

# STORAGE IN APPROVED MAGAZINES OF 2.75" HYDRA ROCKETS PACKED IN M648 CYLINDRICAL METAL CON- TAINERS, ON METAL PALLETS

<u>ITEM</u>	<u>INDEX</u>	<u>PAGE(S)</u>
GENERAL NOTES AND MATERIAL SPECIFICATIONS	- - - - -	2
PALLET UNIT DETAILS	- - - - -	3
TYPICAL STORAGE IN ARCHED OR ROUNDED ROOF MAGAZINES	- - - - -	4-7
CORBETTA MAGAZINE	- - - - -	8, 9
100'-8" L X 50'-0" W RECTANGULAR MAGAZINE	- - - - -	10, 11
60'-0" L X 40'-0" W X 15'-0" H TYPE II BUNKER MAGAZINE	- - - - -	12-13
60'-0" L X 40'-0" W X 11'-0" H TYPE III BUNKER MAGAZINE	- - - - -	14-15
40'-0" L X 20'-0" W X 11'-0" H TYPE IV BUNKER MAGAZINE	- - - - -	16-17
TYPICAL MULTIPLE-LOT STORAGE PROCEDURES	- - - - -	18-23
FLOOR DUNNAGE AND SHIM LOCATION DETAILS	- - - - -	24

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## GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE STORAGE PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR STORAGE IN VARIOUS TYPES AND SIZES OF MAGAZINES. THE STORAGE PROCEDURES DEPICTED FOR THE SPECIFIC TYPES OF MAGAZINES MAY ALSO BE UTILIZED TO STORE HYDRA ROCKET PALLET UNITS IN OTHER TYPES OF APPROVED MAGAZINES. MINOR ADJUSTMENTS MAY BE MADE TO FACILITATE STORAGE IN OTHER TYPES OF MAGAZINES; HOWEVER, THE BASIC PRINCIPLES AS DEPICTED HEREIN WILL BE FOLLOWED.
- C. THE STORAGE PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF 2.75" HYDRA ROCKETS PACKED IN M648 CYLINDRICAL METAL CONTAINERS, UNITIZED 12 PER 78-1/2" X 29-5/16" SPECIAL METAL PALLET. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE PAGE 3 AND AMC DRAWING 19-48-4231/60A-20PM1006 FOR DETAILS OF THE PALLET UNIT.
- D. **CAUTION:** THE ALLOWABLE "EXPLOSIVE LIMIT" ESTABLISHED FOR A MAGAZINE IS NOT TO BE EXCEEDED. THIS LIMITATION MAY REQUIRE A QUANTITY REDUCTION FROM THE STORAGE AS SHOWN.
- E. **CAUTION:** THIS ITEM IS IN A "PROPULSIVE STATE" AND MUST BE STORED WITH THE FORWARD END FACING TOWARDS THE MAGAZINE SIDEWALL AND/OR THE REAR WALL AS INDICATED BY THE DIRECTIONAL ARROWS ON THE STORAGE VIEWS.
- F. STORED PALLET UNITS MUST NOT CONTACT THE SIDES OF A MAGAZINE. THEREFORE, PALLET UNITS MUST BE STORED A MINIMUM OF 6" FROM THE SIDEWALL OR CURVATURE OF THE MAGAZINE AS APPLICABLE. TO PROVIDE FOR THIS MANDATORY CLEARANCE REQUIREMENT, PALLET UNITS MAY BE ELIMINATED FROM THE DEPICTED STORAGE PATTERN AS NECESSARY.
- G. AISLE DIMENSION SHOWN FOR STORAGE PROCEDURES IN MAGAZINES MAY BE ADJUSTED TO SUIT LOCAL CONDITIONS. VARIATIONS IN PALLET UNIT DIMENSIONS, AND/OR AVAILABLE MATERIAL HANDLING EQUIPMENT (MHE). HOWEVER, A 24" MINIMUM INSPECTION AISLE MUST BE MAINTAINED AT THE END OF THE CONTAINERS WHERE HUMIDITY INDICATORS ARE LOCATED.
- H. IF AVAILABLE MHE PERMITS, ADDITIONAL PALLET UNITS MAY BE STORED WITHIN THE MHE AREA AND/OR OTHER AVAILABLE AREA OF THE MAGAZINE.
- J. THE MAXIMUM FLOOR LOAD FOR A MAGAZINE AS PRESCRIBED WILL NOT BE EXCEEDED.
- K. THE HEIGHT OF THE PACKAGE GUARD ON SOME FORKLIFT TRUCKS MAY NOT PERMIT PLACEMENT OF SOME TOP LAYER PALLET UNITS IN THE STACKS SHOWN IN THE STORAGE VIEWS HEREIN, UNLESS TWO UPPER PALLET UNITS ARE HANDLED AS ONE LIFT OR THE PACKAGE GUARD IS REMOVED (TINE CARRIAGE WILL IN MOST INSTANCES PROVIDE ADEQUATE PACKAGE GUARD PROTECTION). ONLY A FORKLIFT TRUCK OF ADEQUATE CAPACITY WILL BE USED WHEN LIFTING TWO PALLET UNITS AS ONE LIFT.
- L. THE USE OF "FLOOR DUNNAGE" IS OPTIONAL, ALTHOUGH THE USE OF THIS TYPE OF DUNNAGE IS DELINEATED WITHIN THIS STORAGE PROCEDURE DRAWING. THE PURPOSE OF FLOOR DUNNAGE IS TO KEEP THE BOTTOM DECKBOARDS OF A PALLET DRY, THUS AIDING IN PREVENTING DETERIORATION. THEREFORE, FLOOR DUNNAGE SHOULD BE USED WHEN STORING IN A MAGAZINE THAT IS KNOWN TO HAVE A "DAMP" FLOOR. ALSO, IN LIEU OF USING ONE-INCH THICK FLOOR DUNNAGE AS SPECIFIED, THE USE OF THICKER FLOOR DUNNAGE MAY BE REQUIRED, AND SHOULD BE USED, TO ACHIEVE THE DESIRED OBJECTIVE. **NOTE:** SOME VIEWS WITHIN THIS DRAWING WILL NOT DEPICT ALL FLOOR DUNNAGE THAT IS REQUIRED WHEN DUNNAGE IS USED. FLOOR DUNNAGE IS SHOWN AT SOME LOCATIONS TO PROVIDE POSITIONING GUIDANCE. SEE GENERAL NOTE "S" AT RIGHT.

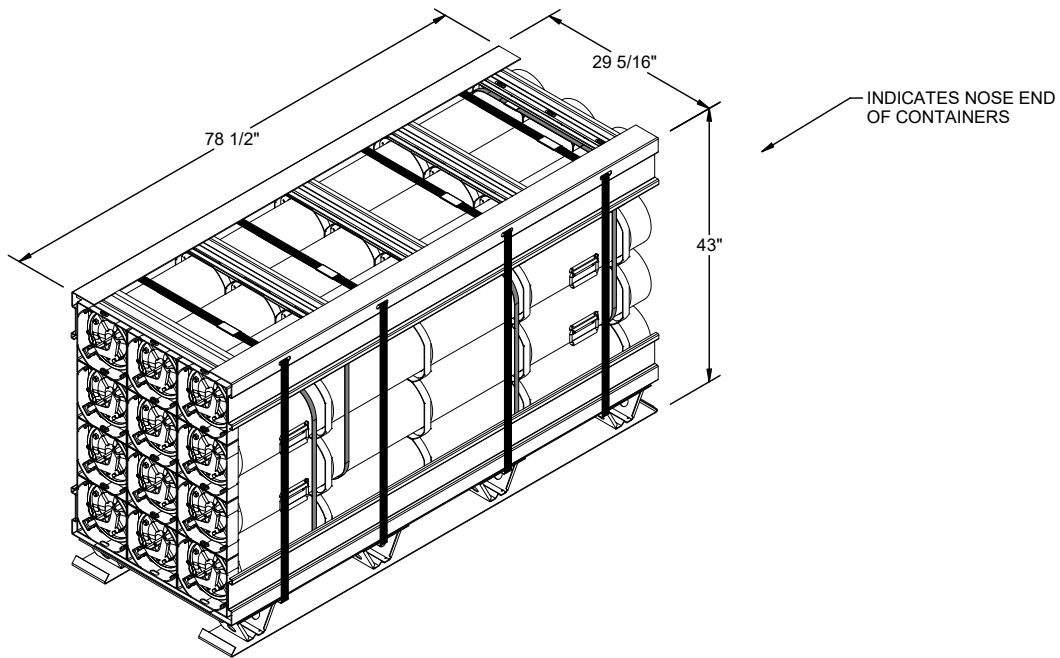
(CONTINUED AT RIGHT)

## (GENERAL NOTES CONTINUED)

- M. WHEN LOCAL STORAGE CONDITIONS ARE SUCH THAT AN AMMUNITION STORAGE MAGAZINE NET EXPLOSIVE WEIGHT LIMIT WILL BE REACHED BEFORE ALL AVAILABLE STORAGE SPACE WILL BE UTILIZED, A COMBINATION OF THE VARIOUS STORAGE PATTERNS DELINEATED HEREIN MAY BE USED IN LIEU OF BLOCK STORAGE PATTERNS TO FACILITATE INVENTORY, INSPECTION, THE USE OF MATERIAL HANDLING EQUIPMENT, SURVEILLANCE, ETC., OF THE AMMUNITION TO BE STORED WITHIN THE MAGAZINE.
- N. STORAGE OF MULTIPLE LOTS IN A MAGAZINE WILL REQUIRE CAREFUL PREPLANNING SO AS TO INSURE MHE ACCESSIBILITY TO ANY LOT IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN THE APPLICABLE "SPECIAL NOTES" SECTIONS OF THE MULTIPLE LOT STORAGE PROCEDURES SHOWN ON PAGES 18 THRU 23.
- O. ALTHOUGH SPECIFIC PROCEDURES ARE INCLUDED IN THIS DRAWING FOR STORING MULTIPLE LOTS WITHIN ONE STRUCTURE, THE BASIC STORAGE PATTERN AS SHOWN ON PAGES 4 THRU 17 CAN ALSO BE ADAPTED FOR STORAGE MORE THAN ONE LOT. MULTIPLE LOTS, WHEN STORED IN ACCORDANCE WITH THE BASIC STORAGE PATTERN MAY BE STORED WITH ONE OR MORE ROWS USED FOR EACH LOT. A SPACE OF APPROXIMATELY 1" WILL HAVE TO BE LEFT BETWEEN ADJACENT ROWS CONTAINING DIFFERENT LOTS. IN BASIC STORAGE PATTERNS WHERE THE WIDTH OF A ROW IS ESTABLISHED BY THE 78-1/2" UNIT DIMENSION, EACH ROW MAY BE A DIFFERENT LOT AND READILY REMOVABLE. IN BASIC STORAGE PATTERNS WHERE THE WIDTH OF THE ROW IS ESTABLISHED BY THE 29-5/16" UNIT DIMENSION, A LOT MUST CONSIST OF TWO OR MORE ROWS TO PROVIDE ADEQUATE SPACE TO ACCOMMODATE THE WIDTH OF A FORKLIFT TRUCK FOR STORING OR REMOVING THE LOT. THE 1" SPACE BETWEEN LOTS, AS STATED ABOVE WILL NOT BE EXCEEDED SOLELY TO ACCOMMODATE THE WIDTH OF A FORKLIFT TRUCK. FOR ADDITIONAL REQUIREMENTS AND GUIDANCE, SEE SPECIAL NOTES FOR MULTIPLE-LOT STORAGE ON PAGE 18 THRU 23.
- P. ANY "LIGHT" PALLET UNIT THAT DOES NOT CONTAIN A FULL QUANTITY OF CONTAINERS WILL NOT BE BURIED IN STORAGE, IT MUST BE POSITIONED ADJACENT TO AN AISLE, PREFERABLY IN FRONT OF THE LOT.
- Q. PALLET UNITS PRESENTLY STORED IN ACCORDANCE WITH A PRIOR APPROVED DRAWING NEED NOT BE RE-STORED SOLELY TO CONFORM TO THE PROCEDURES SPECIFIED IN THIS DOCUMENT.
- R. OTHER COMPATIBLE ITEMS MAY BE STORED IN A MAGAZINE, WHICH IS PARTIALLY FILLED WITH THE DESIGNATED ITEM.
- S. IN IGLOO, ARCH TYPE AND STRADLEY MAGAZINES WHICH HAVE SLOPING FLOORS, THE DEPICTED STORAGE PATTERNS, IN SOME CASES, INCLUDE PALLET UNIT STACKS WHICH STRADDLE THE RIDGE OF THE FLOOR AT THE CENTER OF THE MAGAZINE. FLOOR DUNNAGE IN THE FORM OF SHIMS WILL BE USED AS REQUIRED TO ACHIEVE SOUND AND ACCEPTABLE STABLE STACKS. SEE THE DETAIL ON PAGE 24.
- T. PORTIONS OF THE MAGAZINES, SUCH AS SIDEWALLS, END WALLS, AND ROOFS HAVE NOT BEEN SHOWN IN THE STORAGE VIEWS FOR CLARITY PURPOSES.
- U. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- V. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENT MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM, AND ONE POUND EQUALS 0.454 KG.

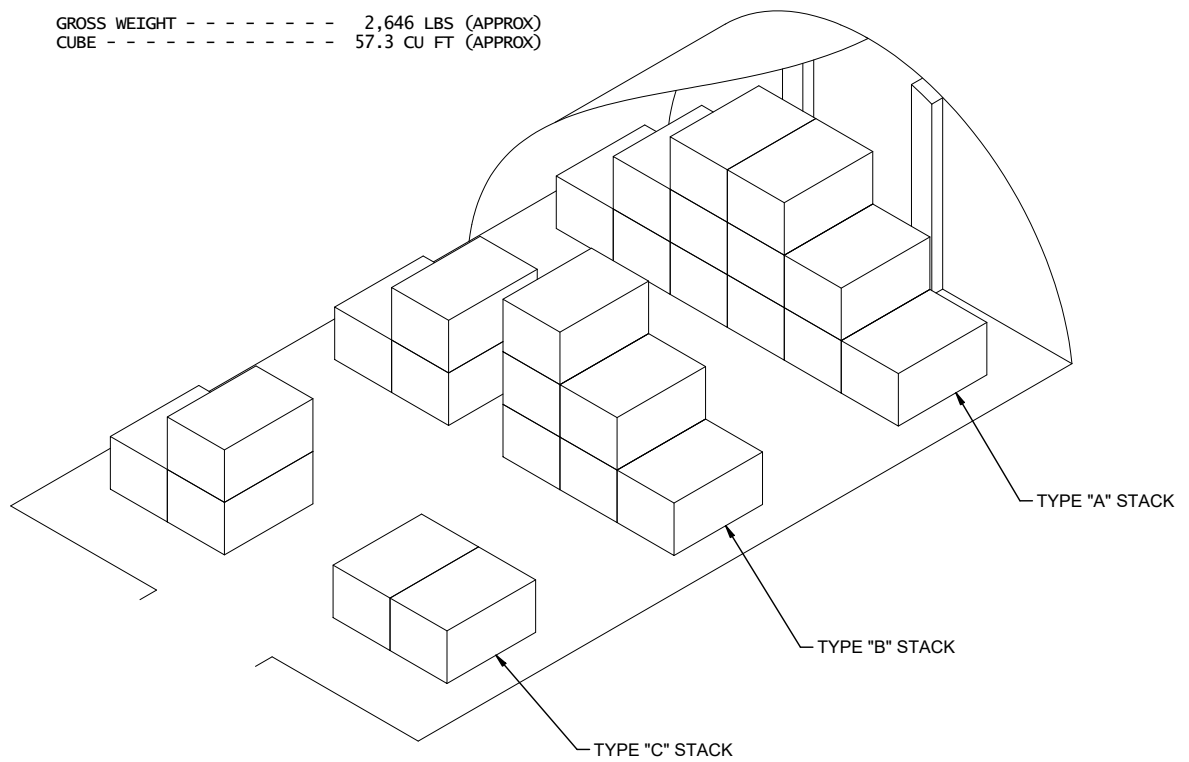
## MATERIAL SPECIFICATIONS

LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.



**PALLET UNIT**

GROSS WEIGHT - - - - - 2,646 LBS (APPROX)  
 CUBE - - - - - 57.3 CU FT (APPROX)

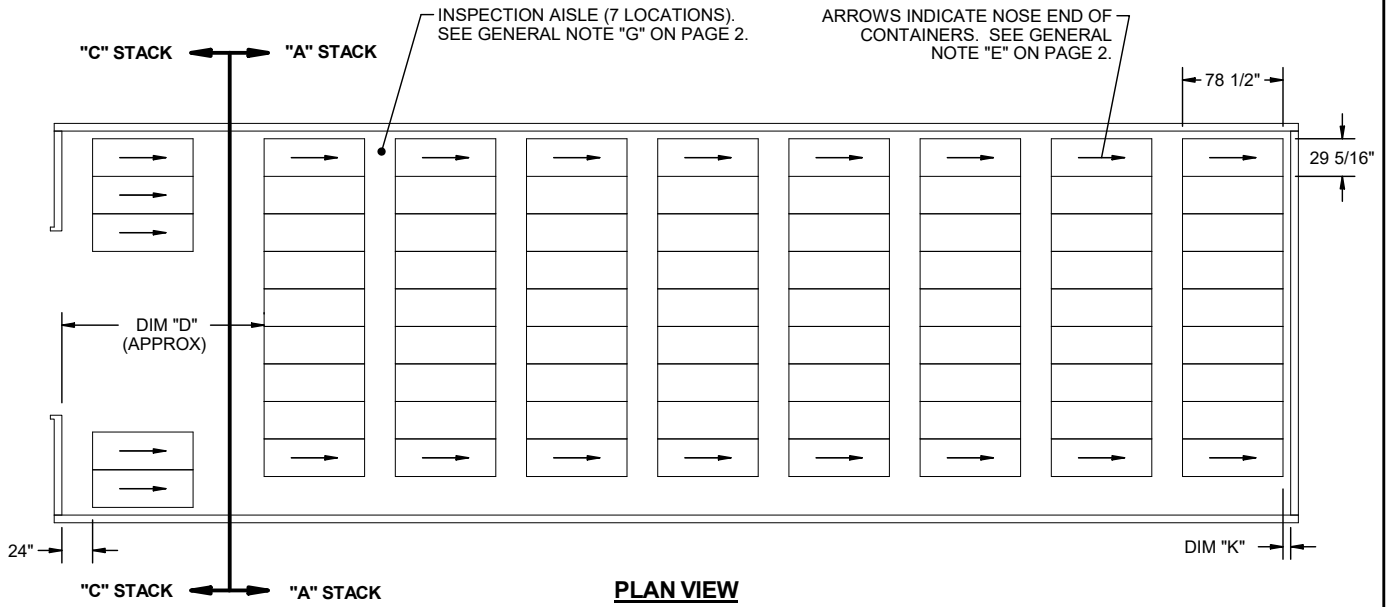


**STACK IDENTIFICATION**

A TYPE "A" STACK IS IDENTIFIED AS A GROUP OF ITEMS/UNITS WHICH EXTENDS FULL WIDTH AND HEIGHT OF THE MAGAZINE, AND IS ONE ITEM/UNIT LONG IN THE LENGTH OF THE MAGAZINE.

A TYPE "B" STACK IS IDENTIFIED AS A GROUP OF ITEMS/UNITS WHICH EXTENDS FULL WIDTH AND HEIGHT OF THE MAGAZINE, AND IS ONE UNIT/ITEM LONG, BUT HAS AN AISLE AT OR NEAR THE CENTER OF THE WIDTH OF THE STACK.

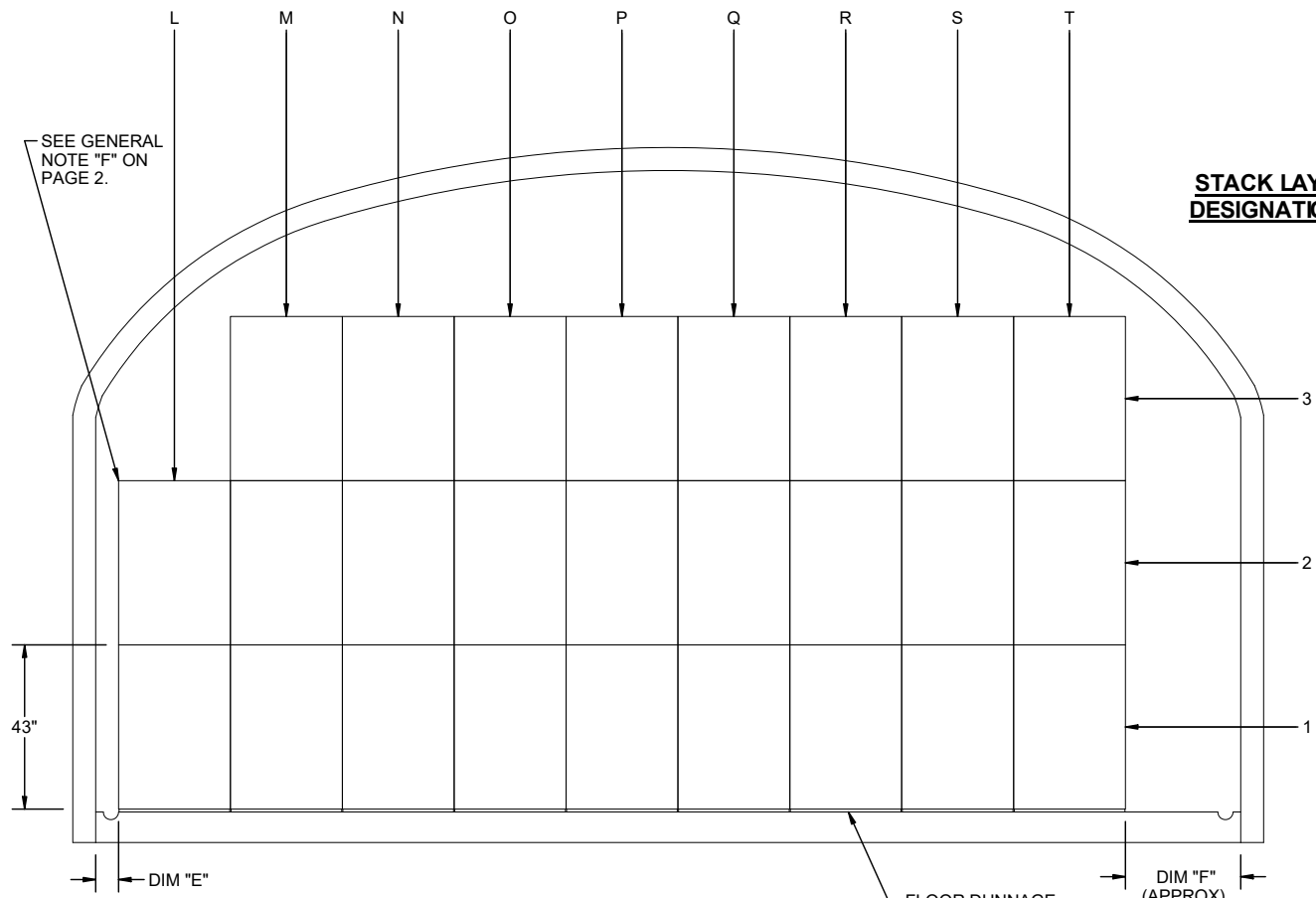
A TYPE "C" STACK IS IDENTIFIED AS A GROUP OF ITEMS/UNITS WHICH IS ONE UNIT/ITEM LONG AND CONSISTS OF PARTIAL STACKS ON EACH SIDE OF THE MAGAZINE, USUALLY ONE ITEM/UNIT HIGH ON ONE SIDE OF THE MAGAZINE.



**NOTE:** FOR IDENTIFICATION OF LETTERED  
DIMENSIONS REFER TO CHART 1 ON PAGE 6.

**STACK COLUMN DESIGNATIONS**

**STACK LAYER DESIGNATIONS**



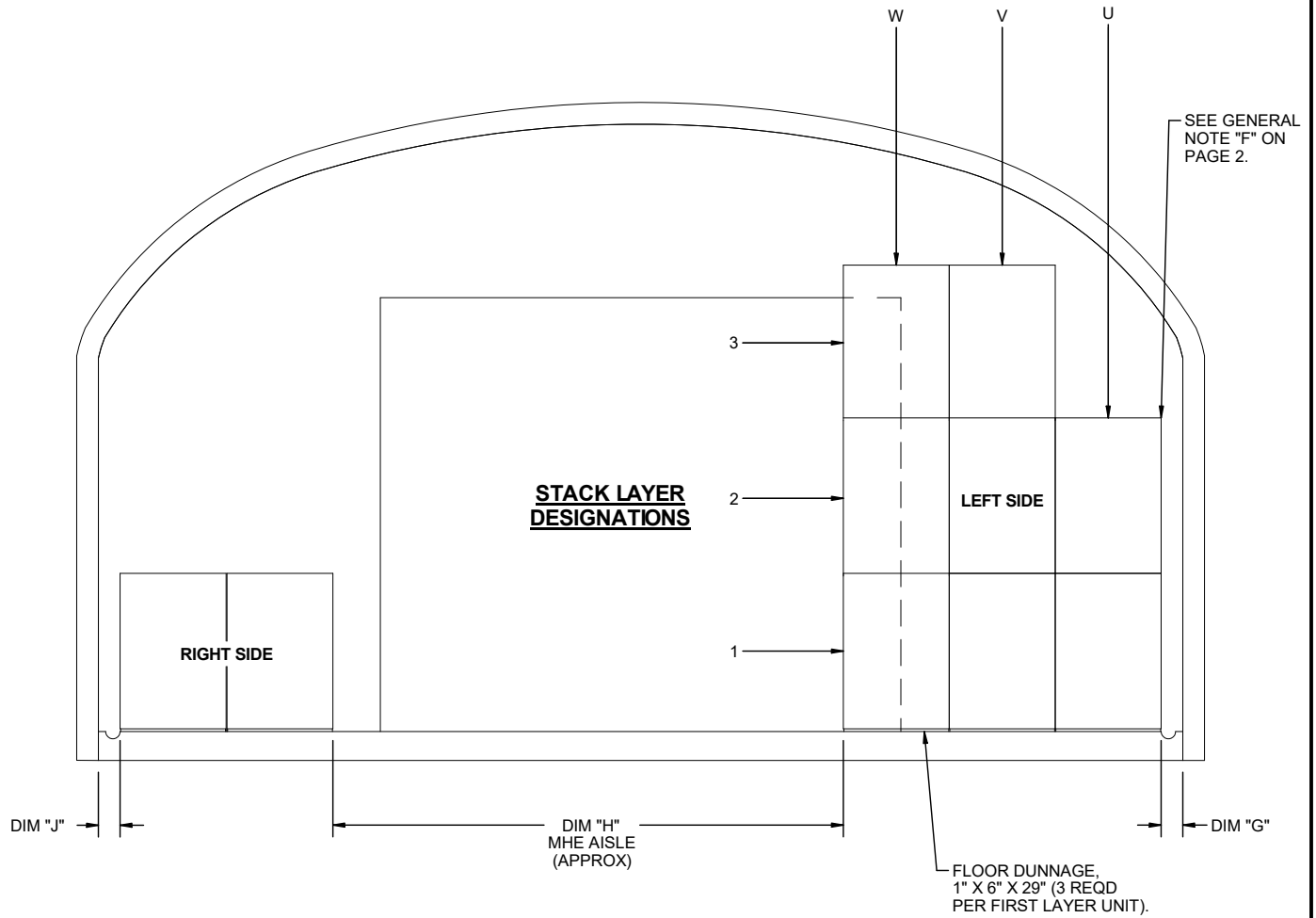
**"A" STACK**

(SEE "STACK IDENTIFICATION" ON PAGE 3  
AND "CHART 2 - STACK CONFIGURATION"  
ON PAGE 7.)

FLOOR DUNNAGE,  
1" X 6" X 29" (3 REQD  
PER FIRST LAYER UNIT).

**NOTE:** FOR IDENTIFICATION OF LETTERED DIMENSIONS REFER TO CHART 1 ON PAGE 6.

**STACK COLUMN DESIGNATIONS**



**"C" STACK**

TYPICAL "C" STACK FOR STRADLEY MAGAZINE.  
(SEE "STACK IDENTIFICATION " ON PAGE 3 AND "CHART 2 - STACK CONFIGURATION" ON PAGE 7)

**SPECIAL NOTES:**

1. THE FOLLOWING NOTES, CHART 1 ON PAGE 6 AND CHART 2 ON PAGE 7 ARE PRESENTED AS GUIDANCE IN THE SELECTION OF A STORAGE PATTERN, AND IN DETERMINING THE QUANTITY OF PALLET UNITS WHICH CAN BE STORED IN THE STORAGE MAGAZINES LISTED IN THE CHARTS MENTIONED ABOVE.
2. CHART 1 ON PAGE 6 DESCRIBES THE STORAGE MAGAZINE GENERAL DIMENSIONS AND THE DIMENSIONS OF THE PALLET UNIT SPACING WITHIN THE STORAGE MAGAZINES.
3. DIMENSIONS "A", "B" AND "C" HAVE BEEN OMITTED TO AVOID CONFUSION WITH STACKS "A", "B" AND "C".
4. CHART 2 ON PAGE 7 DETAILS THE QUANTITY OF PALLET UNITS IN EACH TYPE OF MAGAZINE AND THE LAYOUT OF THE STACKS FOR EACH TYPE OF MAGAZINE. THE CHART SHOWS THE NUMBER OF PALLET UNITS IN EACH STACK LAYER AND THE LOCATION OF THE PALLET UNIT ON EACH LAYER.

(CONTINUED AT RIGHT)

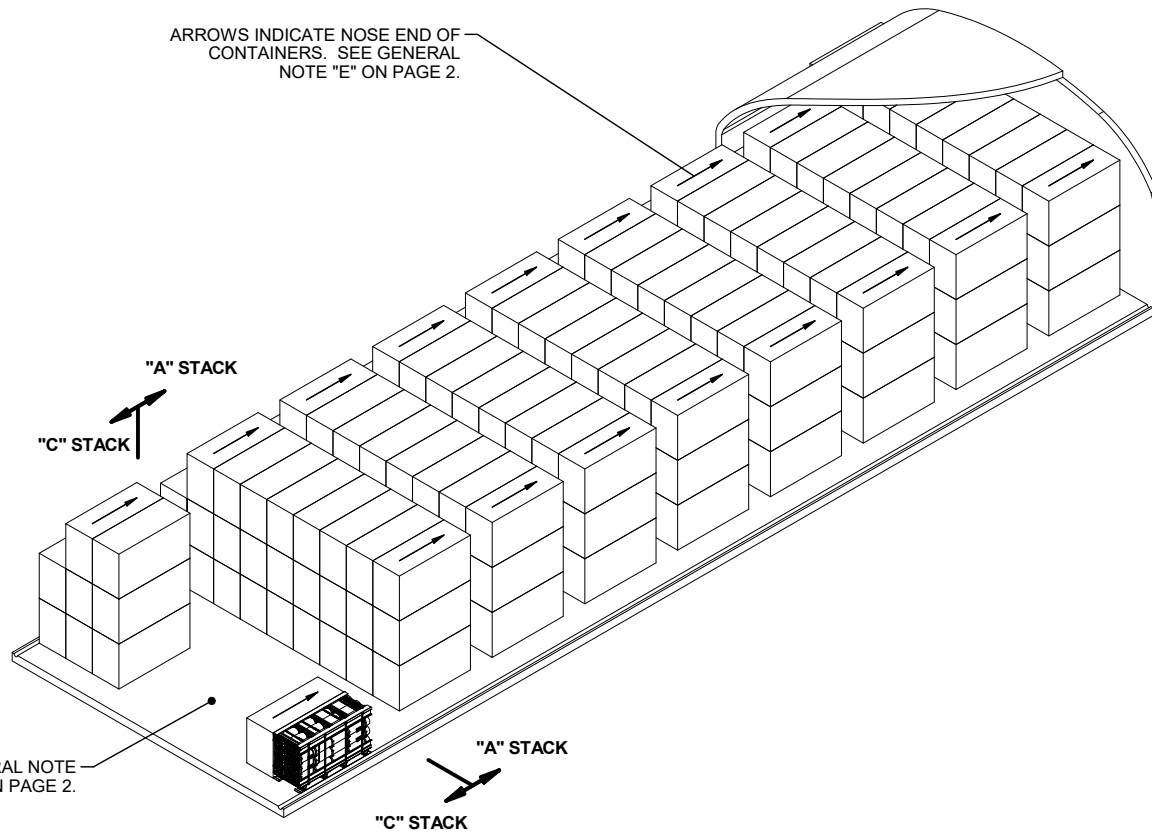
**EXAMPLE:**

CHART 2 - "A" STACK CONFIGURATION  
MAGAZINE: STRADLEY

- LAYER NUMBER 1: 9 (L-T)
- LAYER NUMBER 2: 9 (L-T)
- LAYER NUMBER 3: 8 (M-T)

**EXPLANATION:**

- LAYER 1 (BOTTOM LAYER) HAS NINE PALLET UNITS FROM THE "L" COLUMN (NEAREST THE LEFT SIDE OF THE MAGAZINE) TO THE "T" COLUMN.
- LAYER 2 (ON TOP OF LAYER 1) HAS NINE PALLET UNITS FROM THE "L" COLUMN (NEAREST THE LEFT SIDE OF THE MAGAZINE) TO THE "T" COLUMN.
- LAYER 3 (ON TOP OF LAYER 2) HAS EIGHT PALLET UNITS FROM THE "M" COLUMN (NEAREST THE LEFT SIDE OF THE MAGAZINE) TO THE "T" COLUMN.



**ISOMETRIC VIEW**

STRADLEY MAGAZINE SHOWN AS TYPICAL.

**CHART 1 - DIMENSIONS**

MAGAZINE DIMENSIONS	MAGAZINE TYPE													
	IGLOO			ARCH 12'		ARCH 11'		ARCH 10'		OVAL ARCH	STRADLEY	STEEL ARCH		
LENGTH	40'-4"	60'-8"	81'-0"	26'-6"	25'-0"	40'-0"	80'-0"	40'-0"	80'-0"	89'-0"	80'-0"	59'-0"	89'-0"	
WIDTH		26'-6"		26'-6"	25'-0"	25'-0"	25'-0"		25'-0"	24'-10"	25'-0"	25'-0"	24'-11"	
HEIGHT					12'-1-3/4"		11'-0"		10'-0"	14'-5"	14'-0"	14'-0"	13'-6"	
DIMENSIONS	PALLET UNIT SPACING DIMENSIONS													
DIM "D" (MHE AREA APPROX)	16'-2"	19'-5"	14'-2"	13'-8"	15'-10"	12'-6"	15'-2"	12'-6"	15'-10"	13'-2"	13'-7"	13'-2"	17'-9"	13'-7"
DIM "E" ("A" STACK LEFT)	13"	13"	13"	17"	12"	12"	21"	21"	24"	24"	6"	6"	6"	6"
DIM "F" ("A" STACK RIGHT APPROX)	41"	41"	41"	66"	53"	53"	44"	44"	70"	70"	28"	30"	30'	29"
DIM "G" ("C" STACK LEFT)	13"	13"	13"	17"	12"	12"	21"	21"	24"	24"	6"	6"	6"	6"
DIM "H" (MHE AISLE APPROX)	12'-1"	12'-1"	12'-1"	11'-5"	10'-9"	10'-9"	11'-10"	11'-10"	11'-2"	11'-2"	11'-7"	11'-9"	11'-9"	11'-8"
DIM "J" ("C" STACK RIGHT)	13"	13"	13"	17"	12"	12"	19"	19"	24"	24"	6"	6"	6"	6"
DIM "K" ("A" STACK BACK)	6"	6"	6"	14"	6"	14"	14"	14"	6"	6"	6"	6"	6"	6"

**CHART 2 - STACK CONFIGURATION**

MAGAZINE TYPE														
QUANTITY PER MAGAZINE	IGLOO			ARCH 12'	ARCH 12' X 25' W		ARCH 11'		ARCH 10'		OVAL ARCH	STRADLEY	STEEL ARCH	
	40'-4" L	60'-8" L	81'-0" L	26'-6" W	40'-0" L	80'-0" L	40'-0" L	80'-0" L	40'-0" L	80'-0" L			59'-0" L	89'-0" L
	70	112	175	151	61	151	48	118	41	101	244	218	118	206
<b>"A" STACK CONFIGURATION</b>														
LAYER	PALLET UNITS PER LAYER													
1	9(L-T)			8(L-S)			8(L-S)		7(L-R)		9(L-T)	9(L-T)	9(L-T)	
2	8(M-T)			7(M-S)			6(M-R)		5(N-R)		9(L-T)	9(L-T)	8(M-T)	
3	4(O-R)			3(O-Q)			0		0		8(M-T)	8(M-T)	5(N-R)	
SINGLE STACK TOTAL	21			18			14		12		26	26	22	
NUMBER OF STACKS	3	5	8	8	3	8	3	8	3	8	9	8	5	9
"A" STACK TOTAL	63	105	168	144	54	144	42	112	36	96	234	208	110	198
<b>"C" STACK CONFIGURATION - LEFT SIDE</b>														
LAYER	PALLET UNITS PER LAYER													
1	3(U-W)			3(U-W)			3(U-W)		3(U-W)		3(U-W)	3(U-W)	3(U-W)	
2	2(V-W)			2(V-W)			2(V-W)		1(W)		3(U-W)	3(U-W)	2(V-W)	
3	0			0			0		0		2(V-W)	2(V-W)	1(W)	
SINGLE STACK TOTAL	5			5			5		4		8	8	6	
NUMBER OF STACKS	1			1			1		1		1	1	1	
"C" STACK LF TOTAL	5			5			5		4		8	8	6	
<b>"C" STACK CONFIGURATION - RIGHT SIDE</b>														
"C" STACK RT TOTAL	2			2			1		1		2	2	2	

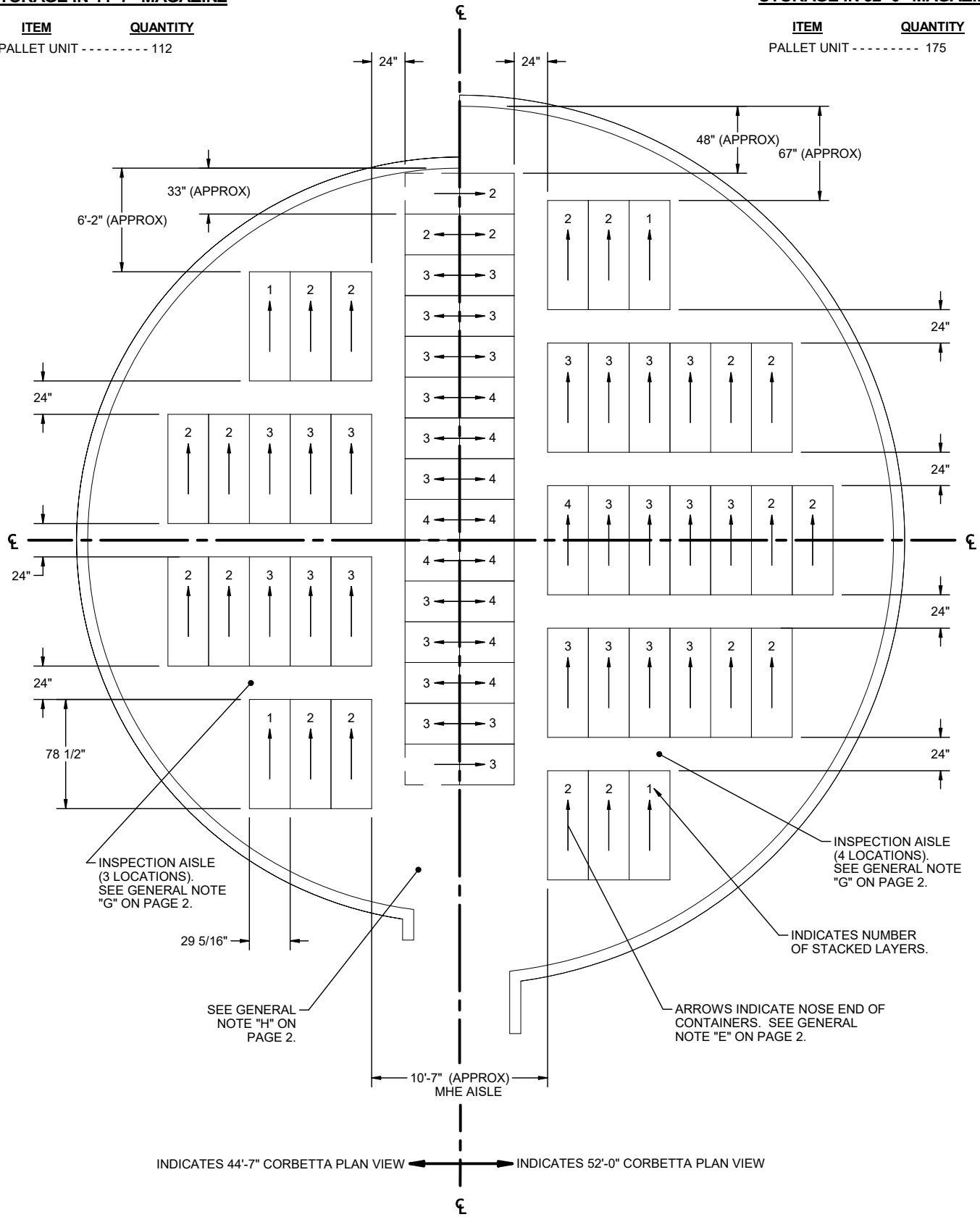
**NOTE:** REFER TO THE SPECIAL NOTES ON THE BOTTOM OF PAGE 5.

**STORAGE IN 44'-7" MAGAZINE**

**STORAGE IN 52'-0" MAGAZINE**

**ITEM QUANTITY**  
PALLET UNIT ----- 112

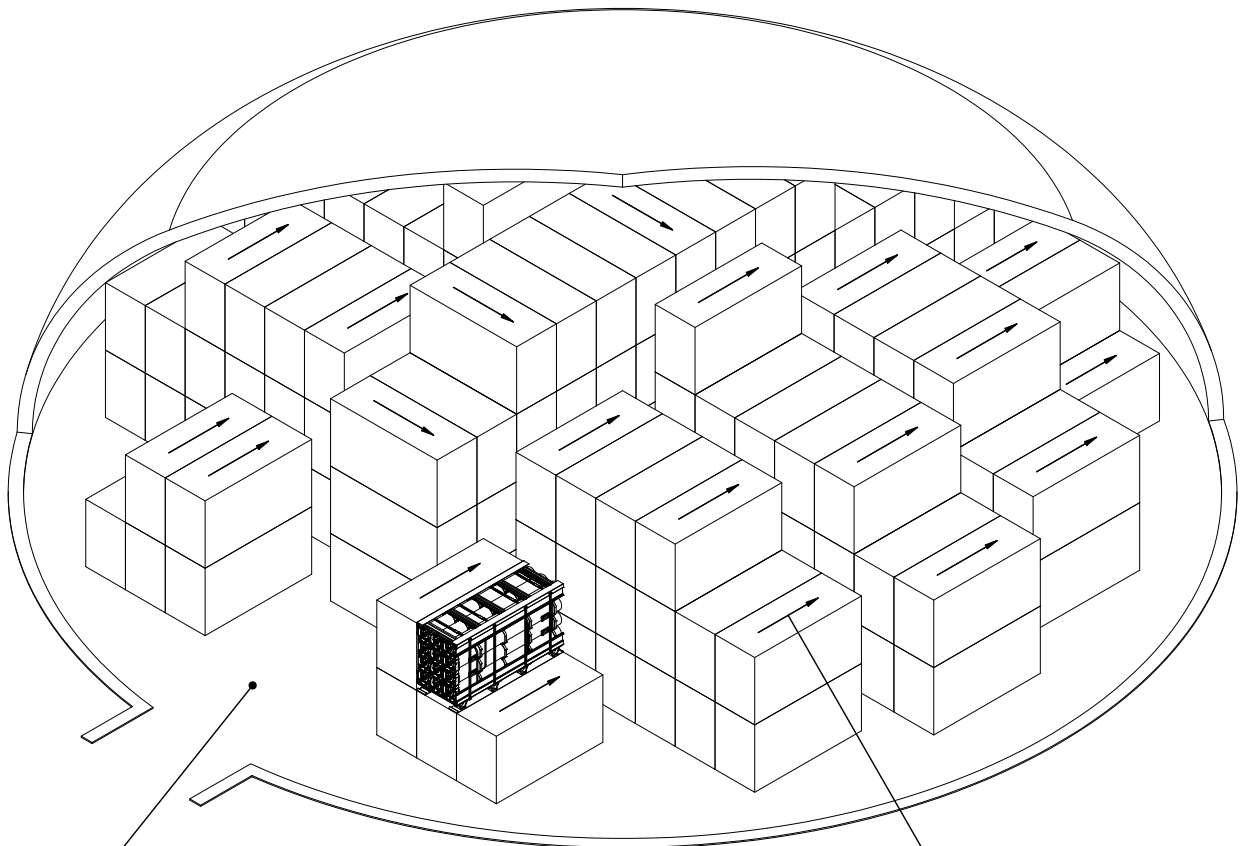
**ITEM QUANTITY**  
PALLET UNIT ----- 175



**PLAN VIEW**

THE RIGHT HAND PLAN VIEW INDICATES A 52'-0" CORBETTA MAGAZINE, AND THE LEFT HAND PLAN VIEW INDICATES A 44'-7" CORBETTA MAGAZINE. BOTH SIZE MAGAZINE LAYOUTS ARE SYMMETRICAL AROUND THE VERTICAL CENTER LINE.





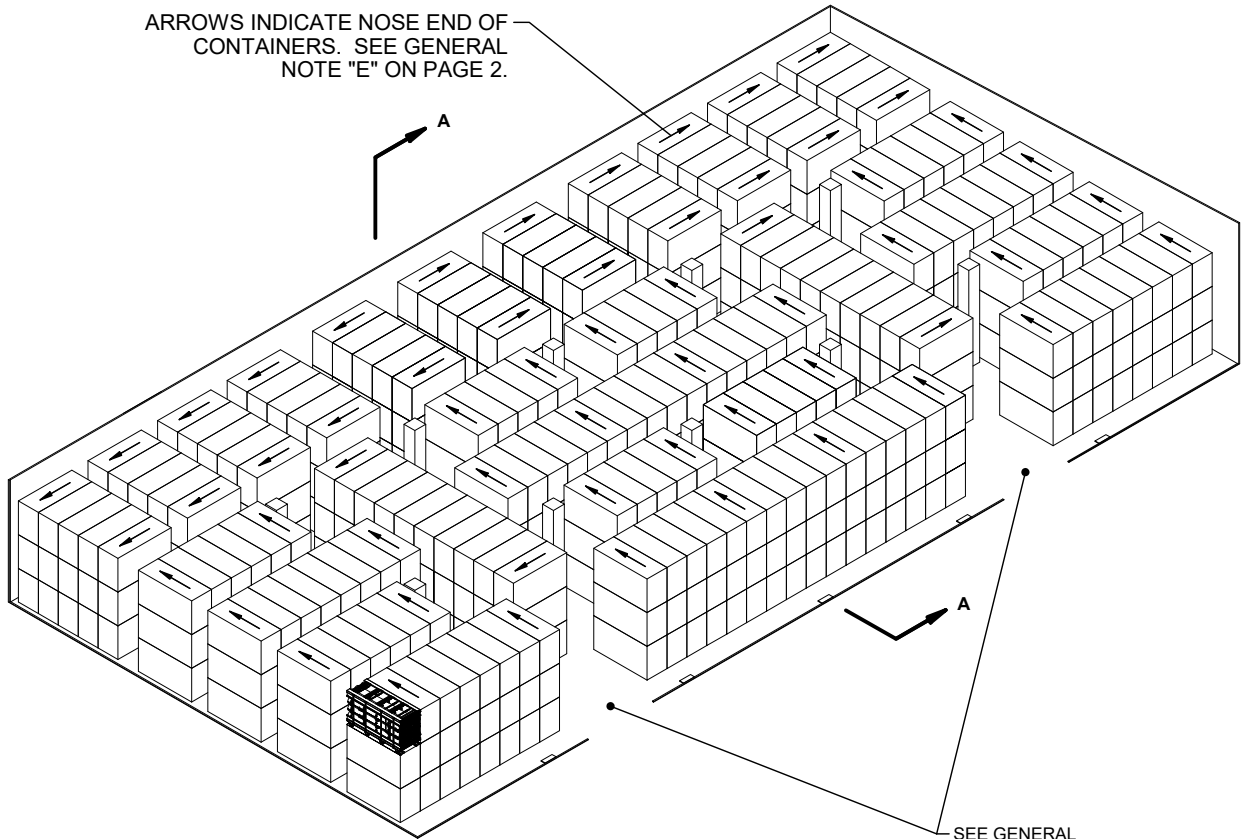
SEE GENERAL  
NOTE "H" ON  
PAGE 2.

ARROWS INDICATE NOSE END OF  
CONTAINERS. SEE GENERAL  
NOTE "E" ON PAGE 2.

**ISOMETRIC VIEW**  
(52' - 0" DIA MAGAZINE)



ARROWS INDICATE NOSE END OF  
CONTAINERS. SEE GENERAL  
NOTE "E" ON PAGE 2.



SEE GENERAL  
NOTE "H" ON  
PAGE 2.

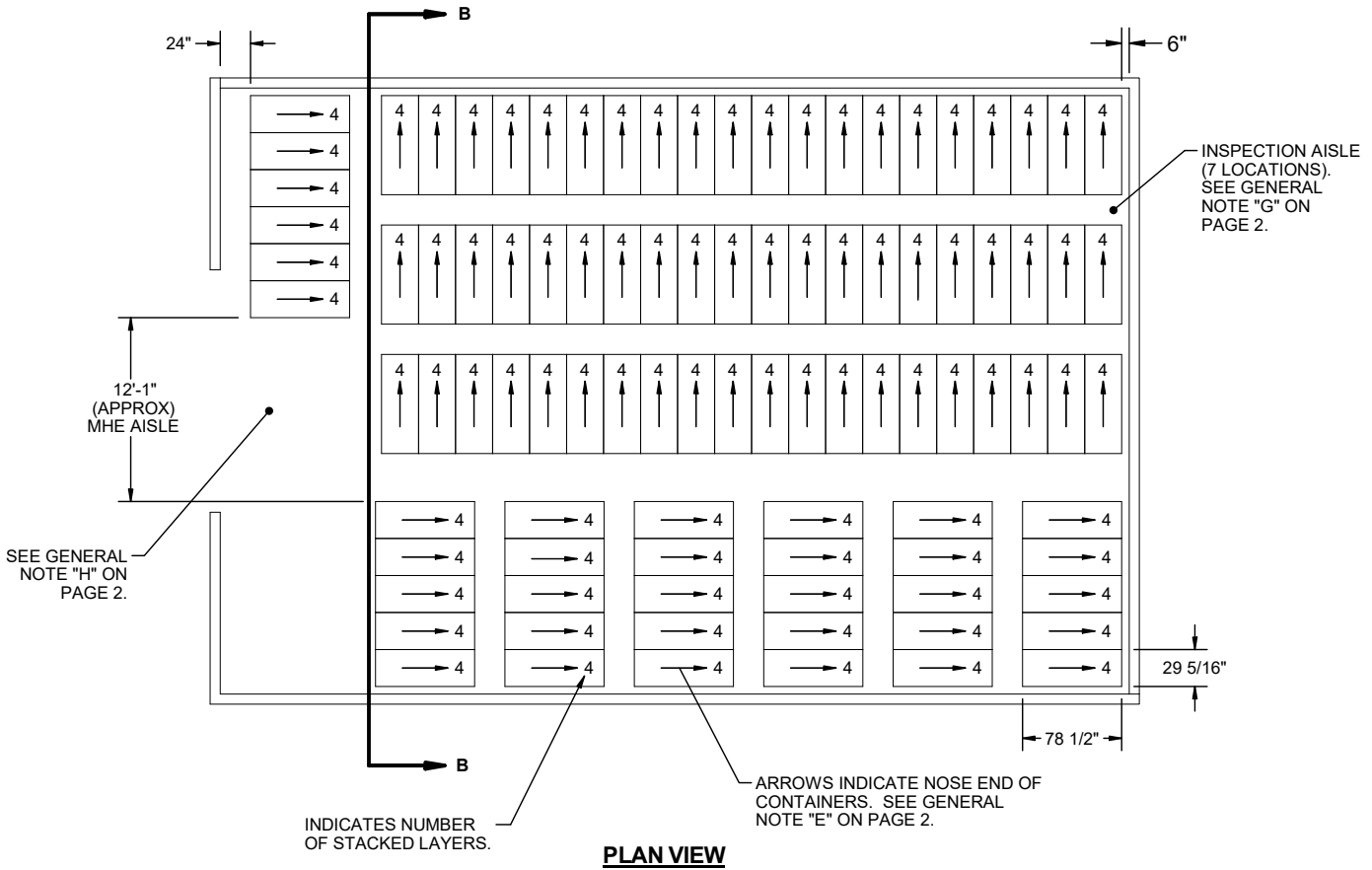
**ISOMETRIC VIEW**

(50'-0" MAGAZINE)

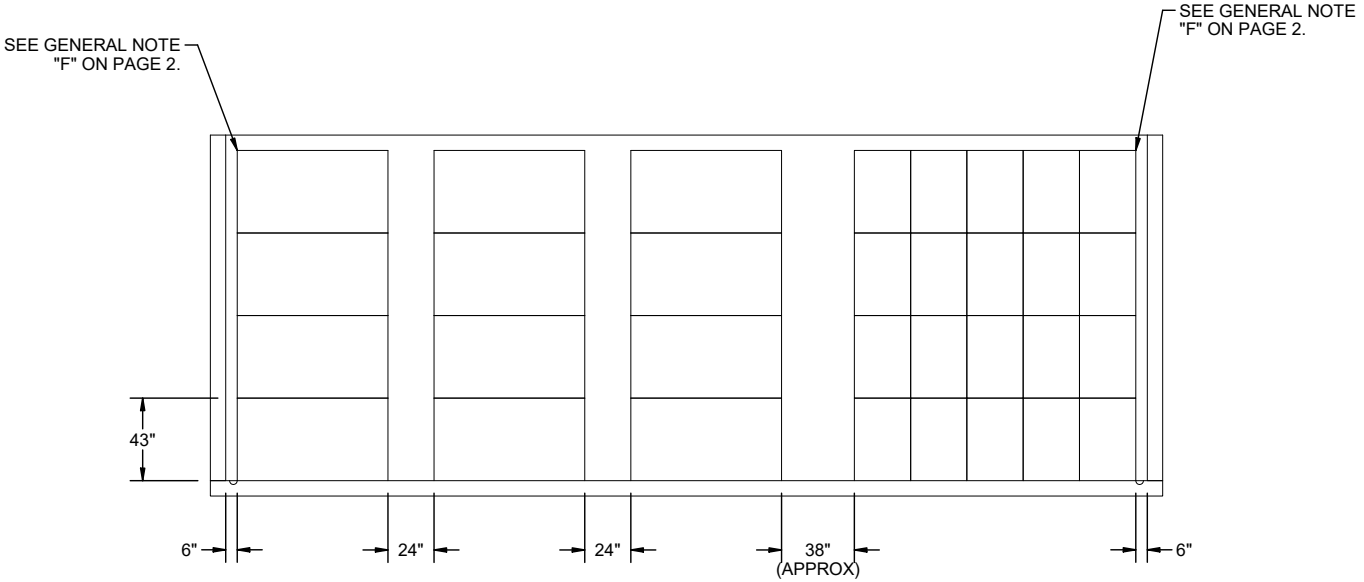
**100'-8" L X 50'-0" W RECTANGULAR MAGAZINE**

**STORAGE IN TYPE II BUNKER  
MAGAZINE**

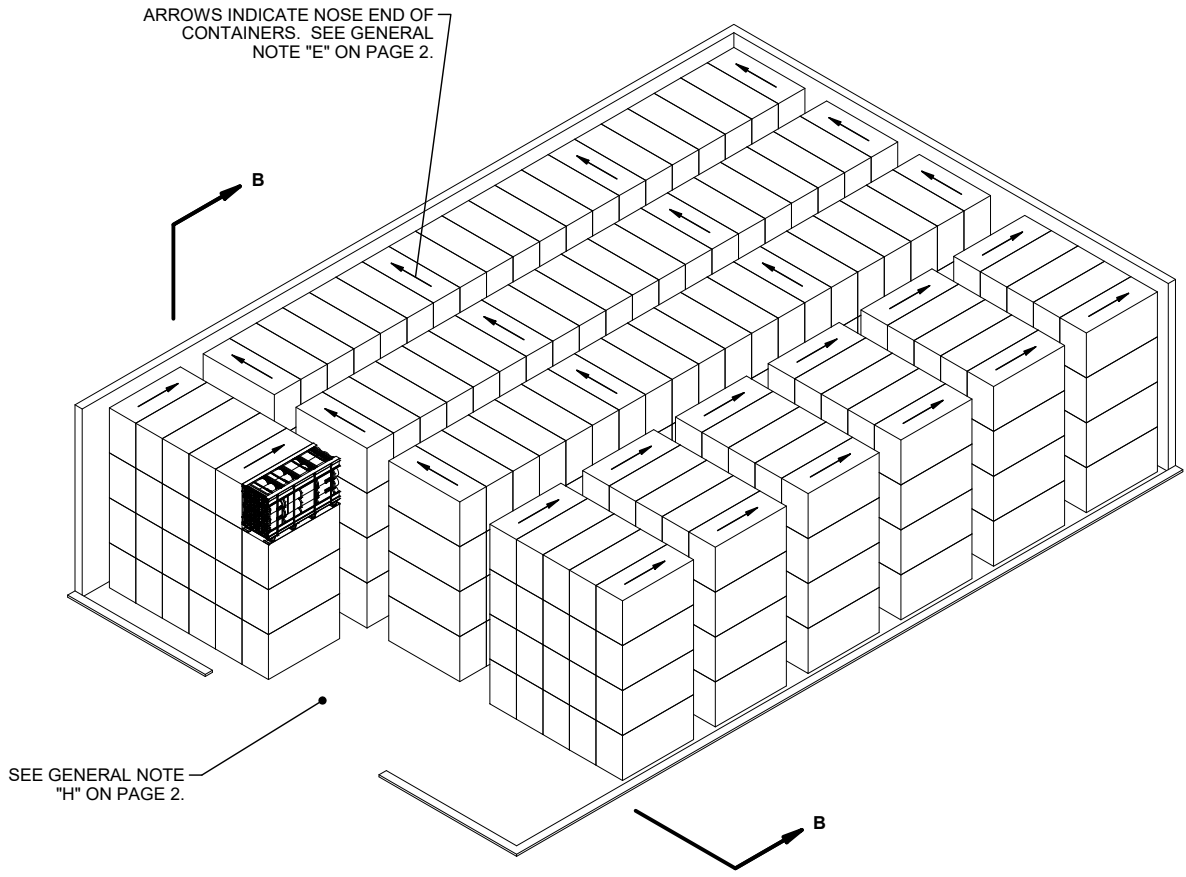
**ITEM**                      **QUANTITY**  
PALLET UNIT ----- 384



**PLAN VIEW**



**SECTION B-B**



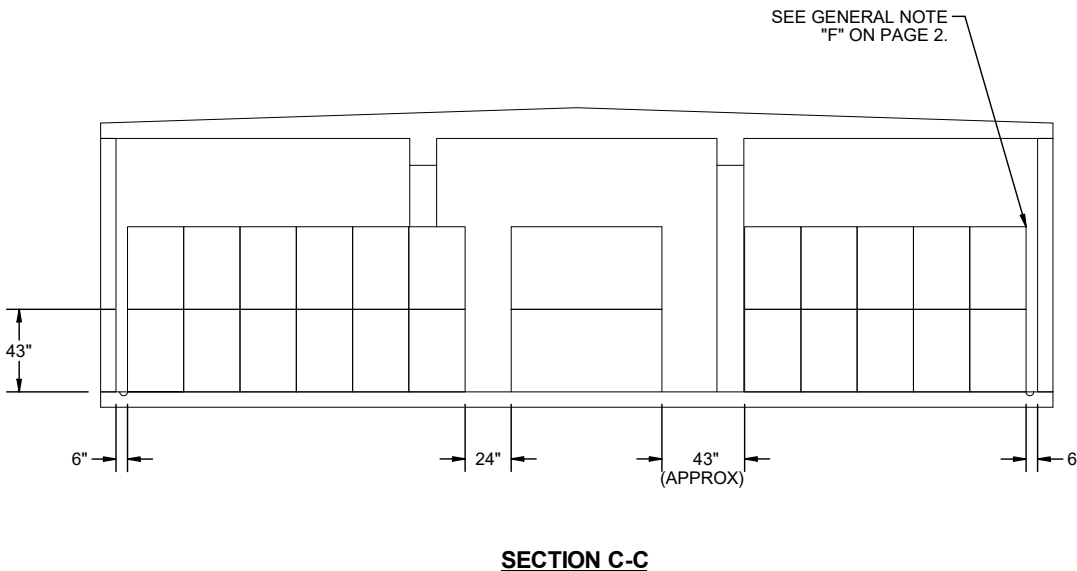
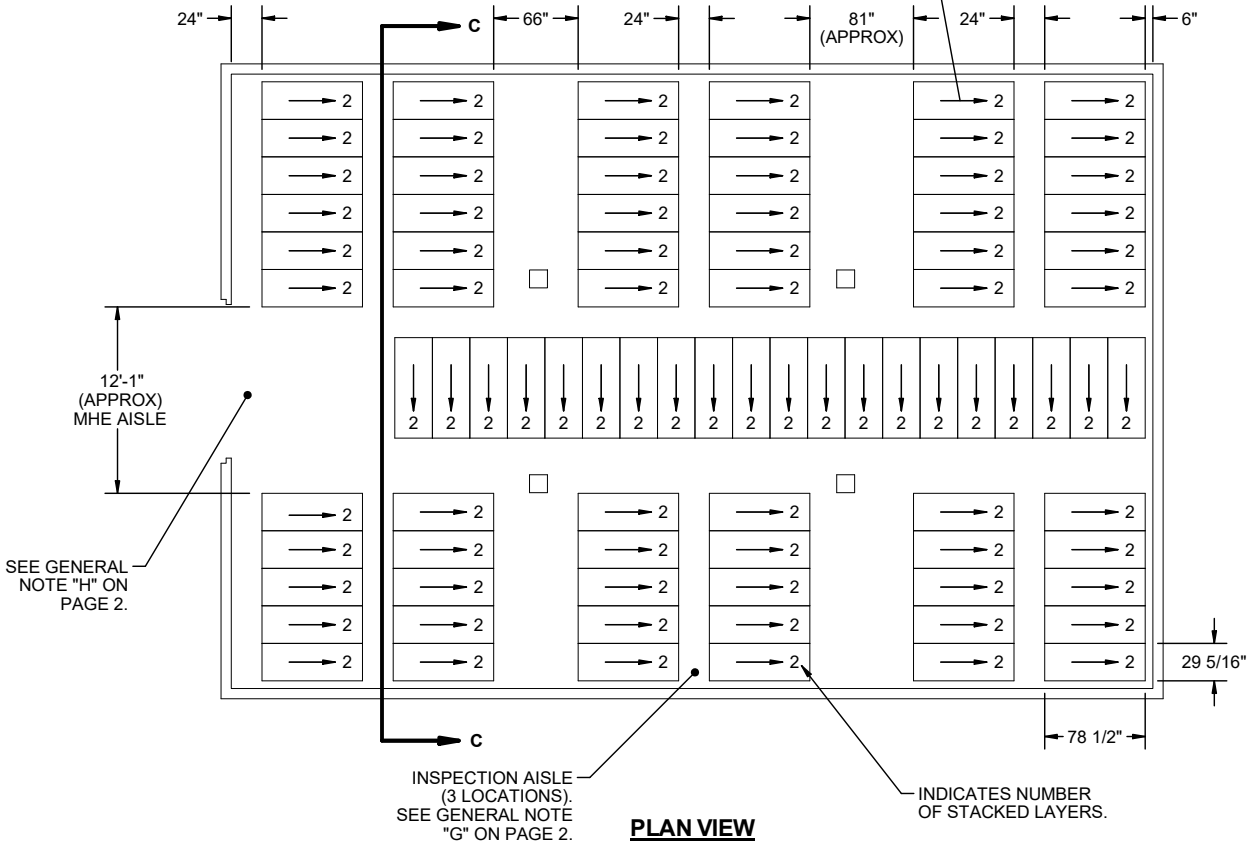
**ISOMETRIC VIEW**  
 (TYPE II BUNKER MAGAZINE)

**60'-0" L X 40'-0" W X 15'-0" H TYPE II BUNKER MAGAZINE**

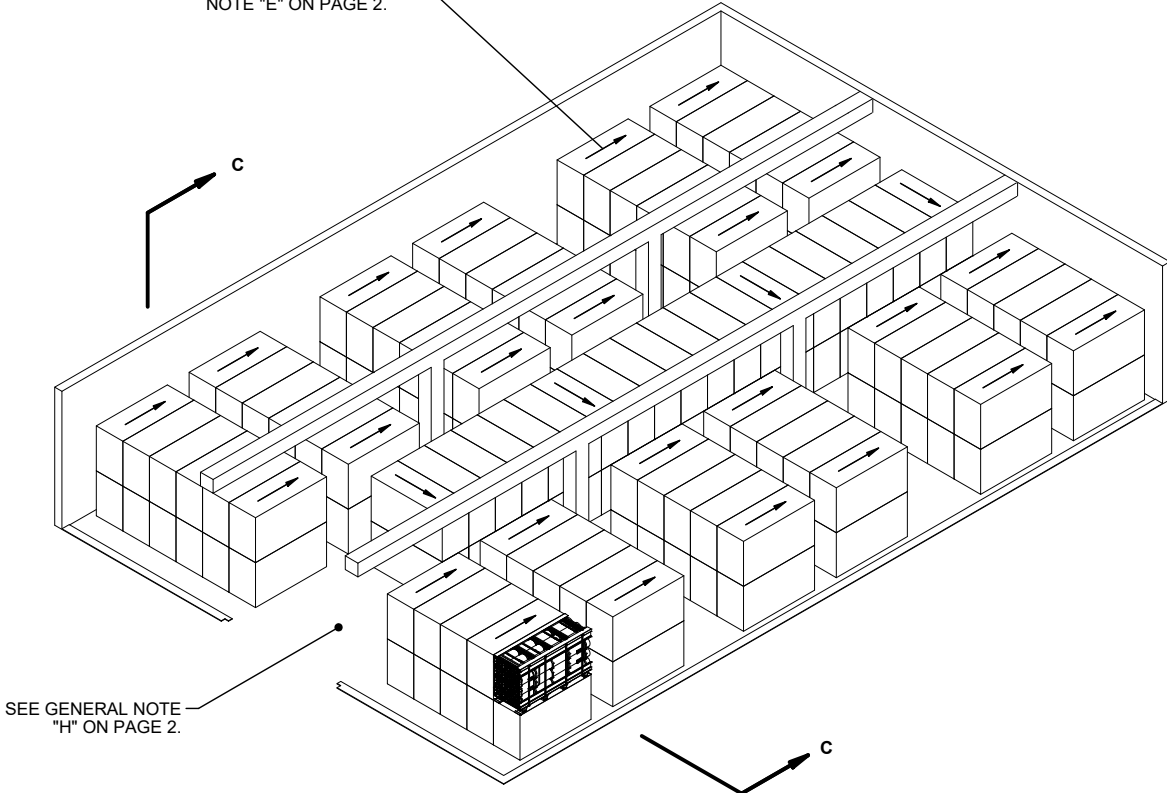
**STORAGE IN TYPE III BUNKER  
MAGAZINE**

**ITEM**                      **QUANTITY**  
PALLET UNIT ----- 172

ARROWS INDICATE NOSE END OF  
CONTAINERS. SEE GENERAL  
NOTE "E" ON PAGE 2.



ARROWS INDICATE FORWARD END  
OF CONTAINER. SEE GENERAL  
NOTE "E" ON PAGE 2.



**ISOMETRIC VIEW**

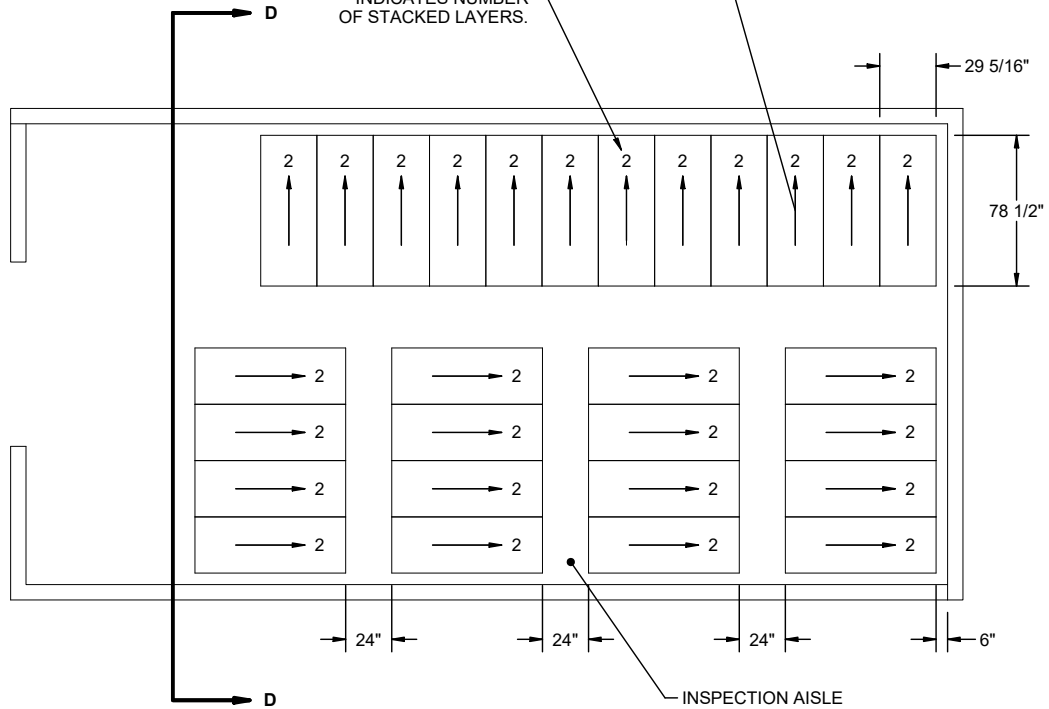
(TYPE III BUNKER MAGAZINE)

**STORAGE IN TYPE IV BUNKER  
MAGAZINE**

**ITEM**                      **QUANTITY**  
PALLET UNIT ----- 56

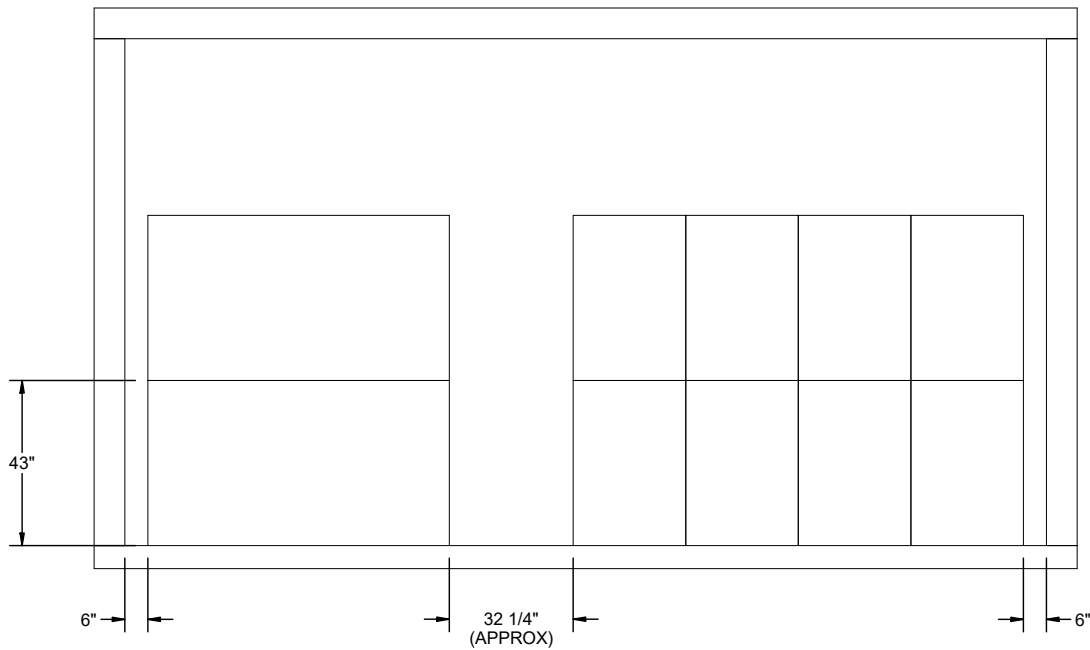
ARROWS INDICATE NOSE END OF  
CONTAINERS. SEE GENERAL  
NOTE "E" ON PAGE 2.

INDICATES NUMBER  
OF STACKED LAYERS.



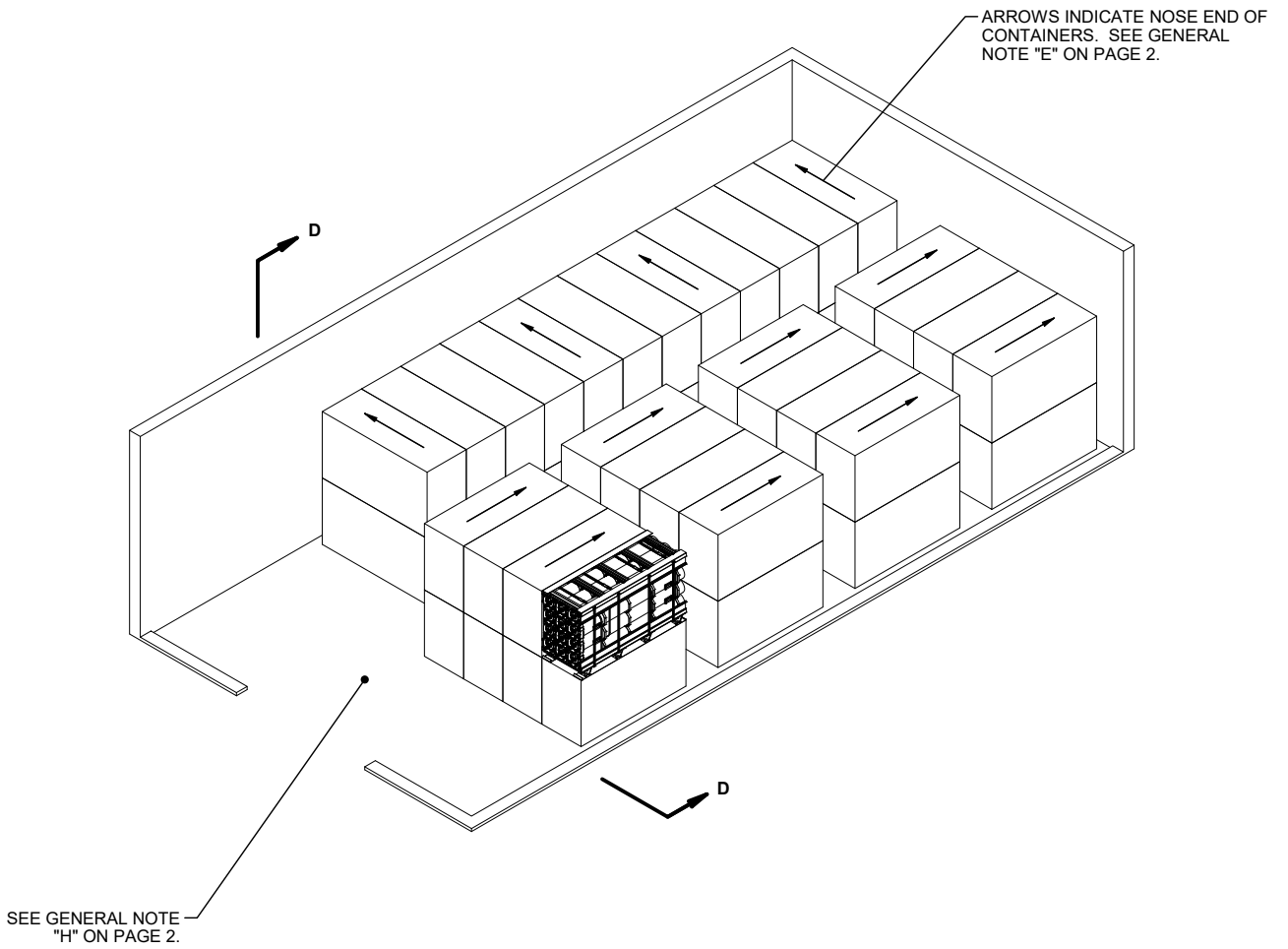
**PLAN VIEW**

INSPECTION AISLE  
(3 LOCATIONS).  
SEE GENERAL  
NOTE "G" ON  
PAGE 2.



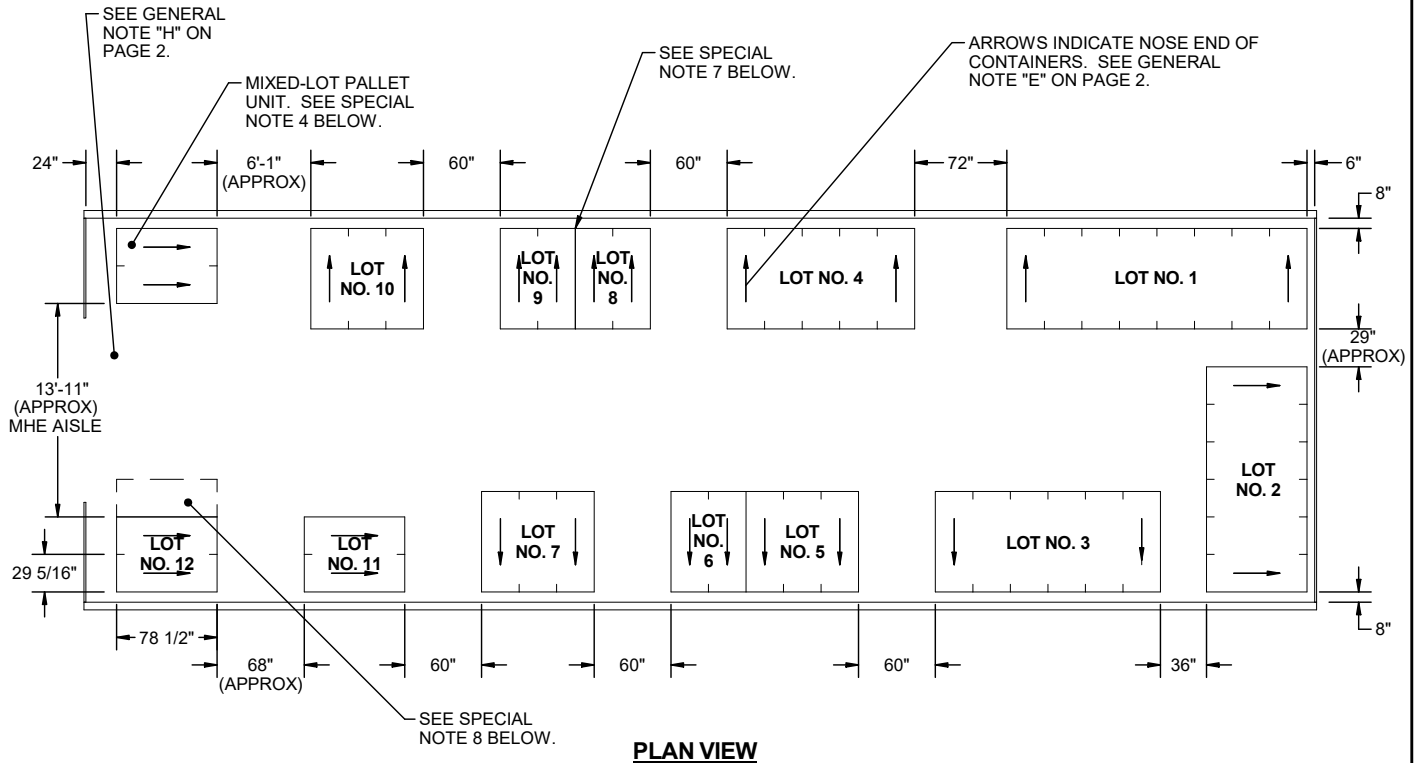
**SECTION D-D**





**ISOMETRIC VIEW**

(TYPE IV BUNKER MAGAZINE)



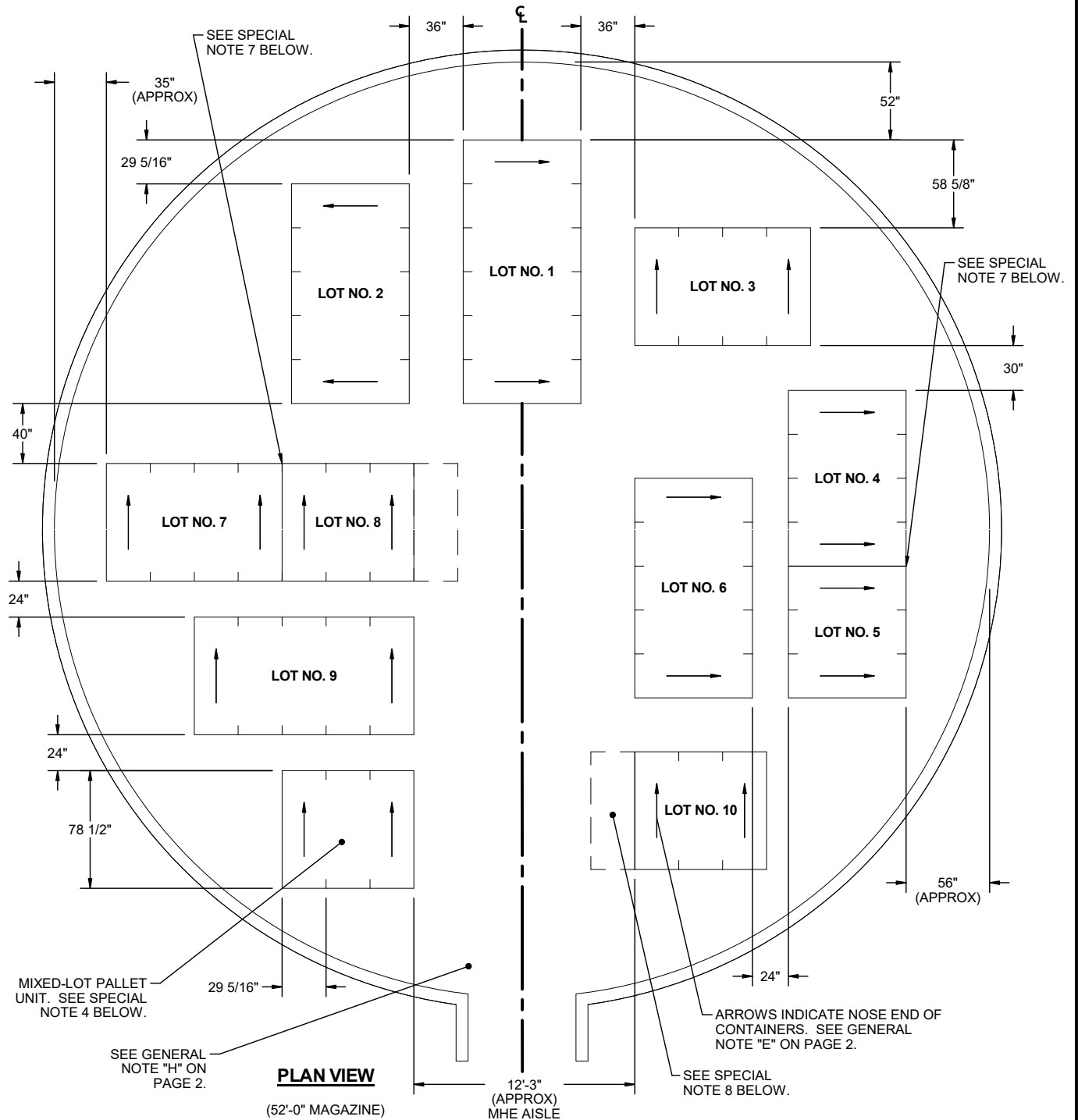
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**PLAN VIEW**  
(52'-0" MAGAZINE)

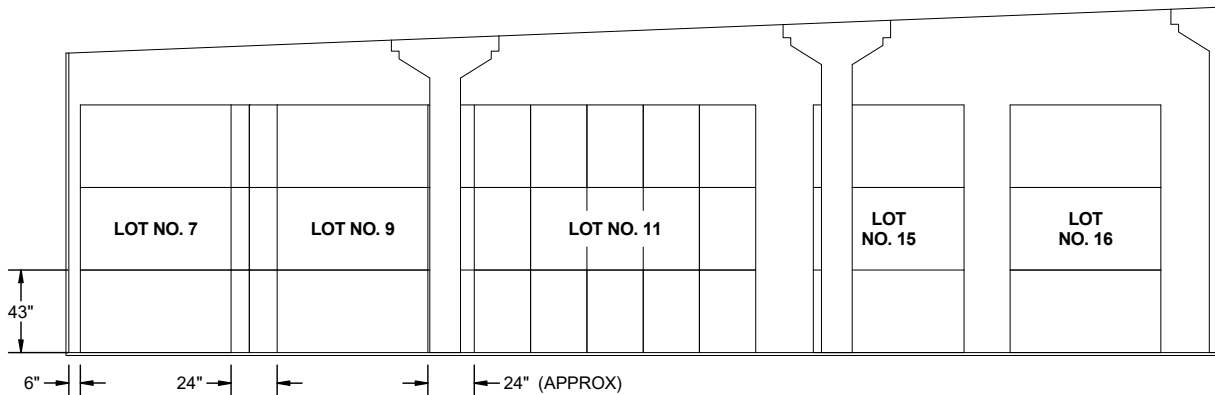
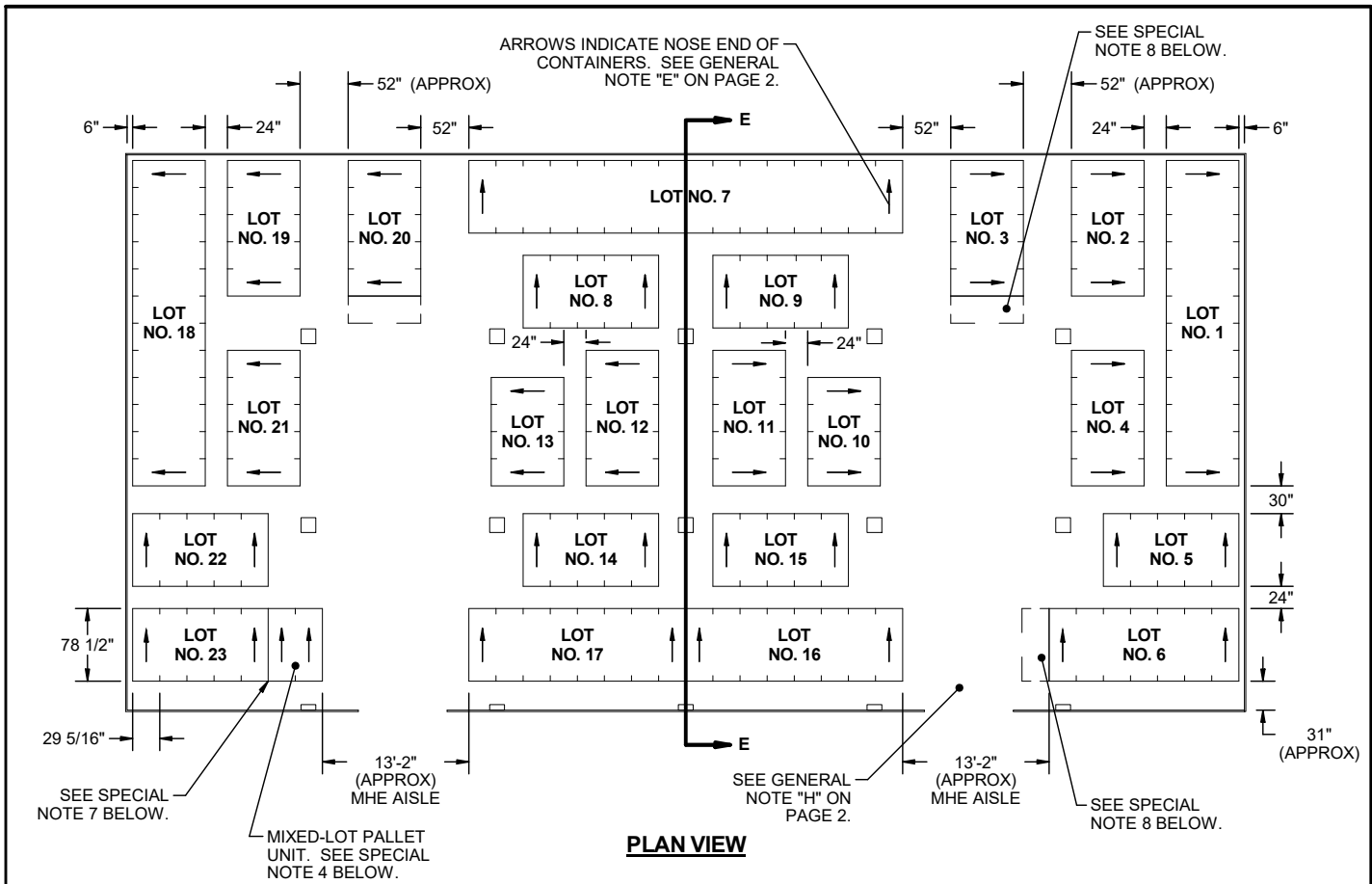
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**TYPICAL MULTIPLE-LOT STORAGE IN CORBETTA MAGAZINE**



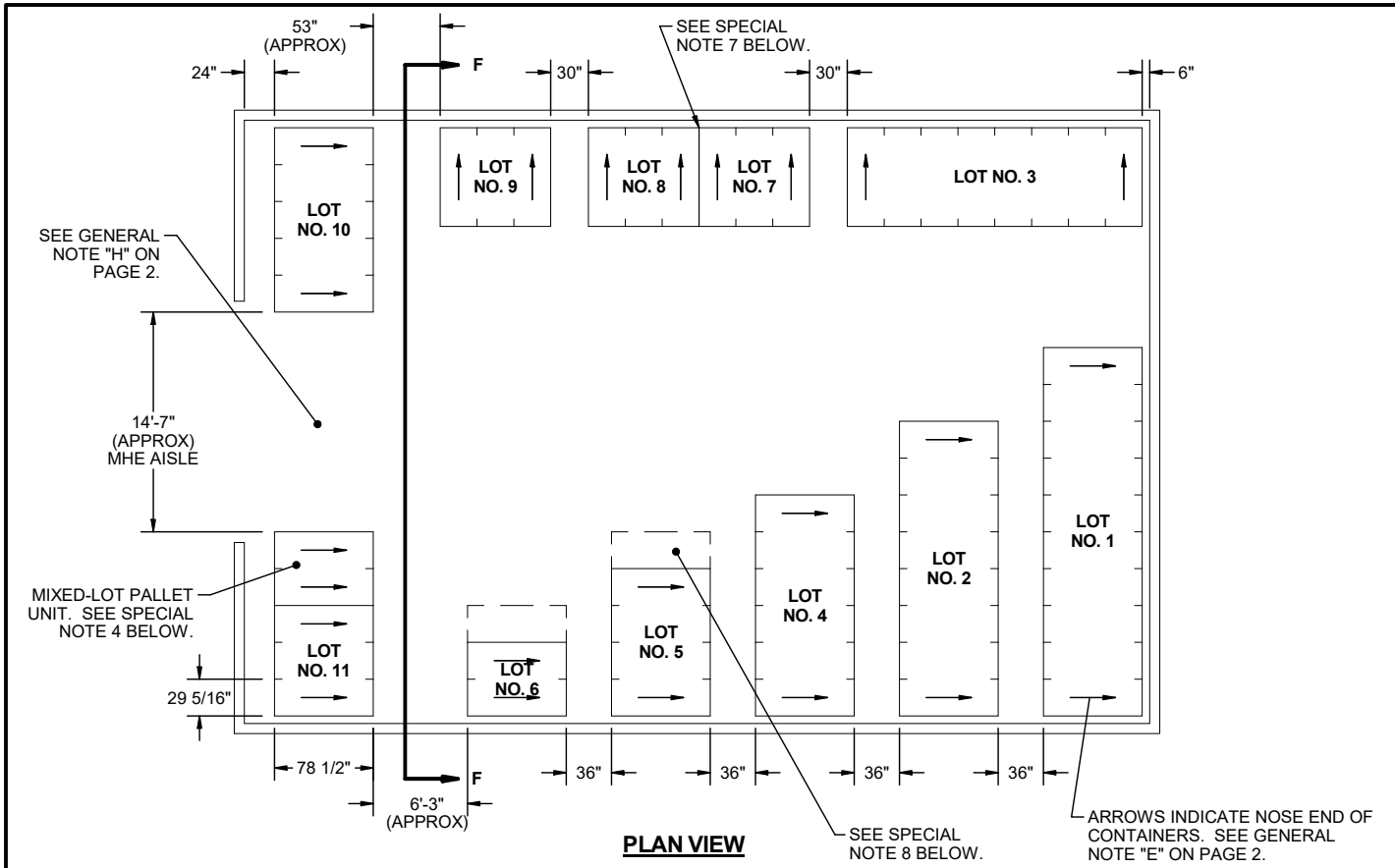
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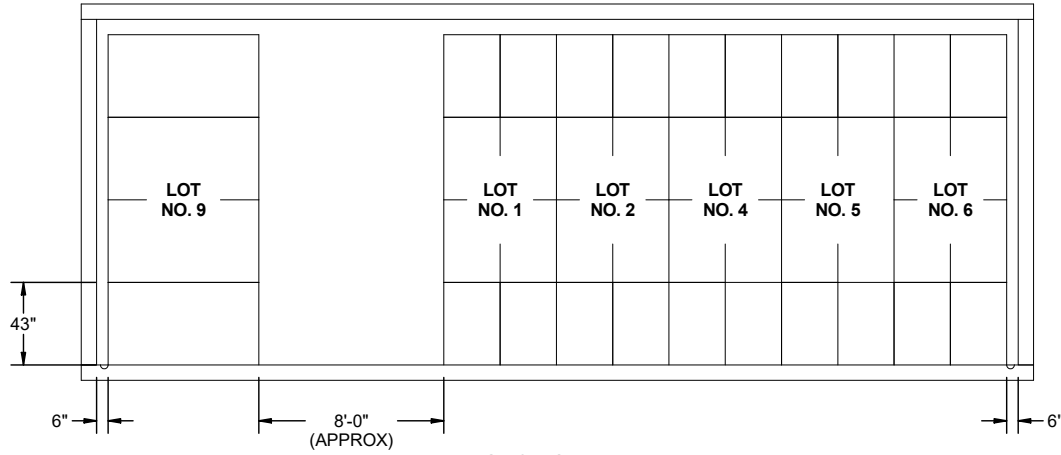
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**PLAN VIEW**



**SECTION F-F**

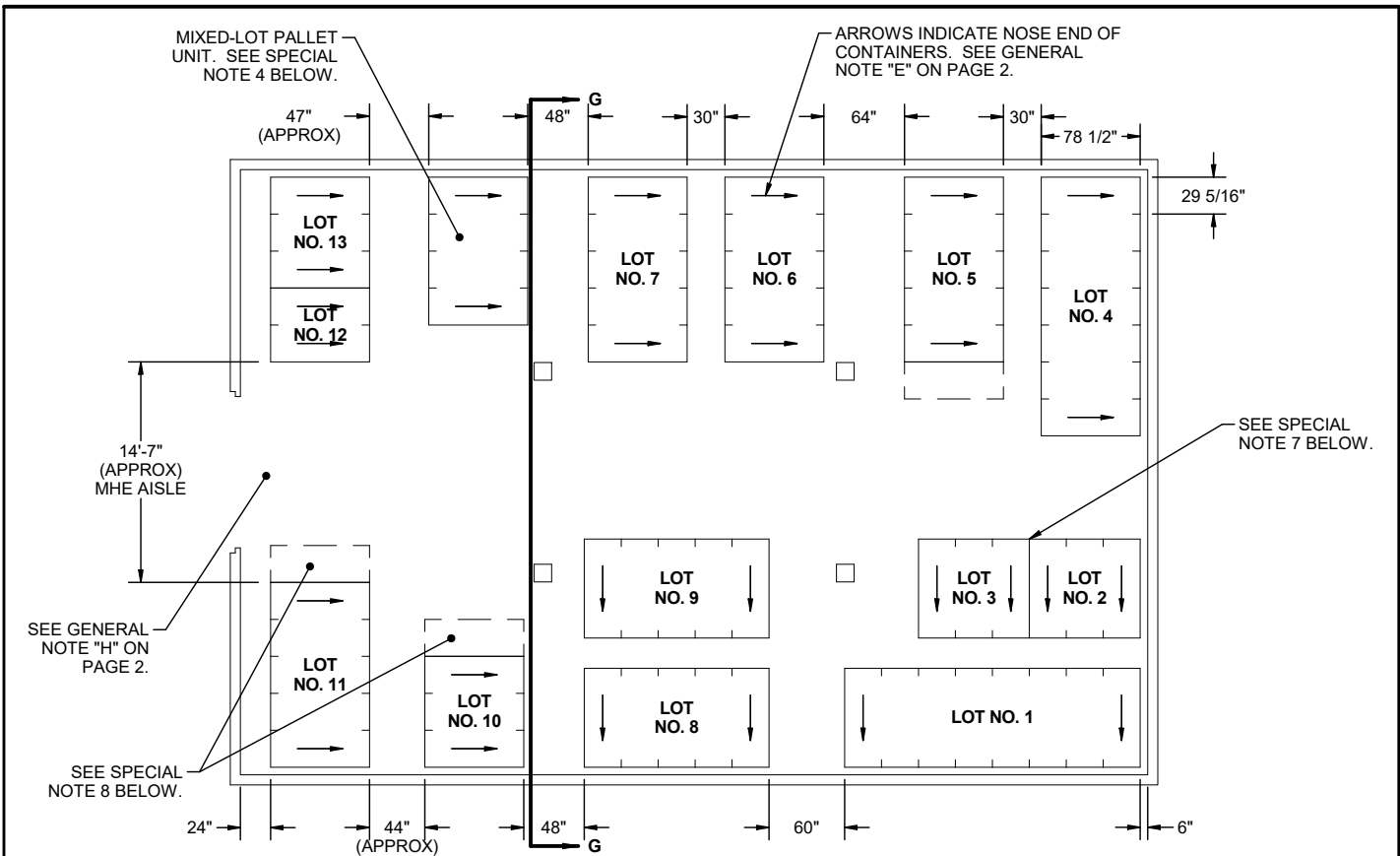
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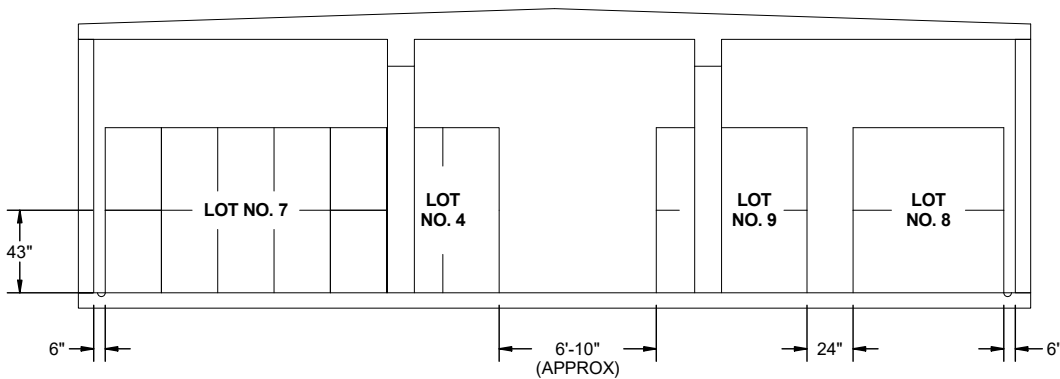
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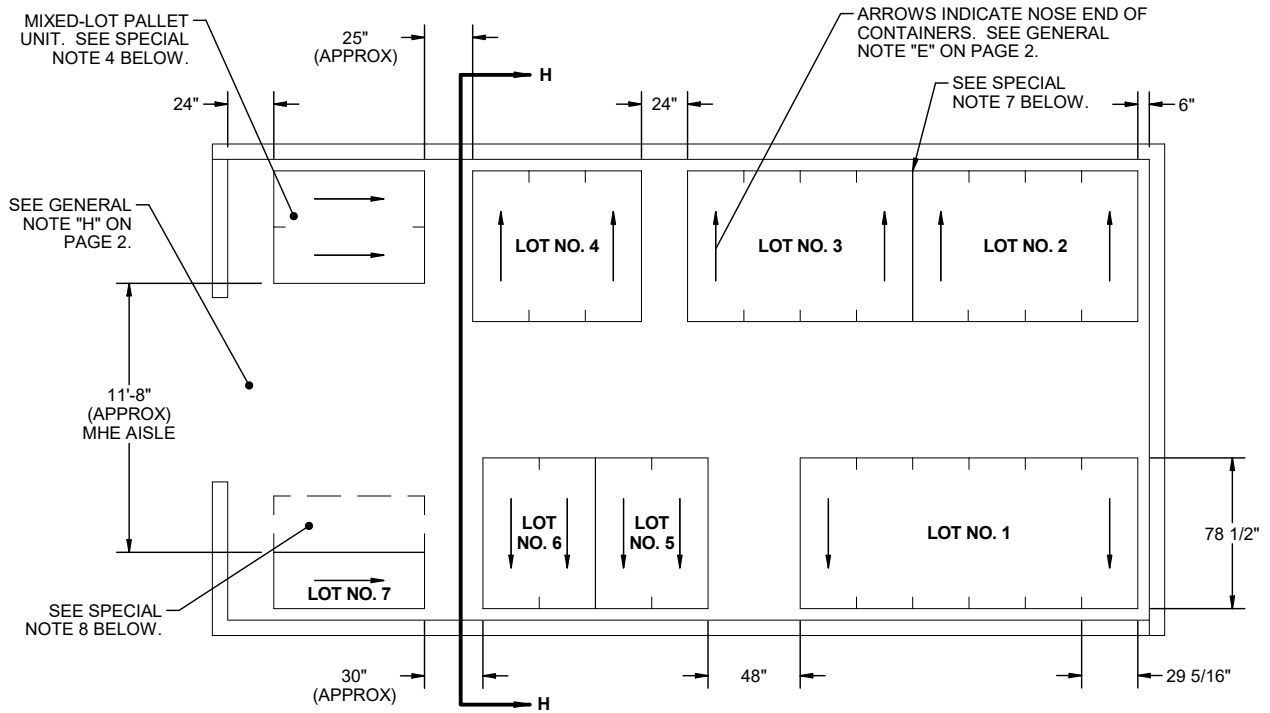
**SECTION G-G**

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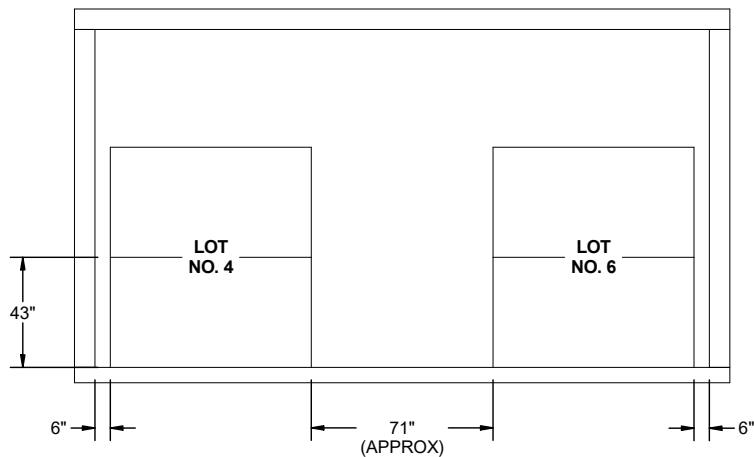
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**PLAN VIEW**



**SECTION H-H**

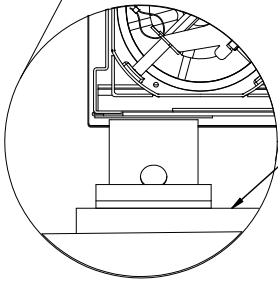
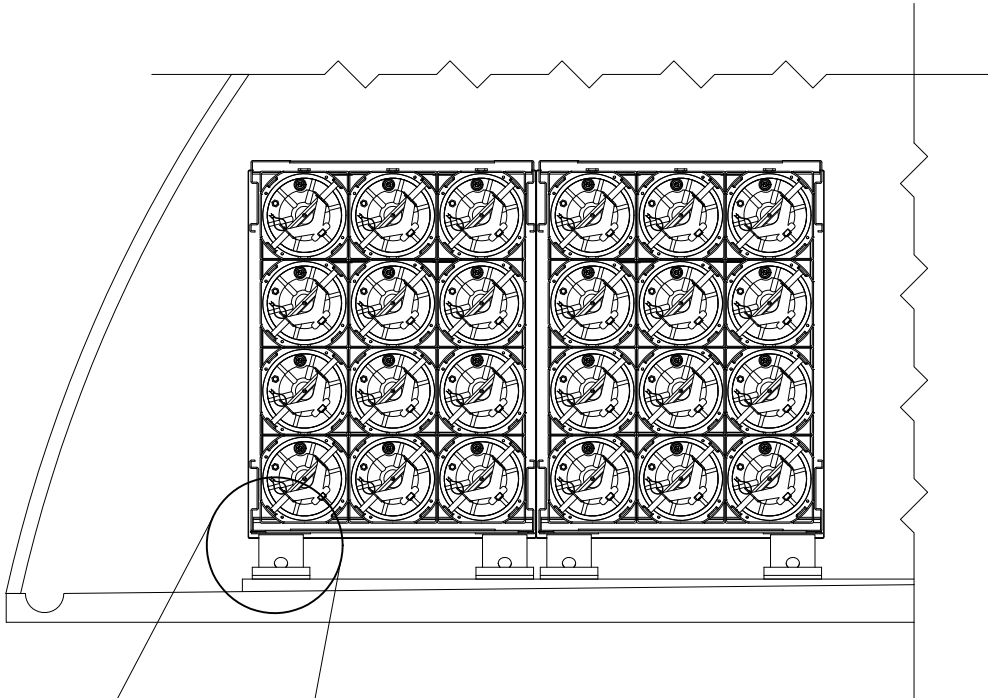
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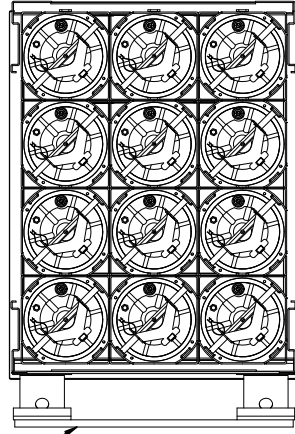
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SHIM (AS REQD TO PROVIDE A LEVEL BEARING SURFACE FOR THE FIRST LAYER CONTAINERS). POSITION UNDER CONTAINER SKIDS. SEE GENERAL NOTE "S" ON PAGE 2.



FLOOR DUNNAGE, 1" X 6" X 29"  
(3 REQD PER FIRST LAYER UNIT).

**FLOOR DUNNAGE**

SEE GENERAL NOTE "L" ON PAGE 2.

**FLOOR DUNNAGE AND SHIM LOCATION DETAILS**