

# VOLUME III      STRUCTURAL

## PRELIMINARY DRAWINGS RECOMMENDED FIVE CORRIDOR SYSTEM

PREPARED FOR  
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT  
MAY 1968

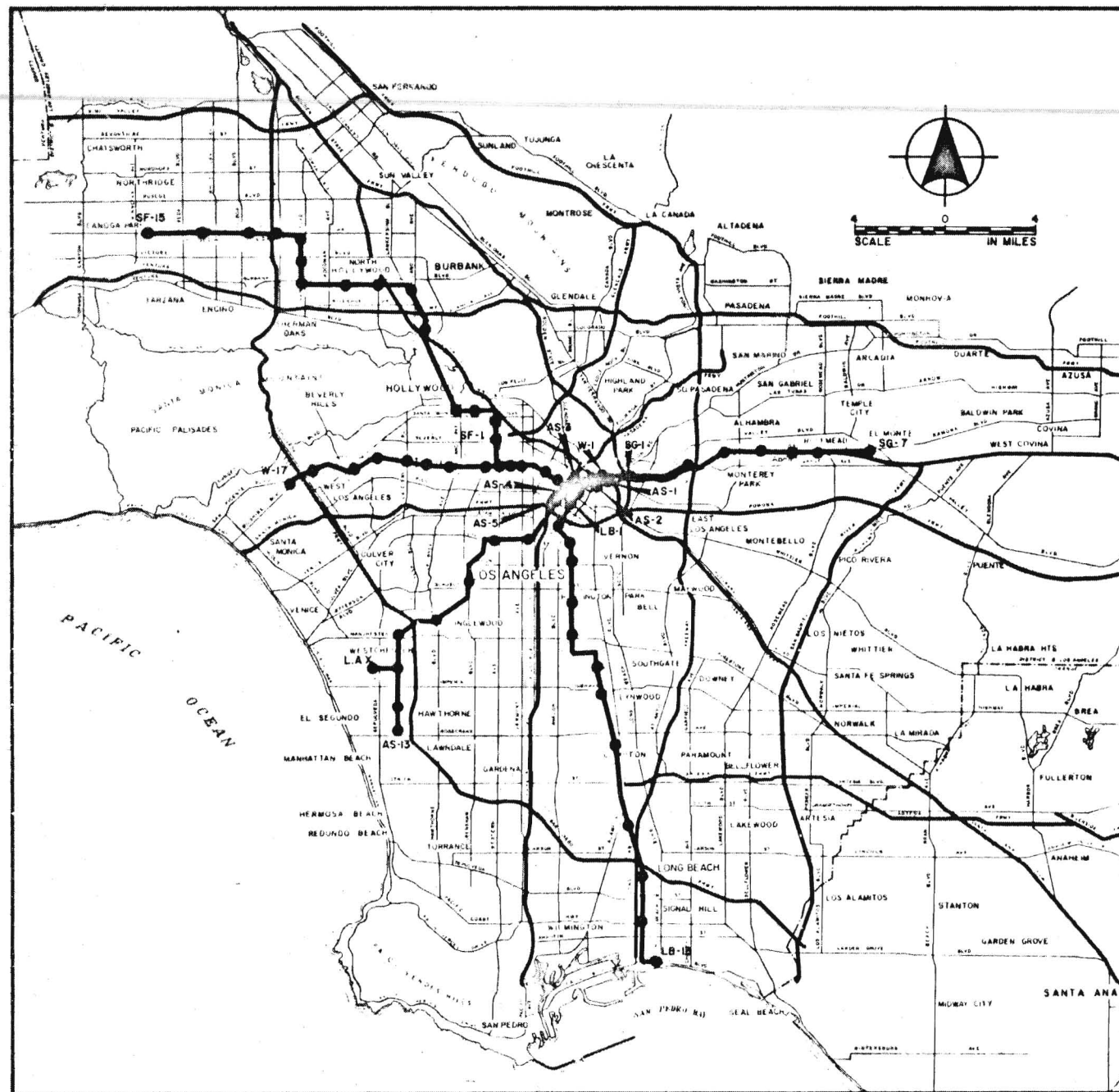
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KAISER ENGINEERS/DANIEL, MANN, JOHNSON, & MENDENHALL      A JOINT VENTURE

■ ARCHITECTS AND ENGINEERS ■





LOCATION MAP

**SAN FERNANDO VALLEY CORRIDOR**

STATION	STATION
SF - 1	BEVERLY BLVD.
SF - 2	SANTA MONICA BLVD.
SF - 3	VINE
SF - 4	HOLLYWOOD-LA BREA
SF - 5	UNIVERSAL CITY
SF - 6	NORTH HOLLYWOOD
SF - 7	LAUREL CANYON
SF - 8	FULTON
SF - 9	BURBANK BLVD.
SF - 10	VAN NUYS
SF - 11	SHERMAN CIRCLE
SF - 12	SEPULVEDA
SF - 13	BALBOA
SF - 14	LINDLEY
SF - 15	TAMPA

**AIRPORT SOUTHWEST CORRIDOR**

STATION	STATION
AS - 1	METROPORT
AS - 2	CIVIC CENTER
AS - 3	BUNKER HILL
AS - 4	7th. & FLOWER
AS - 5	CONVENTION CENTER
AS - 6	EXPOSITION PARK
AS - 7	WESTERN AVE.
AS - 8	CRENSHAW - 54th.
AS - 9	INGLEWOOD
AS - 10	MANCHESTER
AS - 11	CENTURY
AS - 12	EL SEGUNDO
AS - 13	ROSECRANS
AS - 14	L.A.X.

**WILSHIRE CORRIDOR**

STATION	STATION
W - 1	UNION STATION
W - 2	CIVIC CENTER
W - 3	6th. & BROADWAY
W - 4	7th. & FLOWER
W - 5	LUCAS
W - 6	ALVARADO
W - 7	VERMONT
W - 8	NORMANDIE
W - 9	WILSHIRE - WESTERN
W - 10	WILSHIRE - CRENSHAW
W - 11	WILSHIRE - LA BREA
W - 12	FAIRFAX
W - 13	LA CIENEGA
W - 14	BEVERLY HILLS
W - 15	CENTURY CITY
W - 16	WESTWOOD
W - 17	BARRINGTON

**LONG BEACH CORRIDOR**

STATION	STATION
LB - 1	OLYMPIC
LB - 2	WASHINGTON
LB - 3	ADAMS
LB - 4	VERNON AVENUE
LB - 5	GAGE
LB - 6	FIRESTONE
LB - 7	WATTS
LB - 8	IMPERIAL
LB - 9	COMPTON
LB - 10	DEL AMO
LB - 11	WARDLOW
LB - 12	PACIFIC COAST
LB - 13	LONG BEACH

**SAN GABRIEL VALLEY CORRIDOR**

STATION	STATION
SG - 1	COUNTY HOSPITAL
SG - 2	STATE COLLEGE
SG - 3	FREMONT
SG - 4	GARFIELD
SG - 5	SAN GABRIEL
SG - 6	ROSEMEAD
SG - 7	EL MONTE



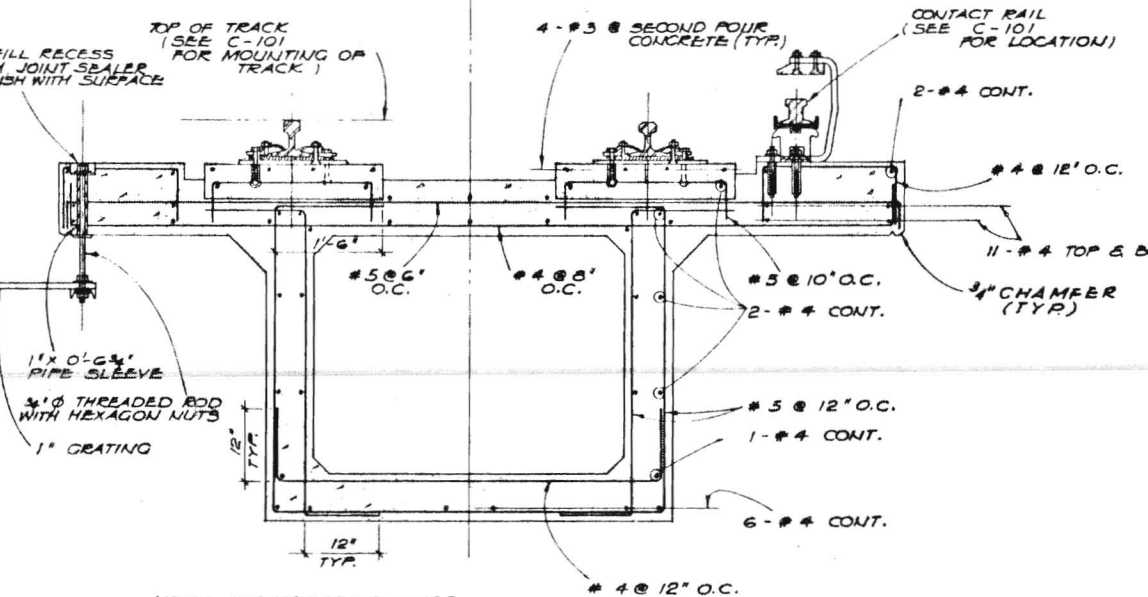
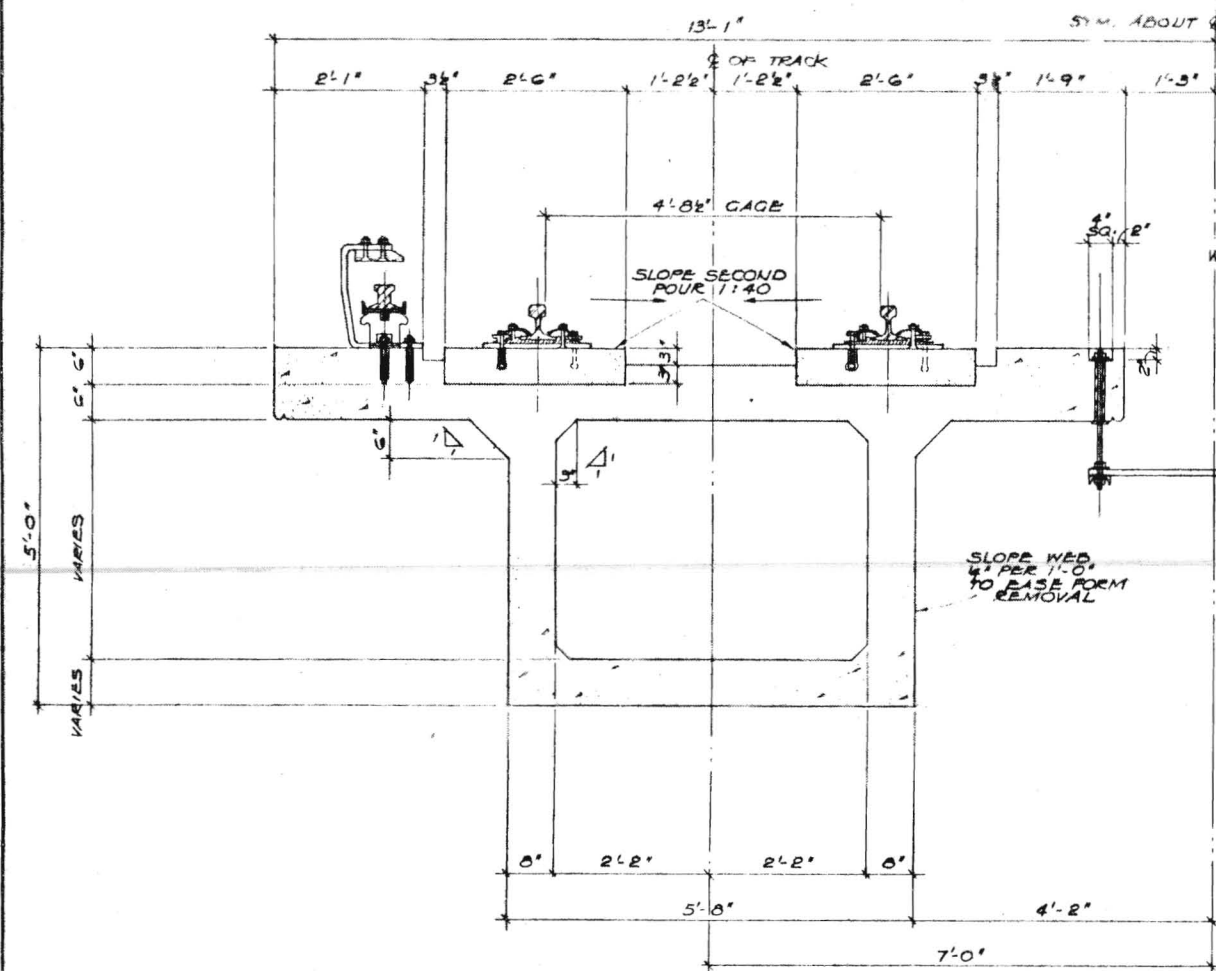
# STRUCTURAL DRAWING INDEX

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S-34	STEEL LINER PLATE TUNNEL - 2300' RADIUS TRACK - 85' LONG VEHICLE
S-35	STEEL LINER PLATE TUNNEL - 1500' RADIUS TRACK - 85' LONG VEHICLE
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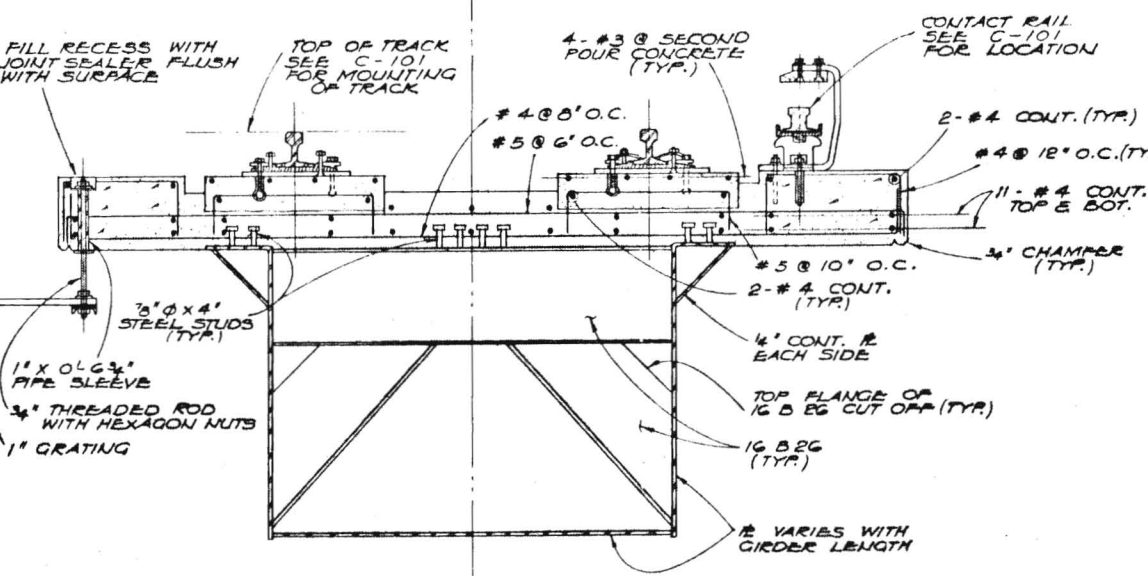
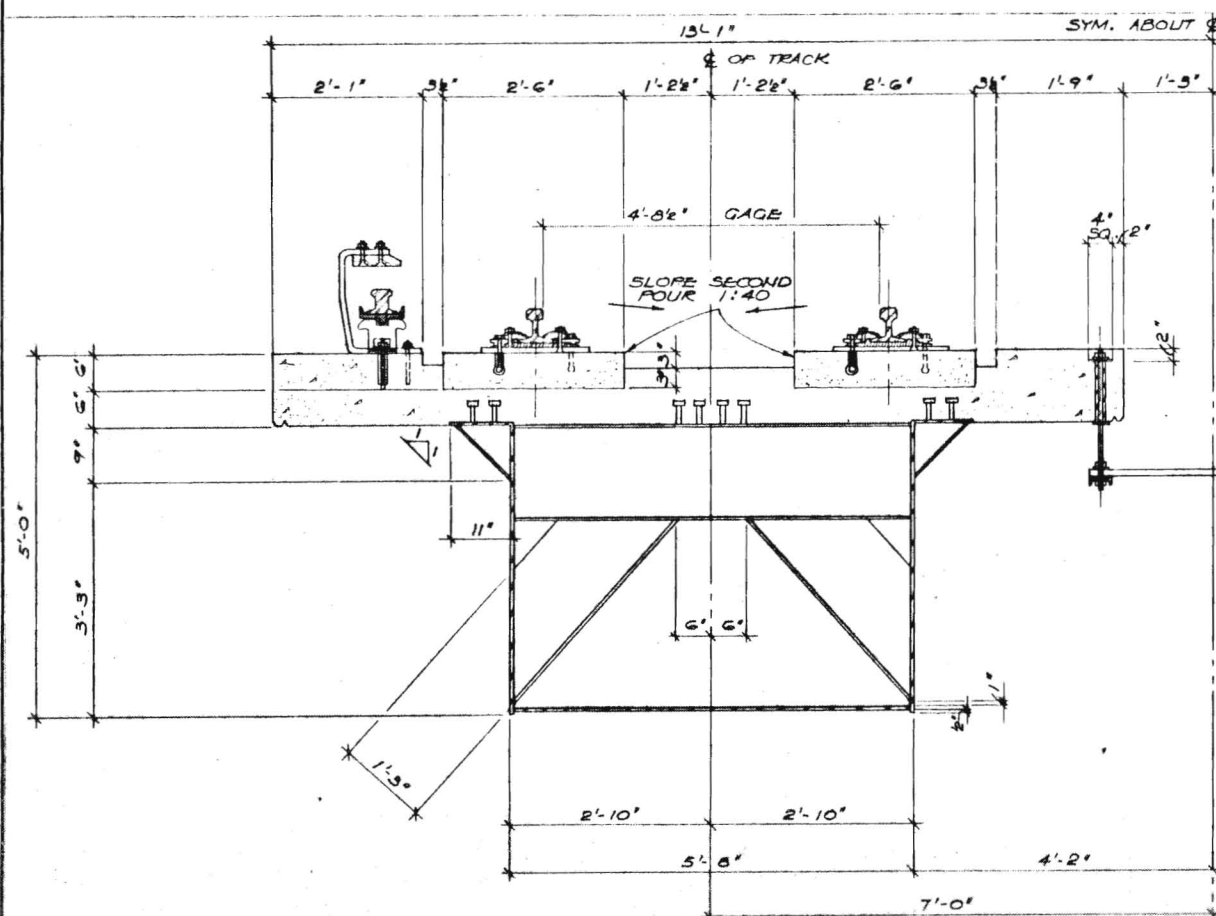
DRAWING NO.	TITLE
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S-210	UNDERPINNING REQUIREMENTS - UNION STATION TO 30TH STREET
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DRAWING NO.		DATE		SCALE		PROJECT	
APPROVALS		DRAWN BY		CHECKED BY		DATE	
PROJECT MANAGER		DATE		DATE		DATE	
DESIGNER		DATE		DATE		DATE	
CHECKER		DATE		DATE		DATE	
DATE		DATE		DATE		DATE	
KAISER ENGINEERS, A JOINT VENTURE DANIEL, MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS							
							
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015							
STRUCTURAL DRAWING INDEX							





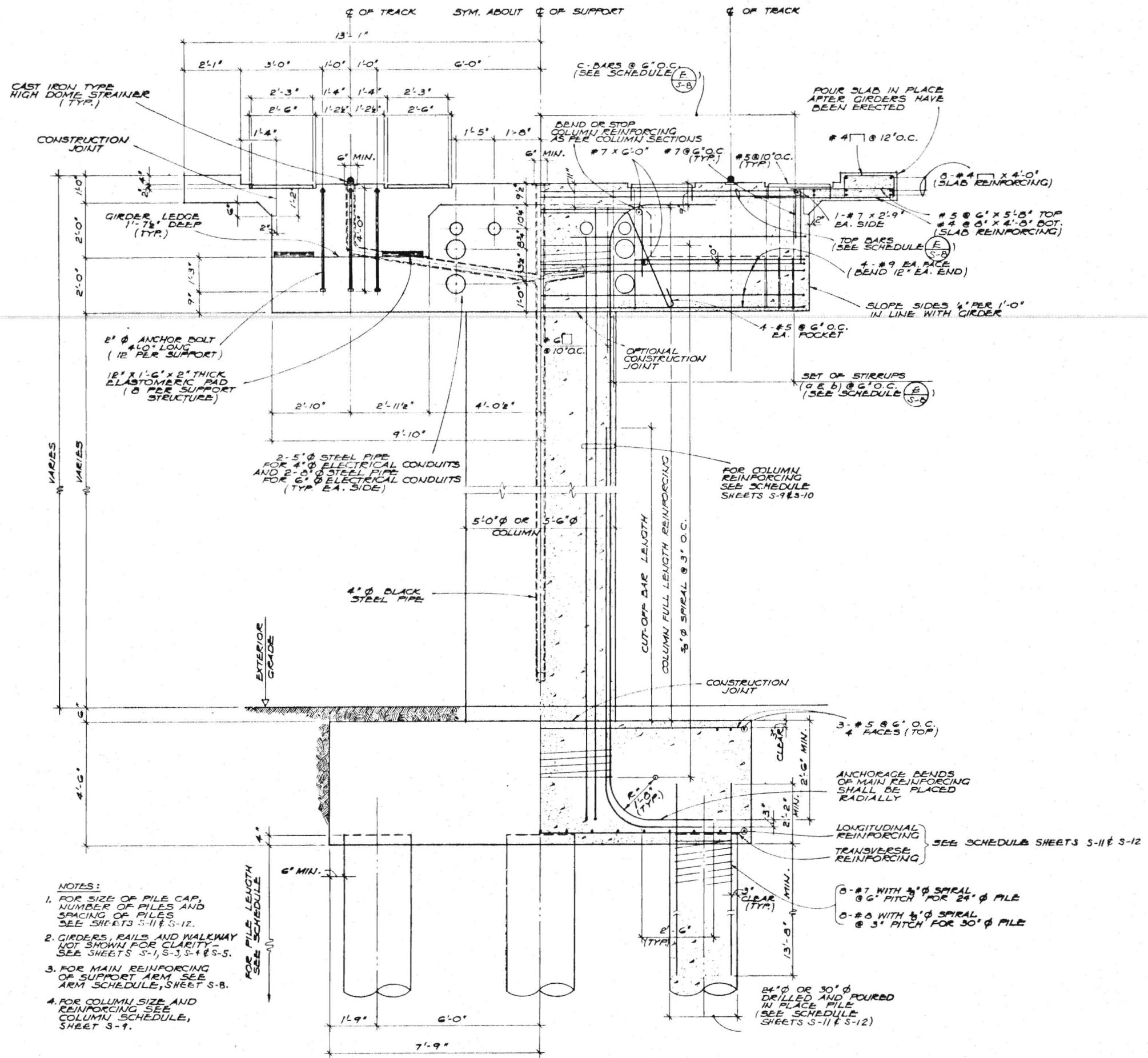
**(A)**  
S-1  
TYPICAL SECTION THROUGH  
PRESTRESSED AERIAL GIRDERS  
3/4" = 1'-0"



**(B)**  
S-1  
TYPICAL SECTION THROUGH  
COMPOSITE AERIAL GIRDERS  
3/4" = 1'-0"

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN





- NOTES:
1. FOR SIZE OF PILE CAP, NUMBER OF PILES AND SPACING OF PILES SEE SHEETS S-11 & S-12.
  2. GIRDERS, RAILS AND WALKWAY NOT SHOWN FOR CLARITY SEE SHEETS S-1, S-3, S-4 & S-5.
  3. FOR MAIN REINFORCING OF SUPPORT ARM SEE ARM SCHEDULE, SHEET S-8.
  4. FOR COLUMN SIZE AND REINFORCING SEE COLUMN SCHEDULE, SHEET S-9.

**A** TYPICAL SECTION THROUGH  
S-2 AERIAL SUPPORT STRUCTURE

1/2" = 1'-0"

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **S-2**

DATE

PROJECT MANAGER

SCRTD

APPROVALS

A JOINT VENTURE  
KAISER ENGINEERS  
DANIEL MANN, JOHNSON, & MENDENHALL  
ARCHITECTS - ENGINEERS

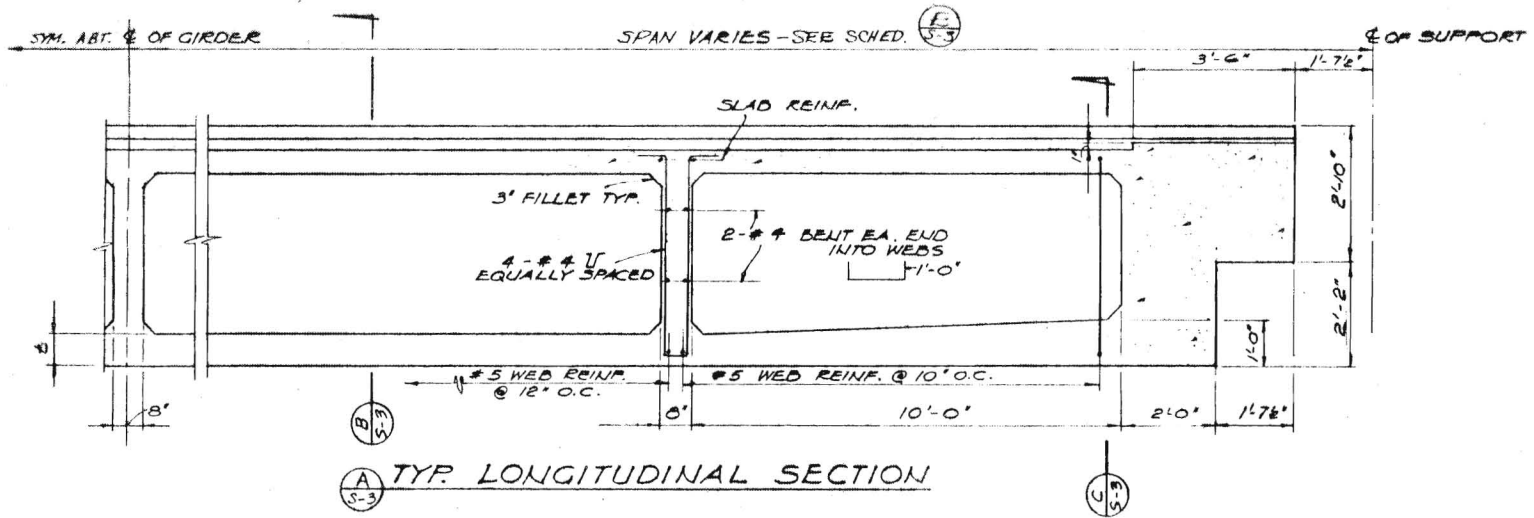
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RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90015

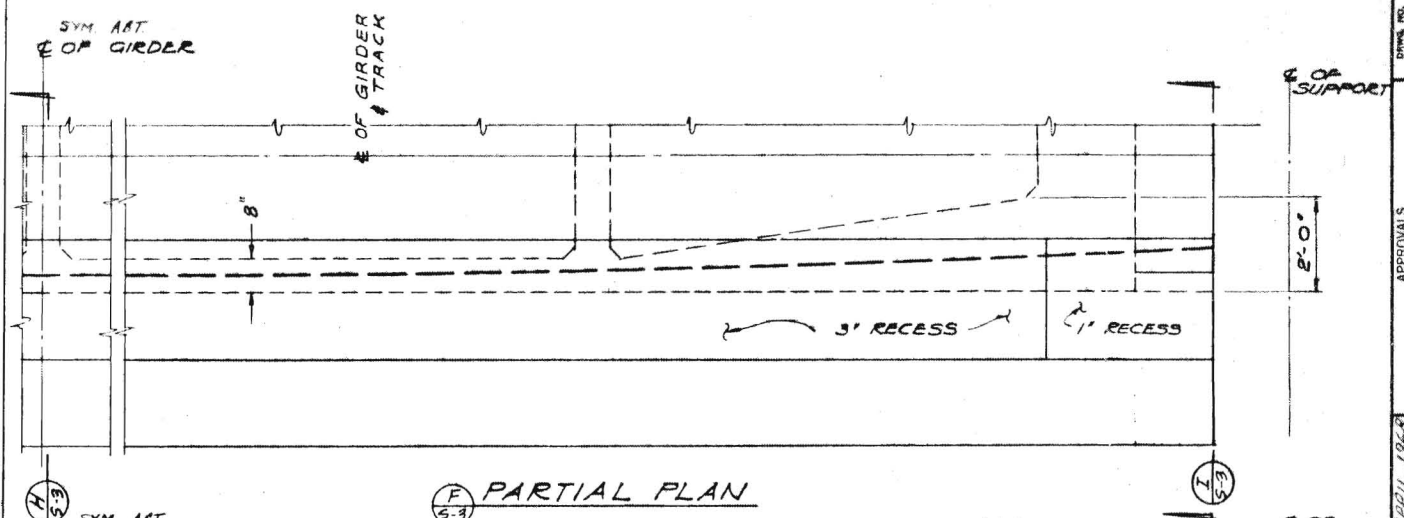
TYPICAL SECTION THROUGH AERIAL  
STRUCTURE PIER

DRAWING NO. **S-2**

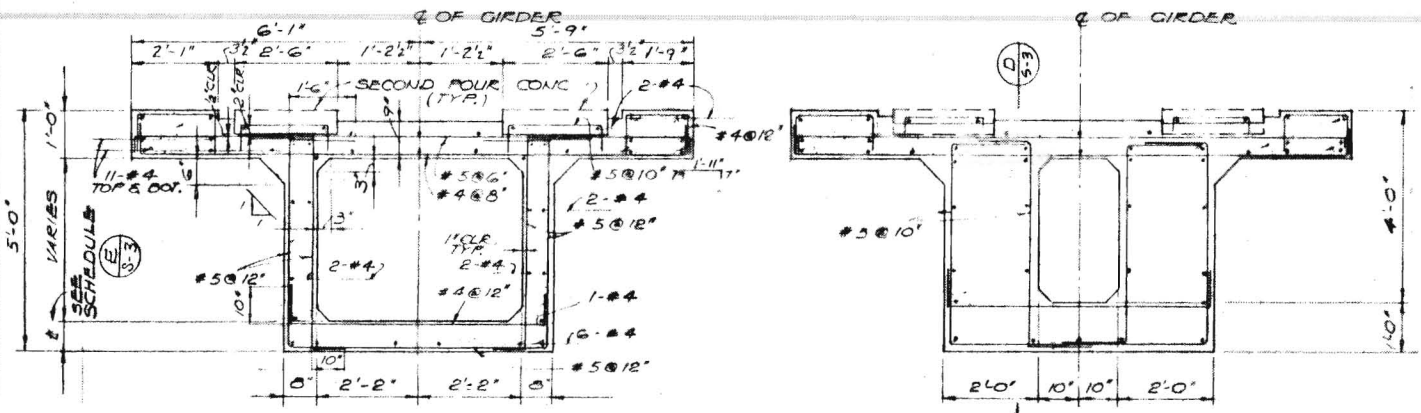




(A) TYP. LONGITUDINAL SECTION

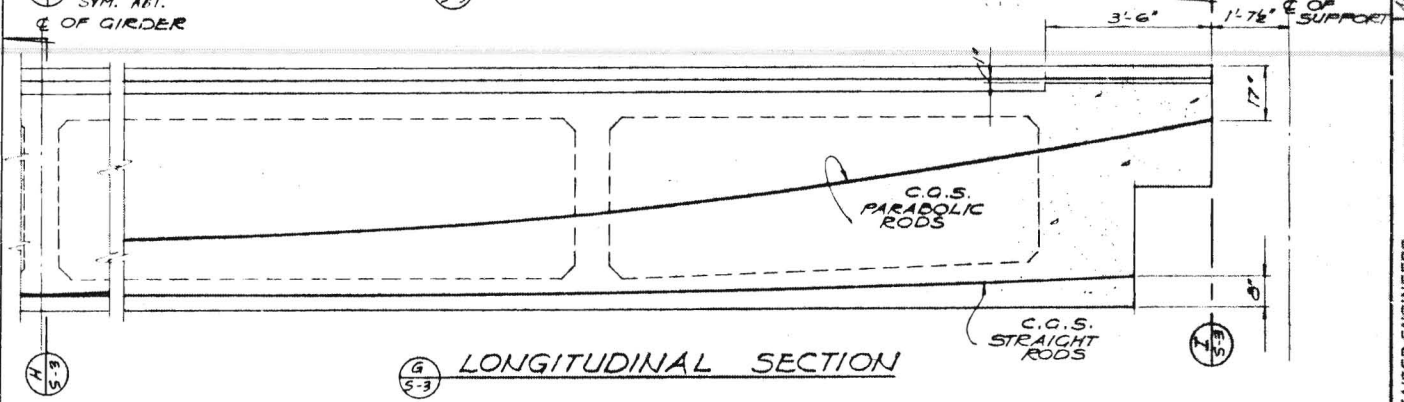


(F) PARTIAL PLAN

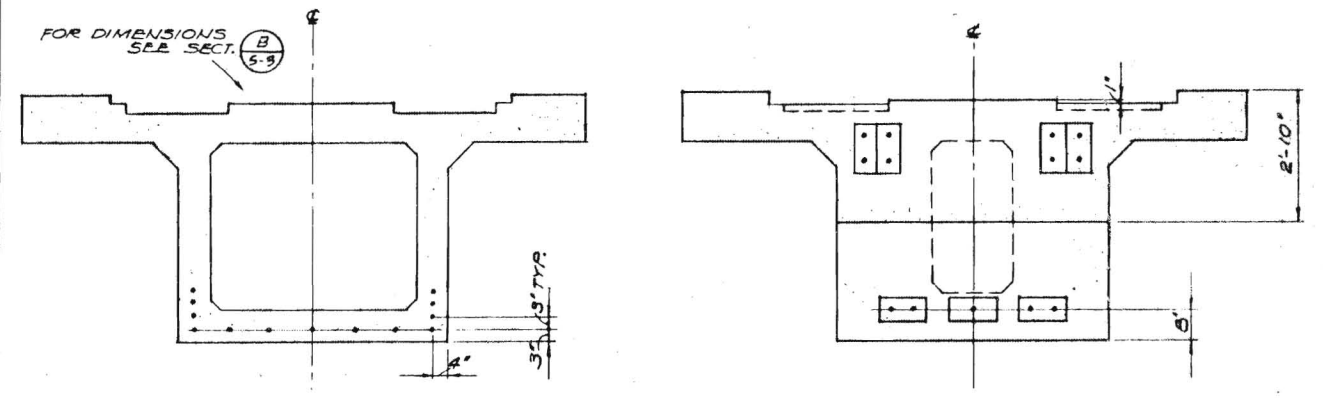


(B) SECTION

(C) SECTION



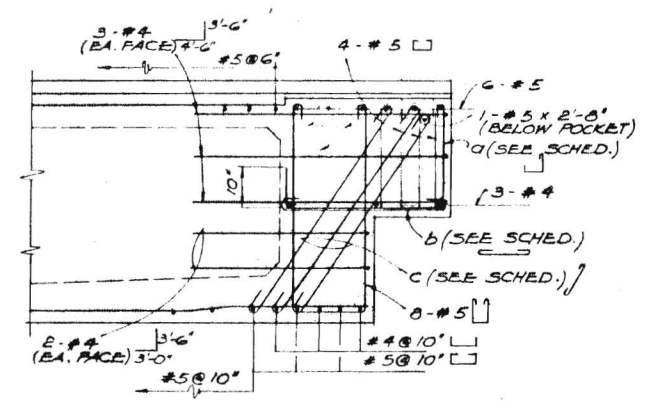
(G) LONGITUDINAL SECTION



(H) SECTION

(I) SECTION

DETAILS FOR POST-TENSIONED RODS SCHEME



(D) SECTION

TYPICAL DETAILS FOR ALL SCHEMES

(E) TYP. PRESTRESSED CONCRETE GIRDER SCHEDULE

SPAN	110'-0"	100'-0"	80'-0"	60'-0"	REMARKS
t	8'	6'	6'	6'	
A <sub>c</sub> (SQ. IN.)	2456	2352	2352	2352	
NO. OF DIAPHRAGMS	5	5	3	3	
CAMBER	1 1/2"	1 1/4"	1"	1"	
REINFORCING END OF GIRDER					
a	12-#8	12-#8	12-#7	12-#7	
b	2-#8	2-#8	2-#7	2-#7	
c	30-#7	30-#7	30-#6	30-#6	

- GENERAL SPECIFICATIONS FOR PRESTRESSED CONCRETE GIRDERS:
- CONCRETE FOR PRESTRESSED CONC. GIRDERS SHALL BE LIGHT WEIGHT CONCRETE WITH F<sub>c</sub> = 5000 P.S.I. MINIMUM.
  - CONCRETE STRENGTH AT TIME OF TRANSFER SHALL BE F<sub>c</sub>' = 4000 P.S.I. MINIMUM.
  - SECOND POUR CONCRETE SHALL BE REGULAR HARD ROCK CONCRETE OF F<sub>c</sub> = 3000 P.S.I.
  - CONVENTIONAL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE, CONFORMING TO ASTM A-15.
  - ALL PRESTRESSING STEEL SHALL BE BONDED TO THE CONCRETE.

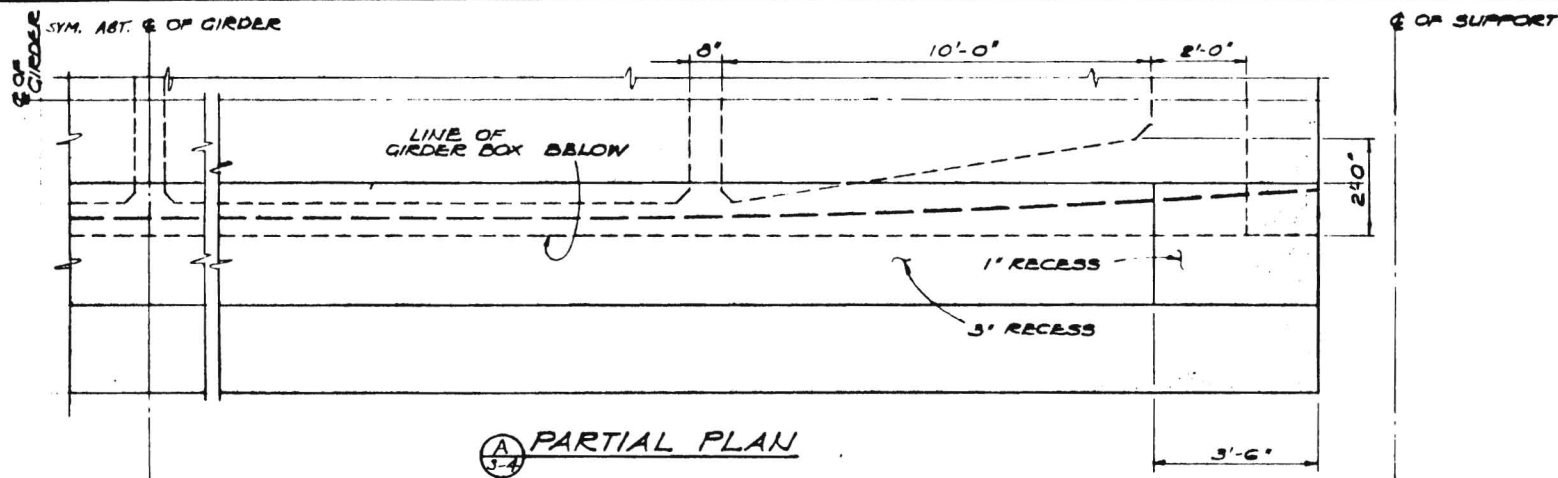
SCALE: 1/2" = 1'-0"

(J) POST-TENSIONED RODS SCHEDULE

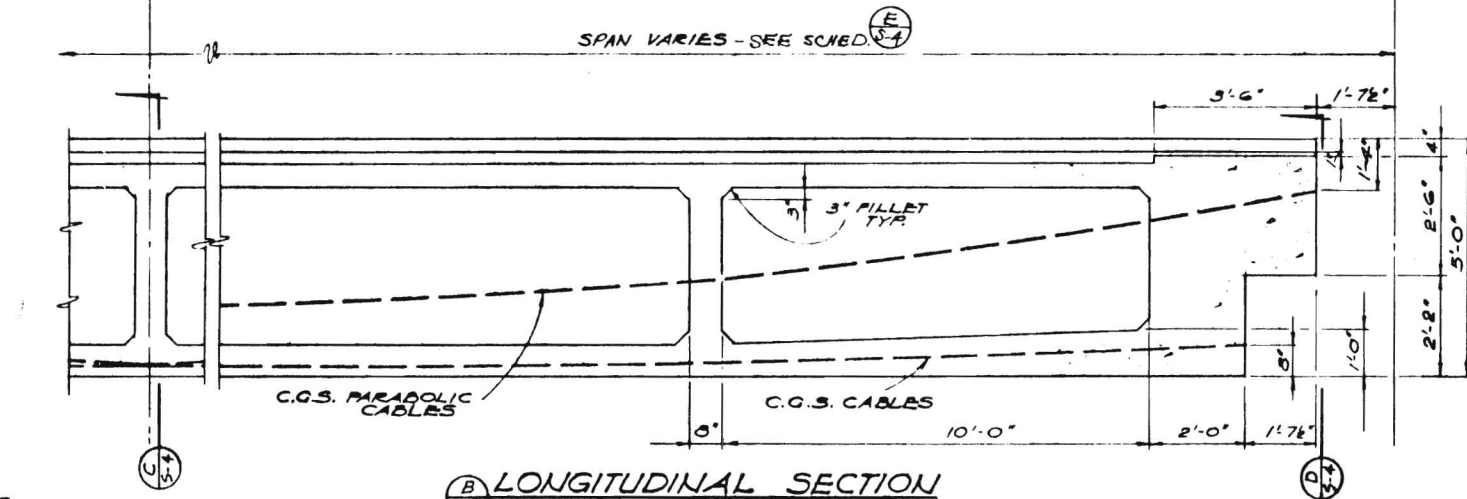
SPAN (C-C OF SUPPORTS)	110'-0"	100'-0"	80'-0"	60'-0"	REMARKS
TOTAL QUANTITY OF 1 1/2" Ø RODS	13	11	7	5	
NUMBER OF PARABOLIC 1 1/2" Ø RODS	8	6	4	2	
TOTAL EFFECTIVE PRESTR. G. FORCE @ MID-SPAN	1793 K	1514	955	688	

- NOTES FOR POST-TENSIONED RODS:
- PRESTRESSING RODS SHALL BE HIGH STRENGTH ALLOY STEEL BARS, SPECIAL GRADE F<sub>c</sub> = 160 K.S.I.
  - TENSION FROM TWO ENDS FOR GIRDERS 100 FT. OR GREATER IN LENGTH; ONE END TENSIONING FOR GIRDERS LESS THAN 100 FT.
  - THE BEARING AREA OF 2" THICK ANCH. R.S. SHALL BE 52.5 SQ. IN. MIN. PER ROD.

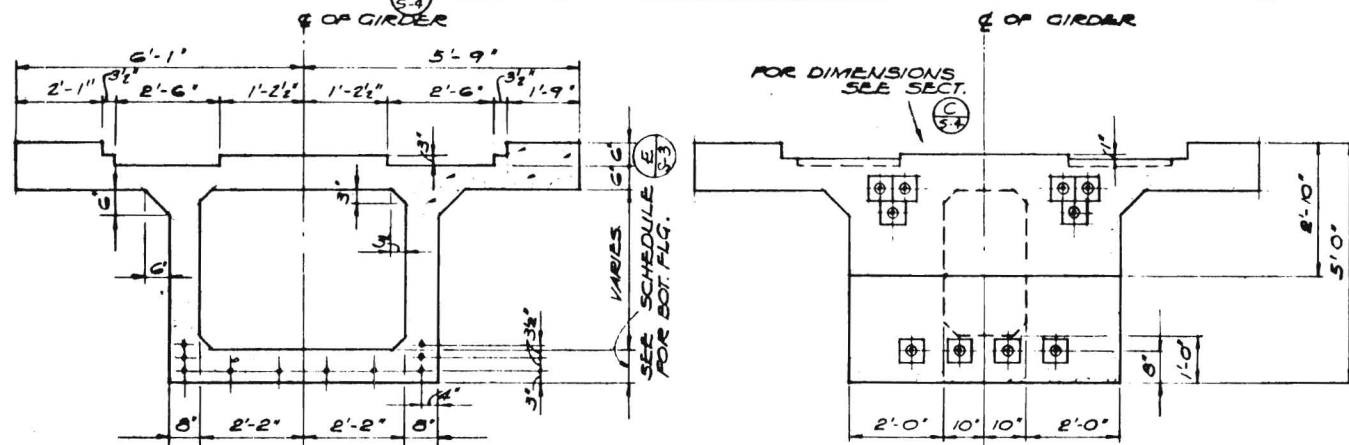




(A) PARTIAL PLAN



(B) LONGITUDINAL SECTION



(C) SECTION

(D) SECTION

DETAILS FOR POST-TENSIONED CABLES SCHEME

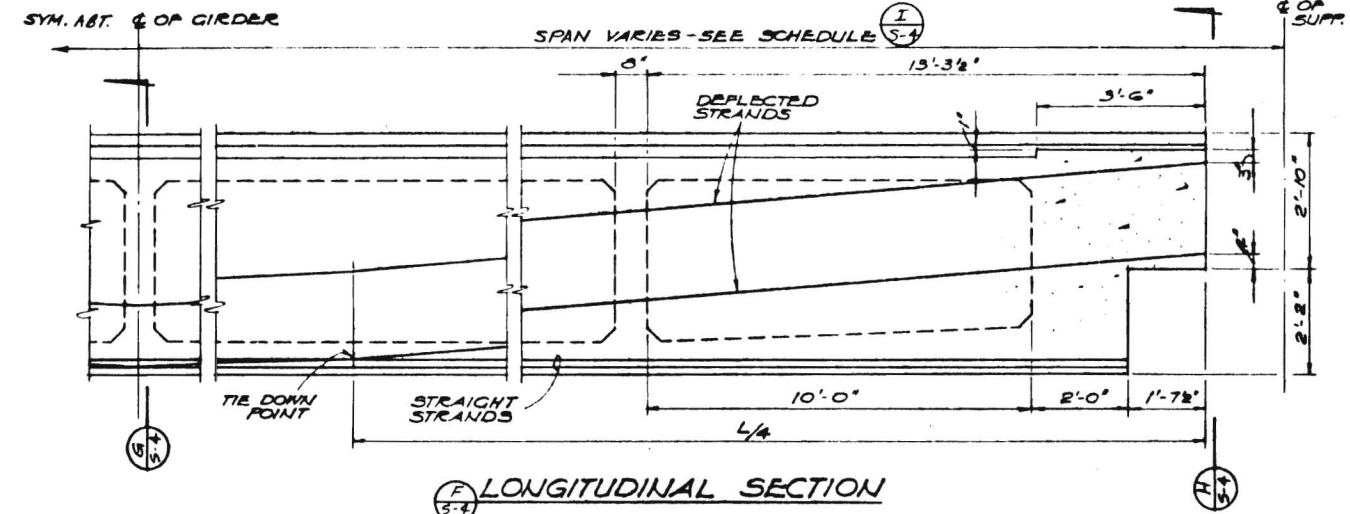
(E) POST-TENSIONED CABLES SCHEDULE

SPAN (C-C OF SUPPORTS)	110'-0"	100'-0"	80'-0"	60'-0"	REMARKS
TOTAL QUANTITY OF CABLES PER GIRDER	10	7	5	4	
NUMBER OF PARABOLIC CABLES PER GIRDER	6	4	2	2	
QUANTITY OF 1/2" Ø WIRES PER CABLE	22	26	24	22	
TOTAL EFFECTIVE PRESTR. FORCE @ MID-SPAN	1800 K	1470 K	952 K	700 K	

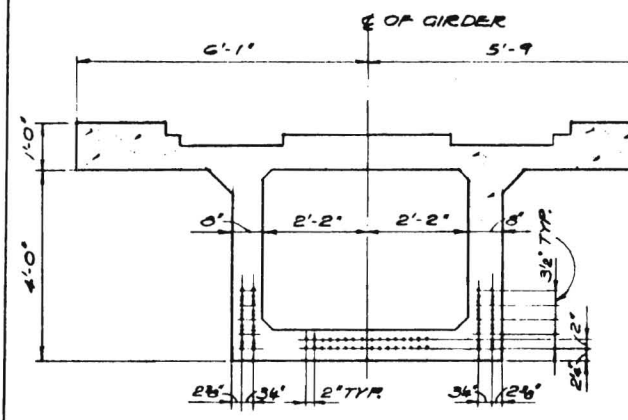
NOTES FOR POST-TENSIONED CABLES:

1. PRESTRESSING CABLES SHALL CONFORM TO ASTM A-421 (f<sub>s</sub> = 270 K.S.I.)
2. POST-TENSION FROM TWO ENDS FOR GIRDERS 100 FT. OR GREATER IN LENGTH; ONE END TENSIONING FOR GIRDERS LESS THAN 100 FT.
3. THE BEARING AREA OF 2" THICK ANCH. RES SHALL BE 100 SQ. IN. (MIN.)

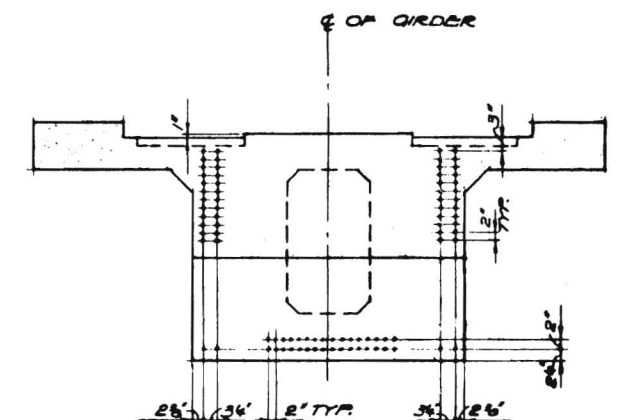
SCALE: 1/2" = 1'-0"



(F) LONGITUDINAL SECTION



(G) SECTION



(H) SECTION

DETAILS FOR PRE-TENSIONED STRANDS SCHEME

NOTE FOR PRE-TENSIONED STRANDS:

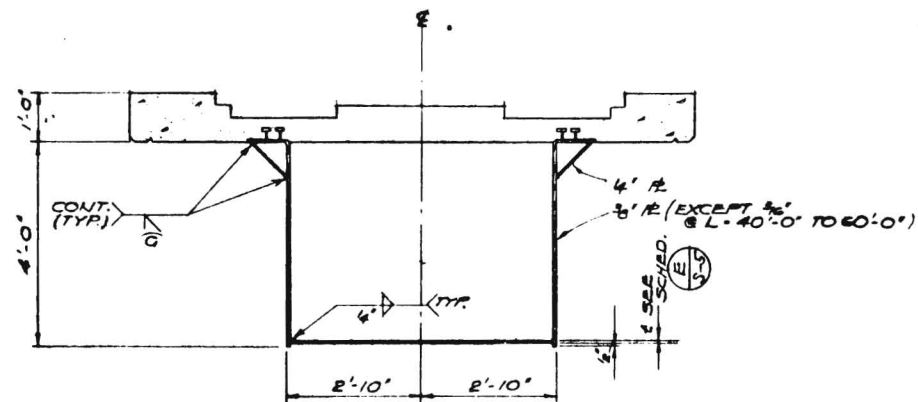
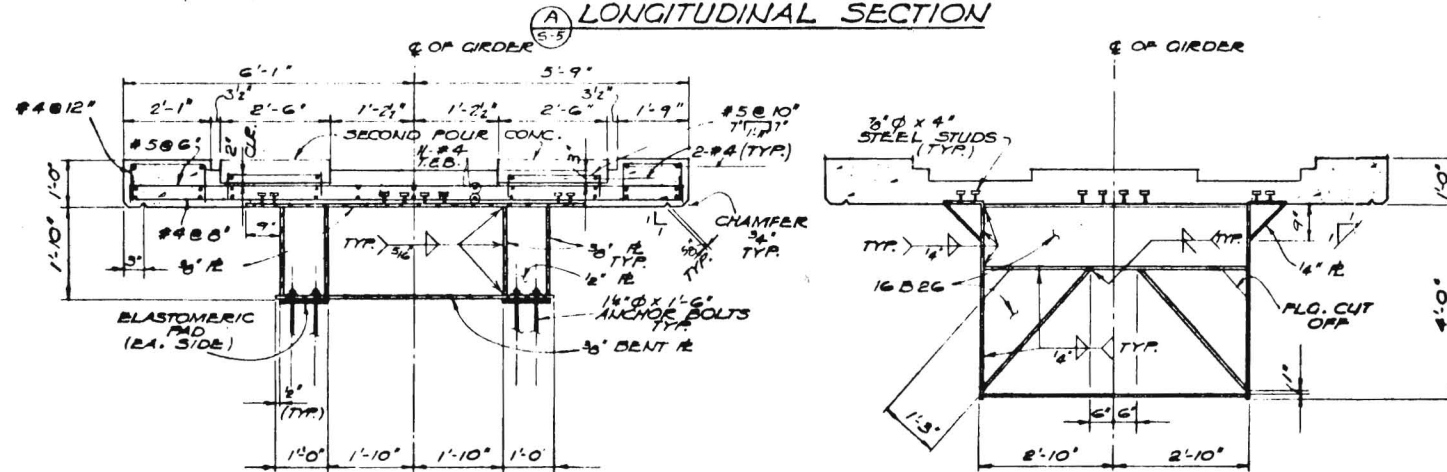
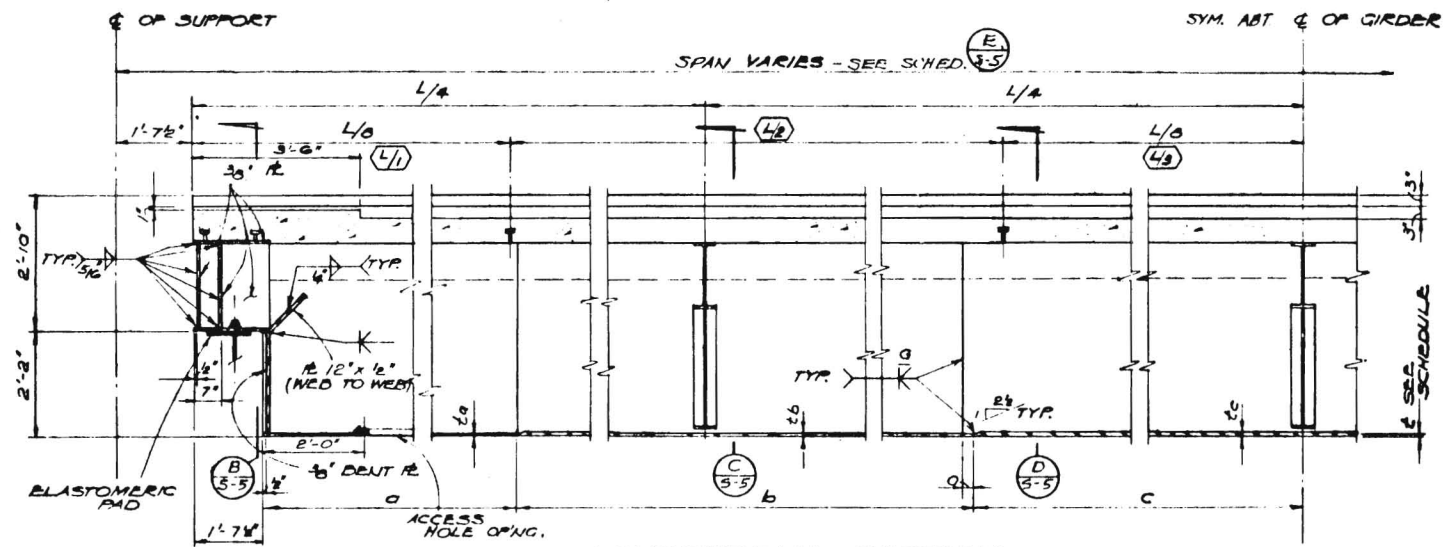
PRESTRESSING STEEL SHALL BE 1/2" Ø UNCOATED STRASS RELIEVED SEVEN WIRE STRAND CONFORMING TO ASTM A-416 (f<sub>s</sub> = 270 K.S.I.)

(I) PRE-TENSIONED STRANDS SCHEDULE

SPAN (C-C OF SUPPORTS)	110'-0"	100'-0"	80'-0"	60'-0"	REMARKS
TOTAL STRANDS (1/2" Ø)	64	71	45	30	
NUMBER OF STRAIGHT STRANDS (1/2" Ø)	36	31	21	14	PLACE STRANDS IN ONE LAYER, FOR GIRDER SPANS 100' AND LESS
NUMBER OF DEFLECTED STRANDS (1/2" Ø)	48	40	24	16	
TOTAL EFFECTIVE PRESTR. FORCE @ MID-SPAN	1800 K	1520 K	962 K	642 K	
TOTAL JACKING FORCE	2280 K	1930 K	1280 K	815 K	

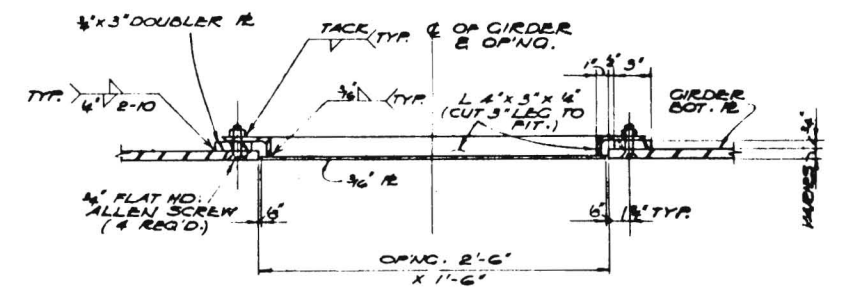
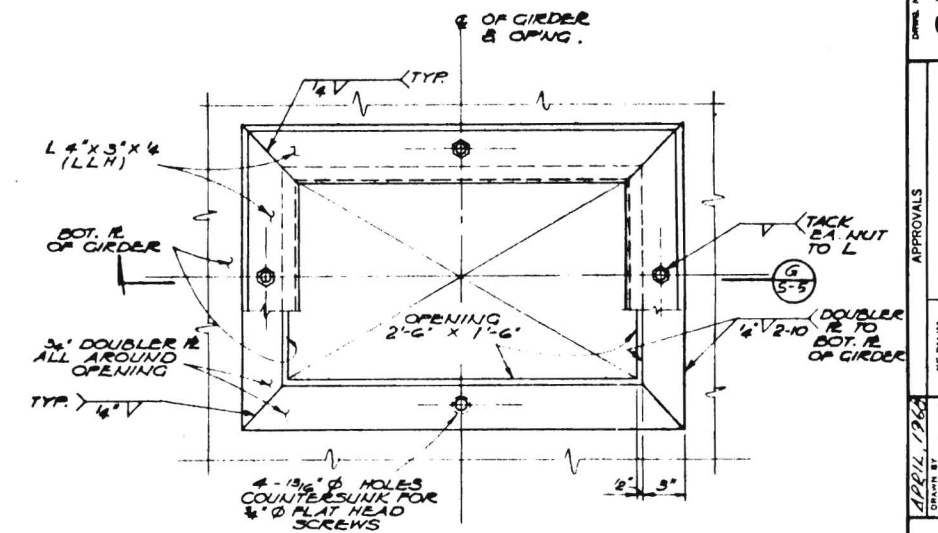
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**(E) SCHEDULE**

SPAN	t <sub>a</sub>	t <sub>b</sub>	t <sub>c</sub>	a	b	c	SHEAR CONNECTORS			ELASTOMERIC PADS	CAMBER
							L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>		
100'-1"-110'-0"	1/2"	3/4"	1 1/4"	4/5 @	4/6 @	4/6 @	22 @ 7"	20 @ 11"	8 @ 21"	11" x 12" x 3"	2 1/4"
80'-1"-100'-0"	5/8"	3/4"	-	4/4 @	4/4 @	0	25 @ 6"	30 @ 10"	8 @ 20"	11" x 11" x 2 1/4"	2 1/4"
60'-1"-80'-0"	3/8"	-	-	L	0	0	15 @ 9"	24 @ 10"	6 @ 20"	10" x 11" x 2 1/4"	1 1/2"
40'-1"-60'-0"	3/8"	-	-	L	0	0	10 @ 9"	15 @ 12"	4 @ 22"	9" x 10" x 1 1/4"	1"



**TYPICAL ACCESS HOLE**  
(ONE END ONLY)

**MATERIALS**

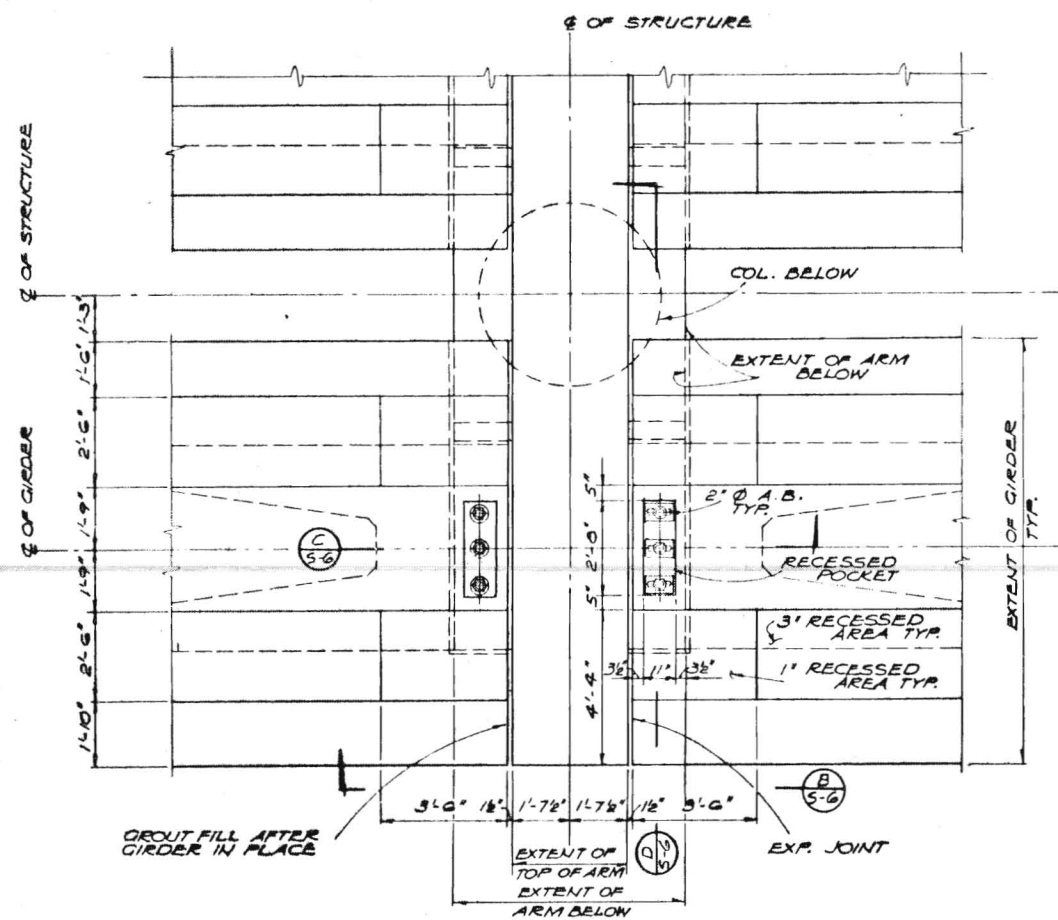
CONCRETE : LIGHT WEIGHT (110 P.C.P.) f'c = 4 K.S.I.  
 REINFORCING STEEL : INTERMEDIATE GRADE  
 STRUCTURAL STEEL : A.S.T.M. A-36

SCALE: 1/2" = 1'-0"  
(UNLESS OTHERWISE NOTED)

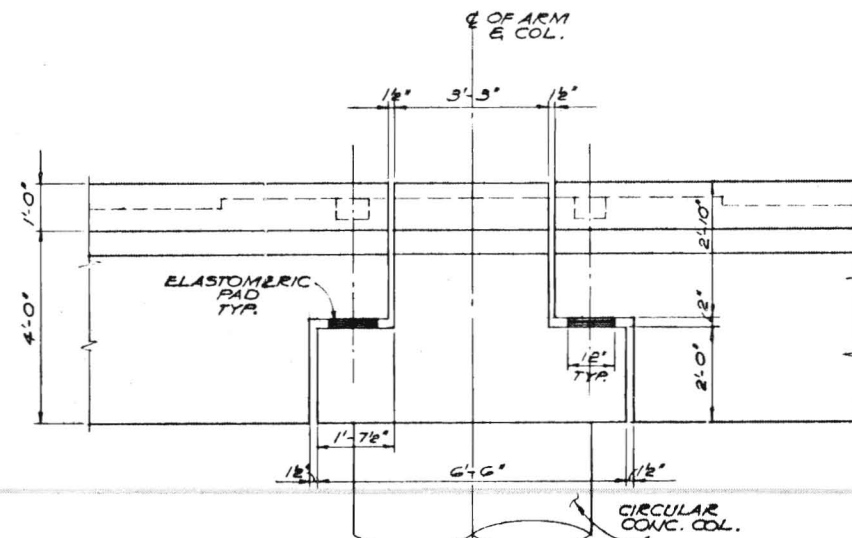
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 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DATE: APRIL 1960  
 DRAWN BY: DANIEL MANN, JOHNSON & MENDENHALL  
 CHECKED BY: DANIEL MANN, JOHNSON & MENDENHALL  
 PROJECT MANAGER: DANIEL MANN, JOHNSON & MENDENHALL  
 ARCHITECTS ENGINEERS  
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 TITLE: TYPICAL COMPOSITE STEEL AERIAL GIRDER SECTIONS & DETAILS  
 SHEET: S-5  
 DRAWING NO: S-5  
 APPROVALS: PROJECT MANAGER, ARCHITECTS ENGINEERS

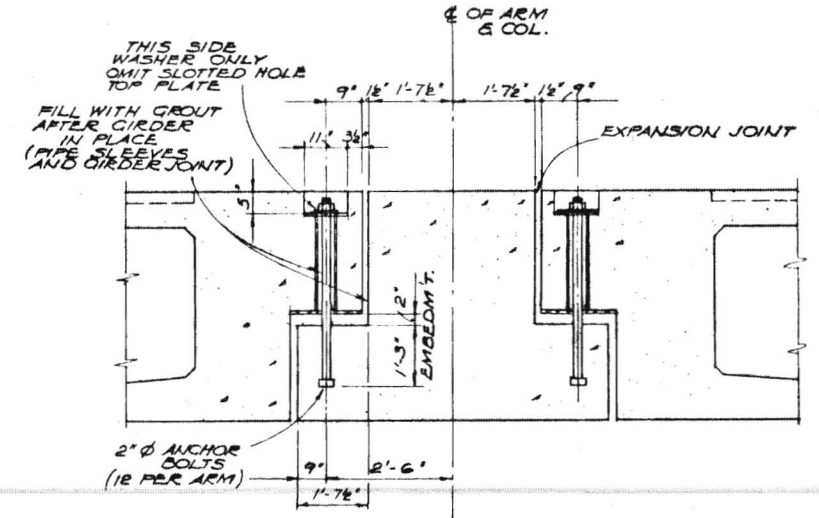




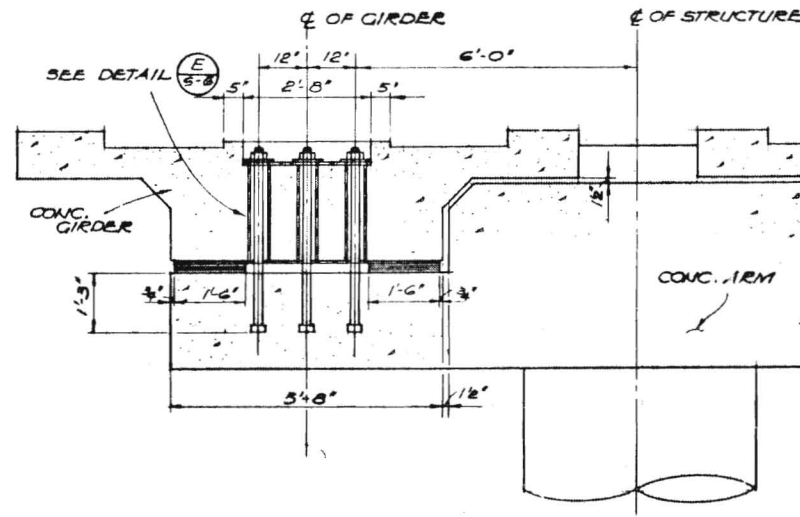
**(A) PARTIAL PLAN**  
SCALE: 3/8" = 1'-0"



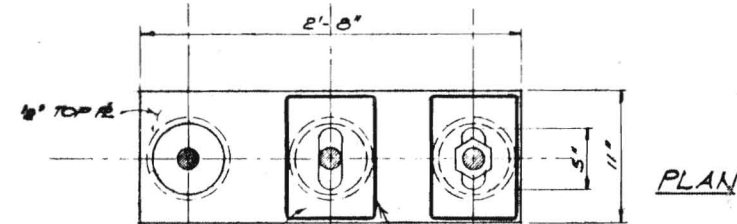
**(B) ELEVATION**  
SCALE: 1/2" = 1'-0"



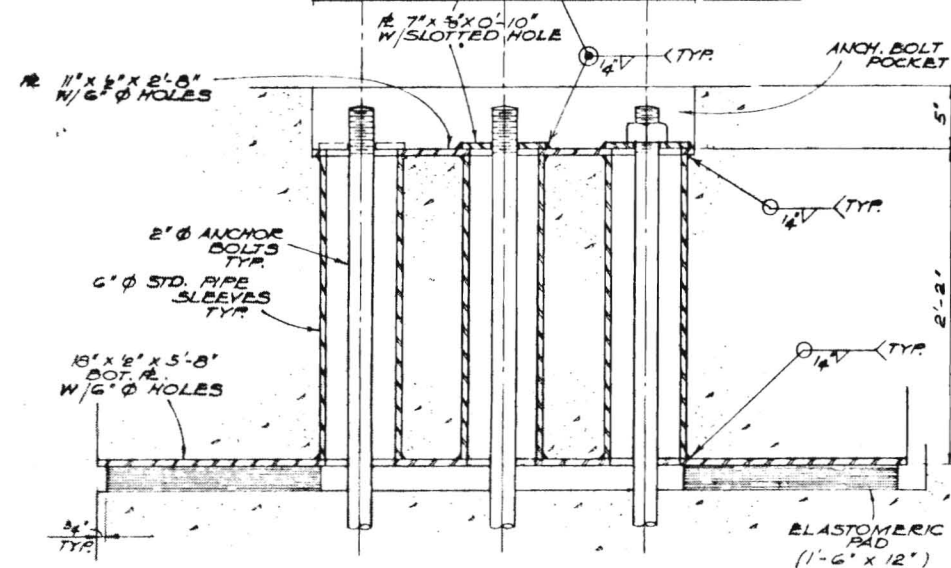
**(C) SECTION**  
SCALE: 1/2" = 1'-0"



**(D) SECTION**  
SCALE: 1/2" = 1'-0"



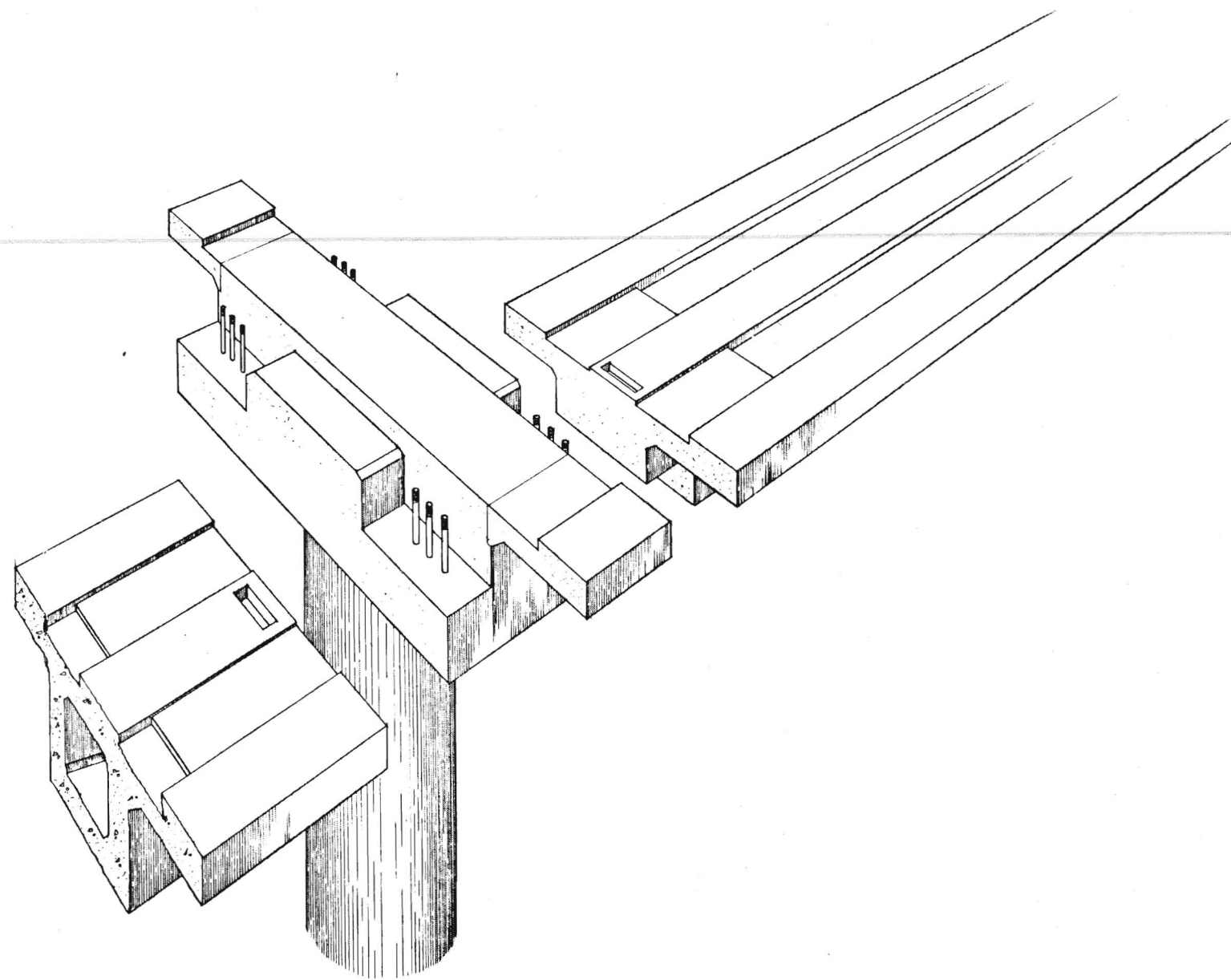
**PLAN**



**(E) TYP. ANCHOR BOLT CONNECTION DETAIL**  
**(C) EXPANSION JOINT**  
SCALE: 1/2" = 1'-0"

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

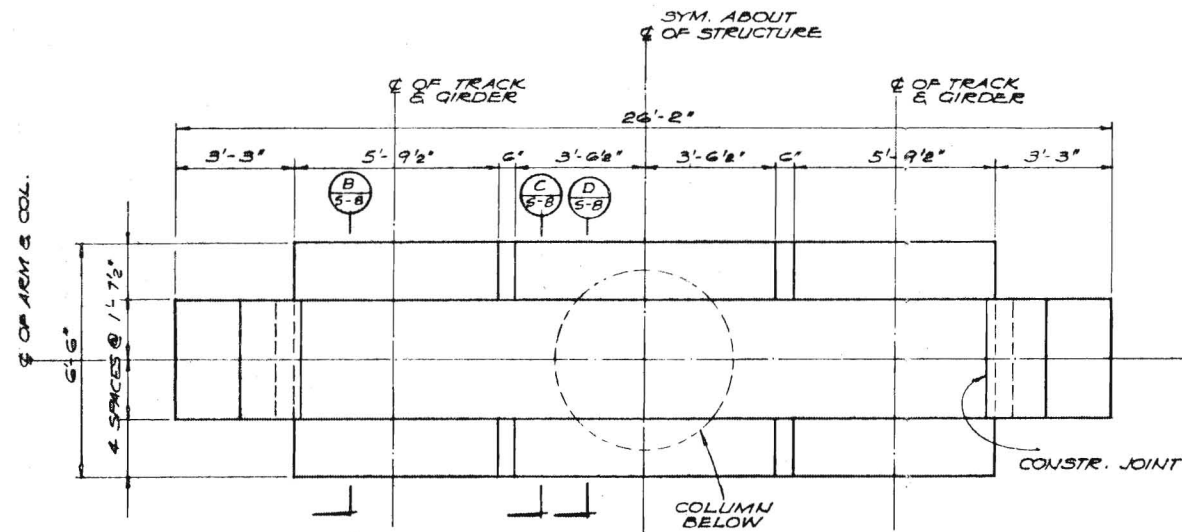




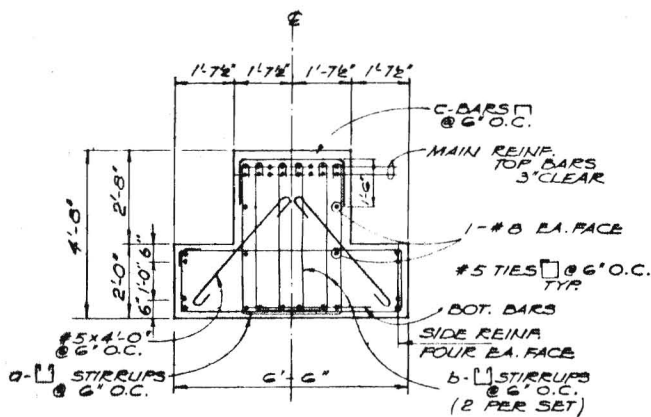
A
S-7
 PARTIAL PERSPECTIVE OF END CONNECTION  
 NO SCALE

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

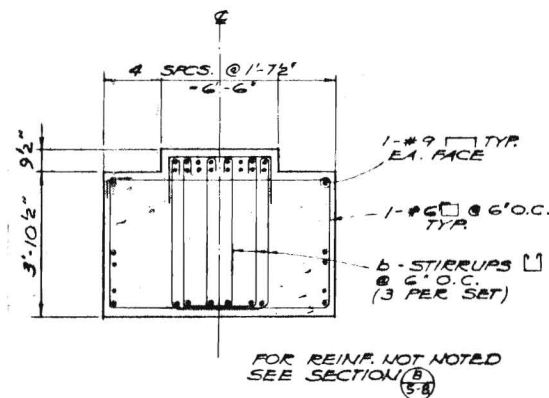
DRAWING NO.	S-7	APPROVALS	REGION	DATE
		PROJECT MANAGER	SCRIBED	DATE
		CHIEF ENGINEER		
DRAWN BY	APPROVED BY	A JOINT VENTURE		
K. HANCOCK	[Signature]	KAISER ENGINEERS		
		DANIEL, MANN, JOHNSON, & MENDENHALL		
		ARCHITECTS - ENGINEERS		
SOUTHERN CALIFORNIA				
RAPID TRANSIT DISTRICT				
LOS ANGELES, CALIFORNIA 90015				
TITLE				
TYPICAL AERIAL GIRDER END CONNECTION - PERSPECTIVE				
DRAWING NO.				
S-7				



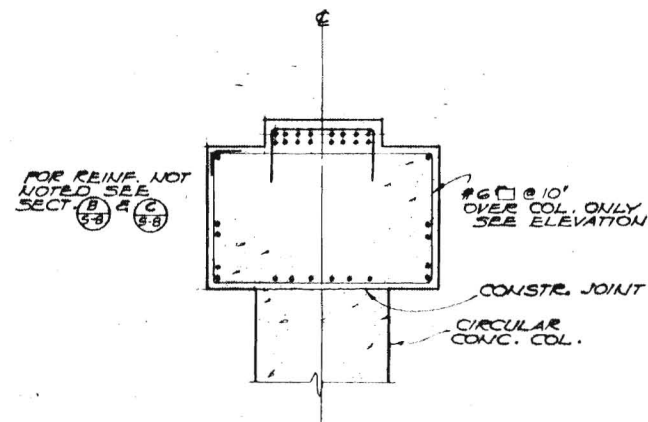
(A) PLAN  
SCALE: 3/8" = 1'-0"



(B) SECTION  
SCALE: 3/8" = 1'-0"



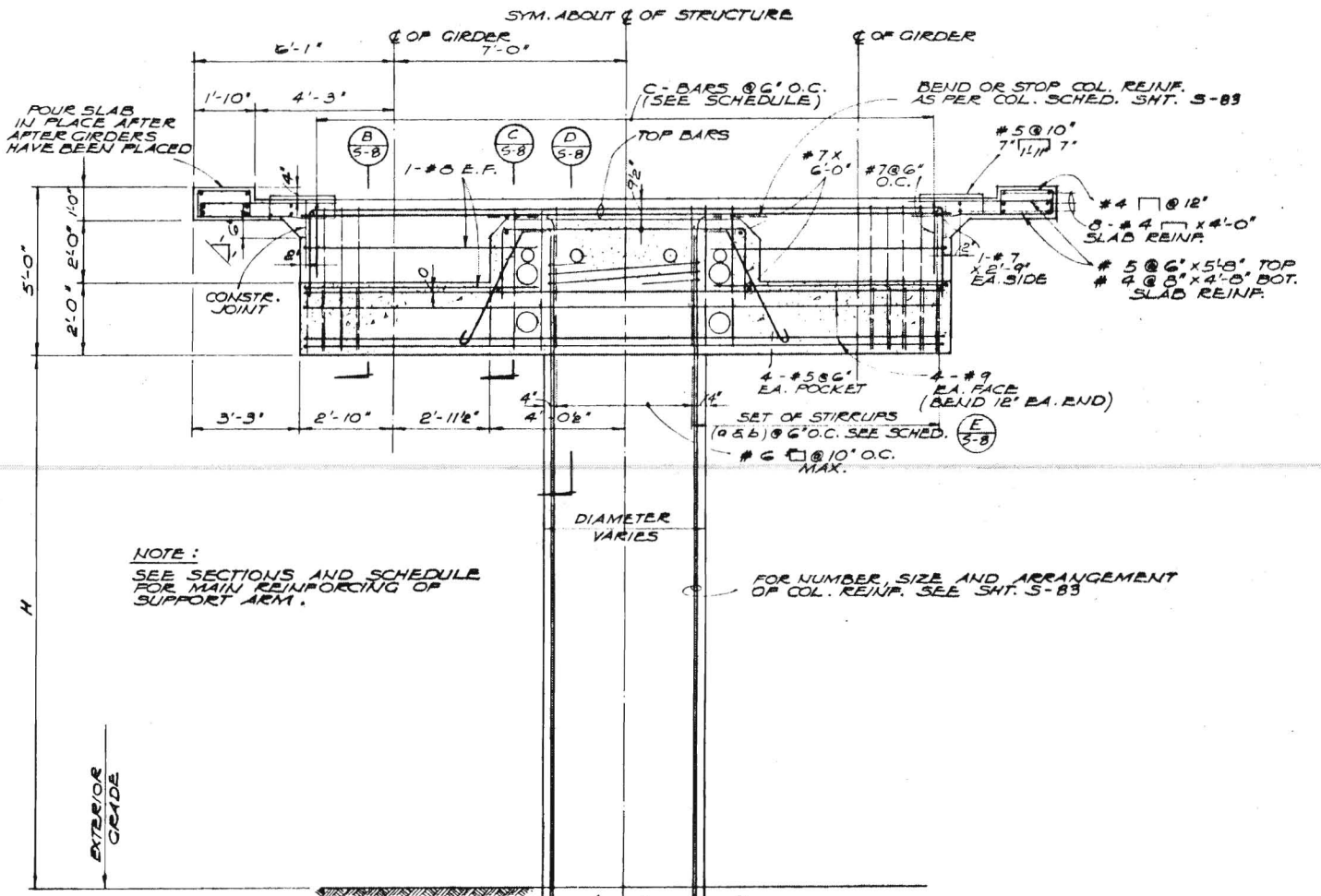
(C) SECTION  
SCALE: 3/8" = 1'-0"



(D) SECTION  
SCALE: 3/8" = 1'-0"

(E) SUPPORT ARM-REINFORCING SCHEDULE

SUPPORT SPACING	TOP BARS	BOTTOM BARS	SIDE BARS	STIRRUPS		TIES	REMARKS
				a	b		
110'	16-#14	6-#8	#9	#7	#5	#7	
100'	14-#14	6-#8	#9	#7	#5	#7	
80'	12-#14	6-#7	#8	#5	#4	#6	
60'	9-#14	6-#7	#7	#5	#4	#6	



(F) ELEVATION-SECTION  
SCALE: 3/8" = 1'-0"

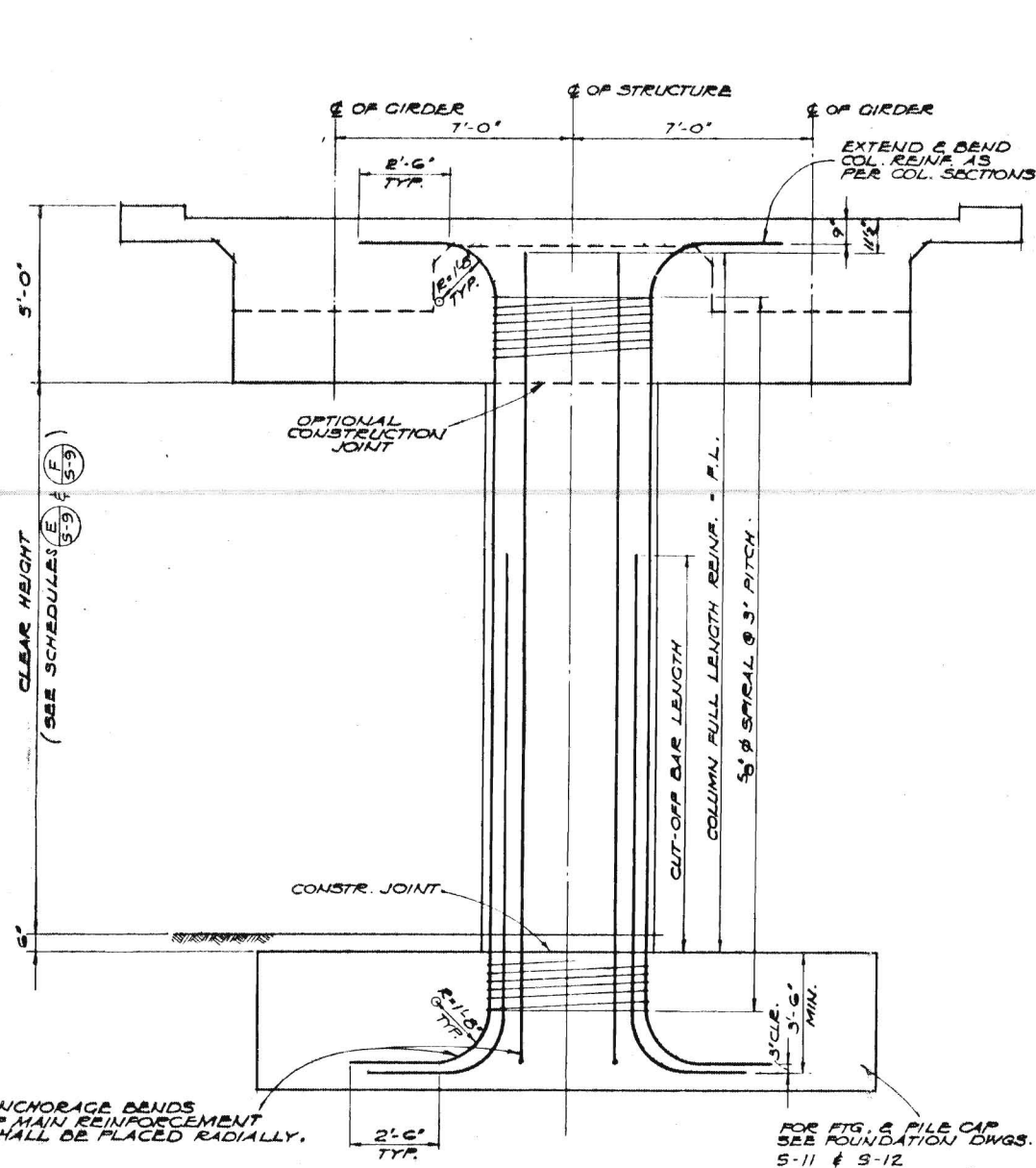
NOTE:  
SEE SECTIONS AND SCHEDULE FOR MAIN REINFORCING OF SUPPORT ARM.

FOR NUMBER, SIZE AND ARRANGEMENT OF COL. REINF. SEE SHT. S-83

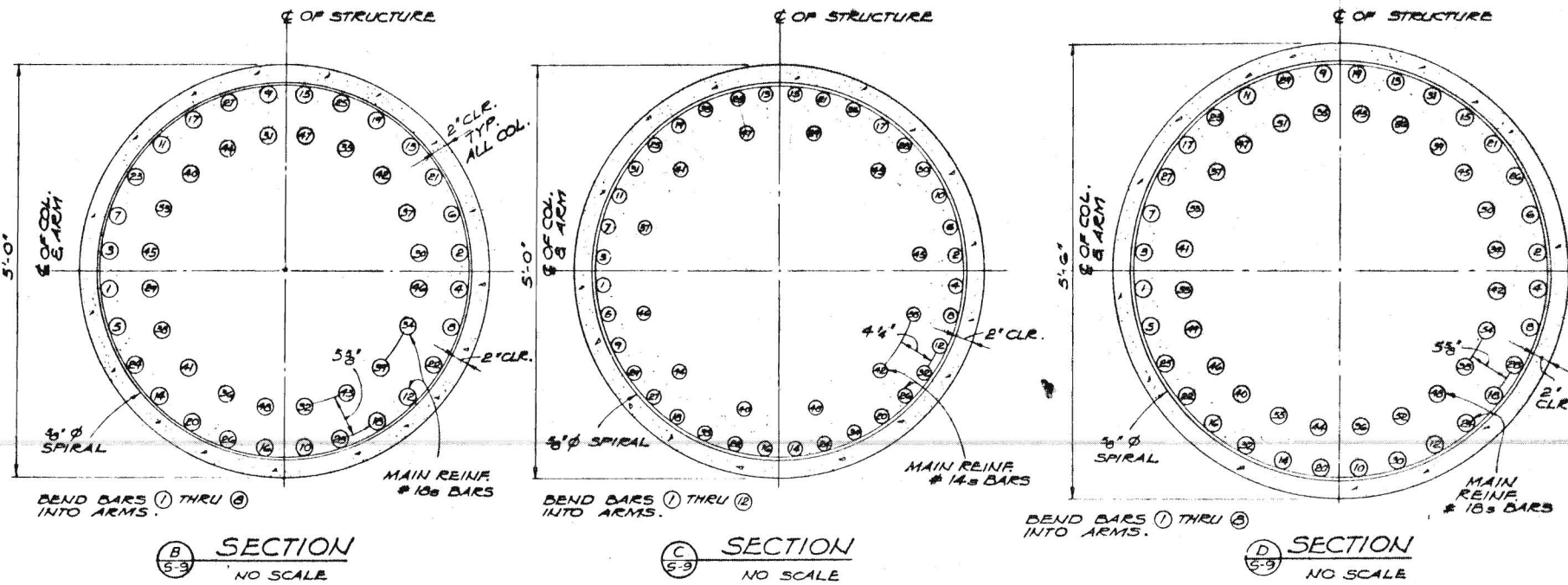
- NOTE:
1. CONCRETE FOR SUPPORT ARM SHALL BE HARD ROCK CONCRETE. f'c - 4000 P.S.I. MIN.
  2. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE 15 - 20 000 P.S.I. CONFORMING TO ASTM A175 EXCEPT #14S SHALL CONFORM TO A-408.

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN





**(A) COLUMN ELEVATION**  
SCALE: 3/8" = 1'-0"



**(B) SECTION**  
NO SCALE

**(C) SECTION**  
NO SCALE

**(D) SECTION**  
NO SCALE

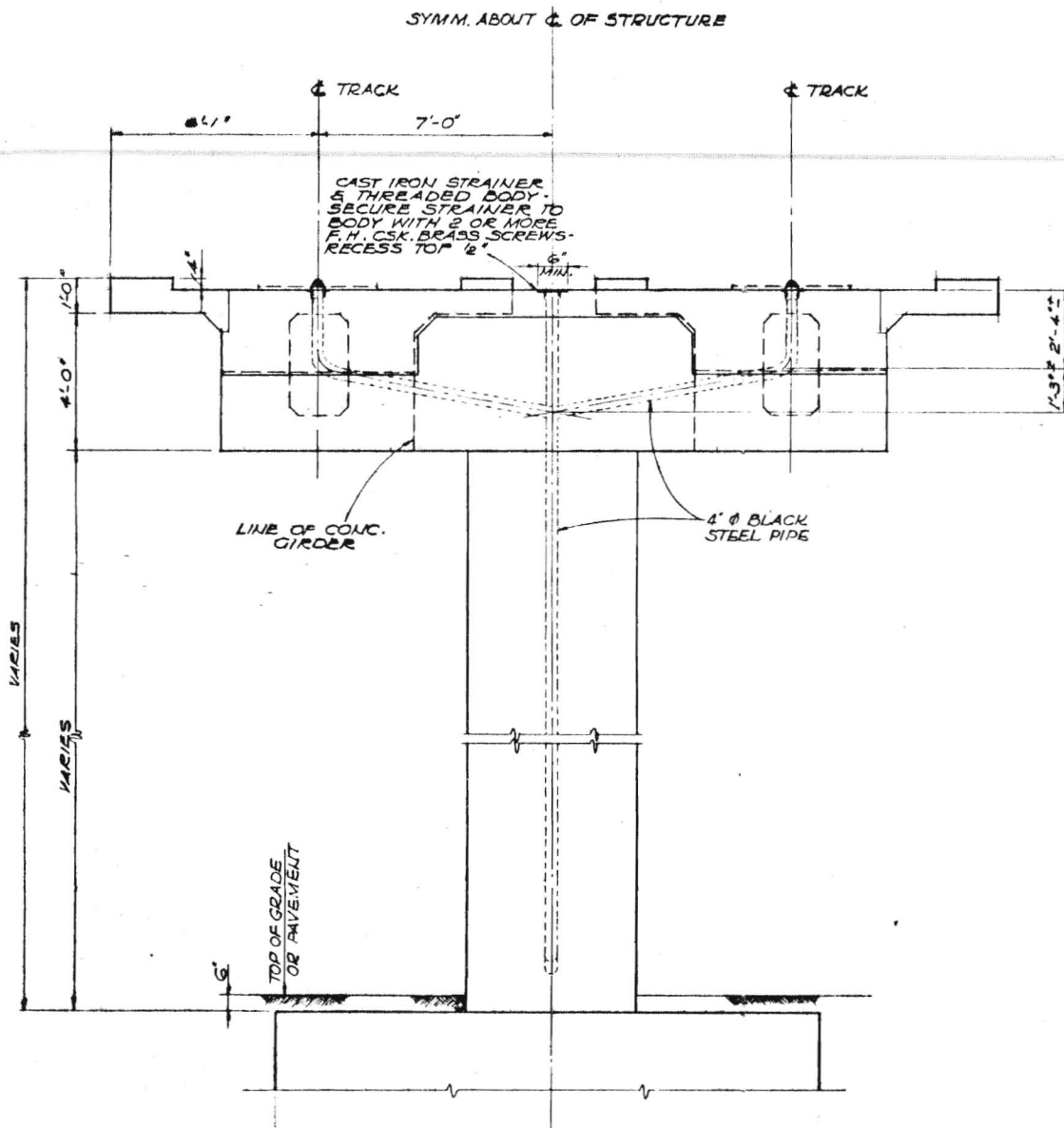
- NOTES:**
- BARS SHALL BE PLACED IN POSITIONS 1 THRU THE NUMBER REPRESENTING THE TOTAL QUANTITY OF MAIN REINFORCING BARS.
  - CONCRETE FOR AERIAL SUPPORT COLUMNS SHALL BE HARD ROCK CONCRETE  $f_c = 4000$  P.S.I. MIN.
  - COLUMN MAIN REINFORCING STEEL SHALL CONFORM TO ASTM A-432.  
SPIRAL REINFORCING STEEL SHALL BE INTERMEDIATE GRADE AND SHALL CONFORM TO ASTM A-5.
  - SPLICING IN REINFORCING SHALL BE AVOIDED IF PRACTICAL BUT IF NECESSARY MAIN REINFORCING BARS SHALL BE MADE BY WELDING FULL PENETRATION.  
SPIRAL REINFORCING SHALL BE MADE BY WELDING OR BY LAP OF 1" TURNS MIN.
  - ALL WELDING SPLICES SHALL CONFORM TO A.W.S. D 18.1. RECOMMENDED PRACTICES FOR WELDING REINFORCING STEEL, METAL INSERTS AND CONNECTIONS IN REINFORCED CONCRETE CONSTRUCTION.

**(E) 5'-0" Ø COLUMN REINFORCING SCHEDULE**

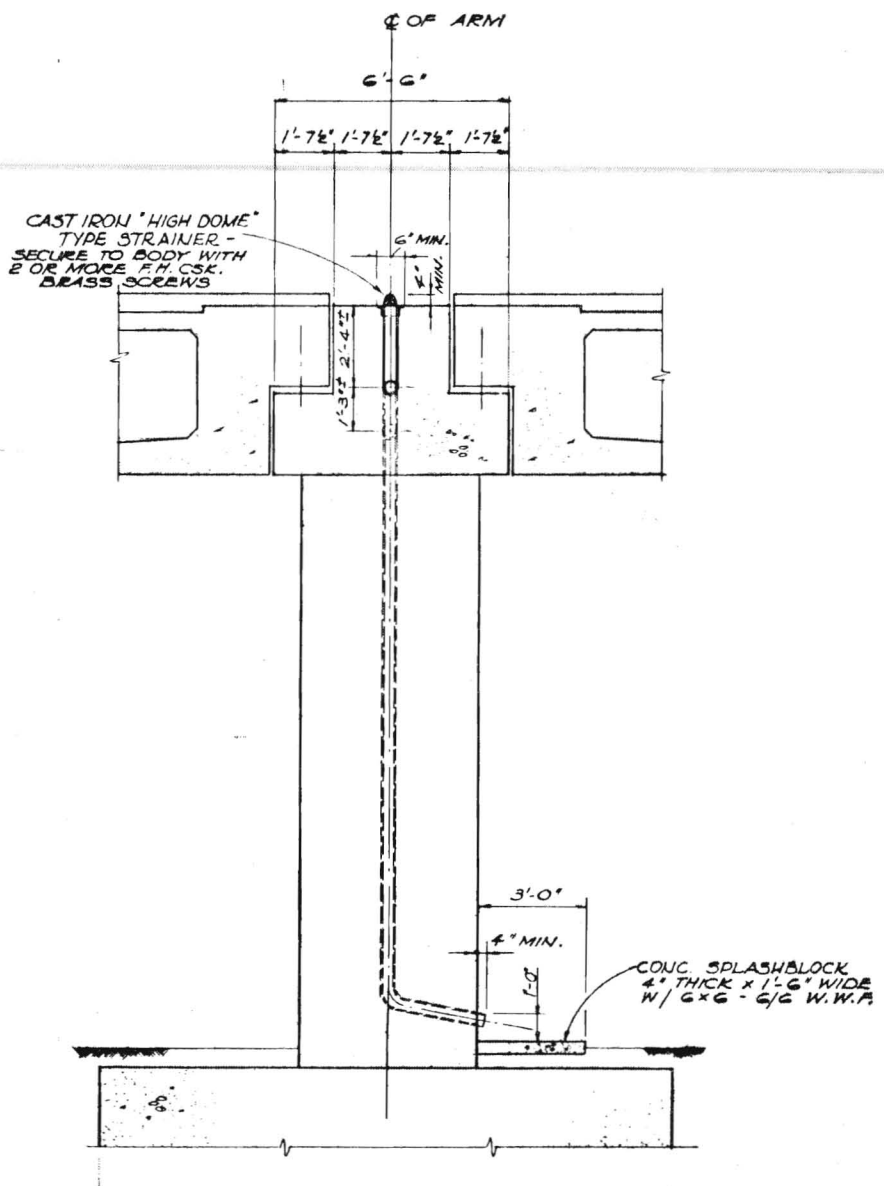
		COLUMN SPACING							
		60'-0"		80'-0"		100'-0"		110'-0"	
COLUMN CLEAR HEIGHT	TOTAL REINF.	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
	UP TO 20'-0"	CUT-OFF BARS	20	F.L. 11'-0"	20	F.L. 15'-6"	20	F.L. 8'-6"	20
DETAIL		B		B		A		A	
20'-1" TO 25'-0"	TOTAL REINF.	32	#14	24	#13	28	#13	32	#13
	CUT-OFF BARS	20	F.L. 17'-0"	20	F.L. 8'-6"	20	F.L. 13'-6"	20	F.L. 10'-0"
25'-1" TO 30'-0"	TOTAL REINF.	40	#14	28	#13	36	#13	40	#13
	CUT-OFF BARS	20	F.L. 22'-6"	20	F.L. 14'-0"	20	F.L. 10'-0"	20	F.L. 21'-6"
30'-1" TO 35'-0"	TOTAL REINF.	28	#13	36	#13	44	#13	48	#13
	CUT-OFF BARS	20	F.L. 15'-0"	20	F.L. 19'-0"	20	F.L. 16'-6"	20	F.L. 21'-6"
35'-1" TO 40'-0"	TOTAL REINF.	32	#13	44	#13				
	CUT-OFF BARS	20	F.L. 20'-0"	20	F.L. 25'-0"	USE 5'-6" Ø COLUMN		USE 5'-6" Ø COLUMN	
40'-1" TO 45'-0"	TOTAL REINF.	40	#13						
	CUT-OFF BARS	20	F.L. 25'-0"	USE 5'-6" Ø COLUMN		USE 5'-6" Ø COLUMN			
DETAIL		A		A		A		A	

**(F) 5'-6" Ø COLUMN REINFORCING SCHEDULE**

		COLUMN SPACING							
		60'-0"		80'-0"		100'-0"		110'-0"	
COL. CLR. HEIGHT	TOTAL REINF.	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
	35'-1" TO 40'-0"	CUT-OFF BARS	USE 5'-0" Ø COLUMN		USE 5'-0" Ø COLUMN		20	F.L. 36'-0"	20
DETAIL		C		C		C		C	
40'-0" TO 45'-0"	TOTAL REINF.	48 - #13		56 - #13					
	CUT-OFF BARS	20	F.L. 35'-0"	20	F.L. 41'-6"	20	F.L. 25'-0"	20	F.L. 28'-0"
DETAIL		C		C		C		C	



(A) TRANSVERSE ELEVATION  
S-10



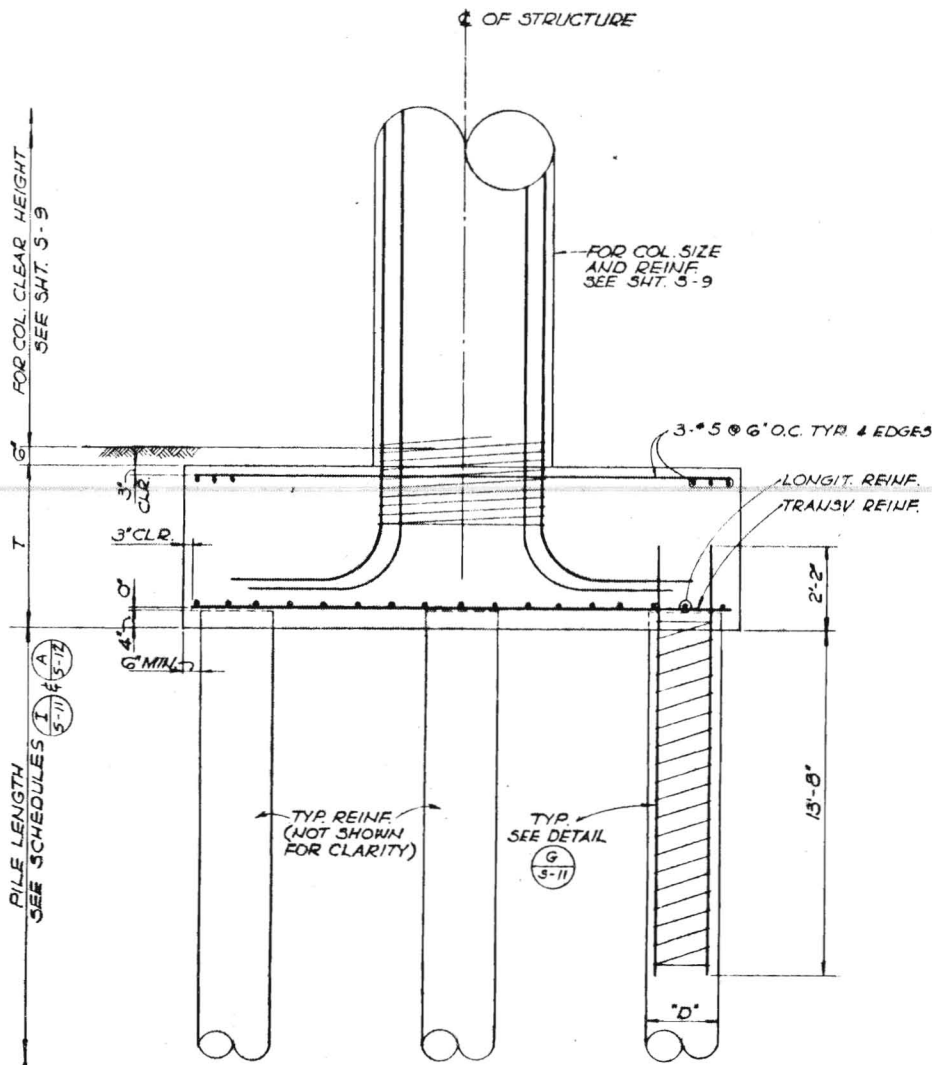
(B) LONG. SECTION  
S-10  
(@  $\phi$  OF GIRDER)

SCALE 3/8" = 1'-0"

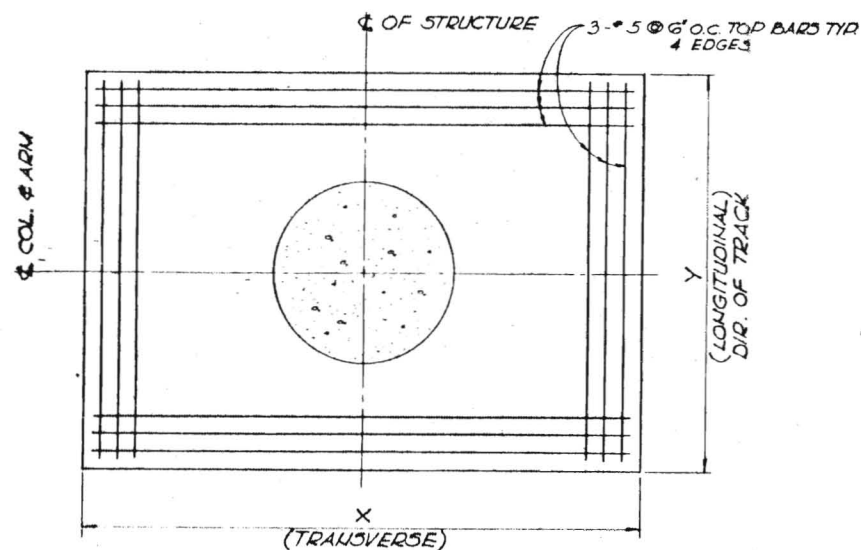
PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. <b>S-10</b>	APPROVALS	DATE
	PROJECT ENGINEER	DATE
REVISION	BY	DATE
SCFD	DATE	
DATE APRIL 1968	DESIGNED BY J. M. R. K. S.	
Kaiser Engineers A Joint Venture Daniel Mann, Johnson, & Mendenhall Architects - Engineers		
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015		
TYPICAL AERIAL STRUCTURE PIER - DRAINAGE DETAILS		
DRAWING NO. <b>S-10</b>		DATE



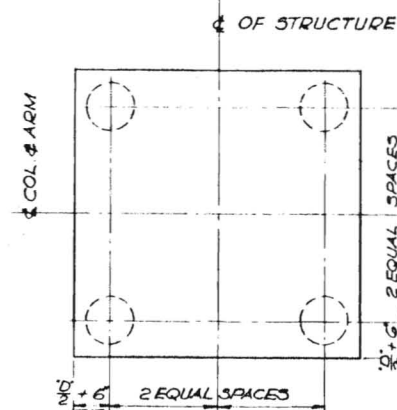


**A PILES & PILE CAP ELEVATION**  
5-11 NO SCALE

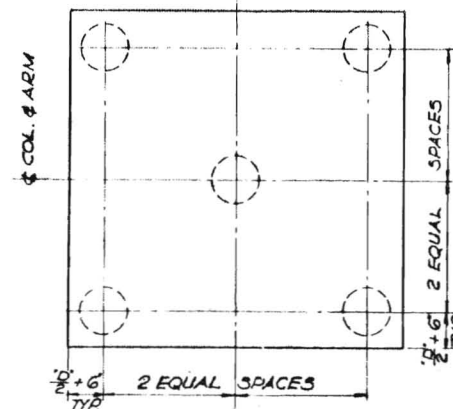


**B PILE CAP PLAN**  
5-11 NO SCALE

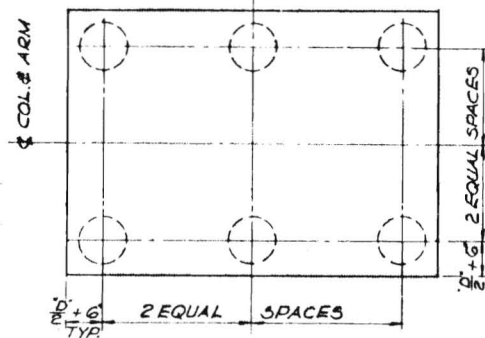
FOR PILE CAP SIZE X, Y, T, & BOT. REINF. SEE SCHEDULE



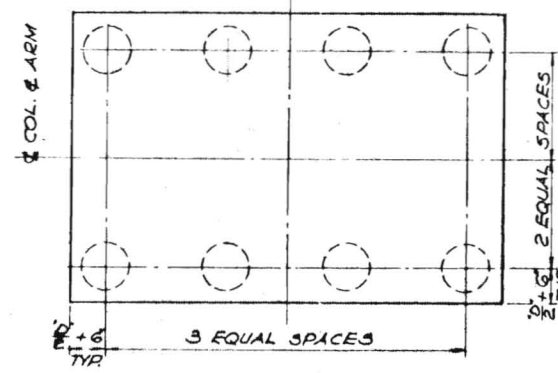
**C DETAIL (4 PILE CAP)**  
5-11 NO SCALE



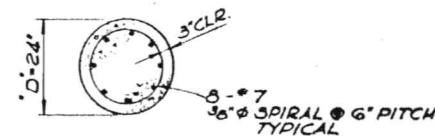
**D DETAIL (5 PILE CAP)**  
5-11 NO SCALE



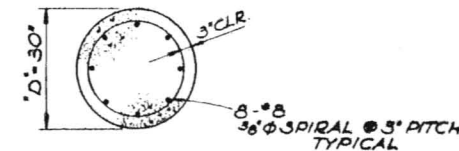
**E DETAIL (6 PILE CAP)**  
5-11 NO SCALE



**F DETAIL (8 PILE CAP)**  
5-11 NO SCALE



**G TYP. 24" Ø PILE**  
5-11 SCALE: 1/2" = 1'-0"



**H TYP. 30" Ø PILE**  
5-11 SCALE: 1/2" = 1'-0"

**I DRILLED & POURED-IN-PLACE PILE FOUNDATION SCHEDULE**

COLUMN CLEAR HEIGHT	VARIABLES	PIER SPACING				
		60'-0"	80'-0"	100'-0"	110'-0"	
UP TO 20'-0"	PILE CAP SIZE XxYxT	12'-0" x 12'-0" x 4'-6"	14'-0" x 14'-0" x 4'-6"	15'-6" x 11'-6" x 4'-6"	21'-0" x 15'-0" x 4'-6"	
	REINF.	TRANSV.	13'-9" x 11'-6"	14'-10" x 13'-6"	17'-10" x 15'-0"	22'-11" x 20'-6"
		LONGIT.	13'-9" x 11'-6"	14'-10" x 13'-6"	17'-8" x 11'-0"	22'-10" x 14'-6"
	NO. OF PILES x LENGTH	4-24" Ø x 40'-0"	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	6-24" Ø x 40'-0"	
CAP DETAIL		C	D	E	E	
20'-1" TO 25'-0"	PILE CAP SIZE XxYxT	13'-0" x 13'-0" x 4'-6"	15'-6" x 15'-6" x 4'-6"	18'-0" x 13'-0" x 4'-6"	23'-0" x 16'-0" x 4'-6"	
	REINF.	TRANSV.	15'-9" x 12'-6"	17'-10" x 15'-0"	17'-11" x 17'-6"	25'-11" x 22'-6"
		LONGIT.	15'-9" x 12'-6"	17'-10" x 15'-0"	19'-9" x 12'-6"	24'-10" x 15'-6"
	NO. OF PILES x LENGTH	4-24" Ø x 40'-0"	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	6-24" Ø x 40'-0"	
CAP DETAIL		C	D	E	E	
25'-1" TO 30'-0"	PILE CAP SIZE XxYxT	15'-6" x 15'-6" x 4'-6"	18'-0" x 18'-0" x 4'-6"	20'-0" x 14'-6" x 4'-6"	26'-6" x 17'-6" x 4'-6"	
	REINF.	TRANSV.	17'-10" x 15'-0"	17'-11" x 17'-6"	21'-11" x 19'-6"	30'-11" x 26'-0"
		LONGIT.	17'-10" x 15'-0"	17'-11" x 17'-6"	25'-9" x 12'-6"	30'-10" x 17'-0"
	NO. OF PILES x LENGTH	4-24" Ø x 40'-0"	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	6-24" Ø x 40'-0"	
CAP DETAIL		C	D	E	E	
30'-1" TO 35'-0"	PILE CAP SIZE XxYxT	13'-0" x 13'-0" x 4'-6"	15'-6" x 15'-6" x 4'-6"	22'-0" x 16'-0" x 4'-6"	18'-0" x 12'-0" x 4'-6"	
	REINF.	TRANSV.	15'-9" x 12'-6"	17'-10" x 15'-0"	24'-11" x 21'-6"	17'-11" x 17'-6"
		LONGIT.	15'-9" x 12'-6"	17'-8" x 11'-0"	24'-10" x 15'-6"	19'-9" x 11'-6"
	NO. OF PILES x LENGTH	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	6-24" Ø x 40'-0"	8-24" Ø x 38'-0"	
CAP DETAIL		D	E	F	F	
35'-1" TO 40'-0"	PILE CAP SIZE XxYxT	14'-0" x 14'-0" x 4'-6"	17'-0" x 12'-0" x 4'-6"	18'-6" x 12'-6" x 4'-6"	19'-0" x 13'-0" x 4'-6"	
	REINF.	TRANSV.	14'-10" x 13'-6"	20'-10" x 16'-6"	18'-11" x 18'-0"	20'-11" x 18'-6"
		LONGIT.	14'-10" x 13'-6"	20'-8" x 11'-6"	21'-9" x 12'-0"	24'-9" x 12'-6"
	NO. OF PILES x LENGTH	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	8-24" Ø x 38'-0"	8-24" Ø x 39'-0"	
CAP DETAIL		D	E	F	F	
40'-1" TO 45'-0"	PILE CAP SIZE XxYxT	15'-0" x 15'-0" x 4'-6"	19'-0" x 13'-0" x 4'-6"	19'-0" x 13'-0" x 4'-6"		
	REINF.	TRANSV.	16'-10" x 14'-6"	20'-11" x 18'-6"	20'-11" x 18'-6"	
		LONGIT.	16'-10" x 14'-6"	19'-9" x 12'-6"	24'-9" x 12'-6"	
	NO. OF PILES x LENGTH	5-24" Ø x 40'-0"	6-24" Ø x 40'-0"	8-24" Ø x 39'-0"		
CAP DETAIL		D	E	F		

**NOTES:**

- CONCRETE FOR PILE CAPS & PILES SHALL BE HARD ROCK CONCRETE  $f_c = 3000$  psi.
- REINFORCING STEEL SHALL BE INTERMEDIATE GRADE CONFORMING TO ASTM A-15.
- PILE FOUNDATION SCHEDULE (I) APPLIES FOR ALL AERIAL STRUCTURES ALONG THE SAN FERNANDO VALLEY CORRIDOR, SAN GABRIEL VALLEY CORRIDOR & LONG BEACH CORRIDOR EXCEPT THE SECTION BETWEEN GREENLEAF BLVD. AND THE EAST BANK OF THE LOS ANGELES RIVER (LONG BEACH CORRIDOR) IN THE VICINITY OF THE RIO HONDO CROSSING (SAN GABRIEL CORRIDOR) & WITHIN THE LOS ANGELES RIVER CROSSING (SAN FERNANDO CORRIDOR & LONG BEACH CORRIDOR). THESE LIMITED AREAS AND OTHER LIMITED SPECIAL CONDITION AREAS WILL BE PRESENTED IN THE FORM OF SKETCHES FOR THE PURPOSE OF ESTIMATING.
- PILE FOUNDATION SCHEDULE (A) (SEE SHT. 5-12) APPLIES FOR THE AERIAL SECTION BETWEEN GREENLEAF BLVD. AND THE EAST BANK OF THE LOS ANGELES RIVER (LONG BEACH CORRIDOR).

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

**(A) 5-13 DRILLED & POURED-IN-PLACE PILE FOUNDATION SCHEDULE**

COLUMN CLEAR HEIGHT	VARIABLES	PIER SPACING				
		60'-0"	80'-0"	100'-0"	110'-0"	
UP TO 20'-0"	PILE CAP SIZE XxYxT	12'-6"x12'-6"x4'-6"	14'-6"x14'-6"x4'-6"	16'-0"x12'-0"x4'-6"	21'-6"x15'-6"x4'-6"	
	REINF.	TRANSV.	13'-9" x 12'-0"	14'-10" x 14'-0"	17'-10" x 15'-6"	22'-11" x 21'-0"
		LONGIT.	13'-9" x 12'-0"	14'-10" x 14'-0"	17'-8" x 11'-0"	22'-10" x 15'-0"
	NO. OF PILES x LENGTH	4-30'φ x 38'-6"	5-30'φ x 38'-6"	6-30'φ x 38'-6"	6-30'φ x 38'-6"	
CAP DETAIL	C	D	E	E		
20'-1" TO 25'-0"	PILE CAP SIZE XxYxT	13'-6"x13'-6"x4'-6"	16'-0"x16'-0"x4'-6"	18'-6"x13'-6"x4'-6"	23'-6"x16'-6"x4'-6"	
	REINF.	TRANSV.	15'-9" x 13'-0"	17'-10" x 15'-6"	17'-11" x 18'-0"	25'-11" x 23'-0"
		LONGIT.	15'-9" x 13'-0"	17'-10" x 15'-6"	19'-9" x 13'-0"	24'-10" x 16'-0"
	NO. OF PILES x LENGTH	4-30'φ x 38'-6"	5-30'φ x 38'-6"	6-30'φ x 38'-6"	6-30'φ x 38'-0"	
CAP DETAIL	C	D	E	E		
25'-1" TO 30'-0"	PILE CAP SIZE XxYxT	16'-0"x16'-0"x4'-6"	18'-6"x18'-6"x4'-6"	20'-6"x15'-0"x4'-6"	27'-0"x18'-0"x4'-6"	
	REINF.	TRANSV.	17'-10" x 15'-6"	17'-11" x 18'-0"	21'-11" x 20'-0"	30'-11" x 26'-6"
		LONGIT.	17'-10" x 15'-6"	17'-11" x 18'-0"	25'-9" x 14'-6"	30'-10" x 17'-6"
	NO. OF PILES x LENGTH	4-30'φ x 38'-6"	5-30'φ x 38'-6"	6-30'φ x 38'-6"	6-30'φ x 40'-0"	
CAP DETAIL	C	D	E	E		
30'-1" TO 35'-0"	PILE CAP SIZE XxYxT	13'-6"x13'-6"x4'-6"	16'-0"x12'-0"x4'-6"	22'-6"x16'-6"x4'-6"	22'-6"x12'-6"x4'-6"	
	REINF.	TRANSV.	15'-9" x 13'-0"	17'-10" x 15'-6"	24'-11" x 22'-0"	23'-11" x 22'-0"
		LONGIT.	15'-9" x 13'-0"	17'-8" x 11'-6"	24'-10" x 16'-0"	19'-9" x 12'-0"
	NO. OF PILES x LENGTH	5-30'φ x 38'-6"	6-30'φ x 38'-6"	6-30'φ x 38'-6"	8-30'φ x 36'-6"	
CAP DETAIL	D	E	E	F		
35'-1" TO 40'-0"	PILE CAP SIZE XxYxT	14'-6"x14'-6"x4'-6"	17'-6"x12'-6"x4'-6"	22'-6"x13'-0"x4'-6"	22'-6"x13'-6"x4'-6"	
	REINF.	TRANSV.	14'-10" x 14'-0"	20'-10" x 17'-0"	23'-11" x 22'-0"	24'-11" x 22'-0"
		LONGIT.	14'-10" x 14'-0"	20'-8" x 12'-0"	21'-9" x 12'-6"	24'-9" x 13'-0"
	NO. OF PILES x LENGTH	5-30'φ x 38'-6"	6-30'φ x 40'-0"	8-30'φ x 37'-0"	8-30'φ x 37'-0"	
CAP DETAIL	D	E	F	F		
40'-1" TO 45'-0"	PILE CAP SIZE XxYxT	15'-6"x15'-6"x4'-6"	19'-6"x13'-6"x4'-6"	22'-6"x13'-6"x4'-6"		
	REINF.	TRANSV.	16'-10" x 15'-0"	20'-11" x 19'-0"	24'-11" x 22'-0"	
		LONGIT.	16'-10" x 15'-0"	19'-9" x 13'-0"	24'-9" x 13'-0"	
	NO. OF PILES x LENGTH	5-30'φ x 38'-6"	6-30'φ x 38'-6"	8-30'φ x 37'-0"		
CAP DETAIL	D	E	F			

**NOTE:**  
REFER TO NOTES, FOUNDATION ELEVATION AND  
PILE CAP DETAILS ON SHEET 5-11.

DRAWING NO. **S-12**

APPROVALS  
PROJECT MANAGER \_\_\_\_\_ DATE \_\_\_\_\_  
KEDJUM SORTD  
Kaiser Engineers A JOINT VENTURE  
DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS

**RID**

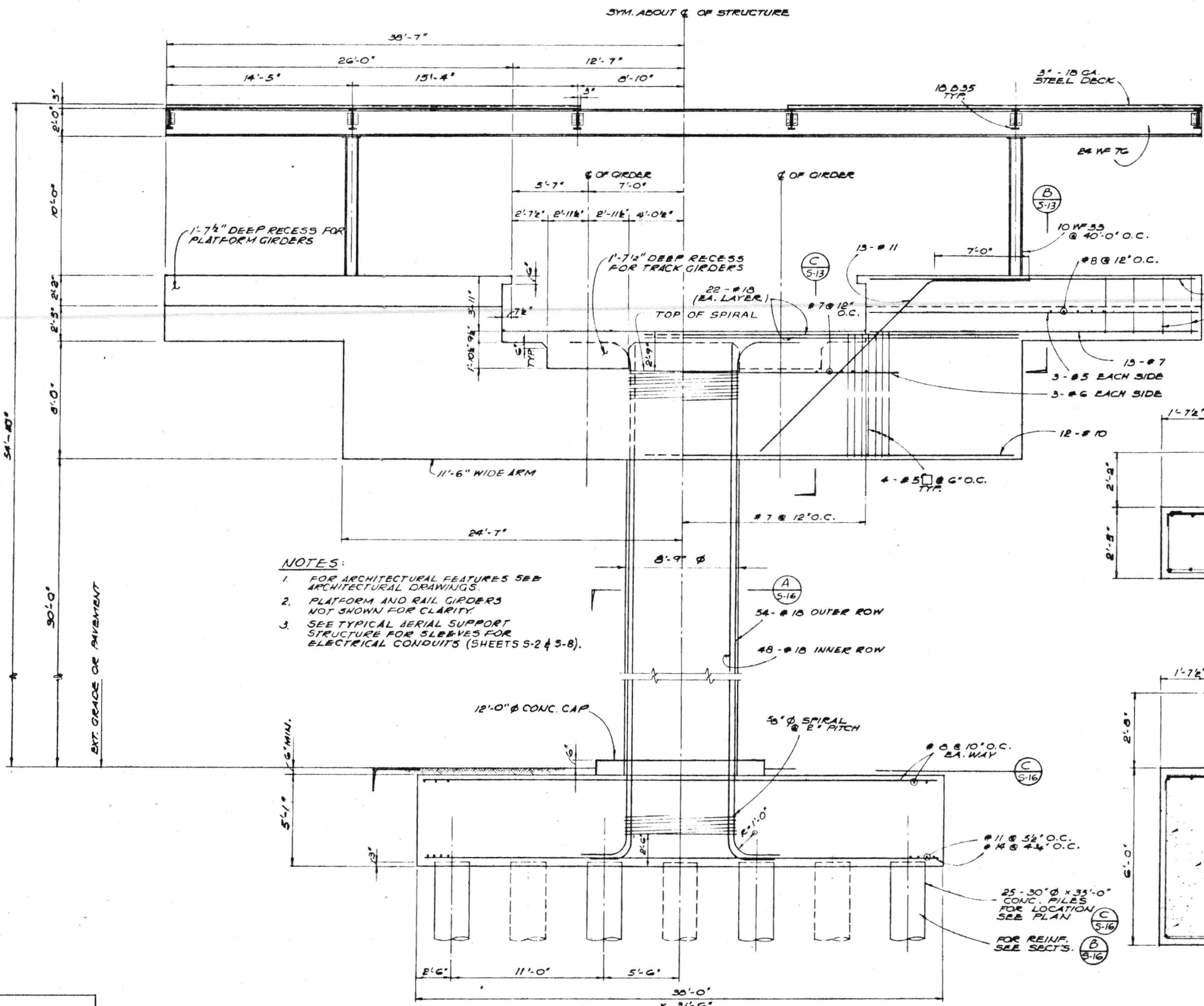
SOUTHERN CALIFORNIA  
RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90015

TYPICAL AERIAL STRUCTURE FOUNDATION  
DETAILS & SCHEDULES - SHEET 2

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

S-12





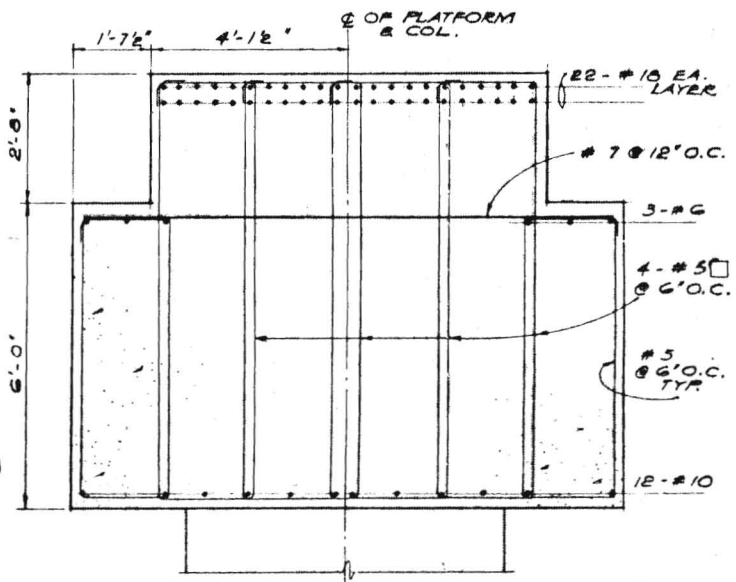
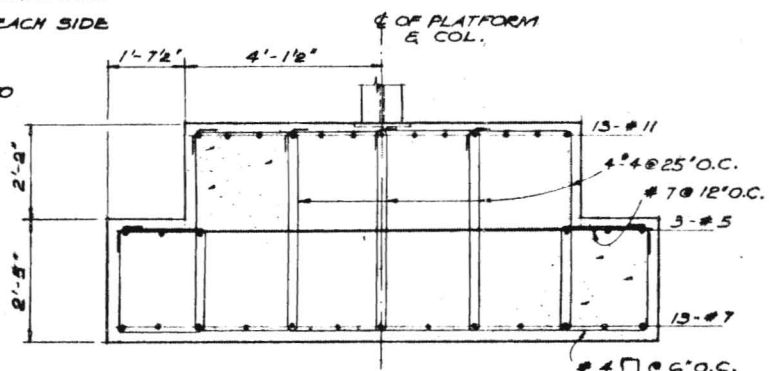
- NOTES:**
1. FOR ARCHITECTURAL FEATURES SEE ARCHITECTURAL DRAWINGS.
  2. PLATFORM AND RAIL GIRDERS NOT SHOWN FOR CLARITY.
  3. SEE TYPICAL AERIAL SUPPORT STRUCTURE FOR SLEEVES FOR ELECTRICAL CONDUITS (SHEETS S-2 & S-8).

**MATERIALS:**

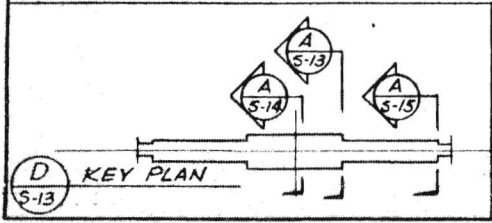
CONCRETE: HARD ROCK:  $f'_c = 4$  K.S.I. EXCEPT 3K.S.I. FOR PILES & PILE CAPS  
 REINFORCING STEEL: INTERMEDIATE GRADE ASTM A-15 ( $f_s = 20$  K.S.I.) EXCEPT COLUMN VERTICALS WHICH ARE ASTM A-432 ( $f_s = 24$  K.S.I.)

PRESTRESSING STRAND: UNCOATED STRESS RELIEVED SEVEN WIRE STRAND CONFORMING TO ASTM 416  $f_s = 270$  K.S.I.

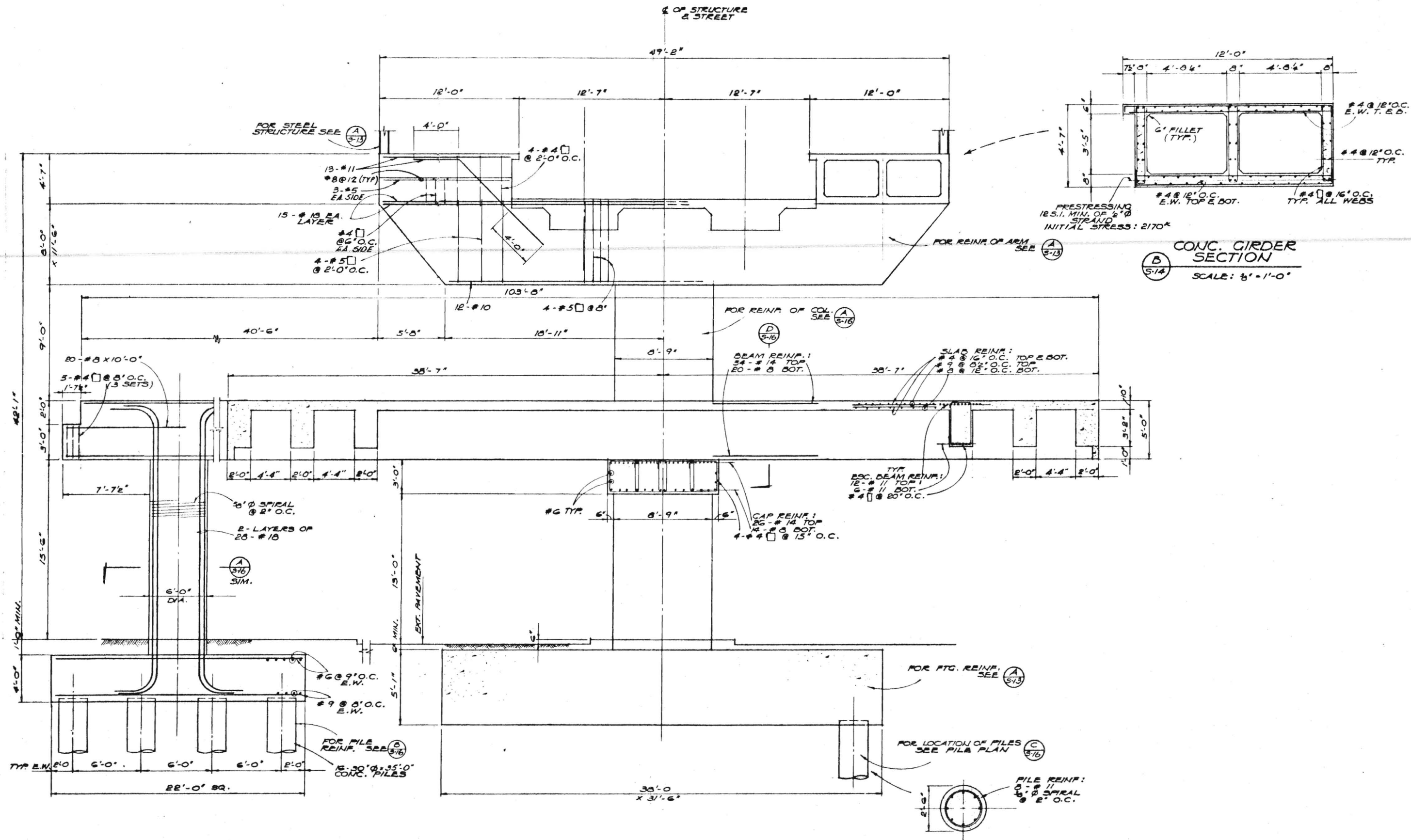
STRUCTURAL STEEL: ASTM A-36



**(A) ELEVATION SECTION-TYPICAL AERIAL STATION SUPPORT ARM**  
 1/4" = 1'-0"



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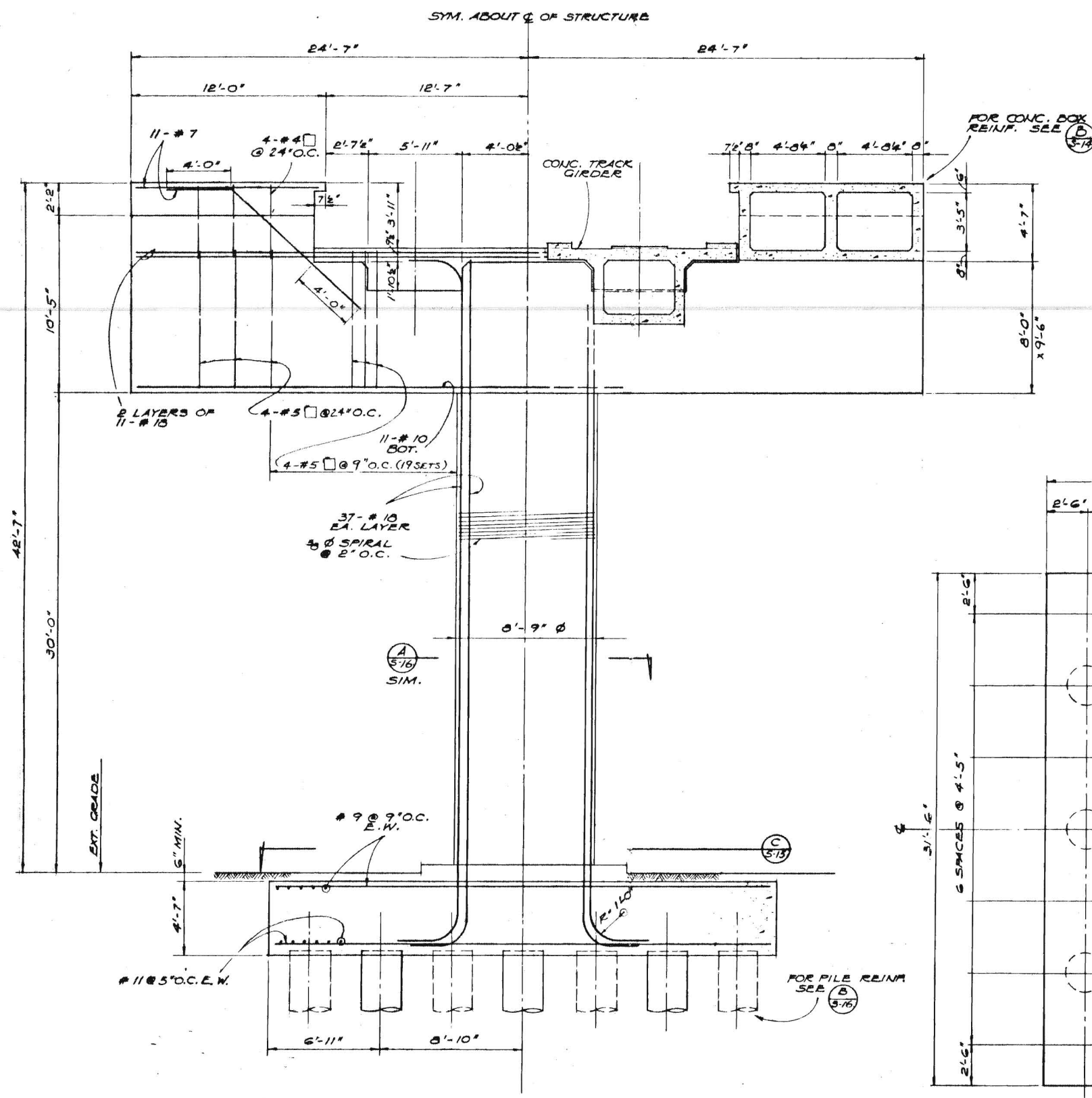
**(A) ELEVATION SECTION**  
SCALE:  $\frac{1}{4}$ " = 1'-0"

**(B) CONC. GIRDER SECTION**  
SCALE:  $\frac{3}{8}$ " = 1'-0"

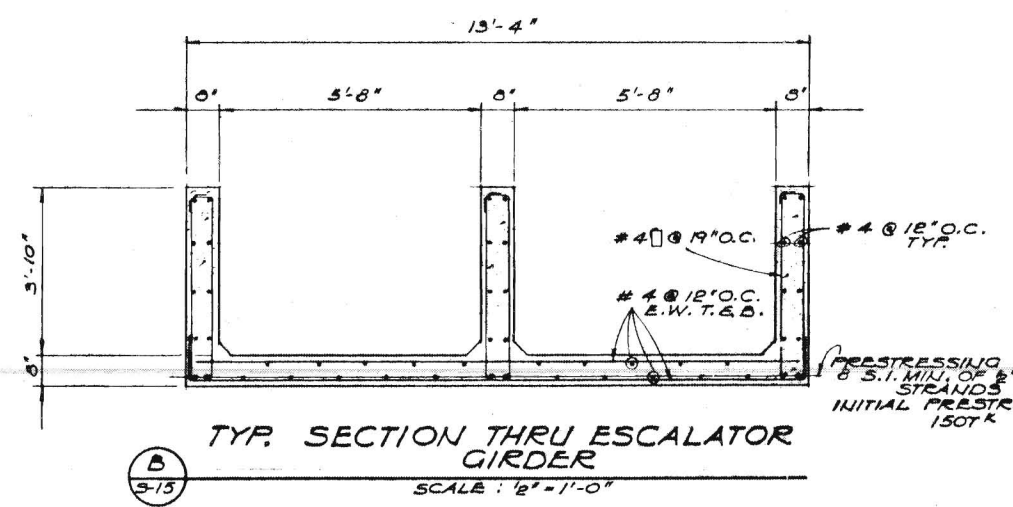
DATE	APRIL 1968
BY	W. S. SELLER
CHECKED BY	W. S. SELLER
APPROVED BY	
PROJECT MANAGER	
DESIGNER	
DRAWING NO.	
TITLE	TYPICAL AERIAL STATION - CENTER COLUMN & BOX GIRDER SECTIONS
PROJECT	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT
ARCHITECTS - ENGINEERS	Kaiser Engineers Daniel Mann, Johnson, & Mendenhall Los Angeles, California 90015
DRWG. NO.	S-14

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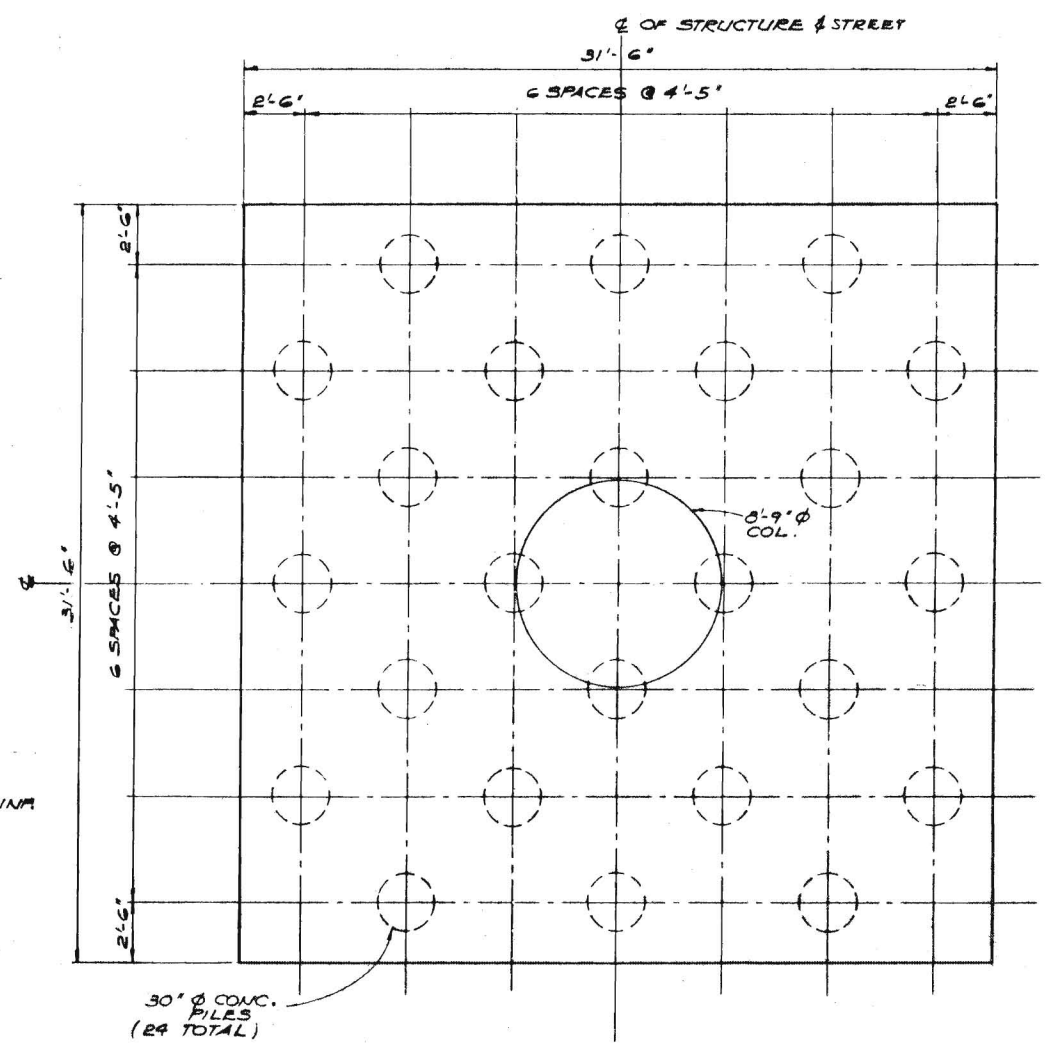




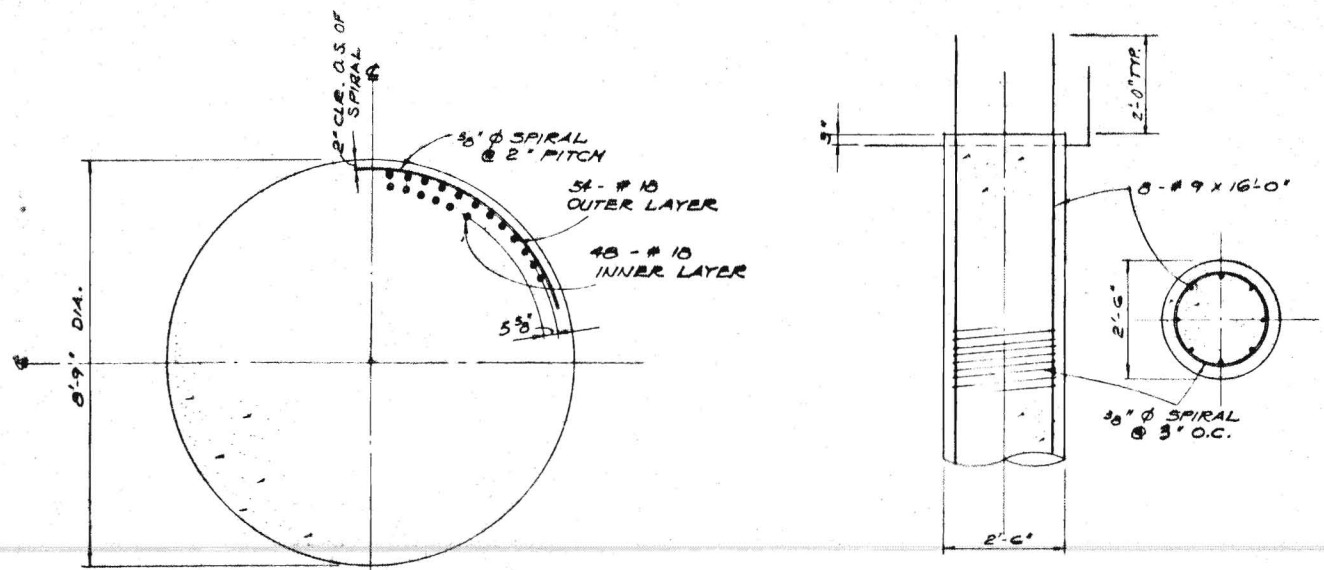
**(A) ELEVATION - SECTION**  
 SCALE: 1/4" = 1'-0"



**(B) TYP. SECTION THRU ESCALATOR GIRDER**  
 SCALE: 1/2" = 1'-0"

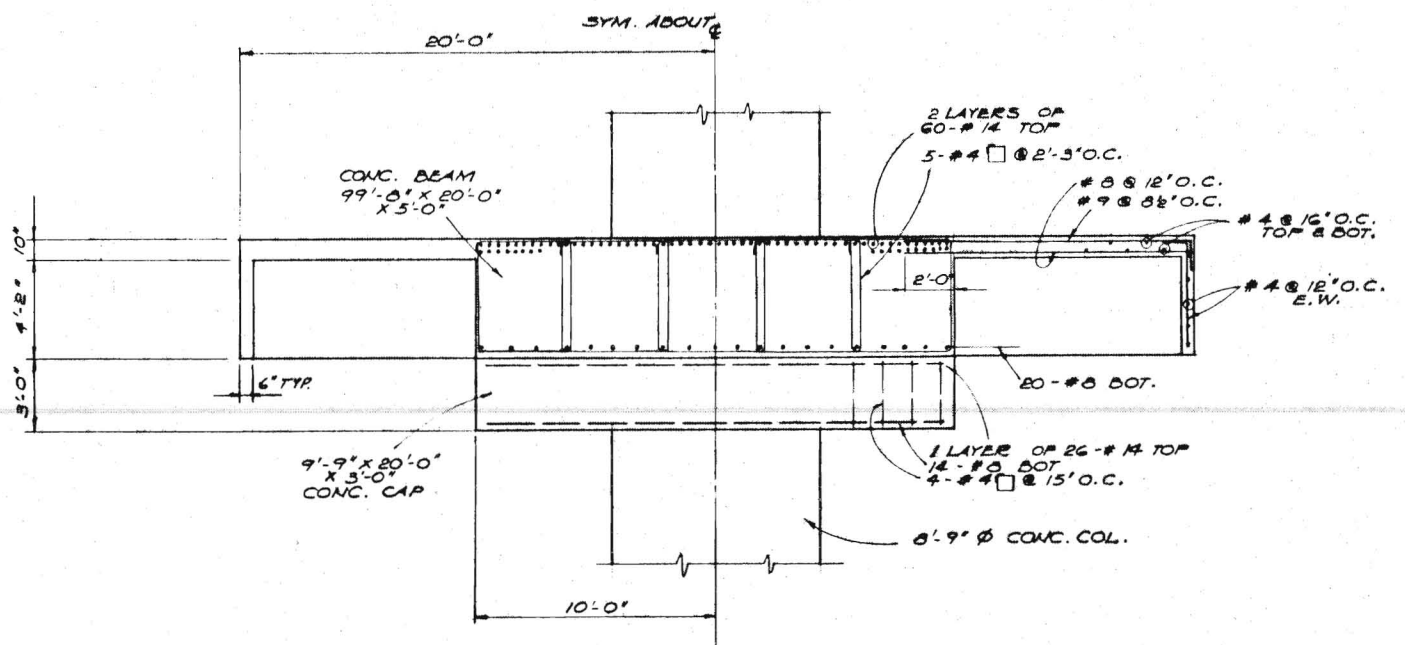


**(C) PILE PLAN**  
 SCALE: 1/4" = 1'-0"

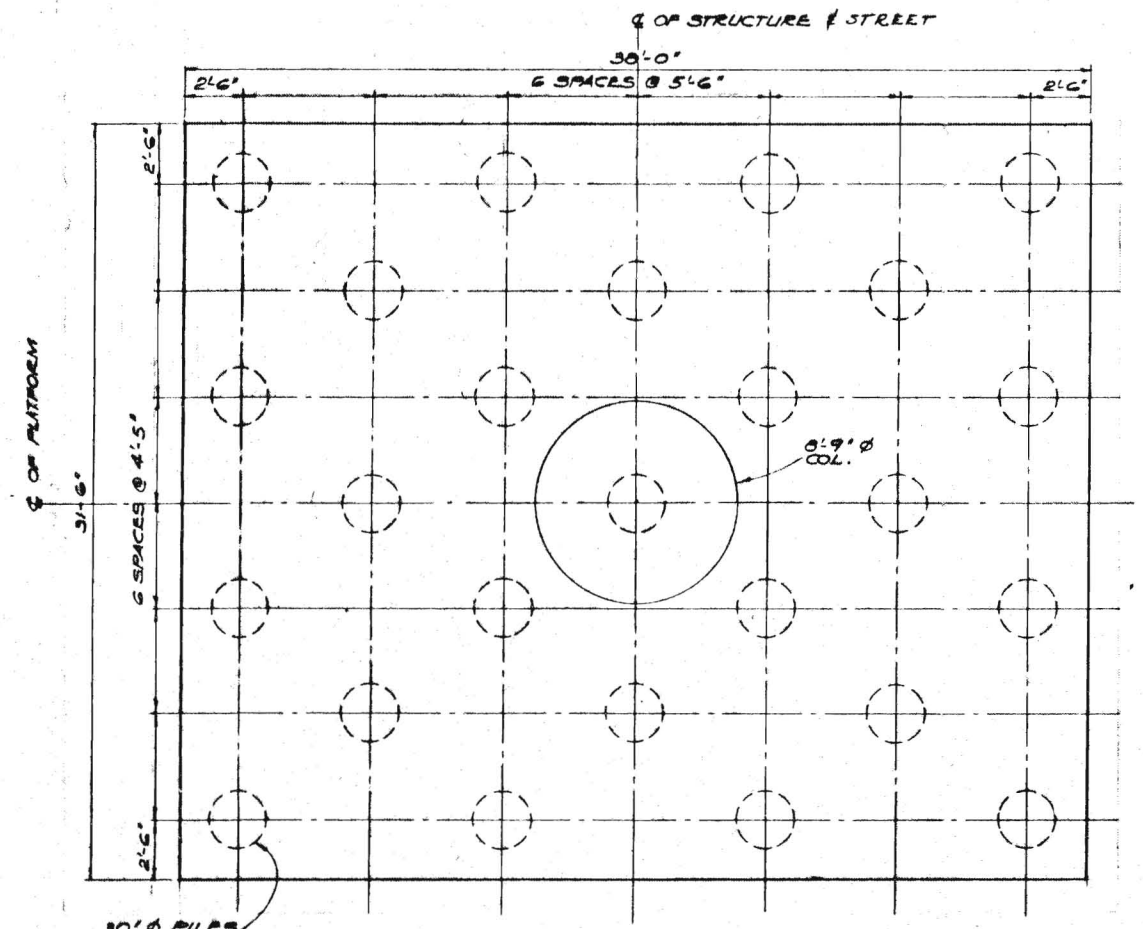


**A SECTION**  
5-16 NO SCALE

**B PILE SECTIONS**  
5-16 NO SCALE



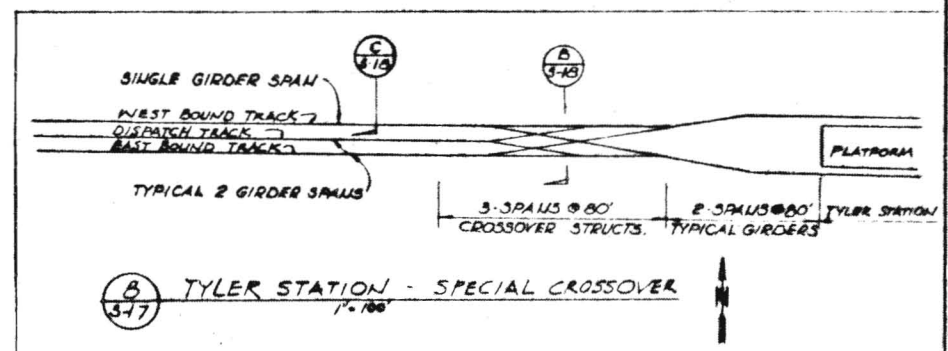
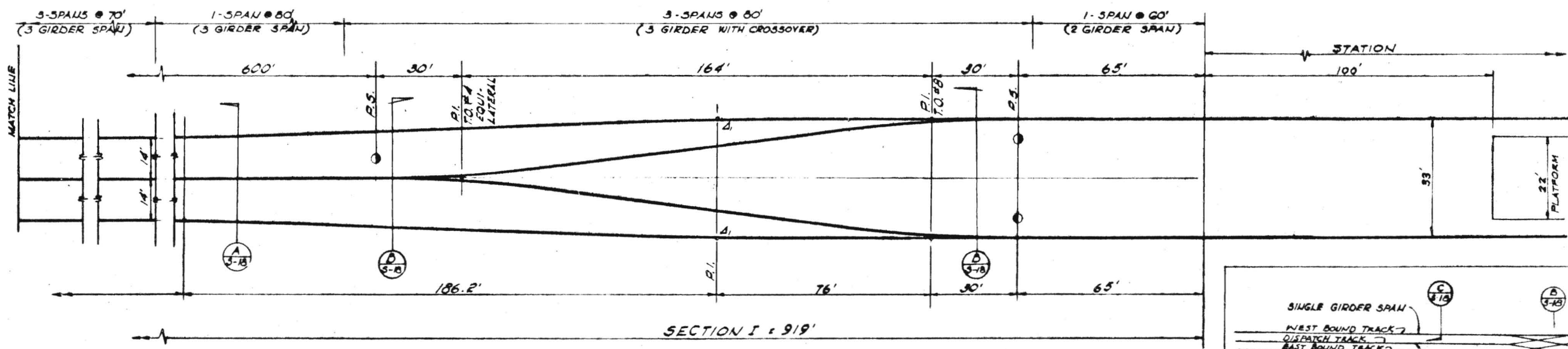
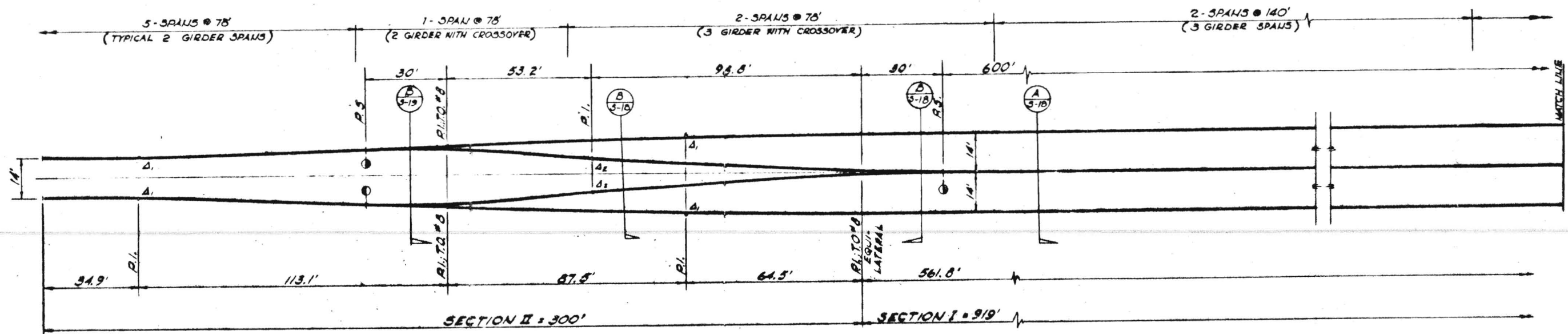
**D SECTION**  
5-16 SCALE: 1/4" = 1'-0"



**C PILE PLAN**  
5-16 SCALE: 1/4" = 1'-0"

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

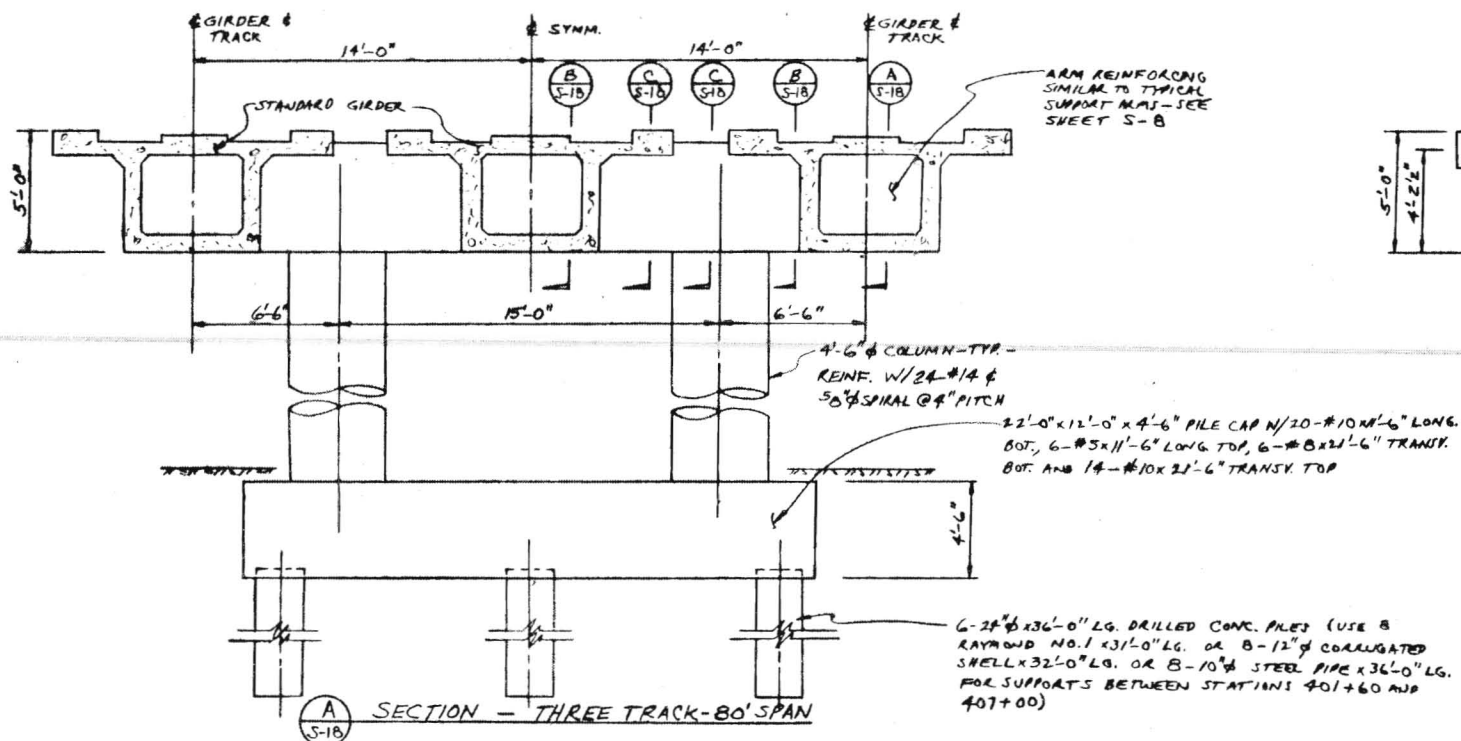




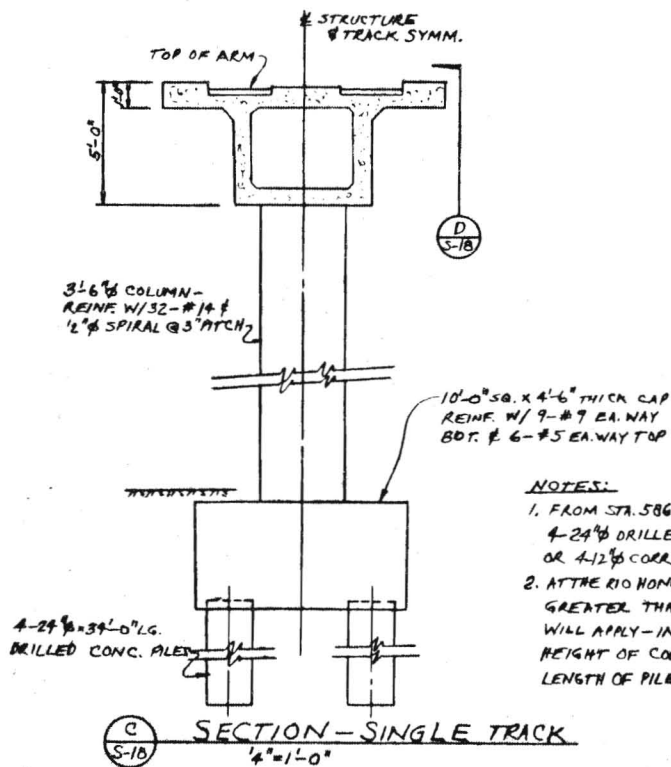
**A** UNIVERSAL CITY STATION TYPE AC TURNBACK  
 SCALE: 1"=20'

**B** TYLER STATION - SPECIAL CROSSOVER  
 SCALE: 1"=100'

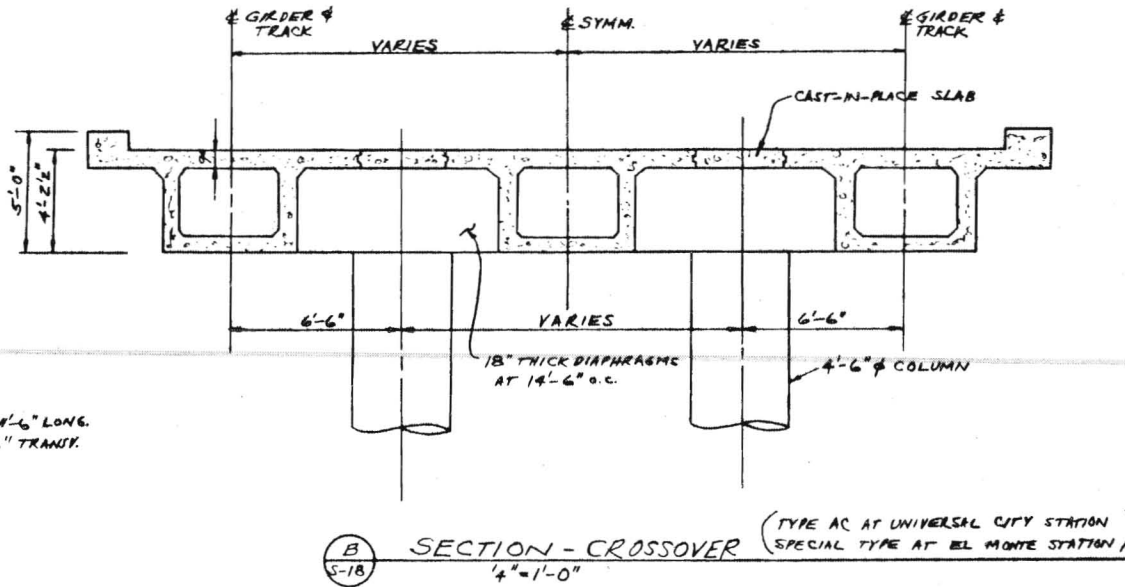
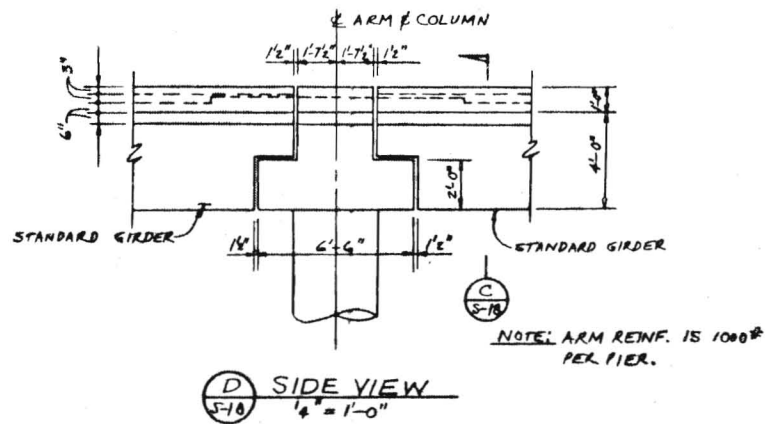
PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN



- NOTE:** FOR 190' SPAN, MODIFY SECTION AS FOLLOWS:
1. MAKE GIRDER 5'-10" DEEP.
  2. MAKE ARM 5'-10" DEEP AND ADD 20% MORE REINFORCING.
  3. MAKE COLUMNS 5'-6" W/ 48-#14 & 1/2" SPIRAL AT 3" PITCH.
  4. ADD 20% MORE REINFORCING TO PILE CAP.
  5. USE 8-24" x 40' LG. DRILLED CONCRETE PILES.

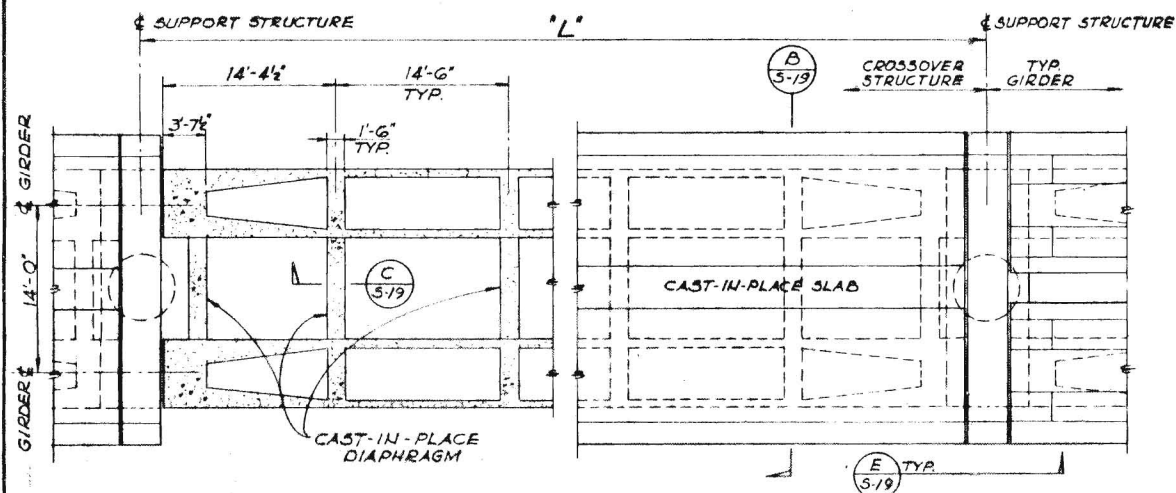


- NOTES:**
1. FROM STA. 586+96 THROUGH STA. 593+10 INCLUSIVE, REPLACE THE 4-24" DRILLED PILES IN SECTION (C) WITH 4 RAYMOND NO. 1 x 48'-0" OR 4-12" CORRUGATED SHELLS x 50'-0" OR 5'-0" STEEL PIPE x 50'-0".
  2. AT THE RIO HONDO CROSSING WHERE COLUMN LENGTHS WILL BE GREATER THAN NORMAL, A SECTION SIMILAR TO SECTION (C) WILL APPLY - INCREASE SIZE AND REINFORCING PER UNIT HEIGHT OF COLUMN BY 50%. INCREASE CAP (AND REINF.) AND LENGTH OF PILES BY 20% OF THAT FOR SECTION (C).



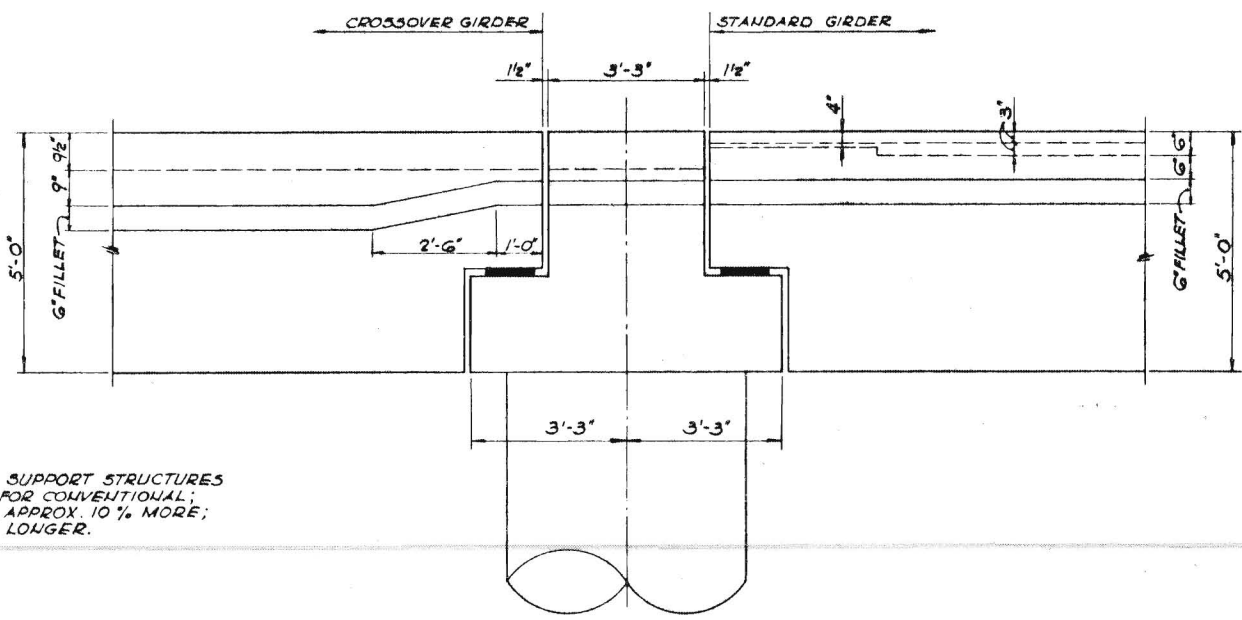
- NOTES:**
1. FOUNDATION DETAILS ARE SIMILAR TO (A).
  2. FOR GIRDERS, CAST-IN-PLACE SLABS, DIAPHRAGMS & REINFORCING REFER TO DETAILS AND NOTES ON SHEET S-19.
  3. REINFORCING FOR ARM ON SUPPORT STRUCTURES IS APPROXIMATELY 20% MORE, FOR COLUMNS 10% MORE, FOR PILE CAP 5% MORE, AND FOR PILES APPROXIMATELY 5% LONGER THAN THAT FOR THE SUPPORT STRUCTURE SHOWN IN SECTION (A).



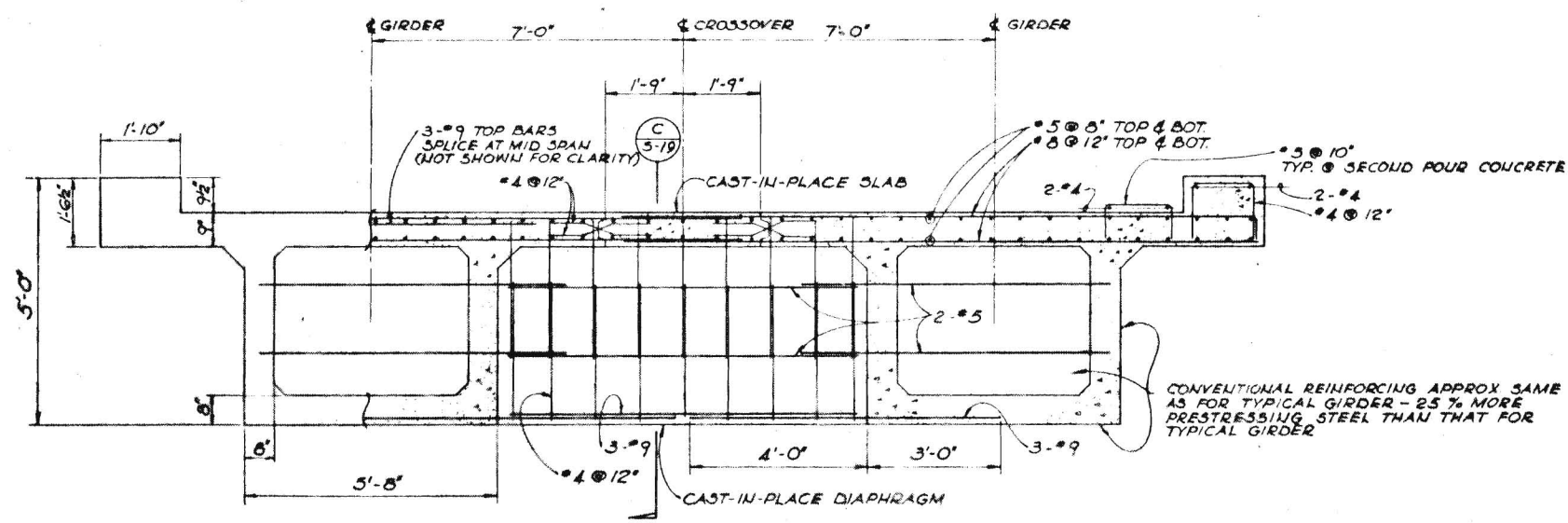


**A** PLAN DETAIL - CROSSOVER TYPE AS  
SCALE: 1/8" = 1'-0"

**NOTE:**  
REINFORCING FOR ARM ON SUPPORT STRUCTURES APPROX. 20% MORE THAN FOR CONVENTIONAL;  
REINFORCING FOR COLUMN APPROX. 10% MORE;  
PILES APPROXIMATELY 5% LONGER.

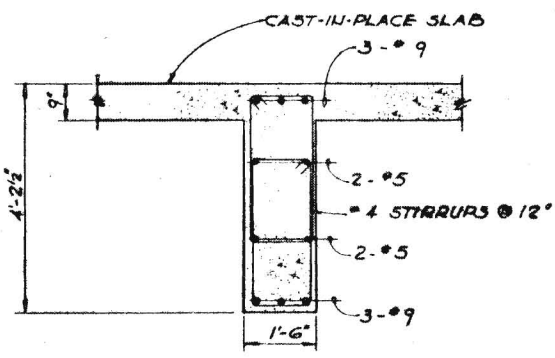


**E** SIDE VIEW OF JUNCTION OF STANDARD GIRDER AND CROSSOVER GIRDER 1/2" = 1'-0"



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

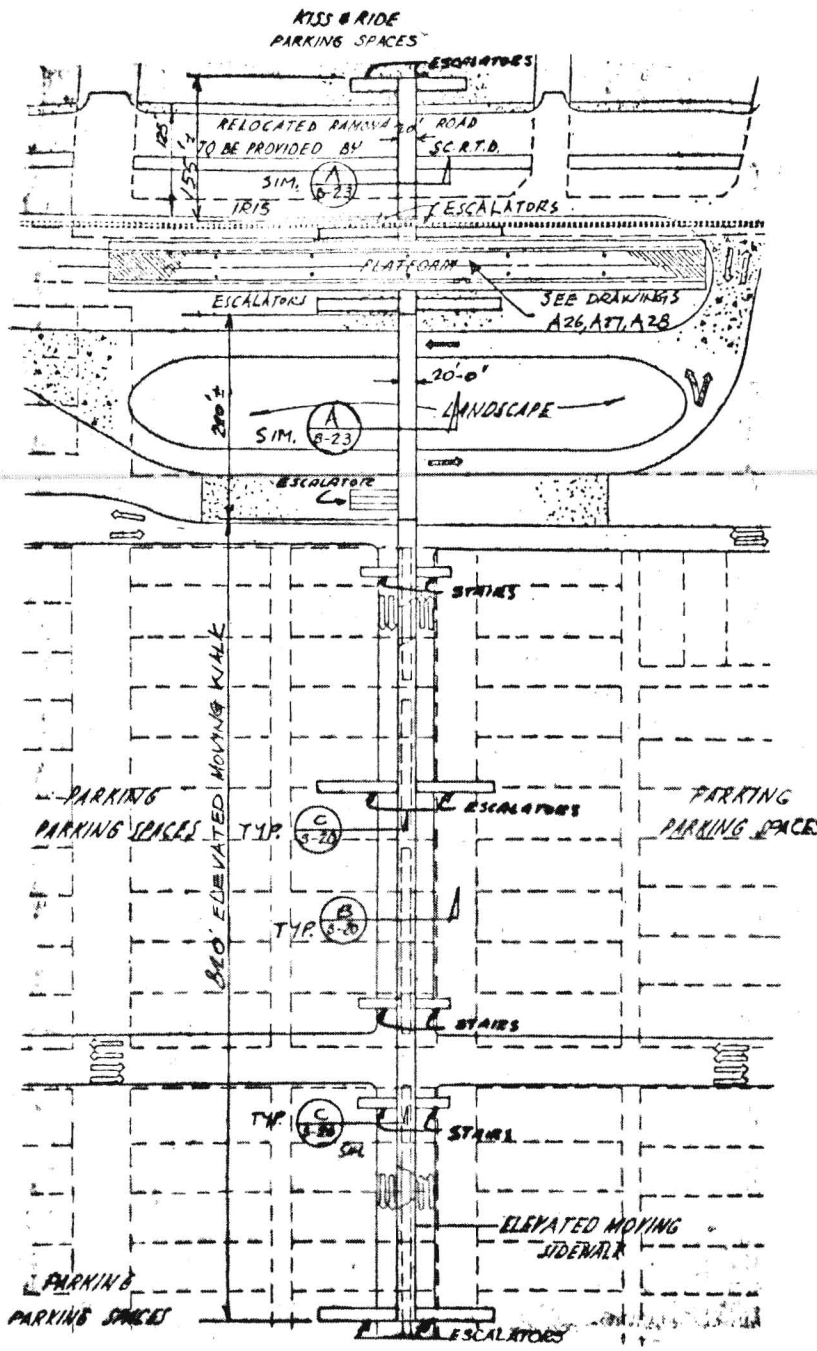
CONVENTIONAL REINFORCING APPROX SAME AS FOR TYPICAL GIRDER - 25% MORE PRESTRESSING STEEL THAN THAT FOR TYPICAL GIRDER



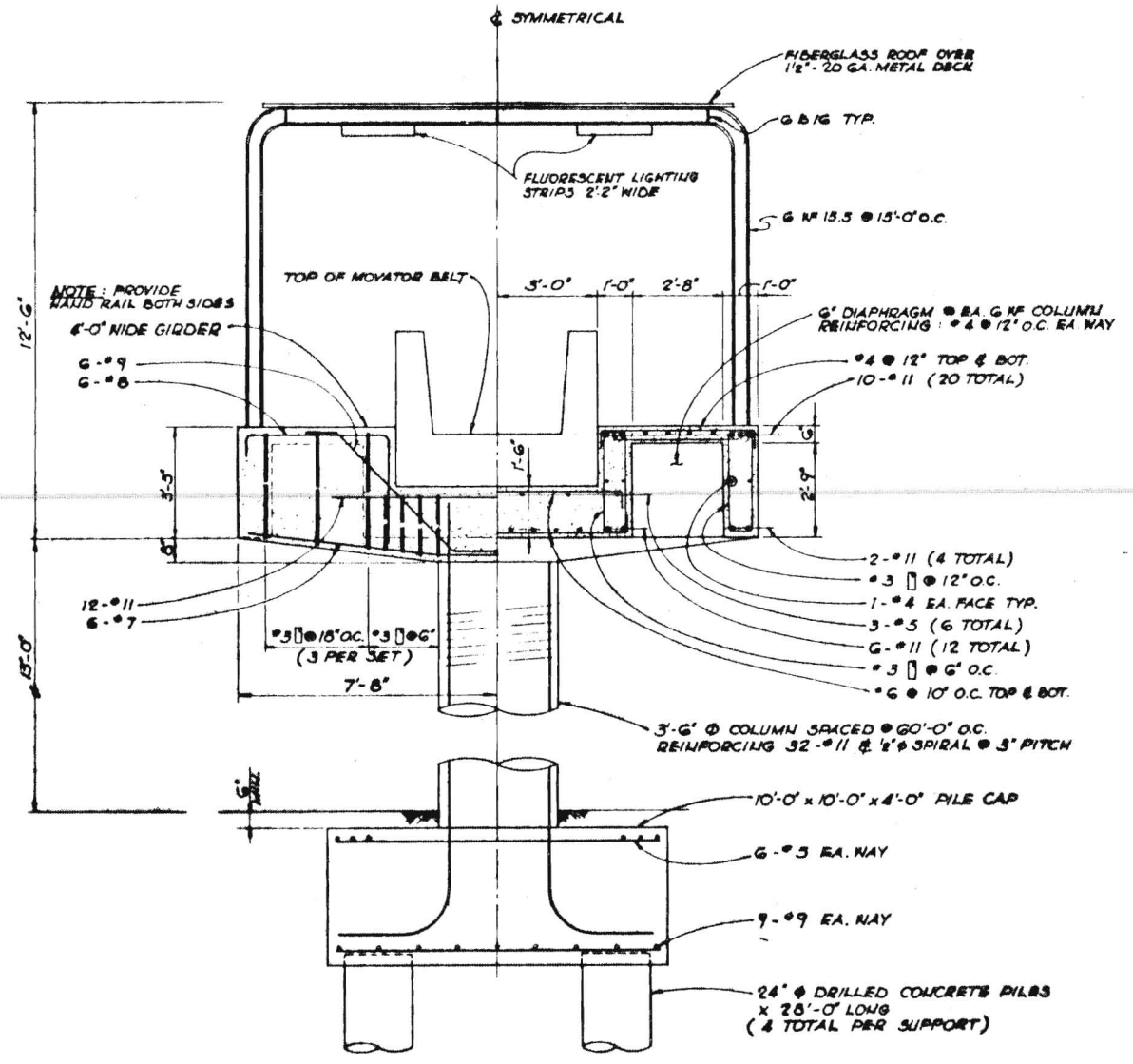
**C** SECTION  
SCALE: 1/2" = 1'-0"

<b>D</b> CROSSOVER STRUCTURE TYPE AS				
CORRIDOR	LOCATION RELATIVE TO STATION	STATION	SUPPORT SPACING	APPROX. TOTAL LENGTH
SAN FERNANDO VALLEY	WEST	FULTON	APPROX. 80'-0"	240'-0"
SAN FERNANDO VALLEY	EAST	SEPULVEDA	APPROX. 78'-0"	234'-0"
SAN FERNANDO VALLEY	WEST	WEST VALLEY	APPROX. 67'-0"	201'-0"
LONG BEACH	SOUTH	VERNON	APPROX. 80'-0"	240'-0"

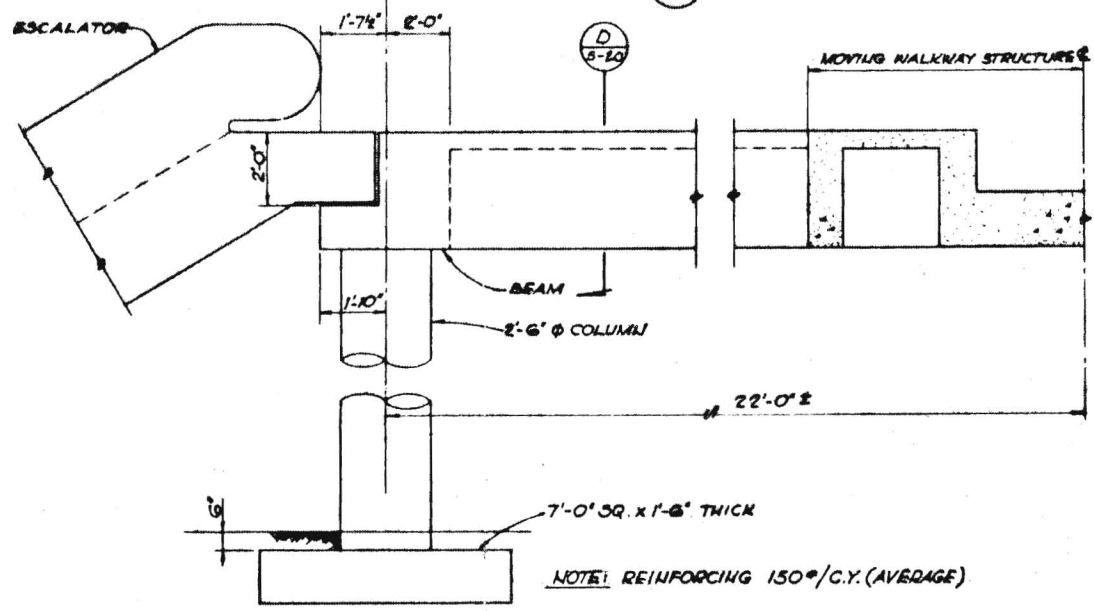
- NOTES:**
1. CONCRETE FOR CAST-IN-PLACE SLAB AND DIAPHRAGM SHALL BE LIGHT WEIGHT CONCRETE,  $f_c = 5000$  psi.
  2. REINFORCING STEEL FOR CAST-IN-PLACE SLAB AND DIAPHRAGM SHALL CONFORM TO ASTM A-15.
  3. FOR GIRDER SEE NOTES ON DRAWING 5-75.



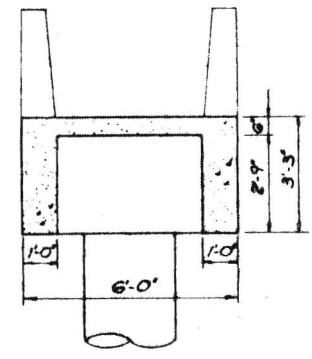
**A PARTIAL PLOT PLAN**  
S-20  
1-100



**B ELEVATED MOVING WALK SECTION**  
S-20  
1/8" = 1'-0"



**C TYPICAL SECTION AT ESCALATOR**  
S-20  
1/8" = 1'-0"

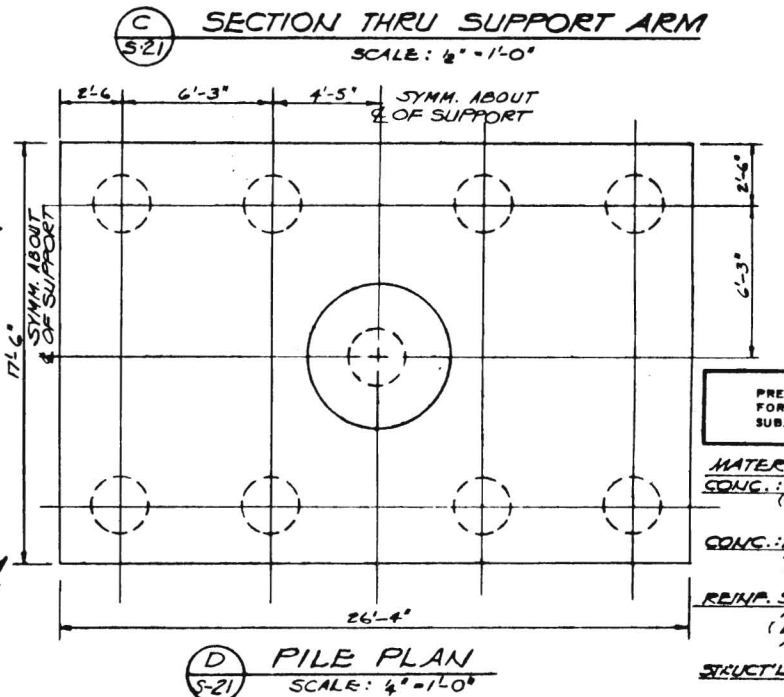
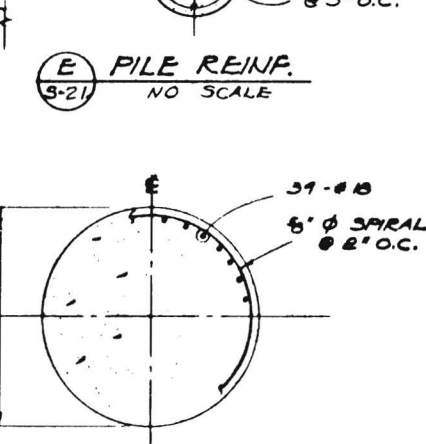
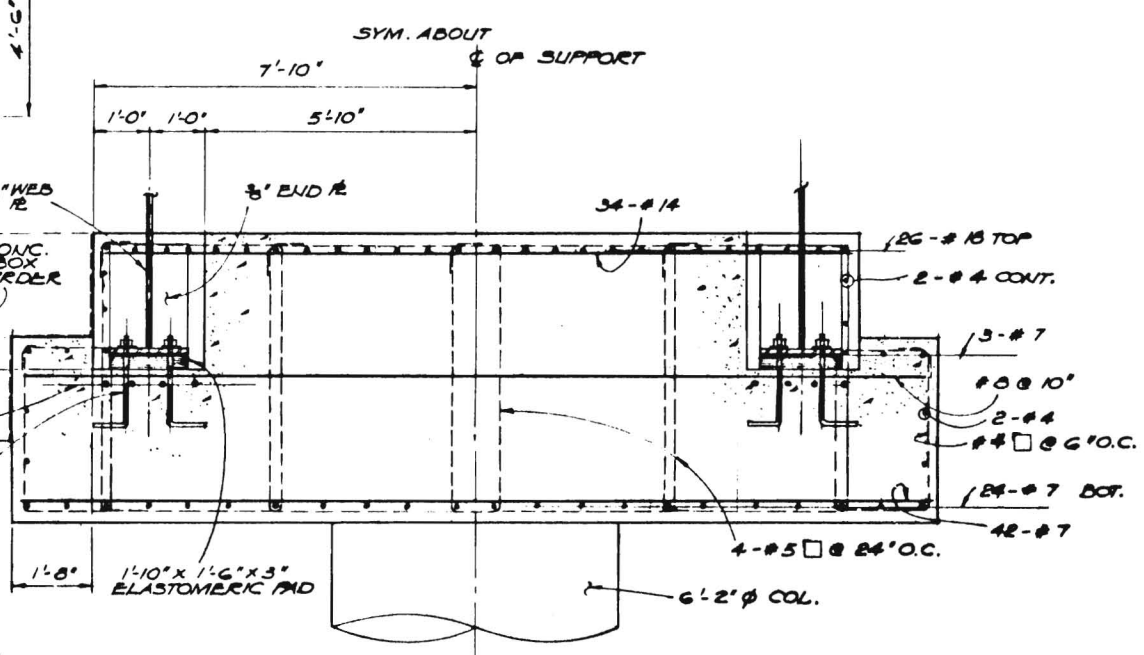
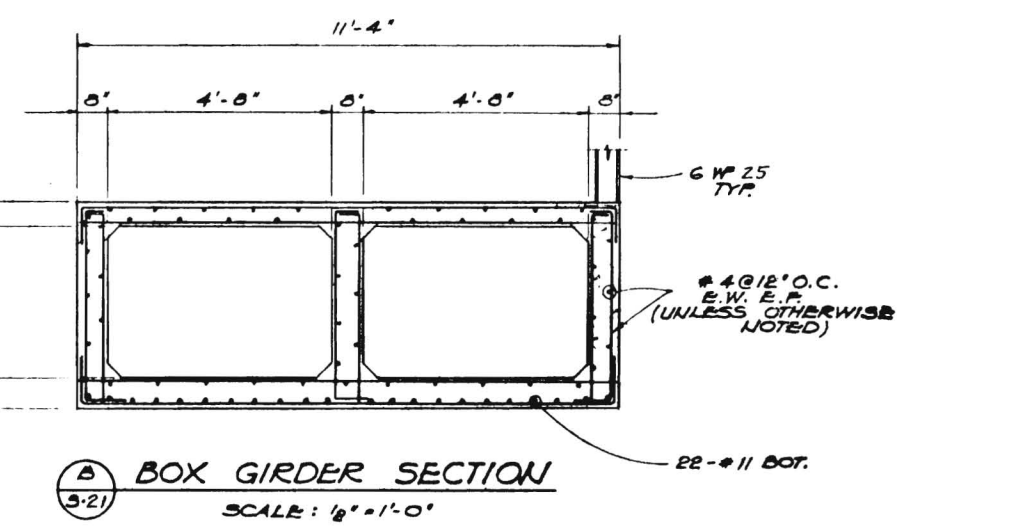
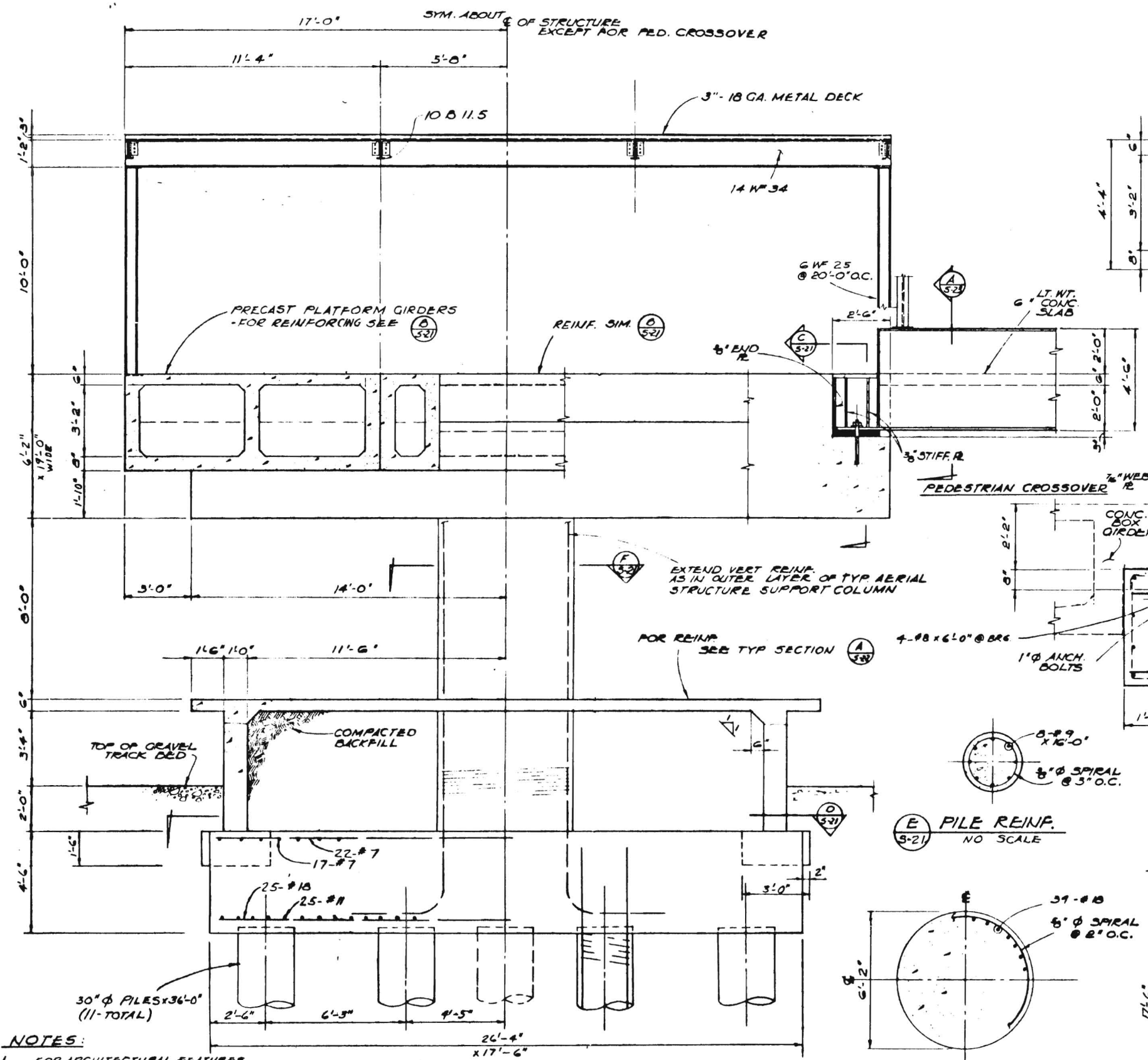


**D SECTION**  
S-20  
3/8" = 1'-0"

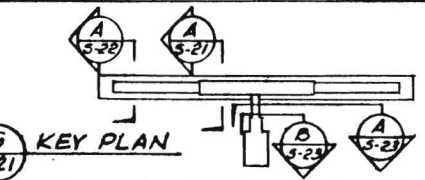
- NOTES:**
1. CONCRETE SHALL BE HARD ROCK CONCRETE - SLAB, COLUMN AND GIRDER  $f_c = 4000$  psi. PILE CAP AND PILES  $f_c = 3000$  psi.
  2. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE CONFORMING TO ASTM A-15.

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN





- NOTES:**
- FOR ARCHITECTURAL FEATURES SEE ARCHITECTURAL DRAWINGS.
  - FOR TRACK DETAILS SEE CIVIL DRAWINGS.



**A** ELEVATION SECTION - TYPICAL AT-GRADE STATION SUPPORT ARM  
SCALE: 3/8" = 1'-0"

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

**C** SECTION THRU SUPPORT ARM  
SCALE: 1/2" = 1'-0"

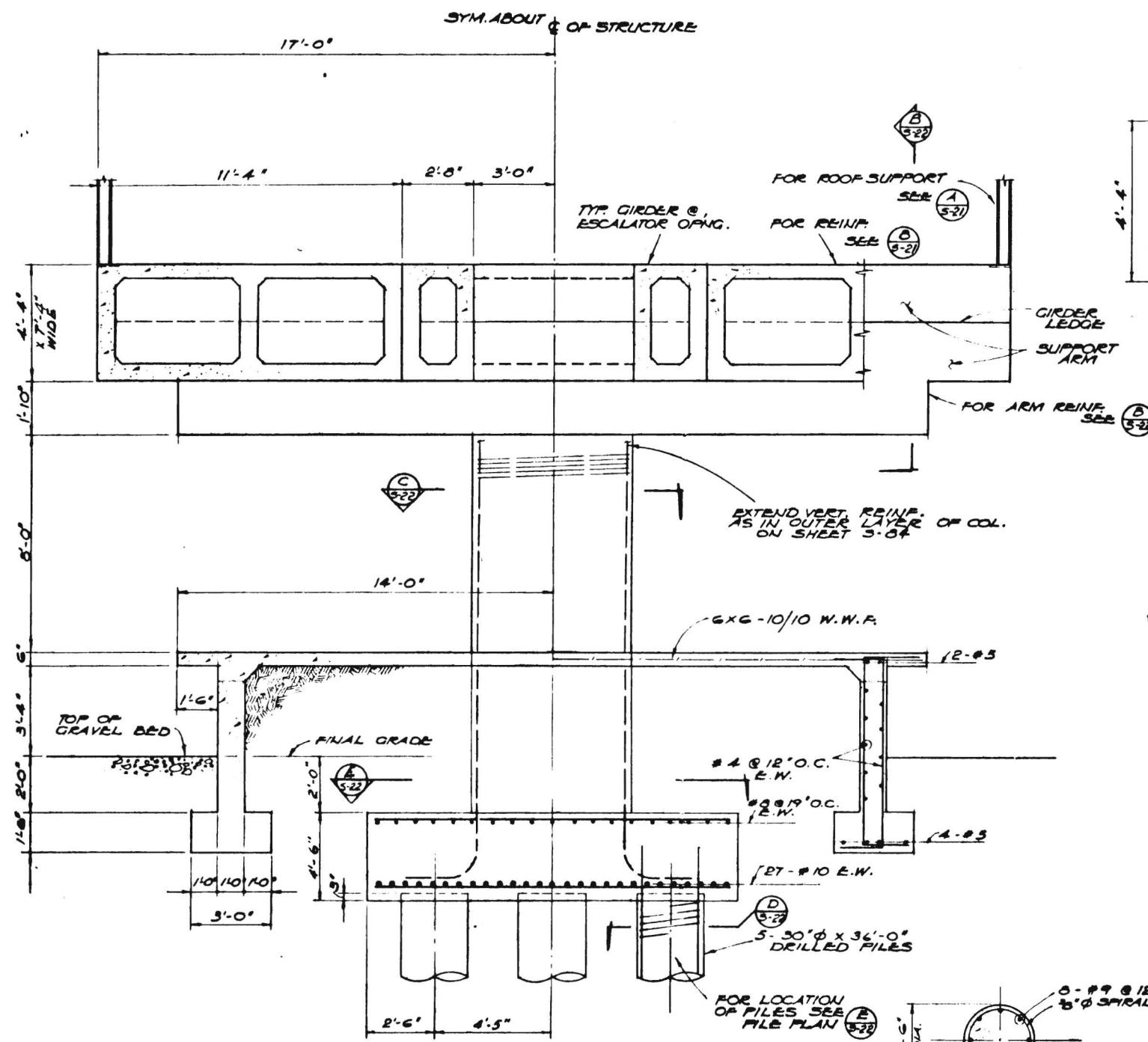
**E** PILE REINF.  
NO SCALE

**F** COL. SECTION  
SCALE: 3/8" = 1'-0"

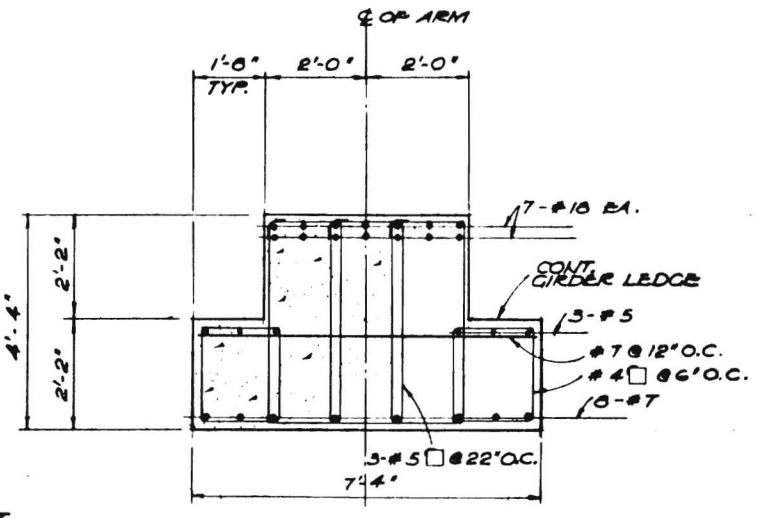
**D** PILE PLAN  
SCALE: 1/4" = 1'-0"

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

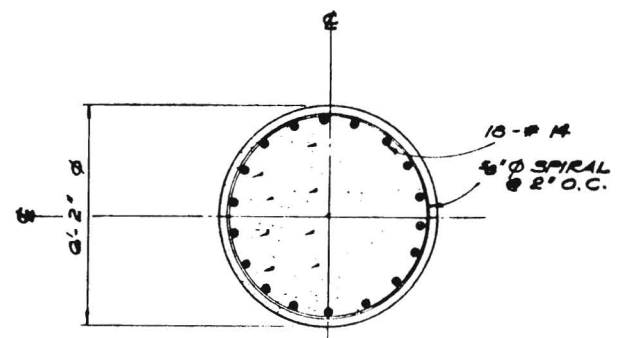
**MATERIALS:**  
 CONG.: HARD ROCK; f<sub>c</sub> = 4 K.S.I.  
 (EXCEPT 3 K.S.I. FOR PILES & PILE CAPS.)  
 CONG.: LIGHT WEIGHT (110 P.C.P.) f<sub>c</sub> = 4 K.S.I. FOR PLATFORM BOX GIRDERS & CROSSING SLAB.)  
**REINF. STEEL:** INTERMEDIATE GRADE  
 ASTM A-13, f<sub>s</sub> = 20 K.S.I.  
 (EXCEPT COL. VERTICALS:  
 ASTM A-452, f<sub>s</sub> = 24 K.S.I.)  
**STRUCT'L. STEEL:** ASTM A-36



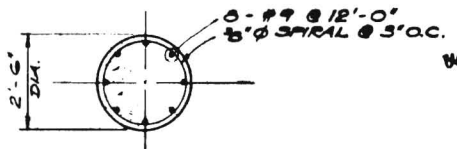
**(A) ELEVATION - SECTION**  
 5-22 SCALE: 3/8" = 1'-0"



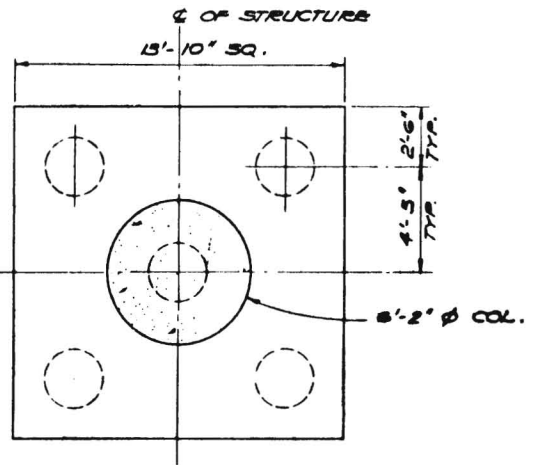
**(B) ARM SECTION**  
 5-22 SCALE: 1/2" = 1'-0"



**(C) COLUMN SECTION**  
 5-22 SCALE: 3/8" = 1'-0"



**(D) PILE SECTION**  
 5-22 NO SCALE

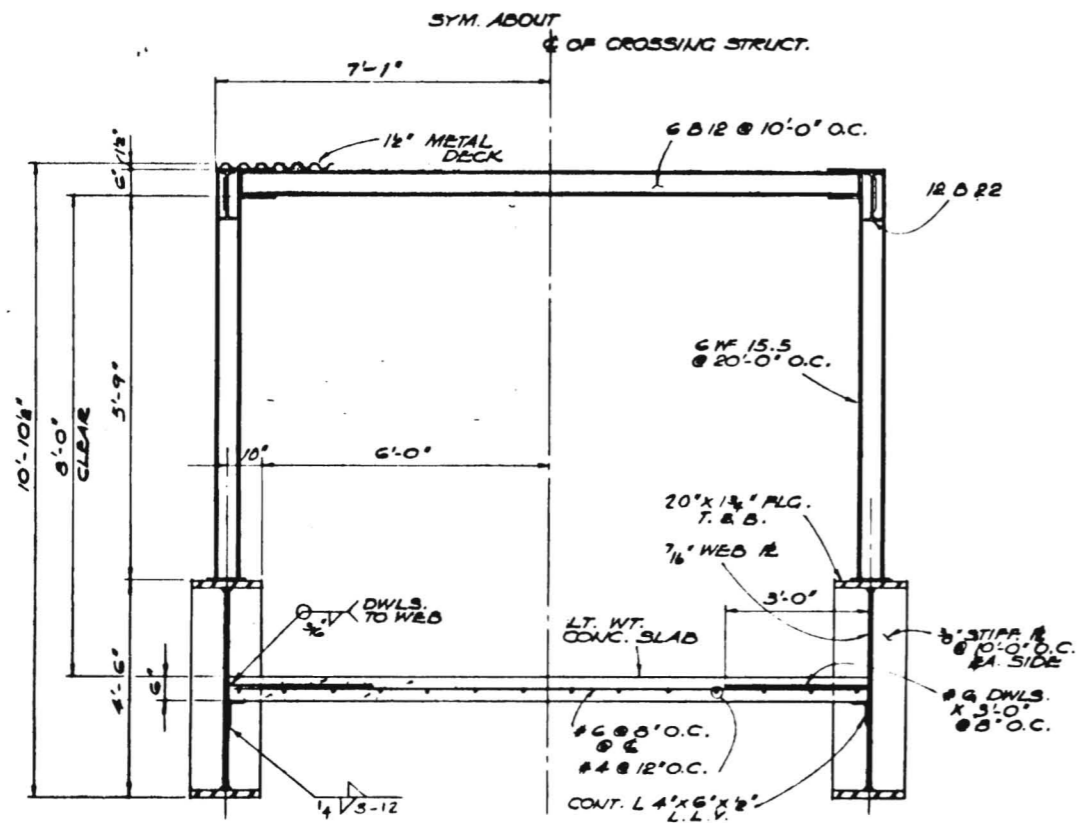


**(E) PILE PLAN**  
 5-22 NO SCALE

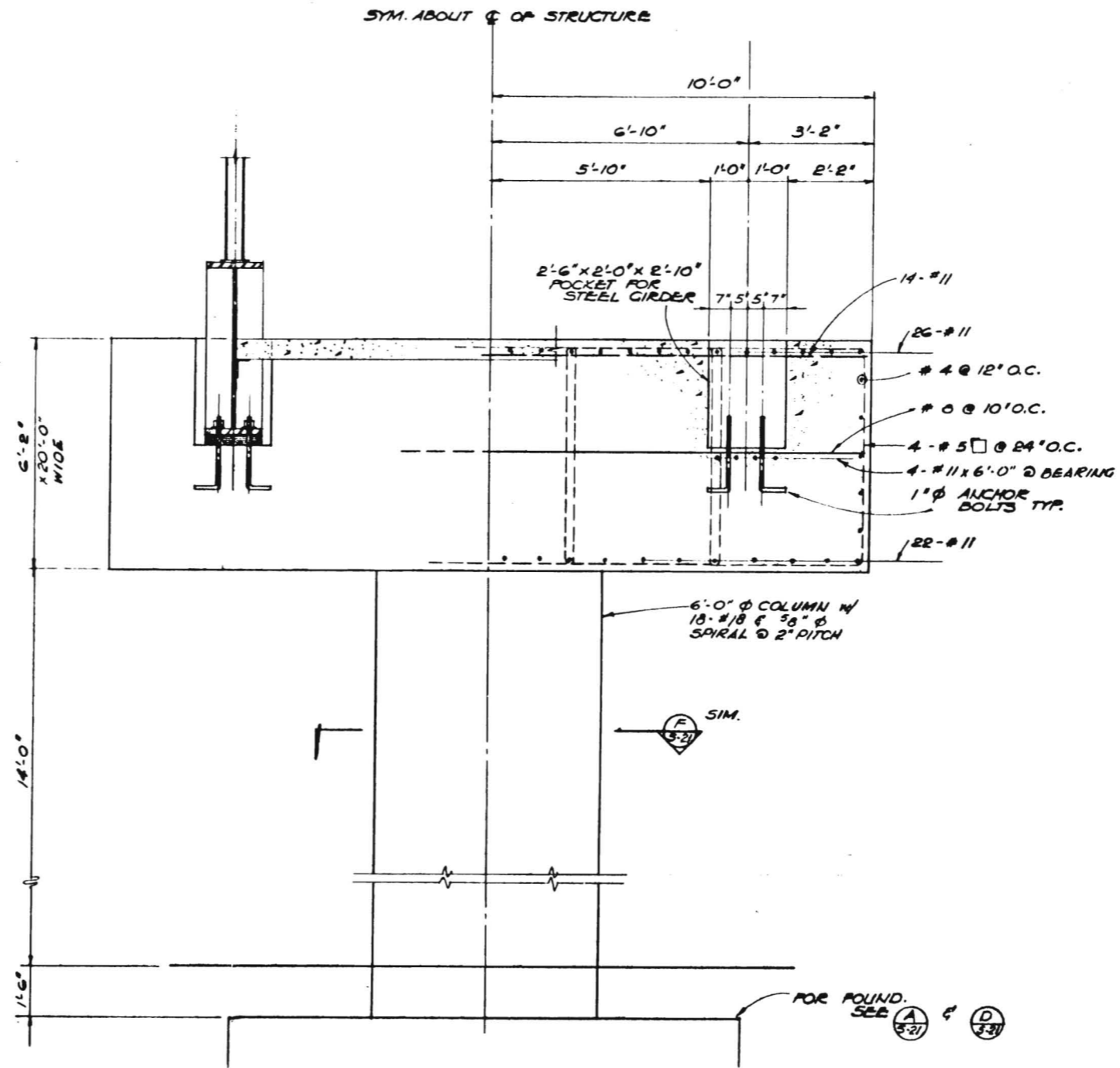
**MATERIALS:**  
 CONC.: HARD ROCK: 1/2" = 4 K.S.I. (EXCEPT 3 K.S.I. FOR PILES & PILE CAPS)  
 CONC.: LIGHT WEIGHT: (110 P.C.F.) 1/2" = 4 K.S.I. (FOR PLATFORM BOX GIRDERS & CROSS G. SLAB)  
 REINF. STEEL: INTERMEDIATE GRADE ASTM A-15  
 15 = 60 K.S.I. (EXCEPT COL. VERTICALS: ASTM A-432, 15 = 64 K.S.I.)  
 STRUCTURAL STEEL: ASTM A-36.

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN





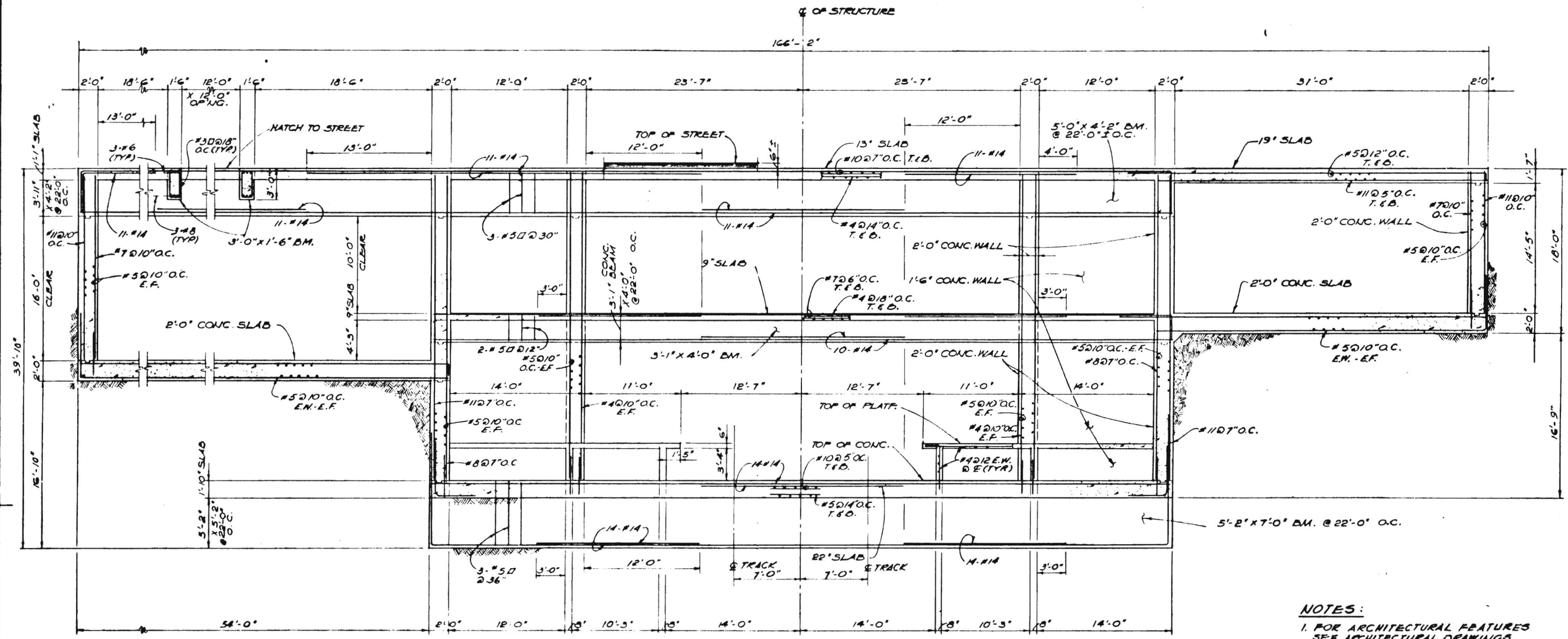
**A**  
SECTION THRU PEDESTRIAN CROSSING  
SCALE: 1/2" = 1'-0"



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

NOTE: FOR MATERIALS  
SEE NOTE ON  
SHEET 5-21.

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SUBJECT TO CHANGE IN FINAL DESIGN

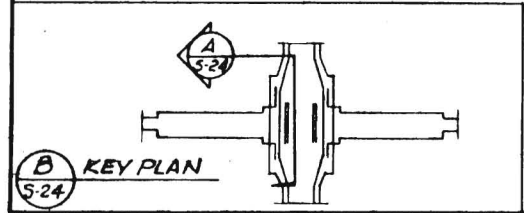


**A** TYPICAL SECTION OF OPEN-CUT STATION  
 SCALE: 3/16" = 1'-0"

**NOTES:**  
 1. FOR ARCHITECTURAL FEATURES SEE ARCHITECTURAL DRAWINGS.  
 2. FOR TRACK DETAILS SEE C-101.

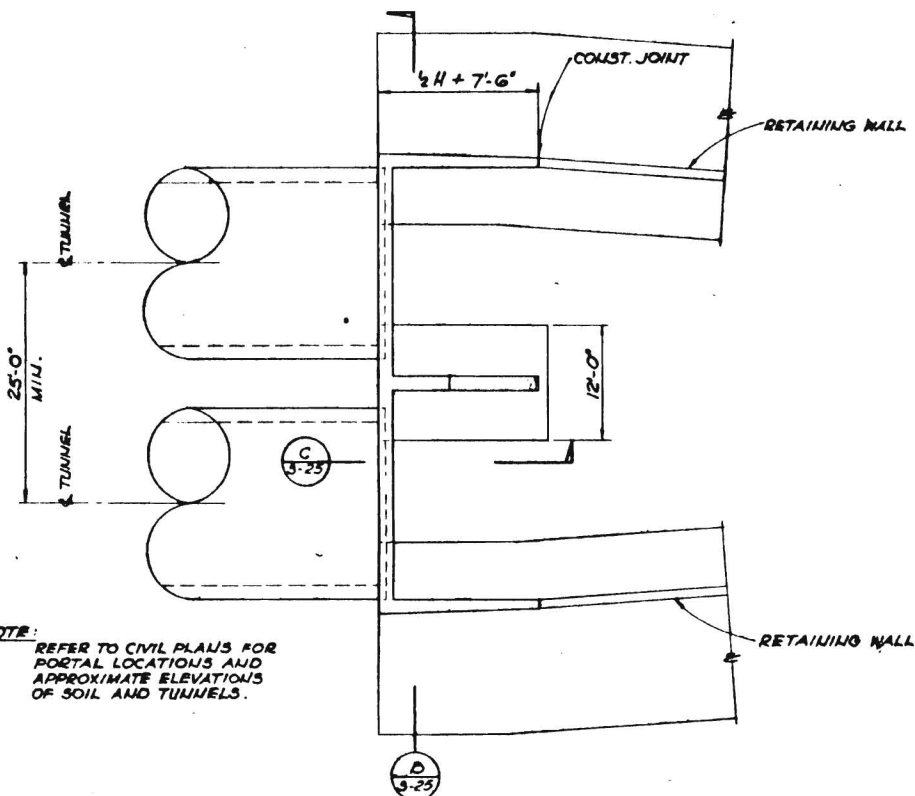
**NOTES:** 1. CURB & GUTTER SECTION MAY BE MONOLITHIC WITH STRUCTURE OR BROXYED TO STRUCTURE.  
 2. PROVIDE 10" THICK x 20'-0" LONG APPROACH SLAB EACH END.

**MATERIALS:**  
 1. CONCRETE SHALL BE HARD ROCK CONCRETE  $f_c = 4000$  P.S.I. MIN.  
 2. REINFORCING STEEL SHALL BE INTERMEDIATE GRADE 15 = 20,000 P.S.I. CONFORMING TO ASTM A-15.

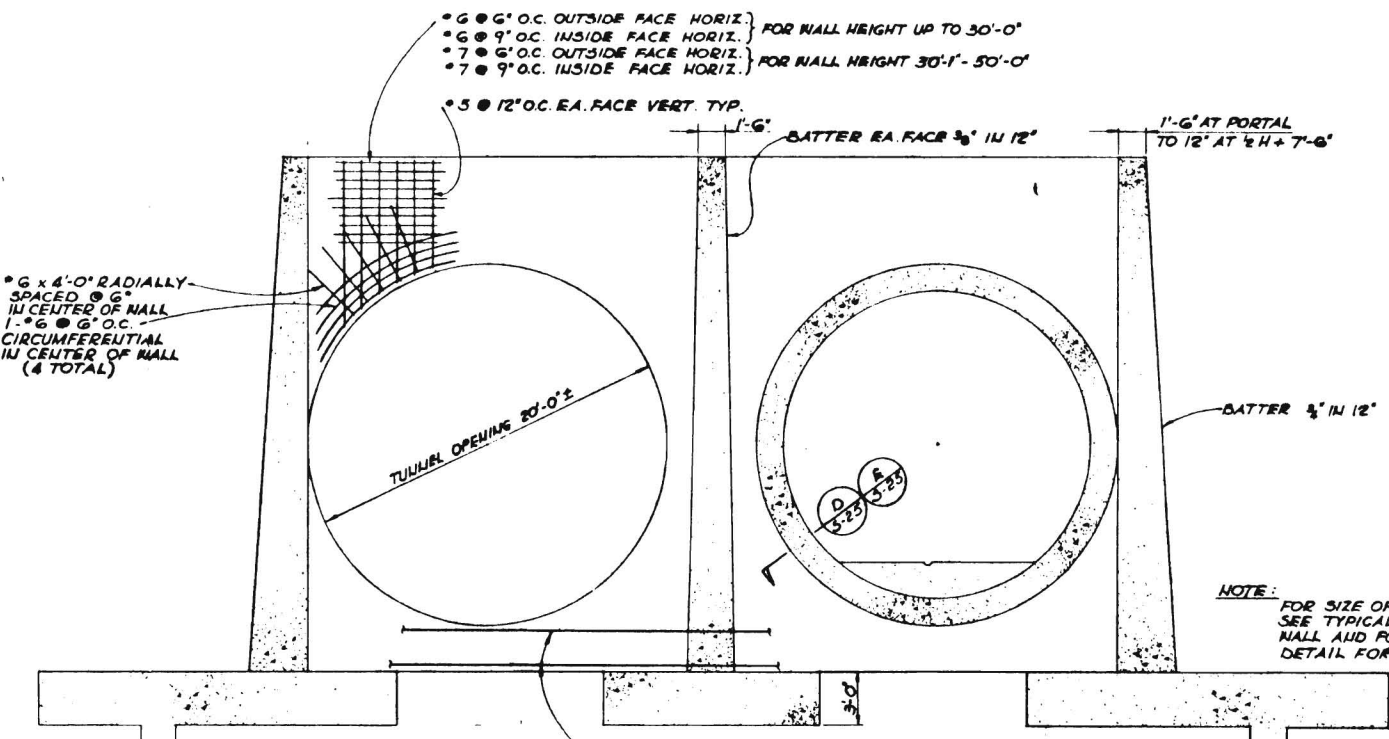


PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DATE	DATE	DATE	DATE
APPROVALS	PROJECT MANAGER	SEAL	DATE
REVISION	DATE	BY	DESCRIPTION
1	12/26/12	D.M.	ISSUED FOR PERMIT
2			
3			
KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS ENGINEERS 1100 W. WASHINGTON ST. SUITE 1000 LOS ANGELES, CALIFORNIA 90015			
<b>FTD</b> SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015			
TYPICAL OPEN CUT STATION - TYPICAL SECTION			
<b>S-24</b>			

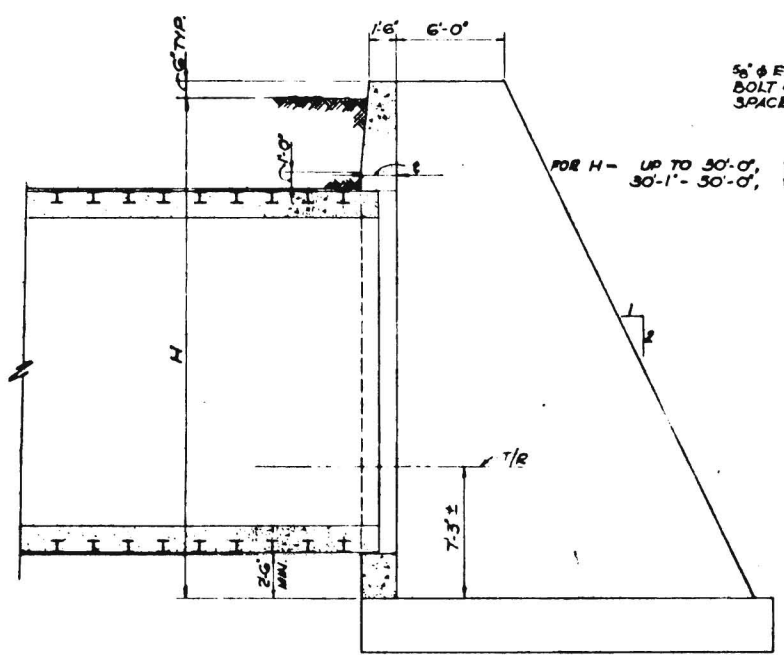


**A PLAN SECTION-PORTAL**  
 3-25 NO SCALE

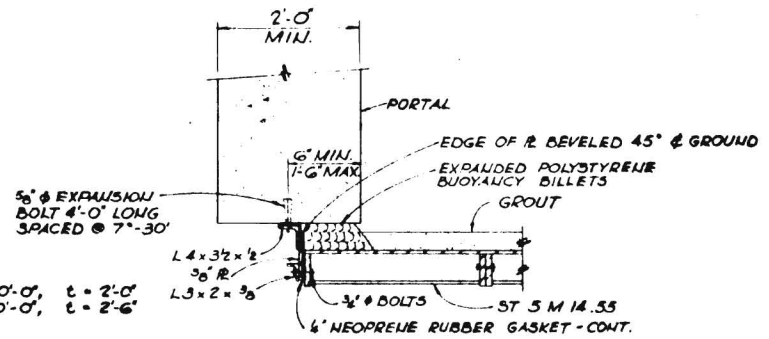


NOTE: REINFORCING FOR VERTICAL WALL WHERE TUNNEL SECTION ENDS IS AS SHOWN; ASSUME REINFORCING FOR ALL OTHER WALLS AND FOUNDATIONS IS 140 #/C.Y. CONCRETE.

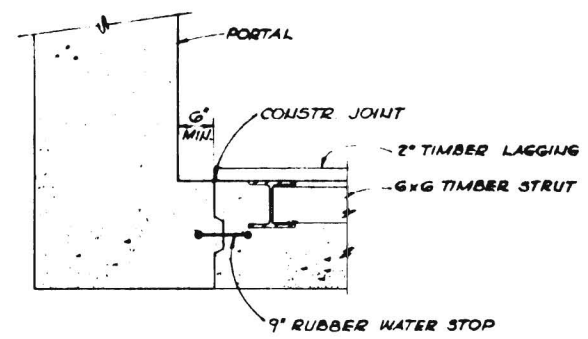
**B SECTION**  
 3-25 3/8" = 1'-0"



**C SECTION**  
 3-25 3/8" = 1'-0"



**E PORTAL CONNECTION**  
 3-25 STEEL LINER PLATE TUNNEL



**D PORTAL CONNECTION**  
 3-25 STEEL RIB AND LAGGING TUNNEL

- NOTES:**
1. CONCRETE: HARD ROCK CONCRETE,  $f'_c = 3000$  psi.
  2. REINFORCING STEEL: INTERMEDIATE GRADE CONFORMING TO ASTM A-15.

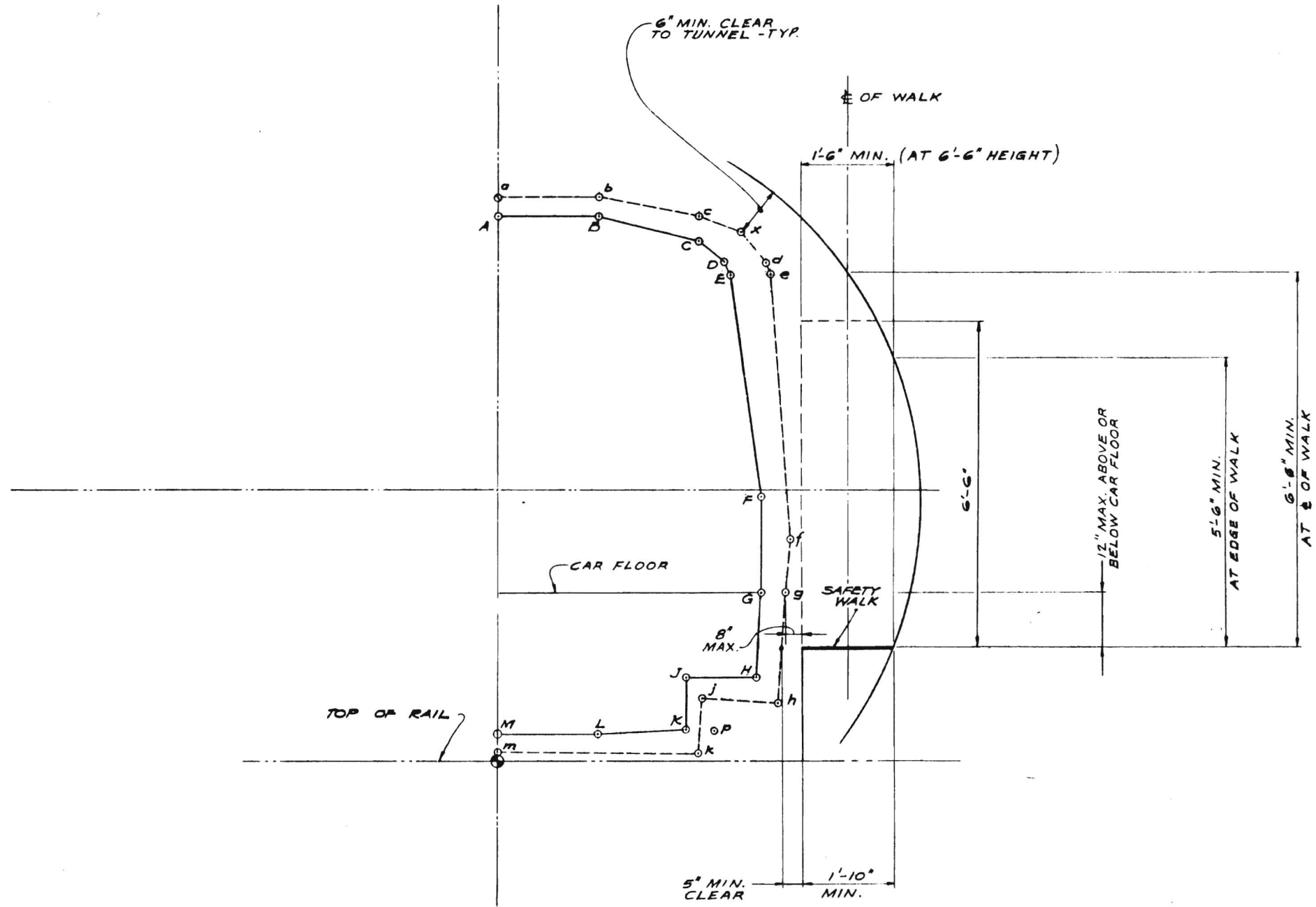
PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DATE	3-25
PROJECT MANAGER	APRIL 1968
REVISION	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE
ARCHITECTS	ENGINEERS
KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDELHALL ARCHITECTS & ENGINEERS LOS ANGELES, CALIFORNIA 90015	
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	
TYPICAL PORTAL DETAILS	
DATE	3-25



**CLEARANCE DIMENSIONS  
FOR S.C.R.T.D VEHICLE**

TO POINT:	RIGHT OF CENTER	ABOVE RAIL
A	0'-0"	10'-10"
B	0'-0"	10'-10"
C	1'-0"	10'-4"
D	1'-0"	10'-4"
E	1'-0"	10'-4"
F	1'-0"	10'-4"
G	1'-0"	10'-4"
H	1'-0"	10'-4"
I	1'-0"	10'-4"
J	1'-0"	10'-4"
K	1'-0"	10'-4"
L	1'-0"	10'-4"
M	1'-0"	10'-4"
N	1'-0"	10'-4"
O	1'-0"	10'-4"
P	1'-0"	10'-4"
Q	1'-0"	10'-4"
R	1'-0"	10'-4"
S	1'-0"	10'-4"
T	1'-0"	10'-4"
U	1'-0"	10'-4"
V	1'-0"	10'-4"
W	1'-0"	10'-4"
X	1'-0"	10'-4"
Y	1'-0"	10'-4"
Z	1'-0"	10'-4"
AA	1'-0"	10'-4"
AB	1'-0"	10'-4"
AC	1'-0"	10'-4"
AD	1'-0"	10'-4"
AE	1'-0"	10'-4"
AF	1'-0"	10'-4"
AG	1'-0"	10'-4"
AH	1'-0"	10'-4"
AI	1'-0"	10'-4"
AJ	1'-0"	10'-4"
AK	1'-0"	10'-4"
AL	1'-0"	10'-4"
AM	1'-0"	10'-4"
AN	1'-0"	10'-4"
AO	1'-0"	10'-4"
AP	1'-0"	10'-4"
AQ	1'-0"	10'-4"
AR	1'-0"	10'-4"
AS	1'-0"	10'-4"
AT	1'-0"	10'-4"
AU	1'-0"	10'-4"
AV	1'-0"	10'-4"
AW	1'-0"	10'-4"
AX	1'-0"	10'-4"
AY	1'-0"	10'-4"
AZ	1'-0"	10'-4"
BA	1'-0"	10'-4"
BB	1'-0"	10'-4"
BC	1'-0"	10'-4"
BD	1'-0"	10'-4"
BE	1'-0"	10'-4"
BF	1'-0"	10'-4"
BG	1'-0"	10'-4"
BH	1'-0"	10'-4"
BI	1'-0"	10'-4"
BJ	1'-0"	10'-4"
BK	1'-0"	10'-4"
BL	1'-0"	10'-4"
BM	1'-0"	10'-4"
BN	1'-0"	10'-4"
BO	1'-0"	10'-4"
BP	1'-0"	10'-4"
BQ	1'-0"	10'-4"
BR	1'-0"	10'-4"
BS	1'-0"	10'-4"
BT	1'-0"	10'-4"
BU	1'-0"	10'-4"
BV	1'-0"	10'-4"
BW	1'-0"	10'-4"
BX	1'-0"	10'-4"
BY	1'-0"	10'-4"
BZ	1'-0"	10'-4"
CA	1'-0"	10'-4"
CB	1'-0"	10'-4"
CC	1'-0"	10'-4"
CD	1'-0"	10'-4"
CE	1'-0"	10'-4"
CF	1'-0"	10'-4"
CG	1'-0"	10'-4"
CH	1'-0"	10'-4"
CI	1'-0"	10'-4"
CJ	1'-0"	10'-4"
CK	1'-0"	10'-4"
CL	1'-0"	10'-4"
CM	1'-0"	10'-4"
CN	1'-0"	10'-4"
CO	1'-0"	10'-4"
CP	1'-0"	10'-4"
CQ	1'-0"	10'-4"
CR	1'-0"	10'-4"
CS	1'-0"	10'-4"
CT	1'-0"	10'-4"
CU	1'-0"	10'-4"
CV	1'-0"	10'-4"
CW	1'-0"	10'-4"
CX	1'-0"	10'-4"
CY	1'-0"	10'-4"
CZ	1'-0"	10'-4"
DA	1'-0"	10'-4"
DB	1'-0"	10'-4"
DC	1'-0"	10'-4"
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DH	1'-0"	10'-4"
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DJ	1'-0"	10'-4"
DK	1'-0"	10'-4"
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DM	1'-0"	10'-4"
DN	1'-0"	10'-4"
DO	1'-0"	10'-4"
DP	1'-0"	10'-4"
DQ	1'-0"	10'-4"
DR	1'-0"	10'-4"
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DT	1'-0"	10'-4"
DU	1'-0"	10'-4"
DV	1'-0"	10'-4"
DW	1'-0"	10'-4"
DX	1'-0"	10'-4"
DY	1'-0"	10'-4"
DZ	1'-0"	10'-4"
EA	1'-0"	10'-4"
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EC	1'-0"	10'-4"
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EG	1'-0"	10'-4"
EH	1'-0"	10'-4"
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EJ	1'-0"	10'-4"
EK	1'-0"	10'-4"
EL	1'-0"	10'-4"
EM	1'-0"	10'-4"
EN	1'-0"	10'-4"
EO	1'-0"	10'-4"
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ET	1'-0"	10'-4"
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EV	1'-0"	10'-4"
EW	1'-0"	10'-4"
EX	1'-0"	10'-4"
EY	1'-0"	10'-4"
EZ	1'-0"	10'-4"
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FB	1'-0"	10'-4"
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FJ	1'-0"	10'-4"
FK	1'-0"	10'-4"
FL	1'-0"	10'-4"
FM	1'-0"	10'-4"
FN	1'-0"	10'-4"
FO	1'-0"	10'-4"
FP	1'-0"	10'-4"
FQ	1'-0"	10'-4"
FR	1'-0"	10'-4"
FS	1'-0"	10'-4"
FT	1'-0"	10'-4"
FU	1'-0"	10'-4"
FV	1'-0"	10'-4"
FW	1'-0"	10'-4"
FX	1'-0"	10'-4"
FY	1'-0"	10'-4"
FZ	1'-0"	10'-4"
GA	1'-0"	10'-4"
GB	1'-0"	10'-4"
GC	1'-0"	10'-4"
GD	1'-0"	10'-4"
GE	1'-0"	10'-4"
GF	1'-0"	10'-4"
GG	1'-0"	10'-4"
GH	1'-0"	10'-4"
GI	1'-0"	10'-4"
GJ	1'-0"	10'-4"
GK	1'-0"	10'-4"
GL	1'-0"	10'-4"
GM	1'-0"	10'-4"
GN	1'-0"	10'-4"
GO	1'-0"	10'-4"
GP	1'-0"	10'-4"
GQ	1'-0"	10'-4"
GR	1'-0"	10'-4"
GS	1'-0"	10'-4"
GT	1'-0"	10'-4"
GU	1'-0"	10'-4"
GV	1'-0"	10'-4"
GW	1'-0"	10'-4"
GX	1'-0"	10'-4"
GY	1'-0"	10'-4"
GA	1'-0"	10'-4"



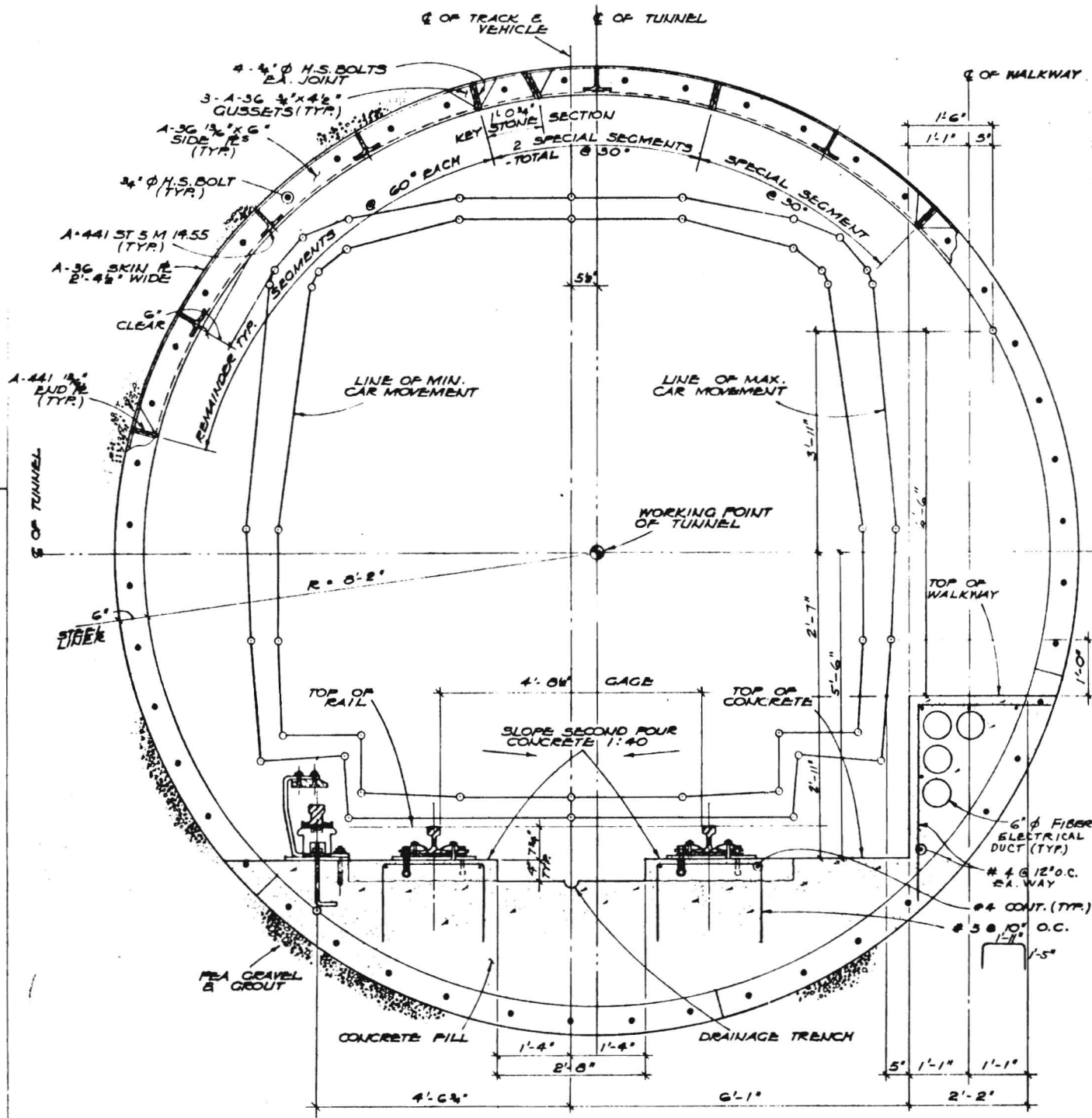
**SCHMATIC  
S.C.R.T.D VEHICLE  
CLEARANCE DIAGRAM**

A  
5-26

3/4" = 1'-0"

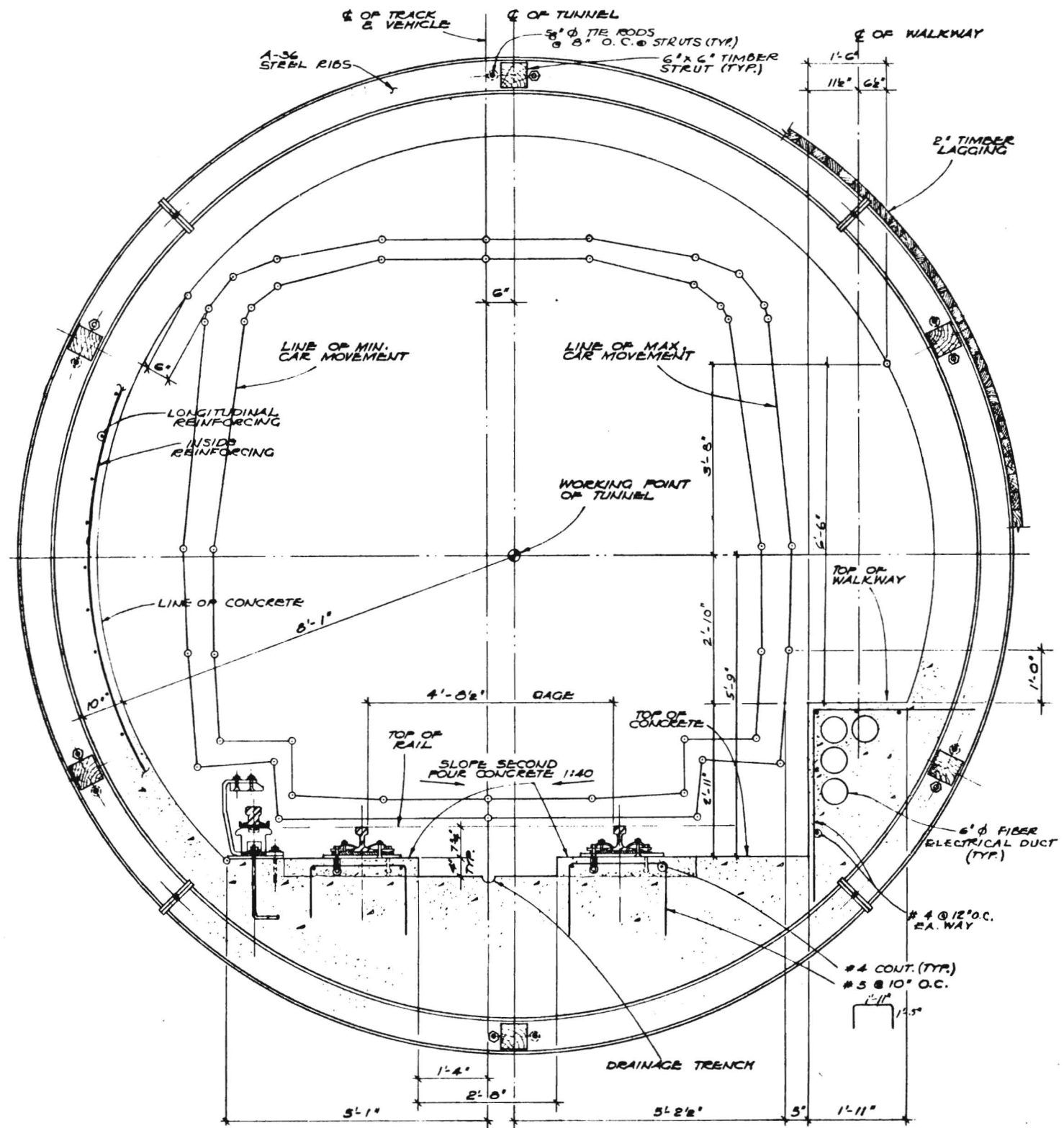
PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

TITLE S.C.R.T.D. VEHICLE CLEARANCE REQUIREMENTS	DRAWING NO. 5-26	APPROVALS PROJECT MANAGER DATE	
		CHECKED BY DATE	SCRTD DATE
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015		KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	



**A**  
S-27  
**TYPICAL SECTION OF  
STEEL LINER PLATE TUNNEL  
TANGENT TRACK**

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



**B**  
S-27  
**TYPICAL SECTION OF  
REINFORCED CONCRETE TUNNEL  
TANGENT TRACK**  
SCALE: 3/4" = 1'-0"

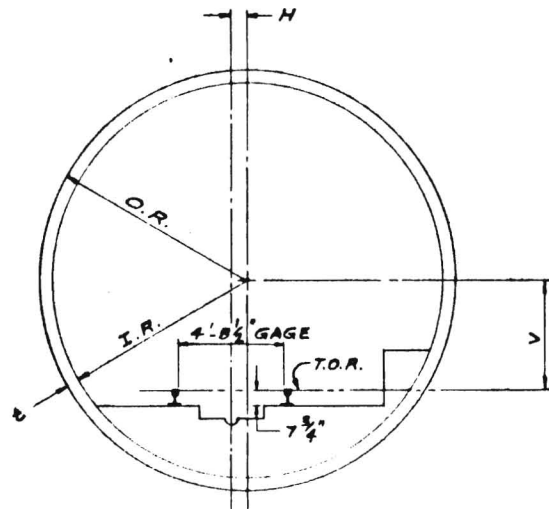
**NOTE :**  
FOR MOUNTING OF TRACK AND LOCATION OF CONTACT  
RAIL SEE C-101.

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

**A** TUNNEL SCHEDULE  
5-28

CORRIDOR	STATIONS	LENGTH	TUNNEL TYPE
SAN FERNANDO VALLEY	1+50 TO 41+00	3950'	D
	128+50 TO 170+25	4175'	C
	177+25 TO 212+50	3475'	A
	224+25 TO 245+00	2075'	B
	245+00 TO 259+00	1400'	E
	259+00 TO 262+00	300'	F
	262+00 TO 302+00	4000'	E
	302+00 TO 305+00	300'	F
	305+00 TO 354+00	7900'	E
	364+00 TO 359+50	550'	F
SAN GABRIEL VALLEY	0+00 TO 25+04	2504'	B
	26+96 TO 43+00	1604'	B
LONG BEACH	62+14 TO 69+75	761'	A
	77+25 TO 109+75	3250'	C
	117+25 TO 129+50	1225'	C
NILSHIRE	1159+50 TO 1196+50	3700'	C
	0+00 TO 1+00	100'	B
	7+00 TO 32+00	2500'	B
	40+60 TO 42+50	190'	B
	47+00 TO 64+00	1700'	A
	66+15 TO 91+75	560'	B
	99+25 TO 121+50	2225'	B
	127+50 TO 159+75	3225'	A
	167+25 TO 169+50	225'	B
	174+00 TO 201+25	2725'	B
	208+75 TO 224+25	1550'	A
	231+75 TO 251+00	1925'	A
	262+25 TO 270+50	825'	A
	274+20 TO 289+50	1530'	A
	295+50 TO 365+50	7000'	A
	371+50 TO 391+50	2000'	A
	397+50 TO 419+75	2225'	B
	427+25 TO 464+75	3750'	C
	472+25 TO 534+25	6200'	B
	541+75 TO 592+50	5075'	B
	603+75 TO 692+25	8850'	B
	699+75 TO 748+50	4875'	B
748+50 TO 759+75	1125'	B	

- NOTES:**
- SHOULD STATIONS DISAGREE SLIGHTLY WITH THOSE SHOWN ON CIVIL DRAWINGS, CIVIL DRAWINGS GOVERN.
  - TYPES A, B, C AND D HAVE 2 ALTERNATES :-  
a. STEEL RIBS AND LAGGING.  
b. STEEL LINER PLATE.
  - TYPES E AND F CAN ONLY BE STEEL RIBS AND LAGGING.

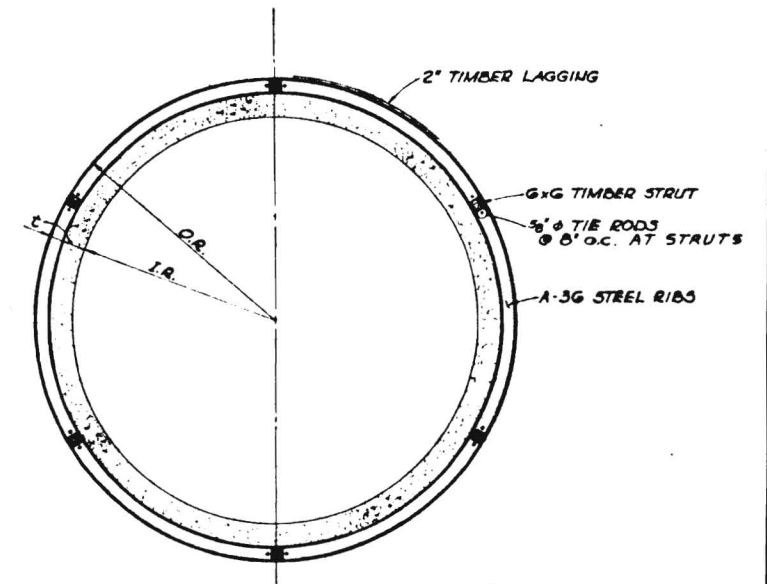


**B** SCHEMATIC\_TANGENT TUNNEL  
5-28 NO SCALE

**D** CIRCULAR TUNNEL -  
5-28 STEEL RIBS AND LAGGING SCHEDULE

TYPE	A	B	C	D	E	F
MIN. RADIUS OF CURVATURE	5000'	1000'	1000'	600'	2000'	2000'
DESIGN COVER	38.67'	40'	27'	41'	8.75'	27.50'
INSIDE RADIUS (I.R.)	8'-2"	8'-6"	8'-6"	8'-7 1/2"	8'-6"	8'-6"
THICKNESS (t)	1'-6"	1'-6"	1'-4"	1'-8"	1'-4"	1'-4"
OUTSIDE RADIUS (O.R.)	9'-8"	10'-0"	9'-10"	10'-3 1/2"	9'-10"	9'-10"
STEEL RIB SIZE & SPACING	8WF28 @ 2'-0"	8WF31 @ 2'-0"	8WF24 @ 2'-0"	8WF35 @ 2'-0"	8WF17 @ 5'-0"	8WF35 @ 2'-0"
V	5'-1 1/2"	VARIES - 5'-6" MIN.		5'-6" ±	5'-6" ±	
H	6"	VARIES - 3 1/2" MIN.		3 1/2" ±	3 1/2" ±	
6x6 TIMBER STRUT SPC'G	45°	60°	45°	60°	30°	60°

- \* - MAX. DESIGN COVER = 2 DIAMETERS
- \*\* - EQUIVALENT DESIGN COVER - SEE SOIL REPORT

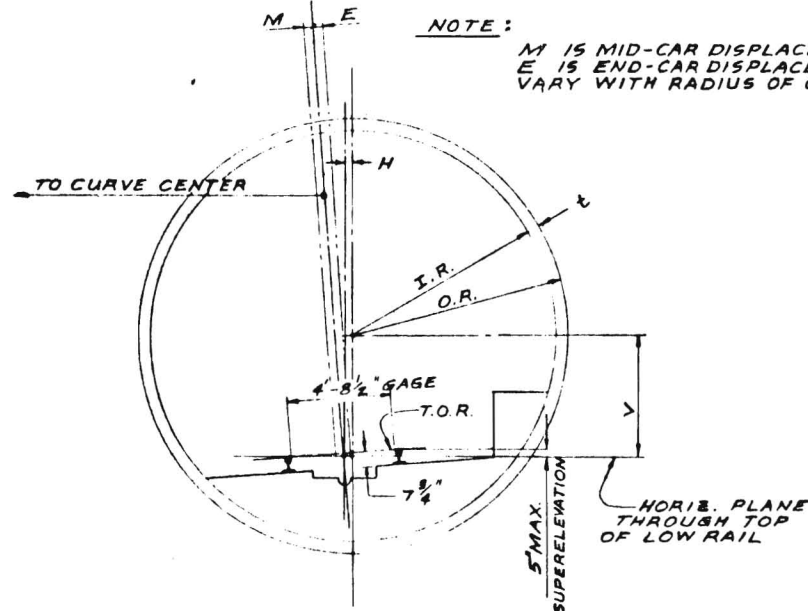


**E** CIRCULAR TUNNEL SECTION  
5-28 STEEL RIBS AND LAGGING - DETAILS  
NO SCALE

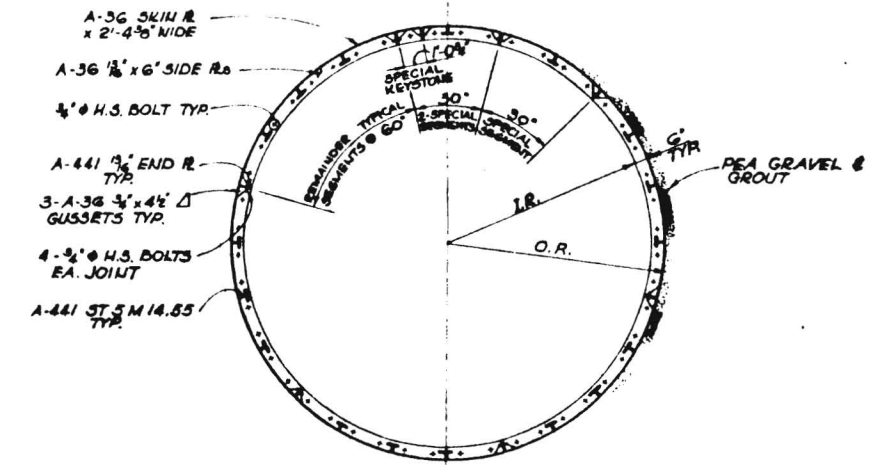
**F** CIRCULAR TUNNEL -  
5-28 STEEL LINER PLATE SCHEDULE

TYPE	A	B	C	D
MIN. RADIUS OF CURVATURE	5000'	1000'	1000'	600'
DESIGN COVER	38.67'	40'	27'	41'
SKIN & THICKNESS	9/16"	9/16"	1/2"	9/16"
INSIDE RADIUS (I.R.)	8'-2"	8'-6"	8'-6"	8'-7 1/2"
OUTSIDE RADIUS (O.R.)	8'-8"	9'-0"	9'-0"	9'-1 1/2"
V	4'-10 1/2"	VARIES - 5'-3 1/2" TO 5'-5"		5'-6 1/2"
H	5 1/2"	2 3/4"	2 3/4"	3"

- \* - MAX. DESIGN COVER = 2 DIAMETERS



**C** SCHEMATIC\_CURVED TUNNEL  
5-28 NO SCALE



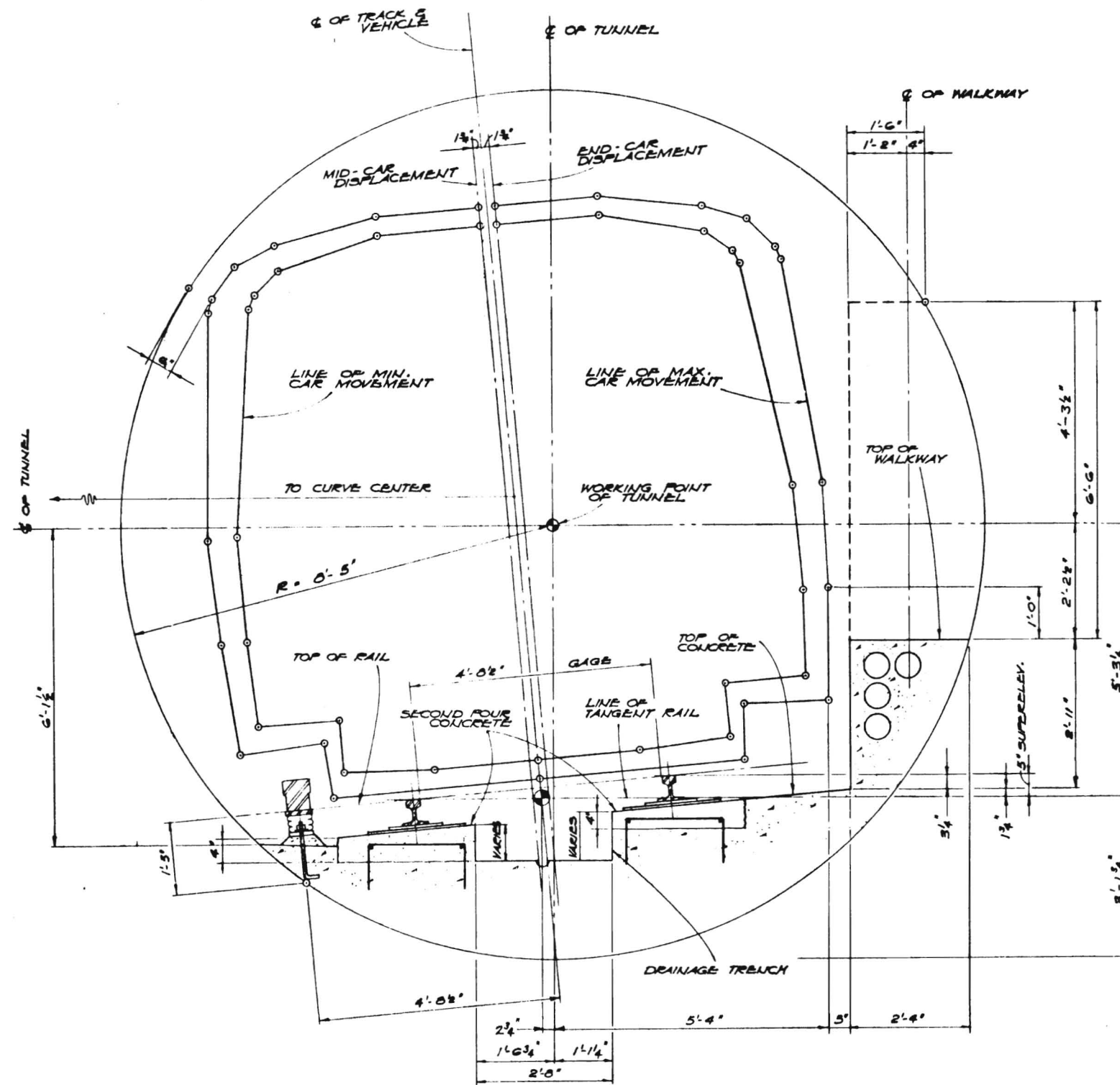
**G** CIRCULAR TUNNEL SECTION  
5-28 STEEL LINER PLATE - DETAILS  
NO SCALE

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

APPROVALS: PROJECT MANAGER, DATE, CHECKED BY, DATE, DESIGNED BY, DATE, DRAWN BY, DATE, SCALE, SHEET NO. 5-28  
 KAISER ENGINEERS, A JOINT VENTURE OF DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS  
 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT, LOS ANGELES, CALIFORNIA 90015  
 TYPICAL TUNNEL SECTIONS & SCHEDULES  
 FILE NO.







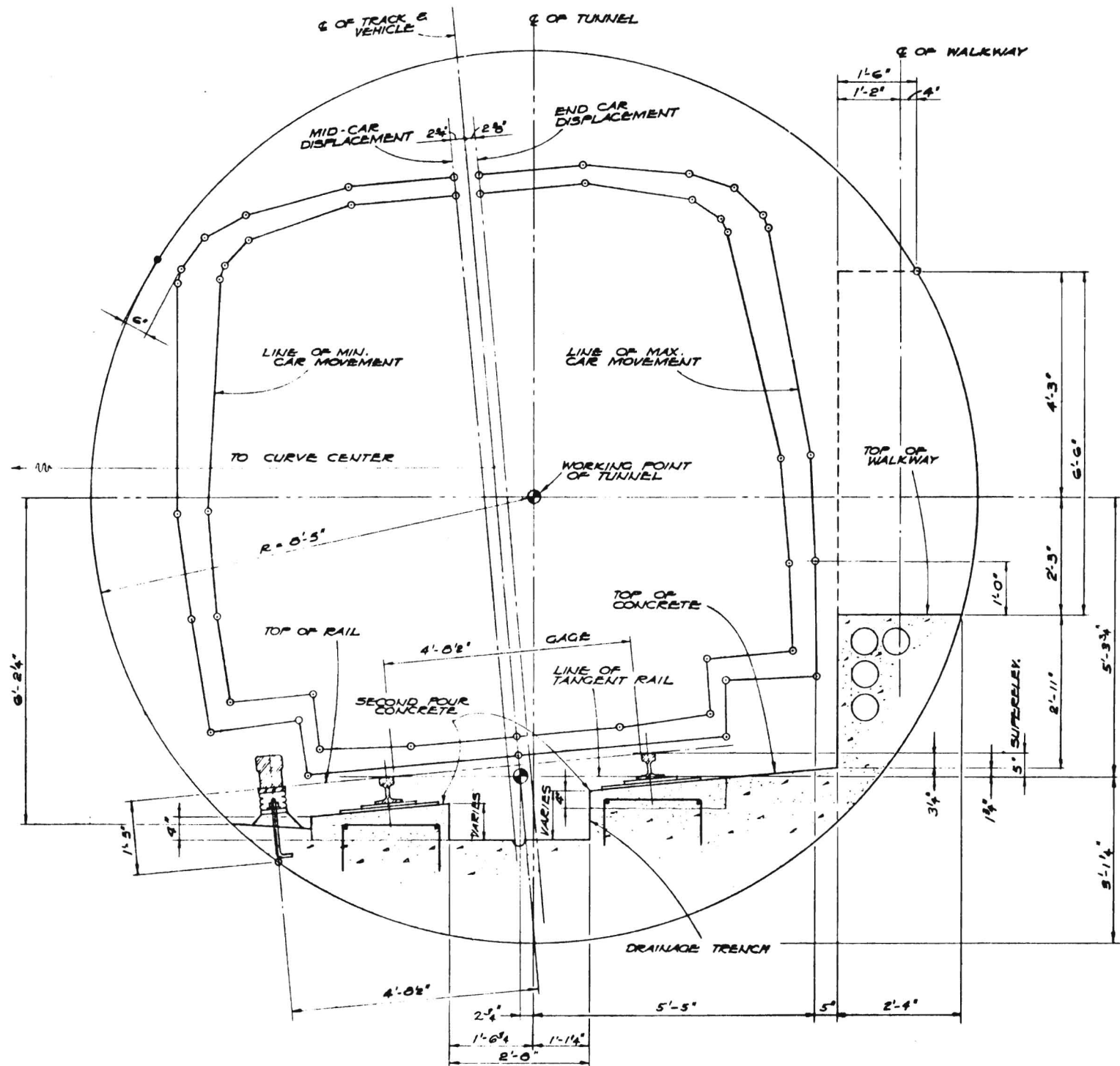
(A) STEEL LINER PLATE TUNNEL  
 S-30 2300' RADIUS TRACK

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

75'-0" LONG VEHICLE  
 52'-0" TRUCK SPACING

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. <b>S-30</b>	APPROVALS	DATE
	PROJECT MANAGER	DATE
REVISION	NO.	DATE
	DESCRIPTION	DATE
DATE <b>APRIL 1960</b>	DESIGNED BY <i>[Signature]</i>	DATE
	CHECKED BY <i>[Signature]</i>	DATE
KAISER ENGINEERS A JOINT VENTURE DANIEL, MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS		
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90013		
STEEL LINER PLATE TUNNEL - 2300' RADIUS TRACK - 75' LONG VEHICLE		
DRAWING NO.	DATE	
<b>S-30</b>		



(A) STEEL LINER PLATE TUNNEL  
 (S-31) 1500' RADIUS TRACK

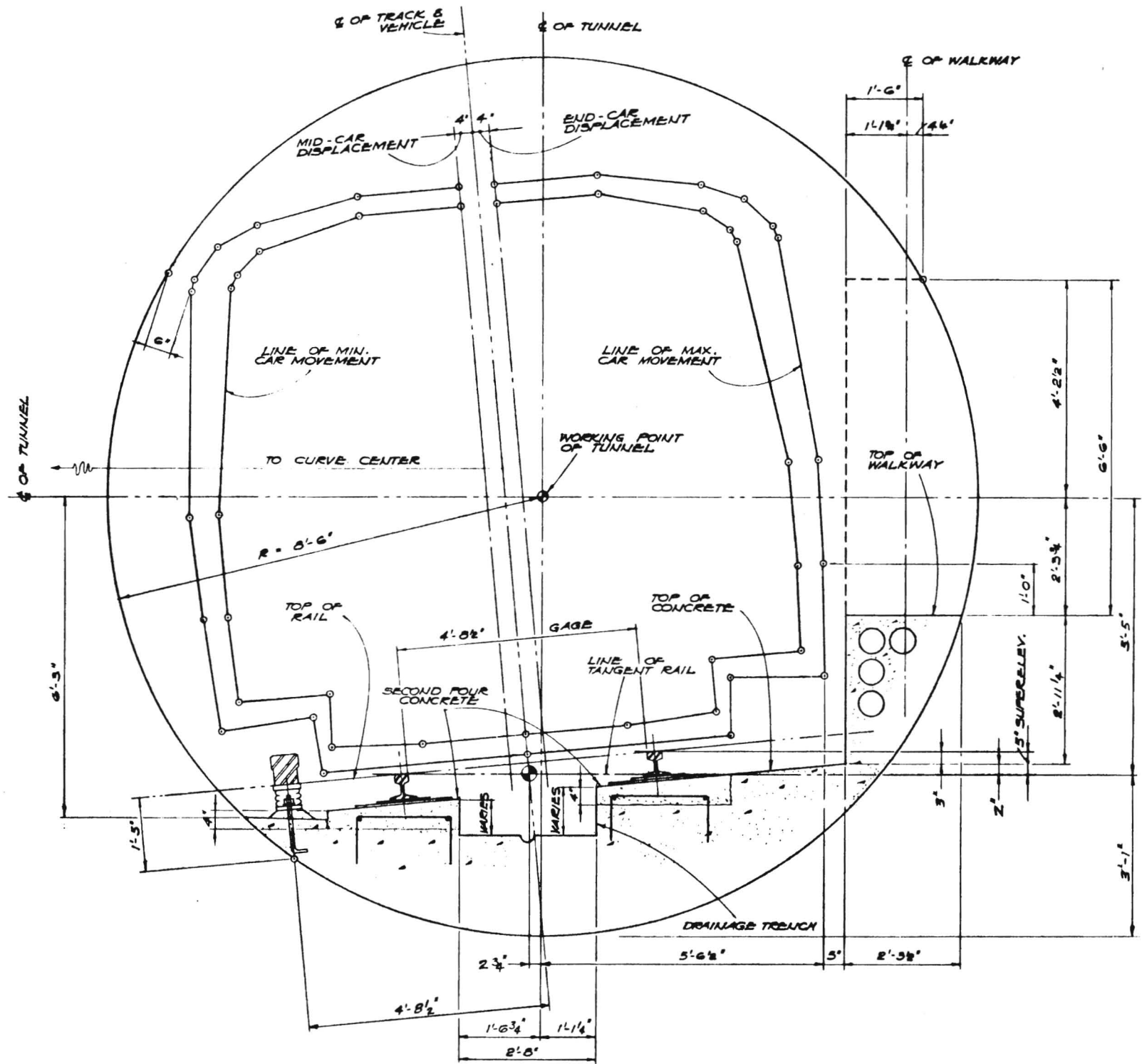
75'-0" LONG VEHICLE  
 52'-0" TRUCK SPACING

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

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

TITLE STEEL LINER PLATE TUNNEL - 1500' RADIUS TRACK - 75' LONG VEHICLE	DRAWING NO. S-31	PROJECT NUMBER S-31	PROJECT MANAGER S-31	DATE
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	KAISER ENGINEERS A JOINT VENTURE DANIEL, MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	DRAWN BY APRIL 1968	CHECKED BY APRIL 1968	DATE
		PROJECT MANAGER S-31	PROJECT MANAGER S-31	DATE





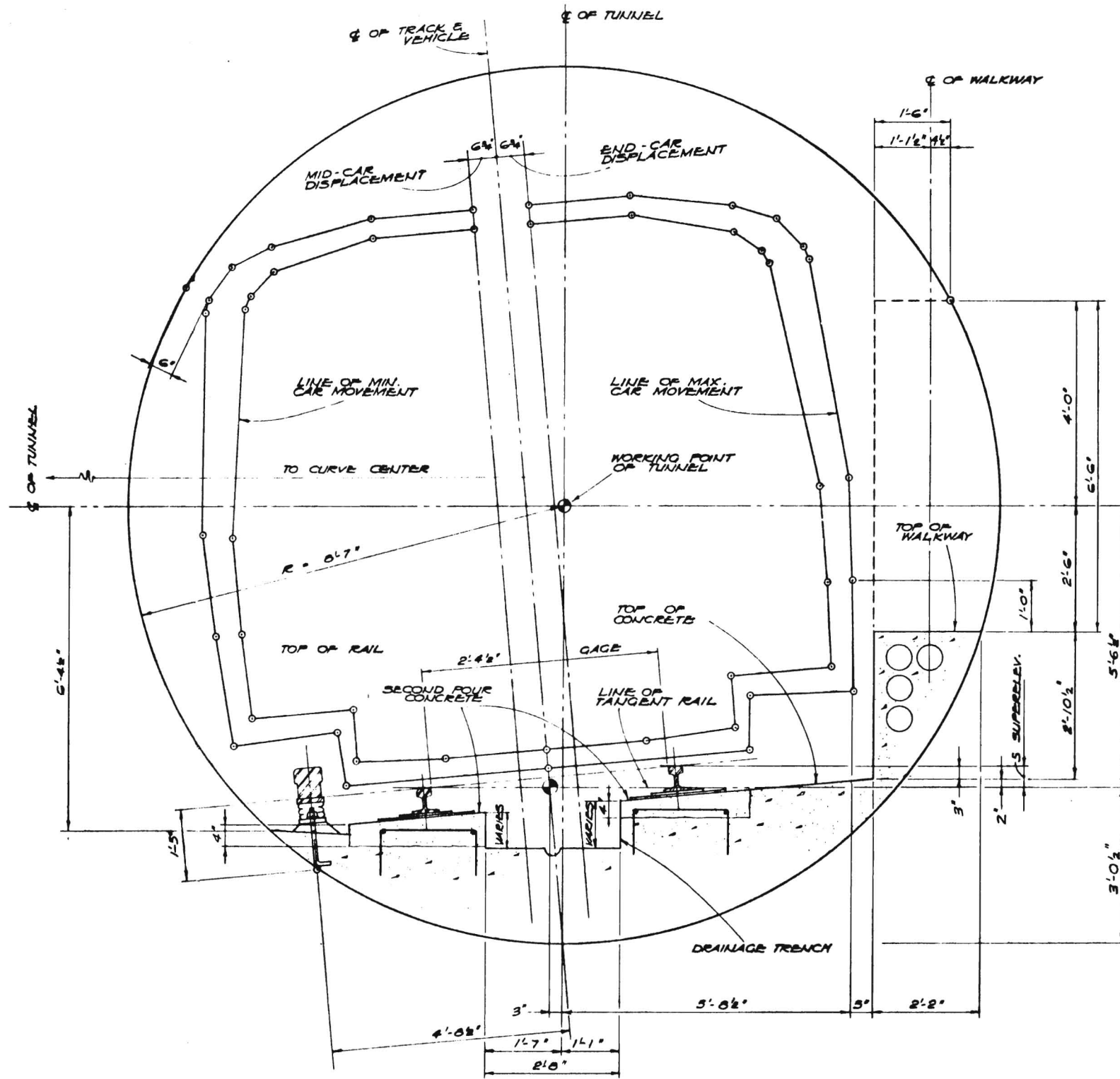
**(A) STEEL LINER PLATE TUNNEL**  
**S-32**  
**1000' RADIUS TRACK**

**75'-0" LONG VEHICLE**  
**52'-0" TRUCK SPACING**

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

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

TITLE <b>STEEL LINER PLATE TUNNEL - 75' LONG VEHICLE</b> <b>1000' RADIUS TRACK - 75' LONG VEHICLE</b>	DRAWING NO. <b>S-32</b>	DATE 	SCALE 	APPROVALS PROJECT MANAGER SCPTD CHIEF ENGINEER	APRIL 1964 DRAWN BY CHECKED BY	A JOINT VENTURE <b>KAISER ENGINEERS</b> DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	DRWG. NO. <b>S-32</b>
					SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	



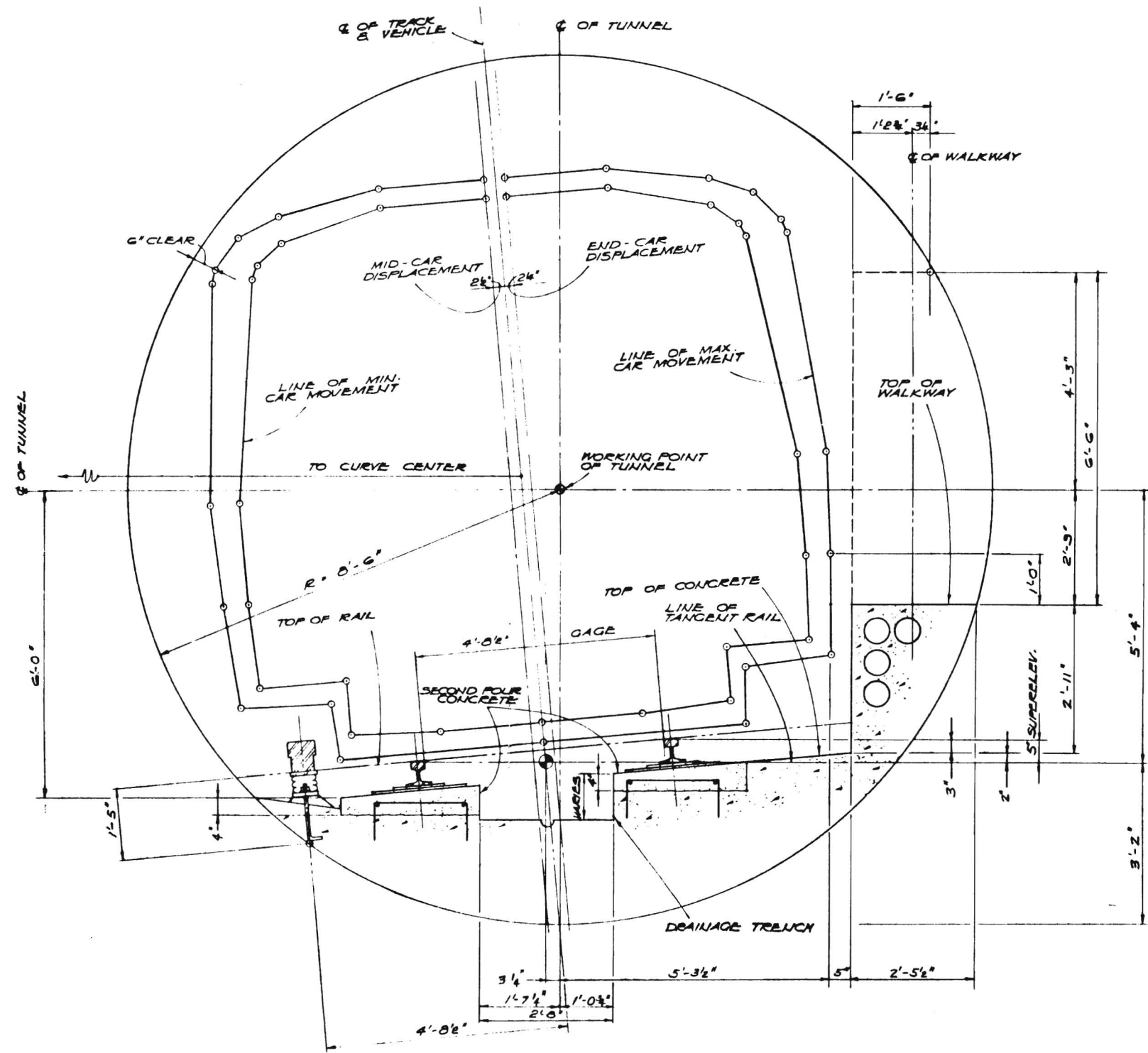
**A** STEEL LINER PLATE TUNNEL  
 600' RADIUS TRACK

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

75'-0" LONG VEHICLE  
 52'-0" TRUCK SPACING

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

TITLE <b>STEEL LINER PLATE TUNNEL - 75' LONG VEHICLE</b> 600' RADIUS TRACK - 75' LONG VEHICLE	DRAWING NO. <b>S-33</b>
	DATE
PROJECT MANAGER PROJECT ENGINEER CHECKED BY DATE	APPROVALS PROJECT MANAGER PROJECT ENGINEER CHECKED BY DATE
	DATE
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS
APRIL 1968 7/16/68 7/16/68	S-33



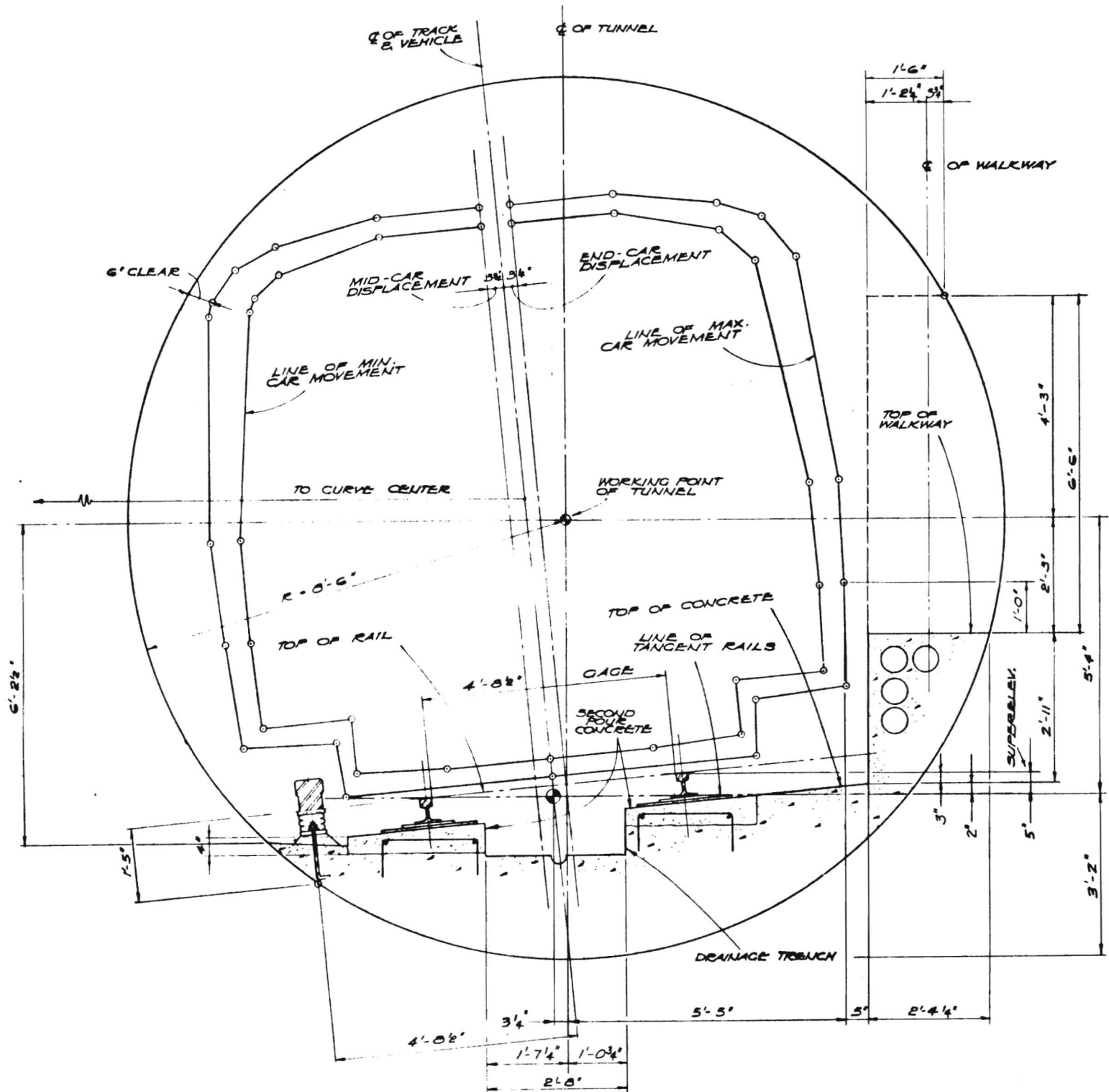
85'-0" LONG VEHICLE  
61'-0" TRUCK SPACING

**A** STEEL LINER PLATE TUNNEL  
2300' RADIUS TRACK  
SCALE: 3/4" = 1'-0"

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

S-34	DATE	DATE
	PROJECT MANAGER	DATE
APPROVALS	REGION	SCPTD
CHIEF ENGINEER	DATE	DATE
1/28/12	1/28/12	1/28/12
DRAWN BY	CHECKED BY	DATE
DANIEL MANN	DANIEL MANN	1/28/12
ARCHITECTS & ENGINEERS	ARCHITECTS & ENGINEERS	ARCHITECTS & ENGINEERS
A JOINT VENTURE	A JOINT VENTURE	A JOINT VENTURE
DANIEL MANN, JOHNSON, & MENDENHALL	DANIEL MANN, JOHNSON, & MENDENHALL	DANIEL MANN, JOHNSON, & MENDENHALL
KAISER ENGINEERS	KAISER ENGINEERS	KAISER ENGINEERS
SOUTHERN CALIFORNIA	SOUTHERN CALIFORNIA	SOUTHERN CALIFORNIA
RAPID TRANSIT DISTRICT	RAPID TRANSIT DISTRICT	RAPID TRANSIT DISTRICT
LOS ANGELES, CALIFORNIA 90015	LOS ANGELES, CALIFORNIA 90015	LOS ANGELES, CALIFORNIA 90015
FTD	FTD	FTD
STEEL LINER PLATE TUNNEL -	STEEL LINER PLATE TUNNEL -	STEEL LINER PLATE TUNNEL -
2300' RADIUS TRACK - 85' LONG VEHICLE	2300' RADIUS TRACK - 85' LONG VEHICLE	2300' RADIUS TRACK - 85' LONG VEHICLE
S-34	S-34	S-34





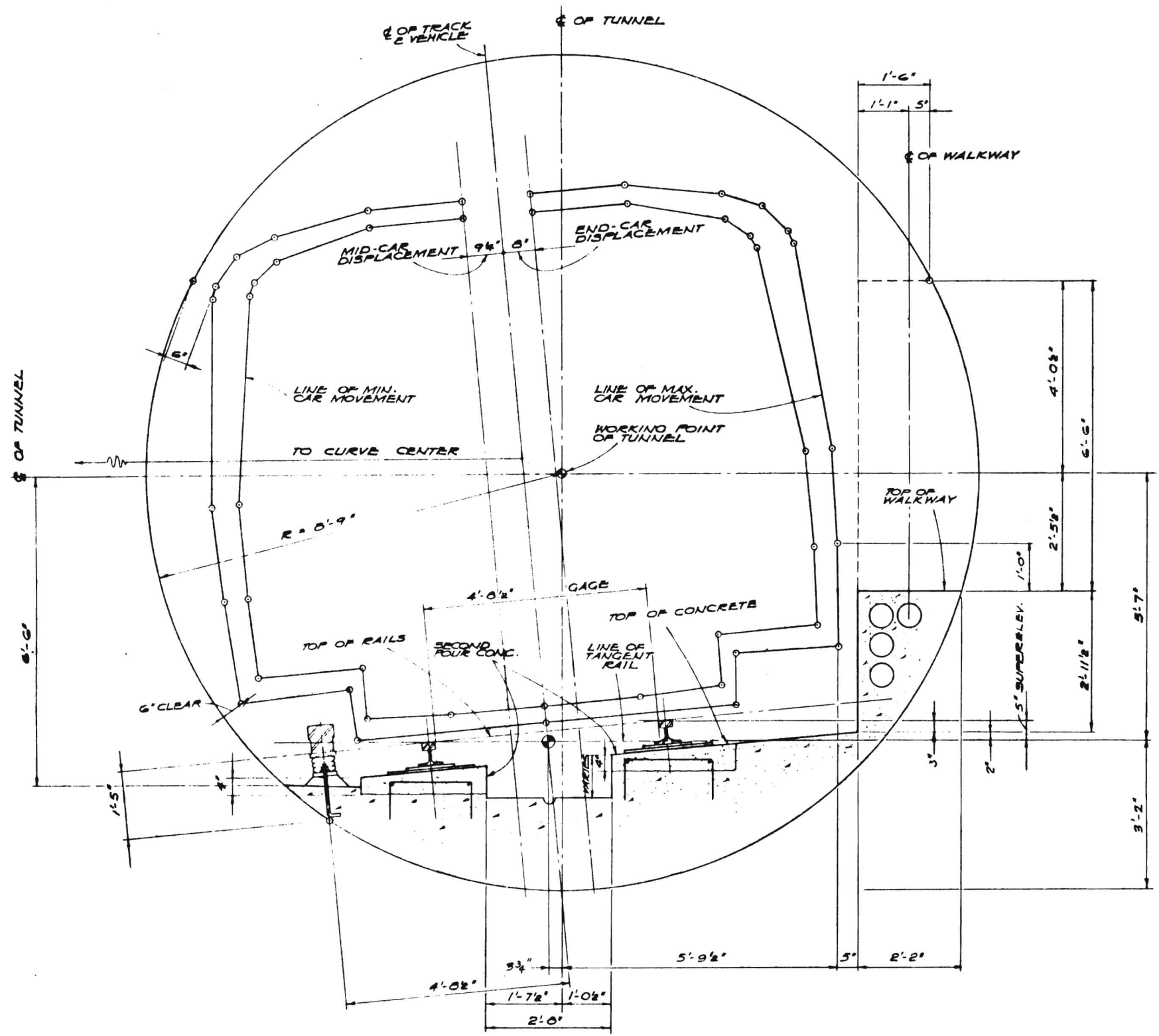
85'-0" LONG VEHICLE  
61'-0" TRUCK SPACING

**A** STEEL LINER PLATE TUNNEL  
1500' RADIUS TRACK  
SCALE: 3/4" = 1'-0"

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DATE	APRIL 1968	APPROVALS	PROJECT MANAGER	DATE	S-35
	DATE				
FILE	APRIL 1968	Kaiser Engineers A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	PROJECT MANAGER	DATE	S-35
DATE	DATE				
PROJECT	STEEL LINER PLATE TUNNEL - 1500' RADIUS TRACK - 85' LONG VEHICLE	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	PROJECT MANAGER	DATE	S-35
DATE	DATE				
DATE	DATE	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	PROJECT MANAGER	DATE	S-35
DATE	DATE				
DATE	DATE	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	PROJECT MANAGER	DATE	S-35
DATE	DATE				





(A) STEEL LINER PLATE TUNNEL  
 S-37  
 600' RADIUS TRACK

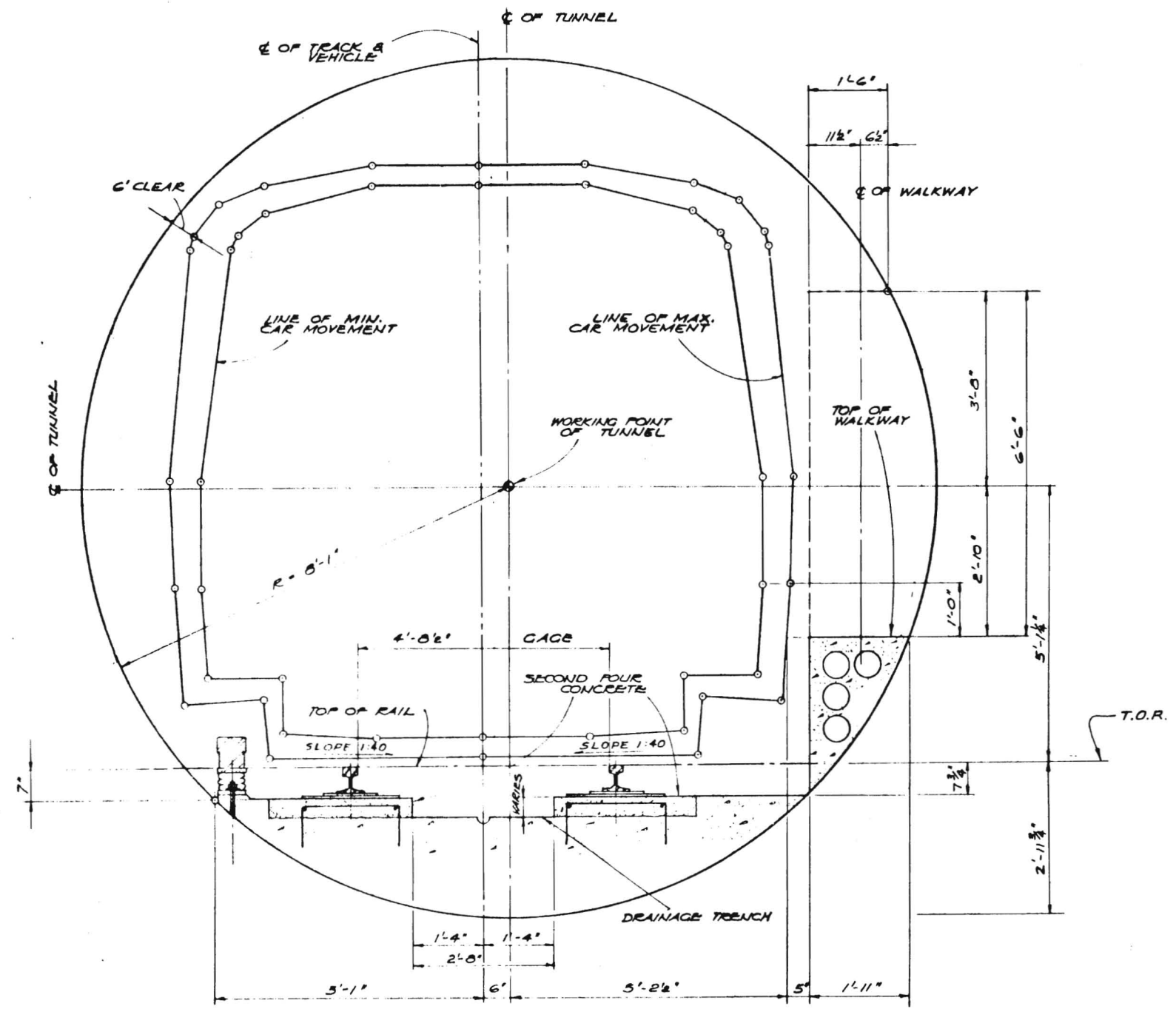
85'-0" LONG VEHICLE  
 61'-0" TRUCK SPACING

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

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

TITLE STEEL LINER PLATE TUNNEL - 600' RADIUS TRACK - 85' LONG VEHICLE	PROJECT NO. S-37	APPROVALS PROJECT MANAGER DATE
		REVISION SCRTD DATE
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	APRIL 1968 DRAWN BY CHECKED BY
		DATE





(A) REINFORCED CONCRETE TUNNEL  
TANGENT TRACK

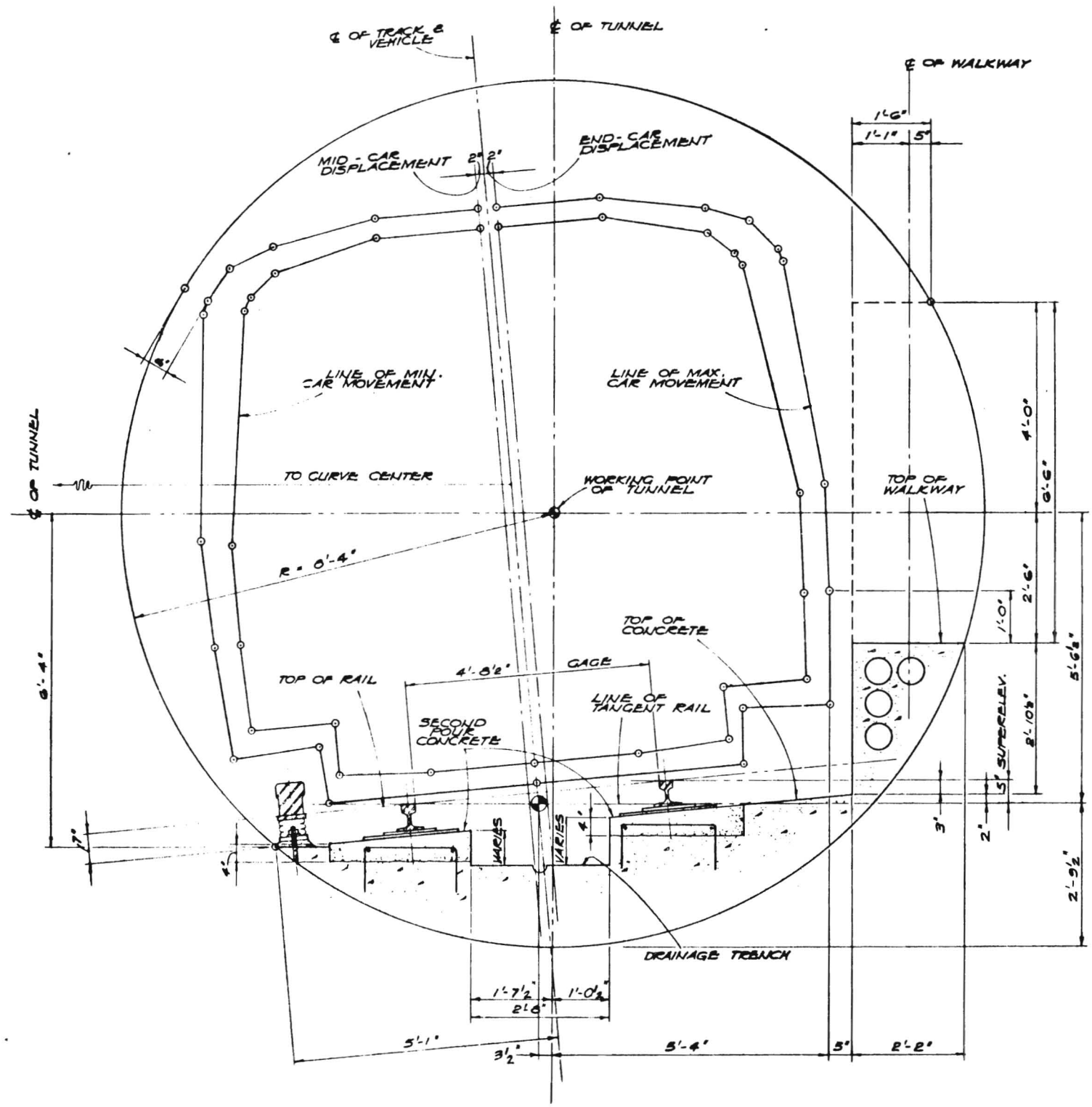
75'-0" & 85'-0" LONG VEHICLE  
ALL TRUCK SPACINGS

SAN FERNANDO VALLEY CORRIDOR

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

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DATE	APRIL 1988	APPROVALS	PROJECT MANAGER	DATE	S-38
ENGINEER		REVISION	SCOTT	DATE	
ARCHITECTS	ENGINEERS	A JOINT VENTURE	DANIEL MANN, JOHNSON, & MENDENHALL	ARCHITECTS	ENGINEERS
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015					
THE REINFORCED CONCRETE TUNNEL, TANGENT TRACK (SAN FERNANDO VALLEY CORRIDOR) - 75' & 85' LONG VEHICLE					
DATE		APPROVALS		DATE	S-38



(A) REINFORCED CONCRETE TUNNEL  
 S-39 2000' RADIUS TRACK

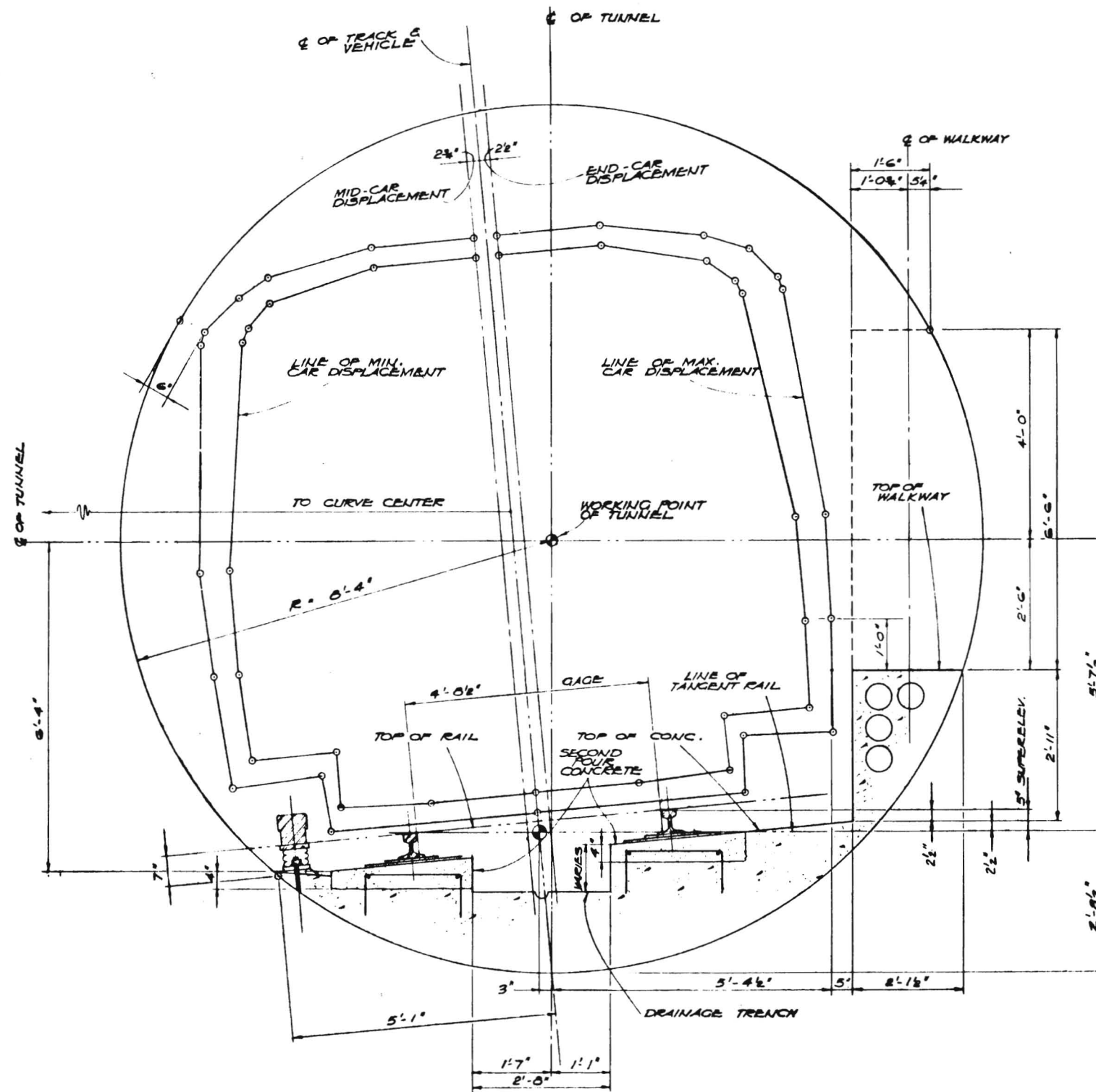
75'-0" LONG VEHICLE  
 52'-0" TRUCK SPACING

SAN FERNANDO VALLEY CORRIDOR

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

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015	KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	APRIL 1968 DRAWN BY CHECKED BY	APPROVALS PROJECT MANAGER S. W. RYD DATE
		APRIL 1968 DRAWN BY CHECKED BY	APPROVALS PROJECT MANAGER S. W. RYD DATE



(A) REINFORCED CONCRETE TUNNEL  
S-49 2000' RADIUS TRACK

85'-0" LONG VEHICLE  
61'-0" TRUCK SPACING

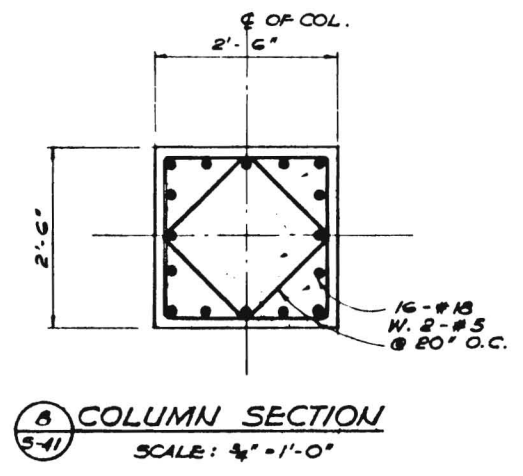
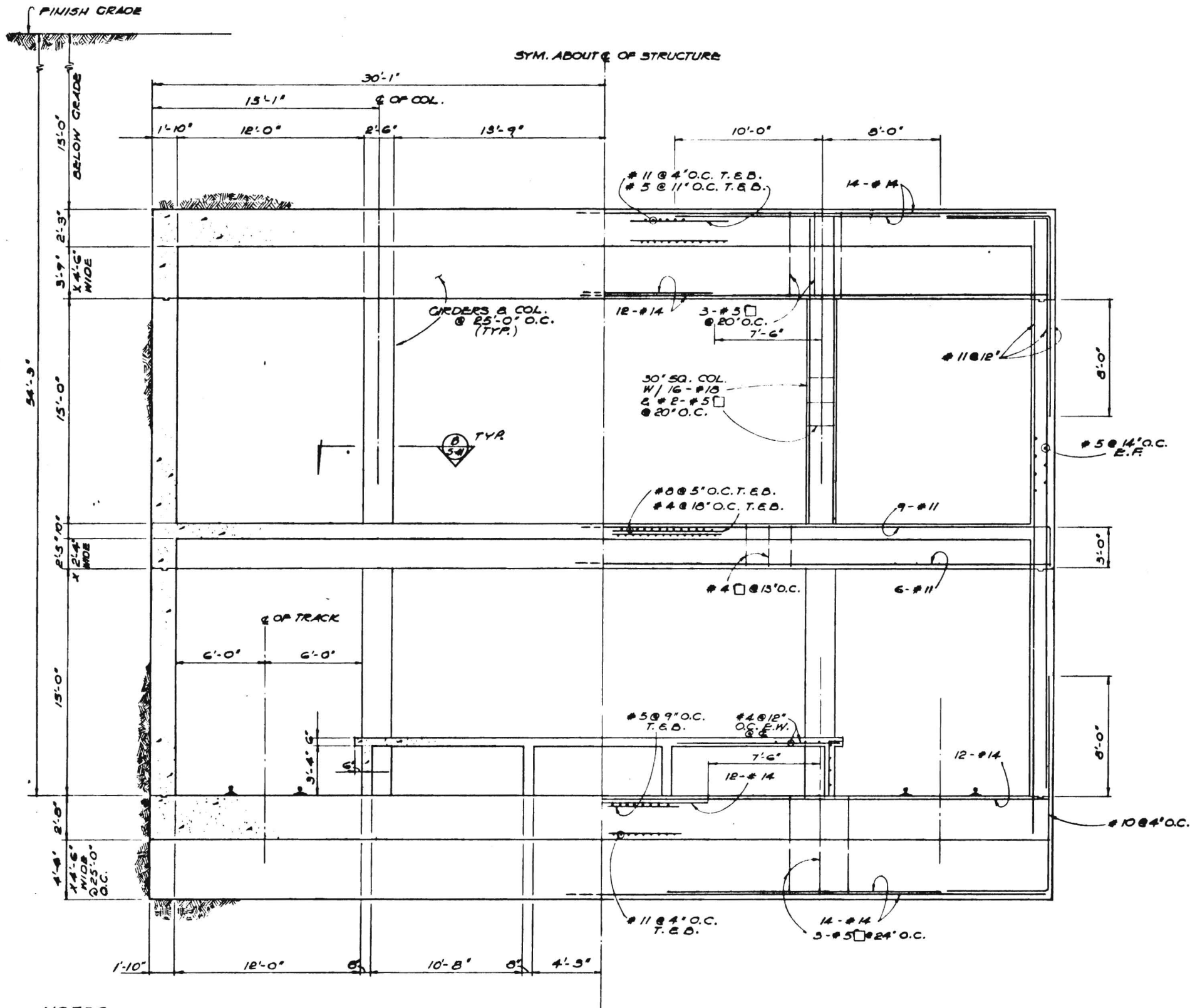
SAN FERNANDO VALLEY CORRIDOR

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

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

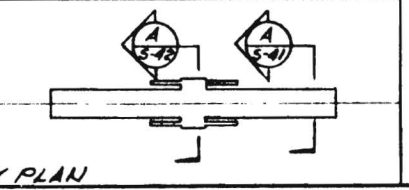
S-40	
APPROVALS	DATE
PROJECT MANAGER	DATE
REVISION	DATE
SCD	DATE
CHIEF ENGINEER	DATE
APRIL 1969	
DRAWN BY: J. J. GARDNER	
CHECKED BY: J. J. GARDNER	
Kaiser Engineers A Joint Venture	
Daniel Mann, Johnson, & Mendenhall	
Architects - Engineers	
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT	
LOS ANGELES, CALIFORNIA 90015	
FID	
REINFORCED CONCRETE TUNNEL, 2000' RADIUS TRACK (SAN FERNANDO VALLEY CORRIDOR) - 85' LONG VEHICLE	
S-40	





**5-41** TYPICAL SECTION - INTERIOR OF TYPICAL UNDERGROUND STATION  
SCALE: 1/4" = 1'-0"

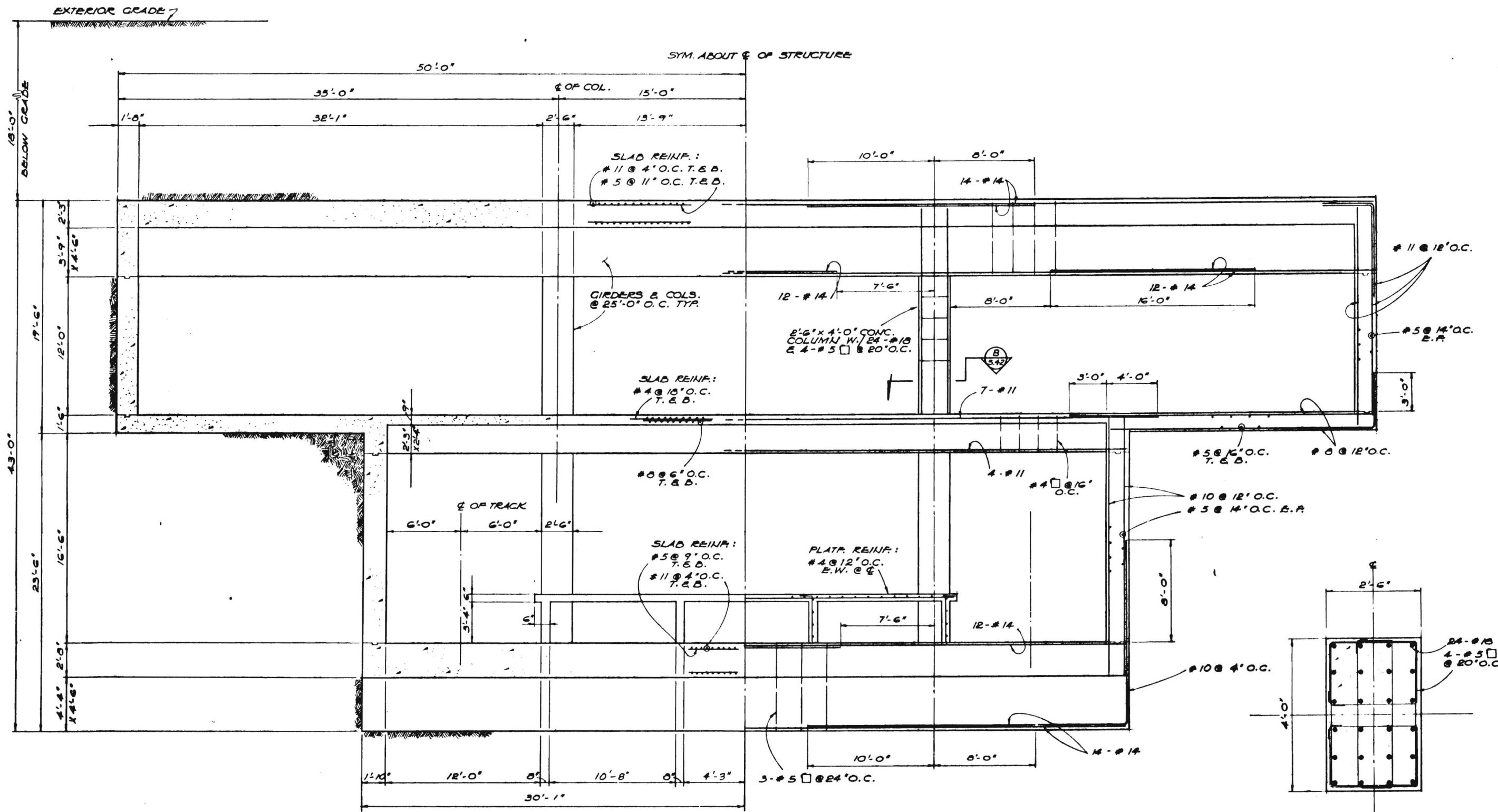
- NOTES:**
- FOR ARCHITECTURAL FEATURES SEE ARCHITECTURAL DRAWINGS.
  - FOR RAIL DETAILS SEE CIVIL DRAWINGS.



**MATERIALS:**  
CONCRETE SHALL BE HARD ROCK CONCRETE  
f'c = 4000 P.S.I. MIN.  
REINFORCING STEEL SHALL BE INTERMEDIATE  
GRADE f's = 20,000 P.S.I. CONFORMING TO  
ASTM A-15, EXCEPT #14s SHALL CONFORM  
TO A-408.

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

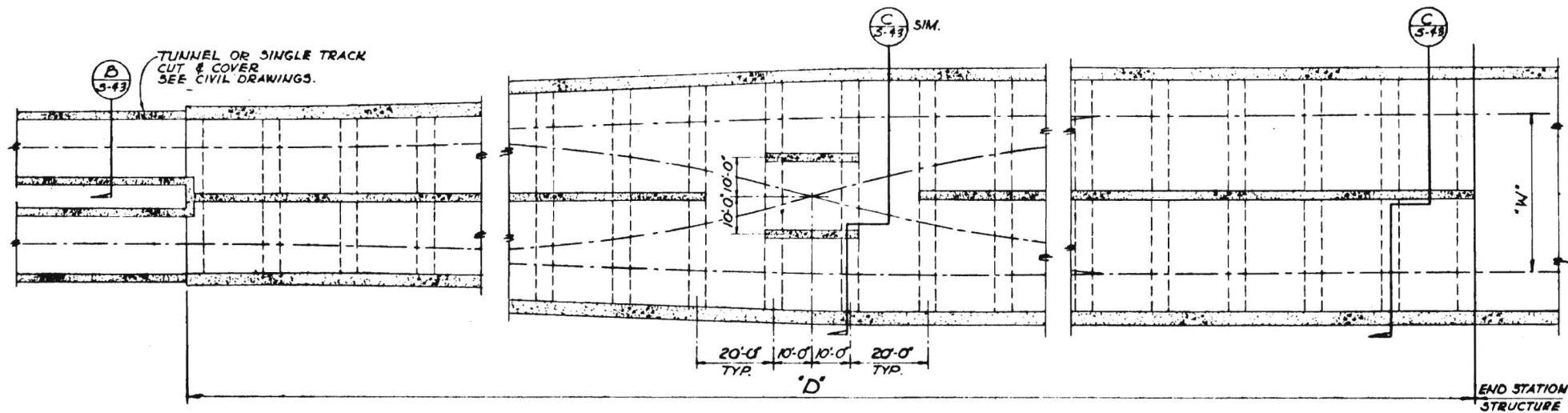
DATE	APRIL 1969	DRAWN BY	W. J. G. E. P.	CHECKED BY	W. J. G. E. P.	APPROVALS	PROJECT MANAGER	DATE	SCALE	SHEET NO.	S-41
	DATE		DATE		DATE		DATE				
KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS LOS ANGELES, CALIFORNIA 90015											
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015											
TYPICAL UNDERGROUND STATION - TYPICAL SECTION AT ENDS											
5-41											



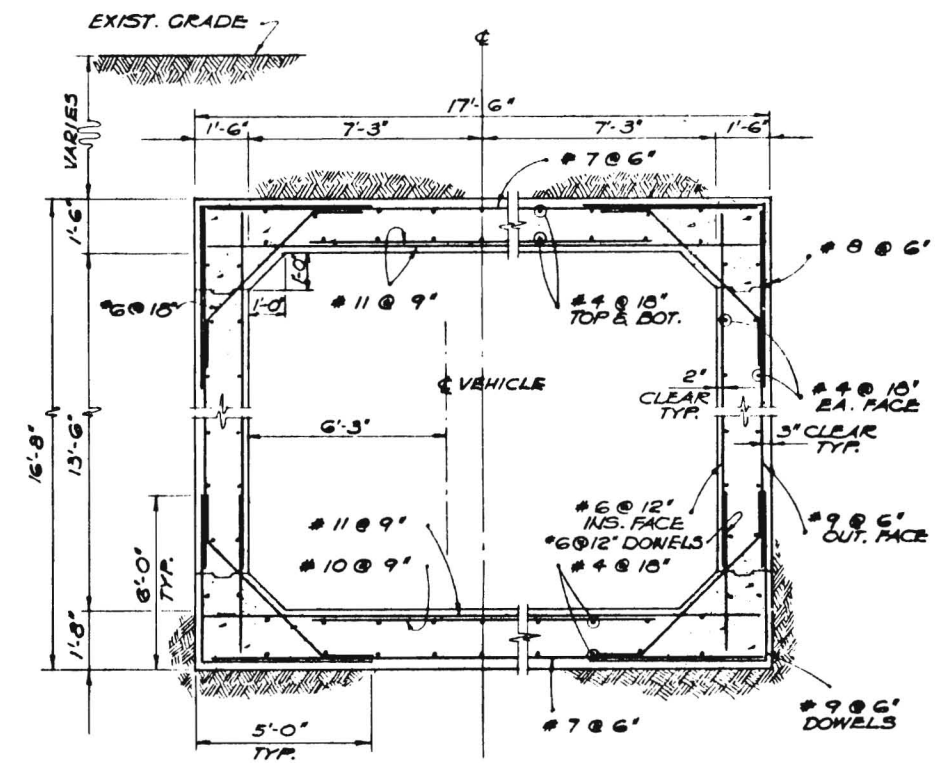
**A SECTION**  
S-42 SCALE: 1/4" = 1'-0"

**B COLUMN SECTION**  
S-42 SCALE: 1/4" = 1'-0"

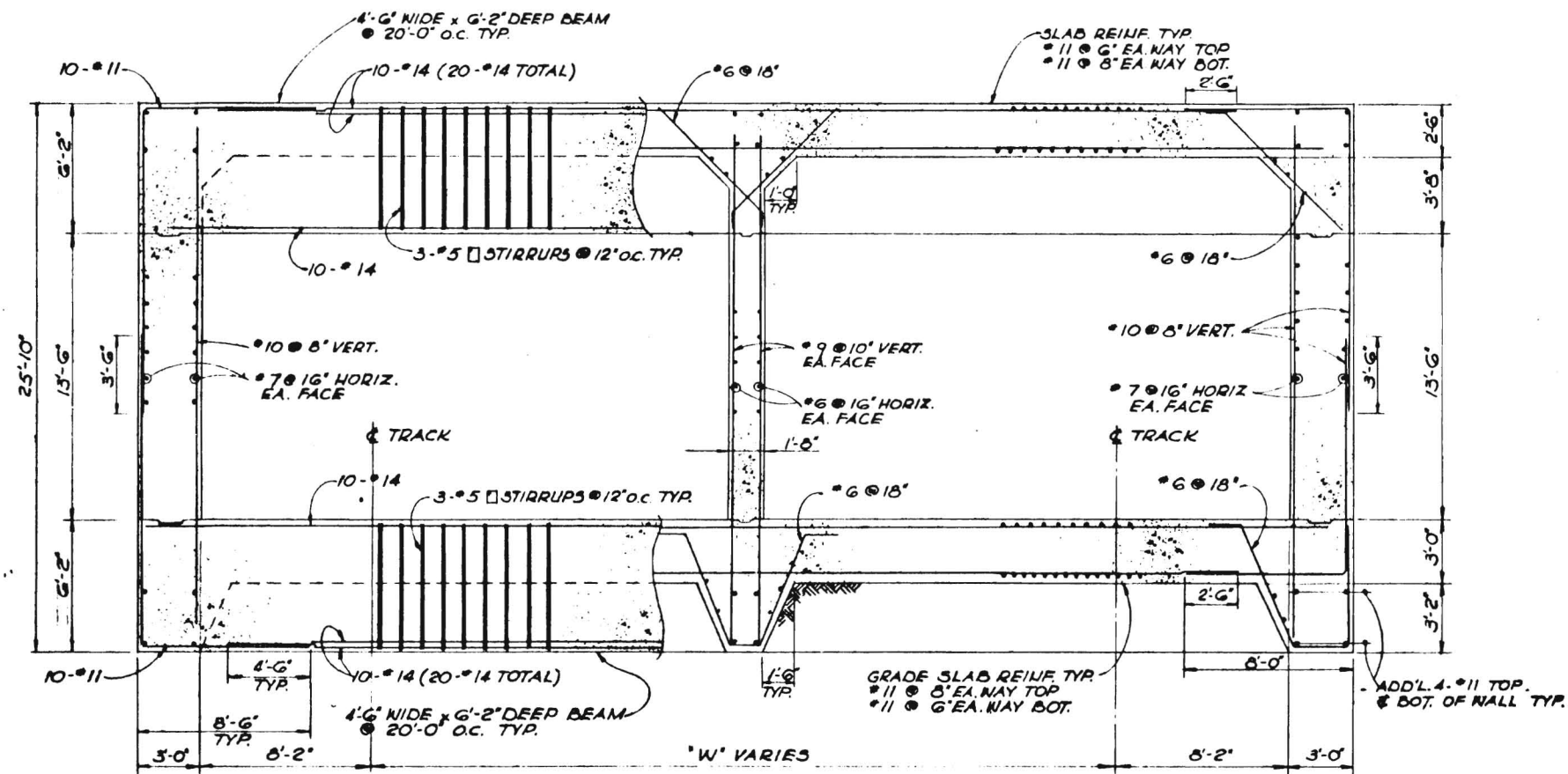
PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN



**A** TYP. CUT & COVER PLAN DETAIL - CROSSOVER TYPE BC  
SCALE: 1" = 20'-0"



**B** TYP. CUT & COVER SECTION-SINGLE TRACK  
SCALE: 3/8" = 1'-0"

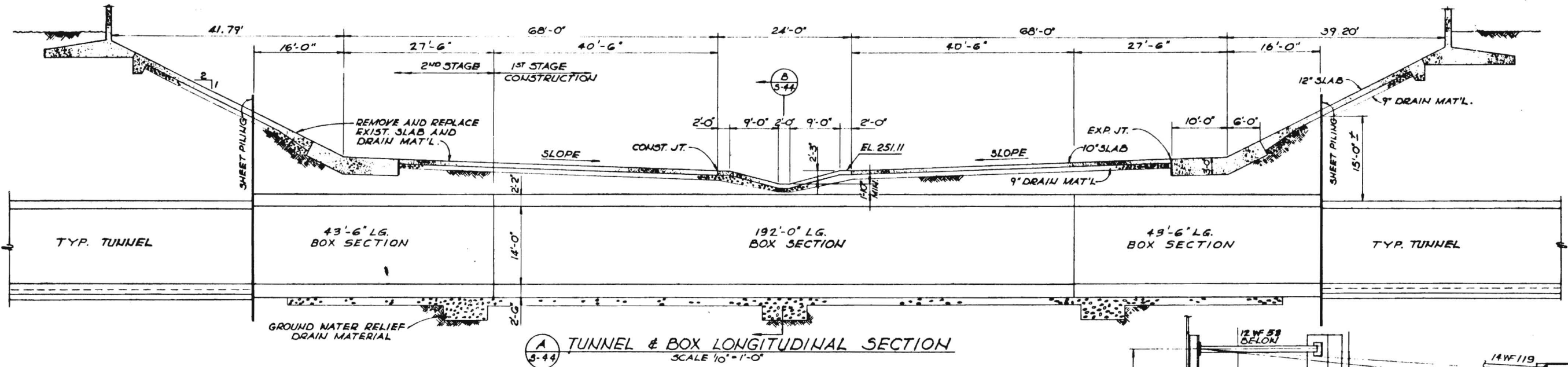


**C** CUT & COVER SECTION - CROSSOVER  
SCALE: 1/4" = 1'-0"

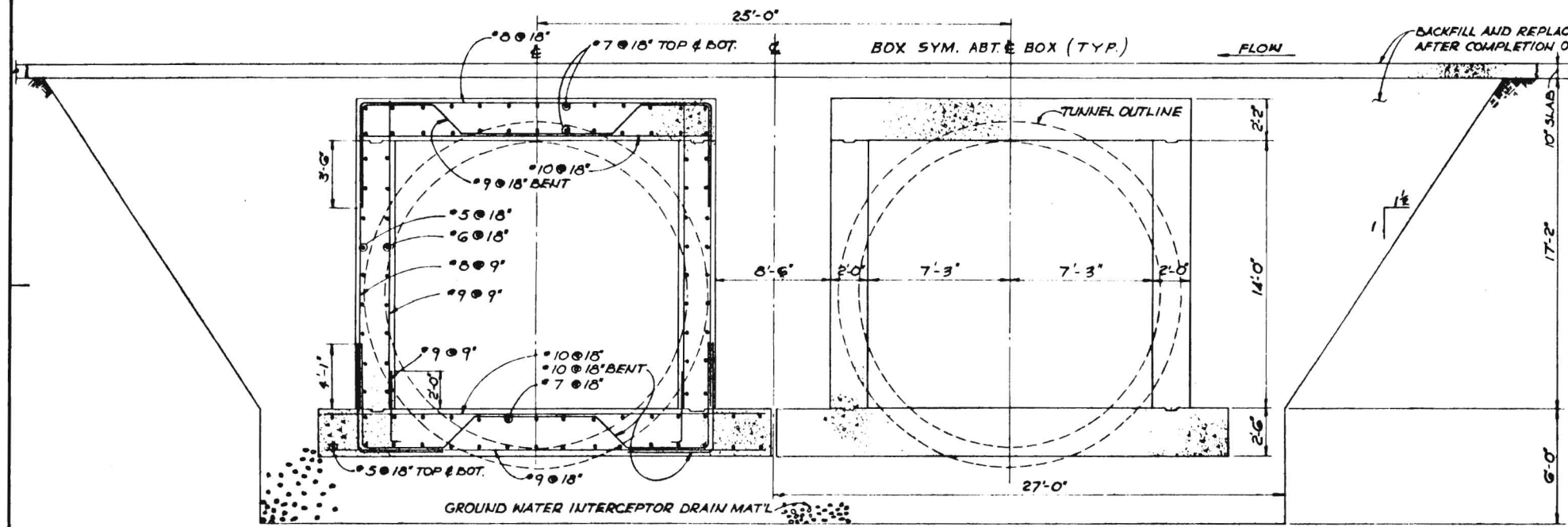
**D** CUT & COVER-CROSSOVER DIMENSIONS  
SCALE: 3/8" = 1'-0"

CORRIDOR	APPROXIMATE LOCATION	STATION	TRACK SPACING "W"	CROSSOVER STRUCTURE "D"	REMARKS
WILSHIRE	45+00	CIVIC CENTER	48'-0"~25'-0"	450'-0"	SOUTH OF STATION
WILSHIRE	172+00	ALVARADO	36'-0"~25'-0"	450'-0"	WEST OF STATION
WILSHIRE	253+50	WESTERN	36'-0"~25'-0"	375'-0"	EAST OF STATION
WILSHIRE	594+50	CENTURY	36'-0"~25'-0"	375'-0"	EAST OF STATION
WILSHIRE	750+50	BARRINGTON	86'-0"~25'-0"	375'-0"	EAST OF STATION
SAN FERNANDO VALLEY	216+00	LA BREA	42'-8"~25'-0"	375'-0"	EAST OF STATION
LONG BEACH	1198+50	LONG BEACH	36'-0"~25'-0"	375'-0"	WEST OF STATION

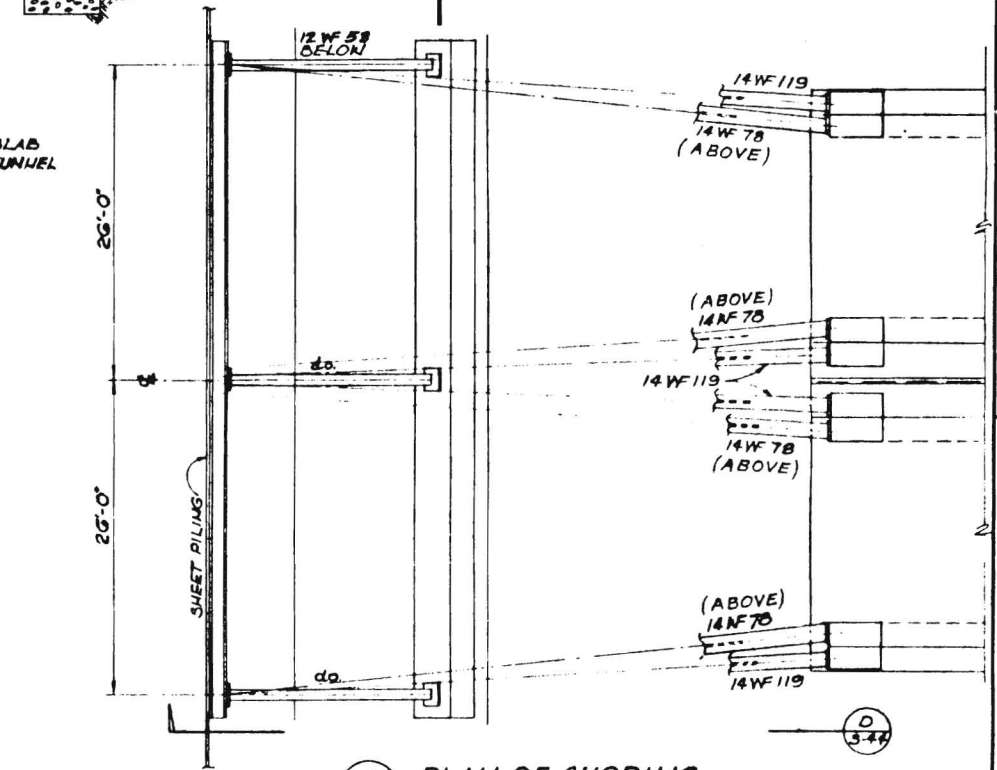
- NOTES:**
- CONCRETE SHALL BE HARD ROCK CONCRETE,  $f_c = 4000$  psi.
  - REINFORCING STEEL SHALL BE INTERMEDIATE GRADE CONFORMING TO A-15 EXCEPT #14 S BARS SHALL CONFORM TO A-405.
  - REFER TO CIVIL DRAWINGS FOR CROSSOVER (TYPE BC) TRACK PLAN DETAIL & PROFILE.



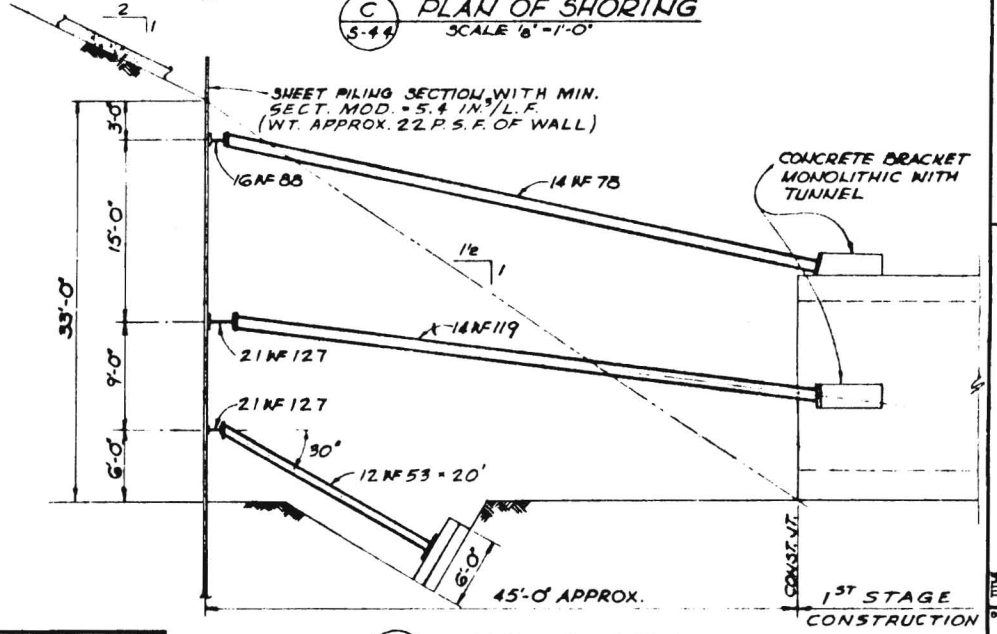
**A** TUNNEL & BOX LONGITUDINAL SECTION  
 SCALE 1/10" = 1'-0"



**B** SECTION  
 SCALE 1/4" = 1'-0"



**C** PLAN OF SHORING  
 SCALE 1/8" = 1'-0"

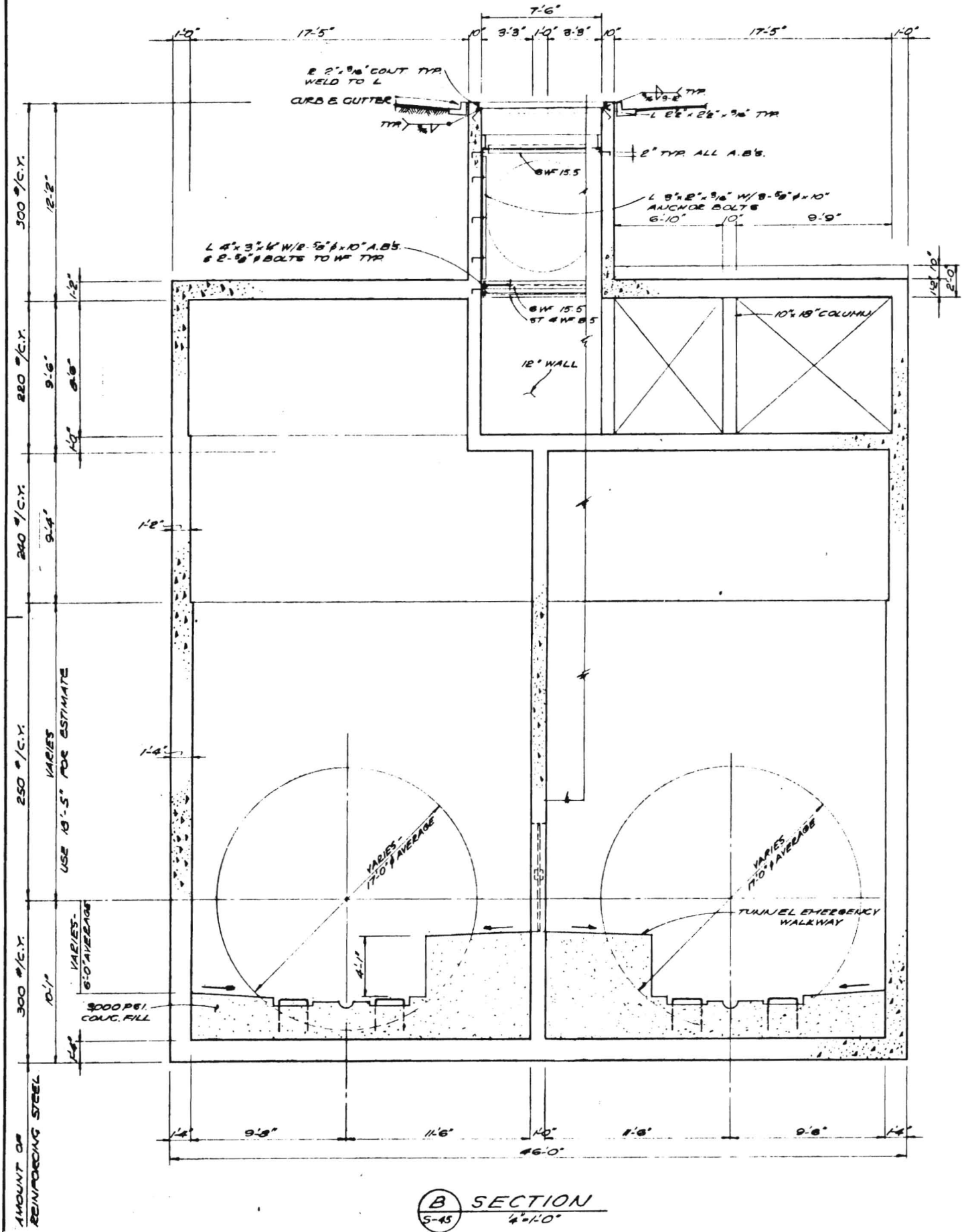


**D** SHORING DETAIL  
 SCALE 1/8" = 1'-0"

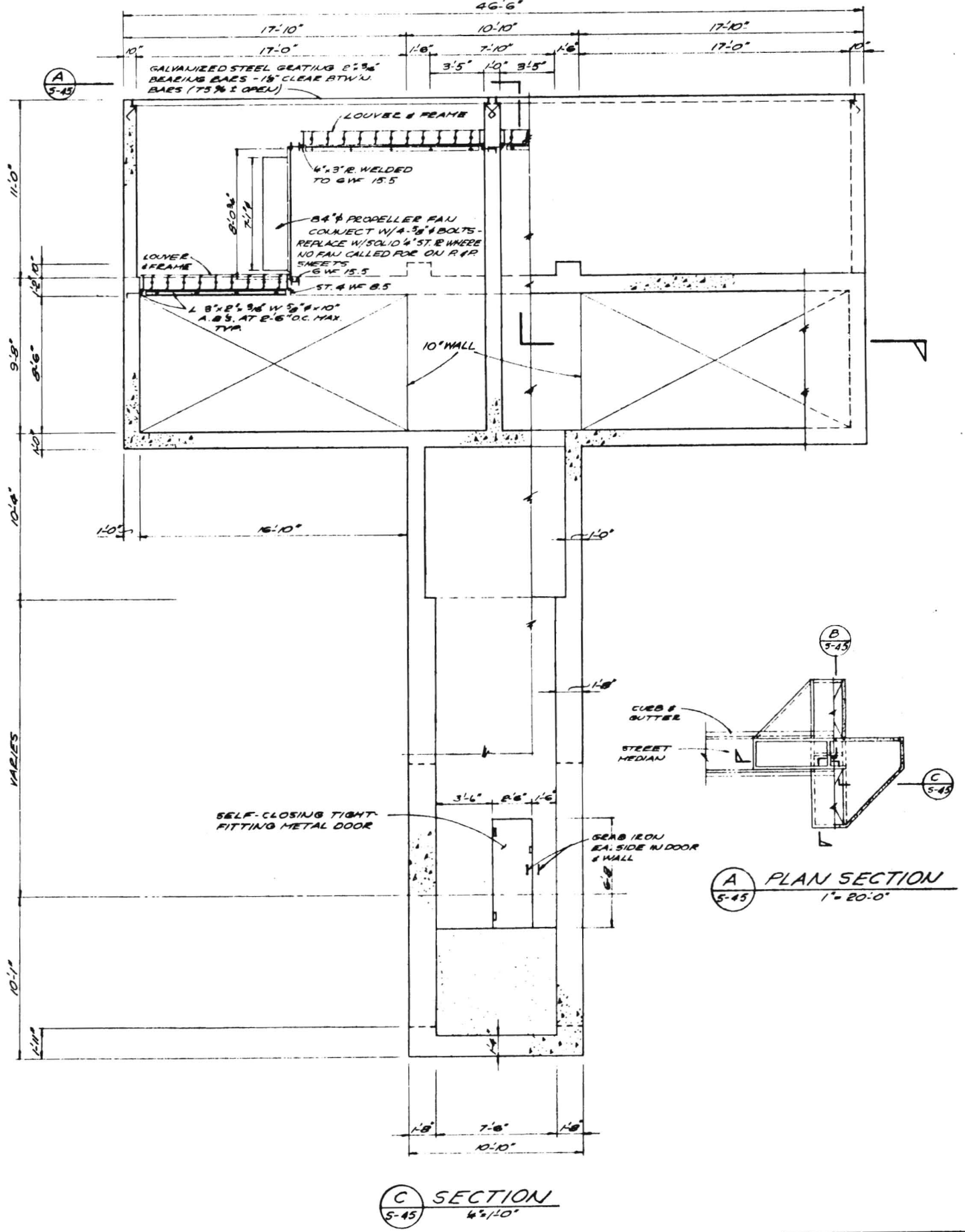
STRUCT. STEEL : A36M A-36  
 CONCRETE : ft = 4000 psi

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

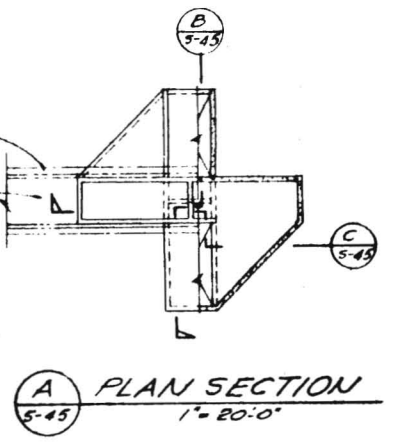




**(B) SECTION**  
 4'-10"



**(C) SECTION**  
 4'-10"



**(A) PLAN SECTION**  
 1" = 20'-0"

AMOUNT OF REINFORCING STEEL VARIES TO AVERAGE  
 250 #/C.Y. 280 #/C.Y. 300 #/C.Y.

PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

**S-45**

APPROVALS	DATE	PROJECT MANAGER	DATE
REVISION	DATE	SCHEMATIC	DATE
DESIGNED BY	DATE	CHECKED BY	DATE
DRAWN BY	DATE	PROJECT ENGINEER	DATE

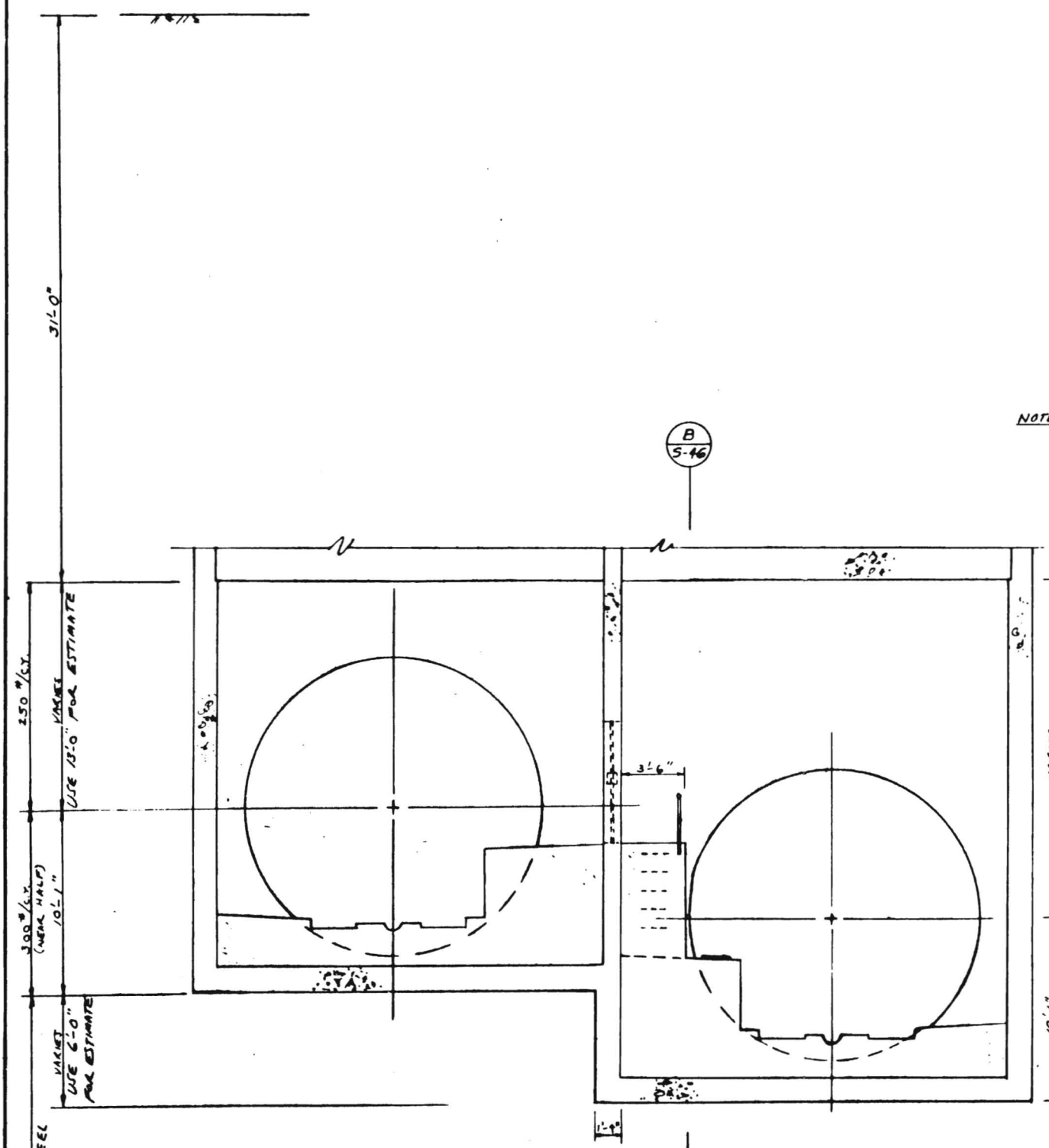
Kaiser Engineers A Joint Venture  
 Daniel Mann, Johnson, & Mendenhall  
 ARCHITECTS - ENGINEERS

**FTD**

SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015

TITLE: INTERMEDIATE VENT SHAFT - TYPICAL CONDITION

**S-45**



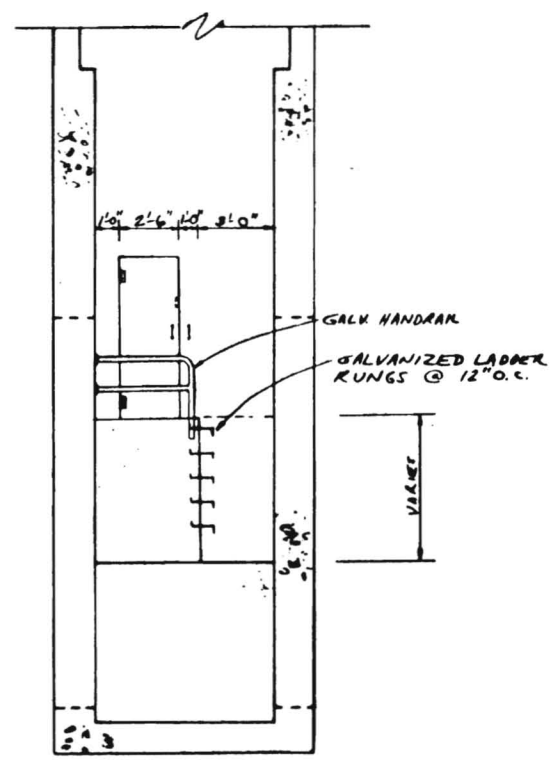
**A SECTION**  
 1/4" = 1'-0"

LOCATIONS: WILSHIRE CORRIDOR - STA. 50+30 ±.  
 WILSHIRE CORRIDOR - STA. 180+30 ±.

NOTE: ALL DETAILS SIMILAR TO SHEET S-45; UPPER SECTION SAME AS SHEET S-45; CONCRETE IS 3000 PSI.



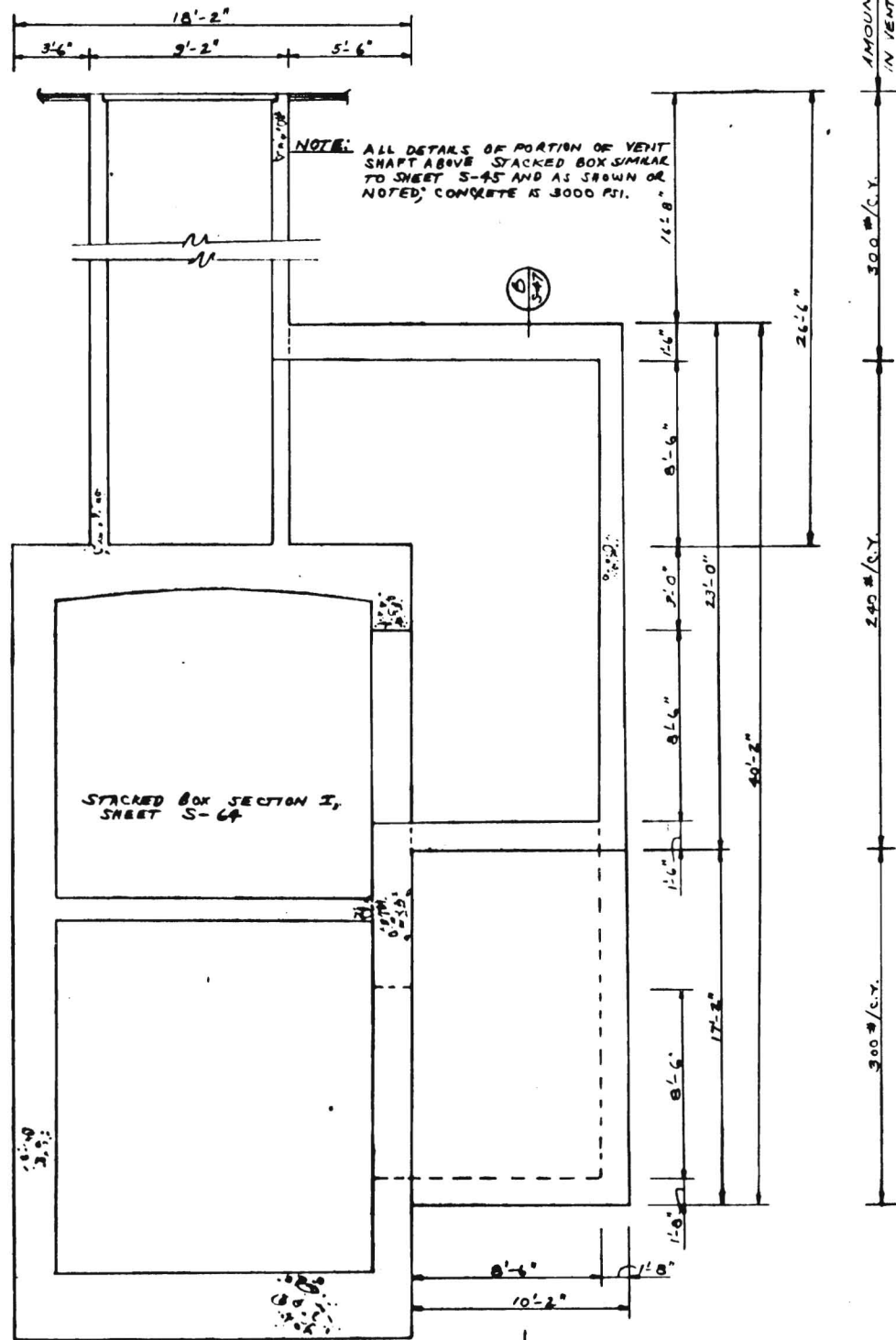
INTERMEDIATE VENT SHAFT -  
 TRACKS AT DIFFERENT LEVELS



**B SECTION**  
 1/4" = 1'-0"

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

S-46	DATE	APPROVALS	Kaiser Engineers A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS
	DATE	PROJECT MANAGER	
S-46	DATE	REVISION	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90013
	DATE	SCHEMATIC	
APPROVALS		DATE	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90013
PROJECT MANAGER		DATE	
REVISION		DATE	INTERMEDIATE VENT SHAFT - TRACKS AT DIFFERENT LEVELS
SCHEMATIC		DATE	



AMOUNT OF REINFORCING STEEL  
IN VENT SHAFT STRUCTURE

300 #/c.y.

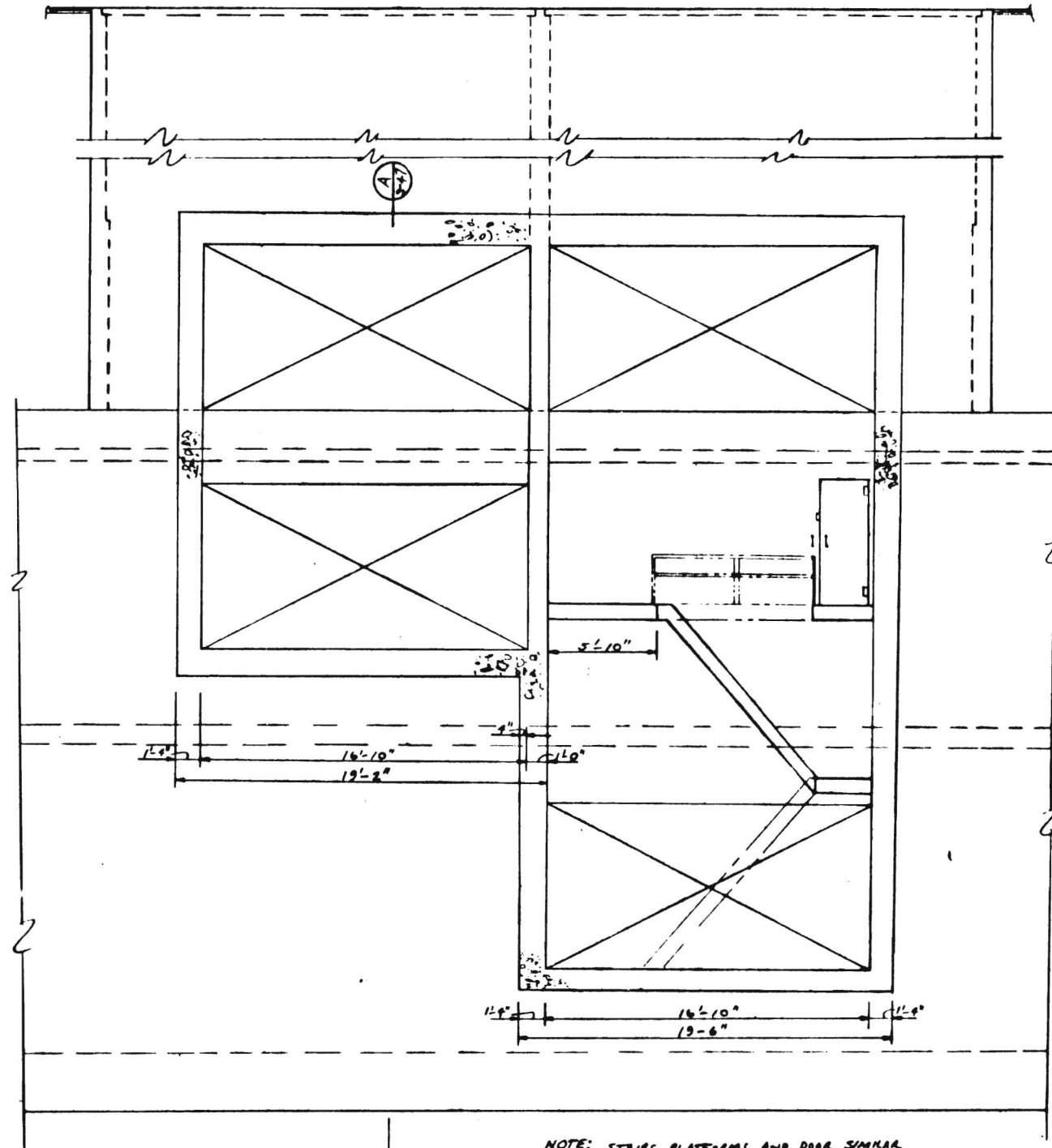
240 #/c.y.

300 #/c.y.

**A** SECTION  
S-47  
4'-70"

**INTERMEDIATE VENT SHAFT -  
STACKED BOX**

LOCATIONS: WILSHIRE CORRIDOR MAIN LINE - STA. 79+10±.  
WILSHIRE CORRIDOR - STA. 60+30±.

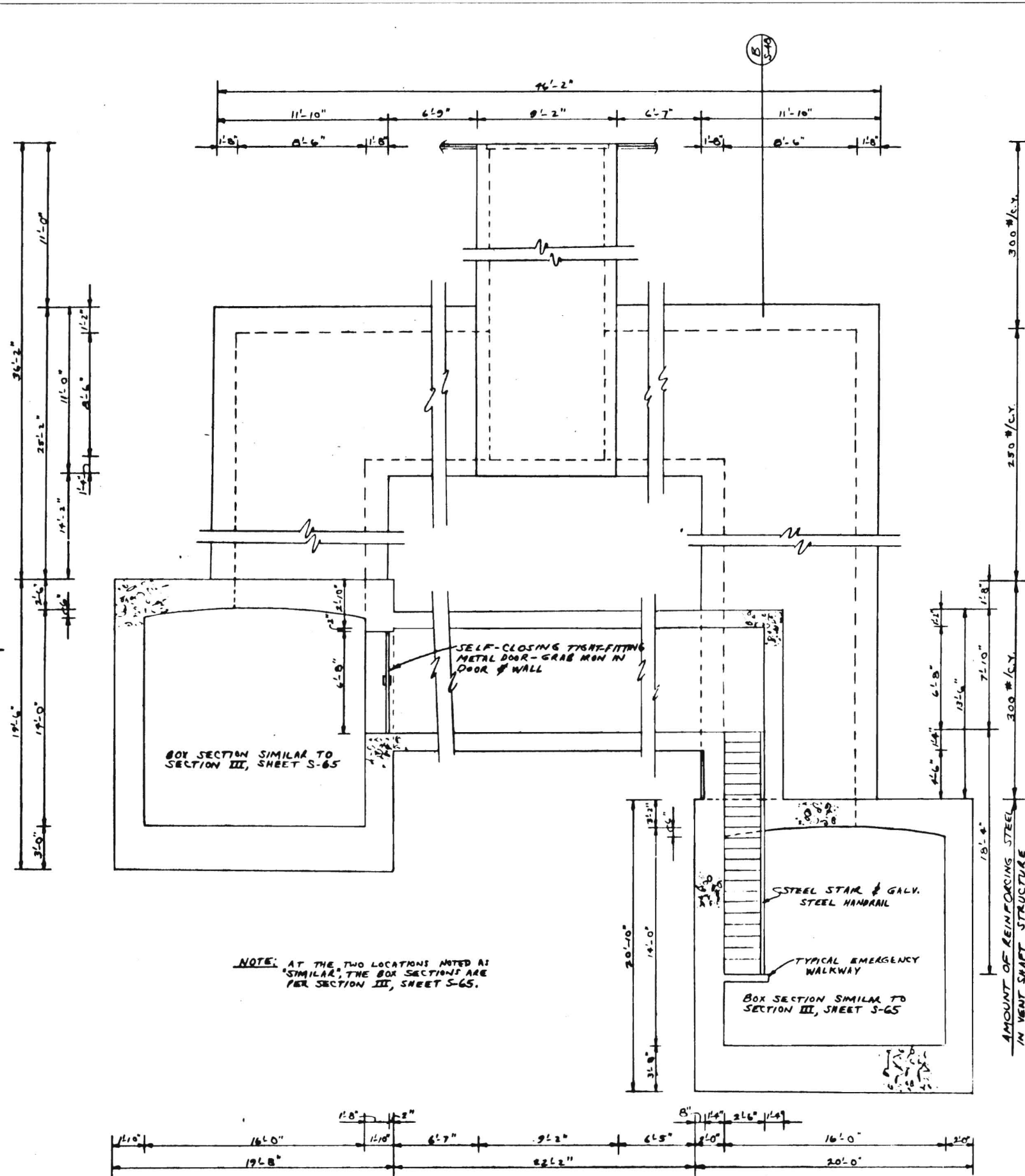


NOTE: STAIRS, PLATFORMS AND DOOR SIMILAR  
TO THOSE FOR STACKED BOX CASES  
CONNECTION (SHT. S-51) EXCEPT AS SHOWN  
OR NOTED.

**B** SECTION  
S-47  
4" = 1'-0"

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

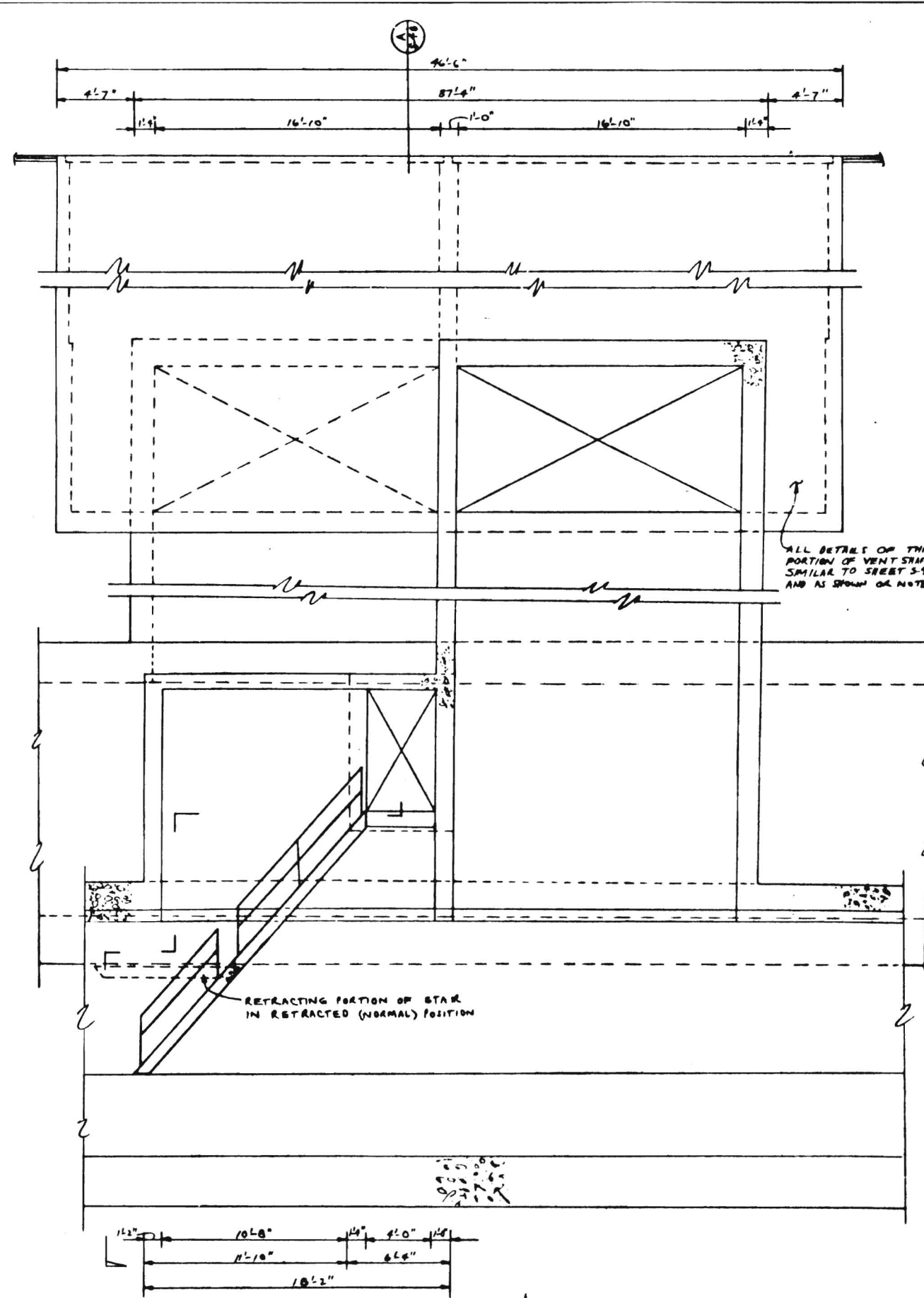
DATE: APR 21, 2005	APPROVALS:	PROJECT MANAGER:	REVISION:	SCALE:	SHEET NO. S-47
DESIGNER: [Signature]	ARCHITECTS: ENGINEERS:	ENGINEER:	DATE:	DATE:	DATE:
KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS					
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015					
INTERMEDIATE VENT SHAFT - STACKED BOX CONDITION					
5-47					



**LOCATIONS:** WILSHIRE CORRIDOR - STA. 271+00±;  
 WILSHIRE CORRIDOR - STA. 60+00±;  
 WILSHIRE CORRIDOR - STA. 80+10± (SIMILAR);  
 LONG BEACH CORRIDOR - STA. 38+30± (SIMILAR).

**A SECTION**  
 4'-7'-0"

**INTERMEDIATE VENT SHAFT -  
 SEPARATED BOXES CONDITION**



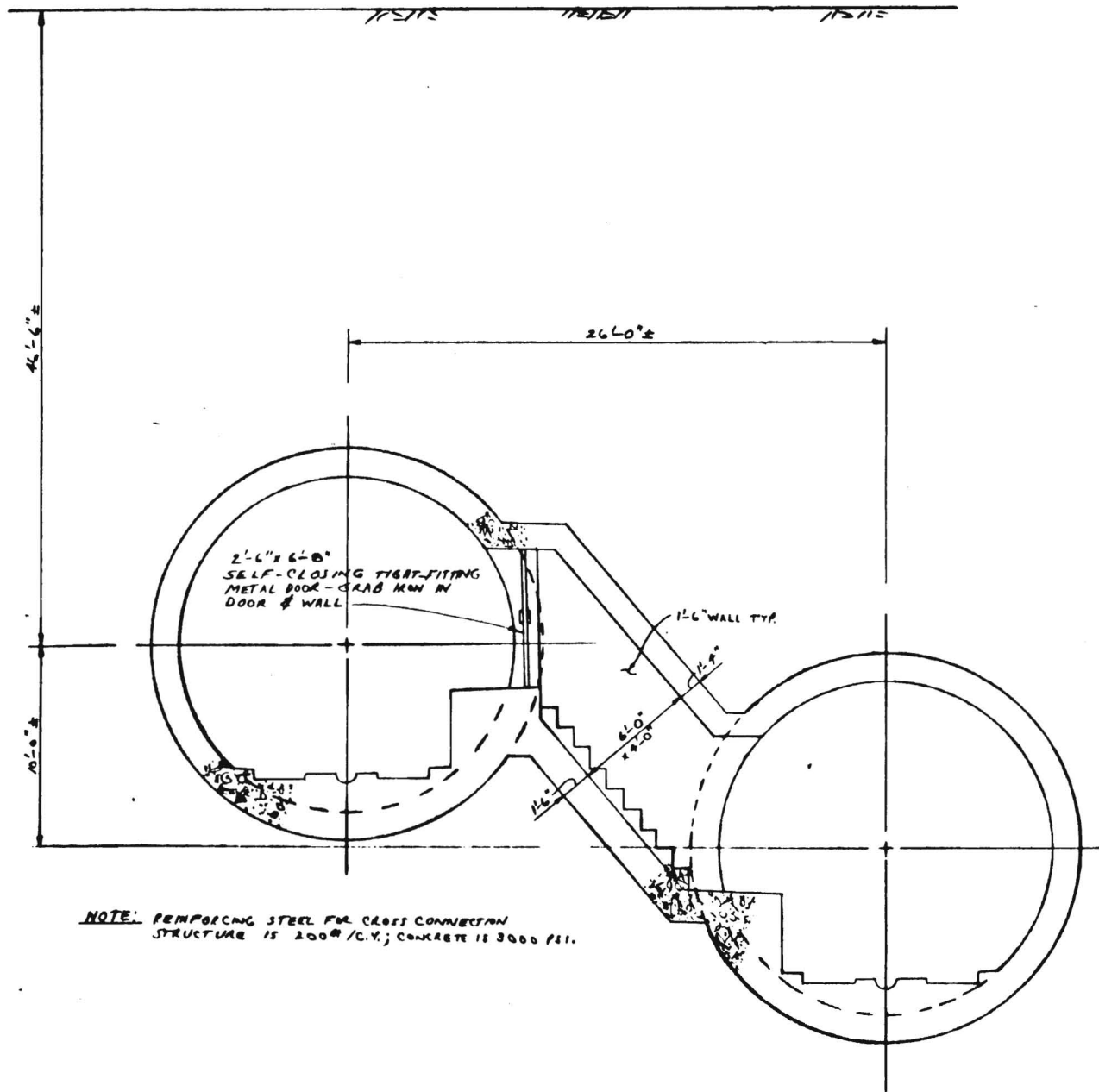
**B SECTION**  
 4'-11'-0"

**NOTE:** ALL CONCRETE IS 3000 PSI.

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN







NOTE: REINFORCING STEEL FOR CROSS CONNECTION STRUCTURE IS 200# / C.Y.; CONCRETE IS 3000 PSI.

LOCATION: SAN FERNANDO VALLEY CORRIDOR - STA. @+00 ±.

A SECTION  
5-50  
1/4" = 1'-0"

CROSS CONNECTION - TUNNELS AT  
DIFFERENT LEVELS

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90011	Kaiser Engineers A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS	APPROVALS	DATE
		PROJECT MANAGER	DATE
S-50	CROSS CONNECTION - TUNNELS AT DIFFERENT LEVELS	REVISION	DATE
		DATE	DATE
APPROVALS		APRIL 1968	
PROJECT MANAGER		5/23/68	
DATE			











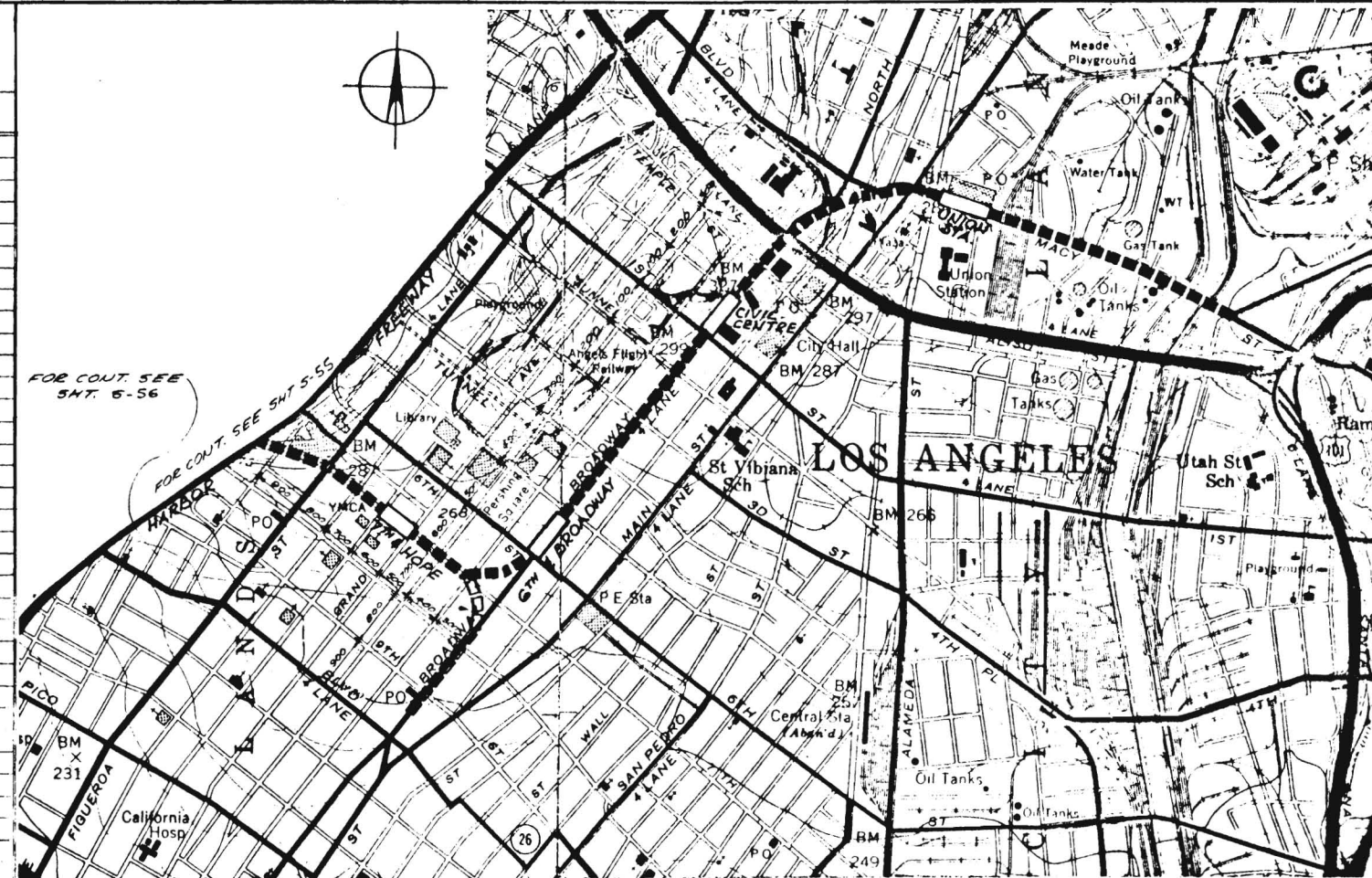






**BUILDING FOUNDATION SCHEDULE**  
(INCLUDES ONLY BUILDINGS & STORIES AND HIGHER)

STREET	BLOCK	NO	BUILDING NAME	FTG TYPE	UNDER PINNING	COLUMN FOOTINGS				BASMT WALL FTGS.			REMARKS
						H	X	B	α	h	y	b	
W. 7 <sup>TH</sup> ST.	1000	1076	CADILLAC AGENCY	ASSUME SPREAD	REQD	16.0	16.3	34.7	64°49'				
	900	953	WELLINGTON APTS. HOTEL	ASSUME SPREAD									
		925	STAYLES HILTON HOTEL	SPREAD	REQD	32.5	14.3	25.2	60°26'	44.0	6.0	13.7	66°20'
	800	840	BARKER BROS.	SPREAD	REQD	35.0				35.5			AT STATION
		811	HAVENSTRITE	SPREAD	REQD	24.3				17.2			DO
	700	735	ROOSEVELT BLDG.	SPREAD	REQD	29.7				29.5			AT STATION
		701	REPUBLIC FEDERAL SAVINGS & LOAN	ASSUME SPREAD	REQD								DO
	600	600-32	ROBINSONS	SPREAD	REQD	21.6							CUT & COVER AREA
		617	UNION OIL BLDG.	SPREAD	REQD								DO
	500	555	QUINBY	SPREAD	REQD	21.8				12.3			CUT & COVER AREA
		520-38	PARSONS BLDG.	SPREAD		16.1				12.7			DO
		527	BRACK SHOPS	SPREAD		18.8				13.5			DO
		518	MANDEL'S	ASSUME SPREAD									DO
		501	BANK OF AMERICA	SPREAD	REQD	22.5				18.0			DO
	400	432	MERCHANDISE MART	SPREAD	REQD								CUT & COVER AREA
		437	LA ATHLETIC CLUB	SPREAD	REQD	15.6				15.8			DO
		400-8	FOREMAN & CLARK	SPREAD	REQD								SEE DWGS S-59-S-63
		401	WARLEN BROS THEATRE	SPREAD	REQD	16.8				15.5			CUT & COVER AREA
	300	322-32	SPRECKLES	COLT. DEAM	REQD								SEE DWGS S-59-S-63
		332	GT WESTERN SVCS	SPREAD	REQD								DO
S BROADWAY	600	636	PALACE THEATRE	SPREAD	REQD								
		645	BULLOCKS	SPREAD	REQD								SEE DWGS S-59-S-63
		635	LEEDS SHOES	ASSUME SPREAD									DO
		633	LEROY JEWELRY	ASSUME SPREAD									DO
		627-29	CH BAKER	ASSUME SPREAD									DO
		621-25	KRESS	SPREAD		17.8				14.3			CUT & COVER AREA
		609-19	LOS ANGELES THEATRE	SPREAD		30.3				14.6			DO
		616	DESMOND'S	SPREAD		21.1				17.4			DO
		600-10	W. P. STORY	SPREAD		18.5				18.5			DO
		601-7	OWL DRUG CO & SICKERS	SPREAD	REQD	16.9				14.2			DO
		644	HARRIS & FRANK	SPREAD	REQD								
		660	HAAS	SPREAD	REQD								
	500	559	SKELLOOM	SPREAD	REQD	22.3				24.0			AT STATION
		558	SILVERWOOD	SPREAD		16.2				12.0			
		538-46	BROADWAY ARCADE	SPREAD		25.7				24.0			
		545	MARTELS	ASSUME SPREAD									
		537-41	HARTFIELDS	COLT/BM		27.2				14.5			
		535	BROADWAY COSMETICS	ASSUME SPREAD									
		532	ARCADE THEATRE	SPREAD		16.5				15.0			
		529	BROADWAY INTERIORS	SPREAD									
		525	REEVES SHOES	SPREAD									
		523	YOUNG AGES	SPREAD									
		522	DAVE TIPP	SPREAD									
		518	ROXIE THEATRE	SPREAD		9.4							
		517	KARLS SHOES	SPREAD									
		501-11	THRIFTY DRUG	ASSUME SPREAD									
		500-08	JEWELRY TRADES	SPREAD	REQD	16.5				18.5			AT STATION
	400	460	CHESTER WILLIAMS	SPREAD	REQD	22.5				20.7			CUT & COVER AREA
		457	J. J. NEWBERRY	SPREAD		21.7				16.7			DO
		424-28	BROADWAY THEATRE	SPREAD		18.2				12.5			DO
		401	BROADWAY STORE	SPREAD		25.3				25.3			DO
		400-10	STACK BLDG.	ASSUME SPREAD	REQD								DO
	300	359	NELSON'S	SPREAD	REQD	15.0	8.9	37.8	76°48'	15.0	-1.7	37.8	92°48'
		356	O.T. JOHNSON	SPREAD	REQD	14.5	9.9	56.3	80°02'	12.8	-0.9	58.0	93°50'
		351	GARBO	SPREAD	REQD	18.0	7.9	34.8	77°13'	13.0	-4.1	39.8	95°54'
		342	TRUSTER BLDG.	ASSUME SPREAD									DO
		341	KARLS SHOES	SPREAD									
		339	SCOTTS	SPREAD									
		335	GALLENKAMP	ASSUME SPREAD									DO



STREET	BLOCK	NO	BUILDING NAME	FTG TYPE	COLUMN FOOTINGS				BASMT WALL FTGS.			REMARKS	
					H	X	B	α	h	y	b		β
S BROADWAY	300	318-22	COZY THEATRE	SPREAD	REQD	16.5	13.4	51.3	75°22'	13.8	1.9	54.0	87°38'
		315-17	POWER LAUNDRY BLDG	SPREAD	REQD	14.3	11.9	40.5	73°37'	14.3	-3.1	40.5	94°20'
		304	BRADBURY BLDG.	ASSUME SPREAD						11.0			
		301	MILLION DOLLAR MOVIE	SPREAD	REQD	22.4	8.4	33.4	75°52'	18.3	-3.6	37.5	95°40'
	200	249	PAN AMER. BLDG.	ASSUME SPREAD									
		242	VICTOR CLOTHING	ASSUME SPREAD									
		207	OLD HOSPITAL	ASSUME SPREAD									
		205	CIVIC CENTER	SPREAD	REQD	15.5	7.4	32.3	77°06'	12.5	-1.6	35.3	92°35'
		—	STATE BLDG.	SPREAD	REQD								WALL SUPPORTS SIDEWALK 217 W. 15 <sup>TH</sup> ST.
	100	100-20	TIMES MIRROR	SPREAD		40.6	21.9	1.2	3°10'	38.2	21.9	4.6	9°0'
		107	NEW STATE BLDG.	ASSUME SPREAD									PART AT CUT & COVER
N BROADWAY	100	139	OLD LAN BLDG	COVB. SPREAD		16.4				14.0			AT STA. (BEING DEMOLISHED)
	200	227	MEN HALL RECORDS	ASSUME SPREAD									
		220	OLD HALL RECORDS	CONT	REQD					24.2			AT STATION
	300	330	OLD HALL JUSTICE	COLT & SPREAD	REQD	33.0	12.6	53.8	76°50'				
		301	CENTE. HEATING	ASSUME SPREAD									
MACY ST.	100	—	POSTERIAL ANNEX	COLT & SPREAD		14.8							AT STATION

REMAINDER OF TUNNEL SECTION DOES NOT NECESSITATE UNDERPINNING EXISTING BUILDINGS

DATE: 1/22/2014	APPROVAL: [Signature]	DATE: 1/22/2014
DRAWN BY: [Name]	PROJECT MANAGER: [Name]	DATE: [ ]
CHECKED BY: [Name]	SCALE: [ ]	DATE: [ ]
PROJECT NO: S-55	DATE: [ ]	DATE: [ ]

Kaiser Engineers a joint venture  
 Daniel Mann, Johnson, & Mendenhall  
 ARCHITECTS ENGINEERS

**ATD**

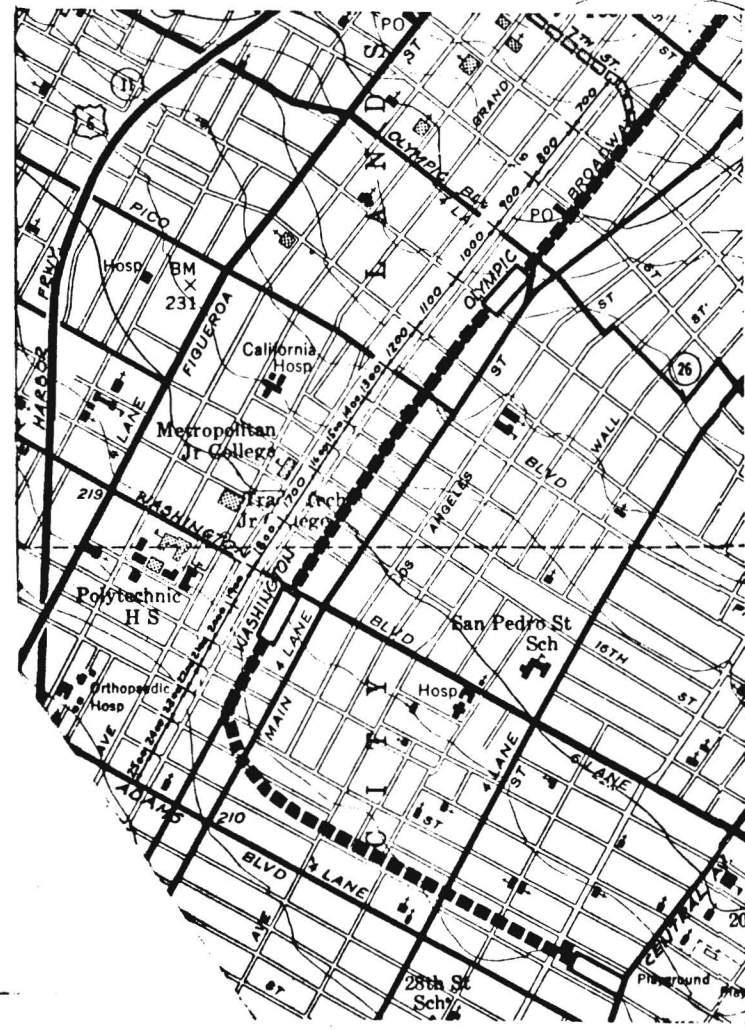
SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015

UNDERPINNING REQUIREMENTS - WILSHIRE  
 CORRIDOR - HARBOR FREEWAY TO  
 UNION STATION

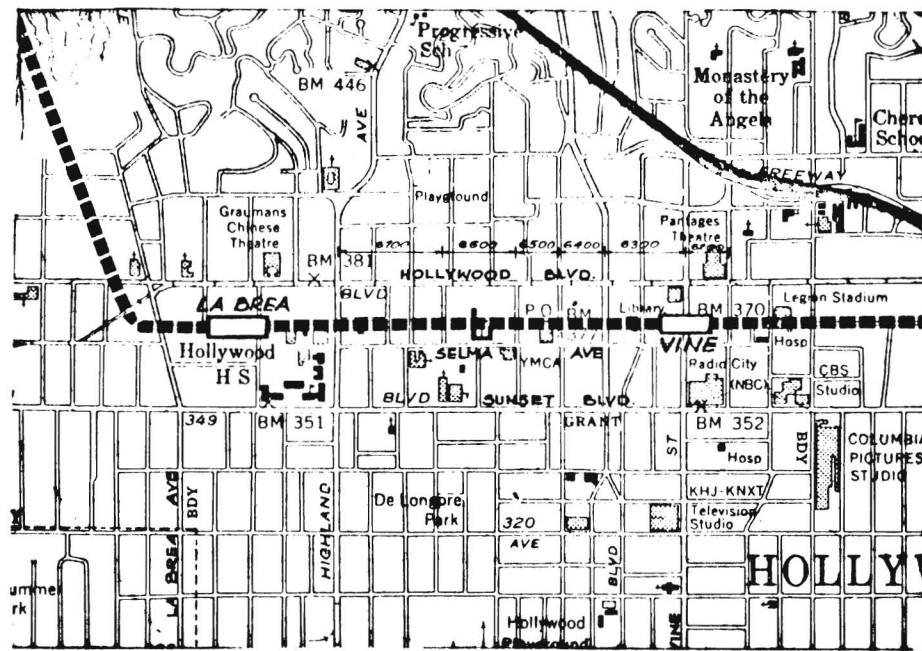
PRELIMINARY ENGINEERING ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN



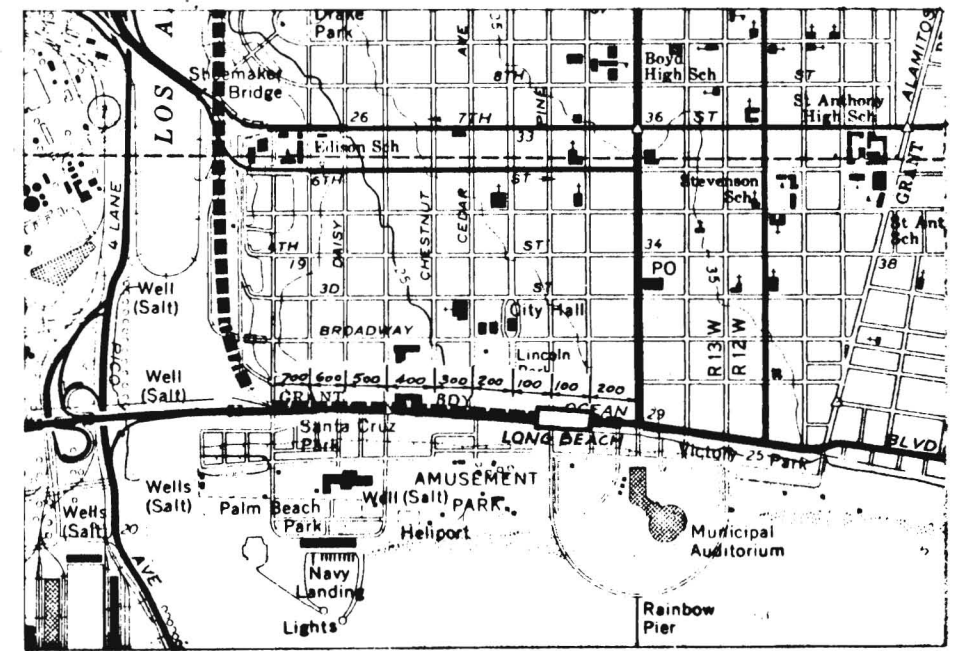
FOR CONTINUATION  
SEE SHEET S-55



**A** LONG BEACH CORRIDOR  
S-56



**B** SAN FERNANDO VALLEY CORRIDOR  
S-56



**C** LONG BEACH CORRIDOR  
S-56

**BUILDING FOUNDATION SCHEDULE**  
(INCLUDES ONLY BUILDINGS 4 STORIES AND HIGHER)

STREET	BLOCK	NO.	BUILDING NAME	FTG. TYPE	UNDER-PINNING	COLUMN FOOTINGS				BAS'MT. WALL FTG.				REMARKS	STREET	BLOCK	NO.	BUILDING NAME	FTG. TYPE	UNDER-PINNING	COLUMN FOOTINGS				BAS'MT. WALL FTG.				REMARKS	
						H	X	B	α	h	y	b	β								H	X	B	α	h	y	b	β		
W. 7TH ST.		230	LAUKERSHIM HOTEL	ASSUME SPREAD											S. BROADWAY	1000	1031	WESTERN PACIFIC BLDG.	SPREAD	REQ'D	23.0				14.2				AT STATION	
																	1060	TRANSIT DISTRICT BLDG.	SPREAD	REQ'D	20.5				20.5			DO		
S BROADWAY	700	707	UNITED BLDG.	SPREAD	REQ'D											1100	1106	JOB CORRS CENTRE	SPREAD		29.0	18.3	1.8	5°40'	29.0	13.9	1.8	7°22'	BAS'MT # SUB BAS'MT.	
		712	PIG'N WHISTLE	ASSUME SPREAD													1111	HERALD EXAMINER	ASSUME SPREAD											
		718	MCKAY JEWELERS	ASSUME SPREAD													1151	S BROADWAY BLDG.	SPREAD	REQ'D	20.0	14.1	1.9	53°23'						
		719	KOOLWORTHS	SPREAD																										
		724	HARDY/WINSTEAD	ASSUME SPREAD																										
		730	APCOA PARKING	ASSUME SPREAD																										
		731	LEEDS	ASSUME SPREAD																										
		735	JEROMES	ASSUME SPREAD																										
		737-47	HARTFIELDS-HOLIDAY PAR'S DECORATORS	SPREAD		14.0				11.0																				
		740	GARLAND BLDG.	SPREAD		19.8				19.8																				
		749	LEARNERS SHOPS	ASSUME SPREAD																										
		756	CHAPMAN BLDG.	ASSUME SPREAD																										
		761	HOME SAVINGS	SPREAD	REQ'D	20.9				15.1																				
		801	MAY CO.	SPREAD	REQ'D	20.2				13.7																				
		802	TOKER THEATRE	SPREAD																										
		806	SINGER BLDG.	SPREAD		15.9				12.1																				
		818	APPAREL CENTER BLDG.	SPREAD		22.2																								
		820	820 BROADWAY BLDG.	ASSUME SPREAD																										
		834	S BROADWAY BLDG.	ASSUME SPREAD	REQ'D																									
		846	WENI ORPHEUM BLDG.	SPREAD		17.6	15.7	10.2	93°20'	13.3	5.4	14.5	76°55'																	
		849	FED. INFORMATION CTR.	ASSUME SPREAD																										
		850	9TH & BROADWAY BLDG.	SPREAD		27.0	15.4	0.8	8°0'	27.0	15.4	0.8	3°0'																	
		908	WASHINGTON TRUST CO.	SPREAD		18.8	14.3	10.0	35°0'	14.0	5.4	14.8	69°56'																	
		909	STATE OF CALIF. (1909)	ASSUME SPREAD																										
		914	HAYDEN MUSIC CO.	ASSUME SPREAD																										
		921	UNITED ARTISTS	SPREAD		25.5	22.6	6.3	15°32'																					
		939	UNION BLDG.	SPREAD		19.6	24.9	15.2	31°20'	16.3	8.4	8.5	45°0'																	
		950	LOCKIE MUSIC EXCHANGE	ASSUME SPREAD																										
															W. OCEAN BLVD.		440	BANK OF CALIF. COUNTY BLDG.	PILE						21.2	101.4	7.6		PILES 40'-0" BELOW ELEV +1.33	
																	415	SOVEREIGN HOTEL	SPREAD		22.0	72.8	6.8	5°20'						
																	360	BLACKSTONE HOTEL	COUNT.						23.8	77.9	5.0	3°40'		
																	200	SAVOY HOTEL	COUNT.						13.0	32.9	16.8	27°0'		
																	117	SCHUYLER HOTEL	ASSUME SPREAD											
															PINE AVE.	19	HEARTWELL BLDG.	SPREAD			15.8	35.8	15.0	22°50'	10.0	37.5	20.8	29°0'		

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

APPROVALS: PROJECT MANAGER, DATE, SHEET, CHECKED BY, DATE, SCALE, ENGINEER, DATE

APRIL 1963

KAISER ENGINEERS  
A JOINT VENTURE  
DANIEL MANN, JOHNSON, & MENDENHALL  
ARCHITECTS ENGINEERS

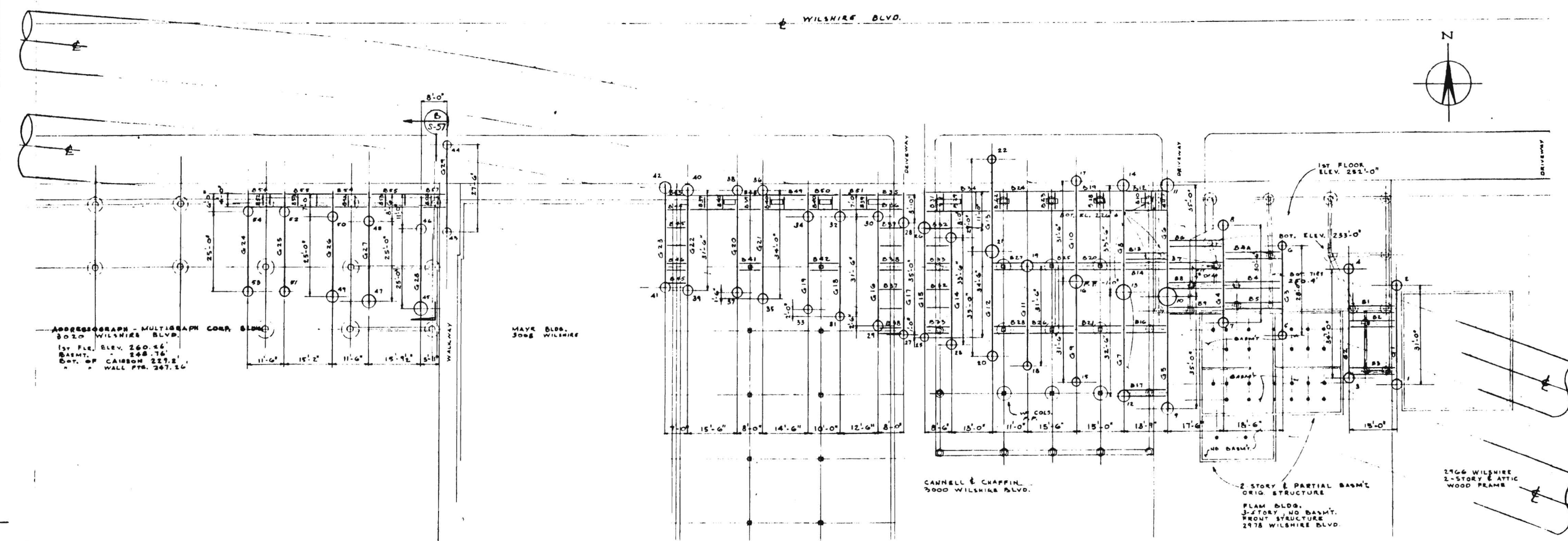
UNDERPINNING REQUIREMENTS - LONG BEACH & SAN FERNANDO VALLEY CORRIDORS

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90015

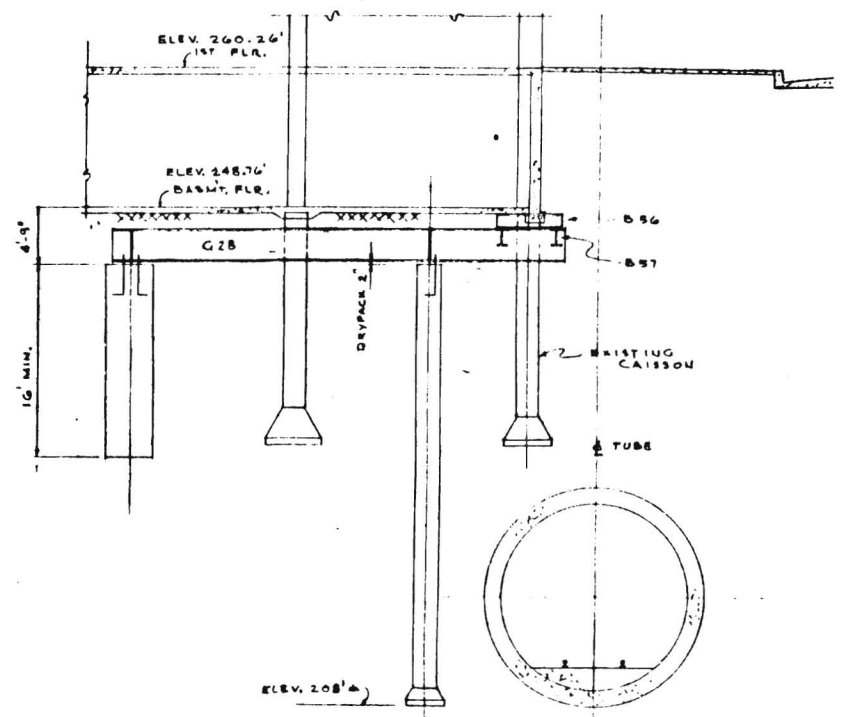
FD

DRAMAING NO. 5-56





**A PLAN**  
5-57 NO SCALE

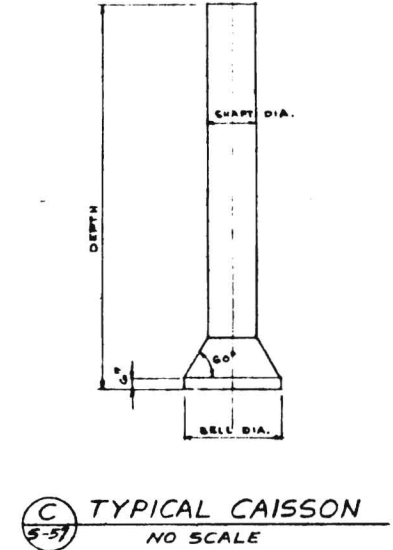


**B SECTION**  
5-57 SCALE: 1/4" = 1'-0"

CAISSON SCHEDULE							
NO.	BELL DIA.	SHAFT DIA.	DEPTH	NO.	BELL DIA.	SHAFT DIA.	DEPTH
1	3'-0"	2'-0"	38'	28	3'-0"	2'-0"	32'
2				29			
3				30			
4				31			
5				32			
6				33			
7				34			
8				35			
9	3'-0"	2'-0"	40'	36			
10	5'-0"	3'-6"		37			
11	4'-0"	2'-6"		38			
12	5'-0"	2'-0"		39			
13	4'-0"	2'-0"		40	3'-0"	2'-6"	
14	3'-0"	2'-0"		41	3'-0"	2'-0"	
15	3'-0"	2'-0"		42	3'-0"	2'-6"	
16	4'-0"	2'-0"		43	3'-0"	2'-0"	36'
17	3'-0"	2'-0"		44	3'-0"	2'-0"	36'
18	3'-0"	2'-0"		45		4'-0"	16' MIN.
19	3'-0"	2'-0"		46	3'-0"	2'-0"	36'
20	3'-0"	2'-0"		47		4'-0"	14' MIN.
21	4'-0"	2'-0"		48	3'-0"	2'-0"	36'
22	3'-0"	2'-0"		49		3'-6"	16' MIN.
23				50	3'-0"	2'-0"	36'
24				51		3'-0"	15' MIN.
25				52	3'-0"	2'-0"	36'
26				53		3'-0"	13' MIN.
27				54	3'-0"	2'-0"	36'

BEAM SCHEDULE			
MARK	SIZE	MARK	SIZE
B1	18 WF 50	B38	18 WF 50
B2	16 W 36	B39	10 WF 21
B3	16 WF 40	B40	14 WF 30
B4	12 WF 27	B41	21 WF 62
B4A	16 WF 36	B42	24 WF 76
B5	16 WF 40	B43	21 WF 68
B6	10 WF 21	B44	21 WF 68
B7	14 WF 30	B45	10 WF 21
B8	14 WF 30	B46	18 WF 50
B9	16 WF 40	B47	16 WF 40
B10	12 WF 27	B48	10 WF 21
B11	12 WF 27	B49	18 WF 50
B12	21 WF 62	B50	16 WF 36
B13	18 WF 50	B51	10 WF 21
B14	21 WF 62	B52	16 WF 36
B15	14 WF 30	B53	10 WF 21
B16	21 WF 62	B54	21 WF 62
B17	21 WF 62	B55	12 WF 27
B18	14 WF 30	B56	16 WF 36
B19	21 WF 62	B57	16 WF 36
B20	24 WF 76		
B21	24 WF 76		
B22	16 WF 36		
B23	14 WF 30		
B24	24 WF 76		
B25	24 WF 76		
B26	24 WF 76		
B27	21 WF 62		
B28	21 WF 62		
B29	10 WF 21		
B30	14 WF 30		
B31	12 WF 27		
B32	10 WF 21		
B33	18 WF 50		
B34	18 WF 50		
B35	21 WF 62		
B36	21 WF 62		
B37	10 WF 21		

GIRDER SCHEDULE			
MARK	SIZE	MARK	SIZE
G1	30 WF 116	G16	30 WF 108
G2	36 WF 170	G17	30 WF 108
G3	24 WF 76	G18	33 WF 130
G4	36 WF 150	G19	33 WF 130
G5	36 WF 230	G20	33 WF 141
G6	36 WF 230	G21	33 WF 141
G7	36 WF 230	G22	36 WF 160
G8	36 WF 230	G23	36 WF 160
G9	36 WF 194	G24	24 WF 76
G10	33 WF 141	G25	27 WF 94
G11	36 WF 150	G26	30 WF 108
G12	36 WF 150	G27	33 WF 130
G13	33 WF 141	G28	33 WF 130
G14	30 WF 108	G29	27 WF 94
G15	30 WF 116		



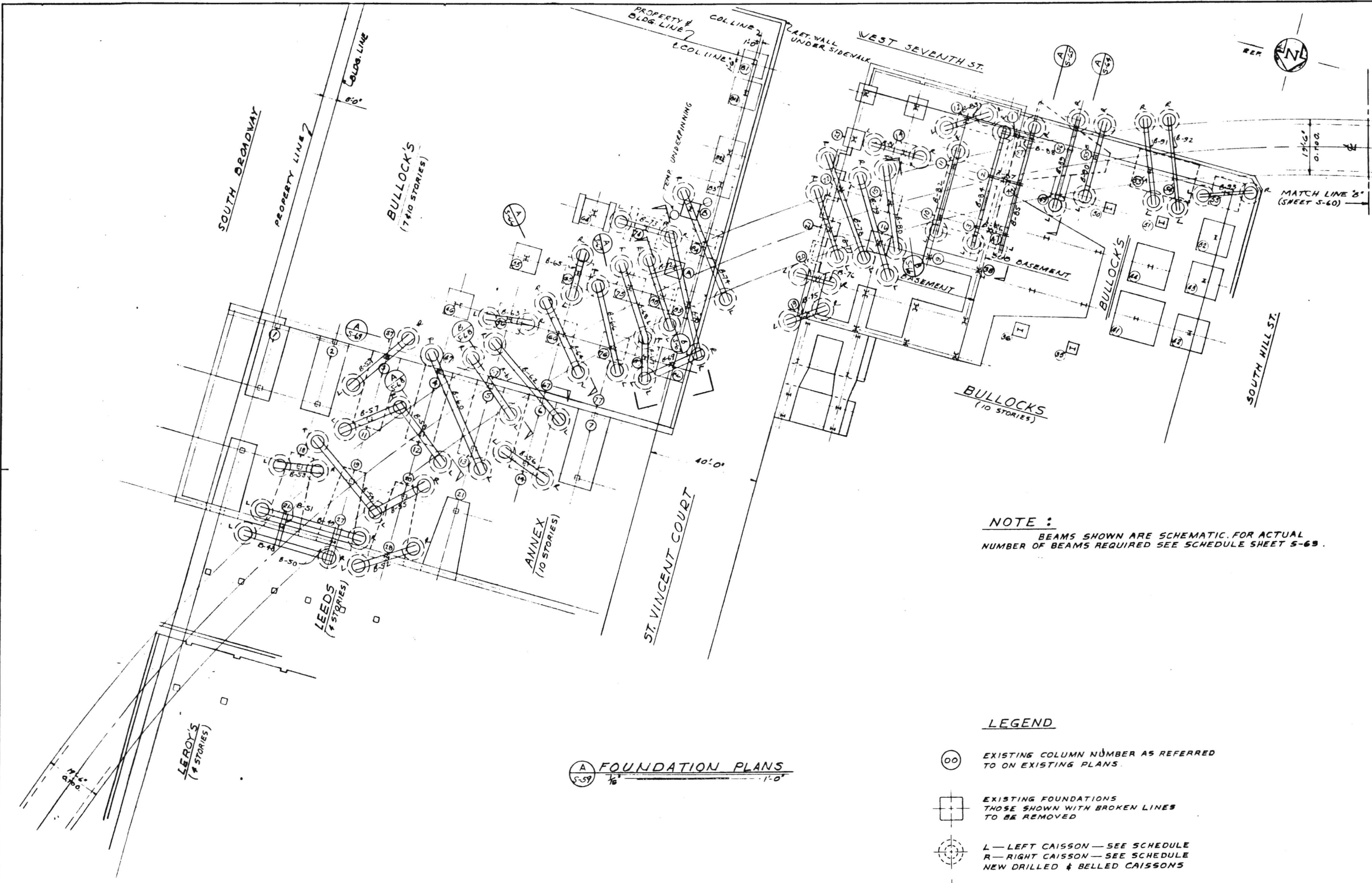
**C TYPICAL CAISSON**  
5-57 NO SCALE

**NOTE:** STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A-36.

PRELIMINARY DESIGN ONLY FOR COST ESTIMATING PURPOSES SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **S-57**  
 DATE  
 PROJECT MANAGER  
 SCHEMATIC DESIGNER  
 APPROVALS  
 KAISER ENGINEERS  
 A JOINT VENTURE  
 DANIEL MANN, JOHNSON, & MENDENHALL  
 ARCHITECTS - ENGINEERS  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 UNDERPINNING REQUIREMENTS - WILSHIRE  
 CORRIDOR - WILSHIRE TO SEVENTH STREET  
 DRAWING NO. **S-57**





**A FOUNDATION PLANS**  
 5-59 1/8" = 1'-0"

**NOTE :**  
 BEAMS SHOWN ARE SCHEMATIC. FOR ACTUAL NUMBER OF BEAMS REQUIRED SEE SCHEDULE SHEET 5-69.

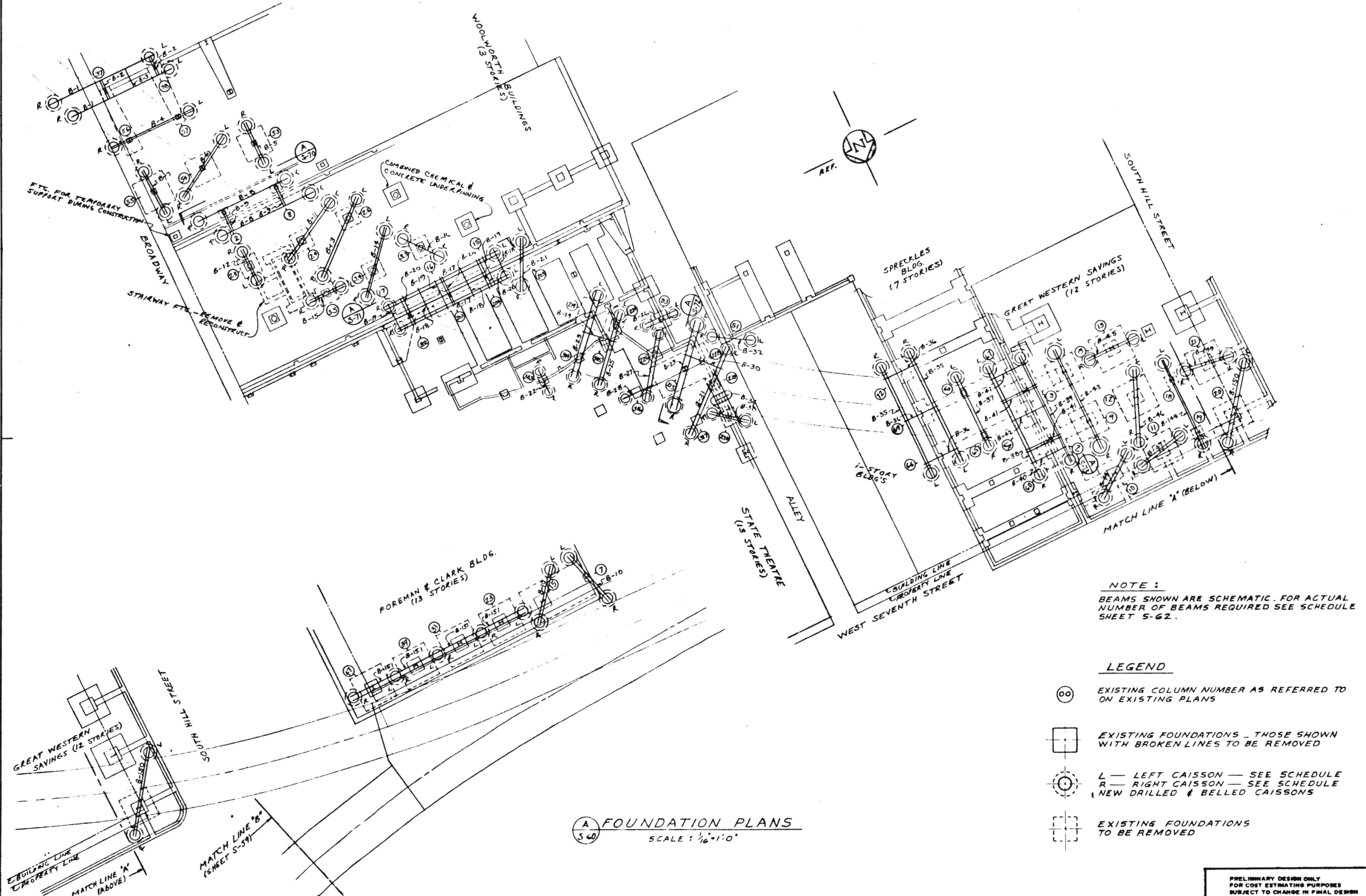
**LEGEND**

- ⊙ EXISTING COLUMN NUMBER AS REFERRED TO ON EXISTING PLANS.
- ⊠ EXISTING FOUNDATIONS THOSE SHOWN WITH BROKEN LINES TO BE REMOVED
- ⊙ L — LEFT CAISSON — SEE SCHEDULE  
 ⊙ R — RIGHT CAISSON — SEE SCHEDULE  
 ⊙ NEW DRILLED & BELLED CAISSONS
- ⊠ EXISTING FOUNDATIONS TO BE REMOVED

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO.	S-59		
	DATE	PROJECT NUMBER	DATE
APPROVALS	DESIGNED BY	PROJECT MANAGER	DATE
	CHECKED BY	SCALE	DATE
TITLE	WILSHIRE/LONG BEACH INTERCHANGE - UNDERPINNING - PLAN OF NORTH LEG		
	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA 90015		
ENGINEER	KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS		
	APRIL 1966		









**A FOUNDATION PLANS**  
 SCALE: 1/16" = 1'-0"

**NOTE:**  
 BEAMS SHOWN ARE SCHEMATIC. FOR ACTUAL NUMBER OF BEAMS REQUIRED SEE SCHEDULE SHEET S-62.

**LEGEND**

-  EXISTING COLUMN NUMBER AS REFERRED TO ON EXISTING PLANS
-  EXISTING FOUNDATIONS - THOSE SHOWN WITH BROKEN LINES TO BE REMOVED
-  L - LEFT CAISSON - SEE SCHEDULE  
 R - RIGHT CAISSON - SEE SCHEDULE  
 NEW DRILLED & BELLED CAISSONS
-  EXISTING FOUNDATIONS TO BE REMOVED

PRELIMINARY DESIGN ONLY  
 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **S-60**

DATE

APPROVALS

PROJECT MANAGER

CHECKED BY

DATE

ARCHITECTS - ENGINEERS

A JOINT VENTURE

DANIEL MANN, JOHNSON, & MENDENHALL

ARCHITECTS - ENGINEERS

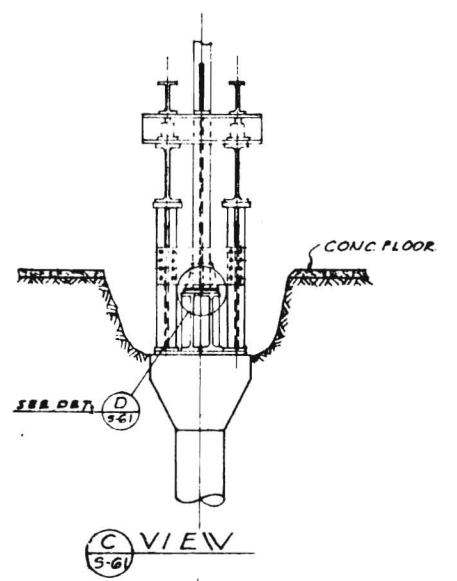
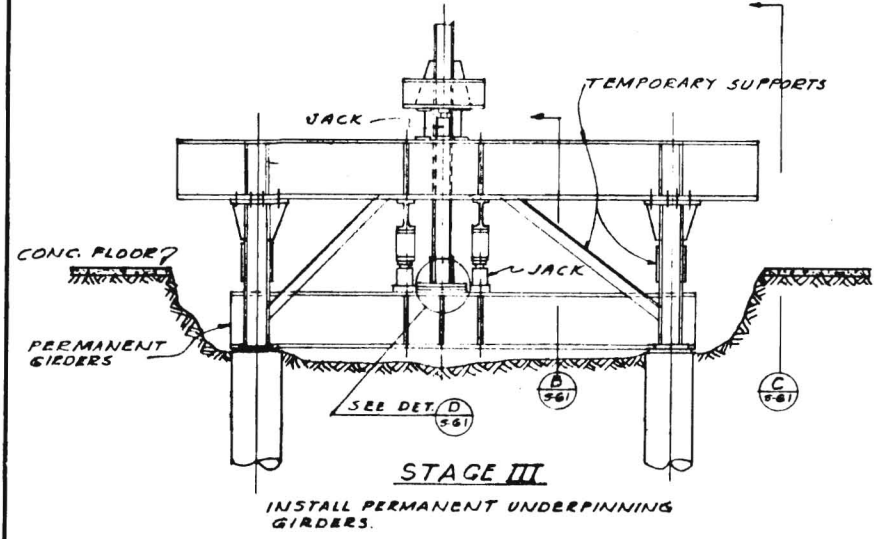
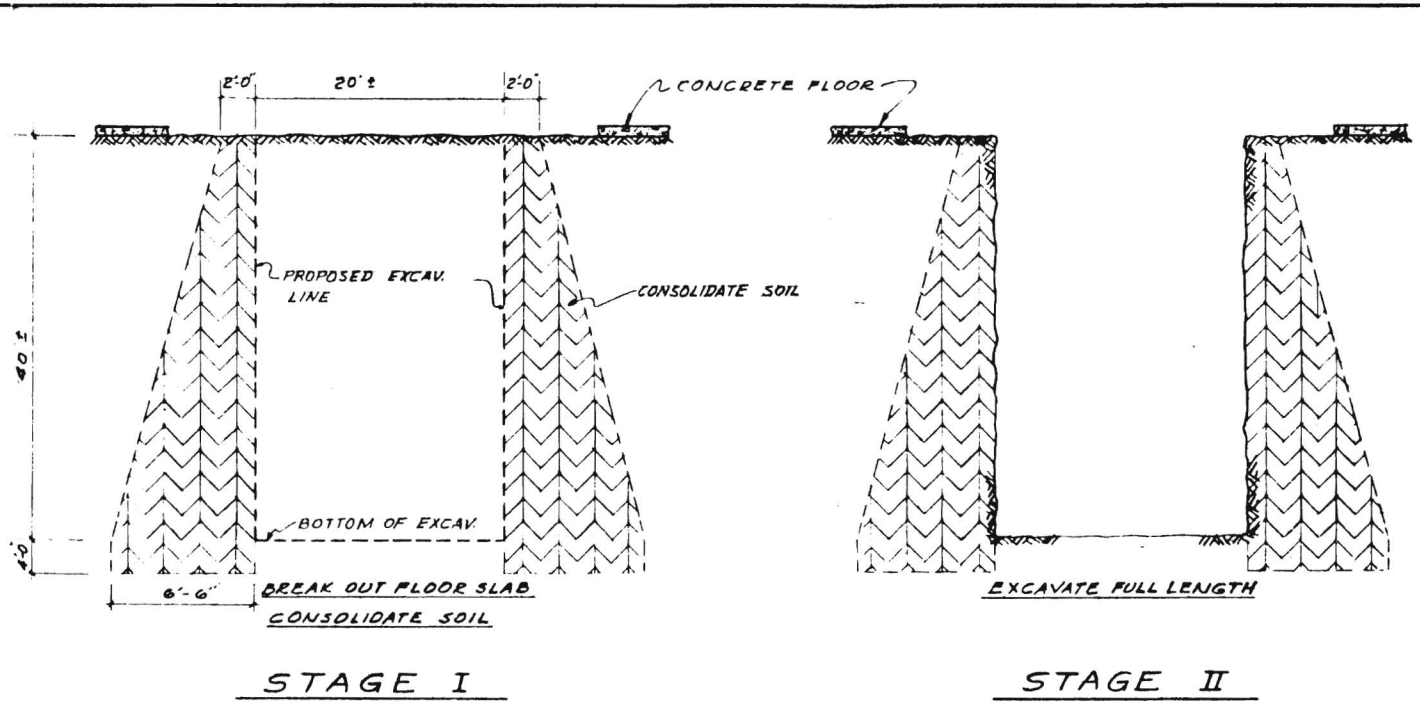
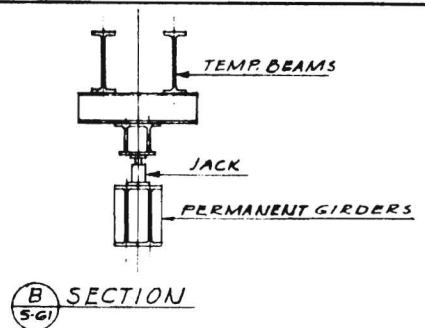
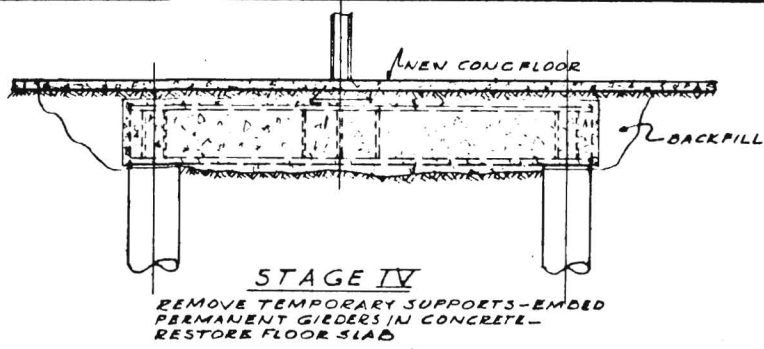
SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

LOS ANGELES, CALIFORNIA 90015

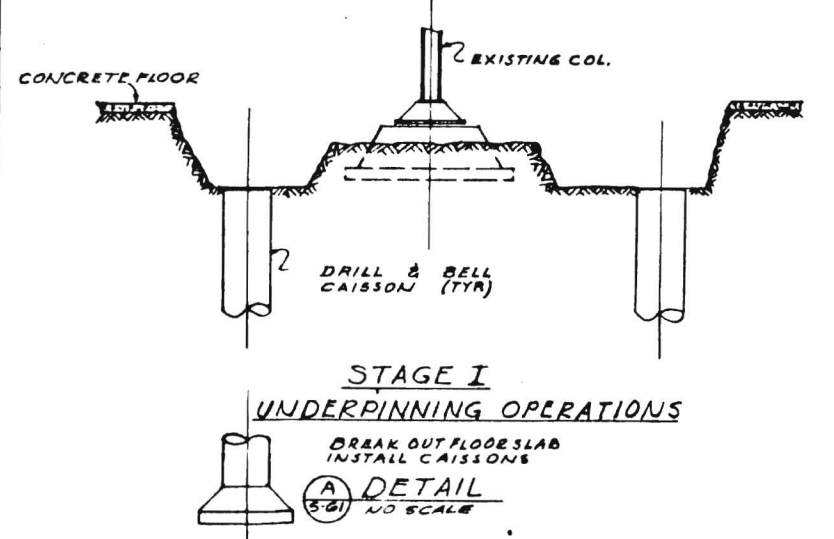
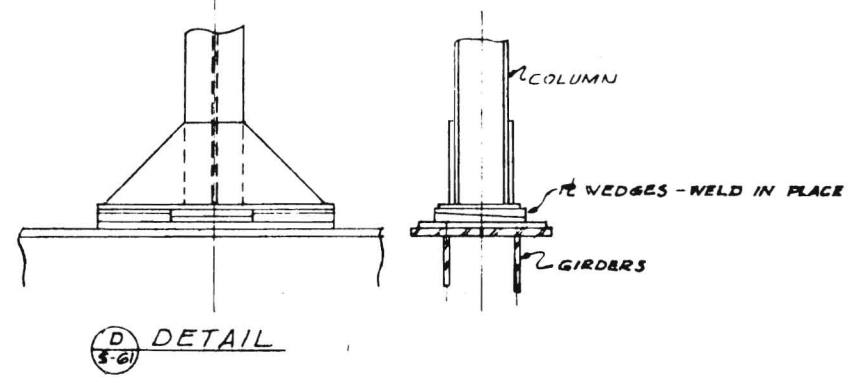
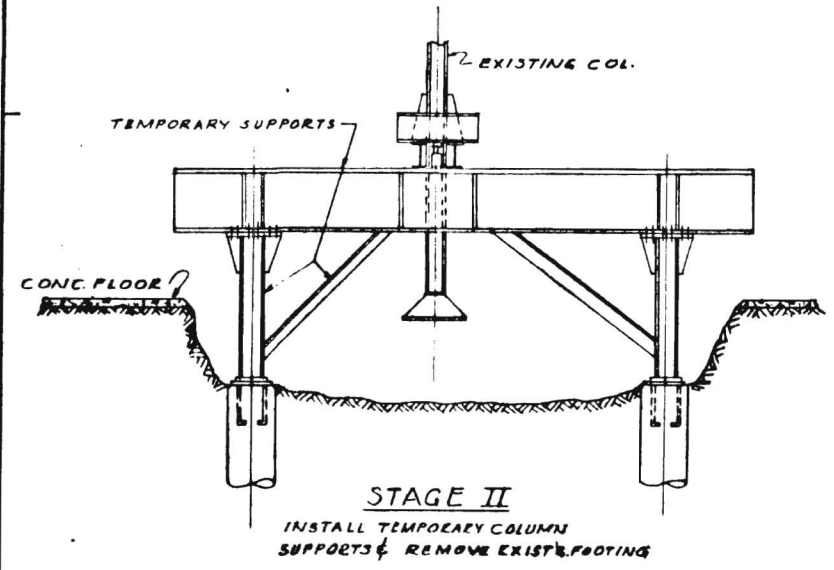
FID

DATE

DRAWING NO. **S-60**



**E CHEMICAL GROUTING DETAIL**  
NO SCALE



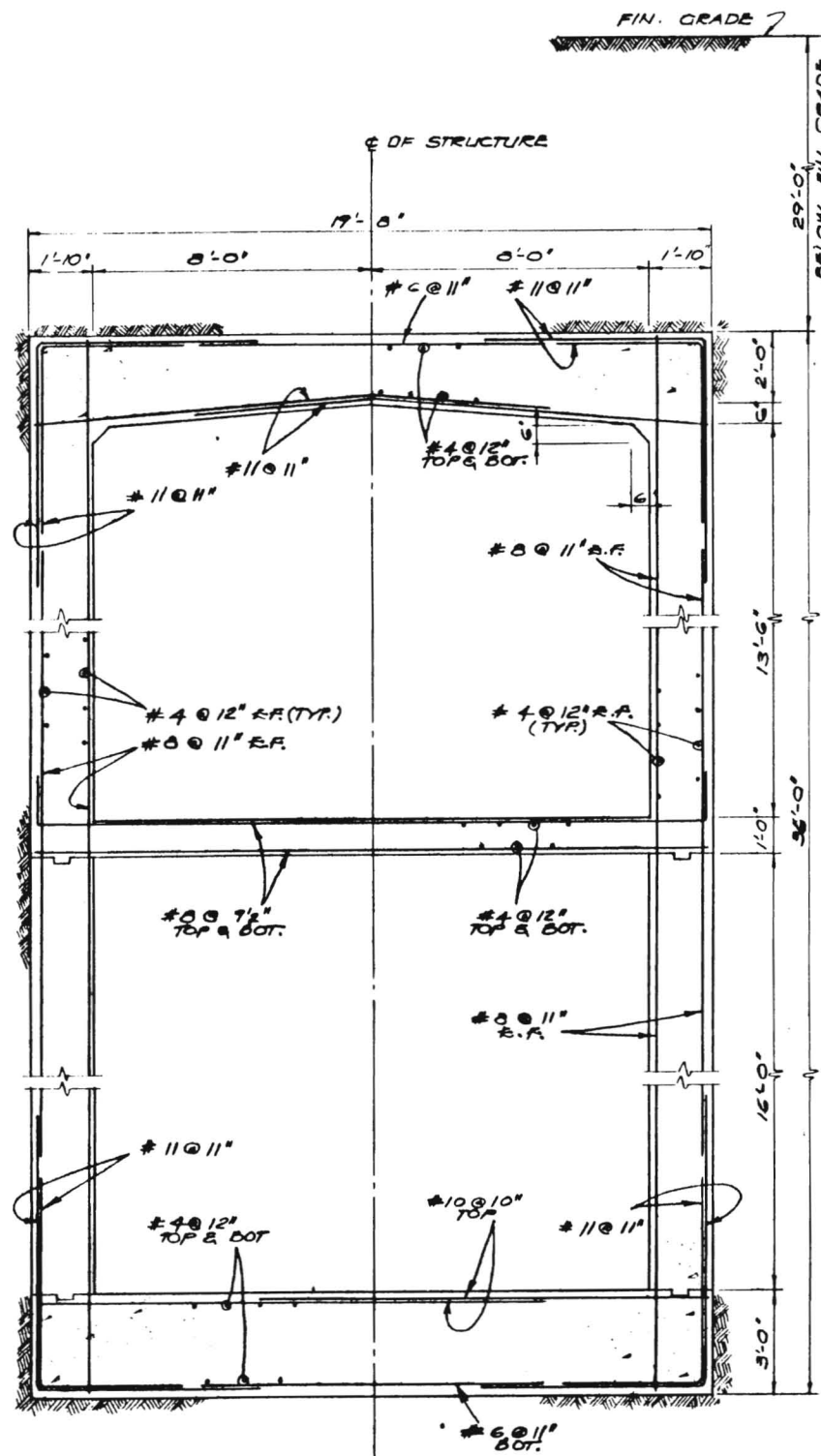
**GENERAL NOTES ON INTERCHANGE UNDERPINNING:**

1. UNDERPINNING FOR THE WOOLWORTH AND SPRECKLES BUILDINGS, WHICH ARE CONCRETE STRUCTURES, WILL REQUIRE MORE SPECIFIC CONSIDERATION FOR FINAL DESIGN THAN IS INCLUDED ON THESE DRAWINGS.
2. IT IS POSSIBLE TO CHEMICALLY GROUT CAISSONS SIMILAR TO (A) (SEE ALSO (A)) IN LIEU OF DRILLING. THE ESTIMATED AVERAGE COST FOR SUCH CAISSONS IS \$4000 ALTHOUGH CHEMICAL GROUT CAISSONS ARE PROBABLY MORE EXPENSIVE THAN NORMAL DRILLED AND BELLED CAISSONS, IT WOULD BE POSSIBLE TO COMBINE SOME CAISSONS INTO THE STABILIZATION FOR THE EXCAVATION (E). IT WILL BE NECESSARY TO CHEMICALLY GROUT UNDER SOME OF THE EXISTING FOUNDATIONS (NOT INDICATED ON THE DRAWINGS) WHEN DRILLING FOR THE CAISSONS WOULD TEND TO UNDERCUT THEIR SUPPORT. THIS COULD FOR THE MOST PART BE ELIMINATED WITH CHEMICAL GROUT CAISSONS.

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN



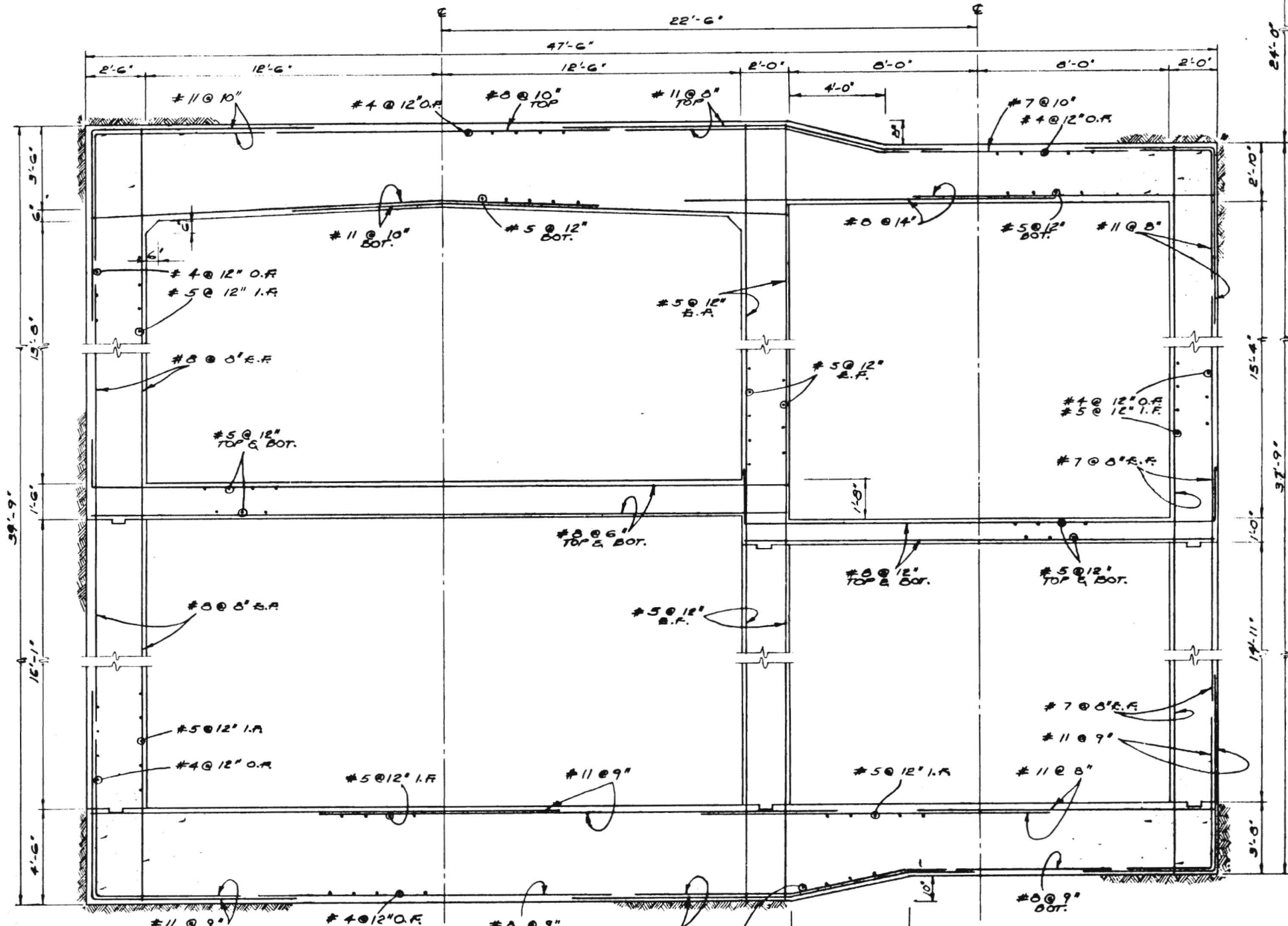




CONC. 8.44 CY/FT.  
REINF. 200 #/C.Y.

**SECTION I**

STATION 84+23.03 TO 85+00 ON 7<sup>TH</sup> STREET (C-115)  
 STATION 75+30 TO 81+70 ON MAIN LINE (C-112)  
 STATION 75+55 TO 81+70 ON LINE "B" (C-112)  
 STATION 72+35 TO 73+00 ON BROADWAY (C-111)  
 STATION 85+59 TO 86+74 ON BROADWAY (C-111, C-114)



CONC. 22.3 CY/FT.  
REINF. 150 #/C.Y.

**SECTION II**

STATION 75+00 TO 75+30 ON BROADWAY (C-111)  
 STATION 83+45 TO 83+80 ON BROADWAY (C-111)  
 STATION 81+70 TO 82+50 ON MAIN LINE (C-112)  
 & LINE "B" (C-112)

NOTE: REFER TO CIVIL DWGS. C-110 THROUGH C-117.

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

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **S-64**

APPROVALS

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: [Date]

PROJECT NUMBER: [Number]

SHEET NUMBER: [Number]

SCALE: [Scale]

ARCHITECTS: KAISER ENGINEERS

ARCHITECTS: DANIEL MANN, JOHNSON, & MENDENHALL

ARCHITECTS: SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

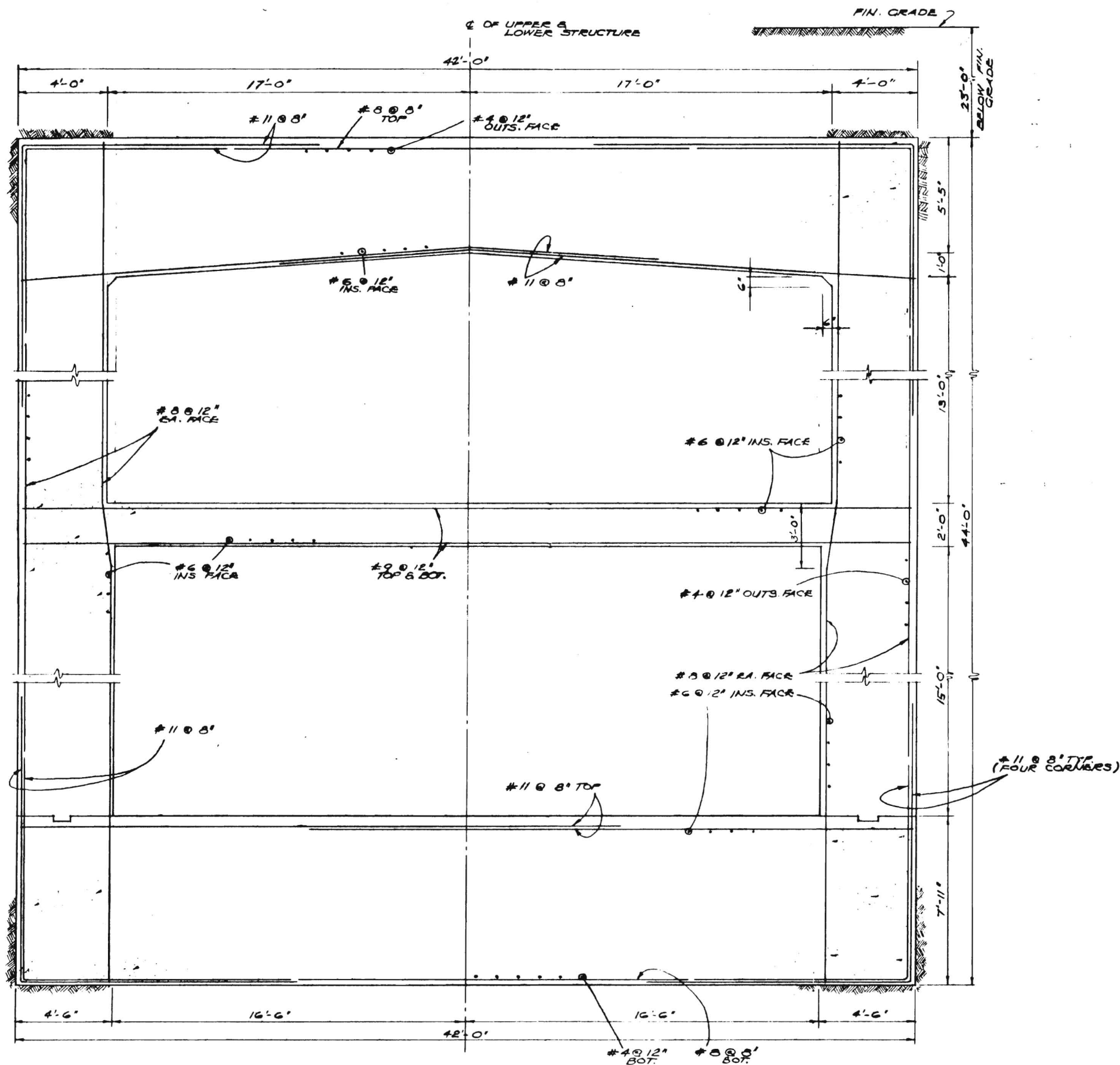
ARCHITECTS: LOS ANGELES, CALIFORNIA 90015

ARCHITECTS: **RTD**

ARCHITECTS: WILSHIRE/LONG BEACH INTERCHANGE - STRUCTURAL SECTIONS I & II

DRAWING NO. **S-64**





**A SECTION V**

NOTE: REFER TO CIVIL DWGS. C-110 - C-117, INCL.

CONC. : 32.8 C.Y./FT.  
REINF. : 73 #/C.Y.

STATION	64 + 00	70	65 + 00	ON BROADWAY (C-113)
STATION	73 + 60	70	75 + 00	ON BROADWAY (C-111)
STATION	75 + 30	70	75 + 50	ON BROADWAY (C-111)
STATION	83 + 00	70	83 + 45	ON BROADWAY (C-111)
STATION	83 + 80	70	85 + 00	ON BROADWAY (C-111)
STATION	87 + 74	70	88 + 74	ON BROADWAY (C-114)
STATION	82 + 50	70	83 + 00	ON MAINLINE & LINE "B" (C-112)

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

PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

DRAWING NO. **S-66**

APPROVALS

DATE: APRIL 1968

PROJECT ENGINEER: MEONIM

CHECKED BY: SCOTD

DATE: 4/1/68

DESIGNED BY: SCOTD

DATE: 4/1/68

DRAWN BY: SCOTD

DATE: 4/1/68

Kaiser Engineers  
A JOINT VENTURE  
DANIEL MANN, JOHNSON, & MENDENHALL  
ARCHITECTS ENGINEERS

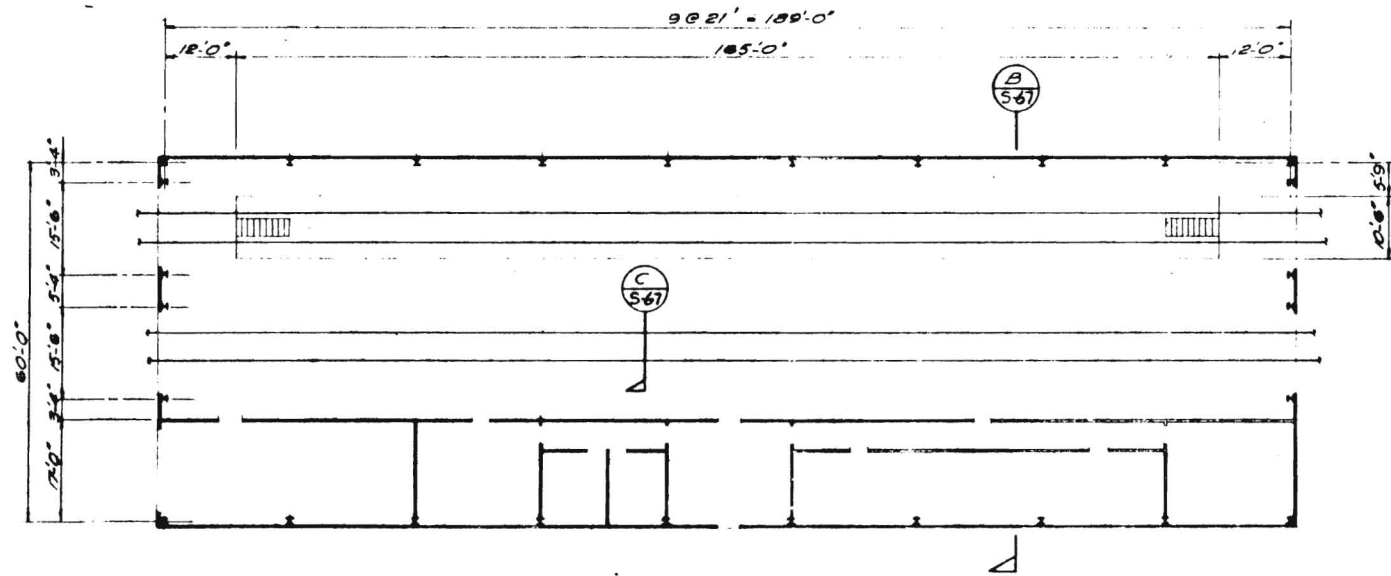
**FTD**

SOUTHERN CALIFORNIA  
RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90013

WILSHIRE/LONG BEACH INTERCHANGE -  
STRUCTURAL SECTION V

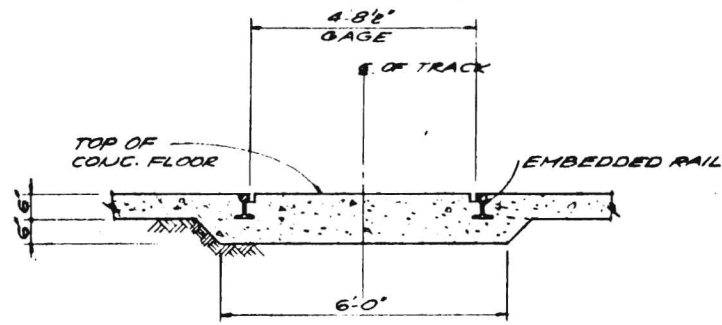
S-66



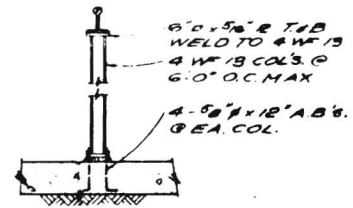


**A** SCHEMATIC PLAN  
5-67  
1/8" = 1'-0"

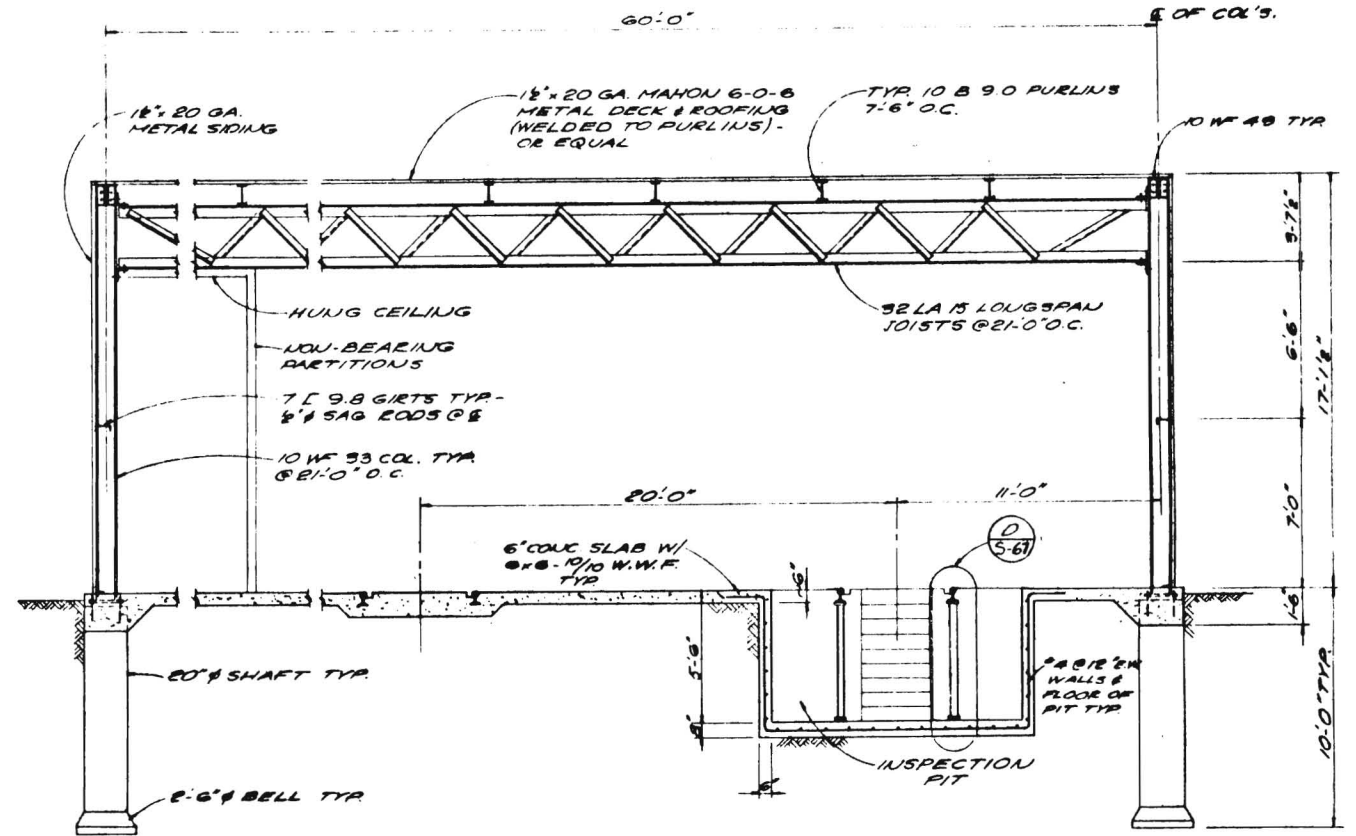
**NOTES:**  
 1. REFER TO A-56 FOR PLAN & ADDITIONAL DETAILS.  
 2. USE 5/8" X BRACING LONGITUDINALLY ONLY EVERY THIRD BAY ALL COLUMN LINES.



**C** TYP. SECTION OF FLOOR AT RAILS  
5-67  
1/2" = 1'-0"



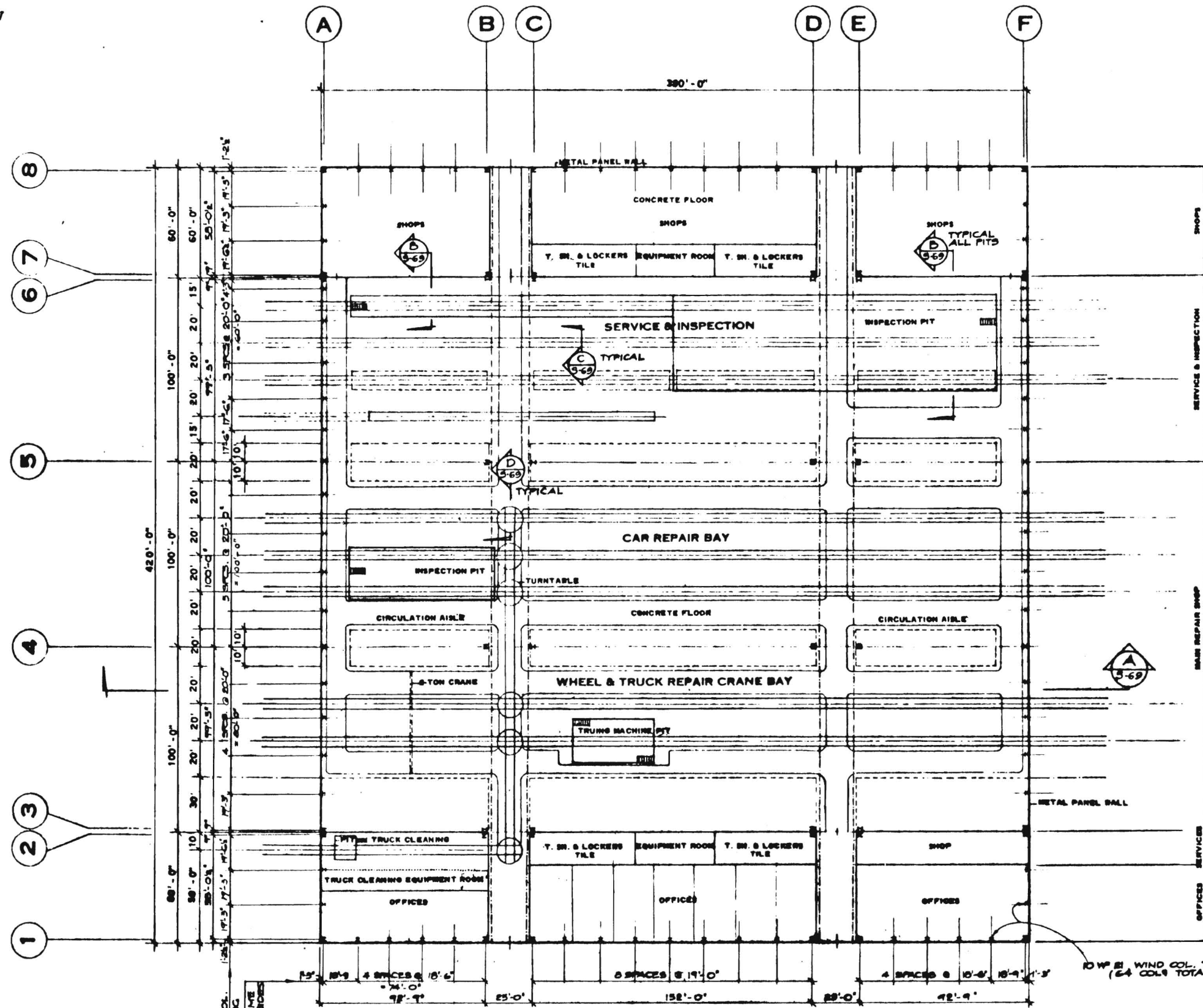
**D** DETAIL  
5-67  
2" = 1'-0"



**B** YARD SERVICE BUILDING  
5-67  
1/4" = 1'-0"  
TYP. STRUCTURAL SECTION

DATE	5-67	SCALE	DATE
APPROVALS		PROJECT MANAGER	
DESIGNED BY	DANIEL MANN, JOHNSON, & MENDENHALL	ENGINEER	
CHECKED BY		ARCHITECTS	
DATE	APRIL 1968	PROJECT NO.	
DATE		PROJECT NAME	YARD SERVICE BUILDING - STRUCTURAL DETAILS
DATE		PROJECT LOCATION	SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT LOS ANGELES, CALIFORNIA, 90015
DATE		PROJECT CLIENT	KAISER ENGINEERS A JOINT VENTURE DANIEL MANN, JOHNSON, & MENDENHALL ARCHITECTS - ENGINEERS
DATE		PROJECT NO.	5-67

PRELIMINARY ENGINEERING ONLY FOR COST ESTIMATING PURPOSES SUBJECT TO CHANGE IN FINAL DESIGN



**GROUND FLOOR PLAN**

1/2" = 1'-0"

**SCHEDULE OF LONGSPAN ROOF JOISTS**

ZONE	APPROX. SPAN	TYPE	WEIGHT (LBS./FT.)	FURLINE
A TO B AND 1 TO 2	39'-0"	36 LA #	30	10 B ILS 8'-0" MAX.
A TO B AND 7 TO 8				
E TO F AND 1 TO 2				
E TO F AND 7 TO 8				
C TO D AND 1 TO 2	—	NONE	—	18 B ILS 8'-0" MAX.
C TO D AND 7 TO 8				
B TO C AND 1 TO 2	100'-0"	SIM. TO 48 LA #	60	10 B ILS 8'-0" MAX.
D TO E AND 1 TO 2				

**SCHEDULE OF ROOF TRUSSES**

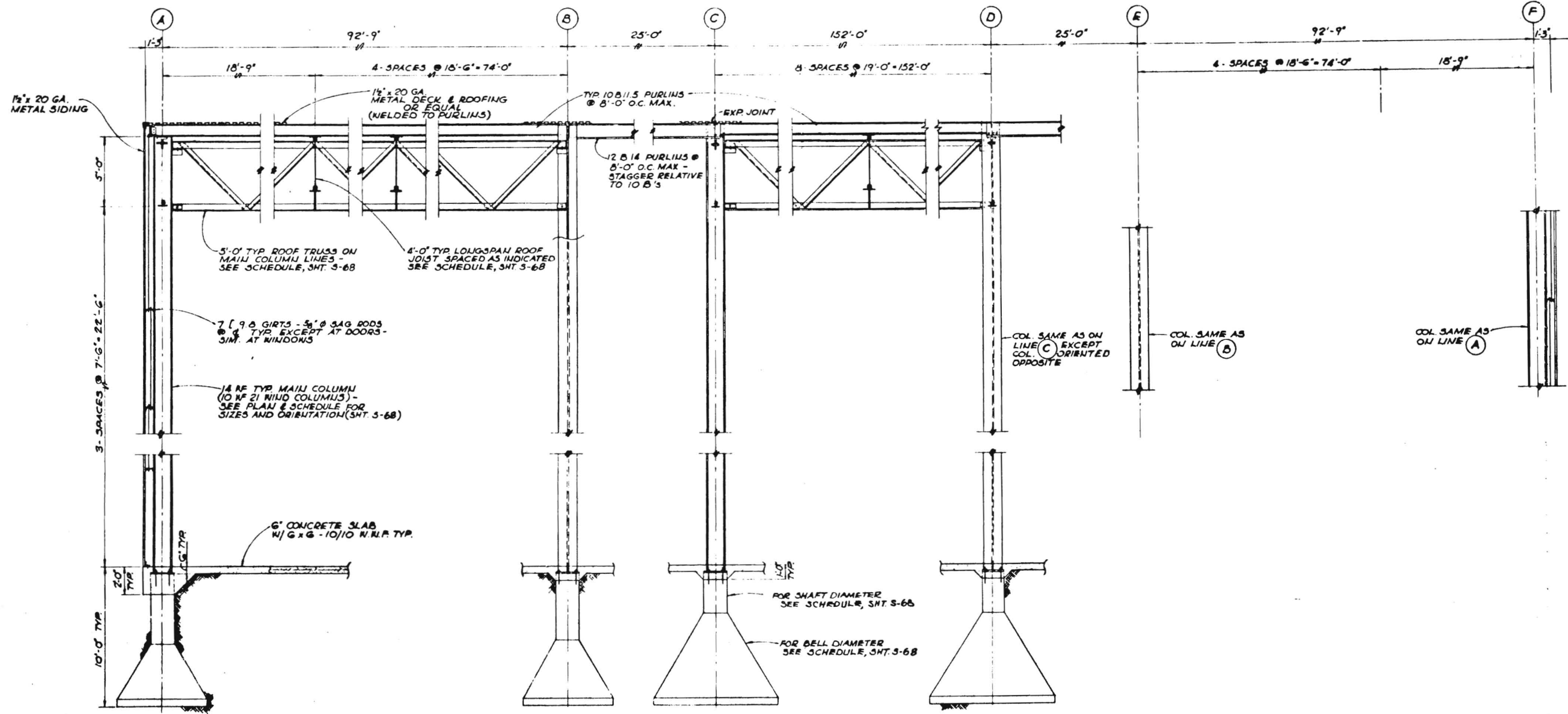
ZONE	FROM LINES	ON LINES	DEPTH	ESTIMATED WEIGHT (LBS./FT.)
A TO B AND E TO F	1 AND 8	1 AND 2	5'-0"	30
		2 AND 7	5'-0"	30
		3 AND 6	5'-0"	80
A TO B AND E TO F	1 AND 8	4 AND 5	5'-0"	180
		5 AND 6	5'-0"	180
B TO C AND D TO E	1 AND 8	1 AND 2	—	NONE
		2 AND 7	—	NONE
		3 AND 6	—	NONE
		4 AND 5	—	NONE
C TO D	1 AND 8	1 AND 2	5'-0"	150
		2 AND 7	5'-0"	360
C TO D	1 AND 8	3 AND 4	5'-0"	450
		4 AND 5	5'-0"	450
1 TO 2 AND 7 TO 8	A AND F	A AND B	5'-0"	40
		B AND C	5'-0"	40
1 TO 2 AND 7 TO 8	A AND F	C AND D	5'-0"	40
		D AND E	5'-0"	75
3 TO 4, 4 TO 5 AND 5 TO 6	A AND F	B AND C	5'-0"	75
		C AND D	5'-0"	75

**SCHEDULE OF COLUMNS & FOOTINGS**

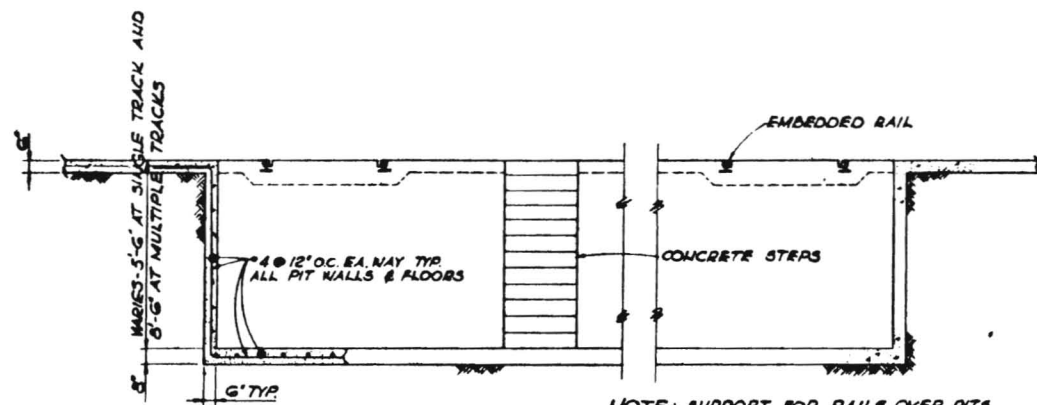
COLUMN DESIGNATION	COLUMN SIZE	CAISSON SHAFT DIA.	FTG. BELL DIAMETER
A-1, A-2, A-3, A-4	14 W 150	1'-0" φ	3'-6" φ
F-1, F-2, F-3, F-4	14 W 150	1'-0" φ	4'-0" φ
C-1, C-2, C-3, C-4	14 W 150	1'-0" φ	4'-9" φ
A-5, A-6	14 W 219	1'-8" φ	4'-9" φ
F-5, F-6	14 W 219	2'-0" φ	6'-6" φ
B-5, B-6	14 W 219	1'-8" φ	5'-3" φ
D-4, D-5	14 W 219	2'-4" φ	7'-3" φ
C-3, C-4	14 W 184	2'-0" φ	6'-6" φ
D-4, D-5	14 W 184	3'-0" φ	9'-0" φ

- GENERAL NOTES:**
- FOR ARCHITECTURAL DETAILS SEE SHEETS A-34 AND A-35.
  - ALL CONCRETE IS HARD ROCK, FC = 3000 P.S.I.
  - ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A-36. ALL LONGSPAN JOISTS SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE STEEL JOIST INSTITUTE.
  - ASSUME ROOF BRACING AT 10% S.P. OF ROOF AREA.
  - SUPPORTS FOR RAILS IN PITS SIM. TO (2); SEE ALSO (3).

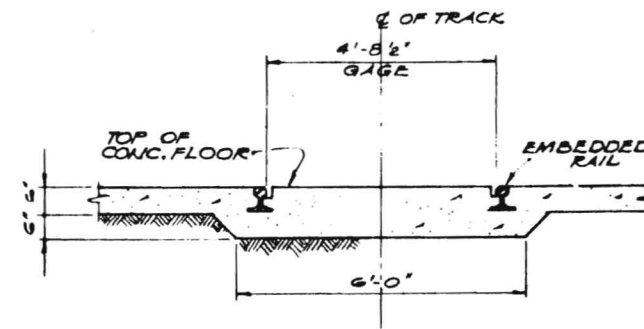
PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN



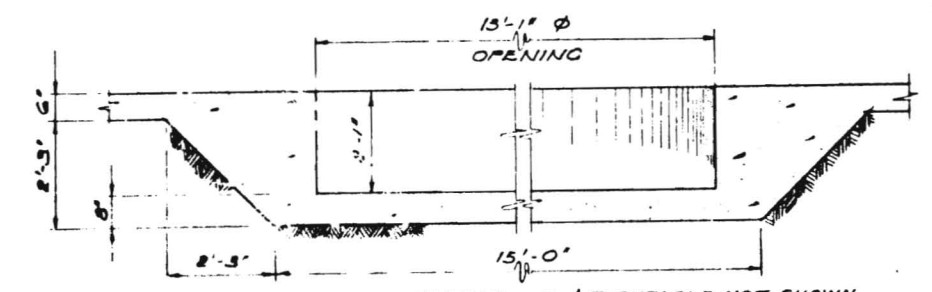
**A**  
5-69  
TYPICAL SECTION — SERVICE, INSPECTION & REPAIR BLDG.  
1/4" = 1'-0"



**B**  
5-69  
TYPICAL PIT DETAIL  
1/4" = 1'-0"



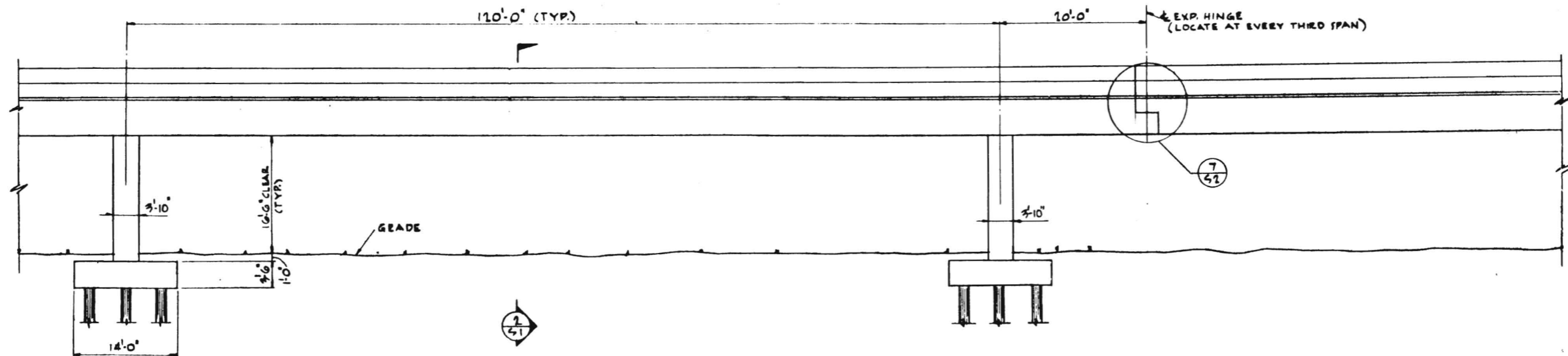
**C**  
5-69  
SECTION EMBEDDED RAIL  
1/2" = 1'-0"



**D**  
5-69  
SECTION THRU TURNTABLE  
OPENING  
1/2" = 1'-0"

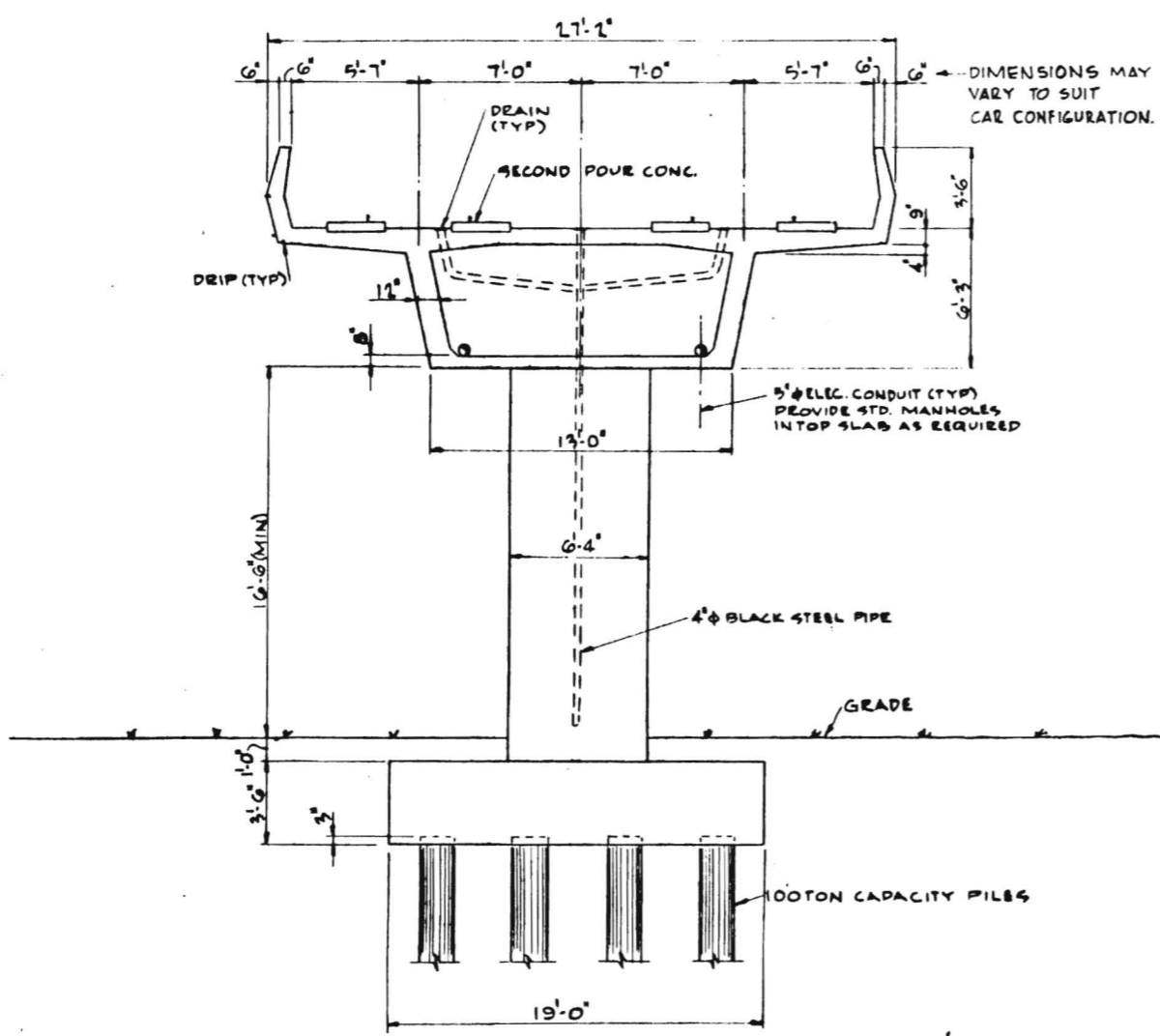
PRELIMINARY DESIGN ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN





11  
51 ELEVATION

1/8" = 1'-0"



13  
51 SECTION

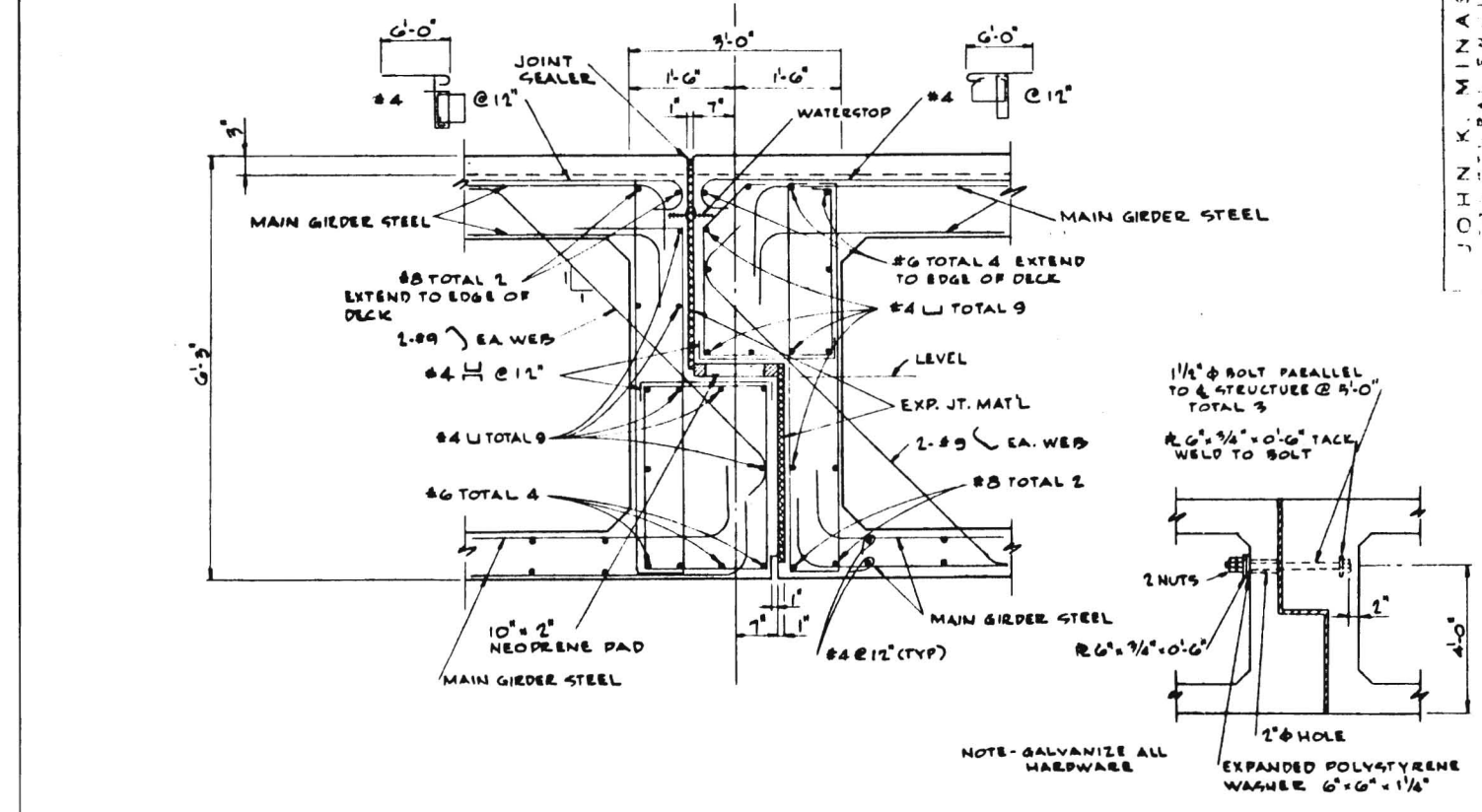
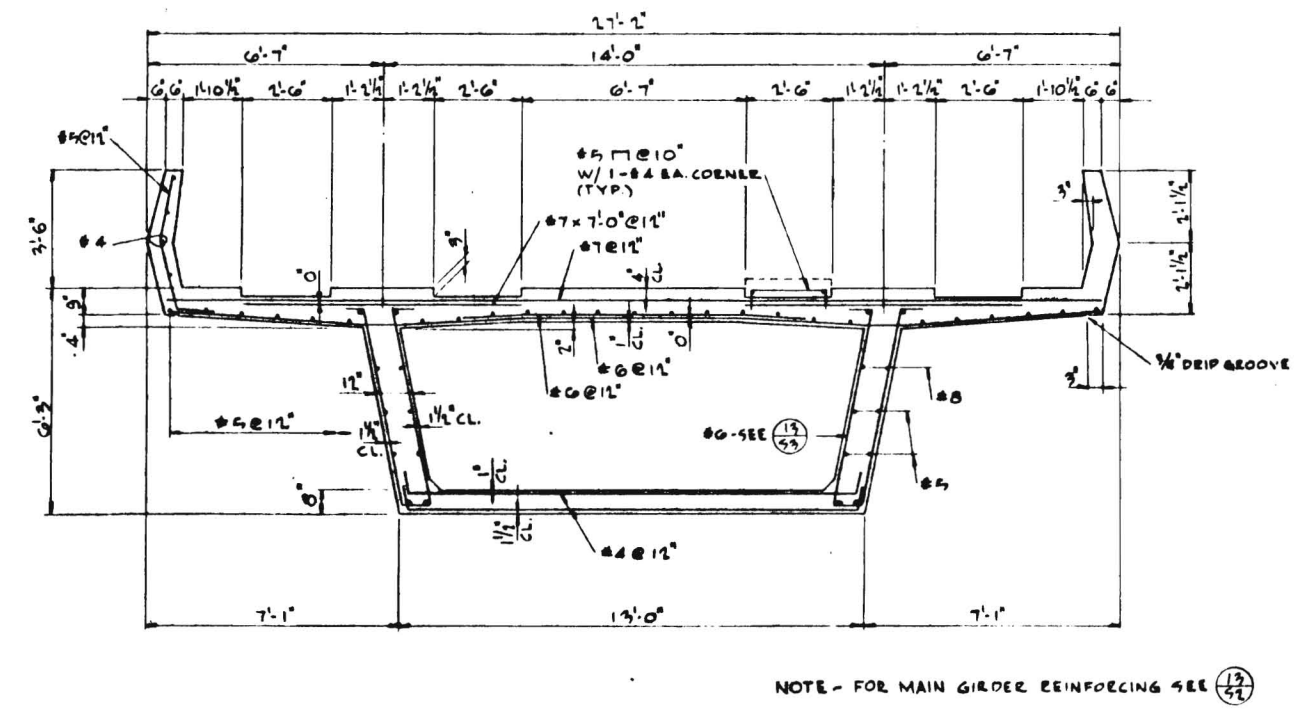
1/4" = 1'-0"

15  
51 GENERAL NOTES

**GENERAL NOTES**

- ALLOWABLE CONCRETE STRESSES -
- AERIAL GIRDERS, COLUMNS AND SPECIAL STRUCTURES - 4000 PSI
- FOUNDATIONS AND STRUCTURAL CONCRETE - 3000 PSI
- REINFORCING STEEL -
- INTERMEDIATE GRADE -  $f_s = 10,000$  PSI; A-432 ( $F_y = 60,000$ )  $f_s = 24,000$  PSI
- STRUCTURAL STEEL - PER A.I.S.C. SPECIFICATIONS
- BASIC BUILDING CODES -
- 1967 UNIFORM BUILDING CODE, 1969 A.A.S.H.O. (9TH EDITION), SIXTH EDITION A.I.S.C. SPECIFICATIONS, AND A.C.I. BUILDING CODE (318-69)
- LOADINGS -
- MAX. LIVE LOAD MOVING WEIGHT CAR AXLE LOAD WITHOUT IMPACT - 26.3k
- MAX. LIVE LOAD MOVING WEIGHT CAR AXLE LOAD WITH IMPACT - 32.8k
- WIND - TO 60' HIGH = 20 PSF; ABOVE 60' HIGH = 25 PSF, OPEN STRUCTURE
- ROOF = 15 PSF (UPLIFT), TRAIN TO 60' HIGH = 225 PLF, ABOVE 60' HIGH = 280 PLF.
- STREET LOADING = H20 S16 (AASHTO)
- SEISMIC - PER LATERAL FORCE REQUIREMENTS OF THE S.E.A.O.C.
- DEFLECTION LIMITATIONS -
- SPANS  $\leq 120'$  - 3.1" (DL)
- SPANS  $> 120'$  - 4.1" (DL)
- LIVE LOAD + IMPACT  $L/800$  MAX. FOR 80% LOAD.

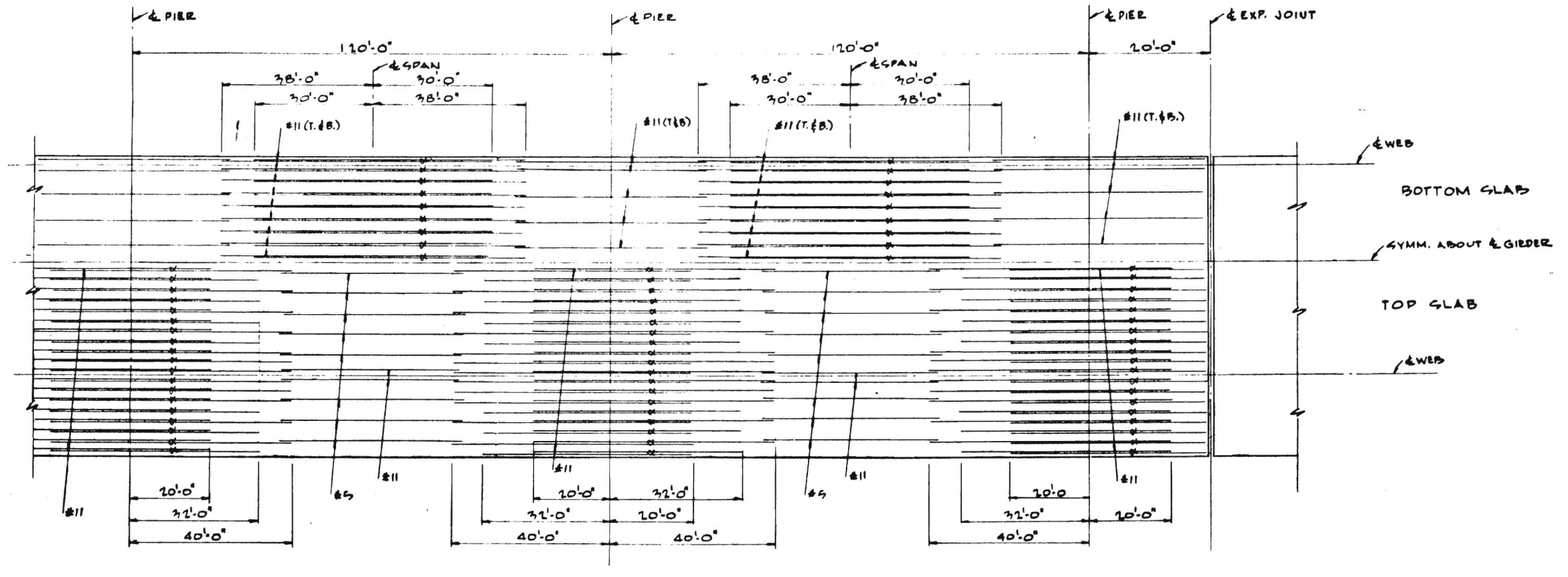
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 FOR COST ESTIMATING PURPOSES  
 SUBJECT TO CHANGE IN FINAL DESIGN



5/57 TYPICAL SECTION AT MIDSPAN

3/8" = 1'-0" 7/57 EXPANSION HINGE DETAIL

3/8" = 1'-0"

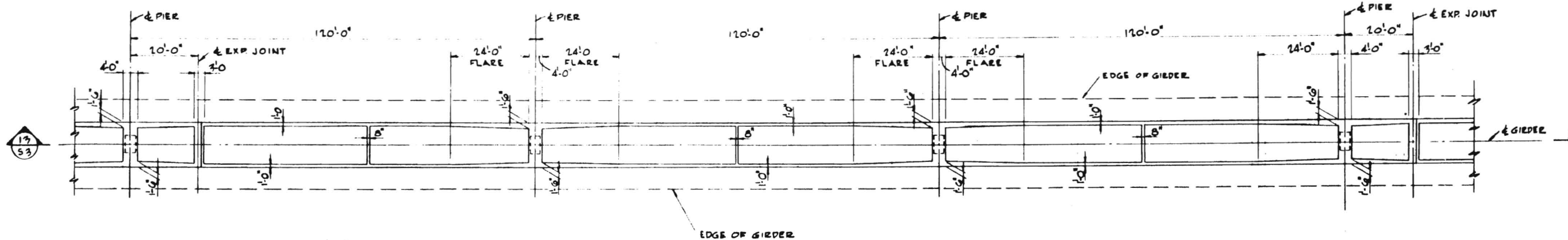


13/57 PLAN - GIRDER REINFORCING

K DENOTES BUNDLED BARS

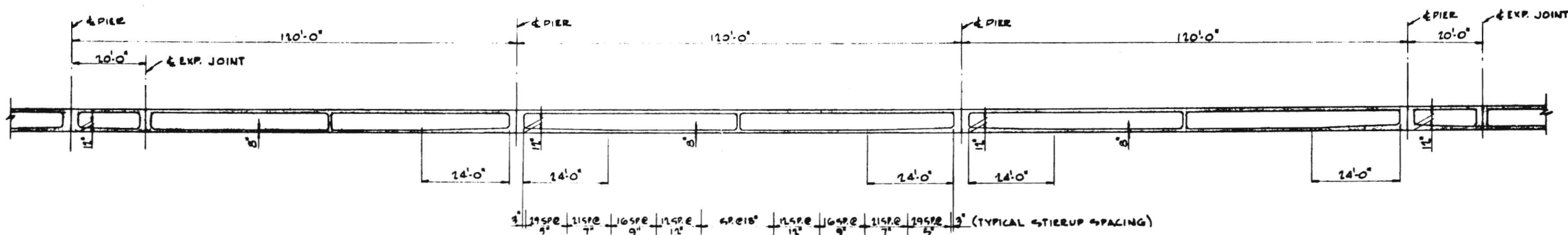
V- H<sup>1</sup> = 1'-0"  
H- H<sup>2</sup> = 1'-0"

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN



13/53 PLAN OF GIRDER LAYOUT

1/16" = 1'-0"



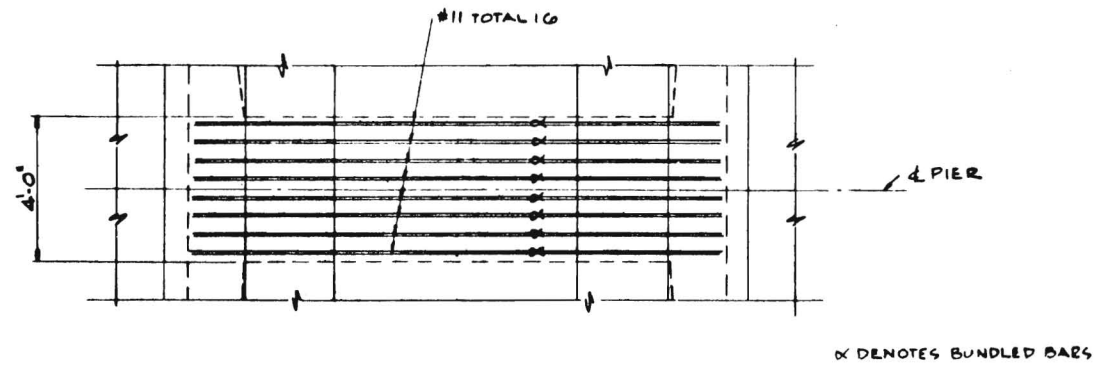
13/53 SECTION

1/16" = 1'-0"

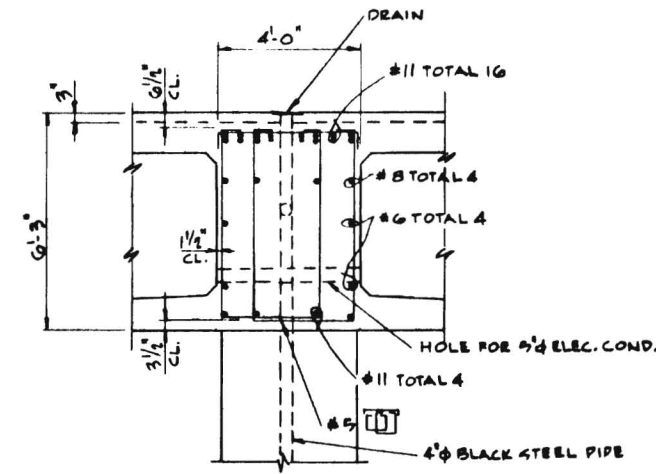
PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

APPROVALS  
 JOHN K. JINASSIAN  
 M. A. NISHKIAN & CO.  
 CONSULTING ENGINEERS  
 LONG BEACH, LOS ANGELES  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 FILE  
 STRUCTURAL DETAILS  
 AIRPORT, SOUTHWEST CORRIDOR  
 DRAWN BY J.K.M.  
 CHECKED BY T.C.  
 APRIL 1968  
 S203

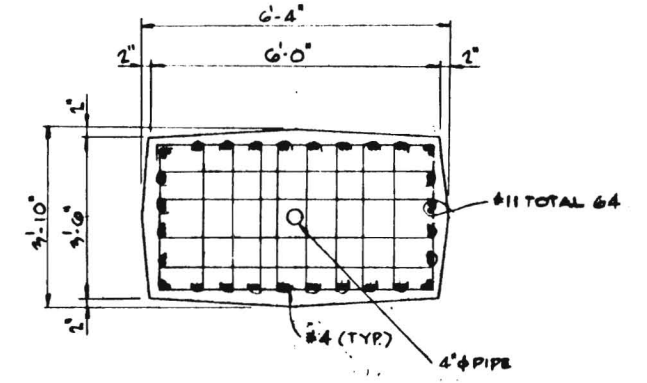




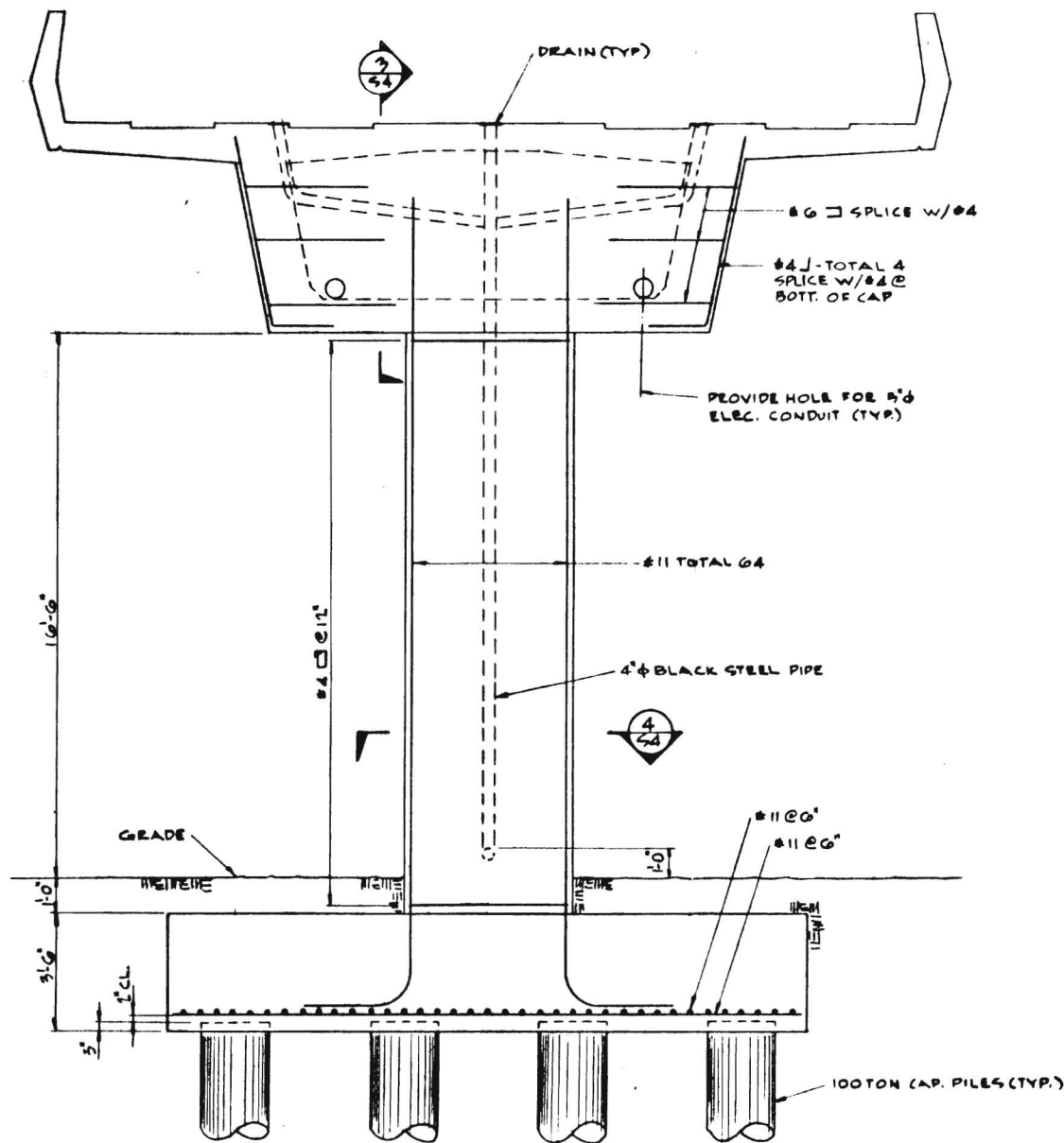
1/54 PLAN - PIER CAP



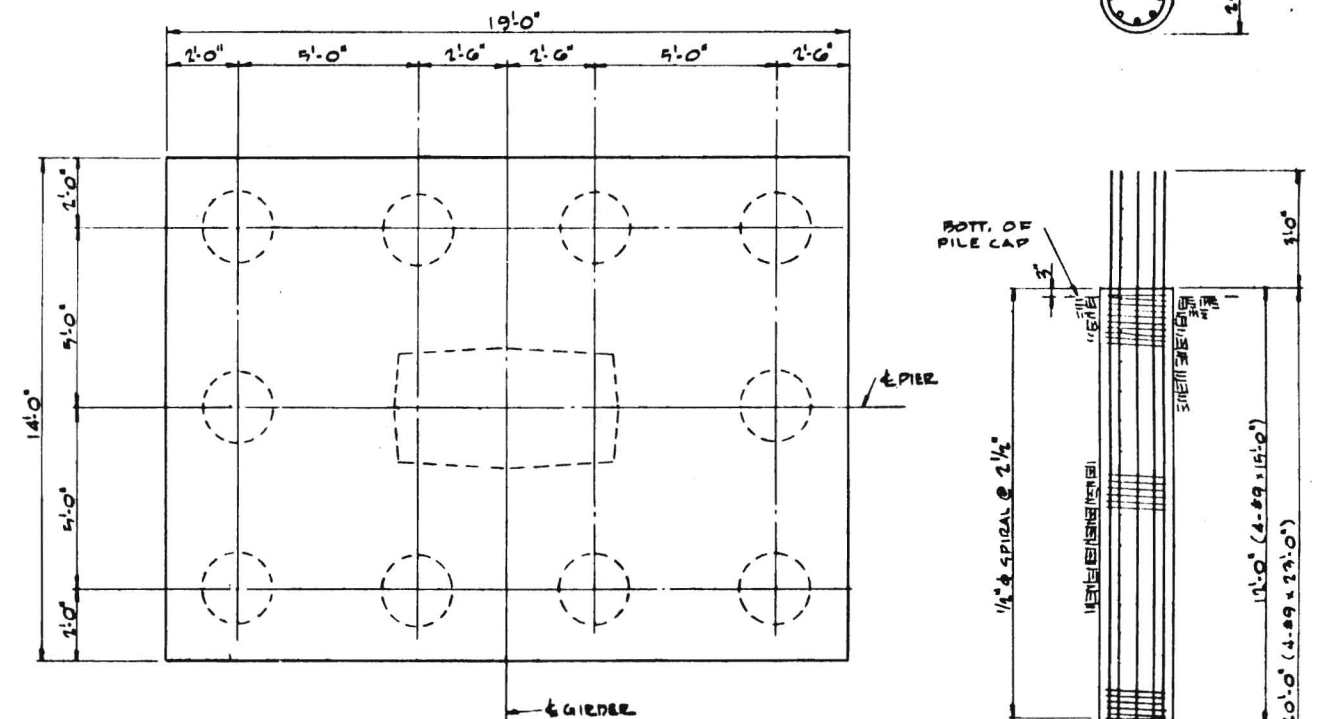
3/54 SECTION



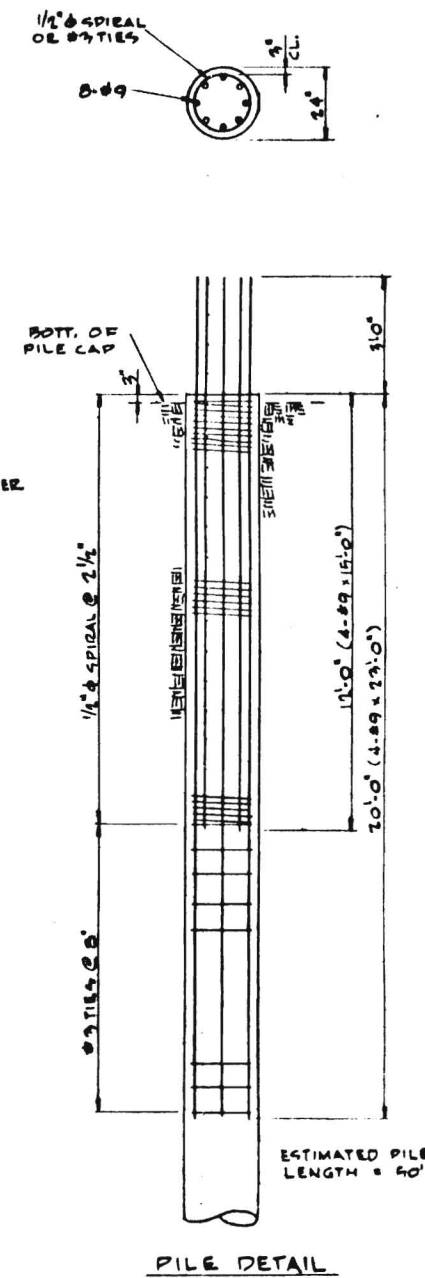
4/54 SECTION



13/54 ELEVATION - PIER



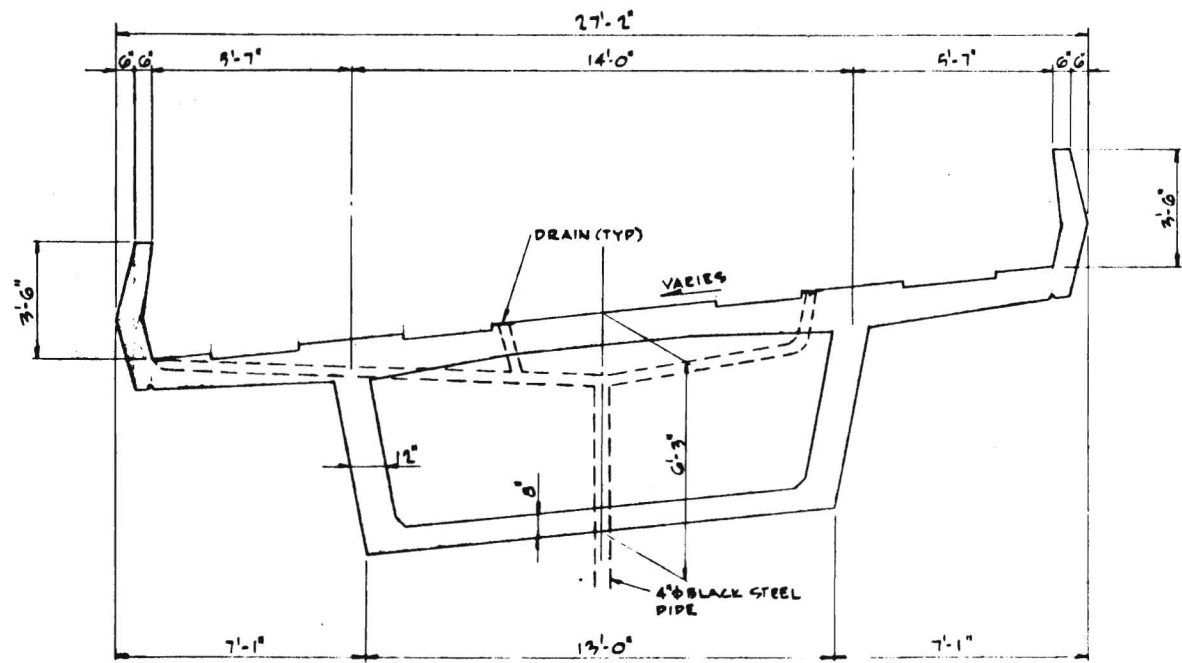
15/54 FOOTING PLAN



PILE DETAIL

PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

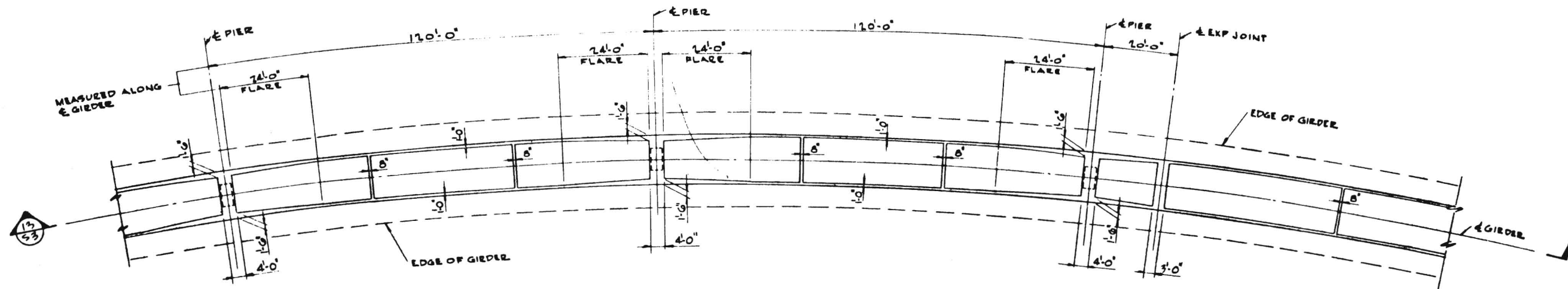
APPROVALS  
APRIL 1968  
DRAWN BY J.K.M.  
CHECKED BY G.L.  
JOHN K. MINASIAN  
M. A. NISHKIAN & CO.  
CONSULTING ENGINEERS  
LOS ANGELES  
SOUTHERN CALIFORNIA  
RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA  
SUPERSTRUCTURE DETAILS  
AIRPORT, SOUTHWEST CORNER  
S204



NOTE -  
FOR DETAILS AND DIMENSIONS NOT SHOWN SEE  $\frac{5}{92}$

$\frac{5}{55}$  TYPICAL SECTION AT MIDSPAN - CURVED ALIGNMENT

$\frac{3}{8}'' = 1'-0''$

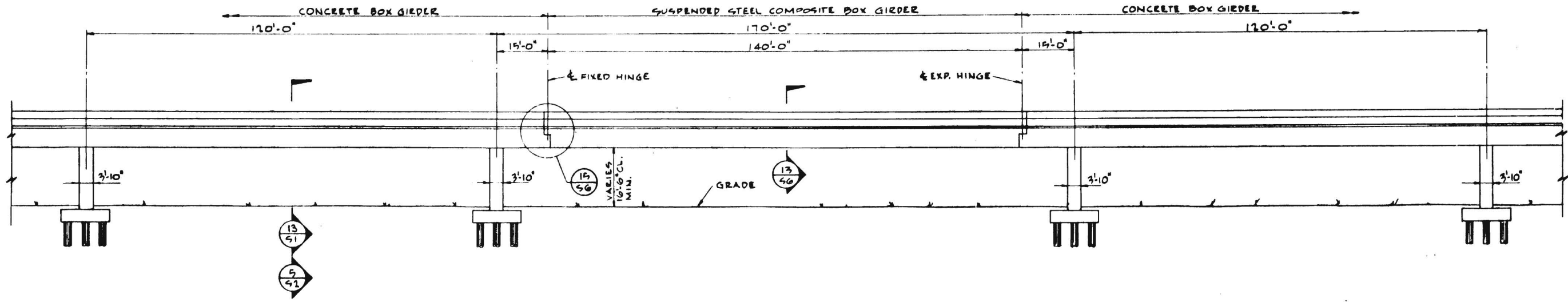


$\frac{12}{55}$  PLAN OF GIRDER LAYOUT - CURVED ALIGNMENT

$\frac{1}{4}'' = 1'-0''$

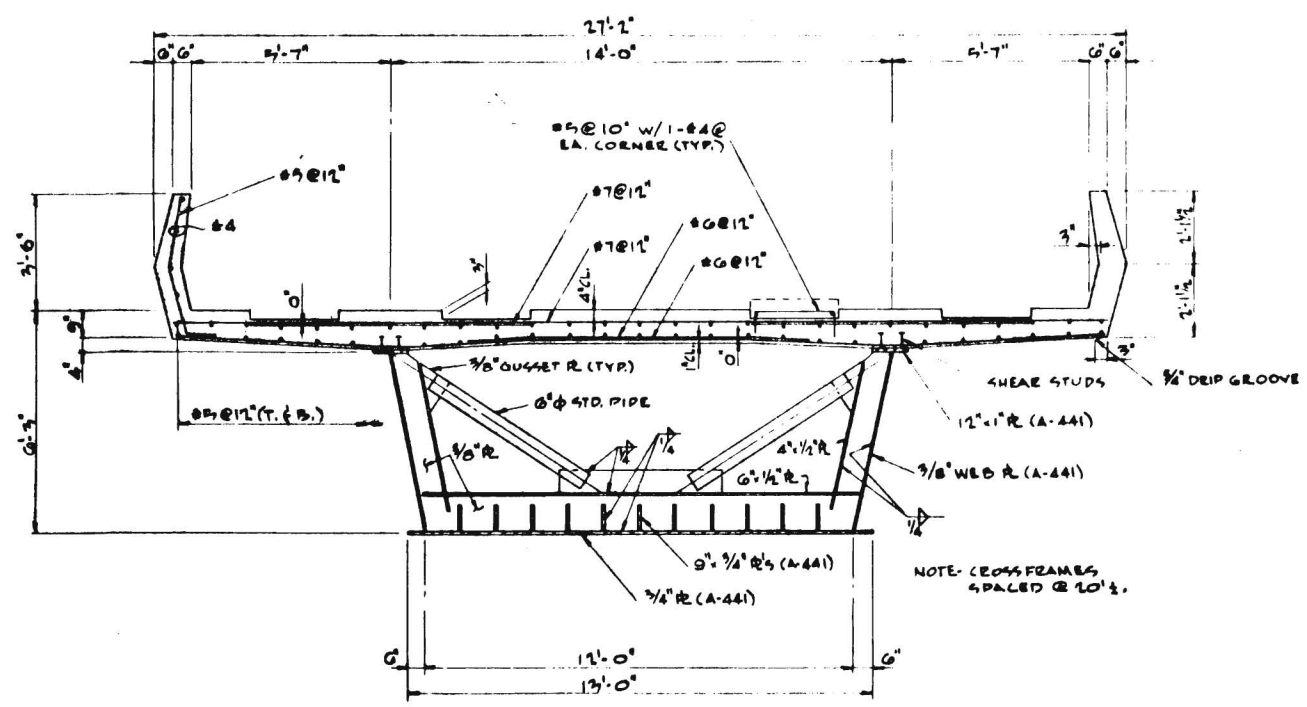
PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

JOHN K. MINASIAN  
 APRIL 1968  
 DRAWN BY J.E.M.  
 CHECKED BY E.L.  
 M. A. NISHKIAN & CO.  
 CONSULTING ENGINEERS  
 LOS ANGELES  
 LONG BEACH  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 STRUCTURES ON CURVE  
 AIRPORT-SOUTHWEST CORRIDOR  
 DRAWING NO. **S205**



1/50 ELEVATION

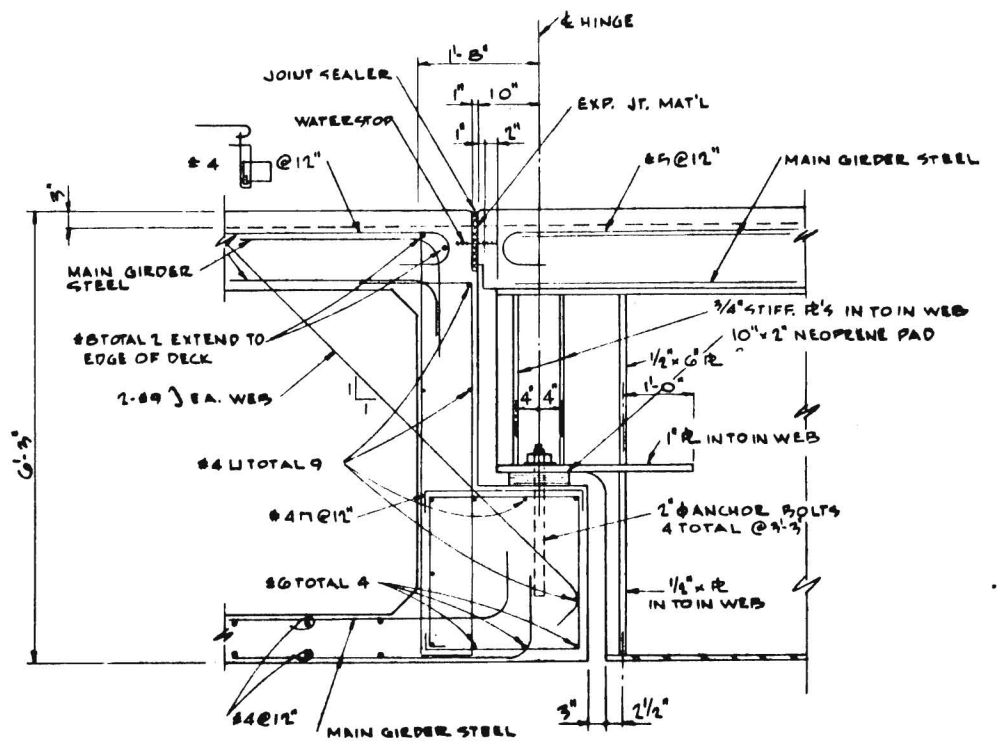
1/16" = 1'-0"



1/50 SECTION

3/8" = 1'-0"

17/50 DETAIL

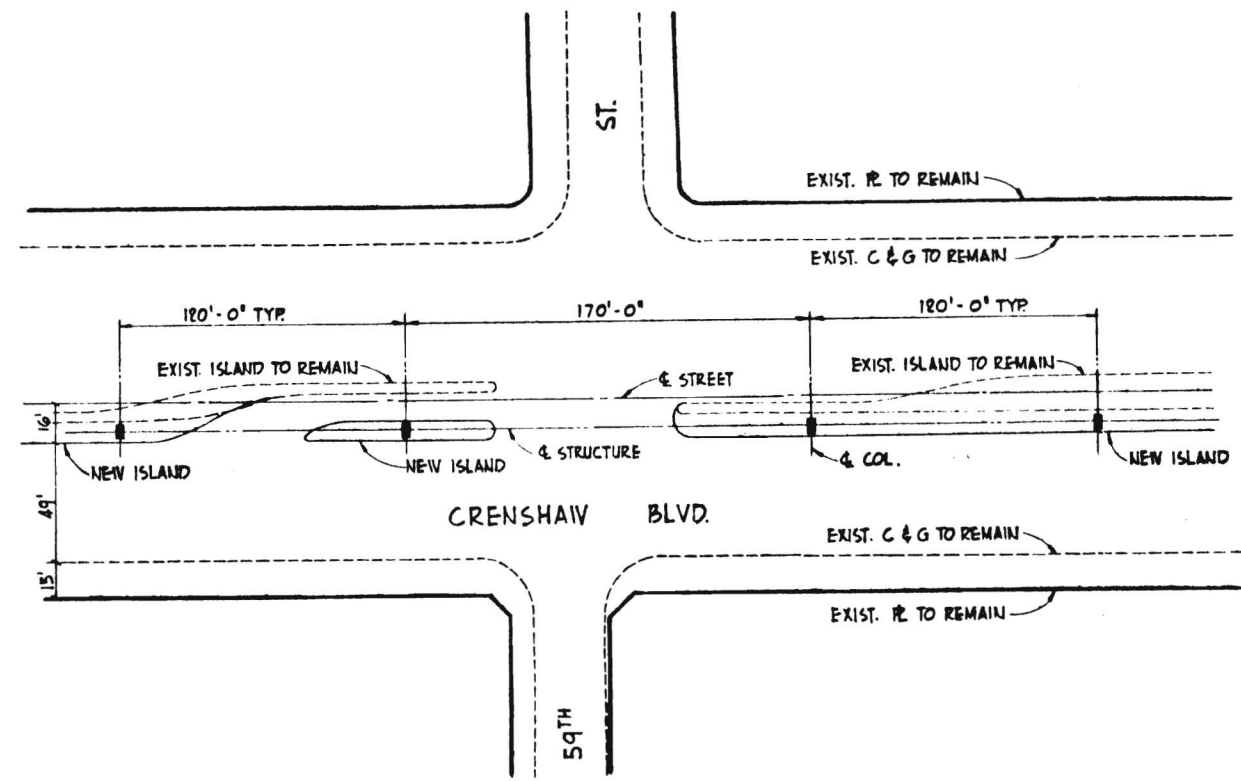
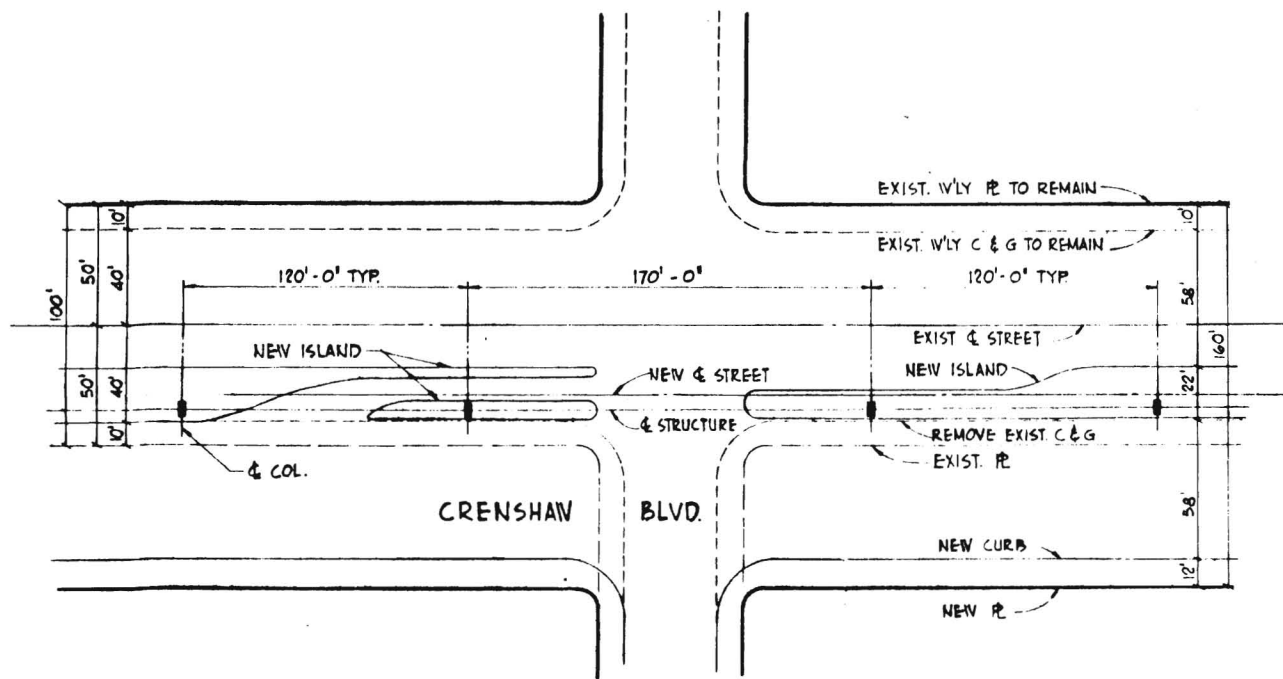


3/8" = 1'-0"

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FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN

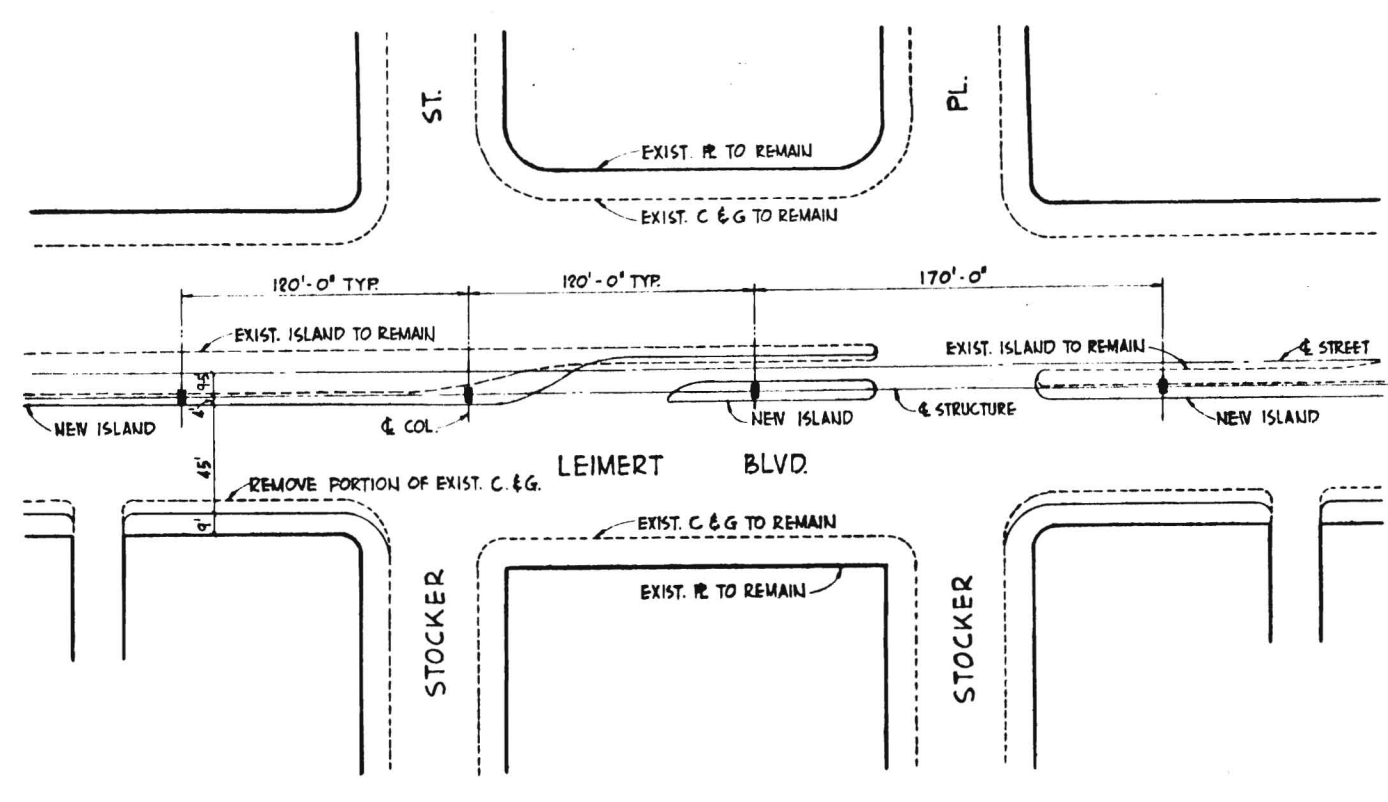
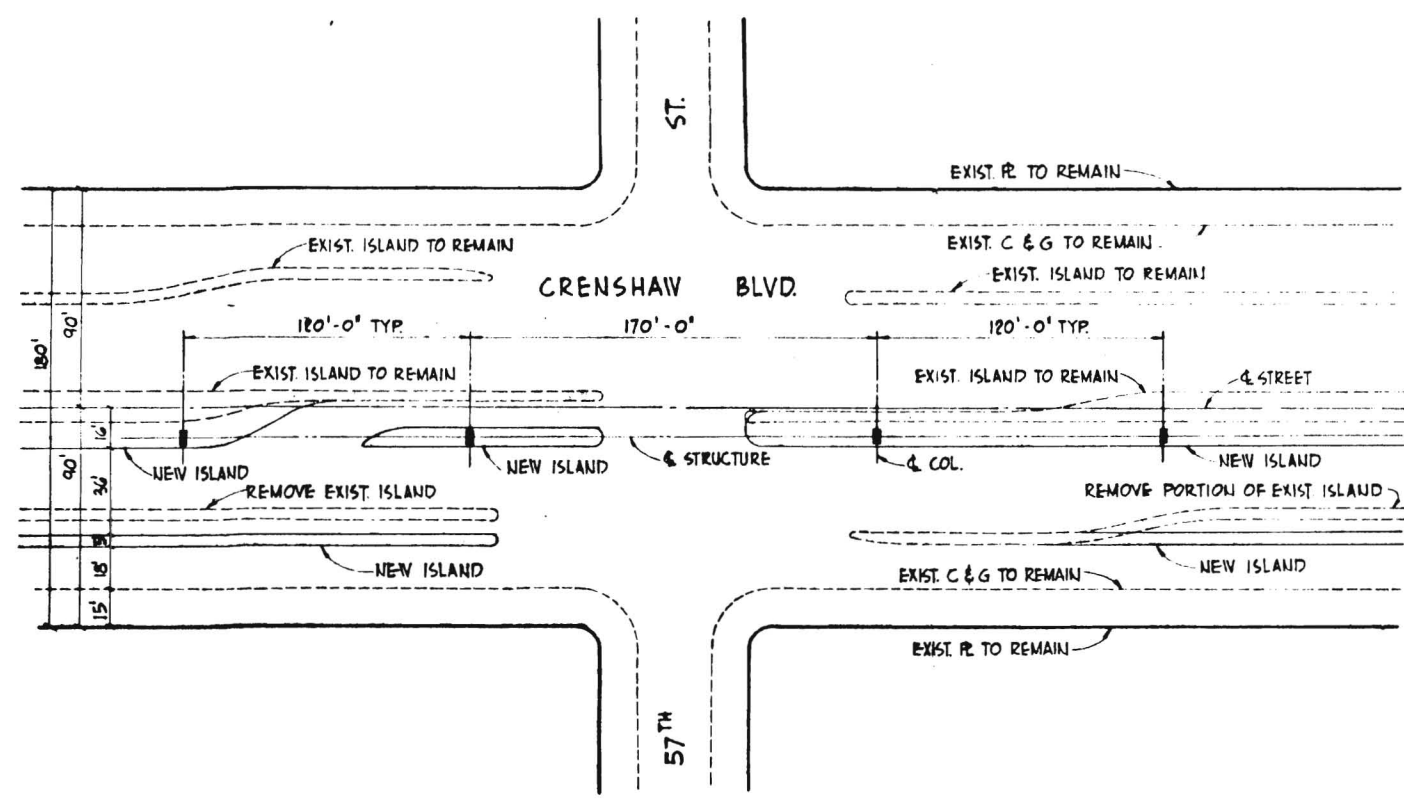
JOHN K. MINASIAN  
 STRUCTURAL ENGINEER  
 S206  
 APPROVALS  
 M. A. NISHKIAN & CO.  
 CONSULTING ENGINEERS  
 LONG BEACH  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 THE DETAILS FOR SUSPENDED  
 STEEL COMPOSITE BOX GIRDER  
 AIRPORT - SOUTHWEST CORRIDOR  
 S206





1/57 CRENshaw BLVD. (60<sup>TH</sup> TO 67<sup>TH</sup> ST.) 1" = 40'-0"

2/57 CRENshaw BLVD. (VERNON TO 60<sup>TH</sup> ST.) 1" = 40'-0"

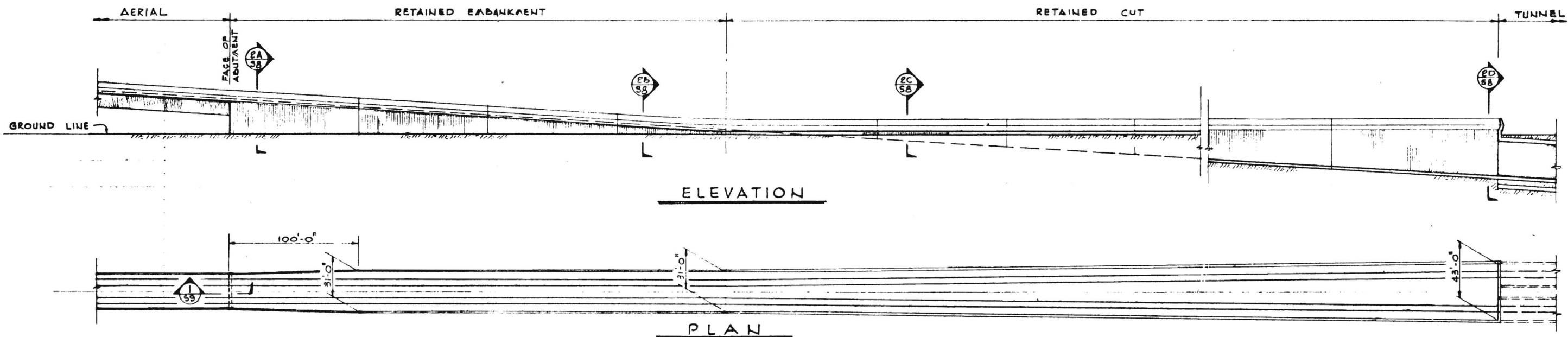


3/57 CRENshaw BLVD. (VERNON TO SLAUSON) 1" = 40'-0"

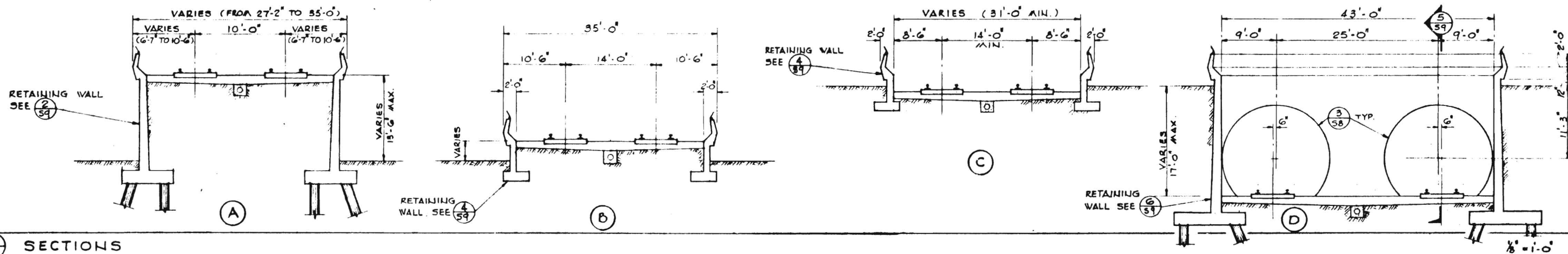
4/57 LEIMERT BLVD. (SANTA BARBARA TO CRENshaw) 1" = 40'-0"

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 SUBJECT TO CHANGE IN FINAL DESIGN

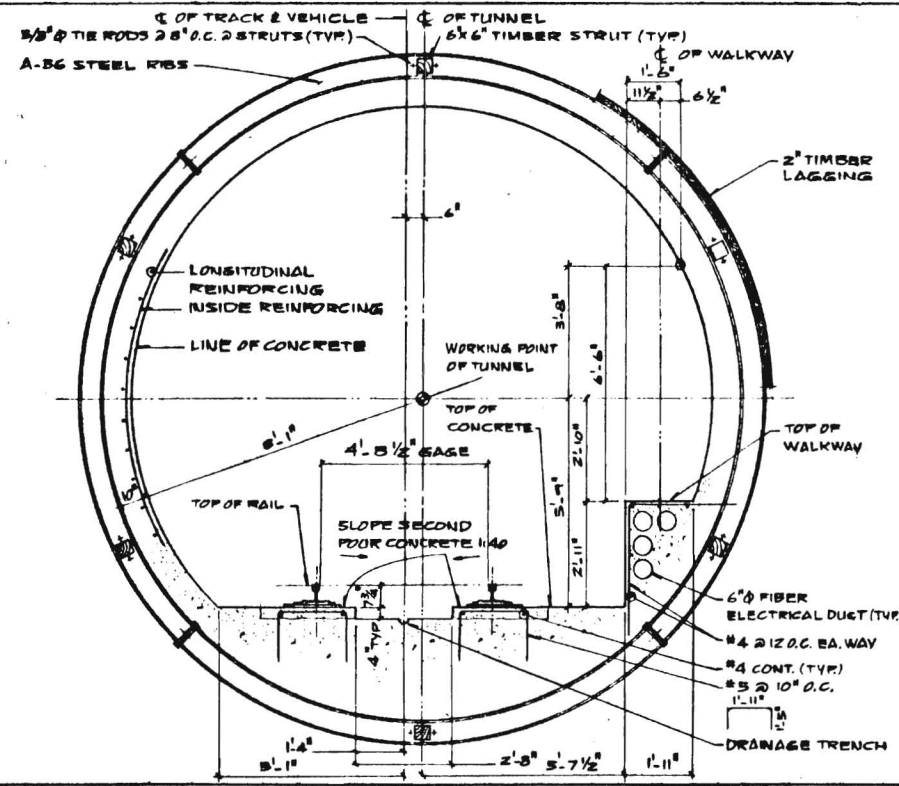
APPROVALS  
 JOHN K. MINASIAN  
 STRUCTURAL ENGINEER  
 APRIL 1968  
 M. A. NISHKIAN & CO.  
 CONSULTING ENGINEERS  
 LOS ANGELES  
 DRAWN BY J.K.M.  
 CHECKED BY J.T.  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 COLUMN LOCATIONS  
 AT STREET INTERSECTIONS  
 AIRPORT, SOUTH W. 1ST CORRIDOR  
 S207



1 58 TRANSITION - AERIAL TO TUNNEL



2 58 SECTIONS



3 58 TYPICAL TUNNEL SECTION

PRELIMINARY ENGINEERING ONLY  
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SUBJECT TO CHANGE IN FINAL DESIGN

APPROVALS  
APR 22 1968  
DRAWN BY J.L.M.  
CHECKED BY F.C.  
DATE 4/22/68

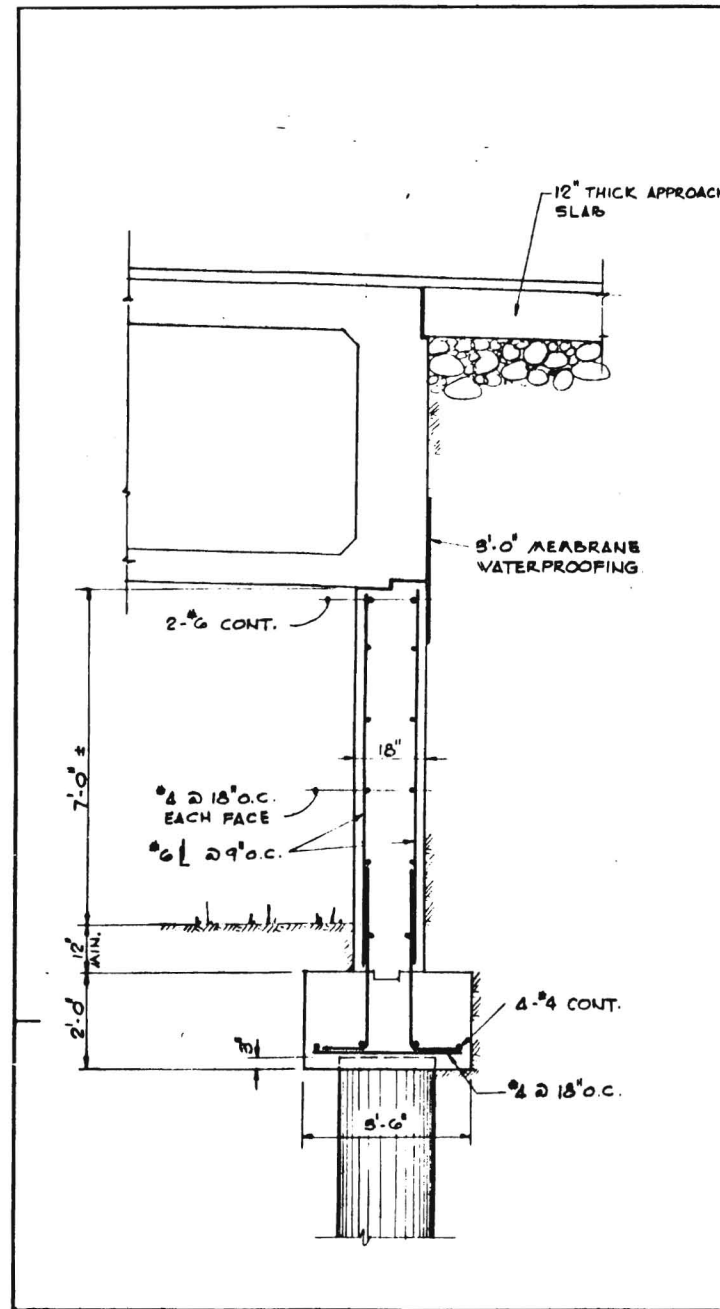
JOHN K. MINASIAN  
3731 W. 10TH ST. LOS ANGELES, CALIF. 90024

M.A. NISHKIAN & CO.  
CONSULTING ENGINEERS  
LONG BEACH, CALIF. 90801

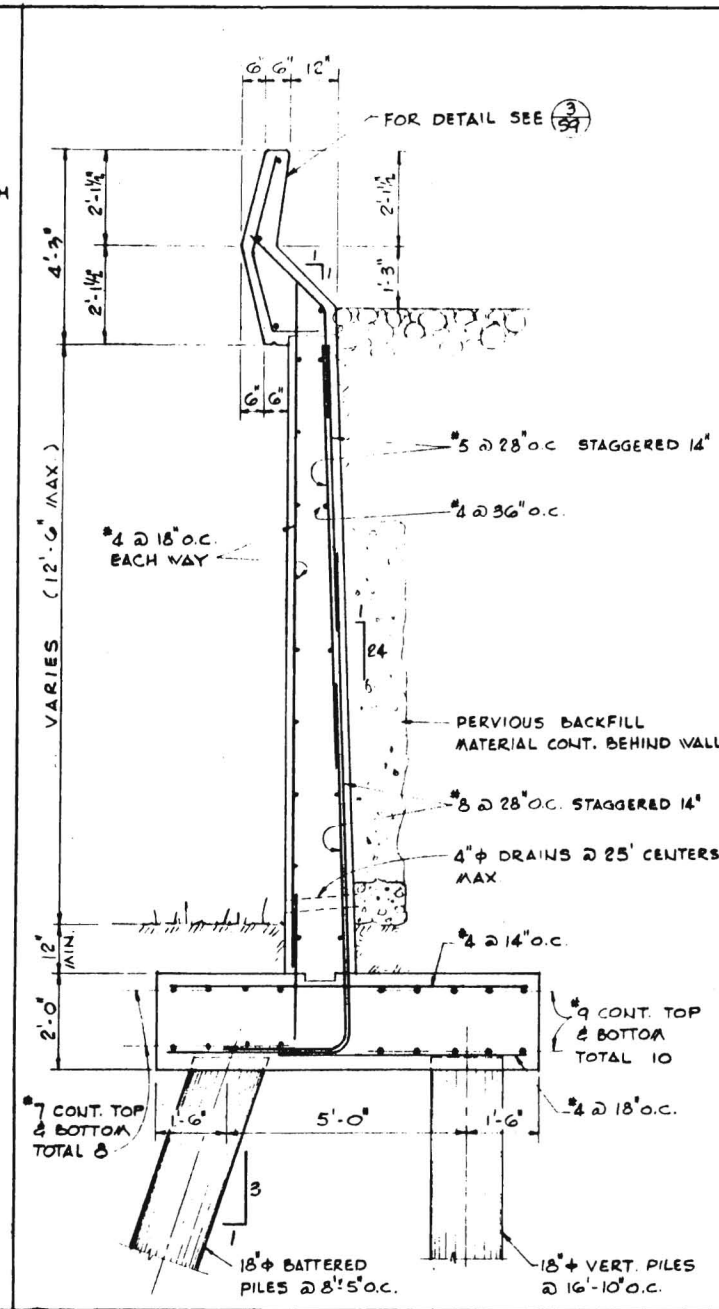
SOUTHERN CALIFORNIA  
RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90015

PORTAL DETAILS  
AIRPORT-SOUTHWEST CORRIDOR

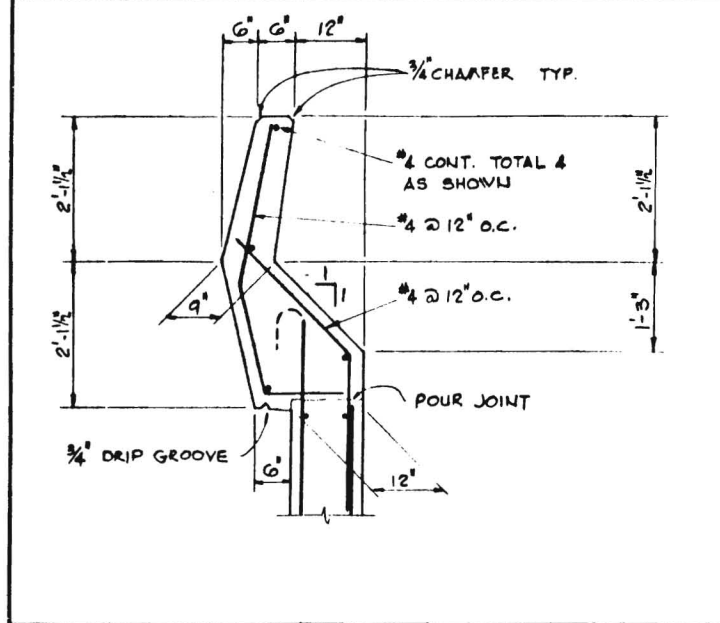
DRAWING NO. S208



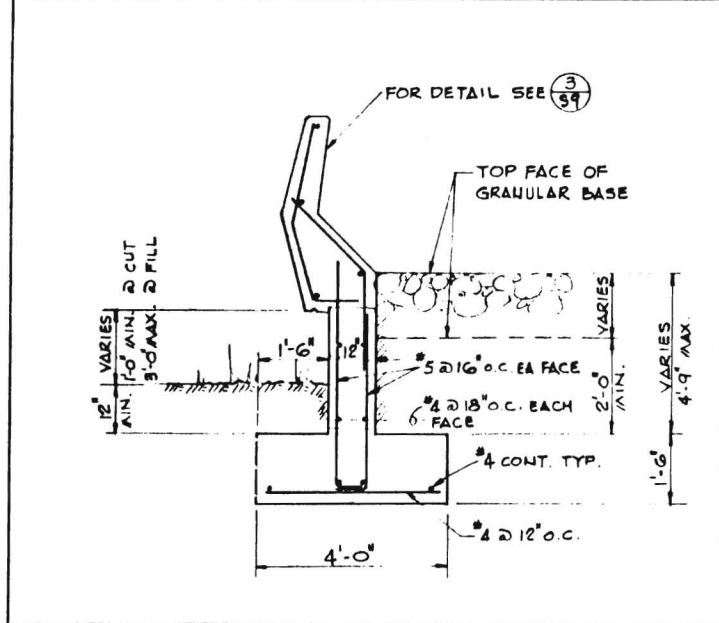
1 SECTION 1/2" = 1'-0"



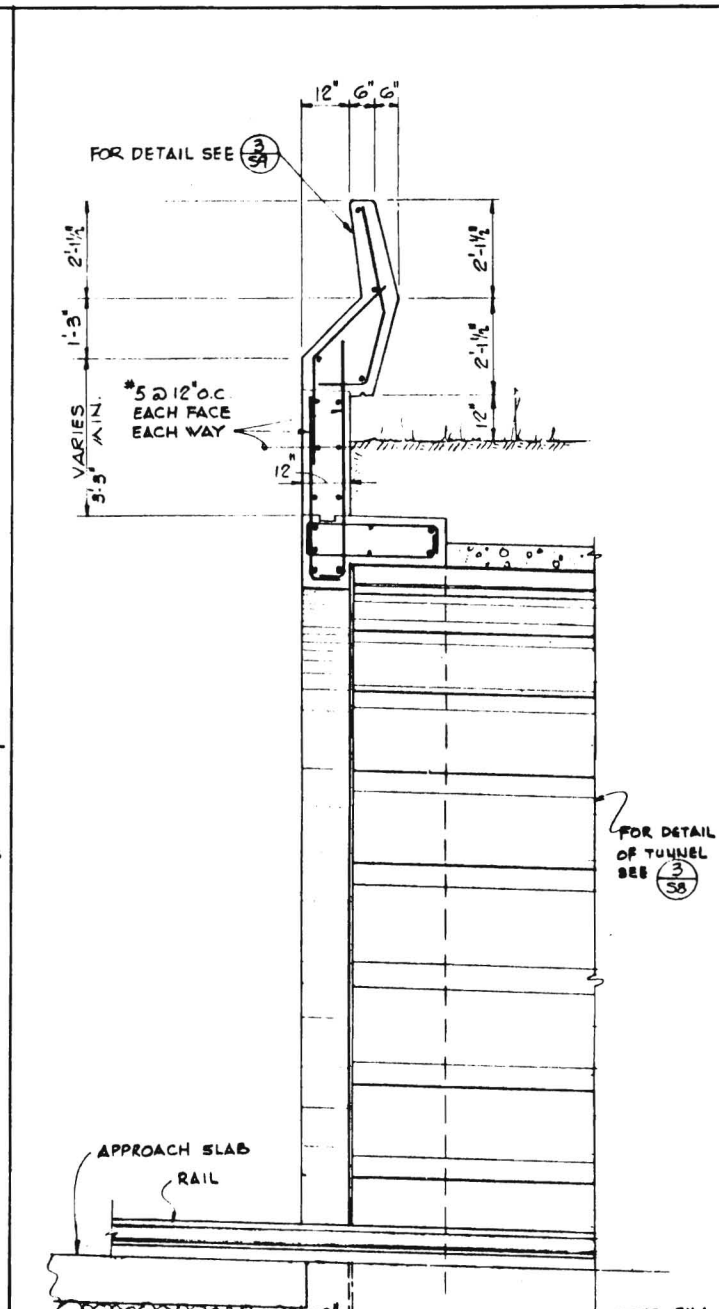
2 SECTION 1/2" = 1'-0"



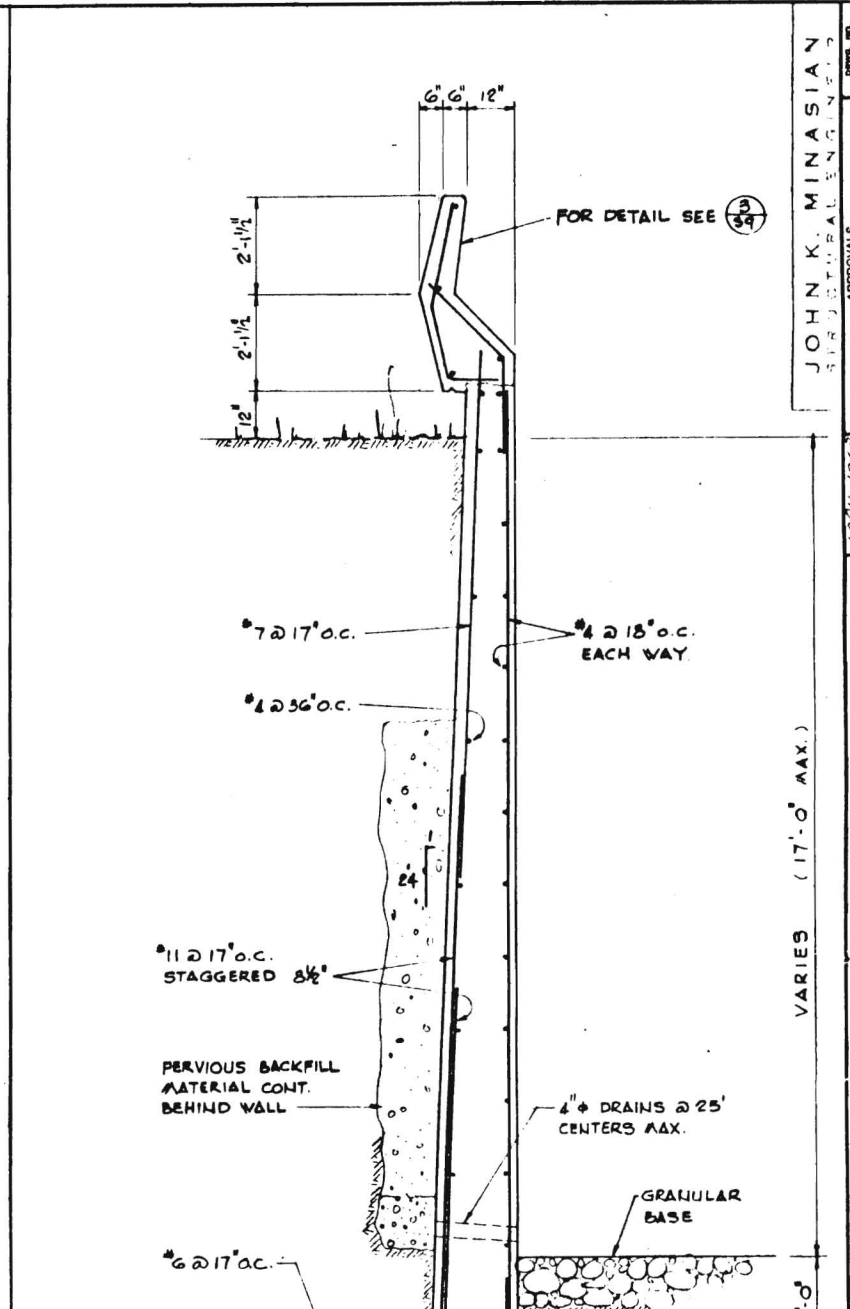
3 BARRIER DETAIL 3/4" = 1'-0"



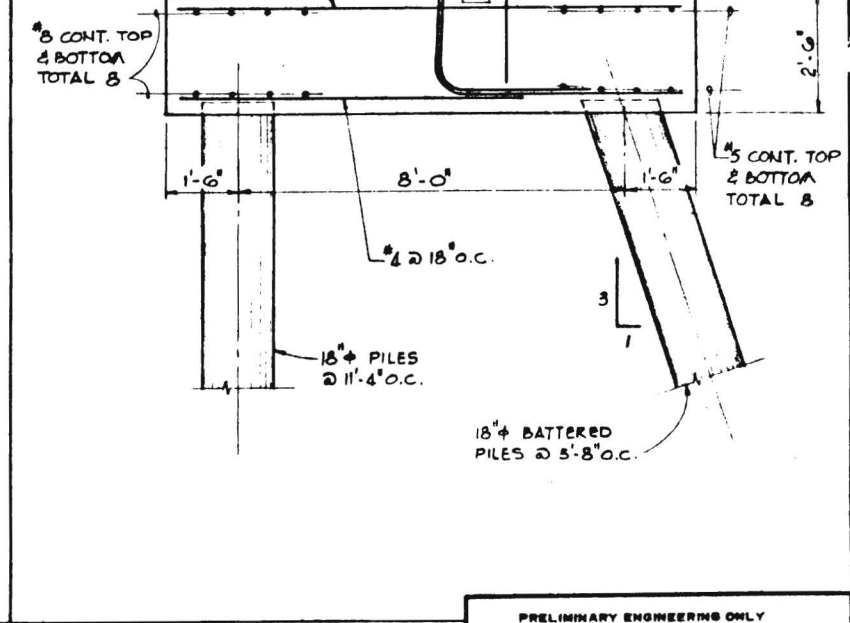
4 SECTION 1/2" = 1'-0"



5 SECTION 1/2" = 1'-0"



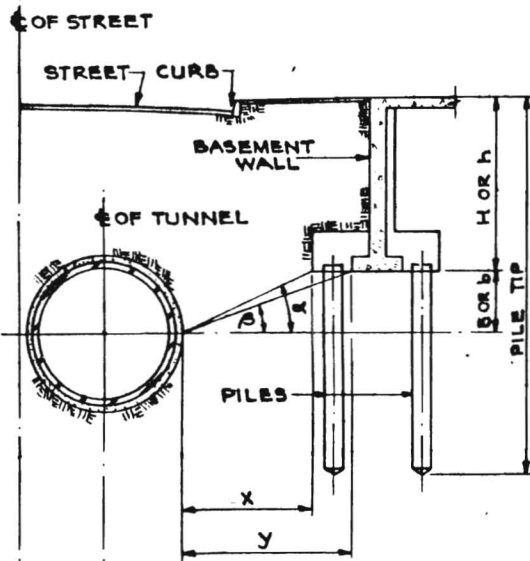
6 SECTION 1/2" = 1'-0"



7 SECTION 1/2" = 1'-0"

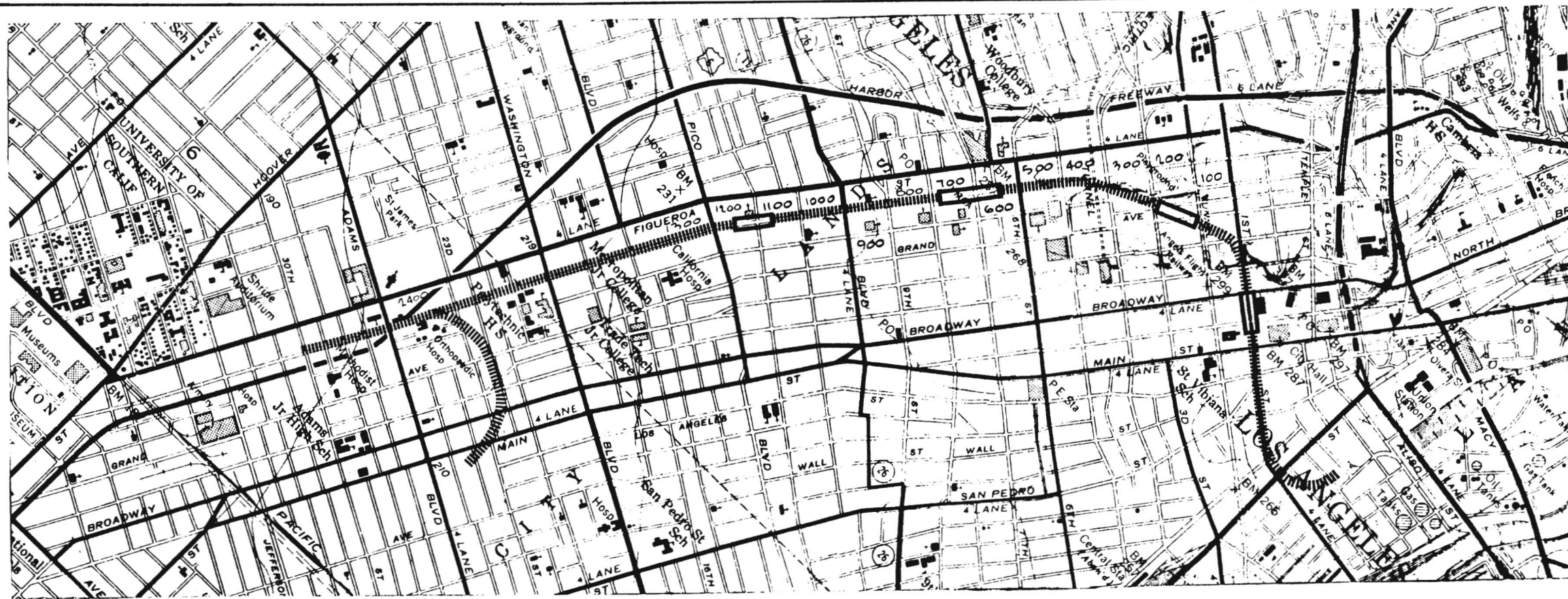
PRELIMINARY ENGINEERING ONLY  
FOR COST ESTIMATING PURPOSES  
SUBJECT TO CHANGE IN FINAL DESIGN





NOTE:  
UNDERPINNING IS ASSUMED TO BE  
REQUIRED WHEN ANGLES  $\alpha$  OR  $\beta$   
EXCEED 45°.

TYPICAL SCHEMATIC TUNNEL  
AND FOUNDATION CONFIGURATION



BUILDING FOUNDATION SCHEDULE  
(INCLUDES ONLY BUILDINGS 4 STORIES & HIGHER)

██████████ DENOTES PROPOSED ROUTE  
▬ DENOTES PROPOSED STATION LOCATION

STREET	BLOCK	NO.	BUILDING NAME	FTG. TYPE	UNDER-PINNING	COLUMN H	FOOTINGS X B $\alpha$	BASEMENT WALL h y b $\beta$	REMARKS	STREET	BLOCK	NO.	BUILDING NAME	FTG. TYPE	UNDER-PINNING	COLUMN H	FOOTINGS X B $\alpha$	BASEMENT WALL h y b $\beta$	REMARKS		
E. FIRST ST.	400	411	LACITY WAREHOUSE	ASSUME CONT.	NONE				BRICK 4 STORY	B FLOWER ST.	700	757	MOBIL PARKING	SPREAD TYPE B	REQ'D	17	17	44	69°	7 STORY	
	300	345	DAIMARU HOTEL	ASSUME SPREAD	NONE				4 STORY			748	ARMODALE HOTEL	ASSUME SPREAD	REQ'D					4 STORY	
		524	MERIT SAVINGS	ASSUME SPREAD	NONE				4 STORY			719	CONGRESS HOTEL	ASSUME SPREAD	REQ'D					4 STORY	
		512	TAUL BLDG.	ASSUME SPREAD	NONE				5 STORY			800	800	GAS CO.	SPREAD TYPE B	19	15	59	69°	11 STORY	
	200	250	KAJIMA BLDG.	SPREAD	NONE	21	30 21 23°	18 30 14 59°	10 STORY			810	GAS CO.	SPREAD TYPE B	REQ'D	15	16	49	70°	11 STORY	
	100	111	HEALTH BLDG.	BELL CAIS	NONE	29	44 19 23°		8 STORY			870	GAS CO.	SPREAD TYPE B	REQ'D	15	19	44	61°	6 STORY	
W. FIRST ST.	100	101	CITY HALL		NONE				STATION			811	MARY E TAFT BLDG.	ASSUME SPREAD	REQ'D					5 STORY	
	200	202	TIMES BLDG.	BELL CAIS	REQ'D	25	54 35 40°	25 29 35 50°	15 STORY			815	MILNER HIGHLAND	SPREAD TYPE B	REQ'D	13	17	47	70°	12 STORY	
		317	OLD STATE BLDG.	SPREAD	NONE	4	141 50 72°		STATION			819	STEPHENS HOTEL	ASSUME SPREAD	REQ'D	15	16	30	62°	4 STORY	
	500	601	LACO LAV LIBRARY	BELL CAIS	NONE	30	35 60 30°	44 44 50 40°	3 STORY			850	WOMEN'S ATHLETIC CLUB	ASSUME SPREAD	REQ'D					7 STORY	
			STATE OFFICES	SPREAD	NONE	28	42 42 38 30 40°	44 44 50 40°	RETAINING WALL			840	JEAN HOTEL	ASSUME SPREAD	REQ'D	15	16	30	62°	4 STORY	
				BELL CAIS	NONE	47	61 42 28 35 34 20 17 31	44 44 50 40°				900	935	HOTEL	ASSUME SPREAD	REQ'D					4 STORY
				BELL CAIS	TYPE B	29	51 30 31 21 51 42 6 19	29 30 65 60 60				1000	1001-17	PATROLEUM BLDG.	SPREAD TYPE A	REQ'D	19	16	32	65°	11 STORY
S. FLOWER ST.	900	538	CALIFORNIA CLUB	ASSUME SPREAD	NONE				7 STORY			1010	BOVES BLDG.	ASSUME SPREAD	REQ'D					5 STORY	
		550	BANK OF CALIF.	SPREAD	TYPE B	35	18 52 68°		UNDER DESIGN			1100									
		555	RICHFIELD									1200	1201	TRINITY CHURCH	ASSUME SPREAD	REQ'D	7	30	40	57°	STATION
	600	605	HOTEL SOUTHLAND	ASSUME SPREAD	REQ'D				7 STORY			1212	PACIFIC AUTO INS.	BELL CAIS	REQ'D						6 STORY
		612	MOBIL BLDG.	SPREAD	TYPE B	18	24 11 30 78°	15 11 53 74°				1300	1315	HOTEL OVIATT	ASSUME SPREAD	REQ'D					4 STORY
		615	TISHMAN BLDG.	SPREAD	TYPE A	30	29 42 55°	12 53 77°				1700		SANTA MONICA FVY	SPREAD	REQ'D					
	698		ROOSEVELT BLDG.	SPREAD	REQ'D	29	51 9 43 15 78°	14 15 72° 47°	STATION			1800	1815	HAMPSHIRE HOUSE	SPREAD	TYPE B	7	55	40	54°	4 STORY
	700	711	BARKER BROS.	SPREAD	REQ'D	31	15 28 62°	10 48 78°				2400	2400	ORTHOPAEDIC HOS.	SPREAD	NONE	18	62	55	28°	6 STORY
		725	MID-TOWN PARK	SPREAD	REQ'D	21	35 31 57°	20 01 72°				2410	MEMORIAL BLDG.	SPREAD	TYPE B	8	22	47	62°	6 STORY	
		729	RANSOHOFF'S CONT.		REQ'D				4 STORY												
		737	MYER-SIEGEL	SPREAD	TYPE A	20	16 42 65°	7 48 82°	5 STORY												
		745	WESTERN UNION	SPREAD	TYPE A	20	16 42 60°	11 40 77°	8 STORY												

PRELIMINARY ENGINEERING ONLY  
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APPROVALS  
DATE: APRIL 1968  
DRAWN BY: L.M.  
CHECKED BY: H.F.D.  
SCALE: AS SHOWN  
S210

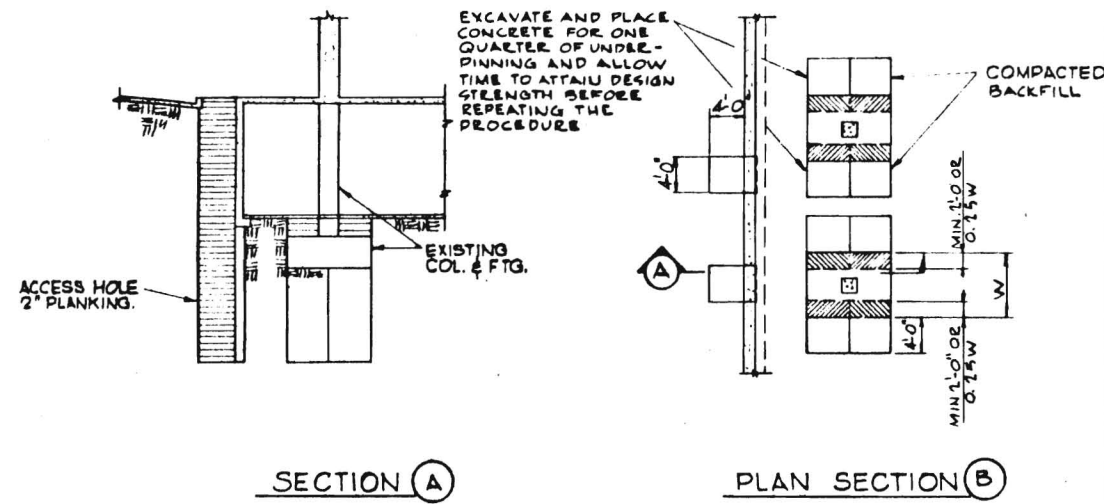
M. A. NISHKIAN & CO.  
CONSULTING ENGINEERS  
LONG BEACH  
LOS ANGELES

SOUTHERN CALIFORNIA  
RAPID TRANSIT DISTRICT  
LOS ANGELES, CALIFORNIA 90015

UNDERPINNING REQUIREMENTS  
UNION STATION TO 307 ST  
AIEP DIST. SOUTHWEST CORRIDOR

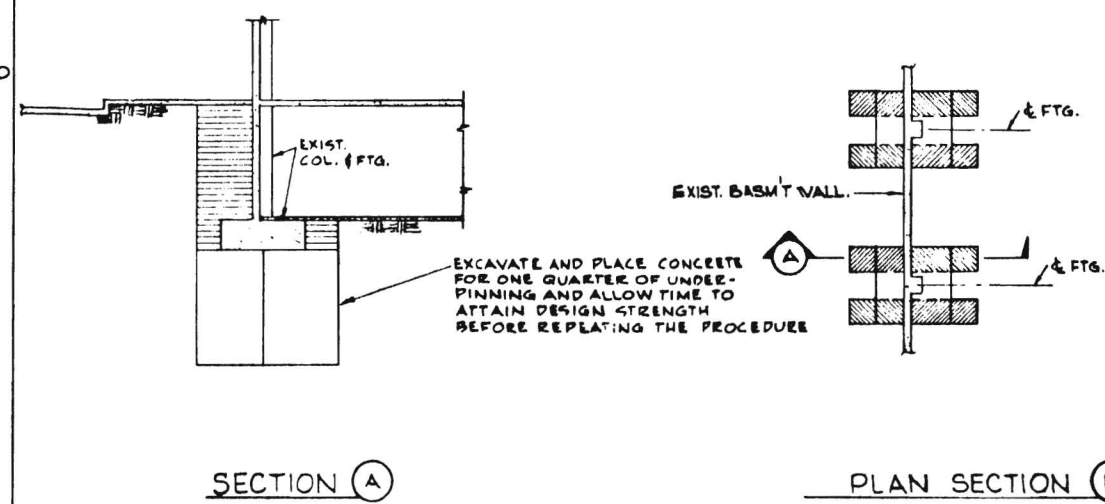
DRAWING NO. S210





SECTION (A)

PLAN SECTION (B)



SECTION (A)

PLAN SECTION (B)

1/511 UNDERPINNING TYPE A

NO SCALE

3/511 UNDERPINNING TYPE B

NO SCALE

GENERAL NOTES FOR UNDERPINNING

1. SOURCES OF INFORMATION  
THE FOLLOWING SOURCES OF INFORMATION WERE USED FOR COMPILING SCHEDULES:  
a. CITY OF LOS ANGELES BUILDING DEPT RECORDS.  
b. FROM THE OFFICES OF LOCAL ARCHITECTS AND ENGINEERS.  
c. FROM PROPERTY OWNERS, AGENTS, AND BUILDING MANAGERS.  
IN CASES WHERE NO DRAWINGS ARE AVAILABLE, ASSUMPTIONS HAVE BEEN MADE AND JUDGEMENT APPLIED TO DETERMINE UNDERPINNING REQUIREMENTS.
2. EXCAVATION  
WALLS AND PITS SHALL BE EXCAVATED NEATLY, AND THEN CLOSE FITTING LAGGING OR SHORING WEDGED FIRMLY AGAINST THE SOIL IMMEDIATELY. IF SOIL IS LOST FROM BEHIND THE LAGGING, THE VOIDS SHALL BE FILLED IMMEDIATELY WITH CONCRETE OR OTHER APPROVED MATERIAL. WHEN DIGGING ACCESS PITS UNDER EXISTING FOOTINGS, NOT MORE THAN 1/4 OF A FOOTING AREA MAY BE LEFT WITHOUT SUPPORT.
3. TEMPORARY UNDERPINNING AND SHORING  
ADEQUATE BRACING, STRUTTING, AND BRIDGING OF TEMPORARY AND PERMANENT SHORING AND UNDERPINNING SHALL BE INSTALLED PROGRESSIVELY AS THE STRUCTURE IS ERRECTED TO ENSURE SAFETY AND STABILITY.
4. LOAD TRANSFERENCE  
THE PERMANENT LOAD SHALL BE TRANSFERRED TO THE UNDERPINNING MEMBER BY JACKING, AND/OR DRIVING STEEL WEDGES INTO POSITION BETWEEN IT AND THE FLOOR, WALL OR COLUMN. STEEL BEAMS SHALL BE DEFLECTED SUFFICIENTLY BY THE WEDGES TO TAKE THE TOTAL DEAD LOAD PLUS 25% LIVE LOAD WITHOUT FURTHER DEFLECTION. FOLLOWING JACKING AND/OR WEDGING, NON-SHRINK DRY PACKED MORTAR SHALL BE THOROUGHLY FORCED BETWEEN THE UNDERPINNING MEMBERS AND THE STRUCTURE ABOVE, FORMING A BED WITH A MINIMUM THICKNESS OF 2", WEDGES SHALL NOT BE REMOVED UNTIL THE MORTAR IS CAPABLE OF TRANSFERRING THE LOAD, WITH A MINIMUM OF 14 DAYS FOR CURING.
5. STRUCTURAL STEEL  
STRUCTURAL STEEL WHICH IS TO BE ENCASED IN CONCRETE SHALL BE WRAPPED WITH 4x4-12/12 STEEL MESH AND ENCASED WITH A MINIMUM OF 3" OF CONCRETE.
6. FIREPROOFING  
AFTER COMPLETION OF CONSTRUCTION ALL STEELWORK, EXCEPT THAT SHOWN ON THE DRAWINGS TO BE CONCRETE ENCASED, SHALL BE SUITABLY FIREPROOFED TO PRESERVE THE EXISTING FIRE RATING OF THE BUILDING.

12/511 GENERAL NOTES FOR UNDERPINNING

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S211

JOHN K. MINASIAN  
 APRIL 1968  
 M. A. NISHKIAN & CO.  
 CONSULTING ENGINEERS  
 LOS ANGELES, CALIFORNIA 90015  
 SOUTHERN CALIFORNIA  
 RAPID TRANSIT DISTRICT  
 LOS ANGELES, CALIFORNIA 90015  
 AIRPORT - SOUTHWEST CORRIDOR  
 UNDERPINNING REQUIREMENTS  
 TYPE NOTES & UNDERPINNING DETAILS  
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