EVALUATION OF SELECTED FIRE DOOR AND DOOR FRAME ASSEMBLIES
(SUPPLEMENT 1)

By

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August 1985

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PURPOSE

An evaluation of selected fire doors protecting safety related areas was conducted for the Pennsylvania Power and Light Co. (PP&L) at Susquehanna Steam Electric Station, Units 1 & 2. The purpose of the evaluation was to examine certain unlabeled doors and compare them with labeled door constructions to render an opinion on their expected fire resistance.

This evaluation was requested by PP&L as a supplement to the original evaluation in a Factory Mutual report dated January 1985.

SUMMARY AND CONCLUSIONS

1. Door No. 279 on Level 676, had a 3 hour label attached. The door may be expected to provide that level of protection.
2. Door No. 421 on Level 719, had a 3 hour label attached. The door may be expected to provide that level of protection.
3. Door Nos. 111 and 201, were compared to Door No. 279 and found to be of the same construction and of the same materials, and were judged to be equivalent, hence, may be expected to provide up to 3 hours of fire resistance.
4. Door No. 515 on Level 749, was compared to Door No. 421 and found to be of the same construction and of the same materials and was judged to be equivalent, hence, may be expected to provide up to 3 hours of fire resistance.
5. To meet FM recommendations, the louver in Door No. 606 on Elevation 779, should be removed and the opening protected. The door was compared to Door No. 421, and if protected as noted in paragraph 2.3, may be expected to provide up to 1-1/2 hour's fire resistance.
6. Should it be necessary to have additional doors at this site analyzed as to their expected fire resistance rating, this may be accomplished by one of the following procedures:
   a. For doors needing up to a 1-1/2 hour equivalency; contact the manufacturer and obtain written confirmation that the doors in question and at least one similar door previously examined by the writer and qualified for 1-1/2 hour rating were fabricated to the appropriate PP&L specification. This should be corroborated by determining that sizes, face sheet thickness and hinge reinforcement thickness are the same. Installation shall conform to the requirements of NFPA Standard 80, "Fire Doors and Windows."
   b. For doors needing up to a 3 hour equivalency; request an additional visit by the writer to determine that peripheral channel framing and latch reinforcements are the same and that internal stiffener quantity and locations are the same.

I
INTRODUCTION

The plant was visited on May 7, 1985. The writer was accompanied by Mr. D. Kohn of PP&L. Four doors and frames were examined during this visit. The assemblies were located in Unit 1 and 2 Reactor Buildings.

The writer is a Project Engineer with 20 years' experience at the Factory Mutual Research Corporation (FMRC). The writer has served on the National Fire Protection Association "Fire Doors and Windows" Committee (NFPA 80) for 18 years. His primary responsibilities are: 1) Testing and determination of fire ratings for fire doors; and 2) Examination of installed unlabeled doors to determine their fire resistance rating for building authorities.

II

FIRE DOOR AND FRAME EVALUATION

Two labeled fire doors and frames, and two unlabeled fire doors and frames, were examined during this visit to the Susquehanna Steam Electric Station at the request of the Pennsylvania Power and Light Company (PP&L).

2.1 Door Frame Assemblies

All frames were found to be fabricated in accordance with the American National Standards Institute, Standard A155.1, and may be expected to provide up to 3 hours fire resistance.

2.2 Fire Doors

Unlabeled fire doors were examined by comparing their construction features with labeled fire doors.

2.2.1 Door Nos. 111 and 201

Door Nos. 111 and 201 were re-evaluated during this visit. They were previously covered in the FMRC report dated January 1985. At that time, those doors were compared against a 1-1/2 hour labeled door (No. 110 at Level 670) and our opinion was that these doors could be expected to provide at least a 1-1/2 hour fire resistance. Door No. 279 on Level 676 bears a label indicating a 3 hour fire resistance.

The construction details of Door No. 279 were compared to Door No. 110 with the following results:

1) All doors had the same dimensions (height, width and thickness).
2) Internal stiffeners were determined to be approximately 6 in. to 8 in. on center. This was done by means of a stethescope.
3) Face sheet, hinge reinforcement and peripheral channel framing were found to be essentially the same. This was done by means of a specially adapted micrometer.

2.2.2 Door No. 515

Door No. 515, on Level 749, was not labeled and was examined to compare its construction details against Door No. 421 using the criteria outlined in Paragraph 2.2.1. Door 421 has a 3 hour label. Both doors have essentially the same construction details.

2.2.3 Door No 606

Door No. 606, on Level 779, was examined to compare its construction against Door No. 421. Door No. 606 contained a louver (6 in. x 8 in.) which precludes the door frame having any fire resistance, unless modified. All other details as outlined in Paragraph 2.2.1 were essentially the same between these two doors. Door No. 421 is a 3 hour rated fire door. If Door No. 606 is modified, it can provide at least 1-1/2 hour's fire resistance. The modification should consist of attaching one 18 gage steel plate to each door face. The plate should be large enough to overlap the louver by 2 in. on all sides. Fasteners should be sheet metal screws, spaced no more than 6 in. on center.

III

RECOMMENDATIONS

1. If a fire resistance rating of up to 1-1/2 hours for Door No. 606, on Level 779, is desired, the louver should be covered on both faces by 18 gage steel plates, overlapping all sides by 2 in., fastened by sheet metal screws spaced no more than 6 in. on center.

APPENDIX R EXEMPTION REQUEST

WRAPAROUND AREA

REQUEST NO. 4

REASON FOR EXEMPTION REQUEST:

A 66 foot wide Wraparound Area is provided between redundant safe shutdown paths on the north and south sides of the Reactor Building on three specific elevations. This Wraparound Area functions to separate the north and south portions of the fire zones on these elevations by providing spatial separation. Within the Wraparound Area both division are protected. In addition, due to the fire protection features or lack of significant combustibles in these areas, it is assumed that fire spread is confined to a 50' distance.

FIRE ZONES AFFECTED:

All fire zones are provided with fire detection. The Wraparound Area is a subset of a fire zone and is located east of the containment within the fire zone (see Figures 3.0, 4.0 and 5.0 in Appendix B). The Table below provides a description of fire protection features and combustible loading in the affected fire zones.

Fire Zone	Protection Provided Essential Raceway	Combustible Loading
1-3B	1 hour/AS	20 min
1-3C	3 hours	9 min
1-4A	1 hour/AS	15 min
1-5A	3 hours	19 min
2-3B	1 hour/AS	16 min
2-3C	3 hours	11 min
2-4A	1 hour/AS	15 min
2-5A	1 hour/AS	18 min

Notes: The 1 hour or 3 hour refers to the fire rating of the raceway wrap for essential safe shutdown cables. "AS" indicates automatic sprinkler protection is provided.

Zone 1-3C and 2-3C have a calculated in-situ combustible loading of 9 and 11 minutes, and due to the congestion and high radiation, transient combustible loading is expected to be very low. Therefore automatic sprinkler protection has not been provided.

The areas north and south of these wraparound areas have different safe shutdown path available. (i.e. Div. I vs. Div. II). Within the wraparound area, both paths are available since a) either components of both paths do not exist or b) components of both paths are protected with

either a 3 hour fire rated wrap or a 1 hour fire rated wrap with automatic sprinklers.

To ensure a 50 foot wide separation a 66 foot wide area was chosen since conduit locations have a ± 8 foot tolerance from the location shown on the drawing.

JUSTIFICATION:

In order to damage redundant shutdown paths fire damage must spread over a distance greater than 50 foot wide. Such damage is not considered feasible, considering the general arrangement, fire protection, fire detection, and low combustible loadings in these areas.

EXEMPTIONS REQUEST:

A 66 foot wide Wraparound Area provided in Fire Zones 1-3B, 1-3C, 1-4A, 1-5A, 2-3B, 2-3C, 2-4A, and 2-5A provide sufficient protection to separate redundant safe shutdown paths, and, therefore, fire rated barriers are not required.

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APPENDIX R EXEMPTION REQUEST

PARTIAL RATING OF WALLS AND FLOOR/CEILING

REQUEST NO. 5

REASON FOR EXEMPTION REQUEST:

Classical fire protection practice provides complete walls, or floor/ceiling assemblies that are fire rated as barriers between adjacent fire areas. The Reactor Building Fire Areas vary in size and shape from those typically found in normal practice, and the need for fire rated fire area boundaries is based on the need to separate redundant paths. When fire rating is required, only the portion of the boundary common to the fire areas with different safe shutdown paths is fire rated (reference Figures 1.0 through 11.0 in Appendix B).

FIRE ZONES AFFECTED:

For the effected fire zones see Table 5-1.

JUSTIFICATION:

Our Fire Barrier Analysis uses a combination of fire rated barriers and spatial separation (wraparound areas) to form fire rated fire area boundaries. The use of partial rating of walls and floor/ceilings is consistent with our use of spatial separation and explained in Appendix B.

EXEMPTION:

Fire boundaries when analyzed to be required between fire areas need be protected only for the portions of the wall or floor/ceilings common to the two areas.

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LIST OF PARTIAL RATING OF WALLS AND FLOOR/CEILING BARRIER SEPARATING FIRE ZONES

Reactor Building Unit #1

FIRE ZONE/FIRE ZONE	REF. FIG. IN APPENDIX B
1-1E/1-3B-W	2, 3 & 9
1-1F/1-3B-W	2, 3 & 9
1-1E/1-3C-W	2, 3 & 10
1-1F/1-3C-W	2, 3 & 10
1-3A/1-4B	3, 4 & 11
1-3A/ 1-4G	3, 4 & 11
1-4A-W/1-5A-S	4, 5 & 10
1-4A-W/1-5A-W	4, 5 & 9
1-4A-N/1-5A-W	4, 5 & 10
1-5A-S/1-6A	5, 6 & 11
1-5A-S/1-6I	5, 6 & 11
1-5A-W/1-5E	5 & 10

TABLE 5-1

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LIST OF PARTIAL RATING OF WALLS AND FLOOR/CEILING BARRIER SEPARATING FIRE ZONES

Reactor Building Unit #2

FIRE ZONE/FIRE ZONE	REF. FIG. IN APPENDIX B
2-1E/2-3B-W	2, 3 & 9
2-1F/2-3B-W	2, 3 & 9
2-1E/2-3C-W	2, 3 & 9
2-1F/2-3C-W	2, 3 & 9
2-3B-N/2-4A-S	3, 4 & 11
2-3B-N/2-4G	3, 4 & 11
2-4A-W/2-5A-N	4, 5, 9 & 10
2-4A-W/2-5A-W	4, 5 & 9
2-4A-S/2-5A-W	4, 5 & 9
2-6A/2-4G	7 & 11
2-5A-S/2-6A	5, 6 & 11
2-5C/2-6A	5, 6 & 11
2-5A-W/2-5E	5 & 10

TABLE 5-1

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APPENDIX R EXEMPTION REQUEST

NON FIREPROOFED STRUCTURAL STEEL

REQUEST NO. 6

REASON FOR EXEMPTION REQUEST:

Within the Unit 1 and 2 Reactor Buildings and Control Structure a few floor/ceiling assemblies are to be upgraded to a 3 hour fire rating, to separate redundant safe shutdown equipment. The structural steel supporting these floors is not protected.

FIRE ZONES AFFECTED:

The table below provides a list of the affected fire zones. For details on the extent of the required fire protection, see Figures 1.0 through 11.0 in Appendix B.

FIRE ZONE BELOW/ FIRE ZONE ABOVE	SPRINKLER PROTECTION BELOW STRUCTURAL STEEL	COMBUSTIBLE LOADING FOR FIRE ZONE BELOW STRUCTURAL STEEL
Unit #1 Reactor Building		
1-1E/1-3C-W	No	12 min
1-1E/1-3B-W	No	12 min
1-1F/1-3B-W	No	18 min
1-1F/1-3C-W	No	18 min
1-3A/1-4B	Yes	25 min
1-3A/1-4G	Yes	25 min
1-3B-W/1-4C	Yes	20 min
1-3B-W/1-4D	Yes	20 min
1-4A-N/1-5A-W	Yes	15 min
1-4A-W/1-5A-S	Yes	15 min
1-4A-W/1-5A-W	Yes	15 min
1-4A-W/1-5E	Yes	15 min
1-4A-W/1-5F	Yes	15 min
1-4A-W/1-5G	Yes	15 min
1-5A-S/1-6A	Yes	19 min
1-5A-S/1-6I	Yes	19 min
Unit #2 - Reactor Building		
2-1E/2-3B-W	No	13 min
2-1E/2-3C-W	No	13 min
2-1F/2-3B-W	No	18 min
2-1F/2-3C-W	No	18 min

FIRE ZONE BELOW/ FIRE ZONE ABOVE	SPRINKLER PROTECTION BELOW STRUCTURAL STEEL	COMBUSTIBLE LOADING
Unit #2 - Reactor Building (Cont.)		
2-3B-N/2-4A-S	Yes	16 min
2-3B-N/2-4G	Yes	16 min
2-3B-W/2-4C	Yes	16 min
2-3B-W/2-4D	Yes	16 min
2-4A-S/2-5A-W	Yes	15 min
2-4A-W/2-5A-N	Yes	15 min
2-4A-W/2-5A-W	Yes	15 min
2-4G/2-5B	No	4 min
2-4A-W/2-5E	Yes	15 min
2-4A-W/2-5F	Yes	15 min
2-4A-W/2-5G	Yes	15 min
2-5A-S/2-6A	Yes	6 min
2-5C/2-6A	No	6 min
2-6A/2-4G	No	6 min
Control Structure Elevation 754'-0 Support Steel	Yes	62 min

JUSTIFICATION:

Unit #1 and #2 Reactor Buildings:

All fire zones have sprinkler protection below the exposed structural steel except for Fire Zones 1-1E, 1-1F, 2-1E, 2-1F 2-4G, 2-5C and 2-6A. In these fire zones the maximum combustible rating is 18 minutes, and minimal transient combustibles are expected. Finally, the in-situ combustibles in these fire zones are generally located near the floor at a distance from where the structural steel forming the fire area barrier is located.

CONTROL STRUCTURE:

Automatic detection and protection is provided below the exposed structural steel. The majority of the combustibles in the area below the exposed structural steel are cables. The majority of the cables are located either below the raised computer floor in the Control Room or in 2 hour fire rated cable chases on the north and south walls of the control structure where only one structural member is effected. There is approximately 20 feet between the raised computer floor and the exposed structural steel supporting elevation 754'-0. Finally, the Control Room comprises the majority of the area beneath this steel and it is continually staffed.

EXEMPTION REQUEST:

Exposed structural steel supporting the identified fire area barriers is acceptable and does not require fire proofing.

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APPENDIX R EXEMPTION REQUEST

FIRE SPREAD LIMITATIONS

REQUEST NO. 7

REASON FOR EXEMPTION REQUEST:

The analysis which determined which fire zone boundaries required fire rating assumed that a fire starting in a given fire zone could damage equipment in the next adjacent fire zones (horizontally and vertically) unless fire rated boundaries were provided. Damage beyond the adjacent zones via a second non-rated boundary was not considered.

FIRE ZONE AFFECTED:

This assumption was used generally throughout the Fire Barrier Analysis.

JUSTIFICATION:

The non-rated fire zone boundaries have some non-fire rated components such as structural steel, doors, HVAC penetrations, pipe penetrations, and seismic gaps seals. The boundaries themselves, however, are constructed of reinforced concrete in excess of 8 inches, and use 3 hour fire rated cable penetrations. The nature of the fire zone boundaries are such that they would be expected to contain minor fires.

The NRC provided the following guidance in an April 18, 1985 letter to PP&L:

> "The reassessment of non-rated construction should be in accordance with guidance presented at the site audit. That is, to provide reasonable assurance that fire propagation will not occur beyond non-fire-rated zone boundaries, the boundaries should be upgraded to be continuous barriers with a fire rating sufficient to withstand the effects of a fire involving in-situ and transient combustibles, with conservative margin. If boundary construction is not upgraded, your reassessment should assume that fire spread will occur into the next most immediate fire zone (horizontally and/or vertically)."

EXEMPTION REQUEST:

It may be assumed in the case of non-rated fire boundaries that fire spread will only occur into the next most immediate fire zone (horizontally and vertically), and that damage beyond the adjacent zones via a second non-rated boundary need not be considered.

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SUSQUEHANNA STEAM ELECTRIC STATION - UNITS 1 & 2

FIRE PROTECTION PROGRAM - CONCERN #1

DOCKETS NO. 50-387

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APPENDIX B - SAMPLE DOCUMENTATION

APPENDIX B

Unrated Fire Zone Boundaries in all safety related structures were reviewed to determine whether they functioned as a fire area barrier and as such were required to be upgraded to fire rated status in accordance with Appendix R.

For Purposes of this Analysis a fire area was defined as a three dimensional volume bounded on all sides either by floors, walls or ceilings using fire rated construction or by a "buffer" fire zone which precludes the spread of a fire. A "buffer" fire zone was defined as a fire zone which acts as a subdivision of two adjacent fire areas and which, due to the protection provided to the essential cables in the fire zone or the lack of any essential cables in the fire zone, can satisfy the criteria for separating one safe shutdown path in one fire area from another in the adjacent fire area.

A sample set of documentation is provided in Attachment #1, Figures 1.0 through 11.0, for the Unit #1 and Unit #2 Reactor Buildings.

The Figures in Attachment #1 show those walls which are currently rated and required to be rated to support our Appendix R Analysis, those walls and floor/ceilings which must be upgraded to support our Appendix R analysis, the Wraparound Areas, and for each fire zone, the paths available for achieving safe shutdown and the in-situ combustible loading. In reviewing these drawings it can readily be seen how the fire areas in Attachment #2 are formed and that the fire area boundaries meet the criteria described above.

There were two types of "Buffer" fire zones used throughout the analysis. The first type is the Wraparound Area. The Wraparound Areas are shown on Figures 3.0, 4.0 & 5.0. In Unit #1 these Wraparound Areas function to separate Fire Area R-1A (Unit #1) from Fire Area R-1B (Unit #1). Exemption Request No. 4 in Appendix A provides the justification for the use of these Wraparound Areas. The second type is best depicted by the use of an example. Refer to Figure 6.0. On this Figure it can be seen how Fire Zone 1-6D. Which contains no essential cables and, therefore, has all paths available, functions as a "buffer" fire zone in separating Fire Zone 1-6C in Fire Area R-1B from Fire Zones 1-6E and 1-2C in Fire Area R-1A. Other "buffer" fire zones are described in Attachment 2.

As described above spatial separation is used in two ways throughout the analysis. This use of spatial separation dictates that only portions of some fire area boundaries common to two fire areas need to be fire rated. One such case is shown on Figure 9.0, where the slab on Elevation 683'-0 is protected only in the area of Wraparound Area 1-3B-W. Protection on this portion of the slab is required because the spatial separation between Fire Zone 1-1F in Fire Area R-1A and Fire Zone 1-3B-N in Fire Area R-1B is less than 50 feet. The use of partial rating is justified in Exemption Request No. 5 in Appendix B.

Our reanalysis was based upon the concept of using valid fire areas to assure the availability of a safe shutdown path to cold shutdown in the event of a fire in any given fire area. A listing of the fire areas in each safety related building is contained in Attachment #2.

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SUSQUEHANNA STEAM ELECTRIC STATION - UNITS 1 & 2

FIRE PROTECTION PROGRAM - CONCERN #1

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APPENDIX B - SAMPLE DOCUMENTATION

ATTACHMENT NO. 1

SUSQUEHANNA STEAM ELECTRIC STATION - UNITS 1 & 2

FIRE PROTECTION PROGRAM - CONCERN #1

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APPENDIX B - SAMPLE DOCUMENTATION

ATTACHMENT NO. 2

LISTING OF FIRE ZONES IN EACH FIRE AREA

REACTOR BUILDING UNIT #1

FIRE AREA R-1A	FIRE AREA R-1B	FIRE AREA R-1C
1-1A	1-1B	1-1H ***
1-1F	1-1C	
1-1G	1-1D	1-4F ***
1-2A	1-1E	
1-2C	1-1I	
	1-1J	
	1-2B	
1-3A	1-2D	
1-3B-S	1-3B-N	
1-3B-W *	1-3B-W *	
1-3C-S	1-3C-N	
1-3C-W *	1-3C-W *	
1-4A-S	1-4A-N	
1-4A-W *	1-4A-W *	
1-4D	1-4B	
1-4E	1-4C	
1-5A-S	1-4G	
1-5A-W *	1-5A-N	
1-5E	1-5A-W *	
1-5G	1-5B	
1-5H	1-5C	
1-6D **	1-5D	
1-6E	1-5F	
1-6F **	1-6A	
0-6H **	1-6B **	
1-7A **	1-6C	
1-7B **	1-6D **	
0-8A **	1-6F **	
	1-6I	
	0-6G **	
	0-8A **	

* These fire zone sub-divisions, known as Wraparound Areas, function as a fire rated barrier separating fire area R-1A from R-1B.

** These fire zones contain no safe shutdown cables and function as a "buffer" fire zone.

*** These fire zones are the primary containment and have an inerted atmosphere.

REACTOR BUILDING UNIT #2

FIRE AREA R-2A	FIRE AREA R-2B	FIRE AREA R-2C
2-1B	2-1A	2-1H ***
2-1F	2-1C	2-4F ***
2-1G	2-1D	
2-1I	2-1E	
	2-1J	
2-2A	2-3B-N	
2-2C	2-3B-W *	
2-3A	2-3C-N	
2-3B-W *	2-3C-W *	
2-3B-S	2-4A-N	
2-3C-W *	2-4A-W *	
2-3C-S	2-4B	
2-4A-W *	2-4C	
2-4A-S	2-5A-N	
2-4D	2-5A-W *	
2-4E	2-5B	
2-4G	2-5E	
2-5A-W *	2-5F	
2-5A-S	2-6A	
2-5C	2-6C	
2-5D	2-6D **	
2-5G	2-6F **	
2-5H		
2-6B		
2-6D **	2-7A **	
2-6E	0-8A **	
2-6F **	2-2B	
2-7A **		
0-8A **		

* These fire zone sub-divisions, known as Wraparound Areas, function as a fire rated barrier separating fire area R-2A from R-2B.

** These fire zones contain no safe shutdown cables and function as a "buffer" fire zone.

*** These fire zones are the primary containment and have an inerted atmosphere.

CONTROL STRUCTURE

FIRE AREA	FIRE ZONE(S)
CS-1	0-21B, 0-29A
CS-2	0-22B, 0-29C,D
CS-3	0-21A, 0-22A, 0-22C, 0-23, 0-24A-G, 0-25A,E
CS-4	0-24I,L
CS-5	0-24K
CS-6	0-24J, 0-25B, 0-26B,S, 0-27F, 0-28P
CS-7	0-24L,M, 0-25C,D, 0-26C,D, 0-26T,V, 0-27G,H, 0-28Q,R
CS-8	0-28S
CS-9	0-26A,E-N,P,R
CS-10	0-27A-E
CS-11	0-28A Subzone I (Room C-613)
CS-12	0-28C
CS-13	0-28E
CS-14	0-28G
CS-15	0-28H
CS-16	0-28J
CS-17	0-28B Subzone I (Room C-604)
CS-18	0-28M
CS-19	0-28N
CS-20	0-28A Subzone II (Rooms C-611, C-612)
CS-21	0-28T
CS-22	0-28D
CS-23	0-28F
CS-24	0-28B Subzone II (Rooms C-605, C-606)
CS-25	0-28I
CS-26	0-28K
CS-27	0-28L
CS-28	0-29B, 0-30A,B

DIESEL GENERATOR

FIRE AREA	FIRE ZONE(S)
D-1	0-41A
D-2	0-41B
D-3	0-41C
D-4	0-41D

ESSW PUMPHOUSE

E-1	0-51
E-2	0-52

SUSQUEHANNA STEAM ELECTRIC STATION - UNITS 1 & 2

FIRE PROTECTION PROGRAM - CONCERN #1

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APPENDIX C - FIRE BARRIERS TO BE UPGRADED

APPENDIX C

LISTING OF FIRE ZONE BOUNDARIES REQUIRING UPGRADE

UNIT #1 - REACTOR BUILDING

BARRIER BETWEEN FIRE ZONE/FIRE ZONE	TYPE	COMBUSTIBLE LOADING FIRE ZONE/FIRE ZONE
1-1A/1-1B	Wall	10/10
1-1E/1-3B-W	Slab	12/20
1-1E/1-3C-W	Slab	12/9
1-1E/1-1F	Wall	12/18
1-1F/1-3B-W	Slab	18/20
1-1F/1-3C-W	Slab	18/9
1-2A/1-2B	Wall	10/5
1-3A/1-3B-N	Wall	25/20
1-3A/1-4B	Slab	25/16
1-3A/1-4G	Slab	25/4
1-4A-W/1-5A-W	Slab	15/19
1-4A-W/1-5E	Slab	15/10
1-4A-W/1-5A-S	Slab	15/19
1-4A-S/1-4G	Wall	15/4
1-4G/1-5A-S	Wall	4/19
1-5A-W/1-5E	Wall	19/10
1-5A-S/1-5B	Wall	19/3
1-5A-S/1-6A	Slab	19/6
1-5A-S/1-6I	Slab	19/5
1-5D/1-5E	Wall	None/10
1-3B-W/1-4D	Slab	20/18*
1-3B-W/1-4C	Slab	20/20*
1-4A-N/1-5A-W	Slab	15/19
1-4A-W/1-5F	Slab	15/16*
1-4A-W/1-5G	Slab	15/10*

* Structural Steel only (Exemption Request filed).

APPENDIX C - Cont.

UNIT #2 - REACTOR BUILDING

BARRIER BETWEEN FIRE ZONE/FIRE ZONE	TYPE	COMBUSTIBLE LOADING FIRE ZONE/FIRE ZONE
2-1A/2-1B	Wall	7/12
2-1E/2-1F	Wall	13/18
2-1E/2-3B-W	Slab	13/16
2-1E/2-3C-W	Slab	13/11
2-1F/2-3B-W	Slab	18/16
2-1F/2-3C-W	Slab	18/11
2-2A/2-2B	Wall	13/5
2-3A/2-3B-N	Wall	30/16
2-3B-N/2-4A-S	Slab	16/15
2-3B-N/2-4G	Slab	16/4
2-3B-W/2-4C	Slab	16/29*
2-3B-W/2-4D	Slab	16/24*
2-4A-W/2-5A-N	Slab	15/18
2-4A-W/2-5A-W	Slab	15/18
2-4A-W/2-5E	Slab	15/9
2-4A-W/2-5F	Slab	15/16*
2-4A-W/2-5G	Slab	15/10*
2-4A-N/2-4G	Wall	15/4
2-4A-S/2-5A-W	Slab	15/18
2-4G/2-4B	Wall	4/16
2-4G/2-5A-N	Wall	4/18
2-4G/2-5B	Wall/Slab	4/3
2-4G/2-6A	Wall/Slab	4/6
2-5A-W/2-5E	Wall	18/9
2-5A-S/2-5B	Wall	18/3
2-5A-S/2-6A	Slab	18/6
2-5C/2-6A	Slab	6/6
2-5D/2-5E	Wall	1/9

*Structural Steel only (Exemption Request filed)

tag/h253c3:del

SUSQUEHANNA STEAM ELECTRIC STATION - UNITS 1 & 2

FIRE PROTECTION PROGRAM - CONCERN #1

DOCKETS NO. 50-387

50-388

APPENDIX D - CONDUIT & RACEWAY REQUIRING PROTECTION

APPENDIX D

To support the Fire Barrier Analysis, in some cases, existing fire zones were reanalyzed because of conflicts with adjacent fire zones. This reanalysis resulted in adjacent fire zones which contained the same shutdown path.

In the process of performing this reanalysis, however, it was determined that certain raceways required additional protection in order to support the reanalysis. Table D.1 provides a listing of these raceways in those fire zones which were reanalyzed. These raceways will be wrapped per Appendix R criteria unless additional systems analysis can prove that these raceways are acceptable as is.

In addition, three additional raceways were identified as requiring protection in order to provide a 66 foot wide Wraparound Area in Fire Zone 1-5A. These raceways will be wrapped per Appendix R criteria and are listed below:

D1K010
B1K009
D1P025

APPENDIX D (Cont.)

FIRE ZONE	EXISTING PATH	NEW PATH ANALYZED FOR	ADDITIONAL RACEWAY REQUIRING PROTECTION TO SUPPORT THE AVAILABILITY OF THE NEW PATH
1-1D	Div. II ADS/CS	Div. I ADS/CS	None
1-3A	Div. II HPCI	Div. II ADS/CS	F1KL12,13,14,15 F1KH14,15 F1M321 F1K036
1-4A-S	Div. II HPCI	Div. II ADS/CS	F1KR21 F1KJ01,02,03 F1K118
1-4A-W	Div. I ADS/CS Div. II HPCI	Div. II ADS/CS	None
1-3B-N	Div. I RCIC	Div. I ADS/CS	A1P019,E1K954 C1P023, C1K057
1-3B-W	Div. I RCIC	Div. I ADS/CS Div. II ADS/CS	E1F137, C1F056
1-3B-S	Div. I RCIC	Div. II ADS/CS	None
1-6A	Div. I RCIC	Div. I ADS/CS	None
2-1D	Div. II ADS/CS	Div. I ADS/CS	None
2-3B-W	Div. I ADS/CS	Div. II ADS/CS	F2KH29,30,31,32 F2PH29,30,31,32
2-3B-S	Div. I ADS/CS	Div. II ADS/CS	None
2-6D	Div. I ADS/CS	Div. II ADS/CS	None

TABLE D-1

tag/h253c3:del

LEGEND

(X-XX-X) FIRE ZONE IDENTIFICATION

(X) AVAILABLE SHUTDOWN PATH:

1. ADS/CS DIVISION I
2. RCIC DIVISION I
3. ADS/CS DIVISION II
4. HPCI DIVISION II

[X] COMBUSTIBLE LOADING (IN MINUTES) IN FIRE ZONE

— — — INDICATES LIMIT OF WRAP AROUND AREA

FIRE RATING COLOR CODING:

RED INDICATES EXISTING BARRIER

ORANGE INDICATES BARRIER TO BE UPGRADED

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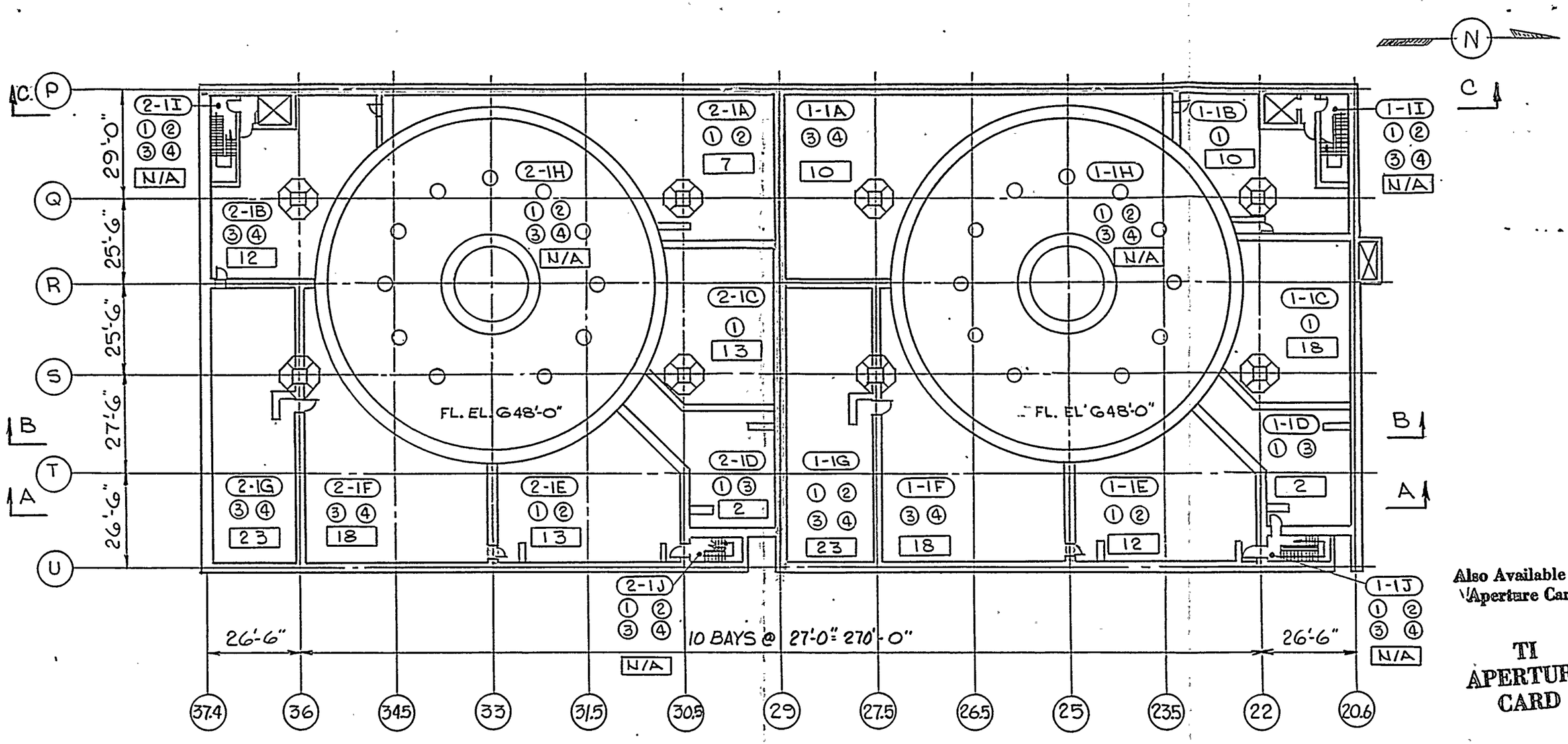

FLOOR PLAN @ EL. 645'-0"

FIGURE 1.0

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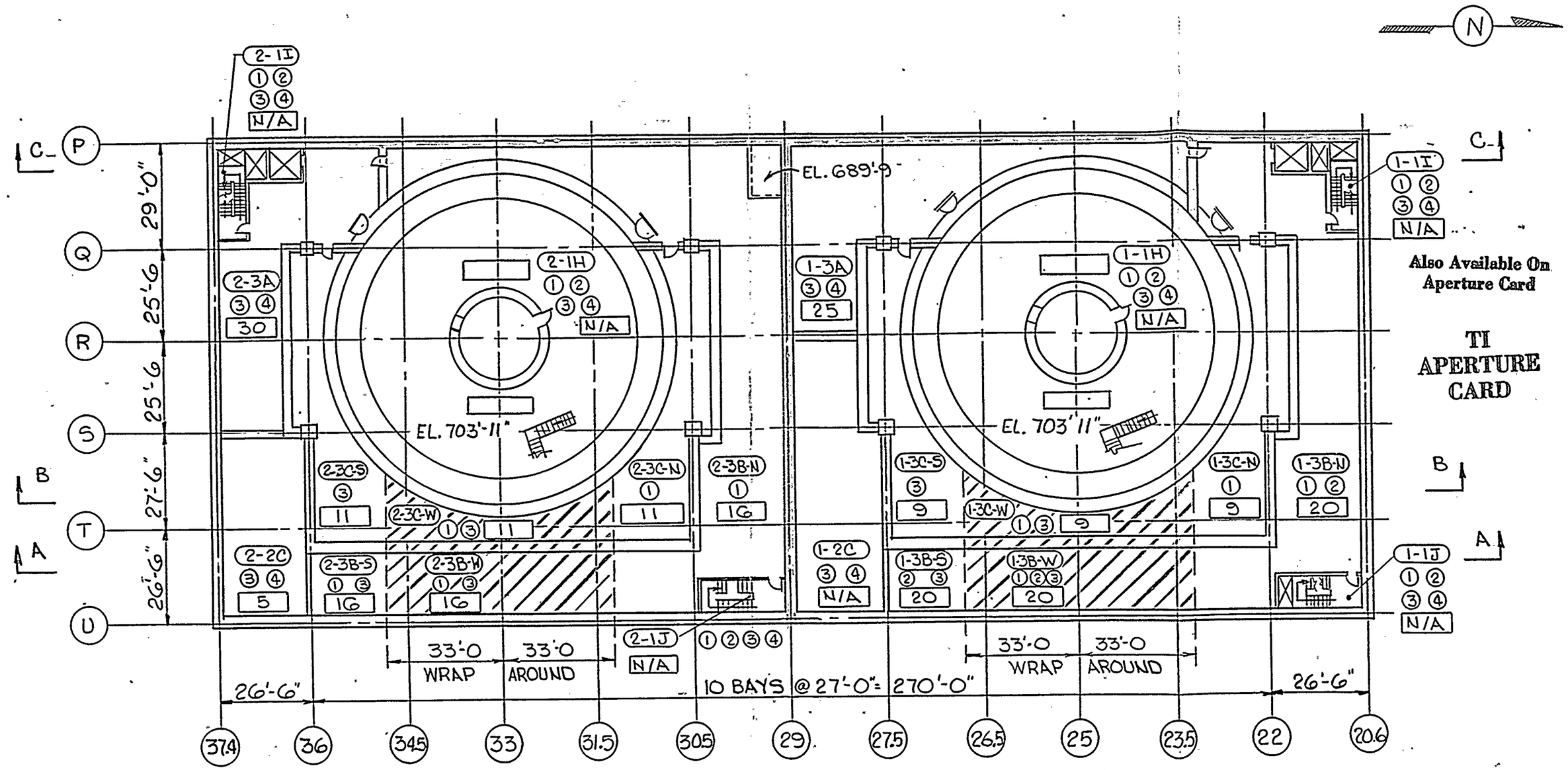

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FIGURE 3.0

MEZZANINE FLOOR PLAN @ EL. 683'-0

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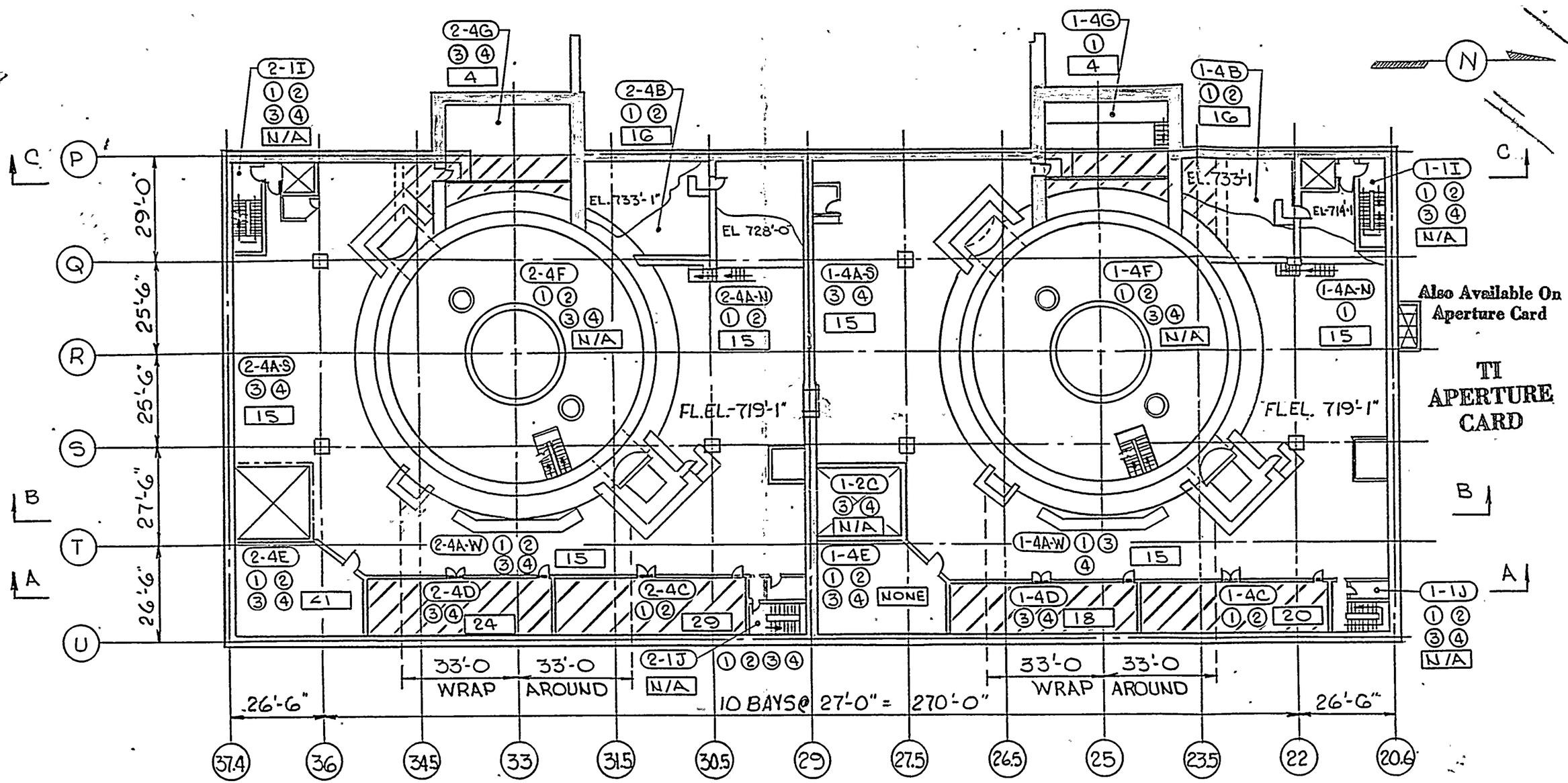

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TI APERTURE CARD

FLOOR PLAN @ EL 719'-1"

FIGURE 4.0

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PP&L FORM 095-1, 11" X 17"

LOCATION CODE

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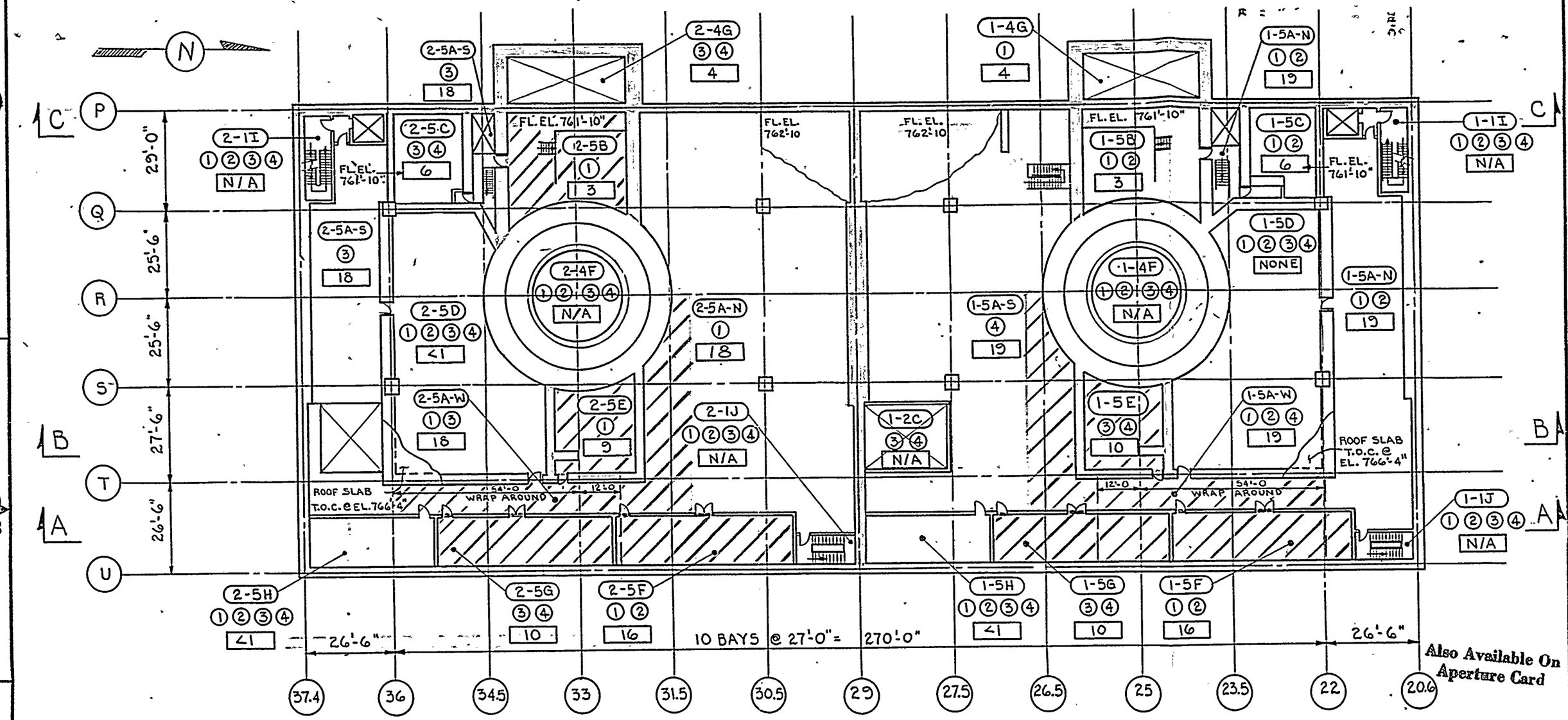

Also Available On Aperture Card

FLOOR PLAN @ EL. 749'-1"

FIGURE 5.0

TI APERTURE CARD

PP&L FORM 695-B (11" X 17")

PP&L Letter-Height Drafting Standard: Dwg. No. - 3/8"; Title - 3/16"; Subtitle - 5/32"; Letter Figures - 1/8" Min.

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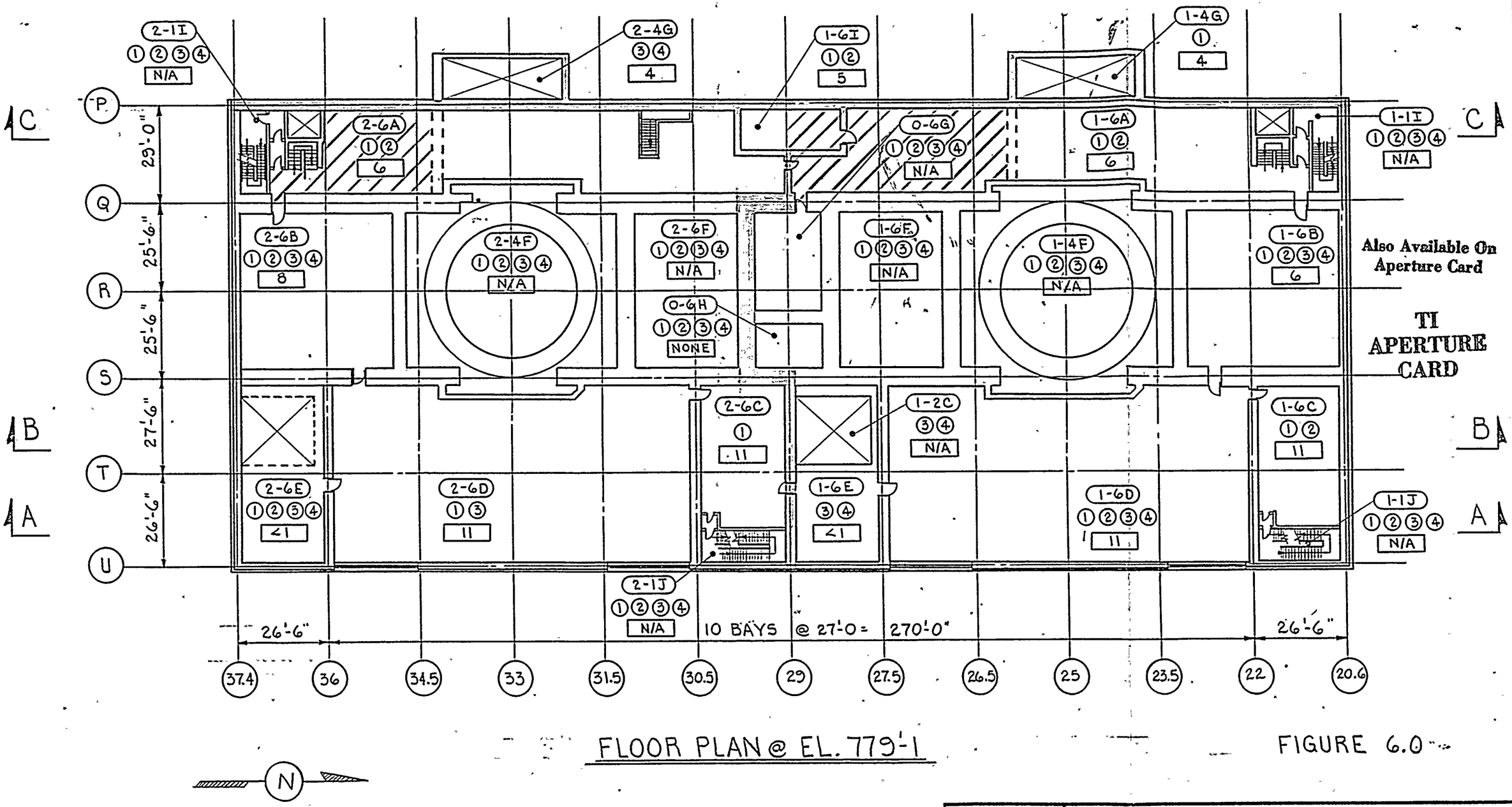

Also Available On Aperture Card

TI APERTURE CARD

FLOOR PLAN @ EL. 779'-1

FIGURE 6.0

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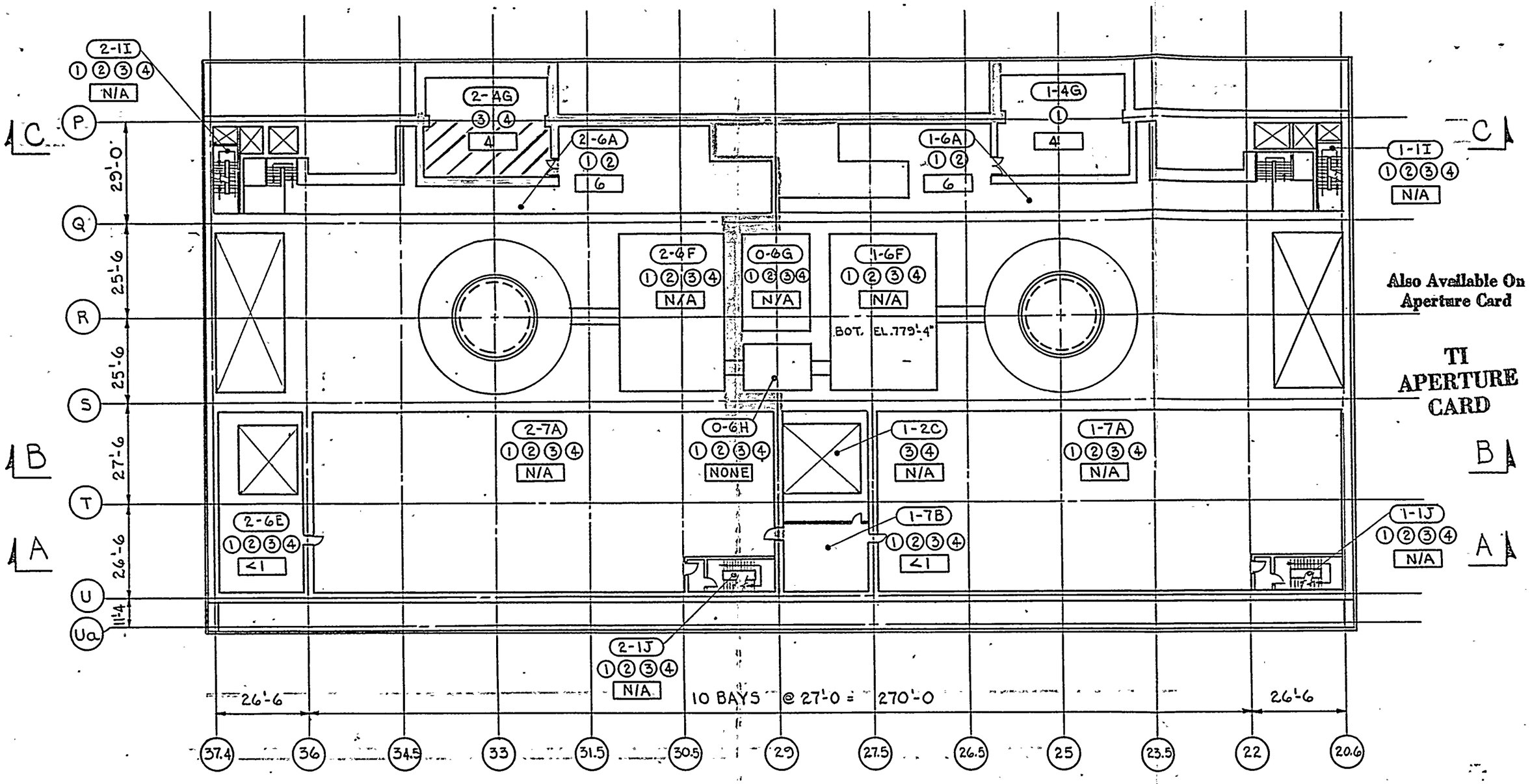

Also Available On Aperture Card

TI APERTURE CARD

FLOOR PLAN @ EL. 799'-1"

FIGURE 7.0

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PP&L FORM 895-D (11" X 17")

7705

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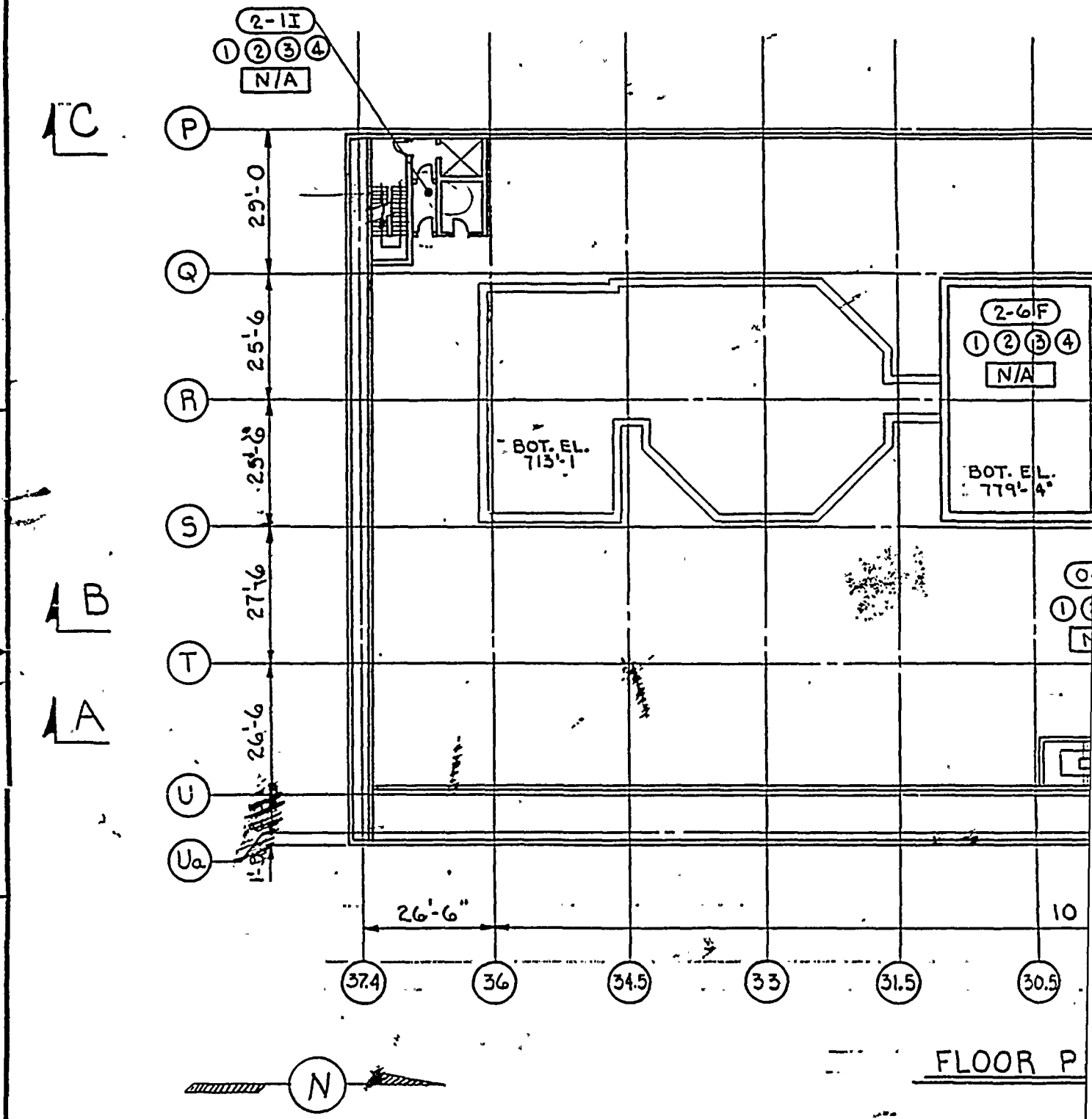

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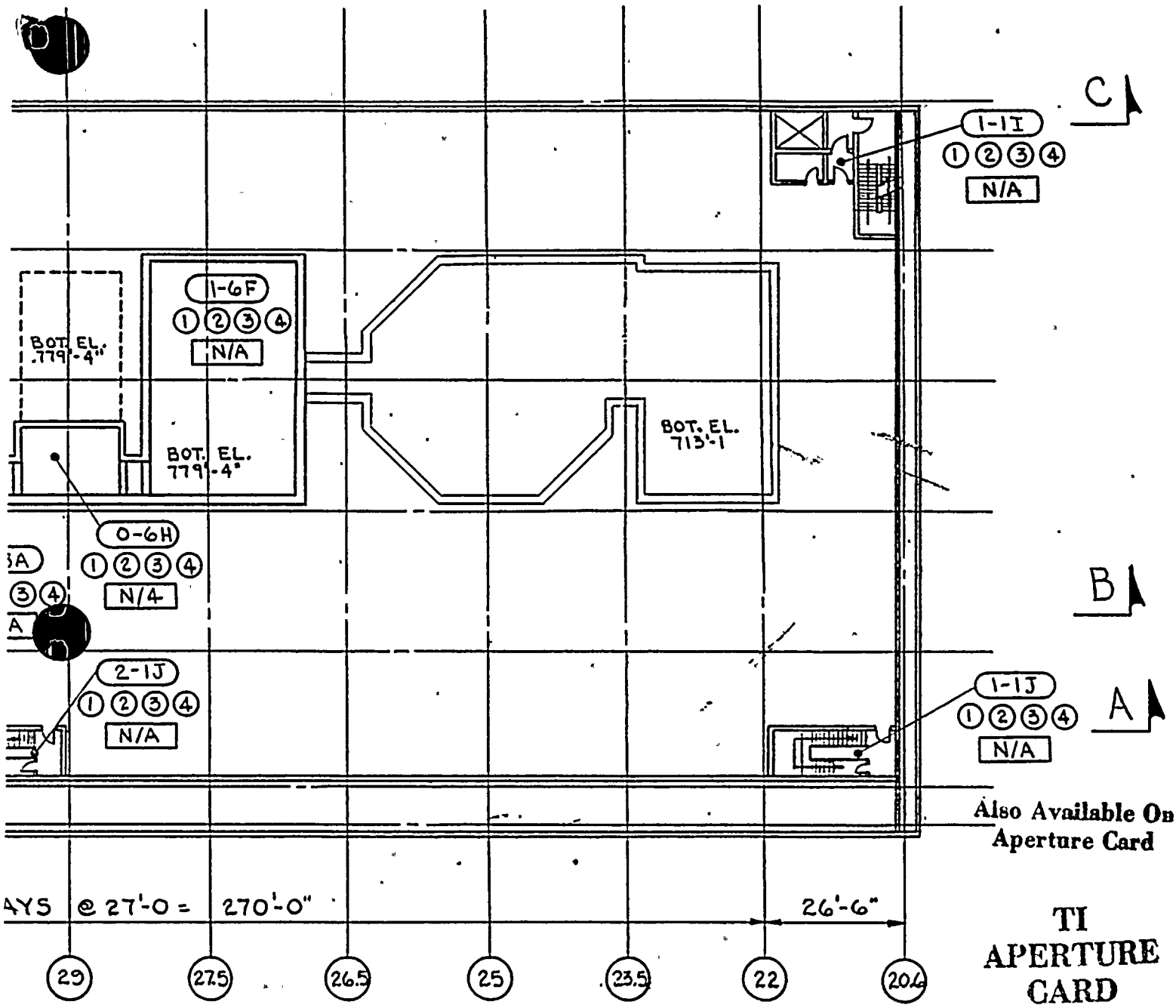

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TI APERTURE CARD

AN @ EL. 818'-1"

FIGURE 8.0

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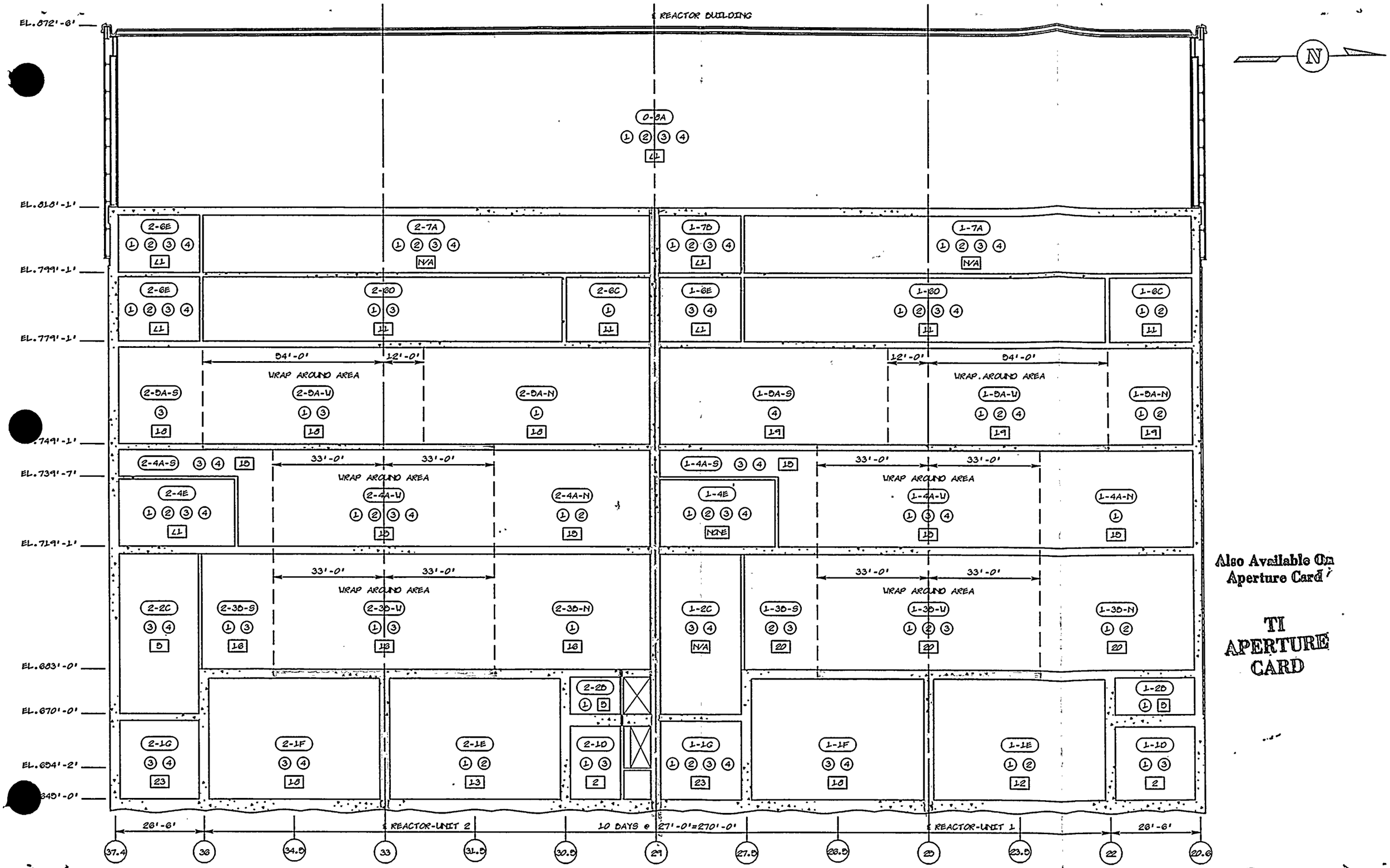

SECTION A-A

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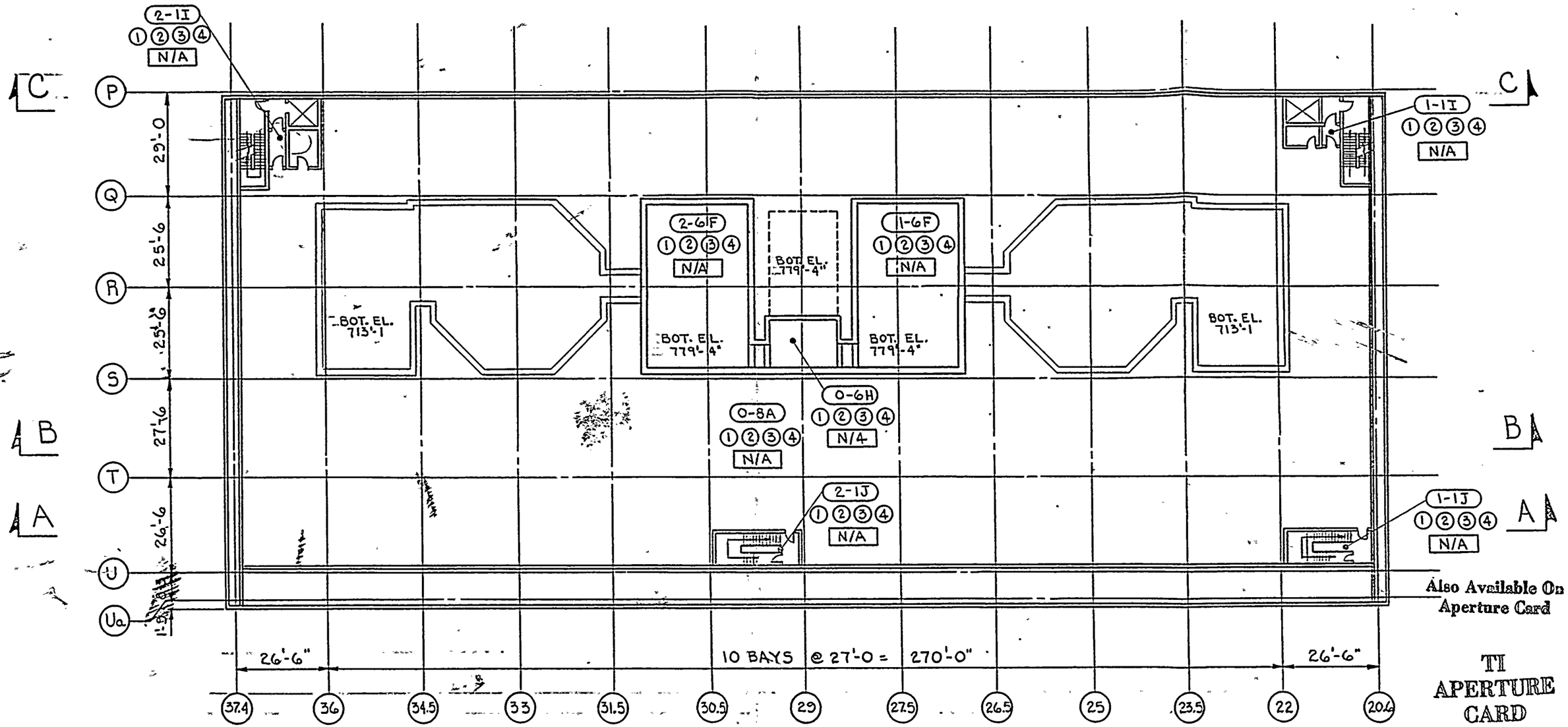
SCALE: NONE

FIGURE 9.0



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FLOOR PLAN @ EL. 818'-1"

FIGURE 8.0

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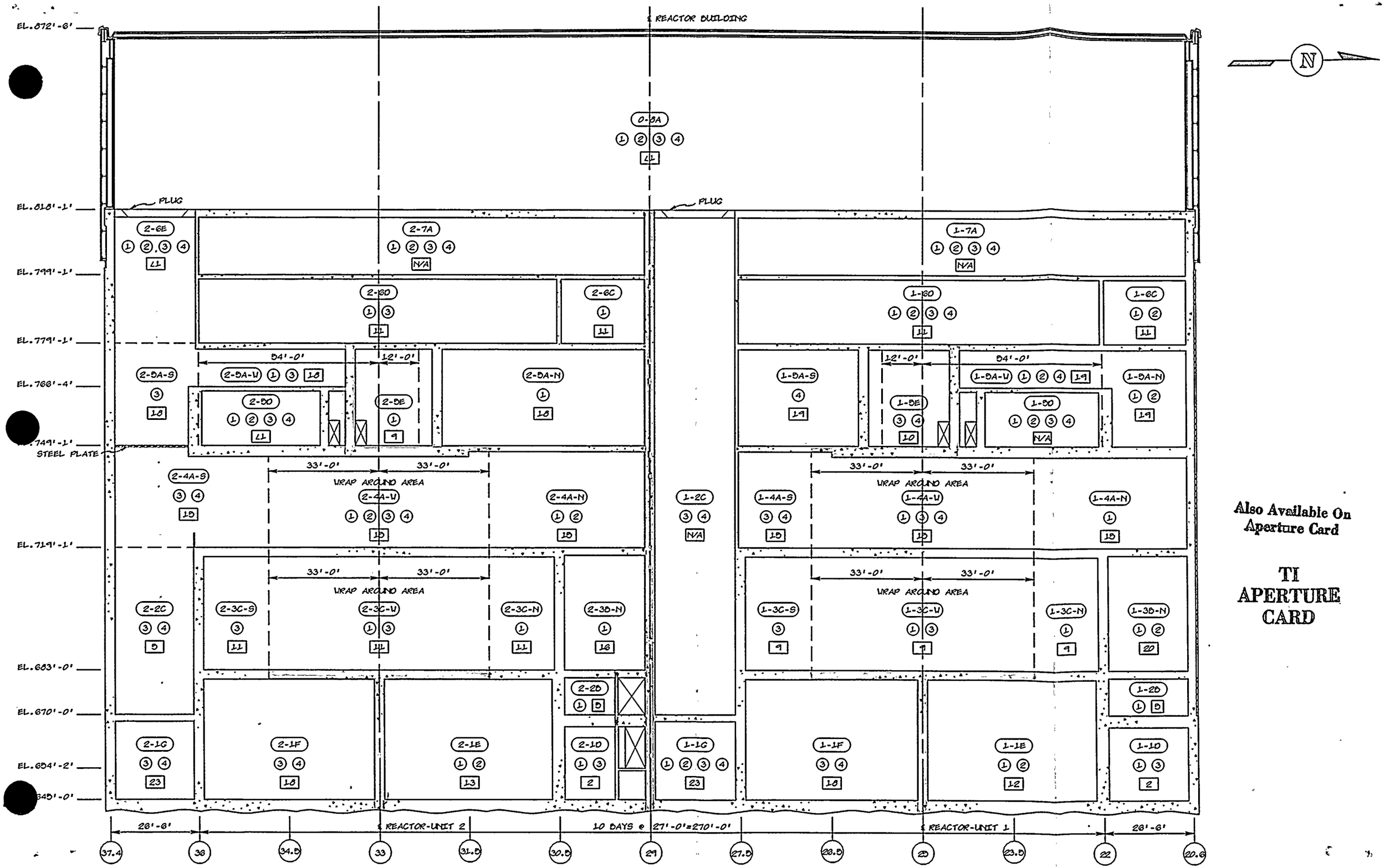

SECTION B-B

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TI APERTURE CARD

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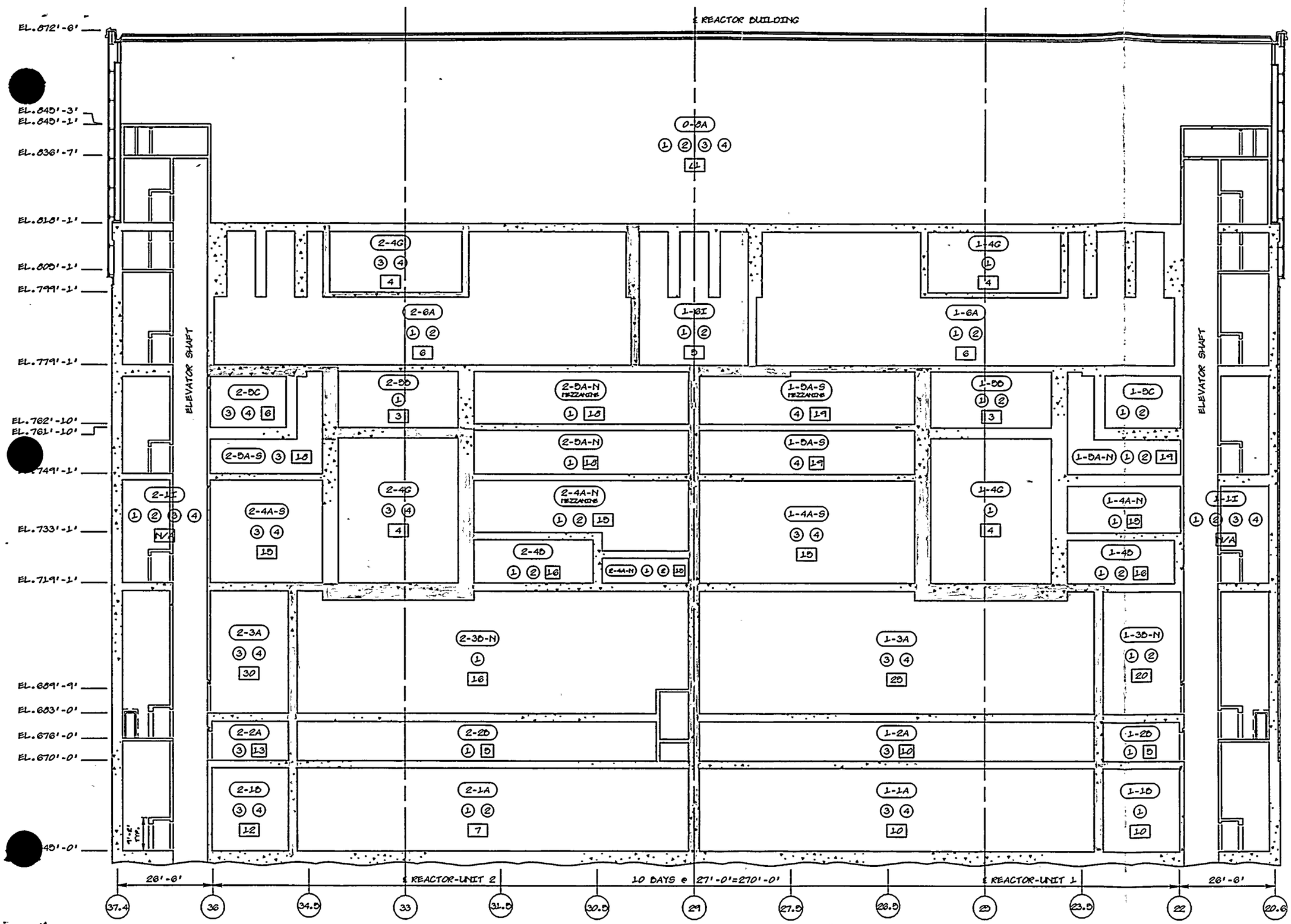
SCALE: NONE

FIGURE 10.0



SECTION C-C

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SCALE: NONE

FIGURE 11.0