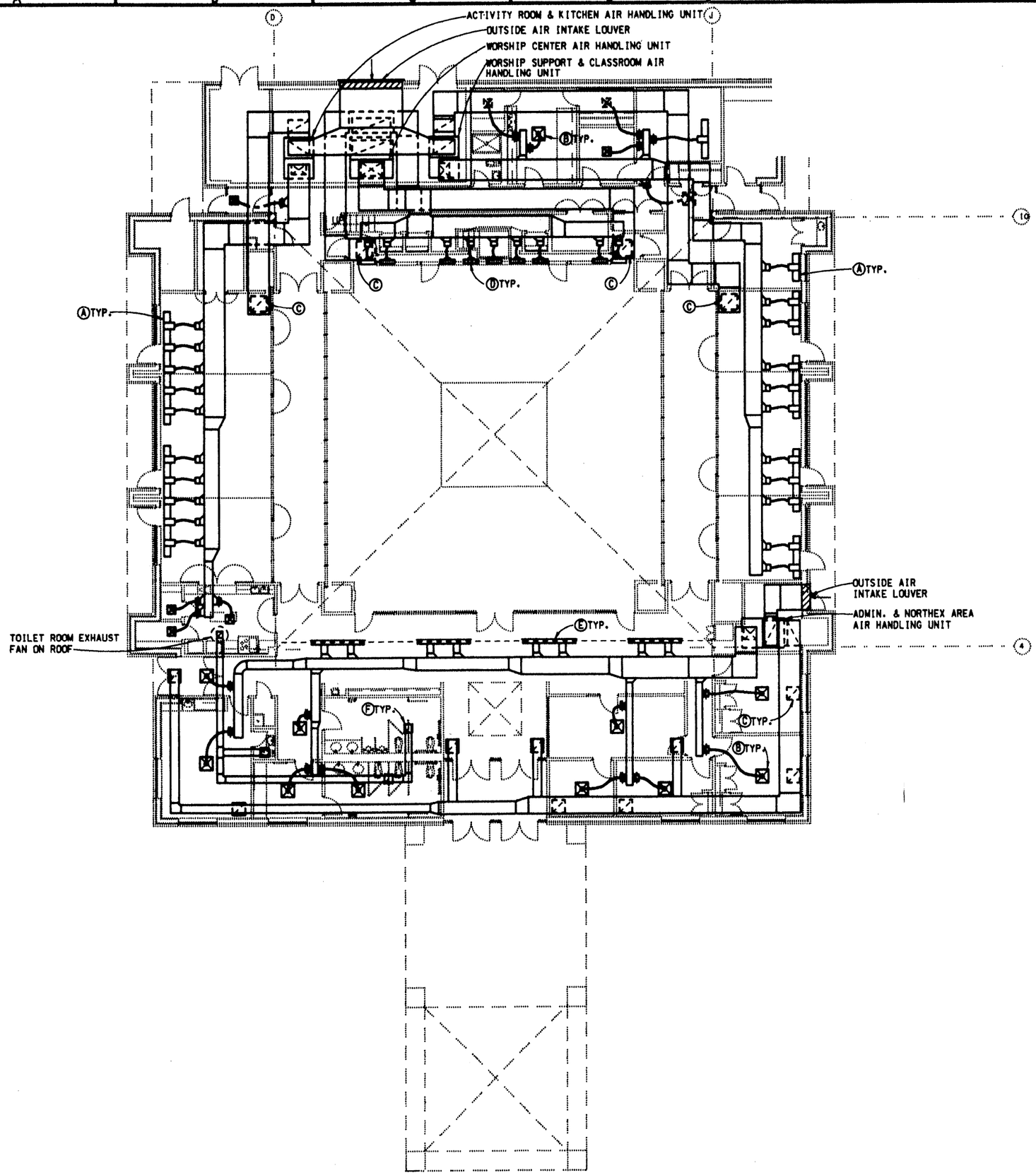

MECHANICAL SYSTEM DESIGN

DEPICTED ON THIS SHEET (AND IN THE ISOMETRIC DRAWING ON SHEET 22) IS A THEORETICAL DESIGN OF A MECHANICAL SYSTEM FOR THE ARMY CHAPEL SCHEME A. IT SHOULD BE EMPHASIZED THAT THIS IS A THEORETICAL DESIGN FOR CLIMATIC CONDITIONS TYPICAL IN THE CENTRAL PART OF THE U.S. AND IS NOT TO BE CONSIDERED AS A COMPLETE DESIGN. IT IS INTENDED TO INDICATE THE EXTENT OF AIR SUPPLY ZONES AND SUGGESTED DUCT ROUTING. THE ACTUAL DESIGN FOR ANY SPECIFIC INSTALLATION MAY BE EXPECTED TO VARY FROM THAT SHOWN HERE. DUCT RUNS, HOWEVER, WILL GIVE GUIDENCE AS TO THE MECHANICAL CONCEPTS TO BE IMPLEMENTED.

THE CRITERIA USED IN THE DESIGN ARE AS FOLLOWS:

A. TOTAL WORSHIP CENTER CAPACITY OF 400, WITH MOVABLE WALLS IN OPEN POSITION;
B. VENTILATION AIR AS REQUIRED BY ASHRAE, 0.0071 m^3/s PER PERSON;
C. MAXIMUM VELOCITY AT AIR SUPPLY GRILLES 2.5 m/s.
D. MAX. NC RATING OF 20.

THE DUCT AND DIFFUSER SIZES AND LOCATIONS DEPICTED HERE SHOW THAT THESE CRITERIA CAN BE MET WITHIN THE ARCHITECTURAL PARAMETERS ESTABLISHED IN THE DESIGN OF THE ARMY CHAPEL SCHEME A.

THE DESIGN SHOWS THE BUILDING DIVIDED INTO FOUR ZONES FOR HEATING AND COOLING PURPOSES. THREE ZONES (THE CENTRAL WORSHIP CENTER AREA AND THE TWO SIDE AREAS) ARE SERVICED FROM THE REAR MECHANICAL ROOM, AND ONE ZONE (THE ADMINISTRATIVE PORTION OF THE BUILDING) IS SERVICED FROM THE SMALLER FAN ROOM. AN ENERGY-EFFICIENT BOILER FOR HEATING SHALL BE PLACED IN THE MECHANICAL ROOM.

COOLING MAY BE PROVIDED BY DIRECT EXPANSION COOLING COILS IN THE AIR HANDLING UNITS EACH WITH INDIVIDUAL CONDENSING UNITS OR BY A CHILLED WATER SYSTEM WITH CENTRAL PACKAGED WATER CHILLER. UNITS LOCATED EXTERIOR SHALL BE CONCEALED BEHIND SCREEN WALLS OF LANDSCAPE OR MASONRY.

FOR BRANCH DUCT CONNECTIONS, 45 DEGREE ENTRY DIVERGING T-TYPE CONNECTIONS ARE RECOMMENDED. EXHAUST AIR FANS ARE RECOMMENED WHEN AN ECONOMIZER CYCLE IS USED; CAUTION SHOULD BE USED IN SELECTING TYPE AND LOCATION OF FANS TO ENSURE THAT OBJECTIONABLE NOISE IS NOT TRANSMITTED TO THE WORSHIP CENTER.

THE MECHANICAL SYSTEM FOR THE SCHEME B CHAPEL MAY BE VERY SIMILAR TO THE SCHEME A CHAPEL SYSTEM DEPICTED HERE. AN ADDITIONAL ZONE WILL BE REQUIRED FOR THE ACTIVITY CENTER AREA, AND ADDITIONAL EQUIPMENT WILL BE NEEDED IN THE (ENLARGED) MECHANICAL ROOM.

GRILLES / DIFFUSERS

- (A) LINEAR SLOT DIFFUSER & DIFFUSER PLENUM
- (B) SQUARE CONE TYPE DIFFUSER
- (C) RETURN GRILLE, PERFORATED FACE
- (D) DRUM LOUVER, HIGH CAPACITY, LONG THROW, MAX. NC 18, WITH 45 DEGREE DIVERGING TEE TYPE BRANCH DUCT CONNECTIONS
- (E) LINEAR SLOT DIFFUSER, 30 DEGREE DEFLECTION DOWN - LOCATE IN VERTICAL PORTION OF NORTHEX CEILING
- (F) EXHAUST REGISTER

SCHEME A FLOOR PLAN - 200 SEATS

2 1 0 2 4 6 8
1:100 METERS

US Army Corps of Engineers Omaha District

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAMS
ARMY CHAPEL
MECHANICAL PLAN - SCHEME A

Sheet reference number: 18
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