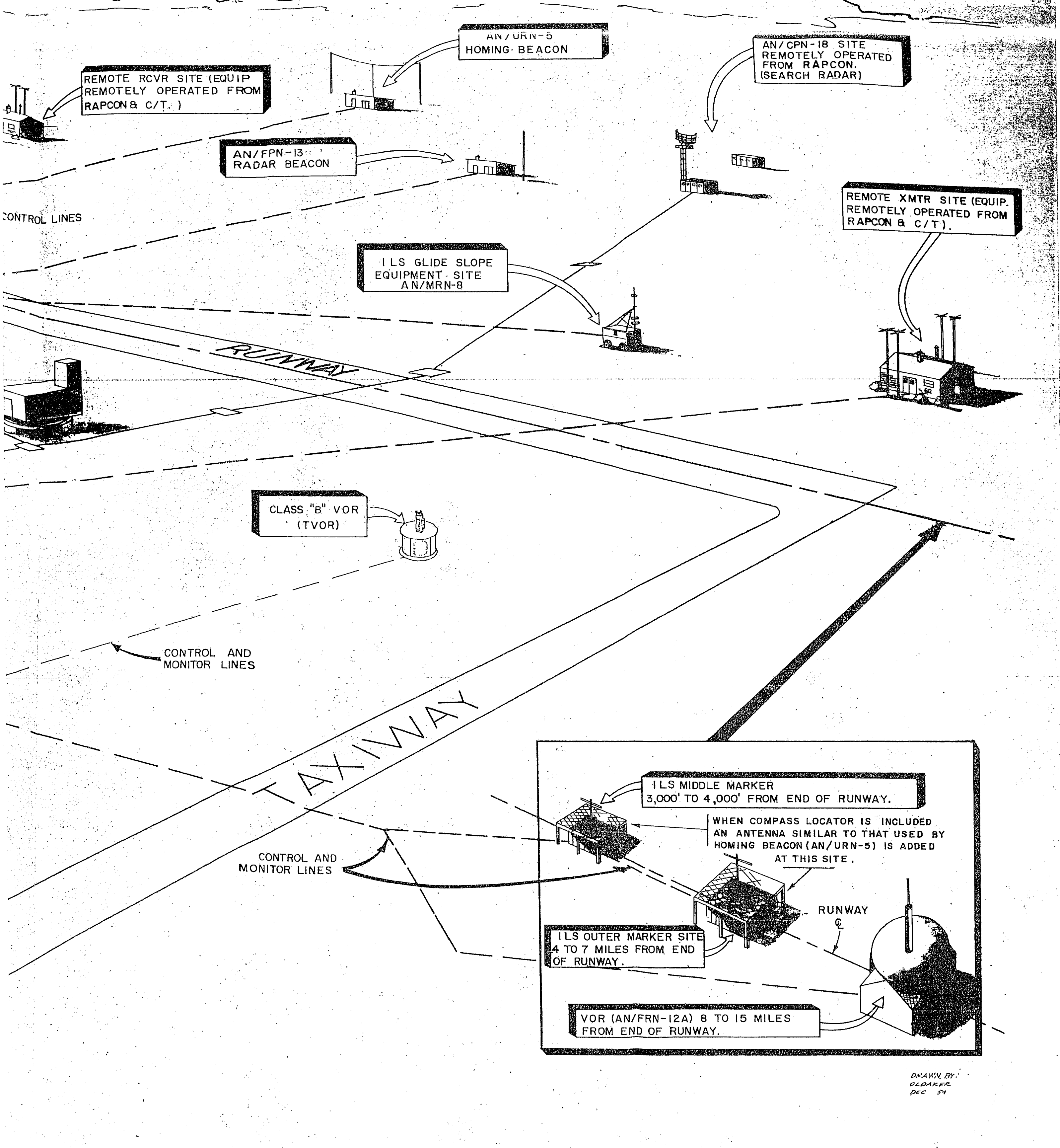
TYPICAL BASE LAYOUT F

461159 O-58 (Face blank p. VIII)

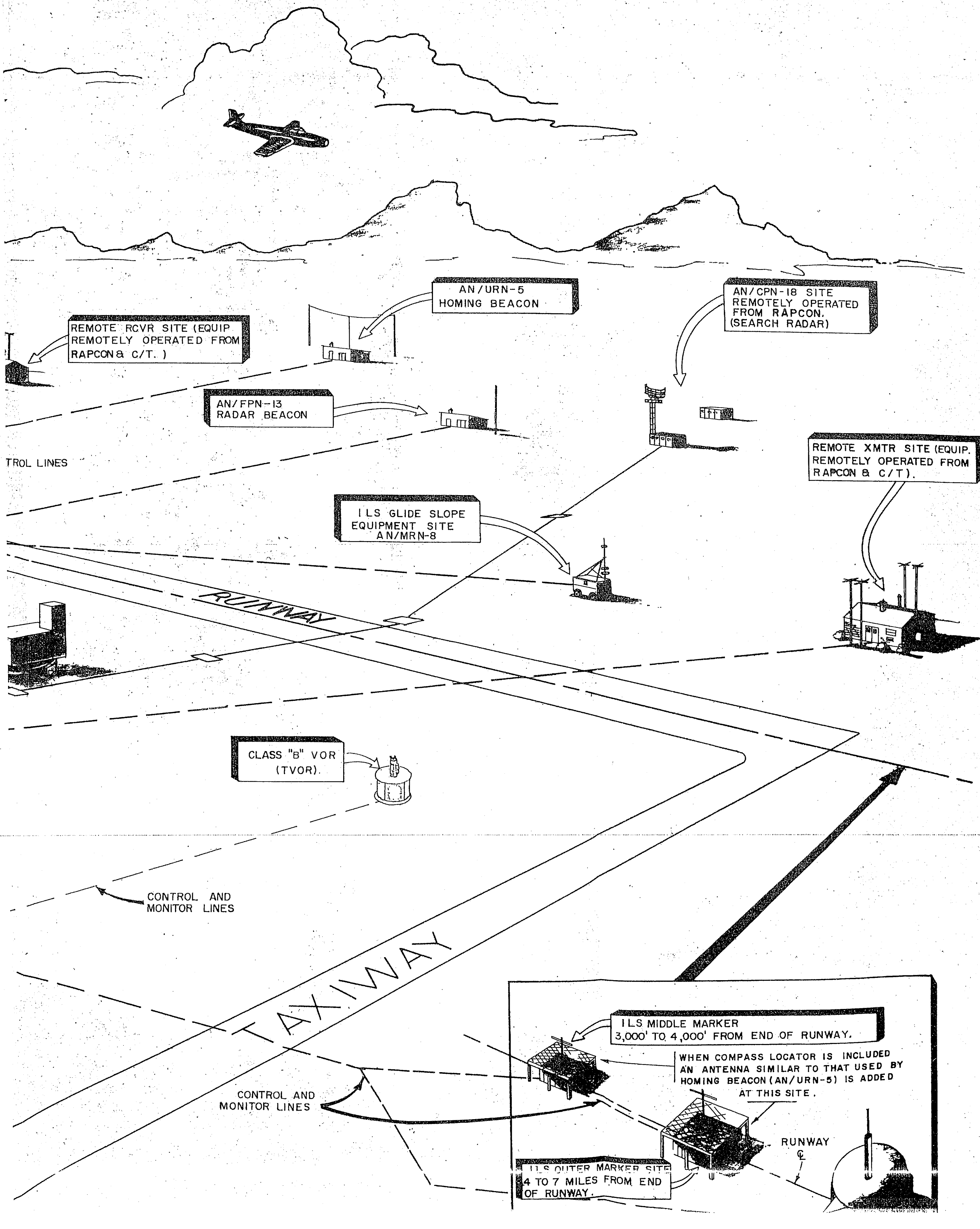


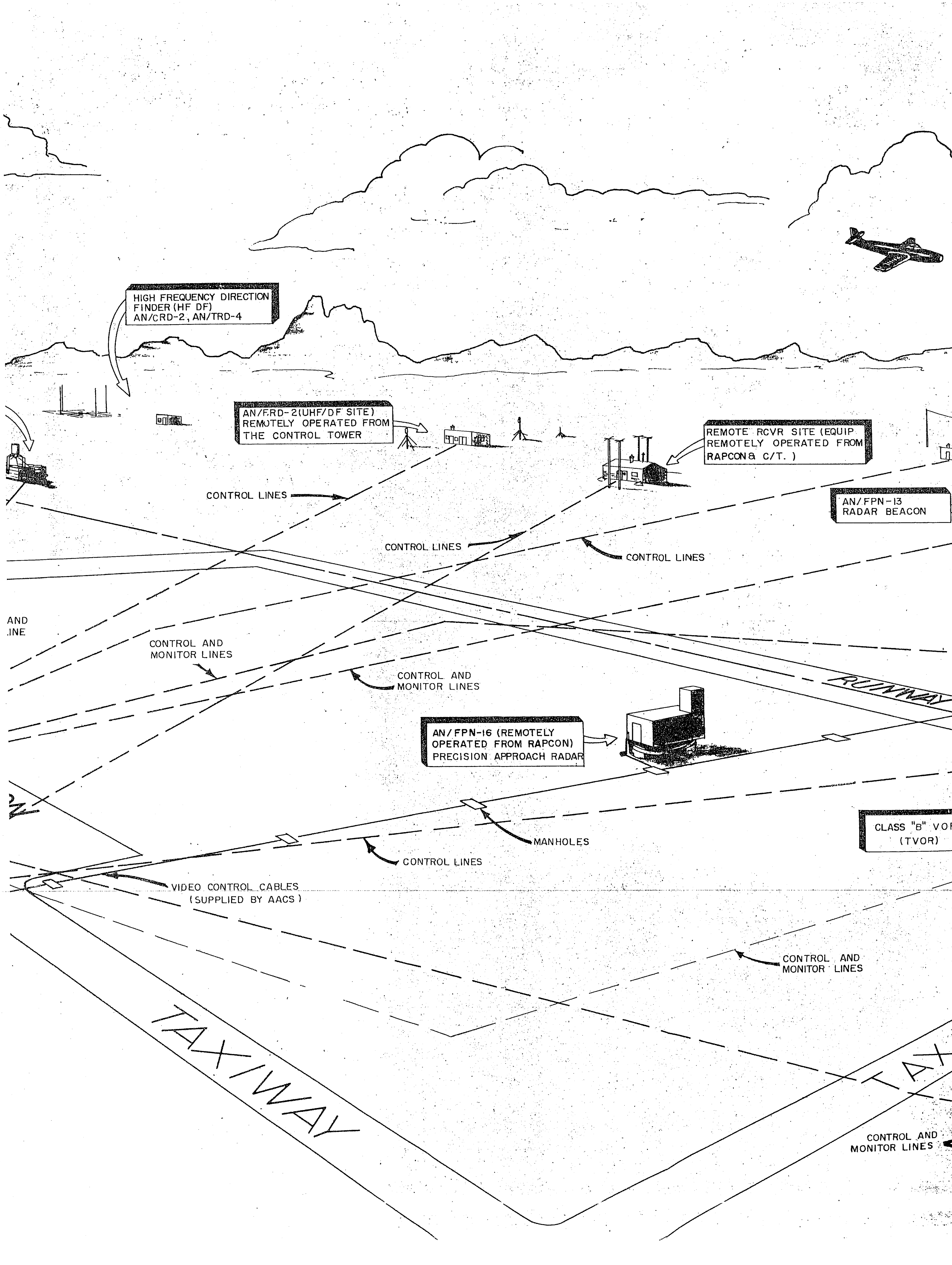
SE LAYOUT FOR AIR NAVIGATIONAL AIDS

Figure 1.

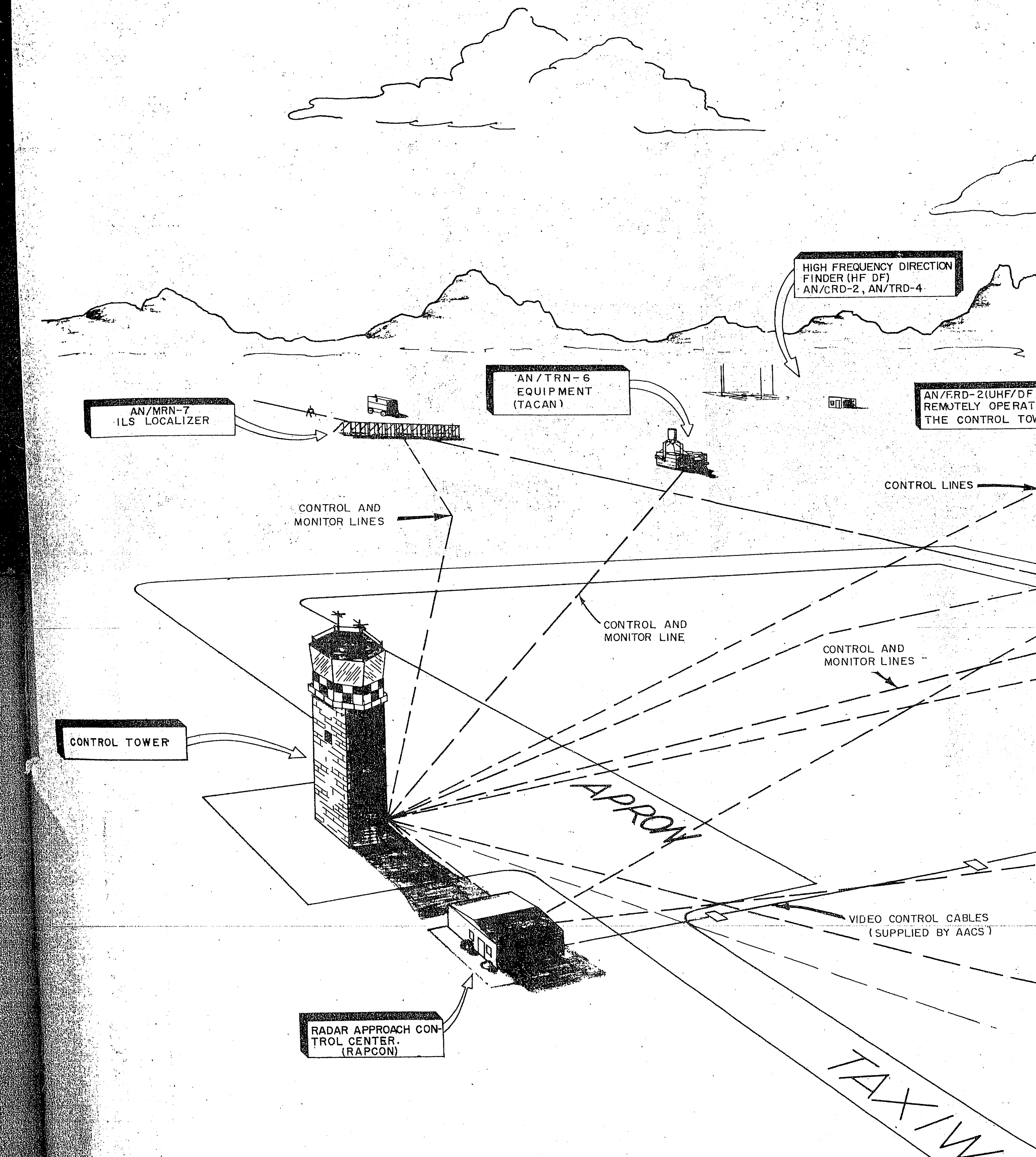


/IGATIONAL AIDS


AN/URN-5
HOMING BEACON
AN/CPN-18 SITE
REMOTELY OPERATED
FROM RAPCON.
(SEARCH RADAR)
REMOTE RCVR SITE (EQUIP
REMOTELY OPERATED FROM
RAPCON & C/T.)
AN/FPN-13
RADAR BEACON
TROL LINES
REMOTE XMTR SITE (EQUIP.
REMOTELY OPERATED FROM
RAPCON & C/T).
ILS GLIDE SLOPE
EQUIPMENT SITE
AN/MRN-8
RUNWAY
CLASS "B" VOR
(TVOR).
CONTROL AND
MONITOR LINES
TAXIWAY
ILS MIDDLE MARKER
3,000' TO 4,000' FROM END OF RUNWAY.
WHEN COMPASS LOCATOR IS INCLUDED
AN ANTENNA SIMILAR TO THAT USED BY
HOMING BEACON (AN/URN-5) IS ADDED
AT THIS SITE.
CONTROL AND
MONITOR LINES
RUNWAY
℄
ILS OUTER MARKER SITE
4 TO 7 MILES FROM END
OF RUNWAY.



HIGH FREQUENCY DIRECTION FINDER (HF DF) AN/CRD-2, AN/TRD-4
AN/FRD-2(UHF/DF SITE) REMOTELY OPERATED FROM THE CONTROL TOWER
REMOTE RCVR SITE (EQUIP REMOTELY OPERATED FROM RAPCON & C/T.)
AN/FPN-13 RADAR BEACON
CONTROL LINES
CONTROL LINES
CONTROL LINES
AND
.INE
CONTROL AND MONITOR LINES
CONTROL AND MONITOR LINES
RUNWAY
AN/FPN-16 (REMOTELY OPERATED FROM RAPCON) PRECISION APPROACH RADAR
CLASS "B" VOR
(TVOR)
MANHOLES
CONTROL LINES
VIDEO CONTROL CABLES (SUPPLIED BY AACS)
CONTROL AND MONITOR LINES
TAXIWAY
TAX
CONTROL AND MONITOR LINES



NOTE:

CABLE ROUTING IS SYMBOLIC ONLY. LOOP CIRCUITS USING ONE CABLE FOR SEVERAL FACILITIES IS DESIRABLE, WITH ONE AUDIO PHONE LINE HAVING DROPS AT EACH FACILITY, WHEN POSSIBLE.

Chapter 1

STANDARD NAVIGATIONAL AIDS BUILDINGS AND APPURTENANCES

A. Standard Navigational Aids Building (Drawing AW–26–03–27)

This building is used for a majority of the fixed-plant navigational aid facilities and may be constructed:

1. To include an equipment room only (type 0), *or*
2. With provisions to house one, two, or three generators (up to 30 kw) in addition to the equipment room (types 1, 2, and 3).

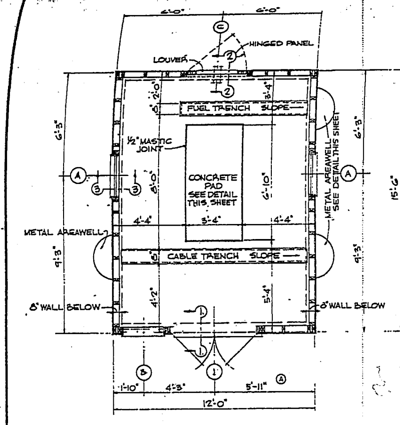
The navigational aids building details shown on drawing AW–26–03–27 are used for standard navigational aids equipment layout drawings, electronic installation drawings, and maintenance and operational planning. Therefore, all construction details affecting the above items must be carefully adhered to. Power wiring details and requirements for all navigational aid facilities using this building are given on the cited drawing. Minor variations for different navigational aids facilities also are noted on the drawing. The building orientation and plot layout are given on drawings for each navigational aid facility, as listed in subsequent chapters of this manual.

B. Power Building (Drawing AW–26–03–26)

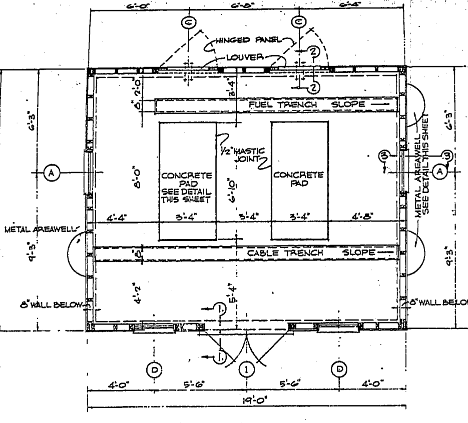
This building is used where a power unit shelter only is required and is available for one, two, or three power units up to 30 KW in size. (Types 1, 2, and 3 buildings in drawing AW–26–03–26.) The information in paragraph A, regarding planning, wiring, plot layout, use of drawing, and so forth, also applies to this building.

C. Fuel Storage and Distribution Facilities (Drawing AW–78–18–01

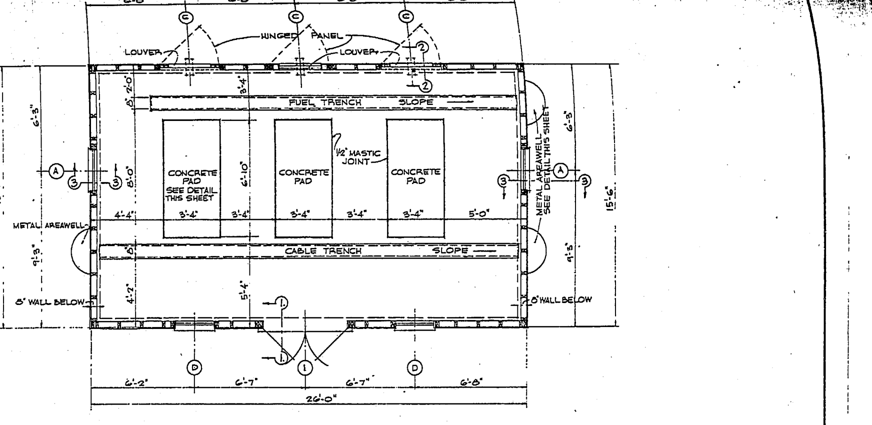
This drawing gives details of the fuel storage (above and below ground) and distribution facilities required for navigational aids facilities. Location of the fuel storage area with respect to plot layout for each facility is shown on the drawing.



FLOOR PLAN - TYPE 1
SCALE: 3/8"=1'-0"



FLOOR PLAN - TYPE 2
SCALE: 3/8"=1'-0"



FLOOR PLAN - TYPE 3
SCALE: 3/8"=1'-0"

GENERAL NOTES

EXCAVATION:

GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PREPARE A SUITABLE COMPACTED SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. BOTTOM OF FOUNDATION WALLS SHALL BE NOT LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL AND SHALL BE. BELOW FROST LINE.
ASSUMED VALUE OF SOIL: 3000 LBS./SQ.FT.

CONCRETE

ALL CONCRETE SHALL BE CLASS "B" (2500 LBS./SQ.IN.

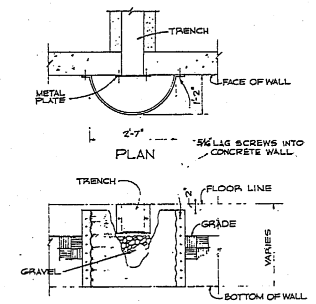
REINFORCING STEEL

ALL REINFORCING BARS TO BE DEFORMED, OF INTERMEDIATE OR HARD GRADE.
DESIGN STRESS 20,000 LBS./SQ.IN.

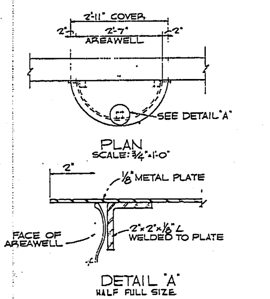
ALL MATERIAL AND CONSTRUCTION SHOWN WILL BE FURNISHED BY THE CONTRACTOR. FOR FUEL STORAGE AND DISTRIBUTION SYSTEM, SEE DWG. AW-73-18-01. (A)

DRAINAGE

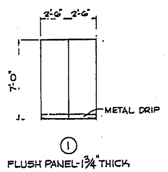
(A) AT THE DISCRETION OF THE CONTRACTING OFFICER, THE DRAINAGE FILL MAY BE OMITTED AND/OR DELETED, DEPENDING ON SITE CONDITIONS.



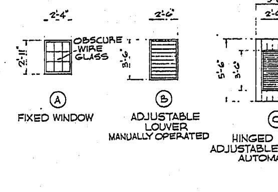
DETAIL OF AREA WELL
SCALE: 3/4"=1'-0"



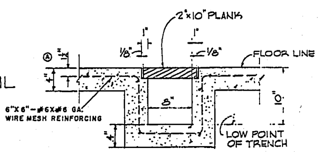
AREA WELL COVER DETAIL



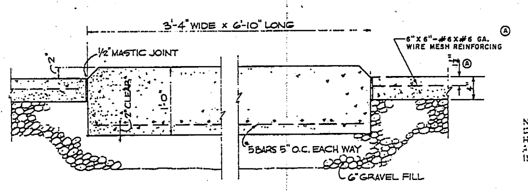
DOOR SCHEDULE
SCALE: 1/4"=1'-0"



WINDOW AND LOUVER SCHEDULE
SCALE: 1/4"=1'-0"

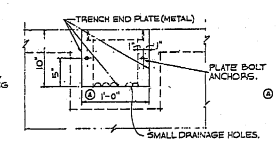


CABLE AND FUEL TRENCH DETAIL
SCALE: 1 1/2"=1'-0"
NOTE: TRENCH SLOPES 1" PER 20'-0"



CONCRETE PAD DETAIL
SCALE: 1 1/2"=1'-0"

NOTE:
DRILL REQUIRED HOLES FOR PIPING AND CABLING AT INSTALLATION

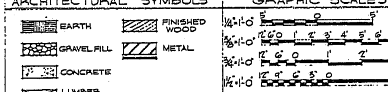


TRENCH END DETAIL
SCALE: 1 1/2"=1'-0"

	SQUARE FEET	CUBIC FEET
TYPE 1	186	1674
TYPE 2	294	2646
TYPE 3	403	3627

APPLICABLE DRAWINGS
AW-26-03-26
AW-78-18-01

ARCHITECTURAL SYMBOLS — GRAPHIC SCALES



SYMBOL	DESCRIPTION	DATE	APPROVAL
(A)	ADDED DRAINAGE NOTE. CHANGED CALL-OUT ON WIRE MESH. TYPE I PLAN 5'-11" DIM. WAS 6'-0". TRENCH END DET DIM CHANGED. ALL AF DWG. REFERENCES CHANGED TO AW- ADDED 1 1/2" DIM MESH LOCATION.	23 JUN 55	

REVISIONS

SCHEDULE OF DRAWINGS

DWG. NO.	SHEET	TITLE
AW-26-03-26	1 OF 6	FLOOR PLANS, SCHEDULES AND DETAILS
AW-26-03-26	2 OF 6	ELEVATIONS AND LONGITUDINAL SECTION
AW-26-03-26	3 OF 6	WALL SECTIONS; DOOR AND WINDOW DETAILS
AW-26-03-26	4 OF 6	FRAMING DETAILS
AW-26-03-26	5 OF 6	ELECTRICAL PLANS AND DETAILS
AW-26-03-26	6 OF 6	ELECTRICAL DIAGRAMS AND SCHEDULES.

APPROVED FOR AACS
Frederick E. Lynch Major USAF
DATE: 19 Feb. 54

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

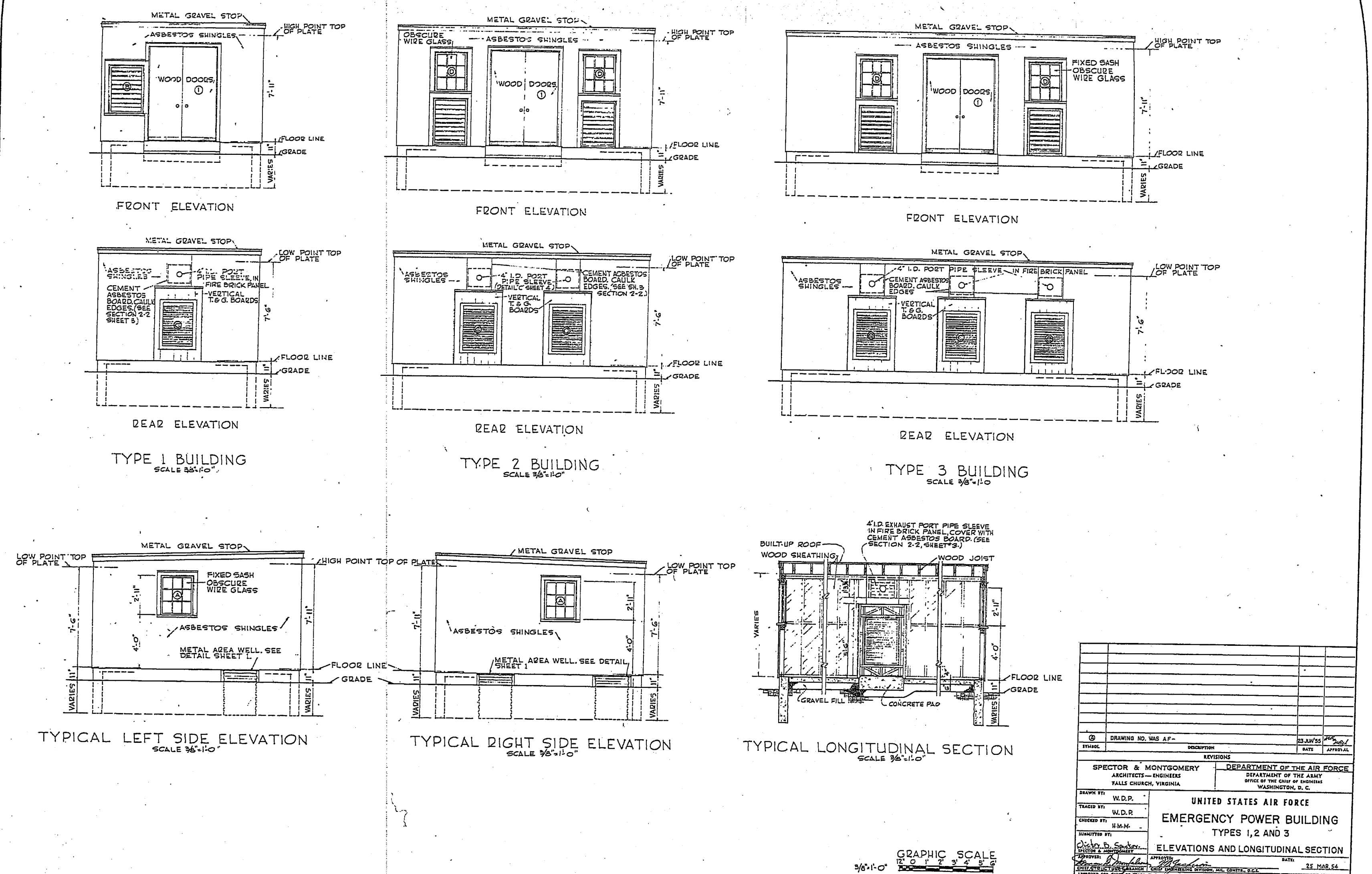
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: PPW
TRACED BY: PFW
CHECKED BY: RAF
SUBMITTED BY: Victor E. Spector — SPECTOR & MONTGOMERY
APPROVED: CHIEF STRUCT. & S. BRANCH
APPROVED: CHIEF, ENGINEERING DIVISION, AIR, CONSTR., O.C.E.
DATE: 25 MAR. 54
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 19 Feb 1954

UNITED STATES AIR FORCE
EMERGENCY POWER BUILDING
TYPES 1, 2 AND 3
FLOOR PLANS, SCHEDULES AND DETAILS

SCALE AS NOTED
SPEC. NO. AW-26-03-26-53C
DRAWING NUMBER AW-26-03-26
SHEET 1 OF 6

THIS DRAWING SUPERSEDES DRAWING Nº 26-03-26 DATED 14 JULY 1952



Ⓐ	DRAWING NO. WAS AF-		23 JUN 55	
SYMBOL	DESCRIPTION		DATE	APPROVAL
REVISIONS				

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

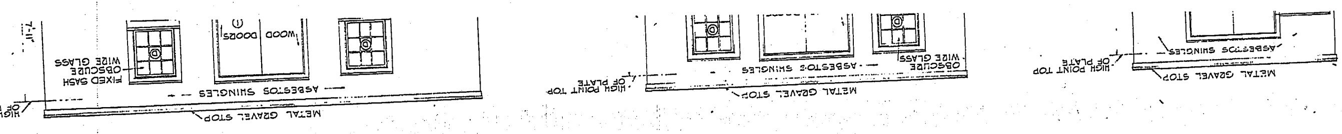
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

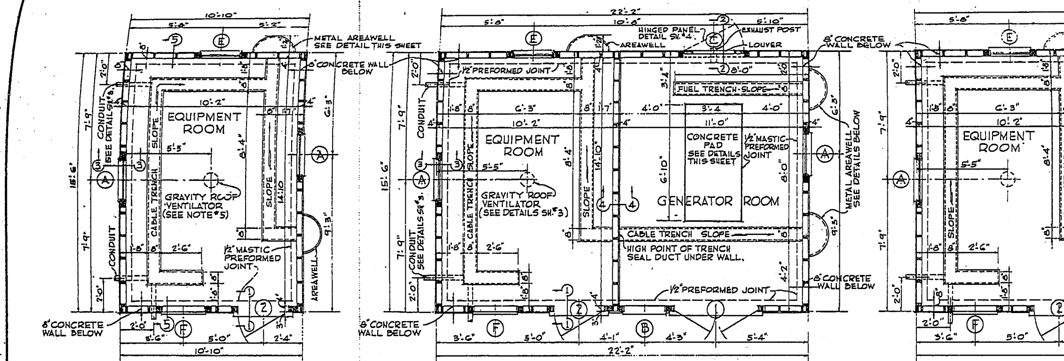
DRAWN BY: W.D.P.
TRACED BY: W.D.P.
CHECKED BY: H.M.M.
SUBMITTED BY: SPECTOR & MONTGOMERY
APPROVED: CHIEF, STRUCTURES BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE:

UNITED STATES AIR FORCE
EMERGENCY POWER BUILDING
TYPES 1, 2 AND 3
ELEVATIONS AND LONGITUDINAL SECTION

DATE: 25 MAR 54
SCALE: 3/8"=1'-0"
DRAWING NUMBER AW-26-03-26
SHEET 2 OF 6

THIS DRAWING SUPERSEDES DRAWING Nº 26-03-26 DATED 14 JULY 1952





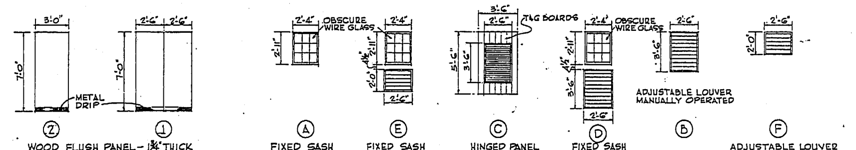
FLOOR PLAN-TYPE "0"
SCALE 3/16"=1'-0"

FLOOR PLAN-TYPE "1"
SCALE 3/16"=1'-0"

FLOOR PLAN-TYPE "2"
SCALE 3/16"=1'-0"

GENERAL NOTES:

1. GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. BOTTOM OF FOUNDATION WALLS SHALL BE NOT LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL AND SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL: 3000 LBS./SQ.FT.
2. ALL CONCRETE SHALL BE CLASS "B" (2500 LBS/SQ.IN.)
3. ALL REINFORCING BARS TO BE DEFORMED OF INTERMEDIATE OR HARD GRADE STEEL. DESIGN STRESS 20,000 LBS/SQ.IN.
4. ALL MATERIAL AND CONSTRUCTION SHOWN WILL BE FURNISHED BY THE CONTRACTOR. FOR FUEL STORAGE AND DISTRIBUTION SYSTEM SEE DRAWING AW-78-18-01. (A)
5. EQUIPMENT ROOMS WITH AN AN/FPN-13 EQUIPMENT INSTALLATION SHALL HAVE A GRAVITY ROOF VENTILATOR. EQUIPMENT ROOMS WITH AN AN/URN-3 EQUIPMENT INSTALLATION SHALL HAVE A GRAVITY ROOF VENTILATOR, AN INTAKE FAN IN PLACE OF LOUVER (F) AND WINDOW-LOUVER (D) IN PLACE OF WINDOW-LOUVER (E).
6. (A) DRAINAGE: AT THE DISCRETION OF THE CONTRACTING OFFICER, THE DRAINAGE FILL MAY BE OMITTED AND/OR DELETED, DEPENDING ON SITE CONDITIONS.

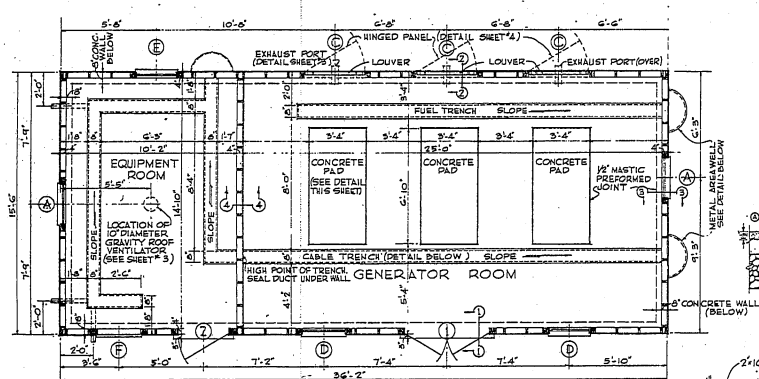


DOOR SCHEDULE
SCALE 1/4"=1'-0"

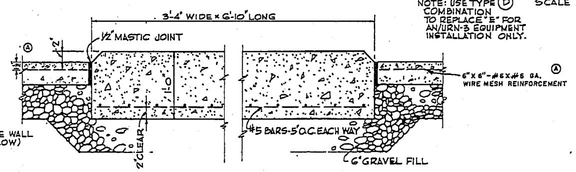
WINDOW AND LOUVER SCHEDULE
SCALE 1/4"=1'-0"

NOTE: USE TYPE (D) COMBINATION TO REPLACE "E" FOR AN/URN-3 EQUIPMENT INSTALLATION ONLY.

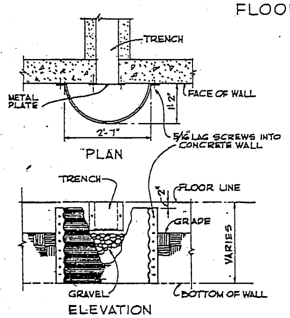
NOTE: ALTERNATE DETAIL REQUIRED FOR AN/URN-3 EQUIPMENT INSTALLATION ONLY. SEE SHEET #3



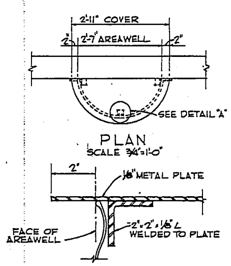
FLOOR PLAN -TYPE "3"
SCALE 3/16"=1'-0"



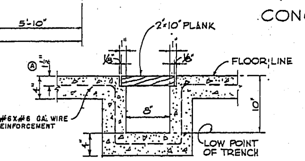
CONCRETE PAD DETAIL
SCALE: 1 1/2"=1'-0"



DETAIL OF AREAWELL
SCALE 3/4"=1'-0"

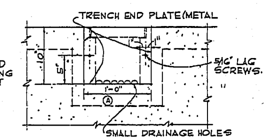


AREAWELL COVER DETAIL



CABLE AND FUEL TRENCH DETAIL
SCALE 1 1/2"=1'-0"
NOTE: TRENCH SLOPES=1" PER 20'-0".

NOTE: DRILL REQUIRED HOLES FOR PIPING AND CABLING AT INSTALLATION.



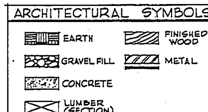
TRENCH END DETAIL
SCALE: 1 1/2"=1'-0"

NOTE: DETAIL UNDER PARTITION "4-4" TO HAVE METAL PLATE AS ABOVE - SLOTTED INTO TRENCH WALLS.

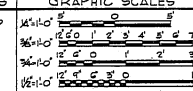
AREAS	SQUARE FEET	CUBIC FEET
TYPE-0.	155	1317.5
TYPE-1.	343.48	2919.58
TYPE-2.	451.98	3841.83
TYPE-3.	560.48	4764.08

APPLICABLE DRAWINGS
(A) AW-26-03-27
AW-78-18-01
E-40-06-04

ARCHITECTURAL SYMBOLS



GRAPHIC SCALES



REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
(A)	ADDED NOTE 6, TRENCH PLATE DIMENSION WAS 10"; CHANGED CALL OUT OF WIRE MESH. ALL AF DWG REFERENCES CHANGED TO AW- ADDED 1 1/2 DIM. MESH LOCATION.	23 JUN '56	[signature]

SCHEDULE OF DRAWINGS

DWG. NO.	SHEET	TITLE
AW-26-03-27	1 OF 6	FLOOR PLANS; SCHEDULES AND DETAILS
AW-26-03-27	2 OF 6	ELEVATIONS AND CROSS SECTION
(A) AW-26-03-27	3 OF 6	WALL SECTIONS; DOOR & WINDOW DETAILS
AW-26-03-27	4 OF 6	FRAMING DETAILS
AW-26-03-27	5 OF 6	ELECTRICAL PLANS & DETAILS
AW-26-03-27	6 OF 6	ELECTRICAL DIAGRAMS & SCHEDULES

APPROVED FOR AACS
Frederick E. [signature] Major USAF
DATE: 19 Feb 1954

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

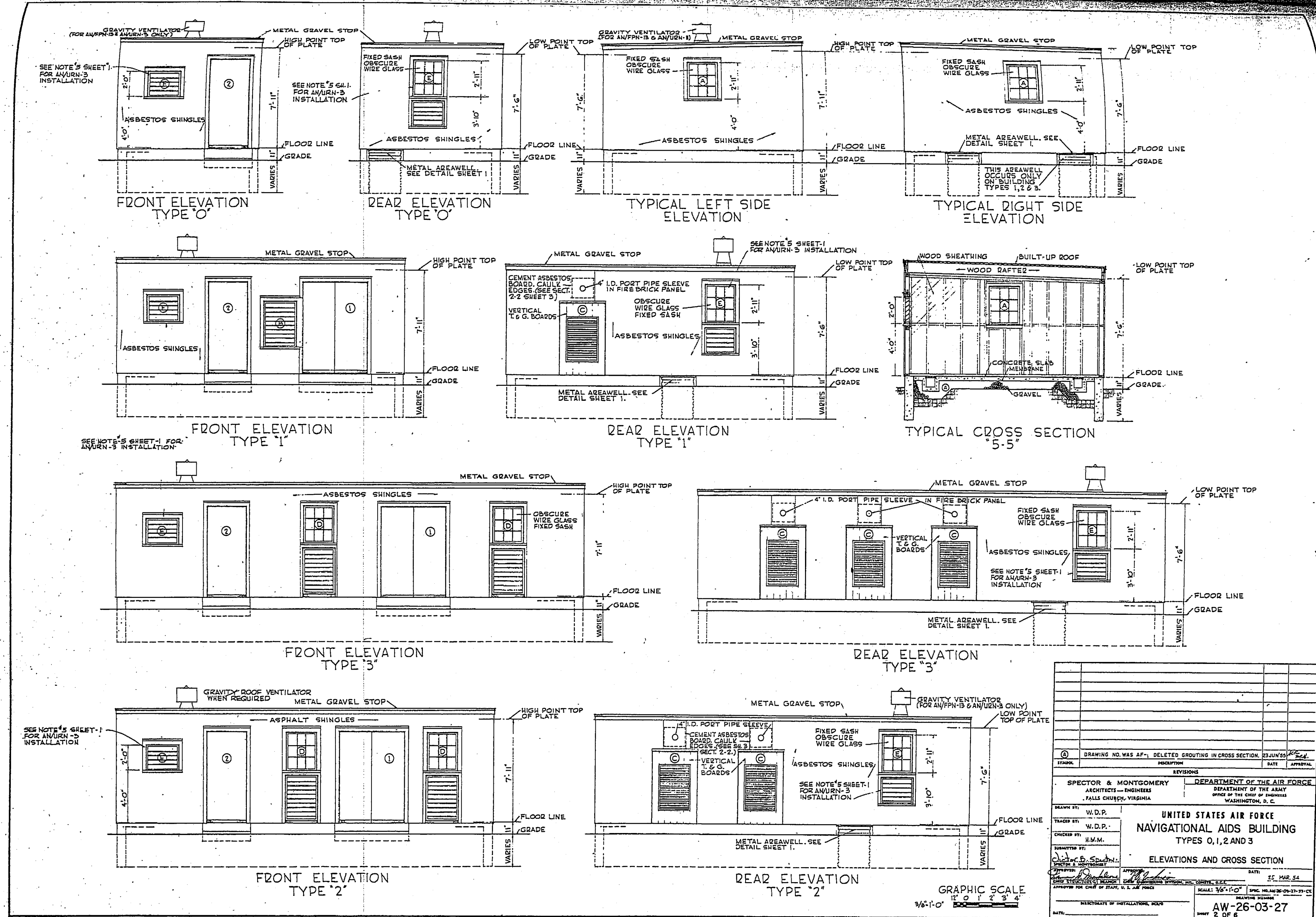
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: HMM
TRACED BY: HMM
CHECKED BY: RAF
SUBMITTED BY: Victor B. Spector
SPECTOR & MONTGOMERY
APPROVED: [signature] CHIEF, STRUCTURES BRANCH
APPROVED: [signature] CHIEF, ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
DATE: 25 MAR. 54
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
[signature] DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 19 Feb 1954

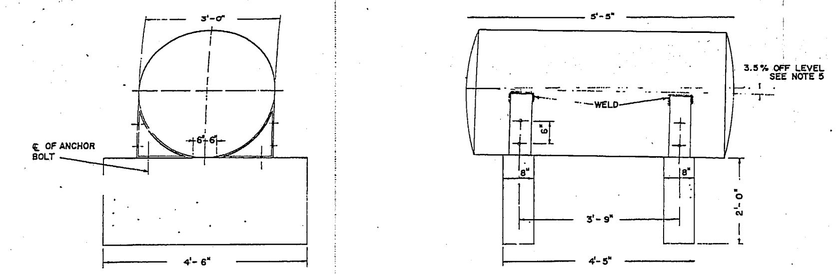
UNITED STATES AIR FORCE
NAVIGATIONAL AIDS BUILDING
TYPES 0,1,2, AND 3
FLOOR PLANS; SCHEDULES AND DETAILS

SCALE AS NOTED
SPEC. NO. AW-26-03-27-SBCE
DRAWING NUMBER AW-26-03-27
SHEET 1 OF 6

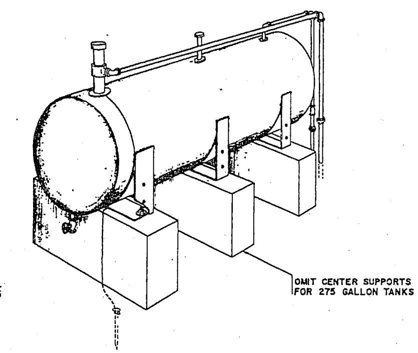
THIS DRAWING SUPERSEDES DRAWING Nº 26-03-27 DATED. 9 MARCH 1953



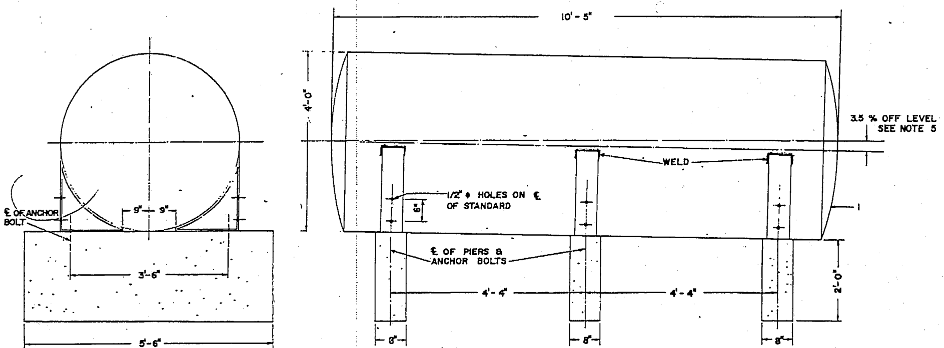
THIS DRAWING SUPERSEDES DRAWING Nº 26-03-27 DATED 9 MARCH 1953



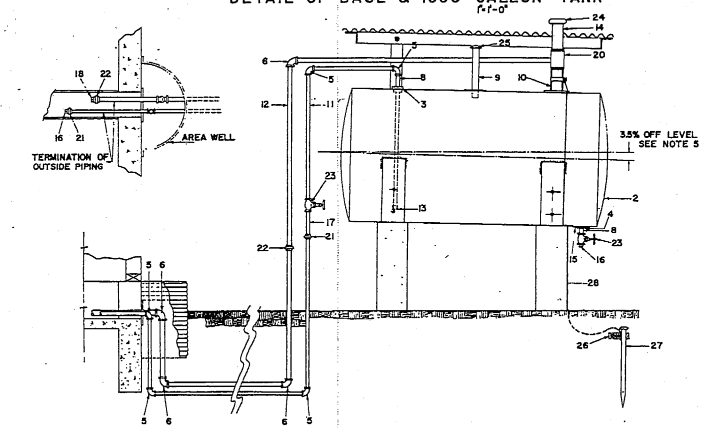
DETAIL OF BASE & 275 GALLON TANK
1"=1'-0"



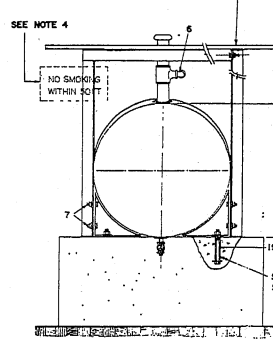
ISOMETRIC OF 1000 GALLON TANK AND BASE
NO SCALE
(275 GALLON TANK SIMILAR EXCEPT AS NOTED)



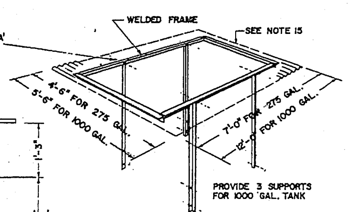
DETAIL OF BASE & 1000 GALLON TANK
1"=1'-0"



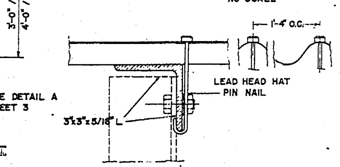
SIDE ELEVATION OF TANK AND PIPING
NO SCALE



END ELEVATION OF TANK AND PIPING
NO SCALE



ISOMETRIC OF SUN SHADE
NO SCALE



DETAIL 'A'
1/2"=1"

BILL OF MATERIAL

ITEM	275 GAL. QUAN.	1000 GAL. QUAN.	NOMENCLATURE
1	0	1	CONTAINER, 1000 GALLON, STEEL ROUND
2	1	0	CONTAINER, 275 GALLON, STEEL ROUND
3	1	1	*BUSHING, PIPE 2"x1/2" DOUBLE. TAPPED BLACK IRON
4	1	1	BUSHING, PIPE 1-1/2"x1/2" BLACK IRON
5	5	5	ELBOW, 1/2"x90°DEG. MALLEABLE IRON
6	4	4	ELBOW, 3/4"x90°DEG. MALLEABLE IRON
7	12	18	BOLT, 3/8"x1" W/ NUT & WASHER
8	2	2	NIPPLE, PIPE 1/2"x2" BLACK STEEL
9	1	1	NIPPLE, PIPE 1"x10" BLACK STEEL
10	1	1	NIPPLE, PIPE 2"x4" BLACK STEEL
11	20 FT	20 FT	PIPE 1/2" BLACK STEEL SEAMLESS
12	20 FT	20 FT	PIPE 3/4" BLACK STEEL SEAMLESS
13	1	1	VALVE, 1/2" CHECK
14	2 FT	2 FT	PIPE 2" BLACK STEEL SEAMLESS
15	1	1	*SAME AS ITEM 3, WITH FLANGE OR BOSS
16	2	2	PLUG, PIPE 1/2" BLACK IRON SQUARE HEAD
17	1	1	NIPPLE, PIPE 1/2"x4"
18	1	1	PLUG, PIPE 3/4" BLACK IRON SQUARE HEAD
19	4	6	1/2" DIA BOLT, 6" LONG W/ NUT & WASHER
20	1	1	TEE, PIPE REDUCING 2"x3/4"x2" BLACK IRON
21	2	2	UNION, PIPE 1/2" BLACK IRON
22	2	2	UNION, PIPE 3/4" BLACK IRON
23	2	2	VALVE, GLOBE 1/2" BRASS FEMALE
24	1	1	CAP, FILLER 2" BRASS, BUCKEYE IRON WORKS 764
25	1	1	VENT, 1" MUSHROOM TYPE W/SCREEN
26	1	1	CLAMP, GROUND
27	1	1	GROUND ROD, GP-26
28	10 FT	10 FT	GROUND WIRE, COPPER No. 4 STRANDED BARE

GENERAL NOTES

1 THIS DRAWING PROVIDES DETAILS OF ABOVE GROUND FUEL FACILITIES FOR GASOLINE OR DIESEL FUEL OIL, FOR INSTALLATION IN THE NAVIGATIONAL AIDS OR EMERGENCY POWER BUILDINGS SHOWN ON DRAWINGS AW 26-03-26 AND AW 26-03-27. MODIFICATIONS OF THIS INSTALLATION CAN BE MADE TO SUIT OTHER TYPE BUILDINGS.
2 THIS SYSTEM INCLUDING TANK AND PIPING SHALL BE INSTALLED IN ACCORDANCE WITH N.F.P.A. AND OR N.B.F.U. CODES.
3 ALL CONCRETE WILL BE CLASS 'B' 2500 P.S.I. REINFORCED.
4 AT LEAST TWO (2) WARNING SIGNS SHALL BE PROMINENTLY DISPLAYED CLOSE TO THE INSTALLATION.
5 THE TANKS WILL BE MOUNTED 3.5% LOWER ON THE FILLER END. THIS NON-HORIZONTAL MOUNTING IS TO FACILITATE REMOVAL OF SEDIMENT AND WATER.
6 DRAIN VALVE WILL BE INSTALLED AT LOWER END TO PERMIT DAILY DRAINING.
7 MINIMUM DISTANCE BETWEEN TANK AND BUILDING SHOULD NOT BE LESS THAN 15 FEET.
8 TANK AND PIPING CONNECTIONS SHALL BE TESTED TO MAINTAIN 5 P.S.I. FOR 30 MIN.
9 TANK AND ABOVE GROUND PIPING TO BE PAINTED IN ACCORDANCE WITH MILITARY SPECIFICATIONS.
10 THREADED PIPE CONNECTIONS WILL BE SEALED WITH OIL AND GASOLINE RESISTANT COMPOUND (NON HARDENING TYPE).
11 ALL BURIED PIPES WILL BE COATED WITH COAL TAR ENAMEL IN ACCORDANCE WITH MILITARY SPECIFICATIONS.
12 FUEL SUPPLY AND RETURN PIPES SHOULD HAVE A DOWNWARD SLOPE TO PREVENT THE FORMATION OF AIR OR VAPOR LOCKS.
13 FIRE EXTINGUISHER IN GOOD WORKING ORDER WILL BE PLACED CLOSE TO THE TANK. PROVIDE CONTAINER SECURED TO SUN-SHADE SUPPORTS.
14 ELECTRICAL SAFETY GROUNDING WILL BE INSTALLED.
15 THE ROOF OF THE PROTECTIVE SHED OVER THE FUEL TANK WILL BE COVERED WITH CORRUGATED METAL OR ANOTHER SIMILAR AVAILABLE ROOFING MATERIAL AND WILL BE FURNISHED BY THE CONTRACTOR.
16 ALL ITEMS SHOWN HERE-ON ARE CONTRACTOR FURNISHED & INSTALLED FOR Z.I. INSTALLATIONS UNLESS OTHERWISE NOTED. FOR O.S. INSTALLATIONS, SUPPLY OF FUEL FACILITIES ITEMS AND CONSTRUCTION REQUIRED WILL BE AS SPECIFIED BY AACS I & M UNITS.
17 OTHER TANK SHAPES OF SIMILAR CAPACITY MAY BE USED IN LIEU OF TYPE SHOWN.

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

JOHN HANS GRAHAM & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

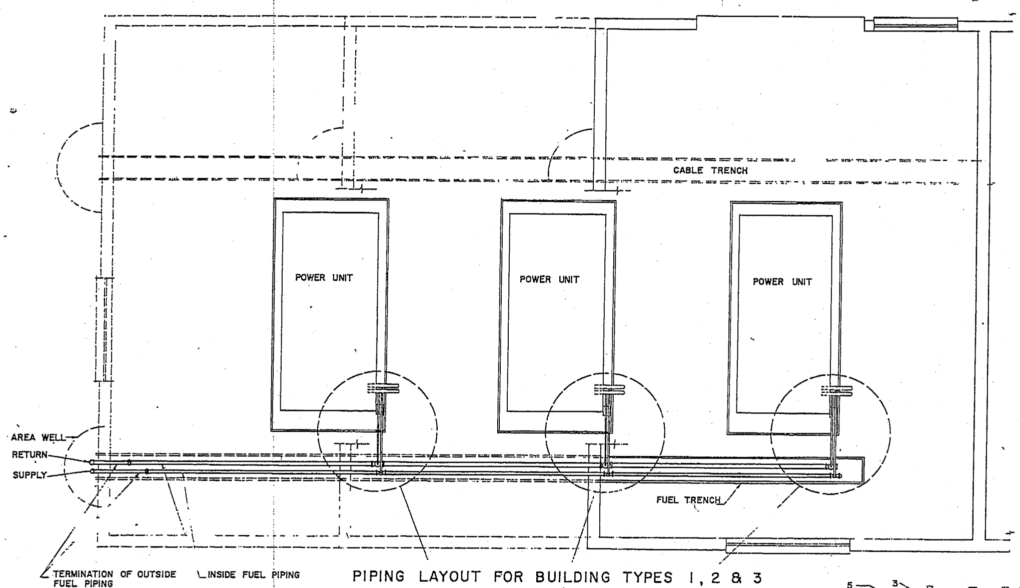
FUEL FACILITIES
FOR NAVIGATIONAL AIDS
OUTSIDE PIPING
ABOVE GROUND INSTALLATION

APPROVED FOR AACS
Lynn W. Ruddick Major USAF
DATE 24 Oct 55

APPROVED: [signature]
FOR CHIEF OF STAFF, USAF

AW-78-18-01
SCALE AS NOTED
DATE 1 SEPT 55
SHEET 1 OF 3

THIS DRAWING SUPERSEDES DWG 78-18-01 DATED 10 SEPT 52 AND DWG AF-78-18-01 DATED 9 FEB 54



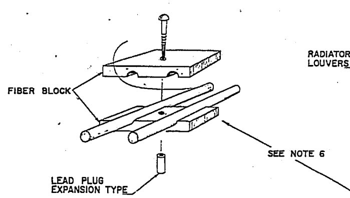
PIPING LAYOUT FOR BUILDING TYPES 1, 2 & 3

BILL OF MATERIAL

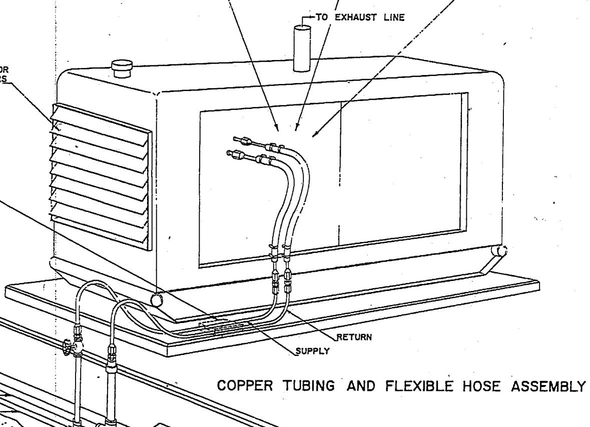
ITEM	GASOLINE POWERED QTY	UNIT	FUNCTION	DIESEL POWERED QTY	UNIT	FUNCTION	NOMENCLATURE
1	2	FT	SUPPLY	4	FT	SUPPLY-RETURN	HOSE ARCFT. FUEL 1/2" I.D. APPX. 1" O.D.
2	4	EA		8	EA		CLAMP, HOSE, APPX. 15/16" DIA., RUST PROOF
3	4	EA		8	EA		NUTS 1/2" FLARE BRASS
4	2	EA		2	EA		CONNECTOR, BRASS, 1/2" FLARE x 1/2" FLARE, STRAIGHT
5	10	FT		20	FT		COPPER TUBING TYPE 'N' 1/2" O.D. x .049" WALL THK.
6	2	EA		4	EA	SUPPLY-RETURN	CONNECTOR, BRASS, 1/2" FLARE x 1/2" MALE PIPE
7	1	EA		1	EA	SUPPLY	VALVE, GLOBE 1/2" BRASS
8	10	FT		10	FT	SUPPLY	PIPE 1/2" BLK STEEL SEAMLESS
9	1	EA	SUPPLY	1	EA	SUPPLY	TEE 1/2" BLK IRON, STRAIGHT
10				1	EA	RETURN	TEE 3/4" BLK IRON, STRAIGHT
11				10	FT	RETURN	PIPE 3/4" BLK STEEL SEAMLESS
12	1	EA	SUPPLY	2	EA	SUPPLY	CONNECTOR BRASS 1/2" FLARE x 3/8" MALE PIPE
13				1	EA	RETURN	COUPLING, REDUCER 3/4" TO 1/2"

GENERAL NOTES

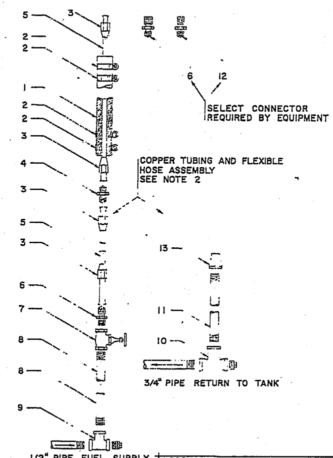
1. THREADED PIPE CONNECTIONS SHALL BE SEALED WITH OIL AND GASOLINE RESISTANT COMPOUND.
2. COPPER TUBING AND FLEXIBLE HOSE ASSEMBLY IS IDENTICAL FOR SUPPLY AND RETURN SYSTEMS.
3. GASOLINE POWERED GENERATORS REQUIRE ONLY THE FUEL SUPPLY PIPING SYSTEM.
4. DIESEL POWERED GENERATORS WILL REQUIRE BOTH FUEL SUPPLY AND FUEL RETURN PIPING SYSTEM.
5. THIS DRAWING PROVIDES DETAILS OF FUEL FACILITIES FOR INSTALLATION IN THE NAVIGATIONAL AIDS OR EMERGENCY POWER BUILDINGS SHOWN IN DRAWINGS AW-26-03-27 AND AW-26-03-26. RELIABLE MODIFICATIONS OF THIS INSTALLATION CAN BE MADE TO SUIT OTHER TYPES OF BUILDINGS.
6. COPPER TUBING SHOULD BE RIGIDLY SECURED IN PLACE.



PREFERRED TUBE CLAMPING DETAIL



COPPER TUBING AND FLEXIBLE HOSE ASSEMBLY



APPROVED FOR AACS
Lyman W. Ruddick Maj. USAF
DATE 24 Oct 55

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

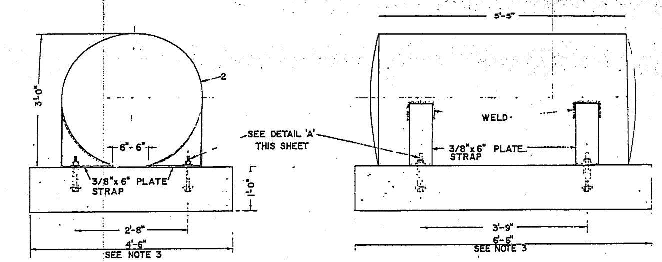
JOHN HANS GRAHAM & ASSOCIATES
ARCHITECTS - ENGINEERS — WASHINGTON, D. C.

FUEL FACILITIES
FOR NAVIGATIONAL AIDS
INSIDE PIPING

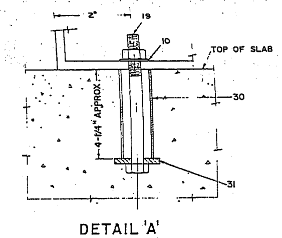
APPROVED: [signature]
FOR CHIEF OF STAFF, USAF

AW - 78 - 18 - 01
SCALE NO SCALE
DATE 1 SEPT 55
SHEET 2 OF 3

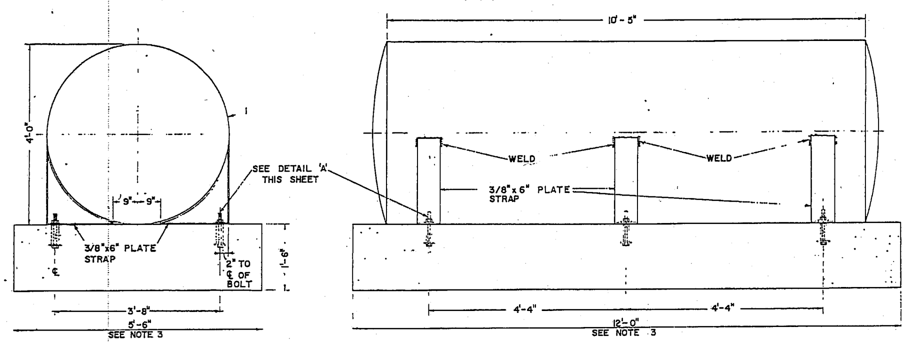
THIS DRAWING SUPERSEDES DWG 78-18-01 DATED 10 SEPT 52 AND DWG AF-78-18-01 DATED 9 FEB 54



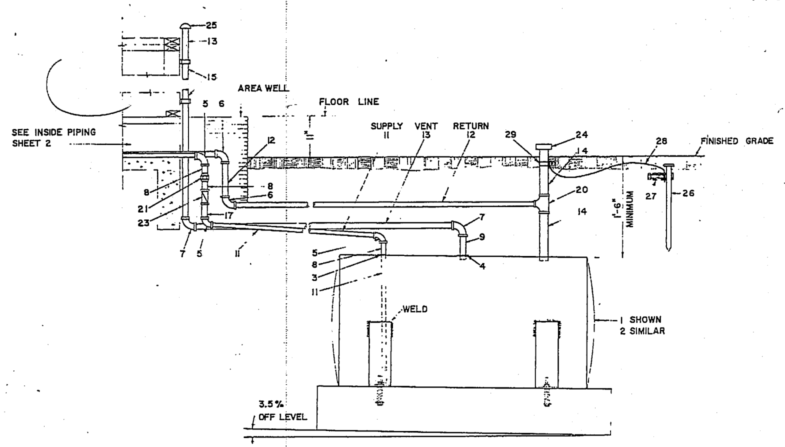
DETAIL OF BASE & 275 GALLON TANK
1"= 1'-0"



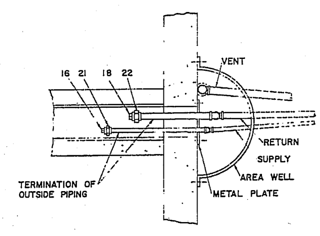
DETAIL 'A'
1/2" = 1"



DETAIL OF BASE & 1000 GALLON TANK
1"= 1'-0"



ELEVATION OF TANK AND PIPING
NO SCALE



PLAN VIEW
1"= 1'-0"

BILL OF MATERIAL

ITEM	275 GAL. QUAN.	1000 GAL. QUAN.	NOMENCLATURE
1	0	1	CONTAINER, 1000 GALLON, STEEL, ROUND, BELOW GROUND
2	1	0	CONTAINER, 275 GALLON, STEEL, ROUND, BELOW GROUND
3	1	1	BUSHING, PIPE 2"x1/2", DOUBLE TAPPED, BLK. IRON
4	1	1	BUSHING, PIPE 2"x1", BLACK IRON
5	3	3	ELBOW, 1/2"x90°, MALLEABLE IRON
6	2	2	ELBOW, 3/4"x90°, MALLEABLE IRON
7	2	2	ELBOW, 1"x90°, MALLEABLE IRON
8	3	3	NIPPLE, PIPE, 1/2"x2", BLACK STEEL
9	1	1	NIPPLE, PIPE, 1"x4", BLACK STEEL
10	4	6	WASHER, PLAIN
11	20 FT	20 FT	PIPE, 1/2" BLACK STEEL, SEAMLESS OR WELDED
12	20 FT	20 FT	PIPE, 3/4" BLACK STEEL, SEAMLESS OR WELDED
13	20 FT	20 FT	PIPE, 1" BLACK STEEL, SEAMLESS OR WELDED
14	5 FT.	5 FT.	PIPE, 2" BLACK STEEL, SEAMLESS OR WELDED
15	2	2	CLAMP, PIPE, 1" GALVANIZED
16	1	1	PLUG, PIPE, 1/2", BLACK IRON, SQUARE HEAD
17	1	1	NIPPLE, PIPE, 1/2"x4"
18	1	1	PLUG, PIPE, 3/4", BLACK IRON SQUARE HEAD
19	4	6	1/2" DIA. BOLT, 6" LONG, THREADED 2", W/NUT
20	1	1	TEE, PIPE REDUCING 2"x3/4"x2", BLACK IRON
21	2	2	UNION, PIPE, 1/2" BLACK IRON
22	1	1	UNION, PIPE, 3/4" BLACK IRON
23	1	1	VALVE, CHECK SWING VERTICAL BRASS 1/2"
24	1	1	CAP, FILLER 2" BRASS, BUCKEYE IRON WORKS 764
25	1	1	VENT, 1" MUSHROOM TYPE W/SCREEN
26	1	1	ROD, GROUND
27	1	1	CLAMP, GROUND
28	1	1	WIRE, GROUND, COPPER NO. 4 STRANDED BARE
29	2 FT	2 FT	STRAPPING, PIPE
30	4	6	1-1/4" I.D. x 4" LONG STD PIPE SLEEVE
31	4	6	2"x2"x1/4" PLATE WASHER 5/8" ⌀ HOLE

GENERAL NOTES

1 THREADED PIPE CONNECTIONS SHALL BE SEALED WITH OIL AND GASOLINE RESISTANT COMPOUND.
2 TANK AND PIPE CONNECTIONS SHALL BE TESTED UNDER 5 LBS. AIR PRESSURE; HOLD FOR ONE-HALF HOUR.
3 TANK BASE MAY VARY DUE TO SOIL CONDITIONS AT EACH LOCATION.
4 THIS SYSTEM INCLUDING TANK AND PIPING SHALL BE INSTALLED IN ACCORDANCE WITH N.F.P.A. AND/OR N.B.F.U. CODES.
5 MINIMUM DISTANCE BETWEEN THE TANK AND BUILDING SHOULD NOT BE LESS THAN 15 FEET.
6 ALL CONCRETE SHOULD BE CLASS 'B', 2500 LBS/SQ.FT.
7 ON BELOW GRADE INSTALLATIONS, TANK AND PIPE SHOULD BE COATED WITH COAL-TAR ENAMEL IN ACCORDANCE WITH MILITARY SPECIFICATIONS.
8 THIS DRAWING PROVIDES DETAILS OF FUEL FACILITIES FOR INSTALLATION IN THE NAVIGATIONAL AIDS OR EMERGENCY POWER BUILDINGS SHOWN IN AW. DRAWINGS AW-26-03-26 & AW-26-03-27. MODIFICATION OF THIS INSTALLATION CAN BE MADE TO SUIT OTHER TYPES OF BUILDINGS.
9 THE CONCRETE BASE SHOWN CAN BE USED FOR A TANK INSTALLATION WHERE WATER MAY LIFT OR DISTORT THE POSITION OF THE TANK; IF SOIL CONDITIONS ARE DRY, A LAYER OF GRAVEL (6") CAN BE USED FOR THE TANK BASE.
10 TANK MUST BE MOUNTED 3.5% OFF LEVEL, LOWER SIDE, AT FILLER END.
11 FUEL SUCTION AND RETURN LINES TO PITCH DOWN TOWARD FUEL TANK ONE INCH FOR EACH TEN FEET.
12 THE TOTAL LENGTH OF FUEL SUPPLY LINE SHALL NOT EXCEED 25 FEET AND THE SUCTION HEAD SHALL NOT EXCEED 8 FEET BELOW THE FUEL TRANSFER PUMP. IF EITHER OF THE ABOVE CONDITIONS CAN NOT BE MET, AN AUXILIARY FUEL LIFT PUMP AND A DAY TANK MAY BE ADDED TO THIS FUEL SYSTEM IF ENGINE FUEL PUMP PROVES UNSATISFACTORY TO LIFT FUEL TO ENGINE.

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

JOHN HANS GRAHAM & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

FUEL FACILITIES
FOR NAVIGATIONAL AIDS
OUTSIDE PIPING
BELOW GROUND INSTALLATION

APPROVED FOR AACS
Lynn W. Ruddick Major USAF
DATE 24 Oct 55

APPROVED: [signature]
FOR CHIEF OF STAFF, USAF

AW-78-18-01
SCALE AS NOTED
DATE 1 SEPT 55
SHEET 3 OF 3

THIS DRAWING SUPERSEDES DWG. 78-18-01 DATED 10 SEPT 52 AND DWG AF-78-18-01 DATED 9 FEB 54

461139 O-58—2

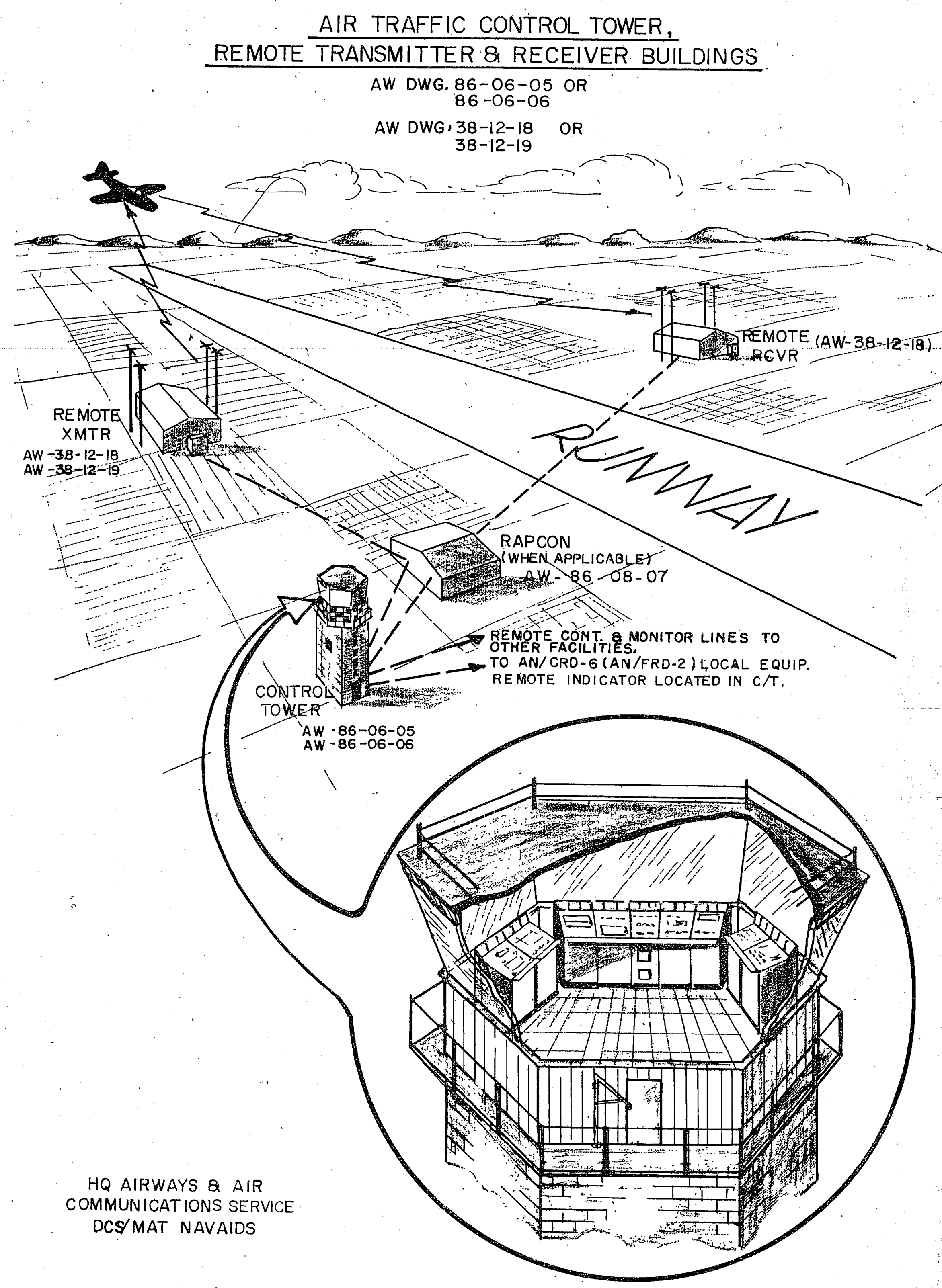
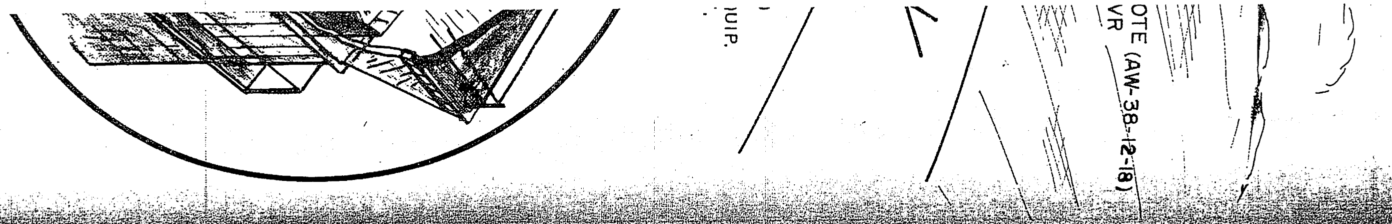

AIR TRAFFIC CONTROL TOWER,
REMOTE TRANSMITTER & RECEIVER BUILDINGS
AW DWG. 86-06-05 OR
86-06-06
AW DWG. 38-12-18 OR
38-12-19
REMOTE (AW-38-12-18)
RCVR
REMOTE
XMTR
AW-38-12-18
AW-38-12-19
RUNWAY
RAPCON
(WHEN APPLICABLE)
AW-86-08-07
REMOTE CONT. & MONITOR LINES TO
OTHER FACILITIES.
TO AN/CRD-6 (AN/FRD-2) LOCAL EQUIP.
REMOTE INDICATOR LOCATED IN C/T.
CONTROL
TOWER
AW-86-06-05
AW-86-06-06
HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 2.



Chapter 2

AIR TRAFFIC CONTROL TOWER

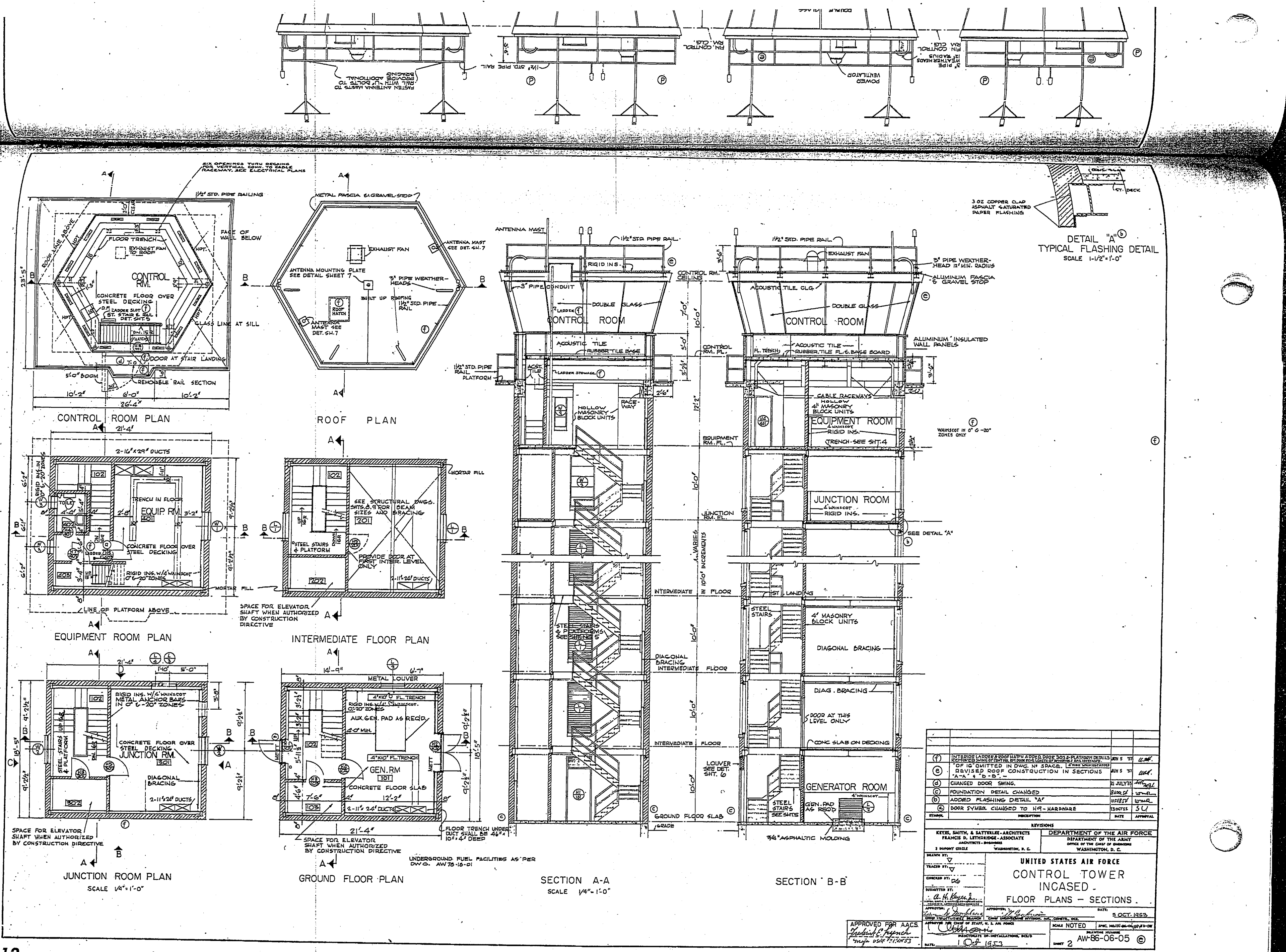
A. Function

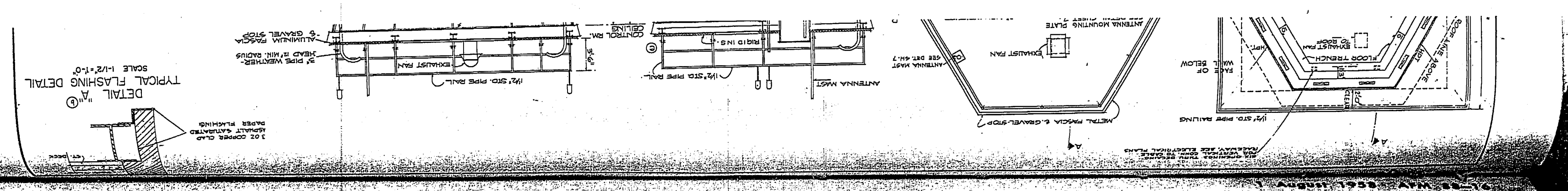
This facility provides visual and aural air traffic control for an airbase through the use of radio communications equipment and visual aids. Aircraft landing, takeoff, and taxi control is accomplished from the control tower by the remote control of communications equipment and coordination by interphone or telephone with other base or associated agencies.

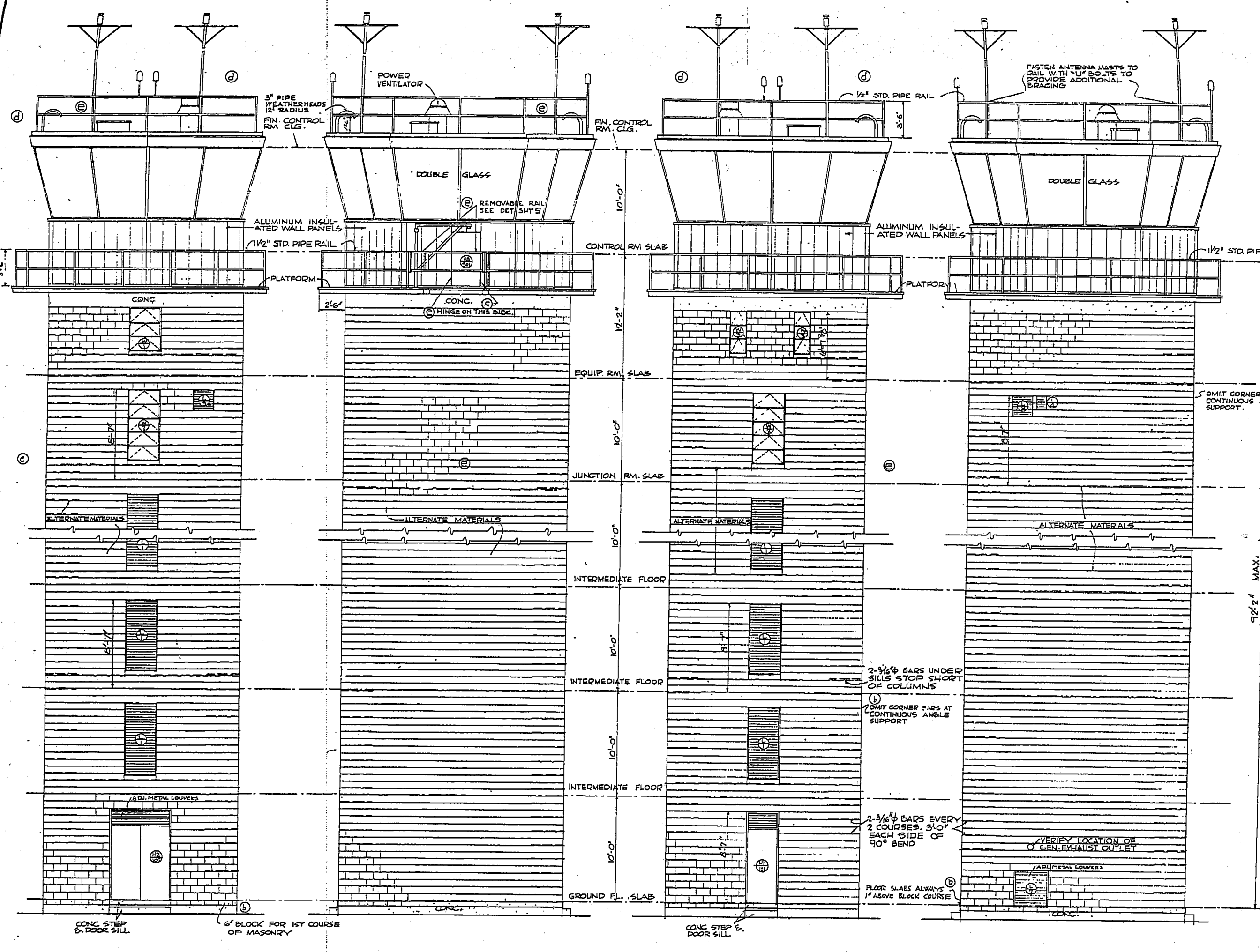
B. Physical Characteristic

1. The standard control tower consists of a control room (cab), equipment room, junction room, and generator room plus intermediate floors or supporting structure as required. The primary equipment located at the control tower includes the AN/FRC–19( ) console, AN/URD–2 (VHF–DF), AN/GRC–32 (UHF Backup), and BC–624 and BC–625 (VHF Backup). The layout and construction requirements are shown on drawings AW–86–06–05 and AW–86–06–06. Siting criteria are available from Airways and Air Communications Service. Total power required for a standard control tower is 41.5 kw, 120/208V, 3-phase, 4-wire 60-cycle, of which 30 kw is heating and/or air conditioning. Minimum (no spares or expansion capability) telephone cable requirements are 64 pairs. However, this requirement varies considerably at each base, depending on local conditions such as Civil Aeronautics Administration tie lines, base tie line requirements, and approach control responsibilities. Fuel facilities are shown on drawing AW–78–18–01.

2. The major air command will determine the height of the control tower and will make the determination based on its knowledge of existing conditions and probable future airfield use. To fulfill its function the control tower cab should be sufficiently high and suitably located to afford an unobstructed view of the airfield runways, clear zones, taxiways, warming-up and parking aprons. A suggested standard is to have the control tower cab floor at least 20 feet above the highest obstruction. It should be noted that drawings AW–86–06–05 and AW–86–06–06 provide that additional intervening floors may be specified so that the control tower cab floor may be placed higher than the minimum of about 30 feet by increments of 10 feet.


CONTROL ROOM PLAN
ROOF PLAN
EQUIPMENT ROOM PLAN
INTERMEDIATE FLOOR PLAN
JUNCTION ROOM PLAN
SCALE 1/4"=1'-0"
GROUND FLOOR PLAN
SECTION A-A
SCALE 1/4"=1'-0"
SECTION B-B
DETAIL "A"
TYPICAL FLASHING DETAIL
SCALE 1-1/2"=1'-0"
CONTROL ROOM
EQUIPMENT ROOM
JUNCTION ROOM
GENERATOR ROOM
UNDERGROUND FUEL FACILITIES AS PER DWG. AW 78-16-01
INTERIOR LADDER & ROOF HATCH ADDED, DOOR 303 & PLATFORM DETAILS REMOVED, SWING OF CONTROL RM. DOOR REVD. LENGTH OF REMOVABLE RAIL INCREASED. JUN 5 '57
"OF 16" OMITTED IN DWG. Nº SPACE. 4' HIGH WAINSCOT ADDED. REVISED ROOF CONSTRUCTION IN SECTIONS "A-A" & "B-B". JUN 5 '57
CHANGED DOOR SWING. 21 JULY 55
FOUNDATION DETAIL CHANGED 8 APR 54
ADDED FLASHING DETAIL "A" 10 FEB 54
DOOR SYMBOL CHANGED TO H9-HARDWARE 23 OCT 53
SYMBOL
DESCRIPTION
DATE
APPROVAL
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
UNITED STATES AIR FORCE
CONTROL TOWER
INCASED
FLOOR PLANS - SECTIONS
DATE: 5 OCT. 1953
APPROVED FOR AACS
DATE: 1 Oct 1953
SCALE NOTED
DRAWING NUMBER
SHEET 2
AW-86-06-05





ELEVATION A

ELEVATION B

ELEVATION C

ELEVATION D

SYMBOL	DESCRIPTION	DATE	APPROVAL
(e)	DOOR 303 & PLATFORM REMOVED, REMOVABLE RAIL MADE LONGER TO CLEAR CRANE BRACE. GATE FOR EXT. LADDER REMOVED. SWING CONT. RM DOOR REVERSED.	JUN 5 '57	[illegible]
(d)	"OF 16" OMITTED IN DWG. N° SPACE. CORRECTED LOCATION OF 3" PIPE WEATHER-HEADS ON ELEVATIONS "A" & "C".	JUN 5 '57	[illegible]
(c)	DOOR SWING CHANGED	21 JUN 55	[illegible]
(b)	ADDED BLOCK COURSE & NOTES	8 APR 54	[illegible]
(a)	ADDED CORNER BAR NOTE	11 FEB 54	SU

REVISIONS

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

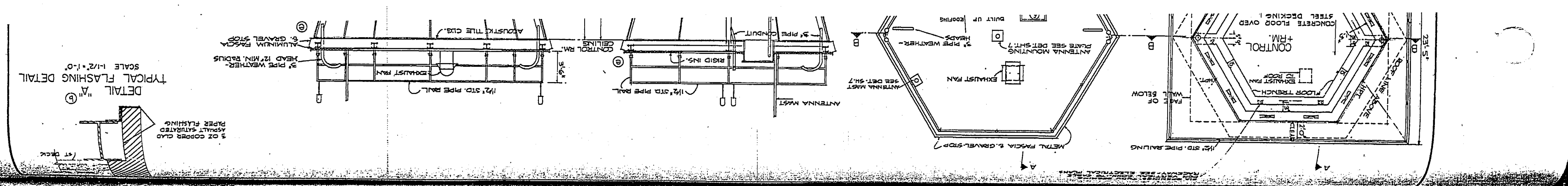
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

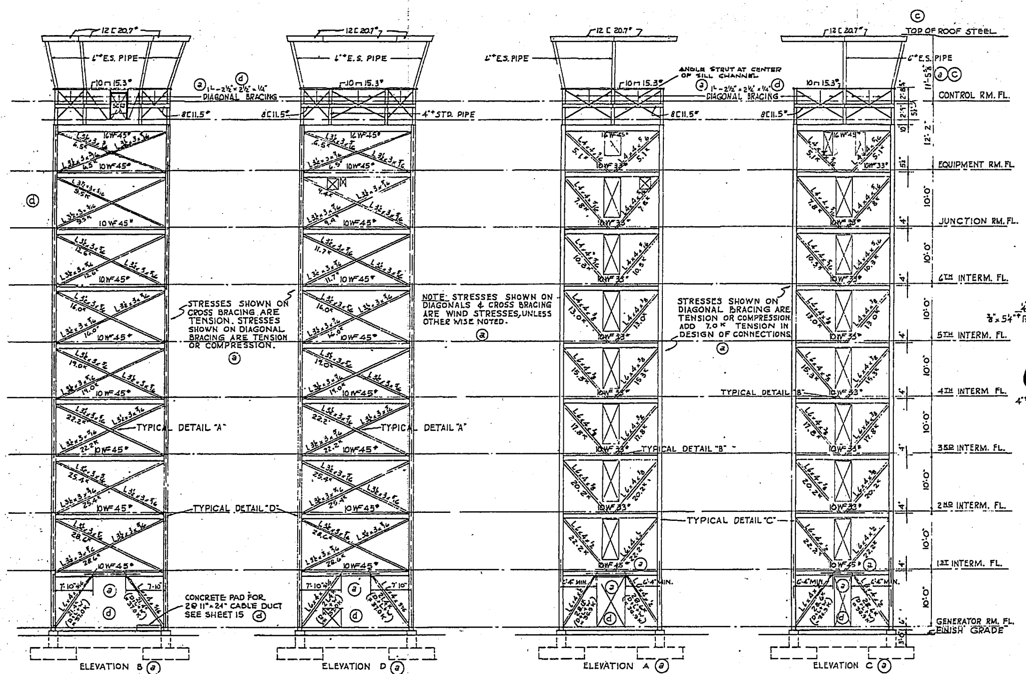
DRAWN BY: DG
TRACED BY: DG
CHECKED BY: A.K.
SUBMITTED BY: A. H. Keyes Jr.
KEYES, SMITH, & SATTERLEE - ARCHITECTS FRANCIS D. LETHBRIDGE - ASSOCIATE

UNITED STATES AIR FORCE
CONTROL TOWER
INCASED ELEVATIONS

APPROVED: [signature] CHIEF STRUCTURES BRANCH
APPROVED: [signature] CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE.
DATE: 5 OCT. 1953
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE:

SCALE 1/4" = 1'-0" SPEC. NO. AW-86-06-05-53-CE
DRAWING NUMBER
SHEET 3 AW-86-06-05 (d)





FRAMING ELEVATIONS

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

TABLE #1 - USE ONLY FOR ~~OPEN LEG OR~~ INCASED TOWERS WITH MASONRY WALLS WEIGHING NOT LESS THAN 33 POUNDS PER SQUARE FOOT OF WALL. REFER TO TABLE 1-A, DRAWING AW-86-06-05, SHEET 10 FOR ~~OPEN LEG OR~~ INCASED TOWER WITH CORRUGATED PANEL WALLS.

TOWER HEIGHT	FTG @ 4000#/SQ.FT. SOIL VAL.	FTG. REINF.	BASE PLATES	PEDESTAL	PED. REINF.	PED. TIES
92'-2"	8'-10"×8'-10"×2'-0"	14-#6 E.W.	15"×2 1/4"×1'-6"	20×20	4-#9	#3@12"O.C.
82'-2"	8'-4"×8'-4"×2'-0"	11-#6 E.W.	16"×2"×1'-6"	20×20	4-#9	#3@12"O.C.
72'-2"	7'-8"×7'-8"×1'-10"	13-#5 E.W.	15"×1 3/4"×1'-4"	18×18	4-#8	#3@12"O.C.
62'-2"	7'-2"×7'-2"×1'-10"	10-#5 E.W.	14"×1 1/2"×1'-4"	18×18	4-#8	#3@12"O.C.
52'-2"	6'-6"×6'-6"×1'-8"	13-#4 E.W.	14"×1 1/2"×1'-2"	16×16	4-#7	#3@12"O.C.
42'-2"	6'-0"×6'-0"×1'-8"	10-#4 E.W.	12"×1"×1'-2"	16×16	4-#7	#3@12"O.C.
32'-2"	5'-4"×5'-4"×1'-6"	9-#4 E.W.	12"×1"×1'-0"	14×14	4-#7	#3@12"O.C.

PEDESTAL SYMMETRICAL ABOUT ℄ OF COLUMN

TOWER HEIGHT IN SCHEDULE IS DISTANCE FROM CONTROL ROOM FLOOR TO GENERATOR ROOM FLOOR.

NOTE: LONG DIMENSION OF BASE PLS TO RUN IN SAME DIRECTION AS COLUMN WEB.

TABLE #2

	DL OF FRAME INCL. ROOF CONTROL EQUIP. AND JUNCTION RM. FLS. IN PLACE	LIVE LOADS, STEEL DECK & CONCRETE FILL	METAL SIDING & GIRTS	MASONRY WALLS ASSUMED 50#/SQ.FT.	WIND STRESSES IN COLUMNS	TOTAL LOAD WITH MASONRY WALLS	MAX. DESIGN COL. LOADS (WITH WIND CORRECTION 1/1.33 WHERE WIND GOVERNS)	
CONTROL RM.								
EQUIP. RM.	25.4K	12.0K	—	—	6.5K	43.9K	8WF31#	32.4
JUNCTION RM.	30.2K	20.8K	0.4K	4.5K	12.3K	69.6K	8WF31#	57.5
6TH INTERM.	34.9K	29.6K	1.0K	16.1K	22.0K	102.6K	8WF31#	80.6
5TH INTERM.	39.7K	38.4K	1.5K	25.7K	30.0K	133.8K	8WF31#	103.5
4TH INTERM.	44.5K	47.2K	2.1K	35.3K	42.0K	169.0K	8WF31#	127.0
3RD INTERM.	49.4K	56.0K	2.7K	44.9K	55.5K	205.8K	8WF48#	154.1
2ND INTERM.	54.4K	64.8K	3.3K	54.5K	71.0K	244.7K	8WF48#	183.5
1ST INTERM.	59.5K	73.6K	3.9K	64.1K	90.5K	287.7K	8WF58#	215.8
GENER. RM.	64.7K	82.4K	4.4K	73.7K	110.0K	330.8K	8WF58#	248.1

STRUCTURAL NOTES

LIVE LOADS:- ROOF 50#/SQ.FT., FLOORS 60#/SQ.FT., STAIRS & LANDINGS 100#/SQ.FT., GENERATOR RM. 150#/SQ.FT.

WIND:- ASSUMED 30#/SQ.FT. NORMAL TO WALL SURFACES. ASSUMED 20#/SQ.FT. NORMAL TO DIAGONAL BETWEEN COLUMNS. ALLOWABLE STRESSES FOR COMBINED D.L., L.L. & WIND INCREASED 30%

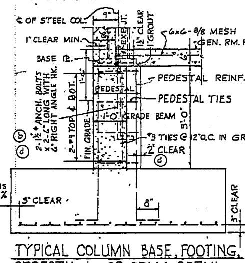
STEEL:- STRUCTURAL STEEL SHALL CONFORM TO A.I.S.C. SPECIFICATIONS FOR THE DESIGN, FABRICATION & ERECTION OF STRUCTURAL STEEL FOR BUILDINGS. WELDING SHALL CONFORM TO THE LATEST SPECIFICATION OF THE AMERICAN WELDING SOCIETY. REINFORCING STEEL SHALL CONFORM TO FEDERAL SPECIFICATION QQ-B-71, TYPE B, GRADE 2, 3, 4 OR 5. DEFORMATIONS SHALL CONFORM TO A.S.T.M. SPECIFICATION A305-50T. SUPPORTING DEVICES SHALL CONFORM TO C.R.S.I. STANDARDS.

CONCRETE:- COLUMN FOOTINGS & SLAB ON GROUND TO BE CLASS "B", 2500#/SQ.IN. ALL OTHER CONC. TO BE CLASS "A", 3000#/SQ.IN. (A.C.I. CODE)

SOIL VALUE:- ASSUMED 4000#/SQ.FT. FOR SOILS HAVING VALUES VARYING FROM THIS VALUE, FOOTINGS MUST BE REDESIGNED. REFERENCE SHALL BE MADE TO TABLE #2 ON THIS DRAWING FOR DESIGN LOADS. STABILITY SHOULD BE VERIFIED UNDER CONDITIONS OF MINIMUM VERTICAL LOAD WITH MAXIMUM WIND.

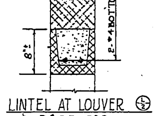
FIELD CONNECTIONS:- DESIGN BASED ON FIELD RIVETED STRUCTURE. 3/4"⌀ RIVETS, 13/16"⌀ HOLES.

NOTE:- TOWER HAS BEEN DESIGNED FOR ALL VARIABLE CONDITIONS.



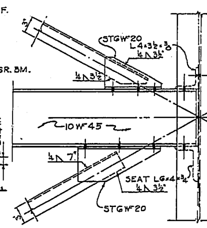
TYPICAL COLUMN BASE, FOOTING, PEDESTAL & GR. BEAM DETAIL

SCALE: 3/4" = 1'-0"



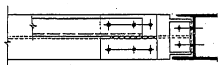
LINTEL AT LOUVER & DOOR 303

SCALE: 1 1/2" = 1'-0"



TYPICAL DETAIL "D"

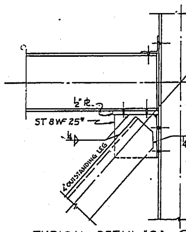
SCALE: 1 1/2" = 1'-0"



TOP FLANGE

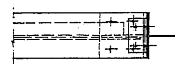
SCALE: 1 1/2" = 1'-0"

NOTE: FOR TOWERS CONSTRUCTED WITH FEWER INTERMEDIATE FLOORS THAN DRAWN ON PLANS, BRACING SHALL BE THE SIZES AS SHOWN FROM THE ROOF DOWN, FOR THE REQUIRED NUMBER OF FLOORS. THE BRACING FROM THE GENERATOR FLOOR TO THE FIRST FLOOR ABOVE TO BE LOCATED AS SHOWN TO CLEAR OPENINGS.



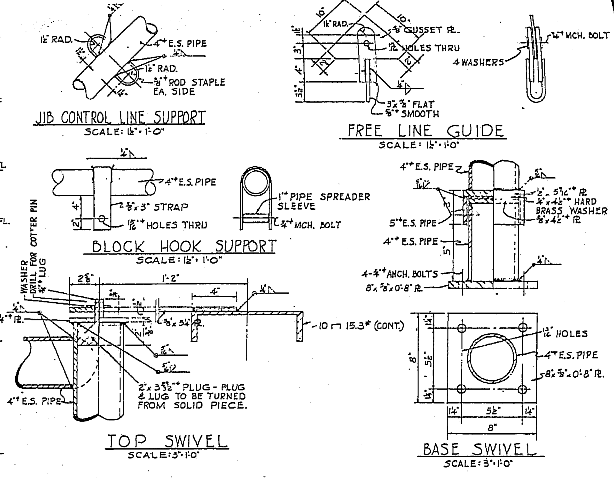
TYPICAL DETAIL "C"

SCALE: 1 1/2" = 1'-0"



TOP FLANGE

SCALE: 1 1/2" = 1'-0"



TOP SWIVEL

SCALE: 3" = 1'-0"

BASE SWIVEL

SCALE: 3" = 1'-0"

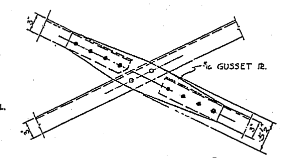
JIB CRANE DETAILS

DESIGN LOAD = 2000#

JIB CONTROL LINE SUPPORT — SCALE: 1 1/2" = 1'-0"

FREE LINE GUIDE — SCALE: 1 1/2" = 1'-0"

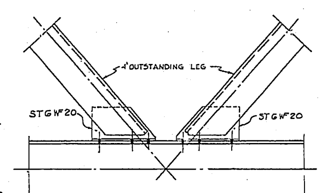
BLOCK HOOK SUPPORT — SCALE: 1 1/2" = 1'-0"



TYPICAL DETAIL "A"

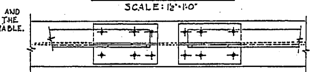
SCALE: 1 1/2" = 1'-0"

NOTE:- TYPICAL DETAILS "A", "B", "C", & "D" SHOW CONNECTIONS BASED ON STRESSES OCCURING IN THE PANELS BETWEEN THE 1ST & 2ND INTERM. FLOORS. THE VERTICAL COMPONENTS OF THE DIAGONAL BRACING STRESSES MUST BE INCLUDED IN THE BEAM TO COLUMN CONNECTIONS AND ALL CONNECTIONS MUST BE PROPORTIONED ON THE BASIS OF THE MAXIMUM COMBINED EFFECTS OBTAINABLE.



TYPICAL DETAIL "B"

SCALE: 1 1/2" = 1'-0"



TOP FLANGE

SCALE: 1 1/2" = 1'-0"

SYMBOL	DESCRIPTION	DATE	APPROVAL
(d)	DOOR OPENING REMOVED, BRACING REVISED, ADDED PAD, ELEV "B"	[illegible]	[illegible]
(c)	"OF 16" OMITTED IN DWG. No SPACE.— REVISED DIMENSION FROM CONTROL ROOM FLOOR TO TOP OF ROOF STEEL ON ELEVATION "C". CHANGED LL. FROM 30 TO 50 PSF. IN STRUCT. NOTES	[illegible]	[illegible]
(b)	REVISED NOTES, TABLE #2 & ANCHOR BOLTS	8 APR 54	SU
(a)	GENERAL REVISIONS	16 FEB 54	SU

REVISIONS

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

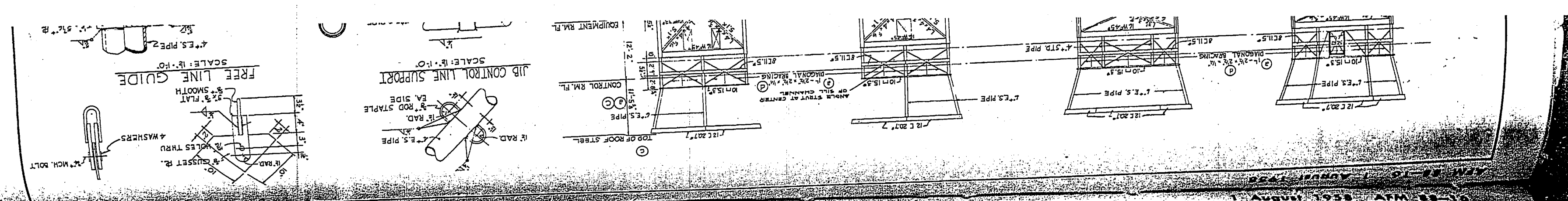
DRAWN BY: AM
TRACED BY: AM
CHECKED BY: SHB
SUBMITTED BY: A. H. Keyes Jr.

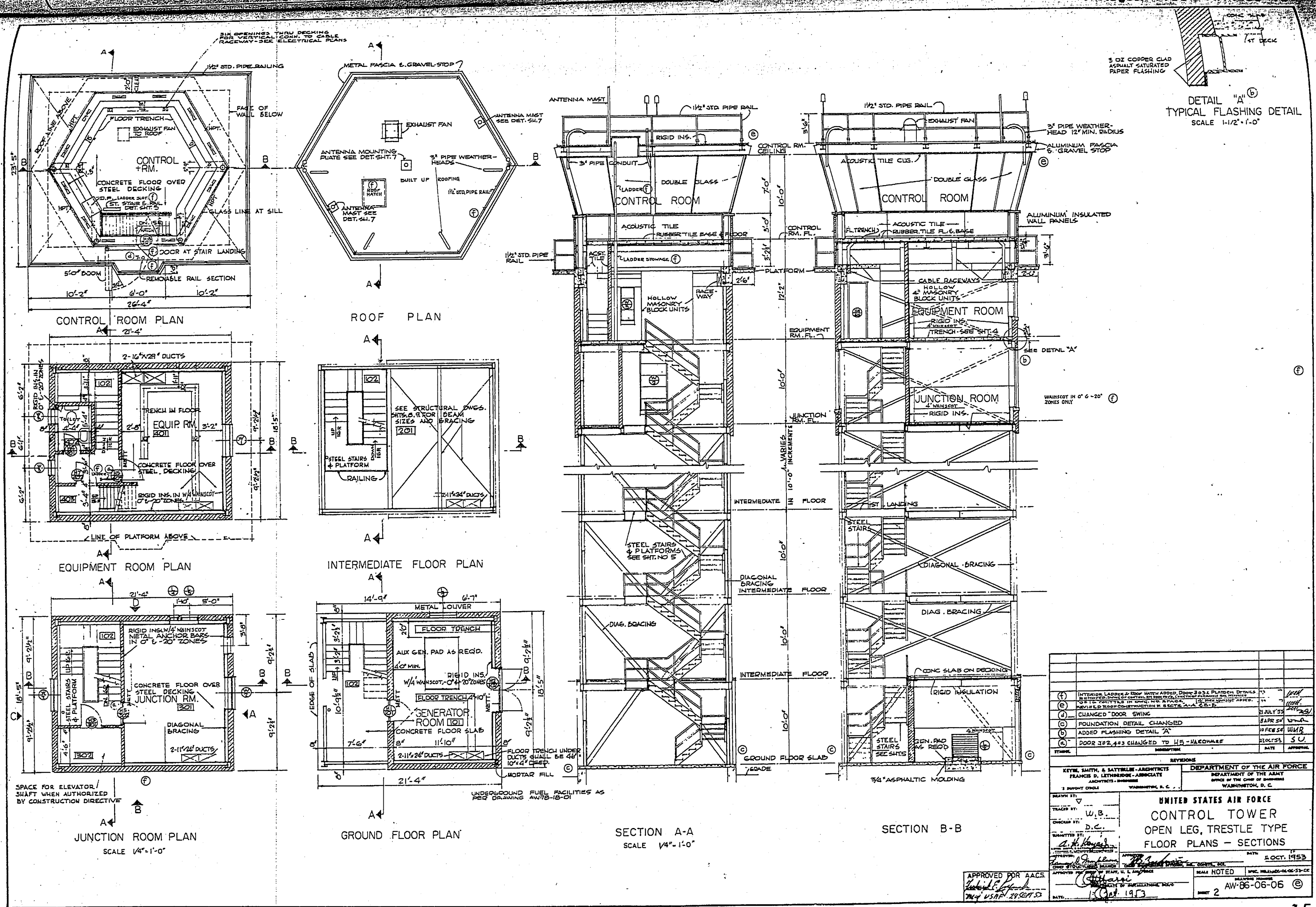
UNITED STATES AIR FORCE
CONTROL TOWER
INCASED
TOWER FRAMING ELEVATIONS & DETAILS

APPROVED: CHIEF STRUCTURES BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 5 OCT 1953

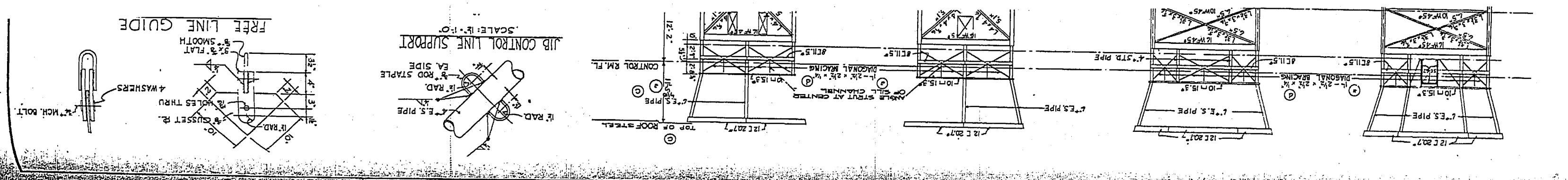
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE:

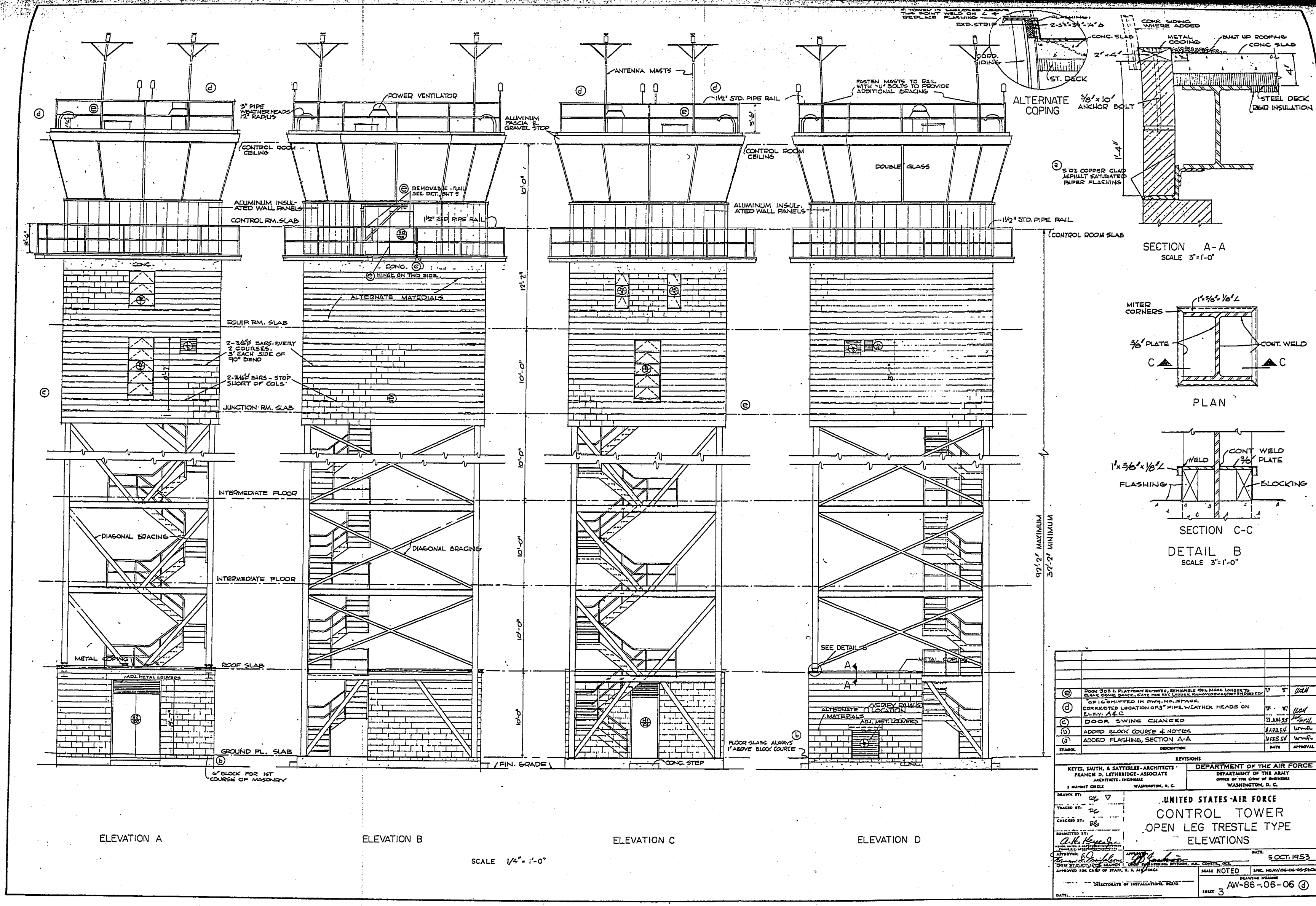
SCALE NOTED
SPEC. NO. AW 86-06-05-53 C
DRAWING NUMBER
SHEET 9 AW-86-06-05 (c)



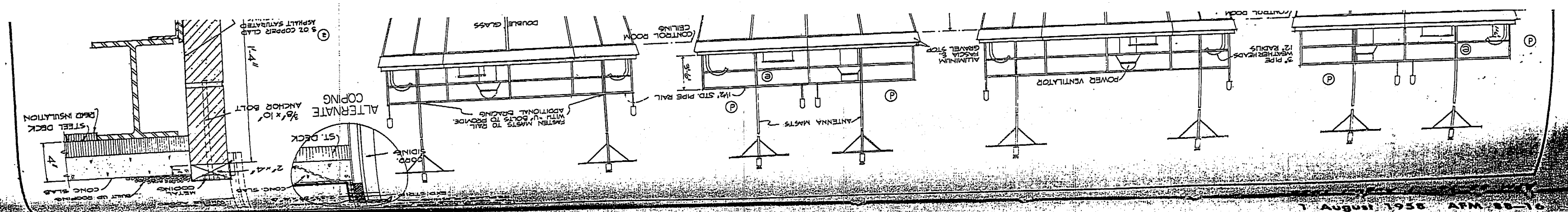


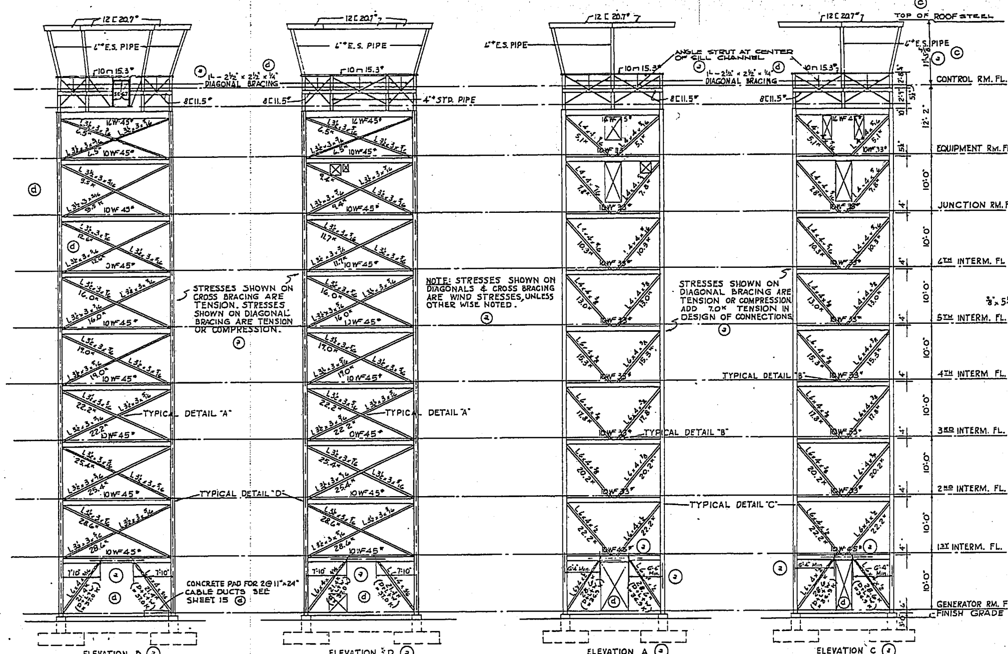
CONTROL ROOM PLAN
ROOF PLAN
EQUIPMENT ROOM PLAN
INTERMEDIATE FLOOR PLAN
JUNCTION ROOM PLAN
SCALE 1/4"=1'-0"
GROUND FLOOR PLAN
SECTION A-A
SCALE 1/4"=1'-0"
SECTION B-B
DETAIL "A"
TYPICAL FLASHING DETAIL
SCALE 1-1/2"=1'-0"
CONTROL RM.
EQUIP. RM.
JUNCTION RM.
GENERATOR ROOM
CONTROL ROOM
EQUIPMENT ROOM
JUNCTION ROOM
INTERMEDIATE FLOOR
GROUND FLOOR SLAB
DIAGONAL BRACING
STEEL STAIRS & PLATFORMS SEE SHT. NO 5
SPACE FOR ELEVATOR SHAFT WHEN AUTHORIZED BY CONSTRUCTION DIRECTIVE
UNDERGROUND FUEL FACILITIES AS PER DRAWING AW-78-18-01
CHANGED DOOR SWING
FOUNDATION DETAIL CHANGED
ADDED FLASHING DETAIL "A"
DOOR 302, 403 CHANGED TO H5-HARDWARE
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
WASHINGTON, D. C.
UNITED STATES AIR FORCE
CONTROL TOWER
OPEN LEG, TRESTLE TYPE
FLOOR PLANS — SECTIONS
5 OCT. 1953
SCALE NOTED
APPROVED FOR AACS
SHEET 2
AW-86-06-06 ©





ELEVATION A
ELEVATION B
ELEVATION C
ELEVATION D
SCALE 1/4" = 1'-0"
ANTENNA MASTS
POWER VENTILATOR
CONTROL ROOM CEILING
ALUMINUM INSULATED WALL PANELS
CONTROL RM. SLAB
EQUIP RM. SLAB
JUNCTION RM. SLAB
INTERMEDIATE FLOOR
DIAGONAL BRACING
ROOF SLAB
GROUND FL. SLAB
FIN. GRADE
CONC. STEP
METAL COPING
ALTERNATE MATERIALS
DOUBLE GLASS
1 1/2" STD. PIPE RAIL
CONTROL ROOM SLAB
SEE DETAIL B
92'-2" MAXIMUM
32'-2" MINIMUM
ALTERNATE COPING
SECTION A-A
SCALE 3" = 1'-0"
PLAN
SECTION C-C
DETAIL B
SCALE 3" = 1'-0"
MITER CORNERS
3/8" PLATE
CONT. WELD
FLASHING
BLOCKING
STEEL DECK
RIGID INSULATION
BUILT UP ROOFING
CONC SLAB
DOOR SWING CHANGED
ADDED BLOCK COURSE & NOTES
ADDED FLASHING, SECTION A-A
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
UNITED STATES AIR FORCE
CONTROL TOWER
OPEN LEG TRESTLE TYPE
ELEVATIONS
5 OCT. 1953
SCALE NOTED
SHEET 3
AW-86-06-06 d



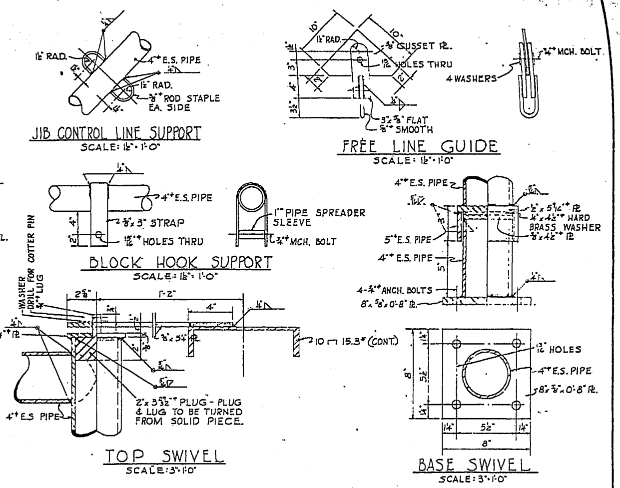


ELEVATION D (d) — ELEVATION D (d) — ELEVATION A (c) — ELEVATION C (c)

FRAMING ELEVATIONS

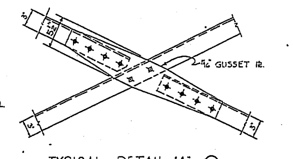
FOR MASONRY UNITS SCALE 1/8" = 1'-0"

NOTE: FOR TOWERS CONSTRUCTED WITH FEWER INTERMEDIATE FLOORS THAN DRAWN ON PLANS, BRACING SHALL BE THE SIZES AS SHOWN FROM THE ROOF DOWN, FOR THE REQUIRED NUMBER OF FLOORS. THE BRACING FROM THE GENERATOR FLOOR TO THE FIRST FLOOR ABOVE TO BE LOCATED AS SHOWN TO CLEAR OPENINGS.



JIB CRANE DETAILS

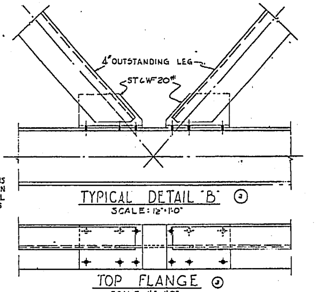
DESIGN LOAD - 2000#



TYPICAL DETAIL 'A' (a)

SCALE: 1 1/2" = 1'-0"

NOTE: TYPICAL DETAILS "A"-"B"-"C"-"D" SHOW CONNECTIONS BASED ON STRESSES OCCURRING IN THE PANELS BETWEEN THE 1ST & 2ND INTERMEDIATE FLOORS. THE VERTICAL COMPONENTS OF THE DIAGONAL BRACING STRESSES MUST BE INCLUDED IN THE BEAM TO COLUMN CONNECTIONS AND ALL CONNECTIONS MUST BE PROPORTIONED ON THE BASIS OF THE MAXIMUM COMBINED EFFECTS OBTAINABLE. (a)



TYPICAL DETAIL 'B' (a)

SCALE: 1 1/2" = 1'-0"

TOP FLANGE (a)

SCALE: 1 1/2" = 1'-0"

TABLE #1 - USE ONLY FOR OPEN LEG ~~OR INCASED~~ TOWERS WITH MASONRY WALLS WEIGHING NOT LESS THAN 33 POUNDS PER SQUARE FOOT OF WALL. (b) REFER TO TABLE 1A, DRAWING AW-86-06-06, SHEET 10 FOR OPEN LEG ~~OR INCASED~~ TOWERS WITH CORRUGATED PANEL WALLS

TOWER HEIGHT	FTG @ 4000#/SQ. FT. SOIL VAL.	FTG. REINF	BASE PLATES	PEDESTAL	PED. REINF.	PED. TIES
92'-2"	8'-10"×8'-10"×2'-0"	14-#6 E.W.	18×2 1/2×1'-6"	20×20	4-#9	#3 @ 12" O.C.
82'-2"	8'-4"×8'-4"×2'-0"	11-#6 E.W.	16"×2"×1'-6"	20×20	4-#9	#3 @ 12" O.C.
72'-2"	7'-8"×7'-8"×1'-10"	13-#5 E.W.	15"×1 3/4"×1'-4"	18×18	4-#8	#3 @ 12" O.C.
62'-2"	7'-2"×7'-2"×1'-10"	10-#5 E.W.	14"×1 3/4"×1'-4"	18×18	4-#8	#3 @ 12" O.C.
52'-2"	6'-6"×6'-6"×1'-8"	13-#4 E.W.	14"×1 1/2"×1'-2"	16×16	4-#7	#3 @ 12" O.C.
42'-2"	6'-0"×6'-0"×1'-8"	10-#4 E.W.	12"×1"×1'-2"	16×16	4-#7	#3 @ 12" O.C.
32'-2"	5'-4"×5'-4"×1'-6"	9-#4 E.W.	12"×1"×1'-0"	14×14	4-#7	#3 @ 12" O.C.

PEDESTAL SYMMETRICAL ABOUT ℄ OF COLUMN. (d)

TOWER HEIGHT IN SCHEDULE IS DISTANCE FROM CONTROL ROOM FLOOR TO GENERATOR ROOM FLOOR. (c)

NOTE: LONG. DIMENSION OF BASE PLS TO RUN IN SAME DIRECTION AS COLUMN WEB.

(b) TABLE #2

	D.L. OF FRAME INCL. ROOF CONTROL EQUIP AND JUNCTION RM. FLS. IN PLACE	LIVE LOADS, STEEL DECK & CONCRETE FILL.	METAL SIDING & GIRTS.	MASONRY WALLS ASSUMED 50#/SQ.FT.	WIND STRESSES IN COLUMNS	TOTAL LOAD WITH MASONRY WALLS.	MAX DESIGN COL. LOADS (WITH WIND CORRECTION 1/1.33 WHERE WIND GOVERNS)	
CONTROL RM.								
EQUIP. RM.	25.4K	12.0K	—	—	6.5K	43.9K	8WF31#	32.4K
JUNCTION RM.	30.2K	20.8K	0.4K	6.5K	12.3K	69.8K	8WF31#	52.5K
6TH INTERM.	34.9K	29.6K	1.0K	16.1K	22.0K	102.6K	8WF31#	80.6K
5TH INTERM.	39.7K	38.4K	1.5K	25.7K	30.0K	133.8K	8WF31#	103.8K
4TH INTERM.	44.5K	47.2K	2.1K	35.3K	42.0K	169.0K	8WF31#	127.0K
3RD INTERM.	49.4K	56.0K	2.7K	44.9K	55.5K	205.8K	8WF48#	154.4K
2ND INTERM.	54.4K	64.8K	3.3K	54.5K	71.0K	244.2K	8WF48#	183.5K
1ST INTERM.	59.5K	73.6K	3.7K	64.1K	90.5K	297.7K	8WF58#	215.8K
GENER. RM.	64.7K	82.4K	4.4K	73.7K	110.0K	334.8K	8WF58#	248.1K

(d)

STRUCTURAL NOTES (c)

LIVE LOADS:- ROOF 50#/SQ.FT., FLOORS 60#/SQ. FT., STAIRS & LANDINGS 100#/SQ.FT., GENERATOR RM. 150#/SQ.FT.

WIND:- ASSUMED 30#/SQ.FT. NORMAL TO WALL SURFACES. ASSUMED 20#/SQ.FT. NORMAL TO DIAGONAL BETWEEN COLUMNS. ALLOWABLE STRESSES FOR COMBINED D.L., L.L. & WIND INCREASED 30% (b)

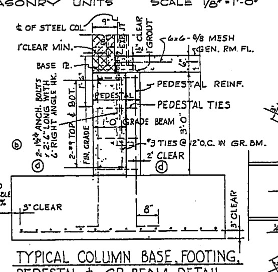
STEEL:- STRUCTURAL STEEL SHALL CONFORM TO A.I.S.C. SPECIFICATIONS FOR THE DESIGN, FABRICATION & ERECTION OF STRUCTURAL STEEL FOR BUILDINGS. WELDING SHALL CONFORM TO THE LATEST SPECIFICATION OF THE AMERICAN WELDING SOCIETY. REINFORCING STEEL SHALL CONFORM TO FEDERAL SPECIFICATION QQ-B-71, TYPE B, GRADE 2, 3, 4 OR 5. DEFORMATIONS SHALL CONFORM TO A.S.T.M. SPECIFICATION A305-50T. SUPPORTING DEVICES SHALL CONFORM TO C.R.S.I. STANDARDS.

CONCRETE:- COLUMN FOOTINGS & SLAB ON GROUND TO BE CLASS "B", 2500#/SQ.IN. ALL OTHER CONC. TO BE CLASS "A", 3000#/SQ. IN. (A.C.I. CODE)

SOIL VALUE:- ASSUMED 4000#/SQ.FT.. FOR SOILS HAVING VALUES VARYING FROM THIS VALUE, FOOTINGS MUST BE REDESIGNED. REFERENCE SHALL BE MADE TO TABLE #2 ON THIS DRAWING FOR DESIGN LOADS. STABILITY SHOULD BE VERIFIED UNDER CONDITIONS OF MINIMUM VERTICAL LOAD WITH MAXIMUM WIND.

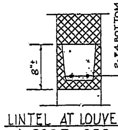
(b) FIELD CONNECTIONS:- DESIGN BASED ON FIELD RIVETED STRUCTURE. 3/4"ϕ RIVETS, 13/16"ϕ HOLES.

NOTE:- TOWER HAS BEEN DESIGNED FOR ALL VARIABLE CONDITIONS.



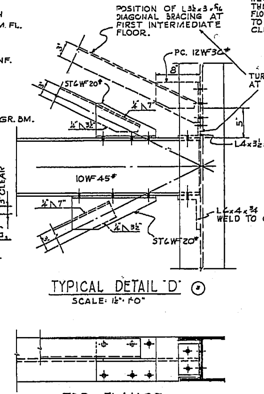
TYPICAL COLUMN BASE, FOOTING, PEDESTAL & GR. BEAM DETAIL

SCALE: 3/4" = 1'-0"



LINTEL AT LOUVER ⊕ & DOOR 303

SCALE: 1" = 1'-0"

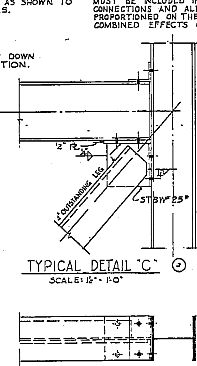


TYPICAL DETAIL 'D' (a)

SCALE: 1 1/2" = 1'-0"

TOP FLANGE (a)

SCALE: 1 1/2" = 1'-0"



TYPICAL DETAIL 'C' (a)

SCALE: 1 1/2" = 1'-0"

TOP FLANGE (a)

SCALE: 1 1/2" = 1'-0"

SYMBOL	DESCRIPTION	DATE	APPROVAL
(d)	DOOR OPENING REMOVED, BRACING REVISED, ADDED PAD TO ELEV "D"	JUN 5 '57	[illegible]
(c)	"OF 16" OMITTED IN DWG. NO SPACE.— REVISED DIMENSION FROM CONTROL ROOM FLOOR TO TOP OF ROOF STEEL ON ELEVATION "C".— CHANGED LL. FROM 30 TO 50 PSF IN STRUCT. NOTES	JUN 5 '57	[illegible]
(b)	REVISED NOTES, TABLE #2 & ANCHOR BOLTS	8 APR 54	SU
(a)	GENERAL REVISIONS	10 FEB 54	SU

REVISIONS

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY AM
TRACED BY AM
CHECKED BY S.H.B.
SUBMITTED BY: A. H. Keyes Jr.
APPROVED: [signature] CHIEF STRUCTURAL BRANCH
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE:

UNITED STATES AIR FORCE
CONTROL TOWER
OPEN LEG TRESTLE TYPE
TOWER FRAMING ELEVATIONS & DETAILS

APPROVED: [signature] CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 5 OCT 1953
SCALE NOTED
SPEC. NO. AW 86-06-04-55 C
DRAWING NUMBER
SHEET 9 AW-86-06-06 (c)

Chapter 3

REMOTE UHF/VHF TRANSMITTER/RECEIVER FACILITIES

A. Function

The remote UHF/VHF transmitter facility provides the UHF and VHF transmitters associated with the control tower and radar approach control (RAPCON) center. The remote UHF/VHF receiver facility accommodates the UHF and VHF receivers associated with the control tower and RAPCON center. The combination of these two facilities provides voice ground/air communications between the control tower and/or RAPCON center and aircraft equipped with VHF and UHF transmitter-receiver equipment.

B. Physical Characteristics

1. The transmitters (AN/GRT–3, T–217, BC–640, and so forth) or receivers (AN/GRR–7, R–278, BC–639, and so forth) are housed in a building constructed in accordance with drawing AW–38–12–10. The type "A" building is used for receivers or transmitters. The type "B–C" or "D" building is used for transmitters when more space is required. Airways and Air Communications Service furnished the siting criteria and erects the necessary antenna supports for the buildings. Power requirements (connected load, including heaters) are as follows (120/208V, 3-phase, 4-wire, 60-cycle):

Type "A" (Transmitter, w/o RAPCON) .... 22.5 kw
Type "A" (Transmitter, with RAPCON) .... 36.2 kw
Type "A" (Receiver with or w/o RAPCON) .... 11.85 kw
Type "B" (Transmitter, w/RAPCON) .... 36.2 kw
Type "C" & "D" Determined by operational plan.

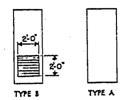
Minimum (no expansion or spare capacity) signal cable requirements are for 28 pairs at each site when RAPCON centers are included or 13 pairs for a base without a RAPCON center.

2. Access road, fencing, plot layout, and construction requirements for buildings are shown on drawing AW–38–12–10. Arctic type of construction for these buildings is detailed on drawings AW–38–12–15 and AW–38–12–16. Fuel facilities are shown on drawing AW–78–18–01.

DOOR SCHEDULE

NO.	SIZE	TYPE	MATERIAL	FRAME	TRESHOLD	REMARKS
1	2-3'-0"x6'-10"x1-3/4"	A	H. M.	METAL	METAL	PROVIDE METAL DRIP
2	2-2'-6"x6'-10"x1-3/4"	B	H. M	METAL	METAL	PROVIDE METAL DRIP
3	2-2'-6"x6'-10"x1-3/4"	A	H. M	METAL	METAL	PROVIDE METAL DRIP
4	3'-0"x6'-10"x1-3/8"	A	WOOD	METAL	NONE	
5	2'-6"x6'-10"x1-3/8"	A	WOOD	METAL	NONE	

NOTE: WOOD DOORS CUT DOWN FROM 7'-0" DOORS

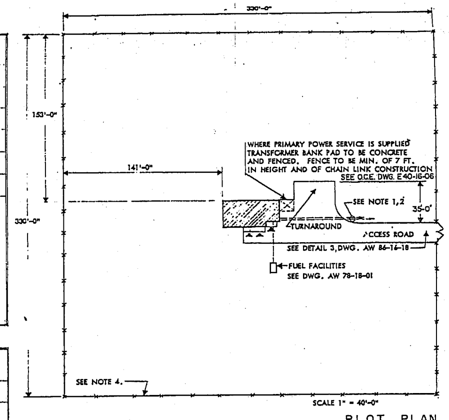


WINDOW AND LOUVER SCHEDULE

NO.	WIDTH	HEIGHT	TYPE	REMARKS
1	1'-8-7/8"	2'-9"	COMMERCIAL PROJECTED	SEE ELEVATION FOR VENTING
2	4'-4" M.O.	6'-0" M.O.		METAL LOUVER
3	2'-6" M.O.	2'-6" M.O.	-	METAL LOUVER
4	3'-0" M.O.	4'-0" M.O.		METAL SCREEN
5	1'-4" M.O.	1'-4" M.O.		METAL LOUVER

FINISH SCHEDULE

SPACE DESIGNATION	FLOOR	BASE	WAINSCOT	WALLS	CEILING	REMARKS
EQUIPMENT RM.	A.T.	—	—	C.M.U.		
GENERATOR RM.	CONC	—	—	C.M.U.		
HEATER RM.	CONC	—	—	C.M.U.		
STORE RM.	A.T.	—	—	C.M.U.		
TOILET	C.T.	C.T.	C.T.	C.M.U.		



PLOT PLAN

SEE NOTE 5.

NOTES:

1. 2-4" FIBRE DUCTS, CONC. ENCASED FOR PRIMARY POWER SERVICE (UNDERGROUND) TO EDGE OF PLOT.
2. TELEPHONE CABLE UNDERGROUND TO EDGE OF PLOT (BY OTHERS).
3. TRANSFORMER MAY BE POLE MOUNTED IN LIEU OF BANK SHOWN, WHERE SPECIFIED BY AACS SITE SURVEY.
4. FENCE REQUIREMENTS WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON-BASE SITE FENCING WILL NOT BE REQUIRED. ON-BASE OR OFF-BASE SITE FENCING WILL IN NO EVENT EXCEED COST OR SECURITY OF FENCE AS DETAILED ON DRAWING AW 86-16-18.
5. PLOT PLAN AS INDICATED APPLIES TO NAV. AIDS SITES ONLY.

APPLICABLE DRAWINGS

AW 86-16-18	MISCELLANEOUS CONSTRUCTION DETAILS
AW 78-18-01	FUEL FACILITIES
E 40-16-06	FENCE & DETAILS

ABBREVIATIONS

A.T.	ASPHALT TILE
C.J.	CONTROL JOINT
CONC	CONCRETE
CONT	CONTINUOUS
C. TO C.	CENTER TO CENTER
C.T.	CERAMIC TILE
C.M.U.	CONCRETE MASONRY UNIT
FIN.	FINISHED
FIN. CLG.	FINISHED CEILING
FL.	FLOOR
GA	GAUGE
GEN	GENERATOR
J.R.	JOINT REINFORCEMENT
MAX	MAXIMUM
MIN	MINIMUM
M.U.	MASONRY UNIT
O.C.	ON CENTER
P.E.J.	PRE-MOULDED EXPANSION JOINT
PL	PLATE
REINF	REINFORCING
S.D.	STEEL DECK
S.J.	STEEL JOIST
T	TOILET
M.O.	MASONRY OPENING
C.L.C.	CEMENT LEVELING COURSE
H.M.	HOLLOW METAL
DWG.	DRAWING
NO.	NUMBER
E.J.	EXPANSION JOINT

LEGEND

*	SECTION NO. SHOWN ON SHEET NO.
*	SECTION NO. CUT ON SHEETS NO.
○	DOOR NO.
◎	WINDOW AND LOUVER NO.
	MATCH LINE.

* NOTE:
ALL SECTIONS SHOWN ON SHEET NO. 4.

SCHEDULE OF DRAWINGS

DWG. NO.	SHEET NO.	SHEET TITLE
AW 38-12-10	1 OF 10	SCHEDULES, SYMBOLS, ABBREVIATIONS, PLOT PLAN
AW 38-12-10	2 OF 10	PLAN, FOUNDATION PLAN & ELEVATIONS (NAV. AIDS SITE)
AW 38-12-10	3 OF 10	PLAN, FOUNDATION PLAN & ELEVATIONS (AC&W SITE)
AW 38-12-10	4 OF 10	WALL SECTIONS AND DETAILS
AW 38-12-10	5 OF 10	MISCELLANEOUS DETAILS
AW 38-12-10	6 OF 10	STRUCTURAL PLANS AND DETAILS
AW 38-12-10	7 OF 10	HEATING, PLUMBING & VENTILATING
AW 38-12-10	8 OF 10	ELECTRICAL (NAV. AIDS SITE)
AW 38-12-10	9 OF 10	ELECTRICAL (AC&W SITE)
AW 38-12-10	10 OF 10	ELECTRICAL

AREA TABULATION

	EQUIPMENT RM AREA		COMBINED WITH GENERATOR RM SIZED				
BASIC	TYPE		1-60 KW GEN RM 261	2-60 KW GEN RM 423	3-60 KW GEN RM 585	15-30 KW GEN RM 211	150 KW GEN RM 325
	A	937	1,198	1,360	1,523	1,149	1,262
	B	1,187	1,448	1,610	1,773	1,399	1,512
	C	1,437	1,698	1,860	2,023	1,649	1,762
	D	1,787	2,048	2,210	2,373	1,999	2,112
ALTERNATE WHERE HEATER RM. IS NOT REQUIRED	EQUIPMENT RM. AREA		COMBINED WITH GENERATOR RM. SIZED				
	TYPE		1-60 KW GEN RM 266	2-60 KW GEN RM 429	3-60 KW GEN RM 586	15-30 KW GEN RM 214	150 KW GEN RM 332
	A	802	1,069	1,231	1,388	1,024	1,149
	B	1,052	1,319	1,481	1,638	1,274	1,399
	C	1,302	1,569	1,731	1,888	1,524	1,649
	D	1,652	1,919	2,081	2,238	1,874	1,999

ARCHITECTURAL SYMBOLS

- CONCRETE MASONRY UNITS
- BRICK
- CONCRETE
- GROUT
- INSULATION
- GRAVEL
- EARTH
- METAL IN SECTION
- METAL IN ELEVATION
- WOOD
- PLYWOOD

GRAPHIC SCALE

0 20 40 60 80 100 120 140 160

1" = 40'-0"

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

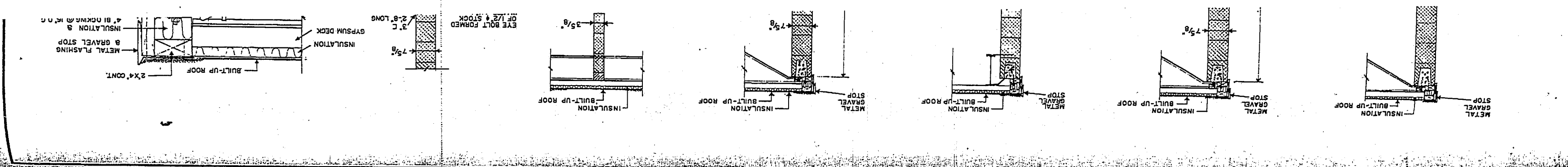
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

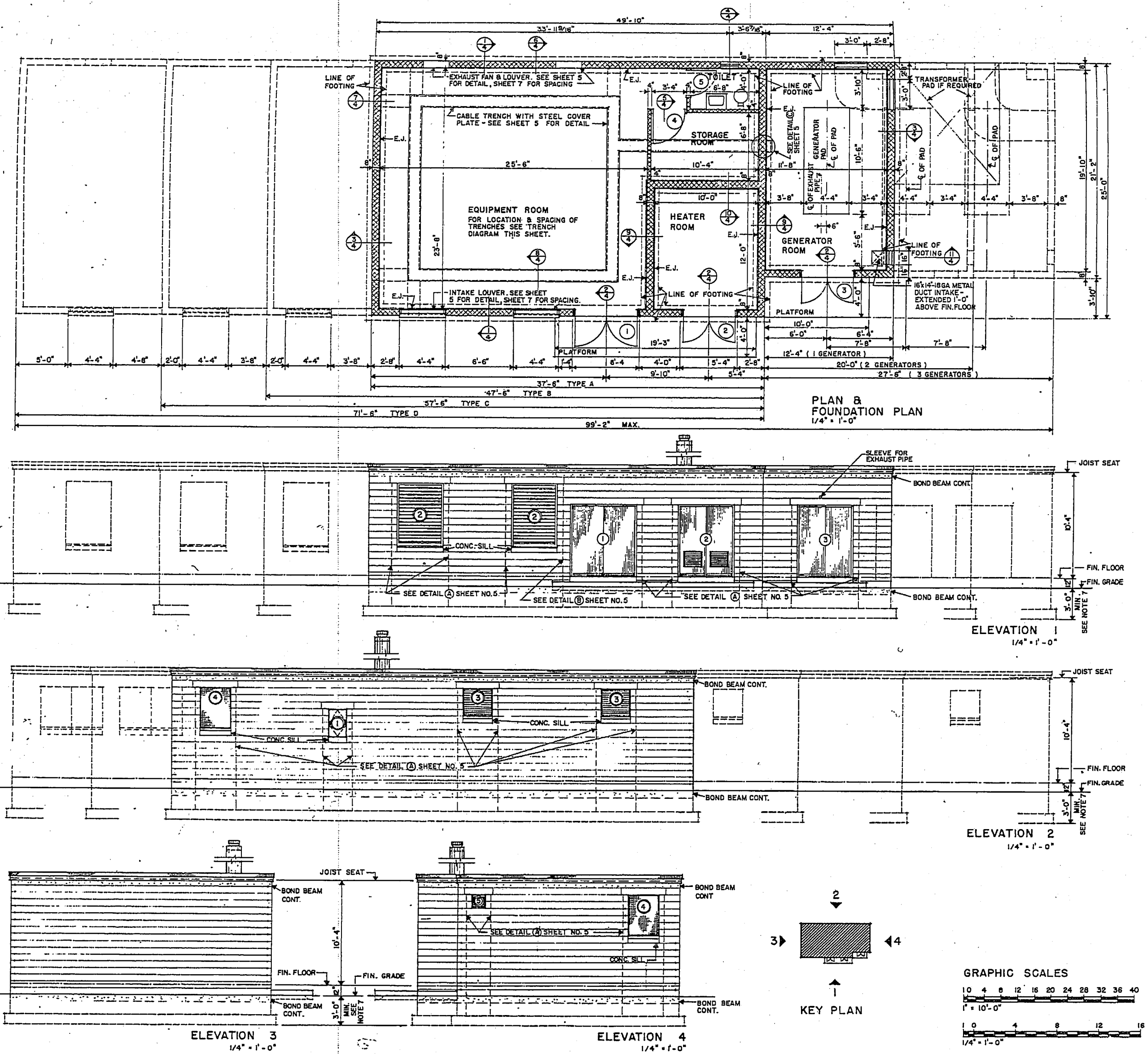
TRANSMITTER – RECEIVER BUILDING
TYPES A, B, C & D
(NAVIGATIONAL AIDS AND AC & W SITES)
SCHEDULES, SYMBOLS, ABBREVIATIONS, PLOT PLAN

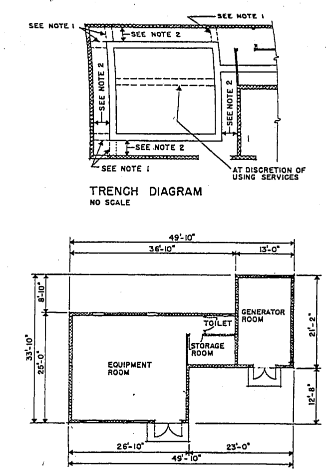
APPROVED:
[signature] AFOIE-E
FOR CHIEF OF STAFF, USAF

AW 38-12-10
SCALE AS NOTED
DATE 29 JULY 1957
SHEET 1 OF 10

THIS DWG. SUPERSEDES DWG. AW 38-12-10 DATED 25TH MAY 1951 AND DWG. AW 38-12-14 DATED 5TH AUG 1952







GENERAL NOTES

1. TRENCH MAY BE EXTENDED TO THE EXTERIOR WALL AS REQUIRED.
2. CRITICAL DIMENSION BETWEEN THE TRENCH AND THE INSIDE FACE OF THE WALL IS : 2'-9"
3. INSTALL JOINT REINFORCING BETWEEN POINTS INDICATED IN THIS MANNER ←—— ON ELEVATIONS.
4. EXACT LOCATION AND QUANTITY OF COAXIAL CABLE SLEEVES WILL BE DETERMINED BY THE AFIR AND AMA BASED ON ANTENNA FARM DRAWINGS.
5. ALL CONCRETE SHALL BE CLASS "B" CONCRETE (2,500 LBS/SQ. IN.)
6. MESH REINFORCEMENT FOR ALL CONCRETE SLABS ON GRADE SHALL CONSIST OF 6" x 6" x 8GA x 8GA WELDED WIRE MESH
7. GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PREPARE A SUITABLE COMPACTED SUB-GRADE AT THE LEVELS SHOWN IN DETAILS. FOOTINGS SHALL BE BELOW FROST LINE, NOT LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL, AND AT LEAST 3'-0" BELOW FIN. GRADE.
   ASSUMED BEARING VALUE OF SOIL: 3,000 LBS/SQ.FT.

GRAPHIC SCALES

1" = 10'-0"

1/4" = 1'-0"

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

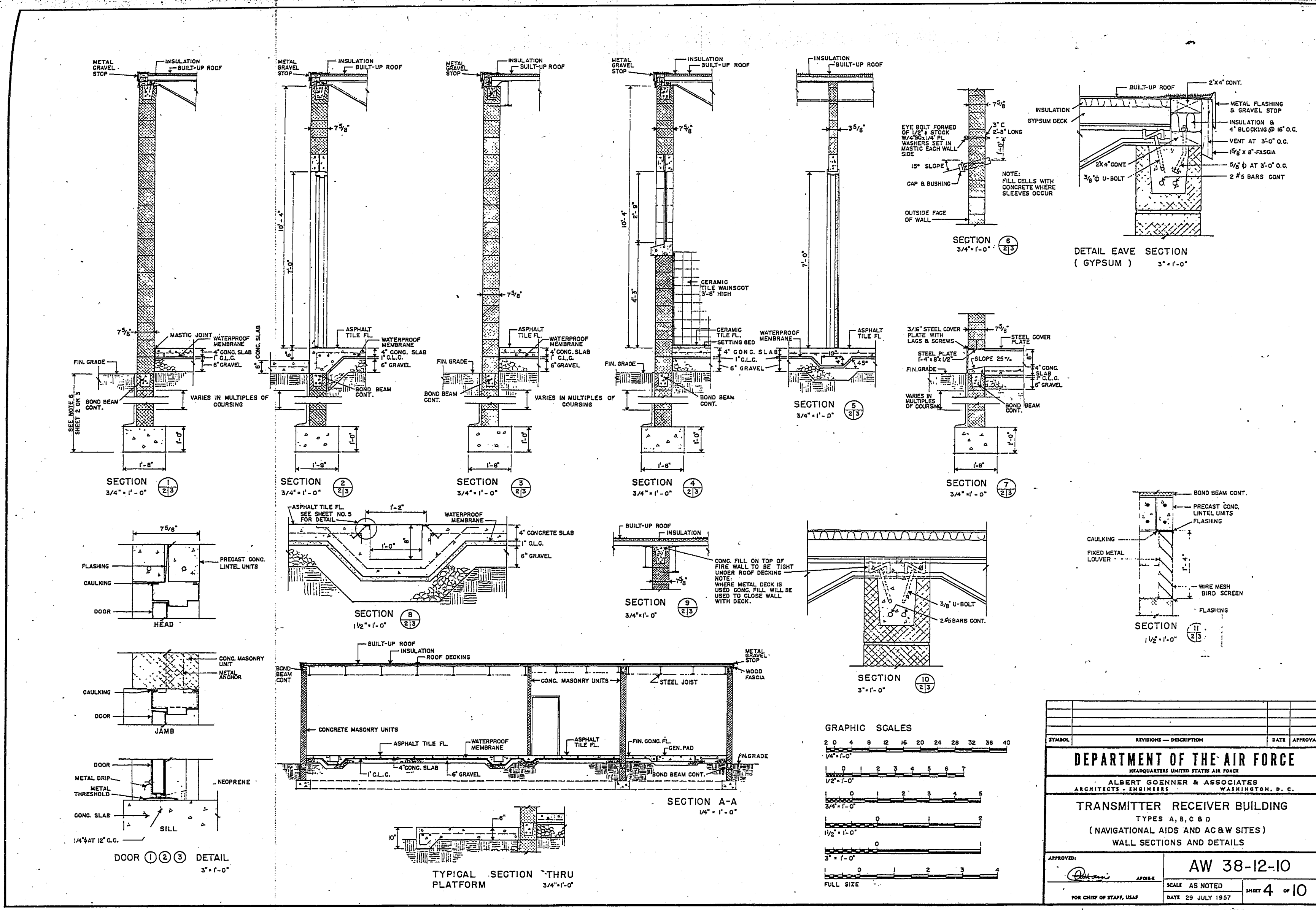
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

TRANSMITTER – RECEIVER BUILDING
TYPES A, B, C & D
(NAVIGATIONAL AIDS SITE)
PLAN, FOUNDATION PLAN & ELEVATIONS

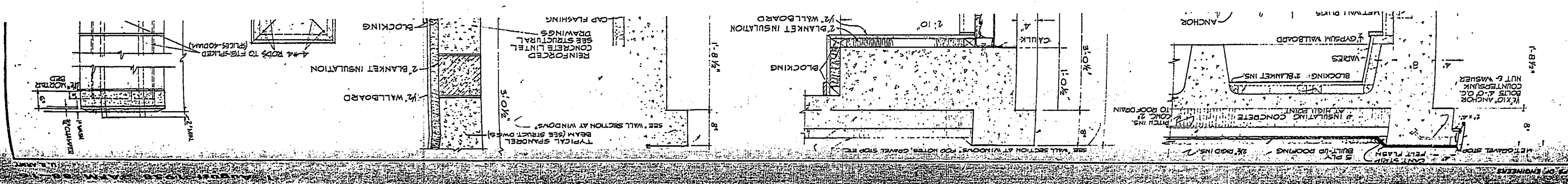
APPROVED: Allani AFOIE-E
FOR CHIEF OF STAFF, USAF

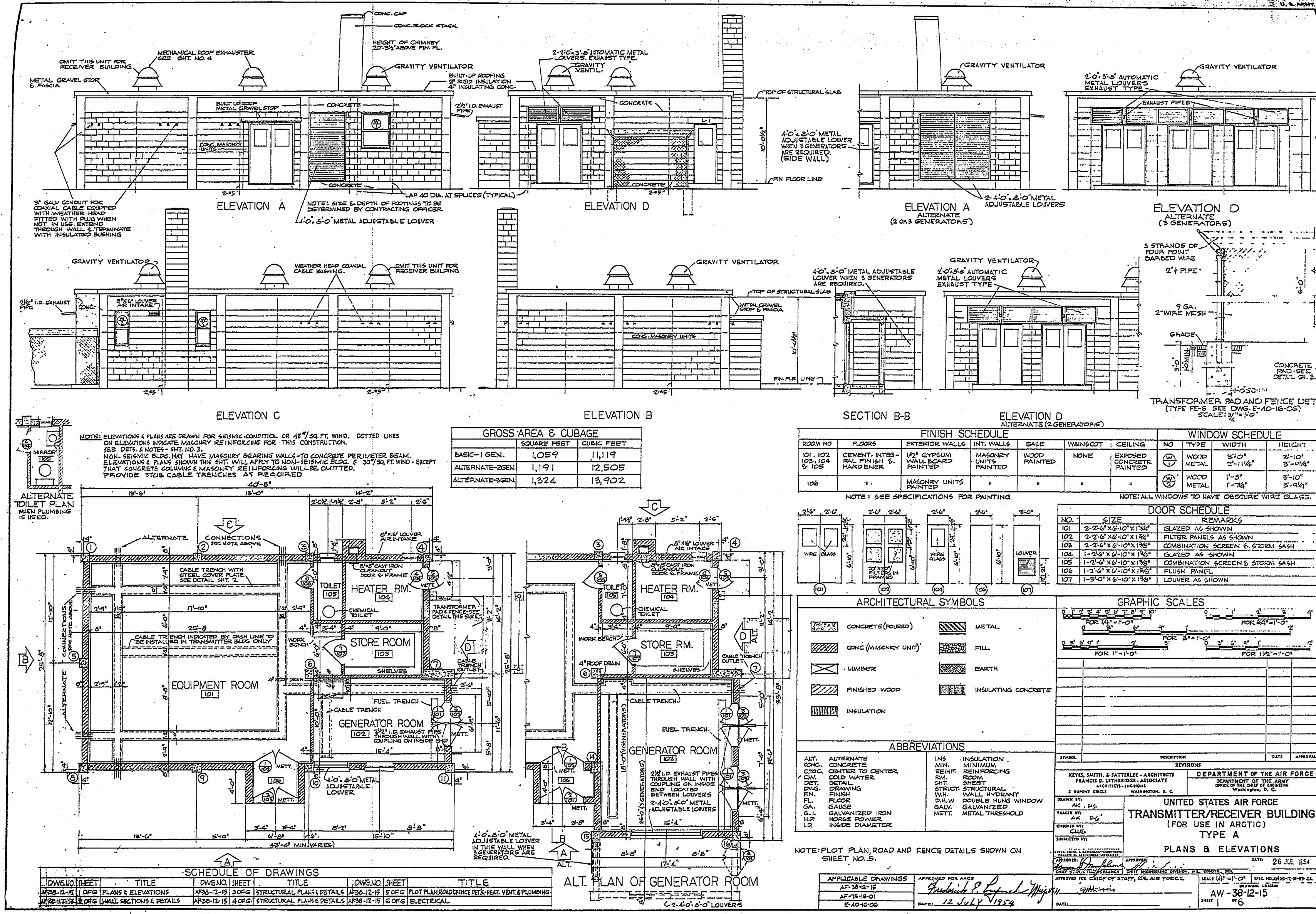
AW 38-12-10
SCALE AS NOTED
DATE 29 JULY 1957
SHEET 2 OF 10

THIS DWG. SUPERSEDES DWG. AW 38-12-10 DATED 25TH MAY 1951 AND DWG. AW 38-12-14 DATED 5TH AUG 1952



THIS DWG. SUPERSEDES DWG. AW 38-12-10 DATED 25TH MAY 1951 AND DWG AW 38-12-14 DATED 5TH AUG 1952





GROSS AREA & CUBAGE	SQUARE FEET	CUBIC FEET
BASIC-1 GEN.	1,059	11,119
ALTERNATE-2GEN.	1,191	12,505
ALTERNATE-3GEN.	1,324	13,902

FINISH SCHEDULE

ROOM NO	FLOORS	EXTERIOR WALLS	INT. WALLS	BASE	WAINSCOT	CEILING
101, 102, 103, 104 & 105	CEMENT, INTEGRAL FINISH & HARDENER	1/2" GYPSUM WALL BOARD PAINTED	MASONRY UNITS PAINTED	WOOD PAINTED	NONE	EXPOSED CONCRETE PAINTED
106	"	MASONRY UNITS PAINTED	"	"	"	"

NOTE: SEE SPECIFICATIONS FOR PAINTING

WINDOW SCHEDULE

NO	TYPE	WIDTH	HEIGHT
W1	WOOD METAL	3'-0" 2'-11 1/4"	3'-10" 3'-9 1/4"
W2	WOOD METAL	1'-8" 1'-7 1/4"	3'-10" 3'-9 1/4"

NOTE: ALL WINDOWS TO HAVE OBSCURE WIRE GLASS.

DOOR SCHEDULE

NO.	SIZE	REMARKS
101	2-2'-6"x6'-10"x1 3/4"	GLAZED AS SHOWN
102	2-2'-6"x6'-10"x1 3/4"	FILTER PANELS AS SHOWN
103	2-2'-6"x6'-10"x1 3/8"	COMBINATION SCREEN & STORM SASH
104	1-2'-6"x6'-10"x1 3/4"	GLAZED AS SHOWN
105	1-2'-6"x6'-10"x1 3/8"	COMBINATION SCREEN & STORM SASH
106	1-2'-6"x6'-10"x1 3/8"	FLUSH PANEL
107	1-3'-0"x6'-10"x1 3/8"	LOUVER AS SHOWN

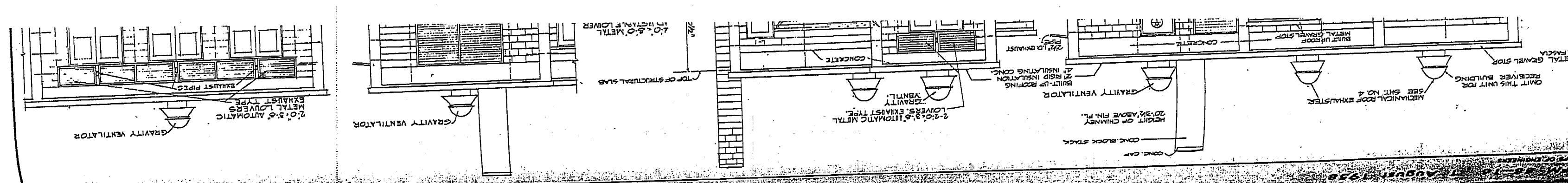
ABBREVIATIONS

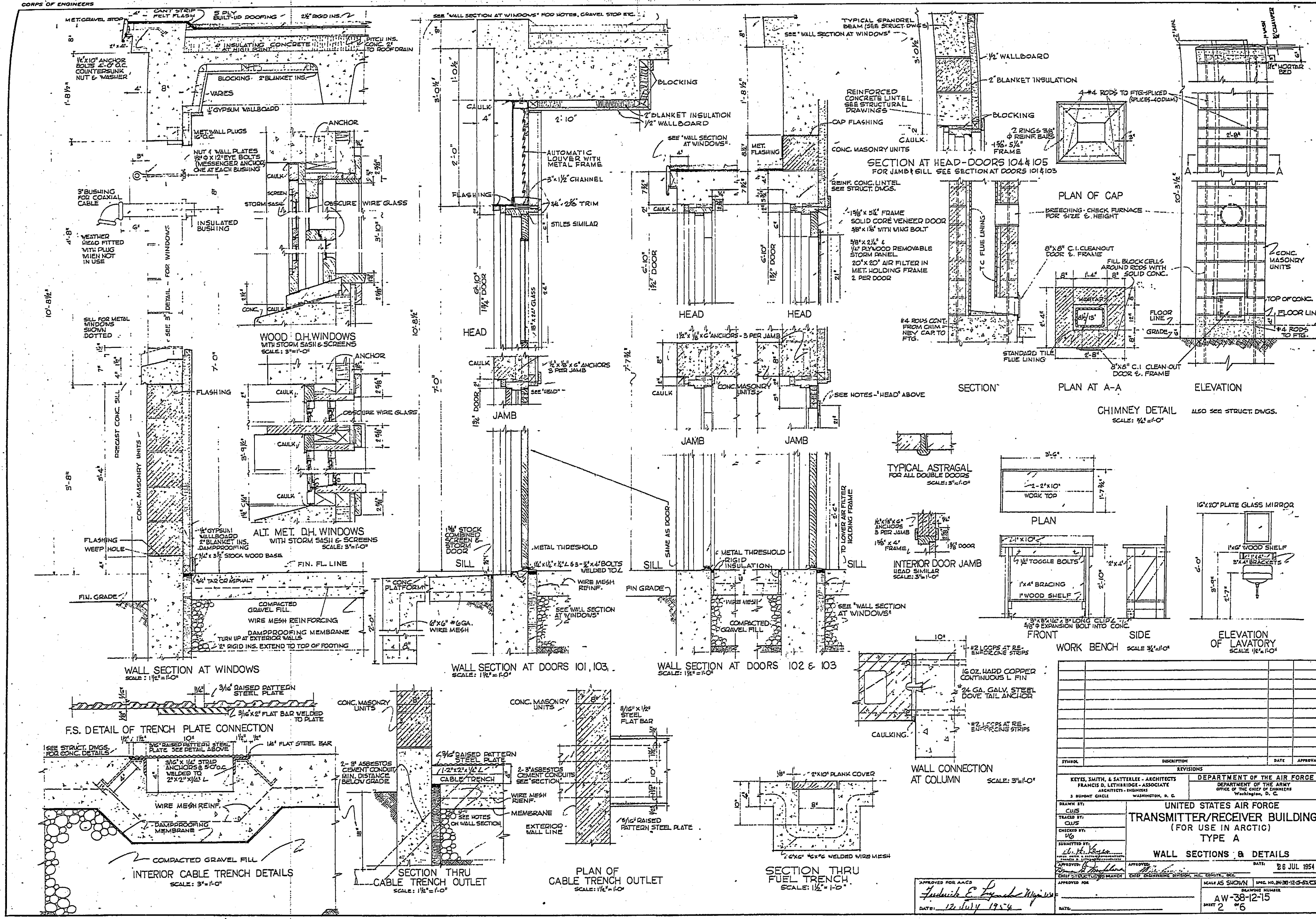
ALT.	ALTERNATE	INS	INSULATION
CONC.	CONCRETE	MIN.	MINIMUM
C.TO C.	CENTER TO CENTER	REINF.	REINFORCING
C.W.	COLD WATER	RM.	ROOM
DET.	DETAIL	SHT.	SHEET
DWG.	DRAWING	STRUCT.	STRUCTURAL
FIN.	FINISH	W.H.	WALL HYDRANT
FL.	FLOOR	D.H.W	DOUBLE HUNG WINDOW
GA.	GAUGE	GALV.	GALVANIZED
G.I.	GALVANIZED IRON	METT.	METAL THRESHOLD
H.P.	HORSE POWER		
I.D.	INSIDE DIAMETER		

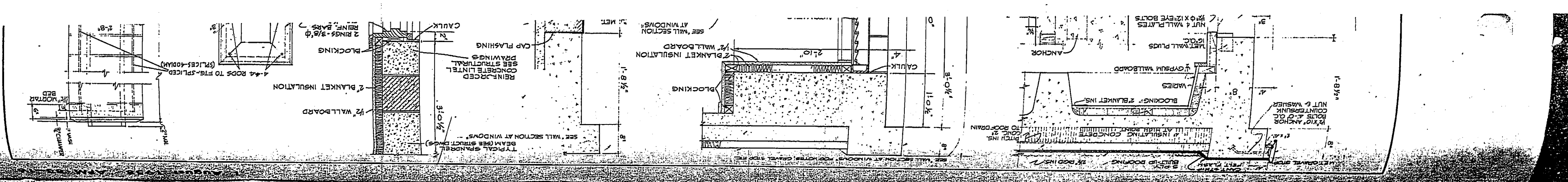
APPLICABLE DRAWINGS
AF-38-12-15
AF-78-18-01
E-40-16-06

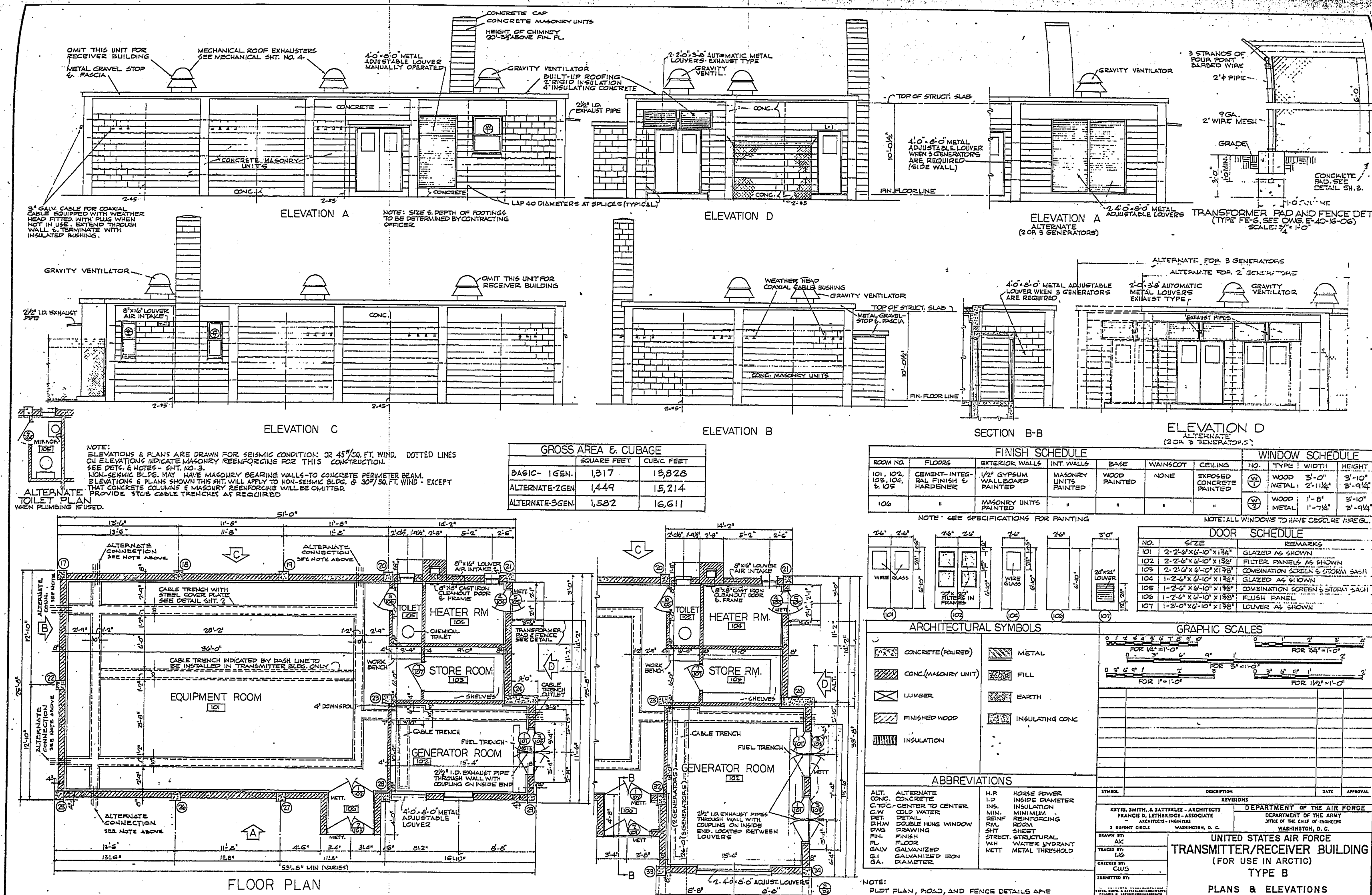
SCHEDULE OF DRAWINGS

DWG. NO.	SHEET	TITLE	DWG. NO.	SHEET	TITLE	DWG. NO.	SHEET	TITLE
AF38-12-15	1 OF 6	PLANS & ELEVATIONS	AF38-12-15	3 OF 6	STRUCTURAL PLANS & DETAILS	AF38-12-15	5 OF 6	PLOT PLAN, ROAD & FENCE DETS. - HEAT. VENT. & PLUMBING
AF38-12-15	2 OF 6	WALL SECTIONS & DETAILS	AF38-12-15	4 OF 6	STRUCTURAL PLANS & DETAILS	AF38-12-15	6 OF 6	ELECTRICAL




WALL SECTION AT WINDOWS
SCALE: 1½"=1'-0"
WOOD D.H. WINDOWS
WITH STORM SASH & SCREENS
SCALE: 3"=1'-0"
ALT. MET. D.H. WINDOWS
WITH STORM SASH & SCREENS
SCALE: 3"=1'-0"
WALL SECTION AT DOORS 101, 103.
SCALE: 1½"=1'-0"
WALL SECTION AT DOORS 102 & 103
SCALE: 1½"=1'-0"
SECTION AT HEAD-DOORS 104 & 105
FOR JAMB & SILL SEE SECTION AT DOORS 101 & 103
PLAN OF CAP
SECTION
PLAN AT A-A
ELEVATION
CHIMNEY DETAIL
SCALE: ¾"=1'-0"
ALSO SEE STRUCT. DWGS.
TYPICAL ASTRAGAL
FOR ALL DOUBLE DOORS
SCALE: 3"=1'-0"
INTERIOR DOOR JAMB
HEAD SIMILAR
SCALE: 3"=1'-0"
PLAN
FRONT
SIDE
WORK BENCH
SCALE ¾"=1'-0"
ELEVATION OF LAVATORY
SCALE ½"=1'-0"
WALL CONNECTION AT COLUMN
SCALE: 3"=1'-0"
F.S. DETAIL OF TRENCH PLATE CONNECTION
INTERIOR CABLE TRENCH DETAILS
SCALE: 3"=1'-0"
SECTION THRU CABLE TRENCH OUTLET
SCALE: 1½"=1'-0"
PLAN OF CABLE TRENCH OUTLET
SCALE: 1½"=1'-0"
SECTION THRU FUEL TRENCH
SCALE: 1½"=1'-0"
SYMBOL
DESCRIPTION
DATE
APPROVAL
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
Washington, D. C.
UNITED STATES AIR FORCE
TRANSMITTER/RECEIVER BUILDING
(FOR USE IN ARCTIC)
TYPE A
WALL SECTIONS & DETAILS
26 JUL 1954
SCALE AS SHOWN
AW-38-12-15
SHEET 2 OF 6
APPROVED FOR AACS
DATE: 12 July 1954





NOTE:
ELEVATIONS & PLANS ARE DRAWN FOR SEISMIC CONDITION OR 45#/SQ. FT. WIND. DOTTED LINES ON ELEVATIONS INDICATE MASONRY REENFORCING FOR THIS CONSTRUCTION. SEE DETS. & NOTES - SHT. NO. 3.
NON-SEISMIC BLDG. MAY HAVE MASONRY BEARING WALLS-TO CONCRETE PERIMETER BEAM.
ELEVATIONS & PLANS SHOWN THIS SHT. WILL APPLY TO NON-SEISMIC BLDG. & 30#/SQ. FT. WIND - EXCEPT THAT CONCRETE COLUMNS & MASONRY REENFORCING WILL BE OMITTED.
PROVIDE STUB CABLE TRENCHES AS REQUIRED

GROSS AREA & CUBAGE	SQUARE FEET	CUBIC FEET
BASIC- 1GEN.	1,317	13,828
ALTERNATE-2GEN.	1,449	15,214
ALTERNATE-3GEN.	1,582	16,611

FINISH SCHEDULE

ROOM NO.	FLOORS	EXTERIOR WALLS	INT. WALLS	BASE	WAINSCOT	CEILING
101, 102, 103, 104, & 105	CEMENT-INTEGRAL FINISH & HARDENER	1/2" GYPSUM WALLBOARD PAINTED	MASONRY UNITS PAINTED	WOOD PAINTED	NONE	EXPOSED CONCRETE PAINTED
106	"	MASONRY UNITS PAINTED	"	"	"	"

NOTE: SEE SPECIFICATIONS FOR PAINTING

WINDOW SCHEDULE

NO.	TYPE	WIDTH	HEIGHT
W1	WOOD	3'-0"	3'-10"
	METAL	2'-11 1/4"	3'-9 1/4"
W2	WOOD	1'-8"	3'-10"
	METAL	1'-7 1/4"	3'-9 1/4"

NOTE: ALL WINDOWS TO HAVE OBSCURE WIRE GL.

DOOR SCHEDULE

NO.	SIZE	REMARKS
101	2-2'-6"x6'-10"x1 3/4"	GLAZED AS SHOWN
102	2-2'-6"x6'-10"x1 3/4"	FILTER PANELS AS SHOWN
103	2-2'-6"x6'-10"x1 3/8"	COMBINATION SCREEN & STORM SASH
104	1-2'-6"x6'-10"x1 3/4"	GLAZED AS SHOWN
105	1-2'-6"x6'-10"x1 3/8"	COMBINATION SCREEN & STORM SASH
106	1-2'-6"x6'-10"x1 3/8"	FLUSH PANEL
107	1-3'-0"x6'-10"x1 3/8"	LOUVER AS SHOWN

ABBREVIATIONS

ALT.	ALTERNATE	H.P.	HORSE POWER
CONC.	CONCRETE	I.D	INSIDE DIAMETER
C.TO C.	CENTER TO CENTER	INS.	INSULATION
C.W	COLD WATER	MIN.	MINIMUM
DET.	DETAIL	REINF	REINFORCING
D.H.W	DOUBLE HUNG WINDOW	RM.	ROOM
DWG	DRAWING	SHT	SHEET
FIN.	FINISH	STRUCT.	STRUCTURAL
FL.	FLOOR	W.H	WATER HYDRANT
GALV	GALVANIZED	METT	METAL THRESHOLD
G.I	GALVANIZED IRON		
GA.	DIAMETER		

NOTE:
PLOT PLAN, ROAD, AND FENCE DETAILS ARE SHOWN ON SHEET 5.

SCHEDULE OF DRAWINGS

DWG.NO.	SHEET	TITLE	DWG.NO.	SHEET	TITLE	DWG.NO.	SHEET	TITLE
AF-38-12-16	1 OF 6	PLANS & ELEVATIONS	AF-38-12-16	3 OF 6	STRUCTURAL PLANS & DETAILS	AF-38-12-16	5 OF 6	PLOT PLAN, ROAD & FENCE DETAILS, HEATING, VENTILATING, & PLUMBING
AF-38-12-16	2 OF 6	WALL SECTIONS & DETAILS	AF-38-12-16	4 OF 6	STRUCTURAL PLANS & DETAILS	AF-38-12-16	6 OF 6	ELECTRICAL

APPLICABLE DRAWINGS
AF-38-12-16
AF-78-18-01
E-40-16106

SYMBOL	DESCRIPTION	DATE	APPROVAL

REVISIONS

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: AK
TRACED BY: LG
CHECKED BY: CWS
SUBMITTED BY:

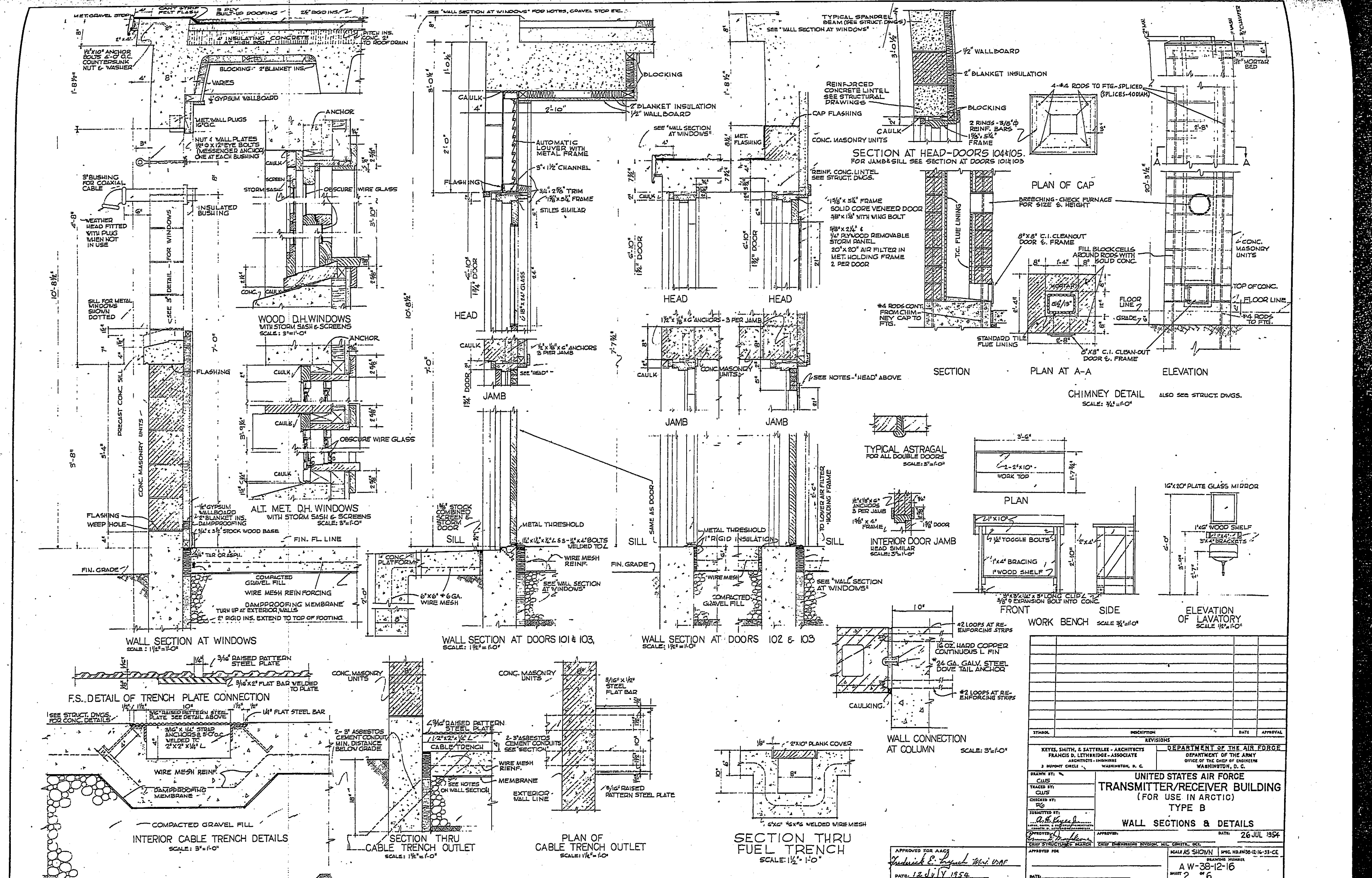
UNITED STATES AIR FORCE
TRANSMITTER/RECEIVER BUILDING
(FOR USE IN ARCTIC)
TYPE B
PLANS & ELEVATIONS

APPROVED: CHIEF STRUCTURES BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE.
DATE: 21 .. 1954

APPROVED FOR AACS
Frederick E. Lysack Maj USAF
DATE: 12 July 1954

APPROVED FOR CHIEF OF STAFF, U.S. AIR FORCE
DATE:

SCALE 1/4"=1'-0" | SPEC. NO. AW-38-12-16-33-CE
DRAWING NUMBER AW-38-12-16
SHEET 1 OF 6


WALL SECTION AT WINDOWS
SCALE: 1½"=1'-0"
WOOD D.H. WINDOWS
WITH STORM SASH & SCREENS
ALT. MET. D.H. WINDOWS
WITH STORM SASH & SCREENS
WALL SECTION AT DOORS 101 & 103,
SCALE: 1½"=1'-0"
WALL SECTION AT DOORS 102 & 103
SCALE: 1½"=1'-0"
SECTION AT HEAD-DOORS 104 & 105.
FOR JAMB & SILL SEE SECTION AT DOORS 101 & 103
HEAD
JAMB
SILL
TYPICAL ASTRAGAL
FOR ALL DOUBLE DOORS
INTERIOR DOOR JAMB
HEAD SIMILAR
PLAN OF CAP
SECTION
PLAN AT A-A
ELEVATION
CHIMNEY DETAIL
ALSO SEE STRUCT. DWGS.
SCALE: ¾"=1'-0"
PLAN
FRONT
SIDE
WORK BENCH
ELEVATION OF LAVATORY
16"x20" PLATE GLASS MIRROR
WALL CONNECTION AT COLUMN
SCALE: 3"=1'-0"
F.S. DETAIL OF TRENCH PLATE CONNECTION
INTERIOR CABLE TRENCH DETAILS
SCALE: 3"=1'-0"
SECTION THRU CABLE TRENCH OUTLET
SCALE: 1½"=1'-0"
PLAN OF CABLE TRENCH OUTLET
SCALE: 1½"=1'-0"
SECTION THRU FUEL TRENCH
SCALE: 1½"=1'-0"
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
UNITED STATES AIR FORCE
TRANSMITTER/RECEIVER BUILDING
(FOR USE IN ARCTIC)
TYPE B
WALL SECTIONS & DETAILS
26 JUL 1954
12 July 1954
SCALE AS SHOWN
AW-38-12-16
SHEET 2 OF 6

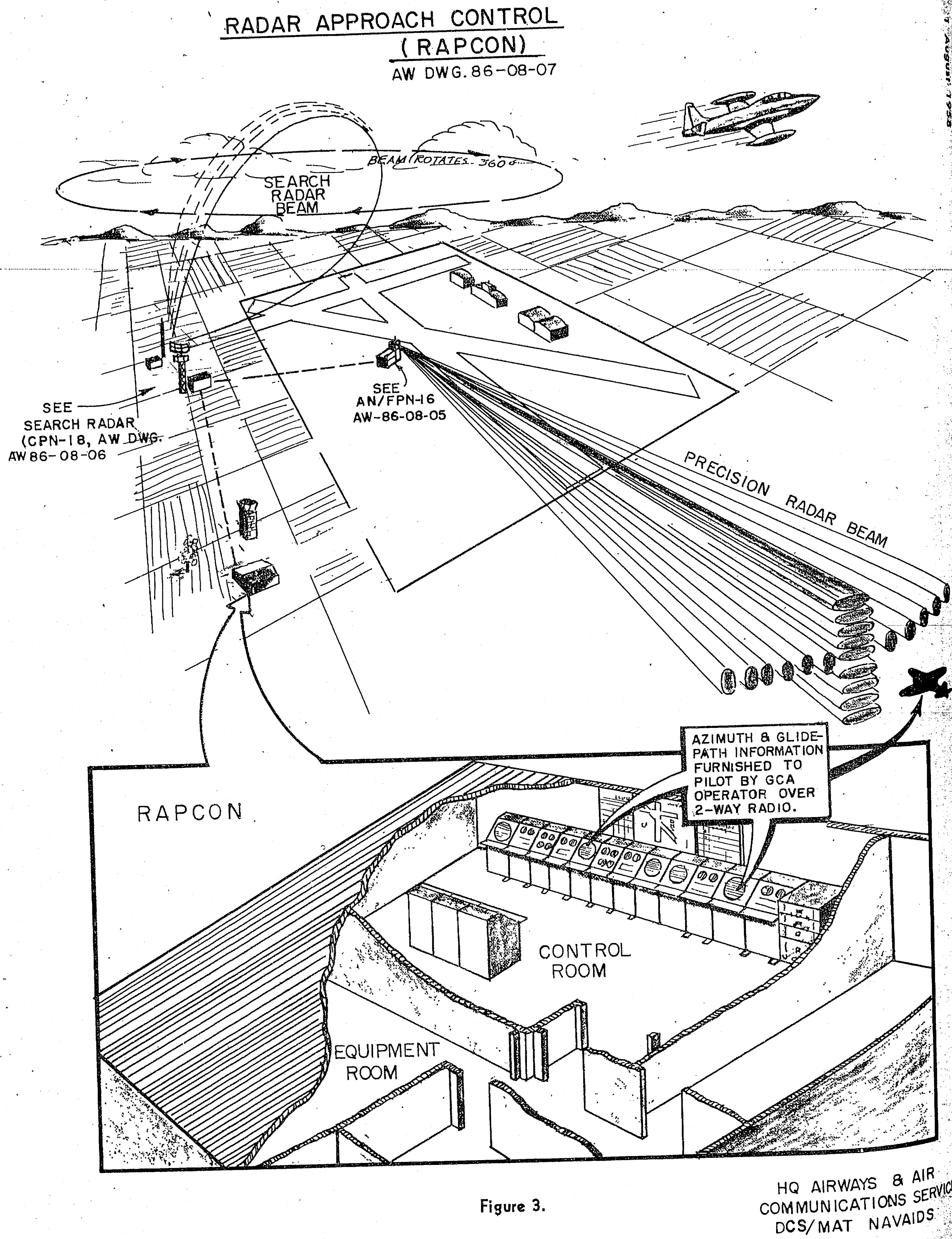
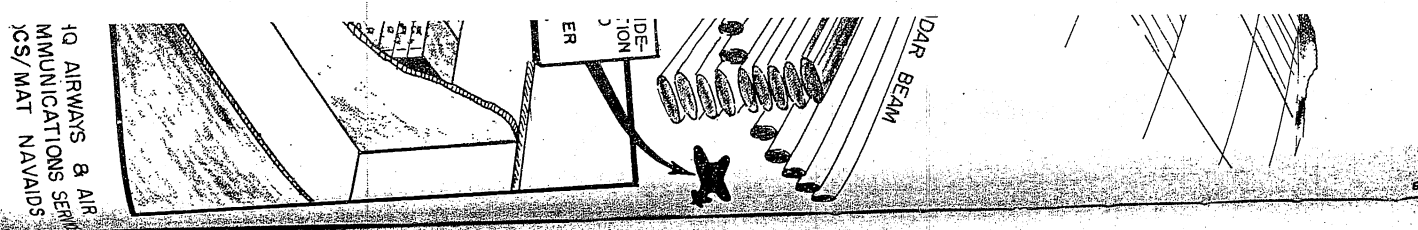

RADAR APPROACH CONTROL
(RAPCON)
AW DWG. 86-08-07
BEAM ROTATES 360°
SEARCH RADAR BEAM
SEE SEARCH RADAR (CPN-18, AW DWG. AW 86-08-06
SEE AN/FPN-16 AW-86-08-05
PRECISION RADAR BEAM
AZIMUTH & GLIDE-PATH INFORMATION FURNISHED TO PILOT BY GCA OPERATOR OVER 2-WAY RADIO.
RAPCON
CONTROL ROOM
EQUIPMENT ROOM
HQ AIRWAYS & AIR COMMUNICATIONS SERVICE DCS/MAT NAVAIDS

Figure 3.



Chapter 4

RADAR APPROACH CONTROL (RAPCON) CENTER

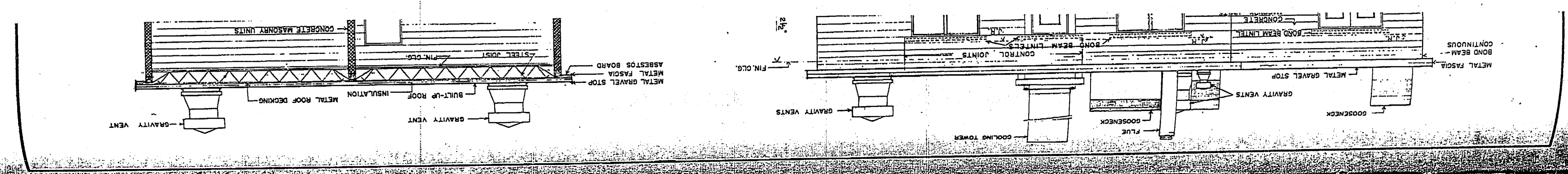
(For Non-CAA Overseas Areas Only)

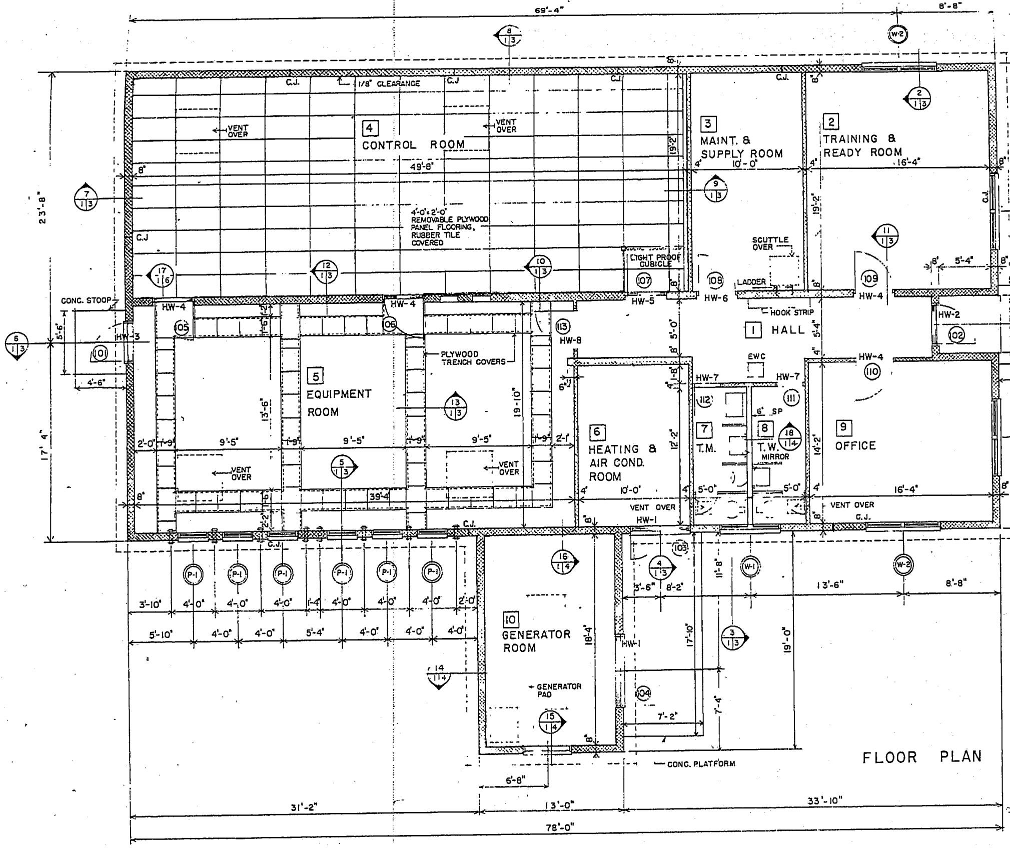
A. Function

The RAPCON center houses the control equipment associated with the RAPCON facility and acts as the nerve center of the RAPCON system. All radar data from the search (AN/CPN–18) and precision (AN/FPN–16) radar sets are presented in the center. All radio communications channels used in the RAPCON procedure are terminated at the operating positions within the center, as are the various wire (telephone) circuits which are used for coordination with adjacent centers and other facilities.

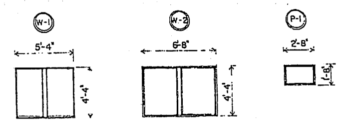
B. Physical Characteristics

The standard RAPCON center building is constructed in accordance with drawing AW–86–08–07. No stringent siting criteria are to be met in determining the location for the building except that it must be within 10,000 cable feet of the associated radar sets. (The radar data may be remoted up to 10,000 cable-feet from the radar sets.) The total power required for full-load operation of the center is approximately 60 kw, 120/208V, 3-phase, 4-wire, 60 cycle. Telephone cable requirements are 130 pairs minimum (no spares or expansion capability). However, this figure may vary widely, depending upon local traffic conditions. Construction details of the emergency power building, for use where required, are shown on drawing AW–26–03–26; associated fuel facilities are shown on drawing AW–78–18–01.





FLOOR PLAN



WINDOW SCHEDULE				
WINDOW TYPE	MASONRY OPENING HEIGHT	MASONRY OPENING WIDTH	GLAZING	REMARKS
W-1	4'-4"	5'-4"	3/16" GLASS	OBSCURE GLASS SECURED BY WOOD STOPS
W-2	4'-4"	6'-8"	3/16" GLASS	GLASS SECURED BY WOOD STOPS
P-1	1'-8"	2'-8"	NONE	5/8" PLYWOOD PANEL SECURED BY WOOD STOPS

ROOM FINISH SCHEDULE							
NO	SPACE NAME	WALLS	FLOORS	BASE	WNSCT	CLG.	REMARKS
1	HALL	M.U.	A.T.	G.S.F.U.	—	G	
2	TRAINING & READY ROOM	M.U.	A.T.	G.S.F.U.	—	G	
3	MAINT. & SUPPLY RM.	M.U.	A.T.	G.S.F.U.	—	G	
4	CONTROL RM.	ACOUS.	R.T.	G.S.F.U.	—	AC. TILE	
5	EQUIPMENT ROOM	M.U.	A.T.	G.S.F.U.	—	AC. TILE	
6	HEATING & AIR COND. RM.	M.U.	CONC.	PAINTED	—	—	
7	TOILET, MEN	G	C.T.	C.T.	* C.T.	G	*
8	TOILET, WOMEN	G	C.T.	C.T.	* C.T.	G	*
9	OFFICE	M.U.	A.T.	G.S.F.U.	—	G	
10	GENERATOR ROOM	M.U.	CONC.	PAINTED	—	—	

* CERAMIC TILE WAINSCOT 4'-0" HIGH ON FIXTURE WALL, 1/2" GYPSUM BOARD ABOVE. BALANCE OF WALLS TO BE M.U. PAINTED, WITH CERAMIC TILE BASE

LEGEND

A.T.	ASPHALT TILE
M.U.	MASONRY UNITS
ACOUS.	ACOUSTICAL
R.T	RUBBER TILE
C.T	CERAMIC TILE
CONC	CONCRETE
G	1/2" GYPSUM BOARD-PAINTED
AC. TILE	ACOUSTICAL TILE
T.M.	TOILET MEN
T.W.	TOILET WOMEN
P.E.J.	PRE-MOULDED EXPANSION JOINT
	CONCRETE MASONRY UNITS
	BRICK
	CONCRETE
	INSULATION
	METAL
	EARTH
	GRAVEL
	WOOD
	GLAZED STRUCTURAL FACING UNIT
G.S.F.U.	" " " "
	DESIGNATION OF SECTION
	DESIGNATION OF WINDOW
	DESIGNATION OF DOOR
	DESIGNATION OF ROOM
SP	STUD PARTITION
EWC	ELECTRIC WATER COOLER
FIN. CLG.	FINISHED CEILING
C.J.	CONTROL JOINT
	PLYWOOD
	GROUT
J.R.	JOINT REINFORCEMENT

SECTION Nº — CUT ON SHEET Nº — DETAILED ON SHEET Nº

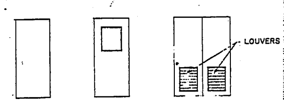
GRAPHIC SCALE 1/4" = 1'-0"

AREA 3,445 SQ. FT.

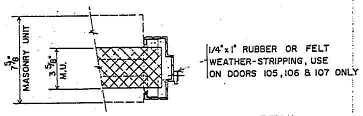
CO-ORDINATION

DOOR SCHEDULE							
DOOR NO	TYPE	WIDTH	HEIGHT	THICKNESS	MATERIAL	FRAME	REMARKS
101	A	1 - 3'-4"	6'-10" *	1 3/4"	WOOD	WOOD	PROVIDE DRIP
102	B	1 - 3'-4"	6'-10" *	1 3/4"	WOOD	WOOD	VISION PANEL
103	C	2 - 2'-6"	6'-10" *	1 3/4"	WOOD	WOOD	TRANSOM OVER
104	B	2 - 3'-0"	6'-10" *	1 3/4"	WOOD	WOOD	PROVIDE DRIP
105	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	SEE BUCK DETAIL
106	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	SEE BUCK DETAIL
107	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	SEE BUCK DETAIL
108	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	
109	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	
110	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	
111	A	1 - 2'-4"	6'-8"	1 3/4"	METAL	METAL	
112	A	1 - 2'-4"	6'-8"	1 3/4"	METAL	METAL	
113	A	1 - 3'-4"	6'-8"	1 3/4"	METAL	METAL	

* 7'-0" HIGH DOOR - CUT DOWN



TYPE A TYPE B TYPE C



TYPICAL BUCK DETAIL

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

JOHN HANS GRAHAM & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

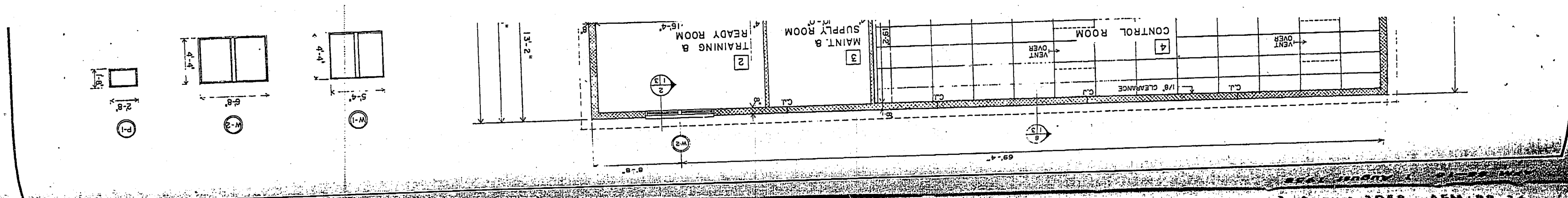
RADAR APPROACH CONTROL CENTER BUILDING
FLOOR PLAN & SCHEDULES

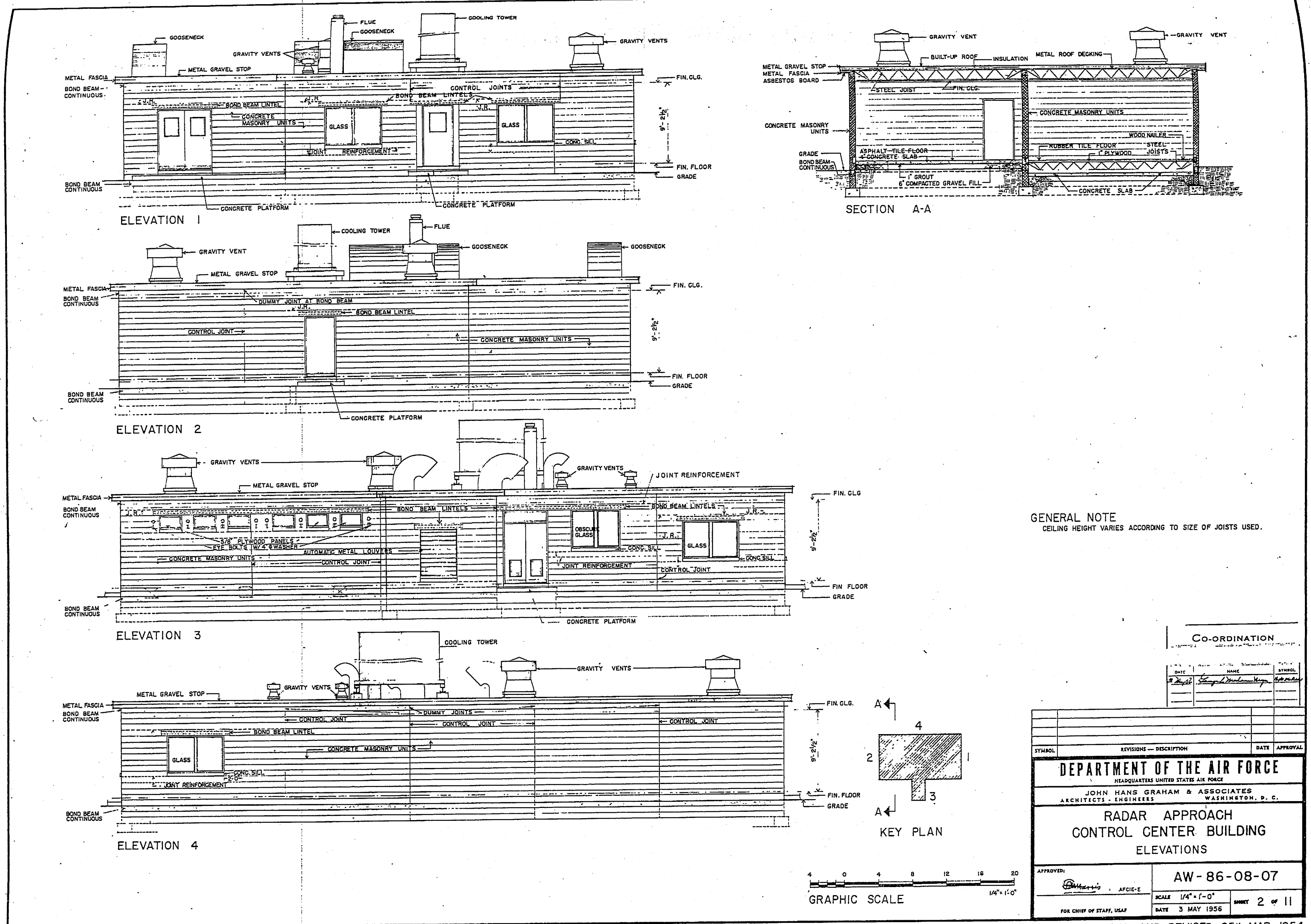
APPROVED: AFCIE-E
FOR CHIEF OF STAFF, USAF

AW-86-08-07

SCALE 1/4" = 1'-0" SHEET 1 OF 11
DATE 3 MAY 1956

THIS DRAWING SUPERSEDES DWG AF 86-08-07 DATED 14th MAR 1952 AND REVISFD 25th MAR 1954





THIS DRAWING SUPERSEDES DWG AF 86-08-07 DATED 14th MAR 1952 AND REVISED 25th MAR 1954

Chapter 5

RADAR APPROACH CONTROL (RAPCON) FACILITY BUILDING

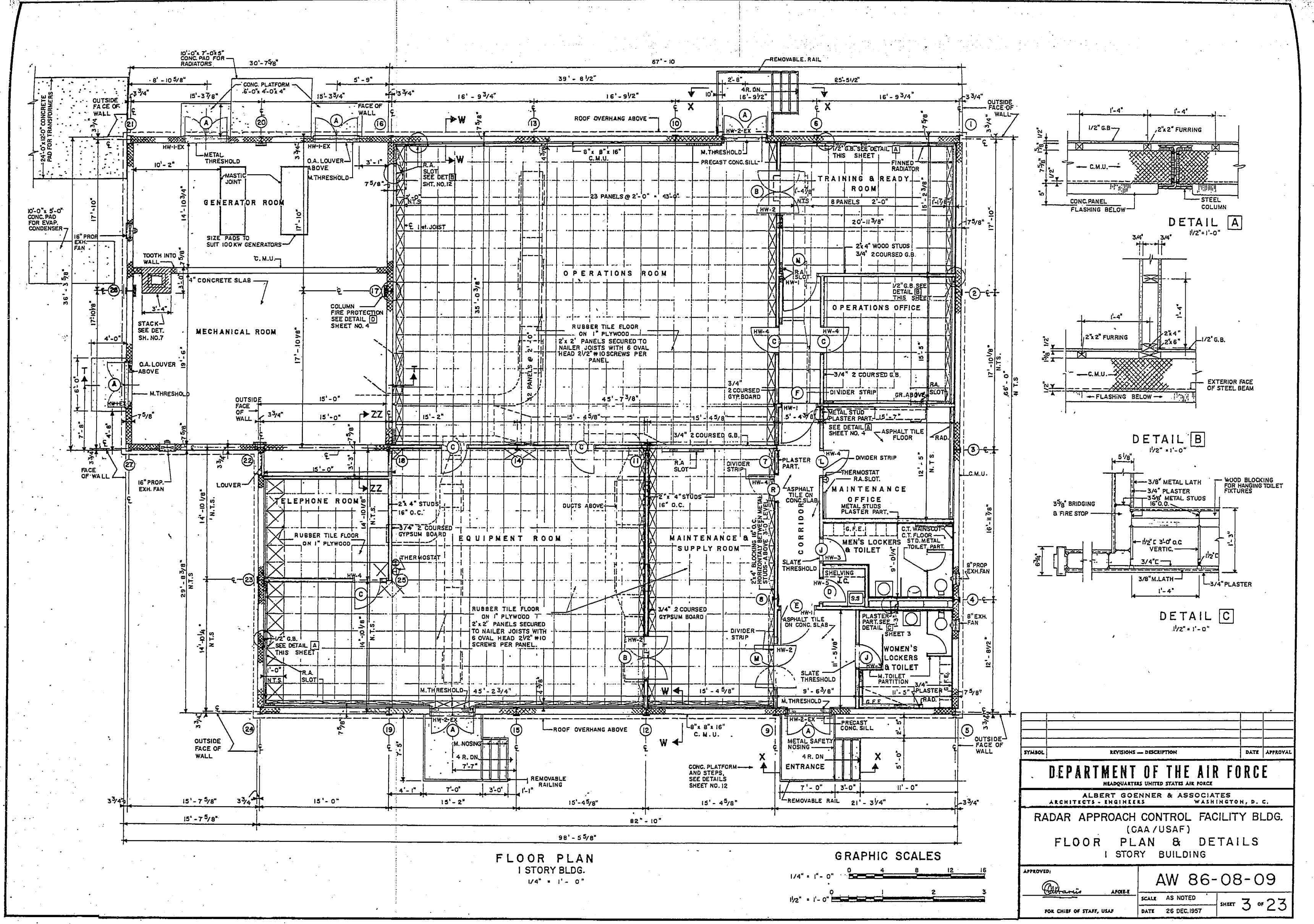
(For Continental United States and CAA Overseas Areas)

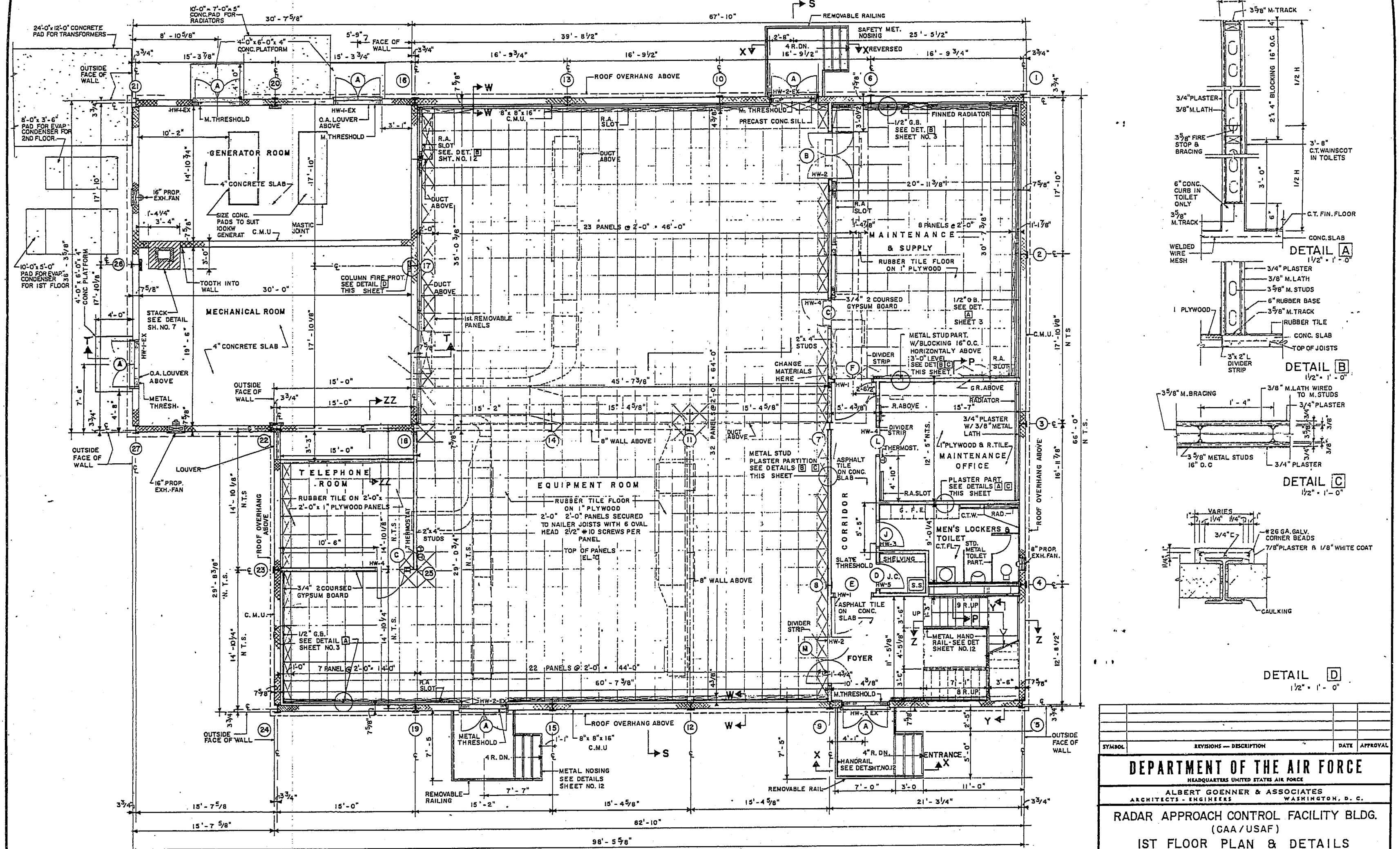
A. Function

The RAPCON facility building houses the control and data processing equipment associated with the RAPCON facility and acts as the nerve center of the RAPCON system. All radar data remoted from various search, precision and/or tracking radar sets are processed and/or presented in this facility building. All radio communications channels and various wire (telephone) circuits used for coordination with adjacent facilities are terminated and distributed to the operating positions within this facility building.

B. Physical Characteristics

The standard RAPCON facility building is constructed in accordance with Drawing AW-86-08-09. This building is designed so that it may be built in one, two, or three story configurations as well as increments between the one and three story configurations. Also, it has the design capability of being expanded in increments between the one and three story configurations in steps, without disruption of operations during the construction periods. This building is complete except for the communications antenna tower. Broadband Blue Lighting is provided in the operations room. Siting criteria is available from Airways and Air Communications Service. Total power required will depend on the building configuration. However, 300KW, 120/208V, 3 phase, 4 wire, 60 cycle should be the minimum building power entrance planned. Minimum (no spares or expansion capability) telephone cable requirements are 130 pairs. However, this requirement varies considerably at each base, depending on local conditions such as Civil Aeronautics Administration tie lines, base tie lines and local traffic conditions.


GENERATOR ROOM
SIZE PADS TO SUIT 100 KW GENERATORS
MECHANICAL ROOM
OPERATIONS ROOM
RUBBER TILE FLOOR ON 1" PLYWOOD 2' x 2' PANELS SECURED TO NAILER JOISTS WITH 6 OVAL HEAD 2 1/2" #10 SCREWS PER PANEL
23 PANELS @ 2'-0" = 46'-0"
32 PANELS @ 2'-0"
TRAINING & READY ROOM
OPERATIONS OFFICE
MAINTENANCE OFFICE
TELEPHONE ROOM
EQUIPMENT ROOM
MAINTENANCE & SUPPLY ROOM
CORRIDOR
MEN'S LOCKERS & TOILET
WOMEN'S LOCKERS & TOILET
ENTRANCE
ROOF OVERHANG ABOVE
REMOVABLE RAIL
OUTSIDE FACE OF WALL
10'-0" x 7'-0" x 5" CONC. PAD FOR RADIATORS
24'-0" x 20'-0" CONCRETE PAD FOR TRANSFORMERS
10'-0" x 5'-0" CONC. PAD FOR EVAP. CONDENSER
67'-10
39'-8 1/2"
98'-5 5/8"
82'-10"
DETAIL A
1 1/2" = 1'-0"
DETAIL B
1 1/2" = 1'-0"
DETAIL C
1 1/2" = 1'-0"
FLOOR PLAN
1 STORY BLDG.
1/4" = 1'-0"
GRAPHIC SCALES
1/4" = 1'-0"
1/2" = 1'-0"
SYMBOL
REVISIONS — DESCRIPTION
DATE
APPROVAL
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
RADAR APPROACH CONTROL FACILITY BLDG.
(CAA / USAF)
FLOOR PLAN & DETAILS
1 STORY BUILDING
APPROVED:
FOR CHIEF OF STAFF, USAF
AW 86-08-09
SCALE AS NOTED
DATE 26 DEC. 1957
SHEET 3 OF 23



1st FLOOR PLAN
2 STORY BLDG.
1/4" = 1'-0"

GRAPHIC SCALES
1/4" = 1'-0" 0 4 8 12 16
1/2" = 1'-0" 0 1 2 3

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

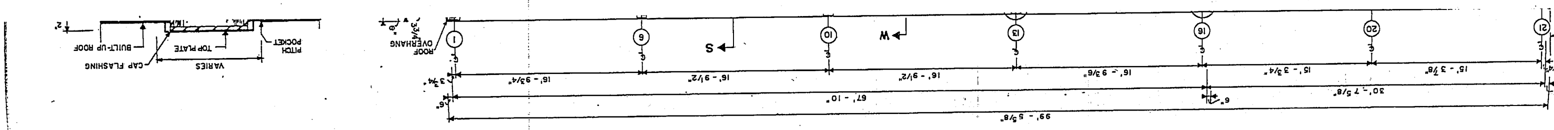
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

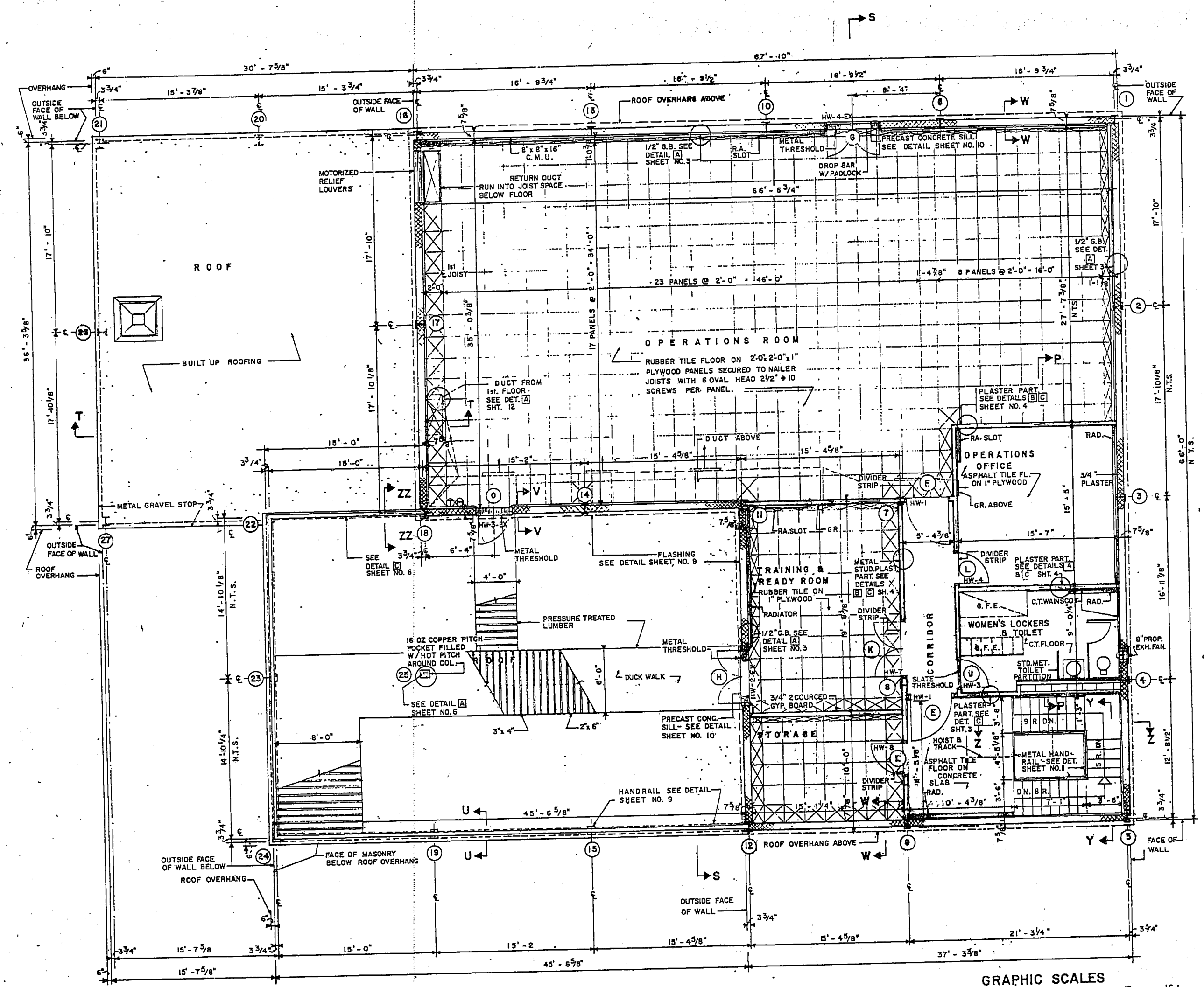
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

RADAR APPROACH CONTROL FACILITY BLDG.
(CAA/USAF)
IST FLOOR PLAN & DETAILS
2 STORY BUILDING

APPROVED: AFOCE-E
FOR CHIEF OF STAFF, USAF

AW 86-08-09
SCALE AS NOTED
DATE 26 DEC. 1957
SHEET 4 OF 23

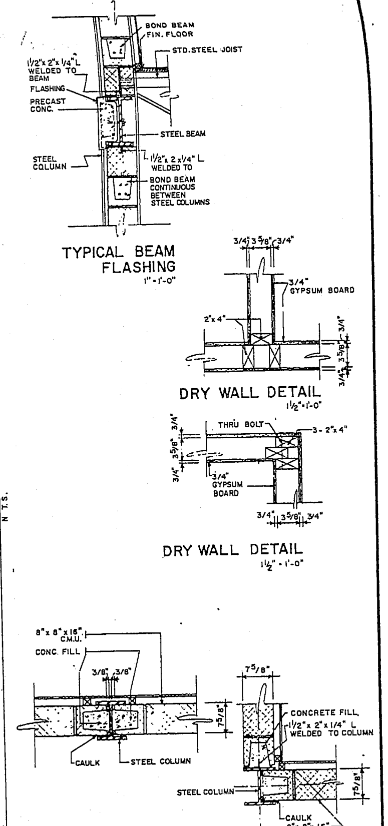




2nd FLOOR PLAN

1/4" = 1'- 0"

GRAPHIC SCALES



TYPICAL BEAM FLASHING 1" = 1'-0"

DRY WALL DETAIL 1 1/2" = 1'-0"

DRY WALL DETAIL 1 1/2" = 1'-0"

TYPICAL COLUMN WATERPROOFING 1" = 1'- 0"

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE

HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

RADAR APPROACH CONTROL FACILITY BLDG.
(CAA / USAF)
2ND FLOOR PLAN & DETAILS
2 STORY BUILDING

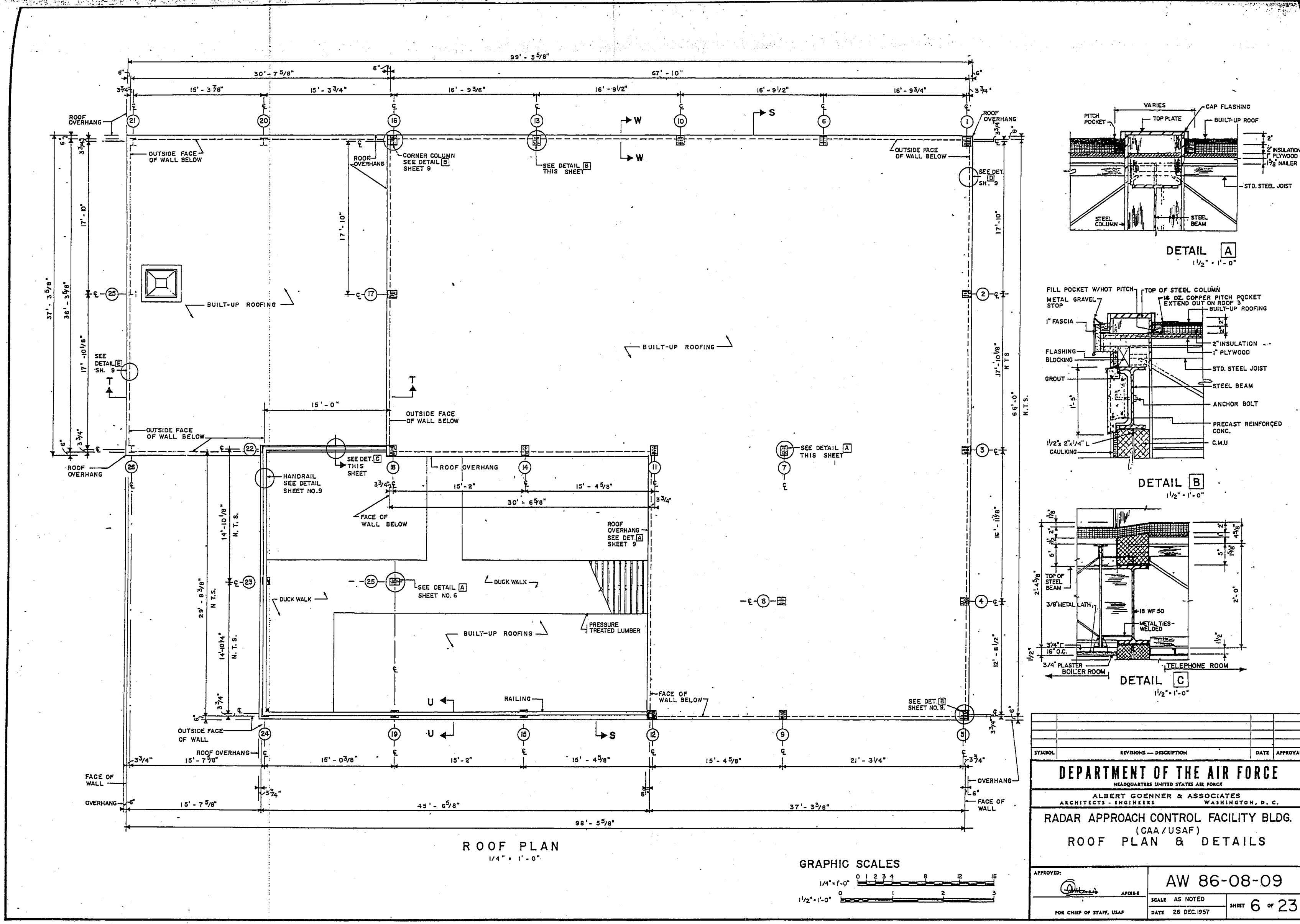
APPROVED: AFOIE-E

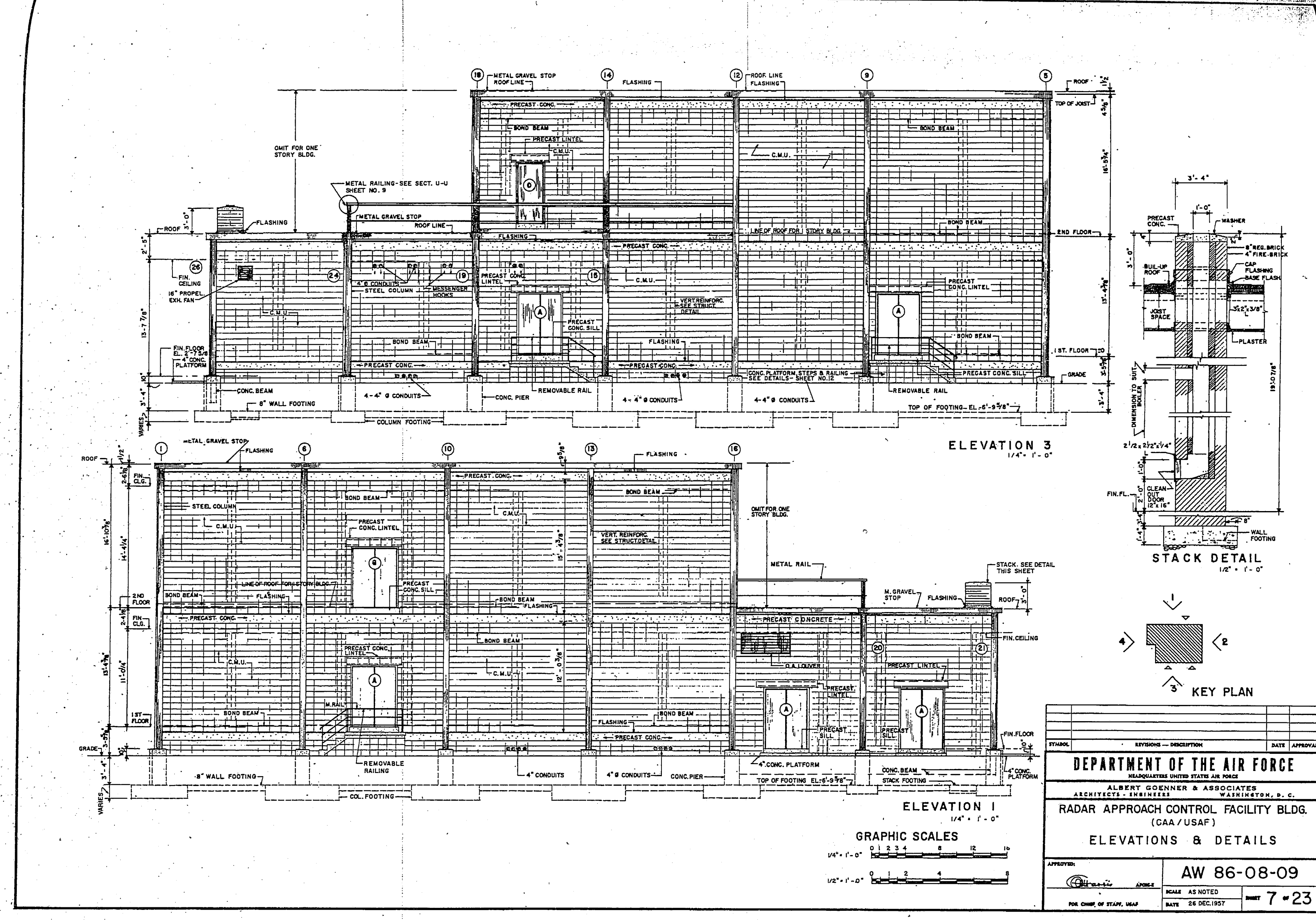
FOR CHIEF OF STAFF, USAF

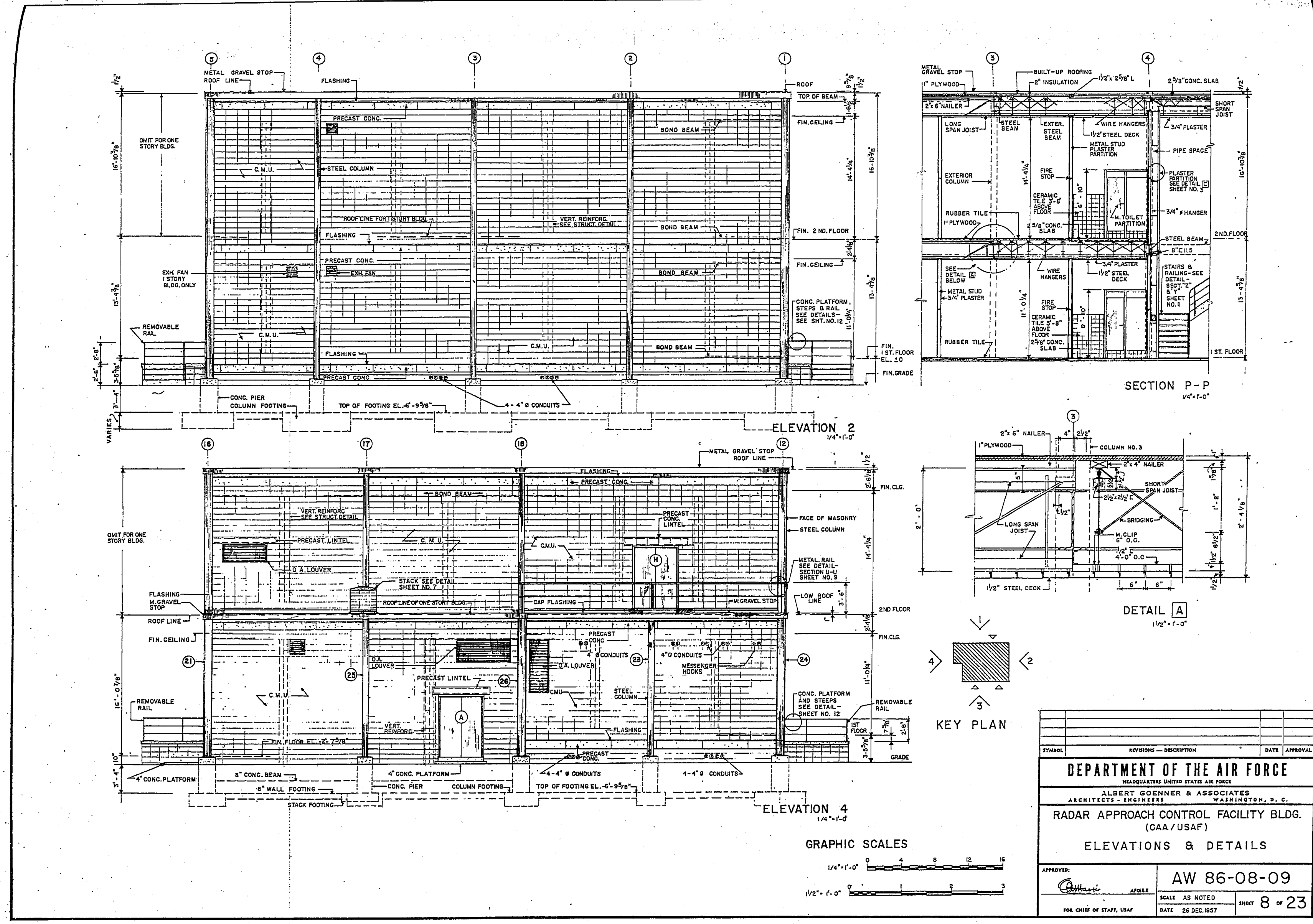
AW 86-08-09

SCALE AS NOTED — SHEET 5 OF 23

DATE 26 DEC. 1957


ROOF PLAN
1/4" = 1'-0"
BUILT-UP ROOFING
ROOF OVERHANG
OUTSIDE FACE OF WALL BELOW
CORNER COLUMN SEE DETAIL B SHEET 9
SEE DETAIL B THIS SHEET
SEE DETAIL A THIS SHEET
HANDRAIL SEE DETAIL SHEET NO.9
SEE DET. C THIS SHEET
FACE OF WALL BELOW
DUCK WALK
SEE DETAIL A SHEET NO. 6
PRESSURE TREATED LUMBER
RAILING
99' - 5 5/8"
98' - 5 5/8"
DETAIL A
1 1/2" = 1'-0"
CAP FLASHING
BUILT-UP ROOF
TOP PLATE
PITCH POCKET
INSULATION
PLYWOOD
NAILER
STD. STEEL JOIST
STEEL COLUMN
STEEL BEAM
DETAIL B
1 1/2" = 1'-0"
FILL POCKET W/HOT PITCH
TOP OF STEEL COLUMN
16 OZ. COPPER PITCH POCKET EXTEND OUT ON ROOF 3"
METAL GRAVEL STOP
1" FASCIA
FLASHING
BLOCKING
GROUT
2" INSULATION
1" PLYWOOD
ANCHOR BOLT
PRECAST REINFORCED CONC.
C.M.U
CAULKING
DETAIL C
1 1/2" = 1'-0"
TOP OF STEEL BEAM
3/8" METAL LATH
18 WF 50
METAL TIES-WELDED
3/4" PLASTER
BOILER ROOM
TELEPHONE ROOM
GRAPHIC SCALES
1/4" = 1'-0"
1 1/2" = 1'-0"
SYMBOL
REVISIONS — DESCRIPTION
DATE
APPROVAL
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
RADAR APPROACH CONTROL FACILITY BLDG.
(CAA/USAF)
ROOF PLAN & DETAILS
APPROVED:
FOR CHIEF OF STAFF, USAF
AW 86-08-09
SCALE AS NOTED
DATE 26 DEC.1957
SHEET 6 OF 23

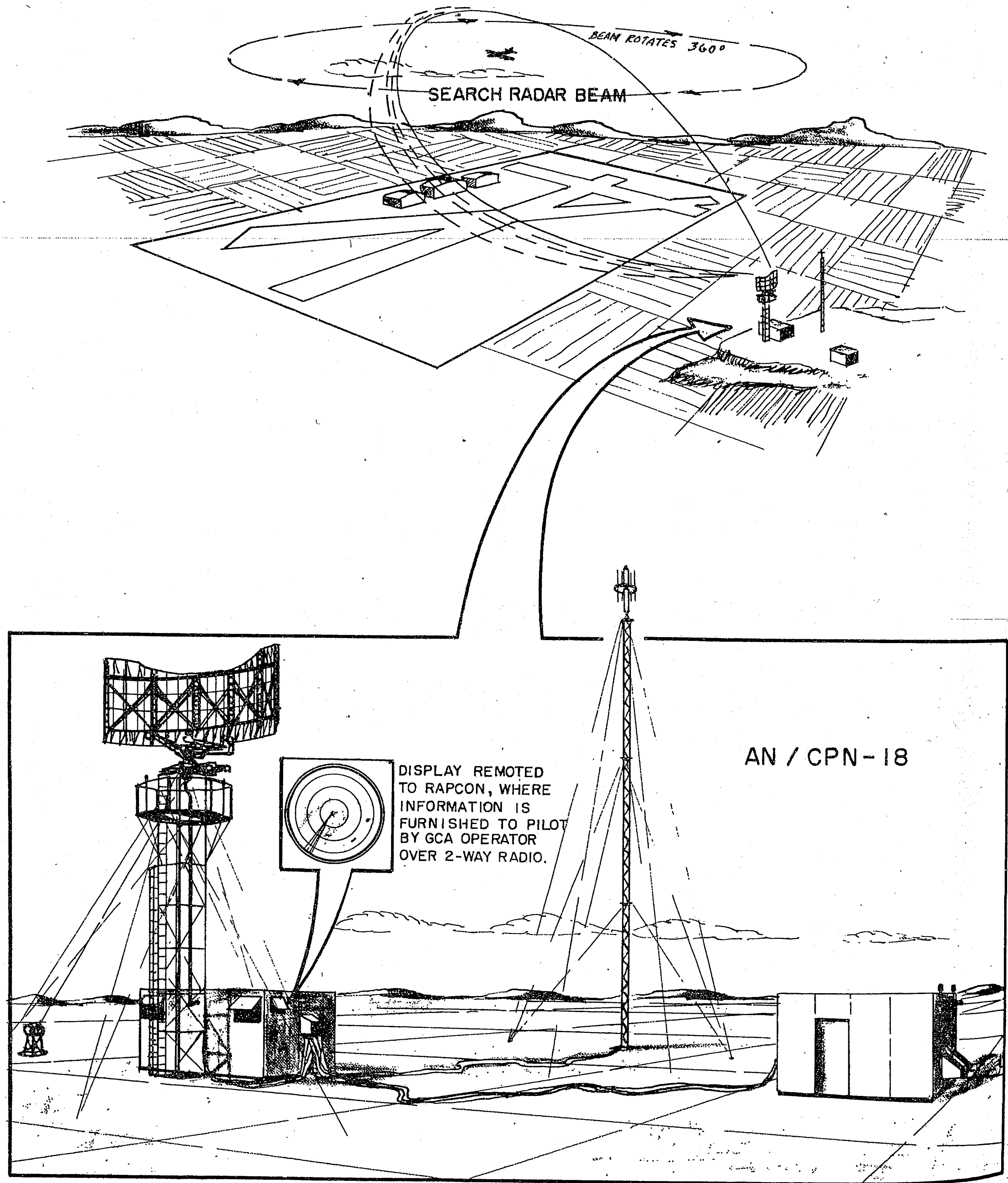

ELEVATION 3
1/4" = 1'-0"
ELEVATION 1
1/4" = 1'-0"
STACK DETAIL
1/2" = 1'-0"
KEY PLAN
GRAPHIC SCALES
1/4" = 1'-0"
1/2" = 1'-0"
METAL GRAVEL STOP
ROOF LINE
FLASHING
PRECAST CONC.
BOND BEAM
PRECAST LINTEL
C.M.U.
OMIT FOR ONE STORY BLDG.
METAL RAILING-SEE SECT. U-U SHEET NO. 9
LINE OF ROOF FOR 1 STORY BLDG.
2ND FLOOR
1ST. FLOOR
GRADE
ROOF
TOP OF JOIST
FIN. CEILING
16" PROPEL. EXH. FAN
4" Ø CONDUITS
STEEL COLUMN
MESSENGER HOOKS
PRECAST CONC. LINTEL
PRECAST CONC. SILL
VERT. REINFORC. SEE STRUCT. DETAIL
FIN. FLOOR
4" CONC. PLATFORM
CONC. BEAM
8" WALL FOOTING
4-4" Ø CONDUITS
CONC. PIER
REMOVABLE RAIL
COLUMN FOOTING
CONC. PLATFORM, STEPS & RAILING SEE DETAILS- SHEET NO. 12
TOP OF FOOTING-EL.-6'-9 5/8"
METAL RAIL
STACK. SEE DETAIL THIS SHEET
M. GRAVEL STOP
PRECAST CONCRETE
O.A. LOUVER
M. RAIL
REMOVABLE RAILING
COL. FOOTING
STACK FOOTING
PRECAST CONC.
WASHER
8" REG. BRICK
4" FIRE-BRICK
BUIL-UP ROOF
CAP FLASHING
BASE FLASH.
JOIST SPACE
PLASTER
DIMENSION TO SUIT BOILER
CLEAN OUT DOOR 12"x16"
WALL FOOTING
SYMBOL
REVISIONS — DESCRIPTION
DATE
APPROVAL
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
RADAR APPROACH CONTROL FACILITY BLDG.
(CAA / USAF)
ELEVATIONS & DETAILS
APPROVED:
FOR CHIEF OF STAFF, USAF
AW 86-08-09
SCALE AS NOTED
DATE 26 DEC. 1957
SHEET 7 of 23


ELEVATION 2
1/4" = 1'-0"
ELEVATION 4
1/4" = 1'-0"
SECTION P-P
1/4" = 1'-0"
DETAIL A
1 1/2" = 1'-0"
KEY PLAN
GRAPHIC SCALES
1/4" = 1'-0"
1 1/2" = 1'-0"
SYMBOL
REVISIONS — DESCRIPTION
DATE
APPROVAL
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
RADAR APPROACH CONTROL FACILITY BLDG.
(CAA/USAF)
ELEVATIONS & DETAILS
APPROVED:
FOR CHIEF OF STAFF, USAF
AW 86-08-09
SCALE AS NOTED
DATE 26 DEC. 1957
SHEET 8 OF 23

Chapter 6

GROUND CONTROLLED APPROACH SYSTEM SEARCH RADAR

GROUND CONTROLLED APPROACH SYSTEM
SEARCH RADAR
AW DWG .86-08-06



HQ. AIRWAYS & AIR COMMUNICATIONS SERVICE DCS/MAT NAVAIDS

Figure 4.

Chapter 6

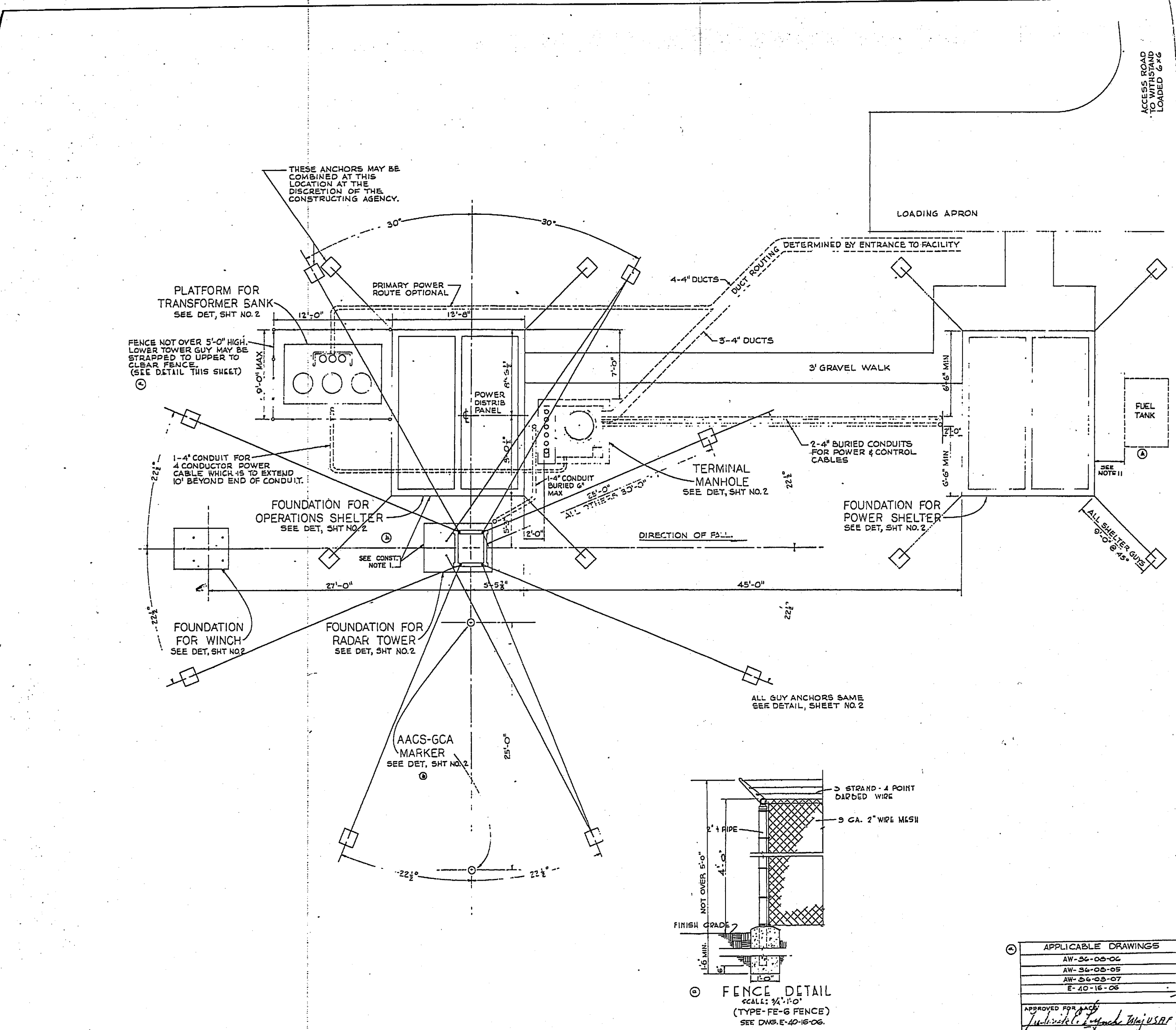
GROUND CONTROLLED APPROACH SYSTEM SEARCH RADAR

A. Function

Area Search Radar, AN/CPN–18 equipment is a conventional two-dimensional-type radar, permanently installed, which provides a map presentation of the area adjacent to the air base. Under optimum conditions, it supplies azimuth and range information on aircraft in any direction and at distances up to 40 miles. This information is transmitted over cables to operators stationed at a central RAPCON center where it is used for identifying and/or monitoring the movement of aircraft in the area covered. The AN/CPN–18 radar may be installed at a distance up to 10,000 cable-feet from the RAPCON center and can be used to maneuver selected flights into position from which the proper approach for a landing can be made under the direction of the precision radar operators.

B. Physical Characteristics

The installation consists of radar equipment installed in a prefabricated building which is located on or in the vicinity of the airbase. The radar antenna is mounted on a tower adjacent to the radar prefabricated shelter and the power unit is housed in a second prefabricated shelter located nearby. Construction requirements are given on drawing AW–86–08–06. Siting criteria are furnished by Airways and Air Communications Service. Total power required at the site is 15 kw, 120/208 V, 3-phase, 4-wire, 60-cycle. Minimum (no spares or expansion capability) telephone cable requirements are 1 pair for connection to the base telephone system, since remoting cables to the RAPCON center are provided with the equipments, however, if it is desired to perform the radar approach control function from the AN/CPN–18 shelter a 26-pair cable should be provided from the base main distribution frame to the AN/CPN–18 site.



NOTES

GENERAL

1. ALL CABLES EXCEPT COMMERCIAL POWER CABLES FURNISHED BY ELECTRONICS PROJECT.

CONSTRUCTION

1. Ⓐ RADAR TOWER FOUNDATION TO BE AT SAME ELEVATION AS TOP OF OPERATIONS SHELTER FOUNDATION. TOP OF ALL FOUNDATIONS TO BE APPROXIMATELY 6 INCHES ABOVE GRADE.
2. WEIGHT LOADING CAPACITY OF FOUNDATIONS TO BE DETERMINED LOCALLY FROM THE FOLLOWING INFORMATION:
   - POWER SHELTER & EQUIPMENT 10,000 LBS
   - OPNS SHELTER & EQUIPMENT 8,000 LBS
   - RADAR ANTENNA AND TOWER 2,100 LBS
3. FOOTINGS TO BE OF REINFORCED CONCRETE.
4. GUY WIRES FURNISHED WITH EQUIPMENT; GUY ANCHORS BY THE CONTRACTOR.
5. PULL WIRES TO BE INSTALLED IN ALL DUCTWORK.
6. MOUNTING BOLTS SHOULD BE COVERED WITH A HEAVY COAT OF GREASE, AND WRAPPED WITH RAGS.
7. STANDARD SAFETY PLACARD SHOULD BE PROVIDED FOR THE TRANSFORMER ENCLOSURE.
8. Ⓒ POWER TO BE OBTAINED FROM NEAREST SOURCE.
9. CABLE PULL RINGS SHOULD BE PROVIDED OPPOSITE ALL INCOMING DUCT RUNS.
10. ALL CONCRETE CLASS "B" 2500#/□"
11. Ⓐ BELOW GROUND FUEL TANK WHERE REQUIRED-SEE AW-78-18-01 FOR DETAILS.

SYMBOL	DESCRIPTION	DATE	APPROVAL
Ⓐ	DELETED OF MAST INSTALLATION. ADDED NOTE 11 AND FUEL TANK. DELETED AACS-GCA MARKER INFO. REVISED CONST NOTE 1. ALL AF DWG. REFERENCES CHANGED TO AW.	23 JUN 58	
ⓐ	APPLICABLE DRAWINGS ADDED. AF ADDED TO DWG. NO.	12 Feb 54	CCP
	TITLE BLOCK REVISED. SPEC. NO. AND FENCE DETAIL ADDED. DIRECTION OF FALL REVERSED. BOLTS REVERSED FENCE NOTE DELETED POWER NOTE ADDED.		

REVISIONS

ⓐ APPLICABLE DRAWINGS
AW-36-08-06
AW-36-08-05
AW-36-08-07
E-40-16-06

APPROVED FOR AACS: [signature] Maj USAF
DATE: 12 Dec 52

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: LM
TRACED BY: LM
CHECKED BY: AK
SUBMITTED BY: A. H. Keyes Jr.
APPROVED: [signature] CHIEF AIRFIELDS BRANCH
APPROVED: [signature] CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 20 MARCH 1953

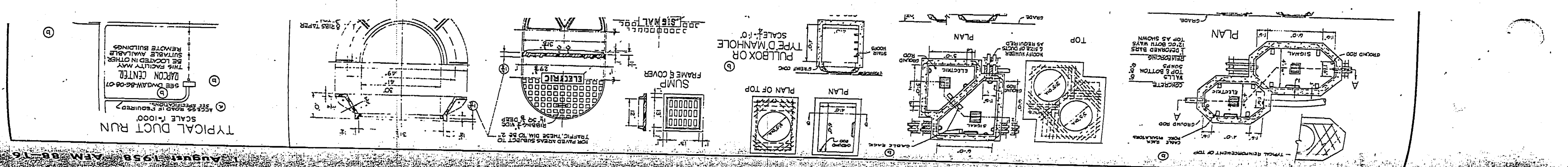
UNITED STATES AIR FORCE

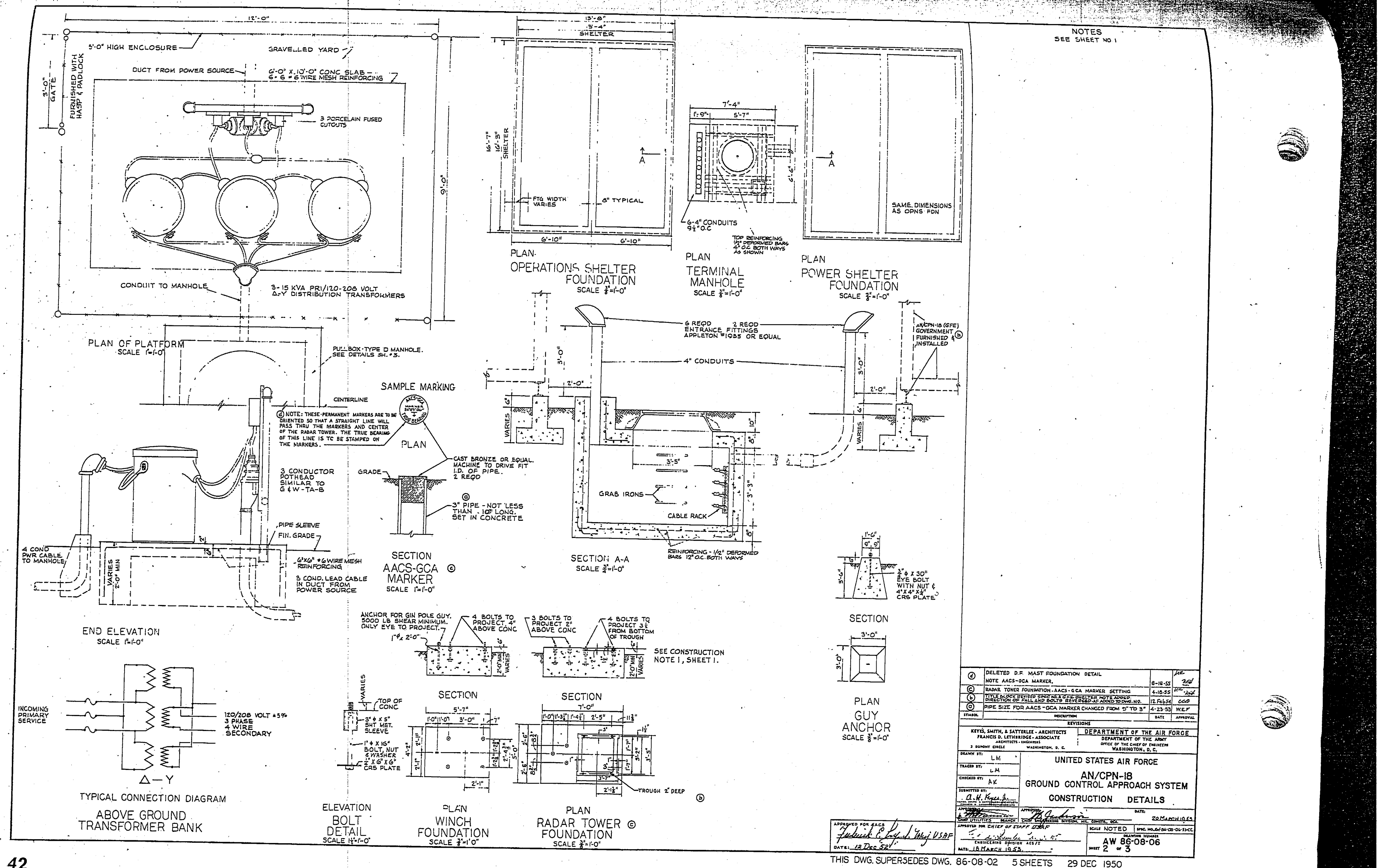
AN/CPN-18
GROUND CONTROL APPROACH SYSTEM
LAYOUT DETAILS

APPROVED FOR CHIEF OF STAFF USAF: [signature] Col USAF
DATE: 18 MARCH 1953

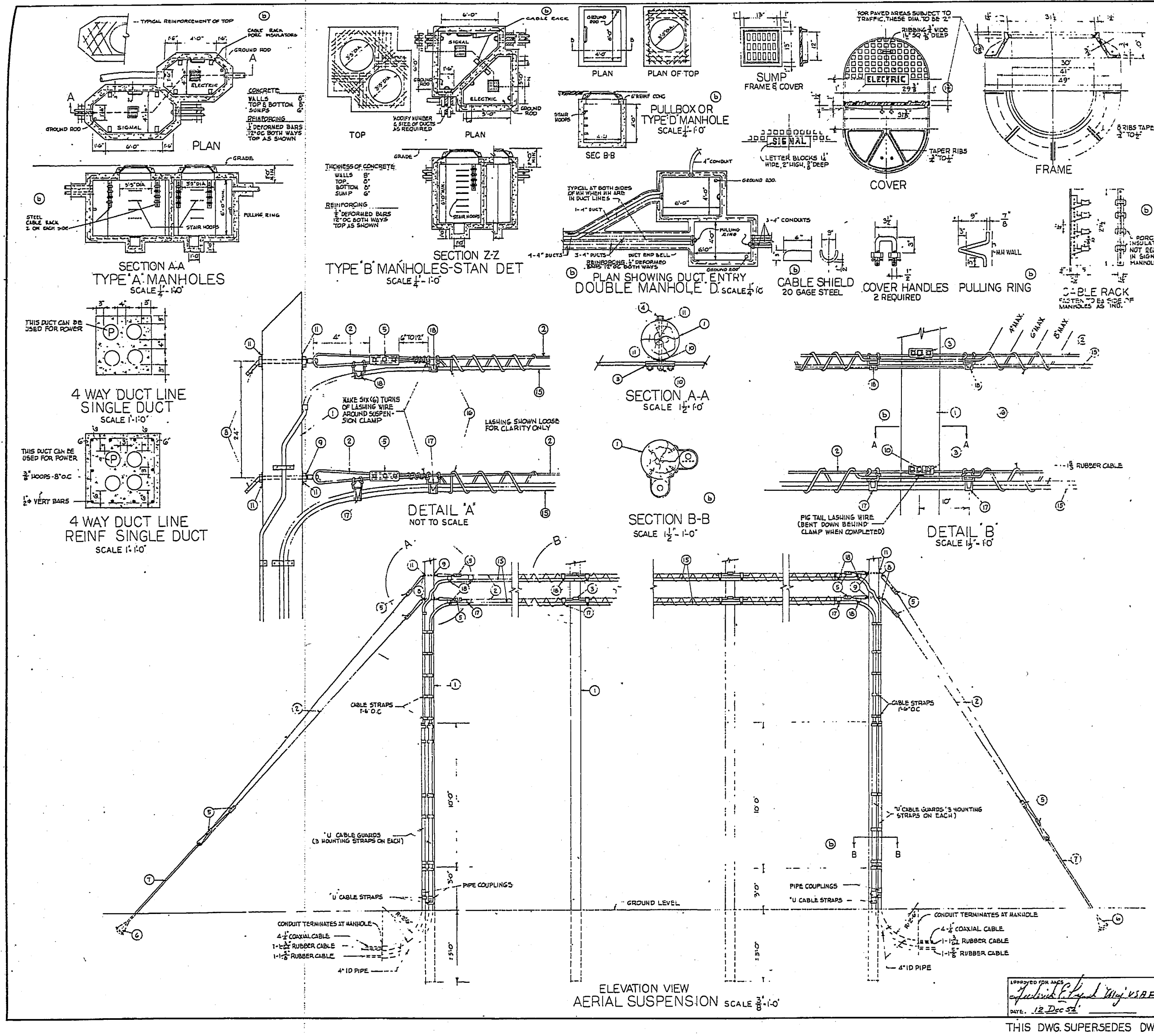
SCALE: ¼" = 1'-0"
SPEC. NO. AW-36-08-06-53-CE
DRAWING NUMBER AW-86-08-06
SHEET 1 OF 3

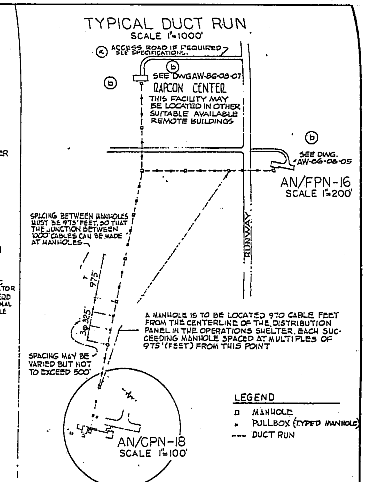
THIS DWG. SUPERSEDES DWG. 86-08-02 5 SHEETS 29 DEC. 1950





NOTES
SEE SHEET NO 1
5'-0" HIGH ENCLOSURE
GRAVELLED YARD
DUCT FROM POWER SOURCE
6'-0" X 10'-0" CONC SLAB - 6-6 #6 WIRE MESH REINFORCING
3'-0" GATE
FURNISHED WITH HASP & PADLOCK
3 PORCELAIN FUSED CUTOUTS
CONDUIT TO MANHOLE
3-15 KVA PRI/120-208 VOLT Δ-Y DISTRIBUTION TRANSFORMERS
PLAN OF PLATFORM
SCALE 1"=1'-0"
PULLBOX-TYPE D MANHOLE. SEE DETAILS SH. #3.
SAMPLE MARKING
CENTERLINE
NOTE: THESE PERMANENT MARKERS ARE TO BE ORIENTED SO THAT A STRAIGHT LINE WILL PASS THRU THE MARKERS AND CENTER OF THE RADAR TOWER. THE TRUE BEARING OF THIS LINE IS TO BE STAMPED ON THE MARKERS.
PLAN
3 CONDUCTOR POTHEAD SIMILAR TO G & W-TA-B
PIPE SLEEVE
FIN. GRADE
4 COND PWR CABLE TO MANHOLE
6"X6" #6 WIRE MESH REINFORCING
3 COND. LEAD CABLE IN DUCT FROM POWER SOURCE
END ELEVATION
SCALE 1"=1'-0"
GRADE
CAST BRONZE OR EQUAL. MACHINE TO DRIVE FIT I.D. OF PIPE. 2 REQD
3" PIPE - NOT LESS THAN 10" LONG. SET IN CONCRETE
SECTION
AACS-GCA MARKER
SCALE 1"=1'-0"
PLAN
OPERATIONS SHELTER FOUNDATION
SCALE 3/8"=1'-0"
FTG WIDTH VARIES
8" TYPICAL
PLAN
TERMINAL MANHOLE
SCALE 3/8"=1'-0"
6-4" CONDUITS 9 1/2" O.C
TOP REINFORCING 1/2" DEFORMED BARS 4" O.C. BOTH WAYS AS SHOWN
PLAN
POWER SHELTER FOUNDATION
SCALE 3/8"=1'-0"
SAME DIMENSIONS AS OPNS FDN
6 REQD 2 REQD ENTRANCE FITTINGS APPLETON #1935 OR EQUAL
4" CONDUITS
AN/CPN-18 (GFE) GOVERNMENT FURNISHED & INSTALLED
GRAB IRONS
CABLE RACK
REINFORCING - 1/2" DEFORMED BARS 12" O.C. BOTH WAYS
SECTION A-A
SCALE 3/8"=1'-0"
3/4" Φ X 30" EYE BOLT WITH NUT & 4"X4"X1/4" CRS PLATE
SECTION
PLAN
GUY ANCHOR
SCALE 3/8"=1'-0"
ANCHOR FOR GIN POLE GUY. 5000 LB SHEAR MINIMUM. ONLY EYE TO PROJECT.
4 BOLTS TO PROJECT 4" ABOVE CONC
3 BOLTS TO PROJECT 2" ABOVE CONC
4 BOLTS TO PROJECT 3 1/2" FROM BOTTOM OF TROUGH
SEE CONSTRUCTION NOTE 1, SHEET 1.
SECTION
SECTION
INCOMING PRIMARY SERVICE
120/208 VOLT ±5% 3 PHASE 4 WIRE SECONDARY
Δ-Y
TYPICAL CONNECTION DIAGRAM
ABOVE GROUND TRANSFORMER BANK
TOP OF CONC
3" Φ X 5" SHT MET. SLEEVE
1" Φ X 16" BOLT, NUT & WASHER 1/4" X 6" X 6" CRS PLATE
ELEVATION
BOLT DETAIL
SCALE 1 1/2"=1'-0"
PLAN
WINCH FOUNDATION
SCALE 3/8"=1'-0"
TROUGH 2" DEEP
PLAN
RADAR TOWER FOUNDATION
SCALE 3/8"=1'-0"
DELETED D.F. MAST FOUNDATION DETAIL NOTE AACS-GCA MARKER. 8-16-55
RADAR TOWER FOUNDATION-AACS-GCA MARKER SETTING 4-18-55
TITLE BLOCK REVISED SPEC NO & GCA SHELTER NOTE ADDED DIRECTION OF FALL AND BOLTS REVERSED AS ADDED TO DWG. NO. 12 Feb 54
PIPE SIZE FOR AACS-GCA MARKER CHANGED FROM 5" TO 3" 4-23-53 W.E.F
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
WASHINGTON, D. C.
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
DRAWN BY: LM
TRACED BY: LM
CHECKED BY: AK
UNITED STATES AIR FORCE
AN/CPN-18
GROUND CONTROL APPROACH SYSTEM
CONSTRUCTION DETAILS
20 MARCH 1953
APPROVED FOR AACS
APPROVED FOR CHIEF OF STAFF USAF
DATE: 12 Dec 52
DATE: 18 MARCH 1953
SCALE NOTED
AW 86-08-06
SHEET 2 OF 3
THIS DWG. SUPERSEDES DWG. 86-08-02 5 SHEETS 29 DEC 1950





NOTES

1. ALL HARDWARE EXCEPT FRAMES & COVERS SHALL BE HOT DIP GALV
2. MANHOLES FOR COMMUNICATIONS SHALL HAVE THE WORD "SIGNAL" ON COVER

(a)

3. PULL WIRES WILL BE INSTALLED IN ALL DUCTS.
4. ALL DUCTS WILL BE SEALED AGAINST ENTRY OF DEBRIS & WATER
5. STAIR HOOPS WILL BE INSTALLED IN ALL MANHOLES.
6. AERIAL SUSPENSION OF CABLES AND POWER LINE TO WITHIN 300' OF RADAR TOWER IS PERMISSIBLE IF NOT IN VIOLATION OF AIRFIELD CLEARANCE REGULATIONS.
7. INCLUDE ALL NECESSARY LIGHTNING PROTECTION
8. INCLUDE POLE STEPS
9. WHEN POWER LINE IS PLACED ON POLES WITH CABLES, POWER LINE MUST BE AT LEAST 6 FEET ABOVE CABLES.
10. ITEMS 15, 16, 17, 18 FURNISHED AND INSTALLED BY USAF. POLES AND MESSENGER AND GUYS FURNISHED AND INSTALLED BY CONTRACTOR
11. MESSENGER REQUIREMENT
    AN/FPN-16 — 1 REQUIRED
    AN/CPN-18 — 2 REQUIRED
    AN/FPN-16 & AN/CPN-18 — 3 REQUIRED
12. CABLE PULL RINGS WILL BE PROVIDED OPPOSITE ALL INCOMING DUCT RUNS

BILL OF MATERIALS PER 1000' FEET OF AERIAL SUSPENSION

NO.	DESCRIPTION	UNIT	QUANTITY
1	POLES, CREOSOTE - 30'-0"	EA	9
2	MESSENGER, GM - 5/16"	FT	3300'
3	3 BOLT CABLE SUSPENSION CLAMPS	EA	21
4	CABLE SUSPENSION "A" BOLTS 5/8"×10"	EA	21
5	CLAMPS, GUY, 3 BOLT - 6"×2"	EA	21
6	ANCHORS, EXPANSION - 10" 4 WAY	EA	6
7	RODS, GUY - 8'-0"	EA	6
8	BOLTS, THIMBLE-EYE, BENT - 5/8"×10"	EA	6
9	NUTS, THIMBLE-EYE - 5/8"	EA	6
10	NUTS, PLACE - 5/8"	EA	40
11	SQUARE WASHER 2 1/4"×2 1/4"×3/16"	EA	54
12			
13			
14			
15	CABLES		
16	WIRE, LASHING - .091		
17	AERIAL CABLE SUPPORTS - 22"		
18	AERIAL CABLE SUPPORTS - 28"		

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
(b)	ALL AF- REFERENCES CHANGED TO AW-; ADDED CABLE RACKS IN TYPE "A" & "B" MANHOLES; CHANGED SIZES OF PULL BOX & DOUBLE MANHOLE "D"; RAPCON WAS RATC; CHANGED WORDING NOTE 12; PULLING RING WAS PULLING IRON; SECTION A-A RELOCATED TO DETAIL "B"; SUSPENSION CLAMP DETAIL CHANGED TO SECTION B-B	23 JULY '55	[illegible]
(a)	TITLE BLOCK REVISED. SPEC. NO. ADDED. WATERPROOFING NOTE DELETED. NOTE ADDED TO PLOT PLAN AF ADDED TO DWG NO.	12 Feb 54	CCO

KEYES, SMITH, & SATTERLEE - ARCHITECTS / FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
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DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: NF
TRACED BY: NF
CHECKED BY: AHK
SUBMITTED BY: A. H. Keyes Jr.
APPROVED: CHIEF UTILITIES BRANCH

UNITED STATES AIR FORCE
AN/CPN-18
GROUND CONTROL APPROACH SYSTEM
DUCT CONSTRUCTION, CABLE RUN & AERIAL SUSPENSION DETAILS

APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 20 MARCH 1953

APPROVED FOR AACS: Frederick E. Kyle Maj USAF
DATE: 12 Dec 52

APPROVED FOR CHIEF OF STAFF USAF
DATE: 18 MARCH 1953

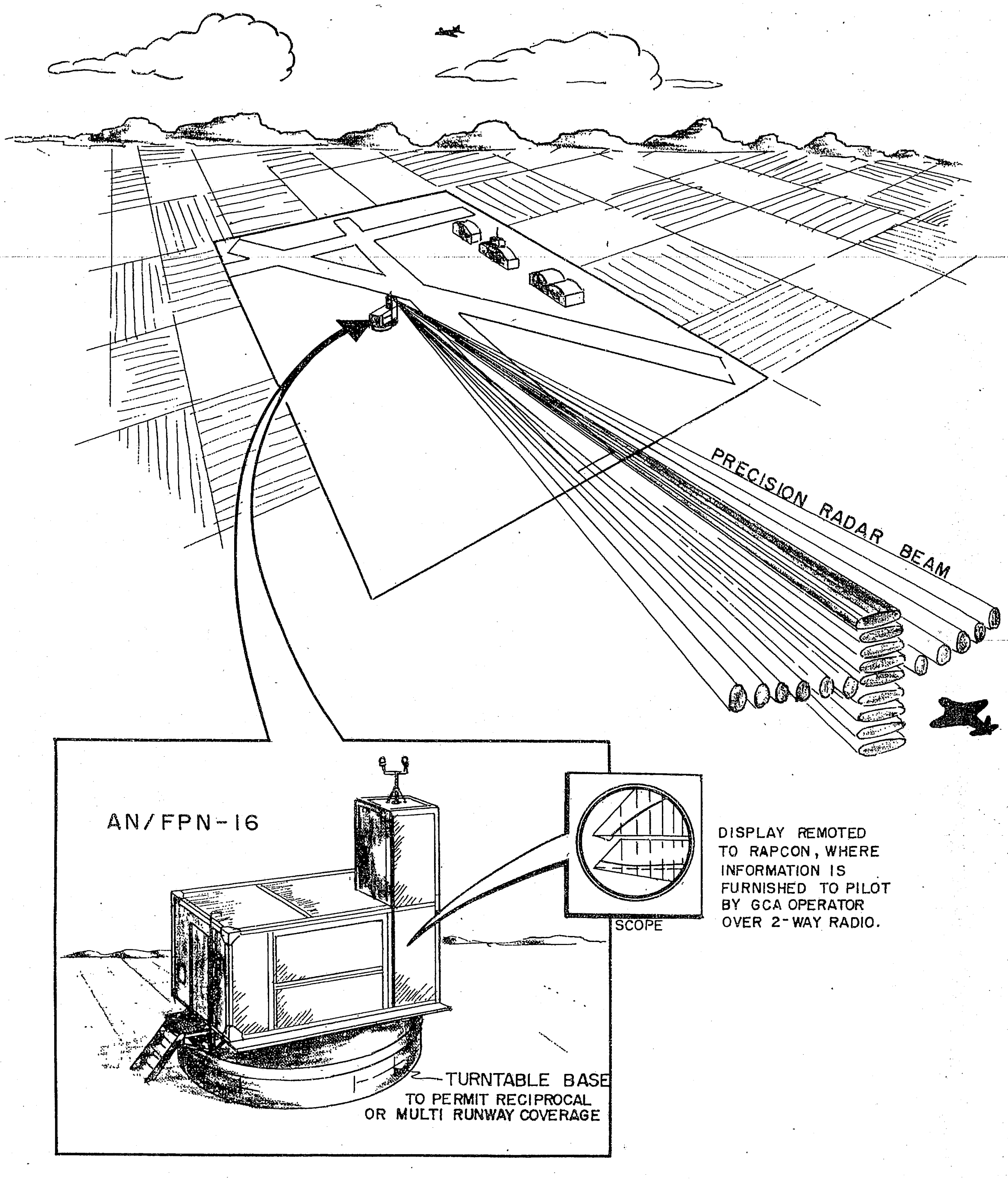
SCALE AS SHOWN
SPEC. NO. AW-86-08-06-53-CL
DRAWING NUMBER AW-86-08-06
SHEET 3 OF 3

THIS DWG. SUPERSEDES DWG. 86-08-02 5 SHEETS 29 DEC. 1950

GROUND CONTROLLED APPROACH SYSTEM

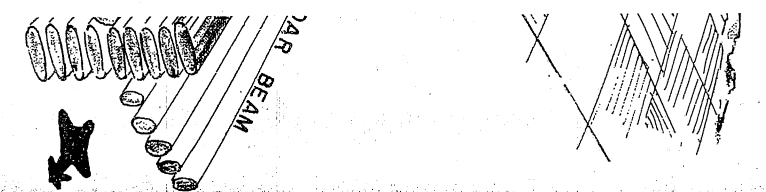
PRECISION RADAR APPROACH

AW DWG. 86-08-05



HQ AIRWAYS & AIR COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 5.



Chapter 7

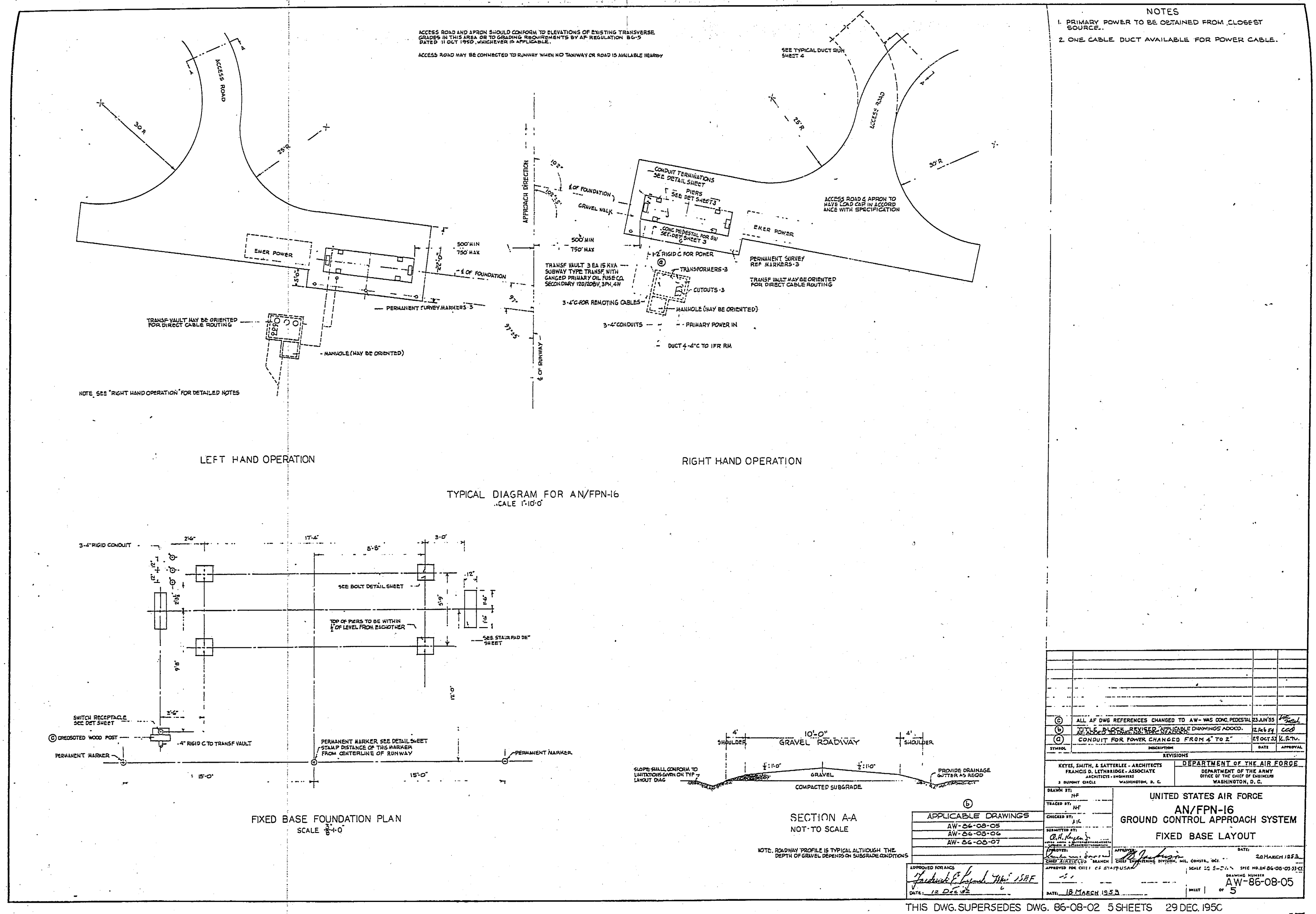
GROUND CONTROLLED APPROACH SYSTEM PRECISION APPROACH RADAR (PAR)

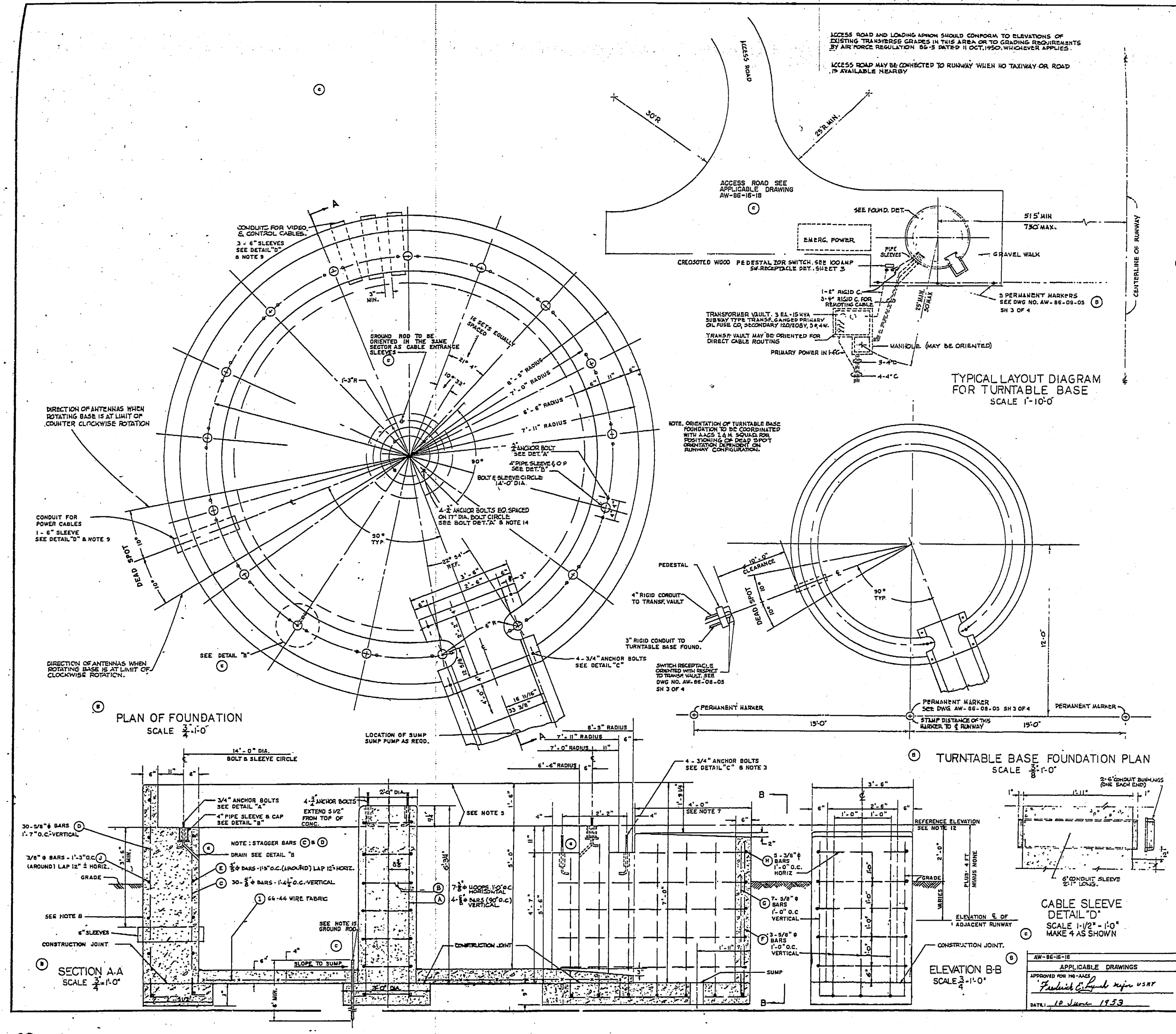
A. Function

Fixed ground control approach (GCA), AN/FPN–16 is a precision type radar, permanently installed, which supplies accurate and continuous azimuth, elevation, and range of aircraft, within a 20° azimuth sector, on final approach to the landing runway. Maximum range is 10 miles. Azimuth and elevation displays show the position of the aircraft with respect to the extended centerline of the runway and the predetermined glidepath. Operators stationed at a RAPCON center located not more than 10,000 feet from the AN/FPN–16 receive these data over remoting cables and interpret lateral and vertical deviations from the final approach path. Corrections then are supplied by the operators to the pilot of the aircraft by radio communications. The AN/FPN–16 is almost identical with the precision system of mobile GCA (AN/CPN–4) and performs the same functions. No communications equipment is supplied with radar set AN/FPN–16.

B. Physical Characteristics

The fixed installation consists of radar equipment, a 5-ton air conditioner driven by a 15-horsepower, 3-phase electric motor and an aircraft-type heater installed in a prefabricated building which is located approximately 500 feet to one side of the instrument runway. The shelter also may be positioned on a turntable MT–1173/FPN in which case it may be rotated to cover runways other than the instrument runway. The radar antennas are a part of the shelter and the power unit is mounted on a pad nearby. Where weather conditions necessitate, a shelter may be constructed for the power unit. (Drawings AW–26–03–26 and AW–78–18–01.) Construction requirements are given on drawing AW–86–08–05. Siting criteria are furnished by Airways and Air Communications Service. Total power required at the site is 21 kw, 120/208 v., 3-phase, 4-wire, 60-cycle. Telephone cable requirement is one pair to the base telephone system, (no expansion capability), since remoting cables to the RAPCON center are provided with the equipment.


NOTES
1. PRIMARY POWER TO BE OBTAINED FROM CLOSEST SOURCE.
2. ONE CABLE DUCT AVAILABLE FOR POWER CABLE.
ACCESS ROAD AND APRON SHOULD CONFORM TO ELEVATIONS OF EXISTING TRANSVERSE GRADES IN THIS AREA OR TO GRADING REQUIREMENTS BY AF REGULATION 86-5 DATED 11 OCT 1950, WHICHEVER IS APPLICABLE.
ACCESS ROAD MAY BE CONNECTED TO RUNWAY WHEN NO TAXIWAY OR ROAD IS AVAILABLE NEARBY
ACCESS ROAD
APPROACH DIRECTION
℄ OF RUNWAY
EMER POWER
500' MIN
750' MAX
PERMANENT SURVEY MARKERS-3
TRANSF VAULT MAY BE ORIENTED FOR DIRECT CABLE ROUTING
MANHOLE (MAY BE ORIENTED)
NOTE: SEE "RIGHT HAND OPERATION" FOR DETAILED NOTES
SEE TYPICAL DUCT RUN SHEET 4
CONDUIT TERMINATIONS SEE DETAIL SHEET
PIERS SEE DET SHEET 3
GRAVEL WALK
CONC PEDESTAL FOR SW SEE DET SHEET 3
ACCESS ROAD & APRON TO HAVE LOAD CAP IN ACCORDANCE WITH SPECIFICATION
TRANSF VAULT 3 EA 15 KVA SUBWAY TYPE TRANSF WITH GANGED PRIMARY OIL FUSE CO. SECONDARY 120/208V, 3PH, 4W
TRANSFORMERS-3
CUTOUTS-3
3-4"C FOR REMOTING CABLES
MANHOLE (MAY BE ORIENTED)
3-4" CONDUITS
PRIMARY POWER IN
DUCT 4-4"C TO IFR RM
PERMANENT SURVEY REF MARKERS-3
LEFT HAND OPERATION
RIGHT HAND OPERATION
TYPICAL DIAGRAM FOR AN/FPN-16
SCALE 1"-10'-0"
3-4" RIGID CONDUIT
SEE BOLT DETAIL SHEET
TOP OF PIERS TO BE WITHIN 1/8" OF LEVEL FROM EACH OTHER
SEE STAIR PAD DE' SHEET
SWITCH RECEPTACLE SEE DET SHEET
CREOSOTED WOOD POST
4" RIGID C TO TRANSF VAULT
PERMANENT MARKER
PERMANENT MARKER SEE DETAIL SHEET STAMP DISTANCE OF THIS MARKER FROM CENTERLINE OF RUNWAY
FIXED BASE FOUNDATION PLAN
SCALE 3/8"-1'-0"
SHOULDER
10'-0"
GRAVEL ROADWAY
SLOPE SHALL CONFORM TO LIMITATIONS GIVEN ON TYP LAYOUT DIAG
GRAVEL
COMPACTED SUBGRADE
PROVIDE DRAINAGE GUTTER AS REQD
SECTION A-A
NOT TO SCALE
NOTE: ROADWAY PROFILE IS TYPICAL ALTHOUGH THE DEPTH OF GRAVEL DEPENDS ON SUBGRADE CONDITIONS
APPLICABLE DRAWINGS
AW-86-08-05
AW-86-08-06
AW-86-08-07
(c) ALL AF DWG REFERENCES CHANGED TO AW- WAS CONC. PEDESTAL 23 JUN '55
(b) TITLE BLOCK REVISED APPLICABLE DRAWINGS ADDED. 12 Feb 54
(a) CONDUIT FOR POWER CHANGED FROM 4" TO 2" 29 OCT 53
SYMBOL DESCRIPTION DATE APPROVAL
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
UNITED STATES AIR FORCE
AN/FPN-16
GROUND CONTROL APPROACH SYSTEM
FIXED BASE LAYOUT
DATE: 20 MARCH 1953
DATE: 18 MARCH 1953
DRAWING NUMBER AW-86-08-05
SHEET 1 OF 5
THIS DWG. SUPERSEDES DWG. 86-08-02 5 SHEETS 29 DEC. 1950



AW-86-16-18
APPLICABLE DRAWINGS

APPROVED FOR THE AACS
Frederick C. Lynd Major USAF
DATE: 10 June 1953

NOTES

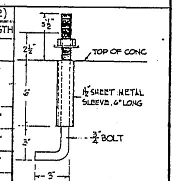
1. CONCRETE BASE HAS BEEN DESIGNED ON THE BASIS THAT SOIL IS GRANULAR GRAVEL WELL DRAINED AND THAT FROST LINE IS 40"-45" BELOW GROUND LEVEL. CHANGES IN DESIGN OF FOUNDATION MAY BE NECESSARY BECAUSE OF OTHER SOIL CONDITIONS AND UNDERGROUND OBSTRUCTIONS.
2. CLASS "B" CONC. 2500#/□" WITH 3/4" COURSE AGGREGATE
3. PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH A HEAVY COAT OF GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION & PROTECT THREADS.
4. KEEP ALL REINFORCING STEEL AT LEAST 2" FROM SURFACE OF CONCRETE.
5. KEEP ALL TOP SURFACES AS LEVEL AS PRACTICABLE AND FINISH SMOOTH
6. COVER FOR PIT IS FURNISHED BY MANUFACTURER AS PART OF TURNTABLE BASE
7. PRODUCTION EQUIPMENT DESIGNED FOR 4'-0" PIT ENTRANCE COVER
8. WATERPROOFING OF CONCRETE OPTIONAL DEPENDENT ON SOIL CONDITION
9. CONDUIT ENTRANCE TO TURNTABLE BASE MAY BE ORIENTED FOR DIRECT ROUTING TO MANHOLES & TRANSFORMER VAULT.
10. (B)
11. CONDUITS FROM TURNTABLE TO TRANSFORMER VAULT & MANHOLE TO BE FURNISHED BY CONTRACTOR.
12. (B) TURNTABLE FOUNDATION REFERENCE ELEVATION IS ASSIGNED A NORMAL TOLERANCE OF PLUS 4 FT MINUS NONE WITH RESPECT TO ADJACENT RUNWAY ℄ ELEVATION WITHOUT REQUIREMENT FOR WAIVER. PRACTICAL UPPER LIMIT ELEVATION IS GOVERNED PRIMARILY BY AFR 86-1. LOWER LIMIT ELEVATION IS GOVERNED BY LINE OF SIGHT TO CORNER REFLECTORS AT APPROACH END OF RUNWAY, DRAINAGE AND OTHER FACTORS. THE FINAL ELEVATION OF THE GCA UNIT WILL BE DEPENDENT UPON ITS OPERATING CHARACTERISTICS AND REQUIREMENTS AS DETERMINED BY THE AACS-I & M SQUADRON CONCERNED.
13. GCA SITES WILL NOT EXCEED 10 PERCENT IN ANY DIRECTION AS SPECIFIED IN AFR 86-5A.
14. (B) THE 5 1/2" BOLT EXTENSION SHOWN IN DETAIL "A" IS USED ON THE 17" DIA BOLT CIRCLE ONLY, 2 1/2" EXTENSION ELSEWHERE.
15. USE GROUND ROD EQUIVALENT TO AF 8800-729175 (ROD, GROUND, STEEL, 6' LG. 1/2 D WITH #12 COPPER WIRE BONDED FIRMLY TO THE UPPER END FOR MAKING GROUND WIRE CONNECTION.)

REINFORCING STEEL (SEE NOTE 2)

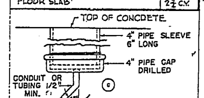
BAR	NO.	SIZE	DETAIL	LENGTH
A	4	5/8 φ	6'-6" 6"	7'-0"
B	7	3/8 φ	1'-6" I.D.	8'-0"
C	30	5/8 φ	5'-9" 6"	6'-3"
D	30	5/8 φ	7'-3" 1'-7"	9'-0"
E	16	3/8 φ	14'-0"	14'-0"
F	3	5/8 φ	6" 6'-0" 5'-3"	12'-9"
G	7	5/8 φ	5'-3" 2'-0" 5'-3"	9'-6"
H	5	3/8 φ	6" 5'-0" 5'-0"	16'-0"
I		66-44	WIRE FABRIC	150 SQ.FT.
J	21	3/8 φ		17'-0"

CONCRETE QUANTITIES

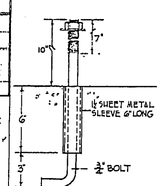
POURING	Q'TY.
FOOTINGS UNDER RING, PIER & PIT	4 1/4 C.Y.
RING & PITWALLS & PIER	15 C.Y.
FLOOR SLAB	2 3/4 C.Y.



ANCHOR BOLT DET. "A"
SCALE 3"-1'-0"
MAKE 38 AS SHOWN (B)
SEE NOTE 14



SLEEVE DETAIL "B"
SCALE 3"-1'-0"
MAKE 17 AS SHOWN



ANCHOR BOLT DET. "C"
SCALE 3"-1'-0"
MAKE 4 AS SHOWN (B)

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
(c)	ADDED GROUND ROD IN FOUNDATION PLAN & SECTION A-A; ADDED WELL DRAIN HOLES IN SECTION A-A & SLEEVE DETAIL "B", DELETED ROAD SECTION C-C & ADDED APPLICABLE DRAWING.	14 MAR57	Can
(B)	DELETED NOTE 10 & ADDED NOTES 12,13,14; AF-DWG REFERENCES CHANGED TO AW-; PLAN OF FOUNDATION, TURNTABLE BASE, SECTION A-A & ELEVATION REVISED; CHANGED DETAILS "A" & "C";	23JUNE 5[illegible]	[illegible]
(a)	TITLE BLOCK REVISED. SPEC. NO. ADDED. AF ADDED TO DWG. NO. NOTE AT ROAD SECTION DELETED. ANCHOR BOLTS DELETED.	12 Feb54	ECA

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

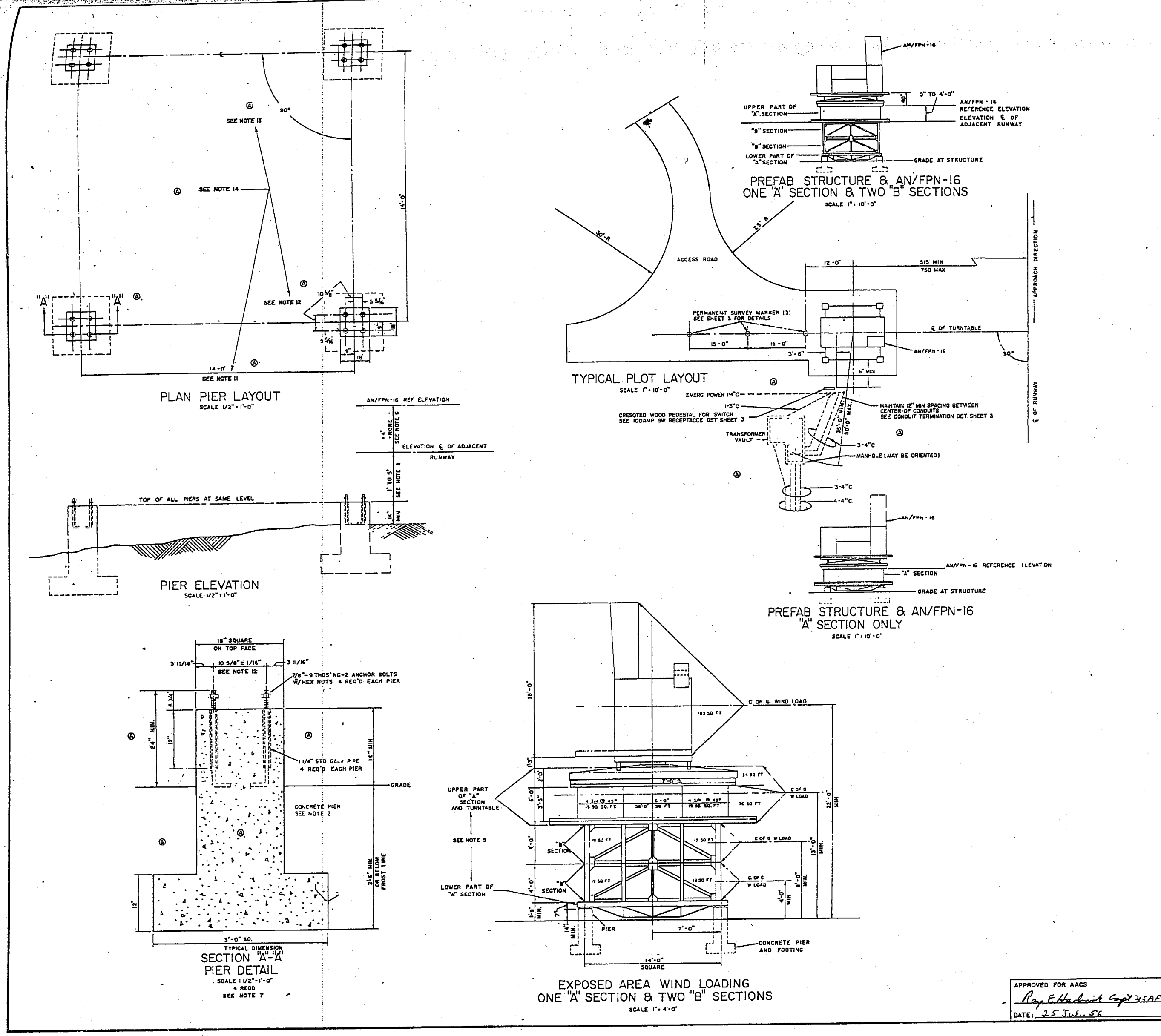
DRAWN BY: NF
TRACED BY: NF
CHECKED BY: E.A.L. A.K. H.C.H.
SUBMITTED BY: A. H. Keyes Jr.
APPROVED: CHIEF AIRFIELDS BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE

UNITED STATES AIR FORCE
AN/FPN-16
GROUND CONTROL APPROACH SYSTEM
TURNTABLE BASE LAYOUT

DATE: 14 AUG 1953

APPROVED FOR CHIEF OF STAFF USAF
COL. USAF
DATE: 12 AUG. 1953

SCALE AS SHOWN
SPEC. NO. AW-86-08-05-33-C
DRAWING NUMBER AW-86-08-05
SHEET 2 OF 5



GENERAL NOTES

1. ASSUMED LOAD BEARING VALUE OF SOIL 3000 LBS/SQ. FT.
2. CLASS "B" CONC. 2500 #/"" WITH 3/4" COARSE AGGREGATE.
3. PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH A HEAVY COAT OF GREASE, AND WRAPPED WITH RAGS TO PREVENT CORROSION & PROTECT THREADS.
4. (A) KEEP ALL REINFORCING STEEL IF REQUIRED AT LEAST 2" FROM SURFACE OF CONCRETE.
5. KEEP ALL TOP SURFACES AS LEVEL AS PRACTICABLE AND FINISH SMOOTH.
6. (A) AN/FPN-16 REFERENCE ELEVATION IS ASSIGNED A NORMAL TOLERANCE OF PLUS 4FT. MINUS NONE WITH RESPECT TO ADJACENT RUNWAY ℄ ELEVATION WITHOUT REQUIREMENT FOR WAIVER. PRACTICAL UPPER LIMIT ELEVATION IS GOVERNED PRIMARILY BY AFR 86-1, LOWER LIMIT ELEVATION IS GOVERNED BY LINE OF SIGHT TO CORNER REFLECTORS AT APPROACH END OF RUNWAY, DRAINAGE AND OTHER FACTORS. THE FINAL ELEVATION OF THE GCA UNIT WILL BE DEPENDENT UPON ITS OPERATING CHARACTERISTICS AND REQUIREMENTS DETERMINED BY THE INSTALLING AGENCY CONCERNED.
7. FOUNDATIONS INDICATED ARE MINIMUM AND SHALL BE DESIGNED TO RESIST UPLIFT FROM WIND FORCES WITH A 1.5 FACTOR OF SAFETY.
8. DIMENSION FOR "A" SECTION ONLY. ADD 4 FEET FOR EACH "B" SECTION
9. "B" SECTIONS IF REQUIRED, ARE INSTALLED BETWEEN TOP OF "A" SECTION AND BOTTOM OF "A" SECTION, MAXIMUM OF FOUR "B" SECTIONS CAN BE USED.
10. AN/FPN-16 AND PREFAB STRUCTURE ("A" AND "B" SECTIONS) INDICATED ON THIS DRAWING ARE GOVERNMENT FURNISHED AND INSTALLED
11. (A) 14' DIMENSION IS CRITICAL. TOLERANCE: $\pm\frac{1}{16}$".
12. (A) DIMENSION BETWEEN BOLT CENTERS IS CRITICAL. TOLERANCE: $\pm\frac{1}{16}$"
13. (A) ALL CONCRETE PIER CENTER LINES MUST BE AT RIGHT ANGLES.
14. (A) RECOMMEND JIG OR MECHANICAL GUIDE TO MEET CRITICAL TOLERANCES. SPECIFIED IN NOTES 11, 12 & 13

INVENTORY OF DEAD WEIGHTS

AN/FPN-16 SHELTER AND CONTENTS	14,500 LBS
MT-1173 TURNTABLE INCLUDE 2 FUEL DRUMS FULL	13,500 "
"A" SECTION, TOP ONLY	10,000 "
"A" SECTION, BOTTOM ONLY	2,072 "
"B" SECTION	2,486 " EACH

SYMBOL	REVISION - DESCRIPTION	DATE	APPROVED
(A)	ADDED NOTES 11, 12, 13 & 14 AND CHANGED NOTES 4 & 6. CONDUIT DETAIL ADDED BETWEEN TRANSFORMER VAULT AND SWITCH PEDESTAL. CHANGED PIER DETAIL SECTION "A"-"A"		

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

UNITED STATES AIR FORCE
AN/FPN-16
GROUND CONTROL APPROACH SYSTEM
PIER LAYOUT AND DETAILS FOR FOUNDATION DESIGN FOR PREFABRICATED STEEL STRUCTURE (TURNTABLE BASE)

APPROVED FOR AACS
Ray E. Hadrick Capt USAF
DATE: 25 Jul. 56

APPROVED
C. E. Harris AFCIE-E
FOR CHIEF OF STAFF USAF

AW 86-08-05

SCALE: AS NOTED
DATE: 26 JULY 1956
SHEET 5 OF 5

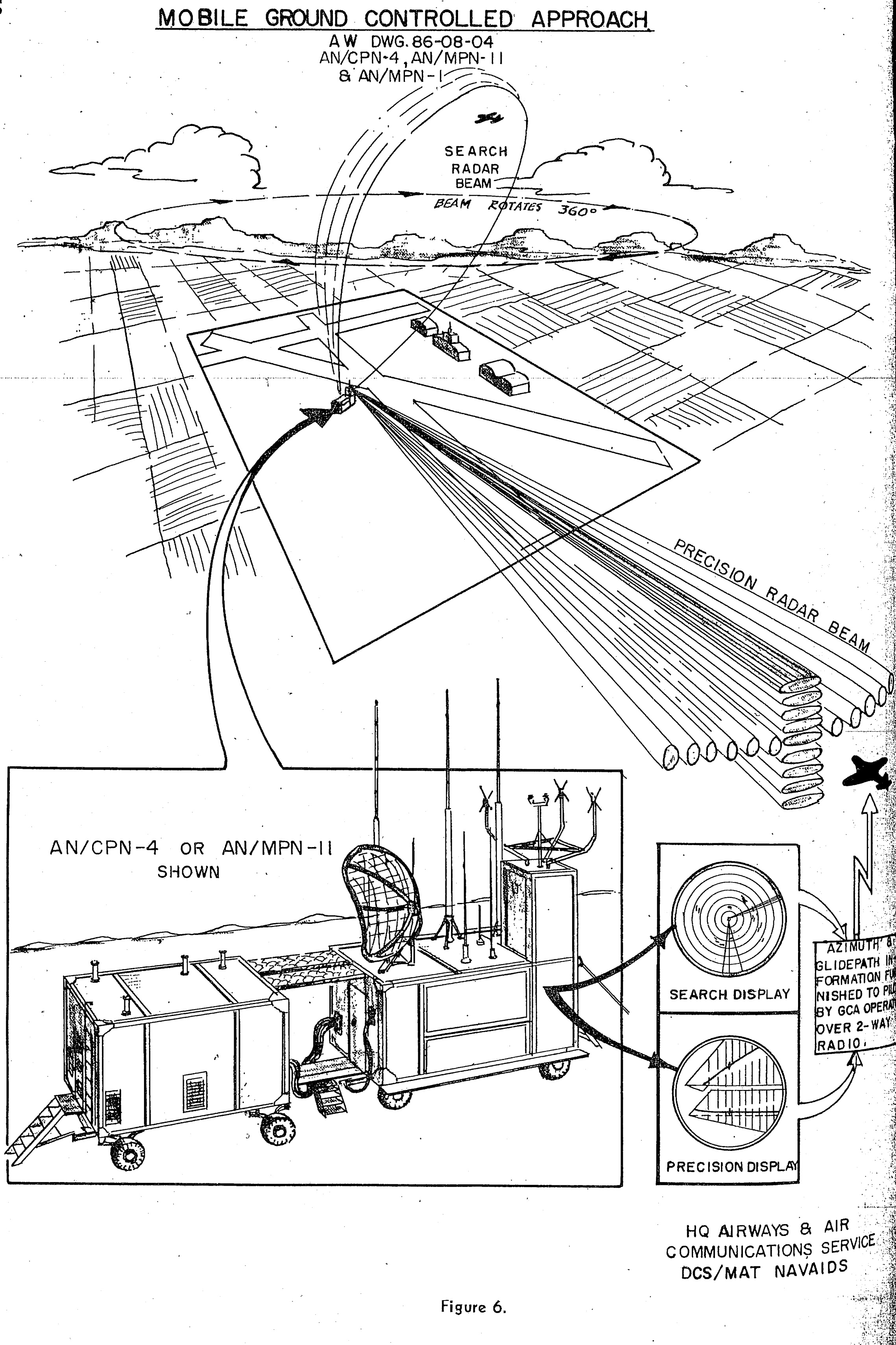
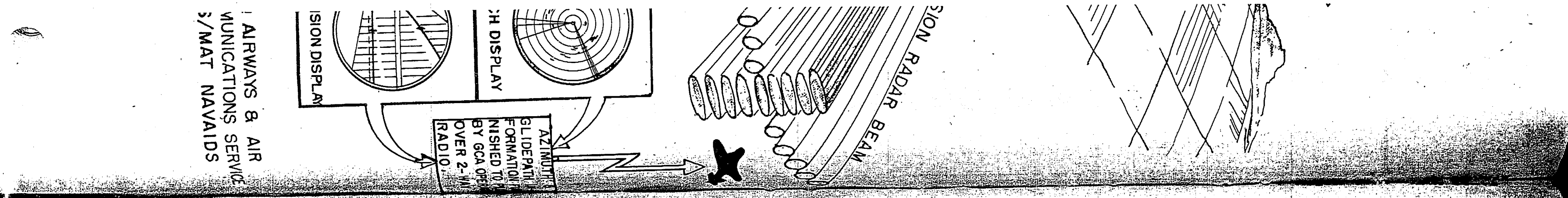

MOBILE GROUND CONTROLLED APPROACH
AW DWG. 86-08-04
AN/CPN-4, AN/MPN-11
& AN/MPN-1
SEARCH
RADAR
BEAM
BEAM ROTATES 360°
PRECISION RADAR BEAM
AN/CPN-4 OR AN/MPN-11
SHOWN
SEARCH DISPLAY
PRECISION DISPLAY
HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 6.



Chapter 8

MOBILE GROUND CONTROLLED APPROACH (GCA)

A. Function

1. This facility is a mobile ground radar and communication system providing a means for directing the movement of aircraft over a predetermined airpath for a safe approach to an airbase runway under conditions of reduced visibility.

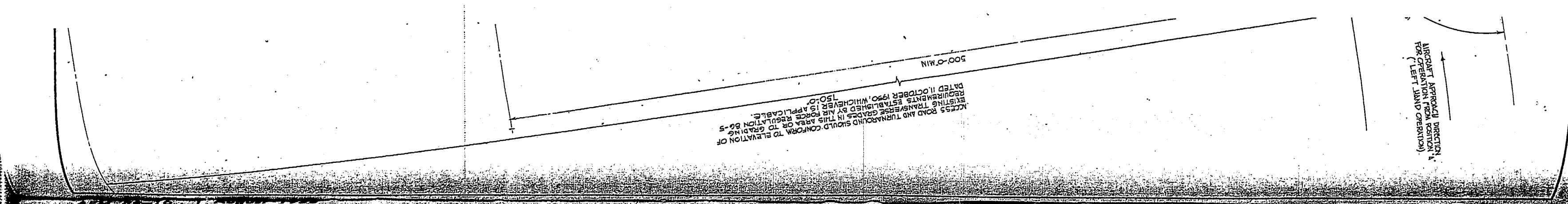
2. Model AN/CPN–4 is used by the Air Force and is an improvement over the older and original GCA model AN/MPN–1. The AN/MPN–1 and AN/CPN–4 are mobile units, complete with power supply and the entire equipment can be towed from one runway location to another or shipped intact on standard railroad flatcars. The equipment also is designed for airlift in cargo aircraft.

3. The radar portion of the AN/CPN–4 and AN/MPN–1 consists of two systems operating independently with separate displays. One radar, called the precision system, is almost identical to the AN/FPN–16 and performs the same function. This system supplies accurate and continuous azimuth, elevation and range of aircraft, within a 20° azimuth sector, on final approach to the landing runway. Maximum range of the precision system is 10 miles. Azimuth and elevation displays show the position of the aircraft with respect to the extended centerline of the runway and the predetermined glidepath. Operators stationed in the operations trailer interpret lateral and vertical deviations of the aircraft from the final approach path and relay corrections to the pilot of the aircraft by radio communications. Radio communication equipment is supplied as an integral part of the AN/CPN–4 and AN/MPN–1. The other radar is a conventional two-dimensional type providing a map presentation of the area adjacent to the airbase. Under optimum conditions, it supplies azimuth and range information on aircraft in any direction and at distances up to 40 miles. This information is used by the operators to locate and identify all aircraft in the covered area and to maneuver selected individual flights into positions from which the proper approach for a landing can be made under the direction of the precision radar operators.

4. Flight control GCA requires no special airborne components to be installed in the aircraft. Successful use of the GCA requires only that the pilot of the approaching aircraft be able to communicate with the GCA operators over standard voice radio communications equipment which normally is installed in all aircraft.

B. Physical Characteristics

1. *Mobile Equipment* (*AN/CPN–4, AN/MPN–1*). The AN/CPN–4 consists of two trailers for rapid road movement if required and is the improved version of the AN/MPN–1 (1 trailer). The facility (either MPN–1 or CPN–4) is located on a hardstand adjacent to the instrument runway. Both the AN/CPN–4 and AN/MPN–1 include power units to supply emergency power in case of a power failure. The AN/CPN–4 power units are mounted



in a second trailer while the power unit for the AN/MPN–1 is mounted in the truck. All operating radars, antennas, and communications equipment are mounted in or on the trailers to provide an independent operating facility. Construction details are shown on drawing AW–86–08–04. Siting criteria are furnished by Airways and Air Communications Service. Total power required at the site is:

AN/MPN–1: 16 kw, 120/208 v, 3-phase, 4-wire, 60 cycle.

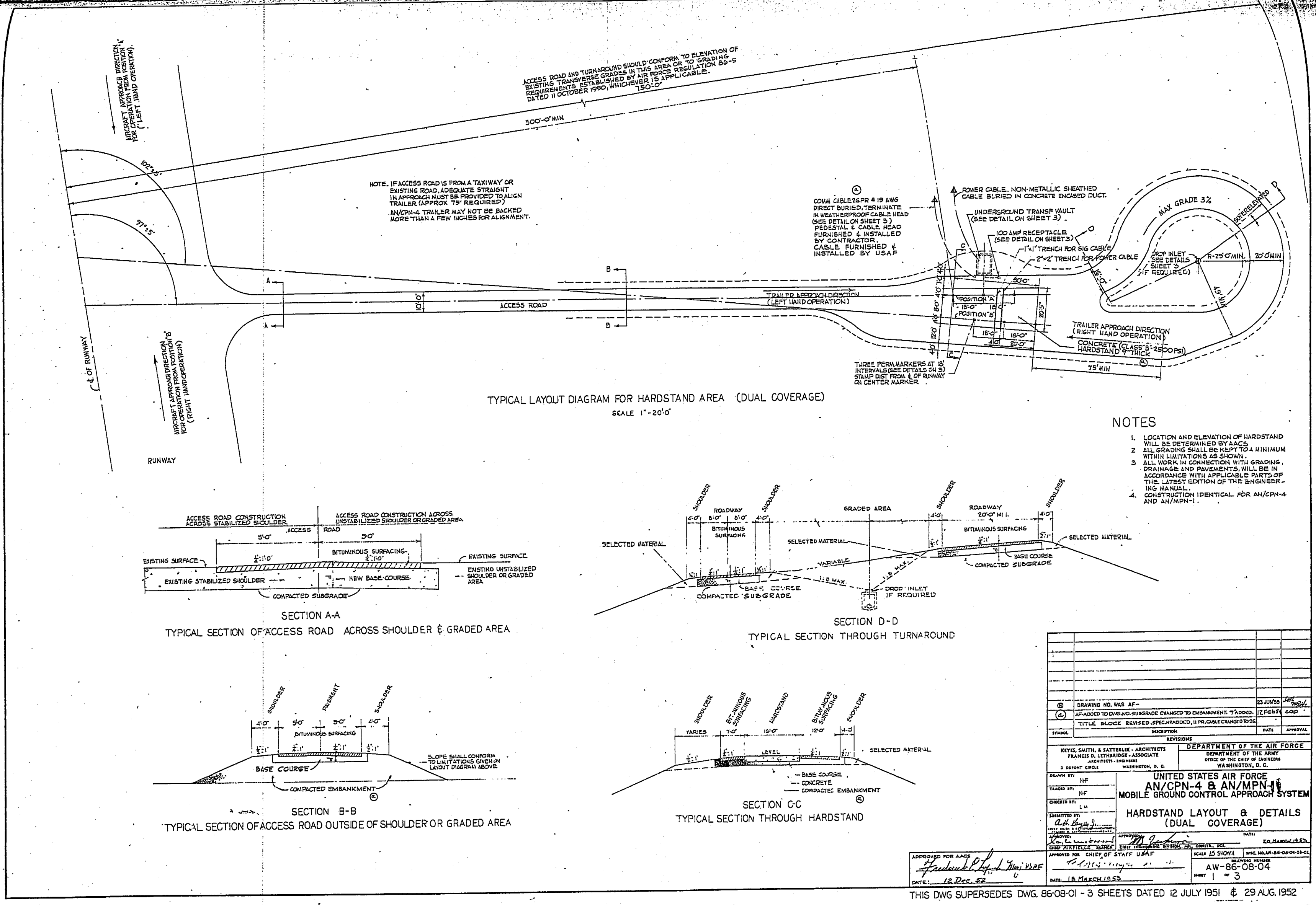
AN/MPN–11B or AN/CPN–4; 20 kw, 120/208 v, 3-phase, 4-wire, 60-cycle.

AN/MPN–11C: 20 kw (1–25 hp motor).

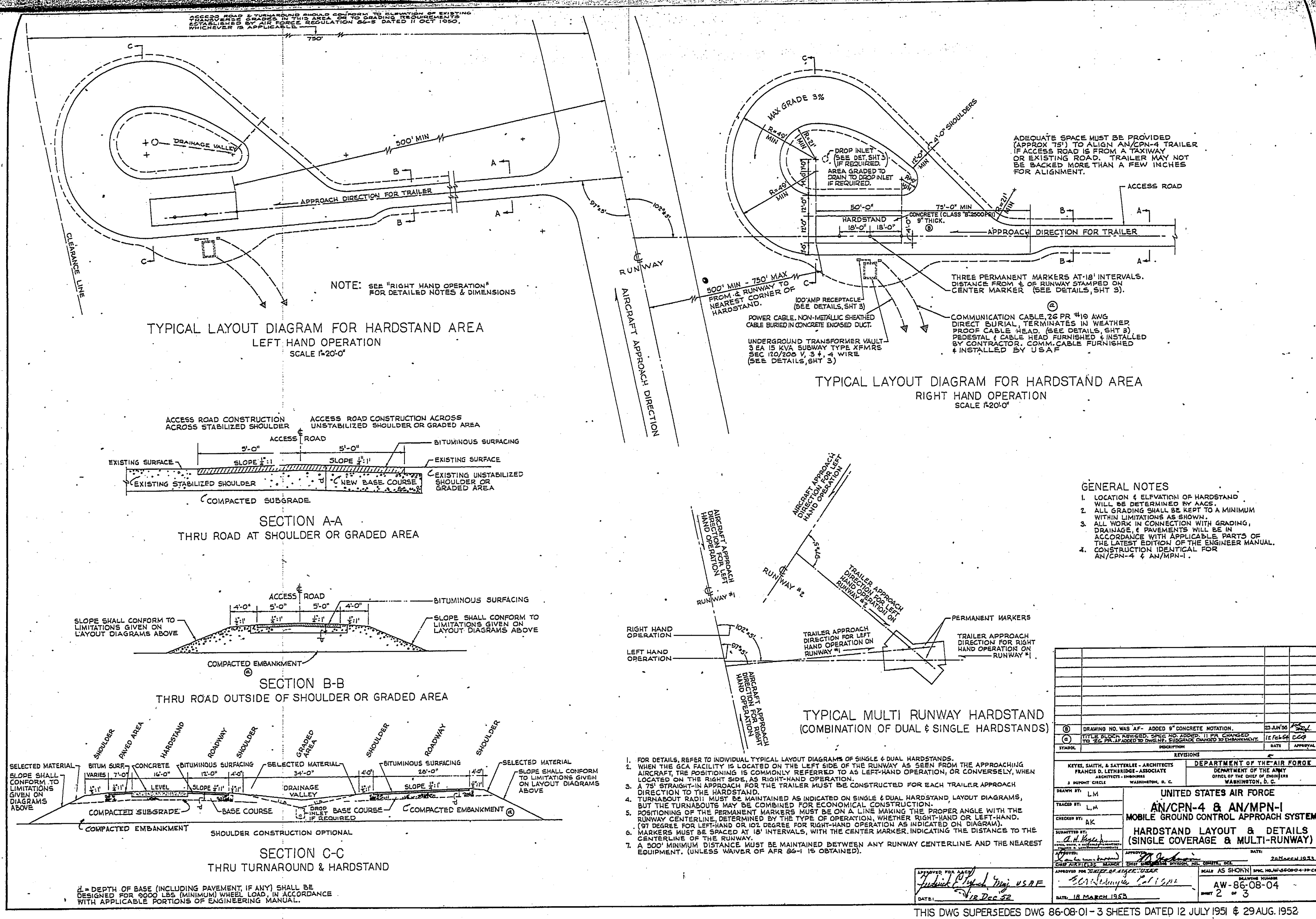
Minimum (no spare or expansion capability) telephone cable requirements are 26 pairs from base telephone exchange to GCA site.

2. *Mobile Equipment (AN/MPN–11).* The essential difference between the AN/CPN–4 and the AN/MPN–11 is that the AN MPN–11 trailers have solid bodies and, therefore, are not transportable in a C–54 aircraft.

3. The newest version of mobile GCA is the AN/MPN–11C. An electric motor (25 hp) driven air conditioner and a third trailer with a 60 kw power unit will be furnished with the AN/MPN–11 C.

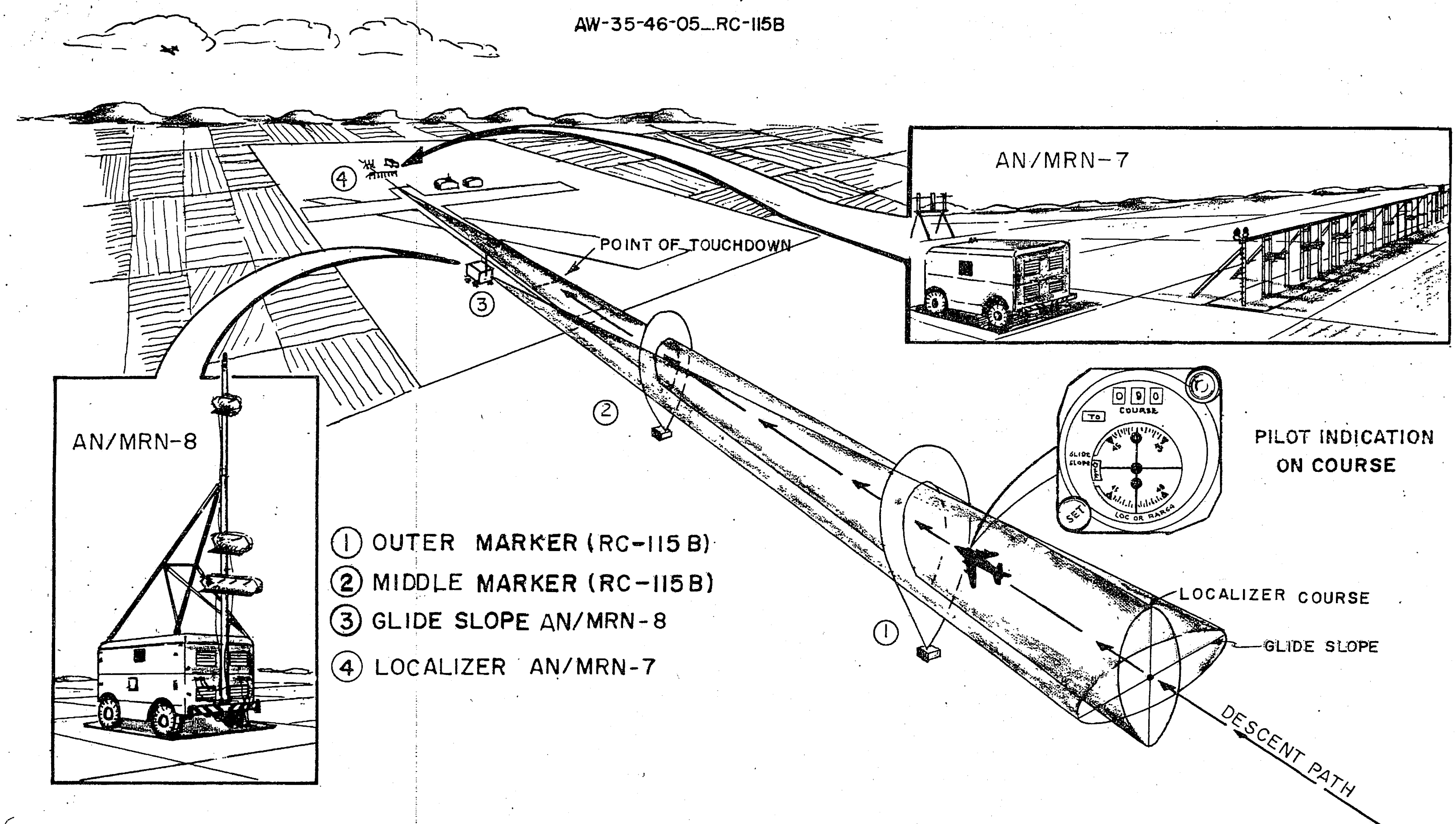


THIS DWG SUPERSEDES DWG. 86-08-01 - 3 SHEETS DATED 12 JULY 1951 & 29 AUG. 1952


TYPICAL LAYOUT DIAGRAM FOR HARDSTAND AREA
LEFT HAND OPERATION
SCALE 1"=20'-0"
NOTE: SEE "RIGHT HAND OPERATION" FOR DETAILED NOTES & DIMENSIONS
APPROACH DIRECTION FOR TRAILER
DRAINAGE VALLEY
300' MIN
750'
CLEARANCE LINE
RUNWAY
AIRCRAFT APPROACH DIRECTION
TYPICAL LAYOUT DIAGRAM FOR HARDSTAND AREA
RIGHT HAND OPERATION
SCALE 1"=20'-0"
MAX GRADE 3%
4'-0" SHOULDERS
ADEQUATE SPACE MUST BE PROVIDED (APPROX 75') TO ALIGN AN/CPN-4 TRAILER IF ACCESS ROAD IS FROM A TAXIWAY OR EXISTING ROAD. TRAILER MAY NOT BE BACKED MORE THAN A FEW INCHES FOR ALIGNMENT.
ACCESS ROAD
DROP INLET (SEE DET. SHT 3) IF REQUIRED.
AREA GRADED TO DRAIN TO DROP INLET IF REQUIRED.
CONCRETE (CLASS "B" 2500 PSI) 9" THICK.
HARDSTAND
75'-0" MIN
50'-0"
18'-0" 18'-0"
APPROACH DIRECTION FOR TRAILER
500' MIN - 750' MAX FROM ℄ RUNWAY TO NEAREST CORNER OF HARDSTAND.
100 AMP RECEPTACLE (SEE DETAILS, SHT 3)
POWER CABLE. NON-METALLIC SHEATHED CABLE BURIED IN CONCRETE ENCASED DUCT.
UNDERGROUND TRANSFORMER VAULT-3 EA 15 KVA SUBWAY TYPE XFMRS SEC 120/208 V, 3 Ø, 4 WIRE (SEE DETAILS, SHT 3)
THREE PERMANENT MARKERS AT 18' INTERVALS. DISTANCE FROM ℄ OF RUNWAY STAMPED ON CENTER MARKER (SEE DETAILS, SHT 3).
COMMUNICATION CABLE, 26 PR #19 AWG DIRECT BURIAL, TERMINATES IN WEATHER PROOF CABLE HEAD. (SEE DETAILS, SHT 3) PEDESTAL & CABLE HEAD FURNISHED & INSTALLED BY CONTRACTOR. COMM. CABLE FURNISHED & INSTALLED BY USAF
ACCESS ROAD CONSTRUCTION ACROSS STABILIZED SHOULDER
ACCESS ROAD CONSTRUCTION ACROSS UNSTABILIZED SHOULDER OR GRADED AREA
BITUMINOUS SURFACING
EXISTING SURFACE
EXISTING STABILIZED SHOULDER
NEW BASE COURSE
EXISTING UNSTABILIZED SHOULDER OR GRADED AREA
COMPACTED SUBGRADE
SECTION A-A
THRU ROAD AT SHOULDER OR GRADED AREA
SLOPE SHALL CONFORM TO LIMITATIONS GIVEN ON LAYOUT DIAGRAMS ABOVE
COMPACTED EMBANKMENT
SECTION B-B
THRU ROAD OUTSIDE OF SHOULDER OR GRADED AREA
SELECTED MATERIAL
BITUM SURF.
CONCRETE
BITUMINOUS SURFACING
DRAINAGE VALLEY
BASE COURSE
DROP INLET IF REQUIRED
SHOULDER CONSTRUCTION OPTIONAL
SECTION C-C
THRU TURNAROUND & HARDSTAND
d = DEPTH OF BASE (INCLUDING PAVEMENT, IF ANY) SHALL BE DESIGNED FOR 9000 LBS (MINIMUM) WHEEL LOAD, IN ACCORDANCE WITH APPLICABLE PORTIONS OF ENGINEERING MANUAL.
GENERAL NOTES
1. LOCATION & ELEVATION OF HARDSTAND WILL BE DETERMINED BY AACS.
2. ALL GRADING SHALL BE KEPT TO A MINIMUM WITHIN LIMITATIONS AS SHOWN.
3. ALL WORK IN CONNECTION WITH GRADING, DRAINAGE, & PAVEMENTS WILL BE IN ACCORDANCE WITH APPLICABLE PARTS OF THE LATEST EDITION OF THE ENGINEER MANUAL.
4. CONSTRUCTION IDENTICAL FOR AN/CPN-4 & AN/MPN-1.
RUNWAY #1
RUNWAY #2
RIGHT HAND OPERATION
LEFT HAND OPERATION
PERMANENT MARKERS
TRAILER APPROACH DIRECTION FOR LEFT HAND OPERATION ON RUNWAY #1
TRAILER APPROACH DIRECTION FOR RIGHT HAND OPERATION ON RUNWAY #1
TYPICAL MULTI RUNWAY HARDSTAND
(COMBINATION OF DUAL & SINGLE HARDSTANDS)
1. FOR DETAILS, REFER TO INDIVIDUAL TYPICAL LAYOUT DIAGRAMS OF SINGLE & DUAL HARDSTANDS.
2. WHEN THE GCA FACILITY IS LOCATED ON THE LEFT SIDE OF THE RUNWAY AS SEEN FROM THE APPROACHING AIRCRAFT, THE POSITIONING IS COMMONLY REFERRED TO AS LEFT-HAND OPERATION, OR CONVERSELY, WHEN LOCATED ON THE RIGHT SIDE, AS RIGHT-HAND OPERATION.
3. A 75' STRAIGHT-IN APPROACH FOR THE TRAILER MUST BE CONSTRUCTED FOR EACH TRAILER APPROACH DIRECTION TO THE HARDSTAND.
4. TURNABOUT RADII MUST BE MAINTAINED AS INDICATED ON SINGLE & DUAL HARDSTAND LAYOUT DIAGRAMS, BUT THE TURNABOUTS MAY BE COMBINED FOR ECONOMICAL CONSTRUCTION.
5. POSITIONING OF THE PERMANENT MARKERS MUST BE ON A LINE MAKING THE PROPER ANGLE WITH THE RUNWAY CENTERLINE, DETERMINED BY THE TYPE OF OPERATION, WHETHER RIGHT-HAND OR LEFT-HAND. (97 DEGREE FOR LEFT-HAND OR 102 DEGREE FOR RIGHT-HAND OPERATION AS INDICATED ON DIAGRAM).
6. MARKERS MUST BE SPACED AT 18' INTERVALS, WITH THE CENTER MARKER INDICATING THE DISTANCE TO THE CENTERLINE OF THE RUNWAY.
7. A 500' MINIMUM DISTANCE MUST BE MAINTAINED BETWEEN ANY RUNWAY CENTERLINE AND THE NEAREST EQUIPMENT. (UNLESS WAIVER OF AFR 86-1 IS OBTAINED).
Ⓑ DRAWING NO. WAS AF- ADDED 9" CONCRETE NOTATION. 23 JUN '56
ⓐ TITLE BLOCK REVISED. SPEC NO. ADDED. 11 PR CHANGED TO 26 PR. AF ADDED TO DWG. NO. SUBGRADE CHANGED TO EMBANKMENT. 12 Feb 54
SYMBOL DESCRIPTION DATE APPROVAL
REVISIONS
KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
DRAWN BY: LM
TRACED BY: L.M
CHECKED BY: AK
UNITED STATES AIR FORCE
AN/CPN-4 & AN/MPN-1
MOBILE GROUND CONTROL APPROACH SYSTEM
HARDSTAND LAYOUT & DETAILS
(SINGLE COVERAGE & MULTI-RUNWAY)
APPROVED FOR AACS
DATE: 12 Dec '52
DATE: 18 MARCH 1953
SCALE AS SHOWN
DRAWING NUMBER AW-86-08-04
SHEET 2 OF 3
THIS DWG SUPERSEDES DWG 86-08-01 - 3 SHEETS DATED 12 JULY 1951 & 29 AUG. 1952

ILS
INSTRUMENT LANDING SYSTEM

AW-86-16-06....AN/MRN-7
AW-86-16-04....AN/MRN-8
AW-35-46-05...RC-115B

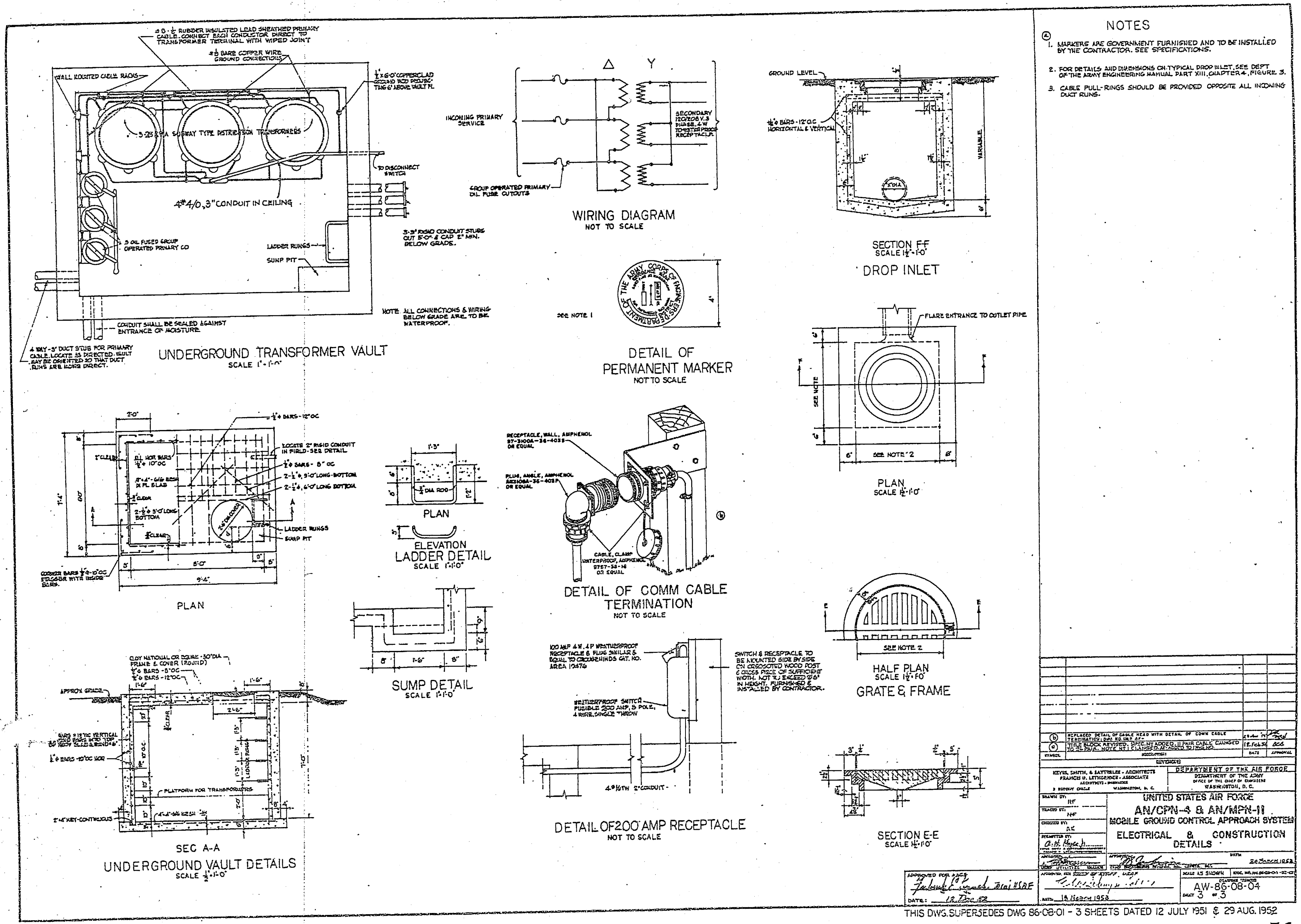


HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

NOTES
A LOW FREQUENCY COMPASS LOCATOR IS SOMETIMES INSTALLED AT EITHER OR BOTH THE MIDDLE AND OUTER MARKER BEACONS.

Figure 7.

ILS
INSTRUMENT LANDING SYSTEM
AW-86-16-06...AN/MRN-7
AW-86-16-04...AN/MRN-8
AW-35-46-05...RC-115B



Chapter 9

INSTRUMENT LANDING SYSTEM (ILS)

A. Function

The instrument landing system (ILS) comprises the following group of related electronic aids to an instrument approach:

1. The localizer (AN/MRN-7) which furnishes lateral guidance to the airport runway.

2. The glide slope (AN/MRN-8) which provides vertical guidance down the predetermined descent angle to the touchdown point on the airport runway.

3. Two marker beacons (RC-115B), middle and outer, which furnish two accurate spot indications of the descending aircraft's distance from the runway end, along the approach course.

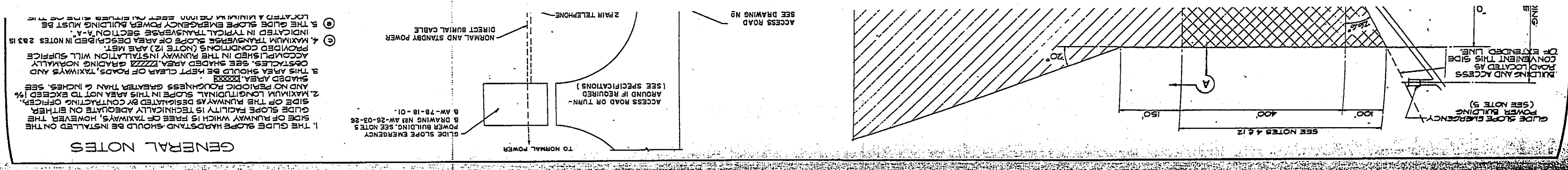
B. Physical Characteristics

1. For the instrument landing system the following constructional aspects apply:

(a) *Localizer (AN/MRN-7)*. Drawing AW 86-16-06 shows the facility layout, construction, grading requirements and access road for the localizer. The localizer transmitting equipment is housed in a weatherproof, heated, van-type prefabricated trailer mounted on a concrete handstand. The localizer antenna system is normally located on the extended runway centerline nearby. Siting criteria are developed and siting is accomplished by the Airways and Air Communications Service. The emergency power unit is housed in a nearby power building (drawings AW 26-03-26 and AW 78-18-01). Total power required at the localizer equipment trailer is 5 KW, 120/240 V, Single phase, 3 wire, 60 cycle. Electric heating requirements, if any, for the emergency power building, must be added. Minimum telephone cable requirements (no spares or expansion capability) are two pairs.

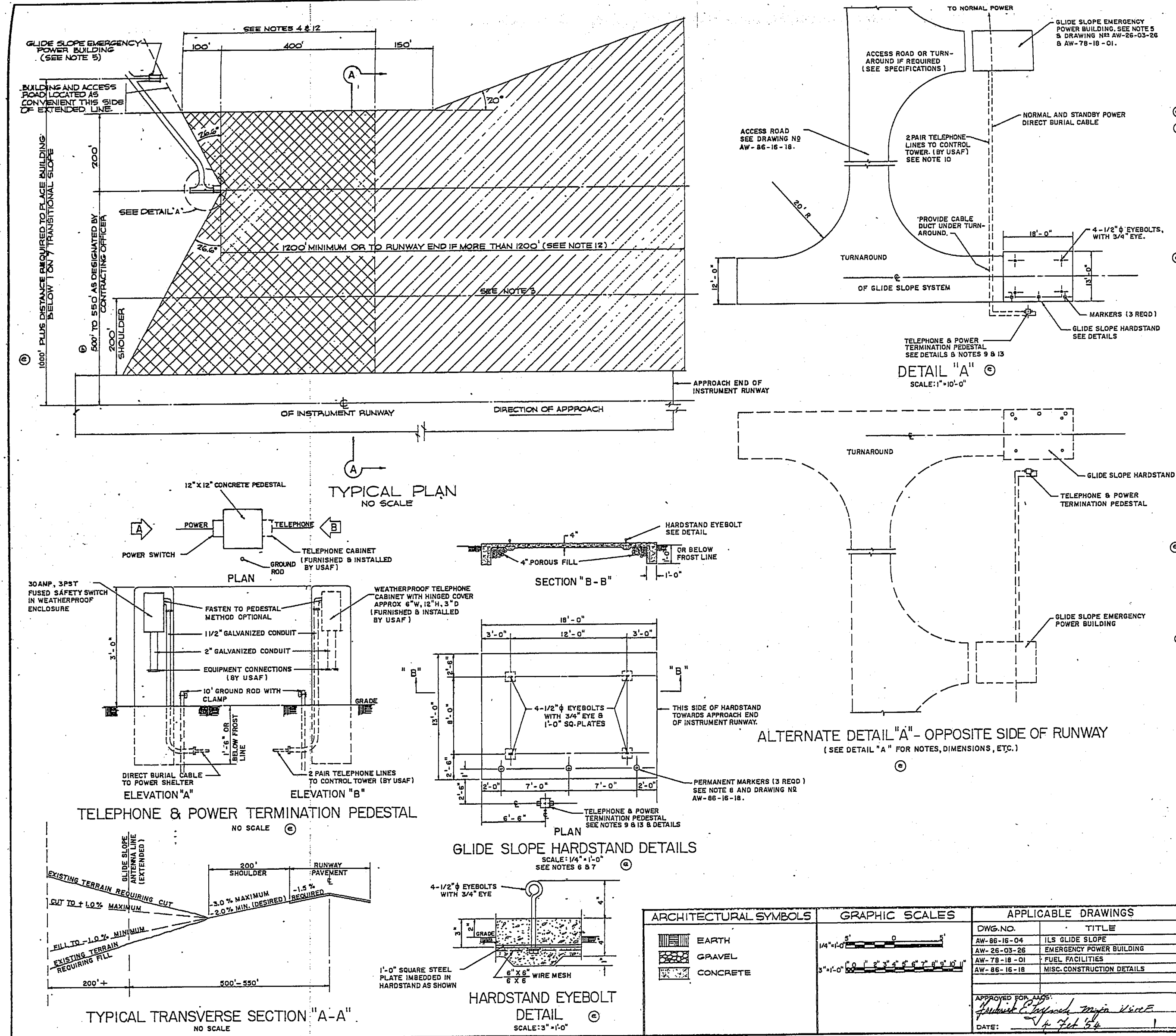
(b) *Glide Slope (AN/MRN-8)*. Drawing AW-86-16-04 shows the layout, construction, grading requirements and access road for the glide slope facility. The glide slope transmitting equipment is housed in the same type of trailer as the localizer and the antenna system is mounted on a mast attached to the equipment trailer. Siting criteria are developed and siting is accomplished by the Airways and Air Communications Service. The emergency power unit is housed in a nearby power building (drawings AW 26-03-26 and AW 78-18-01). Total power required at the glide slope equipment trailer is 5 KW, 120/240 V, Single phase, 3 wire, 60 cycle. Electric heating requirements, if any, for the emergency power building must be added. Minimum telephone cable requirements (no spares or expansion capability) are two pairs.

(c) *Middle and Outer Marker Beacon (RC-115B)*. Drawing AW 35-46-05 shows plot layout, antenna counterpoise, access road and fencing for the marker Beacon facility. The transmitting equipment is normally installed in a NAVAIDS building, (drawings AW 26-03-27 and AW 78-18-01) with the exact type, i. e., 0, 1, 2 or 3 being designated on the basis of availability and dependability of local power service. The equipment antenna and



antenna counterpoise are mounted on top of the building. Total power required at the site is 13 KW, 120/240 V, single-phase, 3 wire, 60 cycle, (3 KW for electronic equipment, lights, outlets and 10 KW for electric heaters). Siting criteria are developed and siting is accomplished by Airways and Air Communications Service. Minimum telephone cable requirements (no spares or expansion capability) are two pairs.

(1) In some cases low frequency homing beacons, termed compass locators, are installed in either or both of the middle and outer marker beacon buildings. In this case, then, plot layout, compass locator antenna pole location, ground radial system, access road and fencing should be as shown on drawing AW 86–16–09. The compass locator equipment is installed in the NAVAIDS building with the appropriate marker beacon. The minimum power supplied for the marker beacon facility will normally provide that required for the compass locator facility. A minimum of two pairs of telephone cable are required for the compass locator equipment.



GENERAL NOTES

1. THE GLIDE SLOPE HARDSTAND SHOULD BE INSTALLED ON THE SIDE OF RUNWAY WHICH IS FREE OF TAXIWAYS, HOWEVER THE GLIDE SLOPE FACILITY IS TECHNICALLY ADEQUATE ON EITHER SIDE OF THE RUNWAY AS DESIGNATED BY CONTRACTING OFFICER.
2. MAXIMUM LONGITUDINAL SLOPE IN THIS AREA NOT TO EXCEED 1% AND NO PERIODIC ROUGHNESS GREATER THAN 6 INCHES. SEE SHADED AREA.
3. THIS AREA SHOULD BE KEPT CLEAR OF ROADS, TAXIWAYS AND OBSTACLES. SEE SHADED AREA. GRADING NORMALLY ACCOMPLISHED IN THE RUNWAY INSTALLATION WILL SUFFICE PROVIDED CONDITIONS (NOTE 12) ARE MET.
4. (c) MAXIMUM TRANSVERSE SLOPE OF AREA DESCRIBED IN NOTES 2 & 3 IS INDICATED IN TYPICAL TRANSVERSE SECTION "A-A".
5. (e) THE GLIDE SLOPE EMERGENCY POWER BUILDING MUST BE LOCATED A MINIMUM OF 1000 FEET ON EITHER SIDE OF THE CENTERLINE OF THE RUNWAY AND BELOW THE 1 ON 7 TRANSITIONAL SLOPE UNLESS WAIVER IS OBTAINED FROM HQ. USAF.
6. HARDSTAND SHOULD NOT EXTEND OVER 2 INCHES ABOVE ADJACENT GROUND LEVEL.
7. HARDSTAND SHOULD BE CONSTRUCTED OF CONCRETE SO THAT UNDER ALL-WEATHER CONDITIONS IT WILL REMAIN FLAT AND LEVEL WITHIN ±1/2" AND BE CAPABLE OF SUPPORTING AN AXLE LOAD OF 5000 LBS. (2 EACH AXLE)
8. CONTRACTOR TO SET PERMANENT MARKERS INDICATING A LINE THROUGH SITE PARALLEL TO RUNWAY CENTERLINE ±.05 DEGREES. (SEE DETAILS)
9. (e) THE TELEPHONE & POWER TERMINATION PEDESTAL SHOULD BE LOCATED ON THE SIDE SHOWN FOR EQUIPMENT TRAILER LOCATION ON EITHER SIDE OF RUNWAY.
10. TELEPHONE CONTROL LINES FOR THE GLIDE SLOPE MAY BE RUN IN THE SAME TRENCH AS THE POWER CABLE IF DESIRED BY BASE. SEPARATED BY A MINIMUM OF ONE FOOT.
11. (b) THE GLIDE SLOPE WILL BE INSTALLED FROM 750 TO 1500 FEET IN FROM THE APPROACH END OF THE RUNWAY AND 500 TO 550 FEET TO THE LEFT OR RIGHT OF THE RUNWAY CENTERLINE.
12. FOR THE INSTALLATION, THE GRADING NORMALLY ACCOMPLISHED IN RUNWAY INSTALLATION WILL BE SUFFICIENT, PROVIDED THAT, WITHIN THE AREA SHOWN IN TYPICAL PLAN, THE FOLLOWING CONDITIONS ARE MET:
   (A) A UNIFORM LONGITUDINAL SLOPE NOT TO EXCEED ONE PER CENT IS PERMISSIBLE. WHERE THE SLOPE EXCEEDS ONE PER CENT, EQUIPMENT ADJUSTMENT CAPABILITIES MAY BE EXCEEDED, AND INSTALLATION ADJUSTMENTS BY A QUALIFIED SPECIALIST MAY BE REQUIRED TO PROVIDE A USEABLE GLIDE SLOPE.
   (B) A SHARP BREAK IN LONGITUDINAL SLOPE MAY CAUSE BUMPS OR DIPS IN THE GLIDE SLOPE AND SHOULD BE AVOIDED.
   (C) SHARP BREAKS IN TRANSVERSE SLOPE MAY CAUSE BENDS IN THE GLIDE SLOPE, AND SHOULD BE AVOIDED.
   (D) DITCHES, MOUNDS AND DEPRESSIONS SHOULD BE AVOIDED.
   (E) NO PLANE, CAR OR TRUCK PARKING, OR STRUCTURES ARE PERMISSIBLE.
   (F) IN CASES WHERE INTERFERENCE DUE TO REFLECTIONS OR SHADOWING FROM NATURAL OR MANMADE OBJECTS APPEARS POSSIBLE TO THE AACS SURVEY ENGINEER, HE WILL PROVIDE ANY ANALYSIS OF THE FEASIBILITY OF OPERATION WITH OR WITHOUT REMEDIAL MEASURES.
13. (e) POWER REQUIRED AT PEDESTAL POWER SWITCH FOR GLIDE SLOPE EQUIPMENT IS 5 KW, 120/240 V, 45-65 CYC., 1 φ AT ± 5% REGULATION.
14. (a) EXCEPT AS MODIFIED BY PARAGRAPH 2, STRUCTURES AND EQUIPMENT WILL BE MARKED AS AN OBSTRUCTION IN ACCORDANCE WITH THE PROVISIONS OF AFR 91-19
15. (a) FORMAL WAIVER FROM HQ-USAF IS REQUIRED WHEN GLIDE SLOPE EQUIPMENT IS LOCATED LESS THAN 500' FROM RUNWAY CENTER-LINE.
16. (d) OBSTRUCTION LIGHTING WILL BE PROVIDED WHERE REQUIRED BY AFR 91-14 TO BE FURNISHED BY USAF AND INSTALLED BY THE CONTRACTOR.

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
e	DELETED SHEET 2 BY REVISING & RELOCATING REQUIRED DETAILS TO THIS SHEET; DELETED ALL REFERENCES TO SCS-51 GLIDE SLOPE; DELETED ONE TRANSVERSE SECTION, ACCESS ROAD, & MARKER DETAIL; REVISED NOTES 4, 5, 9 & 13 & DWG TITLE;	1-7-57	[illegible]
d	NOTE 16 ADDED	6-17-55	[illegible]
c	TRANS. SHOULDER GRADING NOW CONFORMS TO AFR 86-5A	6-17-55	[illegible]
b	NOTE 11 AND DRAWING CORRECTED	6-17-55	[illegible]
a	NOTES 14 & 15 ADDED	4-19-55	[illegible]

ARCHITECTURAL SYMBOLS

EARTH
GRAVEL
CONCRETE

GRAPHIC SCALES

1/4"=1'-0"
3"=1'-0"

APPLICABLE DRAWINGS

DWG. NO.	TITLE
AW-86-16-04	ILS GLIDE SLOPE
AW-26-03-26	EMERGENCY POWER BUILDING
AW-78-18-01	FUEL FACILITIES
AW-86-16-18	MISC. CONSTRUCTION DETAILS

APPROVED FOR AACS: Frederick E. [illegible] Major USAF
DATE: 4 Feb '54

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

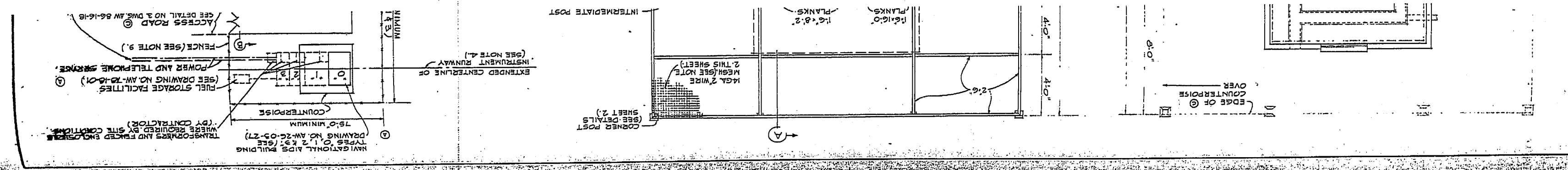
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

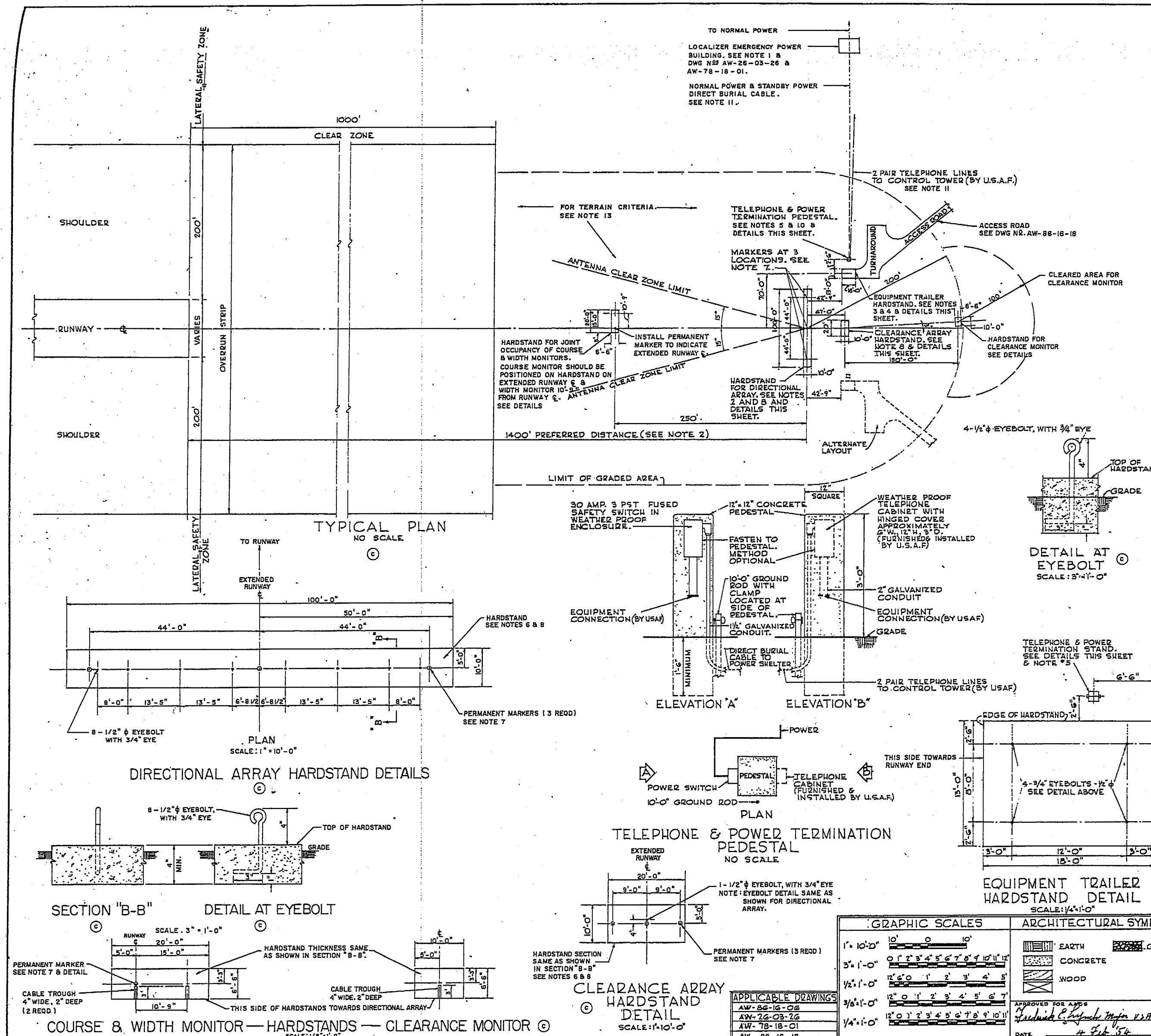
DRAWN BY: PPW
TRACED BY: PPW
CHECKED BY: RAF
SUBMITTED BY: Victor B. Spector — SPECTOR & MONTGOMERY
APPROVED: [illegible] — CHIEF AIRFIELDS BRANCH
APPROVED: [illegible] — CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
DATE: 9 FEB. 1954
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE: [illegible] — ENGINEERING DIVISION ACS/I
DATE: 4 Feb 1954

UNITED STATES AIR FORCE
ILS GLIDE SLOPE
AN/MRN-8
SITING AND CONSTRUCTION CRITERIA

SCALE: AS NOTED
SPEC. NO. AW-86-16-04-53CE
DRAWING NUMBER: AW-86-16-04
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DRAWING Nº 86-16-04 SHEET 1 DATED 14 JULY 1952





GENERAL NOTES

(C) 1. THE POWER BUILDING SHOULD BE LOCATED A MINIMUM OF 1000' OFF THE CENTERLINE OF THE RUNWAY ON EITHER SIDE AND BELOW 1 ON 7 TRANSITIONAL SLOPE, UNLESS WAIVER IS OBTAINED FROM HEADQUARTERS USAF.

2. LOCATE LOCALIZER OUTSIDE OF THE CLEAR ZONE AND BELOW THE 50:1 GLIDE ANGLE AREA. A WAIVER MUST BE OBTAINED FROM HEADQUARTERS USAF FOR ANY DEVIATION FROM THIS REQUIREMENT.

(C) 3. EQUIPMENT TRAILER HARDSTAND SHOULD BE CONCRETE WITH A SURFACE LEVEL WITHIN ± 1/2 INCH AND CAPABLE OF SUPPORTING A VEHICLE WITH AN AXLE LOAD OF 5,000 LBS.

4. THE LOCATION OF THE EQUIPMENT TRAILER HARDSTAND MAY BE ON EITHER SIDE OF THE RUNWAY CENTERLINE AND WILL BE GOVERNED BY EASE OF CONSTRUCTION OF ACCESS ROAD; HOWEVER, TURNAROUND WILL BE CONSTRUCTED AT FURTHER POINT FROM RUNWAY ℄.

5. THE TELEPHONE AND POWER TERMINATION PEDESTAL SHOULD BE LOCATED ON THE SIDE SHOWN FOR EITHER POSITION OF EQUIPMENT TRAILER.

(C) 6. THE CLEARANCE ARRAY & DIRECTIONAL ARRAY HARDSTANDS SHOULD BE AT THE SAME ELEVATION ± 2".

7. CONTRACTOR TO SET PERMANENT MARKERS INDICATING EXTENDED CENTERLINE OF RUNWAY AND A LINE PERPENDICULAR TO THE EXTENDED CENTERLINE AT THE SITE. (SEE DWG. Nº AW-86-16-18)

(C) 8. DIRECTIONAL & CLEARANCE ANTENNA ARRAY HARDSTANDS ARE REQUIRED TO SUPPORT WEIGHTS NOT TO EXCEED 400 LBS. PER SQUARE FOOT. THESE HARDSTANDS MUST BE CONSTRUCTED SO THAT UNDER ALL WEATHER CONDITIONS THEY WILL REMAIN FLAT WITHIN A ± 1/2 INCH. THEY SHOULD CONFORM WITH A UNIFORM GROUND SLOPE NOT TO EXCEED 2%. HARDSTAND SHOULD BE OF CONCRETE OR BITUMINUS CONSTRUCTION.

9. AN ELEVATING TRESTLE FOR THE LOCALIZER ANTENNA ARRAYS WILL BE REQUIRED UNDER THE FOLLOWING CONDITIONS:
   - A. WHERE THE ELEVATION AT THE LOCALIZER SITE IS MORE THAN 15 TO 20 FEET BELOW LINE OF SITE TO TOUCHDOWN.
   - B. WHERE THE TERRAIN BETWEEN THE RUNWAY END AND THE LOCALIZER SITE CONTAINS A STEEP, BLUFF LIKE SURFACE.

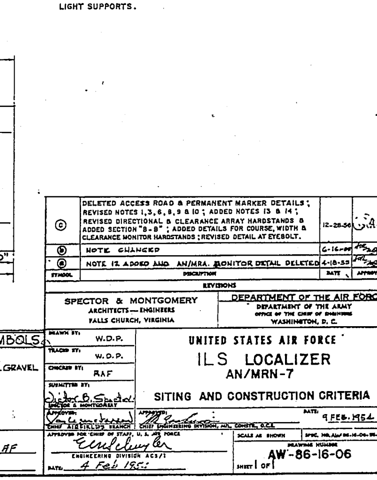
(C) 10. POWER REQUIRED AT PEDESTAL POWER. SWITCH IS 120/240 V, 45-65 CYCLE 1 ϕ AT ± 5 % REGULATION, AT 5 KW MAXIMUM LOAD.

11. TELEPHONE CONTROL LINES MAY BE RUN IN THE SAME TRENCH AS THE POWER CABLE, IF SO DESIRED. THEY SHOULD BE SEPARATED A MINIMUM OF 1 FOOT.

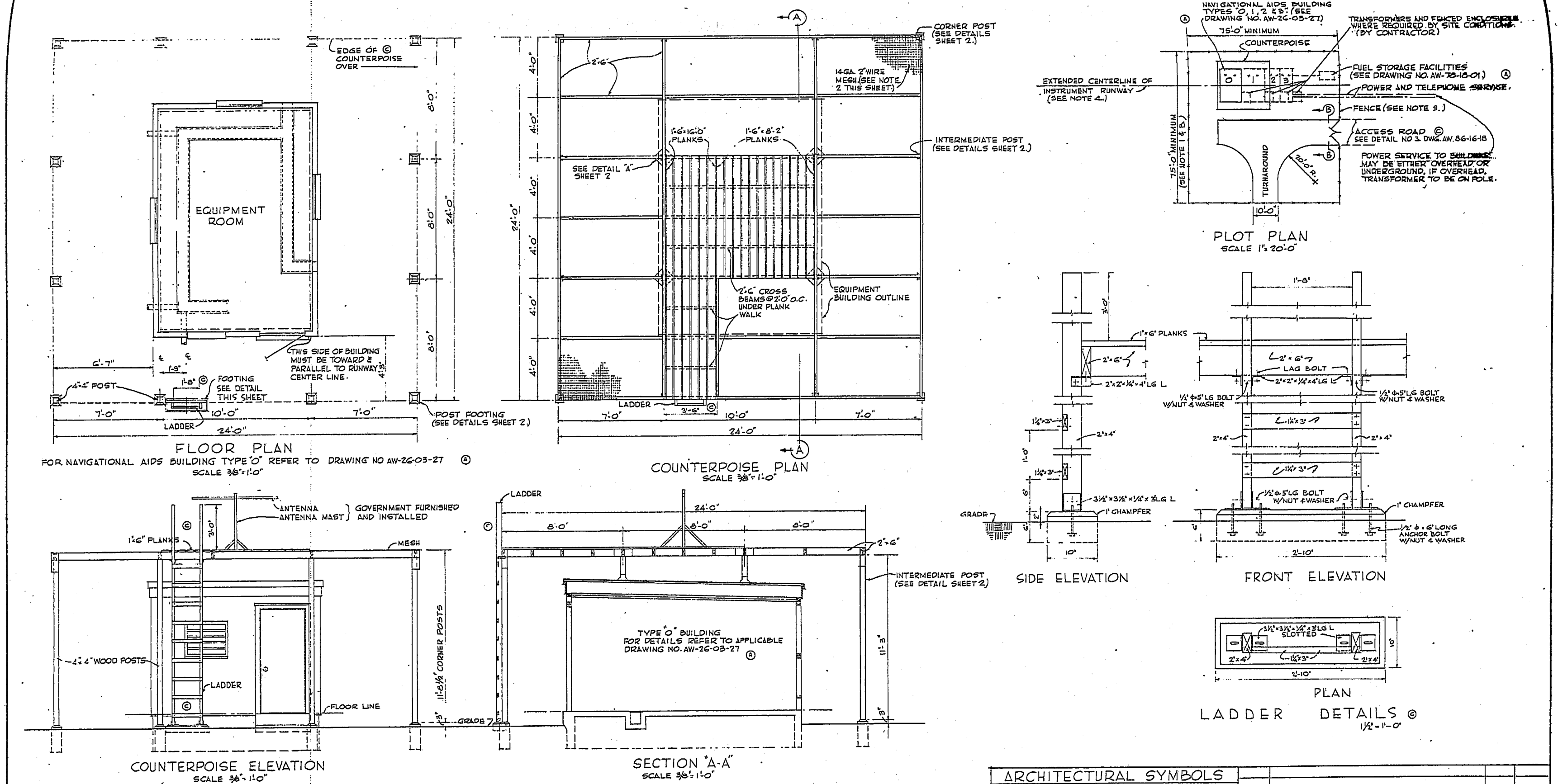
12. EXCEPT AS MODIFIED BY PARAGRAPH 2 STRUCTURES AND EQUIPMENT WILL BE MARKED AS AN OBSTRUCTION IN ACCORDANCE WITH THE PROVISIONS OF AFR 91-19.

(C) 13. CONTOUR (AND CONTENT) OF AREA AROUND LOCALIZER ANTENNAS AND BETWEEN LOCALIZER ANTENNAS AND RUNWAY END MAY BE DISREGARDED, SUBJECT TO THE FOLLOWING LIMITATIONS:
   - A. NO METALLIC OBJECTS OR STUMPS LARGER THAN 2 FEET IN DIAMETER MAY EXTEND HIGHER THAN 2 FEET ABOVE THE PLANE BETWEEN ANTENNA BASE AND END OF RUNWAY. SUCH OBJECTS, WHEN OTHERWISE PERMISSIBLE IN ACCORDANCE WITH THIS CRITERION, MUST NOT BE SYMMETRICALLY SPACED IN A PATTERN OF LINES OR ROWS.
   - B. DITCHES AND STREAMS ARE PERMISSIBLE IF THEY RUN BELOW THE PLANE WHICH INCLUDES THE LINES BETWEEN ANTENNA BASE AND RUNWAY END PROVIDED THE DITCHES OR STREAMS ARE LESS THAN 25 FEET IN WIDTH AND PROVIDED THE DITCHES OR STREAMS DO NOT FORM AN ANGLE GREATER THAN 10° WITH A LINE PARALLEL WITH FACE OF THE ANTENNA.
   - C. ROADS LOCATED BELOW THE PLANE INCLUDING THE ANTENNA BASE AND RUNWAY END ARE PERMISSIBLE, PROVIDED (1) TRAFFIC DOES NOT EXTEND ABOVE THE PLANE, OR (2) TRAFFIC THAT DOES EXTEND ABOVE PLANE IS UNDER CONTROL OF THE CONTROL TOWER.
   - D. TREES AND VEGETATION (EXCEPT FOR LOW GRASS) MUST NOT BE PERMITTED TO EXTEND ABOVE THE ANTENNA BASE-RUNWAY END PLANE; HOWEVER, OUTCROPPING LEDGES AND BOULDERS, AND SMALL NON-METALLIC STRUCTURES, ARE PERMISSIBLE.
   - E. A SHARP CHANGE IN TRANSVERSE SLOPE IN THE AREA BETWEEN THE ANTENNA AND RUNWAY END SHOULD BE AVOIDED. A GENERALLY UNIFORM TRANSVERSE SLOPE NOT EXCEEDING 2% IS PERMISSIBLE.

(C) 14. AT LOCATIONS WHERE AN APPROACH LIGHTING SYSTEM WILL BE INSTALLED ON ELEVATED SUPPORTS, BETWEEN THE LOCALIZER AND THE RUNWAY END, THE LOCALIZER ANTENNA ARRAYS WILL BE ELEVATED ON TRESTLE STRUCTURES EQUAL IN ELEVATION TO THE PLANE OF THE APPROACH LIGHT SUPPORTS.



THIS DRAWING SUPERSEDES DRAWING Nº 86-16-06 SHEET 1 DATED 14 JULY 1952



GENERAL NOTES

1. A MINIMUM PLOT SIZE OF 75' SQUARE IS REQUIRED FOR MARKER BEACON FACILITY
2. TOP OF COUNTERPOISE TO BE LEVEL AND COVERED WITH #14 GA. 2" DIAMOND MESH WIRE SECURELY BRAZED TO MAKE ELECTRICALLY CONTINUOUS.
3. WHERE COMPASS LOCATOR IS INSTALLED WITH MARKER BEACON, SEE DRAWING NO. AW-86-16-09 FOR OTHER DETAILS, INCLUDING LARGER PLOT SIZE Ⓐ
4. LOCATE BUILDING ON EXTENDED CENTERLINE OF INSTRUMENT RUNWAY, OFF APPROACH END; A DEVIATION OF 250' EITHER SIDE MAY BE TOLERATED. MIDDLE AND OUTER MARKERS SHOULD BE ON SAME SIDE OF RUNWAY CENTERLINE. Ⓑ ORIENTATION OF PLOT MAY BE VARIED IF NECESSARY TO SIMPLIFY REAL ESTATE REQUIREMENTS AND ACQUISITION. THE BUILDING AND BEACONS WILL BE CORRESPONDINGLY RE-ORIENTED, ALONG WITH THEIR REQUIRED PLOT, TO MAINTAIN THE SAME RELATION TO THE 100'×220' PLOT AS SHOWN ON DRAWING AW-86-16-09.
5. COUNTERPOISE FRAME TO BE YELLOW PINE OR EQUIVALENT.
6. COUNTERPOISE TO BE GROUNDED AT EACH CORNER TO 6' GROUND RODS RODS MUST BE CONNECTED TOGETHER WITH #2 COPPER WIRE OR RIBBON
7. ALL CONCRETE SHALL BE CLASS "B" (2500#/SQ.IN.) ASSUMED BEARING VALUE OF SOIL = 3000#/SQ.FT. ROOF LIVE LOAD = 30#/SQ.FT. LUMBER = 1100f.
8. FOR DETAILS OF BUILDING, REFER TO NAVIGATIONAL AIDS BUILDING TYPES "O, 1, 2 & 3" DRAWING NO. AW-26-03-27 Ⓐ
9. FENCE REQUIRED WILL BE DETERMINED AT EACH LOCATION. NORMALLY, ON BASE SITE FENCING WILL NOT BE REQUIRED. ON OR OFF BASE FENCING WILL BE IN ACCORDANCE WITH DETAIL NO. 1 ON DRAWING NO AW 86-16-18 Ⓒ

ARCHITECTURAL SYMBOLS

GRAVEL — EARTH — WOOD

GRAPHIC SCALES

1"=20'-0"
3/8"=1'-0"
1½"=1'-0"

APPLICABLE DRAWINGS Ⓐ Ⓒ

AW-35-46-05
AW-26-03-27
AW-78-18-01
E-40-16-02
AW-86-16-09
AW 86-16-18

SCHEDULE OF DRAWINGS

DRWG. NO.	SH. NO.	TITLE
AW-35-46-05	1 OF 2	PLANS, ELEVATIONS FOR TYPE "O" PLOT PLAN AND NOTES FOR TYPES-0,1,2&3.
AW-35-46-05	2 OF 2	PLANS AND ELEVATIONS FOR TYPES-1,2,&3. DETAILS FOR TYPES-0,1,2&3.

APPROVED FOR AACS.
Frederick E. Lynch Major USAF
DATE. 4 Feb '54

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
Ⓒ	LADDER ADDED, NOTE 9 REVISED, DETAIL OF FENCE & ROAD DELETED	5 AUG 57	
Ⓑ	EXPANDED GENERAL NOTE 4	8 MAR 56	
Ⓐ	ALL AF- DWG. REFERENCES CHANGED TO AW-, ILS WAS ILAS.	23 Jun 55	

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

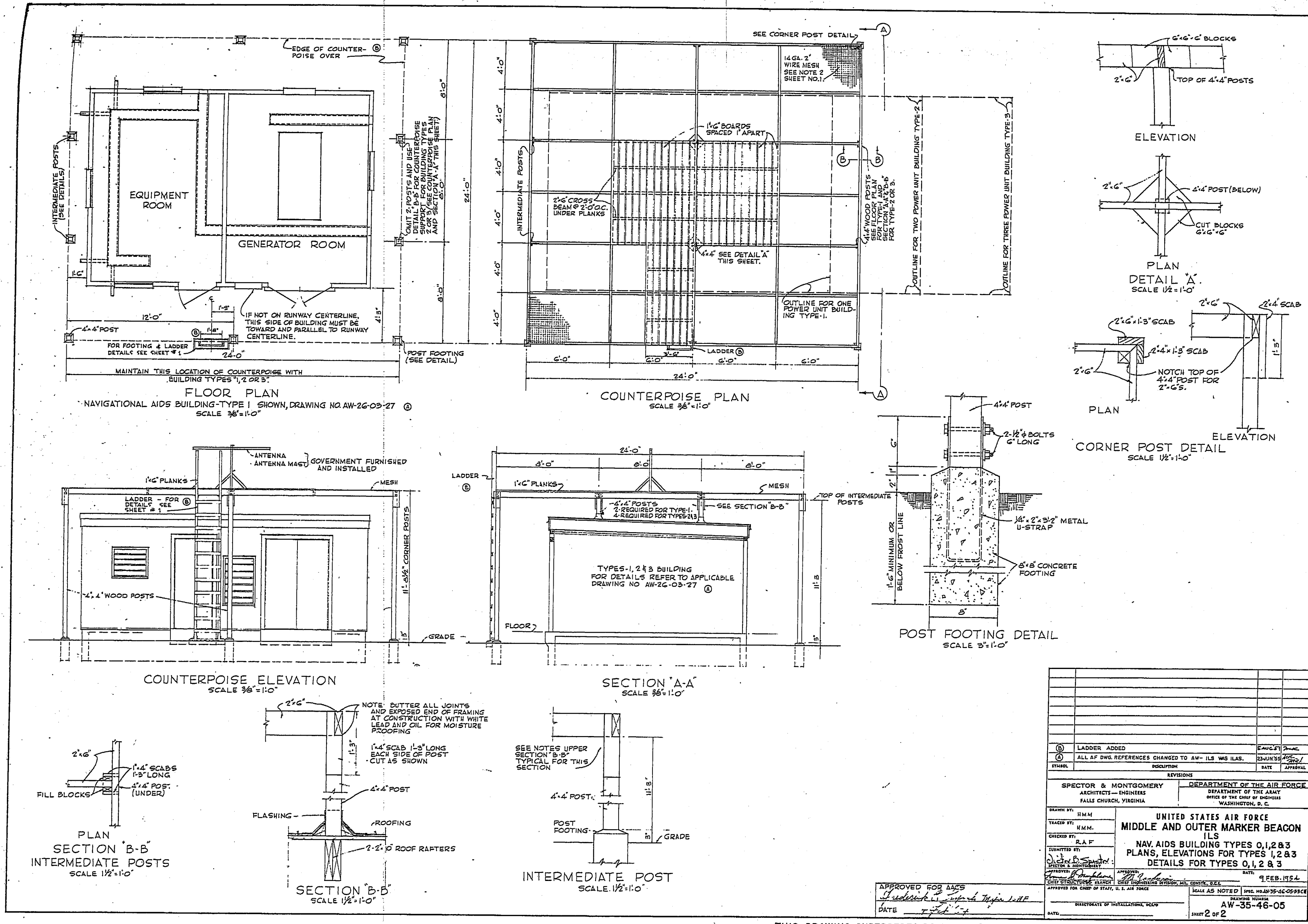
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: HMM
TRACED BY: HMM
CHECKED BY: RAF
SUBMITTED BY: Victor B. Spector — SPECTOR & MONTGOMERY
APPROVED: CHIEF STRUCTURAL BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
APPROVED FOR CHIEF OF STAFF, U.S. AIR FORCE
E. W. Schuyler
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 4 Feb 1954

UNITED STATES AIR FORCE
MIDDLE AND OUTER MARKER BEACON
ILS
NAV. AIDS BUILDING TYPES 0,1,2 & 3
PLANS, ELEVATIONS FOR TYPE 0
PLOT PLAN AND NOTES FOR TYPES 0,1,2 & 3

DATE: 9 FEB. 1954
SCALE AS NOTED
DRAWING NUMBER AW-35-46-05
SHEET 1 OF 2

THIS DRAWING SUPERSEDES DRAWING Nº 35-46-05 SHEET 1 OF 2 DATED 9 OCTOBER 1952



THIS DRAWING SUPERSEDES DRAWING Nº 35-46-05 SHEET 2 OF 2 DATED 9 OCTOBER 1952

CLASS "B" VOR (TVOR)

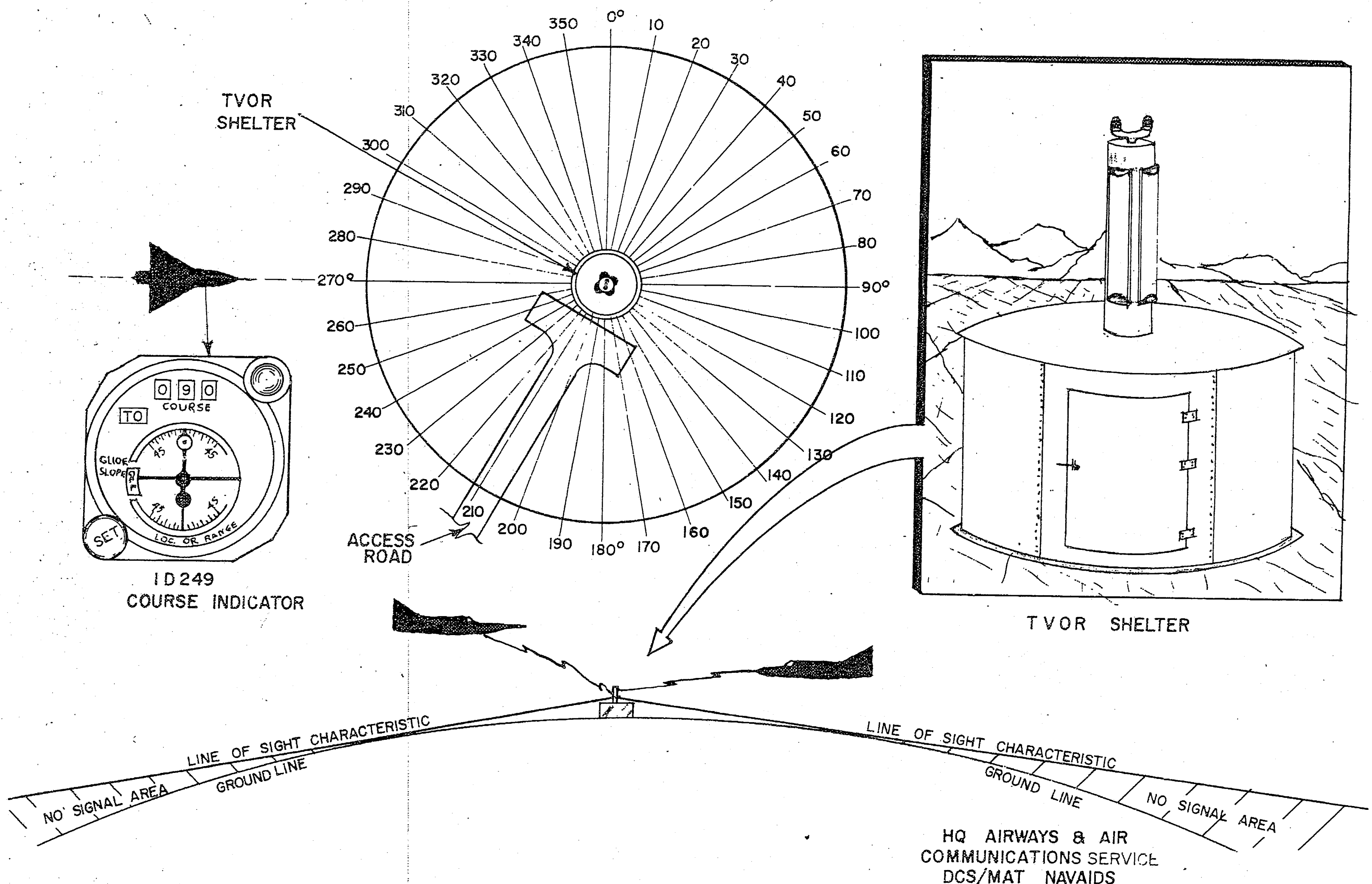


Figure 8.

Chapter 10

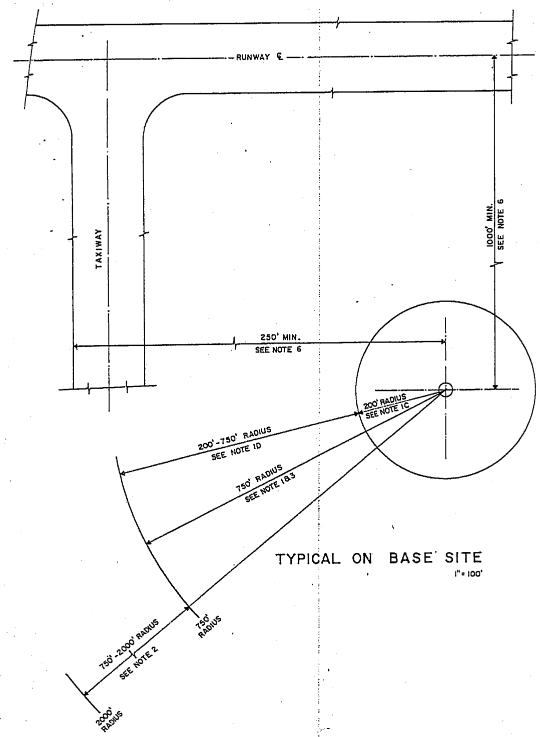
CLASS "B" VOR (TVOR)

A. Function

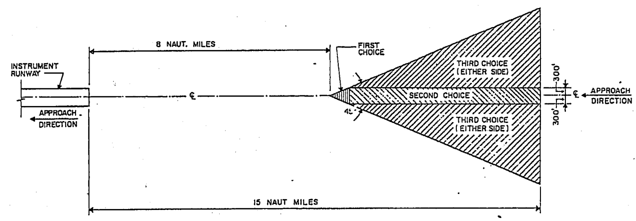
The Class "B" VOR (TVOR) is a low power (50 watts) omnidirectional range that provides, for aircraft equipment with the appropriate airborne equipment, automatic visual indications of azimuth bearing to and from a ground station. The facility operated in the VHF spectrum as an enroute or terminal navigational aid and is limited to "line of sight" range.

B. Physical Characteristics

The Class "B" VOR (TVOR) is a complete packaged fifty watt TVOR facility consisting of dual transmitting equipments with automatic changeover capabilities, a TVOR antenna (84 inches by 21.50 inches diameter), prefabricated steel shelter (78 inches by 114.5 inches diameter), electromechanical voltage regulator, frequency stabilizer, ventilation unit, obstruction lighting kit, field detector, a remote control unit and electronic component spare parts. The plot layout, access road, location of the field detector mounting post and emergency engine generator unit, and construction requirements are shown for a normal TVOR installation on drawings AW 86-16-21 and AW 78-18-01. Siting criteria are available from Airways and Air Communications Service. Manufacturer instruction handbooks for installation and maintenance, operation and parts lists are furnished with the equipment. Fullload power requirements are 7.5 kva, 120/240 V, 1 phase, 3 wire, 50/60 cycles.

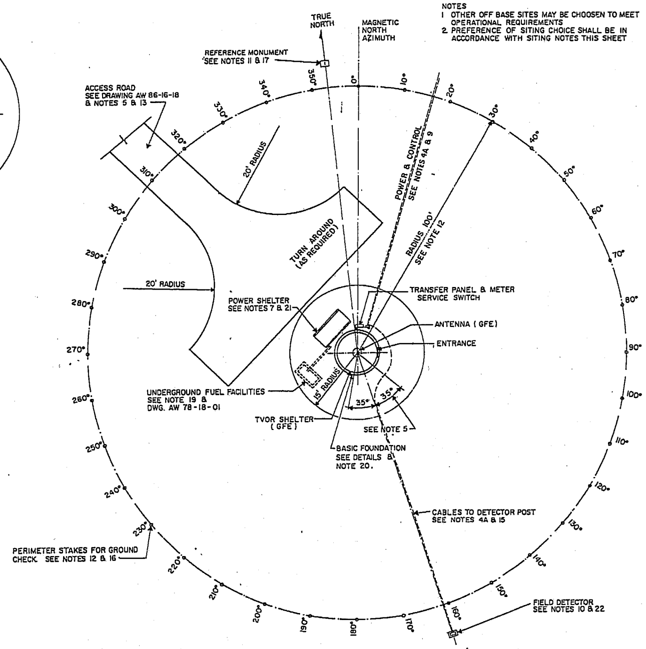


TYPICAL ON BASE SITE
1" = 100'



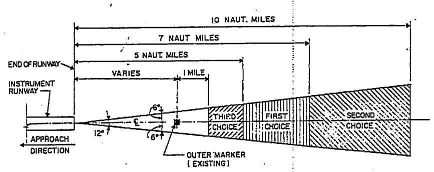
TYPICAL OFF BASE SITE
NO SCALE

NOTES
1 OTHER OFF BASE SITES MAY BE CHOOSEN TO MEET OPERATIONAL REQUIREMENTS
2 PREFERENCE OF SITING CHOICE SHALL BE IN ACCORDANCE WITH SITING NOTES THIS SHEET



TYPICAL SITE PLAN

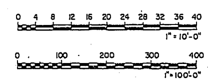
NOTE: PERIMETER STAKES, REFERENCE MONUMENT & FIELD DETECTOR NOT LOCATED TO SCALE



OFF BASE SITE
(SAC SPECIAL REQUIREMENTS)
NO SCALE

NOTE
PREFERENCE OF SITING CHOICE SHALL BE IN ACCORDANCE WITH SITING NOTES THIS SHEET

GRAPHIC SCALES



SITING NOTES

1. WITHIN 750' RADIUS, GENERALLY LEVEL TERRAIN IS REQUIRED
   - A. FOR WATER DRAINAGE A GRADUAL DOWNWARD SLOPE OF APPROXIMATELY 4" IN 100' IS PERMITTED.
   - B. NO UPWARD SLOPE IS PERMITTED FROM CENTER OF SITE
   - C. THE TERRAIN WITHIN A RADIUS OF 200' FROM CENTER OF THE SITE SHOULD BE UNIFORMLY GRADED.
   - D. THE TERRAIN FROM 200' TO 750' SHOULD HAVE NO IRREGULARITIES WHOSE HEIGHT, WIDTH, OR DEPTH EXCEEDS ONE PERCENT OF THEIR DISTANCE FROM THE CENTER OF THE SITE.
2. BETWEEN 750' to 2000' RADIUS
   - A. UPWARD SLOPE UNDESIRABLE. HOWEVER, IF AN UPWARD SLOPE DOES EXIST, IT SHOULD NOT EXCEED 4' IN 1000'.
   - B. NO TERRAIN IRREGULARITIES SHOULD EXIST THAT EXCEED IN HEIGHT, WIDTH OR DEPTH A VALUE OF ONE PERCENT OF THEIR DISTANCE FROM THE CENTER OF THE SITE.
   - C. A DOWNWARD SLOPE OF NOT MORE THAN 4' IN 100' MAY BE TOLERATED.
   - D. BASE DRAINAGE CANALS SHOULD NOT BE CLOSER THAN 1000' FROM THE SITE.
3. WITHIN 750' RADIUS: NO OBSTRUCTIONS. ARRANGEMENTS SHOULD BE MADE TO PREVENT ENCROACHMENTS.
4. BETWEEN 750' TO 2000' RADIUS:
   - A. NO OVERHEAD LINES ARE PERMITTED EXCEPT THOSE TO SITE WHICH SHALL BE ON A RADIAL OF THE STATION AND SHALL GO UNDERGROUND AT LEAST 750' FROM THE STATION.
   - B. NO OBSTRUCTIONS SUBTENDING A POSITIVE ANGLE OF ELEVATION GREATER THAN ONE DEGREE, MEASURED FROM THE HORIZONTAL PLANE OF A TRANSIT LOCATED AT THE CENTER OF THE SITE, ARE PERMITTED IN THIS AREA.
5. ACCESS ROAD, IF NECESSARY, MAY BE LOCATED IN ANY AREA EXCEPT THE 70 DEGREE SECTOR CENTERED ON A RADIAL FROM THE TVOR ANTENNA TO THE FIELD DETECTOR MONITOR.
6. SITE LOCATION WILL COMPLY WITH AFR'S 86-1,3,5 UNLESS WAIVER IS OBTAINED. NO WAIVER OF 7 TO 1 TRANSITION SLOPE REQUIRED UNLESS TVOR IS CLOSER THAN 1000' TO CENTERLINE OF RUNWAY.
7. IF POWER SHELTER IS CONSTRUCTED OVERALL HEIGHT SHOULD NOT EXCEED 4' AND IT SHOULD BE PLACED ADJACENT TO SHELTER ON OPPOSITE SIDE FROM FIELD DETECTOR AS SHOWN IN DETAIL "A".
8. FENCING IF REQUIRED SHOULD BE CONSTRUCTED OF NONMETALLIC MATERIALS.
9. DIRECT BURIAL OF CONDUIT AS REQUIRED BY LOCAL CONDITIONS. CABLES TO BE BURIED 18" DEEP EXCEPT CABLES LAID UNDER DRIVE & OFF LEASED AREA WHICH ARE TO BE BURIED 36" DEEP.
10. DISTANCE OF FIELD DETECTOR POST FROM CENTER OF STATION IS 115' ± 1', LOCATED WITHIN ± 20° OF ONE OF THE CARDINAL POINTS.
11. PERMANENT REFERENCE MONUMENT TO BE SET 125' FROM CENTER OF TVOR ANTENNA FOR USE OF DETERMINING THE MAGNETIC NORTH RADIAL.
12. PERIMETER STAKES (STEEL RODS OR PIPE FLUSH WITH GROUND AND SET IN CONCRETE IS RECOMMENDED) FOR GROUND CHECK SET IN A CIRCLE OF 100 FOOT RADIUS FROM THE CENTER OF THE TVOR ANTENNA WITH INITIAL STAKE ON MAGNETIC NORTH RADIAL AND OTHER STAKES EVERY 10° AROUND THE CIRCLE.

CONSTRUCTION NOTES

13. ACCESS ROAD AND TURNAROUND. SEE DRAWING AW-86-16-18 & NOTE 5.
14. FENCE AS REQUIRED. SEE DRAWING AW-86-16-18 & NOTE 8.
15. UNDERGROUND POWER AND CONTROL CABLES FROM TERMINAL POLE TO TVOR FACILITY, AND NECESSARY TRENCHING. SEE NOTE 9.
16. PERIMETER STAKES, 1/2" STEEL RODS OR PIPE 2'-0" LONG DRIVEN SET. SEE NOTE 12.
17. PERMANENT REFERENCE MONUMENT, 12" x 12" CONCRETE TOP SET FLUSH WITH GRADE AND BOTTOM BELOW FROST LINE. SEE NOTE 11.
18. GRADE SITE AND CLEAR OBSTRUCTIONS IN SPECIFIED AREAS. SEE GENERAL NOTES.
19. REFER TO DRAWING AW-78-18-01 WHICH SPECIFIES THE AGENCY RESPONSIBLE FOR FURNISHING AND INSTALLING FUEL STORAGE TANKS AND DISTRIBUTION SYSTEM.
20. CONSTRUCT CONCRETE FOUNDATIONS AS SHOWN IN DETAILS.
21. CONSTRUCT POWER SHELTER AS SHOWN IN DETAILS AND FURNISH AND INSTALL EMERGENCY GENERATOR AND TRANSFER PANEL.
22. CONSTRUCT FIELD DETECTOR PIER & MOUNTING POST AS SHOWN IN DETAILS.
23. GFE INDICATES GOVERNMENT FURNISHED EQUIPMENT

APPLICABLE DRAWINGS

NUMBER	TITLE
AW 78-18-01	FUEL FACILITIES FOR NAV. AIDS
AW 86-16-18	MISCELLANEOUS CONSTRUCTION DETAILS
AW 86-16-21	CLASS "B" VOR (TVOR)

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

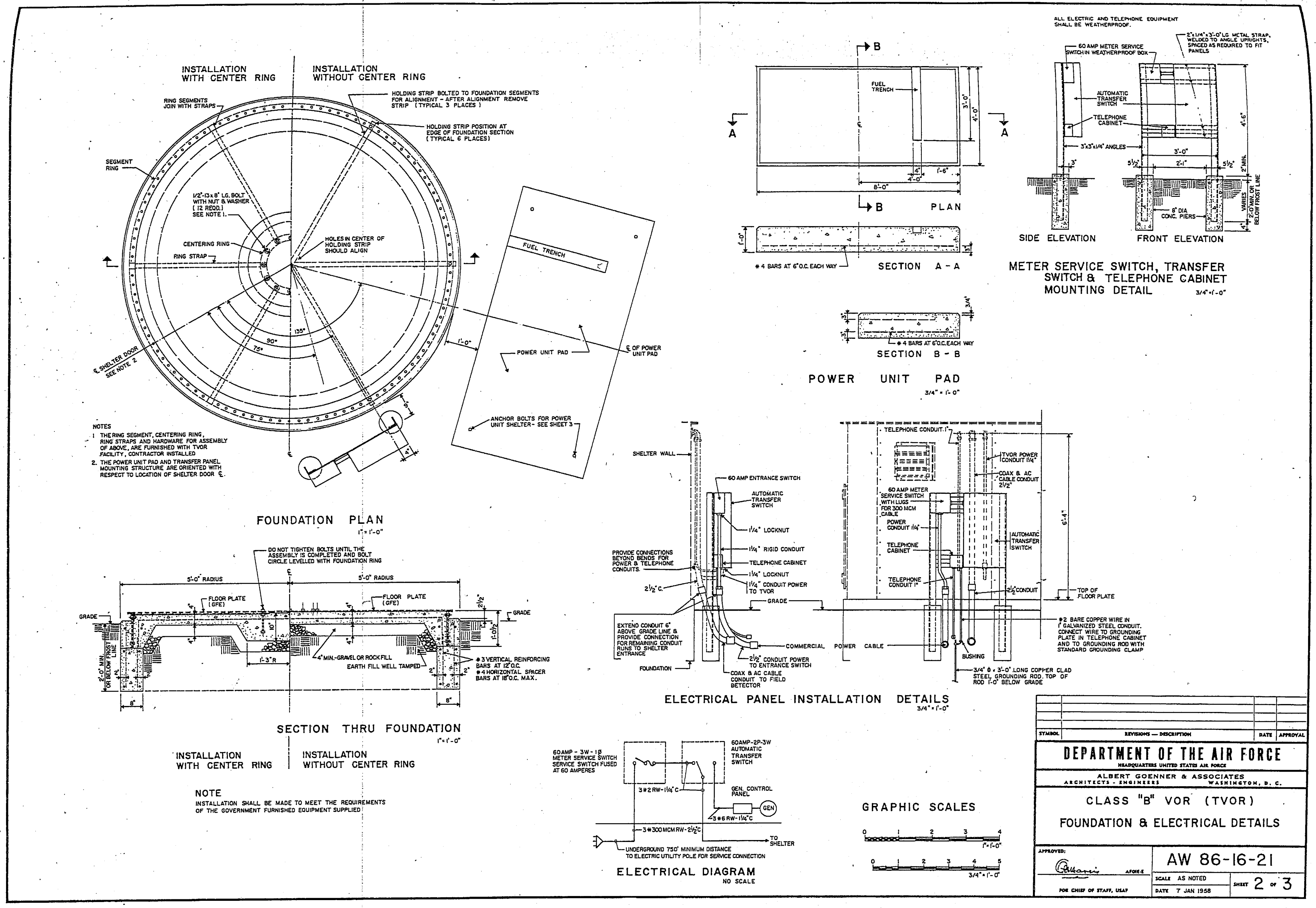
CLASS "B" VOR (TVOR)

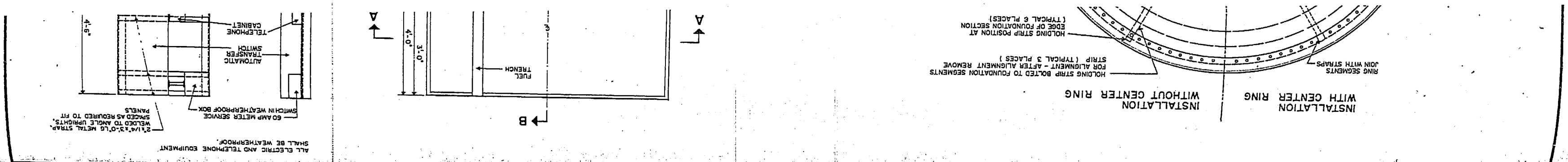
S I T I N G

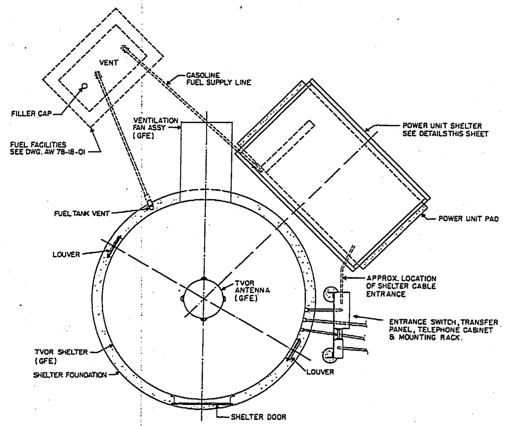
APPROVED:
AFOIE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-21

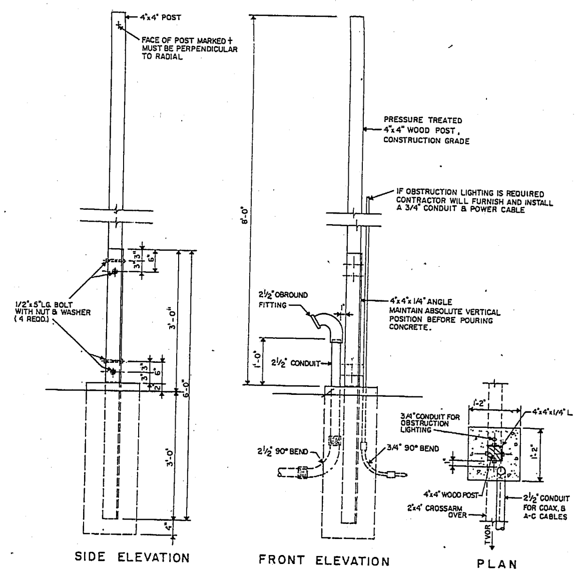
SCALE AS NOTED
DATE 7 JAN 1958
SHEET 1 OF 3


INSTALLATION WITH CENTER RING
INSTALLATION WITHOUT CENTER RING
FOUNDATION PLAN
1" = 1'-0"
NOTES
1. THE RING SEGMENT, CENTERING RING, RING STRAPS AND HARDWARE FOR ASSEMBLY OF ABOVE, ARE FURNISHED WITH TVOR FACILITY, CONTRACTOR INSTALLED
2. THE POWER UNIT PAD AND TRANSFER PANEL MOUNTING STRUCTURE ARE ORIENTED WITH RESPECT TO LOCATION OF SHELTER DOOR ℄.
SECTION THRU FOUNDATION
1" = 1'-0"
NOTE
INSTALLATION SHALL BE MADE TO MEET THE REQUIREMENTS OF THE GOVERNMENT FURNISHED EQUIPMENT SUPPLIED
POWER UNIT PAD
3/4" = 1'-0"
SECTION A - A
SECTION B - B
ALL ELECTRIC AND TELEPHONE EQUIPMENT SHALL BE WEATHERPROOF.
SIDE ELEVATION
FRONT ELEVATION
METER SERVICE SWITCH, TRANSFER SWITCH & TELEPHONE CABINET MOUNTING DETAIL
3/4" = 1'-0"
ELECTRICAL PANEL INSTALLATION DETAILS
3/4" = 1'-0"
ELECTRICAL DIAGRAM
NO SCALE
GRAPHIC SCALES
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS
WASHINGTON, D. C.
CLASS "B" VOR (TVOR)
FOUNDATION & ELECTRICAL DETAILS
FOR CHIEF OF STAFF, USAF
AW 86-16-21
SCALE AS NOTED
DATE 7 JAN 1958
SHEET 2 OF 3

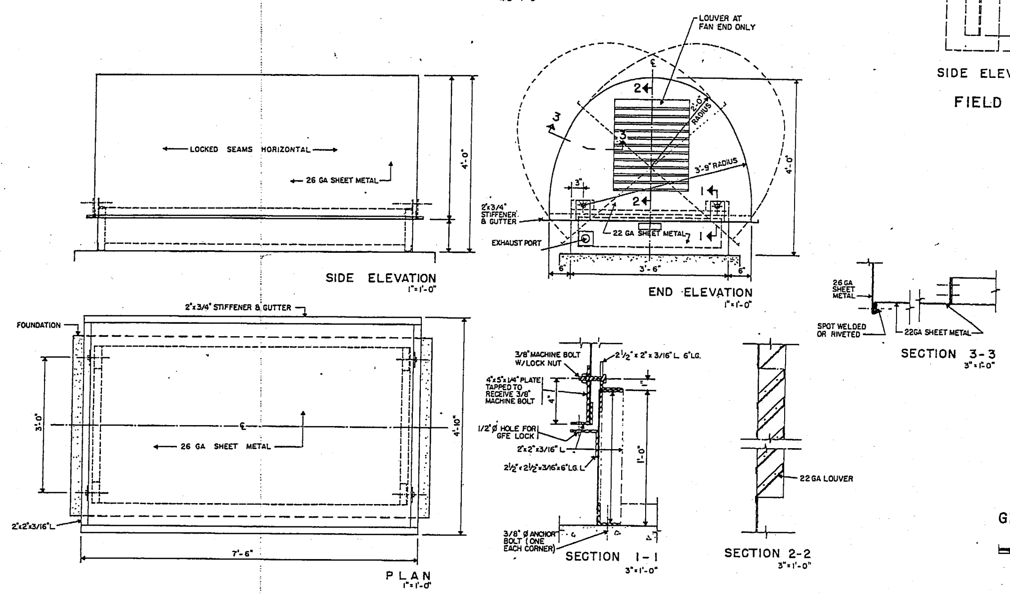




PLAN - TYPICAL LAYOUT
1/2"=1'-0"



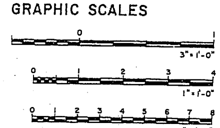
FIELD DETECTOR MOUNTING POST DETAIL
1"=1'-0"



POWER UNIT SHELTER

NOTE: ANGLE FRAMES & CLIPS SHALL BE JOINED WITH 3/16" FILLET WELD

GRAPHIC SCALES



SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

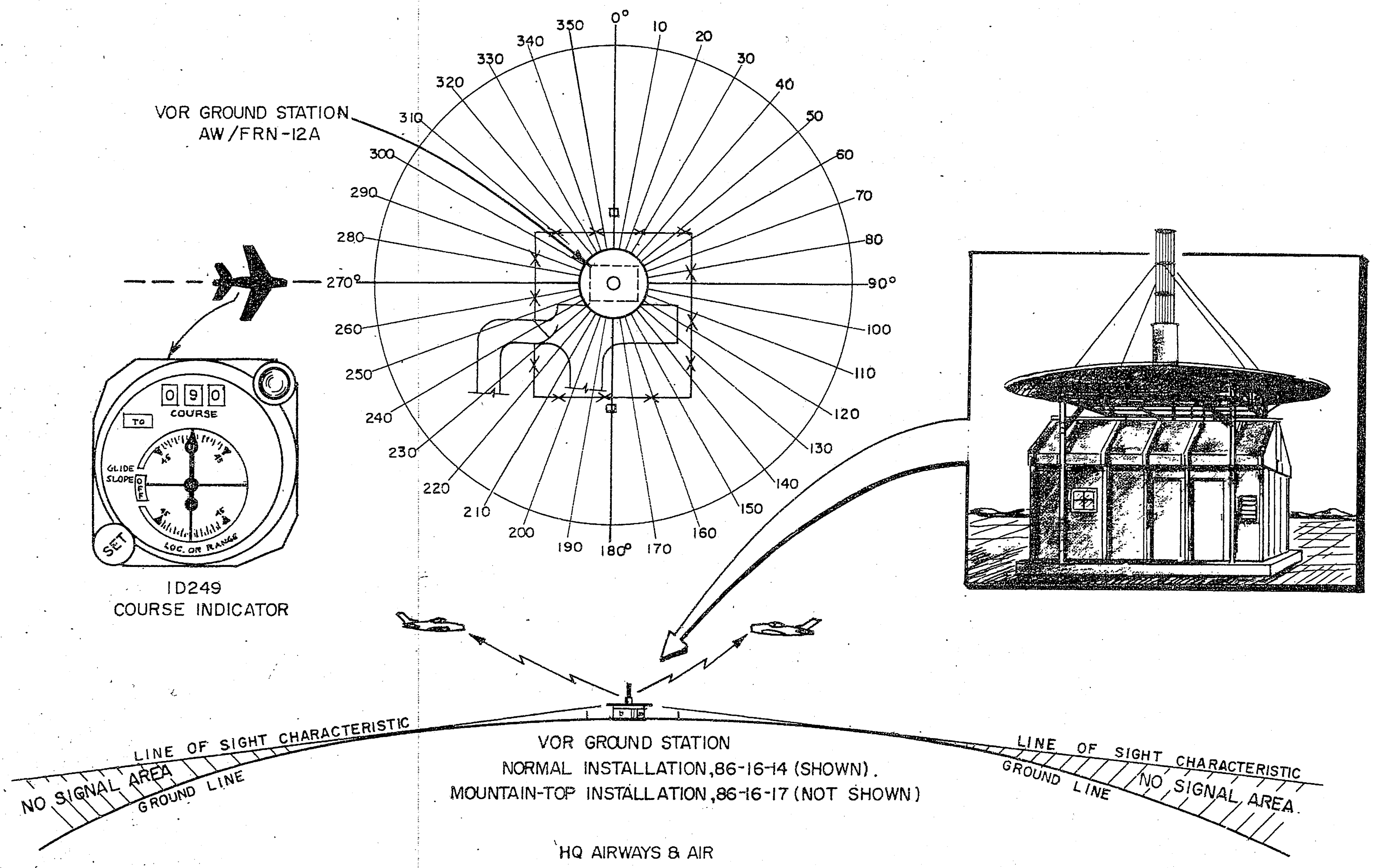
CLASS "B" VOR (TVOR)
TYPICAL LAYOUT, FIELD DETECTOR & GENERATOR SHELTER DETAILS

APPROVED: APOSE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-21

SCALE AS NOTED
DATE 7 JAN 1958
SHEET 3 OF 3

VHF OMNI RANGE (VOR)
AW DWGS. 86-16-14 OR 86-16-17



VOR GROUND STATION
NORMAL INSTALLATION, 86-16-14 (SHOWN).
MOUNTAIN-TOP INSTALLATION, 86-16-17 (NOT SHOWN)

HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 9.

Chapter 11

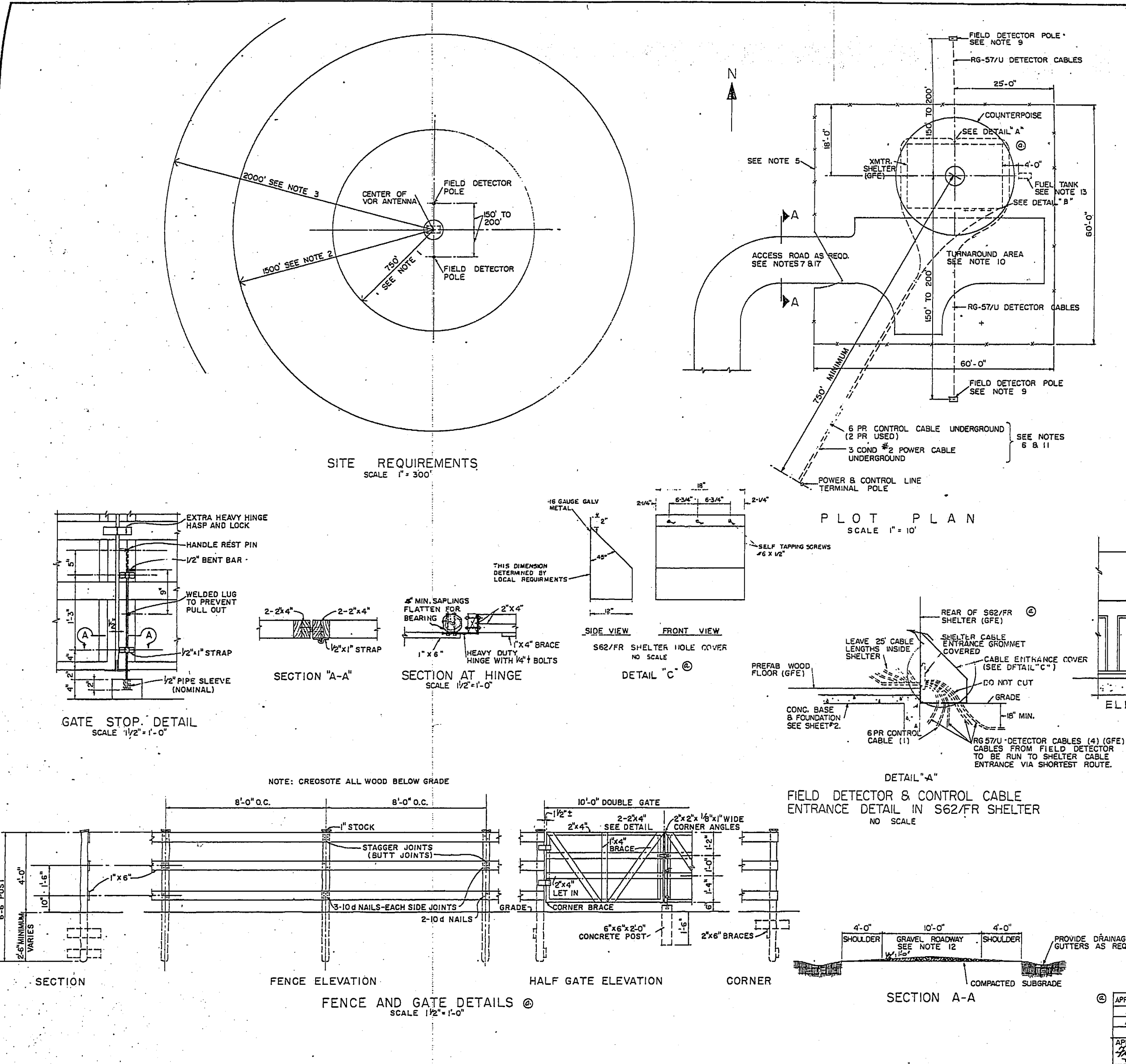
VHF OMNIDIRECTIONAL RANGE (VOR)

A. Function

The VHF omnidirectional range (VOR) provides, for aircraft equipped with the appropriate airborne equipment, automatic visual indications of azimuth bearing to and from a ground station. The facility operates in the VHF spectrum and is limited to line of sight range.

B. Physical Characteristics

The VOR equipment (AN/FRN–12A) comes complete with a prefabricated building, 16 x 24 feet. Normally, the antenna and counterpoise are located at the building site, however, in a mountain top installation the antenna and counterpoise are separated from the building by a distance of approximately 300 feet. The plot layout, fencing, access roads, and construction requirements are shown for a normal VOR installation on drawings AW 86–16–14, AW 78–18–01, and AW 86–16–21, and for a mountain top installation on drawings AW 86–16–17 and AW 78–18–01. Siting criteria are available from Airways and Air Communications Service. Total power required at the site is 10.5 kw. 120/240V, single-phase, 3-wire, 60-cycle. Minimum (no spares or expansion capability) telephone cable requirements are one pair.



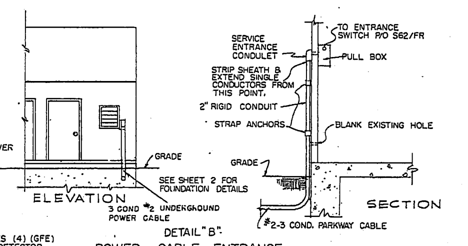
GENERAL NOTES

(a)
1. AREA WITHIN A RADIUS OF 750' TO BE CLEARED OF ALL VEGETATION, GRASS EXCEPTED.
2. NO VEGETATION OVER 15' HIGH PERMITTED WITHIN THE AREA 750' TO 1500'.
3. NO TREES OVER 60' PERMITTED WITHIN THE AREA 1500' TO 2000'.
4. IN HILLY AREAS LOCATE VOR ON HIGHEST SUITABLE LOCATION.
5. REQUIREMENT OF FENCE & GATE TO BE DETERMINED AT EACH LOCATION MUST BE NON-METALLIC TYPE. (SEE DETAILS).
6. UNDERGROUND CABLES TO BE BURIED 18" DEEP EXCEPT CABLES LAID UNDER DRIVE & OFF LEASED AREA WHICH ARE 36" DEEP.
7. DIRECTION OF ACCESS ROAD TO BE LOCATED TO FIT EACH SITE.
8. VEHICLES TO BE PARKED UNDER COUNTERPOISE & NEXT TO BLDG.
9. LOCATE NORTH DETECTOR POLE AT MAGNETIC NORTH ±0°, SOUTH DETECTOR POLE TO BE LOCATED 180° ±0° FROM NORTH DETECTOR POLE.
10. TURNAROUND AREA TO BE LAID OUT TO CONFORM TO ACCESS ROAD ENTRANCE AS REQUIRED.
11. CONTROL & POWER CABLES MAY BE LAID IN SAME TRENCH IF A SPACING OF 18" BETWEEN CABLES IS MAINTAINED.
12. DEPTH OF ROAD BASE & SURFACING SHALL BE DESIGNED FOR 5000 LBS AXLE LOAD IN ACCORDANCE WITH PART X CHAP. I OCE ENGINEERING MANUAL
13. (b) FOR FUEL TANK DETAILS SEE DRAWING AW78-18-01.
14. POWER REQUIREMENTS: 10KW, 1φ, 3 WIRE, 115/230 V, 60 CYCLES, ± 5% REGULATION.

NORMAL CONTRACT SERVICES REQUIRED

15. FURNISH & INSTALL CONCRETE COUNTERPOISE PIERS & BUILDING FOUNDATION. SEE SHEET 2.
16. FURNISH & INSTALL FENCE IF REQUIRED. SEE DETAIL SHEET 1.
17. FURNISH & INSTALL ACCESS ROAD & TURNAROUND. SEE DETAIL SHEET 1.
18. GRADE SITE & CLEAR OBSTRUCTIONS IN SPECIFIED AREAS. SEE GENERAL NOTES.
19. (b) REFER TO DRAWING AW78-18-01 WHICH SPECIFIES THE AGENCY RESPONSIBLE FOR FURNISHING & INSTALLING FUEL STORAGE TANKS AND DISTRIBUTION SYSTEMS.
20. FURNISH & INSTALL UNDERGROUND POWER CABLE FROM TERMINAL POLE TO TRANSMITTING SHELTER S62/FR
21. FURNISH & INSTALL METAL COVER OVER CONTROL AND DETECTOR CABLE ENTRANCE. SEE DETAIL SHT. 1.
22. FURNISH & INSTALL NECESSARY CONDUIT & FITTINGS FOR POWER CABLE ENTRANCE. SEE DETAIL SHT. 1.
23. PROVIDE TRENCHES FROM SHELTER TO EACH DETECTOR POLE LOCATION.
24. ERECTION AND/OR INSTALLATION OF THE FOLLOWING GFE ITEMS SHOULD BE INCLUDED IN CONTRACT SPECIFICATIONS DEPENDING ON THEIR AVAILABILITY PRIOR TO AWARDING CONTRACT:
    a. TWO 30 FOOT FIELD DETECTOR POLES.
    b. ONE ANTENNA COUNTERPOISE. SEE T.O. 16-30 FRN12-10.
    c. S-62/FR TRANSMITTER SHELTER. SEE T.O. 16-35S62-2.
    d. FOUR DETECTOR CABLES & BACKFILL TRENCHES.

NOTE IF ANY OF THE ABOVE GFE ITEMS ARE NOT AVAILABLE AT TIME INDICATED, AIR FORCE WILL ASSUME RESPONSIBILITY FOR INSTALLING SAME.



POWER CABLE ENTRANCE DETAIL IN SHELTER S62/FR
NO SCALE

SYMBOL	DESCRIPTION	DATE	APPROVAL
(b)	AF NOS. CHANGED TO AW	5 July 55	
(a)	DETAILS "A", "B", & "C" REVISED. NOTES AMENDED. NEW FENCE DETAIL DRAWN. SPEC. NO. ADDED. APPLICABLE DWGS. ADDED.	12 Feb 54	

REVISIONS

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

UNITED STATES AIR FORCE
VHF OMNI RANGE
AN/FRN - 12A
PLOT PLAN & SITE REQUIREMENTS

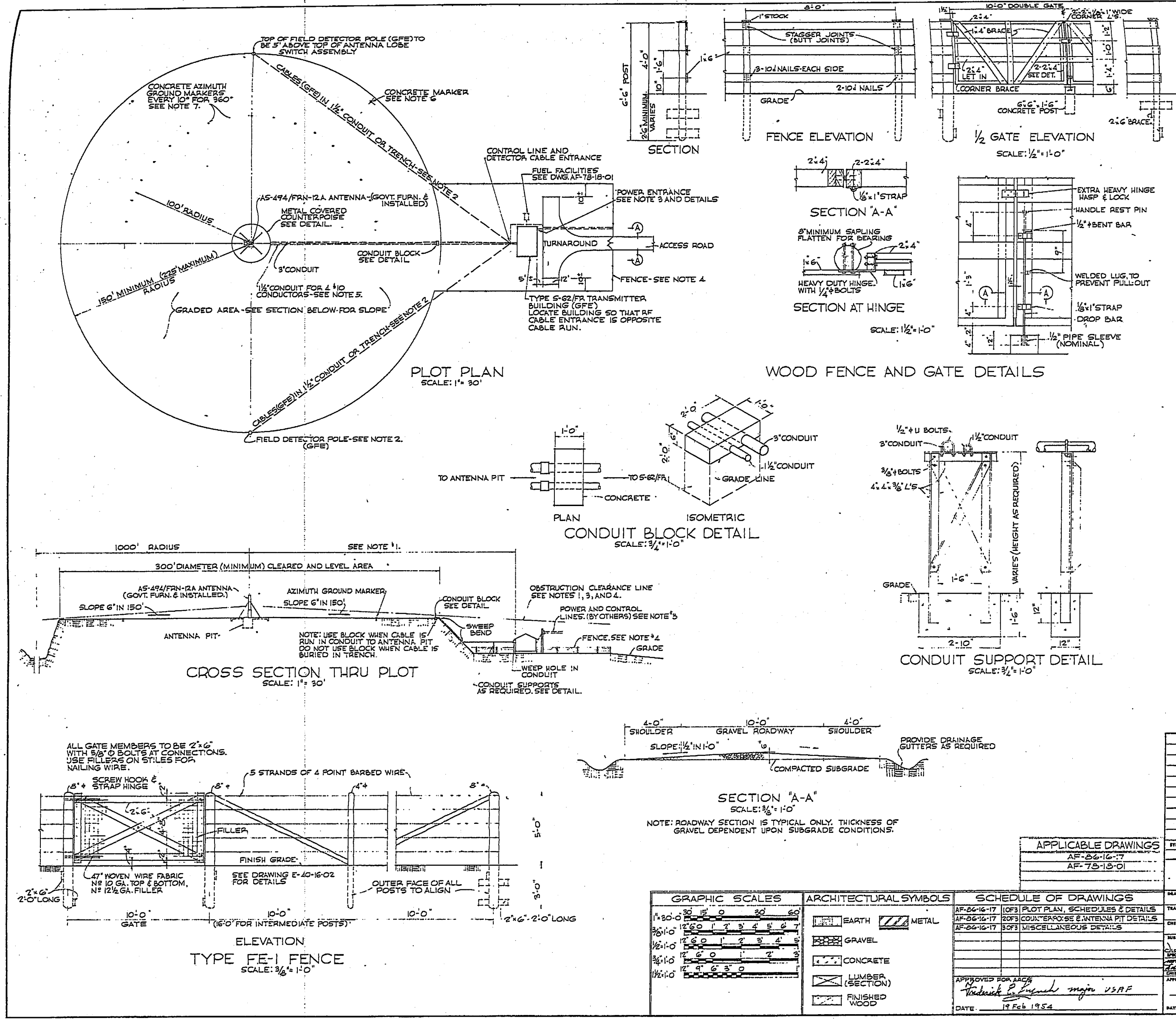
DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED BY:
APPROVED: CHIEF AIRFIELDS BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 29-SEP 1953

(a) APPLICABLE DRAWINGS
AF-86-16-14
AF-78-18-01

APPROVED FOR AACS
Frederick P. Lynch
Major USAF

APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 23 Sept 1953

SCALE NOTED
SPEC. NO. AW-86-16-14-50CE
DRAWING NUMBER AW-86-16-14
SHEET 1 OF 3



GENERAL NOTES

1. TRANSMITTER BUILDING MAY BE LOCATED ON ANY AZIMUTH FROM THE ANTENNA PROVIDED NO PART OF THE BUILDING SHALL BE VISIBLE FROM TOP OF THE ANTENNA LOBE SWITCH ASSEMBLY AND THE LENGTH OF EACH RF CABLE BETWEEN THE ANTENNA AND TRANSMITTER BUILDING SHOULD NOT EXCEED 300.'
2. ONE FIELD DETECTOR SHOULD BE LOCATED ON THE MAGNETIC NORTH MERIDIAN THROUGH THE CENTER OF THE ANTENNA AND THE OTHER FIELD DETECTOR ON THE MAGNETIC SOUTH MERIDIAN, 150' FROM THE CENTER OF ANTENNA. FIELD DETECTOR CABLES SHOULD BE INSTALLED ON THE SHORTEST CABLE DISTANCE FROM THE BUILDING TO DETECTOR POLES, AND SHALL NOT BE INSTALLED IN SAME CONDUIT WITH RF ANTENNA CABLES. CABLES IN SAME TRENCH MUST HAVE A SPACING OF 12". DETECTOR CABLES TO BE DIRECT EARTH BURIED IN 18" DEEP TRENCH UNLESS ROCK EXCAVATION IS ENCOUNTERED IN WHICH CASE CONDUIT IS LAID ON SURFACE.
3. POWER AND CONTROL LINES MAY BE RUN OVERHEAD TO THE TRANSMITTER BUILDING PROVIDED THAT NO PART OF THE LINE WITHIN 750' EXTENDS ABOVE THE LEVELED AREA AND FROM 750' TO 1200' IS ON A RADIAL FROM THE CENTER OF THE ANTENNA. IF UNDERGROUND, CABLES MAY BE LAID IN SAME TRENCH IF A SPACING OF 18" IS MAINTAINED.
4. IF FENCING IS REQUIRED AROUND THE TRANSMITTER BUILDING AND/OR THE CLEARED AREA, TYPE FE-1 MAY BE USED PROVIDED TOP WIRE IS BELOW THE EDGE OF THE LEVEL AREA AND NO PART THEREOF IS VISIBLE FROM THE TOP OF THE LOBE SWITCH ASSEMBLY, OTHERWISE A WOOD RAIL FENCE (AS SHOWN) IS TO BE ERECTED. IF NECESSARY TO PREVENT ANIMALS OR PEOPLE FROM APPROACHING THE ANTENNA AND FIELD DETECTORS, WOOD FENCES 50' TO 20' SQUARE SHOULD BE ERECTED AROUND THE ANTENNA AND DETECTOR POLES. HEIGHT OF THESE FENCES NOT TO EXCEED 42."
5. THE CABLE CONDUIT FROM EDGE OF CLEARED AREA TO THE TRANSMITTER BUILDING MAY BE INSTALLED TO FOLLOW THE CONTOUR OF SLOPE PROVIDED IT ENTERS THE REAR OF THE BUILDING AT A HEIGHT 6'-0" ABOVE THE S-62/FR GROUND FLANGE. CABLES TO ANTENNA PIT TO BE DIRECT EARTH BURIED IN 18" DEEP TRENCH UNLESS ROCK EXCAVATION IS ENCOUNTERED, IN WHICH CASE RUN CABLES IN CONDUITS LAID ON SURFACE FROM CONDUIT BLOCK. IF CABLE TRENCH IS USED SEAL ENDS OF CONDUITS FROM TRANSMITTER BUILDING. MINIMUM BENDING RADIUS OF RG-17/U RF CABLES 12 INCHES.
6. MARKERS ARE FOR USE IN CONNECTION WITH THEODOLITE CHECKS. THE SITE DRAWING SHALL SHOW THE TRUE BEARING BETWEEN THE MARKERS AND THE TRUE BEARING FROM EACH MARKER TO THE NORTH FIELD DETECTOR. APPROX. 4" SQUARE OR 4" DIA. BY 1'-6" DEEP CONCRETE FLUSH WITH GROUND. (GFE)
7. THE AZIMUTH GROUND MARKERS SHALL BE IDENTIFIED NUMERICALLY AT LEAST EVERY 10° BEGINNING WITH MAGNETIC NORTH (0°). THESE MARKERS SHALL BE EITHER 4" SQUARE OR 4" DIA. CONCRETE POSTS 1'-6" IN LENGTH INSTALLED FLUSH WITH GROUND.

NORMAL CONTRACT SERVICES REQUIRED

1. INSTALL ALL ITEMS NOTED GFE ON THIS DRAWING. IF ANY OF THE GFE ITEMS ARE NOT AVAILABLE, AIR FORCE WILL ASSUME RESPONSIBILITY FOR INSTALLING SAME. ITEMS NOTED AS GOVT. FURNISHED AND INSTALLED ARE NO PART OF CONTRACT SERVICE.
2. ALL OTHER ITEMS AND MATERIAL SHOWN HEREON ARE CONTRACTOR FURNISHED AND INSTALLED.

EXCAVATION:
GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. BOTTOM OF FOUNDATION WALLS SHALL BE NOT LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL AND SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL: 3000 LBS/SQ.FT.

CONCRETE:
ALL CONCRETE SHALL BE CLASS "B" (2500 PSI.)

REINFORCING BARS:
ALL REINFORCING BARS TO BE DEFORMED OF INTERMEDIATE OR HARD GRADE STEEL. DESIGN STRESS 20,000 PSI.

ANCHOR BOLT PROTECTION:
THE PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THREADS.

APPLICABLE DRAWINGS
AF-86-16-17
AF-78-18-01

SCHEDULE OF DRAWINGS

AF-86-16-17	1 OF 3	PLOT PLAN, SCHEDULES & DETAILS
AF-86-16-17	2 OF 3	COUNTERPOISE & ANTENNA PIT DETAILS
AF-86-16-17	3 OF 3	MISCELLANEOUS DETAILS

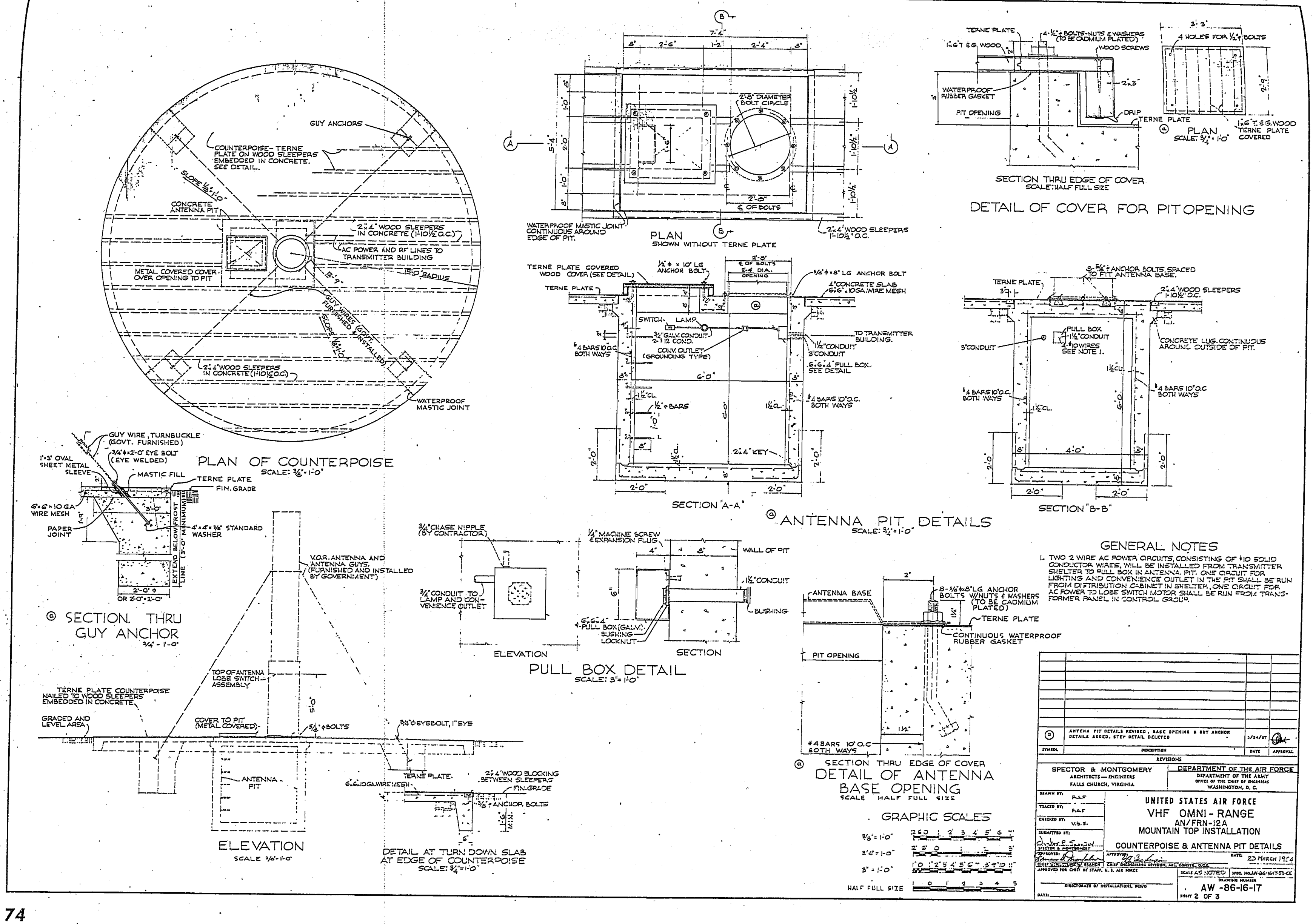
GRAPHIC SCALES — ARCHITECTURAL SYMBOLS: EARTH, METAL, GRAVEL, CONCRETE, LUMBER (SECTION), FINISHED WOOD

APPROVED FOR AACS: Frederick P. Lynch major USAF DATE 19 Feb 1954

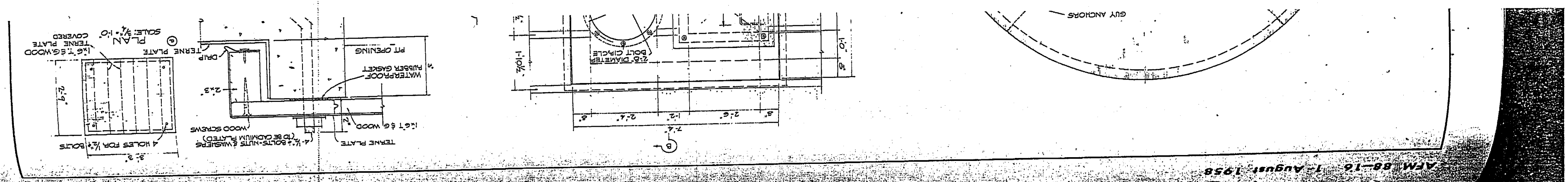
SPECTOR & MONTGOMERY, ARCHITECTS — ENGINEERS, FALLS CHURCH, VIRGINIA
DEPARTMENT OF THE AIR FORCE — DEPARTMENT OF THE ARMY, OFFICE OF THE CHIEF OF ENGINEERS, WASHINGTON, D. C.

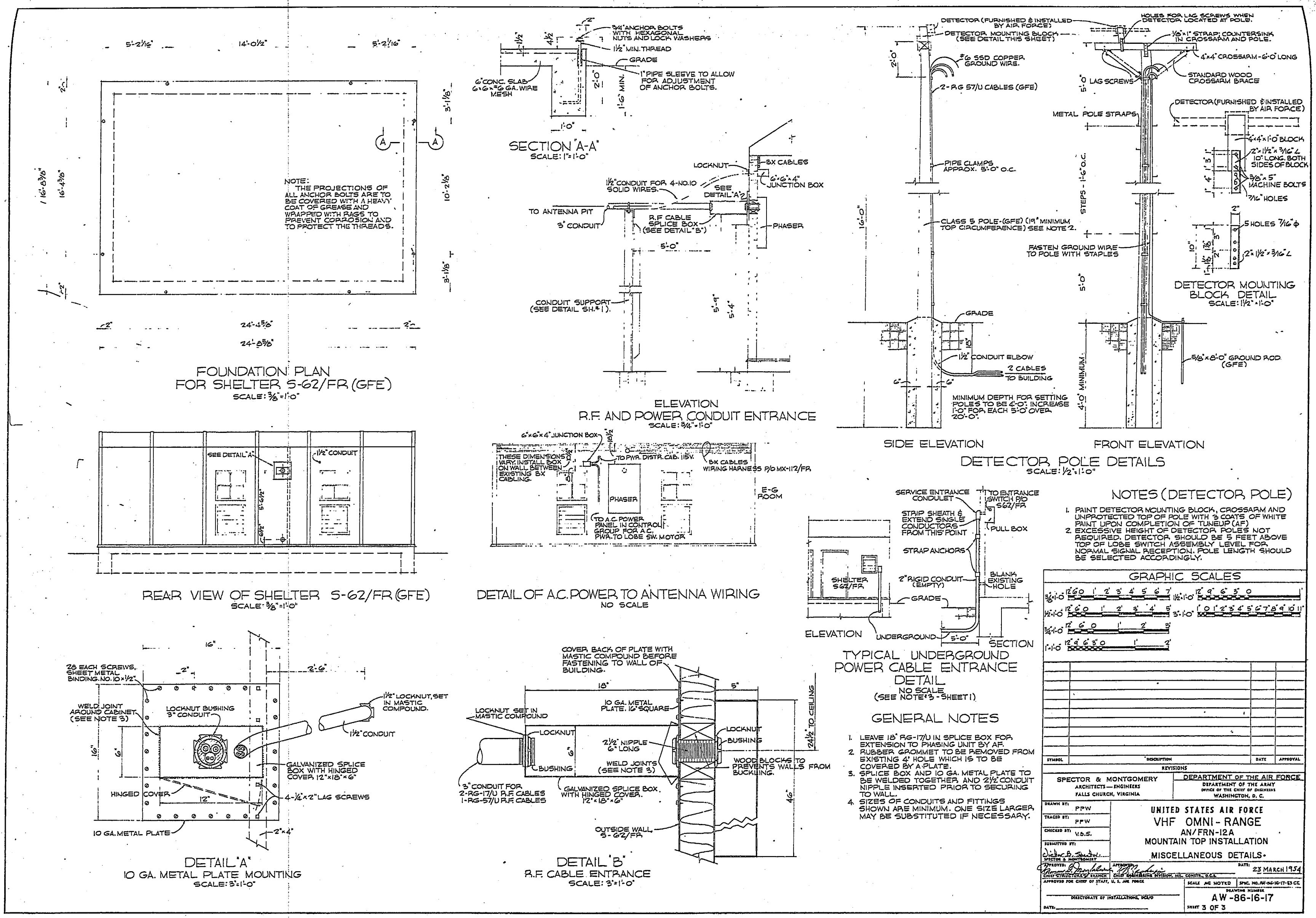
UNITED STATES AIR FORCE
VHF OMNI-RANGE
AN/FRN-12A
MOUNTAIN TOP INSTALLATION
PLOT PLAN, SCHEDULES & DETAILS

DRAWN BY: RAF — TRACED BY: RAF — CHECKED BY: V.B.G.
DATE: 23 MARCH 1954 — SCALE AS NOTED
AW-86-16-17 — SHEET 1 OF 3



PLAN OF COUNTERPOISE
SCALE: 3/8" = 1'-0"
GUY ANCHORS
COUNTERPOISE - TERNE PLATE ON WOOD SLEEPERS EMBEDDED IN CONCRETE. SEE DETAIL.
SLOPE 1/8" : 1'-0"
CONCRETE ANTENNA PIT
2"x4" WOOD SLEEPERS IN CONCRETE (1'-10 1/2" O.C.)
AC POWER AND RF LINES TO TRANSMITTER BUILDING
METAL COVERED COVER OVER OPENING TO PIT
15'-0" RADIUS
GUY WIRES (GOVT. FURNISHED & INSTALLED)
WATERPROOF MASTIC JOINT
PLAN
SHOWN WITHOUT TERNE PLATE
2'-8" DIAMETER BOLT CIRCLE
WATERPROOF MASTIC JOINT CONTINUOUS AROUND EDGE OF PIT.
2"x4" WOOD SLEEPERS 1'-10 1/2" O.C.
SECTION "A-A"
SECTION "B-B"
ANTENNA PIT DETAILS
SCALE: 3/4" = 1'-0"
TERNE PLATE COVERED WOOD COVER (SEE DETAIL)
1/2" ϕ x 10" LG ANCHOR BOLT
5/8" ϕ x 8" LG ANCHOR BOLT
4" CONCRETE SLAB 6x6 - 10GA. WIRE MESH
SWITCH
LAMP
3/4" GALV. CONDUIT 2-#12 COND.
CONV. OUTLET (GROUNDING TYPE)
TO TRANSMITTER BUILDING
1 1/2" CONDUIT
3" CONDUIT
6x6x4" PULL BOX. SEE DETAIL
#4 BARS 10" O.C. BOTH WAYS
1/2" ϕ BARS
2"x4" KEY
8-5/8" ϕ ANCHOR BOLTS SPACED TO FIT ANTENNA BASE.
PULL BOX 1 1/2" CONDUIT 4-#10 WIRES SEE NOTE 1.
CONCRETE LUG. CONTINUOUS AROUND OUTSIDE OF PIT.
DETAIL OF COVER FOR PIT OPENING
SECTION THRU EDGE OF COVER.
SCALE: HALF FULL SIZE
4-1/2" ϕ BOLTS-NUTS & WASHERS (TO BE CADMIUM PLATED)
WOOD SCREWS
WATERPROOF RUBBER GASKET
PIT OPENING
DRIP
4 HOLES FOR 1/2" ϕ BOLTS
PLAN
SCALE: 3/4" = 1'-0"
1x6 T. & G. WOOD TERNE PLATE COVERED
GENERAL NOTES
1. TWO 2 WIRE AC POWER CIRCUITS, CONSISTING OF #10 SOLID CONDUCTOR WIRES, WILL BE INSTALLED FROM TRANSMITTER SHELTER TO PULL BOX IN ANTENNA PIT. ONE CIRCUIT FOR LIGHTING AND CONVENIENCE OUTLET IN THE PIT SHALL BE RUN FROM DISTRIBUTION CABINET IN SHELTER, ONE CIRCUIT FOR AC POWER TO LOBE SWITCH MOTOR SHALL BE RUN FROM TRANSFORMER PANEL IN CONTROL GROUP.
SECTION. THRU GUY ANCHOR
3/4" = 1'-0"
GUY WIRE, TURNBUCKLE (GOVT. FURNISHED)
3/4" ϕ x 2'-0" EYE BOLT (EYE WELDED)
1'-3" OVAL SHEET METAL SLEEVE
MASTIC FILL
TERNE PLATE
FIN. GRADE
6x6-10 GA. WIRE MESH
PAPER JOINT
4"x4"x3/8" STANDARD WASHER
EXTEND BELOW FROST LINE (3'-0" MINIMUM)
2'-0" ϕ OR 2'-0" x 2'-0"
V.O.R. ANTENNA AND ANTENNA GUYS. (FURNISHED AND INSTALLED BY GOVERNMENT)
TOP OF ANTENNA LOBE SWITCH ASSEMBLY
TERNE PLATE COUNTERPOISE NAILED TO WOOD SLEEPERS EMBEDDED IN CONCRETE
GRADED AND LEVEL AREA
COVER TO PIT (METAL COVERED)
5/8" ϕ BOLTS
3/4" ϕ EYEBOLT, 1" EYE
ANTENNA PIT
ELEVATION
SCALE 3/8" = 1'-0"
TERNE PLATE
6.6.10GA. WIRE MESH
2"x4" WOOD BLOCKING BETWEEN SLEEPERS
FIN. GRADE
3/8" ϕ ANCHOR BOLTS
DETAIL AT TURN DOWN SLAB AT EDGE OF COUNTERPOISE
SCALE: 3/4" = 1'-0"
3/4" CHASE NIPPLE (BY CONTRACTOR)
1/4" MACHINE SCREW & EXPANSION PLUG
WALL OF PIT
1 1/2" CONDUIT
3/4" CONDUIT TO LAMP AND CONVENIENCE OUTLET
BUSHING
6x6x4" PULL BOX (GALV.)
BUSHING
LOCKNUT
ELEVATION
SECTION
PULL BOX DETAIL
SCALE: 3" = 1'-0"
ANTENNA BASE
8-5/8" ϕ x 8" LG ANCHOR BOLTS W/NUTS & WASHERS (TO BE CADMIUM PLATED)
TERNE PLATE
CONTINUOUS WATERPROOF RUBBER GASKET
PIT OPENING
#4 BARS 10" O.C. BOTH WAYS
SECTION THRU EDGE OF COVER
DETAIL OF ANTENNA BASE OPENING
SCALE HALF FULL SIZE
GRAPHIC SCALES
3/8" = 1'-0"
3/4" = 1'-0"
3" = 1'-0"
HALF FULL SIZE
ANTENNA PIT DETAILS REVISED, BASE OPENING & GUY ANCHOR DETAILS ADDED, STEP DETAIL DELETED
SYMBOL
DESCRIPTION
DATE
APPROVAL
REVISIONS
SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
UNITED STATES AIR FORCE
VHF OMNI - RANGE
AN/FRN-12A
MOUNTAIN TOP INSTALLATION
COUNTERPOISE & ANTENNA PIT DETAILS
23 MARCH 1956
SCALE AS NOTED
AW -86-16-17
SHEET 2 OF 3




FOUNDATION PLAN
FOR SHELTER S-62/FR (GFE)
SCALE: 3/8"=1'-0"
NOTE:
THE PROJECTIONS OF ALL ANCHOR BOLTS ARE TO BE COVERED WITH A HEAVY COAT OF GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THE THREADS.
SECTION "A-A"
SCALE: 1"=1'-0"
3/4" ANCHOR BOLTS WITH HEXAGONAL NUTS AND LOCK WASHERS
1 1/2" MIN. THREAD
GRADE
1" PIPE SLEEVE TO ALLOW FOR ADJUSTMENT OF ANCHOR BOLTS.
6" CONC. SLAB 6"x6"x#6 GA. WIRE MESH
ELEVATION
R.F. AND POWER CONDUIT ENTRANCE
SCALE: 3/4"=1'-0"
LOCKNUT
BX CABLES
1 1/2" CONDUIT FOR 4-NO.10 SOLID WIRES.
SEE DETAIL "A"
6"x6"x4" JUNCTION BOX
TO ANTENNA PIT
3" CONDUIT
R.F. CABLE SPLICE BOX (SEE DETAIL "B")
PHASER
CONDUIT SUPPORT (SEE DETAIL SH.#1).
REAR VIEW OF SHELTER S-62/FR (GFE)
SCALE: 3/8"=1'-0"
SEE DETAIL "A"
1 1/2" CONDUIT
DETAIL OF A.C. POWER TO ANTENNA WIRING
NO SCALE
6"x6"x4" JUNCTION BOX
THESE DIMENSIONS VARY. INSTALL BOX ON WALL BETWEEN EXISTING BX CABLING.
TO PWR. DISTR. CAB. 115V.
BX CABLES WIRING HARNESS P/O MX-112/FR
E-G ROOM
PHASER
TO A.C. POWER PANEL IN CONTROL GROUP FOR A.C. PWR. TO LOBE SW. MOTOR
DETECTOR POLE DETAILS
SCALE: 1/2"=1'-0"
SIDE ELEVATION
FRONT ELEVATION
DETECTOR (FURNISHED & INSTALLED BY AIR FORCE)
DETECTOR MOUNTING BLOCK (SEE DETAIL THIS SHEET)
#6 SSD COPPER GROUND WIRE.
2-RG 57/U CABLES (GFE)
PIPE CLAMPS APPROX. 5'-0" O.C.
CLASS 5 POLE-(GFE) (19" MINIMUM TOP CIRCUMFERENCE) SEE NOTE 2.
GRADE
1 1/2" CONDUIT ELBOW
2 CABLES TO BUILDING
MINIMUM DEPTH FOR SETTING POLES TO BE 4'-0". INCREASE 1'-0" FOR EACH 5'-0" OVER 20'-0".
HOLES FOR LAG SCREWS WHEN DETECTOR LOCATED AT POLE.
1/8"x1" STRAP; COUNTERSINK IN CROSSARM AND POLE.
4"x4" CROSSARM-6'-0" LONG
LAG SCREWS
STANDARD WOOD CROSSARM BRACE
METAL POLE STRAPS
STEPS-1'-6" O.C.
FASTEN GROUND WIRE TO POLE WITH STAPLES
5/8"x8'-0" GROUND ROD (GFE)
DETECTOR (FURNISHED & INSTALLED BY AIR FORCE)
4"x4"x1'-0" BLOCK
2"x1 1/2"x3/16" L 10" LONG. BOTH SIDES OF BLOCK
3/8"x5" MACHINE BOLTS
7/16" HOLES
5 HOLES 7/16" φ
2"x1 1/2"x3/16" L
DETECTOR MOUNTING BLOCK DETAIL
SCALE: 1 1/2"=1'-0"
NOTES (DETECTOR POLE)
1. PAINT DETECTOR MOUNTING BLOCK, CROSSARM AND UNPROTECTED TOP OF POLE WITH 3 COATS OF WHITE PAINT UPON COMPLETION OF TUNEUP (AF)
2. EXCESSIVE HEIGHT OF DETECTOR POLES NOT REQUIRED. DETECTOR SHOULD BE 5 FEET ABOVE TOP OF LOBE SWITCH ASSEMBLY LEVEL FOR NORMAL SIGNAL RECEPTION. POLE LENGTH SHOULD BE SELECTED ACCORDINGLY.
SERVICE ENTRANCE CONDULET
TO ENTRANCE SWITCH P/O S62/FR
STRIP SHEATH & EXTEND SINGLE CONDUCTORS FROM THIS POINT
PULL BOX
STRAP ANCHORS
SHELTER S62/FR
2" RIGID CONDUIT (EMPTY)
BLANK EXISTING HOLE
GRADE
UNDERGROUND
ELEVATION
SECTION
TYPICAL UNDERGROUND POWER CABLE ENTRANCE DETAIL
NO SCALE
(SEE NOTE #3 - SHEET 1)
GRAPHIC SCALES
GENERAL NOTES
1. LEAVE 18" RG-17/U IN SPLICE BOX FOR EXTENSION TO PHASING UNIT BY AF.
2. RUBBER GROMMET TO BE REMOVED FROM EXISTING 4" HOLE WHICH IS TO BE COVERED BY A PLATE.
3. SPLICE BOX AND 10 GA. METAL PLATE TO BE WELDED TOGETHER, AND 2 1/2" CONDUIT NIPPLE INSERTED PRIOR TO SECURING TO WALL.
4. SIZES OF CONDUITS AND FITTINGS SHOWN ARE MINIMUM. ONE SIZE LARGER MAY BE SUBSTITUTED IF NECESSARY.
DETAIL "A"
10 GA. METAL PLATE MOUNTING
SCALE: 3"=1'-0"
28 EACH SCREWS, SHEET METAL BINDING, NO. 10x1/2"
WELD JOINT AROUND CABINET (SEE NOTE 3)
LOCKNUT BUSHING 3" CONDUIT
1 1/2" LOCKNUT, SET IN MASTIC COMPOUND.
1 1/2" CONDUIT
GALVANIZED SPLICE BOX WITH HINGED COVER 12"x18"x6"
HINGED COVER
4-1/4"x2" LAG SCREWS
10 GA. METAL PLATE
DETAIL "B"
R.F. CABLE ENTRANCE
SCALE: 3"=1'-0"
COVER BACK OF PLATE WITH MASTIC COMPOUND BEFORE FASTENING TO WALL OF BUILDING.
10 GA. METAL PLATE, 16" SQUARE
LOCKNUT SET IN MASTIC COMPOUND
LOCKNUT
BUSHING
2 1/2" NIPPLE 6" LONG
WELD JOINTS (SEE NOTE 3)
WOOD BLOCKS TO PREVENTS WALLS FROM BUCKLING.
3" CONDUIT FOR 2-RG-17/U R.F. CABLES 1-RG-57/U R.F. CABLES
GALVANIZED SPLICE BOX. WITH HINGED COVER. 12"x18"x6"
OUTSIDE WALL S-62/FR
24 1/2" TO CEILING
REVISIONS
SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.
DRAWN BY: PPW
TRACED BY: PPW
CHECKED BY: V.B.S.
UNITED STATES AIR FORCE
VHF OMNI-RANGE
AN/FRN-12A
MOUNTAIN TOP INSTALLATION
MISCELLANEOUS DETAILS
23 MARCH 1954
SCALE AS NOTED
AW-86-16-17
SHEET 3 OF 3

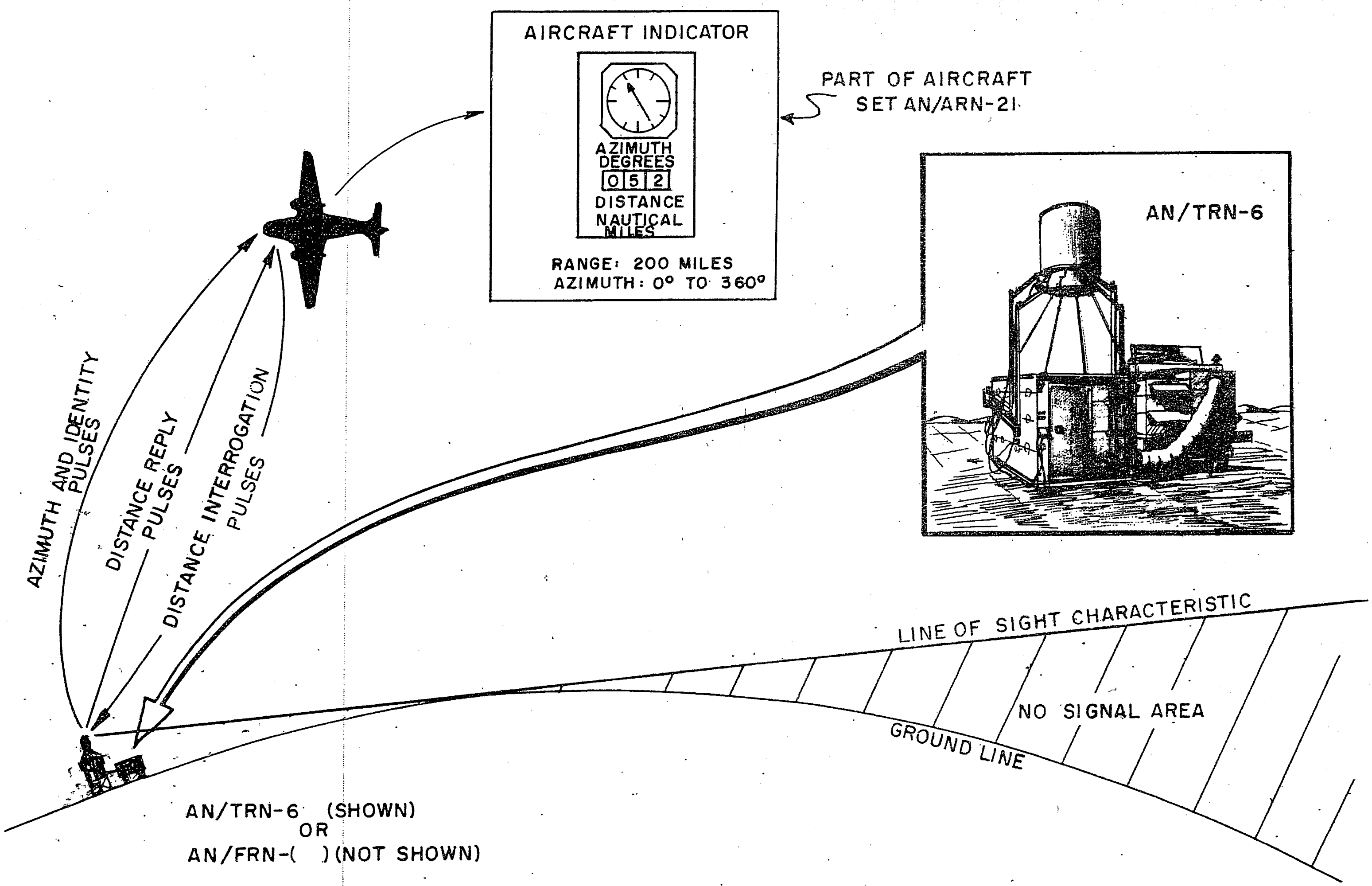
TACTICAL AIR NAVIGATION (TACAN), OMNIBEARING DISTANCE (OBD) FACILITY

Chapter 12

TACAN (OBD) FACILITY

AW DWGS 86-16-13 & 86-16-15

TACTICAL AIR NAVIGATION (OMNI BEARING DISTANCE) FACILITY



NOTE: COMMON BASIC EQUIP.- AN/URN-3

HQ AIRWAYS & AIR COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 10.

Chapter 12

TACTICAL AIR NAVIGATION (TACAN), OMNIBEARING DISTANCE (OBD) FACILITY

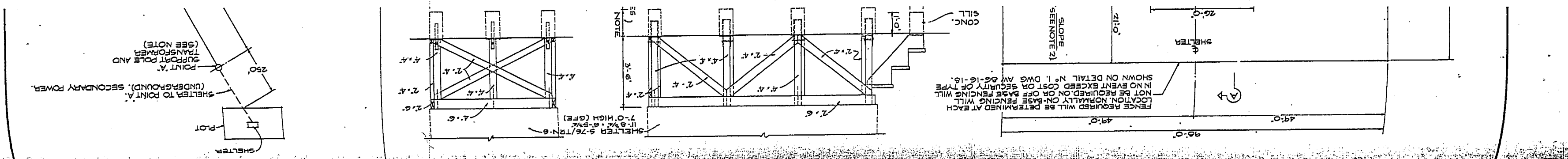
A. Function

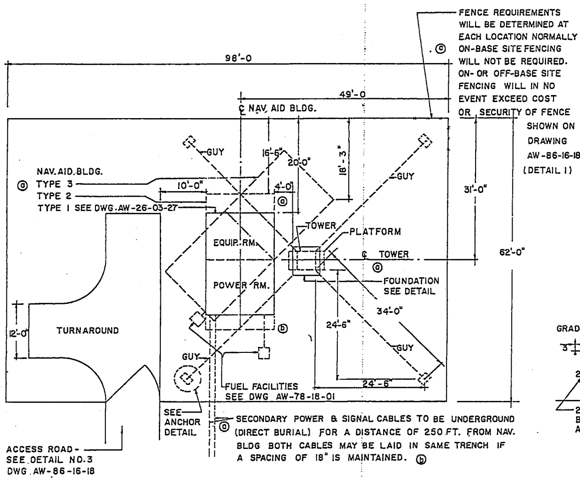
TACAN provides, for aircraft equipped with the appropriate airborne equipment, automatic visual indications of azimuth bearing and distance measurements to the ground installation. Distance measurement is visually displayed in the aircraft in nautical miles up to a range of 195 nautical miles, line of sight. Azimuth bearing is displayed in degrees (0–360), within line of sight. TACAN operates in the UHF band.

B. Physical Characteristics

1. *Fixed Plant Equipment* (*AN/FRN*–( ). The fixed plant installation consists of the AN/URN–3, basic ground transmitter-receiver, installed in a standard NAVAIDS building (Drawing AW–26–03–27) with the antenna mounted adjacent thereto on a 30-foot tower. The plot layout, fencing, access road, and construction requirements are detailed on drawings AW–86–16–13, AW–26–03–27 and AW–78–18–01. Siting criteria are available from Airways and Air Communications Service. Total power required at site is 30 kw, 120/208v, 3-phase, 4-wire, 60-cycle. Minimum (no spares or expansion capability) telephone cable requirements are two pairs; one for future remote and monitor use and one for voice communications.

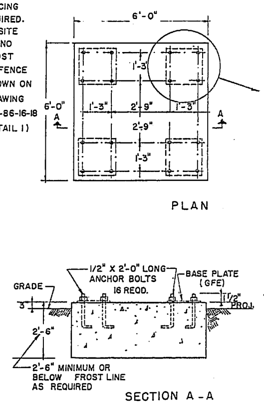
2. *Mobile Equipment* (*AN/TRN–6*). The mobile, air-transportable TACAN installation consists of the AN/URN–3 basic ground transmitter-receiver, installed in a prefabricated shelter with the antenna mounted thereon, and a trailer which contains an engine generator and air conditioner. The complete unit is transportable with a standard 4-ton cargo truck, for transporting the shelter and towing the trailer. The plot layout, fencing, access road, and construction requirements are shown on drawings AW–86–16–15 and AW–78–18–01. Siting criteria are available from Airways and Air Communications Service. Total power required at site is 20.5 kw, 120/208 v, 3-phase, 4-wire, 60-cycle. Minimum telephone cable requirements are two pairs; one for future remote and monitor use and one for telephone communications.





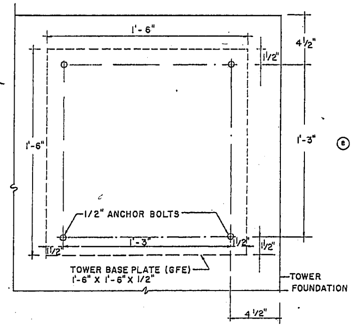
PLOT PLAN ⓒ

SCALE 1"=10'-0



TOWER FOUNDATION DETAILS

SCALE 1/2" = 1'-0"

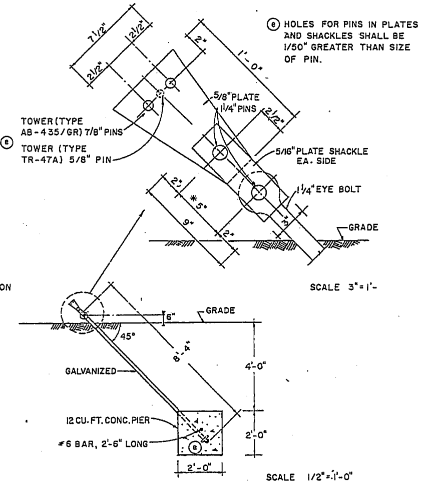


ANCHOR BOLT DETAIL

SCALE 3"=1'-0"

ⓓ NOTE: ALTERNATE SCREW OR PLATE TYPE PATENT ANCHORS MAY BE USED IN LIEU OF THAT SHOWN PROVIDED EQUIVALENT ANCHORAGE IS FURNISHED. TOWERS MUST BE RIGIDLY BRACED.

*NOTE:
WHEN BUILDING TYPES 2 OR 3 ARE USED INCREASE LENGTH OF SHACKLES TO 8'-2" BETWEEN PIN CENTERS FOR GUY WIRE CLEARANCE ABOVE BUILDINGS. FOR TOWER TYPE AB-435/GR ONLY.

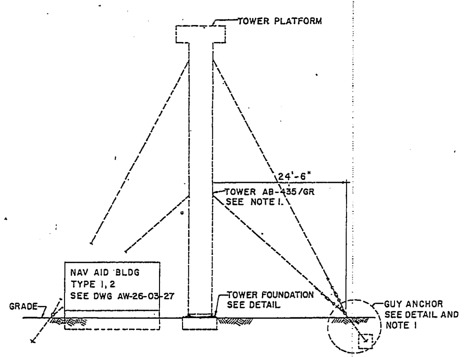


GUY ANCHOR DETAIL ⓔ

(4 REQUIRED - SEE NOTE 1)

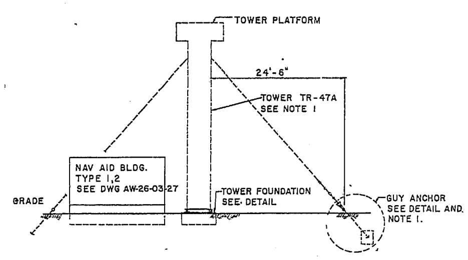
NOTES:

1. ALL TOWER COMPONENTS WILL BE GOVERNMENT FURNISHED & INSTALLED EXCEPT THE GUY ANCHORS, TOWER FOUNDATION, AND ANCHOR BOLTS. ALL OTHER ITEMS ON THIS DRAWING TO BE CONTRACTOR FURNISHED AND INSTALLED.
2. ASSUMED BEARING VALUE OF SOIL, 3000 LBS PSF.
3. ⓓ GENERAL EXCAVATING SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL, AND SHALL BE BELOW FROST LINE.
4. ALL CONCRETE SHALL BE CLASS "B", 2500 PSI.
5. ⓓ TOTAL POWER REQUIRED FOR THE AN/URN-3 IN A TYPE I NAVAIDS BLDG. WITH HEATERS IS 30.5 KW, 3 φ, 4 WIRE, 0.8 P.F., 120/208V, 60 CYCLE, ± 1.5 CYCLES FREQUENCY REGULATION FOR CHANGING LOAD, AND ± 0.5 CYCLES FOR STEADY STATE.



TOWER ELEVATION (TYPE AB-435/GR) ⓔ

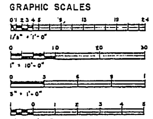
SCALE 1/8" = 1'-0"



TOWER ELEVATION (TYPE TR-47A)

SCALE 1/8" = 1'-0"

GRAPHIC SCALES



SYMBOL	DESCRIPTION	DATE	APPROVAL
ⓔ	TOWER ADDED AND GUY ANCHOR REVISED	7 FEB 57	[illegible]
ⓓ	NOTES ADDED	20 MAY 55	[illegible]
ⓒ	REVISION OF ANCHOR BOLT DETAIL AND PLAN	18 APRIL 55	[illegible]
ⓑ	POWER RM EXTEND DIM CHGD. APPLICABLE DWG ADDED	26 FEB 54	ECO
ⓐ	CABLE NOTE AT PLOT PLAN REVISED. NOTE 2 & 3 ADDED. NOTE ADDED TO FOOTING DEPTH - SECT "B" APPLICABLE DWGS ADDED. 4' DIMENSION WAS 5'. ADDED TYPE 2 & 3 BUILDING OUTLINE & DIMENSIONS; DELETED ℄ NAV AID BLDG. CHANGED FENCING NOTE & ADDED FENCE DETAIL	18 Feb 54	ECO

REVISIONS

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DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: AK ▽
TRACED BY:
CHECKED BY: N.C.H.
SUBMITTED BY: [signature]

UNITED STATES AIR FORCE
FIXED PLANT OBD
AN/URN-3
PLOT PLAN & TOWER FOUNDATION DETAILS

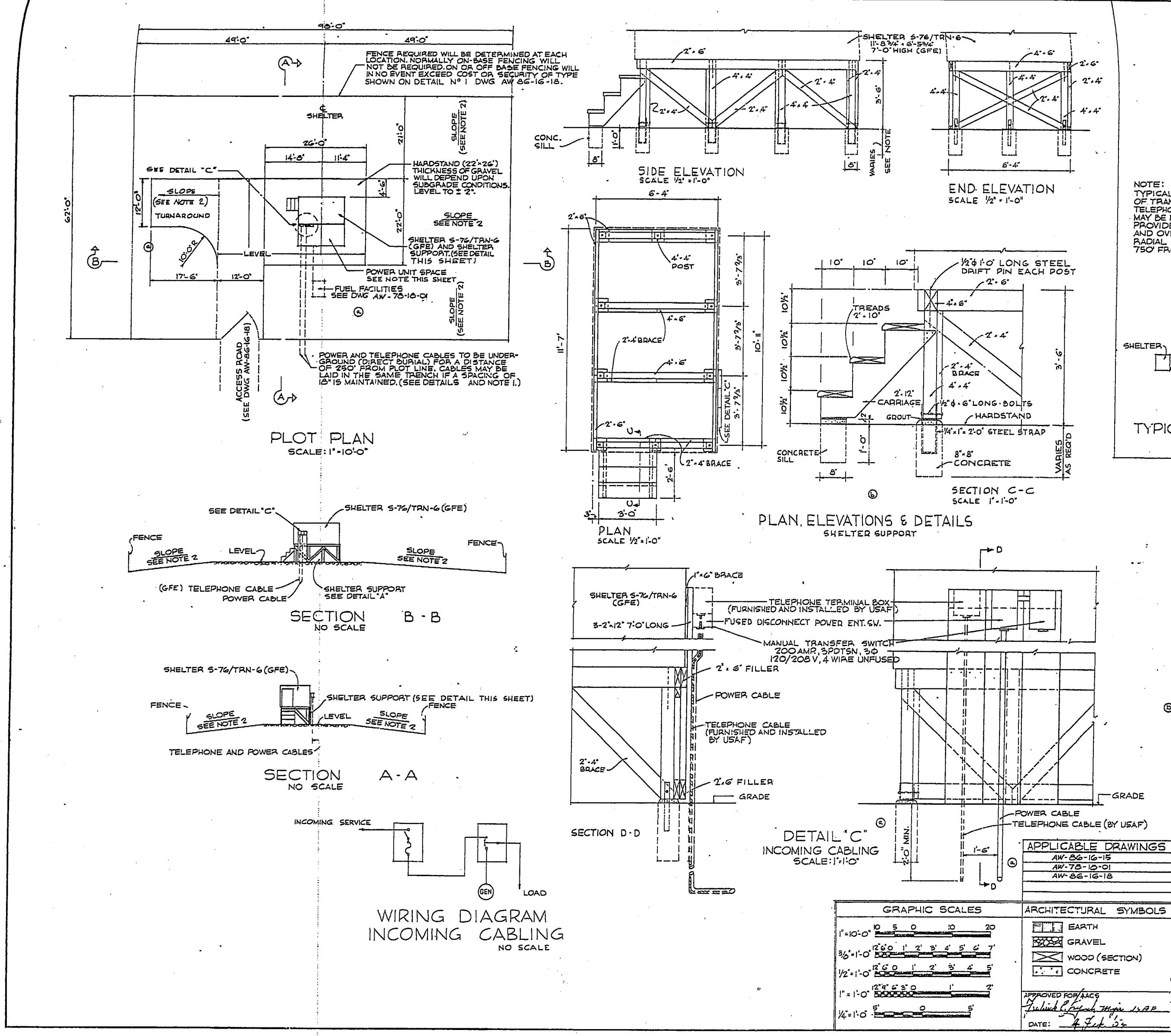
CHIEF AIRFIELDS BRANCH [signature]
APPROVED: [signature]
DATE: 28 JULY 1953

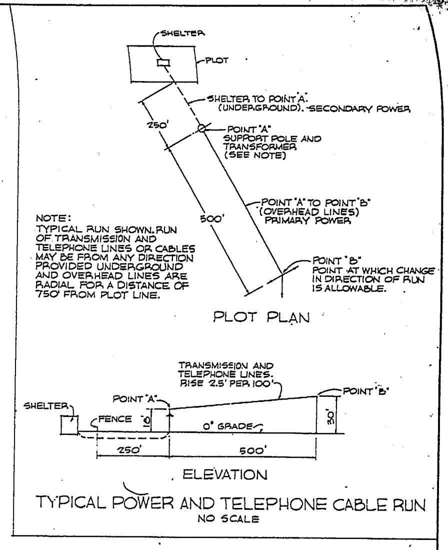
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE [signature]
ENGINEERING DIVISION ACS/I
DATE: 27 July 1953

SCALE NOTED
DRAWING NUMBER AW-86-16-13
SHEET 1 OF 1

APPLICABLE DRAWINGS ⓐ
AW-86-16-13
AW-26-03-27
AW-78-18-01 ⓑ
AW-86-16-18

APPROVED FOR AACS
Frederick C. Lynch
Major USAF





GENERAL NOTES

1. SUPPORT POLE AND TRANSMISSION LINE HEIGHT AT POINT WHERE POWER AND TELEPHONE CABLE GOES UNDERGROUND (250' FROM PLOT LINE) WILL NOT EXCEED 18' ABOVE ZERO GRADE ELEVATION (ZERO GRADE ELEVATION IS ELEVATION OF LEVEL HARDSTAND). DIFFERENCE IN ELEVATION OF GROUND LEVEL AT SUPPORT POLE SHOULD BE ADDED TO OR SUBTRACTED FROM POLE HEIGHT, AS APPLICABLE. THE POWER TRANSMISSION AND/OR TELEPHONE LINE WILL BE RUN ON A RADIAL (BASED ON CENTER OF SHELTER) FOR AT LEAST 500' FROM POINT WHERE CABLES GO UNDERGROUND AND WILL NOT INCREASE IN HEIGHT ABOVE ZERO GRADE ELEVATION AT A RATE GREATER THAN 2.5' PER 100' OF RUN.
2. A SLOPE OF UP TO 10% IS DESIRABLE BUT NOT MANDATORY.
3. ALL ITEMS ON THIS DRAWING TO BE CONTRACTOR FURNISHED AND INSTALLED EXCEPT THOSE NOTED AS GFE.

EXCAVATION: GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL AND BOTTOM OF FOOTING SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL: 3000 PSF.
CONCRETE: ALL CONCRETE SHALL BE CLASS "B", 2500 PSI.
WOOD: ALL WOOD TO BE PRESERVATIVE TREATED.

NOTE: POWER REQUIRED AT SHELTER TO BE 3 ϕ, 4 WIRE, (b) (a) 120/208 V, 20.5 KW ± 5% VOLTAGE REGULATION, 0.8 P.F., 60 CYCLE ± 1.5 CYCLES, FREQUENCY REGULATION FOR CHANGING LOAD AND ± 0.5 CYCLES FOR STEADY STATE. IF USED TO CALCULATE COMMERCIAL SERVICE FEEDER EQUIPMENT OR TRANSFORMER SIZES CONVERT TO KVA (0.8 PF) AND ADD 15% FOR RESERVE CAPACITY. A GENERATOR IS FURNISHED AS A PART OF AN/TRN-6 (GFE). AUTOMATIC POWER TRANSFER EQUIPMENT (CONTRACTOR FURNISHED AND INSTALLED) MAY BE USED IN LIEU OF THE MANUAL TRANSFER SWITCH SHOWN ON THIS DRAWING.

SYMBOL	DESCRIPTION	DATE	APPROVAL
(b)	SHELTER SUPPORT REVISED, PLAN ADDED, ROAD SECTION & FENCE DETAIL DELETED, NOTE REVISED	4-8-57	
(a)	NOTE REVISED; TURNAROUND CHANGED; ALL AF- DWG REFERENCES CHANGED TO AW-; RELOCATED BOXES & SWITCH ON SHELTER SUPPORT DETAIL "C"	4-19-55	

REVISIONS

SPECTOR & MONTGOMERY
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FALLS CHURCH, VIRGINIA.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

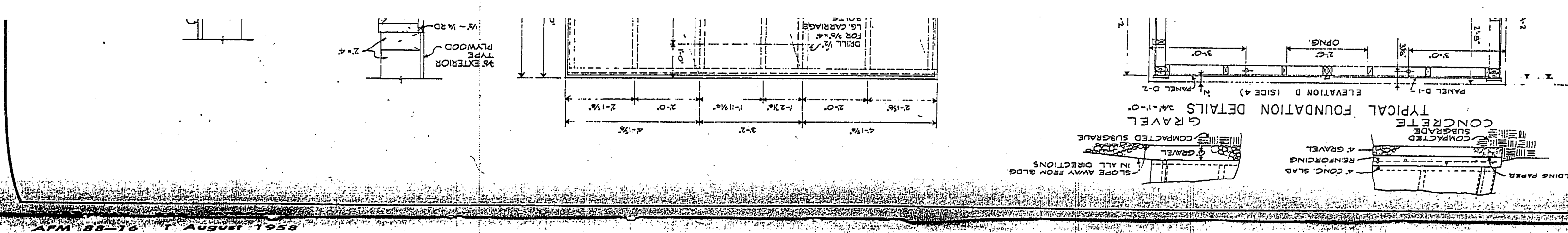
DRAWN BY: PPW
TRACED BY: PPW
CHECKED BY: RAF
SUBMITTED BY: SPECTOR & MONTGOMERY
APPROVED: CHIEF STRUCTURES BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
DATE: 9 FEB. 1954

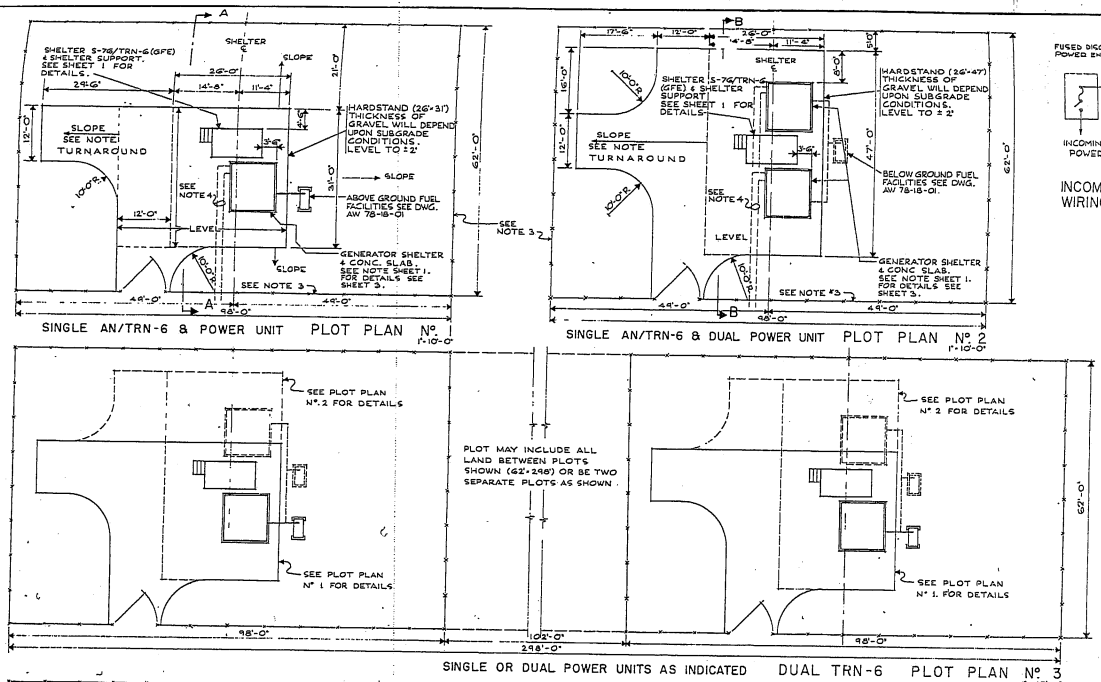
UNITED STATES AIR FORCE
MOBILE TACAN
AN/TRN-6
PLOT PLAN AND DETAILS

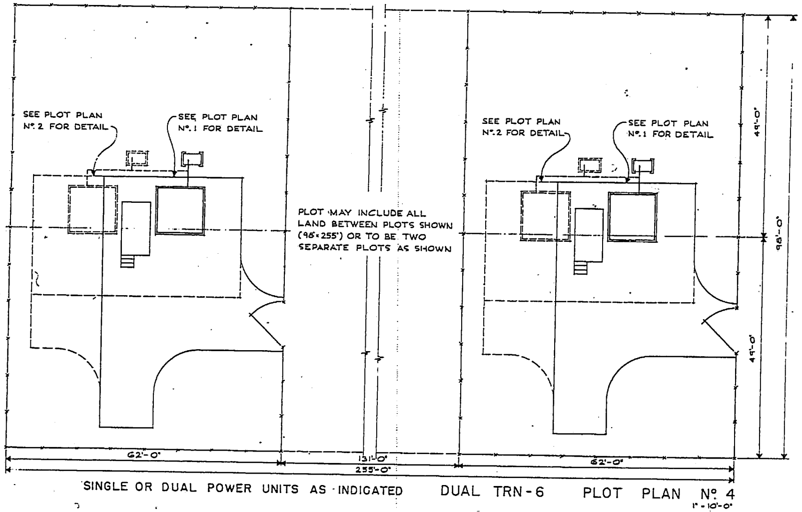
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
ENGINEERING DIVISION ACS/I
DATE: 4 Feb. 1954

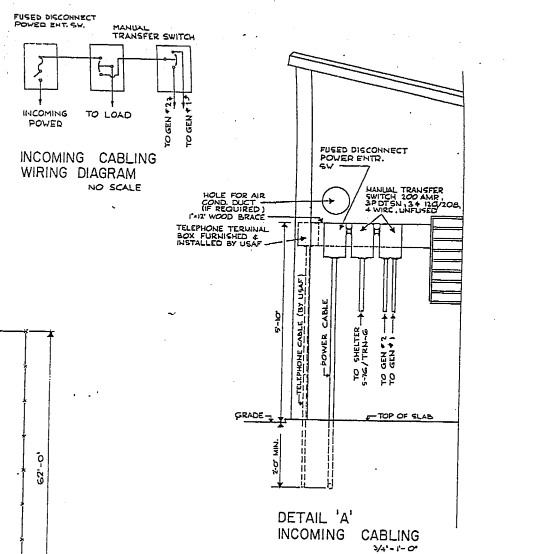
APPROVED FOR/SACS
DATE: 4 Feb 54

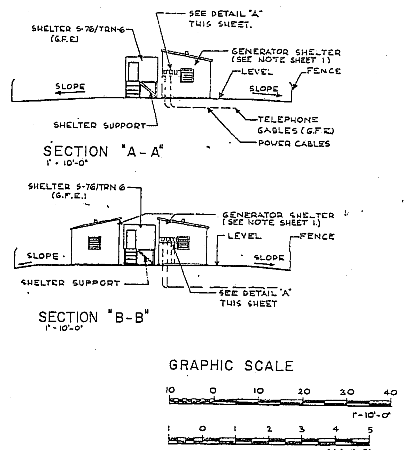
SCALE AS SHOWN
SPEC. NO. AW 86-16-15-55-CE
DRAWING NUMBER AW-86-16-15
SHEET 1 OF 3











GENERAL NOTES

1 FOR SINGLE AN/TRN-6 WITH 3 POWER UNITS A PLOT WITH A POWER BUILDING (TYPE 3 AF DWG AW-26-03-26) A SHELTER SUPPORT AND AN ANTENNA TOWER IS REQUIRED TENTATIVE DRAWINGS, UTILIZING THE EXISTING PLOT, ARE AVAILABLE FROM HQ'S USAF FOR THIS TYPE INSTALLATION.
FOR DUAL AN/TRN-6 INSTALLATIONS WHERE NO COMMERCIAL POWER IS AVAILABLE (THAT IS 3 POWER UNITS) HQ'S USAF WILL PROVIDE TENTATIVE DRAWINGS UTILIZING THE EXISTING PLOT, A TYPE 3 POWER BLDG, TWO AN/TRN-6 SHELTER SUPPORTS AND A SINGLE ANTENNA TOWER.

2 NOTES 1, 2 & 3 SHEET 1 APPLY TO THIS SHEET ALSO.

3 FENCE REQUIRED WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON-BASE FENCING WILL NOT BE REQUIRED. ON OR OFF BASE FENCING WILL IN NO EVENT EXCEED COST OR SECURITY OF FENCE SHOWN ON DWG. AW 86-16-18, DETAIL NO. 1.

4 POWER & TELEPHONE CABLES TO BE UNDERGROUND (DIRECT BURIAL) FOR A DISTANCE OF 250FT. FROM PLOT LINE. CABLES MAY BE LAID IN THE SAME TRENCH IF A SPACING OF 18" IS MAINTAINED. (SEE DETAILS THIS SHEET & NOTE 2.)

5 FOR DETAIL OF ACCESS ROAD SEE DWG. AW 86-16-18.

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

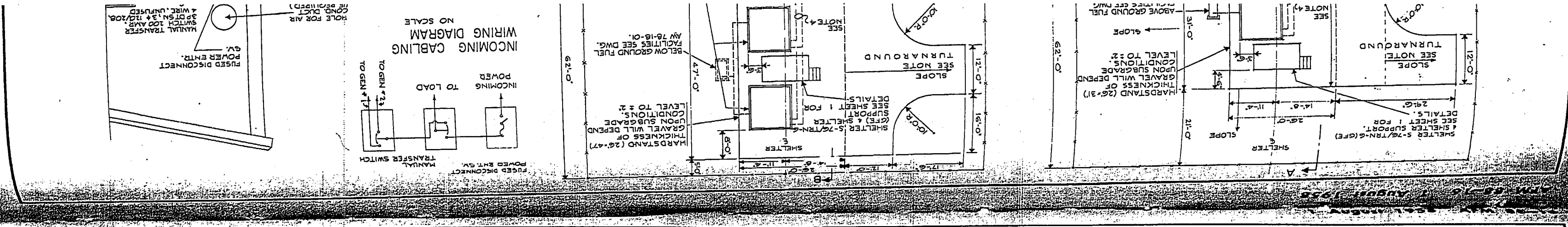
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

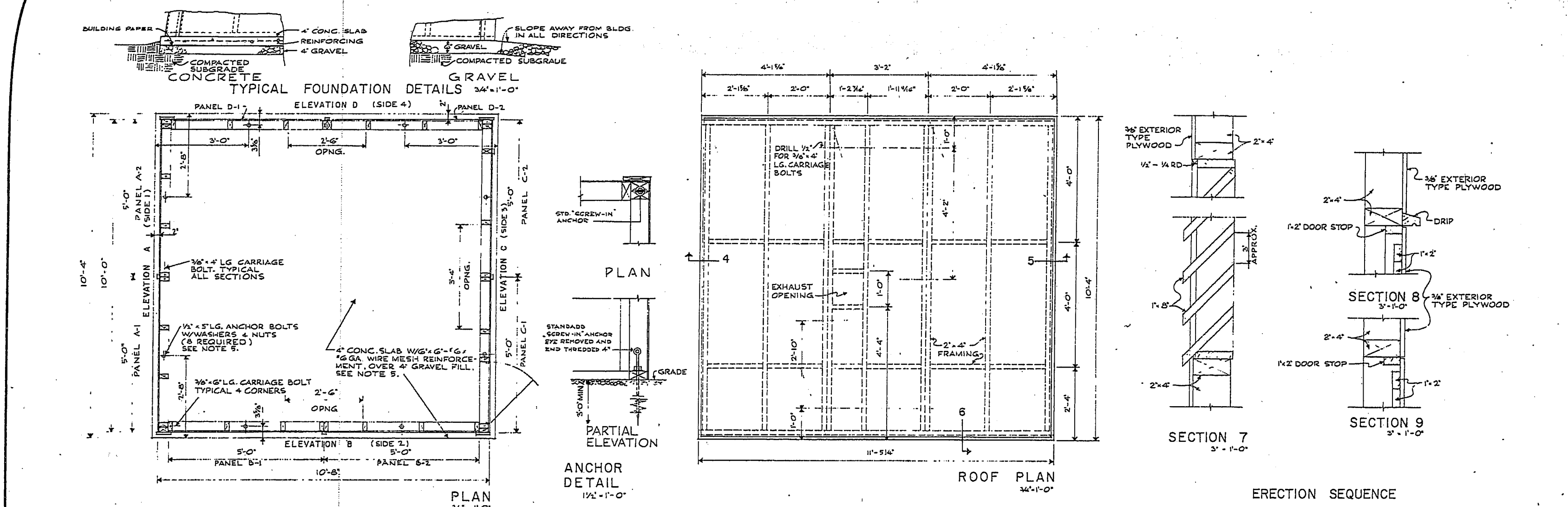
ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

MOBILE TACAN
AN/TRN-6
PLOT PLAN LAYOUTS WITH GENERATOR SHELTER

APPROVED: [signature] AFCIE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-15
SCALE AS SHOWN
DATE 8 APRIL 1957
SHEET 2 OF 3





ERECTION SEQUENCE

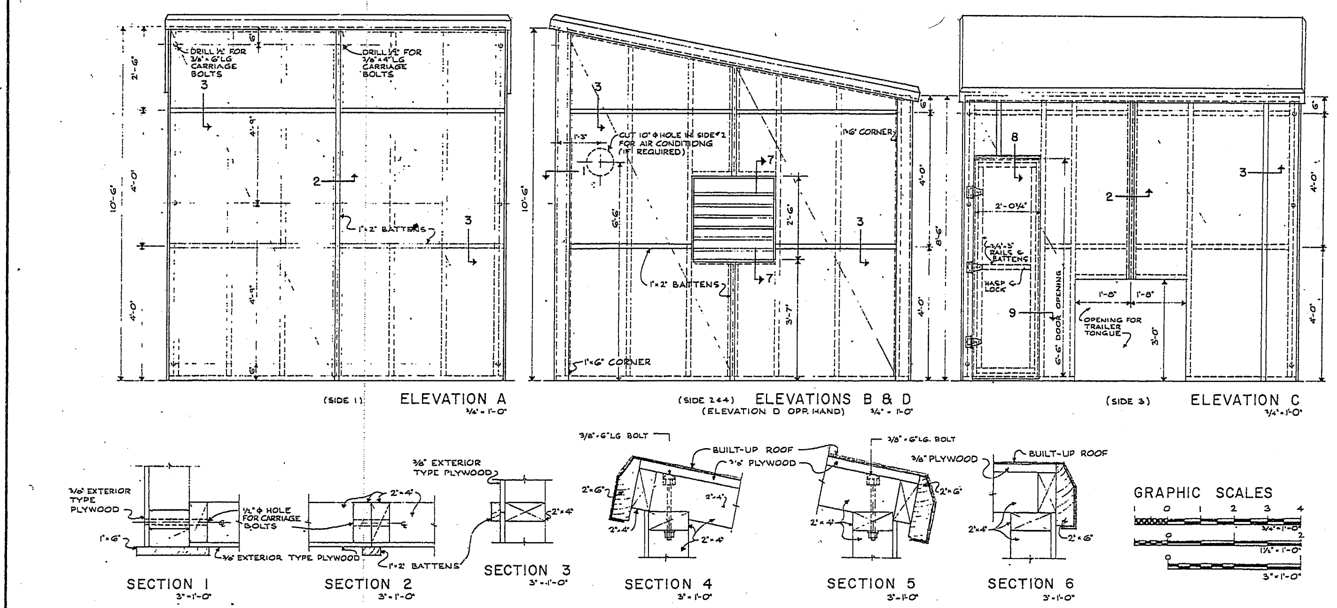
1. BOLT SECTIONS OF RESPECTIVE SIDES & ROOF TOGETHER.
2. BOLT SIDES 1, 2 & 4 TO FOUNDATION.
3. BOLT SIDES 1, 2 & 4 TOGETHER.

NOTE MOVE GENERATOR INTO SHELTER PRIOR TO STEP 4 IF GENERATOR IS AVAILABLE, IF NOT, REMOVE SIDE 3 TO INSTALL.

4. BOLT SIDE 3 TO FOUNDATION.
5. BOLT SIDE 3 TO SIDES 2 & 4.
6. BOLT ROOF TO SIDES 1, 2 & 4.
7. INSTALL ROOF JACK RAIN CAP & LOUVER.
8. NAIL ROOFING IN PLACE & LAP OVER EDGES OF ROOF PANEL.
9. PROVIDE CANVAS FLAP FOR TONGUE OPENING IN SIDE 3.

GENERAL NOTES

1. LOUVER TO BE WOOD OR METAL AND INSTALLED IN SIDES 2 & 4.
2. FABRICATE ROOF JACK & RAIN CAP FOR ENGINE EXHAUST OPENING IN ROOF. PROVIDE INSIDE FLASHING AROUND OPENING
3. ALL SECTIONS TO BE PAINTED PRIOR TO ERECTION
4. ROOFING TO BE 90 LB ASPHALT IMPREGNATED FELT OR EQUAL, TARRED AND NAILED IN PLACE AFTER ERECTION.
5. IF CONCRETE SLAB IS NOT FEASIBLE, GRAVEL HARDSTAND WILL BE USED. SHELTER HOLDOWN METHOD IN THIS CASE WILL BE DONE AS SHOWN IN DETAIL THIS SHEET.



SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

MOBILE TACAN
AN/TRN-6
GENERATOR SHELTER DETAILS

APPROVED: [signature] AFCIE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-15
SCALE AS SHOWN
DATE 8 APRIL 1957
SHEET 3 OF 3

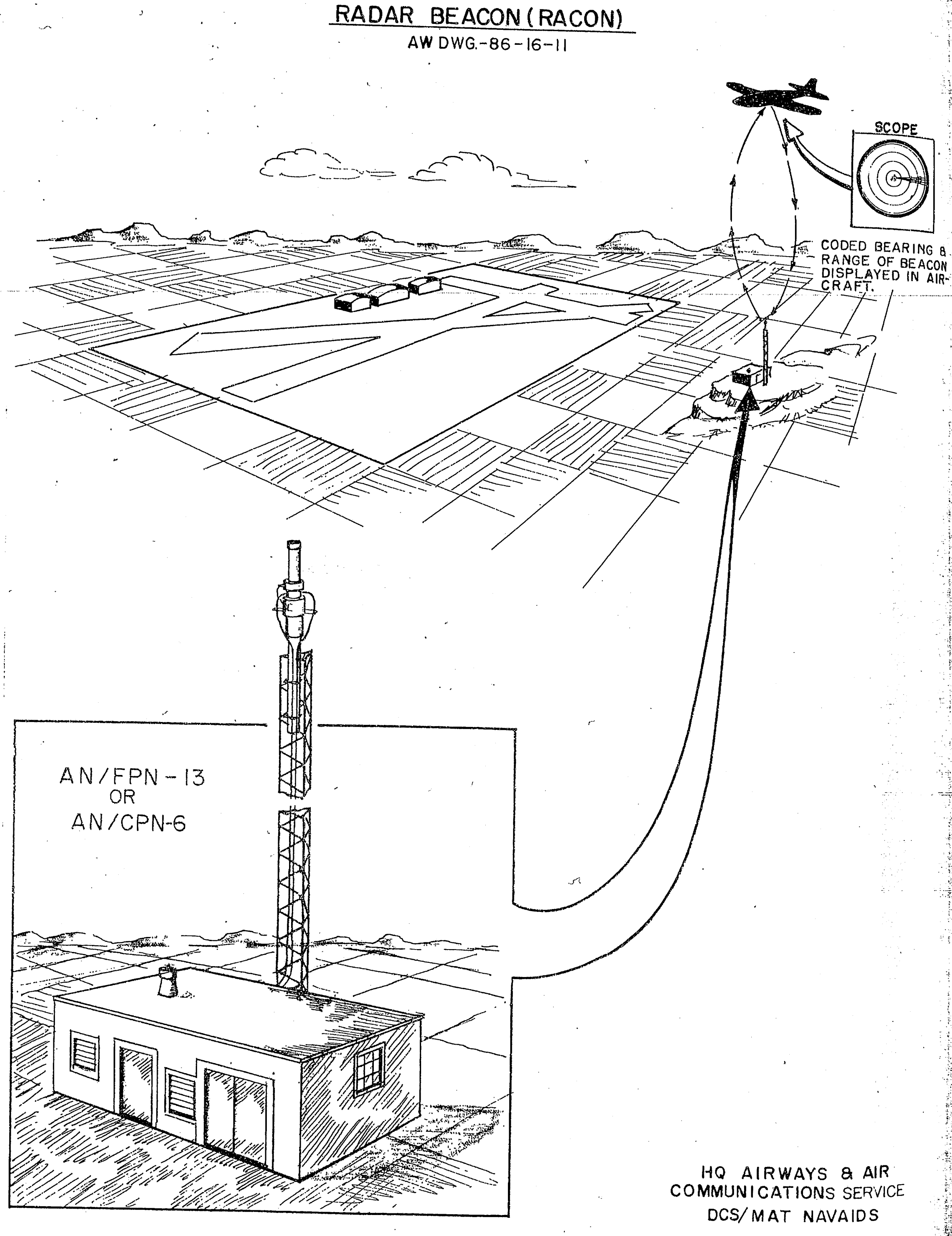
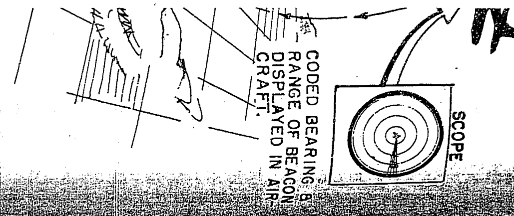

RADAR BEACON (RACON)
AW DWG.-86-16-11
SCOPE
CODED BEARING & RANGE OF BEACON DISPLAYED IN AIR-CRAFT.
AN/FPN-13
OR
AN/CPN-6
HQ AIRWAYS & AIR COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 11.

IRWAYS & AIR
ICATIONS SERVICE
MAT NAVAIDS



Chapter 13

RADAR BEACON (RACON)

A. Function

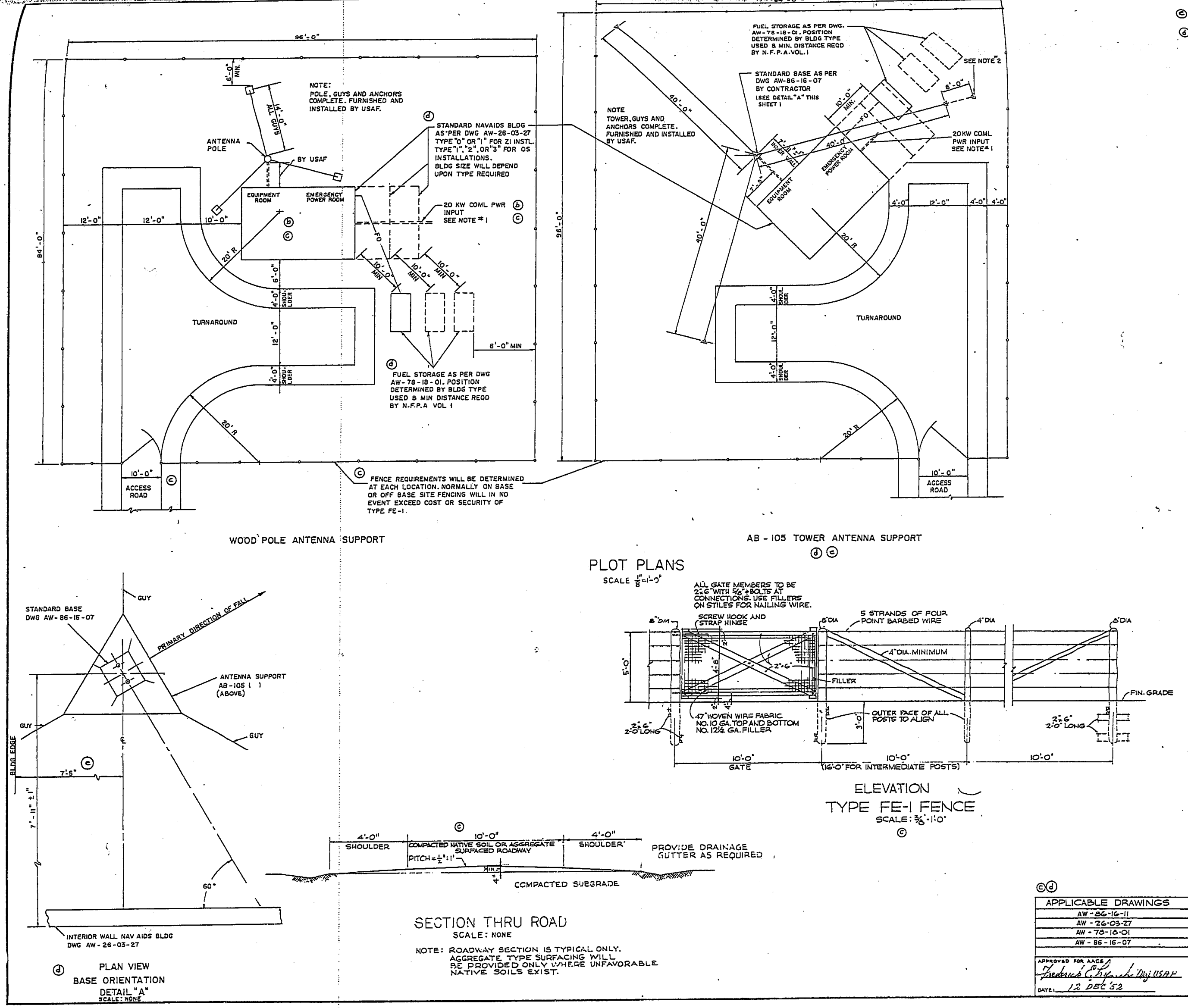
Radar beacon (RACON) facilities AN/FPN–13 and AN/CPN–6 are microwave transmitter-receivers (X-band frequency) that provide a beacon signal to any suitable airborne radar and from which the radar operator in the aircraft can obtain both distance and direction information. The signal also is coded so that the particular beacon can be identified by reference to a chart or beacon list. An additional advantage of the RACON is that it transmits only when interrogated by a special radar signal emitted from the aircraft desiring orientation. The beacon requires no operators and functions automatically and unattended except for electronic maintenance. Installations are usually on or near an air base for convenience of maintenance and providing a suitable "homing" facility for aircraft.

B. Physical Characteristics

The RACON equipment (AN/CPN–6 or AN/FPN–13) normally is installed in a NAVAIDS building (drawing AW–26–03–27) with the antenna mounted on a pole adjacent to the building. The plot layout, fencing, access road, and construction requirements are detailed on drawings AW–86–16–11, AW–26–03–27, and AW–78–18–01. Siting criteria are available from Airways and Air Communications Service. Total power required at the site is:

AN/CPN–6: 16.5 kw, 120/208V, 3-phase, 4-wire, 60-cycle.
AN/FPN–13: 26.9 kw, 120/208V, 3-phase, 4-wire, 60-cycle.

Minimum (no spares or expansion capability) telephone cable requirements are for two pairs.



NOTES

(c) 1. COMMERCIAL POWER TO BE EITHER 120/240V, 1Φ, 3 WIRE OR 120/208V, 3Φ, 4 WIRE AS DETERMINED BY LOCAL CONDITIONS.

(d) 2. WHEN TYPE "3" BUILDING IS USED BASE LINE IS EXTENDED TO ELEVATE GUY CLEAR OF BUILDING.

APPLICABLE DRAWINGS
AW-86-16-11
AW-26-03-27
AW-78-18-01
AW-86-16-07

APPROVED FOR AACS: Frederick C. [signature] Maj USAF
DATE: 12 DEC 52

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
(e)	REVERSED PLOT PLAN FOR AB-105 TOWER; IN DETAIL "A", 7'-5" DIMENSION RELOCATED	8 MAR '56	[signature]
(d)	ADDED PLOT PLAN FOR ANTENNA SUPPORT; ADDED DETAIL "A" & TO NOTES; ALL AF-DWG REFERENCES CHANGED TO AW-;	OCT 15 '53	[signature]
(c)	~~AF ADDED TO DRAWING NO. APPLICABLE DRAWINGS ADDED.~~ TITLE BLOCK CHANGED. ROADWAY WIDTH CHANGED. SPEC. NUMBER ADDED. COML. POWER CHANGED. FENCE NOTE REVISED. FENCE DETAIL ADDED.	18 Feb 54	CCD
(b)	COML. PWR. CHANGED FROM 120/208V3PH4W TO 115/230-1PH 3W	15 SEPT 53	[signature]
(a)	COML. PWR CHANGED FROM 115V1PH TO 120/208V3PH	28 APR 53	[signature]

KEYES, SMITH, & SATTERLEE - ARCHITECTS
FRANCIS D. LETHBRIDGE - ASSOCIATE
ARCHITECTS - ENGINEERS
3 DUPONT CIRCLE WASHINGTON, D. C.

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: LM
TRACED BY: LM
CHECKED BY: A.H.K.
SUBMITTED BY: A. H. Keyes Jr.
APPROVED: [signature] CHIEF AIRFIELDS BRANCH
APPROVED: [signature] CHIEF ENGINEERING DIVISION, MIL. CONSTR., OCE
DATE: 20 MARCH 1953

UNITED STATES AIR FORCE
AN/CPN-6 & AN/FPN-13 RADAR BEACONS
TYPICAL LAYOUT PLOT PLAN & DETAILS

APPROVED FOR CHIEF OF STAFF USAF: [signature]
DATE: 18 MARCH 1953
SCALE: NOTED
SPEC. NO. AW-86-16-11-53-CE
DRAWING NUMBER: AW-86-16-11
SHEET 1 OF 1

75 MC FAN MARKER

AW DWG. 86-16-16

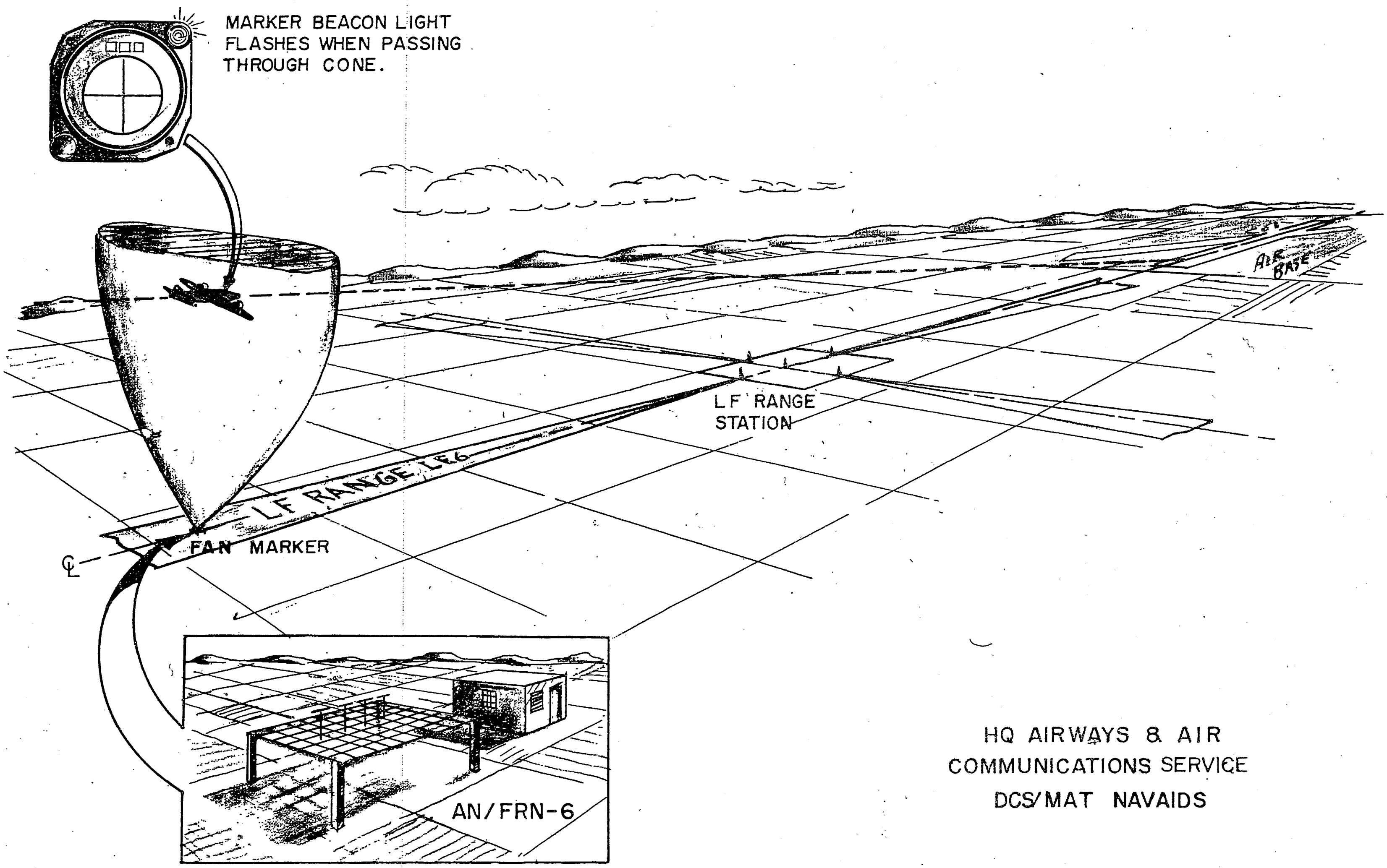


Figure 12.

Chapter 14

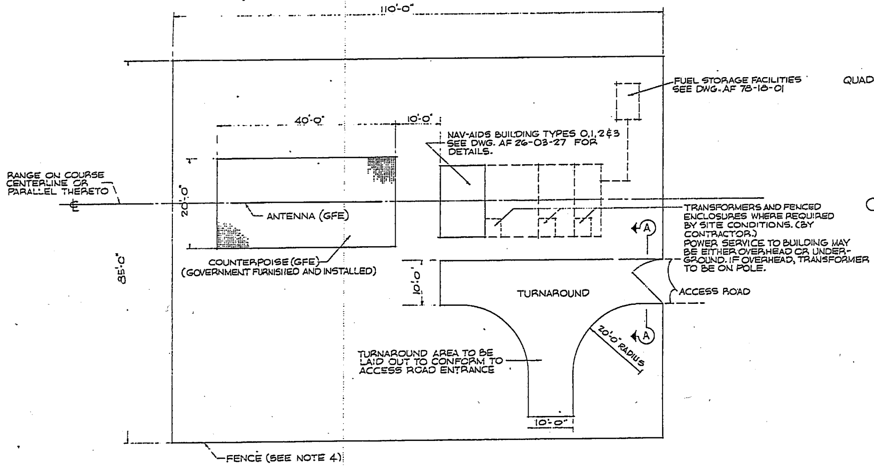
75MC FAN MARKER

A. Function

The 75-MC fan marker is used in conjunction with radio ranges for determining range leg position. Aircraft equipped with the 75-MC marker beacon receiver may determine their position on the range leg by means of coded visual and/or aural signals depending on the type of receiver used.

B. Physical Characteristics

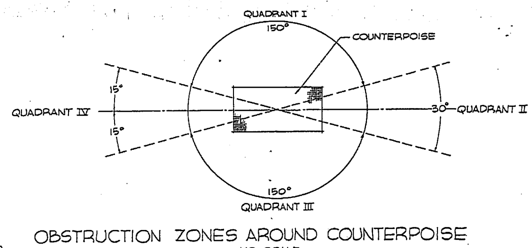
The fan marker installation consists of the basic transmitting equipment housed in a NAVAIDS building (drawing AW–26–03–27) with the antenna counterpoise and antenna located adjacent thereto. The counterpoise and antenna are furnished and erected by Airways and Air Communications Service. The plot layout, access road, fencing, and construction requirements are shown on drawings AW–86–16–16, AW–26–03–27, and AW–78–18–01. Siting criteria are available from Airways and Air Communications Service. Total power required at the site is approximately 13 kw, 120/240V, single-phase, 3-wire, 60-cycle. Mininum telephone cable requirements (no spares or expansion capability) are one pair.



PLOT PLAN

SCALE: 1" = 10'-0"

NOTE: NAV-AIDS BUILDING, TURNAROUND AND ANTENNA COUNTERPOISE MAY BE REVERSED 180 DEGREES FROM POSITION SHOWN, PROVIDED THE LONG POSITION IS MAINTAINED PARALLEL TO THE LINE OF NORMAL FLIGHT, i.e., BUILDING MAY BE IN EITHER QUADRANT II OR QUADRANT IV.



OBSTRUCTION ZONES AROUND COUNTERPOISE

NO SCALE

OBSTRUCTIONS ADJACENT TO THE SITE THAT CANNOT BE REMOVED SHOULD BE IN QUADRANT II OR IV AND MINIMUM OF 10' THEREFROM.

FIG. 1

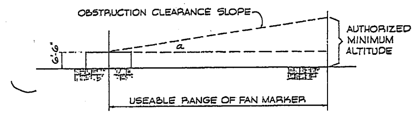


FIG. 2

NO SCALE

FAN MARKER				
QUADRANTS I & III			QUADRANTS II & IV	
ALTITUDE FEET ABOVE STATION	RANGE	VERTICAL ANGLE a OBSTRUCTION SLOPE	RANGE	VERTICAL ANGLE a OBSTRUCTION SLOPE
1000	6 MI.	1° - 45'	1½ MI.	8° - 15'
1500	7 MI.	2° - 15'	1½ MI.	9° - 30'
2000	9 MI.	2° - 30'	2 MI.	10° - 45'
3000	11 MI.	3° - 00'	2½ MI.	14° - 00'
5000	15 MI.	3° - 30'	3 MI.	17° - 30'
7000	17 MI.	4° - 00'	3½ MI.	20° - 45'
9000	19 MI.	5° - 00'	4 MI	24° - 15'

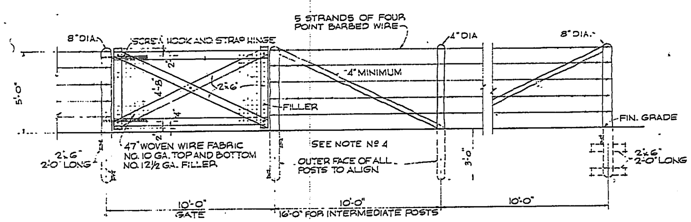
THIS TABLE SHOWS THE RANGE OF THE MARKER AT VARIOUS ALTITUDES AND THE REQUIRED OBSTRUCTION CLEARANCE SLOPE.

GENERAL NOTES

1. IN ORDER TO OBTAIN ADEQUATE SIGNAL AT A GIVEN ALTITUDE, THE AIR SPACE BETWEEN THE MARKER ANTENNA AND THIS ALTITUDE, FOR THE DESIRED RANGE OF THE MARKER, SHOULD NOT BE SCREENED BY TERRAIN OR LARGE GROUPS OF OBSTACLES, SUCH AS TREES, BUILDINGS, ETC.
2. POWER LINES SHALL NOT CROSS THE COUNTERPOISE.
3. (a) THE LONG AXIS OF THE 20' × 40' FAN MARKER COUNTERPOISE MUST BE ON OR PARALLEL TO THE RANGE COURSE SERVED EXCEPT AT INTERSECTIONS OF RANGE COURSES WHERE IT SHALL BE ORIENTATED AND POSITIONED FOR OPTIMUM USE.
(b) FAN MARKER SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE CENTERLINE OF THE RANGE COURSE SERVED. IN ANY EVENT SO ADEQUATE RECEPTION IS OBTAINED AT THE AUTHORIZED MINIMUM ALTITUDE.
4. FENCE REQUIREMENTS WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON BASE OR OFF BASE SITE FENCING WILL IN NO EVENT EXCEED COST OR SECURITY OF TYPE FE-1.

NORMAL CONTRACT SERVICE

5. SEE DWG. AF-26-03-27 FOR NAV AID BUILDING DETAILS.
6. SEE DWG AF-78-18-01 FOR FUEL STORAGE INSTALLATION DETAILS.
7. FURNISH AND INSTALL FENCE, IF REQUIRED. SEE NOTE 4.
8. INSTALL ACCESS ROAD AND TURNAROUND AREA.
9. FURNISH GRAVEL ON TURNAROUND AREA.
10. CLEAR OBSTRUCTIONS ADJACENT TO SITE AS REQUIRED.
11. FURNISH AND INSTALL POWER SERVICE TO BUILDING.

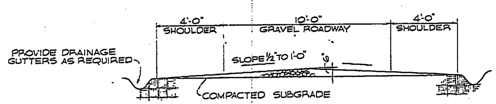


ALL GATE MEMBERS TO BE 2×6 WITH 5/8" ⌀ BOLTS AT CONNECTIONS. USE FILLERS AT STILES FOR NAILING WIRE.

ELEVATION

TYPE FE-1 FENCE

SCALE 3/8" = 1'-0"



SECTION "A-A"

SCALE: 3/8" = 1'-0"

NOTE: ROADWAY SECTION IS TYPICAL ONLY. THICKNESS OF GRAVEL DEPENDENT UPON SUBGRADE CONDITIONS

APPLICABLE DRAWINGS
AF-86-16-16
AF-78-18-01
AF-26-03-27

SYMBOL	DESCRIPTION	DATE	APPROVAL

REVISIONS

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

GRAPHIC SCALES

1" = 10'-0" 10' 0' 10'

3/8" = 1'-0" 12" 6" 0 1' 2' 3' 4' 5' 6' 7'

ARCHITECTURAL SYMBOLS

GRAVEL

EARTH

APPROVED FOR AACS Frederick E. [illegible] Maj USAF

DATE 4 Feb 54

DRAWN BY: PPW

TRACED BY: PPW

CHECKED BY: RAF

SUBMITTED BY: Victor D. Spector
SPECTOR & MONTGOMERY

APPROVED: [illegible]
CHIEF STRUCTURES BRANCH

APPROVED: [illegible]
CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.

DATE: 9 FEB. 1954

APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE [illegible]
DIRECTORATE OF INSTALLATIONS, DCS/O

DATE: 4 Feb 1954

UNITED STATES AIR FORCE

75 MC FAN MARKER

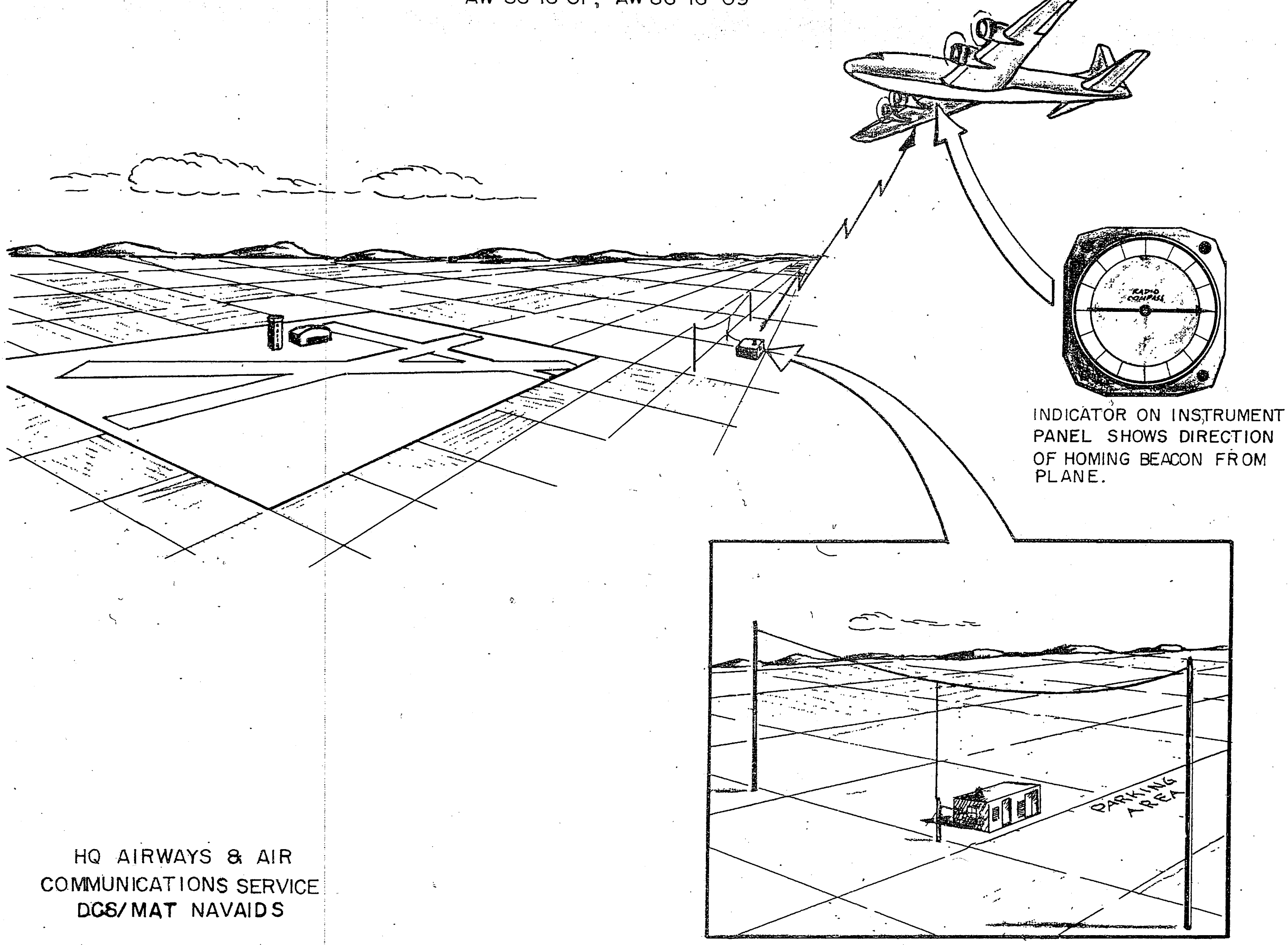
TYPICAL PLOT PLAN AND DETAILS

SCALE AS NOTED | SPEC. NO. AW-86-16-16-53-CE

DRAWING NUMBER AW-86-16-16

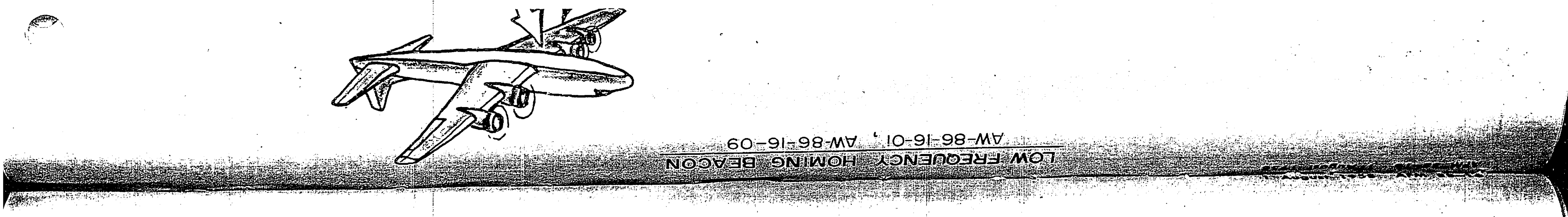
SHEET 1 OF 1

LOW FREQUENCY HOMING BEACON
AW-86-16-01 , AW-86-16-09



HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 13.



Chapter 15

RADIO HOMING BEACON

A. Function

A radio homing beacon radiates a signal in all directions, like an ordinary broadcasting station. The beacon also sends identifying code characters at short intervals. The pilot, having identified the beacon and its location, can guide his aircraft by observing the needle of his low frequency radio compass (ADF), which points toward the radio beacon. Several types of radio homing beacons are used, as detailed below.

B. Physical Characteristics

Three types of radio homing beacon equipments are programed for Air Force installation, AN/URN–5, BC–446, and BC–329. Construction of buildings, access roads, power and control lines, as well as plot plan layouts, are identical for all three types, and are outlined below:

1. *Applicable Drawings:*

AW–26–03–26	Emergency power building.
AW–26–03–27	NAVAIDS Buildings types 0, 1, 2, and 3.
AW–86–16–01	AN/URN–5 layout and details.
AW–86–16–07	Standard base for 73-foot antenna supports.
AW–86–16–09	AN/URN–5, BC–329, or BC–446 layout.
AW–78–18–01	Fuel facilities.

2. *Buildings and Roads.* Normally, the standard NAVAIDS building is projected for a radio homing beacon, with the exact type 0, 1, 2, or 3 being designated on the basis of availability and dependability of local normal and emergency power service. In some cases, radio homing beacons are installed in either or both of the middle and outer marker buildings, to function as components of the ILS facility. They are then called "compass locators." The extra power consumption and landline requirements must be added to middle and outer marker requirements.

3. *Power and Control Lines:*

(a) *Power.* Power required will vary with the type of installation; for details refer to the following drawings as applicable: AW–86–16–01, AW–86–16–09, AW–26–03–26, and AW–26–03–27.

(1) AN/URN–5—16.9 kw including 10 kw for electric heaters, single phase, 3 wire, 120/240 volts.

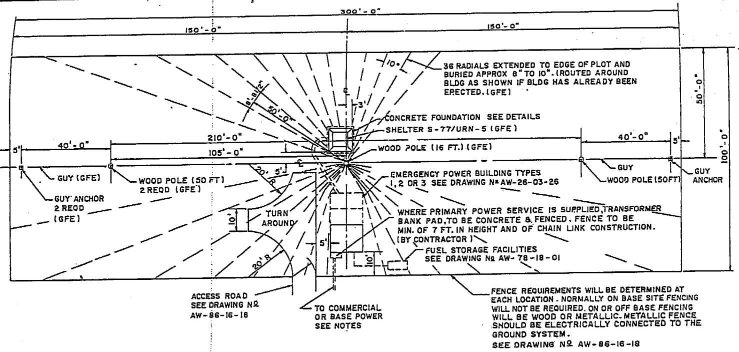
(2) BC–329—13.6 kw including 10 kw for electric heaters, single phase, 3 wire, 120/240 volts.

(3) BC–446—15.5 kw including 10 kw for electric heaters, single phase, 3 wire, 120/240 volts.

(b) *Control Lines.* Air Force homing beacons normally are operated as remote, unattended facilities without control lines. If voice operation is desired and/or it is necessary to turn the beacon on or off from a location other than the local site, landlines are required as follows:

(1) AN/URN–5—one pair to perform on, off, and push-to-talk operation.

(2) BC–446/BC–329—one pair for control, one pair for voice modulation, or two pairs to perform on, off, and push-to-talk operation. In addition, one pair of wires, for telephone communication with maintenance personnel at the beacon, may be required.



PLOT PLAN
SCALE. 1" = 20'-0"
(A)

GENERAL NOTES

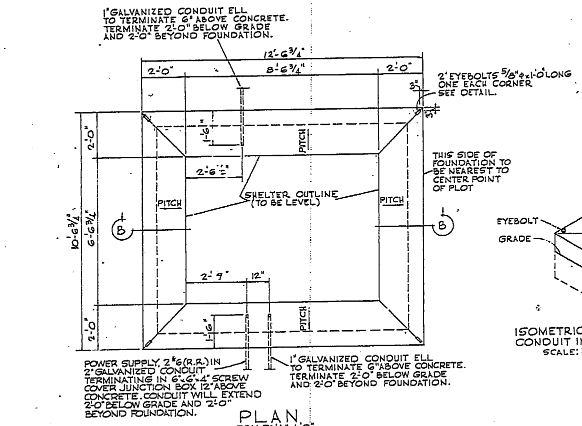
EXCAVATION:
GENERAL EXCAVATING SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL, AND SHALL BE BELOW FROST LINE.

ASSUMED BEARING VALUE OF SOIL: 3000#/SQ.FT.

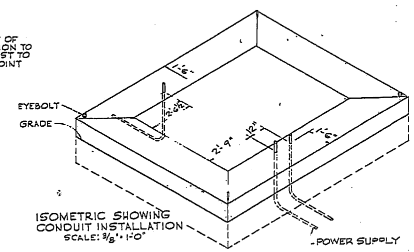
CONCRETE:
ALL CONCRETE SHALL BE CLASS "B", 2500#/SQ.IN.

MISCELLANEOUS:
ALL MATERIALS SHOWN ON THIS DWG OR ON APPLICABLE DWGS ARE CONTRACTOR FURNISHED AND INSTALLED EXCEPT AS NOTED.

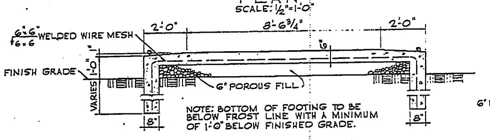
AERIAL OR UNDERGROUND POWER AND COMMUNICATION SERVICE CABLES ARE SATISFACTORY. IF UNDERGROUND SERVICE IS TO BE SUPPLIED, CONTRACTOR WILL PROVIDE 2 - 4" DUCTS (CONCRETE ENCASED) FROM POWER BLDG TO EDGE OF PLOT.



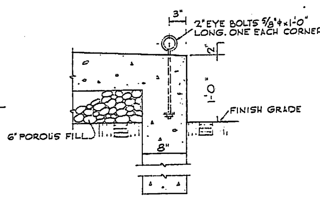
PLAN
SCALE: 1/2"=1'-0"



ISOMETRIC SHOWING CONDUIT INSTALLATION
SCALE: 3/8"=1'-0"



SECTION "B-B"
SCALE: 1/2"=1'-0"



SECTION AT EYEBOLT
SCALE: 1 1/2"=1'-0"

DETAILS OF SHELTER S/77 FOUNDATION

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL
(A)	REVISED PLOT PLAN, DELETED FENCE & ACCESS ROAD DETAILS WHICH APPEAR ON APPLICABLE DWG AW-86-16-18.	1-12-57	[signature]

APPLICABLE DRAWINGS
AW-86-16-01
AW 26-03-26
AW-78-18 01
AW-86-16-18 (A)

GRAPHIC SCALES
1" = 20'-0" 20' 0 20'
3/8" = 1'-0" 12" 0 1' 2' 3' 4' 5' 6' 7'
1/2" = 1'-0" 12" 6" 0 1' 2' 3' 4' 5'
1 1/2" = 1'-0" 12" 9" 6" 3" 0 1'

ARCHITECTURAL SYMBOLS
CONCRETE
EARTH
GRAVEL OR POROUS FILL

APPROVED FOR AACS.- Frederick E. [illegible] USAF
DATE [illegible]

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

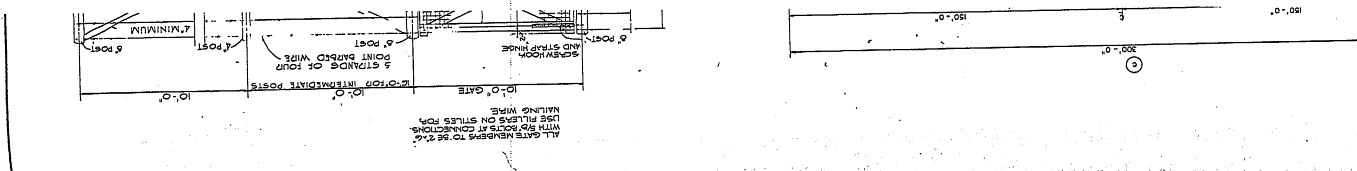
DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

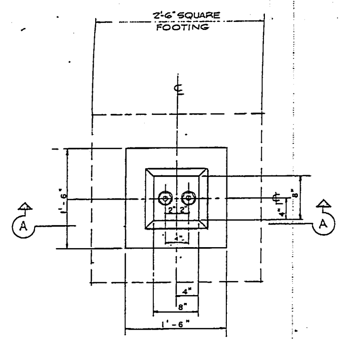
DRAWN BY: RAF
TRACED BY: RAF
CHECKED BY: V.B.S.
SUBMITTED BY: [signature] SPECTOR & MONTGOMERY
APPROVED: [signature] CHIEF STRUCTURES BRANCH
APPROVED: [signature] CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
DATE: 9 FEB. 1954
APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE [signature] DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 4 [illegible] 1954

UNITED STATES AIR FORCE
LOW FREQUENCY HOMING BEACON
AN/URN-5 IN S/77 SHELTER
TYPICAL LAYOUT AND DETAILS

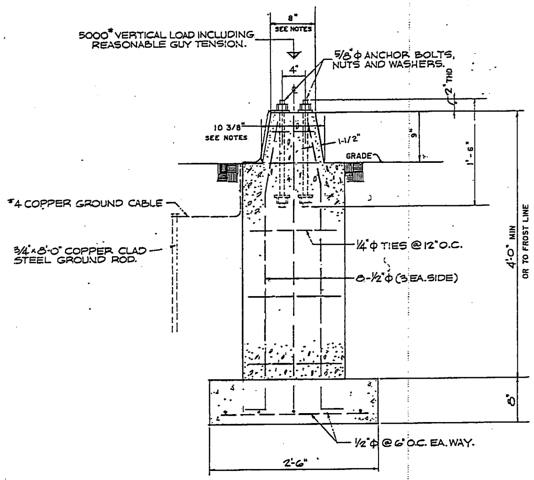
SCALE AS NOTED
SPEC. NO. AW-86-16-01-53-CE
DRAWING NUMBER AW - 86 - 16 - 01
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DRAWING NO. 86-16-01 2 SHEETS DATED 16, JULY 1952





ⓐ PLAN



ⓐ SECTION "A-A" CONCRETE BASE

GRAPHIC SCALE

1½" = 1'-0" 12" 9" 6" 3" 0 1'

GENERAL NOTES

SOIL BEARING:

DIMENSIONS SHOWN ARE USED FOR SOIL BEARING OF 3000 P.S.F. OR MORE.

FOR LOWER SOIL BEARING VALUES, PIER, FOOTINGS, ETC. SHALL BE REDESIGNED TO SUIT LOCAL CONDITIONS.

CONCRETE:

ALL CONCRETE TO BE CLASS "B" (2500 P.S.I.)

ANCHOR BOLTS:

THE PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THREADS.

ⓐ DETAILS ON THIS DRAWING APPLICABLE FOR L.F. ANTENNA INSTALLATION IN CONNECTION WITH AN/URN-5, BC 446 AND BC 329 AS SHOWN ON DRAWING AW-86-16-09, AND AN/CPN-6 & AN/FPN-13 AS SHOWN ON DRAWING AW-86-16-11.

ⓐ THE 8" AND 10 3/8" DIMENSIONS AS SHOWN ON CONCRETE BASE MUST BE MAINTAINED TO PROVIDE THE NECESSARY CLEARANCES FOR RAISING THE SUPPORT.

ⓐ ALTERNATE STEEL BASE MAY BE USED. FOR DETAILS SEE TM 11-2615 AND T.O. 16-35AB105-5. STEEL BASE IS GOVERNMENT FURNISHED AND INSTALLED.

SYMBOL	DESCRIPTION	DATE	APPROVAL
ⓐ	DELETED ELEVATION OF STEEL BASE; MODIFIED CONCRETE BASE; ADDED TO NOTES, ADDED APPLICABLE DRAWINGS; ALL AF-DWG REFERENCES CHANGED TO AW-	OCT 14 '55	

REVISIONS

APPLICABLE DRAWINGS
AW - 86 - 16 - 09
AW - 86 - 16 - 11

ⓐ

ARCHITECTURAL SYMBOLS

EARTH

CONCRETE

APPROVED FOR AACS
Frederick E. Lynch Major USAF
DATE: 4 Feb '54

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: P.P.W.
TRACED BY: P.P.W.
CHECKED BY: R.A.F
SUBMITTED BY: Victor B. Spector — SPECTOR & MONTGOMERY
APPROVED: CHIEF STRUCTURES BRANCH
APPROVED: CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.
DATE: 9 FEB. 1954

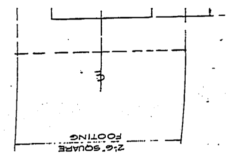
UNITED STATES AIR FORCE

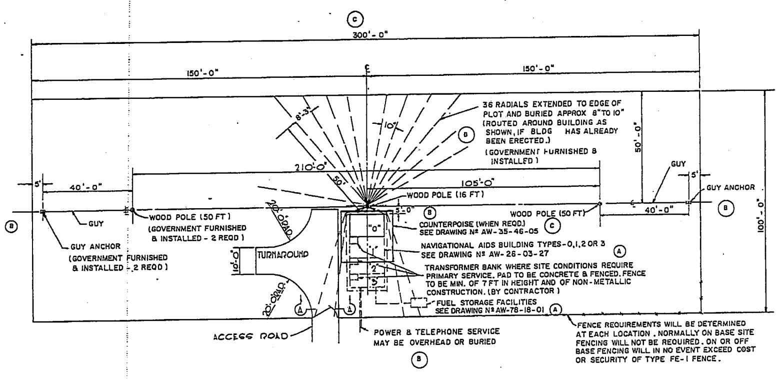
STANDARD BASE FOR 73 FT. ANTENNA SUPPORTS

APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 4 Feb 1954

SCALE: 1½" = 1'-0"
SPEC. NO. AW-86-16-07-53-CE
DRAWING NUMBER AW -86-16-07
SHEET 1 OF 1

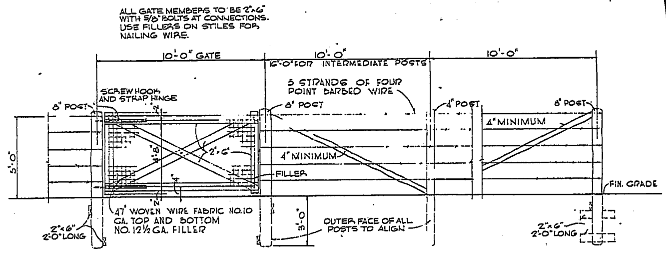
THIS DRAWING SUPERSEDES DRAWING Nº 86-16-07 SHEET 1 DATED 25 JULY 1952



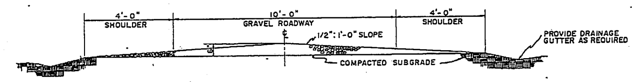


PLOT PLAN
SCALE: 1" = 20'-0"

LOW FREQUENCY HOMING BEACON
OR
ILS MARKER BEACON - COMPASS LOCATOR



ELEVATION
TYPE FE-1 FENCE
SCALE: 3/8" = 1'-0"



NOTE: ROADWAY SECTION IS TYPICAL ONLY, THICKNESS OF GRAVEL WILL DEPEND UPON SUBGRADE CONDITIONS.

SECTION "A"-"A"
ACCESS ROAD
SCALE: 1/2" = 1'-0"

NOTES

(C) 1. FOR COMPASS LOCATOR FACILITY CONSTRUCT BUILDING ON EXTENDED CENTERLINE OF INSTRUMENT RUNWAY, OFF APPROACH END ; A DEVIATION OF 250' EITHER SIDE MAY BE TOLERATED. MIDDLE AND OUTER MARKERS SHOULD BE ON SAME SIDE OF RUNWAY CENTERLINE. ORIENTATION OF PLOT MAY BE VARIED IF NECESSARY TO SIMPLIFY REAL ESTATE REQUIREMENTS & ACQUISITION. THE BUILDING & ANTENNA WILL BE CORRESPONDINGLY RE-ORIENTED, ALONG WITH THE PLOT, TO MAINTAIN THE SAME RELATION TO THE 100' X 300' PLOT.

2. TYPE OF GUY ANCHOR USED WILL BE SELECTED BY BASE IE ACCORDING TO LOCAL SOIL AND WIND REQUIREMENTS.

(C) 3. WHERE COMPASS LOCATOR OR HOMING BEACON IS LOCATED AT AN ILS MIDDLE MARKER SITE, HEIGHT OF 50' POLES MAY REQUIRE ADJUSTMENT TO MEET REQUIREMENTS OF AFR 86-5. POLE HEIGHT WILL NOT BE REDUCED TO LESS THAN 28' ABOVE GROUND. A WAIVER WILL BE REQUIRED IN EVENT THIS HEIGHT CONFLICTS WITH THE PROVISIONS OF AFR 86-5.

(C)

REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
(C)	COMBINED COMPASS LOCATOR AND HOMING BEACON PLOT PLANS ; CHANGED NOTE 1 AND ADDED NOTE 3 ;	18 AUG '56	[illegible]
(B)	ADDED COMPASS LOCATOR PLOT PLAN, NOTES & APPLICABLE DWG ; CHANGED DWG. TITLE ; MINOR CHANGES IN LF HOMING BEACON PLOT PLAN	11 JUNE '56	[illegible]
(A)	ALL AF- DWG REFERENCES CHANGED TO AW-	7 OCT 55	[illegible]

APPLICABLE DRAWINGS

	AW-86-16-09
	AW-26-03-27
(A)	AW 78-18-01
	AW-86-16-07
(B)	AW-35-46-05

GRAPHIC SCALES

1" = 20'-0"
1/2" = 1'-0"
3/8" = 1'-0"

ARCHITECTURAL SYMBOLS

EARTH
GRAVEL

APPROVED FOR AACS: Frederick E. Lynch Maj USAF
DATE 4 Feb '54

SPECTOR & MONTGOMERY
ARCHITECTS — ENGINEERS
FALLS CHURCH, VIRGINIA

DEPARTMENT OF THE AIR FORCE
DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D. C.

DRAWN BY: DJO
TRACED BY: DJO
CHECKED BY: RAF
SUBMITTED BY: Victor B. Spector
SPECTOR & MONTGOMERY
APPROVED: [signature]
CHIEF STRUCTURAL BRANCH
APPROVED: [signature]
CHIEF ENGINEERING DIVISION, MIL. CONSTR., O.C.E.

UNITED STATES AIR FORCE
LOW FREQUENCY HOMING BEACON
OR
ILS COMPASS LOCATOR
IN NAV. AIDS BUILDING TYPES 0,1,2 OR 3
TYPICAL LAYOUT & DETAILS

DATE: 9 FEB. 1954

APPROVED FOR CHIEF OF STAFF, U. S. AIR FORCE
[signature]
DIRECTORATE OF INSTALLATIONS, DCS/O
DATE: 4 Feb 1954

SCALE: AS SHOWN
SPEC. NO. AW-86-16-09-53-CE
DRAWING NUMBER
AW-86-16-09
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DRAWING Nº 86-16-09 SHEET 1 DATED 12 NOVEMBER 1952

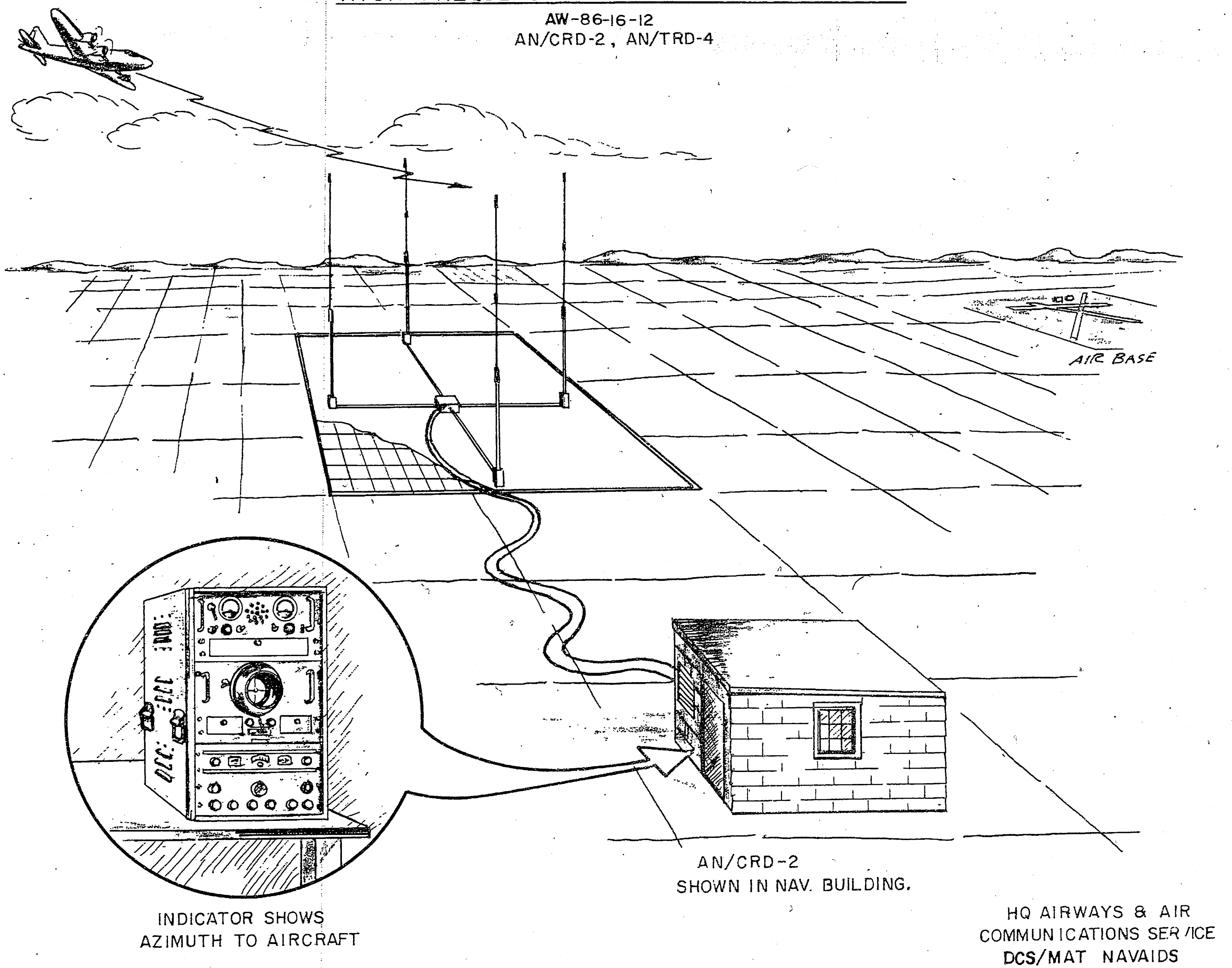
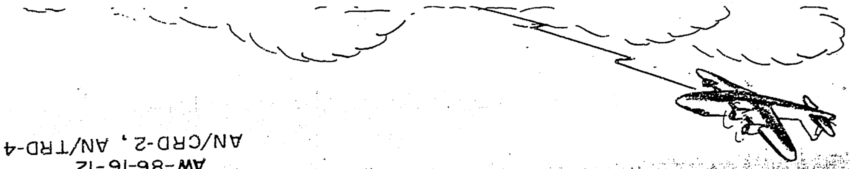

HIGH FREQUENCY DIRECTION FINDER (HFDF)
AW-86-16-12
AN/CRD-2, AN/TRD-4
AIR BASE
AN/CRD-2
SHOWN IN NAV. BUILDING.
INDICATOR SHOWS
AZIMUTH TO AIRCRAFT
HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 14.



Chapter 16

HIGH FREQUENCY DIRECTION FINDER (HF–D/F)

A. Function

AN/CRD–2 and AN/TRD–4 are high frequency direction finders (HF–D/F's) which serve essentially the same operational requirement. AN/TRD–4 is the current production military HF–D/F. A single HF–D/F station is used to indicate the direction of arrival of radio signals, from ground or airborne transmitters. This information, in the case of aircraft, may be transmitted to the pilot as a "steer" or "bearing" by any available communications. Several HF–D/F stations may be employed in a D/F net to obtain a "fix," or position for the aircraft or other station.

B. Physical Characteristics

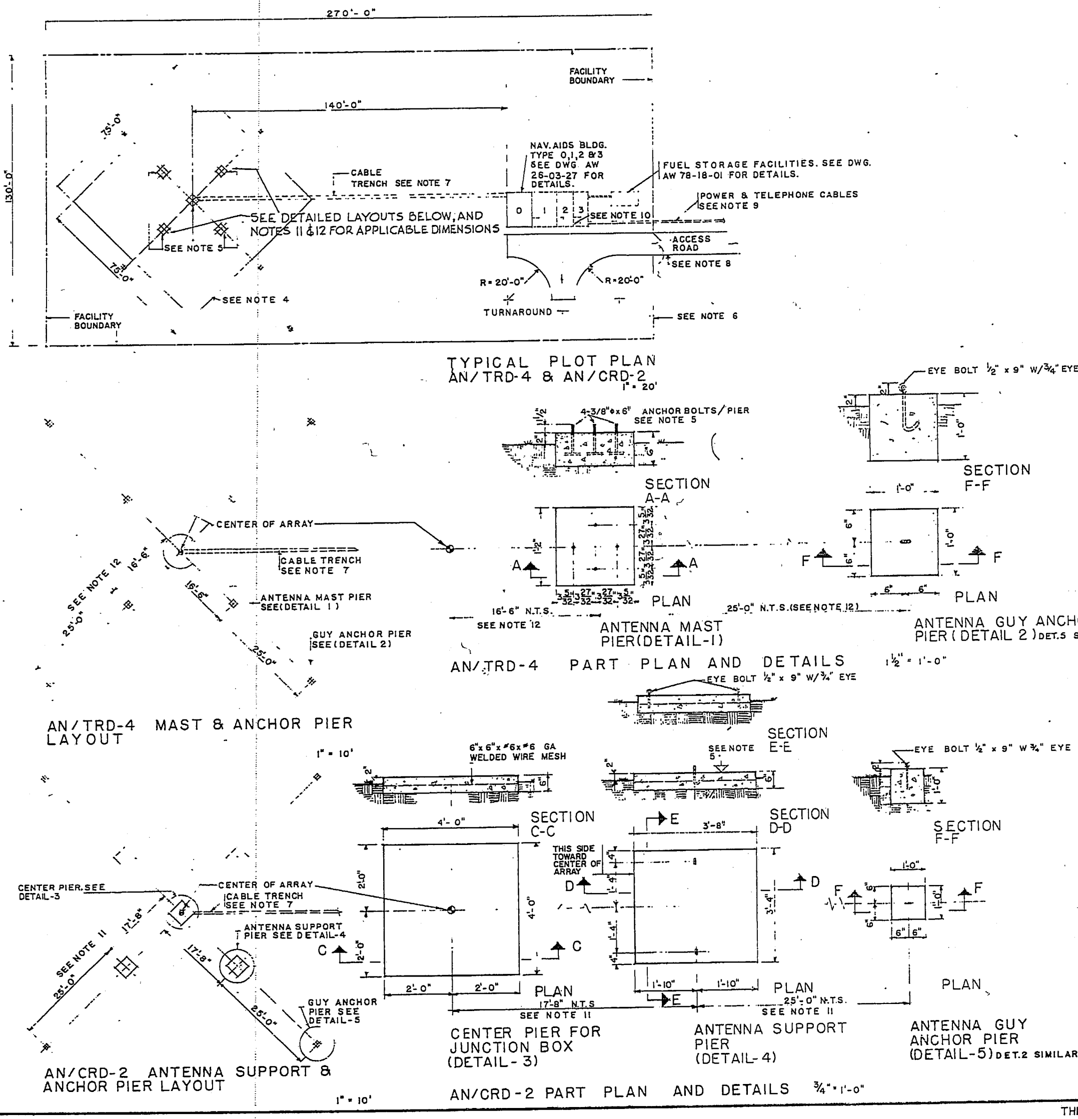
AN/CRD–2 consists of basic electronic components comprising an HF–D/F facility. It requires shelter and power additionally. AN/TRD–4 consists of basic electronic components comprising an HF–D/F facility plus an HF short-range ground wave D/F. These equipments are installed in a 3-operator position prefabricated shelter with two 5-kw power generators included. Sitting is performed by Airways and Air Communications Service and the criteria are the same for both AN/CRD–2 and AN/TRD–4 and are shown on drawing AW–86–16–12. However, the layout varries, depending upon individual station physical plant, that is, shelter, NAVAIDS, or other type of building, access road, power and communications lines.

C. Power

Power required varies with the type of installation. For AN/CRD–2 or the AN/TRD–4 alone, 13-kw (including 10 kw for two electric heaters), single-phase, 3-wire, 120/240 volts would be required. If a NAVAIDS building or other locally constructed shelter is employed, power details as shown on drawings AW–26–03–26 and AW–26–03–27 are applicable.

D. Control Lines

Neither AN/CRD–2 nor AN/TRD–4 is designed for remote indication or control and each must be locally attended and operated. Interconnection with base communications is a definite requirement. Individual stations in D/F nets require interconnection with an evaluation center. Telephone lines are used for voice and teletype interconnections, the number of pairs depends upon the operational requirements. Separate point-to-point radio facilities are sometimes employed in D/F net operation.



GENERAL NOTES:

SITING CRITERIA

1. LISTED BELOW ARE RECOMMENDED DISTANCES TO BE MAINTAINED BETWEEN THE ANTENNA SYSTEM AND VARIOUS OBSTRUCTIONS:

. WIRE FENCES	200 YARDS
. SCATTERED TREES AND SINGLE SMALL BUILDINGS (EXCEPT EQUIP AND POWER SHELTER)	300 YARDS
C. BURIED METALLIC CONDUCTORS (EXCEPT THOSE TO DF FACILITY)	300 YARDS
D. CHIMNEY STACKS AND WATER TOWERS	500 YARDS
E. OVERHEAD CONDUCTORS (POWER AND TELEPHONE LINES AND ANTENNAS) AND RAILROAD TRACKS	500 YARDS
F. RIVERS, STREAMS AND LAKES	600 YARDS
G. FORESTS AND METAL STRUCTURES	500 TO 1000 YDS
H. HIGH CLIFFS AND DEEP RAVINES	OVER 1 MILE
I. MOUNTAINS	5 TO 25 MILES

2. IF PRACTICAL UNDER LOCAL CONDITIONS, SHELTER AND ACCESS ROAD SHOULD BE LOCATED IN THE QUADRANT OF LEAST ANTICIPATED D/F USAGE. ORIENTATION WITH RESPECT TO THE ANTENNA ARRAY SHOULD BE MAINTAINED.

3. THE D/F ANTENNA SYSTEM SHOULD BE ORIENTED TO EITHER TRUE OR MAGNETIC NORTH AS DIRECTED BY THE USING ORGANIZATION.

4. CLEAR AND LEVEL AN AREA 75 FEET SQUARE FOR INSTALLATION OF THE ANTENNA AND COUNTERPOISE.

5. TOPS OF MAST PIERS SHOULD BE LEVEL WITH EACH OTHER.

6. FENCING, IF REQUIRED, SHOULD BE CONSTRUCTED OF A NON-METALLIC MATERIAL SUCH AS WOOD. FOR FENCE DETAILS, SEE DWG AW 86-16-10.

7. CABLE TRENCH 12 INCHES WIDE AND 18 INCHES DEEP FROM CENTER OF ANTENNA SYSTEM TO CABLE DUCT ENTRANCE OF NAV AID BLDG. CABLE TO BE FURNISHED AND LAID BY USAF.

8. FOR ACCESS ROAD DETAILS, SEE DWG AW 86-16-10.

9. PROVIDE A MINIMUM OF 2 PAIRS OF TELEPHONE CONDUCTORS TO THE EQUIPMENT SITE. BOTH POWER AND TELEPHONE LINES SHOULD BE BURIED FOR A MINIMUM DISTANCE OF 300 YARDS FROM THE EQUIPMENT BLDG. THE PRIMARY POWER SHALL BE IN CONCRETE ENCASED DUCT AND SHALL TERMINATE AT THE POWER TRANSFORMER BANK ADJACENT TO THE EQUIPMENT BLDG. BOTH POWER AND TELEPHONE CABLES MAY BE LAID IN THE SAME TRENCH BUT SHOULD BE SEPARATED A MINIMUM OF 12 INCHES.

10. CONSTRUCT A NON-METALLIC FENCE TO ENCLOSE THE PRIMARY POWER TRANSFORMER BANK. THIS FENCE SHOULD BE AT LEAST 7 FEET IN HEIGHT.

11. THE DIMENSIONS SHOWN ARE ANTENNA AND GUY ANCHOR SPACINGS FOR LOW FREQUENCY OPERATION (.54 TO 8 MEGACYCLES). FOR HIGH FREQUENCY OPERATION (6 TO 30 MEGACYCLES) DISTANCES OF 9' 8" FROM CENTER OF ANTENNA ARRAY TO CENTER OF ANTENNA MAST PIERS AND 14' FROM CENTER OF ANTENNA MAST PIERS TO ASSOCIATED GUY ANCHOR PIERS ARE REQUIRED.

12. THE DIMENSIONS SHOWN ARE ANTENNA AND GUY ANCHOR SPACINGS FOR LOW FREQUENCY OPERATION (.54 TO 10 MEGACYCLES). FOR HIGH FREQUENCY OPERATION (8 TO 30 MEGACYCLES) DISTANCES OF 9' 5" FROM CENTER OF ANTENNA ARRAY TO CENTER OF ANTENNA MAST PIERS AND 14' BETWEEN CENTER OF ANTENNA MAST PIERS TO CENTER OF ASSOCIATED GUY ANCHOR PIERS ARE REQUIRED.

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

ASSOCIATED DRAWINGS
AW-26-03-27
AW-78-18-01
AW-86-16-01
AW-86-16-10

APPROVED FOR AACS
Lynn W. Ruddick Major USAF
DATE 24 Oct 55

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

JOHN HANS GRAHAM & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

HF/DF AN/TRD-4 AND AN/CRD-2
PLOT PLAN AND DETAILS
WITH NAVAIDS BLDG. TYPE 0,1,2, OR 3

APPROVED:
[illegible] Col. U.S.A.F.
FOR CHIEF OF STAFF, USAF

AW 86-16-12
SCALE AS NOTED
DATE 24 OCT. '55
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DRAWING NO. AF 86-16-12 REVISED 18 FEB. 1954

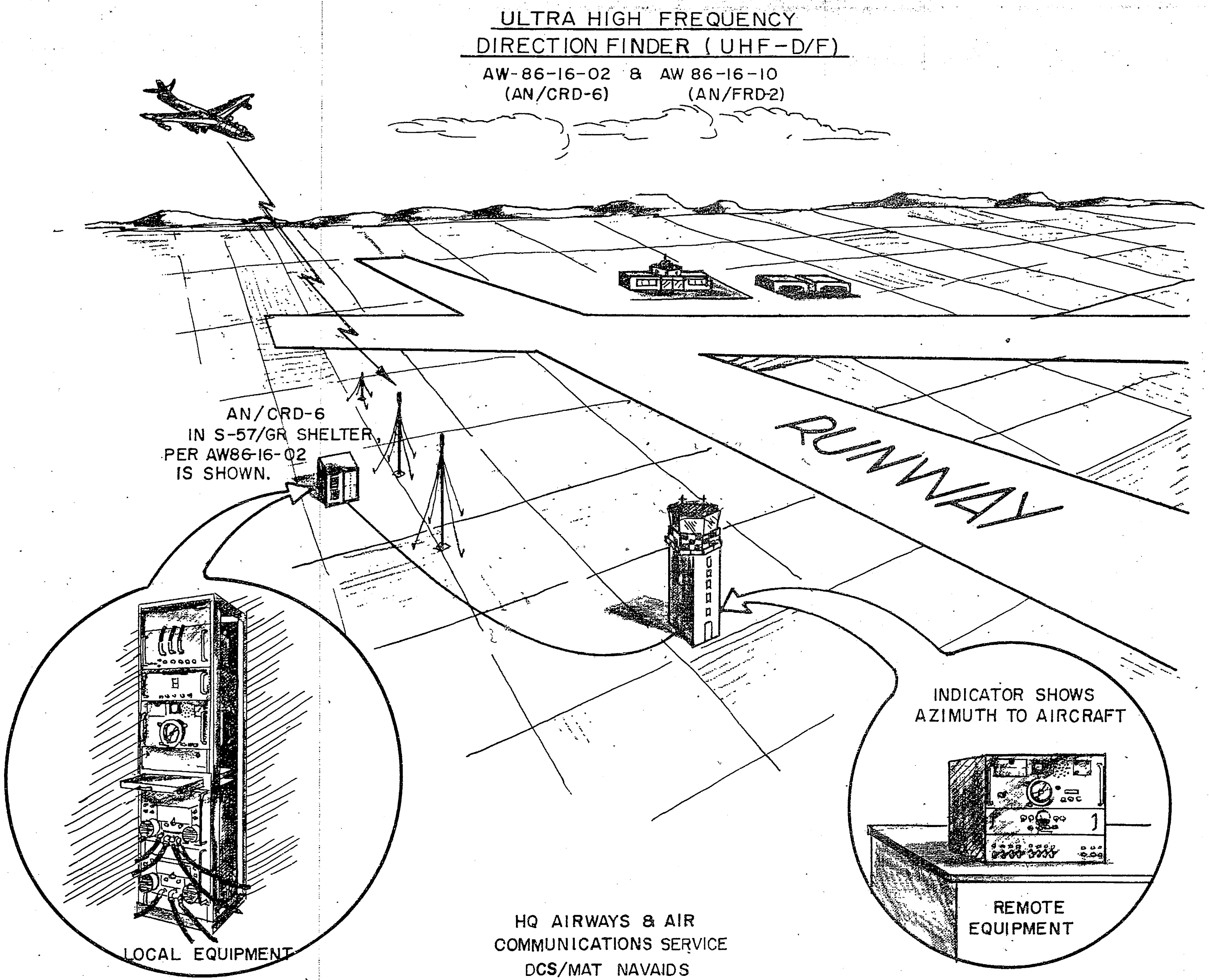

ULTRA HIGH FREQUENCY
DIRECTION FINDER (UHF-D/F)
AW-86-16-02 & AW 86-16-10
(AN/CRD-6) (AN/FRD-2)
AN/CRD-6
IN S-57/GR SHELTER,
PER AW86-16-02
IS SHOWN.
RUNWAY
INDICATOR SHOWS
AZIMUTH TO AIRCRAFT
LOCAL EQUIPMENT
REMOTE
EQUIPMENT
HQ AIRWAYS & AIR
COMMUNICATIONS SERVICE
DCS/MAT NAVAIDS

Figure 15.

Chapter 17

ULTRA HIGH FREQUENCY DIRECTION FINDER (UHF–D/F)

A. Function

1. AN/CRD–6 and AN/FRD–2 are ultra high frequency (UHF) (225–400 MC), ground direction finders (D/F) which indicate the direction of arrival of radio signals (transmissions, usually from an aircraft). This information is transmitted to the pilot as a "steer" or "bearing" by any available communications. Range is limited approximately to line of sight. This equipment is designed for remote control for a distance of up to 5 miles. The remote control normally is located in the control tower but may be in other locations such as the RAPCON center or the instrument flight room (IFR). There may be as many as four remote control locations. The AN/CR–6 and the AN/FRD–2 each is a diversity system that utilizes two antennas.

2. AN/FRD–7 is an AN/CRD–6 or AN/FRD–2 modified by the MK–341 modification kit for single antenna, now diversity installations.

3. AN/FRD–5 is under procurement for fixed nonremotable, single antenna control tower or similar type of installations.

4. AN/FRD–6 is the same equipment as the AN/FRD–5 with the addition of remoting capabilities.

B. Physical Characteristics

1. AN/CRD–6 and AN/FRD–2 are the same in basic electronic components. AN/CRD–6 includes a prefabricated shelter and reusable transit cases, comprising a tactical facility. AN/FRD–2 is a fixed-plant type of direction finder which does not include shelter and transit cases. Drawings AW–86–16–02, AW–26–03–26, and AW–78–18–01 show the plot layout, also, such items as access road, fencing, construction, and power building requirements for AN/CRD–6. Drawing AW–26–03–27 shows details of the NAVAIDS building in which AN/FRD–2 normally is installed. Plot layout, access road, fencing and construction requirements are shown on drawings AW–86–16–10, AW–26–03–27, and AW–78–18–01.

2. AN/FRD–5 and AN/FRD–7 equipments are intended to be installed in existing structures the physical locations of which will be determined by site adaptation.

3. AN/FRD–6, AW–86–16–10, AW–86–16–02 and AW–86–16–19 drawings are applicable to this equipment.

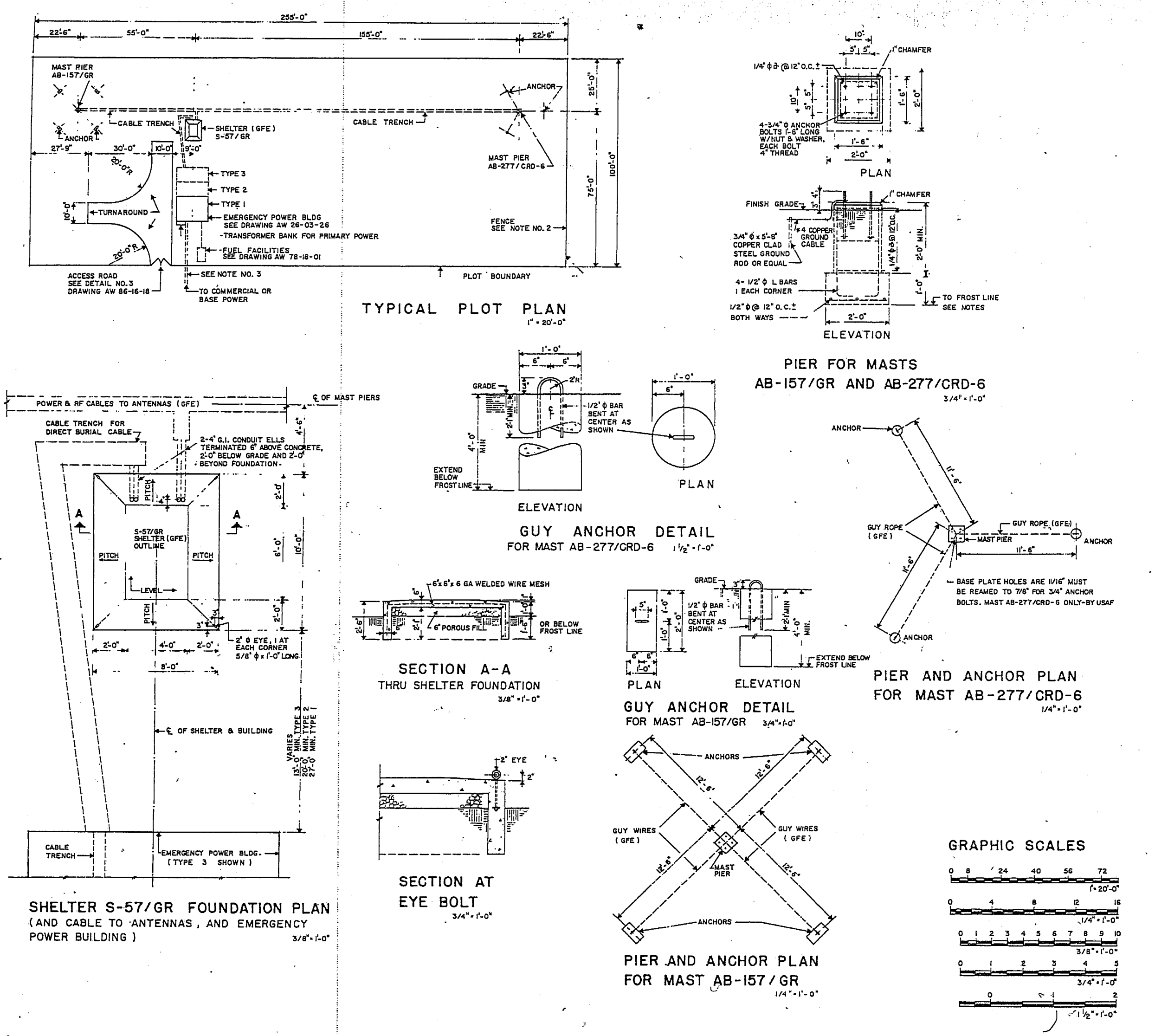
C. Power

1. Power required for AN/CRD–6 and AN/FRD–2 is 14.3 Kw, 120/240 V, single-phase, 3-wire, 60 cycle, including 10 kw for electric heaters. Details are shown on drawings AW–86–16–02, AW–26–03–26, AW–86–16–10, and AW–26–03–27.

2. AN/FRD–7, AN/FRD–6 and AN/FRD–5 Power requirements are to be submitted at a later date.

D. Control Lines

1. Ordinarily, the indicator for the UHF–D/F is remoted to the control tower cab where personnel are available to take bearings and communicate with aircraft. Minimum telephone cable requirements are 2 pairs and copper ground return (3 pairs) from the local station to the first remote station. Additional remote stations require 12 pairs and copper ground return (13 pairs) for extension from the first remote station. This does not apply to the AN/FRD–5 and AN/FRD–7 equipments as they do not have remoting capabilities.



GENERAL NOTES

EXCAVATION:
GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL AND SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL - 3000 LBS. PER SQUARE FOOT.

CONCRETE:
ALL CONCRETE SHALL BE CLASS "B" (2500 LBS. PER SQUARE INCH).

REINFORCING:
ALL REINFORCING BARS TO BE DEFORMED AND TO BE INTERMEDIATE OR HARD GRADE STEEL-DESIGN STRESS - 20,000 LBS. PER SQUARE INCH.

ANCHOR BOLT PROTECTION:
THE PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THE THREADS.

CABLE TRENCH:
CABLE TRENCH 12 INCHES WIDE AND 18 INCHES DEEP FROM ANTENNA MAST TO CABLE DUCT ENTRANCES OF SHELTER (GFE) S-57/GR. CABLES TO BE LAID AND FURNISHED BY USAF.

AREA CLEARANCE:
ALL VEGETATION, EXCEPT GRASS, TO BE CLEARED WITHIN A RADIUS OF 800 FEET. DISTANCE TO HEAVILY WOODED AREA SHOULD BE MORE THAN 1000 FEET. POWER, COMMUNICATIONS AND CONTROL LINES SHOULD BE BURIED FOR A MINIMUM DISTANCE OF 800 FEET FROM THE BUILDING.

ORIENTATION:
ORIENTATION OF PLOT, BUILDING, ACCESS ROAD, TURN-AROUND, POWER AND COMMUNICATION FACILITIES NOT CRITICAL; TO BE ESTABLISHED IN ACCORDANCE WITH LOCAL CONVENIENCE AND ECONOMY.

MISCELLANEOUS:
ALL MATERIALS SHOWN ON THIS DRAWING OR ON REFERENCED DRAWINGS ARE CONTRACTOR FURNISHED AND INSTALLED EXCEPT AS NOTED.

NOTES

1. WHERE PRIMARY POWER SERVICE IS SUPPLIED, TRANSFORMER BANK PAD TO BE CONCRETE AND FENCED. FENCE TO BE MINIMUM OF 7 FEET IN HEIGHT AND OF CHAIN LINK CONSTRUCTION.
2. FENCE REQUIREMENTS WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON BASE SITE FENCING WILL NOT BE REQUIRED. ON OR OFF BASE FENCING WILL BE NON-METALLIC.
SEE DRAWING AW 86-16-18 DETAIL NO. 2.
3. PROVIDE TWO EMPTY 4 INCH DUCTS UNDERGROUND (CONCRETE ENCASED) FOR A DISTANCE OF 800 FEET FROM THE BUILDING. MANHOLE TO BE PROVIDED AT A DISTANCE NOT TO EXCEED 500 FEET FROM POWER BUILDING. SERVICE CONNECTION TO BE MADE AS REQUIRED TO BASE OR COMMERCIAL SOURCE.
4. GUY ANCHOR DETAILS, SHOWN ON THIS DRAWING, WERE DESIGNED FOR MASTS AB-157/GR AND AB-277/CRD-6 WITH MAXIMUM HEIGHTS OF 35'-6" AND 24'-0", RESPECTIVELY, UNDER THE FOLLOWING ASSUMPTIONS:
   A. SOIL BEARING VALUE OF 1000 POUNDS PER SQUARE FOOT.
   B. WIND VELOCITY @ 120 M.P.H. WITH A GUST FACTOR OF 1.3.
   C. 1/2 INCH ICE COATING ON MAST, ANTENNA, AND THE GUY WIRES.

IF LOCAL SOIL CONDITIONS OR OTHER REQUIREMENTS VARY FROM THOSE ASSUMED, THE DESIGN OF THE GUY ANCHORS SHOWN HEREON SHALL BE MODIFIED ACCORDINGLY

APPLICABLE DRAWINGS

NUMBER	TITLE
AW 86-16-02	UHF DIRECTION FINDER AN/CRD-6 IN S-57/GR SHELTER.
AW 86-16-18	MISCELLANEOUS CONSTRUCTION DETAILS.
AW 78-18-01	FUEL FACILITIES FOR NAVIGATIONAL AIDS.
AW 26-03-26	EMERGENCY POWER BUILDING TYPES 1, 2, AND 3.

LEGEND

GFE — GOVERNMENT FURNISHED EQUIPMENT

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS — WASHINGTON, D. C.

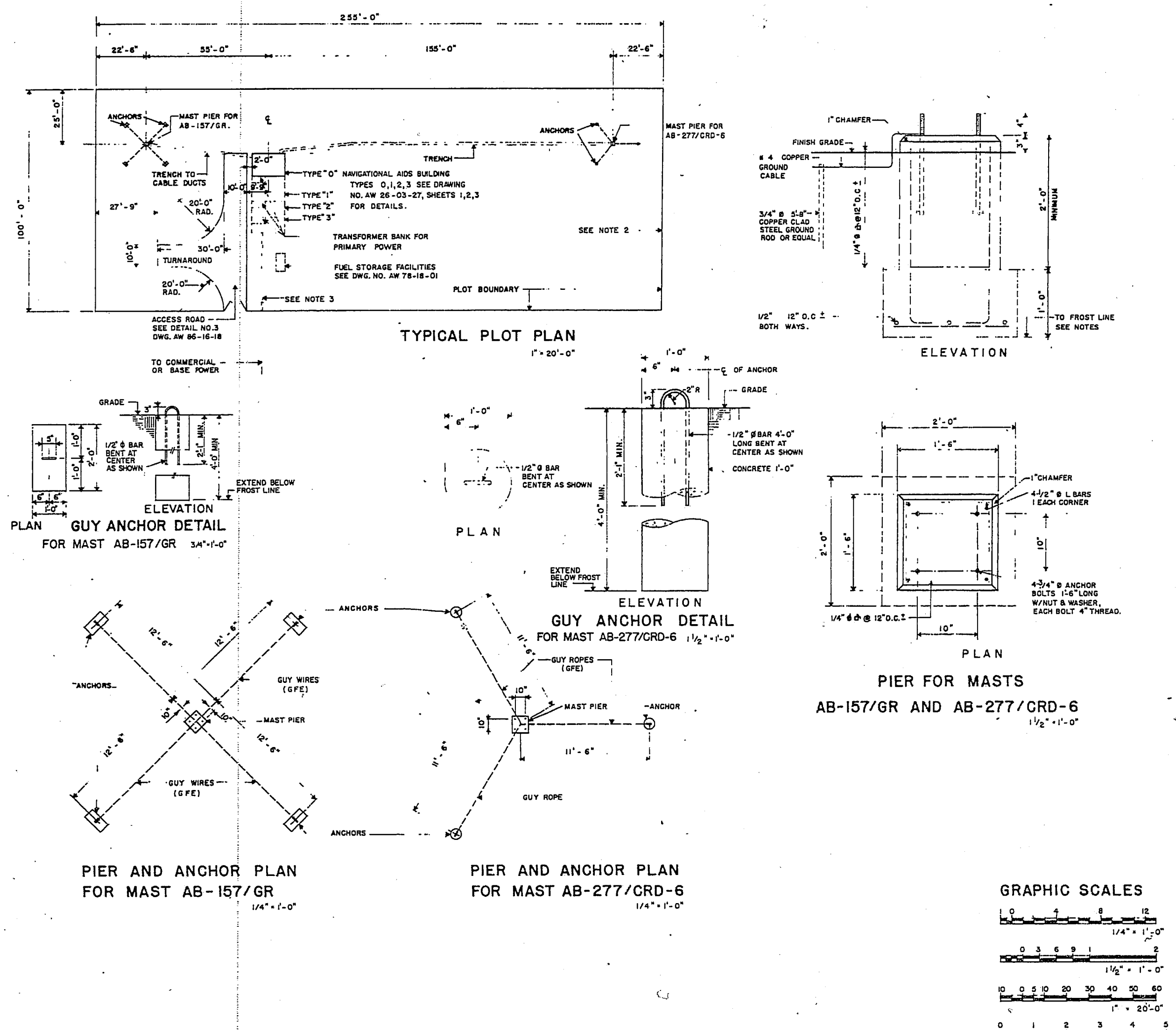
UHF DIRECTION FINDER
AN/CRD-6
IN S-57/GR SHELTER
NAV. AIDS BUILDING TYPES 0,1,2,3
PLANS, SECTIONS & DETAILS

APPROVED: APCIE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-02

SCALE AS SHOWN
DATE 24 MAY 1957
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DWG. AW 86-16-02 DATED 22ND JULY 1952 AND REVISED 12TH FEB 1954



GENERAL NOTES

EXCAVATION:
GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1 INCH BELOW ORIGINAL GRADE ON NATURAL SOIL AND SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL – 3000 LBS. PER SQUARE FOOT.

CONCRETE:
ALL CONCRETE SHALL BE CLASS "B" (2500 LBS. PER SQUARE INCH).

REINFORCING:
ALL REINFORCING BARS TO BE DEFORMED AND TO BE INTERMEDIATE OR HARD GRADE STEEL-DESIGN STRESS – 20,000 LBS. PER SQUARE INCH.

ANCHOR BOLT PROTECTION:
THE PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THE THREADS.

CABLE TRENCH:
CABLE TRENCH 12 INCHES WIDE AND 18 INCHES DEEP FROM ANTENNA MAST TO CABLE DUCT ENTRANCES OF NAVIGATIONAL AIDS BUILDING. CABLES TO BE LAID AND FURNISHED BY USAF.

AREA CLEARANCE:
ALL VEGETATION, EXCEPT GRASS, TO BE CLEARED WITHIN A RADIUS OF 800 FEET. DISTANCE TO HEAVILY WOODED AREA SHOULD BE MORE THAN 1000 FEET. POWER, COMMUNICATIONS AND CONTROL LINES SHOULD BE BURIED FOR A MINIMUM DISTANCE OF 800 FEET FROM THE BUILDING.

ORIENTATION:
ORIENTATION OF PLOT, BUILDING, ACCESS ROAD, TURN-AROUND, POWER AND COMMUNICATION FACILITIES NOT CRITICAL; TO BE ESTABLISHED IN ACCORDANCE WITH LOCAL, CONVENIENCE AND ECONOMY.

MISCELLANEOUS:
ALL MATERIALS SHOWN ON THIS DRAWING OR ON REFERENCED DRAWINGS ARE CONTRACTOR FURNISHED AND INSTALLED EXCEPT AS NOTED.

NOTES

1. WHERE PRIMARY POWER SERVICE IS SUPPLIED, TRANSFORMER BANK PAD TO BE CONCRETE AND FENCED. FENCE TO BE MINIMUM OF 7 FEET IN HEIGHT AND OF CHAIN LINK CONSTRUCTION.
2. FENCE REQUIREMENTS WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON BASE SITE FENCING WILL NOT BE REQUIRED. ON OR OFF BASE FENCING WILL BE NON-METALLIC.
SEE DRAWING AW 86-16-18 DETAIL NO. 2.
3. PROVIDE TWO EMPTY 4 INCH DUCTS UNDERGROUND (CONCRETE ENCASED) FOR A DISTANCE OF 800 FEET FROM THE BUILDING. MANHOLE TO BE PROVIDED AT A DISTANCE NOT TO EXCEED 500 FEET FROM POWER BUILDING. SERVICE CONNECTION TO BE MADE AS REQUIRED TO BASE OR COMMERCIAL SOURCE.
4. GUY ANCHOR DETAILS, SHOWN ON THIS DRAWING, WERE DESIGNED FOR MASTS AB-157/GR AND AB-277/CRD-6 WITH MAXIMUM HEIGHTS OF 35'-6" AND 24'-0", RESPECTIVELY, UNDER THE FOLLOWING ASSUMPTIONS:
   A. SOIL BEARING VALUE OF 1000 POUNDS PER SQUARE FOOT.
   B. WIND VELOCITY @ 120 M.P.H. WITH A GUST FACTOR OF 1.3.
   C. 1/2 INCH ICE COATING ON MAST, ANTENNA, AND THE GUY WIRES.

IF LOCAL SOIL CONDITIONS OR OTHER REQUIREMENTS VARY FROM THOSE ASSUMED, THE DESIGN OF THE GUY ANCHORS SHOWN HEREON SHALL BE MODIFIED ACCORDINGLY.

APPLICABLE DRAWINGS

NUMBER	TITLE
AW 86-16-10	UHF DIRECTION FINDER AN/CRD-6 & AN/FRD-2 NAVIGATIONAL AIDS BUILDING TYPES 0, 1, 2, & 3.
AW 86-16-18	MISCELLANEOUS CONSTRUCTION DETAILS.
AW 78-18-01	FUEL FACILITIES FOR NAVIGATIONAL AIDS.
AW 26-03-27	NAVIGATIONAL AIDS BUILDING TYPES 0, 1, 2, & 3.

LEGEND

GFE GOVERNMENT FURNISHED EQUIPMENT

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

UHF DIRECTION FINDER
AN/CRD-6 & AN/FRD-2
NAV. AIDS BUILDING TYPES 0,1,2,3
PLANS & DETAILS

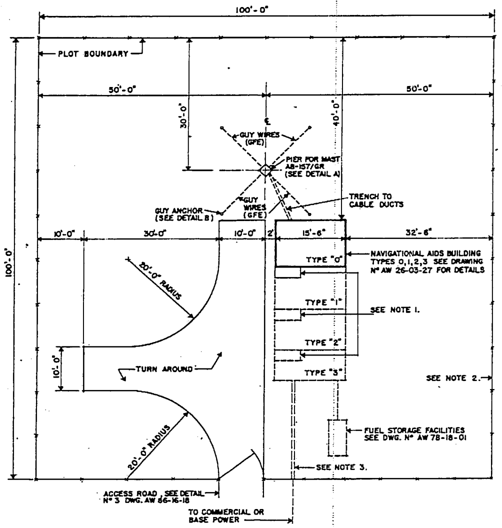
APPROVED:
FOR CHIEF OF STAFF, USAF

AW 86-16-10

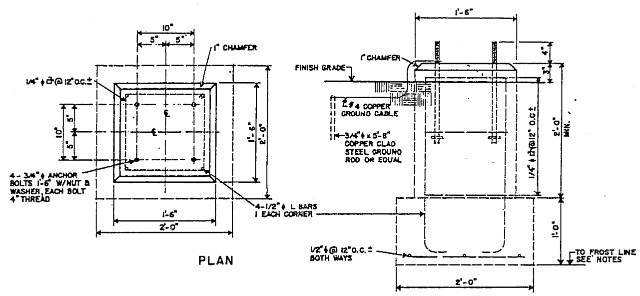
SCALE AS SHOWN
DATE 24 MAY 1957
SHEET 1 OF 1

THIS DRAWING SUPERSEDES DWG. AW 86-16-10 DATED 9TH FEB 1954

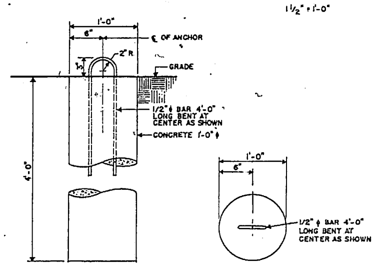
RADIO AIDS TO NAVIGATION
Radar Approach Control



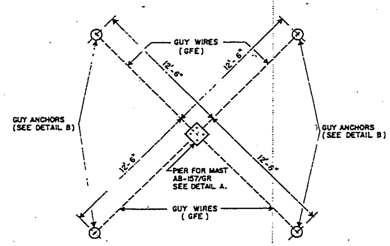
TYPICAL PLOT PLAN
1" = 10'-0"



DETAIL A
PIER FOR MAST AB-157/GR
1 1/2" = 1'-0"

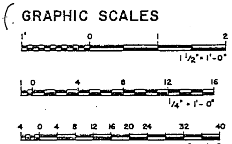


DETAIL B
GUY ANCHOR DETAIL
1 1/2" = 1'-0"



PIER AND ANCHOR PLAN
FOR MAST AB-157/GR
1/4" = 1'-0"

GRAPHIC SCALES



GENERAL NOTES

EXCAVATION–
GENERAL EXCAVATION SHALL NOT BE LOWER THAN THAT REQUIRED TO PROVIDE A SUITABLE SUBGRADE AT THE LEVELS SHOWN IN THE DETAILS. FOOTINGS SHALL NOT BE LESS THAN 1'-0" BELOW ORIGINAL GRADE ON NATURAL SOIL & SHALL BE BELOW FROST LINE. ASSUMED BEARING VALUE OF SOIL-3000 LBS. PER SQUARE FOOT.

CONCRETE–
ALL CONCRETE SHALL BE CLASS "B" (2500 LBS. PER SQUARE INCH).

REINFORCING–
ALL REINFORCING BARS TO BE DEFORMED AND TO BE INTERMEDIATE OR HARD GRADE STEEL-DESIGN STRESS-20,000 LBS. PER SQUARE INCH.

ANCHOR BOLT PROTECTION–
THE PROJECTIONS OF ANCHOR BOLTS ARE TO BE COVERED WITH GREASE AND WRAPPED WITH RAGS TO PREVENT CORROSION AND TO PROTECT THE THREADS.

CABLE TRENCH–
CABLE TRENCH 12" WIDE & 18" DEEP FROM ANTENNA MAST TO CABLE DUCT ENTRANCES OF NAVIGATIONAL AIDS BUILDING. CABLES TO BE LAID & FURNISHED BY USAF.

AREA CLEARANCE–
ALL VEGETATION, EXCEPT GRASS, TO BE CLEARED WITHIN A RADIUS OF 800 FEET. DISTANCE TO HEAVILY WOODED AREA SHOULD BE MORE THAN 1000 FEET. POWER, COMMUNICATIONS AND CONTROL LINES SHOULD BE BURIED FOR A MINIMUM DISTANCE OF 800 FEET FROM THE BUILDING.

ORIENTATION–
ORIENTATION OF PLOT, BUILDING, ACCESS ROAD, TURN-AROUND, POWER AND COMMUNICATION FACILITIES NOT CRITICAL; TO BE ESTABLISHED IN ACCORDANCE WITH LOCAL CONVENIENCE AND ECONOMY:

MISCELLANEOUS–
ALL MATERIALS SHOWN ON THIS DRAWING OR ON REFERENCED DRAWINGS ARE CONTRACTOR FURNISHED AND INSTALLED EXCEPT AS NOTED.

NOTES

1. WHERE PRIMARY POWER SERVICE IS SUPPLIED, TRANSFORMER BANK PAD TO BE CONCRETE & FENCED. FENCE TO BE MINIMUM OF 7 FEET IN HEIGHT AND OF CHAIN LINK CONSTRUCTION.
2. FENCE REQUIREMENTS WILL BE DETERMINED AT EACH LOCATION. NORMALLY ON BASE SITE FENCING WILL NOT BE REQUIRED. ON OR OFF BASE FENCING WILL BE NON-METALLIC. SEE DRAWING AW 86-16-18 DETAIL NO. 2.
3. PROVIDE TWO EMPTY 4" DUCTS UNDERGROUND (CONCRETE ENCASED) FOR A DISTANCE OF 800'-0" FROM THE BUILDING. MANHOLE TO BE PROVIDED AT A DISTANCE NOT TO EXCEED 500'-0" FROM POWER BUILDING. SERVICE CONNECTION TO BE MADE AS REQUIRED TO BASE OR COMMERCIAL SOURCE.

APPLICABLE DRAWINGS

NUMBER	TITLE
AW 86-16-18	MISCELLANEOUS CONSTRUCTION DETAILS.
AW 78-18-01	FUEL FACILITIES FOR NAVAIDS
AW 26-03-27	NAVAIDS BUILDING TYPES 0, 1, 2, 3
AW 86-16-19	UHF DIRECTION FINDER AN/FRD-5/6 & SINGLE ANTENNA AN/CRD-6/FRD-2, NAV. AIDS BUILDING TYPES 0,1,2,3

LEGEND

G F E — GOVERNMENT FURNISHED EQUIPMENT.

SYMBOL	REVISIONS — DESCRIPTION	DATE	APPROVAL

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE

ALBERT GOENNER & ASSOCIATES
ARCHITECTS - ENGINEERS WASHINGTON, D. C.

UHF DIRECTION FINDER
AN/FRD-5/6 & SINGLE ANTENNA
AN/CRD-6/FRD-2
NAV. AIDS BUILDING TYPES 0,1,2,3
TYPICAL LAYOUT & DETAILS

APPROVED: [signature] AFCIE-E
FOR CHIEF OF STAFF, USAF

AW 86-16-19
SCALE AS NOTED
DATE 18 MAR 1957
SHEET 1 OF 1

U. S. GOVERNMENT PRINTING OFFICE : 1958 O—461139

CHANGE

AIR FORCE MANUAL
No. 88–16A

DEPARTMENT OF THE AIR FORCE
Washington, *24 June 1960*

Construction

NAVIGATIONAL AIDS—CONSTRUCTION DESIGN INFORMATION

AFM 88–16, 1 August 1958, is changed as follows:

1. This change tells how to revise the design of the Ground Control Approach System, USAF Standard working Drawing AW 86–08–04, Sheets 1, 2, and 3. Only sheets 1 and 2 are included in AFM 88–16. Full size reproducibles of sheets 1, 2, and 3 have been furnished to interested Air Force agencies.

2. The AN/MPN–1 equipment referred to on the cited drawings is obsolete. There will be no future programming of this equipment and that which is in use will be phased out.

3. The new construction standards are immediately applicable to the Air Force Construction Program by all construction agents. They will have immediate application and will be integrated into current and future programs when necessary.

a. By addendum to the bidding documents before the opening of bids if time permits.

b. By change order if time does not permit.

4. Where incorporation of this change involves any of the following, refer the matter to Hq USAF (AFOCE–E), Wash 25, D. C., before implementation.

a. The change will delay critical beneficial occupancy dates.

b. The change will result in removal of more than an economic amount of construction already in place, or the loss of use of materials already delivered.

c. The additional funding required will cause the current working estimate to exceed the control cost by more than 25 percent, necessitate further apportionment or will jeopardize funding of other items in the current program.

5. Make the following changes in pen and ink to sheets 1, 2, and 3 of drawing AW 86–08–04 and pages 53 and 55 of the manual as appropriate:

Sheet of Drawing	*Page of Manual*	*Action To Be Taken*
1, 2, & 3	53, 55	Change "AN/MPN–1" to read "AN/MPN–11."
1, 2, & 3	53, 55	Change "15 KVA transformers" to read "25 KVA transformers."
1, 2, & 3	53, 55	Change "100 AMP receptacle" to read "200 AMP receptacle." The 200 AMP receptacle and plug shall be similar and equal to Crouse-Hinds catalogue number AREA 20417.
1, 2, & 3	53, 55	Change "100 AMP weatherproof fusible switch" to read "200 AMP weatherproof fusible switch."
2	55	Under General Notes, Note 1—Change "AACS" to read "GEEIA."
3	None	Secondary wiring, from transformer to receptacle will be changed from "4 #0, 2 Conduit" to "4 #4/0, 3 Conduit."

***This manual supersedes AFM 88–16A, 29 February 1960.**

DISTRIBUTION: F

6. After necessary action, file this change sheet in the front of the manual.

BY ORDER OF THE SECRETARY OF THE AIR FORCE:

OFFICIAL:

THOMAS D. WHITE
Chief of Staff

J. L. TARR
Colonel, USAF
Director of Administrative Services

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F O R C

INSTALLATION PLANNING AND

K168.13086-4
25 Aug 1958

STANDARD INSTALLATIONS FACILITY REQUIREMENTS

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DEPARTMENT OF THE AIR FORCE

AIR FORCE MANUAL
No. 86-4A

DEPARTMENT OF THE AIR FORCE
Washington, *23 October 1959*

S/S by AFM 86-4 1 Sept 61

Installations Planning and Development

STANDARD INSTALLATIONS FACILITY REQUIREMENTS

AFM 86-4, 25 August 1958, is changed as follows:

1. Make the following changes by pen and ink:

Page	*Figure or Table*	*Action To Be Taken*
50	Figure 11-19	Change dimension of 37.5 feet to 50.0 feet for shoulder stabilization along 75 foot wide taxiway leading to alert apron. The 37.5 foot shoulder stabilization along all edges of the operational alert apron, including the 100 foot wide interior taxi lane, remains valid.
62	Table "Standard Warmup Holding Pads"	Under column heading "Size—Sq Yds" change "7,756" to "8,200."
63	Figure 11-28	Change Area "7,756" to "8,200" Sq Yds.

2. Insert the attached revised pages according to page numbers and remove the corresponding pages.

REMOVE		INSERT
Page	Edition Date	Page
83, 84	25 Aug 58	83, 84
89, 90	25 Aug 58	89 thru 90a
99, 100	25 Aug 58	99, 100
113 thru 116	25 Aug 58	113 thru 116
125 thru 128	25 Aug 58	125 thru 128
131, 132	25 Aug 58	131, 132
143 thru 152	25 Aug 58	143 thru 152
157 thru 166	25 Aug 58	157 thru 166
191 thru 194	25 Aug 58	191 thru 194a

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Civil Engineering Center 125
Office, Chief of Engineers, Army 150
Bureau of Yards and Docks, Navy 10
Hq ARDC, ATTN: RDMFW, W-PAFB, Ohio 50

3. After necessary action, file this cover sheet in the front of the manual.

BY ORDER OF THE SECRETARY OF THE AIR FORCE:

OFFICIAL:

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Chief of Staff

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