

DESIGN OF AN UNDERGROUND
PARKING STRUCTURE IN
LANSING, MICHIGAN

Thesis for the Degree of M. S.
MICHIGAN STATE COLLEGE

Ralph John Stephenson

1947

THESIS



SUPPLEMENTARY
MATERIAL
IN BACK OF BOOK

This is to certify that the

thesis entitled

"Design of an Underground
Parking Structure in
Lansing, Michigan"

presented by

Ralph John Stephenson

has been accepted towards fulfillment
of the requirements for

M. S. degree in Civil Engineering

Major professor

Date December 18, 1947

M-795

DESIGN OF AN
UNDERGROUND PARKING STRUCTURE
IN LANSING, MICHIGAN

By
RALPH JOHN STEPHENSON

A THESIS

Submitted to the School of Graduate Studies of Michigan
State College of Agriculture and Applied Science
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE

Department of Civil Engineering

1947

THESIS

4/1/48
9
6

INTRODUCTION

196361

The necessity of moving traffic without congestion on the roads and highways has become increasingly evident in the last fifteen years. Its seriousness is shown by the attention that safety engineers and traffic engineers have given to the elimination of the causes of congestion.

It is generally agreed that the parking of automobiles along a street does slow down traffic. In addition, parking requires one, two, and sometimes three lanes of the right of way which could otherwise be used for moving vehicles. So, in sections where mobility of traffic is of prime importance, such as in a crowded business district, it can be seen that optimum results can be obtained only if street parking is either partially or completely eliminated. However, if street parking is eliminated, a second and possibly more serious problem arises -- What is to be done with those automobiles which would normally have been parked on the street?

By the application of a comprehensive parking plan utilizing off-street areas throughout the district, these vehicles can be conveniently stored. At certain points, structures of one type or another may be needed to fully utilize the space available, and it is the design of such a structure that constitutes the main body of this thesis.

In addition, three other points closely related to the main topic are considered, making four points in all. The four are discussed in the order shown below:

1. Analysis of present and future parking needs.
2. Location of structure to be designed.
3. Design of structure.
4. Method of financing project.

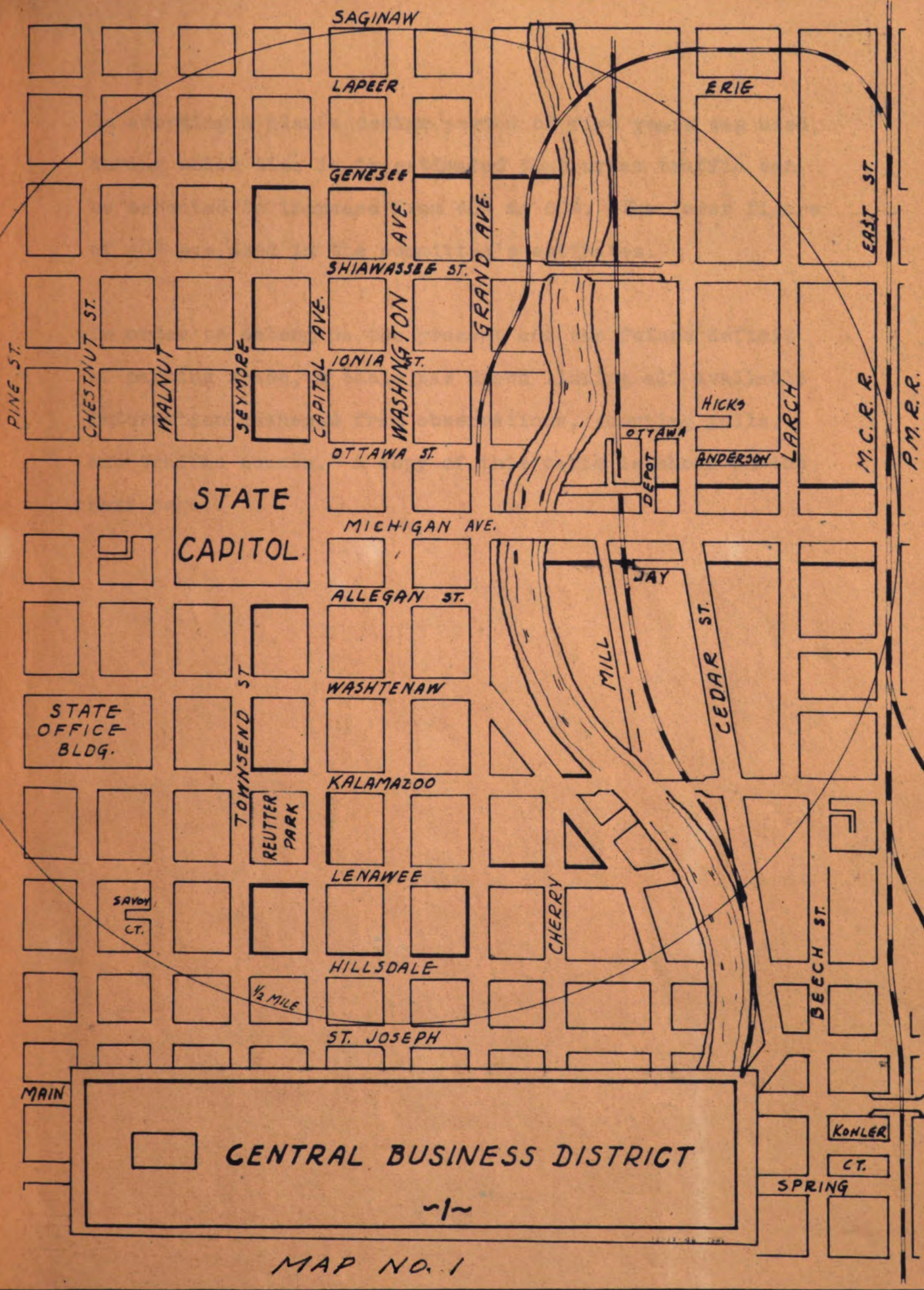
ANALYSIS OF PRESENT AND FUTURE

PARKING NEEDS

In the central business district of Lansing, Michigan, a problem, similar to that outlined in the introduction, has developed. Although parking has not been forbidden on the streets, still a deficit of parking spaces exists. It is expected that this deficit will increase in the next few years, and bring with it correspondingly greater traffic confusion. Therefore, it was felt that some solution to the problem must be found, and applied immediately.

A plan, which was the result of a lengthy and detailed study by a committee of seven men, has been presented to the city, and it is gradually being put into operation. The plans and statistics evolved from this study are presented below, and except where noted are summarizations of the information published by this committee.

The first step in approaching the problem was to define the central business district, since this was the area directly concerned in the study. The area was considered as that bounded by Genesee Street on the North, Hillsdale Street on the South, the Grand River on the East, and Seymour and Townsend Streets on the West. Also included was the property lying along both sides of Michigan Avenue from the Grand River east to the Michigan Central Railroad. (See Map No.1)



In adopting a plan a design period of five years was used, during which time it is estimated that urban traffic can be expected to increase from 40% to 60%. The lower figure of 40% was used in the committee's estimates.

In order to determine the present and the future deficit of parking space, a table was drawn listing all available information gathered from observations, shopping polls, and traffic counts. A copy of this table is shown on the next page.

PARKING FACILITY ANALYSIS - TABLE NO. 1

Present Facilities

Off Street (25 lots & 3 buildings)	2,264 Vehicles	
Street - Metered	930	
Street - Time Limited	<u>968</u>	<u>1,898</u> "
Total Parking Facilities	4,162	"

People Entering Central Business District and Parking

Facilities Required

	<u>Total</u>	<u>By Automobile</u>	<u>Persons Per Car</u>
Labor Force	10,000	6,000	1.4
Shopping Force	15,000	9,000	1.7
Business	1,500	900	1.7
Recreation	<u>500</u>	<u>300</u>	<u>1.7</u>
Total (normal day)	27,000	16,200	1.6
	<u>No. Cars</u>	<u>Parking Turnover</u>	<u>Parking Required</u>
Labor Force	4,200	1.1	3,890
Shopping Force	5,290	5.0	1,058
Business	529	2.0	265
Recreation	<u>176</u>	<u>2.0</u>	<u>88</u>
Total (normal day)	10,275	2.5	5,301
			<u>795</u>
Total - peak day (normal + 15%)			6,096
Anticipated increase of 40%			<u>2,438</u>
Total future requirements			8,534

(Table No. 1 continued on next page.)

(Table No. 1 continued)

Assured Future Facilities

Street Parking (25% of present)	475
(25% is an estimate of the amount of street parking to be allowed.)	
Off Street Parking (3 buildings)	415
Total future facilities	<u>890</u>
Future Deficit	7,644

It can be seen from the table that approximately 7,500 parking spaces must be provided to handle the expected increase.

As a start, the committee asked themselves:- "Where should this parking be located?" (1) In one large central building. (2) In several locations around the outer edge of the central business district. (3) At various locations in the district.

It has been agreed upon by leading national architects and planners that the greatest distance people are willing to walk from their cars to shop is between a block, and a block and a half. It can be seen from this that the first two suggestions are impractical since it would be impossible to bring all points in the central business district within a block and a half of parking areas located using these plans.

Therefore, the third suggestion was the one selected, and the overall parking plan was set up using this as a basis.

The next step was to provide the area within the business district where the automobiles could be parked. Three plans were proposed: (1) Parking over the Grand River. (2) Parking under Washington or Michigan Avenue (3) Parking in lots

and buildings within the district. The first two of these plans were rejected because of the expense involved in their construction (it might be noted at this point that much of the cost of the underground parking plan was for moving public utilities, repaving streets, and strengthening footings of existing buildings). Therefore, the third plan was selected as being the most practical.

A survey was made of the entire central business district and thirty-two locations of sufficient size for parking were found. All of these were either vacant or occupied by low cost buildings which were well amortized, marking it economically possible to use them for this purpose.

Ten of these sites were chosen as to location, parking capacity, and traffic distribution. They were so located that practically all property in the district is within one and one half blocks of at least one of them. (See Map No. 2).

The capacity of these areas when fully developed by use of five story parking structures is 7,940 automobiles. Each site has access from two streets, and traffic to and from them would be spread over twenty different points on

PINE ST.

CHESTNUT ST.

WALNUT

SEYMORE

CAPITOL AVE.

WASHINGTON ST.

GRAND AVE.

EAST ST.

M. C. R. R.

P. M. R. R.

SAGINAW

LAPEER

GENESEE

ERIE

SHIAWASSEE ST.

32

19

OTTAWA

MICHIGAN AVE

ALLEGAN 11

WASHTENAW 14

KALAMAZOO

LENAWEE

HILLSDALE

ST. JOSEPH

STATE
CAPITOL

STATE
OFFICE
BLDG.

TOWNSEND ST.

REUTER
PARK

SAVOY
CT.

1/2 MILE

JAY

MILL

CEDAR ST.

CHERRY

RIVER

BEECH ST.

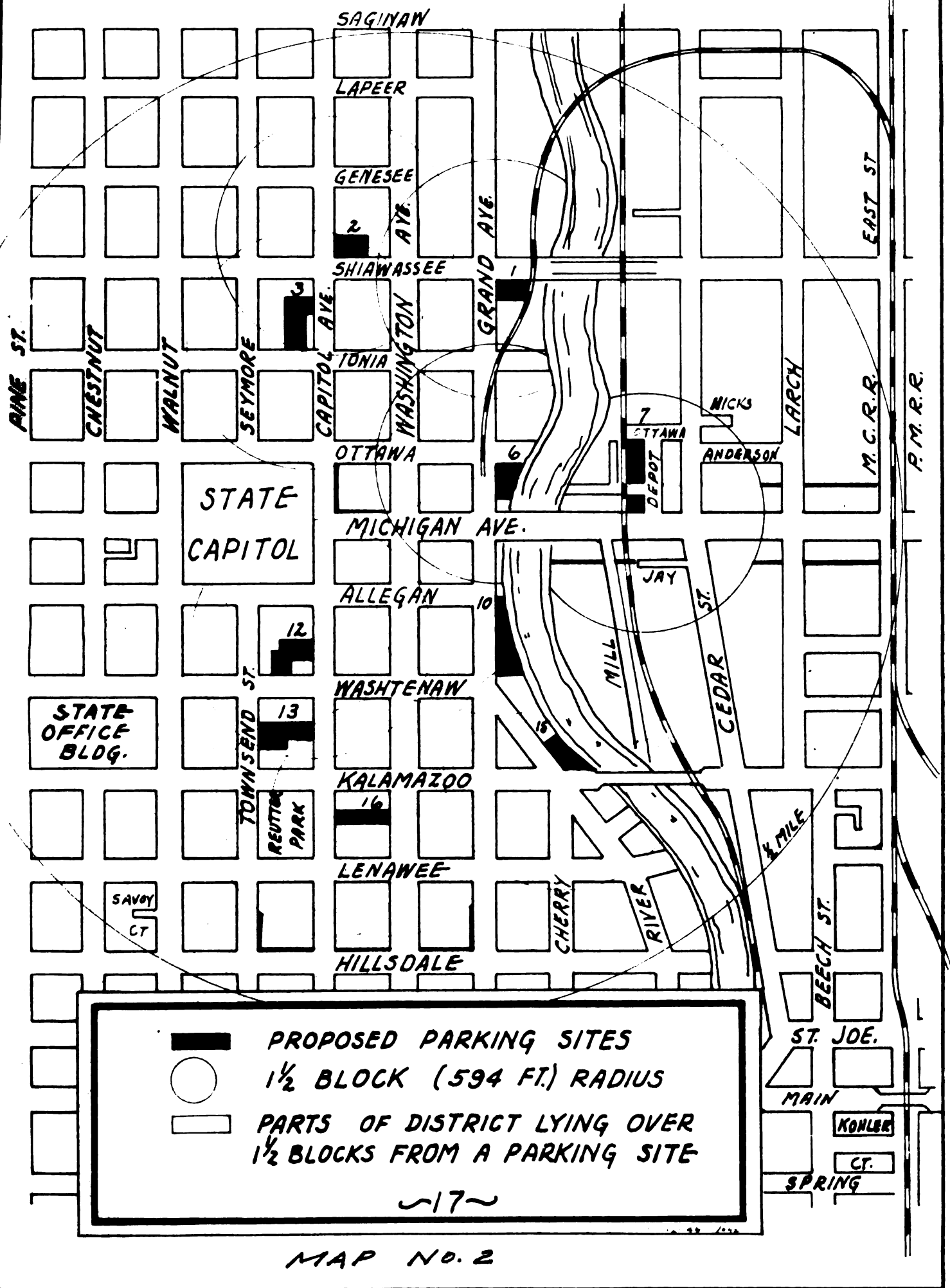
KOHLER

CT.

SPRING

32 LOCATIONS IN DISTRICT

~15~



thirteen streets. In addition, the cost per parking unit was found to be nearly \$2,500 cheaper than the least expensive of the other two plans considered. It is also the most flexible of the three plans, as each unit may be developed as it is needed.

The reasons for the selection of plan number three, the recommendations in the administration of the plan, and the conclusions of the committee can be summed up in the following twelve points. (Point number twelve was added by the author.)

1. It provides adequate parking facilities within easy walking distance of any property in the central business district.
 2. It will spread parking traffic throughout the area rather than congest it at a few focal points.
 3. It is the most flexible plan. Each of the ten units can be developed separately, and to a degree to satisfy parking demands at this particular location.
 4. It is the most economical plan having an estimated unit cost of \$620.20 against \$3,054.74 for plan number one, and \$4,844.17 for plan number two.
 5. This plan can be completed without cost to the city.
- The acquisition of the ten parcels of land, the surfacing, and the installation of meters can be financed by

use of the funds created by parking meters for this purpose, and a loan from the Public Improvement Reserve Pool. This loan is to be repaid from parking earnings.

6. It is the most economical plan to operate.

Recommendations

7. The parking buildings should be built as needed by the sale of revenue bonds to be retired from earnings.
8. Each lot should be equipped with two-hour parking meters that will take one, two or three nickels at a time, making it possible for the customer to park his own car for a period up to six hours. These lots would not require an attendant, only a periodic check by the police department.
9. The parking charge should be five cents for each two hours.
10. The first buildings erected on each location should be three level, one level below grade, one level on grade, and one level above grade. The structures are to be so designed so that two or more levels can be added when needed. These three level buildings should also be metered, allowing personal parking. This would require but one attendant to check available spaces and violations.
11. Each unit could be municipally operated, or leased to private operators. If municipally operated, this plan

would not only be self sustaining, but would provide a net return of \$85,000 to \$500,000 to the city annually, which might relieve property taxes or make possible an earlier realization of planned public improvements.

12.* All parking on Michigan Avenue from the Grand River to the capitol, on Washington Avenue from Genesee Avenue Hillsdale Street, and on Capitol Avenue from Ottawa Street to Allegan Street is to be eliminated.

* Added by author

LOCATION OF STRUCTURE

TO BE DESIGNED

An inspection of
parking sites are
still a few sec
are not adequate
Capitol and Mic
business distri
is apparent. In
within a block
can furnish add
addition, there
is concentrated
the Olds Tower,
building. Indi
planning on ex
the four block
building. This
concentration
course necessi

Further inspe
possible loca
ly in front o
structure bui
would be acces
that if the ar

An inspection of map number two, showing the ten selected parking sites and the area they serve, shows that there are still a few sections in the central business district which are not adequately served. One of these is the area at Capitol and Michigan Avenue. It is in the heart of the business district, and the need for parking facilities here is apparent. There is a large number of retail stores within a block and a half of this intersection, none of which can furnish adequate parking space for their customers. In addition, there is a large labor force to be served which is concentrated in the State Capitol, the Lansing City Hall, the Olds Tower, the Olds Hotel, and the Bank of Lansing building. Indications are at present that the state is planning on extending the capitol buildings to the West in the four blocks directly in the rear of the present capitol building. This will have the effect of increasing traffic concentration at all points near the capitol, and will of course necessitate more parking spaces.

Further inspection of map number two reveals that the only possible location for parking is the large open area directly in front of the State Capitol. Since neither a parking structure built above the ground or parking at ground level would be acceptable because of the appearance, it follows that if the area is to be utilized, parking must be under-

ground. This solution has been applied in many cities, and it could be very easily applied here.

The land is state owned and any attempt to use it for the above purpose would probably meet much resistance in the state legislature. Most of the objections come from the desire on the part of many to retain old landmarks and memorials. However, it is felt by the author that the city containing the state capitol should be a leader in its state in civic improvement. Surely, visitors from other sections of the country cannot be expected to be favorably impressed with a state whose Capitol City provides him with the present limited parking spaces and crowded streets.

The objection that the beauty of the area would be destroyed is an invalid one, since the proposed structure would be covered and landscaped. Thus, a park fully as beautiful as the one existing could be placed on top of the underground parking building.

Traffic to this area comes in from North, South, East, and West, and therefore a parking area here would be easily accessible. Traffic to or from the structure could be moved from or into six streets, Michigan, Capitol, Allegan, Ottawa

Seigneur

load co

It is p

structo

Allern

entrar

dische

tunni

One o

sele

This

the

str

In

tes

of

ti

as

t

m

z

Seymour, and Townsend. Therefore, at rush hours, the traffic load could be distributed with little congestion.

It is planned to have three entrances and exits to the structure; one on Capitol leading in from Michigan, one at Allegan and Townsend, and one at Ottawa and Seymour. These entrances and exits are to be designed so that they may discharge and receive their traffic with a minimum of turning and stopping.

One other point which was considered before this area was selected was its location from an engineering standpoint. This consideration included the depth of the water table, the soil conditions, and the proximity of the proposed structure to existing utilities and structures.

Information concerning soil conditions was taken from a test boring made by the highway department at the NE corner of Capitol and Michigan Avenue. From this boring the conditions existing at the site of the proposed structure were assumed. It was found that at the elevation of the foundation, the soil was a mixture of fine and medium yellow sand with an estimated bearing capacity of 6,000 lbs/sq. ft. for an ordinary spread footing.

The water table was found to be at an elevation of approximately 818.24'. This is far enough below the elevation of the foundation of the parking structure so as to eliminate any danger of frost action or buoyant force tending to lift the structure.

The closest structure, and the only one offering any problem to construction, is the capitol building. This difficulty has been overcome by locating the parking structure retaining walls far enough from the capitol building so that no surcharge need be added in their design. At one point, the entrance steps to the capitol are over the structure, but this weight can be taken by the columns underneath the steps.

From information obtained from the capitol building superintendent, the telephone company, the water and power company, and the city engineer, it was found that no utilities are located so as to be interfered with by any part of the structure except the north ramps. At the intersection of Townsend and Ottawa an electric conduit enters the capitol area. This conduit would be crossed by any ramps from or into the structure at this point. It is located at an average depth of two to three feet below the present ground surface, and would present no difficulty in bypassing during construction. Steam and water lines also enter the capitol area at this point, but they too can be easily bypassed, and need only be left

in their temporary position during the construction of the ramps.

DESIGN OF STRUCTURE

In designing the structure the first step was to estimate how many automobiles it should be able to handle so as to best fit into the plan advanced by the parking committee. Since their plan called for ten parking areas to handle a deficit of 7,644 spaces, it was felt that a structure capable of storing about one ninth of this figure or about 850 vehicles would be of the correct size. Rough calculations showed that in order to provide this amount of parking space in the area selected, a two level structure would be needed.

Of the great number of building materials available, one had to be selected which would **meet** the following requirements:

1. Be fire resistant.
2. Provide maximum head room with minimum depth.
3. Provide high strength with comparatively thin sections.
4. Be easy to transport and place.
5. Be comparatively quiet to erect or place.
6. Have low comparative cost.
7. Require short erection, or placing time.

Of the materials considered, reinforced concrete was the type which possessed most of the above requirements, espec-

ially the first three. Therefore, it was decided to design the structure using reinforced concrete throughout.

Specifications Used

In order to make the structure conform as closely as possible to the most widely used, and the safest set of standards, several codes were examined.

Since the State of Michigan does not have a building code, the Lansing building code was selected first. The section concerning the structural standards of reinforced concrete design had been deleted and reference was made to the code published by the American Concrete Institute. The next code selected for consideration was the one published by the National Board of Fire Underwriters. This too referred to the American Concrete Institute code. Therefore, the 1941 Building Regulations for Reinforced Concrete (A.C.I. code) was adopted as the standard to be used in the design specifications of all the reinforced concrete members.

The next step was the selection of a code which specified the live and dead loads, ventilation requirements, and any other factors not directly involved in the design of the structural members. The building code published by the National Board of Fire Underwriters was compared with the Lansing building codes. In general, it was found that the former provided a greater margin of safety, and most re-

quirements of the Lansing code were also contained in the Underwriters code. Since this was the case it was decided to adopt the National Board of Fire Underwriters building code as the one used in the design of the structure.

Loads on Floor and Roof System

In the selection of floor loads and roof loads, the maximum specified in the National Board of Fire Underwriters code were used.

So as to indicate clearly which part of the structure is referred to certain terms are defined at this point.

1. Roof - Refers to the top of the parking structure and includes that portion of the structure which supports the earth cover.
2. First level - Refers to the first level below the surface of the ground.
3. First level floor - Refers to the floor of the first level which is also the ceiling on the second level.
4. Second level - Refers to the second level below the surface of the ground.
5. Second level floor - Refers to the portion of second level floor, other than column and retaining wall footings, which is directly in contact with the earth.

In order that the park that is in front of the capitol at present may be replaced when the structure is completed, a thin cover of earth must be furnished to allow landscaping. A depth of four feet was designed for, since this would permit the use of shrubs and small trees. Assuming earth to weigh 150 lbs/cu. ft., this would produce a dead load of (4) (150) lb/sq. ft. or 600 lb/sq. ft. An additional live load of 100 lb/sq. ft. was added to this to take care of any group of persons collecting, or any small vehicles such as power lawn mowers being used. The thickness of the roof slab of the structure was initially estimated at 12 inches and later calculation proved this correct. Therefore, taking the weight of reinforced concrete as 150 lb/cu. ft. this gives a load of (1) (150) or 150 lb/sq. ft. Summarizing the roof loads.

Earth load	-	600 lb/sq. ft.
Live load	-	100 lb/sq. ft.
Slab load	-	<u>150</u> lb/sq. ft.
Total	-	850 lb/sq. ft.

The load on the first level floor was composed of the live load due to vehicles and pedestrians, plus the dead load due to the weight of the floor. From the building code the live load was taken as 175 lb/sq. ft. which is from 25 to 50 lb/sq. ft. above local building codes. The slab thickness was estimated at 8 inches and this also proved to be correct

in later calculations. Summarizing the first level load.

Live load - 175 lb/sq. ft.

Slab load - 100 lb/sq. ft.

Total - 275 lb/sq. ft.

Where the walks are located on each floor an increase in concrete thickness of approximately 6 inches occurs. However, the whole floor is designed for a 175 lb/sq. ft. live load and only that portion used by vehicles is subjected to this load. The sidewalks need only be designed for a live load of 100 lb/sq. ft., and so a 6 inch curbing increasing the load by 75 lb/sq. ft. is permissible.

Design of Roof and Floors

In selecting the type of construction to be used in the roof and floors, two types were considered; beam and girder construction, and use of the flat slab. Of the two the latter was selected because of two important reasons,

(1), It provided maximum headroom with minimum depth of structure, and (2), The formwork used in flat slab construction is simpler and less expensive than that used in the beam and girder system. In addition, it offers such features as providing flat surfaces for ductwork, eliminating many corners and points of weakness, and provides greater simplicity of design and steel placement than the beam and girder type.

The type of flat slab construction used was the two way steel system, with drop panels and column capitals.

The first step in the design of the floor and roof system was to draw a framing diagram (Plates 1 & 2) showing the dimensions and the location of each of the panels. All panels having the same dimensions were assigned the same letter. The number following designates the position of the panel in the structure, and thus indicates which panels are adjacent to it. This system was used on both the roof and the first level floors, as well as the main entrance

and exit ramps at Capitol Avenue. These ramp panels are also flat slabs and they all have the same thickness as the first level floor panels and are included in this design, but are clearly designated in the tables as ramp panels.

A sample calculation showing the procedure used in a panel design is given. This sample shows the design of panel A1, and presents all work done in checking each panel.

As an aid in tabulating the information gathered, three tables are used; a "Steel Design" table, a "Bar Dimension" table, and a "Bar Placement Schedule". Each is accompanied by an explanation which gives all the necessary information about the table.

Panel Design - Sample Calculation

Method used: Moment coefficient (ACI 1003)

Panel - Roof panel A1

Dimensions - 18'-00" x 21'-00" Area = 378 ft²

General Data

$$f'_c = 3,000 \text{ lbs/in}^2 \quad R = 236$$

$$f_s = 20,000 \text{ lbs/in}^2 \quad j = .866$$

Assume 24 in. diam. columns

Use drop panel 8'-00" square

Let capital diam. $c = 64$ in.

Loads

$$\text{Live load} = 100 \text{ lbs/ft}^2$$

$$4 \text{ ft. earth} = 600 \text{ lbs/ft}^2$$

$$12 \text{ in. slab} = 150 \text{ lbs/ft}^2$$

$$\text{Total} \quad \underline{850 \text{ lbs/ft}^2}$$

Wt. of drop (Assume a drop of 8 in) =

$$(8 \text{ ft.})(8 \text{ ft.}) \left(\frac{8 \text{ ft.}}{12} \right) (150 \text{ lbs/ft}^3) = 4800 \text{ lbs}$$

Min & Max thickness (A.C.I. 1006)

$$\text{Min } t = \frac{L}{40} = \frac{(18)(12)}{40} = 5.4 \text{ in.}$$

$$\text{Max } t = 19.25 \text{ in.}$$

Use t (slab) = 12 in.

t , (drop) = 18 in.

Moments

$$M_o = 0.09 WL \left(1 - \frac{2c}{3L} \right)^2$$

W : Total load on slab

L : Distance ℓ - ℓ in direction of bending between columns.

c : Diam. of column capital

Moment Coefficients (max) Table 1004(a)

Interior panel Thin section +.20 M_o

Drop -.50 M_o

Exterior panel Thin section .25 M_o

Drop -.55 M_o

Panel Design - Sample Calculations

Formulas

$$\text{Depth} = d = \sqrt{\frac{M}{Rb}}$$

$$\text{Shear} = v = \frac{V}{bjd}$$

Loads

$$(850 \text{ lbs/ft}^2)(378 \text{ ft}^2) = 321,000 \text{ lbs}$$

$$\text{Drop} = 4,800 \text{ lbs}$$

$$W = \underline{325,800 \text{ lbs}}$$

Design 21'-00" Length

$$\begin{aligned} M_o &= (.09)(325,800)(21)(12) \left(1 - \frac{10.67}{63}\right)^2 \\ &= 22.7 (325,800) (1 - .1691)^2 \\ &= 22.7 (325,800) (.8309)^2 \\ &= 15.67 (325,800) \\ &= 5,100,000 \text{ lb. in.} \end{aligned}$$

$$\begin{aligned} M_o &= 5,100,000 \text{ lb. in.} \\ &= \underline{5,100 \text{ kip in.}} \end{aligned}$$

Checking depths

Since panel A1 is an interior panel, the max. neg. moment occurring = .20 M_o

d = max effective depth

b = Width of strip = (.75) (Width of strip)
or (.75) (Width of drop)

$$R = 236$$

Thin section

$$d = \sqrt{\frac{(5,100,000)(.20)}{(236)(.75)(12)(9)}} = \sqrt{53.3} = 7.31$$

$$\underline{d = 7.31}$$

$$\text{Total } t = 7.31 + 1 + .50 = 8.81$$

12 in. ok

Note: Cover is figured as 1 in. for (+) steel
& 2 in for (-) steel.

Panel Design- Sample Calculations

Drop panel

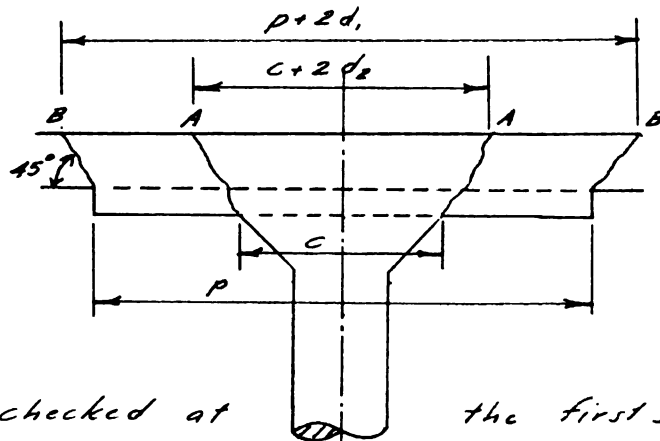
$$d_1 = \sqrt{\frac{(5,100,000)(.50)}{(236)(.75)(96)}} = \sqrt{150.0} = 12.24 \text{ in}$$

$$d_1 = 12.24 \text{ in.}$$

$$\text{Total } t_1 = 12.24 + 2 + .50 = 14.74 \text{ in}$$

18 in. OK

Check shear



Shear is checked at the first section from which a crack can run through the slab. This occurs at A for the drop panel & at B for the slab.

$$\text{The distance } d_1 = t - 1.5 = 10.5 \text{ in.}$$

$$d_2 = t_1 - 1.5 = 16.5 \text{ in} \quad (\text{A.C.I. 807})$$

Thin section

$$v = \frac{V}{b_j d}$$

The average load is taken as $\frac{W}{A} = \frac{325,800}{378}$ or 862 lbs/ft^2 . Shear through the thin section is taken as this load acting on the area outside the perimeter at B.

$$\text{Diameter of subtracted area} = 96 + (10.5)(2) =$$

$$96 + 21 = 117 \text{ in.}$$

$$9.75 \text{ ft.}$$

Panel Design - Sample Calculation

$$v = \frac{(862 \text{ lbs/ft}^2) [(22)(18) \text{ ft}^2 - (9.75)^2 \text{ ft}^2]}{(4)(117 \text{ in.})(.866)(10.5 \text{ in.})}$$

$$v = \frac{(862)(298.9)}{(4910)(.866)} \text{ lbs/in}^2 = 60.5 \text{ lbs/in}^2$$

$$\underline{v = 60.5 \text{ lbs/in}^2}$$

$$\frac{\text{Drop width}}{\text{Strip width}} = \frac{8}{9} > .5$$

$$\text{Allowable } v = .03 f'_c = .03(3000) = 90 \text{ lbs/in}^2$$

(ACI 807a)

$$\underline{\text{Allowable } v = 90 \text{ lbs/in}^2}$$

v ok

Drop panel shear

$$\text{Diameter of subtracted area} = 64 + (2)(16.5) =$$

$$64 + 33 = 97'' =$$

$$v = \frac{(862 \text{ lbs/ft}^2) [(22)(18) \text{ ft}^2 - \frac{(\pi)(8.08 \text{ ft})^2}{4}]}{(\pi)(97 \text{ in.})(.866)(16.5 \text{ in.})}$$

$$v = \frac{(862)(342.7)}{(5020)(.866)} \text{ lbs/in}^2 = 68 \text{ lbs/in}^2$$

$$\underline{v = 68 \text{ lbs/in}^2}$$

$$\frac{\text{Capital width}}{\text{Strip width}} = \frac{5.33}{9} = .593 > .5$$

$$\underline{\text{Allowable } v = 90 \text{ lbs/in}^2}$$

v ok

Panel Design - Sample Calculations

Design 18'-00" Length

$$\begin{aligned}M_o &= (.09)(325,800)(18)(12)\left(1 - \frac{10.67}{54}\right)^2 \\&= (.09)(18)(12)(325,800)(1 - .1975)^2 \\&= (.09)(18)(12)(325,800)(.8025)^2 \\&= (12.52)(325,800) \\M_o &= 4,080,000 \text{ lb. in.}\end{aligned}$$

$$\begin{aligned}M_o &= 4,080,000 \text{ lb. in.} \\&= 4,080 \text{ Kip in}\end{aligned}$$

Checking depths

Thin section

$$d = \sqrt{\frac{(4,080,000)(.20)}{(236)(.75)(12)(10.5)}} \cdot \sqrt{36.6} = 6.05 \text{ in.}$$

$$\begin{aligned}t &= 6.05 + 1 + 1.5 = 8.55 \text{ in.} \\&\quad 12 \text{ in. ok}\end{aligned}$$

Drop panel

$$d_1 = \sqrt{\frac{(4,080,000)(.50)}{(236)(72)}} = \sqrt{120} = 10.95 \text{ in.}$$

$$\begin{aligned}t_1 &= 10.95 + 2 + 1.5 = 14.45 \text{ in.} \\&\quad 18 \text{ in. ok}\end{aligned}$$

Shear same as for 21'-00" Length

Panel Design- Sample Calculations

The next step in the design of the panel was the determination of the steel areas necessary. These calculations are tabulated in the "Steel Design" tables.

Since roof panel A1 is an interior panel, only the first major heading is considered (An explanation of the "Steel Design" tables are given with the tables.)

Steel areas needed are:

21'-00" Length

Col. strip

Pos. bending 8 bars - 1" ϕ deformed
Neg " 12 "

Mid strip

Pos bending 6 bars
Neg " 6 bars

18'-00" Length

Col strip

Pos bending 6 bars
Neg " 11 bars

Mid strip

Pos bending 5 bars
Neg bending 5 bars

The vertical position of the bars at points where they cross are also given in these tables.

Next, a selection of the type of bars to use is made, and the dimensions of the bars found. This information is compiled in the "Bar Dimension Schedule."

Here it is found that bar types E1, E2A, & E2B are used. The dimensions for each of these bar types used in the column & mid strips for both the long & short lengths of the panel, follow the bar designation

Drawings of the bar types are shown on the "Bar Type Sheets."

Panel Design - Sample Calculations

After the bar types & dimensions are found, the bars are placed in the panel.

Again, a set of tables "The Bar Placement Schedule" has been used. A full explanation of these tables accompany them, and no effort will be made at this point to give the procedure used.

All other panels in the roof and 1st level floor were checked for depth and shear as shown in the preceding calculations. In some cases it was necessary to increase the drop thickness one inch to obtain sufficient depth, and the positions of these thicker drop panels are circled on the framing diagrams (Plate 1 & 2)

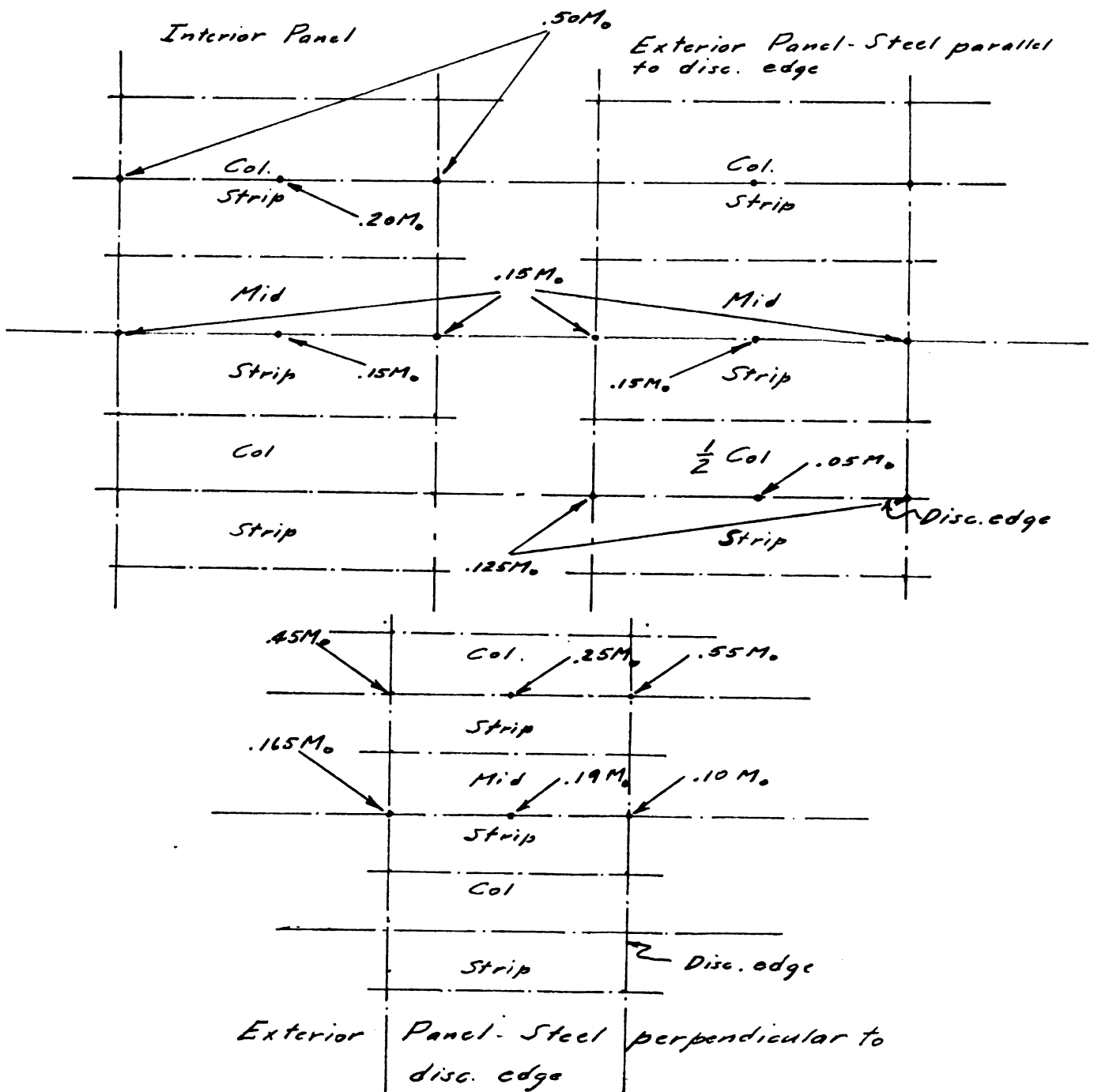
An increase of one inch in the drop panel produces a negligible increase in the moment and shear.

Panel Dimensions

<u>Panel</u>	<u>Dimensions</u>
A	18'00" x 21'00"
B	18'00" x 23'00"
C	18'00" x 23'06"
D	18'00" x 24'00"
E	20'00" x 21'00"
F	20'00" x 23'00"
G	18'00" x 22'06"
H	20'00" x 23'06"
I	23'00" x 21'00"
J	23'00" x 23'00"
K	23'00" x 23'06"
L	20'00" x 22'06"
M	20'00" x 24'00"
N	22'06" x 21'00"
O	22'06" x 23'00"
P	22'06" x 22'06"
Q	20'06" x 21'00"
R	20'06" x 23'00"
S	20'06" x 23'06"

EXPLANATION OF "STEEL DESIGN" TABLES

These tables are arranged so as to include all flat slab (FS) panels in the structure. The three major vertical columns indicate where the panel is located, and the subtitles under them show which portion of the panel is being considered. The sketches below show the three types and indicate where the moments occur.



EXPLANATION OF "STEEL DESIGN" TABLES

In the first horizontal row the moment M_0 as calculated in the initial panel design is given.

Next, the moment coefficient and the moments corresponding to the portion of the panel they occur in are given. These coefficients were obtained from A.C.I. Code Table 1004 (a), and 1004 (b).

The small drawing below each moment shows the vertical position of the steel at that point in the panel. The arrow designates the depth, which is given on the next line.

The next three rows give steel areas. The first is the calculated area necessary to resist the moment, and is found from the formula shown. The second and third give the minimum steel areas which can be used; (A.C.I. 1004(g)). These are temperature steel areas.

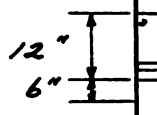
The greatest steel area of the above three is listed next, and the number of bars is then calculated using A_s .79 sq.in. for 1" round bars and A_s .44 sq.in. for $\frac{3}{4}$ in round bars.

STEEL DESIGN (FS)

18'-00" x 21'-00"

Roof 21'-00" Length

A

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 5,100 \text{ kip in.}$					*	*								
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1020	2550	765	765	255	637	765	765						
 Using 1" ϕ Bars Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)} =$	5.79	9.50	4.20	4.65	1.90	2.37	4.20	4.65						
Min. $A_s = (0.025)(108)(d)$	2.83		2.83	2.57	1.42		2.83	2.57						
Min. $A_s = (0.025)(96)(d)$		3.48				1.74								
Use A_s sq. in.	5.79	9.50	4.20	4.65	1.90	2.37	4.20	4.65						
No. of bars	8	12	6	6	2	3	6	6						

1st Level Floor

$M_o = 1,682 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	337	841	252	252	84	210	252	252						
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)} =$	2.94	5.05	2.20	2.59	.73	1.26	2.20	2.59						
Min. $A_s = (0.025)(108)(d)$	1.79		1.79	1.52	.90		1.79	1.52						
Min $A_s = (0.025)(96)(d)$		2.13				1.06								
Use A_s sq. in	2.94	5.05	2.20	2.59	.90	1.26	2.20	2.59						
No. of bars	7	12	5	6	3	3	5	6						

* Half strip designed for

STEEL DESIGN (FS)

18'-00" x 21'-00"

Roof 18'-00" Length

A

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
$M_0 = 4,080 \text{ kip in.}$	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	816	2040	612	612					1020	2240	1835	775	673	408
Using 1" ϕ Bars														
Depth d in. =	10.5	14.5	9.5	9.5					10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$	4.49	8.12	3.72	3.72					5.61	8.91	7.31	4.70	4.09	2.48
Min. $A_s =$ (.0025)(126)(d)	3.31		2.99	2.99					3.31			2.99	2.99	2.99
Min. $A_s =$ (.0025)(96)(d)		3.48								3.48	3.48			
Use A_s sq. in.	4.49	8.12	3.72	3.72					5.61	8.91	7.31	4.70	4.09	2.99
No. of bars	6	11	5	5					8	12	10	6	6	4

1st Level Floor

$M_0 = 1,345 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	269	673	202	202					336	740	605	256	222	135
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87	5.87	5.62					6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	2.35	4.38	1.99	2.07					2.93	4.82	3.94	2.51	2.28	1.38
Min. $A_s =$ (.0025)(126)(d)	2.09		1.85	1.77					2.09			1.85	1.77	1.77
Min $A_s =$ (.0025)(96)(d)		2.13								2.13	2.13			
Use A_s sq. in	2.35	4.38	1.99	2.07					2.93	4.82	3.94	2.51	2.28	1.77
No. of bars	6	10	5	5					7	11	9	6	6	5

STEEL DESIGN (FS)

18'-00" x 23'-00"

Roof 23'-00" Length

B

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
M_o = 6,330 kip in.	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1268	3170	950	950	317	792	950	950						
														
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5						
A_s = $\frac{M}{(20)(.866)(d)}$ =	6.96	11.81	5.22	5.78	1.74	2.95	5.22	5.78						
Min. A_s = (0.025)(108)(d)	2.83		2.83	2.56	1.42		2.83	2.56						
Min. A_s = (0.025)(96)(d)		3.72				1.86								
Use A_s sq. in.	6.96	11.81	5.22	5.78	1.74	2.95	5.22	5.78						
No. of bars	9	15	7	8	3	4	7	8						

1st Level Floor

M_o = 2,080 kip in.

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	416	1040	312	312	104	260	312	312						
														
Using $\frac{3}{4}$" ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62						
A_s = $\frac{M}{(20)(.866)(d)}$ =	3.63	6.24	2.72	3.37	.91	1.56	2.72	3.21						
Min. A_s = (0.025)(108)(d)	1.79		1.79	1.52	.89		1.79	1.52						
Min A_s = (0.025)(96)(d)		2.31				1.16								
Use A_s sq. in	3.63	6.24	2.72	3.37	.91	1.56	2.72	3.21						
No. of bars	9	15	7	8	3	4	7	8						

STEEL DESIGN (FS)

18'-00" x 23'-00"

Roof 18'-00" Length

B

$M_0 = 4,460 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	892	2230	669	669					1115	2450	2010	847	735	446
Using 1" ϕ Bars														
Depth d in. =	10.5	14.5	9.5	9.5					10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$	4.90	8.88	4.06	4.06					6.12	9.75	8.00	5.15	4.47	2.71
Min. $A_s =$ (.0025)(138)(d)	3.62		3.28	3.28					3.62			3.28	3.28	3.28
Min. $A_s =$ (.0025)(96)(d)		3.48								3.48	3.98			
Use A_s sq. in.	4.90	8.88	4.06	4.06					6.12	9.75	8.00	5.15	4.47	3.28
No. of bars	7	12	6	6					8	13	11	7	6	5

1st Level Floor

$M_0 = 1,468 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	293	734	220	220					347	807	660	279	242	147
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87	5.87	5.62					6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	2.56	4.78	2.16	2.26					3.03	5.25	4.30	2.74	2.49	1.51
Min. $A_s =$ (.0025)(138)(d)	2.28		2.03	1.94					1.05			2.03	1.94	1.94
Min $A_s =$ (.0025)(96)(d)		2.13								2.13	2.13			
Use A_s sq. in	2.56	4.78	2.16	2.26					3.03	5.25	4.30	2.74	2.49	1.94
No. of bars	6	11	5	6					7	12	10	7	6	5

STEEL DESIGN (FS)

18'-00" x 23'-06"

Roof 23'-06" Length

C

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
$M_o = 6,680 \text{ kip in.}$	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1337	3390	1002	1002					1670	3680	3010	1270	1102	668
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	10.5	9.5					10.5	15.5	15.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$	7.33	12.43	5.60	6.20					9.18	13.70	11.21	6.98	6.70	4.06
Min. $A_s =$ (.0025)(108)(d)	2.83		2.83	2.57					2.83			2.83	2.57	2.57
Min. $A_s =$ (.0025)(96)(d)		3.72								3.72	3.72			
Use A_s sq. in.	7.33	12.43	5.60	6.20					9.18	13.70	11.21	6.98	6.70	4.06
No. of bars	10	16	8	8					12	18	15	9	9	6

1st Level Floor

$M_o = 2,190 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	438	1095	328	328	*	*			548	1205	986	416	361	219
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62					6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	3.81	6.56	2.86	3.37					4.77	7.23	5.92	3.63	3.72	2.25
Min. $A_s =$ (.0025)(108)(d)	1.79		1.79	1.52					1.79			1.79	1.52	1.52
Min $A_s =$ (.0025)(96)(d)		2.31								2.31	2.31			
Use A_s sq. in	3.81	6.56	2.86	3.37					4.77	7.23	5.92	3.63	3.72	2.25
No. of bars	9	15	7	8					11	17	14	9	9	6

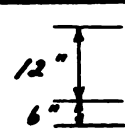
1

STEEL DESIGN (FS)

18'-00" x 23'-06"

Roof 18'-00" Length

C

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
$M_o = 4.560 \text{ kip in.}$	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	913	2280	684	684	228	570	684	684						
														
Using 1" ϕ Bars Depth d in. =	10.5	14.5	9.5	9.5	10.5	14.5	9.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)}$	6.02	9.13	4.16	4.22	1.25	2.27	4.16	4.16						
Min. $A_s = (0.0025)(141)(d)$	3.70		3.35	3.35	1.85		3.35	3.35						
Min. $A_s = (0.0025)(96)(d)$		3.48				1.74								
Use A_s sq. in.	5.02	9.13	4.16	4.22	1.85	2.27	4.16	4.16						
No. of bars	7	13	6	6	3	3	6	6						

1st Level Floor

$M_o = 1,497 \text{ kip in.}$

	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	299	749	225	225	75	187	225	225						
														
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62						
$A_s = \frac{M}{(20)(.866)(d)}$	2.60	4.87	2.21	2.31	.65	1.22	2.21	2.31						
Min. $A_s = (0.0025)(141)(d)$	2.33		2.07	1.98	1.17		2.07	1.98						
Min $A_s = (0.0025)(96)(d)$		2.13				1.06								
Use A_s sq. in	2.60	4.87	2.21	2.31	1.17	1.22	2.21	2.31						
No. of bars	6	12	6	6	3	3	6	6						

STEEL DESIGN (FS)

18'-00" x 24'-00"

Roof 24'-00" Length

D

$M_o = 6,980 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	* .05	* .125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1396	3490	1048	1048	349	873	1048	1048	1747	3840	3140	1328	1152	698
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5	10.5	15.5	15.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$	768	130	5.75	6.36	2.01	3.25	5.75	6.36	960	14.30	11.69	7.29	7.01	4.24
Min. $A_s = (0.0025)(108)(d)$	2.84		2.84	2.57	1.42		2.84	2.57	2.84			2.84	2.57	2.57
Min. $A_s = (0.0025)(96)(d)$		3.72				1.86				3.72	3.72			
Use A_s sq. in.	7.68	13.0	5.75	6.36	2.01	3.25	5.75	6.36	9.60	14.30	11.69	7.29	7.01	4.24
No. of bars	10	17	8	9	3	5	8	9	13	19	15	10	9	6

1st Level Floor

$M_o = 2,300 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	* .05	* .125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	460	1150	345	345	115	287	345	345	575	1265	1035	437	380	230
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	4.01	6.90	3.01	3.54	1.00	1.72	3.01	3.54	5.02	7.59	6.21	3.81	3.91	2.36
Min. $A_s = (0.0025)(108)(d)$	1.79		1.79	1.52	.89		1.79	1.52	1.79			1.79	1.52	1.52
Min $A_s = (0.0025)(96)(d)$		2.31				1.16				2.31	2.31			
Use A_s sq. in	4.01	6.90	3.01	3.54	1.00	1.72	3.01	3.54	5.02	7.59	6.21	3.81	3.91	2.36
No. of bars	10	16	7	9	3	4	7	9	12	18	15	9	9	6

STEEL DESIGN (FS)

18'-00" x 24'-00"

Roof 18'-00" Length

D

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 4,650 \text{ kip in.}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	930	2325	698	698	233	581	698	698	1162	2560	2090	884	767	465
Using 1" ϕ Bars Depth d in. =	10.5	14.5	9.5	9.5	10.5	14.5	9.5	9.5	10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$	5.11	9.27	4.24	4.24	1.28	2.31	4.24	4.24	6.39	10.2	8.32	5.37	4.66	2.83
Min. $A_s = (0.0025)(144)(d)$	3.99		3.61	3.61	1.89		3.61	3.61	3.99			3.61	3.61	3.61
Min. $A_s = (0.0025)(96)(d)$		3.48				1.74				3.48	3.48			
Use A_s sq. in.	5.11	9.27	4.24	4.24	1.89	2.31	4.24	4.24	6.39	10.2	8.32	5.37	4.66	3.61
No. of bars	7	12	6	6	3	3	6	6	9	13	11	7	6	5

1st Level Floor

$M_o = 1,530 \text{ kip in.}$

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	306	765	230	230	77	191	230	230	381	841	689	291	252	153
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	2.67	4.98	2.27	2.37	.67	1.24	2.27	2.37	3.32	5.48	4.48	2.86	2.69	1.57
Min. $A_s = (0.0025)(144)(d)$	2.52		2.23	2.14	1.19		2.23	2.14	2.52			2.23	2.14	2.14
Min $A_s = (0.0025)(96)(d)$		2.13				1.07				2.13	2.13			
Use A_s sq. in	2.67	4.98	2.27	2.37	1.19	1.24	2.27	2.37	3.32	5.48	4.48	2.86	2.69	2.14
No. of bars	7	12	6	6	3	3	6	6	8	13	11	7	7	5

STEEL DESIGN (FS)

20'-00" x 21'-00"

Roof 21'-00" Length

E

$M_o = 5,660 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1131	2830	849	849	283	708	849	849						
Using 1" ϕ Bars Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)}$	6.22	10.54	4.66	5.16	1.56	2.64	4.66	5.16						
Min. $A_s = (0.0025)(120)(d)$	3.15		3.15	2.85	1.58		3.15	2.85						
Min. $A_s = (0.0025)(96)(d)$		3.72				1.86								
Use A_s sq. in.	6.22	10.54	4.66	5.16	1.58	2.64	4.66	5.16						
No. of bars	8	14	6	7	2	4	6	7						

1st Level Floor

$M_o = 1,859 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	372	930	279	279	93	232	279	279						
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)}$	3.24	5.58	2.43	2.87	.81	1.39	2.43	2.87						
Min. $A_s = (0.0025)(120)(d)$	1.99		1.99	1.69	.99		1.99	1.69						
Min $A_s = (0.0025)(96)(d)$		2.31				1.16								
Use A_s sq. in	3.24	5.58	2.43	2.87	.99	1.39	2.43	2.87						
No. of bars	8	13	6	7	3	4	6	7						

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

STEEL DESIGN (FS)

20'-00" x 21'-00"
Roof 20'-00" Length

E

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
$M_o = 5,290 \text{ kip in.}$	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1059	2650	794	794					1322	2910	2380	1005	873	529
Using 1" ϕ Bars Depth d in. =	10.5	14.5	9.5	9.5					10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$	5.82	10.55	4.83	4.83					7.27	11.58	9.48	6.11	5.30	3.21
Min. $A_s =$ (.0025)(120)(d)	3.15		2.85	2.85					3.15			2.85	2.85	2.85
Min. $A_s =$ (.0025)(96)(d)		3.48								3.48	3.48			
Use A_s sq. in.	5.82	10.55	4.83	4.83					7.27	11.58	9.48	6.11	5.30	3.21
No. of bars	8	14	7	7					10	15	12	8	7	5

1st Level Floor

$M_o = 1,736 \text{ kip in.}$

	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	347	867	260	260					434	955	781	330	286	174
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62					6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	3.02	5.65	2.55	2.67					3.78	6.22	5.09	3.25	2.93	1.79
Min. $A_s =$ (.0025)(120)(d)	1.99		1.76	1.69					1.99			1.76	1.69	1.69
Min $A_s =$ (.0025)(96)(d)		2.13								1.50	2.13			
Use A_s sq. in	3.02	5.65	2.55	2.67					3.78	6.22	5.09	3.25	2.93	1.79
No. of bars	7	13	6	7					9	15	12	8	7	5

STEEL DESIGN (FS)

20'-00" x 23'-00"
Roof 23'-00" Length

F

$M_o = 7,010 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1403	3505	1052	1052	351	876	1052	1052						
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)}$	7.81	13.05	5.78	6.40	1.93	3.29	5.79	6.40						
Min. $A_s = (.0025)(120)(d)$	3.15		3.15	2.85	1.58		3.15	2.85						
Min. $A_s = (.0025)(96)(d)$		3.72				1.86								
Use A_s sq. in.	7.81	13.05	5.78	6.40	1.93	3.29	5.79	6.40						
No. of bars	10	17	8	9	3	5	8	9						

1st Level Floor

$M_o = 2,300 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	460	1150	345	345	115	288	345	345						
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)}$	4.01	6.90	3.01	3.54	1.00	1.73	3.01	3.54						
Min. $A_s = (.0025)(120)(d)$	1.99		1.99	1.69	.99		1.99	1.69						
Min $A_s = (.0025)(96)(d)$		2.31				1.05								
Use A_s sq. in	4.01	6.90	3.01	3.54	1.00	1.73	3.01	3.54						
No. of bars	10	16	7	9	3	4	7	9						

STEEL DESIGN (FS)

20'-00" x 23'-00"

Roof 20'-00" Length

F

$M_o = 5,790 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1159	2895	868	868					1448	3190	2610	1100	955	579
Using 1" ϕ Bars Depth d in. =	10.5	14.5	9.5	9.5					10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$	6.37	11.52	5.28	5.28					7.95	12.71	10.39	6.69	5.80	3.75
Min. $A_s = (0.025)(138)(d)$	3.62		3.28	3.28					3.62			3.28	3.28	3.28
Min. $A_s = (0.025)(96)(d)$		3.48								3.48	3.48			
Use A_s sq. in.	6.37	11.52	5.28	5.28					7.95	12.71	10.39	6.69	5.80	3.75
No. of bars	9	15	7	7					11	17	14	9	8	5

1st Level Floor

$M_o = 1,900 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	380	950	285	285					475	1045	855	361	313	190
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62					6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	3.31	6.17	2.93	2.93					4.14	6.80	5.56	3.55	3.21	1.95
Min. $A_s = (0.025)(138)(d)$	2.28		2.02	1.94					2.28			2.02	1.94	1.94
Min $A_s = (0.025)(96)(d)$		2.13								2.13	2.13			
Use A_s sq. in	3.31	6.17	2.93	2.93					4.14	6.80	5.56	3.55	3.21	1.95
No. of bars	8	15	7	7					10	16	13	9	8	5

STEEL DESIGN (FS)

18'-00" x 22'-06"
Roof 22'-06" Length

G

$M_o = 6,020 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*	*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips					301	753	903	903	1506	3310	2710	1144	994	602
Using 1" ϕ Bars Depth d in. =					10.5	15.5	10.5	9.5	10.5	15.5	15.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$					1.66	2.80	4.96	5.49	8.27	12.31	10.09	6.29	6.03	3.66
Min. $A_s = (0.025)(108)(d)$					1.42			2.57	2.83			2.83	2.57	2.57
Min. $A_s = (0.025)(96)(d)$						1.86	1.86			3.72	3.72			
Use A_s sq. in.					1.66	2.80	4.96	5.49	8.27	12.31	10.09	6.29	6.03	3.66
No. of bars					3	4	7	7	11	16	13	8	8	5

1st Level Floor

$M_o = 1,977 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	*	*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips					99	247	297	297	494	1088	889	375	326	198
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =					6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$					.95	1.48	2.59	3.05	4.31	6.52	5.33	3.27	3.35	2.03
Min. $A_s = (0.025)(108)(d)$					.90		1.79	1.52	1.79			1.79	1.52	1.52
Min $A_s = (0.025)(96)(d)$						1.16				2.31	2.31			
Use A_s sq. in					.95	1.48	2.59	3.05	4.31	6.52	5.33	3.27	3.35	2.03
No. of bars					3	4	6	7	10	15	13	8	8	5

STEEL DESIGN (FS)

18'-00" x 22'-06"

Roof 18'-00" Length

G

$M_o = 4,370 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	875	2185			269	546	656	656	1092	2410	1969	831	722	437
Using 1" ϕ Bars														
Depth d in. =	10.5	14.5			10.5	14.5	9.5	9.5	10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$	4.81	8.70			1.48	2.17	3.99	3.99	6.00	9.59	7.84	5.05	4.39	2.65
Min. $A_s = (.0025)(135)(d)$	3.52				1.77		3.21	3.21	3.52			3.21	3.21	3.21
Min. $A_s = (.0025)(96)(d)$		3.48				1.74				3.48	3.48			
Use A_s sq. in.	4.81	8.70			1.77	2.17	3.99	3.99	6.00	9.59	7.84	5.05	4.39	3.21
No. of bars	7	11			3	3	6	6	8	13	10	7	6	5

1st Level Floor

$M_o = 1,435 \text{ kip in.}$

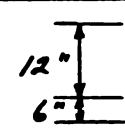
Moment Coeff	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	287	718			72	179	215	215	359	790	646	273	237	144
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87			6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	2.50	4.67			.63	1.17	2.11	2.21	3.13	5.14	4.21	2.69	2.43	1.48
Min. $A_s = (.0025)(135)(d)$	2.23				1.12		1.98	1.85	2.23			1.98	1.85	1.85
Min $A_s = (.0025)(96)(d)$		2.13				1.07				2.13	2.13			
Use A_s sq. in	2.50	4.67			1.12	1.17	2.11	2.21	3.13	5.14	4.21	2.69	2.43	1.85
No. of bars	6	11			3	3	5	5	8	12	10	7	6	5

STEEL DESIGN (FS)

20'-00" x 23'-06"

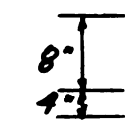
Roof 23'-06" Length

H

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 7,380 \text{ kip in.}$					*	*								
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1476	3690			369	922	1170	1170						
														
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5			10.5	15.5	10.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)}$	8.07	13.72			2.03	3.43	6.43	7.11						
Min. $A_s = (.0025)(120)(d)$	3.15				1.58		3.15	2.85						
Min. $A_s = (.0025)(96)(d)$		3.72				1.86								
Use A_s sq. in.	8.07	13.72			2.03	3.43	6.43	7.11						
No. of bars	11	18			3	5	8	9						

1st Level Floor

$M_o = 2,420 \text{ kip in.}$

	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment Coeff														
Moment in. kips	484	1210			121	303	363	363						
														
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62			6.62	9.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)}$	4.22	5.78			1.05	1.82	3.17	3.73						
Min. $A_s = (.0025)(120)(d)$	1.99				.99		1.99	1.69						
Min $A_s = (.0025)(96)(d)$		2.31				1.16								
Use A_s sq. in	4.22	5.78			1.05	1.82	3.17	3.73						
No. of bars	10	14			3	5	8	9						

STEEL DESIGN (FS)

20'-00" x 23'-06"
Roof 20'-00" Length

H

$M_0 = 5,900 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.*	.*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips									1475	3250	2650	1120	973	590
Using 1" ϕ Bars Depth d in. =									10.5	14.5	14.5	9.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$									8.10	12.94	10.55	6.81	5.91	3.59
Min. $A_s =$ (.0025)(141)(d)									3.70			3.35	3.35	3.35
Min. $A_s =$ (.0025)(96)(d)										3.48	3.48			
Use A_s sq. in.									8.10	12.94	10.55	6.81	5.91	3.59
No. of bars									11	17	14	9	8	5

1st Level Floor

$M_0 = 1,936 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.*	.*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips									484	1064	871	368	319	194
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =									6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$									4.36	6.92	5.75	3.61	3.27	1.99
Min. $A_s =$ (.0025)(141)(d)									2.34			2.07	1.98	1.98
Min $A_s =$ (.0025)(96)(d)										2.13	2.13			
Use A_s sq. in									4.36	6.92	5.75	3.61	3.27	1.99
No. of bars									10	16	14	9	8	5

STEEL DESIGN (FS)

23'-00" x 21'-00"

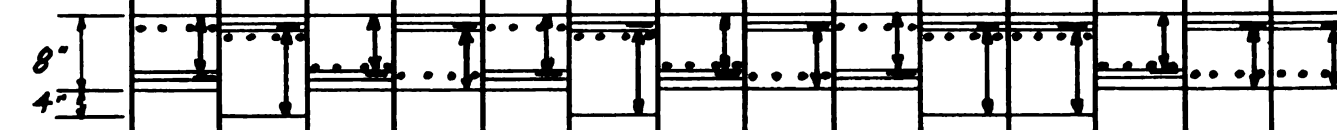
Roof 21'-00" Length

I

$M_o = 6,520 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1304	3260	978	978										
Using 1" ϕ Bars														
Depth d in. =	10.5	16.5	10.5	9.5										
$A_s = \frac{M}{(20)(.866)(d)}$	7.17	11.41	5.38	5.95										
Min. $A_s = (.0025)(138)(d)$	3.62		3.62	3.28										
Min. $A_s = (.0025)(96)(d)$		3.96												
Use A_s sq. in.	7.17	11.41	5.38	5.95										
No. of bars	10	15	7	8										

1st Level Floor

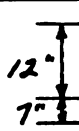
$M_o = 2,140 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	428	1070	321	321	107	268	321	321	685	1176	963	406	353	214
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	3.73	6.42	2.80	3.30	.93	1.61	2.80	3.30	4.66	7.06	5.77	3.54	3.62	2.20
Min. $A_s = (.0025)(138)(d)$	2.28		2.28	1.94	1.14		2.28	1.94	2.28			2.28	1.94	1.94
Min $A_s = (.0025)(96)(d)$		2.31				1.26				2.31	2.31			
Use A_s sq. in	3.73	6.42	2.80	3.30	1.14	1.61	2.80	3.30	4.66	7.06	5.77	3.54	3.62	2.20
No. of bars	9	15	7	8	3	4	7	8	11	16	14	8	9	5

STEEL DESIGN (FS)

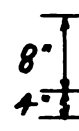
23'-00" x 21'-00"
Roof 23'-00" Length

I

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
$M_o = 7,390 \text{ kip in.}$	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1478	3690	1109	1109										
														
Using 1" ϕ Bars Depth d in. =	10.5	15.5	9.5	9.5										
$A_s = \frac{M}{(20)(.866)(d)} =$	8.12	13.75	6.74	6.74										
Min. $A_s =$ (.0025)(126)(d)	3.31		2.99	2.99										
Min. $A_s =$ (.0025)(96)(d)		3.72												
Use A_s sq. in.	8.12	13.75	6.74	6.74										
No. of bars	11	18	9	9										

1st Level Floor

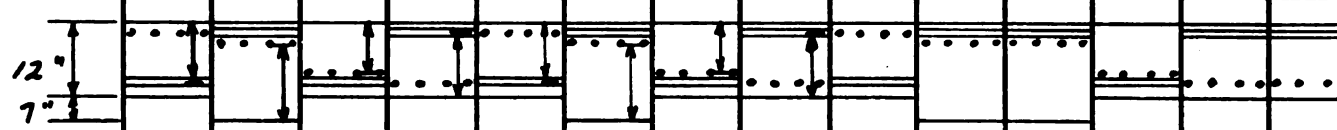
$M_o = 2,420 \text{ kip in.}$

	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	484	1210	363	363	121	303	363	363	605	1331	1089	460	399	242
														
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	4.21	7.88	3.57	3.73	1.07	1.97	3.57	3.73	5.28	8.67	7.09	5.78	4.10	2.49
Min. $A_s =$ (.0025)(126)(d)	2.09		1.85	1.77	1.05		1.85	1.77	2.09			1.85	1.77	1.77
Min $A_s =$ (.0025)(96)(d)		2.13				1.07				2.13	2.13			
Use A_s sq. in	4.21	7.88	3.57	3.73	1.07	1.97	3.57	3.73	5.28	8.67	7.09	5.78	4.10	2.49
No. of bars	10	18	9	9	3	5	9	9	12	20	17	14	10	6

STEEL DESIGN (FS)

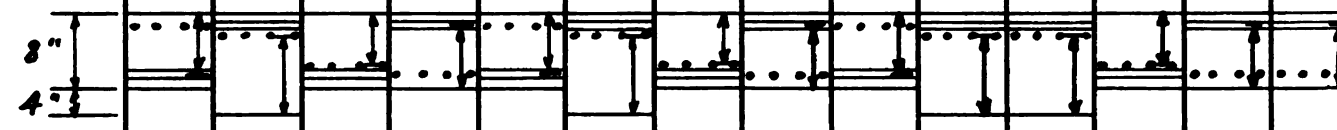
23'-00" x 23'-00"
Roof Long Length (NS)

✓

$M_o = 8,050 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1610	4025	1208	1208	403	1007	1208	1208						
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	9.5	9.5	10.5	15.5	9.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)} =$	8.84	15.00	7.33	7.33	2.22	3.75	7.33	7.33						
Min. $A_s =$ (.0025)(138)(d)	3.62		3.27	3.27	1.81		3.27	3.27						
Min. $A_s =$ (.0025)(96)(d)		3.72				1.86								
Use A_s sq. in.	8.84	15.00	7.33	7.33	2.22	3.75	7.33	7.33						
No. of bars	12	19	10	10	3	5	10	10						

1st Level Floor

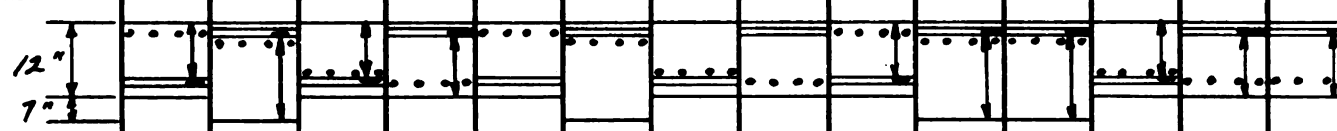
$M_o = 2,640 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	528	1320	396	396	132	330	396	396	660	1451	1189	501	436	264
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	4.60	8.60	3.89	4.06	1.15	2.15	3.89	4.06	5.75	9.44	7.73	4.93	4.48	2.71
Min. $A_s =$ (.0025)(138)(d)	2.29		2.03	1.94	1.15		2.03	1.94	2.29			2.03	1.94	1.94
Min $A_s =$ (.0025)(96)(d)		2.13				1.07				2.13	2.13			
Use A_s sq. in	4.60	8.60	3.89	4.06	1.15	2.15	3.89	4.06	5.75	9.44	7.73	4.93	4.48	2.71
No. of bars	11	20	9	10	3	5	9	10	14	22	18	12	11	7

STEEL DESIGN (FS)

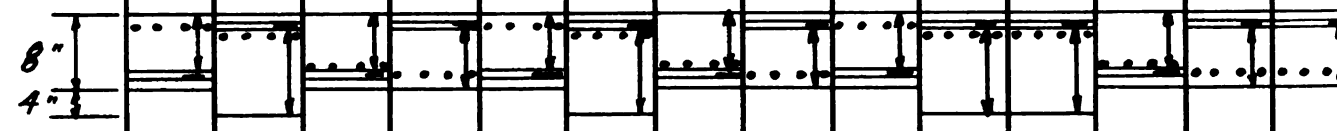
23'-00" x 23'-00"

Roof Short Length (EW)

$M_o = 8,050 \text{ kip in.}$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.*	.*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1610	4025	1208	1208					2010	4430	3620	1530	2050	805
Using 1" ϕ Bars														
Depth d in. =	10.5	16.5	10.5	9.5					10.5	16.5	16.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)}$	8.84	14.10	6.63	7.33					11.05	15.49	12.66	8.42	12.46	4.89
Min. $A_s = (.0025)(138)(d)$	3.62		3.62	3.27					3.62			3.62	3.27	3.27
Min. $A_s = (.0025)(96)(d)$		3.96								3.96	3.96			
Use A_s sq. in.	8.84	14.10	6.63	7.33					11.05	15.49	12.66	8.42	12.46	4.89
No. of bars	12	18	9	10					14	20	16	11	16	7

1st Level Floor

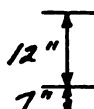
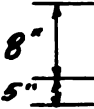
$M_o = 2,640 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.*	.*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	528	1320	396	396	132	330	396	396	660	1451	1189	501	436	264
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	4.60	7.92	3.45	4.06	1.15	1.98	3.45	4.06	5.75	8.71	7.13	4.36	4.48	2.71
Min. $A_s = (.0025)(138)(d)$	2.29		2.29	1.94	1.15		2.29	1.94	2.29			2.29	1.94	1.94
Min $A_s = (.0025)(96)(d)$		2.31				1.12				2.31	2.31			
Use A_s sq. in	4.60	7.92	3.45	4.06	1.15	1.98	3.45	4.06	5.75	8.71	7.13	4.36	4.48	2.71
No. of bars	11	18	8	10	3	5	8	10	14	20	17	10	11	7

STEEL DESIGN (FS)

23'-00" x 23'-06"
 Roof 23'-00" Length

K

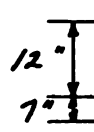
	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 8,240 \text{ kip in.}$					*	*								
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1648	4120			412	1030	1236	1236						
 Using 1" ϕ Bars Depth d in. =	10.5	15.5			10.5	15.5	9.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)} =$	9.07	15.35			2.27	3.84	7.51	7.51						
Min. $A_s =$ (.0025)(141)(d)	3.70				1.85		3.35	3.35						
Min. $A_s =$ (.0025)(96)(d)		3.72				1.86								
Use A_s sq. in.	9.07	15.35			2.27	3.84	7.51	7.51						
No. of bars	12	20			3	5	10	10						
1st Level Floor														
$M_o = 2,700 \text{ kip in.}$														
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	540	1350			135	338	405	405						
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.87			6.62	9.87	5.87	5.62						
$A_s = \frac{M}{(20)(.866)(d)} =$	4.71	7.89			1.18	1.98	3.98	4.16						
Min. $A_s =$ (.0025)(141)(d)	2.33				1.17		2.07	1.98						
Min $A_s =$ (.0025)(96)(d)		2.37				1.18								
Use A_s sq. in	4.71	7.89			1.18	1.98	3.98	4.16						
No. of bars	11	18			3	5	10	10						

STEEL DESIGN (FS)

23'-00" x 23'-06"

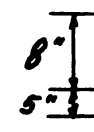
Roof 23'-06" Length

K

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
$M_o = 8,500 \text{ kip in.}$	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1700	4250							2130	4670	3830	1614	1402	850
														
Using 1" ϕ Bars														
Depth d in. =	10.5	16.5							10.5	16.5	16.5	10.5	9.5	9.5
$\frac{M}{(20)(.866)(d)} =$	9.35	14.86							11.71	16.35	13.40	8.89	8.53	5.16
Min. $A_s =$ (.0025)(138)(d)	362								362			362	3.28	3.28
Min. $A_s =$ (.0025)(96)(d)		396								3.96	3.96			
se A_s sq. in.	9.35	14.86							11.71	16.35	13.40	8.89	8.53	5.16
No. of bars	12	19							15	21	17	12	11	7

1st Level Floor

$M_o = 2,780 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	556	1390							695	1530	1251	529	459	278
														
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	10.62							6.62	10.62	10.62	6.62	5.62	5.62
$\frac{M}{(20)(.866)(d)} =$	4.85	7.54							6.06	8.30	6.80	4.61	4.71	2.85
Min. $A_s =$ (.0025)(138)(d)	2.29								2.29			2.29	1.94	1.94
Min $A_s =$ (.0025)(96)(d)		2.55								2.55	2.55			
se A_s sq. in	4.85	7.54							6.06	8.30	6.80	4.61	4.71	2.85
No. of bars	12	18							14	19	16	11	11	7

STEEL DESIGN (FS)

20'-00" x 22'-06"

Roof 22'-06" Length

L

M _o = 6,660 kip in.	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1332	3330	1000	1000	333	833	1000	1000	1665	3670	3000	1265	1099	666
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	10.5	9.5	10.5	15.5	10.5	9.5	10.5	15.5	15.5	10.5	9.5	9.5
A _s = $\frac{M}{(20)(.866)(d)}$	7.33	12.41	5.50	6.08	1.83	3.10	5.50	6.08	9.17	13.66	11.17	7.01	6.68	4.05
Min. A _s = (.0025)(120)(d)	3.15		3.15	2.85	1.59		3.15	2.85	3.15			3.15	2.85	2.85
Min. A _s = (.0025)(96)(d)		3.72				1.86				3.72	3.72			
Use A _s sq. in.	7.33	12.41	5.50	6.08	1.83	3.10	5.50	6.08	9.17	13.66	11.17	7.01	6.68	4.05
No. of bars	10	16	7	8	3	4	7	8	12	18	15	9	9	6

1st Level Floor

M_o = 2,190 kip in.

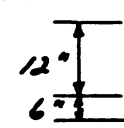
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	438	1095	329	329	110	272	329	329	548	1205	986	416	361	219
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
A _s = $\frac{M}{(20)(.866)(d)}$	3.81	6.57	2.87	3.38	.96	1.63	2.87	3.38	4.78	7.23	5.92	3.63	3.71	2.25
Min. A _s = (.0025)(120)(d)	1.99		1.99	1.69	1.00		1.99	1.69	1.99			1.99	1.69	1.69
Min A _s = (.0025)(96)(d)		2.31				1.15				2.31	2.31			
Use A _s sq. in	3.81	6.57	2.87	3.38	1.00	1.63	2.87	3.38	4.78	7.23	5.92	3.63	3.71	2.25
No. of bars	9	15	7	8	3	4	7	8	11	17	14	9	9	6

STEEL DESIGN (FS)

20'-00" x 22'-06"

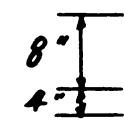
Roof 20'-00" Length

L

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 5,640 \text{ kip in.}$					*	*								
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1128	2820	846	846	282	705	846	846	1410	3100	2540	1071	930	564
 Using 1" ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)}$	6.20	11.24	5.78	5.78	1.55	2.81	5.78	5.78	7.75	12.35	10.11	6.51	5.65	3.43
Min. $A_s = (.0025)(135)(d)$	3.54		3.21	3.21	1.77		3.21	3.21	3.59			3.21	3.21	3.21
Min. $A_s = (.0025)(96)(d)$		3.48				1.74				3.48	3.48			
Use A_s sq. in.	6.20	11.24	5.78	5.78	1.77	2.81	5.78	5.78	7.75	12.35	10.11	6.51	5.65	3.43
No. of bars	8	13	8	8	3	4	8	8	10	16	13	9	8	5

1st Level Floor

$M_o = 1,858 \text{ kip in.}$

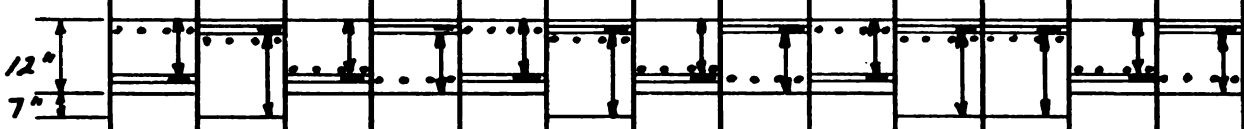
Moment Coeff	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	362	929	279	279	93	232	279	279	465	1021	836	353	307	186
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)}$	3.15	6.04	2.74	2.87	.81	1.51	2.74	2.87	4.06	6.63	5.44	3.47	3.15	1.91
Min. $A_s = (.0025)(135)(d)$	2.23		1.98	1.90	1.12		1.98	1.90	2.23			1.98	1.90	1.90
Min $A_s = (.0025)(96)(d)$		2.13				1.07				2.13	2.13			
Use A_s sq. in	3.15	6.04	2.74	2.87	1.12	1.51	2.74	2.87	4.06	6.63	5.44	3.47	3.15	1.91
No. of bars	8	14	7	7	3	4	7	7	10	16	13	8	8	5

STEEL DESIGN (FS)

20'-00" x 24'-00"

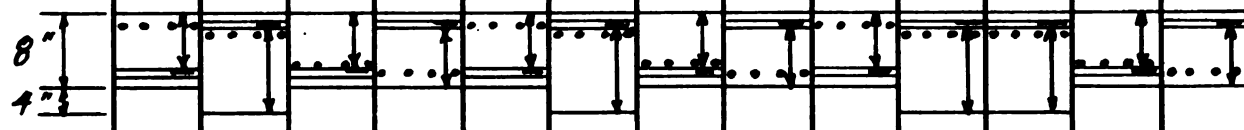
Roof 24'-00" Length

M

M ₀ = 7,760 kip in.	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1552	3880	1164	1164	388	970	1164	1164	1940	4270	3490	1475	1280	776
Using 1" ϕ Bars														
Depth d in. =	10.5	16.5	10.5	9.5	10.5	16.5	10.5	9.5	10.5	16.5	16.5	10.5	9.5	9.5
A _s = $\frac{M}{(20)(.866)(d)}$	8.53	13.58	6.40	7.08	2.13	3.39	6.40	7.08	10.66	14.95	12.20	8.11	7.78	4.72
Min. A _s = $(.0025)(120)(d)$	3.15		3.15	2.85	1.08		3.15	2.85	3.15			3.15	2.85	2.85
Min. A _s = $(.0025)(96)(d)$		3.96				1.98				3.96	3.96			
Use A _s sq. in.	8.53	13.58	6.40	7.08	2.13	3.39	6.40	7.08	10.66	14.95	12.20	8.11	7.78	4.72
No. of bars	11	18	9	9	3	5	9	9	14	19	16	11	10	6

1st Level Floor

M₀ = 2,550 kip in.

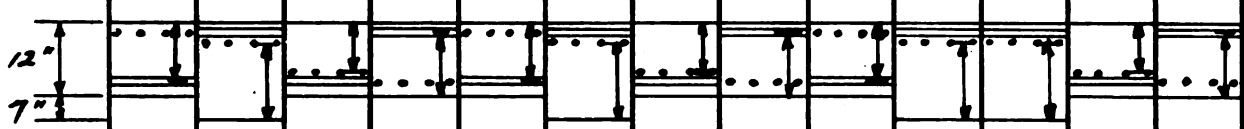
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	510	1275	383	383	128	319	383	383	638	1403	1148	485	421	255
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
A _s = $\frac{M}{(20)(.866)(d)}$	4.45	7.65	3.34	3.93	1.12	1.92	3.34	3.93	5.56	8.42	6.98	4.22	4.32	2.62
Min. A _s = $(.0025)(120)(d)$	1.99		1.99	1.69	1.00		1.99	1.69	1.99			1.99	1.69	1.69
Min A _s = $(.0025)(96)(d)$		2.31				1.16				2.31	2.31			
Use A _s sq. in	4.45	7.65	3.34	3.93	1.12	1.92	3.34	3.93	5.56	8.42	6.98	4.22	4.32	2.62
No. of bars	11	18	8	9	3	5	8	9	13	20	16	10	10	6

STEEL DESIGN (FS)

20'-00" x 24'-00"

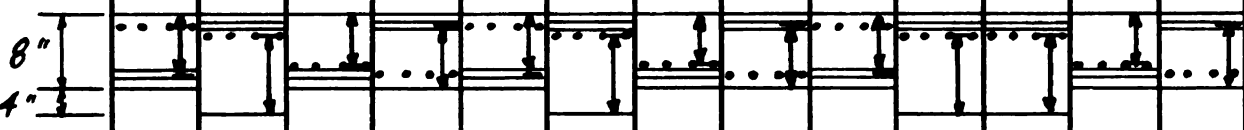
Roof 20'-00" Length

M

M ₀ = 6,040 kip-in	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1208	3020	906	906	302	755	906	906	1511	3320	2720	1148	997	604
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5	9.5	9.5	10.5	15.5	9.5	9.5	10.5	15.5	15.5	9.5	9.5	9.5
A _s = $\frac{M}{(20)(.866)(d)}$	6.63	11.25	5.51	5.51	1.65	2.81	5.51	5.51	8.31	12.37	10.12	6.98	6.06	3.67
Min. A _s = (.0025)(144)(d)	3.99		3.61	3.61	2.00		3.61	3.61	3.99			3.61	3.61	3.61
Min. A _s = (.0025)(96)(d)		3.72				1.86				3.72	3.72			
Use A _s sq. in.	6.63	11.25	5.51	5.51	2.00	2.81	5.51	5.51	8.31	12.37	10.12	6.98	6.06	3.67
No. of bars	9	15	7	7	3	4	7	7	11	16	13	9	8	5

1st Level Floor

M₀ = 1,980 kip-in.

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	396	990	297	297	99	248	297	297	495	1089	891	376	327	198
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
A _s = $\frac{M}{(20)(.866)(d)}$	3.45	6.44	2.92	3.05	.86	1.62	2.92	3.05	4.31	7.08	5.80	3.70	3.36	2.03
Min. A _s = (.0025)(144)(d)	2.52		2.23	2.14	1.26		2.23	2.14	2.52			2.23	2.14	2.14
Min A _s = (.0025)(96)(d)		2.13				1.07				2.13	2.13			
Use A _s sq. in	3.45	6.44	2.92	3.05	1.26	1.62	2.92	3.05	4.31	7.08	5.80	3.70	3.36	2.14
No. of bars	8	15	7	7	3	4	7	7	10	17	14	9	8	5

[illegible]

STEEL DESIGN (FS)

22'-06" x 21'-00"

Roof 22'-06" Length

N

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
$M_o =$	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*	*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips														
Using 1" ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)}$														
Min. $A_s =$ (.0025)() (d)														
Min. $A_s =$ (.0025)(96)(d)														
Use A_s sq. in.														
No. of bars														

1st Level Floor

$M_o = 2,300$ kip in.

Moment Coeff	.20	.50	.15	.15	*	*	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	460	1150	345	345	115	287	345	345	575	1265	1035	436	579	230
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.87	5.87	5.62	6.62	9.87	5.87	5.62	6.62	9.87	9.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	4.01	6.73	3.39	3.55	1.00	1.68	3.39	3.55	5.01	7.40	6.05	4.29	3.89	2.36
Min. $A_s =$ (.0025)(126)(d)	2.09		1.85	1.77	1.05		1.85	1.77	2.09			1.85	1.77	1.77
Min $A_s =$ (.0025)(96)(d)		2.37				1.19				2.37	2.37			
Use A_s sq. in	4.01	6.73	3.39	3.55	1.05	1.68	3.39	3.55	5.01	7.40	6.05	4.29	3.89	2.36
No. of bars	10	16	8	9	3	4	8	9	12	17	14	10	9	6

STEEL DESIGN (FS)

22'-06" x 22'-06"

Roof Short Length running EW

P

$M_o =$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips														
Using 1" ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)} =$														
Min. $A_s =$ (.0025)() (d)														
Min. $A_s =$ (.0025)(96)(d)														
Use A_s sq. in.														
No. of bars														

1st Level Floor

$M_o = 2,460 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	492	1230			123	307	369	369	615	1352	1107	467	406	246
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	10.62			6.62	10.62	6.62	5.62	6.62	10.62	10.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	4.29	6.68			1.07	1.67	3.21	3.79	5.36	7.34	6.01	4.07	4.17	2.53
Min. $A_s =$ (.0025)(135)(d)	2.23				1.12		2.23	1.90	2.23			2.23	1.90	1.90
Min $A_s =$ (.0025)(96)(d)		2.55				1.28				2.55	2.55			
Use A_s sq. in	4.29	6.68			1.12	1.67	3.21	3.79	5.36	7.34	6.01	4.07	4.17	2.53
No. of bars	10	16			3	4	8	9	13	17	14	10	10	6

STEEL DESIGN (FS)

22'-06" x 23'-00"

Roof 23'-00" Length

0

M _o =	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips														
Using 1" ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)} =$														
Min. A _s = (.0025)() (d)														
Min. A _s = (.0025)(96)(d)														
Use A _s sq. in.														
No. of bars														

1st Level Floor

M_o = 2,580 kip in.

Moment Coeff	.20	.50	.15	.15	*.05	*.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	512	1290			129	323	387	387						
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	10.62			6.62	10.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)} =$	4.47	7.00			1.12	1.76	3.37	3.97						
Min. A _s = (.0025)(135)(d)	2.23				1.12		2.23	1.90						
Min A _s = (.0025)(96)(d)		2.55				1.28								
Use A _s sq. in	4.47	7.00			1.12	1.76	3.37	3.97						
No. of bars	11	16			3	4	8	10						

STEEL DESIGN (FS)

22'-06" x 22'-06"

Roof Long Length running NS

P

$M_o =$	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips														
Using 1" ϕ Bars Depth d in. =														
$A_s = \frac{M}{(20)(.866)(d)}$														
Min. $A_s =$ (.0025)() (d)														
Min. $A_s =$ (.0025)(96)(d)														
Use A_s sq. in.														
No. of bars														

1st Level Floor

$M_o = 2,460$ kip in.

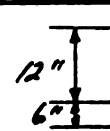
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	492	1230			123	307	369	369	615	1352	1107	467	406	246
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.87			6.62	9.87	5.87	5.62	6.62	9.87	9.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)}$	4.29	7.19			1.07	1.80	3.63	3.79	5.36	7.90	6.47	4.59	4.17	2.53
Min. $A_s =$ (.0025)(/35)(d)	2.23				1.12		1.98	1.90	2.23			1.98	1.90	1.90
Min $A_s =$ (.0025)(96)(d)		2.37				1.59				1.59	1.59			
Use A_s sq. in	4.29	7.19			1.12	1.80	3.63	3.79	5.36	7.90	6.47	4.59	4.17	2.53
No. of bars	10	17			3	5	9	9	13	18	15	11	10	6

STEEL DESIGN (FS)

20'-06" x 21'-00"

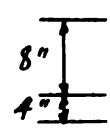
Roof *21'-00" Length*

Q

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 5,810 \text{ kip in.}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1162	2905	871	871										
 Using 1" ϕ Bars Depth d in. =	10.5	15.5	10.5	9.5										
$A_s = \frac{M}{(20)(.866)(d)} =$	6.39	10.81	4.79	5.30										
Min. $A_s = (.0025)(123)(d)$	3.23		3.23	2.92										
Min. $A_s = (.0025)(96)(d)$		3.72												
Use A_s sq. in.	6.39	10.81	4.79	5.30										
No. of bars	9	14	7	7										

1st Level Floor

$M_o = 1,904 \text{ kip in.}$

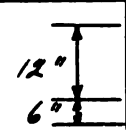
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	381	952	285	285	95	238	285	285						
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62						
$A_s = \frac{M}{(20)(.866)(d)} =$	3.32	5.71	2.49	2.93	.83	1.43	2.49	2.93						
Min. $A_s = (.0025)(123)(d)$	2.03		2.03	1.73	1.02		2.03	1.73						
Min $A_s = (.0025)(96)(d)$		2.31				1.16								
Use A_s sq. in	3.32	5.71	2.49	2.93	1.02	1.43	2.49	2.93						
No. of bars	8	13	6	7	3	4	6	7						

STEEL DESIGN (FS)

20'-06" x 21'-00"

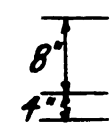
Roof 20'-06" Length

Q

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 5,610 \text{ kip in.}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1122	2805	842	842										
 Using 1" ϕ Bars Depth d in. =	10.5	14.5	9.5	9.5										
$A_s = \frac{M}{(20)(.866)(d)} =$	6.18	11.17	5.71	5.71										
Min. $A_s =$ (.0025)(126)(d)	3.31		2.99	2.99										
Min. $A_s =$ (.0025)(96)(d)		3.48												
Use A_s sq. in.	6.18	11.17	5.71	5.71										
No. of bars	8	15	8	8										

1st Level Floor

$M_o = 1,839 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	368	920	276	276					460	1011	827	349	303	184
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	8.87	5.87	5.62					6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	3.21	5.70	2.71	2.83					4.01	6.59	5.38	3.43	3.13	1.89
Min. $A_s =$ (.0025)(126)(d)	2.09		1.85	1.77					2.09			1.85	1.77	1.77
Min $A_s =$ (.0025)(96)(d)		1.37								1.37	1.37			
Use A_s sq. in	3.21	5.70	2.71	2.83					4.01	6.59	5.38	3.43	3.13	1.89
No. of bars	8	13	7	7					10	15	13	8	8	5

STEEL DESIGN (FS)

20'-06" x 23'-00"
Roof 23'-00" Length

R

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 7,210 \text{ kip in.}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1442	3605	1081	1081					1802	3970	3250	1370	1190	721
Using 1" ϕ Bars Depth d in. =	10.5	15.5	10.5	9.5					10.5	15.5	15.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$	7.93	13.42	5.95	6.57					9.91	14.79	12.09	7.53	7.23	4.38
Min. $A_s =$ (.0025)(123)(d)	3.23		3.23	2.92					3.23			3.23	2.92	2.92
Min. $A_s =$ (.0025)(96)(d)		3.72								3.72	3.72			
Use A_s sq. in.	7.93	13.42	5.95	6.57					9.91	14.79	12.09	7.53	7.23	4.38
No. of bars	11	17	8	9					13	19	16	10	10	6

1st Level Floor

$M_o = 2,360 \text{ kip in.}$

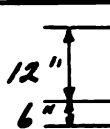
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	472	1180	354	354	118	295	354	354	590	1299	1061	448	389	236
Using $\frac{3}{4}$ " ϕ Bars Depth d in. =	6.62	9.62	6.62	5.62	6.62	9.62	6.62	5.62	6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	4.11	7.09	3.08	3.63	1.03	1.77	3.08	3.63	5.15	7.80	6.38	4.26	3.99	2.43
Min. $A_s =$ (.0025)(123)(d)	2.03		2.03	1.73	1.02		2.03	1.73	2.03			2.03	1.73	1.73
Min $A_s =$ (.0025)(96)(d)		2.31				1.16				2.31	2.31			
Use A_s sq. in	4.11	7.09	3.08	3.63	1.03	1.77	3.08	3.63	5.15	7.80	6.38	4.26	3.99	2.43
No. of bars	10	17	7	9	3	4	7	9	12	18	15	10	10	6

STEEL DESIGN (FS)

20'-06" x 23'-00"

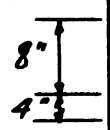
Roof 20'-06" Length

R

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
$M_o = 6,140 \text{ kip in.}$	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1228	3070	921	921	307	768	921	921						
														
Using 1" ϕ Bars														
Depth d in. =	10.5	14.5	9.5	9.5	10.5	14.5	9.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)} =$	6.75	12.22	5.60	5.60	1.69	3.06	5.60	5.60						
Min. $A_s =$ (.0025)(138)(d)	3.62		3.28	3.28	1.81		3.28	3.28						
Min. $A_s =$ (.0025)(96)(d)		3.48				1.74								
Use A_s sq. in.	6.75	12.22	5.60	5.60	1.81	3.06	5.60	5.60						
No. of bars	9	16	8	8	3	4	8	8						

1st Level Floor

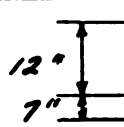
$M_o = 2,010 \text{ kip in.}$

	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment Coeff														
Moment in. kips	402	1005	301	301	101	251	301	301	503	1107	904	382	332	201
														
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87	5.87	5.62	6.62	8.87	5.87	5.62	6.62	8.87	8.87	5.87	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$	3.51	6.55	2.96	3.09	.88	1.78	2.96	3.09	4.38	7.20	5.88	3.75	3.41	2.06
Min. $A_s =$ (.0025)(138)(d)	2.31		2.05	1.96	1.16		2.05	1.96	2.31			2.05	1.96	1.96
Min $A_s =$ (.0025)(96)(d)		2.13				1.07				2.13	2.13			
Use A_s sq. in	3.51	6.55	2.96	3.09	1.16	1.78	2.96	3.09	4.38	7.20	5.88	3.75	3.41	2.06
No. of bars	8	15	7	8	3	5	7	8	10	17	14	9	8	5

STEEL DESIGN (FS)

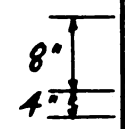
20'-06" x 23'-06"
Roof 23'-06" Length

5

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 7580 \text{ kip in.}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips									1895	4170	3410	1440	1250	758
 Using 1" ϕ Bars Depth d in. =									10.5	16.5	16.5	10.5	9.5	9.5
$A_s = \frac{M}{(20)(.866)(d)} =$									10.41	14.60	11.93	7.93	7.60	4.61
Min. $A_s = (.0025)(123)(d)$									3.23			3.23	2.92	2.92
Min. $A_s = (.0025)(96)(d)$										3.96	3.96			
Use A_s sq. in.									10.41	14.60	11.93	7.93	7.60	4.61
No. of bars									14	19	16	11	10	6

1st Level Floor

$M_o = 2,480 \text{ kip in.}$

Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips									620	1364	1116	471	409	248
 Using $\frac{3}{4}$ " ϕ Bars Depth d in. =									6.62	9.62	9.62	6.62	5.62	5.62
$A_s = \frac{M}{(20)(.866)(d)} =$									5.41	8.19	6.70	4.11	4.20	2.55
Min. $A_s = (.0025)(123)(d)$									2.04			2.04	1.73	1.73
Min $A_s = (.0025)(96)(d)$										2.31	2.31			
Use A_s sq. in									5.41	8.19	6.70	4.11	4.20	2.55
No. of bars									13	19	16	10	10	6

STEEL DESIGN (FS)

20'-06" x 23'-06"
Roof 20'-06" Length

5

	Interior Panel				Exterior Panel, Steel Parallel to disc. edge				Exterior Panel, Steel Perpendicular to disc. edge					
	Column Strip		Mid Strip		Column Strip		Mid Strip		Column Strip			Mid Strip		
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Int Neg	Ext Neg	Pos	Int Neg	Ext Neg
$M_o = 6,260 \text{ kip in}$														
Moment Coeff.	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	1252	3130			313	782	939	939						
Using 1" ϕ Bars														
Depth d in. =	10.5	15.5			10.5	15.5	9.5	9.5						
$A_s = \frac{M}{(20)(.866)(d)}$	6.89	11.67			1.72	2.91	5.71	5.71						
Min. $A_s = (.0025)(1/4)(d)$	3.70				1.85		3.35	3.35						
Min. $A_s = (.0025)(96)(d)$		3.72				1.86								
Use A_s sq. in.	6.89	11.67			1.85	2.91	5.71	5.71						
No. of bars	9	14			3	4	8	8						

1st Level Floor

$M_o = 2,050 \text{ kip in.}$

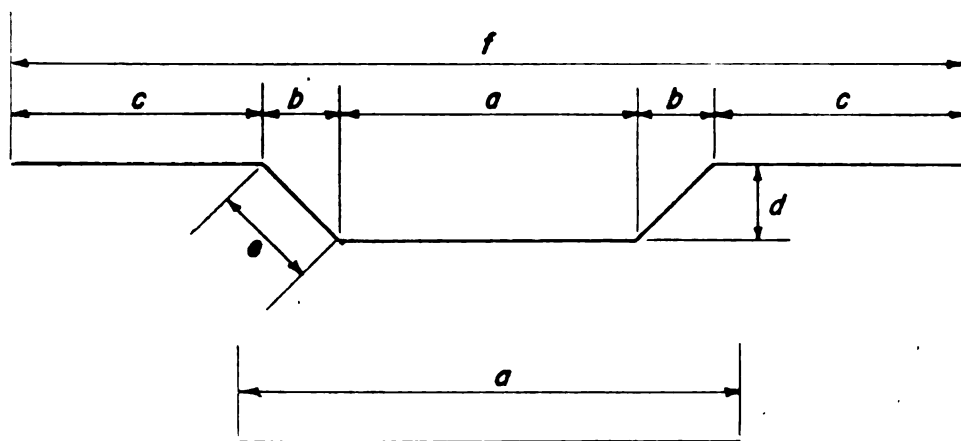
Moment Coeff	.20	.50	.15	.15	.05	.125	.15	.15	.25	.55	.45	.19	.165	.10
Moment in. kips	410	1025			103	256	307	307						
Using $\frac{3}{4}$ " ϕ Bars														
Depth d in. =	6.62	8.87			6.62	8.87	5.87	5.62						
$A_s = \frac{M}{(20)(.866)(d)}$	3.57	6.68			.90	1.67	3.02	3.15						
Min. $A_s = (.0025)(1/4)(d)$	2.33				1.17		2.07	1.98						
Min $A_s = (.0025)(96)(d)$		2.13				1.07								
Use A_s sq. in	3.57	6.68			1.17	1.67	3.02	3.15						
No. of bars	9	16			3	4	7	8						

EXPLANATION OF "BAR DIMENSION" TABLES

These tables give the bar dimensions for all bars used in each panel. The first column refers to the panel number, A1, etc. The second column gives the length, ("L" for long, and "S" for short). If the panel is square the length is designated by the direction. The third column refers to the strip in which the bar is located, ("C" for column strip, and "M" for mid strip), and the "Bar No." column gives the bar type number. An "E" before the number indicates it is an exterior panel bar, while an "I" indicates it is an interior panel bar.

The bar length column gives the total length of unbent bar which must be used to obtain the dimensions required. The dimensions of the bar, "a to g", are shown on the Bar Type Sheets, (Plate No. 3), and the data by which these dimensions were obtained is shown on the Bar Dimension Sheets, (Plate No. 4).

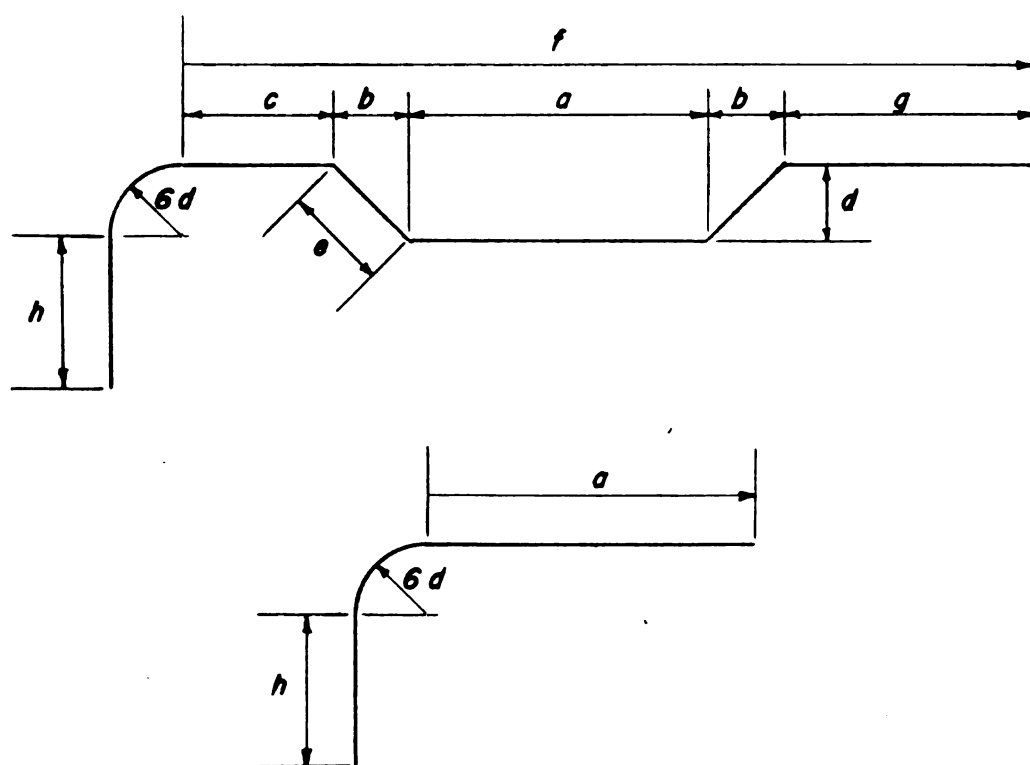
The data for dimensioning the bars was taken from the 1928 (A.C.I.) Joint Standard Building Code, sections 1007, 1008, and 1009.



Bar 1

Bar 2

*Interior Type
Bars*



Bar 3

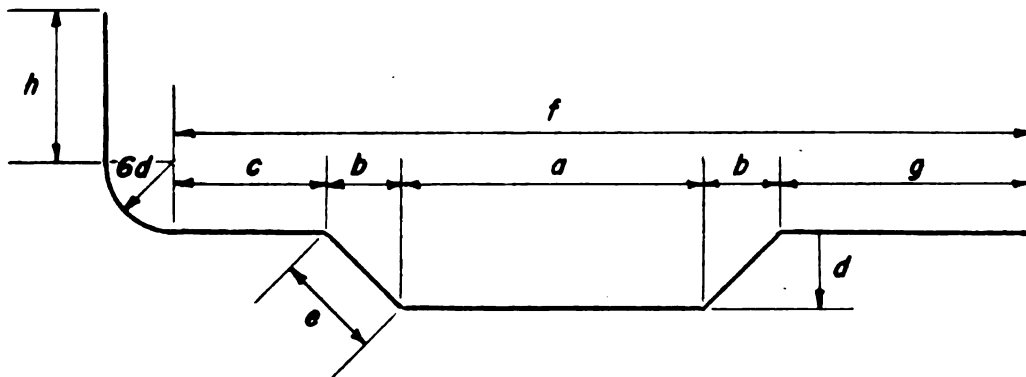
Bar 4

*Exterior Type
Bars*

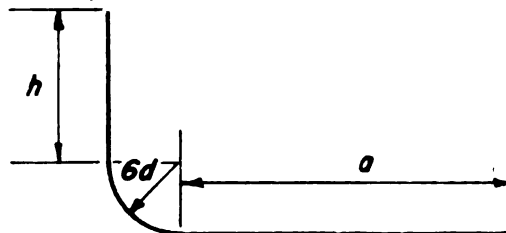
*Plate No. 3
BAR TYPE
SHEET (FS)*

*Scale - None Ralph J.
Stephenson*

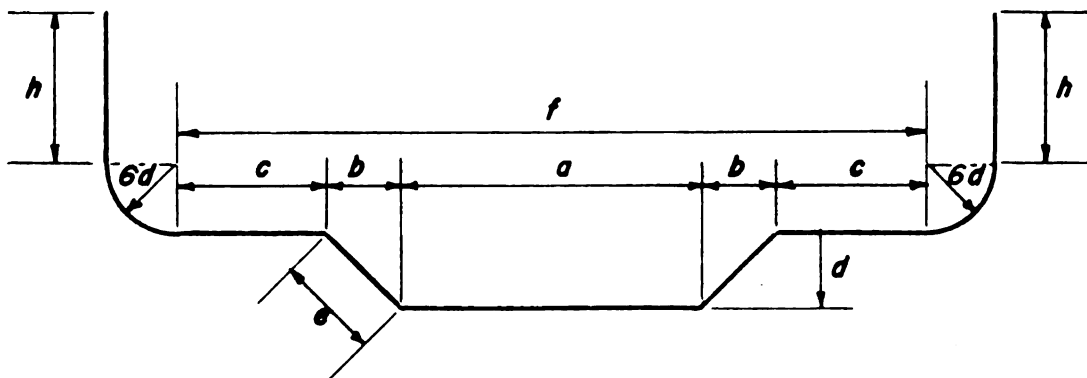
Sheet 1 of 2 Sheets



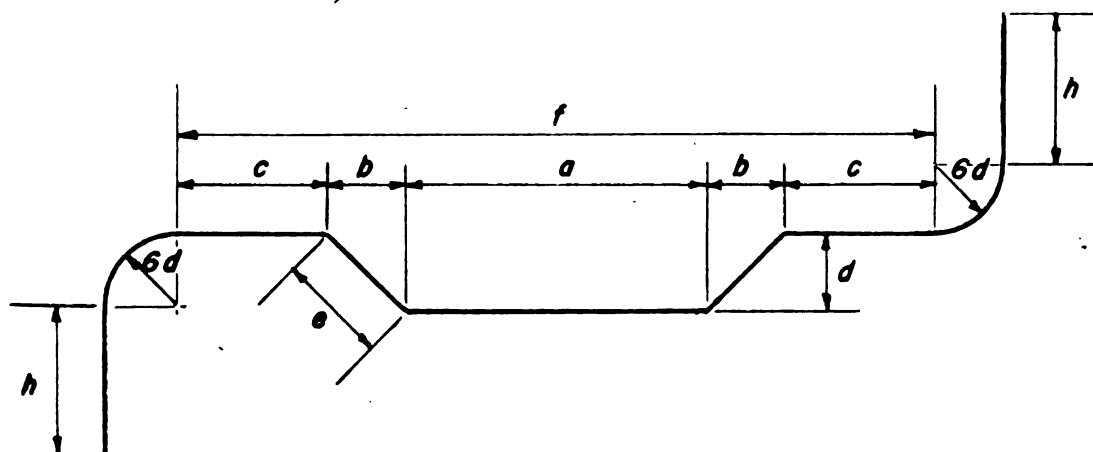
Bar 5



Bar 6



Bar 7



Bar 8

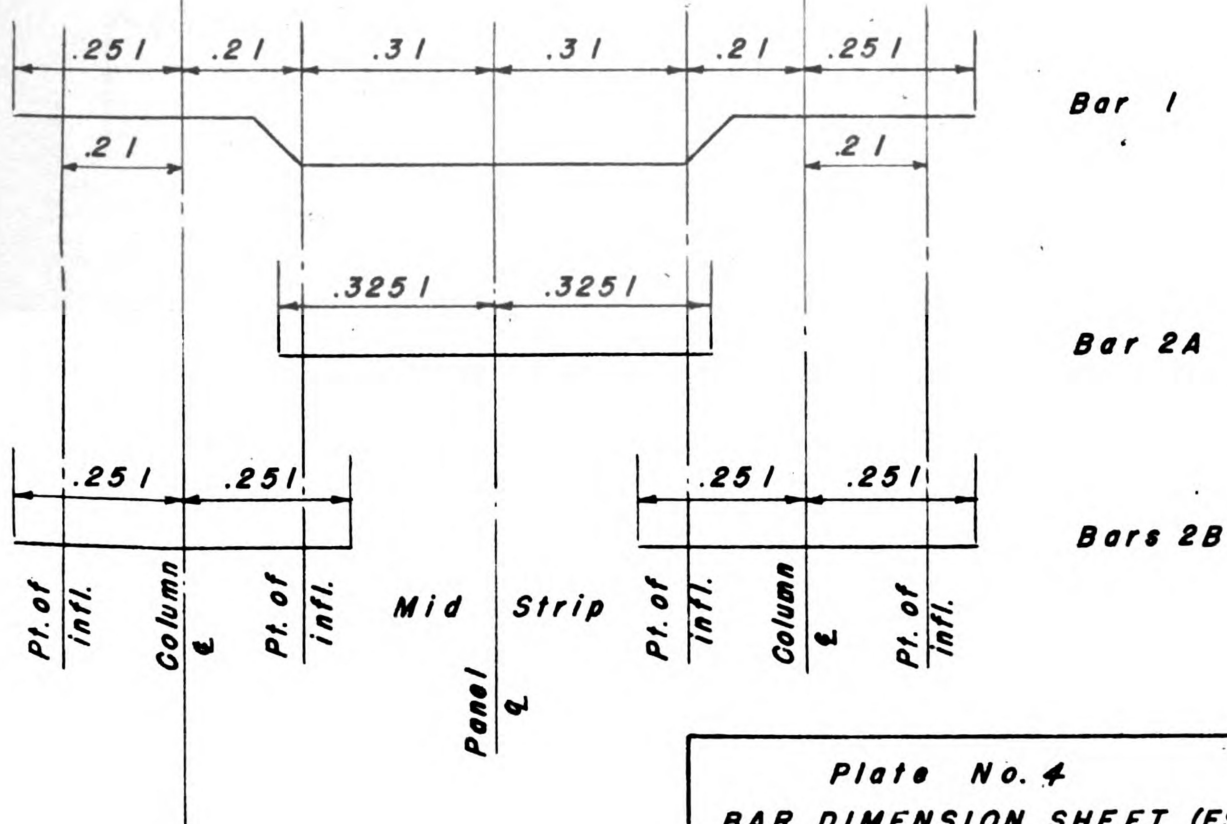
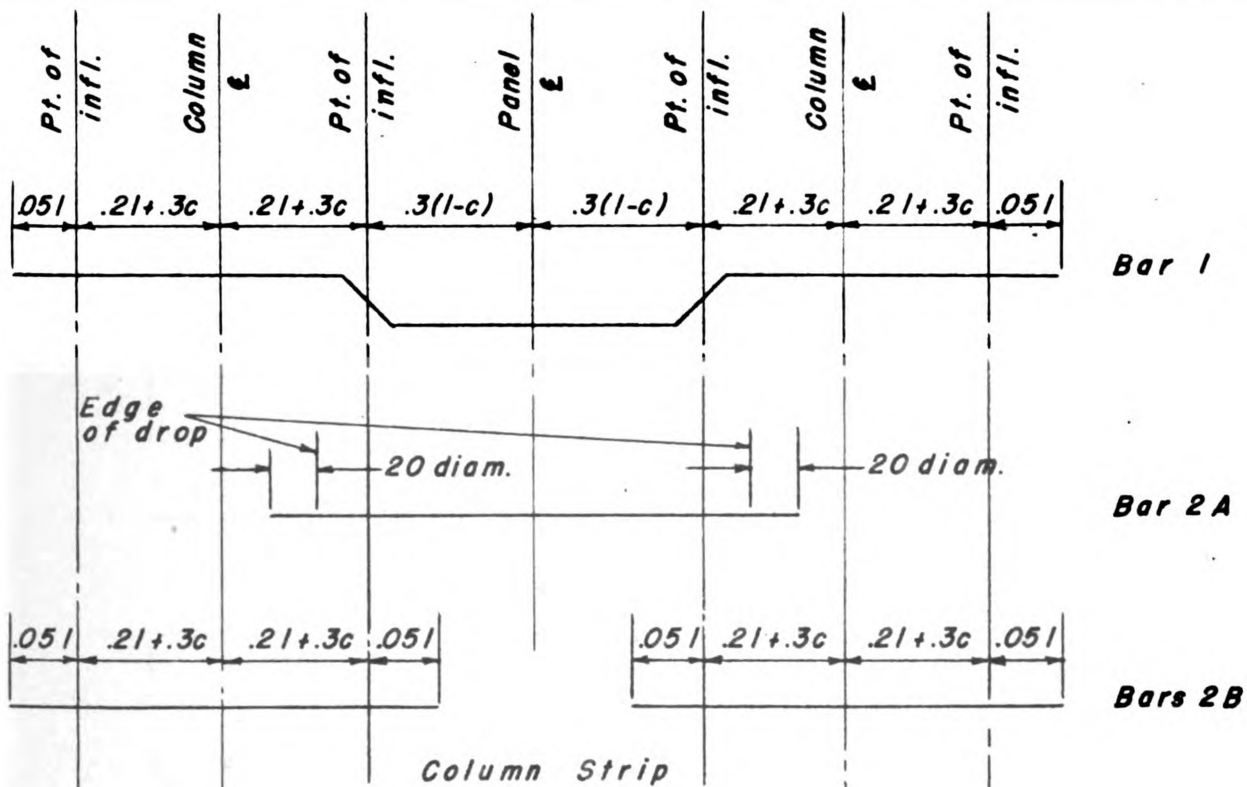
*Exterior Type
Bars*

*Plate No. 3
BAR TYPE SHEET
(FS)*

Scale - None

*Ralph J.
Stephenson*

Sheet 2 of 2 sheets



$l = \text{length of panel}$

Plate No. 4
BAR DIMENSION SHEET (FS)
INTERIOR PANEL BARS

Scale - None

Ralph J.
Stephenson

Sheet 1 of 4 sheets

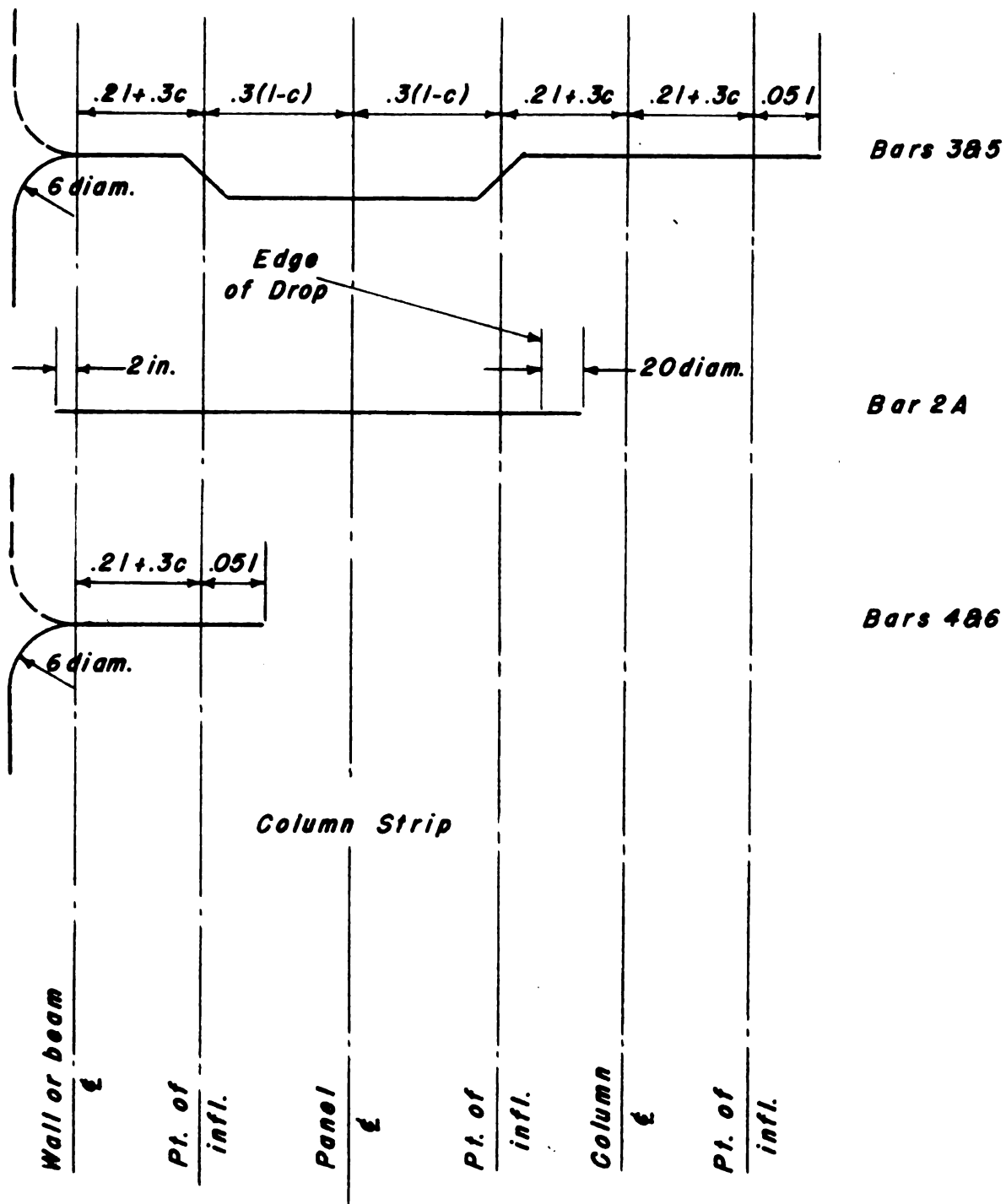


Plate No. 4
 BAR DIMENSION SHEET (FS)
 EXTERIOR PANEL BARS

Scale - None

Ralph J.
 Stephenson

Sheet 2 of 4 sheets

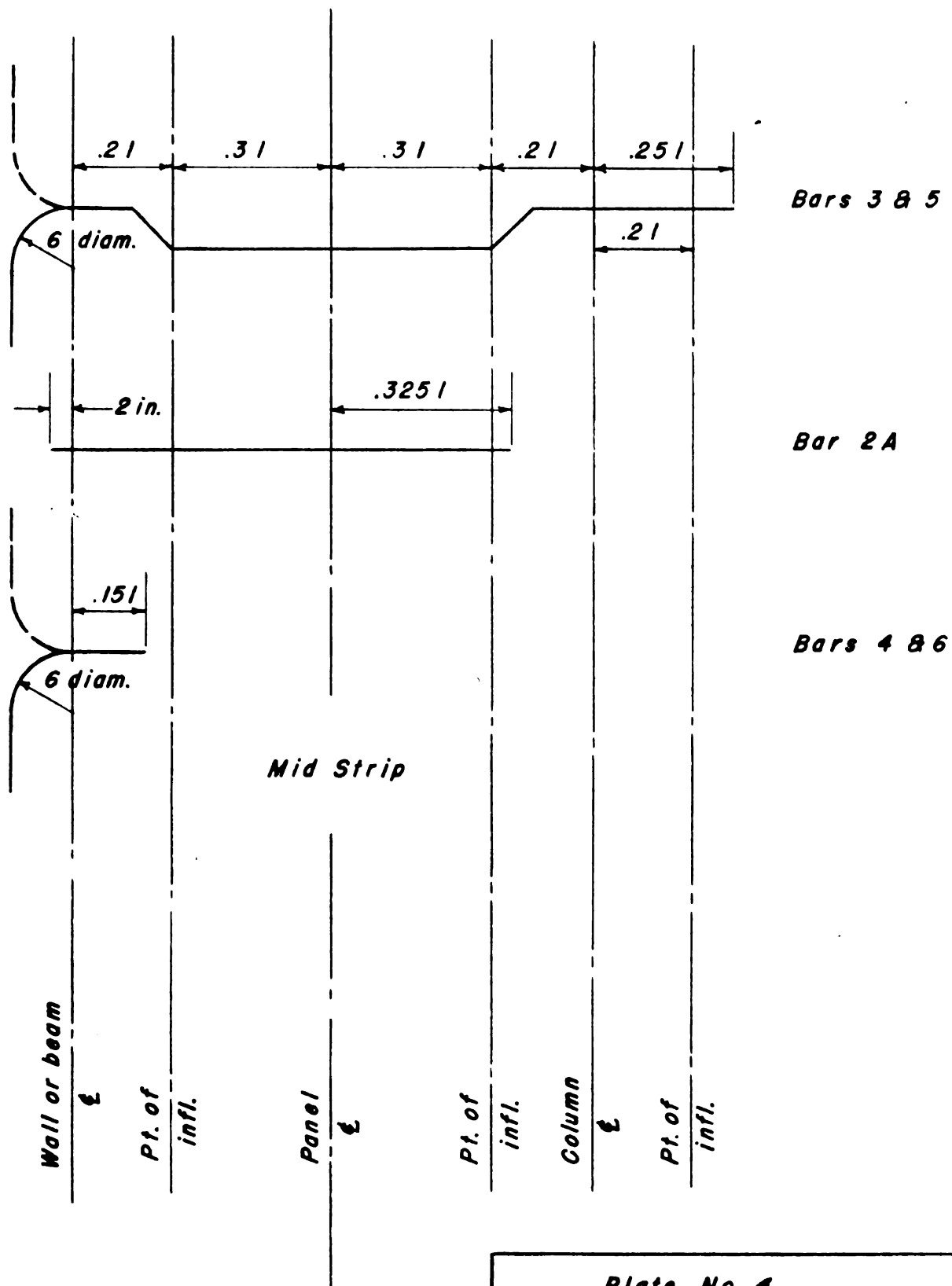


Plate No. 4
 BAR DIMENSION SHEET (FS)
 EXTERIOR PANEL BARS

Scale - None

Ralph J.
 Stephenson

Sheet 3 of 4 sheets

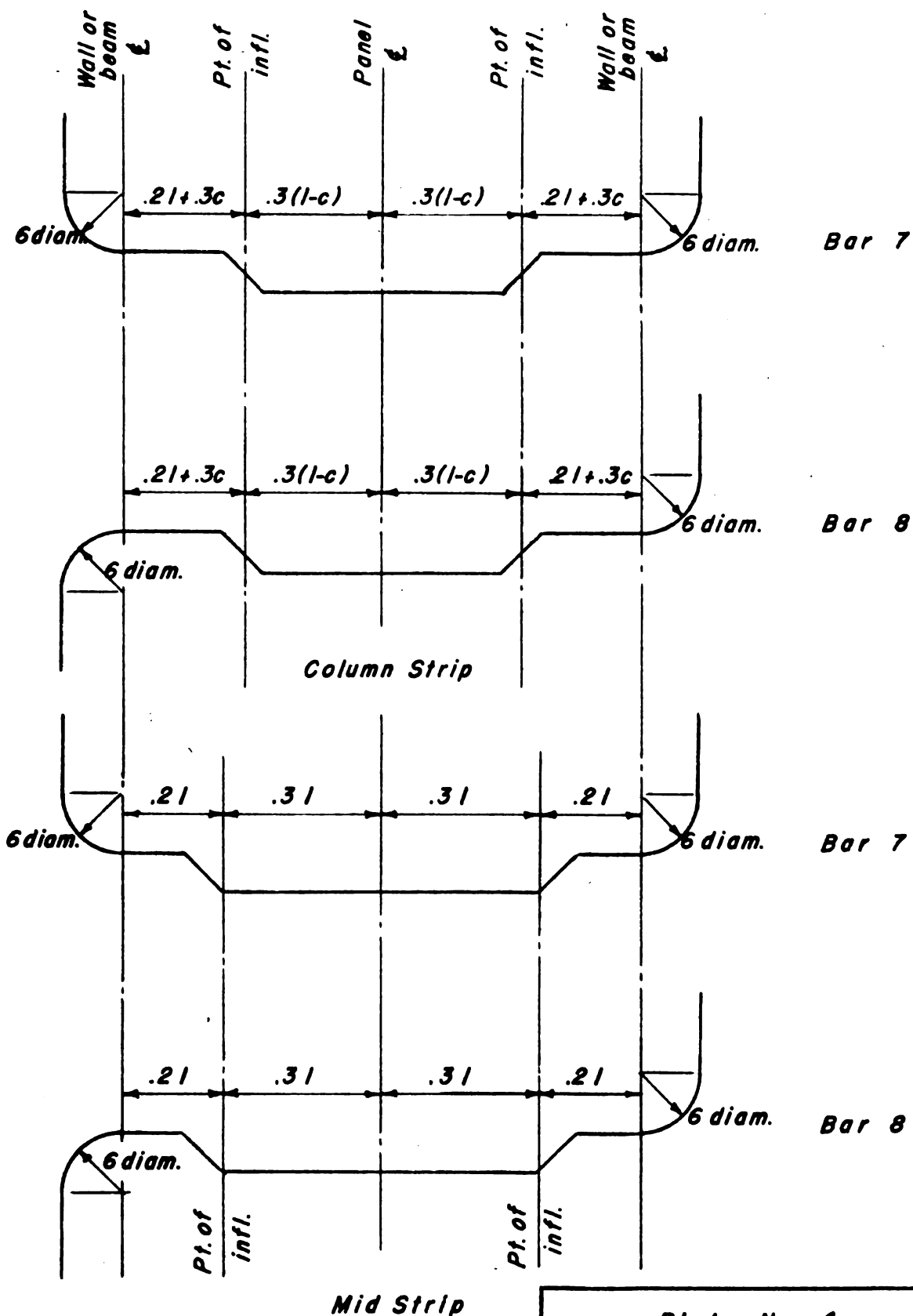


Plate No. 4
 BAR DIMENSION SHEET (FS)
 EXTERIOR PANEL BARS

Scale - None

Ralph J.
 Stephenson

Sheet 4 of 4 sheets

(FS)

18'-00" x 21'-00"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
A1	L	C	I1	36'-6"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-11 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-11 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
		M	I1	33'-3 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-4 $\frac{7}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-9"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-9"	11'-9"							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{8}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
A2	L	C	I1	36'-3"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-9 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-8 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'- $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-3 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-6"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
	S	Same as A1			S							
A3	L	C	I1	36'-3"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-9 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-8 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'- $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-3 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-6"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
	S	Same as A1			S							
A4	L	Same as A2			L							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			E2A	15'-10"	15'-10"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{8}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							

(FS)

18'-00" x 21'-00"

Roof

[illegible]

(FS)

18'-00" x 23'-00"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
B1	L	C	I1	37'-3"	9'-11 $\frac{1}{4}$ "	0'-8"	12'-8 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	36'-8 $\frac{3}{8}$ "		
			I2A	18'-4"	18'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	34'-5 $\frac{5}{8}$ "	13'-9 $\frac{5}{8}$ "	0'-8"	9'-2 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	33'-6"		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	11'-6"	11'-6"							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{2}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
B2	L	Same as	B1	L								
	S	C	I1	31'-11 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-7 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-5 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-5 $\frac{3}{8}$ "	13'-5 $\frac{3}{8}$ "							
		M	I1	28'-8 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'-1 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-3"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-3"	10'-3"							
B3	L	Same as	B1	L								
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{2}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			E2A	15'-10"	15'-10"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							
B4	L	Same as	B1	L								
	S	C	I1	31'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-6 $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							

(FS)

18'-00" x 23'-06"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
C1	L	C	I1	39'-3"	10'-2 $\frac{3}{4}$ "	0'-8"	13'-6 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	38'-8 $\frac{3}{8}$ "		
			I2A	18'-10"	18'-10"							
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	I1	36'- $\frac{5}{8}$ "	14'-1 $\frac{1}{4}$ "	0'-8"	10'- $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-6"		
			I2A	15'-3 $\frac{1}{4}$ "	15'-3 $\frac{1}{4}$ "							
			I2B	12'-0"	12'-0"							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
C2	L	C	E3	34'-3 $\frac{3}{8}$ "	10'-2 $\frac{3}{4}$ "	0'-8"	5'-11 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	31'-1 $\frac{1}{4}$ "	13'-6 $\frac{3}{4}$ "	1'-10 $\frac{1}{4}$ "
			E2A	21'-4"	21'-4"							
			E4	10'-1 $\frac{1}{4}$ "	7'-7 $\frac{5}{8}$ "							1'-10 $\frac{1}{4}$ "
			I2B	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
		M	E3	32'-8 $\frac{1}{4}$ "	14'-1 $\frac{1}{4}$ "	0'-8"	4'- $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	29'-6"	10'- $\frac{3}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	19'-6 $\frac{5}{8}$ "	19'-6 $\frac{5}{8}$ "							
	S	C	E4	6'-1 $\frac{7}{8}$ "	3'-6 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	11'-9"	11'-9"							
			I1	31'-11 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-7 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-5 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-5 $\frac{3}{8}$ "	13'-5 $\frac{3}{8}$ "							
		M	I1	28'-8 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'-1 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-3"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-3"	10'-3"							
C3	L	Same as C1		L								
	S	C	I1	31'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-6 $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							

(FS)

18'-00" x 24'-00"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
D1	L	C	E3	34'-9 $\frac{3}{8}$ "	10'-6 $\frac{3}{8}$ "	0'-8"	6'- $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	31'-7 $\frac{1}{4}$ "	13'-8"	1'-10 $\frac{1}{4}$ "
			E2A	21'-10"	21'-10"							
			E4	10'-2 $\frac{3}{4}$ "	7'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	E3	33'-2 $\frac{1}{4}$ "	14'-4 $\frac{3}{4}$ "	0'-8"	4'-1 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	30'-0"	10'-1 $\frac{5}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	19'-11 $\frac{5}{8}$ "	19'-11 $\frac{5}{8}$ "							
			E4	6'-2 $\frac{3}{4}$ "	3'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	12'-0"	12'-0"							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
D2	L	Same as D1 L										
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			E2A	15'-10"	15'-10"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			E2A	14'-6 $\frac{3}{4}$ "	14'-6 $\frac{3}{4}$ "							
			I2B	9'-0"	9'-0"							
D3	L	C	I1	39'-9"	10'-6 $\frac{3}{8}$ "	0'-8"	13'-8"	0'-8"	0'-11 $\frac{1}{4}$ "	39'-2 $\frac{3}{8}$ "		
			I2A	19'-4"	19'-4"							
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	I1	36'-6 $\frac{5}{8}$ "	14'-4 $\frac{3}{4}$ "	0'-8"	10'-1 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	36'-0"		
			I2A	15'-7 $\frac{1}{4}$ "	15'-7 $\frac{1}{4}$ "							
			I2B	12'-0"	12'-0"							
	S	Same as D1 S										
D4	L	Same as D1 L										
	S	Same as D1 S										
D5	L	C	E5	34'-9 $\frac{3}{8}$ "	10'-6 $\frac{3}{8}$ "	0'-8"	6'- $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	31'-7 $\frac{1}{4}$ "	13'-8"	1'-10 $\frac{1}{4}$ "
			E2A	21'-10"	21'-10"							
			E6	10'-2 $\frac{3}{4}$ "	7'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							

(FS)

18'-00" x 24'-00"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
D5	L	M	E5	33'-2 $\frac{1}{4}$ "	14'-4 $\frac{3}{4}$ "	0'-8"	4'-1 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	30'-0"	10'-1 $\frac{5}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	19'-11 $\frac{5}{8}$ "	19'-11 $\frac{5}{8}$ "							
			E6	6'-2 $\frac{3}{4}$ "	3'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	12'-0"	12'-0"							
	S	C	I1	31'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-6 $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							
D6	L	Same as	D3	L								
	S	Same as	D5	S								
D7	L	Same as	D5	L								
	S	Same as	D1	S								
D8	L	Same as	D5	L								
	S	Same as	D5	S								
D9	L	Same as	D5	L								
	S	C	E5	27'-2 $\frac{5}{8}$ "	7'- $\frac{1}{4}$ "	0'-7"	4'-10 $\frac{7}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	24'-1 $\frac{1}{4}$ "	11'- $\frac{1}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	15'-10"	15'-10"							
			E6	8'-8 $\frac{3}{4}$ "	6'-1 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	E5	25'-7 $\frac{3}{8}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	3'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	22'-6"	7'-6 $\frac{1}{4}$ "	1'-10 $\frac{1}{4}$ "
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			E6	5'-4"	2'-8 $\frac{3}{8}$ "							1'-10 $\frac{1}{4}$ "
			I2B	9'-0"	9'-0"							
D10	L	Same as	D1	L								
	S	C	E3	27'-2 $\frac{5}{8}$ "	7'- $\frac{1}{4}$ "	0'-7"	4'-10 $\frac{7}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	24'-1 $\frac{1}{4}$ "	11'- $\frac{1}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	15'-10"	15'-10"							
			E4	8'-8 $\frac{3}{4}$ "	6'-1 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
			E3	25'-7 $\frac{3}{8}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	3'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	22'-6"	7'-6 $\frac{1}{4}$ "	1'-10 $\frac{1}{4}$ "
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			E4	5'-4"	2'-8 $\frac{3}{8}$ "							1'-10 $\frac{1}{4}$ "
			I2B	9'-0"	9'-0"							

(FS)

20:00~x21:00"

Roof

[illegible]

(FS)

20'-00" x 23'-00"

Roof

[illegible]

(FS)

18'-00" x 22'-06"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
G1	L	C	E3	32'-6 $\frac{3}{8}$ "	9'-7 $\frac{5}{8}$ "	0'-8"	5'-9 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	29'-4 $\frac{1}{4}$ "	12'-7 $\frac{3}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	20'-4"	20'-4"							
			E4	9'-10 $\frac{1}{4}$ "	7'-2 $\frac{5}{8}$ "							1'-10 $\frac{1}{4}$ "
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	E3	30'-11 $\frac{1}{4}$ "	13'-6"	0'-8"	3'-10"	0'-8"	0'-11 $\frac{1}{4}$ "	27'-9"	9'-1"	1'-10 $\frac{1}{4}$ "
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			E4	6'- $\frac{1}{8}$ "	3'-4 $\frac{1}{2}$ "							1'-10 $\frac{1}{4}$ "
			I2B	11'-3"	11'-3"							
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
G2	L	Same as	G1	L								
	S	C	I1	30'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'- $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	30'-2 $\frac{3}{8}$ "		
			E2A	15'-10"	15'-10"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	7'-6 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	27'-0"		
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							
G3	L	Same as	G1	L								
	S	C	I1	31'-8 $\frac{1}{4}$ "	7'- $\frac{1}{4}$ "	0'-7"	11'-6 $\frac{1}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	31'-2 $\frac{3}{8}$ "		
			I2A	13'-4"	13'-4"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-5 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-7"	8'- $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							

(FS)

20'-00" x 23'-6"

Leaf

[illegible]

(FS)

23'-0" x 21'-0"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
I1	L	C	I1	36'-11 $\frac{1}{2}$ "	10'- $\frac{1}{2}$ "	0'-7"	12'-7 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	36'-5 $\frac{3}{8}$ "		
			I2A	18'-4"	18'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'-8 $\frac{3}{4}$ "	13'-9 $\frac{5}{8}$ "	0'-7"	9'-1 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	33'-3"		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	10'-3"	10'-3"							
		S	I1	36'-6"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-11 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-11 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
I2	S	C	I1	36'-9"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-9 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-8 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'-5 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-3 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-6"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
		L	I1	36'-9"	8'-8 $\frac{3}{4}$ "	0'-8"	12'-9 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-8 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							

(FS)

23'-00" x 23'-00"

Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
J1	L	C	I1	36'-11 $\frac{1}{2}$ "	10'- $\frac{1}{4}$ "	0'-7"	12'-7 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{3}{8}$ "	36'-5 $\frac{3}{8}$ "		
			I2A	18'-4"	18'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'-8 $\frac{3}{4}$ "	13'-9 $\frac{5}{8}$ "	0'-7"	9'-1 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{3}{8}$ "	33'-3"		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	11'-6"	11'-6"							
	S	C	I1	37'-3"	9'-11 $\frac{1}{4}$ "	0'-8"	12'-8 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	36'-8 $\frac{3}{8}$ "		
			I2A	18'-4"	18'-4"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	34'- $\frac{5}{8}$ "	13'-9 $\frac{5}{8}$ "	0'-8"	9'-2 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	33'-6"		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	11'-6"	11'-6"							
J2	L	Same	as J1	L								
	S	C	E5	33'- $\frac{3}{8}$ "	9'-11 $\frac{1}{4}$ "	0'-8"	5'-10 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	29'-10 $\frac{1}{4}$ "	12'-8 $\frac{5}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	20'-10"	20'-10"							
			E6	9'-11 $\frac{3}{4}$ "	7'-4 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	E5	31'-5 $\frac{1}{4}$ "	13'-9 $\frac{3}{8}$ "	0'-8"	3'-11 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	28'-3"	9'-2 $\frac{1}{4}$ "	1'-10 $\frac{1}{4}$ "
			E2A	19'-1 $\frac{5}{8}$ "	19'-1 $\frac{5}{8}$ "							
			E6	6'-1"	3'-5 $\frac{3}{8}$ "							1'-10 $\frac{1}{4}$ "
			I2B	11'-6"	11'-6"							

23'-00" x 23'-6"
Roof

[illegible]

(FS)

20'-00" x 22'-6"

Roof

[illegible]

(FS)

20'-00" x 24'-00"Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
M1	L	C	E5	34'-9 $\frac{3}{8}$ "	10'-6 $\frac{3}{8}$ "	0'-8"	6'- $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	31'-7 $\frac{1}{2}$ "	13'-8"	1'-10 $\frac{1}{4}$ "
			E2A	21'-10"	21'-10"							
			E6	10'-2 $\frac{3}{4}$ "	7'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	E5	33'-2 $\frac{1}{4}$ "	14'-4 $\frac{3}{4}$ "	0'-8"	4'-1 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	30'-0"	10'-1 $\frac{5}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	19'-11 $\frac{5}{8}$ "	19'-11 $\frac{5}{8}$ "							
			E6	6'-2 $\frac{3}{4}$ "	3'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	12'-0"	12'-0"							
	S	C	E3	29'-2 $\frac{5}{8}$ "	8'-2 $\frac{5}{8}$ "	0'-7"	5'-3 $\frac{5}{8}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	26'-1 $\frac{1}{4}$ "	11'-4 $\frac{7}{8}$ "	1'-10 $\frac{1}{4}$ "
			E2A	17'-10"	17'-10"							
			E4	9'-2 $\frac{3}{4}$ "	6'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	E3	27'-7 $\frac{3}{8}$ "	12'-0"	0'-7"	3'-5"	0'-7"	0'-9 $\frac{7}{8}$ "	24'-6"	7'-11"	1'-10 $\frac{1}{4}$ "
			E2A	16'-8"	16'-8"							
			E4	5'-7 $\frac{5}{8}$ "	3'-0"							1'-10 $\frac{1}{4}$ "
			I2B	10'-0"	10'-0"							
M2	L	C	I1	39'-9"	10'-6 $\frac{3}{8}$ "	0'-8"	13'-8"	0'-8"	0'-11 $\frac{1}{4}$ "	39'-2 $\frac{3}{8}$ "		
			I2A	19'-4"	19'-4"							
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	I1	36'-6 $\frac{5}{8}$ "	14'-4 $\frac{3}{4}$ "	0'-8"	10'-1 $\frac{5}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	36'-0"		
			I2A	15'-7 $\frac{1}{4}$ "	15'-7 $\frac{1}{4}$ "							
			I2B	12'-0"	12'-0"							
	S	Same as		M1S								
		Same as		M1L Use E3 & E4 in place of E5 & E6								
		C	E8	25'-9"	8'-2 $\frac{5}{8}$ "	0'-7"	5'-3 $\frac{3}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	20'-0"		1'-10 $\frac{1}{4}$ "
			E2A	20'-4"	20'-4"							
			E6	9'-2 $\frac{3}{4}$ "	6'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
			E4	9'-2 $\frac{3}{4}$ "	6'-7 $\frac{1}{4}$ "							1'-10 $\frac{1}{4}$ "
		M	E8	25'-9"	12'-0"	0'-7"	3'-5"	0'-7"	0'-9 $\frac{7}{8}$ "	20'-0"		1'-10 $\frac{1}{4}$ "
			E2A	20'-4"	20'-4"							
			E6	4'-10 $\frac{1}{4}$ "	3'-0"							1'-10 $\frac{1}{4}$ "
			E4	4'-10 $\frac{1}{4}$ "	3'-0"							1'-10 $\frac{1}{4}$ "

(FS)

20'-6" x 21'-00"

Roof

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
Q1	L	C	I1	36'-6"	8'-8 $\frac{1}{2}$ "	0'-8"	12'-11 $\frac{1}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-11 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
		M	I1	33'-3 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-4 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-9"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-9"	11'-9"							
	S	C	I1	36'- $\frac{1}{4}$ "	8'-10 $\frac{1}{4}$ "	0'-7"	12'-9 $\frac{1}{2}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	35'-6 $\frac{3}{8}$ "		
			I2A	15'-10"	15'-10"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	32'-5 $\frac{3}{4}$ "	12'-3 $\frac{5}{8}$ "	0'-7"	9'-3 $\frac{1}{4}$ "	0'-7"	0'-9 $\frac{7}{8}$ "	32'-0"		
			I2A	13'-4"	13'-4"							
			I2B	11'-6"	11'-6"							
Q2	L	C	I1	36'-3"	8'-8 $\frac{1}{4}$ "	0'-8"	12'-9 $\frac{3}{4}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	35'-8 $\frac{3}{8}$ "		
			I2A	16'-4"	16'-4"							
			I2B	14'-8 $\frac{1}{2}$ "	14'-8 $\frac{1}{2}$ "							
		M	I1	33'- $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-8"	9'-3 $\frac{3}{8}$ "	0'-8"	0'-11 $\frac{1}{4}$ "	32'-6"		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
	S	Same	as		Q15							

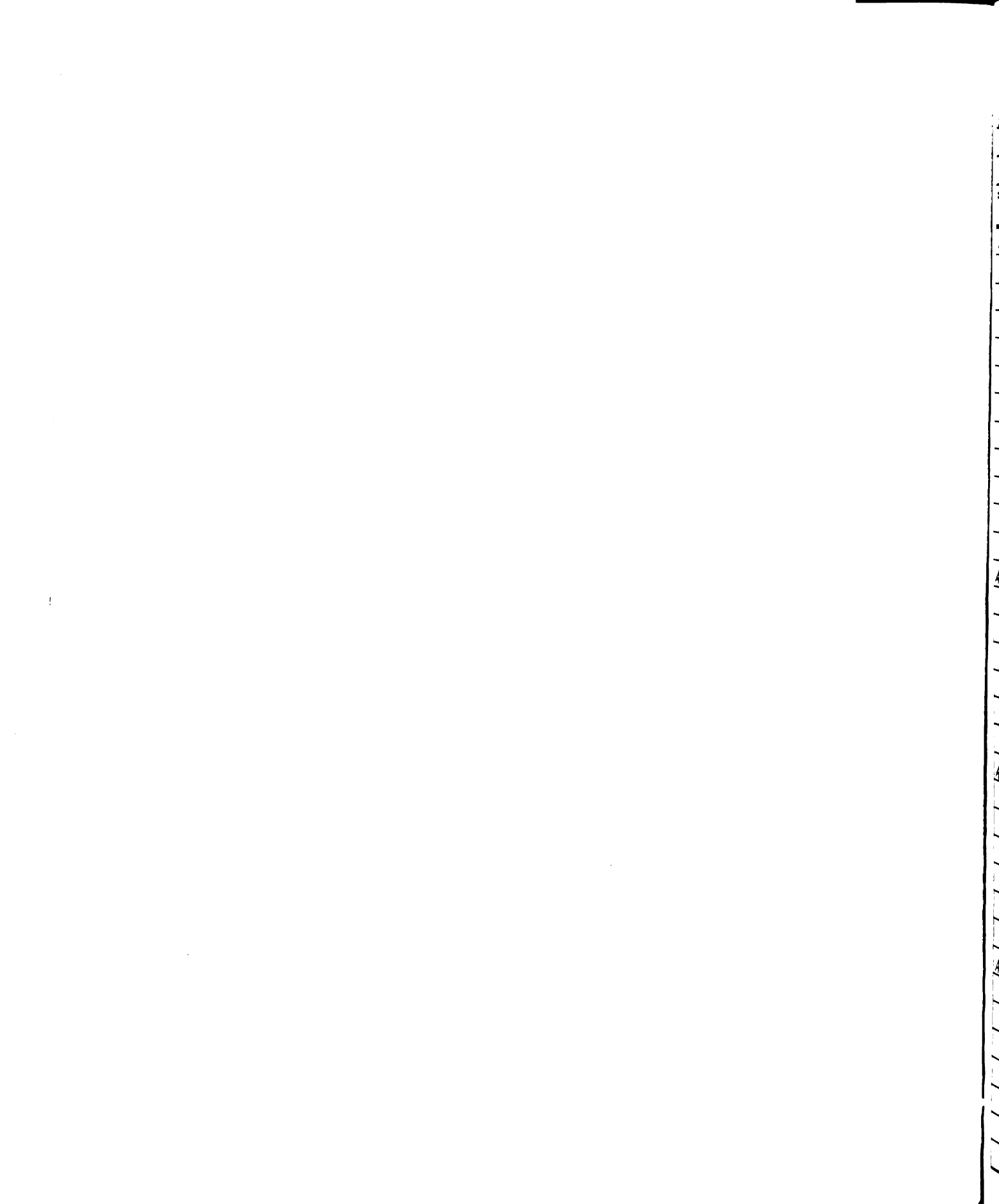
[illegible]

(FS)

20'-6" x 23'-6"

Roof

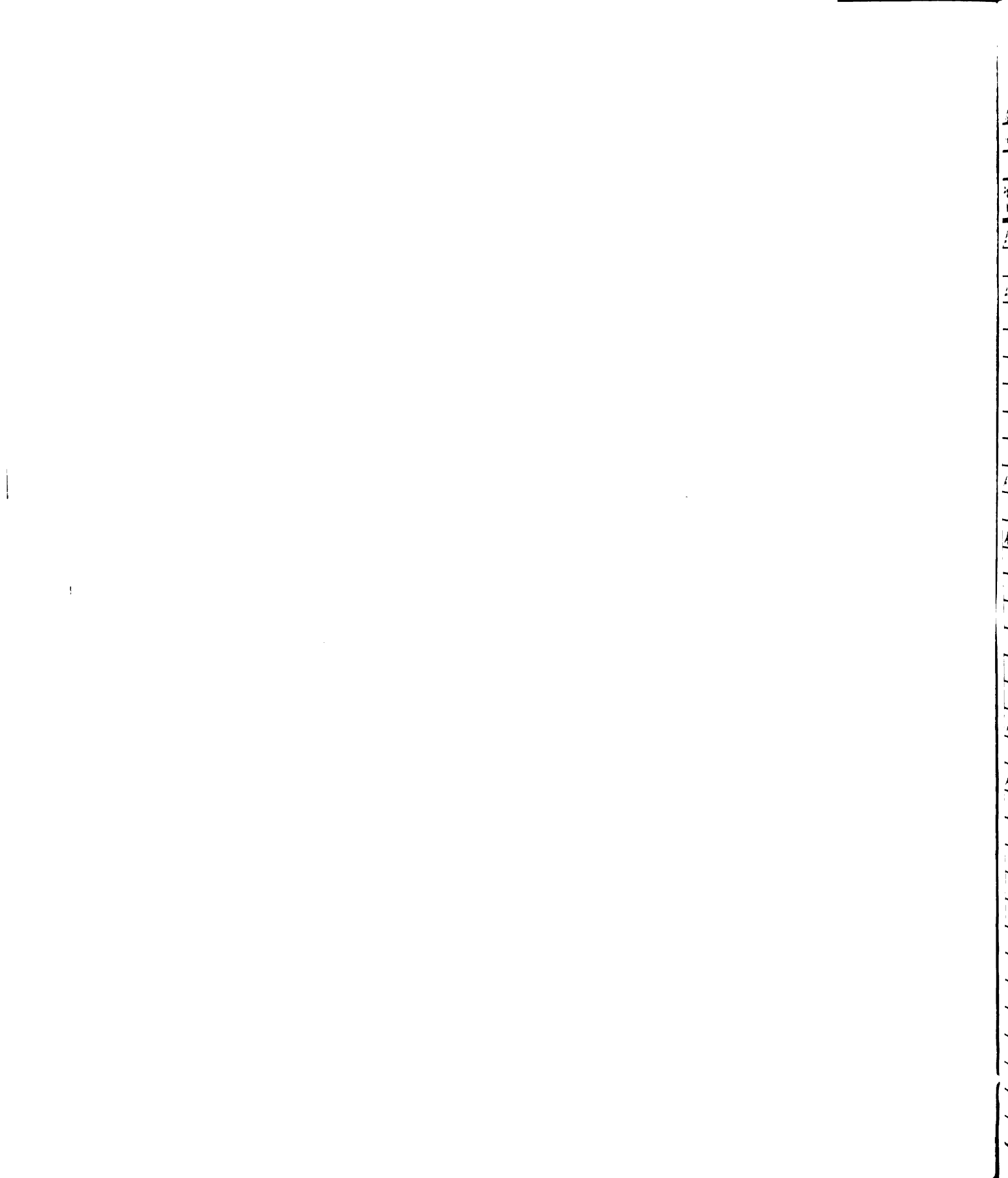
[illegible]



(FS)

18'-00" x 21'-00"1st Level Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
A1	L	C	I1	36'-3 $\frac{1}{2}$ "	9'- $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	13'-1 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-11 $\frac{1}{2}$ "		
			I2A	15'-6"	15'-6"							
			I2B	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
		M	I1	33'- $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	9'-8 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	32'-9 $\frac{1}{8}$ "		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-9"	11'-9"							
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
A2	L	C	I1	36'- $\frac{1}{8}$ "	9'- $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	12'-11 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-8 $\frac{1}{2}$ "		
			I2A	15'-6"	15'-6"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	32'-9 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	9'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	32'-6 $\frac{3}{8}$ "		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
	S	Same	as	A1S								
A3	L	C	I1	36'- $\frac{1}{8}$ "	9'- $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	12'-11 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-8 $\frac{1}{2}$ "		
			I2A	15'-6"	15'-6"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	32'-9 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	9'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	32'-6 $\frac{3}{8}$ "		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
	S	Same	as	A1S								
A4	L	Same	as	A2L								
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			E2A	15'-5"	15'-5"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							



(FS)

18:00" x 21:00"

1st Level Floor

[illegible]

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

12

(FS)

18'-00" x 23'-00"1st Level Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
B1	L	C	I1	37'- $\frac{1}{8}$ "	10'-3"	0'-4 $\frac{1}{4}$ "	12'-10 $\frac{1}{2}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	36'-8 $\frac{1}{2}$ "		
			I2A	17'-6"	17'-6"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'-9 $\frac{5}{8}$ "	13'-9 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	9'-6"	0'-4 $\frac{1}{4}$ "	0'-6"	33'-6 $\frac{1}{8}$ "		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	11'-6"	11'-6"							
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	12'-2 $\frac{5}{8}$ "	12'-2 $\frac{5}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
B2	L	Same	as	B1L								
	S	C	I1	31'-8 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-9 $\frac{3}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-5 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-5 $\frac{3}{8}$ "	13'-5 $\frac{3}{8}$ "							
		M	I1	28'-6"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-5 $\frac{1}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-3"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-3"	10'-3"							
B3	L	Same	as	B1L								
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	15'-5"	15'-5"							
			I2B	12'-2 $\frac{5}{8}$ "	12'-2 $\frac{5}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							
B4	L	Same	as	B1L								
	S	C	I1	31'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-7 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							

(FS)

18'-00" x 23'-6"1st Level Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
C1	L	C	I1	39'- $\frac{1}{8}$ "	10'-6 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	13'-8 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	38'-8 $\frac{1}{2}$ "		
			I2A	18'-0"	18'-0"							
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	I1	35'-9 $\frac{5}{8}$ "	14'-1 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	10'-4 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-6 $\frac{1}{8}$ "		
			I2A	15'-3 $\frac{1}{4}$ "	15'-3 $\frac{1}{4}$ "							
			I2B	12'-0"	12'-0"							
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
C2	L	C	E3	33'-4 $\frac{5}{8}$ "	10'-6 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	6'-1 $\frac{1}{2}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	31'-1 $\frac{1}{4}$ "	13'-8 $\frac{5}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	20'-11"	20'-11"							
			E4	9'-5 $\frac{1}{2}$ "	7'-5 $\frac{5}{8}$ "							1'-4 $\frac{5}{8}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	E3	31'-9 $\frac{1}{2}$ "	14'-1 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	4'-4 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	29'-6 $\frac{1}{8}$ "	10'-4 $\frac{1}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-6 $\frac{5}{8}$ "	19'-6 $\frac{5}{8}$ "							
			E4	5'-6 $\frac{1}{8}$ "	3'-5 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	12'-0"	12'-0"							
	S	C	I1	31'-8 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-9 $\frac{3}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-5 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-5 $\frac{3}{8}$ "	13'-5 $\frac{3}{8}$ "							
		M	I1	28'-6"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-5 $\frac{1}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-3"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-3"	10'-3"							
C3	L	Same as C1L										
	S	C	I1	31'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-7 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							

(FS)

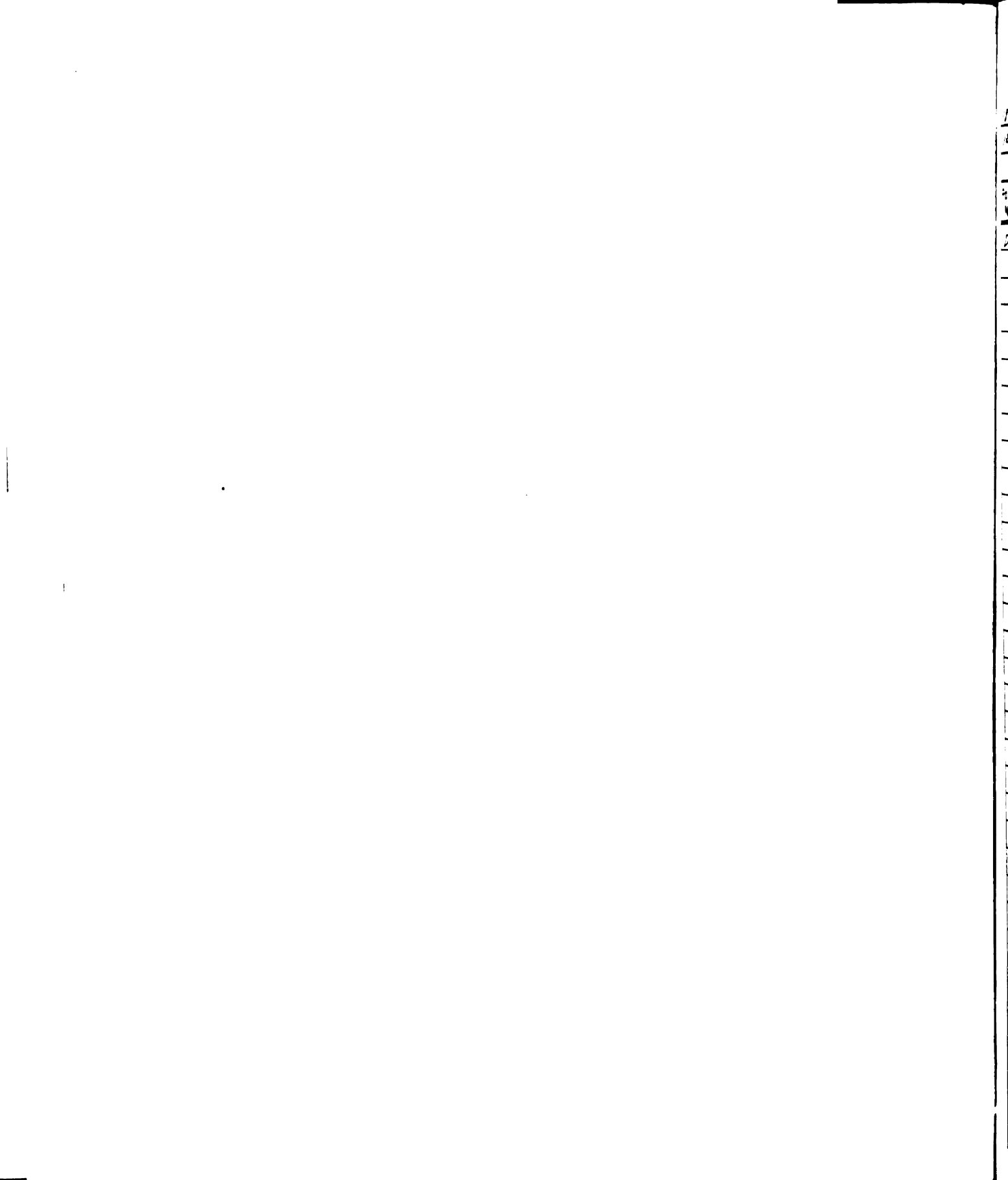
18'-00" x 24'-00"1st Level Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
D1	L	C	E3	33'-10 $\frac{5}{8}$ "	10'-10 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	6'-2 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	31'-7 $\frac{1}{4}$ "	13'-9 $\frac{3}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	21'-5"	21'-5"							
			E4	9'-7"	7'-7 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	E3	32'-3 $\frac{1}{2}$ "	14'-4 $\frac{3}{4}$ "	0'-4 $\frac{1}{4}$ "	4'-5 $\frac{3}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	30'- $\frac{1}{8}$ "	10'-5 $\frac{3}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-11 $\frac{5}{8}$ "	19'-11 $\frac{5}{8}$ "							
			E4	5'-7"	3'-7 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	12'-0"	12'-0"							
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
D2	L	Same	as	D1/L								
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			E2A	15'-5"	15'-5"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			E2A	15'- $\frac{1}{8}$ "	15'- $\frac{1}{8}$ "							
			I2B	9'-0"	9'-0"							
D3	L	C	I1	39'-6 $\frac{1}{8}$ "	10'-10 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	13'-9 $\frac{7}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	39'-2 $\frac{1}{2}$ "		
			I2A	18'-6"	18'-6"							
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							
		M	I1	36'-3 $\frac{5}{8}$ "	14'-4 $\frac{3}{4}$ "	0'-4 $\frac{1}{4}$ "	10'-5 $\frac{3}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	36'- $\frac{1}{8}$ "		
			I2A	15'-7 $\frac{1}{4}$ "	15'-7 $\frac{1}{4}$ "							
			I2B	12'-0"	12'-0"							
	S	Same	as	D1/S								
D4		Same	as	D1								
D5	L	C	E5	33'-10 $\frac{5}{8}$ "	10'-10 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	6'-2 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	31'-7 $\frac{1}{4}$ "	13'-9 $\frac{3}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	21'-5"	21'-5"							
			E6	9'-7"	7'-7 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	15'-2 $\frac{3}{8}$ "	15'-2 $\frac{3}{8}$ "							

(FS)

18'-00" x 24'-00"1st Level Floor

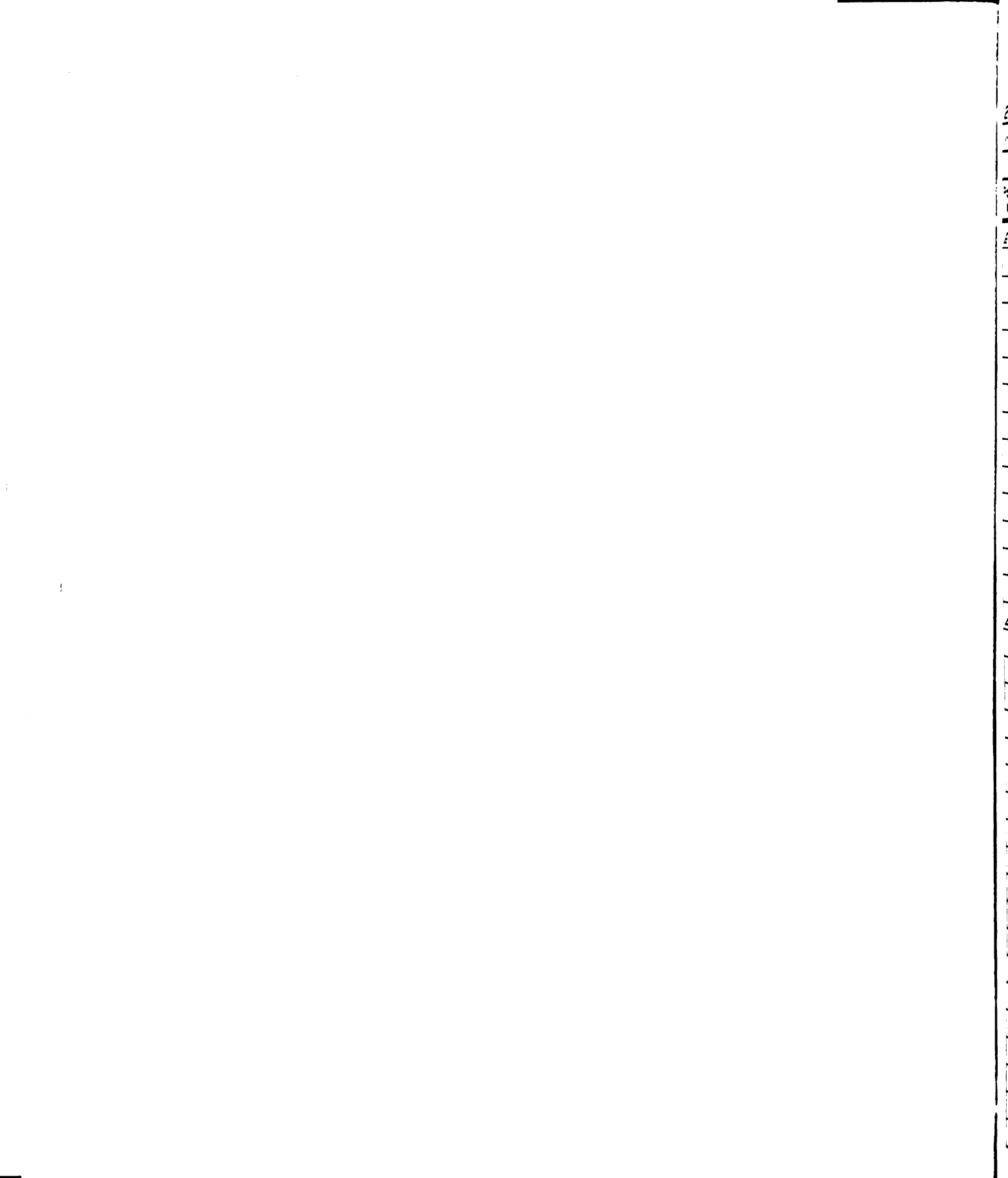
Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
D5	L	M	E5	32'-3 $\frac{1}{2}$ "	14'-4 $\frac{3}{4}$ "	0'-4 $\frac{1}{4}$ "	4'-5 $\frac{3}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	30'- $\frac{1}{8}$ "	10'-5 $\frac{3}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-11 $\frac{5}{8}$ "	19'-11 $\frac{5}{8}$ "							
			E6	5'-7"	3'-7 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	12'-0"	12'-0"							
	S	C	I1	31'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-7 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							
D6	L	Same	as	as	D3L							
	S	Same	as	as	D5S							
D7	L	Same	as	as	D5L							
	S	Same	as	as	D1S							
D8	L	Same	as	as	D5L							
	S	Same	as	as	D1S							
D9	L	Same	as	as	D1L							
	S	C	E5	26'-4 $\frac{1}{8}$ "	7'-3 $\frac{3}{4}$ "	0'-3 $\frac{1}{2}$ "	5'- $\frac{3}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	24'-1 $\frac{1}{4}$ "	11'-1 $\frac{7}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	15'-5"	15'-5"							
			E6	8'-1"	6'-1 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	E5	24'-8 $\frac{3}{4}$ "	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	3'-3 $\frac{3}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	22'-6"	7'-9 $\frac{3}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			E6	4'-8 $\frac{1}{4}$ "	2'-8 $\frac{3}{8}$ "							1'-4 $\frac{5}{8}$ "
			I2B	9'-0"	9'-0"							
D10	L	Same	as	as	D1L							
	S	Same	as	as	D9S	Except use bars E3 & E4 in place of E5 & E6						
D11	L	Same	as	as	D5L	Except use bars E3 & E4 in place of E5 & E6						
	S	C	E5	26'-10 $\frac{1}{8}$ "	7'-3 $\frac{3}{4}$ "	0'-3 $\frac{1}{2}$ "	5'- $\frac{3}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	24'-6 $\frac{1}{4}$ "	11'-7 $\frac{7}{8}$ "	1'-4 $\frac{5}{8}$ "
			E2A	15'-5"	15'-5"							
			E6	8'-1"	6'-1 $\frac{1}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							



(FS)

18'-00" x 24'-00"
1st Level Floor

[illegible]



20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

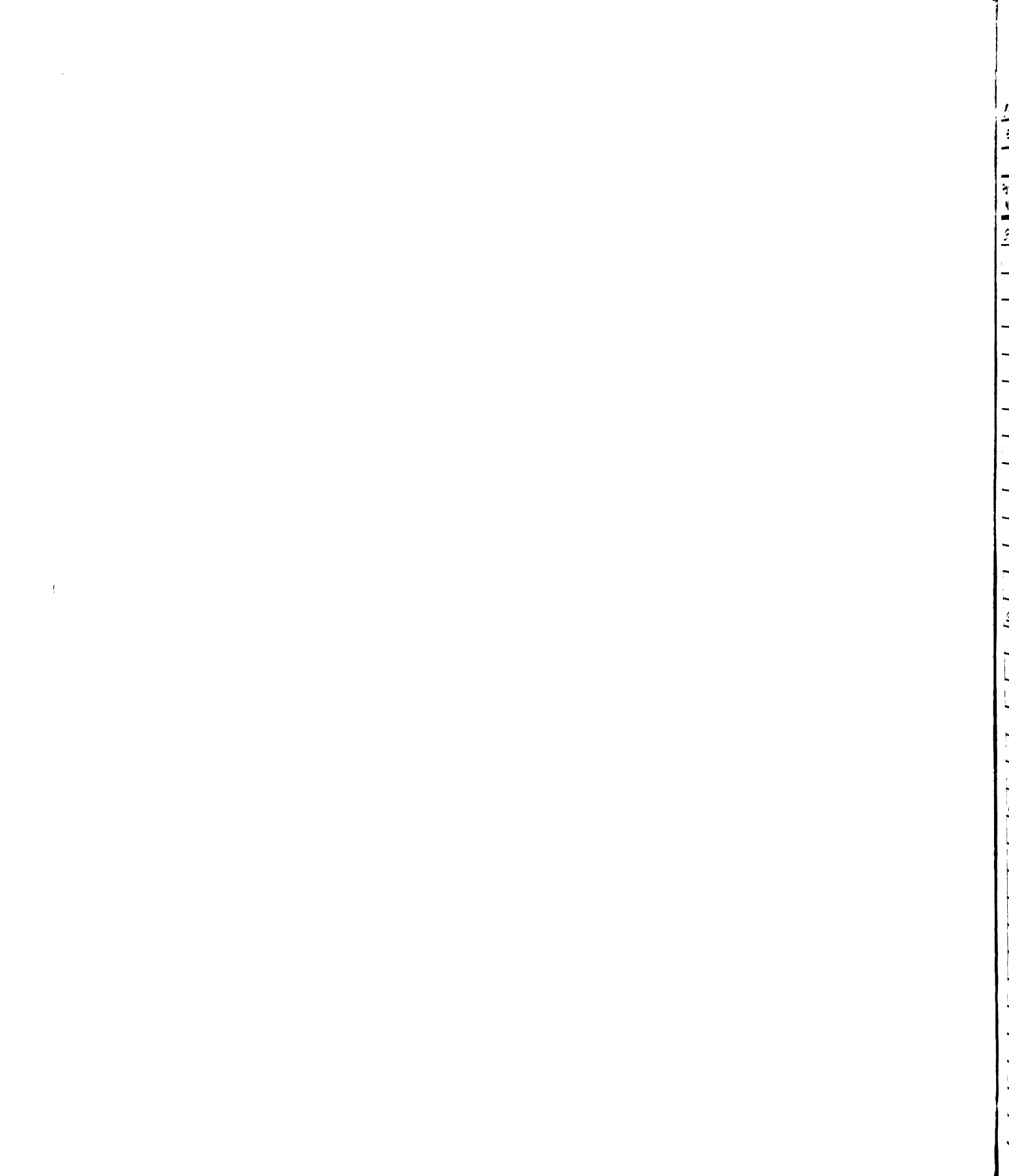
42

(FS)

20'00" x 23'00"

1st Level Floor

[illegible]

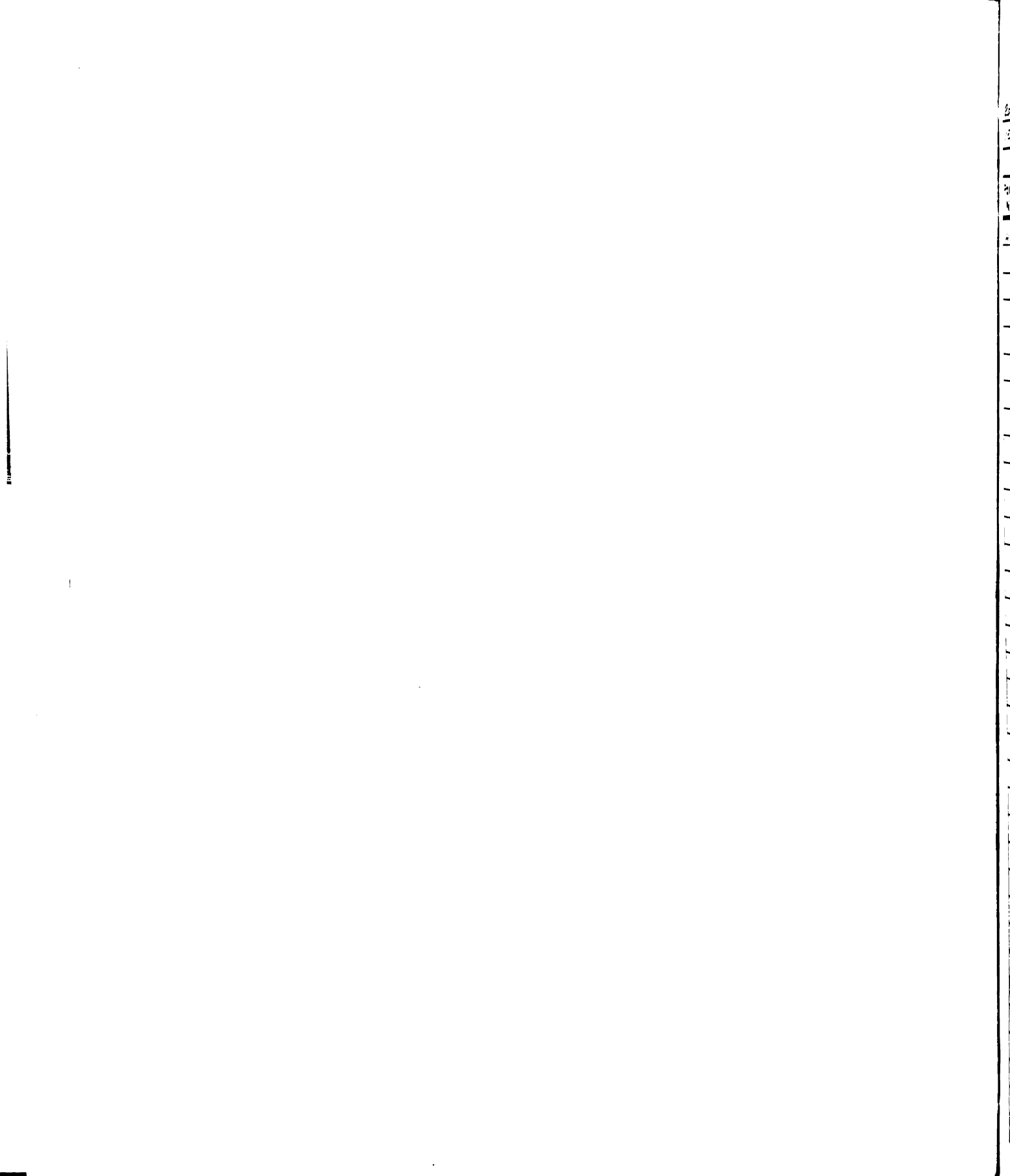


(FS)

18'-00" x 22'-6"

1st Level Floor

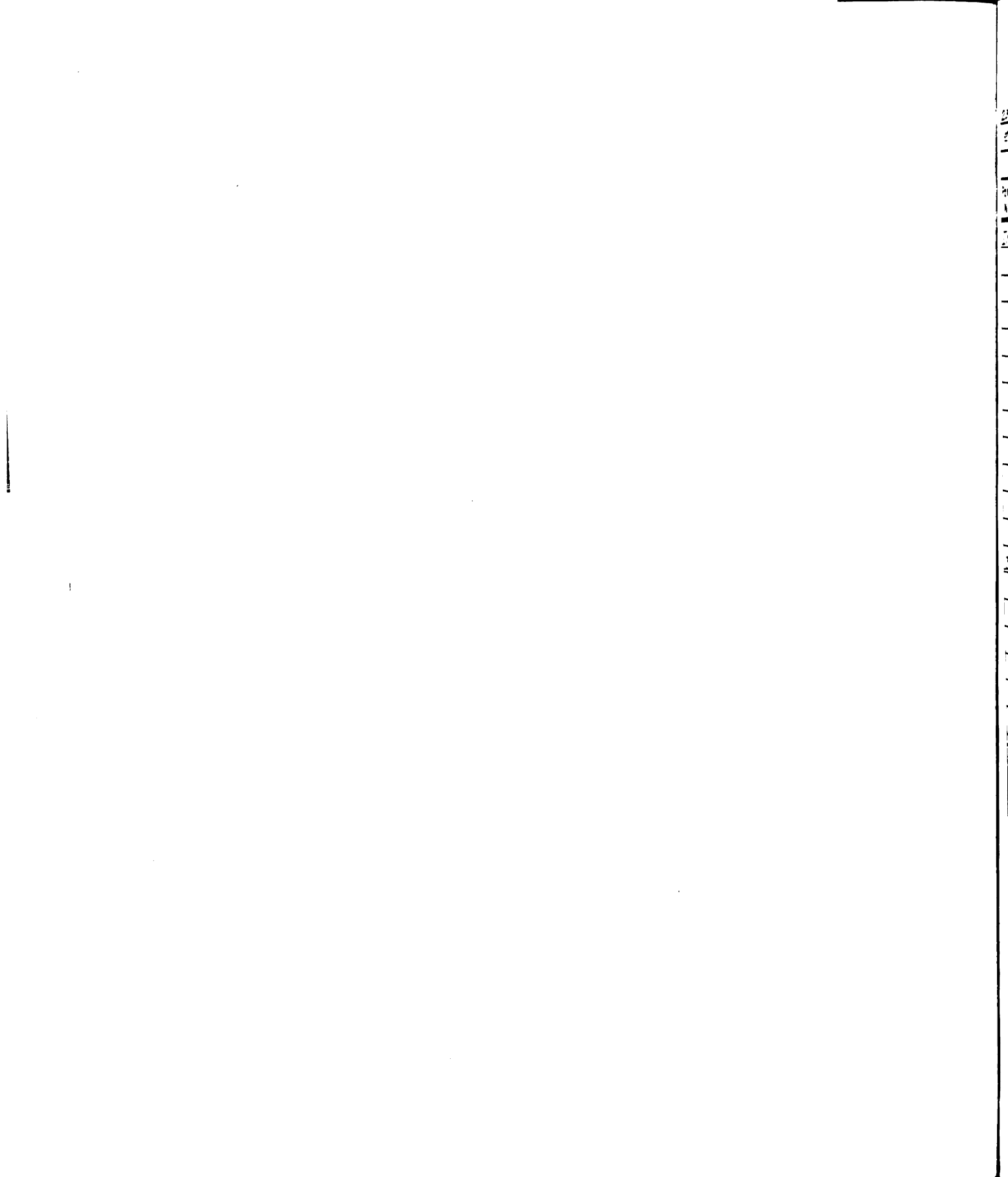
Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
G1	L	C	E3	31'-7 $\frac{5}{8}$ "	9'-11 $\frac{3}{8}$ "	0'-4 $\frac{1}{4}$ "	5'-11 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	29'-4 $\frac{1}{4}$ "	12'-9 $\frac{1}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-11"	19'-11"							
			E4	9'-2 $\frac{1}{2}$ "	7'-2 $\frac{5}{8}$ "							1'-4 $\frac{5}{8}$ "
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	E3	30'- $\frac{1}{2}$ "	13'-6"	0'-4 $\frac{1}{4}$ "	4'-1 $\frac{3}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	27'-9 $\frac{1}{8}$ "	9'-4 $\frac{3}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			E4	5'-4 $\frac{1}{4}$ "	3'-4 $\frac{1}{2}$ "							1'-4 $\frac{5}{8}$ "
			I2B	11'-3"	11'-3"							
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	9'-0"	9'-0"							
G2	L	Same	as	G1L								
	S	C	I1	30'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-1 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	30'-2 $\frac{1}{2}$ "		
			E2A	15'-5"	15'-5"							
			I2B	12'-2 $\frac{3}{8}$ "	12'-2 $\frac{3}{8}$ "							
		M	I1	27'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	7'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	27'-0"		
			E2A	15'- $\frac{1}{4}$ "	15'- $\frac{1}{4}$ "							
			I2B	9'-0"	9'-0"							
G3	L	Same	as	G1L								
	S	C	I1	31'-5 $\frac{1}{2}$ "	7'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	11'-7 $\frac{7}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	31'-2 $\frac{1}{2}$ "		
			I2A	12'-6"	12'-6"							
			I2B	13'-2 $\frac{3}{8}$ "	13'-2 $\frac{3}{8}$ "							
		M	I1	28'-3"	10'-9 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	8'-3 $\frac{5}{8}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-0"		
			I2A	11'-8 $\frac{3}{8}$ "	11'-8 $\frac{3}{8}$ "							
			I2B	10'-0"	10'-0"							



(FS)

20'-00" x 23'-6"
1st Level Floor

[illegible]

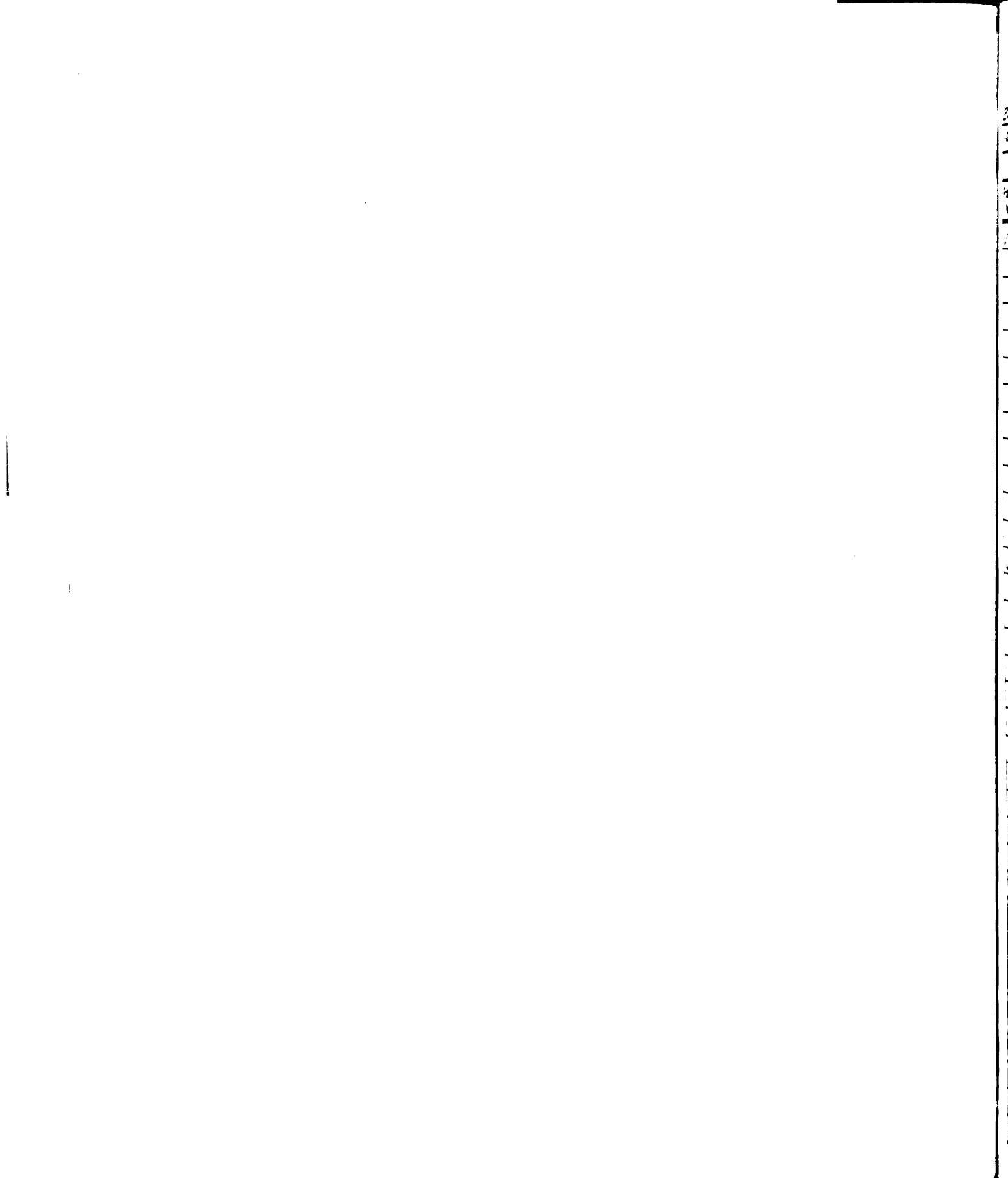


(FS)

23'-00" x 21'-00"

1st Level Floor - Ramp from 1st Level to 2nd Level

[illegible]



(FS)

23'-00" x 23'-00"

1st Level Floor - Ramp from 1st Level to 2nd Level

[illegible]

23'-00" x 23'-6"

1st Level Floor

[illegible]

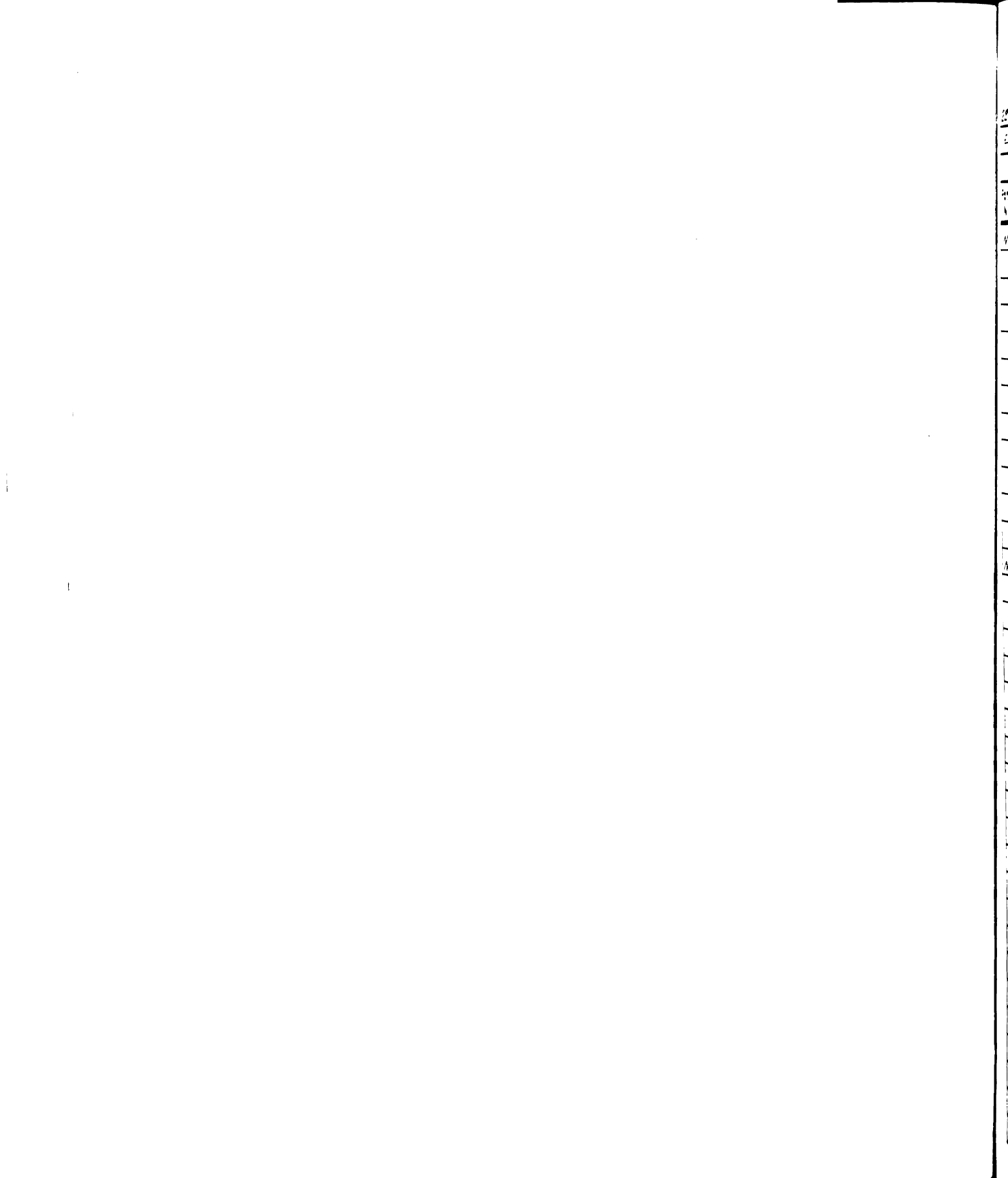
(FS)

20'-00" x 22'-6"

1st Level Floor

[illegible]

[illegible]



(FS)

22'-6" x 21'-00"1st Level Floor & Ramp leading to 1st Level.

Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
N1	L	C	I1	37'-2 $\frac{1}{2}$ "	10'- $\frac{1}{8}$ "	0'-3 $\frac{1}{2}$ "	13'-2 $\frac{1}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	36'-11 $\frac{1}{2}$ "		
			E2A	19'-11"	19'-11"							
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	I1	34'-0"	13'-6"	0'-3 $\frac{1}{2}$ "	9'-10"	0'-3 $\frac{1}{2}$ "	0'-5"	33'-9"		
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			I2B	11'-3"	11'-3"							
	S	C	I1	36'- $\frac{1}{8}$ "	9'- $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	12'-11 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-8 $\frac{1}{2}$ "		
			E2A	18'-5"	18'-5"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	32'-9 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	9'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	32'-6 $\frac{1}{8}$ "		
			E2A	15'-9 $\frac{7}{8}$ "	15'-9 $\frac{7}{8}$ "							
			I2B	11'-6"	11'-6"							
N2	L	Same	as	N1L								
	S	C	I1	36'- $\frac{1}{8}$ "	9'- $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	12'-11 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	35'-8 $\frac{1}{2}$ "		
			I2A	15'-5"	15'-6"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	32'-9 $\frac{5}{8}$ "	12'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	9'-7 $\frac{1}{4}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	32'-6 $\frac{1}{8}$ "		
			I2A	13'-7 $\frac{3}{4}$ "	13'-7 $\frac{3}{4}$ "							
			I2B	11'-6"	11'-6"							
N3	L	Same	as	N1L								
	S	Same	as	N2S								
Ramp												
N1	L	C	E5	31'-11 $\frac{5}{8}$ "	10'- $\frac{1}{8}$ "	0'-3 $\frac{1}{2}$ "	5'-11 $\frac{1}{2}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	29'-8 $\frac{3}{4}$ "	13'-2 $\frac{1}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-11"	19'-11"							
			E6	9'-2 $\frac{1}{2}$ "	7'-2 $\frac{3}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	E5	30'-4 $\frac{1}{4}$ "	13'-6"	0'-3 $\frac{1}{2}$ "	4'-2 $\frac{1}{2}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-1 $\frac{1}{2}$ "	9'-10"	1'-4 $\frac{5}{8}$ "
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			E6	5'-4 $\frac{1}{4}$ "	3'-4 $\frac{1}{2}$ "							1'-4 $\frac{5}{8}$ "
			I2B	11'-3"	11'-3"							
	S	Same	as	N1S	of	Floor	system	above				
N2	L	Same	as	N1L	of	Ramp	system					
	S	Same	as	N2S	of	Floor	system	above				

(FS)

22'-6" x 21'-00"

1st Level Floor & Ramp leading to 1st Level

[illegible]

(FS)

22'-6" x 23'-00"1st Level Floor & Ramp leading to 1st Level
Floor

Panel No.	Length	Strip	Bar No.	Bar Length	a.	b.	c.	d.	e.	f.	g.	h.
01	L	C	I1	37'- $\frac{1}{8}$ "	10'-3"	0'-4 $\frac{1}{4}$ "	12'-10 $\frac{1}{2}$ "	0'-4 $\frac{1}{4}$ "	0'-6"	36'-8 $\frac{1}{2}$ "		
			I2A	17'-6"	17'-6"							
			I2B	14'-8 $\frac{3}{8}$ "	14'-8 $\frac{3}{8}$ "							
		M	I1	33'-9 $\frac{5}{8}$ "	13'-9 $\frac{5}{8}$ "	0'-4 $\frac{1}{4}$ "	9'-6"	0'-4 $\frac{1}{4}$ "	0'-6"	33'-6 $\frac{1}{8}$ "		
			I2A	14'-11 $\frac{3}{8}$ "	14'-11 $\frac{3}{8}$ "							
			I2B	11'-6"	11'-6"							
	S	C	I1	37'-2 $\frac{1}{2}$ "	10'- $\frac{1}{8}$ "	0'-3 $\frac{1}{2}$ "	13'-2 $\frac{1}{4}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	36'-11 $\frac{1}{2}$ "		
			E2A	19'-11"	19'-11"							
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	I1	34'-0"	13'-6"	0'-3 $\frac{1}{2}$ "	9'-10"	0'-3 $\frac{1}{2}$ "	0'-5"	33'-9"		
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			I2B	11'-3"	11'-3"							
Ramp												
01	L	Same as OIL of Floor system above										
	S	C	E5	31'-11 $\frac{5}{8}$ "	10'- $\frac{1}{8}$ "	0'-3 $\frac{1}{2}$ "	5'-11 $\frac{1}{2}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	29'-8 $\frac{3}{4}$ "	13'-2 $\frac{1}{4}$ "	1'-4 $\frac{5}{8}$ "
			E2A	19'-11"	19'-11"							
			E6	9'-2 $\frac{1}{2}$ "	7'-2 $\frac{3}{4}$ "							1'-4 $\frac{5}{8}$ "
			I2B	14'-5 $\frac{3}{8}$ "	14'-5 $\frac{3}{8}$ "							
		M	E5	30'-4 $\frac{1}{4}$ "	13'-6"	0'-3 $\frac{1}{2}$ "	4'-2 $\frac{1}{2}$ "	0'-3 $\frac{1}{2}$ "	0'-5"	28'-1 $\frac{1}{2}$ "	9'-10"	1'-4 $\frac{5}{8}$ "
			E2A	18'-8 $\frac{3}{4}$ "	18'-8 $\frac{3}{4}$ "							
			E6	5'-4 $\frac{1}{4}$ "	3'-4 $\frac{1}{2}$ "							1'-4 $\frac{5}{8}$ "
			I2B	11'-3"	11'-3"							

[illegible]

(FS)

22'-6" x 22'-6"

1st Level Floor & Ramp leading to 1st Level

Floor

[illegible]

20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

(FS)

20'-6" x 23'-6"

1st Level Floor

[illegible]

EXPLANATION OF COLUMNS IN BAR PLACEMENT SCHEDULE

Column 1 - Panel No.

Designates the panel (as A1)

Column 2 - Length

Designates the length (long dimension- L, short dimension- S) in the direction in which steel is being placed.

Column 3 - Bar No.

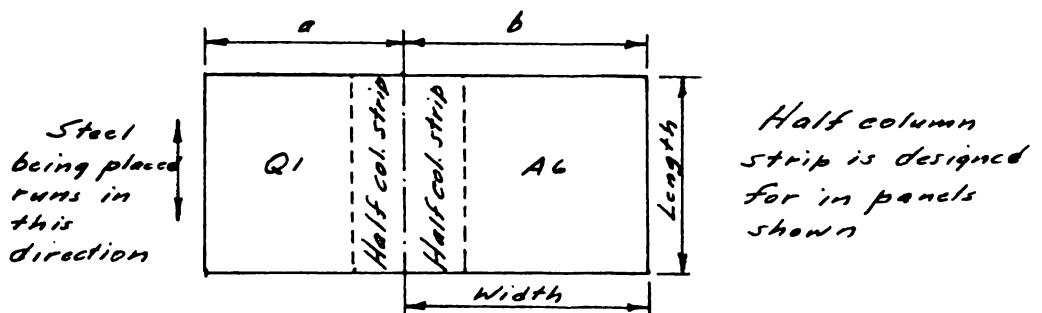
Designates bar type as shown on "Bar Type Sheet"

Letter preceding number indicates whether bar belongs to interior (I), or exterior (E) type.

Letter following number indicates position of bar in the strip as shown on "Bar Dimension Sheet".

Column 4 - Strip Size

Designates whether a whole (W), or half (H) column strip is receiving the reinforcement designated. If the panel is bounded by a different dimensioned panel (width) on a side parallel to the direction in which the steel runs, only a half column strip (H) is designed for. See sketch below.



Column 5 - Strip Location

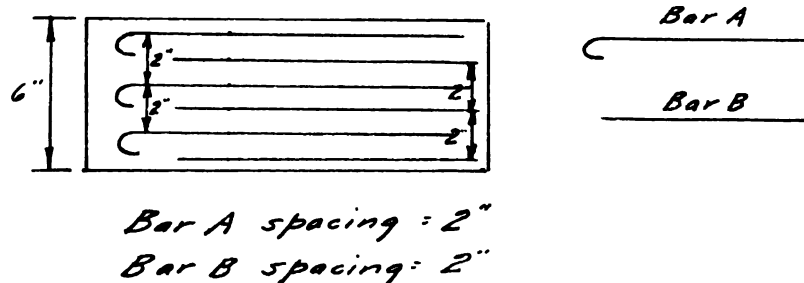
The location of the strip is given in this column by writing its location as for example "side adjacent to panel Q1." If the two half column strips in a panel are reinforced in the same manner, a dash (-) is placed in this column. It is not necessary to locate whole column strips since their location can be found by reference to the framing plan.

Column 6 - No. of Bars

Gives the number of bars of that particular type that are used. A cross in this column indicates that the bars of this type, and at this position, have already been placed on another sheet shown by the numbers in the cross.

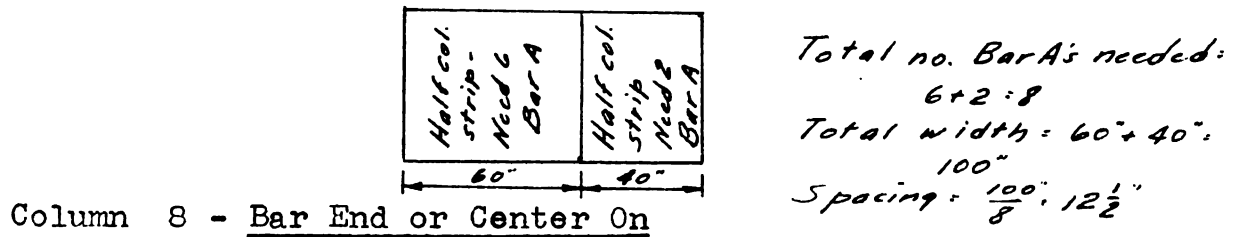
Column 7 - Spacing

Gives spacing of type of bar indicated only. If other types of bars run parallel to these particular bars, they are spaced separately. For example:



When spacing is given for bars in a half column strip this spacing is obtained by adding the width of the half column strip adjacent and dividing the total number of bars of the particular type used into the total width.

This is shown in the sketch below.

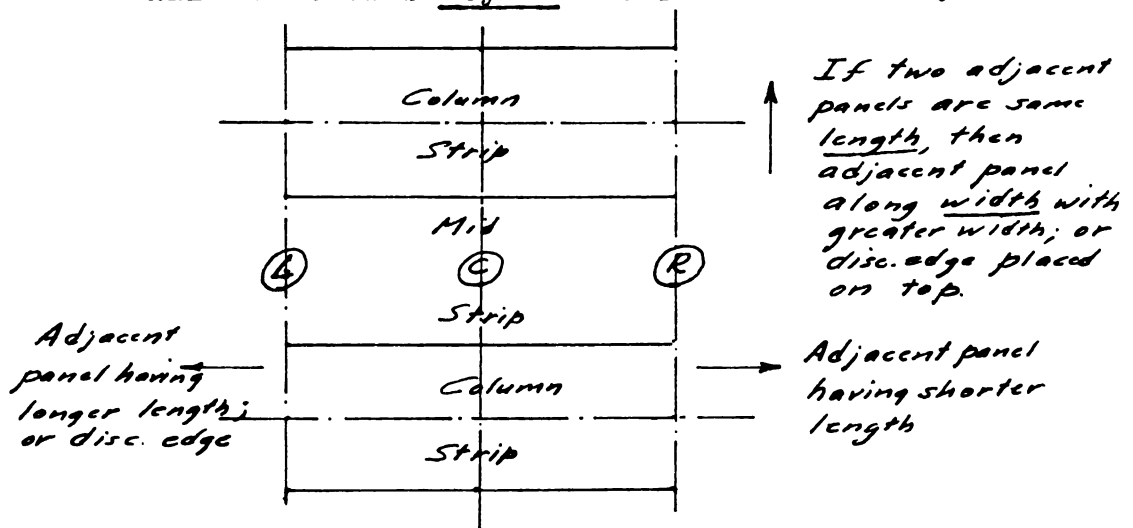


This column gives the location of either the center of the bar (not centerline; see sketch below) if an interior type bar, or the end of the bar if an exterior type bar.



In order to locate the bar positions, the panel must first be placed in some particular position. The panel is placed so that, of the two adjacent panels along the length being considered, the one with the smaller length of the two adjacent panels is on the right, and the larger length and any discontinuous edge is on the left. If the two adjacent lengths are equal, the panels adjacent along the width are used, and the panel with the larger width or any discontinuous edge is placed on top.

When the panel has been positioned, the left edge is lettered "L", the centerline "C", and the right edge "R". These are the lines referred to in the next paragraph. Interior type bars are placed so that they are perpendicular to and centered on the line given in Column 6. Exterior type hooked bars are placed so that the hook starts at the line indicated. Exterior type straight bars are placed so that their ends fall two inches beyond the line indicated.



Column 9 - Same as Column 3.

Column 10 - Same as Column 6.

Column 11 - Same as Column 7.

Column 12 - Same as Column 8.

Column 13 -

14 -

15 - Gives dimensions of panels perpendicular to

direction bars run. Used to calculate spacings.

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 21'-00"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
A1	L	I1	W		5	13 1/2"	C	I1	3	18"	C	216	108	54
		I2A	W		3		C	I2A	3		C			
		I2B	W		6 1 L		L	I2B	6 1 L		L			
		I2B	W		6 1 L		R	I2B	6 1 L		R			
	S	I1	H	Adjacent Adjacent C1 B1	2	19 1/8"	C	I1	3	21"	C	252	126	63
		I2A	H		1		C	I2A	3		C			
		I2B	H		2	26 5/8"	L	I2B	-	-	L			
		I2B	H		2	26 5/8"	R	I2B	-	-	R			
		I1	H		2	18 7/8"	C							
		I2A	H		1		C							
		I2B	H		2	33"	L							
		I2B	H		2	33"	R							
	A2	I1	W		5	13 1/2"	C	I1	3	18"	C	216	108	54
		I2A	W		3		C	I2A	3		C			
		I2B	W		6 1 L		L	I2B	6 1 L		L			
		I2B	W		2	27"	R	I2B	-	-	R			
		I1	W		4	21"	C	I1	3	21"	C	252	126	63
		I2A	W		2		C	I2A	3		C			
A3	L	I2B	W		3*	43"	L	I2B	-	-	L			
		I2B	W		3	43"	R	I2B	-	-	R			
		I1	H	Adjacent B1	2	18 7/8"	C							
		I2A	H		1		C							
	S	I2B	H		2*	33"	L							
		I2B	H		2	33"	R							
		I1	W		5	13 1/2"	C	I1	3	18"	C	216	108	54
		I2A	W		3		C	I2A	3		C			
		I2B	W		6 1 L		L	I2B	6 1 L		L			
		I2B	W		6 1 L		R	I2B	6 1 L		R			
	S	I1	H	Adjacent B1	2	18 5/8"	C	I1	3	21"	C			
		I2A	H		1		C	I2A	3		C			
		I2B	H		2*	32 5/8"	L	I2B	-	-	L			
		I2B	H		2	32 5/8"	R	I2B	-	-	R			

* Except adjacent panel A4. See A45C

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 21'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
A3	S	I1	H	Adjacent B1	2	18 ⁷ / ₈ "	C					252	126	63
		I2A	H		1		C							
		I2B	H		2*	33"	L							
		I2B	H		2	33"	R							
A4	L	I1	H	Adjacent disc. edge	1	27"	C	I1	3	18"	C	216	108	54
		I2A	H		1		C	I2A	3		C			
		I2B	H		B 3 L		L	I2B	B 3 L		L			
		I2B	H		2	27"	R	I2B	-	-	R			
		Whole col. strip shared with A2 as A2LC												
	S	I1	W		5	15 ³ / ₄ "	C	I1	3	21"	C	252	126	63
		E2A	W		3		L	E2A	3		L			
		I2B	W		5	25 ¹ / ₄ "	L	I2B	1	-	L			
		I2B	W		2	63"	R	I2B	-	-	R			
		I1	H	Adjacent B2	2	16 ⁵ / ₈ "	C							
		E2A	H		2		L							
		I2B	H		3	18 ⁷ / ₈ "	L							
		I2B	H		1	33"	R							
		I1	H	Adjacent B3	2	16 ⁵ / ₈ "	C							
		E2A	H		2		L							
		I2B	H		3	18 ⁷ / ₈ "	L							
		I2B	H		1	33"	R							
A5	L	I1	H	Adjacent disc. edge	1	27"	C	I1	3	18"	C	216	108	54
		I2A	H		1		C	I2A	3		C			
		I2B	H		B 3 L		L	I2B	B 3 L		L			
		I2B	H		G 2 L		R	I2B	-	-	R			
		Whole col. strip shared with A3 as A3LC												
	S	I1	H	Adjacent B3	2	16 ⁵ / ₈ "	C	I1	3	21"	C	252	126	63
		E2A	H		2		L	E2A	3		L			
		I2B	H		3	18 ⁷ / ₈ "	L	I2B	1	-	L			
		I2B	H		1	33"	R	I2B	-	-	R			
		I1	H	Adjacent G2	2	16 ¹ / ₄ "	C							
		E2A	H		2		L							
		I2B	H		3	21 ³ / ₄ "	L							
		I2B	H		1	32 ⁵ / ₈ "	R							

18- Except adjacent panel A5 see A5SC

18'-00" x 21'-00"

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
A6	L	I1	H	Adjacent	2	11 7/8"	C	I1	3	18"	C	216	108	54
		I2A	H	Adjacent	2		C	I2A	3		C			
		I2B	H	Adjacent	C 2 L		L	I2B	C 2 L		L			
		I2B	H	Adjacent	B 2 L		R	I2B	B 2 L		R			
		Whole col. strip shared with A1 is same as A1LC												
	S	I1	H	Adjacent	2	19 1/8"	C	I1	3	21"	C	252	126	63
		I2A	H	Adjacent	1		C	I2A	3		C			
		I2B	H	Adjacent	A 1 S		L	I2B	A 1 S		L			
		I2B	H	Adjacent	A 1 S		R	I2B	-	-	R			
		I1	H	Adjacent	2	19 1/8"	C							
		I2A	H	Adjacent	1		C							
		I2B	H	Adjacent	A 1 S		L							
		I2B	H	Adjacent	A 1 S		R							
A7	L	I1	H	Adjacent	2	11 7/8"	C	I1	3	18"	C	216	108	54
		I2A	H	Adjacent	2		C	I2A	3		C			
		I2B	H	Adjacent	B 2 L		L	I2B	B 2 L		L			
		I2B	H	Adjacent	2	38 1/2"	R	I2B	-	-	R			
		Whole col. strip shared with A2 is same as A2LC												
	S	I1	H	Adjacent	2	18 7/8"	C	I1	3	21"	C	252	126	63
		I2A	H	Adjacent	1		C	I2A	3		C			
		I2B	H	Adjacent	A 2 S		L	I2B	A 2 S		L			
		I2B	H	Adjacent	A 2 S		R	I2B	-	-	R			
		I1	W		4	21"	C							
		I2A	W		2		C							
		I2B	W		A 2 S		L							
		I2B	W		A 2 S		R							
A8	L	I1	H	Adjacent	2	14 5/8"	C	I1	3	18"	C	216	108	54
		I2A	H	Adjacent	2		C	I2A	3		C			
		I2B	H	Adjacent	C 3 L		L	I2B	C 3 L		L			
		I2B	H	Adjacent	B 4 L		R	I2B	B 4 L		R			
		Whole col. strip shared with A1 is same as A1LC												

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 21'-00"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
A8	S	I1	H	Adjacent C3	2	19 1/8"	C	I1	3	21"	C	252	126	63
		I2A	H		1		C	I2A	3		C			
		I2B	H		E 1 5		L	I2B	-	-	L			
		I2B	H		A 1 5		R	I2B	-	-	R			
		I1	H	Adjacent B4	2	18 7/8"	C							
		I2A	H		1		C							
		I2B	H		E 1 5		L							
		I2B	H		A 1 5		R							
A9	L	I1	H	Adjacent E2	2	14 1/4"	C	I1	3	18"	C	216"	108"	54"
		I2A	H		2		C	I2A	3		C			
		I2B	H		B 4 L		L	I2B	B 4 L		L			
		I2B	H		2	22 3/4"	R	I2B	-	-	R			
		Whole col. strip shared with A2 is same as A2LC.												
	S	I1	W		4	21"	C	I1	3	21"	C	252	126	63
		I2A	W		2		C	I2A	3		C			
		I2B	W		E 2 5		L	I2B	-	-	L			
		I2B	W		A 2 5		R	I2B	-	-	R			
		I1	H	Adjacent B4	2	21"	C							
		I2A	H		1		C							
		I2B	H		E 2 5		L							
		I2B	H		A 2 5		R							
A10	L	I1	H	Adjacent E3	2	14 1/4"	C	I1	3	18"	C	216	108	54
		I2A	H		2		C	I2A	3		C			
		I2B	H		B 4 L		L	I2B	B 4 L		L			
		I2B	H		G 3 L		R	I2B	G 3 L		R			
		Whole col. strip adjacent E shared with A3 same as A3LC.												
	S	I1	H	Adjacent B4	2	18 7/8"	C	I1	3	21"	C	252	126	63
		I2A	H		1		C	I2A	3		C			
		I2B	H		E 3 5		L	I2B	-	-	L			
		I2B	H		A 3 5		R	I2B	-	-	R			
		I1	H	Adjacent C3	2	18 5/8"	C							
		I2A	H		1		C							
		I2B	H		E 3 5		L							
		I2B	H		A 3 5		R							

BAR PLACEMENT SCHEDULE (FS)

18'-10" x 23'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.			
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width			
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o						
B1	L	I1	W		6	12"	C	I1	4	13 1/2"	C	216	108	54			
		I2A	W		3		C	I2A	4		C						
		I2B	W		4	27"	L	I2B	1	-	L						
		I2B	W		4	27"	R	I2B	1	-	R						
	S	I1	H	Adjacent A1, A2, A3	2	18 7/8"	C	I1	3	23"	C	276	138	69			
		I2A	H		2		C	I2A	3		C						
		I2B	H		2*	33"	L	I2B	-*	-	L						
		I2B	H		2	33"	R	I2B	-	-	R						
B2	L	I1	H	Adjacent R1, R2	3	10 1/2"	C	I1	4	13 1/2"	C	216	108	54			
		I2A	H		2		C	I2A	4		C						
		I2B	H		2	28 7/8"	L	I2B	1		L						
		I2B	H		2	28 7/8"	R	I2B	1		R						
		Whole col. strip shared with B1 is same as B1LC															
	S	I1	H	Adjacent A6 & A7	2	18 7/8"	C	I1	3	23"		276	138	69			
		I2A	H		2		C	I2A	3								
		I2B	H		R 1/2 5		L	I2B	R 1/2 5								
		I2B	H		B 1/2 5		R	I2B	-								
		I1	H	Adjacent A4	2	16 5/8"	C										
		I2A	H		2		C										
		I2B	H		R 1/2 5		L										
		I2B	H		B 1/2 5		R										
B3	L	I1	H	Adjacent disc. edge	2	18"	C	I1	4	13 1/2"	C	216	108	54			
		I2A	H		1		C	I2A	4		C						
		I2B	H		1		L	I2B	1	-	L						
		I2B	H		1		R	I2B	1	-	R						
		Whole col. strip shared with B1 is same as B1LC															
	S	I1	H	Adjacent A4 & A5	2	16 5/8"	C	I1	4	17 1/4"	C	276	138	69			
		E2A	H		2		L	E2A	4		L						
		I2B	H		4	18 7/8"	L	I2B	2	69"	L						
		I2B	H		3	33"	R	I2B	-	-	R						

18'-00" x 23'-00"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
B4	L	I1	H	Adjacent	3	11 3/8"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H	F1	2		C	I2A	4		C			
		I2B	H	Adjacent	3	16 1/4"	L	I2B	1		L			
		I2B	H	Adjacent	3	16 1/4"	R	I2B	1		R			
		Whole col. strip shared with B1 same as B1LC												
S		I1	H	Adjacent	2	18 7/8"	C	I1	3	23"	C	276	138	69
		I2A	H	A9 & A10	2		C	I2A	3		C			
		I2B	H	Adjacent			L	I2B	-	-	L			
		I2B	H	A9 & A10			R	I2B	-	-	R			

BAR PLACEMENT SCHEDULE
(FS)

18'-00" x 23'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
C1	L	I1	W		6	$10\frac{3}{4}$ "	C	I1	4	$13\frac{1}{2}$ "	C	216	108	54
		I2A	W		4		C	I2A	4		C			
		I2B	W		0 3/4 10		L	I2B	0 3/4 10		L			
		I2B	W		5	$21\frac{5}{8}$ "	R	I2B	1	-	R			
		I1	H	Adjacent C2	3	$10\frac{3}{4}$ "	C							
		I2A	H		2		C							
		I2B	H		3	18"	L							
		I2B	H		3	18"	R							
	S	I1	H	Adjacent D3 & D4	2	$17\frac{7}{8}$ "	C	I1	3	$23\frac{1}{2}$ "	C	282	141	70.5
		I2A	H		2		C	I2A	3		C			
		I2B	H		3	$23\frac{1}{2}$ "	L	I2B	-	-	L			
		I2B	H		3	$23\frac{1}{2}$ "	R	I2B	-	-	R			
		I1	H	Adjacent D10	2	$17\frac{5}{8}$ "	C							
		I2A	H		2		C							
		I2B	H		3	$23\frac{1}{2}$ "	L							
		I2B	H		3	$23\frac{1}{2}$ "	R							
		I1	H	Adjacent A1	2	$19\frac{1}{2}$ "	C							
		I2A	H		2		C							
		I2B	H		3	$26\frac{5}{8}$ "	L							
		I2B	H		3	$26\frac{5}{8}$ "	R							
C2	L	E3	H	Adjacent C1	4	9"	L	E3	5	$10\frac{3}{4}$ "	L	216	108	54
		E2A	H		2		L	E2A	5		L			
		E4	H		4	$13\frac{1}{2}$ "	L	E4	1		L			
		I2B	H		3	18"	R	I2B	1		R			
		E3	H	Adjacent 51	4	$8\frac{7}{8}$ "	L							
		E2A	H		2		L							
		E4	H		4	$14\frac{1}{2}$ "	L							
		I2B	H		3	$19\frac{1}{4}$ "	R							
	S	I1	H	Adjacent disc. edge	2	$23\frac{1}{2}$ "	C	I1	3	$23\frac{1}{2}$ "	C	282	141	70.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	5 1/5		L			
		I2B	H		-	-	R	I2B	-	-	R			

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 23'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
C2	S	I1	H	Adjacent A6	2	19 1/8"	C							
		I2A	H		2		C							
		I2B	H		5 1/5		L							
		I2B	H		6 1/5		R							
C3	L	I1	H	Adjacent H1	3	10 3/8"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		2		C	I2A	4		C			
		I2B	H		5 6/8		L	I2B	5 6/8		L			
		I2B	H		3		R	I2B	1		R			
		Whole col. CI same strip shared with C1LC												
	S	I1	H	Adjacent D6 & D8	2	17 3/4"	C	I1	3	23 1/2"	C	282	141	70.5
		I2A	H		2		C	I2A	3		C			
		I2B	H		5 1/5		L	I2B	-		L			
		I2B	H		6 1/5		R	I2B	-		R			
		I1	H	Adjacent A8	2	19 1/8"	C							
		I2A	H		2		C							
		I2B	H		5 1/5		L							
		I2B	H		6 1/5		R							

14

Let

1-

291

14

21

1-

1

1

1.

1.

1

1

1

1

1

1.

15

1

1.

1

1

—

- 1

1

1

1

1.

—

1

1

1

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D1	L	E3	W		8	$8\frac{1}{4}"$	L	E3	5	$10\frac{3}{4}"$	L	216	108	54
		E2A	W		5		L	E2A	5		L			
		E4	W		7	$15\frac{3}{8}"$	L	E4	1	-	L			
		I2B	W		5	$21\frac{5}{8}"$	R	I2B	-	-	R			
		E3	H	Adjacent D7	4	$7\frac{5}{8}"$	L							
		E2A	H		3		L							
		E4	H		4	$13\frac{1}{2}"$	L							
		I2B	H		3	18"	R							
	S	I1	H	Adjacent disc. edge	2	$24"$	C	I1	3	$24"$	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		-*	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	W		4	$20\frac{1}{2}"$	C							
		I2A	W		3		C							
		I2B	W		4	36"	L							
		I2B	W		4	36"	R							
D2	L	E3	H	Adjacent disc. edge	4	$7\frac{5}{8}"$	L	E3	5	$10\frac{3}{4}"$	L	216	108	54
		E2A	H		3		L	E2A	5		L			
		E4	H		4	$13\frac{1}{2}"$	L	E4	1	-	L			
		I2B	H		4	$13\frac{1}{2}"$	R	I2B	-	-	R			
		Whole col. strip shared with D1 same as D1 LC												
	S	I1	H	Adjacent disc. edge D3	3	$12\frac{1}{4}"$	C	I1	4	18"	C	288	144	72
		E2A	H		2		L	E2A	4		L			
		I2B	H		3	24	L	I2B	1		L			
		I2B	H		2	36	R	I2B	-		R			
D3	L	I1	W		6	$10\frac{3}{4}"$	C	I1	4	$13\frac{1}{2}"$	C	216	108	54
		I2A	W		4		C	I2A	4		C			
		I2B	W		D1-2 L 7-1		L	I2B	-	-	L			
		I2B	W		5	$21\frac{5}{8}"$	R	I2B	1	-	R			
		I1	H	Adjacent D4 & D8	3	$10\frac{3}{8}"$	C							
		I2A	H		2		C							
		I2B	H		D2-7 L		L							
		I2B	H		-	-	R							

* Except as noted D2 - See D2SC

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D3	S	I1	H	Adjacent C1	2	17 ³ / ₄ "	C	I1	3	24"	C	288	144	72
		I2A	H		2		C	I2A	3		C			
		I2B	H		2	28 ¹ / ₂ "	L	I2B	-	-	L			
		I2B	H		2	28 ¹ / ₂ "	R	I2B	-	-	R			
		Whole strip adjacent is same as D15C												
D4	L	E3	W		8	8 ¹ / ₄ "	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	W		5		L	E2A	5		L			
		E4	W		7	15 ³ / ₈ "	L	E4	1	L				
		I2B	W		5	21 ⁵ / ₈ "	R	I2B		R				
		E3	H		Adjacent D3	4	7 ⁵ / ₈ "	L						
		E2A	H	3		L								
		E4	H	4		13 ¹ / ₂ "	L							
		I2B	H	3		18"	R							
	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		D 3 5	L	I2B	-	-	L				
		I2B	H		D 10 5	R	I2B	-	-	R				
		I1	H		Adjacent C1	2	17 ⁷ / ₈ "	C						
		I2A	H	2		C								
		I2B	H	D 3 5		L								
		I2B	H	D 10 5		R								
D5	L	E5	H	Adjacent M1		4	8 ³ / ₄ "	L	E5	5	10 ³ / ₄ "	L	216	108
		E2A	H		3	L		E2A	5	L				
		E6	H		4	14 ¹ / ₄ "	L	E6	1	-	L			
		I2B	H		3	22 ³ / ₄ "	R	I2B	-	-	R			
		E5	W		8	8 ¹ / ₄ "	L							
		E2A	W	5	L									
		E6	W	7	15 ³ / ₈ "	L								
		I2B	W	5	21 ⁵ / ₈ "	R								
	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		M 1 5	L	I2B	M 1 5	-	L				
		I2B	H		-	-	R	I2B	-	-	R			

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D5	S	I1	W		4	20 1/2"	C							
		I2A	W		3		C							
		I2B	W		M 1 5		L							
		I2B	W		4	36"	R							
D6	L	I1	H	Adjacent M2	3	10 3/8"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		2		C	I2A	4		C			
		I2B	H		D 5 L	L	I2B	-	-	L				
		I2B	H		3	28 1/2"	R	I2B	1	-	R			
		Whole col. strip shared with D3 is same as D3LC												
	S	I1	H	Adjacent C3	2	17 3/4"	C	I1	3	24"	C	288	144	72
		I2A	H		2		C	I2A	3		C			
		I2B	H		M 2 5	L	I2B	M 2 5	L					
		I2B	H		D 3 5	R	I2B	-	-	R				
		Whole col. strip shared with D5 is same as D5SC												
D7	L	E5	W		8	8 1/4"	L	E5	5	10 3/4"	L	216	108	54
		E2A	W		5		L	E2A	5		L			
		E6	W		7	15 3/8"	L	E6	1	-	L			
		I2B	W		5	21 5/8"	R	I2B	-	-	R			
		E5	H	Adjacent D1	4	7 3/4"	L							
		E2A	H		3		L							
		E6	H		4	13 1/2"	L							
		I2B	H		3	18"	R							
	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B		L				
		I2B	H		-	-	R	I2B		R				
		I1	W			4	20 1/2"	C						
		I2A	W		3	C								
		I2B	W		4	36"		L						
		I2B	W		4	36"	R							
D8	L	E5	H	Adjacent M2 & D3	4	7 5/8"	L	E5	5	10 3/4"		216	108	54
		E2A	H		3		L	E2A	5					
		E6	H		4	13 1/2"	L	E6	1	-				
		I2B	H		3	18"	R	I2B	-	-				

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spac-ing	Bar e. or c.o	Bar No.	No. of bars	Spac-ing	Bar e. or c.o			
D8	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	H	Adjacent disc. edge	2	17 3/4"	C							
		I2A	H		2		C							
		I2B	H		C3	M 2 5	L							
		I2B	H			D 3 5	R							
D9	L	E5	H	Adjacent disc edge	4	7 5/8"	L	E5	5	10 3/4"	L	216	108	54
		E2A	H		3		L	E2A	5		L			
		E6	H		4	27"	L	E6	1	-	L			
		I2B	H		3	18"	R	I2B	-	-	R			
		Whole col. strip shared with D7 is same as D7LC												
	S	E5	H	Adjacent disc. edge of D3	3	12 1/4"	L	E5	4	18"	L	288	144	72
		E2A	H		2		L	E2A	4		L			
		E6	H		3	24"	L	E6	1	-	L			
		I2B	H		2	36"	R	I2B	D 7 5		R			
D10	L	E3	H	Adjacent disc. edge	4	7 5/8"	L	E3	5	10 3/4"	L	216	108	54
		E2A	H		3		L	E2A	5		L			
		E4	H		2	27"	L	E4	1	-	L			
		I2B	H		3	18"	R	I2B	-	-	R			
		Whole strip shared with D4 is same as D4 LC.												
	S	E3	H	Adjacent disc. edge of C1	3	14 1/4"	L	E3	4	18"	L	288	144	72
		E2A	H		2		L	E2A	4		L			
		E4	H		3	24"	L	E4	1	-	L			
		I2B	H		2	36"	R	I2B	-	-	R			

BAR PLACEMENT SCHEDULE (FS)

20'-10" x 21'-00"

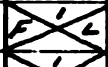
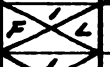
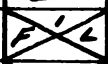
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
E1	L	I1	H	Adjacent disc. edge	1	30"	C	I1	3	20"	C	240	120	60
		I2A	H	Adjacent disc. edge	1		C	I2A	3		C			
		I2B	H	Adjacent disc. edge	N		L	I2B	N		L			
		I2B	H	Adjacent disc. edge	F		R	I2B	F		R			
		I1	H	Adjacent A8	2	14 1/4"	C							
		I2A	H	Adjacent A8	2		C							
		I2B	H	Adjacent A8	N		L							
		I2B	H	Adjacent A8	F		R							
	S	E3	H	Adjacent H1	3	12 1/8"	L	E3	4	15 3/4"	L	252	126	63
		E2A	H	Adjacent H1	2		L	E2A	4		L			
		E4	H	Adjacent H1	3		L	E4	1		L			
		I2B	H	Adjacent H1	3		R	I2B	-		R			
		E3	H	Adjacent F1	3	12"	L							
		E2A	H	Adjacent F1	2		L							
		E4	H	Adjacent F1	3		L							
		I2B	H	Adjacent F1	3		R							
E2	L	I1	H	Adjacent disc. edge	1	30"	C	I1	3	20"	C	240	120	60
		I2A	H	Adjacent disc. edge	1		C	I2A	3		C			
		I2B	H	Adjacent disc. edge	F		L	I2B	F		L			
		I2B	H	Adjacent disc. edge	2		R	I2B	1		R			
		I1	H	Adjacent A9	2	14 1/4"	C							
		I2A	H	Adjacent A9	2		C							
		I2B	H	Adjacent A9	F		L							
		I2B	H	Adjacent A9	3		R							
	S	E3	H	Adjacent F1	3	12"	L	E3	4	15 3/4"	L	252	126	63
		E2A	H	Adjacent F1	2		L	E2A	4		L			
		E4	H	Adjacent F1	3		L	E4	1		L			
		I2B	H	Adjacent F1	3		R	I2B	-		R			
		E3	W		6	12 5/8"	L							
		E2A	W		4		L							
		E4	W		6		L							
		I2B	W		5		R							

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 21'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width	
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.				
E3	L	I1	H	Adjacent disc. edge	1	30"	C	I1	3	20"	C	240	120	60	
		I2A	H		1		C	I2A	3		C				
		I2B	H				L	I2B			L				
		I2B	H				R	I2B			R				
		I1	H	Adjacent A/C	2	14 1/4"	C								
		I2A	H		2		C								
		I2B	H				L								
		I2B	H				R								
	S	E3	H	Adjacent F1	3	12"	L	E3	4	15 3/4"	L	252	126	63	
		E2A	H		2		L	E2A	4		L				
		E4	H		3	22"	L	E4	1	-	L				
		I2B	H		3	22"	R	I2B	-	-	R				
		E3	H	Adjacent L1	3	13"	L								
		E2A	H		2		L								
		E4	H		3	18 5/8"	L								
		I2B	H		3	21 3/4"	R								

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 23'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or o.o	Bar No.	No. of bars	Spacing	Bar e. or o.o			
F1	L	I1	H	Adjacent dis. edge	2	20"	C	I1	4	15"	C	240	120	60
		I2A	H		1		C	I2A	4		C			
		I2B	H		2	30"	L	I2B	2	60"	L			
		I2B	H		2	30"	R	I2B	2	60"	R			
		I1	H	Adjacent B4	3	11 3/8"	C							
		I2A	H		2		C							
		I2B	H		4	16 1/4"	L							
		I2B	H		4	16 1/4"	R							
	S	E3	H	Adjacent E1, E2 & E3	4	12"	L	E3	5	13 3/4"	L	276	138	69
		E2A	H		2		L	E2A	5		L			
		E4	H		3	22"	L	E4	-	-	L			
		I2B	H		3	22"	R	I2B	-	-	R			

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 22'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.			
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width			
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.						
G1	L	E3	W		7	$\left\{ \begin{array}{l} 9\frac{7}{8} \\ 18'' \\ 27'' \end{array} \right.$	L	E3	4	$\left\{ \begin{array}{l} 13\frac{1}{2}'' \\ - \\ - \end{array} \right.$	L	216	108	54			
		E2A	W		4		L	E2A	4		L						
		E4	W		6		L	E4	1		L						
		I2B	W		4		R	I2B	1		R						
	S	I1	H	Adjacent disc. edge	2	$\left\{ \begin{array}{l} 16\frac{7}{8}'' \\ - \\ - \end{array} \right.$	C	I1	3	$\left\{ \begin{array}{l} 22\frac{1}{2}'' \\ - \\ - \end{array} \right.$	C	270	135	67.5			
		I2A	H		2		C	I2A	3		C						
		I2B	H		-		L	I2B	-		L						
		I2B	H		-		R	I2B	-		R						
		I1	H	Adjacent disc. edge A3	2	$\left\{ \begin{array}{l} 18\frac{5}{8}'' \\ 32\frac{5}{8}'' \\ 32\frac{5}{8}'' \end{array} \right.$	C										
		I2A	H		2		C										
		I2B	H		2*		L										
		I2B	H		2		R										
G2	L	E3	H	Adjacent disc. edge	2	$\left\{ \begin{array}{l} 18'' \\ 27'' \\ - \end{array} \right.$	L	E3	4	$\left\{ \begin{array}{l} 13\frac{1}{2}'' \\ - \\ 36'' \end{array} \right.$	L	216	108	54			
		E2A	H		1		L	E2A	4		L						
		E4	H		2		L	E4	3		L						
		I2B	H		1		R	I2B	-		R						
		Whole col. strip shared with G1 is same as G1LC															
	S	I1	H	Adjacent disc. edge	2	$\left\{ \begin{array}{l} 16\frac{7}{8}'' \\ 22\frac{1}{2}'' \\ 22\frac{1}{2}'' \end{array} \right.$	C	I1	4	$\left\{ \begin{array}{l} 16\frac{7}{8}'' \\ 67\frac{1}{2}'' \\ - \end{array} \right.$	C	270	135	67.5			
		E2A	H		2		L	E2A	4		L						
		I2B	H		3		L	I2B	2		L						
		I2B	H		3		R	I2B	-		R						
		I1	H	Adjacent disc. edge A5	2	$\left\{ \begin{array}{l} 16\frac{1}{4}'' \\ 21\frac{3}{4}'' \\ 32\frac{5}{8}'' \end{array} \right.$	C										
		E2A	H		2		L										
		I2B	H		3		L										
		I2B	H		3		R										
G3	L	E3	H	Adjacent disc. edge L1	4	$\left\{ \begin{array}{l} 9\frac{1}{2}'' \\ 16\frac{1}{4}'' \\ 22\frac{3}{4}'' \end{array} \right.$	L	E3	4	$\left\{ \begin{array}{l} 13\frac{1}{2}'' \\ - \\ - \end{array} \right.$	L	216	108	54			
		E2A	H		2		L	E2A	4		L						
		E4	H		3		L	E4	1		L						
		I2B	H		2		R	I2B	1		R						
		Whole col. strip shared with G1 is same as G1LC															

* Except adjacent to G2 see G25C

Bar	Length	Bar No.	Bar Size	Strip No.	Column Strip	Row Strip	Notes
1	10	1	1/2"	1	1	1	
2	10	2	1/2"	2	1	2	
3	10	3	1/2"	3	1	3	
4	10	4	1/2"	4	1	4	
5	10	5	1/2"	5	1	5	
6	10	6	1/2"	6	1	6	
7	10	7	1/2"	7	1	7	
8	10	8	1/2"	8	1	8	
9	10	9	1/2"	9	1	9	
10	10	10	1/2"	10	1	10	
11	10	11	1/2"	11	1	11	
12	10	12	1/2"	12	1	12	
13	10	13	1/2"	13	1	13	
14	10	14	1/2"	14	1	14	
15	10	15	1/2"	15	1	15	
16	10	16	1/2"	16	1	16	
17	10	17	1/2"	17	1	17	
18	10	18	1/2"	18	1	18	
19	10	19	1/2"	19	1	19	
20	10	20	1/2"	20	1	20	
21	10	21	1/2"	21	1	21	
22	10	22	1/2"	22	1	22	
23	10	23	1/2"	23	1	23	
24	10	24	1/2"	24	1	24	
25	10	25	1/2"	25	1	25	
26	10	26	1/2"	26	1	26	
27	10	27	1/2"	27	1	27	
28	10	28	1/2"	28	1	28	
29	10	29	1/2"	29	1	29	
30	10	30	1/2"	30	1	30	
31	10	31	1/2"	31	1	31	
32	10	32	1/2"	32	1	32	
33	10	33	1/2"	33	1	33	
34	10	34	1/2"	34	1	34	
35	10	35	1/2"	35	1	35	
36	10	36	1/2"	36	1	36	
37	10	37	1/2"	37	1	37	
38	10	38	1/2"	38	1	38	
39	10	39	1/2"	39	1	39	
40	10	40	1/2"	40	1	40	
41	10	41	1/2"	41	1	41	
42	10	42	1/2"	42	1	42	
43	10	43	1/2"	43	1	43	
44	10	44	1/2"	44	1	44	
45	10	45	1/2"	45	1	45	
46	10	46	1/2"	46	1	46	
47	10	47	1/2"	47	1	47	
48	10	48	1/2"	48	1	48	
49	10	49	1/2"	49	1	49	
50	10	50	1/2"	50	1	50	
51	10	51	1/2"	51	1	51	
52	10	52	1/2"	52	1	52	
53	10	53	1/2"	53	1	53	
54	10	54	1/2"	54	1	54	
55	10	55	1/2"	55	1	55	
56	10	56	1/2"	56	1	56	
57	10	57	1/2"	57	1	57	
58	10	58	1/2"	58	1	58	
59	10	59	1/2"	59	1	59	
60	10	60	1/2"	60	1	60	
61	10	61	1/2"	61	1	61	
62	10	62	1/2"	62	1	62	
63	10	63	1/2"	63	1	63	
64	10	64	1/2"	64	1	64	
65	10	65	1/2"	65	1	65	
66	10	66	1/2"	66	1	66	
67	10	67	1/2"	67	1	67	
68	10	68	1/2"	68	1	68	
69	10	69	1/2"	69	1	69	
70	10	70	1/2"	70	1	70	
71	10	71	1/2"	71	1	71	
72	10	72	1/2"	72	1	72	
73	10	73	1/2"	73	1	73	
74	10	74	1/2"	74	1	74	
75	10	75	1/2"	75	1	75	
76	10	76	1/2"	76	1	76	
77	10	77	1/2"	77	1	77	
78	10	78	1/2"	78	1	78	
79	10	79	1/2"	79	1	79	
80	10	80	1/2"	80	1	80	
81	10	81	1/2"	81	1	81	
82	10	82	1/2"	82	1	82	
83	10	83	1/2"	83	1	83	
84	10	84	1/2"	84	1	84	
85	10	85	1/2"	85	1	85	
86	10	86	1/2"	86	1	86	
87	10	87	1/2"	87	1	87	
88	10	88	1/2"	88	1	88	
89	10	89	1/2"	89	1	89	
90	10	90	1/2"	90	1	90	
91	10	91	1/2"	91	1	91	
92	10	92	1/2"	92	1	92	
93	10	93	1/2"	93	1	93	
94	10	94	1/2"	94	1	94	
95	10	95	1/2"	95	1	95	
96	10	96	1/2"	96	1	96	
97	10	97	1/2"	97	1	97	
98	10	98	1/2"	98	1	98	
99	10	99	1/2"	99	1	99	
100	10	100	1/2"	100	1	100	

18'-00" x 22'-6"
Roof

[illegible]

20'-00" x 23'-6"
Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	$\frac{1}{2}$ Panel Width	$\frac{1}{4}$ Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
H1	L	I1	H	Adjacent	2	$\left\{ 20'' \right.$	C	I1	4	$\left\{ 15'' \right.$	C	240	120	60
		I2A	H	Adjacent	1	$\left. \right\}$	C	I2A	4	$\left. \right\}$	C			
		I2B	H	Adjacent	-	-	L	I2B	-	-	L			
		I2B	H	disc. edge	2	30"	R	I2B	2	60"	R			
		I1	H	Adjacent	4	$\left\{ 10\frac{3}{4}'' \right.$	C							
		I2A	H	Adjacent	2	$\left. \right\}$	C							
		I2B	H	C3	1	2	L							
		I2B	H	Adjacent	3	19"	R							
	S	E3	H	Adjacent	4	$\left\{ 11\frac{7}{8}'' \right.$	L	E3	5	$\left\{ 14\frac{1}{8}'' \right.$	L	282	141	70.5
		E2A	H	Adjacent	2	$\left. \right\}$	L	E2A	5	$\left. \right\}$	L			
		E4	H	M2	3	$23\frac{3}{4}''$	L	E4	-	-	L			
		I2B	H	Adjacent	3	$28\frac{1}{2}''$	R	I2B	-	-	R			
		E3	H	Adjacent	4	$\left\{ 12\frac{1}{8}'' \right.$	L							
		E2A	H	Adjacent	2	$\left. \right\}$	L							
		E4	H	E1	3	$22\frac{1}{8}''$	L							
		I2B	H	Adjacent	3	$22\frac{1}{8}''$	R							

BAR PLACEMENT SCHEDULE (FS)

23'-00" x 21'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
I1	L	I1	H	Adjacent K1	4	11 1/8"	C	I1	5	12 5/8"	C	252	126	63
		I2A	H		2		C	I2A	5		C			
		I2B	H		3	22 1/4"	L	I2B	-	-	L			
		I2B	H		3	22 1/4"	R	I2B	-	-	R			
		I1	H	Adjacent J1	4	11"	C							
		I2A	H		2		C							
		I2B	H		3	22"	L							
		I2B	H		3	22"	R							
	S	I1	H	Adjacent Q1	3	13"	C	I1	4	17 1/4"	C	276	138	69
		I2A	H		2		C	I2A	4		C			
		I2B	H		3	22"	L	I2B	1	17 1/4"	L			
		I2B	H		3	22"	R	I2B	1	17 1/4"	R			
		I1	H	Adjacent Q2	3	13"	C	I1	4	17 1/4"	C			
		I2A	H		2		C	I2A	4		C			
		I2B	H		3	22"	L	I2B	1	17 1/4"	L			
		I2B	H		3	22"	R	I2B	1	17 1/4"	R			
I2	L	I1	H	Adjacent J1	4	11"	C	I1	5	12 5/8"	C	252	126	63
		I2A	H		2		C	I2A	5		C			
		I2B	H		3	22"	L	I2B	-	-	L			
		I2B	H		3	22"	R	I2B	-	-	R			
		I1	W	Adjacent J2	7	11 3/8"	C							
		I2A	W		4		C							
		I2B	W		6	21"	L							
		I2B	W		6	21"	R							
	S	I1	H	Adjacent Q2	3	13"	C	I1	4	17 1/4"	C	276	138	69
		I2A	H		2		C	I2A	4		C			
		I2B	H		3	22"	L	I2B	1	17 1/4"	L			
		I2B	H		3	22"	R	I2B	1	17 1/4"	R			
		I1	H	Adjacent Q2	2	43 1/2"	R							
		I2A	H		2		R							
		I2B	H		2	43 1/2"	R							
		I2B	H		2	43 1/2"	R							

23'-00" x 23'-00"
Roof

23'-00" x 23'-00"
Roof

BAR PLACEMENT SCHEDULE (FS)

23'-00" x 23'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
K1	L	E3	H	Adjacent 5'	5	8 5/8"	L	E3	6	11 3/4"	L	276	138	69
		E2A	H		3		L	E2A	6		L			
		E4	H		4	16 1/4"	L	E4	1	-	L			
		I2B	H		3	21 3/4"	R	I2B	1	-	R			
	S	I1	H	Adjacent disc. edge	2	23"	C	I1	5	13 3/4"	C	282	141	70.5
		I2A	H		1		C	I2A	5		C			
		I2B	H		1	-	L	I2B	1		L			
		I2B	H		1	-	R	I2B	1		R			
		I1	H	Adjacent I1	4	11 1/8"	C							
		I2A	H		2		C							
		I2B	H		3	22 1/4"	L							
		I2B	H		3	22 1/4"	R							

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 22'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
L1	L	E3	H	Adjacent	4	10"	L	E3	5	12"	L	240	120	60
		E2A	H	Adjacent	2		L	E2A	5		L			
		E4	H	Adjacent	4	15"	L	E4	1	-	L			
		I2B	H	disc. edge	4	15"	R	I2B	1	-	R			
		E3	H	Adjacent	4	9 1/2"	L							
		E2A	H	Adjacent	2		L							
		E4	H	Adjacent	4	16 1/4"	L							
		I2B	H	Adjacent	3	22 3/4"	R							
	S	E3	H	Adjacent	3	27"	L	E3	5	13 1/2"	L	270	135	67.5
		E2A	H	Adjacent	2		L	E2A	5		L			
		E4	H	Adjacent	4	16 7/8"	L	E4	-	-	L			
		I2B	H	disc. edge	3	22 1/2"	R	I2B	-	-	R			
		E3	H	Adjacent	3	13"	L							
		E2A	H	Adjacent	2		L							
		E4	H	Adjacent	4	18 5/8"	L							
		I2B	H	Adjacent	3	21 3/4"	R							

20'-00" x 24'-00"

[illegible]

20'-00" x 24'-00"
Roof

[illegible]

BAR PLACEMENT SCHEDULE (FS)

20'-6" x 21'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
Q1	L	I1	H	Adjacent A6	3	11 7/8"	C	I1	4	15 3/4"	C	246	123	61.5
		I2A	H		2		C	I2A	4		C			
		I2B	H		5 1/2	1	L	I2B	5 1/2	1	L			
		I2B	H		R 1/2	1	R	I2B	R 1/2	1	R			
		I1	H	Adjacent A6	3	13"	C							
		I2A	H		2		C							
		I2B	H		5 1/2	1	L							
		I2B	H		R 1/2	1	R							
	S	I1	H	Adjacent A6	2	14 5/8"	C	I1	4	15 3/4"	C	252	126	63
		I2A	H		2		C	I2A	4		C			
		I2B	H		1 1/2	1	L	I2B	-	-	L			
		I2B	H		4	22 1/4"	R	I2B	1	-	R			
		I1	H	Adjacent A6	2	14 5/8"	C							
		I2A	H		2		C							
		I2B	H		1 1/2	1	L							
		I2B	H		4	18 7/8"	R							
Q2	L	I1	H	Adjacent A7	3	11 7/8"	C	I1	4	15 3/4"	C	246	123	61.5
		I2A	H		2		C	I2A	4		C			
		I2B	H		R 1/2	1	L	I2B	R 1/2	1	L			
		I2B	H		1	31 1/2"	R	I2B	-	-	R			
		I1	H	Adjacent A7	3	13"	C							
		I2A	H		2		C							
		I2B	H		R 1/2	1	L							
		I2B	H		1	43 1/2"	R							
	S	I1	H	Adjacent A7	2	14 5/8"	C	I1	4	15 3/4"	C	252	126	63
		I2A	H		2		C	I2A	4		C			
		I2B	H		1 1/2	1	L	I2B	-	-	L			
		I2B	H		4	18 7/8"	R	I2B	1	-	R			
		I1	W	Adjacent A7	5	15 3/4"	C							
		I2A	W		3		C							
		I2B	W		1 1/2	1	L							
		I2B	W		6	21"	R							

BAR PLACEMENT SCHEDULE (FS)

20'-6" x 23'-00"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
R1	L	I1	H	Adjacent B2	4	$\left\{ 10\frac{1}{2}'' \right.$	C	I1	4	$\left\{ 15\frac{3}{8}'' \right.$	C	246	123	61.5
		I2A	H		2		C	I2A	4		C			
		I2B	H		2	$28\frac{7}{8}''$	L	I2B	1	-	L			
		I2B	H		2	$28\frac{7}{8}''$	R	I2B	1	-	R			
		I1	H	Adjacent J1	4	$\left\{ 10\frac{7}{8}'' \right.$	C							
		I2A	H		2		C							
		I2B	H		2	$32\frac{5}{8}''$	L							
		I2B	H		2	$32\frac{5}{8}''$	R							
	S	I1	H	Adjacent Q1	3	$\left\{ 14\frac{5}{8}'' \right.$	C	I1	4	$\left\{ 17\frac{1}{4}'' \right.$	C	276	138	69
		I2A	H		2		C	I2A	4		C			
		I2B	H		1		L	I2B	-	-	L			
		I2B	H		3	$18\frac{7}{8}''$	R	I2B	1	-	R			
R2	L	E5	H	Adjacent B2	4	$\left\{ 8\frac{3}{4}'' \right.$	L	E5	5	$\left\{ 12\frac{1}{4}'' \right.$	L	246	123	61.5
		E2A	H		3		L	E2A	5		L			
		E6	H		4	$15\frac{3}{8}''$	L	E6	1		L			
		I2B	H		3	$28\frac{7}{8}''$	R	I2B	1		R			
		E5	H	Adjacent J2	4	$\left\{ 9\frac{3}{8}'' \right.$	L							
		E2A	H		3		L							
		E6	H		4	$16\frac{1}{4}''$	L							
		I2B	H		3	$21\frac{3}{4}''$	R							
	S	I1	H	Adjacent disc. edge	2	$\left\{ 23'' \right.$	C	I1	4	$\left\{ 17\frac{1}{4}'' \right.$	C	276	138	69
		I2A	H		1		C	I2A	4		C			
		I2B	H		1		L	I2B	1		L			
		I2B	H		1	-	R	I2B	1		R			
		I1	H	Adjacent Q2	3	$\left\{ 14\frac{5}{8}'' \right.$								
		I2A	H		2									
		I2B	H		1									
		I2B	H		3	$18\frac{7}{8}''$								

* Bars spaced independently of B2 due to bar shape.

20'-6" x 23'-6"

Roof

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
51	L	E3	H	Adjacent C2	4	$8\frac{7}{8}$ "	L	E3	6	$10\frac{1}{4}$ "	L	246	123	61.5
		E2A	H		3		L	E2A	6		L			
		E4	H		4	$14\frac{1}{2}$ "	L	E4	-	-	L			
		I2B	H		3	$19\frac{1}{4}$ "	R	I2B	-	-	R			
		E3	H	Adjacent E1	4	$8\frac{5}{8}$ "	L							
		E2A	H		3		L							
		E4	H		4	$16\frac{1}{4}$ "	L							
		I2B	H		3	$21\frac{3}{4}$ "	R							
S		I1	H	Adjacent div. edge	2	$23\frac{1}{2}$ "	C	I1	4	$17\frac{5}{8}$ "	C	282	141	70.5
		I2A	H		1		C	I2A	4		C			
		I2B	H		K1.5		L	I2B	K1.5	L				
		I2B	H		-	-	R	I2B	1	R				
		I1	H	Adjacent Q1	3	$14\frac{5}{8}$ "	C							
		I2A	H		2		C							
		I2B	H		K1.5		L							
		I2B	H		2	$22\frac{1}{4}$ "	R							

18'-00" x 21'-00"
1st Level Floor

* Except adjacent panel A4 Sec A45C
** " " " " " " " " " " " "

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 21'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
A3	S	I1	H	Adjacent G1	2	21 $\frac{3}{4}$ "	C					252	126	63
		I2A	H		1		C							
		I2B	H		1**	43 $\frac{1}{2}$ "	L							
		I2B	H		1	43 $\frac{1}{2}$ "	R							
A4	L	I1	H	Adjacent disc. edge	2	18"	C	I1	3	18"	C	216	108	54
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	3	L				
		I2B	H		-	-	R	I2B	-	-	R			
		Whole col strip shared with A2 same as A2LC												
	S	I1	W		4	18"	C	I1	3	21"	C	252	126	63
		E2A	W		3		L	E2A	3		L			
		I2B	W		5	25 $\frac{1}{4}$ "	L	I2B	3*	42"	L			
		I2B	W		3	42"	R	I2B	-	-	R			
		I1	H	Adjacent B2	2	18 $\frac{7}{8}$ "	C							
		E2A	H		2		L							
		I2B	H		3	22"	L							
		I2B	H		2	33"	R							
		I1	H	Adjacent B3	2	16 $\frac{1}{2}$ "	C							
		E2A	H		2		L							
		I2B	H		3	22"	L							
		I2B	H		2	33"	R							
A5	L	I1	H	Adjacent disc. edge	2	18"	C	I1	3	18"	C	216	108	54
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	3	L				
		I2B	H		6	2	R	I2B	6	2	R			
		Whole col strip shared with A3 same as A3LC												
	S	I1	H	Adjacent B3	2	16 $\frac{1}{2}$ "	C	I1	3	18"	C	252	126	63
		E2A	H		2		L	E2A	3		L			
		I2B	H		3	22"	L	I2B	3*	42"	L			
		I2B	H		2	33"	R	I2B	-	-	R			
		I1	H	Adjacent G2	2	16 $\frac{1}{4}$ "	C							
		E2A	H		2		L							
		I2B	H		3	21 $\frac{3}{4}$ "	L							
		I2B	H		2	32 $\frac{5}{8}$ "	R							

* Extra bars used to cut down spacing to 3t

18'-00" x 21'-00"
1st Level Floor

18'-00" x 21'-00"
1st Level Floor

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 21'-00"

1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
A8	S	I1	H	Adjacent C3	2	22 1/4"	C	I1	3	21"	C	252	126	63
		I2A	H		1		C	I2A	3		C			
		I2B	H		E 1 5		L	I2B	E 1 5		L			
		I2B	H		A 1 5		R	I2B	-	-	R			
		I1	H	Adjacent B4	2	22"	C							
		I2A	H		1		C							
		I2B	H		E 1 5		L							
		I2B	H		A 1 5		R							
A9	L	I1	H	Adjacent E2	2	14 1/4"	C	I1	3	18"	C	216	108	54
		I2A	H		2		C	I2A	3		C			
		I2B	H		B 4 L		L	I2B	B 4 L		L			
		I2B	H		2	22 3/4"	R	I2B	-	-	R			
		Whole col. strip shared with A2, same as A2LC												
	S	I1	W	Adjacent B4	4	21"	C	I1	3	21"	C	252	126	63
		I2A	W		2		C	I2A	3		C			
		I2B	W		E 2 5		L	I2B	E 2 5		L			
		I2B	W		A 2 5		R	I2B	-	-	R			
		I1	H		2	22"	C							
		I2A	H		1		C							
		I2B	H		E 2 5		L							
		I2B	H		A 2 5		R							
A10	L	I1	H	Adjacent E3	2	14 1/4"	C	I1	3	18"	C	216"	108"	54"
		I2A	H		2		C	I2A	3		C			
		I2B	H		B 4 L		L	I2B	B 4 L		L			
		I2B	H		G 3 L		R	I2B	G 3 L		R			
		Whole col. strip shared with A3 is same as A3LC												
	S	I1	H	Adjacent B4	2	22"	C	I1	3	21"	C	252"	126"	63"
		I2A	H		1		C	I2A	3		C			
		I2B	H		E 3 5		L	I2B	E 3 5		L			
		I2B	H		A 3 5		R	I2B	-	-	R			
		I1	H		2	21 3/4"	C							
		I2A	H		1		C							
		I2B	H	E 3 5		L								
		I2B	H	A 3 5		R								

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 23'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
B1	L	I1	W		6	12"	C	I1	4	13 1/2"	C	216	108	54
		I2A	W		3		C	I2A	4		C			
		I2B	W		5	21 5/8"	L	I2B	1	-	L			
		I2B	W		5	21 5/8"	R	I2B	1	-	R			
	S	I1	H		2	22"	C	I1	3	23"	C	276"	138"	69"
		I2A	H		1		C	I2A	3		C			
		I2B	H		2 *	44"	L	I2B	- *	-	L			
		I2B	H		2	44"	R	I2B	-	-	R			
B2	L	I1	H		3	11 1/2"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		2		C	I2A	4		C			
		I2B	H		2	19 1/4"	L	I2B	1	-	L			
		I2B	H		2	19 1/4"	R	I2B	1	-	R			
		I1	H		3	11"	C							
		I2A	H		2		C							
		I2B	H		2	19 1/4"	L							
		I2B	H		2	23 1/8"	R							
		Whole col. strip shared with B1 is same as B1LC												
	S	I1	H		2	22"	C	I1	3	23"	C	276	138	69
		I2A	H		1		C	I2A	3		C			
		I2B	H				L	I2B	-	-	L			
		I2B	H				R	I2B	-	-	R			
B3	L	I1	H		2	18"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		1		C	I2A	4		C			
		I2B	H		-	-	L	I2B	1		L			
		I2B	H		-	-	R	I2B	1		R			
		Whole col. strip shared with B1 is same as B1LC												
	S	I1	H		2	16 1/2"	C	I1	4	17 1/4"	C	276	138	69
		E2A	H		2		L	E2A	4		L			
		I2B	H		3	22"	L	I2B	1	-	L			
		I2B	H		2	33"	R	I2B	-	-	R			
B3S	L	I1	H		2	18"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		1		C	I2A	4		C			
		I2B	H		-	-	L	I2B	1		L			
		I2B	H		-	-	R	I2B	1		R			
		Whole col. strip shared with B1 is same as B1LC												
	S	I1	H		2	16 1/2"	C	I1	4	17 1/4"	C	276	138	69
		E2A	H		2		L	E2A	4		L			
		I2B	H		3	22"	L	I2B	1	-	L			
		I2B	H		2	33"	R	I2B	-	-	R			
B3S	L	I1	H		2	18"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		1		C	I2A	4		C			
		I2B	H		-	-	L	I2B	1		L			
		I2B	H		-	-	R	I2B	1		R			
		Whole col. strip shared with B1 is same as B1LC												
	S	I1	H		2	16 1/2"	C	I1	4	17 1/4"	C	276	138	69
		E2A	H		2		L	E2A	4		L			
		I2B	H		3	22"	L	I2B	1	-	L			
		I2B	H		2	33"	R	I2B	-	-	R			

* Except adjacent to panel B3S

18'-00" x 23'-00"
1st Level Floor

[illegible]

BAR PLACEMENT SCHEDULE
(FS)

18'-00" x 23'-6"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width	
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o				
C1	L	I1	W		6	12"	C	I1	4	13 1/2"	C	216	108	54	
		I2A	W		3		C	I2A	4		C				
		I2B	W		D 3/4 L		L	I2B	D 3/4 L		L				
		I2B	W		5	21 5/8"	R	I2B	1		R				
		I1	H	Adjacent C2	3	10 3/8"	C								
		I2A	H		2		C								
		I2B	H		D 10/8 L		L								
		I2B	H		3	18"	R								
	S	I1	H	Adjacent D3, D9, D10	2	20 3/8"	C	I1	3	23 1/2"	C	282	141	70.5	
		I2A	H		1		C	I2A	3		C				
		I2B	H		2	38 1/8"	L	I2B	-	-	L				
		I2B	H		2	38 1/8"	R	I2B	-	-	R				
		I1	H	Adjacent A1	2	22 1/4"	C								
		I2A	H		1		C								
		I2B	H		2	44 1/2"	L								
		I2B	H		2	44 1/2"	R								
		I1	H	Adjacent D10	2	20 3/8"	C								
		I2A	H		1		C								
		I2B	H		2	35 1/2"	L								
		I2B	H		2	28 1/2"	R								
C2	L	E3	H	Adjacent C1	4	9"	L	E3	5	10 3/4"	L	216	108	54	
		E2A	H		2		L	E2A	5		L				
		E4	H		3	18"	L	E4	1	-	L				
		I2B	H		3	18"	R	I2B	1	-	R				
		E3	H	Adjacent 51	4	8 7/8"	L								
		E2A	H		2		L								
		E4	H		3	16 1/2"	L								
		I2B	H		3	16 1/2"	R								



BAR PLACEMENT SCHEDULE
(FS)

18'-00" x 23'-6"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
C2	S	I1	H	Adjacent dir. edge	2	$23\frac{1}{2}$ "	C	I1	3	$23\frac{1}{2}$ "	C	282	141	70.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		$5\frac{1}{2}$		L	I2B	$5\frac{1}{2}$		L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	H	Adjacent A6	2	$22\frac{1}{4}$ "	C							
		I2A	H		1		C							
		I2B	H		$5\frac{1}{2}$		L							
		I2B	H		$6\frac{1}{2}$		R							
C3	L	I1	H	Adjacent H1	3	$11\frac{3}{8}$ "	C	I1	4	$13\frac{1}{2}$ "	C	216	108	54
		I2A	H		2		C	I2A	4		C			
		I2B	H		$6\frac{6}{8}$		L	I2B	$6\frac{6}{8}$		L			
		I2B	H		3	$22\frac{3}{4}$ "	R	I2B	1	-	R			
		Whole Col. Strip shared with C1 is same as C1 & C												
	S	I1	H	Adjacent A6	2	$22\frac{1}{4}$ "	C	I1	3	$13\frac{1}{2}$ "	C	282	141	70.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		$4\frac{1}{2}$		L	I2B	-	-	L			
		I2B	H		$6\frac{1}{2}$		R	I2B	$6\frac{1}{2}$		R			
		I1	H	Adjacent D6	2	$20\frac{3}{8}$ "	C							
		I2A	H		1		C							
		I2B	H		$4\frac{1}{2}$		L							
		I2B	H		$6\frac{1}{2}$		R							

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D1	L	E3	W		8	9"	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	W		4		L	E2A	5		L			
		E4	W		7	16 ⁷ / ₈ "	L	E4	1	-	L			
		I2B	W		4	27"	R	I2B	-	-	R			
		E3	H	Adjacent Disc. edge D5 & D7	4	9"	L							
		E2A	H		2		L							
		E4	H		4	13 ¹ / ₂ "	L							
		I2B	H		2	27"	R							
	S	I1	H	Adjacent Disc. edge	2	24"	C	I1	3	24"	C	288	144	72"
		I2A	H		1		C	I2A	3		C			
		I2B	H		*	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	W		4	20 ⁵ / ₈ "	C							
		I2A	W		3		C							
		I2B	W		4*		L							
		I2B	W		4		R							
D2	L	E3	H	Adjacent Disc. Edge	4	9"	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	H		2		L	E2A	5		L			
		E4	H		4	13 ¹ / ₂ "	L	E4	1	-	L			
		I2B	H		3	18"	R	I2B	-	-	R			
		Whole col. strip shared with D1 same as D1LC.												
	S	E3	H	Adjacent Disc. edge & D3	2	18"	L	E3	4	18"	L	288	144	72
		E2A	H		2		L	E2A	4		L			
		E4	H		4	24"	L	E4	1	-	L			
		I2B	H		3	36"	R	I2B	-	-	R			
D3	L	I1	W		6	10 ³ / ₄ "	C	I1	4	13 ¹ / ₂ "	C	216	108	54
		I2A	W		4		C	I2A	4		C			
		I2B	W		D1 L		L	I2B	-	-	L			
		I2B	W		4	27"	R	I2B	1	-	R			
		I1	H	Adjacent D8	3	10 ³ / ₈ "	C							
		I2A	H		2		C							
		I2B	H		D9 L		L							
		I2B	H		2	27"	R							

* Except adjacent D2 See D25C

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"

1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D3	S	I1	H	Adjacent C1	2	20 ³ / ₈ "	C	I1	3	24"	C	288	144	72
		I2A	H		2		C	I2A	3		C			
		I2B	H		2	38 ¹ / ₂ "	L	I2B	-	-	L			
		I2B	H		2	38 ¹ / ₂ "	R	I2B	-	-	R			
		Whole col. strip shared with D1 same as DISC												
D4	L	E3	W		8	9"	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	W		4		L	E2A	5		L			
		E4	W		7	16 ⁷ / ₈ "	L	E4	1	-	L			
		I2B	W		4	27"	R	I2B	-	-	R			
		E3	H		Adjacent D3	4	9"	L						
		E2A	H	2		L								
		E4	H	4		13 ¹ / ₂ "	L							
		I2B	H	2		27"	R							
	S	I1	H	Adjacent disc. edge		2	24"	C	I1	4	18"	C	288	144
		I2A	H		1	C		I2A	4	C				
		I2B	H		0 3 5		L	I2B	2	72"	L			
		I2B	H		0 10 5		R	I2B	-	-	R			
		I1	H		Adjacent C1	2	20 ³ / ₈ "	C						
		I2A	H	2		C								
		I2B	H	0 3 5			L							
		I2B	H	0 10 5			R							
D5	L	E5	H	Adjacent M1		4	8 ³ / ₄ "	L	E5	5	10 ³ / ₄ "	L	216	108
		E2A	H		2	L		E2A	5	L				
		E6	H		4	14 ¹ / ₂ "	L	E6	1	-	L			
		I2B	H		2	28 ¹ / ₂ "	R	I2B	-	-	R			
		E5	H		Adjacent D1	4	9"	L						
		E2A	H	2		L								
		E6	H	4		13 ¹ / ₂ "	L							
		I2B	H	2		27"	R							

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D5	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	W		4	20 1/2"	C							
		I2A	W		3		C							
		I2B	W		M 1/5		L							
		I2B	W		D 1/5		R							
D6	L	I1	H	Adjacent M2	3	10 3/8"	C	I1	4	13 1/2"	C	216	108	54
		I2A	H		2		C	I2A	4		C			
		I2B	H		D 3/4	L	I2B	-	-	L				
		I2B	H		2	28 1/2"	R	I2B	1	-	R			
		Whole col. strip shared with D3 is same as D3LE.												
	S	I1	H	Adjacent C3	2	20 3/8"	C	I1	3	24"	C	288	144	72
		I2A	H		2		C	I2A	3		C			
		I2B	H		M 2/5	L	I2B	-	-	L				
		I2B	H		D 3/5	R	I2B	-	-	R				
		Whole col. strip shared with D5 is same as D5SC.												
D7	L	E5	H	Adjacent D1 & D9	4	9"	L	E5	5	10 3/4"	L	216	108	54
		E2A	H		2		L	E2A	5		L			
		E6	H		4	13 1/2"	L	E6	1	-	L			
		I2B	H		3	18"	R	I2B	1	-	R			
	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H		1		C	I2A	3		C			
		I2B	H		-	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		Whole col. strip shared with D3 is same as D3SC.												
D8	L	E5	H	Adjacent D3 & D6	4	9"	L	E5	5	10 3/4"	L	216	108	54
		E2A	H		2		L	E2A	5		L			
		E6	H		4	13 1/2"	L	E6	1	-	L			
		I2B	H		2	27"	R	I2B	-	-	R			

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------

BAR PLACEMENT SCHEDULE
(FS)

18'-00" x 24'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D8	S	I1	H	Adjacent disc. edge	2	24"	C	I1	3	24"	C	288	144	72
		I2A	H	Adjacent disc. edge	1		C	I2A	3		C			
		I2B	H	Adjacent disc. edge	-	-	L	I2B	-	-	L			
		I2B	H	Adjacent disc. edge	-	-	R	I2B	-	-	R			
		I1	H	Adjacent C1	2	20 ³ / ₈ "	C							
		I2A	H	Adjacent C1	2		C							
		I2B	H	Adjacent C1	-	-	L							
		I2B	H	Adjacent C1	-	-	R							
D9	L	E3	H	Adjacent disc. edge of D7	4	9"	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	H	Adjacent disc. edge of D7	2		L	E2A	5		L			
		E4	H	Adjacent disc. edge of D7	4	13 ¹ / ₂ "	L	E4	1	-	L			
		I2B	H	Adjacent disc. edge of D7	2	27"	R	I2B	-	-	R			
	S	E5	H	Adjacent disc. edge of D3	2	18"	L	E5	4	18"	L	288	144	72
		E2A	H	Adjacent disc. edge of D3	2		L	E2A	4		L			
		E6	H	Adjacent disc. edge of D3	4	18"	L	E6	1	-	L			
		I2B	H	Adjacent disc. edge of D3	3	24"	R	I2B	-	-	R			
D10	L	E3	H	Adjacent disc. edge	4	9"	L	E3	5	10 ³ / ₄ "	L	216	108	54
		E2A	H	Adjacent disc. edge	2		L	E2A	5		L			
		E4	H	Adjacent disc. edge	4	13 ¹ / ₂ "	L	E4	1	-	L			
		I2B	H	Adjacent disc. edge	2	27"	R	I2B	-	-	R			
		Whole col. strip shared with D4 is same as D4L												
	S	E3	H	Adjacent disc. edge	2	18"	L	E3	4	18"	L	288	144	72
		E2A	H	Adjacent disc. edge	2		L	E2A	4		L			
		E4	H	Adjacent disc. edge	4	18"	L	E4	1	-	L			
		I2B	H	Adjacent disc. edge	3	24"	R	I2B	-	-	R			
		E3	H	Adjacent C1	2	20 ³ / ₈ "	L							
		E2A	H	Adjacent C1	2		L							
		E4	H	Adjacent C1	4	18"	L							
		I2B	H	Adjacent C1	3	28 ¹ / ₂ "	R							

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 24'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
D11	L	E3	H	Adjacent disc. edge	4	9"	L	E3	5	10 3/4"	L	216	108	54
		E2A	H		2		L	E2A	5		L			
		E4	H		4	13 1/2"	L	E4	1	-	L			
		I2B	H		2	27"	R	I2B	-	-	R			
		E3	H	Adjacent MI	4	8 3/4"	L							
		E2A	H		2		L							
		E4	H		4	14 1/4"	L							
		I2B	H		2	28 1/2"	R							
	S	E5	H	Adjacent disc. edge of D6	2	18"	L	E5	4	18"	L	288	144	72
		E2A	H		2		L	E2A	4		L			
		E4	H		4	18"	L	E4	1	L				
		I2B	H		2		R	I2B	1		R			

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 21'-00"

1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
E1	L	I1	H	Adjacent disc. edge	2	20"	C	I1	3	20"	C	240	120	60
		I2A	H		1		C	I2A	3		C			
		I2B	H		N 1 L		L	I2B	N 1 L		L			
		I2B	H		-		R	I2B	F 1 L		R			
		I1	H	Adjacent A8	2	14 1/4"	C							
		I2A	H		2		C							
		I2B	H		N 1 L		L							
		I2B	H		-		R							
	S	E3	H	Adjacent HV	3	13 3/8"	L	E3	4	15 3/4"	L	252	126	63
		E2A	H		2		L	E2A	4		L			
		E4	H		3	19 3/4"	L	E4	1	-	L			
		I2B	H		3	22 1/4"	R	I2B	-	-	R			
		E3	H	Adjacent F1	3	13 1/4"	L							
		E2A	H		2		L							
		E4	H		3	18 7/8"	L							
		I2B	H		3	22"	R							
E2	L	I1	H	Adjacent disc. edge	2	20"	C	I1	3	20"	C	240	120	60
		I2A	H		1		C	I2A	3		C			
		I2B	H		-		L	I2B	F 1 L		L			
		I2B	H		-		R	I2B	1	-	R			
		I1	H	Adjacent A9	2	14 1/4"	C							
		I2A	H		2		C							
		I2B	H		-	-	L							
		I2B	H		3	22 3/4"	R							
	S	E3	H	Adjacent F1	3	13 1/4"	L	E3	4	15 3/4"	L	252	126	63
		E2A	H		2		L	E2A	4		L			
		E4	H		3	18 7/8"	L	E4	1	-	L			
		I2B	H		3	22"	R	I2B	-	-	R			
		E3	W		6	14"	L							
		E2A	W		3		L							
		E4	W		6	21"	L							
		I2B	W		5	25 1/4"	R							

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 21'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
E3	L	I1	H	Adjacent	2	20"	C	I1	3	20"	C	240	120	60
		I2A	H	disc. edge	1		C	I2A	3		C			
		I2B	H	Adjacent	-	-	L	I2B	1		L			
		I2B	H		1		R	I2B	1		R			
		I1	H	Adjacent	2	14 1/4"	C							
		I2A	H		2		C							
		I2B	H		1		L							
		I2B	H		1		R							
	S	E3	H	Adjacent	3	13 1/4"	L	E3	4	15 3/4"	L	252	126	63
		E2A	H		2		L	E2A	4		L			
		E4	H	Adjacent	3	18 3/4"	L	E4	1	-	L			
		I2B	H		3	22"	R	I2B	-	-	R			
		E3	H	Adjacent	3	13"	L							
		E2A	H		2		L							
		E4	H		3	18 5/8"	L							
		I2B	H		3	21 3/4"	R							

20'00" x 23'00"
1st Level Floor

[illegible]

BAR PLACEMENT SCHEDULE (FS)

18'-00" x 22'-6"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
G1	L	E3	W		6	$10\frac{3}{4}$	L	E3	4	$13\frac{1}{2}$	L	216	108	54
		E2A	W		4		L	E2A	4		L			
		E4	W		7	$15\frac{3}{8}$	L	E4	1	-	L			
		I2B	W		5	$21\frac{5}{8}$	R	I2B	1	-	R			
	S	I1	H	Adjacent disc. edge	2	$22\frac{1}{2}$	C	I1	3	$22\frac{1}{2}$	C	270	135	67.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		-*	-	L	I2B	-	-	L			
		I2B	H		-	-	R	I2B	-	-	R			
		I1	H	Adjacent disc. edge A3	2	$21\frac{3}{4}$	C							
		I2A	H		1		C							
		I2B	H		2	$43\frac{1}{2}$	L							
		I2B	H		2	$43\frac{1}{2}$	R							
G2	L	E3	H	Adjacent disc. edge	3	$21\frac{5}{8}$	L	E3	4	$13\frac{1}{2}$	L	216	108	54
		E2A	H		2		L	E2A	4		L			
		E4	H		4	27"	L	E4	1		L			
		I2B	H		3	36"	R	I2B	1		R			
		Whole strip shared with G1 is same as G1LC												
	S	I1	H	Adjacent disc. edge	2	$16\frac{7}{8}$	C	I1	4	$16\frac{7}{8}$	C	270	135	67.5
		E2A	H		2		L	E2A	4		L			
		I2B	H		3	$22\frac{1}{2}$	L	I2B	1		L			
		I2B	H		2	$33\frac{3}{4}$	R	I2B			R			
		I1	H	Adjacent disc. edge A5	2	$16\frac{1}{4}$	C							
		E2A	H		2		L							
		I2B	H		3	$21\frac{3}{4}$	L							
		I2B	H		6 5	$32\frac{5}{8}$	R							
G3	L	E3	H	Adjacent disc. edge L1	3	$10\frac{3}{8}$	L	E3	4	$13\frac{1}{2}$	L	216	108	54
		E2A	H		2		L	E2A	4		L			
		E4	H		4	$17\frac{3}{4}$	L	E4	1	-	L			
		I2B	H		2	$22\frac{3}{4}$	R	I2B	1	-	R			
		Whole col. strip shared with G1 is same as G1LC												

28 Except adjacent panel G2 (see G2SC)

18'-00" x 22'-6"
1st Level Floor

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 23'-6"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
H1	L	I1	H	Adjacent dirc. edge	2	20"	C	I1	4	15"	C	240	120	60
		I2A	H		1		C	I2A	4		C			
		I2B	H		M 2 L		L	I2B	-	-	L			
		I2B	H		1	-	R	I2B	2	60"	R			
		I1	H	Adjacent C3	3	11 3/8"	C							
		I2A	H		2		C							
		I2B	H		M 2 L		L							
		I2B	H		2	22 3/4"	R							
	S	E3	H	Adjacent E1	3	14 1/4"	L	E3	5	14 1/8"	L	282	141	70.5
		E2A	H		2		L	E2A	5		L			
		E4	H		4	17 3/4"	L	E4	-	-	L			
		I2B	H		3	20 1/2"	R	I2B	-	-	R			
		E3	H	Adjacent M2	3	13 3/8"	L							
		E2A	H		2		L							
		E4	H		4	19 3/4"	L							
		I2B	H		3	22 1/4"	R							
	</													

BAR PLACEMENT SCHEDULE (FS)

23'-00" x 21'-00"

Ramp to 2nd Level

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
I1	L	E7	H	Adjacent	2	21"	L&R	E7	7	9"	L&R	252	126	63
		E2A	H	Adjacent	1		L&R	E2A	7		L&R			
		E6	H	Adjacent	3	21"	L	E6	3	42"	L			
		E6	H	Adjacent	3	21"	R	E6	3	42"	R			
		E7	H	Adjacent	4	10 1/8"	L&R							
		E2A	H	Adjacent	2		L&R							
		E6	H	Adjacent	6	10 1/8"	L							
		E6	H	Adjacent	6	10 1/8"	R							
	S	I1	H	Adjacent	4	11 1/2"	C	I1	4	17 1/4"	C	276	138	69
		E2A	H	Adjacent	2		L	E2A	4		L			
		I2B	H	Adjacent	3	23"	L	I2B	1		L			
		I2B	H	Adjacent	-	-	R	I2B	1/5		R			
I2	L	E7	H	Adjacent	4	10 1/8"	L&R	E7	7	9"	L&R	252	126	63
		E2A	H	Adjacent	2		L&R	E2A	7		L&R			
		E6	H	Adjacent	6	10 1/8"	L	E6	3	42"	L			
		E6	H	Adjacent	6	10 1/8"	R	E6	3	42"	R			
		E7	W		8	10 1/2"	L&R							
		E2A	W		4		L&R							
		E6	W		12	10 1/2"	L							
		E6	W		12	10 1/2"	R							
	S	I1	H	Adjacent	2	23"	C	I1	4	17 1/4"	C	276	138	69
		I2A	H	Adjacent	1		C	I2A	4		C			
		I2B	H	Adjacent	1/2		L	I2B	1/2		L			
		I2B	H	Adjacent	-	-	R	I2B	-	-	R			

23'-00" x 23'-00"
Ramp to 2nd Level

[illegible]

23'-00" x 23'-6"
1st Level Floor

* Spaced independently of δ_1 due to shape of bars.

BAR PLACEMENT SCHEDULE (FS)

20'-00" x 22'-6"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
L1	L	E3	H	Adjacent	4	10"	L	E3	5	12"	L	240	120	60
		E2A	H	Adjacent	2		L	E2A	5		L			
		E4	H	Adjacent	3	20"	L	E4	1		L			
		I2B	H	disc. edge	3	20"	R	I2B	1		R			
		E3	H	Adjacent	4	10 ³ / ₈ "	L							
		E2A	H	Adjacent	2		L							
		E4	H	Adjacent	3	17 ³ / ₄ "	L							
		I2B	H	Adjacent	3	22 ³ / ₄ "	R							
S		E3	H	Adjacent	3	13 ¹ / ₂ "	L	E3	4	16 ⁷ / ₈ "	L	270	135	67.5
		E2A	H	Adjacent	2		L	E2A	4		L			
		E4	H	Adjacent	4	16 ⁷ / ₈ "	L	E4	1	-	L			
		I2B	H	disc. edge	3	21 ¹ / ₂ "	R	E2B	1	-	R			
		E3	H	Adjacent	3	13"	L							
		E2A	H	Adjacent	2		L							
		E4	H	Adjacent	4	18 ⁵ / ₈ "	L							
		I2B	H	Adjacent	3	21 ³ / ₄ "	R							

20'-00" x 24'-00"
1st Level Floor

20'-00" x 24'-00"
1st Level Floor

10-10-57
10-10-57

Bar No.	Bar Size	Bar Loc.	No. of Bars	Column Strip - C	Footings	Walls	Other
1	1/2"	1/2"	1				
2	1/2"	1/2"	1				
3	1/2"	1/2"	1				
4	1/2"	1/2"	1				
5	1/2"	1/2"	1				
6	1/2"	1/2"	1				
7	1/2"	1/2"	1				
8	1/2"	1/2"	1				
9	1/2"	1/2"	1				
10	1/2"	1/2"	1				
11	1/2"	1/2"	1				
12	1/2"	1/2"	1				
13	1/2"	1/2"	1				
14	1/2"	1/2"	1				
15	1/2"	1/2"	1				
16	1/2"	1/2"	1				
17	1/2"	1/2"	1				
18	1/2"	1/2"	1				
19	1/2"	1/2"	1				
20	1/2"	1/2"	1				
21	1/2"	1/2"	1				
22	1/2"	1/2"	1				
23	1/2"	1/2"	1				
24	1/2"	1/2"	1				
25	1/2"	1/2"	1				
26	1/2"	1/2"	1				
27	1/2"	1/2"	1				
28	1/2"	1/2"	1				
29	1/2"	1/2"	1				
30	1/2"	1/2"	1				
31	1/2"	1/2"	1				
32	1/2"	1/2"	1				
33	1/2"	1/2"	1				
34	1/2"	1/2"	1				
35	1/2"	1/2"	1				
36	1/2"	1/2"	1				
37	1/2"	1/2"	1				
38	1/2"	1/2"	1				
39	1/2"	1/2"	1				
40	1/2"	1/2"	1				
41	1/2"	1/2"	1				
42	1/2"	1/2"	1				
43	1/2"	1/2"	1				
44	1/2"	1/2"	1				
45	1/2"	1/2"	1				
46	1/2"	1/2"	1				
47	1/2"	1/2"	1				
48	1/2"	1/2"	1				
49	1/2"	1/2"	1				
50	1/2"	1/2"	1				
51	1/2"	1/2"	1				
52	1/2"	1/2"	1				
53	1/2"	1/2"	1				
54	1/2"	1/2"	1				
55	1/2"	1/2"	1				
56	1/2"	1/2"	1				
57	1/2"	1/2"	1				
58	1/2"	1/2"	1				
59	1/2"	1/2"	1				
60	1/2"	1/2"	1				
61	1/2"	1/2"	1				
62	1/2"	1/2"	1				
63	1/2"	1/2"	1				
64	1/2"	1/2"	1				
65	1/2"	1/2"	1				
66	1/2"	1/2"	1				
67	1/2"	1/2"	1				
68	1/2"	1/2"	1				
69	1/2"	1/2"	1				
70	1/2"	1/2"	1				
71	1/2"	1/2"	1				
72	1/2"	1/2"	1				
73	1/2"	1/2"	1				
74	1/2"	1/2"	1				
75	1/2"	1/2"	1				
76	1/2"	1/2"	1				
77	1/2"	1/2"	1				
78	1/2"	1/2"	1				
79	1/2"	1/2"	1				
80	1/2"	1/2"	1				
81	1/2"	1/2"	1				
82	1/2"	1/2"	1				
83	1/2"	1/2"	1				
84	1/2"	1/2"	1				
85	1/2"	1/2"	1				
86	1/2"	1/2"	1				
87	1/2"	1/2"	1				
88	1/2"	1/2"	1				
89	1/2"	1/2"	1				
90	1/2"	1/2"	1				
91	1/2"	1/2"	1				
92	1/2"	1/2"	1				
93	1/2"	1/2"	1				
94	1/2"	1/2"	1				
95	1/2"	1/2"	1				
96	1/2"	1/2"	1				
97	1/2"	1/2"	1				
98	1/2"	1/2"	1				
99	1/2"	1/2"	1				
100	1/2"	1/2"	1				

BAR PLACEMENT SCHEDULE (FS)

22'-6" x 21'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
N1	L	I1	H	Adjacent disc. edge	4	10 1/2"	C	I1	5	12 5/8"	C	252	126	63
		E2A	H		2		L	E2A	5		L			
		I2B	H		3	21"	L	I2B	1	-	L			
		I2B	H		1	-	R	I2B	-	-	R			
		I1	W		8	10 1/2"	C							
		E2A	W		4		L							
		I2B	W		6	21"	L							
		I2B	W		1	-	R							
	S	I1	H	Adjacent disc. edge	4	11 1/4"	C	I1	4	16 7/8"	C	270	135	67.5
		E2A	H		2		L	E2A	4		L			
		I2B	H		2	33 5/8"	L	I2B	1	-	L			
		I2B	H		2	33 5/8"	R	I2B	-	-	R			
		I1	W		7	12 1/4"	C							
		E2A	W		4		L							
		I2B	W		5	27"	L							
		I2B	W		2	67 1/2"	R							
N2	L	I1	H	Adjacent disc. edge	4	10 1/8"	C	I1	5	12 5/8"	C	252	126	63
		E2A	H		2		L	E2A	5		L			
		I2B	H		3	18 7/8"	L	I2B	1	-	L			
		I2B	H		1	44"	R	I2B	-	-	R			
		Whole col. strip shared with N1 is same as N1C												
	S	I1	H	Adjacent disc. edge	2	22 1/2"	C	I1	4	16 7/8"	C	270	135	67.5
		I2A	H		1		C	I2A	4		C			
		I2B	H		-		L	I2B	0 1/2		L			
		I2B	H			N1/5		R	I2B	-	-	R		
		I1	W		6	15"	C							
		I2A	W		3		C							
		I2B	W		0 1/2		L							
		I2B	W		N1/5		R							

BAR PLACEMENT SCHEDULE (FS)

22'-6" x 21'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
N3	L	I1	H	Adjacent O1	4	10 ¹ / ₈ "	C	I1	5	12 ⁵ / ₈ "	C	252	126	63
		E2A	H		2		L	E2A	5		L			
		I2B	H		3	18 ⁷ / ₈ "	L	I2B	1	-	L			
		I2B	H		1	44"	R	I2B	-	-	R			
		I1	H	Adjacent P1	4	10"	C							
		E2A	H		2		L							
		I2B	H		3	18 ⁵ / ₈ "	L							
		I2B	H		1	65 ¹ / ₄ "	R							
	S	I1	H	Adjacent disc. edge	2	22 ¹ / ₂ "	C	I1	4	16 ⁷ / ₈ "	C	270	135	67.5
		I2A	H		1		C	I2A	4		C			
		I2B	H		-		L	I2B	0' 1 1/2		L			
		I2B	H		P 1 1/2		R	I2B	P 1 1/2		R			
		I1	W		6	15"	C							
		I2A	W		3		C							
		I2B	W		0' 1 1/2		L							
		I2B	W		P 1 1/2		R							

BAR PLACEMENT SCHEDULE

(FS)

22'-6" x 21'-00"

Ramp to 1st Level from street

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
N1	L	E5	H	Adjacent disc. edge	4	10 1/2"	L	E5	5	12 5/8"	L	252	126	63
		E2A	H		2		L	E2A	5		L			
		E6	H		3	21"	L	E6	1	-	L			
		I2B	H		1	-	R	I2B	-	-	R			
		E5	W		8	10 1/2"	L							
		E2A	W		4		L							
		E6	W		6	21"	L							
		I2B	W		1	-	R							
	*S	I1	H	Adjacent disc. edge	4	11 1/4"	C	I1	4	16 7/8"	C	270	135	67.5
		E2A	H		2		L	E2A	4		L			
		I2B	H		2	33 3/4"	L	I2B	1	-	L			
		I2B	H		2	33 3/4"	R	I2B	-	-	R			
		I1	W		7	12 1/4"	C							
		E2A	W		4		L							
		I2B	W		5	27"	L							
		I2B	W		2	67 1/2"	R							
N2	L	E5	H	Adjacent disc. edge	4	10 1/8"	L	E5	5	12 5/8"	L	252	126	63
		E2A	H		2		L	E2A	5		L			
		E6	H		3	18 7/8"	L	E6	1	-	L			
		I2B	H		1	44"	R	I2B	-	-	R			
		Whole col. strip shared with N1 is same as N1LG.												
	S	I1	H	Adjacent disc. edge	2	22 1/2"	C	I1	4	16 7/8"	C	270	135	67.5
		I2A	H		1		C	I2A	4		C			
		I2B	H		-		L	I2B	0 1/2		L			
		I2B	H		N 1/5		R	I2B	-	-	R			
		I1	W		6		C							
		I2A	W		3		C							
		I2B	W		0 1/2		L							
		I2B	W		N 1/5		R							

* Assume perpendicular to disc. edge

BAR PLACEMENT SCHEDULE

(FS)

22'-6" x 21'-00"

Ramp to 1st Level from street

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
N3	L	E5	H	Adjacent D1	4	10 1/8"	L	E5	5	12 5/8"	L	252	126	63
		E2A	H		2		L	E2A	5		L			
		EC	H		3	18 7/8"	L	EC	1		L			
		I2B	H		1	44"	R	I2B	-		R			
		E5	H	Adjacent P1	4	10"	L							
		E2A	H		2		L							
		EC	H		3	18 5/8"	L							
		I2B	H		1	65 1/4"	R							
	S	I1	H	Adjacent dire. edge	2		C	I1	4	16 1/8"	C	270	135	67.5
		I2A	H		1		C	I2A	4		C			
		I2B	H		-	-	L	I2B	0 1/4		L			
		I2B	H		P 1/5		R	I2B	P 1/5		R			
		I1	W		6	15"	C							
		I2A	W		3		C							
		I2B	W		0 1/4		L							
		I2B	W		P 1/5		R							

22'-6" x 23'-00"
1st Level Floor

22'-6" x 23'-00"
1st Level Floor

22'-6" x 23'-00"

[illegible]

(FS)

1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.		
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width		
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o					
P1	L	I1	H	Adjacent disc. edge	4	9 1/2"	C	I1	6	11 1/4"	C	270	135	67.5		
		E2A	H		3		L	E2A	6		L					
		I2B	H		4	16 7/8"	L	I2B		L						
		I2B	H		1	-	R	I2B		R						
		I1	H	Adjacent N3	4	10"	C									
		E2A	H		3		L									
		I2B	H		4	18 5/8"	L									
		I2B	H		1	65 1/4"	R									
S		E3	H	Adjacent disc. edge	4	9 1/2"	L	E3	5	13 1/2"	L	270	135	67.5		
		E2A	H		3		L	E2A	5		L					
		E4	H		3	22 1/2"	L	E4	1	L						
		E2B	H		3	22 1/2"	R	E2B	1	R						
		E3	W	8	10 3/8"	L										
		E2A	W	5		L										
		E4	W	6		22 1/2"	L									
		E2B	W	3		45"	R									
Note: Length "S" runs North & South Length "L" runs East & West																

(FS)

Ramp to 1st Level from street

Note: Length "S" runs North & South
Length "L" runs East & West

BAR PLACEMENT SCHEDULE
(FS)

20'-6" x 21'-00"
1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
Q1	L	I1	H	Adjacent disc. edge	2	20 1/2"	C	I1	3	20 1/2"	C	246	123	61.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		5	X	L	I2B	5	X	L			
		I2B	H		-		R	I2B	R		R			
		I1	H	Adjacent A4	2	14 1/2"	C							
		I2A	H		2		C							
		I2B	H		5	X	L			X	L			
		I2B	H		R		R							
	S	E5	H	Adjacent 51	3	12 3/8"	L	E5	4	15 3/4"	L	252	126	63
		E2A	H		2		L	E2A	4		L			
		E6	H		4	15 3/4"	L	E6	1	-	L			
		I2B	H		3	22 1/4"	R	I2B	1	-	R			
		E5	H	Adjacent R1	3	13 1/4"	L							
		E2A	H		2		L							
		E6	H		4	16 1/2"	L							
		I2B	H		3	18 7/8"	R							
Q2	L	I1	H	Adjacent disc. edge	2	20 1/2"	C	I1	3	20 1/2"	C	246	123	61.5
		I2A	H		1		C	I2A	3		C			
		I2B	H		R	X	L	I2B	R	X	L			
		I2B	H		-		R	I2B	1	-	R			
		I1	H	Adjacent A7	2	14 1/2"	C							
		I2A	H		2		C							
		I2B	H		R	X	L			X	L			
		I2B	H		3		R							
	S	E5	H	Adjacent B1 & B2	3	13 1/4"	L	E5	4	15 3/4"	L	252	126	63
		E2A	H		2		L	E2A	4		L			
		E6	H		4	16 1/2"	L	E6	1	-	L			
		I2B	H		3	18 7/8"	R	I2B	1	-	R			
		E5	W		6	12 5/8"	L							
		E2A	W		4		L							
		E6	W		7	18"	L							
		I2B	W		5	25 1/4"	R							

BAR PLACEMENT SCHEDULE (FS)

20'-6" x 23'-00"

1st Level Floor

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o	Bar No.	No. of bars	Spacing	Bar e. or c.o			
R1	L	I1	H	Adjacent	2	20 1/2"	C	I1	4	15 3/8"	C	246	123	61.5
		I2A	H	Adjacent	1		C	I2A	4		C			
		I2B	H	Adjacent	-	-	L	I2B	2	61 1/2"	L			
		I2B	H	disc. edge	-	-	R	I2B	2	61 1/2"	R			
		I1	H	Adjacent	3	11 1/2"	C							
		I2A	H	Adjacent	2		C							
		I2B	H	Adjacent	4	19 1/4"	L							
		I2B	H	Adjacent	4	19 1/4"	R							
	S	E5	H	Adjacent	3	13 1/4"	L	E5	5	13 3/4"	L	276	138	69
		E2A	H	Adjacent	2		L	E2A	5		L			
		E4	H	Adjacent	4	16 1/2"	L	E4	-	-	L			
		I2B	H	Adjacent	4	18 7/8"	R	I2B	-	-	R			
R2	L	I1	H	Adjacent	4	10 1/4"	C	I1	5	12 1/4"	C	246	123	61.5
		E2A	H	Adjacent	2		L	E2A	5		L			
		I2B	H	Adjacent	4	15 3/8"	L	I2B	1	-	L			
		I2B	H	disc. edge	3	20 1/2"	R	I2B	2	61 1/2"	R			
		I1	H	Adjacent	4	11"	C							
		E2A	H	Adjacent	2		L							
		I2B	H	Adjacent	4	19 1/4"	L							
		I2B	H	Adjacent	3	23 1/8"	R							
	S	E5	H	Adjacent	3	13 3/4"	L	E5	5	13 3/4"	L	276	138	69
		E2A	H	Adjacent	2		L	E2A	5		L			
		E4	H	Adjacent	4	17 1/4"	L	E4	-	-	L			
		I2B	H	disc. edge	4	17 1/4"	R	I2B	-	-	R			
		E5	H	Adjacent	3	13 1/4"	L							
		E2A	H	Adjacent	2		L							
		E4	H	Adjacent	4	16 1/2"	L							
		I2B	H	Adjacent	4	18 7/8"	R							

BAR PLACEMENT SCHEDULE
(FS)

20'-6" x 23'-6"
1st Level Floor

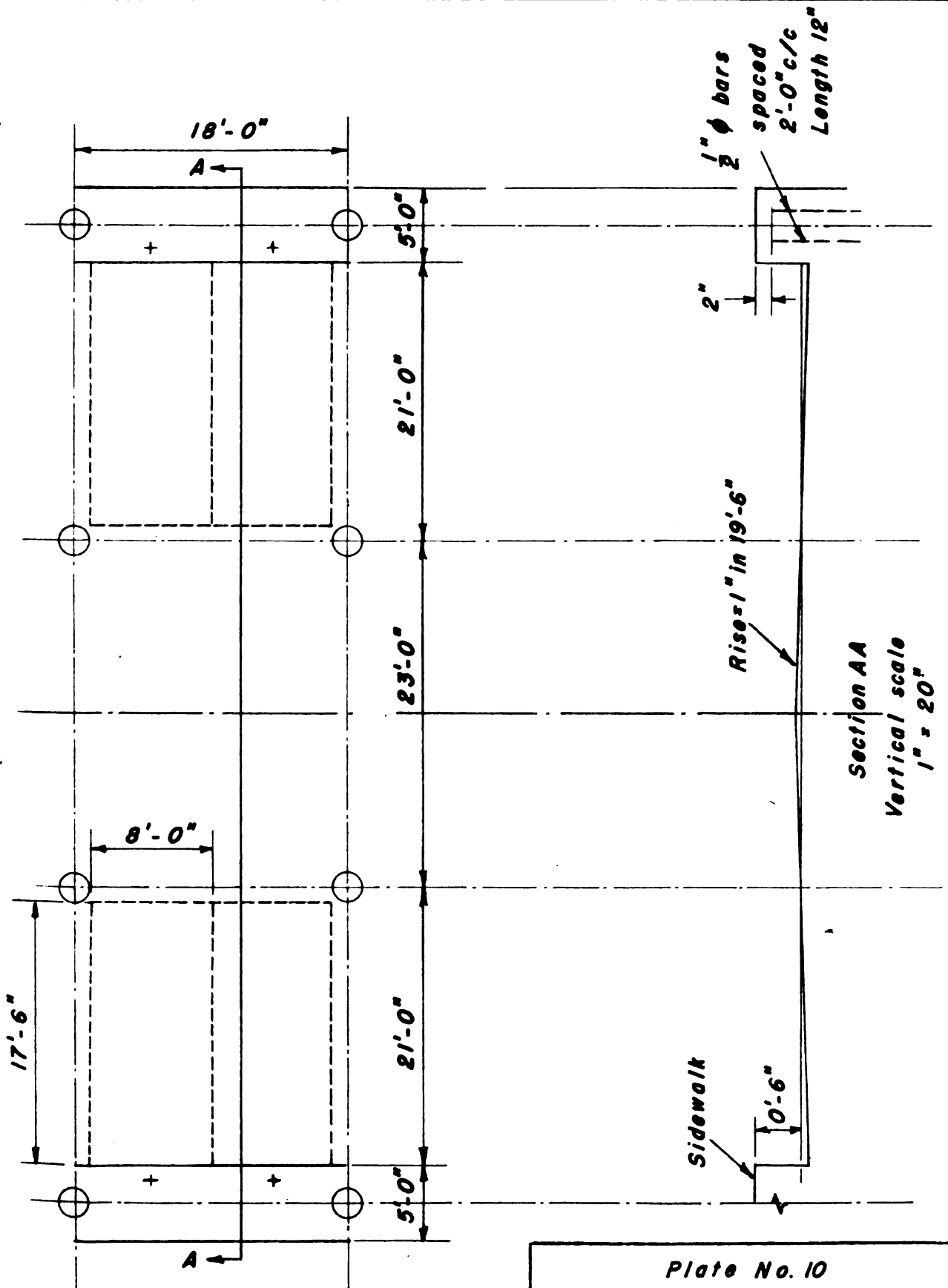
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Panel No.	Length	Column Strip - C						Mid Strip - M				Panel Width	1/2 Panel Width	1/4 Panel Width
		Bar No.	Strip Size	Strip Loc.	No. of bars	Spacing	Bar e. or c.o.	Bar No.	No. of bars	Spacing	Bar e. or c.o.			
51	L	E3	H	Adjacent K1	4	8 3/4"	L	E3	5	12 1/4"	L	246	123	61.5
		E2A	H		3		L	E2A	5		L			
		E4	H		4	17 1/2"	L	E4	1	-	L			
		I2B	H		4	15 1/4"	R	I2B	2	6 1/2"	R			
		E3	H	Adjacent C2	4	8 7/8"	L							
		E2A	H		3		L							
		E4	H		4	16 1/2"	L							
		E2B	H		4	16 1/2"	R							
	S	I1	H	Adjacent div. edge	2	23 1/2"	C	I1	5	14 1/8"	C	282	141	70.5
		I2A	H		1		C	I2A	5		C			
		I2B	H		1	1	L	I2B	-	-	L			
		I2B	H		1		R	I2B	2	7 1/2"	R			
		I1	H	Adjacent Q1	3	14 1/8"	C							
		I2A	H		2		C							
		I2B	H		1	1	L							
		I2B	H		3	22 1/4"	R							

Design of Unit Parking Space

The dimensions for the parking spaces in the structure follow as closely as possible those recommended by the American Automobile Association in their "Parking Manual".

Slight modifications were made so that the greatest possible storage space was available.

A diagram of a typical parking space is shown in Plate No. 10.



Dotted lines enclose 1 parking space
Col. diam. = 2'-0"
Parking meters +

Plate No. 10
TYPICAL PARKING SPACE
& CURB DETAIL

Scale 1" = 10'
Except where noted

Ralph J.
Stephenson

Sheet 1 of 1 sheet

Design of Retaining Wall

Most of the data on the retaining wall design is given in the sample calculation. However, it should be mentioned here, that the wall columns are designed so as to be an integral part of the retaining wall. The retaining wall reinforcement is furnished to these wall columns as well as the regular column steel. No separation is made between the column, or the column footing, and the retaining wall, or the retaining wall footing so as to distribute the loads over as great an area as possible.

The toe of the retaining wall is poured integrally with the second level floor and is connected to it by means of the wire mesh used for reinforcement in the floor slab.

Retaining Wall - Sample Calculations

Loading condition - Earth pressure to depth of wall only
Assume level backfill

Design of Wall

Assume a vertical inner face (earth side).

Depth of wall = 20 ft.

For length of 1 ft.

$$E = \frac{wh^2}{2} \frac{\sin^2(\theta - \phi)}{\sin^2\theta \sin(\theta + \alpha) \left[1 + \sqrt{\frac{\sin(\phi - \delta) \sin(\phi + \alpha)}{\sin(\theta - \delta) \sin(\theta + \alpha)}} \right]^2}$$

$$w = 150 \text{ lbs/ft}^3$$

$$h = 20 \text{ ft.}$$

$$\theta = 90^\circ$$

$$\delta = 0^\circ$$

$$\text{Let } \phi = 37^\circ \text{ (Civil Engineer's Handbook)}$$

$$\alpha = 30^\circ$$

$$E = \frac{(150)(20)^2}{2} \frac{\sin^2 53^\circ}{\sin^2 90^\circ \cos 30^\circ \left[1 + \sqrt{\frac{(\sin 37^\circ)(\sin 67^\circ)}{(\sin 90^\circ)(\cos 30^\circ)}} \right]^2}$$

$$E = 6830 \text{ lbs/ft. of length}$$

$$\text{Earth press.} = \underline{E = 6830 \text{ lbs/ft. of length}}$$

Max. moment at base = M

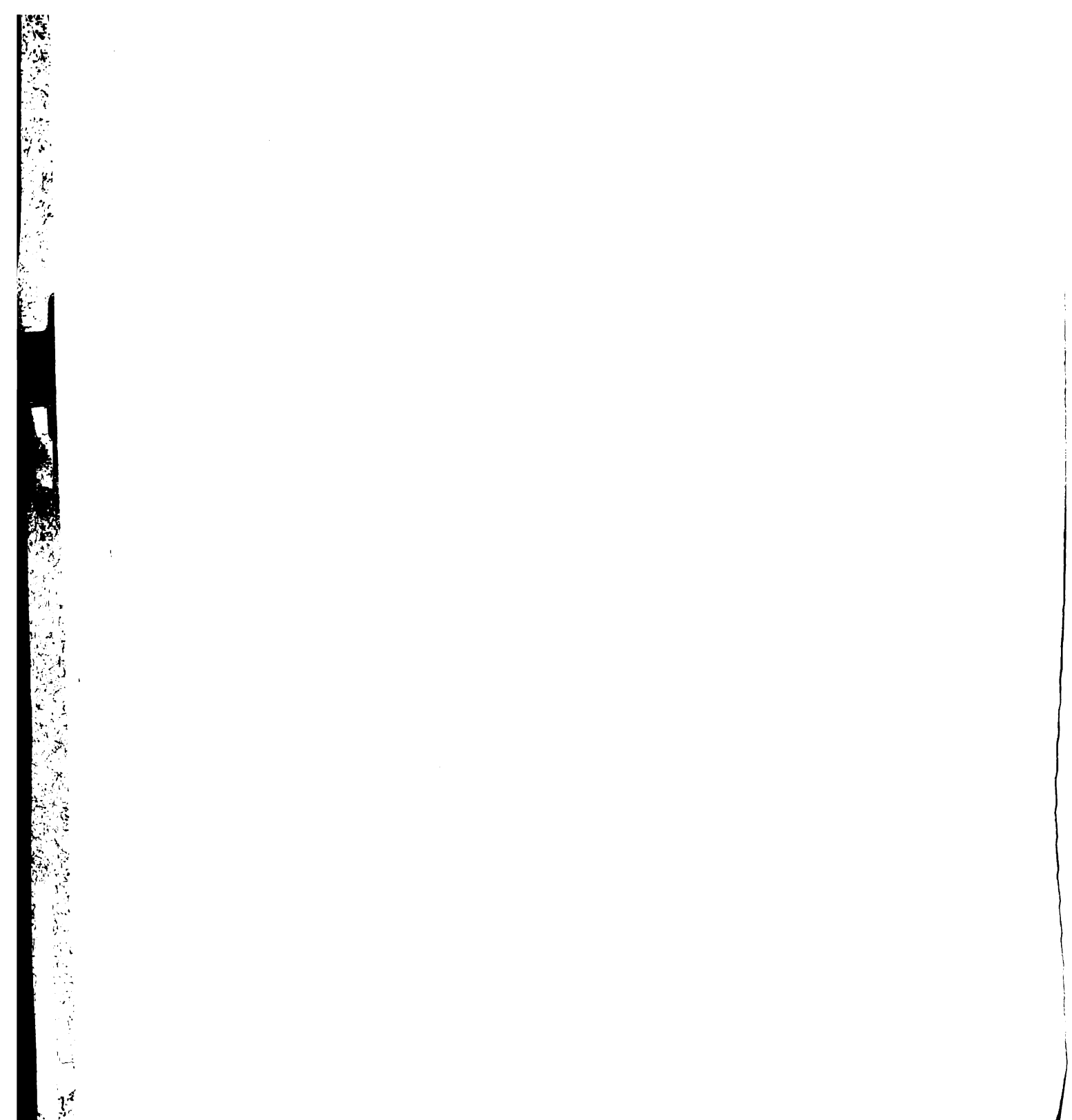
$$M = (E \cos 37^\circ) \left(\frac{20}{3} \right) (12) - E \sin 37^\circ \left(\frac{t}{2} \right) =$$
$$= (5460) \left(\frac{240}{3} \right) - 4110 \left(\frac{t}{2} \right)$$

Let $t = 2 \text{ ft}$ as an approximation

$$M = 437,000 - 2050(24) = 437,000 - 49,200$$

$$M = 387,800 \text{ lb. in.}$$

$$\underline{M = 387,800 \text{ lb. in.}}$$



Retaining Wall. Sample Calculations

Using $f'_c = 2500 \text{ lbs/in}^2$

$$R = 196$$

$$d = \sqrt{\frac{M}{Rb}} = \sqrt{\frac{387800}{(196)(12)}} = \sqrt{164.5}$$

$$d = 12.81 \text{ in.}$$

$$\underline{d = 12.81 \text{ in.}}$$

With minimum cover = 3 in.

Using 1" sq. bars

$$t = 12.81 + 3.50 = 16.31 \text{ in}$$

Use 18" wall

$$\text{Let } \underline{t = 18 \text{ in.}}$$

$$\underline{d = 14.5 \text{ in}}$$

Shear & Diagonal Tension

$$\text{Max. shear: } v = \frac{V}{bjd} = \frac{5460}{(12)(.87)(14.5)} = 36.1 \text{ lbs/in}^2$$

$$\underline{v = 36.1 \text{ lbs/in}^2}$$

$$\text{Allowable} = .06 f'_c = 150 \text{ lbs/in}^2$$

$$\underline{\text{Allowable } v = 150 \text{ lbs/in}^2}$$

v ok

$$\text{Allowable diagonal tension for concrete} = .02 f'_c = 50 \text{ lbs/in}^2$$

Diagonal tension ok

Retaining Wall - Sample Calculations

Wall Steel

Wall has constant thickness
of 18 in.

At any section

$$E = \frac{150 h^2}{2} \times .227 = 17.03 h^2$$

$$E_h = E \cos 37^\circ = E(.799) = 13.60 h^2$$

$$E_v = E \sin 37^\circ = E(.602) = 10.26 h^2$$

Where h = distance down from top of
wall.

$$M = 13.60 h^2 \left(\frac{12h}{3} \right) - 10.26 h^2 \left(\frac{18}{2} \right) =$$
$$54.4 h^3 - 92.3 h^2 = h^2 (54.4h - 92.3) \text{ lb. in.}$$

$$M = \frac{h^2 (54.4h - 92.3) \text{ lb. in.}}{(h \text{ in ft})}$$

Also

$$M = f_s A_s j d$$

$$f_s = 20,000 \text{ lbs/in}^2$$

$$j = .87$$

$$d = 14.5 \text{ in.}$$

$$M = (20,000)(A_s)(.87)(14.5) = 253,000 A_s$$

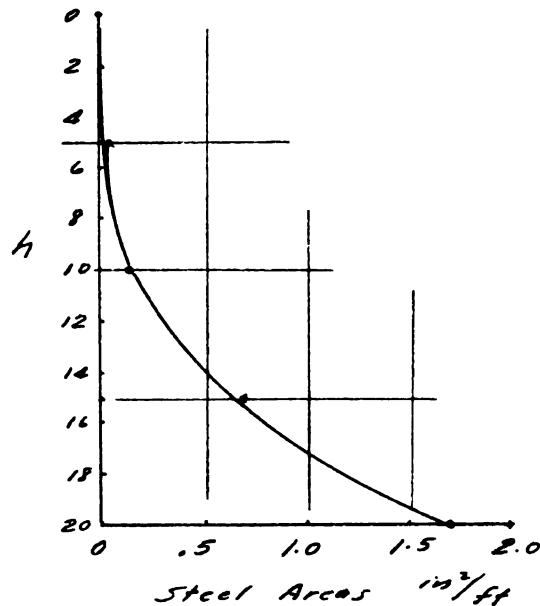
$$A_s = \frac{h^2 (54.4h - 92.3)}{253,000} \quad \frac{M = 253,000 A_s}{\text{---}}$$

Calculating A_s at various values of h
we obtain the following values.

At base	$h = 20 \text{ ft}$	$A_s = 1.57 \text{ in}^2/\text{ft}$
	$h = 15$	$A_s = .652 \text{ in}^2/\text{ft}$
	$h = 10$	$A_s = .181 \text{ in}^2/\text{ft}$
	$h = 5$	$A_s = .0178 \text{ in}^2/\text{ft}$
	$h = 0$	$A_s = 0$

Retaining Wall - Sample Calculations

Plotting these values:



Use 1" sq. bars spaced 7.5 in. c/c at base

Check bond at base

$$u = \frac{V}{\Sigma o j d} = \frac{5460}{(1.6)(4)(.87)(14.5)} = 67.6 \text{ lbs/in}^2$$

$$\text{Allowable } u = .05 f'_c = 125 \text{ lbs/in}^2$$

Bond O.K. at base

It is economical to cut off bars since steel areas drop off rapidly.

Cut off 2 bars out of 3

$$\text{Remaining area} = \frac{1.6}{3} = .53 \text{ in}^2$$

This area is required (Steel curve) about 14 ft. from top.

Check

$$h = 14 \quad A_s = \frac{(196)(762 - 92.3)}{253,000} = \frac{(196)(669)}{253,000}$$

$$A_s = .52 \text{ in}^2$$

Anchor with 10 d

$$h = 13'-2" \text{ from top}$$

Retaining Wall - Sample Calculations

Cut off half of remaining bars

$$Area = \frac{1.6}{6} = .267 \text{ in}^2$$

$$h = 11 \text{ ft.}$$

Check

$$A_s = \frac{(121)(598 - 92.3)}{253,000} = .245 \text{ in}^2$$

Anchor with 10 d

$$h = 10' - 2'' \text{ from top}$$

Remaining bars run to top of wall

Temperature Steel

Temp. steel required by A.C.I. code reduced since the faces of both walls are protected.

Use $\frac{1}{2}$ " sq. bars

Outer face Spaced

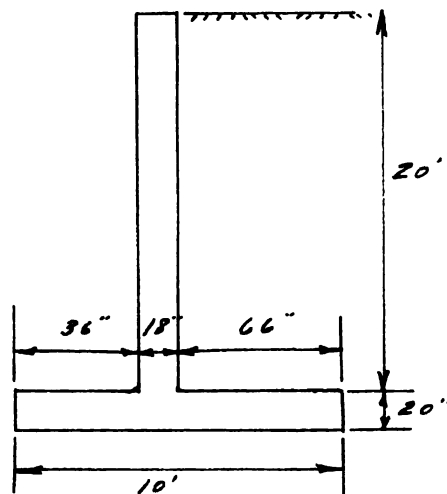
vertically 2'-00" c/c
horiz. 10" c/c

Inner face

Horizontally only
space 15" c/c

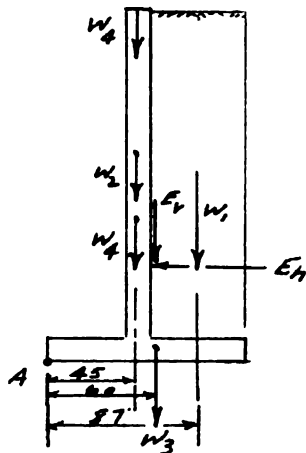
Location of Wall on Footing

After many trials the position of the wall and the dimensions shown below were selected



Retaining Wall - Sample Calculations

Check soil pressures



$$W_1 = \text{Wt. of backfill} = (20)(5.5)(150) = 16,500 \text{ lbs}$$

$$W_2 = \text{Wt. of wall} = (20)(1.5)(150) = 4,500 \text{ lbs}$$

$$W_3 = \text{Wt. of footing} = (10)(1.67)(150) = 2,500 \text{ lbs}$$

$$W_4 = \text{Panel loads} = 26,800 \text{ lbs} \\ \left(\frac{1}{4} \text{ total panel loads on Roof \& 1st Level Floor} \right)$$

$$E_v = 4,860 \text{ lbs}$$

$$E_h = 5,650 \text{ lbs}$$

Taking moments about toe (A)

	Force (lbs)	Distance from toe (inches)	Moment about toe (lb.in.)
W_1	16,500	87	1,435,000
W_2	4,500	45	203,000
W_3	2,500	60	150,000
W_4	26,800	45	1,207,000
E_v	4,860	120	583,000
	<u>55,160</u>		<u>3,578,000</u>
E_h	5,650	86	486,000
			<u>3,092,000 lb.in.</u>

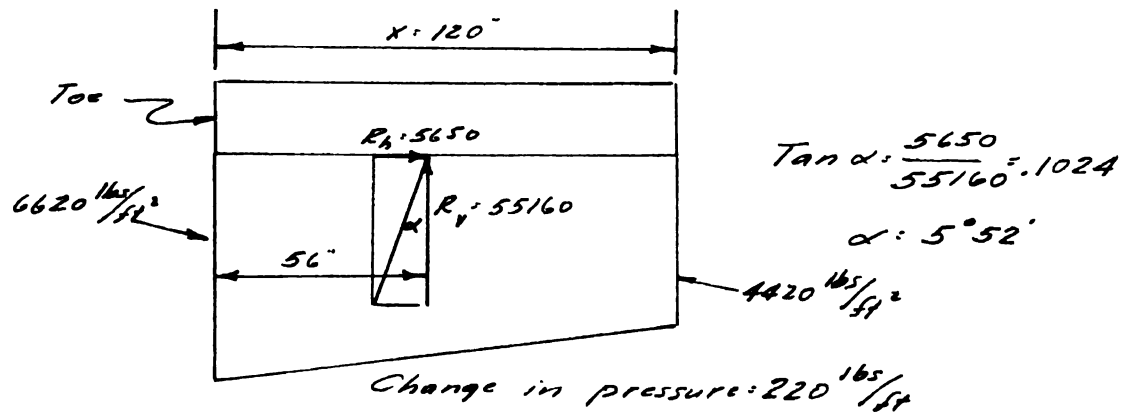
$$x_r = \frac{3,092,000}{55,160} = 56.0 \text{ in.}$$

$$\text{Soil pressures} = \frac{55,160}{10} \left[1 \pm \frac{(6)(.33)}{10} \right] = \begin{array}{l} \text{Max. of } 6,620 \text{ lbs/ft}^2 \\ \text{Min. of } 4,420 \text{ lbs/ft}^2 \end{array}$$

Retaining Wall - Sample Calculations

The max soil pressure is 620 lbs/ft^2 above lower value estimated. However, due to uncertainties in max. allowable soil stresses and also since toe of footing is connected to 2nd Level Floor, it is felt that this stress is not excessive.

Check Factors of Safety



Sliding

$$\text{Available friction} = R_v \tan \epsilon = (55160)(.577) = 31900 \text{ lbs.}$$

$$\text{Friction needed} = 5650 \text{ lbs}$$

$$F.S. = \frac{31900}{5650} = 5.64$$

$$F.S. \text{ for sliding} =$$

$$\frac{5.64}{\text{ok}}$$

Overturning

$$\Sigma \text{ Overturning } M = E_h (86) = 486,000 \text{ lb.in.}$$

$$\Sigma \text{ Stabilizing } M = 3,578,000 \text{ lb.in.}$$

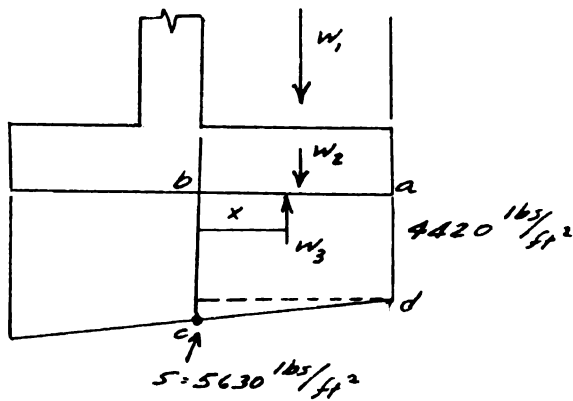
$$F.S. = \frac{3,578,000}{486,000} = 7.36$$

$$F.S. \text{ for overturning} =$$

$$\frac{7.36}{\text{ok}}$$

Retaining Wall- Sample Calculations

Design of inner footing



Find centroid of trapezoid abcd

$$\begin{aligned} \Sigma M_{bc} &= (4420)(66)(33) + \\ &= (5630 - 4420)\left(\frac{66}{2}\right)(22) - \\ &= \left(\frac{4420 + 5630}{2}\right)(66)(x) = 0 \end{aligned}$$

Solving for x

$$x = 31.7 \text{ in. from b}$$

W_1 : Wt. of back fill: 16,500 lbs

W_2 : Wt. of inner footing: 1375 lbs

W_3 : Reaction = $\frac{(4420)(5630)}{2} \left(\frac{66}{12}\right)(1) = 27600 \text{ lbs.}$

Taking moments about b.

	Force (lbs)	Distance to b (inches)	Moment (in lbs)
W_1	16500	33	544,000
W_2	1375	33	45,400
	<u>+17875</u>		<u>+589,400</u>
W_3	-27600	31.7	-872,000
Resultant Shear	-9725		<u>-282,600</u>

$$d = \sqrt{\frac{282600}{(196)(12)}} = \sqrt{119.8} = 10.92$$

$$t = 10.92 + 3.50 = 14.42 \text{ in}$$

Use 20 in. footing

Shear

Check shear at b

$$v = \frac{9725}{(12)(.87)(16.5)} = 56.5 \text{ lbs/in}^2$$

$$v = 56.5 \text{ lbs/in}^2$$



Retaining Wall - Sample Calculation

Shear

$$\text{Allowable shear} = (.03)f'_c =$$

$$(.03)(2500) = 75 \text{ lbs/in}^2$$

$$\text{Allowable} = 75 \text{ lbs/in}^2$$

Shear ok

Steel for inner footing

$$A_s = \frac{M}{f_s j d} = \frac{282600}{(20000)(.87)(16.5)} = .982 \text{ in}^2/\text{ft}$$

Bond

$$\Sigma O = \frac{V}{\mu j d} = \frac{9725}{(.075)(2500)(.87)(16.5)} = 3.62 \text{ in/ft}$$

Using $\frac{3}{4}$ " ϕ bars

$$\text{Need } \frac{.982}{.44} = 2.23 \text{ bars/ft}$$

$$\Sigma O = (2.23)(2.356) = 5.25 \text{ in}$$

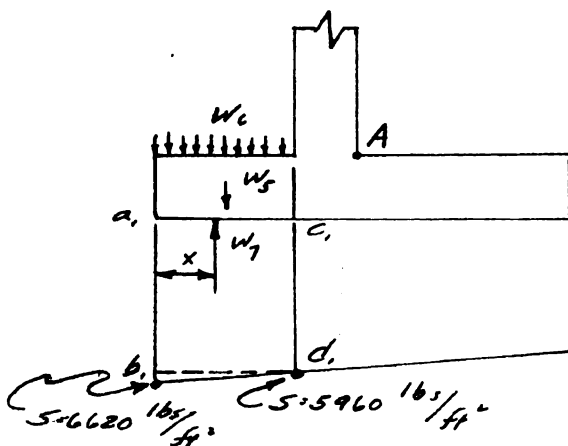
ok for bond

Use $\frac{3}{4}$ " rd. bars

spaced $5\frac{1}{4}$ " o/c

Hook ends

Design of outer footing



Find centroid of trapezoid
a, b, c, d,

$$\Sigma M_{a,b} = (5960)(36)(18) - 660\left(\frac{36}{2}\right)(12) - \frac{(5960 + 6620)(36)(x)}{2} = 0$$

Solving for x

$$x = 17.7 \text{ in. from toe}$$

Retaining Wall - Sample Calculations

$$W_5 = \text{Wt. of footing} = (3)(250) = 750 \text{ lbs}$$

$$W_6 = \text{Live load} = (3)(150) = 450 \text{ lbs}$$

$$W_7 = \text{Reaction} = \left(\frac{5960 + 6620}{2} \right) (3) = 18,870 \text{ lbs}$$

Taking moments about a,

	Force (lbs)	Distance from a, (in.)	Moment (lb.in)
W_5	750	18	13,500
W_6	450	18	8,100
- Shear	-1200		-21,600
W_7	+18,870	17.7	+334,000

Resultant = +17,670
Shear

$$\Sigma M_a = +312,400$$

$$d = \sqrt{\frac{(312,400)}{(1.46)(12)}} = \sqrt{133} = 11.52 \text{ in.}$$

$$\underline{d = 11.52 \text{ in.}}$$

$$t = 11.52 + 3.50 = 15.02 \text{ in.}$$

20 in. ok for depth

Shear

$$v = \frac{17670}{(12)(.87)(16.5)} = 102.5 \text{ lbs/in}^2$$

$$\text{Allowable} = 75 \text{ lbs/in}^2$$

Increase footing depth at A to 26 in

$$d = 26 - 3.50 =$$

$$\underline{d = 22.5 \text{ in.}}$$

$$v = \frac{17670}{(12)(.87)(22.5)} = 75 \text{ lbs/in}^2$$

v ok

Retaining Wall- Sample Calculations

Steel for outer footing

$$A_s = \frac{M}{f_s j d} = \frac{3,124,000}{(20,000)(.87)(22.5)} = .804 \text{ in}^2/\text{ft}$$

Bond

$$\text{Perimeter needed: } \Sigma O = \frac{V}{u j d} = \frac{17670}{(.075)(2500)(.87)(22.5)} = 4.82 \text{ in./ft}$$

Using $\frac{3}{4}$ " ϕ bars

$$\text{Need } \frac{.804}{.44} = 1.83 \text{ bars/ft}$$

$$\text{Perimeter} = (1.83)(2.356) = 4.30 \text{ in./ft}$$

Not enough

Try 1" ϕ bars

$$\text{Perimeter} = 3.1416 \text{ in.}$$

$$\text{No. of bars needed} = \frac{4.82}{3.14} = 1.54 \text{ bars/ft.}$$

$$\text{Area} = (1.54)(.79) = 1.21 \text{ in}^2/\text{ft}$$

Area ok

$$\text{Spacing} = \frac{12 \text{ in./ft}}{1.54 \text{ bars/ft}} = 7.80 \text{ in.}$$

Use 1" rd bars

spaced 7 $\frac{3}{4}$ " c/c

Hook ends

Beam 1 - Sample Calculations

(See plate no. 6)

$$f_c' = 3000 \text{ lbs/in}^2 \quad f_s = 20,000 \text{ lbs/in}^2$$

Span & Max. moments

Assume clear span: 16'-0" for computations

$$\text{Let max. pos. moment} = \frac{wl^2}{10}$$

$$\text{" neg. moment} = \frac{wl^2}{16}$$

Loads

$$\frac{1}{4} \text{ Panel load} = \frac{1}{4} \frac{(18)(24)(850)}{18} = 5100 \text{ lbs/ft}$$

$$\text{Wt. of } 5\frac{1}{2}' \text{ high wall} = 1650 \text{ lbs/ft}$$

$$w = 6750 \text{ lbs/ft}$$

Depth

$$M_{\max} = \frac{(6750)(16)^2(12)}{12} = 1,728,000 \text{ lb.in.}$$

$$x = d \left(\frac{1350}{3350} \right) = .403 d$$

$$jd = .866 d$$

$$C = \frac{f_c}{2} (x)(b) = \left(\frac{1350}{2} \right) (.403d)(24) = 6520 d$$

$$\text{Resisting moment} = Cjd$$

$$M_R = 6520 d^2 = M_{\max}$$

$$6520 d^2 = 1,728,000$$

$$d = 16.3 \text{ in.}$$

$$\underline{d = 16.3 \text{ in.}}$$

Shear

Since great depth is available from the small wall above let diagonal tension govern depth.

$$v = \frac{V}{bjd}$$

$$V = \frac{(16)(6750)}{2} = 54,000 \text{ lbs.}$$

$$b = 24 \text{ in.}$$

$$jd = .866 d$$

Beam 1 - Sample Calculations

$$\text{Allowable } v = .03 f'_c = 90 \text{ lbs/in}^2$$

$$\therefore d = \frac{54000}{(90)(24)(.866)} = 28.9 \text{ in.}$$

$$\underline{\text{Let } d = 29 \text{ in}}$$

Steel Areas

$$+A_s = \frac{M}{f_s j d} = \frac{1728000}{(20,000)(.866)(29)} = 3.44 \text{ in}^2$$

Use 1 row of 4-1" sq. bars
spaced 6" c/c

$$-A_s = \frac{-M}{f_s j d} = \frac{1295000}{(20000)(.866)(29)} = 2.57 \text{ in}^2$$

Use 1 row of 3-1" sq. bars
spaced 8" c/c

Bond

$$u = \frac{V}{\Sigma o j d} = \frac{54000}{(12)(.866)(29)} = 179.2 \text{ lbs/in}^2$$

$$\text{Allowable} = 225 \text{ lbs/in}^2$$

Bond ok at ends of beam

10,000 lbs/in² developed by using standard hook
10,000 lbs/in² must be developed by embedment

$$\text{Allowable bond} = 225 \text{ lbs/in}^2$$

Embedment for 10,000 lbs/in²:

$$\frac{f_s}{4u} D = \frac{20000}{(4)(225)(2)} (1) = 11.1 \text{ in.}$$

For all beam bars embed $11\frac{1}{8}"$ &
terminate in standard hooks as shown
in plate no. 6.

Inflection points are found from moment
curve ("Reinforced Concrete Structures"
Pebody Pg 508)

Beam 1 - Sample Calculation

Inflection pts. +M .94l & .06l
 -M .85l & .15l

For B1

Inflection pts.

+M 1'-0" & 15'-0" from ends
-M 2'-4 $\frac{3}{4}$ " & 13'-7 $\frac{1}{4}$ " " "

Embedment considered as beginning at
inflection points.

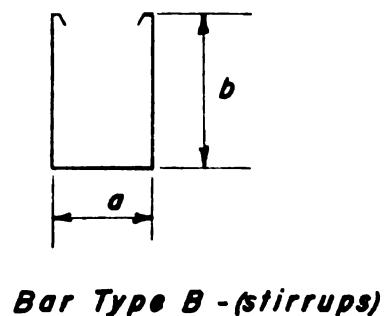
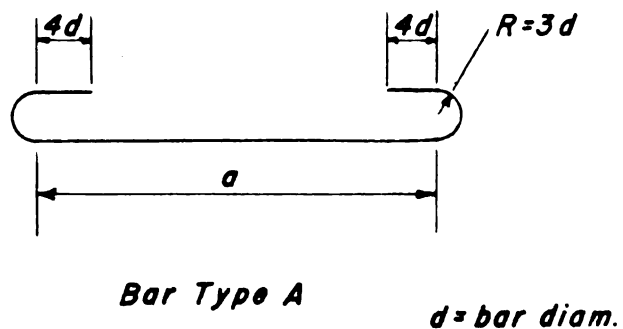
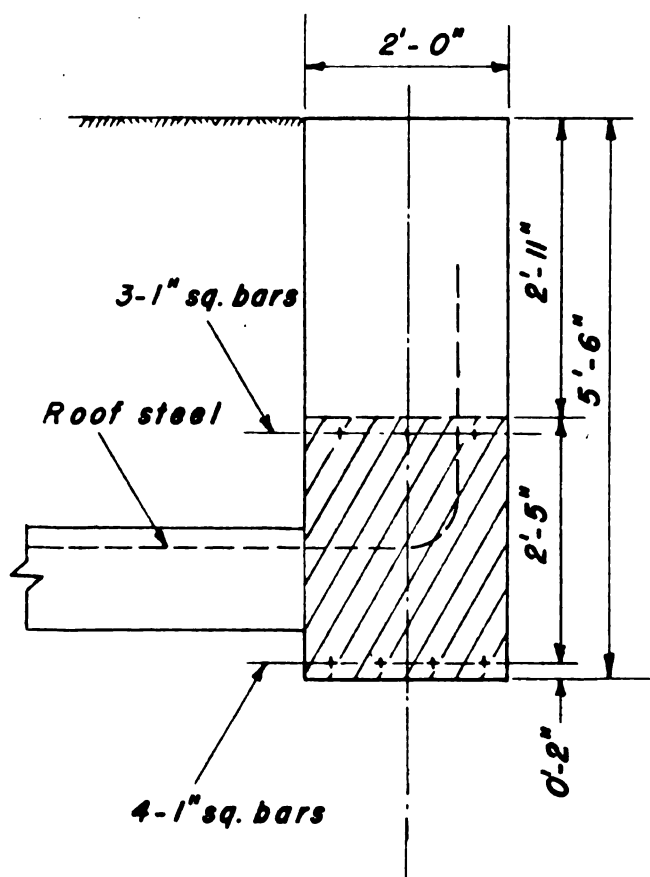
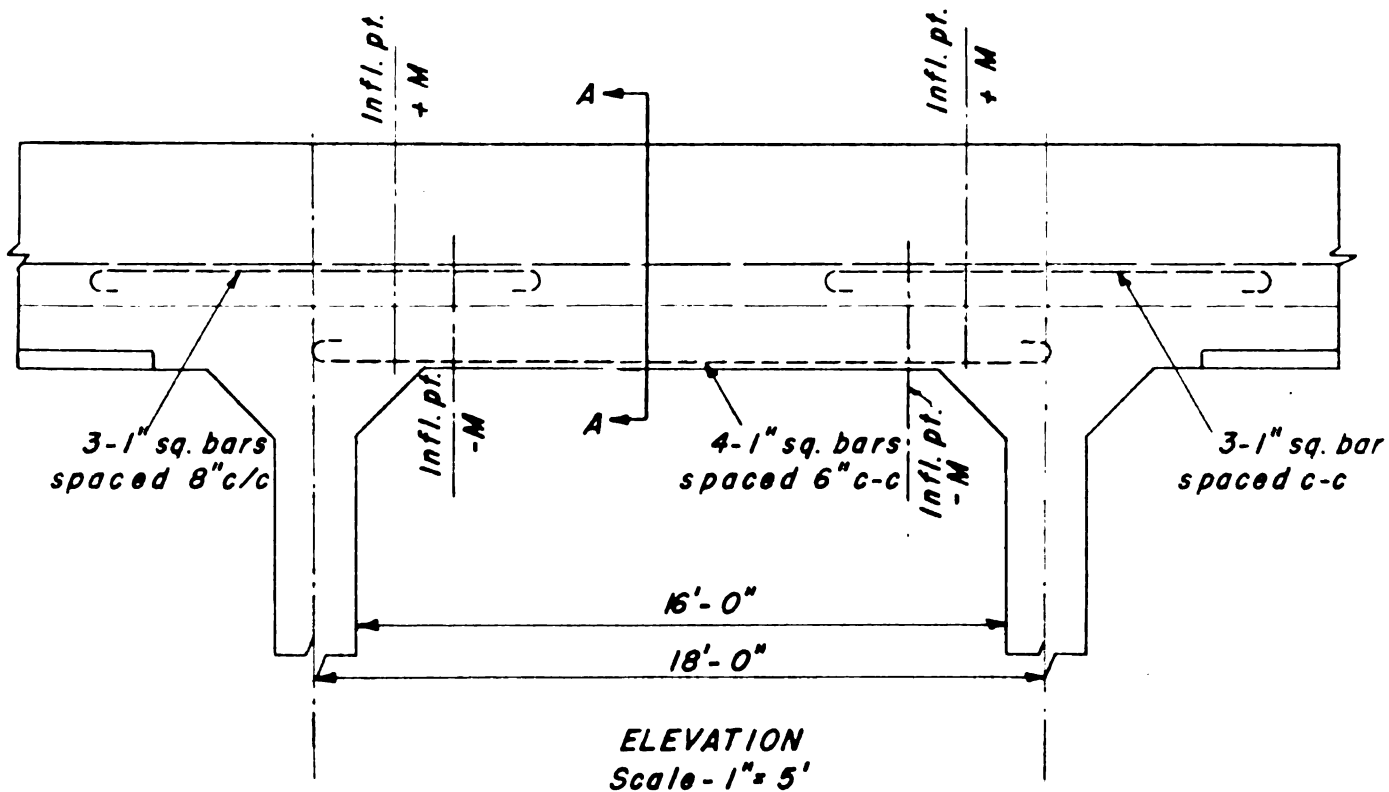


Plate No. 6
SAMPLE BEAM DESIGN
Bm. I

Scale - As shown

Ralph J.
Stephenson

Sheet 1 of 1 sheet

Design of Ramps

A total of ten ramps is used to move traffic in and out of the structure. Of these ten, there are two entrances, two exits, and one two-way ramp to the first level, and two entrances, two exits, and one two-way ramp to the second level.

The slope of the ramps was taken as the rise of the inside edge in 100 feet. The maximum used was 17.37 percent. This occurred on the South exit ramp from the second level. In general, most of the slopes range between 10 and 15 percent, which is the slope recommended by the American Automobile Association.

The main ramps leading into the structure from Capitol Avenue are designed as flat slabs. The other ramps are also designed as flat slabs wherever there is an incline within the structure. Curbing, tracing the curved portions of the roadway is raised above the surface of the slab. Inclined portions outside the structure are cut directly in the ground and paved with an eight inch pavement reinforced by a 70 lb. steel mesh.

Clearance at the points where the ramps leave the building has been kept at seven and one half feet as a minimum.

Details of ramps are shown in Plates No. 14, 15, 16, and 17.

Design of Second Level Floor

The second level floor is simply an eight inch concrete slab poured on the ground and reinforced with $\frac{1}{4}$ inch round 70 lb per 100 sq. ft. wire mesh. This wire mesh extends into the toe of the retaining wall footings and continues out to the outside of the wall.

The mesh is placed 3 inches below the surface of the concrete, and the mesh should lap the distance between bars or about 12 inches.

Wherever an interior column footing is located, it is separated from the floor slab by a bituminous joint so as to prevent any transmission of differential settlement to other portions of the structure through the floor slab.

Design of Column

The design of the columns was made using information obtained from the "Reinforced Concrete Design Handbook".

Columns on the 1st and 2nd levels were made the same size, but the reinforcement was varied. All the wall columns with the exception of those framing openings are square with a side dimension of two feet.

The column design is shown in the following calculations.

Column Design - Sample Calculations

1st Level Columns

$$f'_c = 3000 \text{ lbs/in}^2$$

Loads

$$\text{Roof load} = 850 \text{ lbs/ft}^2$$

$$\text{Wt. drop panel 7" deep} = 5600 \text{ lbs}$$

$$\text{Largest panel} = 23'-00" \times 23'-6" = 541 \text{ ft}^2$$

$$\text{Total Load} = (541)(850) + 5600 = 460,000 + 5600$$

$$\text{Load} = 465,600 \text{ lbs}$$

Round Columns

$$\text{Col. size} = 24" \text{ diam.}$$

$$\text{Gross area} = 452 \text{ in}^2$$

From Reinforced Concrete Design Handbook
(R.C.D.H.)

$$\text{Column load} = 456.6 \text{ kips}$$

$$\text{Load on concrete} = 238.0 \text{ kips}$$

$$\text{Load taken by steel} = 218.6 \text{ kips}$$

$$\text{Use } 14 - 1" \text{ sq. bars}$$

$$\frac{1}{4}" \text{ ties @ } 12 \text{ in.}$$

Square columns

$$\text{Col size} = 24" \text{ square}$$

$$\text{Gross area} = 576 \text{ in}^2$$

From R.C.D.H.

$$\text{Column load} = 456.6 \text{ kips}$$

$$\text{Load on concrete} = 311.0 \text{ kips}$$

$$\text{Load on steel} = 145.6 \text{ kips}$$

$$\text{Use } 10 - 1" \text{ sq. bars}$$

$$\frac{1}{4}" \text{ ties @ } 12 \text{ in.}$$

Column Design - Sample Calculations

2nd Level Columns

$$f'_c = 3000 \text{ lbs/in}^2$$

Loads

$$\text{Roof load} = 850 \text{ lbs/ft}^2$$

$$1^{\text{st}} \text{ Level Floor} = 275 \text{ lbs/ft}^2$$

$$\underline{1125 \text{ lbs/ft}^2}$$

$$\text{Wt. of 5" drop} = 4000 \text{ lbs}$$

$$\text{Wt. of 7" drop} = 5600 \text{ lbs}$$

$$\text{Wt. of column} = 6000 \text{ lbs}$$

$$\underline{15600 \text{ lbs}}$$

$$\text{Total load} = (541)(1125) + 15600 =$$

$$610,000 + 15,600 = 625,600 \text{ lbs}$$

$$\underline{\text{Load} = 625,600 \text{ lbs}}$$

From "Reinforced Concrete Design Handbook"

For square col.

Use 12 - 1" sq. bars for longitudinal steel

& use $\frac{1}{2}$ " round spiral with $2\frac{1}{4}$ in. pitch

For round col.

Use 16 - 1" sq. bars for longitudinal steel

12 in outer ring

4 in inner ring

& use $\frac{3}{8}$ " round spiral with 2 in. pitch

Foundation

The first step in selecting the type of foundation to be used was to investigate soil conditions at the location of the structure. As was mentioned previously a record of test borings was obtained from the Michigan State Highway Department. These borings were taken very close to the City Hall in downtown Lansing, and from examination of these it was decided that approximately the same soil conditions prevailed at the site of the parking building. So the test hole on the north-east corner of the Michigan and Capitol intersection was selected since this represented a typical boring close to the required site.

A copy of the field notes and of the results of a laboratory visual inspection are given below.

LOG OF BORINGS Project - 4501 Lansing No. for Lansing
City Hall. Michigan State Highway De-
partment.

Test Hole 1 (Elev. 147.36) Record of samples
Location - 30' N. of N. curb of Michigan and 4' E. of E.
curb of Capitol.

0' - 0.4'	Concrete Walk
0.4' - 4'	Firm yellow clay, trace of gravel
4' - 11'	Firm yellow loam, very sandy with some gravel
11' - 20'	Fine yellow sand
20' - 25'	Medium and coarse yellow sand
25' - 32'	Medium and fine yellow sand with small particles of black shaley material.
32' - 46.5'	Hard blue clay, sandy and gravel
46.5' - 49'	Medium and fine grey sand
49' - 51'	Gravel
51' - 59'	Medium and fine grey sand (compact)
59' - 62'	Medium and fine grey sand (loose)
62' - 63'	Medium hard grey sand stone
63' -	Hard grey sand stone

Test Hole #1

Record of Samples

Sample #	Consistency	Sample Depth	Sample Length	Sample Penetration Drive	No. of blows to drive 12" with 140 lb Hammer
1	Firm	6'	12"	15"	11
2	Firm	10'	Failed	15"	8
2	Sand	15'	13"	15"	18
3	Sand	20'	12"	12"	10
4	Sand	25'	Failed	12"	8
4	Sand	25'	Wash sample		
5	Sand	30'	9"	12"	6
6	Hard	35'	7"	12"	36
7	Hard	41'	6"	8"	21
8	Sand	48'	Wash sample		

(Note) Consistency determined by inspection of samples and substantiated by resistance to casing and jet rod.

All Test Holes Sampled Feb. 20, 1947

Laboratory Visual Inspection

Sample No.

1. P. I. 4 Yellow, sandy loam. Shear sample soft to plastic. Weakly coherent.
2. Non plastic. Clean, yellow, firm sand. Some very fine sand. Slight trace of silt.
3. Non plastic. Dark, mottled, yellow brown, fine to coarse sand. Slight trace of clay and silt.
4. Non plastic. Wash sample. Clean fine grey sand.
5. Non plastic. Clean grey, fine sand.
6. P. I. 5. Firm stiff, sandy loam. Trace of small pebbles.
7. P. I. 40. Stiff, sandy, loam. Trace of pebbles.
8. Non plastic. Wash sample, clean, fine, grey sand.

(Note) The textural classification used in the remarks column is based on the triaxial chart.

(Note A) No water in uncased boring holes to a depth of 35 feet. Hole caved in at a depth of 35 feet. Observation made 30 days later in original boring hole.

Foundation

The elevations given in the field notes must be corrected by adding 705.88 feet to them. This is caused by the fact that the elevations taken for the boring were referred to a city bench mark whose elevation is taken as 705.88 feet less than the U. S. Coast and Geodetic survey elevation on the benchmark.

Referring to the "log of borings" it is seen that between an elevation of 849.24 and 828.24 a medium to fine yellow sand was found. The bearing capacity of this sand was estimated at 6,000 lb/sq. in.

Design of Column Footing

The column footing selected was an reinforced concrete spread footing. An allowable soil pressure of 6000 to 7000 lbs/ sq. foot was used.

The footing was designed using tables in the "Reinforced Concrete Design Handbook".

Complete data and design loads are given in the sample calculations on the following page.

Footing Design

Type used - Spread footing

$$f'_c = 3000 \text{ lbs/in}^2$$

Allowable soil pressure = 6000 - 7000 lbs/ft^2

Loads

$$\text{Roof load} = 850 \text{ lbs/ft}^2$$

$$\text{1st Level Floor} = 275 \text{ lbs/ft}^2$$

$$\underline{1125 \text{ lbs/ft}^2}$$

$$\text{Largest panel} = 23'-0" \times 23'-6" = 541 \text{ ft}^2$$

$$\text{Panel load on footing} = (1125)(541) = 609,000 \text{ lbs.}$$

$$\text{Drop panels} = 4000 + 5600 = 9,600 \text{ lbs}$$

$$\text{Wt 2 columns @ 6000 lbs} = 12,000 \text{ lbs}$$

$$\text{Total load} = \underline{630,600 \text{ lbs}}$$

From "Reinforced Concrete Design Handbook"

$$\underline{\text{Depth of footing} = 28 \text{ in.}}$$

$$\underline{\text{Width of footing} = 9'-5" \text{ sq.}}$$

$$\underline{\text{Use } 24 - \frac{5}{8}'' \text{ } \Phi \text{ bars - spaced } 5\frac{3}{8}'' \text{ c/c}}$$

Design of Stairways

All stairways are shown on the framing diagram, (Plates No. 1 & 2). There are two types used, the reinforced concrete stairway and the all metal circular staircase. The concrete stairways are designed as one way slabs having a span equal to the horizontal projection of the stairway. The circular staircases are prefabricated and are simply erected in the openings provided for them.

All reinforced concrete stairways are designed with a landing every ten rises. This prevents fatigue and also improves the appearance of the stairway itself. The stairway leading to the Capitol Building vestibule is housed in a shaft consisting simply of a retaining wall. These stairs are designed in a manner similar to the stairway shown in the sample calculation.

All stairways are equipped with prefabricated steel handrails which are connected to the stairs with bolts cast in the concrete.

Utilities

In order to ventilate the structure properly, it is necessary to install a blower system that is capable of changing the air at frequent intervals.

The building code of the National Board of Fire Underwriters requires that positive recirculation of at least one cubic foot of air per minute, per sq. foot of floor area shall be provided. Five per cent of this air must be taken in from the outside, therefore, in order to provide for sufficient recirculation a fan, or fans, capable of handling 186,000 cubic feet of air per minute must be installed on each floor.

These fans can be located under the main ramps leading in from Capitol Avenue. It is not considered necessary to install a heating system, except that unit steam heaters should be placed in the waiting rooms and utility rooms.

To provide drainage of moisture which may be caused by water or snow on the automobiles, each isleway is sloped toward the center where a system of drains can collect the moisture and drain it to storm sewers.

Method of Financing

Due to the rapidly changing costs of labor and materials, the total cost of the structure would be very difficult to estimate at the present time. Since many other projects of this kind have been planned throughout the country, a cost based on price estimates per unit space of these structures was used.

It is figured that a cost of approximately \$1,845 per parking space would apply in this case. The structure has a capacity of 378 automobiles on the 1st level, and 392 automobiles on the 2nd level making a total of 770. At the above rate the total cost would be \$1,420,000.

It is planned to use the 2nd level of the structure for persons who desire to park all day, such as office workers, government officials, etc. The 1st level is to be used for persons parking for a short time only, such as, shoppers, salespeople, etc.

Rates charged would be five cents per two hours on both levels, however, the meters on the 2nd level would be capable of taking from one to five nickels so that it would be unnecessary for an all day parker to return to his automobile during the day. The 1st level will have regular meters taking one

to five pennies or one nickel. (The above plan deviates slightly from that suggested by the Lansing Parking Commission, see page 10 of part one). Because the structure is equipped with parking meters, it requires only a check by the Police Department, periodically, to ticket parking violators. This eliminates much of the overhead expense.

In order to figure the income provided by this project, a five and one half day week was used as a basis. The 1st level was figured to be in use 10 hours during the daytime, and 4 hours in the evening making a total of 14 hours per day. This will provide an income of \$132 per day, or \$726 per week. The 2nd level will be used only during the daytime unless, demand warrents opening it in the evenings. However, for design purposes, a 10 hour per day usage was assumed, providing a daily income of \$98 or \$539 per week. This makes a total weekly income of \$1,265 or a yearly income of \$65,780.

Upkeep is estimated at \$20,000 per year making a net profit of \$45,780 per year.

In order to finance a project of this type and size, revenue bonds are generally used. In this case it is planned that a bond issue of \$1,550,000 at 3% interest will be made. These bonds to be retired in 20 years, at which time the profits may be used by the city of Lansing.

References

1. Reinforced Concrete Structures - Peabody
2. Reinforced Concrete Design - Sutherland and Reese
3. Reinforced Concrete Design Handbook of the American Concrete Institute - Detroit, Michigan
4. Building Regulations for Reinforced Concrete - American Concrete Institute - 1941
5. Recommended Practice and Standard Specifications for Concrete and Reinforced Concrete - American Concrete Institute - (third printing August 1944)
6. Parking Manual - American Automobile Association
7. Building Code - National Board of Fire Underwriters - (1943 edition)
8. Building and Safety Code - City of Lansing
9. Highway Design and Construction - Arthur G. Bruce

Acknowledgements

It is desired by the author to thank the following people and organizations for their great help, and cooperation in securing the information contained in this thesis.

Professor C. L. Allen

Professor C. A. Miller

Professor F. R. Theroux

Mr. Wood - City Planning Engineer of Lansing

Mr. Al Matthews - Michigan State Highway Department

American Automobile Association

Detroit Planning Commission

Portland, Oregon Planning Commission

LEGEND

Beams -----
 Retaining Walls -----
 Curtain Walls -----
 Large circles indicate drop panels
 with 19" thickness
 Shaded circles- Circular stairways
 Shaded areas- One way slabs
 Bm. 7 - Beam number 7
 Columns indicated by +

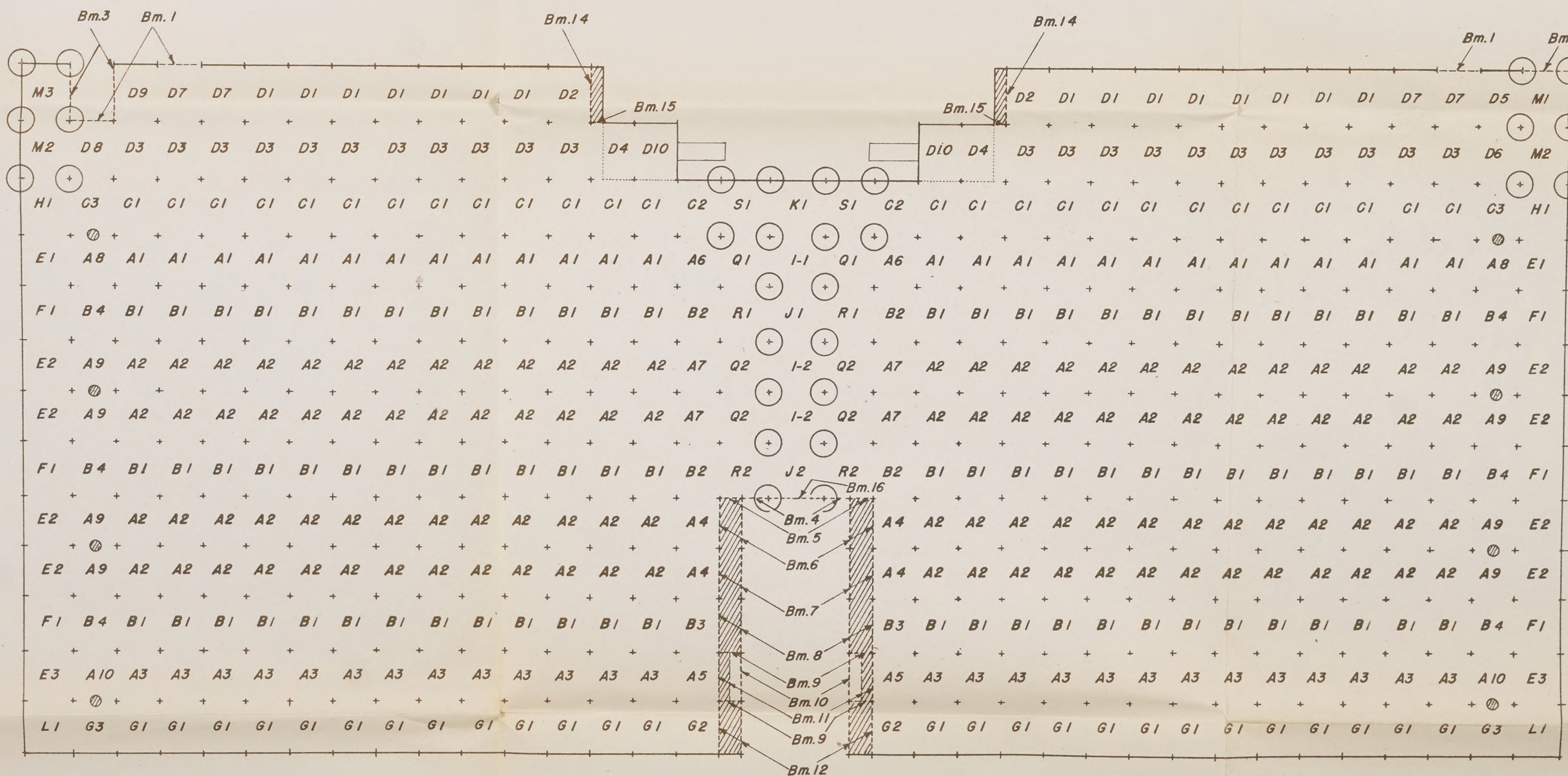


Plate No. 1
 FRAMING PLAN
 Roof

Scale 1" = 40' Ralph J. Stephenson
 Sheet 1 of 1 sheet

126
 820
 TH3
 Plate
 no. 1



SUPPLEMENTARY MATERIAL

LEGEND

Beams -----
 Retain'g Walls -----
 Curtain Walls -----
 Open circles indicate drop panels
 with 13" thickness
 Shaded circles- Circular stairways
 Shaded areas- One way slabs
 Columns indicated by +
 Beams adjacent to one way slabs have
 same number as corresponding beams in
 roof, but are preceded by letter "A."

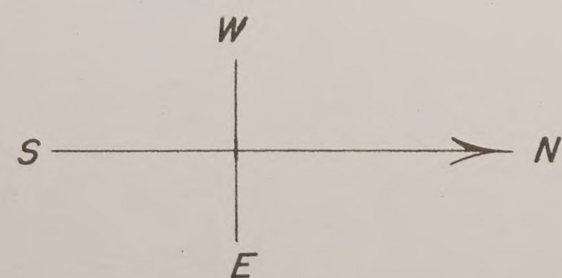
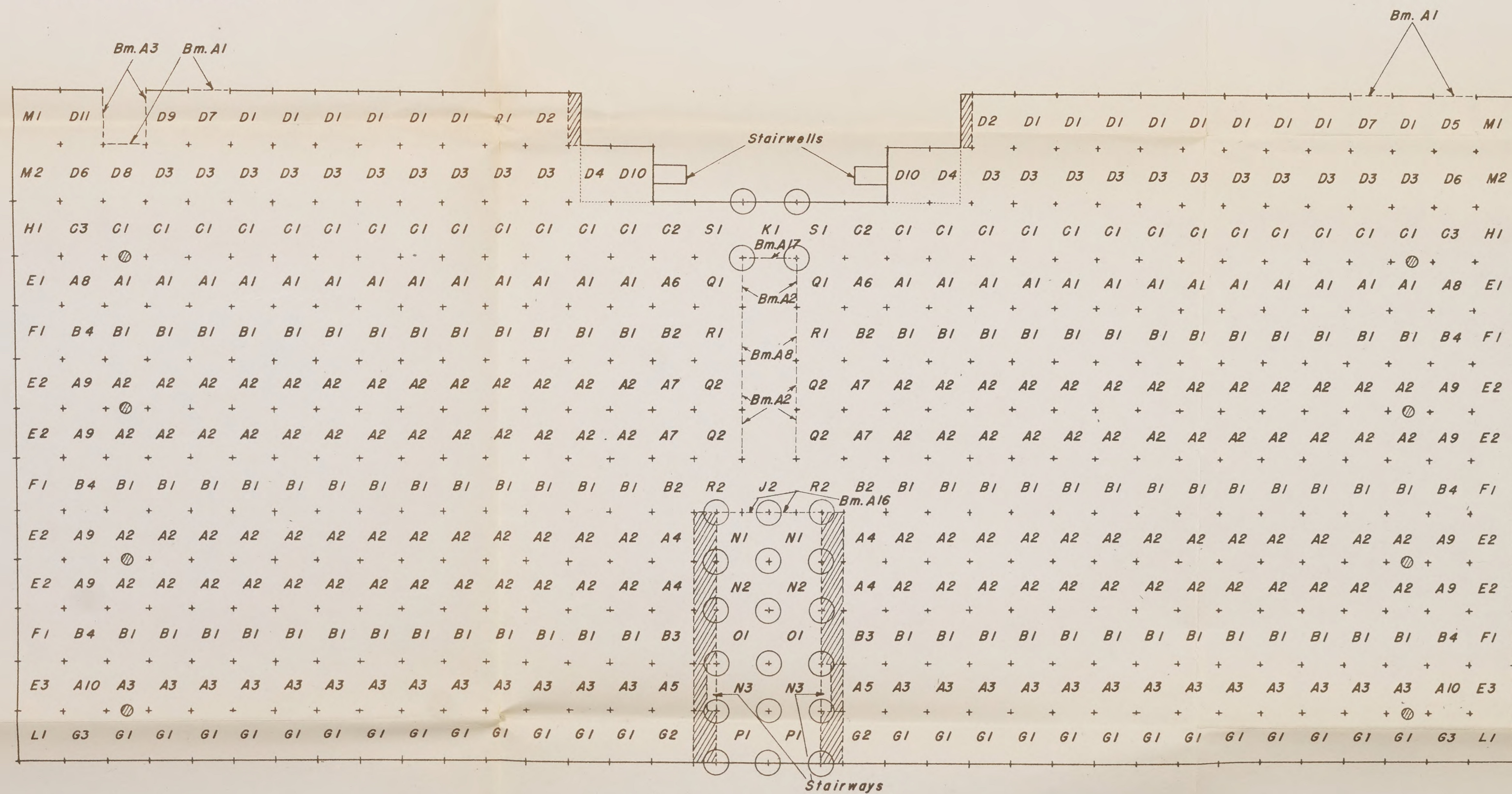


Plate No. 2
 FRAMING PLAN
 1st Level Floor

Scale 1"=40'

Ralph J.
 Stephenson

Sheet 1 of 1 sheet

126
 820
 THS
 Plate
 no. 2

MICHIGAN STATE UNIVERSITY LIBRARIES
 3 1293 03150 9460

SUPPLEMENTARY
 MATERIAL

CAPITOL

All columns 2'-0" in diam.

Parking meters - +

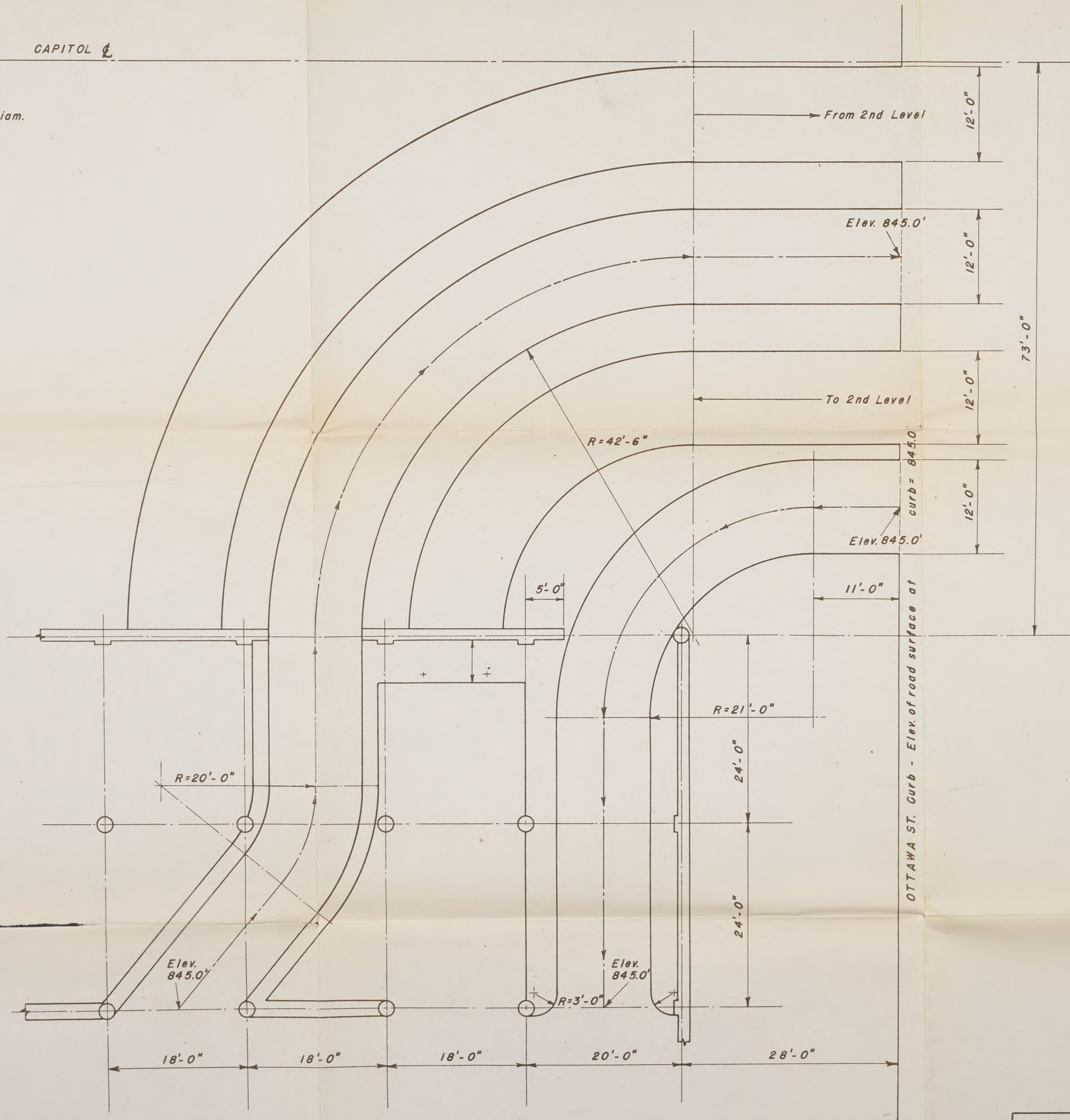


Plate No. 14
NORTH ENTRANCE & EXIT
1st Level
Scale 1" = 10'
Ralph J. Stephenson
Sheet 1 of 1 sheet

126
820
THS
Plate
No. 14

MICHIGAN STATE UNIVERSITY LIBRARIES
3 1293 03150 9478

SUPPLEMENTARY
MATERIAL

126
830
TAS
Plate
no. 15



SUPPLEMENTARY
MATERIAL

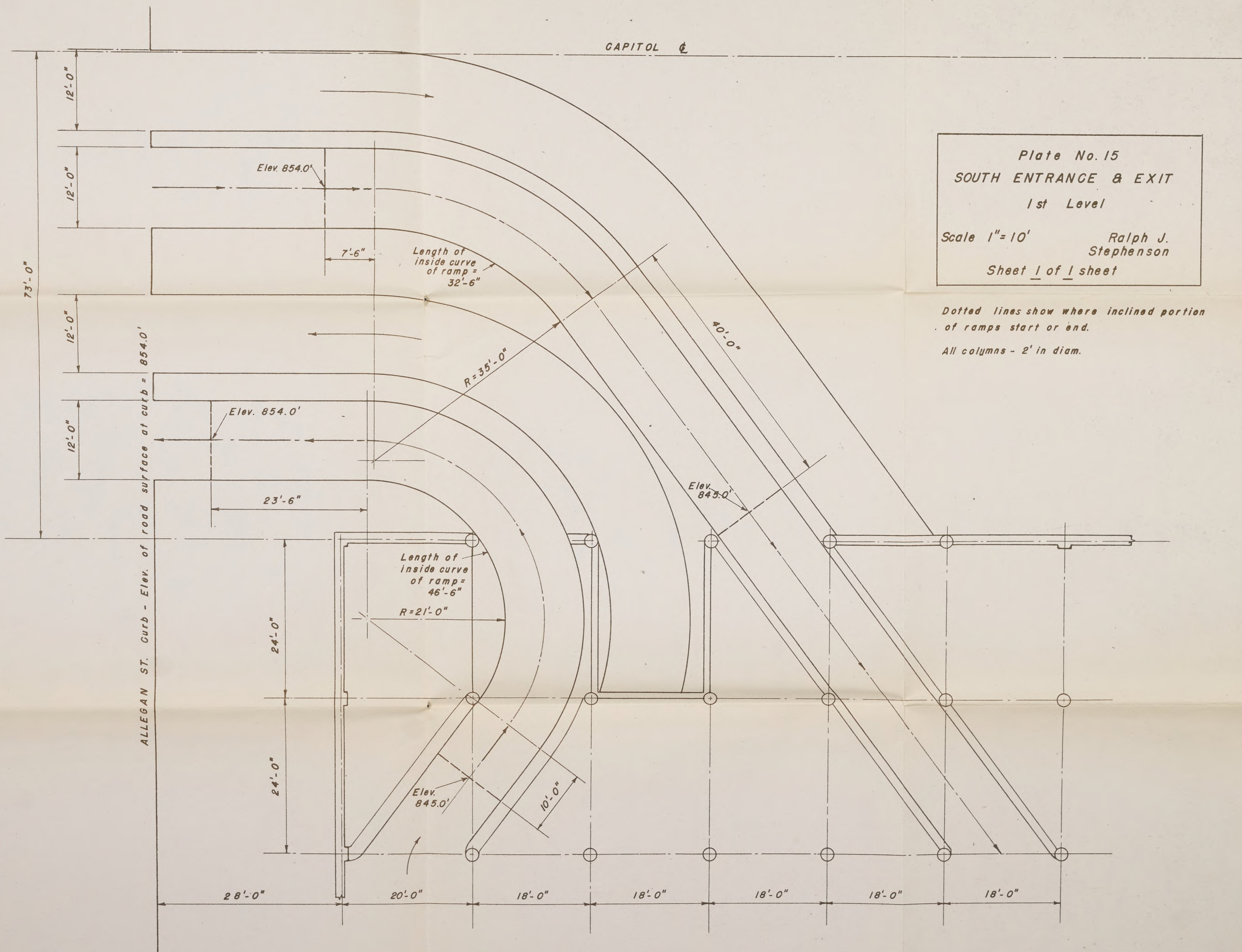


Plate No. 15
SOUTH ENTRANCE & EXIT
1st Level
Scale 1"=10' Ralph J. Stephenson
Sheet 1 of 1 sheet

Dotted lines show where inclined portion
of ramps start or end.
All columns - 2' in diam.

All column 2'-0" in diam.
Parking meters

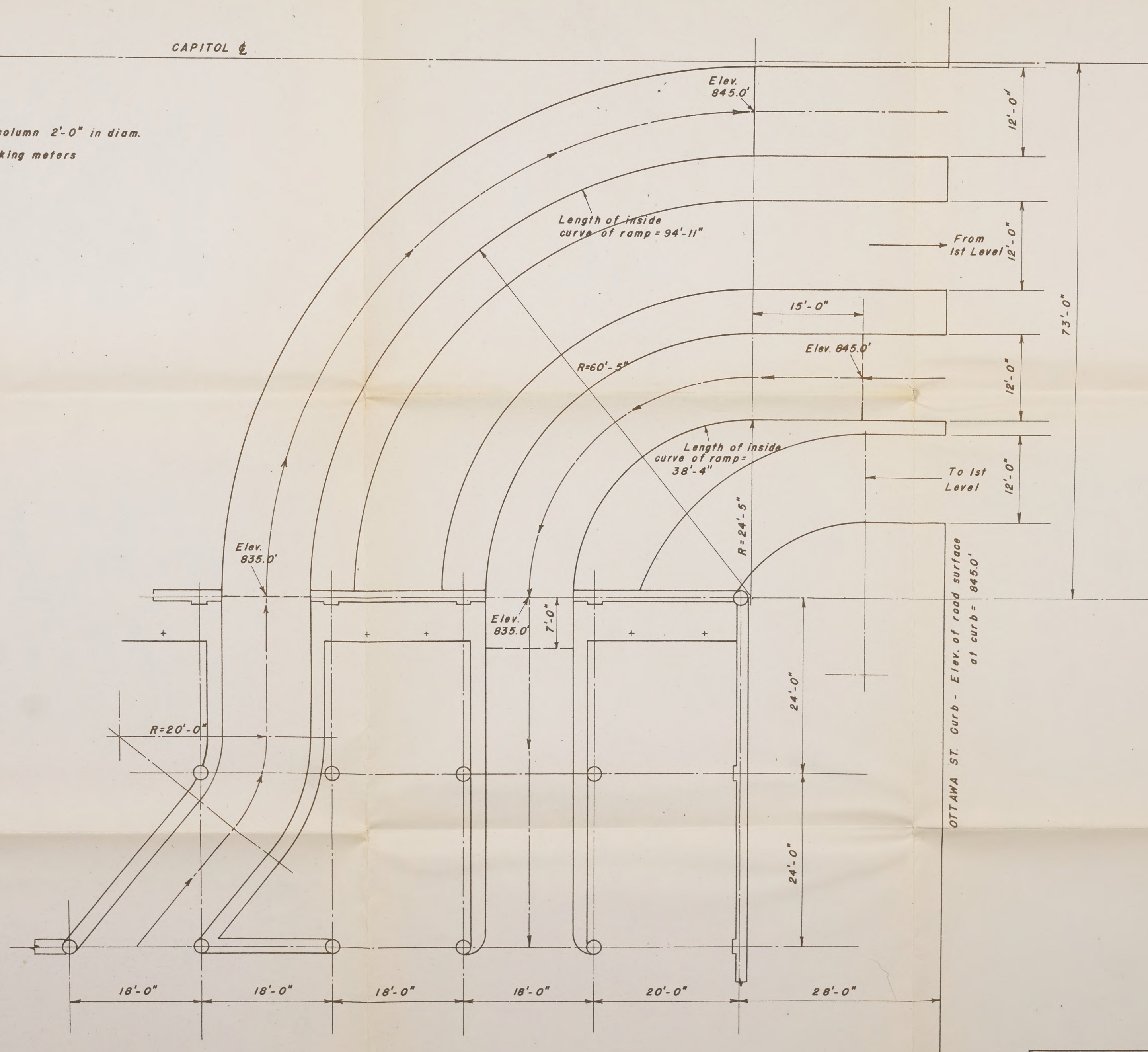


Plate No. 16
NORTH ENTRANCE & EXIT
2nd Level
Scale 1"=10'
Ralph J. Stephenson
Sheet 1 of 1 sheet

126
820
T45
Plate
no. 16



SUPPLEMENTARY
MATERIAL

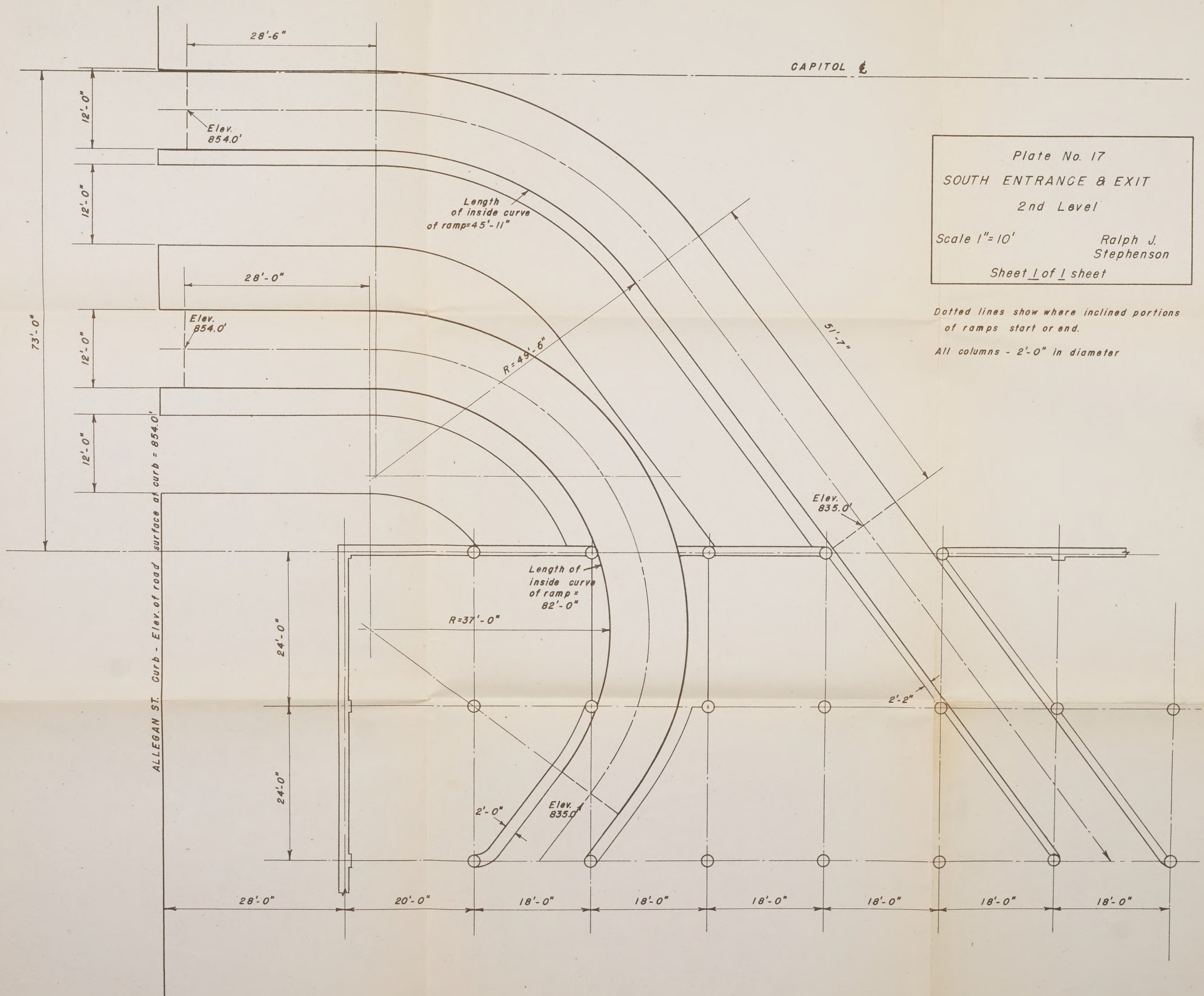


Plate No. 17
 SOUTH ENTRANCE & EXIT
 2nd Level
 Scale 1"=10'
 Ralph J. Stephenson
 Sheet 1 of 1 sheet

Dotted lines show where inclined portions
 of ramps start or end.
 All columns - 2'-0" in diameter

LEGEND

Curb & sidewalk boundaries -----
 Curtain Walls
 Shaded areas indicate 4' protective wall
 Shaded circles - Circular stairways
 Columns indicated by +
 Arrows show direction of traffic
 Only 1st level ramps shown at North & South ends
 Only ramp outlines shown

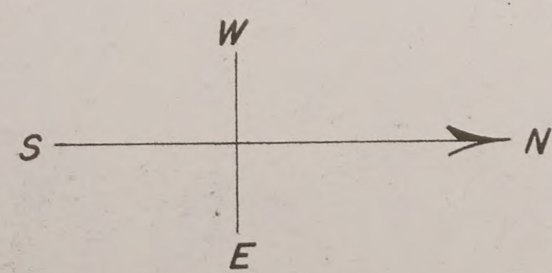
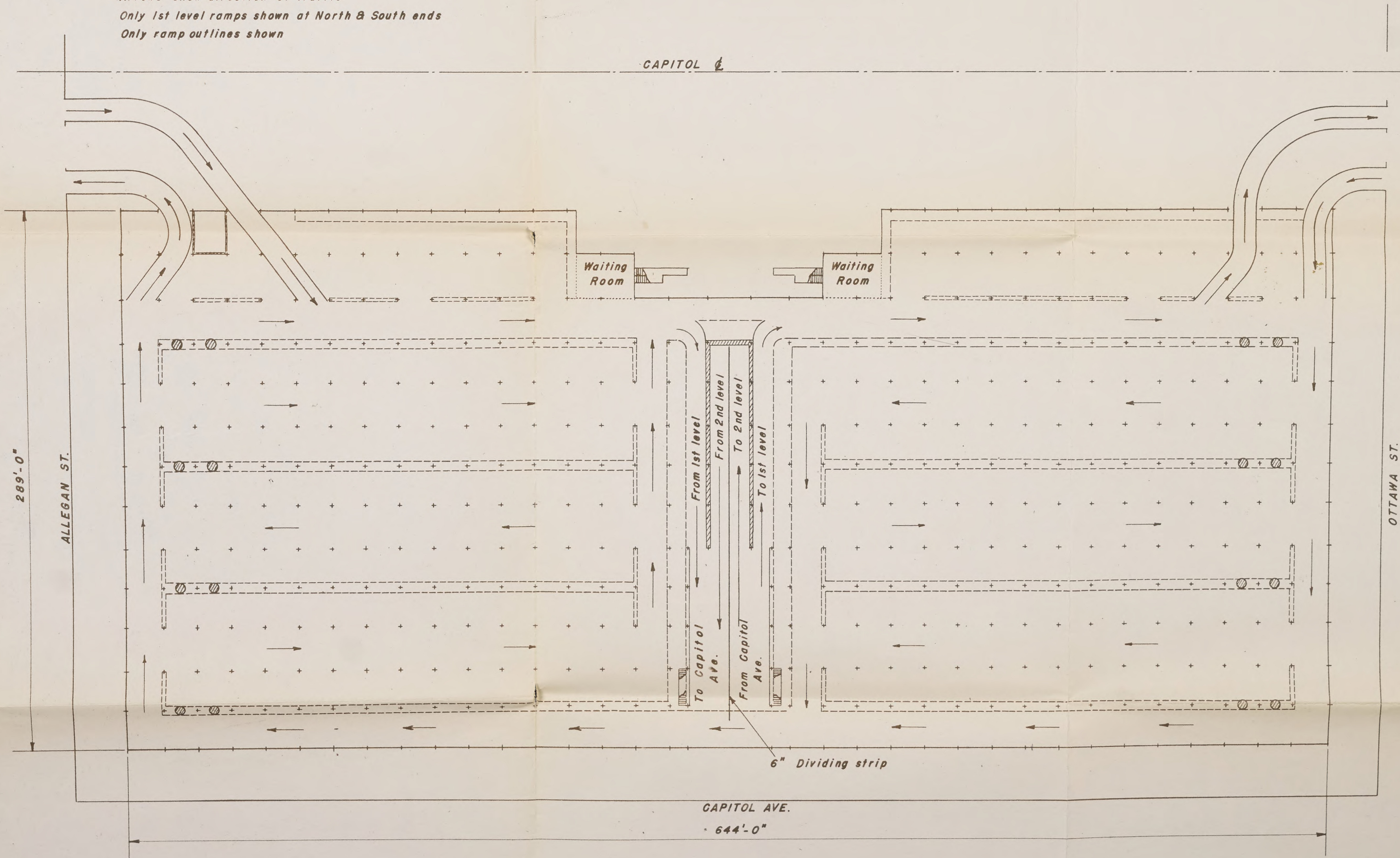


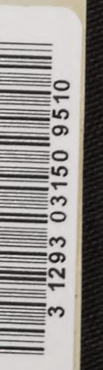
Plate No. 18
 TRAFFIC MOVEMENT
 1st Level

Scale 1"=40'

Ralph J.
 Stephenson

Sheet 1 of 1 sheet

126
 820
 THS
 Plate
 no. 18



SUPPLEMENTARY MATERIAL

LEGEND

Curb & sidewalk boundaries -----
 Curtain walls
 Shaded areas indicate 4' protective wall
 Shaded circles - Circular stairways
 Columns indicated by +
 Arrows show direction of traffic
 Only 2nd level ramps shown at North & South ends
 Only ramp outlines shown

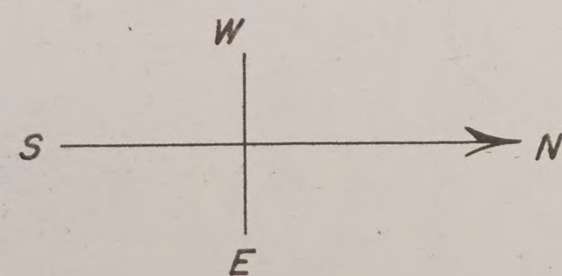
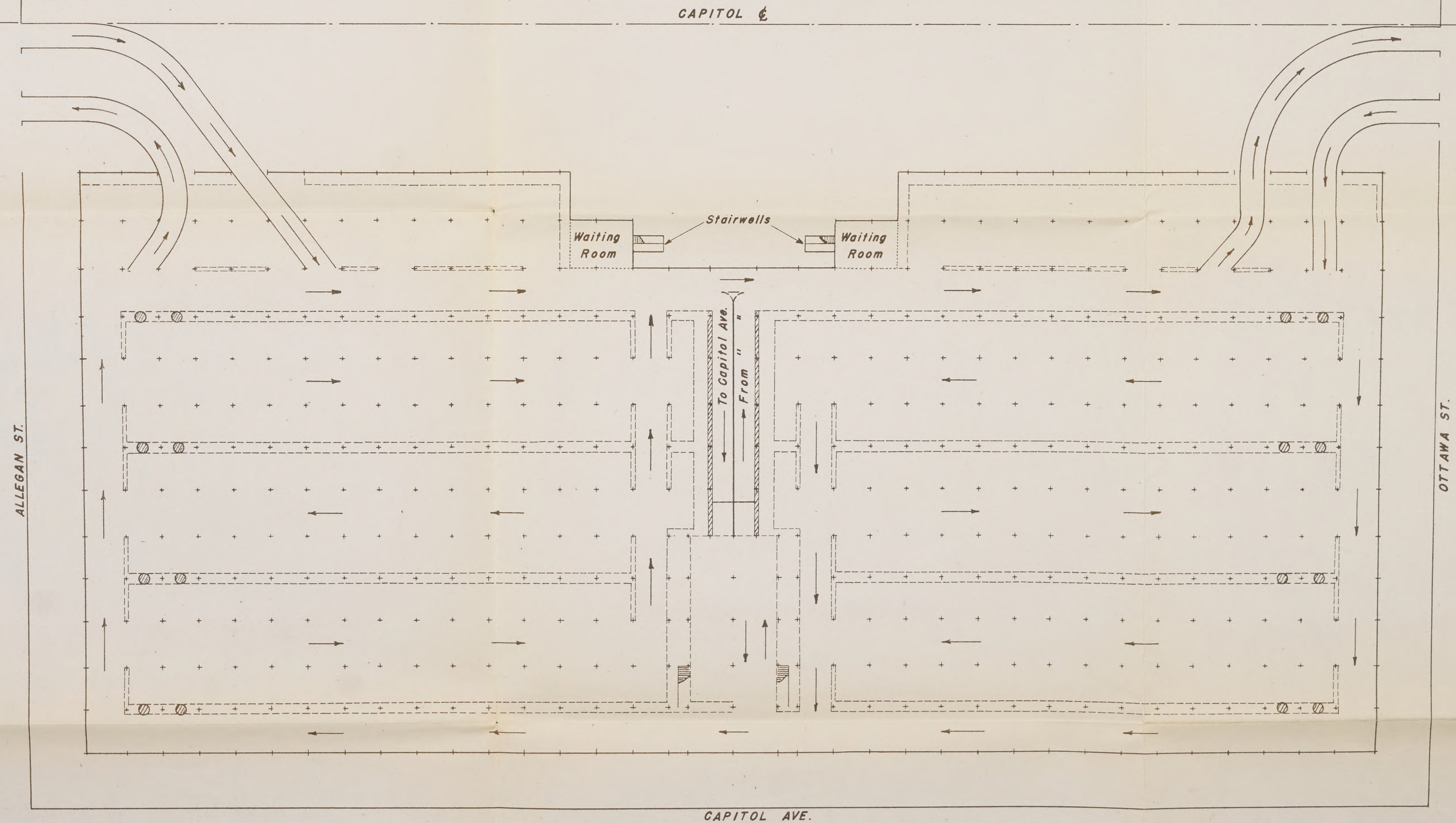
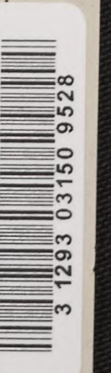


Plate No. 19
 TRAFFIC MOVEMENT
 2nd Level

Scale 1"=40'

Ralph J.
 Stephenson
 Sheet 1 of 1 sheet

126
 820
 TMS
 Plate
 no. 19



SUPPLEMENTARY
 MATERIAL

8 plates

(1, 2, 16, 17)

Mar 2 4 4 p 4

Mar 25 1944

Apr 6 '49

Apr 20 '49

May 31 491

SEP 19 '56

OCT 16 1962

Rec'd 10-23-62

~~JUN 21 1963~~ 

APR 28 1989

126

126

820

743

1

	61	61	61	61	61	61	L1
	61	61	61	61	61	61	L1

MICHIGAN STATE UNIV. LIBRARIES



31293010098097