

9-7 U-6

CONVENTIONAL SIGNS

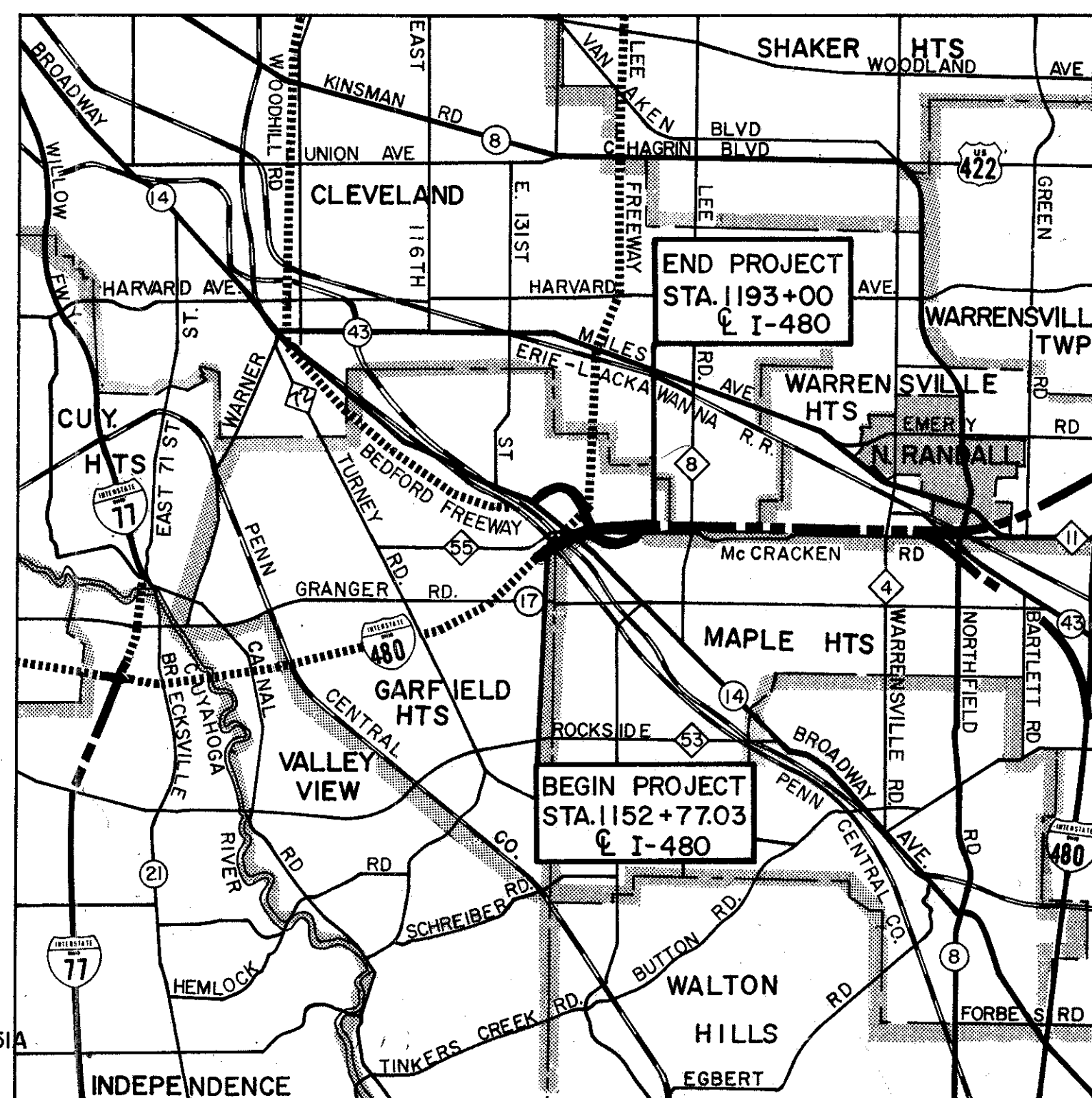
PROPERTY LINE	---
EXISTING RIGHT OF WAY	---
SUBDIVISION LINE	---
SUBLOT LINE OR EXISTING EASEMENT	---
ORIGINAL TOWNSHIP LOT LINE	---
CORPORATION LINE	---
LIMITED ACCESS LINE	LA
LIMITED ACCESS LINE AND RIGHT OF WAY LINE	LA & RW
RIGHT OF WAY LINE AND HIGHWAY EASEMENT LINE	R/W
AERIAL EASEMENT LINE	AERIAL
TEMPORARY RIGHT OF WAY	T
SEWER EASEMENT LINE	S
SLOPE EASEMENT LINE	SL
CHANNEL EASEMENT	X
PARTICIPATION LINE	P
CENTER LINE	---
FENCE LINE	x
GUARD RAIL (EXISTING)	---
GUARD RAIL (PROPOSED)	---
RAILROAD	---
POWER POLES	⊕
TELEPHONE POLES	⊕
POWER AND TELEPHONE POLES	⊕
LIGHT POLES	⊕
TREES (EXISTING)	⊕
ELECTRICAL TOWER	⊕
WATER LINE	/
GAS LINE	G
TELEPHONE CONDUIT	T
EXISTING SEWERS (R/W PLANS)	S
EXISTING STORM SEWER (DRAINAGE PLANS)	S
EXISTING SANITARY SEWER (DRAINAGE PLANS)	S
OIL LINE	o
FIRE HYDRANT (EXISTING)	⬆
FIRE HYDRANT (PROPOSED)	⬆
MANHOLE (EXISTING)	⊙
MANHOLE (PROPOSED STORM)	⊙
MANHOLE (PROPOSED SANITARY)	⊙
CATCH BASIN OR INLET (EXISTING)	⊙
CATCH BASIN OR INLET (PROPOSED)	⊙

MICROFILMED  
DEC 21 1982

STATE OF OHIO  
DEPARTMENT OF TRANSPORTATION  
**CUY-480-21.40**

CUYAHOGA COUNTY  
CITY OF GARFIELD HTS.  
CITY OF MAPLE HTS.

GRADE SEPARATION WITH PENN CENTRAL TRANSPORTATION COMPANY  
AND NORFOLK AND WESTERN RY. CO.



LOCATION MAP  
SCALE

INDEX OF SHEETS

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Sheets 331 & 332 revised 9-27-74 EBL  
Sheets 311, 319, & 321 revised 12-27-74 EBL

SUPPLEMENTAL SPECIFICATIONS

NUMBER	DATE	NUMBER	DATE
		839	11-25-70
808	1-1-71	941	11-25-70
815	9-20-72	1001	9-20-72
816	9-20-72		
836	1-1-71		
838	5-18-70		

PORTION TO BE IMPROVED  
EXISTING FREEWAYS  
STATE ROADS  
COUNTY ROADS  
OTHER ROADS  
FUTURE CONSTRUCTION  
UNDER CONSTRUCTION

SCALE  
PLAN 1"=201.50' PROFILE HOR 1"=201.100'  
CROSS SECTIONS 1"=10' PROFILE VERT 1"=5', 10', 20'

LINE DATA

Begin Project I-480 Sta. 1152+77.03  
End Project I-480 Sta. 1193+00.00  
Net Length of Project = 4,022.97 Lin. Ft. or 0.761 Miles

Work Additions

WB I-480 Sta. 1149+42 # To Sta. 1152+77.03 = 335.03 Lin. Ft.  
Bedford Freeway Sta. 35+31.29 To Sta. 74+54.29 = 3,923.00 Lin. Ft.  
Orchard Road Sta. 4+66 To Sta. 11+00 = 634.00 Lin. Ft.  
Net Length of Work: 8,915 Lin. Ft. or 1.688 Miles

STANDARD DRAWINGS

NUMBER	DATE	NUMBER	DATE
BR-2-67	10-15-71	HW-E	6-1-65
BP-1	6-1-65	GR-5	1-1-71
BP-2	12-1-68	GR-6	1-1-71
BP-3	1-1-71	HL-1, HL-4 thru HL-10	3-6-73
BP-4	1-1-71	HL-2, HL-3	7-27-73
BP-5	6-1-72	HL-11, HL-12	4-6-73
I-2	6-6-69	HL-17A, HL-17B	4-6-73
BP-7	1-1-66	HW-4	1-1-70
CB-2-2AEB	6-1-65	I-2A	6-6-69
CB-3A	6-1-65	I-3	1-20-70
CB-4	9-1-69	L-1	6-1-71
CB-5	9-1-69	MC-1	6-13-69
CB-6	6-1-65	MC-3	6-1-71
F-1	6-1-72	MC-4	6-13-69
F-2	1-1-71	MC-5	6-1-71
F-3	3-10-69	MC-7	10-1-68
F-6	10-1-66	MC-8	12-1-67
HI-15, HL-16	4-6-73	MH-1	10-1-68
		MH-1A	10-1-68
GR-2A	1-1-71	AS-1-57	6-12-69
GR-2B	11-9-71	BR-1-67 1 of 3	10-15-71
GR-3	11-9-71	RB-1-55	2-2-59
GR-4	11-9-71	SD-1-69 1-4	6-12-69

ISSUE NO. 1

FHWA REGION	STATE	PROJECT
5	OHIO	I-480-4(3)174

1  
390

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR OF TRANSPORTATION IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02, REVISED CODE OF OHIO.

CUYAHOGA COUNTY  
CUY-480-21.40

PROJECT DESIGNATION CUY. 80-21.40 APPEARING THROUGHOUT THIS PLAN SHALL BE CONSIDERED TO READ CUY-480-21.40.

"FEDERAL ROAD DIVISION 2" APPEARING IN THE UPPER RIGHT HAND BLOCKS SHALL BE CONSIDERED TO READ FHWA REGION 5.

1-480-4(31)174

1973 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

THE RIGHT OF WAY FOR THIS IMPROVEMENT WILL BE PROVIDED BY THE STATE OF OHIO.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING OF THE HIGHWAY TO TRAFFIC AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED  
DATE 9-26-73

Joseph J. Lowell  
DISTRICT DEPUTY DIRECTOR OF TRANSPORTATION

APPROVED  
DATE 7-15-74

Robert B. Pfeifer  
ENGINEER, BUREAU OF BRIDGES

APPROVED  
DATE 11-26-73

C. J. Schaefer  
ENGINEER, BUREAU OF ROADWAY DESIGN

APPROVED  
DATE 11-26-73

William E. Slatt  
ASSISTANT DEPUTY DIRECTOR FOR HIGHWAY DESIGN

APPROVED  
DATE 11-26-73

Julius J. Keenan  
ASSISTANT DEPUTY DIRECTOR FOR REAL ESTATE

APPROVED  
DATE 11-26-73

William S. Brunkle  
ASSISTANT DEPUTY DIRECTOR FOR PROGRAM DEVELOPMENT

APPROVED  
DATE

CHIEF ENGINEER, DIVISION OF HIGHWAYS

APPROVED  
DATE 11-26-73

William W. Baker  
DEPUTY DIRECTOR, DIVISION OF HIGHWAYS

APPROVED  
DATE 11-27-73

William P. McKenna  
ASSISTANT DIRECTOR, DEPARTMENT OF TRANSPORTATION

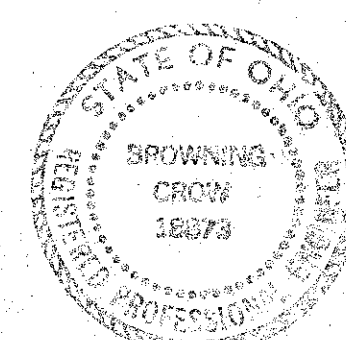
APPROVED  
DATE 11-28-73

Director, Department of Transportation

PREPARED AND RECOMMENDED BY  
**HOWARD NEEDLES TAMMEN & BERGENDOFF**  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**H.G. SOURS**  
ASSOCIATE  
COLUMBUS

*Browning Crow*  
**BROWNING CROW**



FILE NO.	CUYAHOGA COUNTY	00351
	CUY. 480-21.40	
DATE OF LETTING		
CONTRACT NO.		

DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER DATE

Rev. 1-9-74  
Rev. 12-7-73

MICROFILMED  
DEC 21 1982

# SCHEMATIC PLAN

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

2  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

**PROPOSED STRUCTURE - BEDFORD FREEWAY AND RAMP B-OBS OVER RELOCATED McCracken Road**

**TYPE:** Continuous rolled beams with reinforced concrete deck and substructure.

**SPANS:** Br 13L 38'-9", 64'-3", 40'-3"  
Br 13R 48'-9", 69'-3", 48'-7" (Measured along @ Ramp B-OBS)

**ROADWAYS:** Br 13L 76'-0" f.f. of parapet with raised Concrete Barrier Median.  
Br 13R 28'-0" f.f. of parapet

**DESIGN LOAD:** HS20-44

**SKEWS:** Br 13L -07°46'02" Left forward to local tangent  
Br 13R -23°50'55" Right forward to local tangent

**WEARING SURFACE:** 1 1/2" Asphalt Concrete on 13.2 1/2" on 13L

**APPROACH SLABS:** AS-1-67 (20 feet long)

**ALIGNMENT:** Br 13L-Tangent  
Br 13R-13°30'00" Left, Spiral

**SUPERELEVATION:** Br 13L-Varies .0156 ft. per ft. to 0.0 ft. per ft.  
Br 13R-Varies .042 ft. per ft. to .083 ft. per ft.

**PROPOSED STRUCTURE - LANE OBS-E-B OVER RELOCATED McCracken Road**

**TYPE:** Continuous steel girders with reinforced concrete deck and substructures

**SPAN:** 61'-8", 95'-1", 66'-5" (Measured along @ Lane OBS-E-B)

**ROADWAY:** 42'-0" f.f. of parapets (Initial)

**DESIGN LOAD:** HS20-44

**SKEW:** 46°51'13" Left Forward

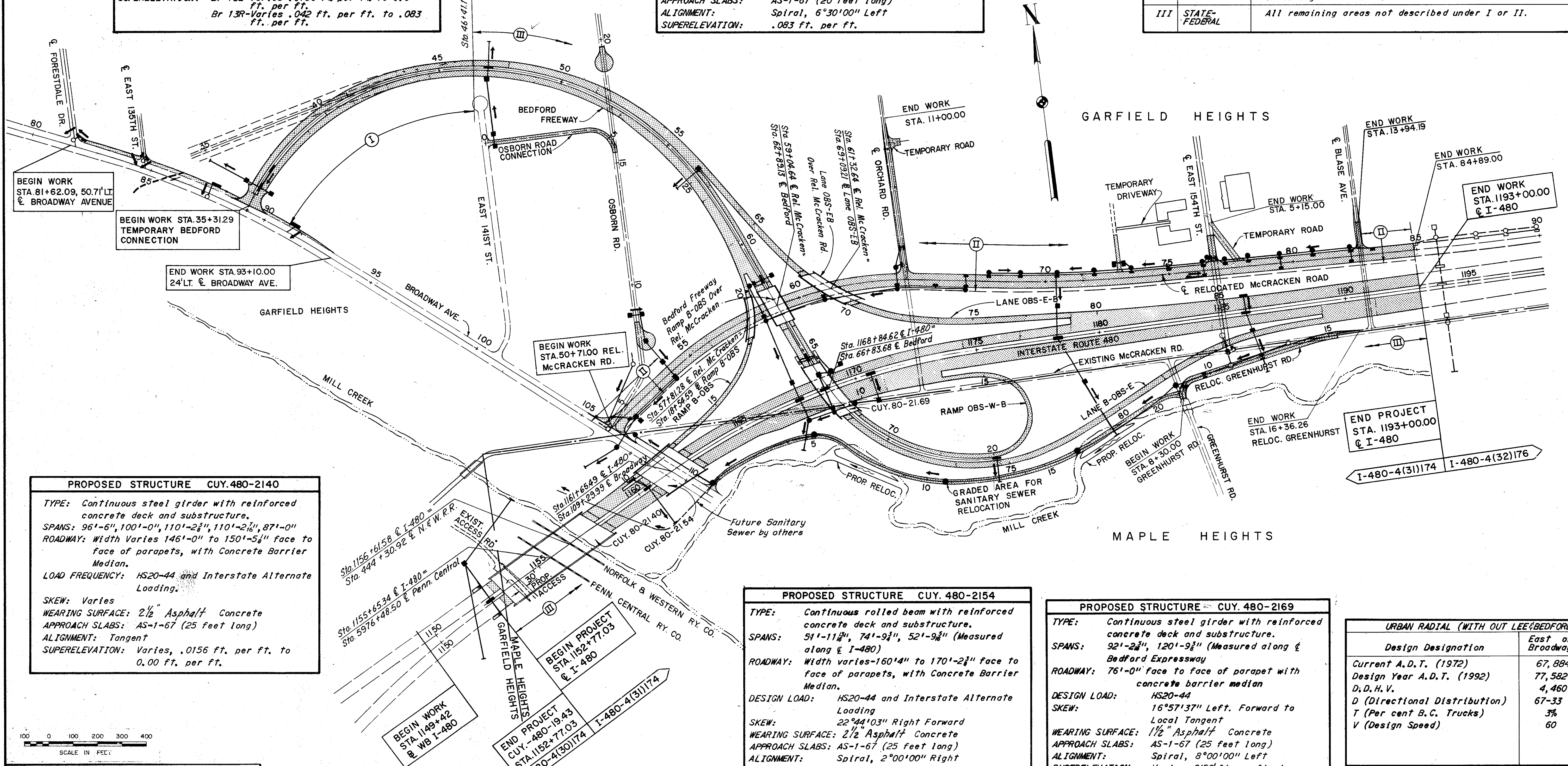
**WEARING SURFACE:** 2 1/2" Asphalt Concrete

**APPROACH SLABS:** AS-1-67 (20 feet long)

**ALIGNMENT:** Spiral, 6°30'00" Left

**SUPERELEVATION:** .083 ft. per ft.

CODE	TYPE	PARTICIPATION LIMITS
I	100% STATE	From Sta. 81+62.09 to Sta. 93+10.00 Broadway Ave. From Sta. 35+31.29 to Sta. 46+41.15 Bedford Freeway
II	COUNTY, STATE-FEDERAL	From Sta. 50+71 to Sta. 84+89 @ Relocated McCracken Rd. Bounded on the South by a line 40' RT. of the @ and Bounded on the North by the Construction Limits not including cross roads.
III	STATE-FEDERAL	All remaining areas not described under I or II.



**PROPOSED STRUCTURE CUY. 480-2140**

**TYPE:** Continuous steel girder with reinforced concrete deck and substructure.

**SPANS:** 96'-6", 100'-0", 110'-2", 110'-2", 87'-0"

**ROADWAY:** Width Varies 146'-0" to 150'-5" face to face of parapets, with Concrete Barrier Median.

**LOAD FREQUENCY:** HS20-44 and Interstate Alternate Loading.

**SKEW:** Varies

**WEARING SURFACE:** 2 1/2" Asphalt Concrete

**APPROACH SLABS:** AS-1-67 (25 feet long)

**ALIGNMENT:** Tangent

**SUPERELEVATION:** Varies, .0156 ft. per ft. to 0.00 ft. per ft.

**PROPOSED STRUCTURE CUY. 480-2154**

**TYPE:** Continuous rolled beam with reinforced concrete deck and substructure.

**SPANS:** 51'-11", 74'-9", 52'-9" (Measured along @ I-480)

**ROADWAY:** Width varies -160'4" to 170'-2" face to face of parapets, with Concrete Barrier Median.

**DESIGN LOAD:** HS20-44 and Interstate Alternate Loading

**SKEW:** 22°44'03" Right Forward

**WEARING SURFACE:** 2 1/2" Asphalt Concrete

**APPROACH SLABS:** AS-1-67 (25 feet long)

**ALIGNMENT:** Spiral, 2°00'00" Right

**SUPERELEVATION:** I-480 Varies .0156 ft. per ft. to .047 ft. per ft. Ramp B-OBS .0156 ft. per ft.

**PROPOSED STRUCTURE - CUY. 480-2169**

**TYPE:** Continuous steel girder with reinforced concrete deck and substructure.

**SPANS:** 92'-2", 120'-9" (Measured along @ Bedford Expressway)

**ROADWAY:** 76'-0" face to face of parapet with concrete barrier median

**DESIGN LOAD:** HS20-44

**SKEW:** 16°57'37" Left. Forward to Local Tangent

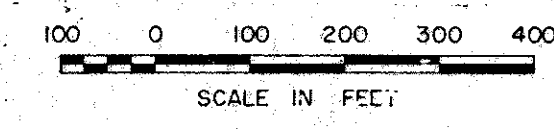
**WEARING SURFACE:** 1 1/2" Asphalt Concrete

**APPROACH SLABS:** AS-1-67 (25 feet long)

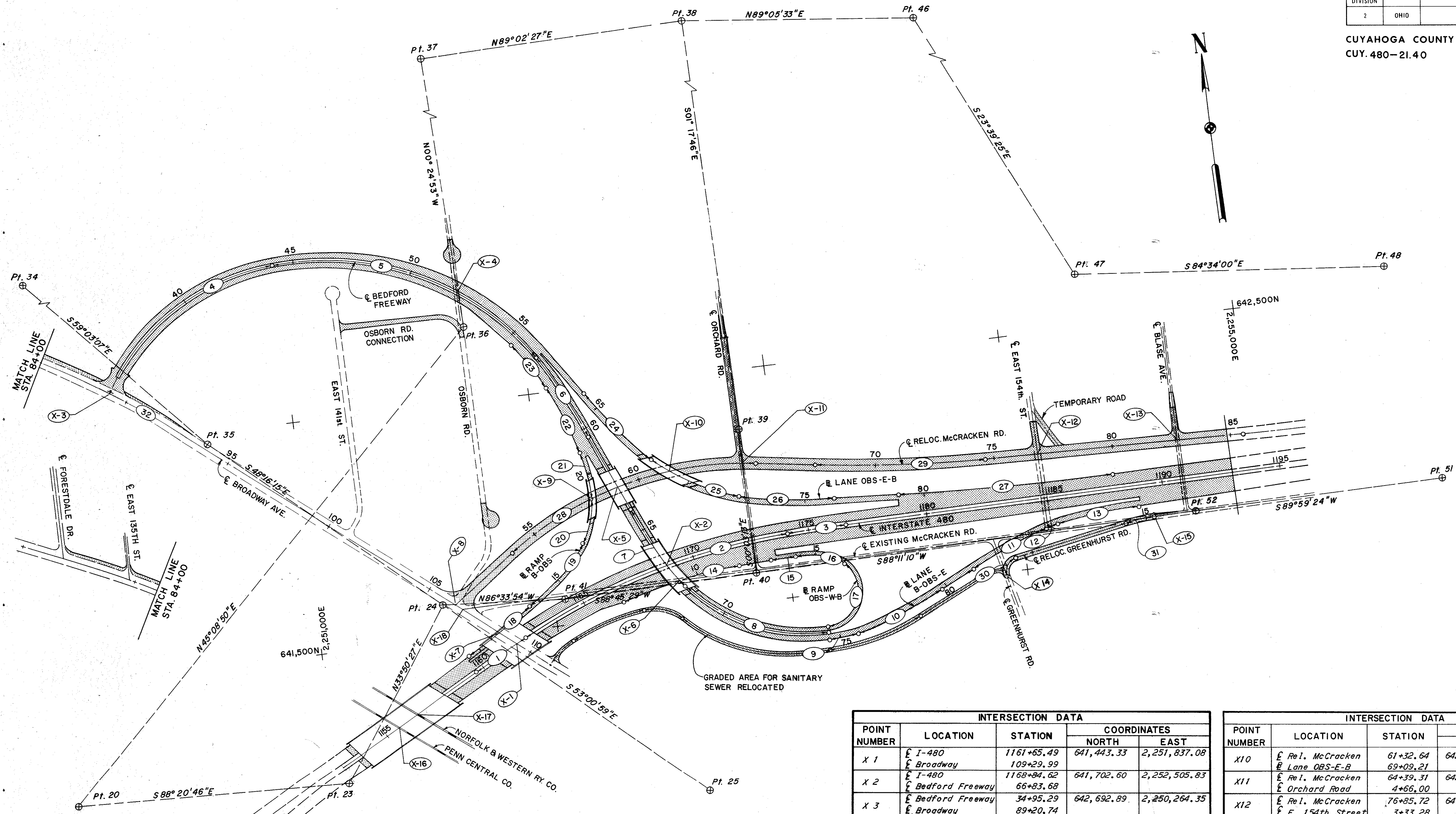
**ALIGNMENT:** Spiral, 8°00'00" Left

**SUPERELEVATION:** Varies .0156 ft. per ft. to .083 ft. per ft.

URBAN RADIAL (WITH OUT LEE BEDFORD FREEWAYS)		
Design Designation	East of Broadway	West of Broadway
Current A.D.T. (1972)	67,884	79,644
Design Year A.D.T. (1992)	77,582	91,022
D.D.H.V.	4,460	5,230
D (Directional Distribution)	67-33	55-45
T (Per cent B.C. Trucks)	3%	3%
V (Design Speed)	60	60



SCALE 1"=200'  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE ERA DATE 5-21-69 CONSULTING ENGINEERS  
TRCD. DATE KANSAS CITY CLEVELAND NEW YORK  
CRD. I.M. DATE 6-21-69

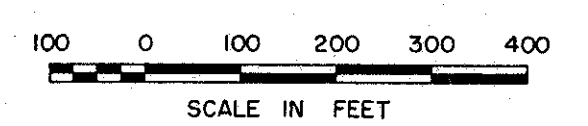


The geometrics for this project have been calculated to the nearest thousandth of a foot for distances and the nearest tenth of a second for angles and bearings. The calculated distances, angles and bearings have been rounded to the nearest hundredth of a foot and even second for inclusion in the plans. Complementary geometric information may not check exactly if only plan data is used for calculations.

INTERSECTION DATA				
POINT NUMBER	LOCATION	STATION	COORDINATES	
			NORTH	EAST
X 1	E I-480	1161+65.49	641,443.33	2,251,837.08
	E Broadway	109+29.99	641,702.60	2,252,505.83
X 2	E I-480	1168+84.62	641,702.60	2,252,505.83
	E Bedford Freeway	66+83.68	642,692.89	2,250,264.35
X 3	E Bedford Freeway	34+95.29	642,692.89	2,250,264.35
	E Broadway	89+20.74	642,956.18	2,251,762.89
X 4	E Bedford Freeway	52+06.26	642,956.18	2,251,762.89
	E Osborn Road	17+49.96	642,059.80	2,252,338.94
X 5	E Bedford Freeway	62+89.13	642,059.80	2,252,338.94
	E Rel. McCracken	59+04.64	641,633.80	2,252,552.02
X 6	E Bedford Freeway	67+66.58	641,633.80	2,252,552.02
	E Ramp OBS-WB	9+14.93	641,498.78	2,251,762.60
X 7	E Ramp B-OBS	11+33.88	641,498.78	2,251,762.60
	E Broadway	108+41.88	641,633.93	2,251,601.68
X 8	E Rel. McCracken	50+46.81	641,633.93	2,251,601.68
	E Broadway	106+27.11	642,022.00	2,252,221.55
X 9	E Rel. McCracken	57+81.28	642,022.00	2,252,221.55
	E Ramp B-OBS	18+54.59		

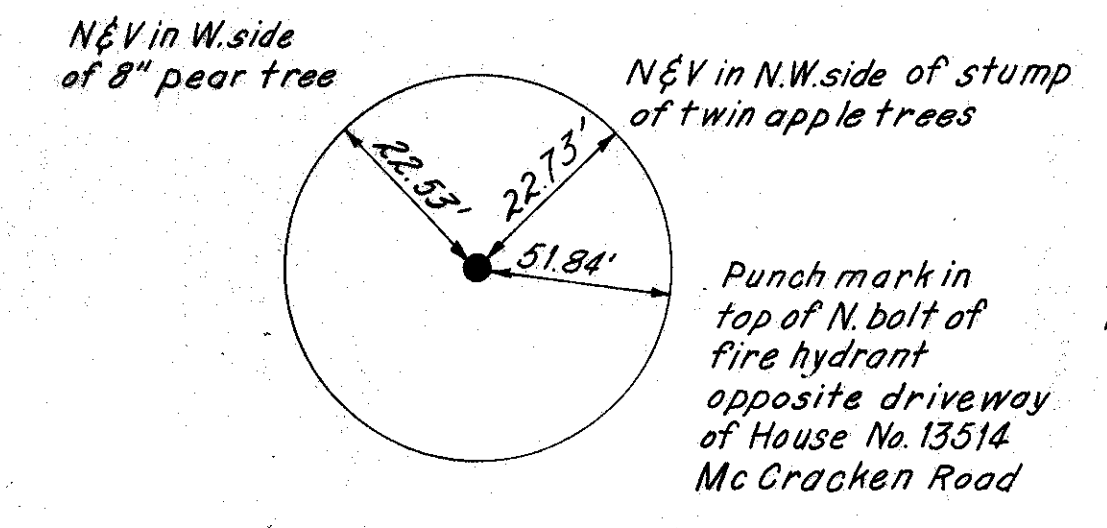
INTERSECTION DATA				
POINT NUMBER	LOCATION	STATION	COORDINATES	
			NORTH	EAST
X 10	E Rel. McCracken	61+32.64	642,102.57	2,252,562.64
X 11	E Lane OBS-E-B	69+09.21	642,103.27	2,252,868.73
	E Orchard Road	4+66.00	641,995.44	2,254,109.02
X 12	E Rel. McCracken	76+85.72	641,995.44	2,254,109.02
	E E. 154th Street	3+33.28	641,983.17	2,254,700.51
X 13	E Rel. McCracken	82+77.34	641,983.17	2,254,700.51
	E Blase Avenue	12+60.75	641,492.31	2,253,918.42
X 14	E Rel. Greenhurst	8+30.00	641,492.31	2,253,918.42
	E Exist. Greenhurst	8+30.00	641,671.24	2,254,564.63
X 15	E Rel. Greenhurst	15+36.26	641,671.24	2,254,564.63
	E Exist. McCracken	29+35.92	641,145.74	2,251,315.92
X 16	E I-480	1155+65.34	641,145.74	2,251,315.92
	E Penn. Railroad	5976+48.50	641,193.72	2,251,399.34
X 17	E I-480	1156+61.58	641,193.72	2,251,399.34
	E N/W Railroad	444+30.92	641,611.90	251,628.88
X 18	E Broadway	106+62.11	641,611.90	251,628.88
	E Exist. McCracken	0+00.00		

SCALE 1" = 200'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE RHA DATE 4-11-68 CONSULTING ENGINEERS  
 TRCD. RHA DATE 4-11-68 KANSAS CITY CLEVELAND NEW YORK  
 CKD. IM DATE 4-1-70

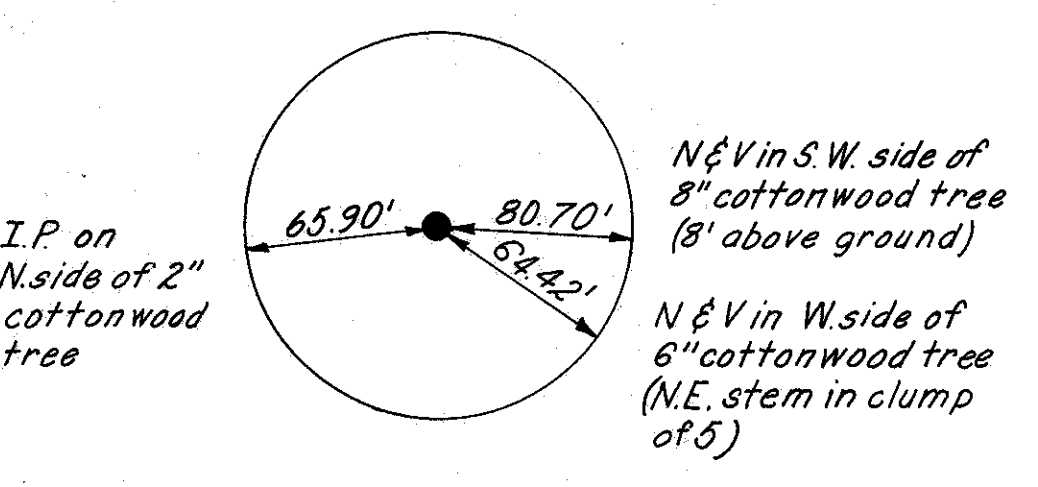




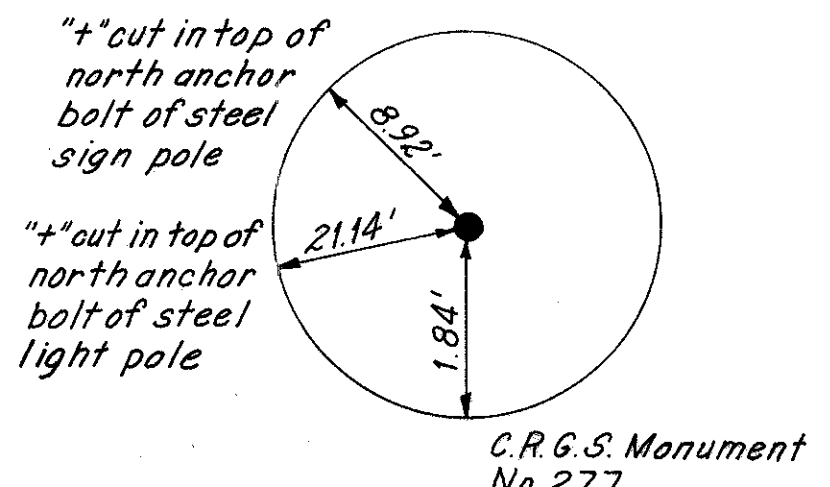
CUYAHOGA COUNTY  
CUY. 480-21.40



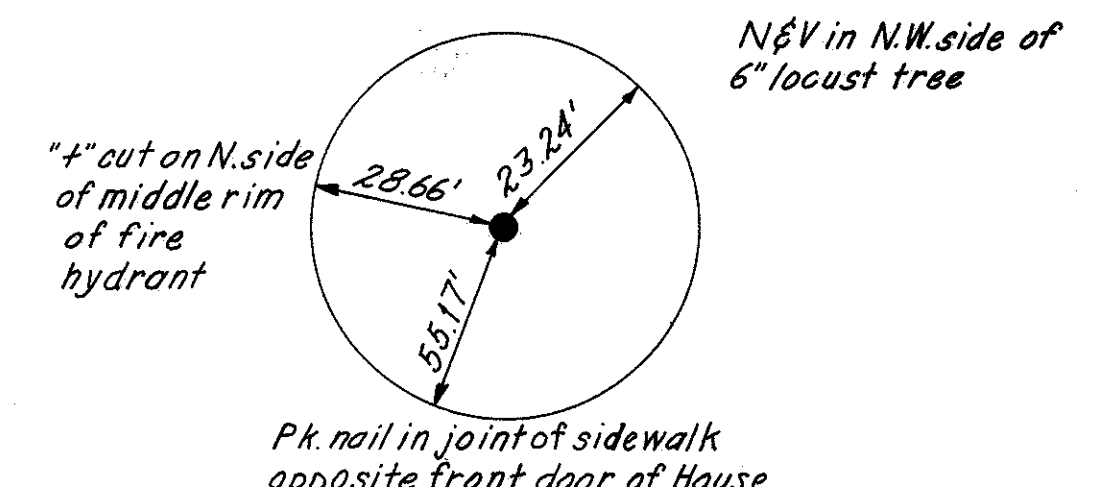
**POINT 20**  
H.N.T.B. brass cap on I.P.



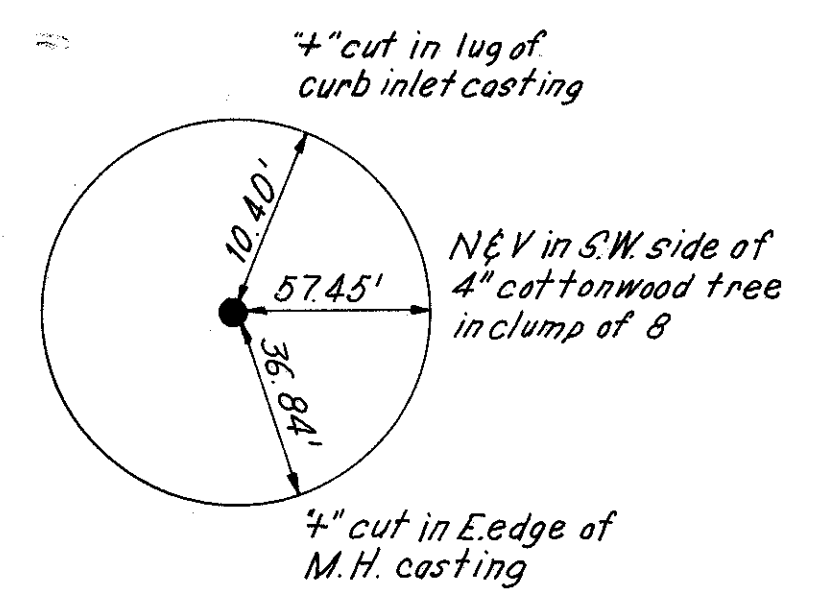
**POINT 23**  
H.N.T.B. brass cap on I.P.



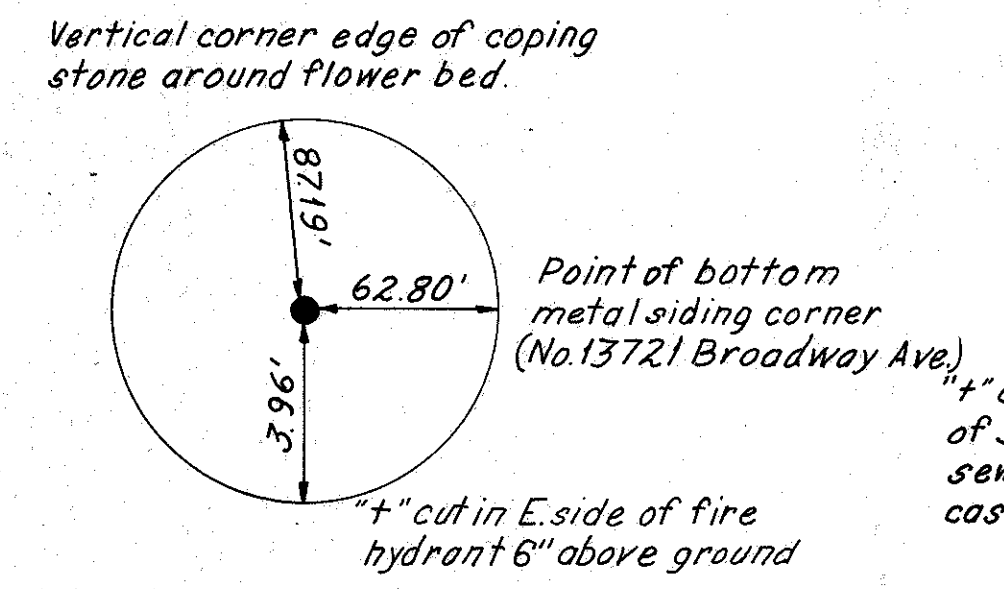
**POINT 24**  
H.N.T.B. brass cap on I.P.  
(At Broadway & McCracken)



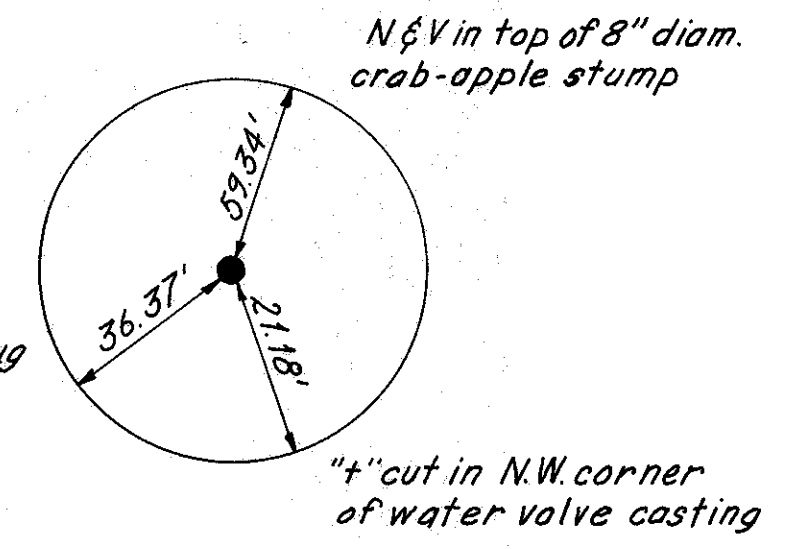
**POINT 25**  
H.N.T.B. brass cap on I.P.



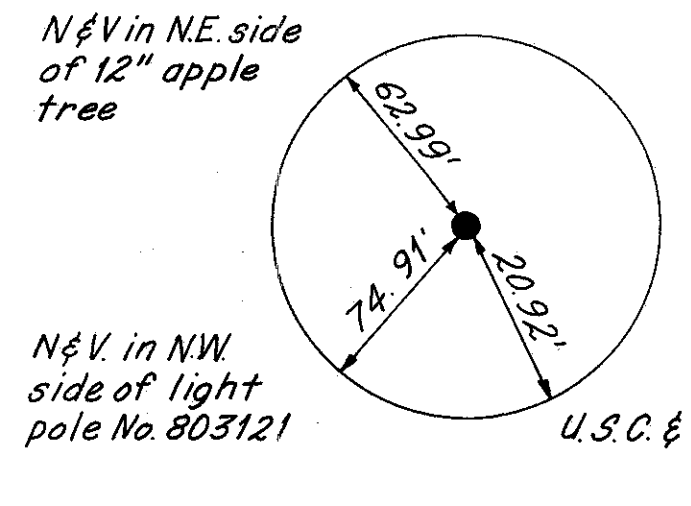
**POINT 34**  
Screw in curb  
(At Broadway & Forestdale Dr.)



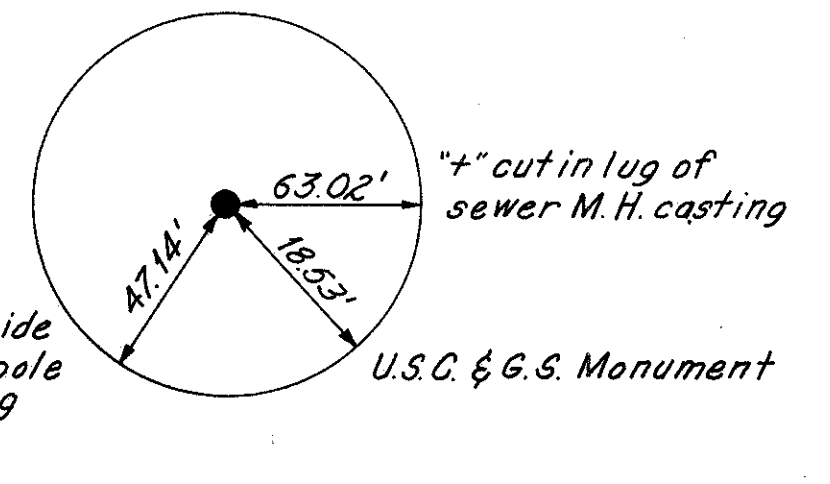
**POINT 35**  
Screw in sidewalk



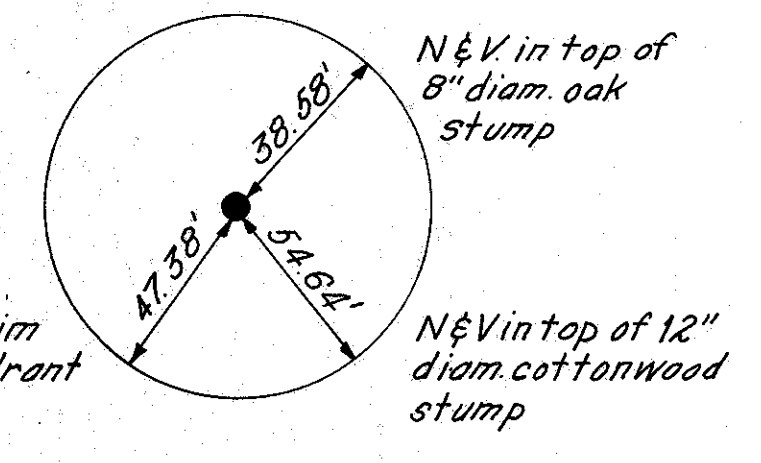
**POINT 36**  
H.N.T.B. brass cap on I.P. at edge  
of pavement (Osborn Road)



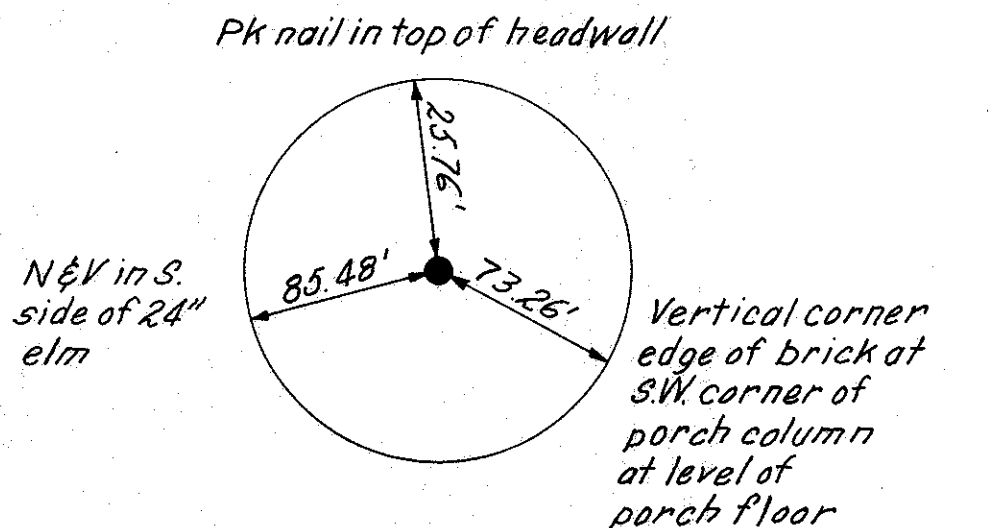
**POINT 37**  
Screw in pavement  
(Hole in asphalt & point  
set in concrete at E.  
143rd St. & Ohio Ave.)



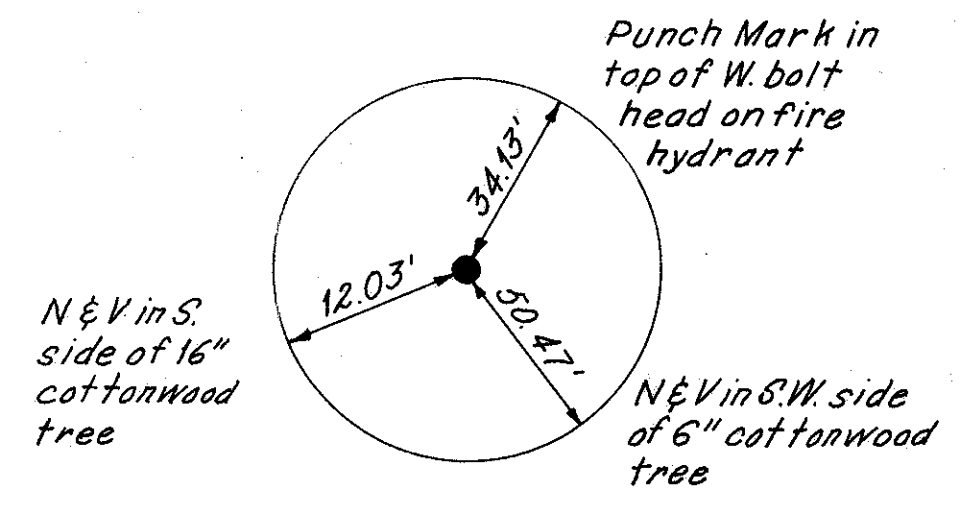
**POINT 38**  
Monument at intersection of center lines  
of streets (Ohio Ave. & E. 149th St.)



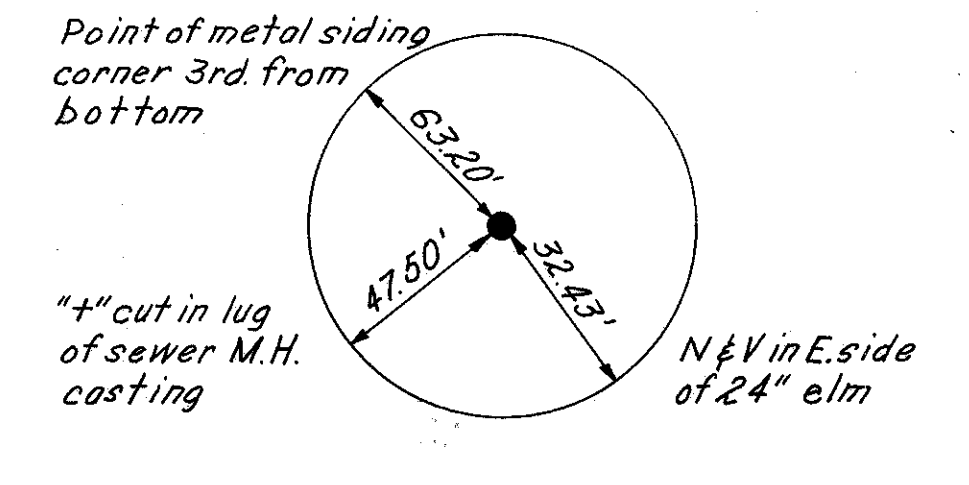
**POINT 39**  
Bolt in pavement  
(Orchard Road)



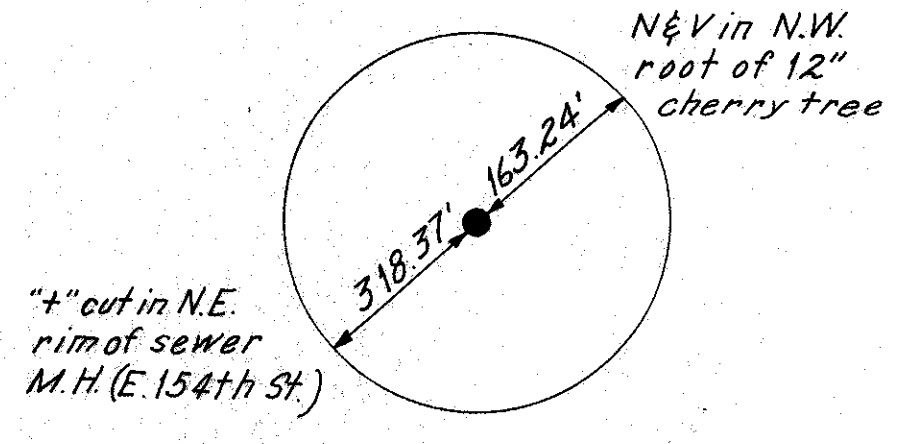
**POINT 40**  
H.N.T.B. brass cap on I.P.  
1' from edge of pavement



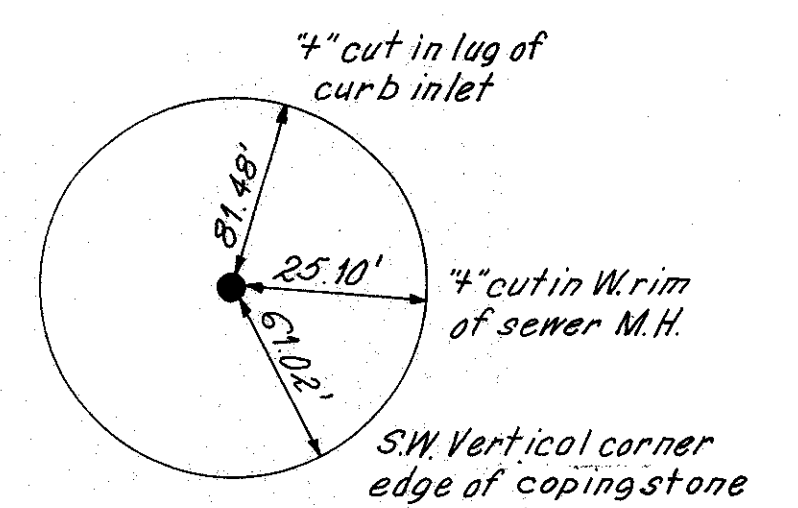
**POINT 41**  
H.N.T.B. brass cap on I.P.  
3' from edge of pavement  
(McCracken Road)



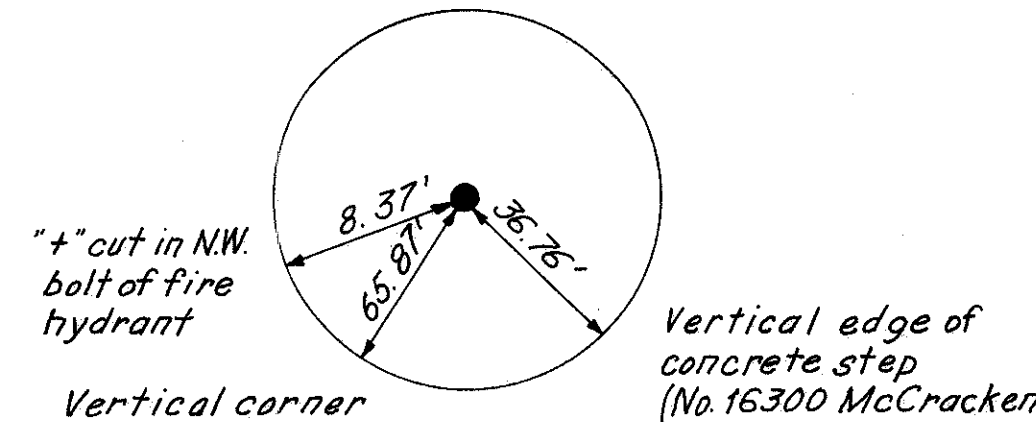
**POINT 46**  
Bolt in pavement  
(At E. 153rd St. & Ohio Ave.)



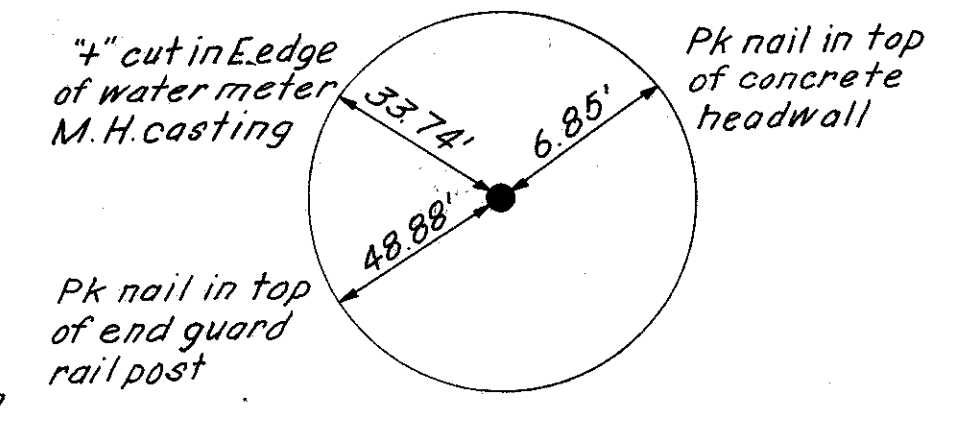
**POINT 47**  
H.N.T.B. brass cap on I.P.



**POINT 48**  
Monument at intersection of center lines  
of streets (Highview Dr. & Myrtle Ave.)



**POINT 51**  
H.N.T.B. brass cap on I.P.



**POINT 52**  
At cross of the "T" on H.N.T.B. brass  
cap on I.P. (Blase Ave. & McCracken Rd.)

BENCH MARKS		
NO.	DESCRIPTION	ELEV.
T.B.M. 1	Railroad spike, utility pole No. 326089 N.E. corner of Broadway Avenue and E. 141st Street.	845.686
20	Top of S.W. bolt, 2.5' S. of railroad signal, 45' S. of railroad tracks and McCracken Road	861.391
21	N.E. flange bolt of fire plug at N.E. angle of Broadway Avenue and McCracken Road	851.202
22	N.E. flange bolt of fire plug, 120' N.W. of 14712 Broadway Avenue, E. side of street.	883.947
31	N.E. flange bolt of fire plug at T-intersection of E. 131st Street and Broadway Avenue	837.126
32	N.E. flange bolt on fire plug at T-intersection of Forestdale Drive and Broadway Avenue	837.295
33	S.E. flange bolt on fire plug at 13721 Broadway Avenue	844.466
34	E. flange bolt on fire plug at 4912 Osborn Road	898.272
35	E. flange bolt on fire plug at 4736 Osborn Road (E. 143rd Street)	912.518
36	E. flange bolt on fire plug, 65' S. of 4928 Orchard Avenue	908.858
37	S. flange bolt on fire plug, 60' E. of 14611 McCracken Road	869.806
38	E. flange bolt on fire plug at 4612 Osborn Road	904.372
44	W. flange bolt on fire plug at 4933 E. 154th Street, 160' N.W. of Amoza Laboratory	913.619
46	S. flange bolt on fire plug at 15819 McCracken Road	876.037
47	S. corner of water valve in front of 15315 (Model Pattern Company) intersection Greenhurst Road and McCracken Road	865.009

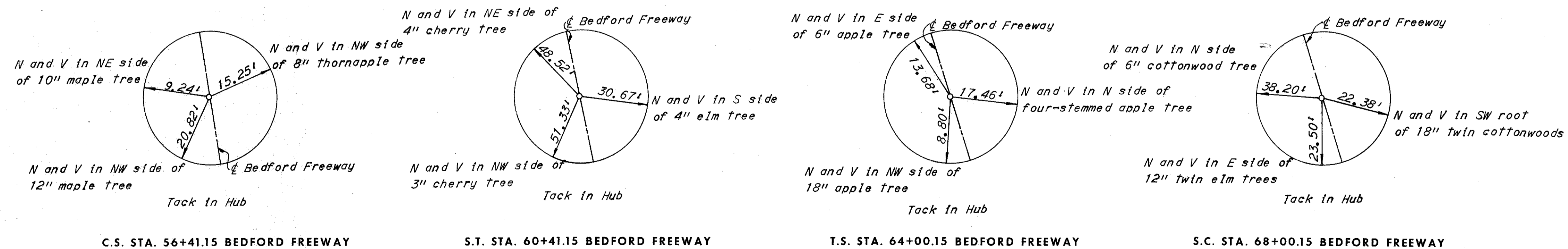
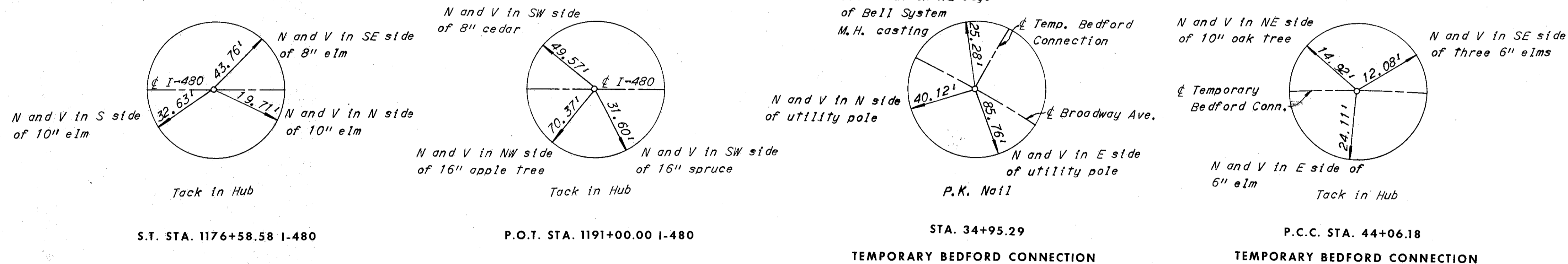
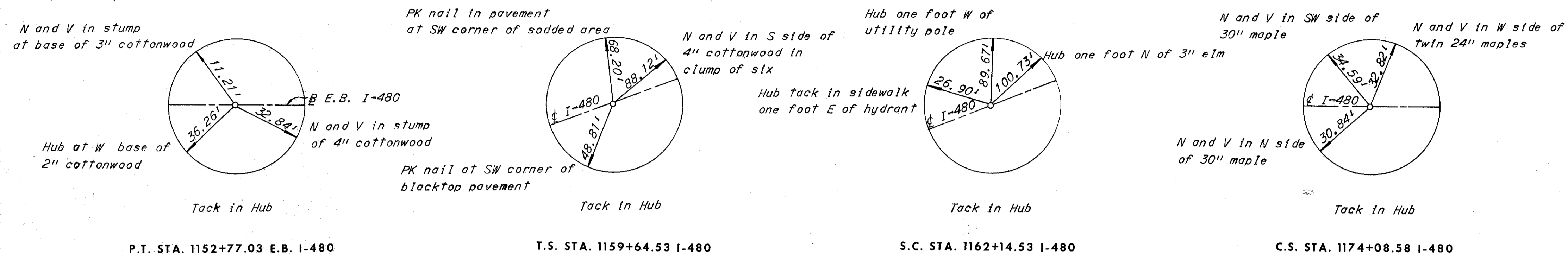
POINT	COORDINATES	
	NORTH	EAST
20	640,967.52	2,249,926.98
23	640,934.69	2,251,063.84
24	641,646.30	2,251,540.96
25	640,723.17	2,252,766.73
34	643,062.47	2,249,614.99
35	642,443.73	2,250,646.86
36	642,805.08	2,251,774.03
37	644,233.26	2,251,763.69
38	644,251.01	2,252,823.94
39	642,243.46	2,252,869.37
40	641,624.56	2,252,869.94
41	641,609.16	2,252,159.71
46	644,264.52	2,253,677.04
47	642,730.14	2,254,349.21
48	642,607.06	2,255,643.18
51	641,683.33	2,255,766.55
52	641,683.15	2,254,719.86

# CENTERLINE REFERENCE POINTS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

5-A  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



**LEGEND**

P.K. Nail = Parker Kelon Nail  
N and V = Nail and vee

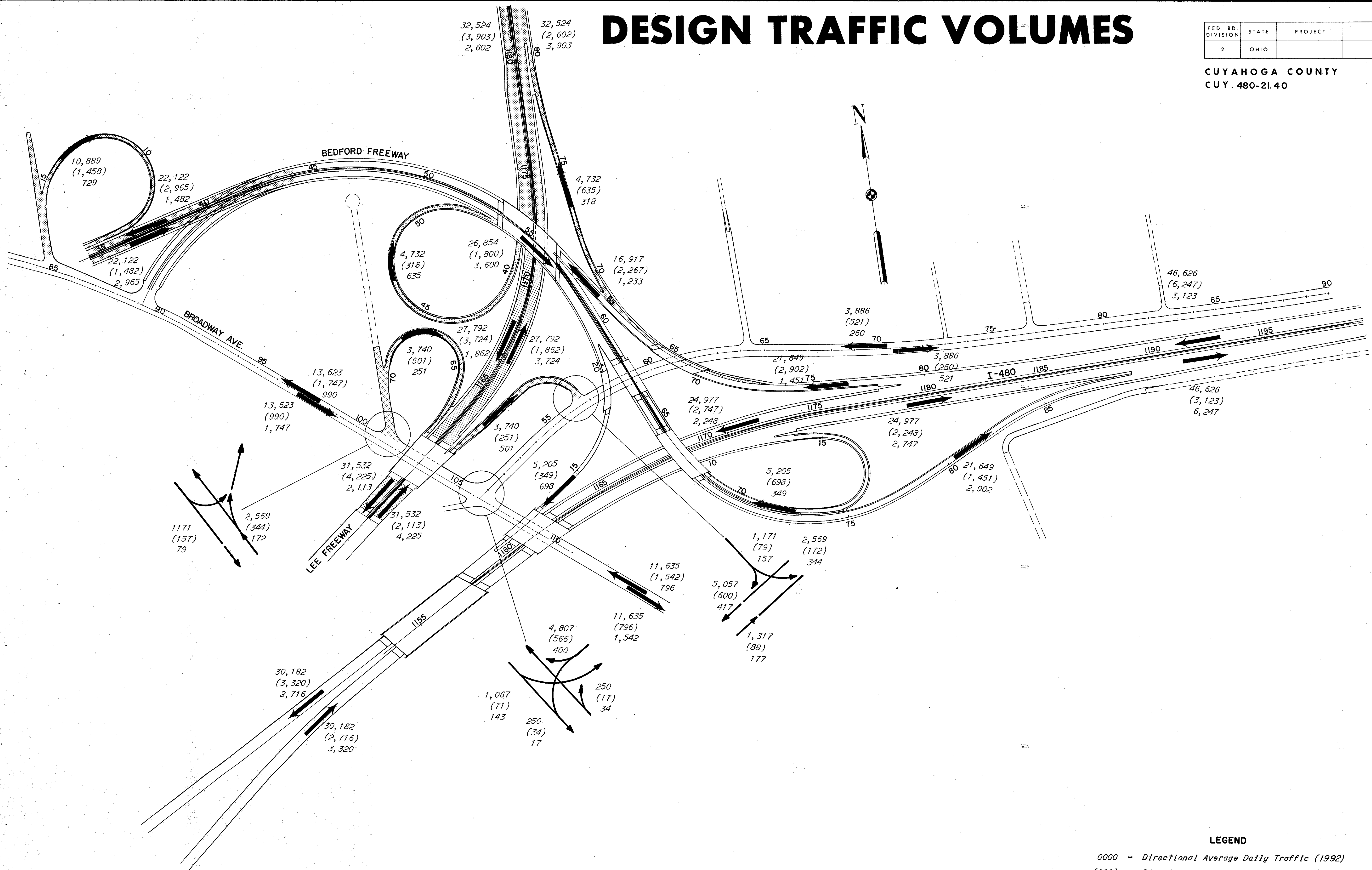
SCALE None HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 9-15-72 CONSULTING ENGINEERS  
TRCD I.M. DATE 9-15-72 KANSAS CITY CLEVELAND NEW YORK  
CKD R.R.H. DATE 9-15-72

# DESIGN TRAFFIC VOLUMES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

6  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



SCALE 1"=200' HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE RHA DATE 4-11-68 CONSULTING ENGINEERS  
TRCD RHA DATE 4-11-68  
CKD JM DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

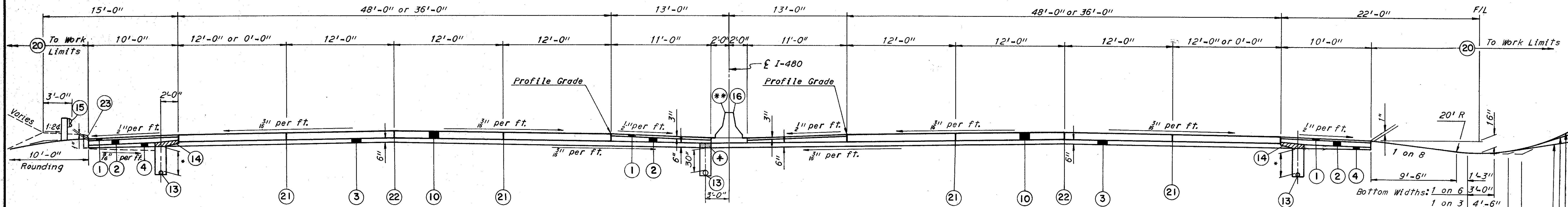
# TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

7  
390

CUYAHOGA COUNTY  
CUY.480-21.40



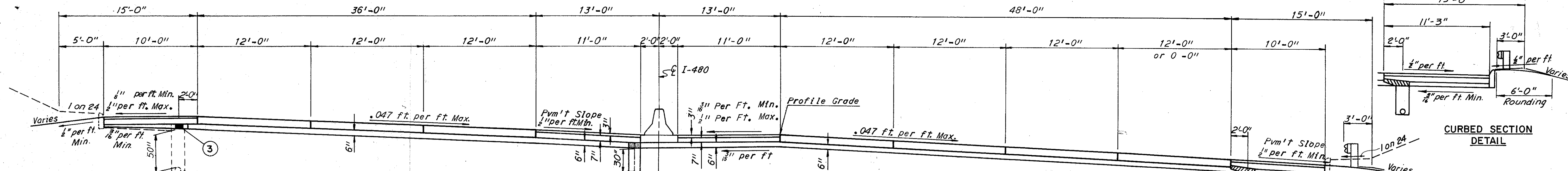
**NORMAL SECTION**

STA. 1152+77.03 TO STA. 1153+08.41 - WESTBOUND I-480  
 STA. 1158+17.04 TO STA. 1159+64.53 - WESTBOUND I-480  
 STA. 1177+84.40 TO STA. 1193+00.00 - EASTBOUND I-480  
 STA. 1177+09.52 TO STA. 1193+00.00 - WESTBOUND I-480

**CURBED SECTION**

STA. 1185+90 TO STA. 1193+00 - WESTBOUND I-480  
 STA. 1158+70.50 TO STA. 1160+89.20 - EASTBOUND I-480 (11'-3" Shoulder See Detail This Sheet)  
 STA. 1158+03 TO STA. 1160+27.20 - WESTBOUND I-480 (7'-3" Shoulder See Detail Sheet No.8)

1 on 6 slopes where R/W permits.  
 1 on 6 to 1 on 3 slopes for cuts to 15 ft.  
 1 on 2 max. slopes for cuts over 15 ft.



**SUPERELEVATED SECTION**

STA. 1152+77.03 TO STA. 1153+08.41 - EASTBOUND I-480  
 STA. 1158+17.04 TO STA. 1160+73.77 - EASTBOUND I-480  
 STA. 1162+58.23 TO STA. 1177+84.40 - EASTBOUND I-480  
 STA. 1159+64.53 TO STA. 1160+73.77 - WESTBOUND I-480  
 STA. 1162+58.23 TO STA. 1177+09.52 - WESTBOUND I-480

**CURBED SECTION**

STA. 1167+75 TO STA. 1169+50  
 WESTBOUND I-480

**CURBED SECTION**

STA. 1168+11.65 TO STA. 1170+21.80  
 EASTBOUND I-480

**LEGEND**

- ① Item 301 Bituminous Aggregate Base 702.01(85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal)
- ② Item 304 Aggregate Base
- ③ Item 310 Subbase, Grading "A", as per plan
- ④ Item 310 Subbase
- ⑩ Item 451 10" Reinforced Portland Cement Concrete Pavement
- ⑬ Item 605 6" Pipe Underdrains, as per plan
- ⑭ Item Special Special Drainage Connection, using No.9 Aggregate (See note in proposal)
- ⑮ Item 606 Guard Rail, Type 5
- ⑯ Item 622 Concrete Barrier
- ⑳ Item 659 Seeding and Mulching (See General Notes)
- ㉑ Standard Longitudinal Joint
- ㉒ Standard Key Joint without Tie Bars
- ㉓ Item 609 Concrete Curb, Standard Type 6

**NOTES:**

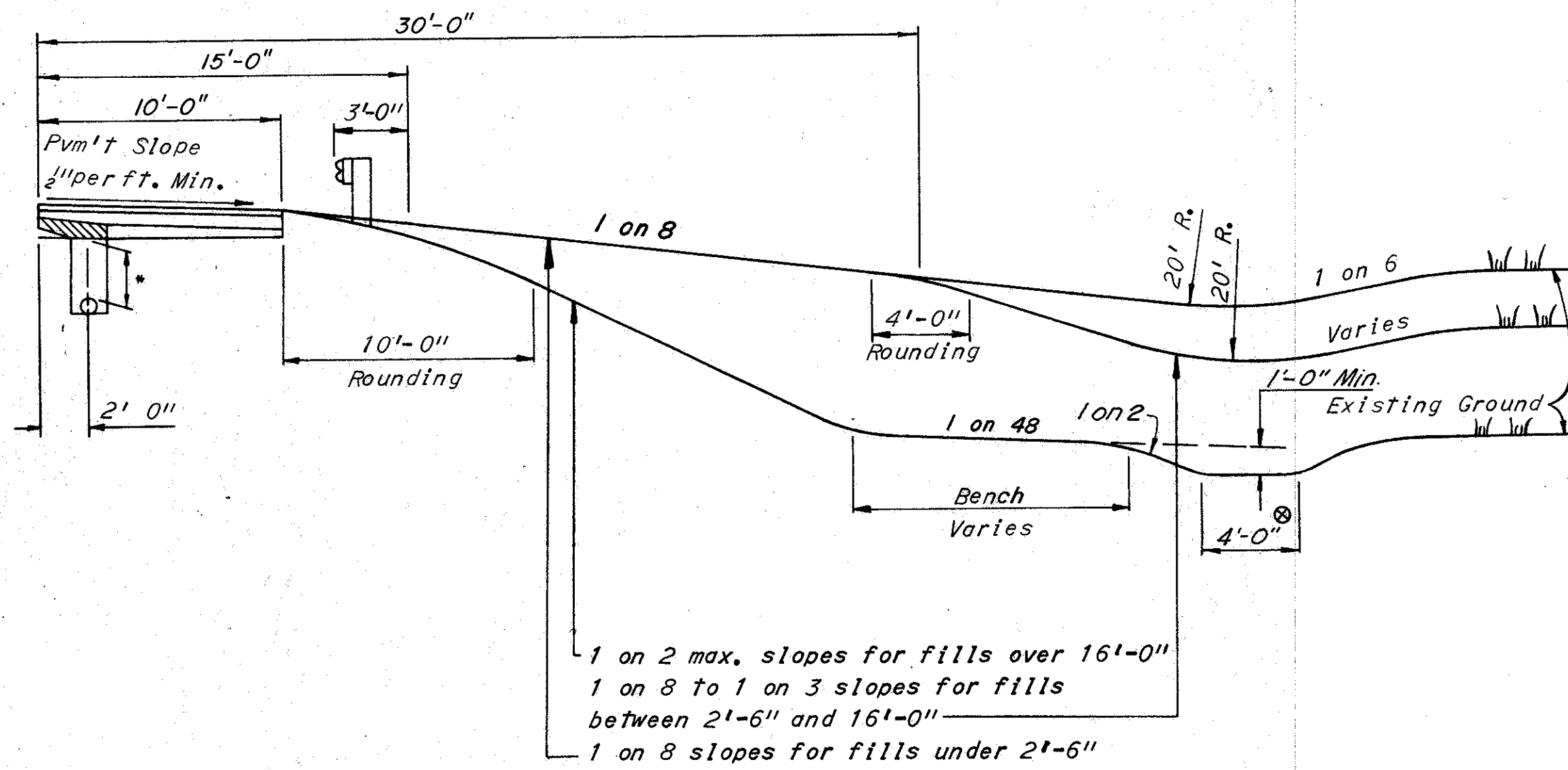
Unless otherwise noted, dimensions and or callouts shown on the top section shall apply to all sections on this sheet.  
 Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross Section sheets.  
 Earth shoulders adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.

\* Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:  
 50" cover from bottom of subbase to the top of the pipe (deep in cut)  
 30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)  
 Transition from shallow to deep (unclassified)

\*\* See Concrete Barrier Detail Sheet No.9  
 ⊕ Remove subbase for width of Item 603 trench and replace with new backfill material in accordance with 605.03(c) immediately prior to placing Item 304 Aggregate Base course. Cost shall be included in price bid per Lin.Ft. for Item 605.

**SEQUENCE OF OPERATIONS:**

- (1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
  - (2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed in this operation.
  - (3) Construct Item 451 pavement.
  - (4) Remove subbase and any contaminated backfill over drain and replace with No.9 Aggregate, as shown by ⑭.
  - (5) Complete shoulder construction.
- ⊕ Unless otherwise shown in the plans.



**FILL SLOPE TREATMENT**

1 on 2 max. slopes for fills over 16'-0"  
 1 on 3 to 1 on 4 slopes for fills between 2'-6" and 16'-0"  
 1 on 6 slopes for fills under 2'-6"

SCALE 3/8" = 1'-0"  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE R.H.A. DATE 4/11/68 CONSULTING ENGINEERS  
 TRCD J.E.M. DATE 4/24/68  
 CKD J.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK



# TYPICAL SECTIONS

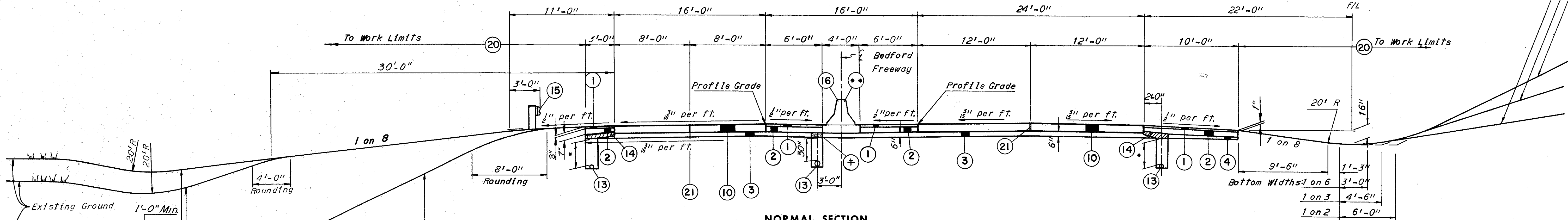
## TYPE 451

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

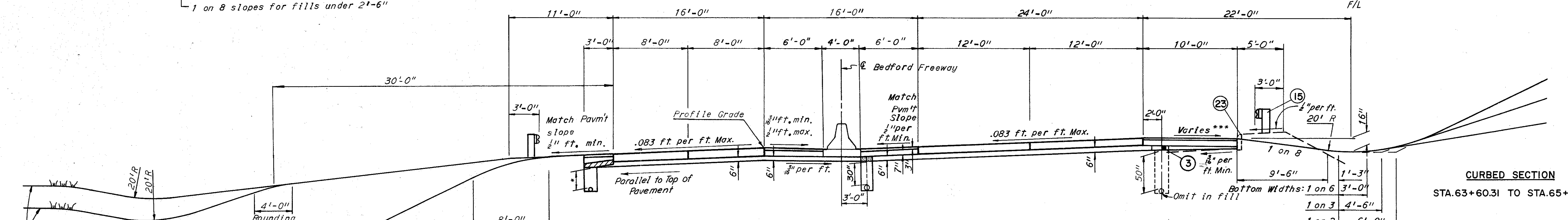
8  
390

CUYAHOGA COUNTY  
CUY.480-21.40

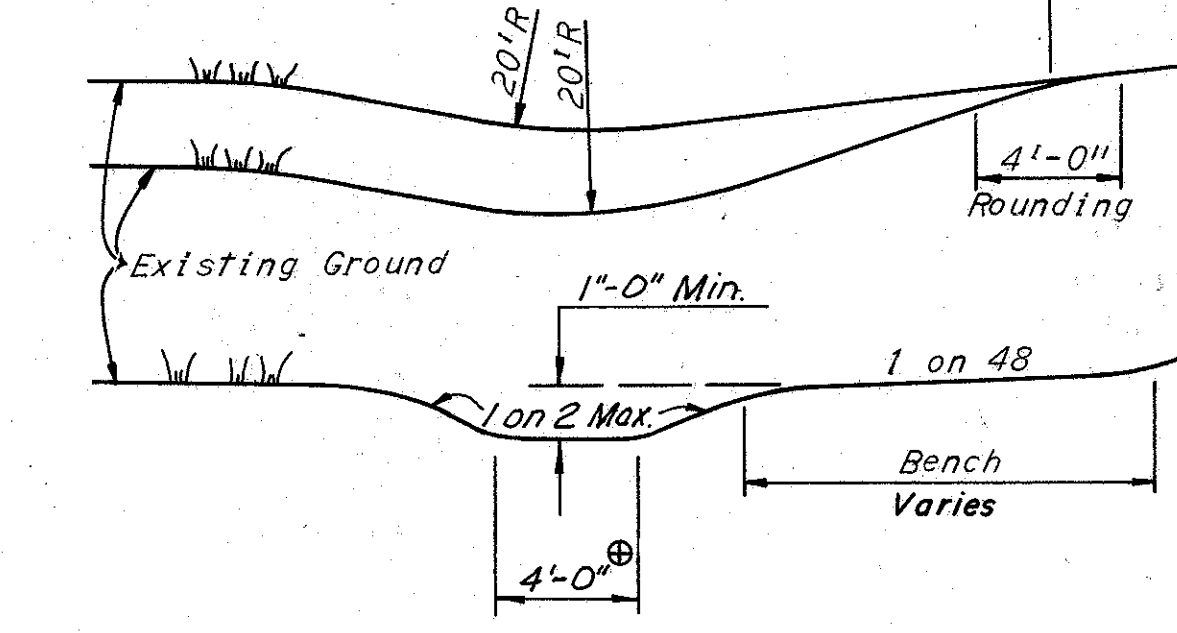
1 on 2 max. slopes for cuts over 15 ft.  
1 on 6 to 1 on 3 slopes for cuts to 15 ft.  
1 on 6 slopes where R/W permits



**NORMAL SECTION**  
STA. 61+63.36 TO STA. 62+17.54



**SUPERELEVATED SECTION**  
STA. 56+41.15 TO STA. 61+63.36  
STA. 63+62.80 TO STA. 65+88.92  
STA. 68+07.24 TO STA. 74+54.29



**CURBED SECTION**  
STA. 63+66.80 TO STA. 65+73.50

**LEGEND**

- ① Item 301 Bituminous Aggregate Base 702.01 (85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal)
- ② Item 304 Aggregate Base
- ③ Item 310 Subbase, Grading "A", as per plan
- ④ Item 310 Subbase
- ⑩ Item 451 10" Reinforced Portland Cement Concrete Pavement
- ⑬ Item 605 6" Pipe Underdrains, as per plan
- ⑭ Item Special Special Drainage Connection, using No.9 Aggregate (See note in proposal)
- ⑮ Item 606 Guard Rail, Type 5
- ⑯ Item 622 Concrete Barrier
- ⑳ Item 659 Seeding and Mulching (See General Notes)
- ㉑ Standard Longitudinal Joint
- ㉓ Item 609 Concrete Curb, Standard Type 6

**NOTES:**  
Unless otherwise noted, dimensions and or callouts shown on the top section shall apply to all sections on this sheet.  
Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross Section sheets.  
Earth shoulders adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.

\* Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:  
50" cover from bottom of subbase to the top of the pipe (deep in cut)  
30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)  
Transition from shallow to deep (unclassified)  
\*\*\* See paved shoulder details  
\*\* See Concrete Barrier Detail Sheet No. 9  
⊕ Remove subbase for width of Item 603 trench and replace with new backfill material in accordance with 605.03(c) immediately prior to placing Item 304 Aggregate Base course. Cost shall be included in price bid per Lin.Ft. for Item 605.

**SEQUENCE OF OPERATIONS:**  
(1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.  
(2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed in this operation.  
(3) Construct Item 451 pavement.  
(4) Remove subbase and any contaminated backfill over drain and replace with No.9 Aggregate, as shown by ⑭.  
(5) Complete shoulder construction.

⊕ Unless otherwise shown in the plans.

SCALE 1/4" = 1'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE R.H.A. DATE 4/11/68 CONSULTING ENGINEERS  
TRCD J.E.W. DATE 4/24/68  
CKD I.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

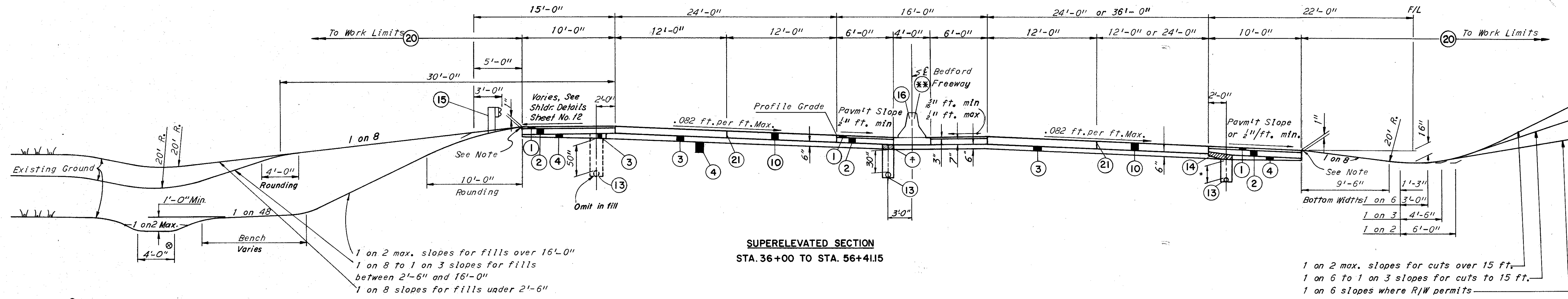
# TYPICAL SECTIONS

TYPE 451

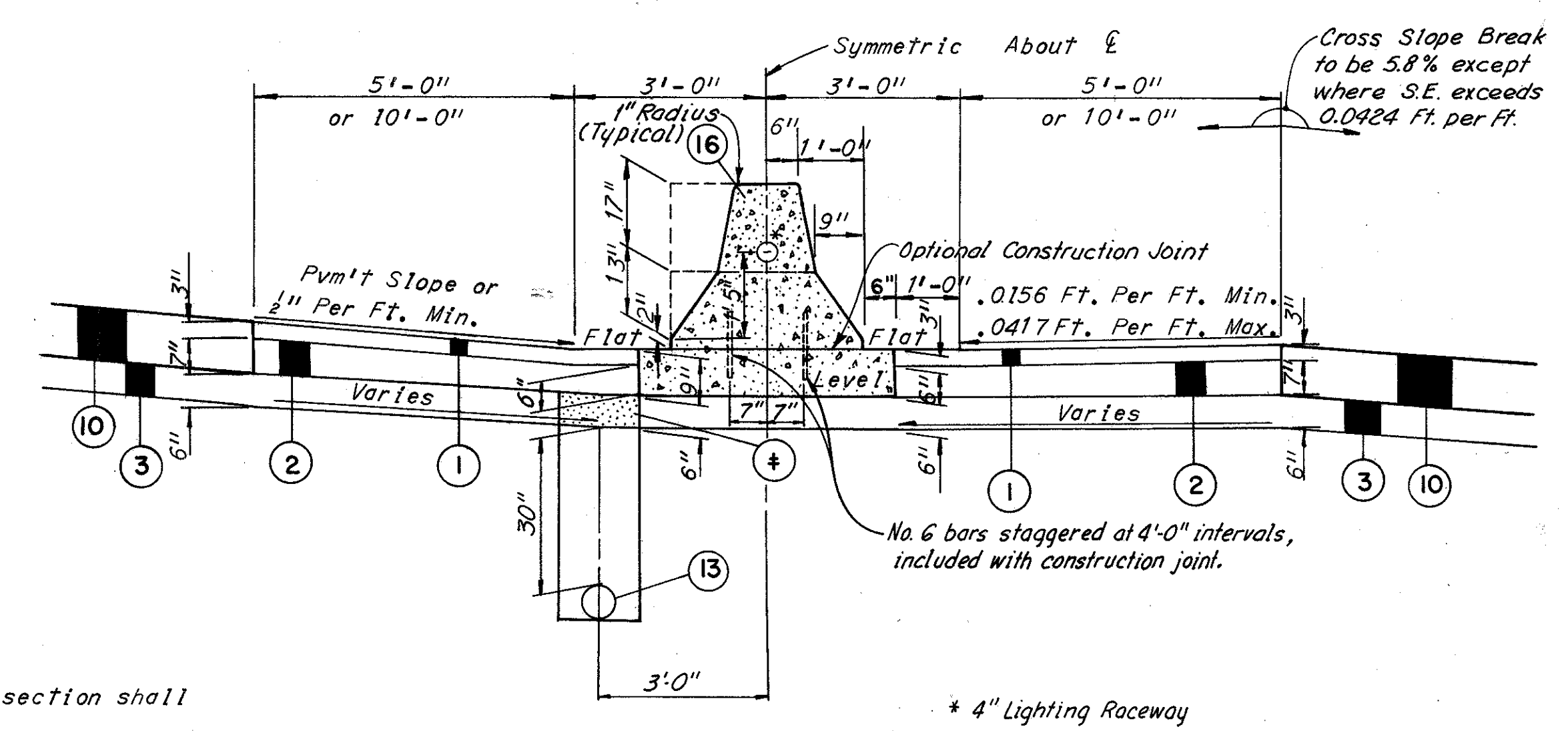
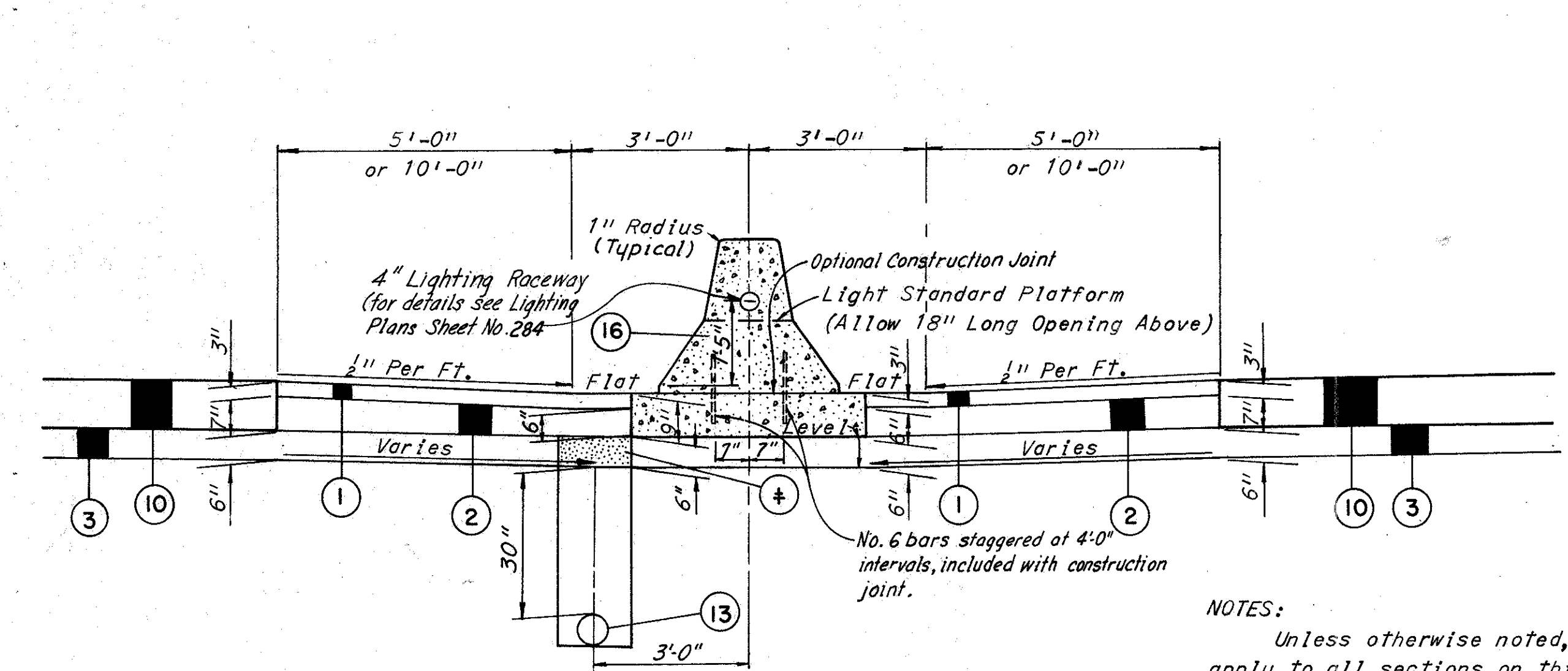
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

9  
390

CUYAHOGA COUNTY  
CUY 480-21.40



⊗ Unless otherwise shown in the plans



**NOTES:**  
Unless otherwise noted, dimensions and or callouts shown on the top section shall apply to all sections on this sheet.  
Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross Section sheets.  
Earth shoulders adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.

\* Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:  
50" cover from bottom of subbase to the top of the pipe (deep in cut)  
30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)  
Transition from shallow to deep (unclassified)

\*\* See Concrete Barrier Details shown on this sheet

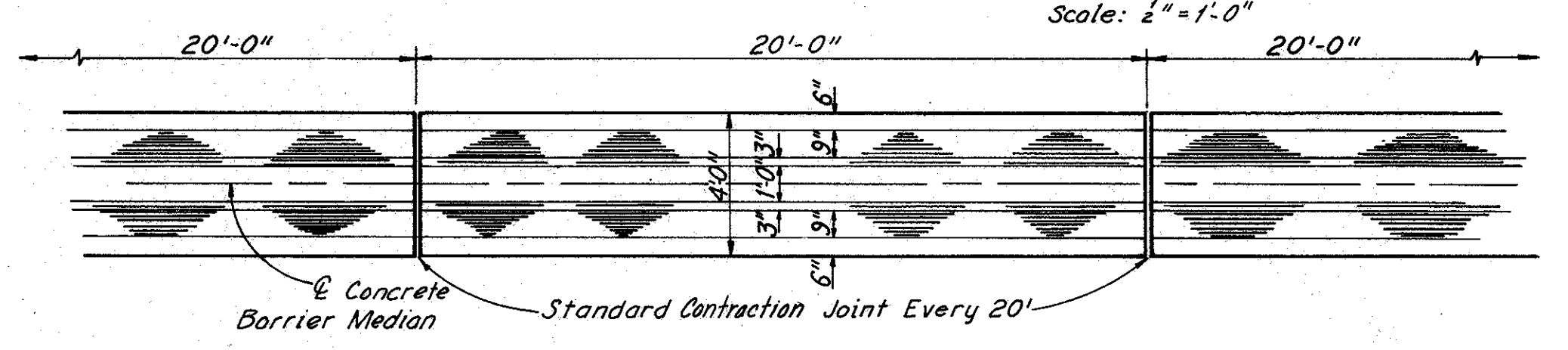
⊕ Remove subbase for width of Item 603 trench and replace with new backfill material in accordance with 605.03(c) immediately prior to placing Item 304 Aggregate Base course. Cost shall be included in price bid per Lin.Ft. for Item 605.

**SEQUENCE OF OPERATIONS:**

- (1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
- (2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed in this operation.
- (3) Construct Item 451 pavement.
- (4) Remove subbase and any contaminated backfill over drain and replace with No.9 Aggregate, as shown by (14).
- (5) Complete shoulder construction.

**LEGEND**

①	Item 301	Bituminous Aggregate Base 702.01 (85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal)
②	Item 304	Aggregate Base
③	Item 310	Subbase, Grading "A", as per plan
④	Item 310	Subbase
⑩	Item 451	10" Reinforced Portland Cement Concrete Pavement
⑬	Item 605	6" Pipe Underdrains, as per plan
⑭	Item Special	Special Drainage Connection, using No.9 Aggregate (See note in proposal)
⑮	Item 606	Guard Rail, Type 5
⑯	Item 622	Concrete Barrier
⑳	Item 659	Seeding and Mulching (See General Notes)
㉑	Standard Longitudinal Joint	



SCALE: 3/8" = 1'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE R.H.A. DATE 4/10/68  
TRCD J.E.M. DATE 7/25/68  
CKD I.M. DATE 4-1-70  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

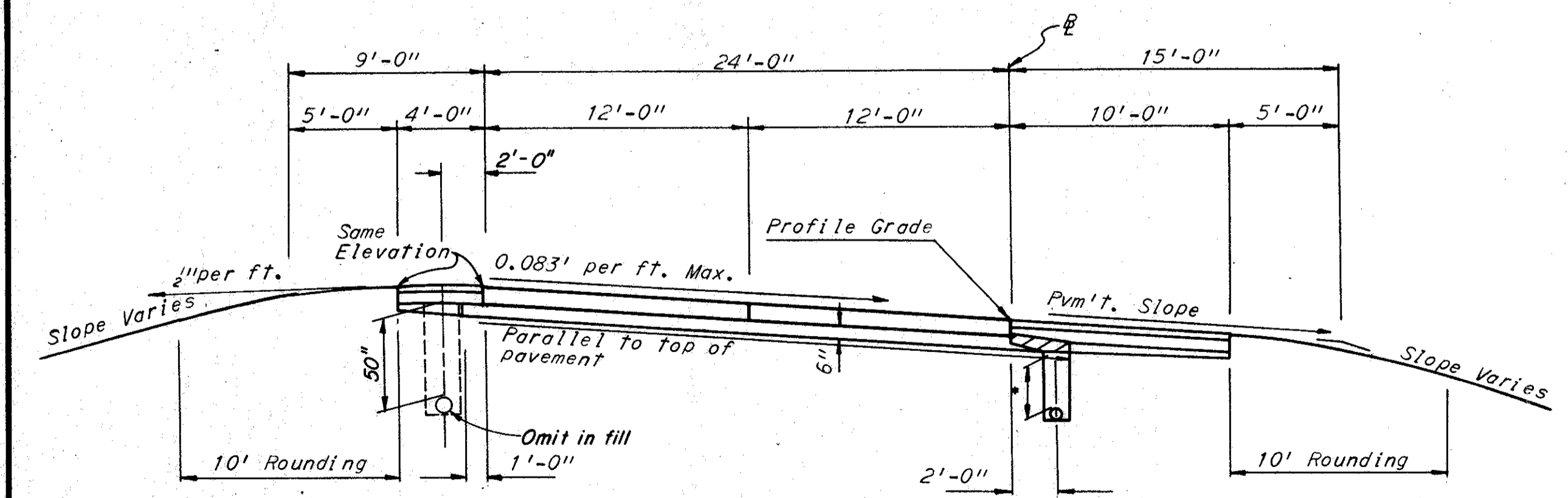
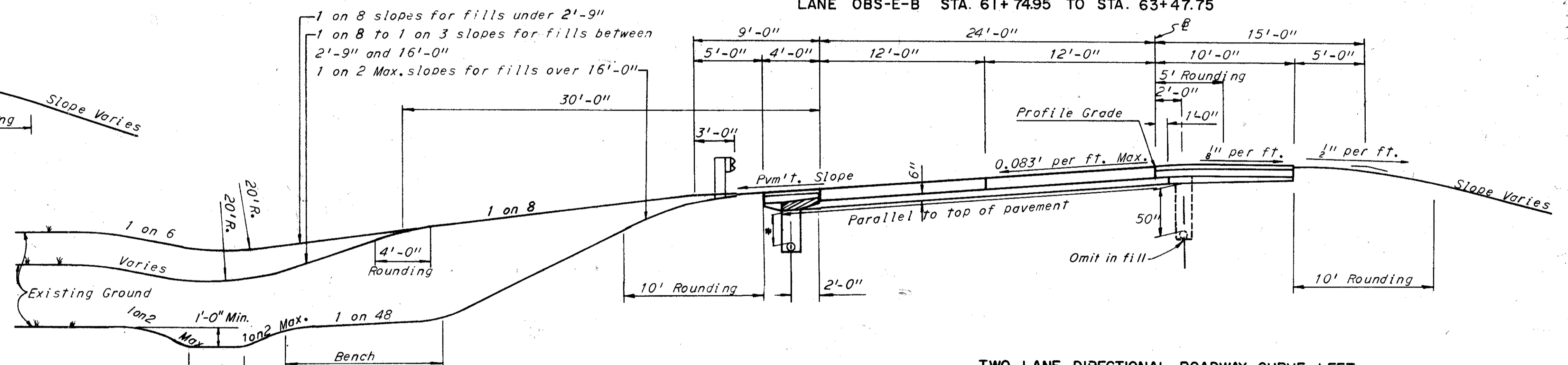
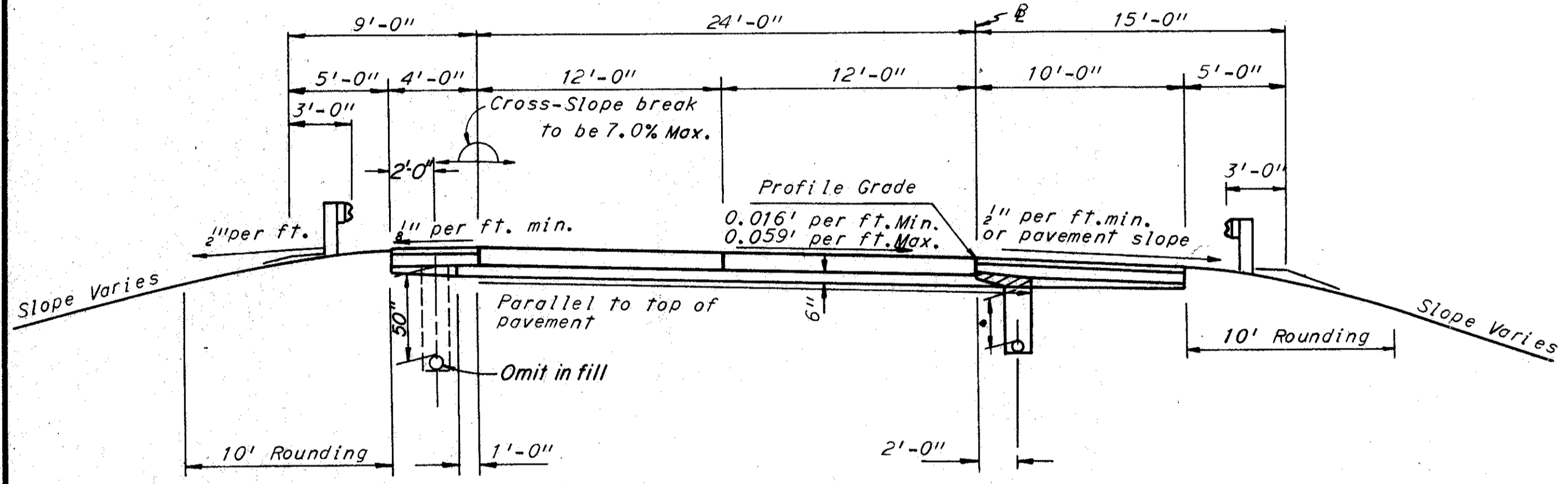
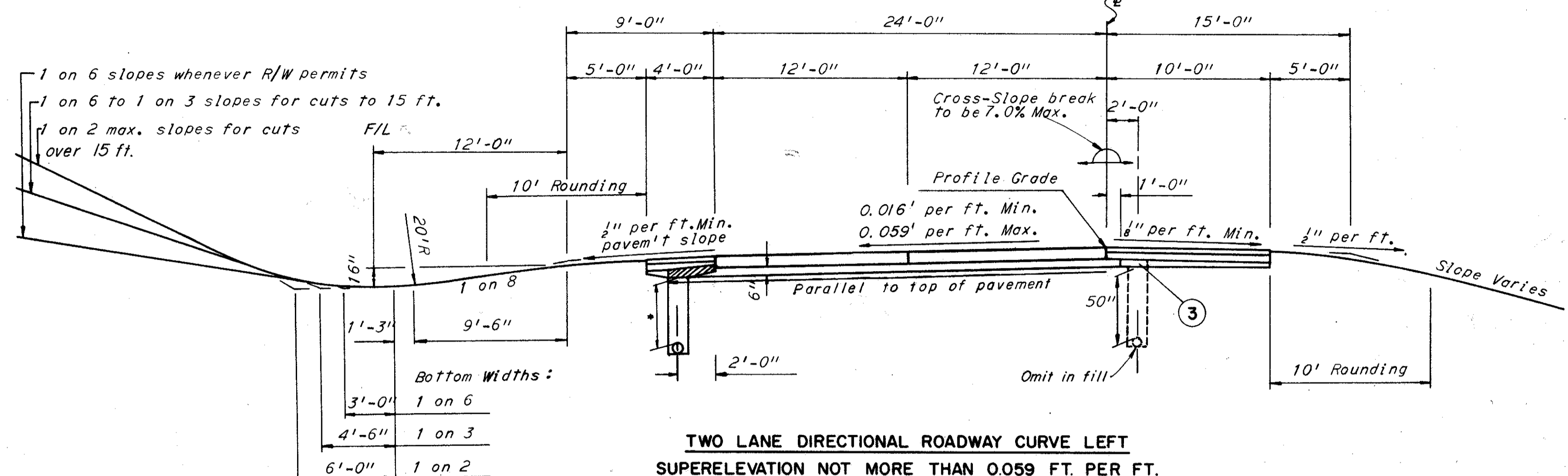
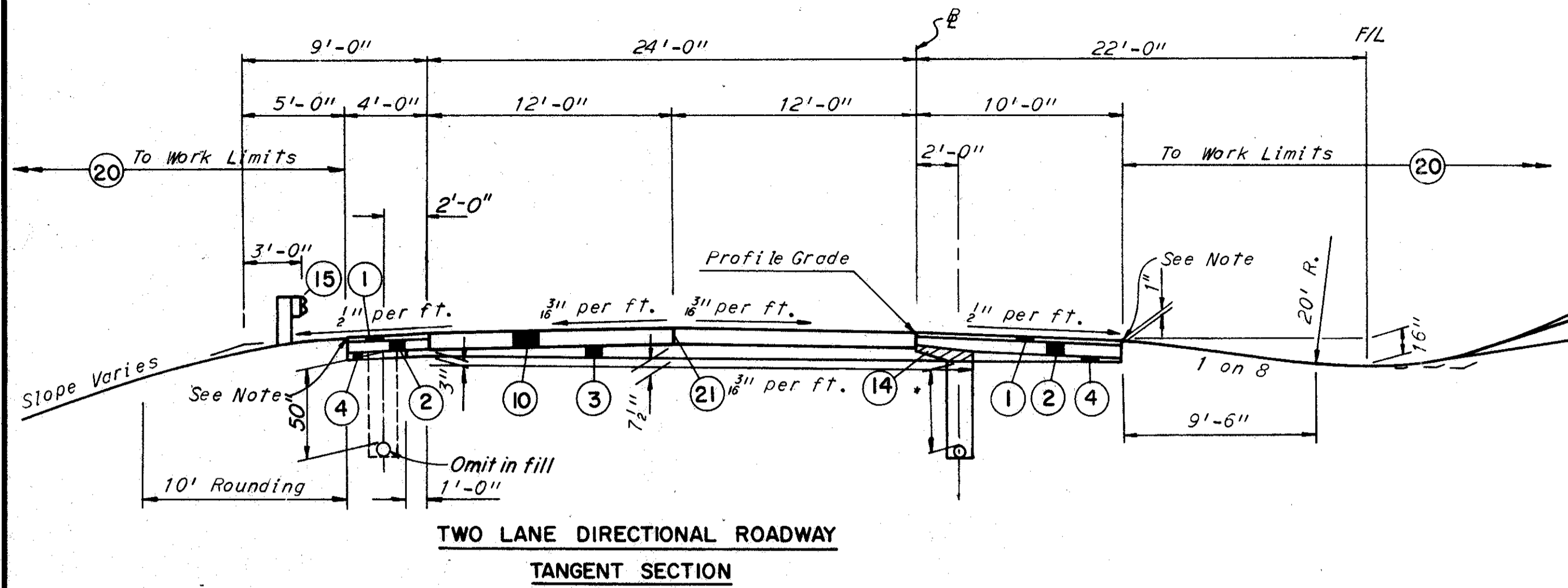
# TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

10  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



- LEGEND**
- ① Item 301 Bituminous Aggregate Base 702.01 (35-100 AC-20) or 702.09 RT-11 or RT-12, as per plan (See Note in Proposal)
  - ② Item 304 Aggregate Base
  - ③ Item 310 Subbase, Grading "A", as per plan.
  - ④ Item 310 Subbase
  - ⑩ Item 451 10" Reinforced Portland Cement Concrete Pavement
  - ⑬ Item 605 6" Pipe Underdrains, as per plan
  - ⑭ Item Special Drainage Connection, using No. 9 Aggregate (See Notes in proposal).
  - ⑮ Item 606 Guard Rail, Type S
  - ⑳ Item 659 Seeding and Mulching (See General Notes)
  - ㉑ Standard Longitudinal Joint

**NOTES:**

All two lane directional roadway typical sections are shown facing in the direction of travel.

Unless otherwise noted, dimensions and/or callouts shown on the top left section shall apply to all sections on this sheet.

Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross Section Sheets.

Earth shoulder adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.

\*Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:

- 50" cover from bottom of subbase to the top of the pipe (deep in cut)
- 30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)
- Transition from shallow to deep (unclassified)

**SEQUENCE OF OPERATIONS:**

- (1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
- (2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed on this operation.
- (3) Construct Item 451 pavement.
- (4) Remove subbase and any contaminated backfill over drain and replace with No. 9 Aggregate as shown by ⑭.
- (5) Complete shoulder construction.

SCALE 3/16" = 1'-0"  
 MADE J.M. DATE 3-3-68  
 TRCD J.M. DATE 3-3-68  
 CKD R.P.R. DATE 4-3-68  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

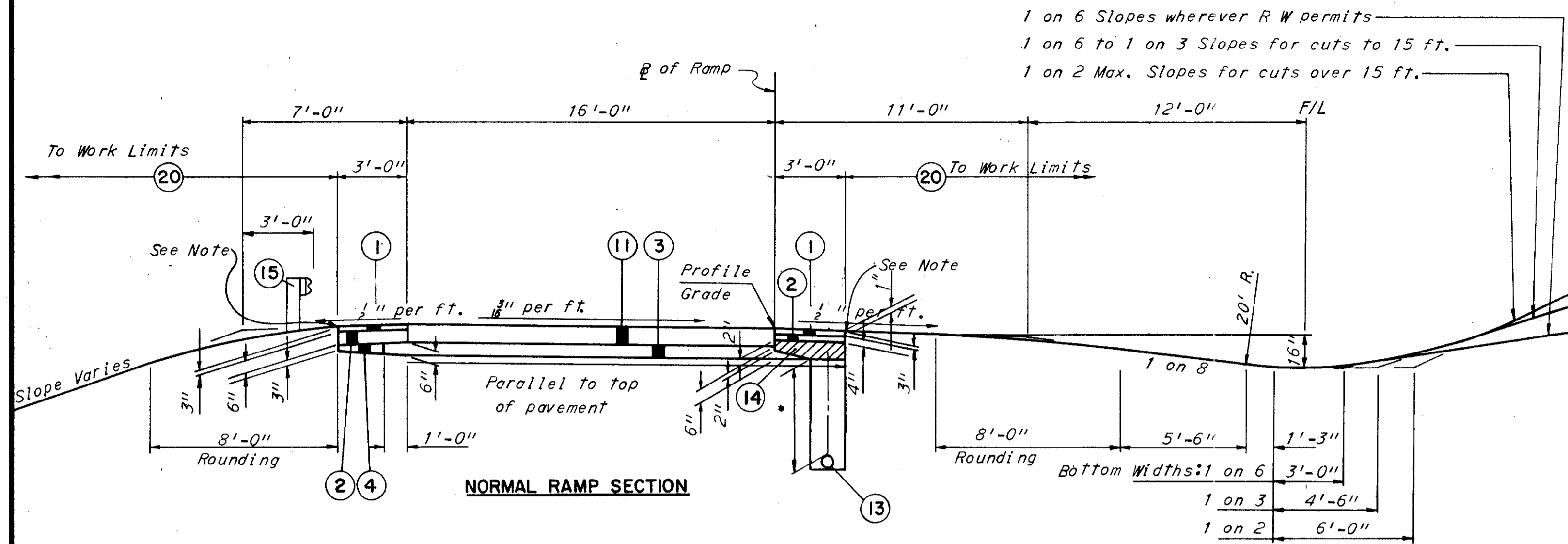
# TYPICAL SECTIONS

TYPE 451

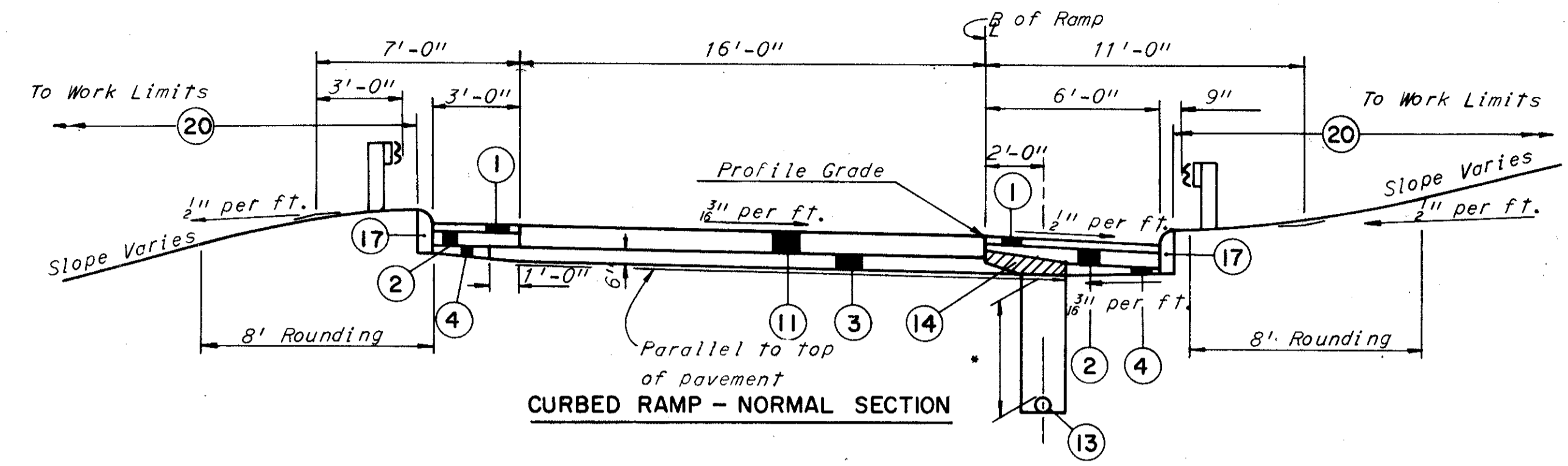
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

11  
390

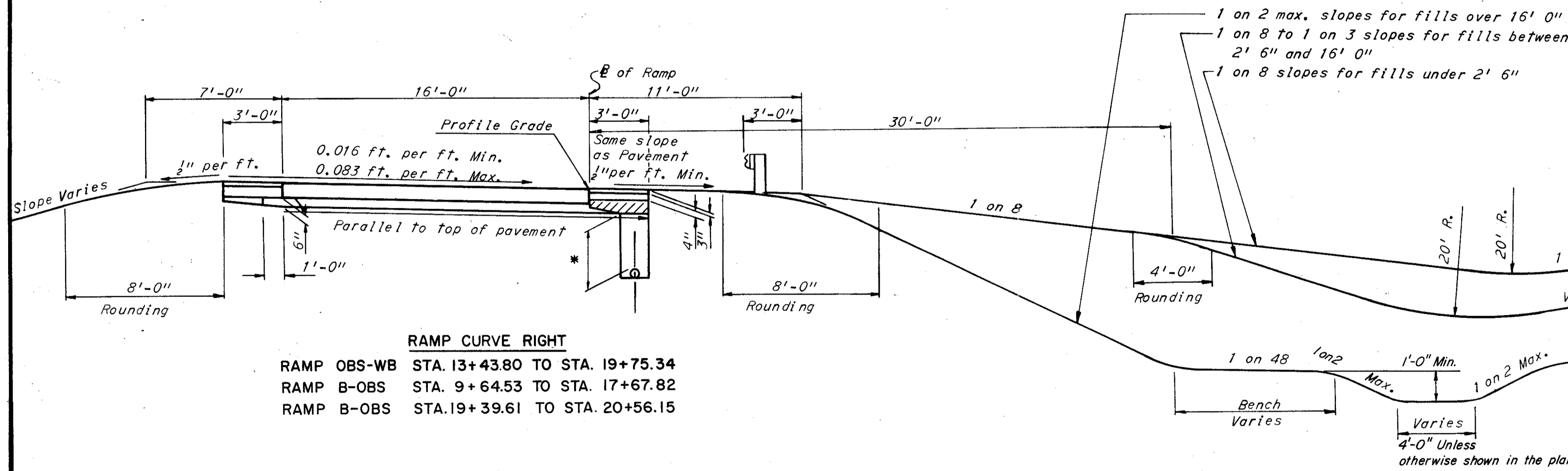
CUYAHOGA COUNTY  
CUY. 480-21.40



**NORMAL RAMP SECTION**

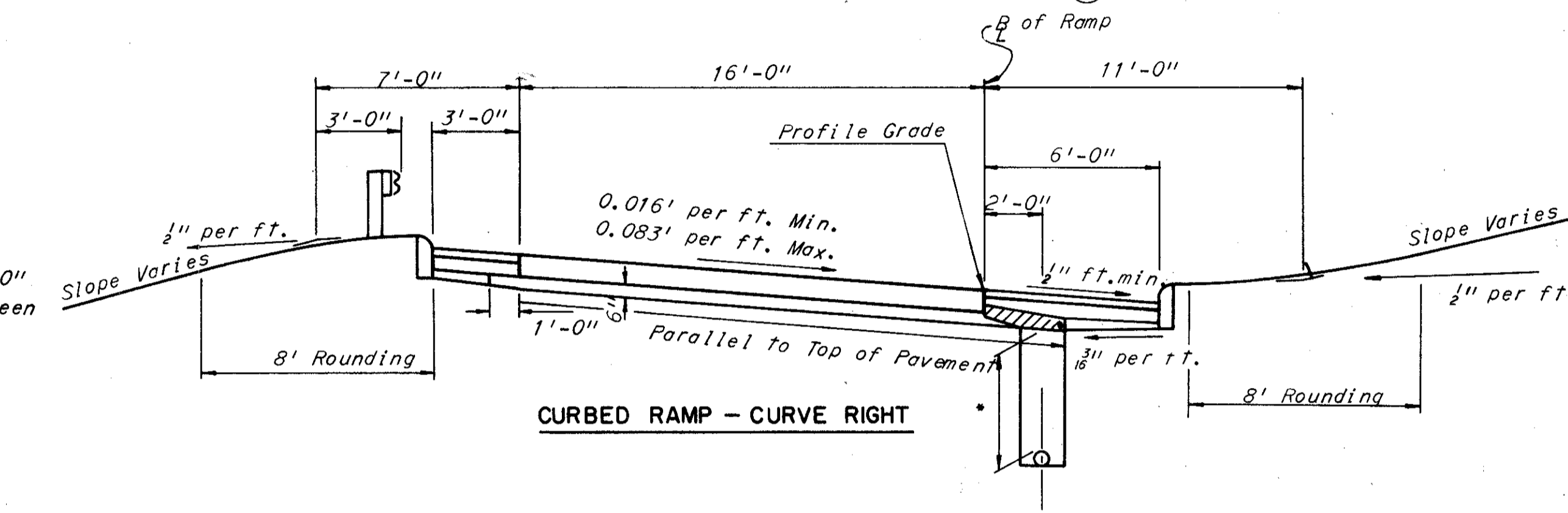


**CURBED RAMP - NORMAL SECTION**

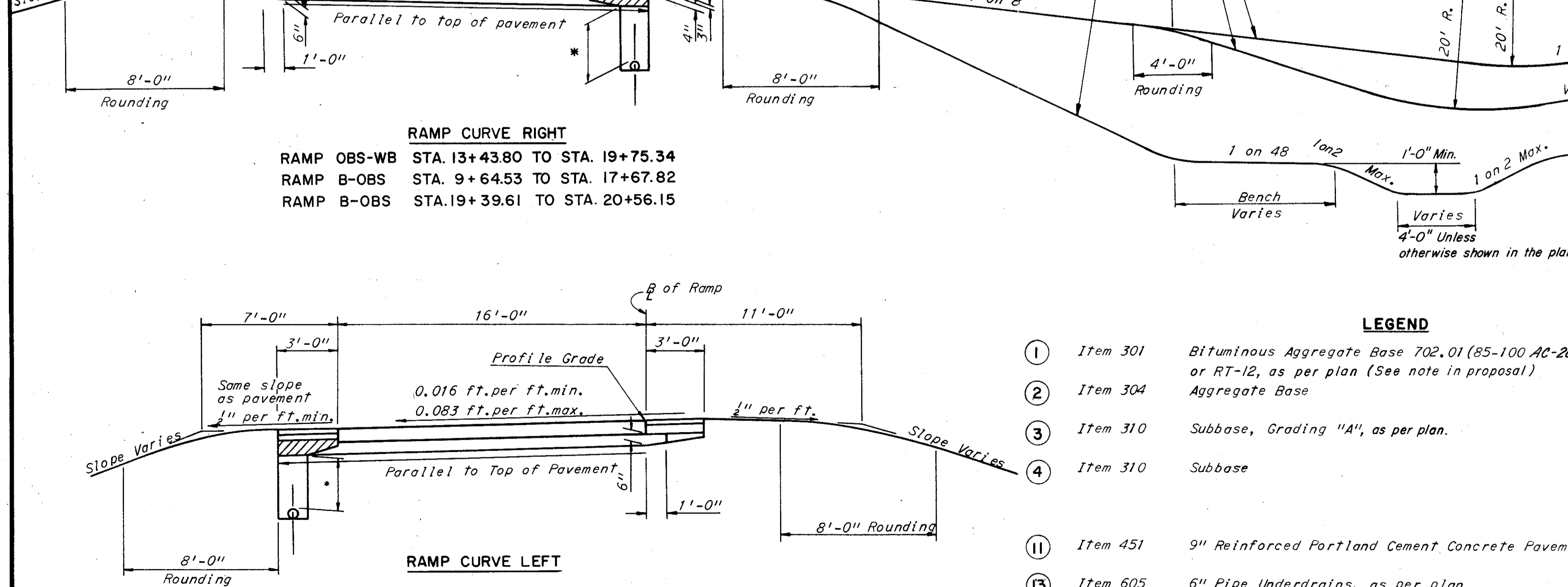


**RAMP CURVE RIGHT**

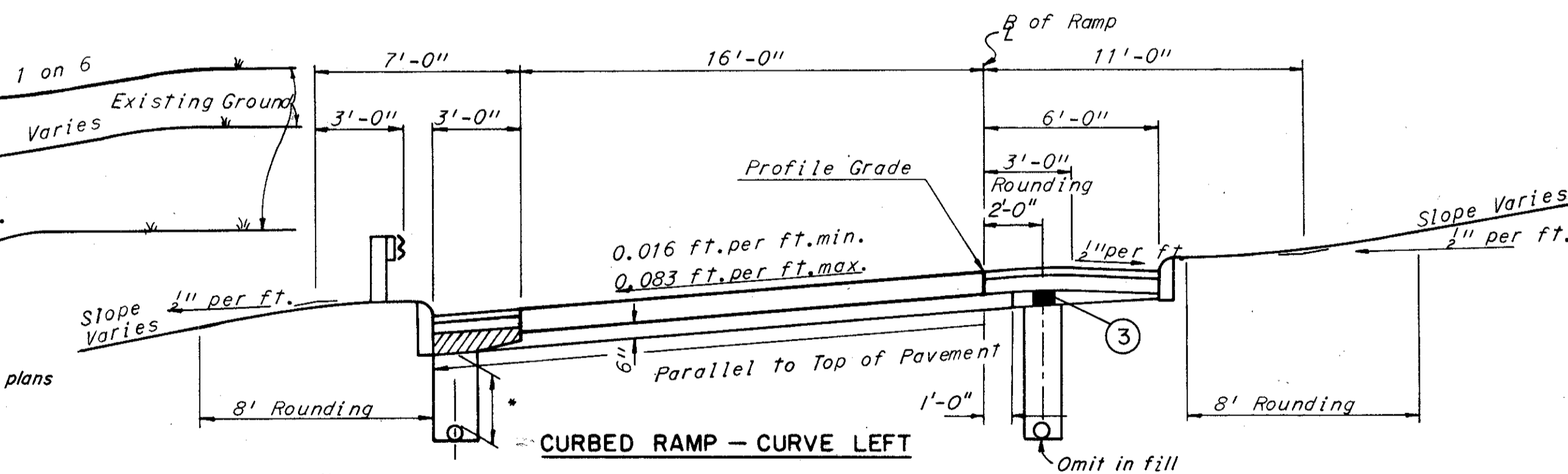
RAMP OBS-WB STA. 13+43.80 TO STA. 19+75.34  
RAMP B-OBS STA. 9+64.53 TO STA. 17+67.82  
RAMP B-OBS STA. 19+39.61 TO STA. 20+56.15



**CURBED RAMP - CURVE RIGHT**



**RAMP CURVE LEFT**



**CURBED RAMP - CURVE LEFT**

SCALE 1/4" = 1'-0"  
MADE IM DATE 3-21-68  
TRCD IM DATE 3-21-68  
CKD PPR DATE 4-3-68  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

- LEGEND**
- ① Item 301 Bituminous Aggregate Base 702.01 (85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal)
  - ② Item 304 Aggregate Base
  - ③ Item 310 Subbase, Grading "A", as per plan.
  - ④ Item 310 Subbase
  - ⑪ Item 451 9" Reinforced Portland Cement Concrete Pavement
  - ⑬ Item 605 6" Pipe Underdrains, as per plan
  - ⑭ Item Special Drainage Connection, using No. 9 Aggregate (See Note in Proposal)
  - ⑮ Item 606 Guard Rail, Type 5
  - ⑰ Item 609 Concrete Curb, Standard Type 6
  - ⑳ Item 659 Seeding and Mulching (See General Notes)

**NOTES:**

- All ramp typical sections are shown facing in the direction of travel.
- Unless otherwise noted, dimensions and/or callouts shown on the top section shall apply to the sections below it.
- Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross Section sheets.
- Earth shoulders adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.
- \*Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:
  - 50" cover from bottom of subbase to the top of the pipe (deep in cut)
  - 30" cover from bottom of subbase to the top of the pipe (shallow in fill median)
  - Transition from shallow to deep (unclassified)

**SEQUENCE OF OPERATIONS:**

- (1) Install pipe underdrain on outside shoulder, where required.
- (2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed on this operation.
- (3) Construct Item 451 pavement.
- (4) Remove subbase and any contaminated backfill over drain and replace with as shown by ⑭.
- (5) Complete shoulder construction.

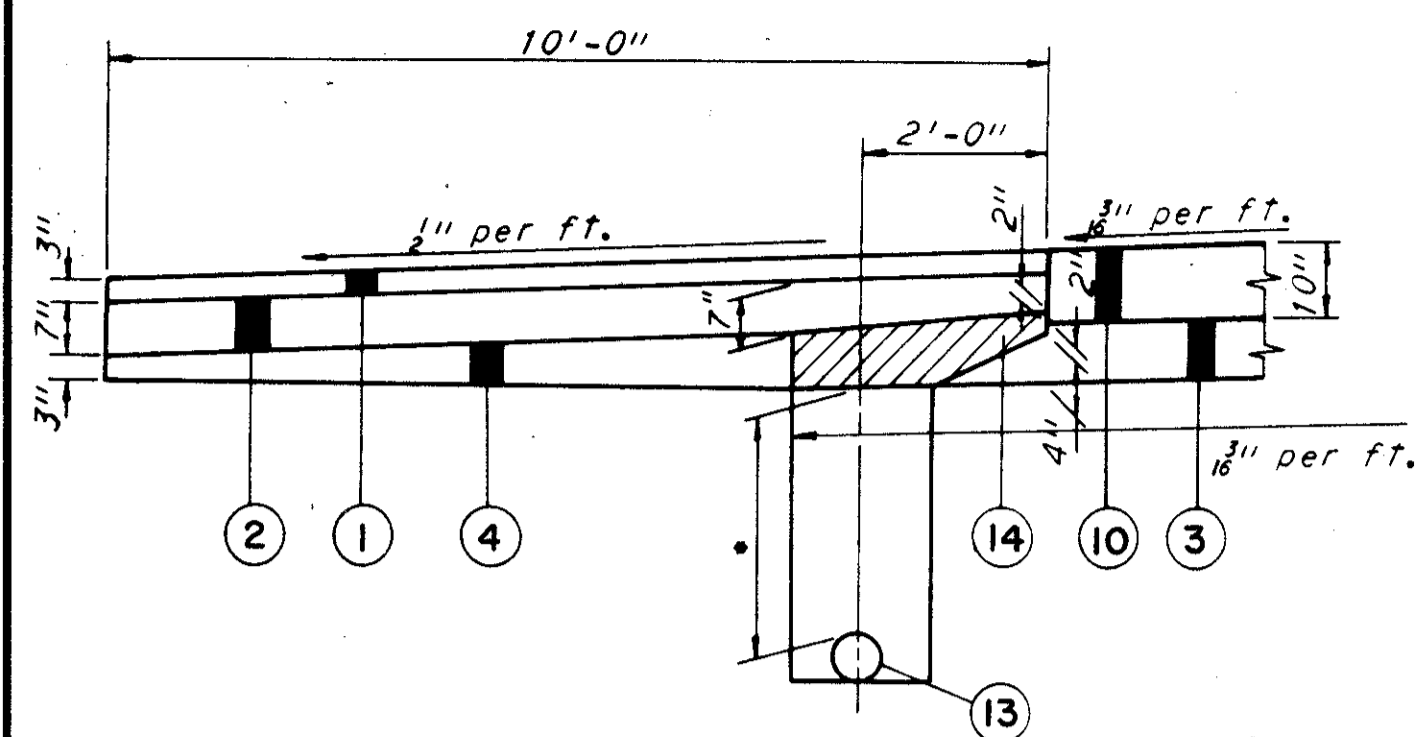
# TYPICAL SECTIONS

## TYPE 451 PAVED SHOULDERS

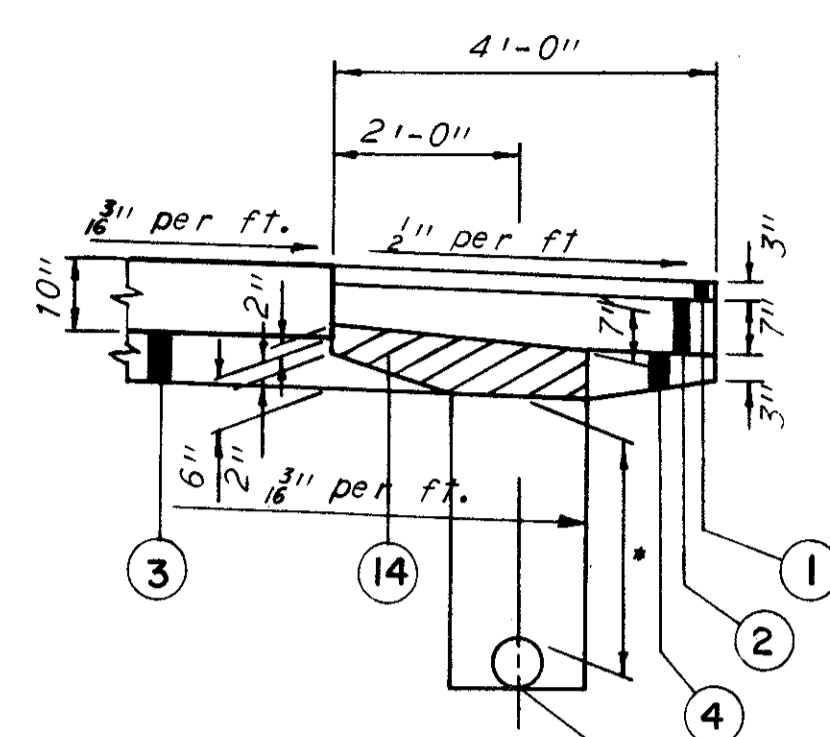
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

12  
390

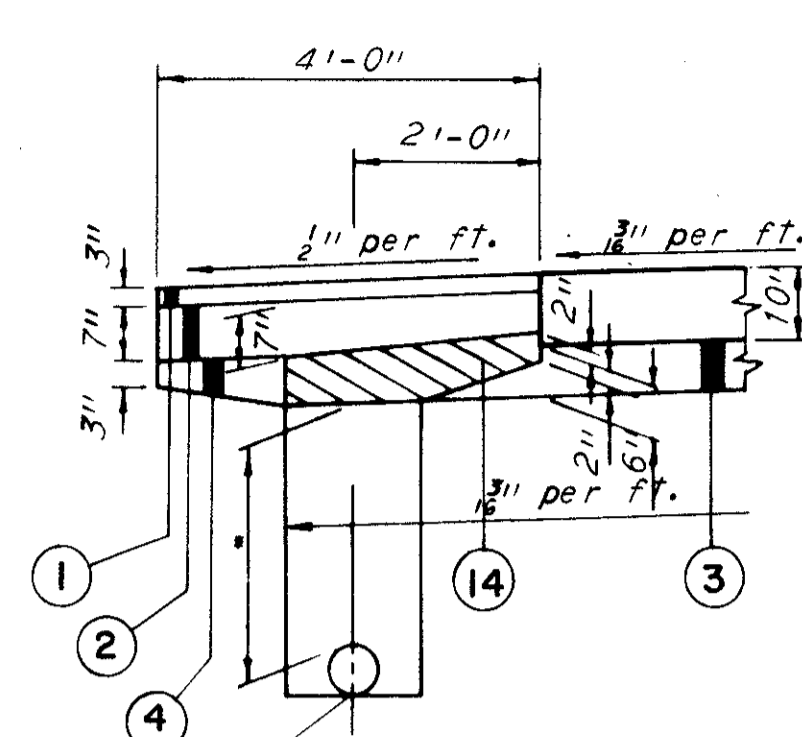
CUYAHOGA COUNTY  
CUY.480-21.40



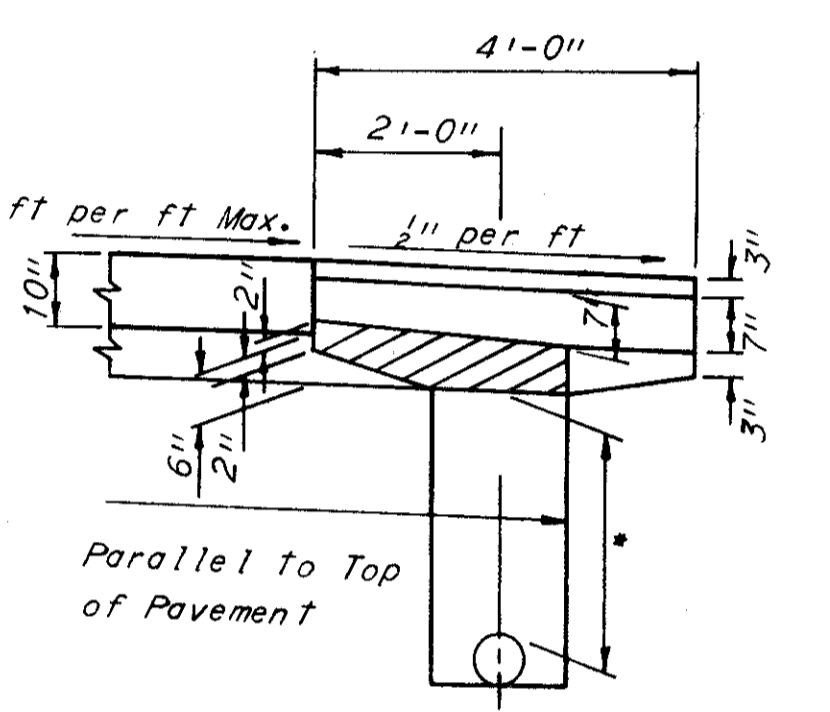
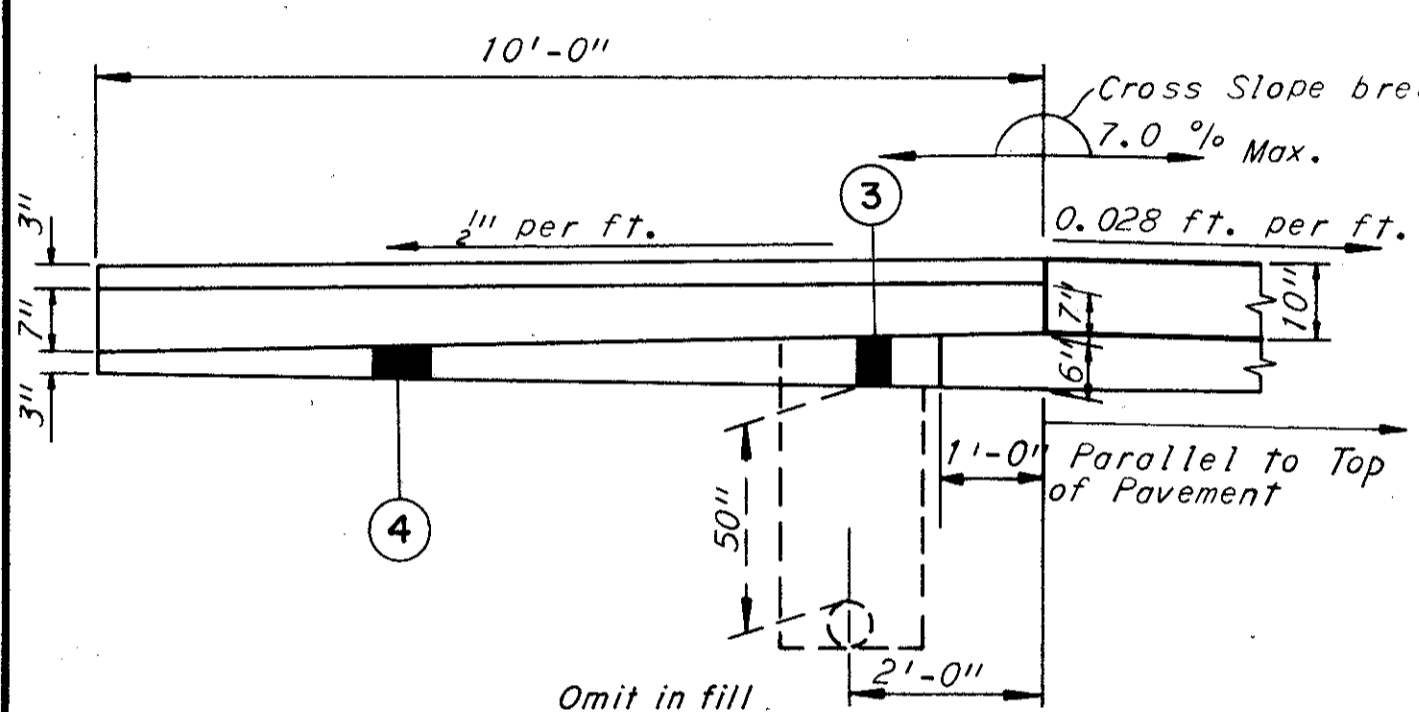
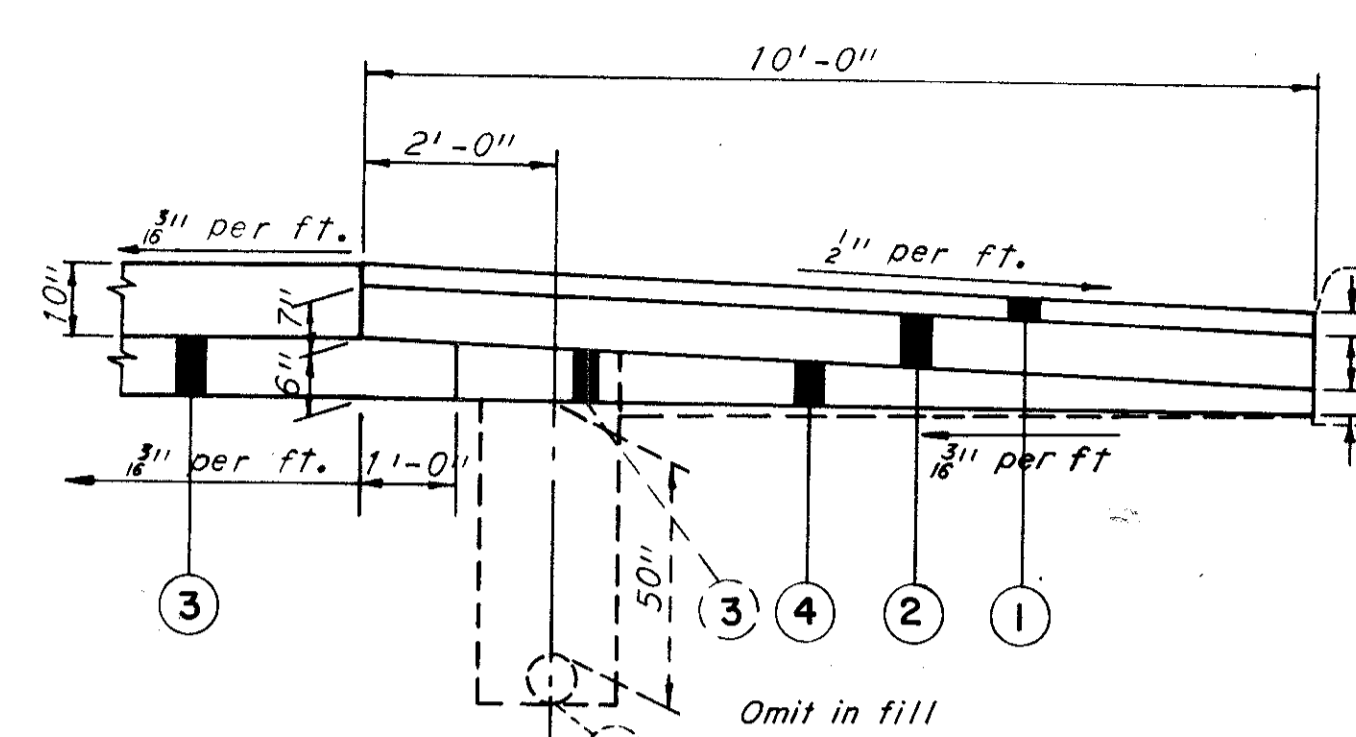
THREE PAVEMENT LANES OR MORE



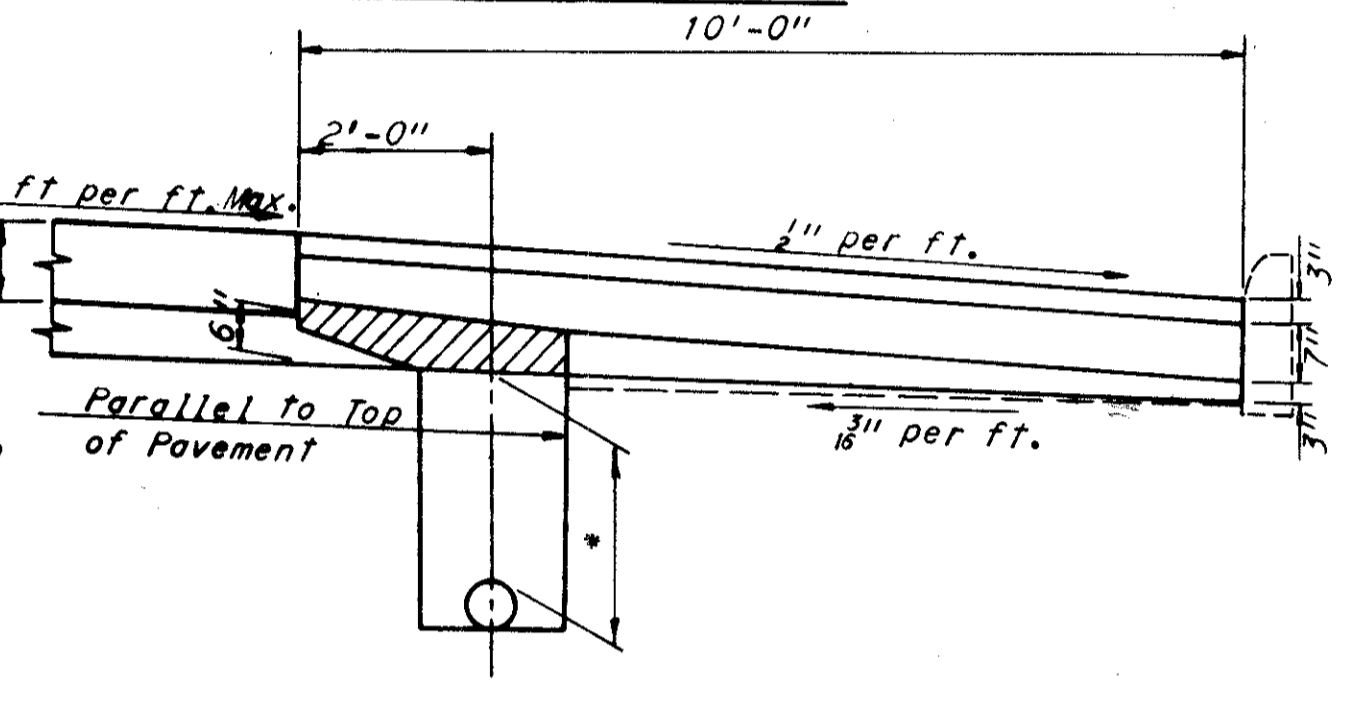
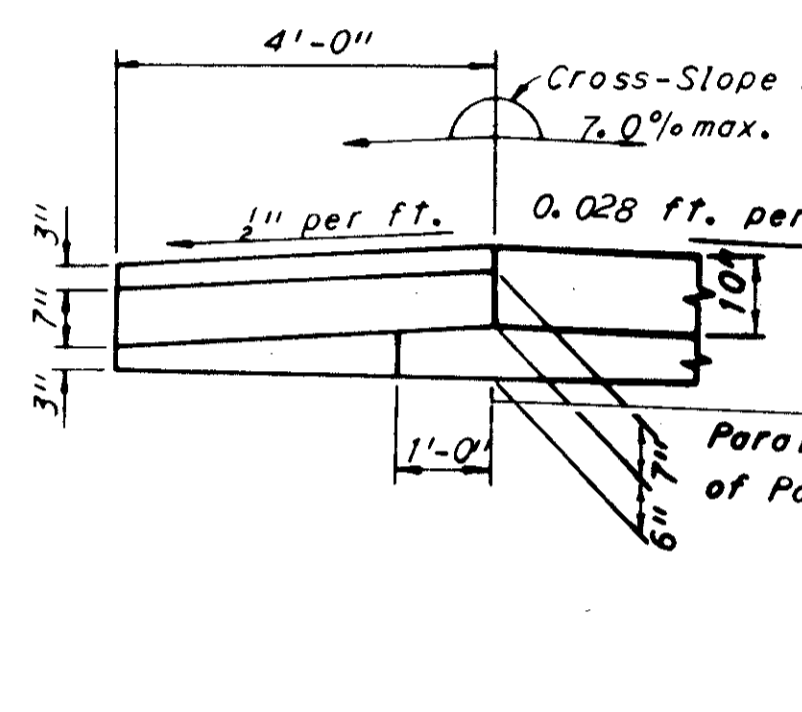
NORMAL SECTION



TWO PAVEMENT LANES



TRANSITION SECTION



NOTES:

Unless otherwise noted, dimensions and/or callouts shown on the top section shall apply to the sections below it.

Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:

50" cover from bottom of subbase to the top of the pipe (deep in cut)

30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)

Transition from shallow to deep (unclassified)

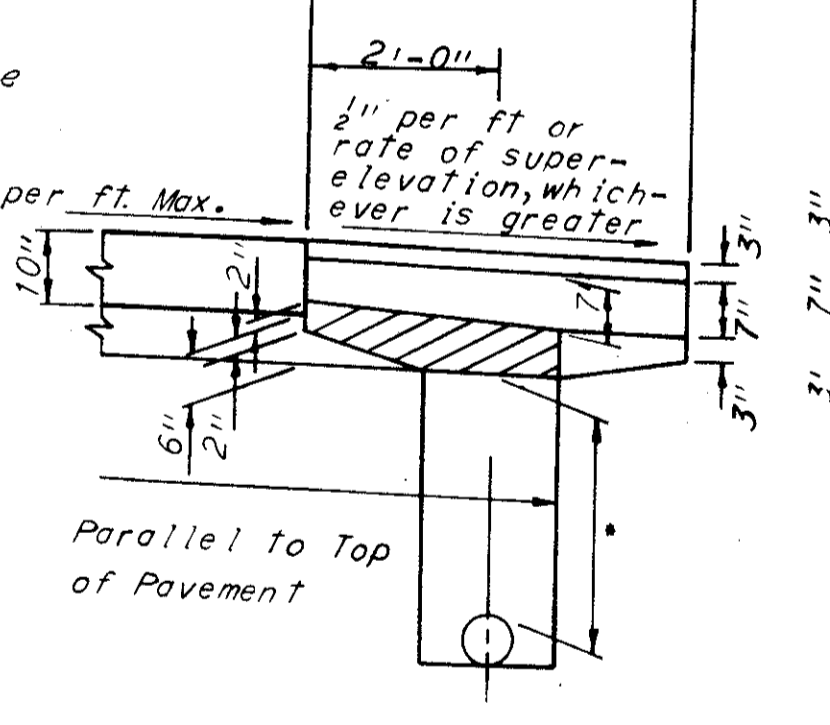
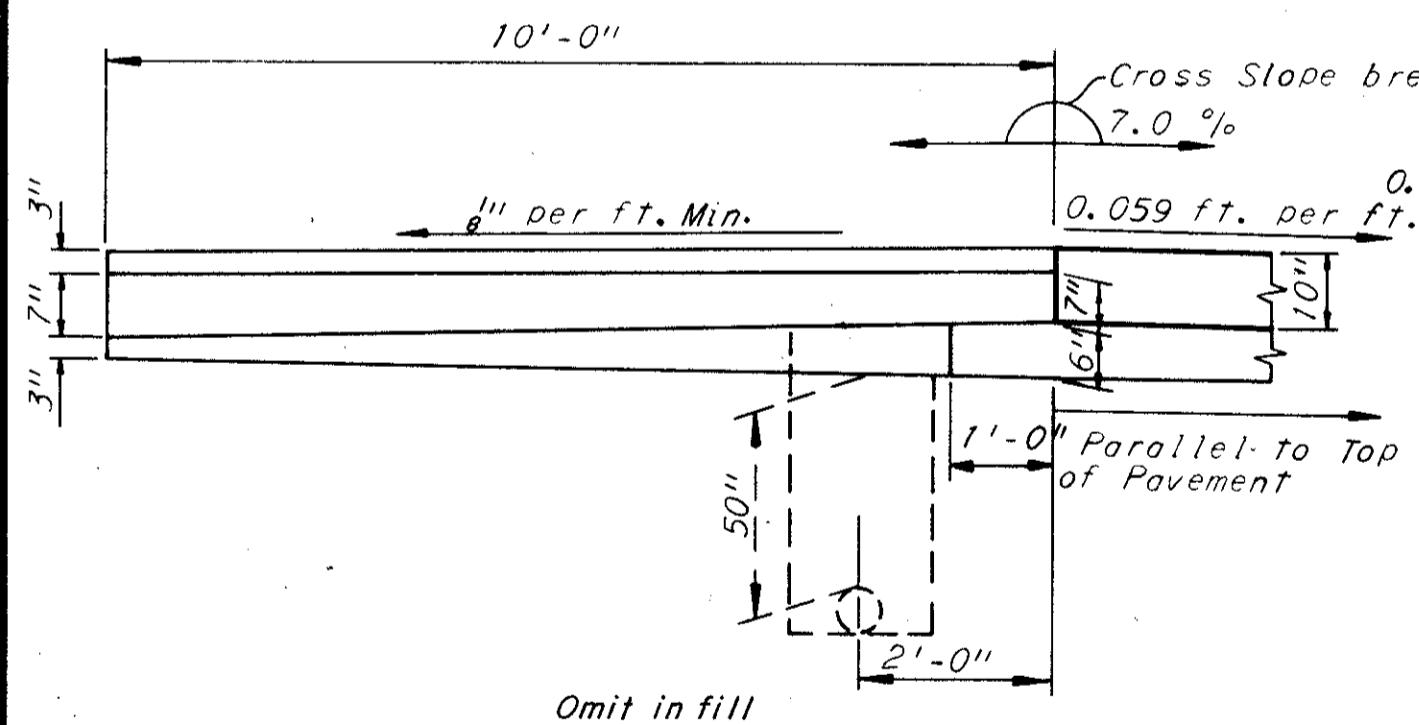
The paved shoulder details shown on this sheet, except for the section shown in the top left corner, shall apply for any width of pavement.

SEQUENCE OF OPERATIONS:

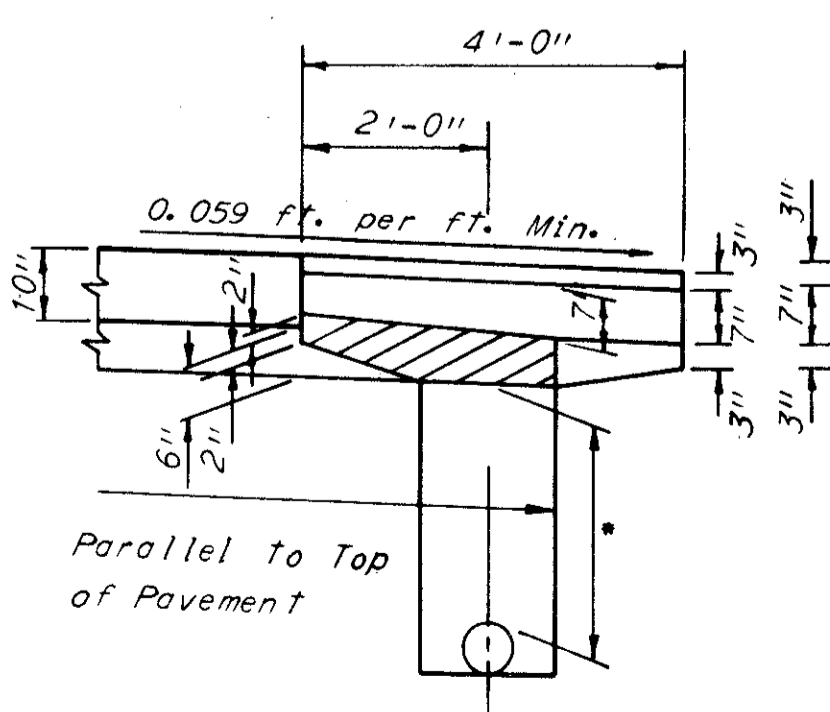
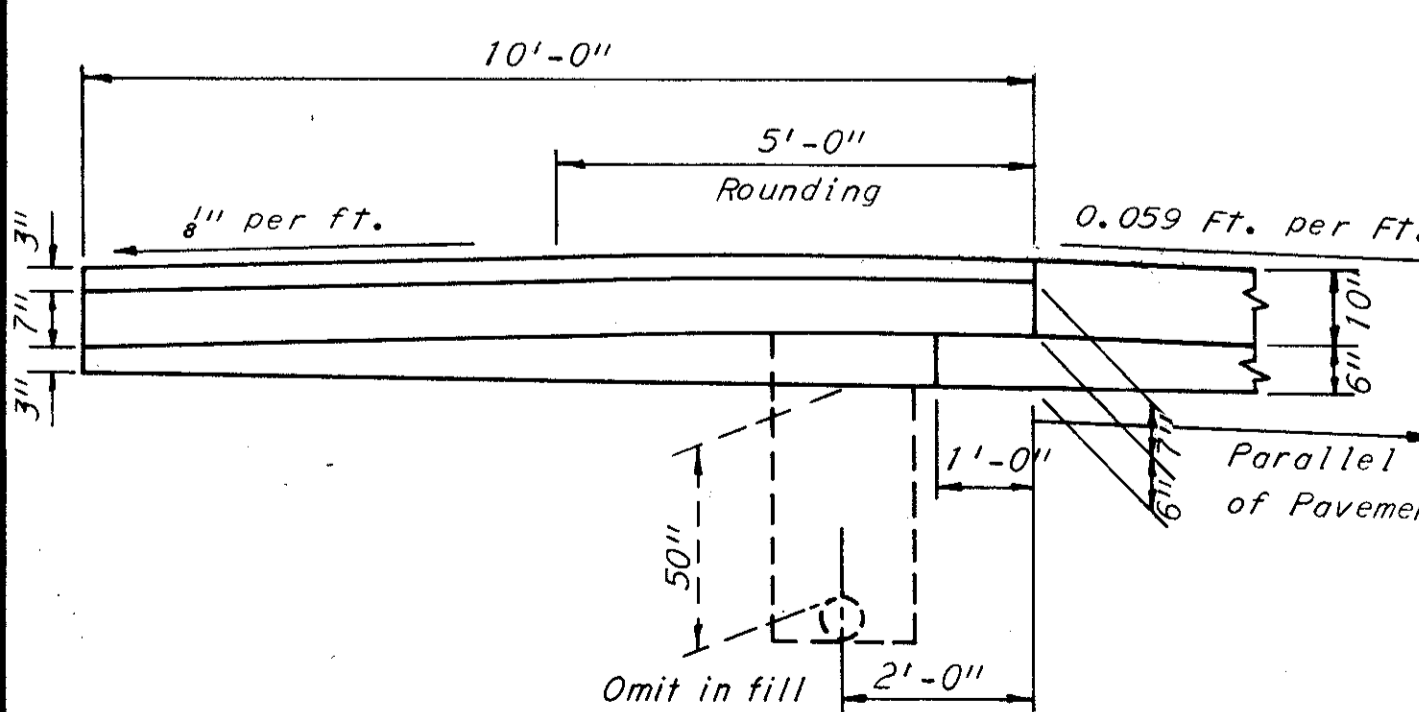
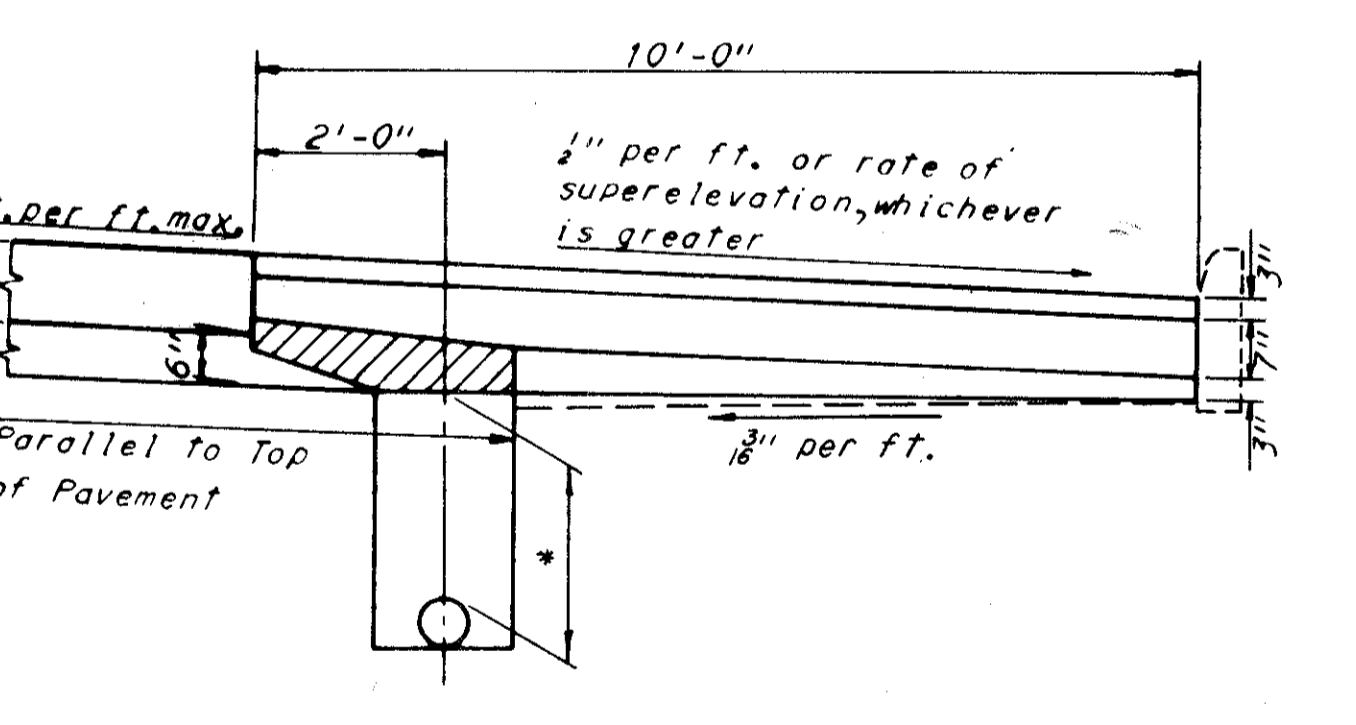
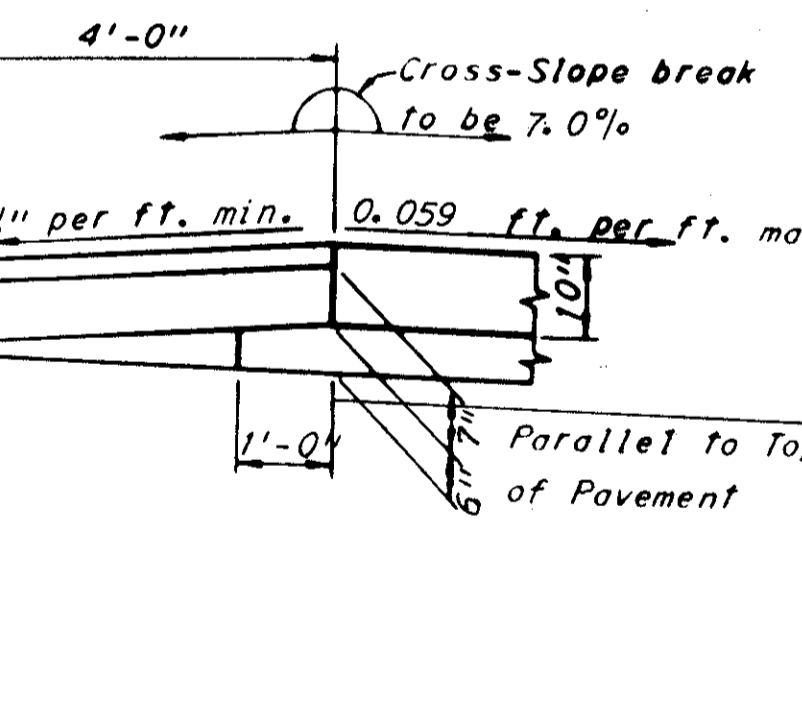
- Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
- Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed on this operation.
- Construct Item 451 pavement.
- Remove subbase and any contaminated backfill over drain and replace with No.9 Aggregate, as shown by (14).
- Complete shoulder construction.

LEGEND

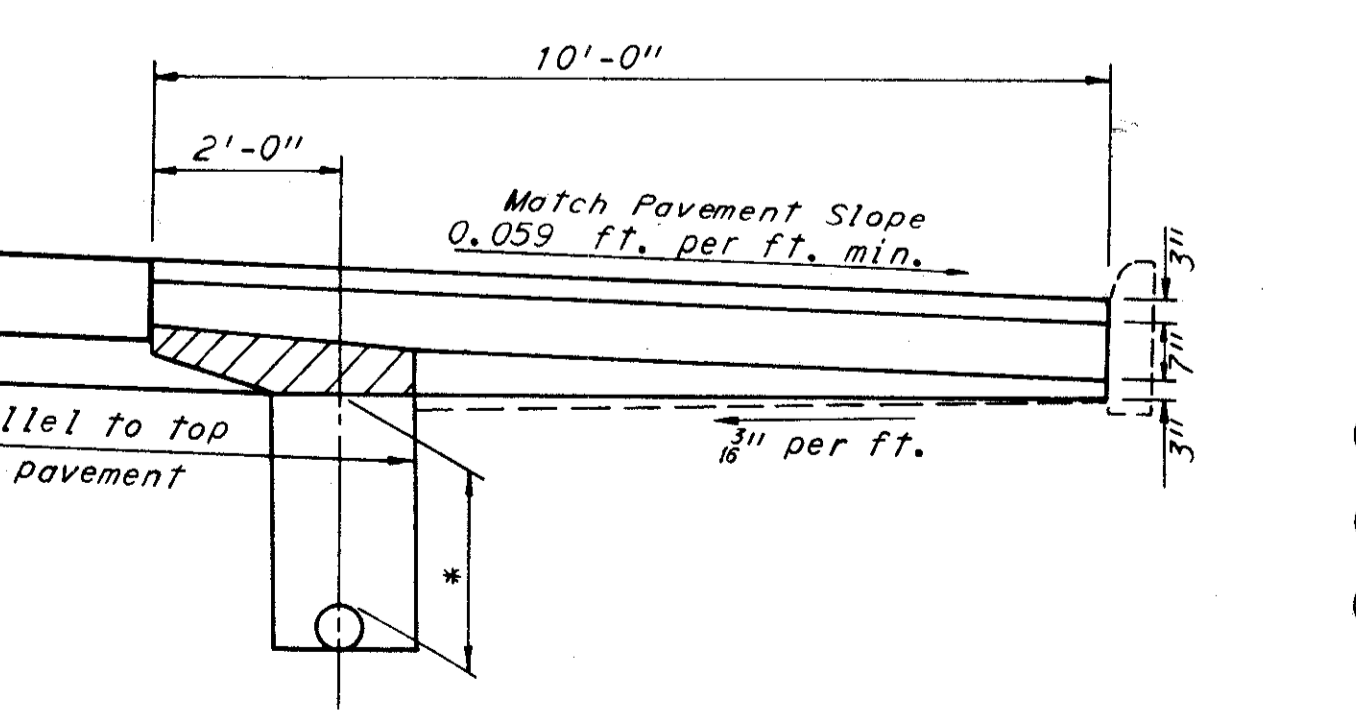
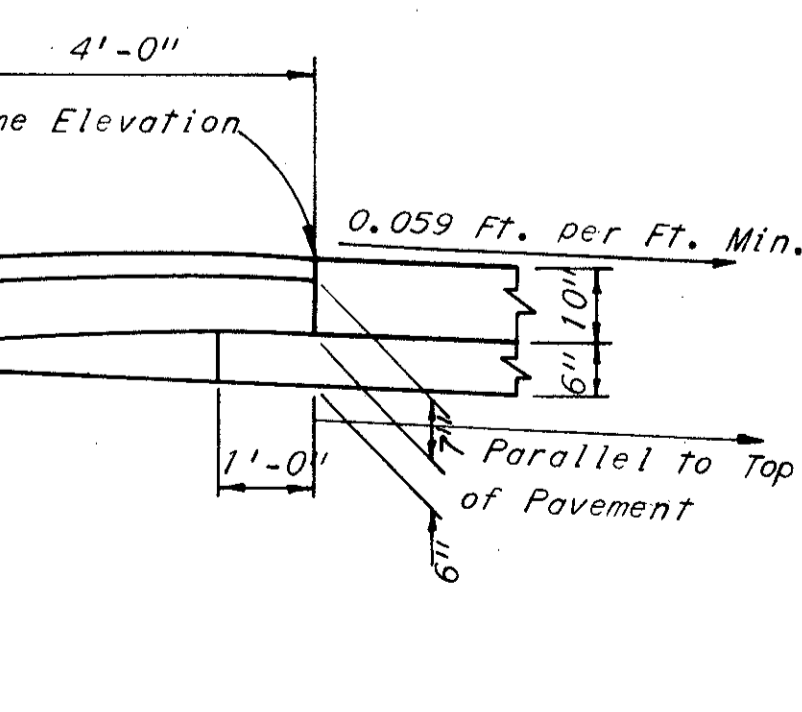
- |   |              |  |
|---|--------------|--|
| ① | Item 301     | Bituminous Aggregate Base 702.01(85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal) |
| ② | Item 304     | Aggregate Base   |
| ③ | Item 310     | Subbase, Grading "A", as per plan.   |
| ④ | Item 310     | Subbase  |
| ⑩ | Item 451     | 10" Reinforced Portland Cement Concrete Pavement   |
| ⑬ | Item 605     | 6" Pipe Underdrains, as per plan   |
| ⑭ | Item Special | Drainage Connection, using No.9 Aggregate (See Note in Proposal)   |



SUPERELEVATION NOT MORE THAN 0.059 FT. PER FT.



SUPERELEVATION MORE THAN 0.059 FT. PER FT.



SCALE: 1/2" = 1'-0"  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 MADE SDH DATE 1-21-68  
 TRCD SDH DATE 1-22-68  
 CKD RPR DATE 1-25-68  
 KANSAS CITY CLEVELAND NEW YORK

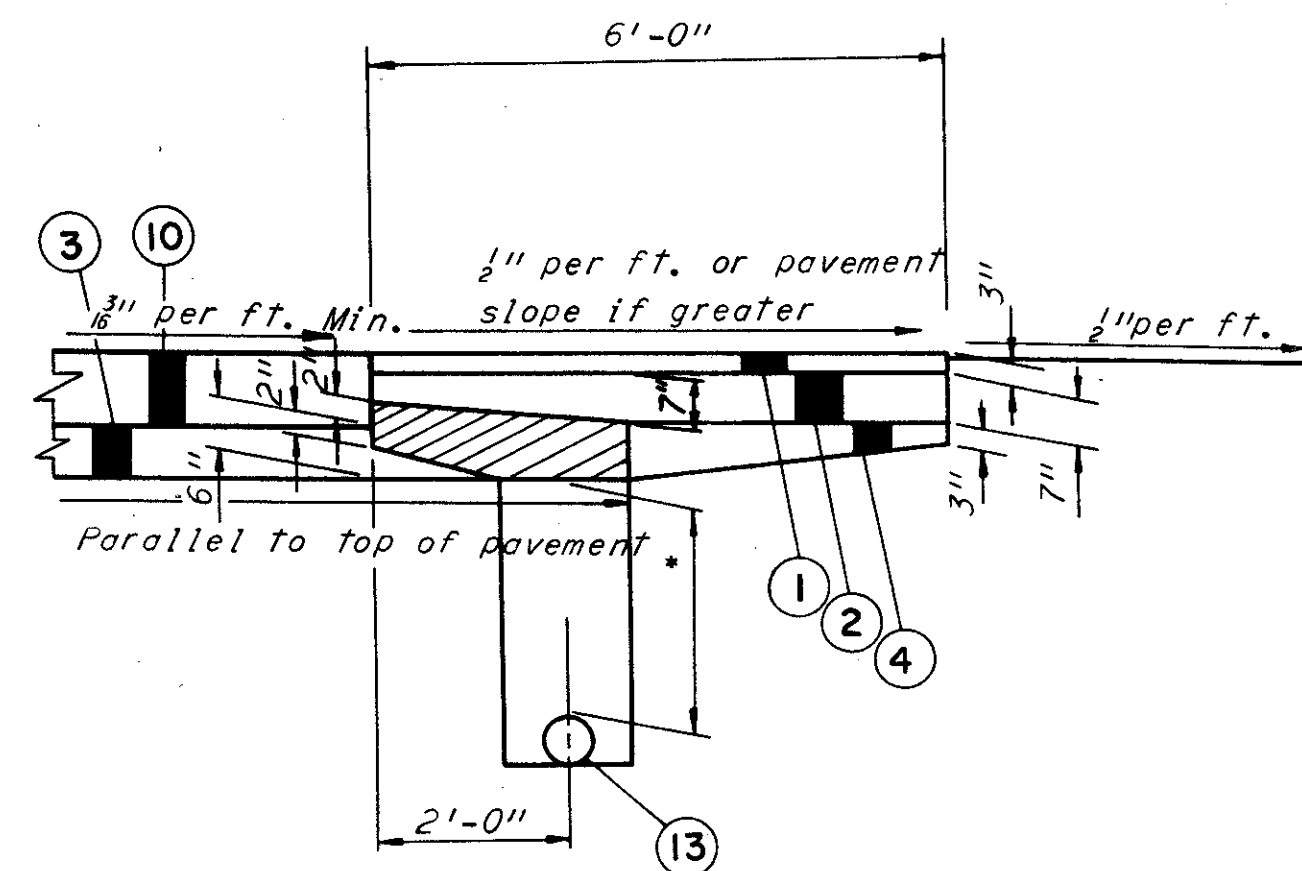
# TYPICAL SECTIONS

## TYPE 451 PAVED SHOULDERS

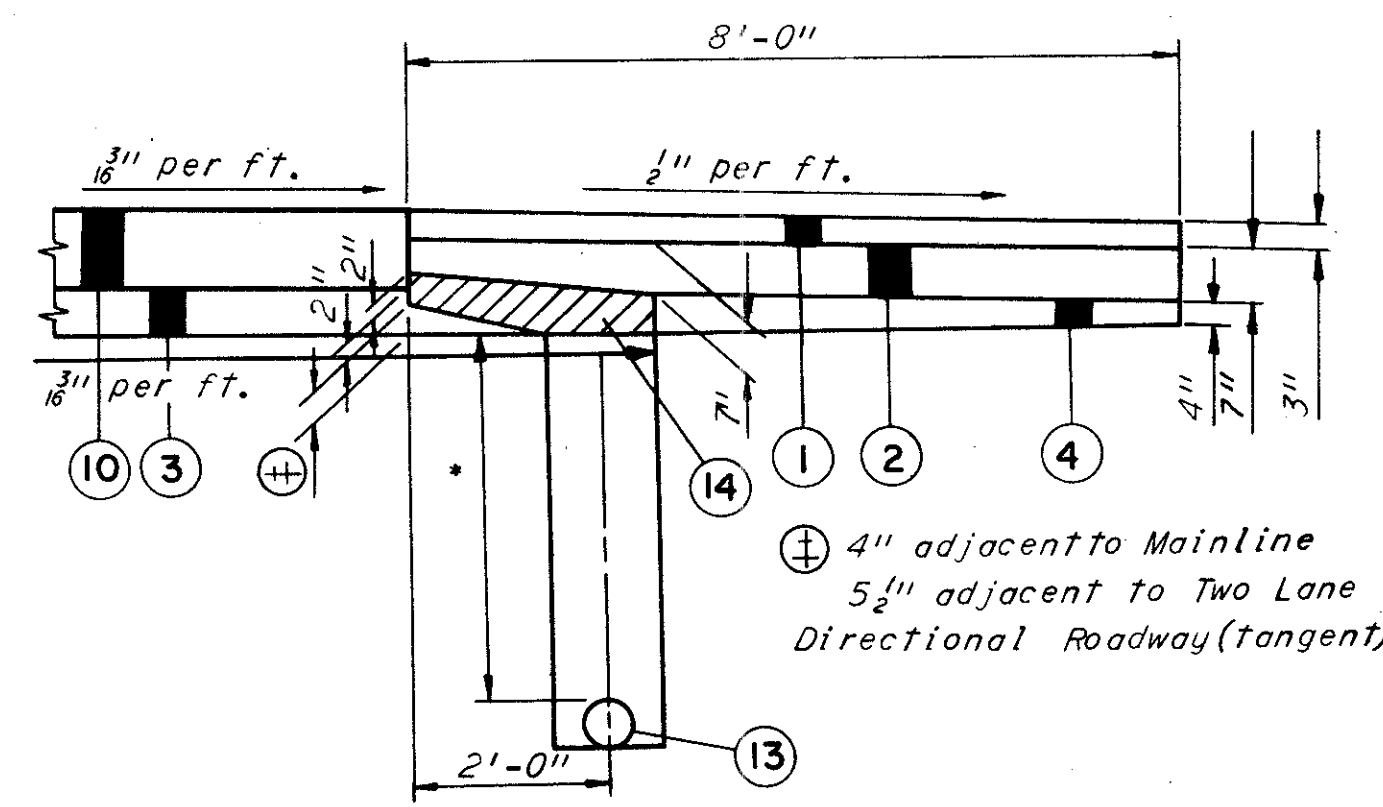
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

13  
390

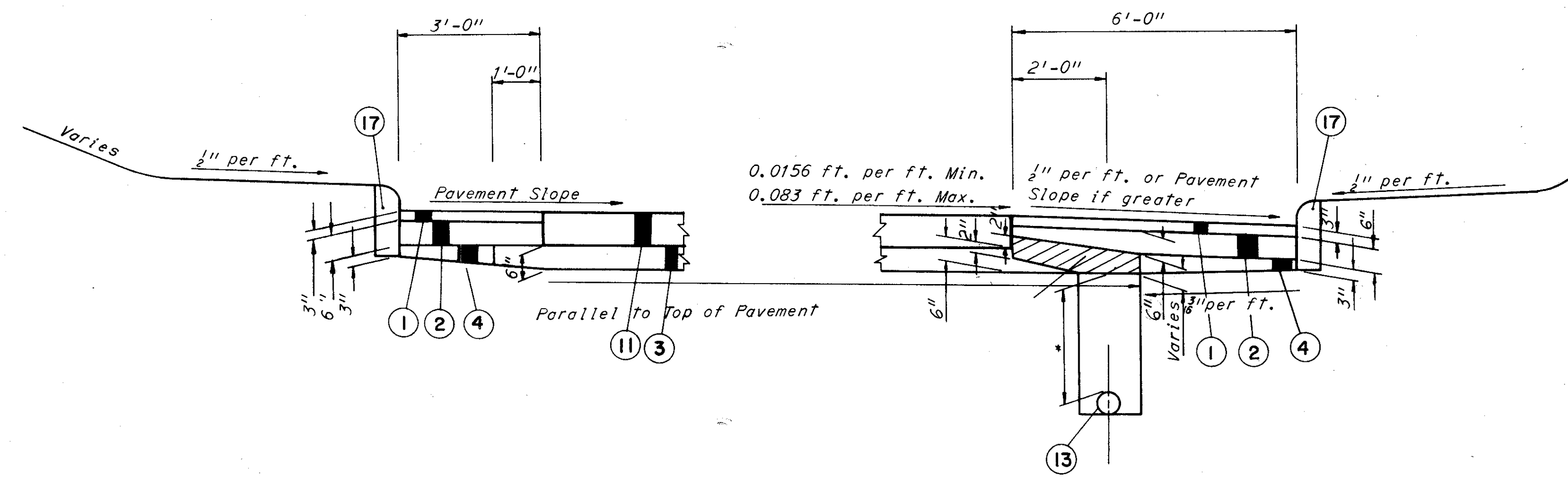
CUYAHOGA COUNTY  
CUY. 480-21.40



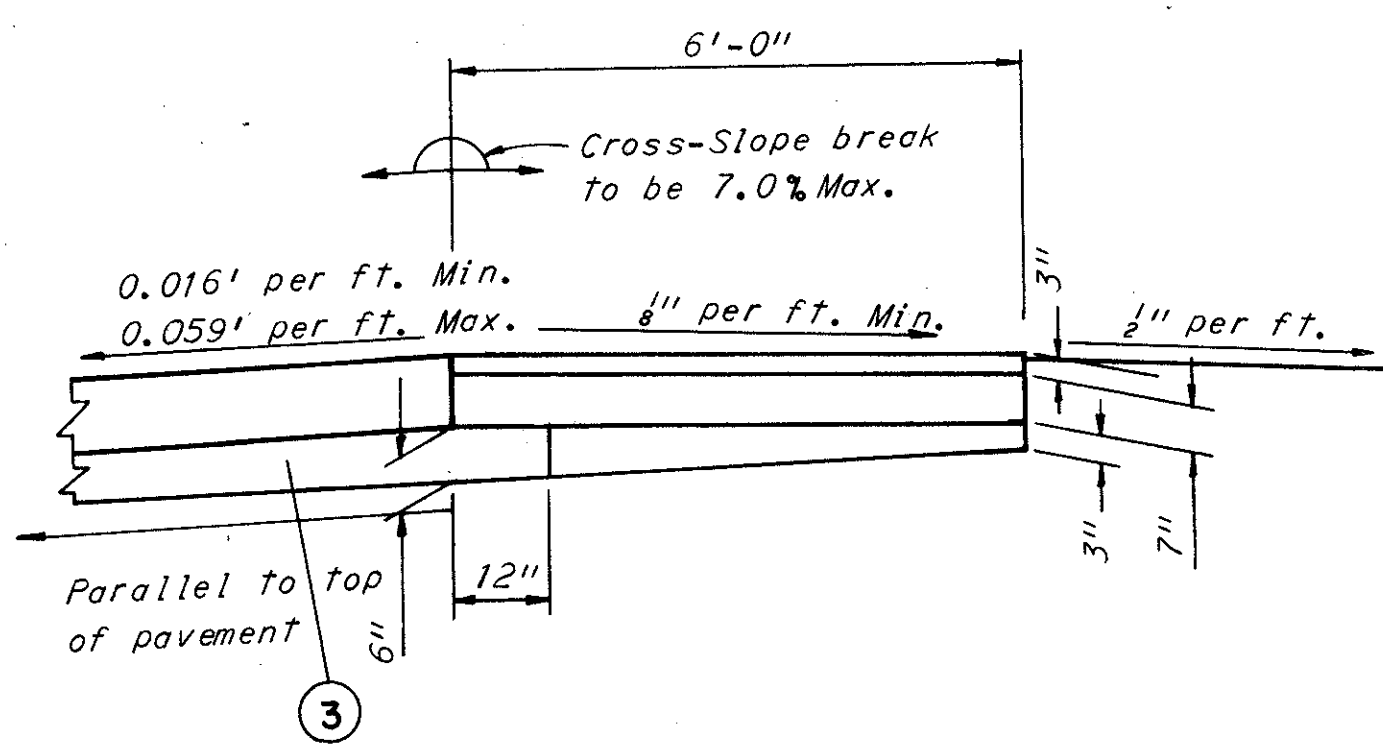
TANGENT SECTION OR CURVE RIGHT



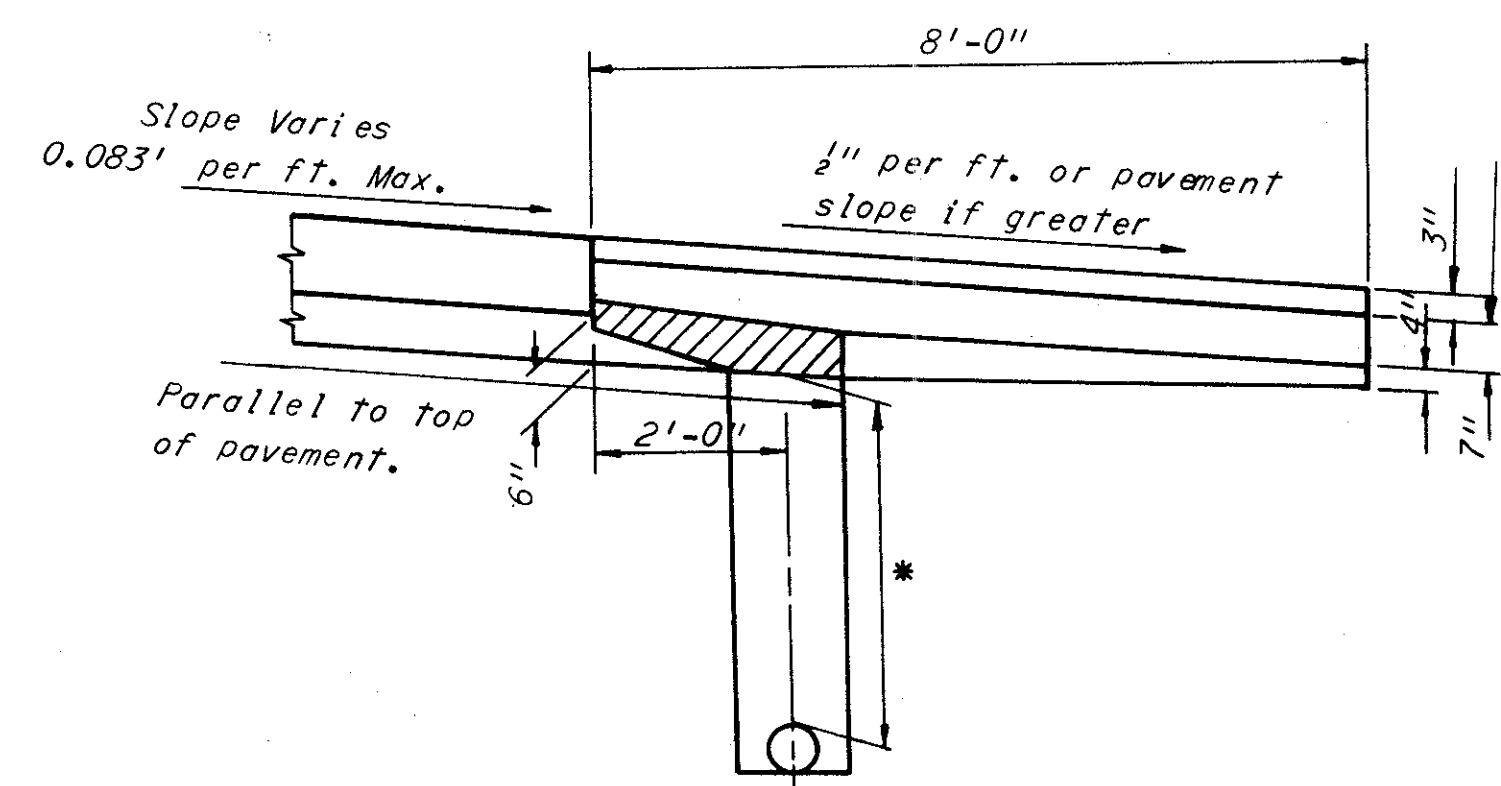
NORMAL SECTION



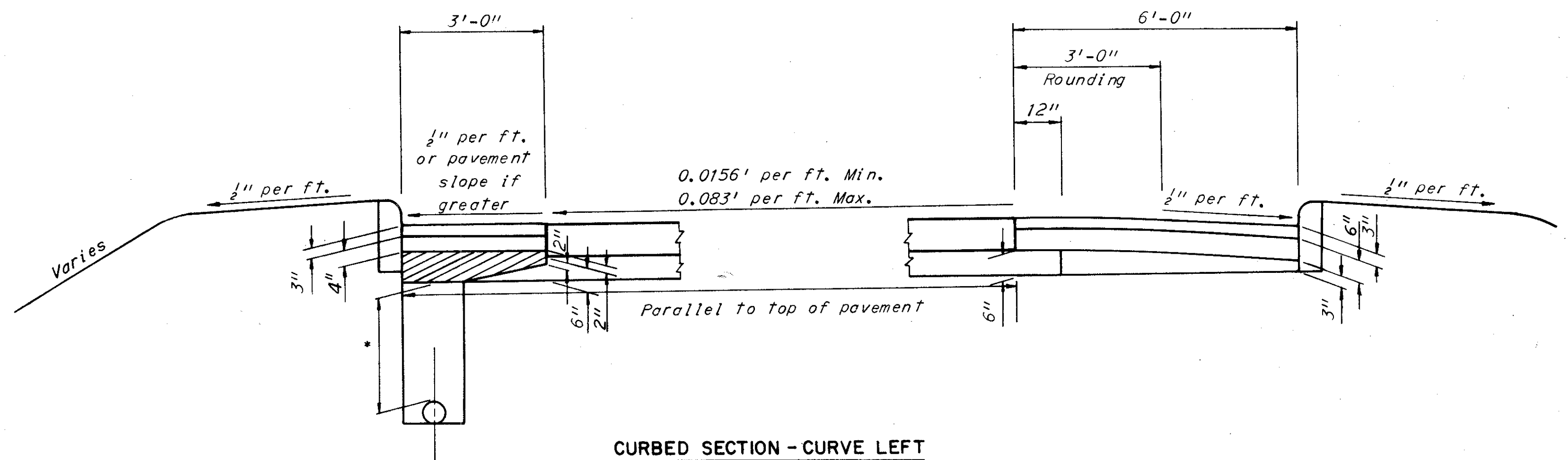
CURBED SECTION - TANGENT OR CURVE RIGHT



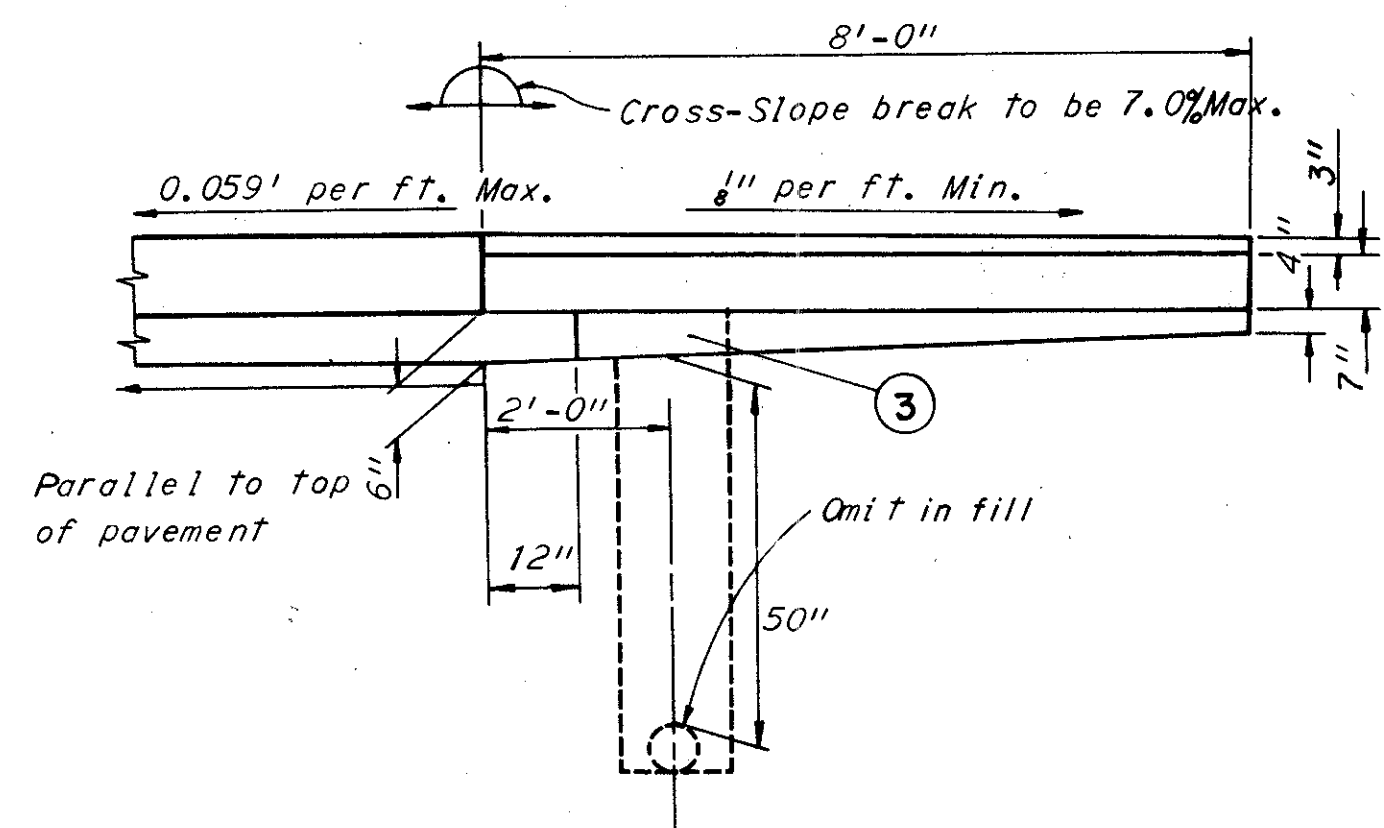
CURVE LEFT - S.E. NOT MORE THAN 0.059 FT. PER FT.



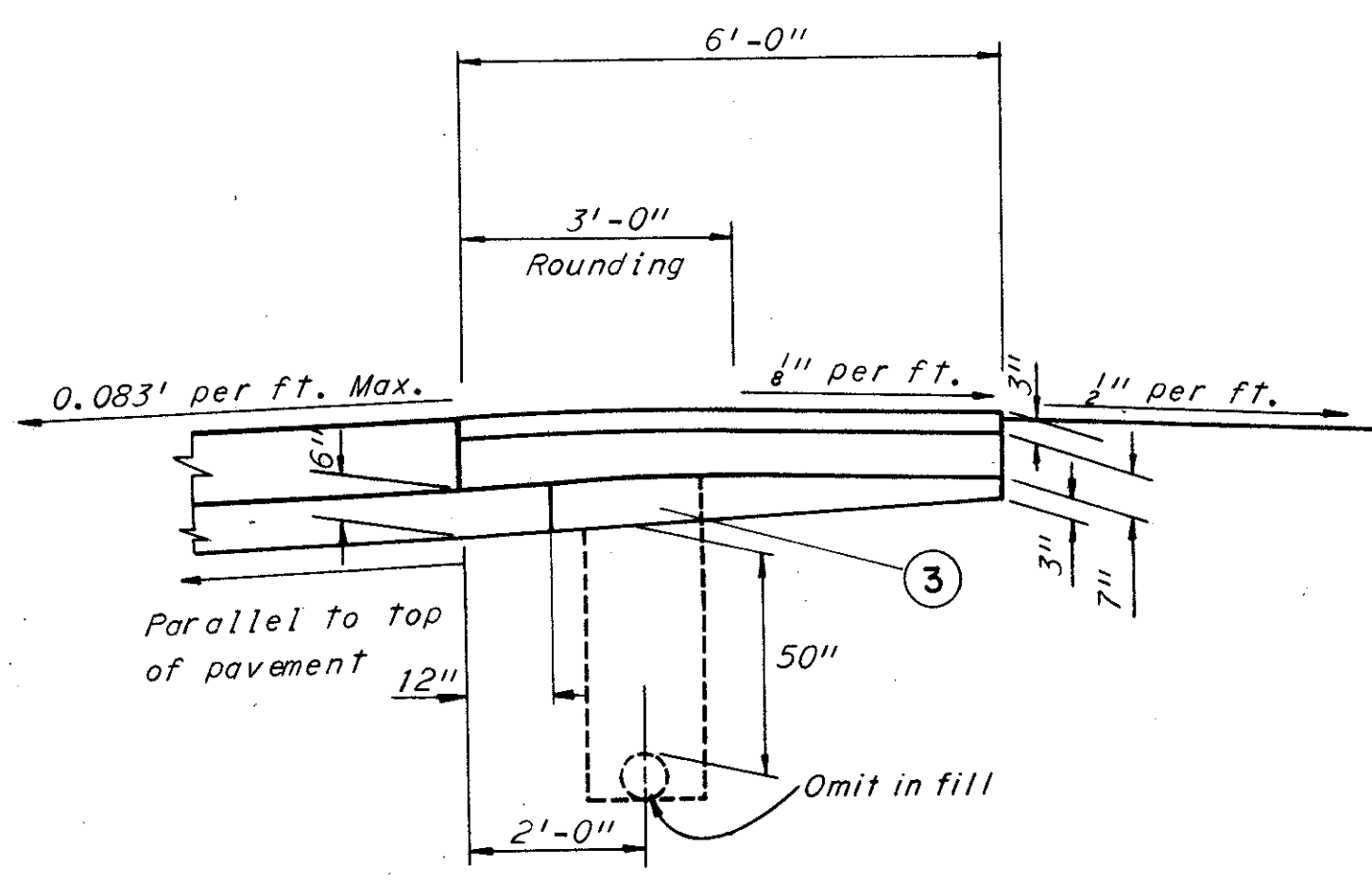
CURVE RIGHT



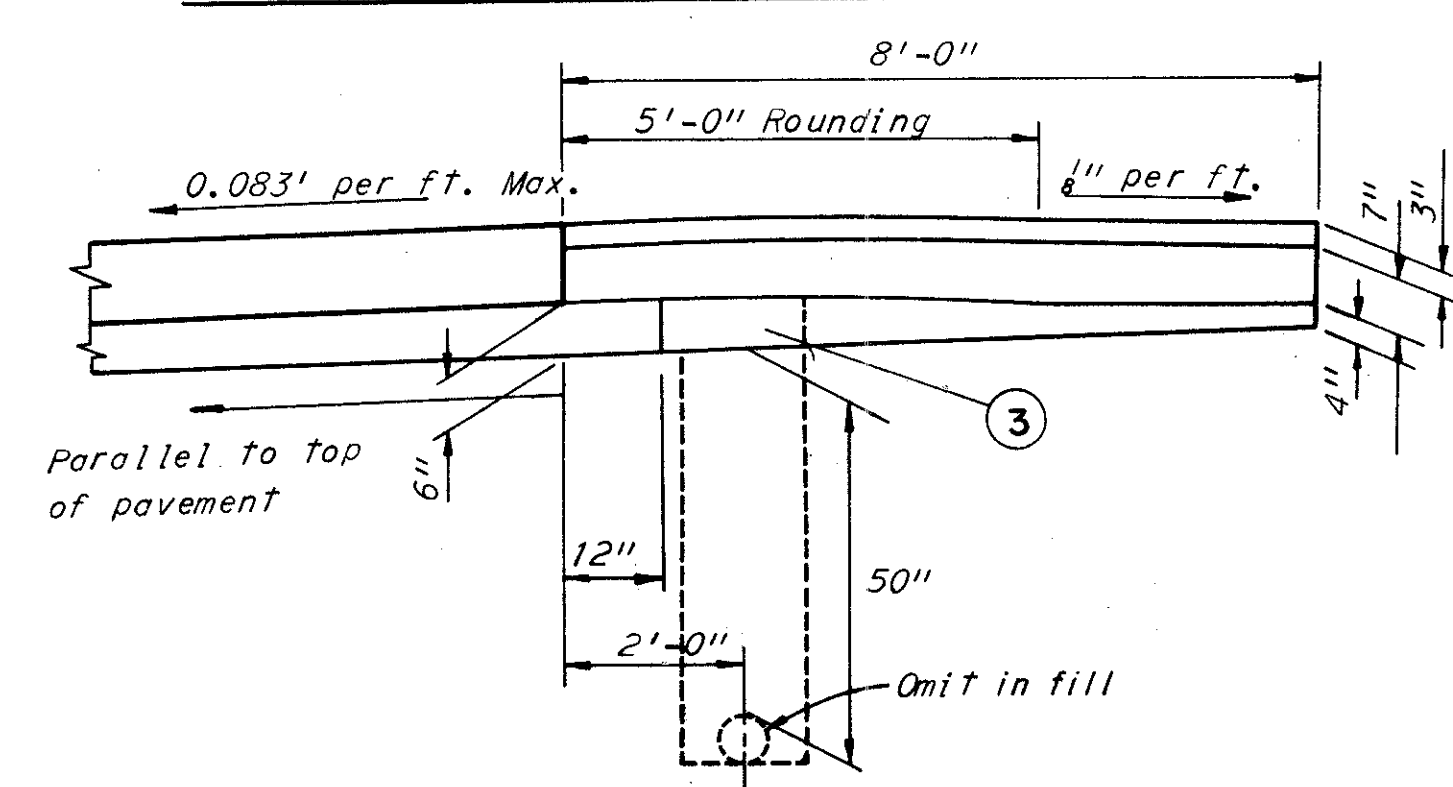
CURBED SECTION - CURVE LEFT



CURVE LEFT - S.E. NOT MORE THAN 0.059 FT. PER FT.



CURVE LEFT - S.E. MORE THAN 0.059 FT. PER FT.



CURVE LEFT - S.E. MORE THAN 0.059 FT. PER FT.

### LEGEND

- ① Item 301 Bituminous Aggregate Base 702.01 (85-100 AC-20) or 702.09, RT-11 or RT-12, as per plan (See note in proposal)
- ② Item 304 Aggregate Base
- ③ Item 310 Subbase, Grading "A", as per plan.
- ④ Item 310 Subbase
- ⑩ Item 451 10" Reinforced Portland Cement Concrete Pavement
- ⑪ Item 451 9" Reinforced Portland Cement Concrete Pavement
- ⑬ Item 605 6" Pipe Underdrains, as per plan
- ⑭ Item Special Drainage Connection, using No. 9 Aggregate (See Note in Proposal)
- ⑰ Item 609 Concrete Curb, Standard Type 6

### NOTES:

- Unless otherwise noted, dimensions and/or callouts shown on the top section shall apply to the sections below it.
- \*Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:
- 50" cover from bottom of subbase to the top of the pipe (deep in cut)
- 30" cover from bottom of subbase to the top of the pipe (shallow in fill and median)
- Transition from shallow to deep (unclassified)

### SEQUENCE OF OPERATIONS:

- (1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
- (2) Place subbase out to outside edge of underdrain or to one foot beyond edge of pavement where no underdrain is present. Payment shall be made for all subbase placed in this operation.
- (3) Construct Item 451 pavement.
- (4) Remove subbase and any contaminated backfill over drain and replace with No. 9 Aggregate, as shown by ⑭.
- (5) Complete shoulder construction.

SCALE 1/2" = 1'-0"  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE 1 M DATE 3-14-68 CONSULTING ENGINEERS  
 TRCD 1 M DATE 3-14-68  
 CKD R.P.R. DATE 4-4-68 KANSAS CITY CLEVELAND NEW YORK

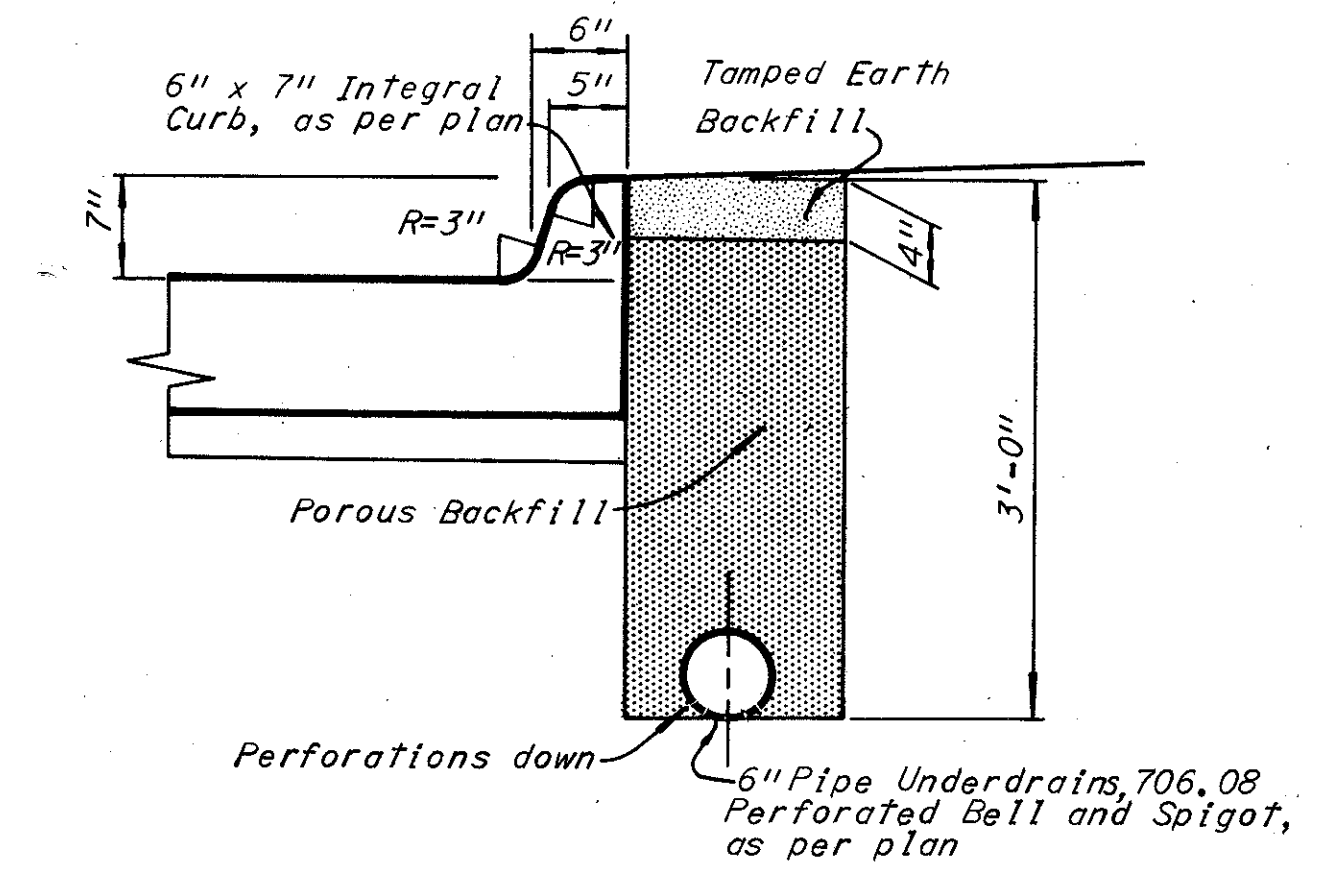
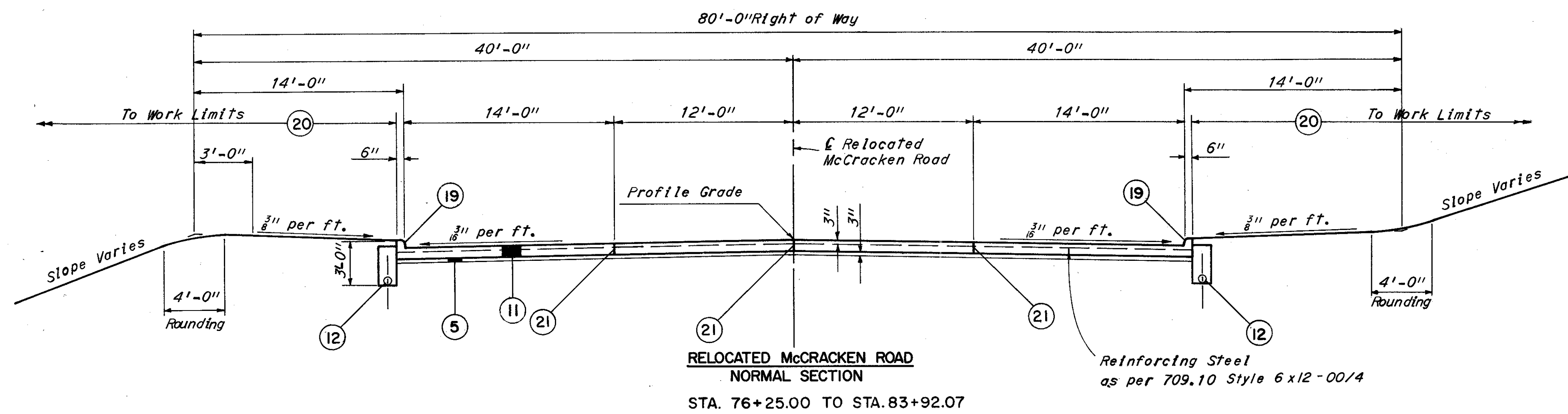
# TYPICAL SECTIONS

TYPE 451

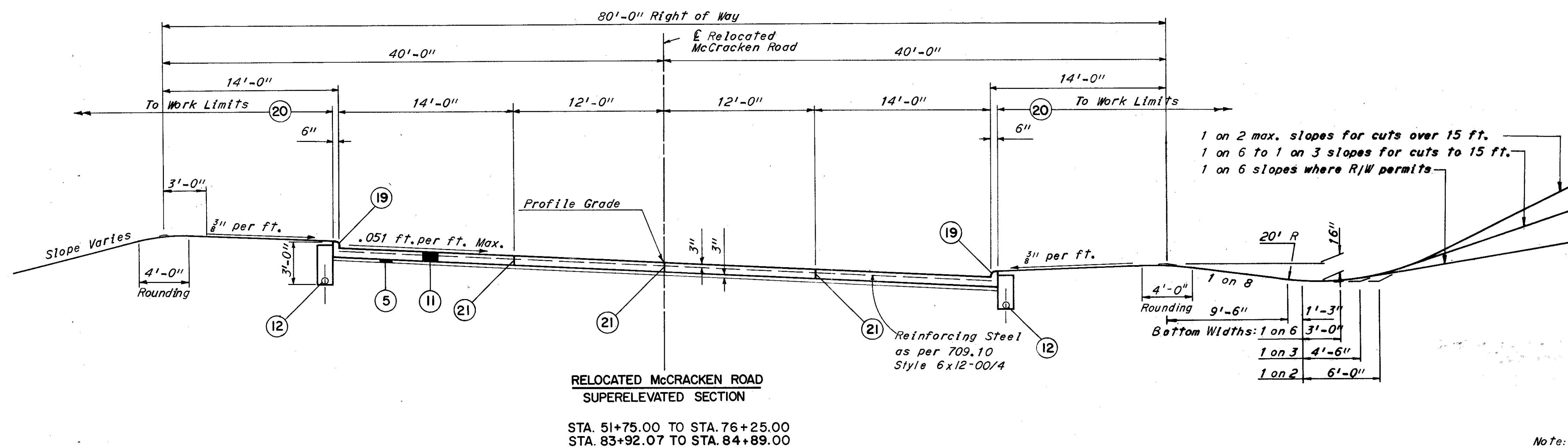
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

14  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



ITEM 605 6" PIPE UNDERDRAINS USING 706.08 PERFORATED BELL AND SPIGOT PIPE, AS PER PLAN AND ITEM 609 CONCRETE CURB, INTEGRAL 6" X 7", AS PER PLAN



## LEGEND

- 5 Item 310 Subbase, 703.08 or 703.10
- 11 Item 451 9" Reinforced Portland Cement Concrete, mod. as per plan
- 12 Item 605 6" Pipe Underdrain 706.08, Perforated Bell and Spigot, as per plan
- 19 Item 609 Concrete Curb, Integral 6"x7", as per plan
- 20 Item 659 Seeding and Mulching (See General Notes)
- 21 Standard Longitudinal Joint

Note: Typical Sections are intended to show general roadway and pavement features only. For details see Plan Sheets and Cross Section Sheets.

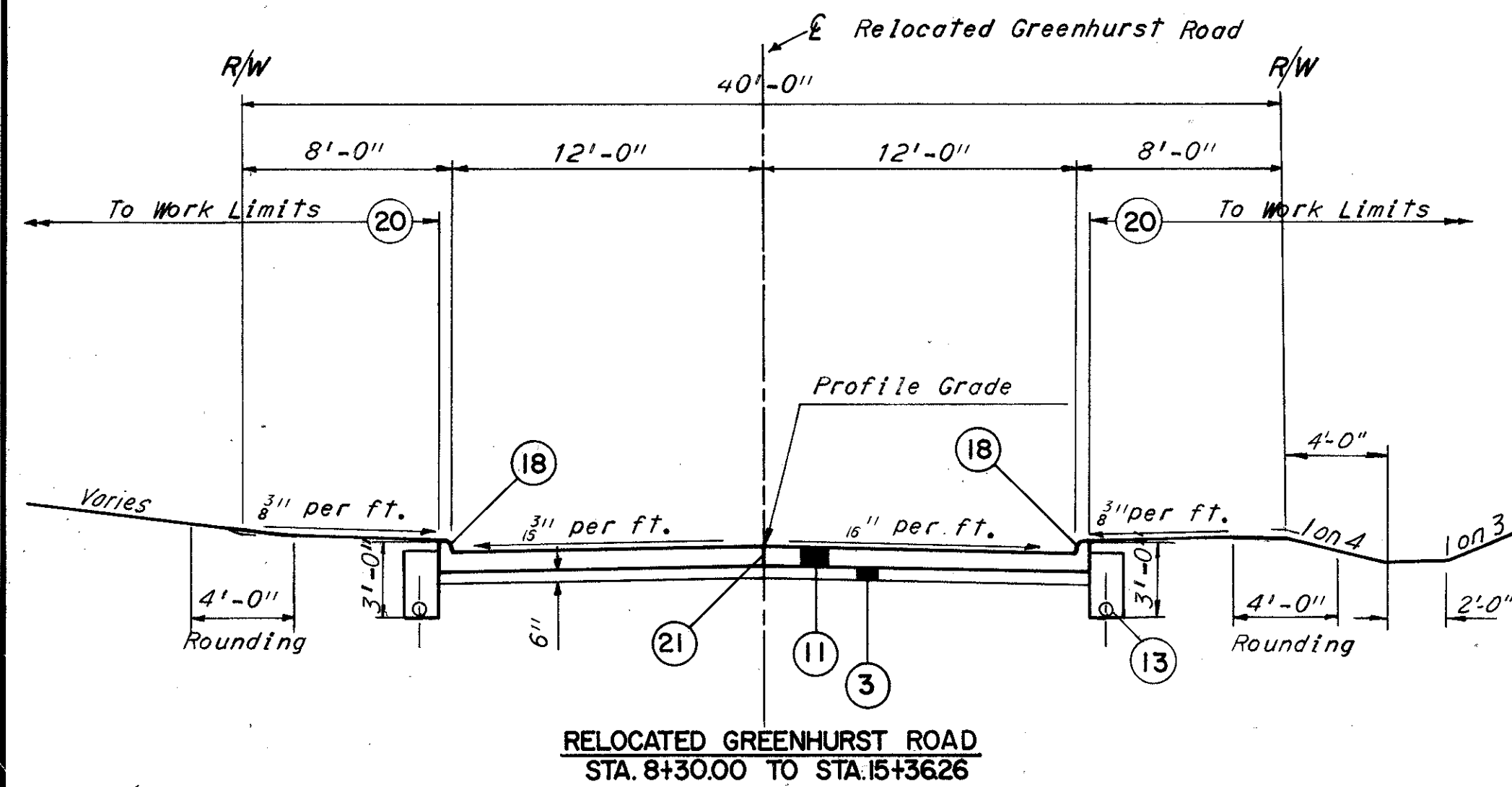
SCALE 3/4" = 1'-0" HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE P.H.A. DATE 4/11/68 CONSULTING ENGINEERS  
TRCD. J.E.M. DATE 4/24/69  
CKD. I.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

# TYPICAL SECTIONS

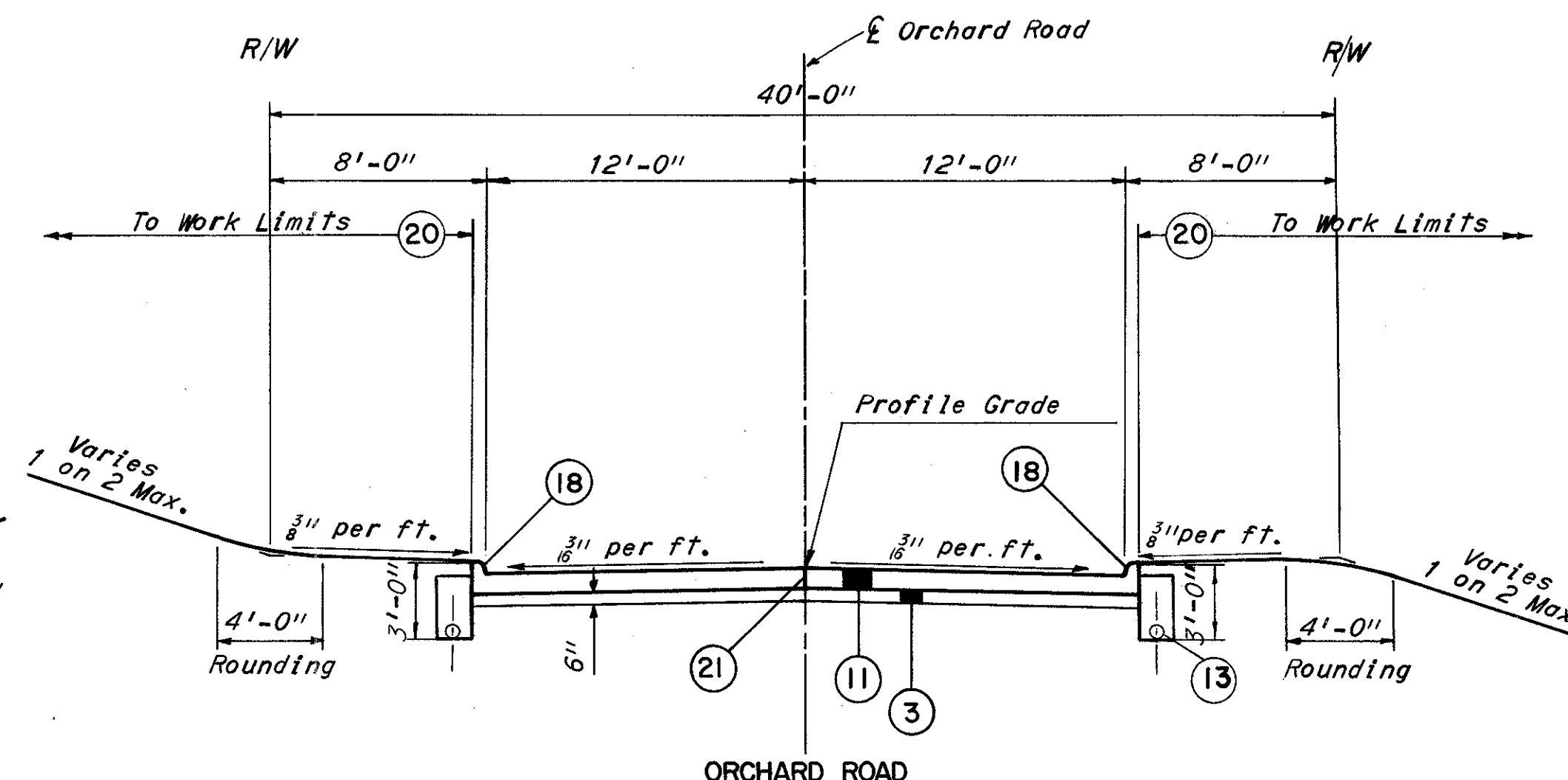
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

15  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

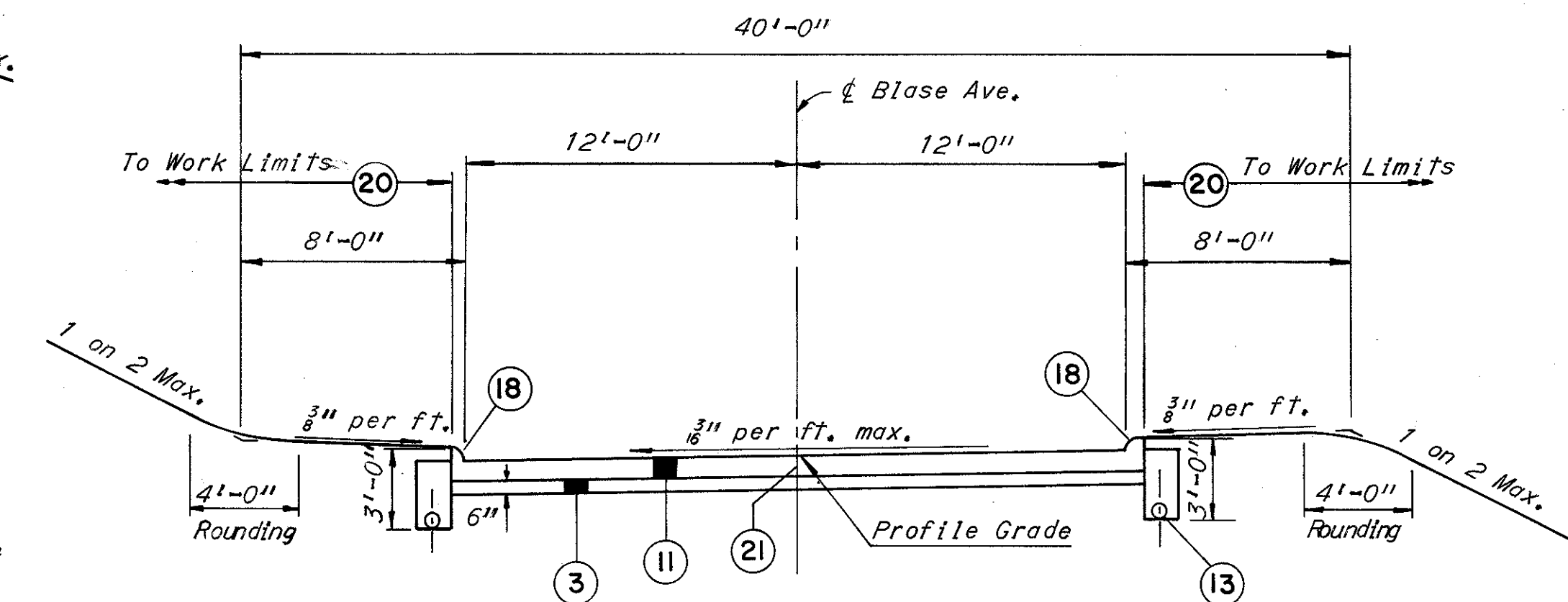


**RELOCATED GREENHURST ROAD**  
STA. 8+30.00 TO STA. 15+36.26

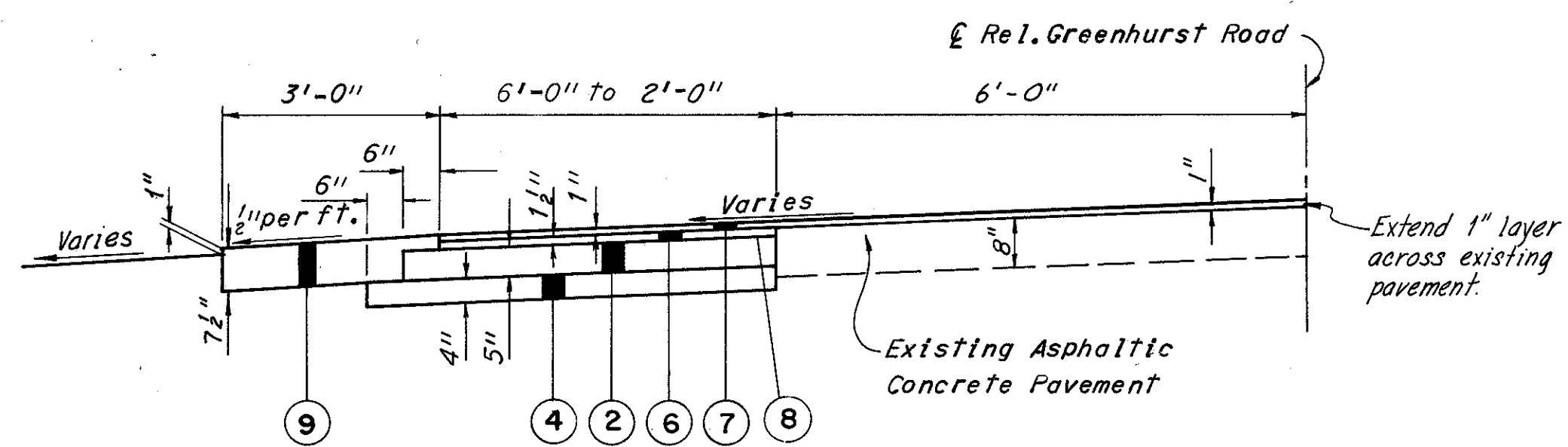


**ORCHARD ROAD**  
STA. 5+25 TO STA. 10+00 \*

\*Limiting Sta. for Underdrains = 9+40



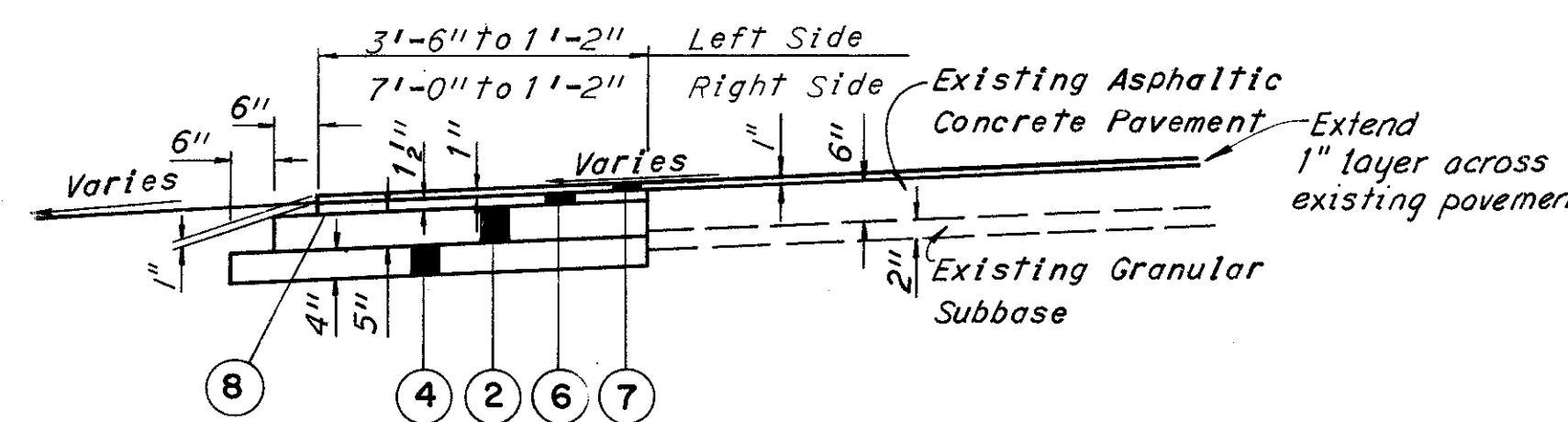
**BLASE AVE.**  
STA. 13+18.05 TO STA. 13+94.19



**RELOCATED GREENHURST ROAD TAPER**  
STA. 15+36.26 TO STA. 16+36.26

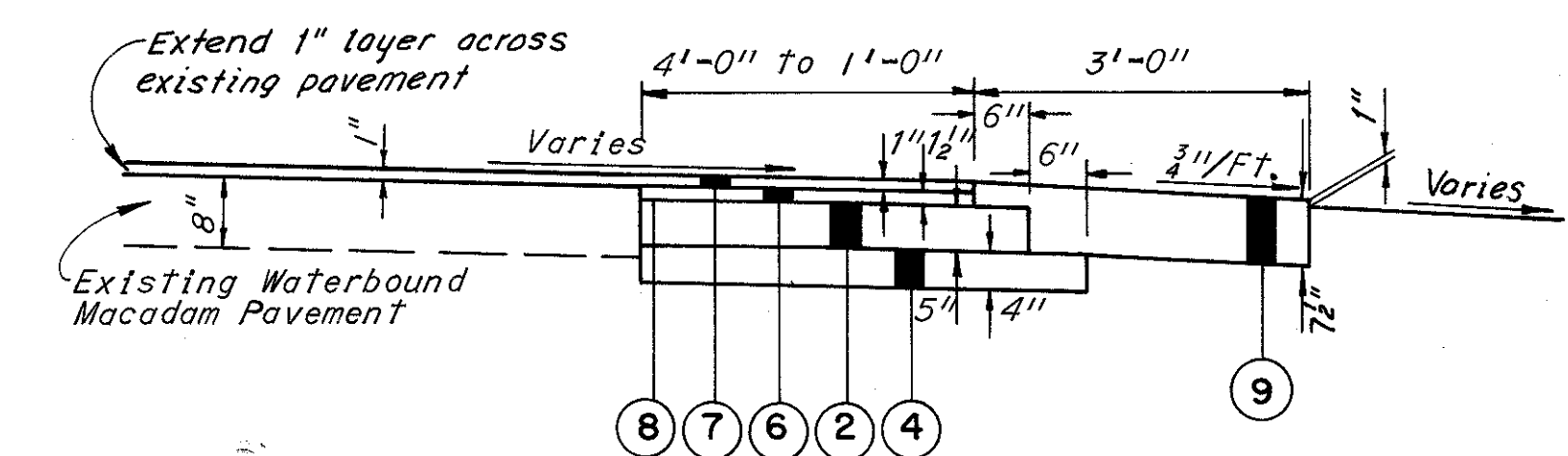
LEFT SIDE ONLY

Scale 1/2" = 1'-0"

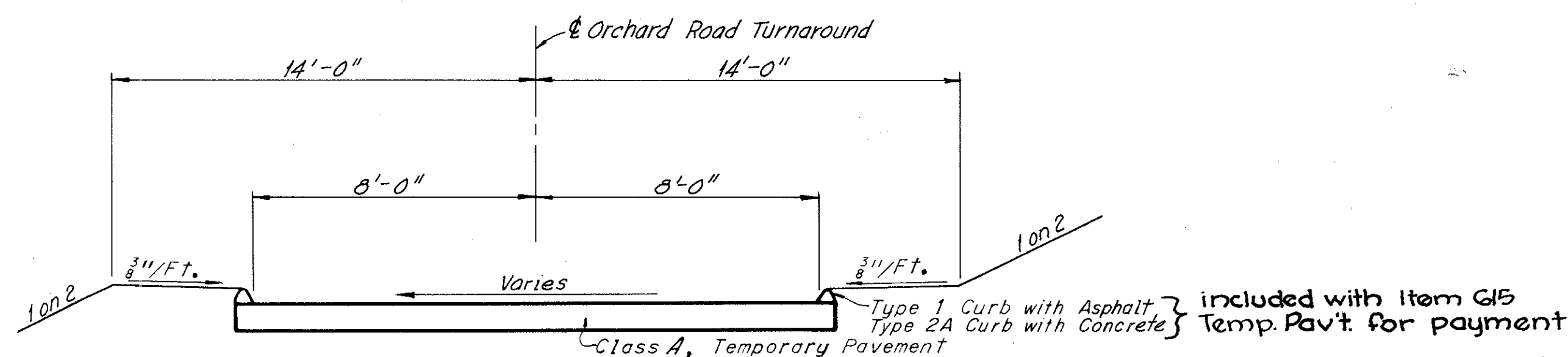


**ORCHARD ROAD TAPER**  
STA. 10+00 TO STA. 11+00  
RIGHT AND LEFT SIDE

Scale 1/2" = 1'-0"



**BLASE AVE. TAPER**  
STA. 13+94.19 TO STA. 14+58.43



**ORCHARD ROAD TURNAROUND**  
No Scale

- LEGEND**
- (2) Item 304 Aggregate Base
  - (3) Item 310 Subbase, Grading "A", as per plan
  - (4) Item 310 Subbase
  - (6) Item 402 Asphalt Concrete (70-85) or (AC-20)
  - (7) Item 404 Asphalt Concrete (70-85) or (AC-20)
  - (8) Item 408 Bituminous Prime Coat, 702.09, RT-2, or RT-3 applied at the rate of 0.40 Gal. per sq. yd.
  - (9) Item 411 Stabilized Crushed Aggregate
  - (11) Item 451 9" Reinforced Portland Cement Concrete Pavement
  - (13) Item 605 6" Pipe Underdrains, as per plan
  - (18) Item 609 Concrete Curb, Standard Type 2-A
  - (20) Item 659 Seeding and Mulching (See General Notes)
  - (21) Standard Longitudinal Joint

SCALE: 3/4" = 1'-0" or as shown  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE P.H.A. DATE 2/11/68  
TRCD. S.E.N. DATE 2/12/68  
KANSAS CITY CLEVELAND NEW YORK  
CKD IM DATE 4-1-70

Note: Typical Sections are intended to show general roadway and pavement features only. For Details see Plan Sheets and Cross-Section Sheets.

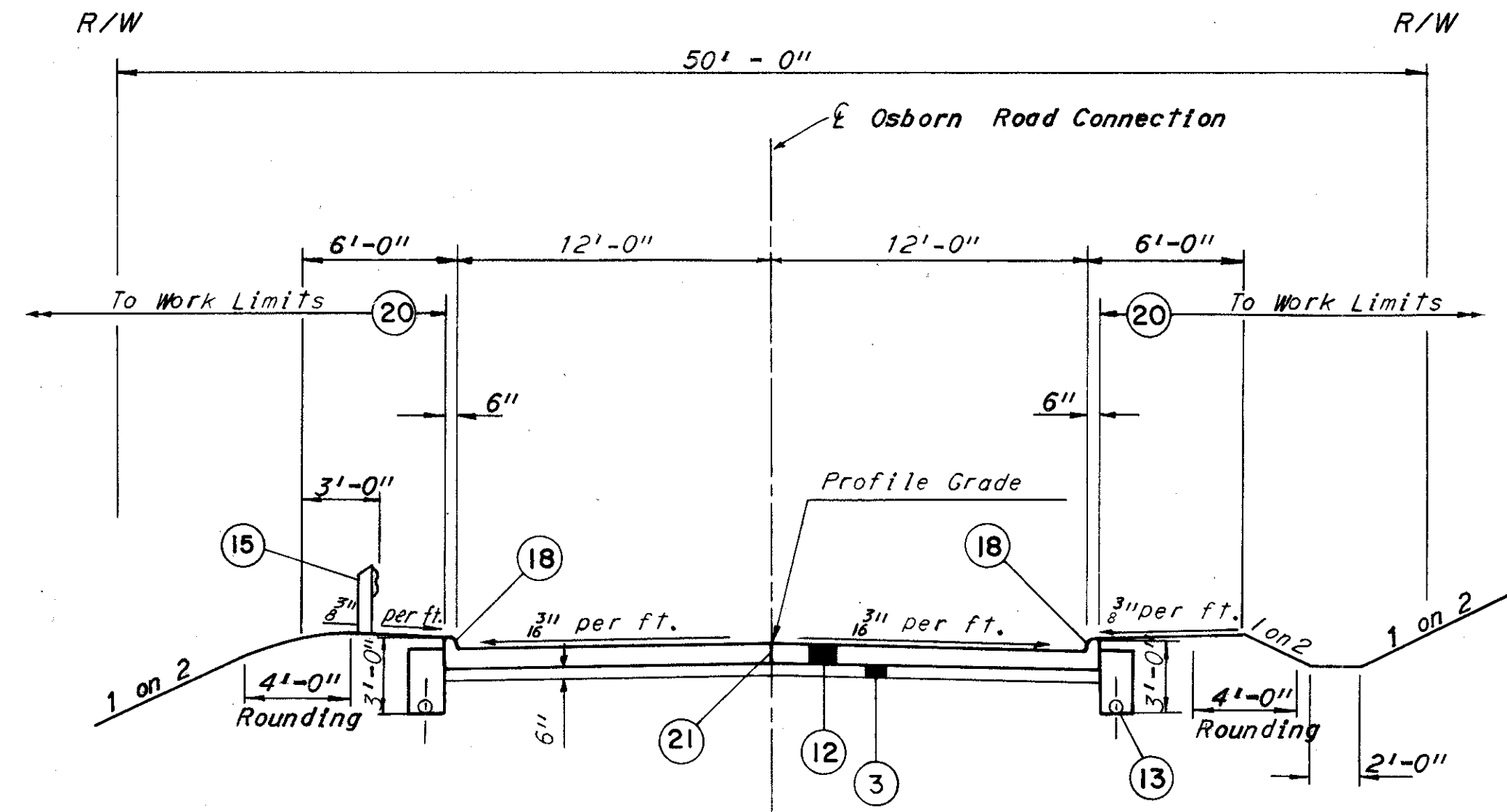


# TYPICAL SECTIONS

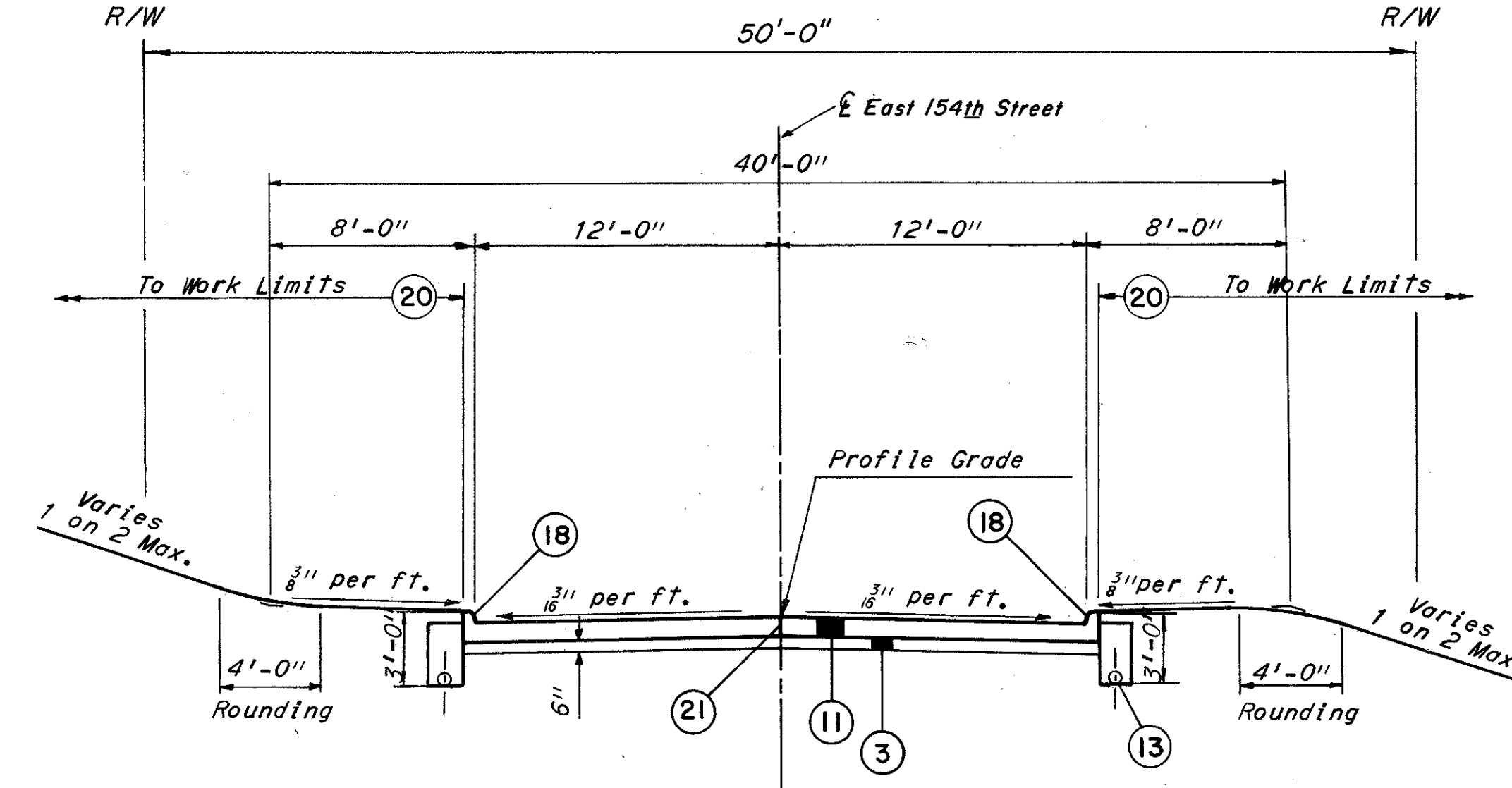
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

16  
390

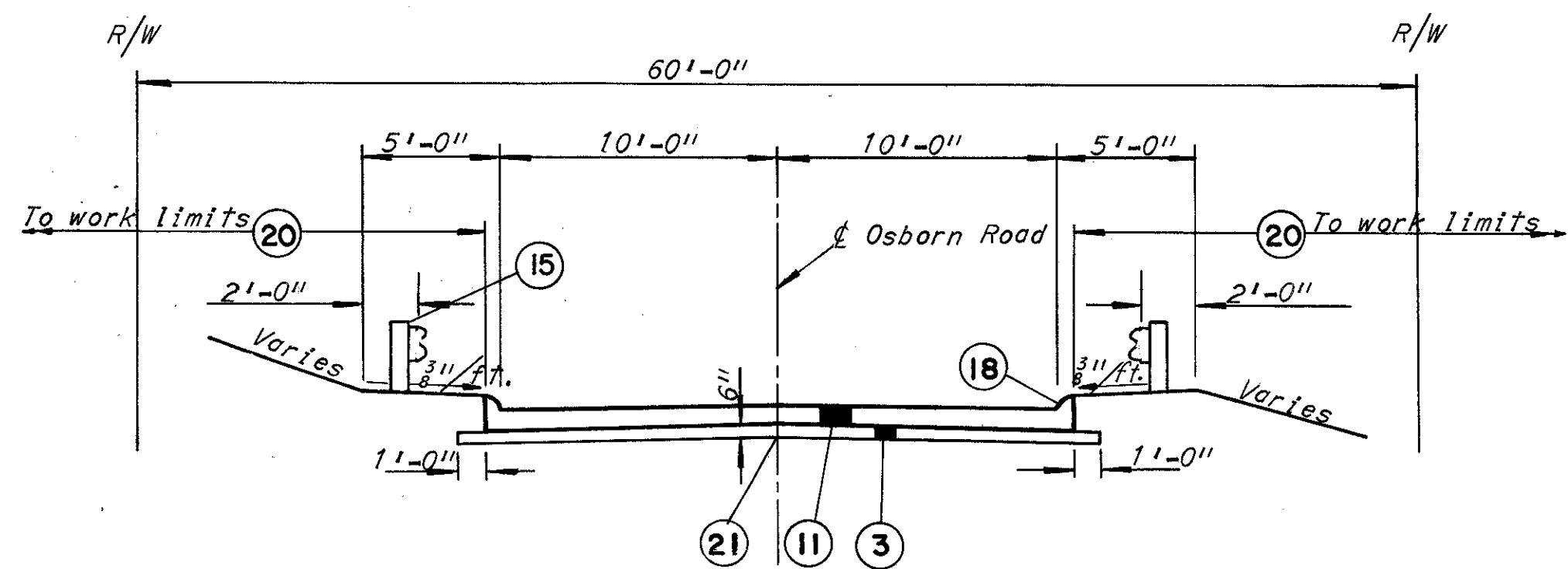
CUYAHOGA COUNTY  
C.U.Y. 480-21.40



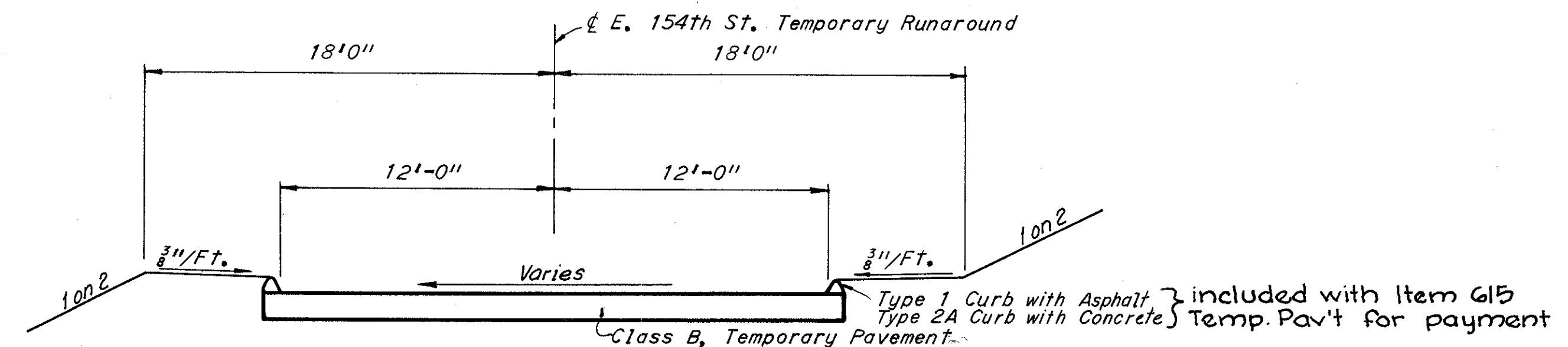
OSBORN ROAD CONNECTION



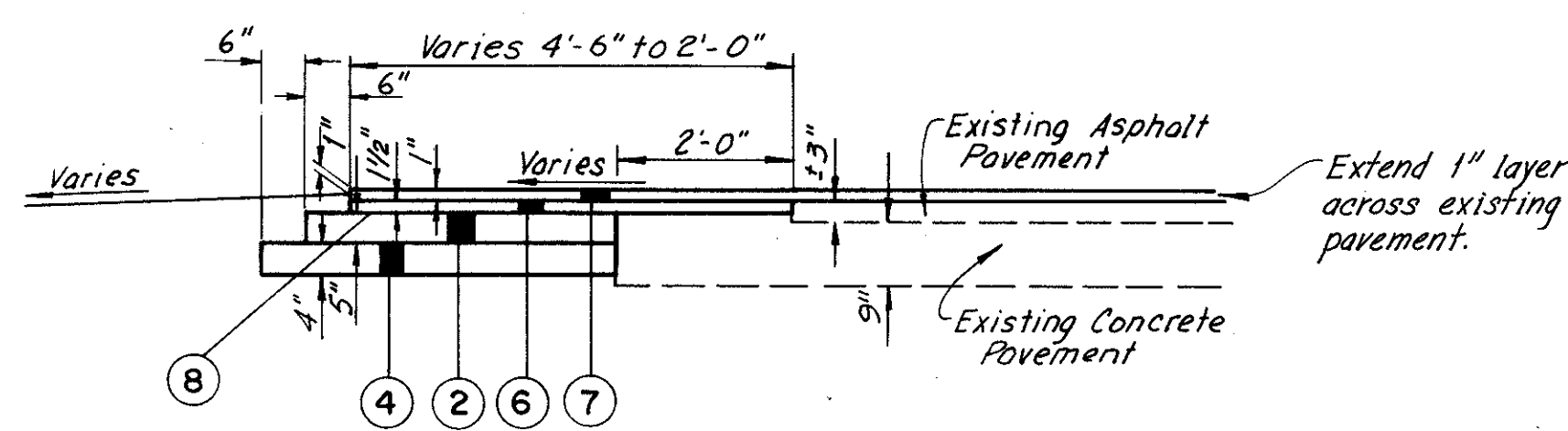
EAST 154th STREET  
STA. 4+00.00 TO STA. 4+59.50



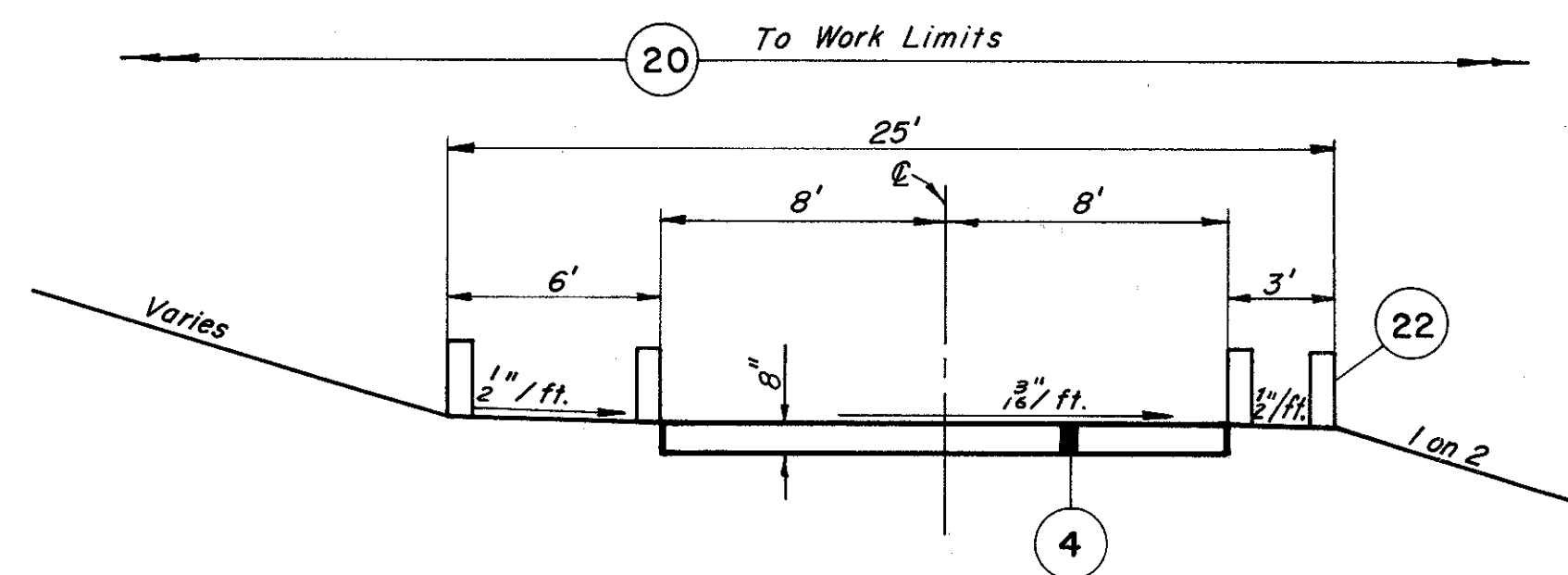
OSBORN ROAD CUL-DE-SAC



E. 154th ST. TEMPORARY RUNAROUND  
Scale: 1"=5'



OSBORN ROAD TAPER  
STA. 14+54.35 TO STA. 15+54.35  
RIGHT AND LEFT SIDE  
Scale: 1/2"=1'-0"



GRADED AREA FOR SANITARY SEWER RELOCATED

**LEGEND**

- (2) Item 304 Aggregate Base
- (3) Item 310 Subbase, Grading "A", as per plan
- (4) Item 310 Subbase
- (6) Item 402 Asphalt Concrete (70-85, or AC-20)
- (7) Item 404 Asphalt Concrete (70-85, or AC-20)
- (8) Item 408 Bituminous Prime Coat, 702.09 RT-2 or RT-3 as applied at the rate of 0.40 Gal. per sq. yd.
- (11) Item 451 9" Reinforced Portland Cement Concrete Pavement
- (12) Item 452 7" Plain Portland Cement Concrete Pavement
- (13) Item 605 6" Pipe Underdrains, as per plan
- (15) Item 606 Guard Rail, Type 5 (Barricade Rail Osborn Rd. Only)
- (18) Item 609 Concrete Curb, Type 2-A
- (20) Item 659 Seeding and Mulching (See General Notes)
- (21) Standard Longitudinal Joint
- (22) Item 606 Guard Post

SCALE 3/16"=1', or as shown  
MADE R.H.A. DATE 4-11-68  
TRCD J.E.W. DATE 4-24-68  
CKD L.M. DATE 4-1-70  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

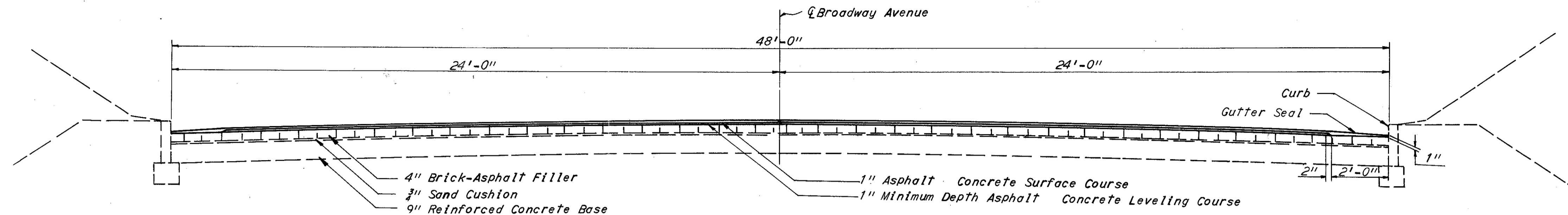
Rev. 1-974

# TYPICAL SECTIONS

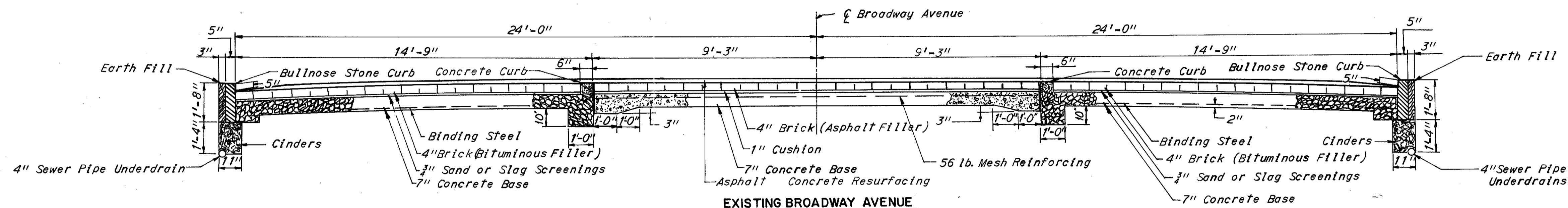
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

17  
390

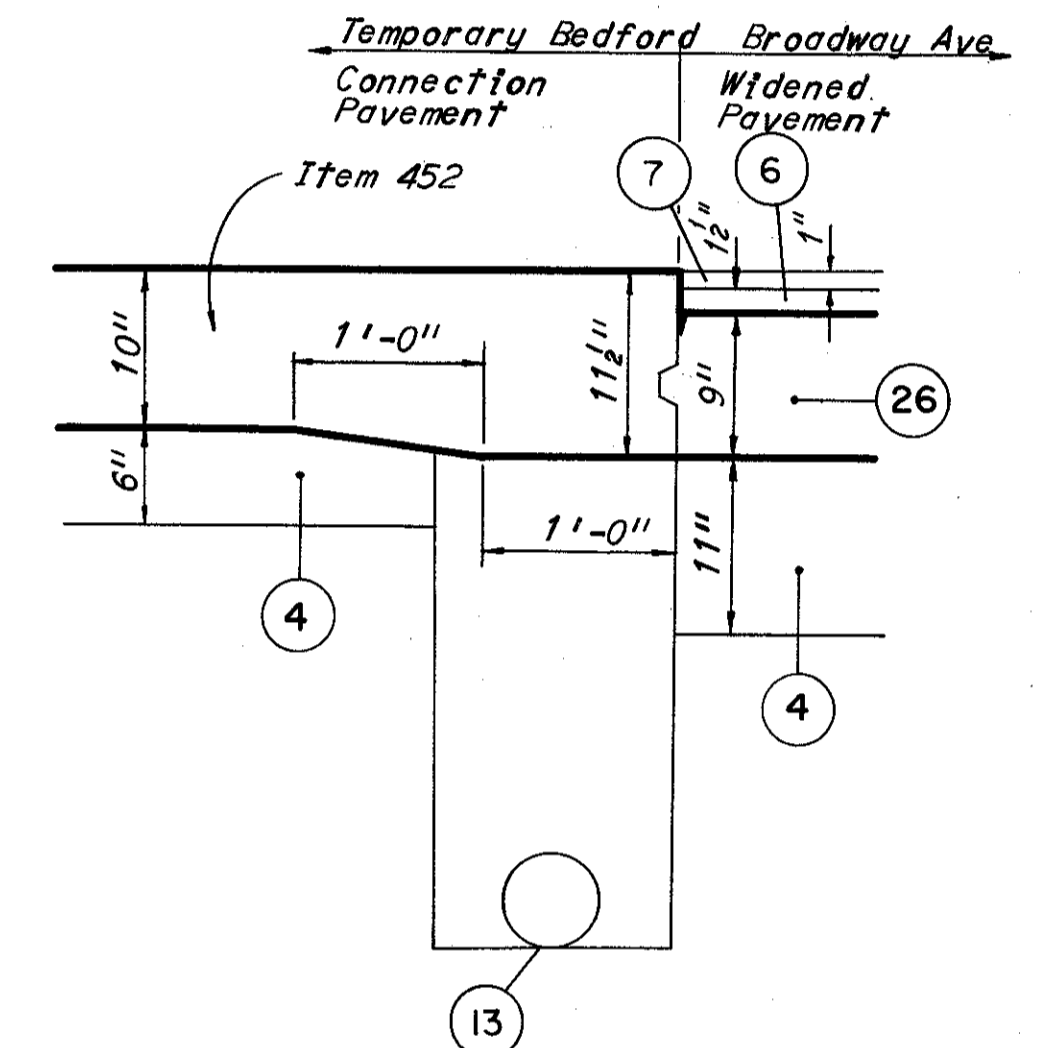
CUYAHOGA COUNTY  
CUY.480-21.40



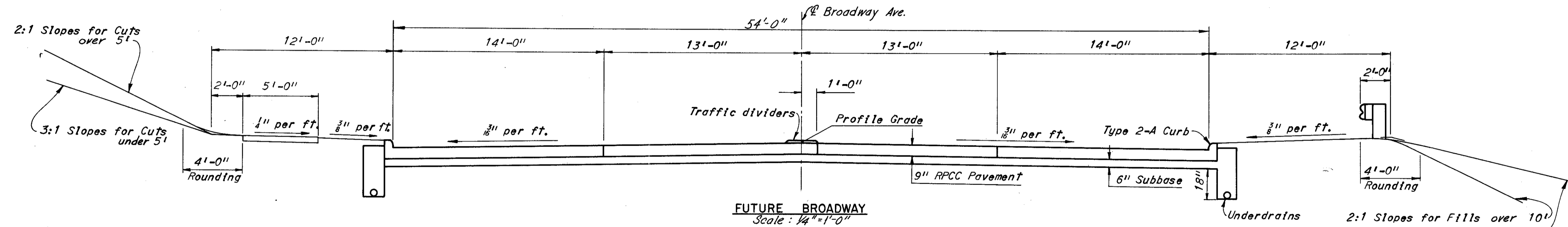
**EXISTING BROADWAY AVENUE**  
STA. 80+00 TO STA. 105+72.6  
Scale:  $\frac{3}{8}'' = 1'-0''$



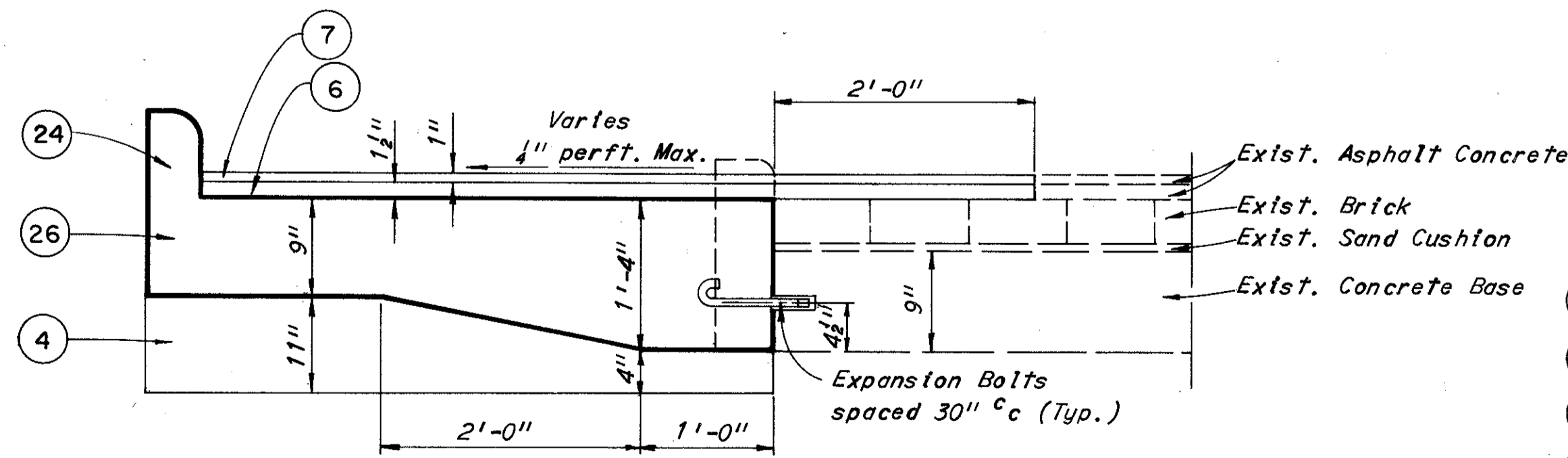
**EXISTING BROADWAY AVENUE**  
STA. 106+62.03 TO STA. 110+00  
Scale:  $\frac{3}{8}'' = 1'-0''$



**STANDARD KEY JOINT MODIFIED**  
AS PER PLAN  
No Scale



**FUTURE BROADWAY**  
Scale:  $\frac{1}{4}'' = 1'-0''$



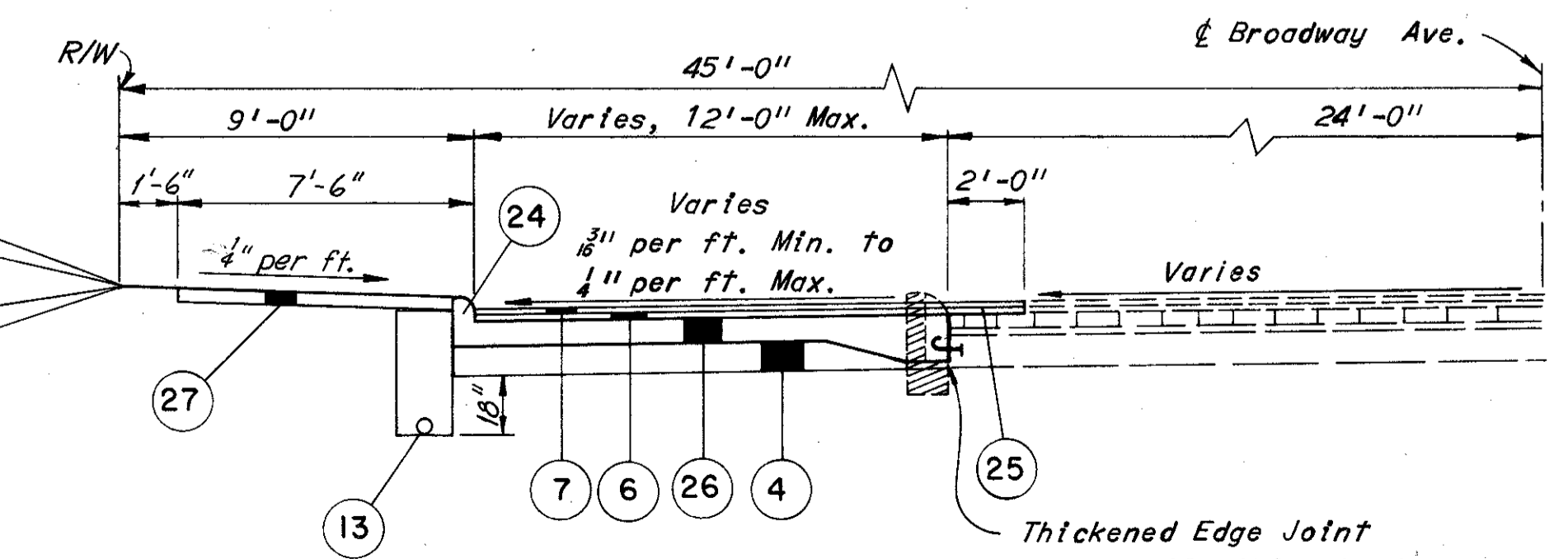
**THICKENED EDGE JOINT**  
No Scale

Note:  
The cost of joint to be included in the pertinent pavement item.

**LEGEND**

- ④ ITEM 310 Subbase Grading "A", as per plan
- ⑥ ITEM 402 Asphalt Concrete (70-85 or AC-20)
- ⑦ ITEM 404 Asphalt Concrete (70-85 or AC-20)
- ⑬ ITEM 605 6" Pipe Underdrains, as per plan
- ⑳ ITEM 609 Concrete Curb, Standard Type 2-B
- ㉑ ITEM 202 Wearing Course Removed
- ㉒ ITEM 305 Portland Cement Concrete Base
- ㉓ ITEM 608 4" Concrete Walk

- 2:1 for Cut Slopes over: 5'-0"
- 3:1 for Cut Slopes Under: 5'-0"
- 4:1 for Fills under 10'-0"
- 2:1 for Fills over 10'-0"



**PAVEMENT WIDENING TYPICAL**  
Scale:  $\frac{1}{4}'' = 1'-0''$

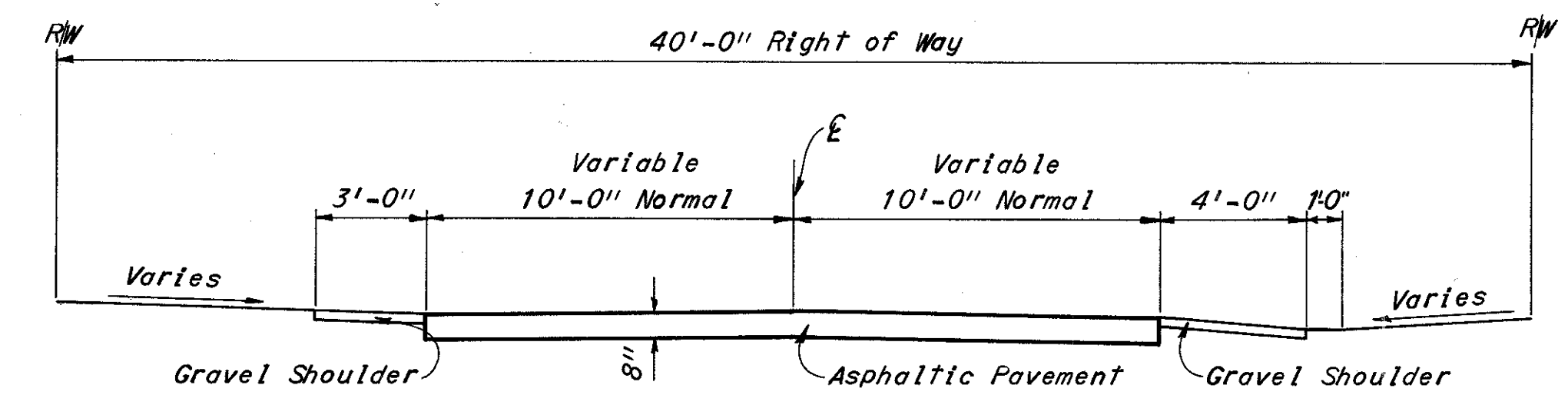
SCALE as shown  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE P.D.J. DATE 8-22-66 CONSULTING ENGINEERS  
TRCD P.D.J. DATE 8-22-66 KANSAS CITY CLEVELAND NEW YORK  
CKD. R.P.R. DATE 8-23-66

# EXISTING TYPICAL SECTIONS

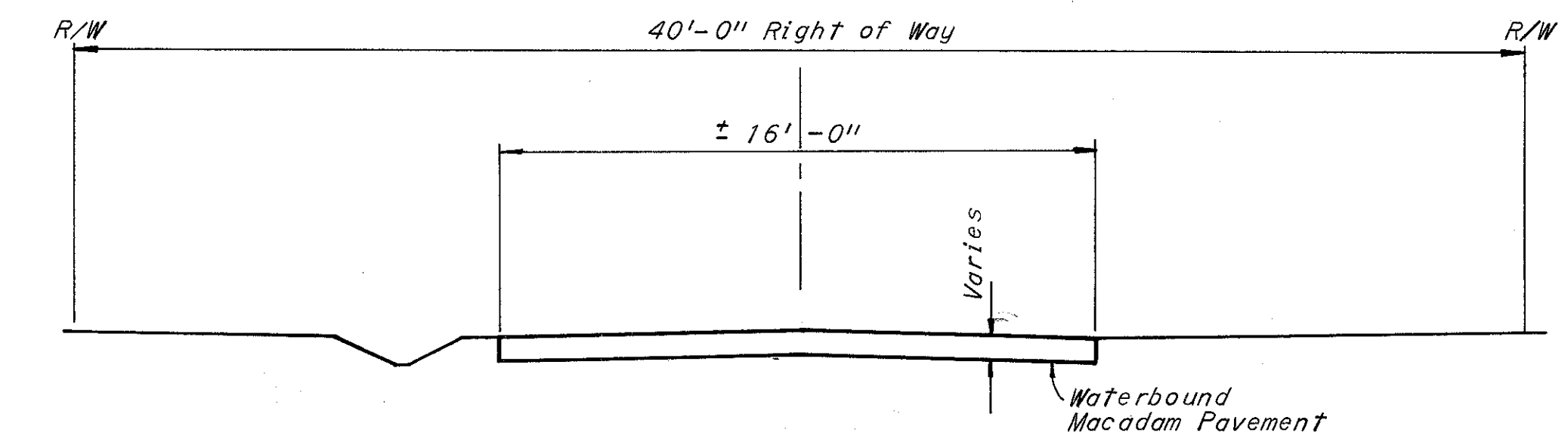
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

18  
390

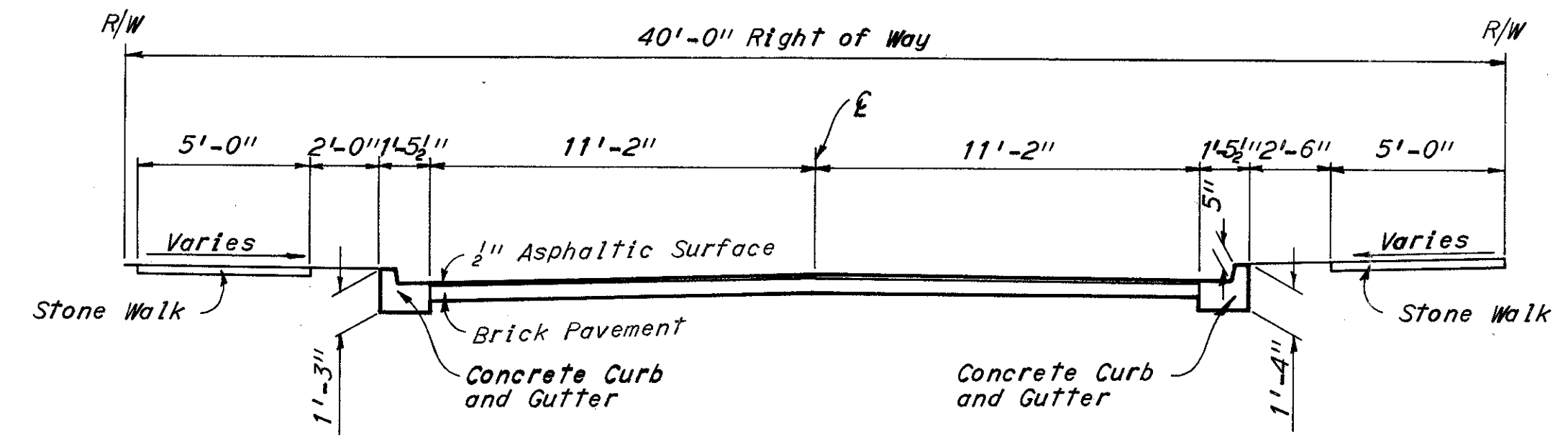
CUYAHOGA COUNTY  
CUY. 480-21.40



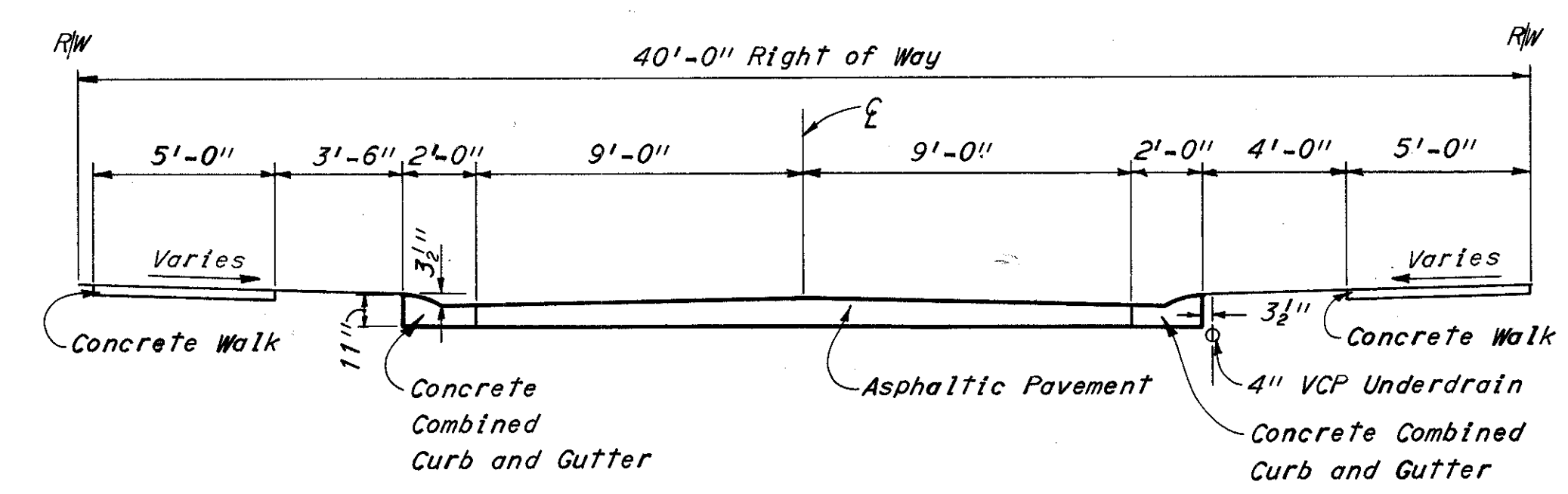
EXISTING McCRACKEN ROAD  
STA. 29+00 TO STA. 30+50



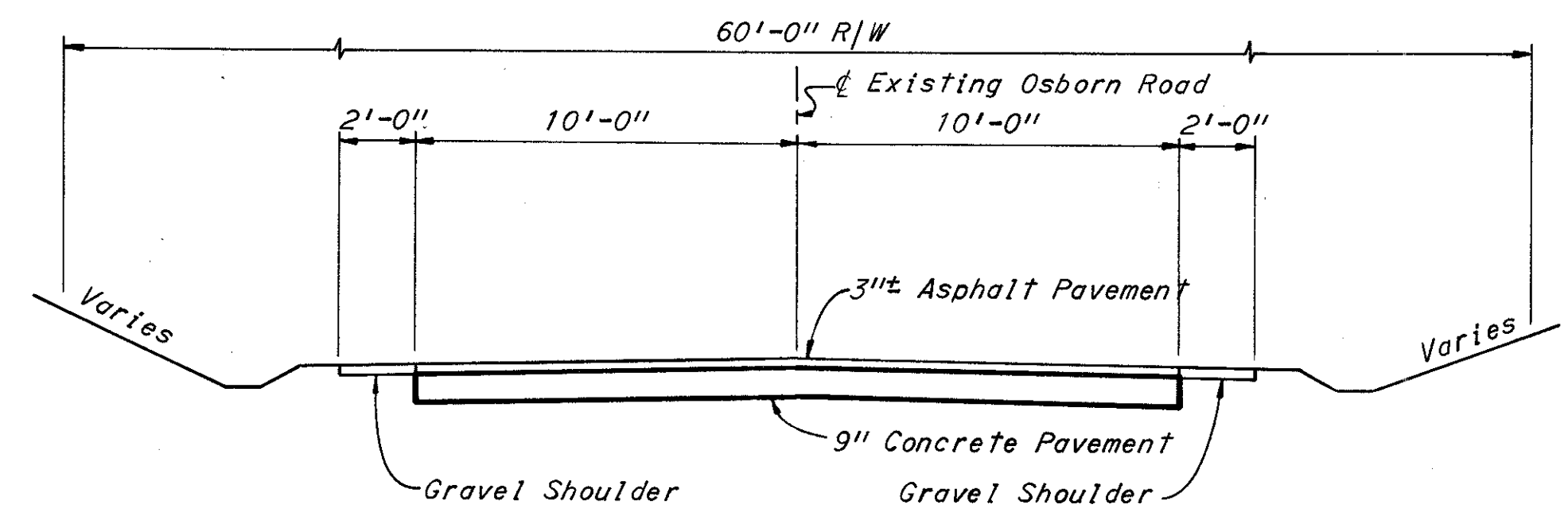
EXISTING BLASE AVE



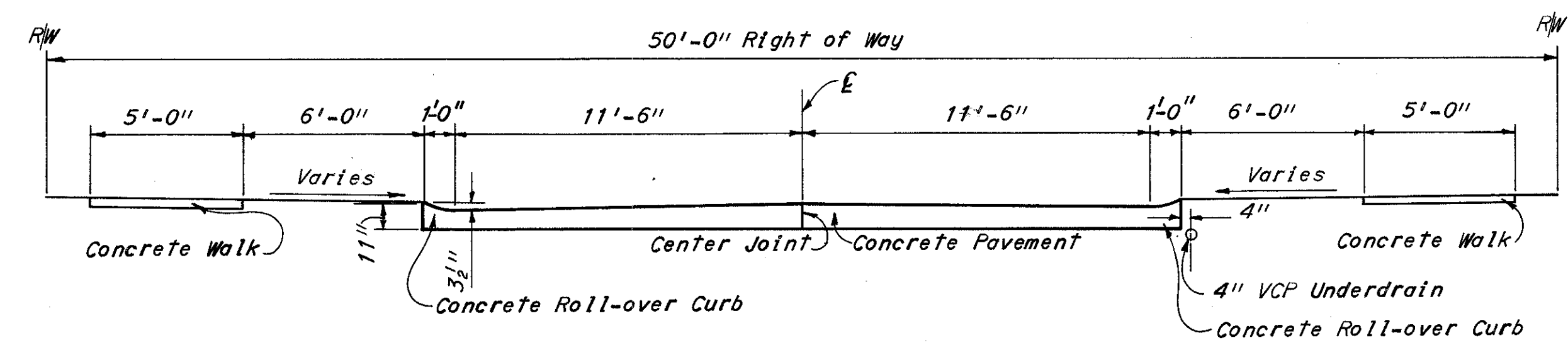
EXISTING GREENHURST ROAD



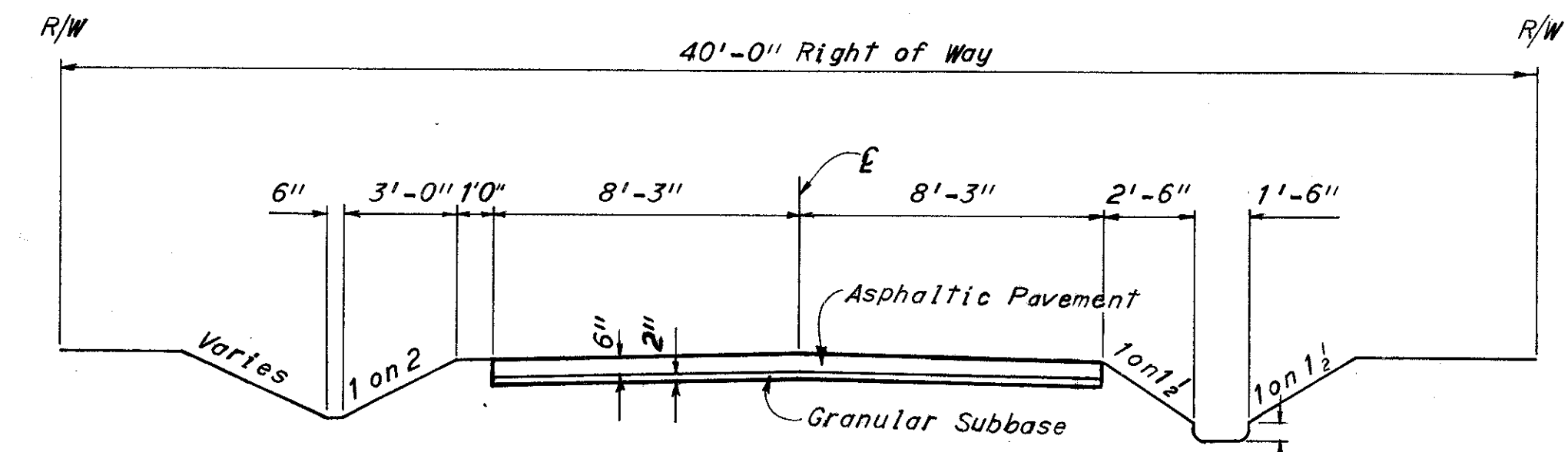
EXISTING EAST 135TH STREET



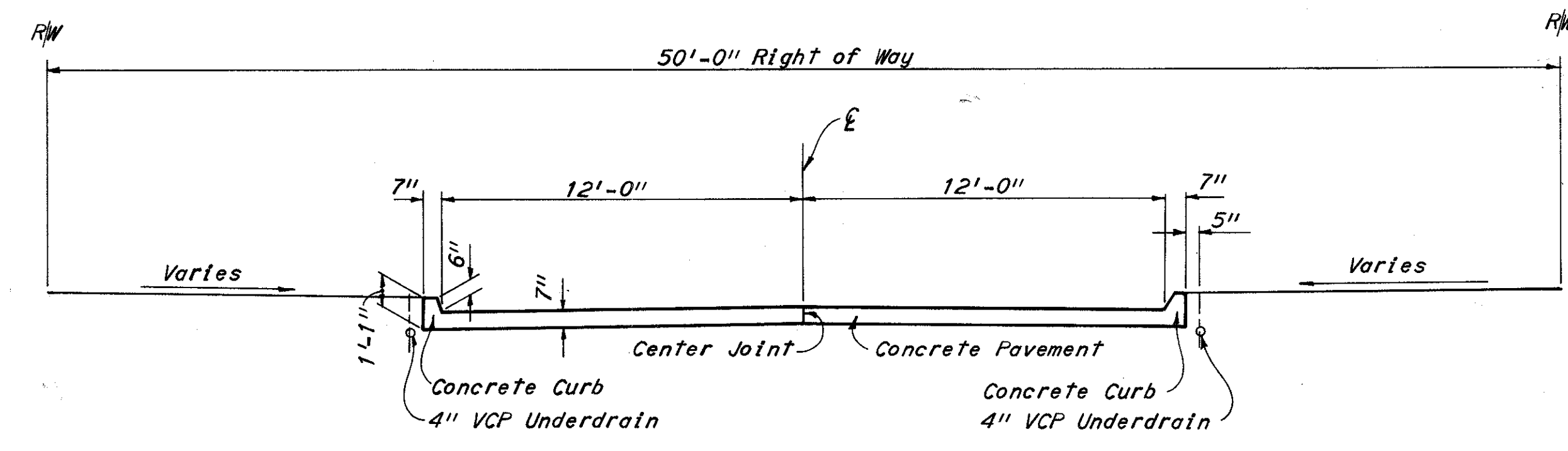
EXISTING OSBORN ROAD



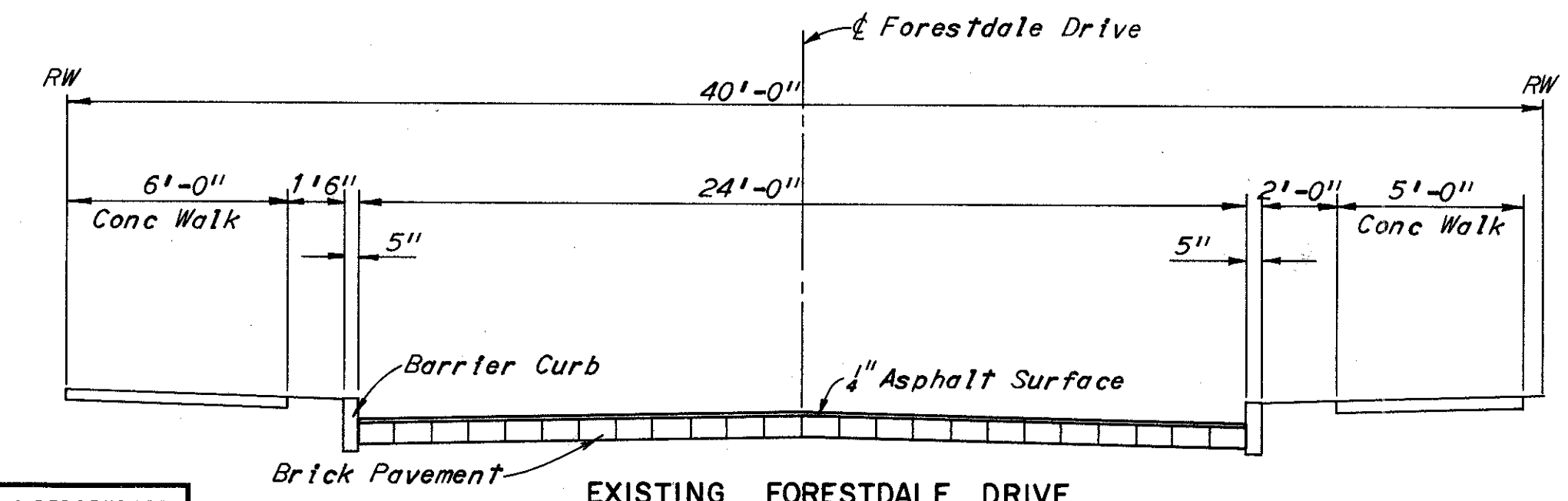
EXISTING EAST 141ST STREET



EXISTING ORCHARD ROAD



EXISTING EAST 154TH STREET



EXISTING FORESTDALE DRIVE  
Scale: 1/4"=1'-0"

SCALE: 1/4" = 1'-0" HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE R.H.A. DATE 3/11/68 CONSULTING ENGINEERS  
TRCD. J.E.N. DATE 4/2/68  
CKD. J.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

# GENERAL NOTES

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## GENERAL

## ROADWAY

### ELEVATION DATUM

All elevations shown on these plans are in feet above the Cleveland Regional Geodetic Survey Datum Plane.

### UNDERGROUND UTILITIES

The locations of the underground utilities shown on the plans have been obtained by diligent field checks and searches of available records. It is believed that they are essentially correct, but the State of Ohio does not guarantee their accuracy or completeness.

### UTILITIES

Following is a list of the utilities within the limits of construction.

East Ohio Gas Company, 1201 East 55th Street, Cleveland, Ohio 44103  
 Cleveland Electric Illuminating Company, 55 Public Square, Cleveland Ohio 44113  
 City of Cleveland Water Department, 1201 Lakeside Avenue, Cleveland, Ohio 44114  
 Ohio Bell Telephone Company, Room 700, 920 Superior Ave. West, Cleveland, Ohio 44113  
 City of Garfield Heights, 5555 Turney Road, Garfield Heights, Ohio 44125  
 City of Maple Heights, 5353 Lee Road, Maple Heights, Ohio 44137  
 Sun Pipe Line Co. Stow Ohio 44224  
 Cuyahoga County Sanitary Engineer, 1219 Ontario, Cleveland, Ohio 44113

### ESTIMATED QUANTITIES

Specific locations and usage of estimated quantities set up in this plan to be used "as directed by the Engineer" shall be made a matter of record by incorporation into the final change order governing completion of this project. Estimated quantities of materials shall not be ordered for delivery to the project unless authorized by the Engineer.

### FIELD OFFICE

The Contractor shall provide a suitable field office having a minimum of 800 square feet of floor space and in addition to the requirements of Item 619, he shall provide and maintain sanitary provisions as per 107.06. All the above is included in the lump sum price bid for Item 619, Field Office.

### COOPERATION - TRAFFIC CONTROL DEVICES

The Contractor is hereby advised that a separate contract may be awarded for the furnishing and erecting of certain Traffic Control Devices within the work limits of this project prior to completion of construction operations.

The Contractor shall cooperate with the separate contractor to arrange a suitable work schedule, subject to the approval of the Engineer, to permit the separate Contractor to work and operate necessary equipment within work limits to carry out the provisions of his contract. The Engineer shall notify the Contractor a minimum of thirty (30) days prior to any scheduled work by the separate Contractor.

Each Contractor shall be held responsible for any damage, by him, or his agents, to the work performed by the other Contractor.

Compensation for the above cooperation shall be incidental to the various pay items included within this construction project.

### TRAFFIC MAINTENANCE

Two-way traffic for local access shall be maintained at all times by use of existing pavements, proposed pavements and temporary roadways surfaced with 410 aggregate and stabilized with Item 616 calcium chloride. It is not intended that temporary roadways be used exclusively for maintaining traffic on this project but that maximum usage be made of existing and proposed pavements. The limits and duration of use of temporary roadways shall be held to an absolute minimum, and in all cases shall be subject to the approval of the Engineer.

Relocated Greenhurst Road shall be constructed and opened to traffic before the closing of existing McCracken Road from Broadway Avenue to Relocated Greenhurst Road will be permitted.

The Osborn Road Connection and the East 154th Street Temporary Connections shall be constructed in accordance with the notes and details shown on Sheet Nos. 42 and 44.

Access to East 154th Street and Blase Avenue through the project must be maintained at all times by use of their existing connections to McCracken Road, the East 154th Street Temporary Connection, or Relocated McCracken Road.

Connections to existing McCracken Road cannot be closed until Relocated McCracken Road is opened to traffic to either Lee Road or Broadway Avenue. The pavement for the East 154th Street Temporary Connection shall be removed and the area restored immediately after Relocated McCracken Road is opened to traffic.

Construction on Orchard Road shall follow a schedule which permits free entrance and exit to homes in the construction area at all times. Traffic in this area shall be routed to Ohio Avenue or to Lee Road via Relocated McCracken Road.

Work on Broadway Avenue shall be done in such a manner that two lanes of traffic shall be maintained in each direction at all times except for brief periods when one lane is maintained in each direction as approved by the Engineer. The work shall be adequately protected with temporary guide markers or barricades.

A 30' clearance area was provided under Structure CUY480-21.40. Traffic shall be maintained on the existing Access Road located in this 30' clearance area according to notes shown on Sheet No. of the Bridge Plans.

The method of maintaining traffic which the Contractor desires to adopt and which is developed according to the guidelines given above shall be submitted to the Engineer for his approval. The Engineer shall notify the affected municipalities two weeks prior to closing of any existing roads.

Payment for all of the above shall be included in the lump sum price bid for Item 614 "Maintaining Traffic", except temporary roads, and pavements shall be paid for as Item 615.

Quantities of the following items are estimated and are included for use only when and in amounts as directed by the Engineer. The amounts of these items and their location shall be recorded as used, and payment will be included in the Final Payment Estimate.

ITEM 410	TRAFFIC COMPACTED SURFACE, TYPE A OR B	100 Cu. Yds.
ITEM 410	TRAFFIC COMPACTED SURFACE, TYPE C	100 Cu. Yds.
ITEM 616	CALCIUM CHLORIDE	20 Tons
ITEM 616	WATER	500 M. Gals.
ITEM 404	ASPHALT CONCRETE OR AN APPROVED BITUMINOUS PREMIXED SURFACE COURSE FOR MAINTAINING TRAFFIC	100 Cu. Yds.

### LIGHTS AND SIGNS AT ADJACENT ROAD INTERSECTIONS

The Contractor shall, in addition to the general requirements of Item 614 on this project, perform the following:

- (a) Provide, erect and maintain standard 48" x 30" size "Road Closed" signs, sign supports and lights at the following locations during the period in which the affected roads are closed to traffic.

Osborn Road just South of Dressler Avenue  
 Osborn Road at Station 12+00.00  
 Greenhurst Road at Station 8+20

- (b) Payment for providing, erecting, maintaining and removing lights, signs and sign supports shall be included in the lump sum price bid for Item 614 "Maintaining Traffic".

### ITEM 622 CONCRETE BARRIER

The lin. ft. payment shall include all materials and labor necessary to complete the item as detailed in these plans, including transitions at bridge piers, sign supports, nose areas, and lead-in parapets to the following structures; Bedford Freeway over Reloc. McCracken Road and Ramp B-OBS over Reloc. McCracken Road.

Impressed or sawed contraction joints 2 1/2" minimum depth shall be used at 20' intervals. The maximum joint opening shall be held to a minimum and shall not extend into the base. Impressed joints shall be tapered with a maximum opening of 3/8".

1/2" expansion joints shall be used on either side of bridge piers and overhead sign supports or as required by the Engineer.

The cost of all the above shall be included in the unit price bid per lineal foot of Concrete Barrier.

### ITEM 659 AGRICULTURAL LIMING, AS PER PLAN

The location and need for agricultural liming materials will be determined by the Engineer on the basis of laboratory tests after rough grading operations have been performed. The quantity of agricultural liming materials shown on the plans is sufficient for application to the entire project but will be non-preformed where tests indicate the item is not needed.

### SEEDING

Quantities for seeding are calculated for the soil areas between the right-of-way fence lines, between the right-of-way lines in unfenced areas, and within the work limits for areas outside the right-of-way lines, covered by work agreement or easement.

### COMMERCIAL FERTILIZER

All areas to be seeded under Item 659 or Item 667 or sodded under Item 660 shall have commercial fertilizer 12-12-12 applied at the rate of twenty (20) pounds per 1,000 sq. ft.

### ROUNDING OF CORNERS ON CROSS SECTIONS

The rounded corners shown on the typical sections apply to all cross sections even though otherwise shown in these plans.

### REMOVAL OF EXISTING PIPE

The removal of all existing pipe drains which would normally be removed in various excavation items shall be included for payment in the unit price bid for the respective excavation items, unless otherwise itemized in the plans.

### ITEM 203 PROOF ROLLING

An estimated quantity for this item has been provided in the General Summary for use in proof rolling of subgrade for the mainline, ramp, and directional roadway pavements, and for paved shoulders, in accordance with Item 203.

### MONUMENTS

Monuments shall be constructed in accordance with details shown on Standard Drawing MC-1. For locations, see Sheet No. 363.

# GENERAL NOTES

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## ROADWAY

### GRADING ON ADJACENT PROJECT

The Contractor is required to do grading work within the area of the adjacent project to the West as shown in detail on sheet 4B.

Work on this section must be so scheduled as to provide full cooperation with the Contractor for the adjoining project.

### TREES AND STUMPS REMOVED

All trees and stumps specifically marked for removal within the construction limits of this project shall be removed under the lump sum price bid for Item 201, Clearing and Grubbing.

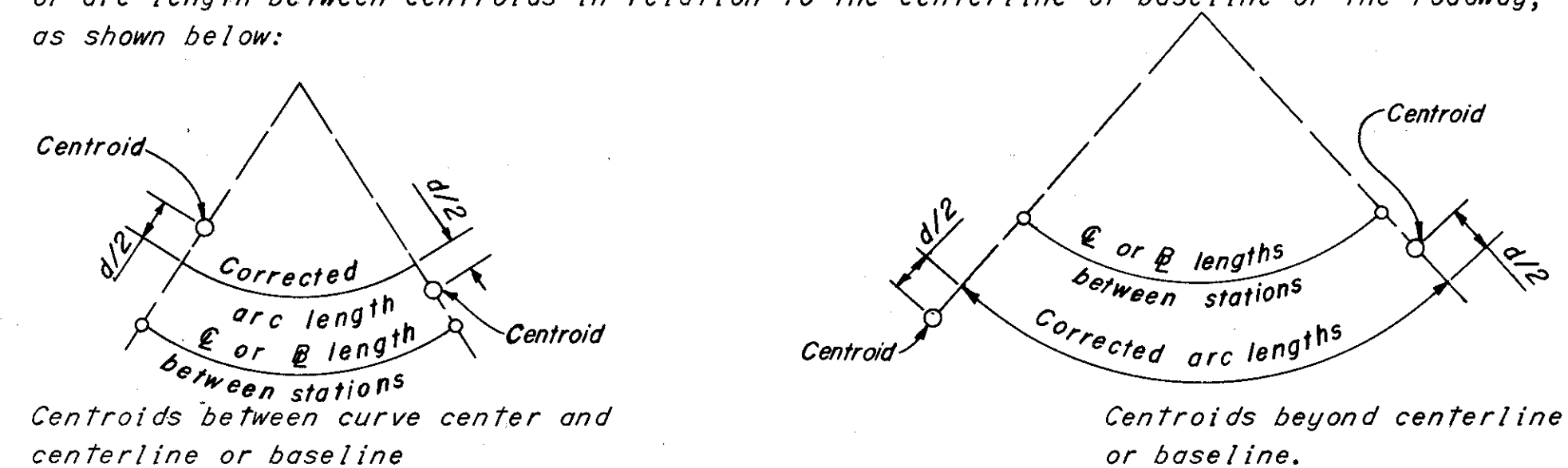
The following is an approximate estimate of the number of trees and stumps to be removed.

Sizes	No. of Trees	No. of Stumps
18"	903	30
30"	553	18
48"	74	2
60"	4	

The above estimate is approximate and the State of Ohio reserves the right to order the removal of additional trees or stumps outside of the limits of construction but within the right-of-way and or easement lines. Payment for the removal of these additional trees or stumps shall be included in the lump sum price bid for Item 201, Clearing and Grubbing.

### EARTHWORK COMPUTATIONS

Adjustments have been made in earthwork quantities when warranted by roadway curvature and by end area centroid location. These adjustments have been made by correction of arc length between centroids in relation to the centerline or baseline of the roadway, as shown below:



$d$  = Radius difference between centroids  
Corrected arc lengths are indicated on Cross Section plan sheets where applicable.

## PAVEMENT

### FUTURE LANE CONSTRUCTION

To provide for future lane construction, the Contractor shall provide and install standard longitudinal key joints with the female end of the standard hook bolt cast into the concrete pavement at 30" spacing as called for on Standard Drawing BP-3.

The above joints shall be placed at the following locations:

Sta. 64+23 to Sta. 67+80 @ Lane OBS-EB

After the forms have been removed, the  $\frac{3}{8}$ " tap bolt shall be re-inserted into the hook bolt to protect the threads and left in place in lieu of the male end of the hook bolt. The exposed metal shall then be painted with two coats of asphalt varnish.

Payment for all of the above shall be included in the unit price bid for the pertinent pavement item.

### 310 SUBBASE GRADING "A" AS PER PLAN

Material for this item shall meet the requirements of Grading "A" of 310.02 except that no more than 10% of the material shall pass a No. 200 sieve after all operations of placing and compacting have been completed.

The Contractor shall place 6 inches of Item 310 Subbase under all bridge approach slabs and shall be compensated therefore at the unit price bid for Item 310 Subbase Grading "A", as per plan.

### LOCATIONS OF GUARDRAIL

The locations of guardrail runs as shown in these plans are subject to adjustment to assure that the planned installations will afford maximum protection for traffic.

### CONTRACTION AND EXPANSION JOINTS

Although specific locations of certain expansion and contraction joints have been detailed on this plan, no waiver of the Specification is intended. Provision of expansion joints at all major structures and the maximum spacing between contraction joints shall in all cases be in accordance with Standard Construction Drawings and the Specifications.

### ITEM 606 GUARD POST, AS PER PLAN

Both access points for the Graded Area for Sanitary Sewer Relocation will be protected by guard posts as shown on Sheet No. 66. A steel chain, galvanized according to ASTM A-153, and with a minimum tensile strength of 3000 pounds will be attached to each post with galvanized hook bolts. At each end post a  $\frac{5}{8}$ " galvanized eyebolt will be driven through the post and securely bolted by spot-welding the nuts. One end of the chain shall be permanently attached to this eyebolt. A heavy duty safety lock as approved by the Engineer will be supplied for both entrances.

Payment for this item including all labor and necessary materials will be included in the unit price bid for Item 606 Guard Post, as per plan.

### GUARD RAIL TERMINAL SECTION

Where indicated on the plan, guard rail shall be terminated by using a Terminal Section. This shall consist of bolting a Standard Terminal as detailed on Standard Drawing GR-2A to the rail element at the last post. Also, the three end posts of each Terminal Section shall be encased in a minimum 4-inch thickness of Class C concrete for the full depth of the post below the ground line. Payment for the Terminal Section shall be included in the unit price bid for Item 606 Guard Rail Type 5.

## PAVEMENT

### ITEM 451-9" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, MODIFIED AS PER PLAN (RELOCATED McCRACKEN ROAD)

The pavement shall be modified by using reinforcing mesh fabric of No. 00/4 gage steel wire spaced at 6" center to center in place of the wire specified in Standard Construction Drawing BP-2.

**Contraction Joint:** The location of the joints shall be clearly marked on the forms in such a manner that the center line can be readily determined for the sawing operation. Spacing between successive contraction joints shall not generally exceed 30 feet except where hinge joints are used.

**Hinge Joints:** When called for on the Plans or in the Proposal, two hinge joints shall be sawed into the pavement, at the 1/3 points, between successive contraction joints or between adjacent contraction and expansion joints. Hinge joints shall not be placed as an extension of either a contraction, expansion or construction joint in an adjacent slab, but may be used to extend a longitudinal tied joint of a more or less perpendicular intersecting roadway when approved by the Engineer. In order to insure the correct identification of the sawed joint for extension when adjacent or future lanes are placed, a 3" block letter, C, for contraction or construction and H for hinge, shall be impressed 1/4" into the finished slab adjacent to and at each end of the joint. If it is not possible to place two successive hinge joints as herein specified, contraction joints shall be used. When hinged joints are used the spacing between successive contraction and/or expansion joints shall not generally exceed 75 feet and the intermediate hinge joint spacing shall not exceed 25 feet except as approved by the Engineer.

Hinge joints shall be constructed in the same manner as contraction joints except that no dowel assembly is required and the reinforcing mesh in the pavement or base shall be carried through the joint. Care shall be taken that the mesh reinforcement is not cut when the joint is being sawed.

**Sealing Joints:** Joints shall be sealed in accordance with Item 451. The recommended widths of saw cut and preformed elastic joint sealers are listed in the following table.

Type of Joint	Spacing between Jts. (Ft.)	JOINT SEAL WIDTHS	
		Width of Saw Cut (In.)	Neoprene Comp. Seal Width (In.)
Contraction	75*	5/16	13/16
Contraction	30	1/4	9/16
Contraction	25' and less	1/4	7/16
Hinge	--	1/4	7/16

\*Hinge Joints are used at the 1/3 points.

**Surface Finishing:** Unless otherwise specified the final surface texture of the pavement shall be a broom finish using a broom of an approved type, not less than 18 inches in width of bass or bassine fiber not more than 5 inches in length. The strokes shall be from edge to edge of the slab, one stroke per width of broom, with adjacent strokes slightly overlapped and shall be drawn without "tearing" of the concrete and so as to produce regular corrugations approximately 1/16 inch in depth.

Brooms shall be washed thoroughly at frequent intervals during each day. Any coarse or long bristles which cause irregularities shall be trimmed or removed.

### ITEM 609 CONCRETE CURB, INTEGRAL 6"x7", AS PER PLAN

Curb shall be constructed according to the dimensions shown on Sheet No. 14 and be paid for as Item 609 Concrete Curb, Integral 6"x7", as per plan.

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 4-1-70 CONSULTING ENGINEERS  
TRCD. I.M. DATE 4-1-70  
CKD. N.H.B. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

# GENERAL NOTES

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## DRAINAGE

### REVIEW OF DRAINAGE FACILITIES

Before any work is started on the project, and again before final acceptance by the State, representatives of the State, the City and the Contractor shall make a visual inspection of the existing storm and sanitary sewers within the work limits which are to remain in service and which may be affected by the work. Records of the inspections shall be kept in writing by the State.

All new conduits, inlets, catch basins and manholes constructed as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the State.

All existing sewers inspected initially by the above mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. Any change in the condition resulting from the Contractor's operations shall be corrected by the Contractor to the satisfaction of the Engineer.

Payment for all operations described above shall be included in the unit prices bid for the pertinent 603 conduit items of the contract.

### MAINTENANCE OF SEWER FLOWS

The Contractor shall conduct his operations so as to maintain sewer flows at all times until new facilities are completed and placed into operation either by use of existing facilities or by other acceptable methods.

Payment for any additional costs involved in maintaining these flows by pumping or by any other means approved by the Engineer shall be included in the unit prices bid for the respective items of 603 Conduit.

### SANITARY FLOW INTO I-480 OR BEDFORD FREEWAY DRAINAGE SYSTEMS

This plan makes no provision for connecting, nor shall the Engineer or Contractor connect any existing or new drainage into the highway drainage system when such drains carry flow from any plumbing fixtures including floor drains and sink drains or drains from livestock lots or barns.

Existing pipe carrying flow which comes within the category outlined above shall be plugged with Class C concrete at the right-of-way line. Payment for said plugging shall be included in the unit price bid for Item 203 Excavation, (or the pertinent 202 Item).

### TREATED SANITARY FLOW INTO HIGHWAY DRAINAGE SYSTEMS OTHER THAN I-480 OR BEDFORD FREEWAY

Treated sanitary flow may be discharged into the highway drainage system provided the owner has secured the approval of the local health authorities and has acquired from the State Highway Department, the official permit to have the connection made.

In each case where a permit has been issued for a sanitary connection to be made into a highway drainage conduit, it shall be provided with an inspection well, in accordance with Standard Construction Drawing No. MC-8, located approximately one foot inside the right-of-way line.

The following estimated quantities have been included in the general summary, for use as directed by the Engineer, in making the above described connections:

Item 603, 6" Conduit, Type "C" = 400 Lin. Ft.  
Item 604, Inspection Wells = 5 Each

and necessary bends and branches which shall be included for payment in the pertinent conduit item. None of the above materials shall be ordered by the Contractor until authorized by the Engineer.

### RESILIENT AND FLEXIBLE GASKET JOINTS 706.11 OR 706.12

Joint as described above shall be required in all conduit used for sanitary sewer construction on this project

### ROOF AND FIELD DRAINS

If during the highway construction the existing flows of private roof or field drains or enclosed natural drainage sources, would reach the road through natural channels if such water was not conducted artificially or disrupted, these drains are to be connected to the storm drainage system as directed by the field engineer. The following estimated quantities have been included in the General Summary, for use as directed by the Engineer, in making the above connections.

ITEM 603 6" Type "B" Conduit 300 Lin. Ft.

### STANDARD NO. 6 CATCH BASIN, AS PER PLAN

The Standard Drawing of this structure is modified to include a 2" additional depression of the grate by warping the shoulder pavement within 5 feet upstream of the basin.

### ITEM 202 SEPTIC TANK REMOVED

An estimated quantity of 10 each, 202 Septic Tank Removed has been provided in the general summary to be used as directed by the Engineer.

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### ITEM SPECIAL SANITARY CURB CONNECTIONS

This item shall be built according to details shown on Sheet No. 101.

Payment for accepted quantities will be made at contract prices for Item Special Sanitary Curb Connections, and will include all materials, excavation, backfill, labor and incidentals necessary to complete this work.

### TYPE C CONDUIT 706.08 CONCRETE ENCASED

Encasement to be constructed as shown on Sheet No. 102.

The cost of this operation shall be included in the unit price bid for the pertinent 603 Conduit item.

### 6" PIPE UNDERDRAINS, AS PER PLAN

Backfill, above the 6" of No. 8 Aggregate above the underdrain, shall be restricted to sand, meeting the requirements of Section 703.02 of the Specifications. Payment for the above shall be included in the price bid for Item 605, Pipe Underdrains as per plan.

### EXTRA DEPTH CATCH BASINS

Catch basins 4 feet deep and over and having a minimum interior dimension of 2'-8" shall have steps meeting the requirements of Item 604. Spacing of the steps shall be 12" minimum and 16" maximum.

### INSPECTION OF CITY SEWERS

Prior to final approval of any newly installed sewer system and of reconstructed sewer, the Contractor shall furnish to the city photographs of the entire sewer system installed or repaired. An inspection must show that the sewer system has been constructed on a sound engineering basis, is free of any and all accumulations of foreign substances, and is of sound workmanship. If in the opinion of the Engineer the sewers are large enough for visual inspection including television survey, such a visual inspection shall be made in lieu of photographs. A report of the visual inspection shall be submitted to the City as a permanent record.

The cost of this operation shall be included in the unit price bid for the pertinent 603 conduit item.

### SPRING DRAINS

Reference is made to Standard Construction Drawing MC-1 showing the method of draining any spring that may be shown on the plan or encountered during construction as determined by the Engineer. The following estimated quantities have been included in the General Summary for this purpose:

Item 605-6" Unclassified Pipe Underdrains, 707.01 Type III or 707.12 as per plan = 100 Lin. Ft.  
Item 605 - Aggregate Drains for Springs, as per plan = 6 Lin. Ft.

The Contractor shall not order materials for "Spring Drains" until authorized by the Engineer and in the event no springs are encountered, the item shall be nonperformed.

### STANDARD NO. 1-A MANHOLE WITH 706.11 JOINTS, AS PER PLAN

The Manhole frame and cover used for this item shall be identical with the castings shown on Sheet No. 105 for the Special No. 1 Manhole.

Manhole steps shall be made of cast iron and conform with Neenah Catalog No. R-1981-S or approved equal as shown on Sheet No. 102.

### ITEM 605-6" PIPE UNDERDRAINS USING 706.08 PERFORATED BELL AND SPIGOT PIPE, AS PER PLAN

The pipe shall have three centering lugs cast in the bell of the pipe. There shall also be a spacer cast in the bell to provide a 3/8" gap between the adjacent bell and spigot ends. The depth of the pipe underdrains is three (3) feet below top of curb unless otherwise shown on the plan and profile sheets.

Payment will be based on the actual number of Linear Feet of pipe with granular filters complete in place measured from end to end of the pipe which includes the depth as shown on the details of modified depths as shown on the plan and profile.

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 4-1-70 CONSULTING ENGINEERS  
TRCD. I.M. DATE 4-1-70  
CKD. H.N.B. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

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## DRAINAGE

### MANHOLE COVERS

The Contractor shall set the frames for manhole covers at such an elevation and inclination as to place the surface of the cover in the plane of the finished surface except where placed on slopes exceeding 1 on 4.

### PIPE CUT OFFS

When bell and spigot pipe is used, any necessary pipe cut offs will be made at the spigot end of the length of pipe adjacent to the end length. When tongue and groove pipe is used, the length of pipe next to the end length shall be cut and butt joint formed with a concrete collar in accordance with Standard Construction Drawing MC 4.

The cost of joints and collar shall be included in the contract unit price bid for the pertinent 603 Conduit Item.

### STREAM CROSSINGS

A quantity of 50 cubic yards of Item 601, Rock Channel Protection Type B has been estimated and included in the General Summary for use in constructing stream crossings at the right-of-way fence. The Rock Channel Protection may not be necessary at all locations shown on the plans and shall be provided only where and as directed by the Engineer.

### MANHOLES, CATCH BASINS AND INLETS

Removal and disposal of structures, not specifically abandoned or removed under Item 202 shall be paid for under "Item 203, Roadway Excavation".

### CONNECTIONS TO EXISTING PIPE

Where the plans provide for proposed conduit to be connected to, or to cross either over or under an existing sewer, it shall be the responsibility of the Contractor to locate the existing pipe both as to line and grade before he starts to lay the proposed conduit.

Payment for all operations described above shall be included in the unit price bid for the pertinent 603 conduit items.

### EXISTING UNDERDRAINS

Where existing underdrains are encountered and no provision has been made for new underdrains, they shall be connected to new inlet with 6" Item 605, Pipe. A quantity of 300 feet has been provided in the General Summary to be used as directed by the Engineer for that purpose. The materials shall not be ordered by the Contractor unless prior approval is received from the Project Engineer.

### ITEM 603 6" CONDUIT, TYPE B 706.08 WITH 706.12 JOINTS, AS PER PLAN (SEE S-10 SHEET NO.96.)

The work for this item consists of replacing the existing sanitary house connection in full compliance with local codes as shown on sheet No.95. It is the Contractor's responsibility to locate the existing sanitary house connection and provide a 6" Test Tee with vitrified clay stopper finished 6" below existing ground and located from 1'-0" to 2'-0" maximum beyond the R/W line. The Tee connection on the line shall be concrete encased providing 6" minimum cover for a minimum length of 2'-0" around the connection.

All material, labor and incidentals will be included in the unit price bid for Item 603 5" Conduit Type B 706.08 with 706.12 joints, as per plan.

## RAILROAD

### ITEM 603, PIPE CULVERTS, SEWERS AND DRAINS UNDER RAILROAD

As a part of this contract it will be necessary to construct a 33 inch conduit under the tracks of the Penn Central Co. and the Norfolk and Western Railway Co. The conduit shall be jacked into place, or placed by some other method approved by the State and both Companies. If jacked into place, no trench excavation or equipment shall be closer than 10'-0" to the centerline of the near track, trenches shall be adequately supported and the specification requirement for Class B Bedding shall be disregarded. If installation is by the open trench method, the Contractor shall provide Class B Bedding for the conduit.

The Contractor shall pay to the Penn Central Co. and the Norfolk and Western Railway Co. all costs for watchmen, flagmen, temporary track supports or any other work deemed necessary by the Companies, or occasioned by the operations or negligence of the contractor, or any subcontractor, in carrying forward work under railroad tracks, or on work affecting safety of railroad operations. The Contractor shall be held responsible for protecting against surface subsidence, damage or disturbance to adjacent property and facilities from his construction methods. In case loose material is encountered and cave ins occur or are anticipated, all operations shall be discontinued, shoring approved by the railroad shall be installed and all voids filled by pressure grouting or other methods approved by the railroad before work is continued. Corrective measures required due to settlement or upheaval of the railroad tracks, during the operation or for a period of thirty (30) days after completion of installation, will be performed by railroad forces at the sole cost and expense of the Contractor. Final payment to the Contractor under the terms of this contract will not be made until he has complied with this provision.

The Contractor shall first secure State and both Companies approval of any methods of operation under railroad tracks, or affecting the safety of railroad operations. The companies will perform its engineering review of methods of operations and engineering supervision of construction without cost to the Contractor.

The Contractor, before bidding, shall consult with the Companies as to when watchmen to protect railroad traffic will be required in view of the contractor's operations. The Contractor shall execute a bond in favor of both the State and Companies as required by Section 5525-16 of the Revised Code of Ohio.

The Contractor shall cooperate with the local officials of the Penn Central Co. and the Norfolk and Western Railway Co. in work adjacent to railroad tracks, in order to avoid delay to, or interference with railroad traffic, and shall notify the Companies twenty-four hours in advance of operations that will or might affect safety of train operation.

### TEMPORARY WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL

The following estimated quantities are to be used as directed by the Engineer for temporary control measures. For details see Proposal Note.

Item 207-Temporary Seeding and Mulching.....	40,306.....Sq.Yds.
Item 659 Commercial Fertilizer .....	7.48..Tons
Item 207-Water.....	87.....M. Gallons
Item 207-Temporary Slope Drains.....	860.....Lin.Ft.
Item 207-Temporary Benches, Dikes, Dams, and Sediment Basins.....	541.....Cu.Yds.
Item 650 Repair Seeding and Mulching.....	10,076.....Sq.Yds.
Item 207-Mowing.....	45.....M Sq.Ft.

### ITEM 604 FURNISH COMPLETE CASTINGS FOR EXISTING MANHOLE , AS PER PLAN

All existing structures to be adjusted to grade have been field checked to determine that the existing castings are suitable for salvage and reuse at the particular structure to be adjusted to grade. However, existing castings may prove to be unsuitable, as determined by the engineer, during construction of the project. To provide for this contingency an estimated quantity of one (1) each "604, Furnish Complete Castings For Existing Manhole, As Per Plan"

has been included in the general summary to be used in any quantity required, as determined by the engineer. It shall be the Contractor's responsibility to provide the casting of the required type, size and strength for the particular structure in question.

The Contractor is cautioned to use extreme care in the removal, storage and placement of all existing castings. Any castings damaged by the Contractor's negligent operations, as determined by the Engineer, shall be replaced with the proper new casting by the Contractor, at no expense to the State.





# COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

24  
390

Quantity Calculations

Made By NMB Date 4-21-72

Checked By IM Date 5-1-72

CUYAHOGA COUNTY

CUY-480-21.40

ITEM 203 EXCAVATION NOT INCLUDING EMBANKMENT CONSTRUCTION AND EMBANKMENT							
STATION		EXCAVATION NOT INCLUDING EMB. CONSTRUCTION (C.Y.)			EMBANKMENT (C.Y.)		
From	To	I	II	III	I	II	III
<b>I-480 EASTBOUND</b>							
1151+00	1192+50			58,762			136,257
<b>I-480 WESTBOUND</b>							
1151+00	1192+50			109,379			154,583
<b>BEDFORD FREEWAY</b>							
35+19	46+41.15	18,015			37,241		
46+41.15	74+54.30			100,247			103,329
<b>LANE B-OBS-E</b>							
74+54.29	87+00			4,044			38,204
<b>LANE OBS-EB</b>							
62+36	77+99			57,975			727
<b>RELOC. McCracken Road</b>							
50+75	64+00			43,118			18
50+70.81	84+38		201,265		46,063		
<b>RAMP B-OBS</b>							
12+50	17+50			25,605			5,429
<b>RAMP OBS-WB</b>							
13+79	19+75.34			7,995			10,720
<b>OSBORN ROAD Cul-De-Sac</b>							
18+80	19+79.70			696			70
7+56	8+75			785			334
<b>OSBORN ROAD CONNECTION</b>							
0+11.50	5+74.11			972			553
<b>ORCHARD ROAD</b>							
5+75	11+00			8,777			0
<b>East 154th St.</b>							
4+00	4+59.50			138			104
<b>BLASE AVENUE</b>							
13+00	14+58.43			71			125
<b>RELOC. GREENHURST ROAD</b>							
8+30	16+36.26			684			2,125
<b>BROADWAY AVE.</b>							
81+50	93+10	1181			162		
<b>DRAINAGE</b>							
				1,877			4,968
<b>PARTICIPATION LIMIT TOTAL</b>		19,196	201,265	427,125	37,403	46,063	457,486
<b>TOTAL</b>		647,586		540,952			

ITEM 203 EMBANKMENT USING GRANULAR MATERIAL, AS PER PLAN		
STATION		EMBANKMENT Cu. Yds.
From	To	
<b>BEDFORD FREEWAY</b>		
61+30.00	61+97.54	914.00x3.67 = 124.24 Cu. Yds.
		27
<b>TOTAL (Part. Limit III)</b>		124.24 Cu. Yds.
Use 124 Cu. Yds.		

ITEM 203 PROOF ROLLING		
	AREA (Sq. Yds.) I	AREA (Sq. Yds.) III
Under Item 451-10" R.P.C. Concrete Pavement	6,303	58,296
Under Item 451-9" R.P.C. Concrete Pavement		2,404
Under Item 301-Area Under the Shoulders	3,571	28,660
Under Item 611-Approach Slabs		1,637
<b>PARTICIPATION LIMIT TOTAL</b>	9,874 Sq. Yds.	90,997 Sq. Yds.
	9,874 Sq. Yds.	90,997 Sq. Yds.
	3,000 Sq. Yds./Hr.	3,000 Sq. Yds./Hr.
	= 3.29 Hours	= 30.33 Hours
<b>TOTAL</b>	33.62 Hours	
	Use 34 Hours	

ITEM 203 SUBGRADE COMPACTION			
	AREA (Sq. Yds.) I	AREA (Sq. Yds.) II	AREA (Sq. Yds.) III
Under Item 451-10" R.P.C. Concrete Pavement	6,303		58,296
Under Item 451-9" R.P.C. Concrete Pavement		20,351	2,404
Under Item 452-7" P.P.C. Concrete Pavement			1,616
Under Item 301-Area Under the Shoulders	3,571		28,660
Under Item 611-Approach Slabs			1,637
Under Item 612-Concrete Median	17		102
Under Item 622-Concrete Barrier	438		2,561
<b>PARTICIPATION LIMIT TOTAL</b>	10,329	20,351	95,276
<b>TOTAL</b>	125,956 Sq. Yds.		

ITEM 622 CONCRETE BARRIER				
STATION		LENGTH (Lin. Ft.)		REMARKS
From	To	I	III	
<b>I-480</b>				
1158+17.04	1159+70.00		152.96	Sign Transition
1159+80.00	1160+73.77		73.77	20' Less For Inlet
1162+58.23	1167+95.00		536.77	Sign Transition
1168+05.00	1182+28.00		1,343.00	Sign Transition
1182+38	1193+00.00		1,042.00	80' Less For 4 Inlets 20' Less For Inlet
<b>BEDFORD FREEWAY</b>				
36+15.00	46+41.15	986.15		40' Less For 2 Inlets
46+41.15	54+95.00		833.85	Sign Transition 20' Less For Inlet
55+05.00	59+83.00		478.00	Sign Transition
59+93.00	62+17.54		224.54	
63+62.80	65+88.92		206.12	20' Less For Inlet
68+07.24	74+54.29		627.04	20' Less For Inlet
74+54.29	75+60.00		105.71	
75+60.00	75+70.00		10.00	Barrier Transition
61+35.00	62+11.14		76.14	Near Modular Crash Cushion
<b>RAMP B-OBS</b>				
19+57.50	20+10.50		53.00	Near Modular Crash Cushion
<b>PARTICIPATION LIMIT TOTAL</b>		986.15	5,552.90*	*210 Less For Light Pole Found.
<b>TOTAL</b>		6,539.05 Lin Ft.		
Use 6,539 Lin Ft.				

ITEM 659 SEEDING AND MULCHING				
	AREA (Sq. Yds.) I	AREA (Sq. Yds.) II	AREA (Sq. Yds.) III	
<b>Total adjusted Right of way (Excluding pavement, paved shoulders, concrete Median, Concrete Curbs and Bridges)</b>				
	18,991	29,619	168,289	
<b>Deduction For</b>				
Riprap			45	
Rock, Channel Protection Type B	5		159	
Sodding	7		141	
Sodding Special Berm and Slope, Protection.			832	
Seeding and Jute Matting	947	125	12,794	
Paved Gutter			203	
	-959	18,991	-125	29,619
	-959		-125	-14,174
<b>PARTICIPATION LIMIT TOTAL</b>	18,032	29,494	154,115	
<b>TOTAL</b>	201,641 Sq. Yds.			

ITEM 659 COMMERCIAL FERTILIZER (12-12-12)			
	AREA (Sq. Yds.) I	AREA (Sq. Yds.) II	AREA (Sq. Yds.) III
<b>Seeded and Sodded Area</b>			
	18,986	29,619	167,886
	= 18,986x9x20	= 29,619x9x20	= 167,886x9x20
	1,000x2,000	1,000x2,000	1,000x2,000
<b>PARTICIPATION LIMIT TOTAL</b>	1.71 Tons	2.66 Tons	15.11 Tons
<b>TOTAL</b>	19.48 Tons		

ITEM 659 AGRICULTURAL LIMING MATERIAL, As Per Plan			
	AREA I	AREA II	AREA III
<b>Seeded and Sodded Area</b>			
	18,986 x 9	29,619 x 9	167,886 x 9
	43,560	43,560	43,560
	= 3.92 Acres	= 6.12 Acres	= 34.69 Acres
	3.92 x 10	6.12 x 10	34.69 x 10
<b>PARTICIPATION LIMIT TOTAL</b>	= 39.20 Tons	= 61.20 Tons	= 346.90 Tons
<b>TOTAL</b>	447.30 Tons		





# COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

27  
390

CUYAHOGA COUNTY  
CUY.-480-21.40

Quantity Calculations  
Made By NNB Date 4-72  
Checked By NNB Date 5-72

ITEM 310 SUBBASE, GRADING "A", As Per Plan (Cont'd)					
STATION		DISTANCE	END AREA	VOLUME (Cu. Yds.)	
From	To	Lin. Ft.	Sq. Ft.	I	III
<b>BEDFORD FREEWAY Westbound</b>					
51+00.00	56+41.15	9,670.92 Sq.Ft. x0.5 Ft.	Calcs.		178.17
56+41.15	57+41.15	100.00	12.8125		47.45
57+41.15	58+41.15	100.00	12.8125		47.45
58+41.15	74+54.29	1,613.14 - 454.67	13.8125		571.19
<b>LANE B-OBS-E</b>					
74+54.29	75+78.84	3,381.85 Sq.Ft. x0.5 Ft.	Calcs.		62.63
75+78.84	79+78.84	10,926.57 Sq.Ft. x0.5 Ft.	Calcs.		202.34
79+78.84	80+00.00	21.16	13.8125		10.82
80+00.00	80+58.00	58.00	14.625		31.42
80+58.00	81+37.92	79.92	13.8125		40.89
81+37.92	84+87.92	9,753.05 Sq.Ft. x0.5 Ft.	Calcs.		180.61
84+87.92	85+40.70	1,474.90 Sq.Ft. x0.5 Ft.	Calcs.		27.31
85+40.70	88+90.70	9,753.05 Sq.Ft. x0.5 Ft.	Calcs.		180.61
88+90.70	89+00.00	9.30	13.8125		4.76
<b>LANE OBS-E-B</b>					
61+74.95	64+19.66	244.71	13.8125		125.19
64+19.66	67+79.70	10,029.53 Sq.Ft. x0.5 Ft.	Calcs.		185.73
70+49.80	72+22.60	172.80(892.65-881.47)	13.8125		89.52
72+22.60	76+22.60	11,153.87 Sq.Ft. x0.5 Ft.	Calcs.		206.55
76+22.60	78+92.86	270.26	13.8125		138.26
61+74.95	63+24.00	1/2(149.05)(4+13)0.5	Nose Subbase		23.46
<b>RAMP B-OBS</b>					
9+64.53	9+78.35	13.82	8.8125		4.51
9+78.35	13+08.63	1,966.30 Sq.Ft. x0.5 Ft.	Calcs.		36.41
13+08.63	16+58.63	350.00	9.8125		127.20
16+58.63	17+47.70	1,915.20 Sq.Ft. x0.5 Ft.	Calcs.		35.47
19+59.60	20+15.50	55.90	10.3125		21.35
20+15.50	20+56.15	340.00 Sq.Ft. x0.5 Ft.	Nose Gate Area		6.30
20+15.50	20+56.15	40.65 x 1/2(22.625+23.625)x0.5			17.41
<b>RAMP OBS-WB</b>					
13+43.80	14+12.86	1,498.83 Sq.Ft. x0.5 Ft.	Calcs.		27.76
14+12.86	16+12.86	200.00	10.8125		80.09
16+12.86	19+75.34	8,266.59 Sq.Ft. x0.5 Ft.	Calcs. 26		153.09
<b>RELOCATED GREENHURST ROAD</b>					
8+30.00	9+27.10	97.10	13.75		49.95
9+27.10	14+13.09	485.99	13.75		247.49
14+13.09	15+36.26	123.17	13.75		62.73
<b>East 154th Street</b>					
3+59.78	3+91.12	31.34	12.00		13.93
3+91.12	4+59.50	68.38	13.75		34.82
77+25.37	3+91.12	259.13 Sq.Ft. x0.5 Ft.	Calcs. 29		4.79
76+41.29	3+91.12	295.48 Sq.Ft. x0.5 Ft.	Calcs. 30		5.47
<b>BLASE AVENUE</b>					
12+87.25	13+18.05	30.80	12.00		13.69
13+18.05	13+94.19	76.14	13.75		38.78
83+17.66	13+18.05	251.88 Sq.Ft. x0.5 Ft.	Calcs.		4.66
82+33.62	13+18.05	288.80 Sq.Ft. x0.5 Ft.	Calcs.		5.35

ITEM 310 SUBBASE, GRADING "A", As Per Plan (Cont'd)					
STATION		DISTANCE	END AREA	VOLUME (Cu. Yds.)	
From	To	Lin. Ft.	Sq. Ft.	I	III
<b>ORCHARD ROAD</b>					
4+92.50	5+26.92	34.42	12.00		15.30
5+26.92	10+00.00	473.08	13.75		240.92
5+26.92	64+73.30	225.33 Sq.Ft. x0.5 Ft.	Calcs.		4.17
5+26.92	63+91.86	323.57 Sq.Ft. x0.5 Ft.	Calcs.		5.99
<b>OSBORN ROAD CUL-DE-SAC</b>					
18+78.51	19+53.51	4685.74 Sq.Ft. x0.5 Ft.	Calcs.		86.77
19+58.11	19+79.70	21.59	10.00		8.00
19+43.31	19+79.00	403.40 Sq.Ft.	Calcs.		7.48
19+43.31	19+58.11	167.85 Sq.Ft.	Calcs. 43		18.65
7+56.26	8+31.26	4,660.97 Sq.Ft. x0.5 Ft.	Calcs.		86.31
7+93.70	8+75.00	1,742.24 Sq.Ft. x0.5 Ft.	Calcs.		32.26
<b>OSBORN ROAD CONNECTION</b>					
0+11.50	0+22.50	11.00	12.00		4.89
0+22.50	0+37.50	15.00	12.875		7.15
0+37.50	5+74.11	536.61	13.75		237.27
0+11.50	0+22.50	56.54 Sq.Ft. x0.5 Ft.	Calcs.		1.05
0+11.50	0+36.50	225.45 Sq.Ft. x0.5 Ft.	Calcs.		4.18
<b>BEDFORD FREEWAY APPROACH SLABS</b>					
61+97.54	62+15.54	1,234.13 Sq.Ft. x0.5 Ft.	Calcs.		22.85
63+64.80	63+82.80	18.00	29.00		19.33
65+63.92	65+86.92	23.00	29.00		24.70
68+09.24	68+32.24	23.00	29.00		24.70
<b>LANE OBS-E-B APPROACH SLABS</b>					
67+79.66	67+97.66	18.00	13.00		8.67
70+31.75	70+49.75	18.00	13.00		8.67
<b>RAMP B-OBS APPROACH SLABS</b>					
19+59.60	19+41.60	18.00	9.00		6.00
17+47.70	17+65.70	18.00	9.00		6.00
12+23.40	12+46.40	23.00	9.00		7.67
10+20.00	10+43.00	23.00	8.00		6.81
<b>PARTICIPATION LIMIT TOTAL</b>				1,995.36	15,005.89
<b>TOTAL</b>					17,001.25 Cu. Yds.
					Use 17,001 Cu. Yds.

SCALE: HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE NNB DATE 4-20-72 CONSULTING ENGINEERS  
TRCD. G.T. DATE 4-20-72  
CKD. I.M. DATE 5-1-72 KANSAS CITY CLEVELAND NEW YORK





# COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

30  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By NNB Date 4-72  
Checked By IM Date 5-72 \* Refer to calc. 2-3

ITEM 451 10" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT					
STATION		LENGTH x WIDTH Lin. Ft.	AREA (Sq. Yds.)		CALCULATIONS
From	To		I	III	
<b>I-480 Main Line</b>					
1158+17.04	1193+00.00	3,298.50x72		26,388.00	L=3,482.96+184.46
<b>I-480 Eastbound</b>					
1158+61.80	1160+73.20	2,478.51 Sq. Ft.		275.39	CALCS.
1163+05.90	1163+11.60	34.26 Sq. Ft.		3.81	CALCS.
1163+11.60	1174+08.58	1,075.92x12		1,434.56	L=1,096.98+2,809.789+2,864.789
1165+50.00	1166+50.00	600.00 Sq. Ft.		66.67	CALCS. (Taper)
1165+50.00	1165+66.67	16.67 Sq. Ft.		1.85	CALCS. Detail "A"
1166+50.00	1166+66.67	16.53x12		22.04	A=LxW
6+74.26	11+62.43	9,182.08 Sq. Ft.		1,020.23	CALCS. (Taper)
11+62.43	12+89.53	4,491.08 Sq. Ft.		499.00	CALCS. (Taper)
12+89.53	13+43.80	2,189.50 Sq. Ft.		243.28	CALCS. (Taper)
1174+08.58	1176+58.58	2,963.52 Sq. Ft.		329.28	CALCS.
1176+58.58	1180+60.00	401.42x12.00		535.23	
1180+60.00	1189+00.00	5,040.00 Sq. Ft.		560.00	A=BxH
1189+00.00	1193+00.00	14,400.00 Sq. Ft.		1,600.00	CALCS.
<b>I-480 Westbound</b>					
1158+11.63	1159+64.53	3,436.00 Sq. Ft.		381.78	CALCS.
1178+91.00	1188+00.00	21,827.22 Sq. Ft.		2,425.25	CALCS.
1188+00.00	1193+00.00	500.00x12.00		666.67	
<b>BEDFORD FREEWAY Main Line</b>					
35+31.29	46+41.15	1109.86x48.00		5,919.25	
35+31.29	35+65.00	33.71x16.00		59.93	CALCS.
46+41.15	56+41.15	1,000.00x48.00		5,333.33	
<b>BEDFORD FREEWAY Eastbound</b>					
35+31.29	36+01.43	716.88 Sq. Ft.		79.65	COMPUTER CALCS.
35+65.00	36+15.00	50.00x13.00		72.22	
36+15.00	36+90.00	75.00(12+4)÷2		66.67	
36+90.00	37+34.00	44.00x4.00		19.56	
52+89.65	53+89.65	100.00x6.00		66.67	CALCS.
53+89.65	60+88.48	8,431.43 Sq. Ft.		936.83	CALCS.
60+88.48	61+91.81	1041.10 Sq. Ft.		115.56	CALCS.
56+41.15	74+54.29	1,359.56x24.00		3,625.49	L=1813.14-453.58
25+98.72	20+56.15	3,115.72 Sq. Ft.		346.19	CALCS.
90+01.56	89+90.36	11.20 Sq. Ft.		1.24	CALCS.
52+89.65	53+06.32	16.67 Sq. Ft.		1.85	CALCS.
60+88.48	61+30.00	340.00 Sq. Ft.		37.78	NOSE GORE AREA
<b>BEDFORD FREEWAY Westbound</b>					
35+31.29	36+06.96	747.94 Sq. Ft.		83.10	COMPUTER CALCS.
46+41.15	56+41.15	10,365.58 Sq. Ft.		1,151.73	CALCS.
56+41.15	57+41.15	100.00x15.00		166.67	
57+41.15	58+41.15	100.00x15.00		166.67	
58+41.15	74+54.29	1,159.56x16.00		2,061.44	L=1613.14-453.58
88+38.09	88+49.29	11.20 Sq. Ft.		1.24	CALCS.

ITEM 451 10" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT (CONT'D)					
STATION		LENGTH x WIDTH Lin. Ft.	AREA (Sq. Yds.)		CALCULATIONS
From	To		I	III	
<b>LANE B-OBS-E</b>					
74+59.29	75+78.84	2,943.00 Sq. Ft.		327.00	CALCS.
75+78.84	79+78.84	9,498.53 Sq. Ft.		1,055.40	CALCS.
79+78.84	81+37.92	159.08x24.00		424.21	
81+37.92	84+87.92	8,466.71 Sq. Ft.		940.75	CALCS.
84+87.92	85+40.70	1,282.27 Sq. Ft.		142.47	CALCS.
85+40.70	88+90.70	8,466.71 Sq. Ft.		940.75	CALCS.
88+90.70	89+00.00	9.30x24.00		24.80	
<b>LANE OBS-E-B</b>					
61+74.95	64+19.66	244.71x29.00		652.56	
64+19.66	67+79.66	8,718.57 Sq. Ft.		968.74	CALCS.
70+49.75	72+22.60	4,201.57 Sq. Ft.		466.84	CALCS.
72+22.60	76+22.60	9,682.70 Sq. Ft.		1,075.86	CALCS.
76+22.60	78+92.86	270.26x24.00		720.69	
<b>RAMP R-OBS</b>					
20+15.50	20+56.15	40.65(210+200)÷2		92.59	
<b>PARTICIPATION LIMIT TOTAL</b>					
			6,302.86	58,295.91	
TOTAL			64,598.77 Sq. Yds.		
			Use 64,599 Sq. Yds.		

ITEM 452 7" PLAIN PORTLAND CEMENT CONCRETE PAVEMENT (Part. Limit III)					
STATION		LENGTH x WIDTH Lin. Ft.	AREA (Sq. Yds.)		CALCULATIONS
From	To		I	III	
<b>OSBORN ROAD CONNECTION</b>					
0+11.50	0+22.50	11 x 24		29.33	
0+22.50	0+37.50	15 x 24.50		40.83	
0+37.50	5+74.11	536.61 x 25		1490.58	L=536.61
0+11.50	0+22.50	39.305 Sq. Ft.		4.37	CALC.
0+11.50	0+37.50	177.76 Sq. Ft.		19.75	CALC.
<b>BROADWAY AVE. at Graded Area for Sanitary Sewer Relocation</b>					
110+82	111+22	40 x 7		*31.11	
TOTAL (PARTICIPATION LIMIT III)			1584.86 Sq. Yds.		
			Use 1585 Sq. Yds.		
*T=8"					

ITEM 611 REINFORCED CONCRETE APPROACH SLABS						
STATION		LENGTH x WIDTH Lin. Ft.	AREA (Sq. Yds.)	404	407	
From	To			2 1/2" C.Y.	1 1/2" C.Y.	Tack Coat Gal.
<b>I-480</b>						
1152+73.41	1153+08.41	2x25x48	266.67	19	27	.93
1158+17.04	1158+42.04	25x48+(1/2)x25(57.79+57.17)	*213.17	15	21	.75
1160+48.77	1160+73.77	(25x48)+(25x36)	233.33	16	23	.82
1162+58.23	1162+83.23	(25x48)+(25x36)	233.33	16	23	.82
<b>BEDFORD FREEWAY</b>						
61+97.54	62+17.54	(16x20)+(34x20)+(1/2)x20x1.25	*112.50	8	11	.39
63+62.80	63+82.80	(16x20)+(24x20)	*88.88	6	9	.31
65+63.92	65+88.92	(16x25)+(24x25)	111.11	5	11	.39
68+07.24	68+32.24	(16x25)+(24x25)	111.11	5	11	.39
<b>LANE OBS-EB</b>						
67+79.66	67+99.66	20x24	*53.33	4	5	.19
70+29.75	70+49.75	20x24	*53.33	4	5	.19
<b>RAMP R-OBS</b>						
10+20.00	10+45.00	25x16	44.44	3	4	.16
12+21.40	12+46.40	25x16	44.44	3	4	.16
17+47.70	17+67.70	20x16	*35.55	2	4	.12
19+39.60	19+59.60	20x16	*35.55	2	4	.12
TOTAL (PARTICIPATION LIMIT III) *T=12"			379.14 Sq. Yds.			
TOTAL (PARTICIPATION LIMIT III) T=13"			1,257.60 Sq. Yds.			
TOTAL (PARTICIPATION LIMIT III)				108	162	5.74

\* 0.1 gal. per sq. yd.

ITEM 612 STANDARD CONCRETE MEDIAN					
STATION		SIDE	LENGTH x WIDTH (Sq. Ft.)	AREA (Sq. Yds.)	
From	To			(Part. Limit I)	
<b>BEDFORD FREEWAY</b>					
35+65.00	36+15.00	Rt.	50.00x3.00		16.67
TOTAL (Part. Limit I)					16.67 Sq. Yds.
					Use 17 Sq. Yds.

ITEM 612 4" CONCRETE MEDIAN, As Per Plan					
STATION		SIDE	LENGTH x WIDTH (Sq. Ft.)	AREA (Sq. Yds.)	
From	To			(Part. Limit III)	
<b>BEDFORD FREEWAY</b>					
61+30.00	61+97.54	Rt.	914.00		101.55
TOTAL (Part. Limit III)					101.55 Sq. Yds.
					Use 102 Sq. Yds.







# GENERAL SUMMARY

## TYPE CODE 7221

Quantity Calculations  
 Made By NNB Date 4-72  
 Checked By I.M. Date 5-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

33  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

SHEET NUMBER																	COST			TOTAL QUANT.	UNIT	ITEM	DESCRIPTION	
24	25	26	27	28	29	30	31	40	41	42	44	46	72-A	73	I	II	III							
																							PAVEMENT	
		2,686																298	-	2,388	2,686	cu.yds.	301	bituminous aggregate base: 702.01 (85-100 or AC20) or 702.09, RT-11 or RT-12, as per plan
			5,958					21	139	1	162							674	-	5,613	6,287	cu.yds.	304	aggregate base
		1,167																1,167	-	-	1,167	sq.yds.	305	9" Portland cement concrete base
				17,001														1,995	-	15,006	17,001	cu.yds.	310	subbase, grading A, as per plan
					3,008													569	-	2,439	3,008	cu.yds.	310	subbase
						1,769												-	1,769	-	1,769	cu.yds.	310	subbase 703.08 or 703.10
							66											58	-	8	66	cu.yds.	402	asphalt concrete (70-85 or AC20)
							57	108										41	-	192	233	cu.yds.	404	asphalt concrete (70-85 or AC20)
								162		8	9	1	48			2		-	-	162	162	gals.	407	Track Coat: 702.04, MS-2 or RS-1; or 702.02, RC-70 or RC-250
								5.74										-	-	5.74	5.74	tons	407	Cover aggregate
							256											-	-	256	256	gals.	408	bituminous prime coat: 702.09, RT-2 or RT-3
																		-	-	13	13	cu.yds.	411	stabilized crushed aggregate
																		-	-	7,774	7,774	sq.yds.	451	9" reinforced Portland cement concrete pavement
																		-	20,351	-	20,351	sq.yds.	451	9" reinforced Portland cement concrete pavement, modified as per plan
																		6,303	-	58,296	64,599	sq.yds.	451	10" reinforced Portland cement concrete pavement
																		-	-	1,782	1,822	sq.yds.	452	7" plain Portland cement concrete pavement
																		-	-	31	31	sq.yds.	452	8" plain Portland cement concrete pavement
																		-	-	64	64	lin.ft.	609	asphalt concrete curb, Standard Type 1 (70-85 or AC-20)
																		179	-	4,490	4,669	lin.ft.	609	concrete curb, Standard Type 2A
																		1,035	-	-	1,035	lin.ft.	609	concrete curb, Standard Type 2B
																		-	-	55	55	lin.ft.	609	concrete curb, Standard Type 3
																		-	-	45	45	lin.ft.	609	concrete curb, Standard Type 3A
																		-	130	2,061	2,191	lin.ft.	609	concrete curb, Standard Type 6
																		-	-	333	333	lin.ft.	609	concrete curb, Standard Type 7
																		-	-	591	591	lin.ft.	609	concrete curb, Standard Type 8
																		-	6,599	-	6,599	lin.ft.	609	concrete curb, Integral 6"x7"
																		-	-	1,258	1,258	sq.yds.	611	reinforced concrete approach slabs (T=13")
																		-	-	379	379	sq.yds.	611	reinforced concrete approach slabs (T=12")
																		17	-	-	17	sq.yds.	612	Standard concrete median
																		-	-	102	102	sq.yds.	612	4" concrete median, as per plan
																		986	-	5,553	6,539	lin.ft.	622	concrete barrier
																		62	-	564	626	cu.yds.	special	drainage connection using no. 9 aggregate
																						lump	special	Modular crash cushion impact attenuator
																					239	lin.ft.	special	Pressure relief joint

SCALE: HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE NNB DATE 5-2-72 CONSULTING ENGINEERS  
 TRCD NNB DATE 5-5-72  
 CKD I.M. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK



# GENERAL SUMMARY

## TYPE CODE 7221

Quantity Calculations  
 Made By NNB Date 4-72  
 Checked By IM Date 5-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

35  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

SHEET NUMBER														COST PARTICIPATION			TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
21	22	45	46	47	86	88	89	91	93	96	I	II	III							
																				DRAINAGE
																	114	lin.ft.	603	27" conduit, Type B
																	169	lin.ft.	603	27" conduit, Type C
														140			-	lin.ft.	603	27" conduit, Type C, 706.02 or 706.08 E.S. or 707.13
																	360	lin.ft.	603	30" conduit, Type B
																	110	lin.ft.	603	33" conduit, Type B, 706.02 Class III
																	202	lin.ft.	603	33" conduit, Type B, 706.02 Class V, under railroad as per plan
																105		lin.ft.	603	33" conduit, Type C, 706.02 or 706.08 E.S. or 707.13
																	22	lin.ft.	603	33" conduit, Type F, 707.05 Type C
																	202	lin.ft.	603	42" conduit, Type B
																	22	lin.ft.	603	42" conduit, Type F, 707.05 Type C
5																	5	each	604	inspection well
1																	1	each	604	furnish complete castings for existing manhole, as per plan
														2			3	each	604	Standard No. 2-10 median inlet
																	1	each	604	Standard No. 1-38 median inlet
																	1	each	604	Standard No. 1-38 median inlet, modified as per plan
														1	1		2	each	604	Standard No. 2-A-6 paved shoulder inlet
																	1	each	604	Standard No. 2-A-12 paved shoulder inlet
														1			1	each	604	Standard No. 2-A-14 paved shoulder inlet
																	2	each	604	Standard No. 2-2-A catch basin
																	2	each	604	Standard No. 2-2-B catch basin
														4			4	each	604	Standard No. 3-A catch basin
																	8	each	604	Cuyahoga County No. 3-C catch basin
																	6	each	604	Standard No. 4 catch basin
														1			2	each	604	Standard No. 4 catch basin, modified as per plan
																	4	each	604	Standard No. 5 catch basin
																	1	each	604	Standard No. 5 catch basin using Grate B
														1			1	each	604	Standard No. 6 catch basin, modified as per plan
																	1	each	604	Standard No. 6 catch basin
																	1	each	604	Standard No. 2-A-6 paved shoulder inlet, modified as per plan
														1			3	each	604	Standard No. 1 manhole
														1			7	each	604	Cuyahoga County No. 1 manhole
																	1	each	604	Standard No. 1-A manhole
																	2	each	604	Cuyahoga County No. 2 manhole
														280	628	296	565	lin.ft.	605	6" shallow pipe underdrains, as per plan
																	3,417	lin.ft.	605	6" deep pipe underdrains, as per plan
																	4,442	lin.ft.	605	6" unclassified pipe underdrains, as per plan
														300			1,263	lin.ft.	605	6" unclassified pipe underdrains, 707.01 Type III, or 707.12, as per plan
																	841	lin.ft.	605	6" pipe underdrains, 706.08 perforated, as per plan
																	325	lin.ft.	605	aggregate drains for springs, as per plan
														100			100	lin.ft.	605	aggregate drains for springs, as per plan
																	3,129	lin.ft.	605	aggregate drains for springs, as per plan
														6			1,697	lin.ft.	605	aggregate drains for springs, as per plan
																	1,962	lin.ft.	605	aggregate drains for springs, as per plan

SCALE: NNB DATE 5-9-72  
 MADE: NNB DATE 5-9-72  
 TRCD: NNB DATE 5-23-72  
 CKD: I.M. DATE 5-23-72  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

# GENERAL SUMMARY

## TYPE CODE 7221

(UNLESS OTHERWISE SHOWN)

FED. RD. DIVISION 2	STATE OHIO	PROJECT CUYAHOGA COUNTY CUY. 480-21.40
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36  
390

SHEET NUMBER												COST			PARTICIPATION			TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
												*CRSD	III ECRSD	I	II	III					
III	III ECRSD	CRSD										175%	175%						EROSION CONTROL - TYPE CODE Y005		
																			riprap using 6" reinforced concrete slab		
																			rock channel protection, Type B		
																			paved gutter, Standard Type 1-2		
																			seeding and mulching		
																			commercial fertilizer (12-12-12)		
																			agricultural liming, as per plan		
																			sodding		
																			sodding for special berm and slope protection, as per plan		
																			seeding and jute matting		
																			temporary seeding and mulching		
																			water		
																			temporary slope drains		
																			temporary benches, dikes, dams and sediment basin		
																			repair seeding and mulching		
																			mowing		
																			SANITARY - TYPE CODE Y060		
																			manhole abandoned		
																			concrete masonry		
																			6" conduit, Type B, 706.08 with 706.12 joints, as per plan		
																			8" conduit, Type B, 706.08 with 706.12 joints		
																			36" conduit, Type B, 706.02 Class III, fully lined as per 706.05 and with joints as per 706.11		
																			48" conduit, Type B 706.02 Class III fully lined as per 706.05 and with joints as per 706.11		
																			48" Conduit, Type B 706.02 Class IX fully lined as per 706.05, with joints as per 706.11		
																			manhole adjusted to grade		
																			Standard No. 1-A manhole with 706.11 joints, as per plan		
																			Junction Chamber		
																			<del>Sanitary curb connection</del>		
																			48" Conduit, Type B 706.02 Class I fully lined as per 706.05, with joints as per 706.11		
																			48" Conduit, Type B 706.02 Class III fully lined as per 706.05 and with joints as per 706.11, Radius Pipe		
																			GENERAL		
																			Maintaining Traffic		
																			Field Office		
																			Construction Layout Stakes		
																			For WATERWORK Quantities see Sheet No. 37		
																			For TRAFFIC CONTROL Quantities see Sheet No. 237		
																			For TRAFFIC SIGNAL Quantities see Sheet No. 260		
																			For LIGHTING Quantities see Sheet No. 268		
																			Structures Over 20' Span		
																			Bridge CUY 480-2140 For Quantities see Sheet No. 292		
																			Bridge CUY 480-2154 For Quantities see Sheet No. 302		
																			Bridge CUY 480-2169 For Quantities see Sheet No. 325		
																			Bridge Bedford Freeway Ramp B-OBS over relocated McCracken Road For Quantities see Sheet No. 337		
																			Bridge Lane OBS-E-B over relocated McCracken Road For Quantities see Sheet No. 351		

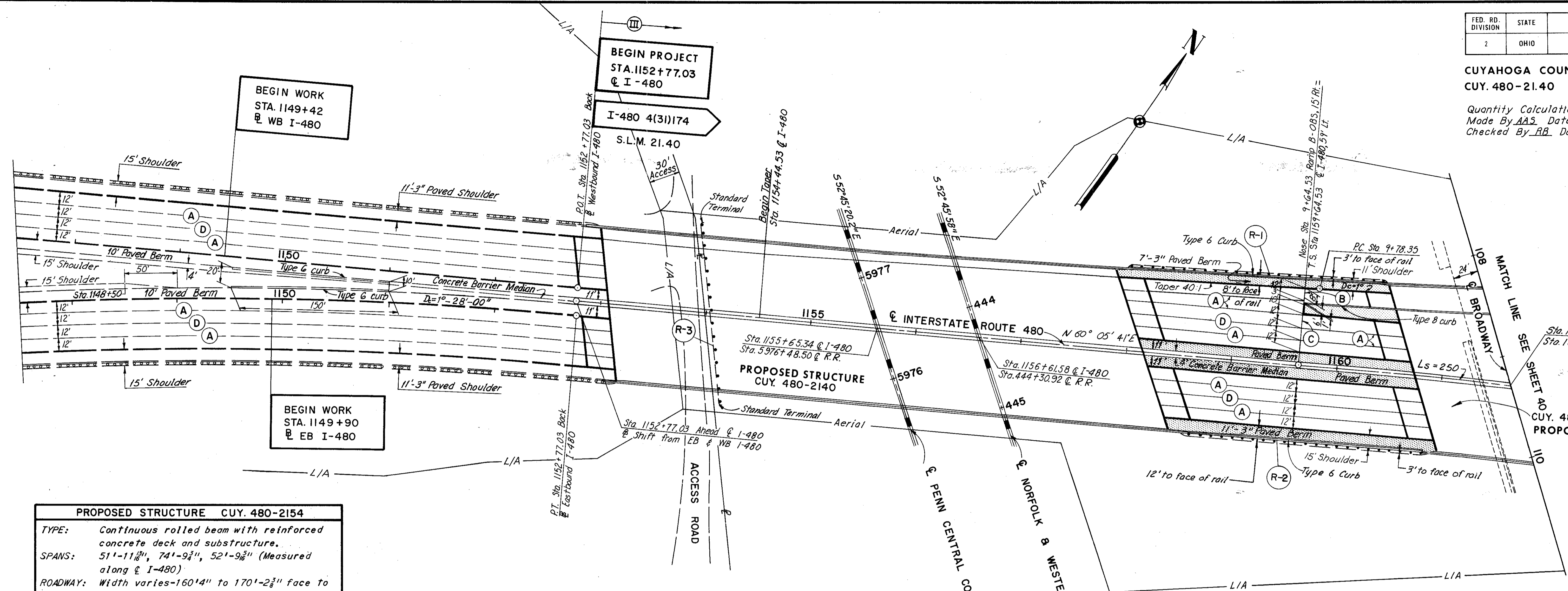
\* CRSD = Cleveland Regional Sewer District  
100%

SCALE  
MADE MMB DATE 5-15-72  
CONSULTING ENGINEERS  
REC'D. DATE  
CRD. I.M. DATE 5-26-72 KANSAS CITY CLEVELAND NEW YORK



CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By AAS Date 9/67  
Checked By RB Date 11-67



**PROPOSED STRUCTURE CUY. 480-2154**

TYPE: Continuous rolled beam with reinforced concrete deck and substructure.

SPANS: 51'-11<sup>1</sup>/<sub>2</sub>"<sup>1</sup>, 74'-9<sup>3</sup>/<sub>8</sub>"<sup>2</sup>, 52'-9<sup>3</sup>/<sub>8</sub>"<sup>3</sup> (Measured along @ I-480)

ROADWAY: Width varies-160'4" to 170'-2<sup>3</sup>/<sub>8</sub>" face to face of parapets, with Concrete Barrier Median.

DESIGN LOAD: HS20-44 and Interstate Alternate Loading

SKEW: 22°44'03" Right Forward

WEARING SURFACE: 2<sup>1</sup>/<sub>2</sub>" Asphalt Concrete

APPROACH SLABS: AS-1-67 (25 feet long)

ALIGNMENT: Spiral, 2°00'00" Right

SUPERELEVATION: I-480 Varies .0156 ft. per ft. to .047 ft. per ft. Ramp B-OBS .0156 ft. per ft.

**PROPOSED STRUCTURE CUY.480-2140**

TYPE: Continuous steel girder with reinforced concrete deck and substructure.

SPANS: 96'-6", 100'-0", 110'-2<sup>3</sup>/<sub>8</sub>"<sup>1</sup>, 110'-2<sup>3</sup>/<sub>8</sub>"<sup>2</sup>, 87'-0"

ROADWAY: Width Varies 146'-0" to 150'-5<sup>1</sup>/<sub>8</sub>" face to face of parapets, with Concrete Barrier Median.

LOAD FREQUENCY: HS20-44 and Interstate Alternate Loading.

SKEW: Varies

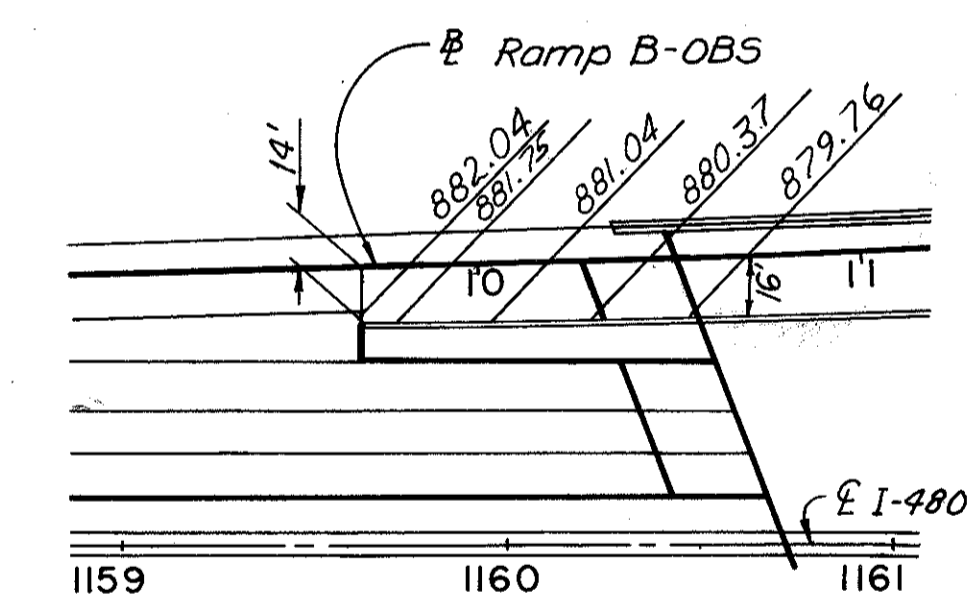
WEARING SURFACE: 2<sup>1</sup>/<sub>2</sub>" Asphalt Concrete

APPROACH SLABS: AS-1-67 (25 feet long)

ALIGNMENT: Tangent

SUPERELEVATION: Varies, .0156 ft. per ft. to 0.00 ft. per ft.

GUARD RAIL					
Ref. No.	Station	Side	606		Type 5 Deep Beam Rail
			Type A Bridge Terminal Assembly	606	
	From	To	Lin. Ft.	Each	
R-1	1158+03	1160+27.2	LT	224.2	2
R-2	1158+70.5	1160+89.2	RT	218.7	2
R-3	1154+05	@		175.0	
Total Part III				617.9	4

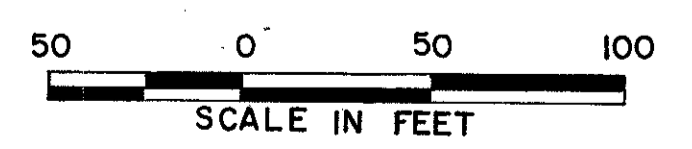


**NOSE DETAIL WITH SHOULDER ELEVATIONS**

Note: Ramp B-OBS, Transition Pavement Width from 14' at Nose to 16' in 100' Length. See Bridge Plans for Additional Information.

- JOINT LEGEND**
- (A) Standard Longitudinal Joint
  - (B) Standard Expansion Joint
  - (C) Standard Contraction Joint
  - (D) Key Joint without Tiebars

Note: All work shown on this sheet is in Participation (III)



SCALE 1"=50'

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

MAD: AAS DATE 9-67  
TRCD: RB DATE 10-67  
CKD: RB DATE 11-67

**CUYAHOGA COUNTY**  
**CUY. 480-21.40**

Quantity Calculations  
Made By AAS, Date 9-67  
Checked By RB, Date 11-67

**PROPOSED STRUCTURE - LANE OBS-E-B OVER RELOCATED McCracken Road**

TYPE: Continuous steel girders with reinforced concrete deck and substructure.

SPAN: 61'-8 $\frac{1}{2}$ ", 95'-1 $\frac{1}{2}$ ", 66'-5" (Measured along @ Lane OBS-E-B)

ROADWAY: 42'-0" f.f. of parapets (Initial)

DESIGN LOAD: HS20-44

SKEW: 46°51'13" Left Forward

WEARING SURFACE: 2 $\frac{1}{2}$ " Asphalt Concrete

APPROACH SLABS: AS-1-67 (20 feet long)

ALIGNMENT: Spiral, 6°30'00" Left

SUPERELEVATION: .083 ft. per ft.

**PROPOSED STRUCTURE CUY. 480-2154**

TYPE: Continuous rolled beam with reinforced concrete deck and substructure.

SPANS: 51'-11 $\frac{1}{2}$ ", 74'-9 $\frac{3}{4}$ ", 52'-9 $\frac{3}{4}$ " (Measured along @ I-480)

ROADWAY: Width varies-160'-4" to 170'-2 $\frac{3}{4}$ " face to face parapets, with Concrete Barrier Median

DESIGN LOAD: HS20-44 and Interstate Alternate Loading

SKEW: 22°44'03" Right Forward

WEARING SURFACE: 2 $\frac{1}{2}$ " Asphalt Concrete

APPROACH SLABS: AS-1-67 (25 feet long)

ALIGNMENT: Spiral, 2°00'00" Right

SUPERELEVATION: I-480 Varies .0156 ft. per ft. to .047 ft. per ft. Ramp B-OBS .0156 ft. per ft.

**PROPOSED STRUCTURE CUY. 480-2169**

TYPE: Continuous steel girder with reinforced concrete deck and substructure.

SPANS: 92'-2 $\frac{3}{4}$ ", 120'-9 $\frac{3}{4}$ " (Measured along @ Bedford Expressway)

ROADWAY: 76'-0" face to face of parapet with concrete barrier median

DESIGN LOAD: HS20-44

SKEW: 16°57'137" Left. Forward to Local Tangent

WEARING SURFACE: 1 $\frac{1}{2}$ " Asphalt Concrete

APPROACH SLABS: AS-1-67 (25 feet long)

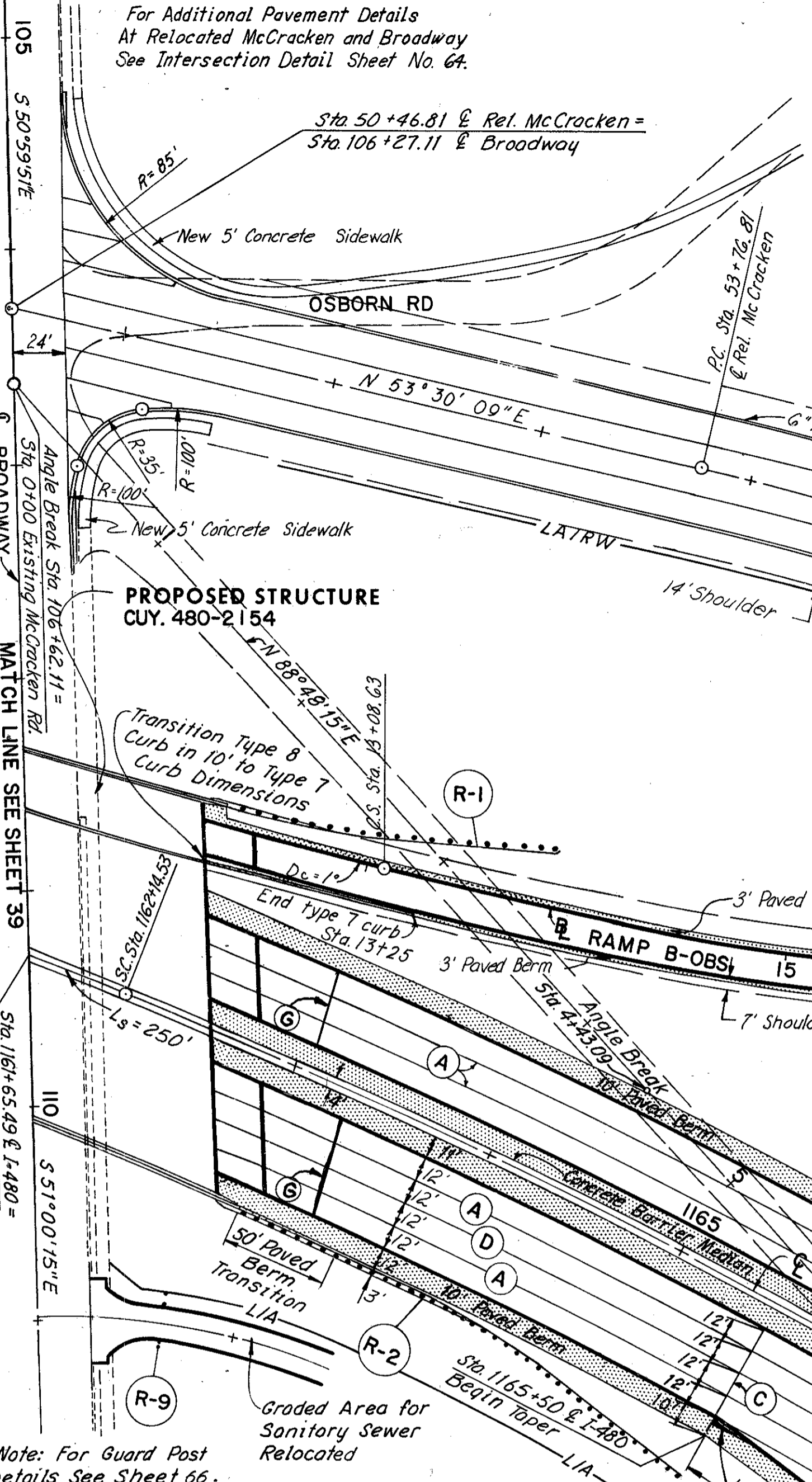
ALIGNMENT: Spiral, 8°00'00" Left

SUPERELEVATION: Varies .0156 ft. per ft. to .083 ft. per ft.

**DRIVES AND APPROACHES**

Ref No	Station	Type	Side	Width	203	203	304	404	452	Profile Sheet No.
					Rdwy Exc.	Rdwy Emb.	Aggr. Base	Asph. Con. 2"	P. C. C. For Drives 7"	
1	7+25	Res.	Lt.	9	465		17.42	7.10	10.85	79
2	9+77.96	Res.	Lt.	6	1	4			21.67	79
3	10+10	Res.	Rt.	9.5	6		3.37	1.38		79
4	10+15.89	Res.	Lt.	9	6				23.33	79
7	10+73.38	Res.	Lt.	5.6	3				16.02	81
Total: Part III					481	4	21	8	72	

See Sheet No. 67 for Miscellaneous Driveway Details.



**PROPOSED STRUCTURES-BEDFORD FREEWAY AND RAMP B-OBS OVER RELOCATED McCracken Road**

TYPE: Continuous rolled beams with reinforced concrete deck and substructure.

SPANS: Br 13L 38'-9", 64'-3", 40'-3"  
Br 13R 48'-9 $\frac{3}{4}$ ", 69'-3 $\frac{1}{4}$ ", 48'-7 $\frac{3}{8}$ " (Measured along @ Ramp B-OBS)

ROADWAYS: Br 13L 76'-0" f.f. of parapet with concrete barrier median  
Br 13R 28'-0" f.f. of parapet

DESIGN LOAD: HS20-44

SKEWS: Br 13L -07°46'02" Left forward to local tangent  
Br 13R -23°50'55" Right forward to local tangent

WEARING SURFACE: 1 $\frac{1}{2}$ " Asphalt Concrete on 13R, 2 $\frac{1}{2}$ " on 13L

APPROACH SLABS: AS-1-67 (20 feet long)

ALIGNMENT: Br 13L-Tangent  
Br 13R-13°30'00" Left, Spiral

SUPERELEVATION: Br 13L-Varies .0156 ft. per ft. to 0.0 ft. per ft.  
Br 13R-Varies .042 ft. per ft. to .083 ft. per ft.

**JOINT LEGEND**

- (A) Standard Longitudinal Joint
- (B) Standard Expansion Joint
- (C) Standard Contraction Joint
- (D) Key Joint without Tiebars
- (E) Pressure relief joint See Sheet No. 72A

**GUARD RAIL**

Ref. No.	Station	Side	606		606	
			Type 5 Deep Beam Rail	Anchor Assem. bly	Bridge Ter- minals Assem. bly	606 Guard Posts as per plan
R-1	12+31	Lt	125	1	1	
R-2	1163+06.5	Rt	243.75	1	1	
R-3	63+60.31	Rt	201.26		2	
R-4	63+66.80	Lt	199.47		2	
R-5	68+16.5	Rt	85		1	
R-6	68+50.8	Lt	42		1	
R-7	70+68.75	Lt.	125	1	1	
R-8	70+09.60	Rt	358		1	
R-9	0+65.00	Graded Area				4
Total: Part. III			1379.48	3	10	4

SCALE IN FEET

50 0 50 100

SCALE 1" = 50'

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

MADE A.A.S. DATE 9-67  
TRCD. P.R. DATE 10-67  
CKD. R.B. DATE 11-67

Note: All work shown on this Sheet is in Participation III



CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculation  
Made By JNL Date 9-67  
Checked By RB Date 11-67

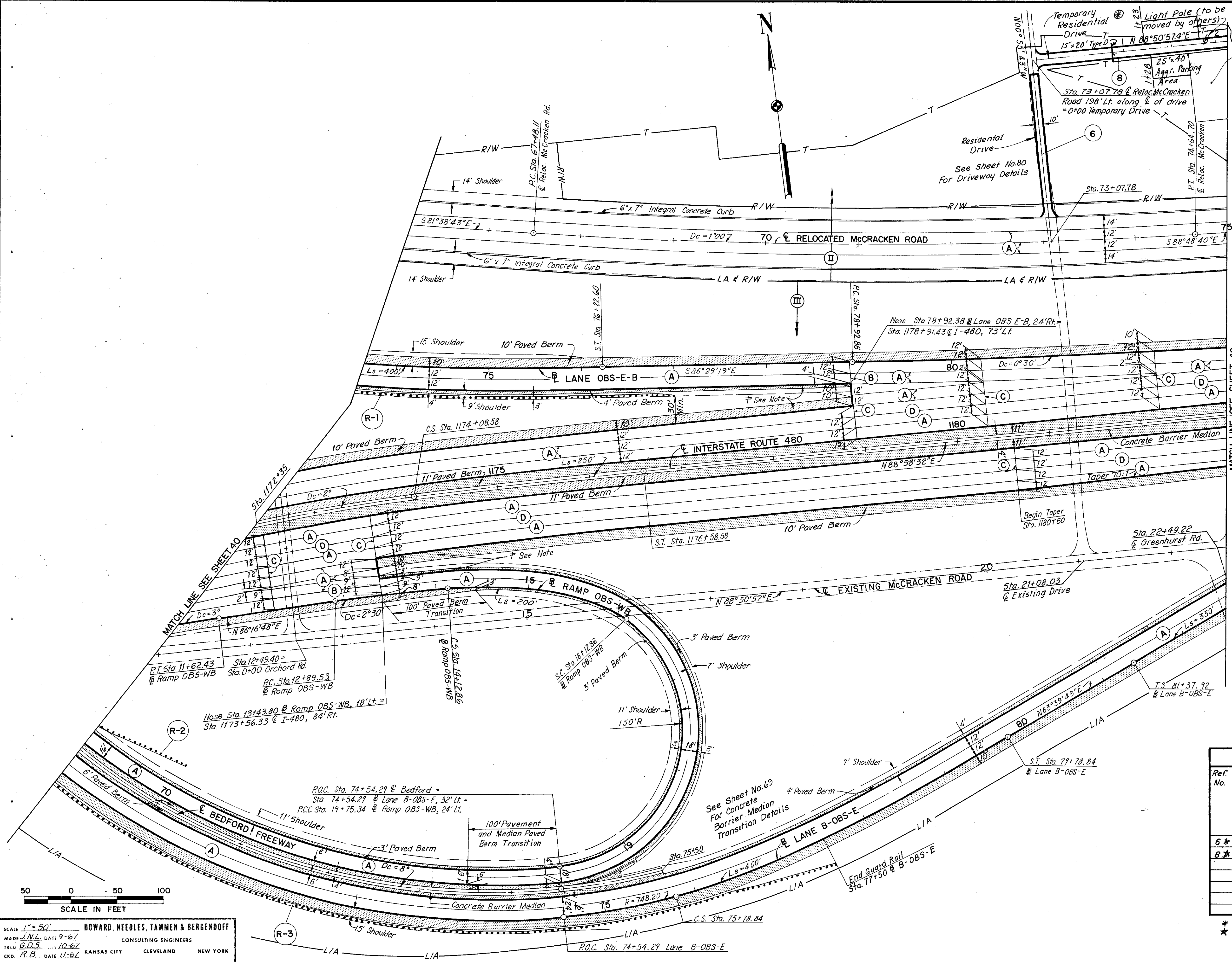
- JOINT LEGEND**
- (A) Standard Longitudinal Joint
  - (B) Standard Expansion Joint
  - (C) Standard Contraction Joint
  - (D) Key Joint without Tiebars

**NOTE**  
Temporary drive from Sta. 0+06.25 to Sta. 1+25.00 shall be abandoned following the completion of work on proposed drive at Sta. 73+07.78 of Reloc. McCracken Rd. This area shall be filled with embankment material and restored to original condition. 100 cu. yds. of embankment has been included in quantities for this purpose.

ALIGNMENT CHECKED	BY	DATE
RIGHT OF WAY		
GRADES		
STRUCTURE NOTATIONS		

DRAWN BY	DATE
CHECKED BY	
QUANTITIES CHECKED	

BY	DATE

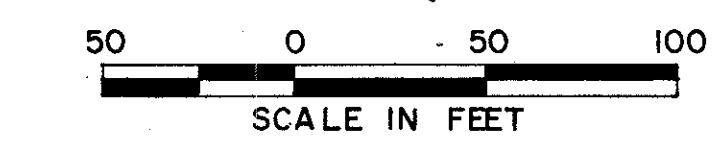


GUARD RAIL				
Ref. No.	Station	Side	606	
			Type 5 Deep Beam Rail	Anchor Assembly
	From	To	Lin. Ft.	Each
R-1	73+57	77+00	Rt. 323.25	1
R-2	68+97	70+10	Lt. 83	1
R-3	68+97	77+50	Rt. 865	1
Total Participation III			1271.25	3

**Note:**  
The Paved Berm Slope shall be Transitioned Smoothly from Typical Berm Slope to Nose Pavement Slope in 100'

DRIVES AND APPROACHES										
Ref. No.	Station	Type	Side	Width	203	203	304	404	452	603
					Rdway Exc.	Rdway Emb.	Aggr. Base	Asph. Con. 2"	P.C.C. For Drives 7"	15" Type D
					Lin. Ft.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Sq. Yds.	Lin. Ft.
6*	73+07.78	Res.	Lt.	10	2	3	23	9.21	18.35	
8*	198' Lt. of Rel. McCr	Res.	Rt.	10	114	128	116			20
Total: Participation III					116	131	139	9	18	20
See Sheet No. 67 for Miscellaneous Driveway Details										

\* Profile Sht. No. 80  
\* Profile Sht. No. 81



SCALE 1" = 50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE JNL DATE 9-67 CONSULTING ENGINEERS  
TRCU G.D.S. DATE 10-67  
CKD R.B. DATE 11-67 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JML Date 9-67  
 Checked By RB Date 11-67

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

42  
390

CUYAHOGA COUNTY  
 CUY.480-21.40

**JOINT LEGEND**

- (A) Standard Longitudinal Joint
- (B) Standard Expansion Joint
- (C) Standard Contraction Joint
- (D) Key Joint without Tiebars

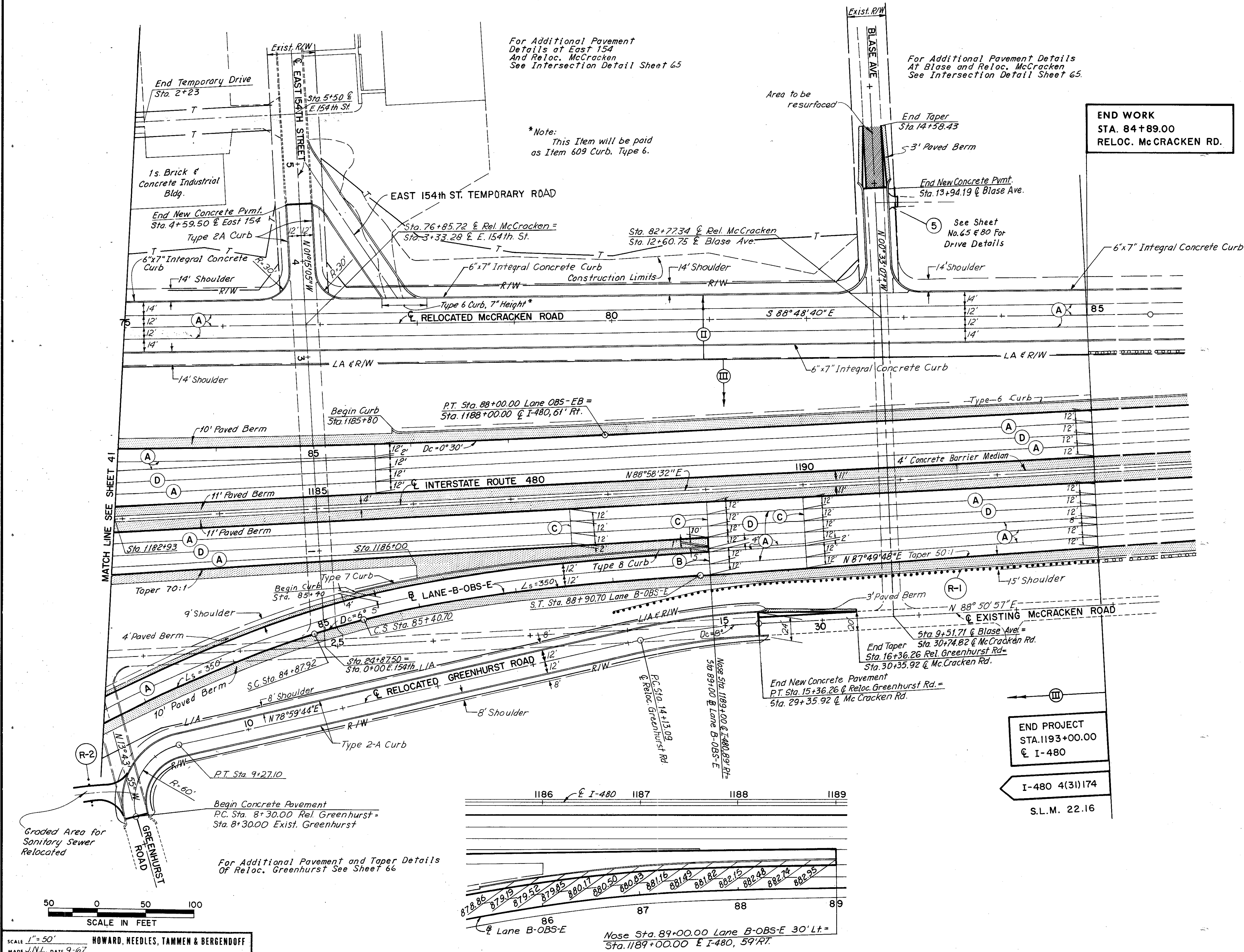
GUARD RAIL						
Ref. No.	Station	Side	606			
			Type 5 Deep Beam Rail	Anchor Assembly	Guard Posts as per plan	
	From	To	Lin. Ft.	Each	Each	
R-1	88+00	1193+00	Rt.	475	1	4
R-2	20+75	Graded Area				4
Total Participation III			475	1	4	

DRIVES AND APPROACHES											
Ref. No.	Station	Type	Side	Width	203		304		404		452
					Rdway Exc.	Rdway Emb.	Aggr. Base	Asph. Con. 2"	P.C.C. For Drives 7"	Profile Sheet No.	
				Lin. Ft.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Sq. Yds.		
5	13+80.70	Res. Rt.		10	2		1.16	0.48	11.68	80	
Total: Participation III					2		1	0.5	12		

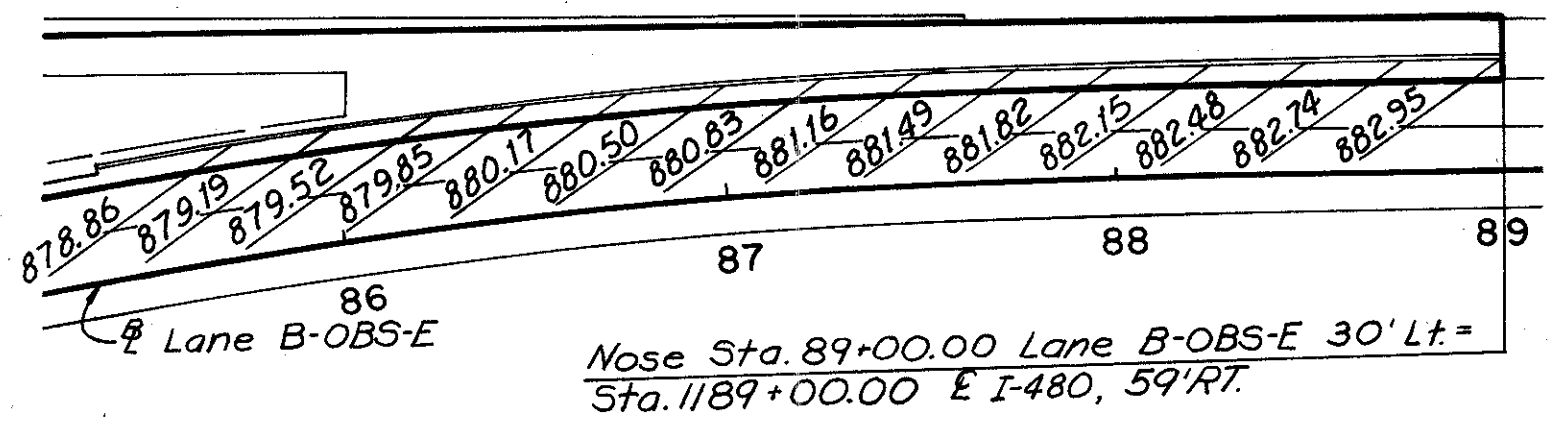
DATE	BY	CHECKED

DATE	BY	CHECKED

DATE	BY	CHECKED



END PROJECT  
 STA. 1193+00.00  
 @ I-480  
 I-480 4(31)174  
 S.L.M. 22.16



SCALE 1" = 50'  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 CONSULTING ENGINEERS  
 MADE JML DATE 9-67  
 TRCD QDS DATE 10-67  
 LKD RB DATE 11-67  
 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

**PROPOSED STRUCTURES—BEDFORD FREEWAY AND RAMP B-OBS OVER RELOCATED McCRACKEN ROAD**

TYPE: Continuous rolled beams with reinforced concrete deck and substructure.

SPANS: Br 13L 38'-9", 64'-3", 40'-3"  
Br 13R 48'-9", 69'-3", 48'-7" (Measured along @ Ramp B-OBS)

ROADWAYS: Br 13L 76'-0" f.f. of parapet with Concrete Barrier median  
Br 13R 28'-0" f.f. of parapet

DESIGN LOAD: HS20-44

SKEWS: Br 13L -07°46'02" Left forward to local tangent  
Br 13R -23°50'55" Right forward to local tangent

WEARING SURFACE: 1 1/2" Asphalt Concrete on 13R, 2 1/2" on 13L

APPROACH SLABS: AS-1-67 (20 feet long)

ALIGNMENT: Br 13L-Tangent  
Br 13R-13°30'00" Left, Spiral

SUPERELEVATION: Br 13L-Varies .0156 ft. per ft. to 0.0 ft. per ft.  
Br 13R-Varies .042 ft. per ft. to .083 ft. per ft.

**PROPOSED STRUCTURE -LANE OBS-E-B OVER RELOCATED McCRACKEN ROAD**

TYPE: Continuous steel girders with reinforced concrete deck and substructures

SPAN: 61'-0", 95'-1", 66'-5" (Measured along @ Lane OBS-E-B)

ROADWAY: 42'-0" f.f. of parapets (Initial)

DESIGN LOAD: HS20-44

SKEW: 46°51'13" Left Forward

WEARING SURFACE: 2 1/2" Asphalt Concrete

APPROACH SLABS: AS-1-67 (20 feet long)

ALIGNMENT: Spiral, 6°30'00" Left

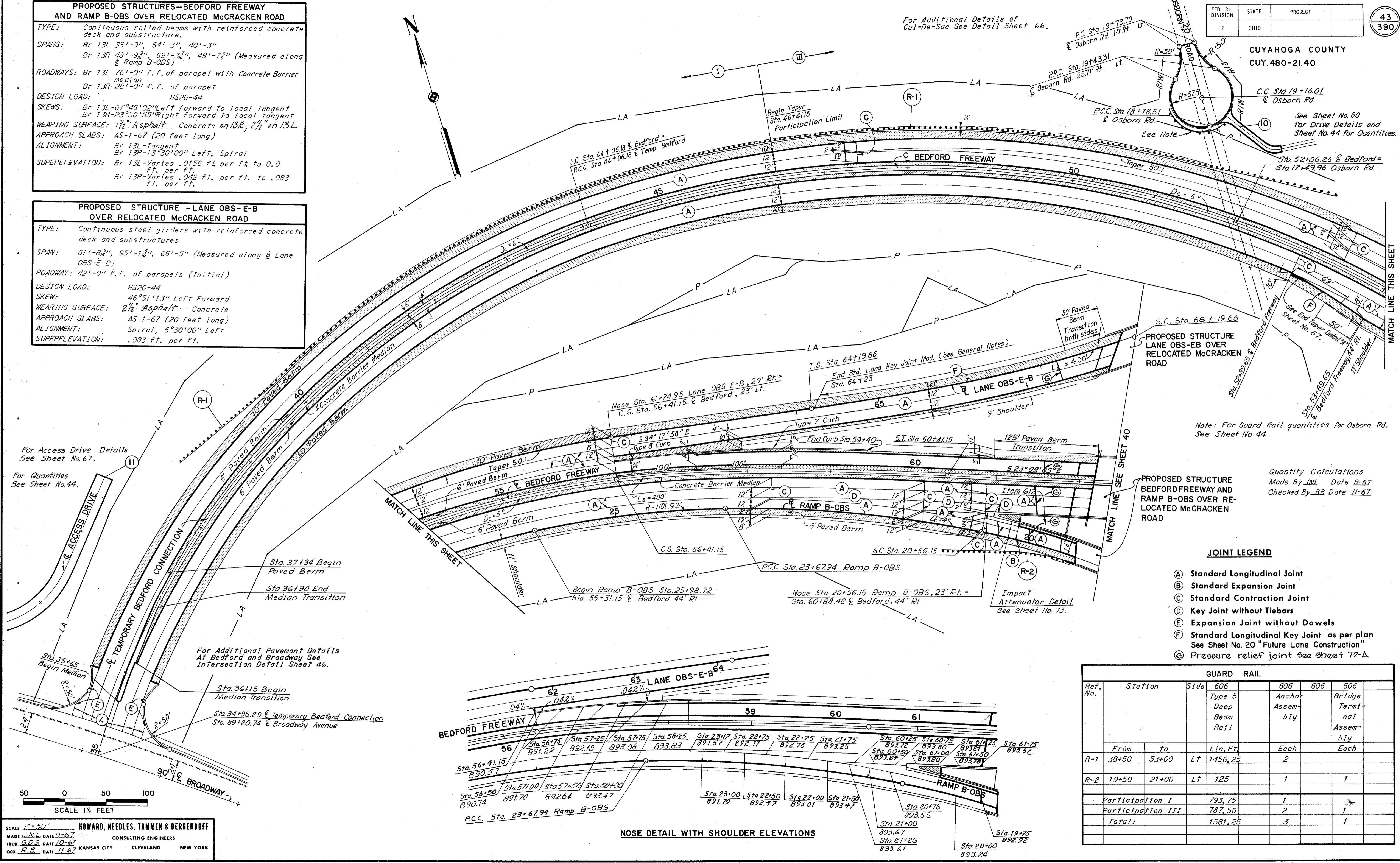
SUPERELEVATION: .083 ft. per ft.

For Additional Details of Cul-De-Sac See Detail Sheet 66.

See Sheet No. 80 for Drive Details and Sheet No. 44 for Quantities.

Note: For Guard Rail quantities for Osborn Rd. See Sheet No. 44.

Quantity Calculations Made By JNL Date 9-67 Checked By RB Date 11-67



ALIGNMENT CHECKED	DATE
RIGHT OF WAY	
GRADES	
B. M.F.	
STRUCTURE NOTATIONS	

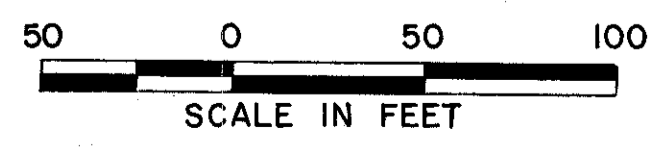
DRAWN BY	DATE
QUANTITIES FIGURED	
CHECKED	

DRAWN BY	DATE
QUANTITIES FIGURED	
CHECKED	

For Access Drive Details See Sheet No. 67.

For Quantities See Sheet No. 44.

For Additional Pavement Details At Bedford and Broadway See Intersection Detail Sheet 46.



SCALE 1" = 50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE IN U.S.A. DATE 9-67  
TRCD. G.D.S. DATE 10-67  
CKD. R.B. DATE 11-67  
KANSAS CITY CLEVELAND NEW YORK

**JOINT LEGEND**

- (A) Standard Longitudinal Joint
- (B) Standard Expansion Joint
- (C) Standard Contraction Joint
- (D) Key Joint without Tiebars
- (E) Expansion Joint without Dowels
- (F) Standard Longitudinal Key Joint as per plan See Sheet No. 20 "Future Lane Construction"
- (G) Pressure relief joint See Sheet 72-A

**NOSE DETAIL WITH SHOULDER ELEVATIONS**

Station	Side	Elevation
Sta. 56+41.15	LT	890.57
Sta. 56+50	LT	890.74
Sta. 57+00	LT	891.70
Sta. 57+50	LT	892.64
Sta. 58+00	LT	893.47
Sta. 23+00	LT	891.79
Sta. 22+50	LT	892.77
Sta. 22+00	LT	893.01
Sta. 21+50	LT	893.77
Sta. 20+75	LT	893.55
Sta. 21+00	LT	893.67
Sta. 21+25	LT	893.61
Sta. 20+00	LT	893.24
Sta. 60+25	LT	893.72
Sta. 60+75	LT	893.80
Sta. 61+25	LT	893.81
Sta. 61+75	LT	893.80
Sta. 61+50	LT	893.78
Sta. 61+25	LT	893.67

Ref. No.	Station	Side	GUARD RAIL			
			606 Type 5 Deep Beam Rail	606 Anchor Assembly	606 Bridge Terminal Assembly	
R-1	38+50	53+00	LT	1456.25	2	1
R-2	19+50	21+00	LT	125	1	1
Participation I			793.75	1		
Participation III			787.50	2	1	
Total:			1581.25	3	1	

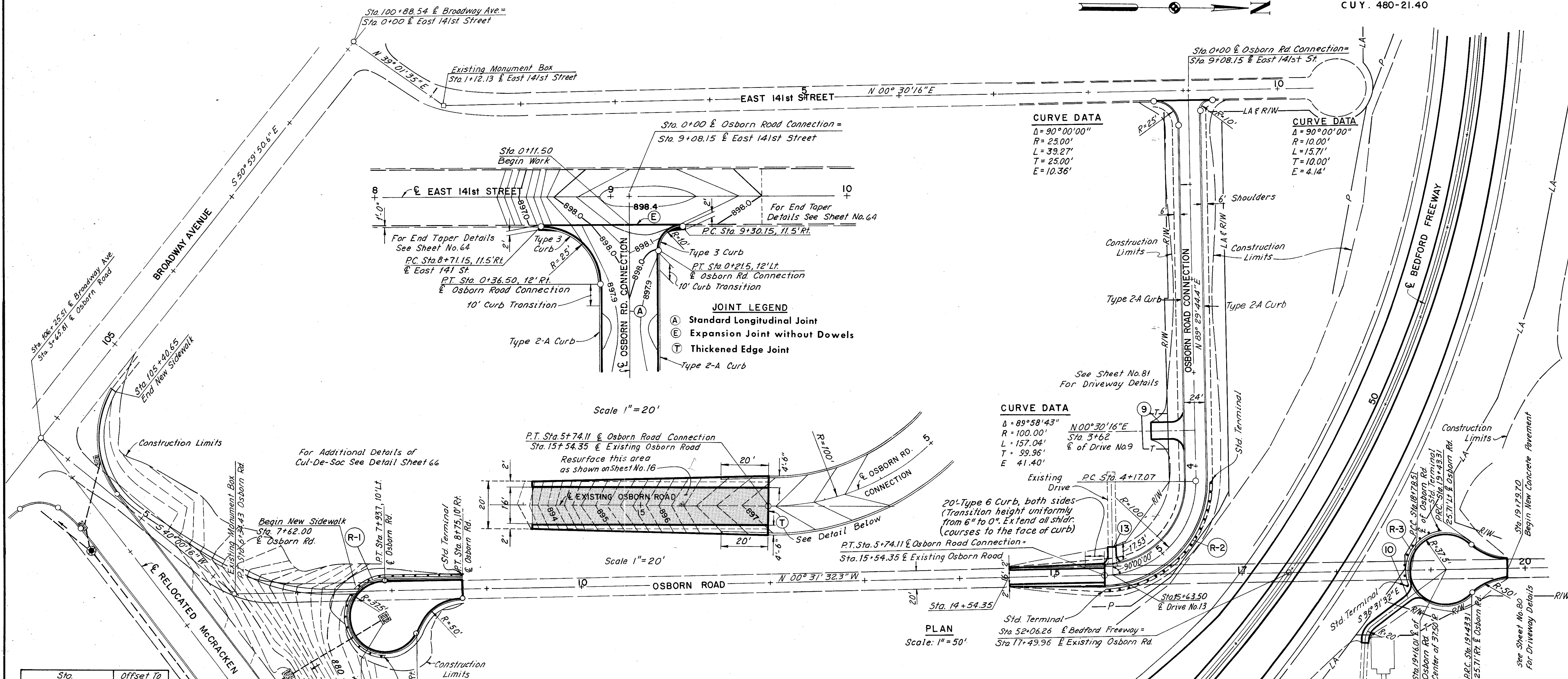
# OSBORN ROAD CONNECTION

Quantity Calculations  
 Made By ERA Date 3-68  
 Checked By IM Date 4-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

44  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40



**CURVE DATA**

Δ = 90°00'00"
R = 25.00'
L = 39.27'
T = 25.00'
E = 10.36'

**CURVE DATA**

Δ = 90°00'00"
R = 10.00'
L = 15.71'
T = 10.00'
E = 4.14'

**CURVE DATA**

Δ = 89°58'43"
R = 100.00'
L = 157.04'
T = 99.96'
E = 41.40'

**CURVE DATA**

Δ = 248°11'47"
R = 37.50'
L = 162.44'

- JOINT LEGEND**
- (A) Standard Longitudinal Joint
  - (E) Expansion Joint without Dowels
  - (T) Thickened Edge Joint

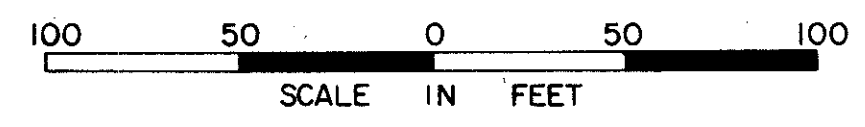
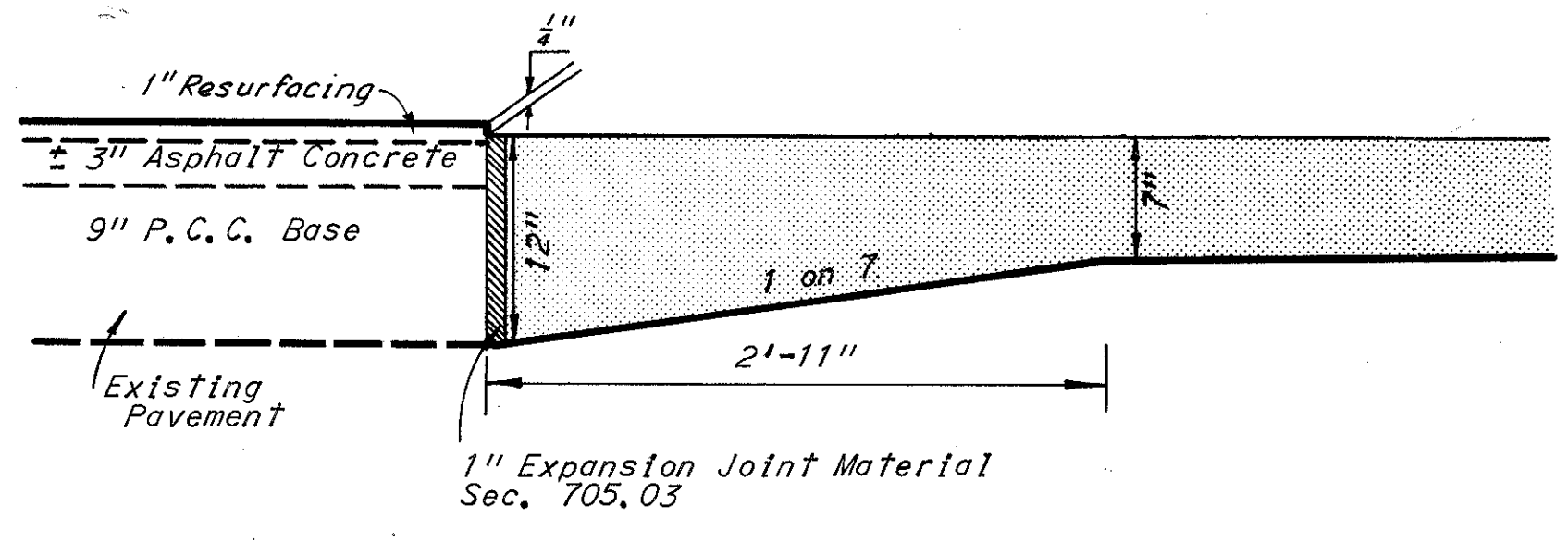
Sta. Reloc. McCracken Rd.	Offset To Sidewalk
52+00	46'
52+50	66'
53+00	87.5'
53+50	123.5'

**GUARD RAIL**

Ref. No.	Station	Side	606	Type 5 Guard Rail
R-1	8+75	7+93.76	Both	200
R-2	4+17	5+74	Lt.	175
R-3	18+78.51	19+12	Lt.	87.5
Total Participation III				462.5

**DRIVES AND APPROACHES**

Ref.	Station	Type	Side	Width	Participation					Profile Sheet No.
					203 Rdway Exc.	203 Rdway Emb.	304 Aggr. Base	404 Asp. Conc. 2"	452 P.C.C. For Drives 7"	
					Lin. Ft.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Sq. Yds.
9	3+62	Res.	Rt.	18	7	2	5.39	2.16	36.55	81
10	19+16.01	Res.	Rt.	8	83		8.77	3.51	12.24	80
11	87+09.66	Comm.	Lt.	20	63	286	148.22	41.89	2335	82
13	15+63.50	Res.	Rt.	10					22.9	82
Total Participation III					153	288	162	48	95	



SCALE: 1" = 50' as shown  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE ERA DATE 3-16-68 CONSULTING ENGINEERS  
 TRCD ERA DATE 3-16-68  
 CKD IM DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

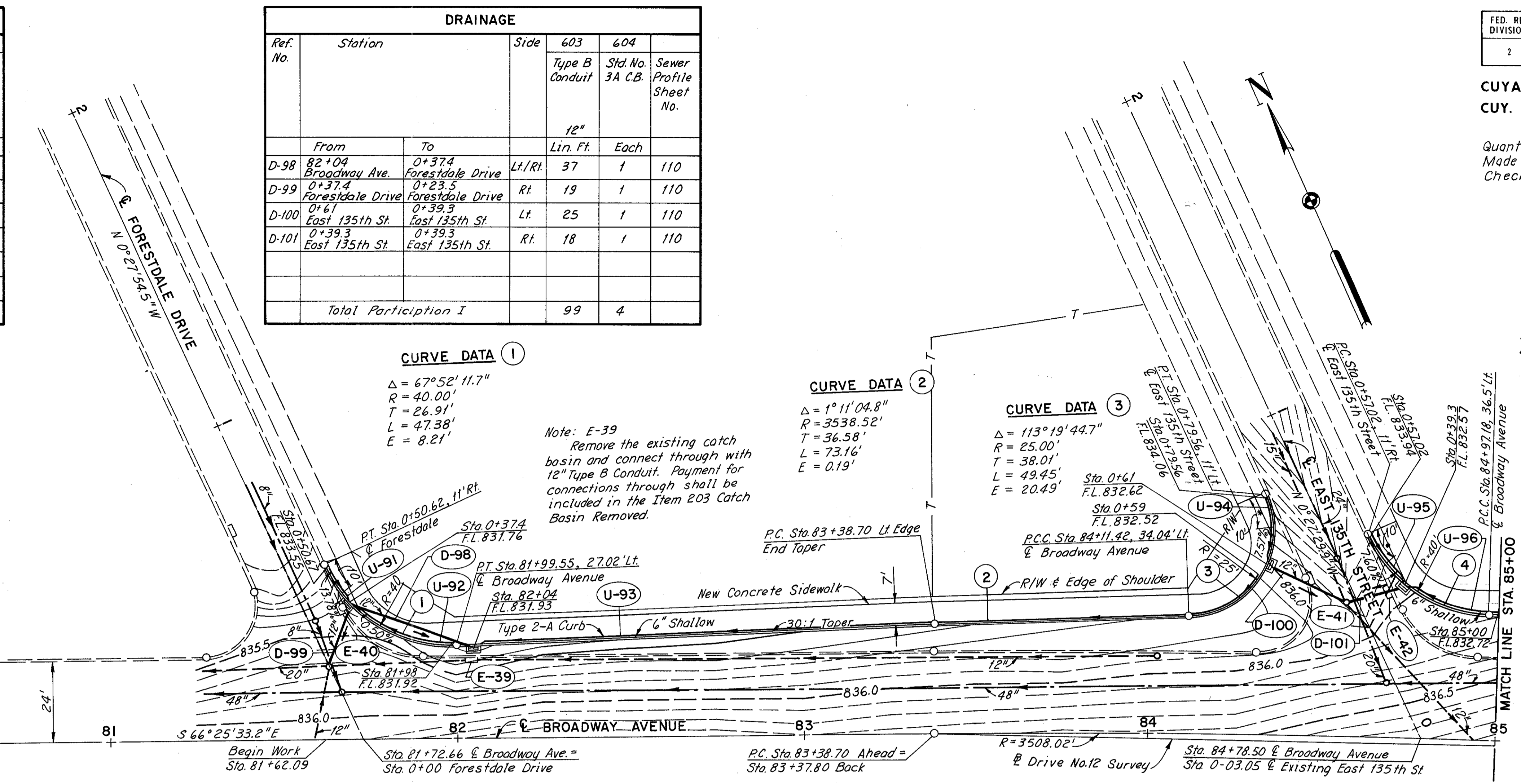
Note: All work shown on this sheet is in Participation III

Quantity Calculations  
Made By JMC, Date 3-27-72  
Checked By EH, Date 3-27-72

ROADWAY					
Ref. No.	Station	Side	202	202	202
			Catch Basin Abandoned	Catch Basin Removed	Pipe Removed Under 15"
From	To		Each	Each	Lin. Ft.
E-39	82+04 Broadway Ave.	Lt.		1	
E-40	0+374 Forestdale Drive	Rt.	1		
E-41	0+51.2 East 135th St. to 0+41.5 East 135th St.	Lt.		1	11
E-42	0+39.3 East 135th St.	Rt.	1		
Total Participation I			2	2	11

DRAINAGE					
Ref. No.	Station	Side	603	604	Sewer Profile Sheet No.
			Type B Conduit	Std. No. 3A C.B.	
From	To		Lin. Ft.	Each	
D-98	82+04 Broadway Ave. to 0+374 Forestdale Drive	Lt./Rt.	37	1	110
D-99	0+374 Forestdale Drive to 0+23.5 Forestdale Drive	Rt.	19	1	110
D-100	0+61 East 135th St. to 0+39.3 East 135th St.	Lt.	25	1	110
D-101	0+39.3 East 135th St. to 0+39.3 East 135th St.	Rt.	18	1	110
Total Participation I			99	4	

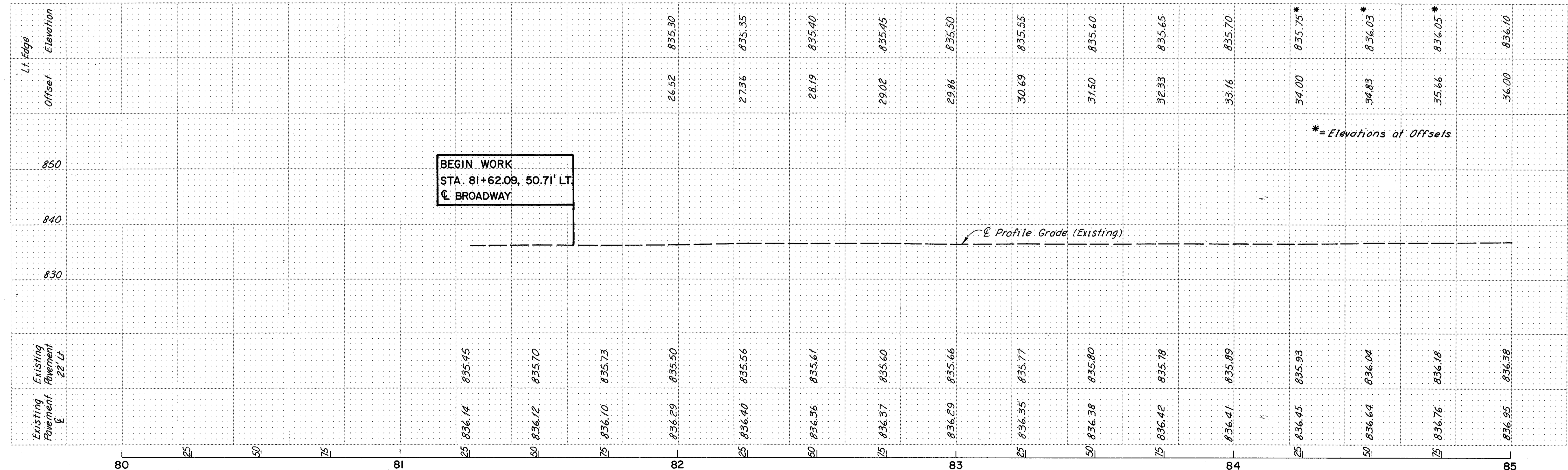
UNDERDRAINS					
Ref. No.	Station	Side	603	605	Shallow U.D.
			Type "F" Conduit		
From	To		Lin. Ft.	Lin. Ft.	
U-91	0+50.62 Forestdale Dr. to 0+374 Forestdale Dr.	Rt.	10	3	
U-92	81+98 Broadway Ave. to 0+374 Forestdale Dr.	Lt./Rt.	10	21	
U-93	0+59 East 135th St. to 82+04 Broadway Ave.	Lt.	10	221	
U-94	0+79.56 East 135th St. to 0+61 East 135th St.	Lt.	10	9	
U-95	0+57.02 East 135th St. to 0+39.3 East 135th St.	Rt.	10	8	
U-96	85+00 Broadway Ave. to 0+39.3 East 135th St.	Lt./Rt.	10	18	
Total Participation I			60	280	



**CURVE DATA ④**

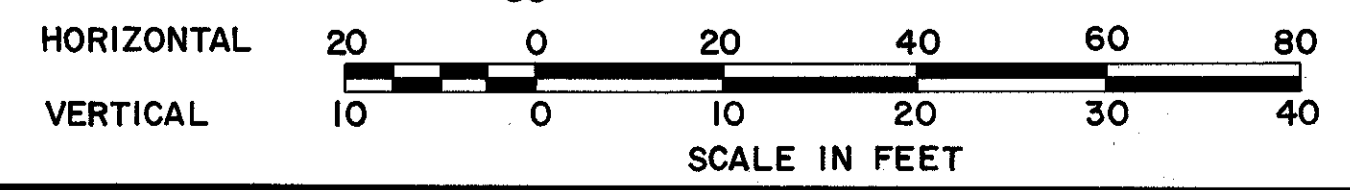
Δ = 63°22'45.1\"  
R = 40.00'  
T = 24.69'  
L = 44.25'  
E = 7.01'

Note:  
\*Transition Type 2-A Curb to meet curb and gutter section.



EARTHWORK	
EXC.	338
EMB.	0

**PROFILE**

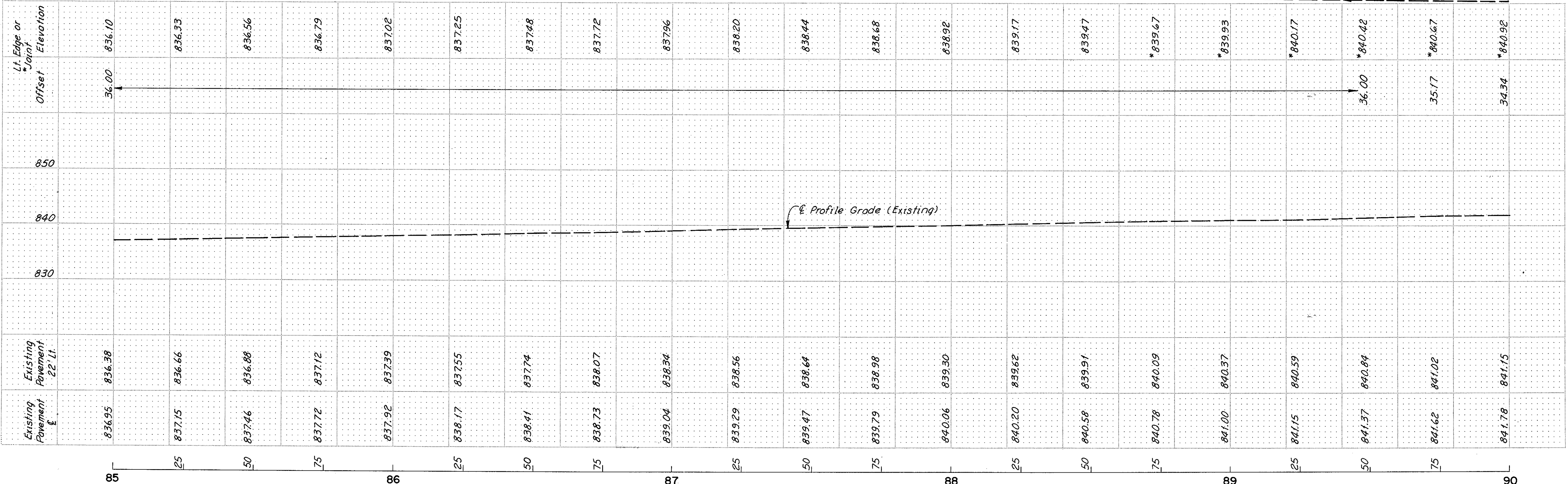
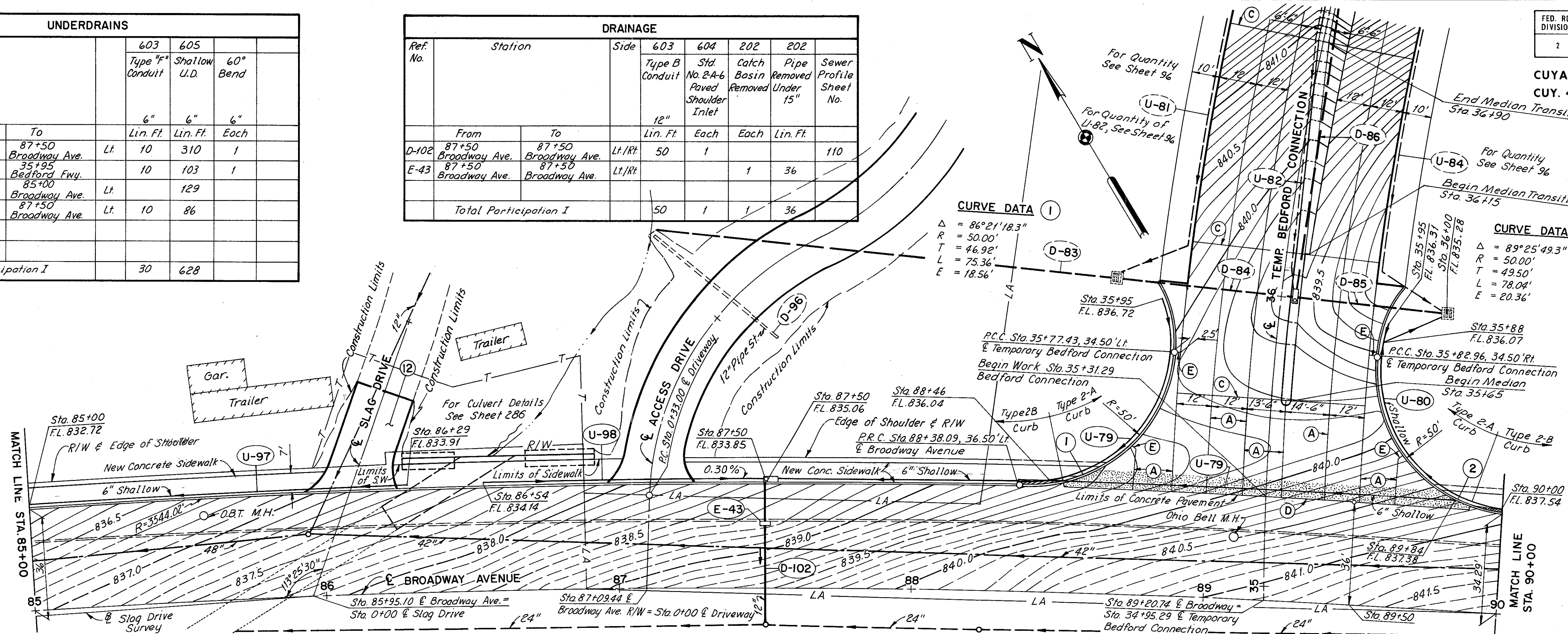


CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By J.M.C. Date 3-72  
Checked By E.H. Date 3-72

UNDERDRAINS					
From	To	Type "A" Conduit	603	605	60° Bend
			Lin. Ft.	Shallow U.D.	
U-79	35+95 Bedford Fwy. to 87+50 Broadway Ave.	Lt.	10	310	1
U-80	90+00 Broadway Ave. to 35+95 Bedford Fwy.	Lt.	10	103	1
U-97	86+29 Broadway Ave. to 85+00 Broadway Ave.	Lt.		129	
U-98	86+54 Broadway Ave. to 87+50 Broadway Ave.	Lt.	10	86	
Total Participation I			30	628	

DRAINAGE						
Ref. No.	Station	Side	603	604	202	202
			Type B Conduit	Std. No. 2-A-6 Paved Shoulder Inlet	Catch Basin Removed	Pipe Removed Under 15"
	From	To	Lin. Ft.	Each	Each	Lin. Ft.
D-102	87+50 Broadway Ave.	87+50 Broadway Ave.	Lt/Rt	50	1	110
E-43	87+50 Broadway Ave.	87+50 Broadway Ave.	Lt/Rt		1	36
Total Participation I			50	1	1	36



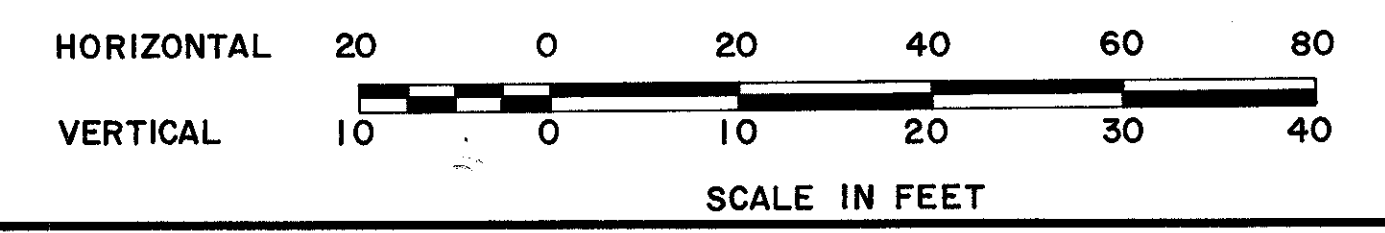
Ref. Station No.	DRIVES AND APPROACHES				Type	Side	Width	Type	Exc.	Cu. Yds.	Emb.	Cu. Yds.	Sp. Yds.	Participation I
	203	304	404	452										
12														

- JOINT LEGEND**
- (A) Standard Longitudinal Joint
  - (D) Key Joint without Tiebars
  - (E) Expansion Joint without Dowels

EARTHWORK	
EXC.	630
EMB.	166

VERT. 1"=10'  
HORIZ. 1"=20'  
SCALE J.M.C. DATE 3-72  
TRCD J.M.C. DATE 3-72  
CKD E.H. DATE 3-72  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

PROFILE



Quantity Calculations  
 Made By J.M.C. Date 3-72  
 Checked By E.H. Date 3-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

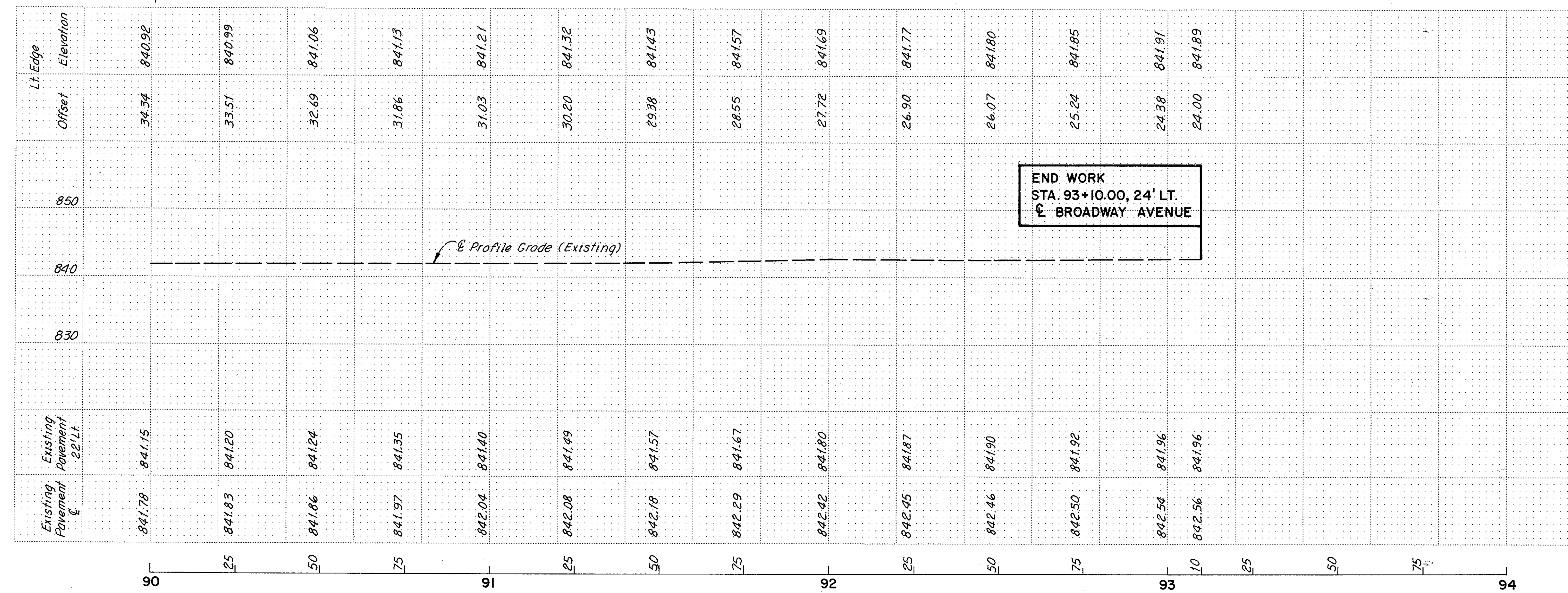
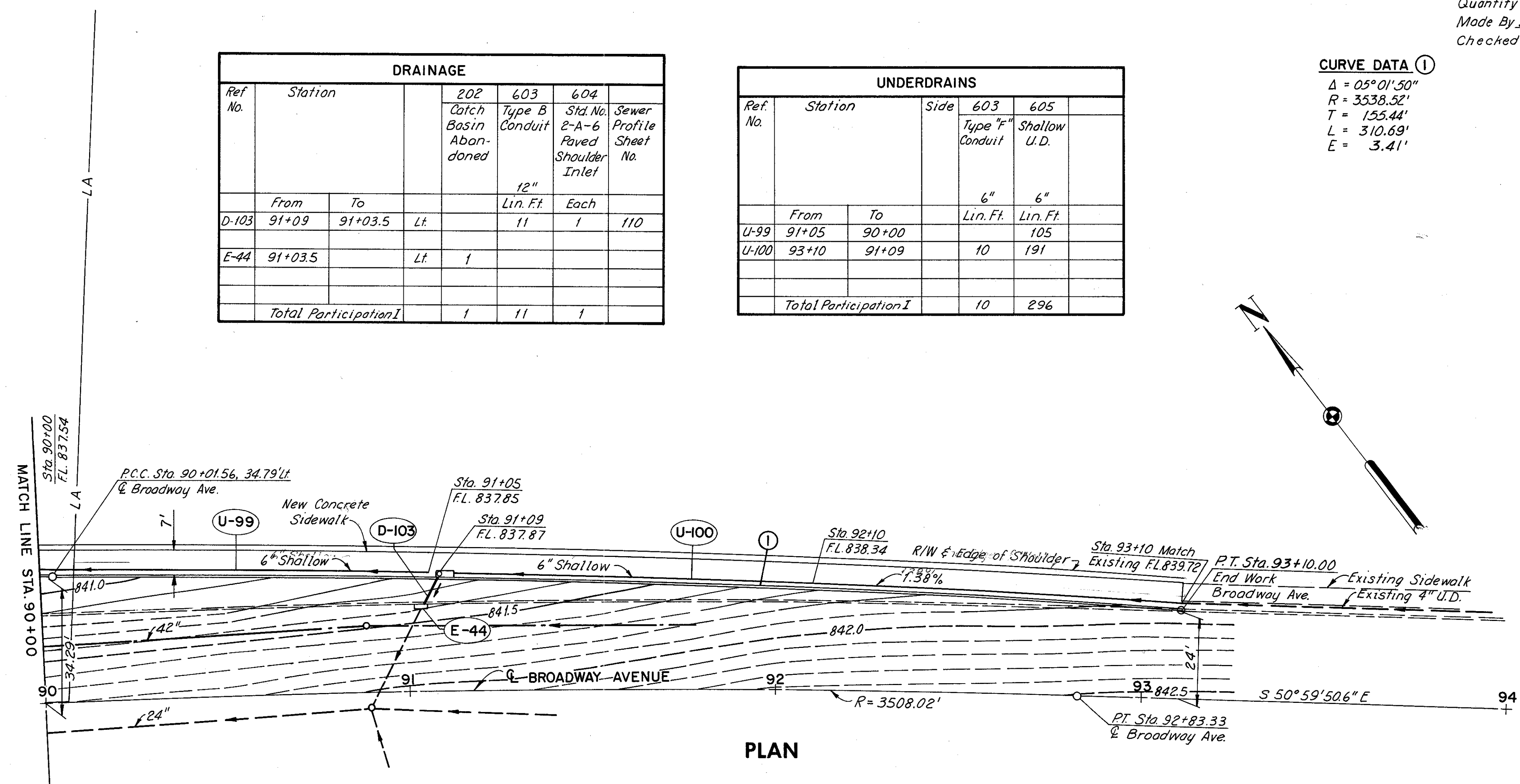
47  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

DRAINAGE						
Ref. No.	Station		202 Catch Basin Abandoned	603 Type B Conduit	604 Std. No. E-A-6 Paved Shoulder Inlet	Sewer Profile Sheet No.
	From	To				
D-103	91+09	91+03.5	Lt.	12" Lin. Ft.	11	110
E-44	91+03.5		Lt.	1		
Total Participation I				1	11	1

UNDERDRAINS					
Ref. No.	Station		Side	603 Type "F" Conduit	605 Shallow U.D.
	From	To			
U-99	91+05	90+00		6"	6"
U-100	93+10	91+09		10	191
Total Participation I				10	296

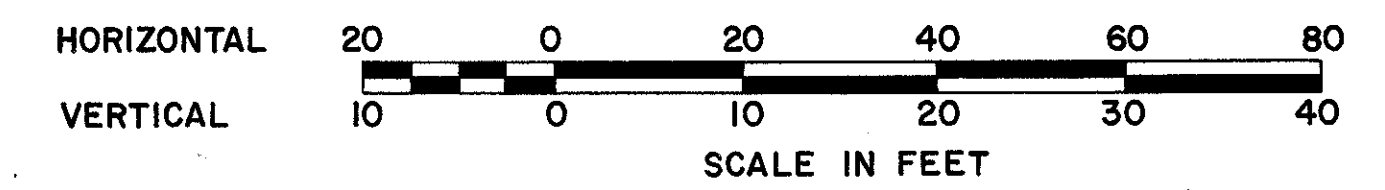
**CURVE DATA ①**  
 $\Delta = 05^{\circ}01'50''$   
 $R = 3538.52'$   
 $T = 155.44'$   
 $L = 310.69'$   
 $E = 3.41'$



END WORK  
 STA. 93+10.00, 24' LT.  
 ☐ BROADWAY AVENUE

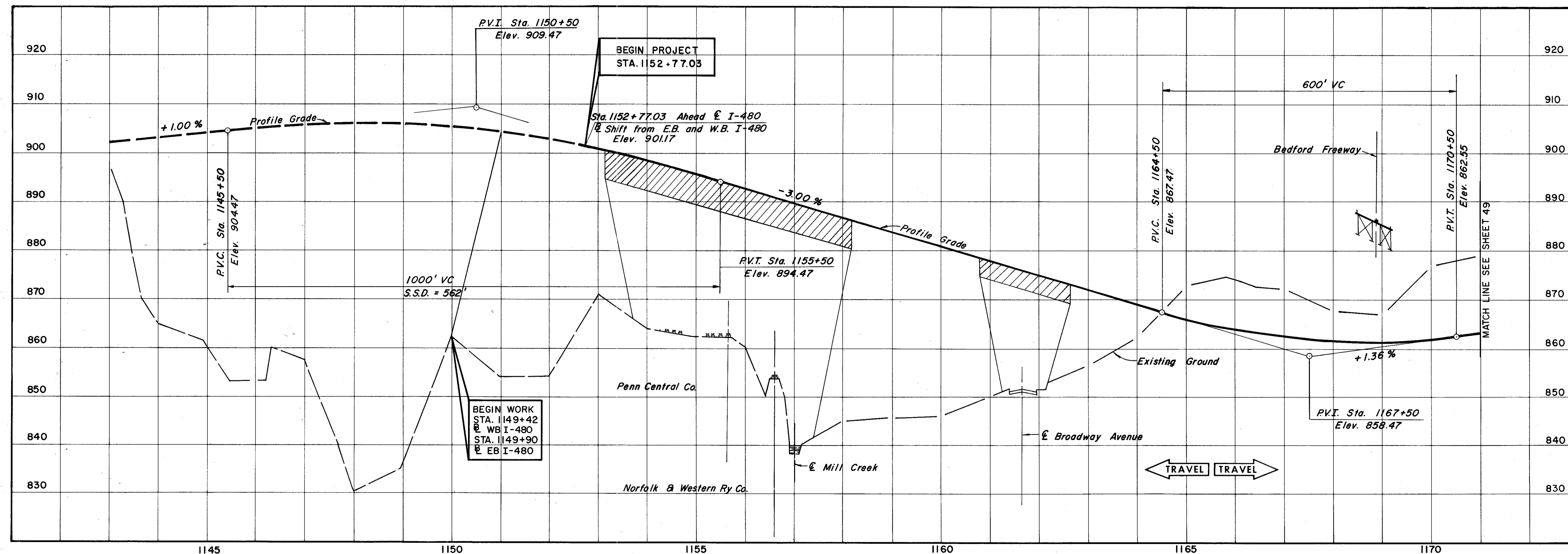
EARTHWORK	
EXC.	213
EMB.	2

VERT. 1"=10'  
 SCALE HORZ. 1"=20'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE J.M.C. DATE 3-72 CONSULTING ENGINEERS  
 TRCD J.M.C. DATE 3-72 KANSAS CITY CLEVELAND NEW YORK  
 CKD. E.H. DATE 3-72



**CUYAHOGA COUNTY**  
**CUY. 480-21.40**

W.B. I-480	24' to Left Edge 0' to 24'		Normal Crown 0.0156 ft./ft.		Super. Trans. +.0156		Superelevation Lt. +0.047 ft./ft.	24' to Lt. E.P.	W.B. I-480
E.B. I-480	0' to 24'	Superelevated Rt. -0.036 ft./ft.	Normal Crown 0.0156 ft./ft.		Super. Trans. -.0156 ft./ft.		Superelevation Rt. -0.047 ft./ft.	0' to 24'	E.B. I-480
	24' to Right Edge							24' to Rt. E.P.	I-480
LEFT EDGE							See Table Sheet No. 59,60&61		LEFT EDGE
PROFILE GRADE									PROFILE GRADE
RIGHT EDGE							See Table Sheet No. 59,60&61		RIGHT EDGE



INTERSTATE ROUTE 480

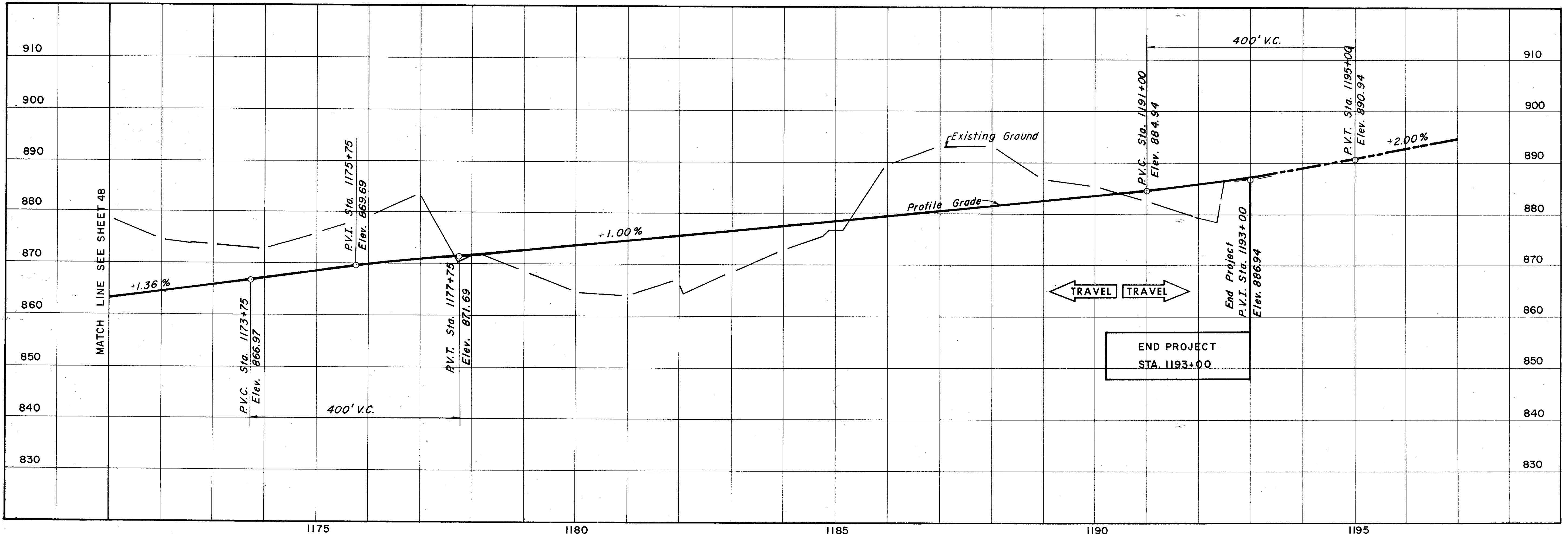
SCALE: Vert. 1"=10'  
Hor. 1"=100'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE BY: J.B. DATE: 10-6-67  
TRCD: J.B. DATE: 10-6-67  
CHK: J.H.C.H. DATE: 10-6-67  
KANSAS CITY CLEVELAND NEW YORK



WB I-480	24' to Lt.E.P. 0' to 24'	Superelevated Lt. + 0.047 ft./ft.	Super. Trans.	Normal Crown 0.0156 ft./ft.	24' to Lt.E.P. 0' to 24'	WB I-480
E.B. I-480	0' to 24' 24' to Rt.E.P.	Superelevated Rt. - 0.047 ft./ft.	Super. Trans. +0.0156 Superelevation Transition Super. Trans. -0.0156 ft./ft.	Normal Crown 0.0156 ft./ft.	0' to 24' 24' to Rt.E.P.	E.B. I-480
LEFT EDGE						LEFT EDGE
PROFILE GRADE						PROFILE GRADE
RIGHT EDGE						RIGHT EDGE

				See Table Sheet No. 61		
25	863.57					
50	863.91					
75	864.25					
25	864.59					
50	865.27					
75	865.61					
25	866.29					
50	866.63					
75	866.97					
25	867.31					
50	867.64					
75	867.96					
25	868.28					
50	868.60					
75	868.91					
25	869.21					
50	869.51					
75	869.80					
25	870.09					
50	870.37					
75	870.64					
25	870.92					
50	871.18					
75	871.44					
25	871.69					
50	871.94					
75	872.19					
25	872.44					
50	872.69					
75	872.94					
25	873.19					
50	873.44					
75	873.69					
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50	887.44					
75	887.82					
25	888.22					
50	888.64					
75	889.07					
25	889.51					
50	889.97					
75	890.44					

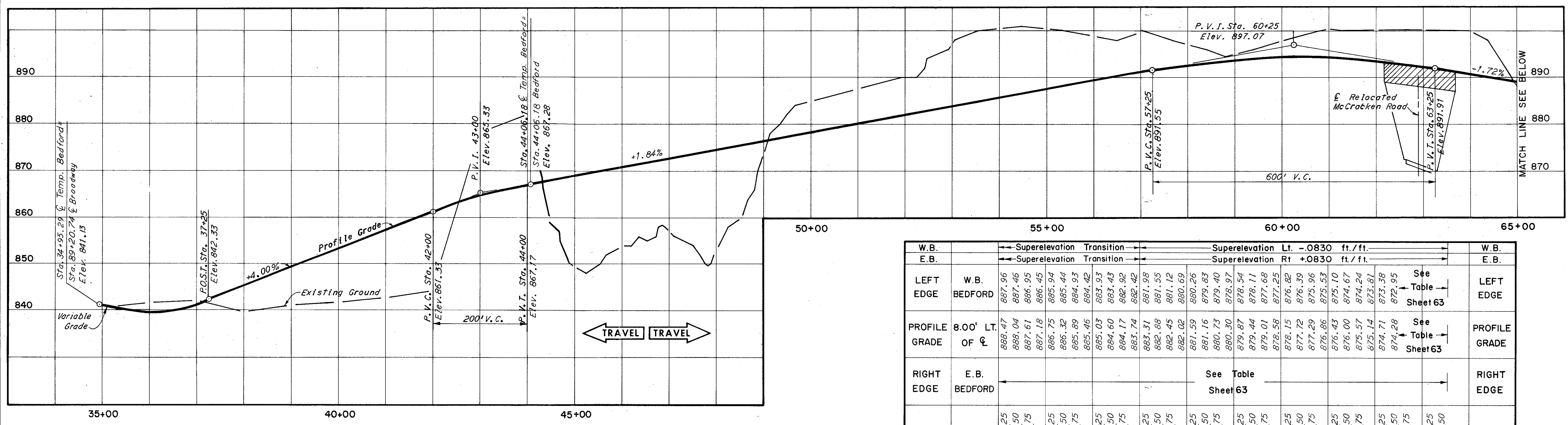


INTERSTATE ROUTE 480

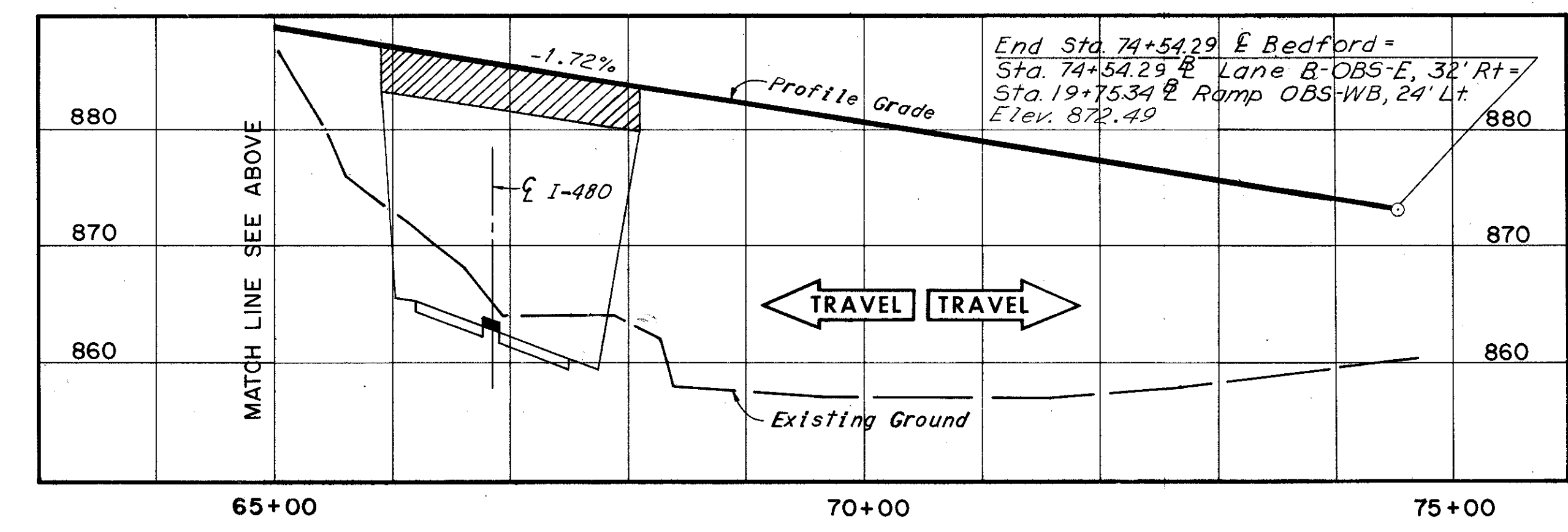
VERT. 1"=10'  
 SCALE Hor. 1"=100'  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 CONSULTING ENGINEERS  
 MADE P.B. DATE 10-6-67  
 TRCD 23 DATE 10-6-67  
 CKD J.H.C.H. DATE 10-6-67 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

W.B. BEDFORD	CR.to Lt.E.P. +0.0156	Superelevation Transition	Superelevation +0.0820 ft./ft.	Super. Trans.	Super. +0.040 ft./ft.	Super. Trans.	-0.0156 ft./ft.	W.B. BEDFORD
E.B. BEDFORD	O'to Crown -0.0156	Superelevation Transition	Superelevation -0.0820 ft./ft.	Super. Trans.	Super. +0.040 ft./ft.	Super. Trans.	+0.0156 ft./ft.	E.B. BEDFORD
LEFT EDGE	W.B. BEDFORD	See Inter-Section Detail		See Table Sheet No. 62 & 63				LEFT EDGE
PROFILE GRADE	8.00' LT. OF C	See Inters. Det.						PROFILE GRADE
RIGHT EDGE	E.B. BEDFORD	See Intersection Detail		See Table Sheet No. 62 & 63				RIGHT EDGE



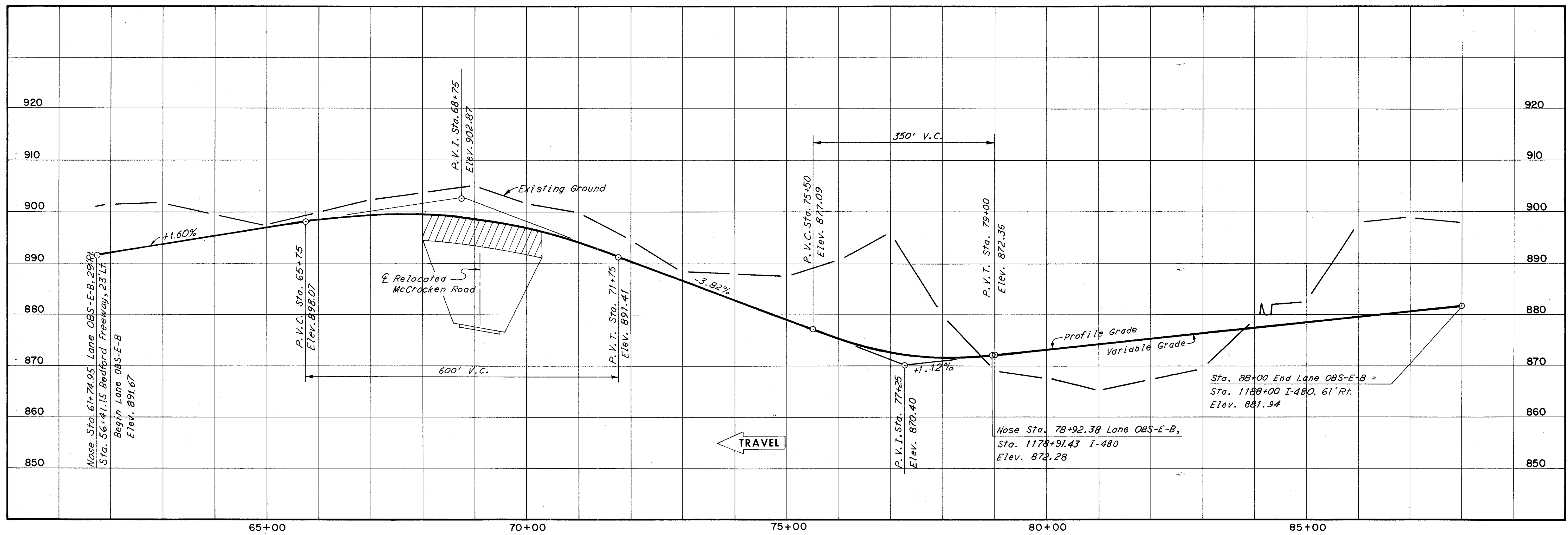
W.B. BEDFORD	Superelevation Transition	Superelevation Lt. -0830 ft./ft.	W.B. BEDFORD
E.B. BEDFORD	Superelevation Transition	Superelevation Rt. +0830 ft./ft.	E.B. BEDFORD
LEFT EDGE	W.B. BEDFORD	See Table Sheet 63	LEFT EDGE
PROFILE GRADE	8.00' LT. OF C	See Table Sheet 63	PROFILE GRADE
RIGHT EDGE	E.B. BEDFORD	See Table Sheet 63	RIGHT EDGE



Scale: 1" = 10'  
1" = 100'  
MADE BY: H.N.T. DATE: 10-6-67  
TRCD: J.H.C.H. DATE: 10-6-67  
CKD: J.H.C.H. DATE: 10-6-67  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

PROFILE GRADE	Superelevation Transition			Super. Rt. +.0830 ft./ft.			Super. Trans.			Superelevation Rt. +.00156 ft./ft.			PROFILE GRADE	
	Right	Center	Left	Right	Center	Left	Right	Center	Left	Right	Center	Left		
RIGHT EDGE (24.00')	890.81	891.67	892.47	892.47	892.47	892.47	892.47	892.47	892.47	892.47	892.47	892.47	892.47	RIGHT EDGE (24.00')
	75	25	50	75	25	50	75	25	50	75	25	50	75	



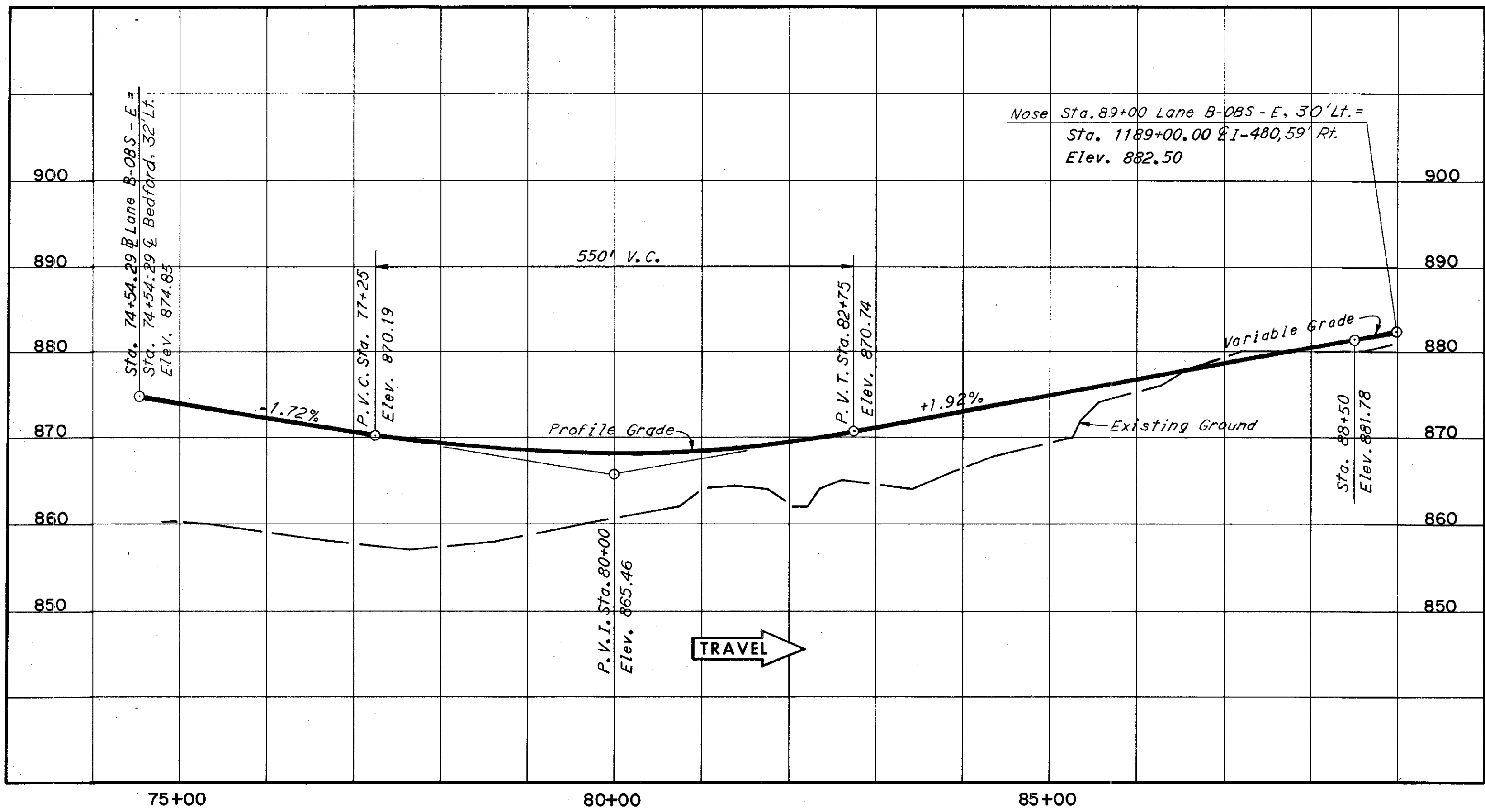
LANE OBS-E-B

SCALE:  $\frac{1/4"=10'}$   
 $\frac{1/8"=100'}$   
MADE BY: B.B. DATE: 10-6-67  
TRCD: H.C.H. DATE: 10-6-67  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

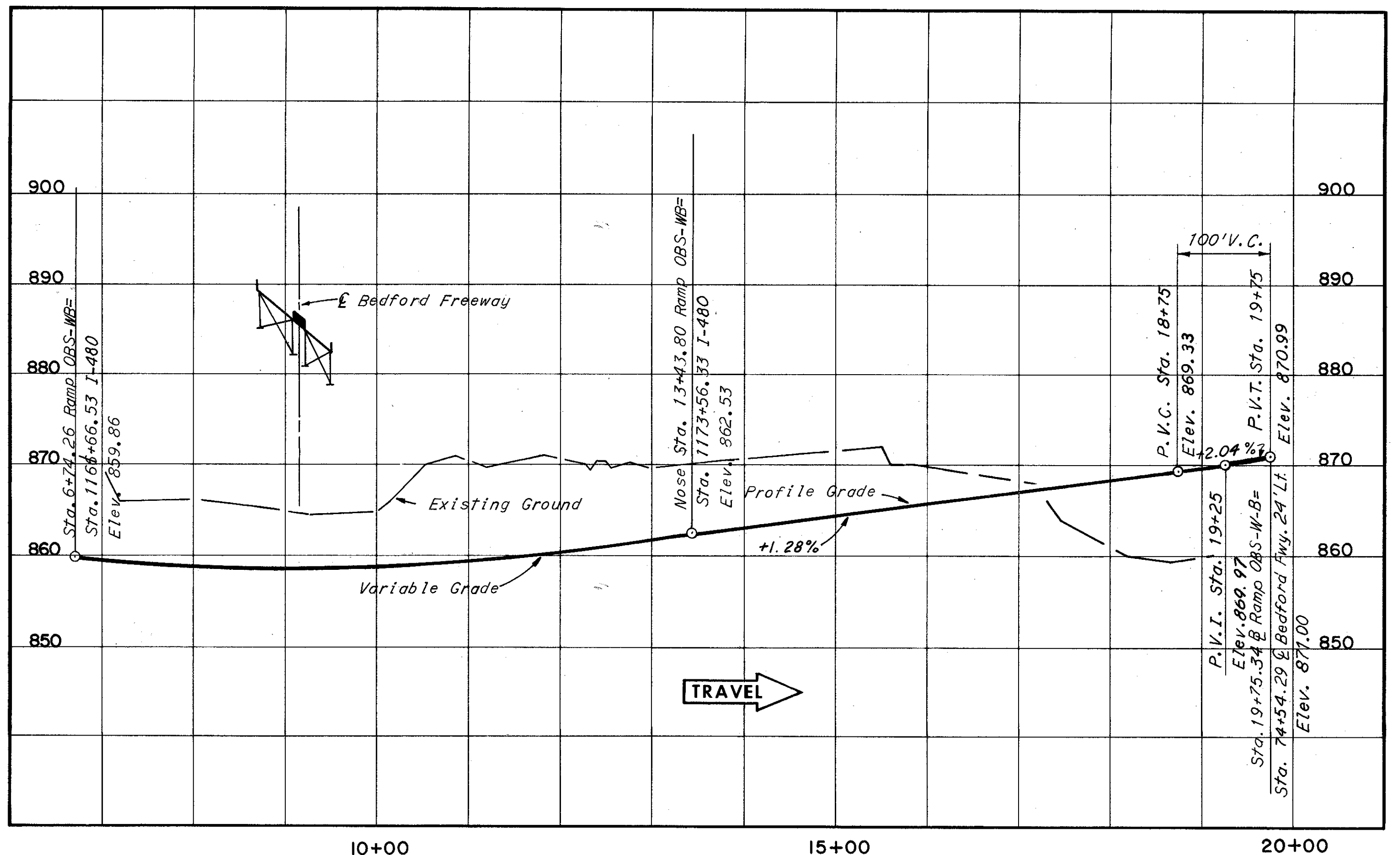
CUYAHOGA COUNTY  
CUY. 480-21.40

LEFT EDGE (24.00')	Superelevation Transition																				LEFT EDGE (24.00')																																									
	-.0830										+.0830																																																			
PROFILE GRADE	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	PROFILE GRADE																																								
GRADE	874.49	874.06	873.63	873.20	872.77	872.34	871.91	871.48	871.05	870.62	870.19	869.78	869.41	869.09	868.80	868.56	868.35	868.19	868.07	868.00	867.96	867.99	867.85	868.01	868.10	868.06	868.30	868.39	868.59	868.91	869.29	869.71	869.49	870.17	870.67	871.21	871.80	872.41	873.01	873.62	874.22	874.82	875.43	876.03	876.57	877.05	877.53	878.01	878.45	878.81	879.16	879.52	879.87	880.23	880.58	880.94	881.29	881.65	882.00	882.36	882.64	882.87

LEFT EDGE (18.00')	Superelevation Lt. + .0470 ft./ft.															LEFT EDGE (18.00')																																					
	Transition										Super. Lt. + .0830 ft./ft.																																										
PROFILE GRADE	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	PROFILE GRADE																										
GRADE	859.84	859.50	859.20	858.95	858.72	858.56	858.43	858.35	858.30	858.31	858.43	858.56	858.74	858.95	859.21	859.49	859.76	860.02	860.28	860.54	860.81	861.08	861.38	861.68	861.98	862.29	862.61	862.93	863.25	863.57	864.46	864.86	865.26	865.66	866.06	866.46	866.86	867.26	867.62	867.94	868.26	868.58	868.90	869.22	869.54	869.86	870.18	870.50	870.82	871.16	871.56	871.99	872.48

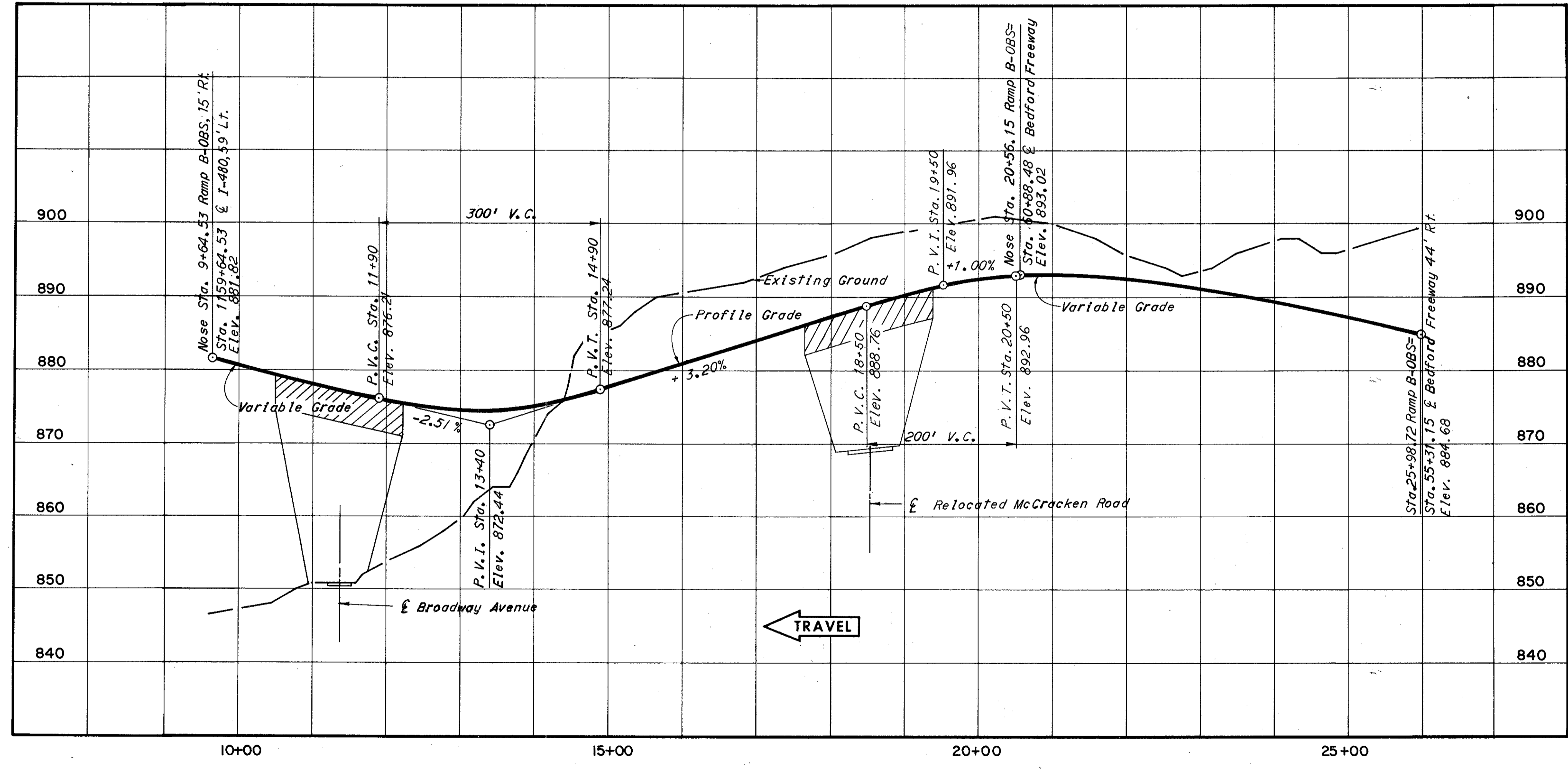


LANE B-OBS-E



RAMP OBS-W-B

PROFILE GRADE	ft	Super. Rt. +.0156 ft./ft.	Super. Trans.	Rt. +.083 ft./ft.	Super. Trans.	+0.32 ft./ft.	Superelevation Transition	ft	PROFILE GRADE
RIGHT EDGE		881.53							
PAVEMENT WIDTH		14.21							
	75	881.75							
	25	880.37							
	50	879.51							
	75	879.18							
	25	878.40							
	50	877.83							
	75	876.58							
	25	875.97							
	50	875.45							
	75	875.04							
	25	874.77							
	50	874.60							
	75	874.55							
	25	874.63							
	50	874.82							
	75	875.13							
	25	875.56							
	50	876.11							
	75	876.79							
	25	877.56							
	50	878.36							
	75	879.16							
	25	881.03							
	50	881.91							
	75	880.76							
	25	882.78							
	50	883.66							
	75	884.49							
	25	885.29							
	50	886.09							
	75	886.89							
	25	887.69							
	50	888.49							
	75	889.29							
	25	890.09							
	50	890.78							
	75	891.37							
	25	891.90							
	50	892.36							
	75	892.76							
	25	893.10							
	50	893.37							
	75	892.68							
	25	892.96							
	50	893.17							
	75	893.29							
	25	893.23							
	50	893.09							
	75	892.87							
	25	892.63							
	50	892.33							
	75	891.99							
	25	891.63							
	50	891.20							
	75	890.75							
	25	890.26							
	50	889.74							
	75	889.13							
	25	888.48							
	50	887.82							
	75	887.17							
	25	886.58							
	50	886.10							
	75	885.62							
	25	885.15							

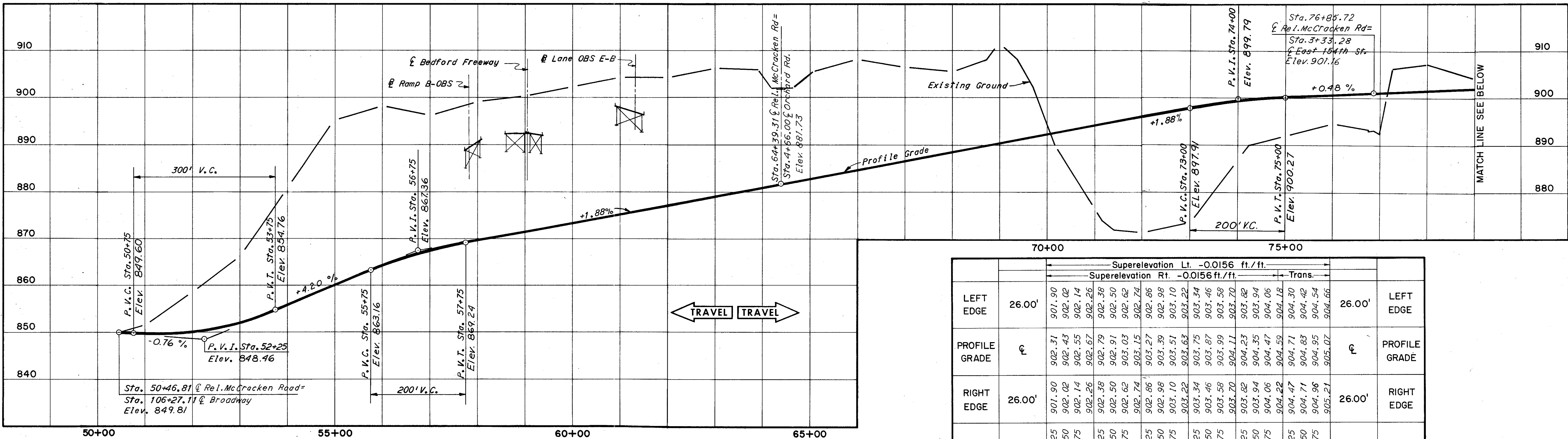


RAMP B-OBS

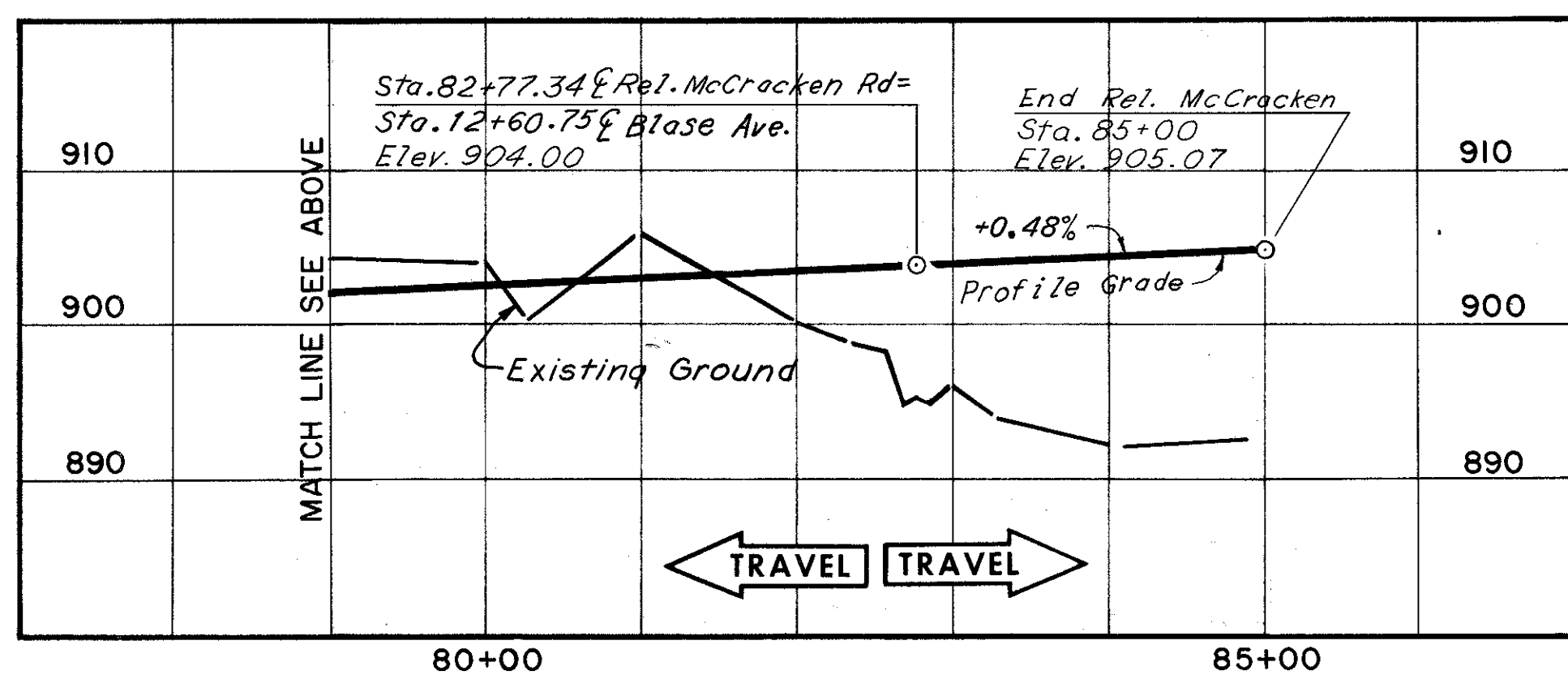
Vert. 1"=10'  
SCALE: HORIZ. 1"=100'  
MADE BY: H.N. DATE: 10-6-67  
TRCD: J.H.C.H. DATE: 10-6-67  
CKD: J.H.C.H. DATE: 10-6-67  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

LEFT EDGE	26.00'	Super. Trans.		Superelevation Lt. +0.0510 ft./ft.		Super. Trans.		Superelevation Lt. -0.0200 ft./ft.		Super. Trans.		Superelevation Lt. -0.0156 ft./ft.		26.00'	LEFT EDGE
		Rt. -0.0156	Trans.	Superelevation Rt. -0.0510 ft./ft.	Sup. Trans.	Superelevation Rt. +0.0200 ft./ft.	Super. Trans.	Superelevation Rt. -0.0156 ft./ft.	Super. Trans.						
		See Inter-section Detail													
PROFILE GRADE	f	849.60	849.46	849.43	849.50	849.67	849.94	850.22	850.83	851.54	852.36	853.27	854.29	855.41	856.58
		75	25	50	75	25	50	75	25	50	75	25	50	75	25
RIGHT EDGE	26.00'	See Inter-section Detail													
PROFILE GRADE	f	849.53	849.91	850.39	851.39	852.08	853.87	855.23	857.76	860.11	862.29	864.49	866.83	869.48	872.92
		75	25	50	75	25	50	75	25	50	75	25	50	75	25



LEFT EDGE	26.00'	Super. Trans.		Superelevation Lt. -0.0156 ft./ft.		Super. Trans.		Superelevation Rt. -0.0156 ft./ft.		26.00'	LEFT EDGE
		Rt. -0.0156	Trans.	Superelevation Rt. -0.0156 ft./ft.	Super. Trans.	Superelevation Rt. -0.0156 ft./ft.	Super. Trans.				
PROFILE GRADE	f	901.90	902.31	902.43	902.55	902.67	902.79	902.91	903.03	903.15	903.27
		25	75	25	75	25	75	25	75	25	75
RIGHT EDGE	26.00'	901.90	902.02	902.14	902.26	902.38	902.50	902.62	902.74	902.86	902.98
		25	75	25	75	25	75	25	75	25	75



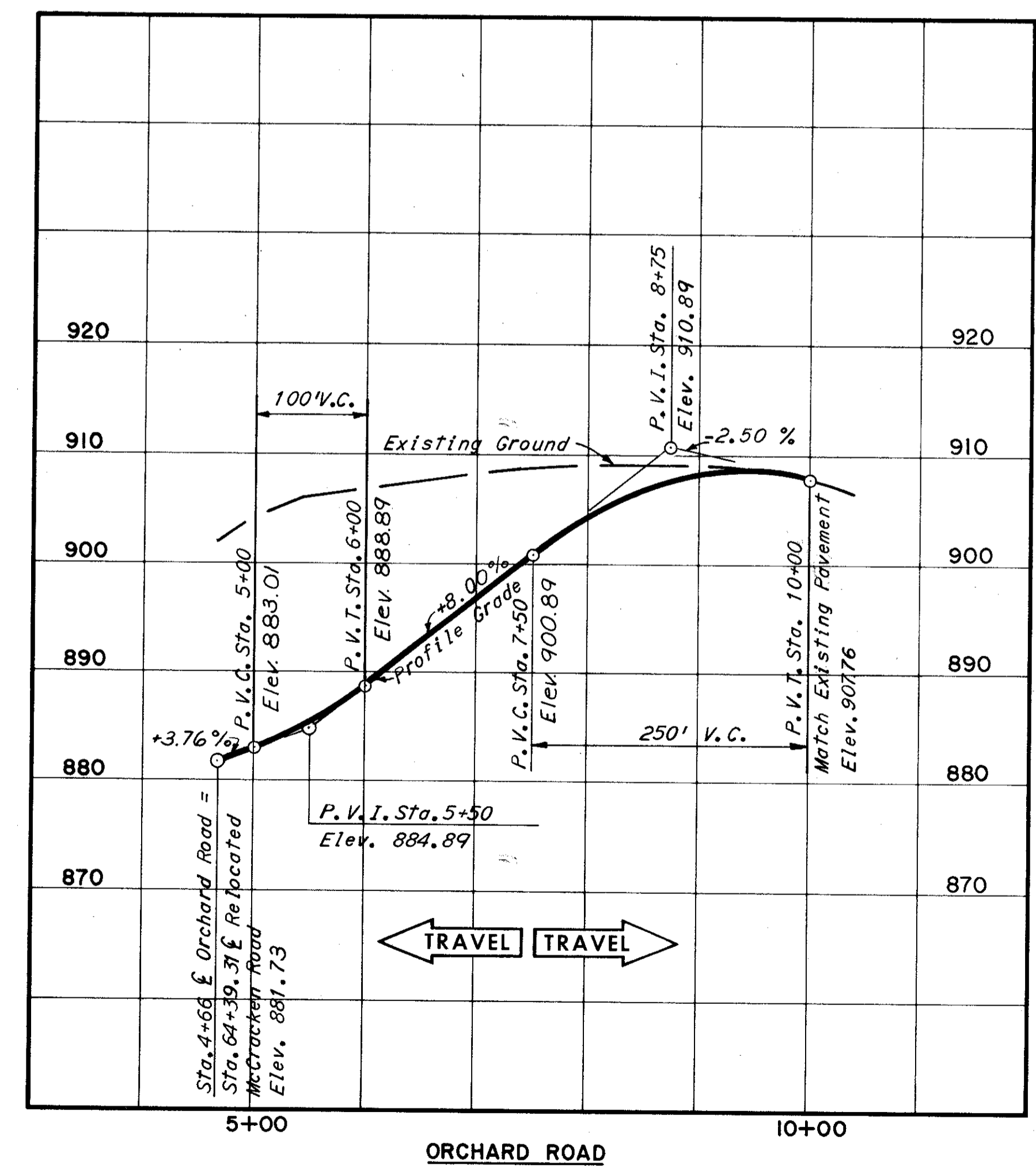
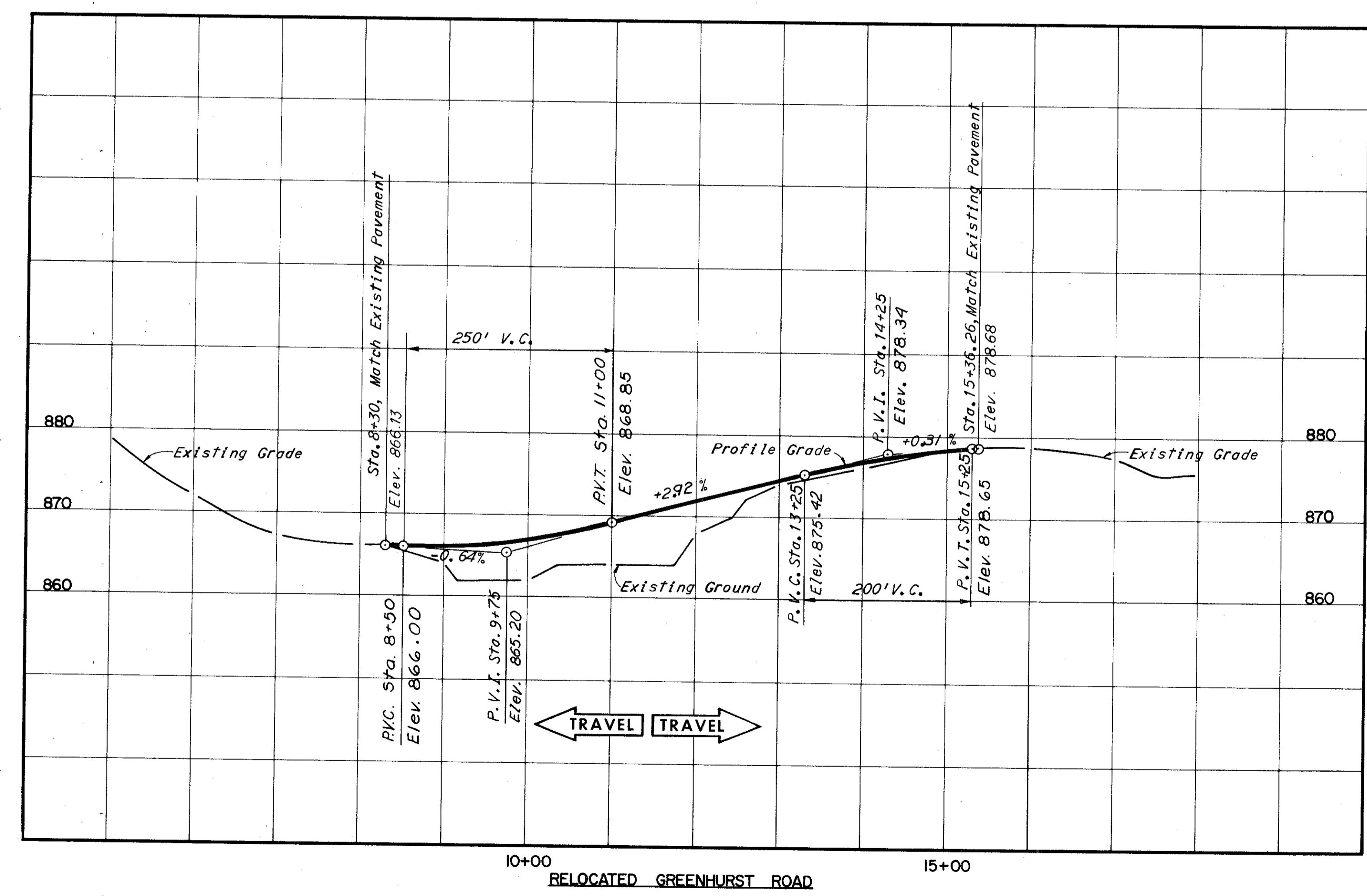
Vert. 1"=10'  
SCALE Hor. 1"=100'  
MADE BY R.B. DATE 10-6-67  
TRCD BY J.H.C.H. DATE 10-6-67  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

RELOCATED McCRACKEN ROAD

PROFILE RELOCATED McCRACKEN ROAD

		Superelevation Lt. -0.0156 ft./ft.																												
		Superelevation Rt. -0.0156 ft./ft.																												
		Trans.																												
LEFT EDGE	12.00'	See Inter-section Detail															12.00'	LEFT EDGE												
PROFILE GRADE	F	866.00	865.88	865.92	866.07	866.31	866.12	866.64	866.87	867.36	867.97	868.66	869.39	870.12	870.85	871.58	872.31	873.04	873.77	874.50	875.23	875.92	876.53	877.24	877.99	878.66	878.15	878.65	F	PROFILE GRADE
RIGHT EDGE	12.00'	Same as Left Edge															12.00'	RIGHT EDGE												
		50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25		

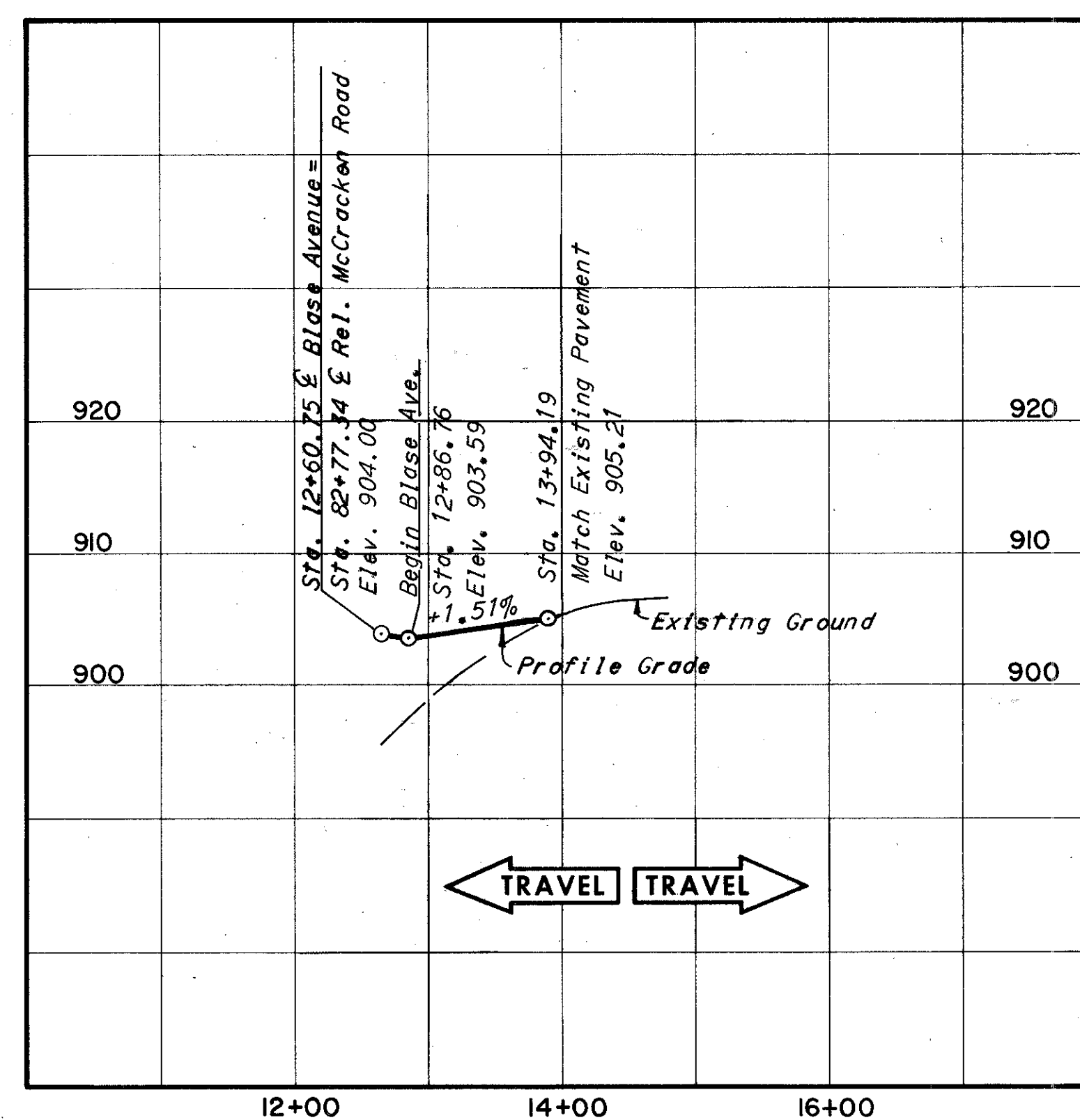
		Superelevation Lt. -0.0156 ft./ft.																														
		Super. Rt. -0.0156 ft./ft.																														
		Trans.																														
LEFT EDGE	12.00'	See Inter-section Detail															12.00'	LEFT EDGE														
PROFILE GRADE	F	883.01	884.08	885.42	887.02	886.83	888.70	888.89	890.70	890.70	892.70	894.70	896.89	896.70	898.89	898.70	900.70	900.70	902.57	904.36	904.17	905.52	906.60	907.42	907.97	908.27	908.30	908.46	908.26	907.76	F	PROFILE GRADE
RIGHT EDGE	12.00'	See Inter-section Detail															12.00'	RIGHT EDGE														
		25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25			



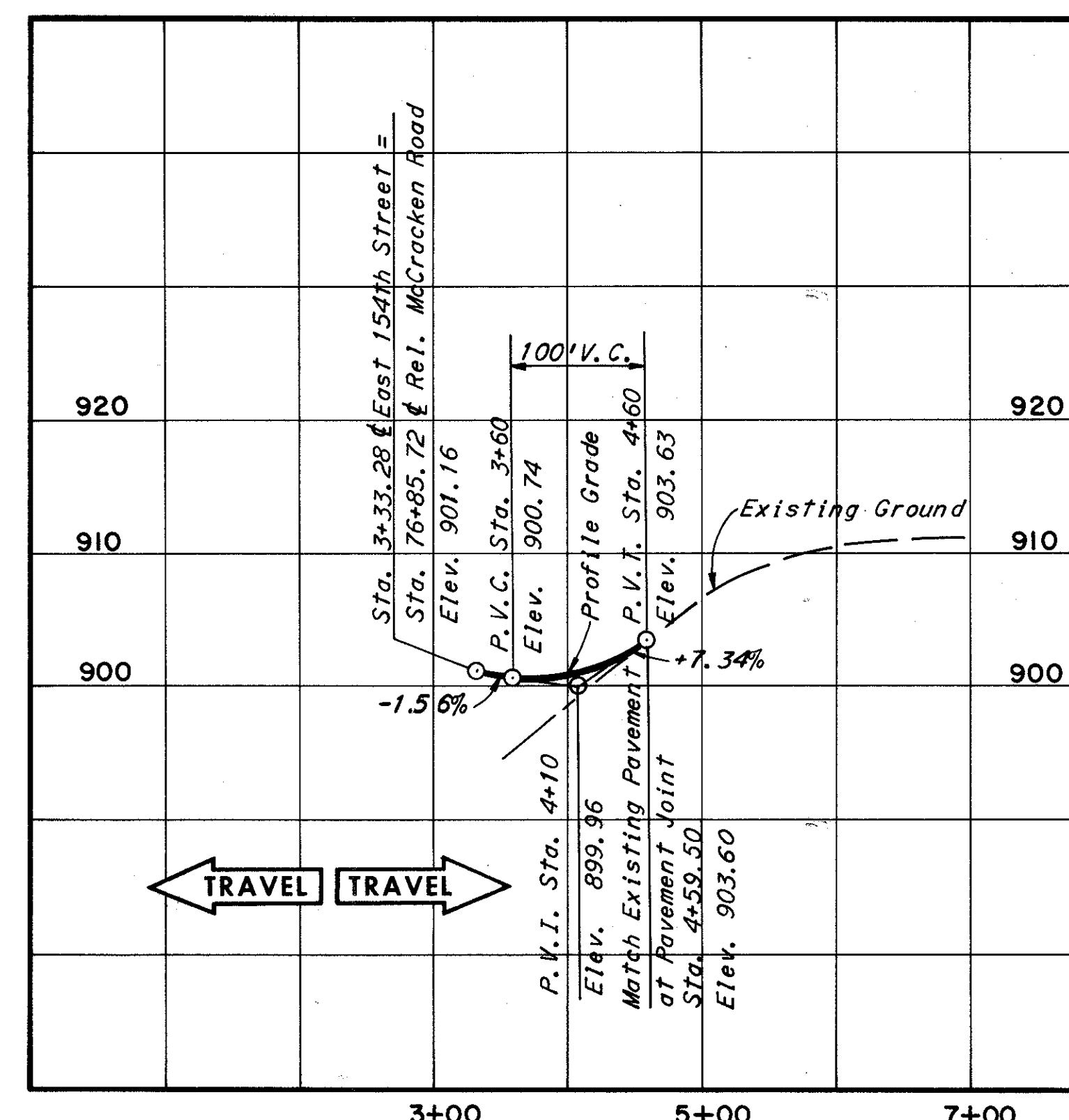
Vert. 1"=10'  
 SCALE 1/8"=10'  
 MADE P.B. DATE 10-6-67  
 TRCD J.H. DATE 10-6-67  
 CKD J.H.C.H. DATE 10-6-67  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

		Lt. -0.0156		Rt. +0.0156		
LEFT EDGE		See Inter-section Details				LEFT EDGE
PROFILE GRADE	ƒ	903.79	904.17	904.54	904.92	ƒ
RIGHT EDGE		See Inter-section Details				RIGHT EDGE
		25	50	75	25	50
		75	25	50	75	

		Super. Lt. .0156 ft. per ft.		Rt. .0156 ft. per ft.		
LEFT EDGE	12.00'	See Inter-section Details				12.00'
PROFILE GRADE	€	900.90	900.61	900.83	901.61	€
RIGHT EDGE	12.00'	See Inter-section Details		See Inter-section Details		12.00'
		50	75	25	50	
		75	25	50	75	



BLASE AVENUE



EAST 154th STREET



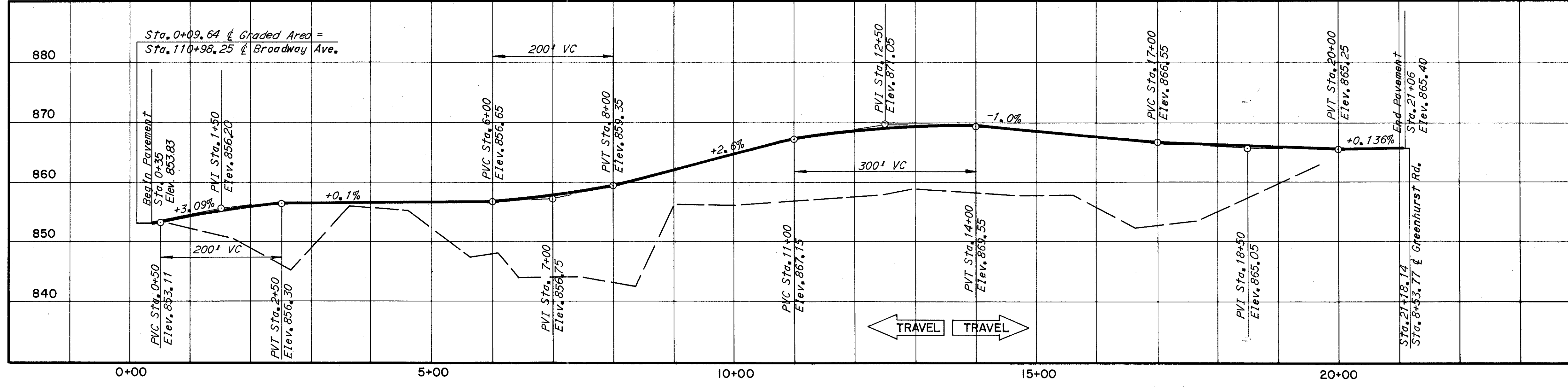
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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**CUYAHOGA COUNTY**  
CUY. 480-21.40

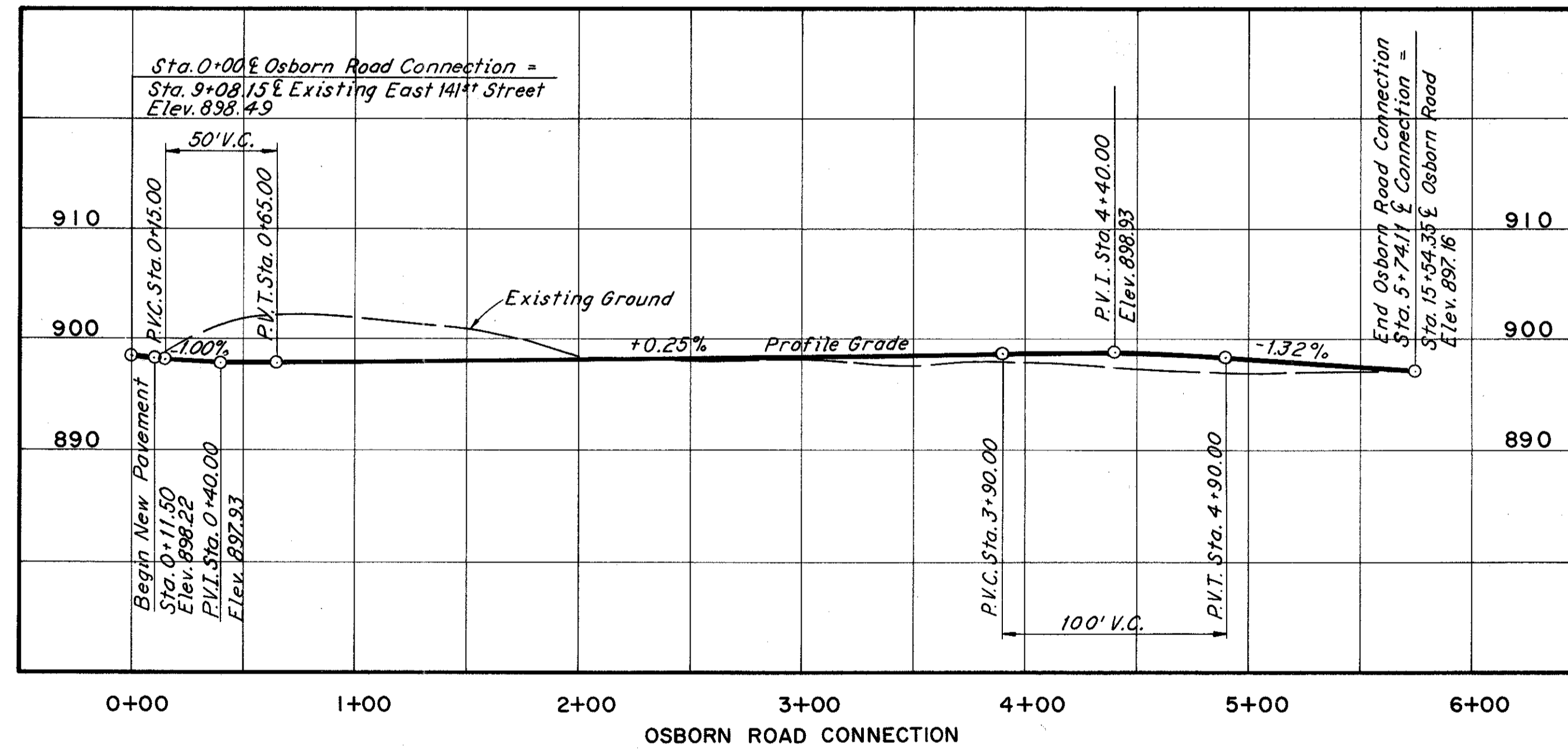
WEST BOUND			EAST BOUND
			WEST BOUND
			EAST BOUND
LEFT EDGE	+ 0.0156 ft/ft		LEFT EDGE
			EAST BOUND
			RIGHT EDGE
50	* 852.99	853.11	* 852.99
75	853.72	853.84	853.72
25	854.35	854.47	854.35
50	854.89	855.01	854.89
75	855.33	855.45	855.33
25	855.68	855.80	855.68
50	855.94	856.06	855.94
75	856.11	856.23	856.11
25	856.18	856.30	856.18
50	856.20	856.32	856.20
75	856.23	856.35	856.23
25	856.25	856.37	856.25
50	856.28	856.40	856.28
75	856.30	856.42	856.30
25	856.33	856.45	856.33
50	856.35	856.47	856.35
75	856.38	856.50	856.38
25	856.40	856.52	856.40
50	856.43	856.55	856.43
75	856.45	856.57	856.45
25	856.48	856.60	856.48
50	856.50	856.62	856.50
75	856.53	856.65	856.53
25	856.59	856.71	856.59
50	856.74	856.86	856.74
75	857.07	857.19	857.07
25	857.25	857.37	857.25
50	857.68	857.80	857.68
75	858.09	858.21	858.09
25	858.62	858.74	858.62
50	859.23	859.35	859.23
75	859.88	860.00	859.88
25	860.53	860.65	860.53
50	861.18	861.30	861.18
75	861.83	861.95	861.83
25	862.48	862.60	862.48
50	863.13	863.25	863.13
75	863.78	863.90	863.78
25	864.43	864.55	864.43
50	865.08	865.20	865.08
75	865.73	865.85	865.73
25	866.37	866.50	866.37
50	867.03	867.15	867.03
75	867.64	867.76	867.64
25	868.18	868.30	868.18
50	868.64	868.76	868.64
75	869.03	869.15	869.03
25	869.34	869.46	869.34
50	869.58	869.70	869.58
75	869.74	869.86	869.74
25	869.83	869.95	869.83
50	869.84	869.96	869.84
75	869.78	869.90	869.78
25	869.64	869.76	869.64
50	869.43	869.55	869.43
75	869.18	869.30	869.18
25	868.93	869.05	868.93
50	868.68	868.80	868.68
75	868.43	868.55	868.43
25	868.18	868.30	868.18
50	867.93	868.05	867.93
75	867.68	867.80	867.68
25	867.43	867.55	867.43
50	867.18	867.30	867.18
75	866.93	867.05	866.93
25	866.68	866.80	866.68
50	866.43	866.55	866.43
75	866.19	866.31	866.19
25	865.98	866.10	865.98
50	865.79	865.91	865.79
75	865.62	865.74	865.62
25	865.48	865.60	865.48
50	865.36	865.48	865.36
75	865.26	865.38	865.26
25	865.19	865.31	865.19
50	865.13	865.25	865.13
75	865.12	865.24	865.12
25	865.11	865.23	865.11
50	865.16	865.28	865.16
75	865.20	865.32	865.20
25	865.23	865.35	865.23
50	865.27	865.39	865.27

\* See Intersection Details Sheet No. 66



Vert. 1"=10'  
SCALE: Hor. 1"=100'  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
MADE F.R.A. DATE 1-10-68 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 3-5-69  
CKD J.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

		← Superelevation Lt. -0.0156 ft./ft. →																							
		← Superelevation Rt. -0.0156 ft./ft. →																							
LEFT EDGE	See Inter-section Details	897.83	897.89	897.95	898.02	898.08	898.14	898.20	898.27	898.33	898.39	898.45	898.51	898.58	898.63	898.60	898.48	898.26	897.95	897.62	897.29	12.00'	LEFT EDGE		
PROFILE GRADE		898.49	897.99	898.02	898.08	898.14	898.21	898.27	898.33	898.39	898.46	898.52	898.58	898.64	898.70	898.77	898.82	898.79	898.67	898.45	898.14	897.81	897.48	ƒ	PROFILE GRADE
RIGHT EDGE	See Inter-section Details	897.83	897.89	897.95	898.02	898.08	898.14	898.20	898.27	898.33	898.39	898.45	898.51	898.58	898.63	898.60	898.48	898.26	897.95	897.62	897.29	12.00'	RIGHT EDGE		
		25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50	75	25	50				

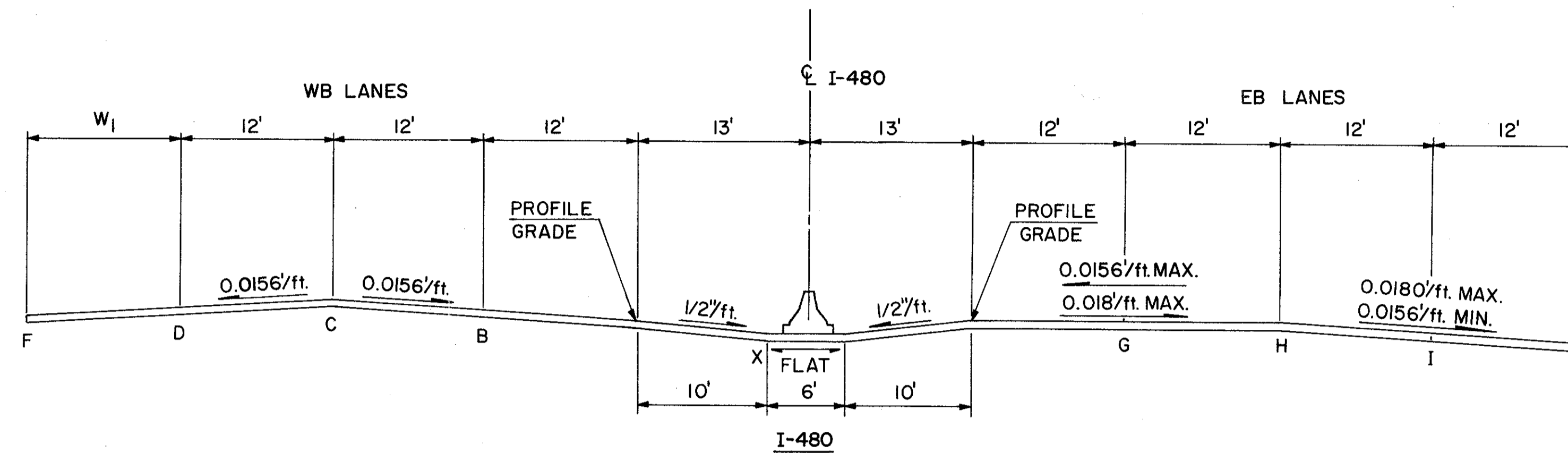


# SUPERELEVATION TABLES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

59  
390

CUYAHOGA COUNTY  
C.U.Y. 480-21.40



STA. 1152+77.03 TO STA. 1159+64.53

STATION	W <sub>1</sub>	F	D	C	B	X	PROFILE GRADE	G	H	I	J		
1152+77.03	12.00	Same As Profile Grade	Same As B	901.54	901.36	900.75	901.17	900.95	900.74	900.52	900.31		
1153+00				901.09	900.91	900.30	900.72	900.56	900.40	900.21	900.03		
1153+25				900.58	900.40	899.79	900.21	900.11	900.02	899.83	899.64		
1153+50				900.04	899.86	899.25	899.67	899.64	899.60	899.41	899.23		
1153+75				899.48	899.30	898.69	899.11	899.12	899.14	898.95	898.77		
1154+00				898.89	898.71	898.10	898.52	898.57	898.61	898.42	898.24		
1154+25				898.28	898.10	897.49	897.91	897.99	898.06	897.87	897.69		
1154+44.53	12.00					897.78	897.60	896.99	897.41	897.51	897.61	897.42	897.24
1154+50	12.14			897.26		897.64	897.46	897.85	897.27	897.38	897.49	897.30	897.12
1154+75	12.76			896.59		896.98	896.80	896.19	896.61	896.75	896.89	896.70	896.52
1155+00	13.39	895.89		896.29	896.11	895.50	895.92	896.09	896.26	896.07	895.89		
1155+25	14.01	895.17		895.58	895.40	894.79	895.21	895.40	895.58	895.39	895.21		
1155+50	14.64	894.42		894.84	894.66	894.05	894.47	894.66	894.84	894.65	894.47		
1155+75	15.26	893.66		894.09	893.91	893.30	893.72	893.91	894.09	893.90	893.72		
1156+00	15.89	892.90		893.34	893.16	892.55	892.97	893.16	893.34	893.15	892.97		
1156+25	16.51	892.15		892.59	892.41	891.80	892.22	892.41	892.59	892.40	892.22		
1156+50	17.14	891.39		891.84	891.66	891.05	891.47	891.66	891.84	891.65	891.47		
1156+75	17.76	890.63		891.09	890.91	890.30	890.72	890.91	891.09	890.90	890.72		
1157+00	18.39	889.87		890.34	890.16	889.55	889.97	890.16	890.34	890.15	889.97		
1157+25	19.01	889.11		889.59	889.41	888.80	889.22	889.41	889.59	889.40	889.22		
1157+50	19.64	888.35		888.84	888.66	888.05	888.47	888.66	888.84	888.65	888.47		
1157+75	20.26	887.59		888.09	887.91	887.30	887.72	887.91	888.09	887.90	887.72		
1158+00	20.89	886.83		887.34	887.16	886.55	886.97	887.16	887.34	887.15	886.97		
1158+25	21.51	886.07		886.59	886.41	885.80	886.22	886.39	886.57	886.38	886.20		
1158+50	22.14	885.31		885.84	885.66	885.05	885.47	885.61	885.76	885.56	885.39		
1158+75	22.76	884.55		885.09	884.91	884.30	884.72	884.83	884.94	884.75	884.57		
1159+00	23.39	883.79		884.34	884.16	883.55	883.97	884.05	884.13	883.94	883.76		
1159+25	24.01	883.03		883.59	883.41	882.80	883.22	883.27	883.32	883.13	882.95		
1159+50	24.64	882.27		882.84	882.66	882.05	882.47	882.49	882.51	882.32	882.14		
1159+64.53	25.00	881.82		882.40	882.22	881.61	882.03	882.03	882.03	881.84	881.66		

SCALE None HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE RHA DATE 4-2-68 CONSULTING ENGINEERS  
 TRCD. RHA DATE 4-2-68  
 CKD. JM DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK







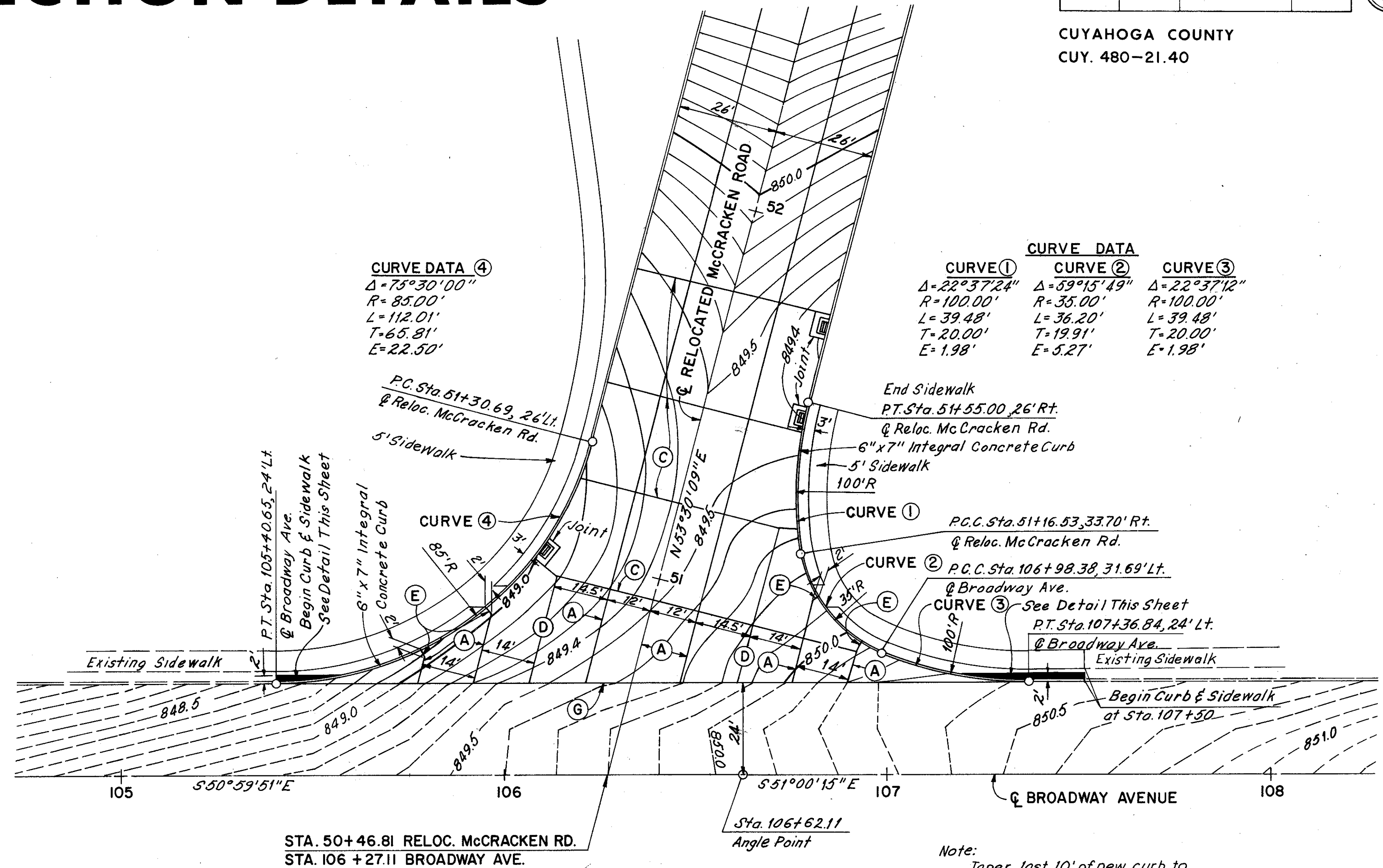


# INTERSECTION DETAILS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

64  
390

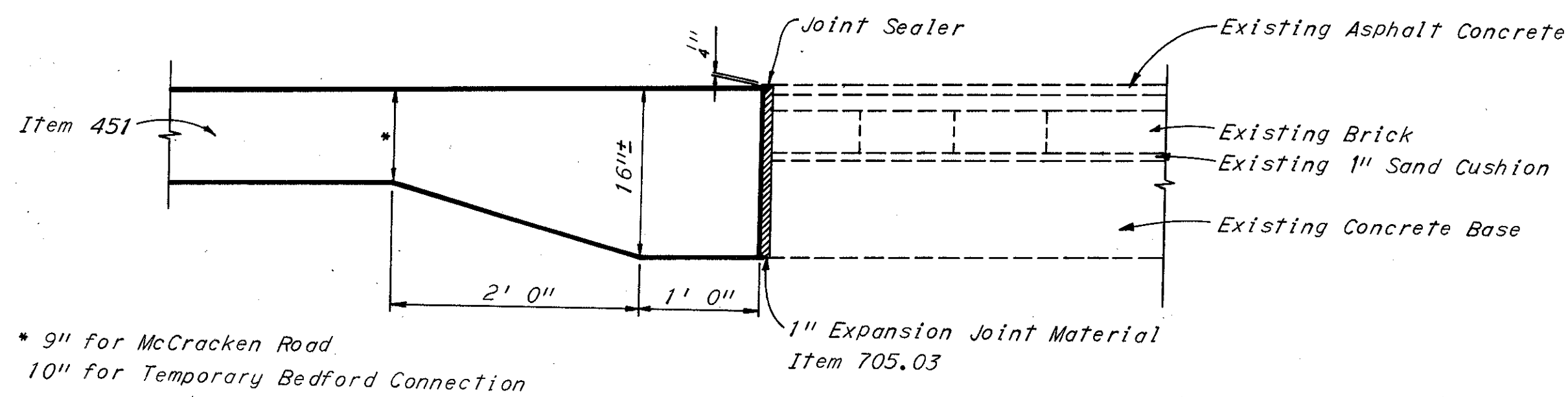
CUYAHOGA COUNTY  
CUY. 480-21.40



Note:  
Taper last 10' of new curb to match Broadway existing curb.

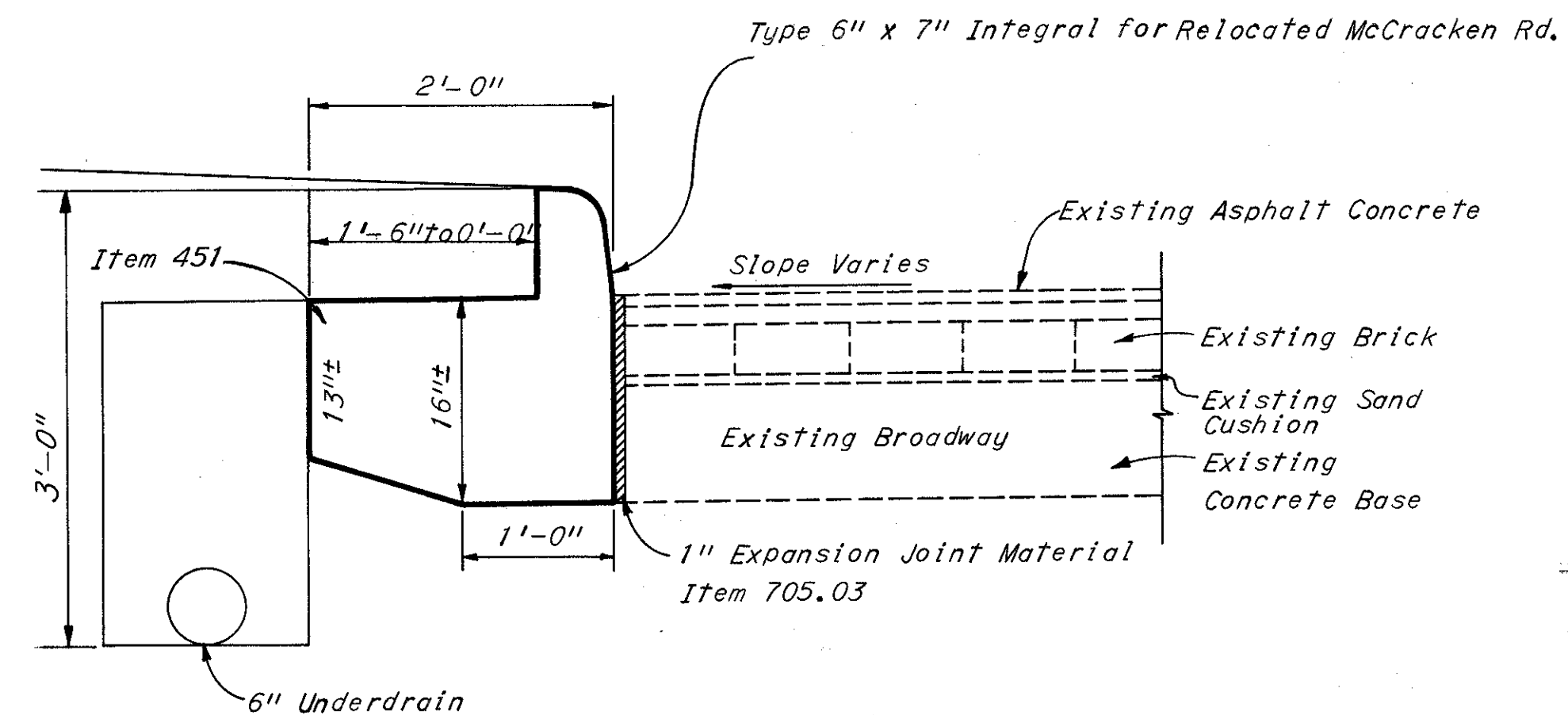
## RELOCATED McCracken ROAD

Scale 1"=20'



### THICKENED-EDGE JOINT ⑥

Scale 1"=1'



### SPECIAL DETAIL AT BEGINNING OF TAPER

Scale 1"=1'

### JOINT LEGEND

- Ⓐ Standard Longitudinal Joint
- Ⓒ Standard Contraction Joint
- Ⓓ Key Joint without Tiebars
- Ⓔ Expansion Joint without Dowels
- Ⓖ Thickened Edge Joint

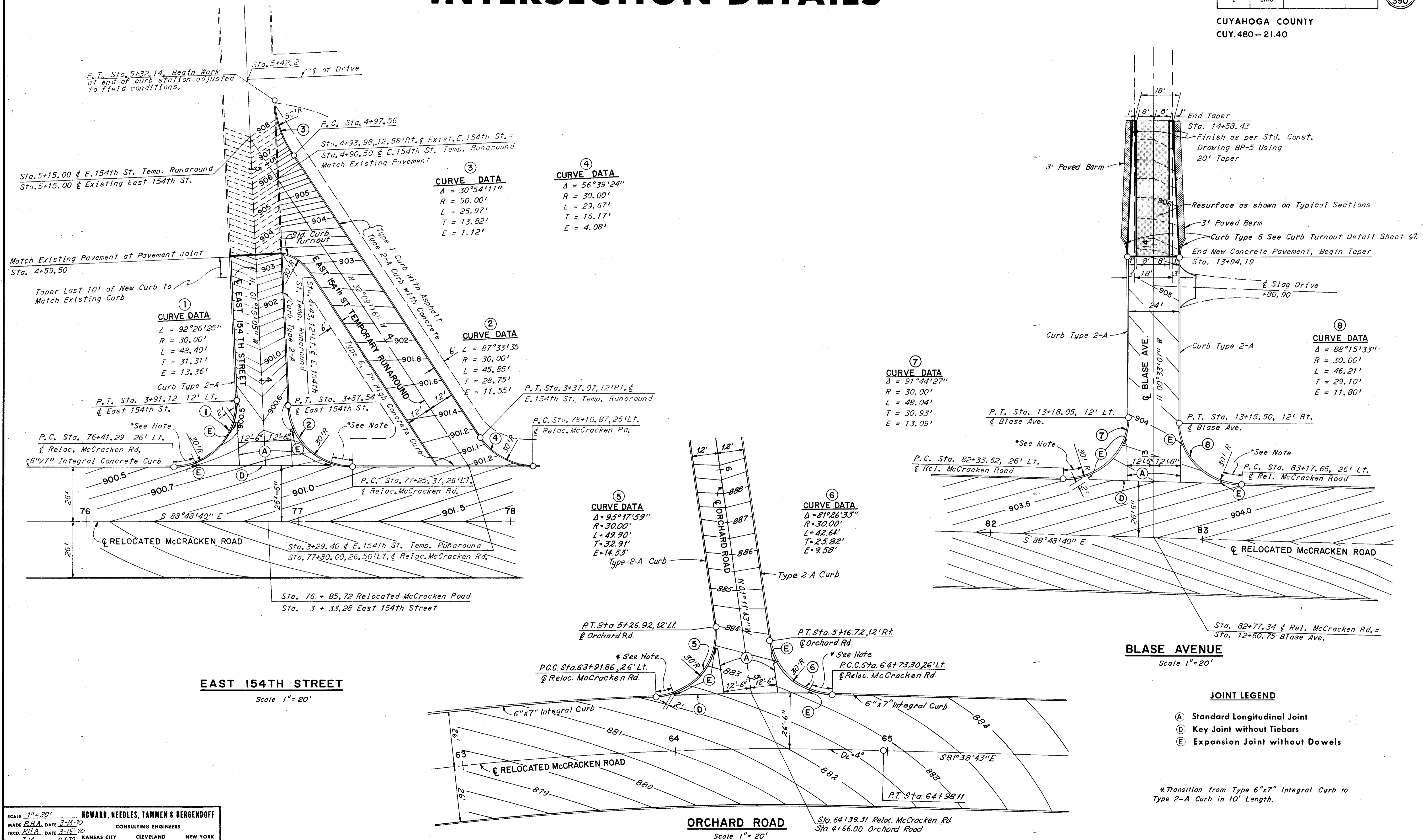
SCALE As Shown  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE R.H.A. DATE 5-1-68 CONSULTING ENGINEERS  
 TRCD. H.L.D. DATE 5-1-68  
 CKD. J.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK



# INTERSECTION DETAILS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

CUYAHOGA COUNTY  
CUY.480-21.40



**③ CURVE DATA**  
 $\Delta = 30^{\circ}54'11''$   
 $R = 50.00'$   
 $L = 26.97'$   
 $T = 13.82'$   
 $E = 1.12'$

**④ CURVE DATA**  
 $\Delta = 56^{\circ}39'24''$   
 $R = 30.00'$   
 $L = 29.67'$   
 $T = 16.17'$   
 $E = 4.08'$

**① CURVE DATA**  
 $\Delta = 92^{\circ}26'25''$   
 $R = 30.00'$   
 $L = 48.40'$   
 $T = 31.31'$   
 $E = 13.36'$

**② CURVE DATA**  
 $\Delta = 87^{\circ}33'35''$   
 $R = 30.00'$   
 $L = 45.85'$   
 $T = 28.75'$   
 $E = 11.55'$

**⑤ CURVE DATA**  
 $\Delta = 95^{\circ}17'59''$   
 $R = 30.00'$   
 $L = 49.90'$   
 $T = 32.91'$   
 $E = 14.53'$

**⑥ CURVE DATA**  
 $\Delta = 81^{\circ}26'33''$   
 $R = 30.00'$   
 $L = 42.64'$   
 $T = 25.82'$   
 $E = 9.58'$

**⑦ CURVE DATA**  
 $\Delta = 91^{\circ}44'27''$   
 $R = 30.00'$   
 $L = 48.04'$   
 $T = 30.93'$   
 $E = 13.09'$

**⑧ CURVE DATA**  
 $\Delta = 88^{\circ}15'33''$   
 $R = 30.00'$   
 $L = 46.21'$   
 $T = 29.10'$   
 $E = 11.80'$

**EAST 154TH STREET**  
Scale 1" = 20'

**BLASE AVENUE**  
Scale 1" = 20'

**ORCHARD ROAD**  
Scale 1" = 20'

- JOINT LEGEND**
- (A) Standard Longitudinal Joint
  - (D) Key Joint without Tiebars
  - (E) Expansion Joint without Dowels

\*Transition from Type 6"x7" Integral Curb to Type 2-A Curb in 10' Length.

SCALE 1" = 20'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE R.H.A. DATE 3-15-70 CONSULTING ENGINEERS  
 TRCD. R.H.A. DATE 3-15-70 KANSAS CITY CLEVELAND NEW YORK  
 CKD. J.M. DATE 4-1-70

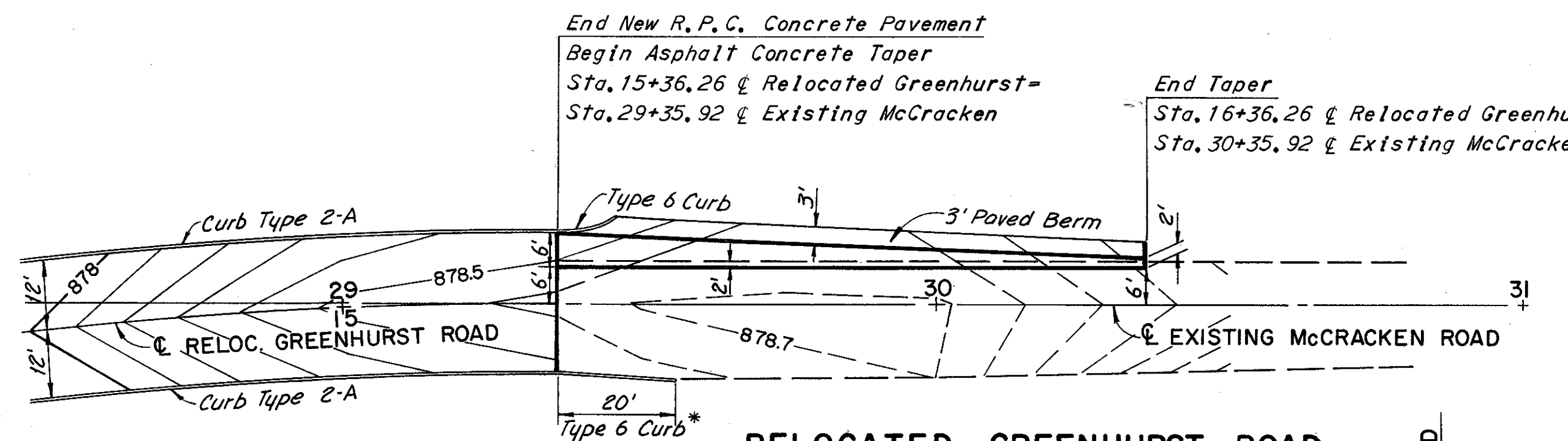
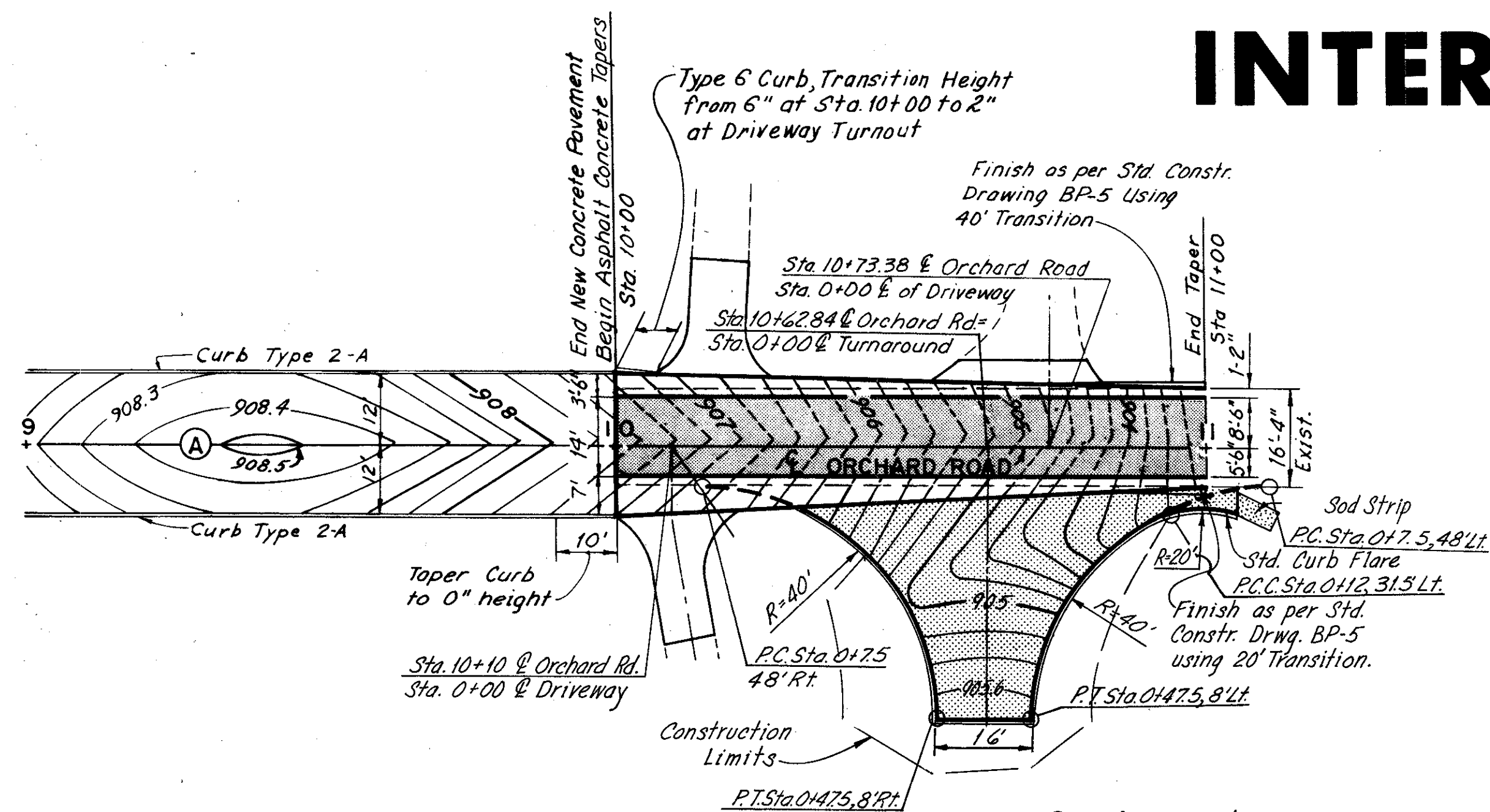
# INTERSECTION DETAILS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

66  
390

CUYAHOGA COUNTY  
CUY 480-21.40

Finish as per Standard Construction Drawing BP-5 using 22' Transition

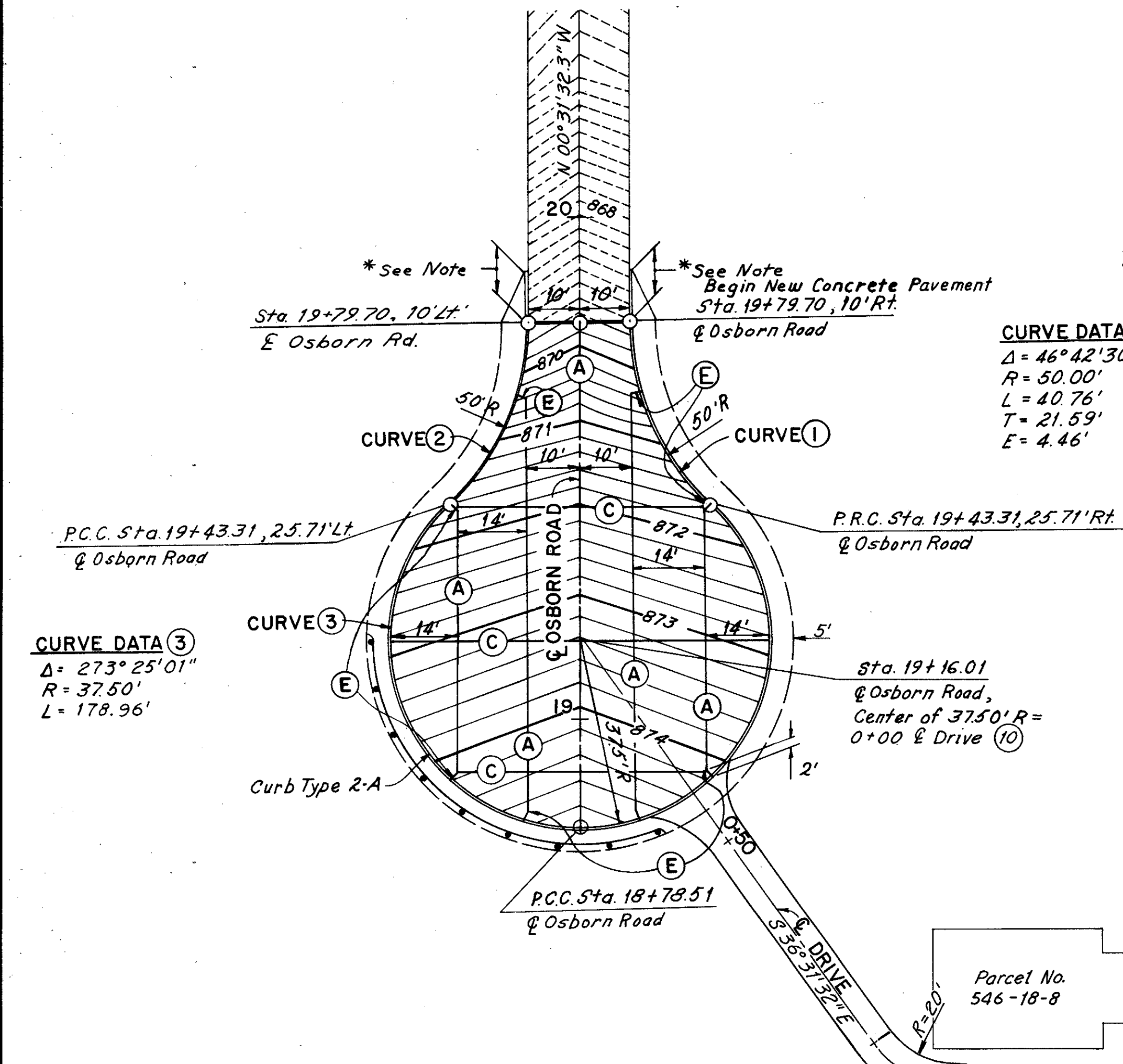


**JOINT LEGEND**

- (A) Standard Longitudinal Joint
- (C) Standard Contraction Joint
- (E) Expansion Joint without Dowels

**ORCHARD ROAD**  
Scale 1"=20'

Resurface as shown on Typical Sections  
Class "A" Temporary Pavement, as per plan



**CURVE DATA (1)**

Δ = 61°02'43"  
R = 30.00'  
L = 31.96'  
T = 17.69'  
E = 4.63'

**CURVE DATA (2)**

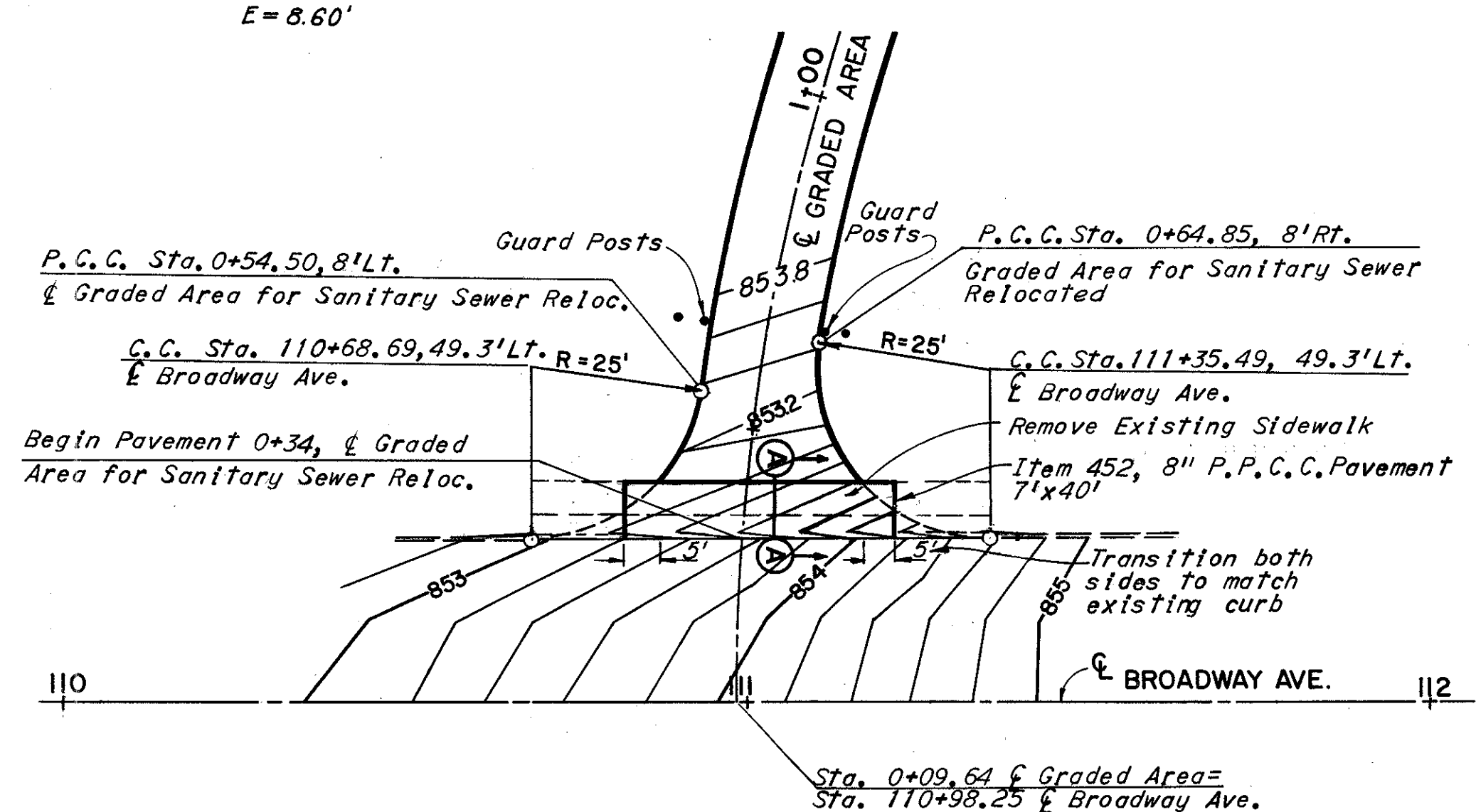
Δ = 77°59'44"  
R = 30.00'  
L = 40.84'  
T = 24.29'  
E = 8.60'

**CURVE DATA (3)**

Δ = 46°42'30"  
R = 50.00'  
L = 40.76'  
T = 21.59'  
E = 4.46'

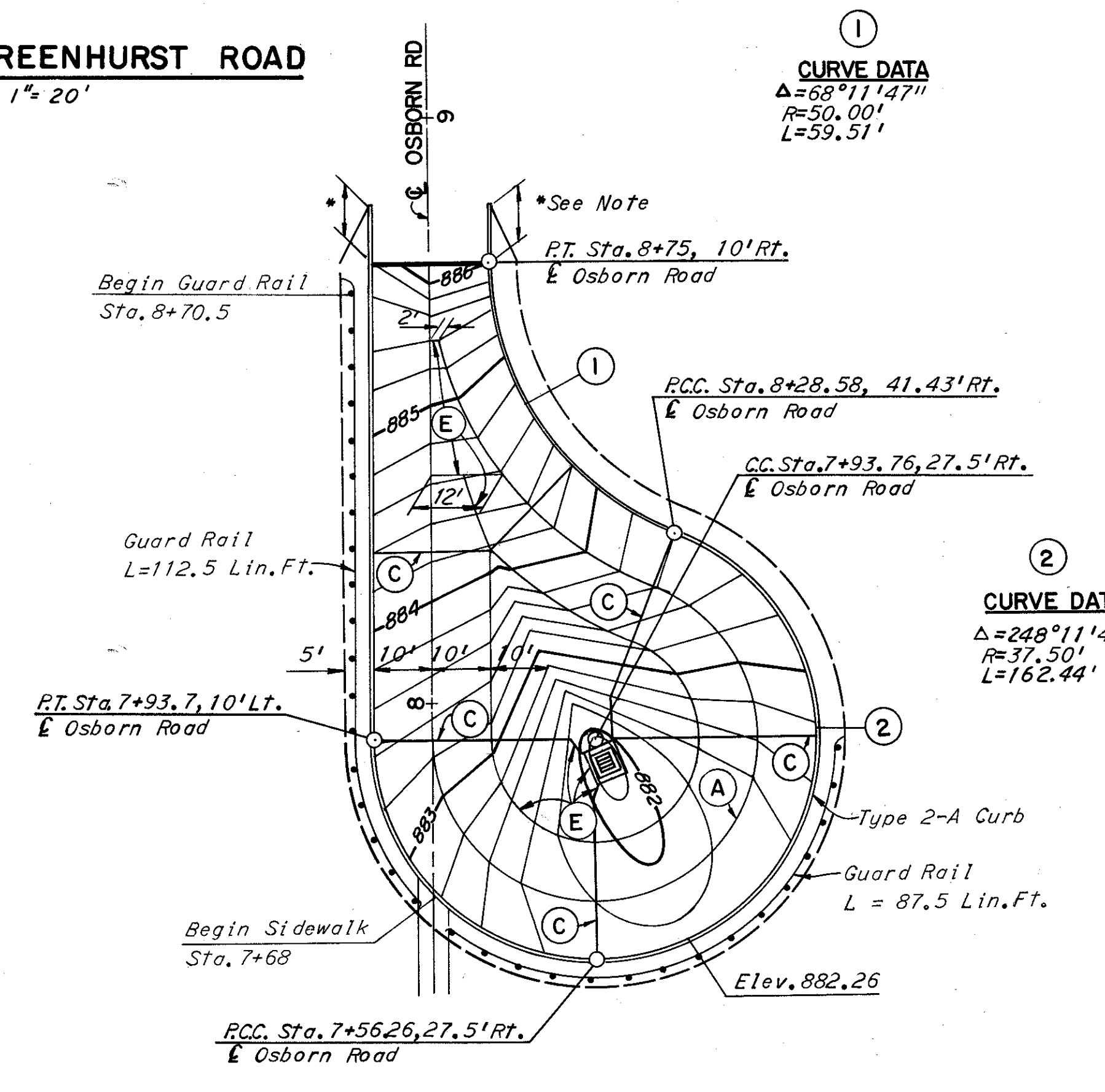
**CURVE DATA (3)**

Δ = 273°25'01"  
R = 37.50'  
L = 178.96'



**GRADED AREA FOR SANITARY SEWER RELOCATED**  
Scale 1"=20'

\* Note  
Type 6 Curb, Transition Height Uniformly from 6" to 0" in 20' Length.



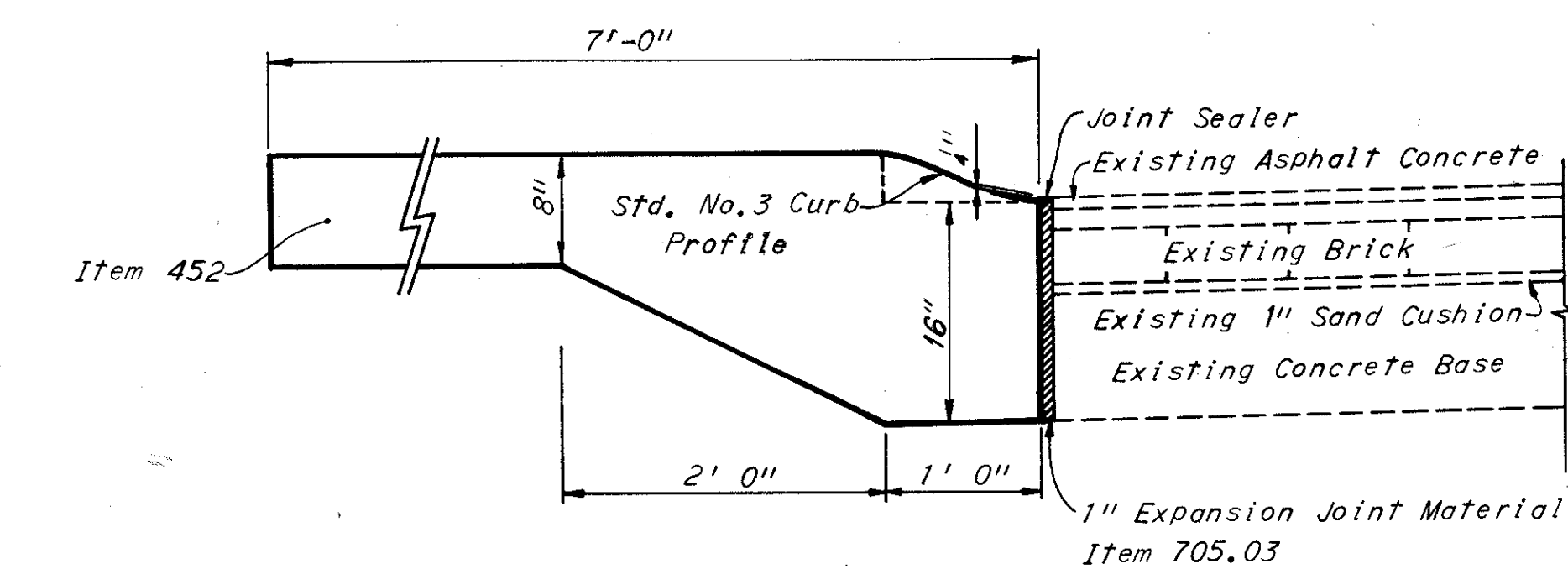
**CURVE DATA (1)**

Δ = 68°11'47"  
R = 50.00'  
L = 59.51'

**CURVE DATA (2)**

Δ = 248°11'47"  
R = 37.50'  
L = 162.44'

**OSBORN ROAD**  
Scale 1"=20'



**SECTION A-A**

SCALE 1"=20' HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE RHA DATE 3-15-70 CONSULTING ENGINEERS  
TRCD RHA DATE 3-15-70  
CKD IM DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

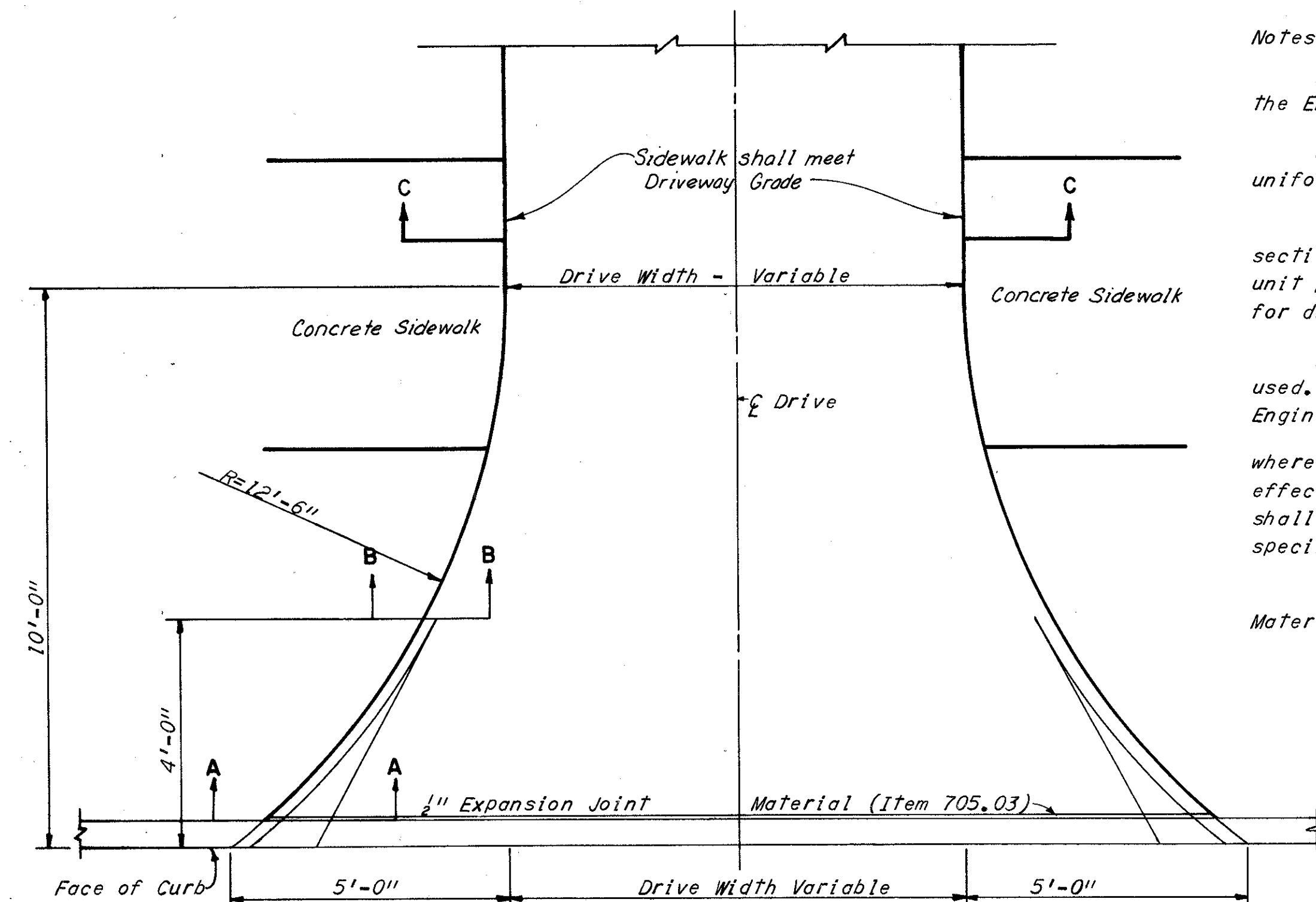


# MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

67  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



**CONCRETE APRON DETAIL**  
No Scale:

**Notes:**

Drive Apron Curb Section is to be placed where directed by the Engineer.

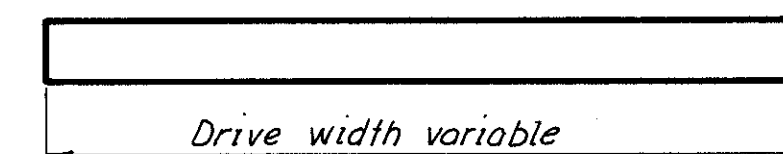
Form drive apron curb Sect. "A-A" behind curb line and taper out uniformly to no curb 4'-0" behind gutter line, as shown.

The cost of all labor and material necessary to construct curb section and thickened edge as shown, shall be included in the contract unit price bid per sq. yd. for Item 452, 7" Portland Cement Concrete for drives.

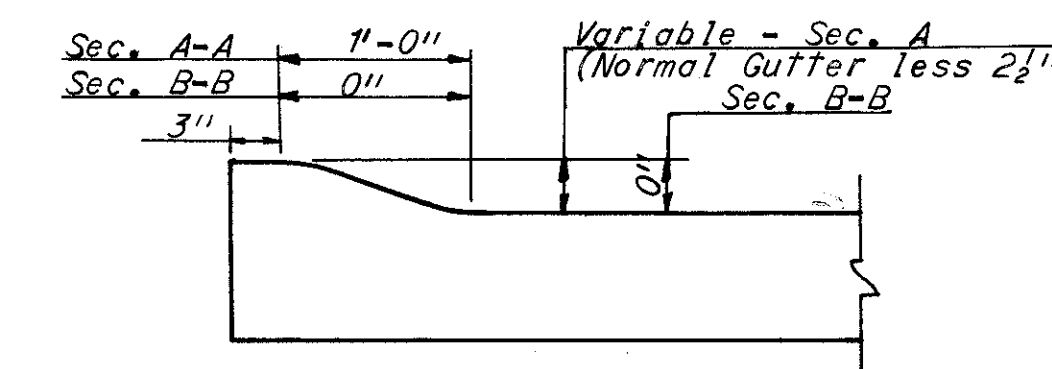
For Asphaltic Concrete and Slag drives, The plan view shown, shall be used. Shape drive section to provide for proper drainage as directed by the Engineer.

Curb shall be dropped to provide a 1/4" gutter at all driveways and wherever directed by the Engineer. The dressing of the Curb, necessary to effect a satisfactory transition from the normal curb height to a 1/4" height, shall be included in the contract unit price bid for the pertinent curb specified.

When drive abuts new or existing concrete sidewalk, 1/2" Expansion Joint Material (Item 705.03) shall be provided.



**SECTION C-C**

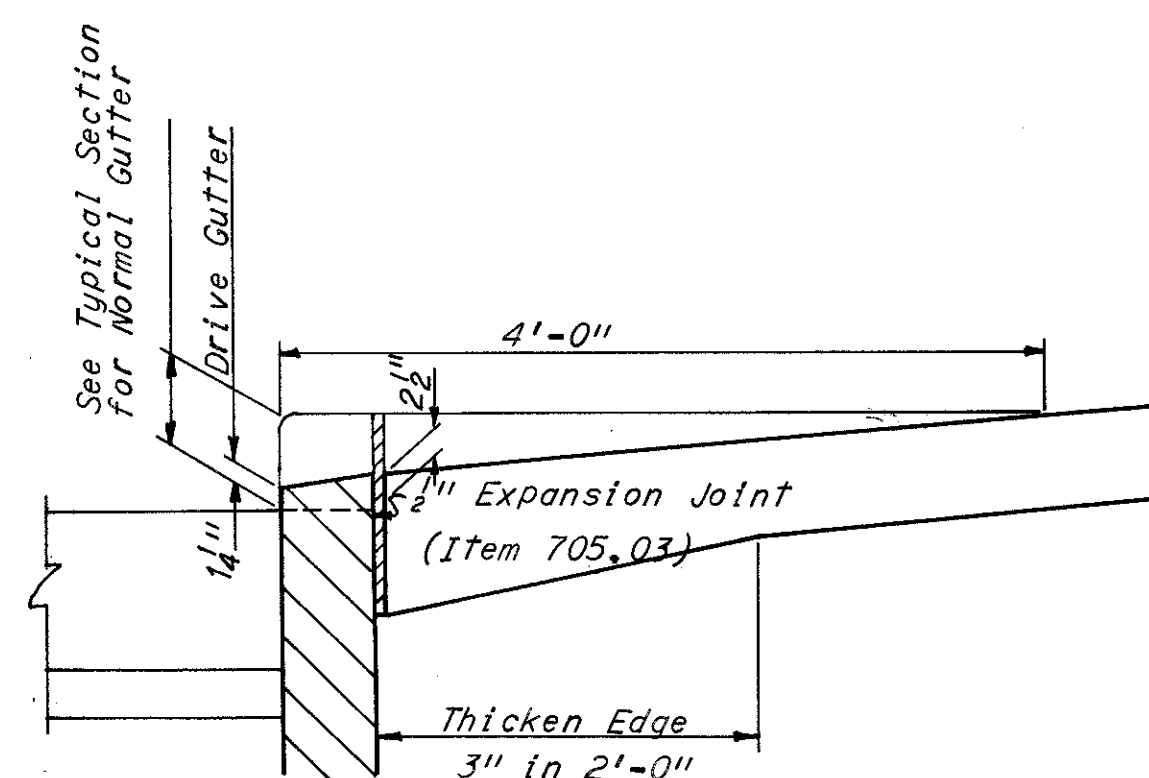


**APRON CURB DETAIL**  
**SECTION A-A & B-B**

**Notes:**

The flared portion of residence drives adjacent to bituminous paved shoulders shall be constructed of the same material and composition as used in the shoulder paving.

The flared portion of residence drives for which earth shoulders only are specified, shall be paved with either 7" Plain Portland Cement Concrete (Item 452) or with two 1" courses of Asphaltic Concrete (Item 404) on 5" of Item 304 Aggregate.

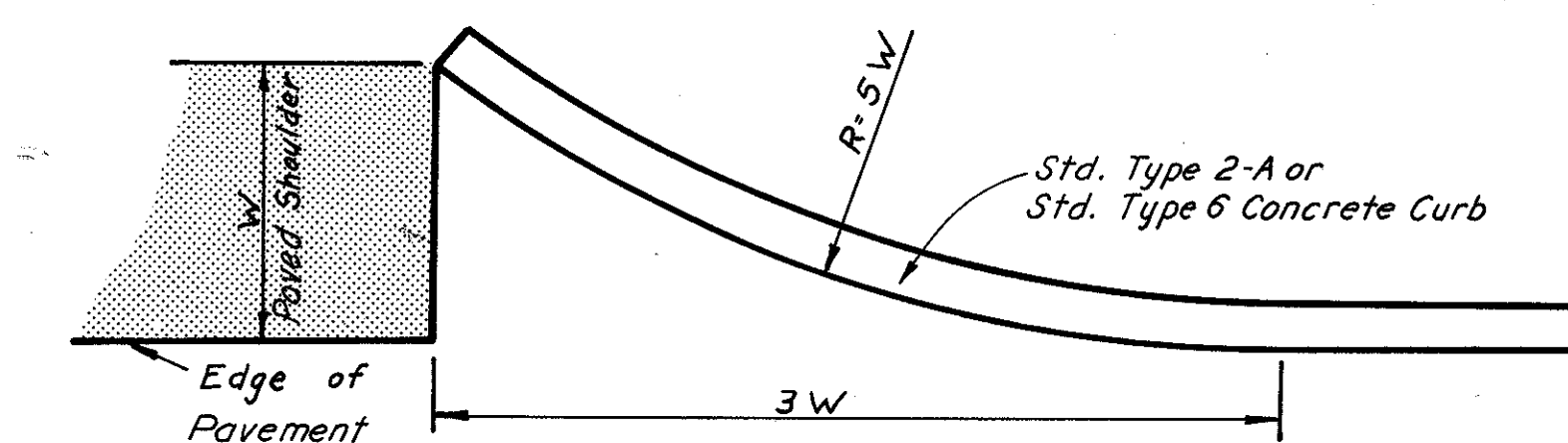


**APRON CURB TRANSITION**  
Scale: 1"=1'-0"

**Notes:**

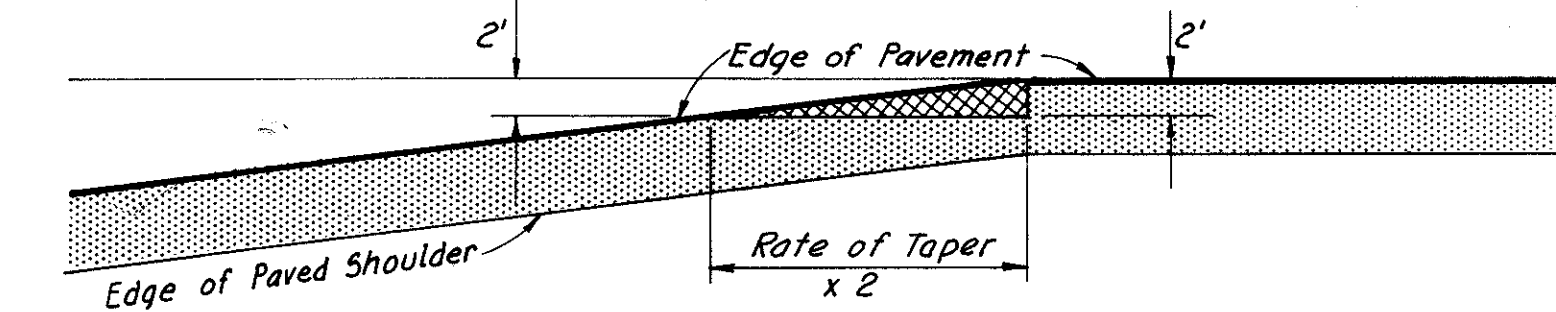
Residence drives having an existing hard surface or existing aggregate surface shall be replaced with a pavement of a similar type insofar as practicable, using one of the following designs for the portion beyond the flared apron:

- (a) 7" Plain Portland Cement Concrete, Item 452
- (b) 5" Item 304 surfaced with two 1" courses of Asphaltic Concrete, Item 404
- (c) 8" Item 304 Aggregate, stabilized with calcium chloride



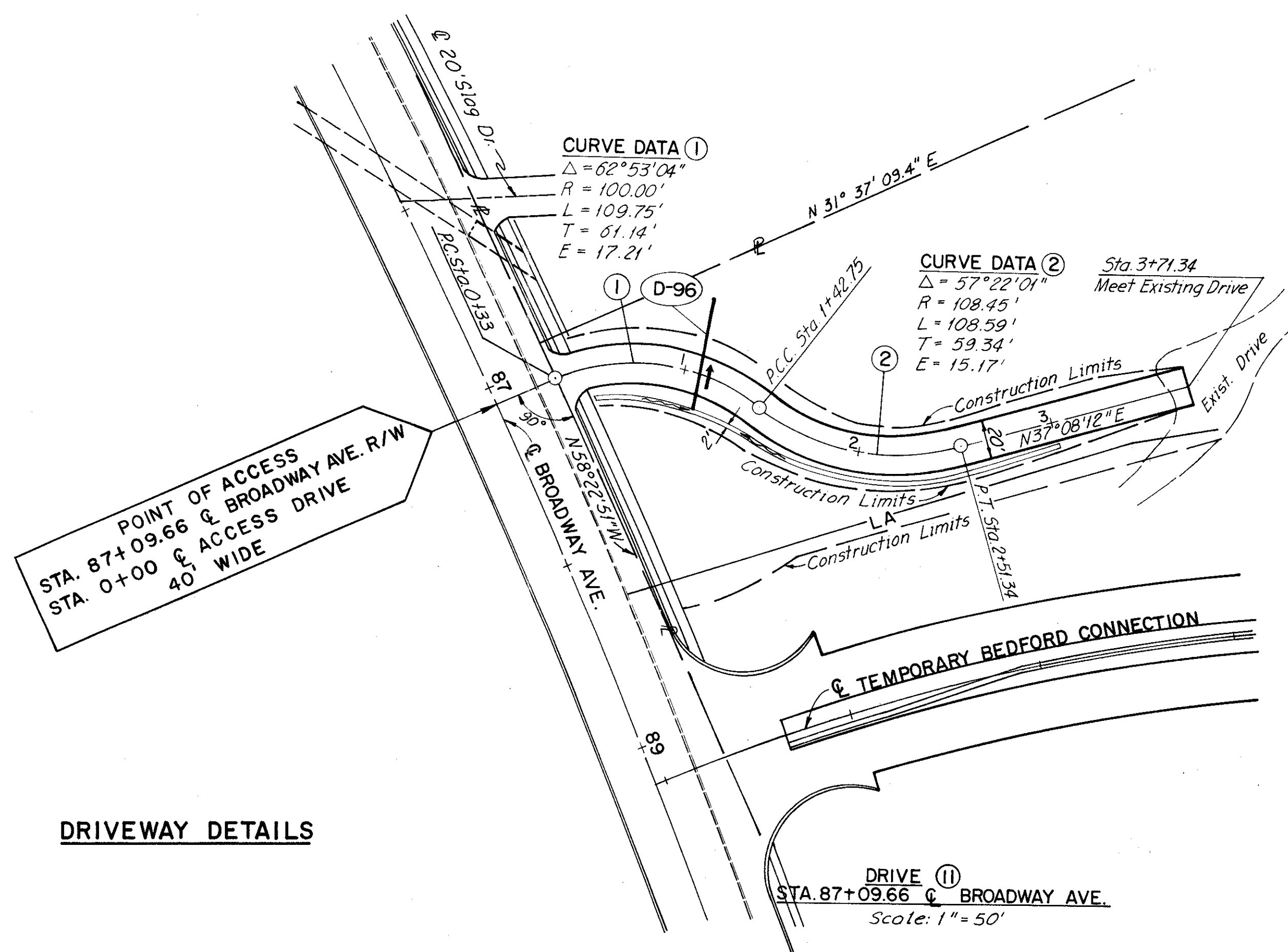
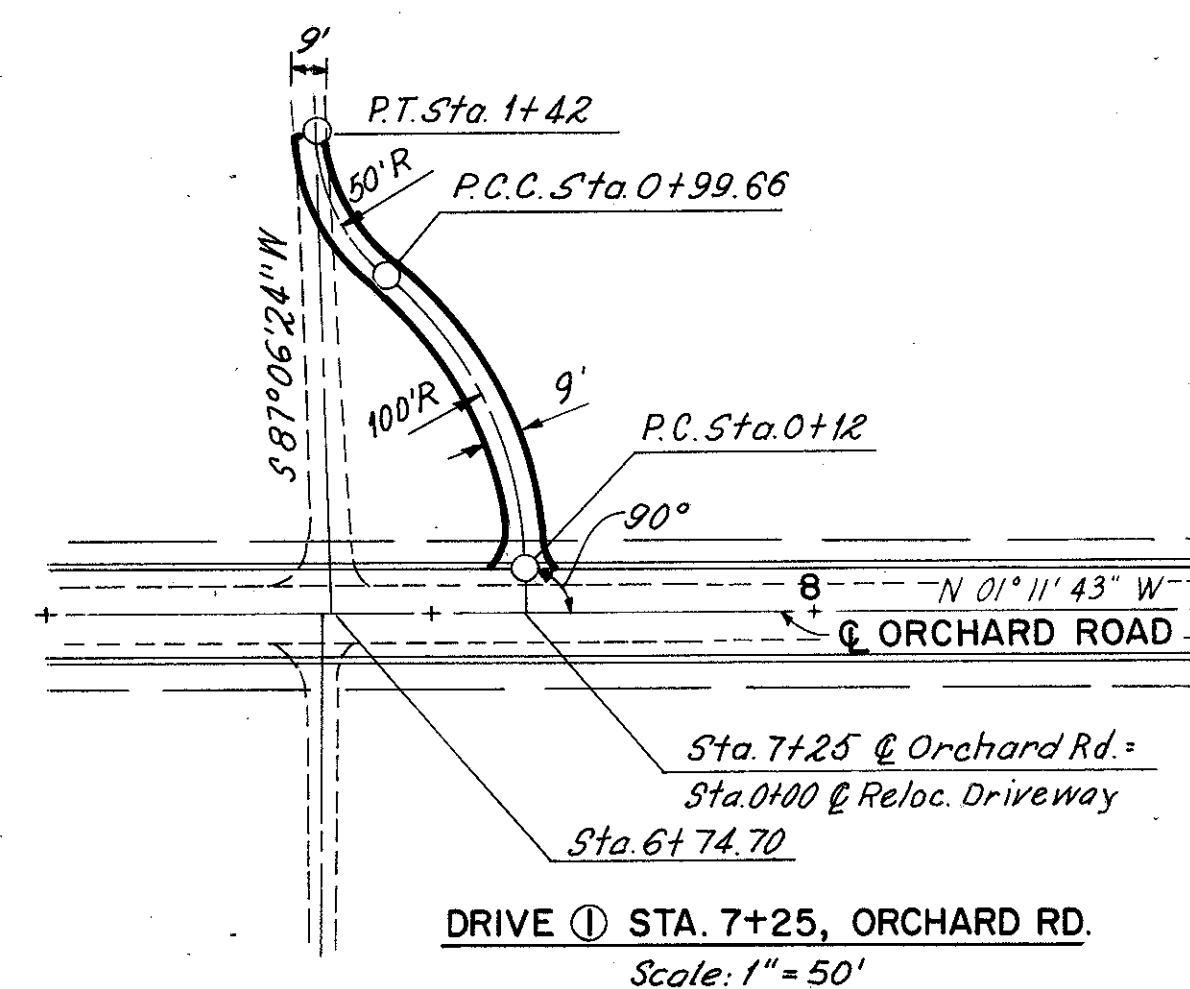
**CURB TURNOUT DETAIL**

Note: Transition curb height at the rate of 1" per 5 Lin. Ft. to reach zero at the end of the turnout.



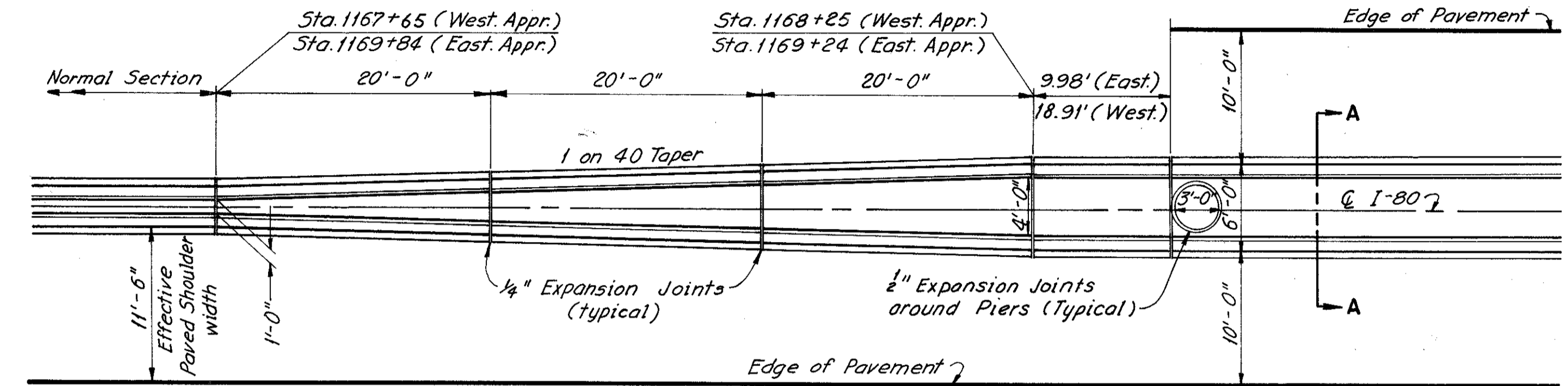
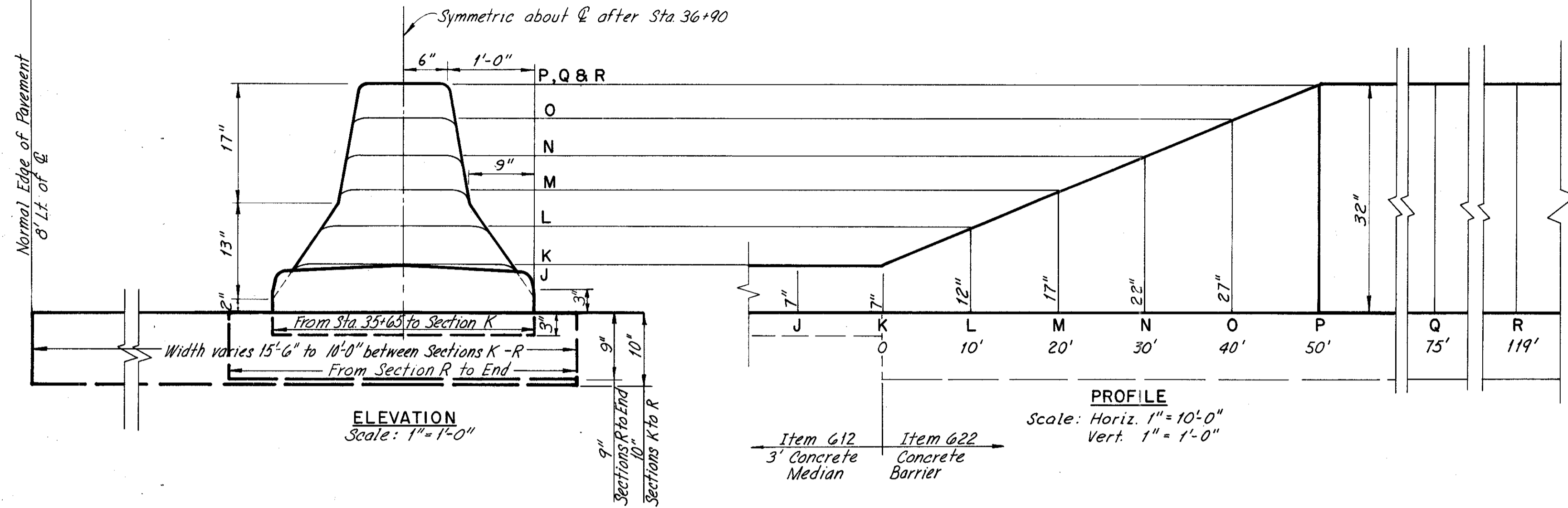
**DETAIL "A"**  
Scale 1"=10'

The shaded area shall be constructed of concrete pavement to an elevation 2 inches lower than the adjacent pavement and surfaced with Item 301, paid for as Item 301. The concrete pavement shall be paid for as full depth 451.

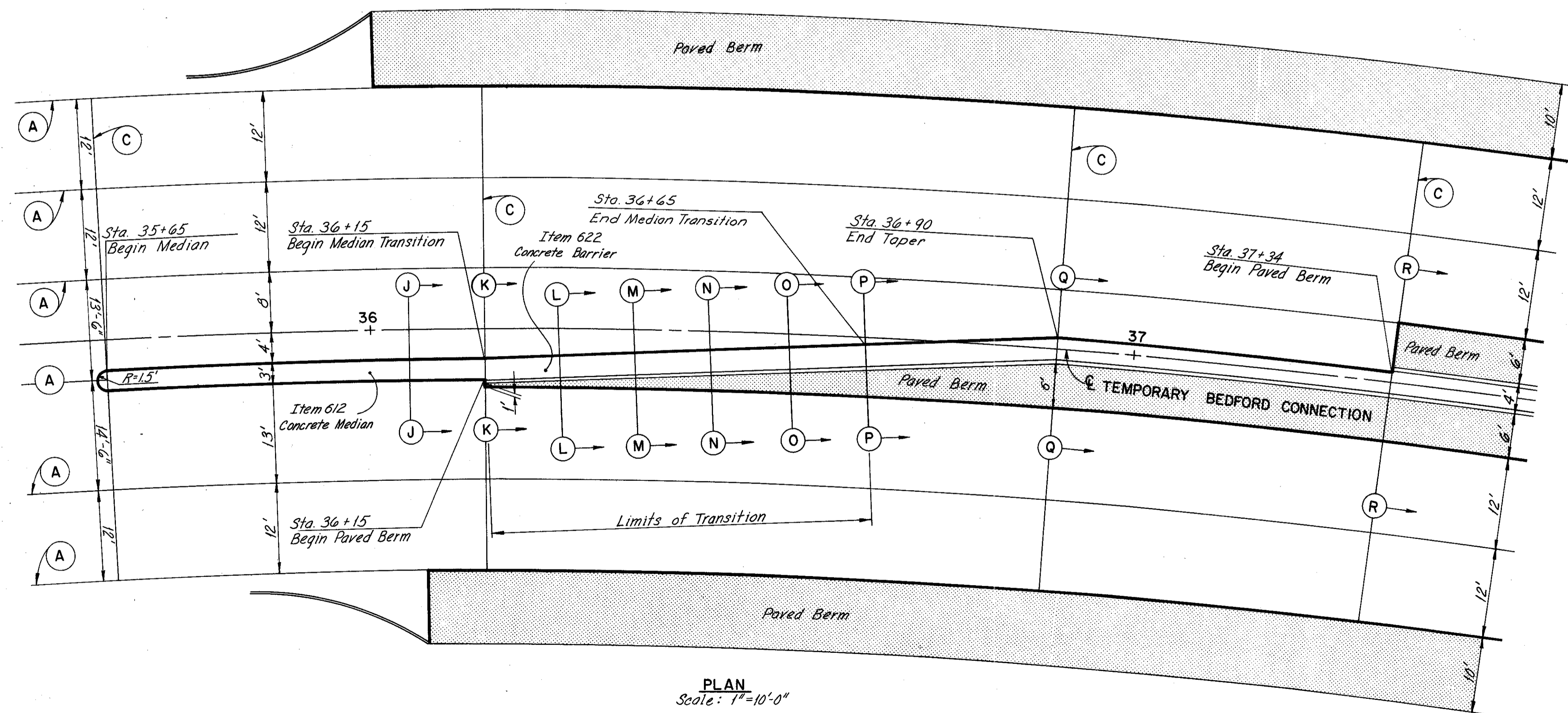


**DRIVEWAY DETAILS**

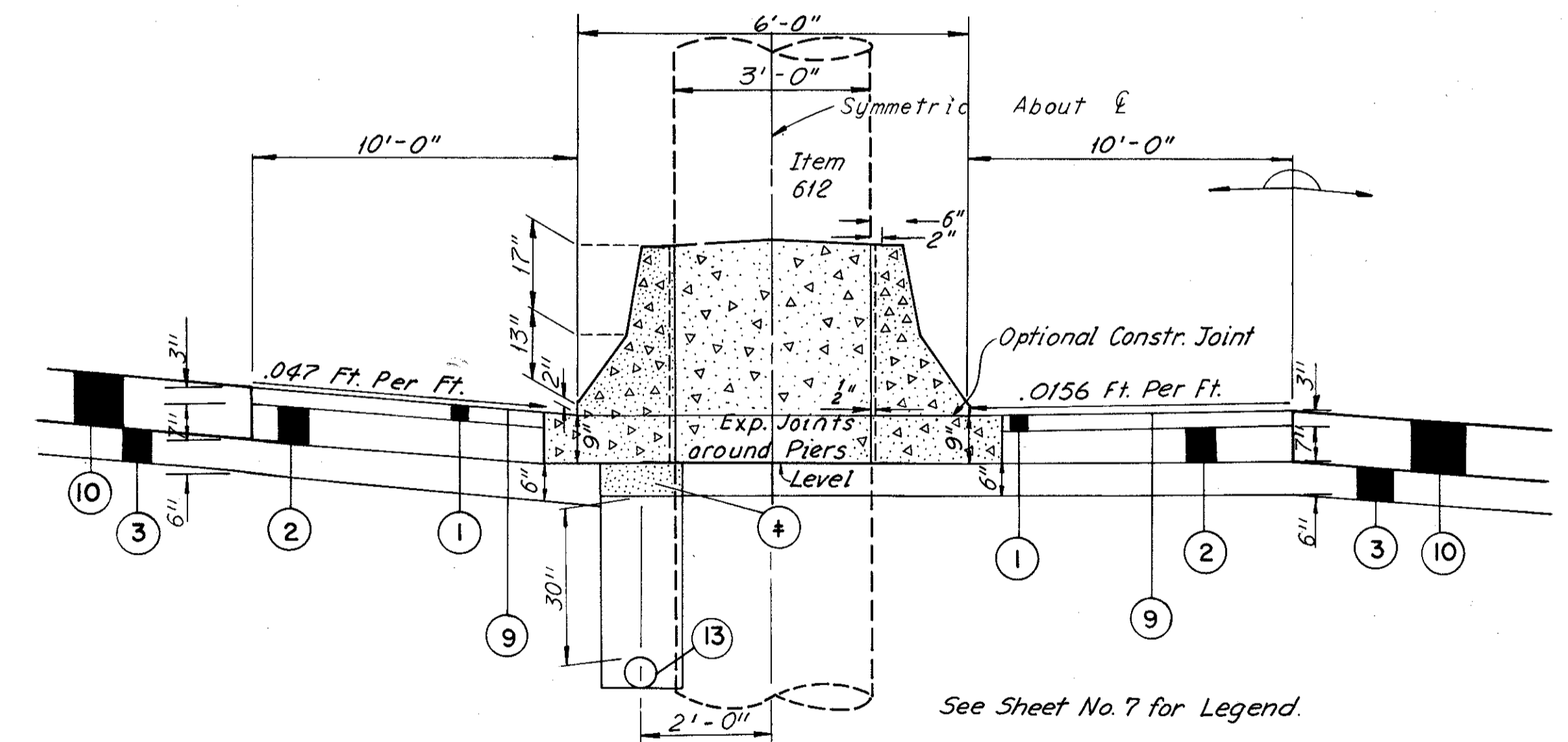
SCALE: As Shown  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE: JEN DATE: 12-22-65  
TRCD: JEN DATE: 12-22-65  
CKD: R.P.R. DATE: 4-27-66  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK



PLAN  
Scale: 1/8" = 1'



PLAN  
Scale: 1" = 10'-0"



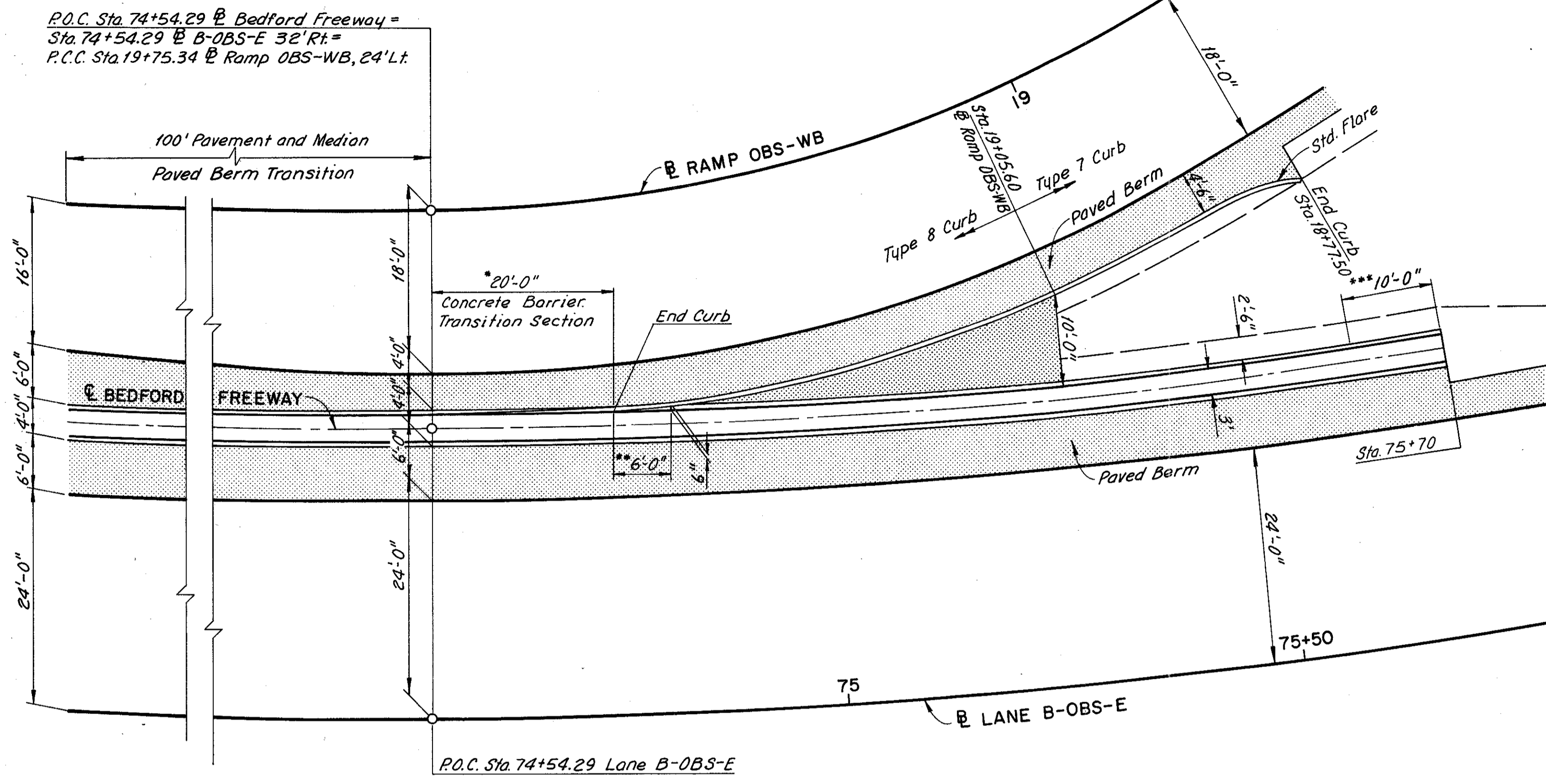
SECTION A-A  
Not to Scale

BRIDGE PIER APPROACH FLARE

TERMINAL TREATMENT  
TEMPORARY BEDFORD CONNECTION

JOINT LEGEND  
 (A) Standard Longitudinal Joint  
 (C) Standard Contraction Joint

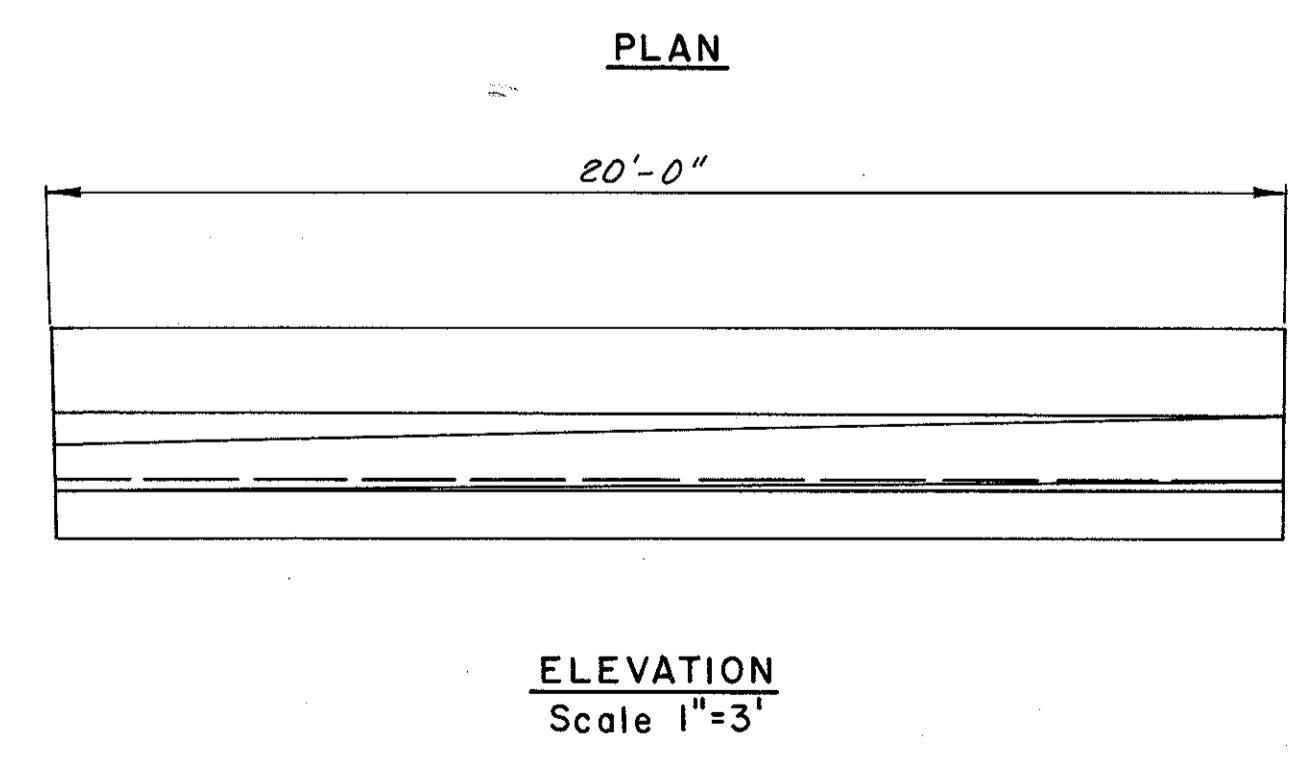
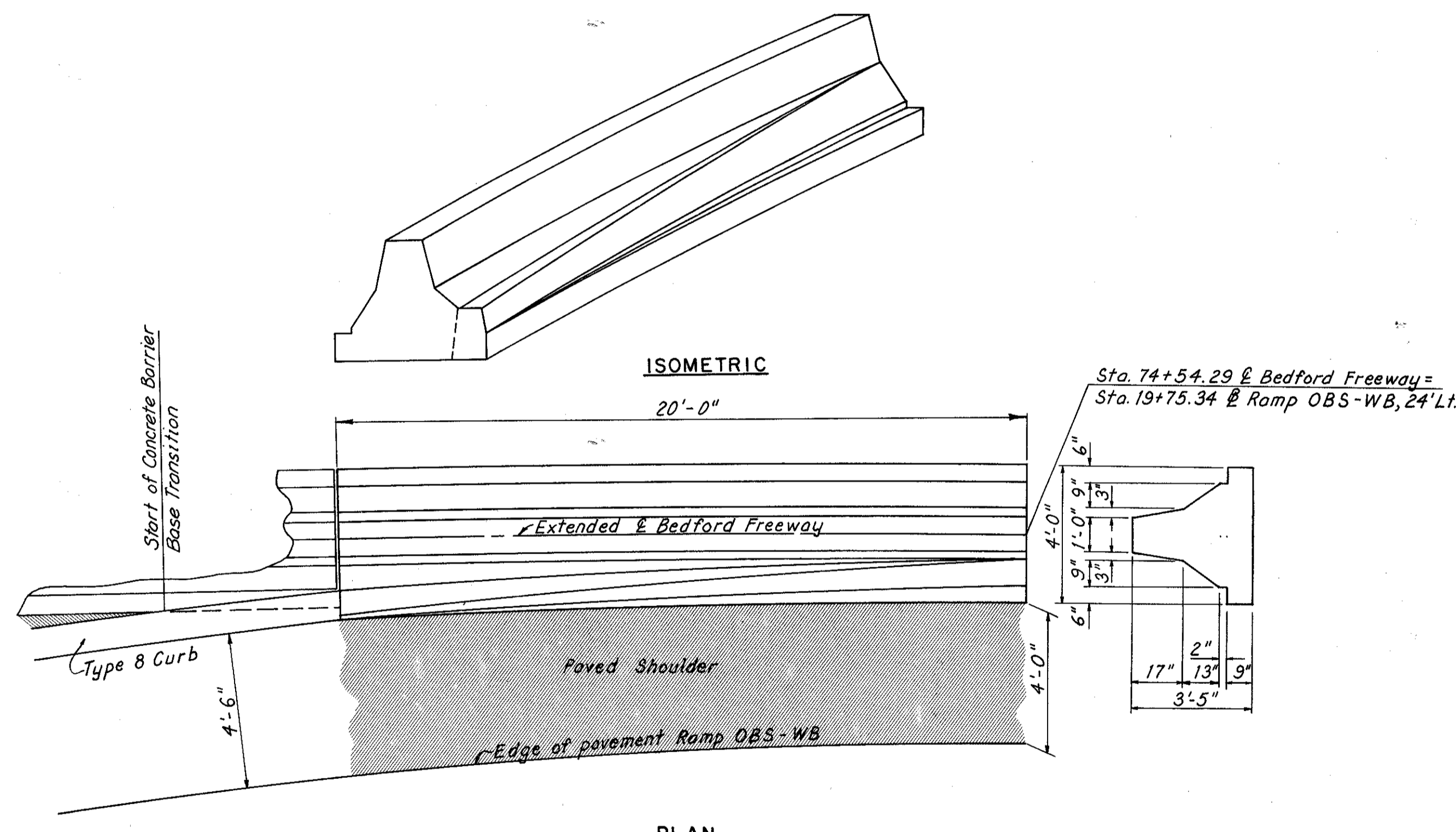
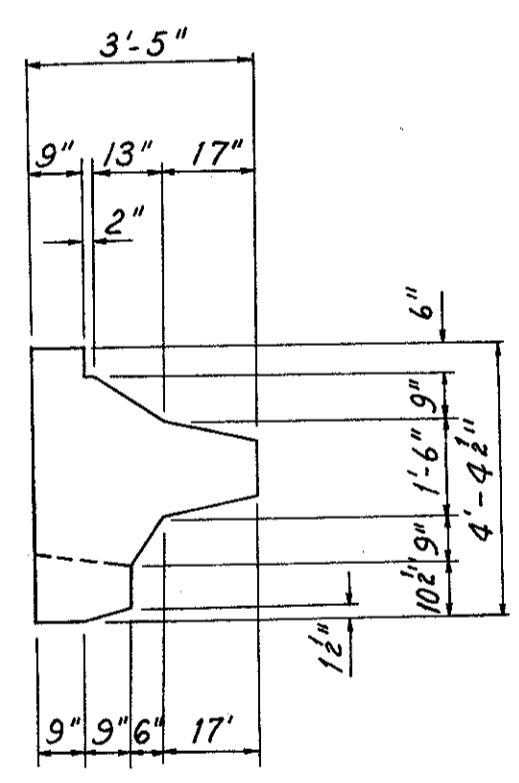
SCALE: as shown  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE I.M. DATE 4-28-69 CONSULTING ENGINEERS  
 TRCD. I.N. DATE 4-28-69  
 CKD. E.R.A. DATE 5-20-69 ANSAS CITY CLEVELAND NEW YORK



**PLAN**  
Scale: 1"=10'-0"

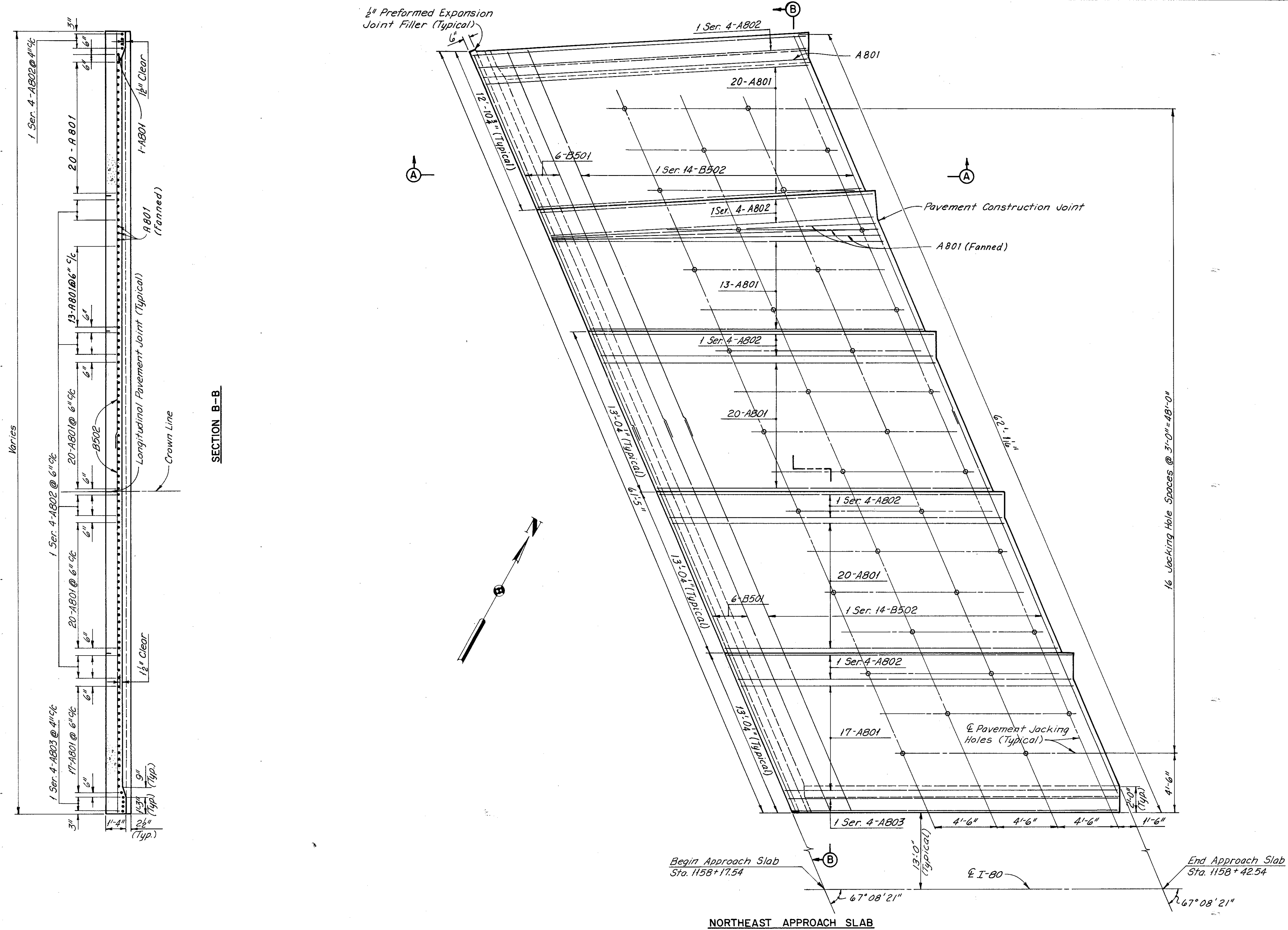
**TERMINAL TREATMENT**  
**BEDFORD FREEWAY**

Notes:  
 \*Transition Concrete Barrier in 20' to meet Type 8 Curb. Cost of transition to be included in the unit price bid for Item Concrete Barrier, as per plan.  
 \*\*Transition Concrete Barrier base facing the ramp by reducing the 6" lip to 0" in 6' to accommodate Type 8 Curb.  
 \*\*\*Transition Concrete Barrier height from 32" to 0" in 10'.

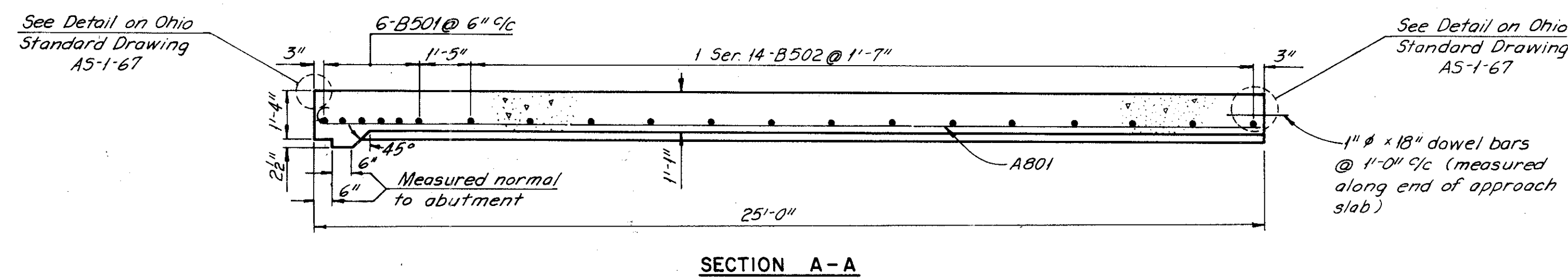
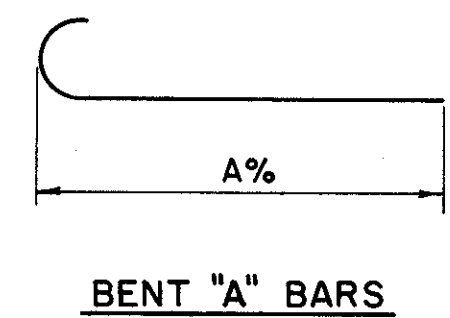


**ELEVATION**  
Scale 1"=3'

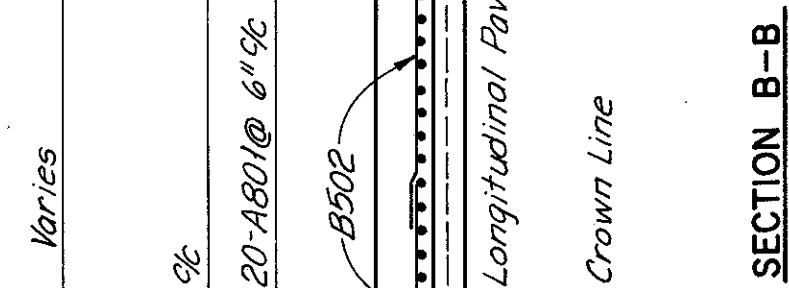
**CONCRETE BARRIER TRANSITION**



REINFORCEMENT SCHEDULE						
TYPE	LENGTH "A"	LENGTH BAR	NUMBER REQUIRED	SHAPE	SERIES INCR.	
A801	24'-6"	25'-7"	94	Bent		
A802	25'-3"	24'-6"	26'-4"	5 Ser. 4 Bent	3"	
A803	24'-3"	28'-9"	25'-4"	24'-10"	1 Ser. 4 Bent	2"
B501		31'-3"	12	Str.		
B502		31'-3"	31'-6"	2 Ser. 14 Str.	4"	



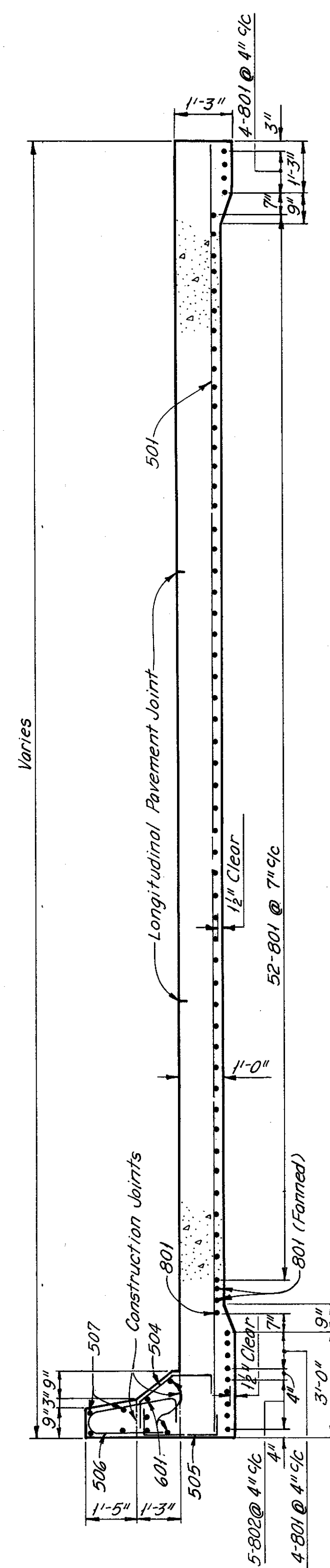
Notes:  
 For Pavement Jacking Hole Detail and for notes, see Standard Drawing AS-1-67.  
 All other Approach Slabs for BR. NO. CUY-480-2140 are standard.  
 For asphalt wearing surface, see approach slab table on Sht. No. 30.



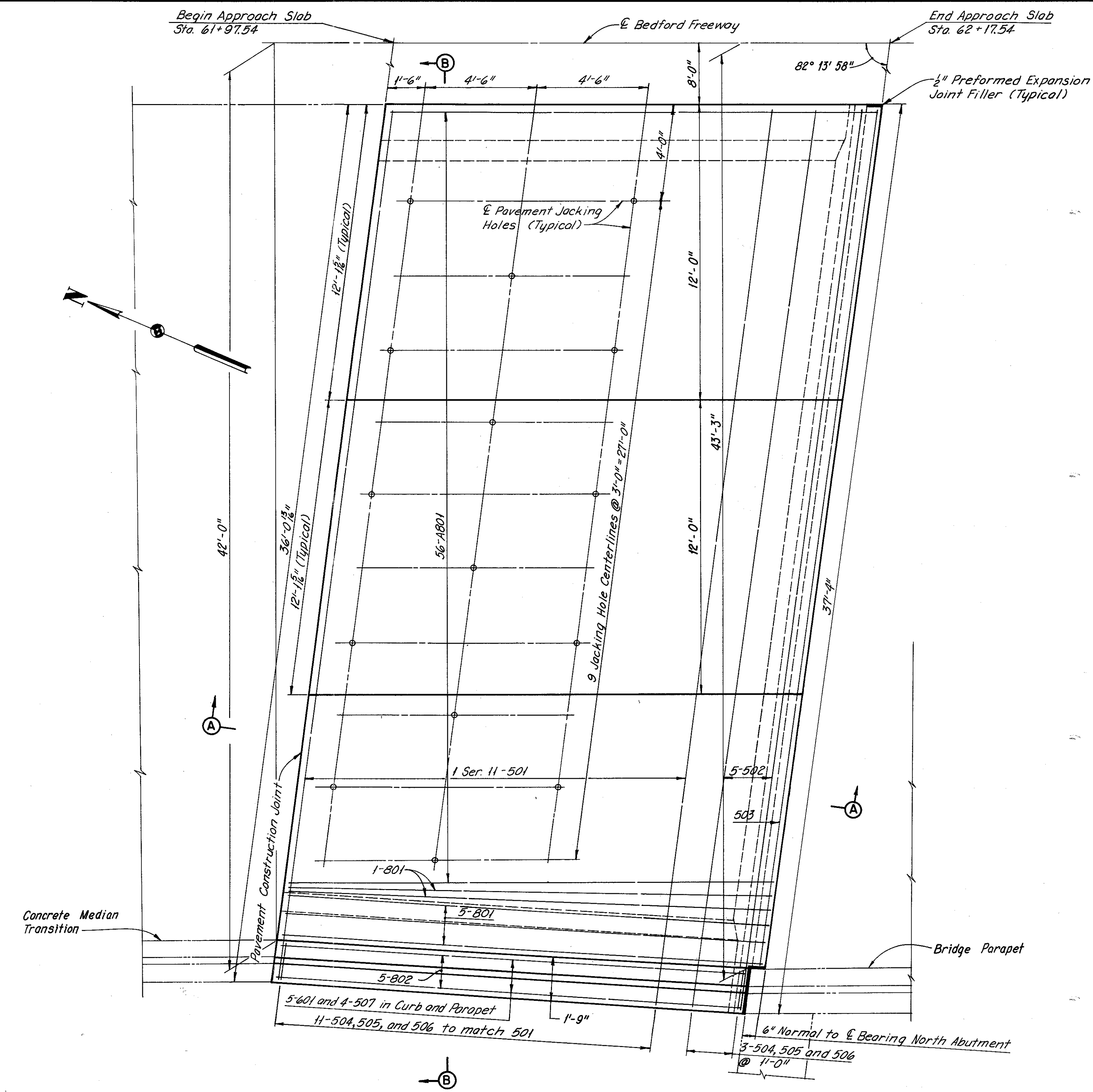
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

71  
390

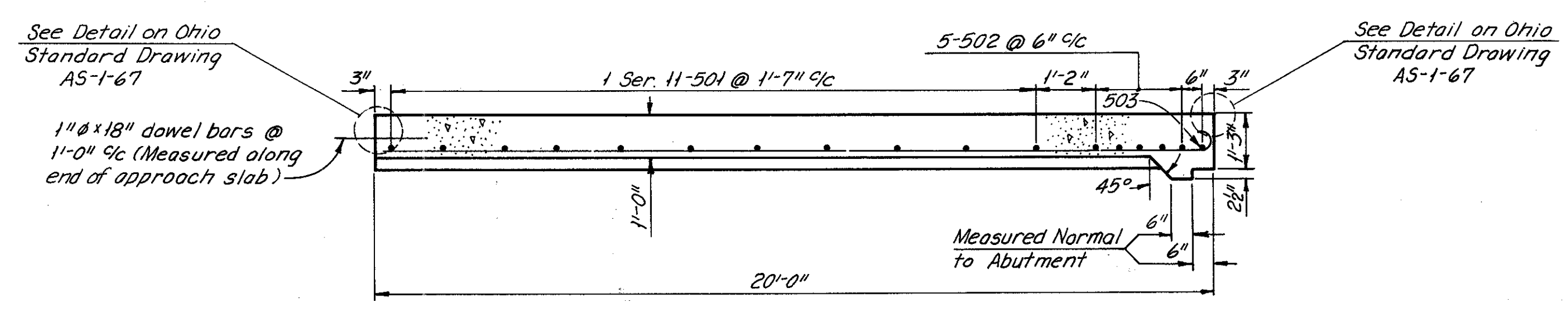
CUYAHOGA COUNTY  
CUY-480-21.40



SECTION B-B

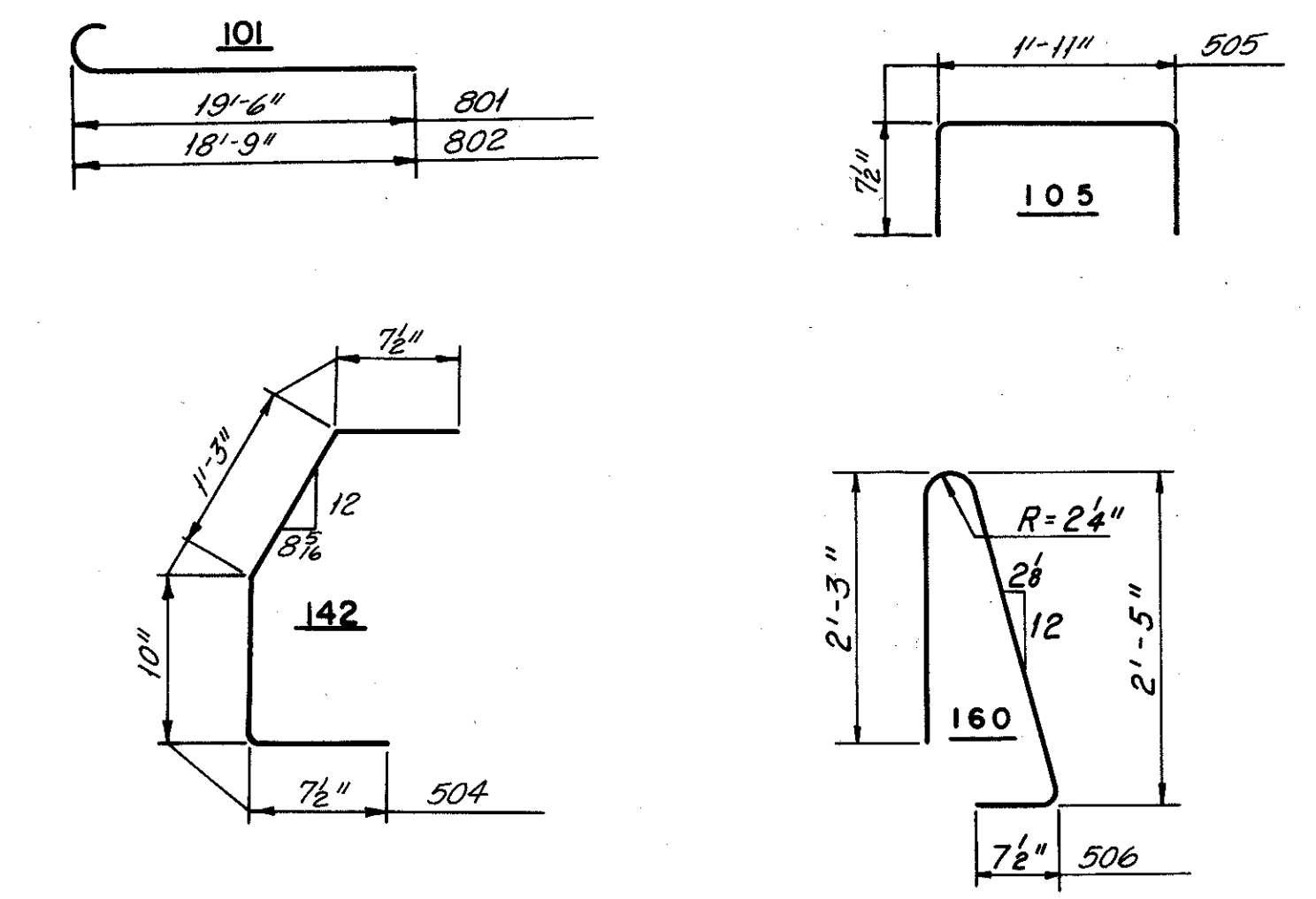


NORTHWEST APPROACH SLAB



SECTION A-A

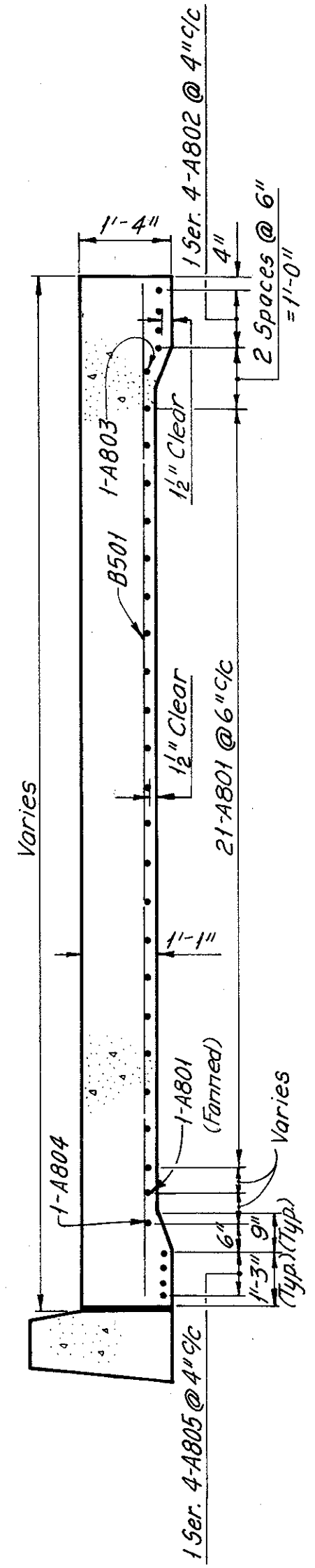
REINFORCEMENT SCHEDULE				
Type	Length Bar	Number Required	Shape	Series Increment
501	35'-9"	1 Ser. 11	Str.	1/2"
502	36'-9"	5	Str.	
503	35'-0"	1	Str.	
504	3'-2"	14	142	
505	2'-11"	14	105	
506	3'-2"	14	160	
507	18'-9"	4	Str.	
601	18'-9"	5	Str.	
801	20'-7"	63	101	
802	19'-10"	5	101	



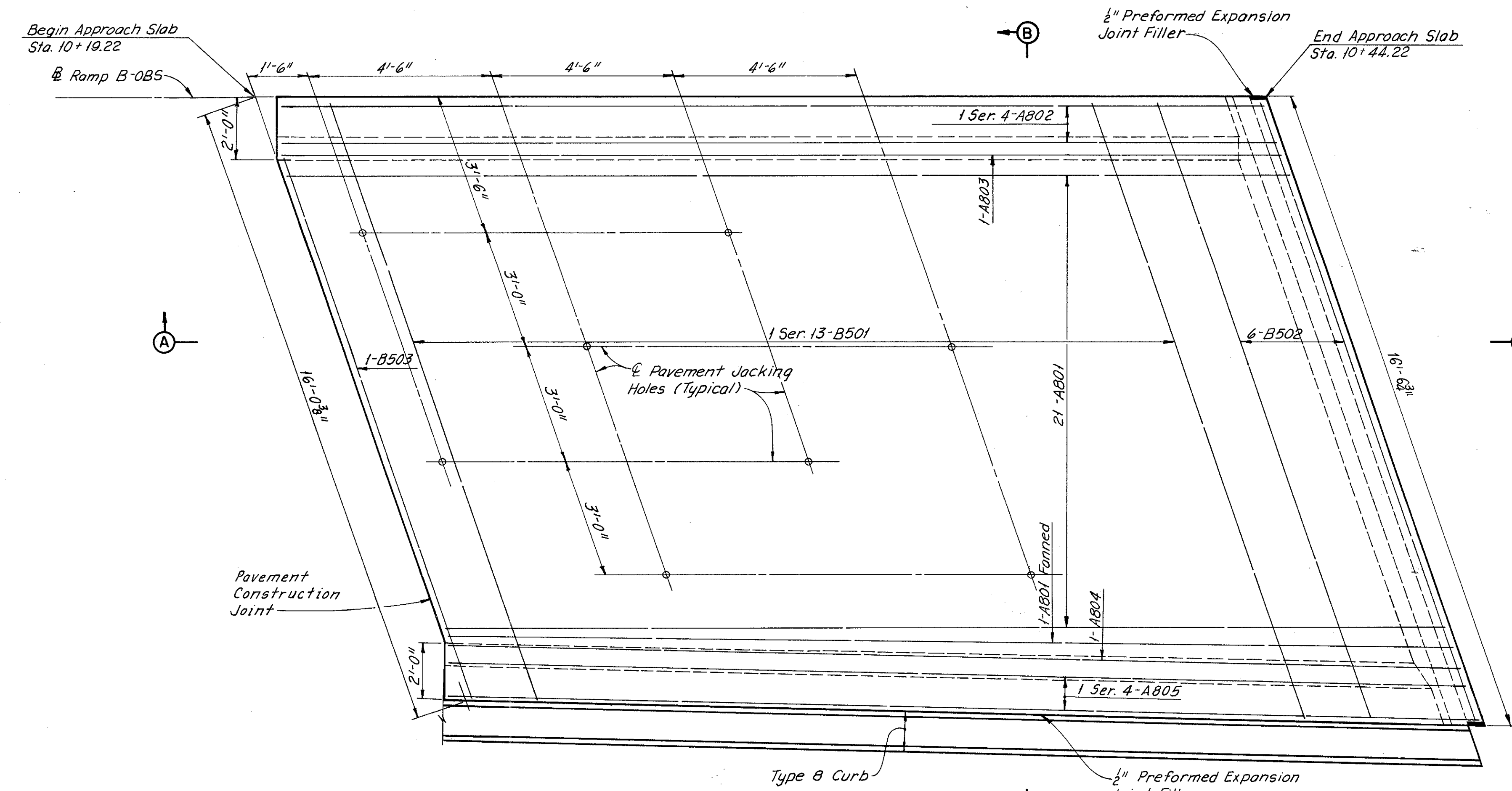
BENDING DIAGRAMS

Notes:  
 For Pavement Jacking Hole Detail and for notes, see Standard Drawing AS-1-67.  
 All other Approach Slabs for Bedford Freeway and Ramp B, QBS over relocated McCracken Road are standard.  
 For asphalt wearing surface, see approach slab table on Sht. No. 30.

SCALE: \_\_\_\_\_  
 MADE BY: MCB DATE: 3-9-70  
 TRCD BY: WB DATE: 3-16-70  
 CKD BY: LJW DATE: 3-19-70  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

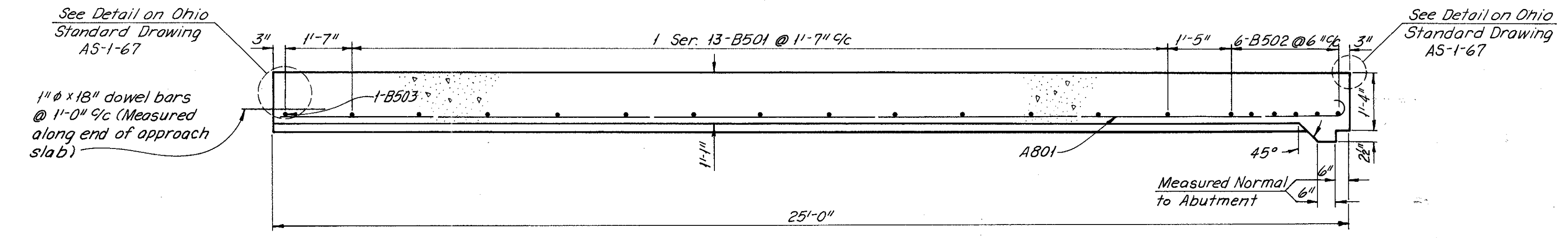


**SECTION B-B**

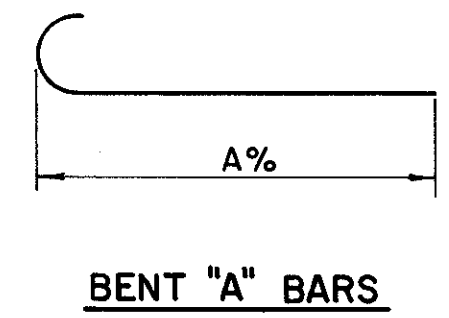


**WEST APPROACH SLAB  
RAMP B-OBS**

REINFORCEMENT SCHEDULE						
TYPE	LENGTH "A"	LENGTH BAR	NO. REQ.	SHAPE	SER. INCR.	
A801	24'-6"	25'-7"	22	Bent		
A802	<del>23'-11"</del>	<del>24'-3"</del>	<del>25'-0"</del>	<del>25'-4"</del>	1 Ser. 4 Bent	1/8"
A803	24'-5"	25'-6"	1	Bent		
A804	24'-7"	25'-8"	1	Bent		
A805	<del>24'-9"</del>	<del>25'-11"</del>	<del>25'-10"</del>	<del>26'-2"</del>	1 Ser. 4 Bent	1/8"
B501		15'-9"	16'-0"	1 Ser. 13 Str.	1/4"	
B502		16'-0"	6	Str.		
B503		14'-0"	1	Str.		

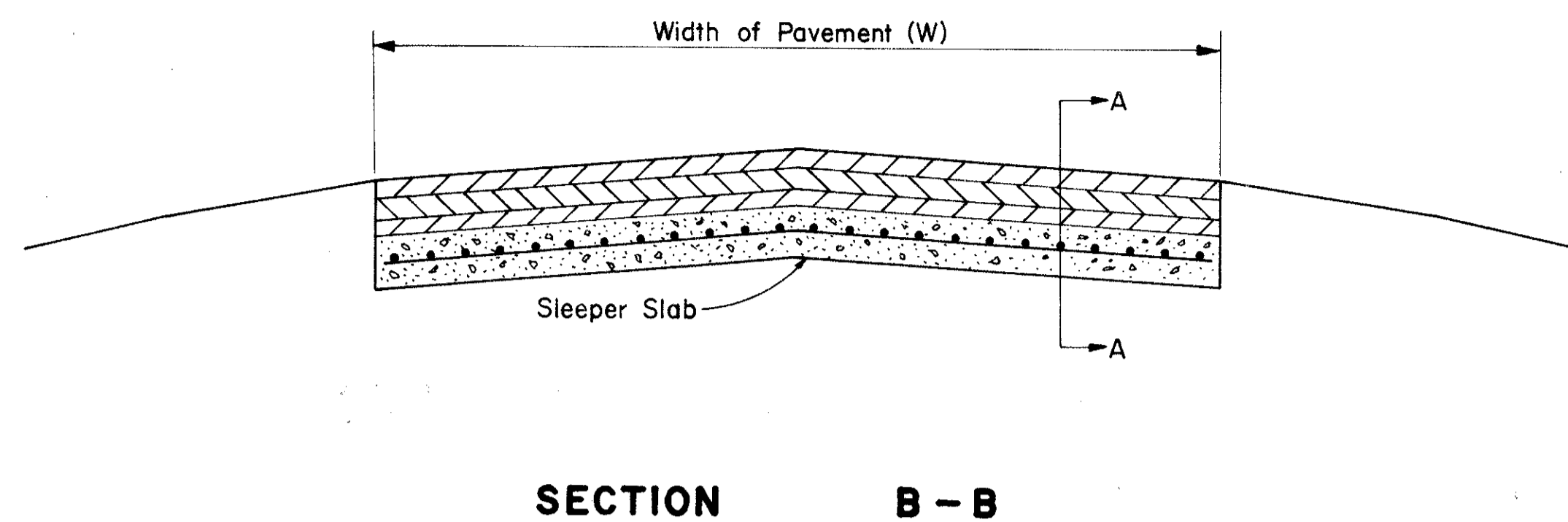


**SECTION A-A**

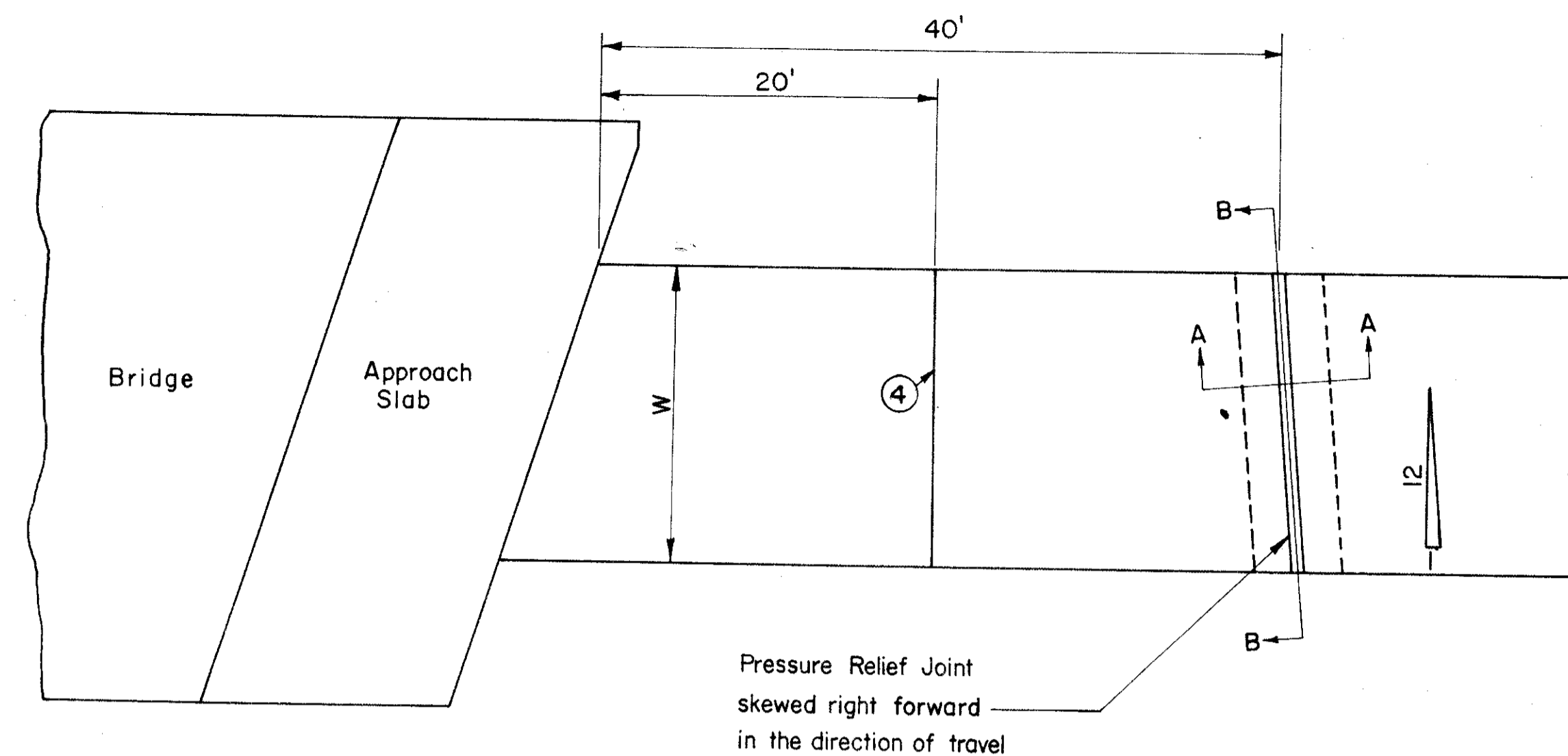


**Notes:**  
For Pavement Jacking Hole Detail and for additional notes, see Standard Drawing AS-1-67.  
All other approach slabs for BR, NO. CUY-480-2154 are standard. See Standard Drawing AS-1-67 for details.  
For asphalt wearing surface, see approach slab table on Sht. No. 30.

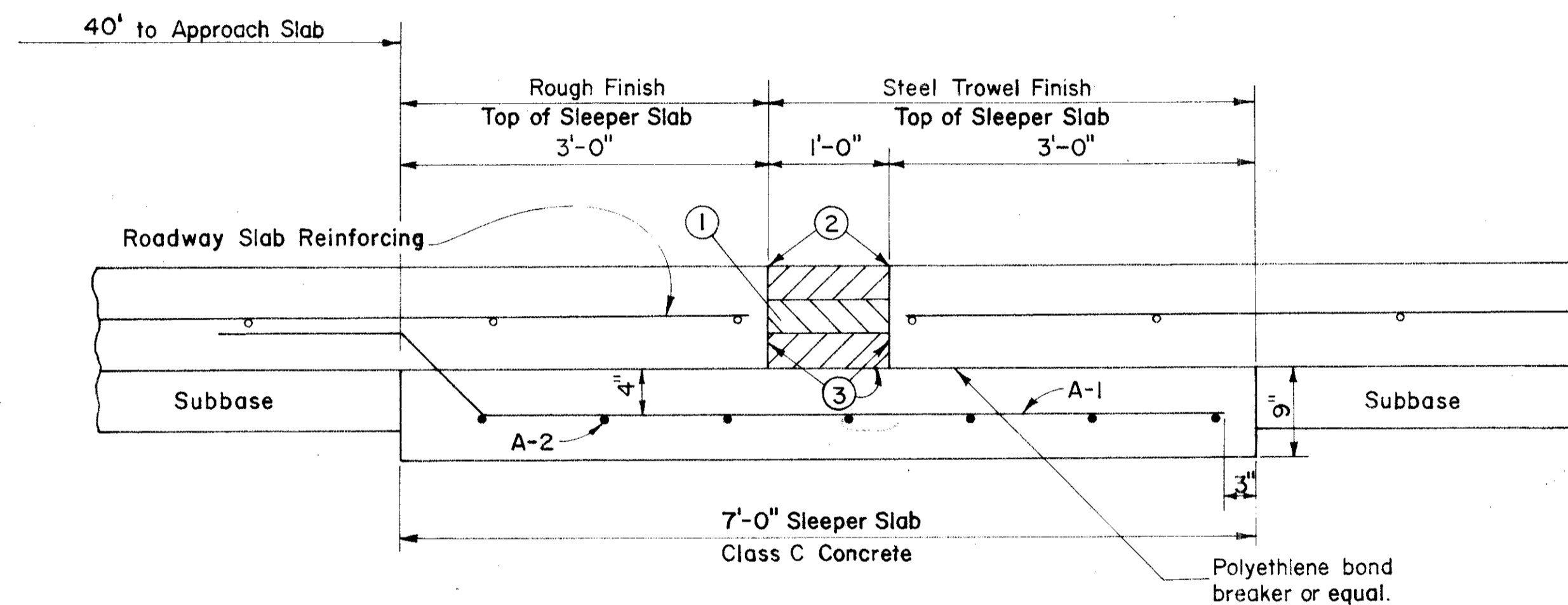




SECTION B - B



PLAN



SECTION A - A

NOTES

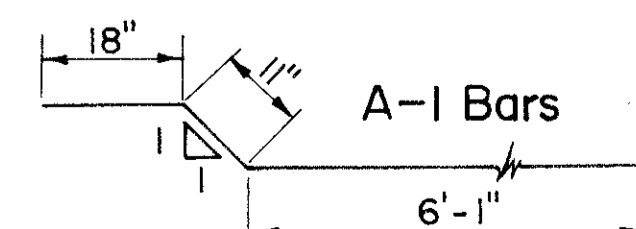
Asphalt concrete shall be placed in the joint in three equal courses and compacted with equipment as approved by the Engineer.  
 The expansion joint approximately 60' from the bridge approach slab, as specified under 451.08 (c) shall be eliminated.  
 Barricades in accordance with 614, shall be provided during construction until the joint has been filled with asphalt.  
 Pressure Relief Joints will be measured by the linear foot along the centerline of the joint from edge to edge of pavement.  
 Payment for the work shall be made per linear foot under "Item Special, Pressure Relief Joint", which price and payment shall constitute full compensation for furnishing and placing of all concrete, asphalt, reinforcing steel, tack coat and all other materials, labor, tools and equipment, and incidentals necessary to complete this item.

LEGEND

- ① Asphalt Concrete placed in three equal courses shall be in accordance with 404
- ② The 451 pavement shall have a 1/2" rounding and the joint shall be sealed in accordance with 705.01.
- ③ Tack Coat: 702.04, MS-2 or RS-1; or 702.02, RC-70 or RC-250 in accordance with 407.
- ④ Expansion Joint

SCHEDULE OF REINFORCING STEEL

Mark	Bar Size	Spa c/c	Length	No. Req'd	Shape
A-1	5	12"	8'-6"	24 for 24' Pmnt.	Bent
A-2	4	12"	W minus 6"	7	Straight



PRESSURE RELIEF JOINTS

LOCATION	LENGTH	SHEET No.
Br. No. CUY-480-2154 Fwd. App.	32.1' - 48.2'	40
Lane OBS-E-B over M <sup>c</sup> Cra. Fwd. App.	24.1'	40
Rear App.	24.1'	43
Ramp B-OBS over M <sup>c</sup> Cra. Rear App.	16'	43
Bedford Freeway over M <sup>c</sup> Cra. Rear App.	14' - 33.1'	43
Br. No. CUY-480-2169 Fwd. App.	16' - 24.1'	40
Total	238.7'	
TOTAL III to GENERAL SUMMARY		239 LIN. FT.

# MODULAR CRASH CUSHION

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

73  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

## ITEM SPECIAL MODULAR CRASH CUSHION IMPACT ATTENUATOR

The work for this item consists of building the Modular Crash Cushion as shown in details in these plans including its back-up wall.

Payment for this item constitutes full compensation for all materials, labor and incidentals necessary to complete this work according to specifications and details shown.

## ITEM 612 4" CONCRETE MEDIAN, AS PER PLAN

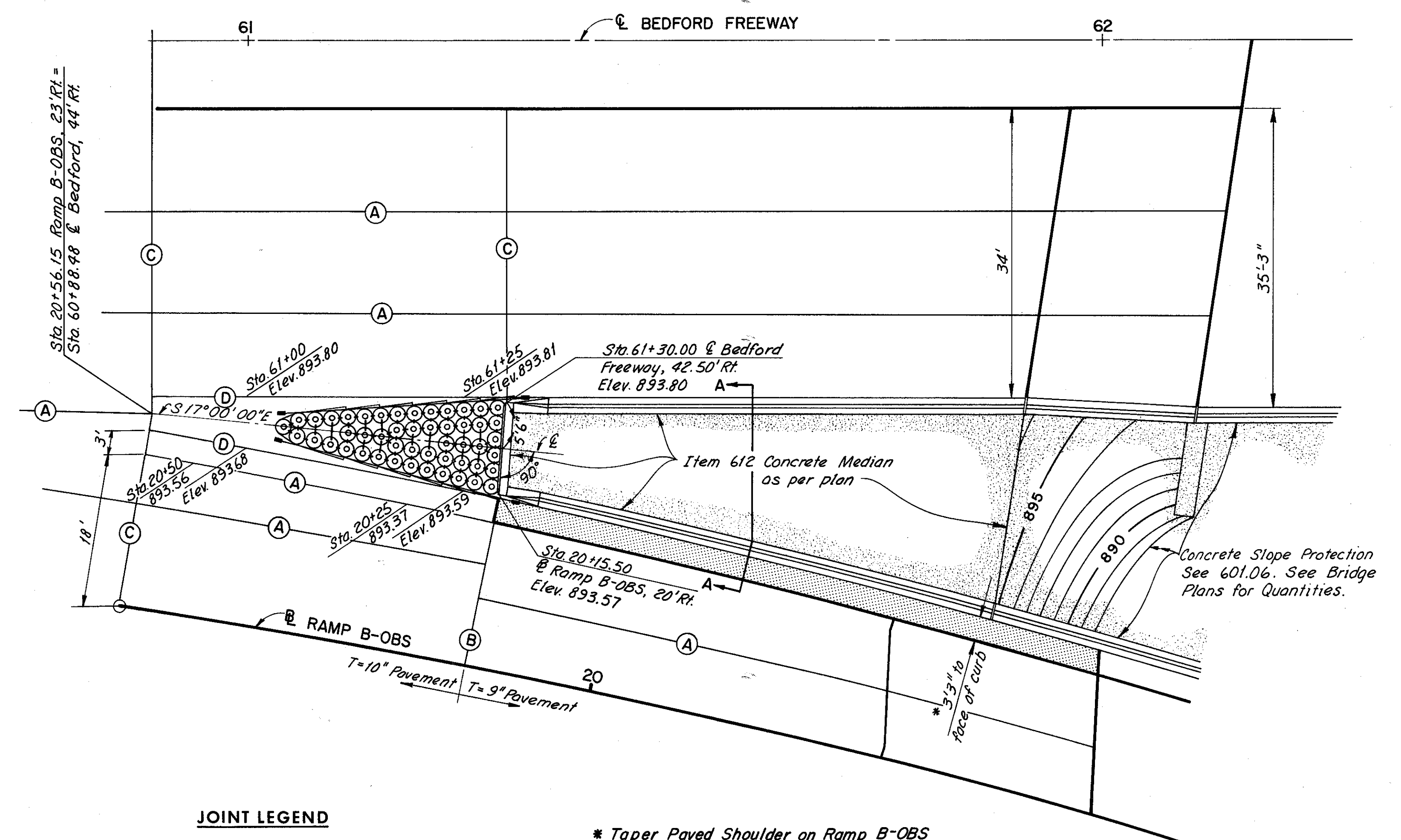
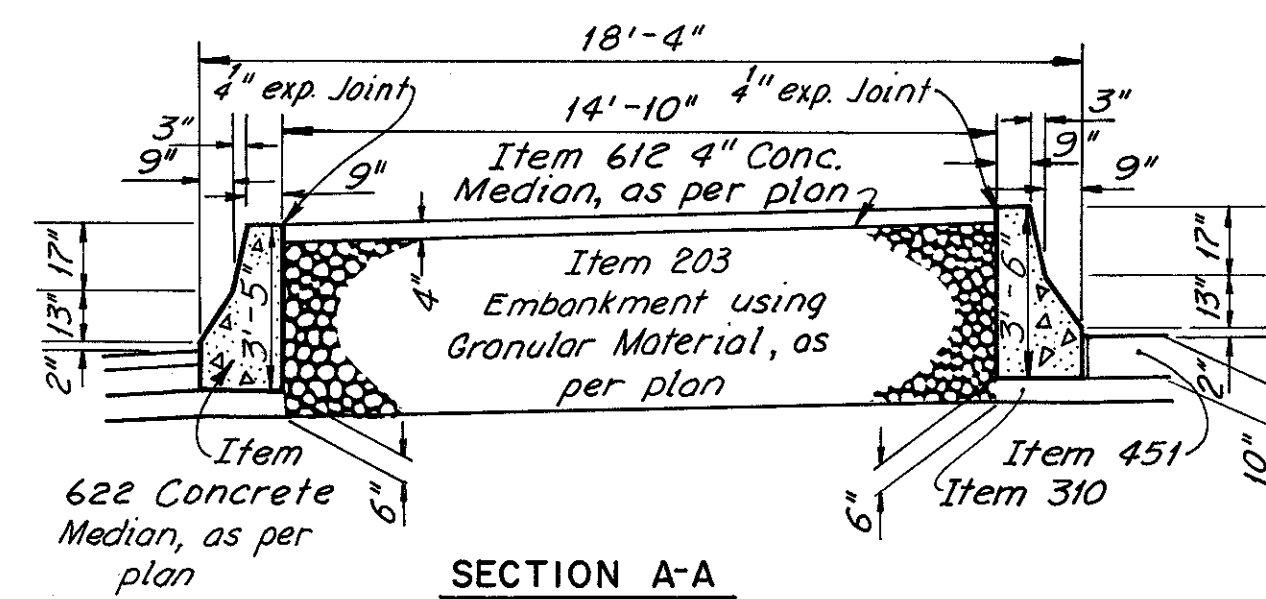
The entire subgrade area under the 4" slab shall be covered with white polyethylene sheeting prior to placing the concrete median. Polyethylene sheeting shall be as described in Sec. 705.06.

Joints: 1/4 inch Expansion Joints shall be constructed at 20ft. intervals both ways. Metal separator plates or templets shall be used if necessary to hold the joint material in accurate position during the placing of the concrete.

Separator plates or templets, if used, shall be removed as soon as the concrete is in place to insure the accurate retention of the joint material.

Expansion joint material shall meet the requirements of 705.03.

In addition to the 1/4 inch expansion joints, contraction joints, consisting of 1 1/2 inch minimum depth impressed joint formed and sealed as per Standard Drawing BP-3, shall be placed in the concrete median at intervals not to exceed 10 feet both ways.



### JOINT LEGEND

- (A) Standard Longitudinal Joint
- (B) Standard Expansion Joint
- (C) Standard Contraction Joint
- (D) Key Joint without Tiebars

\* Taper Paved Shoulder on Ramp B-OBS from 3' at nose to 3'3" at the End of Bridge Parapet.

### PLAN

Scale: 1" = 10'

SCALE: As Shown  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE L.M.C. DATE 10-28-71  
TRCD L.M.C. DATE 11-4-71  
CKD S.M.B. DATE 11-4-71  
KANSAS CITY CLEVELAND NEW YORK

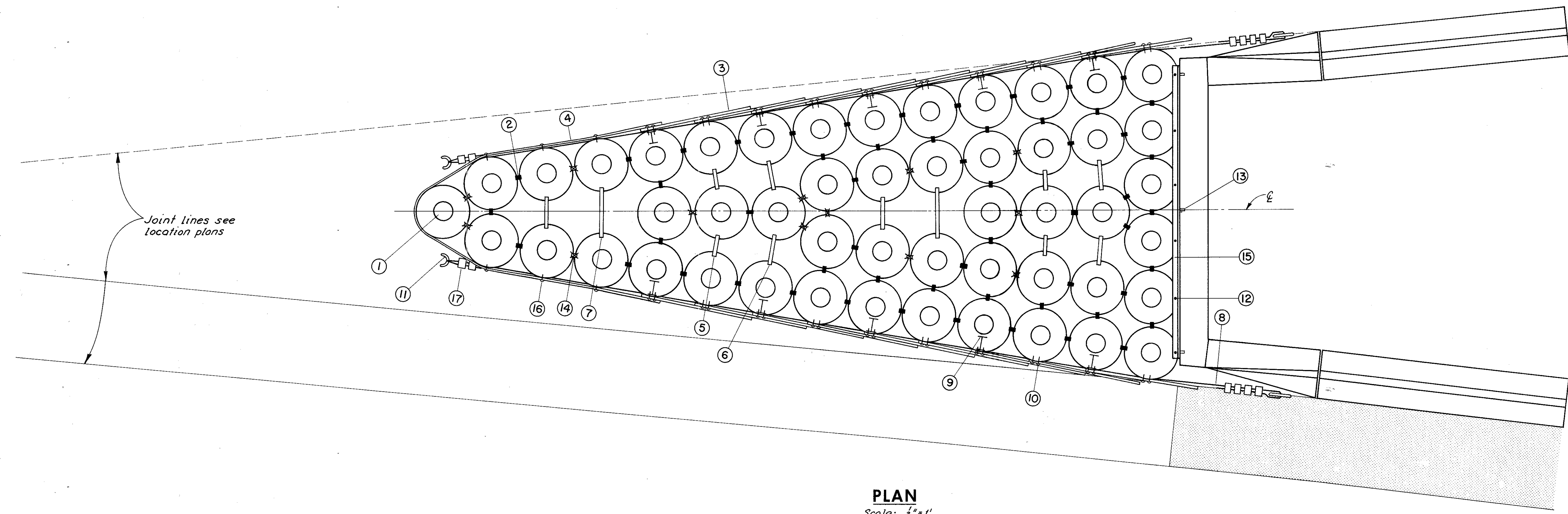
# MODULAR CRASH CUSHION

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

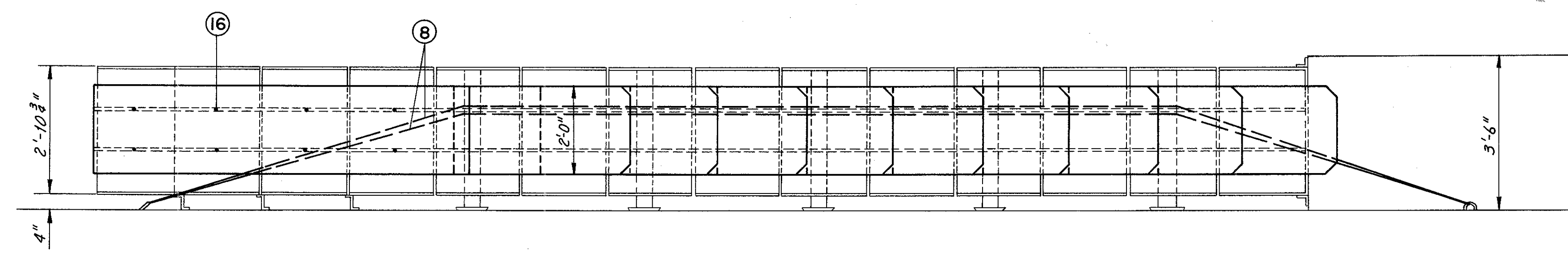
74  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By JMC Date 10-71  
Checked By SMB ; 11-71



**PLAN**  
Scale: 1/2" = 1'

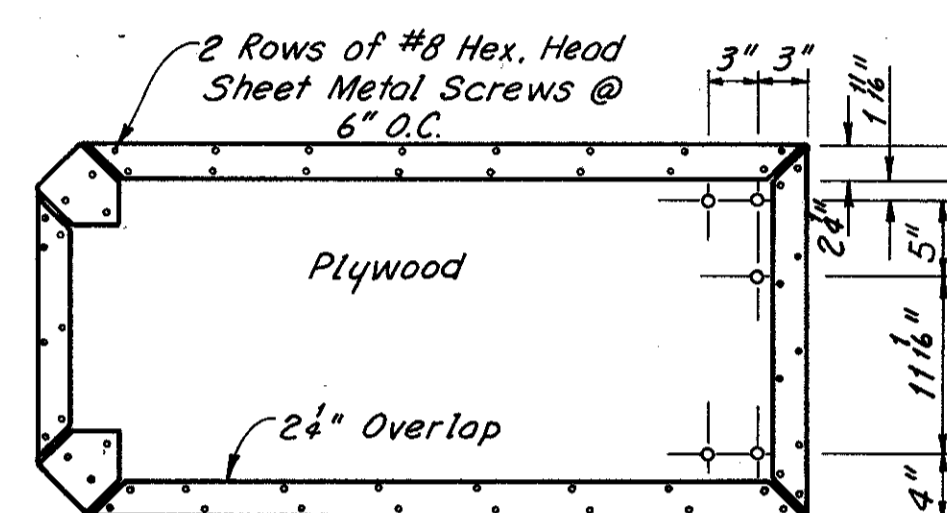
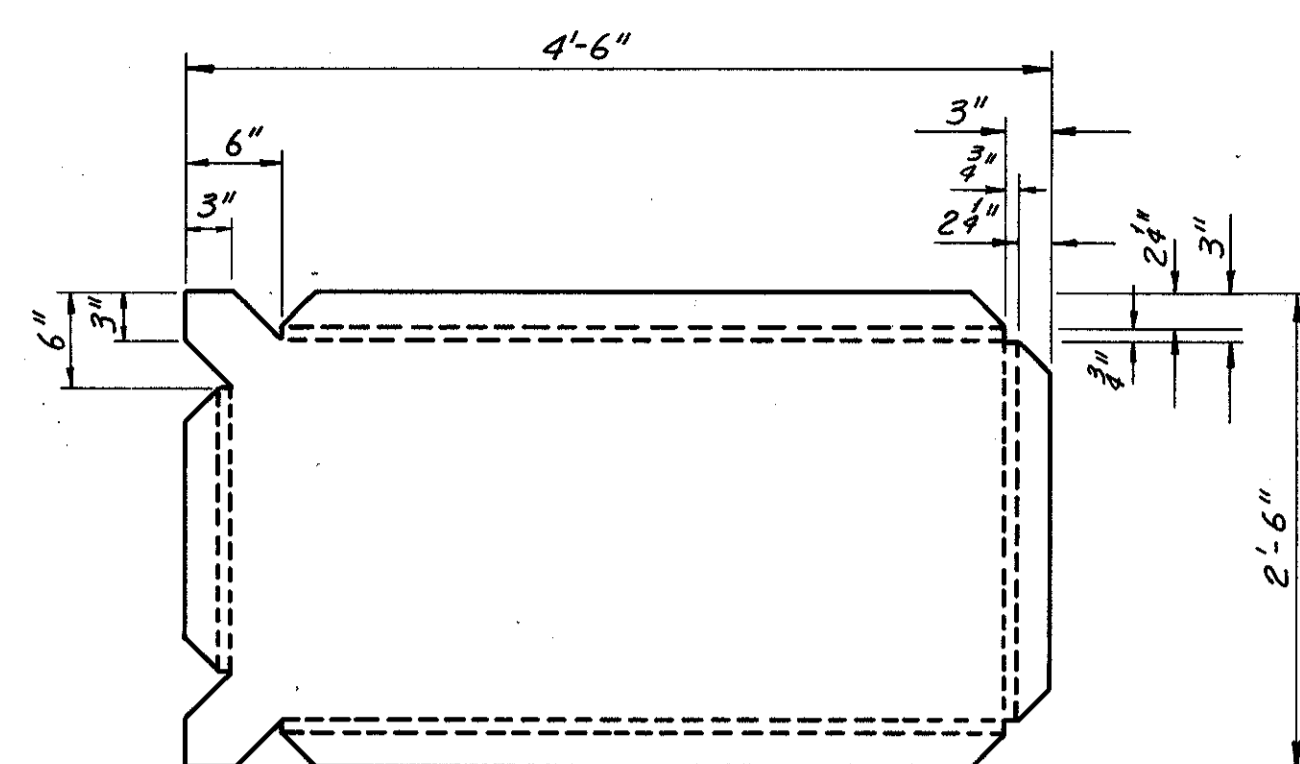


**ELEVATION**  
Scale: 1/2" = 1'

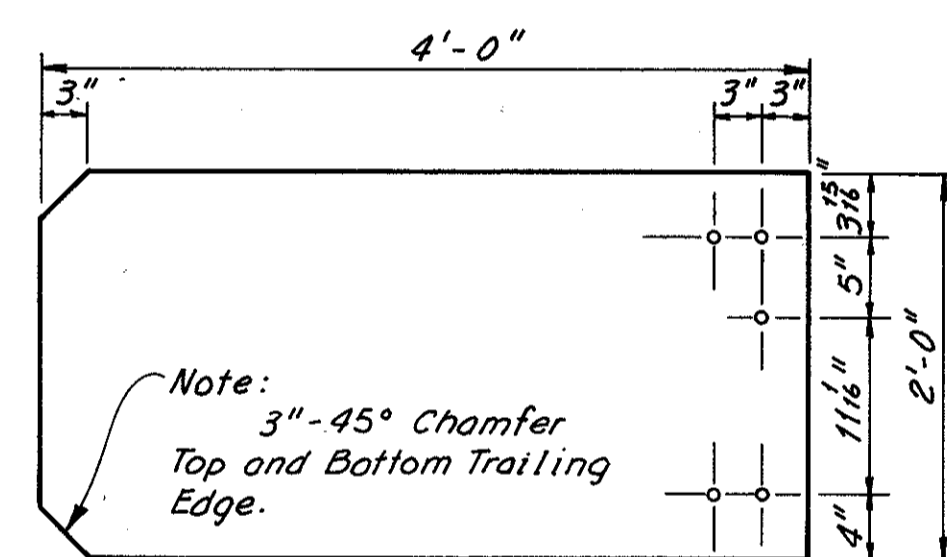
ESTIMATED QUANTITIES		
Ref. No.	Quantity	Description
1	49	55 Gal. Drums
2	138	Drum Connectors (Denoted by: ■)
3	18	4' Fish Scales
4	1	26 Gage Sheet Metal Nose 20'x3'
5	4	4 1/2" - 7 1/2" Spacers
6	6	7 1/2" - 13 1/2" Spacers
7	2	13 1/2" - 25" Spacers
8	4	3/4" Wire Rope
9	10	W6x8.5 Junior Beam with Skidplate
10	100	1/2" Buttonhead Hex. Socket Cap Screws
11	4	Anchor Stirrups
12	6	1/2" Attachment Rods
13	6	1/2" Expansion Shields with 1/2" Hex. Head Bolts
14	13	1"Z" Chairs (Denoted by: ✕)
15	2	L3 x 3 x 1/4; 10'-6" Sections
16	1314	Sheet Metal Screws
17	24	Wire Rope Clips

SCALE 1/2" = 1'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE J.M.C. DATE 10-28-71 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 11-3-71  
CKD S.M.B. DATE 11-3-71 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40



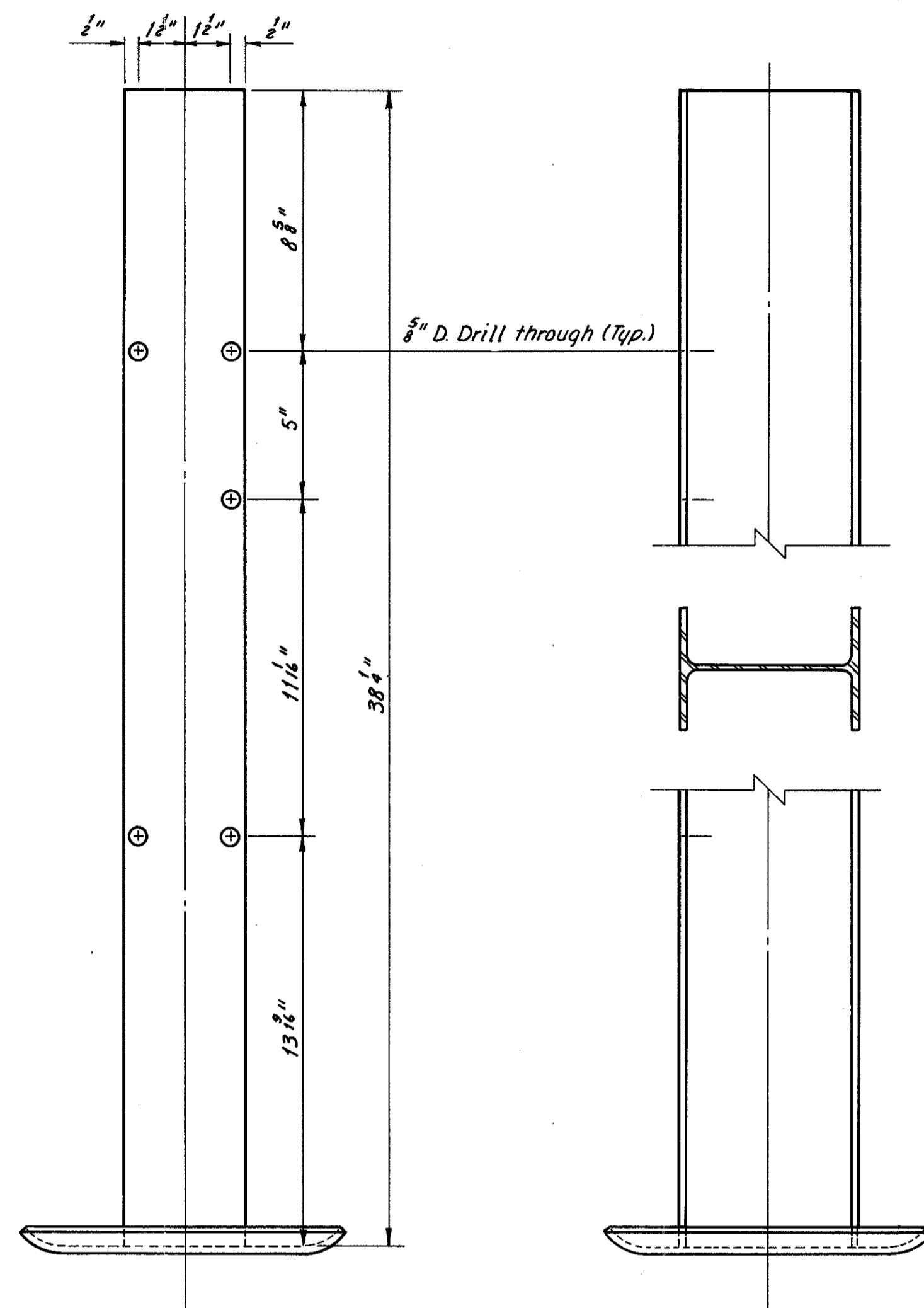
BACK VIEW



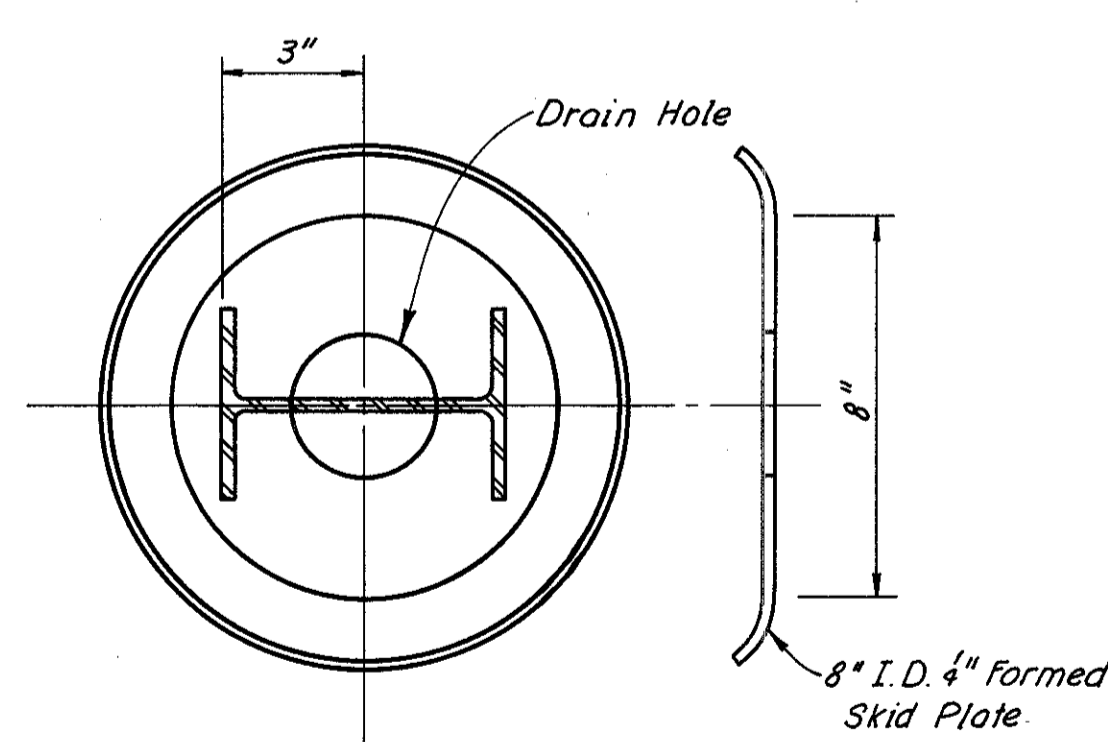
FRONT VIEW  
**FISH SCALES**  
Scale: 1" = 1'-0"

Note: 3"-45° Chamfer Top and Bottom Trailing Edge.

- FISH SCALES**
- (1) Fish scales shall be constructed of 3/4 inch plywood covered with 26-gage steel sheet of the sizes and configuration shown.
  - (2) The plywood shall be 5 ply exterior blue and conform to "American Plywood Product Standard PS 1-66 for 3/4 inch B-B EXT-DFPA(4)."
  - (3) The steel sheets shall be 26-gage galvanized steel sheet or coil conforming to ASTM Standard A 446-69 (Commercial Class) with 1.25 ounces of zinc per square foot.
  - (4) Fasteners shall be #8 Hex Head galvanized screws.
  - (5) The steel sheets and/or coils shall be coated on the exposed face with a 2 mil minimum thickness thermal setting coating applied in accordance with the coating manufacturer's recommendations. The color shall be off white as shown on color cards available through the Ohio Dept. of Highways; Division of Operations; Bureau of Traffic; Columbus, Ohio.
  - (6) The plywood shall be primed and given a second coat of paint or suitable coating conforming to Federal Specification TT-P-81d.
- Optional: Galvanized Industrial weight staples may be used in lieu of #8 Hex Head Screws.



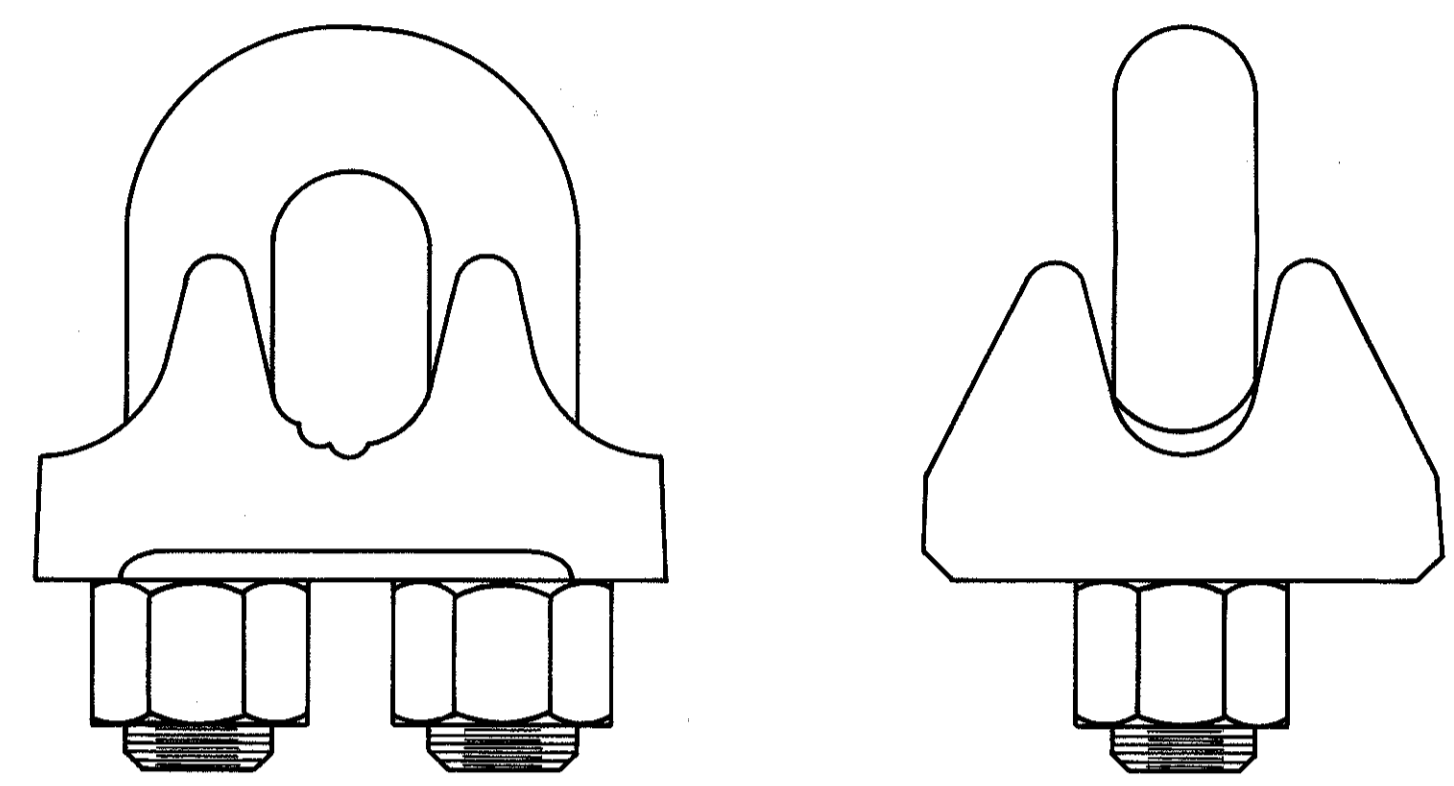
ELEVATION



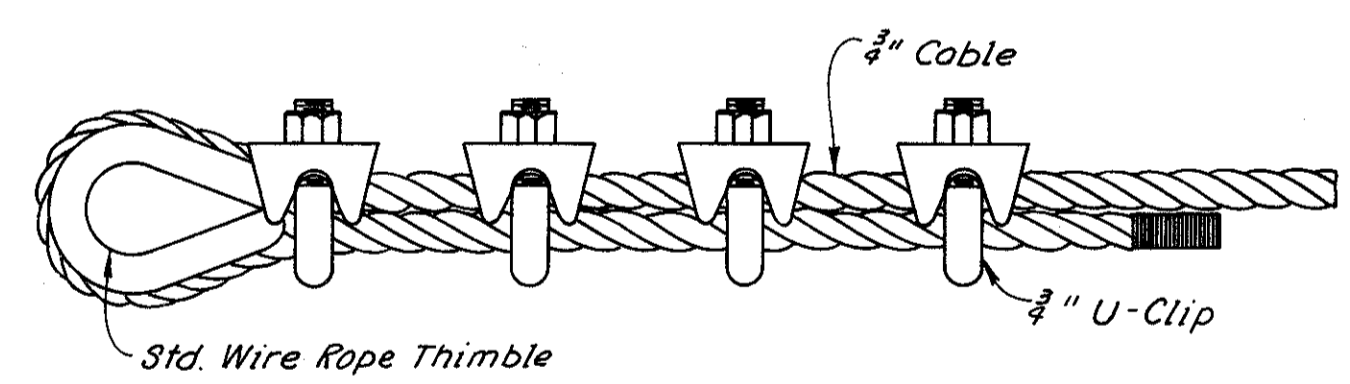
PLAN

6B 8.5 BEAM AND SKID PLATE  
**DRUM SUPPORT SKID BASE (6B 8.5)**  
Scale: 3" = 1'-0"

- DRUM SUPPORT SKID BASE**
- (1) All rolled sections shall conform to the applicable requirements of the AISC Steel Construction Manual. Material shall conform to the requirements for ASTM Standard A 36-63.
  - (2) Welding shall conform to Section 513.17.
  - (3) All parts shall be galvanized after fabrication in accordance with ASTM Standard A 123-69 (Commercial Class).

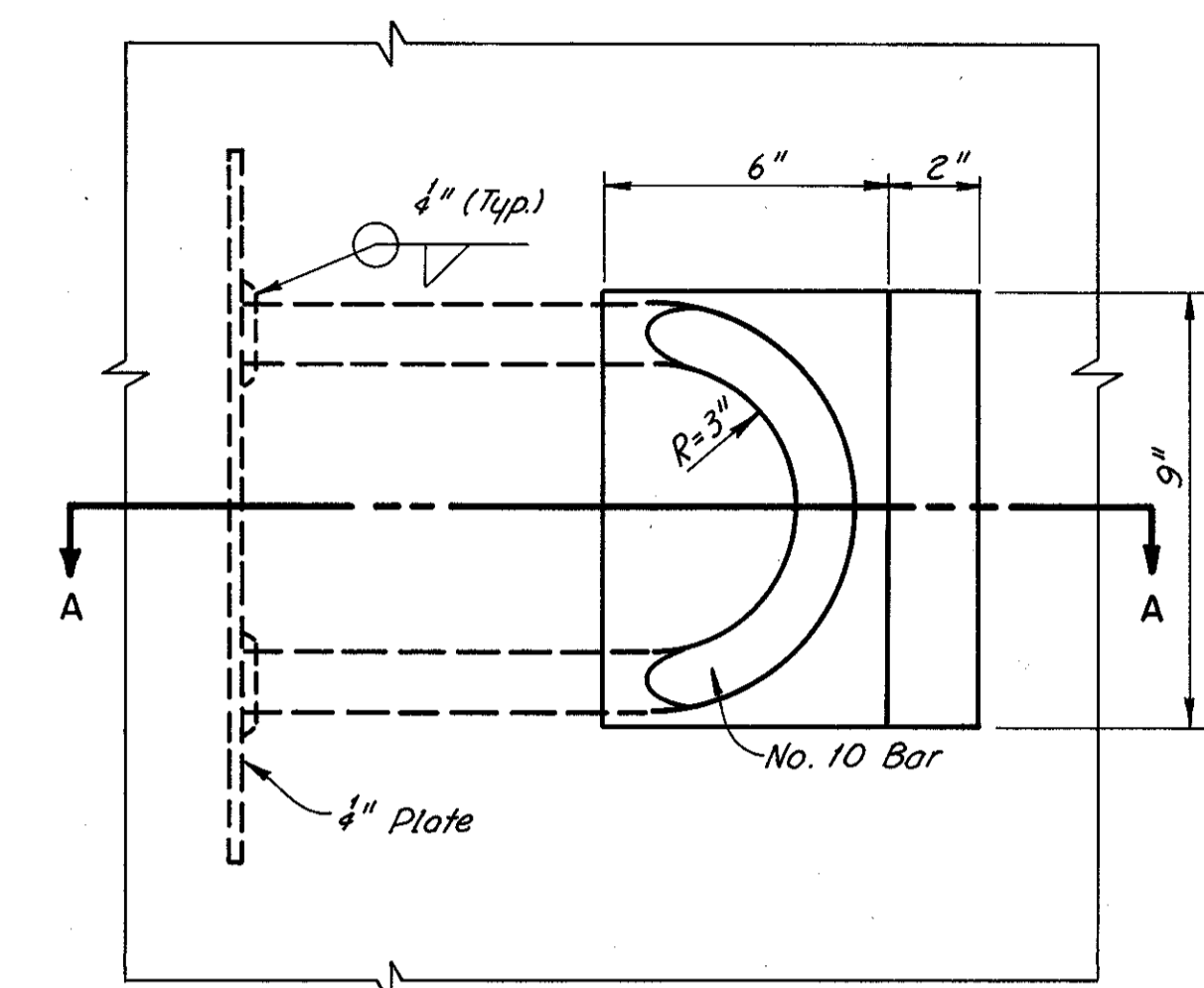
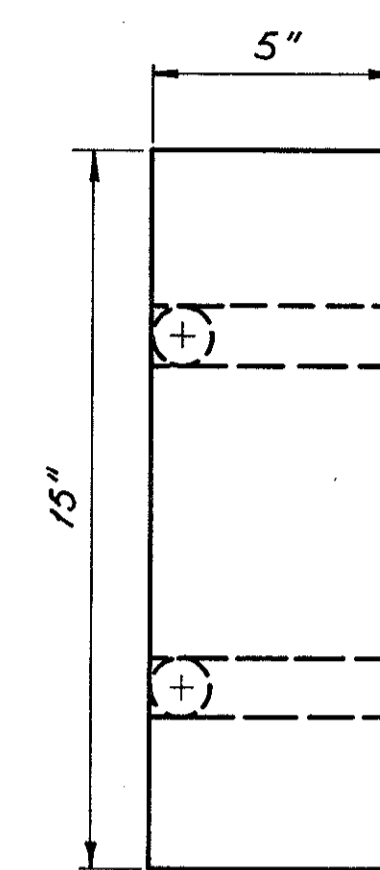


3/4" WIRE ROPE CLIP  
Scale: Full Size

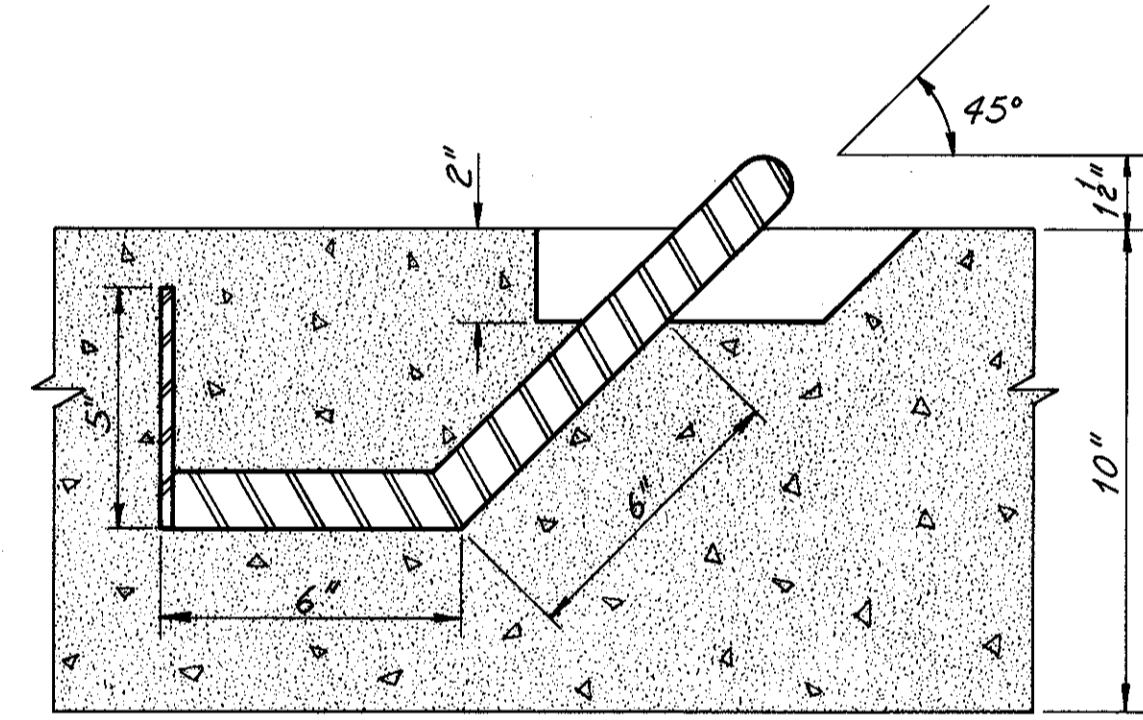


**CABLE CONNECTION**  
Scale: 3" = 1'-0"

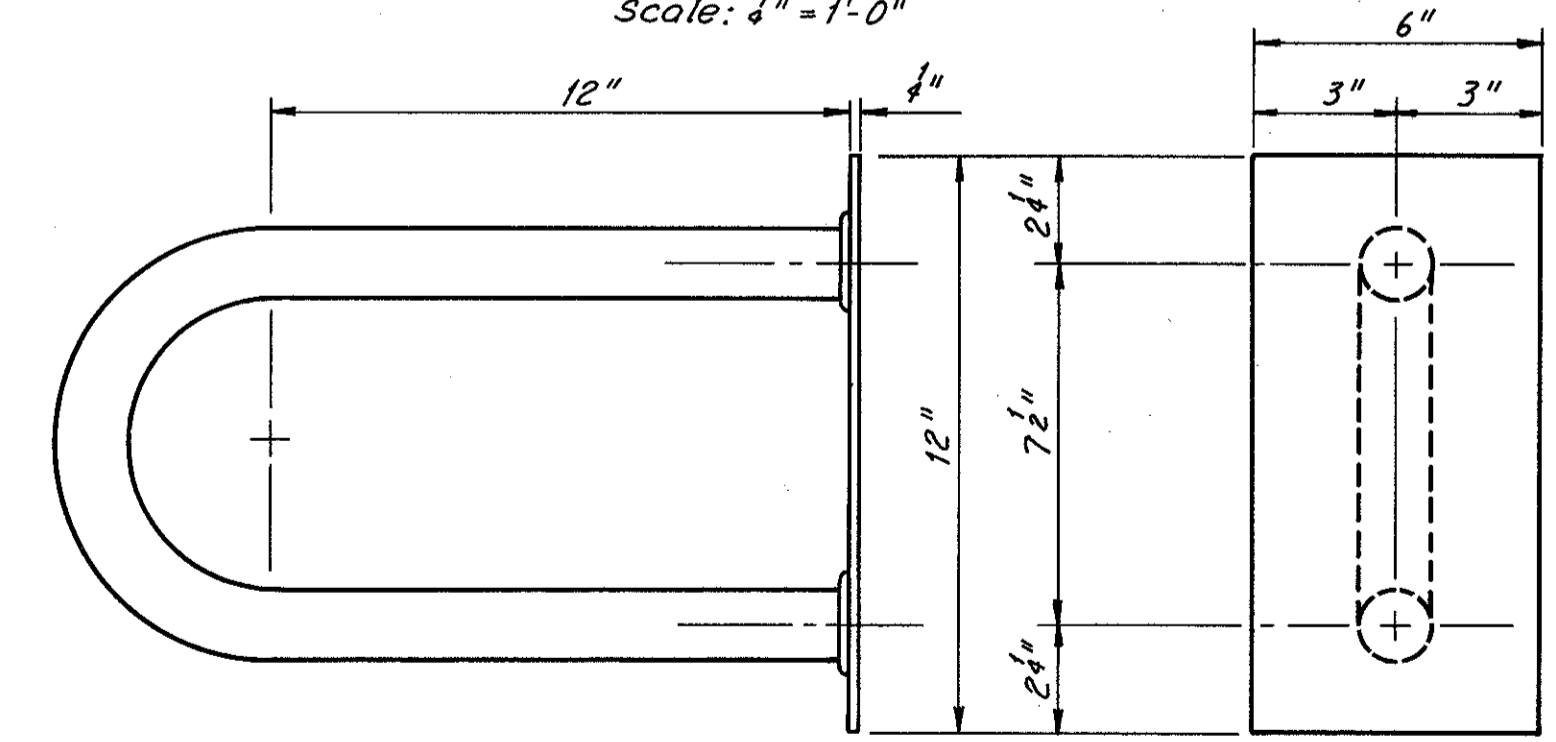
**CABLE CONNECTION**  
Wire rope clips shall conform to the applicable provisions of ASTM Standards A 307-68 and A 48-64 and shall be galvanized after fabrication. Galvanizing shall conform to ASTM Standard A 153-67.



PLAN



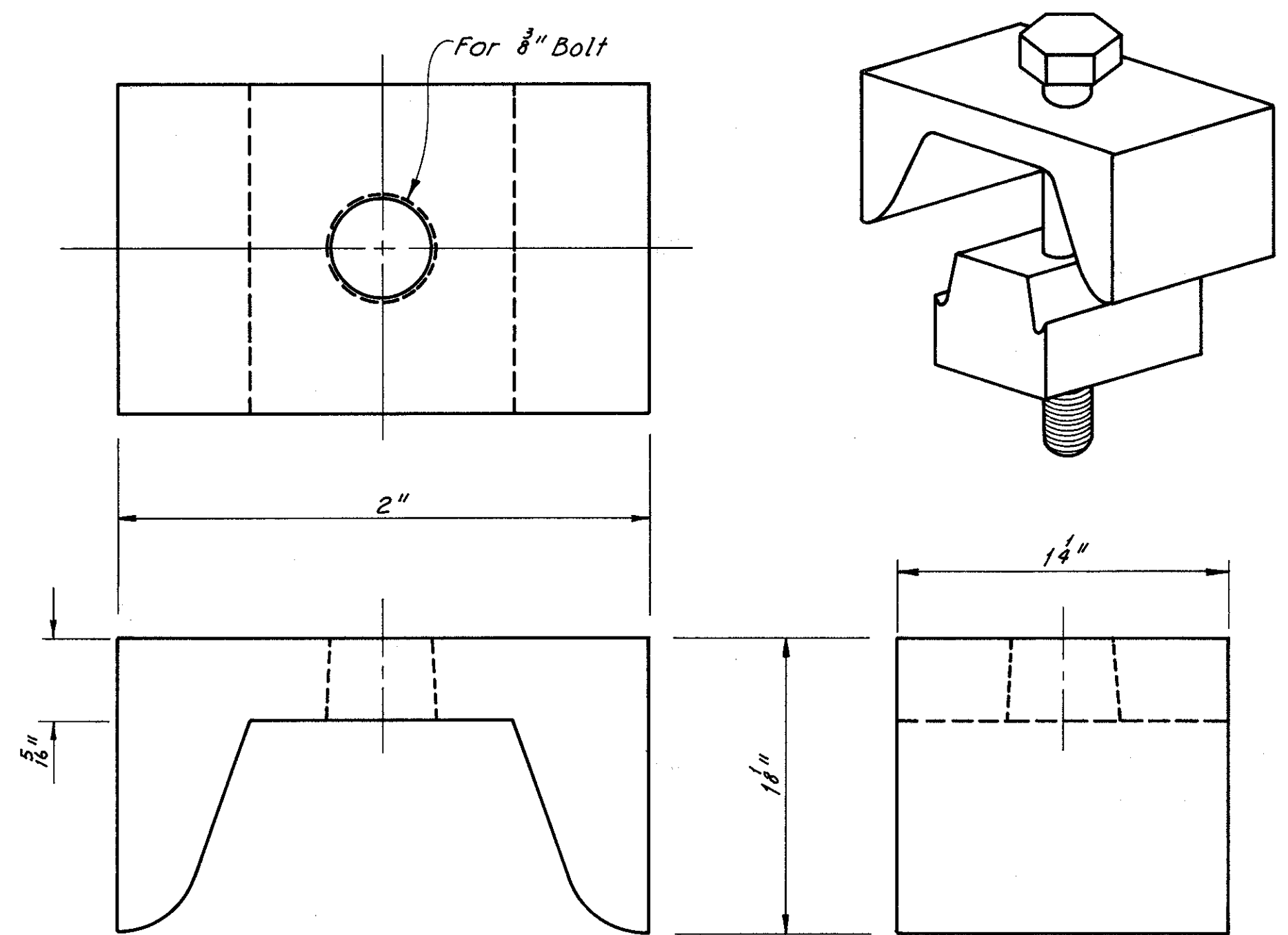
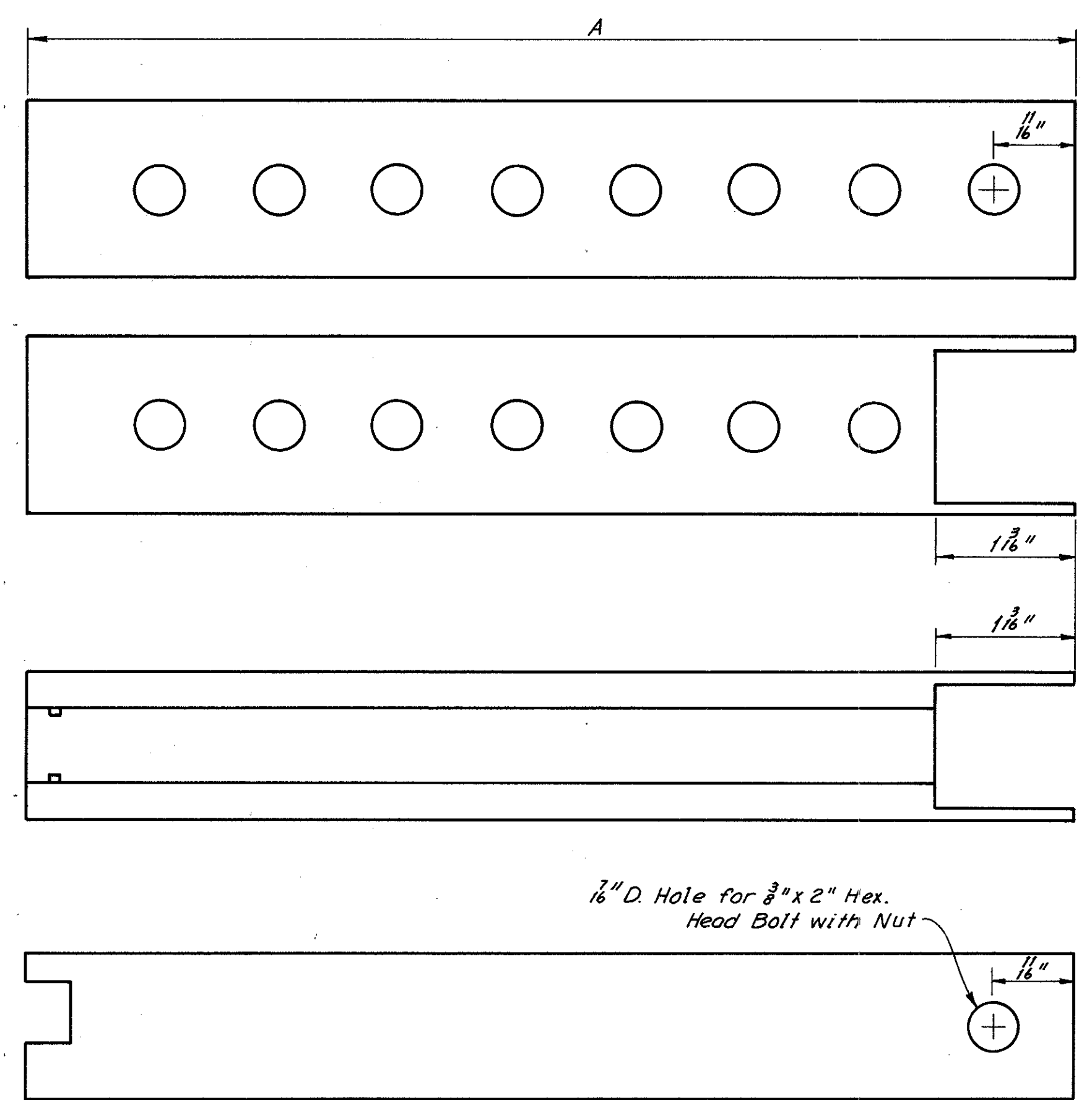
SECTION A-A  
**TYPE A ANCHOR**  
Scale: 4" = 1'-0"



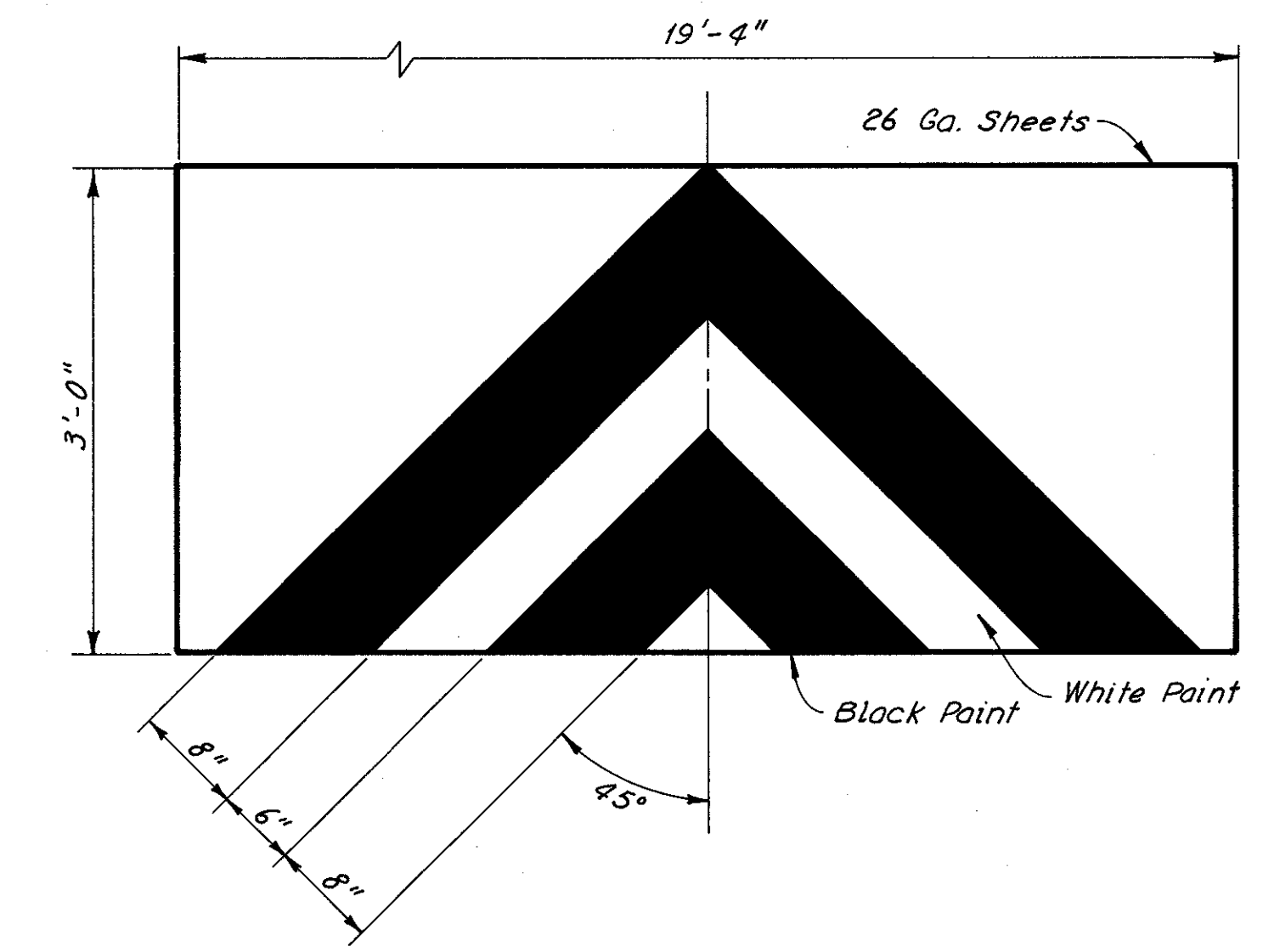
**TYPE B ANCHOR**  
Scale: 3" = 1'-0"

**ANCHOR STIRRUP DETAILS**

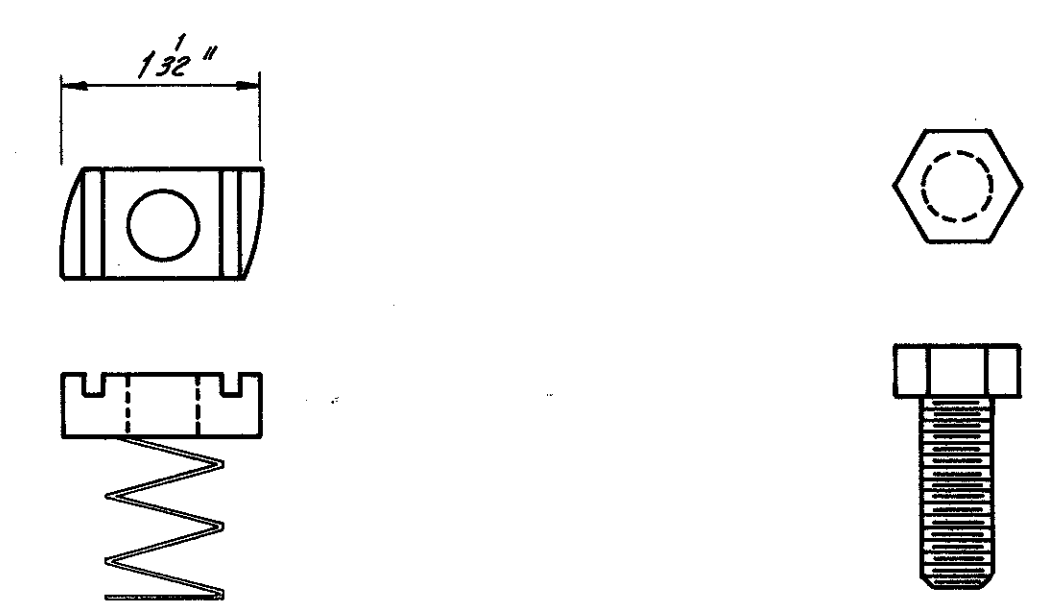
- ANCHOR STIRRUP**
- (1) The anchor stirrup shall conform to ASTM Standard A 615-68 Grade 60. The bar shall conform to ASTM Standard A 283-67.
  - (2) Welding shall conform to Section 513.17.
  - (3) The anchor stirrup shall be galvanized after fabrication in accordance with ASTM Standard 123-69 (Commercial Class).



Note: Groove shall be free of all casting sand and metal.



**NOSE SHEET DETAIL**  
Scale: 1" = 1'-0"

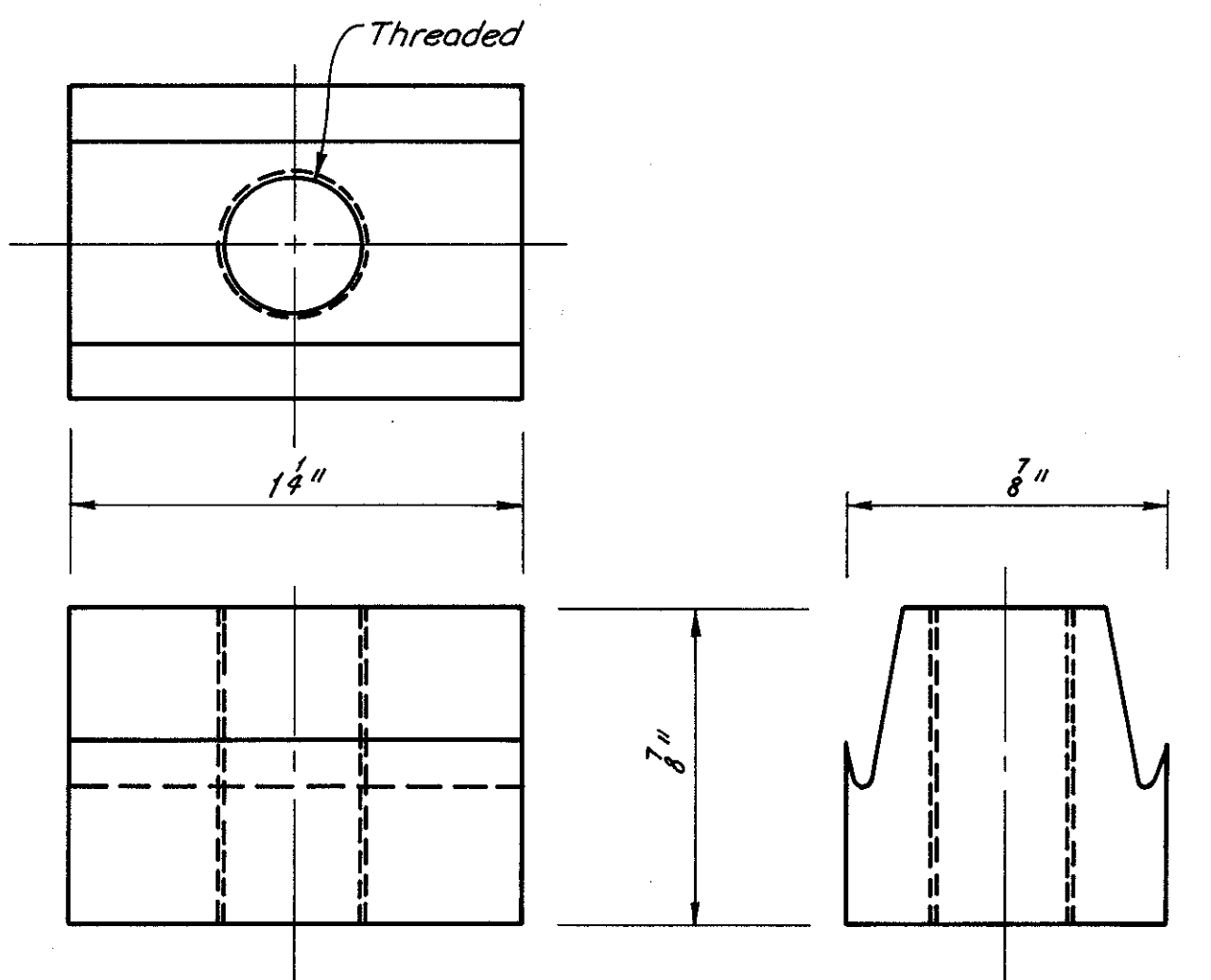


**DRUM SPACER DETAILS**  
Scale: Full Size

**SPACER DETAIL**

- Box sections and channels shall be of pregalvanized sheet with prepunched holes to 1.25 ounce coating to conform to ASTM Specification A-525.
- Tubing shall be 12 gage thickness (.105 U.S.S. Gage) cold rolled steel C-1010.

DESCRIPTION	A
3 $\frac{1}{2}$ " to 4 $\frac{1}{2}$ "	4 $\frac{13}{16}$ "
4 $\frac{1}{2}$ " to 7 $\frac{1}{2}$ "	5 $\frac{13}{16}$ "
7 $\frac{1}{2}$ " to 13 $\frac{1}{2}$ "	8 $\frac{13}{16}$ "
13 $\frac{1}{2}$ " to 25"	14 $\frac{13}{16}$ "



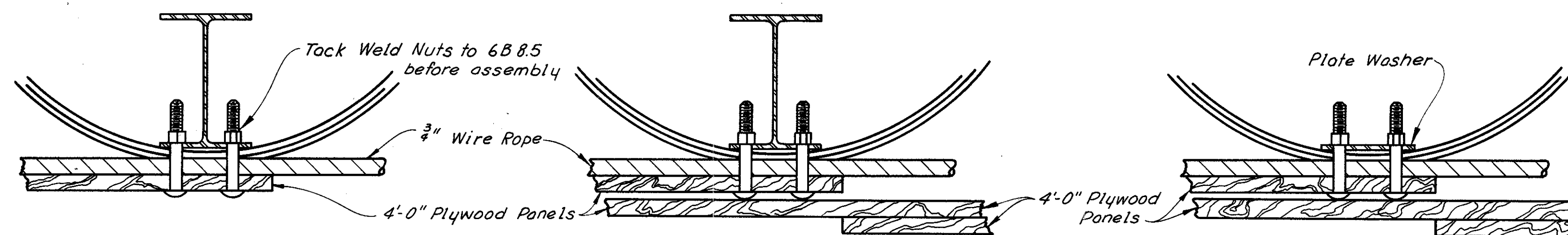
**DRUM CONNECTOR DETAILS**  
Scale: 2" = 1"

**DRUM CONNECTOR**

- The saddle shall be manufactured in accordance with ASTM Standard Specifications A 47-68, "Malleable Iron Castings".
- The block shall be manufactured in accordance with ASTM Standard Specification A 48-64, "Gray Iron Castings".
- After the block has been cast, burrs shall be removed by grinding to provide an assembly which will be compatible with the saddle and the lip of the drums.
- Bolts, nuts and washers shall conform to ASTM Standard Specification A 76-64.
- After fabrication all components shall be galvanized in accordance with ASTM Standard A 123-69 Commercial Class.

**NOSE SHEET**

- The nose sheet shall be formed from 26-gage galvanized steel sheet or coil conforming to ASTM Standard A 446-69 (Commercial Class) 1.25 ounces of zinc per square foot.
- Fasteners used to fasten the nose sheet to the drums shall be #8 Hex Head galvanized self tapping metal screws.
- The steel sheets and/or coils shall be coated on the exposed face with a 2 mil minimum thickness thermal setting coating applied in accordance with the coating manufacturer's specifications. The color shall be off white as shown on color cards available through the Ohio Dept. of Highways; Division of Operations; Bureau of Traffic; Columbus, Ohio.
- Markings shall conform in size and color to Ohio Manual on Uniform Traffic Control Devices for Streets and Highways, Part V.



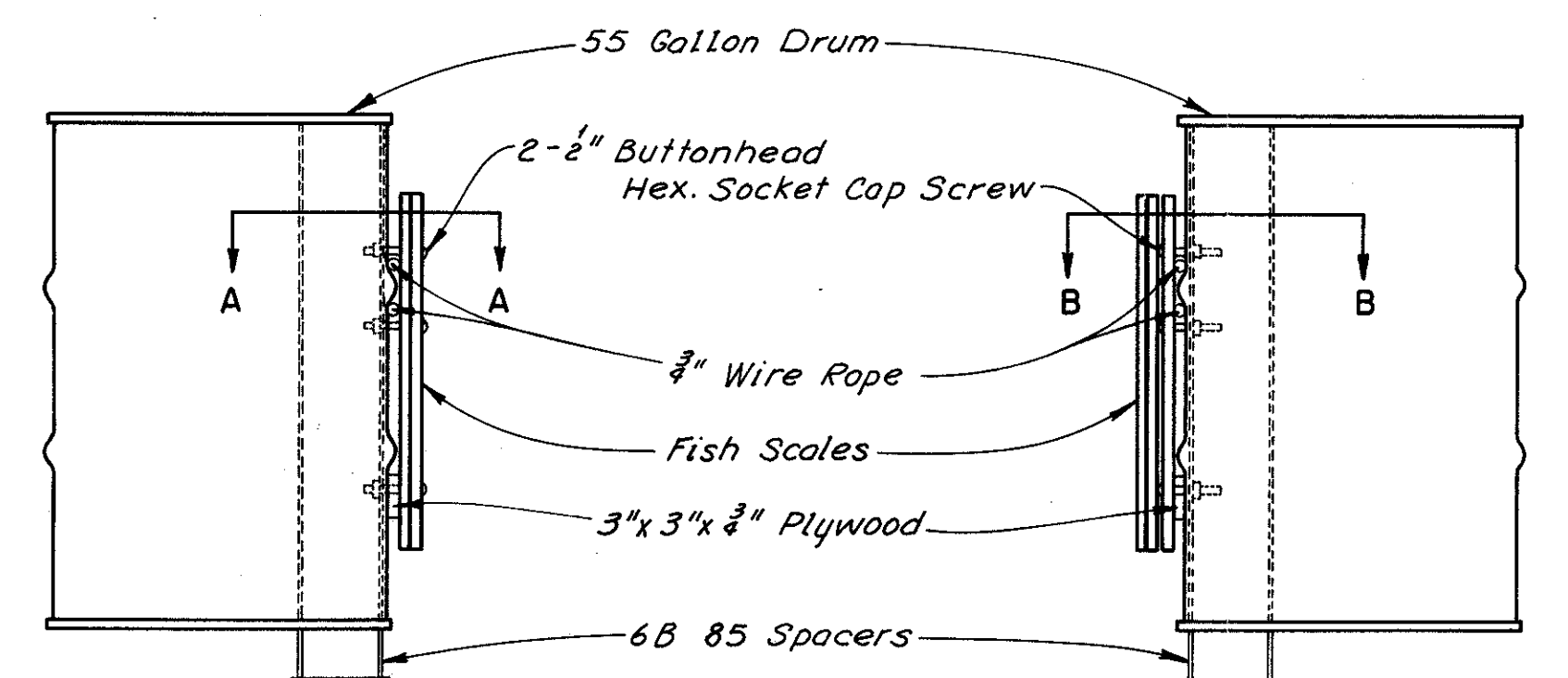
LEAD PANEL ATTACHMENTS

INTERMEDIATE AND FINAL PANEL ATTACHMENTS

PLATE WASHER-FOR USE BETWEEN POST SUPPORTS

SECTION A-A

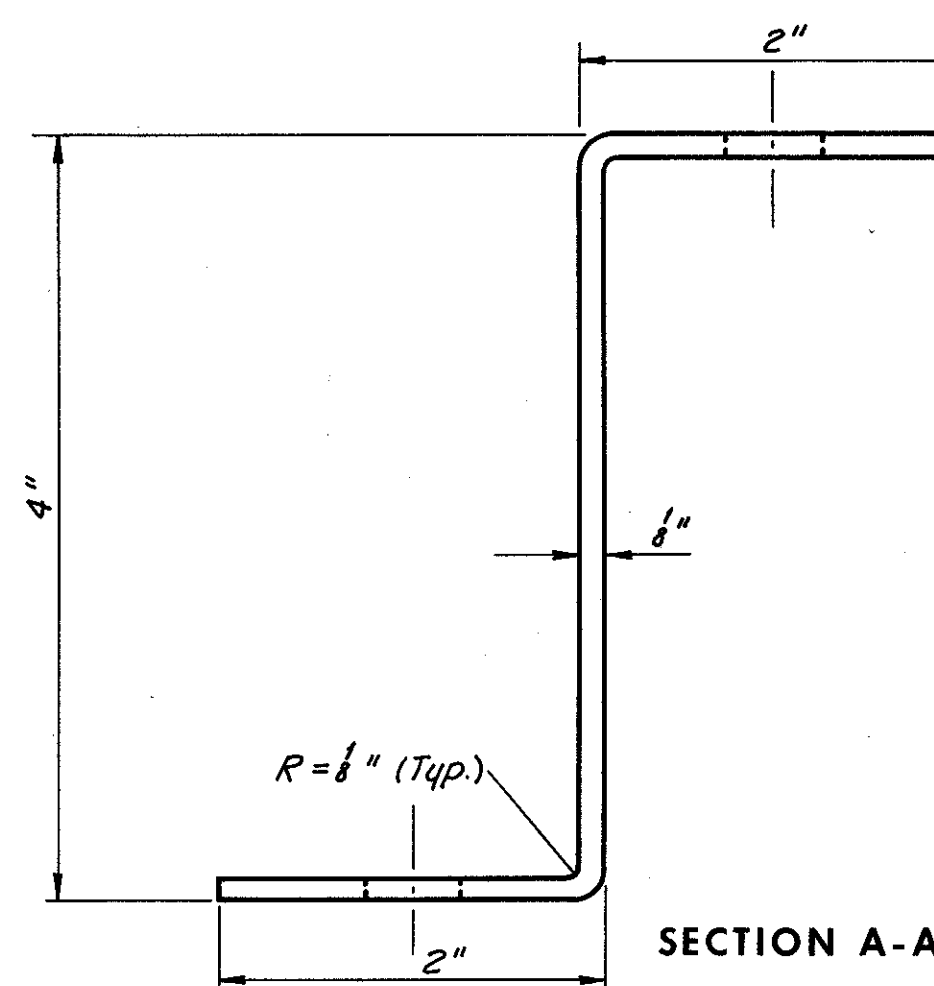
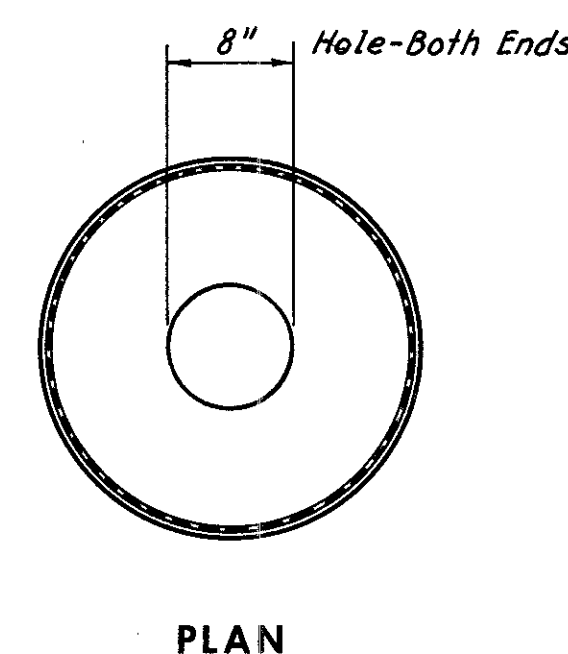
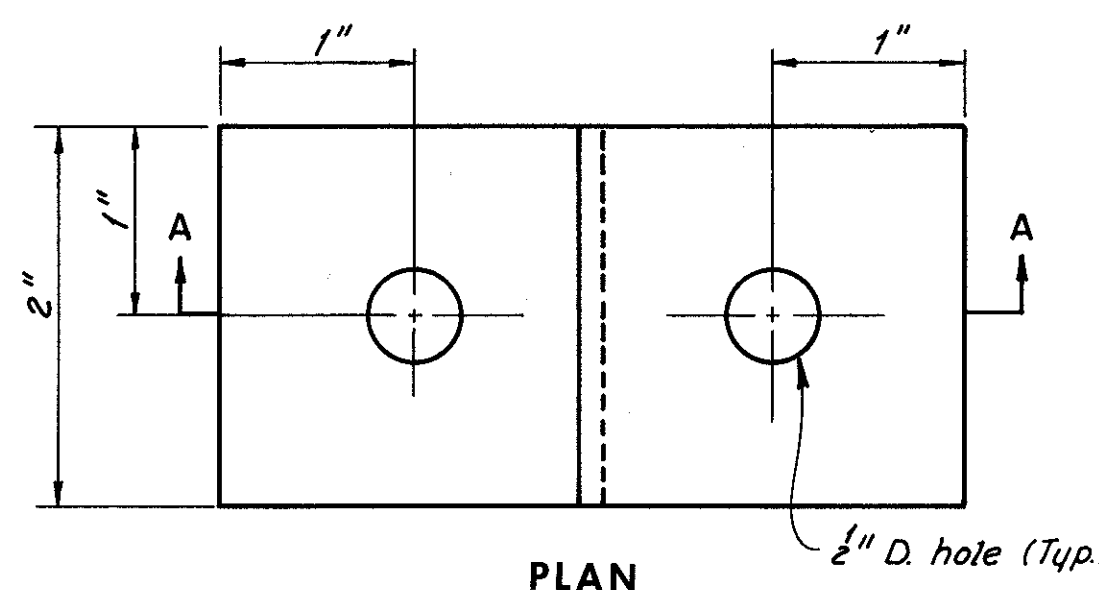
SECTION B-B



ELEVATION

ASSEMBLY DETAILS

Scale: 3"=1'-0"

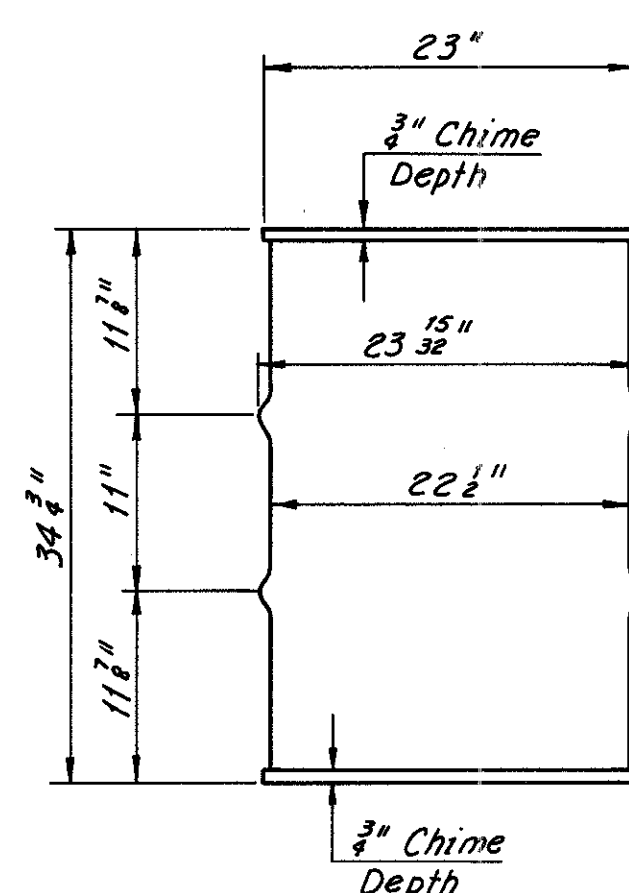


Z CHAIRS

Scale: Full Size

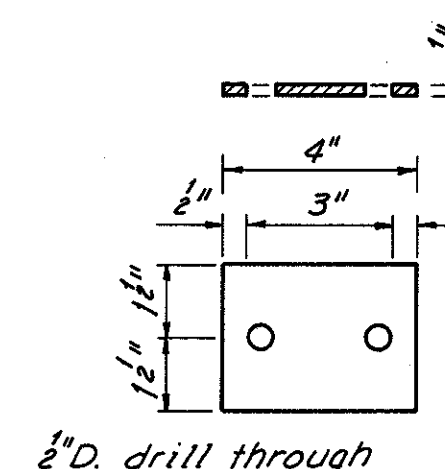
1/2" CHAIRS

1/2" chairs shall be formed from steel plates or strip conforming to ASTM Standard A 283-67 and shall be galvanized after fabrication. Galvanizing shall conform to ASTM Standard A 123-69 (Commercial Class).



DRUM DESIGN

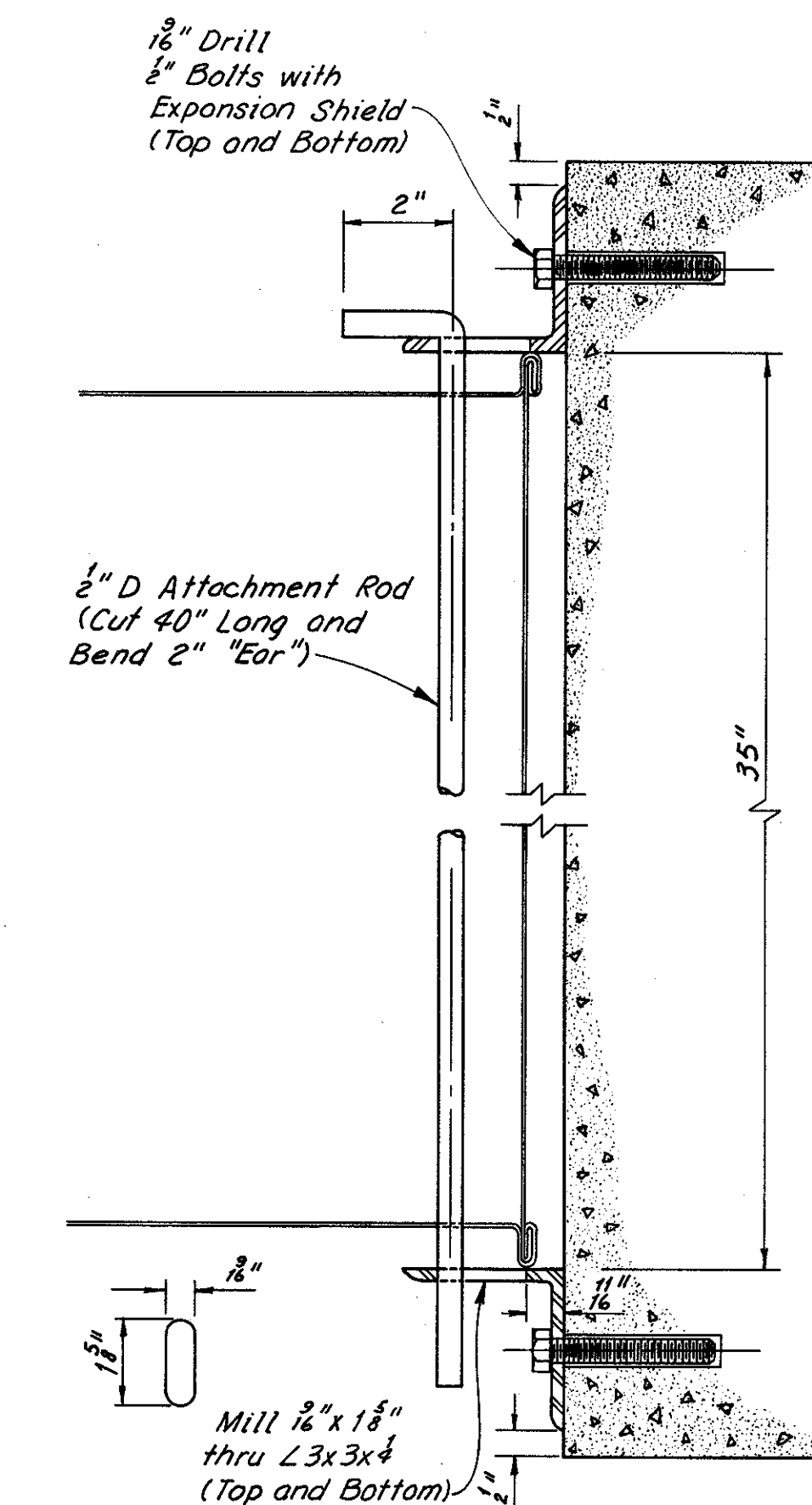
Scale: 1"=1'-0"



DRUMS

Drums shall be new, 55-gallon capacity conforming to the applicable parts of Federal Specification PPP-D-729C dated August 16, 1969, for Type II, "straight side, with rolled or expanded hoops, cylindrical drum; double seamed without chime reinforcement," except as modified herein.

- The drums shall be constructed of 20 gage steel for the head, bottom, and body. The head and bottom shall be hot dipped galvanized with 1.25 ounces of zinc per square foot in accordance with ASTM Standard A 446-69 (Commercial Class).
- The average diametrical crushing strength per drums shall be 6,000 pounds; with the maximum variation for any single drum  $\pm 1,000$  pounds; and the maximum average variation for 10 tests shall be 400 pounds.
- The configuration of the drums shall be as shown in these plans with the only penetrations being the 8 inch diameter holes in the center of the top and bottom.
- The body of the drum shall be painted inside and outside after fabrication with one (1) coat of primer Section 708.15 and two (2) coats of finish paint in accordance with the requirements of Ohio Specification 514. The primer and finish coats may be applied by spray coating or brushing however each coat must be allowed to dry thoroughly (minimum 18 hours) prior to application of the next coat of paint. The two finish coats of paint shall be yellow automotive enamels, conforming to National Bureau of Standards Color No. 33538 of Federal Standard 595, within 5.0 N.B.S. units. Color chips showing tolerance limits are available at the Bureau of Traffic, 450 East Town St., Columbus 15, Ohio. The quality of paint shall be as listed below or equal:
  - DuPont - Dulux 93-65334
  - Sherwin Williams - Ken Transport
  - Marten Senour - Synthol Series 80
  - Ditzler - Series DQE
  - Acme - Series 22
- Paragraph 6.1, "Intended use", of PPP-D-729c shall be deleted and replaced by the following: "The steel drums covered by this specification are intended primarily to be used in Modular Crash Cushions."
- Tolerances:
  - On overall diameter:  $\pm 1/16$ "
  - On overall height, inside height, rolling hoop spring:  $\pm 1/8$ "
  - On other dimensions:  $\pm 1/16$ "



ANGLE ANGLE CONNECTION DETAILS

SUPPORTS AT BACKUP WALL

Scale: 1"=3"

SUPPORTS AT BACKUP WALL

- Rolled sections shall conform to ASTM Standard A 36-63.
- Nuts, bolts, and washers shall conform to ASTM Standard A 307-68 and shall be galvanized in accordance with ASTM Standard A 153-67.
- Individual components except nuts, bolts, and washers, shall be galvanized after fabrication in accordance with ASTM Standard A 123-69 Commercial Class.

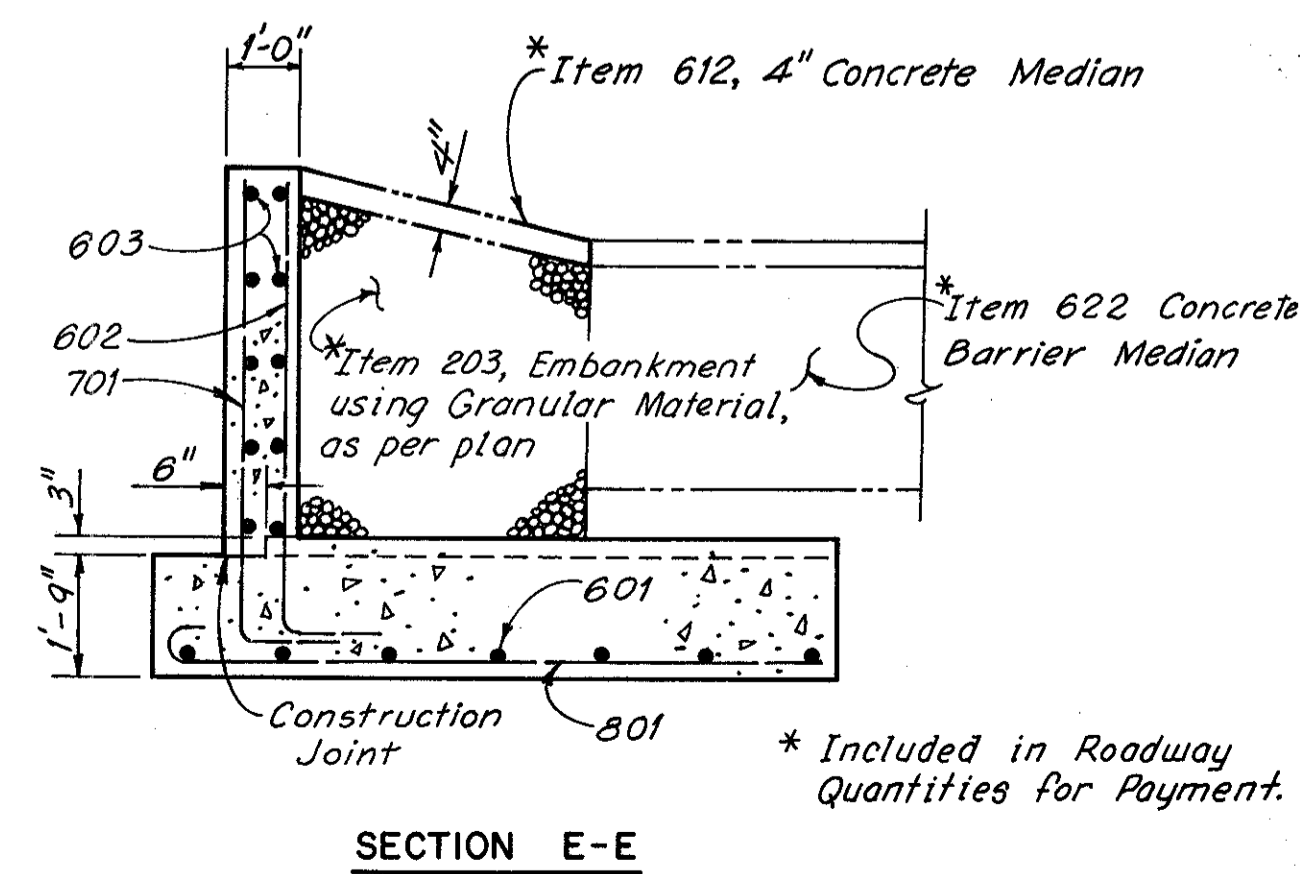
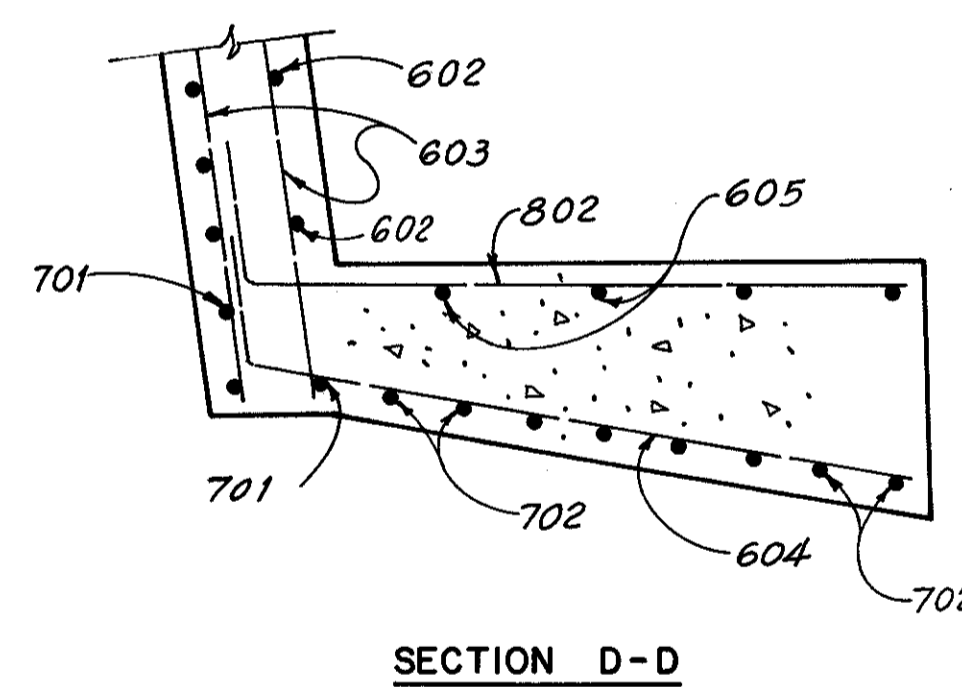
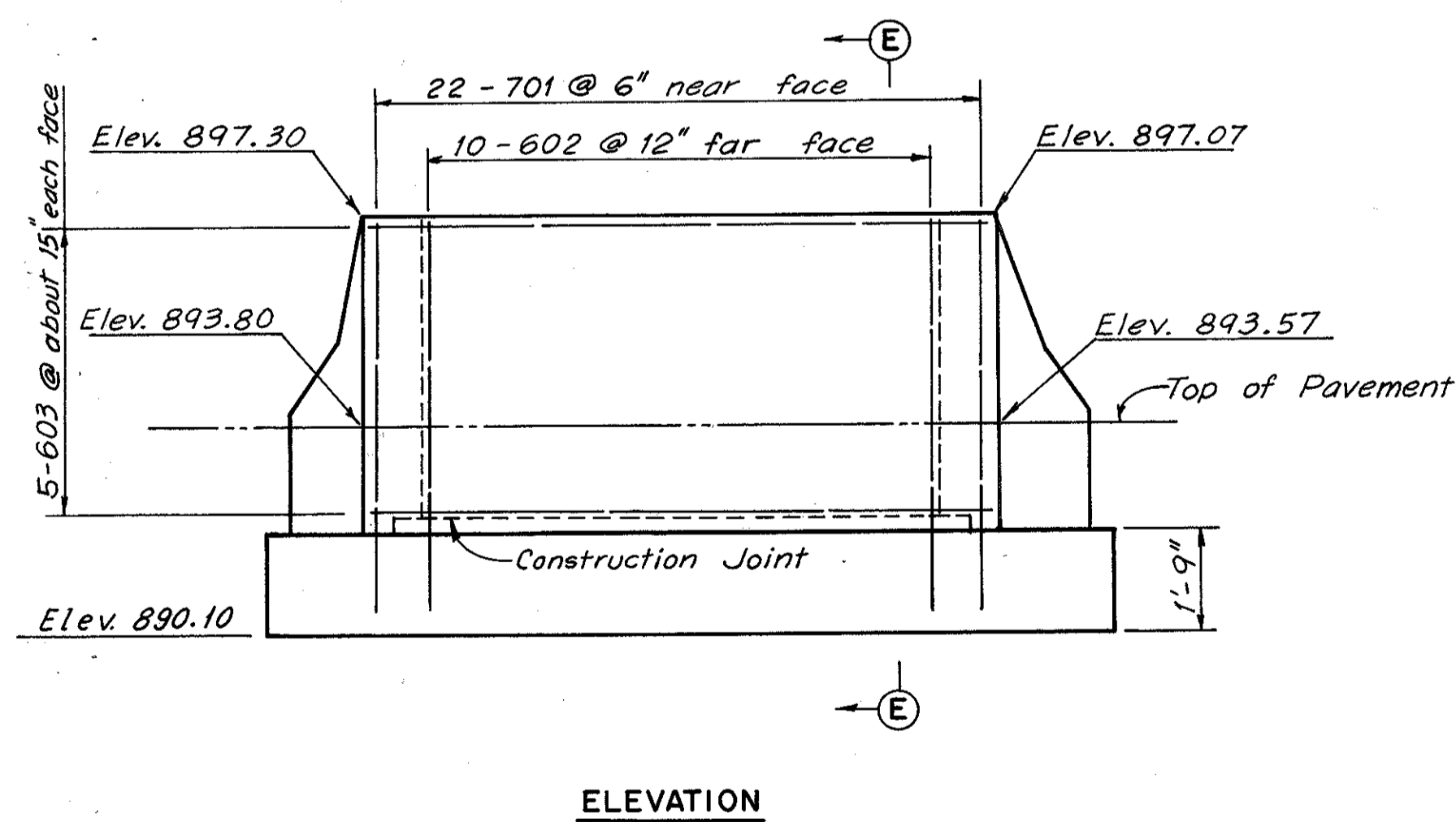
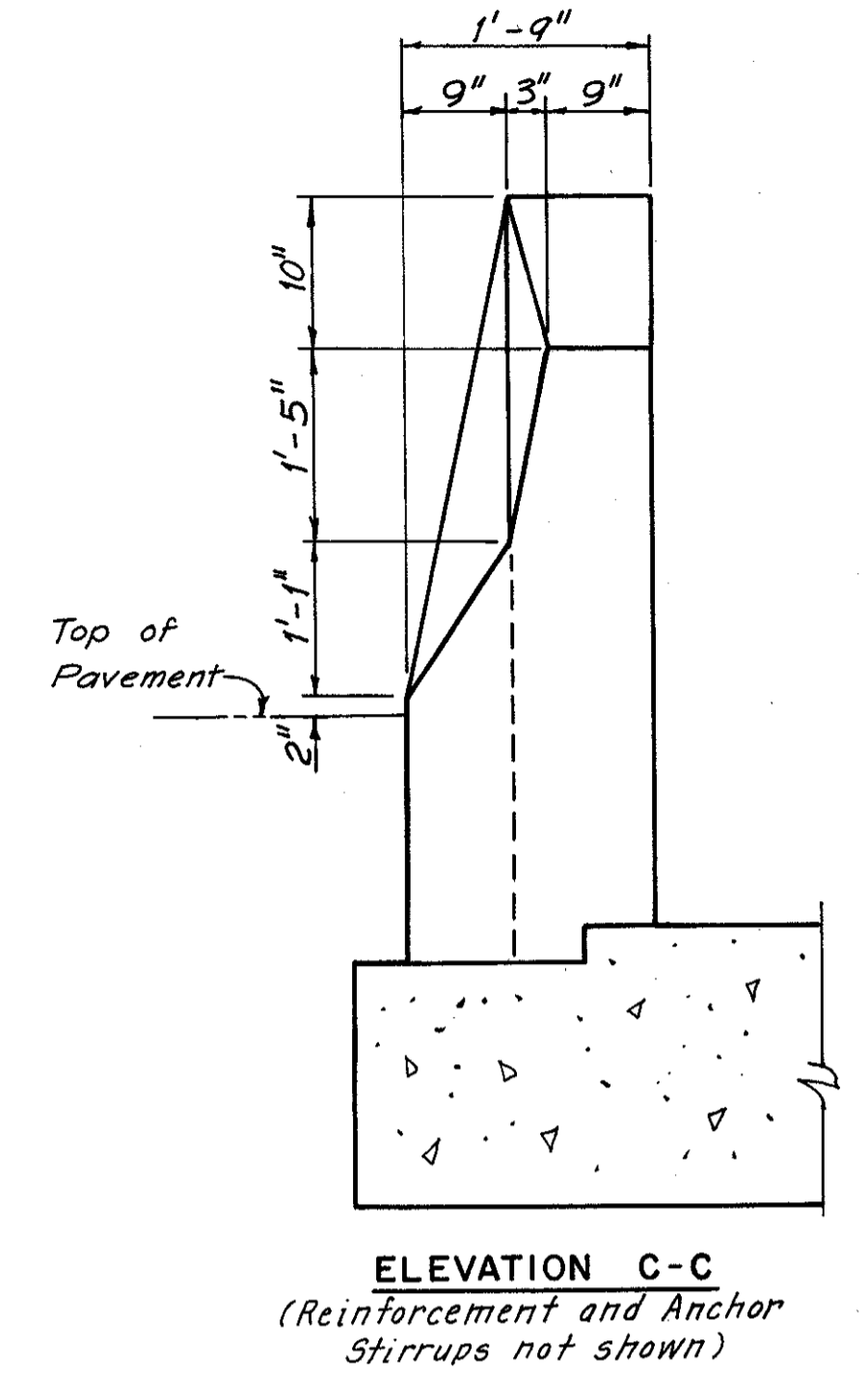
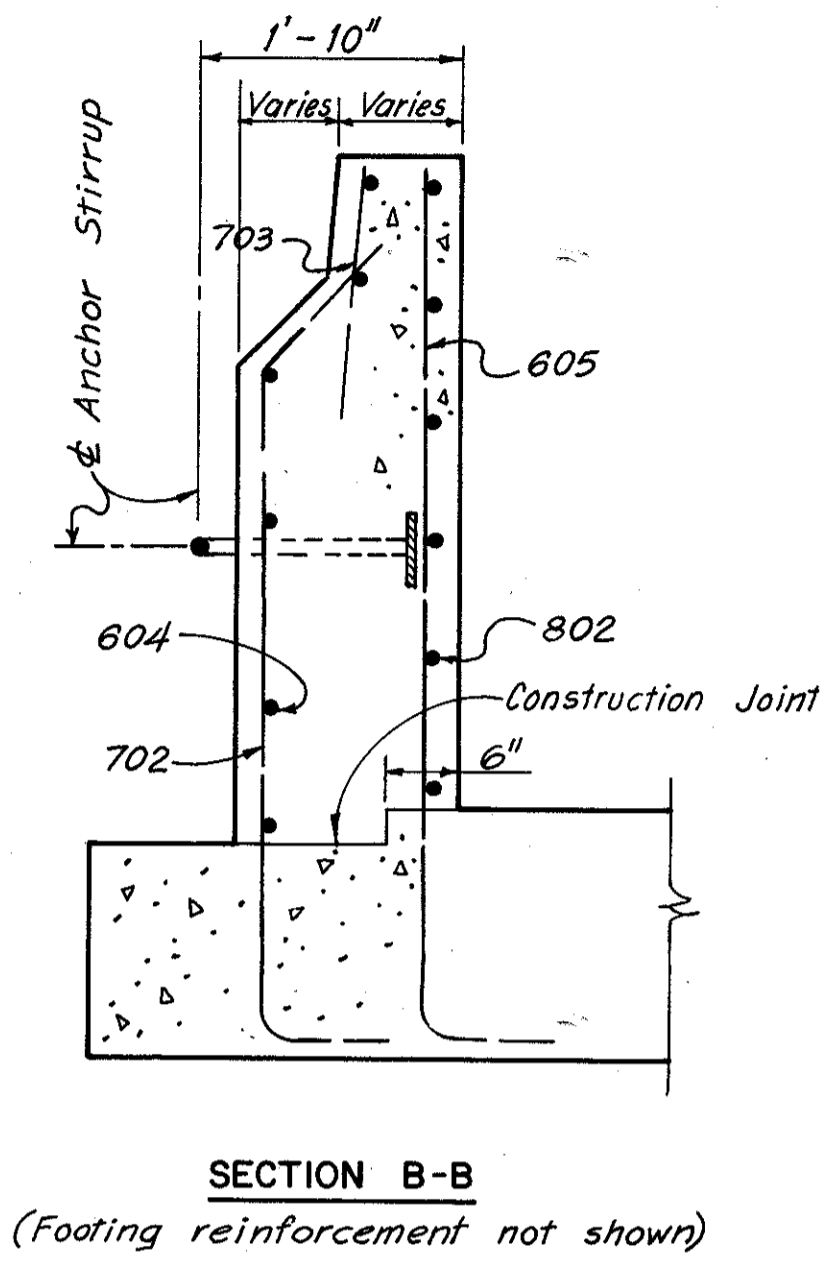
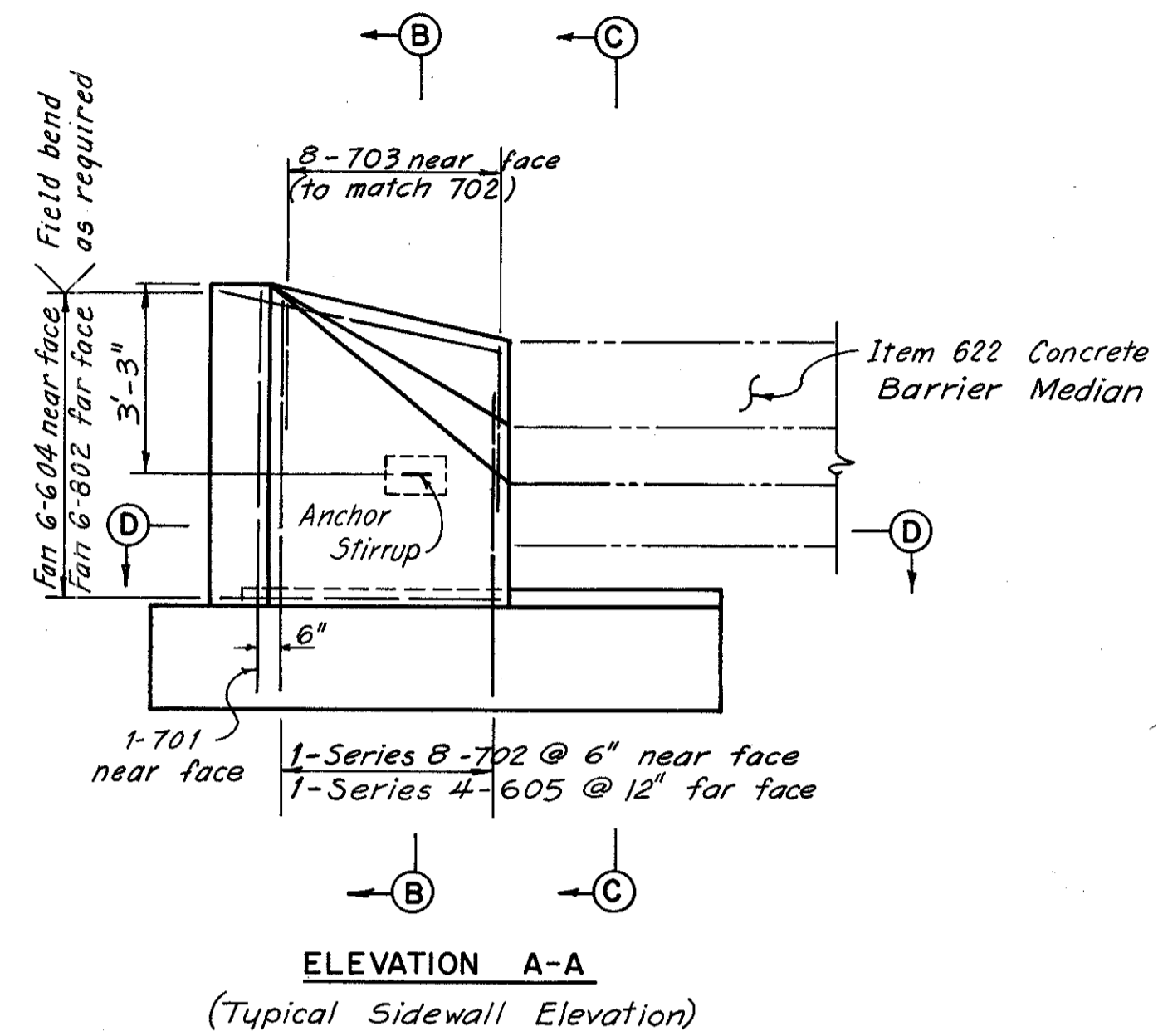
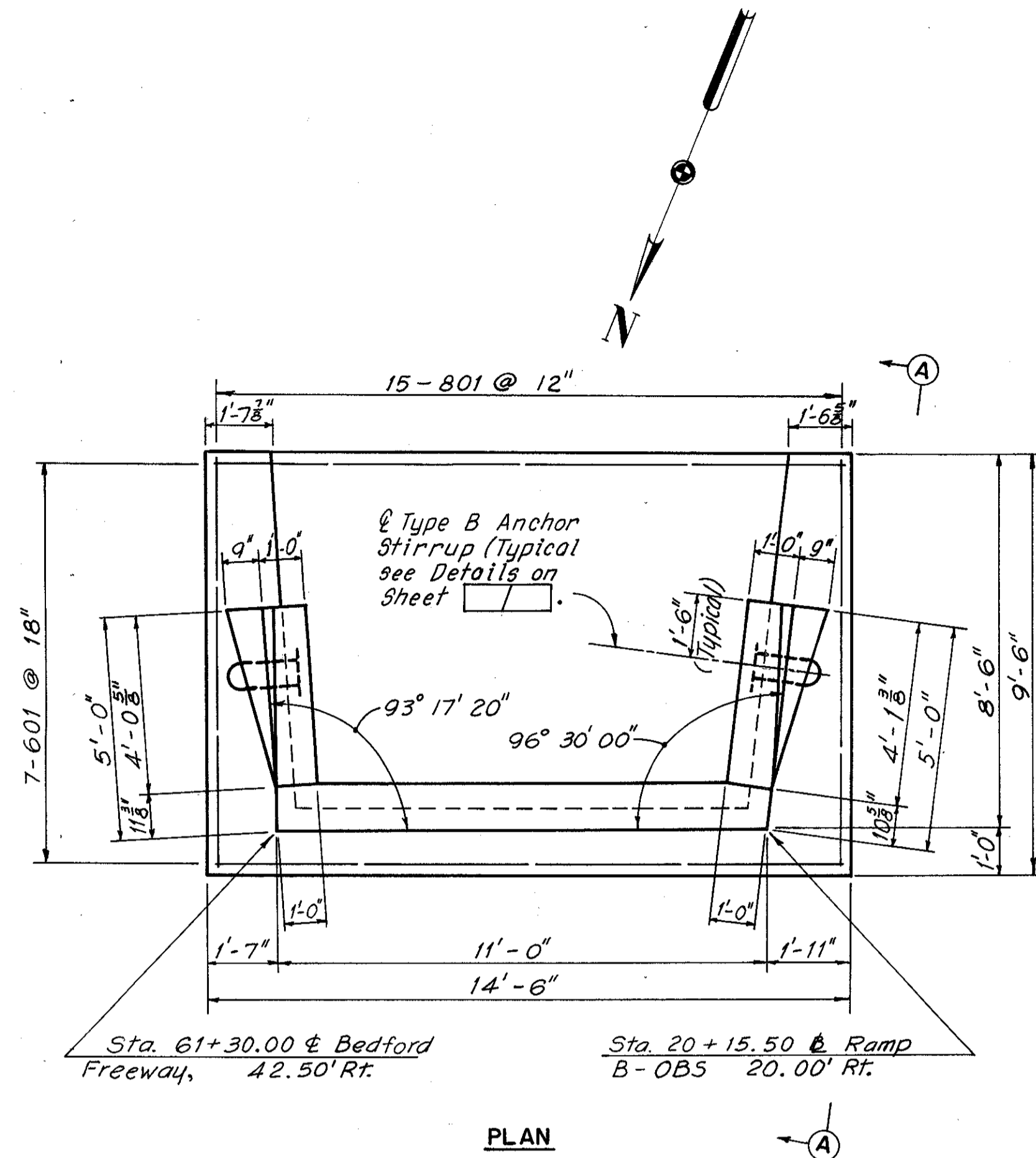
# BACKUP WALL DETAILS

Quantity Calculations  
 Made By Lee Date 4-72  
 Checked By SMR Date 4-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

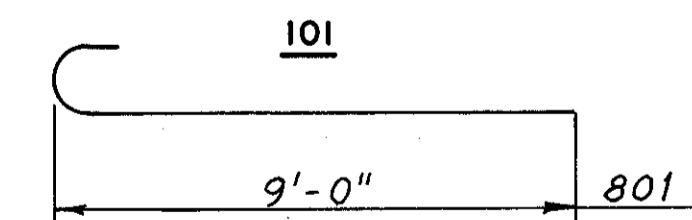
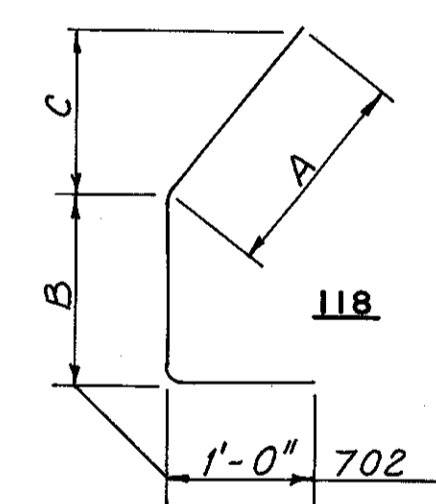
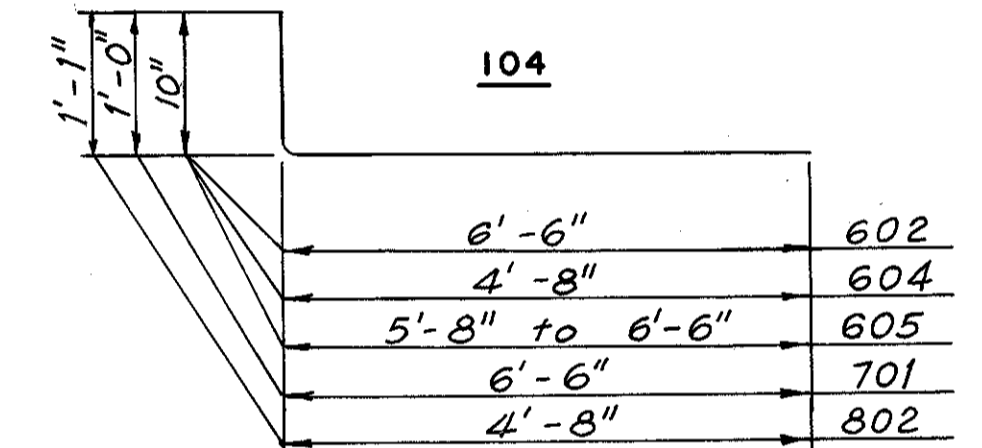
78  
390

CUYAHOGA COUNTY  
 CUY-480-21.40



## REINFORCEMENT SCHEDULE AND BENDING DIAGRAMS

MARK	NO.	LENGTH	TYPE	SERIES INC.	WEIGHT	REMARKS
601	7	14'-0"	str.		147	
602	10	7'-2"	104		114	
603	10	10'-9"	str.		161	
604	12	5'-4"	104		96	
605	2 Ser. 4	7'-2" / 6'-4"	104	3 3/8"	81	
701	24	7'-4"	104		360	
702	2 Ser. 8	5'-10" / 7'-3"	118	2 3/8"	214	
703	16	3'-3"	str.		106	
801	15	10'-1"	101		404	
802	12	5'-7"	104		179	
				Total	1862	



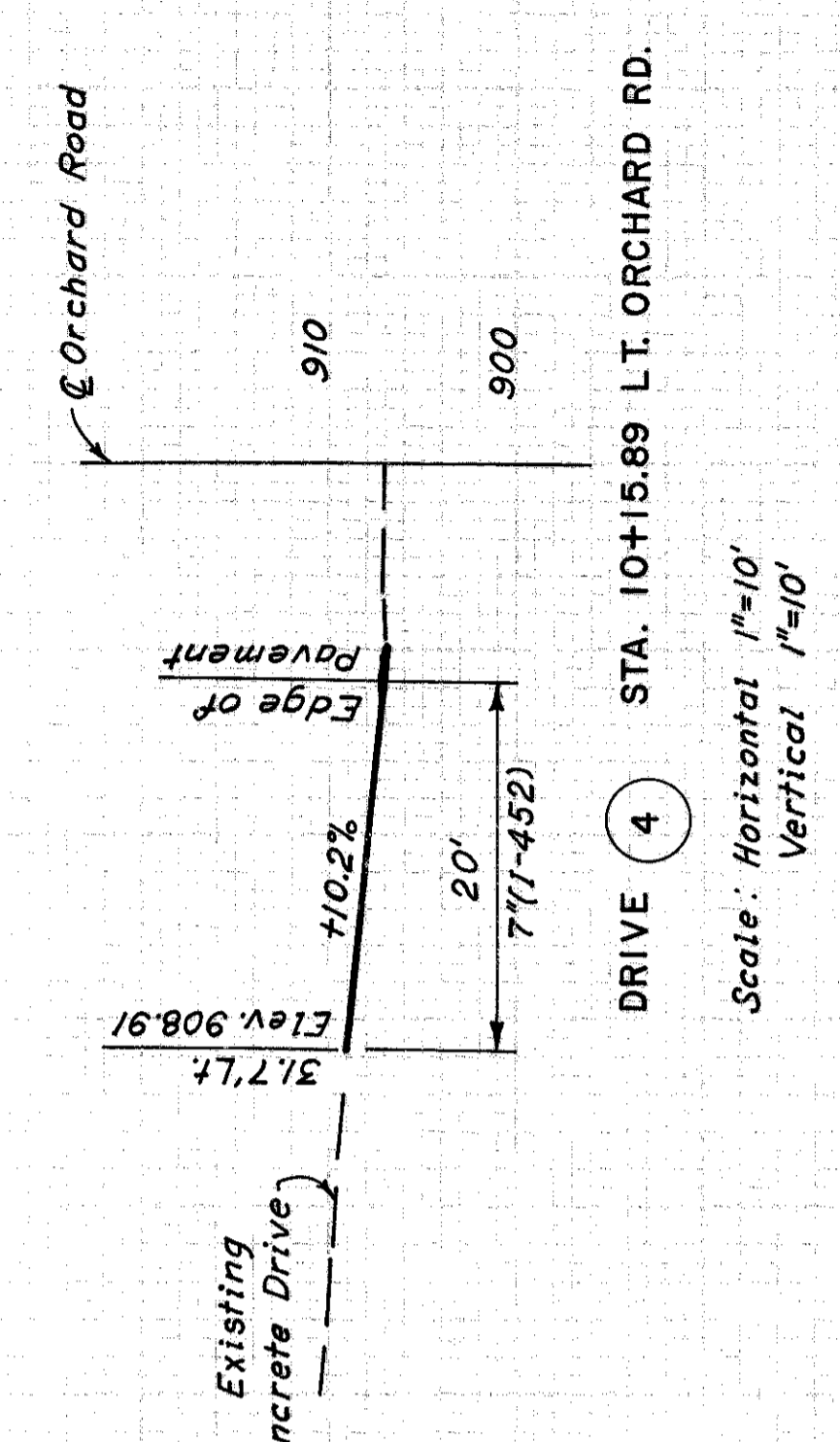
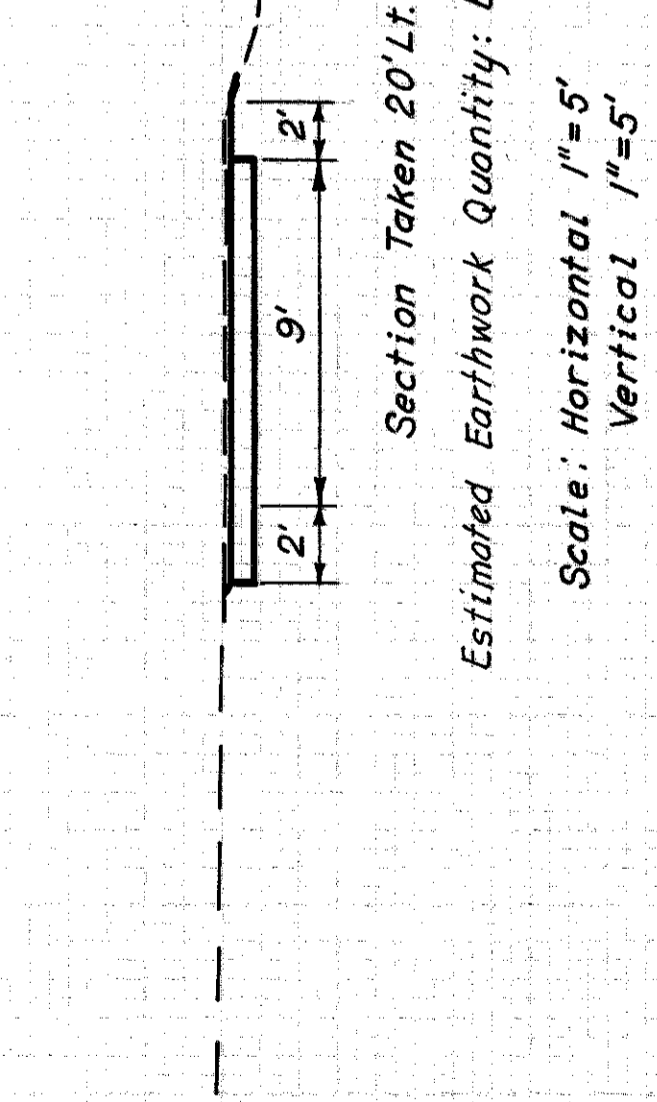
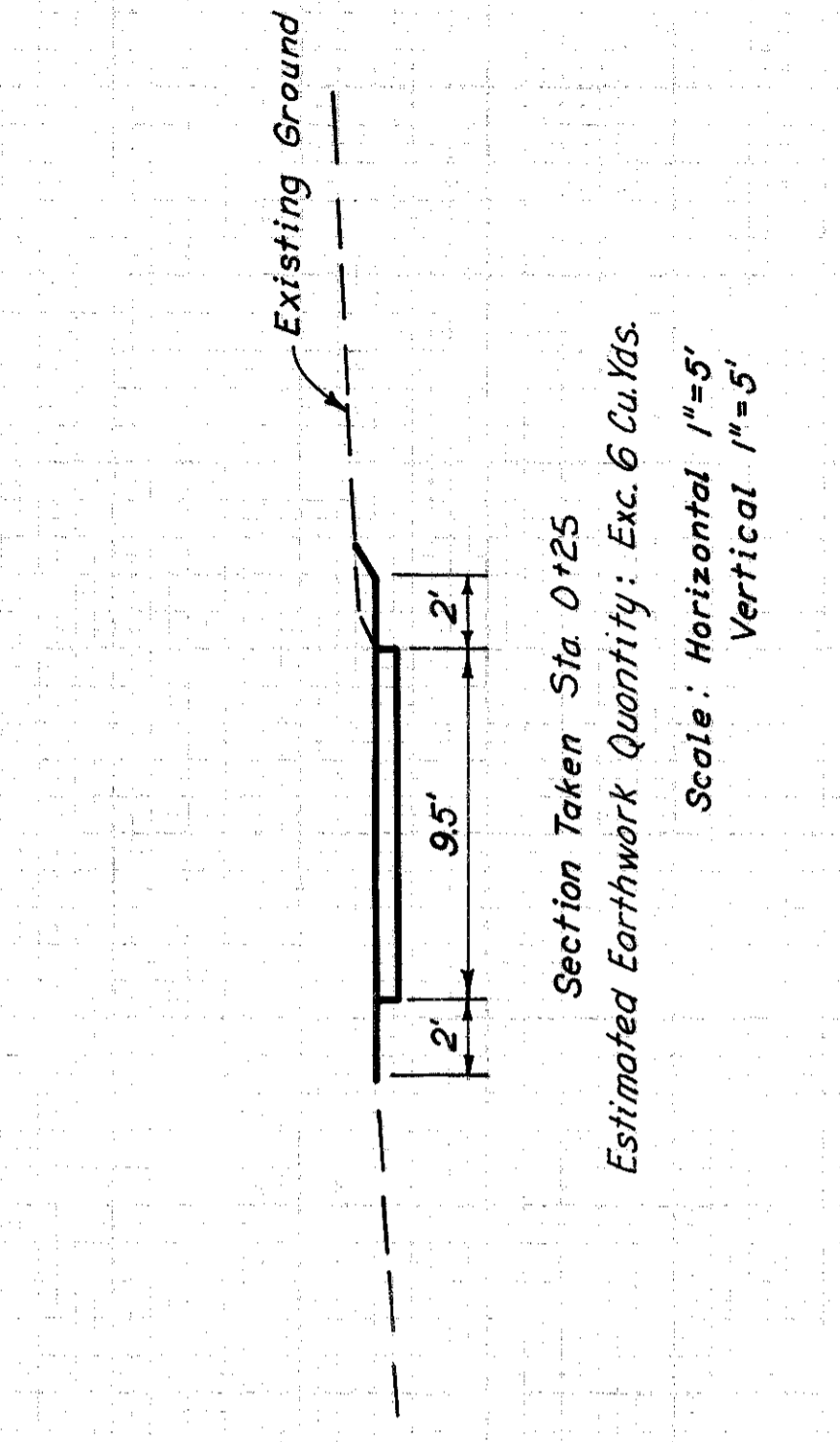
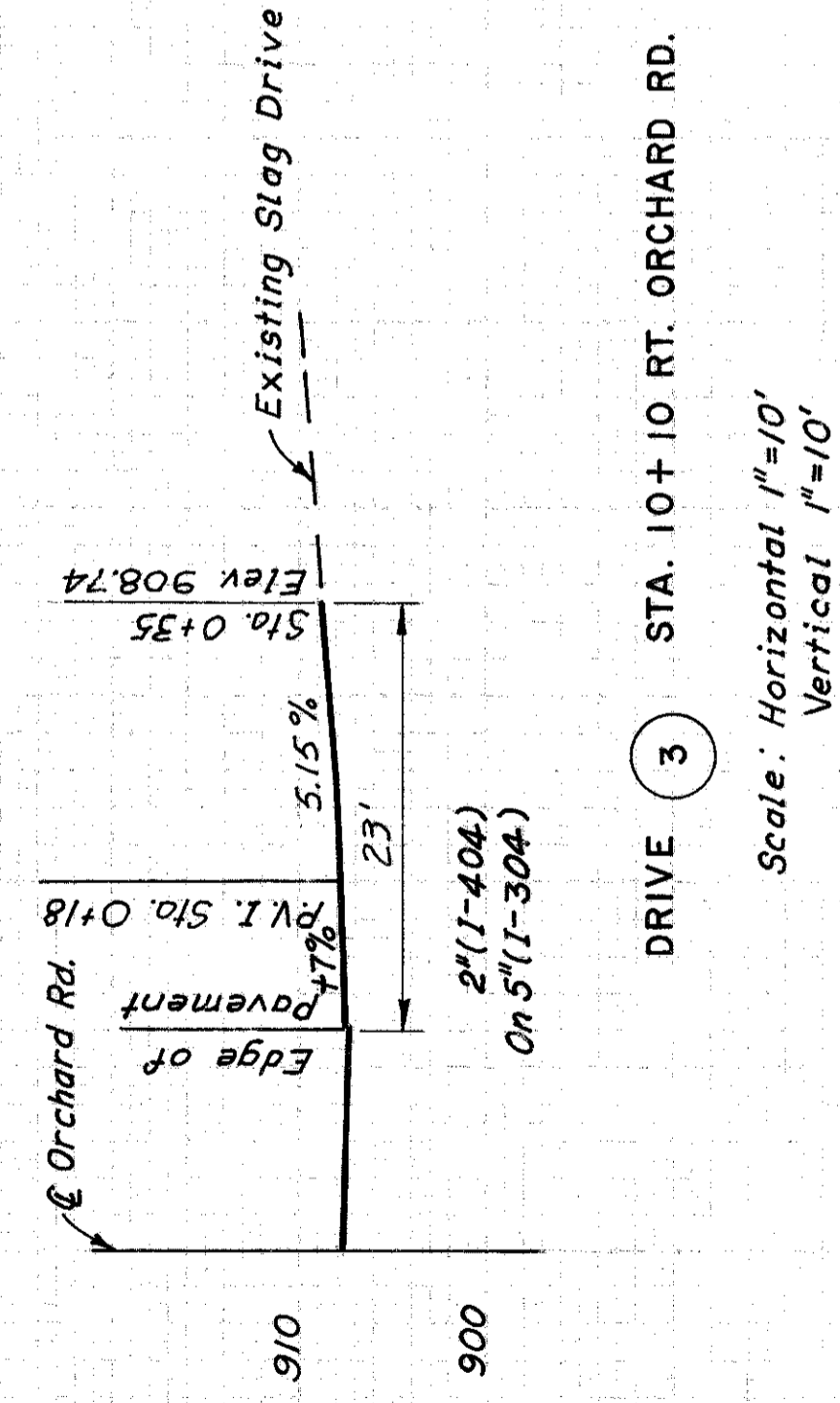
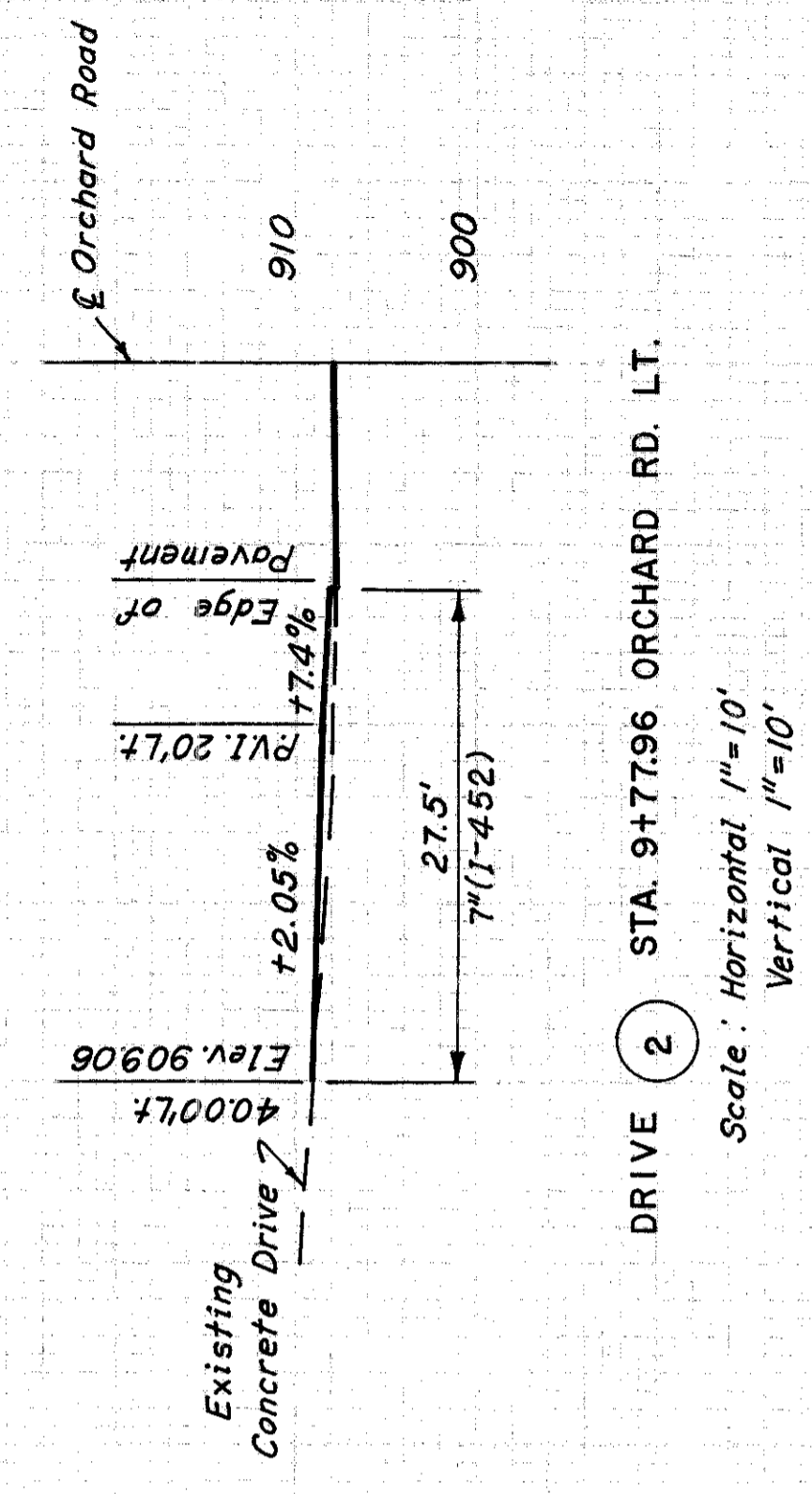
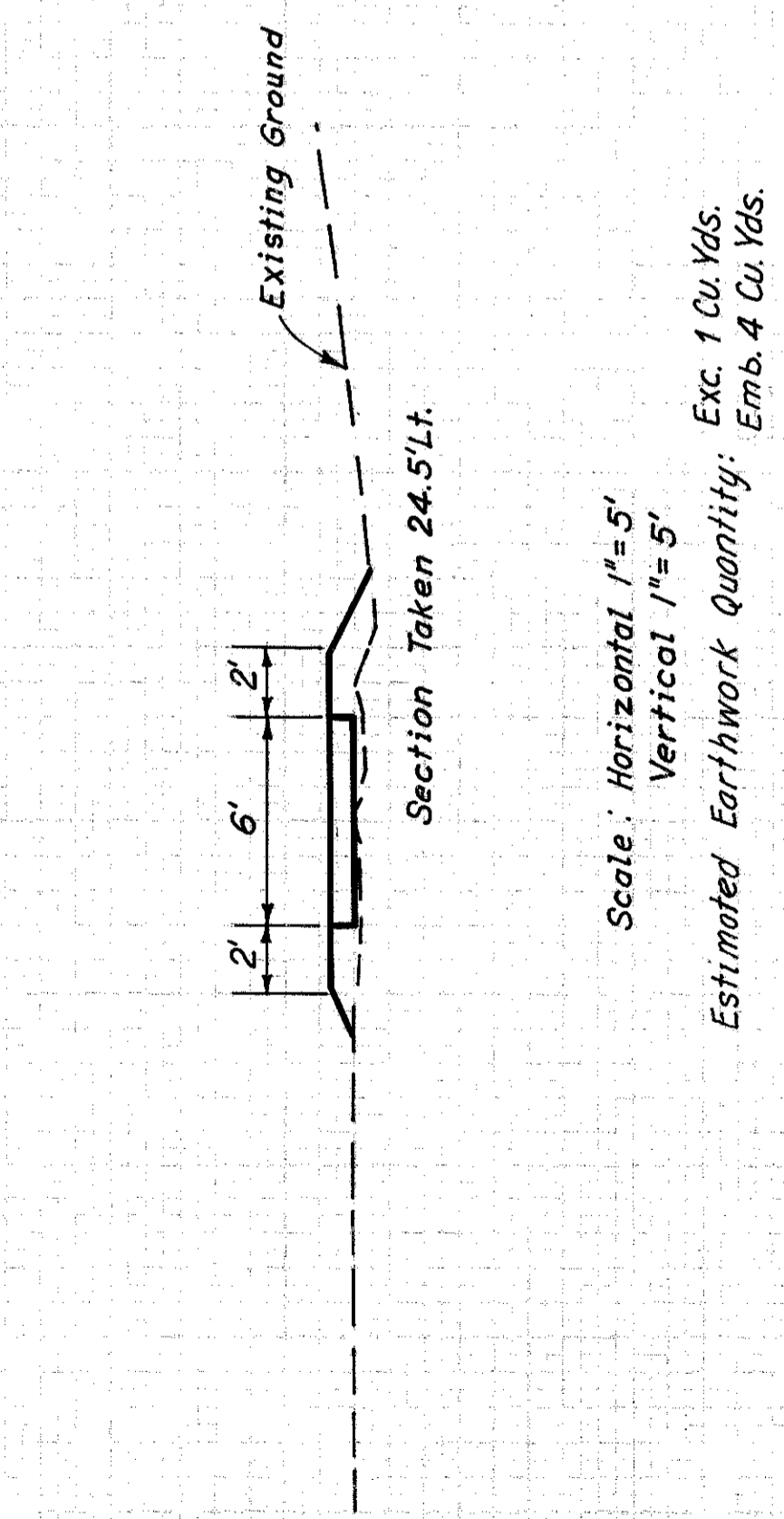
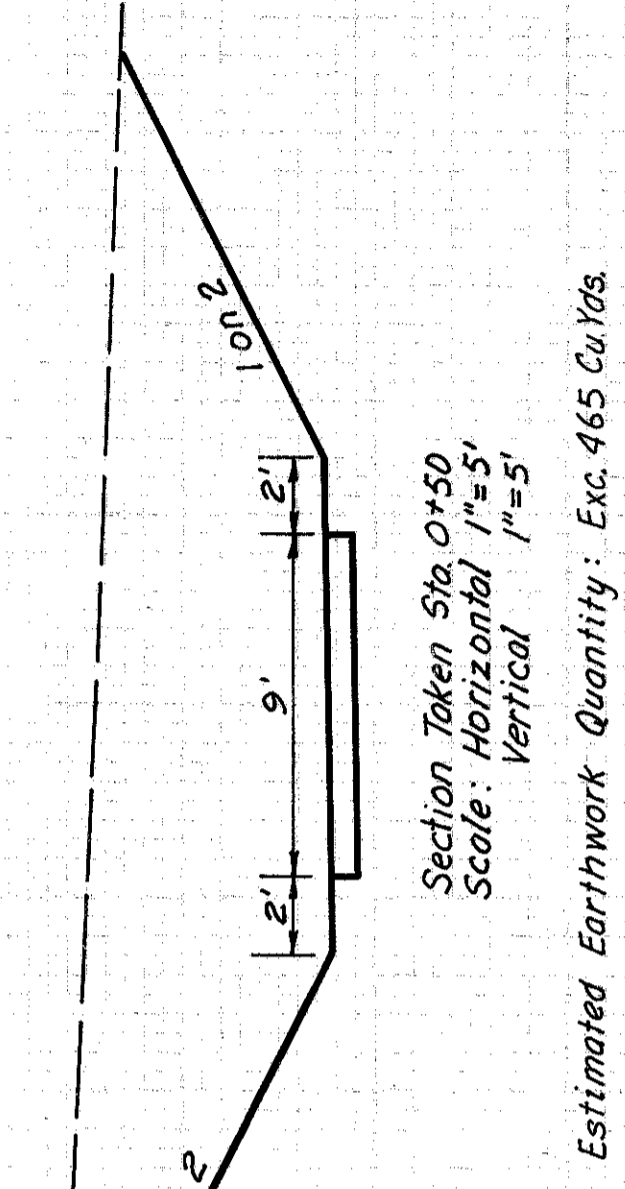
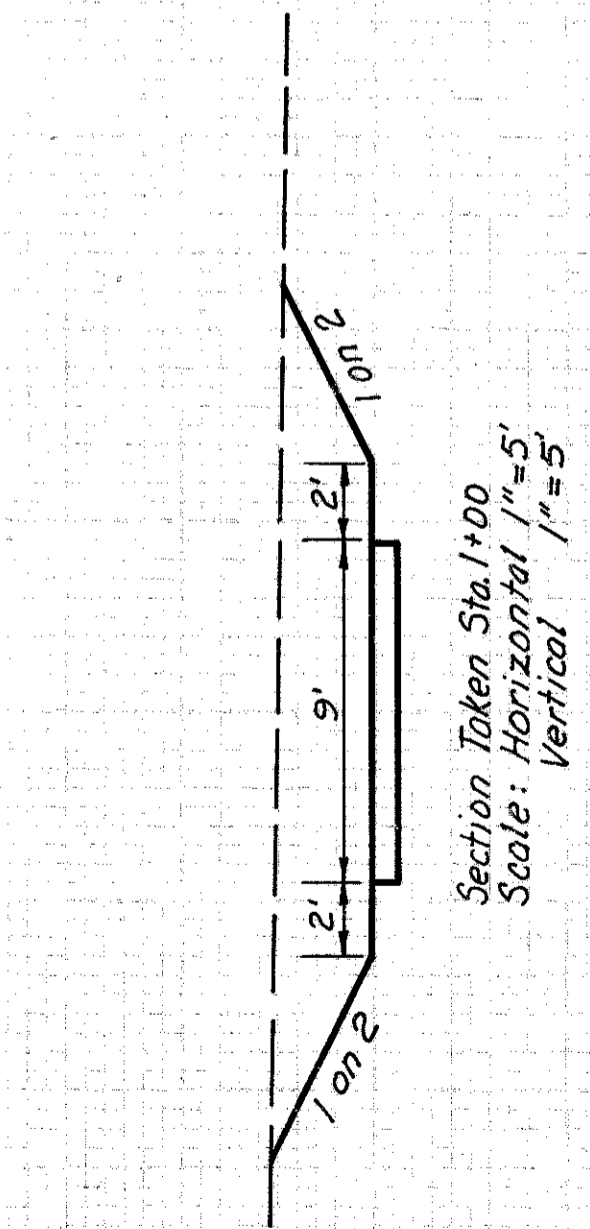
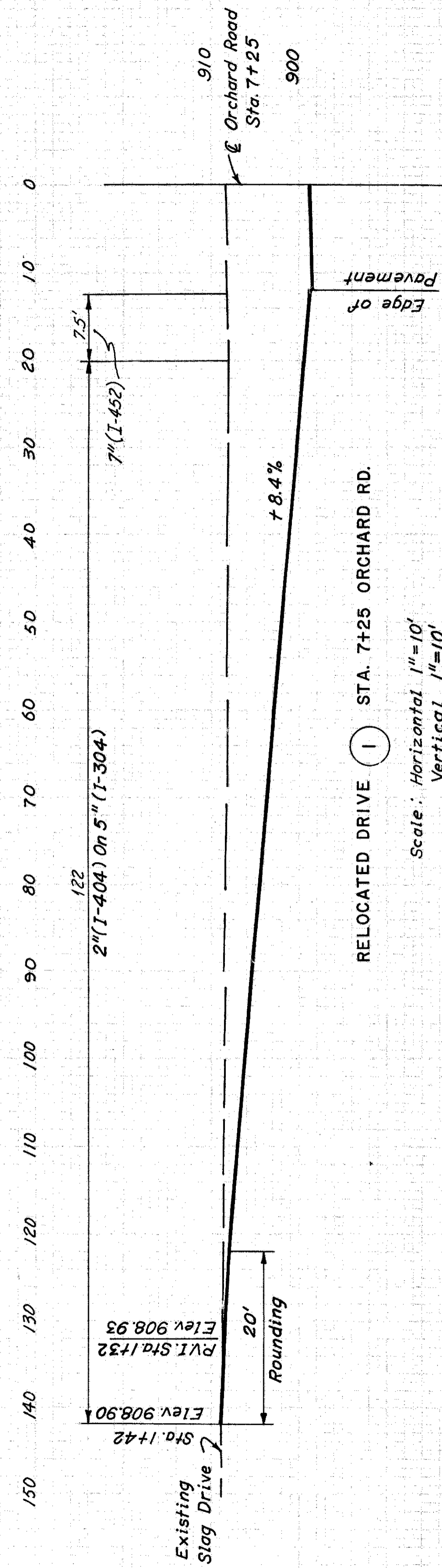
	LENGTH	SERIES INC.
A	1'-7" to 3"	2 1/2"
B	3'-6" to 6'-2"	4 3/8"
C	1'-4" to 3"	1 3/8"

## ESTIMATED QUANTITIES

TOTAL	UNIT	DESCRIPTION
22	Cu. Yds.	Unclassified Excavation
1862	Pounds	Reinforcing Steel
14	Cu. Yds.	Class C Concrete

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE Lee DATE 4-3-72 CONSULTING ENGINEERS  
 TRCD Lee DATE 4-13-72  
 CKD SMR DATE 4-18-72 KANSAS CITY CLEVELAND NEW YORK

Scale: As shown  
 P.L.M.  
 Checked: 2-10-68  
 4-1-70



Quantity Calculations  
 Made By RHA Date 2-68  
 Checked By IM Date 4-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY  
 CUY.480-21.40

79  
 390

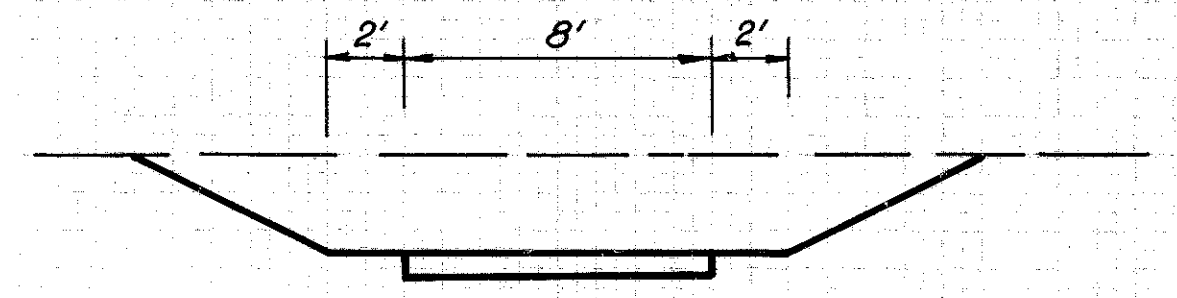
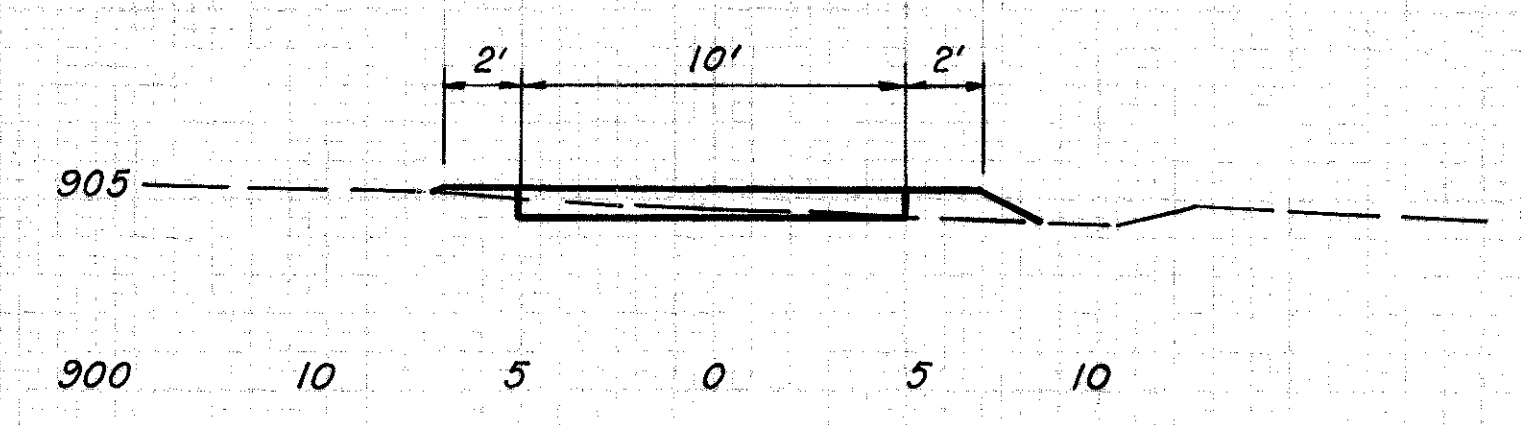
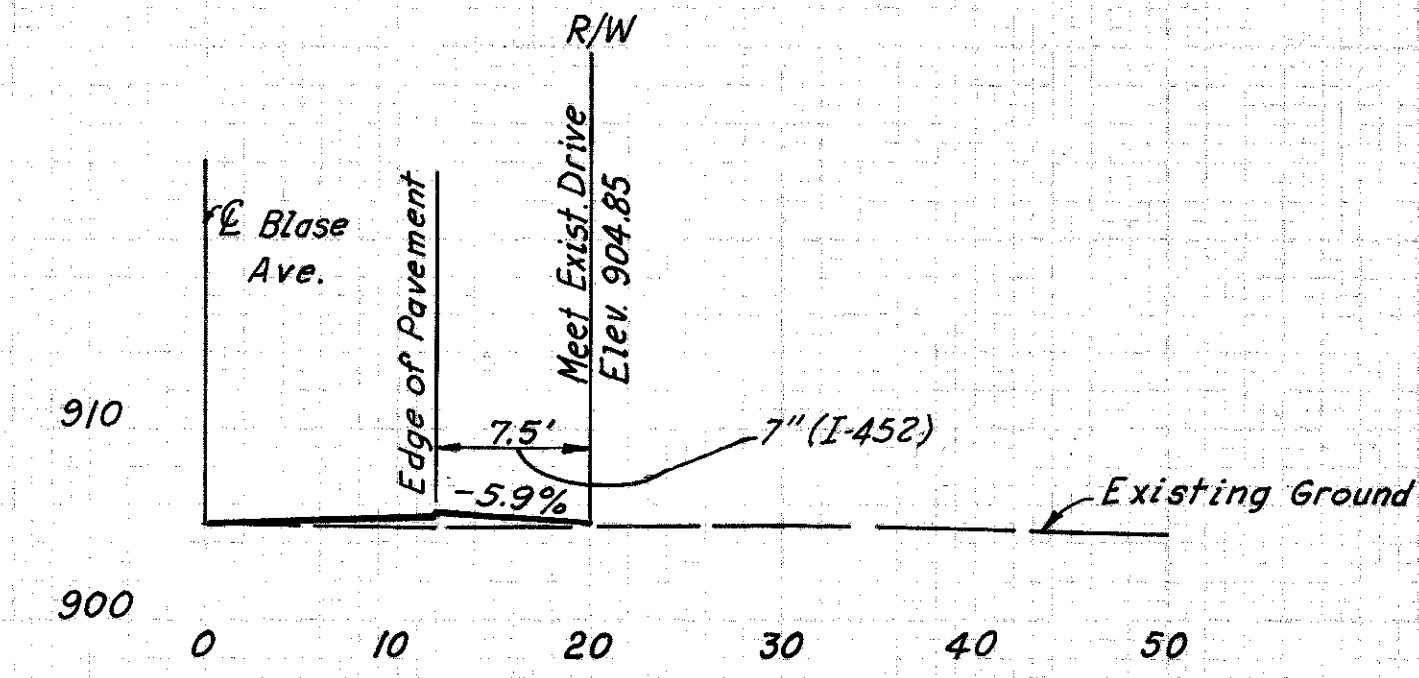
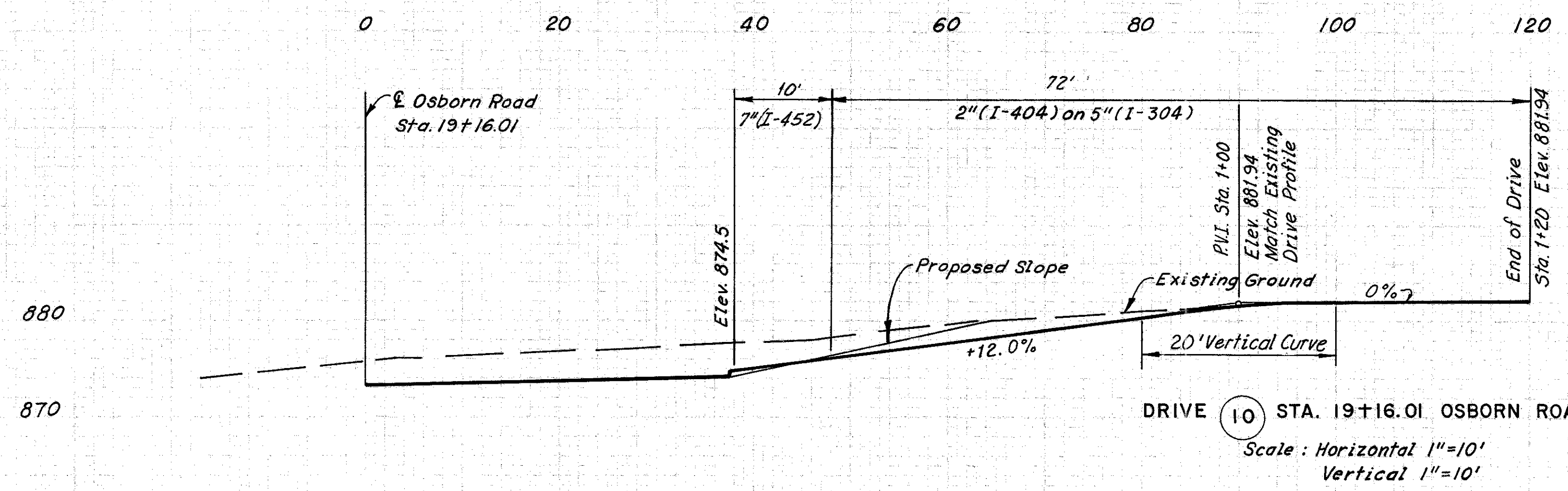


Quantity Calculations  
 Made By RHA Date 2-68  
 Checked By IM Date 4-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

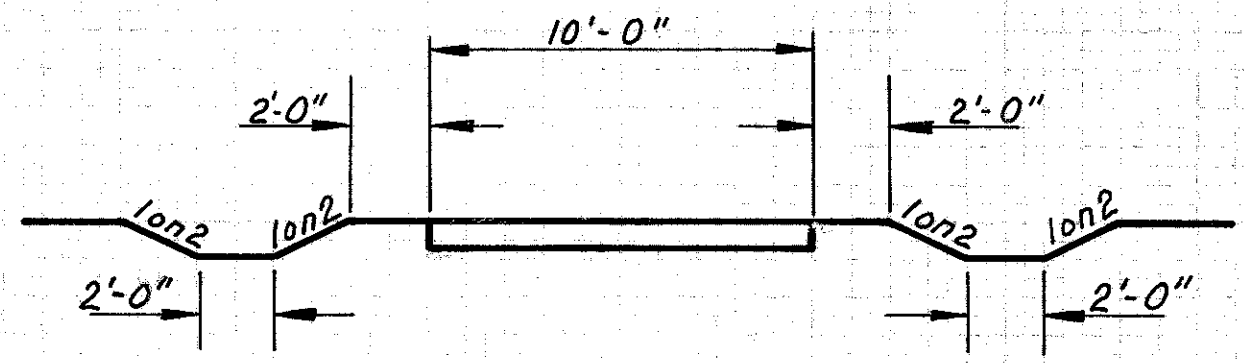
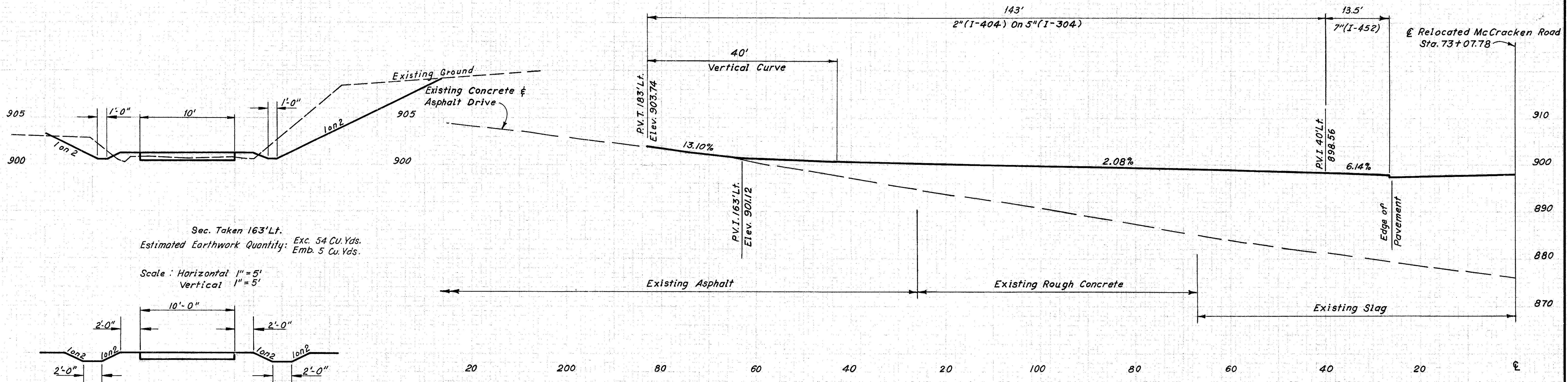
80  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40



Sec. Taken Sta. 0+65 @ Drive (37.8' Rt. @ Osborn Road)  
 Estimated Earthwork Quantity: Exc. 83 Cu. Yds.

Scale: Horizontal 1"=5'  
 Vertical 1"=5'



TYPICAL SECTION OF DRIVE 6

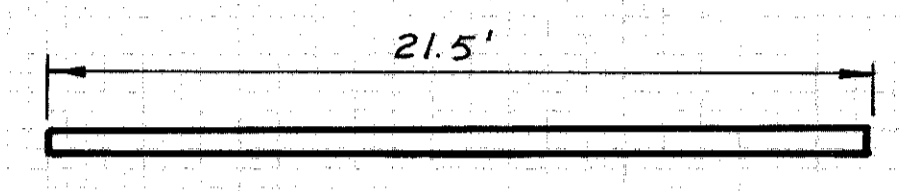
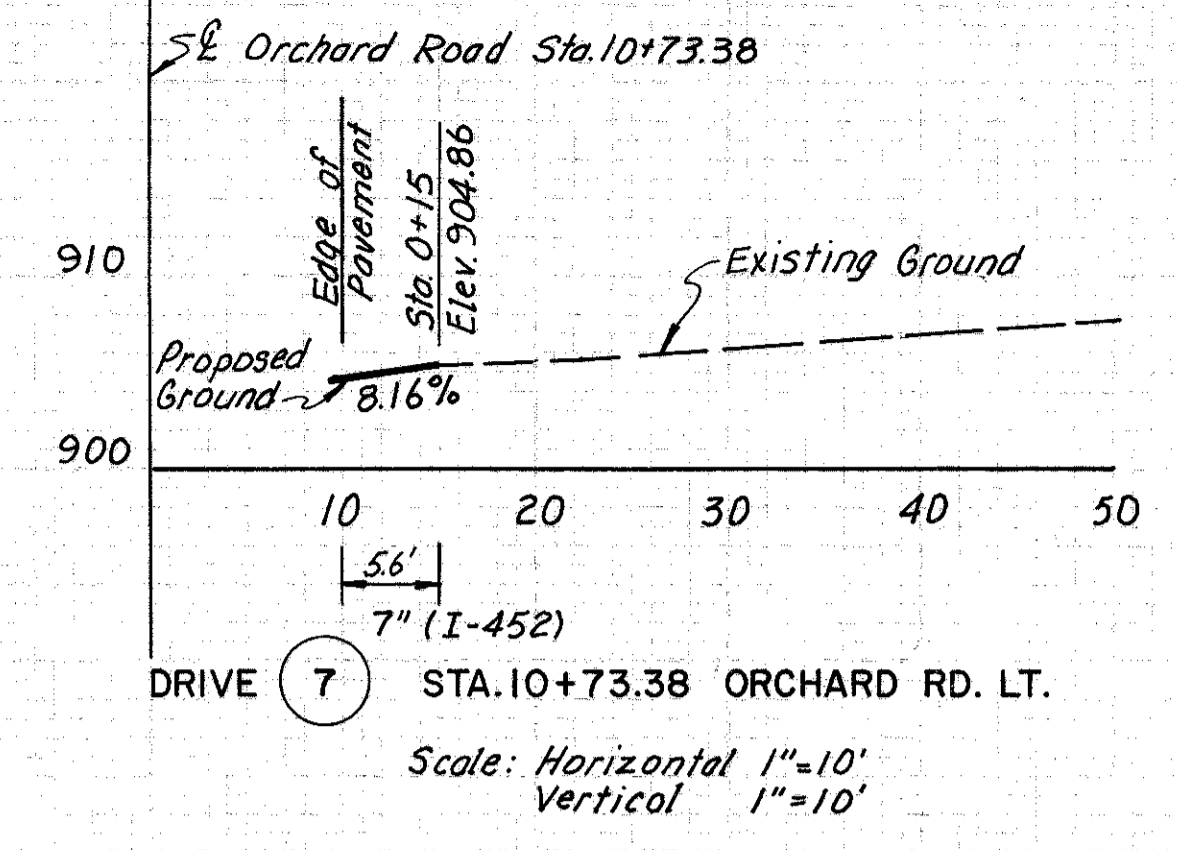
Scale: As shown R.H.A. I.M. Checked: 2-10-68 4-1-70

Quantity Calculations  
 Made By RHA Date 2-68  
 Checked By IM Date 4-70

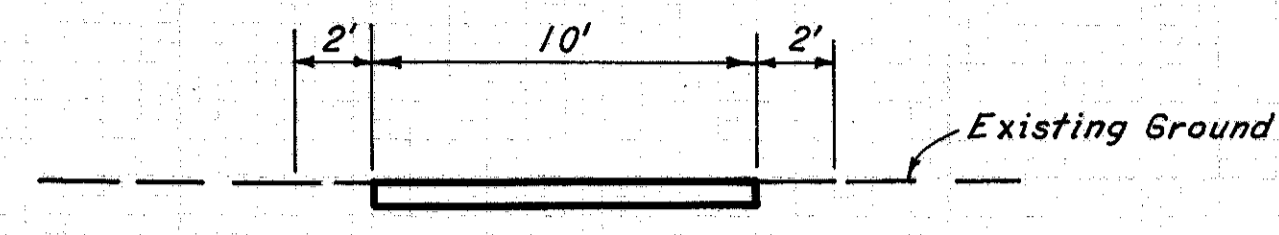
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

81  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

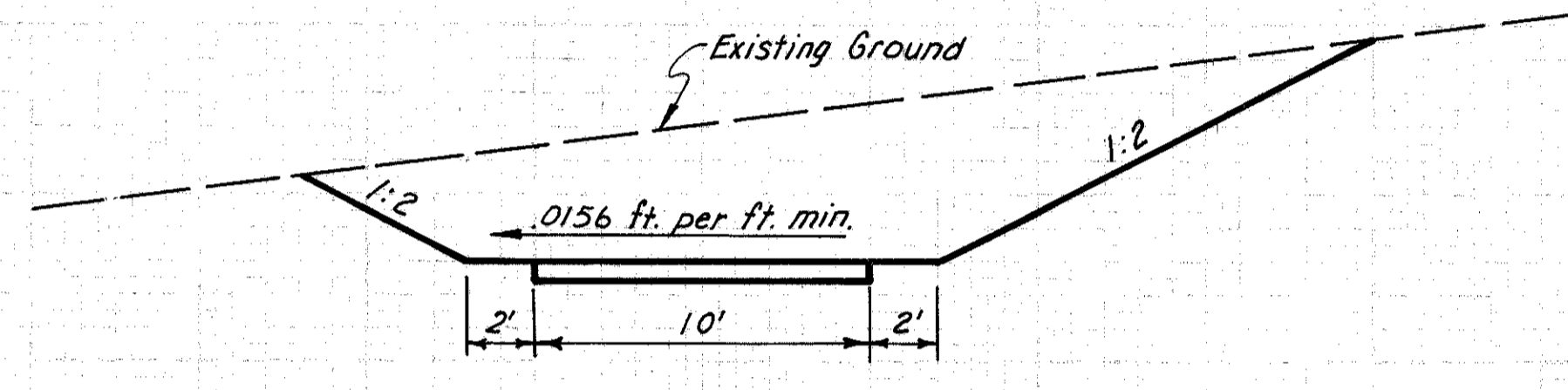


Section Taken Sta. 0+15  
 Estimated Earthwork Quantity: Exc. 3 Cu.Yds.  
 Scale: Horizontal 1"=5'  
 Vertical 1"=5'



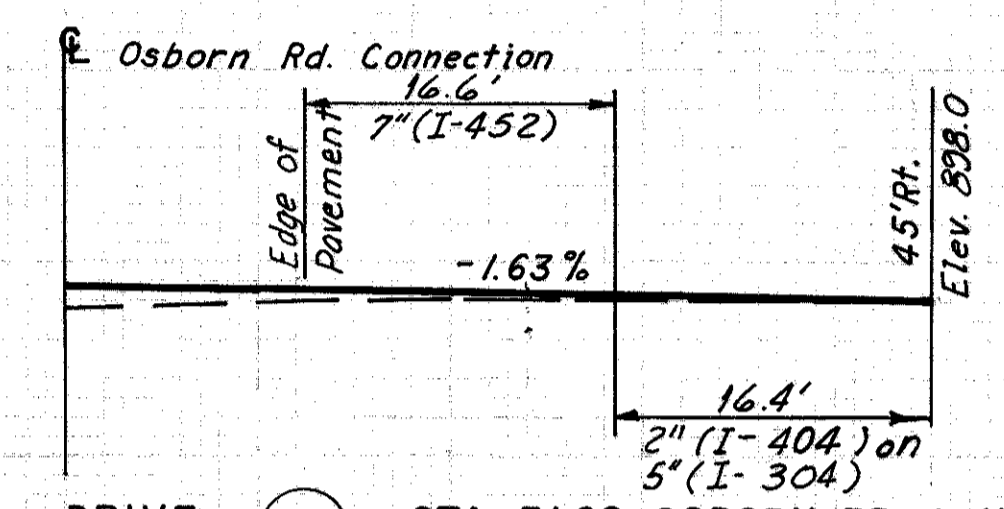
Section Taken Sta. 1+80  
 Scale: Horizontal 1"=5'  
 Vertical 1"=5'

DRIVE 8

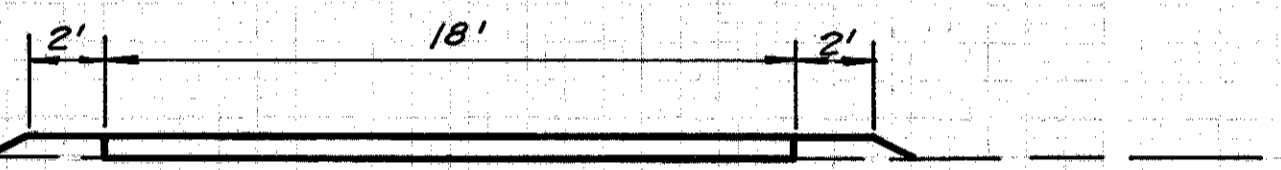


Section Taken 0+30  
 Estimated Earthwork Quantity: Exc. 114 Cu.Yds. Emb. 128 Cu.Yds.  
 Scale: Horizontal 1"=5'  
 Vertical 1"=5'

DRIVE 8

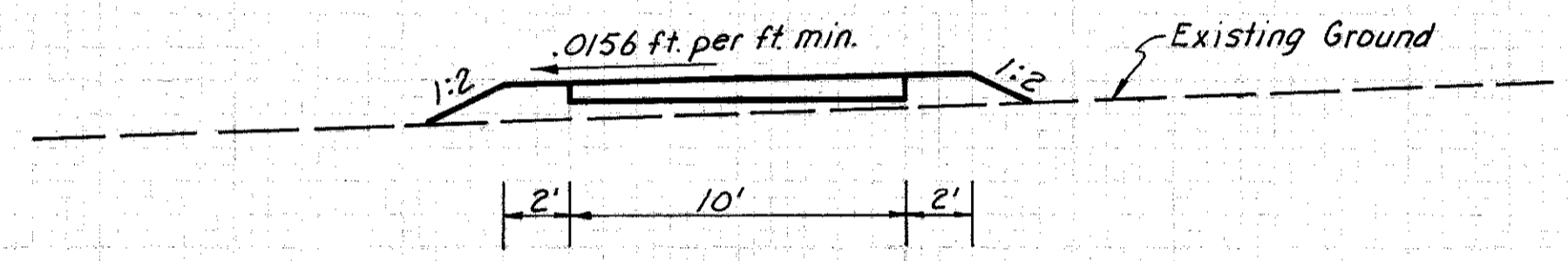


DRIVE 9 STA. 3+62 OSBORN RD. CONNECTION

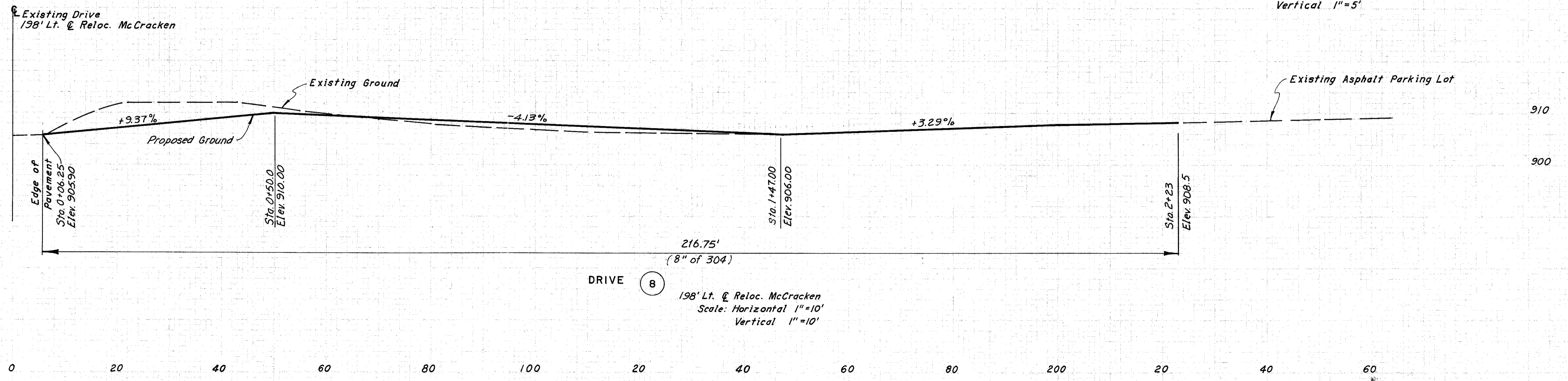


Section Taken 10' Rt.  
 Estimated Earthwork Quantity: Exc. 7 Cu.Yds. Emb. 2 Cu.Yds.

Scale: Horizontal 1"=5'  
 Vertical 1"=5'



DRIVE 8 Section Taken Sta. 1+10  
 Scale: Horizontal 1"=5'  
 Vertical 1"=5'

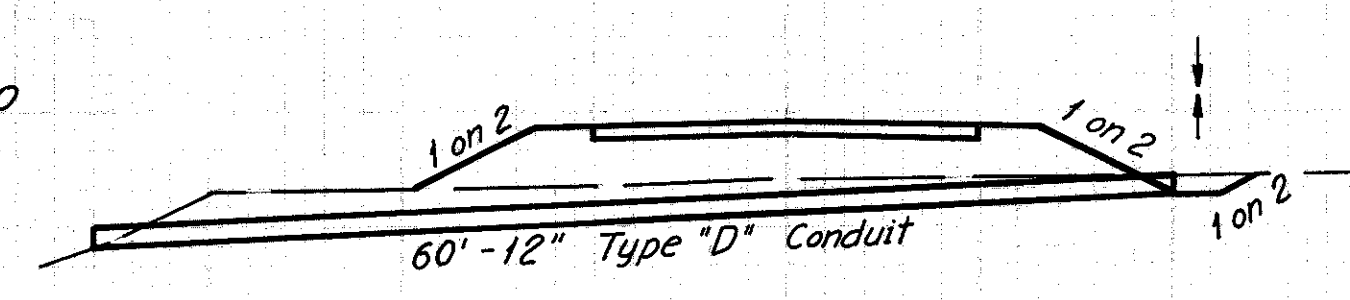
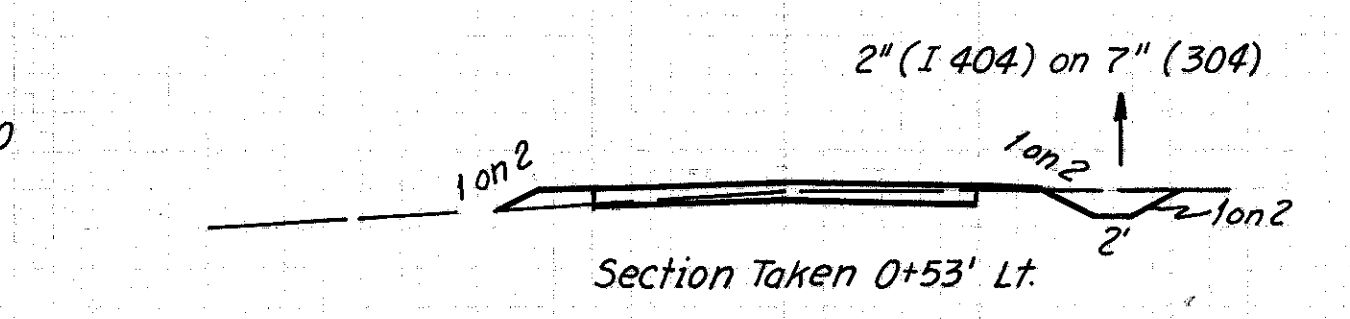
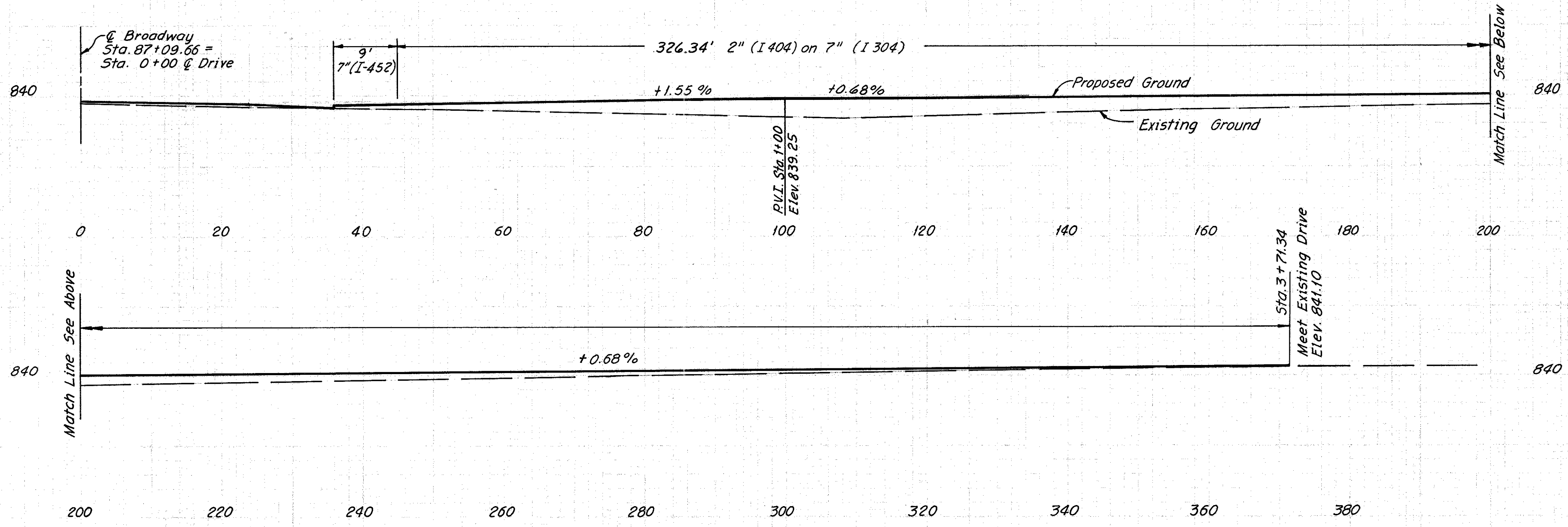


As shown R.T.M.  
 Scale: Checked  
 2-10-68  
 4-1-70

Quantity Calculations  
Made By WNB Date 2-70  
Checked By IM Date 4-70

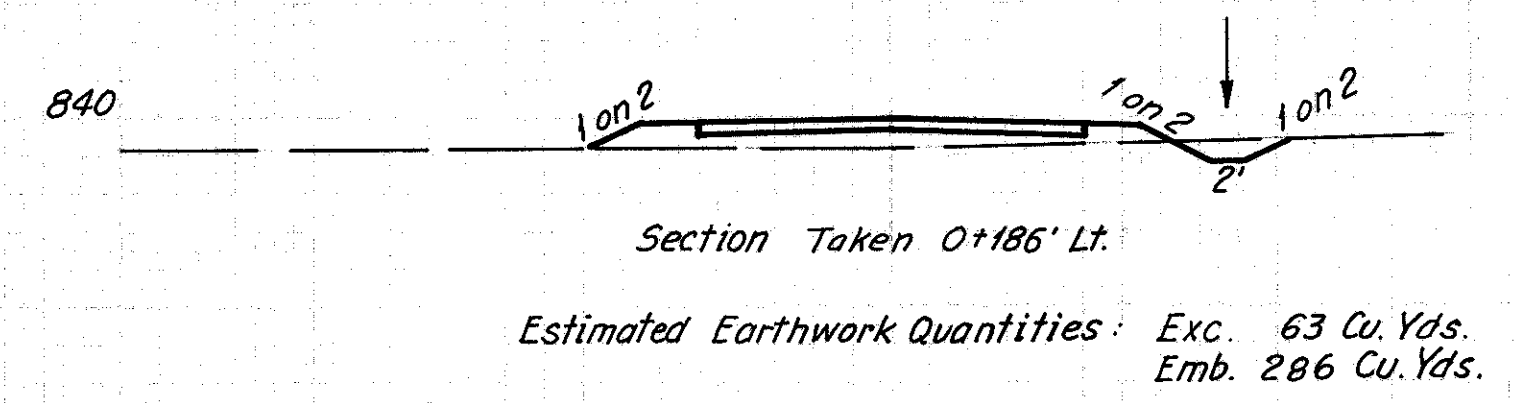
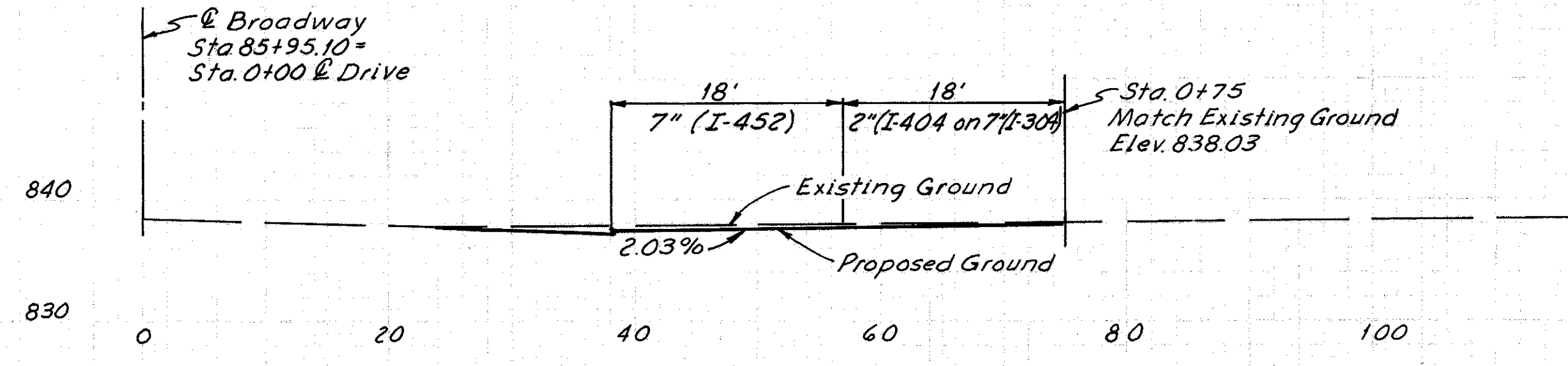
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY  
CUY 480-21.40



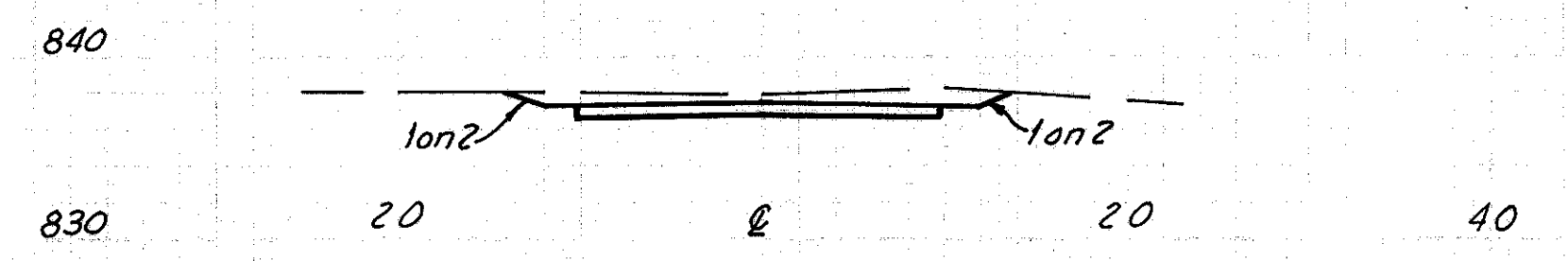
Section Taken 0+108' Lt.  
**(D-96)**

DRIVE (1) STA. 87+09.66 @ BROADWAY AVE.  
Scale: Horizontal & Vertical 1"=10'

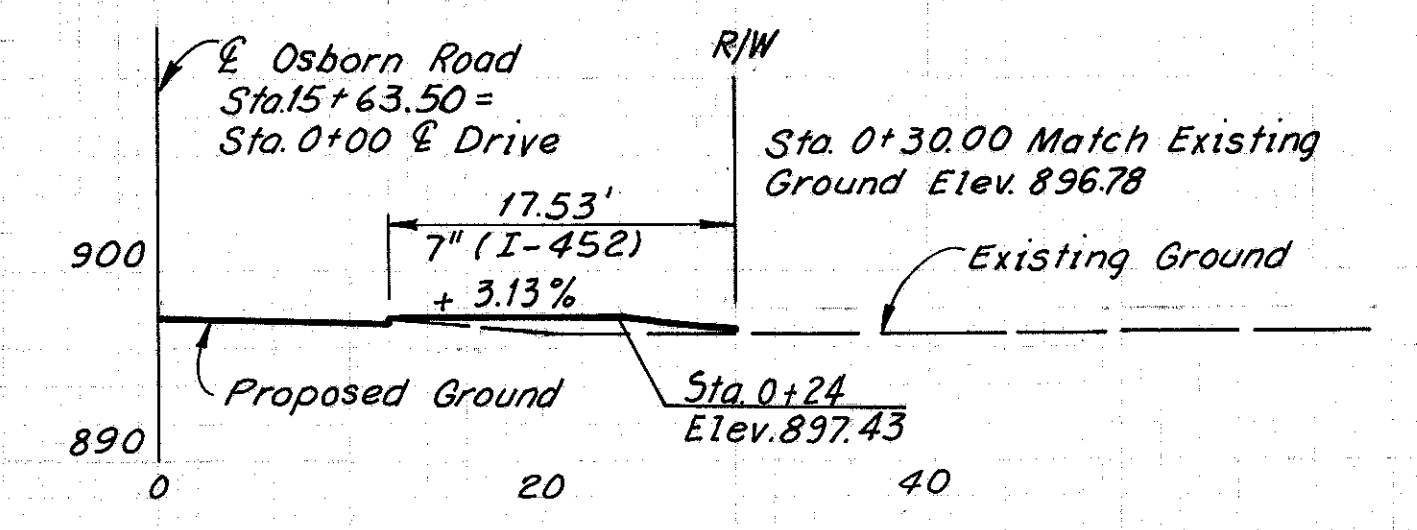


Section Taken 0+186' Lt.  
Estimated Earthwork Quantities: Exc. 63 Cu. Yds.  
Emb. 286 Cu. Yds.

DRIVE (2) STA. 85+95.10 @ BROADWAY AVE.  
Scale: Horizontal & Vertical 1"=10'



Section Taken 0+50 Lt.  
Estimated Earthwork Quantities: Exc. = 34 C.Y.



DRIVE (3) STA 15+63.50 @ OSBORN ROAD CONNECTION  
Scale: Horizontal & Vertical 1"=10'

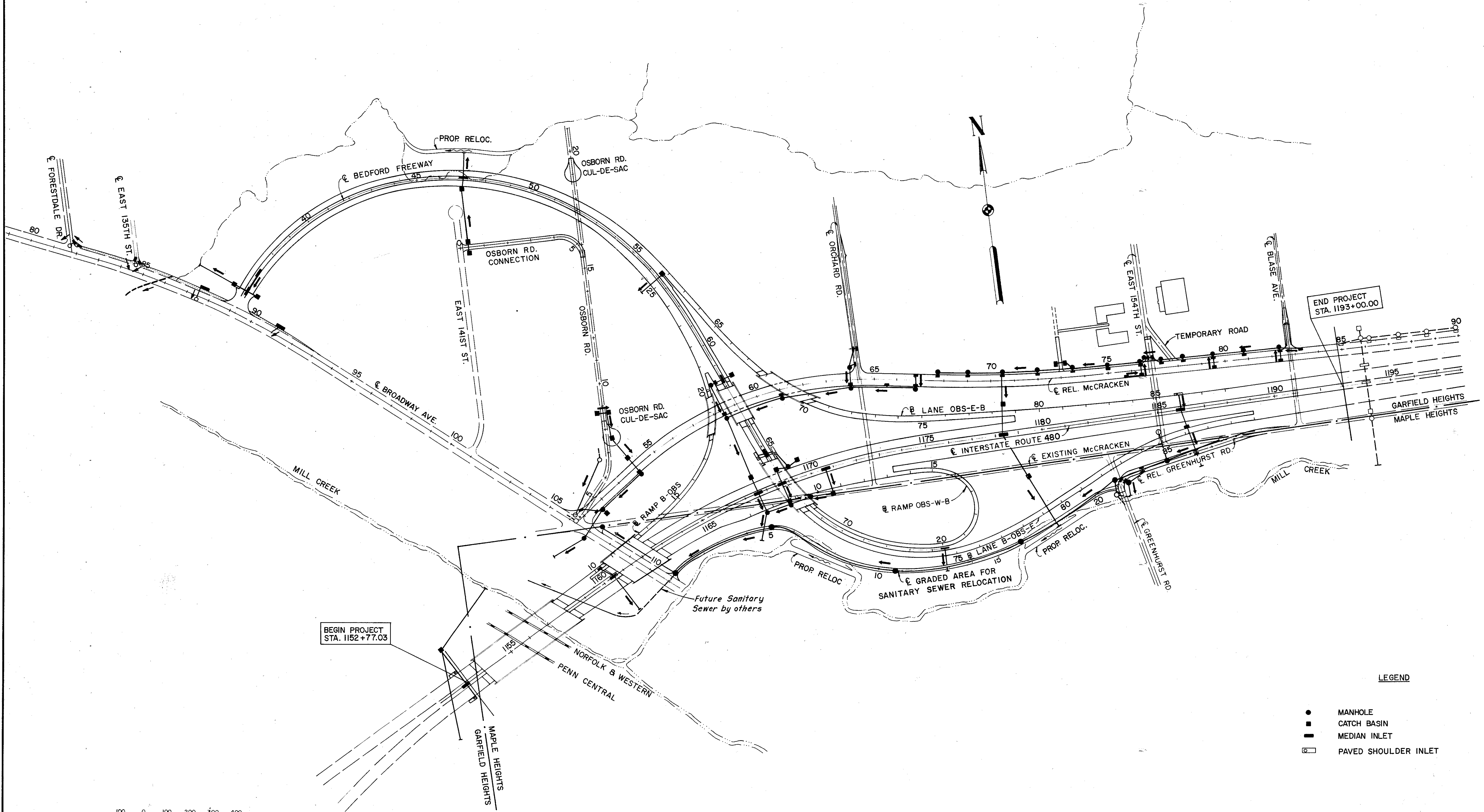
Scale: As shown  
2-3-70  
4-1-70  
N. V. B.  
I. M.  
Checked

# SCHEMATIC DRAINAGE PLAN

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

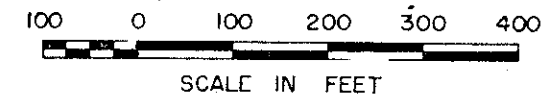
83  
390

CUYAHOGA COUNTY  
C.U.Y. 480-21.40

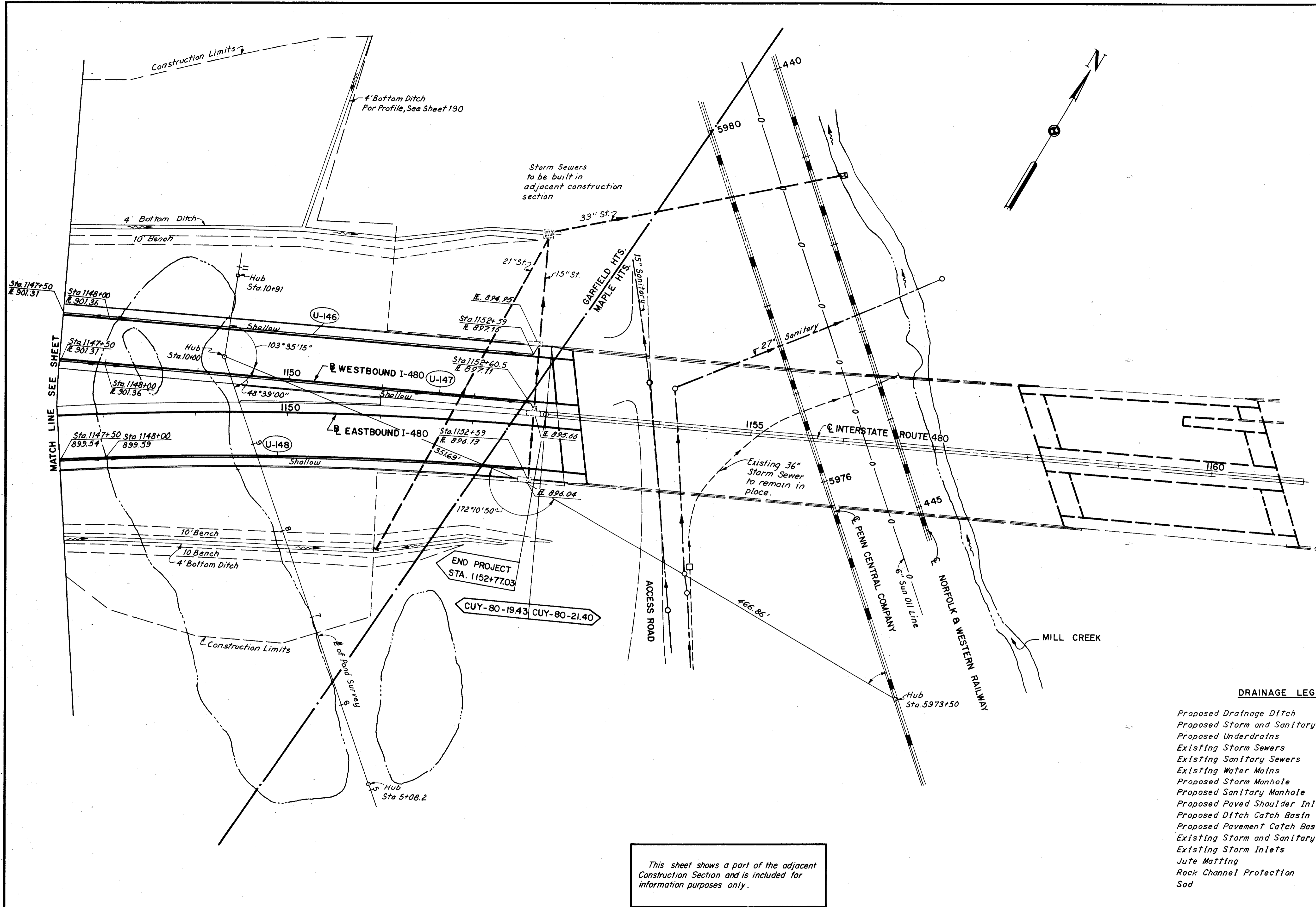


**LEGEND**

- MANHOLE
- CATCH BASIN
- MEDIAN INLET
- ▭ PAVED SHOULDER INLET

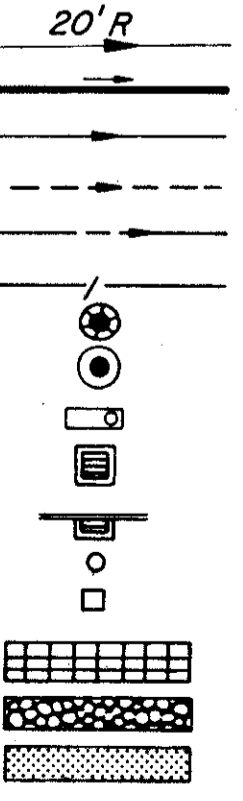


SCALE 1"=200'  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 MADE E.R.A. DATE 3-15-68 CONSULTING ENGINEERS  
 FRED DATE \_\_\_\_\_  
 CKD I.M. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK



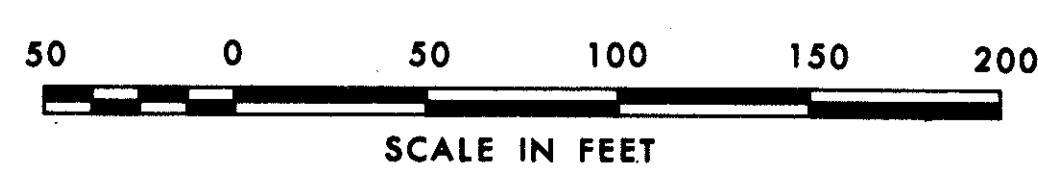
**DRAINAGE LEGEND**

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Paved Shoulder Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod

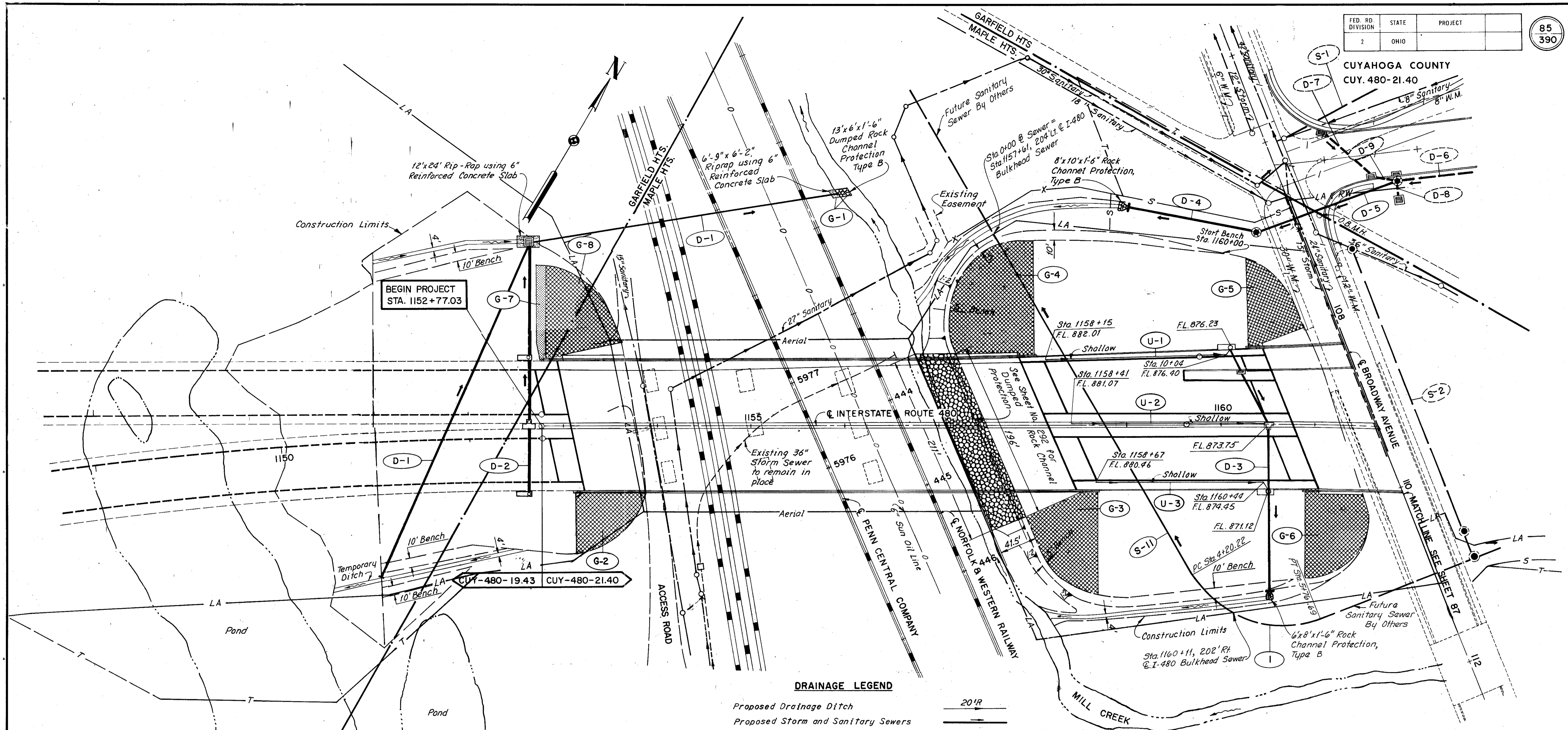


This sheet shows a part of the adjacent Construction Section and is included for information purposes only.

SCALE 1"=50'  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 MADE P.A. DATE 11/29/63  
 TRCD. DATE 11/21/63  
 CKD. DATE 11/30/63  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK



CUYAHOGA COUNTY  
CUY. 480-21.40



**DRAINAGE LEGEND**

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Median Inlet
- Proposed Paved Shoulder Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod
- Paved Gutter

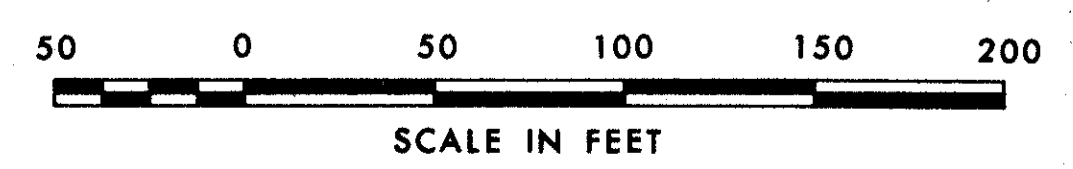
*Curve 1*  
 P.I. Sta. 110+98.25, 227' Rt. of Broadway =  
 Sta. 5+15.00 of Sewer  
 $\Delta = 81^{\circ}30'00''$   
 $R = 110.00'$   
 $T = 94.78'$   
 $L = 156.47'$

**SANITARY (100% CLEVELAND REGIONAL SEWER DISTRICT)**

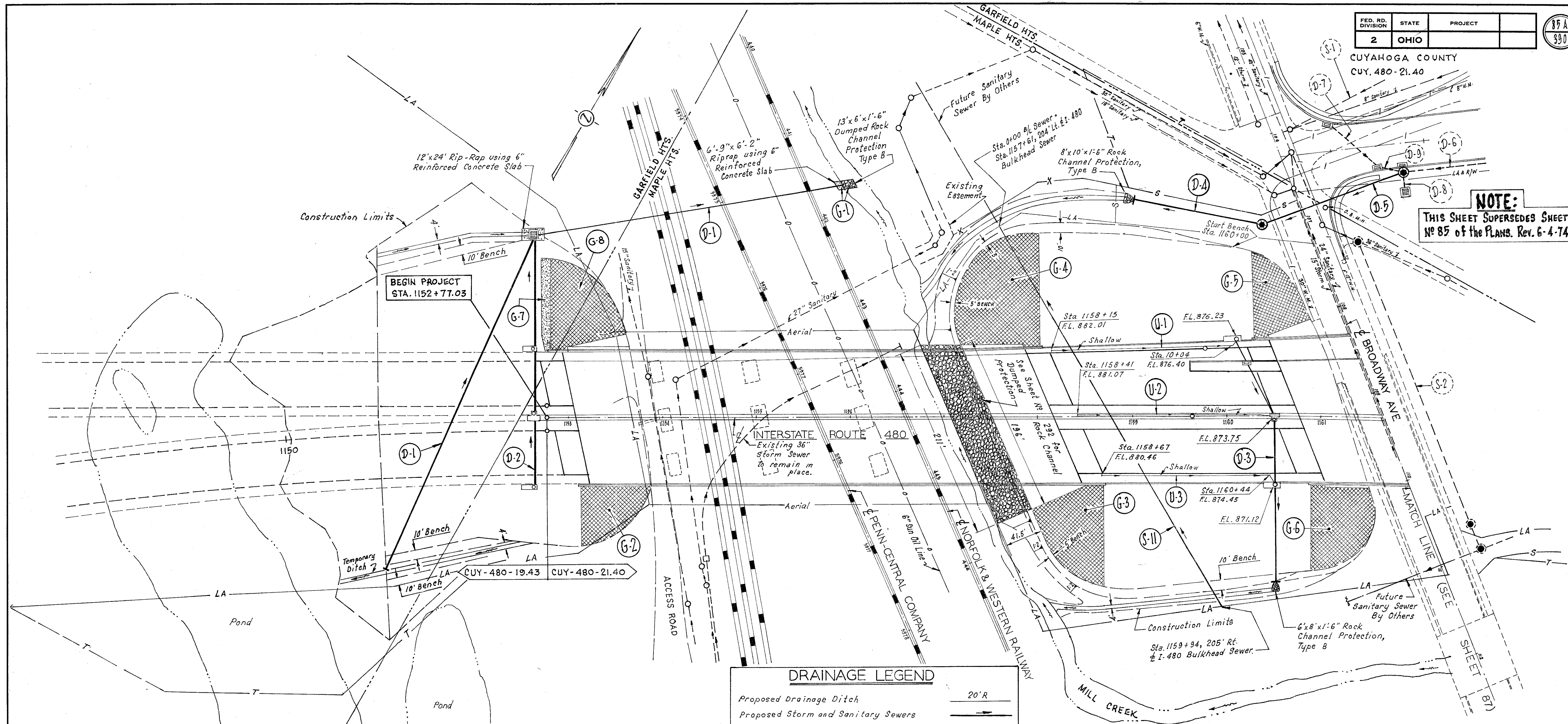
Ref. No.	Station	Side	Sewer Profile Sheet No.	603	
				Type B	Type B
				706.02 Cl. II	706.02 Cl. III
				Fully Lined	Fully Lined
				as per 706.05	as per 706.05
				706.11 Joints	706.11 Joints
				48"	48"
				110'R. 48"	110'R. 48"
				Lin. Ft.	Lin. Ft.
S-11	157+61	160+11 Lt. of Rt.	120 A	420	64
Totals				420	64

For drainage quantities see sheet no. 86

SCALE 1"=50'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE E.R.A. DATE 3-20-68 CONSULTING ENGINEERS  
 TRCD. DATE \_\_\_\_\_ KANSAS CITY CLEVELAND NEW YORK  
 CKD. I.M. DATE 4-1-70



**NOTE:**  
THIS SHEET SUPERSEDES SHEET  
NO 85 OF THE PLANS. REV. 6-4-74



**DRAINAGE LEGEND**

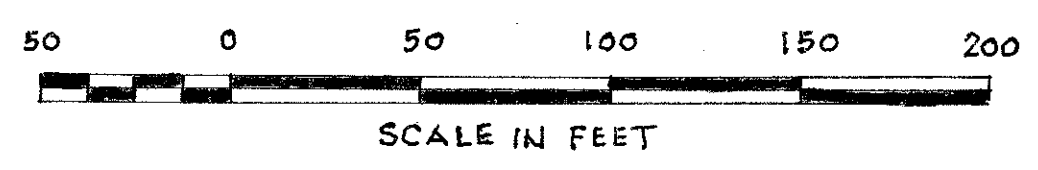
Proposed Drainage Ditch	20' R
Proposed Storm and Sanitary Sewers	—
Proposed Underdrains	—
Existing Storm Sewers	- - -
Existing Sanitary Sewers	- - -
Existing Water Mains	- - -
Proposed Storm Manhole	⊙
Proposed Sanitary Manhole	⊙
Proposed Median Inlet	⊙
Proposed Paved Shoulder Inlet	⊙
Proposed Ditch Catch Basin	⊙
Proposed Pavement Catch Basin	⊙
Existing Storm and Sanitary Manholes	○
Existing Storm Inlets	□
Jute Matting	▨
Rock Channel Protection	▨
Sod	▨
Paved Gutter	▨

**\*NOTE:** The 48" pipe shall have joints as per 706.11, and 1/3 (invert) vitrified clay lined as per 706.05. The remaining 2/3 shall be coated as per Coating Note on Sheet No 120 B.

**SANITARY (100% CLEVELAND REGIONAL SEWER DISTRICT)**

REF. NO.	Station		SIDE R or L	SEWER PROFILE Sheet No.	603	
	FROM	TO			TYPE B	706.02 Cl. I 1/3 Lined* as per 706.05 706.11 Joints 48"
S-11	157+61	159+94	R-L	120 B	472	
<b>TOTALS</b>					472	

For drainage quantities see sheet No 86



Quantity Calculations  
 Made By J.M. Date 2-68  
 Checked By M.N.B. Date 4-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

86  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

DRAINAGE																						
Ref. No.	Station		Side	Sewer Profile Sheet No.	602	603	603	603	603	603	603	604	604	604	604	604	604	604	604	603		
	From	To			Concrete Masonry	Type B	Type F	Type F 707.05	Type B 707.05	Type B	Type C 706.02 or 706.08 E.S. 707.13	Type B 706.02 Cl. Cl. III V	Std. No. 1-3B Median Inlet	Std. No. 2-A-6 Paved Shoulder Inlet	Std. No. 2-A-12 Paved Shoulder Inlet	Std. No. 2-A-14 Paved Shoulder Inlet	Std. No. 1 M.H.	Cuy. County No. 1 M.H.	Std. No. 4 C.B. Modified as per plan	Std. No. 6 C.B. as per plan	Type F Bend 15°30'	Type F Bend 17°30'
					Cu. Yds.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each	33" Lin. Ft.
D-1	1150+00	I-480	Lt.Rt.	109	0.99				393		110 202						1					22
D-2	1152+65	I-480	Lt.Rt.	110		147		123				1		1	1							1
D-3	10+09.5	1160+50	Lt.Rt.	26-127	0.26	166	114					1	2					1	1	1		
D-4	106+98.86	Broadway	Rt.	111	0.47					140						1						
D-5	51+75	106+89.86	Lt.Rt.	111						67												
D-5	51+75	106+89.86	Lt.Rt.	111						93*						1*						
Totals: Participation III					1.7	313	114	123	393	67	140	110 202	2	2	1	1	1	1	1			22
Participation II*										93							1					-
Grand Total:					1.7	313	114	123	393	160	140	110 202	2	2	1	1	1	1	1			22

EROSION CONTROL								
Ref. No.	Station		Side	601	601	660	667	
	From	To		Rip-Rap using 6" Reinf. Concrete Slab	Rock Channel Protect. Type B	Sodding Special Berm and Slope Protect.	Seeding and Jute Matting	
				Sq. Yds.	Cu. Yds.	Sq. Yds.	Sq. Yds.	
G-1	441+75			4	5.8			
G-2	1153+12	I-480	Rt.				292	
G-3	1158+69.50	I-480	Rt.				616	
G-4	1158+02	I-480	Lt.				1077	
G-5	10+29	B-OBS					436	
G-6	1160+90.2	I-480	Rt.				572	
G-7	1152+77.03	I-480	Lt.			100		
G-8	1152+80.03	I-480	Lt.				608	
D-1	1150+00	I-480	Lt.	29	5.3			
D-3	1160+50	I-480	Rt.		5.9			
D-4	106+98.86	Broadway	Rt.		3.6			
Totals: Participation III				33	21	100	3,601	

UNDERDRAINS						
Ref. No.	Station		Side	603	605	
	From	To		Type F 6"	Shallow 6"	60° Bend 6"
				Lin. Ft.	Lin. Ft.	Each
U-1	1158+15	1160+28	Lt.	10	185	1
U-2	1158+41	1160+50	Lt.	10	200	
U-3	1158+67	1160+50	Rt.	10	180	
Totals: Participation III				30	565	

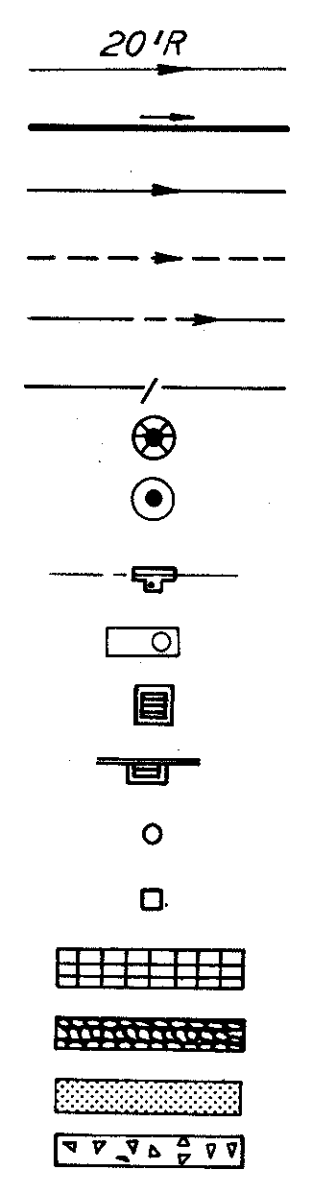
Note: Each pipe run shows only the upstream drainage structures for quantities.  
 For Drainage Structure Locations, See Sheet No. 85.

SCALE: \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE J.M. DATE 2-10-68 CONSULTING ENGINEERS  
 TRCD. J.M.C. DATE 1-8-70  
 CKD. M.N.B. DATE 4-1-70 KANSAS CITY CLEVELAND NEW YORK

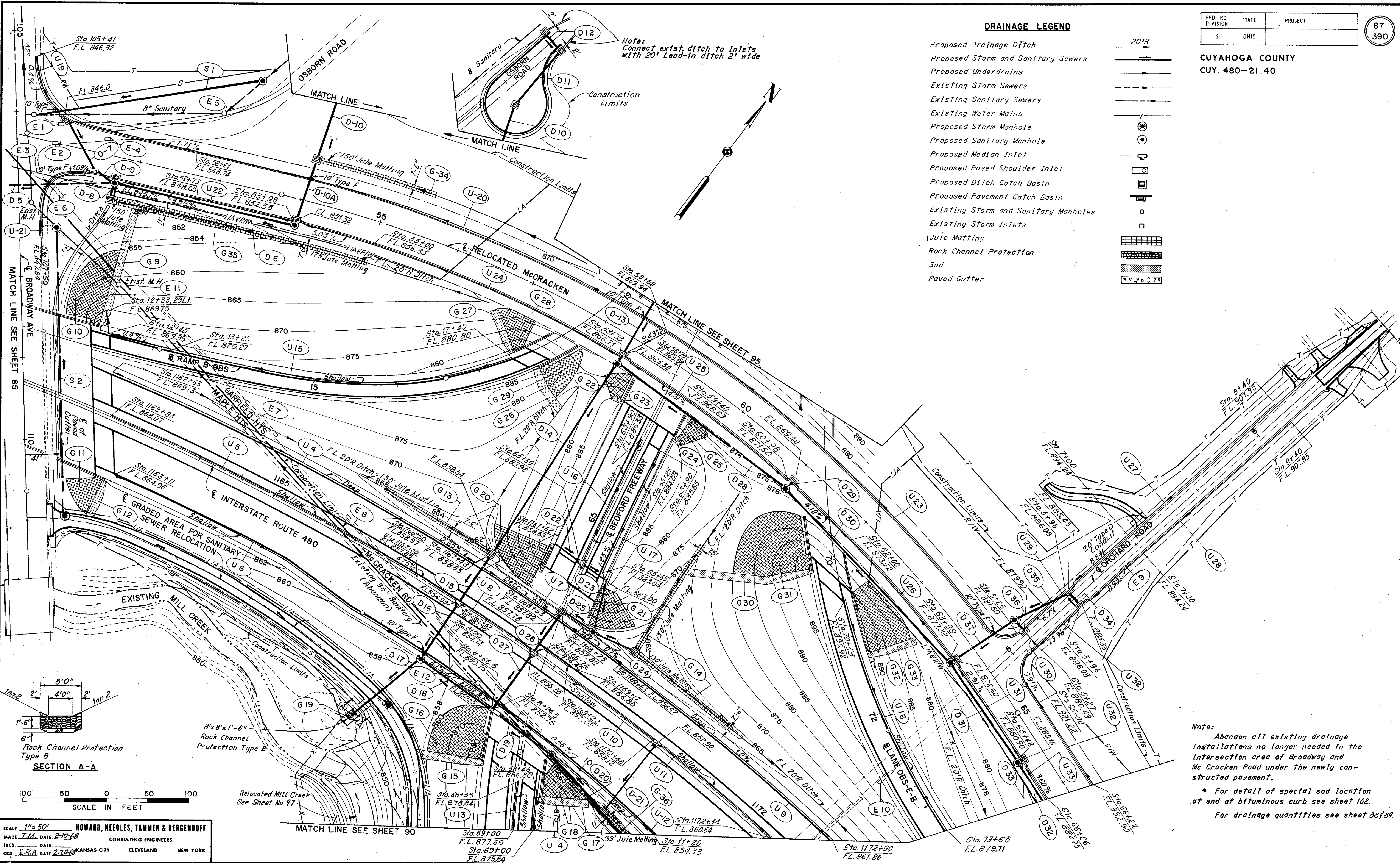
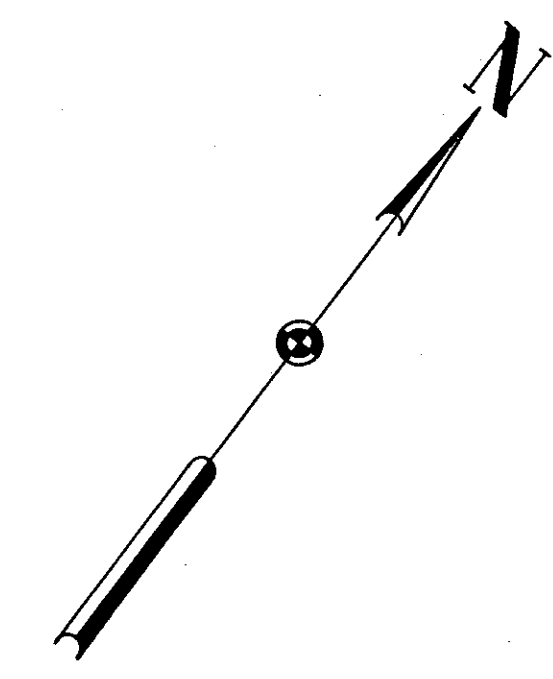


**DRAINAGE LEGEND**

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Median Inlet
- Proposed Paved Shoulder Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod
- Paved Gutter



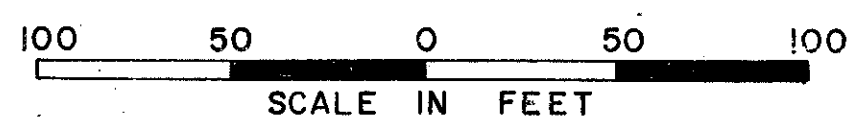
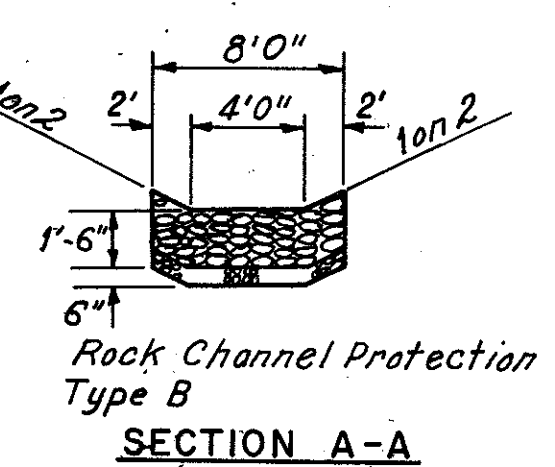
Note: Connect exist ditch to Inlets with 20' Lead-in ditch 2' wide



ALIGNMENT CHECKED	DATE
RIGHT OF WAY	
GRADES	
CONSTRUCTION NOTATIONS	

DRAWN BY	DATE
CHECKED	
QUANTITIES CHECKED	

DRAWN BY	DATE
CHECKED	
QUANTITIES CHECKED	



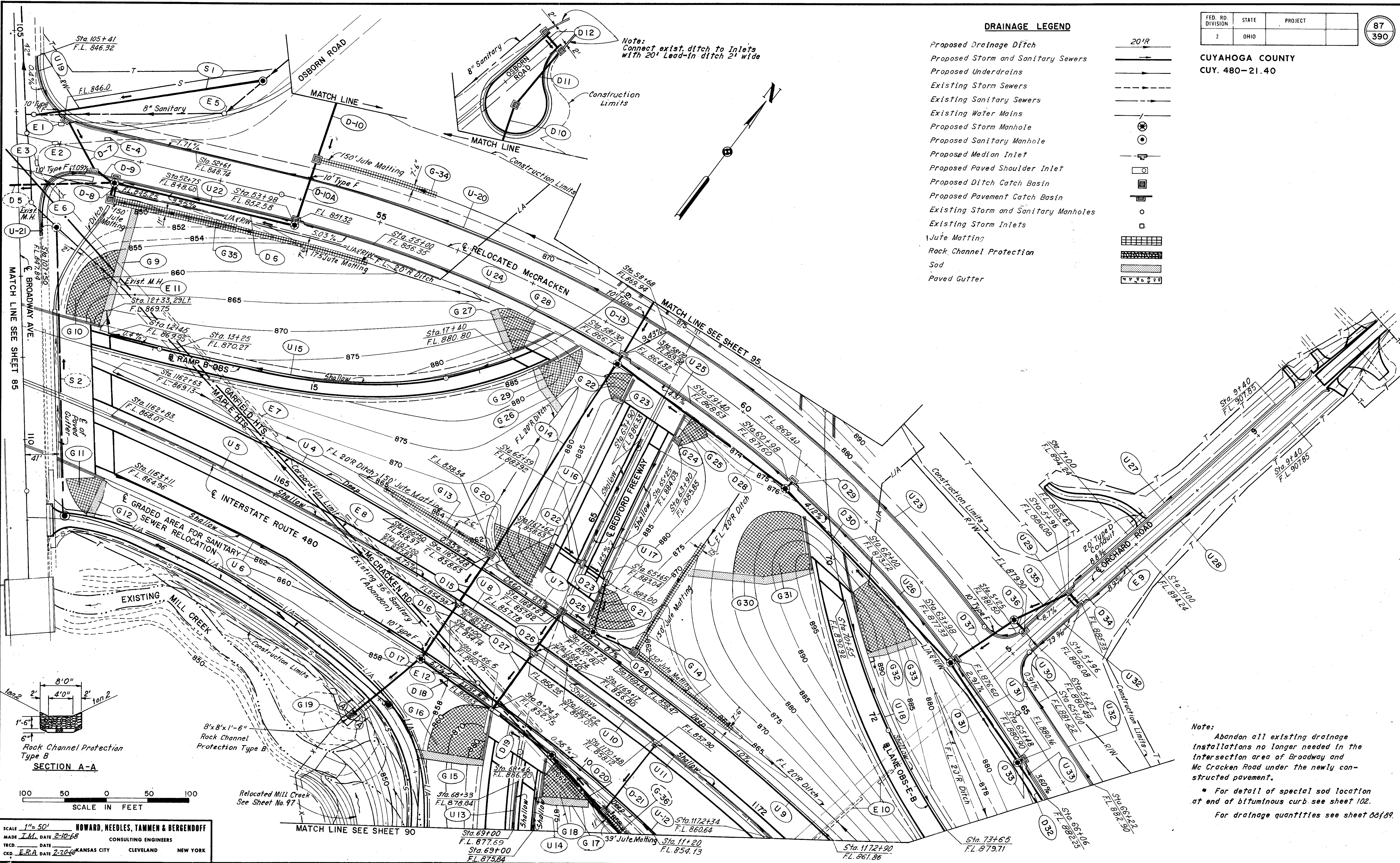
SCALE 1" = 50'  
**HOWARD, NEEDLES, TAMMEN & BERGENOFF**  
 MADE T.M. DATE 2-10-68 CONSULTING ENGINEERS  
 TRCD. DATE  
 CKD. E.R.A. DATE 2-20-68 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

**DRAINAGE LEGEND**

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Median Inlet
- Proposed Paved Shoulder Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod
- Paved Gutter

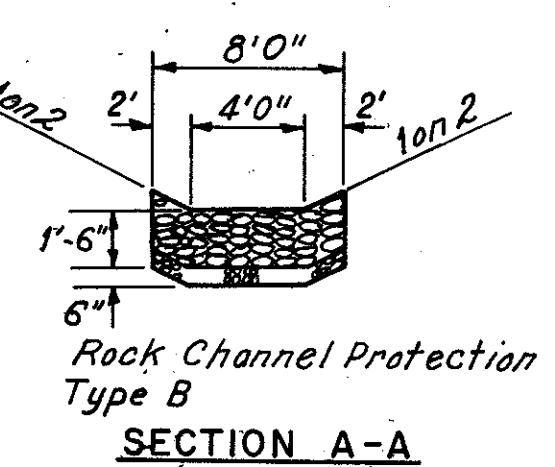
Note: Connect exist ditch to Inlets with 20' Lead-in ditch 2' wide



ALIGNMENT CHECKED	DATE
RIGHT OF WAY	
GRADES	
CONSTRUCTION NOTATIONS	

DRAWN BY	DATE
CHECKED	
QUANTITIES CHECKED	

DRAWN BY	DATE
CHECKED	
QUANTITIES CHECKED	



SCALE IN FEET  
100 50 0 50 100

SCALE 1" = 50'  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE I.M. DATE 2-10-68 CONSULTING ENGINEERS  
TRCD. DATE  
CKD. E.R.A. DATE 2-20-68 KANSAS CITY CLEVELAND NEW YORK

Note: Abandon all existing drainage installations no longer needed in the intersection area of Broadway and McCracken Road under the newly constructed pavement.  
\* For detail of special sod location at end of bituminous curb see sheet 102.  
For drainage quantities see sheet 0069.



UNDERDRAINS											
Ref. No.	Station	Side	603	603	603	605	605	603	605	60° Bend	Tee
			Type B 6"	Type D 6"	Type F 6"	Shallow 6"	Deep 6"	Type B 706.08 with Class C Bedding 6"	706.08 Perf. as plan 6"		
From		To		Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Each	Each
U-4	1162+63	1167+60	Lt.			10		497		1	
U-5	1162+83	1167+60	Lt.			10	467				
U-6	1163+11	8+70.50	Rt.			20	536			1	
U-7	1167+62	1168+68	Lt.			10		100		1	
U-8	1167+67	1168+68	Lt.			10	91				
U-9	1172+90	1168+68	Lt.			10		424		1	
U-10	1170+48	1168+68	Lt.			10	181			3	
U-11	1172+34	1170+55	Lt.			10	169				
U-12	11+20	1168+68	Rt.			10		242		1	
U-13	68+33	69+00	Lt.					67			
U-14	68+46	69+00	Lt.					54			
U-15	12+45	17+40	Lt.			10	515			1	
U-16	63+90	65+59	Rt.			10	159				
U-17	63+90	65+69	Lt.			10	169			1	
U-18	70+53	73+85	Lt.				310				
U-19	105+41	51+00	Lt.			20*				60*	
U-20	58+68	51+00	Lt.			30*				774*	
U-21	107+50	51+50	Lt.			10*				113*	
U-22	53+98	51+75	Rt.			10*				213*	
U-23	5+25	58+70	Lt.			10*			60*	560*	1
U-24	58+38	54+00	Rt.			10*				428*	
U-25	60+98	58+40	Rt.			10*				248*	
U-26	63+98	61+00	Rt.			10*				288*	
U-27	9+40	8+00	Lt.		20	10	310				
U-28	9+40	6+00	Rt.			10	330				
U-29	5+96	5+27	Lt.			10	59				
U-30	5+27	Orchard	Lt.	25							
U-31	65+48	64+00	Rt.			10*				138*	
U-32	5+96	66+22	Lt.							261*	1*
U-33	66+06	65+50	Rt.			10*				46*	
Participation III				25	20	160	3,417	1,263			
Participation II*						130			60*	3,129	
Grand Total				25	20	290	3,417	1,263	60	3,129	11

EROSION CONTROL									
Ref. No.	Station	Side	601	680	687	601			
			Rock Channel Protection Type B	Sodding Spec. Berm and Slope Protec.	Seeding and Jute Matting	Std. Type 1-2 Paved Gutter			
From		To		Cu. Yds.	Sq. Yds.	Sq. Yds.	Lin. Ft.		
G-9	1162+28.5	I-80	Lt.		153				
G-10	1162+28.5	I-80	Lt.			370			
G-11	1163+06	I-80	Rt.			156			
G-12	1163+08	I-80	Rt.		48				
G-13	1166+10	1167+80	Lt.			125			
G-14	1169+63	1171+15	Lt.			250			
G-15	68+20	Bedford	Rt.		80				
G-16	68+20	Bedford	Rt.			445			
G-17	68+56	Bedford	Lt.		63				
G-18	68+56	Bedford	Lt.			175			
G-19	1167+25	I-80	Rt.	4.8					
G-20	65+52	Bedford	Rt.			314			
G-21	65+71	Bedford	Lt.			195			
G-22	63+57	Bedford	Rt.			75			
G-23	63+57	Bedford	Rt.		9				
G-24	63+68	Bedford	Lt.		9				
G-25	63+68	Bedford	Lt.			83			
G-26	17+64	B-OBS	Rt.		60				
G-27	17+45	B-OBS	Lt.		54				
G-28	17+45	B-OBS	Lt.			190			
G-29	17+64	B-OBS	Rt.			230			
G-30	70+11	OBS-EB	Rt.		150				
G-31	70+11	OBS-EB	Rt.			660			
G-32	71+27	OBS-EB	Rt.			380			
G-33	71+27	OBS-EB	Rt.		60				
G-34	54+08	55+58	Lt.			125*			
G-35	51+75	55+00	Rt.			329			
G-41	108+42	110+	Lt.				206		
Participation III				5.0	688	3,979	206		
Participation II*						125			
Grand Total				5.0	688	4,104	206		

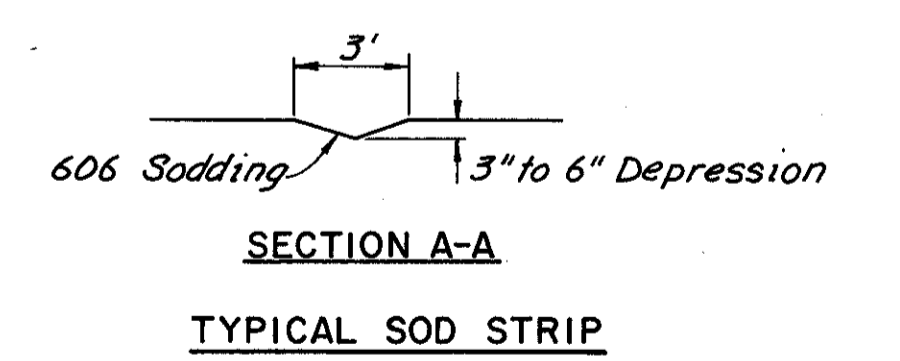
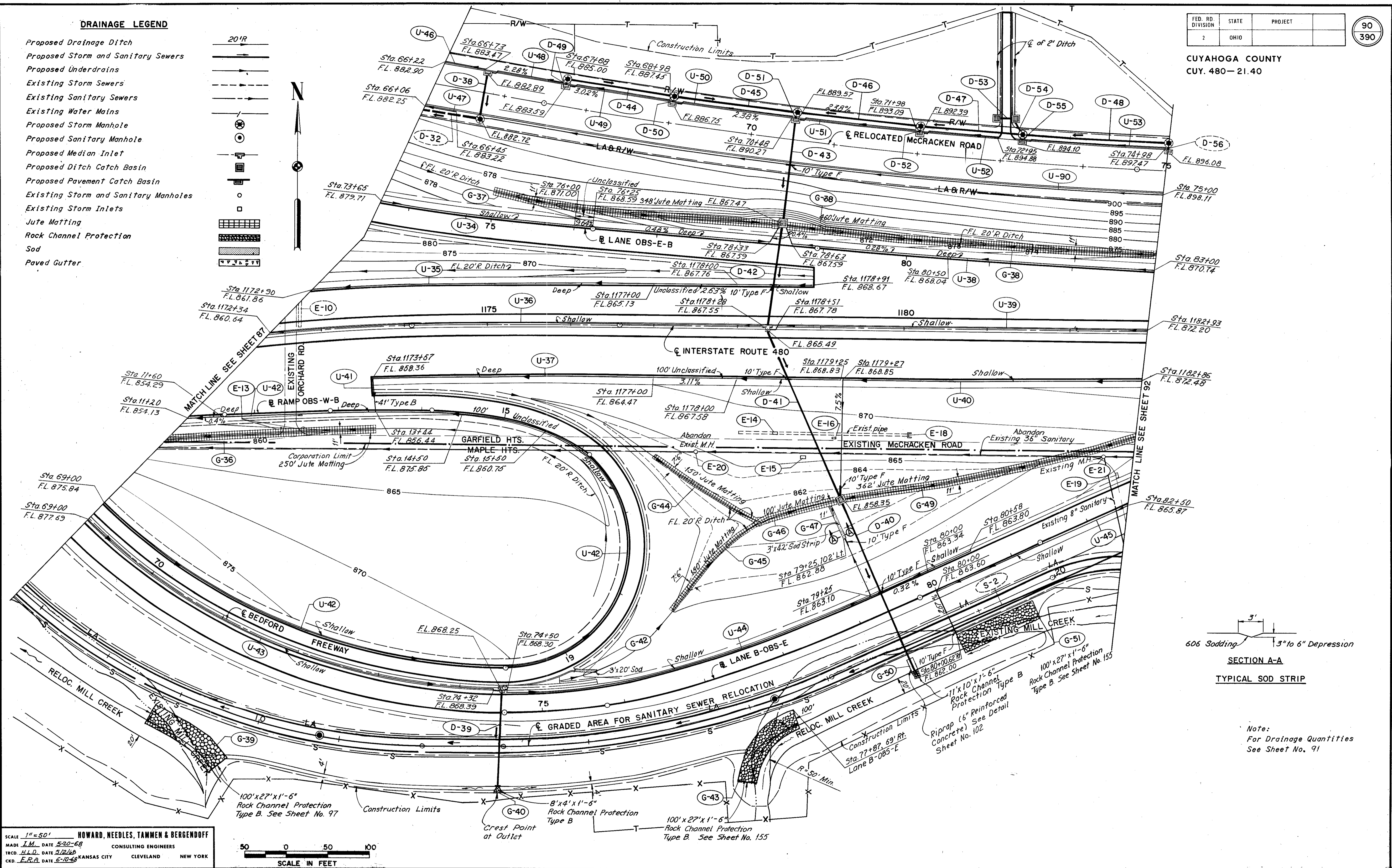
DRAINAGE								
Ref. No.	Station	Side	202	202	202	202		
			Pipe Removed (15" and Under)	Gutter Removed	Manhole Abandoned	Catch Basin Removed	Struct. Removed	
From		To		Lin. Ft.	Lin. Ft.	Each	Each	Lump Sum
E-1	50+96	ReI. McCracken	Lt.				1*	
E-2	50+93	"	Rt.				1*	
E-3	50+78	"	Rt.				1*	
E-4	51+56	"	Lt.				1*	
E-5	52+88	"	Lt.			1*		
E-6	51+00	"	Rt.	15*				1*
E-7	13+00	14+63		50	150			
E-8	1165+90	1169+25			348			
E-9	6+65	6+80	Rt.	15				
E-10	1172+75	I-80	Lt.	15	135			1
E-11	1+97.19	McCracken	Rt.			1*		
E-12	8+45.59	McCracken	Rt.			1*		
Participation III				80	633			1
Participation II*				15			4	1
Sanitary						3		
Grand Total				95	633	3	4	2

\*Denotes Sanitary

SANITARY						
Ref. No.	Station	Side	Sewer Profile Sheet No.	603	604	
				Type B 706.08 ES with 706.12 Joints as per plan 8"	Std. No. 1-A.M.H. with 706.11 Joints as per plan	
From		To		Lin. Ft.	Each	
S-1	106+04.5	7+00	Lt.	119	285	1
Totals				285	1	

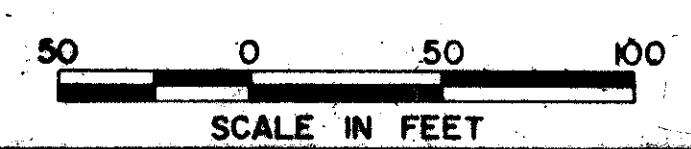
**DRAINAGE LEGEND**

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Median Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod
- Paved Gutter



Note:  
For Drainage Quantities  
See Sheet No. 91

SCALE 1"=50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 5-20-68 CONSULTING ENGINEERS  
TRCD H.L.D. DATE 5/2/68  
CKD E.R.B. DATE 6-10-68 KANSAS CITY CLEVELAND NEW YORK

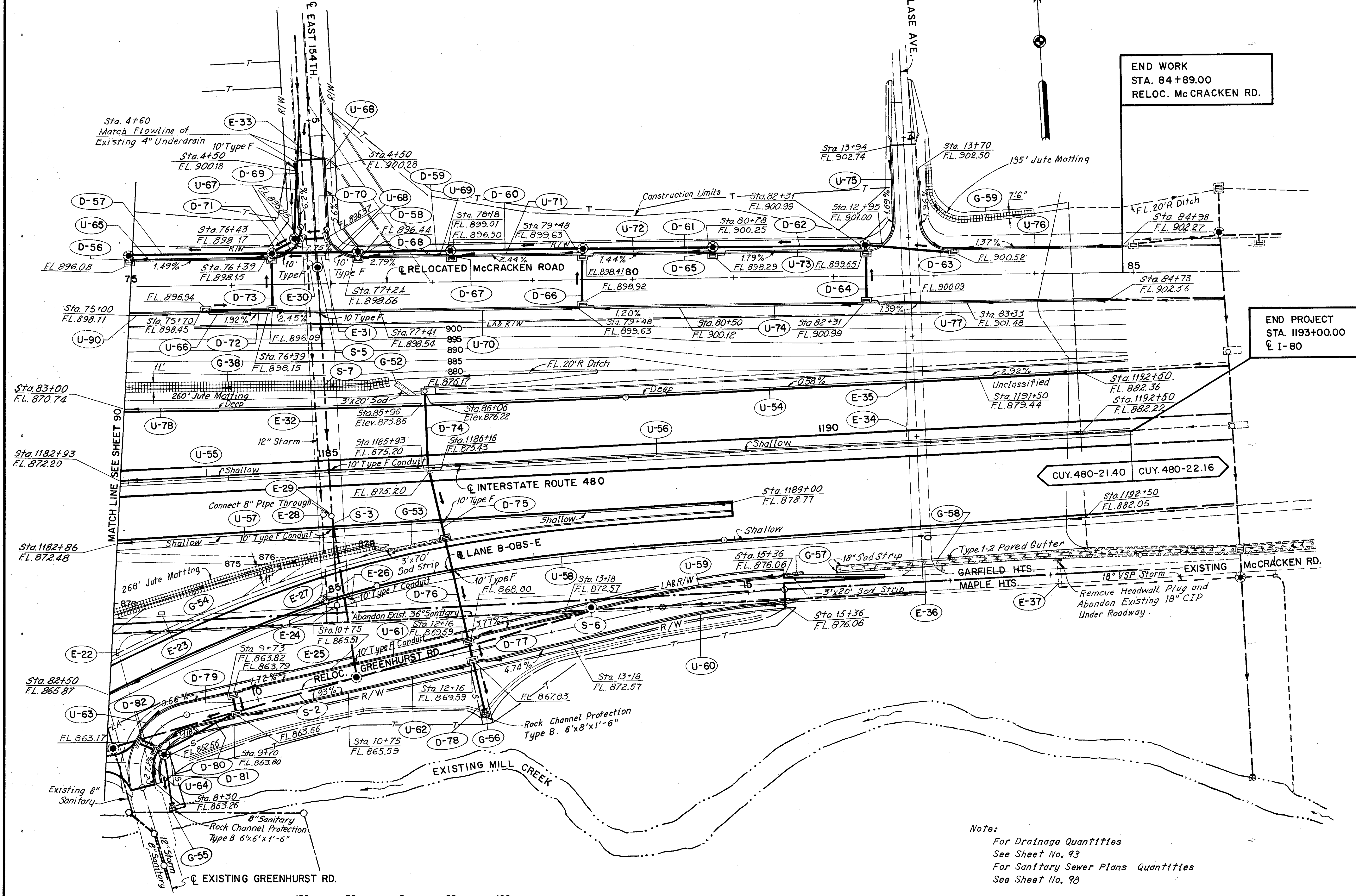




CUYAHOGA COUNTY  
CUY. 480-21.40

DRAINAGE LEGEND

- Proposed Drainage Ditch
- Proposed Storm and Sanitary Sewers
- Proposed Underdrains
- Existing Storm Sewers
- Existing Sanitary Sewers
- Existing Water Mains
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Median Inlet
- Proposed Paved Shoulder Inlet
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manholes
- Existing Storm Inlets
- Jute Matting
- Rock Channel Protection
- Sod
- Paved Gutter



END WORK  
STA. 84+89.00  
RELOC. McCRACKEN RD.

END PROJECT  
STA. 1193+00.00  
I-80

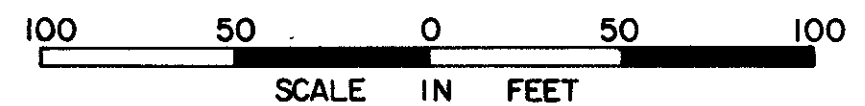
Note:  
For Drainage Quantities  
See Sheet No. 93  
For Sanitary Sewer Plans Quantities  
See Sheet No. 90

DATE	
BY	
ALIGNMENT CHECKED	
GRADES	
STRUCTURE NOTATIONS	

DATE	
BY	
QUANTITIES FIGURED	
QUANTITIES CHECKED	

DATE	
BY	
DRAWN	
CHECKED	

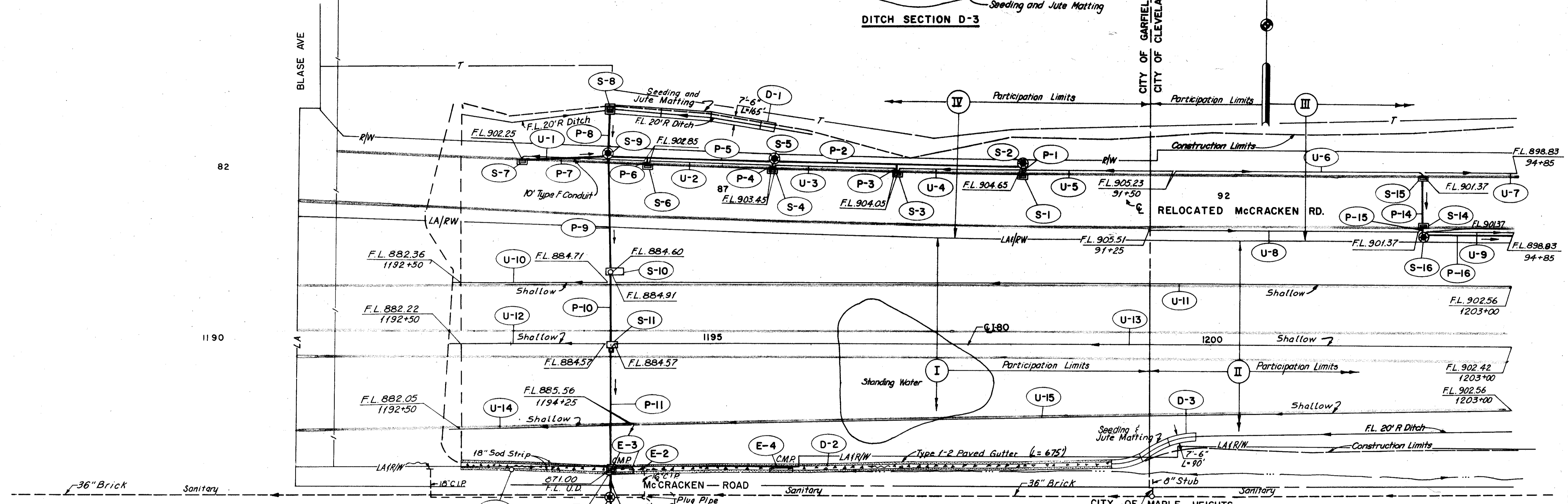
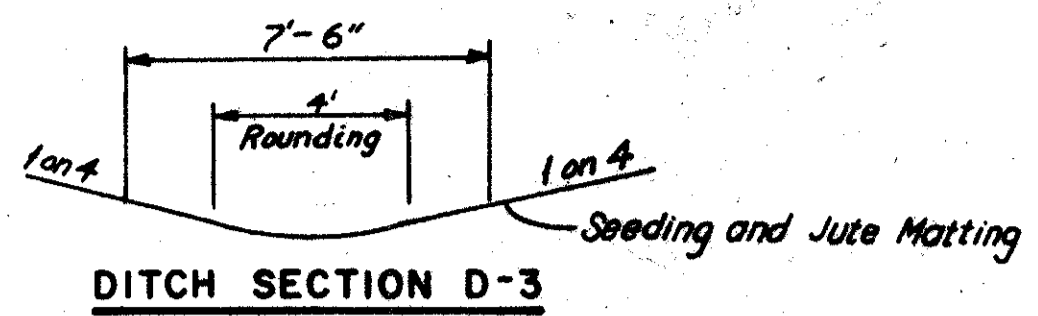
SCALE 1"=50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 4-2-68  
TRCD I.W. DATE 2-2-68  
CKD E.R.A. DATE 4-10-68  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK







Note:  
Do not disturb existing water pipe, under this Contract.



**DRAINAGE LEGEND**

- Proposed Storm and Sanitary Sewers
- Existing Storm Sewer and Sanitary Sewer
- Proposed Storm Manhole
- Proposed Sanitary Manhole
- Proposed Paved Shoulder Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Ditch Catch Basin
- Proposed Pavement Catch Basin
- Existing Storm and Sanitary Manhole
- Existing Storm Inlet
- Seeding and Jute Matting
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope



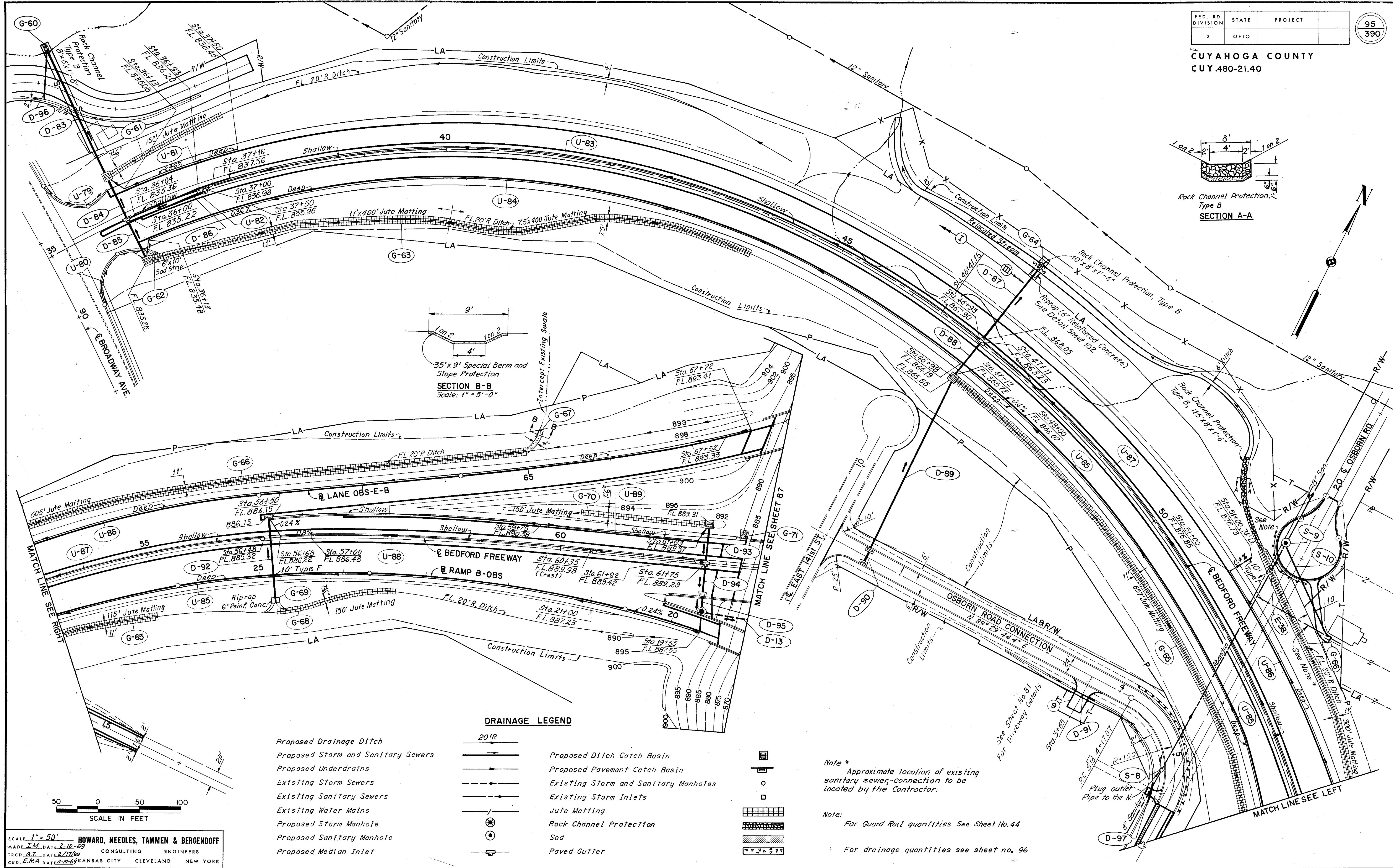
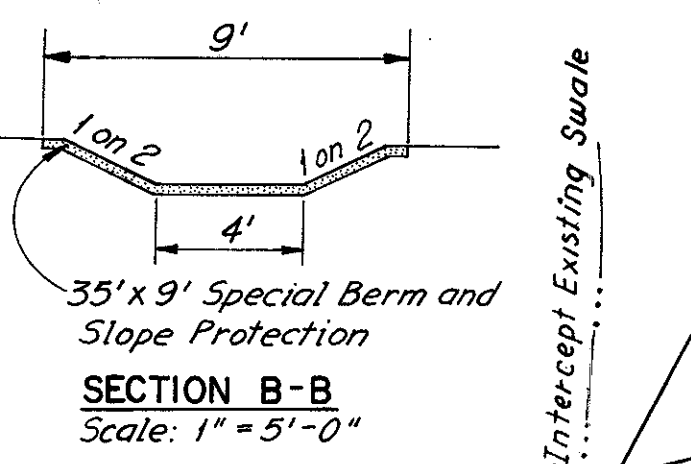
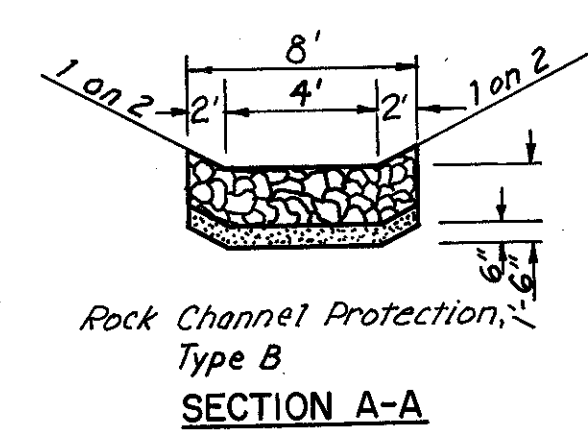
SCALE 1"=50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE D.D.S. DATE 4-2-60 CONSULTING ENGINEERS  
TRCD D.D.S. DATE 4-3-68  
CKD D.C.F. DATE 8-21-67 KANSAS CITY CLEVELAND NEW YORK

Plug with Class "E" concrete. Payment to be included in 203 Excavation

This sheet shows a part of the adjacent Construction Section and is included for information purposes only.

Note: All existing sewer pipes are storm sewers unless otherwise stated.

Note:  
See Sheet 74 for Drainage Quantities.  
See Sheet 79 for Drainage Quantities D-1, D-2, D-3, D-33 & R-12

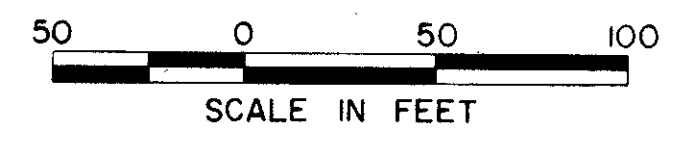


**DRAINAGE LEGEND**

- |                                    |      |                                      |  |
|------------------------------------|------|--------------------------------------|--|
| Proposed Drainage Ditch            | 20'R | Proposed Ditch Catch Basin           |  |
| Proposed Storm and Sanitary Sewers |      | Proposed Pavement Catch Basin        |  |
| Proposed Underdrains               |      | Existing Storm and Sanitary Manholes |  |
| Existing Storm Sewers              |      | Existing Storm Inlets                |  |
| Existing Sanitary Sewers           |      | Jute Matting                         |  |
| Existing Water Mains               |      | Rock Channel Protection              |  |
| Proposed Storm Manhole             |      | Sod                                  |  |
| Proposed Sanitary Manhole          |      | Paved Gutter                         |  |
| Proposed Median Inlet              |      |                                      |  |

Note \*  
Approximate location of existing sanitary sewer-connection to be located by the Contractor.

Note:  
For Guard Rail quantities See Sheet No.44  
For drainage quantities see sheet no. 96



SCALE 1" = 50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 2-10-69 CONSULTING ENGINEERS  
TRCD. G.T. DATE 2/17/69  
CKD. E.R.A. DATE 2-10-69 KANSAS CITY CLEVELAND NEW YORK

DRAINAGE																						
Ref. No.	Station	Side	Sewer Profile Sheet No.	602	603	603	603	603	603	603	603	603	603	603	604	604	604	604	604	Type F 24° Bend	Type F 26° Bend	
				Concrete Masonry	Type B 12"	Type D 12"	Type F 707, 05 12"	Type B 15"	Type F 15"	Type B 18"	Type C 18"	Type B 21"	Type F 21"	Type B 27"	Type C 27"	Std. No. 1-3B Median Inlet	Std. No. 3-A C.B.	Std. No. 5 C.B.	Std. No. 6 C.B. as per plan			Std. No. 2-10 Median Inlet
Part.				I	III	I	III	III	I	III	III	III	III	I	I	I	III	III	III	I	III	III
From To				Cu. Yds.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Ln. Ft.	Each	Each	Each	Each		Each	Each	
D-83	36+00	Bedford	Lt.	143																		
D-84	36+00	Bedford	Lt.	143																		
D-85	36+00	Bedford	Rt.	143																		
D-86	36+00	37+00		114																		
D-87	47+00	Bedford	Lt.	145																		
D-88	47+00	Bedford	Rt.	145																		
D-89	0+55	47+00		117																		
D-90	0+55	Osborn C.		117																		
D-91	3+47	3+77	Rt.																			
D-92	56+50	Bedford	Rt.	114																		
D-93	61+75	Bedford	Lt.	149																		
D-94	61+75	Bedford	Rt.	149																		
D-95	61+75	Bedford	Rt.	149																		
D-96	1+08	Access Dr.	Lt./Rt.																			
D-97	15+62		Lt.																			
Participation III					24	55	235	75	27	89	18	119	49		2	2	2	2				
Participation I				0.5		60		100					114	169	1		2		1			
Totals				0.5	24	115	235	175	27	89	18	119	49	114	169	3	2	4	2	1		

Note: Each pipe run shows only the upstream drainage structures for quantities.

SANITARY						
Ref. No.	Station	Side	Sewer Profile Sheet No.	603	604	604
				Type B 706.08 with 706.12 Joints as/plan 6"	M.H. Adjusted To Grade	Std. No. 1-A M.H. with 706.11 Joints
From To				Ln. Ft.	Each	Each
S-8	15+91.0	Osborn Rd	Lt		1	
S-9	19+00	Osborn Rd				1
S-10		Osborn Rd	Lt	120		
Totals: Participation III				120	1	1

EROSION CONTROL											
Ref. No.	Station	Side	601	601	660	660	667				
			Riprap 6" Reinforced Concrete Slab	Rock Channel Protect. Type B	Sodding	Sodding Special Berm and Slope Protect.	Seeding and Jute Matting	III	I	III	I
From To			Sq. Yds.	Cu. Yds.	Sq. Yds.	Sq. Yds.	Sq. Yds.	Sq. Yds.			
G-60	36+00	Bedford	Rt.	3.5							
G-61	36+00	37+50	Lt.							125	
G-62	36+00	Bedford	Rt.			7					
G-63	36+00	44+00	Rt.							822	
G-64	47+00	Bedford	Lt.	3.1	6.0						
G-65	47+00	55+00	Rt.							944	
G-66	50+00	65+00	Lt.		74.0					1106	
G-67	65+00	OBS-EB	Lt.				35				
G-68	56+50	58+00	Rt.							125	
G-69	56+50	Bedford	Rt.	3.0							
G-70	60+25	61+75	Lt.							125	
G-71	62+23	Bedford	Lt.				9				
Participation III				6.1	80.0		44			2,300	
Participation I					3.5	7				947	
Totals				6.1	83.5	7	44			3,247	

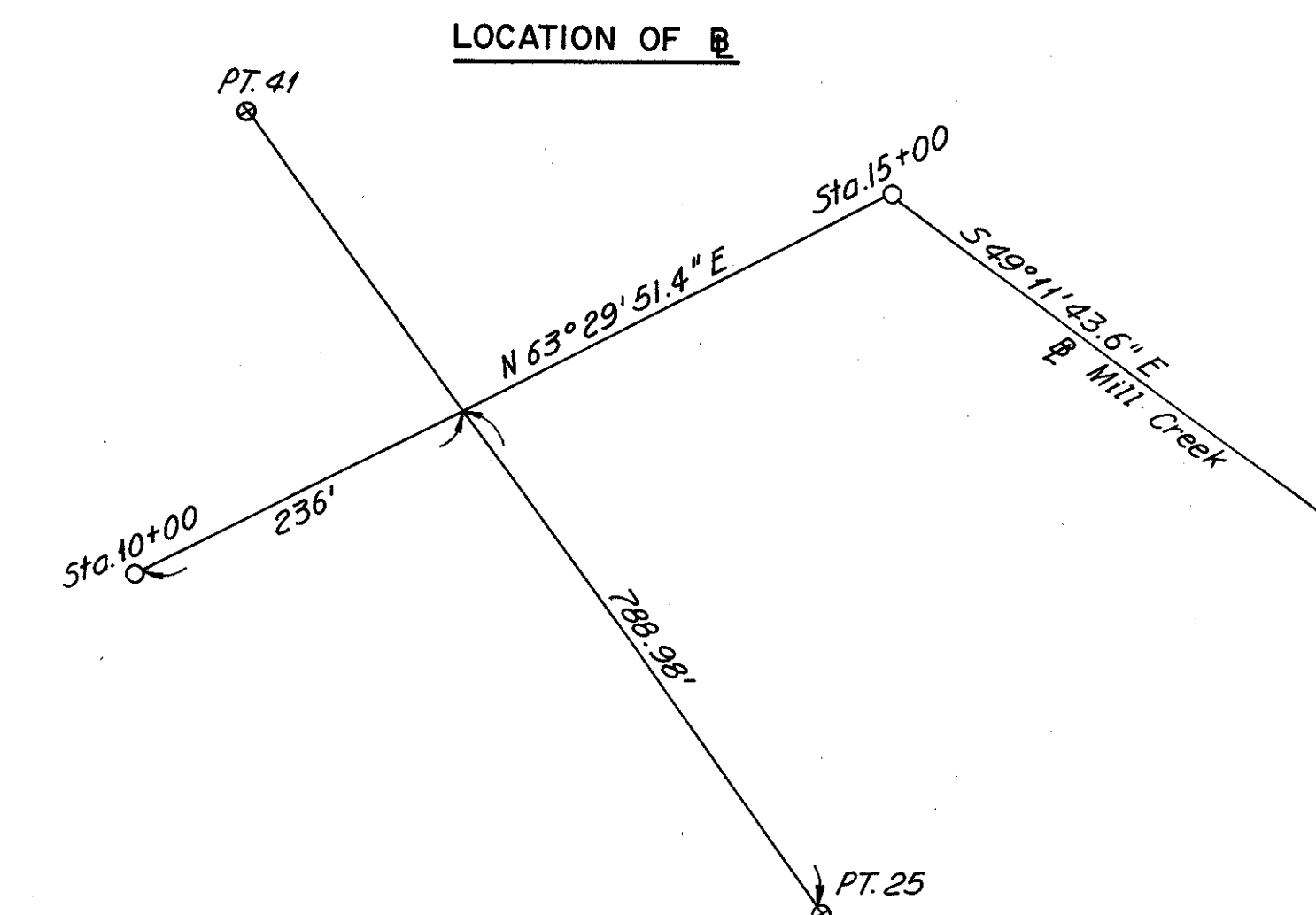
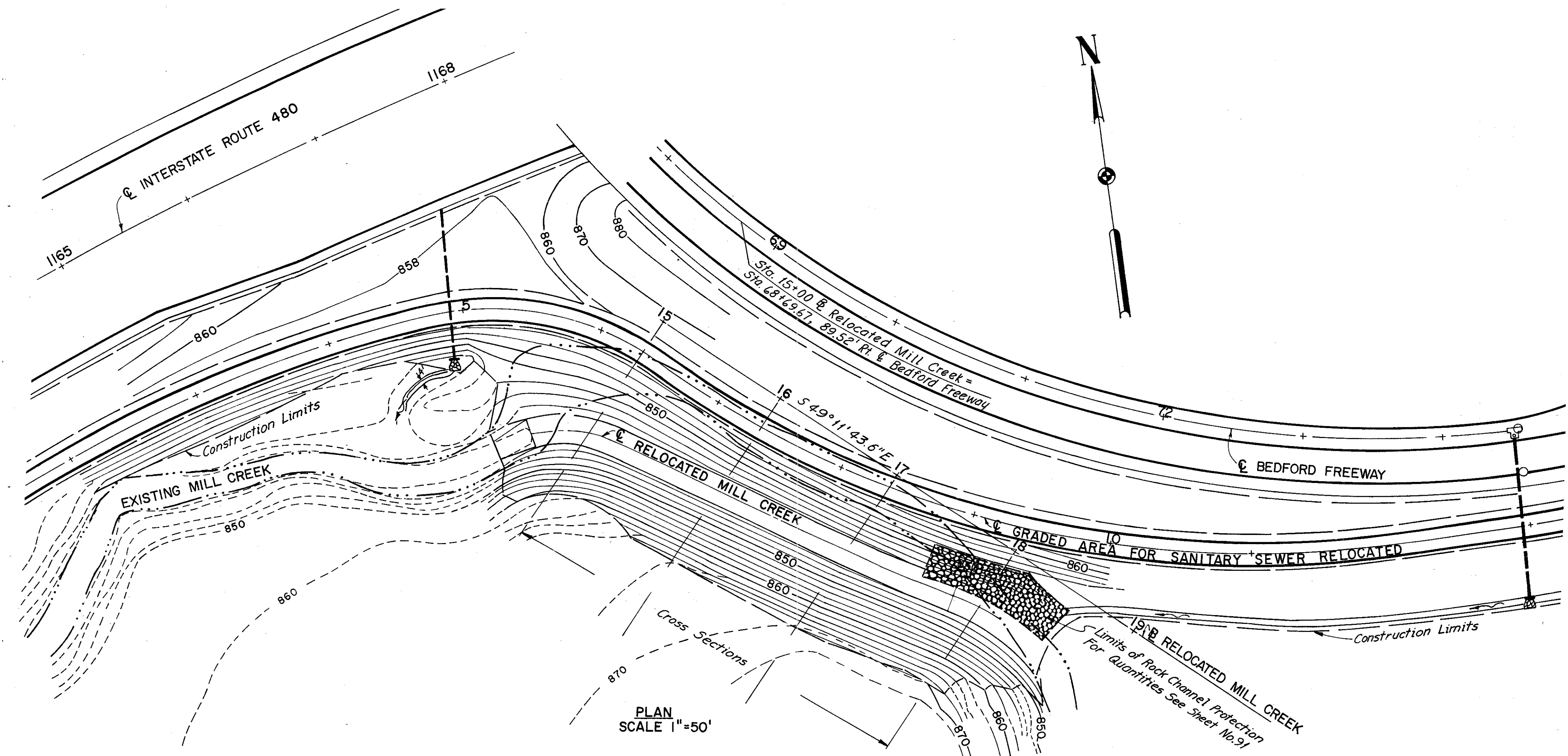
UNDERDRAINS										
Ref. No.	Station	Side	603	605	605					
			Type F 6"	Shallow 6"	Deep 6"			Bend 60° 6"	Bend 90° 6"	
From To			Ln. Ft.	Ln. Ft.	Ln. Ft.			Each	Each	
U-81	36+00	37+50	Lt.	10		153			1	
U-82	36+00	36+93	Lt.	10	87					
U-83	37+00	46+93	Lt.	10	933	52				
U-84	36+00	46+98	Rt.	10		1043	57		1	
U-85	47+00	19+65	Rt.	20		1455			1	
U-86	51+00	67+72	Lt.	10		1159				1
U-87	47+00	56+48	Lt.	10	939					
U-88	56+50	61+75	Lt.	20	514					
U-89	56+50	61+75	Lt.	20	517				1	
Participation III				80	2,022	2,671				
Participation I				40	1,020	1,196				
Totals				120	3,042	3,867				

DRAINAGE				
Ref. No.	Station	Side	Sewer Profile Sheet No.	202
				Manhole Abandoned
From To				Each
E-38	18+65.5	Osborn Rd	Lt	1
Sanitary Total: Participation III				1

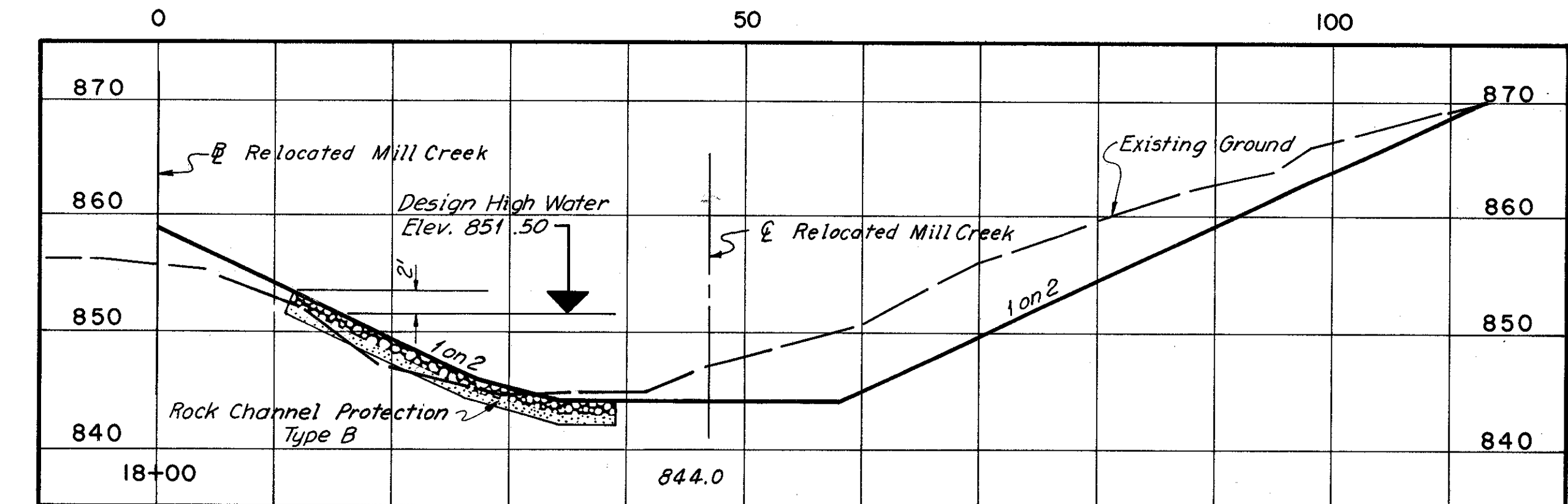
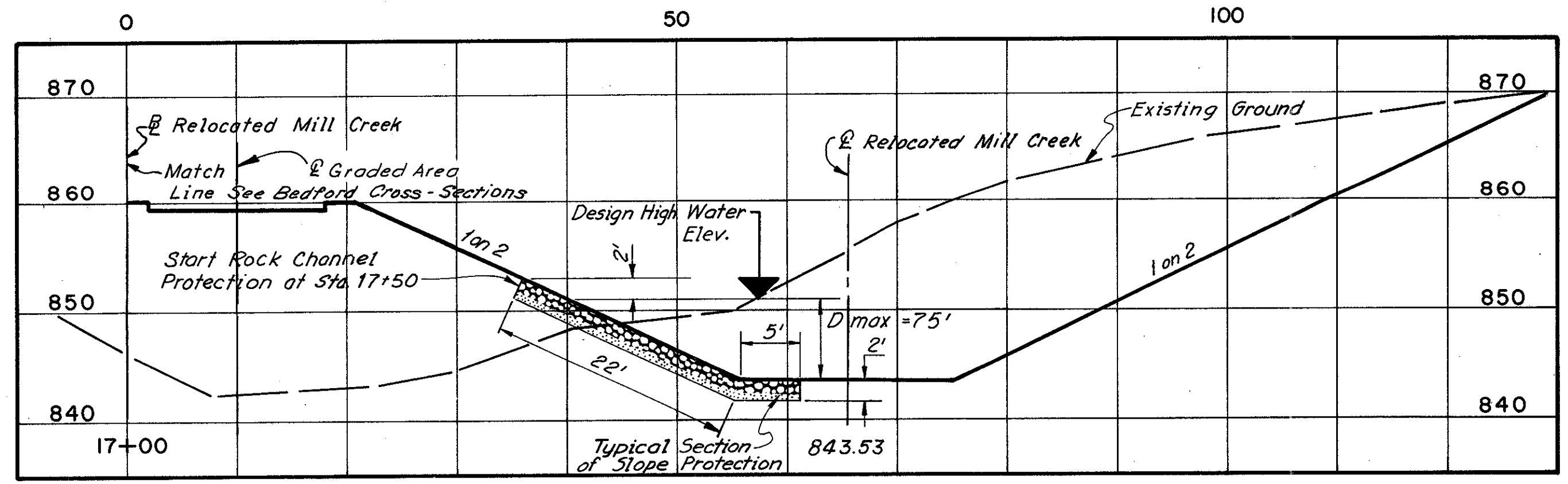
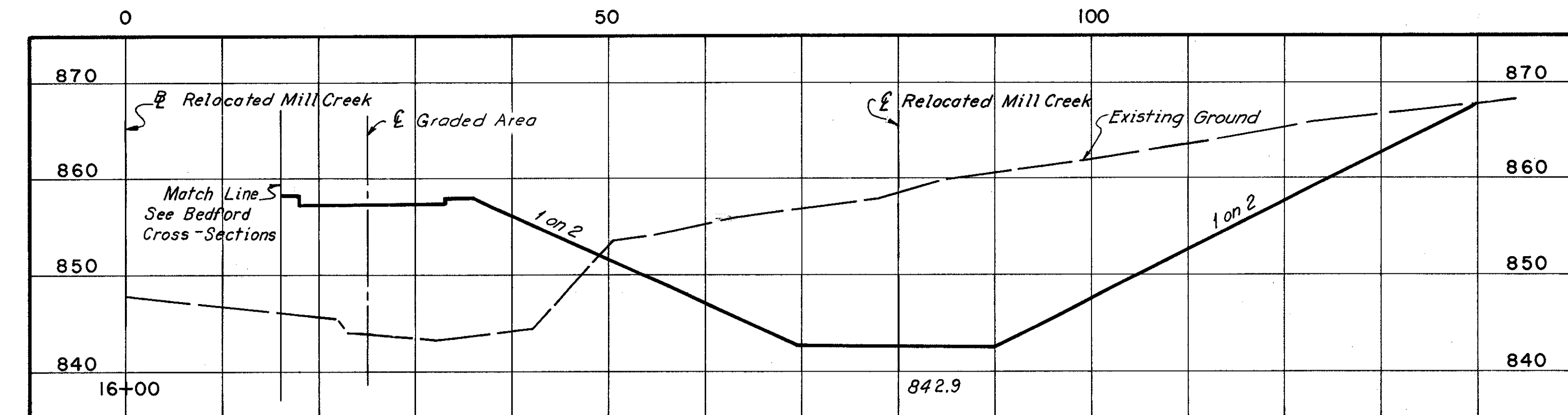
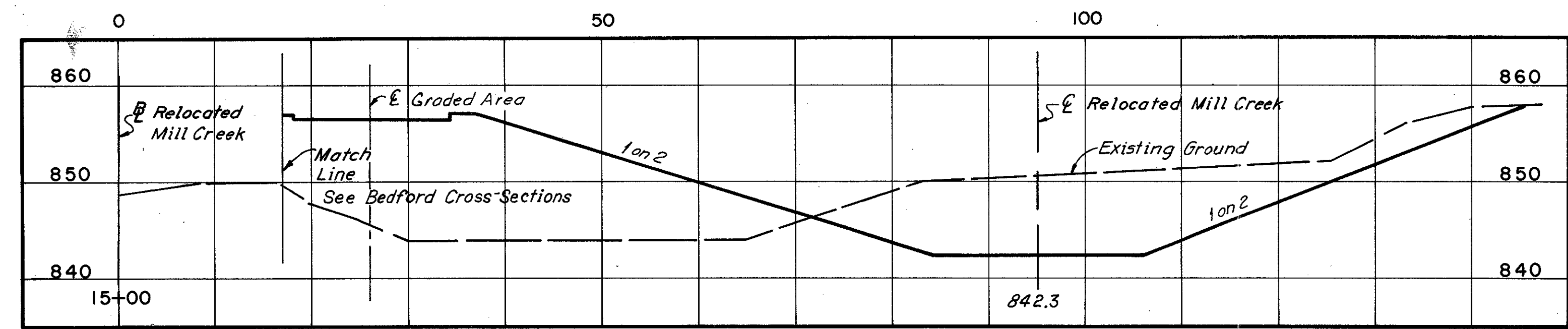
MANHOLE COVER ELEVATIONS				
Ref. No.	Location	Side	Existing T/C Elevation	Final T/C Elevation
S-8	15+91 Osborn	Lt	897.08	897.23
S-9	19+00, 25, 71	Lt	-	873.70

Note: Each pipe run shows only the upstream drainage structures for quantities.

For Drainage Structure Locations, See Sheet No. 95



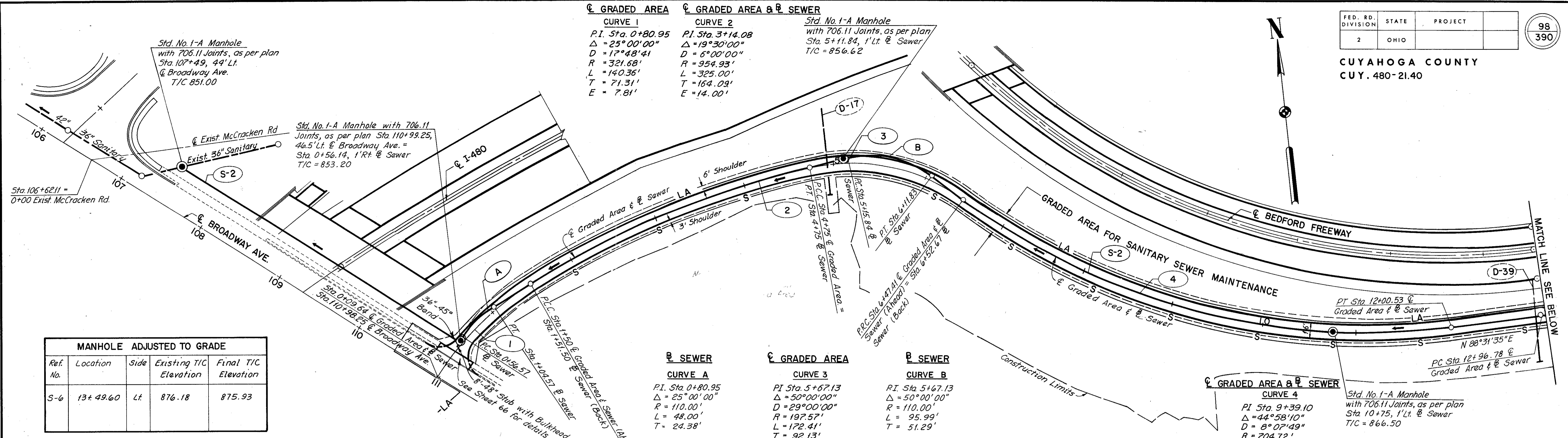
Note:  
For Drainage Quantities  
See Sheet No. 91, Ref. G-39



CHANNEL CROSS-SECTIONS  
SCALE HORIZONTAL 1"=10'  
VERTICAL 1"=10'

SCALE As shown HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE I.M. DATE 7-2-68 CONSULTING ENGINEERS  
TRCD C.M.D. DATE 7-30-68 KANSAS CITY CLEVELAND NEW YORK  
CED. E.R.A. DATE 10-3-68

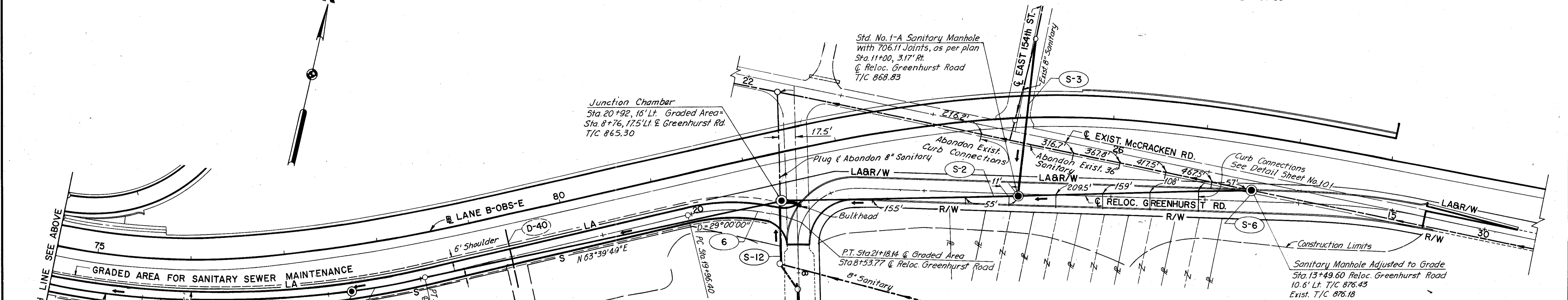
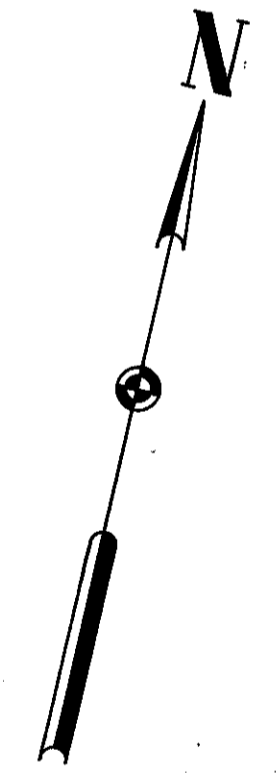
EARTHWORK  
EXC. 7,877 CU. YDS.  
EMB. 4,968 CU. YDS.



Ref. No.	Location	Side	Existing TIC Elevation	Final TIC Elevation
S-6	13+49.60	Lt.	876.18	875.93

SEWER		GRADED AREA		SEWER	
CURVE A		CURVE 3		CURVE B	
PI Sta.	0+80.95	PI Sta.	5+67.13	PI Sta.	5+67.13
Δ	25°00'00"	Δ	50°00'00"	Δ	50°00'00"
D	170.00'	D	29°00'00"	D	110.00'
R	110.00'	R	197.57'	R	95.99'
L	48.00'	L	172.41'	L	51.29'
T	24.38'	T	92.13'	T	51.29'
E		E	20.42'	E	

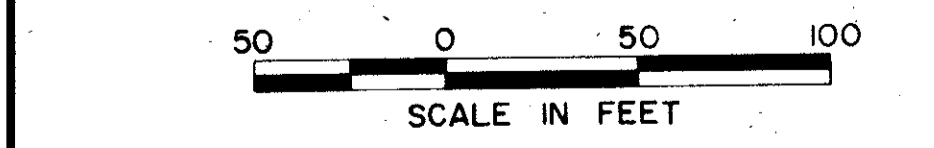
GRADED AREA & SEWER		SEWER	
CURVE 4		CURVE 5	
PI Sta.	9+39.10	PI Sta.	15+04.17
Δ	44°58'10"	Δ	35°18'16"
D	8°07'49"	D	29°00'00"
R	704.72'	R	197.57'
L	553.11'	L	121.74'
T	291.68'	T	62.87'
E	57.99'	E	9.76'



GRADED AREA	
CURVE 6	
PI Sta.	20+59.27
Δ	35°18'16"
D	29°00'00"
R	197.57'
L	121.74'
T	62.87'
E	9.76'

Ref. No.	Station	Side	Sewer Profile Sheet No.	Sanitary Details									
				603 Type B 706.02 Cl. III Fully Lined as per 706.05 706.11 Joints	603 Type B 706.02 Cl. III Fully Lined as per 706.05 706.11 Joints	603 Type B 706.02 Cl. III Fully Lined as per 706.05 706.11 Joints	603 Type B 706.02 Cl. III Fully Lined as per 706.05 706.11 Joints	603 Type B 706.02 Cl. III Fully Lined as per 706.05 706.11 Joints	604 Junction Chamber	604 Manhole Adjusted to Grade	604 Std. No. 1-A Manhole 706.11 Joints as per plan	Special Curb Connections	
From	To			Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Each	Each	Each	Each	
S-2	107+49	13+49.60	Lt. & Rt.	120	827	417	1484	144		1		6	7
S-3	1+01	11+00	Rt.	119				167					
S-6	13+49.60		Lt.	120					1				
S-12	8+08	8+76	Lt.	120A				62					
Sub-totals (III)					800				167		1	2	7
Sub-totals (100% CRSD)					27			62					
Sub-totals (III-CRSD)						417	1484	144		1		4	
Totals					827	417	1484	144	229	1	1	6	7

Notes: Profiles of Graded Area and Sewers are shown on sheets as follows:  
 Graded Area Profile: Sheet No. 57  
 S-2 Sanitary Sewer: Sheet No. 120  
 S-3 Sanitary Sewer: Sheet No. 119  
 Graded Area Intersection Details are on Sheet No. 66.



**NOTE:** THIS SHEET SUPERSEDES  
SHEET No 98 OF THE PLANS.  
REVISED 6-4-74

**CURVE DATA**

CURVE 1	CURVE 2
P.I. Sta. 0+80.95	P.I. Sta. 3+14.08
$\Delta = 25^{\circ}00'00''$	$\Delta = 19^{\circ}30'00''$
$D = 17^{\circ}48'41''$	$D = 6^{\circ}00'00''$
$R = 321.68'$	$R = 954.93'$
$L = 140.36'$	$L = 325.00'$
$T = 71.31'$	$T = 164.09'$
$E = 7.81'$	$E = 14.00'$

Std. No 1-A Manhole  
with 706.11 Joints, as per plan.  
Sta. 5+40, 8' Lt.  
T/C = 856.75 F.L. = 840.63

Std. No 1-A Manhole with 706.11  
Joints, as per plan Sta. 110+99.25,  
46.5' Lt.  $\pm$  Broadway Ave.  
Sta. 0+56.14, 1' Rt.  
T.C. = 853.20

Std. No 1-A Manhole  
with 706.11 Joints, as per plan.  
Sta. 2+50, 10' Lt.  
T/C = 856.50 F.L. = 839.46

Std. No 1-A Manhole  
with 706.11 Joints, as per plan.  
Sta. 8+50, 8' Rt.  
T/C = 860.53 F.L. = 842.36

Std. No 1-A Manhole  
with 706.11 Joints, as per plan.  
Sta. 12+00, 8' Rt.  
T/C = 869.03 F.L. = 844.46

**CURVE DATA**

**CURVE 3**

P.I. Sta. 5+67.13
$\Delta = 50^{\circ}00'00''$
$D = 29^{\circ}00'00''$
$R = 197.57'$
$L = 172.41'$
$T = 92.13'$
$E = 20.42'$

**CURVE DATA**

**CURVE 4**

P.I. Sta. 9+39.10
$\Delta = 44^{\circ}58'10''$
$D = 8^{\circ}07'49''$
$R = 704.72'$
$L = 553.11'$
$T = 291.68'$
$E = 57.98'$

**CURVE DATA**

**CURVE 6**

P.I. Sta. 20+59.27
$\Delta = 35^{\circ}18'16''$
$D = 29^{\circ}00'00''$
$R = 197.57'$
$L = 121.74'$
$T = 62.87'$
$E = 9.76'$

**CURVE DATA**

**CURVE 5**

P.I. Sta. 15+04.17
$\Delta = 24^{\circ}31'46''$
$D = 6^{\circ}05'24''$
$R = 940.82'$
$L = 408.25'$
$T = 207.39'$
$E = 22.59'$

**MANHOLE ADJUSTED TO GRADE**

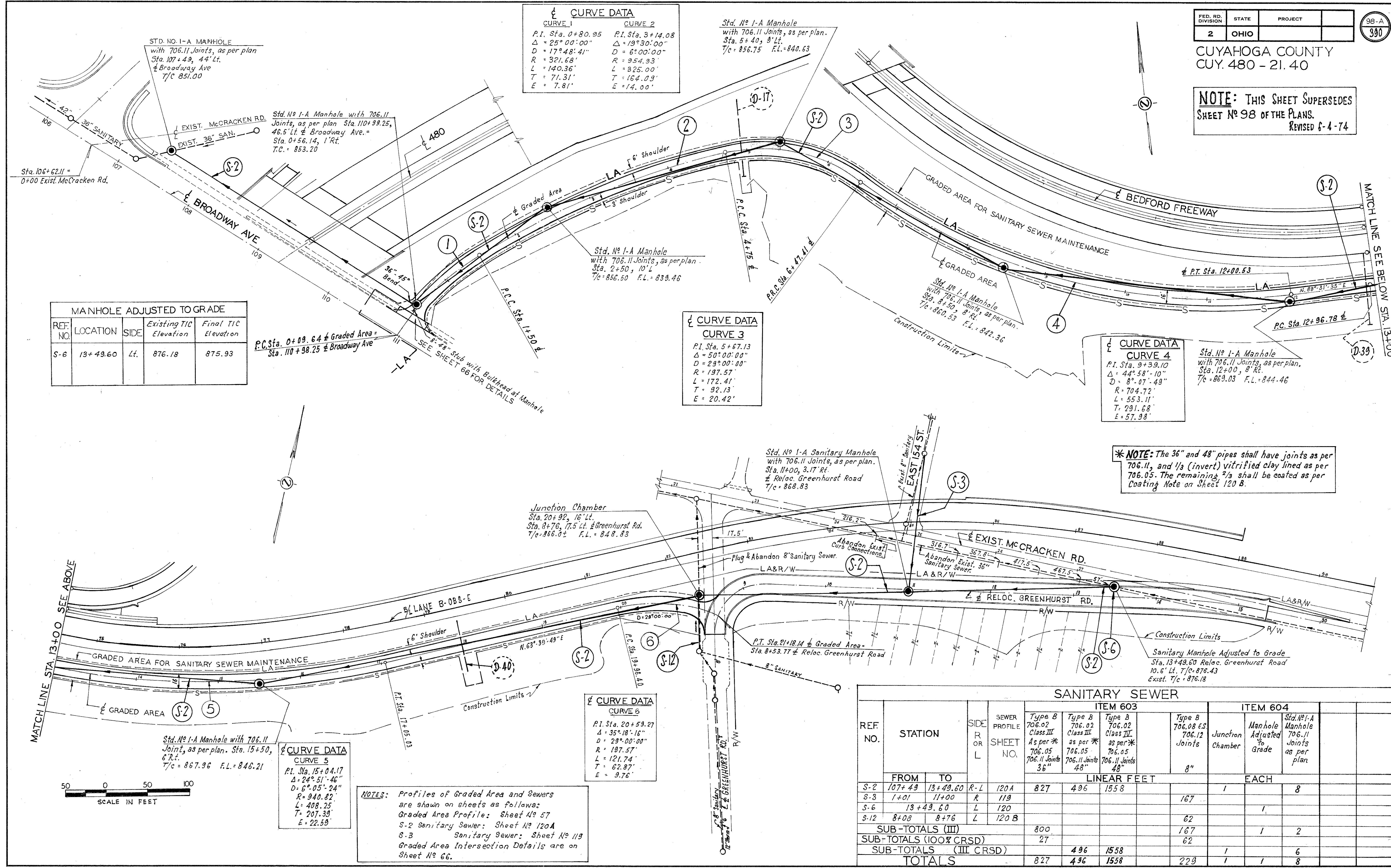
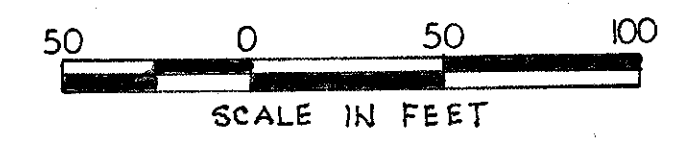
REF. NO.	LOCATION	SIDE	Existing TIC Elevation	Final TIC Elevation
S-6	13+49.60	Lt.	876.18	875.93

**\*NOTE:** The 36" and 48" pipes shall have joints as per 706.11, and 1/3 (invert) vitrified clay lined as per 706.05. The remaining 2/3 shall be coated as per Coating Note on Sheet 120 B.

**NOTES:** Profiles of Graded Area and Sewers are shown on sheets as follows:  
Graded Area Profile: Sheet No 57  
S-2 Sanitary Sewer: Sheet No 120A  
S-3 Sanitary Sewer: Sheet No 118  
Graded Area Intersection Details are on Sheet No 66.

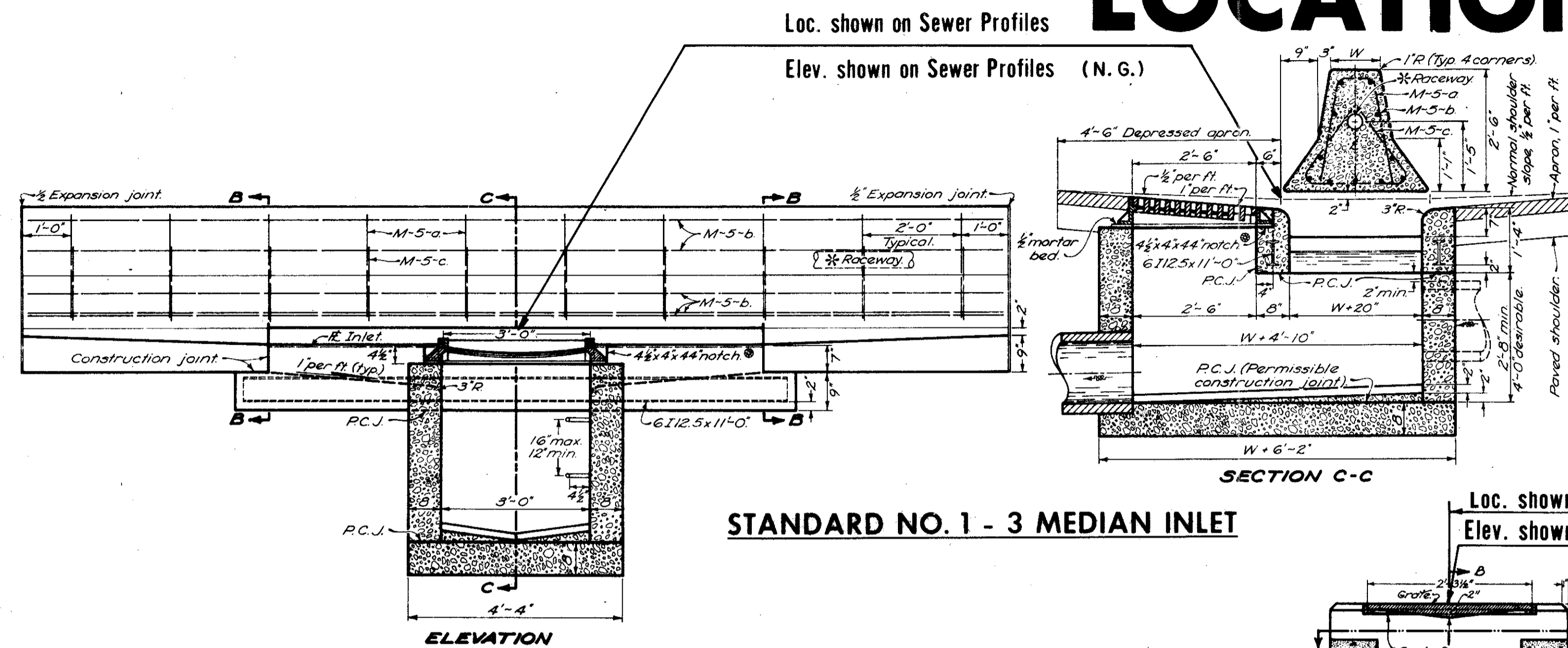
**SANITARY SEWER**

REF. NO.	STATION	SIDE R OR L	SEWER PROFILE SHEET NO.	ITEM 603			ITEM 604					
				Type B 706.02 Class III As per * 706.05 36"	Type B 706.02 Class III as per * 706.05 48"	Type B 706.02 Class II as per * 706.05 48"	Type B 706.08 & S 706.12 Joints 8"	Junction Chamber	Manhole Adjusted to Grade	Std. No 1-A Manhole 706.11 Joints as per plan		
S-2	107+49	13+49.60	R-L	120A	827	496	1558					
S-3	1+01	11+00	R	119				167				
S-6	13+49.60		L	120								
S-12	8+08	8+76	L	120 B								
SUB-TOTALS (III)					800							
SUB-TOTALS (100% CRSD)					27			167			1	2
SUB-TOTALS (III CRSD)						496	1558			1		6
<b>TOTALS</b>					<b>827</b>	<b>496</b>	<b>1558</b>			<b>229</b>	<b>1</b>	<b>8</b>

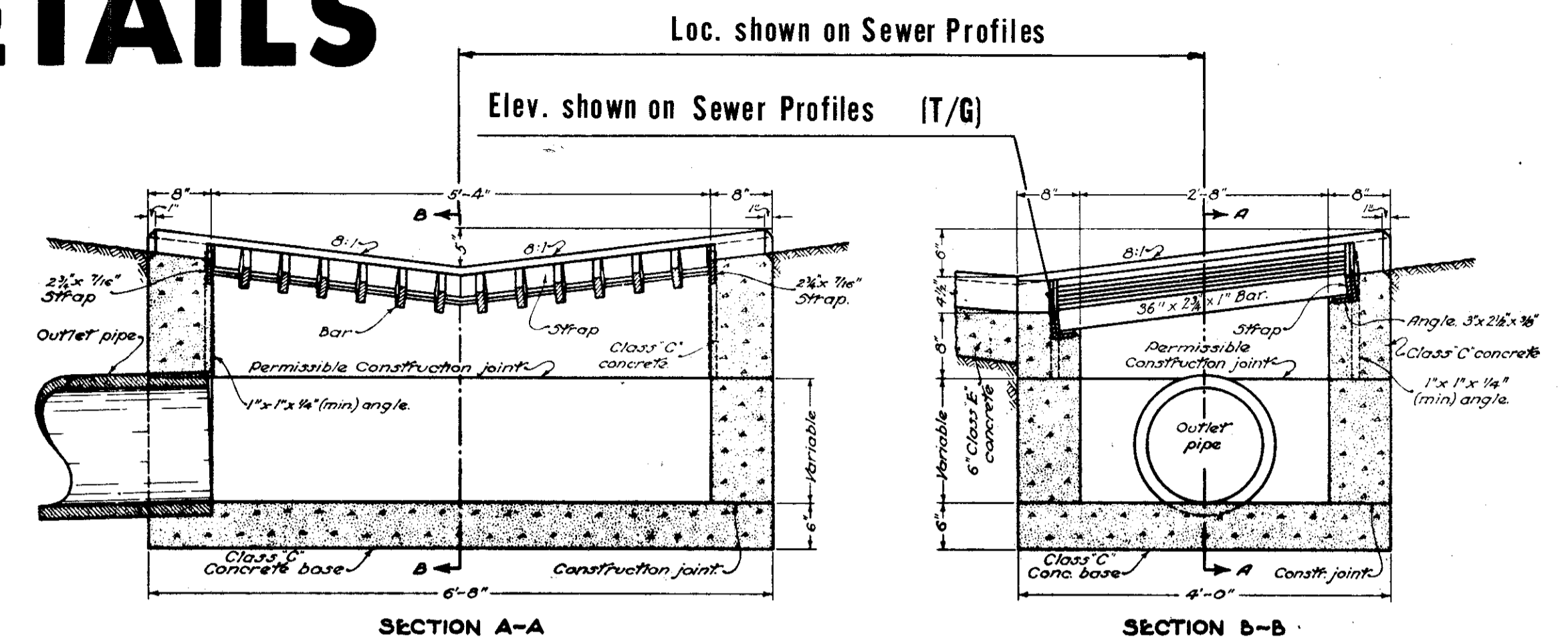


# DRAINAGE STRUCTURE DETAILS

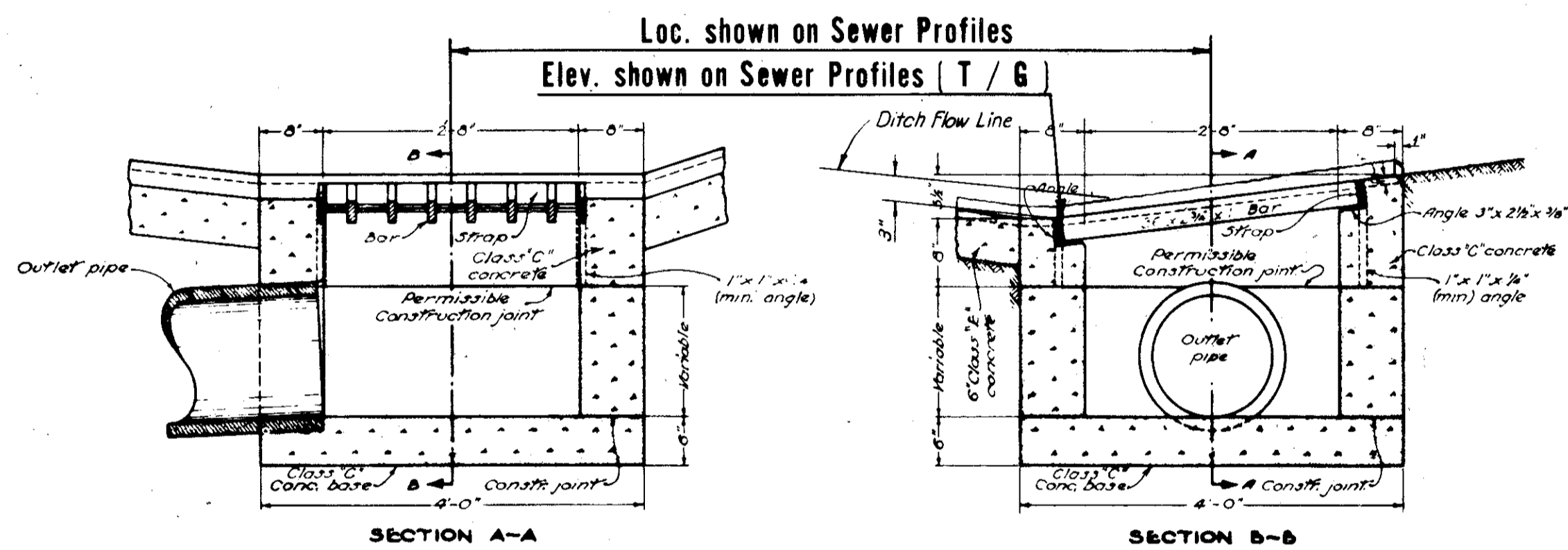
CUYAHOGA COUNTY  
CUY. 480-21.40



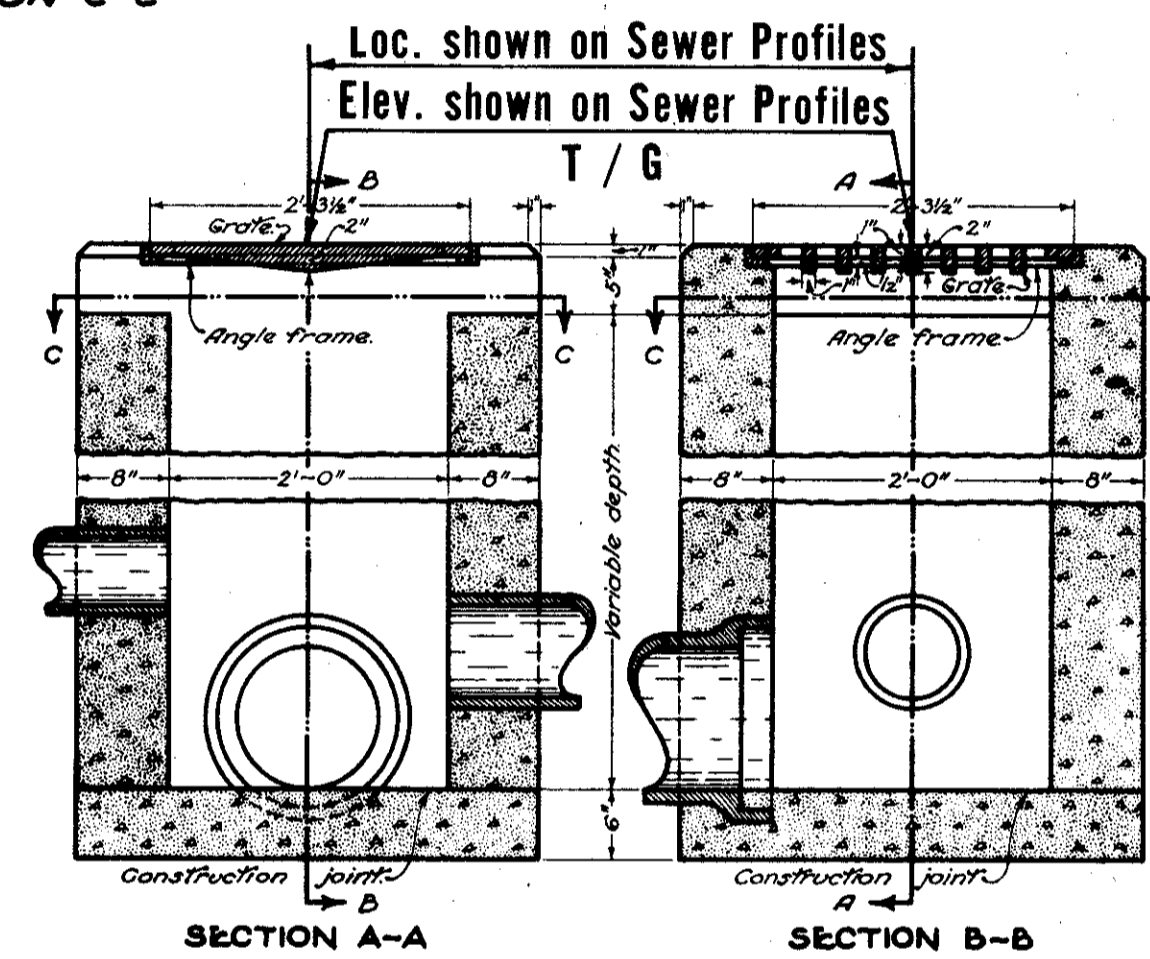
STANDARD No. 1 - 3 MEDIAN INLET



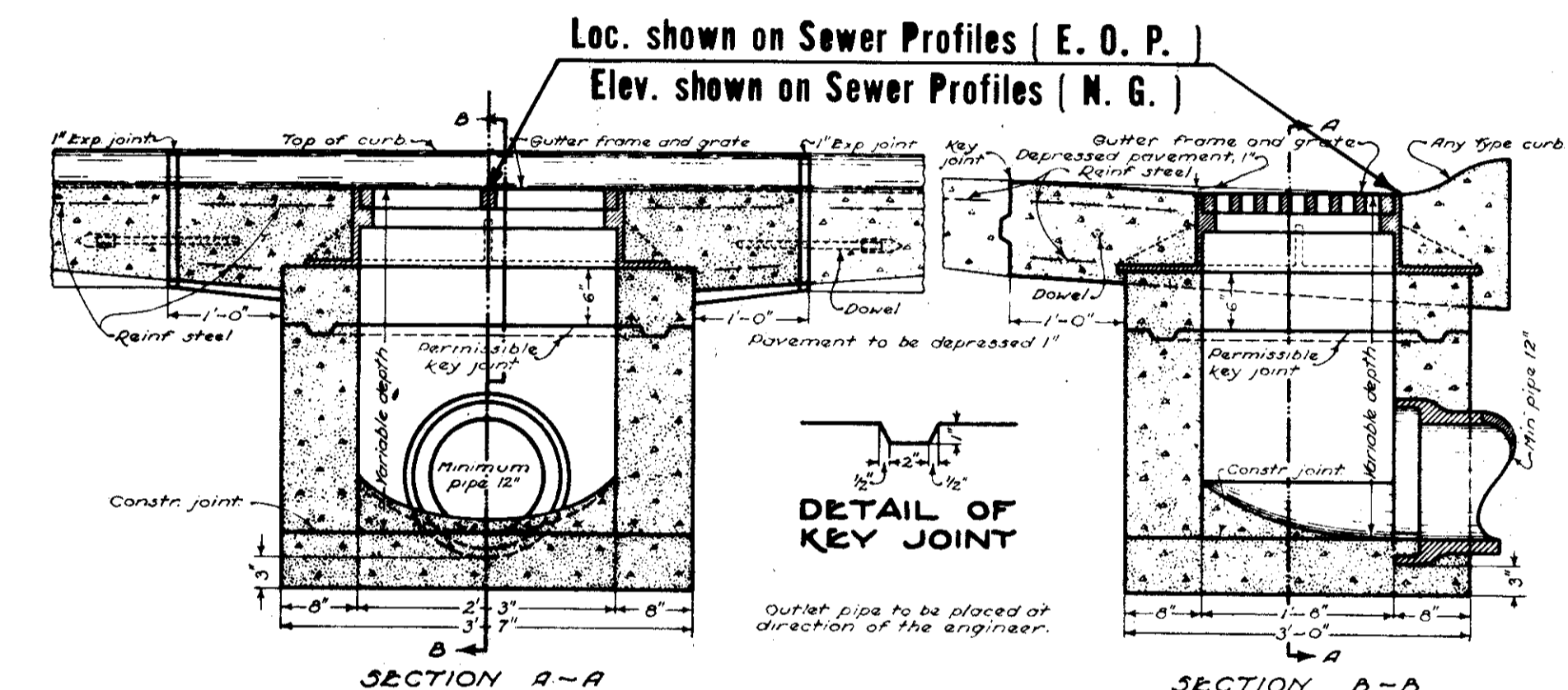
STANDARD No. 4 CATCH BASIN



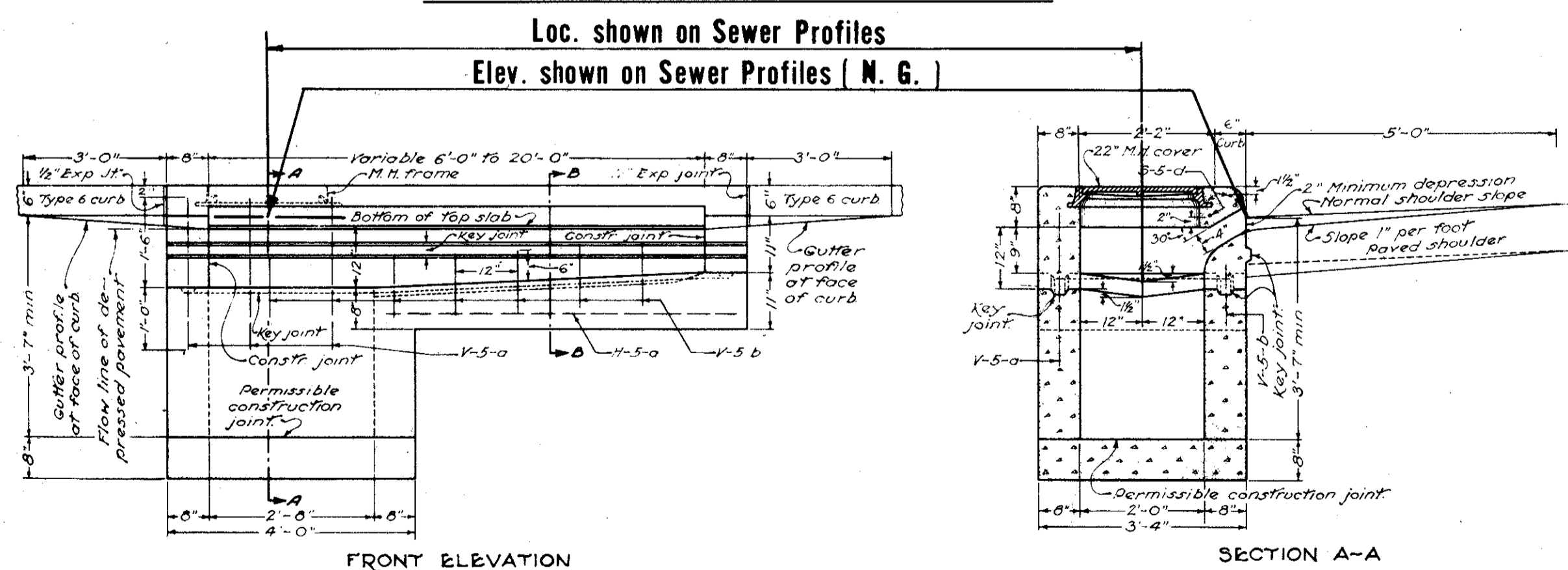
STANDARD No. 5 CATCH BASIN



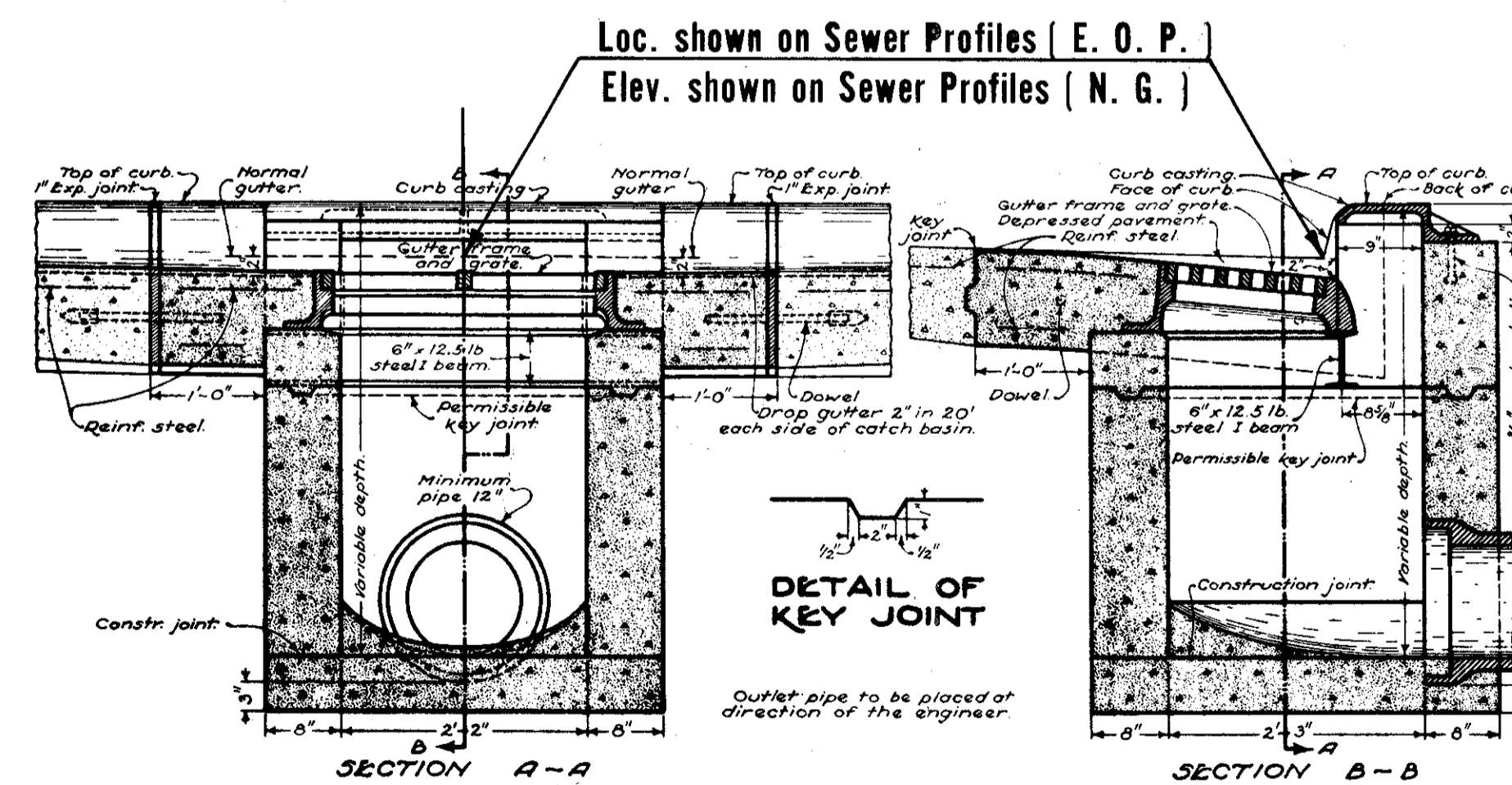
STANDARD No. 2-2-A CATCH BASIN



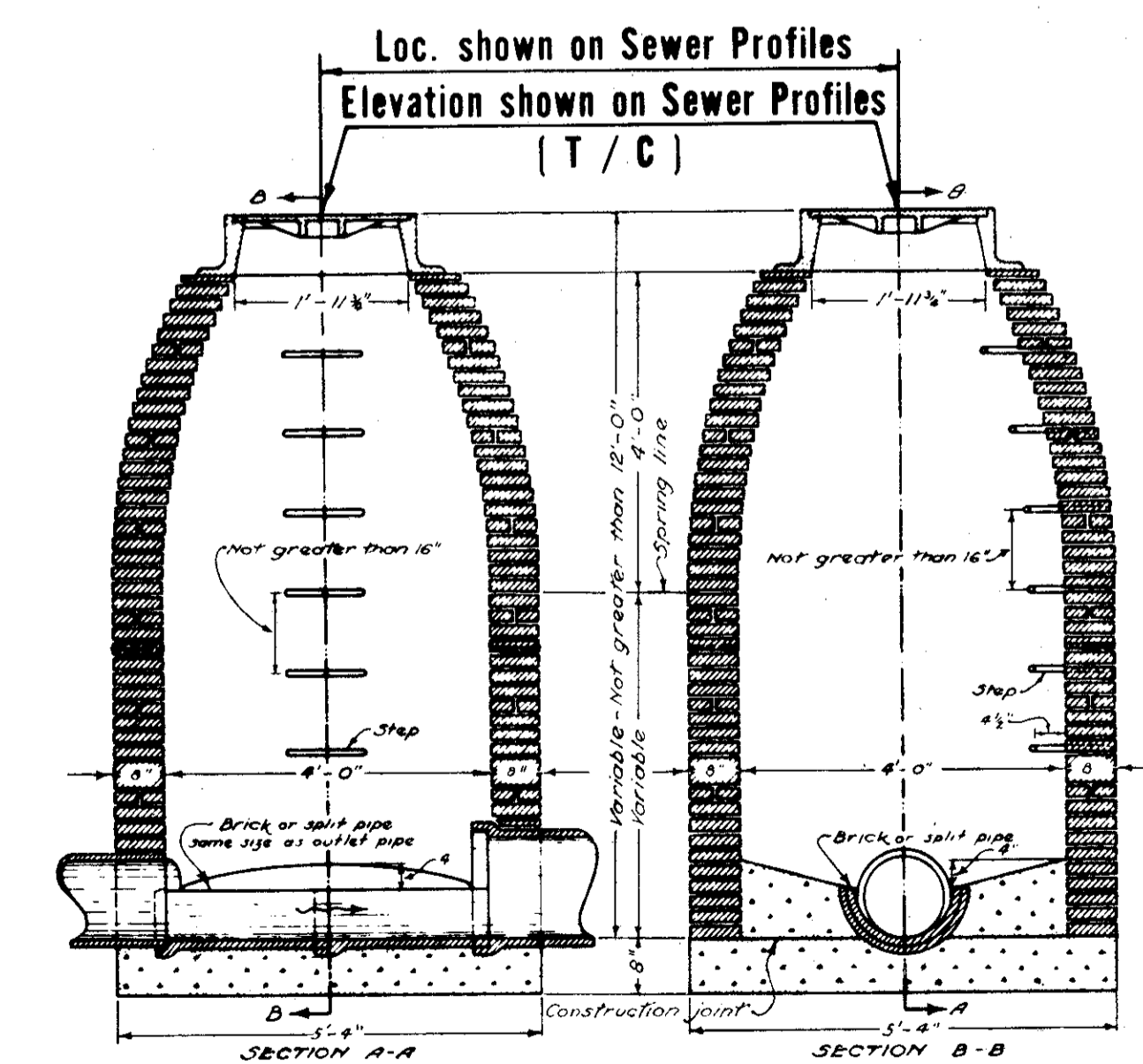
STANDARD No. 6 CATCH BASIN



STANDARD No. 2-A PAVED SHOULDER INLETS



STANDARD No. 3-A CATCH BASIN



STANDARD MANHOLE

Note: This sheet is to be used for clarification of the location and elevation as shown on the sewer profiles. Use the Standard Construction Drawings for details regarding the construction of the drainage structures.

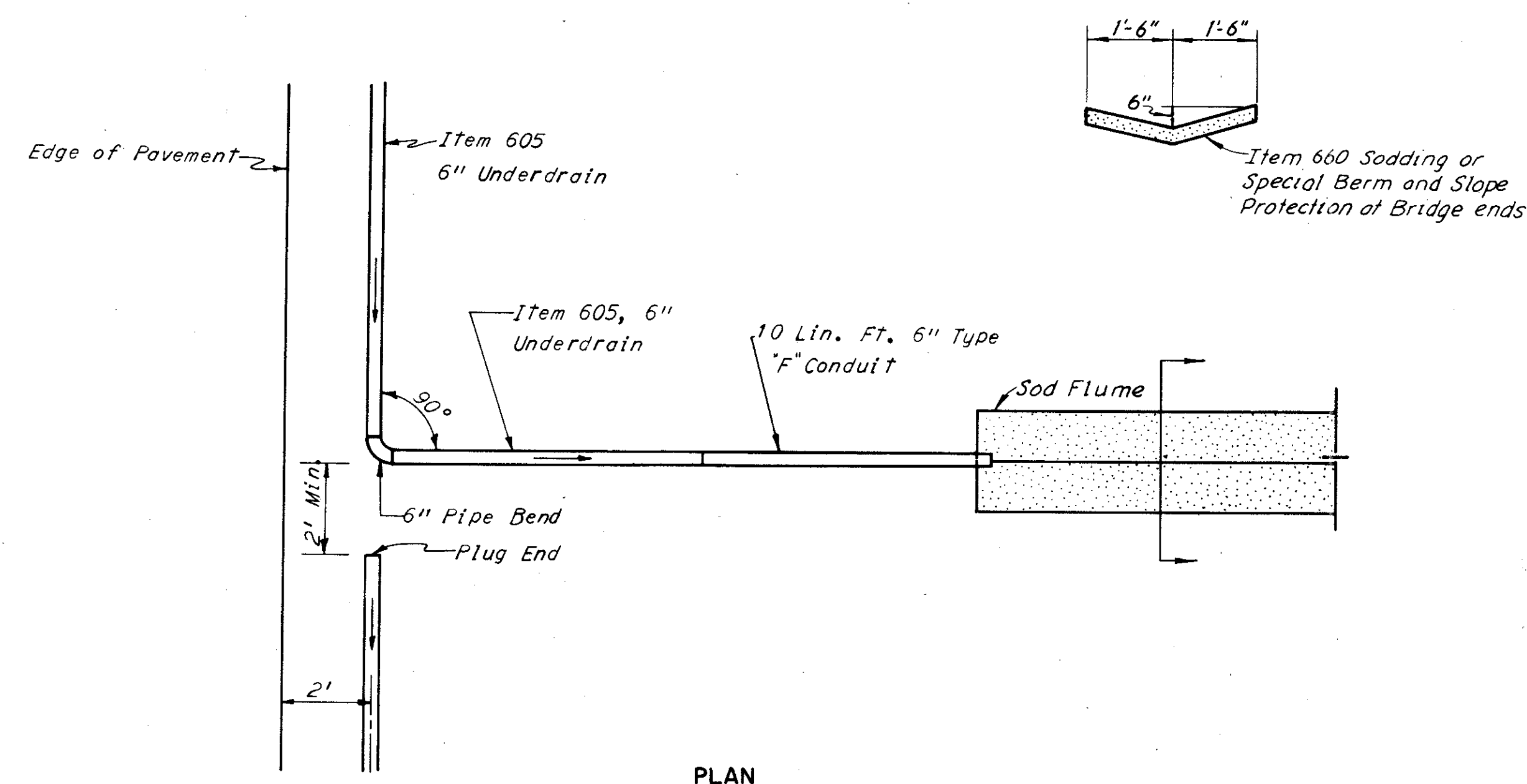
**LEGEND**

- E.O.P.-Edge of Pavement or Paved Shoulder
- N.G.-Normal Gutter Elevation at Face of Curb
- T/G-Top of Catch Basin Grate Elevation
- T/C-Top of Manhole Cover Elevation

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

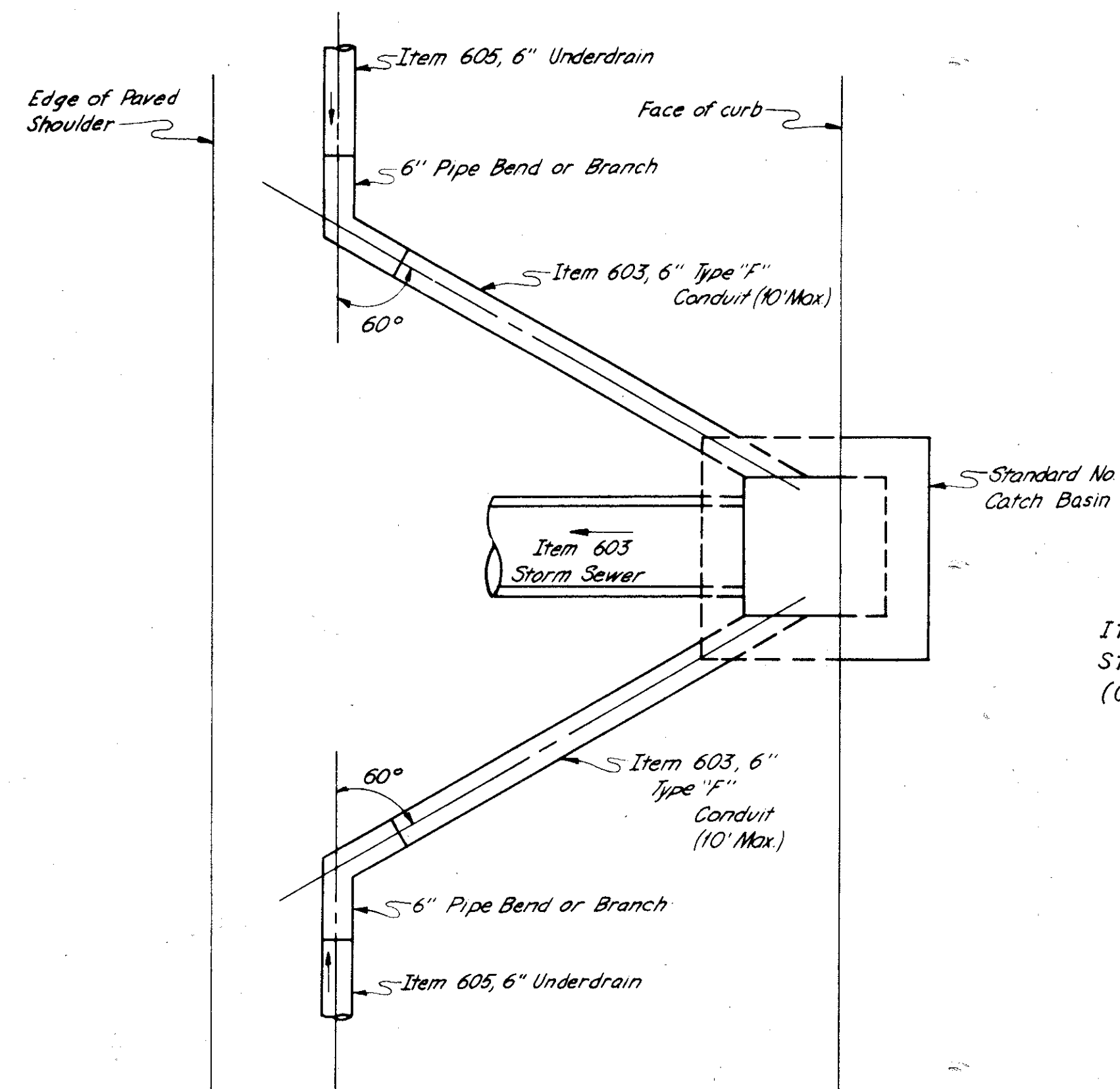
100  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

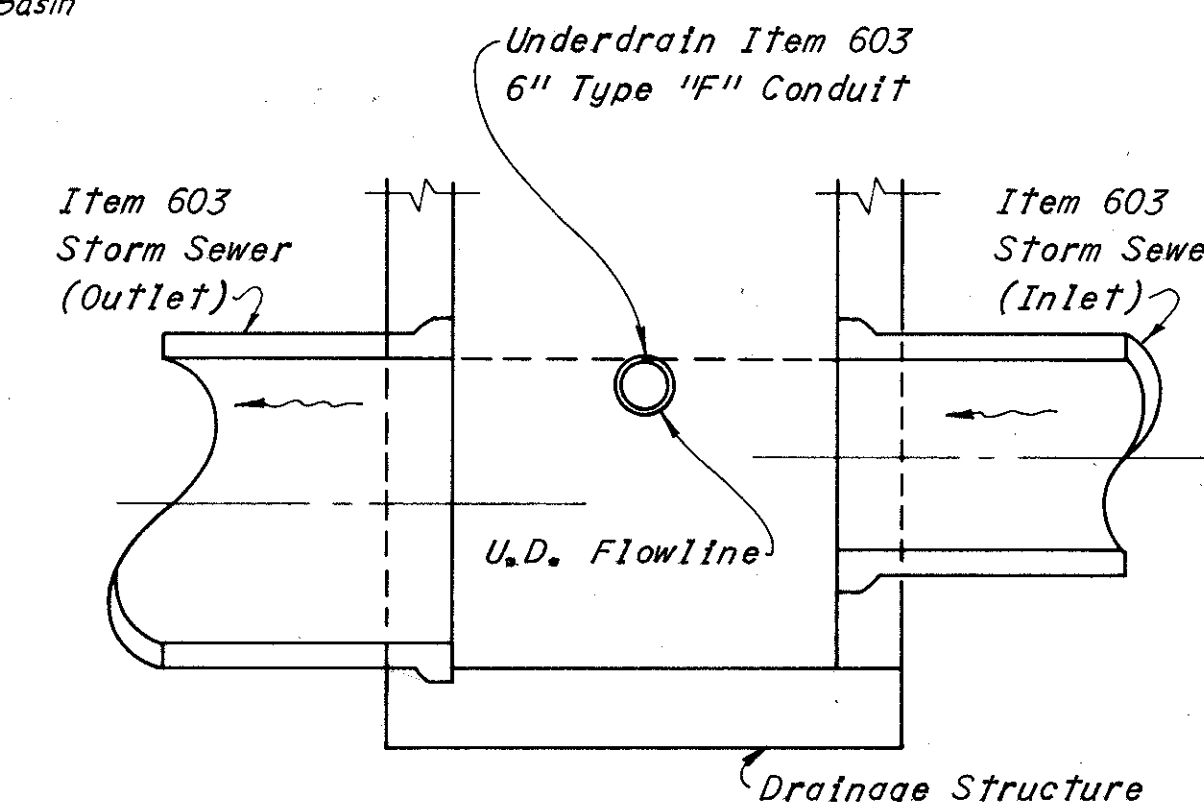


PLAN

UNDERDRAIN OUTLET IN FILL

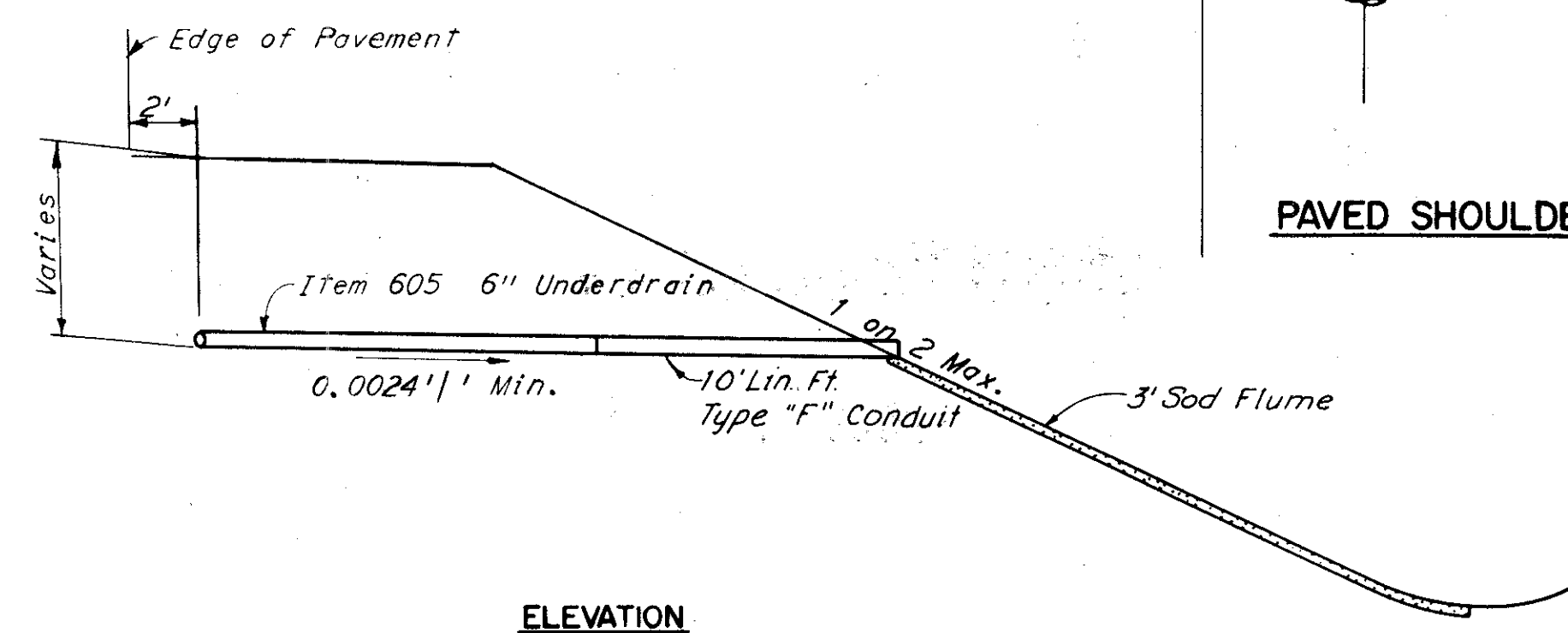


PAVED SHOULDER LOW POINT



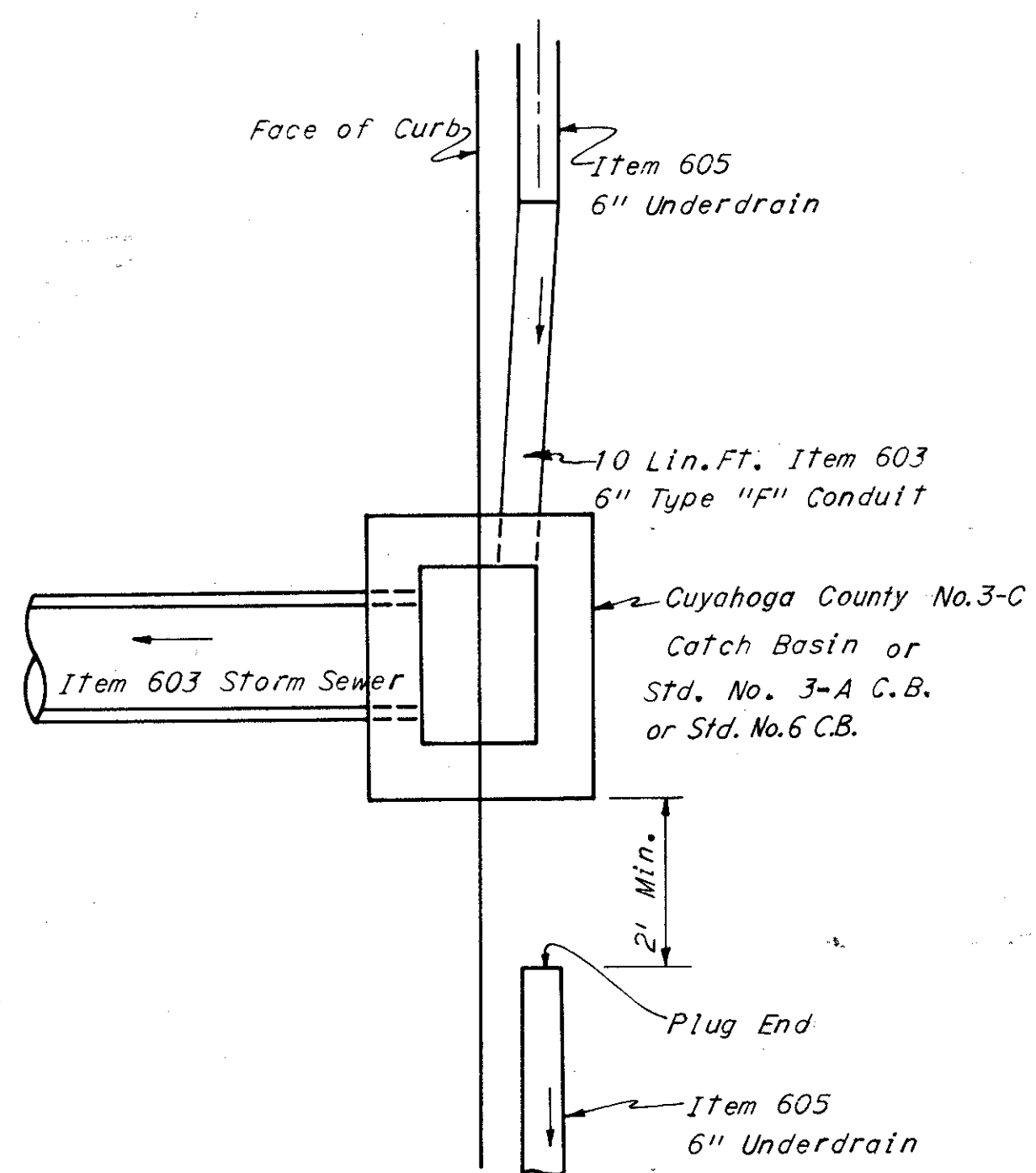
ELEVATION

FLOWLINES AT STRUCTURES (TYPICAL)

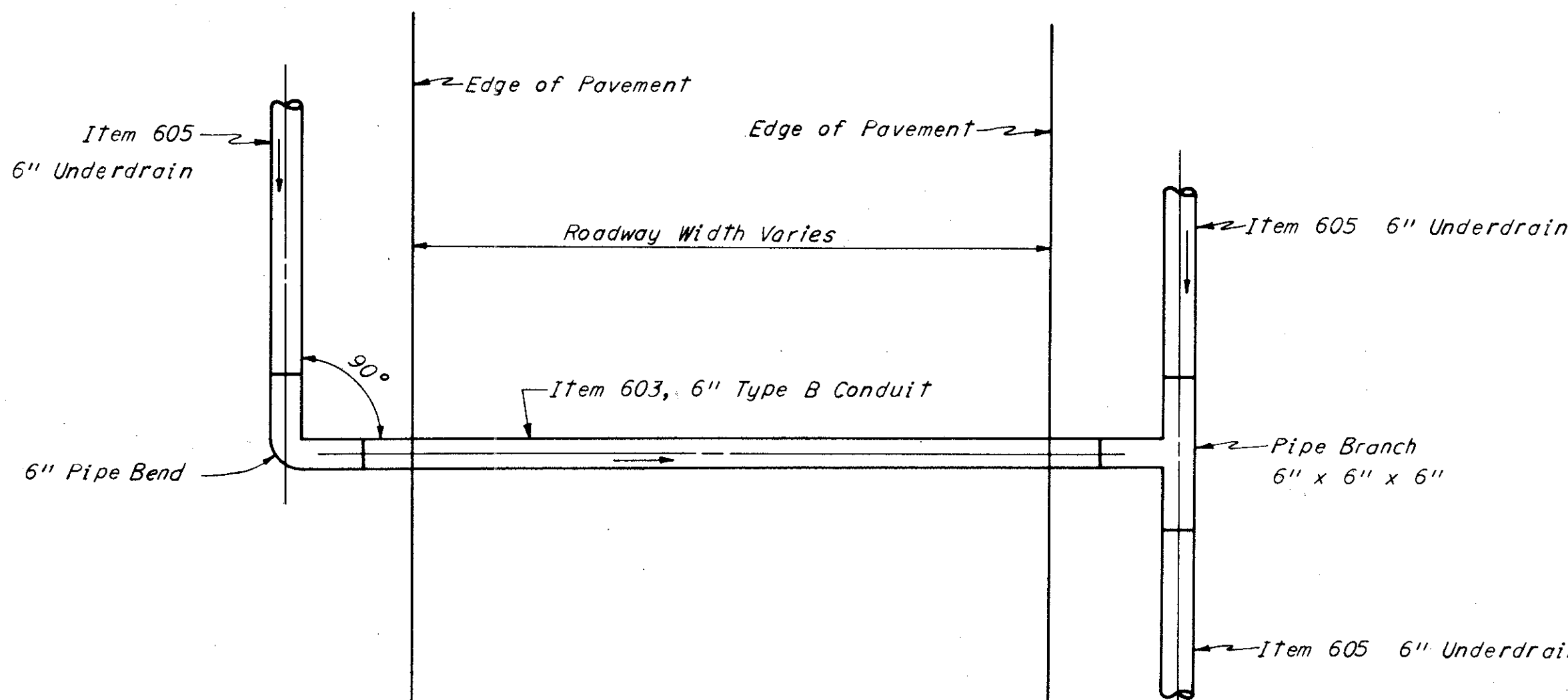


ELEVATION

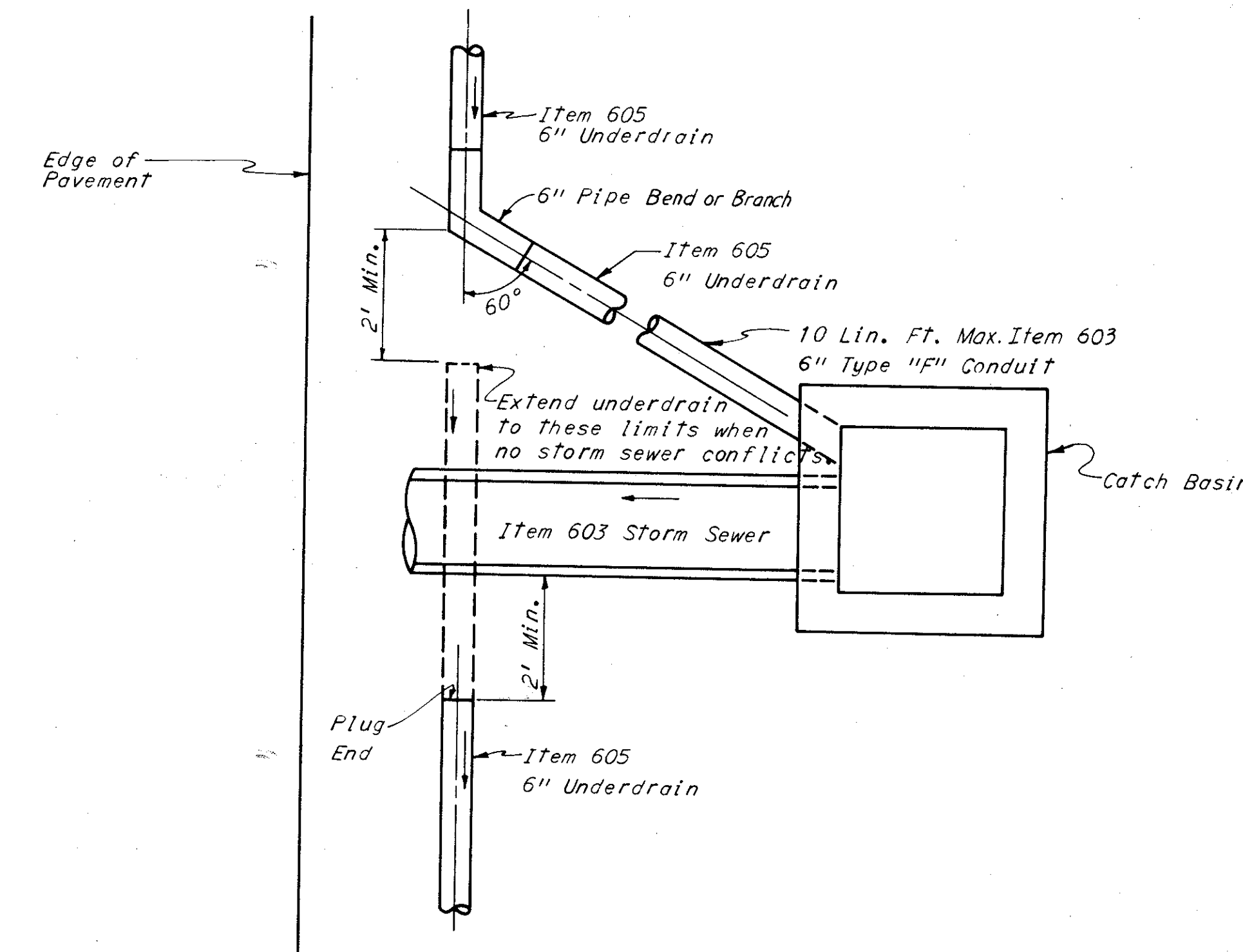
UNDERDRAIN OUTLET IN FILL



UNDERDRAIN TO CATCH BASIN AT CURB



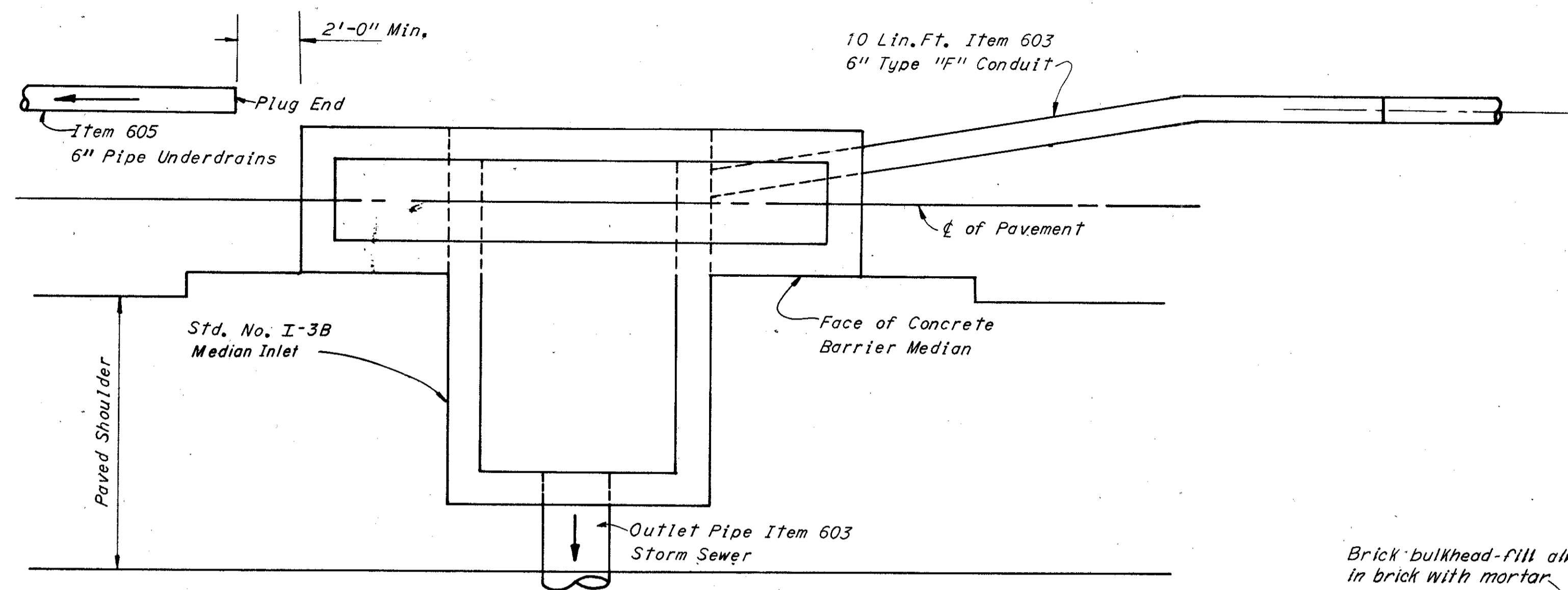
UNDERDRAIN CROSSING ROADWAY



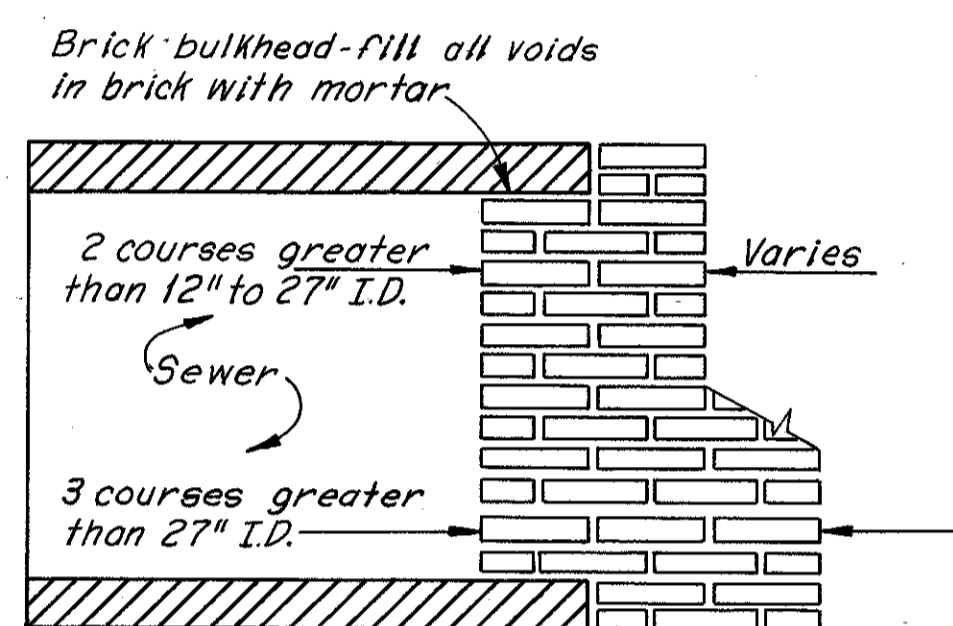
UNDERDRAIN TO DRAINAGE STRUCTURES

SCALE *Not to Scale* HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE I.M. DATE 6-2-69 CONSULTING ENGINEERS  
 TRCD I.M. DATE 6-3-69  
 CND. F.R.A. DATE 8-10-69 KANSAS CITY CLEVELAND NEW YORK



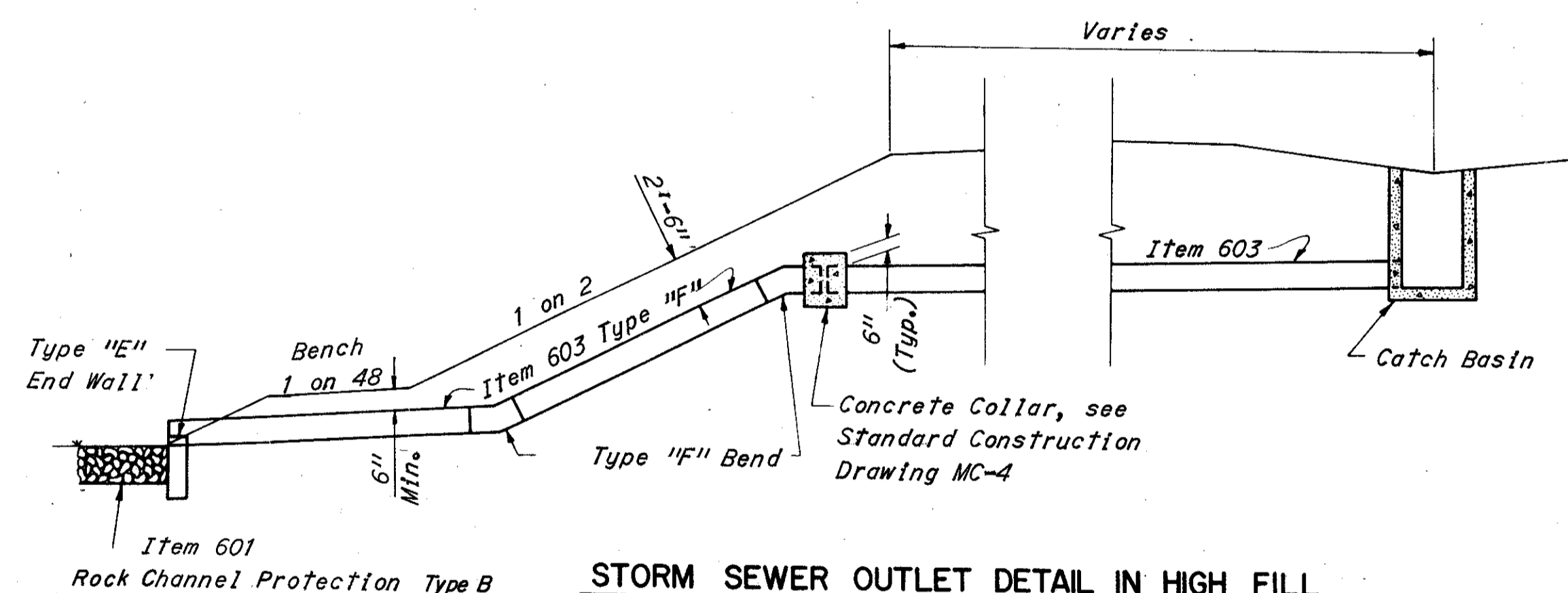


**MEDIAN INLET ON GRADE**

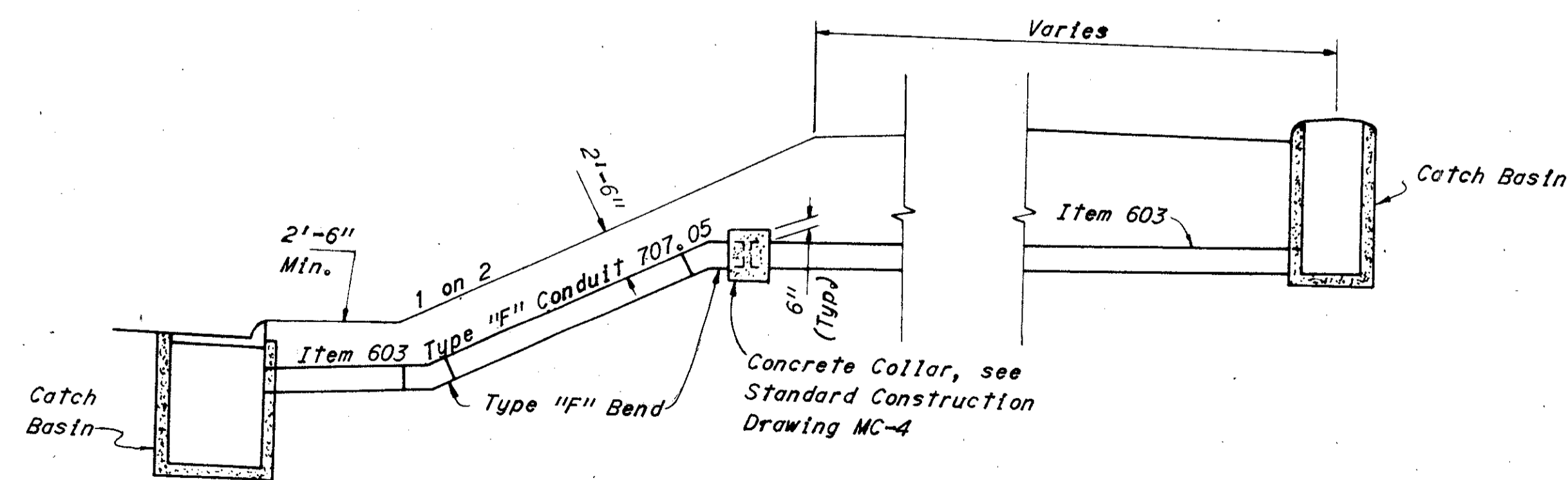


Payment for pipe bulkhead shall be included in pertinent 603 Item

**PIPE BULKHEADS**

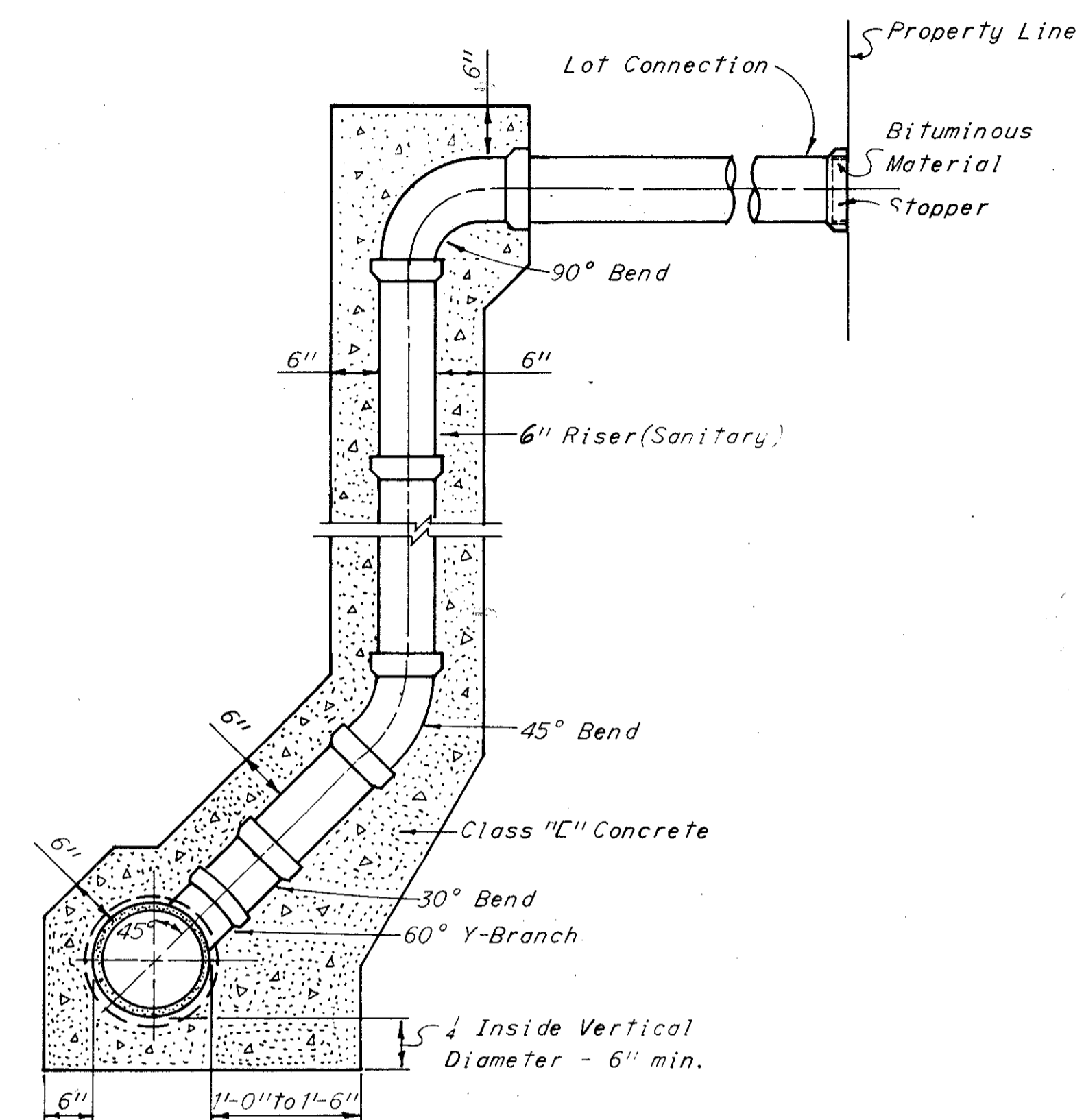


**STORM SEWER OUTLET DETAIL IN HIGH FILL**



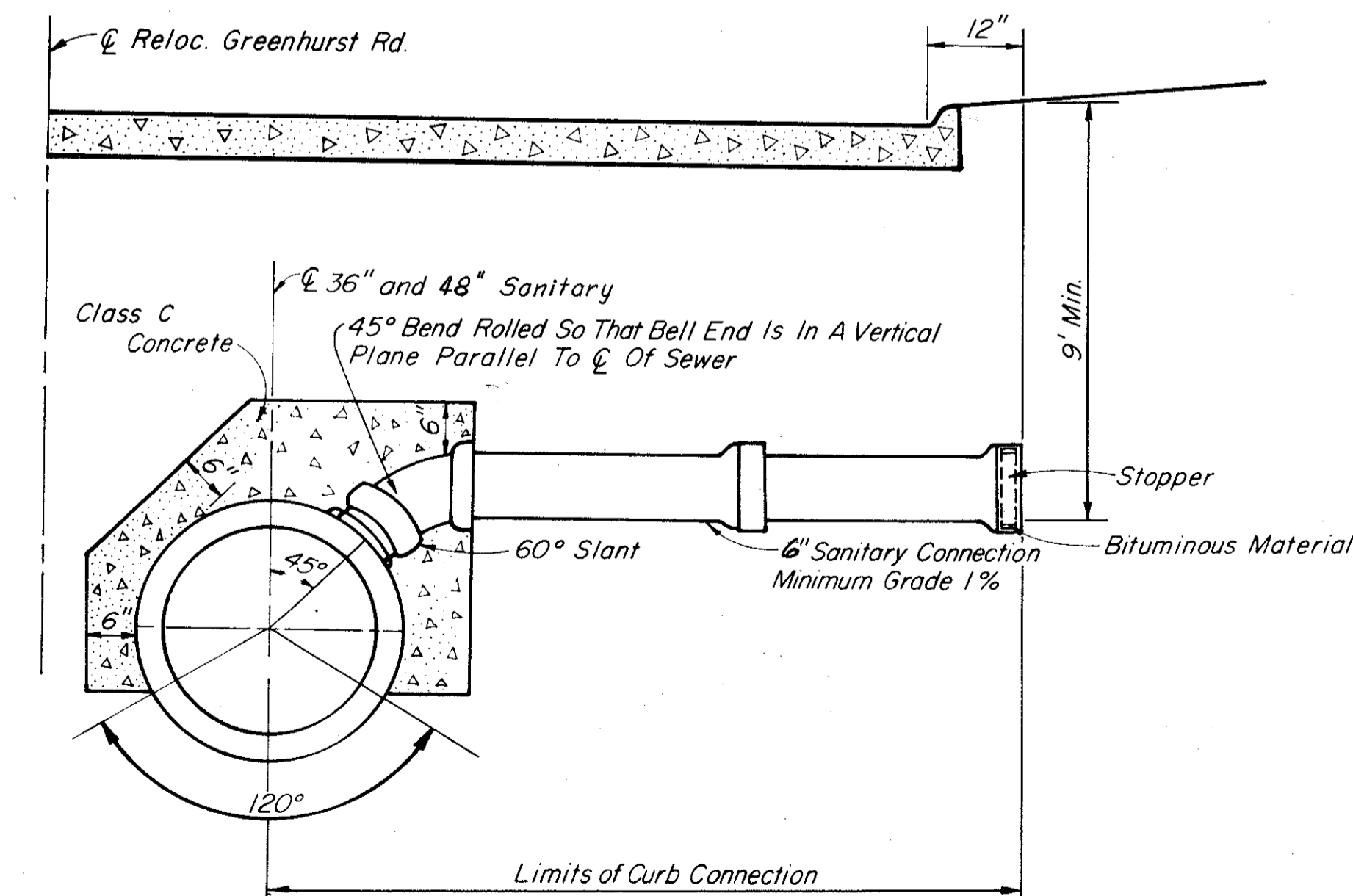
**STORM SEWER DETAIL CLOSED SYSTEM HIGH FILL OUTLET**

No Scale



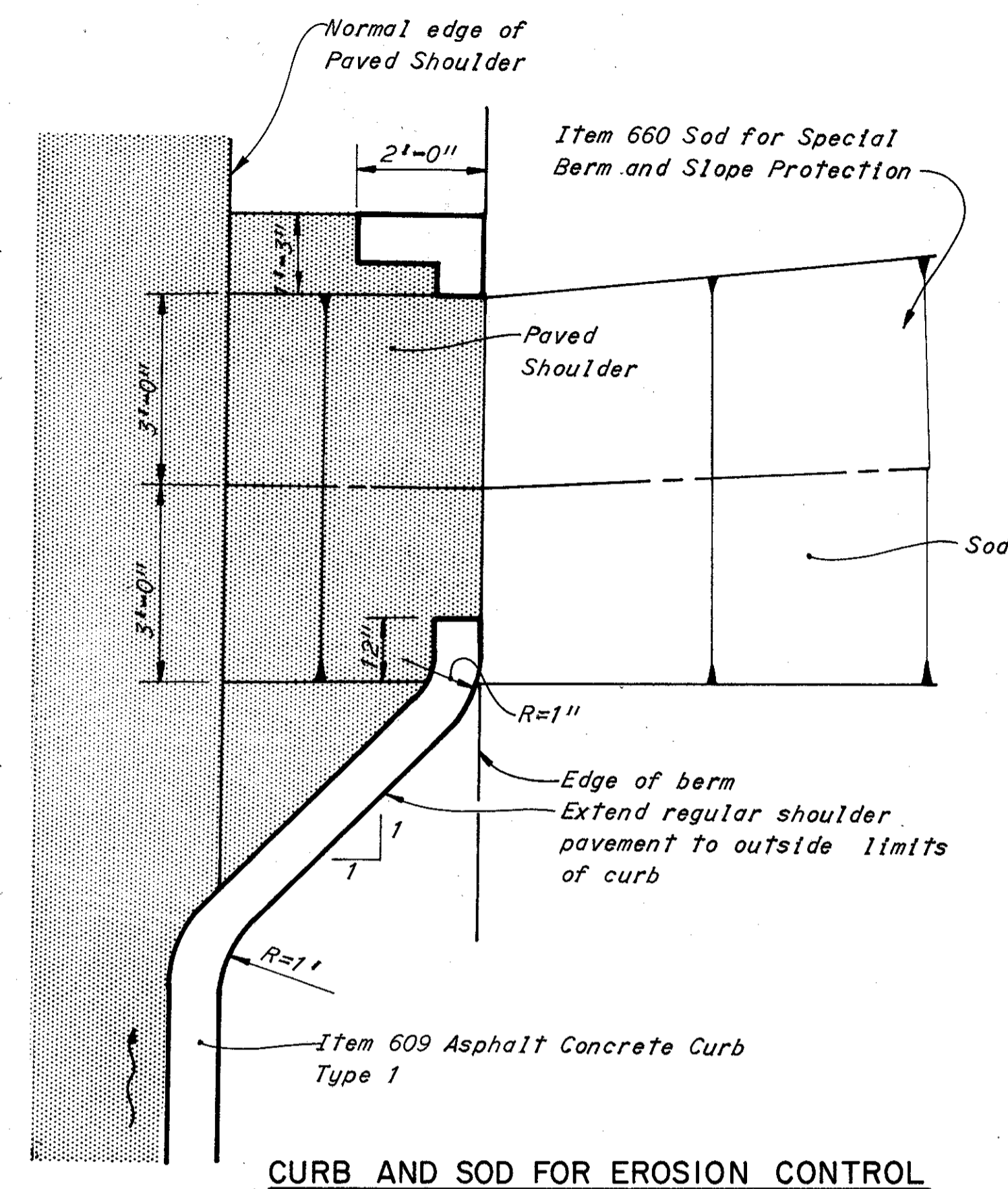
**TYPICAL Y-BRANCH AND RISER DETAIL**

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

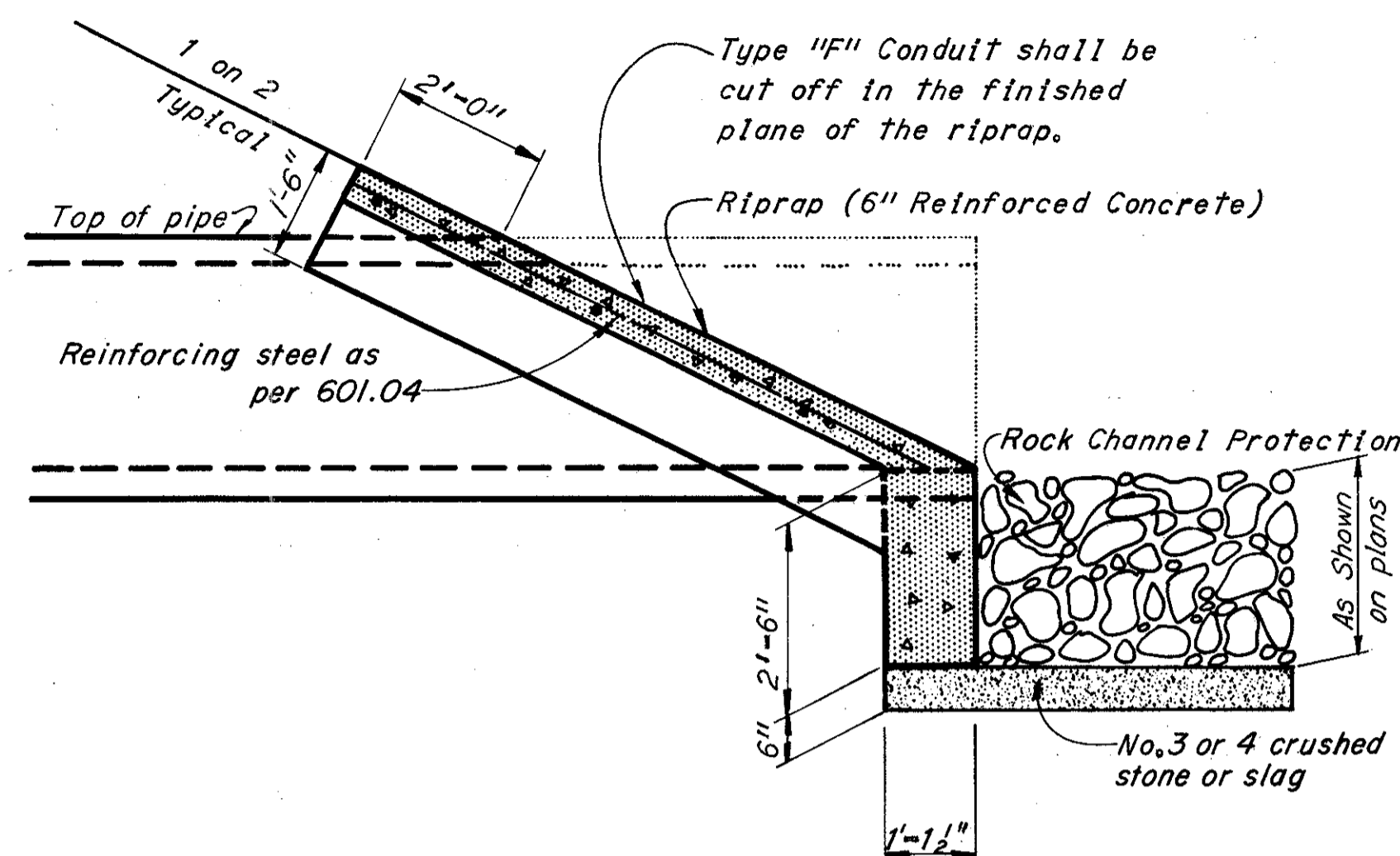


**DETAIL OF CURB CONNECTIONS TO 36" AND 48" SANITARY SEWER  
RELOCATED GREENHURST ROAD**

Note: 6" Class 200 Cast Iron Water Main pipe is required for all bored sewer service connections including slip-on rubber joints with an A.S.A. thickness classification No. 25.

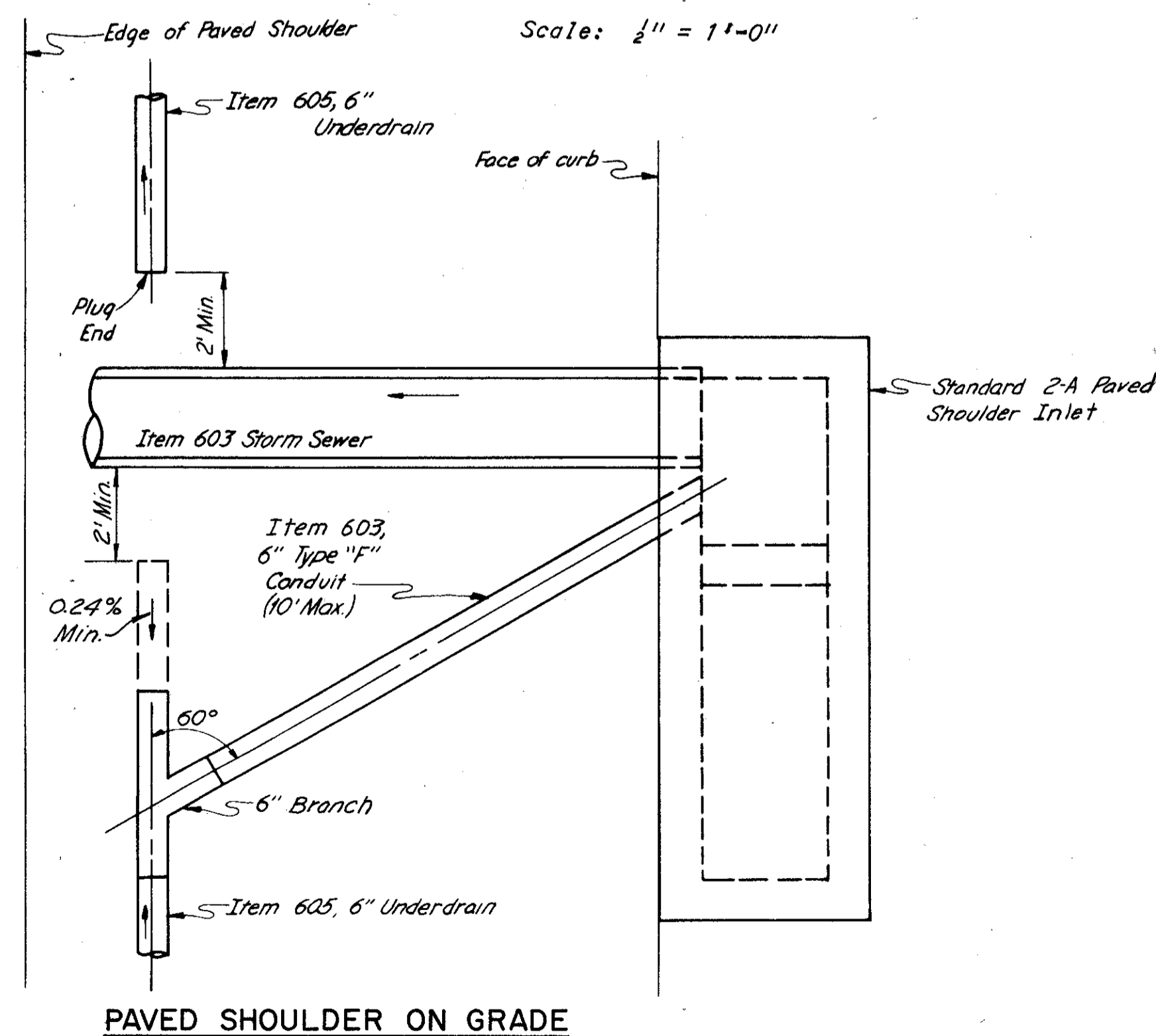
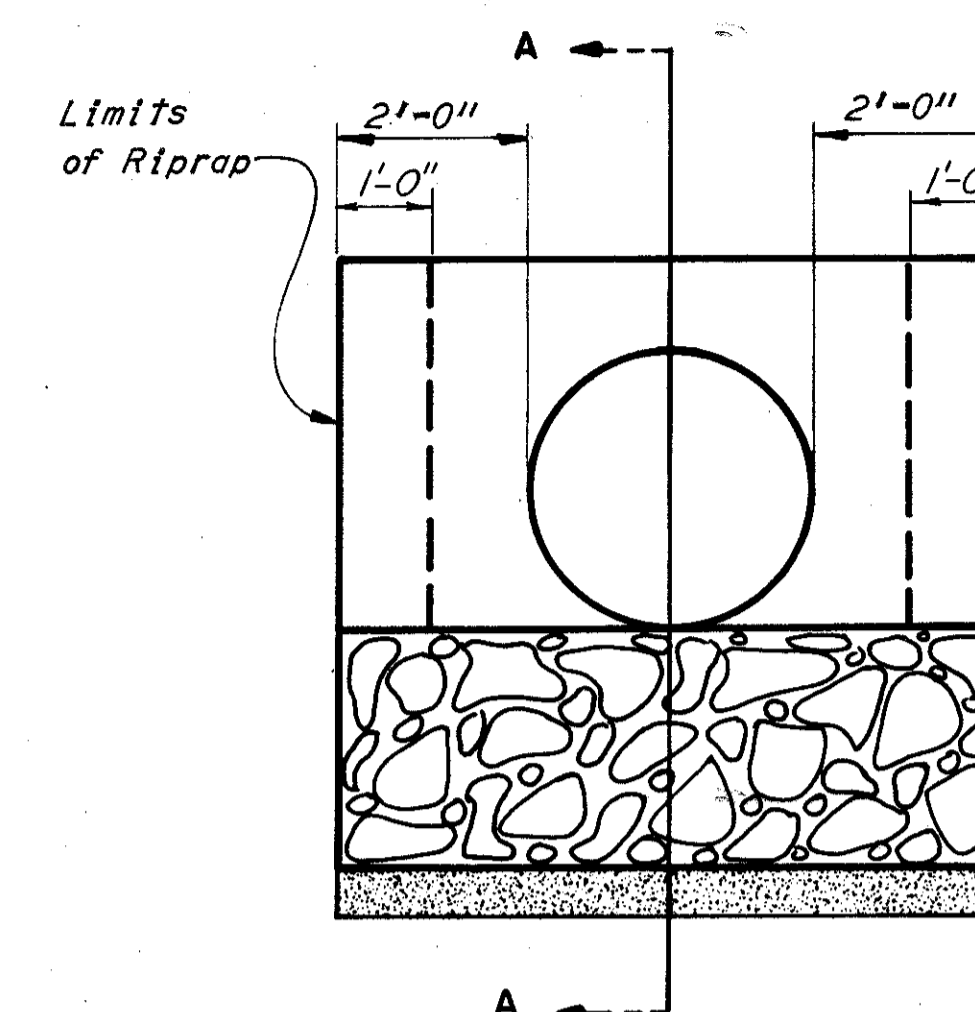


**CURB AND SOD FOR EROSION CONTROL**

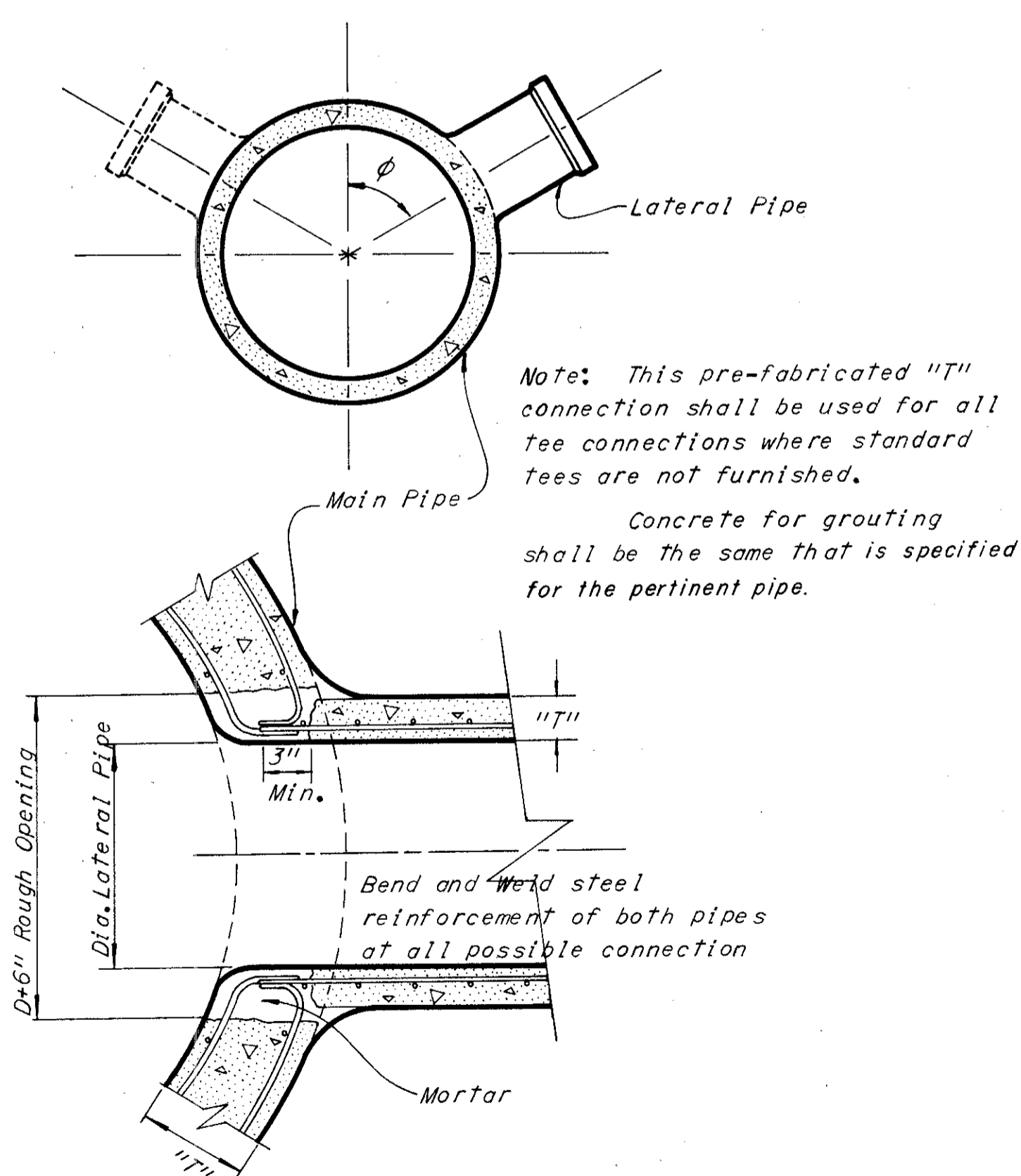


**SECTION A-A**

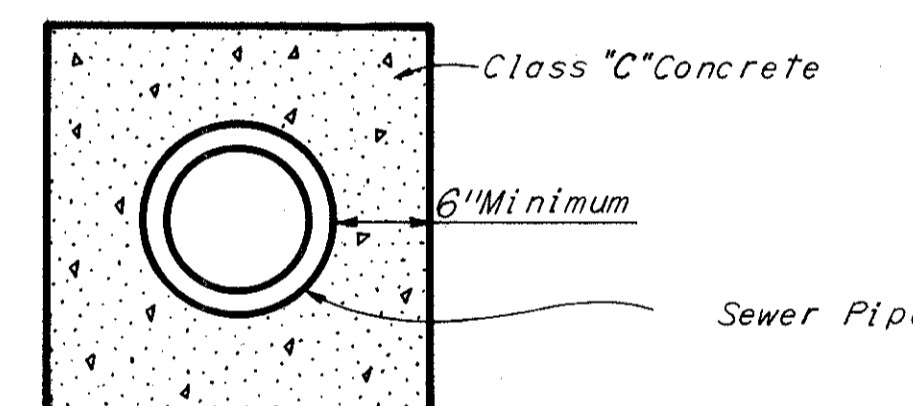
**STORM SEWER OUTLET DETAIL**  
Scale: 1/2" = 1'



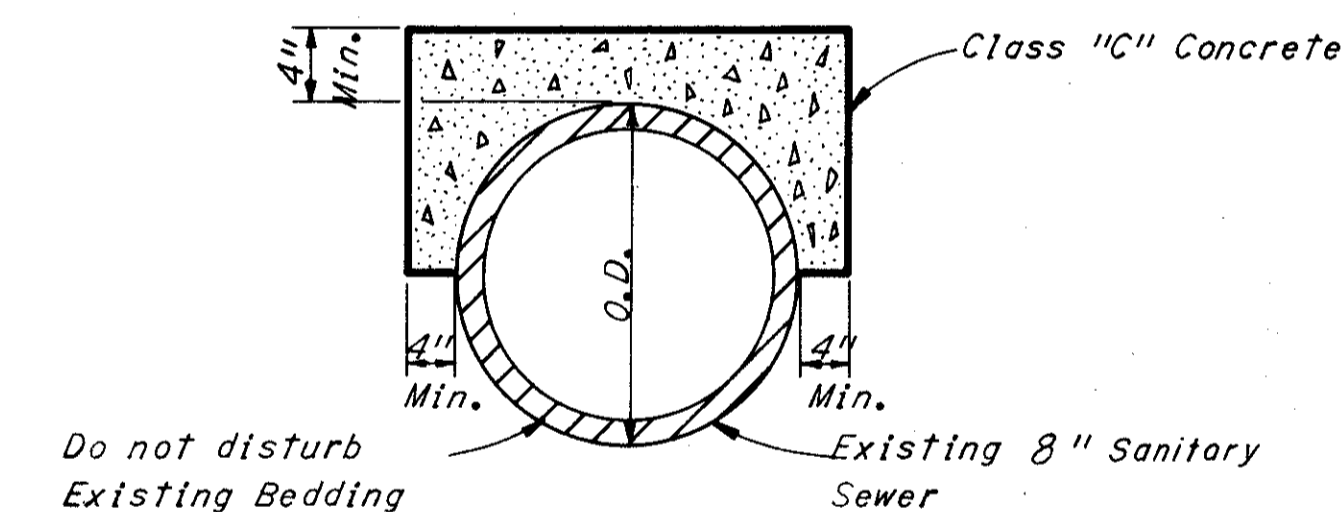
**PAVED SHOULDER ON GRADE**



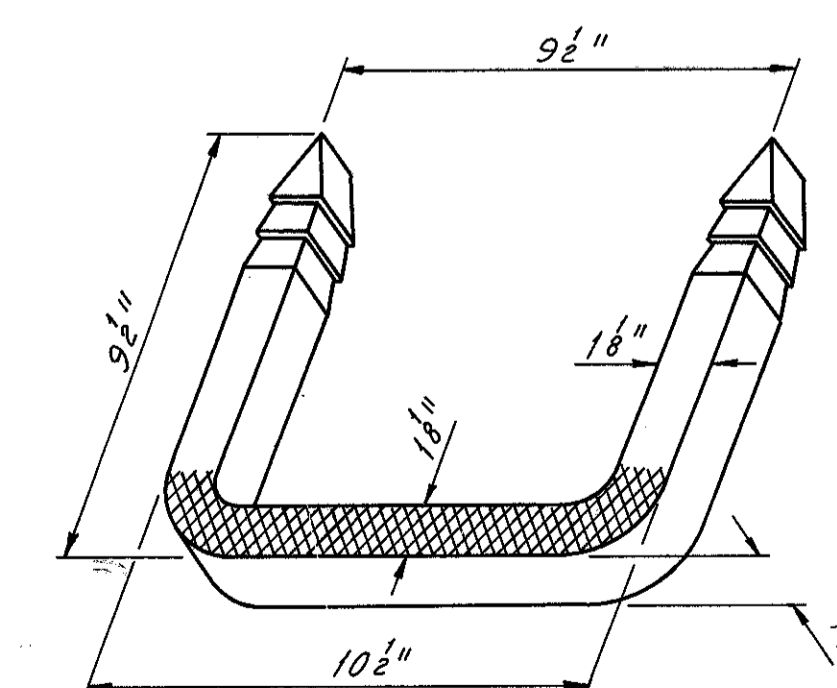
**PRE-FABRICATED "T" CONNECTION**



**SEWER PIPE ENCASEMENT**

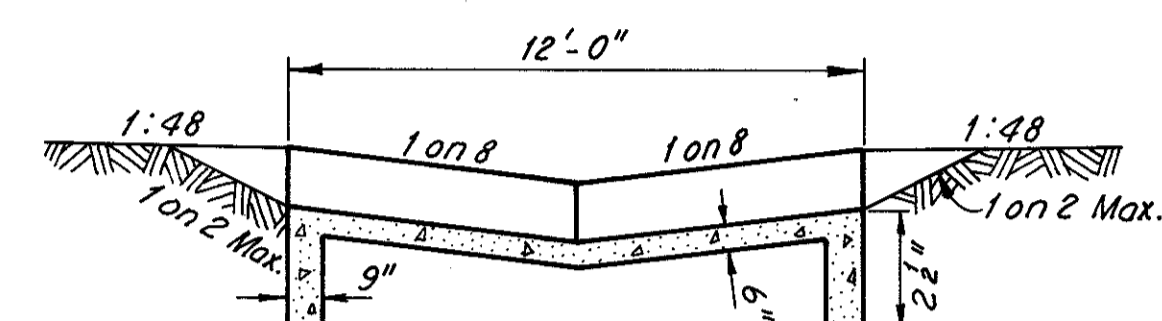


**ARCH ENCASEMENT DETAIL (S-7)**

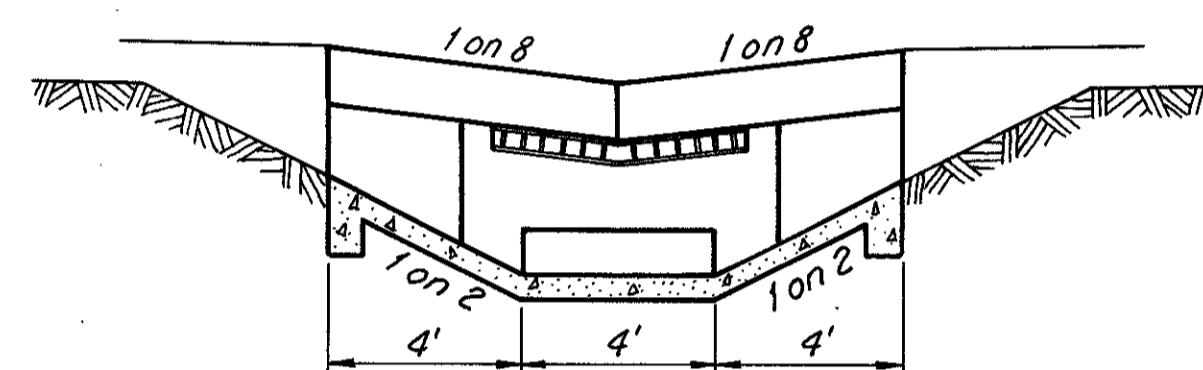


Neenah or Equal Cast Iron Step: R-1981-Z

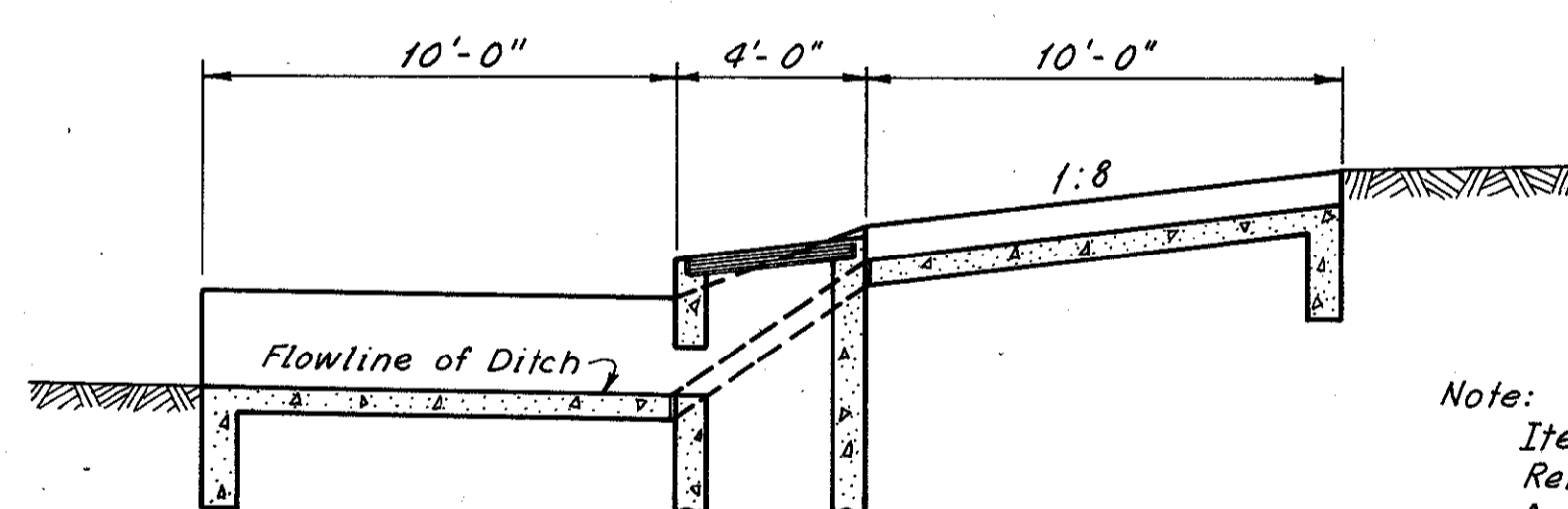
**CAST IRON MANHOLE STEP**  
Scale: 3/4" = 1'-0"



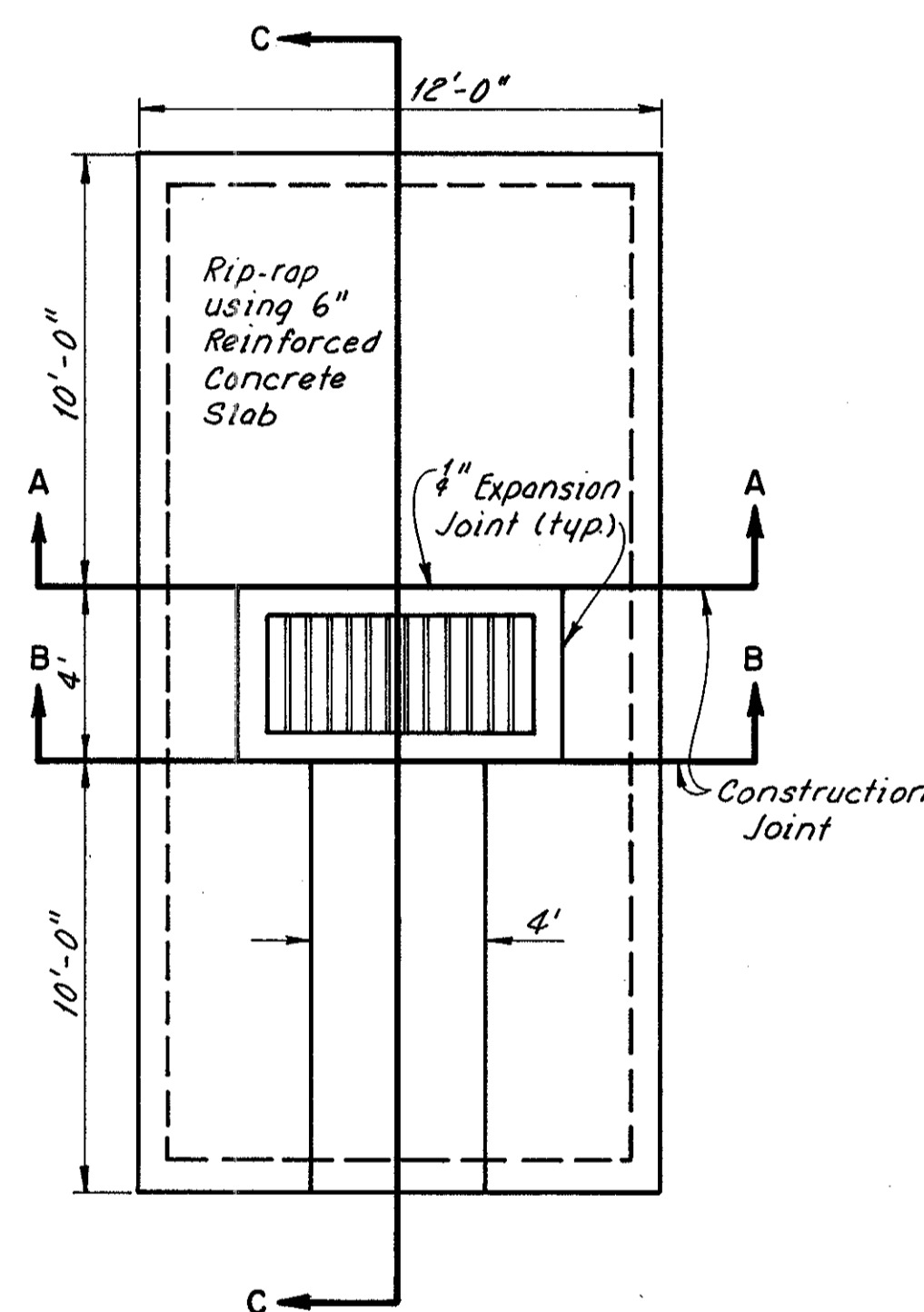
SECTION A-A



SECTION B-B

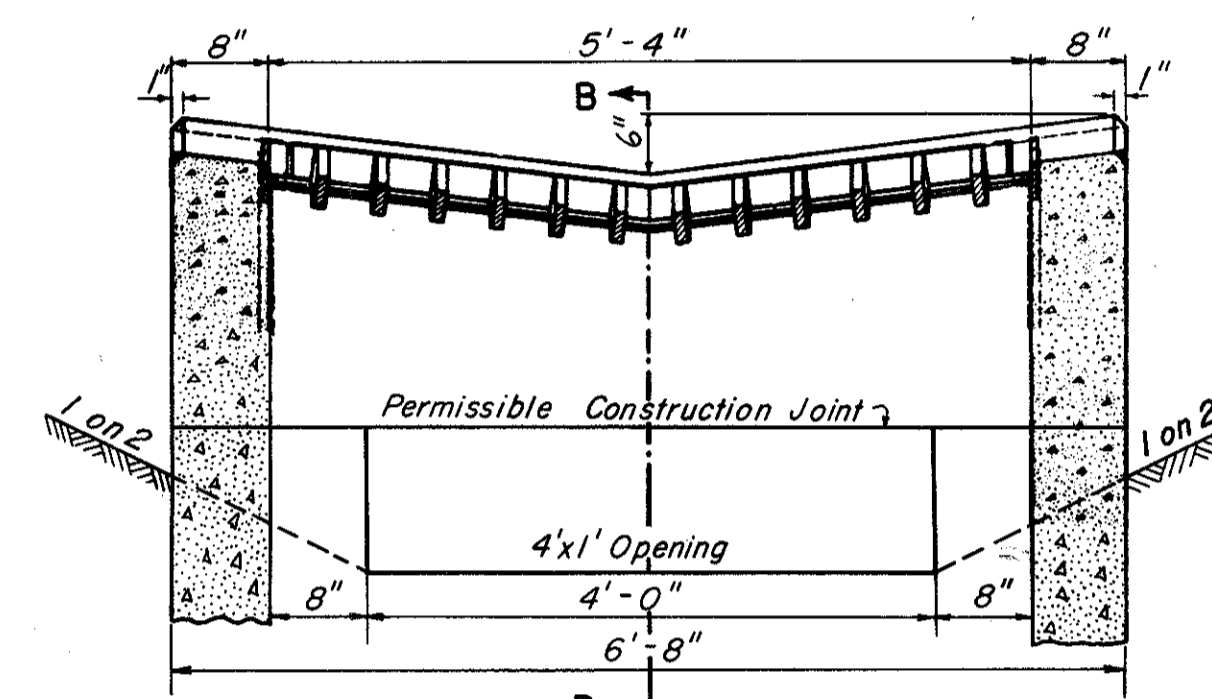


SECTION C-C

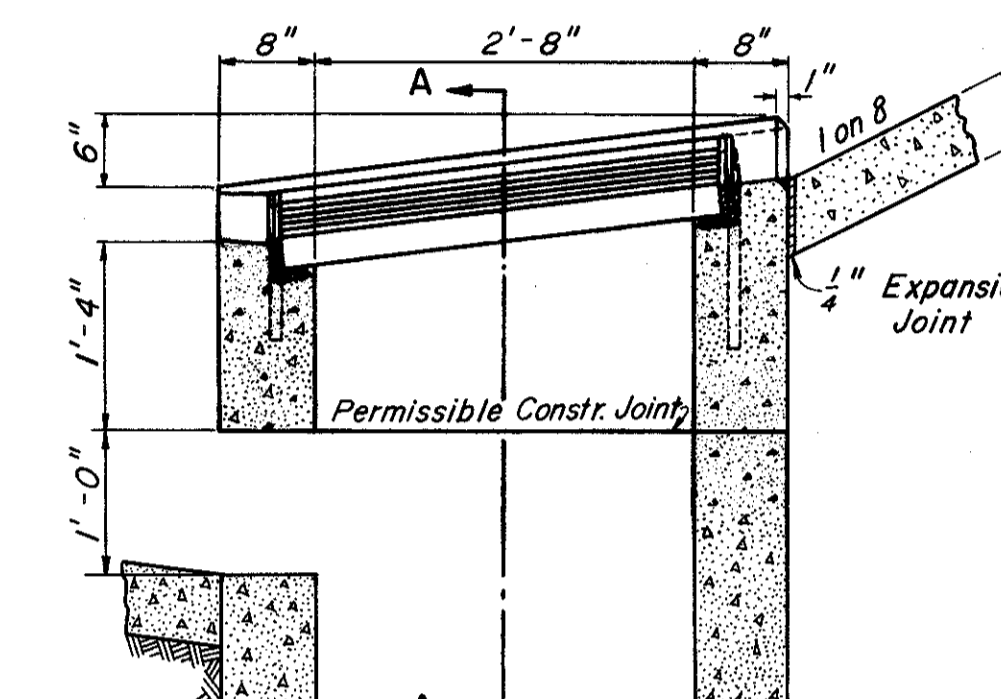


PLAN  
Scale:  $\frac{1}{4}'' = 1'-0''$

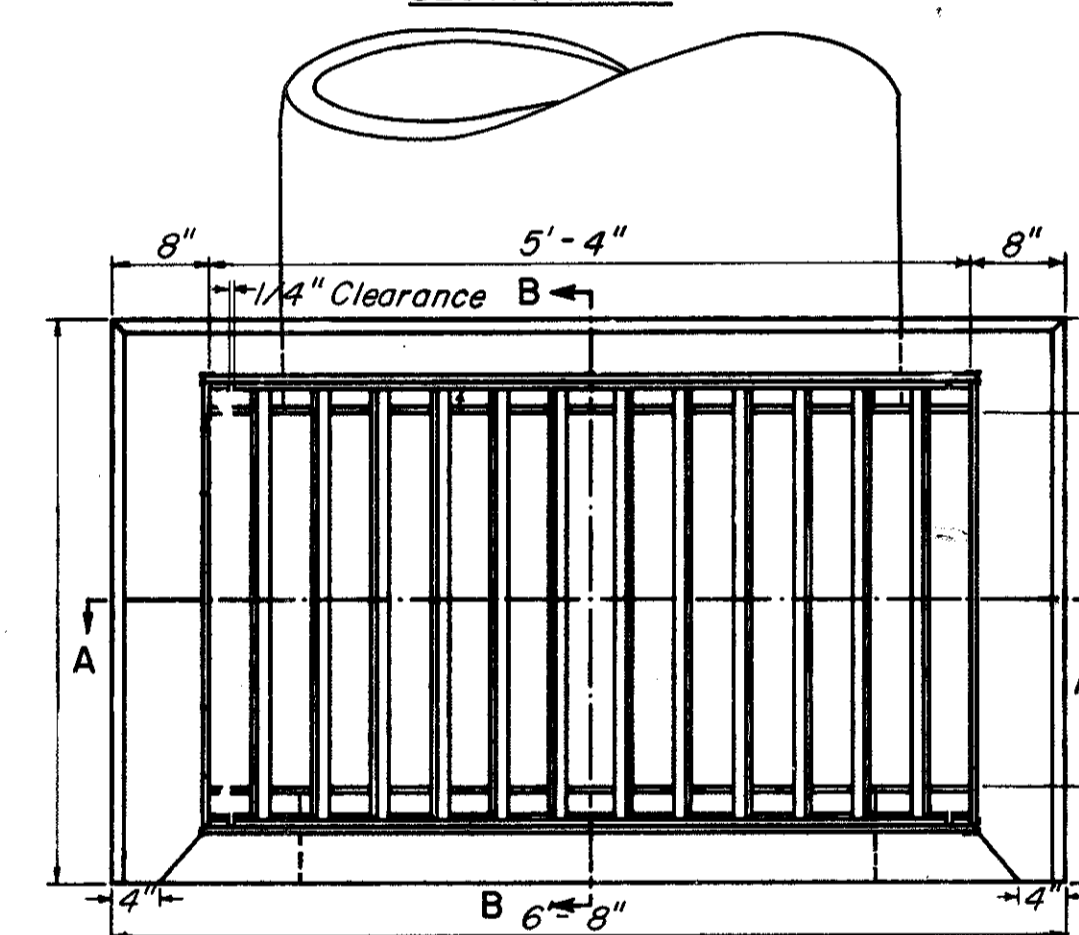
Note:  
Item 601 Rip-rap using 6"  
Reinforced Concrete Slab  
Area = (24x12) - (4x6.66) = 29 Sq. Yds.



SECTION A-A



SECTION B-B



PLAN OF CATCH BASIN

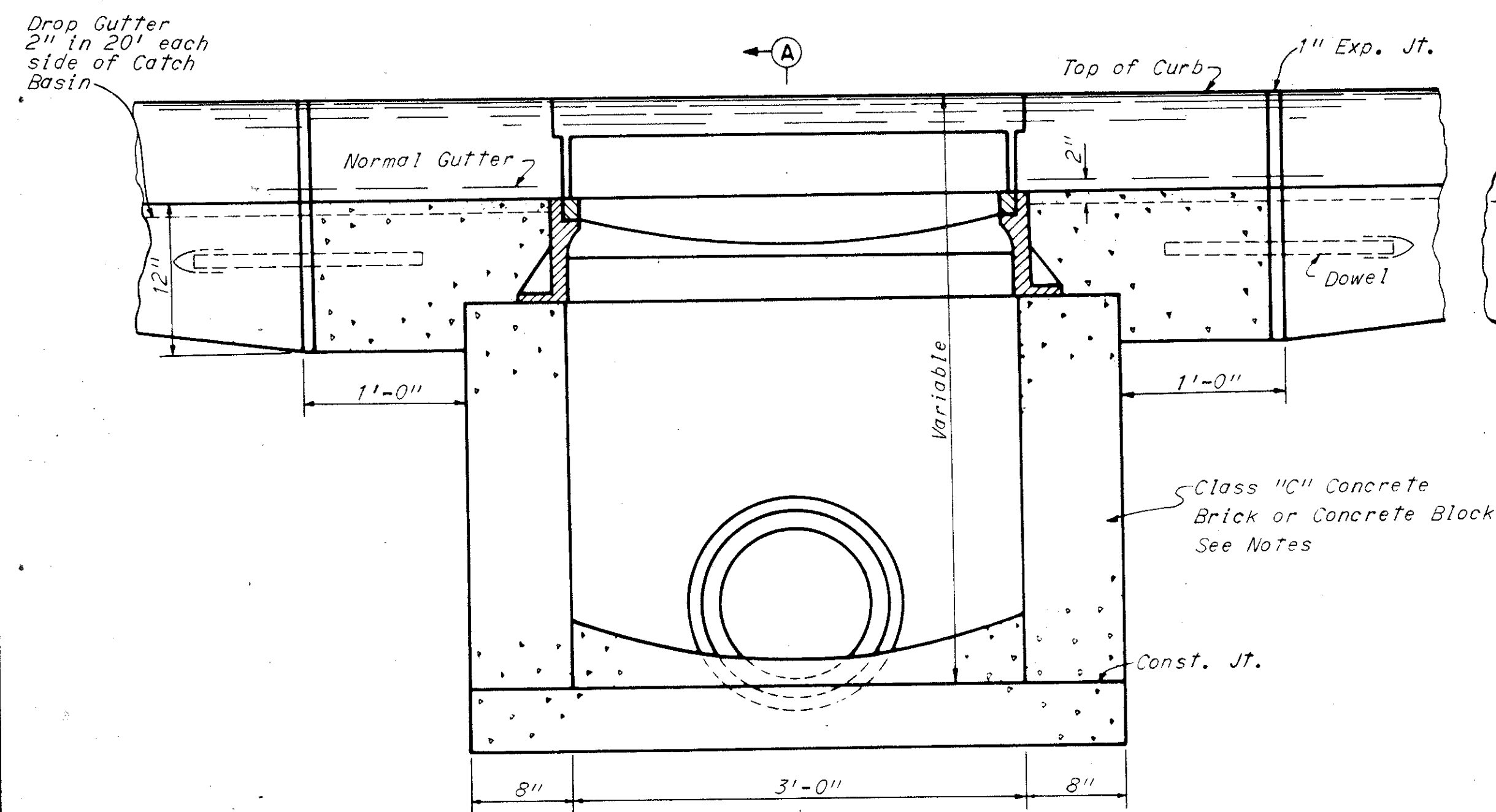
Notes:  
Ditch grading and lining shall be in accordance with the details shown on sheet.  
Brick or Concrete Block may be used in wall construction between the concrete base and the flowline of the window.  
All other notes and details shall be in accordance with Standard Construction Drawing CB-4.

STANDARD NO. 4 CATCH BASIN MODIFIED AS PER PLAN

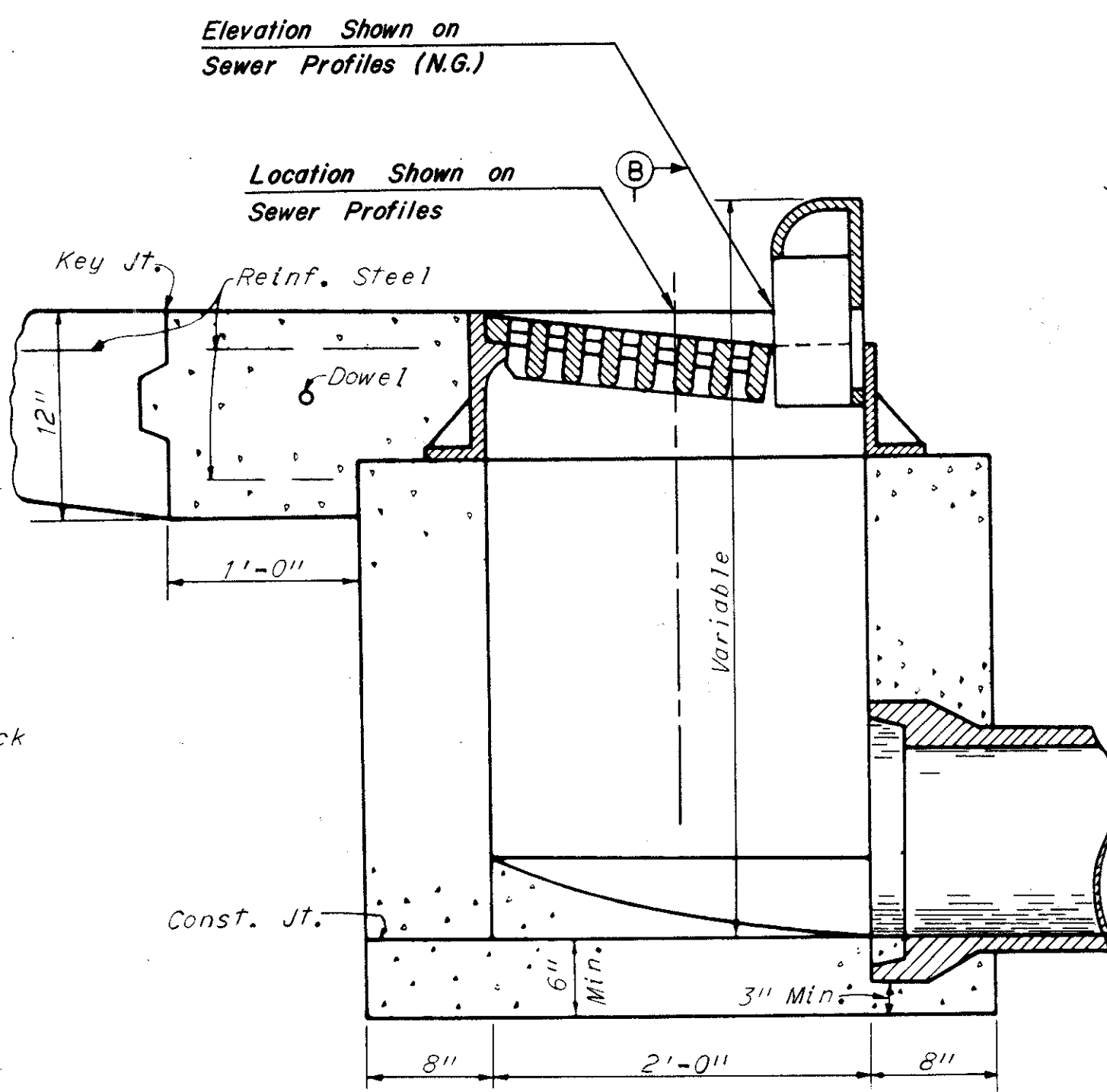
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

104  
390

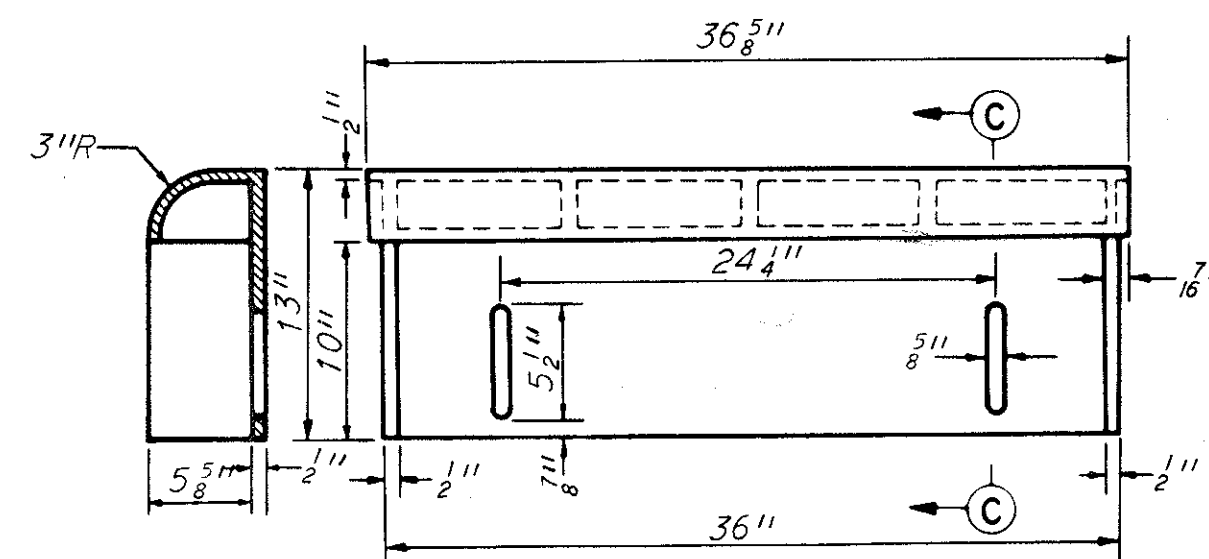
CUYAHOGA COUNTY  
CUY. 480-21.40



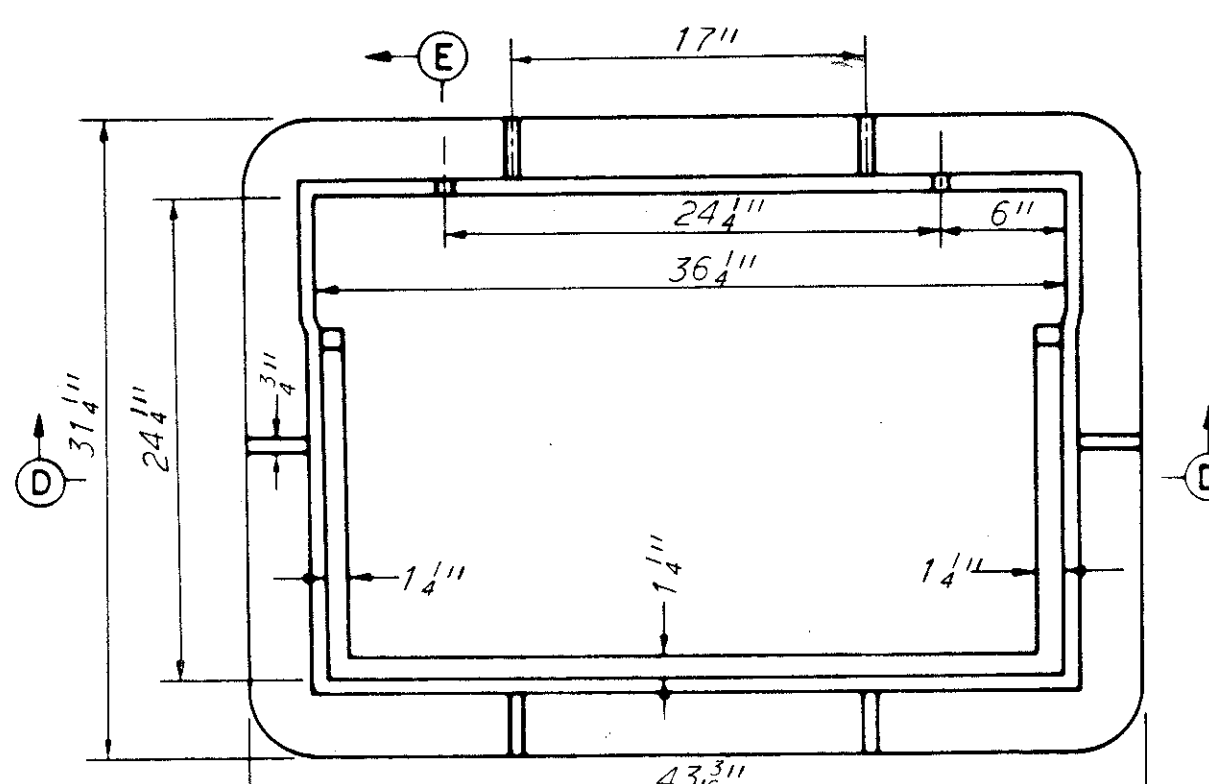
SECTION B-B



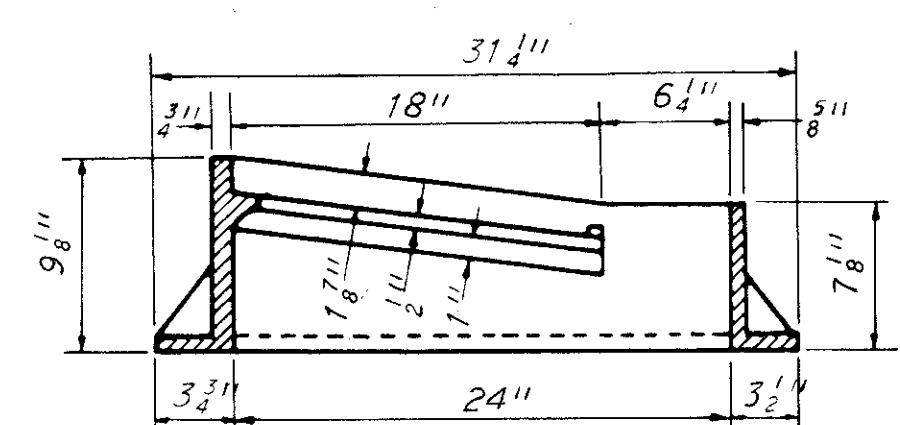
SECTION A-A



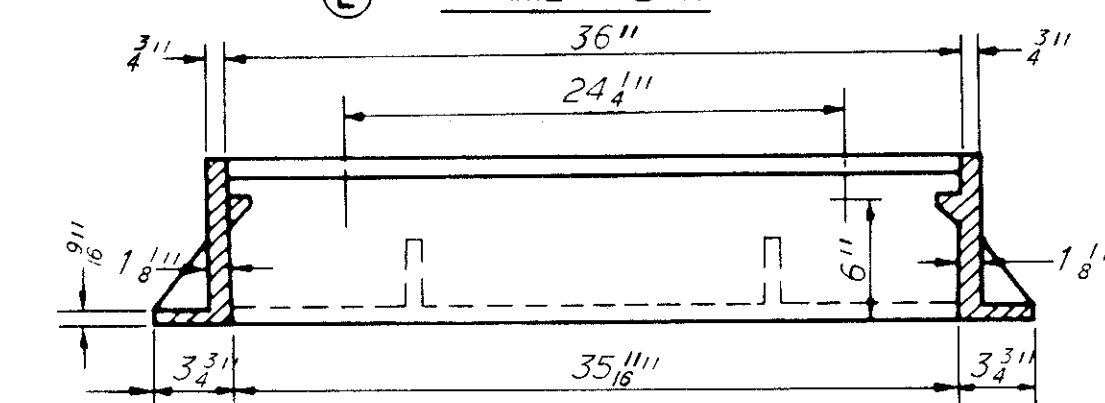
SECTION C-C  
ELEVATION  
RADIUS CURB BOX



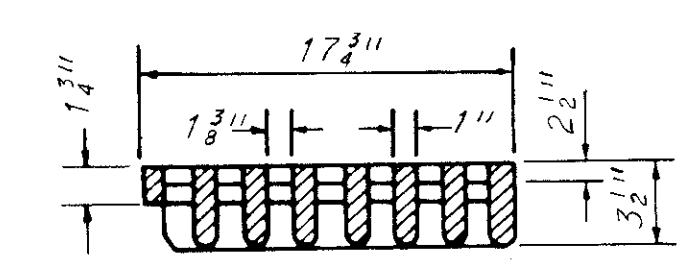
FRAME PLAN



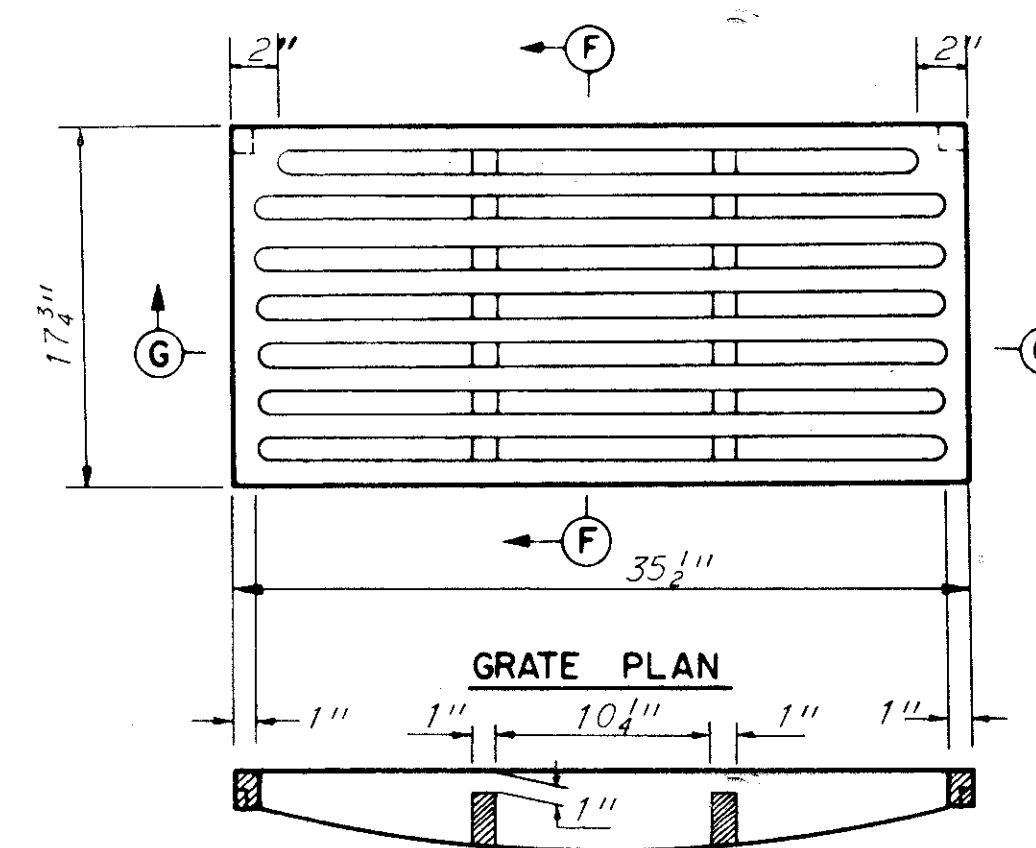
SECTION E-E



SECTION D-D



SECTION F-F



SECTION G-G

Castings shall meet the requirements of Item 604. The design shall be essentially the same and equally as strong as those shown hereon.

Weights, minimum  
 Curb casting 100 pounds  
 Gutter grate 200 pounds  
 Gutter frame 300 pounds

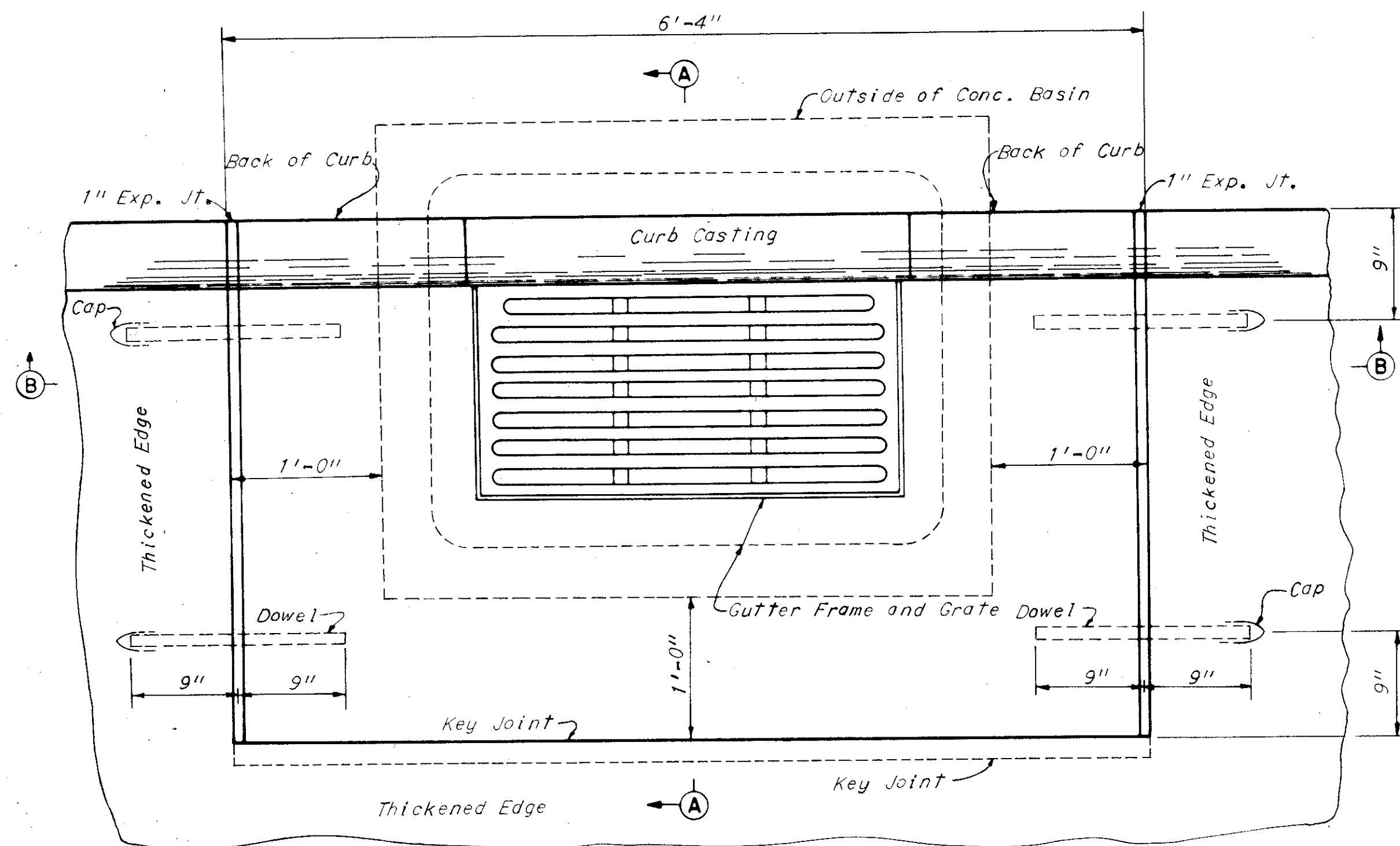
Bearing Areas of frame and grate shall be so fitted and finished as to provide a firm and even seat for all portions of the grate in the frame. No projections shall exist on bearing areas of either casting and the grate shall sit in its frame without rocking. Frame and grate shall be fitted, matched and marked before delivery to the project.

Dowels to be 1 inch round, smooth bars 18 inches long spaced as shown hereon and greased.

Concrete cast in place to be Class "C".  
 Brick or Concrete Block side walls, when used in place of concrete, shall be 8 inches minimum in thickness.

Pavement: The portion blocked out of the pavement shall be placed after the casting has been set but shall be paid for as part of the pavement.

Expansion Joint: The 1" Expansion Material shall be omitted when Asphaltic Concrete Surface is part of the Pavement.



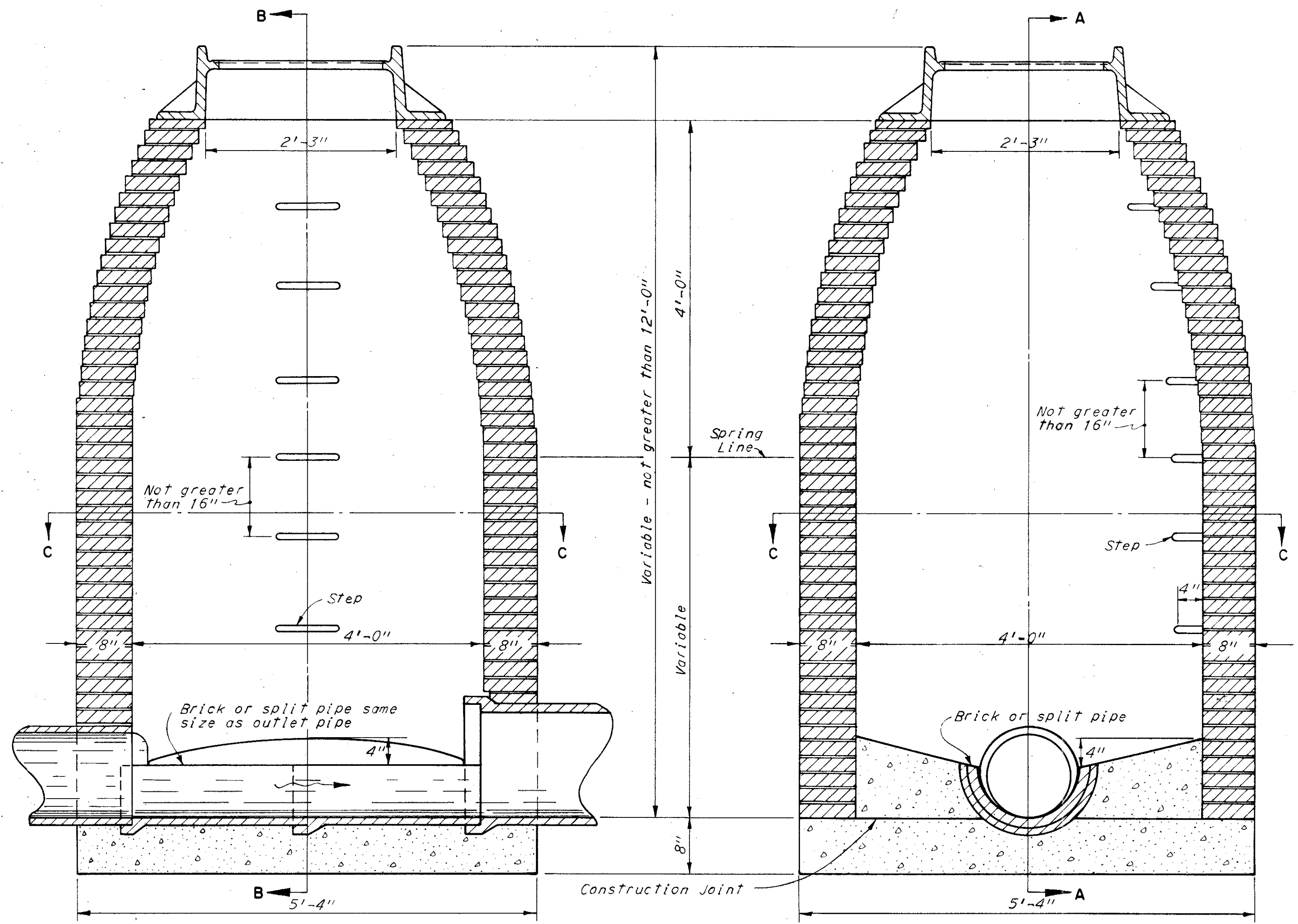
PLAN OF CATCH BASIN & PAVEMENT JOINTS

MADE RJK DATE 12-30-59 TRACED DATE  
 CHECKED I.M. DATE 11-7-68 SCALE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

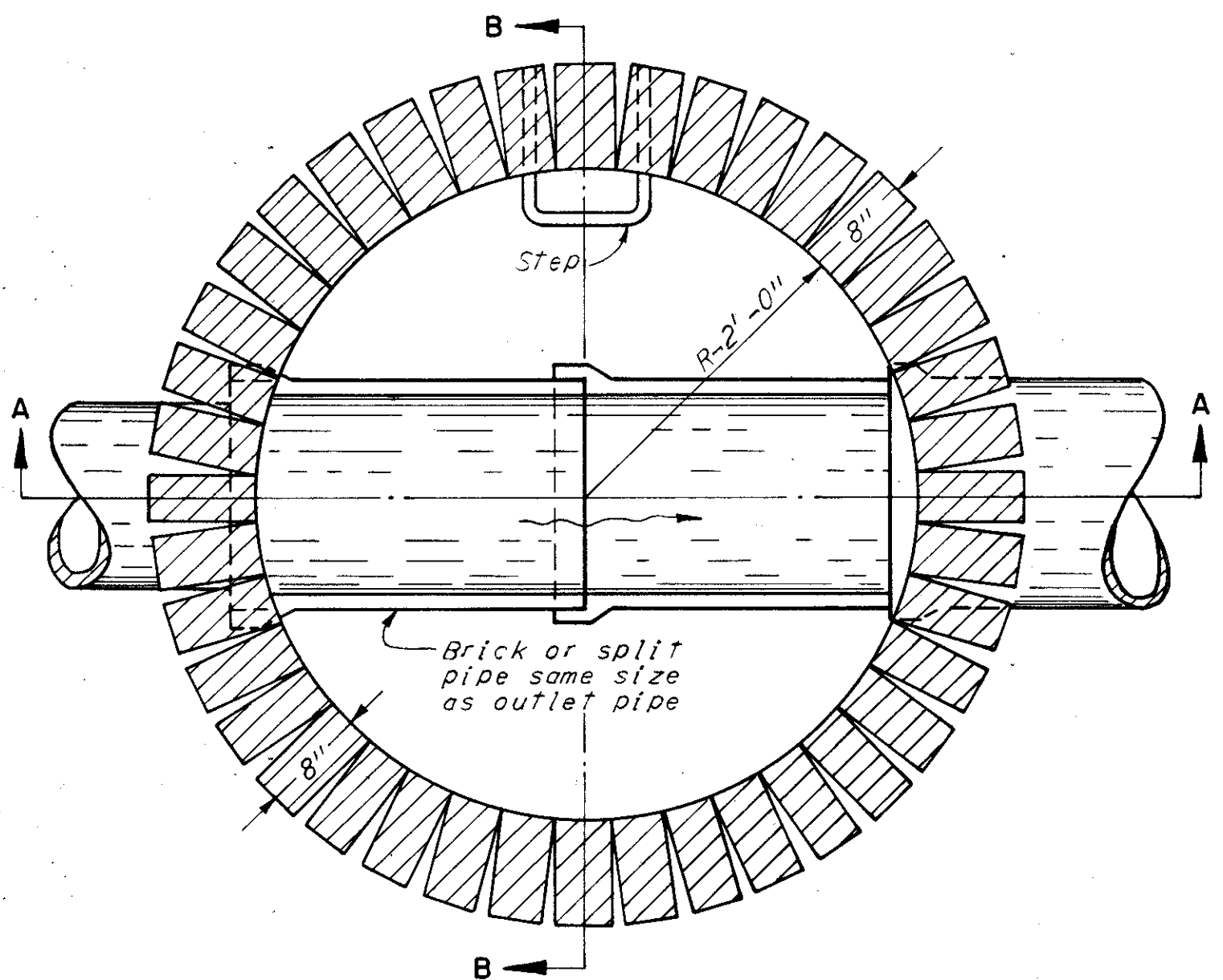
Note: This catch basin is identical with the Cuyahoga County Standard No. 3-C Catch Basin.

CUYAHOGA COUNTY  
CUY-480-21.40

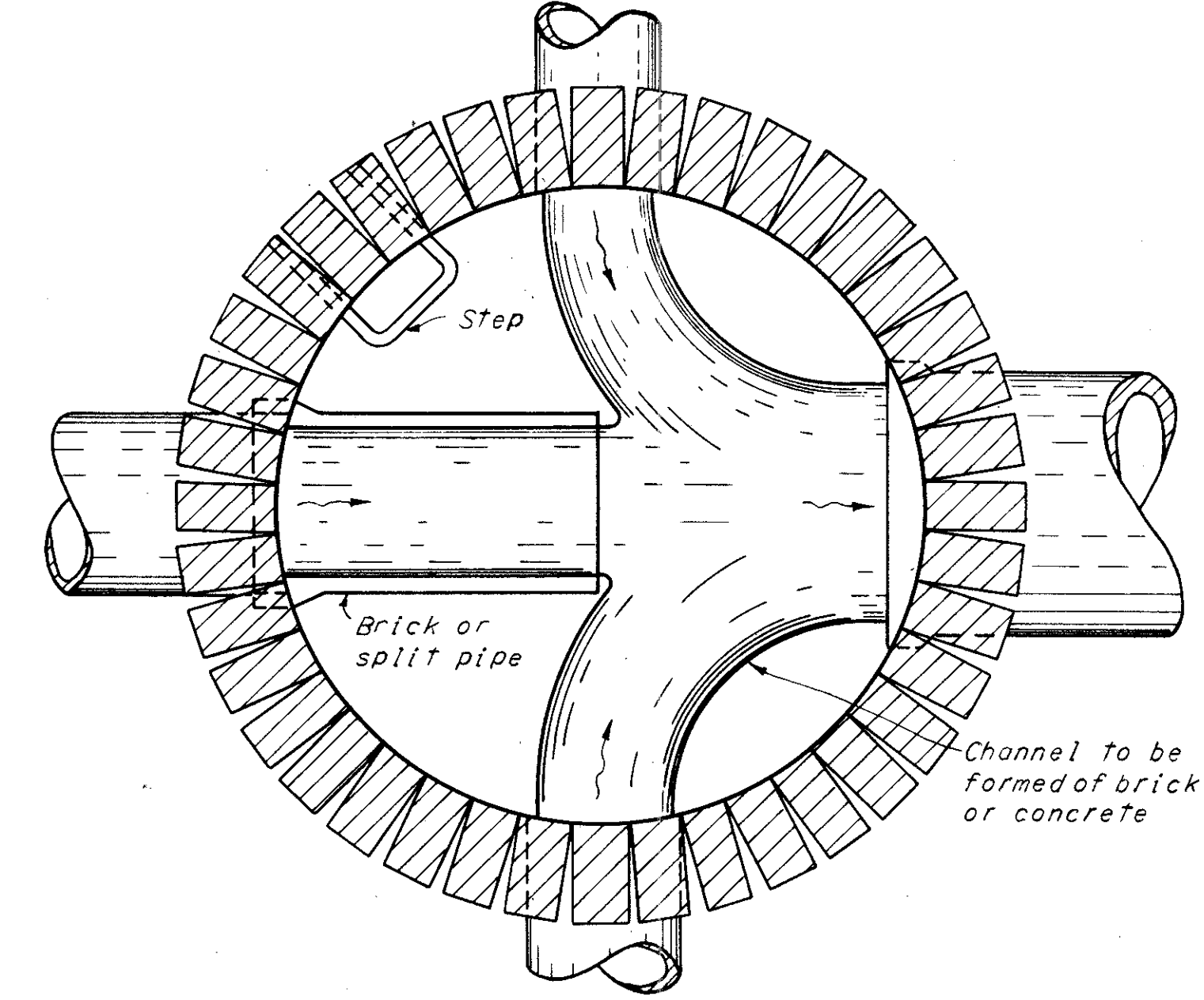


SECTION A-A  
Scale: 1"=1'-0"

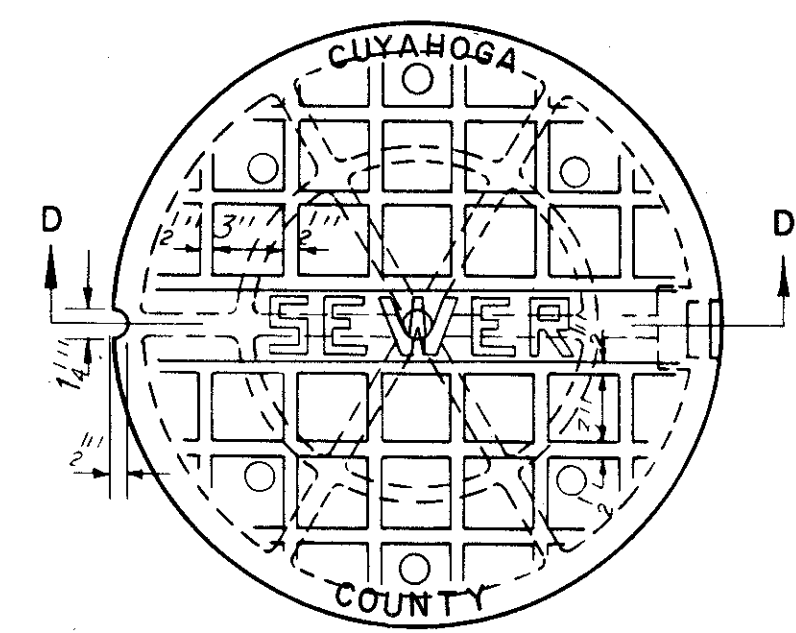
SECTION B-B  
Scale: 1"=1'-0"



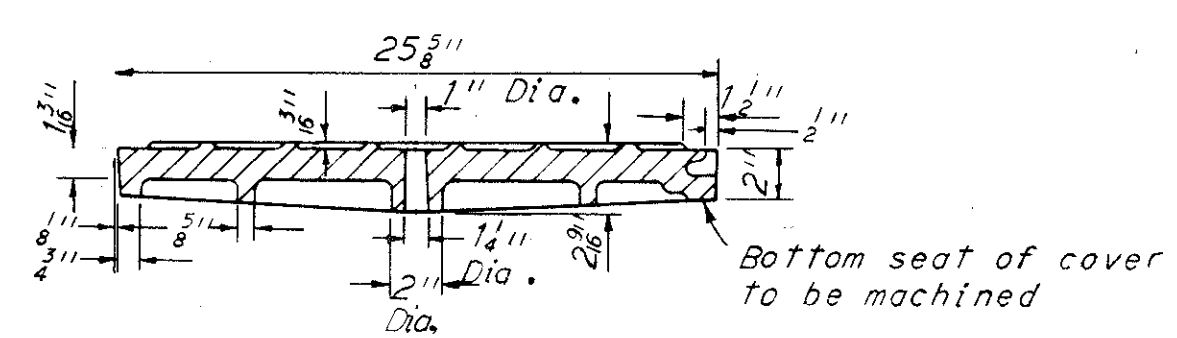
SECTION C-C



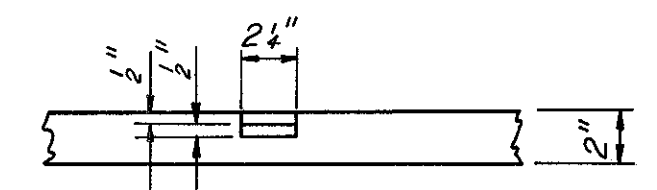
SECTION BELOW SPRING LINE SHOWING  
METHOD OF TURNING SIDE DRAINS



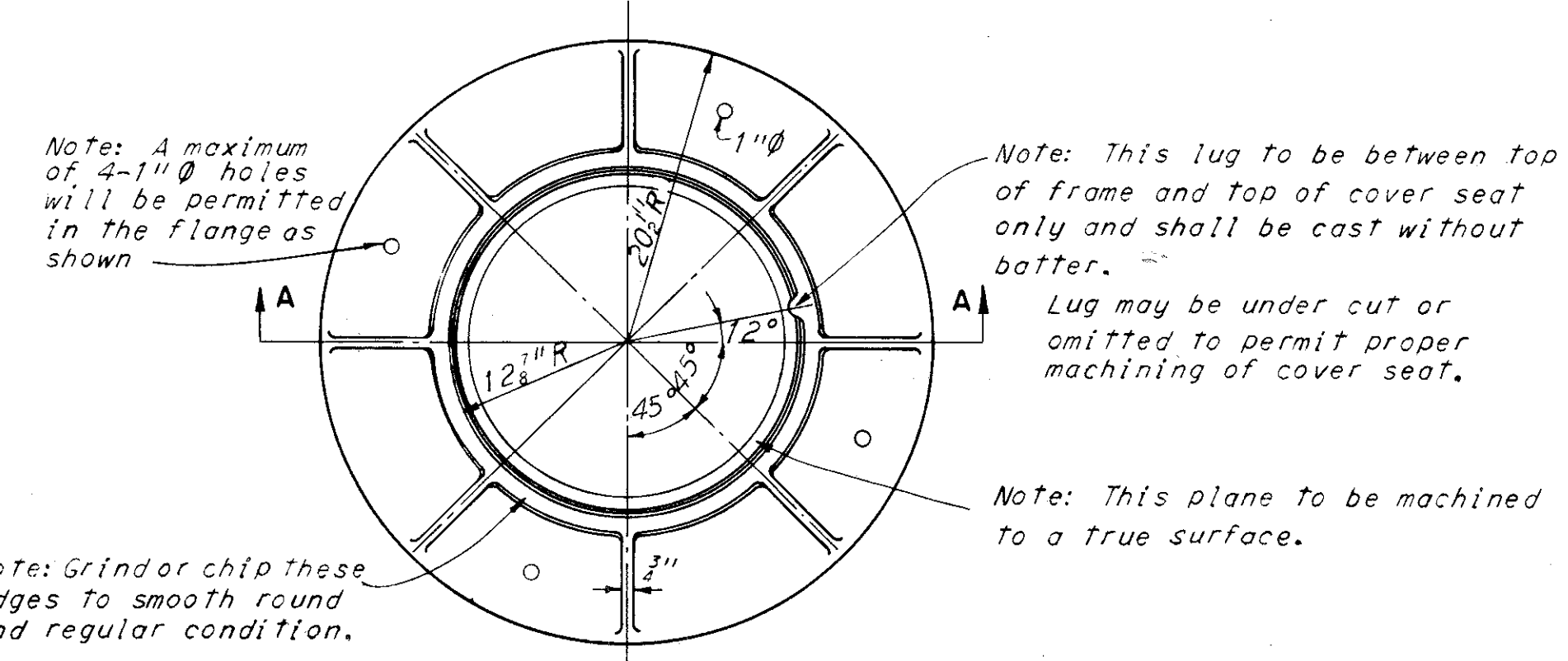
PLAN OF COVER



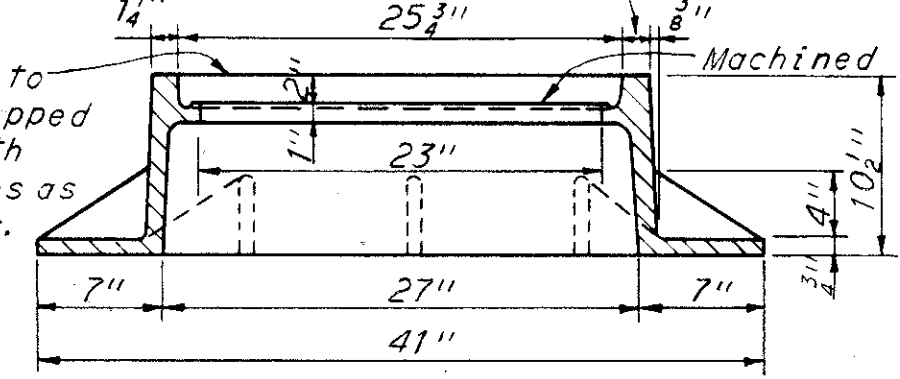
SECTION D-D  
Scale: 1 1/2"=1'-0"



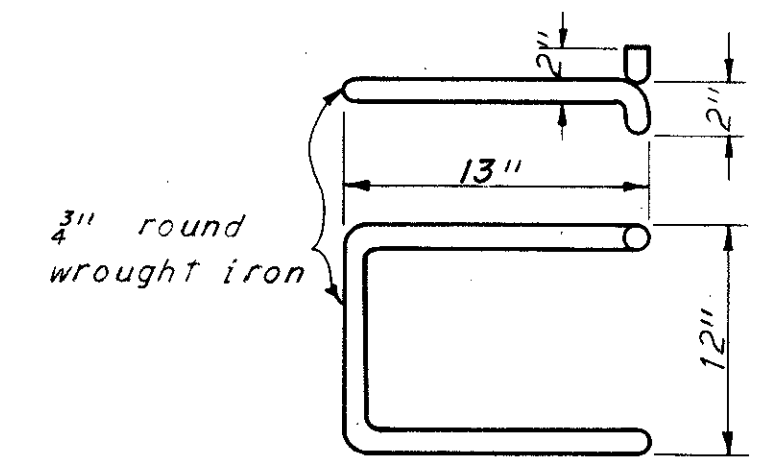
NOTCH DETAIL



PLAN OF FRAME



SECTION A-A  
Scale: 1 1/2"=1'-0"



DETAIL OF MANHOLE STEP  
Not to Scale

- NOTES -

**GENERAL** - The design shown hereon is for brick construction. If precast solid concrete blocks, or cast in place concrete are used, the design shall be modified to fit the dimensions of the material used, except that the thickness of the wall shall not be less than 6 inches for precast solid concrete blocks or cast in place concrete construction.

**BEARING AREAS** of frame and cover shall be so fitted and finished as to provide a firm and even seat for all portions of the cover in the frame. No projections shall exist on bearing areas of either casting, and each cover shall seat in its frame without rocking. Frames and covers shall be fitted, matched and marked before delivery to the project.

**SETTING OF CASTING** - The base of the frame shall be set in a full bed of Portland cement mortar, and so adjusted to conform to the finished pavement grade.

**CASTING** - Minimum weight of frame and cover 615 pounds. Casting shall meet the requirements of 604. The design shall be essentially the same and equally as strong as those shown hereon, and shall be given one coat of paint as per specifications.

**STEPS** shall be wrought iron or nodular iron meeting the requirements of 604.

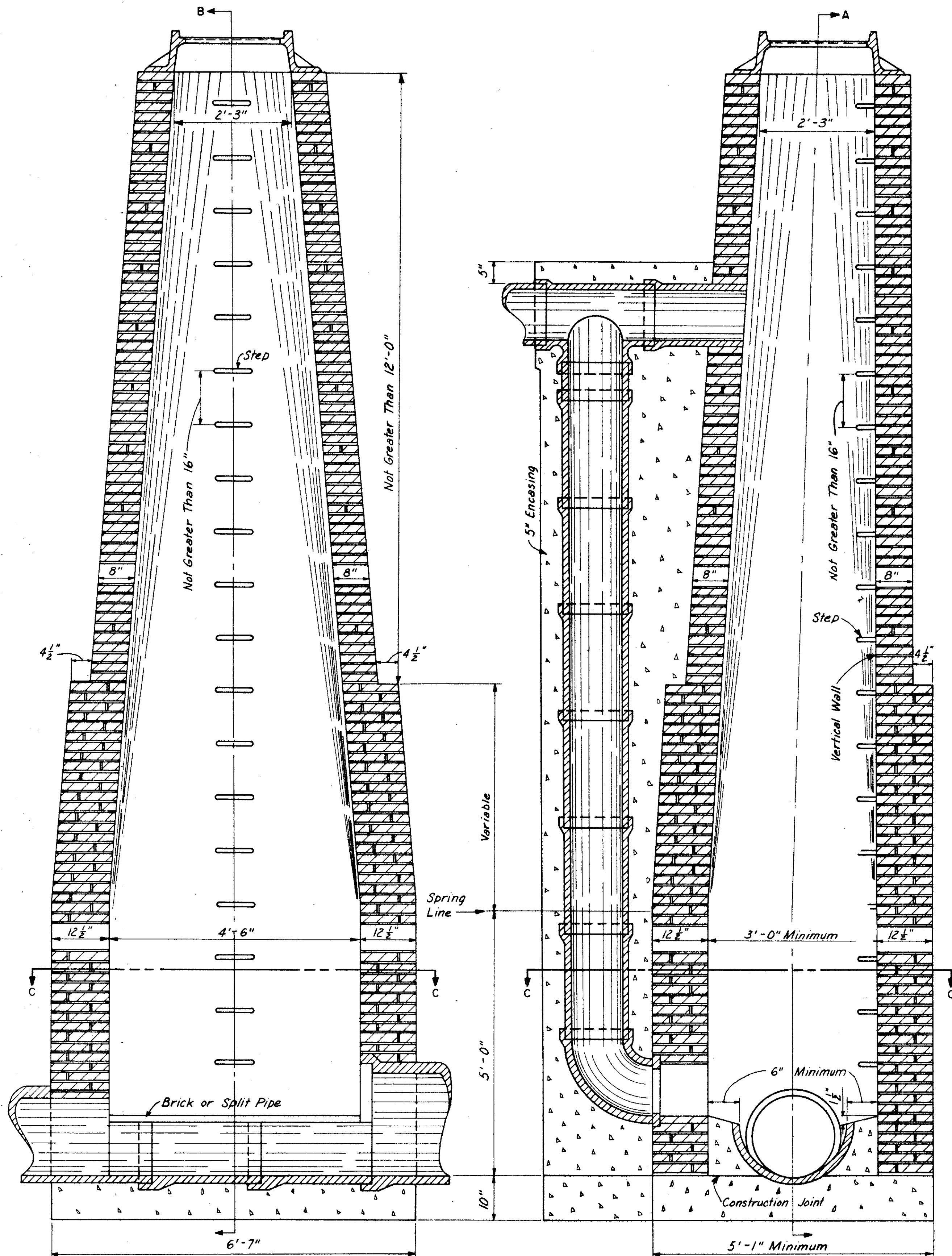
**CONSTRUCTION** - Manholes shall be built of brick, precast solid concrete blocks, or cast in place concrete. When manholes are constructed of brick, every sixth course shall be a stretcher course.

Bottom of manhole shall be Class "C" concrete.

Channel sections in the manhole shall be constructed of split pipe or brick except curved sections which may be built by forming a channel in the concrete.

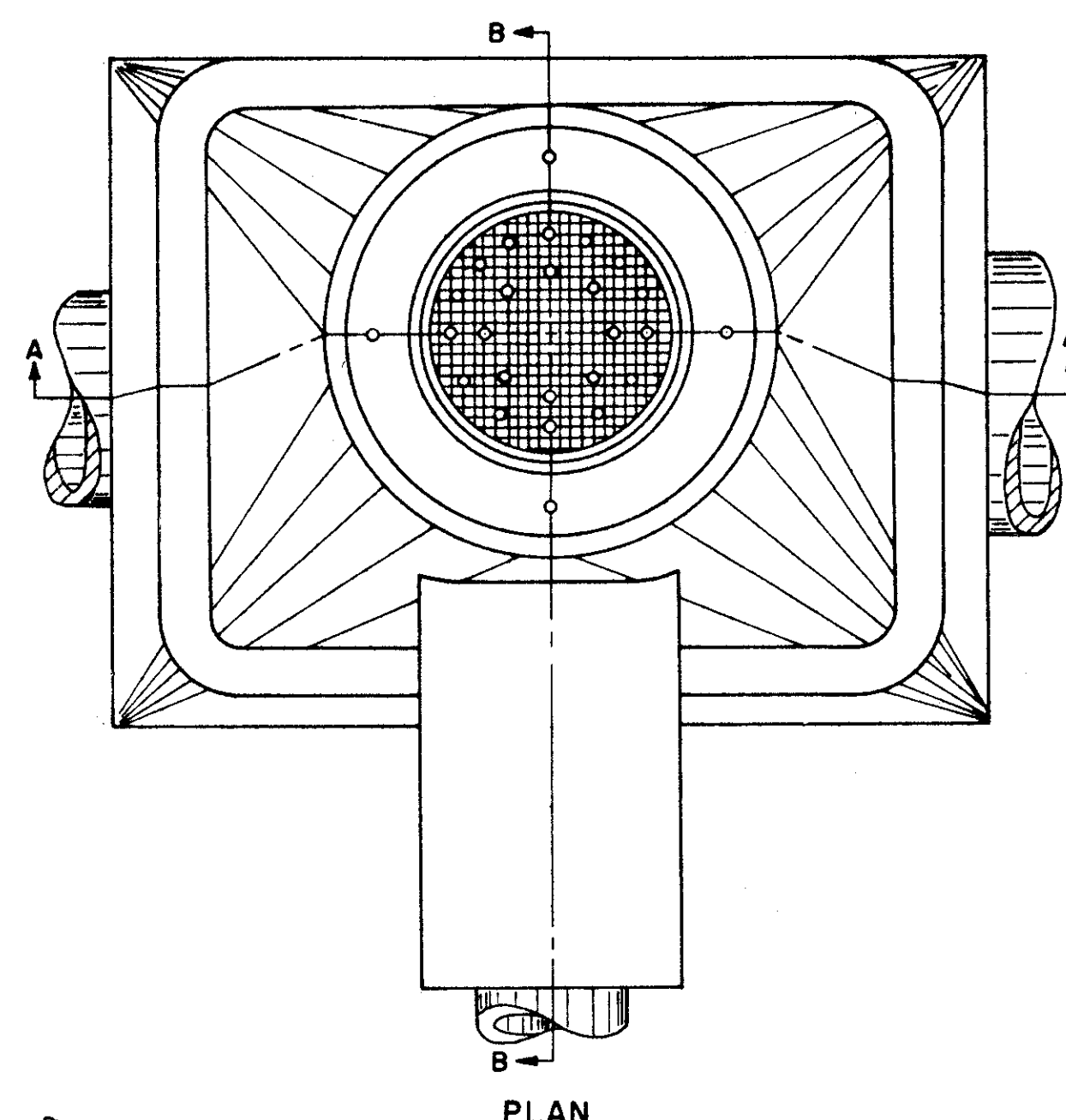
MADE I.M. DATE 6-2-69 TRACED DATE  
CHECKED E.R.A. DATE 6-10-69 SCALE As Shown

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

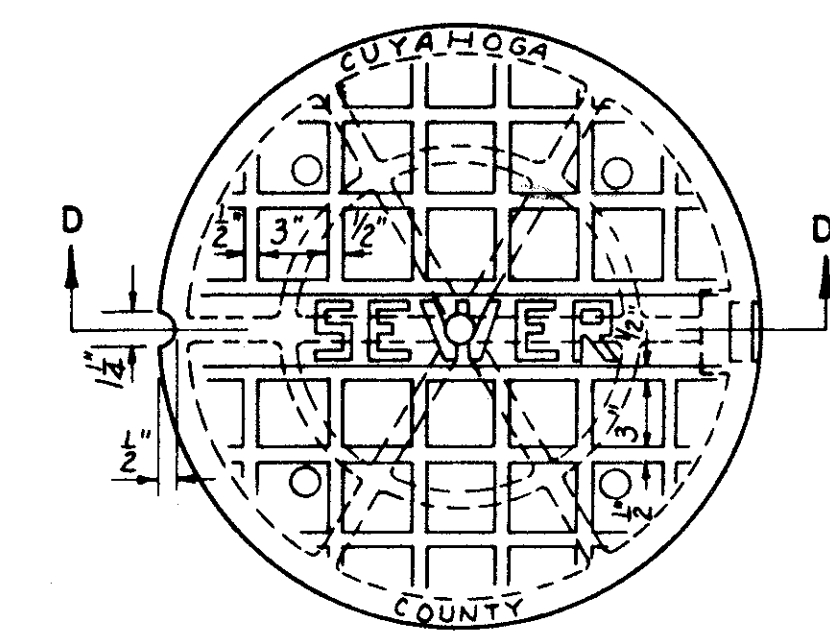


SECTION A-A

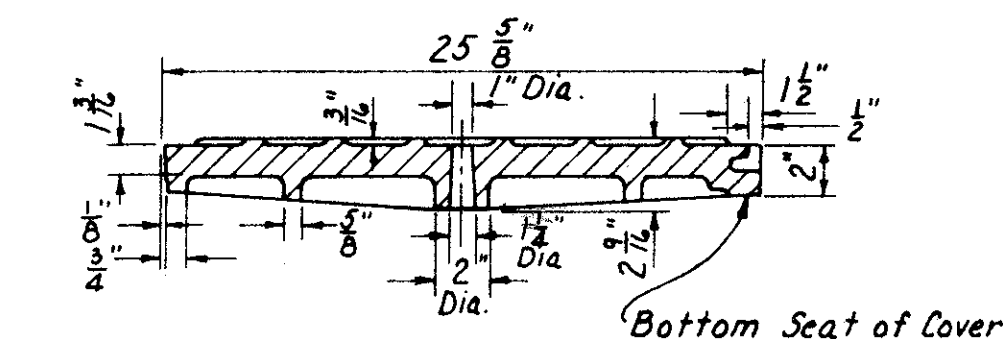
SECTION B-B



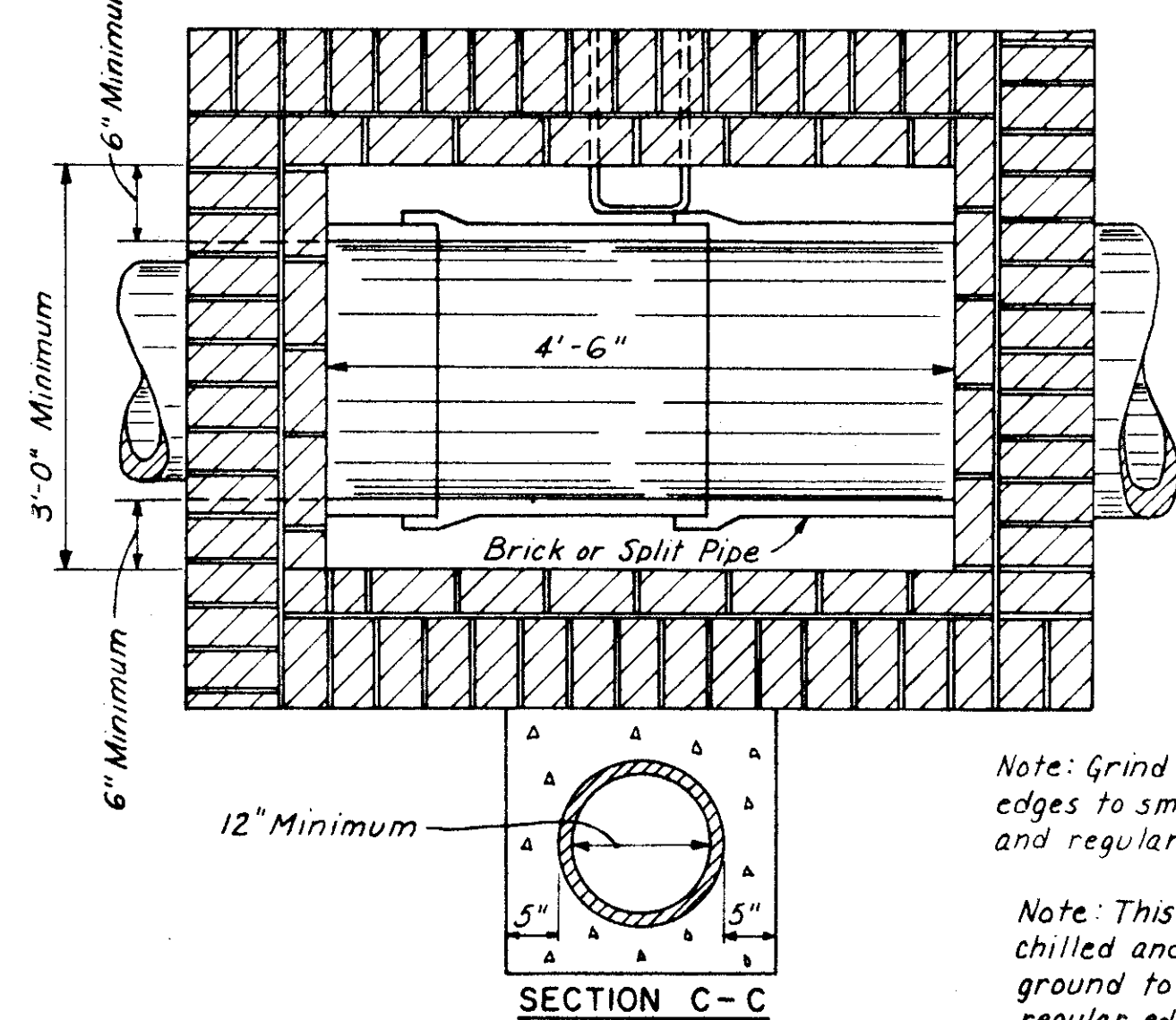
PLAN



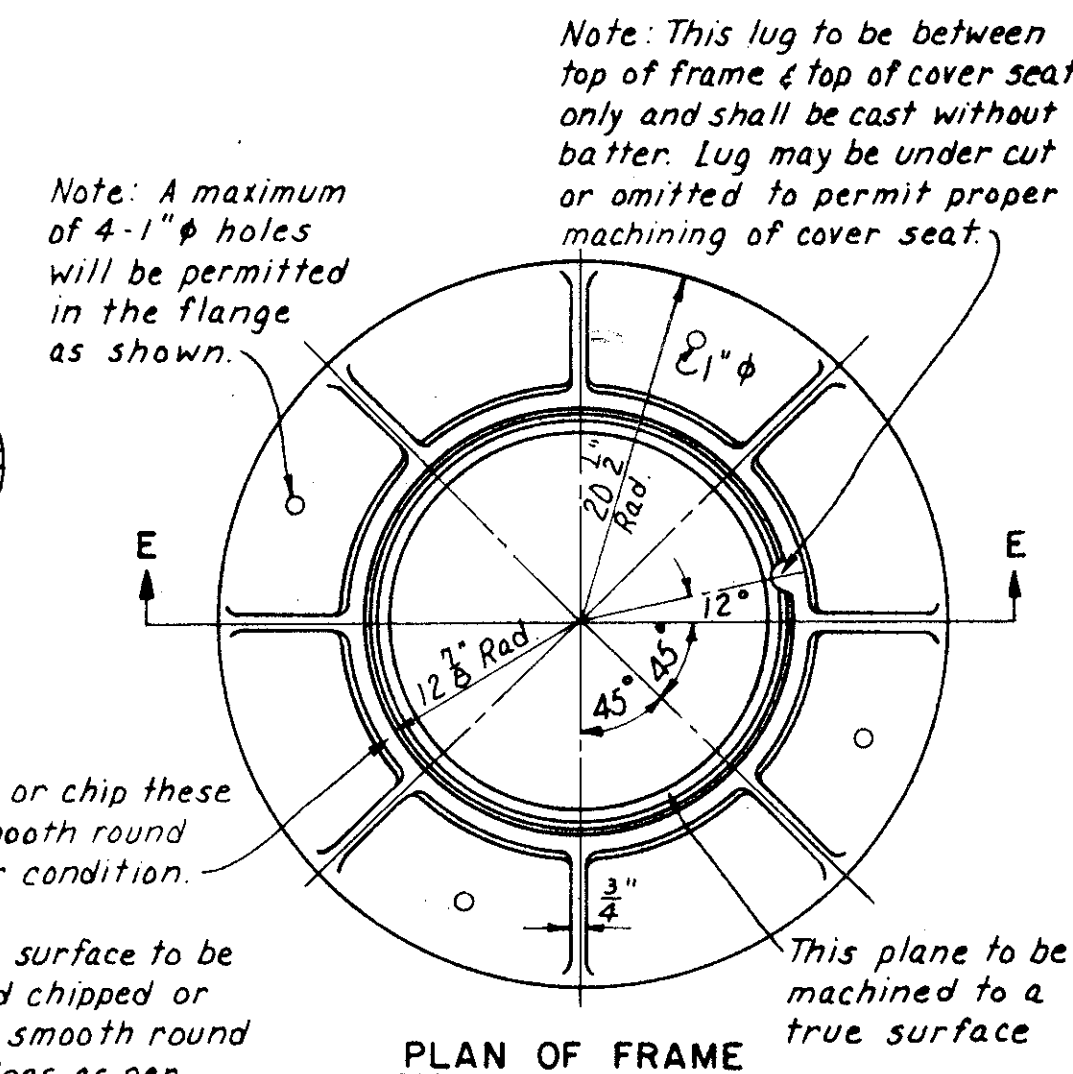
PLAN OF COVER



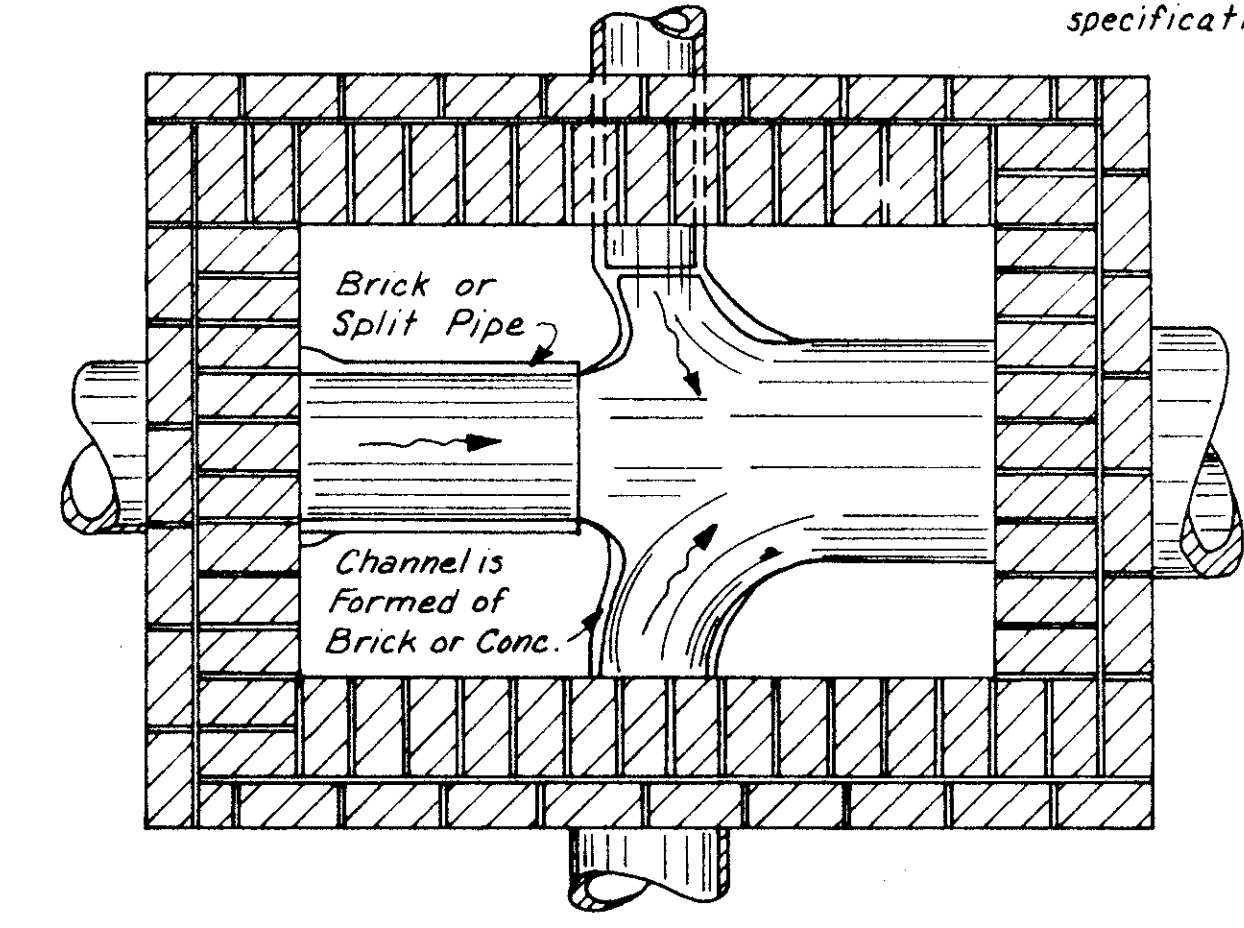
SECTION D-D  
Scale: 1/8" = 1'-0"



SECTION C-C

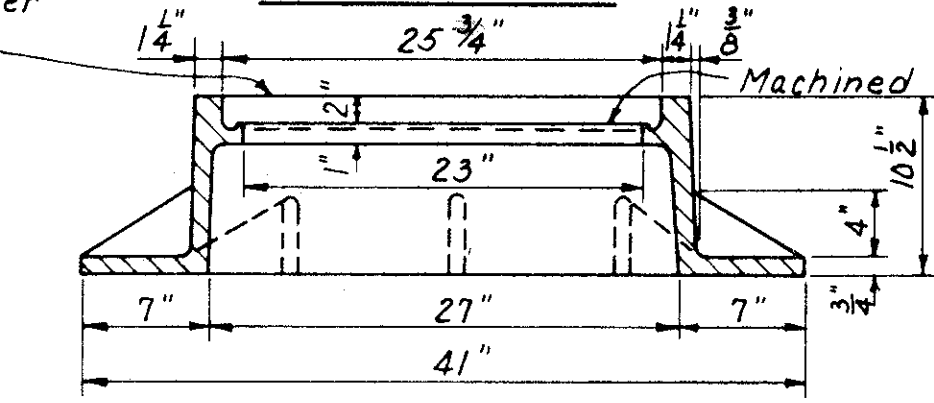


PLAN OF FRAME

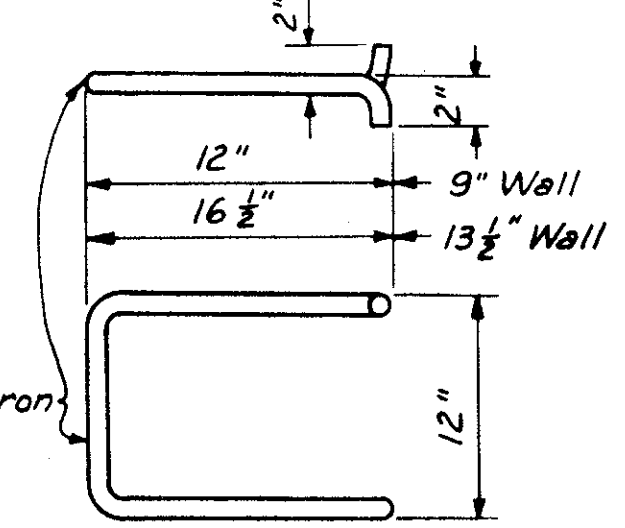


SECTION BELOW SPRINGING LINE

Showing method of turning side drain which enter the manhole of the flow line.



SECTION E-E  
Scale: 3/32" = 1'-0"



DETAIL OF STEPS

**NOTES:**  
**BEARING AREAS** of frame and cover shall be so fitted and finished as to provide a firm and even seat for all portions of the cover in the frame. No projections shall exist on bearing areas of either casting and each cover shall seat in its frame without rocking. Frames and covers shall be fitted, matched and marked before delivery to the project.  
**SETTING OF CASTING** - The base of the frame shall be set in a full bed of Portland cement mortar, and so adjusted to conform to the finished pavement grade.  
**CASTINGS** - Minimum weight of frame and cover 615 pounds. Castings shall meet the requirements of Item 604. The design shall be essentially the same and equally as strong as those shown hereon and shall be given one coat of paint as per specifications.  
**STEPS** shall be wrought iron or nodular iron meeting the requirements of Item 604.

**CONSTRUCTION** - Manholes shall be built of brick, precast solid concrete block, or cast in place concrete. When manholes are constructed of brick, every sixth course shall be a stretcher course.  
 Bottom of manhole shall be class "C" concrete.  
 Channel sections in the manhole shall be constructed of split pipe or brick except curved sections which may be built by forming a channel in the concrete.  
**DROP PIPES** for all drains which cannot be connected to manhole at the flow line shall be 12 inches minimum diameter with class "C" concrete encasing.

Note: A maximum of 4-1" φ holes will be permitted in the flange as shown.

Note: This lug to be between top of frame & top of cover seat only and shall be cast without batter. Lug may be under cut or omitted to permit proper machining of cover seat.

Note: Grind or chip these edges to smooth round and regular condition.

Note: This surface to be chilled and chipped or ground to smooth round regular edges as per specifications.

This plane to be machined to a true surface

Note: This manhole is identical to Cuyahoga County Standard No. 2 Manhole.

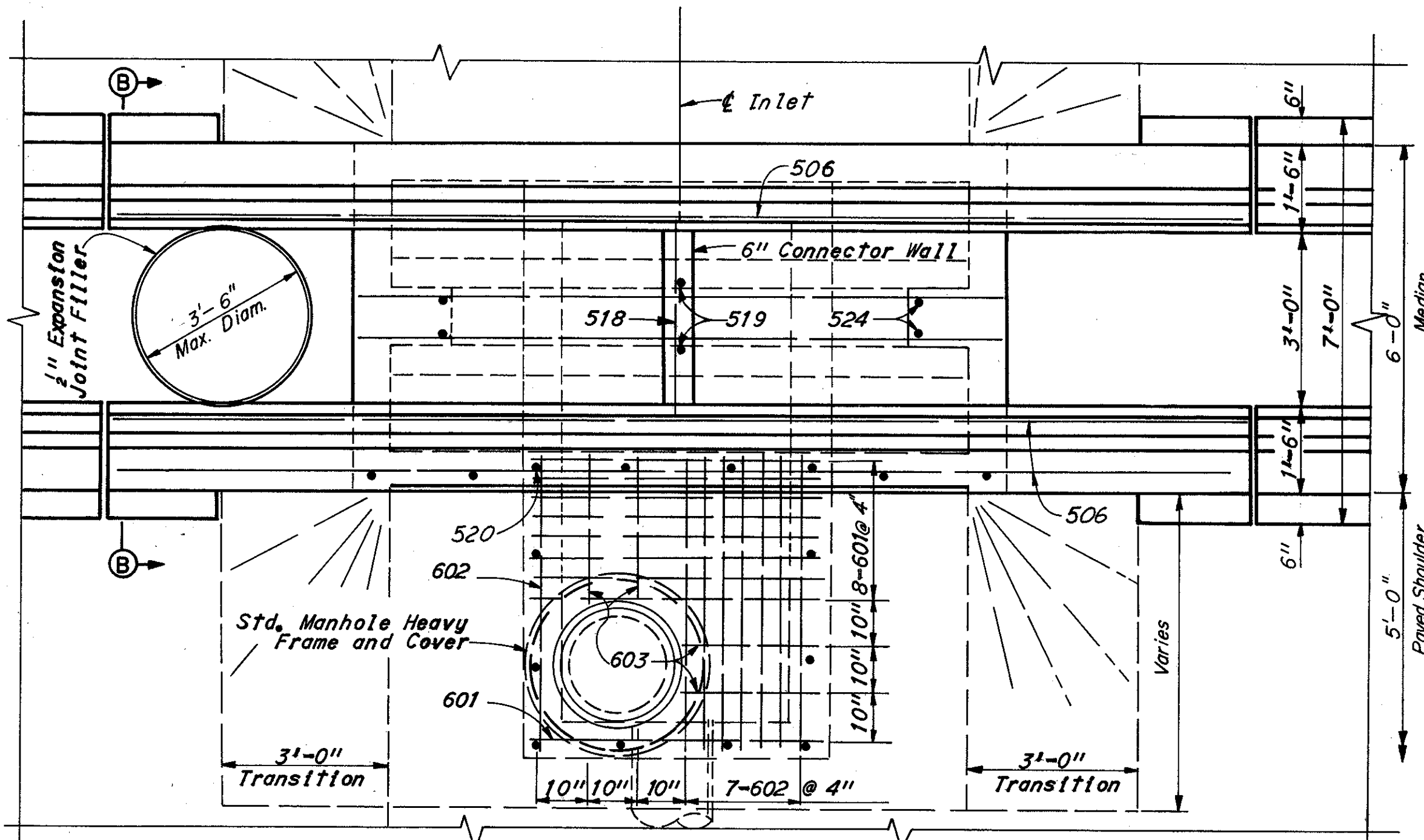
# MEDIAN INLET

Quantity Calculations  
 Made By LJD Date 3-28-69  
 Checked By DDS Date 4-26-69

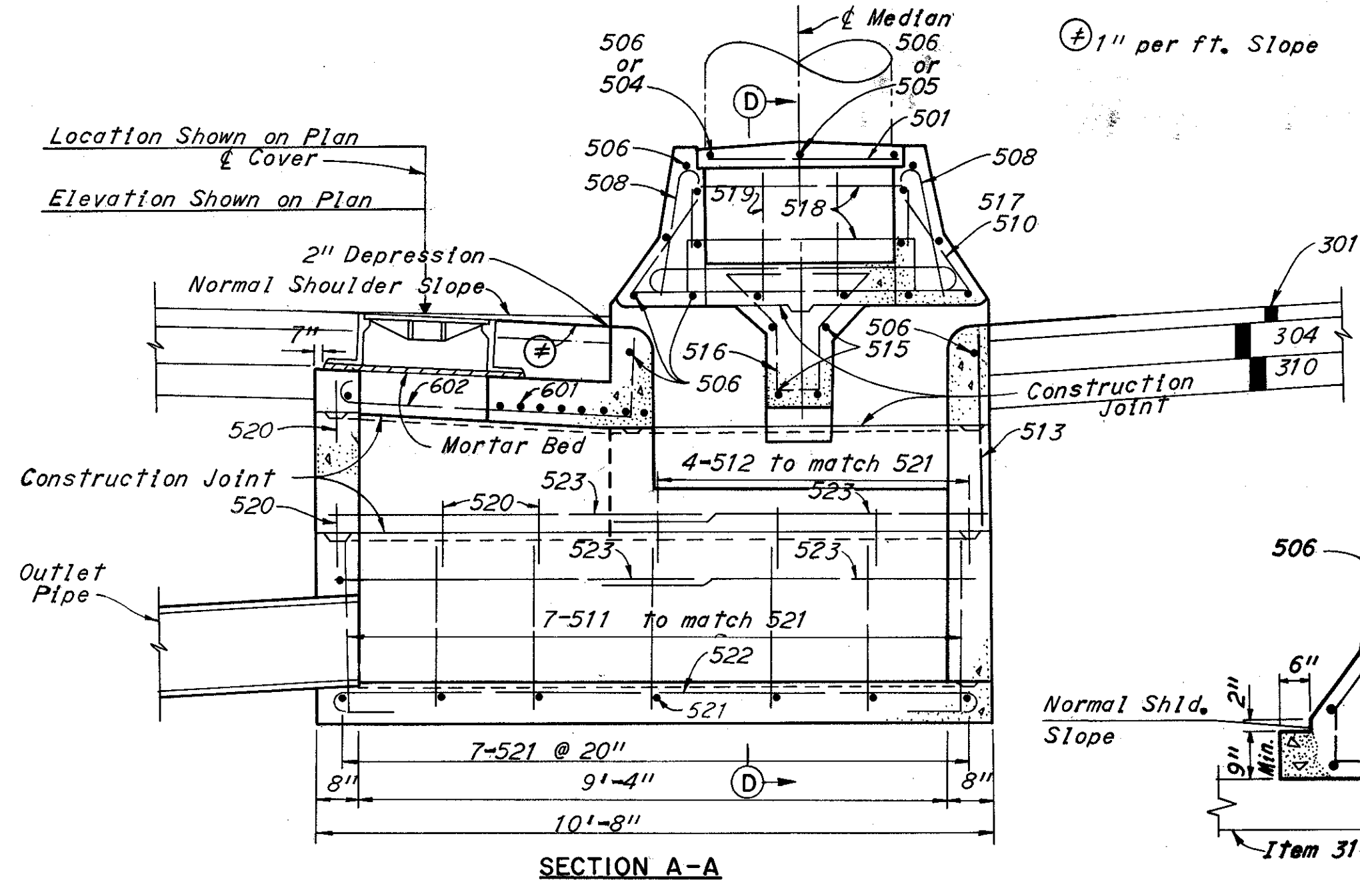
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

107  
390

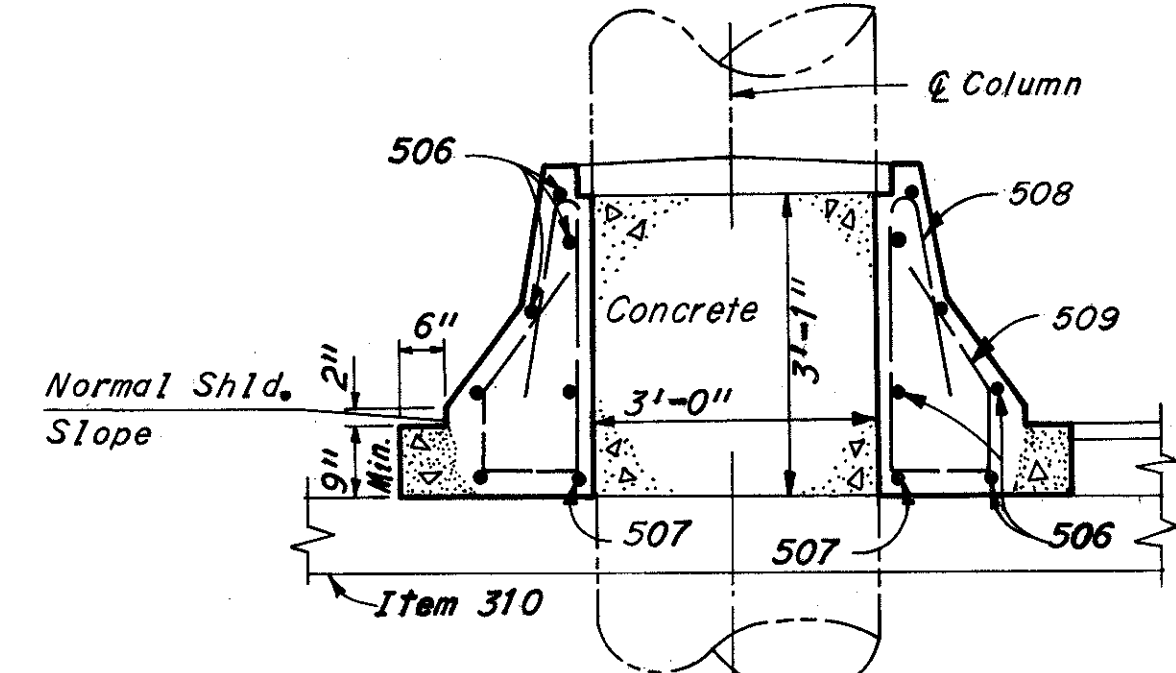
CUYAHOGA COUNTY  
 CUY. 480-21.40



PLAN  
(Without Concrete Cover)



SECTION A-A



SECTION B-B

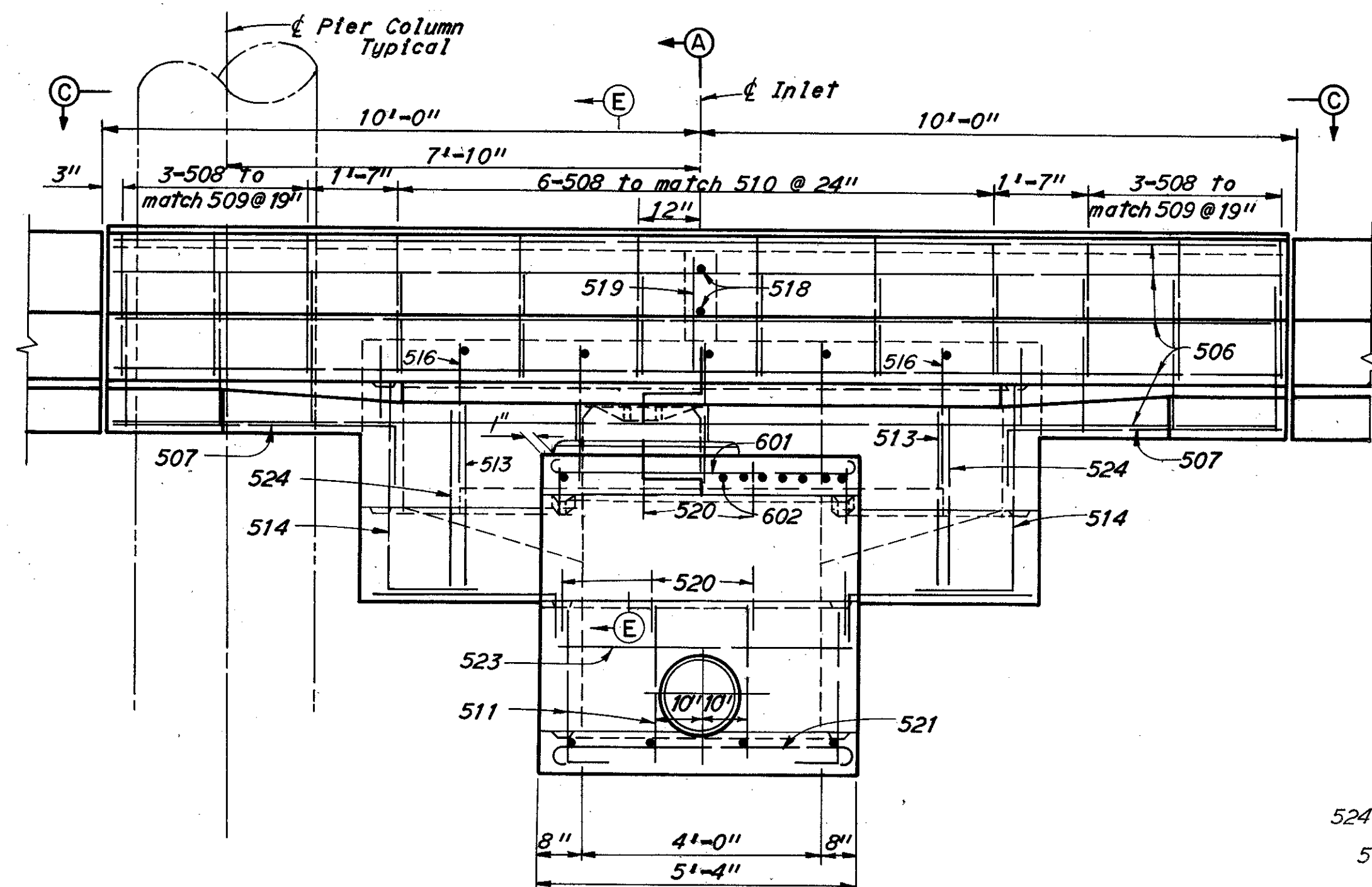
Castings shall meet the requirements of 604. The design shall be essentially the same and equally as strong as those shown on standard construction drawing MH-1 for Heavy Frame and Cover.

Bearing areas of frame and cover shall be so fitted and finished as to provide a firm and even seat for the entire cover in the frame. No projections shall exist on bearing seat in its frame without rocking. Frames and covers shall be fitted, matched and marked before delivery to the project.

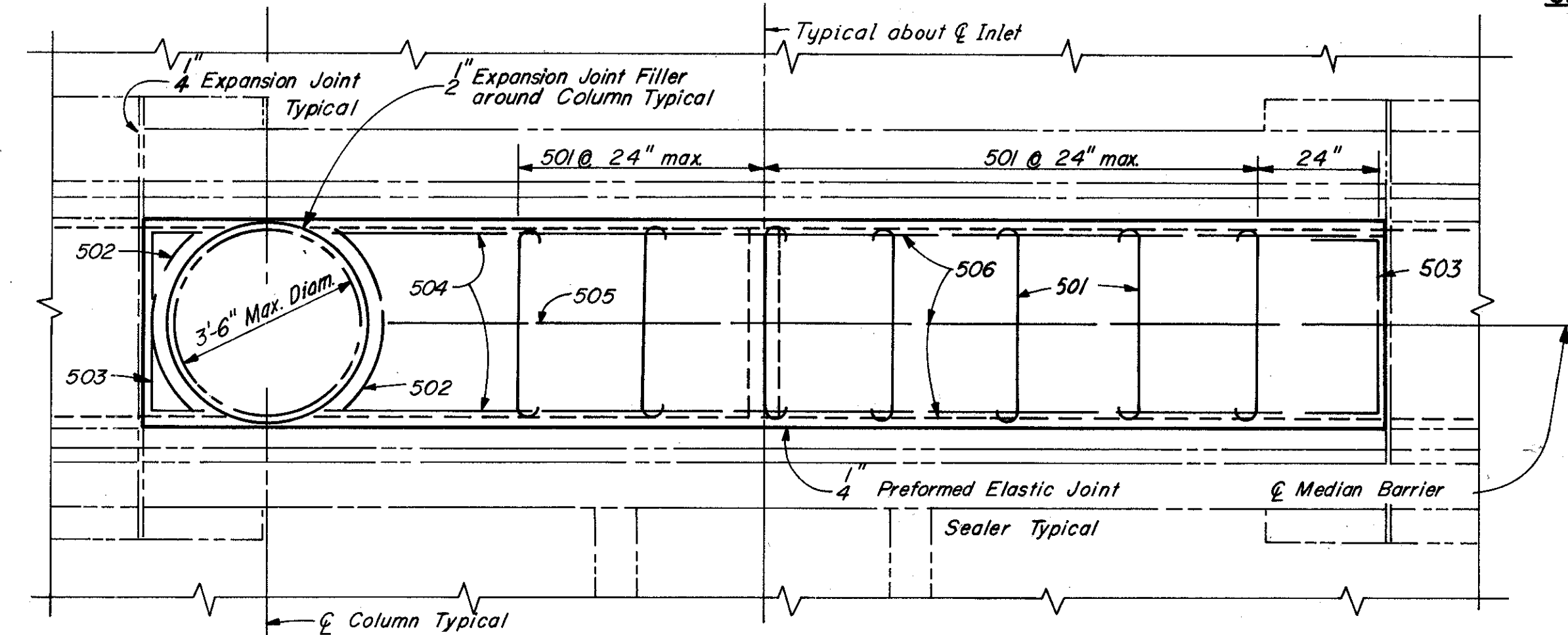
Minimum weight of frame and cover 475 lbs. Setting of Castings: The base of the frame shall be set in a full bed of Portland cement mortar, and so adjusted to conform to the finished pavement grade.

Reinforcing Steel, shall be round bars in accordance with steel details shown hereon and conforming to 509 of the Construction Materials Specifications. Cost of furnishing and placing reinforcing steel shall be included in 604 for payment.

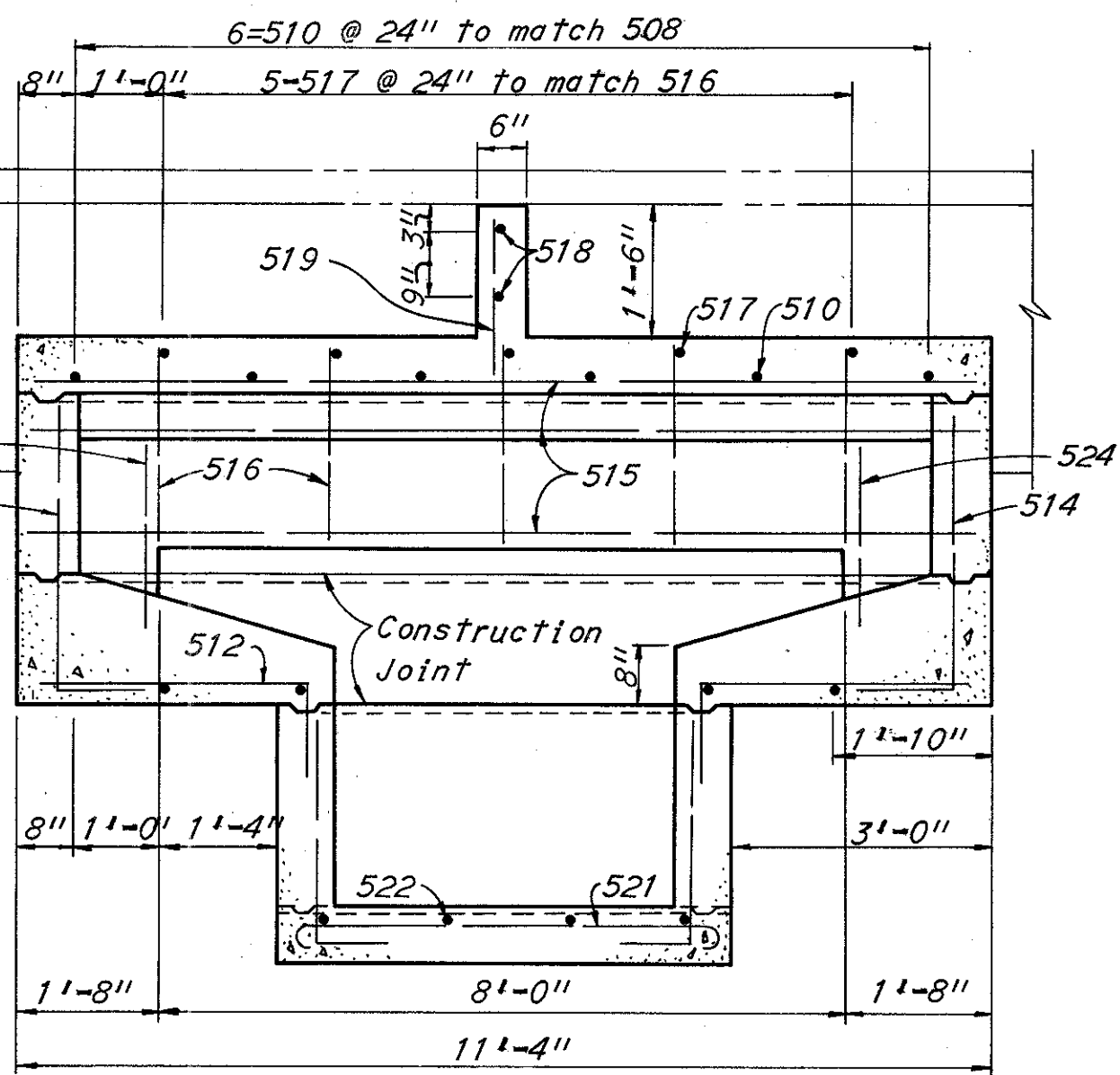
Quantities of concrete median, pavement, depressed apron and within the limits of the inlet shall be deducted from the project quantities.



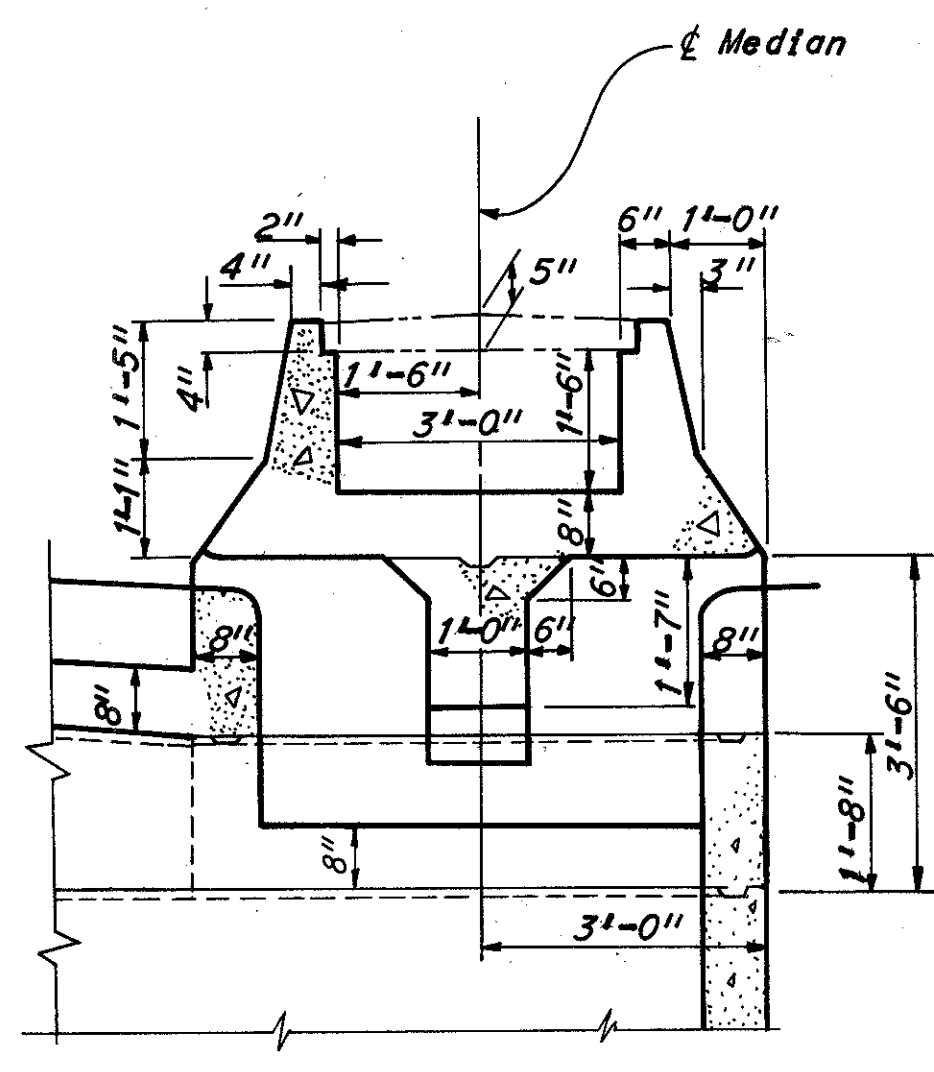
ELEVATION



VIEW C-C



SECTION D-D



SECTION E-E

CONCRETE AND REINFORCING STEEL QUANTITIES				
MARK	NO.	LENGTH	SHAPE	WEIGHT
501	5	4'-2"	1	22
502	4	3'-7"	2	15
503	2	5'-1"	3	11
504	2	13'-9"	Str.	29
505	1	12'-3"	Str.	13
506	14	19'-6"	Str.	285
507	4	5'-0"	4	21
508	24	2'-7"	5	65
509	12	5'-11"	6	74
510	6	8'-5"	7	53
511	18	3'-2"	4	59
512	8	4'-9"	4	40
513	7	2'-9"	Str.	20
514	8	5'-0"	4	42
515	6	11'-0"	Str.	69
516	5	6'-2"	8	32
517	5	5'-11"	1	31
518	2	5'-3"	3	11
519	2	2'-0"	Str.	4
520	18	1'-0"	Str.	19
521	7	6'-2"	1	45
522	4	1'-6"	1	48
523	4	16'-8"	3	70
524	4	2'-3"	Str.	9
601	9	6'-4"	1	86
602	8	6'-4"	9	76
603	4	3'-5"	1	21

TOTAL REINFORCING STEEL 1270 lbs.  
 TOTAL CLASS "C" CONCRETE 11 cu. yds.

† Varies M.H. depth

Note: The above table of quantities is included with this drawing for estimating purposes only. The cost of furnishing and placing all concrete, reinforcing steel, casting, etc., shall be included in 604 for payment.

SCALE 1/2" = 1'  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 MADE LJD DATE 3/28/69 CONSULTING ENGINEERS  
 TRCD. MAG DATE 4/4/69  
 CKD. DDS DATE 4/3/69 KANSAS CITY CLEVELAND NEW YORK

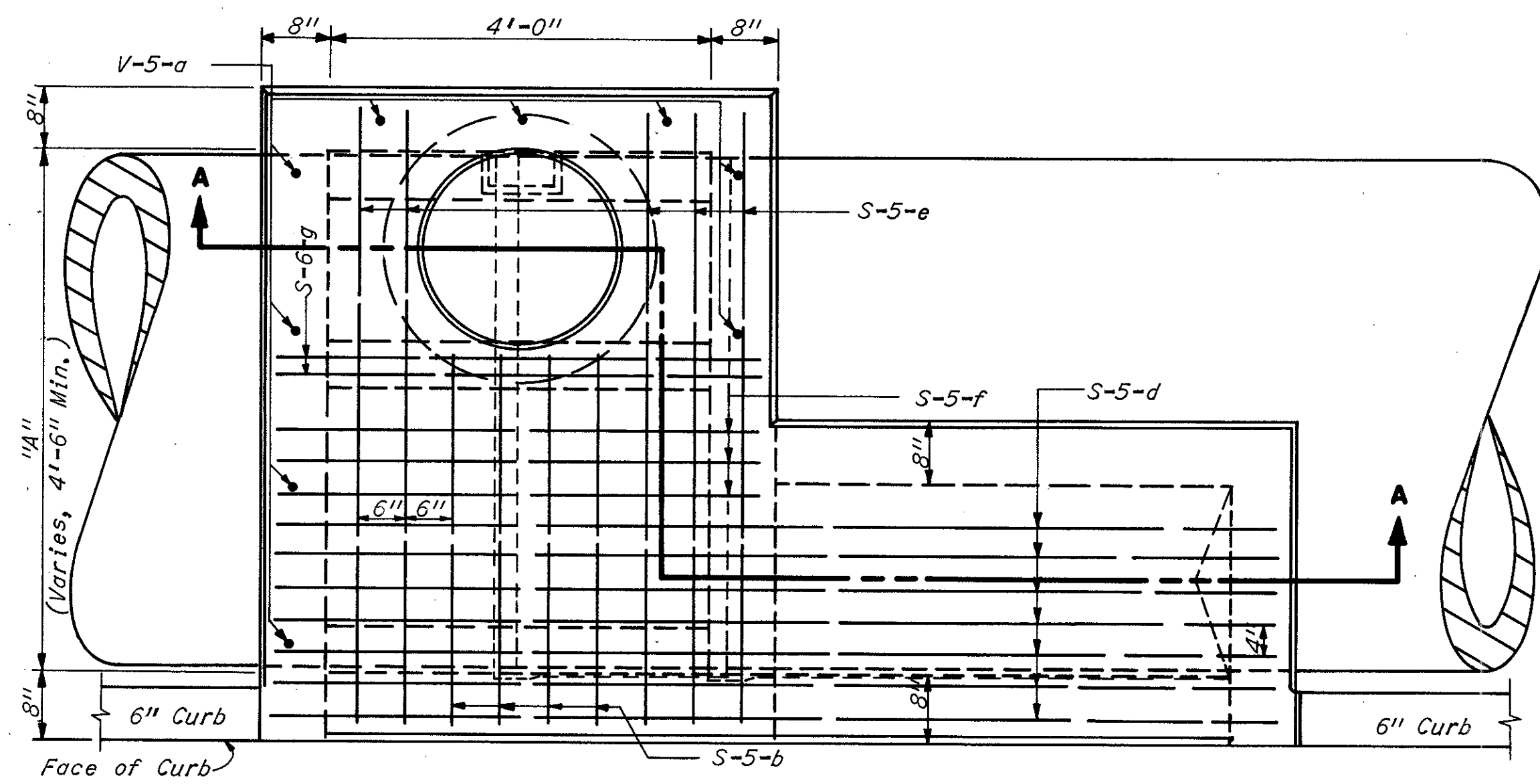
# STD NO 2-A-6 TO 2-A-20 PAVED SHOULDER INLET MODIFIED AS PER PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

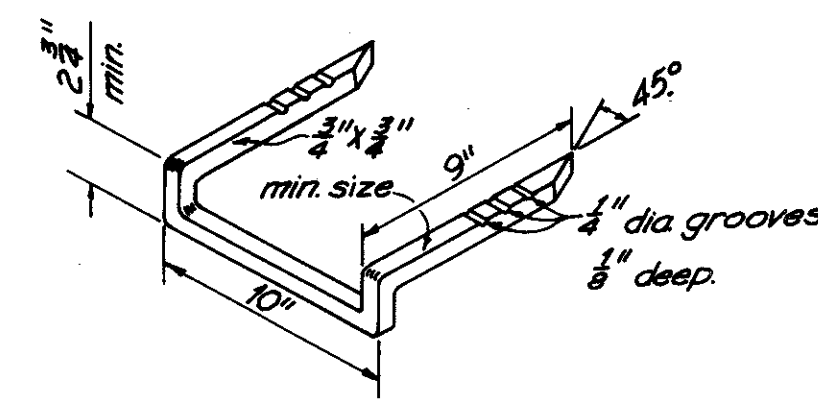
108  
360

CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By CHD Date 10-68  
Checked By DDS Date 10-68



**PLAN**



**STEP DETAIL**

REINFORCING BARS COMMON TO ALL PIPE DIAMETERS	REINFORCING STEEL													
	Length Ft.	S-6-a		S-5-d		S-5-f		S-6-g		H-5-a		V-5-b		
		No.	Lin. Ft.	No.	Lin. Ft.	No.	Lin. Ft.	No.	Lin. Ft.	No.	Lin. Ft.	No.	Lin. Ft.	
6	2	8'-10"	7	7'-0"	3	5'-0"	2	5'-0"	4	2'-4"	2	1'-0"		
8	6	8'-10"	7	9'-0"	3	5'-0"	2	5'-0"	4	4'-4"	2	1'-0"		
10	10	8'-10"	7	11'-0"	3	5'-0"	2	5'-0"	4	6'-4"	2	1'-0"		
12	14	8'-10"	7	13'-0"	3	5'-0"	2	5'-0"	4	8'-4"	2	1'-0"		
14	18	8'-10"	7	15'-0"	3	5'-0"	2	5'-0"	4	10'-4"	2	1'-0"		
16	22	8'-10"	7	17'-0"	3	5'-0"	2	5'-0"	4	12'-4"	2	1'-0"		
18	26	8'-10"	7	19'-0"	3	5'-0"	2	5'-0"	4	14'-4"	2	1'-0"		
20	30	8'-10"	7	21'-0"	3	5'-0"	2	5'-0"	4	16'-4"	2	1'-0"		

Pipe Diameter	A	S-5-b	S-5-e	V-5-a			
Ft.	No.	Lin. Ft.	No.	Lin. Ft.			
Under 48"	4'-6"	4	2'-11"	5	5'-6"	9	2'-6"
48"	4'-10"	4	3'-3"	5	5'-10"	9	2'-6"
54"	5'-5"	4	3'-10"	5	6'-5"	11	2'-6"
60"	6'-0"	4	4'-5"	5	7'-0"	11	2'-6"
66"	6'-7"	4	5'-0"	5	7'-7"	13	2'-6"
72"	7'-2"	4	5'-7"	5	8'-2"	13	2'-6"

**NOTES**

**GENERAL** -- The design shown hereon shall not be used for inlets having a depth (top of manhole cover to top of floor) greater than 30 feet. If split pipe is used to form the inlet bottom it shall be split concrete pipe only. Otherwise, the inlet bottom shall be formed in Class "E" concrete.

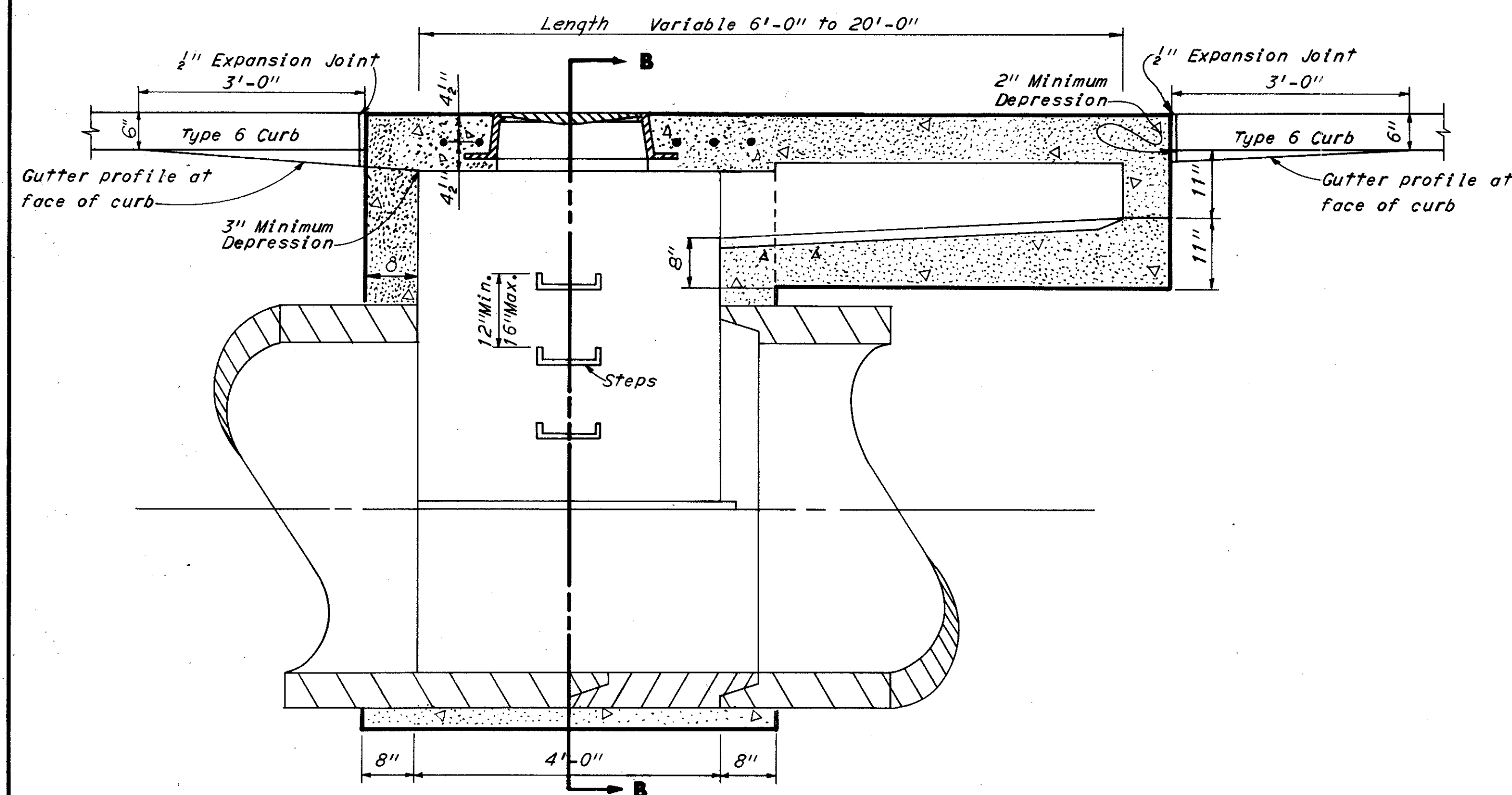
Manholes over 12 feet in depth shall be built of reinforced Class "C" Concrete. Manholes for pipes under 60" in diameter shall be reinforced by placing 3/4" diameter bars 12" center to center vertically and 3/4" diameter bars 9" center to center horizontally. Manholes for pipes over 48" in diameter shall be reinforced by placing 1" diameter bars 12" center to center vertically and 1" diameter bars at 9" center to center horizontally. Bars shall be placed with a 2" clearance from the inside face of the wall. Payment for furnishing and placing the reinforcing steel shall be included in the price bid for Item 604, Special Paved Shoulder Inlet Manhole.

For Notes and Details not shown see Standard Construction Drawing I-2A.

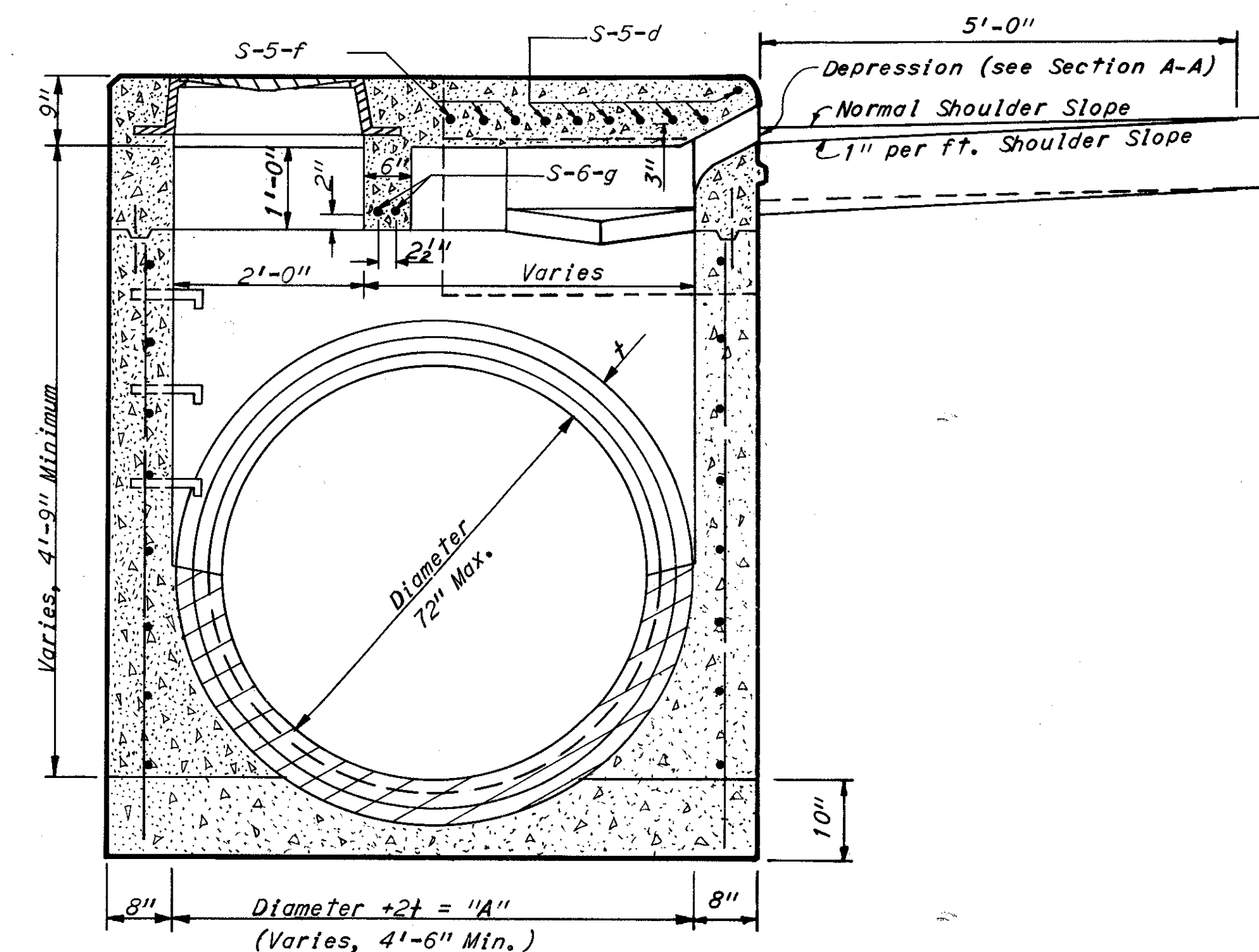
**FRAME AND COVER** -- The frame and cover shall be the light frame and cover detailed on Standard Construction Drawing MH-1.

**STEPS** -- shall meet the requirements of 604.

**REINFORCING STEEL** -- Bars S-6-a and S-6-f shall be 3/4" round. All other bars shall be 5/8" round. For location of bars not shown on the drawing, see Standard Construction Drawing I-2A.



**SECTION A-A**



**SECTION B-B**

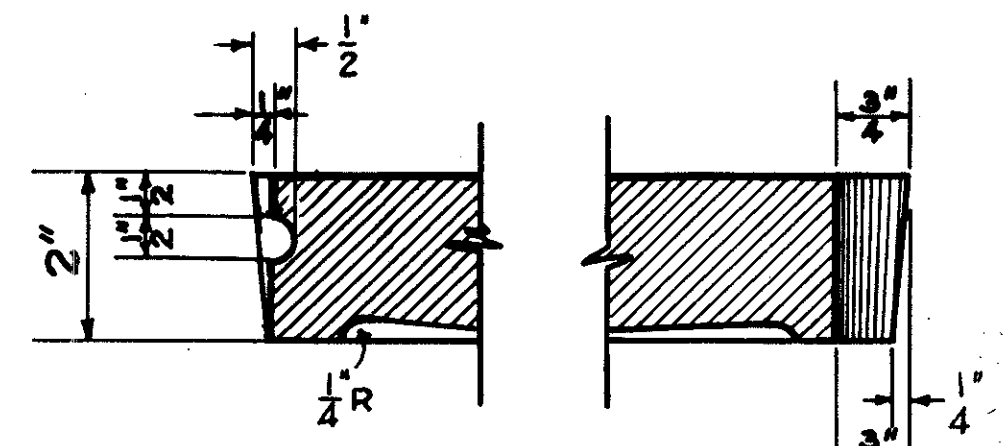
SCALE: \_\_\_\_\_  
 MADE CHD DATE 10-8-68  
 TRCD CHD DATE 10-8-68  
 CKD DDS DATE 10-23-68  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK



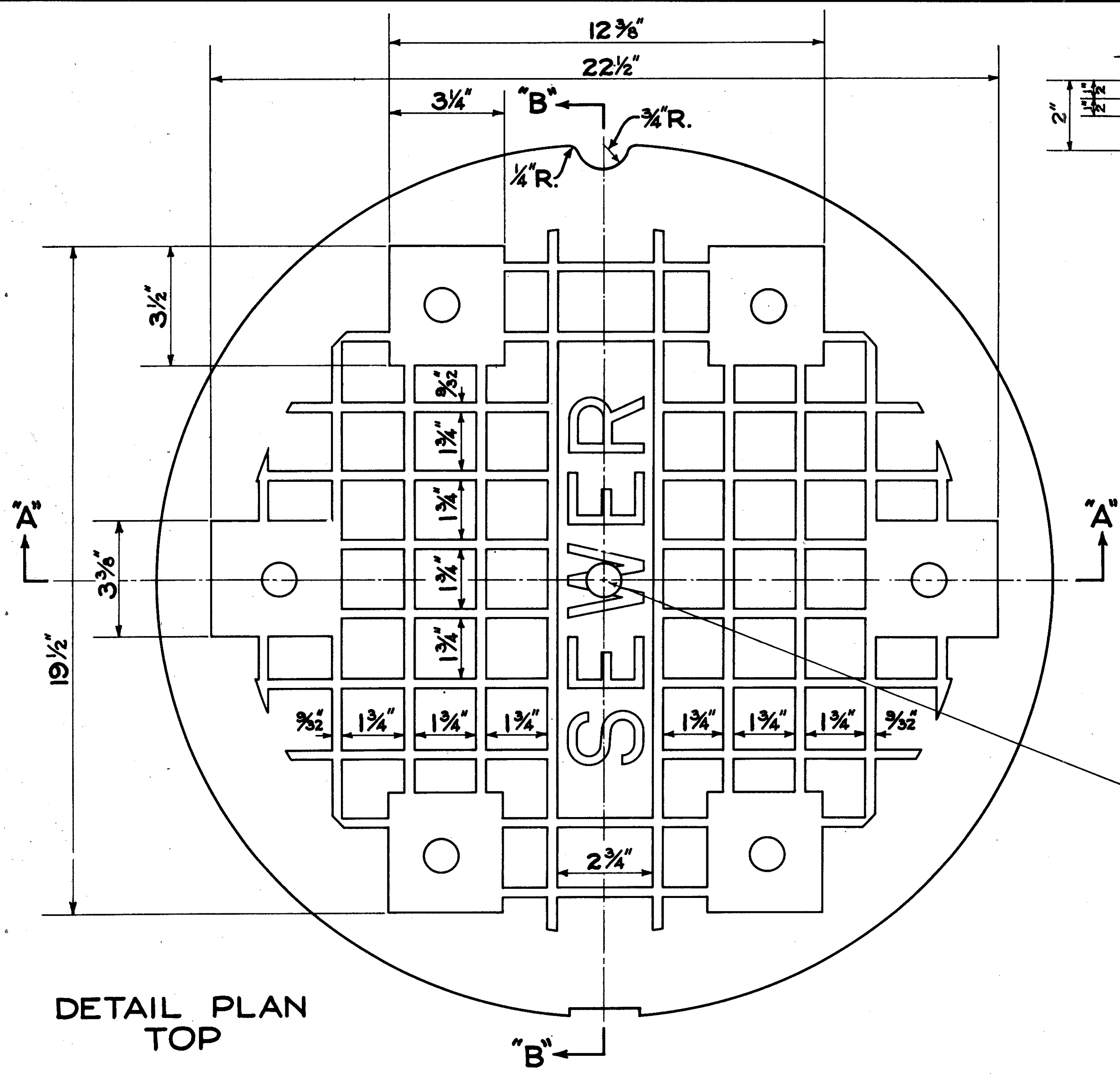
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

108A  
390

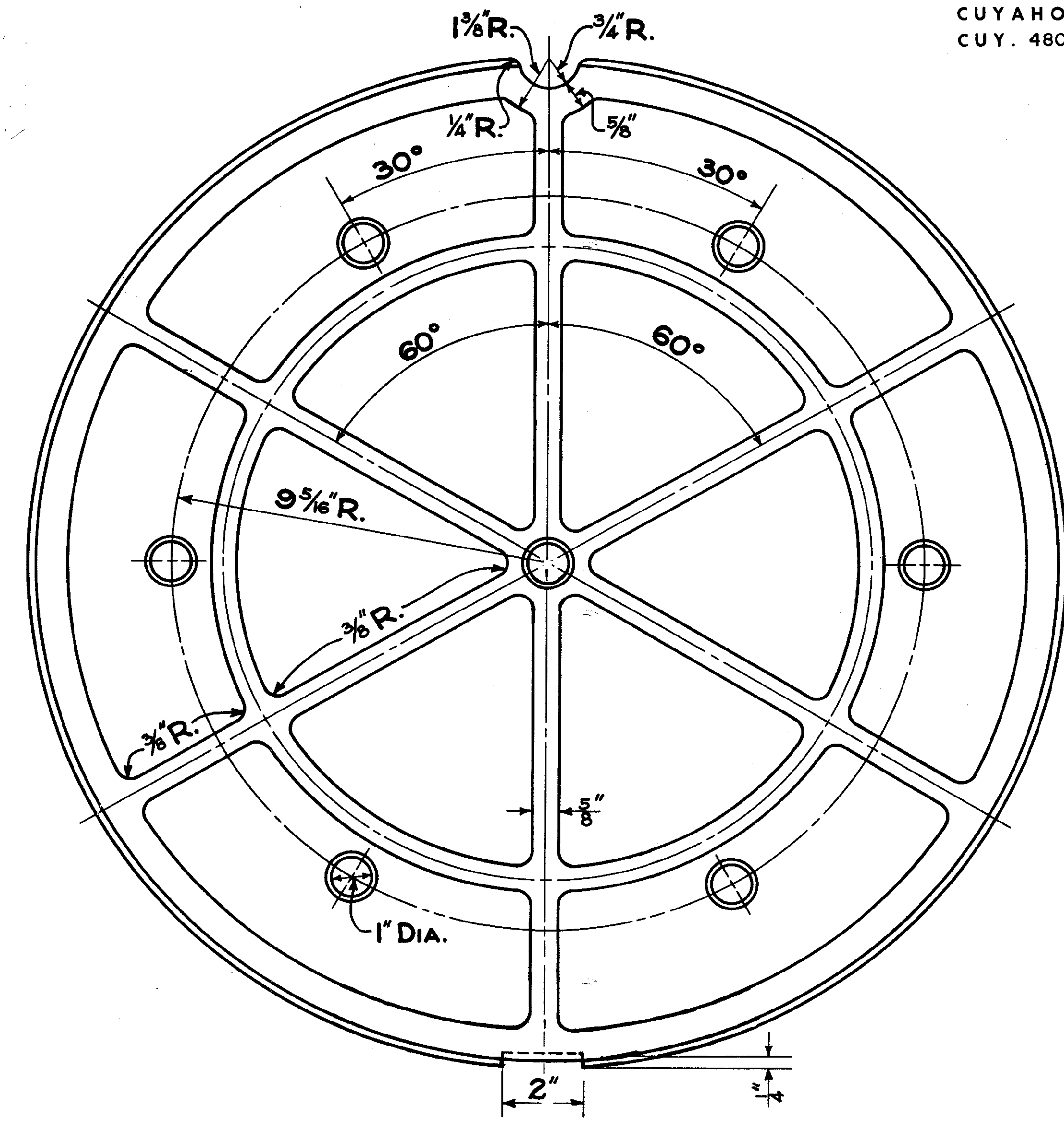
CUYAHOGA COUNTY  
CUY. 480-21.40



SECTION "B-B"

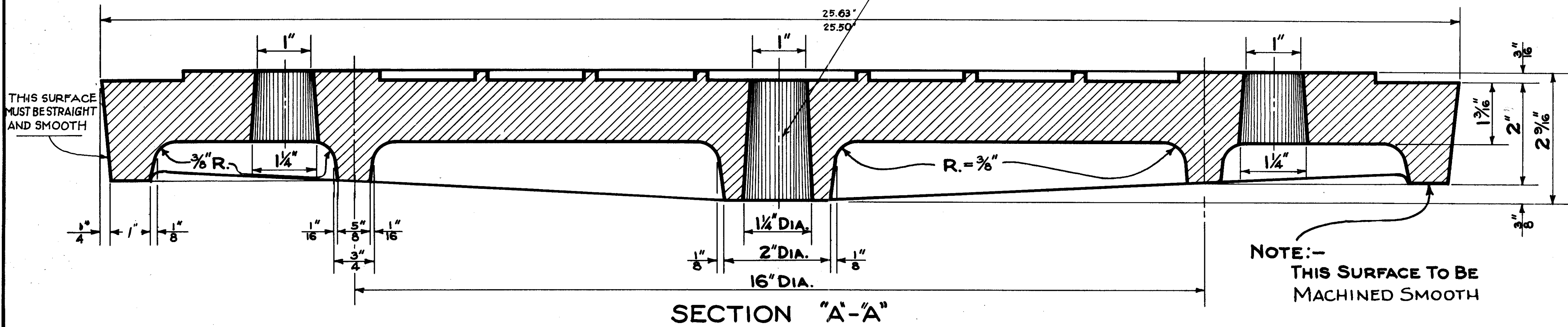


DETAIL PLAN TOP



DETAIL PLAN BOTTOM

OPTION -  
CENTER HOLE  
MAY BE OMITTED



SECTION "A-A"

NOTE:-  
THIS SURFACE TO BE  
MACHINED SMOOTH

SCALE None HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE TPM DATE 9-12-68 CONSULTING ENGINEERS  
TRCD. DATE 9-13-68 KANSAS CITY CLEVELAND NEW YORK  
CKD. DDS. DATE 9-13-68

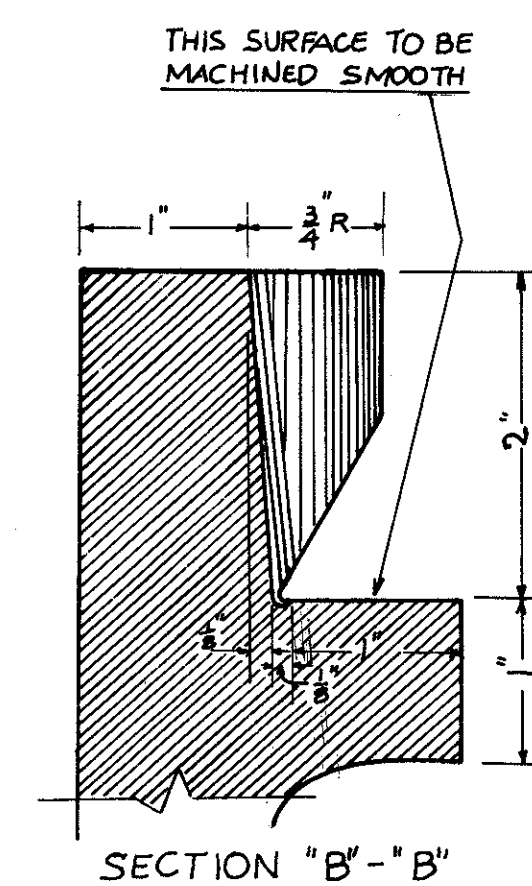
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

1088  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

TAPERED SURFACE MUST BE STRAIGHT SMOOTH AND FREE FROM IRREGULARITIES.  
OPTION - TAPER MAY BE MACHINE FINISHED TO OR BELOW MACHINED SEAT.

SECTION THRU A-A



SECTION "B"- "B"

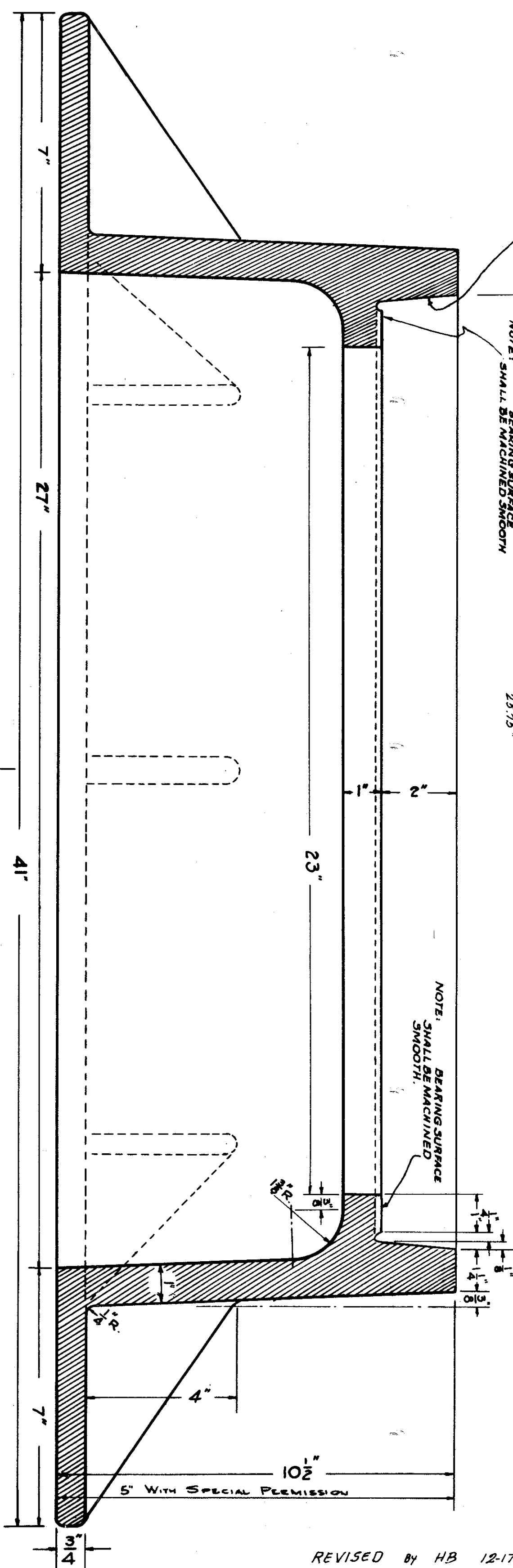
NOTE: SHALL BE MACHINED SMOOTH

25.97"

25.75"

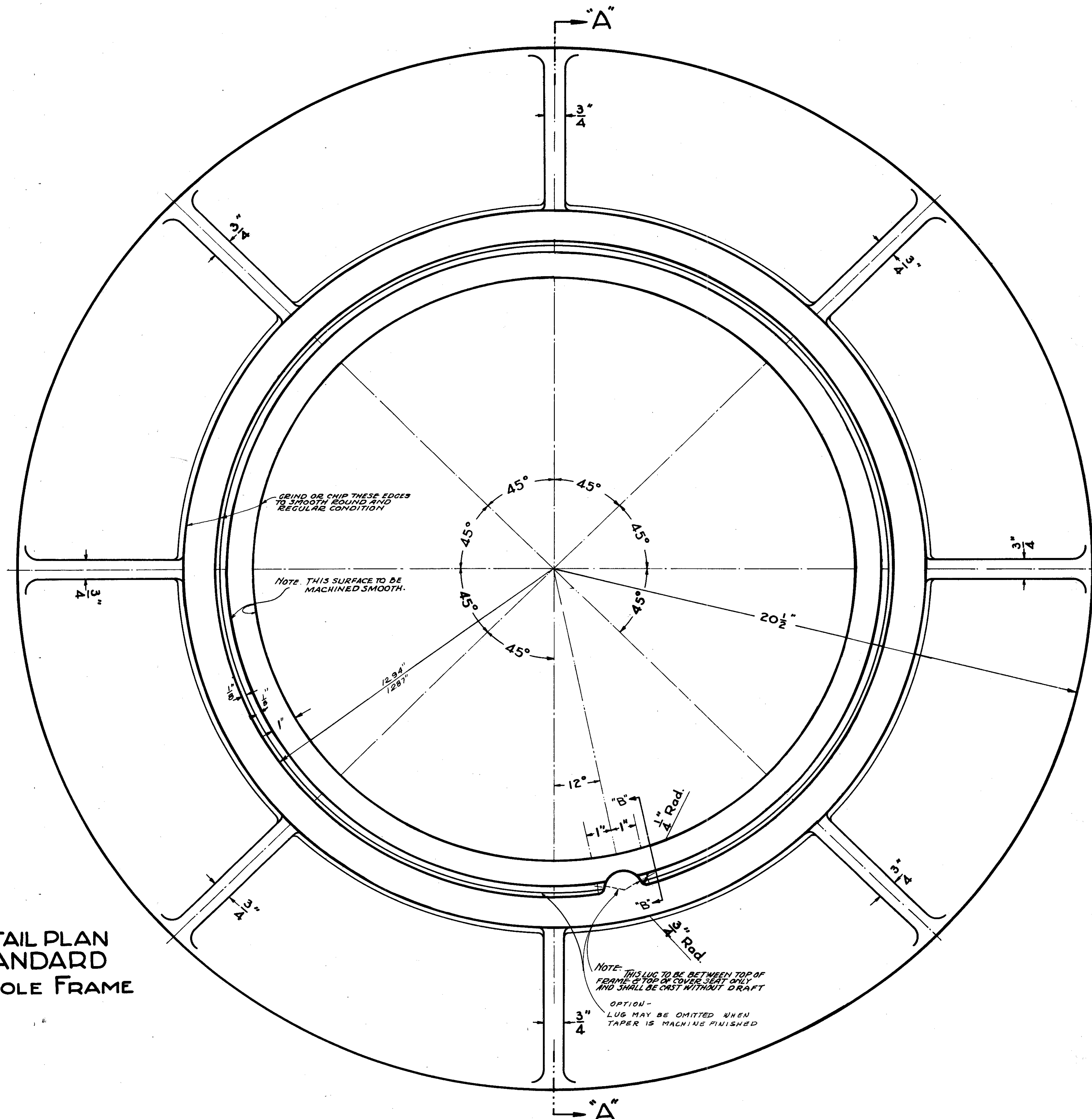
NOTE: BEARING SURFACE SHALL BE MACHINED SMOOTH

23"



REVISED BY HB 12-17-65  
REVISED BY W.J.Y 11-25-66

DETAIL PLAN  
STANDARD  
MANHOLE FRAME



NOTE: THIS LUG TO BE BETWEEN TOP OF FRAME & TOP OF COVER SEAT ONLY AND SHALL BE CAST WITHOUT DRAFT  
OPTION - LUG MAY BE OMITTED WHEN TAPER IS MACHINE FINISHED

EXCEPT WHERE LIMITS ARE NOTED - A CASTING VARIATION OF 1/8" PER FOOT PERMITTED.

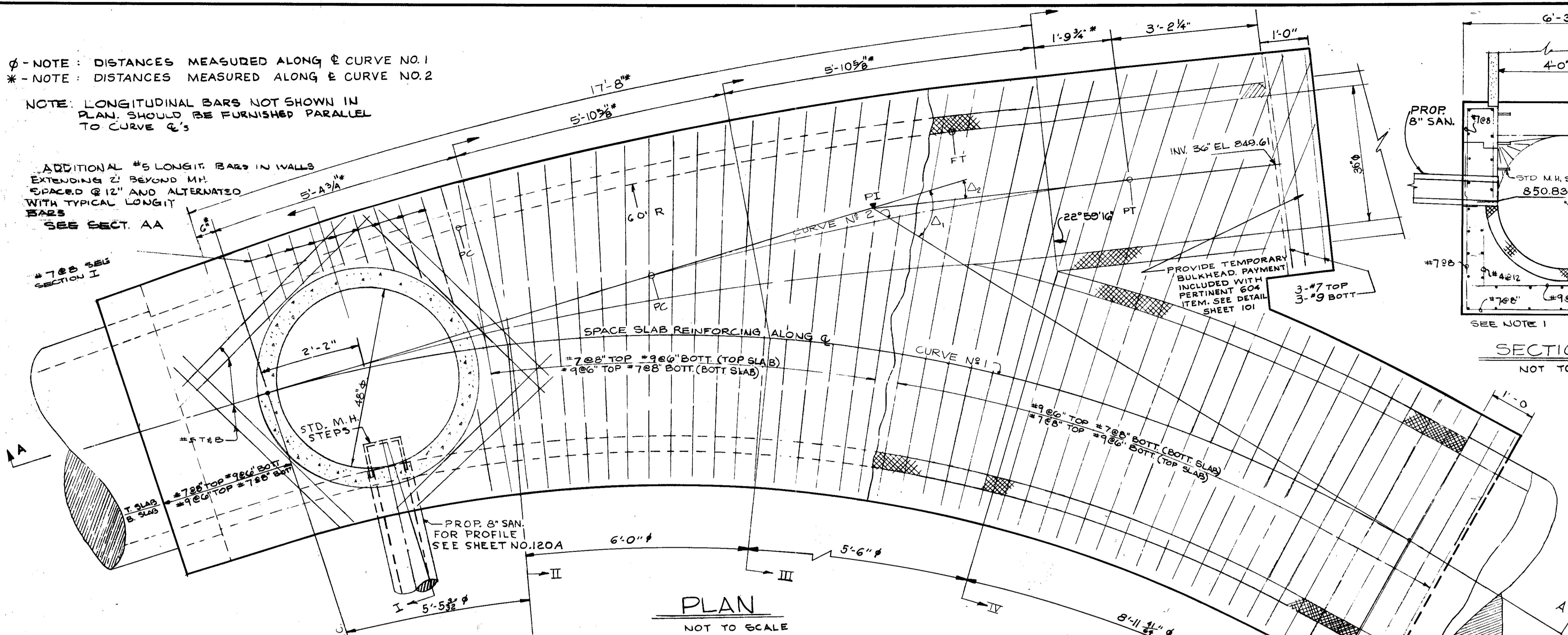
SCALE None HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE FROM DATE 9-13-60 CONSULTING ENGINEERS  
TRCD DATE KANSAS CITY CLEVELAND NEW YORK  
CKD D.D.S. DATE 9-16-60

CUYAHOGA COUNTY  
CUY. 480-21.40

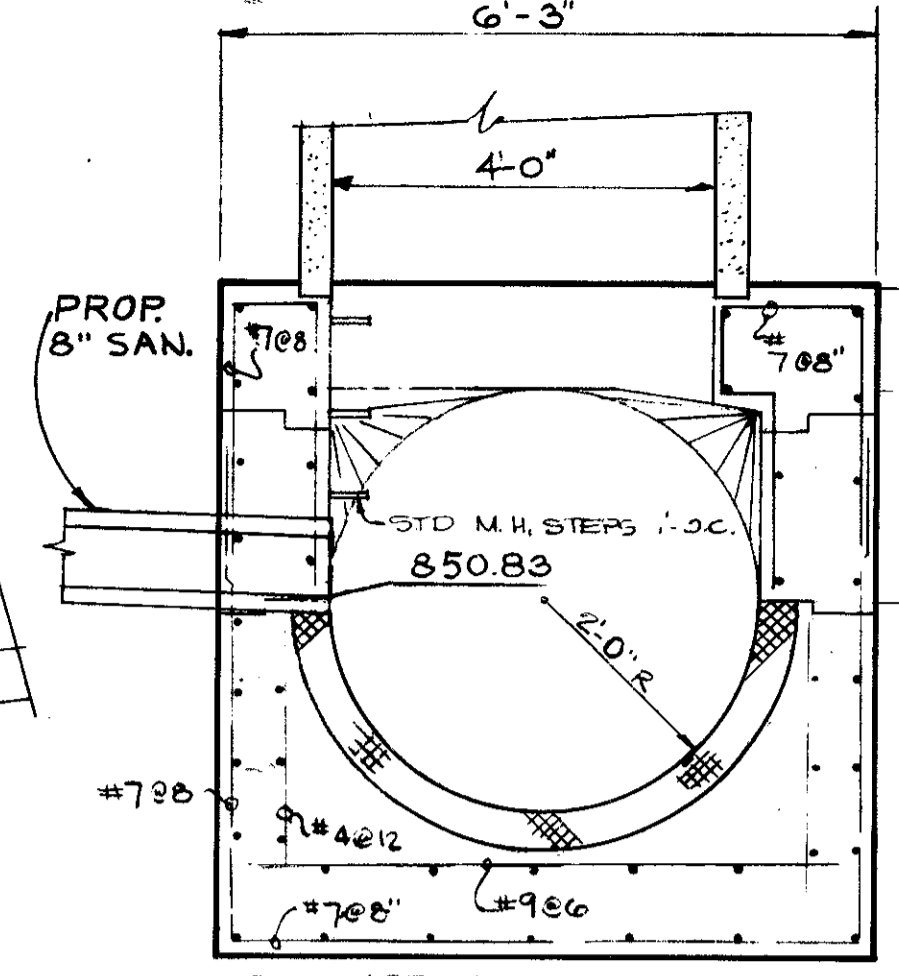
Ø - NOTE: DISTANCES MEASURED ALONG C CURVE NO. 1  
\* - NOTE: DISTANCES MEASURED ALONG C CURVE NO. 2  
NOTE: LONGITUDINAL BARS NOT SHOWN IN PLAN, SHOULD BE FURNISHED PARALLEL TO CURVE C'S

ADDITIONAL #5 LONGIT. BARS IN WALLS EXTENDING 2' BEYOND M.H. SPACED @ 12" AND ALTERNATED WITH TYPICAL LONGIT. BARS SEE SECT. AA

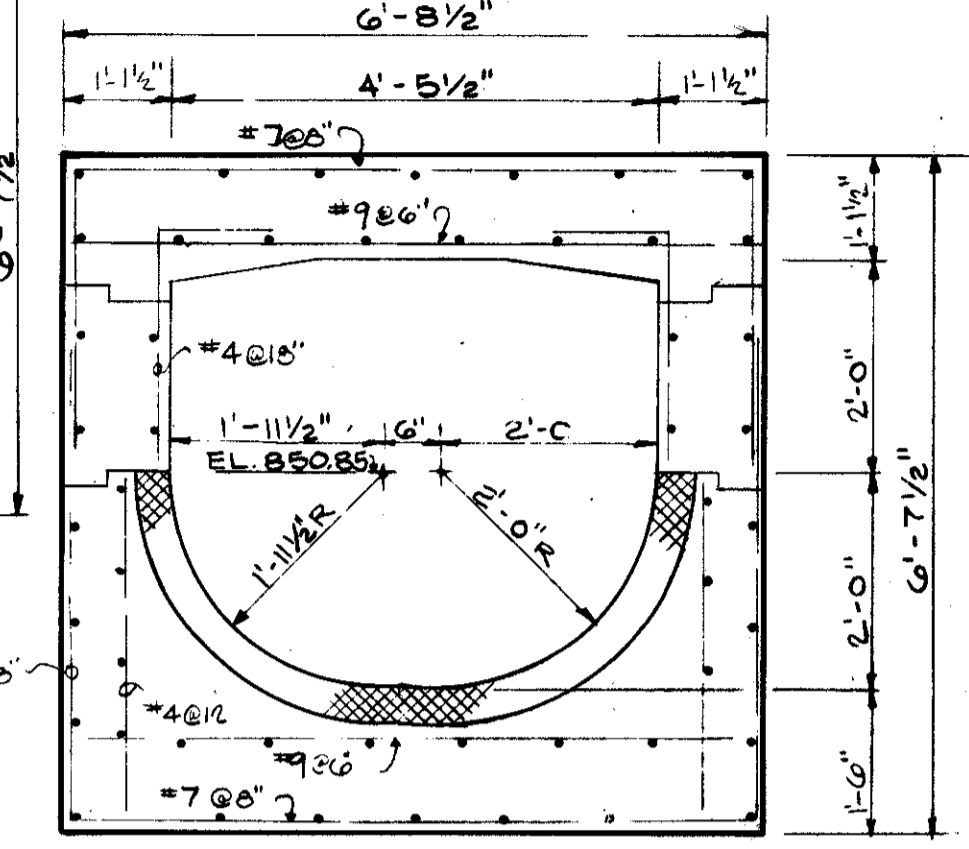
#7 @ 8" SECTION I



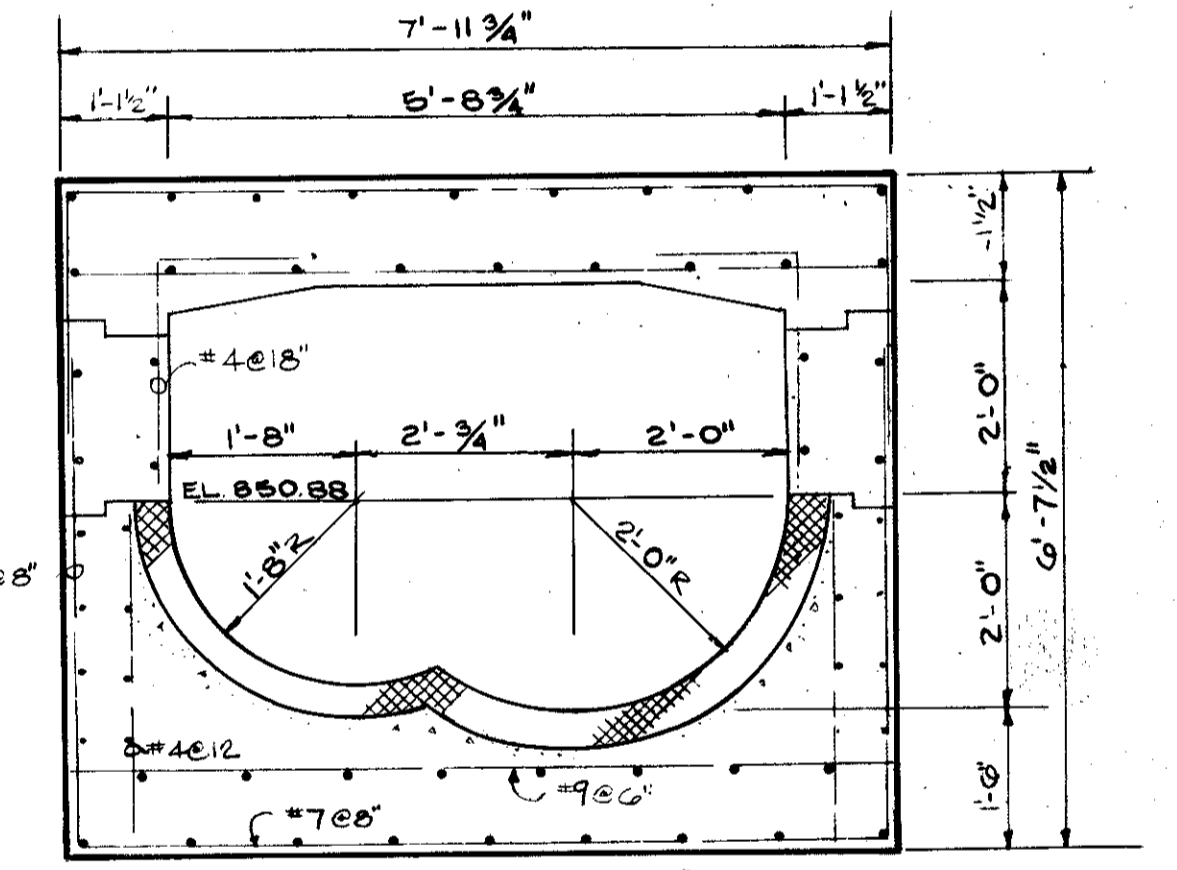
PLAN  
NOT TO SCALE



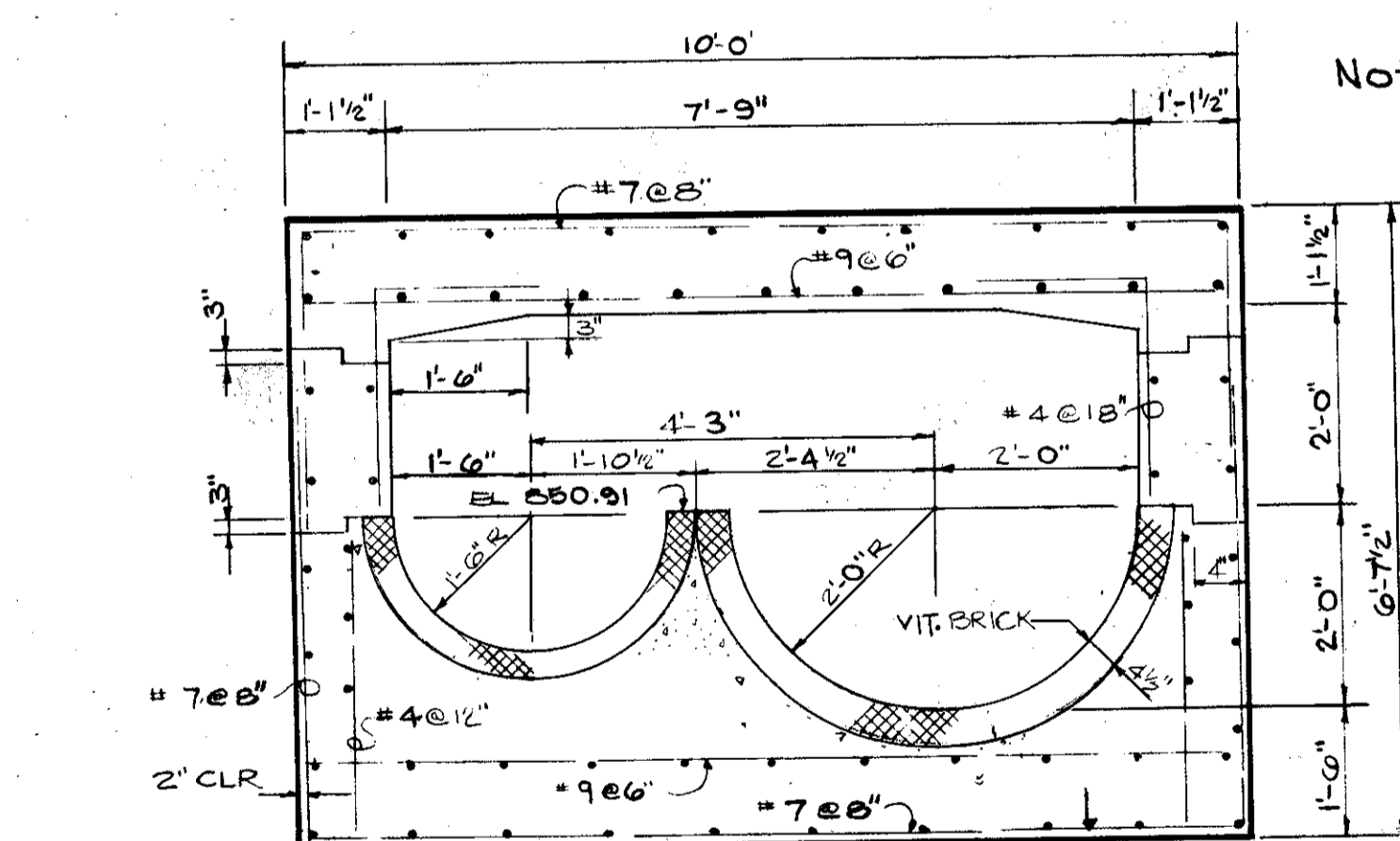
SECTION I  
NOT TO SCALE



SECTION II  
NOT TO SCALE

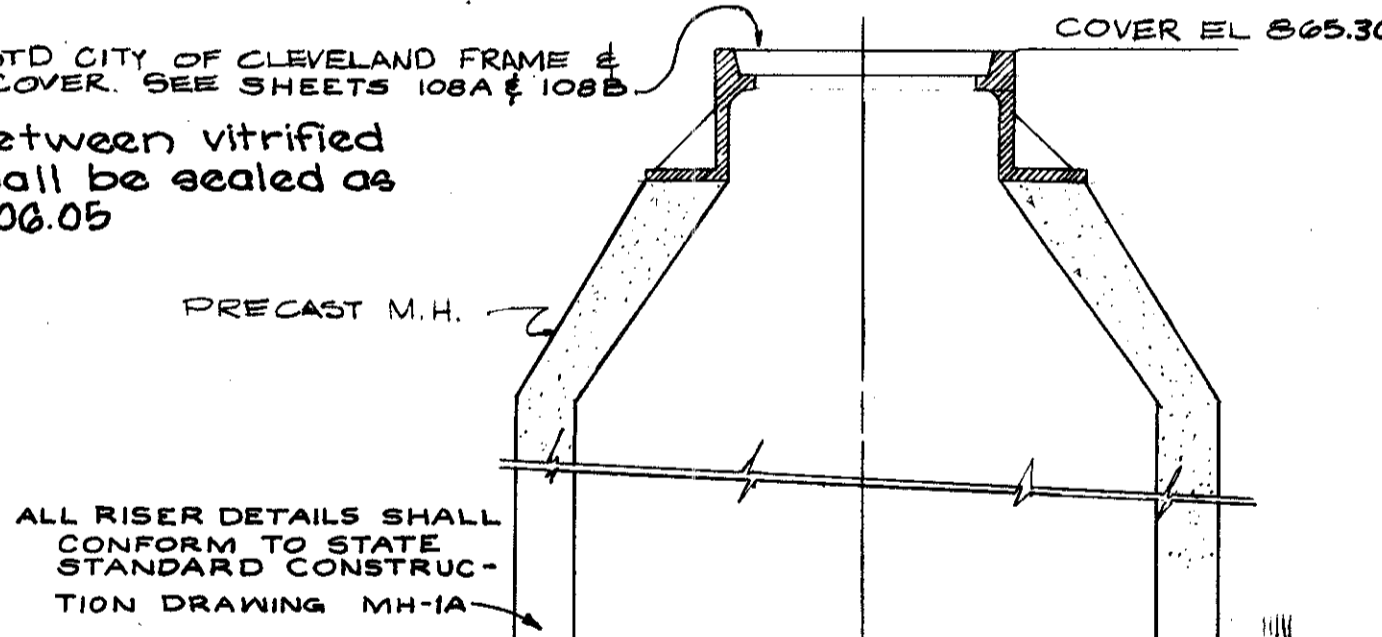


SECTION III  
NOT TO SCALE

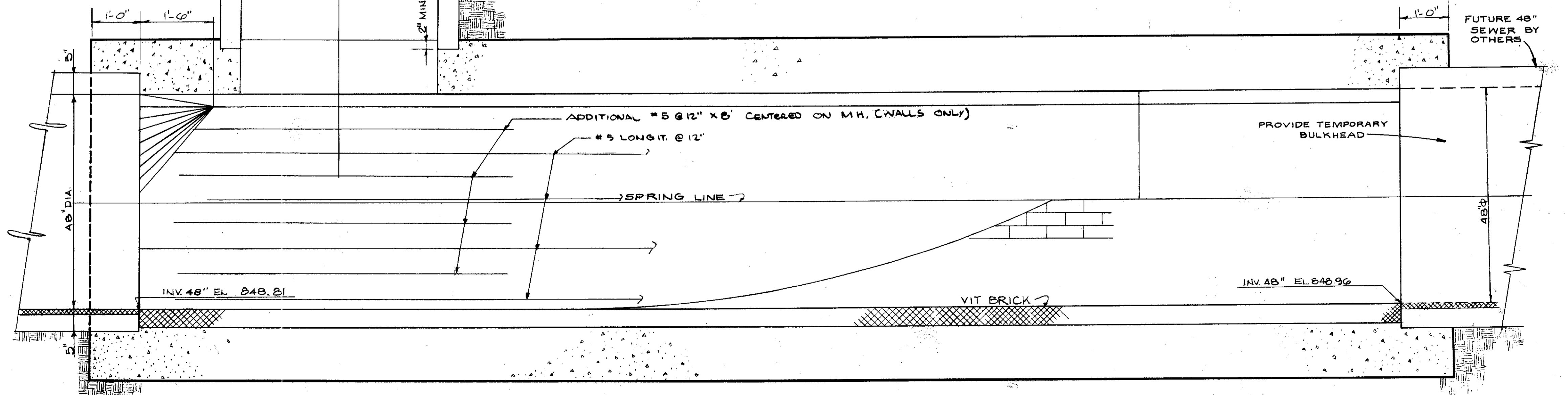


SECTION IV  
NOT TO SCALE

Note: Joints between vitrified bricks shall be sealed as per Sec. 706.05



Ø CURVE DATA CURVE NO. 1 (48")	Ø CURVE DATA CURVE NO. 2 (36")
Δ = 49° 29' 39"	Δ = 11° 20' 35"
R = 30'	R = 60'
T = 13.83'	T = 5.96'
L = 25.92'	L = 11.88'



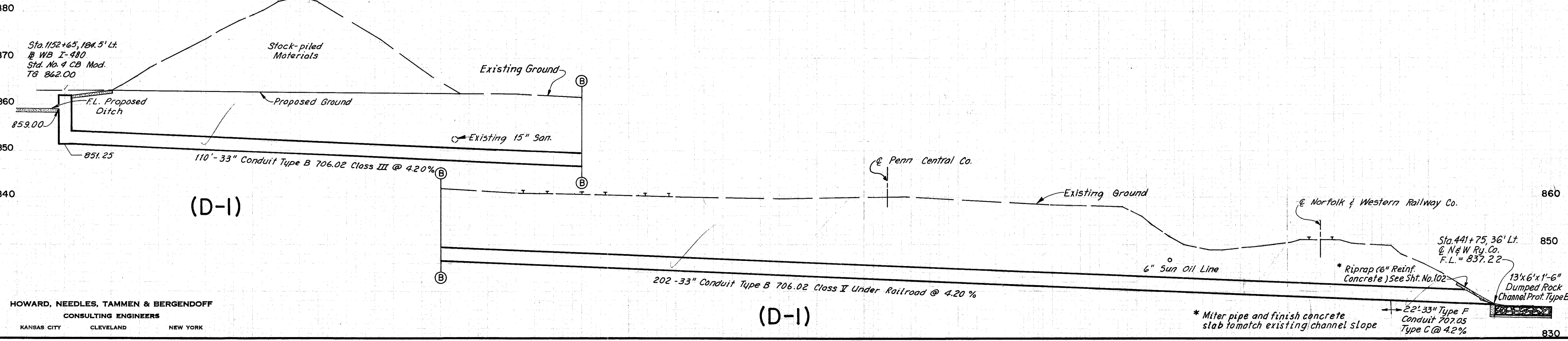
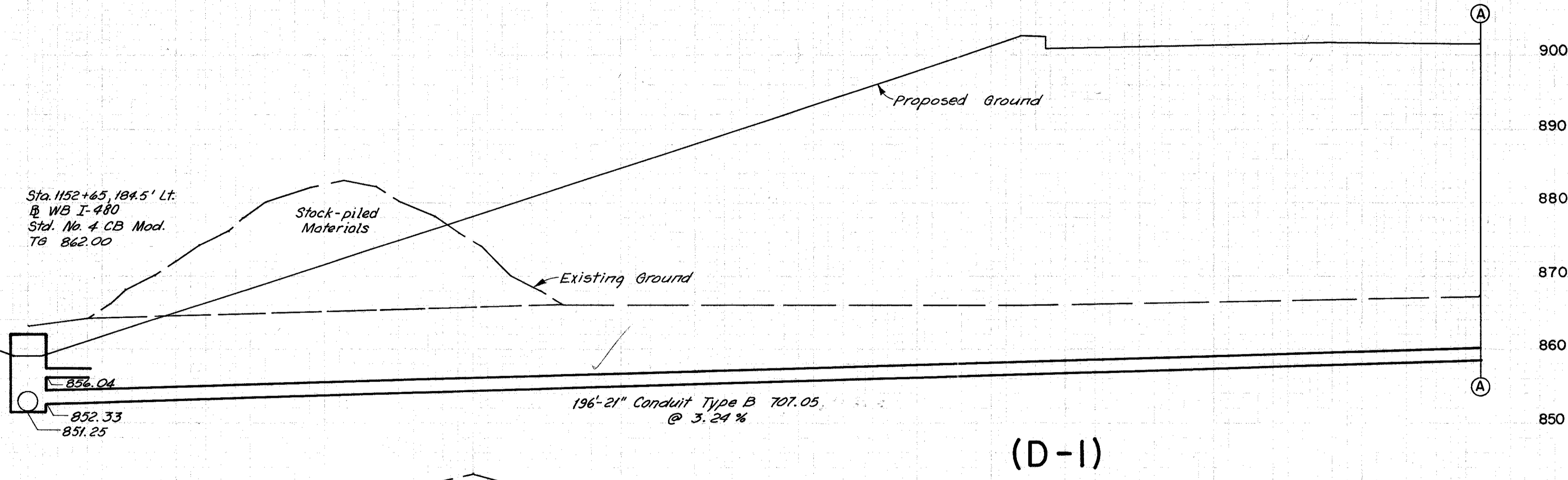
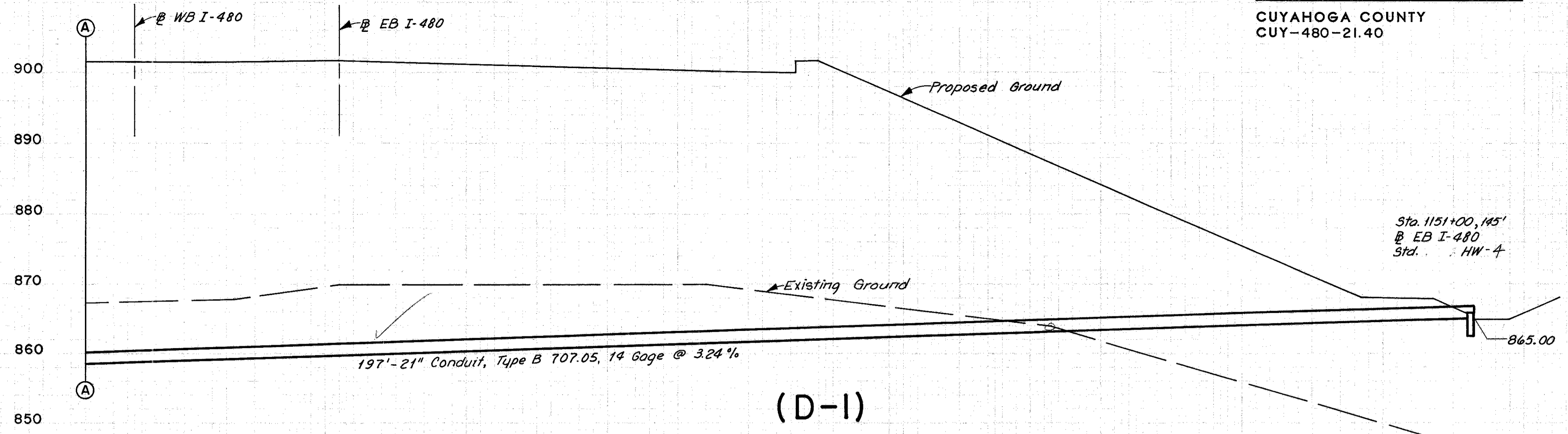
SECTION A-A  
NOT TO SCALE

**GENERAL NOTES**  
FOUNDATION MATERIAL OF APPROXIMATELY UNIFORM BEARING CAPACITY IS CONTEMPLATED. SPOTS OF SOFT EARTH SHALL BE REMOVED AND BE REPLACED WITH THOROUGHLY COMPACTED GRANULAR MATERIAL.  
EMBANKMENT SHALL BE PLACED SYMMETRICALLY ON BOTH SIDES OF THE CHAMBER AFTER THE TOP SLAB IS IN PLACE. EMBANKMENT OVER THE BARREL SHALL BE PLACED IN HORIZONTAL LAYERS SIMULTANEOUSLY, WITH THAT ON EACH SIDE OF CHAMBER.  
CONCRETE SHALL BE CLASS "C".  
REINFORCING - ALL REINFORCING STEEL TO HAVE A 2" MINIMUM COVER EXCEPT WHERE OTHERWISE NOTED.  
DESIGN SPECIFICATIONS - THIS STRUCTURE CONFORMS TO THE REQUIREMENTS OF DESIGN SPECIFICATIONS FOR HIGHWAY STRUCTURE OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

109  
390

CUYAHOGA COUNTY  
CUY-480-21.40



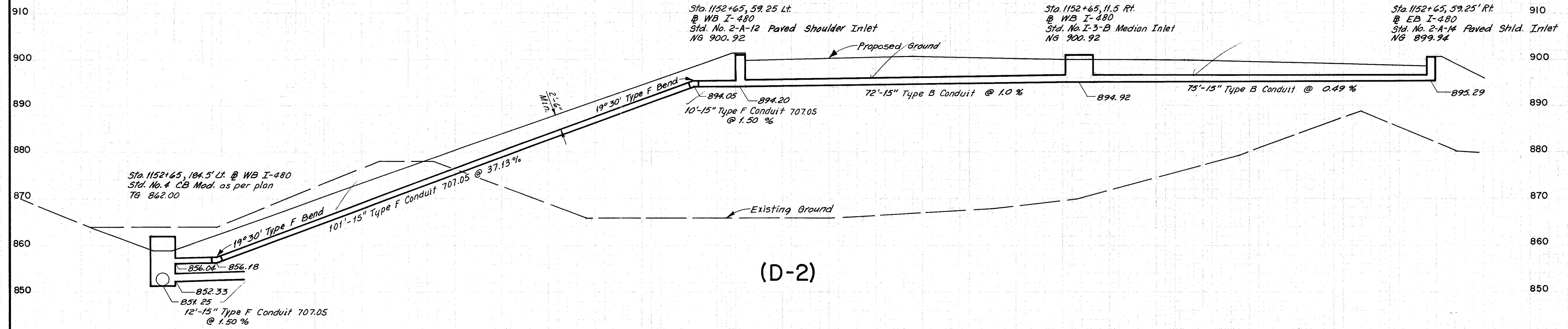
F.P.A.  
K.A.M.  
I.M.  
3-28-71  
3-30-71  
4-8-71

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

110  
390

CUYAHOGA COUNTY  
CUY-480-21.40



(D-2)

(E-41)

(E-43)

(D-100)

(D-102)

(E-42)

(E-44)

(D-101)

(D-103)

(D-98)

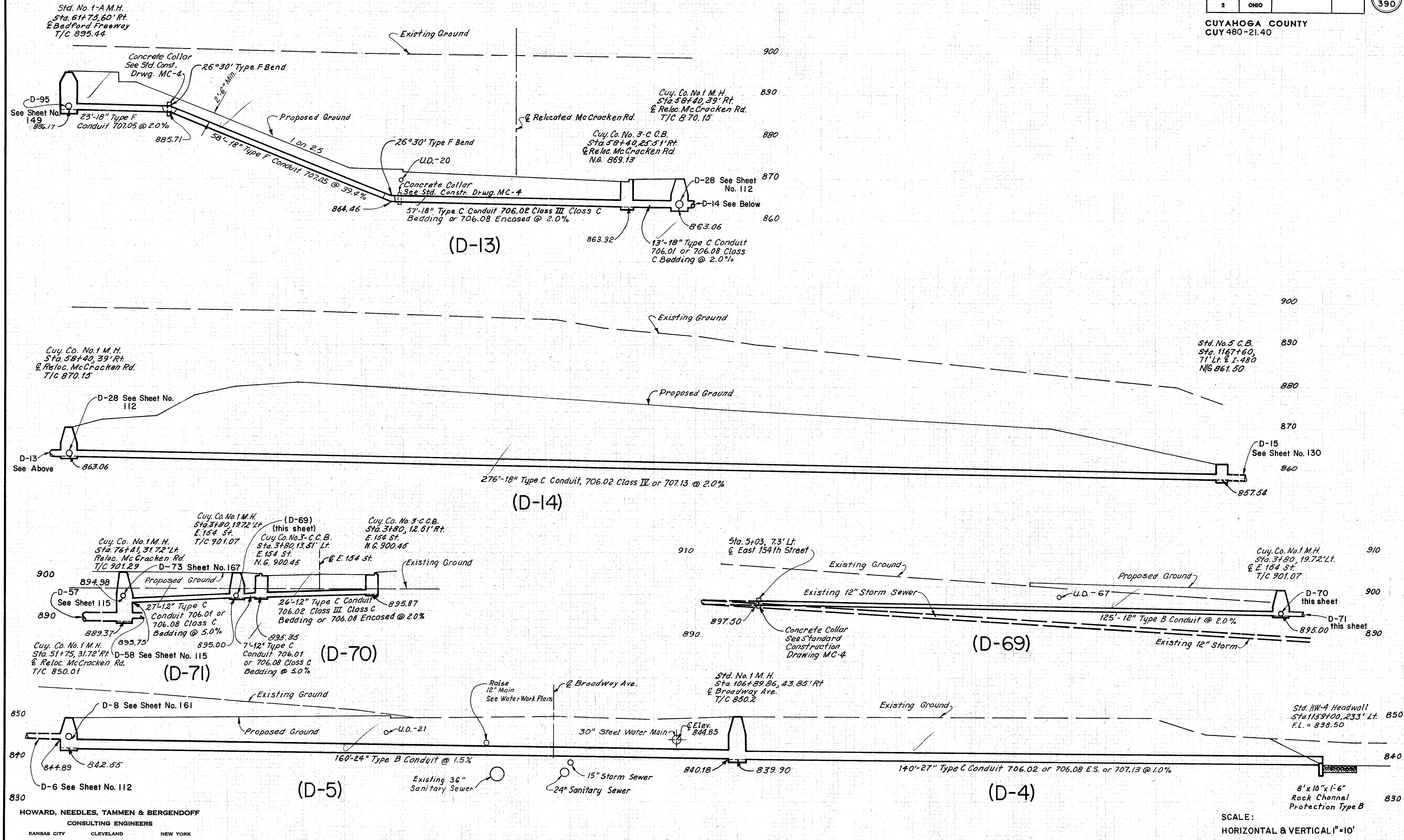
(D-99)

8-26-71  
 3-5-71  
 4-8-71  
 E.P.A.  
 R.A.W.  
 I.M.

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

390

CUYAHOGA COUNTY  
CUY 480-21.40

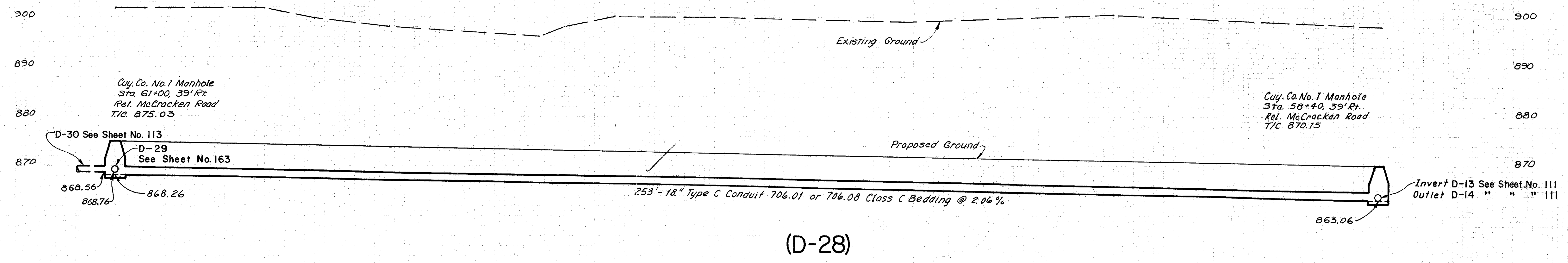


31069  
 I.M.  
 E.R.A.  
 Made  
 Checked

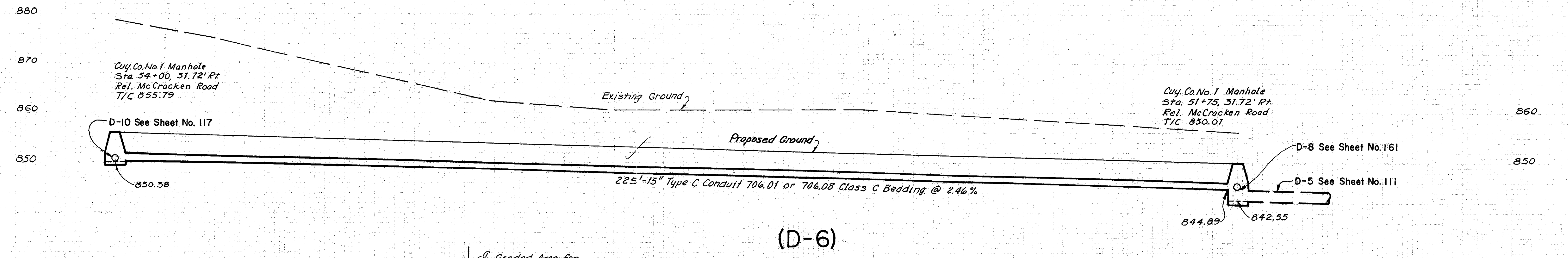
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

SCALE:  
HORIZONTAL & VERTICAL 1"=10'

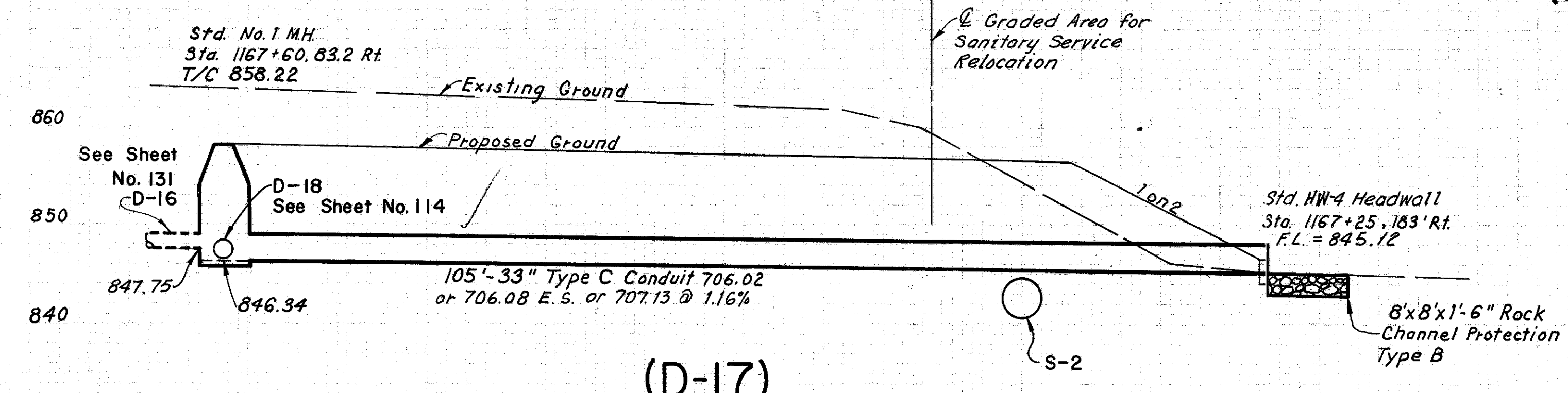
CUYAHOGA COUNTY  
CUY 480-21.40



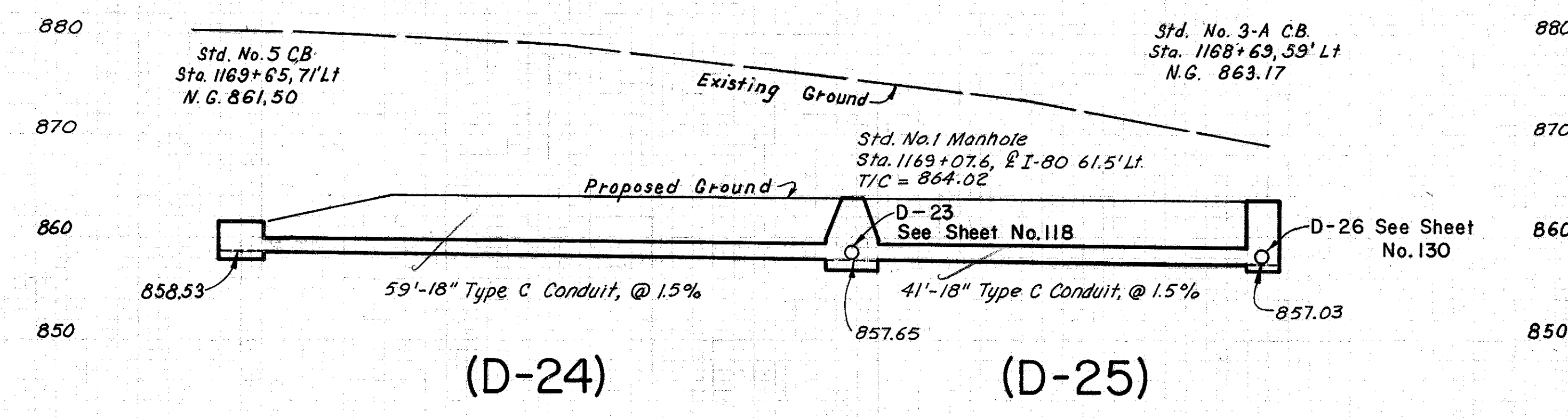
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(D-6)



(D-17)

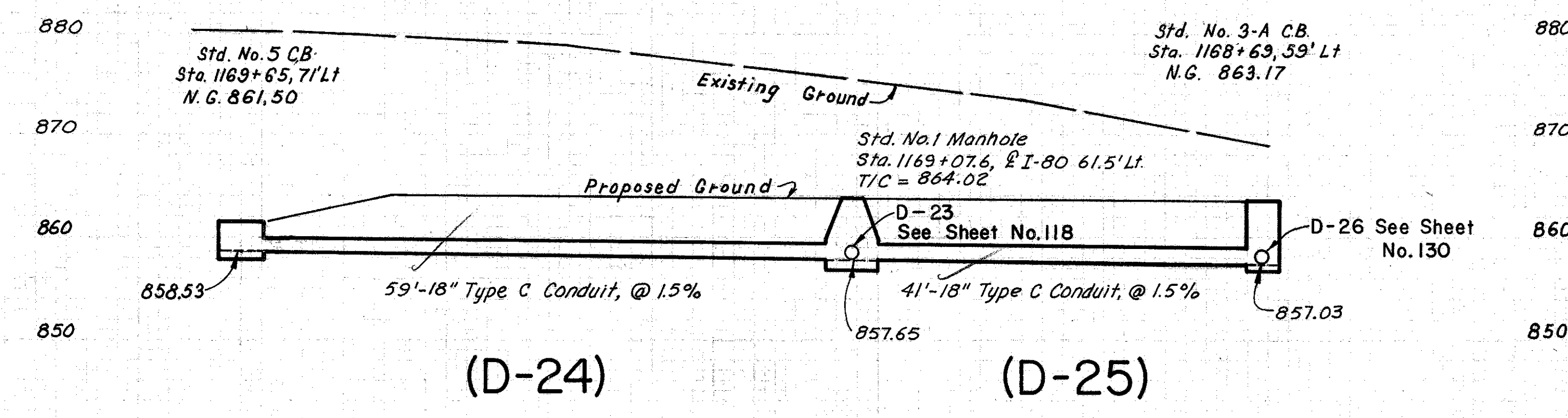
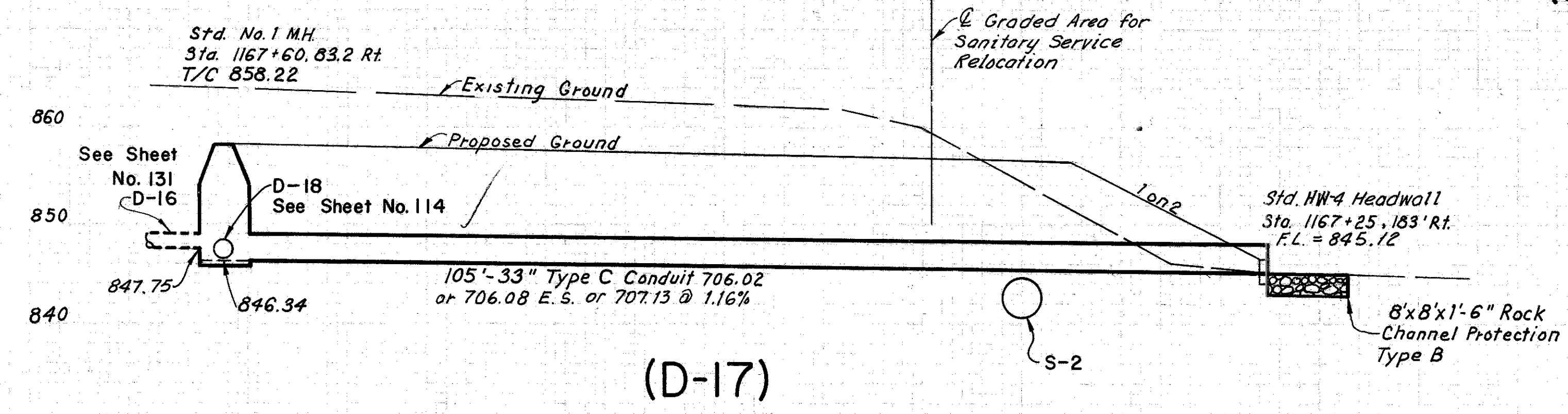
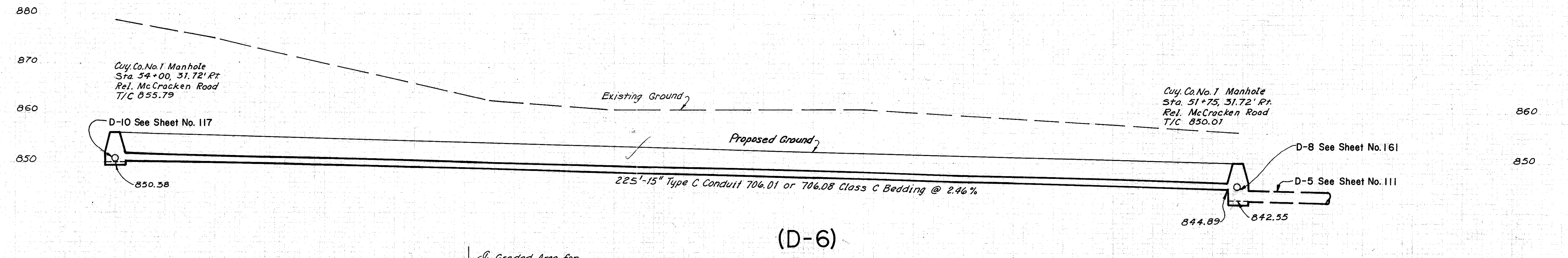
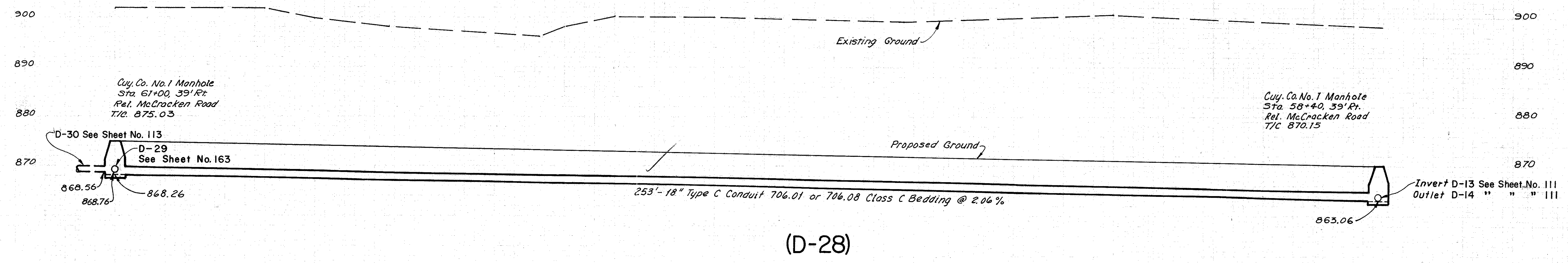


(D-24)

(D-25)

3/10/69  
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E.R.A.  
Made:  
Checked:

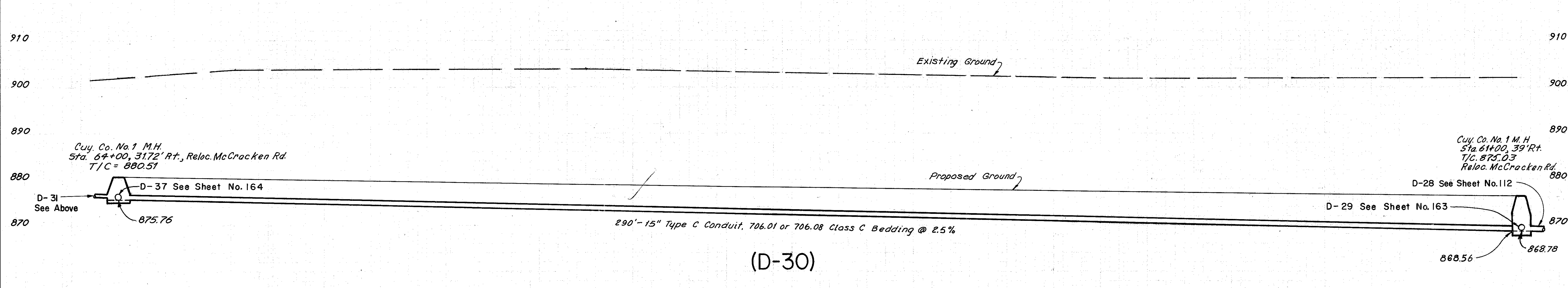
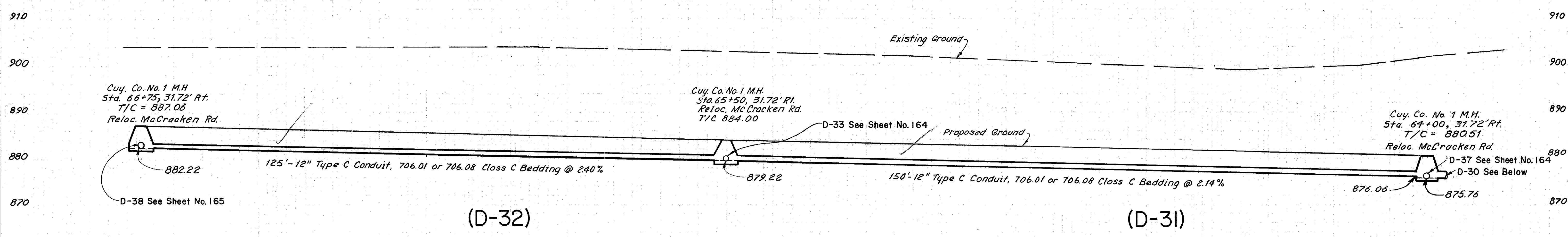
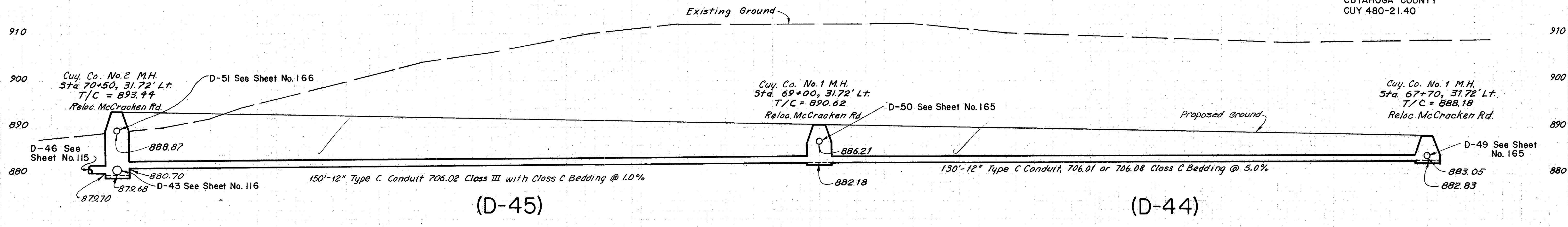
CUYAHOGA COUNTY  
CUY 480-21.40



3-10-69  
I.M.  
E.R.A.  
Made:  
Checked:

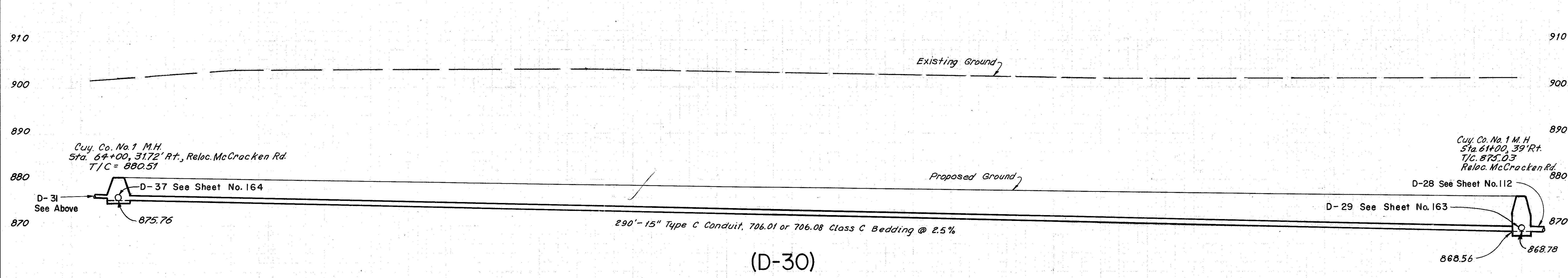
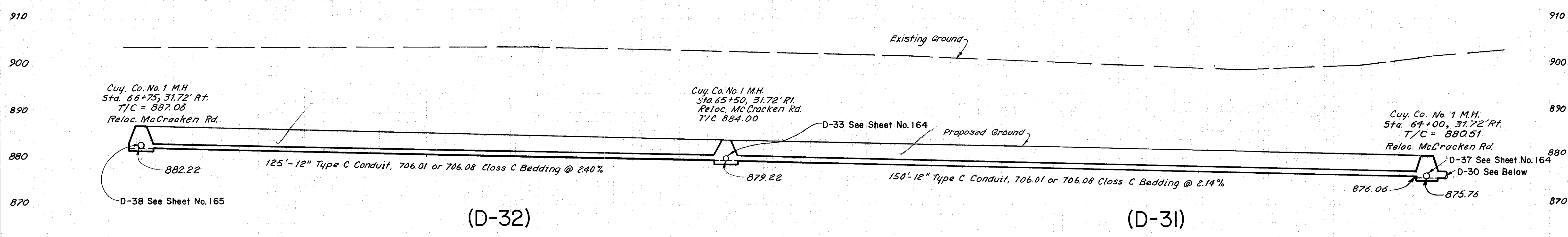
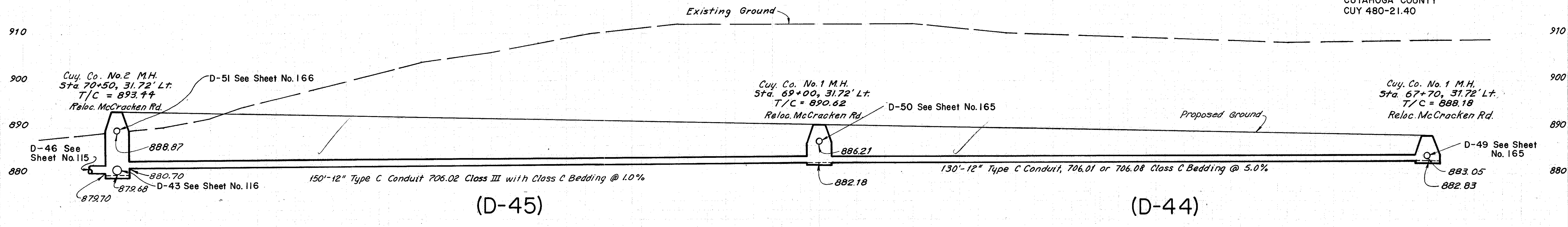


CUYAHOGA COUNTY  
CUY 480-21.40

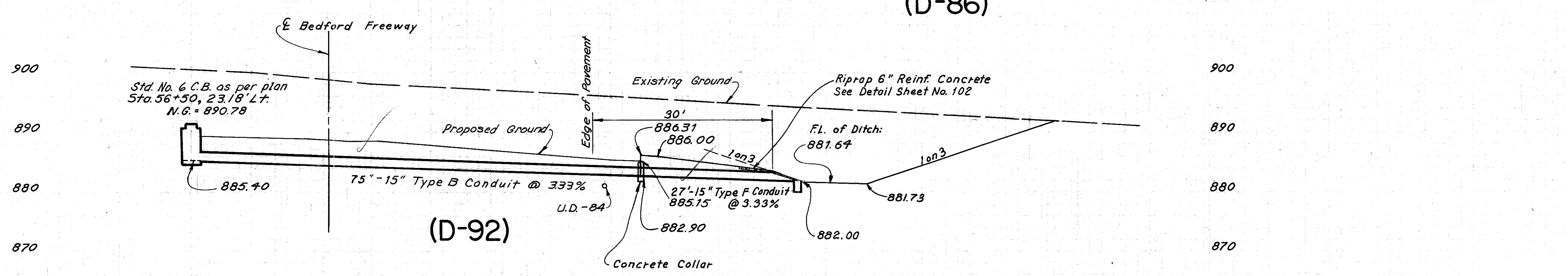
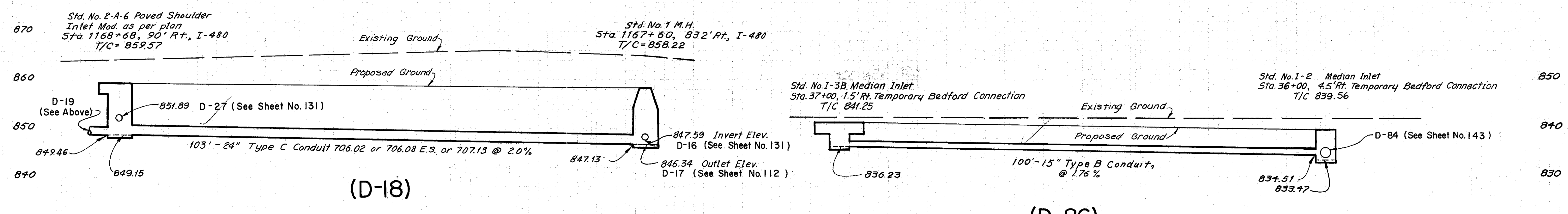
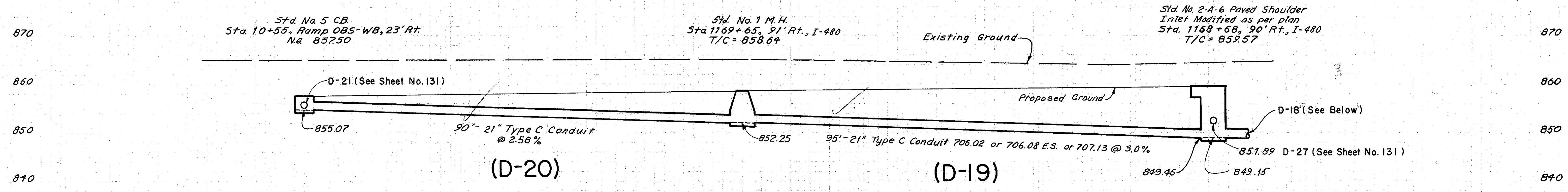


Made: 3-10-69  
 Checked: 3-20-69  
 I.M.  
 E.R.A.

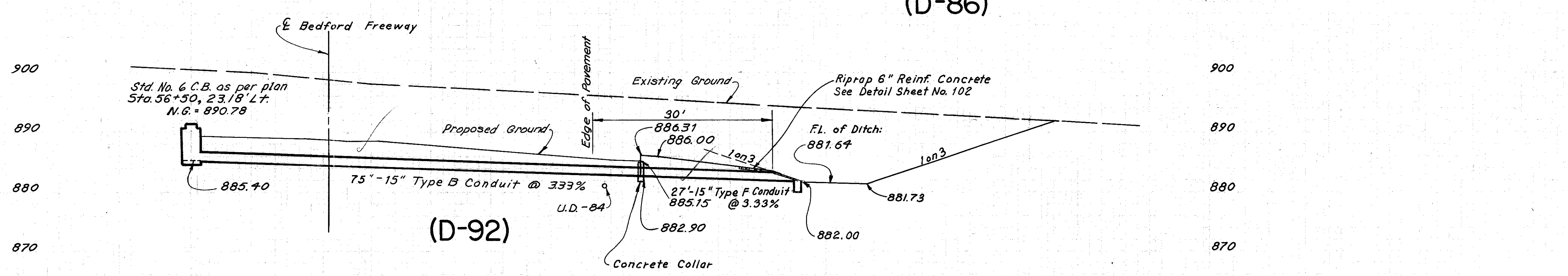
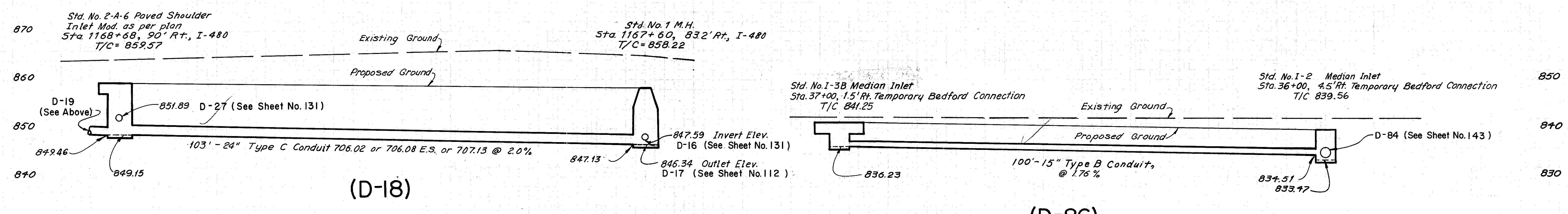
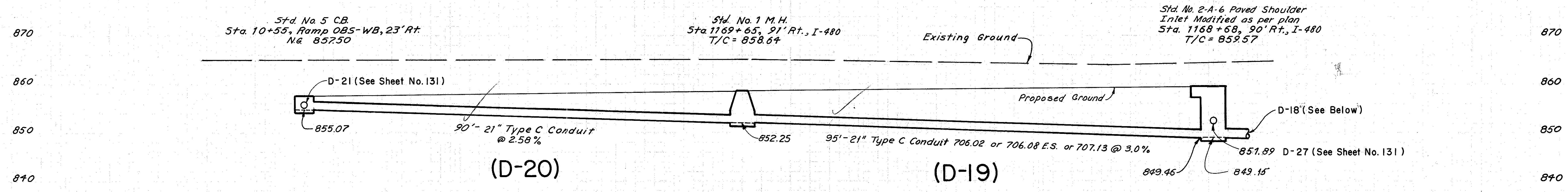
CUYAHOGA COUNTY  
CUY 480-21.40



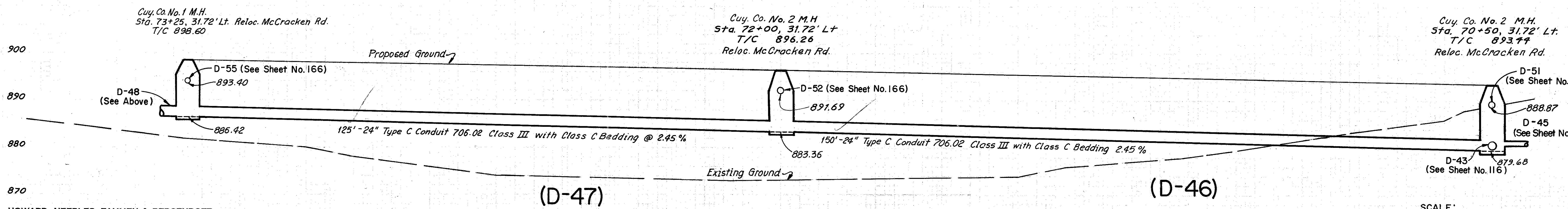
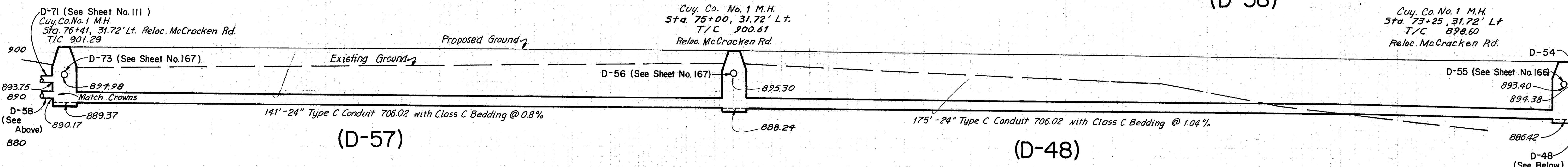
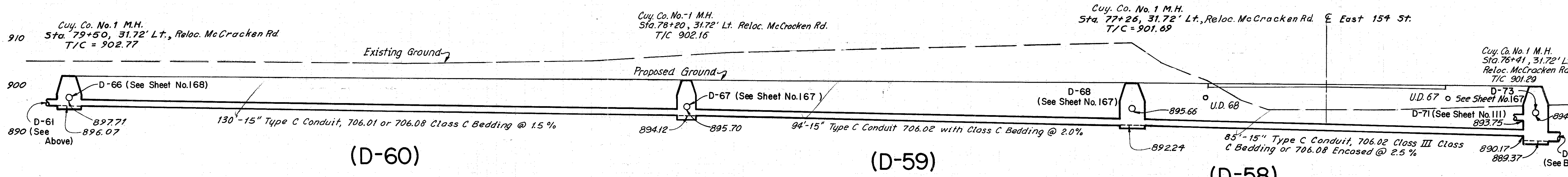
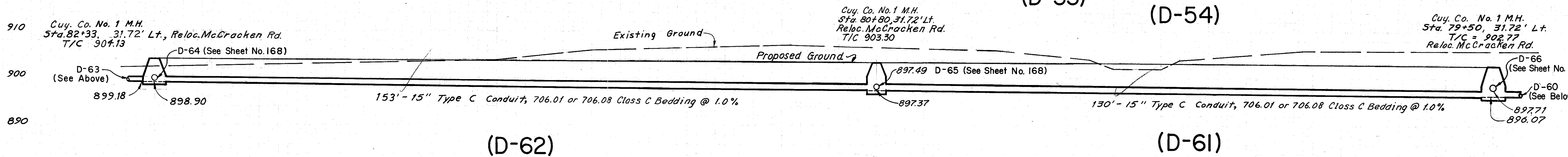
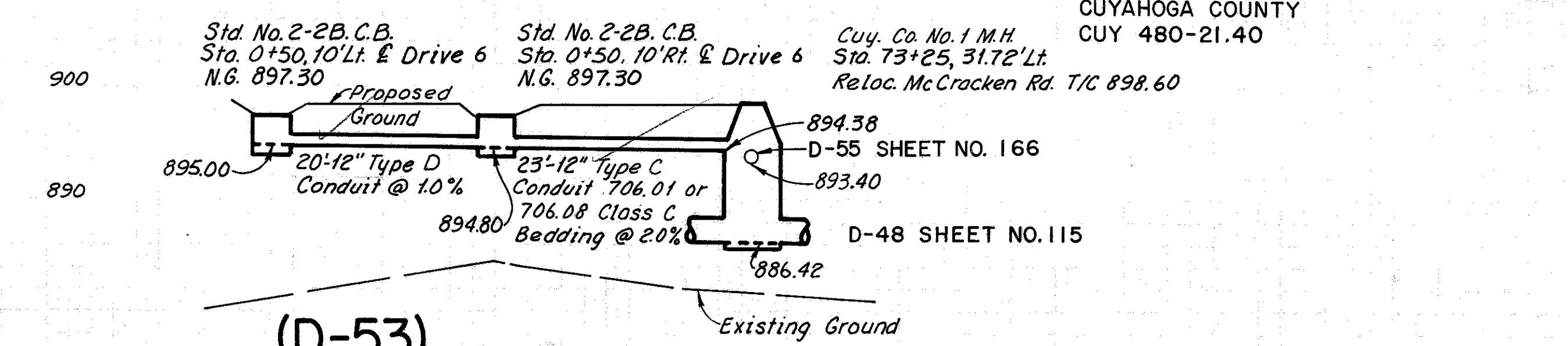
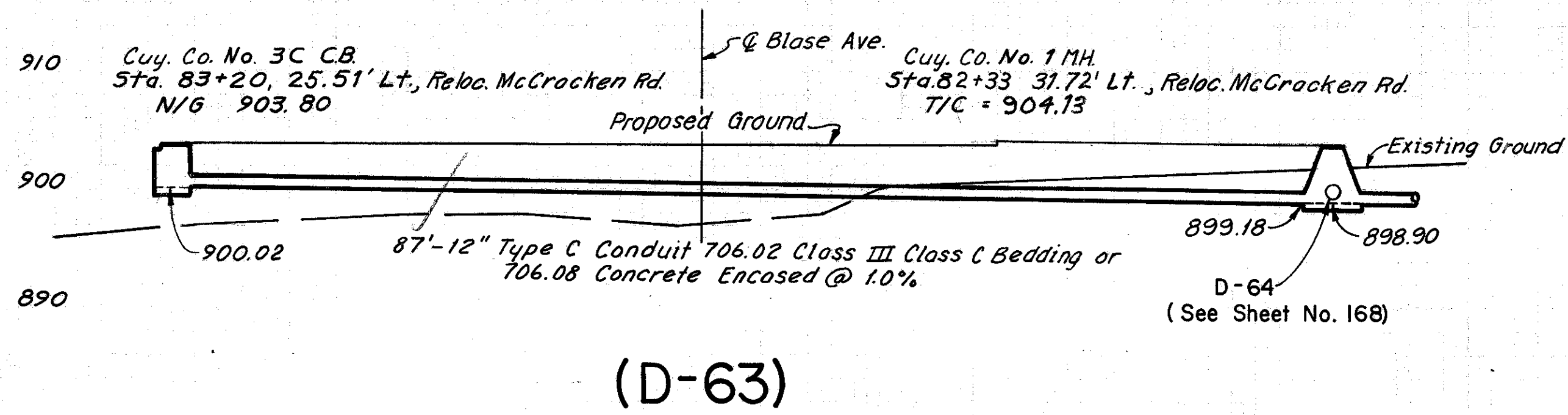
Made: 3-10-69  
 Checked: 3-20-69  
 I.M.  
 E.R.A.



3-10-69  
 I.M.E.R.A.  
 Made 1/24/69

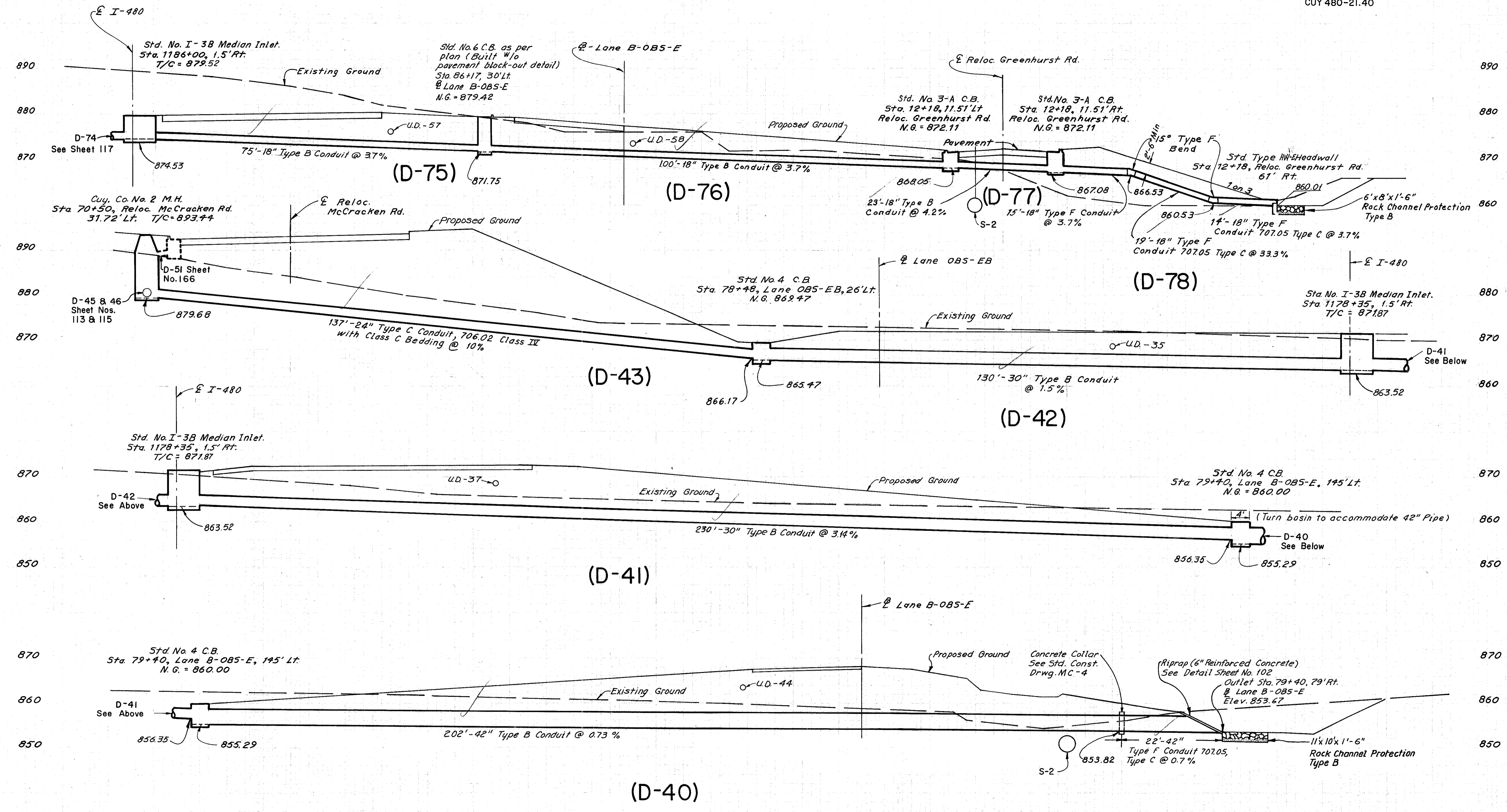


3-10-69  
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 E.R.A.  
 Made  
 1/24/69

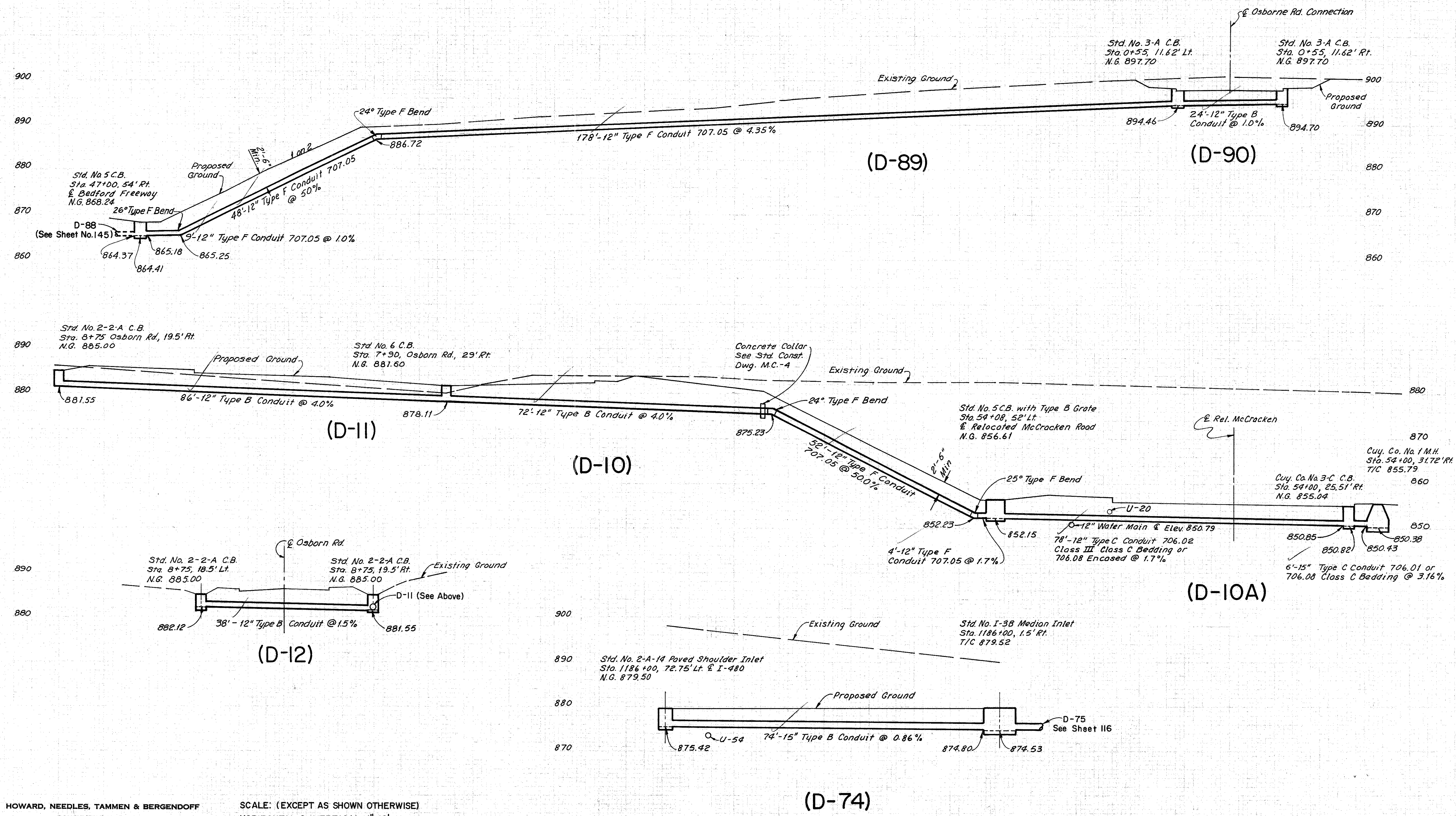


5/10/69  
 3/20/69  
 I.M.  
 E.R.A.  
 Made: Checked

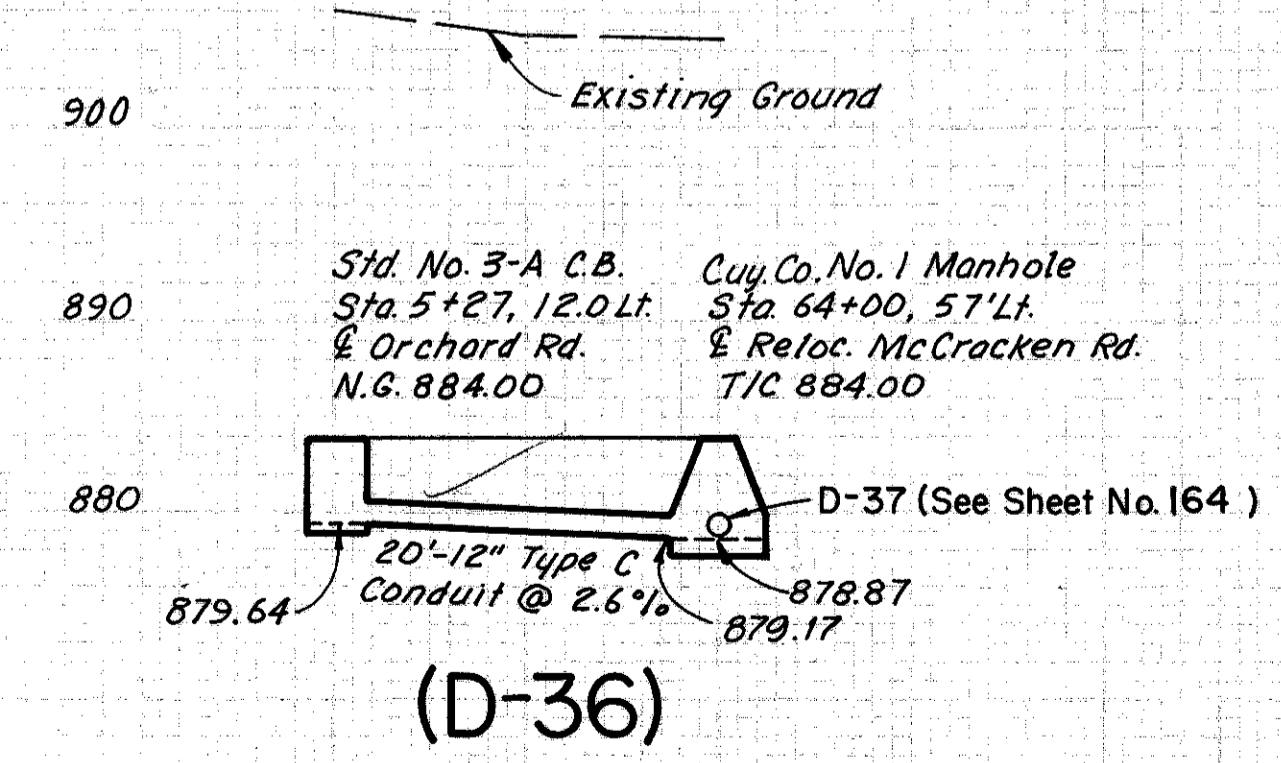
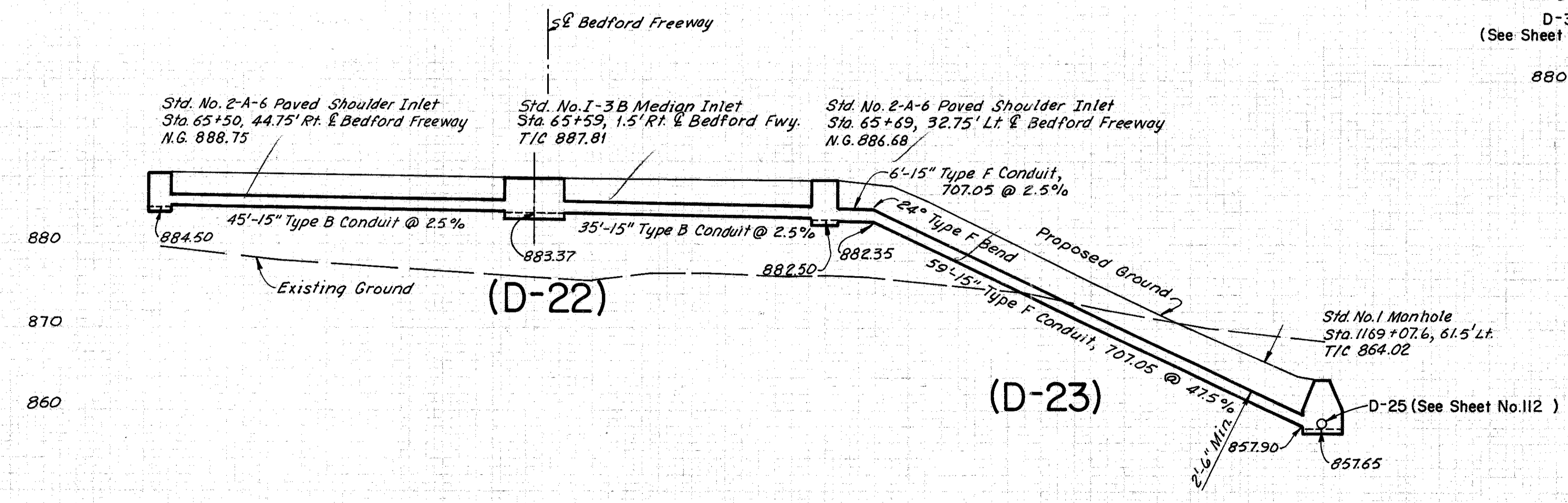
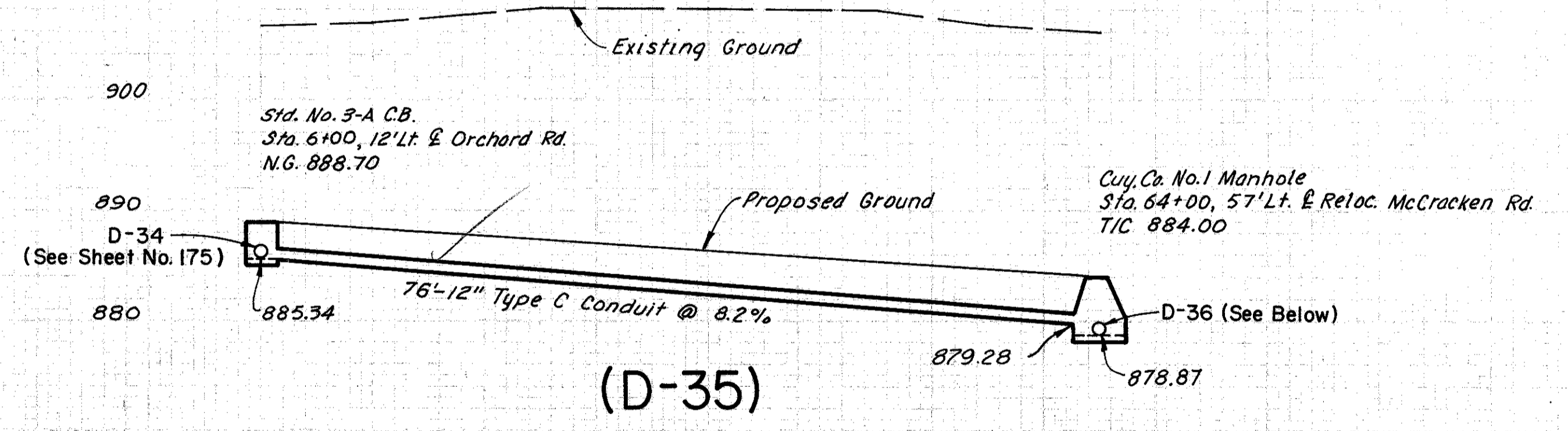
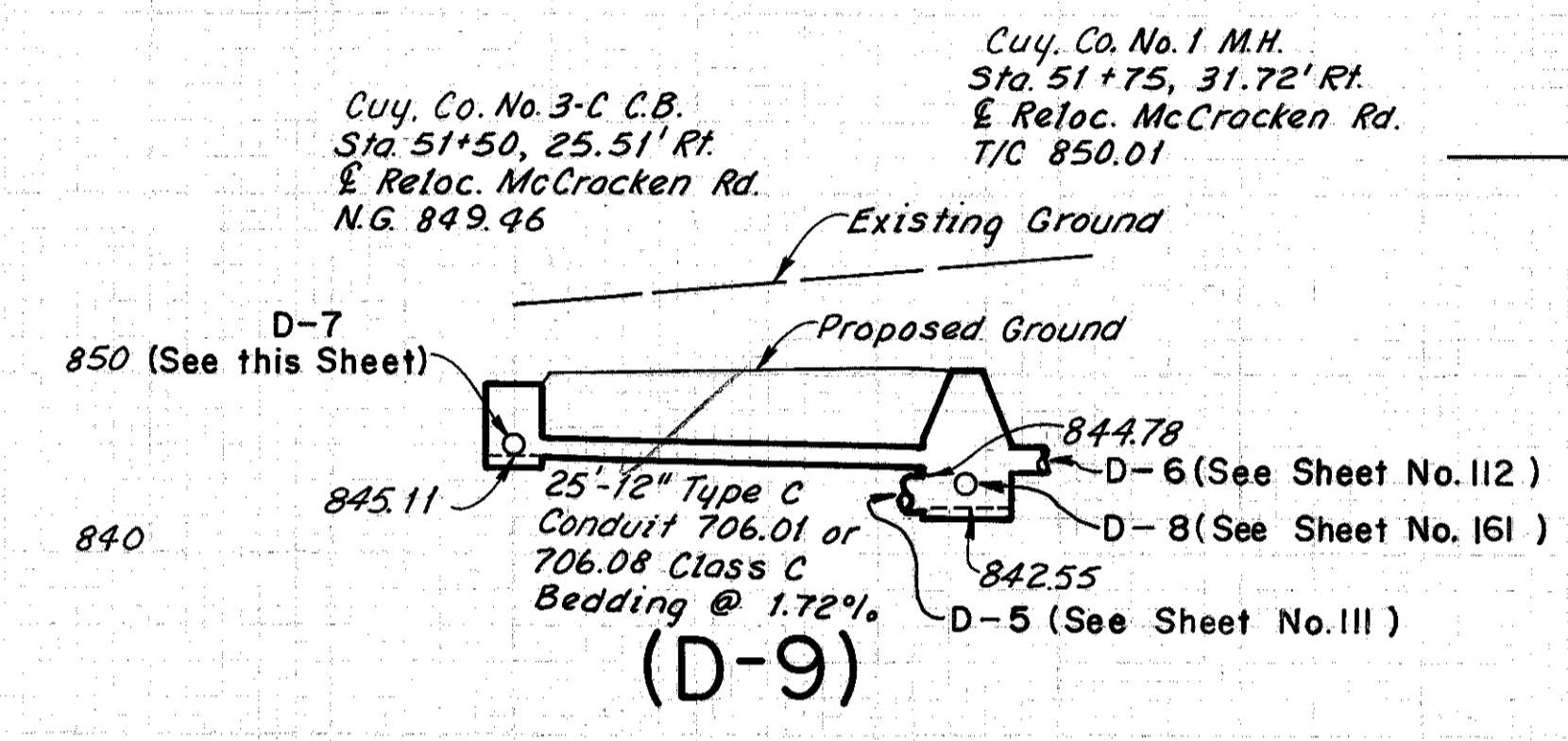
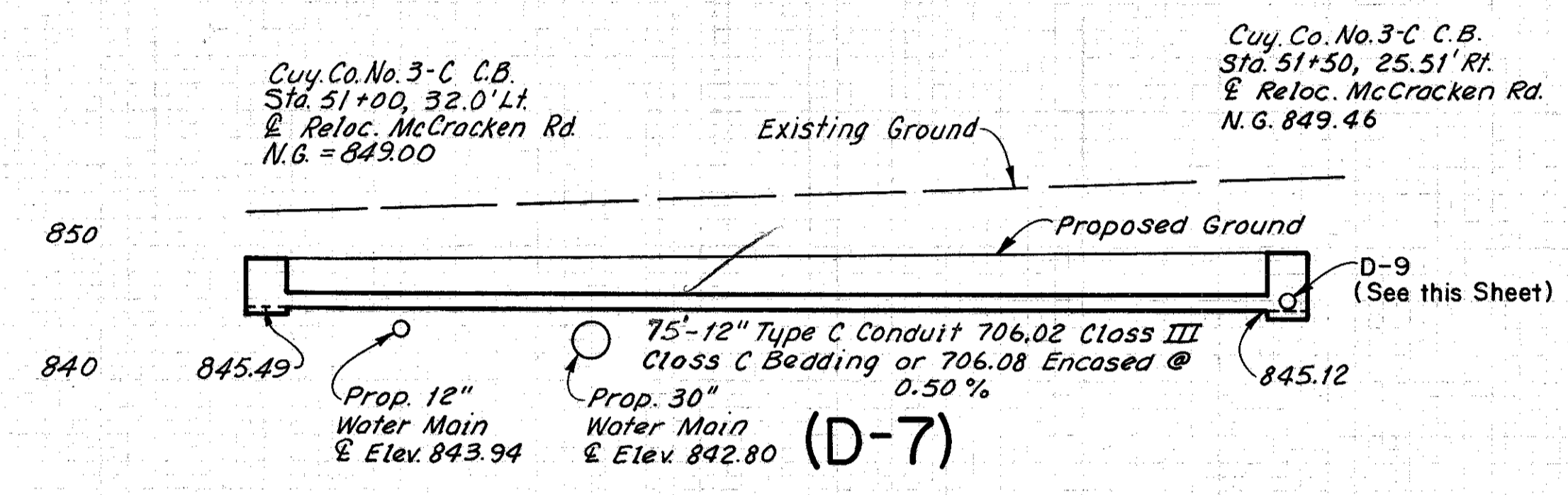
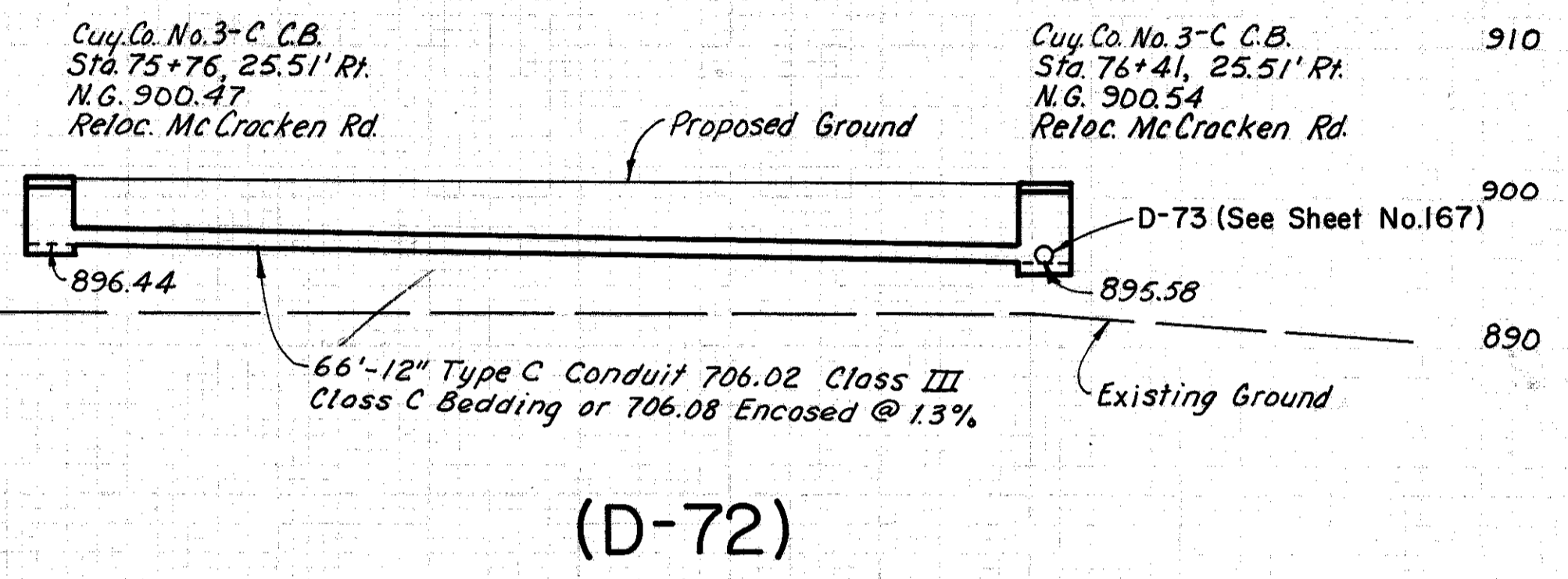
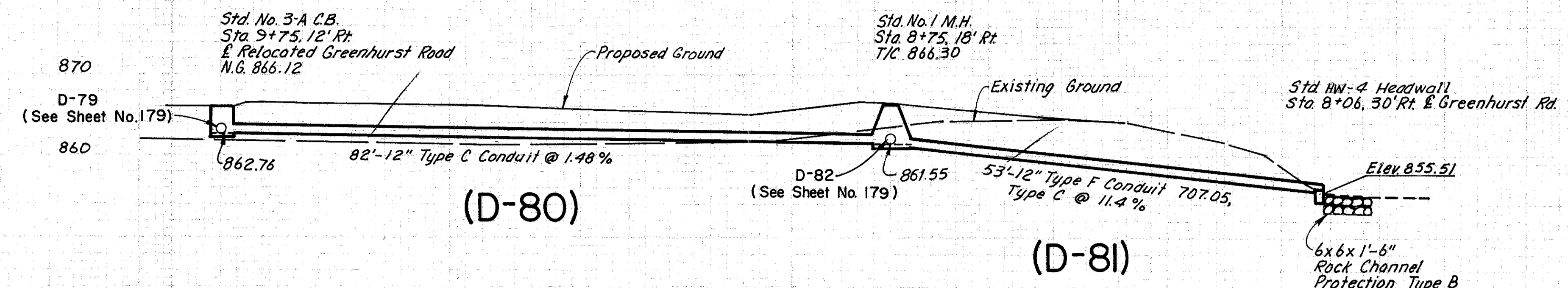
CUYAHOGA COUNTY  
CUY 480-21.40



3-10-68  
 3-20-68  
 I.M.  
 E.R.A.  
 Made  
 Checked



5-10-69  
 J.M.  
 E.P.A.  
 Made: Checked:



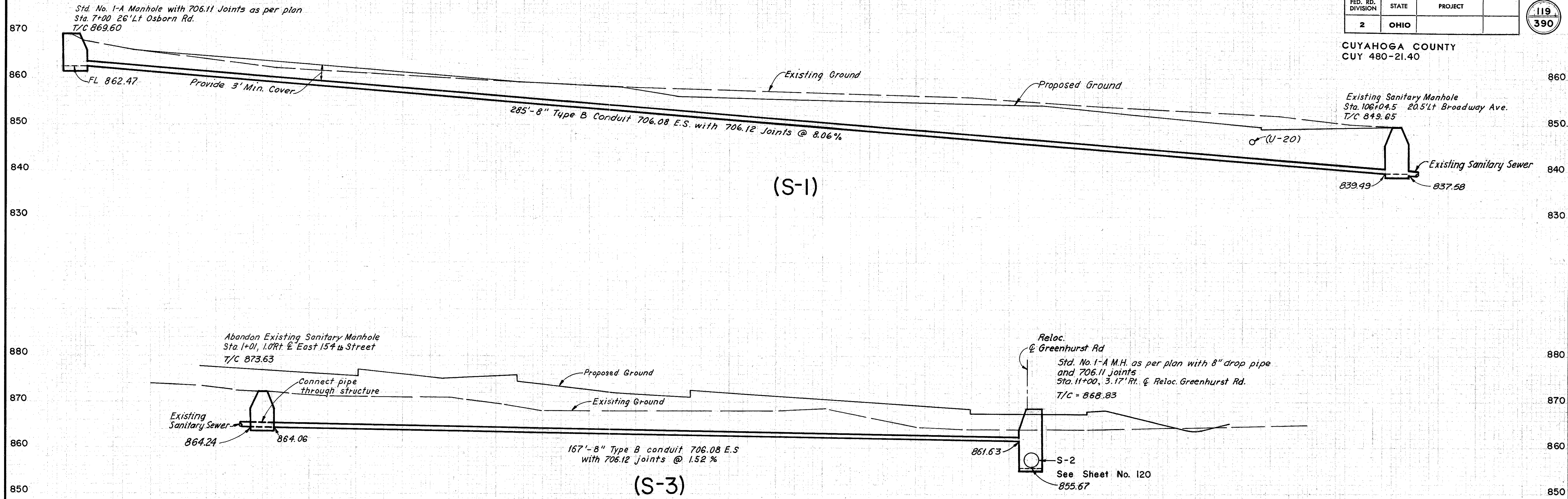
3/10/89  
3/20/89  
I.M.  
E.R.A.  
Made  
Checked



FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

119  
390

CUYAHOGA COUNTY  
CUY 480-21.40

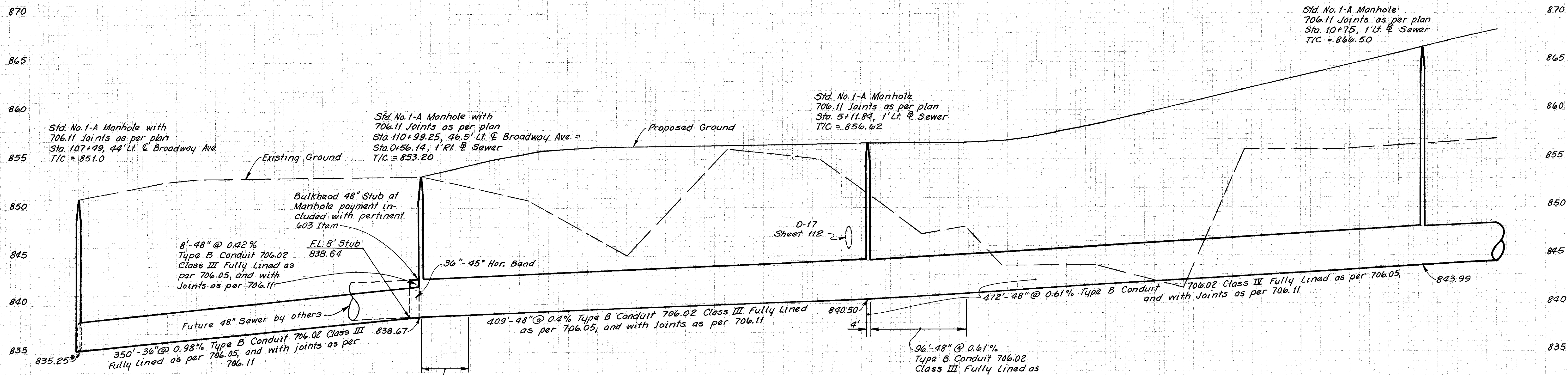


3-10-69  
 3-20-69  
 J.M.  
 E.R.A.  
 Made  
 Checked:

FHWA REGION	STATE	PROJECT	
5	OHIO		

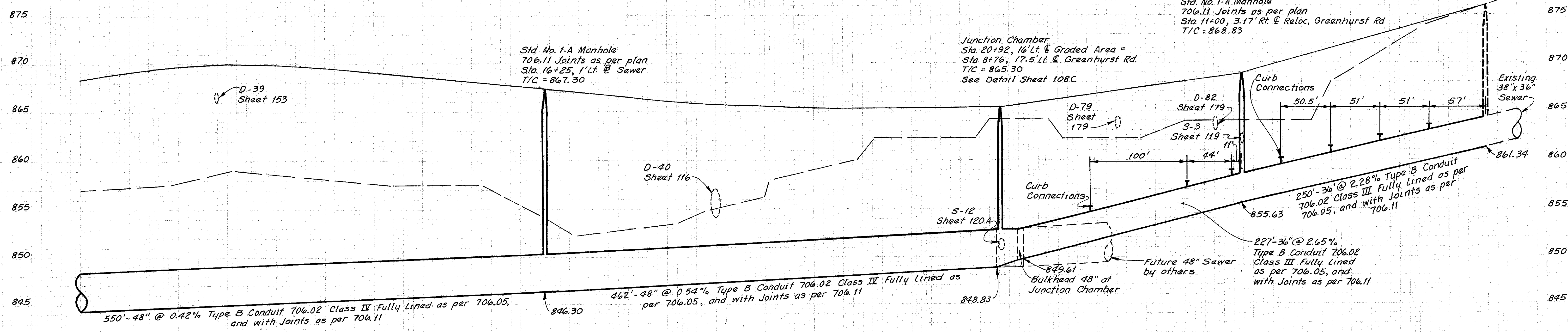
120  
390

CUYAHOGA COUNTY  
CUY 480-21.40



\* Verify in field and adjust grade as required

S-2



S-2

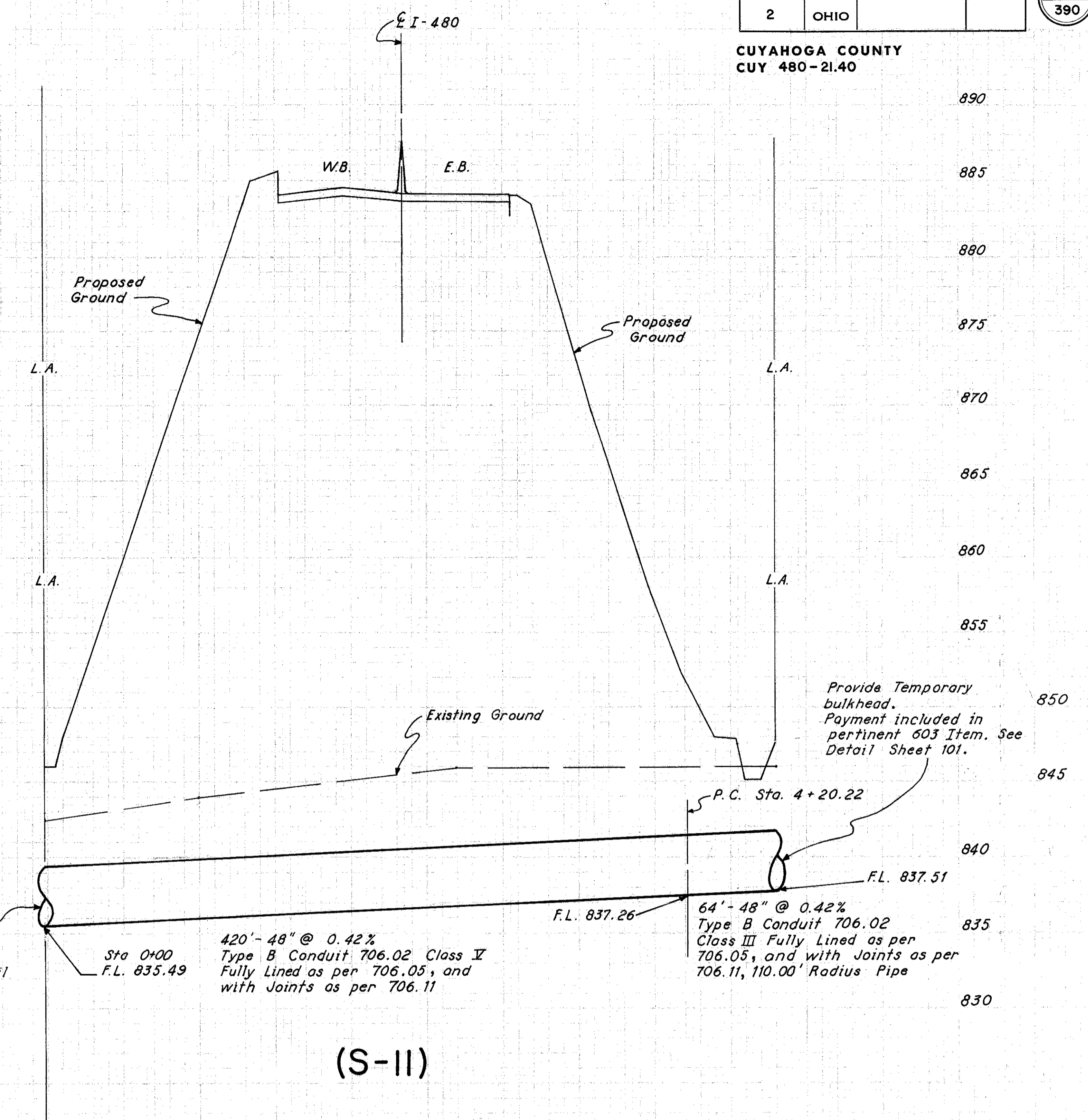
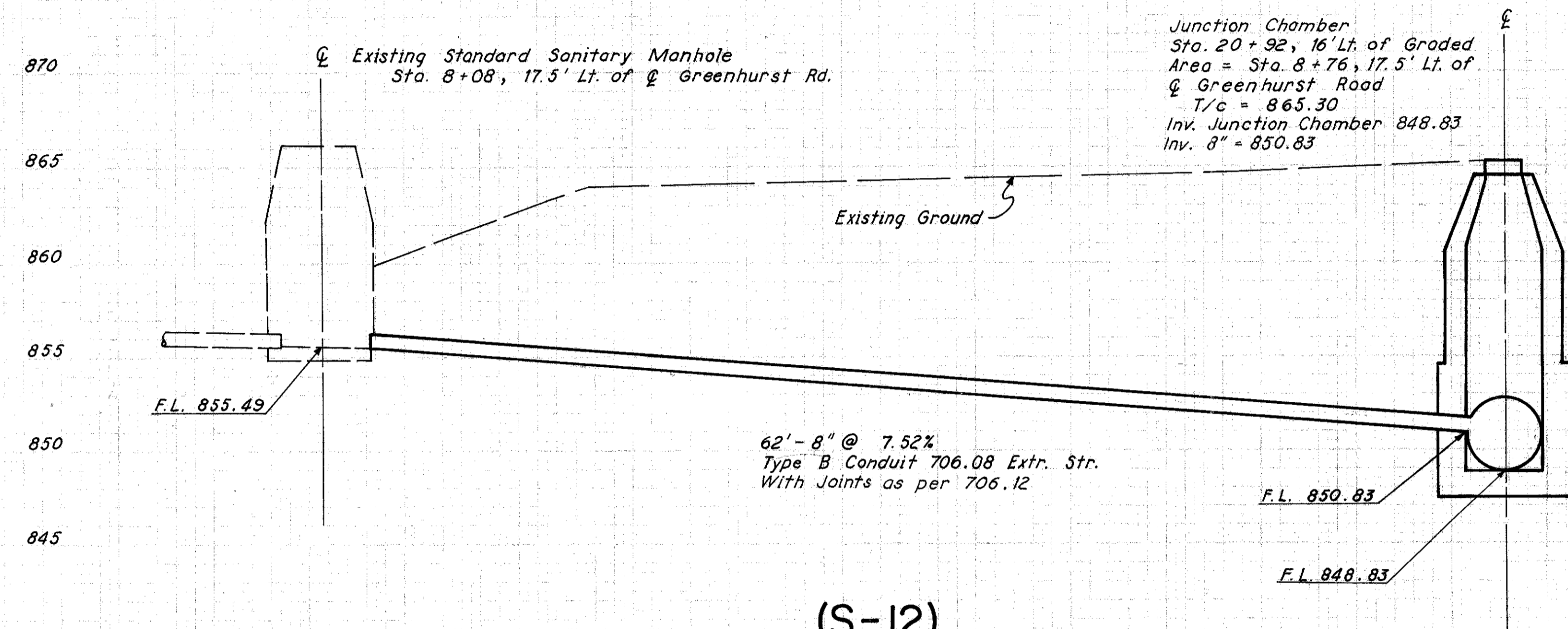
Scale: 1" = 50' Horizontal  
1" = 5' Vertical

9-28-73  
10-3-73  
MADE  
CHECKED  
D.D.S.  
D.S.P.

FHWA REGION	STATE	PROJECT
2	OHIO	

120A  
390

CUYAHOGA COUNTY  
CUY 480-21.40



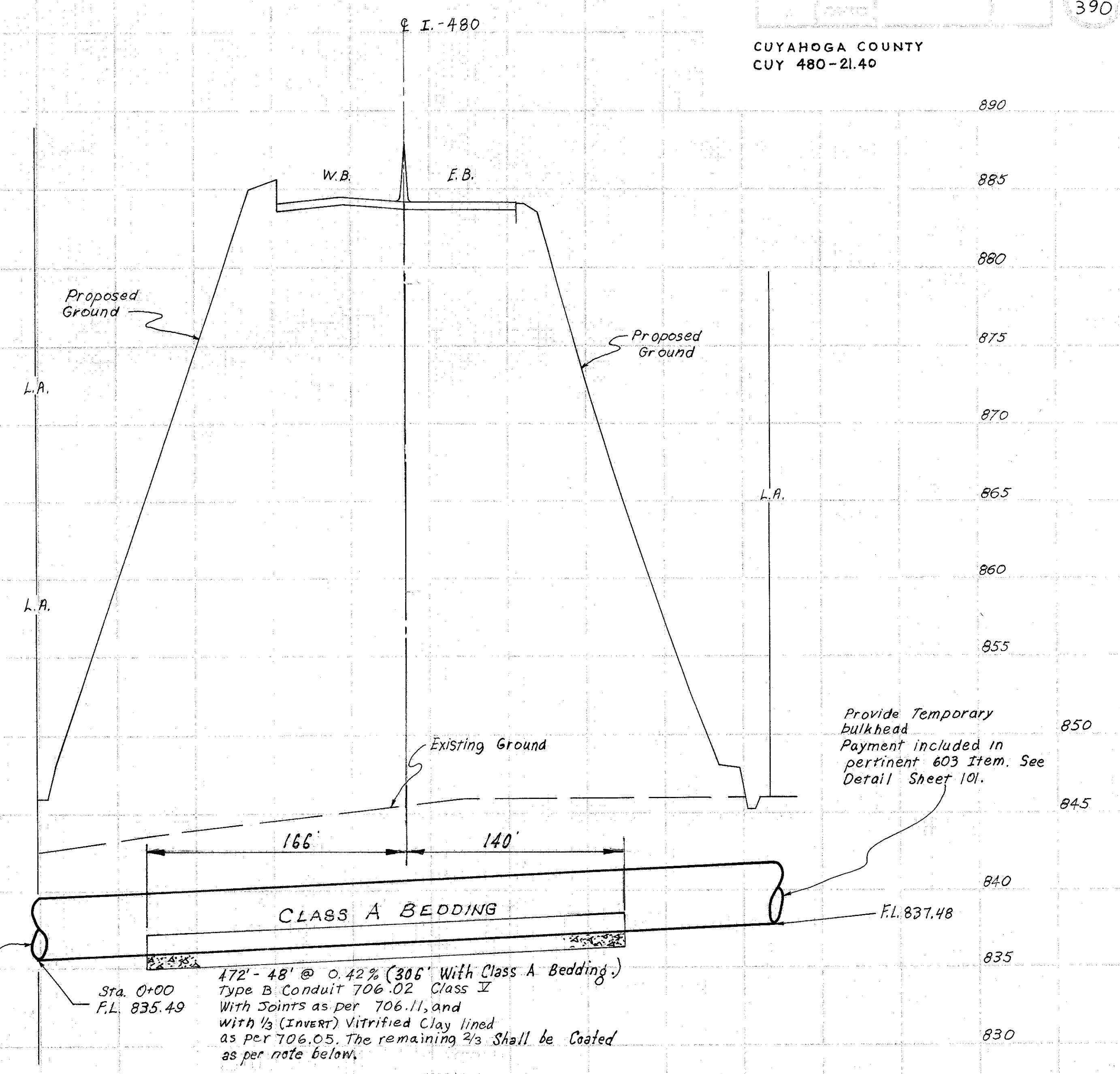
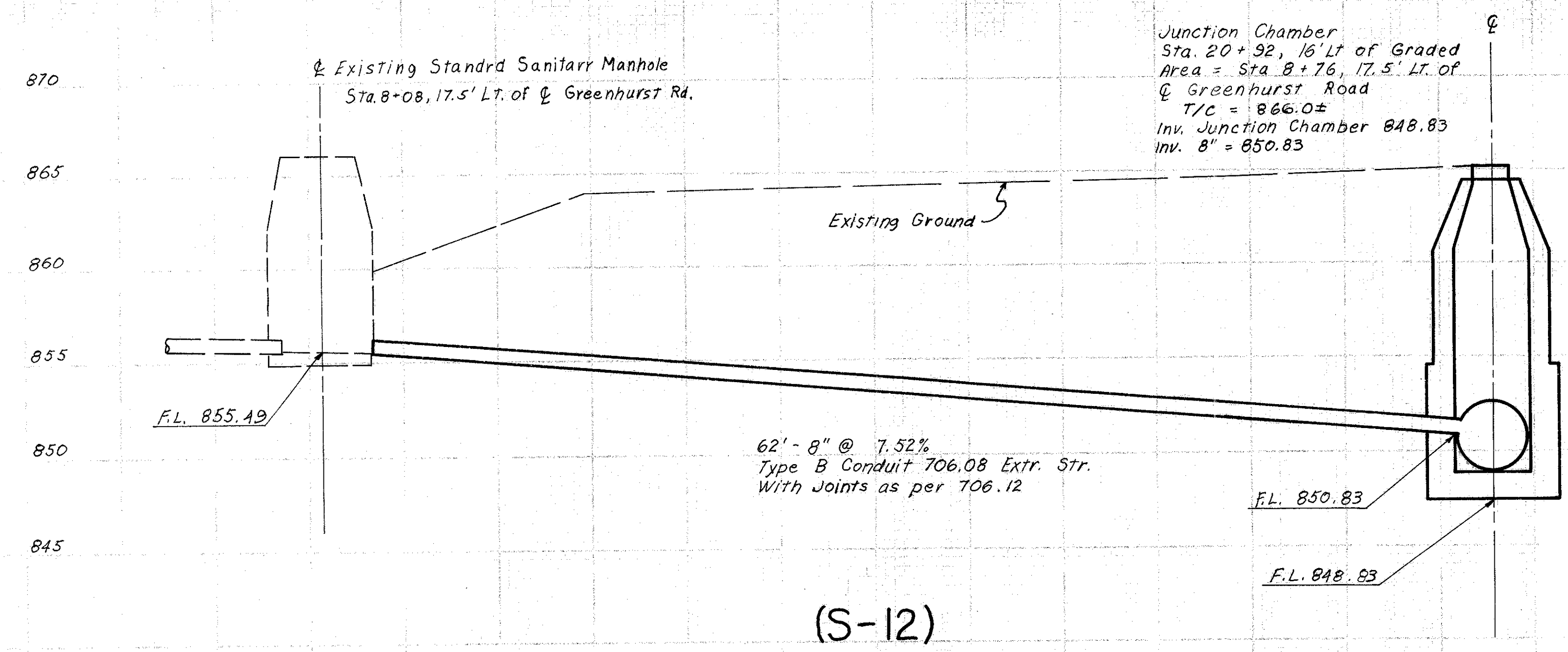
Scale  
Horizontal 1" = 5'  
Vertical 1" = 5'

Scale  
Horizontal 1" = 50'  
Vertical 1" = 5'

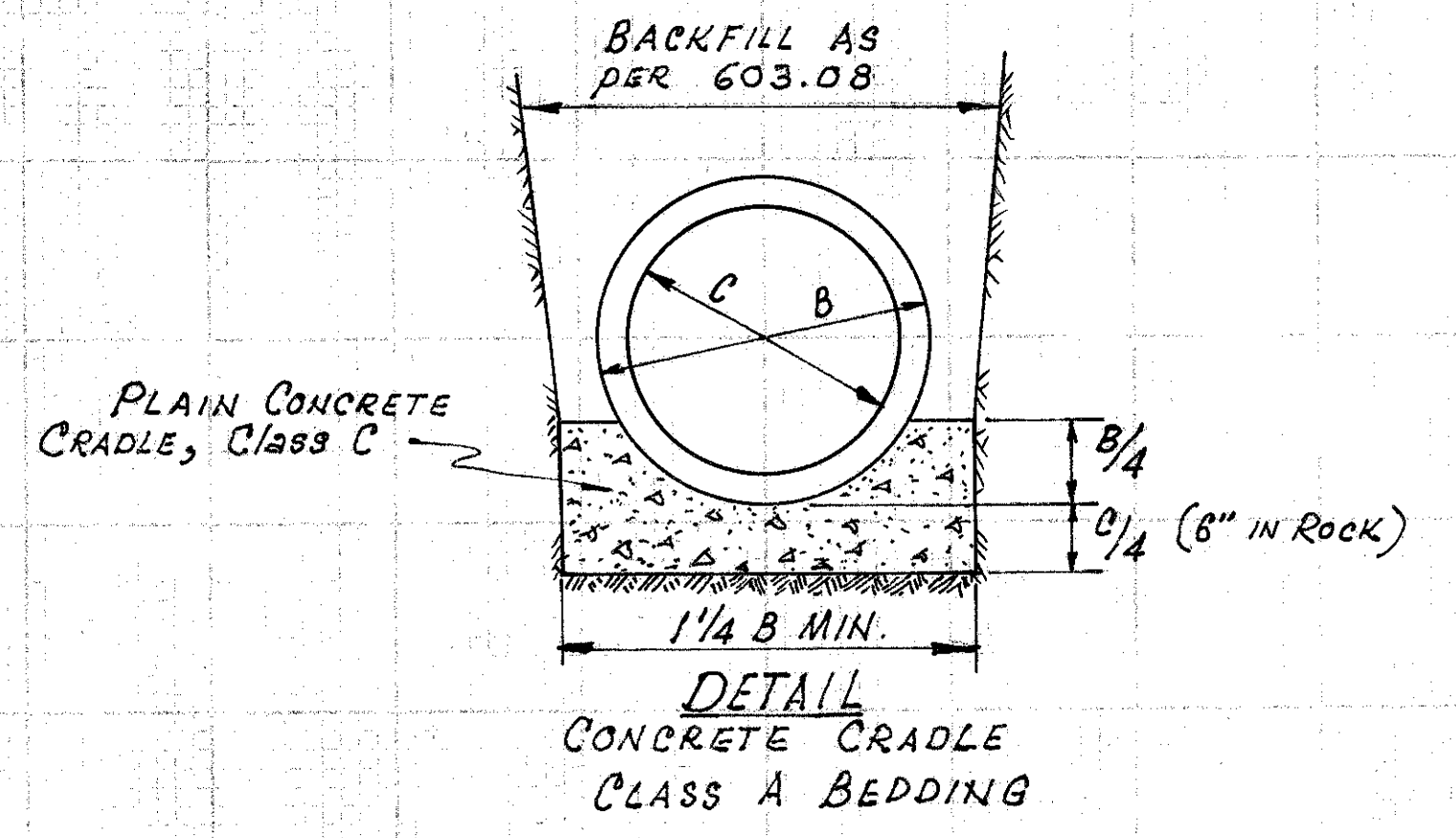
9-26-71  
9-28-71  
10-4-71

DESIGNED BY  
CHECKED BY  
DATE

ORIGINAL SURVEY PLATS  
NOTE BOOK AREAS CHECKED



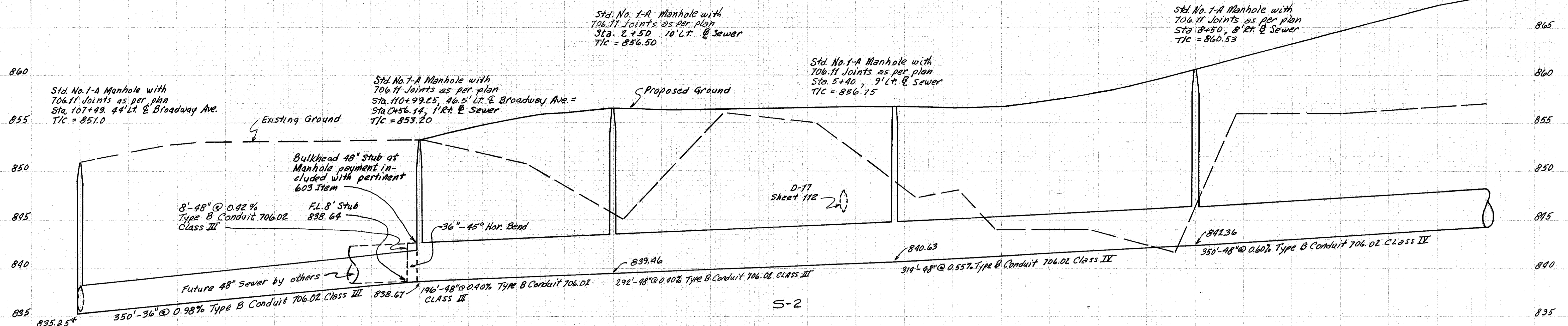
Scale  
 Horizontal 1" = 5'  
 Vertical 1" = 5'



THIS SHEET SUPERSEDES  
 SHEET No. 120A  
 SEE SHEET 85A FOR  
 REVISED ALIGNMENT.  
 Rev. 6-3-74

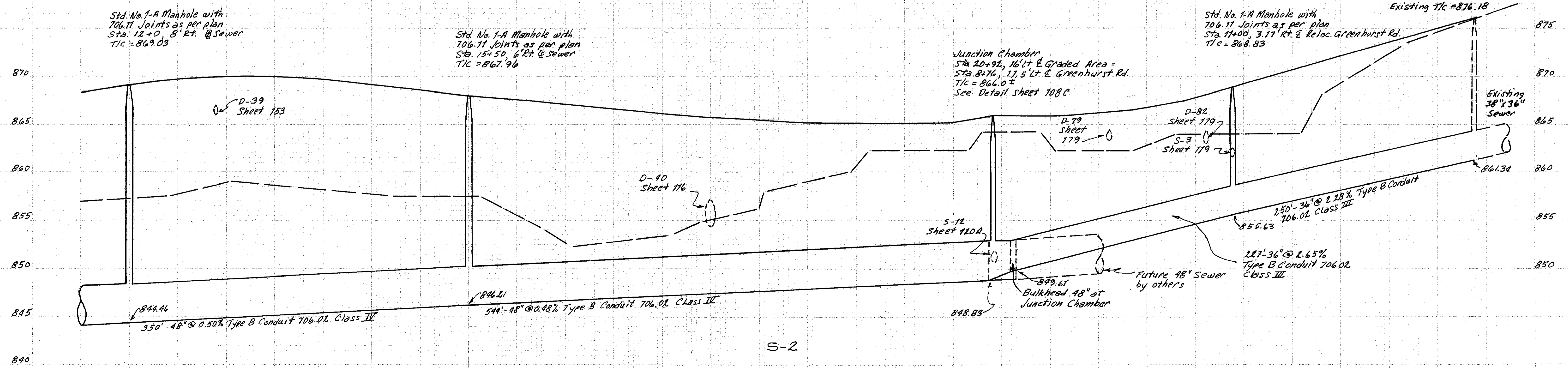
NOTE: Coating Concrete Pipe for Sanitary Sewers:  
 Pipe shall be coated inside with Two (2) Coats of Coal  
 Tar Pitch Paint at a rate of not more than 180 Square  
 Feet per Gallon per Coat. Waterproofing Material shall  
 consist of "INTERTOL STANDARD THICK", "KAPPERS SUPER  
 SERVICE", "PITT.-CHEM 103" or an Approved Equal.  
 Payment to be included in Pertinent 603 ITEM.

Scale  
 Horizontal 1" = 50'  
 Vertical 1" = 5'



\* Verify in field and adjust grade as required

NOTE: The 36" and 48" pipes shall have joints as per 706.11, and 1/3 (invert) vitrified clay lined as per 706.05. The remaining 2/3 shall be coated as per Coating Note on Sheet No 120 B.



Scale: 1" = 50' Horizontal  
1" = 5' Vertical

Note:  
This sheet supersedes  
Sheet No. 120  
Rev. 5-91-74

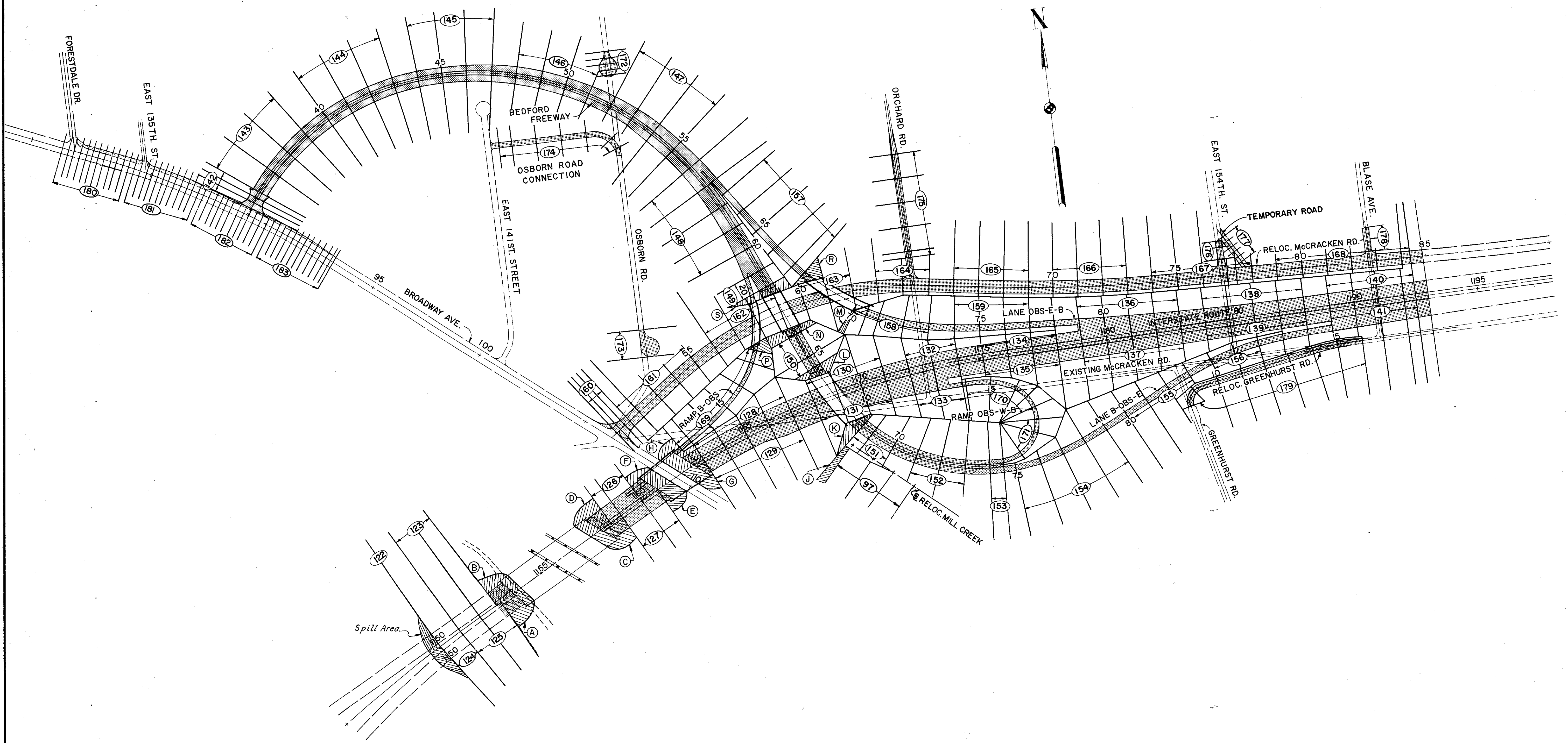
9-7

U-6

# CROSS SECTION LAYOUT SHEET

FED. RD. DIVISION	STATE	PROJECT	121 390
2	OHIO		

CUYAHOGA COUNTY  
CUY. 480-21.40



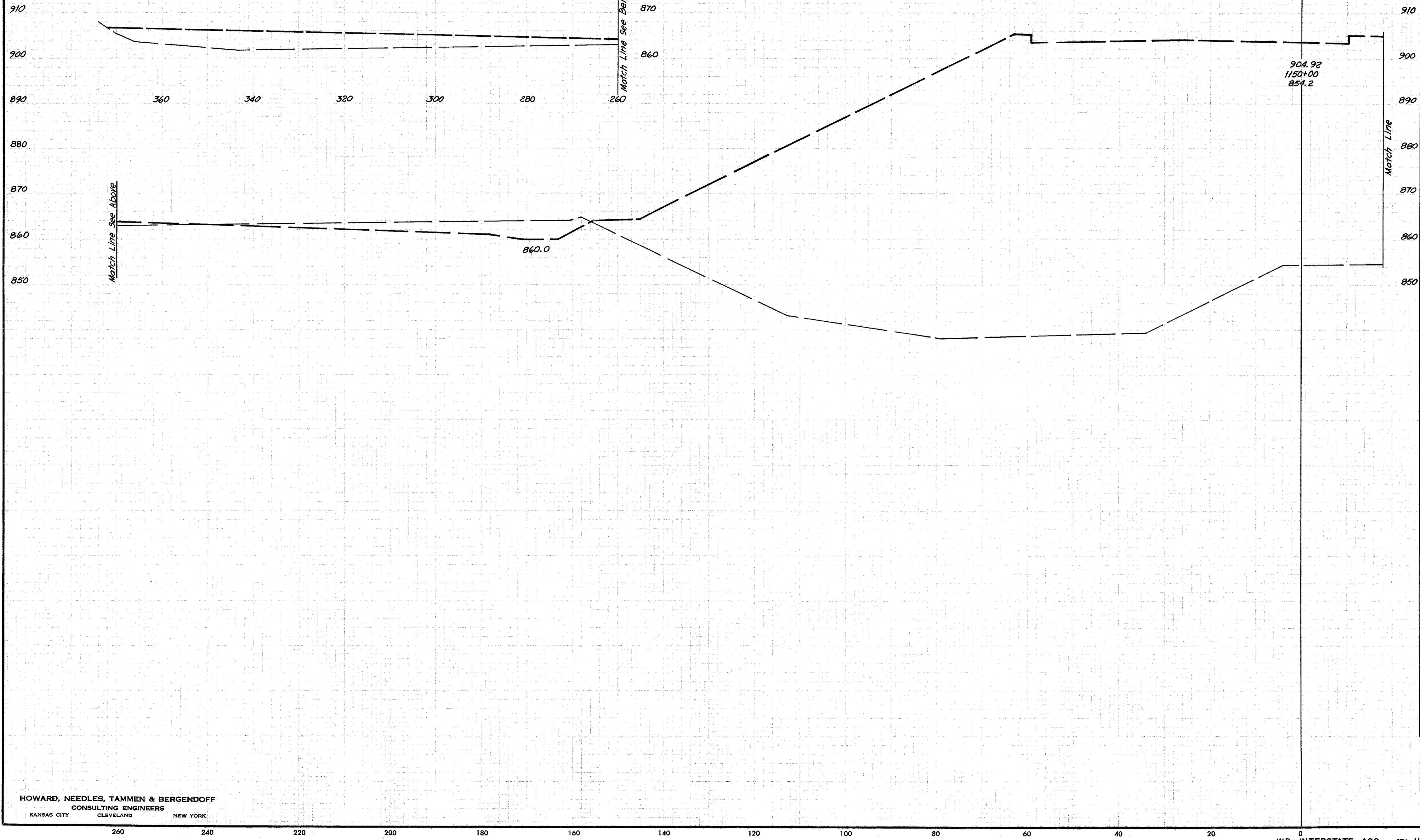
SCALE 1" = 200'  
 MADE I.E.N. DATE 5-4-67  
 TRCD. R.D. DATE 6-6-67  
 CKD. R.H.A. DATE 9-67

**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

122  
390

CUYAHOGA COUNTY  
CUY-480-21.40



360 340 320 300 280 260

Match Line See Above

Match Line See Below

904.92  
1150+00  
854.2

860.0

3-30-49  
3-30-51  
3-30-54  
7-7-72  
  
K.M.C.  
K.A.N.  
T.M.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

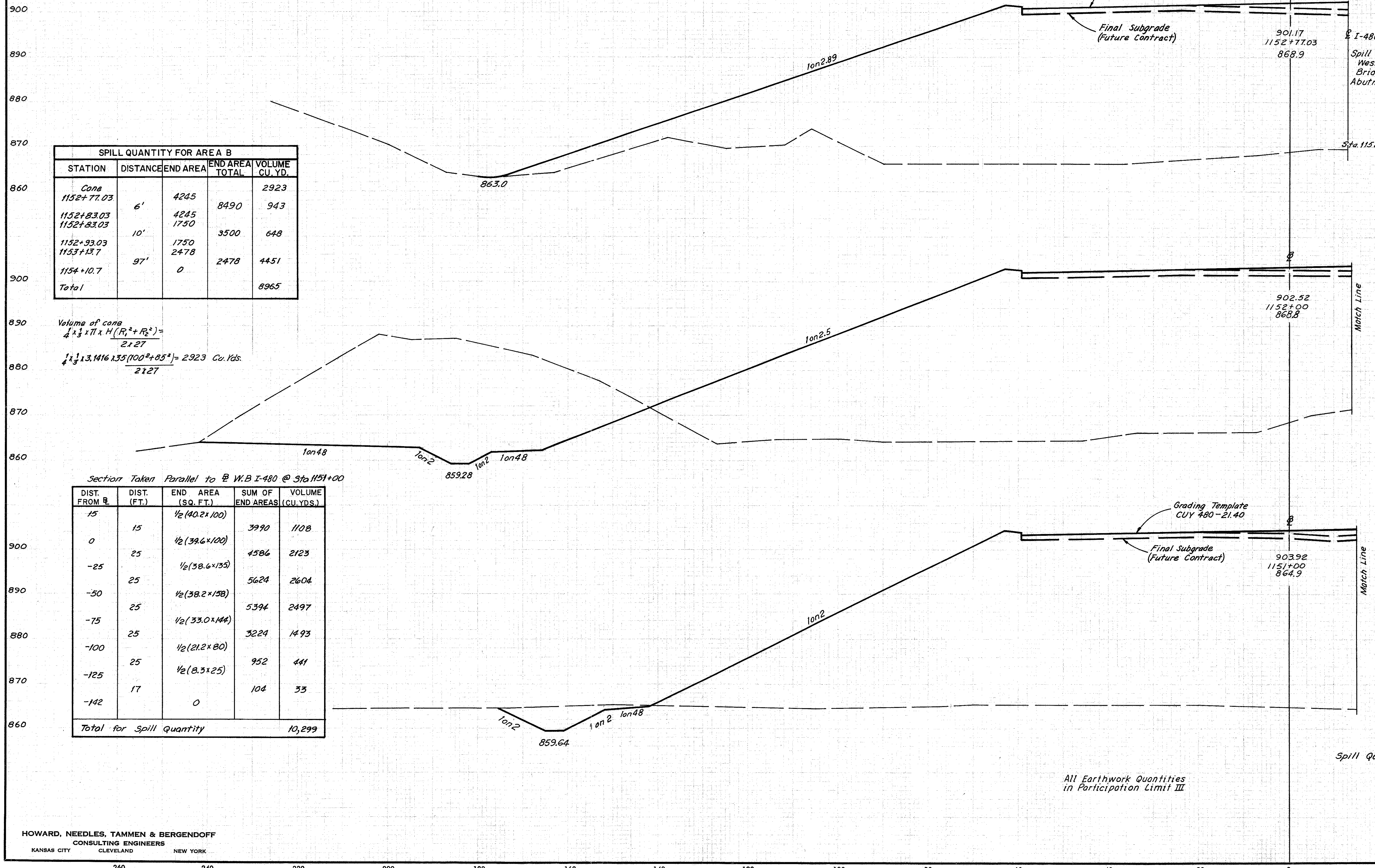
WB INTERSTATE 480 STA. 1150+00 LEFT HALF TO STA.

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

123  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



STATION	DISTANCE	END AREA	END AREA TOTAL	VOLUME CU. YD.
Cone				2923
1152+77.03	6'	4245	8490	943
1152+83.03		4245	1750	
1152+83.03	10'	1750	3500	648
1152+93.03		1750	2478	
1153+13.7	97'	0	2478	4451
1154+10.7		0		
Total				8965

Volume of cone  
 $\frac{1}{3} \times \pi \times H (R_1^2 + R_2^2) = \frac{2 \times 27}{2 \times 27} = 2923$  Cu. Yds.

Section Taken Parallel to W.B I-480 @ Sta 1151+00

DIST. FROM R	DIST. (FT.)	END AREA (SQ. FT.)	SUM OF END AREAS (SQ. FT.)	VOLUME (CU. YDS.)
15	15	1/2 (40.2 x 100)	3990	1108
0	25	1/2 (39.6 x 100)	4586	2123
-25	25	1/2 (38.6 x 135)	5624	2604
-50	25	1/2 (38.2 x 138)	5394	2497
-75	25	1/2 (33.0 x 144)	3224	1493
-100	25	1/2 (21.2 x 80)	952	441
-125	17	1/2 (8.3 x 25)	104	33
-142		0		
Total for Spill Quantity				10,299

END	EARTHWORK		VOLUME
	EXC.	EMB.	
880			0 8965
860	0	4245	2352 12559
890			1649 4559
860			3209 16869
890	84	4550	
860			21 10,299

All Earthwork Quantities in Participation Limit III

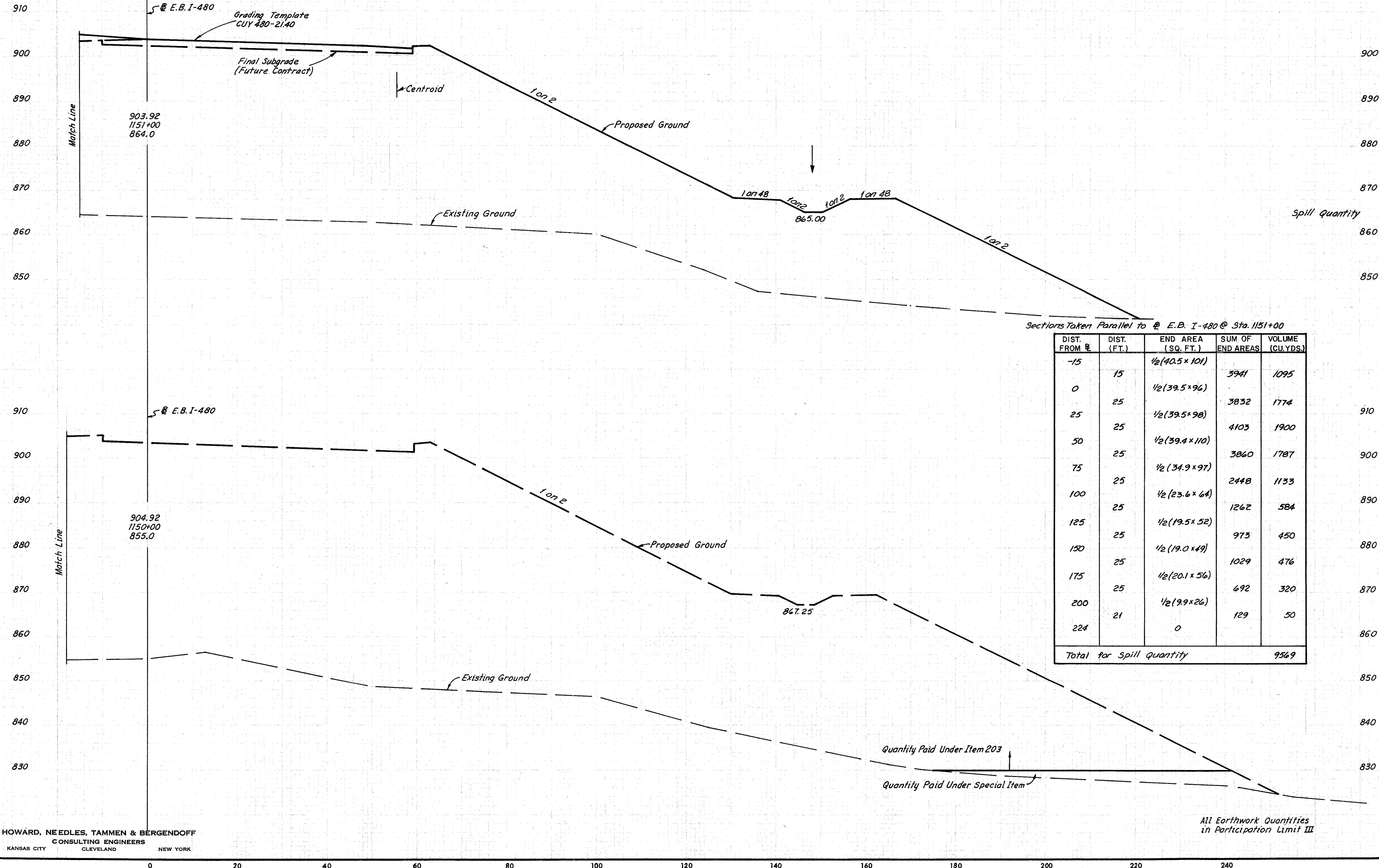


Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

124  
390

CUYAHOGA COUNTY  
 CUY-480-21.40



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	6634		
		0	9569

Sections Taken Parallel to E.B. I-480 @ Sta. 1151+00

DIST. FROM #	DIST. (FT.)	END AREA (SQ. FT.)	SUM OF END AREAS	VOLUME (CU. YDS.)
-15	15	1/2(40.5 x 101)	3941	1095
0	25	1/2(39.5 x 96)	3832	1774
25	25	1/2(39.5 x 98)	4103	1900
50	25	1/2(39.4 x 110)	3860	1787
75	25	1/2(34.9 x 97)	2448	1133
100	25	1/2(23.6 x 64)	1262	584
125	25	1/2(19.5 x 52)	973	450
150	25	1/2(19.0 x 49)	1029	476
175	25	1/2(20.1 x 56)	692	320
200	21	1/2(9.9 x 26)	129	50
224		0		
Total for Spill Quantity				9569

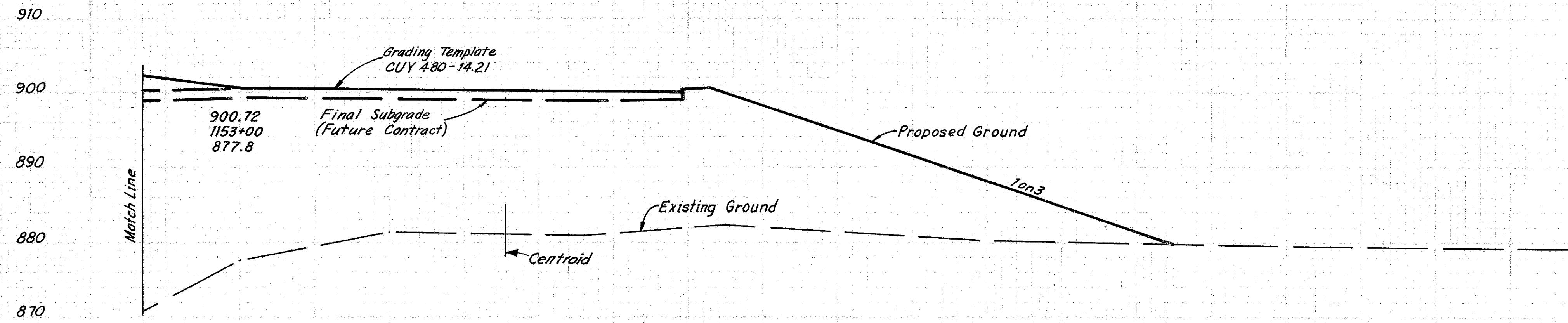
J.M.C.  
4-3-70  
J.E.M.  
6-72

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

125  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

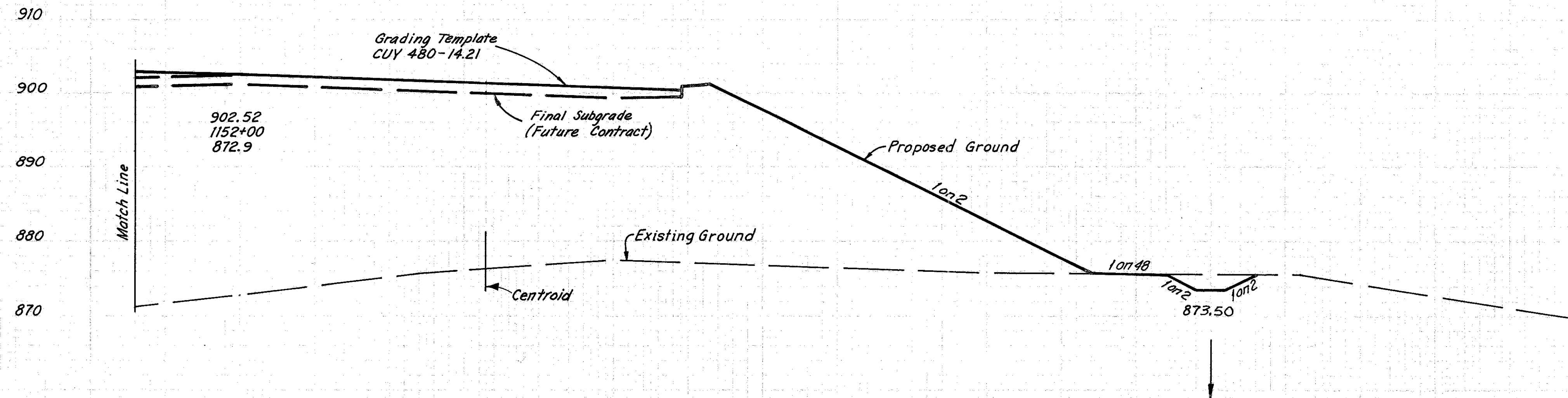


Station	Distance	End Area	End Area Total	Volume Cu. Yds.
1153+00		2152	4304	1196
1153+15	15	2152	4304	
1153+85	70	0	1514	1963
<b>Total</b>				<b>4018</b>

Volume of Cone:  
 $\frac{1}{4} \times \frac{1}{3} \times \pi \times \frac{(65^2 + 75^2)}{2} \times 18 = 859 \text{ Cu. Yds.}$

Spill Quantity West End  
 Bridge Abutment

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
			4018
			28 8838
			27 16995
			6634



$(3906.5 - 34.4) 100 = 99.1'$   
3906.5

$(3906.5 - 49.0) 100 = 98.7'$   
3906.5

All Earthwork Quantities  
 in Participation Limit III

Sta. 1151+00

J.M.C.  
 J.E.N.  
 J.E.M.  
 3/4 68  
 3/9 70  
 6-72

Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

126  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

SPILL QUANTITY FOR AREA "F"

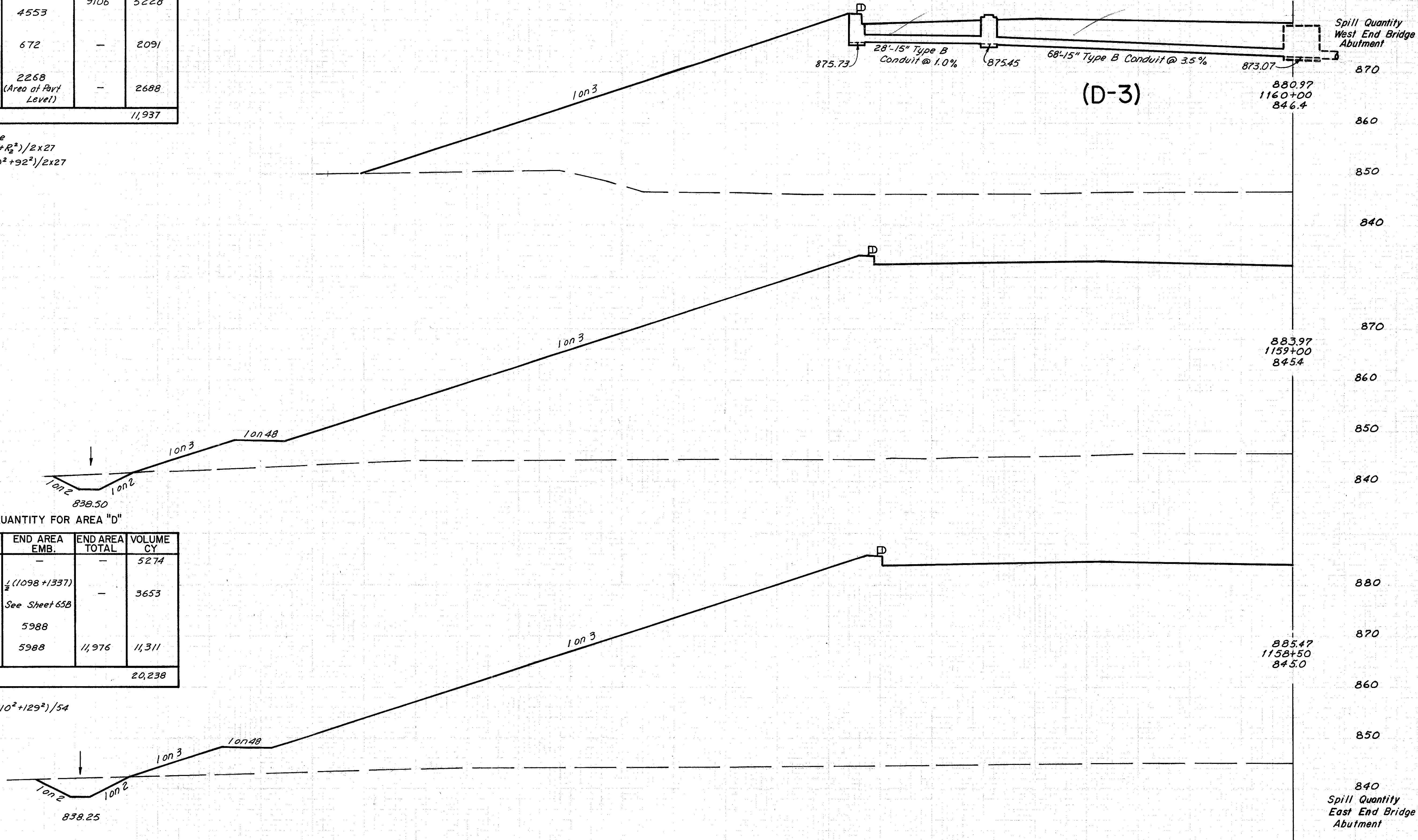
STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	1930
1160+00	31	4553	9106	5228
1160+31		4553		
1160+57 (84' Wide)	47	672	-	2091
1161+04				
1160+31	32' (Ave. Ht.)	2268 (Area at Part Level)	-	2688
1160+74				
Total				11,937

Volume of Cone  
 $V = \frac{1}{4} \times \frac{1}{3} \times \pi \times H (R_1^2 + R_2^2) / 2 \times 27$   
 $= \frac{1}{4} \times \frac{1}{3} \times \pi \times 33 (60^2 + 92^2) / 2 \times 27$   
 $= 1929.86$

Std. No. 2-A-6  
 Paved Shoulder Inlet  
 Sta. 10+09.5, 9.66' Lt.  
 N.G. = 880.23

Std. No. 6 C.B. as per plan  
 Sta. 1160+20, 59.5' Lt.  
 N.G. = 880.50

Std. No. I-3B Median Inlet  
 Sta. 1160+50, 1.5' Rt.  
 7/C 87208



EARTHWORK			
END EXC.	AREA EMB.	VOLUME	
		EXC.	EMB.
		0	11937
0	4553		
		50	18854
27	5628		
		66	10756
44	5988		
		202	20238

SPILL QUANTITY FOR AREA "D"

STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	5274
1157+26 (81' Wide)	73	$\frac{1}{2}(1098+1337)$	-	3653
1157+99		See Sheet 65B		
1157+99	51	5988		
1158+50		5988	11,976	11,311
Total				20,238

Volume of Cone  
 $V = \frac{1}{4} \times \frac{1}{3} \times \pi \times 40.5 (110^2 + 129^2) / 54$   
 $= 5274.34$

JMC  
 JEM  
 3848  
 3848  
 6-70  
 6-72

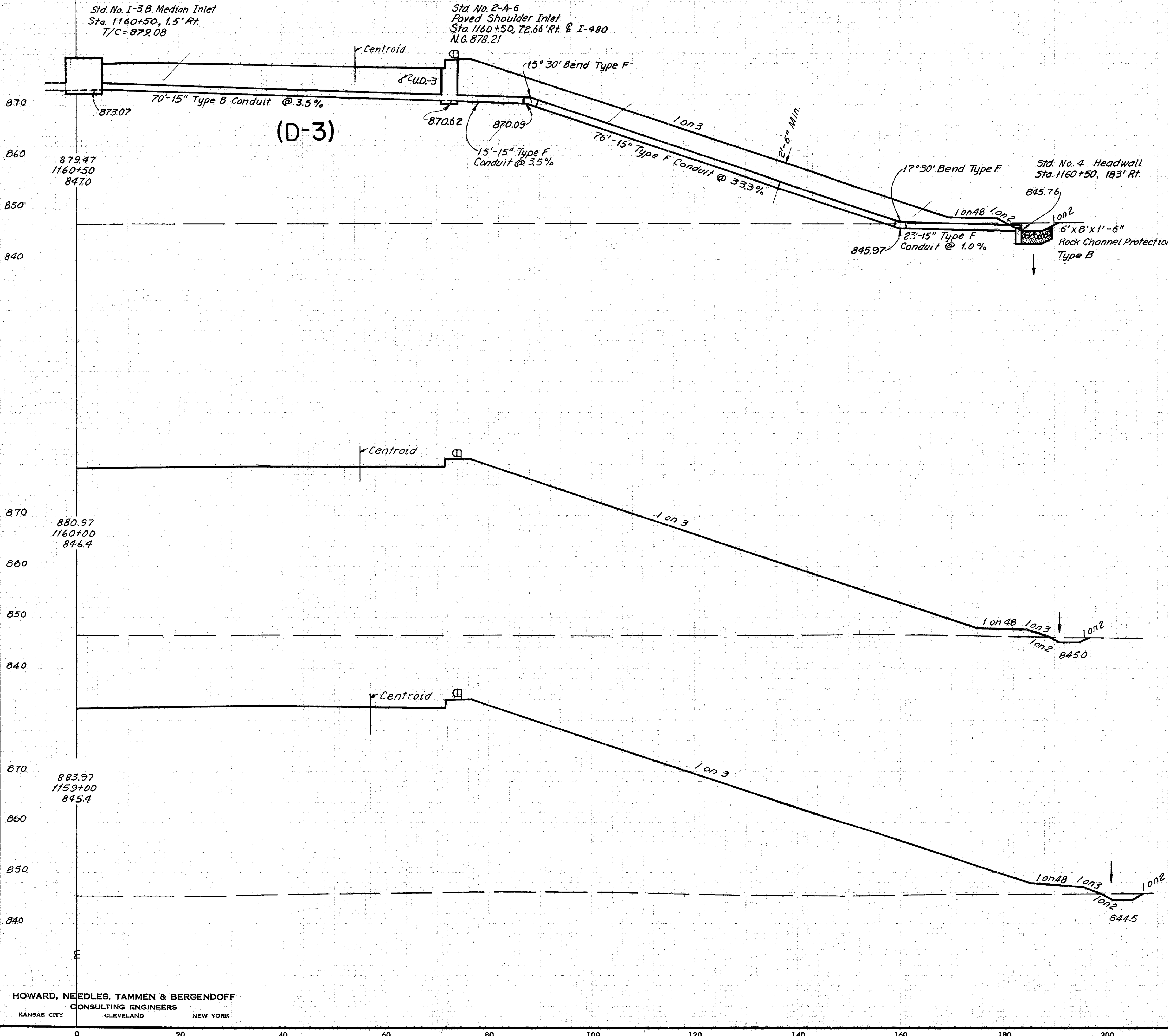
All Earthwork Quantities  
 in Participation Limit III

Quantity Calculations  
 Made By JEN Date 6-72  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

127  
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CUYAHOGA COUNTY  
 CUY 480 - 21.40



SPILL QUANTITY FOR AREA "E"

STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	1878
1160+50	40	3902	7804	5781
1160+90		3902		
1160+90	(76' Wide)	672		1892
1161+30	40			
Total				9,556

Volume of Cone  
 $= \frac{1}{4} \times \frac{1}{3} \times \pi \times H \times (R_1^2 + R_2^2)$   
 $= \frac{1}{4} \times \frac{1}{3} \times \pi \times 31 \times (62^2 + 33^2) / 2 \times 27$   
 $= 1878$

SPILL QUANTITY FOR AREA "C"

STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	4917
1158+16	(76' Wide)	$\frac{1}{2} (1098 + 1337)$ See Sheet 65B	2435	3427
1158+16	39'	$\frac{1}{2} \times 76 \times (20 + 50.5)$ Area at Pave Level		3870
1158+66.5	(Ave. Ht.)	5047		
1158+66.5	33.5'	5047	10,094	6262
1159+00				
Total				18,476

Volume of Cone  
 $V = \frac{1}{4} \times \frac{1}{3} \times \pi \times H (R_1^2 + R_2^2) / 2 \times 27$   
 $= \frac{1}{4} \times \frac{1}{3} \times \pi \times 39.0 (111^2 + 117^2) / 2 \times 27 = 4917.29$

870  
 Spill Quantity West End Bridge Abutment  
 860  
 850  
 840

870  
 Spill Quantity East End Bridge Abutment  
 860  
 850  
 840

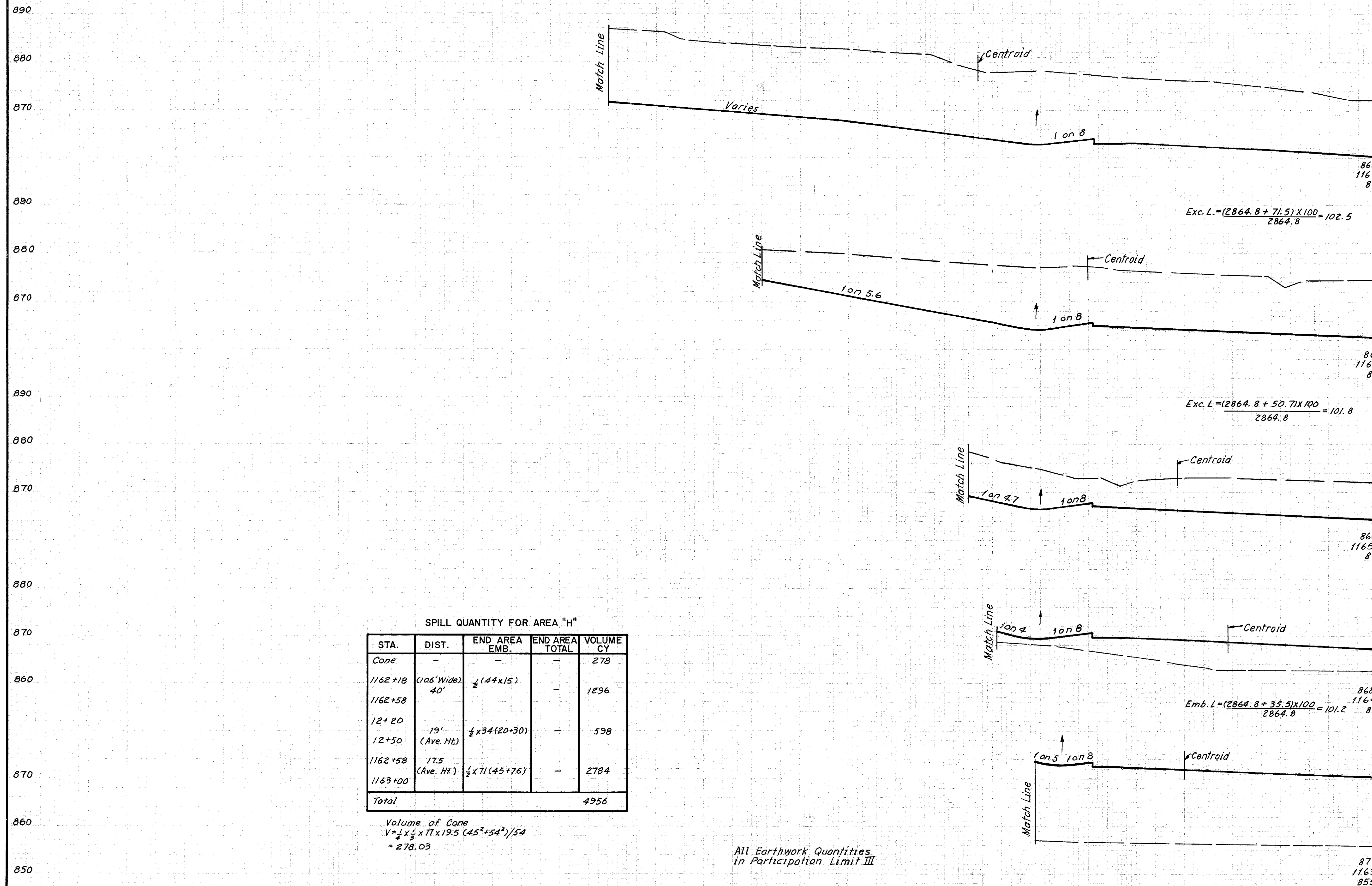
END EXC.	AREA		VOLUME	
	EMB.	EXC.	EMB.	EXC.
10	3902		0	9556
			15	7615
6	4322			
			30	17350
10	5047			
			54	18476

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By J.M. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

128  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



SPILL QUANTITY FOR AREA "H"

STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	278
1162+18	(106' Wide)	$\frac{1}{2}(44 \times 15)$	-	1296
1162+58	40'	-	-	-
12+20	19' (Ave. Ht.)	$\frac{1}{2} \times 34(20+30)$	-	598
1162+58	17.5 (Ave. Ht.)	$\frac{1}{2} \times 71(45+76)$	-	2784
1163+00				
Total				4956

Volume of Cone  
 $V = \frac{1}{3} \times \frac{1}{2} \times \pi \times 19.5 (45^2 + 54^2) / 54$   
 = 278.03

All Earthwork Quantities  
 in Participation Limit III

END STA.	EARTHWORK			
	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
1167+00	2255	0		
1166+00			6919	0
1166+00	1390	0		
1166+00			3765	0
1165+00	607	0		
1165+00			787	0
Sta. 1164+30	0	0		
1164+00			0	187
1164+00	0	337		
1164+00			0	2682
1163+00	0	1094		
1163+00			0	4956

Spill Quantity  
 East Abutment

8-67  
9-67  
6-72  
R.F.T.  
W.L.L.  
J.E.H.  
J.M.

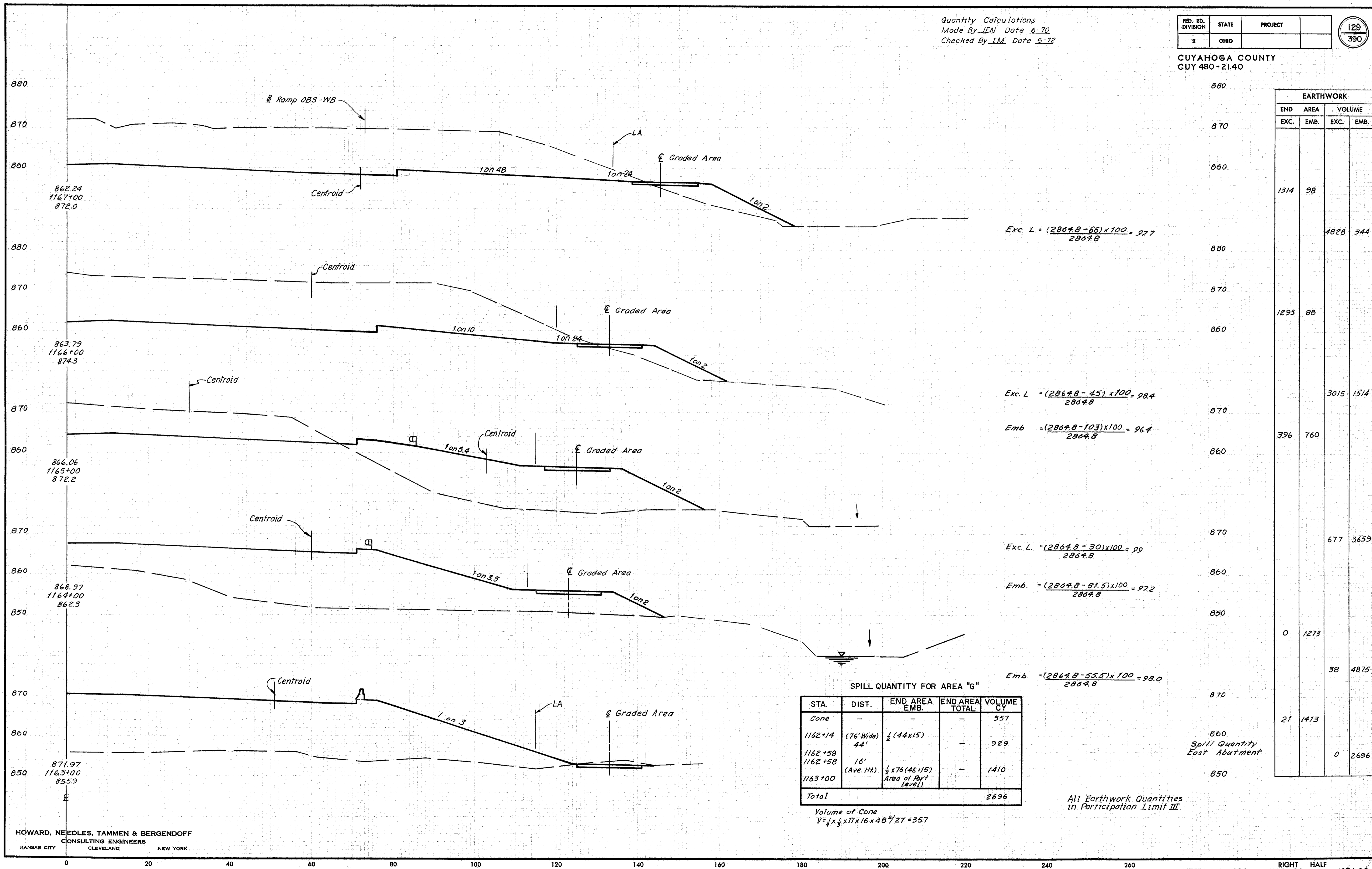
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

129  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
 CPW  
 WLL  
 JEN  
 IM



$$\text{Exc. L.} = \frac{(2864.8 - 66) \times 100}{2864.8} = 97.7$$

$$\text{Exc. L.} = \frac{(2864.8 - 45) \times 100}{2864.8} = 98.4$$

$$\text{Emb.} = \frac{(2864.8 - 103) \times 100}{2864.8} = 96.4$$

$$\text{Exc. L.} = \frac{(2864.8 - 30) \times 100}{2864.8} = 99$$

$$\text{Emb.} = \frac{(2864.8 - 81.5) \times 100}{2864.8} = 97.2$$

$$\text{Emb.} = \frac{(2864.8 - 55.5) \times 100}{2864.8} = 98.0$$

SPILL QUANTITY FOR AREA "G"

STA.	DIST.	END AREA EMB.	END AREA TOTAL	VOLUME CY
Cone	-	-	-	357
1162+14	(76' Wide) 44'	$\frac{1}{2}(44 \times 15)$	-	929
1162+58	16'	(Ave. Ht)	-	1410
1163+00		$\frac{1}{2} \times 76(46+15)$ Area of Part Level	-	
<b>Total</b>				<b>2696</b>

Volume of Cone  
 $V = \frac{1}{3} \times \frac{1}{2} \times \pi \times 16 \times 48^2 / 27 = 357$

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
1314	98		
		4828	344
1293	88		
		3015	1514
396	760		
		677	3659
0	1273		
		38	4875
21	1473		
		0	2696

All Earthwork Quantities  
 in Participation Limit III

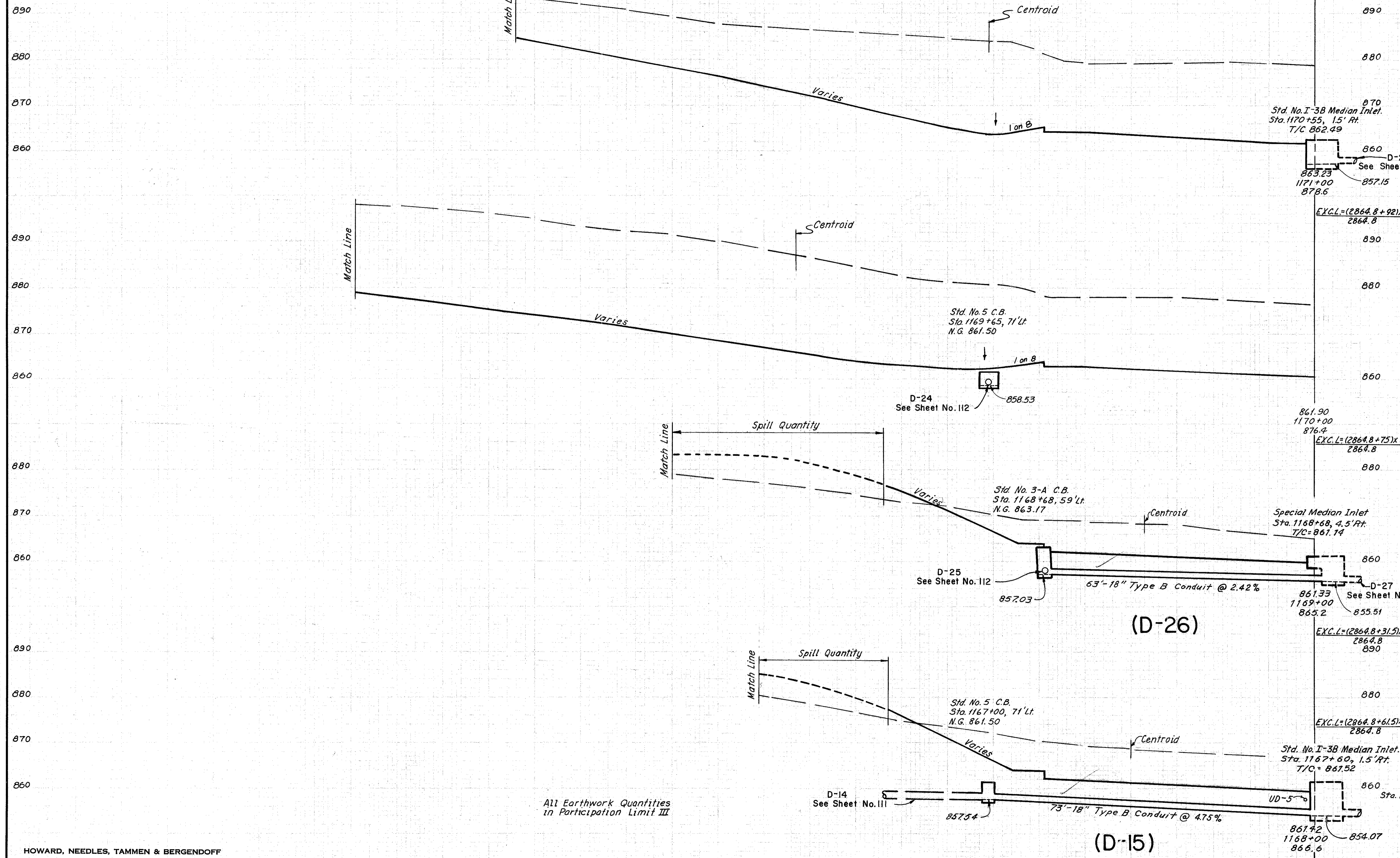
HOWARD, NEEDES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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390

CUYAHOGA COUNTY  
 CUY 480-21.40



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
		2599	0
		12516	0
		3950	0
		8396	28
		469	15
		1938	37
		566	5
		5334	9
		2255	0

All Earthwork Quantities  
 in Participation Limit III

8-67  
 9-67  
 6-72  
 6-72  
 R.F.T.  
 W.L.L.  
 J.E.N.  
 I.M.

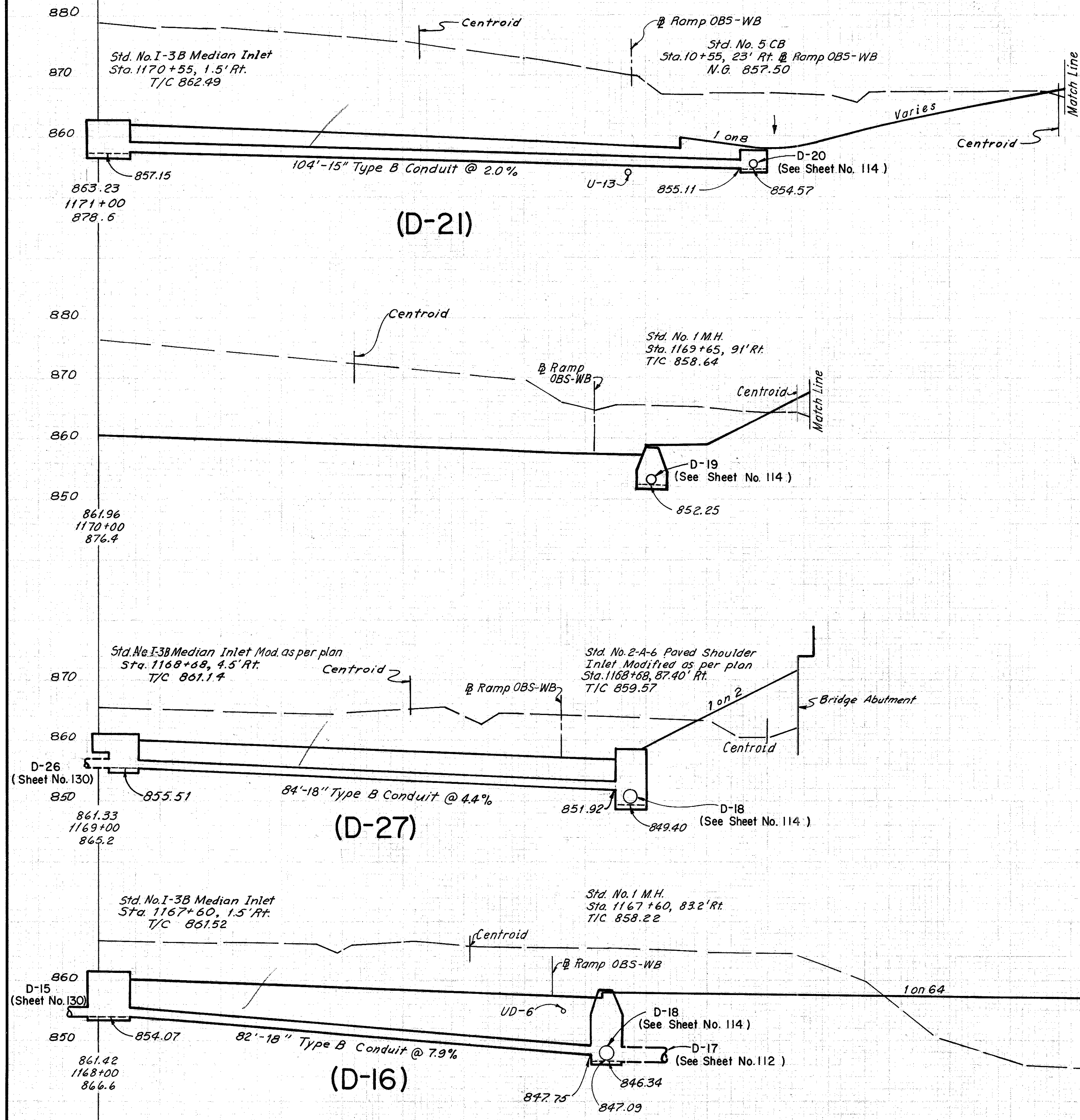
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

131  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
9-52  
6-72  
CPM  
W.L.  
J.E.M.  
I.M.



880	880		
870	870		
860	860		
Exc. L. = $\frac{(2864.8 - 47.7) \times 100}{2864.8} = 98.3$			
Emb. L. = $\frac{(2864.8 - 139.5) \times 100}{2864.8} = 95.2$			
880	880		
870	870		
860	860		
850	850		
Exc. L. = $\frac{(2864.8 - 46.8) \times 100}{2864.8} = 98.4$			
Emb. L. = $\frac{(2864.8 - 113) \times 100}{2864.8} = 96.1$			
870	870		
860	860		
850	850		
Emb. = $\frac{(2864.8 - 121) \times 100}{2864.8} = 95.8$			
Exc. = $\frac{(2864.8 - 56) \times 100}{2864.8} = 98.0$			
860	860		
850	850		
Exc. = $\frac{(2864.8 - 66.5) \times 100}{2864.8} = 97.7$			

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
	1750	2	
		5436	21
	1236	10	
		3306	203
	578	104	
		2668	1771
	892	872	
		4353	1755
	1314	98	

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK



Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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390

CUYAHOGA COUNTY  
 CUY 480 - 21.40



$$Exc. L = \frac{(2864.8 + 49.5) \times 100}{2864.8} = 101.7$$

$$Exc. L = \frac{(2864.8 + 58) \times 100}{2864.8} = 102.0$$

$$Exc. L = \frac{2864.8 + 67.8}{2864.8} \times 100 = 102.4$$

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
671	0		
		3083	0
966	0		
		4601	0
1470	0		
		7716	0
Sta. 1171+00	2599	0	

All Earthwork Quantities  
 in Participation Limit III

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

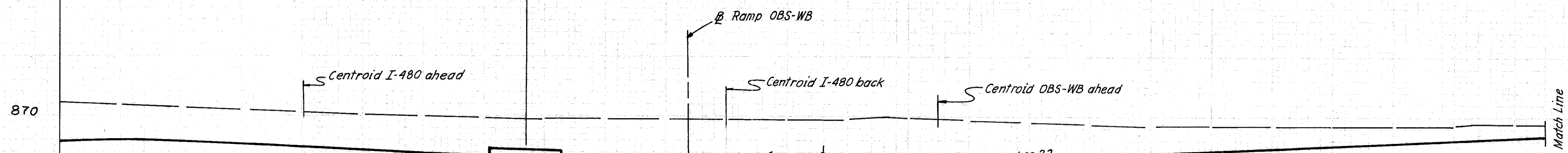
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

133  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

Ahead to I-480    Ahead to Ramp OBS-WB  
 Back to I-480    Back to I-480

8-67  
 8-67  
 6-70  
 6-72  
 H.D.  
 P.H.  
 J.E.N.  
 I.M.

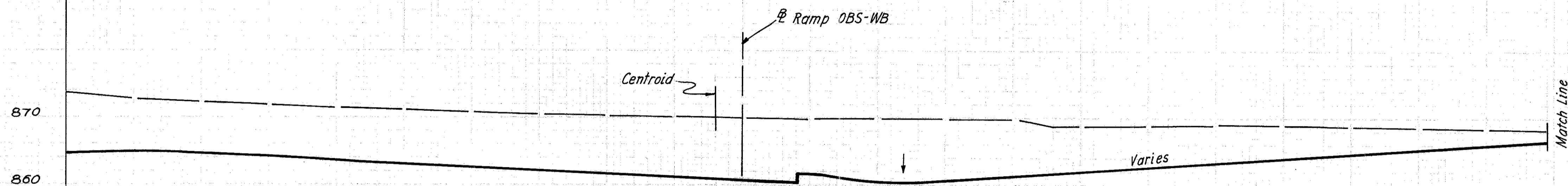


867.31  
1174+00  
872.1

870  
Sta. 1174+00 Ahead 449 0  
Sta. 1174+00 Back 1375 0  
860

$$Exc. L = \frac{(2864.8 - 103) \times 100}{2864.8} = 96.4$$

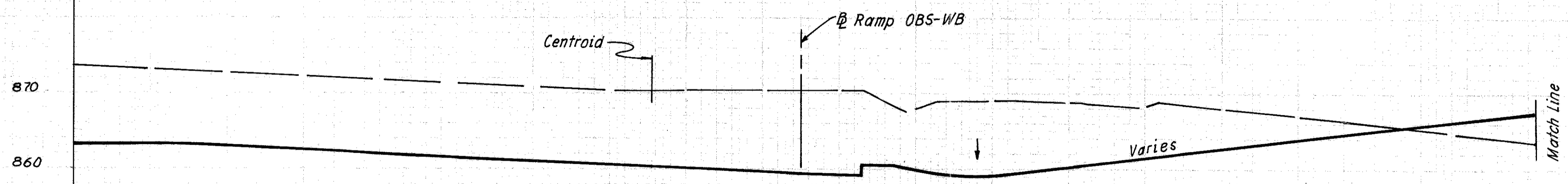
EARTHWORK			
END	AREA	VOLUME	
		EXC.	EMB.
870			
860			
		5257	0
870			
860			
	1570	0	
		5418	60
870			
860			
	1491	35	
		5870	64
	1750	2	



865.95  
1173+00  
873.3

$$Exc. L = \frac{(2864.8 - 85.8) \times 100}{2864.8} = 97.0$$

$$Emb. L = \frac{(2864.8 - 211) \times 100}{2864.8} = 92.6$$



864.59  
1172+00  
873.8

$$Exc. L = \frac{(2864.8 - 64.2) \times 100}{2864.8} = 97.8$$

$$Emb. L = \frac{(2864.8 - 172.7) \times 100}{2864.8} = 94.0$$

All Earthwork Quantities  
 in Participation Limit III

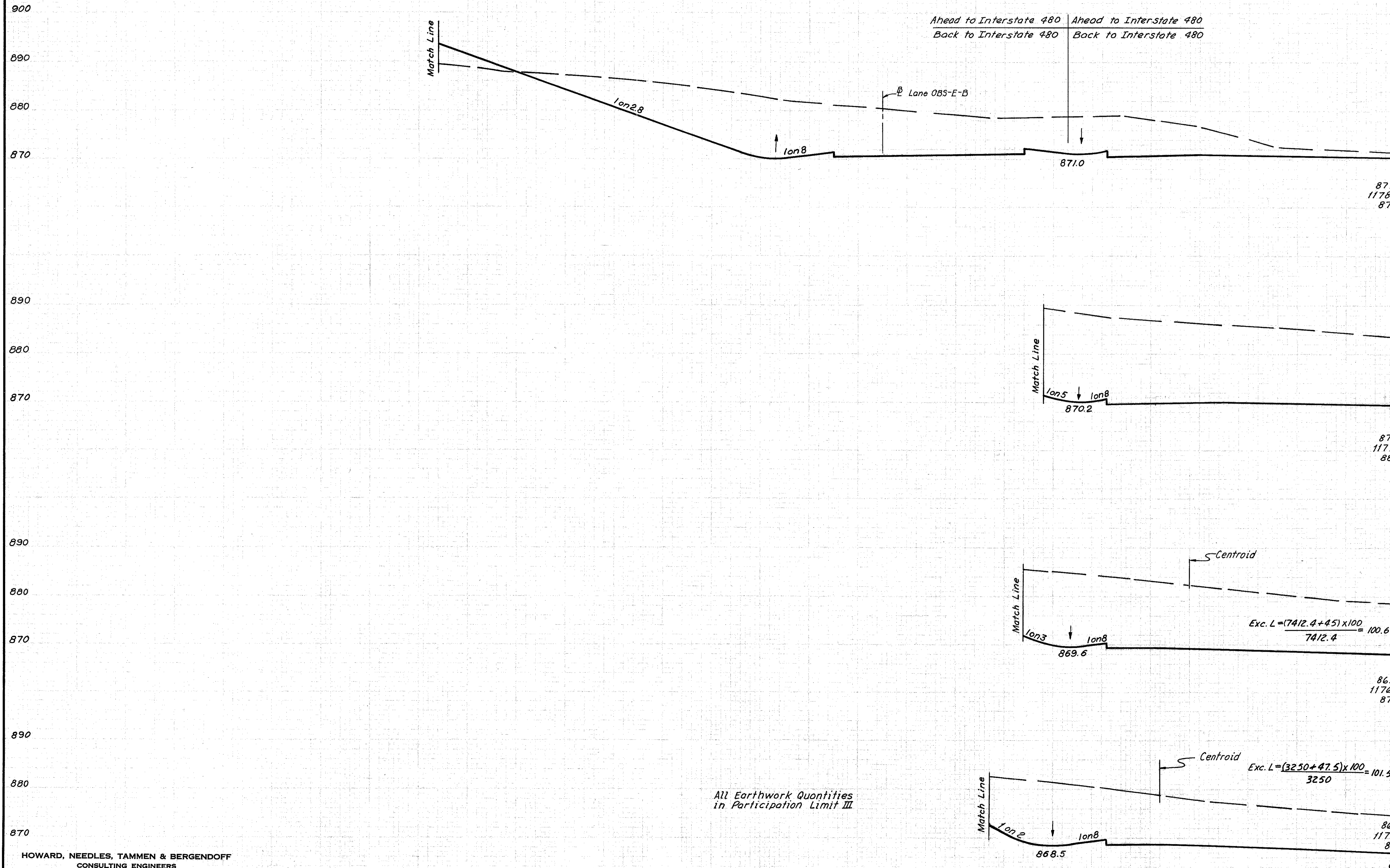
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY    CLEVELAND    NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked JM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	134
2	OHIO		390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
  
 C.P.W.  
 R.F.T.  
 J.E.N.  
 J.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.

870					
890					
880					
870		1223	32		
		292	0		
				2713	0
890					
880		1173	0		
870					
890					
880					
870					
				3994	0
890					
880		984	0		
870					
				3366	0
890					
880		823	0		
870					
				2808	0
870					
				671	0

Sta. 1178+00 Ahead  
 Sta. 1178+00 Back

871.94  
 1178+00  
 871.4

Sta. 1178+00 Ahead  
 Sta. 1178+00 Back

870.92  
 1177+00  
 883.7

869.80  
 1176+00  
 878.5

868.60  
 1175+00  
 874.7

Exc. L =  $\frac{(7412.4 + 45) \times 100}{7412.4} = 100.6$

Exc. L =  $\frac{(3250 + 47.5) \times 100}{3250} = 101.5$

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

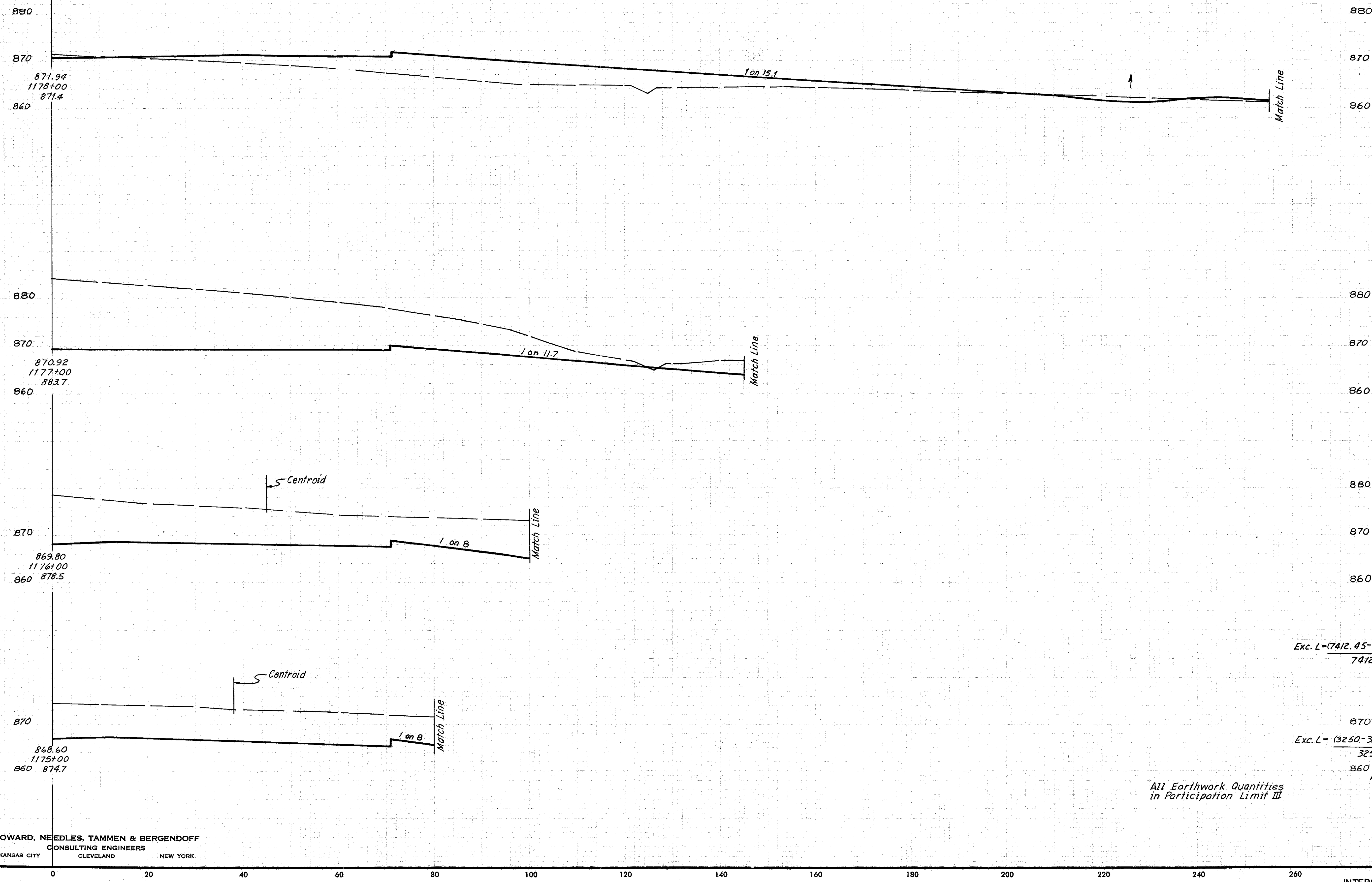
Quantity Calculations  
 Made By JEN. Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

135  
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CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-72  
 H.L.D.  
 R.F.A.  
 J.E.N.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
	18	481	
		5	89
	9	0	
		1882	0
	1120	0	
		3480	0
			2402
	546	0	
		1820	0
	449	0	

$$\text{Exc. L} = \frac{(7412.45 - 45) \times 100}{7412.45} = 99.4$$

$$\text{Exc. L} = \frac{(3250 - 39) \times 100}{3250} = 3250$$

Ahead Sta. 1174+00

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

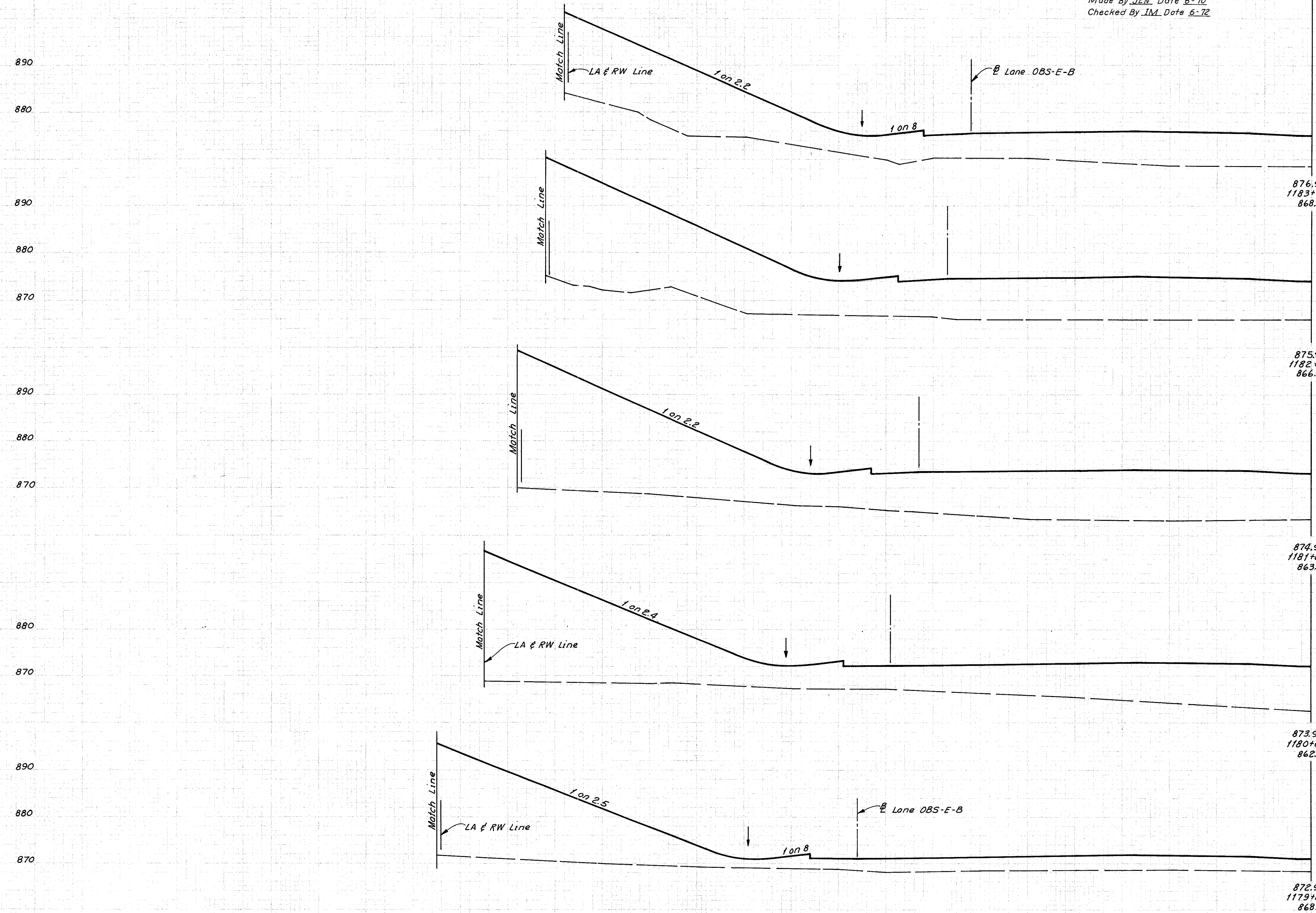
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

136  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 9-72  
 C.P.W.  
 J.E.N.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
		0	1318
		0	5915
		0	1876
		0	7382
		0	2110
		0	7154
		0	1753
		0	5285
		1223	32
Sta. 1178+00 Ahead	870	2265	2098

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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 KANSAS CITY CLEVELAND NEW YORK

INTERSTATE 480 STA. 1179+00 LEFT TO STA. 1183+00 HALF

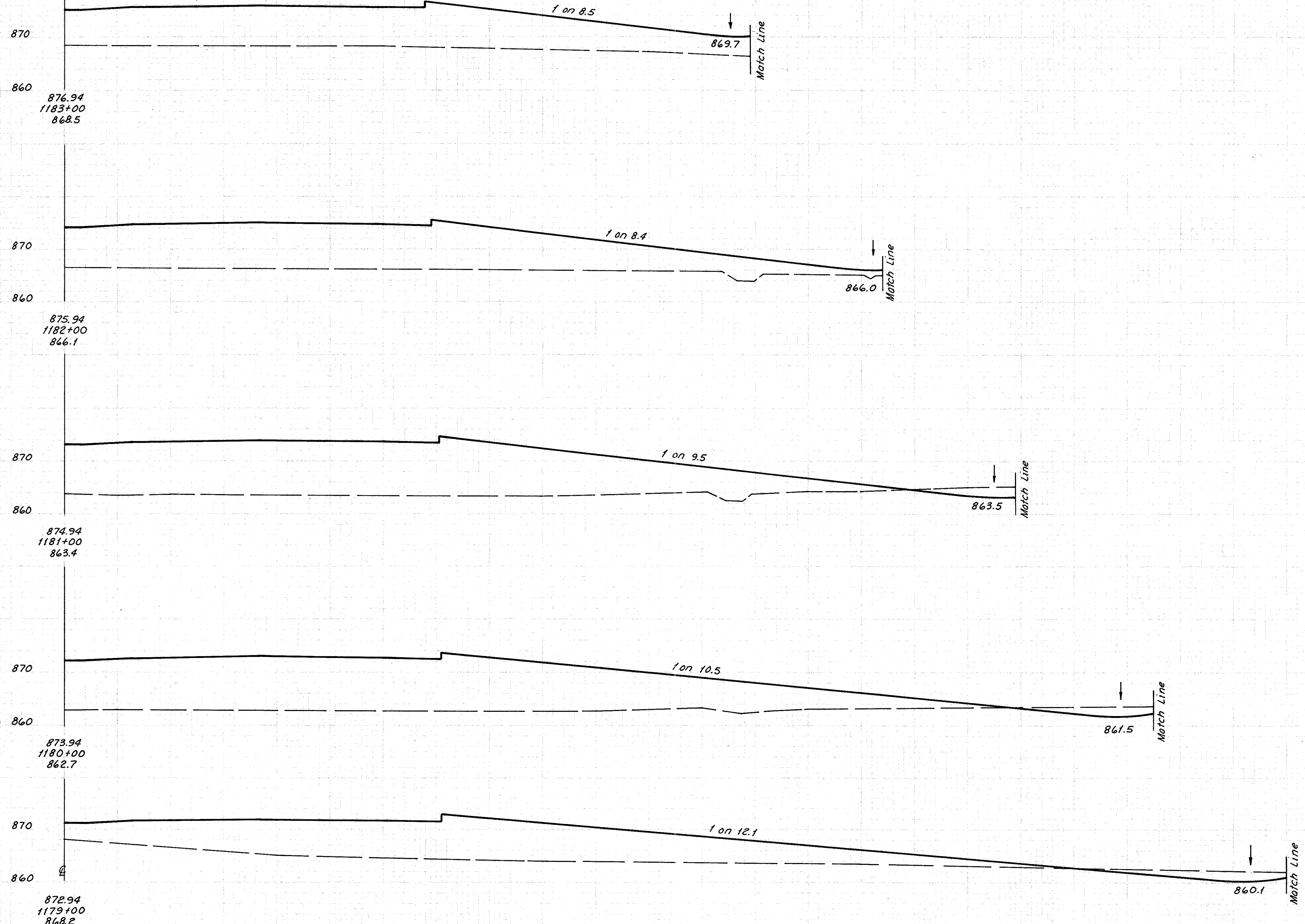
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

137  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
9-67  
6-72  
  
CPM  
R.E.M.  
J.M.



END	EARTHWORK		
	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
870			
860	0	840	0
870			3417
860	0	1005	
870			39
860	21	1258	4191
870			113
860	40	1308	4752
870			156
860	44	922	4130
Sta. 1178+00	18	481	2598
860			

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

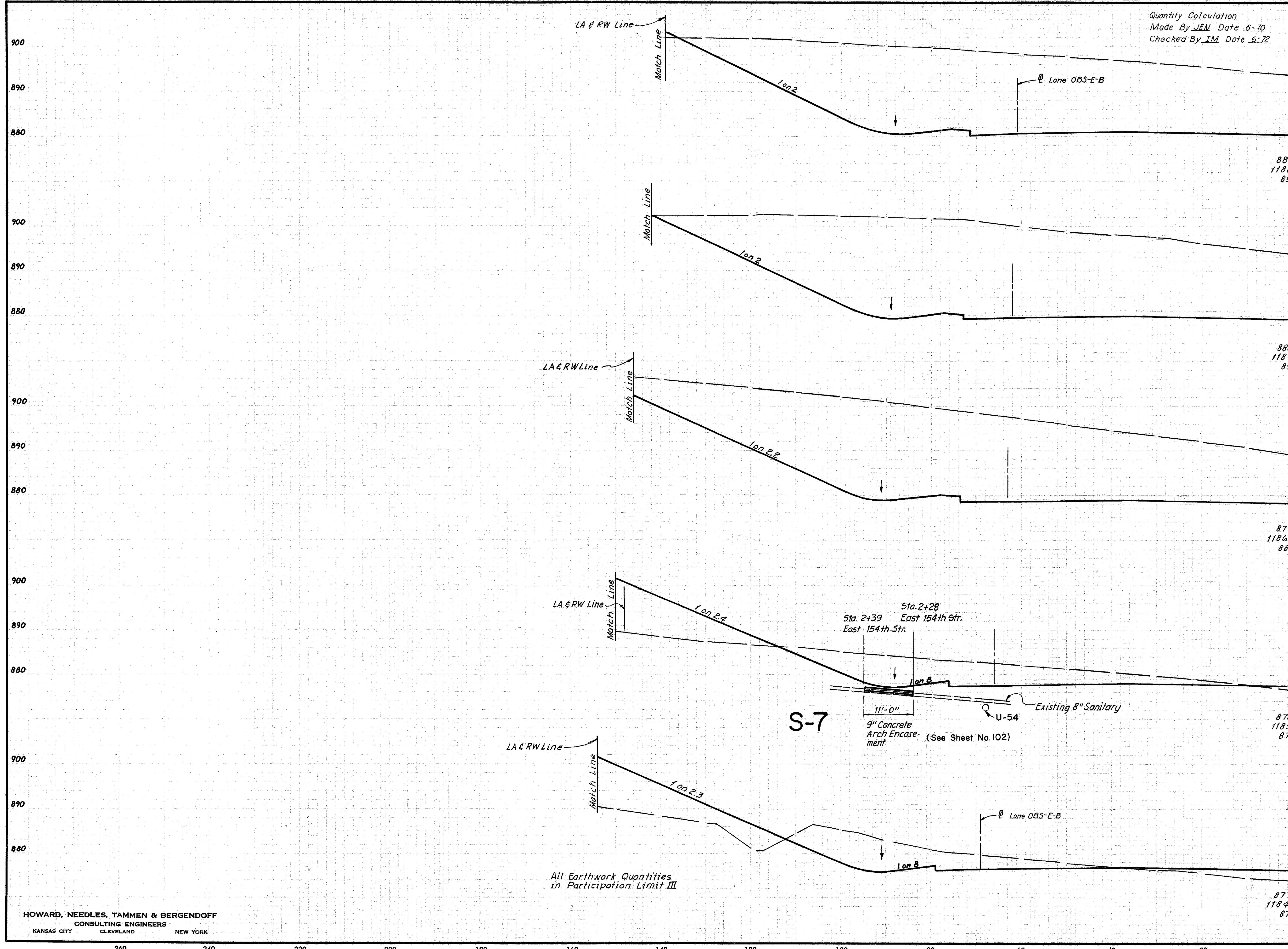
Quantity Calculation  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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390

CUYAHOGA COUNTY  
 CUY. 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
  
 R.F.T.  
 J.E.N.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
1984	1		
		7963	2
2318	0		
		8520	0
2283	0		
		4957	4/3
394	223		
		1267	963
290	297		
		537	2991
Sta. 1183+00	0	1318	
880			

All Earthwork Quantities  
 in Participation Limit III

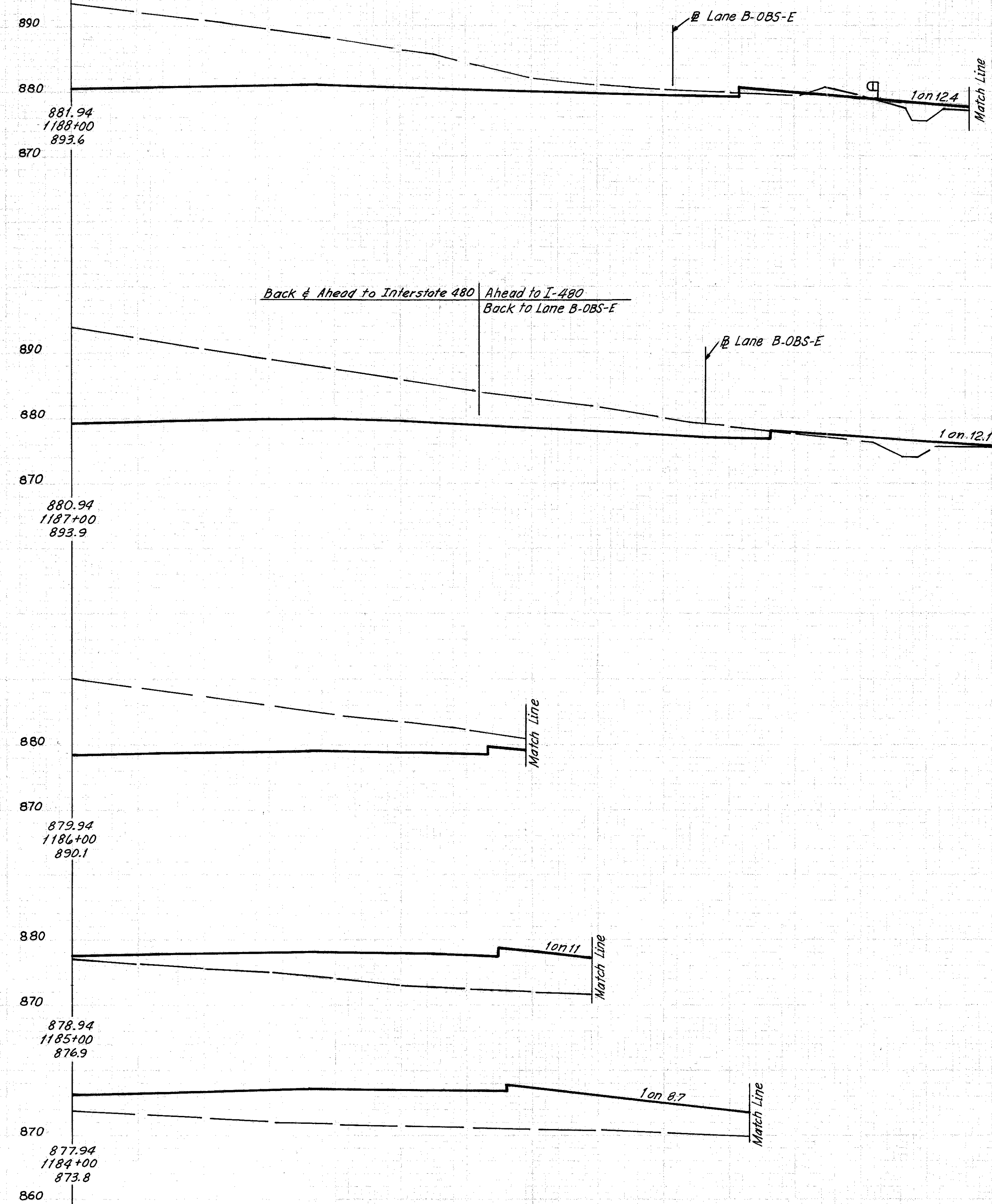
Quantity Calculations  
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FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

139  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
 H.L.D.  
 R.H.A.  
 J.E.N.  
 L.M.



Back & Ahead to Interstate 480  
 Ahead to I-480  
 Back to Lane B-OBS-E

ELEVATION	EARTHWORK			
	END EXC.	AREA EMB.	VOLUME EXC.	VOLUME EMB.
890				
880				
870	587	27		
			2415	107
890				
880				
870				
Sta. 1187+00 Ahead	717	31		
Sta. 1187+00 Back	577	0		
			1909	0
880				
870				
Sta. 1185+37	0	0	0	212
880	454	0		
870			530	0
880	0	310		
870			0	1502
870	0	501		
Sta. 1183+00	0	840	0	2483
870				
860				

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

INTERSTATE 480 STA. 1184+00 RIGHT HALF TO STA. 1188+00

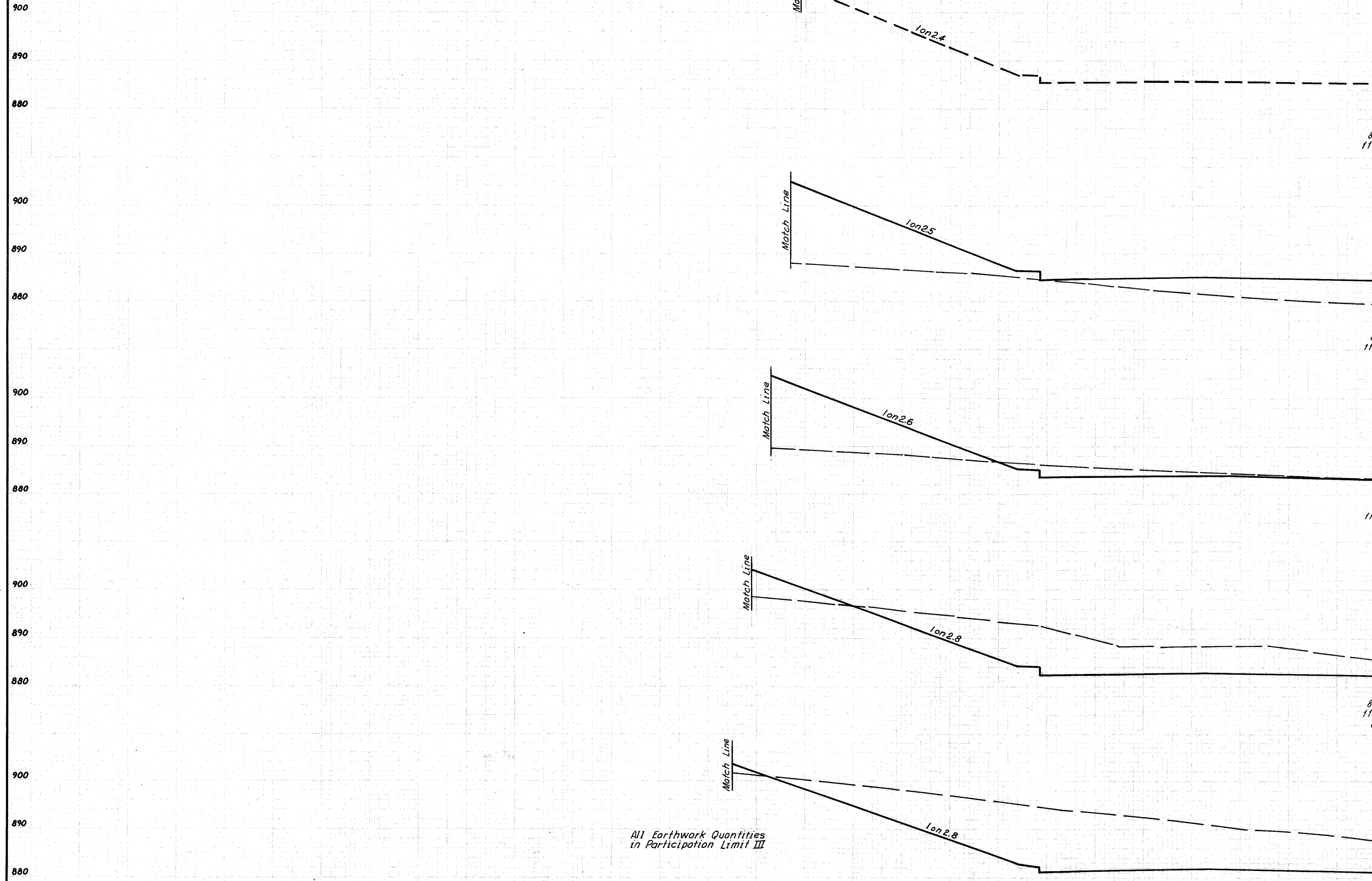


Quantity Calculations  
 Made By JEN Date 6-72  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

140  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



900  
890  
880  
Sta. 1192+50 End Areas Taken From Adjacent Project

886.72  
1192+50  
323 Cu. Yds. of Embankment Deducted For Adjacent Project Earthwork

886.07  
1192+00  
879.2

884.94  
1191+00  
883.3

883.94  
1190+00  
885.4

882.94  
1189+00  
887.6

EARTHWORK				
END STA.	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
1192+50	0	1050		
1192+50			0	1258
1192+00	0	657		
1192+00			139	1857
1191+00	75	346		
1191+00				1250
1190+00	600	63		
1190+00				3080
1189+00	1063	4		
1189+00				5565
1188+00	1942	0		

All Earthwork Quantities in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

INTERSTATE 480 STA. 1189+00 LEFT TO STA. 1192+50

8-67  
9-67  
6-70  
6-72  
  
R.F.T.  
J.E.M.  
J.L.M.

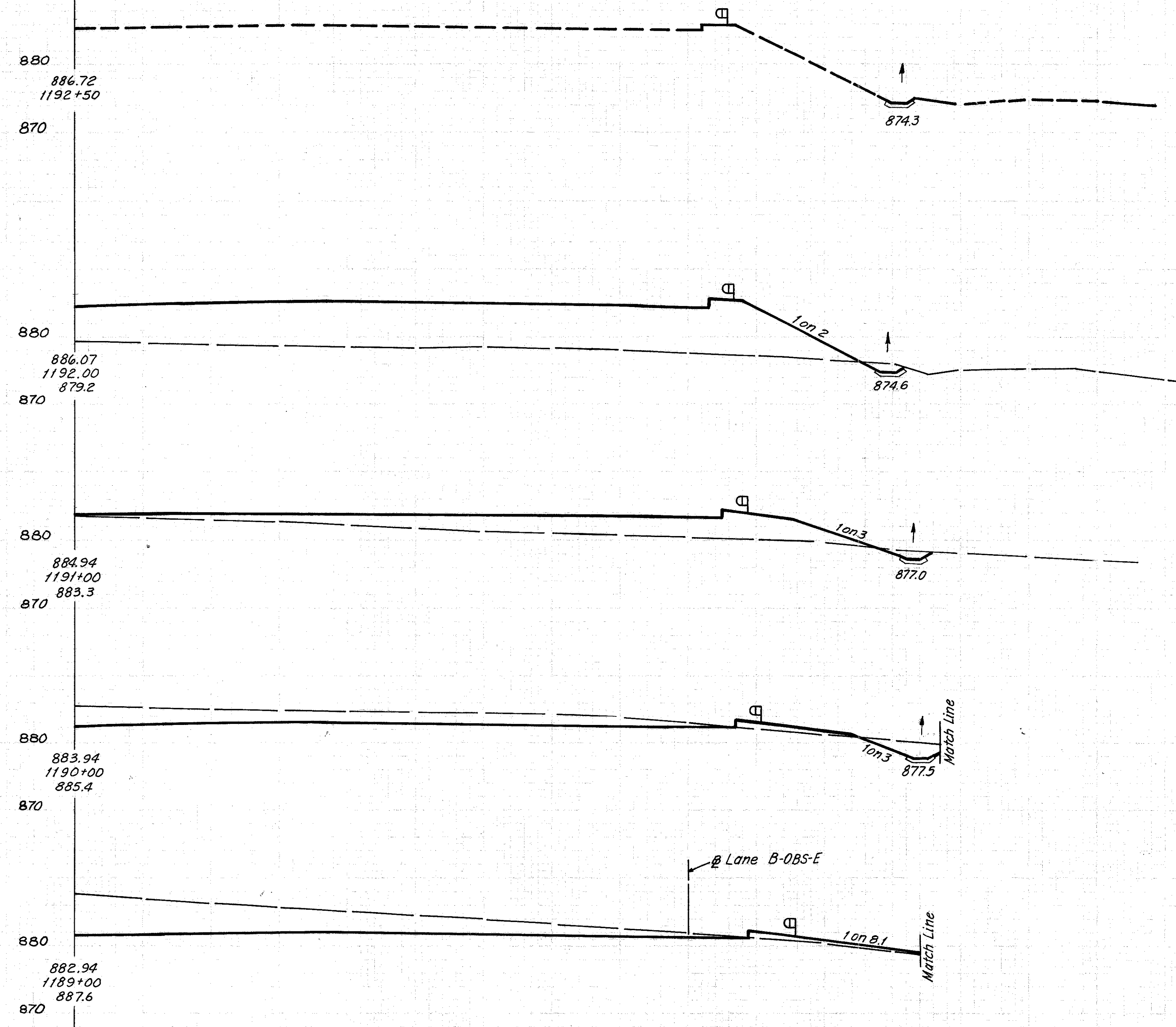
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

141  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
 H.P.  
 R.H.A.  
 J.E.M.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
880			
STA. 1192+50 End Area Taken from Adjacent Project	3	1070	
306 Cu. Yds. of Embankment Deducted for Adjacent Project Earthwork			7 1346
880			
870	5	715	
880			19 1763
870	5	237	
			8 154
Sta. 1190+65	8	0	
			247 16
870	197	13	
			896 46
880	287	12	
Sta. 1188+00	587	27	1619 72
870			

All Earthwork Quantities in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

RIGHT HALF  
 INTERSTATE 480 STA. 1189+00 TO STA. 1192+50

120 100 80 60 40 20 20 40 60 80 100 120

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

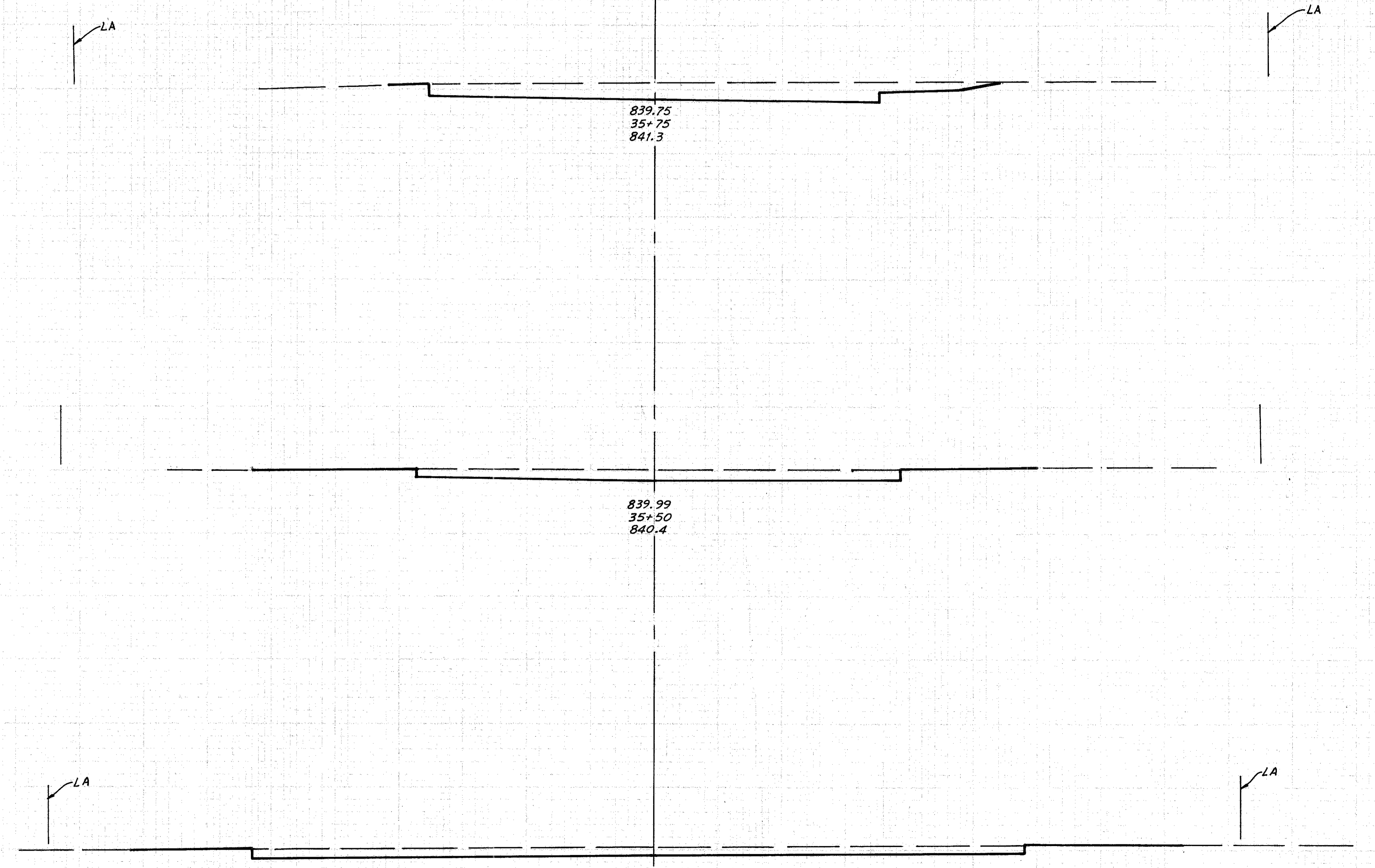
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

142  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 3-68  
 6-70  
 6-72  
 H.L.A.  
 R.H.A.  
 J.E.N.  
 I.M.

850  
 840  
 830  
 850  
 840  
 830  
 850  
 840  
 830



END	EARTHWORK		VOLUME	
	EXC.	EMB.	EXC.	EMB.
202	0			
		154	0	
130	0			
		138	0	
168	0			
		43	0	
220	0			

All Earthwork Quantities  
 in Participation Limit I

$\frac{(168 + 220) \cdot 6}{2 \times 27} = 43$   
 Sta. 35+19

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

140 120 100 80 60 40 20 20 40 60 80 100 120

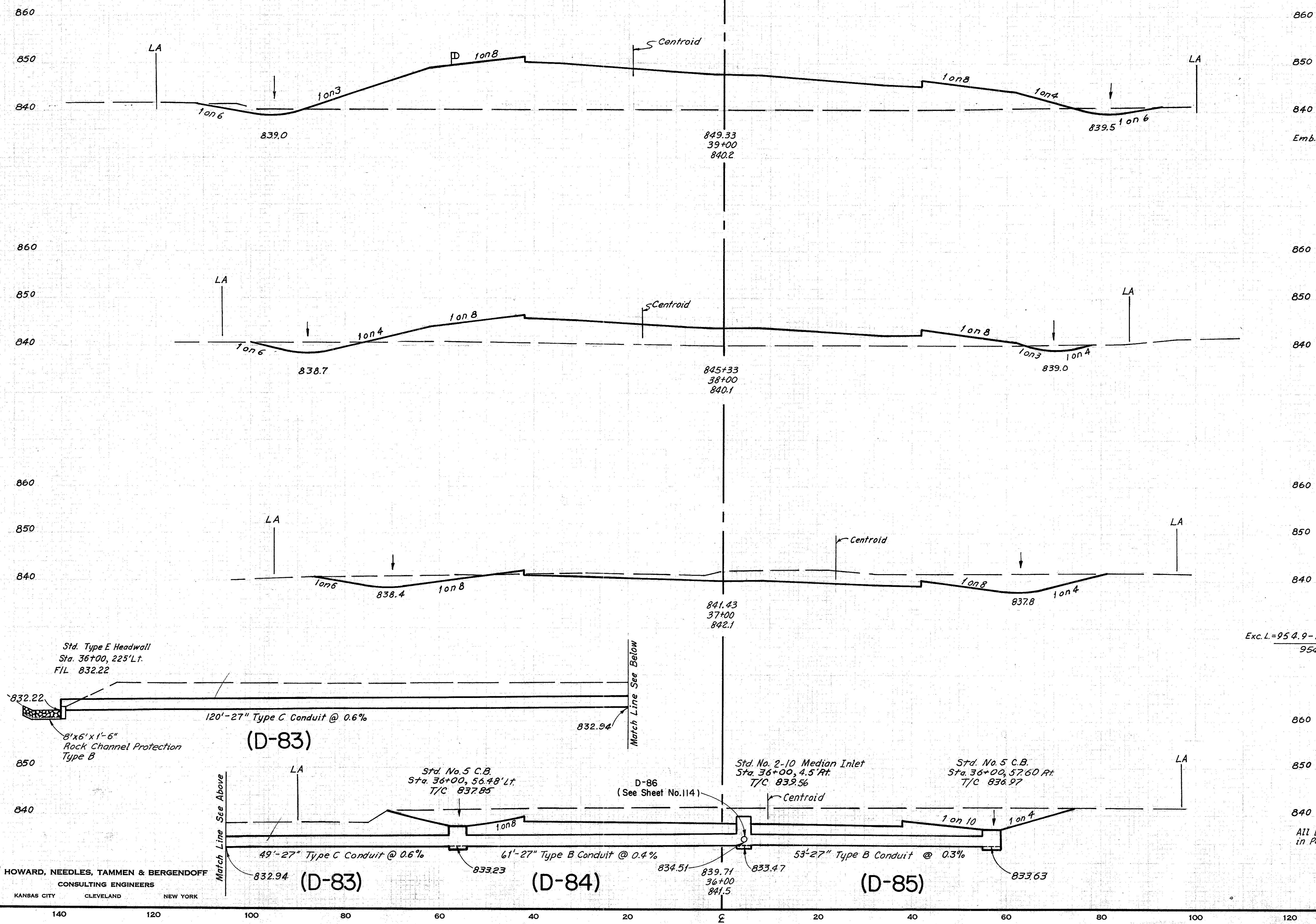
BEDFORD FREEWAY STA. 35+25 TO STA. 35+75

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

143  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



$$\text{Emb. L.} = \frac{(954.9 + 18) \times 100}{954.9} = 101.9$$

$$\text{Exc. L.} = \frac{954.9 - 17 \times 100}{954.9} = 98.2$$

EARTHWORK				
END	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	38	1072		
			124	2885
	29	457		
			591	850
	290	2		
			1328	4
	440	0		
			297	0
	202	0		

All Earthwork Quantities  
 in Participation Limit I

Sta. 35+75

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

144  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
2551	7		
0	0	2357	6
		78	1724
84	1843		
		196	7202
22	1996		
		72	6838
17	1660		
		102	5145
38	1072		



$$\text{Exc.} = \frac{(954.9 - 18) \times 50}{954.9} = 49.9$$

$$\text{Sta. } 42+50$$

$$\text{Emb. } L = \frac{(954.9 + 10) \times 50}{954.9} = 50.5$$

$$\text{Emb. } L = \frac{(954.9 + 12.5) \times 100}{954.9} = 101.3$$

$$\text{Emb. } L = \frac{(954.9 + 9.5) \times 100}{954.9} = 101.0$$

$$\text{Emb. } L = \frac{(954.9 + 16.5) \times 100}{954.9} = 107.1$$

8-57  
 H.L.D.  
 R.H.A.  
 J.E.N.  
 6-72

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit 1



120 100 80 60 40 20 0 20 40 60 80 100 120

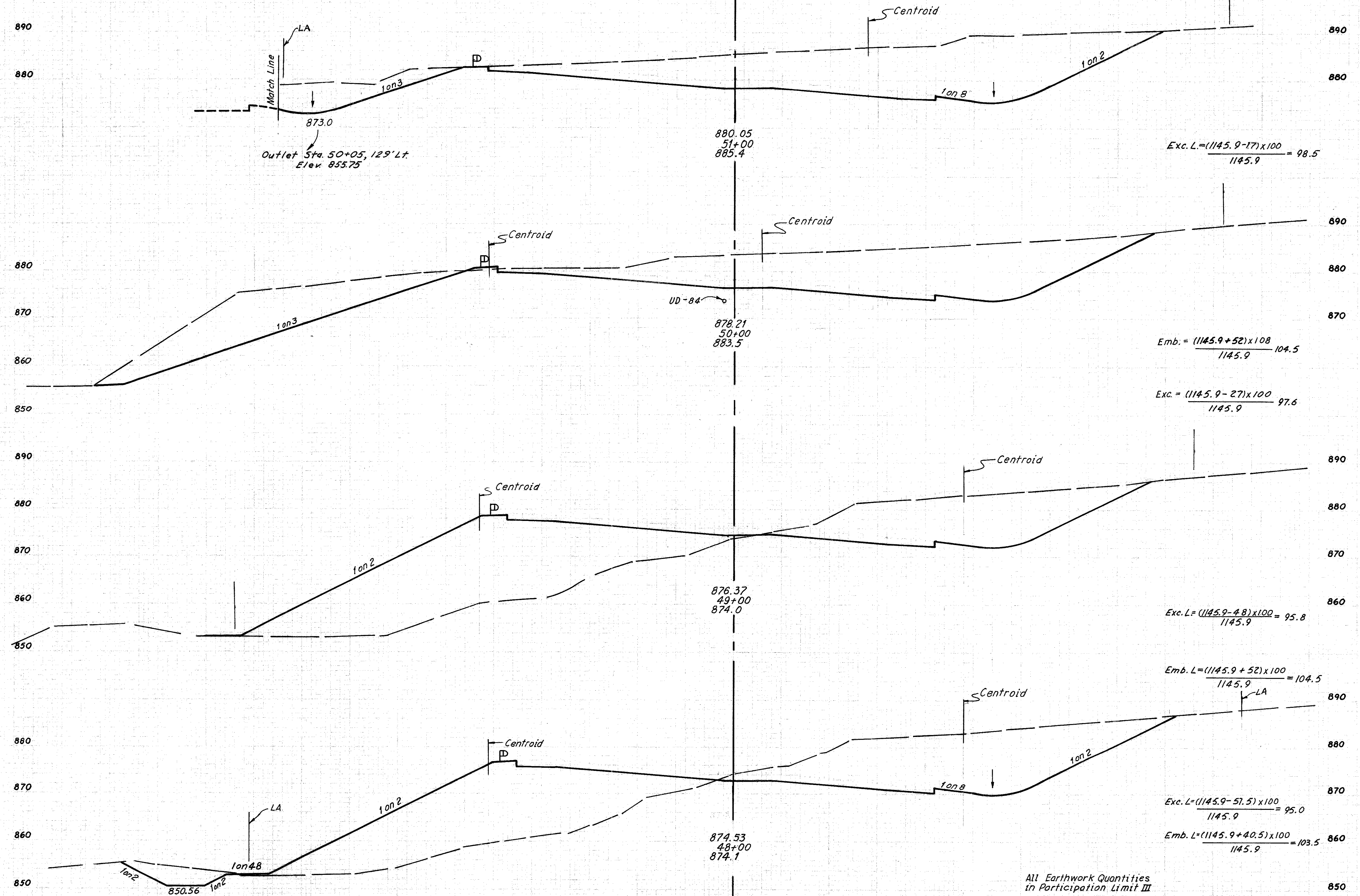
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By JM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

146  
390

CUYAHOGA COUNTY  
 CUY. 480-21.40

8-87  
 9-87  
 6-70  
 6-72  
 FCW  
 R.F.T.  
 JEM  
 JM



$$\text{Exc. L} = \frac{(1145.9 - 17) \times 100}{1145.9} = 98.5$$

$$\text{Emb.} = \frac{(1145.9 + 52) \times 108}{1145.9} = 104.5$$

$$\text{Exc.} = \frac{(1145.9 - 27) \times 100}{1145.9} = 97.6$$

$$\text{Exc. L} = \frac{(1145.9 - 48) \times 100}{1145.9} = 95.8$$

$$\text{Emb. L} = \frac{(1145.9 + 52) \times 100}{1145.9} = 104.5$$

$$\text{Exc. L} = \frac{(1145.9 - 57.5) \times 100}{1145.9} = 95.0$$

$$\text{Emb. L} = \frac{(1145.9 + 40.5) \times 100}{1145.9} = 103.5$$

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
1170	7		
		4660	22
1385	5		
		3535	2135
571	1098		
		2540	3853
861	893		
		2004	5507
Sta. 47+00	329	1980	

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

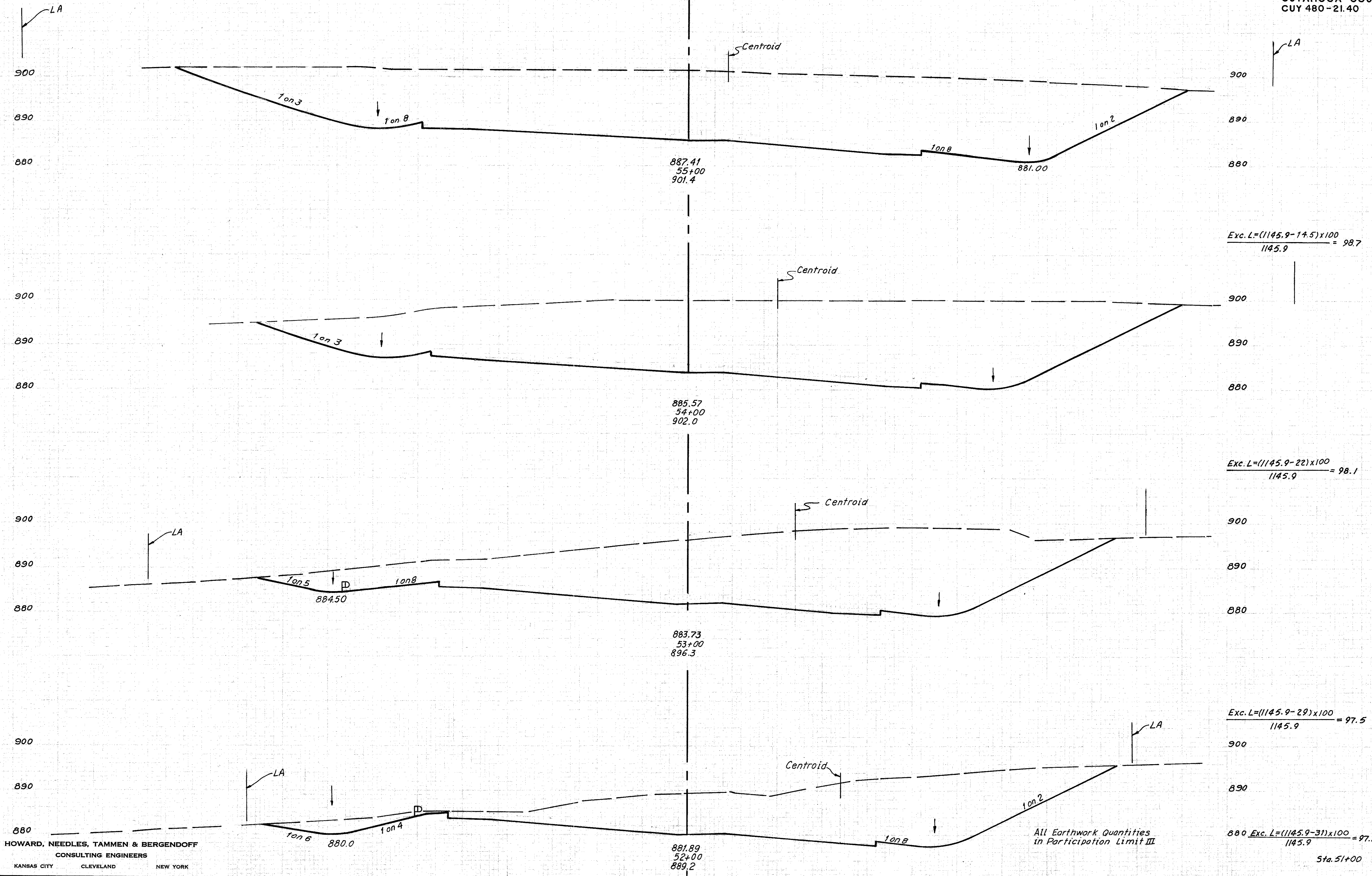
Quantity Calculations  
 Made By JEN Date 6-72  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

147  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 8-67  
 6-72  
 6-72  
 W.L.L.  
 R.F.M.  
 J.E.M.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
2945	0		
		10336	0
2710	0		
		8747	0
2105	0		
		6274	0
1370	0		
		4577	13
1170	7		

$$\frac{Exc. L = (1145.9 - 14.5) \times 100}{1145.9} = 98.7$$

$$\frac{Exc. L = (1145.9 - 22) \times 100}{1145.9} = 98.1$$

$$\frac{Exc. L = (1145.9 - 29) \times 100}{1145.9} = 97.5$$

$$\frac{Exc. L = (1145.9 - 31) \times 100}{1145.9} = 97.3$$

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit III



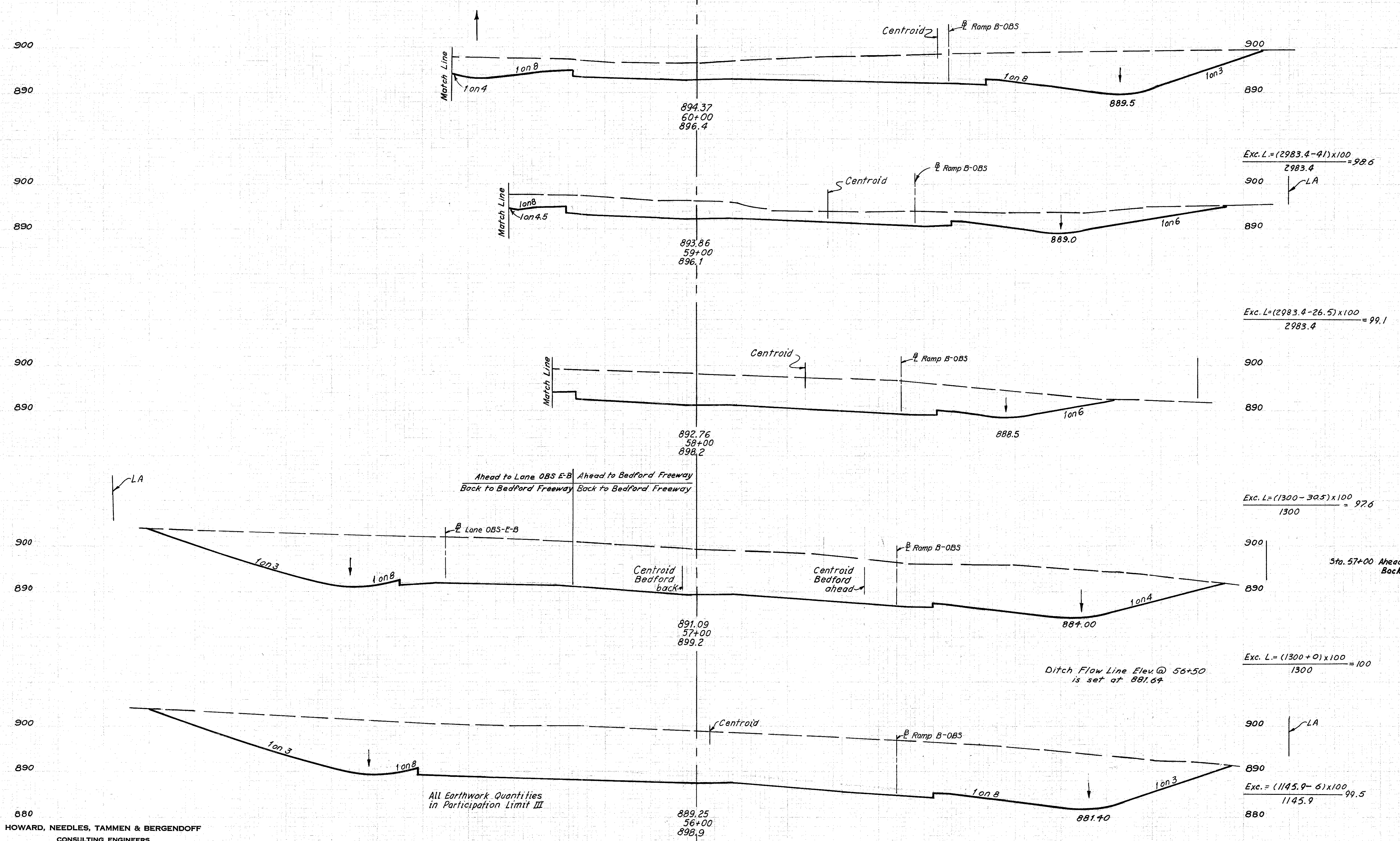
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

148  
390

CUYAHOGA COUNTY  
 CUY480-21.40

8-67  
 9-67  
 6-72  
  
 FCW  
 R.F.T.  
 J.E.M.  
 H.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
920	0		
		2589	0
498	0		
		2288	0
749	0		
		3685	0
1290	0		
2070	0		
		8250	0
2385	0		
		9821	0
2945	0		

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit III

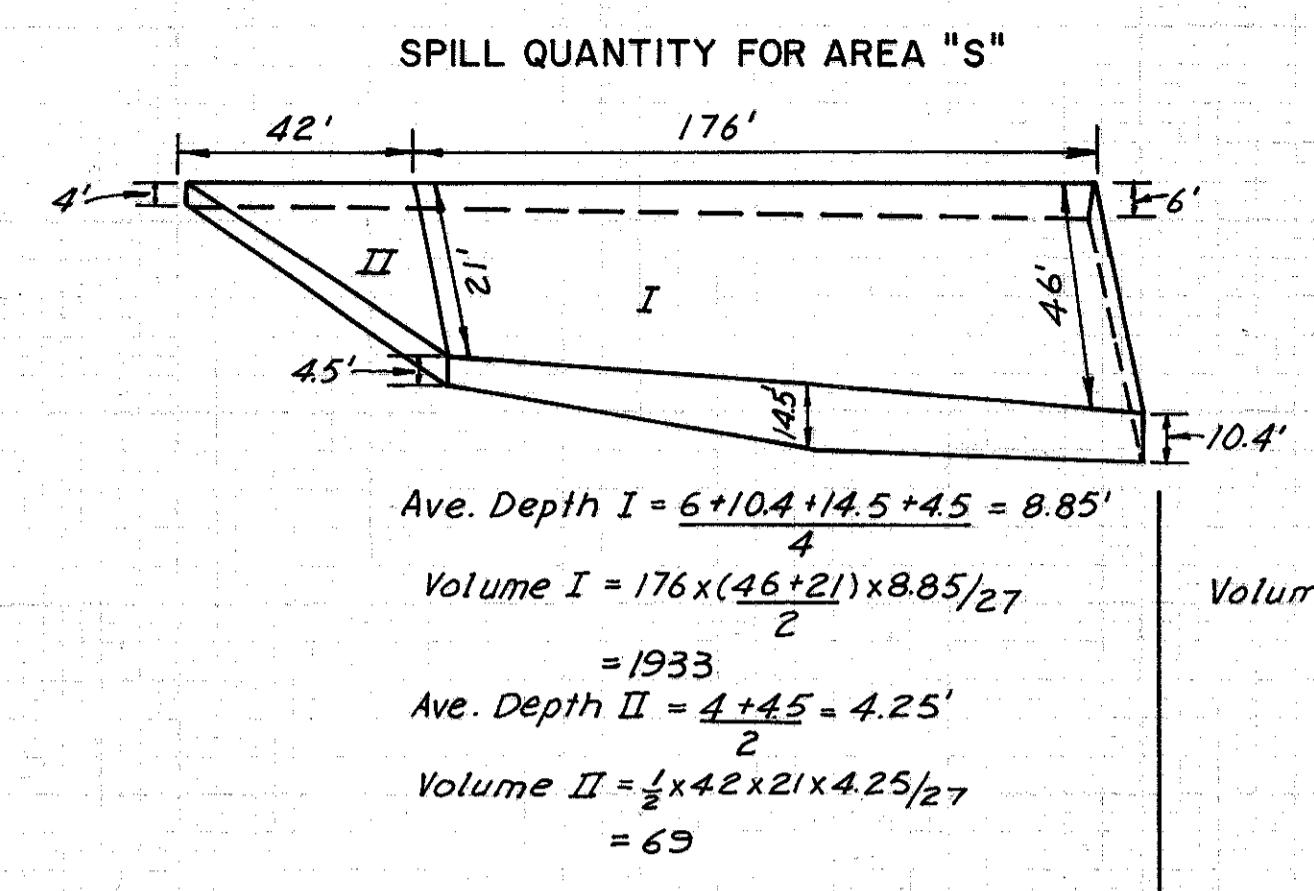
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Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

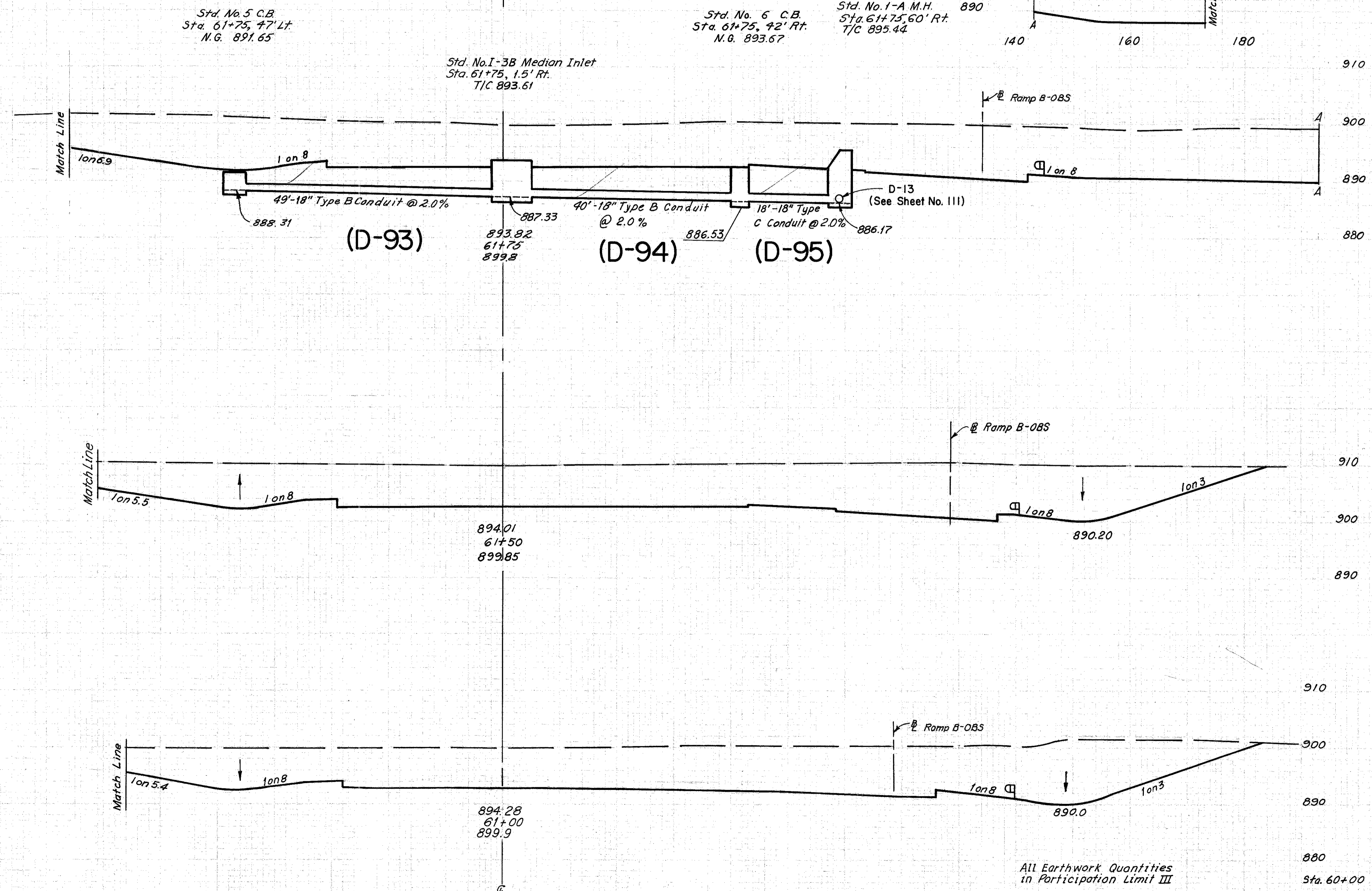
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

149  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



8-67  
 9-67  
 6-70  
 6-72  
 W.L.L.  
 R.F.F.  
 J.E.M.  
 I.M.



END	EARTHWORK		VOLUME
	EXC.	EMB.	
			2002 0
			1651 0
			4335 0
			1470 0
			4426 0
			920 0

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit III

BEDFORD FREEWAY STA. 61+00 TO STA. 61+75

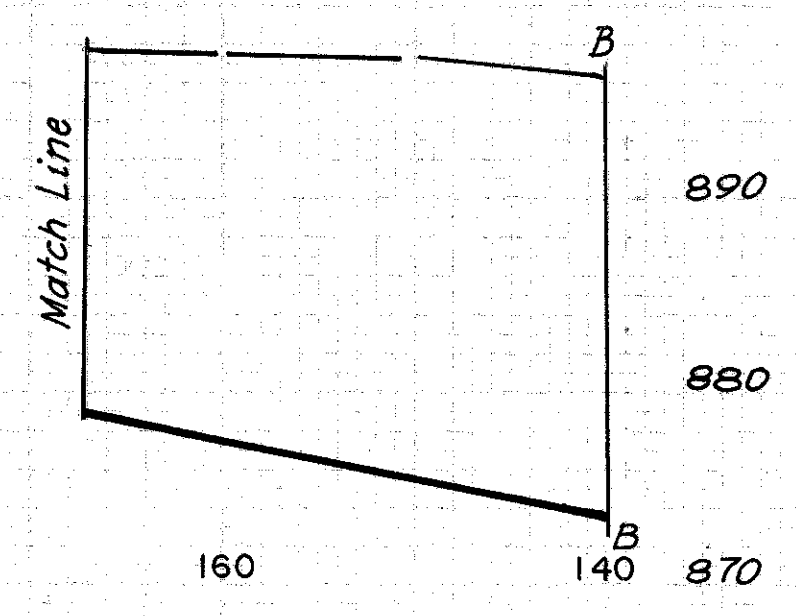
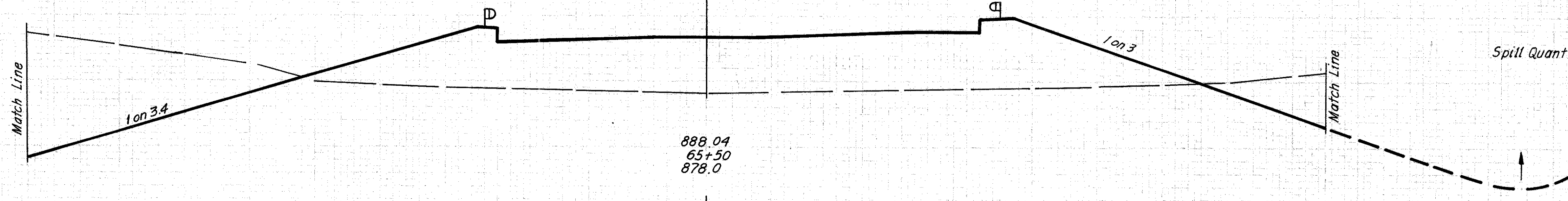
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

150  
390

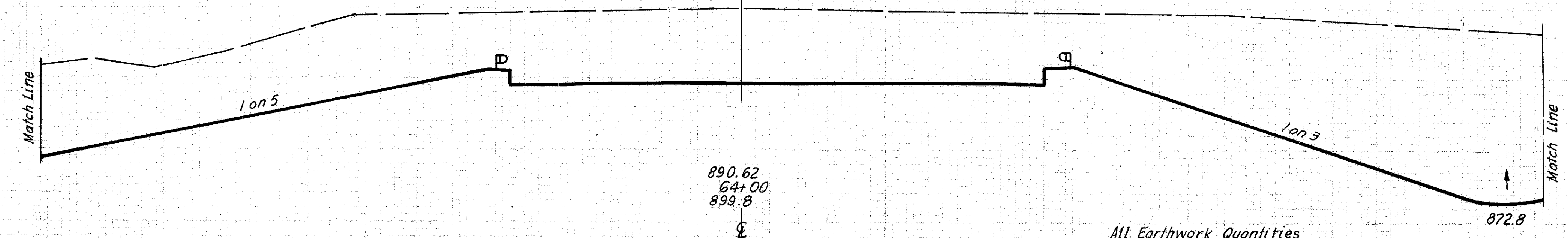
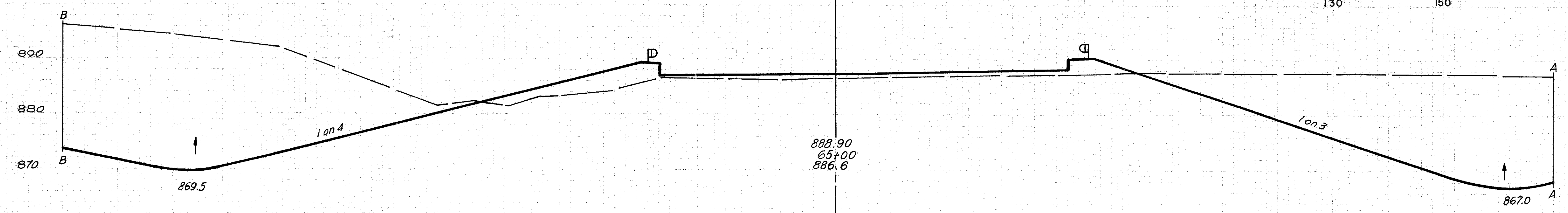
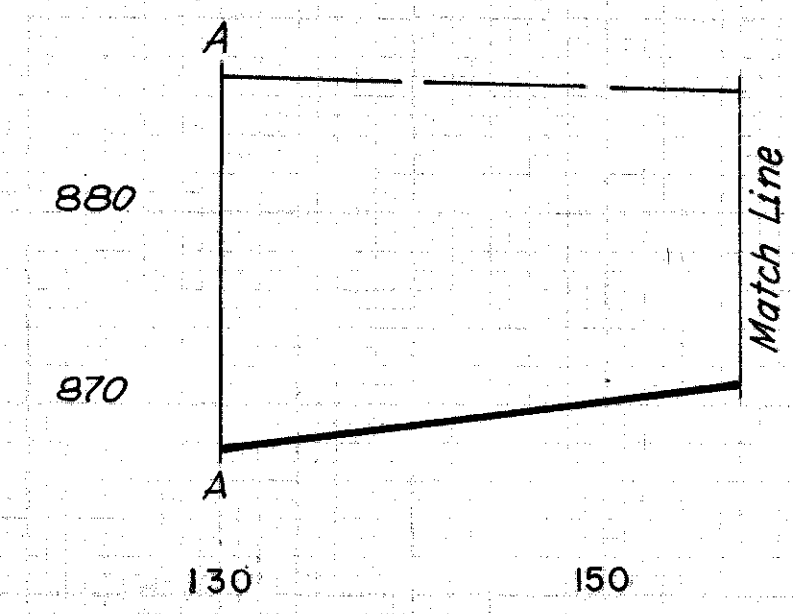
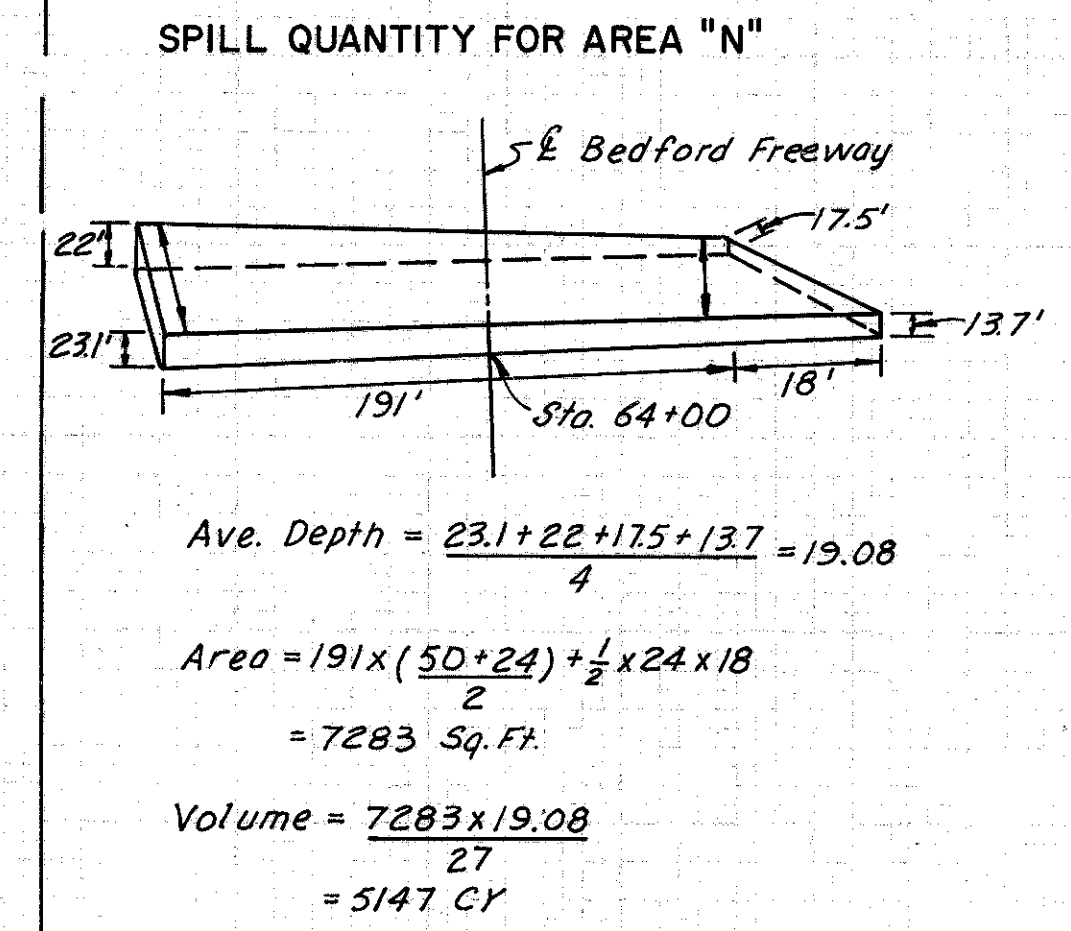
CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
 H.T.A.  
 J.E.N.  
 I.M.



SPILL QUANTITY FOR AREA "L"

STA.	DIST.	END AREA	END AREA TOTAL	VOLUME CY
65+50		994	1283	922 (Emb)
65+88.8	38.8	289		
65+50		97	97	36 (Exc)
65+88.8	20' (Ave. Ht)	-		
65+50		420	420	194 (Exc)
65+88.8	25' (Ave. Ht)	-		



EARTHWORK			
END STA.	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
		230	922
302	994		
		3365	1072
3132	164		
		10646	304
2617	0		
		5147	0

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit III

Spill Quantity S. Abutment

120 100 80 60 40 20 0 20 40 60 80 100 120 BEDFORD FREEWAY STA. 64+00 TO STA. 65+50

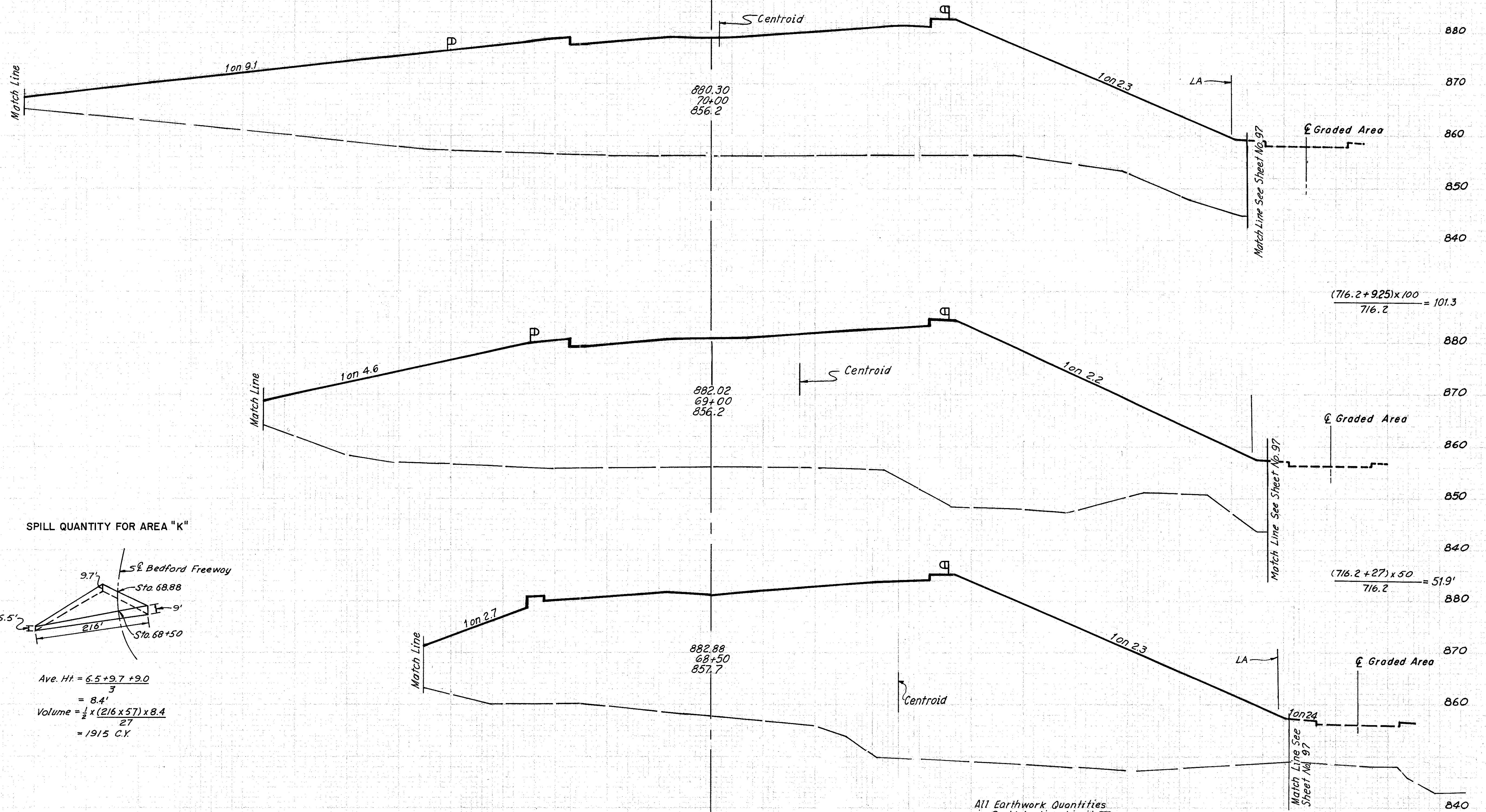
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By JM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

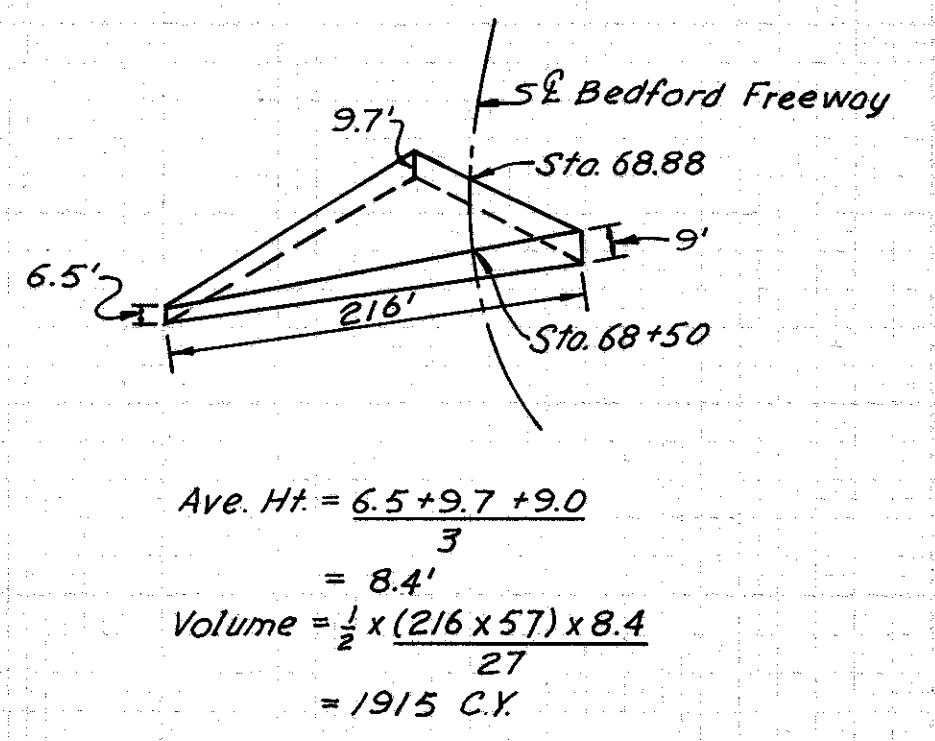
151  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 H.P.A.  
 9-67  
 J.E.M.  
 6-72



SPILL QUANTITY FOR AREA "K"



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	4057		
		0	15490
0	4200		
		0	7785
0	3900		
		0	1915

$$\frac{(716.2 + 9.25) \times 100}{716.2} = 101.3$$

$$\frac{(716.2 + 27) \times 50}{716.2} = 51.9'$$

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities  
 in Participation Limit III

Spill Quantity S. Abutment

120 100 80 60 40 20 20 40 60 80 100 120

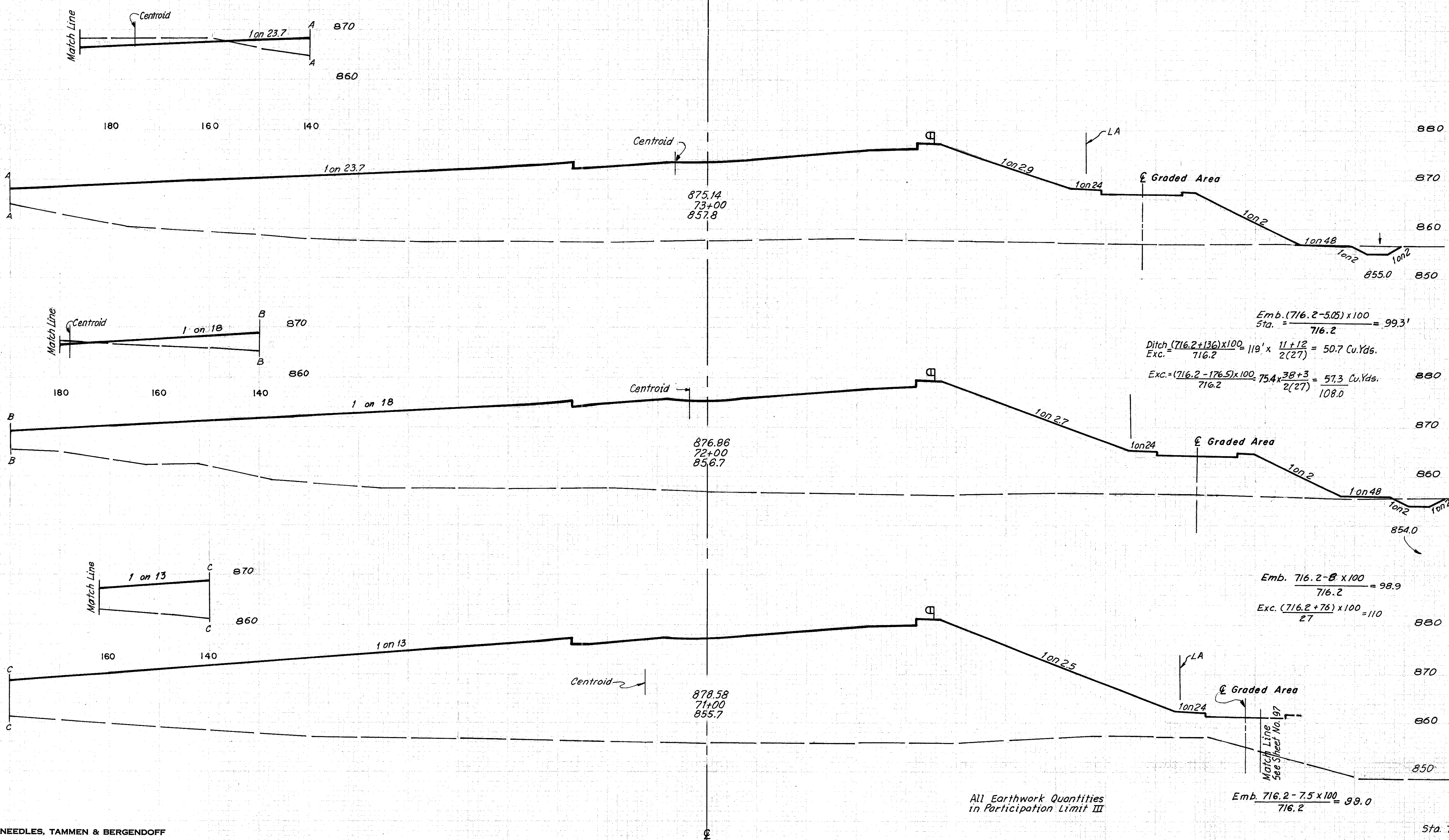
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By JM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

152  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-72  
 H.L.D.  
 R.H.A.  
 J.E.V.  
 J.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
50	3340		
14	3761		
0	4285		
0	4057		
		108	13058
		29	14366
		0	15294

$$\text{Emb.} = \frac{(716.2 - 5.05) \times 100}{716.2} = 99.3'$$

$$\text{Ditch} = \frac{(716.2 + 136) \times 100}{716.2} = 119' \times \frac{11 + 12}{2(27)} = 50.7 \text{ Cu. Yds.}$$

$$\text{Exc.} = \frac{(716.2 - 176.5) \times 100}{716.2} = 75.4 \times \frac{38 + 3}{2(27)} = 57.3 \text{ Cu. Yds.}$$

$$\text{Emb.} = \frac{716.2 - 8}{716.2} \times 100 = 98.9$$

$$\text{Exc.} = \frac{(716.2 + 76) \times 100}{27} = 110$$

$$\text{Emb.} = \frac{716.2 - 7.5 \times 100}{716.2} = 99.0$$

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

140 120 100 80 60 40 20 20 40 60 80 100 120 BEDFORD FREEWAY STA. 71+00 TO STA. 73+00

120 100 80 60 40 20 20 40 60 80 100 120

Quantity Calculations  
Made By JEN Date 6-70  
Checked By IM Date 6-72

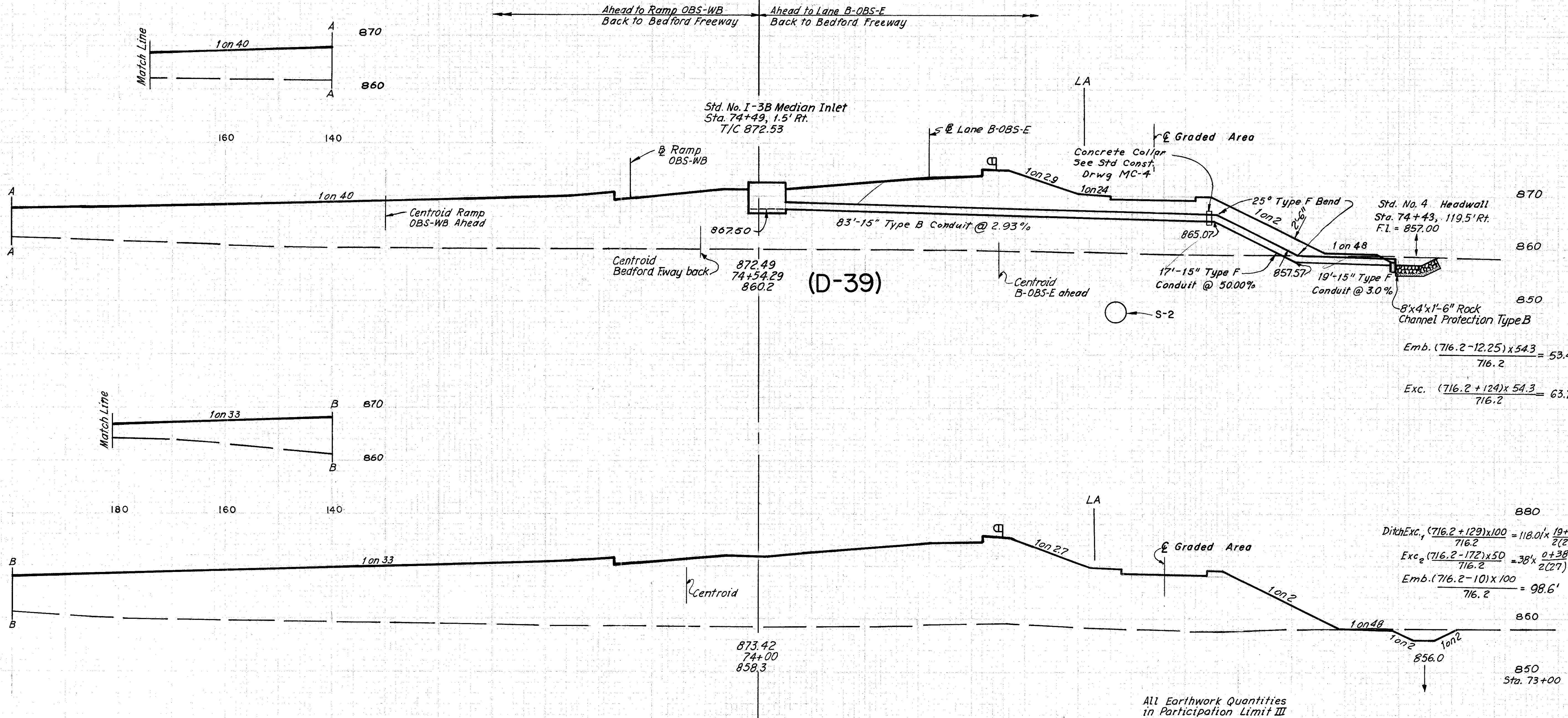
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

153  
390

CUYAHOGA COUNTY  
CUY 480-21.40

EARTHWORK			
END	AREA	VOLUME	
		EXC.	EMB.
870			
860	11	2550	
850			
870			
860			
850			
870			
860	26	5526	
850			
880			
860			
850			
860	19	3038	
850			
860			
850			
860	95	11,646	
850			
860			
850	50	3340	

Ahead to Lane B-OBS-E Emb. 1157  
Exc. 11  
Ahead to Ramp OBS-WB Emb. 1393



$$\text{Emb. } \frac{(716.2 - 12.25) \times 54.3}{716.2} = 53.4'$$

$$\text{Exc. } \frac{(716.2 + 124) \times 54.3}{716.2} = 63.7'$$

$$\text{Ditch Exc. } \frac{(716.2 + 129) \times 100}{716.2} = 118.0' \times \frac{19 + 12}{2(27)} = 67.75 \text{ Cu Yds.}$$

$$\text{Exc. } \frac{(716.2 - 172) \times 50}{716.2} = 38' \times \frac{0 + 38}{2(27)} = 26.75 \text{ Cu Yds.}$$

$$\text{Emb. } \frac{(716.2 - 10) \times 100}{716.2} = 98.6'$$

5-67  
6-70  
6-72  
H.A.  
J.E.N.  
I.M.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

All Earthwork Quantities in Participation Limit III

140 120 100 80 60 40 20 20 40 60 80 100 120 BEDFORD FREEWAY STA. 74+00 TO STA. 74+54.29

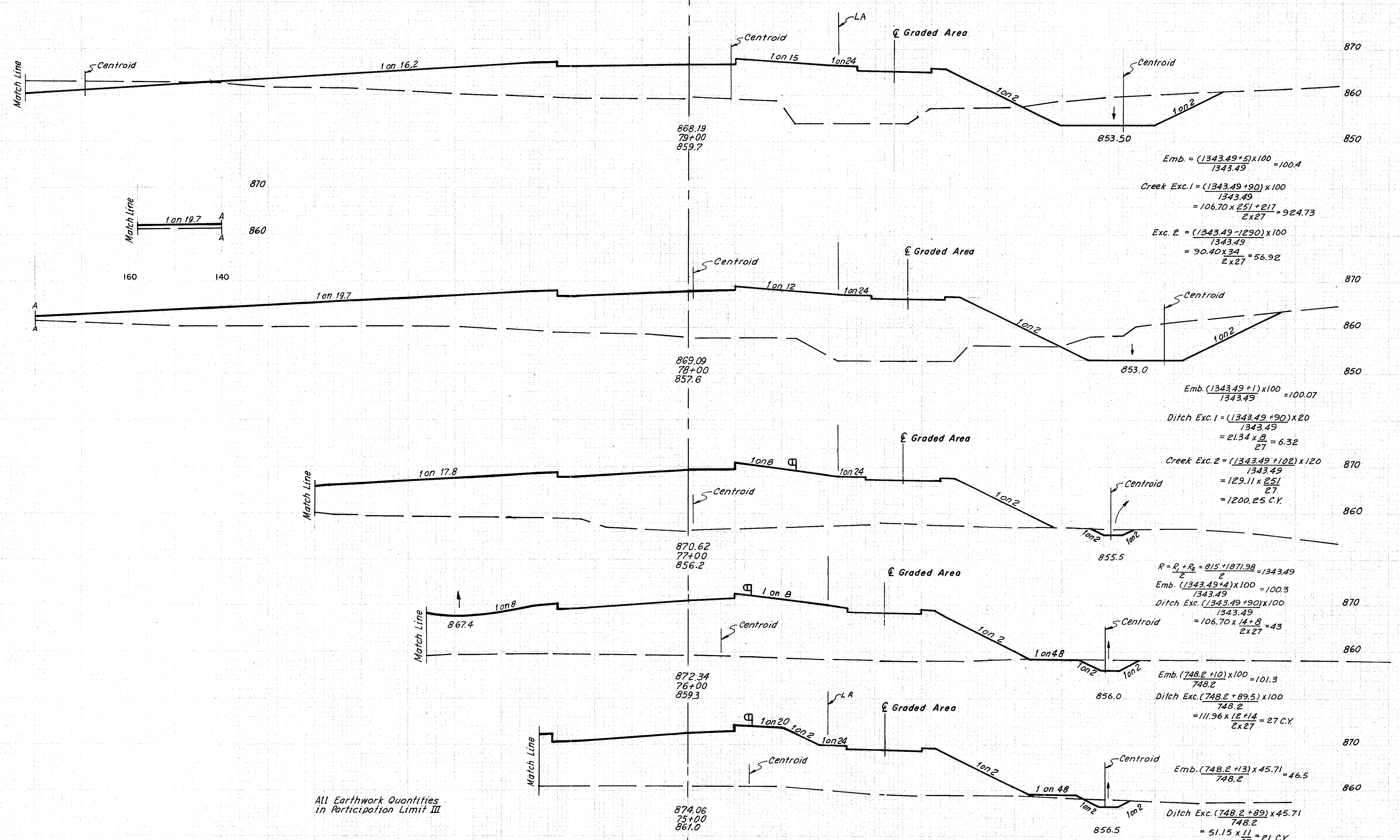
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

154  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-70  
 6-72  
 H.F.A.  
 J.E.M.  
 I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
251	1154		
251	1648	982	5210
		1207	5837
8	1502		
14	1277	41	5162
		48	4335
12	1034		
		19	1896
11	1168		

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

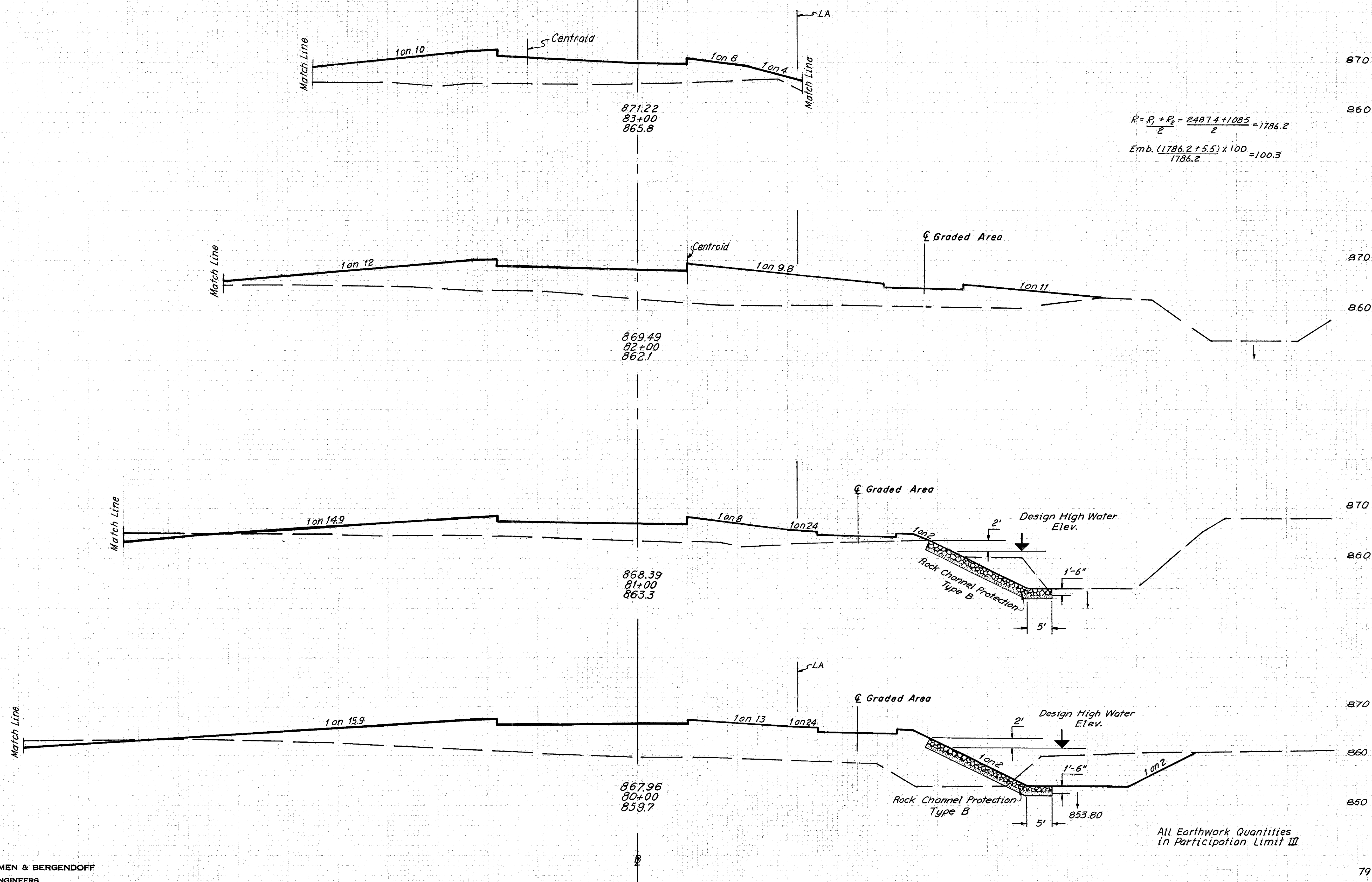
155  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	426		
		0	2251
		117	2144
63	371		
		480	2396
		196	923
		828	3846
251	1154		

$$R = \frac{R_1 + R_2}{2} = \frac{2487.4 + 1085}{2} = 1786.2$$

$$\text{Emb.} = \frac{(1786.2 + 5.5) \times 100}{1786.2} = 100.3$$



All Earthwork Quantities  
 in Participation Limit III

8-67  
 9-67  
 6-70  
 H.F.A.  
 J.E.N.  
 I.M.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK



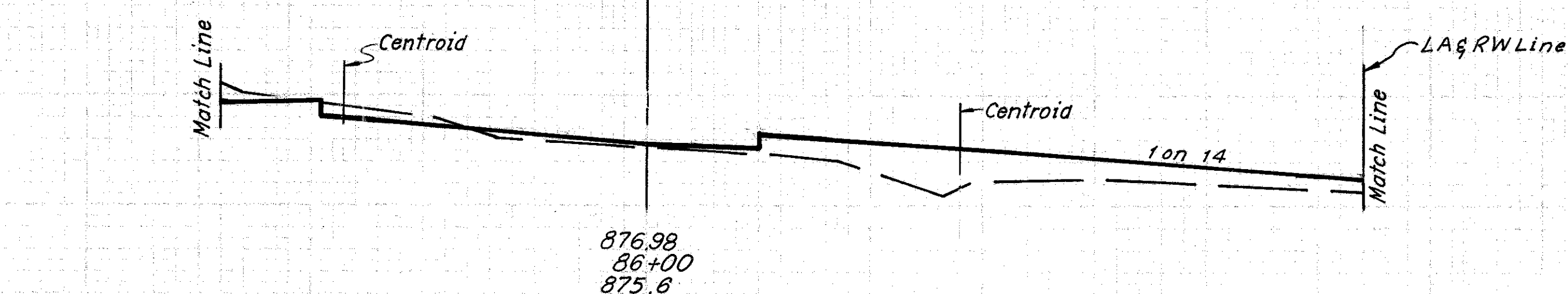
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

156  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 8-67  
 6-72  
 H.L.D.  
 R.H.A.  
 J.E.N.  
 I.M.



$$\text{Emb.} = \frac{(1085 - 26) \times 100}{1085} = 97.6$$

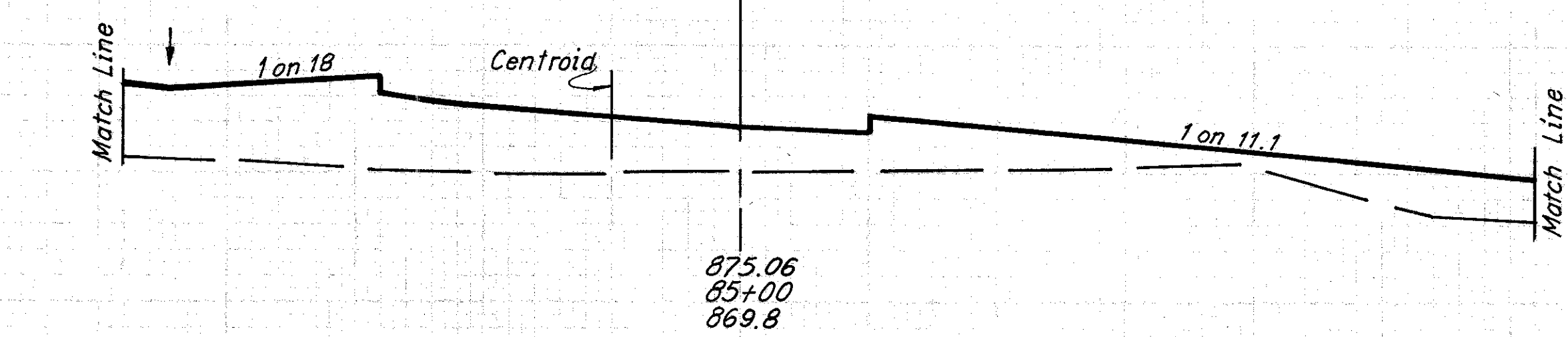
880

$$\text{Exc.} = \frac{(1085 + 25) \times 100}{1085} = 102.3$$

870

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.

150	31		
		303	298
10	134		



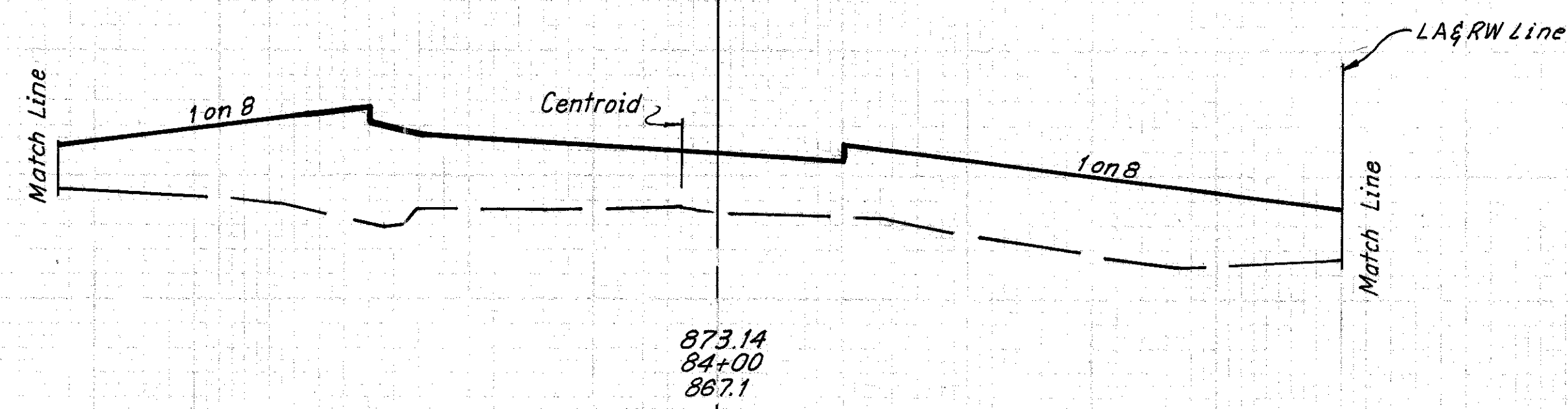
$$\frac{(954.9 - 9) \times 100}{954.9} = 99.1$$

880

870

		19	1042
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0	434		
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$$\frac{(1786.2 + 6) \times 100}{1786.2} = 100.3$$

870

860

$$\frac{(1786.2 + 12) \times 100}{1786.2} = 100.7$$

Sta. 83+00

0	1896		
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0	587		
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0	426		
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All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

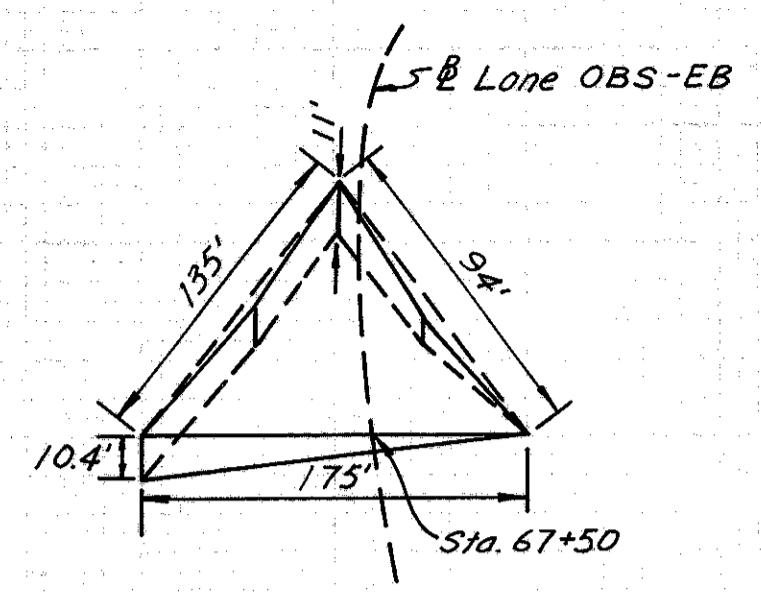
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

157  
390

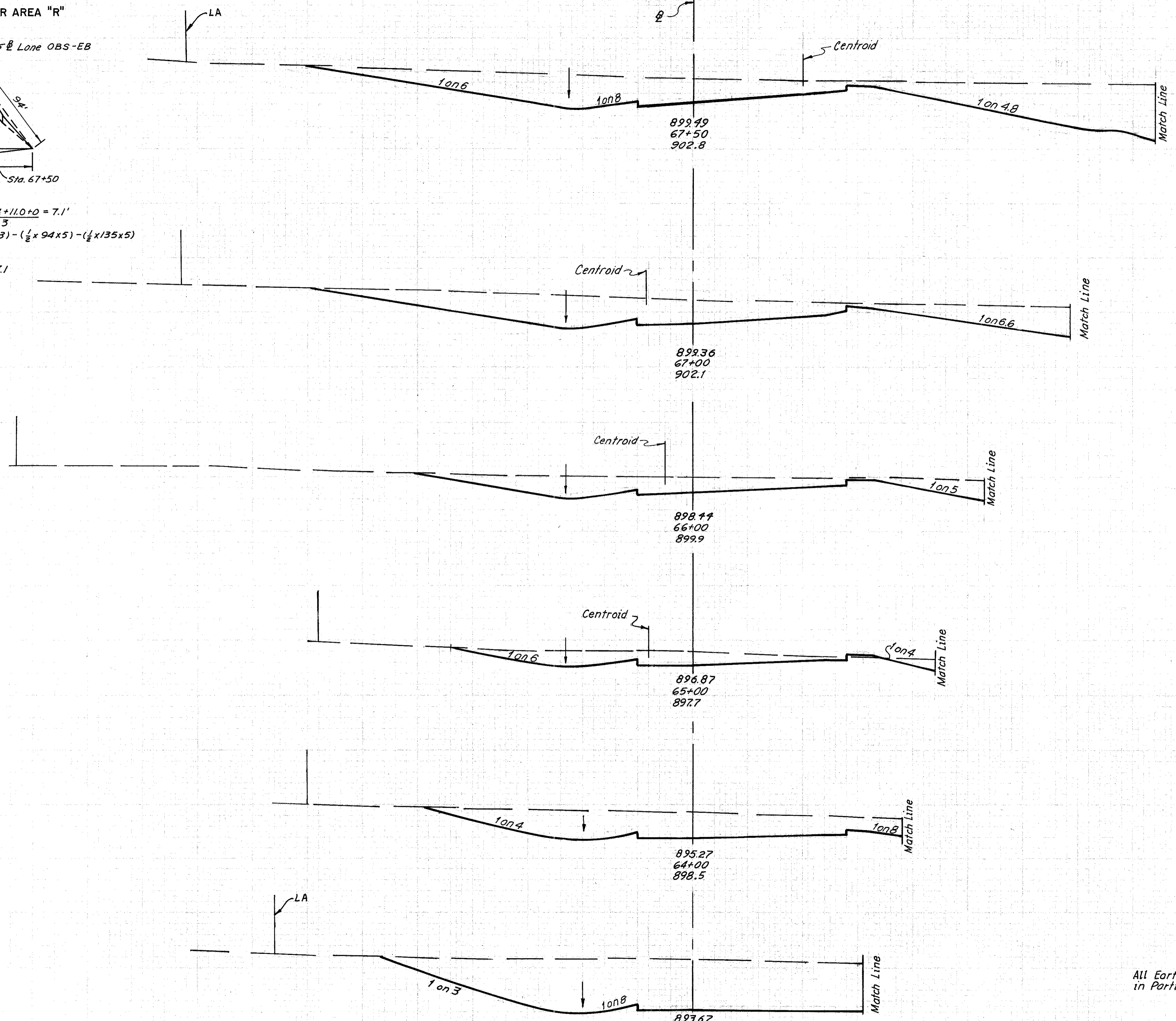
CUYAHOGA COUNTY  
 CUY 480-21.40

SPILL QUANTITY FOR AREA "R"



Ave. Depth =  $\frac{10.4 + 11.0 + 0}{3} = 7.1'$   
 Area =  $(\frac{1}{2} \times 175 \times 7.1) - (\frac{1}{2} \times 94 \times 5) - (\frac{1}{2} \times 135 \times 5)$   
 = 5815  
 Volume =  $\frac{5815 \times 7.1}{27}$   
 = 1529

6-67  
 8-67  
 6-72  
 H.L.D.  
 R.H.A.  
 J.E.N.  
 I.M.



900  
 Spill Quantity  
 N. End Abut.  
 890

$\frac{(1000+6) \times 50}{1000} = 50.3$

Exc. =  $\frac{(2294.9 - 6.5) \times 100}{2294.9} = 99.7$

Exc. =  $\frac{(2294.9 - 6.5) \times 100}{2294.9} = 99.7$

Emb. =  $\frac{(2294.9 + 30) \times 100}{2294.9} = 101.3$

END STA.	EARTHWORK		END STA.
	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
67+50	0	1529	0
651	0	1039	0
464	0	1283	0
231	0	667	6
130	3	889	6
350	0	1917	0
685	0	1736	0
780	0		

All Earthwork Quantities  
 in Participation Limit III

890  
 Sta. 62+36  
 See Sheet  
 (Bedford Sta. 57+00)

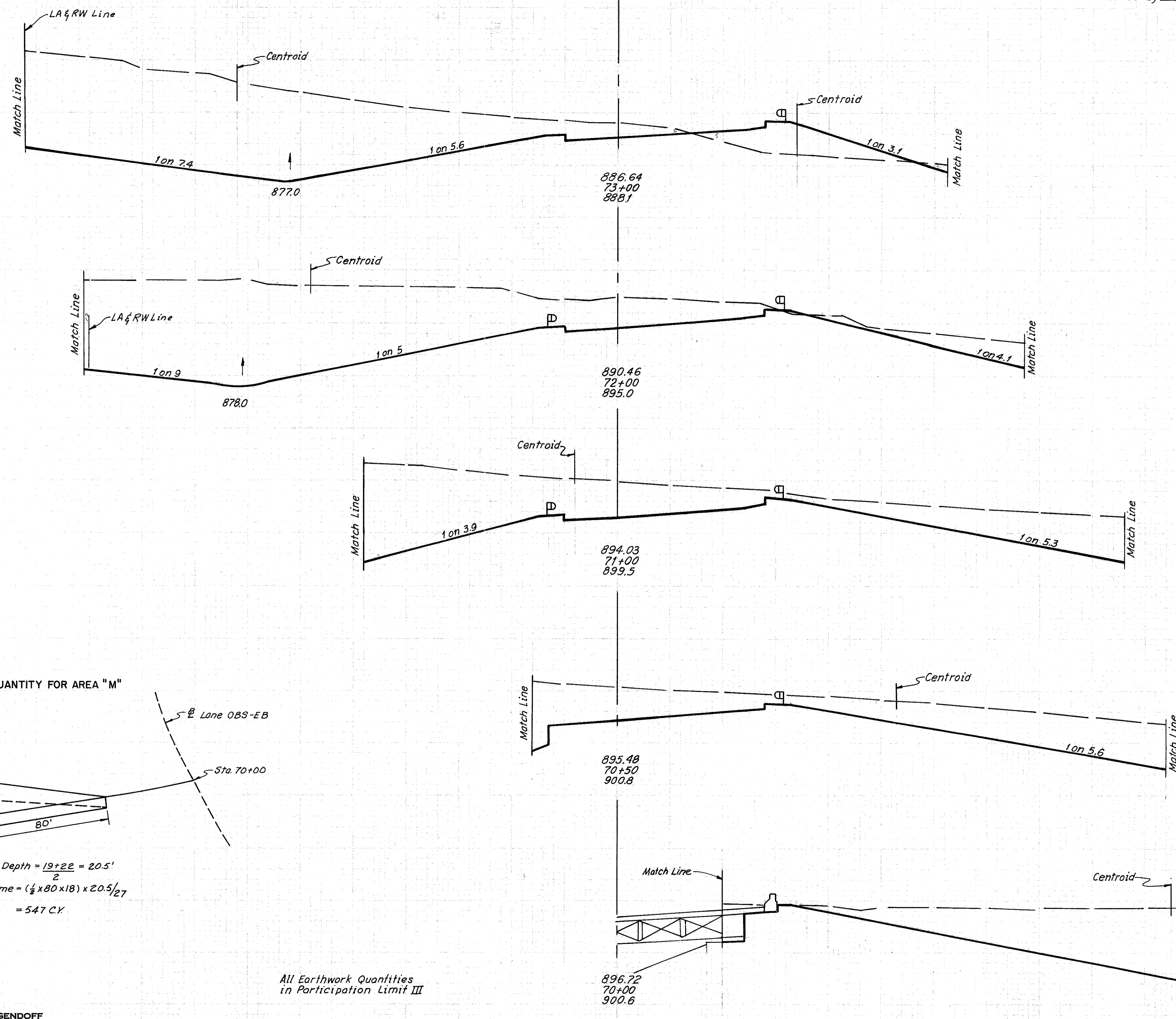
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

158  
390

CUYAHOGA COUNTY  
 CUY 480-21.40



ELEVATION	EARTHWORK			
	END EXC.	AREA EMB.	VOLUME EXC.	VOLUME EMB.
900				
890				
880	1463	134		
				5276 258
900				
890	1584	1		
880				
				4562 0
900				
890	974	0		
880				
				1552 0
900				
890	660	0		
880				
				1639 0
900				
890	964	0		
880				
				547 0

$$Exc. = \frac{(1000 - 65) \times 100}{1000} = 93.5$$

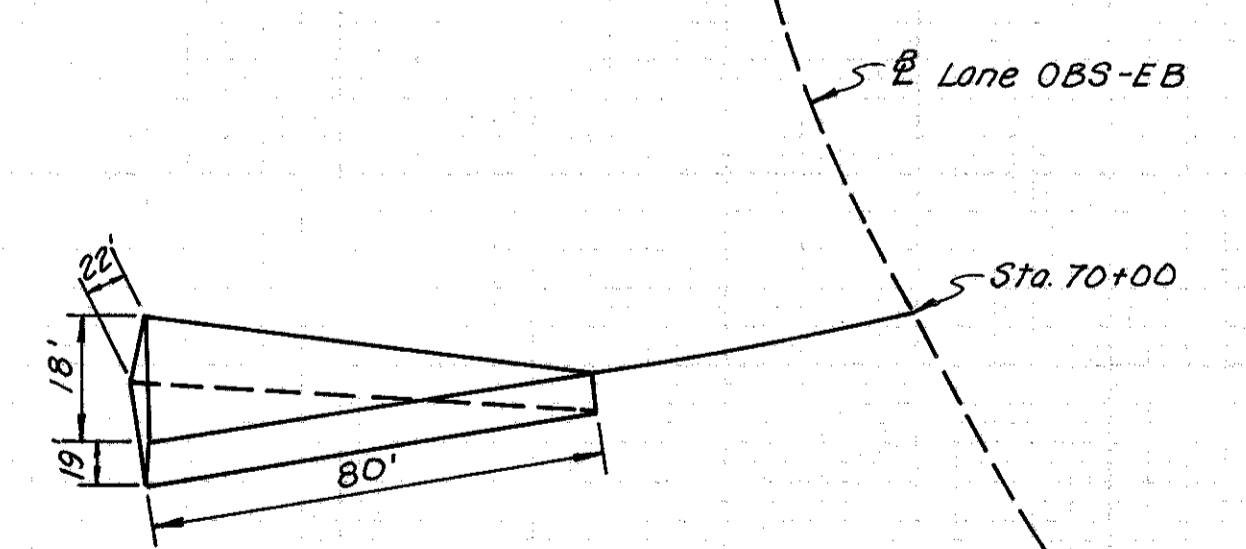
$$Emb. = \frac{(1000 + 33) \times 100}{1000} = 103.3$$

$$\frac{(881.5 - 33) \times 100}{881.5} = 96.3$$

$$\frac{(881.5 + 22.5) \times 50}{881.5} = 51.3$$

$$\frac{(881.5 + 79) \times 50}{881.5} = 54.5$$

SPILL QUANTITY FOR AREA "M"



Ave. Depth =  $\frac{19+22}{2} = 20.5'$   
 Volume =  $(\frac{1}{2} \times 80 \times 18) \times 20.5 / 27$   
 = 547 C.Y.

All Earthwork Quantities  
 in Participation Limit III

8-67  
 8-67  
 8-72  
 8-72  
 H.L.D.  
 R.H.A.  
 JEN  
 IM

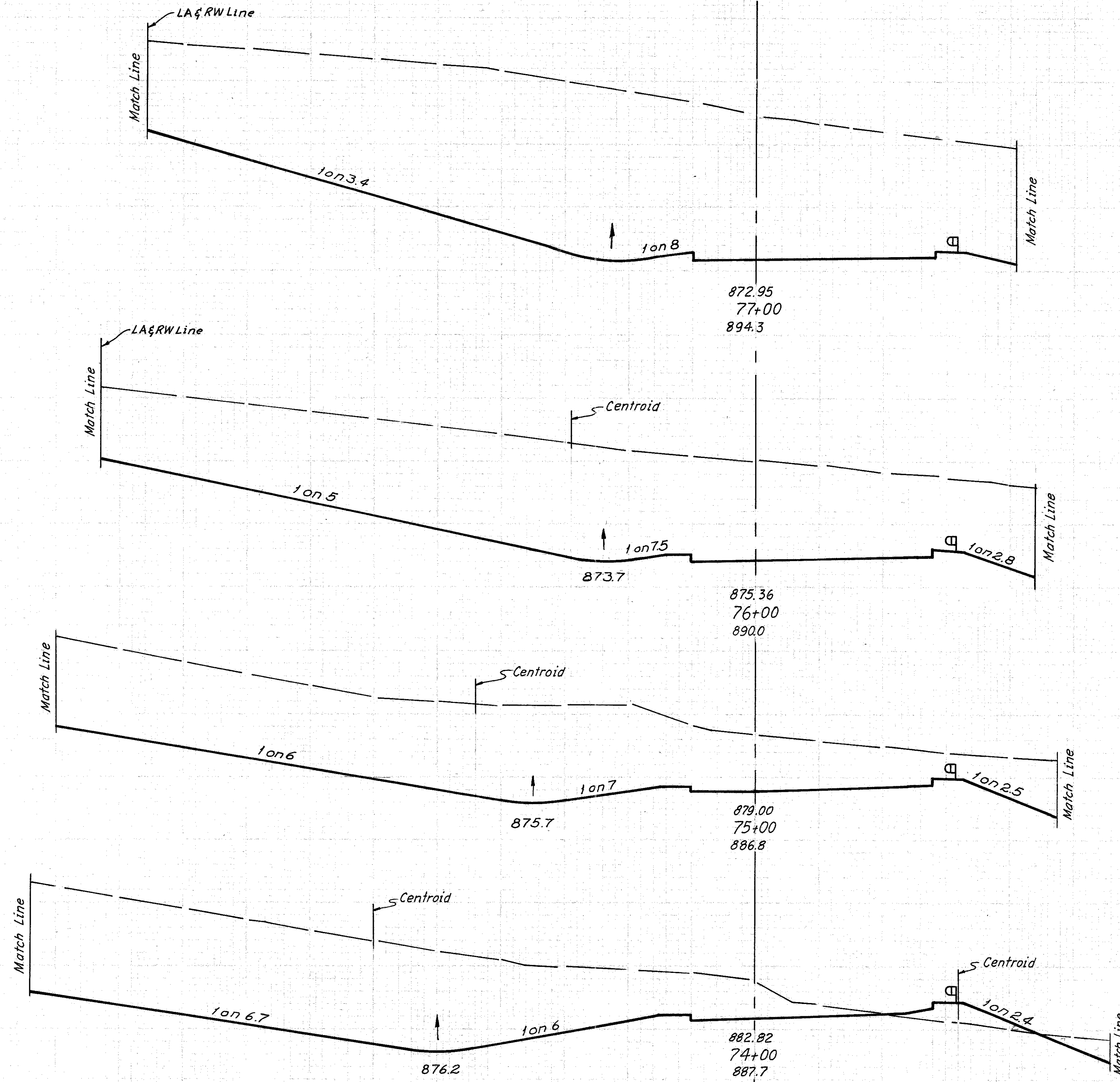
Quantity Calculations  
 Made By JEN. Date 6-70  
 Checked By IM. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

159  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

8-67  
 9-67  
 6-72  
 HLD.  
 RFA  
 JEM



Back From EB-I-480  
 Sta. 77+99  
 See Sheet No 127  
 (I-80 1178+00)

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
931	32		
		7152	59
890			
2970	0		
880			
870			
		9567	0
890			
2196	0		
880			
870			
		7251	0
$\frac{(2294.9 - 36.5) \times 100}{2294.9} = 98.4$			
890			
1783	0		
880			
870			
		6155	71
$\frac{(2294.9 - 52) \times 100}{2294.9} = 97.7$			
890			
$\text{Emb. } \frac{(2294.9 + 32) \times 100}{2294.9} = 101.4$			
890			
$\frac{(1000 - 66) \times 100}{1000} = 93.4$			
		1619	38
880			
		5331	327
870			
$\text{Emb. } \frac{(1000 + 26) \times 100}{1000} = 102.6$			
870			
		1143	134
		3082	122

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

120 100 80 60 40 20 20 40 60 80 100 120

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

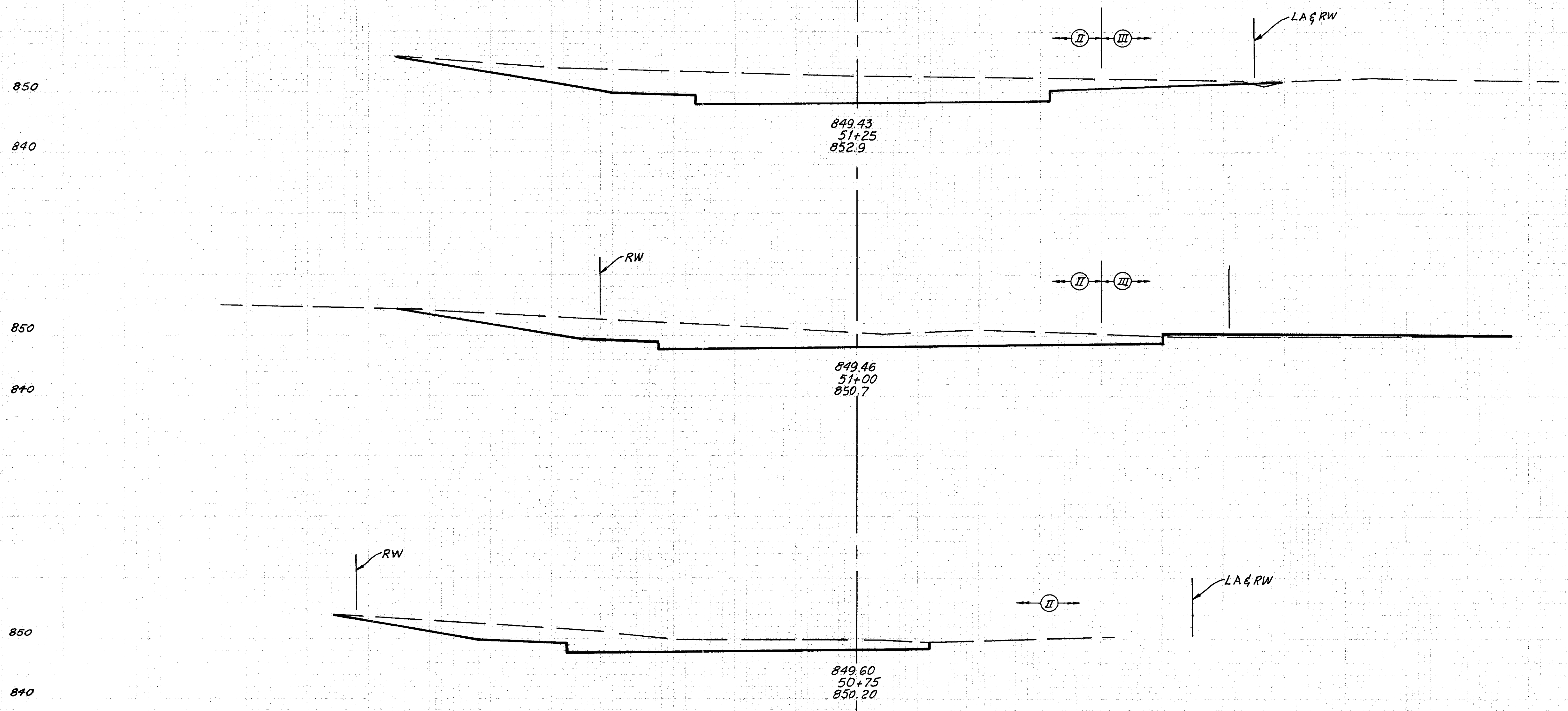
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

160  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

8-63  
 9-63  
 6-72  
 H.D.  
 J.E.V.  
 J.M.

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
399 24	0 0		
		322 17	0 9
296 15	0 20		
		231 7	0 9
204 0	0		
		35 0	0 0
261 0			



HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Sta 50+70.81  
 Participation Area II 000  
 Participation Area III 000

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

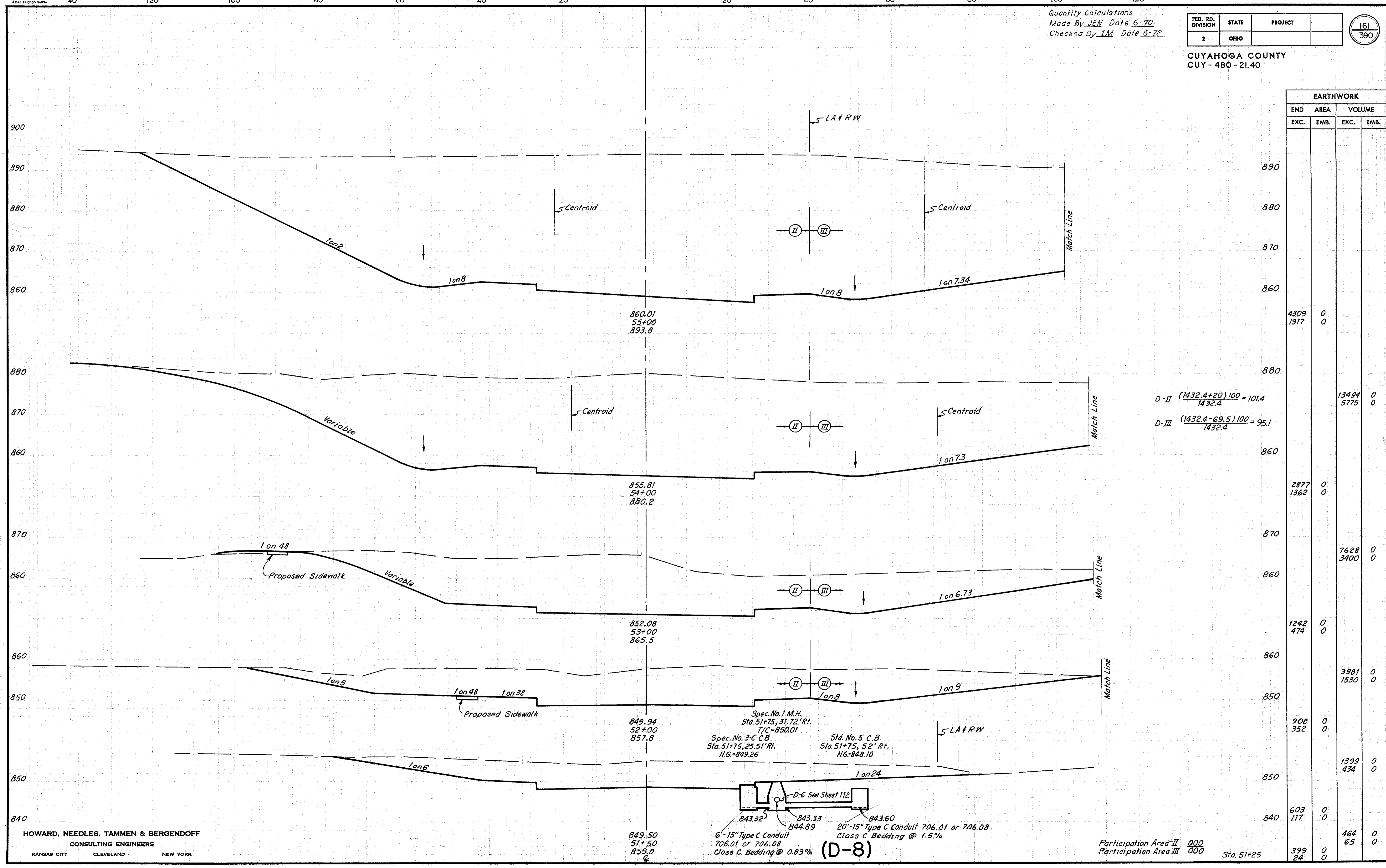
FED. RD. DIVISION 2	STATE OHIO	PROJECT	

CUYAHOGA COUNTY  
 CUY - 480 - 21.40

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
890		4309	0
880		1917	0
870			
860			
850			
840			
		13494	0
		5775	0
		2877	0
		1362	0
		7628	0
		3400	0
		1242	0
		474	0
		3981	0
		1530	0
		908	0
		352	0
		1399	0
		434	0
		603	0
		177	0
		464	0
		65	0
		399	0
		24	0

$$D-II \frac{(1432.4 + 20) 100}{1432.4} = 101.4$$

$$D-III \frac{(1432.4 - 69.5) 100}{1432.4} = 95.1$$



JEN  
 RJA  
 SSS  
 M

6-67  
 5-67  
 6-70  
 6-72

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY   CLEVELAND   NEW YORK

Participation Area II 000  
 Participation Area III 000

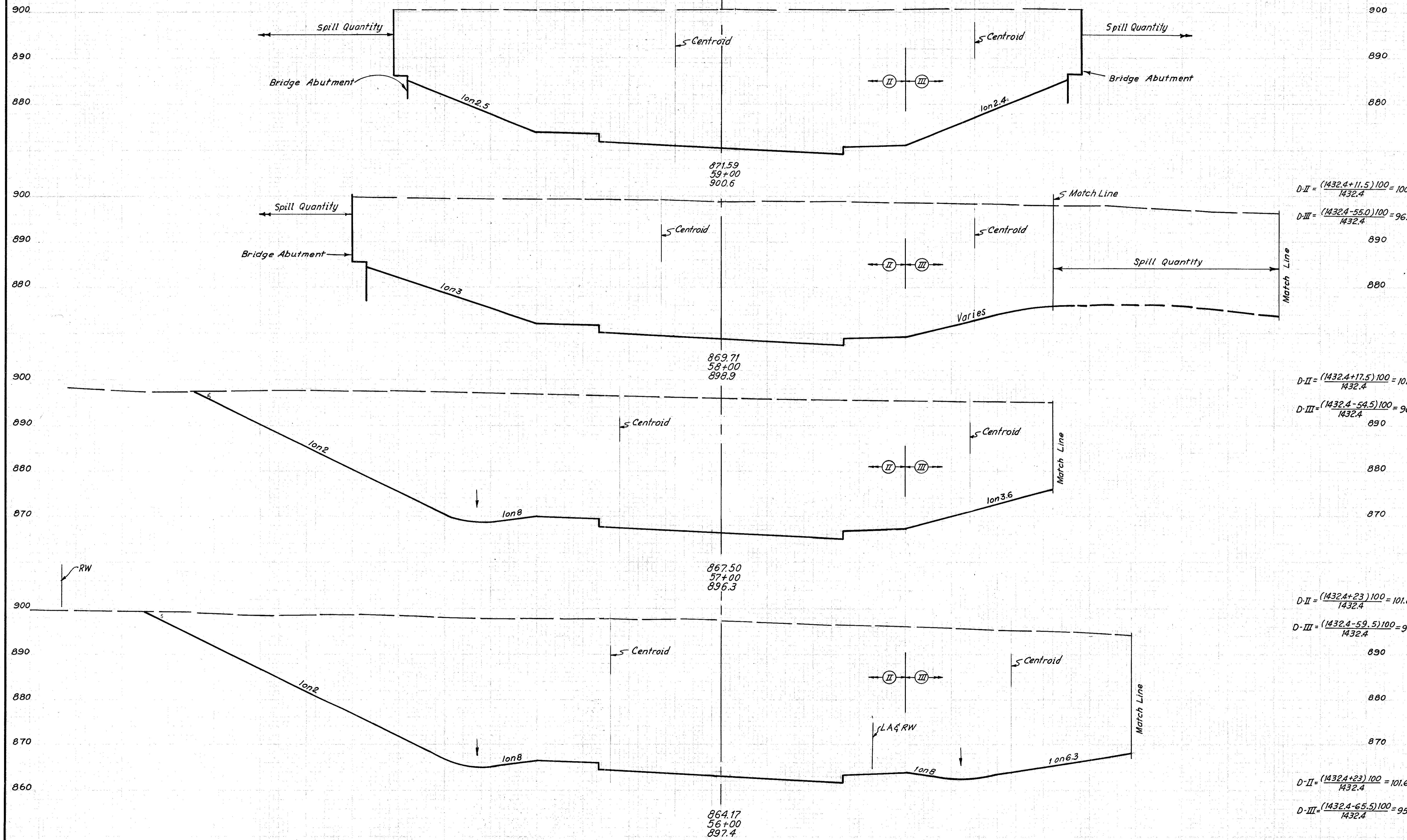
Sta. 51+25

Quantity Calculations  
 Made By J.E.N. Date 6-70  
 Checked By I.M. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

162  
390

CUYAHOGA COUNTY  
 CUY-480-21.40



END	EARTHWORK		VOLUME	
	EXC.	EMB.	EXC.	EMB.
900				
890				
880	2996	0		
	838	0		
900				
890				
880			11609	0
			2934	0
900				
890				
880	3223	0		
	809	0		
900				
890				
880			12845	0
			2781	0
900				
890				
880				
870	3631	0		
	752	0		
900				
890				
880				
870			15022	0
			3995	0
900				
890				
880				
870	4353	0		
	1500	0		
900				
890				
880				
870			16297	0
			6037	0
900				
890				
880				
870				
860				
			4309	0
			1917	0

D-II =  $\frac{(1432.4 + 11.5)100}{1432.4} = 100.8$

D-III =  $\frac{(1432.4 - 55.0)100}{1432.4} = 96.2$

D-II =  $\frac{(1432.4 + 17.5)100}{1432.4} = 101.2$

D-III =  $\frac{(1432.4 - 54.5)100}{1432.4} = 96.2$

D-II =  $\frac{(1432.4 + 23)100}{1432.4} = 101.6$

D-III =  $\frac{(1432.4 - 59.5)100}{1432.4} = 95.8$

D-II =  $\frac{(1432.4 + 23)100}{1432.4} = 101.6$

D-III =  $\frac{(1432.4 - 65.5)100}{1432.4} = 95.4$

Participation Area II 000 Sta. 55+00 4309 0  
 Participation Area III 000 1917 0

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

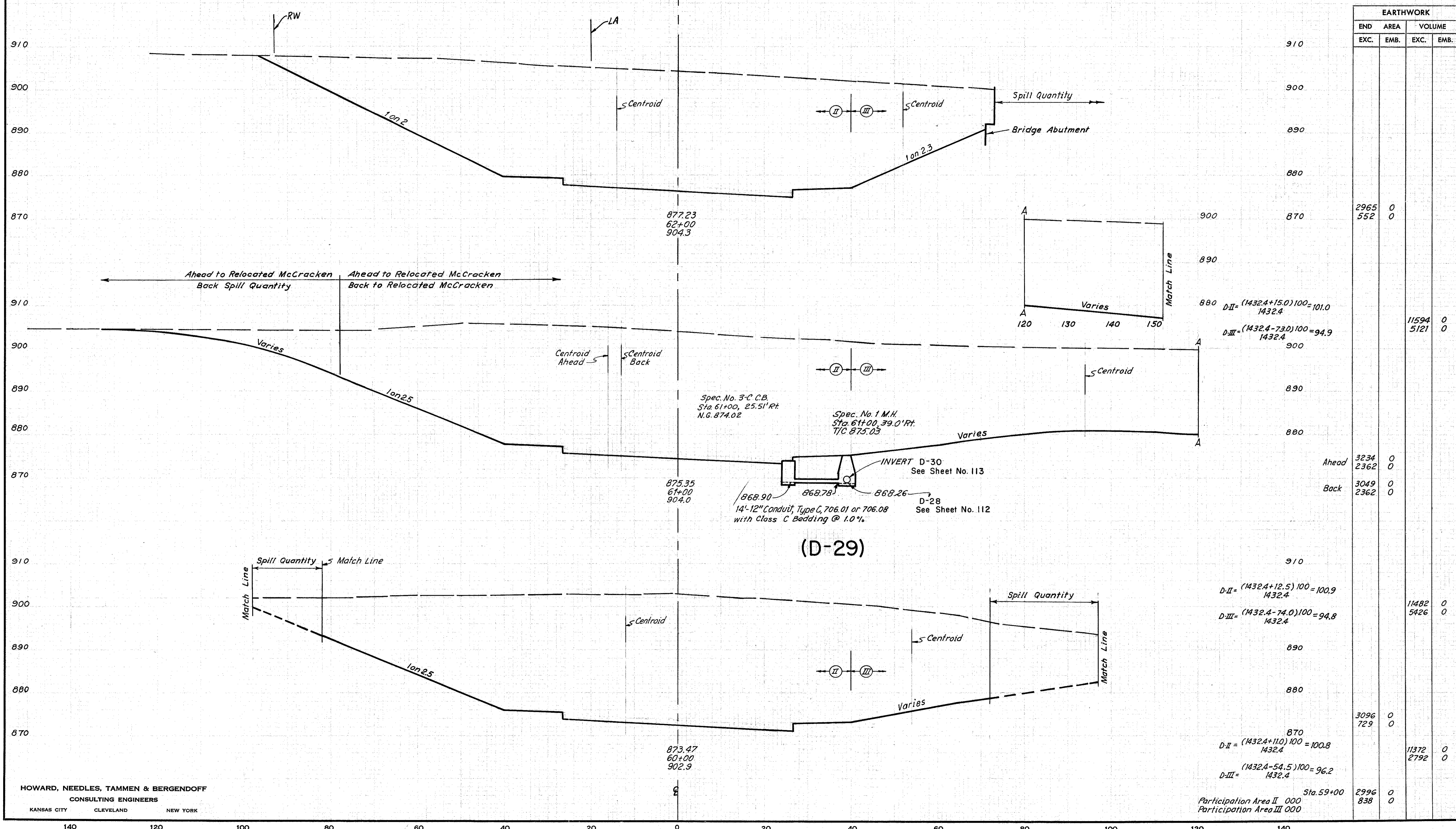
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

163  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

8-67  
 9-67  
 6-72  
 FCM  
 R.F.M.  
 J.E.M.

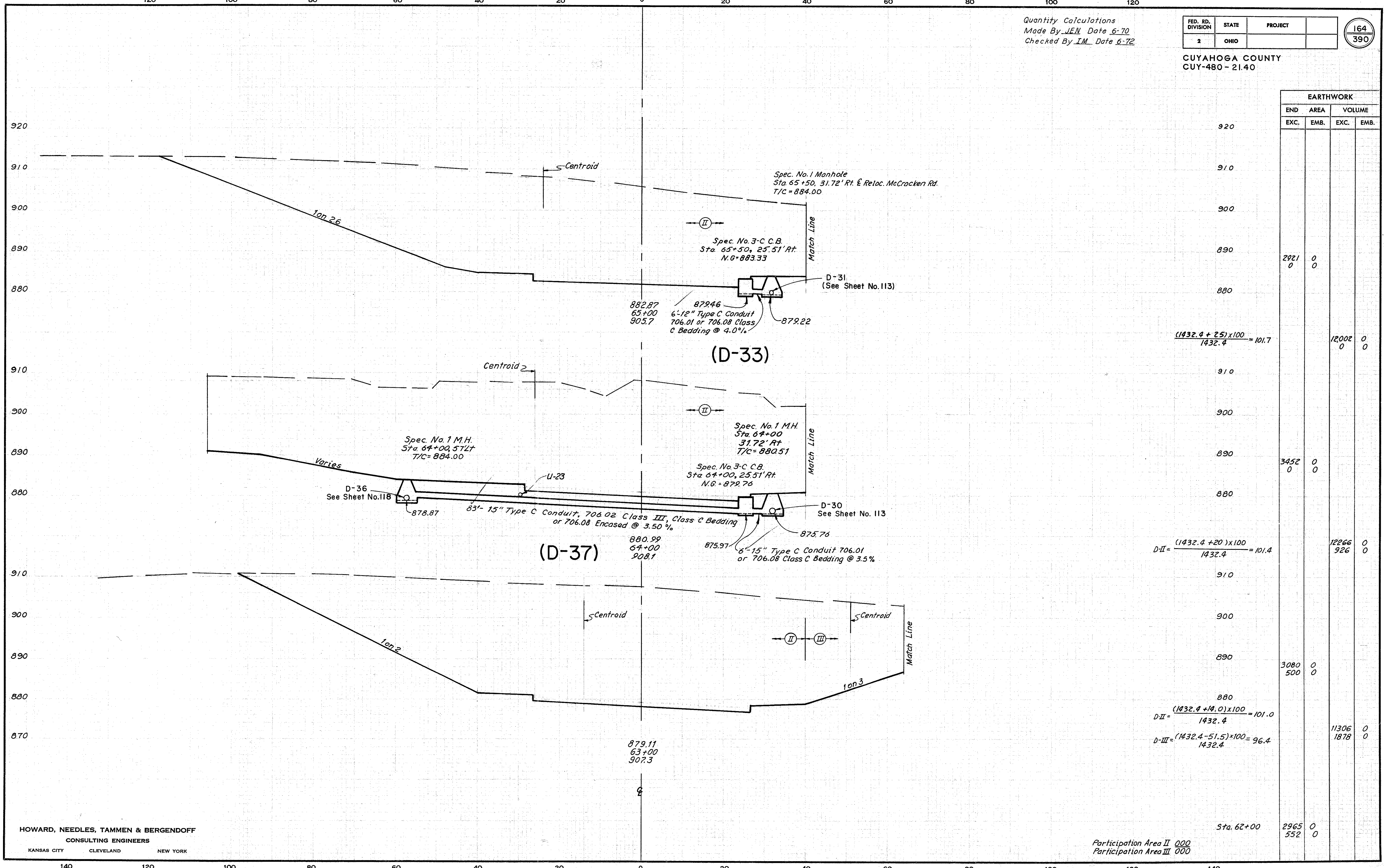


EARTHWORK			
END STA.	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
910			
900			
890			
880			
870	2965	0	0
870	552	0	0
880			
880			
890			
900			
910			
Ahead	3234	0	0
Back	2362	0	0
910			
900			
890			
880			
870	3096	0	0
870	729	0	0
880			
890			
900			
910			
870			
870			
880			
890			
900			
910			
Participation Area II	000	2996	0
Participation Area III	000	838	0

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK



8-87  
 9-87  
 6-72  
 W.L.L.  
 R.F.T.  
 J.E.N.  
 I.M.



120 100 80 60 40 20 0 20 40 60 80 100 120

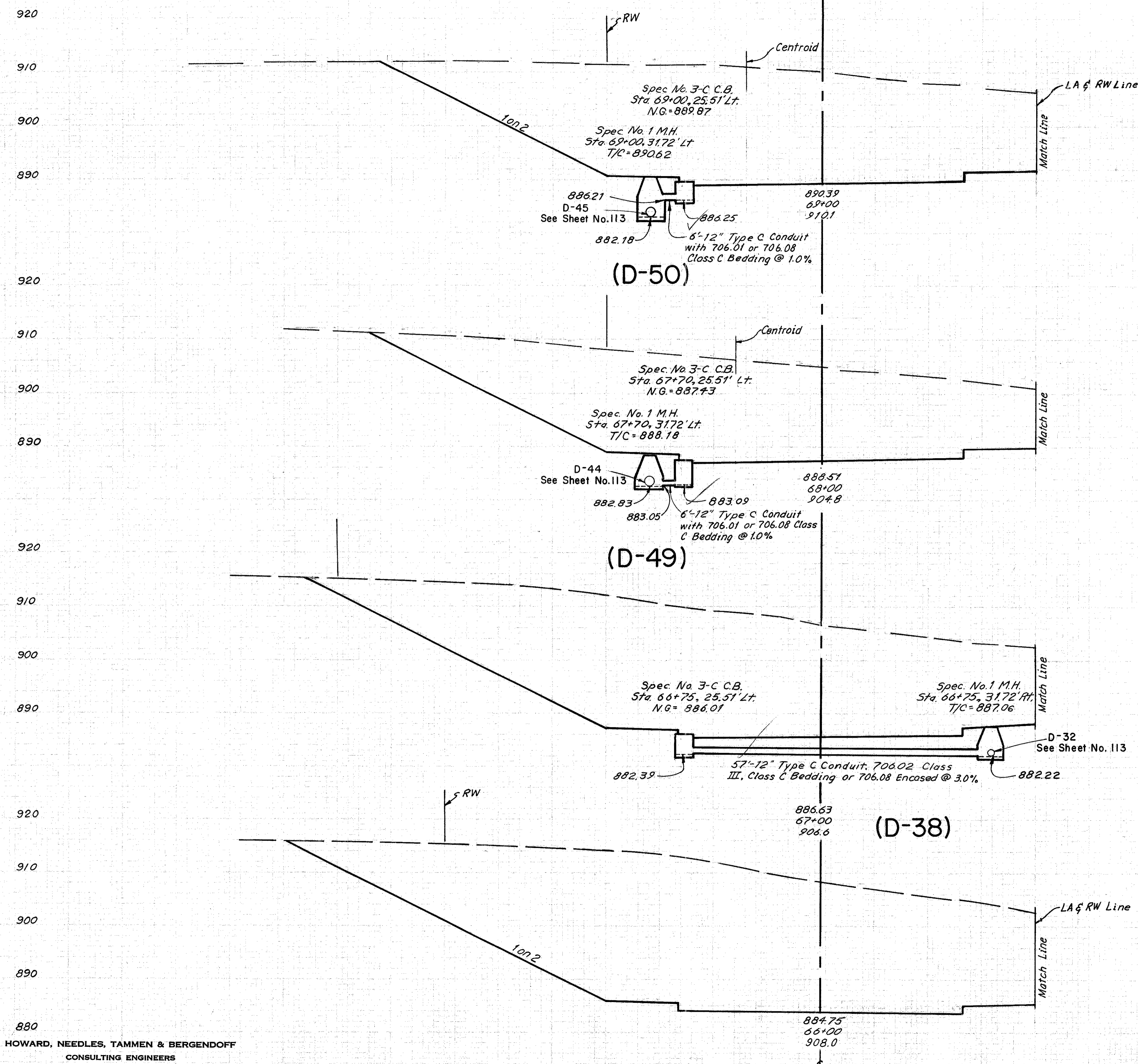
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

165  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

8-67  
 9-67  
 6-72  
 JEM  
 RFT



$(5729.6 - 15) \times 100 = 99.7$   
 $5729.6$

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
		2039	0
			7084 0
		1798	0
			7731 0
		2377	0
			9591 0
		2802	0
			10,598 0
		2921	0

Sta. 65+00  
 All Earthwork Quantities  
 in Participation Limit II

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

120 100 80 60 40 20 20 40 60 80 100 120

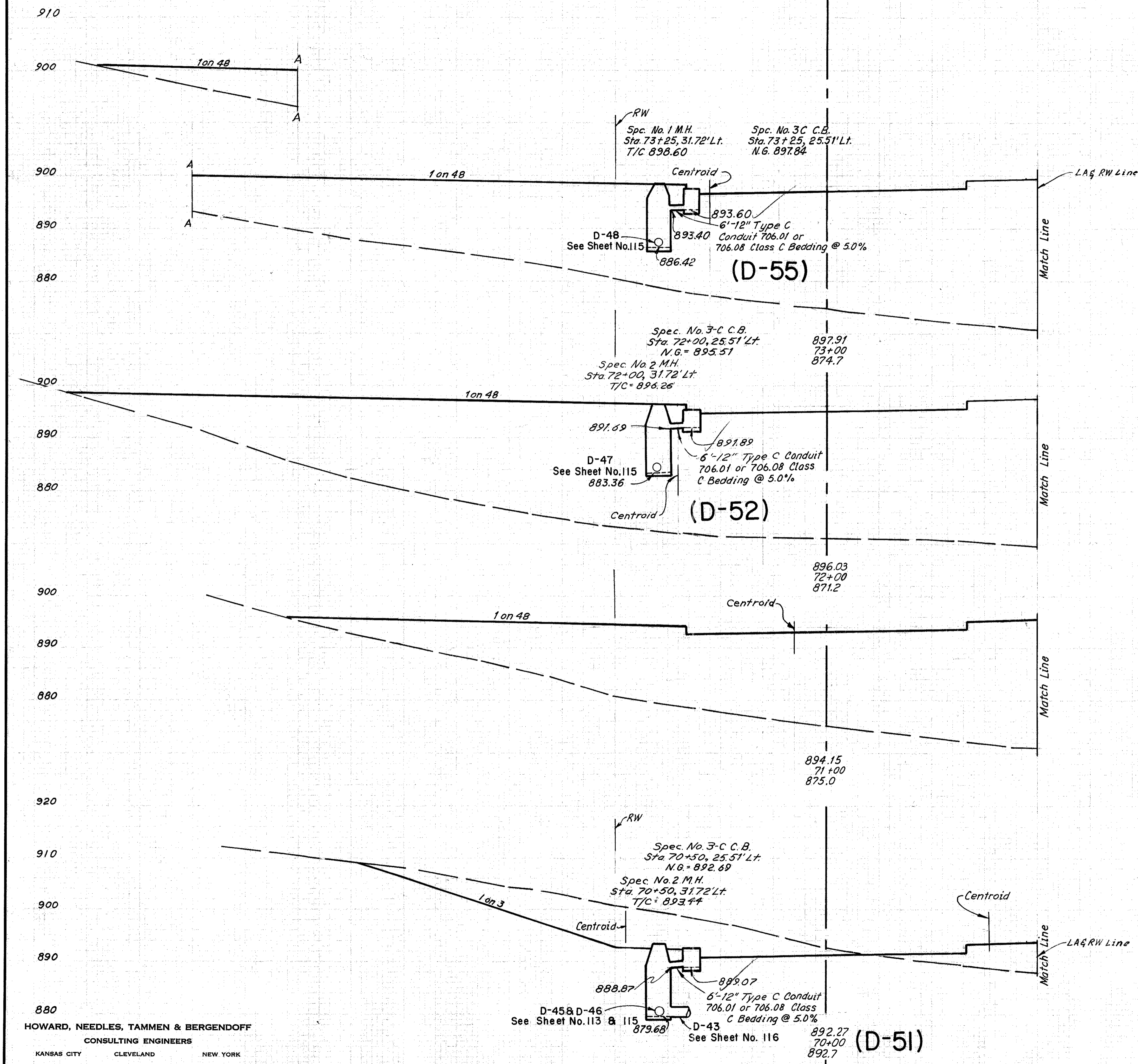
Quantity Calculations  
 Made By JEN Date 6-72  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

166  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

8-67  
9-67  
6-72  
W.L.L.  
J.E.W.  
I.M.



HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

END	EARTHWORK		VOLUME
	AREA		
	EXC.	EMB.	
900	0	2940	
890			
880			
			0 11,498
			$\frac{Emb. (5729.6 - 25) \times 100}{5729.6} = 99.6$
900			
890	0	3294	
880			
			0 9564
			$\frac{Emb. (5729.6 - 17) \times 100}{5729.6} = 99.7$
900			
890	0	1886	
880			
			819 3663
			$\frac{Emb. (5729.6 + 12.5) \times 100}{5729.6} = 100.2$
920			
910	442	88	
900			
			4571 163
890			
			$\frac{Exc. (5729.6 - 26) \times 100}{5729.6} = 99.5$
880	2039	0	
			Sta. 69+00

All Earthwork Quantities  
 in Participation Limit II

REL. MCCRACKEN STA. 70+00 TO STA. 73+00

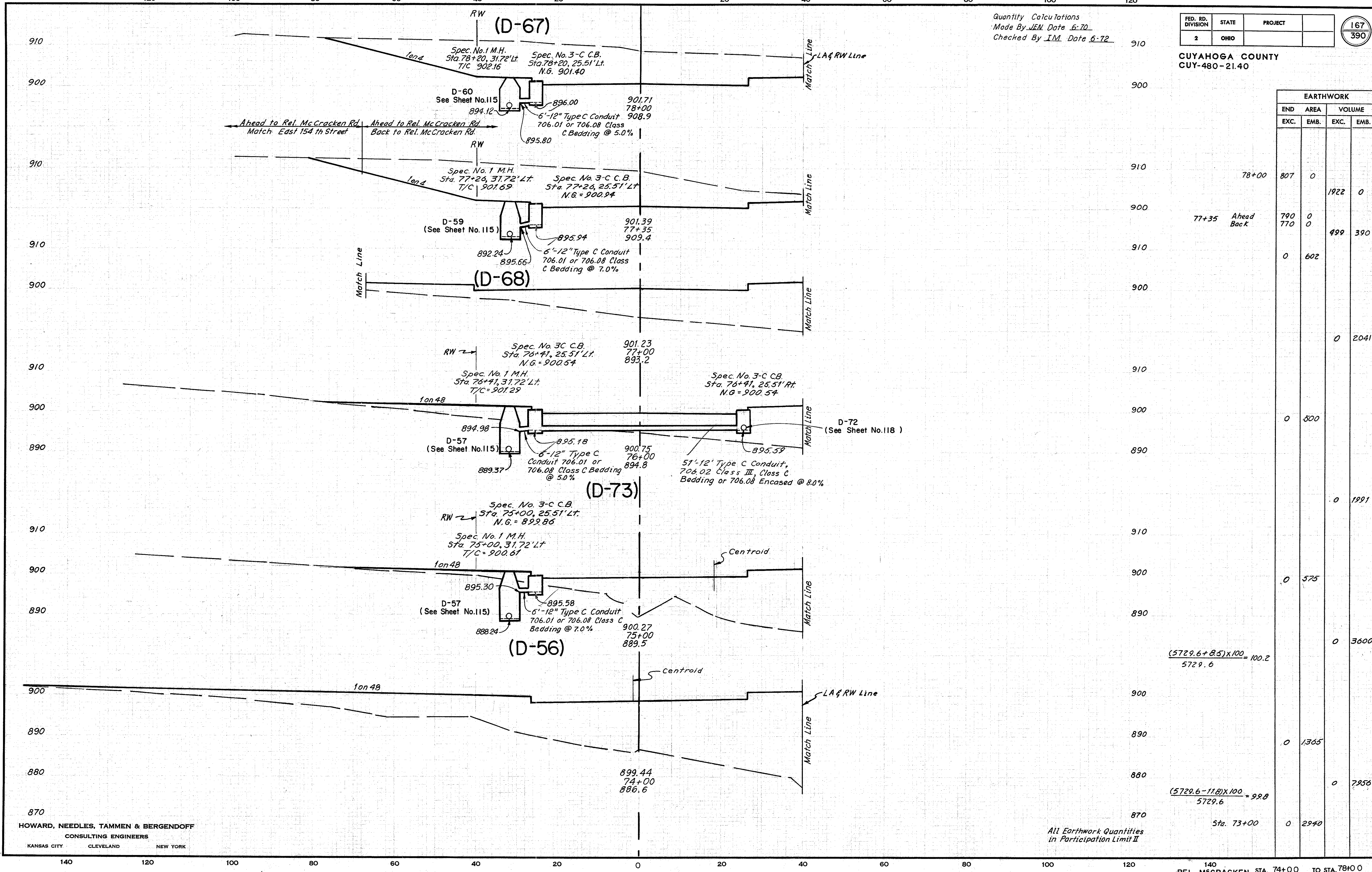
Quantity Calculations  
 Made By JEM Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

167  
390

CUYAHOGA COUNTY  
 CUY-480-21.40

B-67  
 9-67  
 6-72  
 F.C.W.  
 R.F.T.  
 J.E.N.  
 I.M.



END	EARTHWORK		VOLUME	
	EXC.	EMB.	EXC.	EMB.
78+00	807	0	1922	0
77+35	790	0	499	390
770	0	602		
			0	2041
	0	500		
			0	1991
	0	575		
			0	3600
			$\frac{(5729.6 + 8.5) \times 100}{5729.6} = 100.2$	
	0	1365		
			0	7956
			$\frac{(5729.6 - 11.8) \times 100}{5729.6} = 99.8$	
Sta. 73+00	0	2940		

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

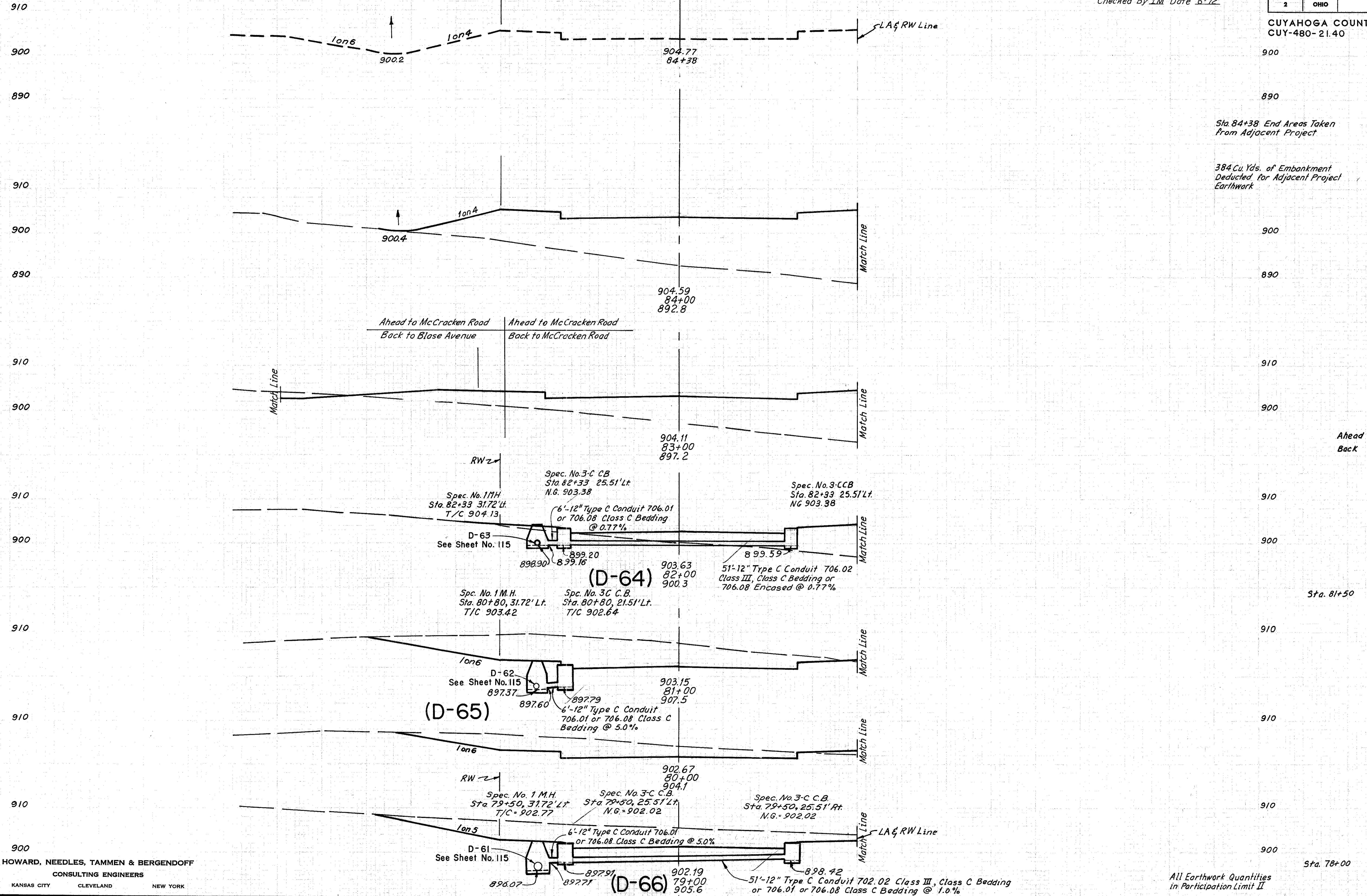
All Earthwork Quantities  
 in Participation Limit II

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

168  
390

CUYAHOGA COUNTY  
 CUY-480-21.40



	EARTHWORK			
	END EXC.	AREA EMB.	VOLUME EXC.	VOLUME EMB.
Sta. 84+38 End Areas Taken From Adjacent Project	0	1000		
384 Cu. Yds. of Embankment Deducted for Adjacent Project Earthwork			0	975
	0	931		
			26	2757
Ahead Back	14 0	558 485		
			0	1267
	0	199		
			0	184
Sta. 81+50	0	0		
	460	0		426 0
				1304 7
	244	4		
				1154 7
	379	0		
				2196 0
Sta. 78+00	807	0		

All Earthwork Quantities in Participation Limit II

8-67  
9-67  
6-72  
W.L.L.  
R.F.N.  
J.E.M.  
I.M.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

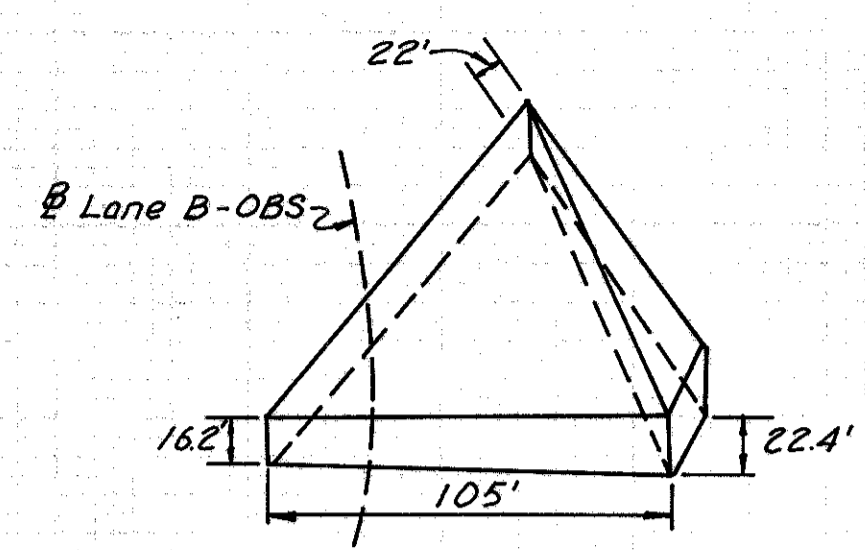
Quantity Calculations  
 Made By J.E.N. Date 6-72  
 Checked By I.M. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

169  
390

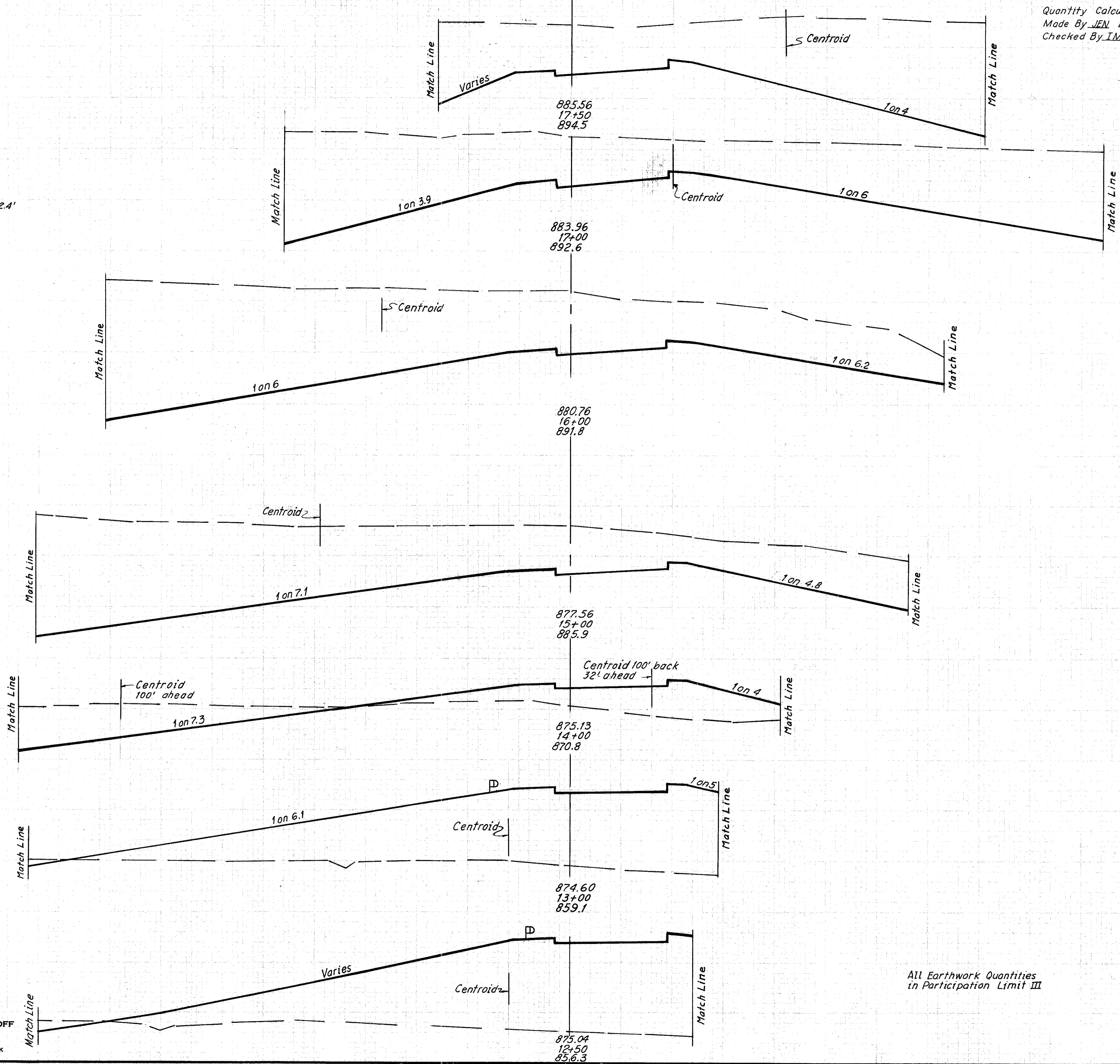
CUYAHOGA COUNTY  
 CUY 480-21.40

SPILL QUANTITY FOR AREA "P"



Ave. Depth =  $\frac{16.2 + 22.2 + 22.4}{3} = 20.2'$   
 Area =  $(\frac{1}{2} \times 10.5 \times 6.0) + (\frac{1}{2} \times 7.0 \times 6)$   
 = 3360 Sq. Ft.  
 Volume =  $\frac{3360 \times 20.2}{27}$   
 = 2514 C.Y.

6-67  
 6-68  
 6-72  
 H.L.D.  
 J.E.N.  
 I.M.



Spill Quantity S. Abutment

Sta. 17+50  
 880

$$\text{Exc. } L = \frac{(424.4 + 31) \times 50}{424.4} = 50.1$$

$$\text{Exc. } L = \frac{(424.4 - 9) \times 100}{424.4} = 97.9$$

$$\text{Exc. } L = \frac{(424.41 - 43.5) \times 100}{424.41} = 89.8$$

$$\text{Exc. } L = \frac{(5729.6 - 68.5) \times 100}{5729.6} = 98.80$$

$$\text{Emb. } L = \frac{(5729.6 + 16) \times 32}{5729.6} = 32.1$$

$$\text{Emb. } L = \frac{(5729.6 + 2) \times 100}{5729.6} = 100$$

$$\text{Exc. } L = \frac{(5729.6 - 96) \times 100}{5729.6} = 98.3$$

$$\text{Emb. } L = \frac{(5729.6 - 12) \times 50}{5729.6} = 49.90$$

END	AREA	VOLUME	
		EXC.	EMB.
1392	0	2514	0
1952	0		3102
2319	0		7743
2082	0		7319
300	308		4358 183
4	1246		308
13	1317		553 2878
			16 2368
			16 2368
			16 2368

All Earthwork Quantities  
 in Participation Limit III

For Spill Quantity See I480Lt half

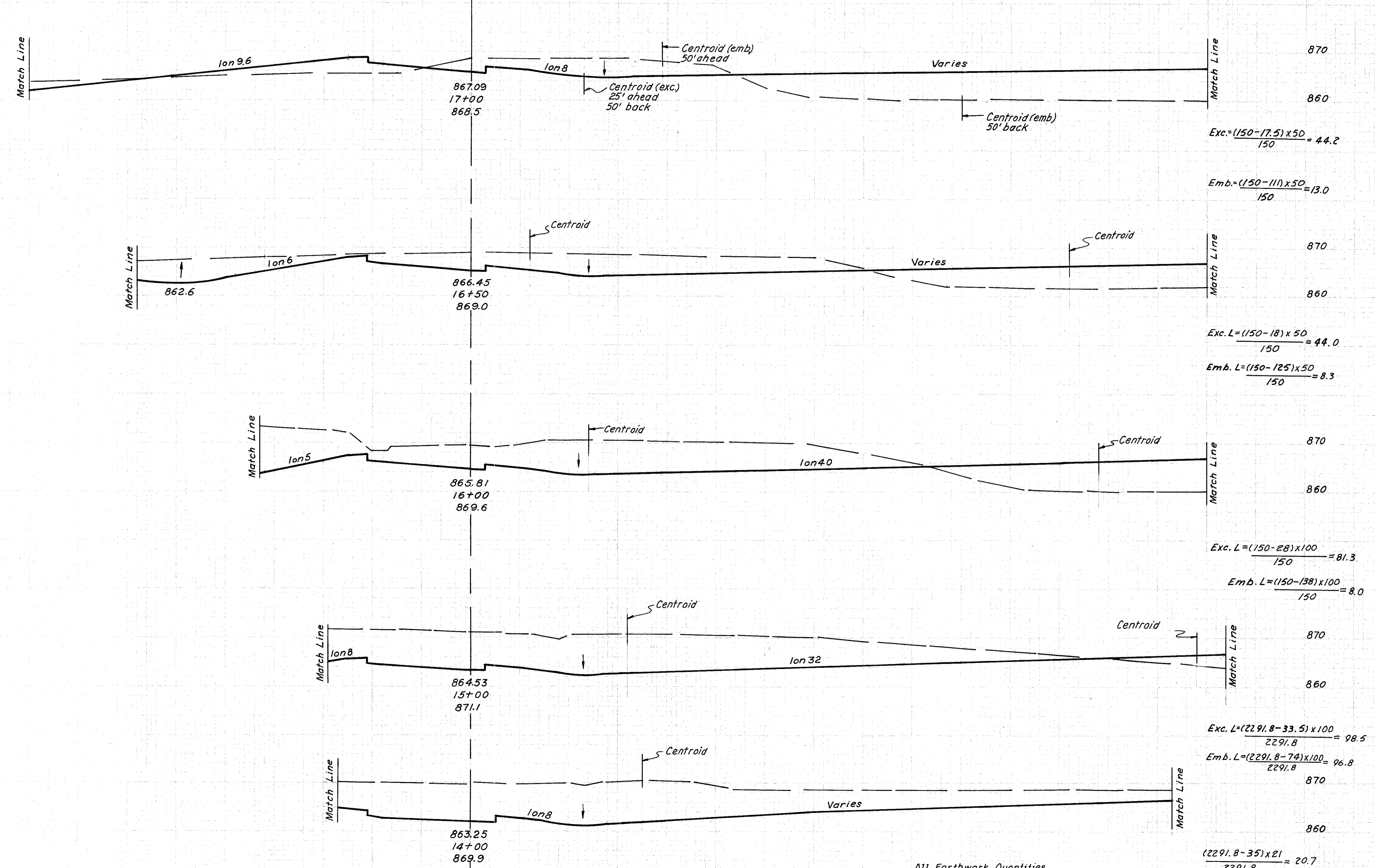
Quantity Calculations  
 Made By JEN. Date 6-70  
 Checked By IM. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

170  
390

CUYAHOGA COUNTY  
 CUY480-21.40

6-67  
8-67  
6-72  
H.L.A.  
R.H.A.  
J.E.M.  
W.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
		870	
180	610		
		860	
		$Exc. = \frac{(150-17.5) \times 50}{150} = 44.2$	
			$Emb. = \frac{(150-111) \times 50}{150} = 13.0$
			533 213
		870	
471	274		
		860	
		$Exc. L = \frac{(150-18) \times 50}{150} = 44.0$	
			$Emb. L = \frac{(150-125) \times 50}{150} = 8.3$
			956 87
		870	
702	290		
		860	
		$Exc. L = \frac{(150-28) \times 100}{150} = 81.3$	
			$Emb. L = \frac{(150-138) \times 100}{150} = 8.0$
			2397 47
		870	
890	30		
		860	
		$Exc. L = \frac{(2291.8-33.5) \times 100}{2291.8} = 98.5$	
			$Emb. L = \frac{(2291.8-74) \times 100}{2291.8} = 96.8$
			3325 54
		870	
933	0		
		860	
		$\frac{(2291.8-35) \times 21}{2291.8} = 20.7$	
			713 0
		870	
926	0		
		860	
		Sta. 13+79 See Sheet 90 I-480 Sta. 1174+00	

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

100 80 60 40 20 0 20 40 60 80 100 120 140 160 RAMP OBS-WB STA.14+00 TO STA.17+00

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

171  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

6-67  
 8-67  
 6-72  
 H.O.  
 R.H.A.  
 J.E.N.  
 I.M.

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	1393	0	2871
0	1560	0	4517
0	1608	0	1865
0	954	180	610
180	610	71	1066

Centroid 46' R.  
 Sta. 19+75.34  
 See Sheet 110  
 (Bedford Sta. 74+54)

$$L = \frac{(150 - 45.5) \times 75.34}{150} = 52.5$$

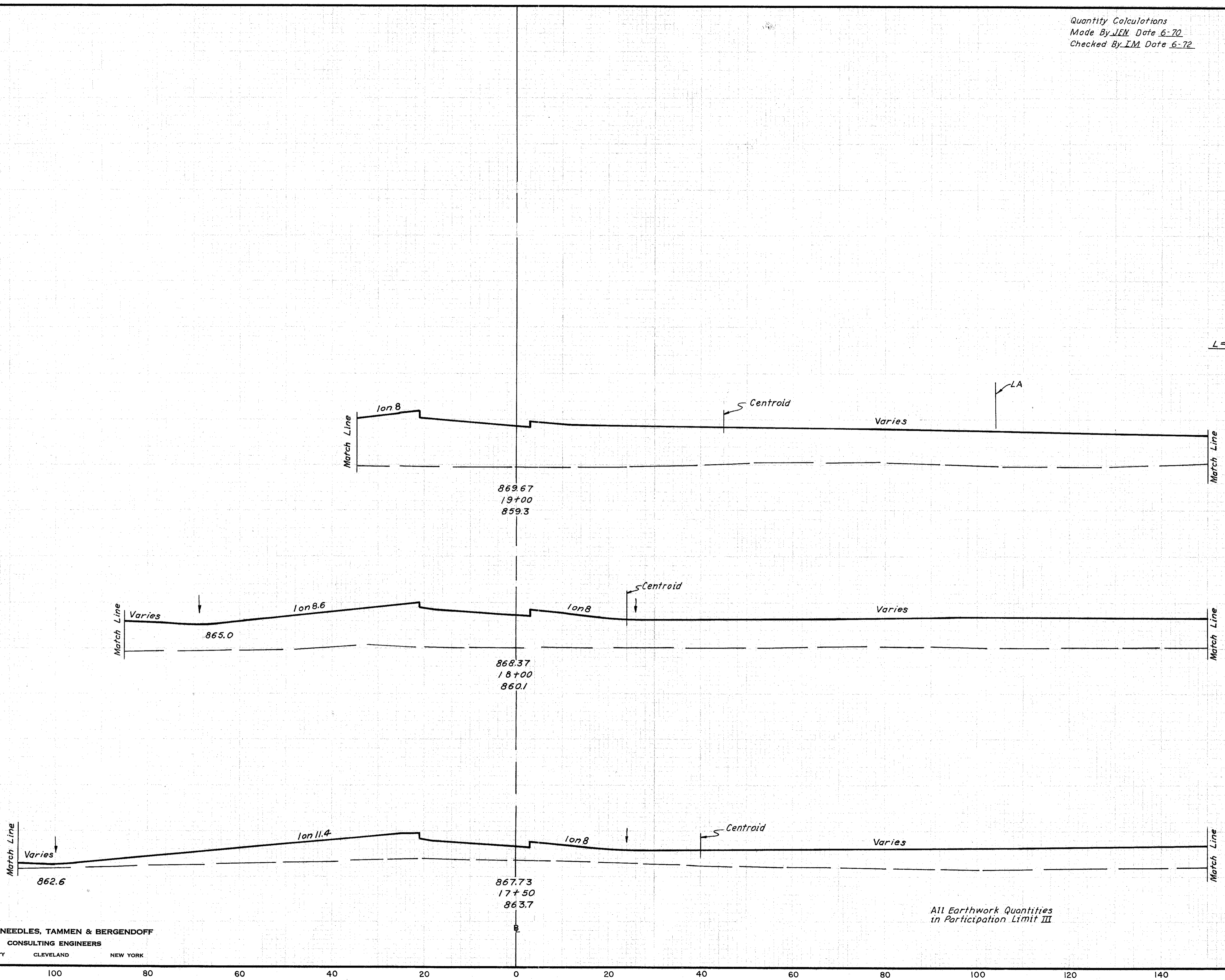
$$L = \frac{(150 - 34.5) \times 100}{150} = 77.00$$

$$L = \frac{(150 - 32) \times 50}{150} = 39.3$$

$$\text{Emb. } L = \frac{(150 - 39.5) \times 50}{150} = 36.83$$

$$\text{Exc. } L = \frac{(150 - 23) \times 25}{150} = 21.17$$

RAMP OBS-WB STA. 17+50 TO STA. 19+00



869.67  
 19+00  
 859.3

868.37  
 18+00  
 860.1

867.73  
 17+50  
 863.7

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

100 80 60 40 20 0 20 40 60 80 100 120 140 160



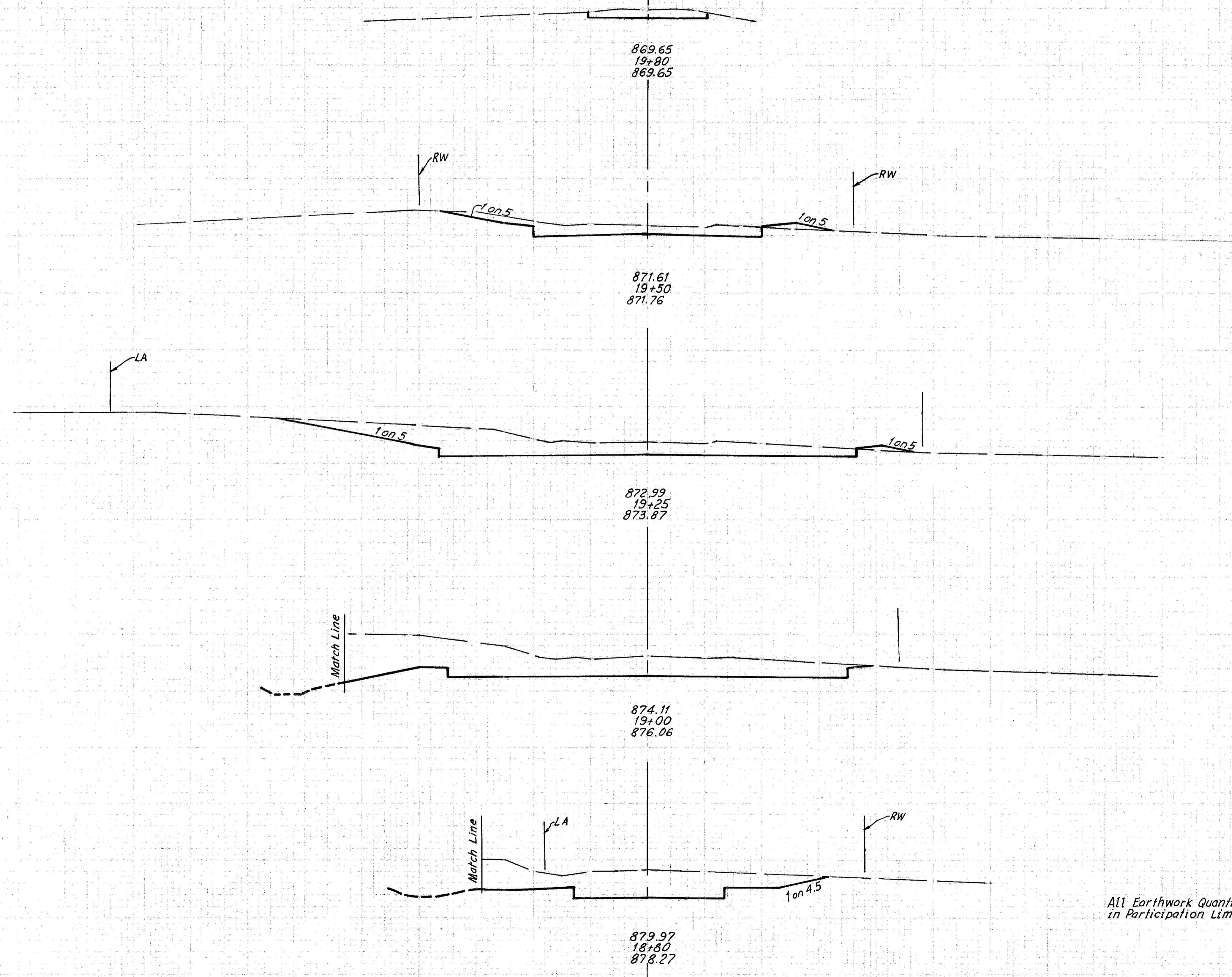
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Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By JM Date 6-72

FED. RD. DIVISION	STATE	PROJECT	172 390
2	OHIO		

CUYAHOGA COUNTY  
 CUY 480-21.40

6-67  
 8-67  
 6-72  
 H.L.D.  
 J.E.N.  
 J.M.

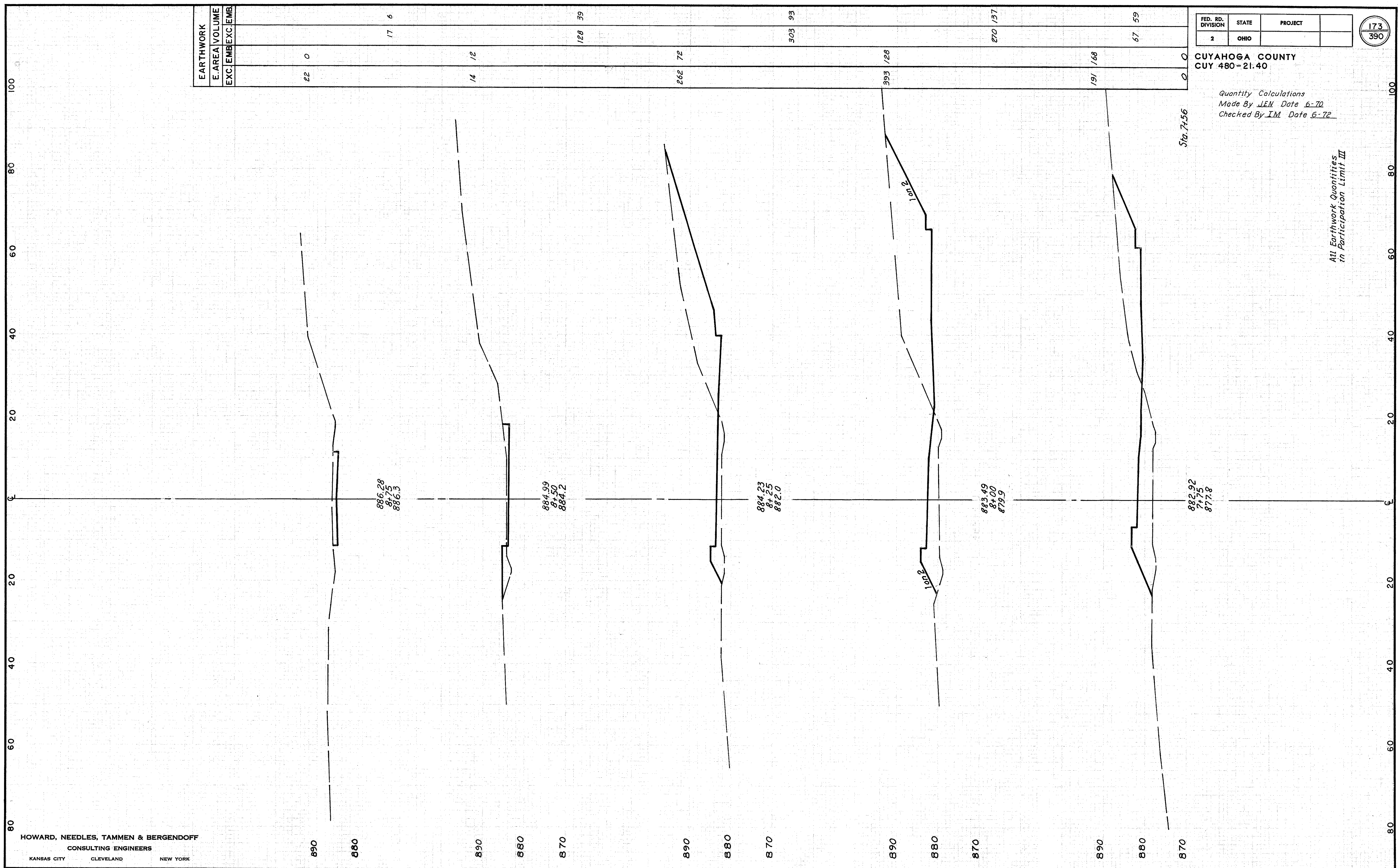


ELEVATION	EARTHWORK			
	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
880				
870				
860	32	0		
880			64	3
870	84	6		
860			159	5
880				
870	260	5		
860			273	2
880	330	0		
870				
860			200	0
880				
870	210	0		
860				

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

H.A.  
J.E.M.  
6-67  
8-67  
6-70  
6-72



FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY  
CUY 480-21.40

Quantity Calculations  
Made By J.E.N. Date 6-70  
Checked By J.M. Date 6-72

All Earthwork Quantities  
in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

6-67  
H.D.  
J.E.M.  
6-72

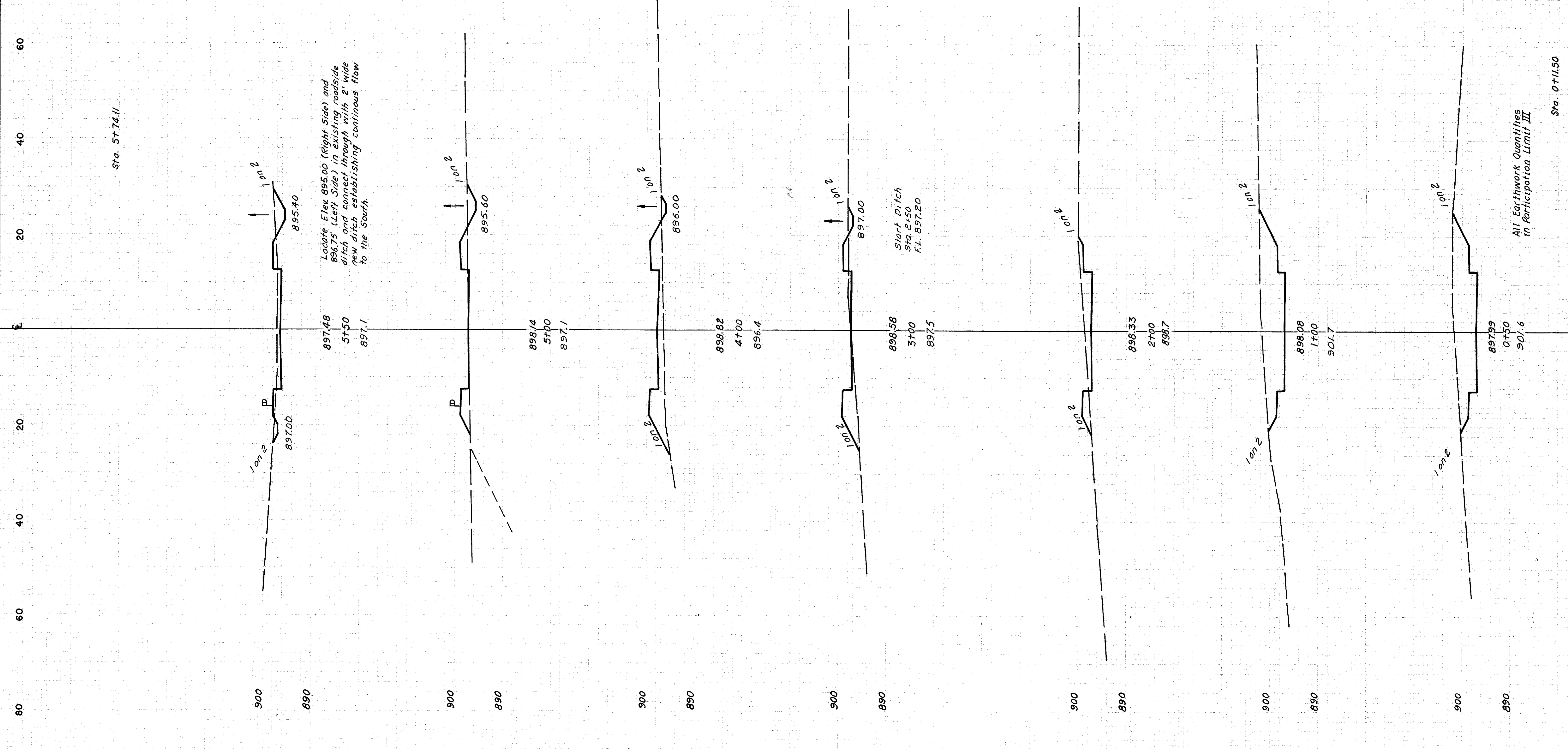
Quantity Calculations  
Made By JEN. Date 6-70  
Checked By I.M. Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

174  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

EARTHWORK	
E. AREA	VOLUME
EXC.	EMB.
32	0
29	4
33	8
9	25
4	78
11	39
37	10
169	0
64	0
24	191
28	217
89	91
381	19
218	0
164	0



HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

120 100 80 60 40 20 20 40 60 80 100 120

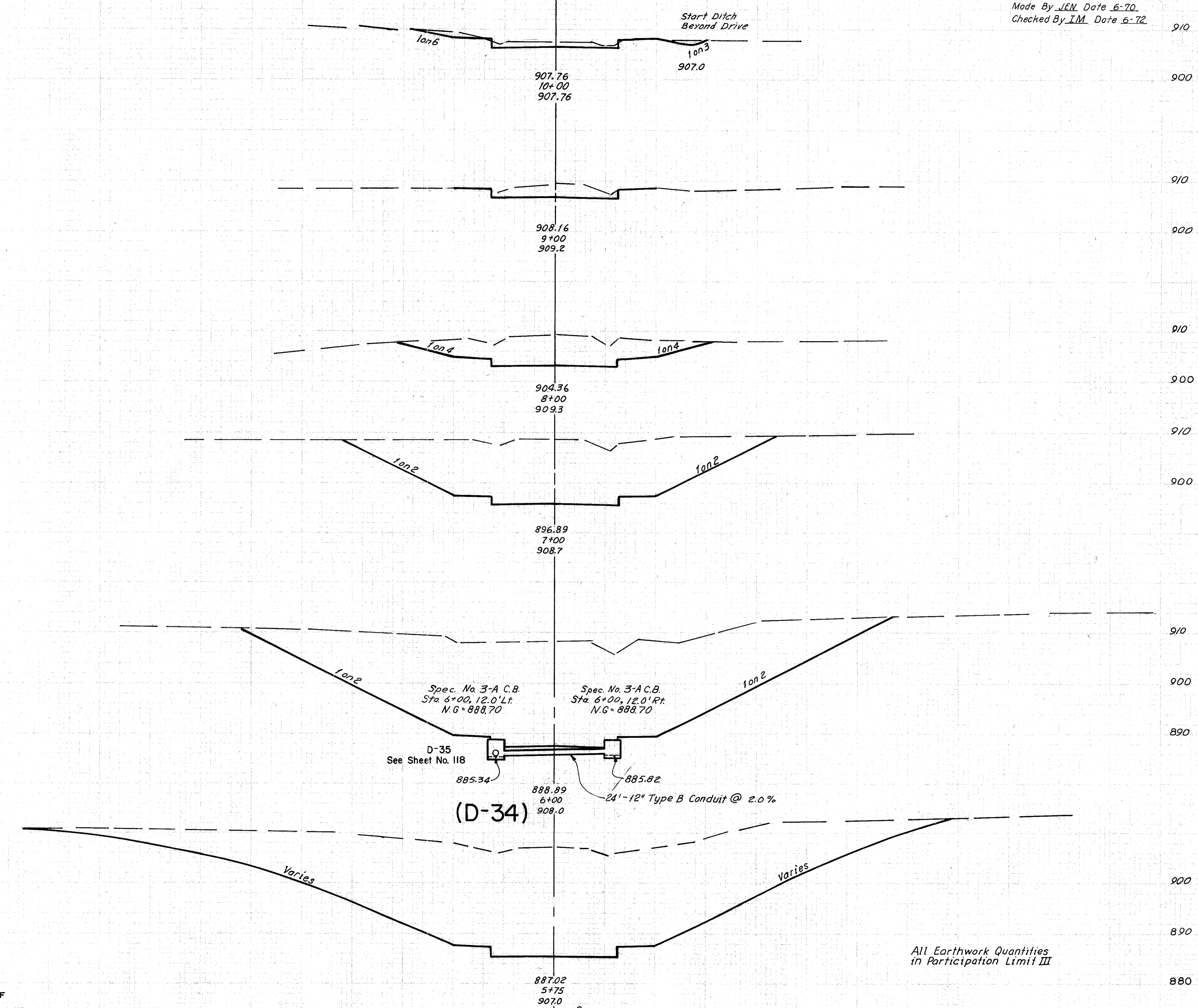
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

175  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

21-5  
 20-20  
 19-8  
 18-3  
 17-5  
 HLD  
 RJA  
 JEM



END STA.	EARTHWORK			
	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
Sta. 11+00	0	0	70	0
Sta. 10+00	38	0	170	0
	40	0		
	52	0	520	0
			229	0
			1781	0
			733	0
			4489	0
			1691	0
			1747	0
			2083	0

All Earthwork Quantities  
 in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

120 100 80 60 40 20 20 40 60 80 100 120

Quantity Calculations  
Made By JEN Date 8-70  
Checked By JM Date 8-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

176  
390

CUYAHOGA COUNTY  
CUY 480-21.40

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.

6-67  
8-52  
8-70  
RPA  
JEM

910

900

5+00  
906.8

910

900

903.55  
4+59.50  
903.55

22	5		
		7	2

910

900

902.94  
4+50  
902.9

20	5		

910

900

1 on 8

1 on 4.5

Match line

900.83  
4+00  
898.8

		131	102
122	105		

All Earthwork Quantities  
in Participation Limit III

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

140 120 100 80 60 40 20 20 40 60 80 100 120 EAST 154th ST. STA. 4+00 TO STA. 5+00

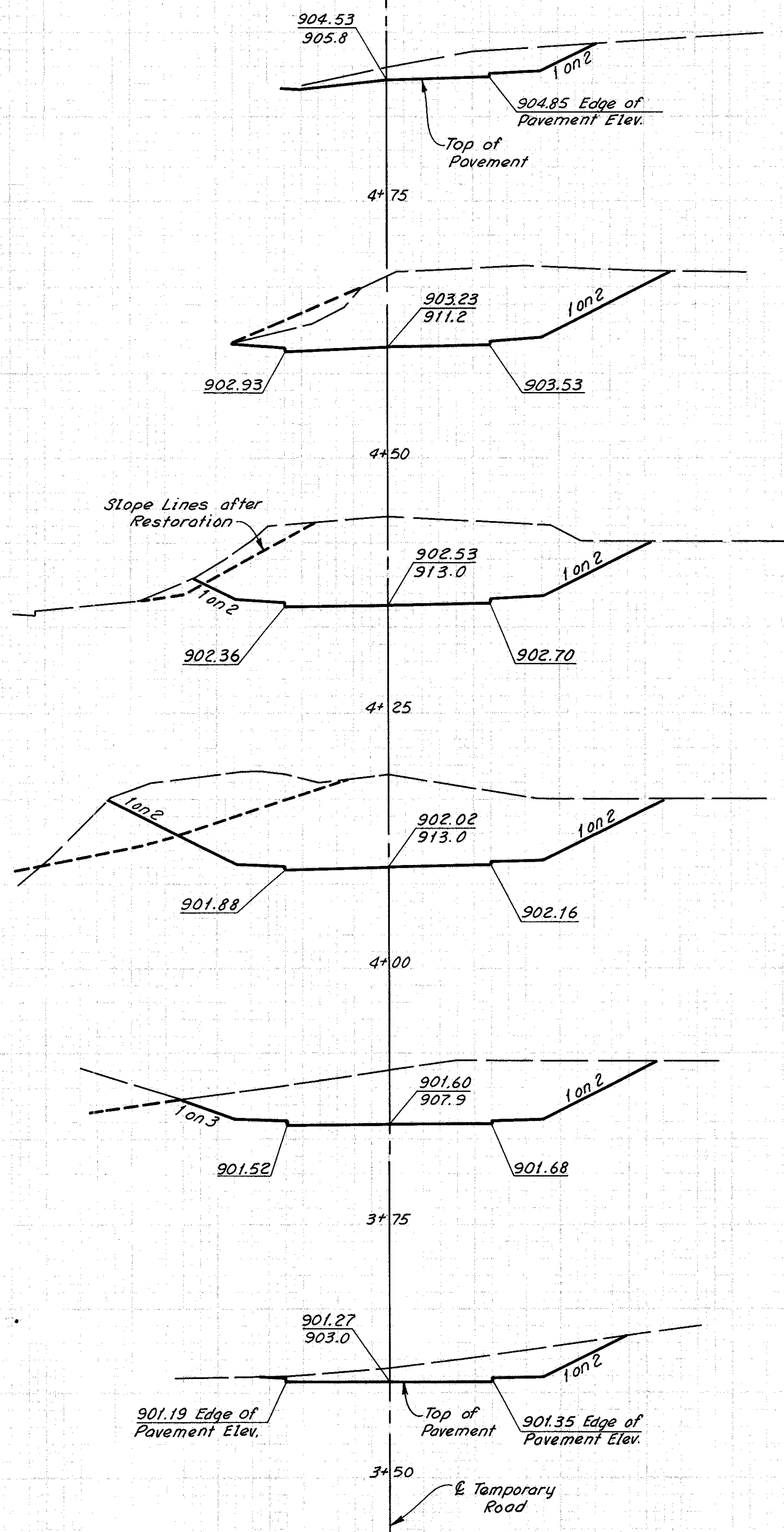
Quantity Calculations  
 Made By NMB Date 6-71  
 Checked By IM Date 6-71

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

177  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

6-71  
6-71  
6-71  
IM  
NMB  
IM



INITIAL CONSTRUCTION	AREAS	
	EXC.*	EMB.
	END AREA SQ. FT.	END AREA SQ. FT.
	95	95
	278	290
	408	386
	500	405
	270	270
	80	80

LEGEND

000.00 Profile Grade Elev.  
 000.0 Existing Ground Elev.

Note:  
 Existing ground as shown here assumes that proposed earthwork is completed from Sta. 77+35, Lt. side Reloc. McCracken Road.

Note: \*  
 Excavation for pavement thickness not included.

120 100 80 60 40 20 20 40 60 80 100 120

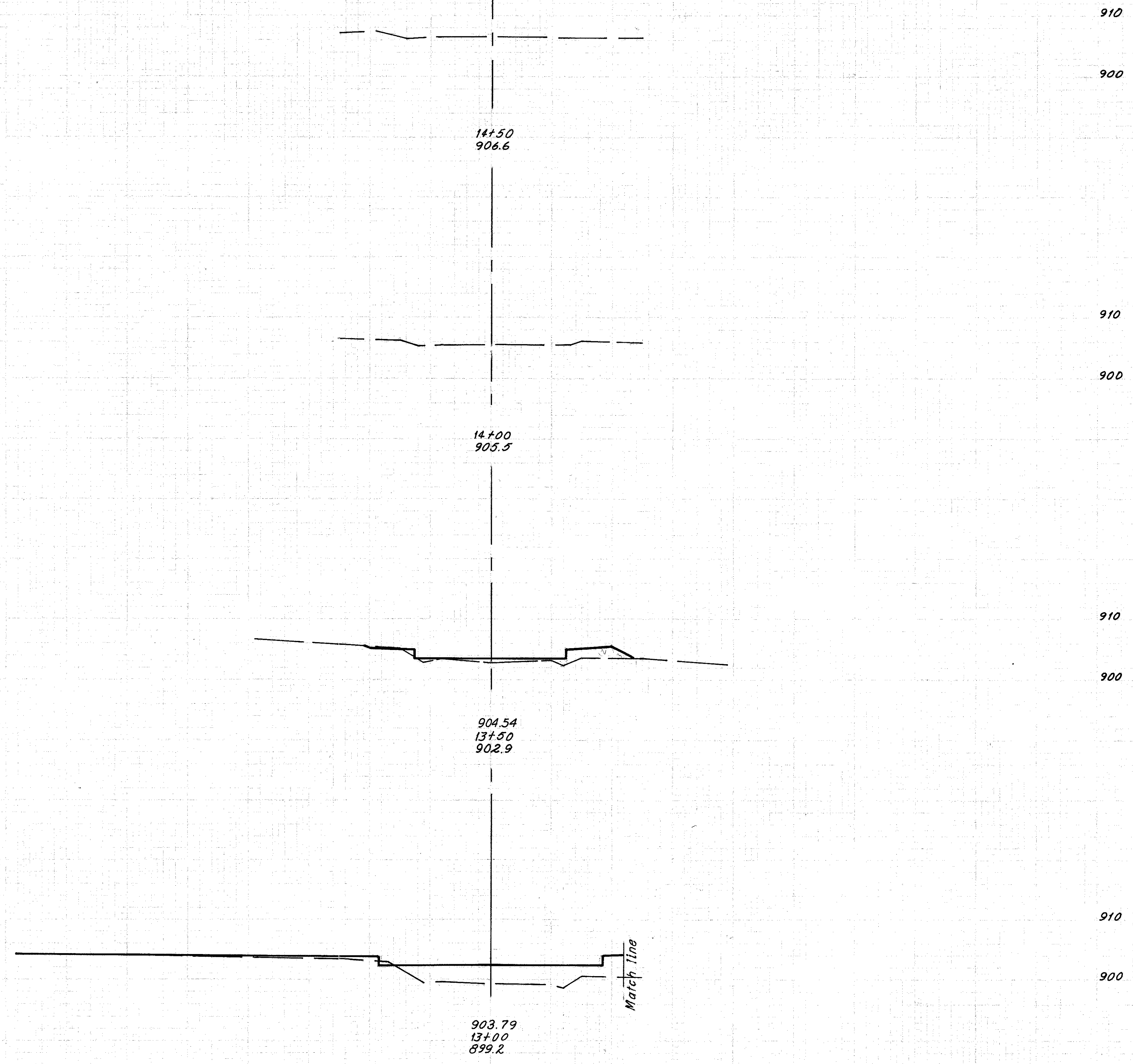
Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By LM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

178  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

6-67  
 8-67  
 6-72  
 HLD  
 RJA  
 JEN  
 LW



910  
 900  
 Sta. 14+58.43  
 Ave. Taper Area =  $\frac{(4 \times 1) + (1 \times 1)}{2} = 2.5 \text{ Sq. Ft.}$

910  
 900  
 Sta. 13+94.19

910  
 900

910  
 900

All Earthwork Quantities  
 in Participation Limit III

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
3	0		
		43	0
33	0		
		27	17
0	21		
		1	108
1	96		

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Quantity Calculations  
 Made By JEN Date 6-70  
 Checked By I.M. Date 7-72

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

179  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

870

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	0	15	7
8	4		
27	5		
		45	7
40	6		
		157	37
45	14		
		213	26
70	0		
		152	519
12	280		
		26	704
2	100		
		9	376
3	103		
		19	341
7	81		
		48	108
30	2		

Sta. 16+36.26  
 Sta. 15+36.26 Ahead  
 Sta. 15+36.26 Back

870

870

870

860

860

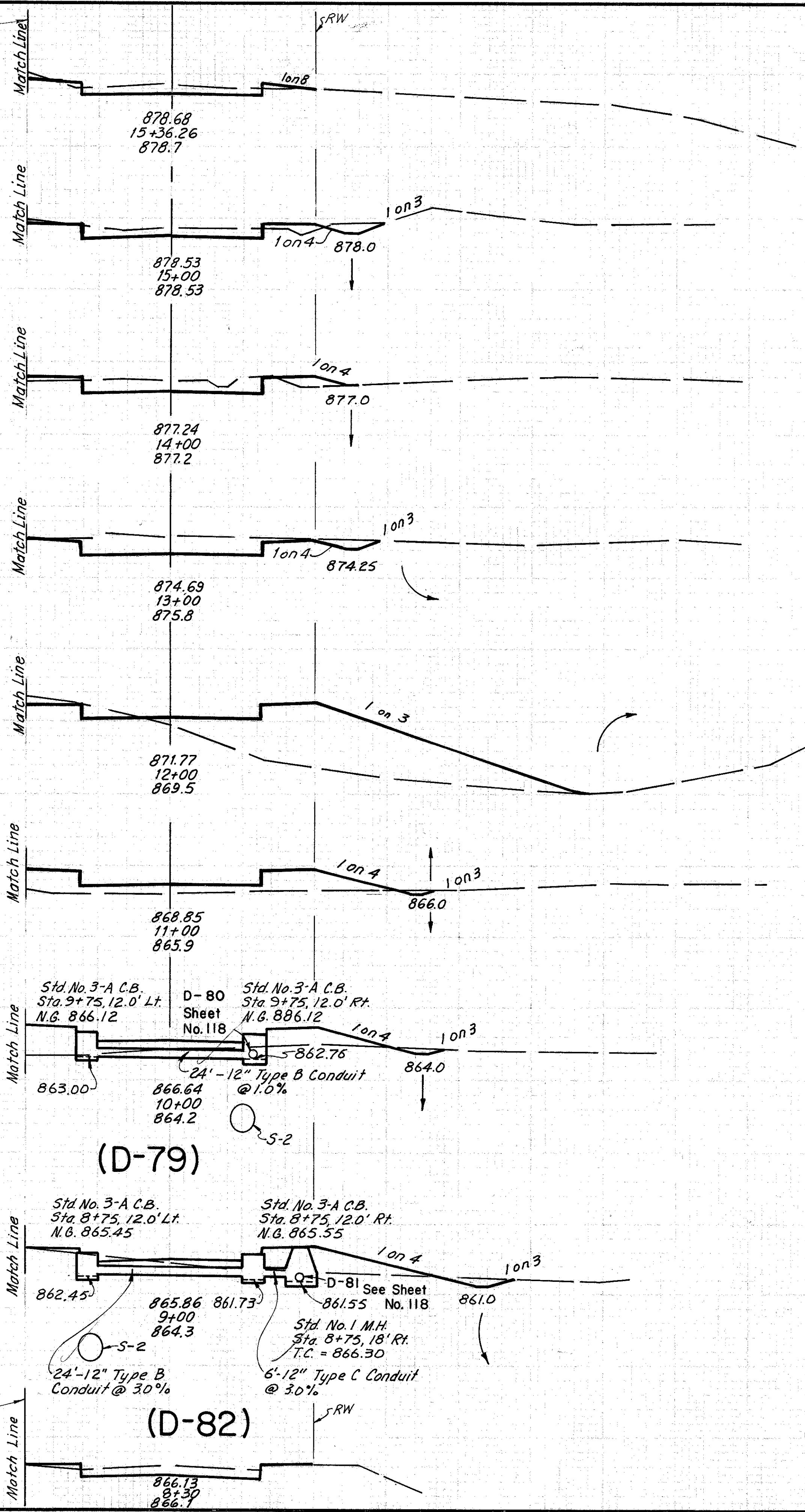
860

860

860

LA & RW Line

SRW



(D-79)

(D-82)

All Earthwork Quantities  
 in Participation Limit III

8-67  
 9-67  
 10-72  
 H.P.  
 J.E.N.



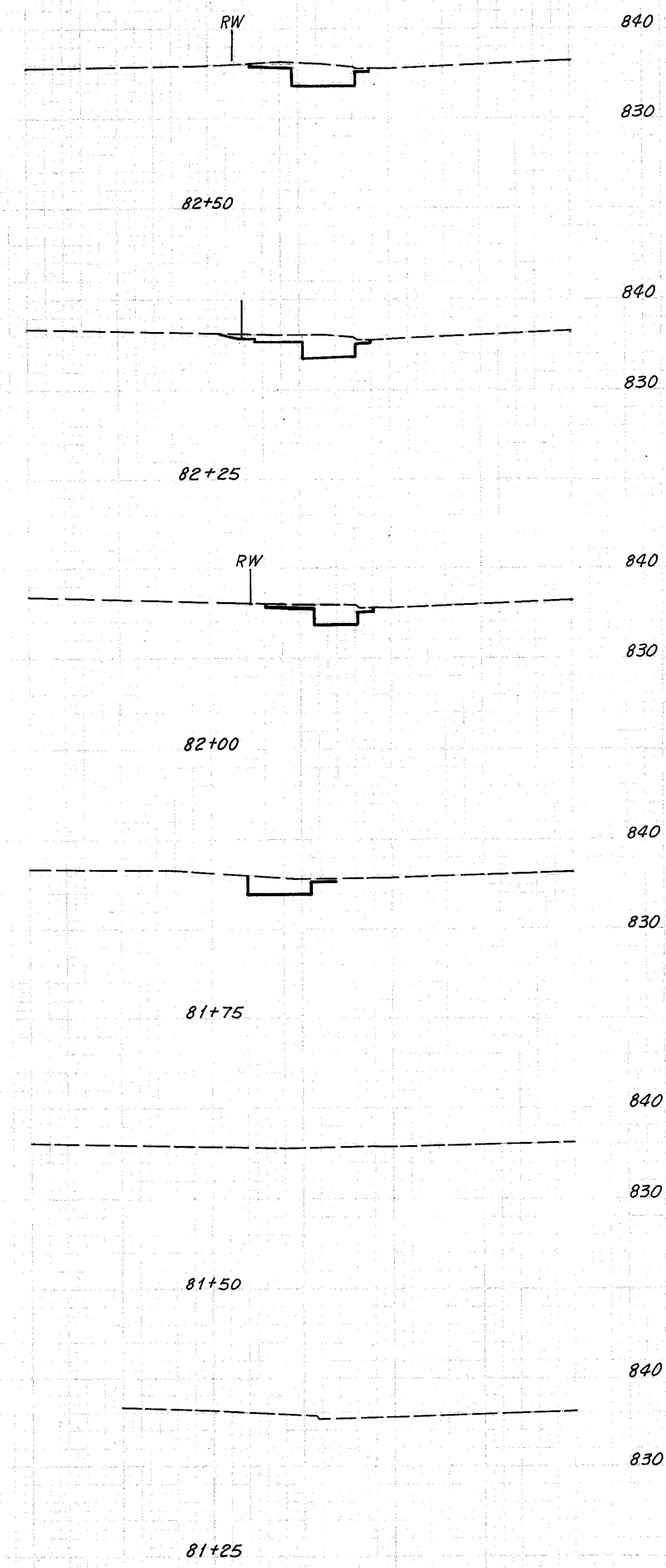
Quantity Calculations  
 Made By *R.D.L.* Date *6-72*  
 Checked By *I.M.* Date *6-72*

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

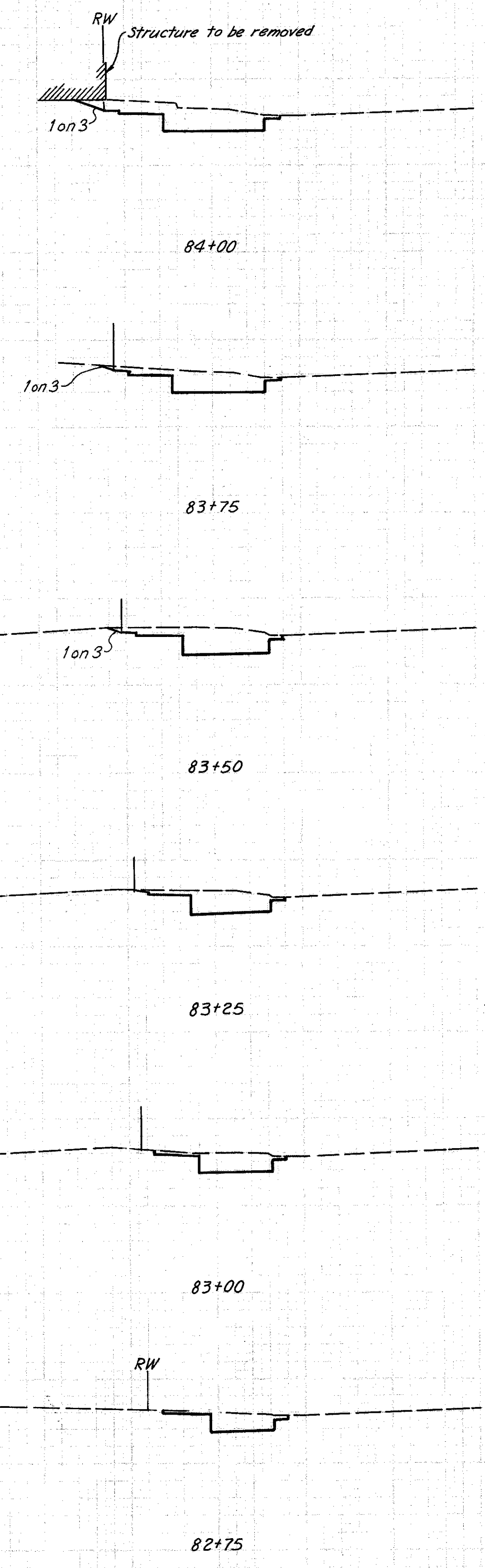
180  
390

CUYAHOGA COUNTY  
 CUY 480-21.40

6-72  
 6-72  
 6-72  
 6-72  
 JCM  
 R.A.E.  
 R.D.L.  
 I.M.



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
19	0	18	0
19	0	15	0
14	0	13	0
15	0	7	0
0	0	0	0
0	0	0	0



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
43	0	33	0
30	0	29	0
33	0	28	0
27	0	22	0
21	0	18	0
18	0	17	0
Sta. 82+50	19	0	0

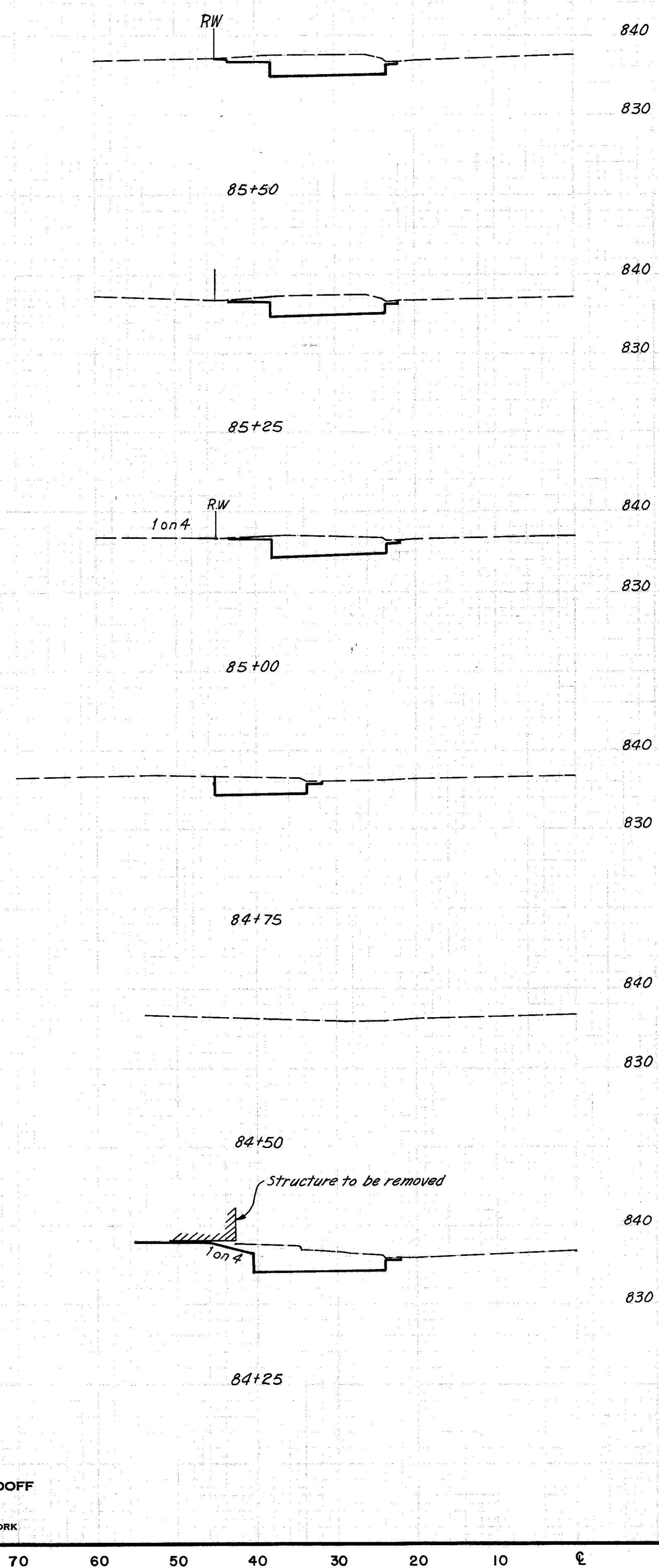
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	



CUYAHOGA COUNTY  
CUY 480-21.40

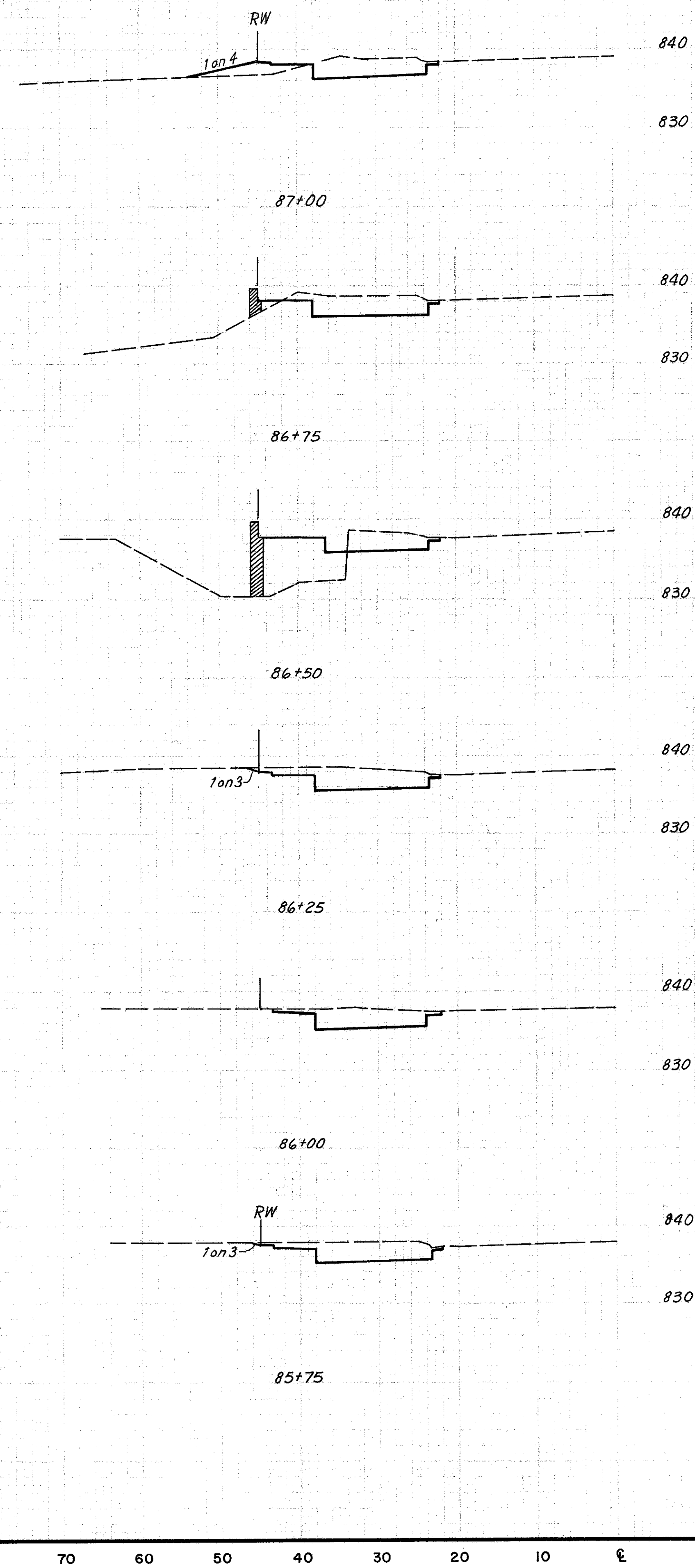
6-72  
 6-72  
 6-72  
 J.C.M.  
 R.A.E.  
 R.D.J.  
 I.M.



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
36	0	32	0
33	0	31	0
34	0	27	0
24	0	31	0
43	0	39	0
41	0	39	0
43	0	39	0

Spill Quantity

Sta. 84+00



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
31	11	33	6
40	2	39	28
23	58	40	27
43	0	41	0
39	0	39	0
39	0	35	0
36	0		

Sta. 85+50

Quantity Calculations  
 Made By R.D.J. Date 6-72  
 Checked By I.M. Date 9-72

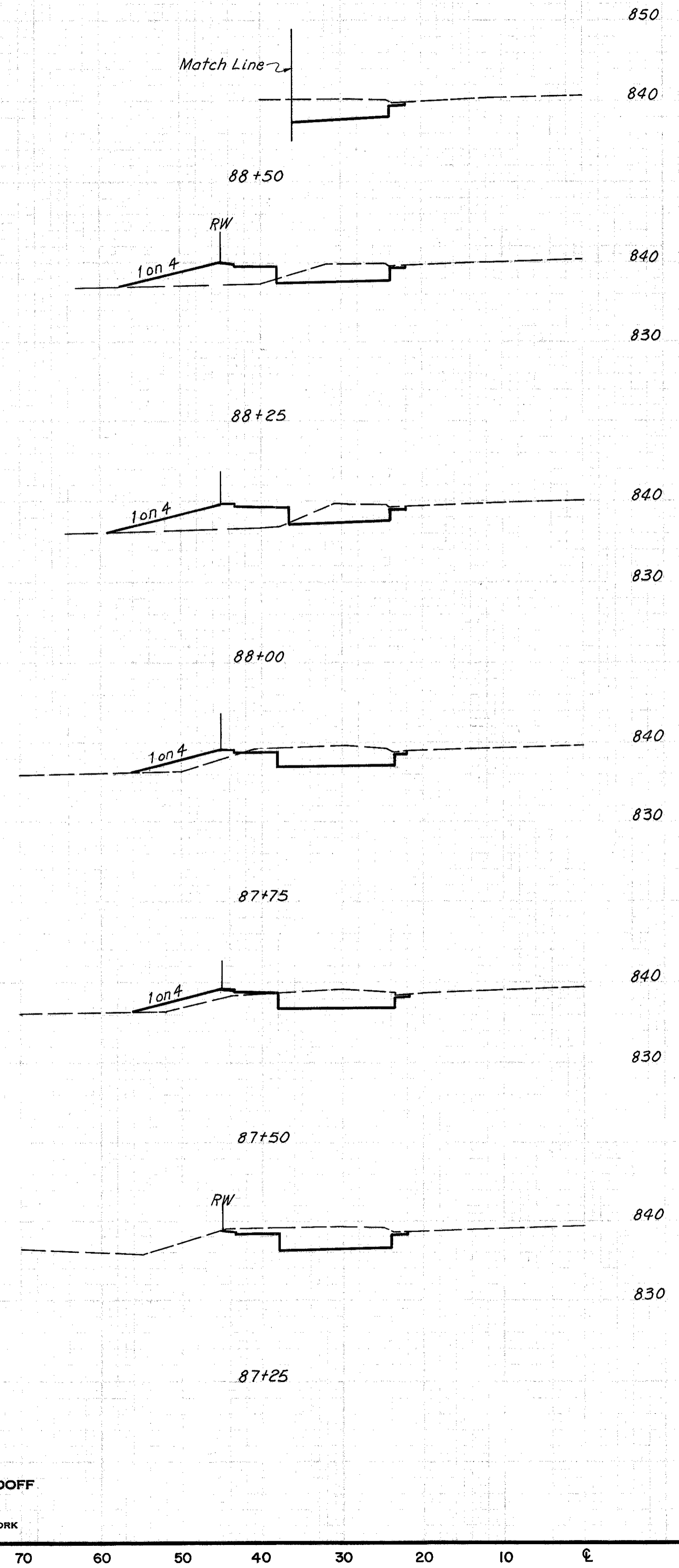
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

70 60 50 40 30 20 10 0

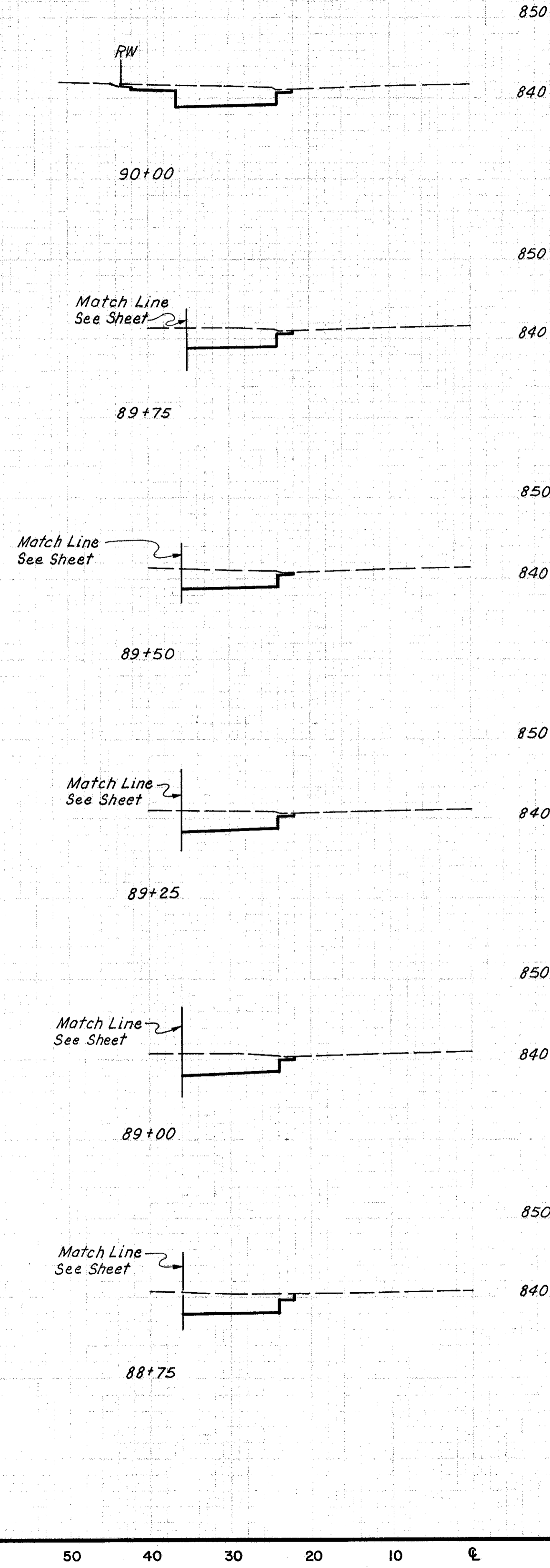
70 60 50 40 30 20 10 0

BROADWAY AVE. STA. 84+25 TO STA. 87+00

6-72  
6-72  
6-72  
6-72  
R.A.E.  
R.O.C.  
I.M.



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
30	0		
		27	16
29	34		
		23	39
20	50		
		26	28
36	11		
		30	11
28	12		
		32	6
42	0		
		34	5
31	11		



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
37	0		
			30
28	0		
			25
26	0		
			26
31	0		
			29
35	0		
			29
32	0		
			29
30	0		

Quantity Calculations  
Made By BDJ Date 6-72  
Checked By IM Date 6-72

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

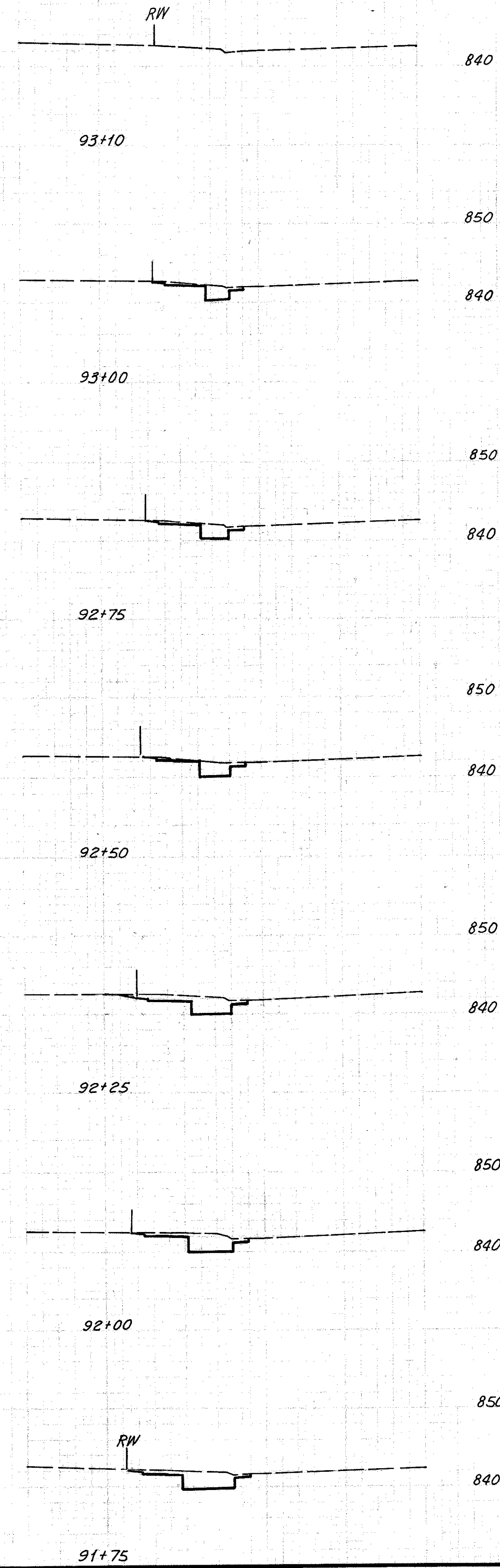
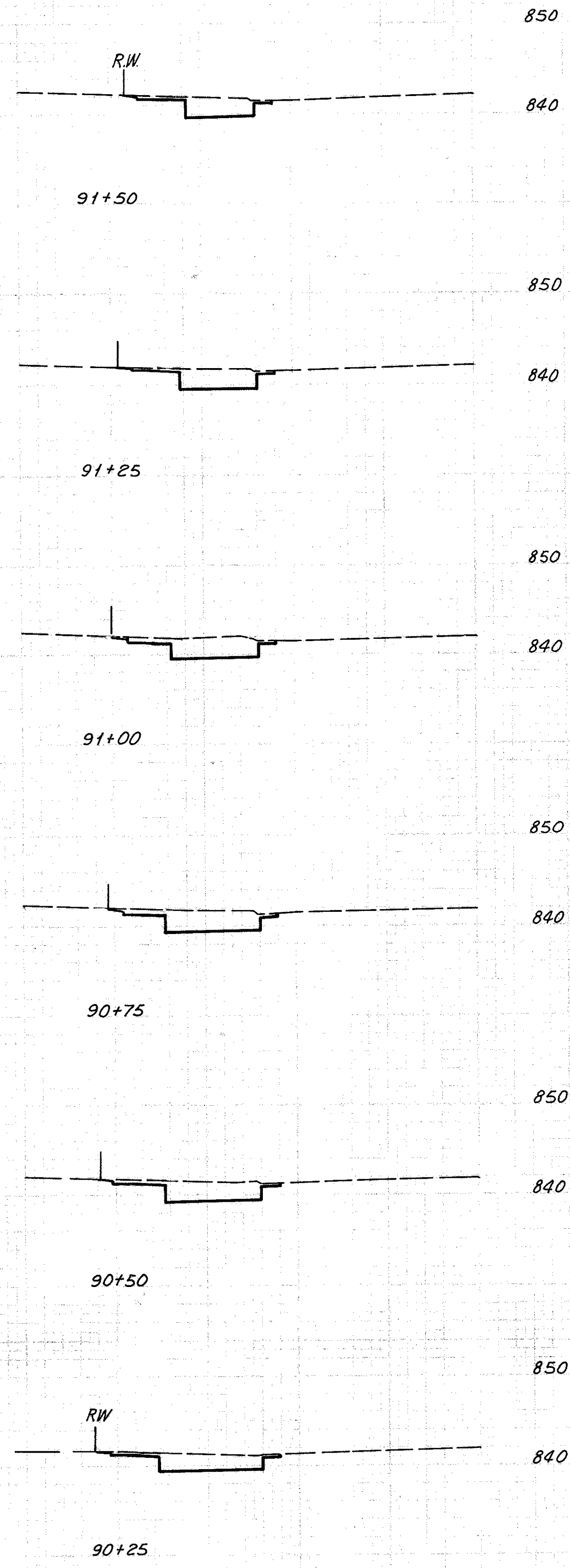
183  
390

CUYAHOGA COUNTY  
CUY 480-21.40

DATE  
6-72  
6-72  
6-72  
6-72

BY  
R.D.J.  
I.M.

ORIGINAL SURVEY  
NOTED WORK  
DATE  
APPROX. DATED



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
17	0		
		17	0
20	0		
		21	0
25	0		
		24	0
29	0		
		26	0
28	0		
		24	0
24	0		

EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	0		
			1
7	1		
			7
9	1		
			9
10	1		
			12
15	0		
			14
15	0		
			14
16	0		
			15
17	0		

Quantity Calculations  
Made By R.D.J. Date 6-72  
Checked By I.M. Date 6-72

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

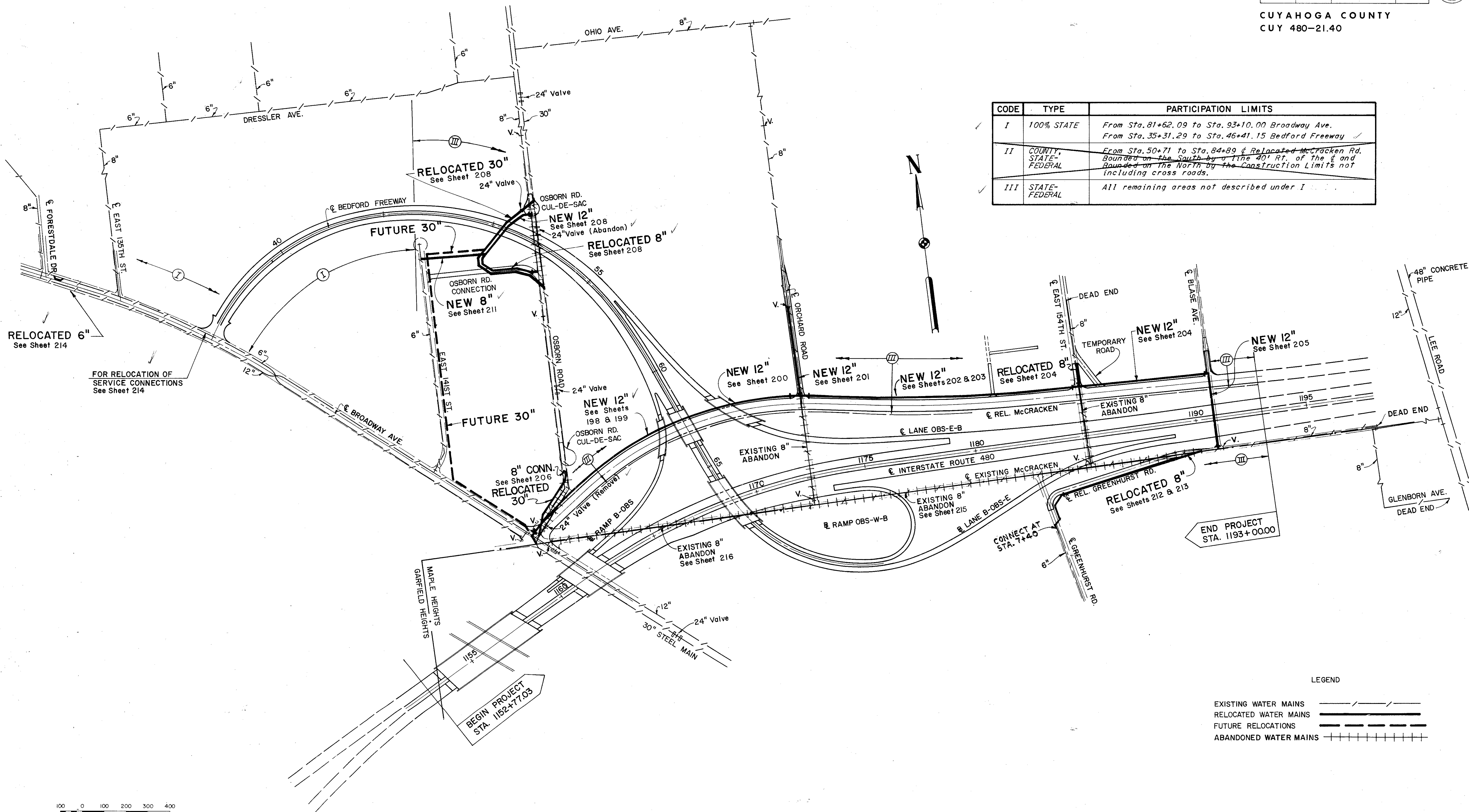
# SCHEMATIC WATER WORK PLAN

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

184  
390

CUYAHOGA COUNTY  
CUY 480-21.40

CODE	TYPE	PARTICIPATION LIMITS
I	100% STATE	From Sta. 81+62.09 to Sta. 93+10.00 Broadway Ave. From Sta. 35+31.29 to Sta. 46+41.15 Bedford Freeway
II	COUNTY, STATE-FEDERAL	From Sta. 50+71 to Sta. 84+89 & Relocated McCracken Rd. Bounded on the South by Line 401 R.R. of the & Bounded on the North by the Construction Limits not including cross roads.
III	STATE-FEDERAL	All remaining areas not described under I

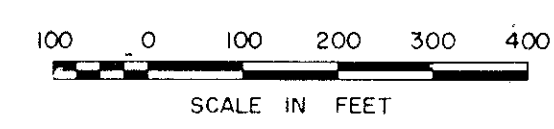


END PROJECT STA. 1193+00.00

BEGIN PROJECT STA. 1152+77.03

LEGEND

EXISTING WATER MAINS	— / — / — / — / — / —
RELOCATED WATER MAINS	=====
FUTURE RELOCATIONS	-----
ABANDONED WATER MAINS	+++++



SCALE 1" = 200'  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 MADE P.L. DATE 3-6-70 CONSULTING ENGINEERS  
 TRCD J.M.C. DATE 4-3-70  
 CKD E.R.H. DATE 5-17-70 KANSAS CITY CLEVELAND NEW YORK

# WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

185  
390

CUYAHOGA COUNTY  
CUY.480-21.40

## GENERAL

### SCOPE OF WORK

The work contemplated under this contract comprises the furnishing and installing, complete with valves and other appurtenances, the following water main relocations and performing other incidental work necessary to abandon existing water facilities.

1. 8" and 12" Cast Iron and 30" Concrete Water Main Relocations in Osborn Rd. at Proposed Bedford Freeway and at Broadway Ave.
2. 12" Cast Iron Water Main in Relocated McCracken Rd. from Broadway Ave. to Blase Ave.
3. 12" Cast Iron Water Main in Orchard Rd. from Relocated McCracken Rd. northerly.
4. 8" Cast Iron Water Main in E. 154 St. from Relocated McCracken Rd. northerly.
5. 8" Cast Iron Water Main in Relocated Greenhurst Rd. from Existing Greenhurst Rd. to Existing McCracken Rd. near Blase Ave.
6. 12" Cast Iron Water Main under I-480 from Existing to Relocated McCracken Rd. at Blase Ave.
7. 2-14" New Service Pipe, Galvanized Iron Service Connections in Access Rd. from Broadway Ave. Northerly.
8. 6" Cast Iron Water Main Relocation in Broadway Ave. near Forestdale Dr.
9. Abandon Existing Water Mains and Service Connections in McCracken Rd., Broadway Ave., Osborn Rd., Orchard Rd. and E.154 St.

The contractor shall do all the work and furnish all the labor and material necessary for the final completion of this contract in the manner and under the conditions herein specified and provided in accordance with the contract drawings.

### THE STATE

The State is the State of Ohio acting through its authorized representative.

### ENGINEER

The Engineer is the District Deputy Director or District Engineer, the District Construction Engineer or the District Maintenance Engineer, or the Project Engineer assigned to administer the contract.

### THE CITY, OR THE CITY OF CLEVELAND

The City, or the City of Cleveland, is the Director, Department of Public Utilities of the City of Cleveland.

### STATUS OF CITY INSPECTOR

Inspectors as designated by the Director of Public Utilities are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the waterwork, and to the preparation or manufacture of the materials to be used in the waterwork. The city inspector as designated by the Director of Public Utilities will make work instructions through the Project Engineer.

### ACCESS TO WORK AND PLACE OF MANUFACTURE

The Contractor shall notify the Engineer and Director of Public Utilities, at least seven (7) days previous to the commencement of the manufacture of any materials, of the time and place where the manufacture is to commence, in order that a representative of the Engineer and Director may be present to inspect the manufacture. The Contractor shall provide, without charge or expense to the State and City, all necessary assistance to the Engineer and Director when required for inspection or verification of work done.

### DIMENSIONS, DETAILED DRAWINGS AND ELEVATIONS

Figured dimensions on drawings shall take precedence over measurements by scale, and detailed drawings are to take precedence over general drawings and shall be considered as explanatory of them and not as indicating extra work. If, however, any of the detailed drawings show more elaborate or expensive work than is normally specified and indicated by the contract drawings, notice thereof must be given to the Engineer by the Contractor within ten (10) days after receipt of such detailed drawings in order that the drawings may be amended or the additional expense on account of such work may be adjusted and authorized. If the Engineer does not receive such notice from the Contractor within ten (10) days after the detailed drawings have been received by him, it is hereby agreed that the Contractor accepts the drawings and will execute them without claim for extra compensation.

### FLOODS AND FREEZING WEATHER

Proper facilities shall be provided for protecting the work from damage by flood, rain or frost, and work done in freezing weather shall be done in such manner as the Engineer may approve. Valves shall be protected from freezing until backfilled in the completed work.

### ADDITIONAL WORK

(A) - Attention is called to the fact that the work of this contract includes certain performances as incidental to the itemized requirements hereof, though not exclusive as follows: To perform all excavation, backfilling, sheeting, shoring, temporary and final repaving and to test the installation. Sand backfill shall be placed under existing and proposed pavement. For the performances herein described and for other incidental performances of like nature, the State will make no specific or separate payment or allowance, but the cost thereof shall be included in the prices stipulated to be paid for the various items of the work to be done under this contract.

(B) - Preliminary flushing: Before being placed in service all dirt and foreign matter shall be removed from the new water main or extensions to existing mains by a thorough flushing through the hydrants or by other approved means. Each valved section of newly laid pipe shall be flushed independently. This shall be done after the pressure test and may be done before or after the trench shall have been back-filled.

(C) - Chlorination: Following the preliminary flushing, the newly laid water main shall be chlorinated. The process of chlorinating, the method of procedure, the chlorinating agent and the rate of application shall be determined by the Engineer. The City of Cleveland will furnish the necessary labor and material required for such chlorination and install the necessary taps at the ends of the water main sections to be chlorinated. No charge will be assessed the Contractor for any material, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water. The Contractor shall furnish the necessary labor for excavation and backfilling which will be required for the installation of taps for injecting the chlorine solution, operating pumps and flushing mains.

(D) - Final flushing and test: Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremities until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proven equal to the water quality served the public from the existing water supply system.

(E) For the performances described in paragraphs (B), (C) and (D), the State will make no specific or separate payment or allowances, but the cost thereof shall be included in the prices stipulated to be paid for each linear foot of pipe furnished and installed.

### MAINTENANCE OF SERVICE AND CONNECTING RELOCATED MAINS

When the new mains have been tested and chlorinated and are ready to be connected to the old main, the Contractor shall make such connections at a time designated by the City. Prior to shutting down the existing mains, the Contractor shall take suitable precautions to assure a minimum interruption to service, including the following:

- (A) Perform all necessary excavation, including bell holes exposing the existing main sufficiently for the operation of the pipe saw by the City.
- (B) Remove the cap or plug from the end of the new main.
- (C) Swab the inside of all pipes, bends and sleeves to be used in connection thoroughly with a chlorine solution of at least 100 p.p.m.
- (D) Make-up as much of the connection as possible outside the ditch to eliminate the need for caulking most of the necessary joints during the shutdown. By careful measurement all pipe cuts can be made by the Contractor prior to shutting down.
- (E) Have sufficient manpower and equipment on the site to perform the operation in a minimum of time.

### PAINTING

(A) - It is the intention of these specifications to provide that all metal work subject to corrosion shall be satisfactorily protected by a durable coating of paint or other approved material and that all metal surfaces not buried in earth, or in concrete shall be left clean and well painted at the completion of the contract. Unless otherwise specified, the protection shall be at least that given by three (3) coats of approved paint. The first coat is to be applied at the shop before the metal has rusted and after all grease, dirt and scale has been removed. Bolts and nuts shall not be shop coated, but shall receive three (3) coats of approved paint after installation.

(B) - All metal work which has not been coated before the arrival on the job shall be given a temporary protective coating of such a nature as to permit the ready adherence of future coatings. The temporary coating shall be a good grade asphaltic paint or other approved material. The temporary protection shall apply particularly to the valve boxes and covers, manhole rings and covers, ladders and ladder rungs and elsewhere when in the opinion of the Engineer, such protection is necessary.

(C) - All surfaces of metal which will be in contact after assembling shall be painted, at least one coat, before assembling. The final coat of paint on all exposed work shall be given shortly before the completion of the contract.

(D) - Where painting clauses appear hereinafter, they shall take precedence over this section, except that temporary protection herein described may be required.

(E) - All of this work shall be included in the price bid for the particular item requiring the painting.

### TESTS, INSPECTION AND REPORTS

Notwithstanding the requirements of any other provisions of these specifications, the Contractor shall arrange for and pay all costs involved for shop inspection of all materials furnished, manufacture of all pipe, valves, fittings, etc., field and shop welds and welding, and furnish to the State and the City of Cleveland copies of all shop, fabrication, manufacture and other related inspection reports of materials furnished. This inspection shall be done by a recognized inspection laboratory approved by the City of Cleveland. In the case of any item not specifically mentioned in the "Waterwork Notes", the State of Ohio, Department of Transportation "Construction and Material Specifications" shall govern.

### HANDLING PIPE AND ACCESSORIES

(A) - Unloading: Cast iron pipe, fittings, valves, hydrants, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor. They shall at all times be handled with care to avoid damage. In loading and unloading they shall be lifted by hoists or slid, or rolled on skidways in such manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

(B) - At site of work: In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

(C) - Protection of pipe coating: Pipe shall be handled in such manner that a minimum amount of damage to the coating will result. Any cast iron pipe or fitting, the coat of which has been damaged in shipping or handling, shall have the damaged portion well cleaned and covered with an asphalt paint, approved by the Engineer, before being placed in the work. The Contractor shall thoroughly coat all exposed parts of bolts and nuts with an approved asphalt paint, after all pipe has been laid and before backfilling has been placed. All field coating shall be furnished by the Contractor.

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

*Frank R. Melone*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Richard J. Stalder*  
ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond Rudickson*  
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*William A. Sweeney*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS**

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE E.R.H. DATE 3/10/70 CONSULTING ENGINEERS  
TRCD. E.R.H. DATE 3/12/70  
CKD. E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

# WATERWORK NOTES

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(D) - Pipe kept clean: The interior of the pipe, fittings, and other accessories shall be kept free from dirt and foreign matter at all times.

(E) - Frost protection: Valves and hydrants before installation shall be drained and stored in a manner that will protect them from damage by freezing.

### CHANGES IN WATER MAINS

(A) - Wherever it becomes necessary in the opinion of the Engineer to change the location of house connections between water main and curb cock, such changes will be made as work to be done by the City. The Contractor shall notify the City in ample time to permit the City to make such changes and avoid unnecessary delay in the completion of the work. The Contractor shall also cooperate with the City in making these and all other changes required and shall do all excavating, backfilling and repaving as may be required. The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters.

(B) - Wherever it becomes necessary, in the opinion of the Engineer, to change the location or elevation of water mains and hydrants, and where connections are to be made between existing distribution mains and water mains under this contract, the Contractor shall remove and dispose of all existing water line materials required to make the connection, and shall furnish and install complete, all the cast iron or ductile iron pipe, fittings and valves to make the connections indicated. The Contractor shall also furnish all necessary labor, materials, tools and equipment and make the excavation, backfill and repaving for such connections. Payment for this will be included in price bid under appropriate item for size of water main or connection to be installed. All pipes, valves, hydrants and appurtenances removed shall become the property of the Contractor.

### WORK TO BE DONE BY THE CITY

(A) - The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters, but the Contractor shall do all the necessary excavation, backfilling and repaving required therefore. No charge will be assessed the Contractor for any of the labor or materials furnished by the City.

(B) - In locations shown on the plans the Contractor will be required to sleeve-in to the existing mains. To speed up this operation, it is called to the Contractor's attention that the water department has on hand at Harvard Yards motor operated pipe cutters which are available for cutting pipe by City forces at the following rates. The prices include cost of labor, use of pipe cutting machine, and truck. The Contractor shall do all necessary excavation, backfilling and repaving and all air compressor equipment shall be furnished by the Contractor.

SIZE OF PIPE	COST PER CWT
8"	\$30.00
10"	30.00
12"	30.00
16"	35.00
24"	60.00
30"	80.00

### EXCAVATION

(A) The Contractor shall remove all existing structures, roadways, driveways and other similar materials and make all excavation necessary for the proper construction of the water main, pipe connections and appurtenant structures, including tunnel and shaft excavation. The excavation shall include the removal, handling, rehandling and disposal of materials encountered in the work and shall include all pumping, bailing, drainage, sheeting and bracing. Moreover, the Contractor must assume all responsibility for any added expense or other liability which may arise by means of quicksand, obstacles or conditions foreseen and unforeseen or encountered in the work of this contract.

(B) Trenches shall in every case be of sufficient width to permit solid packing of backfill under and around pipes, and satisfactory construction of all appurtenances and for such sheeting and shoring, pumping and draining as may be necessary.

(C) - The trench shall be dug to the alignment and depth required and only so far in advance of pipe laying as the Engineer shall permit. The trench shall be so braced and drained that workmen may work therein safely and efficiently. It is essential that the discharge from pumps be led to natural drainage channels, to drains, or to sewers.

(D) - The trench width may vary with and depend upon the depth of trench and the nature of the excavated material encountered; but in any case shall be of ample width to permit the pipe to be laid and jointed properly and of the backfill to be placed and compacted properly. The minimum width of unshaded trench shall be eighteen (18) inches and for pipe ten (10) inches or larger, at least twelve (12) inches larger than the outside diameter of the pipe for concrete pipe and eighteen (18) inches larger than the outside diameter of the pipe for cast iron and steel pipe, except by consent of the Engineer. The maximum clear width of trench shall be not more than two (2) feet greater than the outside pipe diameter. When sheeting and bracing is used, the trench width shall be increased accordingly.

(E) - The trench, unless otherwise specified, shall have a flat bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon sound soil cut true and even, so that the barrel of the pipe will have a bearing for its full length.

(F) - Any part of the trench excavated below grade shall be corrected with approved material, thoroughly compacted.

(G) - When the uncovered trench bottom at subgrade is soft and in the opinion of the Engineer cannot support the pipe, a further depth and or width shall be excavated and backfilled to pipe foundation grade as required under (F), or other approved means shall be adopted to assure a firm foundation for the pipe.

(H) - Ledge rock, boulders, large stones, and shale shall be removed to provide a clearance of at least six (6) inches below all parts of the pipe, valves, or fittings and a clear width of six (6) inches on each side of all concrete pipe and nine (9) inches on each side of all cast iron and steel pipe shall be provided.

(I) - Excavation below subgrade in rock, shale or in boulders shall be back-filled to subgrade with approved material, thoroughly compacted.

(J) - Bell holes of ample dimensions shall be dug in earth trenches at each joint to permit the jointing to be made properly. Adequate clearance for proper jointing pipe laid in rock shall be provided at bell holes.

(K) - The use of excavating machinery will be permitted except in places where its operation will cause damage to trees, buildings, or existing structures above or below ground; in which case hand methods shall be employed.

(L) - Trees, fences, poles and all other property shall be protected unless their removal is authorized. Any property damaged shall be satisfactorily restored by the Contractor.

(M) - Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during the construction period.

(N) - The Contractor shall maintain all excavations in good order during the construction, so as not to hinder or injure the pipe laying, masonry or other work. He shall take all reasonable precautions to prevent movement of the sides of such excavation, and shall remove at his own expense any material sliding into the excavation.

### SHEETING AND BRACING

(A) - The Contractor shall furnish and put in place such sheeting and bracing as may be required to support the sides of trenches or other excavation and shall remove such sheeting and bracing, as the trench or excavation is filled up, unless the Engineer shall order it left in place, in which case the Contractor shall cut the plank off at a height as ordered by the Engineer, or as called for on the contract drawings. No payment will be made for wasted ends.

A quantity of 2 M.B.M. has been provided in the General Summary for Item Special, Sheeting Left in place.

(B) - Whenever the excavations for the work described herein are immediately adjacent to other subsurface structures, the Contractor shall furnish and place sheeting and bracing where noted on contract drawings and as may be necessary so as to reduce to a minimum the possibility of injury or damage the same.

(C) - If the Engineer is of the opinion that at any point sufficient or proper supports, sheeting, or bracing have not been provided, he may order additional supports, sheeting or bracing, at the expense of the Contractor, and the compliance with such orders by the Contractor shall not relieve or release him from his responsibility for sufficiency of such supports.

### REMOVAL OF EXCAVATED MATERIAL

(A) - All surplus material and such other material as the Engineer may deem unfit for use as backfill shall be disposed of by the Contractor so as to give a minimum of inconvenience to the public. In case of settlement after backfill, the Contractor shall supply sufficient material satisfactory to the Engineer to make up for the deficiency.

(B) - In the storing of excavated material, which is to be used as a backfill, the Contractor shall exercise care so as to avoid inconveniencing the public. If, in the opinion of the Engineer, it is necessary to remove this excavated material from the streets or lots, the Contractor shall be required to do so.

(C) - Any material which may spill or drip from vehicles by hauling in the streets, shall be removed and the streets cleaned by the Contractor, to the satisfaction of the Director of Public Service of the City of Cleveland or the proper officials of the municipality or township in which the work is being done.

(D) - When so directed by the Engineer, the Contractor shall immediately remove all excavated materials from the site.

### LAYING PIPE

(A) - Proper implements, tools, and facilities, satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings, and valves shall be carefully lowered into the trench, piece by piece, by means of derrick, proper slings, and other suitable tools or equipment, in such manner as to prevent damage to pipe or coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. If any defective piece is discovered while pipe is suspended or after being laid, a new piece shall be furnished and installed by the Contractor.

(B) - All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying.

(C) - At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe. No pipe shall be laid in water, or when the trench conditions or the weather is unsuitable for such work, except by permission of the Engineer.

(D) - Wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions, to plumb stems, or for other reasons, the degree of deflection shall be approved by the Engineer.

(E) - Before laying cast iron or ductile iron pipe, all lumps, blisters and excess coal tar coating shall be removed from the bell and spigot ends of each pipe, the pipe ends shall then be kept clean until joints are made.

APPROVED DATE JUNE 15, 1972

*Franklin R. Melena*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Richard J. [Signature]*  
ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond J. [Signature]*  
DIRECTOR OF PUBLIC UTILITIES  
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COMMISSIONER OF WATER AND HEAT  
*[Signature]*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*[Signature]*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*[Signature]*  
ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS AND THE CITY OF MAPLE HEIGHTS

SCALE HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE E.R.H. DATE 3/10/70 CONSULTING ENGINEERS  
TRCD 460 DATE 4/2/70  
CKD E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

# WATERWORK NOTES

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### ✓ LAYING PIPE (CONTINUED)

(F) - Before laying concrete pipe, the pipe ends shall be made smooth with emery cloth, file or other approved means, wire brushed and wiped until clean and dry. Pipe ends shall be kept clean until joints are made. After cleaning and drying, all contact surfaces of the gaskets and steel joint rings shall be coated with an approved flax soap before entering the spigot end into the socket. Immediately after the joint is pulled together, the pipe shall be blocked with wood blocking. A surcingle shall be installed around the joint and the pipe shall be secured with earth or sand as required, carefully tamped under and on each side up to the spring line of the pipe, including the bell holes. All blocking shall be removed when backfill has reached the spring line of the pipe.

### ✓ FLOATING

The Contractor shall take every precaution against the floating of the pipe due to water coming into the trench, or through caving in, flushing or puddling. In case of such floating the Contractor shall replace the pipe at his own expense, and make wholly good any injury or damage which may have resulted.

### TESTING MAINS

(A) - All pipes, valves, fittings, etc., shall be laid in such a manner as to leave all joints watertight. After the pipe is laid, and before backfill is placed around the joints, such lengths of the water main as the Engineer may determine, shall be tested under a hydrostatic pressure of seventy-five (75) pounds per square inch above the static pressure, but nowhere less than 100 pounds per square inch.

(B) - The test shall be under the direction of the Engineer and Director of Public Utilities or his designate. The Contractor may obtain water for testing by observing the rules and regulations enforced in the municipalities or townships in which the work is being done. The City will furnish a pressure gage for measuring the pressure on the water main, but the Contractor shall furnish a suitable pump, pipes, test heads and all appliances, labor, fuel and other appurtenances necessary to make these tests.

(C) - The test pressure shall be maintained for a sufficient length of time to allow for a thorough examination of joints and elimination of leakage where necessary. The pipe lines shall be made absolutely tight under the test pressure.

(D) - After a section of the water main has been tested, the Contractor shall drain the main. In case the drains are connected to valve or drain vaults, then the Contractor, within a reasonable time after the test has been completed, shall pump all water out of the vaults.

(E) - In cold weather immediately after testing a section of the water main, the Contractor shall open all valves, air cocks, by-passes and drains and properly drain bonnets of all valves in the section of the water main, and take all other precautions necessary to prevent injury to the water main and appurtenances due to freezing.

(F) - As an alternate for testing concrete and steel mains other than by the preceding method, the Contractor may choose the following procedure:

The water main shall be tested under the same hydrostatic pressure as previously noted. The test pressure shall be maintained for a period of two (2) hours by pumping additional water into the main, if necessary. The quantity of water thus pumped into the main multiplied by twelve (12) shall be taken as the leakage per twenty-four (24) hours.

(G) - The permitted leakage shall not exceed a rate of seventy-five (75) gallons per twenty-four (24) hours per mile of pipe per inch of nominal diameter.

(H) - In calculating leakage, the Engineer will make allowance for any leakage at the valves, the removable bulkheads, etc.

(I) - In using this method of testing, the Contractor may backfill the pipe except at lead joints, flanged joints, victaulic couplings, and drain connections immediately following the laying and before the actual test has been made. In case the leakage exceeds the permissible amount mentioned above, the Contractor shall find the leak and make the joints tight. The Contractor shall furnish suitable means for determining the quantity of water lost by leakage during the test.

(J) - In order to be able to make proper allowances for leakage at valves, etc., previously noted, only such sections of water main may be selected for test as will have such valves, removable bulk-heads, etc., accessible.

(K) - The evaluation of actual leakage to standard pressure (150 lbs.) leakage is calculated by the application of the ratio determined from the square root of respective pressures, other factors being equal.

### ✓ CLOSING VALVES

The closing of all gate valves on water mains for making connections, tests, or for any other cause, will be done by the City of Cleveland and sufficient notice shall be given to the City, by the Contractor, so that the work may be done with a minimum of inconvenience to the public and delay to the Contractor.

### ✓ PLUGGING DEAD ENDS

Standard plugs with clamps shall be inserted into the bells of all dead ends of pipes, tees, or crosses, and spigot ends capped and clamped by the Contractor, on all mains constructed by him and on existing water mains where indicated in the contract drawings. Concrete piers shall be placed when called for on the contract drawings, or ordered by the Engineer. The cost of furnishing and installing the plugs in new water mains shall be included in the per linear foot price bid for the various sizes of new water mains. The cost of furnishing and installing the plug in existing water main shall be included in the unit price bid for each item, "Plugging Existing Water Mains and Branches", classified as to size as shown elsewhere in these plans.

### ✓ BACKFILLING

(A) - This work includes all backfilling, together with ramming, puddling, and rolling, as required; the regrading of grounds; the replacing of surface and subsurface structures; the placing and maintaining of temporary sidewalks, and driveways; the furnishing of suitable material for backfill, reseeding lawns and replacing trees and shrubbery damaged by the Contractor; and all appurtenant work incidental thereto. Pavements, curbs, sidewalks and driveways within the limits of the work shall be temporarily surfaced, maintained and finally replaced or repaved as set forth under "Road Surfaces, Sidewalks, Driveways and Curbing."

(B) - Backfill, unless otherwise specified, may be made with material excavated from trenches, providing it is satisfactory to the Engineer. If, in the opinion of the Engineer, the material excavated is unsatisfactory, then the Contractor shall furnish at his own expense other material suitable for backfill. All backfill shall be free from slag, cinders, rubbish and other objectionable material.

(C) - Before laying the pipe, the bottom of the trench shall be brought to the grade of the bottom of the pipe, except at field joints. Wherever the bottom of the trench has been excavated below the bottom of the pipe, the Contractor shall place sand, or other material satisfactory to the Engineer to bring the bottom of the trench to the grade of the bottom of the pipe. This bed shall be thoroughly tamped before the pipe is laid.

(D) - Unless otherwise specified, the backfill under, around and to a depth of one (1) foot above the top of all pipe, shall be made with material satisfactory to the Engineer, which material shall be free from stone and other objectionable material noted above. The Contractor must use special care in placing this portion of the backfill, so as to avoid injuring, distorting or moving the pipe during compaction. Above this level the backfill shall be made with material satisfactory to the Engineer. However, where specified, sand shall be used for the entire portion of the backfill. See below.

(E) - Backfilling as noted in paragraph (D) shall be tamped in thin layers, simultaneously on each side of the pipe, and thoroughly compacted so as to provide a solid backing against the external surface of the pipe.

(F) - Only after the backfill previously mentioned has been satisfactorily compacted, may work proceed in placing the remaining backfill which must be carefully placed and compacted by tamping, puddling, or rolling. All precautions must be taken to eliminate future settlement. The number of men tamping shall be not less than the number backfilling, and additional men shall be kept in the trench to spread the material.

(G) - Backfilling shall not be done in freezing weather, except by permission of the Engineer, and it shall not be made with frozen material, nor shall any fill be made where the material already in the ditch is frozen.

(H) - The entire backfill shall be made with sand where permanent pavements, curbs, driveways, or sidewalks, have been opened for or undercut by the excavation.

(I) - All sand to be used for backfill shall be a natural bank sand, graded from fine to coarse, not lumpy or frozen, and free from slag, cinders, ashes, rubbish, or other deleterious or objectionable material. It shall not contain a total of more than 10 per cent by weight of loam and clay, and all material must be capable of being passed through a  $\frac{3}{4}$  inch sieve. Not more than 5 per cent shall remain on a No. 4 sieve.

(J) - Special treatment of the trench will be required where cinder excavation exceeding one foot measured from the top surface is encountered. Before laying the pipe, the bottom of the trench shall be dug below grade and then brought to the grade of the pipe in the following manner, a four (4) inch layer of crushed limestone shall be placed on the entire width of the bottom of the trench followed by a filler of hydrated lime and a layer of three (3) inches of sand. The crushed limestone shall be well graded from fine to coarse and free from slag, cinders, ashes, rubbish or other objectionable material. All limestone must be capable of being passed through a  $\frac{3}{4}$  inch sieve. On top of this layer of crushed stone, hydrated lime shall be supplied in the amount of  $\frac{1}{2}$  of a pound per square foot of trench. This bed of crushed limestone shall be thoroughly tamped before the 3" layer of sand is placed. The backfill around and to the depth of 3" above the top of the pipe shall be made with sand. The Contractor must use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe when compacting same. On top of the sand the Contractor shall place another layer of crushed limestone five (5) inches thick on the entire width of the trench. On top of the compacted layer of limestone hydrated lime shall then be applied in the amount of  $\frac{1}{2}$  of a pound per square foot of trench. The remaining backfill shall be made with sand, carefully placed and compacted by tamping, puddling, or rolling. All precautions shall be taken to eliminate future settlement. The treatment of the trench bottom, previously described, may be omitted where the cinder depth, measured from the top surface does not exceed 2' - 6".

### ✓ ROAD SURFACES, SIDEWALKS, DRIVEWAYS, AND CURBING

(A) - The Contractor shall remove all pavements and road surfaces within the lines of excavation. After the pipe has been laid, all appurtenant work constructed and backfill completed, he shall furnish, place and maintain, wherever the pavement road surface has been removed or damaged by him, a temporary pavement in the paved portion of streets, or a temporary road surface in the unpaved portion of streets so as to provide a safe and passable roadway until such time as the final pavement or road surface is completed.

(B) - When only a portion of the street is paved and the lines of excavation are in the unpaved portion, the Contractor shall use the utmost care in preventing injury to the pavement. If, in making the excavation or for any other cause the pavement is removed or injured by the Contractor, he shall furnish, place and maintain a temporary pavement wherever the pavement has been removed or damaged, so as to provide a safe and passable roadway until such time as the final pavement is completed.

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

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Richard J. Piller  
ENGINEER, CITY OF MAPLE HEIGHTS  
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William J. Sweeney  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS**

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE ERH DATE 3/10/70 CONSULTING ENGINEERS  
TRCD ERH DATE 3/17/72 KANSAS CITY CLEVELAND NEW YORK  
CKD ERH DATE 5-17-72



# WATERWORK NOTES

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### ROAD SURFACED, SIDEWALKS, DRIVEWAYS, AND CURBING (CONTINUED)

(C) - All final paving of road surfaces, if so noted on the contract drawings shall be done by the Contractor to the satisfaction of the Engineer and in conformity with the City of Cleveland "Standard Specifications for Construction of Pavements, Sidewalks and Sewers," dated November, 1966. The Contractor shall bear the entire cost of the work. At locations not specifically mentioned, the Contractor shall restore the same type of pavement as encountered.

(D) - All damaged or displaced curb shall be renewed or reset to the satisfaction of the Engineer. No faulty curb or curb less than 30" long will be permitted for reuse.

(E) - If prior to the expiration of this contract, any of the pavements or road surfaces within the lines of excavation or adjacent thereto, shall have been damaged or injured, due to undermining, or for any other cause which may be attributed to the work which is being done by the Contractor, then the Contractor shall remove such damaged or injured pavements or road surfaces, backfill with sand properly rammed and replace the final pavement or road surface.

(F) - If any sidewalks, driveways or curbs are removed or injured by the Contractor in the course of making excavation or handling materials, or for any other reason which may be attributed to work which has been done by the Contractor, then he shall relay same after all work, including backfilling, has been completed. If any stone sidewalks, driveways or curbs which have been removed or injured, are unfit to be relaid, then the Contractor shall furnish and relay new material. All concrete or cement sidewalks, driveways or curbs, which are removed or injured by the Contractor shall be broken up by him and he shall furnish all labor and materials and construct new sidewalks, driveways or curbs, to replace those removed or injured. At intersecting walks, drives, etc., additional concrete slabs beyond the excavation limits shall be removed and replaced with new material, in order to avoid having more joints than in the original work. All slabs replaced shall be of full width. The Contractor shall furnish, place and maintain, wherever the sidewalk has been removed or damaged by him, a temporary sidewalk so as to provide a safe and passable sidewalk until such time as the final sidewalk is completed.

(G) - All pavements, road surfaces, sidewalks, driveways, or curbs, which the Contractor is required to replace or to have replaced, shall, at the expiration of this contract, be in at least as good condition as at the time of awarding the contract.

(H) - All work which the Contractor may do in connection with the opening up or replacing of pavements, road surfaces, sidewalks, driveways, or curbs, as well as the final repaving, shall be done at his expense, in accordance with the rules and requirements of the Street or Sidewalk Departments of the City of Cleveland and in accordance with the additional requirements of these specifications. And the Contractor shall furnish evidence to the Engineer that the work has been completed to their satisfaction.

(I) - Tunneling will not be permitted without permission of the Engineer. In backfilling tunnels, sand shall be used as far as possible and balance of backfilling made with Class C concrete, rammed in place.

(J) - The Contractor shall make all pavement cuts by channeling machine, hand-operated pneumatic tools or by such other methods as will furnish a clean cut in the pavement and pavement base without undue shattering. The use of ball or weight to break the pavement will not be permitted.

(K) - No specific or separate payment will be made for all of this work, but the cost thereof shall be included in the prices bid for the various items of the work to be done under this contract. Restoration as noted above will only be required in areas where the plans do not otherwise propose new construction of pavement sidewalks and curbs, except that temporary restoration in such areas may be required by the Engineer in order to maintain traffic or local access as per 104.04 and 107.10, State of Ohio, Dept. of Highways specification.

### LIST AND INVOICES

The Contractor shall furnish the Engineer with a list, in duplicate, of pieces in each shipment of pipe and specials, giving the serial number and designation of each pipe and special sent at that time.

## CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

### WORK INCLUDED

The Contractor shall furnish, all the materials for and shall properly construct and connect in place, at the locations shown on the drawings or as directed, all cast iron or ductile iron pipe and fittings, including all excavation work the cutting into and removal of existing pipe, backfilling, sand backfill, and repaving, all as required for the proper completion of the work included under this contract.

### CAST IRON PIPE AND FITTINGS

(A) - All pit cast pipe shall be manufactured in all respects in accordance with, and shall meet the requirements of the latest "Standard Specifications for Cast Iron Pipe and Special Fittings" as adopted by the American Water Works Association which specifications except as herein modified are made a part of these specifications.

(B) - In lieu of pit cast pipe above the Contractor will be permitted to furnish either centrifugal or high strength cement lined pipe. The metal shall have a modulus of rupture of not less than 40,000 pounds and a tensile strength of not less than 18,000 pounds and shall be of class noted on the contract drawings. Pipe may be furnished in 12, 16, or 18 foot lengths. The centrifugally cast pipe shall conform to the American Standard Specification A21.6-1952 and all subsequent amendments thereto.

When noted on the contract drawings ductile iron pipe shall be supplied. All ductile iron pipe shall be manufactured in accordance with A.S.A. A21.51 or Federal Specification WWP-421B. All ductile iron fittings shall be manufactured in accordance with A.S.A. A21.10 or AWWA C 100-55. Ductile iron shall have a minimum of 60,000 psi ultimate tensile strength, 40,000 psi yield point and 10% elongation. The chemical analysis shall be as follows: Carbon 3% minimum, Phosphorus .08% maximum and Silicon 2.75% maximum. The thickness of the centrifugally cast ductile iron pipe and cast iron pipe shall conform to the following:

CAST IRON PIPE				DUCTILE IRON PIPE			
SIZE	WORKING PRESSURE	STANDARD THICKNESS	CLASS	SIZE	WORKING PRESSURE	STANDARD THICKNESS	CLASS
4"	250 psi	.44"	25	6"	350 psi	.43"	6
6"	250 psi	.48"	26	8"	350 psi	.45"	6
8"	250 psi	.52"	26	10"	350 psi	.47"	6
10"	250 psi	.56"	26	12"	350 psi	.49"	6
12"	200 psi	.56"	26	16"	350 psi	.52"	6
14"	250 psi	.60"	26				
16"	200 psi	.68"	26				
16"	250 psi	.73"	26				

All fittings, such as bends, tees, crosses, offsets, hydrant branches, etc., shall have bell and bell or bell and spigot ends with cast lead joints, pipe between offsets or bends and on hydrant branches, shall also be of bell and spigot type with lead joints.

(C) - All pipe shall have bell and spigot ends for cast lead joints or a slip-on type joint with compressed rubber ring inserts. All pipe and fittings shall be cement lined.

(D) - Gaskets shall be of rubber or other equally effective protection against uneven distortion of the gasket.

(E) - Where fittings are shown which are not covered by the above specifications, they shall conform to the dimensions and otherwise meet the specifications for the respective type which are carried in the latest revisions to the current edition of the "Handbook of Cast Iron Pipe" by the Cast Iron Pipe Research Association or which are otherwise shown on the contract drawings.

(F) - Wherever changes in line and grade of the main as shown on the drawings are not standard fitting deflections, the Contractor will be permitted to submit details using combinations of standard fittings and small deflections (not to exceed a maximum of one half (1/2) inch joint opening) in the adjoining lengths of pipe. Pipe to be installed with air cocks or drains shall be cast with bosses thereon, drilled and tapped for two (2) inch connections and plugged in the shop with cast iron threaded plugs before shipment.

(G) - Plugs for bell and spigot pipe and caps for lugged pipe shall be furnished with two (2) plugged two (2) inch taps for drain and air cock connections.

(H) - Closure pieces shall be accurately measured and cut in the field and installed using solid type pattern sleeves as shown or as required.

(I) - Tests, inspection, reports and analyses of tests of samples for all materials shall be furnished as set forth elsewhere in these notes.

(J) - Bitumastic coating shall be applied on the exterior of all cast iron pipe and fittings in accordance with AWWA Specifications.

### CEMENT LINING

All cast iron or ductile iron pipe and fittings shall be given a cement mortar lining at the point of manufacture. The lining shall conform to the American Standard Specification A 21.4-1964 and all subsequent amendments thereto.

### MARKING

All cast iron or ductile iron pipe and fittings shall be suitably marked to denote the manufacturer, class, date, weight and other elements of identification.

### LAYING

(A) - Proper and suitable tools and appliances for the safe and convenient handling and laying of the pipes and fittings shall be used. Great care shall be taken to prevent the pipe coating from being damaged particularly on the inside of pipes and fittings and any such damage shall be remedied as directed. All pipes and fittings shall be carefully examined by the Contractor for defects just before laying and no pipe or fitting shall be laid which is known to be defective.

(B) - If any defective pipe is discovered after having been laid, it shall be removed and replaced with a sound pipe or fitting in a satisfactory manner by the Contractor at his own expense. All pipes and fittings shall be thoroughly cleaned before they are laid, shall be kept clean until they are used in the completed work, and when laid, shall conform to the lines and grades given by the Engineer. Open ends of pipes shall be kept plugged with a bulkhead during construction. In no event shall any portion of the damaged pipe be permitted to remain in the line. Any approval stamps found on damaged pipe shall be removed or the pipe broken up for scrap.

(C) - Pipe laid in trench shall be laid to a firm and even bearing for its full length. Precautions shall be taken against floating.

APPROVED DATE JUNE 15, 1972

*Franklin R. Melens*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond Radecki*  
ENGINEER, CITY OF MAPLE HEIGHTS

*John J. Stellan*  
DIRECTOR OF PUBLIC UTILITIES

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*William J. Sweeney*  
ENGINEER OF CONSTRUCTION AND SURVEYS

*William J. Sweeney*  
ENGINEER OF DESIGN

## 2ND HIGH SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS**

SCALE: ERH DATE: 3/10/72  
MADE: WLD DATE: 3/17/72  
TRCD: WLD DATE: 3/17/72  
CKD: ERH DATE: 3/17/72

**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
CONSULTING ENGINEERS  
KANSAS CITY    CLEVELAND    NEW YORK

# WATERWORK NOTES

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CUYAHOGA COUNTY  
CUY.480-21.40

## CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

## VALVES

### LAYING (CONTINUED)

(D) - It is the intention of these specifications to secure first class workmanship in the placing of pipe and accessories. In such details as are not specifically mentioned herein or called for on the drawings, the Contractor will be required to conform with the applicable sections of the latest "Standard Specifications for Laying Cast Iron Pipe" as adopted by the American Water Works Association.

### CUTTING PIPE

Whenever the pipes require cutting to fit into the lines, the work shall be done in a satisfactory manner so as to leave a smooth end at right angles to the axis of the pipe. In no event shall flame cutting be used. When a piece of pipe is cut to fit into the line, no payment will be made for the portion cut off and not used in the line.

### LEAD JOINTS

In jointing all bell and spigot pipe and fittings having lead joints, the spigot of each pipe shall be properly seated in the bell of the next adjacent piece and adjusted so as to give a uniform annular space. The joint shall be made with twisted hard jute and soft pig lead. Before placing the jute, it shall be sterilized either by boiling or by dipping in a concentrated solution of "HTH". The jute shall be twisted and thoroughly driven into the bell, so that the lead, after having been caulked, shall have a depth of two and one-half (2 1/2) inches.

The furnace and melting pot shall be kept near the joint to be poured and each joint shall be made with one pouring. Dross shall not be allowed to accumulate in the melting pot. The joints shall be thoroughly caulked by competent pipe joiners and in such manner as will secure a tight joint without overstraining the iron of the bell.

### PAINTING

After erection, all exposed or damaged coatings and all bolts for lugged joints shall be cleaned and painted with three (3) field coats of Inertol 50 or Bitumastic 50 or approved equal.

### DRAWINGS

(A) - The Contractor shall submit to the Engineer for approval duplicate prints of all shop drawings for pit cast iron pipe and fittings and miscellaneous details which are not standard construction, and are not mentioned in the regular catalogue of the company furnishing the pipe. No work shall be done in the shop until after the drawings have been approved.

(B) - The approval of the drawings by the Engineer shall not relieve the Contractor of any of his obligations in connection with this contract.

### MEASUREMENT

The number of linear feet of cast iron pipe and ductile iron pipe and connections to be paid for shall be the actual number of linear feet furnished and placed in accordance with these specifications as measured along the axis of the piping including fittings and valves connected up in place. For connections between new and existing mains, measurement shall be the distance from centerline to centerline of mains and the actual length of existing main ordered to be removed to make the connection.

### PAYMENT

The footage measured as provided above shall be paid for at the contract price bid per linear foot for "Item Special - Water Main" Classified as to size and type, which price and payment shall constitute full compensation for excavating and for furnishing, hauling, placing, cutting into and connecting the pipe, pipe bends, plug and clamps at dead ends, concrete piers, sheeting and bracing, sand backfill, water used for compaction, incidental concrete, the removal of all surplus excavation and discarded material, repaving, and for all labor, equipment, tools materials and incidentals necessary to complete this item, except for the items specifically listed as separate pay items.

The chlorination of the newly laid water mains by the City of Cleveland, Division of Water, which is described under "General - Additional Work - (C) Chlorination", will be at no expense to the Contractor.

### WORK INCLUDED

The Contractor shall furnish all materials for and shall properly set in place and connect at the locations shown on the drawings or as directed, all air cocks, drain valves, gate and inserting valves of the various sizes and types specified or ordered, all as required for the proper completion of the work included under this contract. Inserting valves shall be installed by the Inserting Valve Supplier. The Contractor shall pay all costs and charges for the insertion. The work shall be under the supervision of The Division of Water and Heat, and shall meet the requirements of Items "Testing Mains", "Lead Joints", and "Detailed Drawings" of these specifications.

### AIR COCKS

All air cocks or air vent valves shall be 2-inch brass angle type globe valves. 2-inch air cocks shall be equal in all respects to the Farnan "Cleveland Standard" Brass Air Vent Valve No. W-4695 as manufactured by the Farnan Brass Works.

### GATE VALVES AND INSERTING VALVES

(A) - Type of Valves: The gate valves shall be manufactured in full compliance with the Standard Specifications for Gate Valves for Ordinary Water Works Service of the American Water Works Association AWWA C-500-61 or latest revision thereof and in addition shall comply with the following supplementary requirements: All gate valves shall be of the non-revolving double disc parallel seat bottom wedge or side wedge type. All gate valves 20 inches and over in size shall include by-pass valves attached thereto. In opening or closing the valve, the gates shall be forced ascend or descend by reason of the thrust exerted upon them by the valve stem nut; this thrust being generated by the rotation of the valve stem. In closing the valve, the discs when opposite the ports, shall be pressed firmly against the body seats by wedges or some other device equally suitable to the Engineer.

(B) - Valves with Stationary Stems: All gate valves, unless otherwise ordered, shall be made with single, non-rising stems.

(C) - Hub Ends: The dimensions of the bells on valves up to and including 24 inches in diameter shall conform to those for Class D pressure fittings, as required by AWWA C100. On valves 30 inches and larger in size, the bell dimensions shall be for the classes ordered.

(D) - Victaulic Ends: Victaulic ends shall conform to the dimensions given on the contract drawings.

(E) - Flange Ends: The end flanges of flanged end gate valves shall conform in dimensions and drilling to the "American 125 pound Cast Iron Flange Standard", unless otherwise ordered.

(F) - Screw Ends: All 2-inch gate valves and under shall be made with screw ends, unless otherwise specified.

(G) - Vertical and Horizontal Valves: All gate valves, 16 inches and under, shall be constructed to work vertically. Valves over 16 inches shall be constructed to work horizontally.

(H) - By-Passes: By-passes with gate valves shall be provided on valves 20 inches and larger. The by-passes shall be located on or below the horizontal centerline of the valves. By-pass valves shall be of the same size as the by-pass and shall conform to the requirement of these specifications for the specific valve used. The size requirements of by-passes shall be as follows: 20-inch valves shall be provided with 3-inch by-passes; valves 24-inches to 30-inches, inclusive, shall be provided with 4-inch by-passes; valves 36-inches to 42-inches, inclusive, shall be provided with 6-inch by-passes; 48-inch valves shall be provided with 8-inch by-passes.

(I) - Flanges: When flanged valves are required, the flanges shall be faced and drilled. Bolt holes shall be spot faced on the back when necessary to secure an even bearing. All bolt holes shall be of the size shown on the drawings to be submitted and approved, shall be accurately drilled from templates, spaced equal distances apart and shall straddle horizontal and vertical axis, all as shown on the drawings. The dimensions and drilling of all end flanges shall conform to the spacing indicated on the drawings which shall be the "American 125 pounds Cast Iron Flange Standard." Flanges shall be plain face with a smooth finish.

(J) - Marking: All gate valves 3 inches and over shall have the identity of maker, size and the year when made and also the letters "C. W. D." cast upon its body or dome in raised letters.

(K) - Stuffing Boxes: The stuffing box on each gate valve 3 inches or over, must be separate from the dome and fastened to it by bolts. For 2 inch valves and under, the stuffing boxes may be formed in the dome of the valve. When required by the Director, valves 16 inches and smaller, shall be furnished with "O" ring type seal plate. The seal plate shall be fitted with at least two (2) "O" rings, the lower "O" ring serving as the pressure seal and the upper "O" ring as a combined dirt and moisture seal. The "O" rings shall be Precision Rubber Corporation Quality Compound No. 122-70, or approved equal.

(L) - Seat and Gate Rings: Dimensions of the bronze seat and gate rings shall be proportioned to fit the test pressure required, and shall meet the approval of the Engineer. The rings shall be firmly secured in place by an approved device, which will prevent them from working loose, particularly when the valve is left partly open. Dimensions of the bronze seat and gate rings for gate valves shall be not less than that specified in the following tables. Body seat rings shall be made of Grade One Bronze. Gate seat rings shall be made of Grade Five Bronze.

BODY AND GATE RINGS  
(DIMENSIONS IN INCHES)

VALVE SIZE	BODY RINGS			GATE RINGS		
	FACE	DEPTH	THICKNESS AT BASE OF THREADS	FACE THICKNESS	FACE THICKNESS	DEPTH
3"	9/16	9/16	3/16	3/16	5/8	1/4
4"	9/16	9/16	3/16	3/16	5/8	5/16
6"	11/16	9/16	3/16	5/32	11/16	5/16
8"	3/4	5/8	3/16	7/32	13/16	5/16
10"	3/4	5/8	3/16	7/32	13/16	11/32
12"	7/8	5/8	7/32	7/32	1	11/32
16"	1-1/8	3/4	1/4	9/32	1-1/4	1/2
20"	1-3/8	1-1/8	5/16	3/8	1-3/8	5/8
24"	1-3/8	1-1/8	5/16	3/8	1-3/8	5/8
30"	1-1/2	1-1/4	3/8	7/16	1-1/2	3/4

SIDE WEDGE						
VALVE SIZE	FACE	DEPTH	THICKNESS AT BASE OF THREADS	FACE THICKNESS	FACE THICKNESS	DEPTH
3"	13/32	1/2	3/16	3/16	ALL BRONZE DISC	
4"	7/16	9/16	3/16	3/16	1/2	21/64
6"	1/2	11/16	9/32	1/4	5/8	21/64
8"	17/32	11/16	9/32	1/4	11/16	21/64
10"	5/8	13/16	3/8	5/16	13/16	21/64
12"	5/8	13/16	3/8	5/16	13/16	21/64
16"	3/4	1	15/32	3/8	7/8	13/32
20"	7/8	1-5/16	17/32	7/16	1	17/32
24"	1-1/16	1-3/8	21/32	1/2	1-3/16	19/32
30"	1-5/16	1-1/2	25/32	1/2	1-7/16	19/32

SCALE: 1"=10' HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE: CEH DATE: 3/10/72 CONSULTING ENGINEERS  
TRCD: HEP DATE: 3/10/72  
CKD: ERH DATE: 5-17-72 KANSAS CITY CLEVELAND NEW YORK

APPROVED: \_\_\_\_\_ DATE: JUNE 15, 1972  
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**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS**

# WATERWORK NOTES

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CUY.480-21.40

## VALVES

### GATE VALVES AND INSERTING VALVES (CONTINUED)

(M) - Valve Stem: All gate valves shall be of the single screw type. The stems shall be of Grade Three Bronze. The threads of stems and stem nuts shall be of Acme, modified Acme or one-half V Type. If requested, a manufacturer's certificate of test shall be furnished with all bronze stems. All stem collars shall be cast integral with stems. The diameters of stems at the base of the thread shall be not less than those shown below. The stem opening and thrust-bearing recess shall be Grade One, bronze bushed. The number of threads per inch shall be as given below.

SIZE OF VALVE INCHES	DIAMETER OF STEM AT BASE OF THREAD - INCHES	NO. OF THREADS PER INCH
2	0.469	4
3	0.859	4
4	0.859	3
6	1.000	3
8	1.000	3
10	1.125	3
12	1.188	3
16	1.438	3
20	1.896	3
24	1.980	2
30	2.480	2

(N) - Wrench Caps: The wrench caps and retaining nuts on heads of valve stems and pinion shafts shall be of Grade Three Bronze. On valves 24 inches and over, wrench caps shall be 2 inches square and 2 inches deep. On valves 4 inches to 20 inches, inclusive, they shall be 1-3/4 inches square on top, 1-7/8 inches square at base, and 1-3/4 inches deep. On 3 inch valves and under: they shall be 1-1/4 inches square on top, 1-3/8 inches square at base and 1-1/2 inches deep. Machined wrench caps for valves 3 inches to 48 inches inclusive shall be fitted to a machined square stem or pinion shaft and held in place by a retaining nut. Wrench caps shall have a cut-away skirt to permit easy access to gland bolts.

(O) - Valves are to open clockwise except those 2 inches and under. All gate valves 3 inches and over including by-pass valves, shall be made to open by turning in a clockwise direction. All valves are to be so made that they can be easily operated.

(P) - Facing of Gates: All discs or gates and threads for seat rings in the body shall be machined true and a groove or grooves shall be machined in each disc or gate for the reception of the face ring. The disc and seat rings shall be securely and rigidly attached to the discs or body seats in a manner approved by the Engineer, and the rings are to be finished to a true surface.

(Q) - Rollers and Scrapers: In all valves 20 inches in diameter and larger designed to lie horizontally, each gate or disc shall be provided with two bronze rollers travelling on bronze-faced tracks and provided with suitable bronze scrapers or two stainless steel rollers travelling on stainless steel-faced tracks and provided with suitable stainless steel scrapers. The thickness of the facing of the tracks shall be not less than 1/4 inch. The bronze shall be Class 1 and the stainless steel shall be ASTM A 276-55, Type 302.

(R) - Valve Guides: All valves 20 inches in diameter and larger shall be provided with guides or tracks which shall be made straight and true, and all irregularities must be machined off. The guides or tracks of horizontal valves shall be substantially faced with a minimum of 1/4 inch of Grade One Bronze, or stainless steel ASTM A 276-55, Type 302, satisfactory to the Engineer, securely fastened and planed off smooth and true.

(S) - Gearing: All valves 20 inches in diameter and larger shall be equipped with enclosed cut tooth steel gears. Gears, shafts and bearings shall be such as to provide easy operation without bending or twisting.

(T) - Dowel Pins: All gear valves shall have two dowel pins set in the flanges connecting the dome and body. Size of the pins to be shown in plans.

(V) - Grease Cases: All valves 20 inches in diameter and larger shall have watertight grease cases installed. The grease cases shall be of the extended type and shall be made of cast iron conforming to ASTM specifications, serial designation A 126, Class B or any subsequent amendment thereto. Bearing surfaces for valve stem and pinion shaft shall be bronze bushed with Grade One Bronze. The grease cases shall be securely bolted to the valve bonnet through a heavy cast iron yoke. The yoke shall be of sufficient length to provide space for repacking valve and grease case stuffing boxes. All grease cases shall be provided with a removable cover securely bolted in place to allow easy access to the gears. There shall be also provided convenient filling and draining plugs and sufficient oil to fully submerge the pinion gear. The valves shall be delivered with the grease cases filled with the proper oil as recommended by the manufacturer.

(W) - Indicators: All valves 20 inches in diameter and over, shall be equipped with indicators denoting the positions of the gate. The moving part and bearings to be of bronze or bronze-lined.

(AA) - Bronze Parts: The stems, stem nuts, operating nuts, retaining nuts, disc and seat rings, shall be of solid bronze. Other parts such as wedges, glands, thrust bearings, gear spindles, rollers, scrapers and tracks, and all other parts coming together in operation, shall be of bronze, or substantially lined with bronze or stainless steel of a thickness no less than 1/4 of an inch and as shown on drawings submitted and approved. All 2 inch valves and under shall be made entirely of bronze, except handwheels which shall be made of malleable iron.

(BB) - Cast Iron Parts: The bodies, covers, discs, frames, etc., of all gate valves 3 inches and over, shall be of cast iron.

(CC) - Waterway Opening: With the valve open, an unobstructed waterway shall be afforded, the diameter of which is not to be less than the full nominal diameter of the valve.

### MATERIAL SPECIFICATIONS

(A) - Strength of Valves: The gate valve shall be designed for 150 lb. working pressure and shall withstand an internally applied hydrostatic pressure at all points of at least 300 lbs. per square inch. A factor of safety of not less than 10 shall be used on the design. Should tests develop any weakness, the valves from that design shall be rejected and a new design made.

(B) - Reinforcement at Flanges: All valve flanges shall be reinforced by fillets in accordance with the manufacturer's practice proven satisfactory in actual service.

(C) - Joints: All joints of the valves shall be faced true in a lathe or planer, and put together with a gasket of some material acceptable to the Engineer.

(D) - Bolt Holes: All bolt holes shall be accurately drilled from templates and spaced equal distances apart.

(E) - Bolts and Nuts: All bolts and nuts shall be made of silicon bronze (A.S.T.M. B 98-55, Alloy A) or stainless steel (A.S.T.M. A 276-55, Type 302).

(F) - Parts to be Interchangeable: All parts of valves of the same size and make must be perfectly interchangeable and all work must be done in a thorough and workmanlike manner.

(G) - Castings: All castings, whether of bronze, iron or steel, shall be sound and smooth without cold shuts, wells, lumps, scabs, blisters, sand holes or other imperfections, and shall be made in accordance with the best modern foundry practice to obtain castings of the best quality and of uniform thickness. No welding, plugging or filling of holes or other defects will be permitted. For parts whose thickness is less than one (1) inch, casting being thinner than the specified thickness by .06 of an inch or more shall be rejected, and for parts whose thickness is one (1) inch or more, castings being thinner than specified by .08 of an inch or more shall be rejected.

(H) - Bronze Parts: (1) Bronze for parts, other than those listed below, shall be Grade One. (2) Valve stems, pinion shafts, stem nuts, wrench caps and retaining nuts shall be made of Grade Three bronze. (3) Disc rings shall be made of Grade Five bronze.

(I) - Tests of Bronze: (1) If requested a manufacturer's certificate of test shall be furnished with all bronze stems. (2) All stems of 16-inch gate valves and over, shall have a prolongation on one end of each stem, of the same dimensions and cross section as the stem, and of sufficient length to enable the cutting of specimens parallel with the longitudinal axis of the stem. Specimens shall be cut from prolongations one-half way between surface and central axis. Other methods of test will be considered by the Director, but must be submitted in detail with the bid. (3) For all stems of gate valves smaller than 16 inches, not less than two test pieces shall be cast from the molten metal of each heat, from which valve stems are being made. (4) All stems made from bronze showing less strength, elongation and or ductility than above required shall be rejected. (5) Tests of valve stems, or the various parts of any valve may be made at any time before or after delivery, and if found to be deficient in strength of unsatisfactory to the Director, the whole lot or shipment may be rejected.

(J) - Cast Iron: (1) Quality: Cast Iron shall conform to ASTM specifications A 126, Class B, or latest revision thereof. All iron castings shall be tough and without brittleness, such as may be cut drilled and chipped by hand with due ease. A blow from a hammer shall produce an indentation on the edge of the casting without flaking the metal. (2) Tests: Bars from the molten metal from which the valves are being made shall be tested at such time and in such manner as the Engineer may require. The requirements of A.S.T.M. Specifications A 126 shall govern testing procedures to determine the physical and chemical characteristics of the iron castings. Should the result obtained from the bar tested fail to show that the cast iron meets the requirements herein specified, the entire melt will be rejected. Test bars, however, whose failure is due to inherent defects shall not be considered. All valves made from iron showing less strength than called for in the A.S.T.M. Specifications shall be rejected.

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE EPH DATE 3/10/70 CONSULTING ENGINEERS  
TRCD HLD DATE 3/11/70  
CKD ERH DATE 5/17/72 KANSAS CITY CLEVELAND NEW YORK

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

Frank R. ...  
ENGINEER, CITY OF GARFIELD HEIGHTS

Richard ...  
ENGINEER, CITY OF MAPLE HEIGHTS

Raymond ...  
DIRECTOR OF PUBLIC UTILITIES

Richard ...  
COMMISSIONER OF WATER AND HEAT

Richard ...  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING

David J. ...  
ENGINEER OF CONSTRUCTION AND SURVEYS

William ...  
ENGINEER OF DESIGN

## 2 ND HIGH SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS

# WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
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## VALVES

### MATERIALS SPECIFICATIONS (CONTINUED)

(K) - Quality of Materials.

Grade One Cast bronze shall conform to the properties of A.S.T.M. B 62.

Grade Two cast bronze shall conform to the properties of A.S.T.M. B 132,

Alloy A.

Grade Three cast bronze shall conform to the properties of A.S.T.M. B 132,

Alloy B.

Grade Four rolled bronze shall conform to the properties of A.S.T.M. B 21,

Alloy A (one-half hard).

Grade Five bronze shall be sufficiently malleable to conform to dove-tailed grooves when peened or rolled, and shall have a minimum compressive strength, without deformation, of 4,000 PSI, and shall have the following chemical composition:

Copper, per cent	91.0
Tin, per cent	0.0
Zinc, per cent	5.0
Lead, per cent	4.0

Silicon Bronze shall conform to A.S.T.M. Specifications B-98, Alloy A.

Stainless Steel shall conform to A.S.T.M. Specifications A-276, Type 302.

Cast Iron shall conform to A.S.T.M. Specifications A-126, Class B.

(L) - Other Materials: All other materials used in the manufacture of these valves and not specified in the specifications shall be of the best quality of their kinds, and subject to inspection, tests, and approval by the Engineer.

(M) - Chemical Analysis: Chemical analysis of the material used shall be furnished by the Contractor whenever required by the Engineer.

(N) - Cleaning of Castings: All iron castings shall be thoroughly cleaned on the outside and inside surfaces, and protected from rain or moisture until they are painted.

(O) - Hydrostatic Tests at Shop: All gate valves shall be tested in the shop by hydrostatic pressure, by closing the valve and applying the required test pressure in the body and dome of the valve as specified below.

3" and under	300 P.S.I. - No time requirement
4" through 12"	400 P.S.I. - No time requirement
14" through 20"	300 P.S.I. for 15 minutes, drop pressure to 150 P.S.I., then elevate again to 300 P.S.I. for 15 minutes - a total of 1/2 hour
24" through 48"	300 P.S.I. for 1/2 hour, drop pressure to 150 P.S.I., then elevate again to 300 P.S.I. for 30 minutes - a total of 1 hour.

This is a modification of section 29 of the "Standard Specifications AWWA Designation C-500-61". All leaks, flaws or other defects developed in making these tests shall be corrected to the satisfaction of the Engineer or the entire piece shall be rejected. After testing, all valves shall be thoroughly drained. All equipment for testing and all tests shall be made at the Contractor's expense.

(P) - Performance Tests: Each valve shall be operated in the position that it will assume in service and for the full length of gate travel in both directions, to demonstrate the free and perfect functioning of all parts in the intended manner. Any defects of workmanship shall be corrected and the test repeated until satisfactory performance is demonstrated.

## VALVES

### PLACING AND TESTING

(A) - All valves shall be set accurately and carefully to the lines and grades given. All connections to pipe shall have the necessary flanged, lead or screwed ends as required under the following items: "Cast Iron Pipe and Fittings," "Furnishing and Setting six (6) inch Fire Hydrants," and "2-Inch Galvanized Black Iron Pipe and Brass Pipe" and as shown on the valve schedule.

(B) - After the valves are set in place and ready to operate, the Contractor shall test them under working pressure and conditions herein specified under "General - Testing Mains"; any valve found to leak shall be made water-tight and if found to be of faulty design, shall be satisfactorily repaired or replaced by the Contractor.

### PAINTING

(A) - Iron body valves shall either be dipped in asphalt paint and all bronze parts cleaned, or all iron castings shall be painted inside before assembling with two (2) coats of approved paint.

(B) - After erection, all exposed metal surfaces of valves except brass or bronze shall be painted with (2) field coats of coal tar pitch paint using Inertol 66 or Koppers Bitumastic 50 or approved equal.

### INSPECTION

The Engineer or his authorized designate will inspect the material and work done, as the interests of the City or State may require. He shall have unrestricted access to the Contractor's plant, and to all parts of the work, and other places at which the preparation of the material and the construction of the different parts of the work to be done under these specifications are carried on, and he shall receive all facilities and assistance to carry out his work of inspection and testing in a manner satisfactory to the Engineer. Such inspection shall not relieve the Contractor from any obligation to perform said work strictly in accordance with the specifications, or any modifications thereof as herein provided, and work not so constructed shall be removed and made good by the Contractor at his own expense.

### DRAWINGS

(A) - Prior to the manufacture of any valves, the Contractor shall submit for the approval of the Engineer and Director of Public Utilities of the City of Cleveland complete working, detail, and dimension drawings showing thicknesses and kinds of material, and similar information.

(B) - One print each of the drawings submitted will be returned with the criticisms or approval of the Engineer. In case the drawings are not approved, the Contractor shall again send for approval duplicate revised prints of the drawings to take care of the criticisms noted, and after the drawings have been finally approved, the Contractor shall again furnish to the Engineer fourteen (14) prints, six of which shall be furnished to the Director of Public Utilities of the City of Cleveland. No work shall be done in the shop until after the drawings have been finally approved.

### PAYMENT

The Unit Price stipulated for each "Item Special - Valves" classified as to size and type, shall include the furnishing, placing, testing and painting of the air cock, drain, gate, check and inserting valves, including by-pass valves, operating nuts and other accessories and appurtenances and the furnishing of all materials, labor, tools, and appliances necessary to complete the work as specified or as shown.

### NOTE:

Air Cock is included for payment in "Item Special - 2" Air Cock Complete."  
Drain Valve is included for payment in "Item Special - 2" Drain Complete."  
Drain Valve is included for payment in "Item Special - 4" Drain Complete."

## BRICK AND PLAIN CONCRETE MASONRY

### WORK INCLUDED

Under these items the Contractor shall furnish all necessary labor, materials, tools and equipment for the construction, complete, of all miscellaneous masonry structures and including all water main drain and pitometer vaults, access and anchorage manholes, valve chambers, anchors, piers at pipe bends and under line valves, floors for drain and valve vaults, and other appurtenant work together with the hauling, mixing, placing, forming, scaffolding, sheeting and bracing, grouting, plastering, curing, etc., all as specified, required or shown on the contract drawings.

### BRICK AND MASONRY MATERIAL

The material furnished by the Contractor for the various kinds of masonry construction to be constructed shall conform to the following specifications:

(A) - All brick furnished and used shall be No. 2 shale brick and shall comply with the requirements for "Grade SA" ASTM C 32.

(B) - Portland cement shall conform to the requirements of 701.04 (ASTM C 150 Type 1) State of Ohio, Dept. of Transportation Construction and Material Specifications.

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE E.P.H. DATE 3/10/70 CONSULTING ENGINEERS  
TRCD. H.P. DATE 3/11/70  
CKD. E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

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2 ND HIGH SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS

# WATERWORK NOTES

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## BRICK AND PLAIN CONCRETE MASONRY

### BRICK AND MASONRY MATERIAL (CONTINUED)

(D) - Fine Aggregate for Mortar or Grout shall conform to the requirements of 703.03 State of Ohio, Dept. of Transportation Construction and Material Specifications.

(E) - Aggregate for Portland Cement Concrete shall conform to the requirements of 703.02 State of Ohio, Dept. of Transportation Construction and Material Specifications.

(F) - All water shall be clean and accurately measured for each batch of concrete.

(G) - All plain concrete shall be State of Ohio, Dept. of Transportation Construction and Material Specification 499 Class "C".

(H) - All cement mortar shall be mixed in the proportion of one (1) part of cement to three (3) parts of sand, except the mortar for brick catch basins and sewer manholes which shall be 1 to 2 mix.

### MANHOLE CONSTRUCTION FOR VALVE CHAMBERS AND DRAIN VAULTS

(A) - All brick manholes, brick necks and extensions, and temporary extensions shall be built in accordance with the contract drawings.

(B) - The walls of manholes shall be built of No. 2 shale brick laid in 1:3 Portland Cement mortar, with brick arranged radially as headers, forming a wall nine (9) inches thick. In deep manholes, the wall shall be thirteen (13) inches thick below a point 12 feet from the surface. All of the brick composing said manholes shall be laid in full mortar beds and joints, with no mortar joints appearing on the inner surface of the manhole exceeding three-eighths ( $\frac{3}{8}$ ) inches thick.

(C) - The top of the walls of manholes shall be properly leveled off with mortar so as to form a flat surface upon which the cast iron manhole ring is to rest, and the manhole shall be built to proper height as indicated by the contract drawings.

(D) - The entire outer surface of all brick manholes shall be plastered with a smooth coating of 1:3 Portland cement mortar, at least one-half ( $\frac{1}{2}$ ) inch thick.

### MANHOLE CONSTRUCTION FOR ACCESS MANHOLES AND ANCHORAGES, METER AND PITOMETER VAULTS

(A) - All plain concrete masonry construction shall be built in accordance with the contract drawings.

(B) - Temporary brick masonry extension for Access Manhole and Anchorage Type "A" shall be built in accordance with the contract drawings.

### PAYMENT

Payment shall be made at the contract unit price bid per each "Item Special" - "Meter Vault", "Drain Vault", "Pitometer Vault", "Access and Anchorage Manhole Type A", "Access Manhole Type B", "Valve Chamber" and "Temporary Manhole Extension" complete and accepted in place. Payment for brick or plain concrete masonry is to be included in the unit price bid for the item in which it is used.

Payment for concrete anchors and piers is to be included in the unit price bid for "Item Special - Water Main".

Payment for concrete anchors and piers is to be included in the unit price bid for "Item Special - Water Main", or "Item Special - Plugging Water Mains and Branches".

## MISCELLANEOUS METAL WORK

### WORK INCLUDED

(A) - The Contractor, shall furnish and install all miscellaneous metal work which is required for the proper completion of the work included under this contract and is not specifically included under the other items of these specifications.

(B) - In general, the work shall include the furnishing and installing of manhole frames and covers, manhole steps, valve boxes, extension stems and brace, structural members, bronze bolts, and other similar items required for the proper completion of the work.

### MATERIALS

All castings shall conform to the requirements of Item 604 of the State of Ohio, Dept. of Transportation Construction and Material Specifications, except that the cast iron shall be Class No. 30B. All structural steel shall meet the requirements of the ASTM Specifications A 7-46. All bronze bolts and nuts shall conform to the U. S. Standard sizes, and shall be clean cut and have well fitted threads. All bronze bolts and nuts shall be of Tobin or Manganese Bronze, or of similar approved materials.

### CLEANING AND TESTING

All castings shall be thoroughly cleaned and subjected to a careful hammer test. No castings shall be coated unless clean and free from rust, and approved in these respects by the Engineer or his authorized inspector immediately before being dipped.

### COATING

Each casting shall be sprayed or brushed inside and out with one coat of asphaltic compound varnish. The varnish shall be made of high grade asphalt fluxed and blended with properly treated drying oils and thinned to a proper consistency with a volatile solvent. The varnish shall be made to comply with Federal Specification 77-V-51a or Joint Army-Navy Specification JAN-P-450. Other methods of coating and types of coating material shall be subject to the approval of the Engineer, in addition to the shop coat the castings shall receive two (2) coats of approved paint.

### INSPECTION

The Engineer or his authorized representative, shall have the right to inspect the material and work done, as the interests of the City or State may require. Such inspection shall not relieve the Contractor from any obligation to perform said work strictly in accordance with the specifications, or any modification thereof, as herein provided, and work not so constructed shall be removed and made good by the Contractor, at his own expense. All manhole rings and covers must be sound and shall conform to these specifications, and any defective castings which may have passed the inspector at the works, or elsewhere, shall be at all times liable to rejection when discovered, until the date of final payment under this contract.

### STEPS AND LADDERS

Ductile iron steps and ladders of the size and shape shown on the contract drawings shall be built into the brick and concrete masonry of the manholes as indicated on the drawings.

### RIMS AND COVERS

(A) - All cast iron manhole rims and covers of the forms, dimensions and details shown on the contract drawings shall be furnished and installed as directed.

(B) - The rims shall be properly set in place in a full bed of mortar or poured monolithic in the masonry, at such elevation as to make the top of the rim conform to the finished surfaces of the structures or the finished grade as established by the Engineer.

### VALVE BOXES AND COVERS

The Contractor shall furnish and install, over each vertically set valve at the locations shown on the drawings, or as required, valve boxes and covers of the types and sizes indicated on the contract plans. These shall be carefully located over the valve nuts, and shall be set plumb and true, to elevation as required.

### DETAILED DRAWINGS

Complete detailed drawings of miscellaneous metal work shall be submitted to the Engineer for approval, prior to the manufacture of any work to be furnished under this item, in accordance with these specifications.

### PAINTING

All miscellaneous metal work not galvanized shall be thoroughly cleaned and given three (3) field coats of coal tar pitch, using Inertol 50 or Bitumastic 50, or approved equal.

### MEASUREMENT

The weight of miscellaneous metal work to be paid for shall be the number of pounds of metal work actually furnished placed in accordance with these specifications and the detailed drawings approved by the Engineer. In computing the weights, if not determined by weighing, one (1) cubic foot of cast iron shall be assumed to weigh four hundred and fifty (450) pounds and one (1) cubic foot of steel shall be assumed to weigh four hundred and ninety (490) pounds.

### PAYMENT

The unit price stipulated per pound for "Item Special - Miscellaneous Metal Work", shall include the furnishing, erecting, machining, fitting, adjusting, bolting, cleaning and painting of all miscellaneous metal work, and the furnishing of all labor, materials, tools and appliances necessary to complete the work as specified or as shown.

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE E.R.H. DATE 3/10/70 CONSULTING ENGINEERS  
TRCD. H.W. DATE 3/11/70  
CKD. E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

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**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS

# WATERWORK NOTES

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CUY. 480-21.40

## FIRE HYDRANTS

### ITEM SPECIAL - FURNISHING AND SETTING 6" FIRE HYDRANT

#### WORK INCLUDED

The Contractor shall furnish all hydrants, caulking material, labor, tools and equipment for and shall properly connect at the location shown on the Contract Drawings, 6" hydrants, complete, as required for the proper completion of the work included under this contract.

#### HYDRANTS

The 6" hydrant details shown in the plans is a City of Cleveland Standard and shall conform to the City's specifications on file at 1201 Lakeside Avenue, Cleveland, Ohio, 44114.

#### SETTING

(A) - General Location: The hydrant shall be located in a manner to provide complete accessibility, and in such manner that the possibility of damage from vehicles or injury to pedestrians will be minimized.

(B) - Location Regarding Curb Lines: When placed behind curb the hydrant barrel shall be set so that center of barrel will be no less than 3 feet from the gutter face of the curb except by consent of the Engineer.

(C) - Location Regarding Sidewalk: When set in the lawn space between the curb and the sidewalk, or between the sidewalk and the property line, no portion of the hydrant or nozzle cap shall be within 6 inches of the sidewalk.

(D) - Position of Nozzles: The hydrant shall stand plumb, with the nozzles pointing toward the road and at an angle of forty-five degrees therefrom. Where hydrant branch piping is parallel with, or not at right-angles to the curb, the Contractor shall release swivel head bolts and adjust the hydrant nozzles to face the road at the proper angle. A hydrant without swivel heads will be adjusted by the City where necessary to correct the angle on nozzles. The elevation shall conform to the established grade with tops of frost casing at least four (4) inches above grade.

(E) - Connection to Main: The hydrant shall be connected to the main pipe with a cast iron branch controlled by the independent gate valve of the same size as hydrant, except as otherwise directed.

(F) - Drainage at Hydrant: Drainage shall be provided at the base of the hydrant by filling around the elbow with coarse gravel or crushed stone to at least six (6) inches above the waste opening. Wherever a hydrant is set in rock, clay or other impervious soil, the trench shall be widened and deepened on each side of the hydrant base and the space shall be filled compactly with coarse gravel or broken stone mixed with coarse sand of sufficient quantity to absorb all water to be drained from the hydrant when the valve is closed.

(G) - Anchorage for Hydrant: The hydrant shall be set on a stone slab or a similar foundation and the base of the hydrant and the hydrant tee shall be well braced against unexcavated earth at the end of the trench with concrete backing, or it shall be tied to the pipe with suitable rods or clamps as directed by the Engineer.

(H) - Cleaning: The hydrant shall be thoroughly cleaned of dirt or foreign matter before setting.

#### PAYMENT

(A) - The unit price stipulated to be paid for each "Item Special - Furnishing and Setting 6" Fire Hydrant" shall include furnishing hydrant, setting, testing, painting, excavating, sheeting and shoring, backfilling, and the furnishing of all labor, material, tools and appliances necessary to complete the work as specified or as shown.

(B) - The cast iron pipe will be paid for under "Cast Iron Pipe and Fittings".

(C) - The valves will be paid for under "Valves".

(D) - The valve boxes will be paid for under "Miscellaneous Metal Work".

### ITEM SPECIAL - FIRE HYDRANT RELOCATED

#### WORK INCLUDED

The Contractor shall remove the hydrant and properly set in place and connect at the locations shown on the drawings or as directed by the Engineer. This shall include all excavating, furnishing and installing cast iron pipe and fittings, gate valve, and valve box, backfilling, testing, seeding and sodding, and repaving required for the proper completion of the work.

#### MATERIALS

All hydrants to be relocated must be in good condition. All other materials and appurtenances necessary for the proper completion of this Item shall be of the kind and grade called for in these notes for the particular kind of construction in which the materials are to be used.

#### CONSTRUCTION METHODS

The construction methods shall conform to the requirements of the "Item Special - Furnishing and Setting 6" Fire Hydrant" as set forth elsewhere in these notes.

#### PAYMENT

(A) - The unit price stipulated to be paid for each "Item Special - Fire Hydrant Relocated" shall include removing, setting, reconnecting, testing, painting, excavating, sheeting and shoring, backfilling, seeding and sodding and repaving, and furnishing of all labor, material, tools, and appliances necessary to complete the work as specified or as shown.

(B) - The cast iron pipe will be paid for under "Cast Iron Pipe and Fittings".

(C) - The Valves will be paid for under "Valves".

(D) - The Valve Boxes will be paid for under "Miscellaneous Metal Work".

### ITEM SPECIAL - REMOVE AND RESET FIRE HYDRANT COMPLETE

#### WORK INCLUDED

The Contractor shall remove the hydrant, extend the existing or furnish new hydrant branch pipe and reset and connect the hydrant at the locations shown on the drawing or as directed by the Engineer. This shall include all excavating, cast iron pipe and fittings furnished and installed, removing and resetting and connecting the fire hydrant, backfilling, testing, seeding and sodding and pavement restoration required for the proper completion of the work.

#### MATERIALS

All hydrants to be reset must be in good condition. All other materials and appurtenances necessary for the proper completion of this Item shall be of the kind and grade called for in these notes for the particular kind of construction in which the materials are to be used.

#### CONSTRUCTION METHODS

The construction methods shall conform to the requirements of the "Item Special - Furnishing and Setting 6" Fire Hydrant" as set forth elsewhere in these notes.

#### PAYMENT

The work included in the Item shall be paid for at the contract unit price bid for each "Item Special - Remove and Reset Fire Hydrant Complete", classified as to size which price and payment shall constitute full compensation for the completion of this work in accordance with the provisions of these specifications and the furnishing of all labor, material, equipment, tools and appliances.

### FIRE HYDRANT ABANDONED

Where fire hydrants are indicated to be abandoned (not indicated for removal), no work is required, the hydrant becomes the property of the Contractor and shall be disposed of as he sees fit. The cost of such disposal shall be included in the price for Item 203 Excavation not including Embankment Construction, as per plan.

### REMOVED ITEMS

All materials consisting of pipe and fittings, valves, fire hydrants, valve boxes, and vault covers which are indicated for removal by the Contractor shall be come the property of the Contractor and be removed and disposed of by him.

SCALE: 1" = 10'  
MADE BY: E.R.H. DATE: 3-11-70  
TRCD BY: H.L.D. DATE: 3-12-70  
CKD BY: E.R.H. DATE: 5-17-70  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

APPROVED: DATE: JUNE 15, 1972

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ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS

**PRESTRESSED CONCRETE CYLINDER PIPE**

# WATERWORK NOTES

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**WORK INCLUDED**

The Contractor shall furnish all the materials, labor, tools and equipment for and shall properly construct and connect in place the water main at locations shown on the drawings, or as directed, using prestressed concrete cylinder pipe and fittings and including all excavation work, backfilling, sand backfill, repaving, concrete cylinder fittings, cast iron pipe and fittings, Victaulic and Dresser Couplings, etc., all as required for the proper completion of the work included under this contract.

**DEFINITIONS**

Whenever the words "concrete pipe" or "prestressed concrete cylinder pipe" are used, they shall refer to and mean "prestressed steel cylinder reinforced concrete pressure pipe".

**PRESTRESSED CONCRETE CYLINDER PIPE AND FITTINGS.**

(A) All pipe to be furnished under this item shall be manufactured to conform in all respects to the American Water Works Specifications, Designation C301-64, for prestressed concrete cylinder pipe, except as herein noted. All pipe shall be Prestressed Concrete Cylinder Pipe designed for the pressures and service herein indicated, and as shown on the drawings.

(B) The prestressed concrete cylinder straight pipe shall, in general, be sixteen (16) or twenty (20) feet in length but bends, tees and other fittings and closure pieces may be made in shorter lengths. The nominal thickness of the core and the nominal thickness of the mortar coating shall not be less than that given in the following table:

Nominal I.D.	Core Thickness	Minimum Mortar Coating Over Wire
16"	1"	$\frac{3}{8}$ inch
20"	1 $\frac{1}{4}$ "	$\frac{3}{8}$ inch
24"	1 $\frac{1}{2}$ "	$\frac{3}{8}$ inch
30"	1 $\frac{3}{4}$ "	$\frac{3}{8}$ inch
36"	2"	$\frac{3}{8}$ inch
42"	2 $\frac{1}{4}$ "	$\frac{3}{8}$ inch
48"	3"	$\frac{3}{8}$ inch

The prestressed concrete cylinder pipe shall consist of a core formed by a continuous arc-welded steel cylinder with steel joint rings welded to its ends, lined with concrete, wrapped under tension with a wire of high tensile strength and coated with a dense covering of cement mortar. Each pipe shall be constructed with a self-centering expansion joint, sealed with a rubber gasket, and capable of caring for earth settlement and extremes of temperature. The pipe line shall be complete including all straight pipe, bevel end pipe, bends, tees, special end pipe and any and all other fittings which are required for the proper completion of the work as shown on the drawings or as directed. Pipe shall be the product of a well-known and reputable manufacturer and of the type which has been successfully used in similar or equivalent installations elsewhere. The ends of pipe shall be at right angles to the pipe axis. Pipes may be beveled to form curves. Maximum allowable bevel angle shall be such as manufactured as standard bevels. The concrete lining of the steel cylinder shall consist of approximately one (1) part cement, one and three-quarter (1 $\frac{3}{4}$ ) parts of fine aggregate, and two and one-quarter (2 $\frac{1}{4}$ ) parts of coarse aggregate, measured by volume. For the purpose of securing greater density, the proportions may be varied, but in no case shall the cement content be less than one (1) part cement to four (4) parts of fine and coarse aggregate measured separately by volume. The maximum ratio of water to cement shall be five and one-half (5 $\frac{1}{2}$ ) U.S. gallons of water to one (1) bag of cement. A minimum of 7.0 bags of cement shall be used per cubic yard of concrete. The intent of this specification is to produce a concrete having a seven (7) day strength of 3,000 p.s.i. and a twenty-eight (28) day strength of forty-five hundred (4500) pounds per square inch for 6"x12" test cylinders made and tested in accordance with A.S.T.M. Specifications C31-59. Concrete for which seven (7) day strength test shall show strengths of less than three thousand (3,000) pounds per square inch may be used, providing that the maximum design compressive stresses in the concrete shall not exceed fifty percent (50%) of the seven (7) day strength as measured.

(C) The pipe shall be reinforced with a steel cylinder. The steel for cylinders shall meet the requirements of Sec. 2.6 of A.W.W.A. Standard C301-64 except that the minimum yield point shall be 30,000 p.s.i., and cylinders shall be not less than 16 gauge, U.S. Standard. Where the pipes are designed for special conditions or for high operating pressures, the cylinders may be made from hot-rolled sheets of special alloy steel having higher elastic limit and ultimate strength than those specified. In such case, the sheets shall be of good welding quality and shall conform to the steel manufacturer's published specifications for the special grade of steel being supplied. Each completed cylinder with joint rings welded to it shall be subjected to a hydrostatic test by closing the ends at the joint rings, filling with water in contact at all points with welds, and raising the water pressure to stress the cylinder to a fibre stress of 25,000 pounds per square inch. While under pressure test, all welds shall be thoroughly inspected. If any leaks are found, they shall be

repaired and the cylinder shall be retested. The finished cylinder with joint rings attached shall be water tight under the required test pressure. Arc welding shall be an approved process and test welds shall be furnished from the work as required. The contractor shall submit to the Engineer detailed designs and shall receive his approval before the construction of any pipe.

(D) The high tensile wire used for circumferential reinforcement shall be of high tensile properties either cold drawn or high carbon MB basis, untempered according to the diameter of the pipe and the pressure for which it is designed. The type of wire to be used shall be determined by the manufacturer and shall conform to the appropriate ASTM specification as follows:

ASTM Designation	A 82-34	A 227-47
Title	Cold-Drawn Steel Wire For Concrete Reinforcement	Hard-Drawn Steel Spring Wire
Min. Ultimate Strength		
No. 6 ga. U.S.S.	80,000 p.s.i.	192,000 p.s.i.
Min. Elastic Limit		
No. 6 ga. U.S.S.	64,000 p.s.i.	100,000 p.s.i.

The circumferential reinforcement properties may be increased by the manufacturer upon approval by the Engineer. Test reports will be required before approval. The average gross wrapping stress of the high tensile wire shall not exceed seventy-five (75) percent of the minimum ultimate tensile strength of the wire, and centerline spacing of the wire shall not exceed 1 $\frac{1}{2}$  inches for lined cylinder pipe with wire of No. 6 gauge U.S.S.; the maximum centerline spacing of wire larger than No. 6 gauge shall be 1 inch. No circumferential wire shall be less than No. 6 gauge. The wire shall be placed directly against the steel cylinder of the core and shall be wrapped spirally, evenly and under constant tension. The wire shall be anchored at the ends of the pipe by mechanical devices of sufficient strength to maintain the stress in the wire. The thickness of the steel cylinders and diameter of wire used as well as the centerline spacing at which the circumferential wire is placed and the tension under which the wire is wound around the lined cylinder shall be such that the zero compression pressure be at least 50 pounds plus 1 $\frac{1}{4}$  times the static pressure. Where the cover over the pipe exceeds eight (8) feet, the design shall be modified to withstand the additional external loading.

(E) Each length of pipe shall be provided with bell and spigot ends formed by steel joint rings securely welded to the steel cylinder. The spigot ring shall be lined by the concrete of the core and the bell ring shall be protected on its exterior surface by the cement mortar coating. Portions of the joint rings which will be exposed after the pipe is manufactured shall be protected from corrosion by metalizing a minimum of 0.003" thick for 20" and smaller pipe, and 0.002" thick for 24" and larger pipe. The spigot ring shall have a groove for the purpose of receiving, holding and protecting the gasket, and the joint surfaces shall be of such shape and dimension that the joints shall be self-centering when the pipes are laid so that the gasket shall not be required to support the weight of the adjoining pipes. The joint shall be sealed by a rubber gasket in such a way that the joint shall remain tight under all conditions of service, including expansion, contraction and normal settlement. The welding of the joint rings to the cylinder pipe shall consist of at least one full continuous weld for pipe sections that are properly tested hydraulically for strength and water tightness. For pipe sections that have to be cut to be fitted up to make bends, such construction shall have double continuous welds. Likewise, any special construction such as for outlets or for pipe having special ends shall have double continuous welds.

(F) The gasket shall be made of rubber of special composition meeting the requirements of Sec. 3.4 of A.W.W.A. Specification C 301-64 and having a texture to assure a water-tight and permanent seal. The gasket shall be an endless ring of appropriate cross-section and of such size as to completely fill the recess between the bell and spigot surfaces and adequately produce a water-tight seal when the pipes are laid.

(G) Fittings or specials conforming to Type B requirements of Sec. 4.3 of A.W.W.A. Standard C 301-64 shall be furnished and installed as shown on the drawings or as required, and shall include specials with bell end, spigot end, flanged end, and victaulic end outlets, with access manholes, air cocks, pitometer, and drain connections, anchor rings, bends, test heads, closure pieces, bevel end pipe, joint harnesses, etc. The Contractor shall submit to the Engineer detailed designs and shall receive his approval before the construction of any such specials.

(H) Special pieces, such as tees, wyes, or branch openings, shall also be of cylinder construction. In all cases, the reinforcement shall adequately compensate for the openings in the pipe wall. If the special piece is prestressed, then the area of the steel in the cylinder and cage, in addition to the compensating reinforcement previously mentioned, shall be not less than that for the adjoining prestressed straight pipe. If the special piece is not prestressed then the additional area of the steel in the cylinder and cage shall be not less than that for the adjoining straight pipe if such straight pipe were designed as concrete cylinder pipe.

(I) The openings in the special may be formed by steel rings or castings of suitable design securely welded to the cylinder and reinforcing cage. All bends and

special pieces shall be provided with joint rings corresponding to those in the straight pipe. All bends, flanged pipe and reducers shall be constructed with steel cylinders having  $\frac{1}{4}$ " minimum plate thickness.

(J) On vertical and horizontal bends and straight pipe within tied joints, the thickness of the cylinder shall be such that the resultant of the longitudinal and circumferential stress shall be not more than sixteen thousand (16,000) p.s.i. at the test pressure, or twelve thousand five hundred (12,500) p.s.i. at the working pressure.

(K) Cast steel saddles and forgings or the equivalent in fabricated steel plates shall be welded to the steel cylinder for manhole and pipe connections and for drain, pitometer, and air cock connections, and shall be drilled and tapped and provided with two (2") inch malleable iron plugs.

(L) Closure pieces of follower ring type which can be cut in the field to fit required measurements shall be provided as are necessary for the proper construction of the water main. Closure pieces are to be avoided where possible within "tied distances" but when so required they shall be fitted with locking devices equivalent to those provided for regular pipe and fittings within "tied distances". Measurements for lengths of closure pieces will be made in the field after adjacent pipe sections are in place in the trench. Testing bulkheads shall be furnished and installed for testing any completed sections of the concrete cylinder pipe main as may be required, but proper care must be taken in their use to prevent opening of adjacent or nearby pipe joints.

(M) All forged or rolled steel pipe flanges shall conform to "Standard Specifications for Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for General Service", A.S.T.M. Designation A181-61T, Grade I.

(N) All steel for castings shall conform to the specifications for Grade 70-36 steel castings, as given in the "Standard Specifications for Mild-to-Medium-Strength Carbon Steel Castings for General Industrial Use", A.S.T.M. Designation A27-62.

(O) All steel forgings shall conform to "Standard Specifications for Carbon-Steel Forgings", A.S.T.M. Designation A235-62T, Class C.

(P) All structural steel shall conform to "Tentative Specifications for Steel For Bridges and Buildings", A.S.T.M. Designation A7-61T, or to "Specifications for Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality", A.S.T.M. Designation A283-58, Grade C.

(Q) All cast iron pipe and fittings shall conform to the requirements of the section "Cast Iron and Ductile Iron Pipe and Fittings" of these specifications.

(R) Iron castings must be smooth and free from blowholes and other defects and the material shall conform to "Standard Specifications for Gray Iron Castings", A.S.T.M. Designation A48-62 Class 30B.

(S) Test, inspection, reports and analyses of test of samples for all materials shall be furnished in accordance with the section "Test, Inspection and Reports" of these specifications.

(T) Manufacturer's design calculations will be required.

(U) A detailed, tabulated laying schedule along with a plan and profile layout will be required.

**MARKING**

Each pipe and special shall have conspicuously painted in black on the inside a serial number for the purpose of identification. Serial numbers shall agree with lists to be furnished to the Engineer. The top center line of all special fittings and each pipe that has a beveled end shall have a white ring painted in the shop around the mark both on the inside and outside of the pipe.

**TYPICAL FIELD JOINTS FOR CONCRETE PIPE**

The Contractor shall make all typical field joints and welded tied joints, and/or clamp type flexible tied joint marked "Y" as shown on the Contract Drawings or as required and as specified in the section of these notes titled "Laying Pipe" and shall properly make all field welds for the above tied joints. The annular recesses at the joint, both inside and outside of the pipe shall be filled with cement mortar mixed in a proportion of not less than one part of cement to two parts of sand.

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

*Donald R. Melone*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond Kudubek*  
DIRECTOR OF PUBLIC UTILITIES  
*David J. Callaway*  
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COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
ENGINEER OF CONSTRUCTION AND SURVEYS  
ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

MADE ECE DATE 4-8-68 TRACED HLD DATE 3/17/70  
CHECKED ERH DATE 3/27/70 SCALE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

# WATERWORK NOTES

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**CUYAHOGA COUNTY**  
CUY. 480-21.40

## PRESTRESSED CONCRETE CYLINDER PIPE

### FLANGED JOINTS

(A) Flanged joints shall be installed as shown on the drawings. Flanges shall be either cast steel, forged or rolled steel, or properly welded and machined fabricated steel plates welded to pipe cylinder with two (2) continuous welds. They shall have plain faces and shall be faced true and smooth at right angles to the axis of the pipe and shall be spot faced on the back. Drilling shall conform to A.S.A. one hundred twenty-five (125) pound Standard. Each blind flange shall be cast iron and shall have bosses tapped at top and bottom for two (2) inch standard pipe and furnished with plugs. All bolts for flanges and for other types of bolting shall conform to the "Tentative Specifications for Low Carbon Steel Externally and Internally Threaded Standard Fasteners, A.S.T.M. Designation A307-63T, Grade A, except where one or both flanges are cast iron, in which case bolts shall be Grade B.

(B) All bolts used in the finished work for flanges and tied joints for concrete pipe shall be of medium open hearth or electric furnace steel. The ends of all bolts must be finished to a standard radius in an acceptable manner. All screw threads shall be American Standard Coarse Thread (N.C.). Stud bolts shall be used to make the flanged joints on pipe. All nuts shall be hexagonal, cold pressed, semi-finished and made of medium open hearth, electric furnace or Bessemer process steel. All dimensions shall be according to American Standard Heavy. Bolts and nuts shall be galvanized before shipment and not primed. Gaskets for flanged pipe shall be full faced rubber one-sixteenth (1/16) inch thick 5X Manila Rope pattern or other approved type.

(C) In place of flanged joints on concrete pipe between vertical bends on tied distances, and elsewhere as shown on the drawings, the use of butt welded joints will be permitted, unless specifically prohibited on the drawings. The steel cylinder shall be reinforced having a thickness of not less than that called for in Detail Z. The ends of the steel cylinders shall be beveled. The weld material and the welding procedure shall conform to the A.W.W.A. C206-62 "Standard Specifications for Field Welding of Steel Water Pipe Joints" and any subsequent amendments thereto. The annular recesses at the joint, both inside and outside of the pipe shall be protected against corrosion by an approved method. All exposed steel surfaces both inside and outside of the pipe shall be coated in accordance with the coating requirements of these specifications.

### LEAD JOINTS

In jointing all bell and spigot pipe and fittings having lead joints, the spigot of each pipe shall be properly seated in the bell of the next adjacent piece and adjusted so as to give a uniform annular space. The joint shall be made with twisted hard jute and soft pig lead. Before placing the jute, it shall be sterilized either by boiling, or by dipping in a concentrated solution of "HTH". The jute shall be twisted and thoroughly driven into the bell so that the lead, after having been caulked, shall have the following depth:

Size of Pipe	Depth of Lead
4 - 20 (Both Inclusive) .....	2 1/2 inches
24 .....	2 3/4 inches
30 - 36 .....	3 1/4 inches
Sleeves .....	Solid

The furnace and melting pot shall be kept near the joint to be poured and each joint shall be made with one pouring. Dross shall not be allowed to accumulate in the melting pot. The joints shall be thoroughly caulked by competent pipe joiners and in such manner as will secure a tight joint without overstraining the iron of the bell.

### VICTAULIC PIPE COUPLINGS

(A) Where shown on the drawings or where required, the Contractor shall furnish and install victaulic type couplings for connection of line valves to prestressed concrete cylinder or steel pipe reducers. Steel pipe ends shall be fabricated and grooved as indicated on the drawings. The couplings shall be adapted for installation on shouldered end cast iron pipe and fittings and designed for not less than the working pressure noted on the contract drawings. Couplings shall be composed of malleable iron housings held together with steel bolts and with a continuous, hollow, molded rubber sealing ring of such type that the seal becomes tight as the pressure within the pipe increases. The joints shall be constructed and installed and be equal in all respects to those manufactured by the "Victaulic Company of America". Malleable housings shall conform to the "Standard Specifications for Malleable Iron Castings", A.S.T.M. Designation A47-61. Bolts shall be manufactured by the coupling manufacturer and shall comply in material with the requirements of bolts for flanged joints specified above. Bolts and nuts shall be galvanized or cadmium plated.

(B) All metal parts of the couplings shall be coated at the shop with one coat of bituminous primer furnished by the same manufacturer who furnishes the coatings as specified under "Coating".

### SHOP COATING AND PAINTING

(A) The exposed surfaces of the steel ends of spigot, bell, victaulic or flanged steel outlet connections and the flanged ends of concrete pipe, etc., shall be cleaned, primed and enameled inside and outside in accordance with the A.W.W.A. Specification C203-62. The coating may be applied by brush or spray. All coatings shall be applied in the shop before shipment. The outside coating shall stop against the flanges at ends of pipe sections.

(B) Galvanized pipe ends for rubber gasket joints are not to be coated.

(C) The grooved steel bands at the ends of the prestressed concrete cylinder pipe to receive victaulic type couplings shall be coated with white lead and tallow. The coating must be removed just prior to installation of the coupling.

(D) All finished surfaces shall be coated with white lead and tallow and not primed.

(E) After erection, all exposed or damaged coatings on surfaces buried underground and all bolts on flanges and victaulic couplings shall be cleaned and painted with three (3) field coats of coal tar pitch paint equal to Inertol 66 or Koppers Bitumastic 50 or equivalent.

### TRANSPORTATION AND DELIVERY

(A) The Contractor shall transport, deliver and distribute along the line of the work, the pipe, specials and appurtenances.

(B) Pipe shall be loaded for shipment upon suitable cars or trucks which shall be provided with wooden skids. In loading and unloading the pipe more than ordinary care must be taken to prevent any injury to the concrete cylinder pipe, steel pipe ends and protuberant steel connections. Such work must be done slowly with the pipe at all times under perfect control, and under no condition shall the pipe be dropped.

(C) In distributing the pipe in the field each pipe must be placed as nearly as possible to the point where it is to be laid, and facing in the proper direction. Suitable skids or blocks must also be left under each pipe, and the pipe securely wedged in place to prevent its being moved until required. A steel cable sling shall be used for rolling or lifting pipe. No iron chains shall be used. Pipe which has been improperly distributed and which must be moved longitudinally along the trench shall be reloaded on a wagon, or lifted and swung by a derrick or moved by such means as may be satisfactory to the Engineer.

(D) If, in the process of manufacture, transportation, or handling, any concrete pipe or special receives any indentation or deformation to the concrete, steel ends or connections, the removal of which will in any degree injure it, such pipe or special shall be rejected and replaced at the Contractor's expense.

(E) Pipe which is placed in storage, streets or drives must be so arranged as not to cause undue inconvenience to traffic and must be protected sufficiently to prevent injury to the concrete cylinder pipe, and the coating of the steel ends and connections.

### MATERIALS DATA WITH PROPOSAL

Each bidder shall submit with his proposal, and in the form provided, the information called for below:

1. Name of Pipe Manufacturer and Location of Plant
2. Name of Coupling Manufacturer and Location of Plant
3. Pipe Coating and Lining Data

### DRAWINGS

(A) The Contractor shall submit to the Engineer for approval, duplicate prints of all shop drawings for concrete pipe, fittings and specials, and miscellaneous details, such as air cock and drain forgings, castings, etc.

(B) The Contractor shall also furnish an assembly plan for the entire length of the pipe line for which concrete pipe is furnished under the appropriate items. This assembly plan shall also show the correct location of all fittings furnished.

(C) One print of each of the drawings submitted will be returned with the criticisms or approval of the Engineer. In case the drawings are not approved, the Contractor shall again send for approval, duplicate revised prints of the drawings to take care of the criticisms noted, and after the drawings have been finally approved, the Contractor shall again furnish to the Engineer seventeen (17) additional prints, sixteen (16) on paper and one (1) mylar or reproducible cloth tracing of each drawing. No work shall be done in the shop until after the drawings have been finally approved.

(D) The approval of the drawings by the Engineer shall not relieve the Contractor of any of his obligations in connection with this contract.

### EXPERIENCE QUALIFICATIONS

All bidders will be required to show to the satisfaction of the Engineer that the type and size of pipe and fittings he proposes to furnish, will be made by a manufacturer whose pipe has been successfully used for like work outside of the builder's works for a period of not less than five years.

### MEASUREMENT

The number of linear feet of water main to be paid for under prestressed concrete cylinder pipe shall be the actual number of linear feet furnished and placed in accordance with these specifications as measured along the axis of the main including fittings and valves connected up in place.

### PAYMENT

The unit price stipulated to be paid for each linear foot of water main "Item Special - Water Main" classified to size shall include the furnishing, laying, painting and inspection and testing of prestressed concrete pipe, concrete cylinder fittings, cast iron pipe and fittings, victaulic and Dresser couplings, the excavation, sheeting and shoring, backfilling, sand backfilling, seeding and sodding, sidewalk replacement, and the temporary and permanent repaving for the above main and the furnishing of all labor, materials, tools, appliances and equipment to complete the work as specified or as shown.

## EXTRA CONCRETE PRESSURE PIPE FITTINGS

### WORK INCLUDED

(A) The Contractor shall furnish all the materials for and shall properly install all the concrete pressure pipe fittings of the various sizes specified which are not shown on the contract drawings or on approved shop drawings and which are ordered installed by the Director in order to change line or grade to avoid obstacles previously unknown, or to meet other field conditions, and any outlet connections for drains, air cocks or other use which may be required due to field conditions, and including all extra excavation, sheeting, shoring, backfilling, sand backfill, seeding, sodding and temporary and permanent repaving required therefor for the proper completion of the work under this contract.

(B) In general, the work of this item shall include bevels, half bevels, adapters, elbows, tangential outlet pieces, and pipes with small outlets (with or without tied joints) which were not shown on approved shop drawings and which are ordered installed by the Engineer.

(C) The provisions of this item shall not relieve the Contractor of his responsibilities to investigate existing facilities as indicated under notes and specifications, nor to use less than normal diligence in excavating or laying pipe to anticipate possible difficulties.

### CONCRETE PRESSURE PIPE FITTINGS

All fittings to be furnished and installed under this item shall be manufactured and installed in full conformance with the requirements of item "Prestressed Concrete Cylinder Pipe" of these specifications. Joints, marking, shop coating, painting, testing and chlorinating shall conform to the requirements of item "Prestressed Concrete Cylinder Pipe", and drawings shall be submitted and approved as required therein.

### PAYMENT

(A) The unit price stipulated per each "Item Special - Extra Concrete Pressure Pipe Fittings" classified as to size and type shall be in full compensation for the furnishing and installing of such extra fittings as are ordered by the Engineer and which are not shown on the contract drawings or approved shop drawings, and shall include any extra excavation, sheeting, shoring, backfilling, sand backfill, seeding, sodding, and temporary and permanent repaving required therefor, and the furnishing of all labor, materials, tools, and appliances necessary to complete the work as specified or as shown.

(B) No deduction will be made in the lengths of pipe and fittings to be paid for under item "Prestressed Concrete Cylinder Pipe", where extra fittings are ordered to be installed and, likewise, no payment will be made for extra fittings which are installed for the convenience of the Contractor without specific orders from the Engineer.

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

*Franklin R. Mylon*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond Kudrinski*  
DIRECTOR OF PUBLIC UTILITIES  
*Ed Stalton*  
COMMISSIONER OF WATER AND HEAT  
*William J. Sweeney*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
ENGINEER OF CONSTRUCTION AND SURVEYS  
ENGINEER OF DESIGN

2 ND HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITIES DIVISION OF WATER AND HEAT CLEVELAND, OHIO
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

MADE ECF DATE 4-8-68 TRACED HLD DATE 3/12/70  
CHECKED ERH DATE 3/30/70 SCALE \_\_\_\_\_

**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
CONSULTING ENGINEERS  
KANSAS CITY      CLEVELAND      NEW YORK



# WATERWORK NOTES

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CUY. 480-21.40

## MISCELLANEOUS ITEMS

### ITEM SPECIAL - SERVICE CONNECTION EXTENDED

WORK INCLUDED

The City of Cleveland, Division of Water, will relocate curb boxes and extend connections at no cost to the Contractor from existing curb box location to new curb box location. All other connection work and material shall be by the Contractor.

The Contractor shall do all the necessary excavation, backfilling, seeding, sodding and repaving required in making these service connections and alterations and costs thereof shall be included in the unit price bid for "Service Connection Extended". The curb boxes shall be relocated by the City and set to final grade by the Contractor. Water Meter Vaults for connections 1 1/2" and over shall be constructed by the Contractor and paid for at contract unit price for each "Item Special - Meter Vault." (Brick and Concrete Masonry, See Sheets 191 and 192.)

MEASUREMENT

The service connection extended to be paid for shall be the actual number of each listed and estimated separately, completed and accepted.

BASIS OF PAYMENT

The unit price stipulated for each "Item Special - Service Connection Extended" under this item shall include the excavation, backfilling, seeding and sodding and repaving and the furnishing of all labor, materials, tools and appliances necessary to complete the work as specified or as shown.

### ITEM SPECIAL - TEMPORARY SERVICE CONNECTION

WORK INCLUDED

The City shall disconnect the existing service connection from the water main that is to be taken temporarily out of service. A tap is to be made on a temporary by-pass or a water main that will remain in service, and the service connection shall be temporarily connected. After service is restored to the water main, the service connection shall be reconnected to the original or relocated main. The City will furnish the piping materials, and make all changes necessary to service connection box only. The Contractor shall do all excavation, backfilling, repaving and all other work.

PAYMENT

The actual number of each "Item Special - Temporary Service Connection", shall be paid at the contract unit price. This price and payment shall constitute full compensation for performing all of the requirements of this item, including furnishing all necessary materials, labor, tools, equipment supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at no expense to the Contractor.

### ITEM SPECIAL - SERVICE CONNECTION RELOCATED

### ITEM SPECIAL - WATER METER RELOCATED

WORK INCLUDED

The City will furnish the piping material for and make all changes required in the relocation of existing house connections and meters from the corporation cock to the curb cock only. The Contractor shall do all the necessary excavation, backfilling, and repaving required and all other connections, labor and material.

Materials furnished by the City include piping, corporation cock, curb cock, and water meter vault. Water Meter Vault for connections 1 1/2" and over shall be constructed by the Contractor and paid for at contract unit price for each, "Item Special - Meter Vault." (Brick and Concrete Masonry, See Sheets 191 and 192.)

PAYMENT

The actual number of each "Item Special - Service Connection Relocated" and each "Item Special - Water Meter Relocated" shall be paid for at the contract unit price bid and payment shall constitute full compensation for performing all the requirements of this item, including furnishing all necessary materials, labor, tools, equipment, supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at no expense to the Contractor.

### ITEM SPECIAL - RELOCATE, RETAP AND RECONNECT SERVICE CONNECTION

WORK INCLUDED

The Contractor shall remove the existing service connection from the existing water main which is to be abandoned. A tap is to be made on the new water main and the existing service piping shall be connected to the new water main. The City will furnish the piping materials and make all changes necessary to re-connect, but the Contractor shall do all excavation, backfilling and repaving.

PAYMENT

The actual number of each "Item Special - Relocate, Retap and Reconnect Service Connection", shall be paid for at the contract unit price. This price and payment shall constitute full compensation for performing all of the requirements of this item, including furnishing all necessary materials, labor, tools, equipment, supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at no expense to the Contractor.

### ITEM SPECIAL - 2" AIR COCK COMPLETE

WORK INCLUDED

The Contractor shall furnish pipe with a 2" air cock connection and furnish and install the 2" air cock complete as shown in the "Water Work Details" at the locations shown in the plans.

PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - 2" Air Cock Complete" which price and payment shall constitute full payment for furnishing and installing all materials, labor, equipment, tools, and appliances necessary to complete this item. The valve box will be paid for separately under the item "Miscellaneous Metal Work".

### ITEM SPECIAL - 4" DRAIN COMPLETE

WORK INCLUDED

The Contractor shall furnish pipe of the sizes shown with a 4" Tangent Outlet at the locations shown on the plans and shall furnish and install the 4" pipe, and valve as shown in the "Water Work Details".

PAYMENT

(A) - The work included in this item shall be paid for at the contract unit price bid for each "Item Special - 4" Drain Complete" which price and payment shall constitute full payment for furnishing and installing all materials, labor, equipment, tools and appliances necessary to complete this item.

(B) - The Drain Vault will be paid for under each "Item Special - Drain Vault".

(C) - The Valve Box will be paid for under "Item Special - Miscellaneous Metal Work".

### ITEM SPECIAL - ADJUST CURB COCK VALVE BOX TO GRADE

### ITEM SPECIAL - ADJUST VALVE BOX TO GRADE

WORK INCLUDED

The Contractor shall raise or lower the existing valve box to fit the revised grade by excavating under or tamping backfill under the valve box to insure that the box has a firm footing.

PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - Adjust Valve Box To Grade", and "Item Special - Adjust Curb Cock Valve Box To Grade", which price and payment shall constitute full compensation for adjusting the valve box, excavation, tamping earth under valve box, backfill, seeding and for all labor, equipment, tools and incidentals necessary to complete this item.

### ITEM SPECIAL - REMOVE ABANDONED VALVE BOX

### ITEM SPECIAL - REMOVE ABANDONED CURB COCK VALVE BOX

WORK INCLUDED

The Contractor shall either remove or leave in place the abandoned curb cock, or gate valve. The valve box shall either be removed or broken off at least 1' below the ground surface and backfilled. If the valve box is in a paved area, the area shall be restored to match the existing pavement.

PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - Remove Abandoned Curb Cock Valve Box" and "Item Special - Remove Abandoned Valve Box" which price and payment shall constitute full compensation for abandoning the valve and removing the valve box, backfilling, seeding, repaving, and for all labor, equipment, tools and incidentals necessary to complete this item.

APPROVED \_\_\_\_\_ DATE JUNE 15, 1972

*Frank R. Spelona*  
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*Robert J. Miller*  
ENGINEER, CITY OF MAPLE HEIGHTS

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*William J. ...*  
ENGINEER OF DESIGN

2 ND HIGH SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS**

SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE ERH DATE 3/20/70 CONSULTING ENGINEERS  
TRCD ALD DATE 3/26/70  
CKD TJT DATE 5-8-70 KANSAS CITY CLEVELAND NEW YORK

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CUY. 480-21.40

## MISCELLANEOUS ITEMS

### 2-INCH GALVANIZED BLACK IRON AND BRASS PIPE FOR FLUSHING CONNECTIONS,

#### WORK INCLUDED

The Contractor shall furnish all the materials for and shall properly connect in place at the locations shown on the drawings or as ordered, all 2-inch extra strong brass pipe and fittings, and all 2-inch extra strong galvanized black iron pipe and fittings respectively, which are necessary for the proper completion of the work included under this contract.

#### BRASS PIPE AND FITTINGS

All brass pipe and fittings shall be extra strong, 2-inch pipe size and the pipe shall conform to A.S.T.M. Specifications B 43-42. Fittings shall be extra strong weight and shall have sound, well fitting threads.

#### GALVANIZED BLACK IRON PIPE AND FITTINGS

All galvanized black iron pipe, nipples and couplings shall be extra strong black iron pipe A.S.T.M. Designation A 120. The fittings shall be beaded, of malleable iron, extra heavy weight. All pipe and fittings shall be hot dipped, zinc coated inside and outside, and shall have sound, well-fitting threads.

#### ERECTION

All pipe shall be carefully placed to the proper lines and grades, and shall be connected up, unless otherwise shown, with screw fittings. Screw joints shall be made tight with a graphite paste and screwed home. A liberal number of unions shall be used to permit the ready removal of any section.

#### PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - Furnish and Install Flush Pipe including Fittings and Valve", whether temporary or left in place which price and payment shall constitute full compensation for excavating and for furnishing, hauling, and placing plugs, clamps, valves, roadway boxes, pressure backing and appurtenances, and for furnishing all labor, material, equipment, tools, and incidentals necessary to complete this item.

A quantity of 4-Each Item Special-Furnish and Install Flush Pipe including Fittings and Valve has been provided in the General Summary for use as directed by the Engineer.

### ITEM SPECIAL-1/2" NEW SERVICE PIPE

#### WORK INCLUDED:

The applicable items of work for new "Water Mains" shall apply using 1/2" Extra-Strong Galvanized Black Iron Pipe A.S.T.M. A-120 with Galvanized Malleable Iron Extra-Heavy weight screwed fittings. Only new pipe is to be used in the temporary Service Pipe on Orchard Road, Sta. 9+05 Lt. to Sta. 6+55 Lt. The Specifications for laying, backfilling, testing, etc. are shown elsewhere in the "Water Work Notes".

#### PAYMENT:

The work included in this Item shall be paid for at the contract unit price bid per Linear Foot for "Item Special-1/2" New Service Pipe" which price and payment shall constitute full compensation for excavation, furnishing and installing the pipe and fittings, backfilling, testing, surface restoration and the furnishing of all labor, materials, small tools and equipment necessary to complete the work as shown on the plans.

The chlorination of the 1/2" New Service Pipe by the City of Cleveland Division of Water will be at no expense to the Contractor.

### ITEM SPECIAL - INSERTING VALVE COMPLETE ITEM SPECIAL - TAPPING SLEEVE AND VALVE

#### WORK INCLUDED

The Contractor shall furnish and install the Tapping Sleeve and Valve at the location shown in these plans or as directed by the Engineer. The Contractor shall do all necessary excavating, backfilling, repaving, furnishing and installing the Tapping Sleeve and Valve and all other work that is necessary for the proper completion of this work.

Where the Tapping Sleeve and Valve is to be installed and a tap is to be made in prestressed concrete cylinder pipe, the Contractor shall arrange for the work with the pipe fabricator or valve supplier.

Complete shop drawings and procedures to be followed shall be approved by the Division of Water and Heat before proceeding with the work.

The work shall be performed under the supervision of the Division of Water and Heat.

#### QUALITY OF VALVES AND SLEEVES

The valves shall be A.P. Smith Manufacturing Co. or approved equal and shall comply with the requirements of the Item "Valves" of these specifications, insofar as they apply, including the provisions of sections (V) and (W).

The sleeves shall be of the class and size as shown and shall conform to the requirements of the Item "Cast Iron Pipe and Fittings" of these specifications, insofar as they apply.

#### PAYMENT

The work included in these items will be paid for at contract unit price bid for Each "Item Special-Tapping Sleeve and Valve" classified as to size, which price and payment shall constitute full compensation for furnishing and installing the Tapping Sleeve and Valve and performing the excavating, sheeting and shoring, backfilling and sand backfilling, seeding and sodding and repaving--if required, and for furnishing all labor, materials, equipment, tools and incidentals necessary to complete the work as specified or as shown.

Valve Box will be paid for separately under "Item Special-Miscellaneous Metal Work".

### ITEM SPECIAL - CUTTING-IN VALVE COMPLETE

#### WORK INCLUDED

The Division of Water will set the time of installation and the Contractor will do all pipe cutting and installing under the supervision of the Division of Water and Heat. The Contractor shall furnish and haul to the proper location the Hub Valve, Standard No. 38 Dresser Coupling or Smith Blair Coupling or approved equal, cast iron pipe and lead for the installation. The Contractor shall excavate, provide sheeting and bracing as necessary, backfill and repave as necessary.

#### PAYMENT

The work included in this item shall be paid for at the unit price bid for each "Item Special - Cutting-in Valve Complete", classified as to size. The price and payment shall constitute full compensation for performing all excavation, sheeting, bracing, backfilling, repaving, furnishing and installing the Cutting-in Valve and the furnishing of all labor, materials, labor, small tools and equipment required to complete this item of work in place.

Valve Box will be paid for separately under "Item Special-Miscellaneous Metal Work".

### EXISTING

### ITEM SPECIAL - PLUGGING WATER MAINS AND BRANCHES ITEM SPECIAL-PLUGGING SERVICE CONNECTIONS

#### WORK INCLUDED

The work included under these items shall consist of the plugging of existing water mains and branches, and the plugging of service connections at the locations shown on the drawings or as ordered, including cast iron plugs or caps with clamps and concrete piers, all excavating, sheeting and bracing, concrete, sand backfill, backfill, temporary repaving and permanent repaving, all as required for the proper completion of the work.

(A) - Plugging Mains and Branches: When indicated on the plans or as ordered the Contractor shall make pipe cuts, remove pipe and fittings and shall plug or cap mains, tees or crossed, plug connections at mains or branches, shall do all the excavating, backfilling and repaving, all as required.

(B) - Plugging Service Connections: The Contractor shall do all necessary excavating, sheeting and bracing, sand backfilling, backfilling and repaving required for this item, but the Cleveland Water Department will plug the service connection. The Contractor shall arrange with the Cleveland Water Department for the necessary work under this item.

#### MEASUREMENT

The existing water mains and branches plugged or service connections plugged to be paid for shall be the actual number of each listed and estimated separately, completed and accepted.

#### PAYMENT

The unit price stipulated for each (A) "Item Special - Plugging Existing Water Mains and Branches" classified as to size shall constitute full compensation for performing all the requirements of this item including furnishing all necessary materials, labor, tools, equipment and incidentals to make this a complete item of work.

The unit price stipulated for each (B) "Item Special - Plugging Service Connections" shall constitute full compensation for performing all the requirements of this item including furnishing all necessary materials, labor, tools, equipment and incidentals to make this a complete item of work.

The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at no expense to the Contractor. The work performed by the City of Cleveland applies to (B) "Plugging Service Connections".

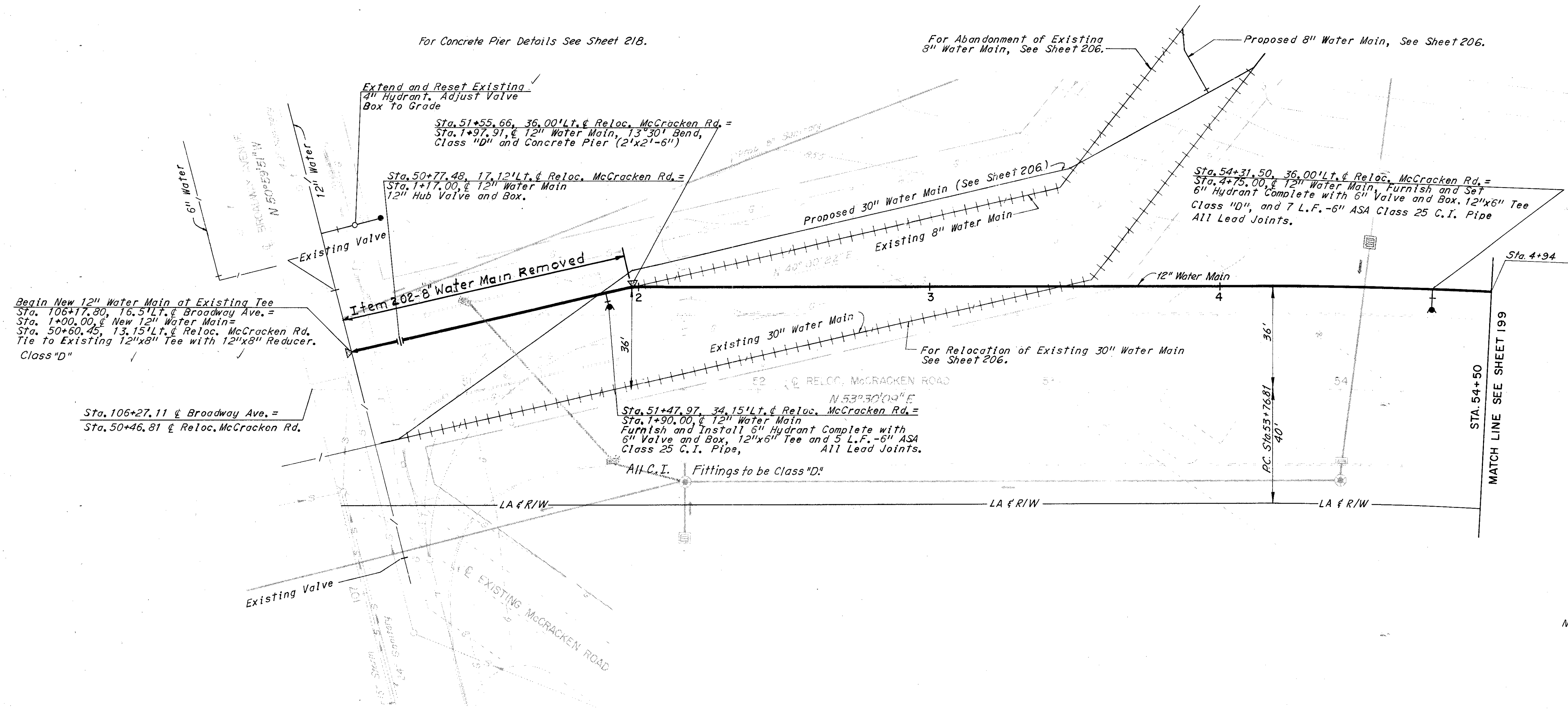
### BOLTLESS RESTRAINED PUSH-ON JOINTS

Boltless restrained pipe joints shall be provided conforming to Clow Corp. Super-lock F-128, U.S. Pipe and Foundry LoK-Tyton or approved equal.

SCALE: HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE ERH DATE 3/19/70 CONSULTING ENGINEERS  
TRCD. WLD DATE 2/26/70  
CKD. ERH DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

APPROVED DATE JUNE 15, 1972  
Franklin R. Meloni  
ENGINEER CITY OF GARFIELD HEIGHTS  
Richard R. Fisher  
ENGINEER CITY OF MAPLE HEIGHTS  
Raymond Rudekew  
DIRECTOR OF PUBLIC UTILITIES  
J. J. Sullivan  
COMMISSIONER OF WATER AND HEAT  
Richard A. Fisher  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
David J. Fisher  
ENGINEER OF CONSTRUCTION AND SURVEYS  
William J. Murney  
ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS



For Concrete Pier Details See Sheet 218.

For Abandonment of Existing 8" Water Main, See Sheet 206.

Begin New 12" Water Main at Existing Tee  
Sta. 106+17.80, 16.51' Lt. & Broadway Ave. =  
Sta. 1+00.00, New 12" Water Main =  
Sta. 50+60.45, 13.15' Lt. & Reloc. McCracken Rd.  
Tie to Existing 12"x8" Tee with 12"x8" Reducer.  
Class "D"

Sta. 106+27.11 & Broadway Ave. =  
Sta. 50+46.81 & Reloc. McCracken Rd.

Extend and Reset Existing  
4" Hydrant. Adjust Valve  
Box to Grade  
Sta. 51+55.66, 36.00' Lt. & Reloc. McCracken Rd. =  
Sta. 1+97.91, & 12" Water Main, 13°30' Bend,  
Class "D" and Concrete Pier (2'x2'-6")

Sta. 50+77.48, 17.12' Lt. & Reloc. McCracken Rd. =  
Sta. 1+17.00, & 12" Water Main  
12" Hub Valve and Box.

Sta. 51+47.97, 34.15' Lt. & Reloc. McCracken Rd. =  
Sta. 1+90.00, & 12" Water Main  
Furnish and Install 6" Hydrant Complete with  
6" Valve and Box, 12"x6" Tee and 5 L.F. - 6" ASA  
Class 25 C.I. Pipe, All Lead Joints.

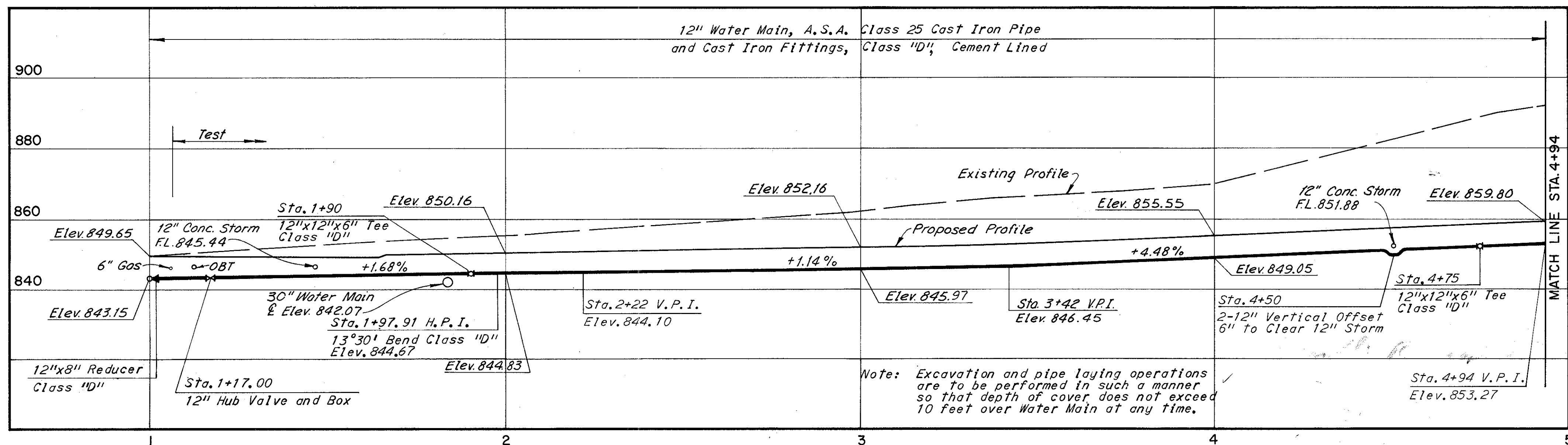
Sta. 54+31.50, 36.00' Lt. & Reloc. McCracken Rd. =  
Sta. 4+75.00, & 12" Water Main, Furnish and Set  
6" Hydrant Complete with 6" Valve and Box, 12"x6" Tee  
Class "D", and 7 L.F. - 6" ASA Class 25 C.I. Pipe  
All Lead Joints.

For Relocation of Existing 30" Water Main  
See Sheet 206.

Notes:  
Waterwork on New 12" Water Main shall not be done until 30" Water Main Relocation is installed and in service. See Sheet 206.

Existing 8" Water Main to be removed from Sta. 1+00 to Sta. 2+00, including 8" Valve at Sta. 1+16.50.

For Waterwork Quantities See Sheet 207.



Note: Excavation and pipe laying operations are to be performed in such a manner so that depth of cover does not exceed 10 feet over Water Main at any time.

APPROVED DATE JUNE 15, 1972

*Donald R. McLean*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond A. Anderson*  
DIRECTOR OF PUBLIC UTILITIES  
*Richard A. Fisher*  
COMMISSIONER OF WATER AND HEAT  
*David J. Griffin*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*William J. Sweeney*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
ENGINEER OF DESIGN

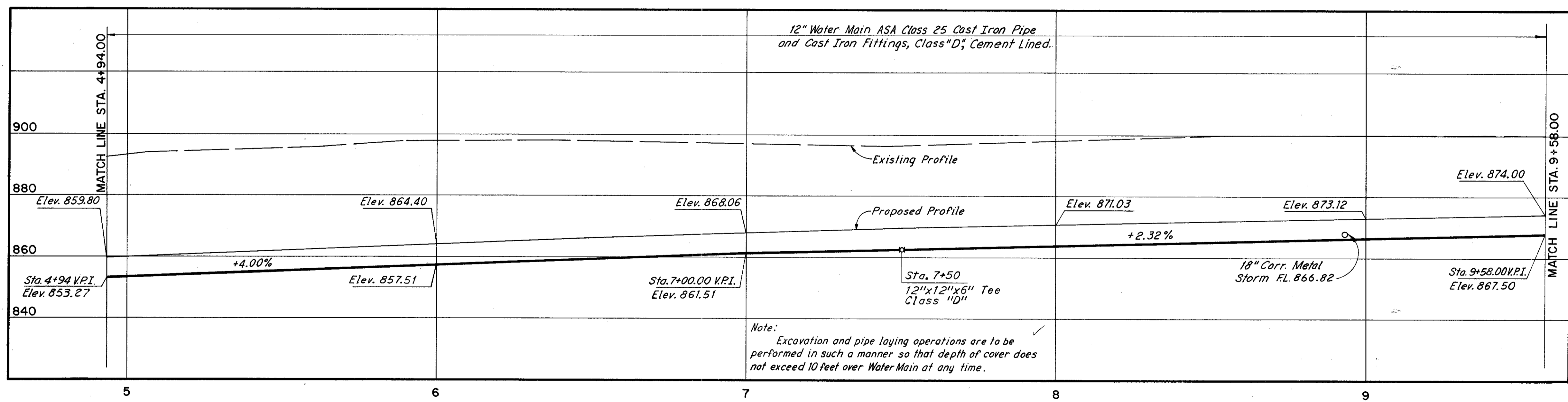
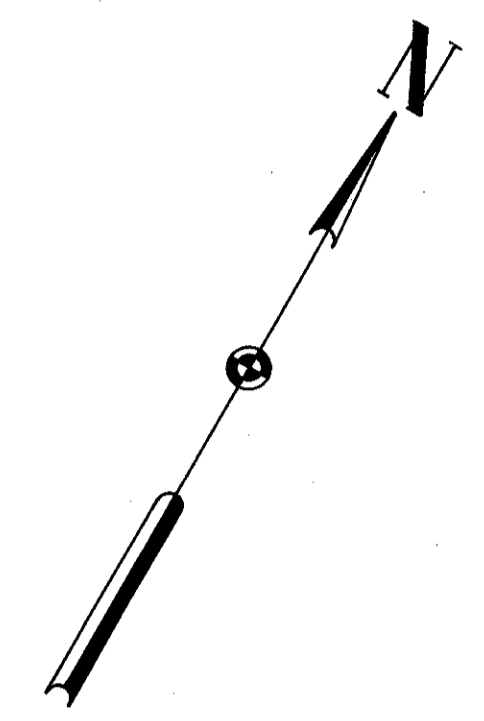
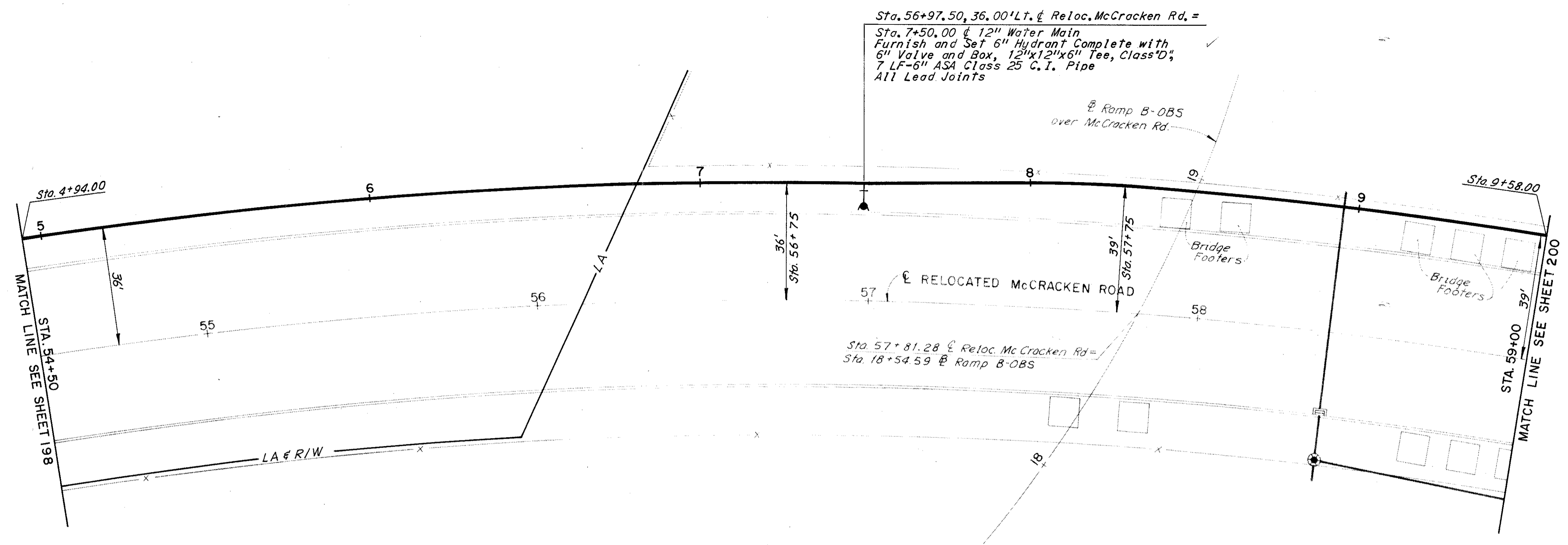
**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS**

SCALE 1" = 20'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE T.J.T. DATE 3-12-71 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 3-31-71  
CKD E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

199  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



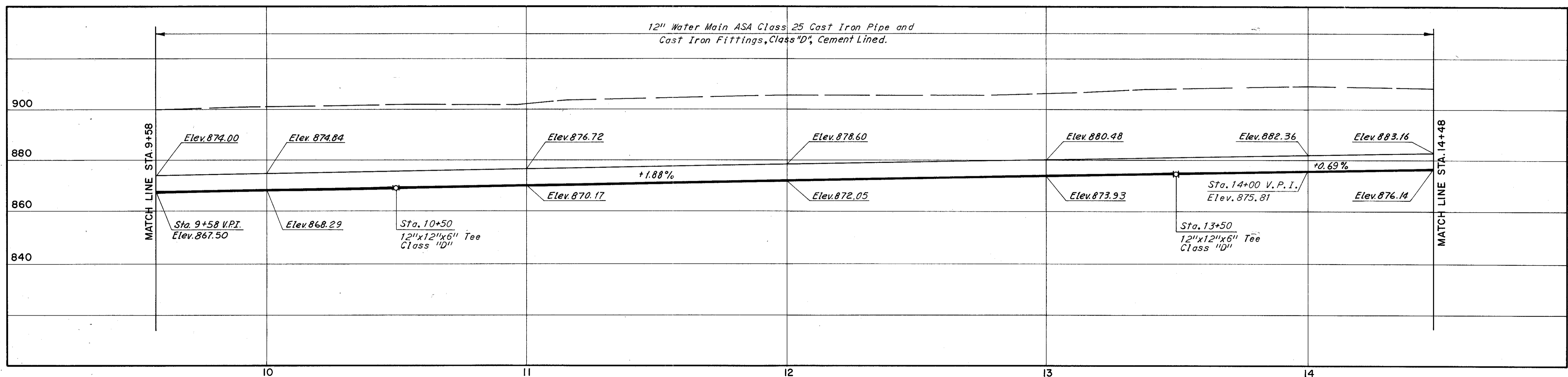
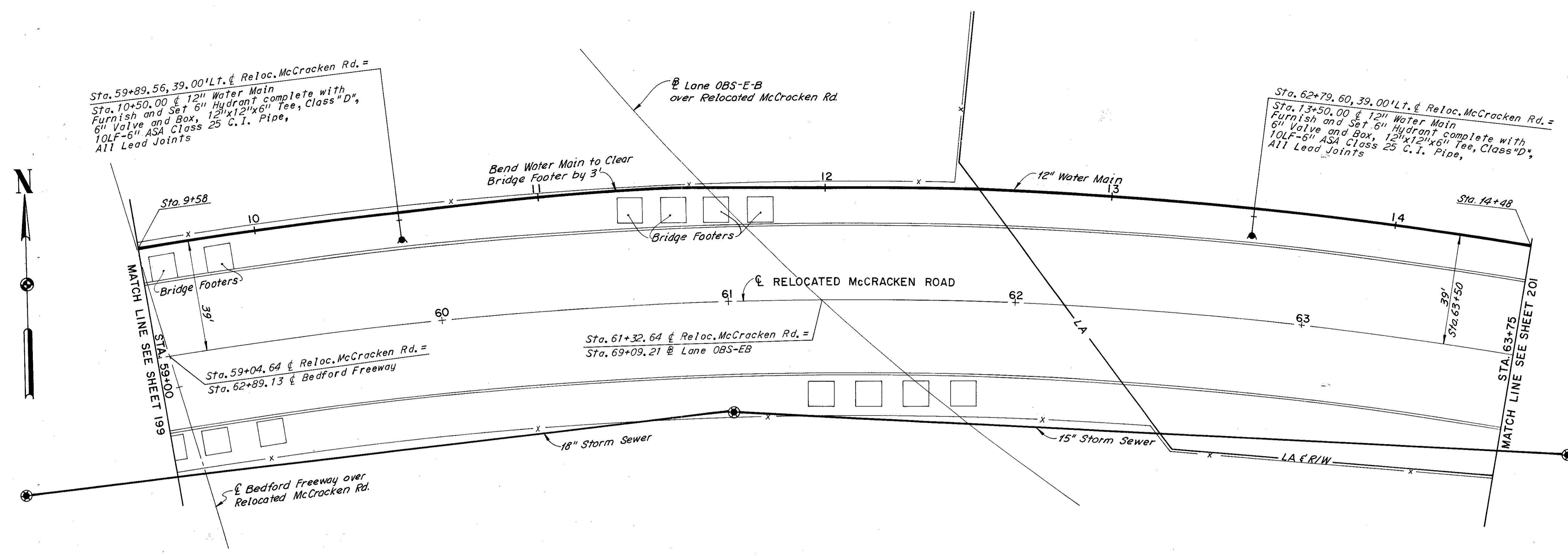
Note:  
Excavation and pipe laying operations are to be performed in such a manner so that depth of cover does not exceed 10 feet over Water Main at any time.

Notes:  
For Waterwork Quantities See Sheet 207.  
Bridge Footers shall be in place before 12" Water Main is installed.

SCALE 1" = 20'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE P.L.T. DATE 3-12-71  
TRCD J.M.C. DATE 3-31-71  
CKD E.R.H. DATE 5-17-72  
KANSAS CITY CLEVELAND NEW YORK

APPROVED DATE JUNE 15, 1972  
*Grant R. Napolitano*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Kukulski*  
 DIRECTOR OF PUBLIC UTILITIES  
*Richard A. Fisher*  
 COMMISSIONER OF WATER AND HEAT  
*David A. Pfeiffer*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS



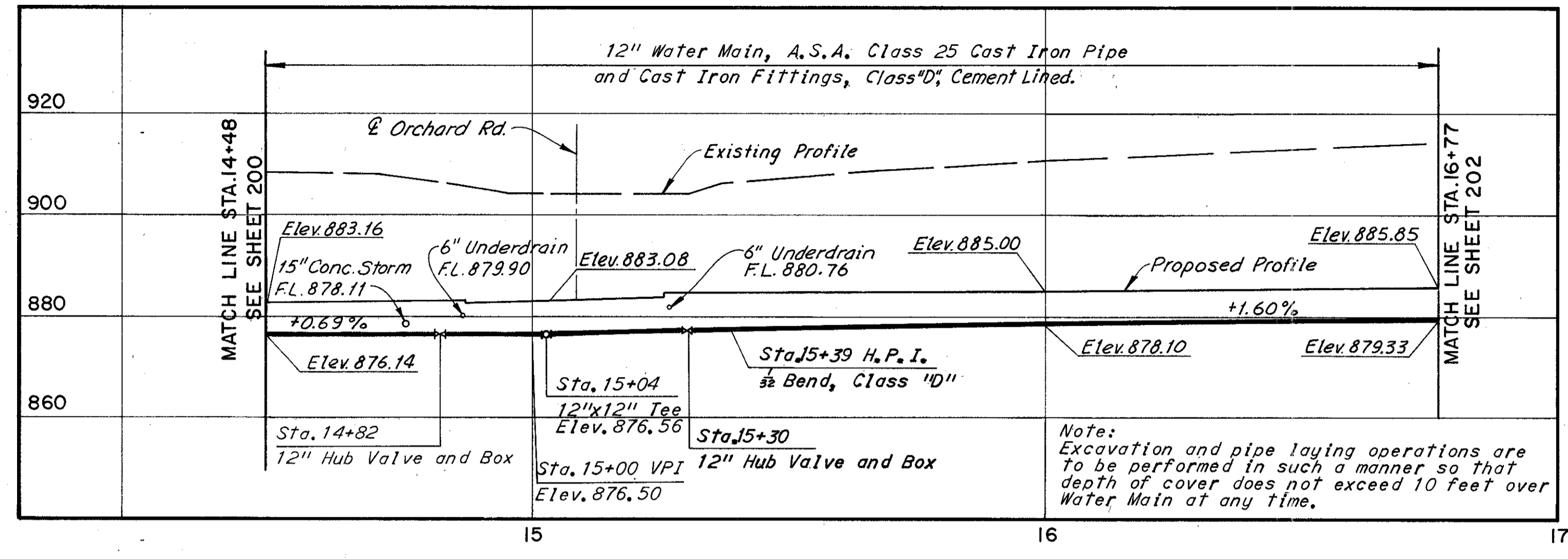
Notes:  
 For Waterwork Quantities See Sheet 207.  
 Bridge Footers shall be in place before 12" Water Main is installed.  
 Excavation and pipe laying operations are to be performed so that depth of cover does not exceed 10 feet over Water Main at any time.

APPROVED DATE JUNE 15, 1972  
*Franklin R. M... (Signature)*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond ... (Signature)*  
 DIRECTOR OF PUBLIC UTILITIES  
*Richard ... (Signature)*  
 COMMISSIONER OF WATER AND HEAT  
*David ... (Signature)*  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*William ... (Signature)*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE 1" = 20'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE I.T. DATE 3-3-71 CONSULTING ENGINEERS  
 TRCD J.M.C. DATE 3-11-71  
 C.K.D. E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

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CUY. 480-21.40



12" WATER MAIN-RELOCATED McCracken Road



Note:  
For Waterwork Quantities See Sheet 207.  
\*Work to be done by Contractor  
†Temporary Service not required, House Removed

Note: Concrete Pier details are shown on sheet 218.

Provide Temporary 8" C.I. Plug at Hydrant Tee Clamps and Concrete Pier (3'-0"x4'-0") (Include in cost of 12" Water Main)

Sta. 8+79.00, 6.00' Lt. Orchard Rd. = Sta. 1+27.66 12" Water Main & Bend, Class "D" and Concrete Pier (3'-0"x3'-6")

Sta. 9+05.00, 10.00' Lt. Orchard Rd. = Sta. 1+00.00 Existing 8" Water Main Install Temporary 2" New Service Pipe Install Plug when Disconnected and Remove Curb Cock Valve Box

Sta. 8+98.60, 10.00' Lt. Orchard Rd. = Sta. 1+06.40 Existing 8" Water Main Existing 8" Hub Valve Reset Valve Box to Grade

Sta. 8+83.00, 10.00' Lt. Orchard Rd. = Sta. 1+22.00 12" Water Main & Bend Class "D" and Concrete Pier (3'-0"x3'-6")

Begin 12" Water Main at Existing Hydrant Tee Sta. 8+85.20, 10.00' Lt. Orchard Rd. = Sta. 1+19.80 Existing 8" Water Main 12"x8" Reducer Class "D" Reset Valve Box to Grade

Install Temporary New Service Pipe 280 L.F. 1 1/2" Extra Heavy Galv. Black Iron Pipe, ASTM A-120 with Galv. Malleable Iron Screwed Fittings. To be laid with minimum 5 1/2" cover. Abandon in place when disconnected.

Temporary 1 1/2" New Service Pipe to be Installed at Proper Elevation to Clear Proposed Drive

Sta. 5+63.80, 6.00' Lt. Orchard Rd. = Sta. 4+42.86 12" Water Main Abandon Existing 4" Hydrant Furnish and Set 6" Hydrant Complete with 6" Valve and Box, 12"x12"x6" Tee, Class "D", 10 LF-6" ASA Class 25 C.I. Pipe All Lead Joints

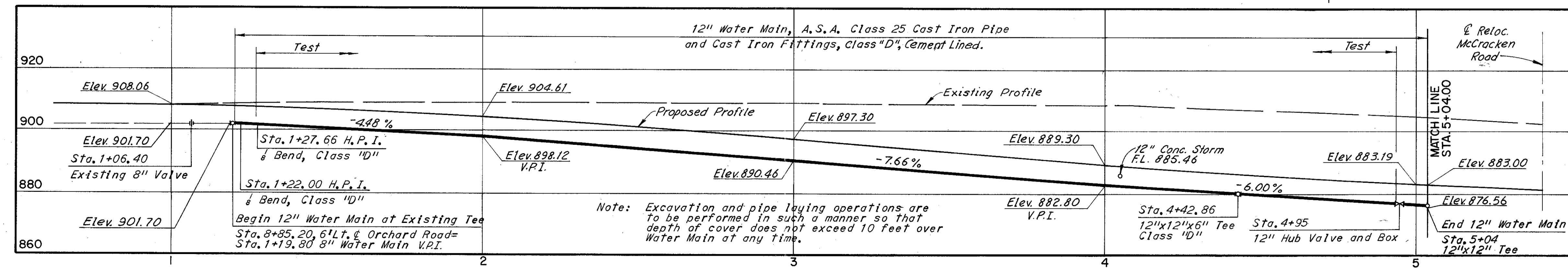
Sta. 64+54.11, 36.00' Lt. Reloc. McCracken Rd. = Sta. 15+30.00 12" Water Main 12" Hub Valve and Box

Sta. 5+11.66, 6.00' Lt. Orchard Rd. = Sta. 4+95.00 12" Water Main 12" Hub Valve and Box

Sta. 15+04.00 12" Water Main (McCracken Rd.) = Sta. 64+28.74, 36.00' Lt. Reloc. McCracken Rd. = Sta. 5+04.00 12" Water Main (Orchard Rd.) = Sta. 5+02.66, 6.00' Lt. Orchard Rd. 12"x12" Tee, Class "D" and Bend to Fit Concrete Pier (4'x5')

Sta. 64+08.00, 36.00' Lt. Reloc. McCracken Rd. = Sta. 14+82.00 12" Water Main 12" Hub Valve and Box

Sta. 14+48



Note: Excavation and pipe laying operations are to be performed in such a manner so that depth of cover does not exceed 10 feet over Water Main at any time.

12" WATER MAIN-ORCHARD ROAD

APPROVED DATE JUNE 15, 1972

*Frank R. Meloni*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond Redeker*  
DIRECTOR OF PUBLIC UTILITIES

*(S. Stallworth)*  
COMMISSIONER OF WATER AND HEAT

*David J. Quillen*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING

*William J. Swenson*  
ENGINEER OF CONSTRUCTION AND SURVEYS

*William J. Swenson*  
ENGINEER OF DESIGN

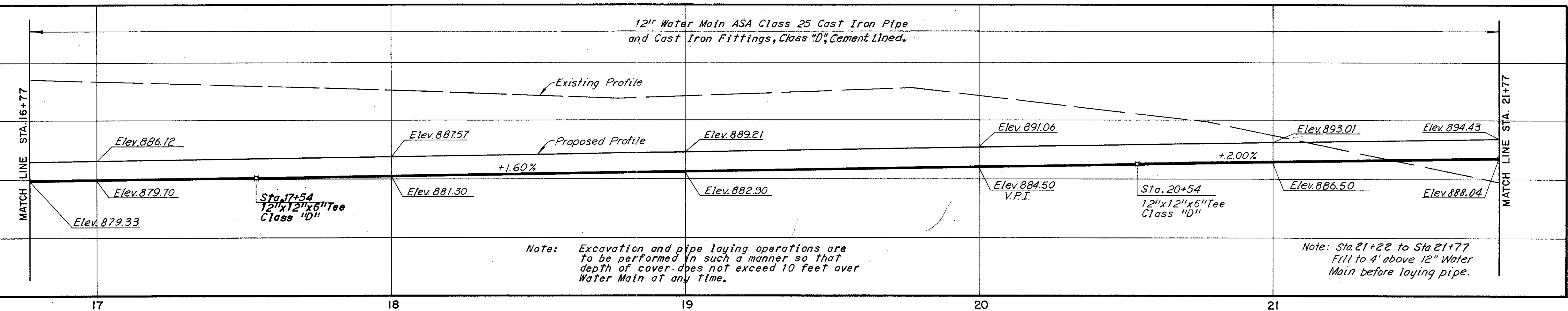
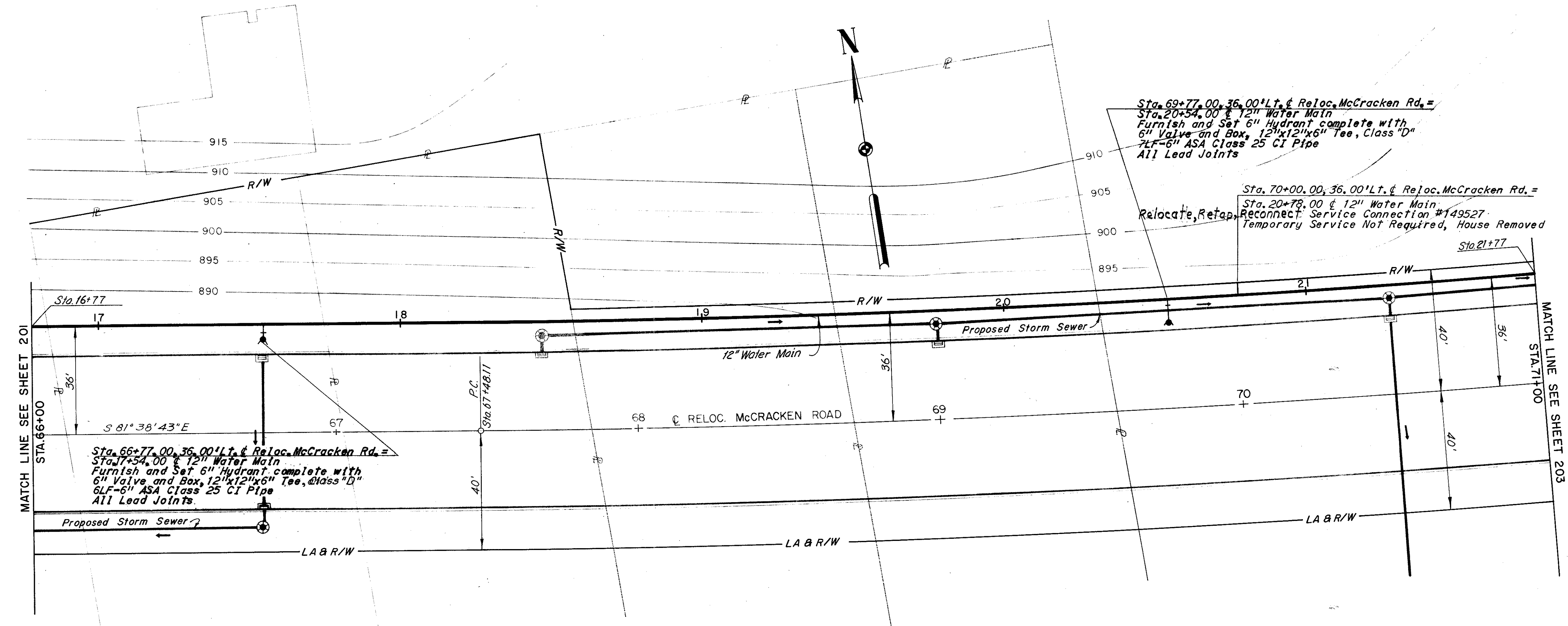
**2ND HIGH SERVICE DISTRICT**

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE 1"=20' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.J.T. DATE 3-1-71 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 3-26-71  
CKD E.R.H. DATE 5-17-72 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40



SCALE Hor. & Vert. 1"=20'  
MADE I.N.T. DATE 3-6-70  
TRCD U.M.C. DATE 4-3-70  
CKD E.R.H. DATE 5-17-70

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

Note: For Waterwork Quantities See Sheet 207.

APPROVED DATE JUNE 15, 1972

*Franklin R. Muelena*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Raduch*  
DIRECTOR OF PUBLIC UTILITIES  
*W. Stalworth*  
COMMISSIONER OF WATER AND HEAT  
*David O. Glavin*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**

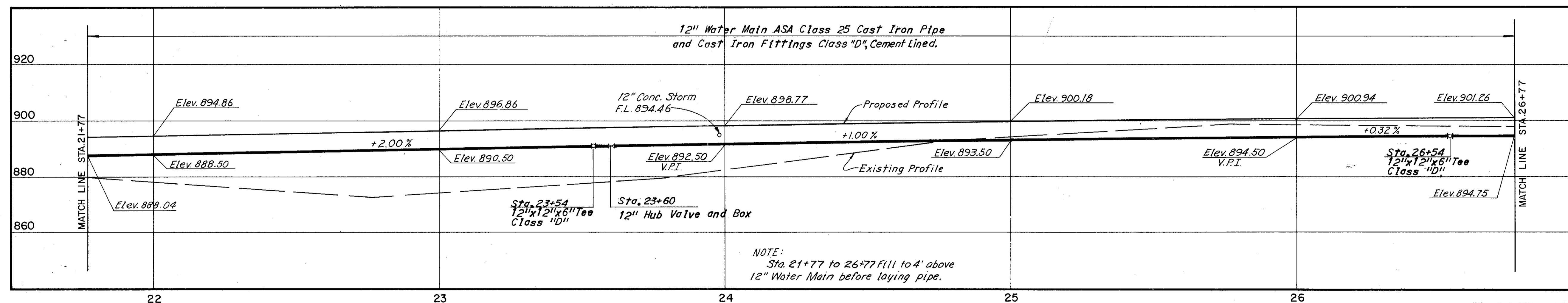
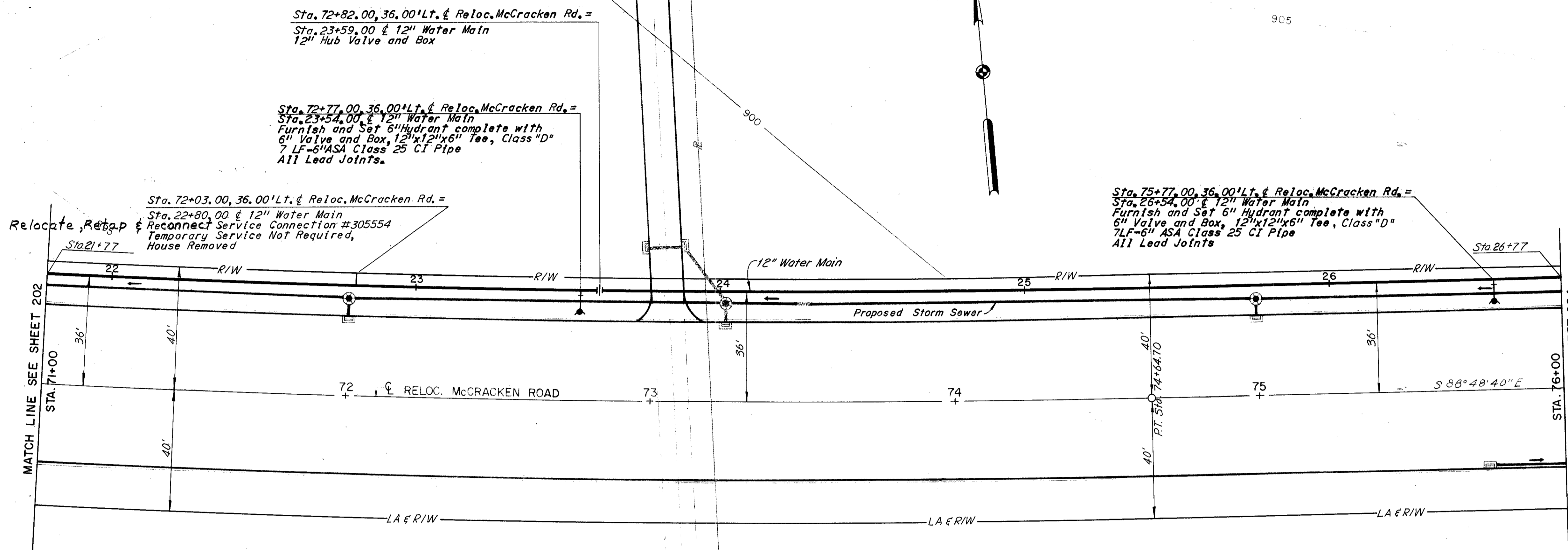
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

203  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



APPROVED DATE JUNE 15, 1972

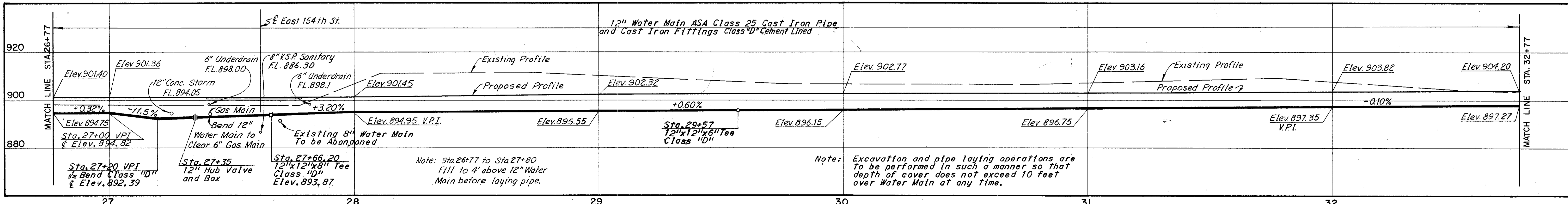
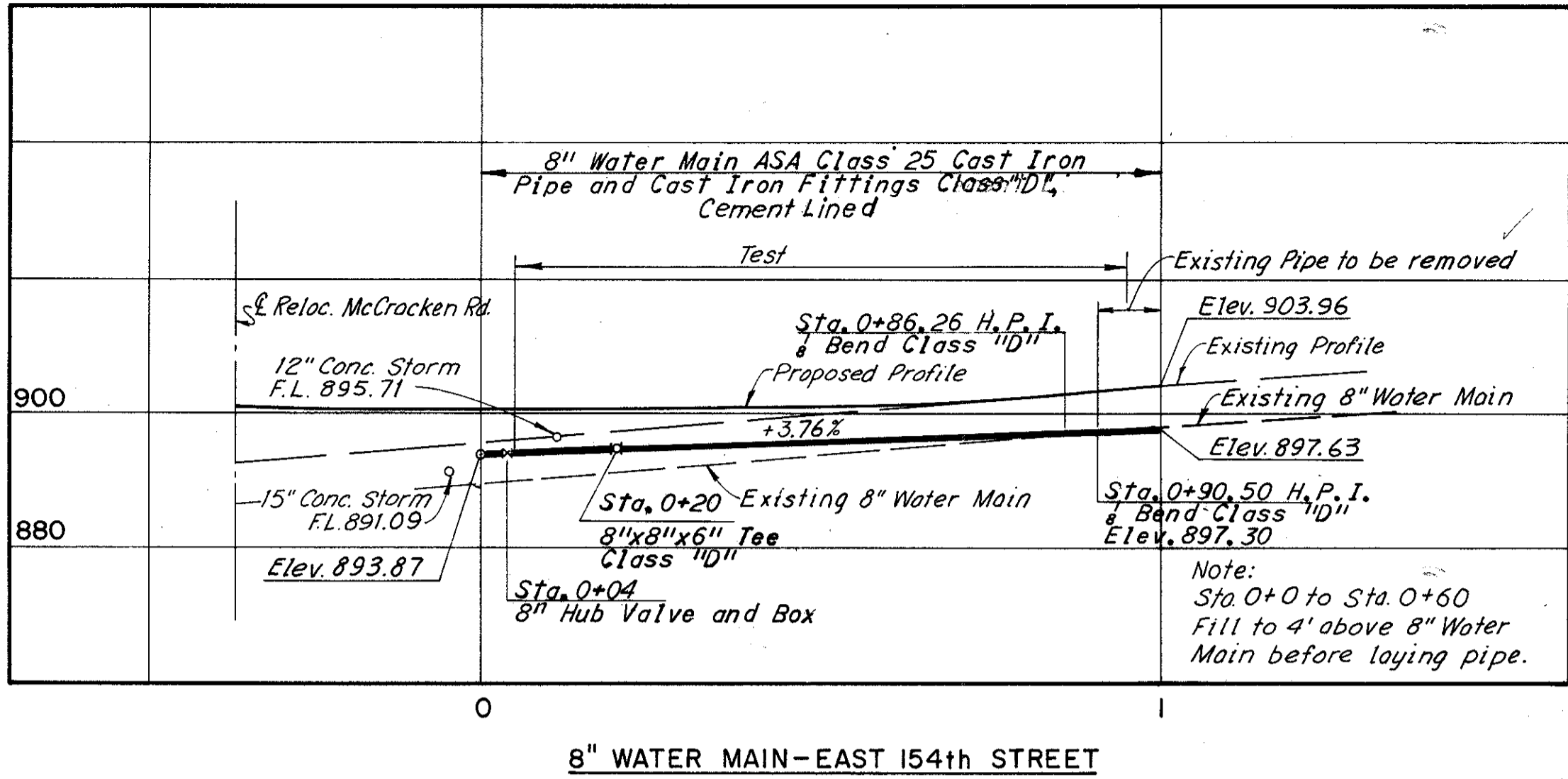
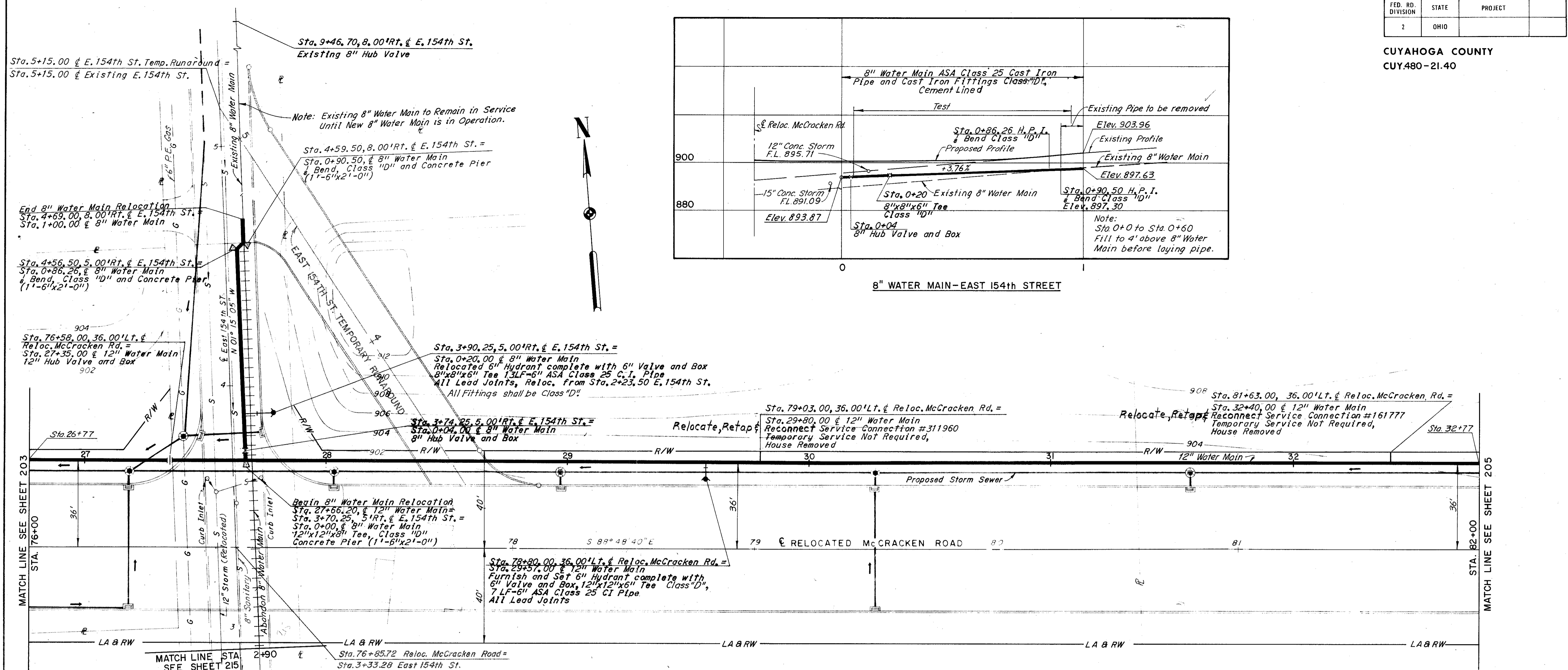
*Franklin R. Spelena*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Kudachan*  
DIRECTOR OF PUBLIC UTILITIES  
*William J. Sweeney*  
COMMISSIONER OF WATER AND HEAT  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David D. Huber*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
ENGINEER OF DESIGN

SCALE Hor & Vert 1"=20'  
MADE J.J.T. DATE 3-6-70  
TRCD. J.M.C. DATE 4-3-70  
CKD. E.R.H. DATE 5-17-72  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

Note: For Waterwork Quantities See Sheet 207.

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS





12" WATER MAIN RELOCATED McCracken RD.

Notes: For Waterwork Quantities in Relocated McCracken Road and E. 154th St. See Sheet 207.

SCALE: Hor. & Vert. 1" = 20'  
 MADE BY: HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 DATE: 3-6-70  
 TRCD: J.M.C. DATE: 2-3-70  
 CKD: E.R.H. DATE: 2-17-70  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

APPROVED: *Franklin R. McLean*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
 DATE: JUNE 15, 1972

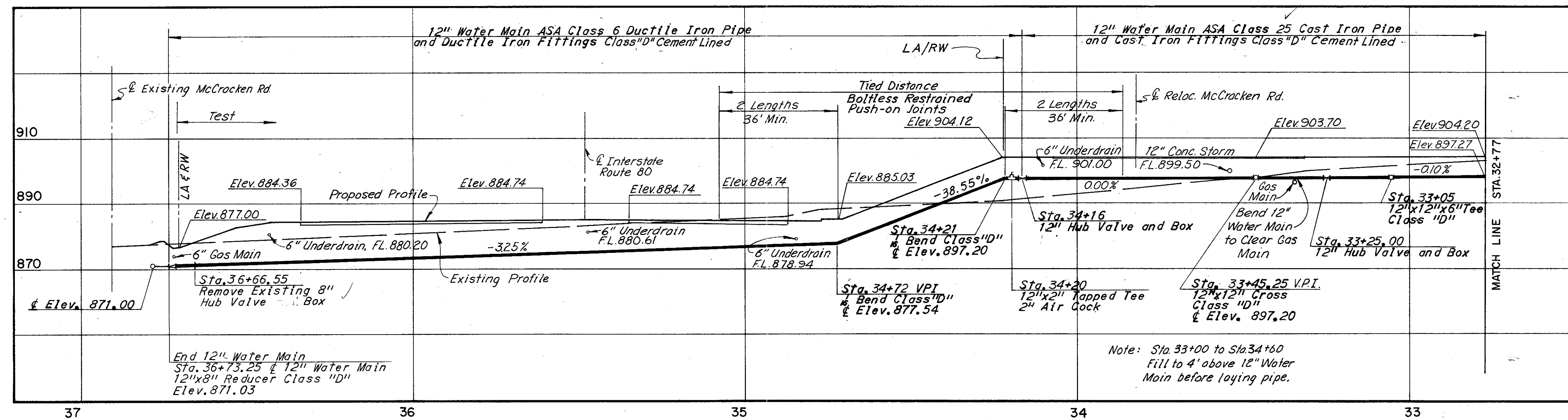
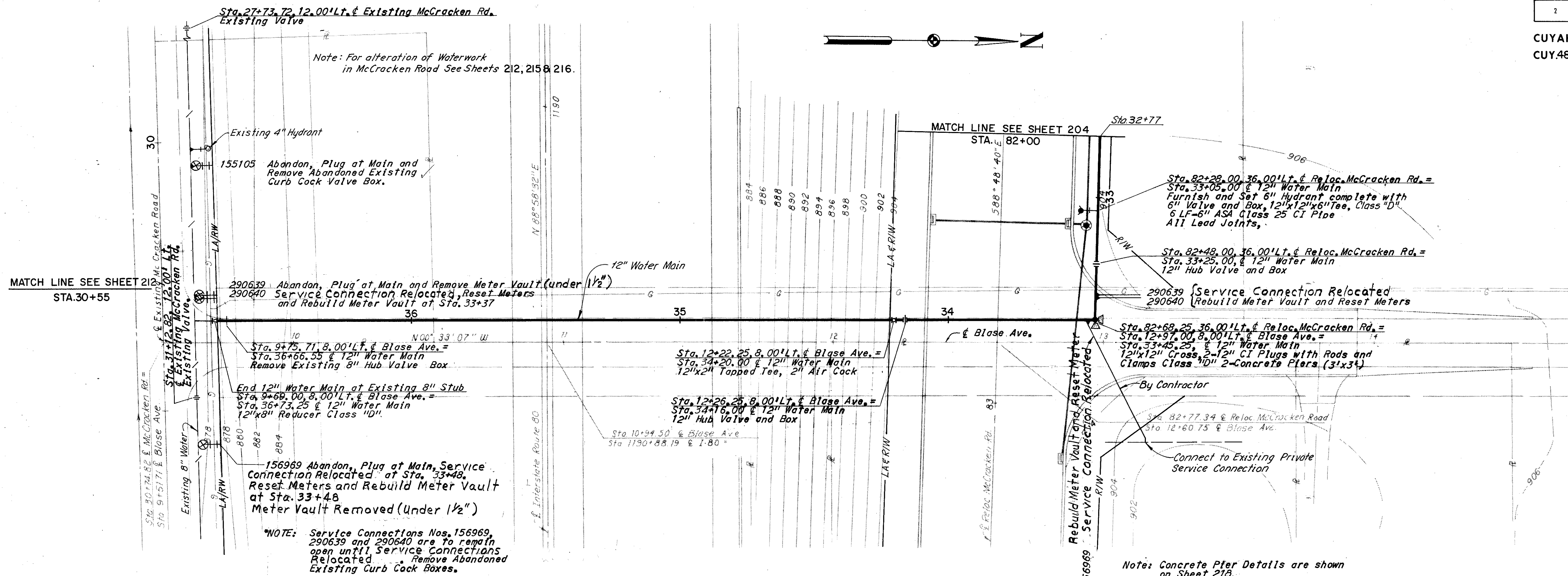
*Raymond Kudelski*  
 DIRECTOR OF PUBLIC UTILITIES  
*Richard A. Suter*  
 COMMISSIONER OF WATER AND HEAT  
*David D. Clifton*  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*William J. ...*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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390

CUYAHOGA COUNTY  
CUY.480-21.40



Note: For Waterwork Quantities See Sheet 207.

APPROVED DATE JUNE 15, 1972

*Frank R. McLaughlin*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond D. Duda*  
DIRECTOR OF PUBLIC UTILITIES

*Richard L. Fagan*  
COMMISSIONER OF WATER AND HEAT

*Richard L. Fagan*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING

*David O. Platten*  
ENGINEER OF CONSTRUCTION AND SURVEYS

*William S. Swann*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**

DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

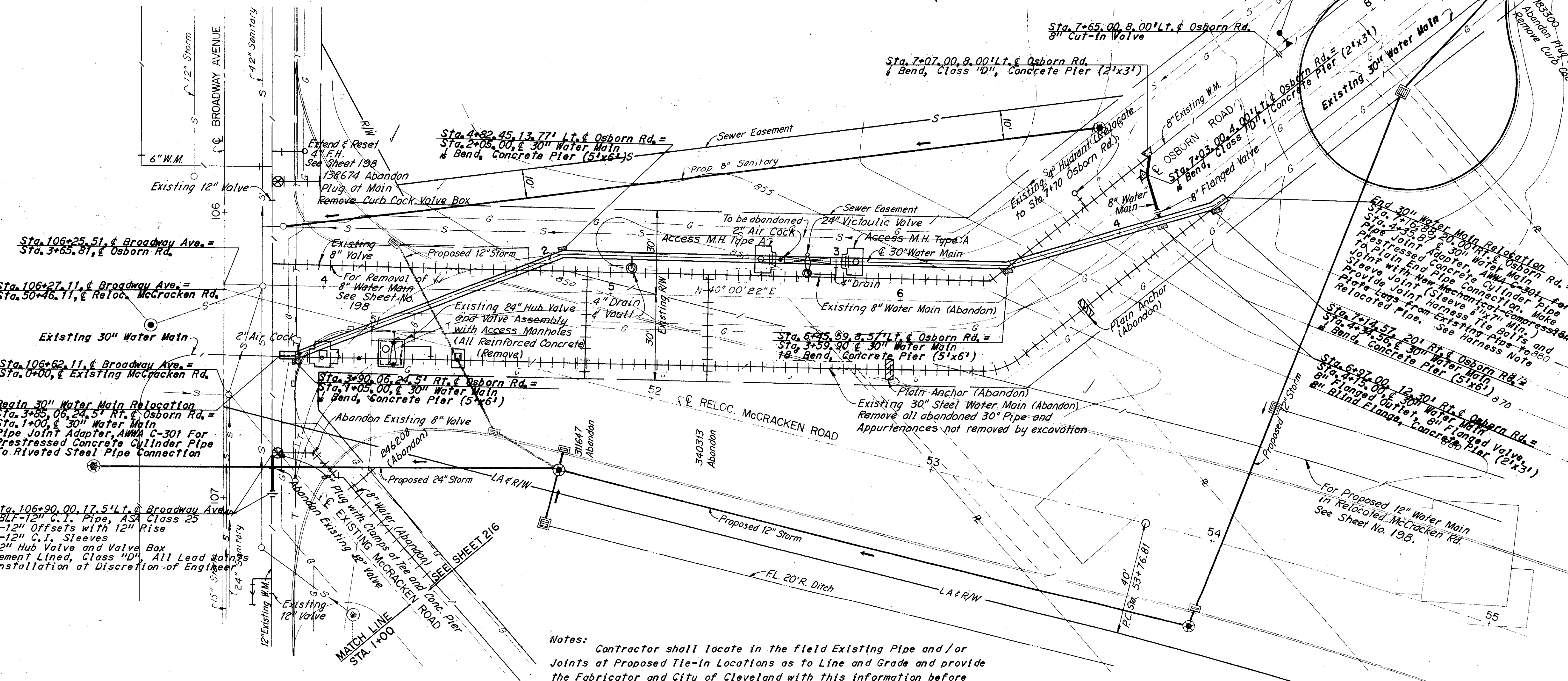
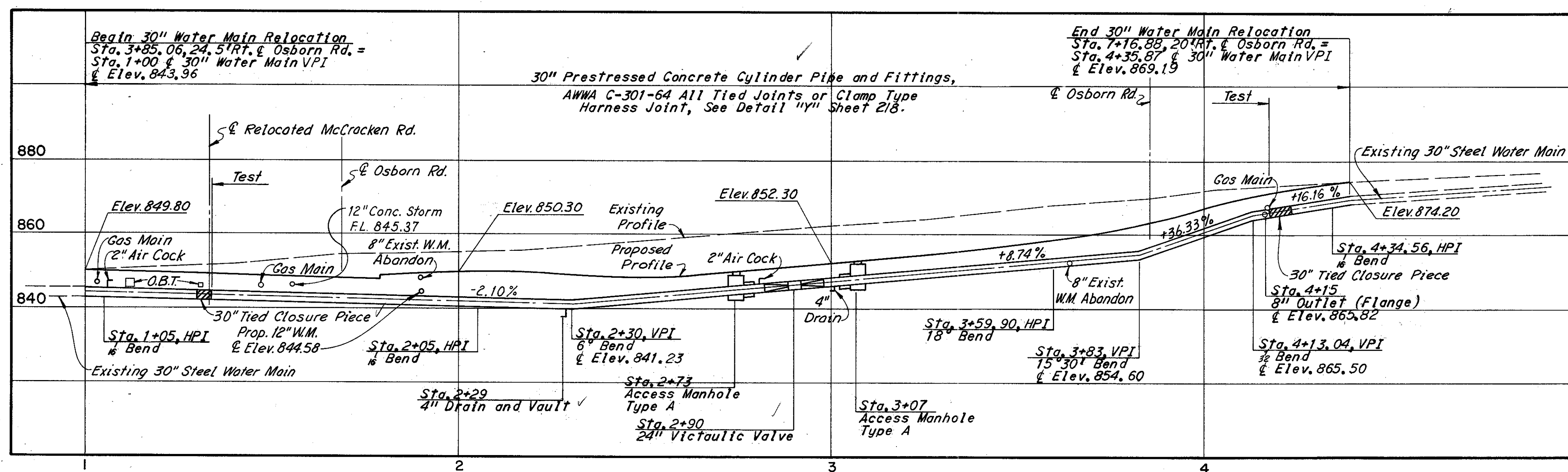
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE: Hor. & Vert. 1" = 20'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.V.E. DATE 9-6-70 CONSULTING ENGINEERS  
TRCD L.M.C. DATE 4-3-70  
CKD E.R.H. DATE 5-17-70 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
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390

CUYAHOGA COUNTY  
CUY. 480-21.40



**Harness Note:**  
Plate lugs shall be:  
12 1/2" min. length from bend line to open end in a modified "V" form.  
3/4" bend line to bend line.  
6 1/2" high at bend line.  
2 1/2" high at open end.  
9/16" at open end  
3/4" thick plate  
Bolt holes:  
2 1/2" in diameter.  
4 1/4" above pipe surface  
Bolts:  
2 1/2" diameter x 42 1/2" long.  
Welded to existing and relocated pipe with 3/8" fillet welds all around with open ends to joint and out to out distance of lugs of 3 1/2".  
Six (6) assemblies required per joint.  
For detail of Joint Harness tie bolts and lugs see sheet 221.  
All Cast Iron Fittings shall be Class "D".

APPROVED DATE JUNE 15, 1972  
*Donald R. Kessel*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond P. ...*  
ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond P. ...*  
DIRECTOR OF PUBLIC UTILITIES  
*William J. ...*  
COMMISSIONER OF WATER AND HEAT  
*David S. ...*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*William J. ...*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. ...*  
ENGINEER OF DESIGN

Notes:  
Contractor shall locate in the field Existing Pipe and/or Joints at Proposed Tie-in Locations as to Line and Grade and provide the Fabricator and City of Cleveland with this information before Contractor will be permitted to make any connections.

See Concrete Pier Details on Sheet 218.

For Water Work Quantities, 8" Water Main and 30" Water Main in Relocated McCracken Road and 12" Water Main in Broadway Ave., See Sheet 207.

For Construction Procedure See Sheet 207.

SCALE: Hor. & Vert. 1"=20'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE IN U.S.A. DATE 3-6-70  
TRCD. J.M.C. DATE 4-3-70  
CKD. E.R.H. DATE 5-17-72  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS AND THE CITY OF MAPLE HEIGHTS

30" WATER MAIN-OSBORN ROAD AT BROADWAY AVE.  
(SHEET 206)

Table with 4 columns: ITEM, DESCRIPTION, QUANTITY, UNIT. Lists various pipe and fitting items for the 30-inch water main project.

\* or Clamp Type Harness Joint

12" WATER MAIN-ORCHARD ROAD  
(SHEET 201)

Table with 4 columns: ITEM, DESCRIPTION, QUANTITY, UNIT. Lists various pipe and fitting items for the 12-inch water main project.

12" WATER MAIN-RELOCATED McCRACKEN ROAD (SHEETS 198-205)  
(INCLUDING E.154 ST. AND UNDER I-480 AT BLASE AVE.)

Table with 4 columns: ITEM, DESCRIPTION, QUANTITY, UNIT. Lists various pipe and fitting items for the 12-inch water main relocation project.

UNDER BEDFORD FREEWAY AT OSBORN RD. AND CONNECTION TO E.141 ST.  
(SHEETS 194 & 197)

CONSTRUCTION PROCEDURE

The Contractor shall notify the Utilities Engineering Office three (3) weeks prior to starting water work. Telephone 964-3125.

The 30" water main in Osborn Road may be shut down for three (3) day maximum periods between October 15th and April 1st upon written permission from the Director of Public Utilities.

The water work in Osborn Road, under the Bedford Freeway and connection to East 141st Street must be installed and in service prior to water work in existing Osborn Road and in Relocated McCracken Road at Broadway Avenue.

The existing 8" and 30" water mains in Osborn Road must be left in service until 8", 12" and 30" water main relocations are installed and in service.

Bedford Freeway earthwork shall be constructed to proposed profile prior to water work.

The sequence of construction for new 8", 12" and 30" water mains is as follows:

- 1. Construct 8" and 12" water mains to points in Osborn Road and East 141st Street as shown on Plans (Sheets 208 and 211) and prepare for testing.
2. Construct 30" water main relocation to points in Osborn Road as shown on Plans (Sheet 208) and prepare for testing.
3. Chlorination and testing of new water mains, Items 1 and 2, shall be under supervision of the Division of Water.
4. After chlorination and testing, the new water mains Item 1 and 2 may be connected.
5. After new water mains are connected open valves Item 4a and 4b to restore service.
6. Division of Water personnel will open and close all valves.
7. Abandoned pipe not removed by roadway excavation shall be filled with sand and ends plugged with concrete.

Quantity Calculations
Made By J.L.T. Date 3-18-71
Checked By E.R.H. Date 5-72

Table with columns: FED. RD. DIVISION, STATE, PROJECT. Values: 7, OHIO, [blank]

207
390

CUYAHOGA COUNTY
CUY 480-21.40

RELOCATED McCRACKEN RD.
(OSBORN RD.) AT BROADWAY AVE.
(SHEET 206)

CONSTRUCTION PROCEDURE

The Contractor shall notify the Utilities Engineering Office three (3) weeks prior to starting water work. Telephone 964-3125.

The 30" water main in Osborn Road and Broadway Avenue may be shut down for three (3) day maximum periods between October 15th and April 1st upon written permission from the Director of Public Utilities.

The water work relocation under the Bedford Freeway at Osborn Road and connection to East 141st Street must be complete and in service prior to starting this water work. (Sheets 208 & 211)

Existing 30" water main in Osborn Road must remain in service during construction of new water main.

The sequence of construction for 8" connection and 30" water main relocation is as follows:

- 1. Install 8" cut-in valve in Osborn Road at Sta. 7+65. Close valve.
2. The existing 8" water main in Osborn Road shall be abandoned after performing the following in Broadway Avenue:
a. Close existing 12" valves in Broadway Avenue at Sta. 105+95± and Sta. 106+90±.
b. Cut existing 8" water main at Osborn Road at 12"x12"x8" tee and temporary plug with 8" C.I. plug with rods and clamps.
c. Open valves Item 2a.
3. The earthwork in Relocated McCracken Road to proposed profile shall be performed between Pipe Sta. 1+33± and Sta. 4+18±. The existing 30" water main shall not be disturbed and shall remain in service during above earthwork, subsequent pipe installation, testing and chlorination.
4. Install 30" water main relocation and 8" connection to points shown on plans. After chlorination and testing the new water mains may be connected after performing the following:
a. Close existing 24" valves at Sta. 10+77± Osborn Road and Sta. 114+67± Broadway Avenue and existing 12" valve on 12" crossover at Sta. 109+18± Broadway Avenue.
b. Remove existing access manhole in Existing Osborn Road.
5. The new 30" water main may be put into service by opening existing valves Item 4a. The 8" cut-in valve, Item 1, shall be opened to put 8" water main into service.
6. The Division of Water personnel will open and close all valves.
7. Abandoned pipe not removed by roadway excavation shall be filled with sand and ends plugged with concrete.

GENERAL NOTES

All paved areas, curb, sidewalk, etc. that fall outside of the limits shown on the pavement detail sheets and have been removed or damaged due to the water relocation work, shall be restored. The cost of such work shall be included in the price bid for waterwork items.

Flange and lead joints are required at certain locations, the class of which are referred to on alignment drawings.

It shall be the responsibility of the Contractor to locate the joints exactly and supply the Engineer and Pipe Fabricator with the measurements.

The Contractor shall furnish measurements to the Engineer and Fabricator and submit shop drawings for approval for closure sections, using closure pieces as required. If the abandoned section of water main, other than that removed in the excavation of the freeway, is to be left in place, it shall be filled with sand and plugged with concrete.

Locations of closures are indicated on the alignment drawings; however, the Contractor may furnish additional closures in order to expedite the work and to provide for the satisfactory installation of the water main.

APPROVED [Signature] DATE JUNE 15, 1972
ENGINEER, CITY OF GARFIELD HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
ENGINEER OF DESIGN

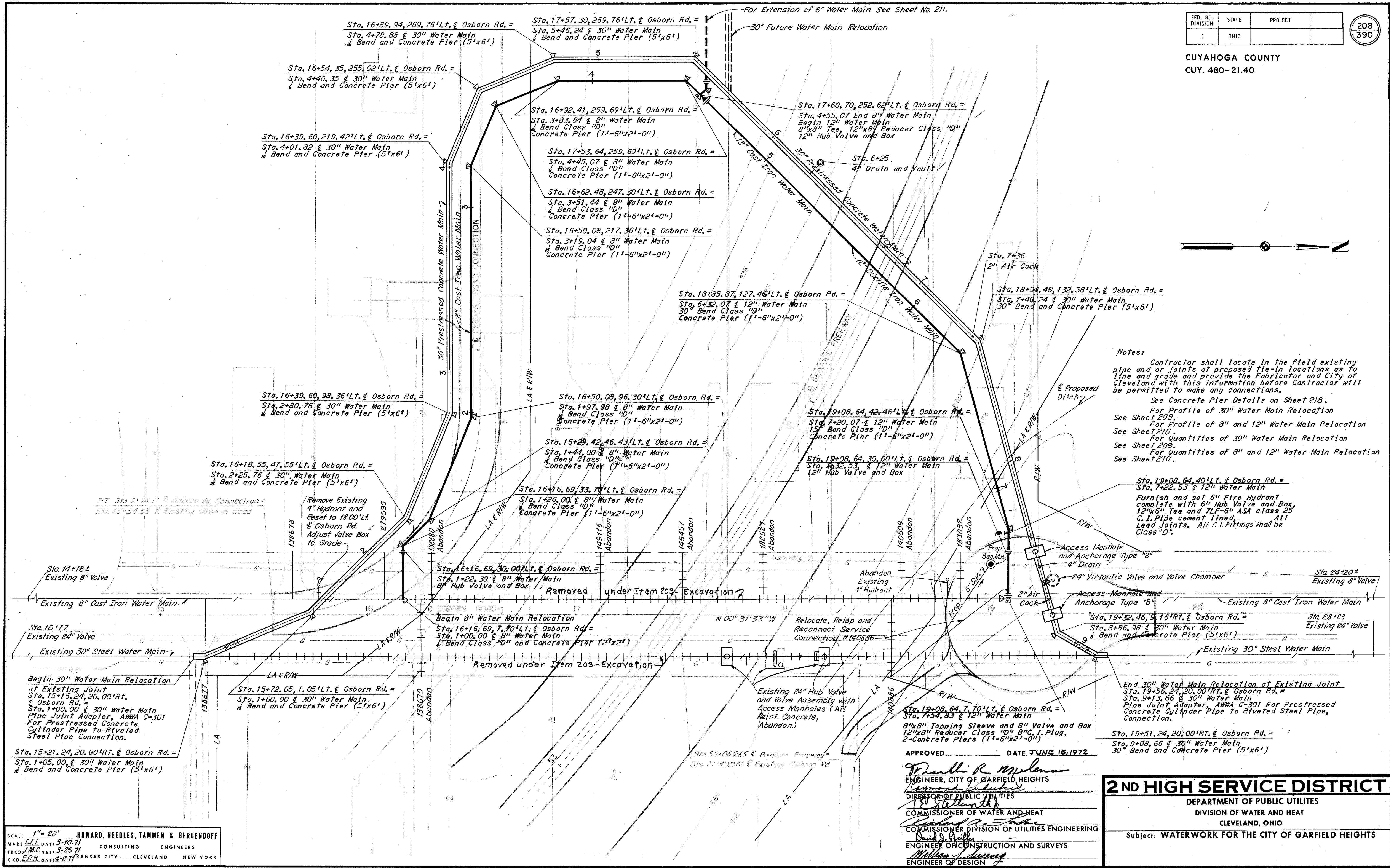
2 ND HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITIES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE No Scale HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE L.L.T. DATE 3-18-71 CONSULTING ENGINEERS
TRCD L.M.C. DATE 5-18-72
CRD E.R.H. DATE 5-18-72 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

208  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



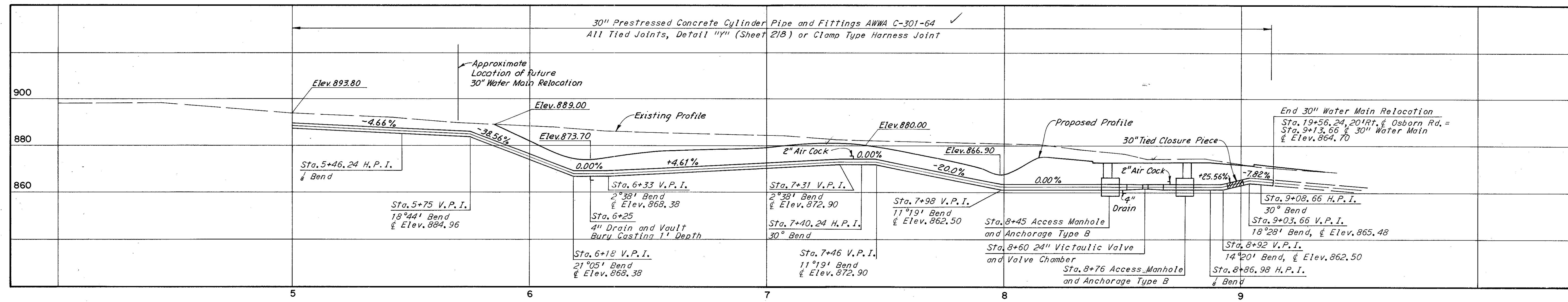
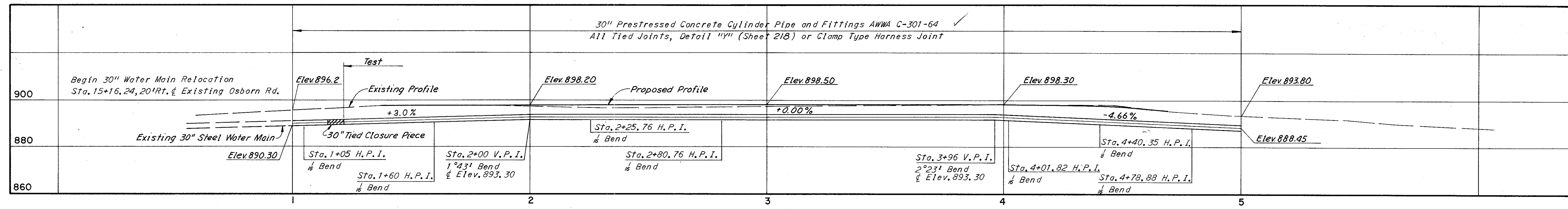
**Notes:**  
 Contractor shall locate in the field existing pipe and or joints at proposed tie-in locations as to line and grade and provide The Fabricator and City of Cleveland with this information before Contractor will be permitted to make any connections.  
 See Concrete Pier Details on Sheet 218.  
 For Profile of 30" Water Main Relocation See Sheet 209.  
 For Profile of 8" and 12" Water Main Relocation See Sheet 210.  
 For Quantities of 30" Water Main Relocation See Sheet 209.  
 For Quantities of 8" and 12" Water Main Relocation See Sheet 210.

APPROVED DATE JUNE 15, 1972

*Frank R. Mullen*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Pulver*  
 DIRECTOR OF PUBLIC UTILITIES  
*David J. Sullivan*  
 COMMISSIONER OF WATER AND HEAT  
*Richard J. ...*  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David J. ...*  
 ENGINEER OR CONSTRUCTION AND SURVEYS  
*William J. ...*  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE 1" = 20'  
 MADE I.T. DATE 3-10-71 HOWARD, NEEDLES, TAMMEN & BERGENDOFF ENGINEERS  
 TRCD J.M.C. DATE 3-25-71 CONSULTING ENGINEERS  
 CKD E.R.H. DATE 4-21-71 KANSAS CITY CLEVELAND NEW YORK



ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	30" Pre-stressed Concrete Cylinder Pipe and Fittings AWWA C-301-64 (All Tied Joints)	826	Lin. Ft.
Special	Pre-stressed Concrete Cylinder Pipe to Riveted Steel Pipe Joint Concrete Pipe Joint Adapter AWWA C-301-30	2	Each
Special	4" Drain - Complete	2	Each
Special	2" AirCock - Complete	2	Each
Special	24" Victaulic Valve	1	Each
Special	Valve Chamber-	1	Each
Special	Access Manhole and Anchorage Type "B"	2	Each
202	Valve Chamber Abandoned	1	Each
Special	Miscellaneous Metal Work	3950	Lbs.
Special	30" Tied Closure Piece	2	Each
Special	Drain Vault	1	Each
202	Access Manhole and Anchorage Type "A" Abandoned	2	Each

Note: For Plan of 30" Water Main See Sheet 208.

Quantity Calculations  
Made By JLI Date 3-16-71  
Checked By ERH Date 4-2-71

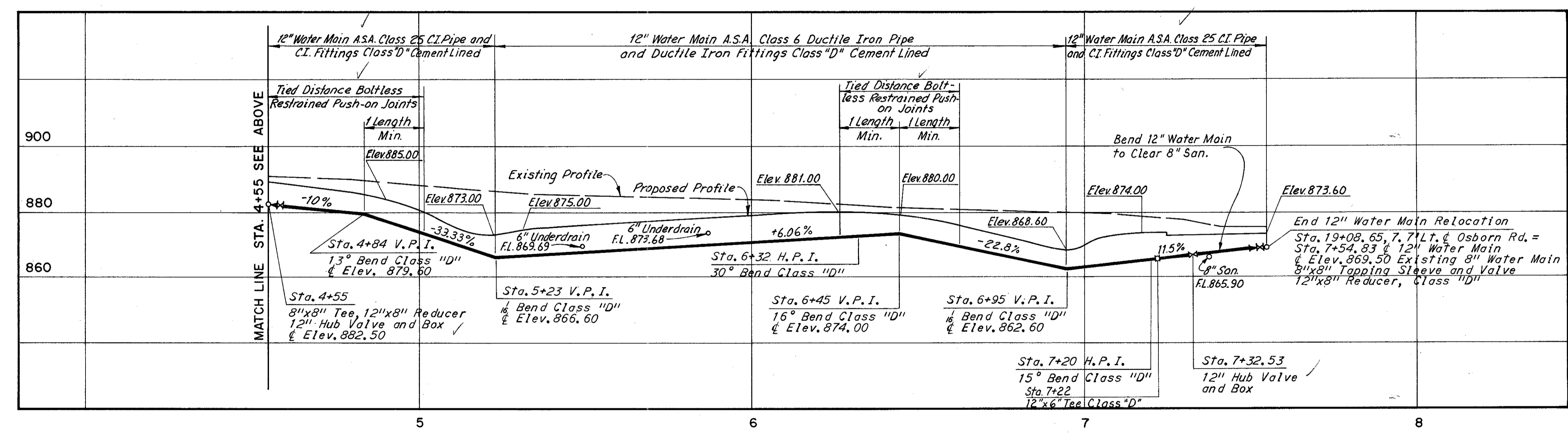
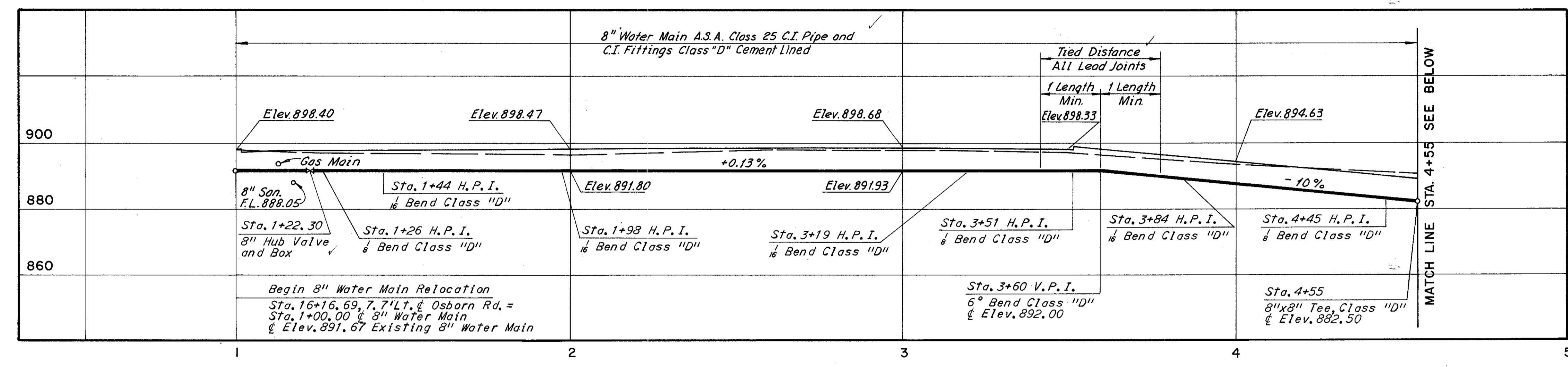
SCALE 1"=20'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE T.J.I. DATE 3-16-71 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 3-30-71  
CKD E.R.H. DATE 4-2-71 KANSAS CITY CLEVELAND NEW YORK

APPROVED DATE JUNE 15, 1972  
*Franklin R. ...*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond ...*  
DIRECTOR OF PUBLIC UTILITIES  
*Stallworth*  
COMMISSIONER OF WATER AND HEAT  
*...*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David J. ...*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. ...*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By I.I.I. Date 3-2-71  
Checked By E.R.H. Date 5-18-72



ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	12" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined	81	Lin. Ft.
Special	12" Water Main A.S.A. Class 6 Ductile Iron Pipe and D.I. Fittings Class "D" Cement Lined	136	Lin. Ft.
Special	8" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined	319	Lin. Ft.
Special	12" Water Main A.S.A. Class 6 Ductile Iron Pipe and D.I. Fittings Class "D" Cement Lined Boltless Restrained Push-On Joints	36	Lin. Ft.
Special	8" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined All Lead Joints	47	Lin. Ft.
Special	12" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined Boltless Restrained Push-On Joints		

ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	12" Hub Valve	2	Each
Special	8" Hub Valve	1	Each
Special	Adjust Valve Box to Grade	1	Each
Special	6" Hub Valve	1	Each
Special	Remove and Reset 4" Fire Hydrant Complete	1	Each
Special	8" x 8" Tapping Sleeve and 8" Tapping Valve Complete	1	Each
Special	Service Connection - Relocate, Retap and Reconnect	1	Each
Special	Miscellaneous Metal Work	545	Lbs.
Special	6" Water Main ASA Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined All Leads Joints	7	Lin. Ft.
Special	Plugging Existing Water Mains and Branches	1	Each

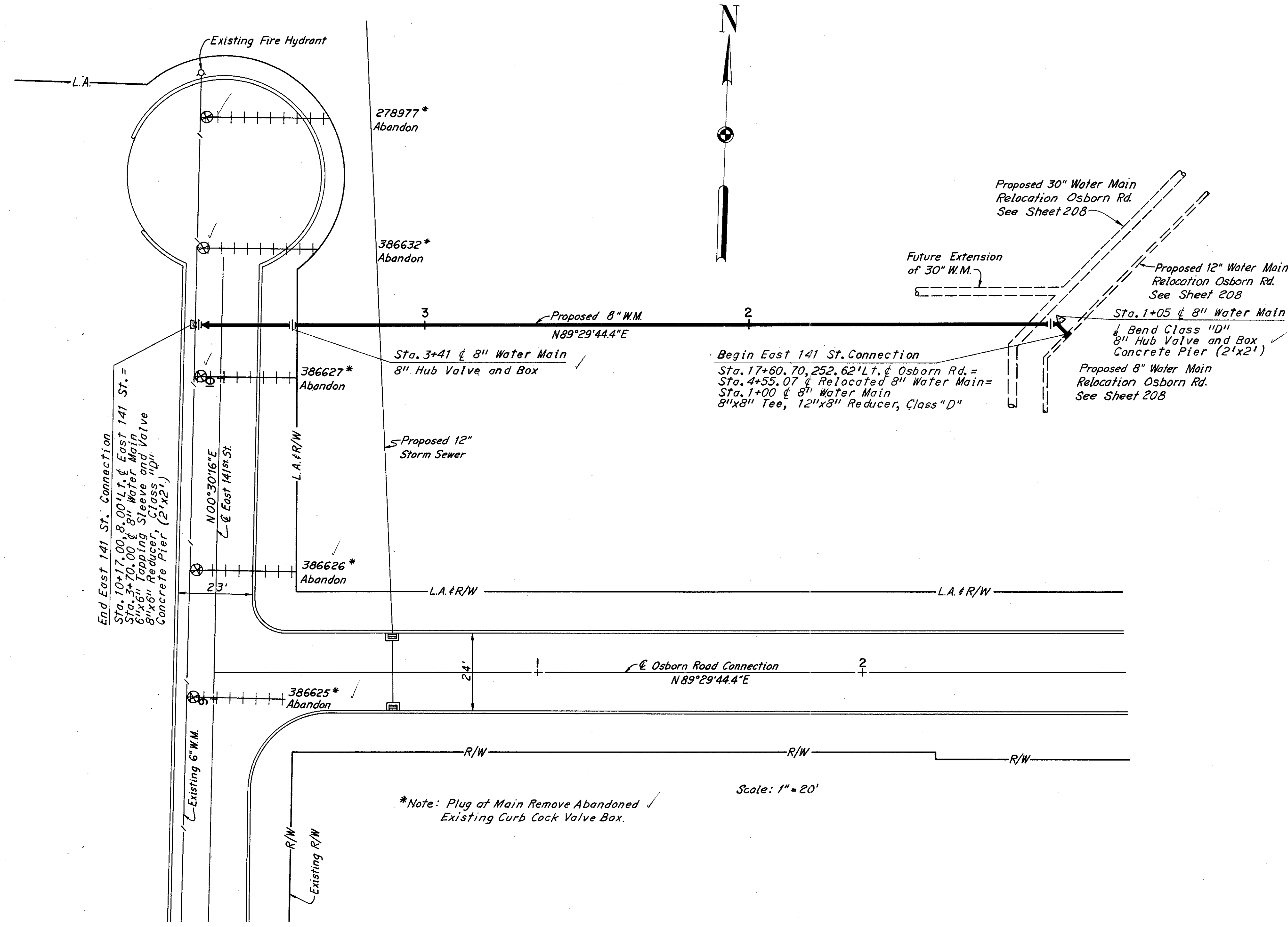
APPROVED DATE JUNE 15, 1972  
*Franklin R. McLean*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond J. Anderson*  
 DIRECTOR OF PUBLIC UTILITIES  
*Richard C. ...*  
 COMMISSIONER OF WATER AND HEAT  
*David J. ...*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. ...*  
 ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE 1" = 20'  
 HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 MADE I.I.I. DATE 3-2-71 CONSULTING ENGINEERS  
 TRCD J.M.C. DATE 3-23-71  
 CKD E.R.H. DATE 5-18-72 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY. 480-21.40

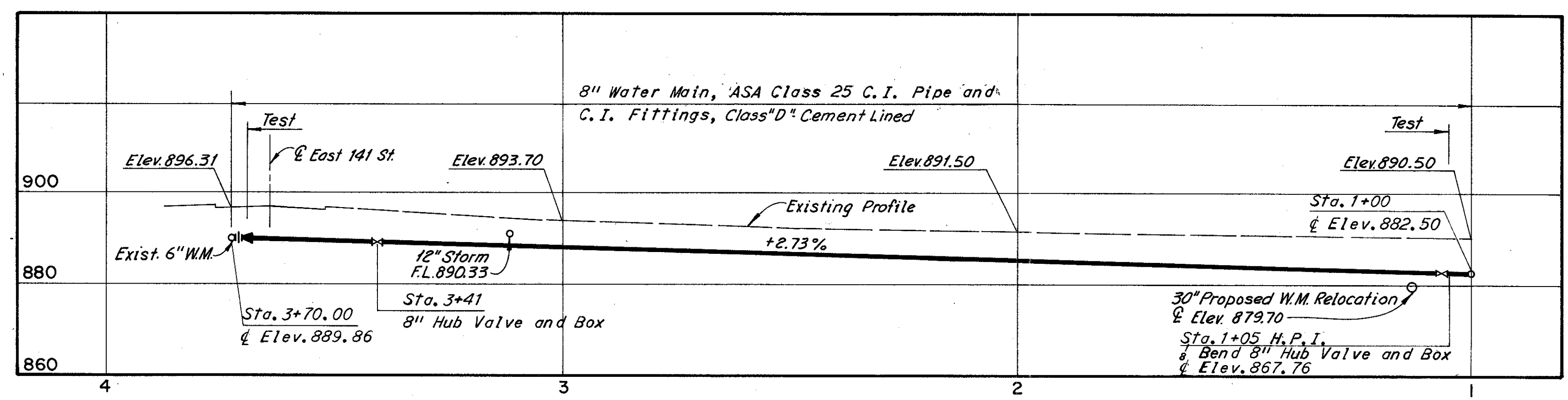
Quantity Calculations  
Made By J.T. Date 3-6-70  
Checked By ERH Date 5-18-72



\*Note: Plug at Main Remove Abandoned Existing Curb Cock Valve Box.

Scale: 1" = 20'

ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	8" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined	270	Lin. Ft.
Special	8" Hub Valve	2	Each
Special	6"x6" Tapping Sleeve and 6" Tapping Valve Complete	1	Each
Special	Miscellaneous Metal Work	366	Lbs.
Special	Plugging Service Connections (3/4" - 2")	5	Each
Special	Remove Abandoned Curb Cock Valve Box	5	Each



Scale: Hor. & Vert. 1" = 20'

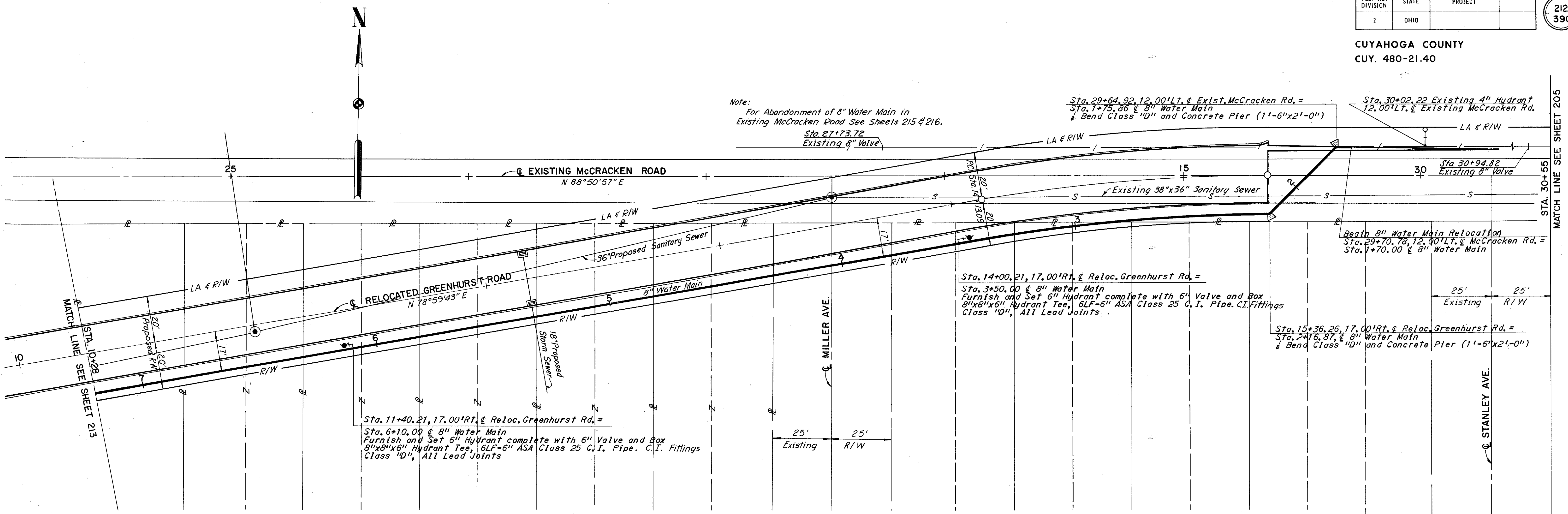
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HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
MADE BY J.T. DATE 3-6-70  
TRCD. J.M.C. DATE 4-3-70  
CKD. ERH DATE 5-18-72  
KANSAS CITY CLEVELAND NEW YORK

APPROVED: DATE JUNE 15, 1972  
*Franklin R. ...*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond ...*  
DIRECTOR OF PUBLIC UTILITIES  
*...*  
COMMISSIONER OF WATER AND HEAT  
*...*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*...*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*...*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS



CUYAHOGA COUNTY  
CUY. 480-21.40



Note:  
For Abandonment of 8" Water Main in Existing McCracken Road See Sheets 215 & 216.  
Sta. 27+73.72 Existing 6" Valve

Sta. 29+64.92, 12.00' LT. & Exist. McCracken Rd. = Sta. 1+75.86 & 8" Water Main & Bend Class "D" and Concrete Pier (11'-6"x2'-0")

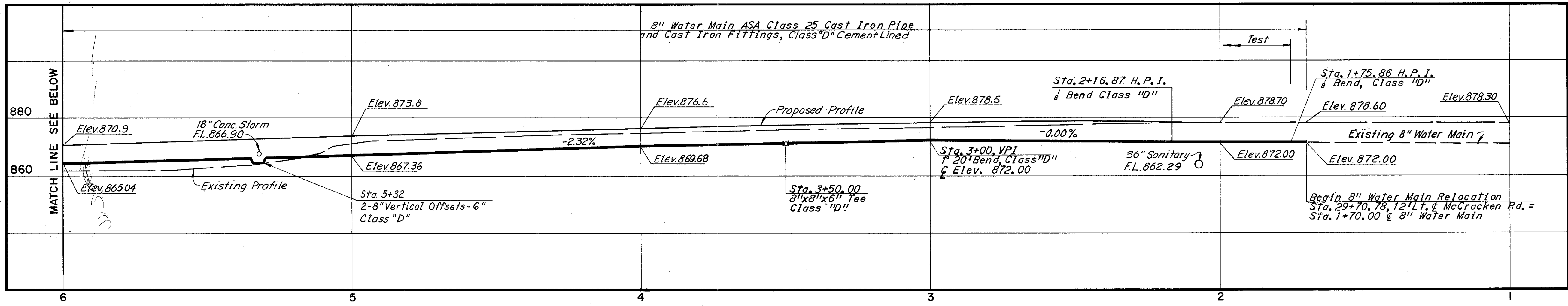
Sta. 30+02.22 Existing 4" Hydrant 12.00' LT. & Existing McCracken Rd. =

Sta. 14+00.21, 17.00' RT. & Reloc. Greenhurst Rd. = Sta. 3+50.00 & 8" Water Main Furnish and Set 6" Hydrant complete with 6" Valve and Box 8"x8"x6" Hydrant Tee, 6LF-6" ASA Class 25 C.I. Pipe, C.I. Fittings Class "D", All Lead Joints.

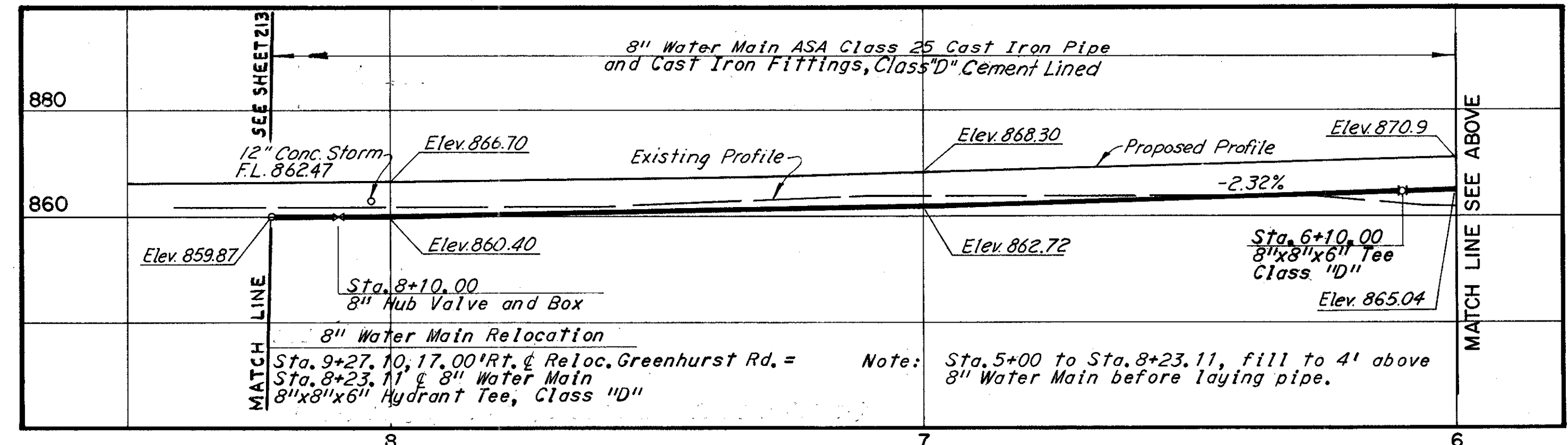
Sta. 11+40.21, 17.00' RT. & Reloc. Greenhurst Rd. = Sta. 6+10.00 & 8" Water Main Furnish and Set 6" Hydrant complete with 6" Valve and Box 8"x8"x6" Hydrant Tee, 6LF-6" ASA Class 25 C.I. Pipe, C.I. Fittings Class "D", All Lead Joints

Sta. 15+36.26, 17.00' RT. & Reloc. Greenhurst Rd. = Sta. 2+16.87 & 8" Water Main & Bend Class "D" and Concrete Pier (11'-6"x2'-0")

Begin 8" Water Main Relocation Sta. 29+70.78, 12.00' LT. & McCracken Rd. = Sta. 1+70.00 & 8" Water Main



Note: For Quantities See Sheet 213.



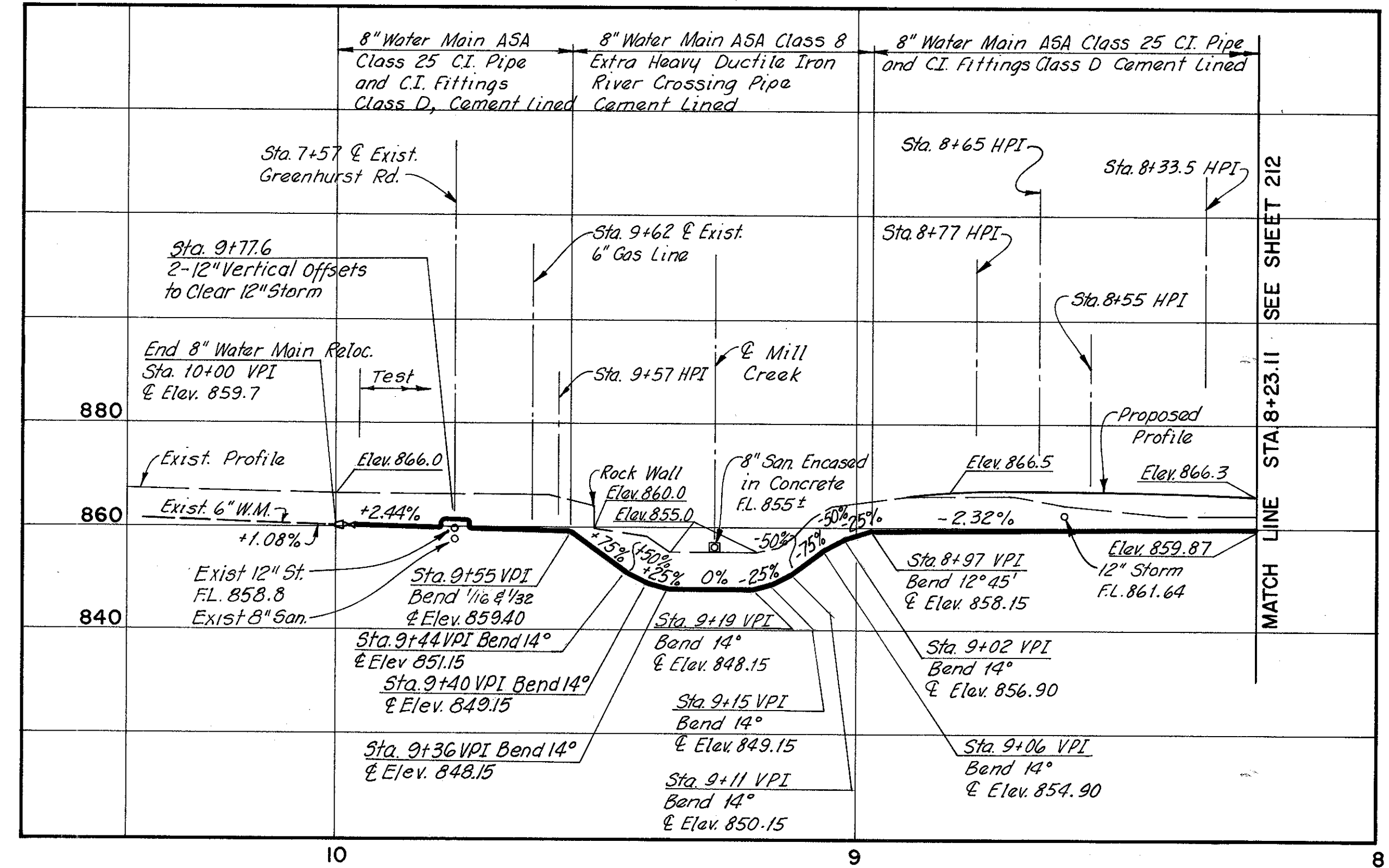
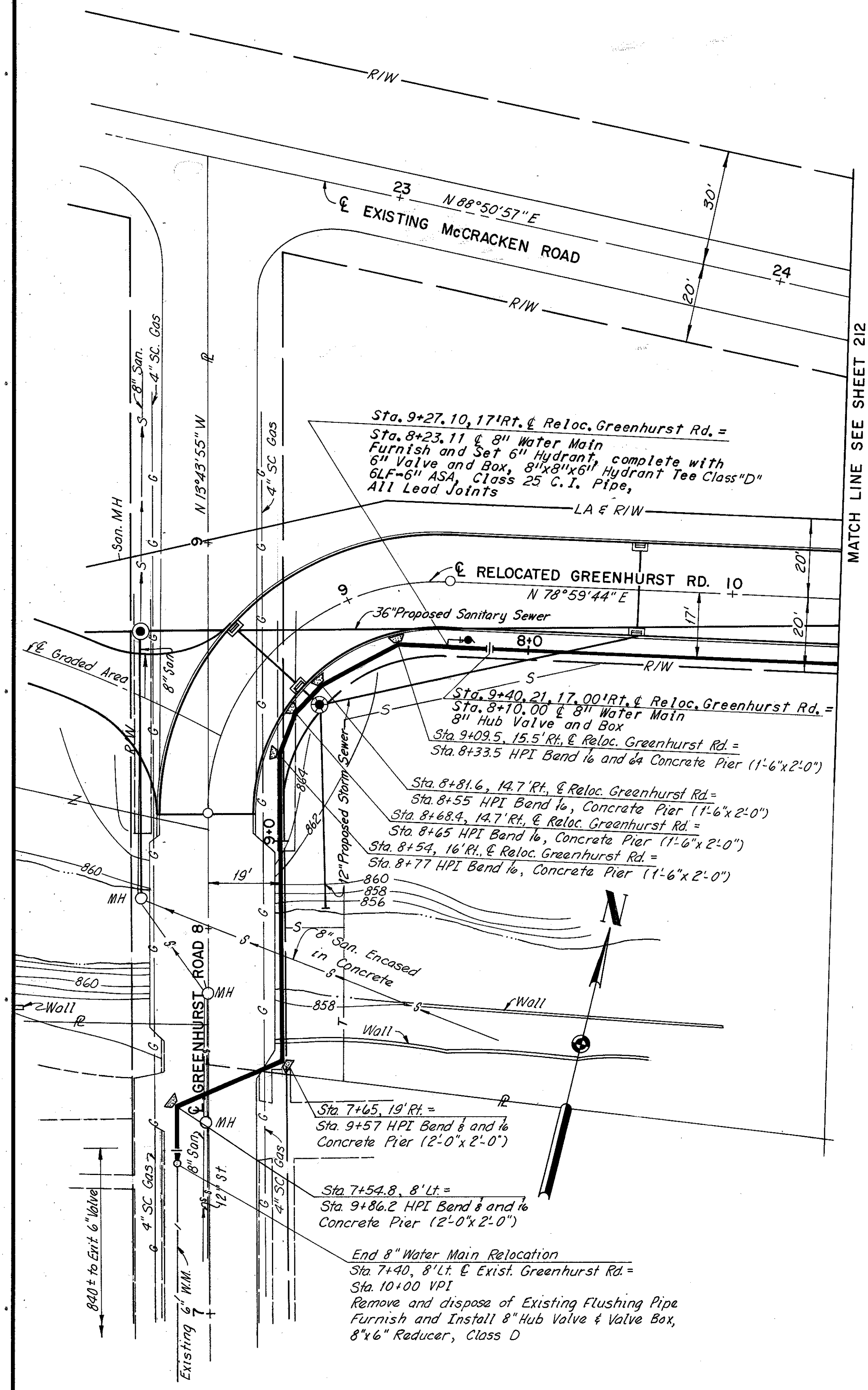
Note: Sta. 5+00 to Sta. 8+23.11, fill to 4' above 8" Water Main before laying pipe.

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
*Franklin R. Melman*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Richard A. Walker*  
 ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond Rudolph*  
 DIRECTOR OF PUBLIC UTILITIES  
*W. Stallworth*  
 COMMISSIONER OF WATER AND HEAT  
*William J. Sherry*  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS AND THE CITY OF MAPLE HEIGHTS**

SCALE Hor. & Vert. 1"=20'  
 MADE I.T. DATE 3-6-70  
 TRCD. J.M.C. DATE 4-3-70  
 CKD. E.R.H. DATE 5-18-70  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

Revised 31 Oct. 73 ERH



ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	8" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined	773	Lin. Ft.
Special	6" Water Main A.S.A. Class 25 C.I. Pipe and C.I. Fittings Class "D" Cement Lined All Lead Joints	18	Lin. Ft.
Special	8" Hub Valve	2	Each
Special	6" Hub Valve	3	Each
Special	Furnishing and Setting 6" Fire Hydrant	3	Each
Special	Miscellaneous Metal Work	895	Lbs.
Special	8" Water Main ASA Class 8 Extra Heavy Ductile Iron River Crossing Pipe Cement Lined	64	Lin. Ft.

Note: For Profile of New 8" Water Main in Relocated Greenhurst Rd. See Sheet 212. (Sta. 1+70 to Sta. 8+23.11)

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

ENGINEER, CITY OF MAPLE HEIGHTS  
 DIRECTOR OF PUBLIC UTILITIES  
 COMMISSIONER OF WATER AND HEAT  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
 ENGINEER OF DESIGN

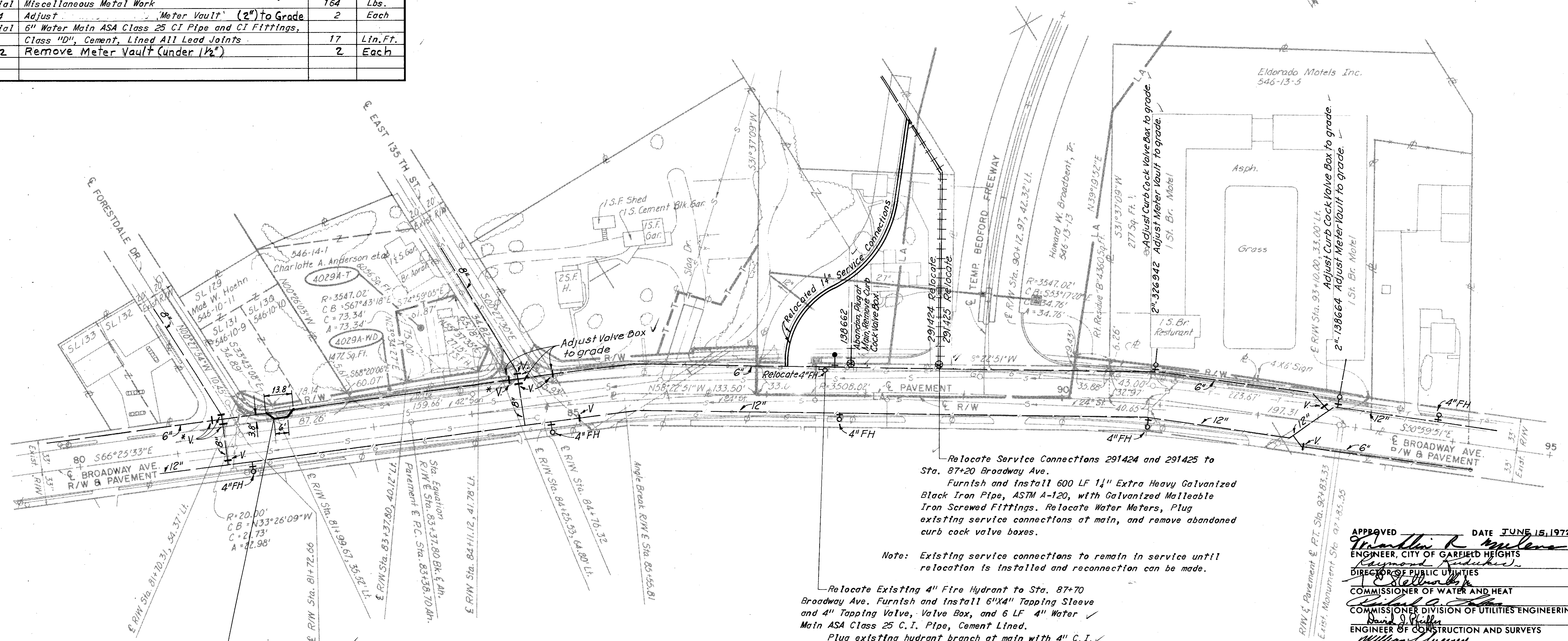
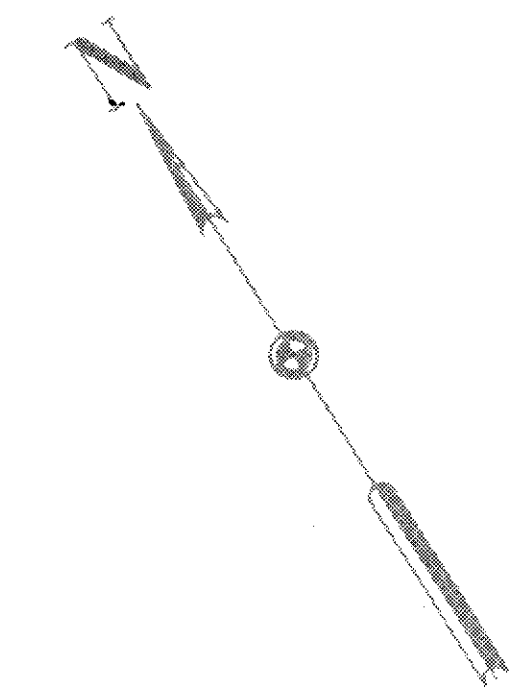
**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF MAPLE HEIGHTS

Revised E.R.H. 30 Oct 73  
 Traced J.M.C. 31 Oct 73  
 Checked E.R.H. 31 Oct 73

**CUYAHOGA COUNTY**  
CUY.480-21.40

Quantity Calculations  
Made By ERH Date 5-72  
Checked By JMC Date 5-72

ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	4" Water Main ASA Class 25 CI Pipe and CI Fittings Class D, Cement Lined, All Lead Joints	10	Lin.Ft.
Special	1 1/4" New Water Pipe	600	Lin.Ft.
Special	6"x4" Tapping Sleeve and 4" Tapping Valve Complete	1	Each
Special	4" Fire Hydrant Relocated	1	Each
Special	Adjust Curb Cock Valve Box to Grade	2	Each
Special	Adjust Valve Box to Grade	4	Each
Special	Remove Abandoned Valve Box	1	Each
Special	Remove Abandoned Curb Cock Valve Box	3	Each
Special	Service Connection Relocated (3/4"-1 1/4")	2	Each
Special	Water Meter Relocated (3/4"-1 1/4")	2	Each
Special	Plugging Service Connections (3/4"-2")	3	Each
Special	Plugging Water Mains and Branches (4") Existing	1	Each
Special	Miscellaneous Metal Work	164	Lbs.
604	Adjust "Meter Vault" (2") to Grade	2	Each
Special	6" Water Main ASA Class 25 CI Pipe and CI Fittings, Class "D", Cement Lined All Lead Joints	17	Lin.Ft.
202	Remove Meter Vault (under 1 1/2")	2	Each



Relocate Service Connections 291424 and 291425 to Sta. 87+20 Broadway Ave.  
Furnish and install 600 LF 1 1/4" Extra Heavy Galvanized Black Iron Pipe, ASTM A-120, with Galvanized Malleable Iron Screwed Fittings. Relocate Water Meters, Plug existing service connections at main, and remove abandoned curb cock valve boxes.

Note: Existing service connections to remain in service until relocation is installed and reconnection can be made.

Relocate Existing 4" Fire Hydrant to Sta. 87+70 Broadway Ave. Furnish and install 6"x4" Tapping Sleeve and 4" Tapping Valve, Valve Box, and 6 LF 4" Water Main ASA Class 25 C.I. Pipe, Cement Lined.  
Plug existing hydrant branch at main with 4" C.I. Plug and Rods and Clamps.  
Remove abandoned Valve Box. ✓

Sta. 82+04 29' Lt. & Broadway Ave. Relocate 6" Water Main to 25.2' Lt. & Broadway Ave. Furnish and install 4-1/2 Bends Class "D" and 17 LF 6" Water Main ASA Class 25 C.I. Pipe, All Cement Lined and Lead Joints.

The Division of Water Personnel shall operate all valves. The Contractor shall notify the Utilities Engineering Office three (3) weeks prior to starting work. Telephone 964-3125.

Valves marked: \*V, in Broadway at Forestdale Dr. and at E.131 St., are to be closed when connecting relocated pipe to existing pipe.

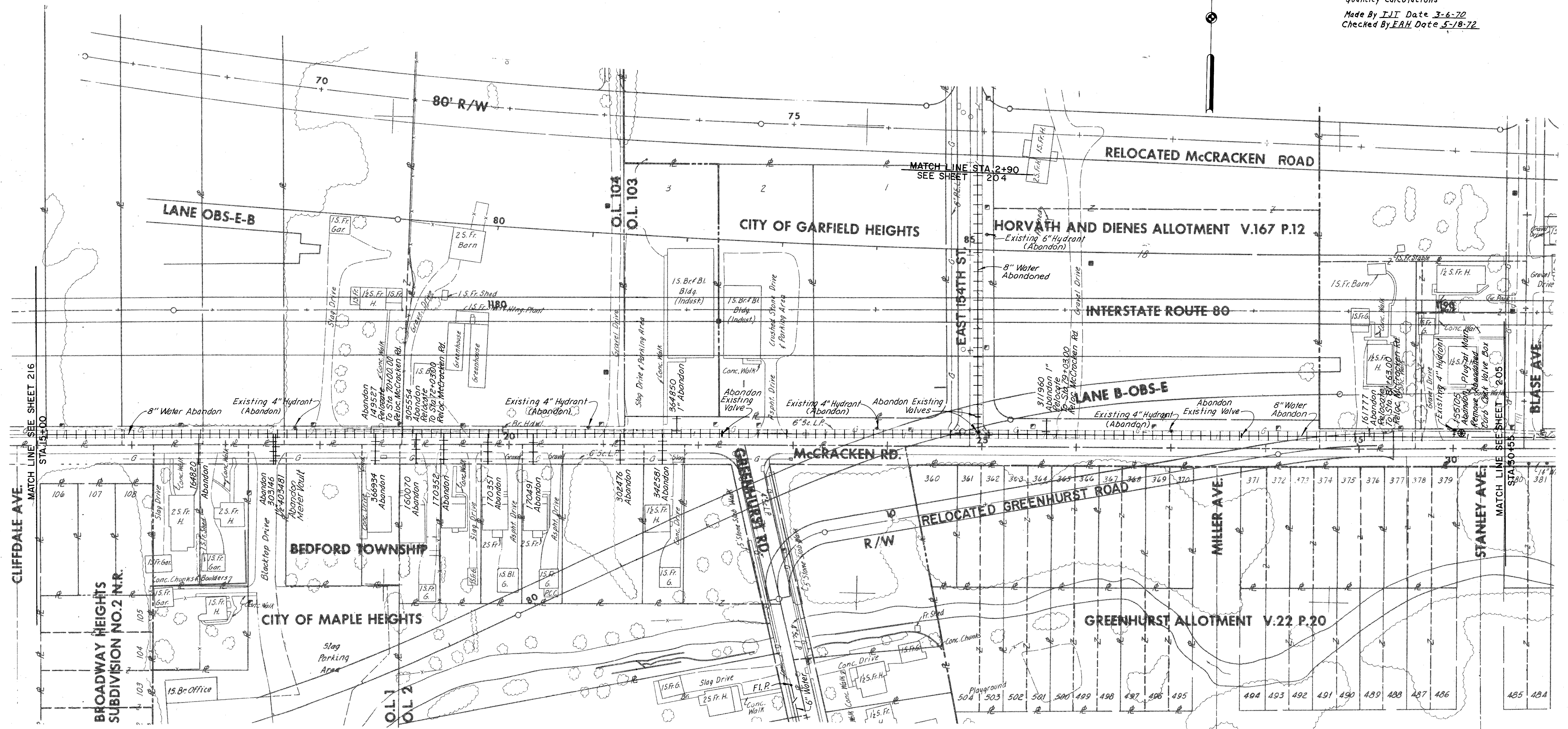
The existing catch basin shall be removed and 12" Type B Conduit connected through. Item E-39 Sheet 45 General Plans.

APPROVED DATE JUNE 15, 1972  
*William R. ...*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond ...*  
DIRECTOR OF PUBLIC UTILITIES  
*...*  
COMMISSIONER OF WATER AND HEAT  
*...*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*...*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*...*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE 1"=50'  
MADE BY ERH DATE 5-11-72  
CHECKED BY JMC DATE 5-18-72  
CONSULTING ENGINEERS  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
 CUY.480-21.40  
 Quantity Calculations  
 Made By T.J.T. Date 3-6-70  
 Checked By E.R.H. Date 5-18-72



Note:  
 For Waterwork on Relocated  
 Greenhurst Road See Sheet 212.

ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	Remove Abandoned Curb Cock Valve Box	1	Each
Special	Plugging Service Connection (3/4"-2")	1	Each

APPROVED DATE JUNE 15, 1972  
*Franklin R. Melkus*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond A. Kullback*  
 ENGINEER, CITY OF MAPLE HEIGHTS  
 DIRECTOR OF PUBLIC UTILITIES  
*Ed. Stalling*  
 COMMISSIONER OF WATER AND HEAT  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David P. Pfeiffer*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
 AND THE CITY OF MAPLE HEIGHTS

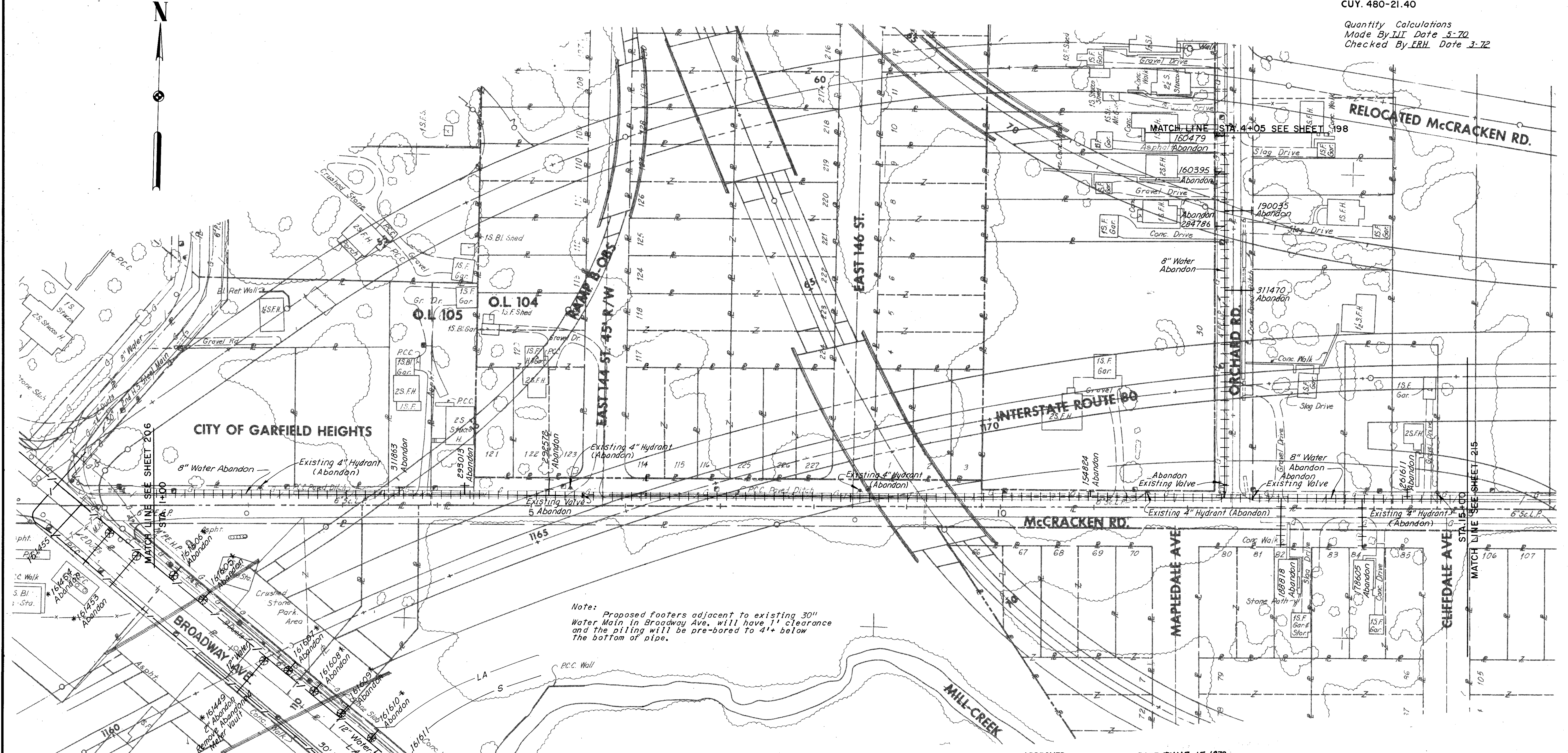
SCALE 1" = 50'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE T.J.T. DATE 3-6-70 CONSULTING ENGINEERS  
 TRCD J.M.C. DATE 4-3-70  
 CKD E.R.H. DATE 5-18-72 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

216  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

Quantity Calculations  
Made By ILL Date 5-70  
Checked By ERH Date 3-72



Note: Proposed footers adjacent to existing 30" Water Main in Broadway Ave. will have 1' clearance and the piling will be pre-bored to 4'+ below the bottom of pipe.

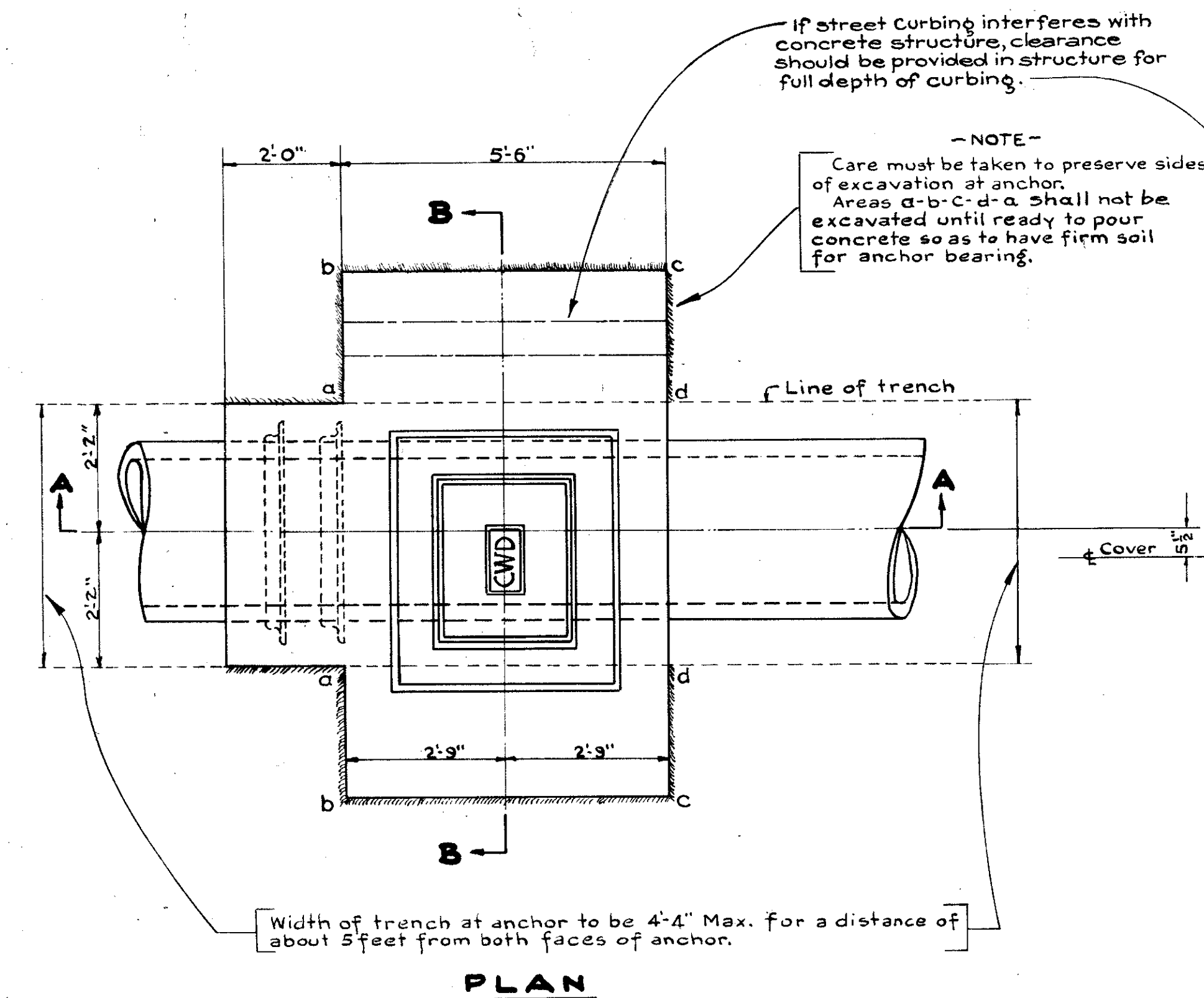
ESTIMATED QUANTITIES		CODE TYPE Y060	
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	Remove Abandoned Curb Cock Valve Box	9	Each
Special	Plugging Service Connections	9	Each
202	Removed (Meter Vault) 2"	1	Each

APPROVED DATE JUNE 15, 1972  
*Orville R. Melan*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond R. Kubicki*  
 ENGINEER, CITY OF MAPLE HEIGHTS  
 DIRECTOR OF PUBLIC UTILITIES  
*William J. Lawrence*  
 COMMISSIONER OF WATER AND HEAT  
 COMMISSIONER, DIVISION OF UTILITIES ENGINEERING  
*David D. Phillips*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Lawrence*  
 ENGINEER OF DESIGN

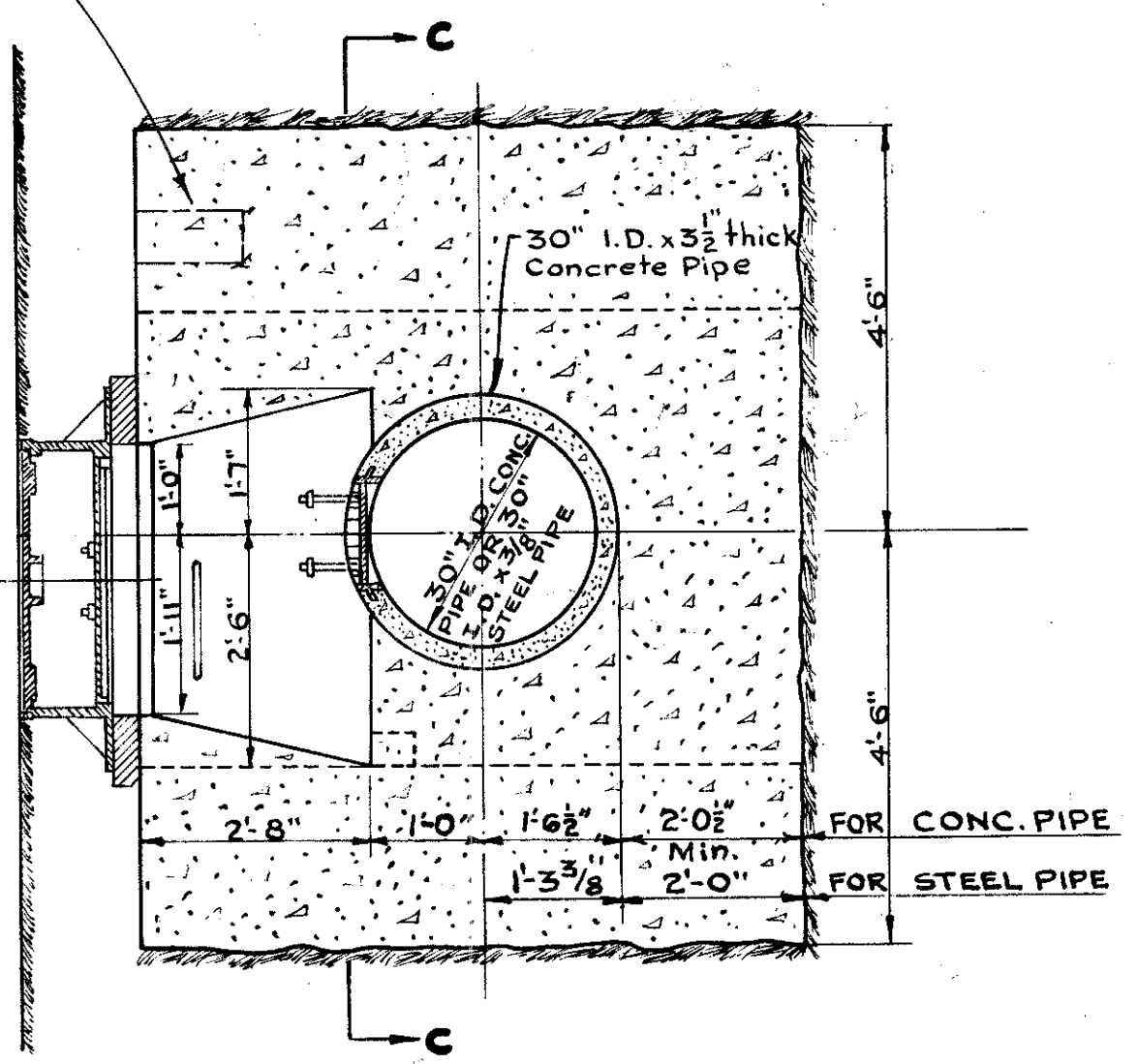
**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS AND THE CITY OF MAPLE HEIGHTS

SCALE 1" = 50'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 MADE I.L.T. DATE 3-6-70  
 TRCO J.M.C. DATE 4-3-70  
 CKD E.R.H. DATE 5-18-72 KANSAS CITY CLEVELAND NEW YORK

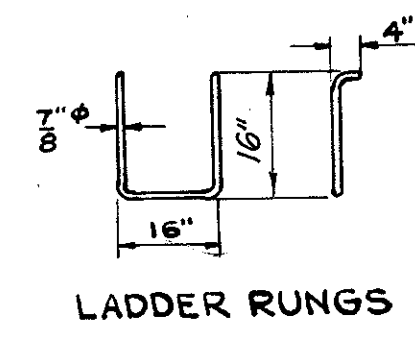
\* Plug at Main and Remove Abandoned Existing Curb Cock Valve Box.



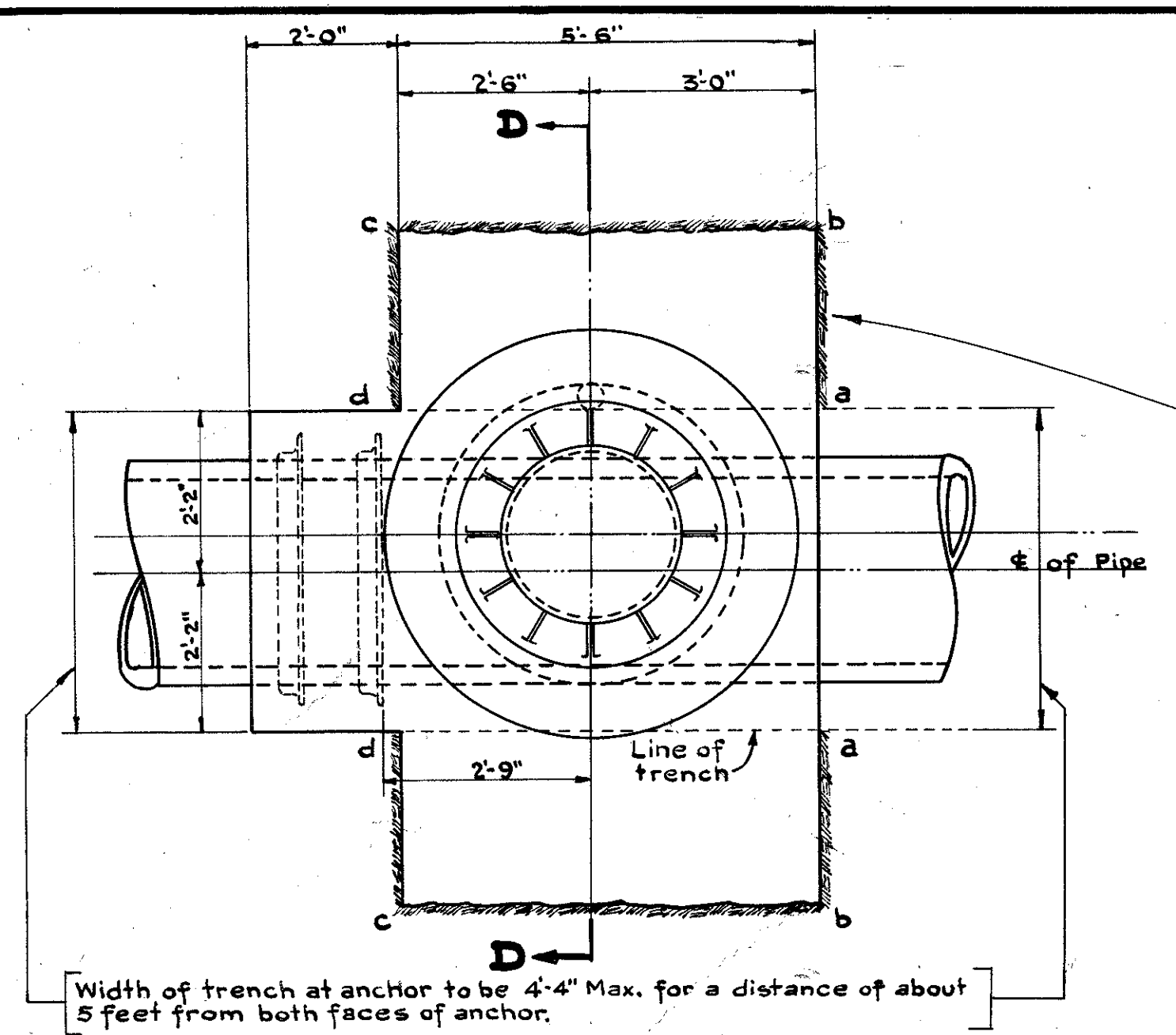
PLAN



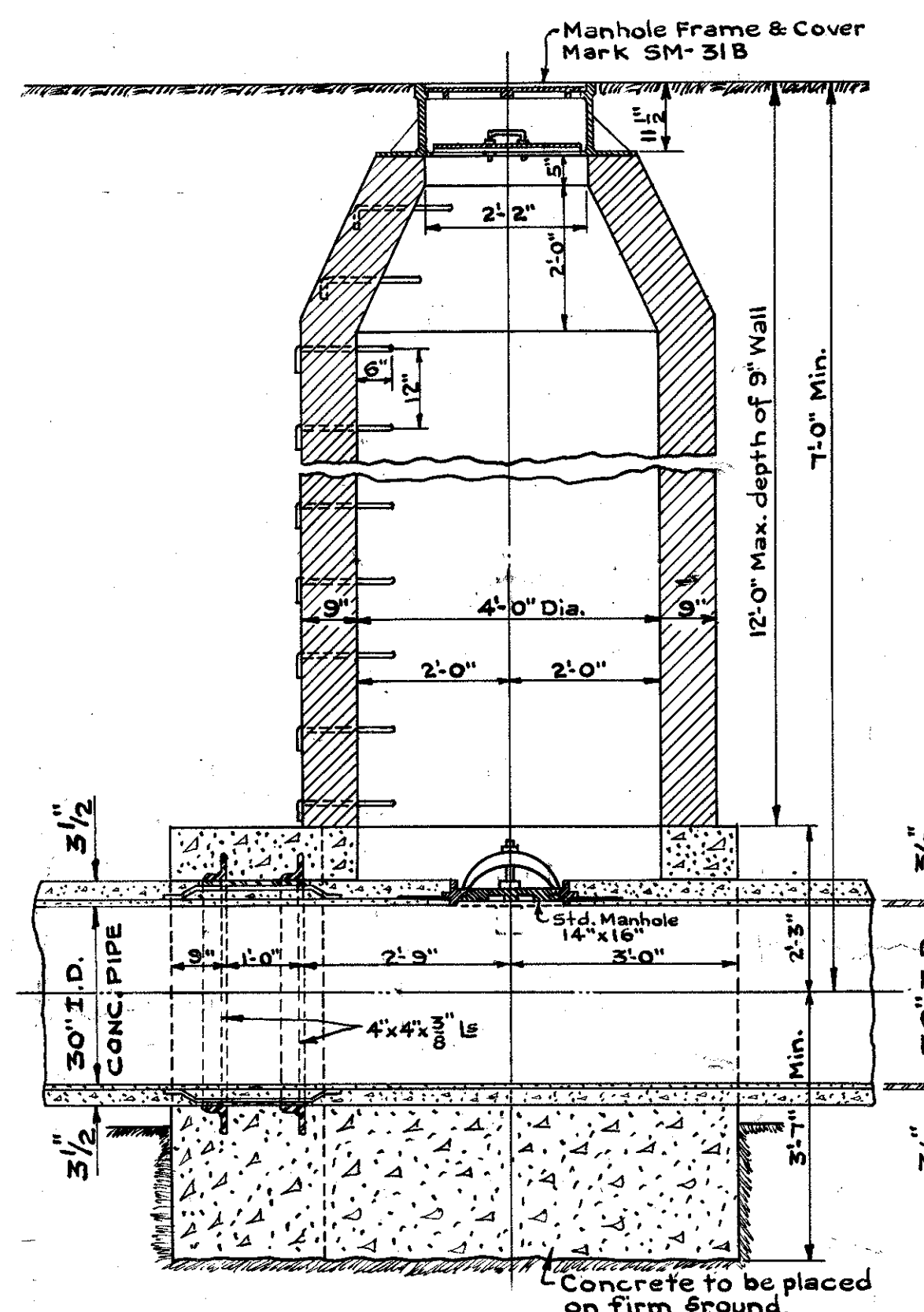
SECTION B-B



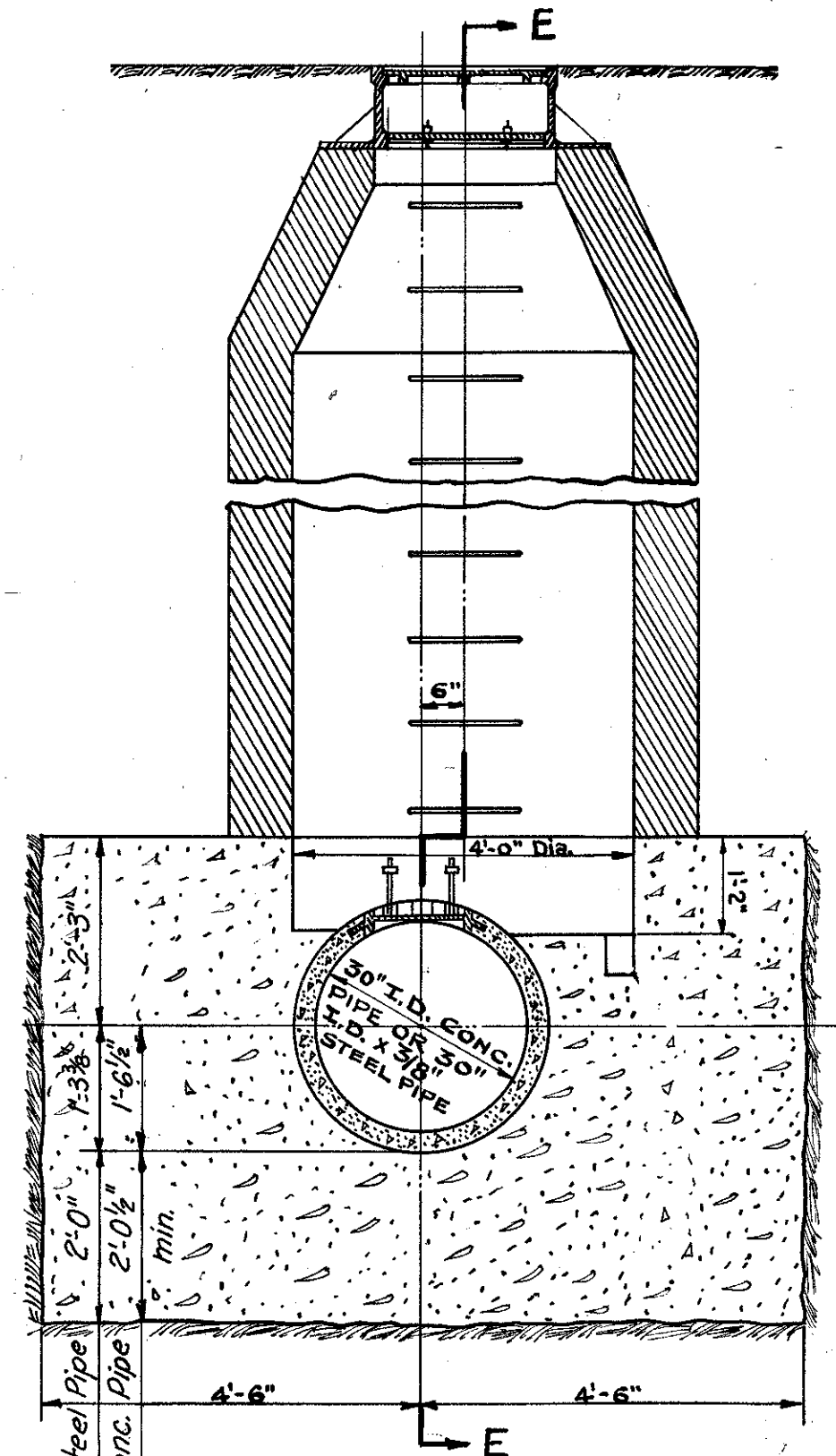
LADDER RUNGS



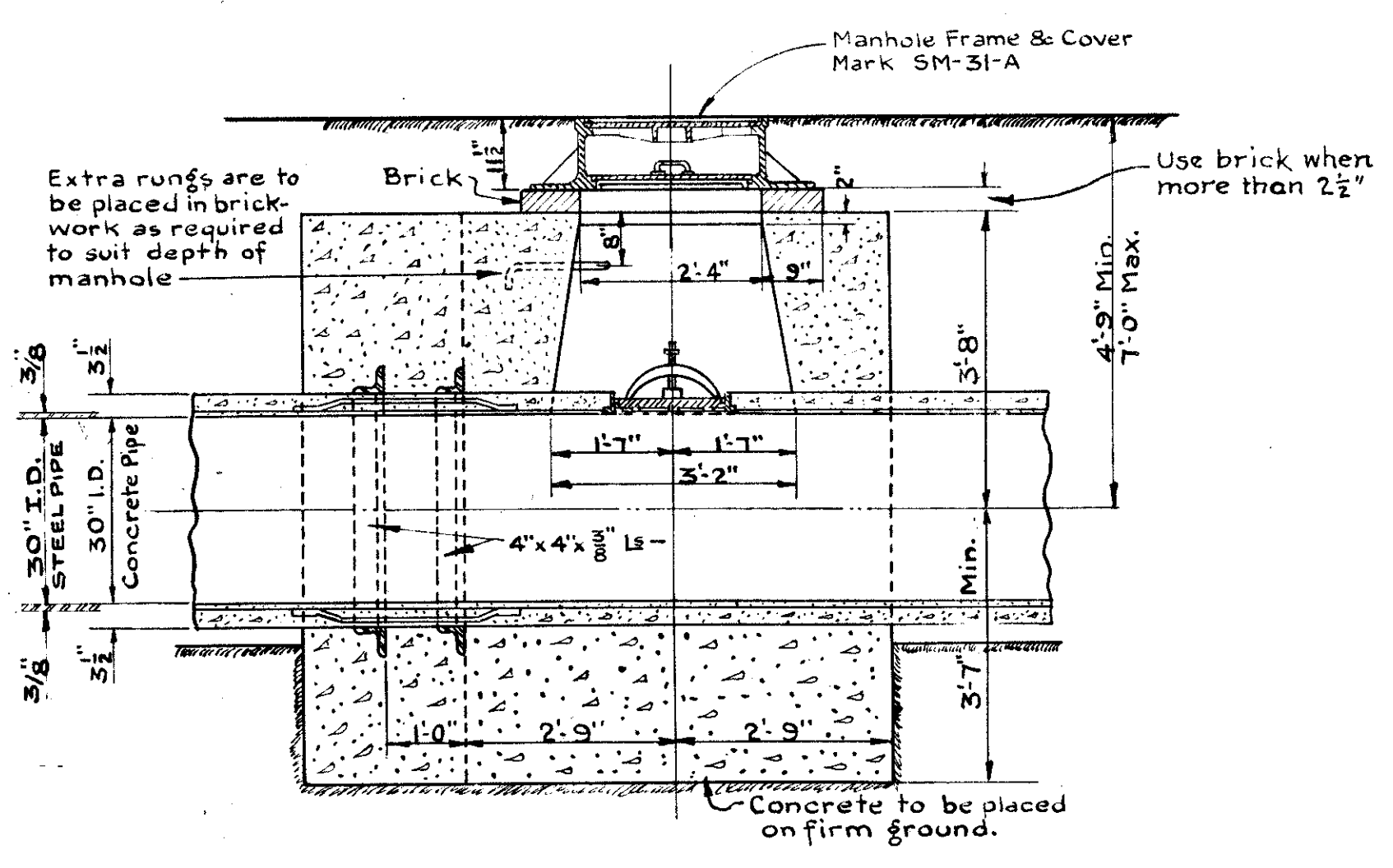
PLAN



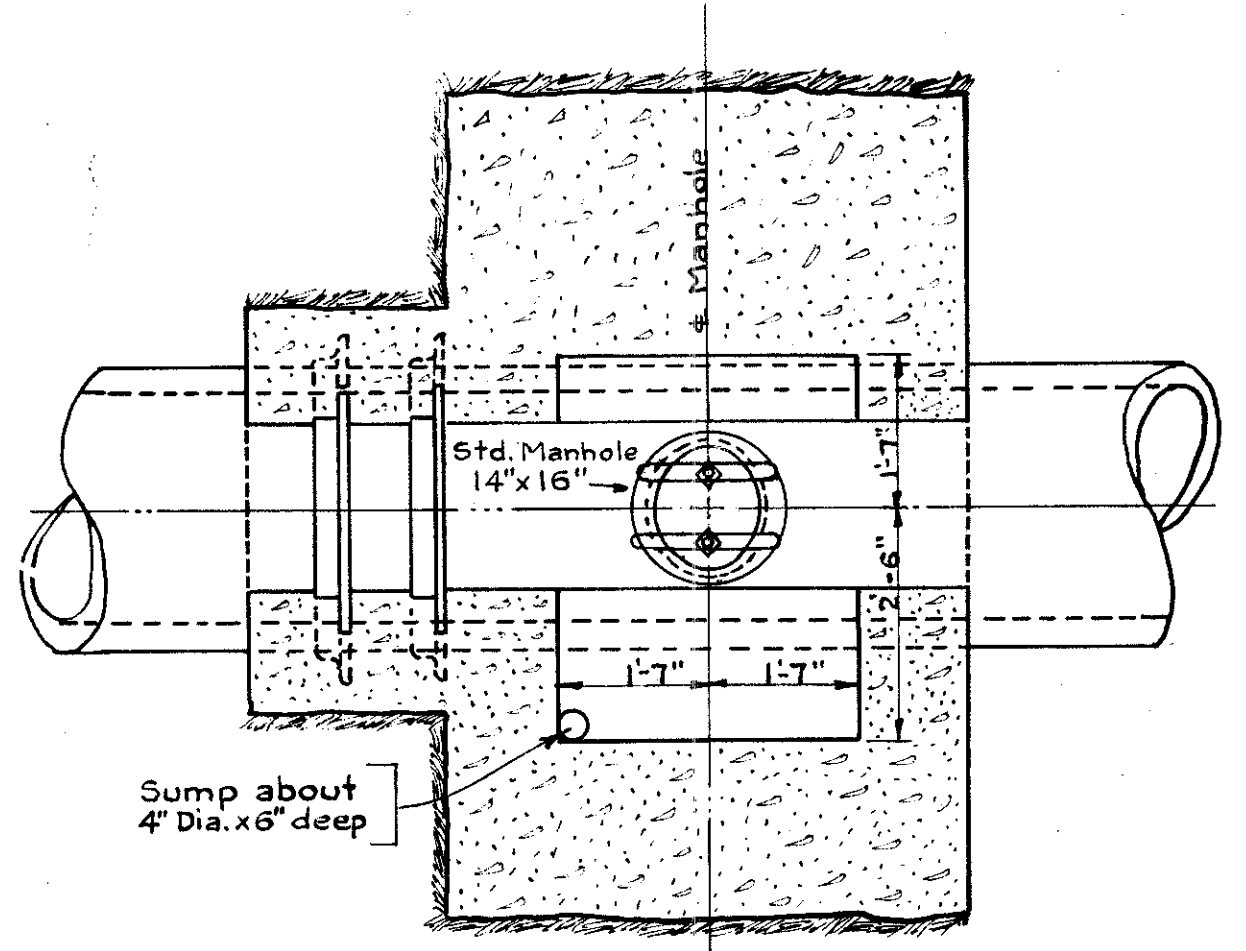
SECTION E-E



SECTION D-D



SECTION A-A



SECTION C-C

**ACCESS MANHOLE AND ANCHORAGE**  
**TYPE "A"**  
Scale: 1/2" = 1'-0"

**ACCESS MANHOLE AND ANCHORAGE**  
**TYPE "B"**  
Scale: 1/2" = 1'-0"

For Anchorage details see sheet 218.  
For Manhole Frame and Cover details see sheets 218 & 219.

APPROVED DATE JUNE 15, 1972  
*Donald R. Melone*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Rudulko*  
DIRECTOR OF PUBLIC UTILITIES  
*Robert J. Stalworth*  
COMMISSIONER OF WATER AND HEAT  
*Edward P. Johnson*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David J. Quillen*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
ENGINEER OF DESIGN

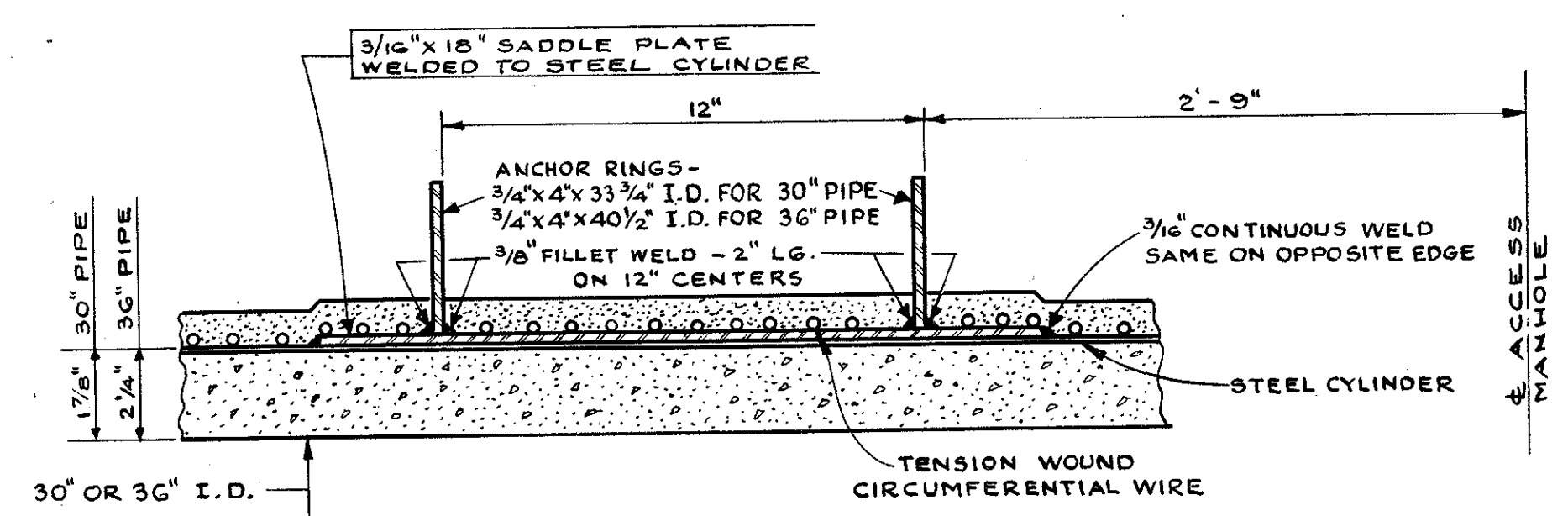
**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

SCALE As Shown  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE DATE CONSULTING ENGINEERS  
TRCD DATE  
CKD ERH DATE 5-10-72 KANSAS CITY CLEVELAND NEW YORK

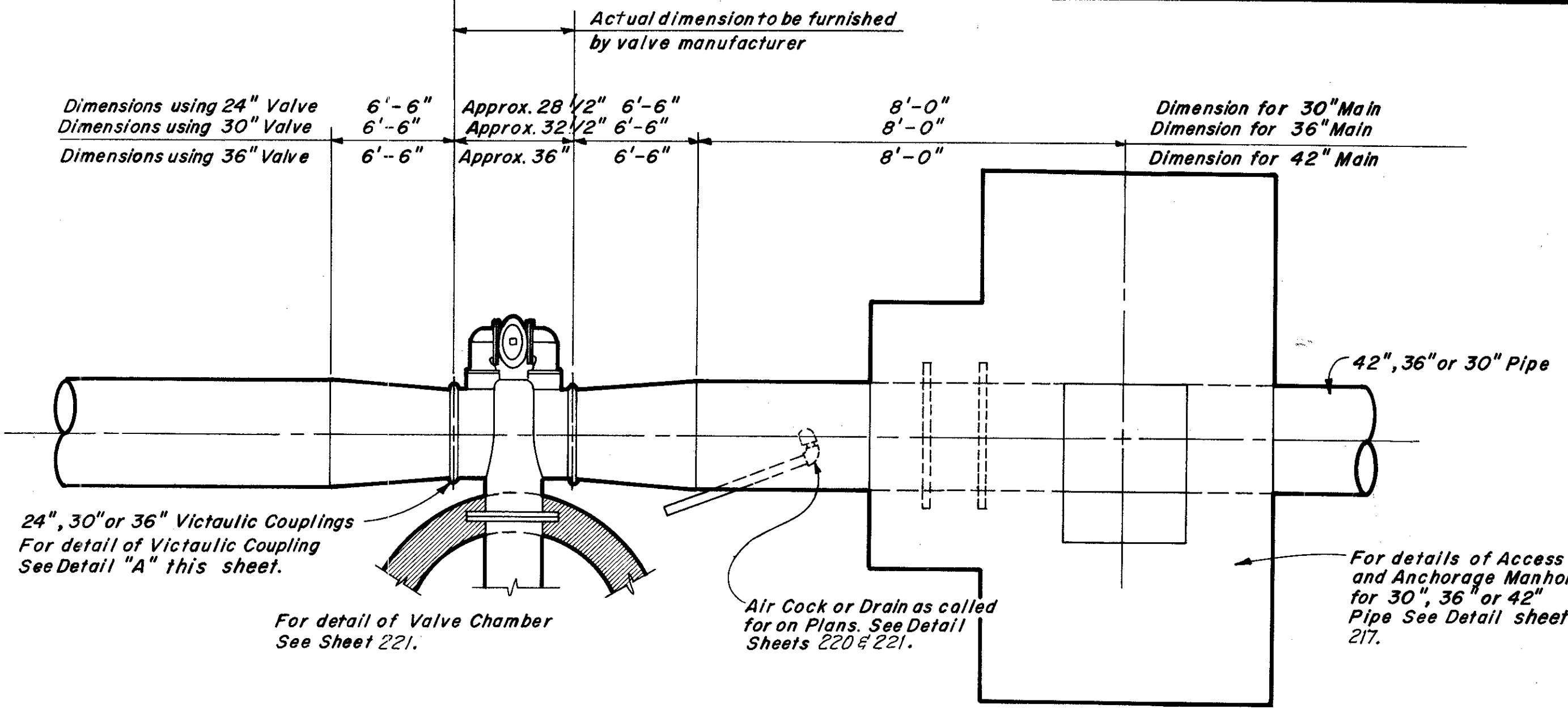
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

218  
390

CUYAHOGA COUNTY  
CUY.480-2140

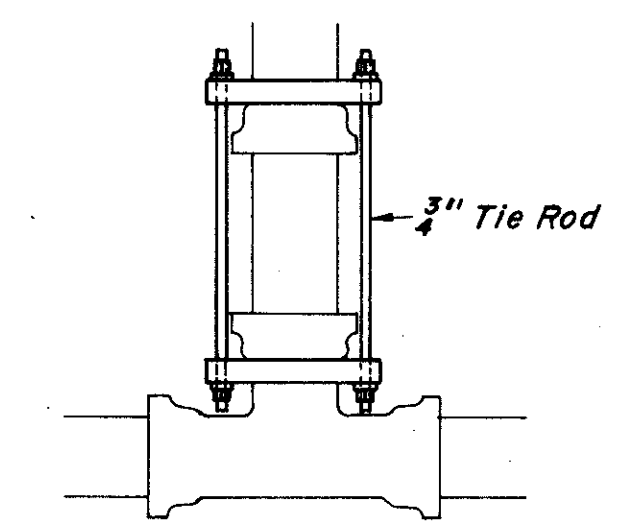


**ANCHORAGE DETAILS FOR 30" AND 36" FOR PRESTRESSED CONCRETE CYLINDER PIPE FOR MANHOLE TYPE "A" AND "B"**



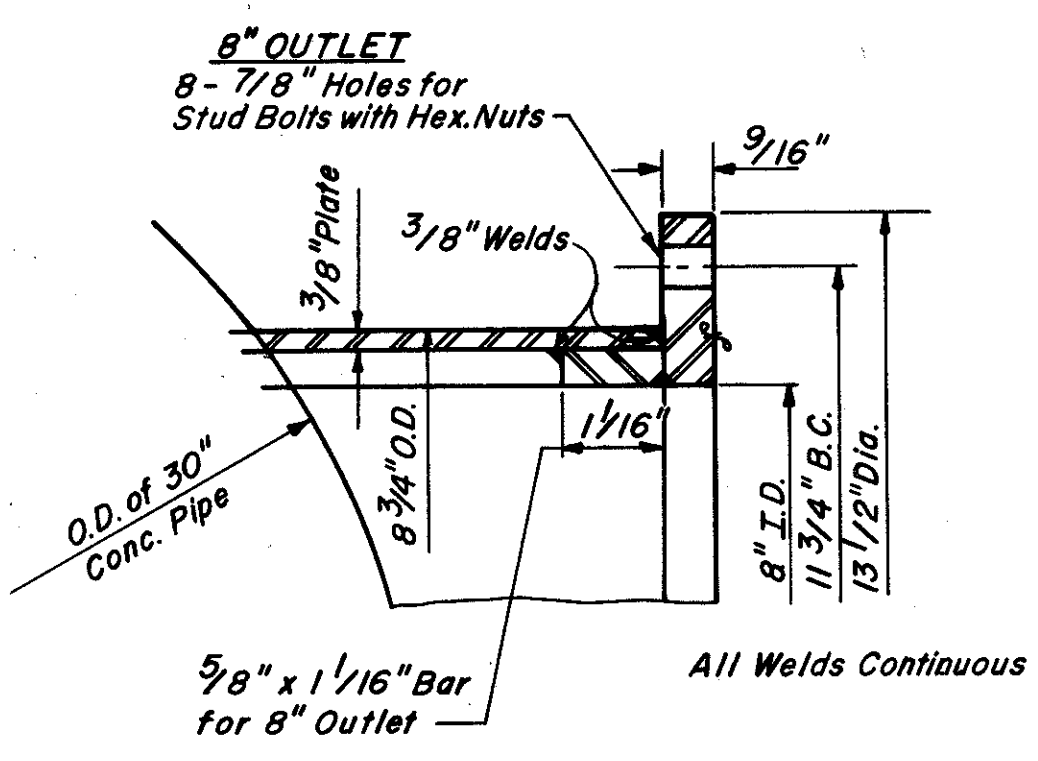
**TYPICAL VALVE ASSEMBLY**

NO SCALE



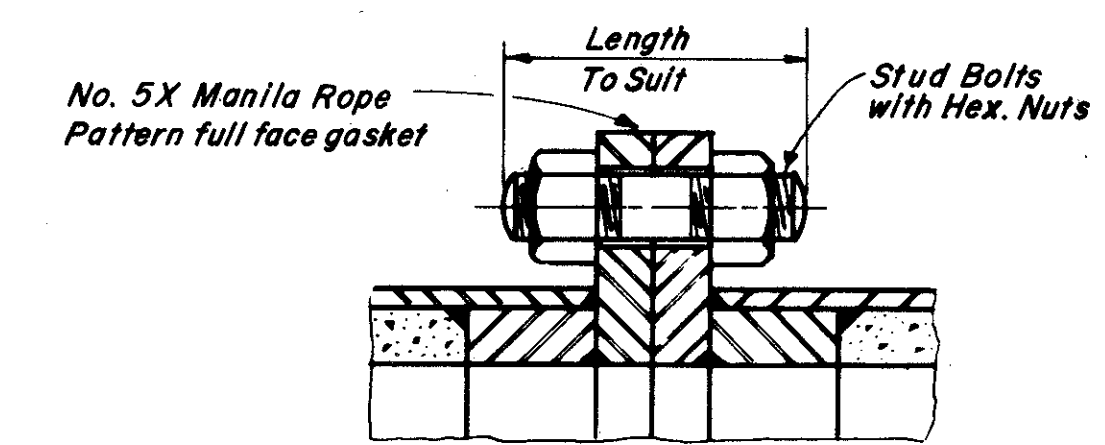
**SOCKET CLAMPS WITH TIE RODS**

No Scale

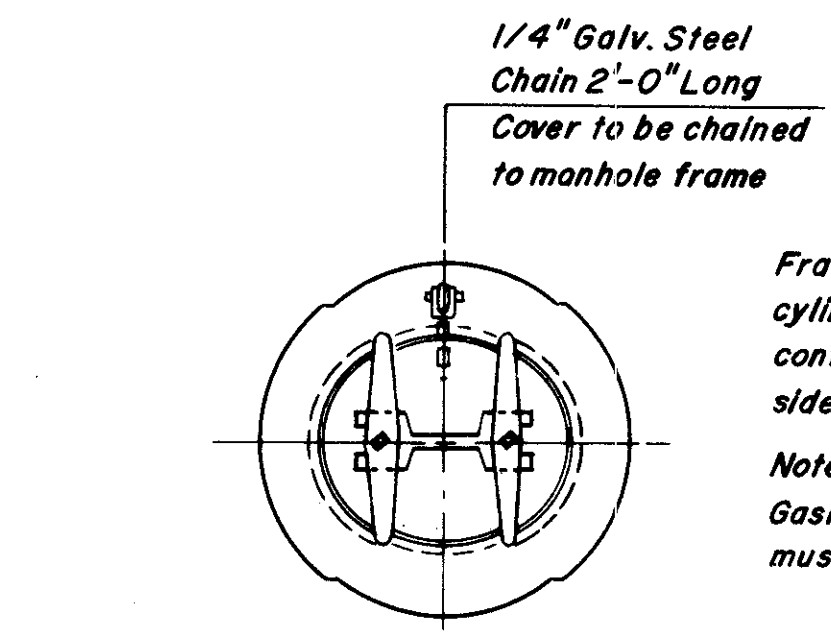


**8" FLANGE OUTLET ON 30" PIPE**

No Scale

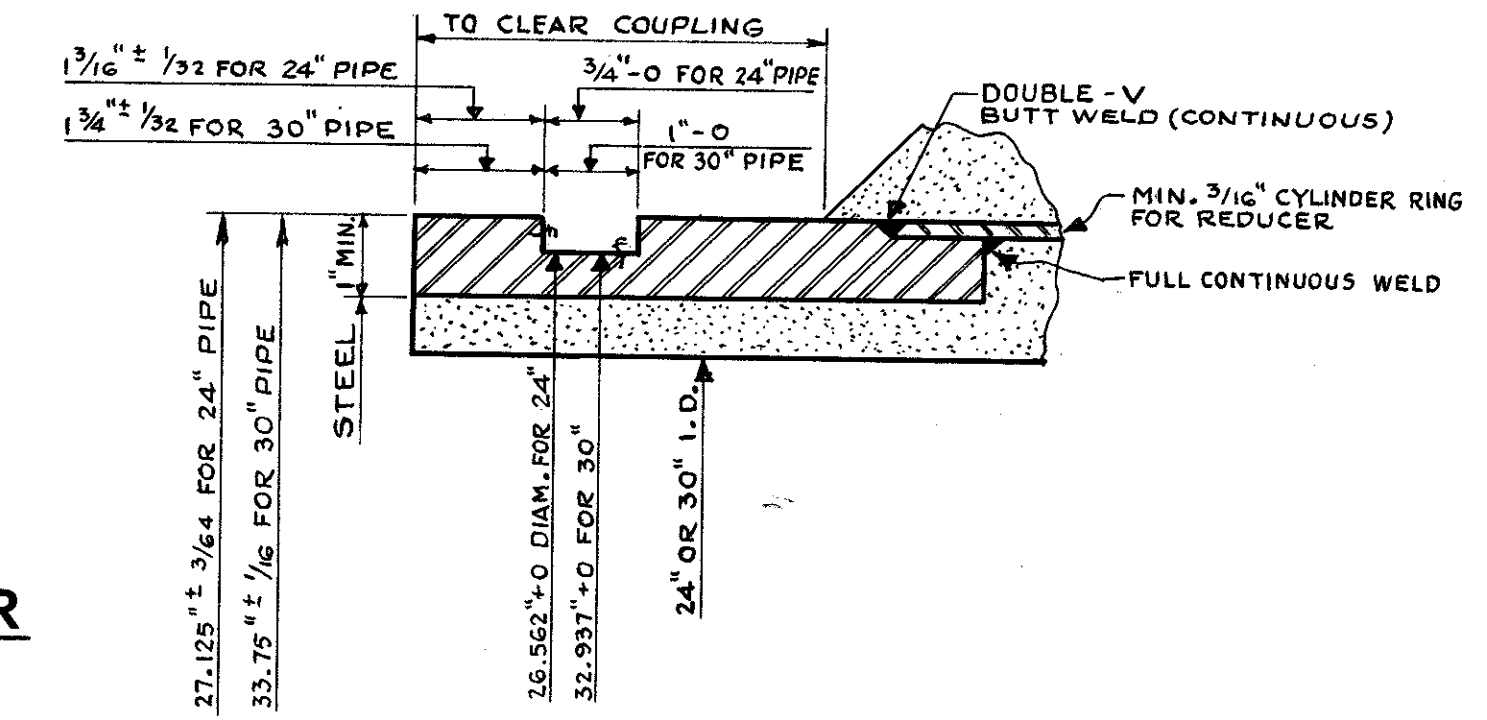


**SECTION THROUGH C SHOWING TYPICAL DETAIL OF FLANGE CONNECTIONS**



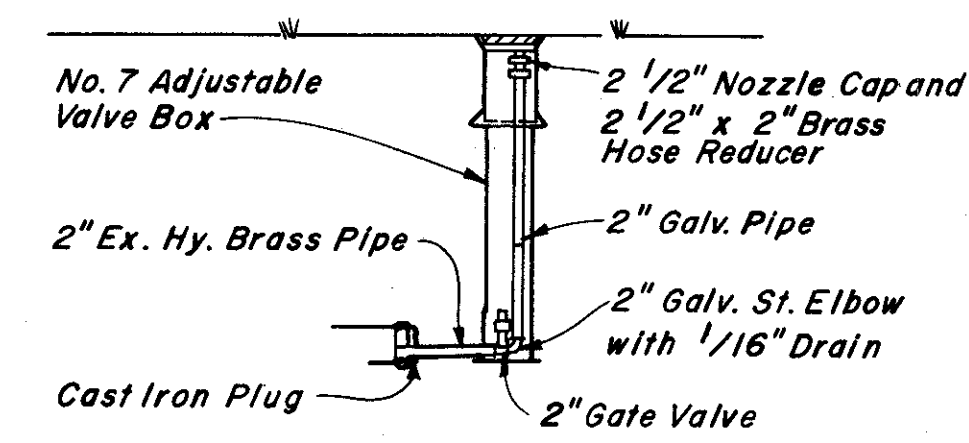
**14" X 16" STANDARD MANHOLE FRAME AND COVER**

(FRAME, COVER AND YOKES TO BE CAST STEEL)

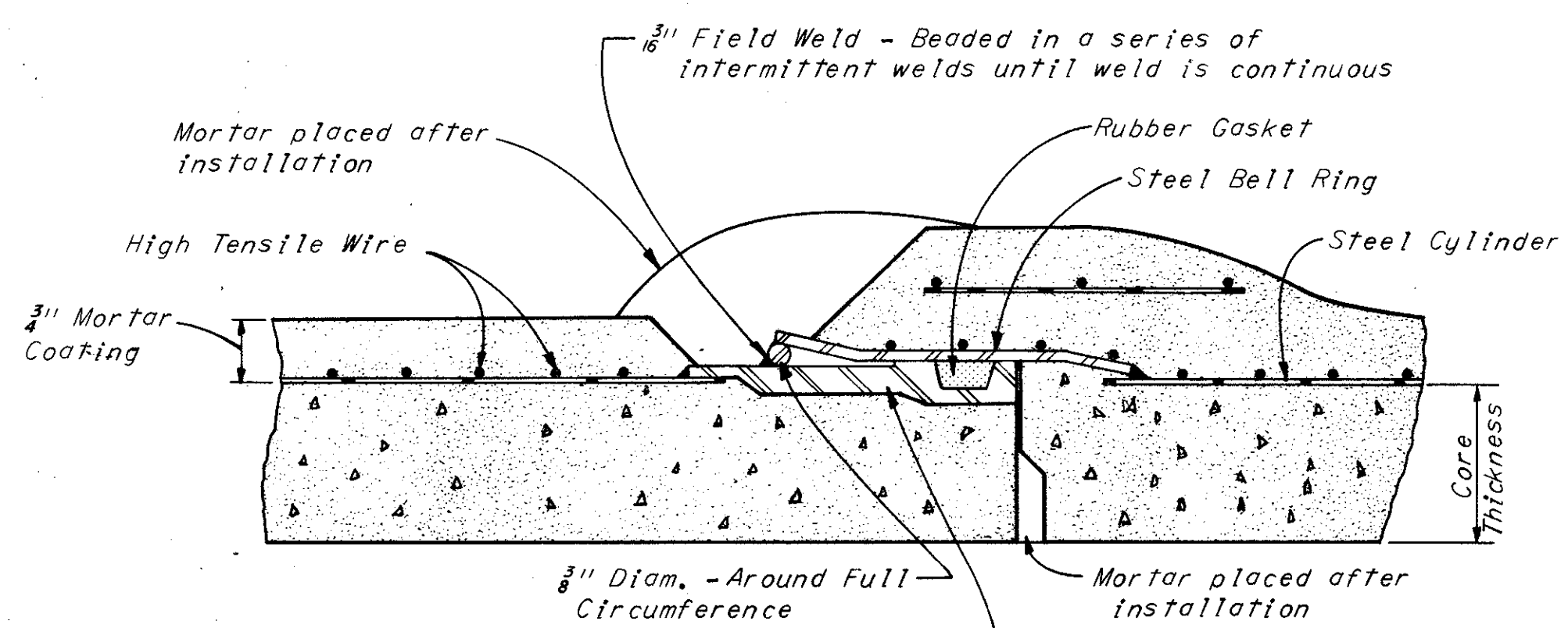


**DETAIL "A"**

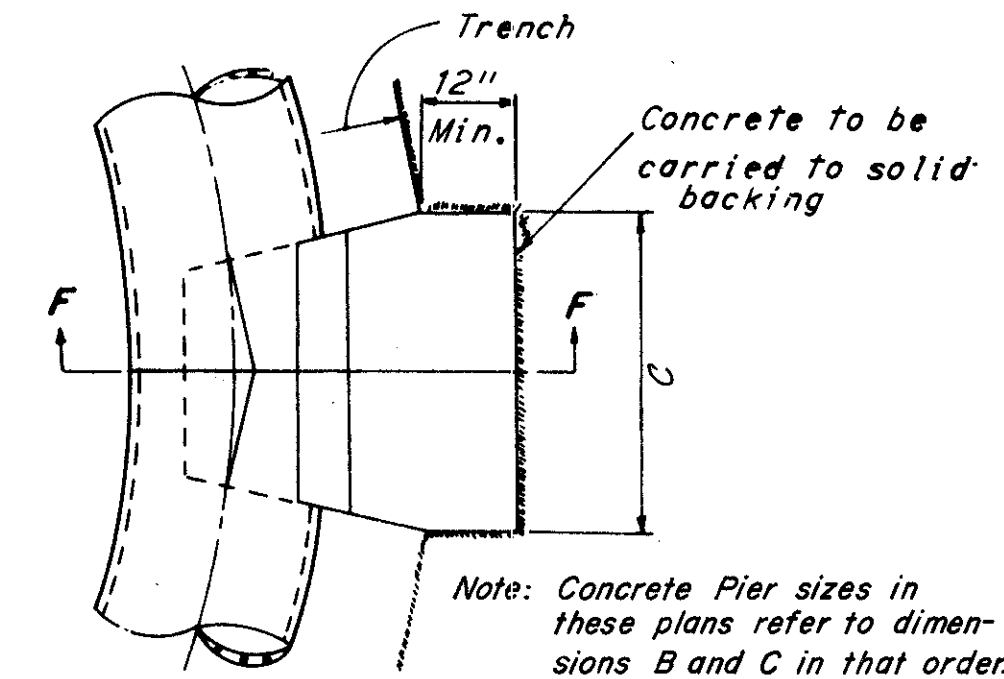
FOR 24" OR 30" VICTAULIC COUPLINGS



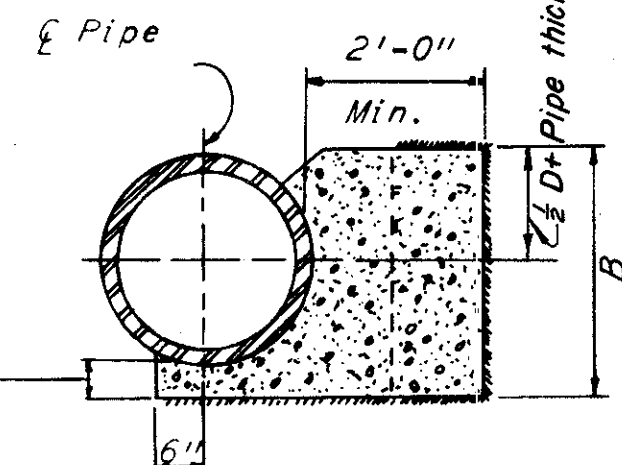
**FLUSHING PIPE**



**DETAIL "Y"**



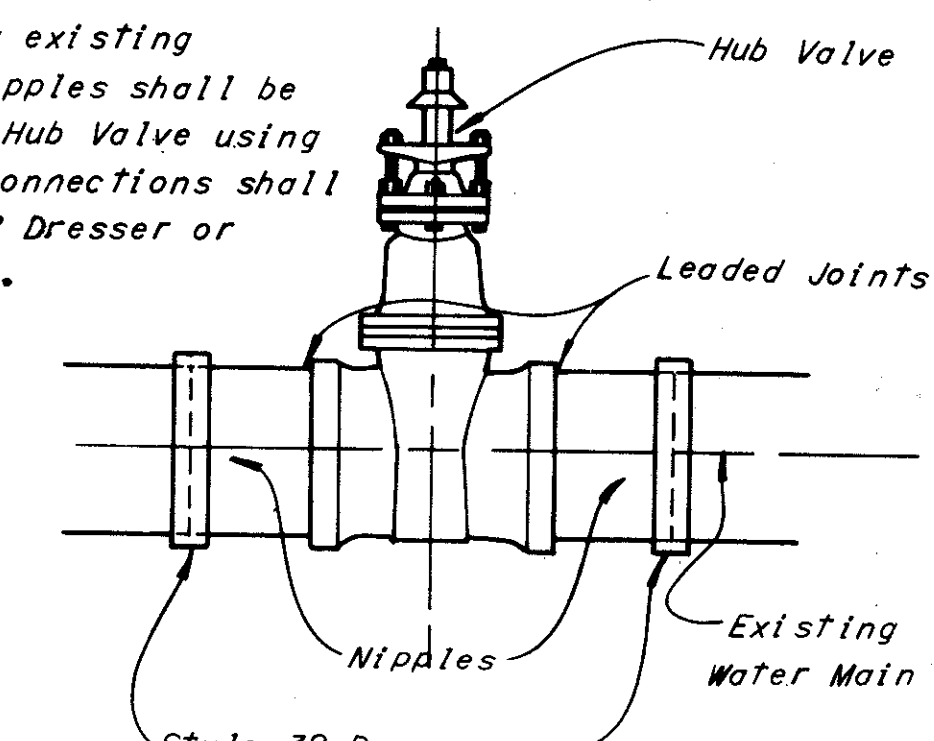
**PLAN**



**SECTION F-F**

**CONCRETE PIER FOR BENDS**

Note: Before cutting existing Water Main the two nipples shall be connected to the Hub Valve using lead joints. Final connections shall be made with Style 38 Dresser or Smith Blair Couplings.



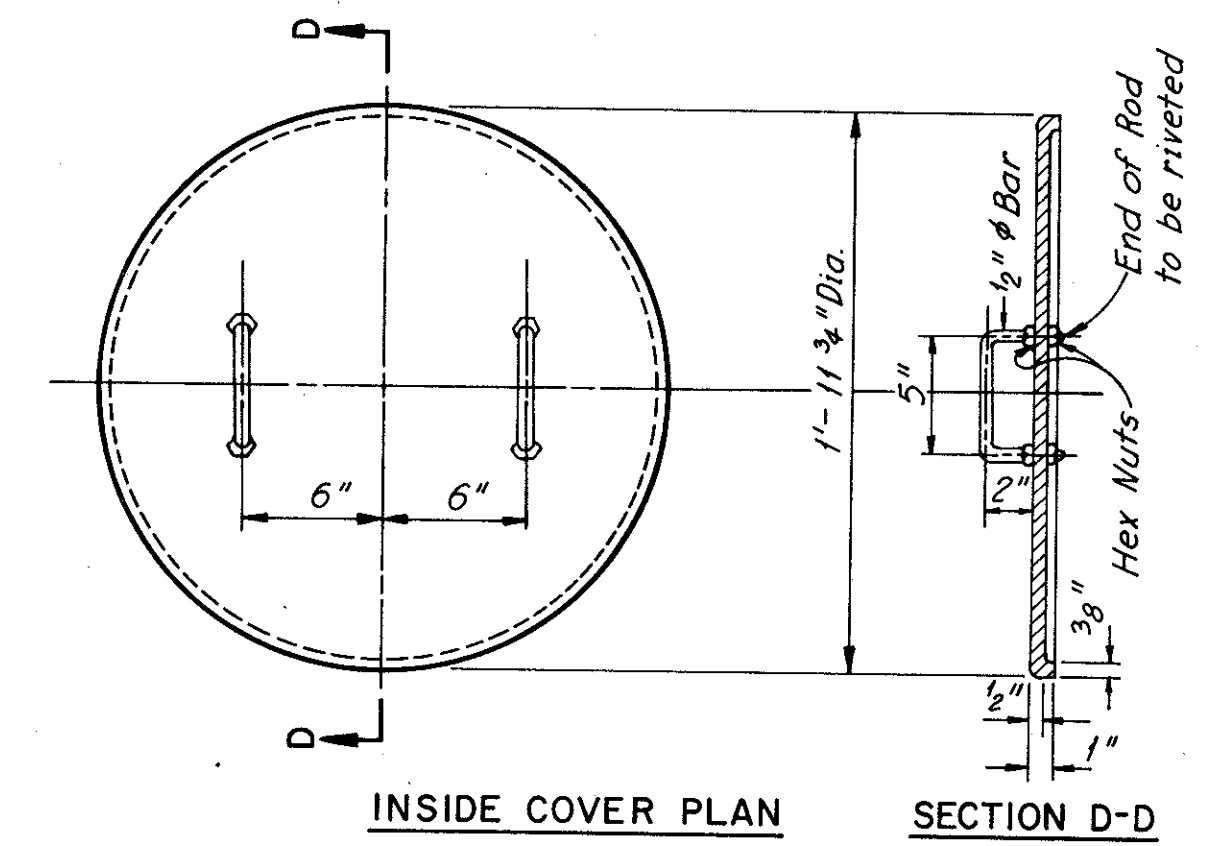
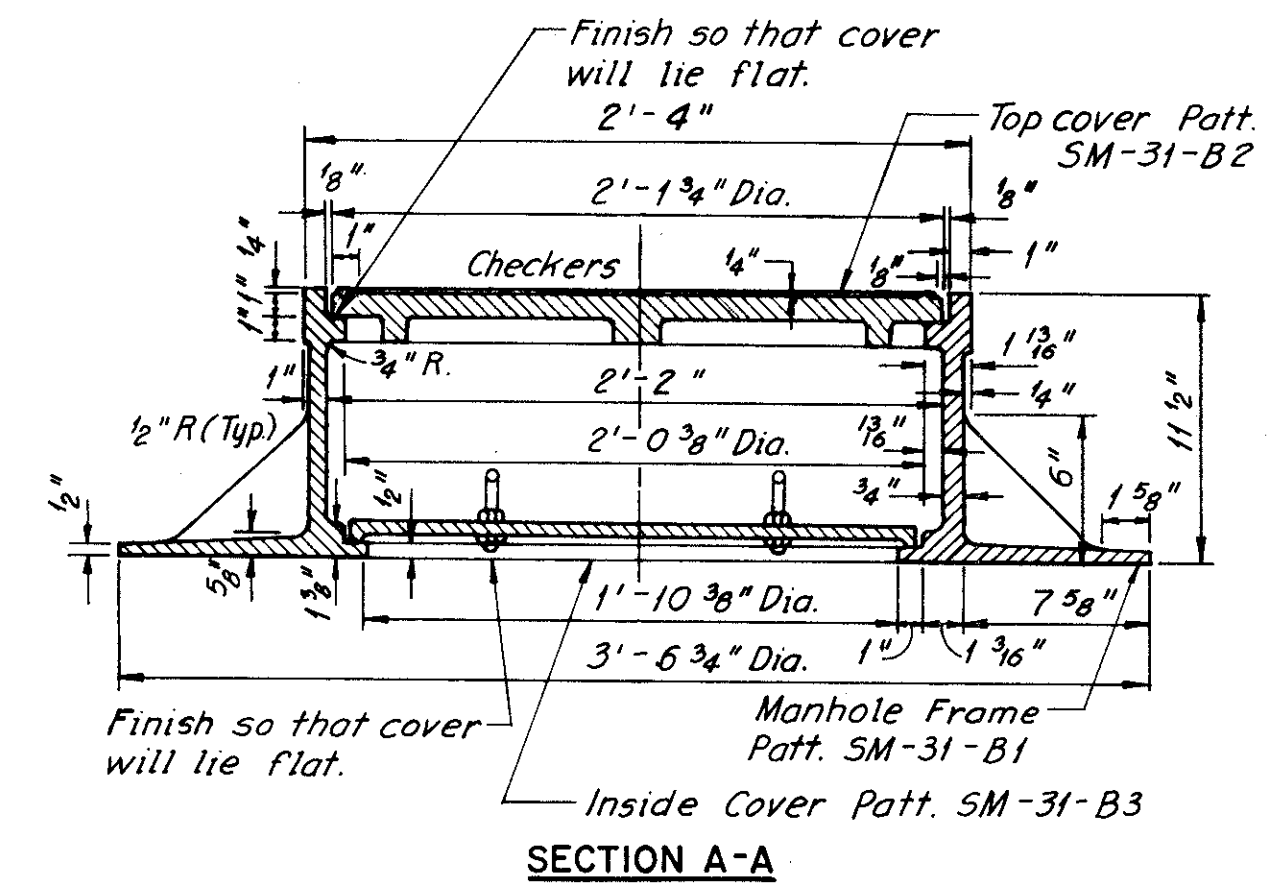
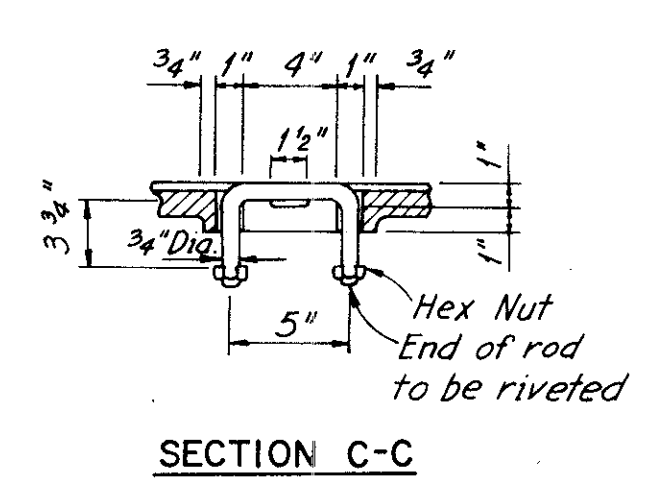
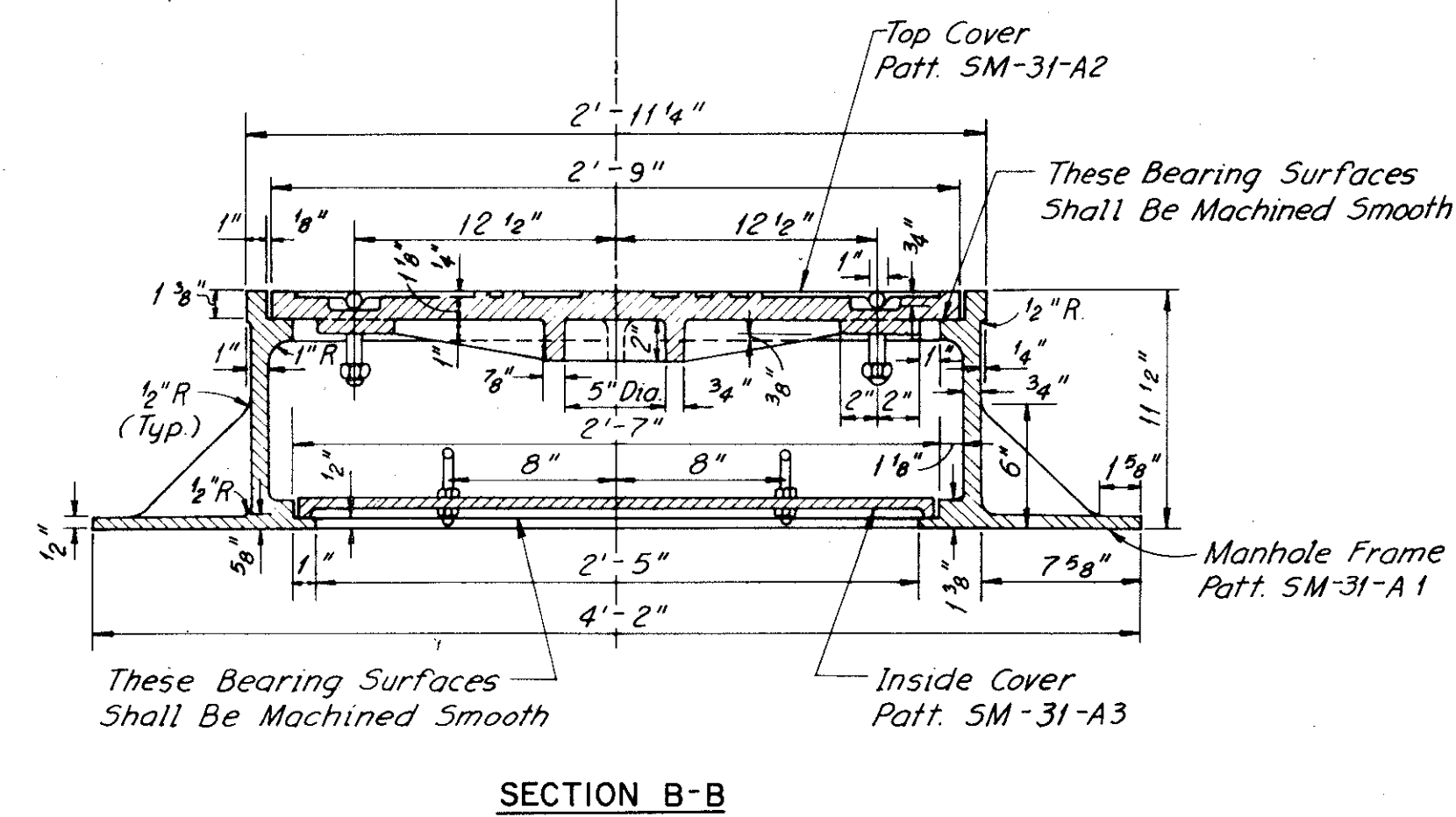
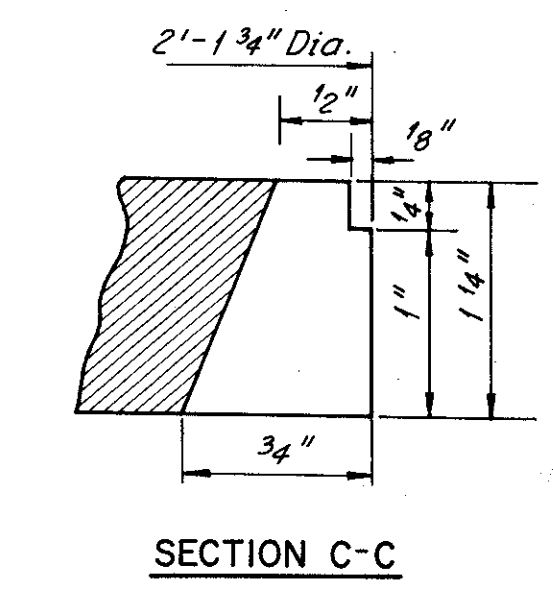
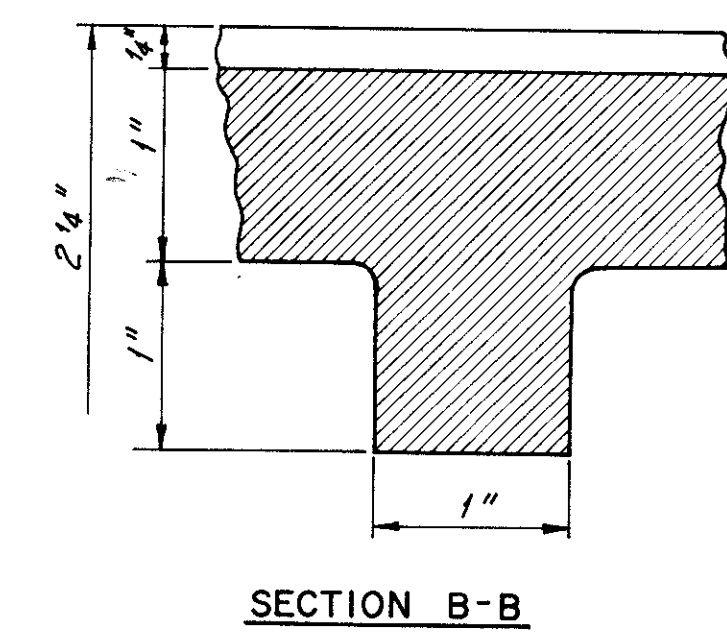
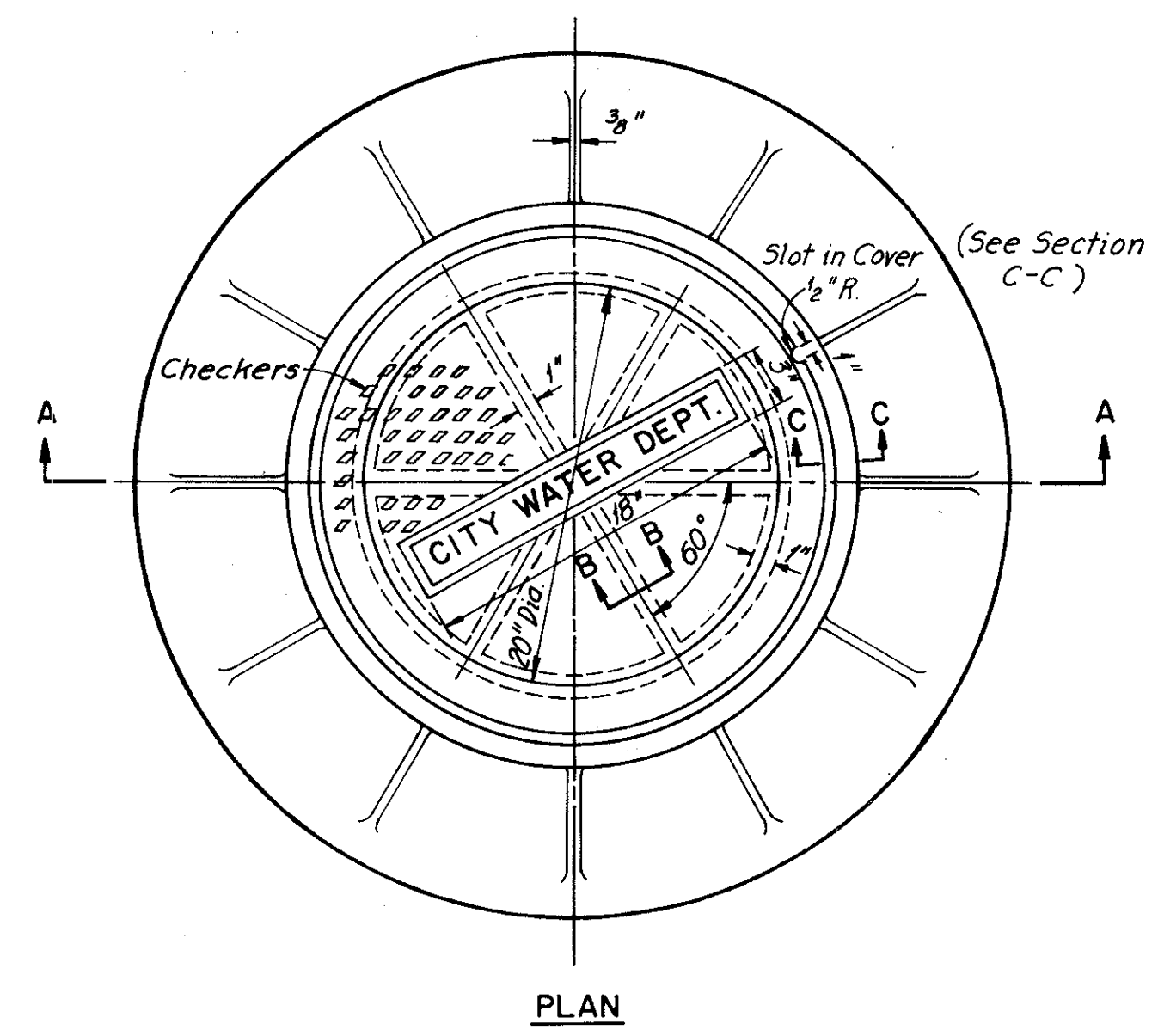
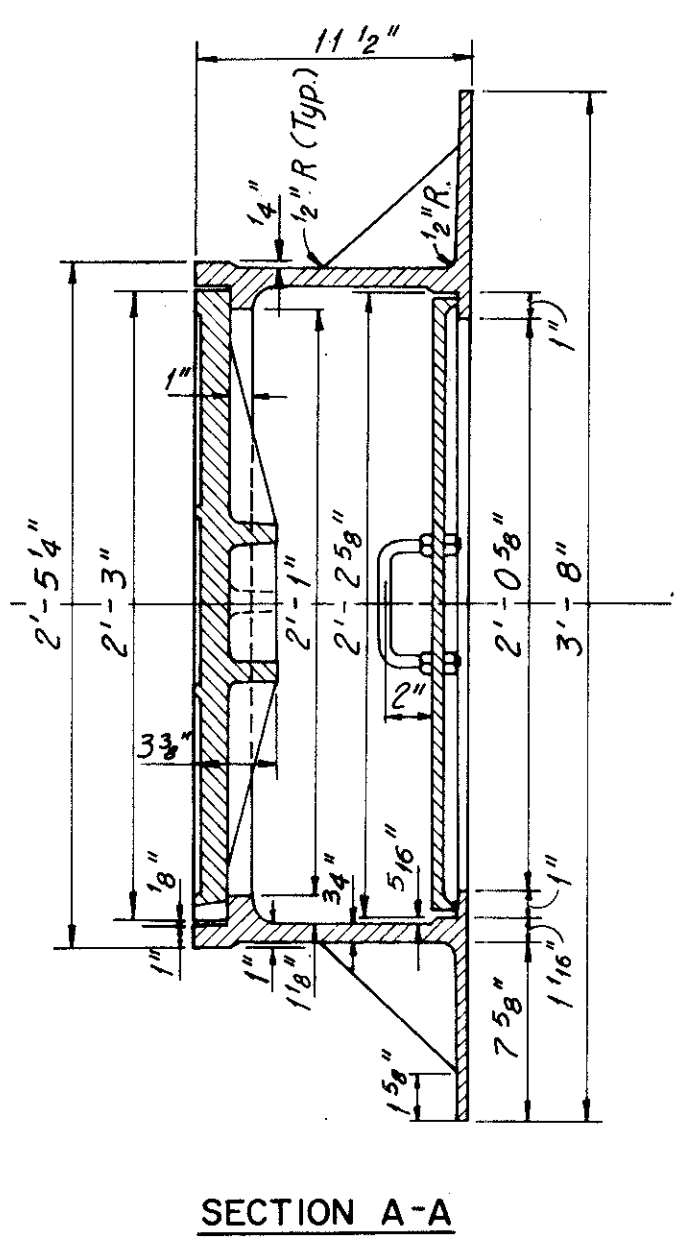
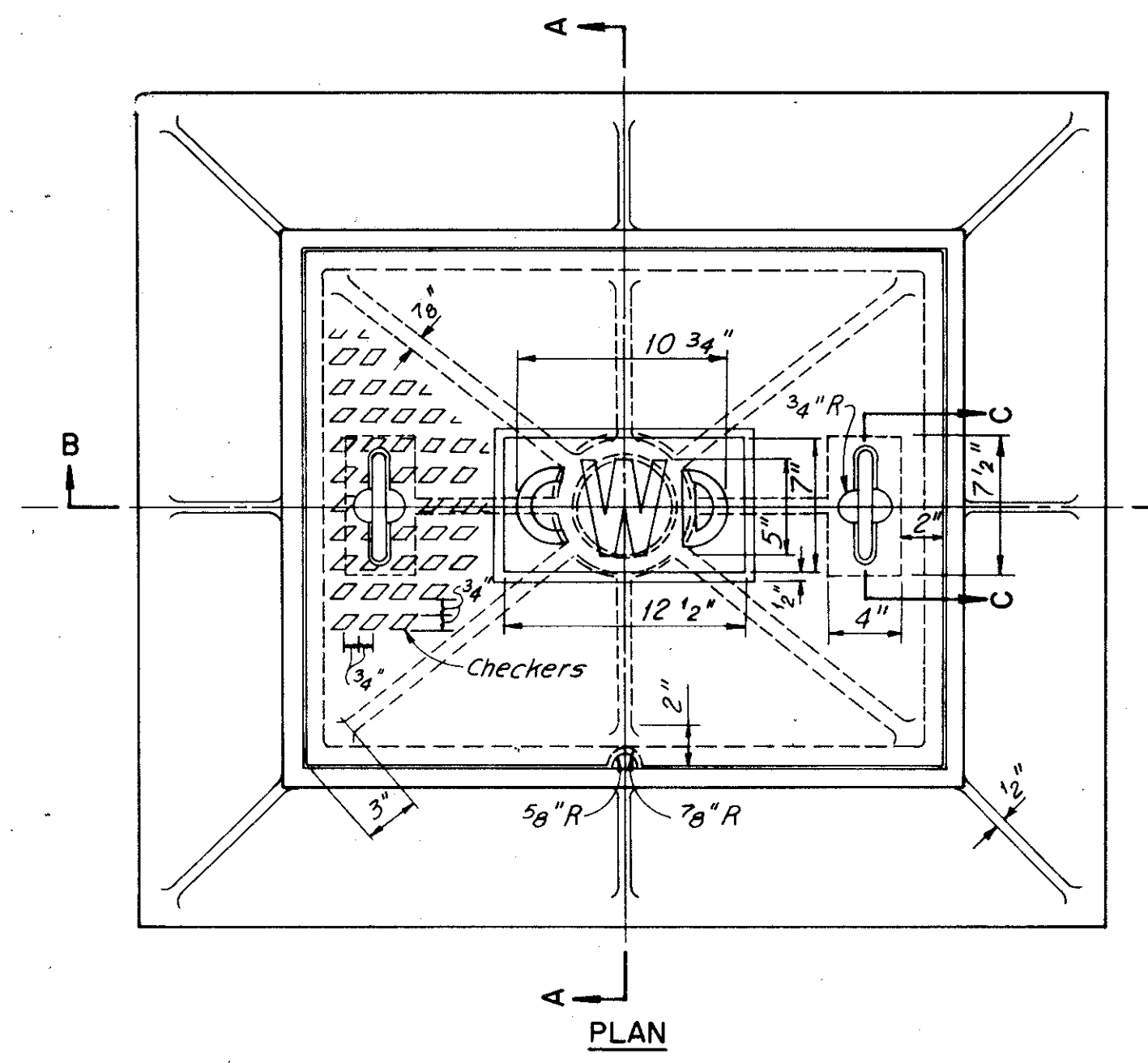
**DETAIL OF CUTTING IN VALVE**

APPROVED DATE JUNE 15, 1972  
*Frank R. Melan*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Robert J. ...*  
 ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond ...*  
 DIRECTOR OF PUBLIC UTILITIES  
*William ...*  
 COMMISSIONER OF WATER AND HEAT  
*Richard ...*  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David ...*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William ...*  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS AND THE CITY OF MAPLE HEIGHTS**

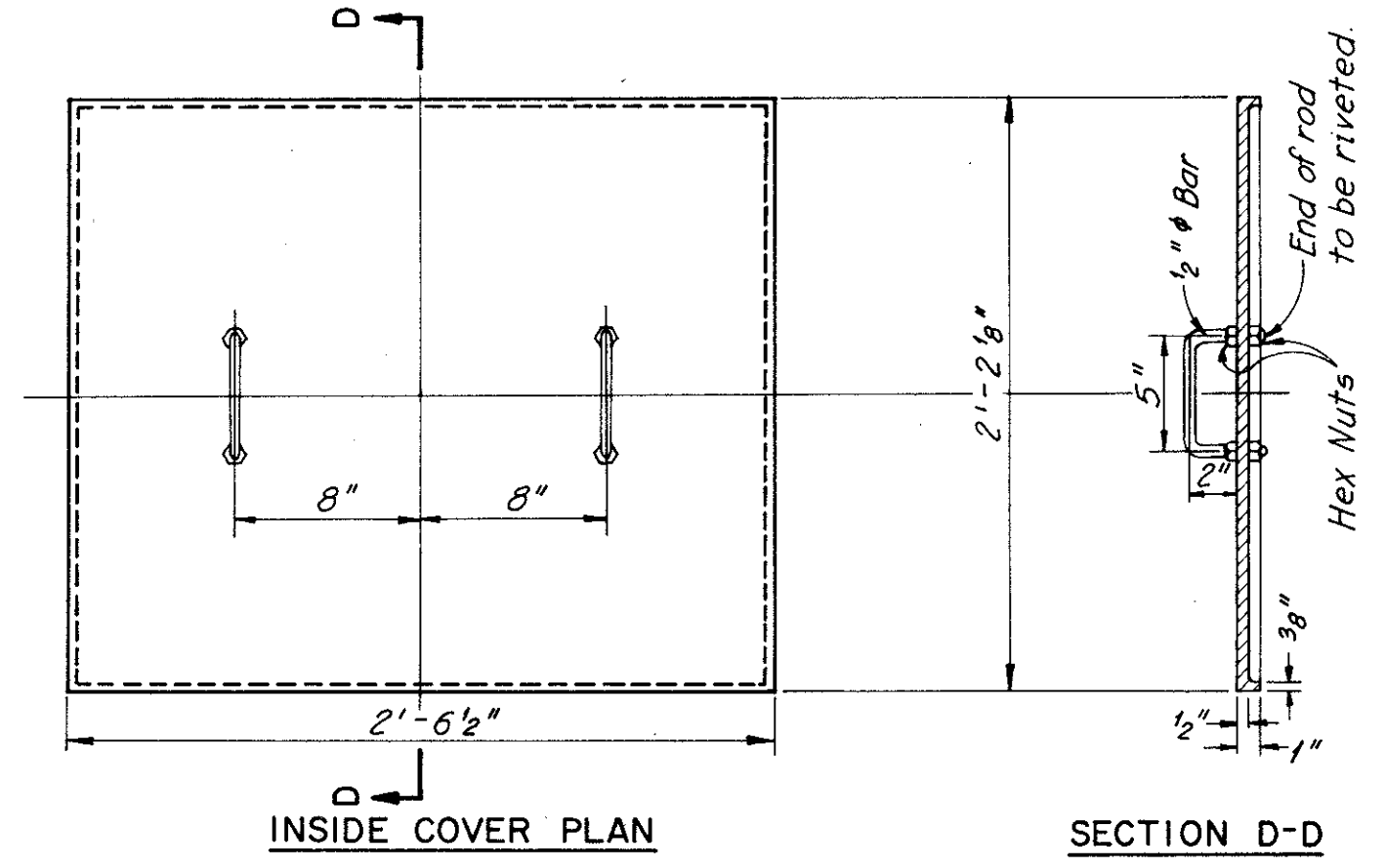
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 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE H.D. DATE: 5/11/71 CONSULTING ENGINEERS  
 TRCD H.D. DATE: 5/11/71  
 CKD E.R.H. DATE: 5-11-72 KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY  
CUY480-21.40



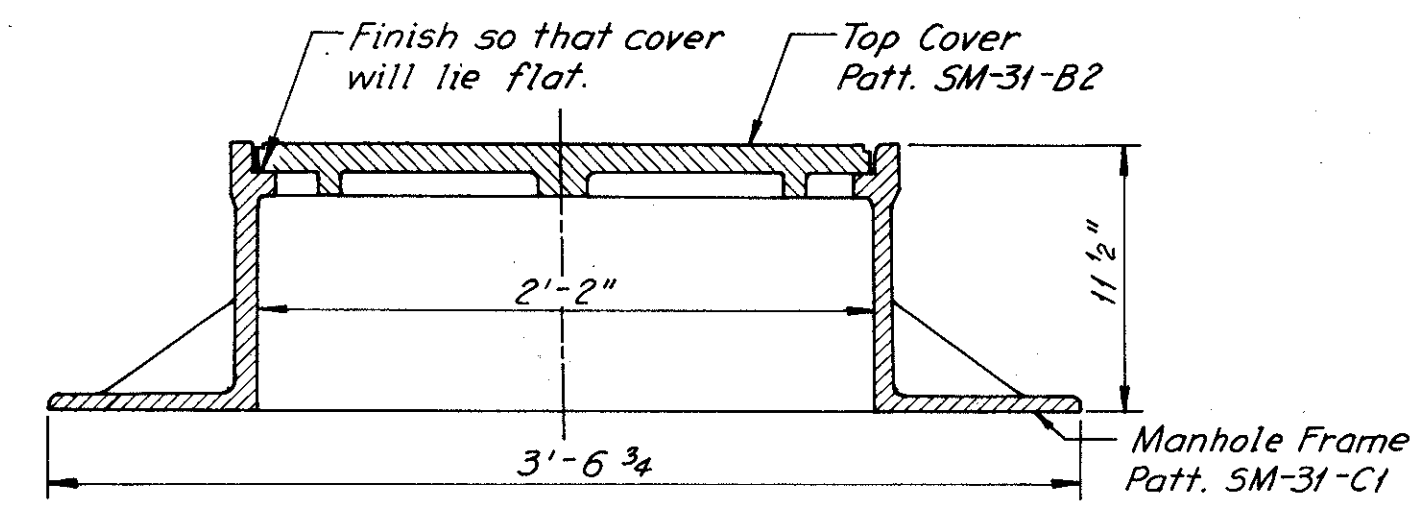
**MANHOLE FRAME AND COVERS MARK SM-31-B**

Consisting of { C.I. Manhole Frame Patt. SM-31-B1  
C.I. Top Cover Patt. SM-31-B2  
C.I. Inside Cover Patt. SM-31-B3  
Approximate Weight = 765 #



**MANHOLE FRAME AND COVERS MARK SM-31-A**

Consisting of { C.I. Manhole Frame Patt. SM-31-A1  
C.I. Top Cover Patt. SM-31-A2  
C.I. Inside Cover Patt. SM-31-A3



**MANHOLE FRAME AND COVER MARK NO. 3**

Consisting of { C.I. Manhole Frame Patt. SM-31-C1  
C.I. Top Cover Patt. SM-31-B2  
(Dimensions not given are the same as those shown for Manhole Frame Patt. Mark SM-31-B)  
Approximate Weight = 602 #

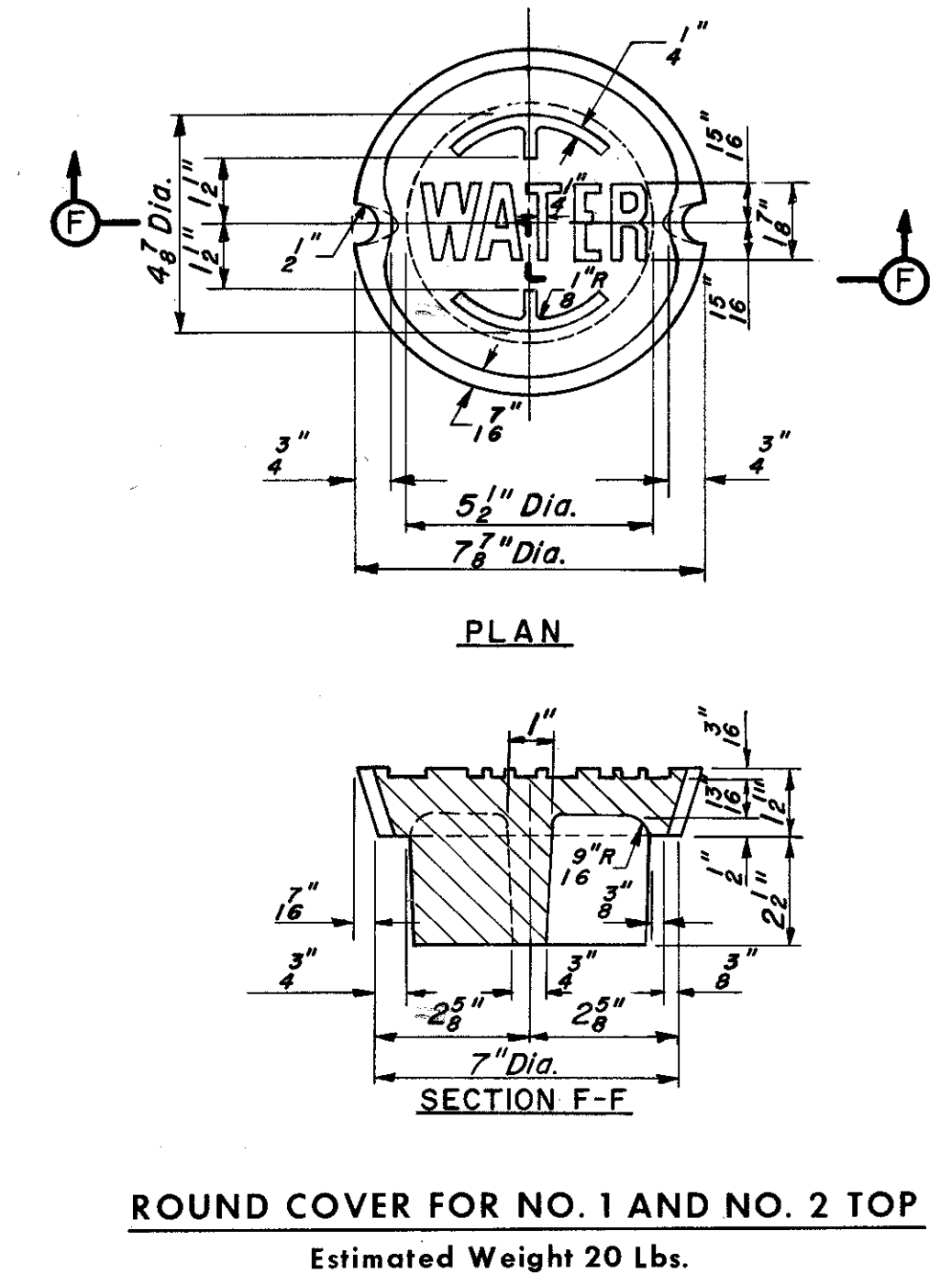
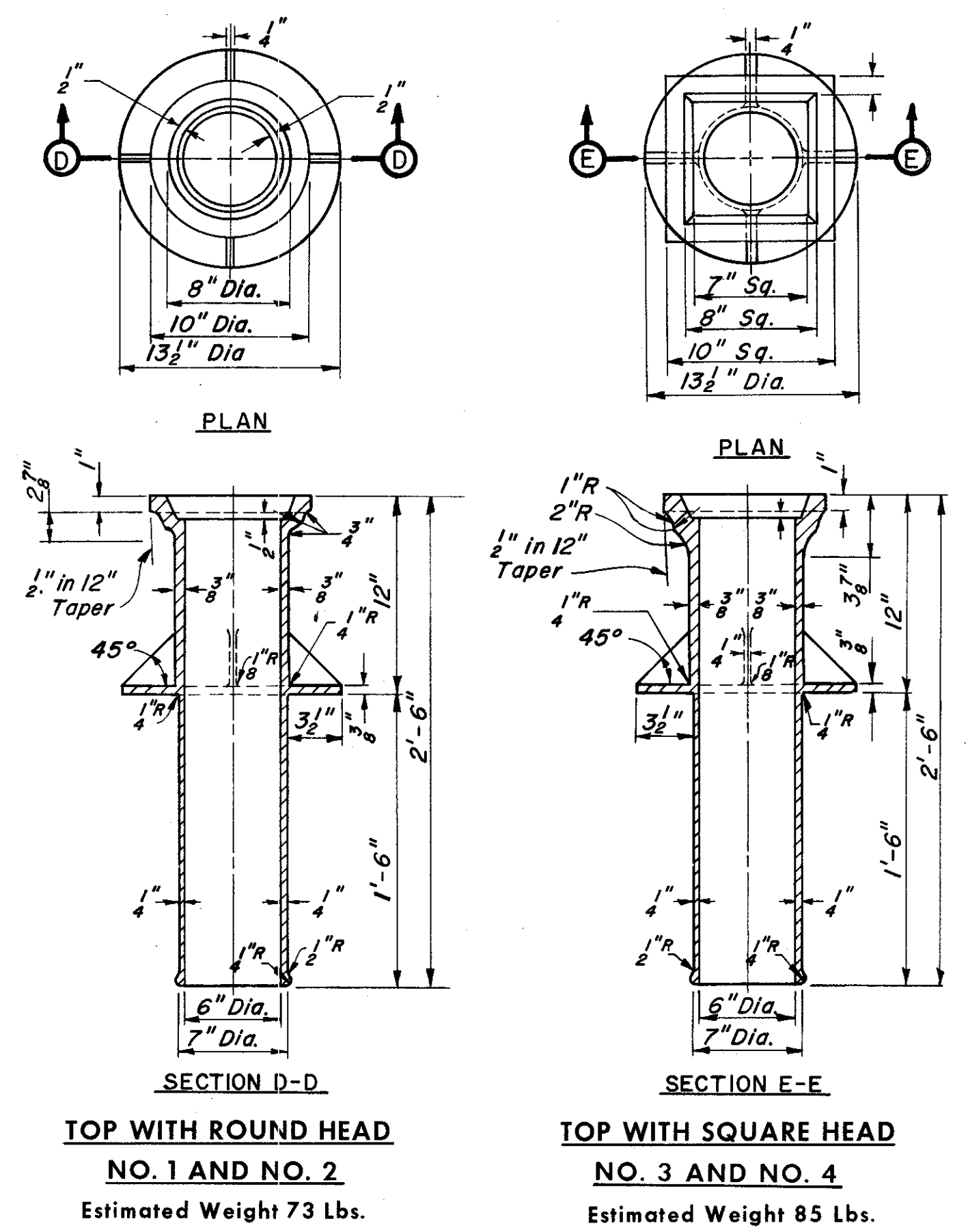
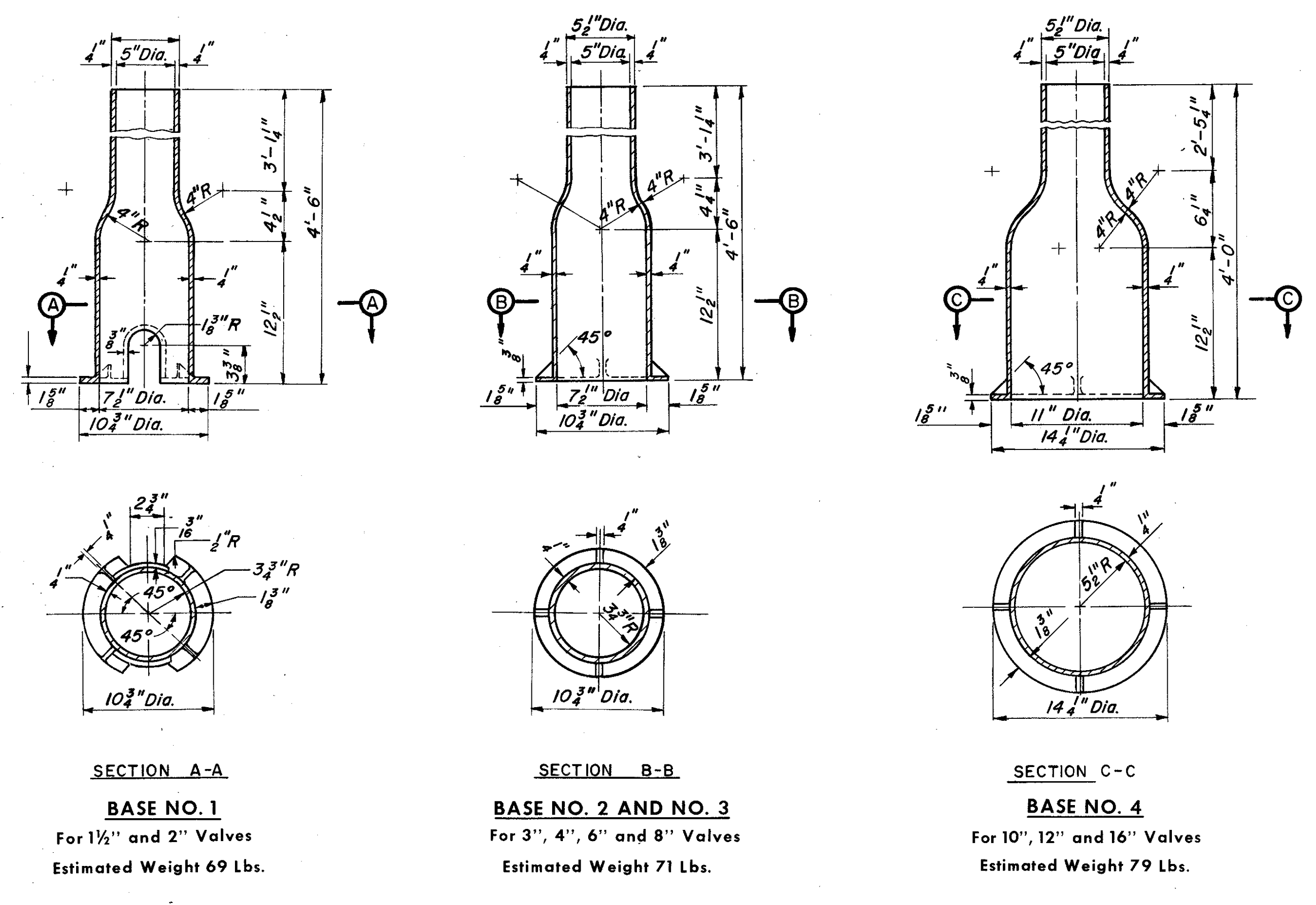
APPROVED \_\_\_\_\_ DATE JUNE 15, 1972  
*Frank R. Melton*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Raymond Kudekew*  
DIRECTOR OF PUBLIC UTILITIES  
*J. B. Stettin*  
COMMISSIONER OF WATER AND HEAT  
*Richard A. Suter*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*Dan O. ...*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
*William J. Sweeney*  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: **WATERWORK FOR THE CITY OF GARFIELD HEIGHTS**

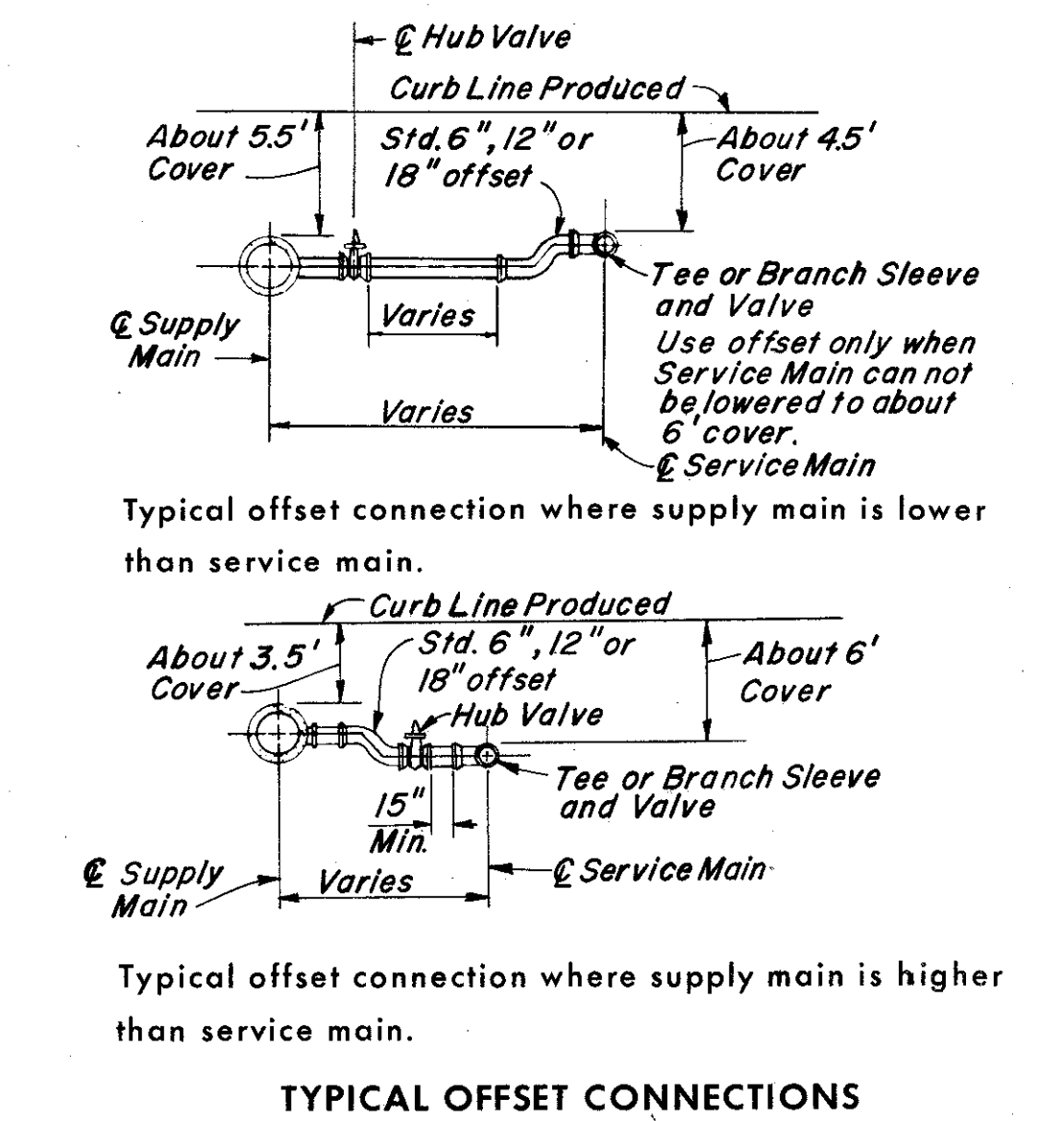
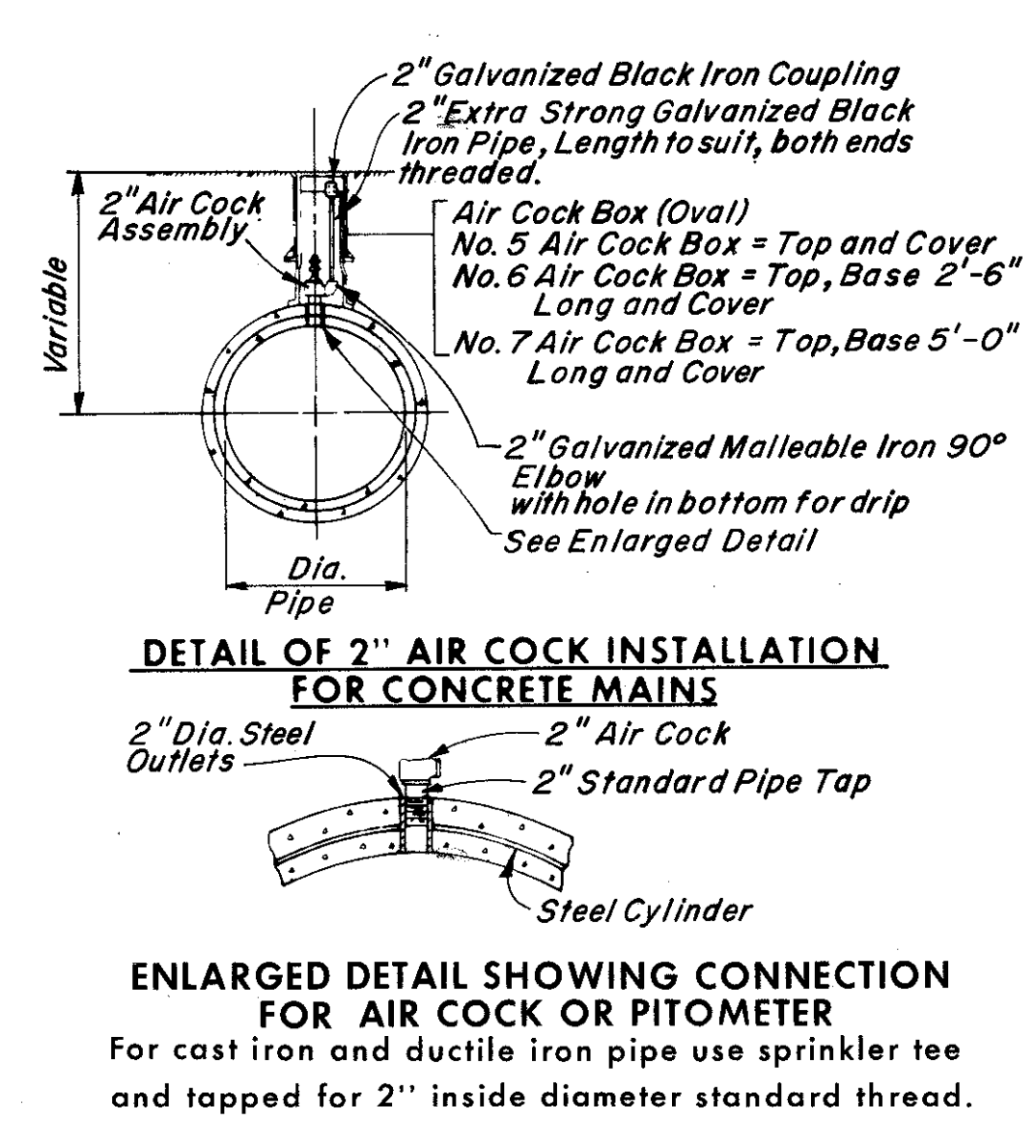
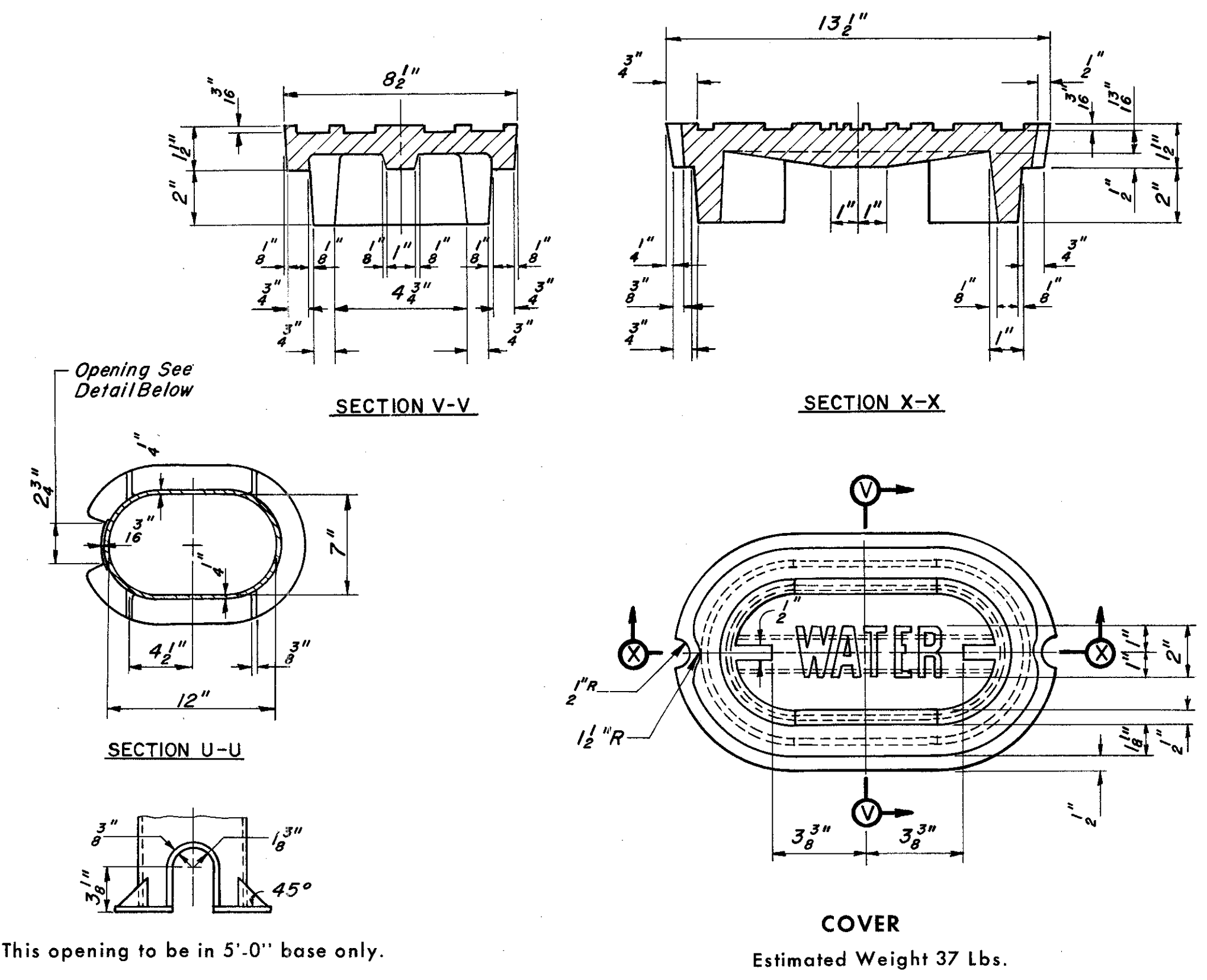
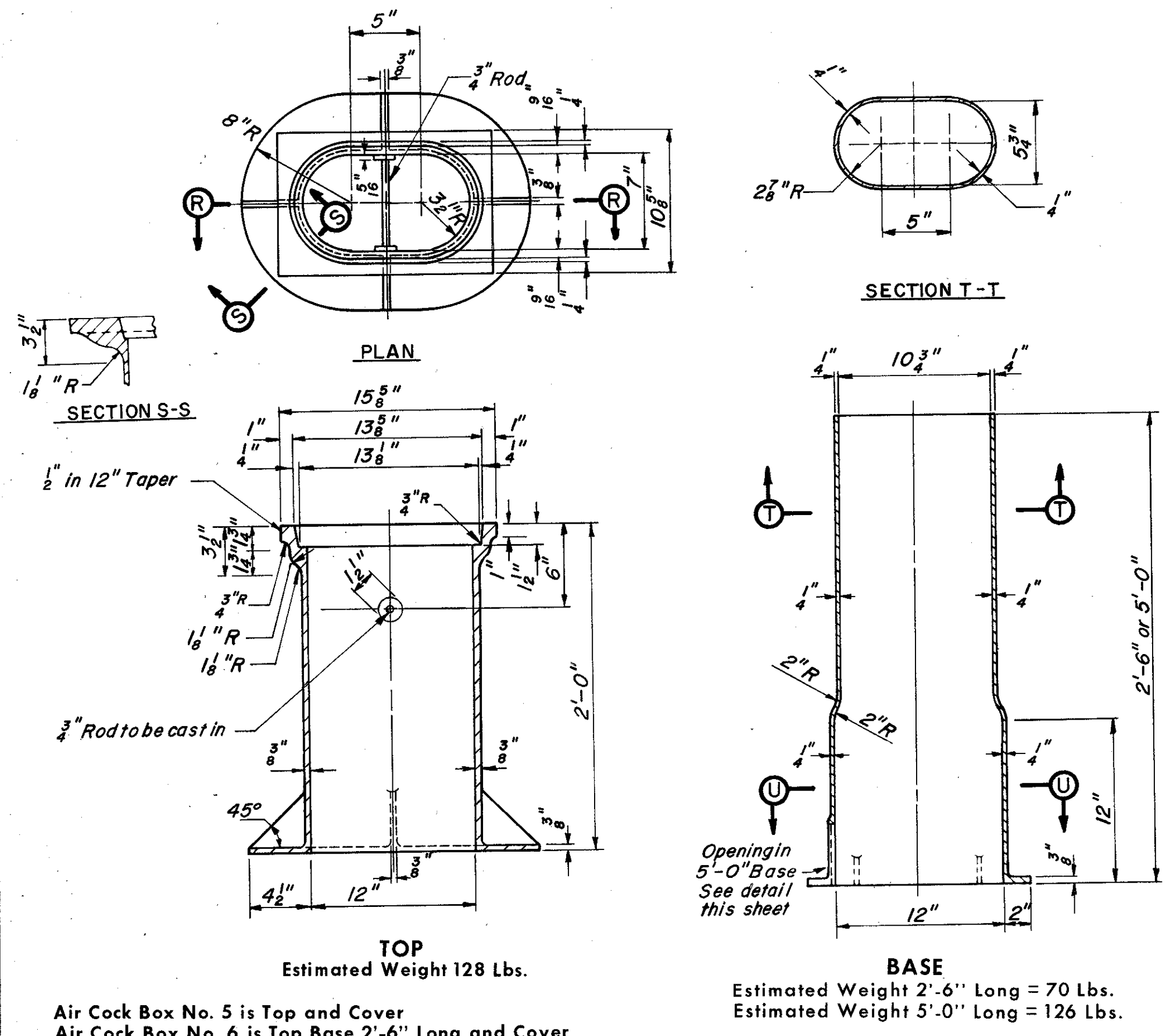
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HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE ERH DATE 6-2-70 CONSULTING ENGINEERS  
TRCD IN DATE 6-12-70  
CKD ERH DATE 5-11-72 KANSAS CITY CLEVELAND NEW YORK



CUYAHOGA COUNTY  
CUY. -480-21.40



**STANDARD DETAILS- VALVE BOXES**



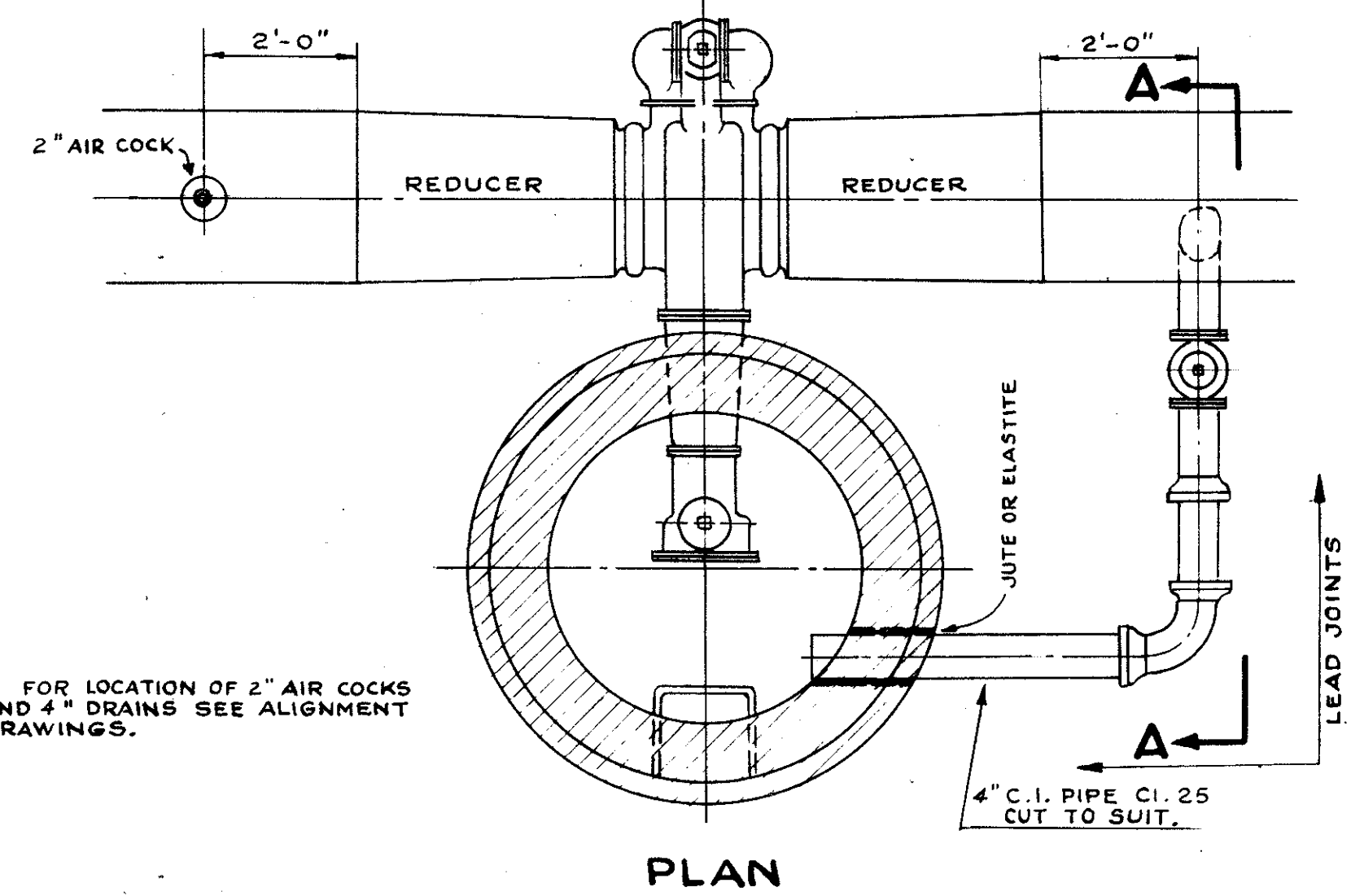
**STANDARD DETAILS- AIR COCK BOXES**

**STANDARD DETAILS- AIR COCK AND CONNECTIONS FOR VARIOUS PIPE**

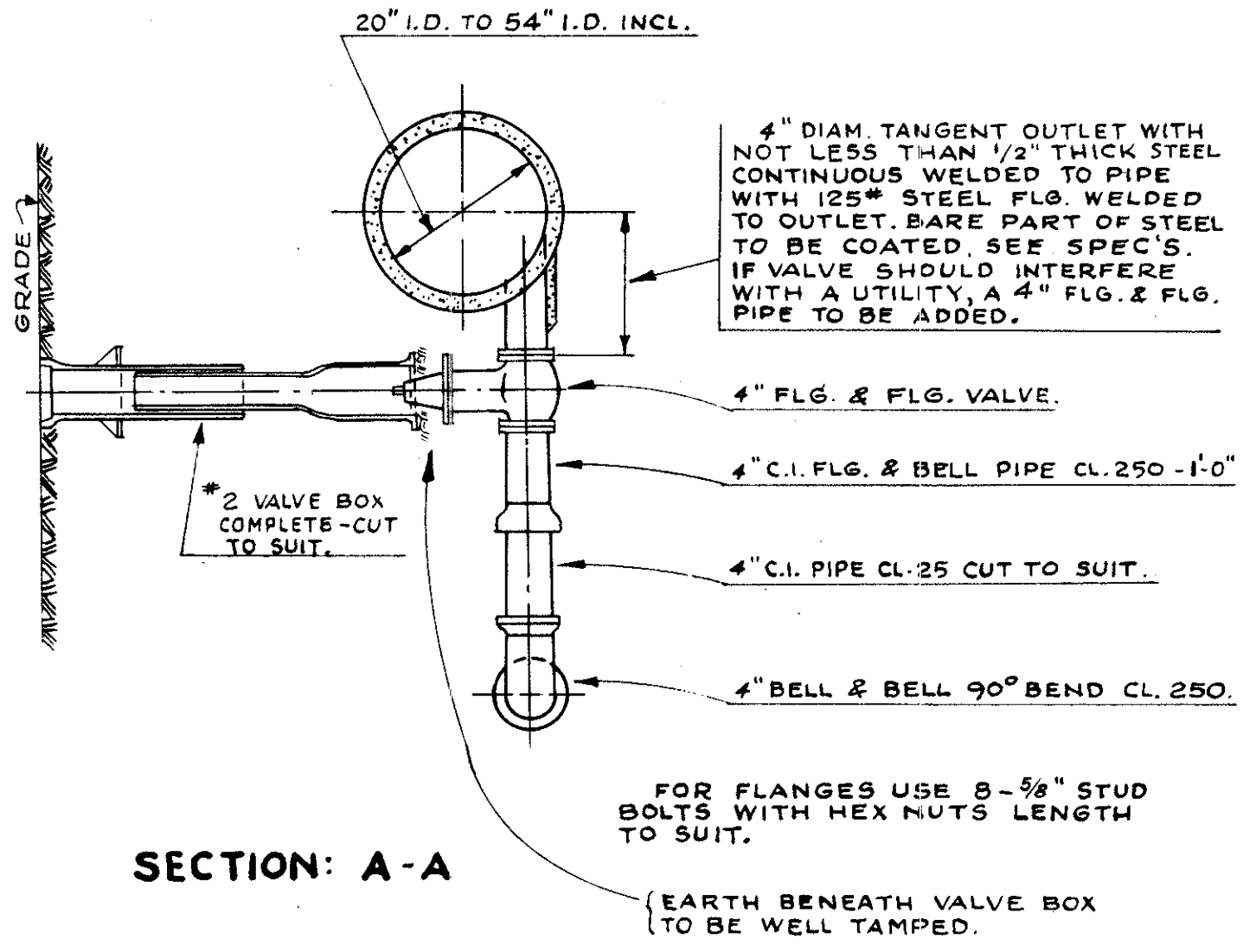
APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
*Franklin R. Mylona*  
 ENGINEER, CITY OF GARFIELD HEIGHTS  
*Richard J. Hall*  
 ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond Rudick*  
 DIRECTOR OF PUBLIC UTILITIES  
*William A. Sweeney*  
 COMMISSIONER OF WATER AND HEAT  
 COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*David D. Giffin*  
 ENGINEER OF CONSTRUCTION AND SURVEYS  
*William A. Sweeney*  
 ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
 DEPARTMENT OF PUBLIC UTILITIES  
 DIVISION OF WATER AND HEAT  
 CLEVELAND, OHIO  
 Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
 AND THE CITY OF MAPLE HEIGHTS

SCALE No Scale HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE ERH DATE 3-19-71 CONSULTING ENGINEERS  
 TRCD HLD DATE 5-10-71  
 CKD ERH DATE 5-10-71 KANSAS CITY CLEVELAND NEW YORK



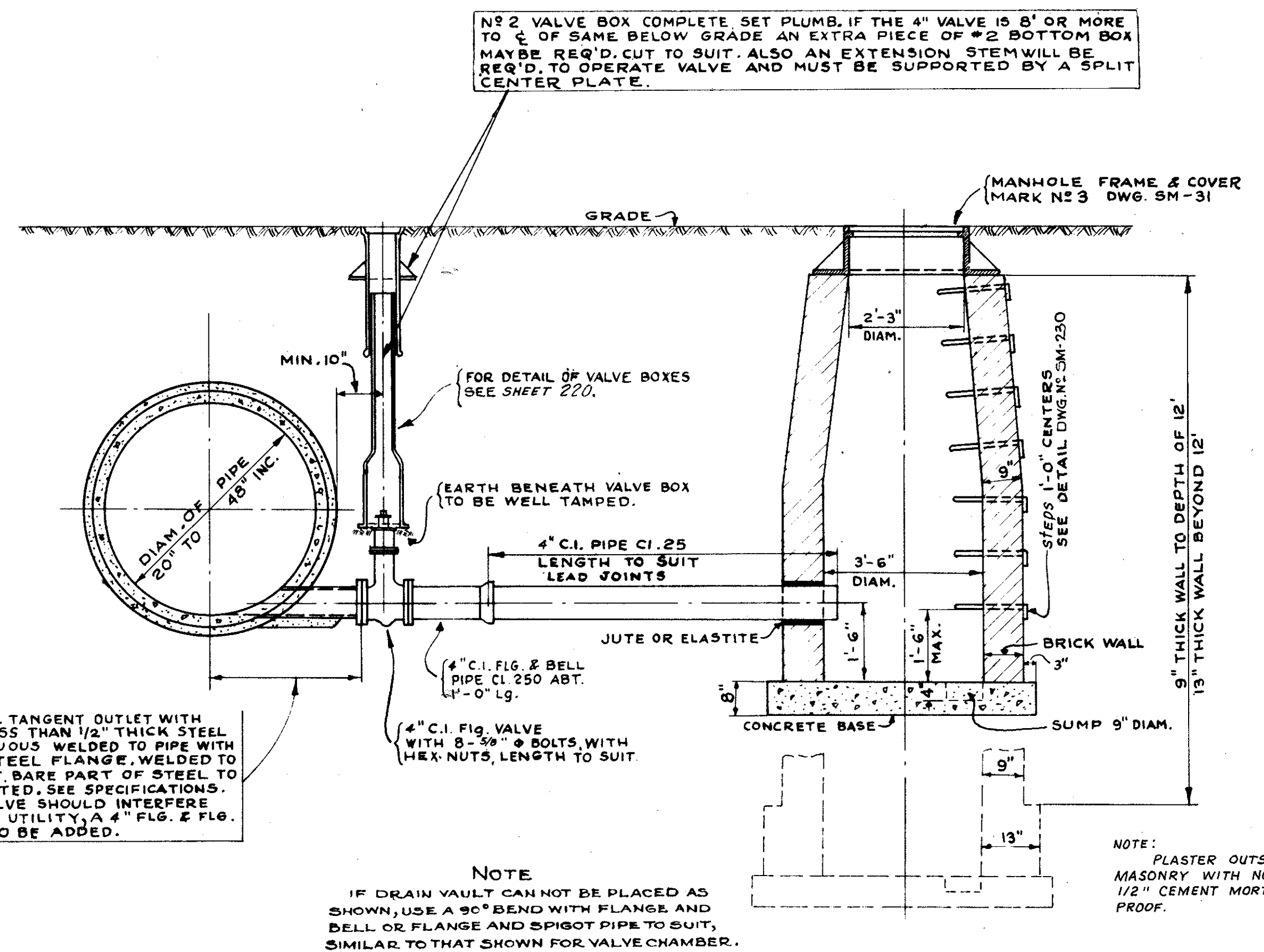
PLAN



SECTION: A-A

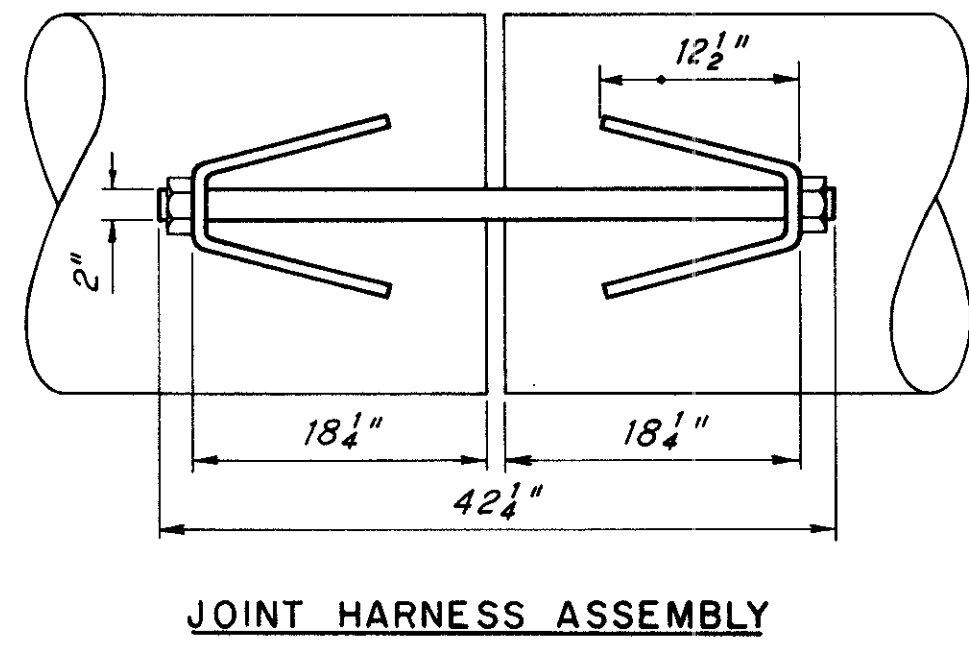
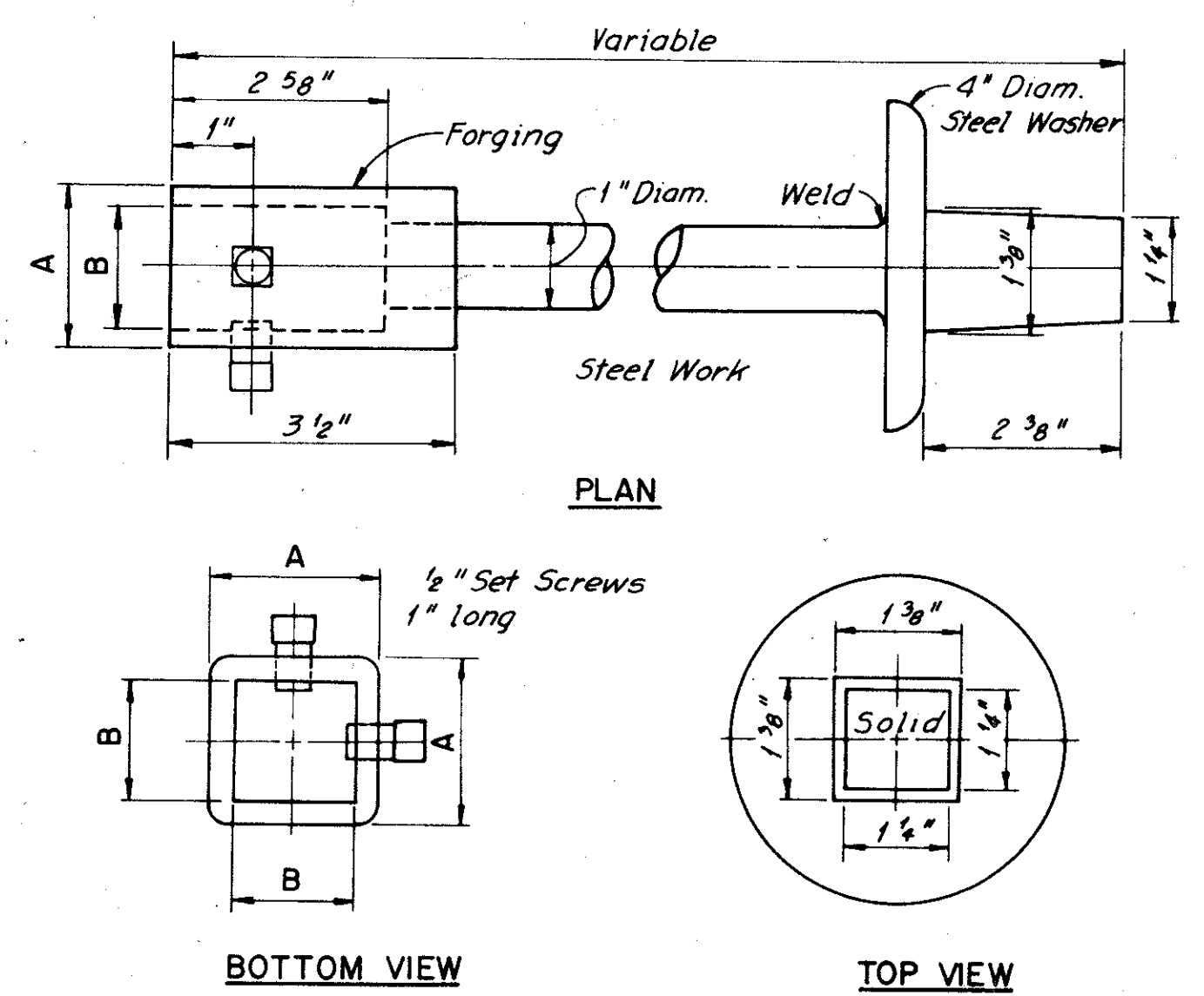
TYPICAL DETAIL SHOWING 4" DRAIN FROM WATER MAIN TO VALVE CHAMBER

SCALE: 1/2" = 1 FT.

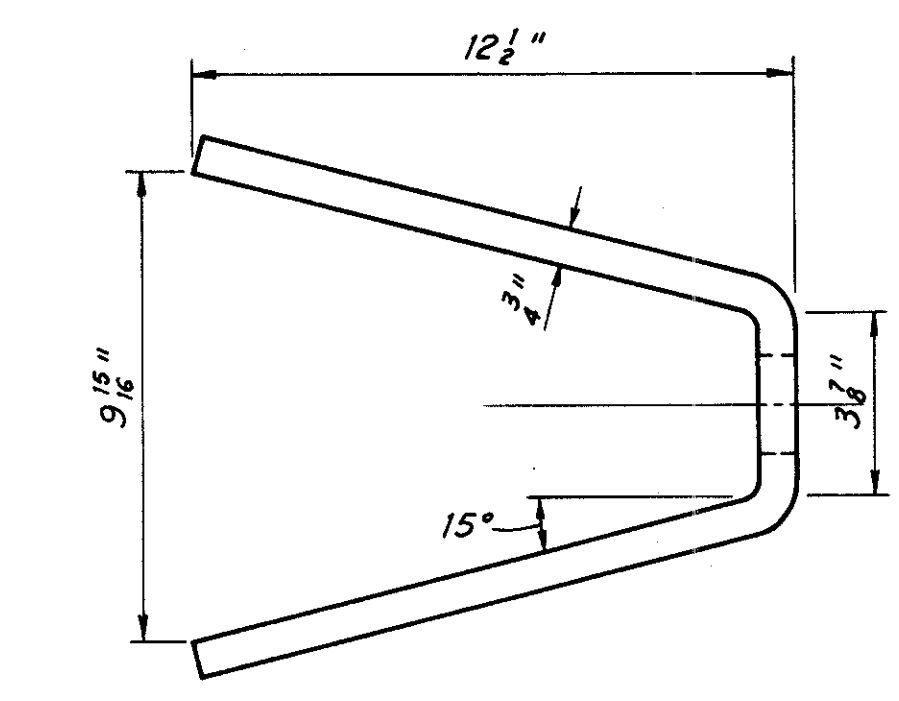


TYPICAL DETAIL OF 4" DRAIN AND VAULT

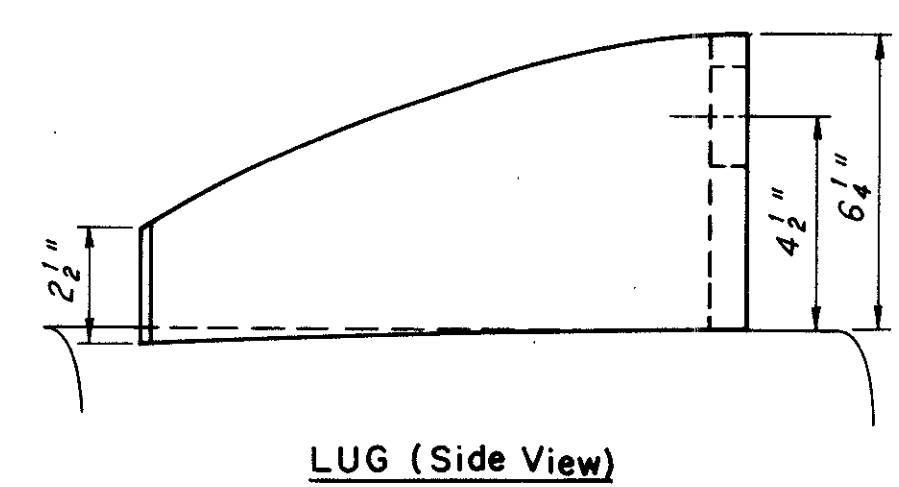
SCALE: 1/2" = 1 FT.



JOINT HARNESS ASSEMBLY

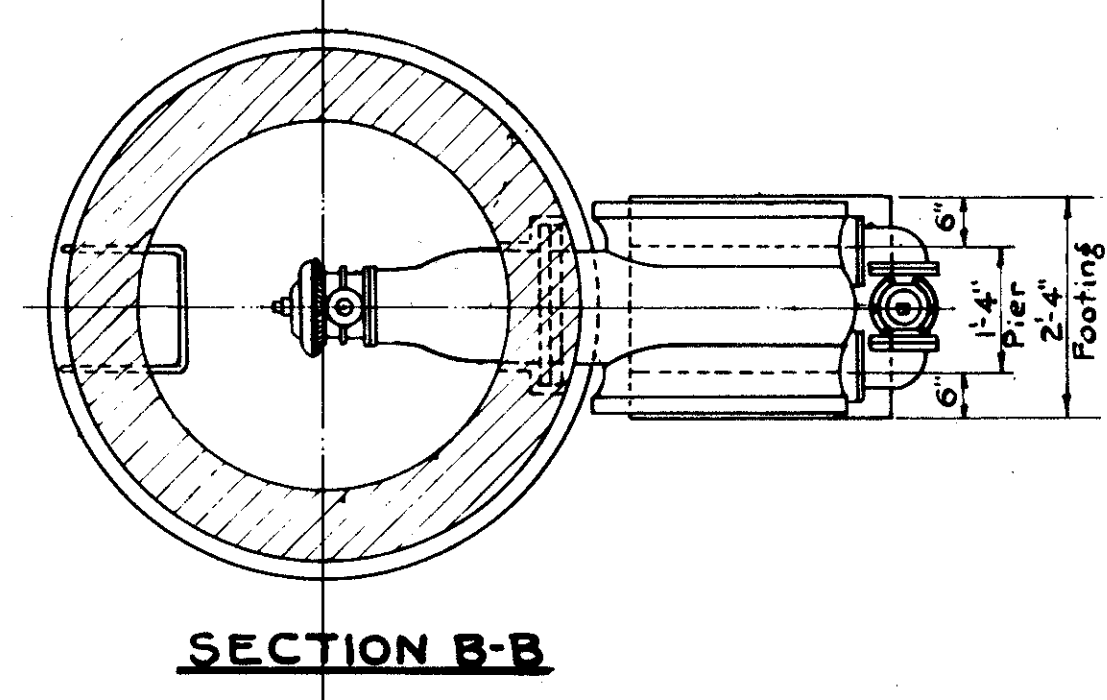


LUG (Top View)

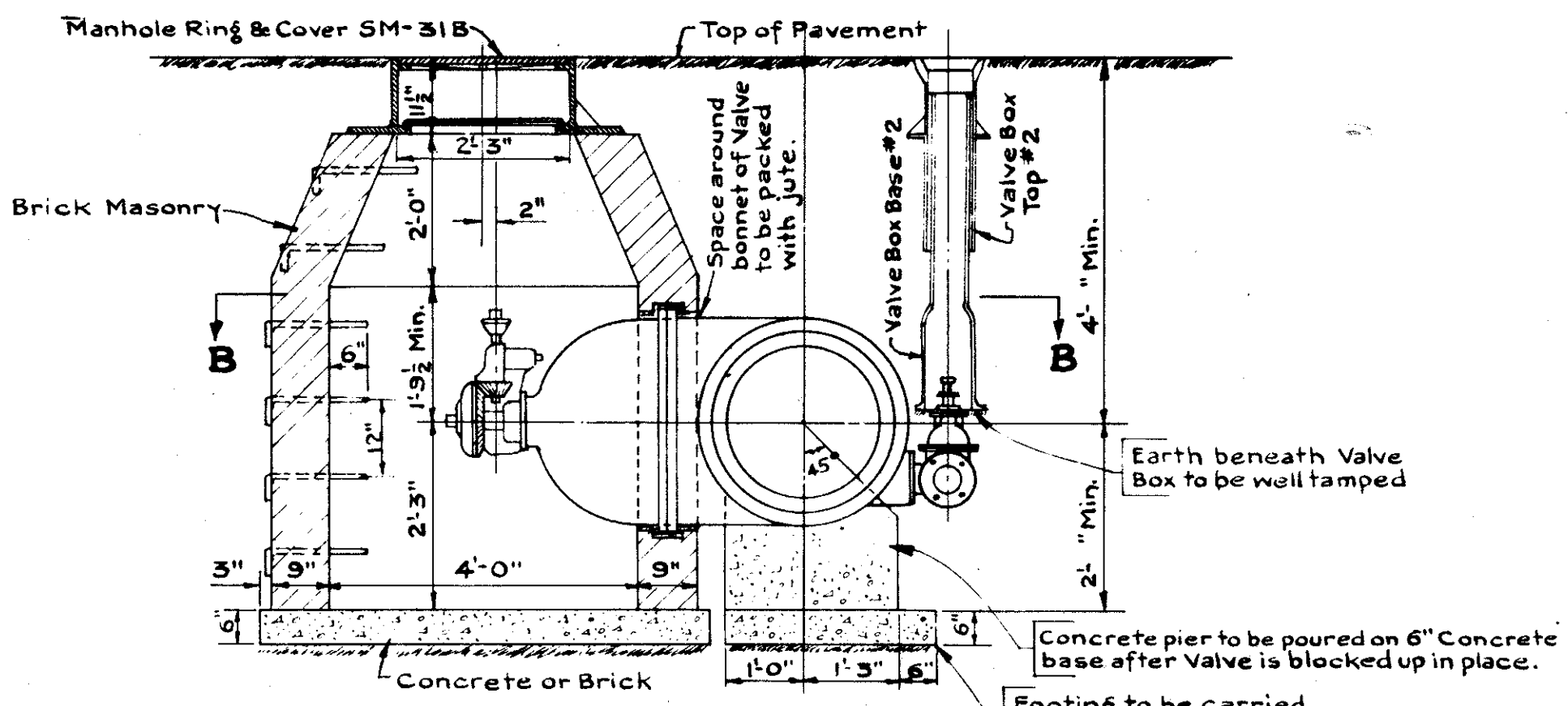


LUG (Side View)

DETAILS OF JOINT HARNESS TIE BOLTS AND LUGS  
NO SCALE



SECTION B-B



CHAMBER FOR 24" VALVE

Scale: 1/2" = 1 FT.

APPROVED DATE: JUNE 15, 1972

*Ronald B. Meland*  
ENGINEER, CITY OF GARFIELD HEIGHTS

*Raymond K. Kubacki*  
DIRECTOR OF PUBLIC UTILITIES  
COMMISSIONER OF WATER AND HEAT

*Edward J. Fisher*  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING

*David J. Plummer*  
ENGINEER OF CONSTRUCTION AND SURVEYS

*William J. Swannet*  
ENGINEER OF DESIGN

**2 ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO

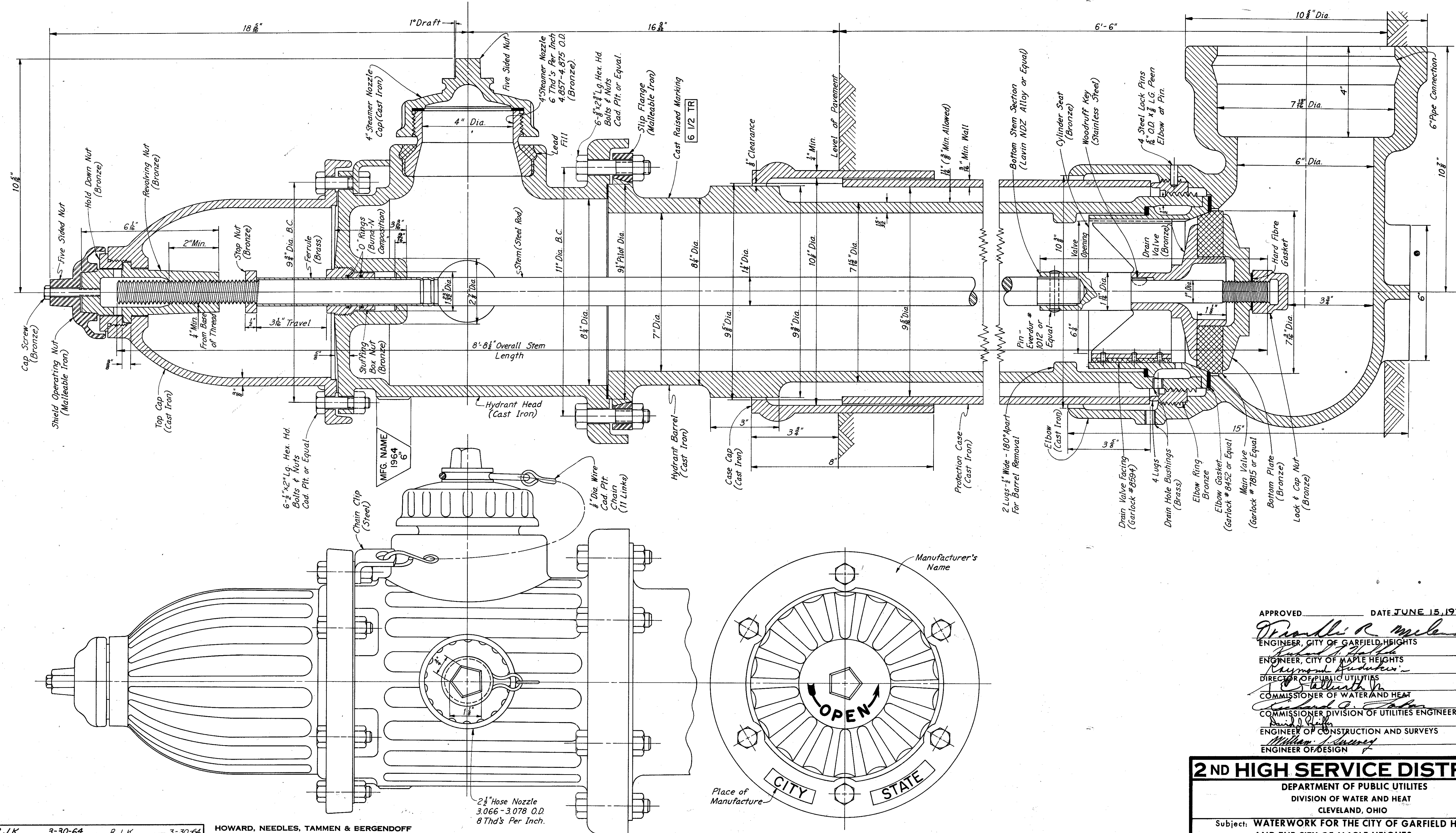
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS

As Shown  
SCALE: E.R.H. DATE: 3-6-70  
MADE: H.L.D. DATE: 4-3-70  
TRCD: J.T.T. DATE: 4-2-71  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

222  
390

CUYAHOGA COUNTY  
CUY480-21.40



MADE R.J.K. DATE 3-30-64 TRACED R.J.K. DATE 3-30-64  
CHECKED E.P.H. DATE 4-2-71 SCALE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

2 1/2" Hose Nozzle  
3.066-3.078 O.D.  
8 Thd's Per Inch.

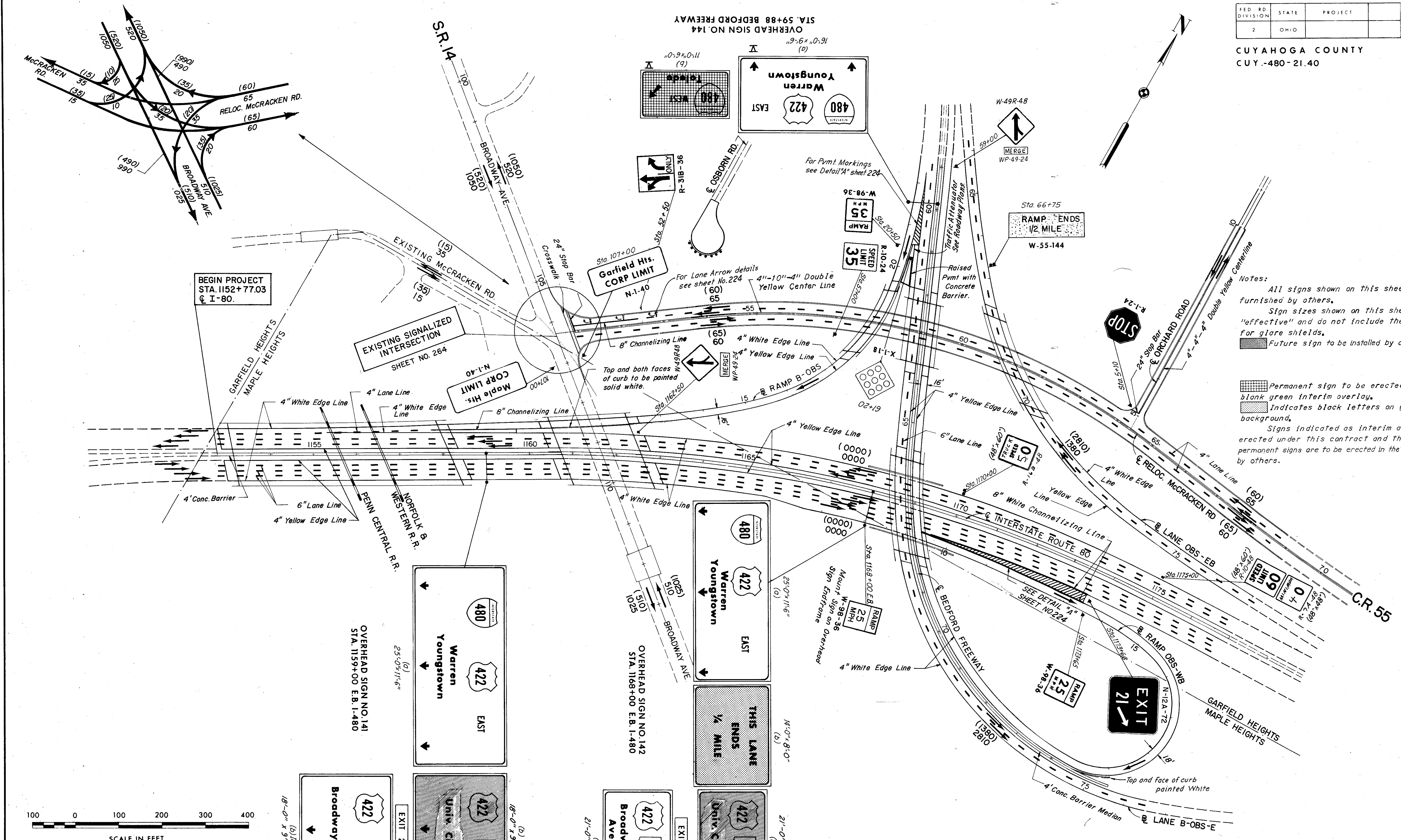
APPROVED DATE JUNE 15, 1972  
*Donald R. McLean*  
ENGINEER, CITY OF GARFIELD HEIGHTS  
*Richard A. Hall*  
ENGINEER, CITY OF MAPLE HEIGHTS  
*Raymond Budzinski*  
DIRECTOR OF PUBLIC UTILITIES  
*William J. Sweeney*  
COMMISSIONER OF WATER AND HEAT  
COMMISSIONER DIVISION OF UTILITIES ENGINEERING  
*William J. Sweeney*  
ENGINEER OF CONSTRUCTION AND SURVEYS  
ENGINEER OF DESIGN

**2ND HIGH SERVICE DISTRICT**  
DEPARTMENT OF PUBLIC UTILITIES  
DIVISION OF WATER AND HEAT  
CLEVELAND, OHIO  
Subject: WATERWORK FOR THE CITY OF GARFIELD HEIGHTS  
AND THE CITY OF MAPLE HEIGHTS

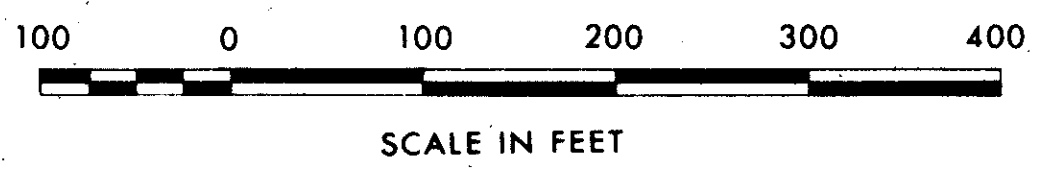
L-7 U-7

FED. RD. DIVISION	STATE	PROJECT	223
2	OHIO		390

CUYAHOGA COUNTY  
CUY.-480-21.40



Notes:  
 All signs shown on this sheet will be furnished by others.  
 Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.  
 [Symbol] Future sign to be installed by others.  
 [Symbol] Permanent sign to be erected with blank green interim overlay.  
 [Symbol] Indicates black letters on yellow background.  
 Signs indicated as interim are to be erected under this contract and the permanent signs are to be erected in the future by others.



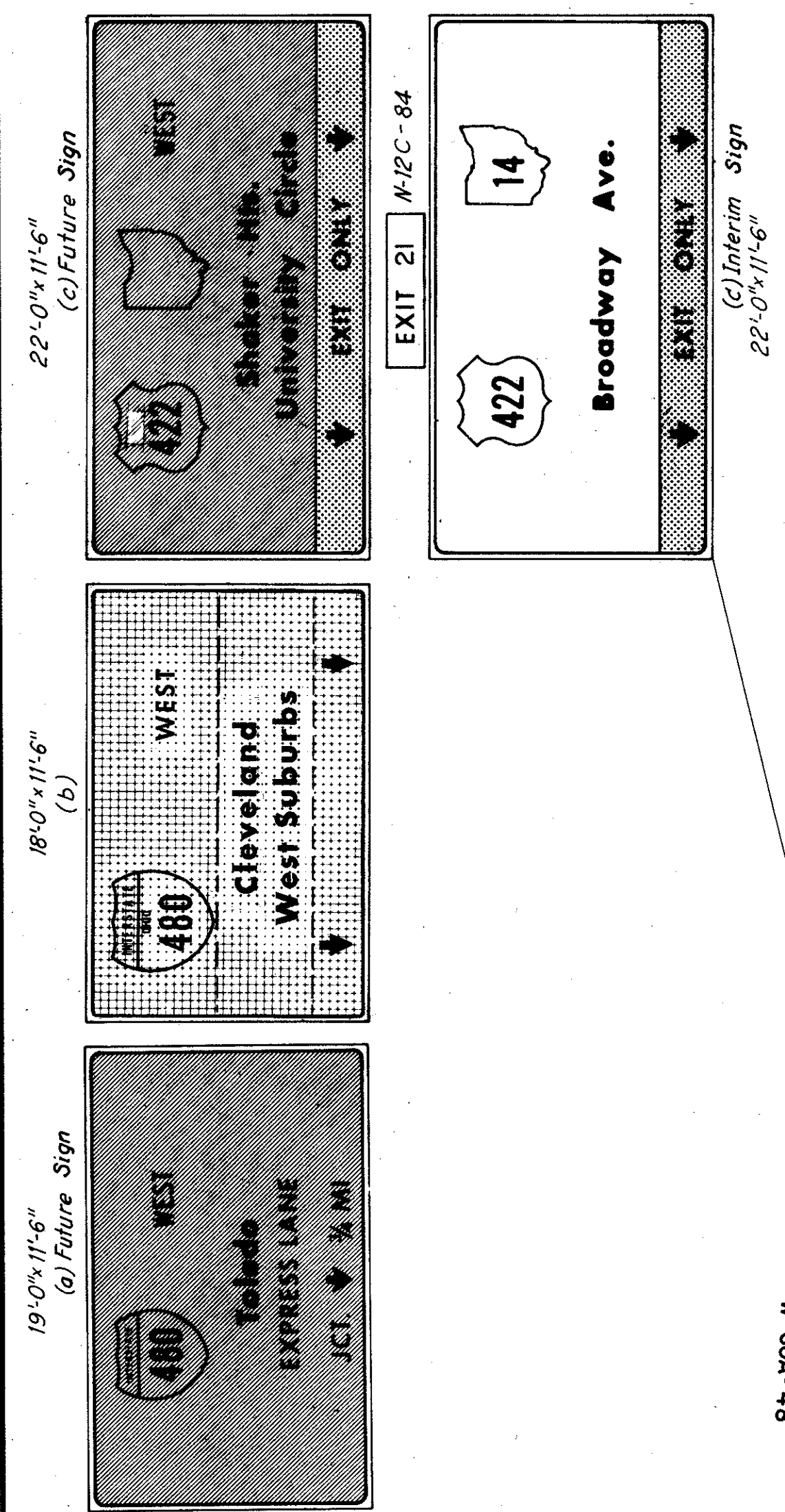
SCALE 1"=100'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE I.M. DATE 7-24-69 CONSULTING ENGINEERS  
 TRCD. L.N. DATE 7-25-69  
 C.K.D. J.C.V. DATE 8-10-72 KANSAS CITY CLEVELAND NEW YORK

DESIGN YEAR: 1992  
 DESIGN SPEED: 60 MPH  
 DIRECTIONAL DESIGN HOURLY VOLUME (DDHV): (000)=A.M. PEAK  
 000 = P.M. PEAK

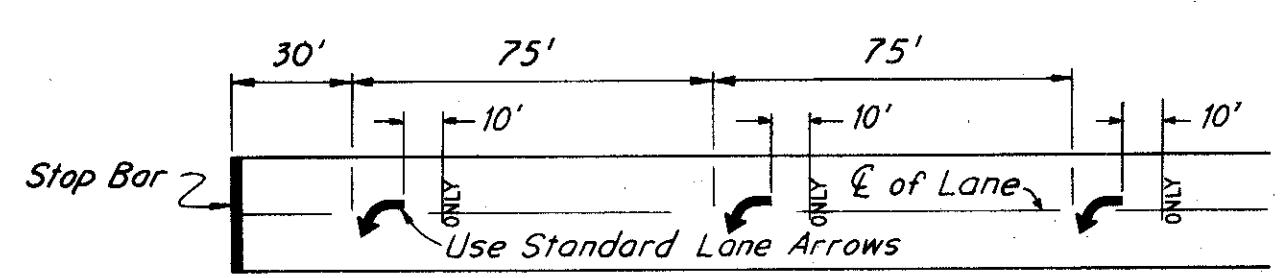
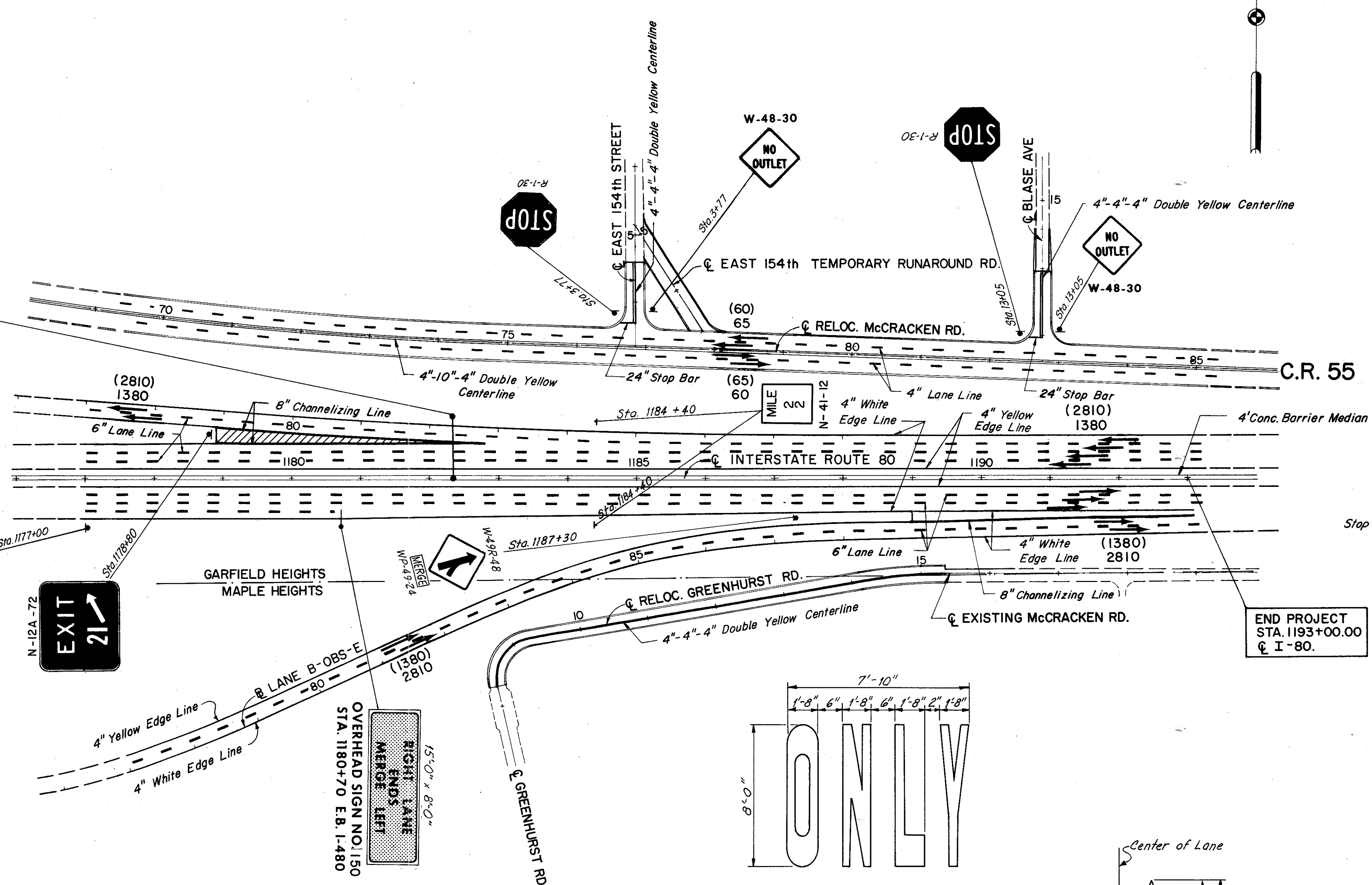
FED. RD. DIVISION	STATE	PROJECT
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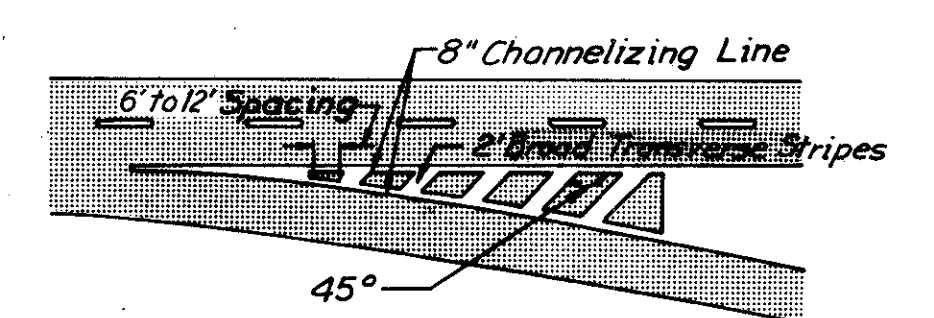
CUYAHOGA COUNTY  
CUY.-480-21.40



OVERHEAD SIGN NO. 143  
STA. 1182+33 W.B. I-480



TYPICAL LOCATION OF LANE ARROWS

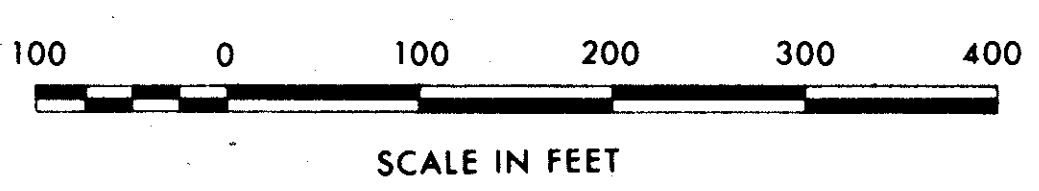


DETAIL "A"  
Not to Scale

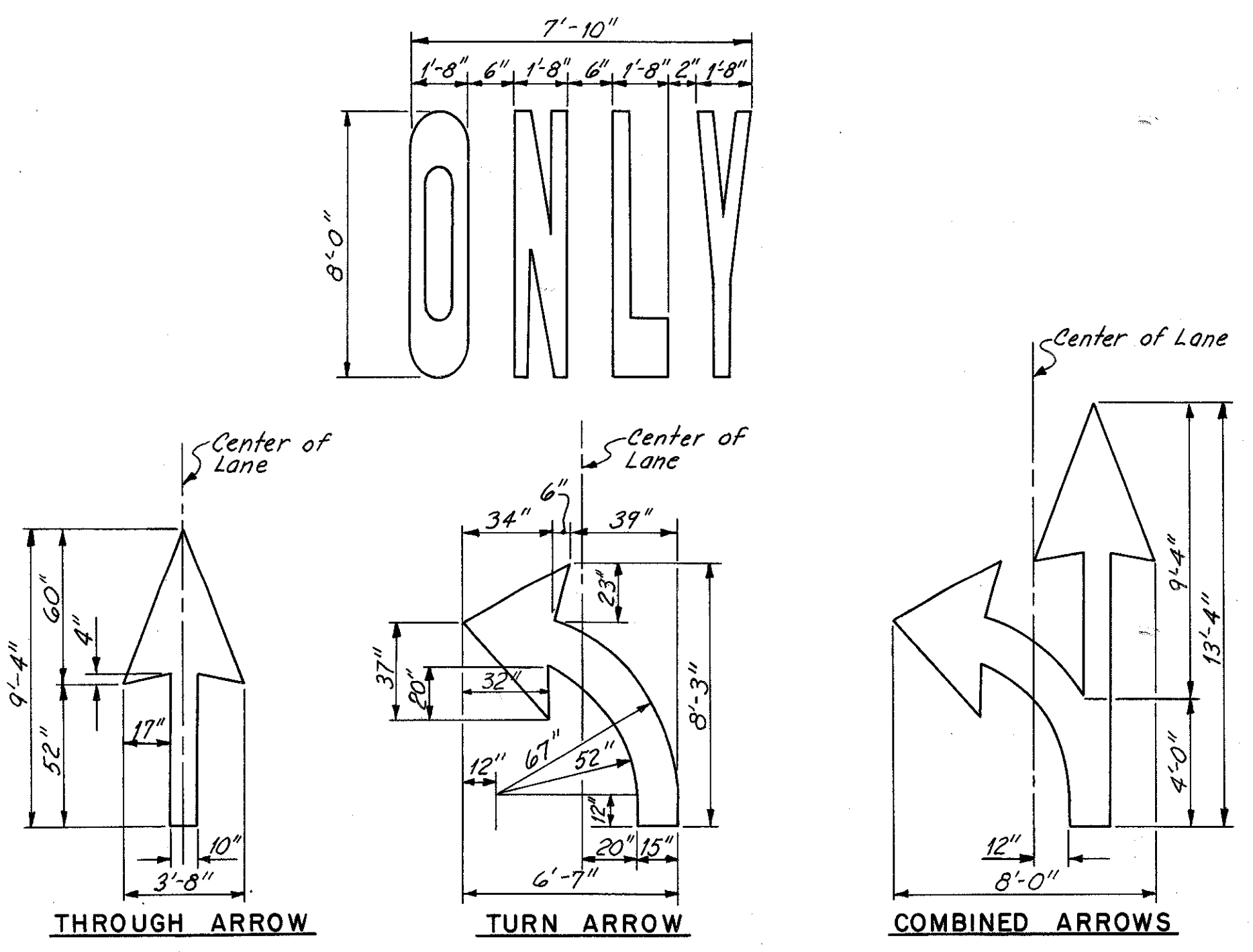
Notes:  
All signs shown on this sheet will be furnished by others.  
Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.  
Future sign to be installed by others.

Permanent sign to be erected with blank green interim overlay.  
Indicates black letters on yellow background.

Signs indicated as interim are to be erected under this contract and the permanent signs are to be erected in the future by others.



SCALE IN FEET



PAVEMENT MARKING DETAILS

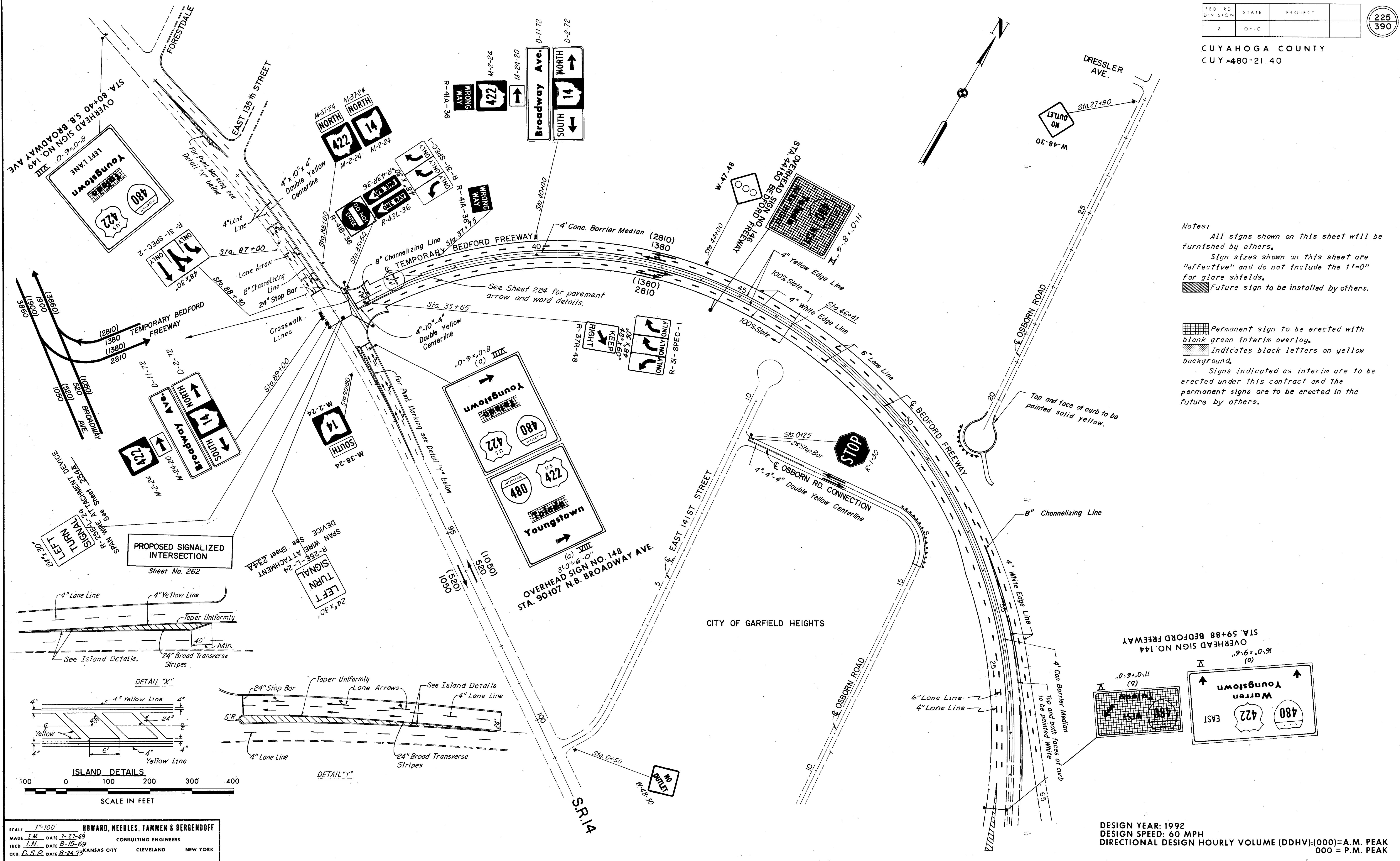
DESIGN YEAR: 1992  
DESIGN SPEED: 60 MPH  
DIRECTIONAL DESIGN HOURLY VOLUME (DDHV): (000)=A.M. PEAK  
000 = P.M. PEAK

SCALE 1"=100'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE I.M. DATE 8-2-69 CONSULTING ENGINEERS  
TRCD. J.N. DATE 8-4-69  
CKD. J.E.N. DATE 4-10-72 KANSAS CITY CLEVELAND NEW YORK

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CUY-480-21.40



Notes:  
 All signs shown on this sheet will be furnished by others.  
 Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.  
 [Symbol] Future sign to be installed by others.  
 [Symbol] Permanent sign to be erected with blank green interim overlay.  
 [Symbol] Indicates black letters on yellow background.  
 Signs indicated as interim are to be erected under this contract and the permanent signs are to be erected in the future by others.

DESIGN YEAR: 1992  
 DESIGN SPEED: 60 MPH  
 DIRECTIONAL DESIGN HOURLY VOLUME (DDHV): (000)=A.M. PEAK  
 (000)=P.M. PEAK

SCALE: 1"=100'  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 MADE I.M. DATE 7-27-69 CONSULTING ENGINEERS  
 TRCD. I.N. DATE 8-15-69  
 CKD. D.S.R. DATE 8-24-73 KANSAS CITY CLEVELAND NEW YORK

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## 816 STRUCTURAL SUPPORTS, STEEL BEAM (TYPE)

The Structural Steel Beam Supports including 6 pound beams, 4 and 2 pound drive post and hardware shall be galvanized in accordance with ASTM A-123 and A-153 respectively. All fabrication shall be completed prior to galvanizing.

Quantities for Item 816 "Structural Supports, Steel Beam (Type)", appearing in the quantity tables are approximate. The Contractor shall be responsible for determining exact support lengths prior to fabrication and galvanizing of supports. Payment shall be at the contract unit price bid per lin. ft. which price and payment shall include all costs in connection with the embedment of the supports.

## 816 OVERHEAD SIGN SUPPORT, BY TYPE

All component parts of the Overhead Sign Supports shall be steel, except for the truss and components for the Number 7 series which shall be aluminum. For specific details and materials, see sheet numbers 240 through 244

Cost of furnishing and installing the sign brackets and the fixture support arm, length "G", with mounting holes and hardware shall be included in the contract unit price bid for Overhead Sign Supports.

Modifying Supplemental Specification 816 Switch Enclosure Mounting Brackets including mounting bolts and drilled holes shall be furnished and installed under payment for 816 Overhead Sign Support Structures at the contract price per Overhead Sign Support, by Type.

Payment for this item shall be made at the contract unit price bid for each Overhead Sign Support, by Type, installed in place and accepted, which price shall be full compensation for furnishing all anchor bolts 2" and 3/4" EMT conduit ells (for installation under 816 Concrete for Overhead Sign Support Foundations), and for furnishing and installing each Overhead Sign Support Structure shown on sheets 238 through 239 including fixture support arms, switch enclosure mounting bracket, sign brackets and all component parts necessary to make a complete workable installation ready for sign erection, installation of disconnect switch and enclosure, ground rod and wire connections and sign wiring.

Erection of these supports shall be accomplished in a manner meeting the requirements of Supplemental Specification 816.

## 816 CONCRETE FOUNDATIONS, FOR SIGN SUPPORTS

Payment for this item shall be based on plan dimensions (or dimensions as modified by the Engineer in lieu of plan quantities) as required in Supplemental Specification 816.

Payment for reinforcing steel and installation only of 2" and 3/4" conduit ells shall be included in the cost of Concrete Foundations for Overhead Sign Supports. Concrete shall be Class "C".

Basis of payment shall be as follows:

1. Concrete Foundations for Overhead Sign Supports, per cubic yard.
2. Concrete for Ground Mounted Sign Support Foundations, per cubic yard.

## 816 SPAN WIRE MOUNTED SIGN ATTACHMENT, AS PER PLAN

This item of work shall consist of the furnishing and installation of a steel angle, span wire mounting bracket, and hardware as detailed on Sheet 234 A.

Basis of payment shall be at the contract bid price per each "Span Wire Mounted Sign Attachment, As Per Plan", which price shall include all labor, material, equipment and incidentals necessary to perform the required item of work.

## 816 POLE MOUNTED SIGN ATTACHMENT, AS PER PLAN

This item of work shall consist of the furnishing and installation of stainless steel straps, mounting brackets, and hardware as detailed on Sheet 234 A.

Basis of payment shall be at the contract bid price per each "Pole Mounted Sign Attachment, As Per Plan", which price shall include all labor, material, equipment and incidentals necessary to perform the required item of work.

## 816 STRUCTURAL SUPPORTS, 6 LB. BEAM, AS PER PLAN, DRIVEN

This item shall consist of the furnishing, assembly, and installation of two (2) 3lb. per foot drive posts (6 lb. beam) in combination with a square welded or seamless galvanized tubular posts extension spliced to the top of the 6 lb. beam. Details are shown on sheet 251 A.

Square tubular post material shall conform to ASTM A-570 Grade "B" after fabrication.

Work shall include all labor, materials, equipment, tools, and hardware necessary to perform the required item of work.

Basis of payment shall be for Structural Supports, 6 lb. Beam, As Per Plan, Driven per linear foot measured by total length of combination beam from end to end.

## 621 WORD ON PAVEMENT, AS PER PLAN

The Contractor shall furnish and apply beaded white pavement words, as shown, located and detailed, in the plans.

Materials, pavement preparation, and application shall be in accordance with the Construction and Material Specifications, Item 621- Pavement Markings. Paint for pavement words shall be applied at the rate of 1 gallon per 100 square feet, and glass beads shall be applied at the rate specified in 621.05.

Basis of payment shall be at the Contract bid price, per each, Item 621 "Word on Pavement, As per Plan" completed, in place, measured, and accepted. Price and payment shall constitute full compensation for providing materials, surface preparation, placing, protecting all applied items, and for all labor, tools, materials equipment and incidentals necessary to lay out and complete the item of work.

## MILE MARKER LOCATION

The Bureau of Planning Survey will locate the longitudinal position of mile markers by a paint blotch on the completed pavement edge.

On divided highways only one pavement edge will be marked. Markers for the opposite direction will be set "across" from those on the marked edge.

The Contractor will notify the Project Engineer thirty (30) days in advance of the planned marker installation. The Project Engineer will then immediately notify the Bureau of Planning Survey by letter of the planned marker installation.

Any delineator that is within fifty (50) feet of a mile marker shall be removed.

## ELECTRICAL - GENERAL

This item shall consist of furnishing all necessary material, labor and facilities required to complete the electrical installation in accordance with the designs, dimensions and details shown in the plans and described in the Specifications.

All material, workmanship and construction methods, except as modified herein, shall conform to the general requirements of the State of Ohio, Department of Highways, Construction and Materials Specifications, January 1, 1971.

## 625 SIGN SERVICE

This item shall consist of the completion of the electrical system and components connecting the connectors in the pull box (included within the roadway lighting quantities) with the primary side of the disconnecting switch.

Work will include the furnishing and installing (including trenching and backfilling) of the 2 inch galvanized steel conduit and couplings from the pull box to the conduit ell in the sign support foundation.

This item will also include the furnishing and installing No. 4 or 6 AWG 600 volt distribution circuit cable, as per 713.02 from the connectors to the disconnect switch.

Basis of payment for this item shall be at contract unit price per each, which shall include all labor, material, and equipment required to complete this item of work.

## 625 WIRE AND CABLE

Wire and cable installation shall conform to Section 625.14 of the Construction and Materials Specifications and shall be of the sizes and types shown on the plans.

Wire or cable installed in conduit on or with sign structures shall be No. 10 RHH, 600 volt standard copper wire (pole and bracket cable).

Cable installed underground leading from the pullbox to the disconnect switch shall be No. 4 or 6 single conductor circuit cable.

## 625 INSPECTION AND TESTING OF SIGN LIGHTING

Electrical tests of sign lighting circuits shall conform to the requirements of Section 625.22 with the following additions:

1. A voltage and amperage measurement shall be made at the sign support switch.
2. Where a low voltage tap transformer is used, the voltage shall be measured to determine the applicable tap.
3. During the performance test period, adjustments to fixture aiming angles shall be made to obtain maximum uniformity as directed by the engineer.

The above measurements and voltage tap selection notations shall be included in the test reports furnished to the Engineer.

## CERTIFICATION AND APPROVAL OF SIGN SUPPORT AND SIGN LIGHTING ITEMS

The Contractor shall submit through proper channels the drawings, information, and samples as required below:

- A. 8 Copies of shop drawings and material lists for approval:
  1. Overhead sign supports
  2. Sign lighting layout plan and details for wiring, conduit size and placement from disconnect switch to fixture.
- B. 8 Copies of catalog cuts descriptions of samples of fabricators standard items as shown in the plans or their equals for approval of their use.
- C. Certifications and/or samples for all material which have been approved above under "A" and "B".
- D. Approval of items under "A" and "B" shall be in the hand of the Contractor prior to any purchase of installation.
- E. Certifications of samples under "C" must be in hand and approved prior to contract completion.

## ERECTOR OF OVERHEAD SPAN TYPE SIGN SUPPORTS (7 SERIES)

In all cases, span type overhead sign supports and signs shall be erected concurrently. At no time shall the box trusses be erected without the sign being in place within eight (8) hours.

# LIGHTING NOTES

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## 625 MERCURY VAPOR SIGN LIGHTING LUMINAIRE, WITH BALLAST AND LAMP, BY RATING

This item of work shall consist of furnishing mercury vapor sign lighting luminaires with lamp and integral ballast as specified below.

The luminaire shall be no more than 8½" high overall by 16" wide by 18½" deep including the ballast enclosure. These measurements shall be checked when the luminaire is resting on a horizontal table top with the lens up.

The outer housing of the luminaire, the frame for the lens, and the ballast housing shall be of cast aluminum with a finish of gray baked acrylic base enamel.

The lamp housing body shall have 3-5/16" diameter holes drilled according to the mounting plate design shown on Sheet 248. The centerline of two of the boltholes shall be 1 3/8" away from and parallel with the projection of the lamp centerline on the base of the lamp housing.

The reflector shall be made of a single piece of aluminum, die formed to shape and processed to distribute the light evenly over the sign area. A heavy duty mogul base lampholder shall be securely fastened to the reflector and the reflector shall be securely fastened to the lamp housing.

The luminaire shall have a borosilicate glass lens capable of withstanding thermal shock and impact of freezing rain and hail. The lens shall be either clear or have a mild diffusion pattern molded into its inner surface. A permanent, flexible, waterproof sealer shall be used to seal the lens into its frame. A continuous water proof gasket shall be provided to seal the lens and frame unit to the lamp housing. This gasket shall be so designed to stay in the proper position for at least 10 years regardless of the number of times the lens unit is opened for service or adjustment.

The lens unit shall be hinged on one edge and fastened on the other edge with spring loaded latches that require no tools to open. The hinges, latches and all other external fasteners shall be of stainless steel.

The luminaire shall be provided with an integral ballast of at least 90% power factor, and of the constant wattage autotransformer type to provide plus or minus 5% lamp watt variation for a plus or minus 10% line voltage variation. Primary supply voltage shall be 60 hertz and 120, 208, 240, 277 or 480 volts as specified in the plans. The luminaire shall operate satisfactorily over any expected outdoor temperatures down to -20 degrees F. Self-ballasted mercury vapor lamp type luminaires are not acceptable.

Basis of payment for this item shall be at contract unit price per each "625 Mercury Vapor Sign Lighting Luminaire With Ballast and Lamp, By Rating" furnished to the job for installation under item 625 Mercury Vapor Lighted Sign Wired Complete.

## 625 MERCURY VAPOR LIGHTED SIGN, WIRED COMPLETE:

This item shall consist of the installation of the mercury vapor luminaires furnished under "625 Mercury Vapor Sign Lighting Luminaire, with Lamp By Rating". It will also include furnishing and installation of the electrical components and hardware from the disconnect switch to the luminaire including furnishing and installing the 2.16#/ft. aluminum channel and fixture mounting plate with "J" bolts. These items will be mounted on the "G" Support arm which is included with Item 816 Overhead Sign Support By Type.

Luminaires shall be mounted as shown on Sheet 248. Wiring shall be not less than #12 THW in 3/4" dia. conduit. The wires should be continuous from a junction box on the top chord of the sign support or on structure mounted conduit to the first fixture, and then continuous to the second, third and fourth fixtures on a single sign. On multiple sign installations each sign shall have a separate junction box so that, if maintenance is needed, the sign and all electrical devices attached to it can be disconnected as a unit from the support by disconnecting only two wires and the U bolts attaching it to the support.

Conduit for the mercury vapor sign lighting shall be as follows:

1. A screw-on-cover, 1½" double hub junction box shall be fastened to a 1½" coupling welded to the top truss chord of the sign support arm with a short 1½" nipple. On structure mounted signs the junction box shall be attached to the conduit mounted on structure.
2. A length of 3/4" P.V.C. covered flexible waterproof conduit shall connect the junction box through a 1½"x3/4" bushing to a 3/4" LR or LL conduit on the sign bracket nearest the pole on which the switch enclosure is mounted.
3. 3/4" rigid conduit shall connect the LR or LL conduit to a 3/4" LB conduit so arranged to line up the short end with the 1 1/8" dia. holes in the sign bracket and fixture support arm. This rigid conduit shall be fastened to the sign bracket with not less than 2 conduit clamps placed within 3" of the conduit fittings and not more than 24" c/c.
4. 3/4" rigid conduit shall connect the above LB conduit to the short end of another LB conduit fitting at the other end of the fixture support arm. This conduit shall be run through both 1 1/8" dia. holes in the fixture support arm, be jogged out of the way of the fasteners on the diagonal bracing rods, when required, be fastened near each end at not less than 24" c/c, and be made to a length that, when screwed into both conduit fittings, the rear conduit shall be approximately centered on the sign bracket web and the front conduit shall fit snugly against the outer plate of the fixture support arm. The long end of the front conduit shall be angled downward approximately 30 degrees, when viewed from the front of the sign, to allow the next piece of conduit to be jogged easily to lay along the centerline and approximately 3/8" in front of flange of the channel that supports the lighting fixtures.
5. A 3/4" type "T" conduit fitting shall be located within approximately 18" of the near edge of each fixture on the sign. 3/4" rigid conduit shall be connected from the LB conduit fitting described above to the first "T" conduit. Straight lengths of conduit shall connect as many "T" condulets as are required for the number of luminaires specified for the sign. A threaded plug shall be used to close the opening in the last "T" conduit used on each sign installation. Suitable conduit clamps shall be used on 24" centers to hold the entire run of conduit on the centerline of the channel flange as listed under Item 4 above. The Type "T" condulets shall be so oriented that the third tapped opening shall be perpendicular to the face of the sign.

6. A length of 2/4" P.V.C. covered waterproof flexible conduit shall connect each fixture to each corresponding "T" conduit. The length of this conduit shall be so arranged to make a neat and gradual curve into the fixture without either sharp bends or drooping appearance. Wiring for mercury vapor sign lighting shall be sized and installed according to the National Electrical Code but shall be not less than No. 12 THW and shall be spliced only in junction boxes or in the wiring enclosure of the luminaire. All wiring shall be in conduit, inside structural chords and poles, or in electrical boxes and fixtures. Solderless connectors, of the proper size and type, may be used where splices and junctions are allowed above ground level. However, when used, they shall be securely taped with water resistant electrical tape to form a waterproof joint. When solderless connectors are not used, all splices and junctions above ground shall be soldered and double taped to make a waterproof electrical joint.

Payment for this item shall be at the contract unit price bid for the following:

1. 625 Mercury Vapor Lighted Sign, Wired Complete.
2. 625 Mercury Vapor Lighted Sign, Wired Complete (Structure Mounted).

Payment shall include all labor and materials to connect all luminaires on one sign into the disconnect switch enclosure, including conduit on structure for structure mounted signs. When more than one sign is mounted on an installation, each sign shall be considered as a separate pay item.

## DISCONNECT SWITCH WITH ENCLOSURE

This item shall include furnishing of a 30 amp. 600 volt fused disconnect switch in a NEMA 4 stainless steel enclosure attached to each sign support by means of mounting brackets as described in detail on sheet 249.

The disconnect switch shall be a 3 pole, solid neutral type meeting the requirements of 713.19, 10.

The enclosure shall meet the requirements of 713.20 with the following exceptions.

- 1) The stenciled legend or plate shall read "sign lighting".
- 2) A chase nipple shall be furnished and installed in the back of the enclosure.
- 3) Factory installed hubs shall not be provided on the top.
- 4) A screened ventilation opening shall not be provided.
- 5) Mounting poles, slots and chase nipple location shall match those provided on the switch enclosure bracket and sign support.

Each switch enclosure shall be furnished with one padlock. Padlocks shall have a brass body and wrought iron shackle equal to Russwin No. 2882 KA or Master No. KA or approved equal. Padlocks shall be all keyed alike with Master Key 3476.

Basis of payment for this item shall be per each at contract unit price, which shall include all labor, material, and equipment to complete this item of work.



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## 816 ALTERNATE DESIGNS FOR OVERHEAD SIGN SUPPORTS

If the Contractor desires to furnish an alternate design for overhead sign supports, the alternate designs must be submitted to the State at least 21 days prior to opening of bids. The Bidder will be notified as to acceptance or rejection of alternate design at least 7 days before bids are to be opened. Alternate designs must utilize tubular structural members. Submissions shall be made to Ohio Department of Highways, Bureau of Design Services, 25 South Front Street, Columbus, Ohio, 43215.

## 202 EXISTING INTERIM OVERLAY REMOVED AND DISPOSED OF

This work shall consist of removal of the rivets in the interim overlay and the disposal of the interim overlay to the satisfaction of the Engineer.

All rivets to be removed shall be drilled out and the overlay removed in such a way as not to harm the surface of the sign. All the remaining rivets in the sign shall be checked, any loose or damaged rivets shall be replaced.

The quantity removed and disposed of will be paid for at the price bid per square foot which price shall be full compensation for removal of rivets, removal and disposal of the interim overlay, replacement rivets and all necessary labor and equipment.

## 202 INTERIM GUARDRAIL, REMOVE AND DISPOSED OF, AS PER PLAN

This work shall consist of the removal of existing temporary guardrail, barrels, signs, delineators and posts.

To assure maintenance of adequate traffic control at all times, no items are to be removed without the approval of the Engineer.

The quantity removed and disposed of will be paid for at the price bid per linear foot which price shall be full compensation for removal and disposal of guardrail, barrels, signs delineators, posts and cleaning of site including all necessary labor and equipment.

## 620 DELINEATORS, AS PER PLAN

The Contractor shall install delineator posts in accordance with details of sheet 253.

Posts may be trimmed on the embedded ends to adjust for grade and required delineator mounting height.

The Contractor shall be responsible for damage to underground utilities or cable during performance of this item of work.

The quantity furnished and installed shall be paid for at the price bid per each which price shall be full compensation for each installation.

## 202 REMOVAL OF EXISTING SIGN INSTALLATIONS, AS PER PLAN

This work shall consist of the removal of all existing sign installations on main roadway, ramps and approach roadways within work limits of this project.

Work shall also include removal of sign supports and foundations as required in Section 202.

All signs, supports and accessories removed shall be stored neatly within the limits of the project at locations approved by the Engineer for removal by State forces. This work shall include disposal of all waste material.

To assure maintenance of adequate traffic control at all times, no signs are to be removed without the approval of the Engineer.

Payment for removal of existing signs shall include all necessary labor and equipment required to perform the required work as indicated above.

1. Basis of payment shall be as follows for signs forty (40) square feet or greater:

REMOVAL OF EXISTING MAJOR SIGN INSTALLATIONS AS PER PLAN at the contract price per each.

2. Basis of payment shall be as follows for all other signs:

REMOVAL OF EXISTING SIGN INSTALLATIONS AS PER PLAN at the contract lump sum price.

## 621 EXISTING INTERIM PAVEMENT MARKINGS REMOVED

This item shall consist of the removal or obliteration of interim pavement markings on the pavement.

The markings may be removed by applying heat or a solvent (Pull-up Tape) or by any other method approved by the Engineer except that the method shall not be injurious to the appearance, texture or strength of the pavement. Upon removal of all pull-up tape, the primer stains shall be removed by use of kerosine, gasoline or other approved solvent.

Payment for Item 621 EXISTING INTERIM PAVEMENT MARKINGS REMOVED shall be made at the contract unit price per linear foot and shall constitute full compensation for all work, including materials, equipment, labor, incidentals and disposal of surplus materials.

## EXISTING SIGNS

Existing signs located within the roadwork areas which are necessary for Interim or Permanent Traffic Control shall be removed and re-erected in locations indicated by the plans or as approved by the Engineer. Stop signs will be maintained at all times while traffic is maintained. The cost of removal, re-erection and subsequent removal if required shall be considered a subsidiary work item. The cost of which shall be included in the price bid for the roadway work items. The signs which are to be re-erected on the berms shall be located with the center line of support on the P.I. of the shoulder.

## CAPPING OF CONDUIT

All conduit in foundations which will not have wire or cable pulled into it during construction shall have the ends closed with capped bushings or otherwise sealed in an approved manner to completely keep all moisture and foreign matter out of the conduit.

## SIGN LOCATIONS

All signs shall be placed normal to the roadway on which they are stationed unless otherwise noted on the Plans.

## 815 SIGN ERECTION, EXTRUSHEET OR FLAT SHEET TYPE

The Contractor shall erect sign panels as indicated on the Traffic Control Plan Sheet numbers 223-225. The panels will be furnished by others and shall be mounted on the brackets or beam supports provided in the plans.

All sign material and accessories will be furnished and transported by others to a delivery point designated by the Contractor on or near the subject project. The Contractor shall be responsible for the handling, protection and storage of the sign panels and accessories from the time of unloading by others at the delivery point.

Large guide signs (over 8 feet in height) may be delivered unassembled. Work shall also consist of assembly of these panels including attachment of demountable sign legend, where necessary, and erection of signs in conformance with the Schematic Sign Plan.

The Contractor shall submit, in three copies, a schedule for sign erection to the Engineer at least 120 calendar days prior to the start of any scheduled erection work. The schedule shall include proposed dates, sign numbers, and delivery point. The Engineer will furnish copies of the schedule to the Division Traffic Engineer and to the Engineer of Design Services, 25 South Front Street, Columbus, Ohio, 43215.

The price bid per square foot for "Item 815, Sign Erection, by Type", shall include payment for all necessary equipment, labor, and tools to store, assemble, and erect the signs as specified.

## 815 INTERIM COVERING FOR SIGNS

This item shall consist of furnishing and installing an interim cover and attachment materials for signs so indicated in the Plans or as directed by the engineer. This item shall also include the subsequent removal of covers when directed by the engineer.

Material for covering shall be plastic coated burlap blankets in conformance with 705.06.

The engineer shall approve the method proposed for attaching interim covers to signs prior to installation of covers.

Work shall include all necessary material, hardware, labor, and equipment required to perform the required item of work.

Basis of payment shall be INTERIM COVERING FOR SIGNS, per square foot.

In addition to the 393 sq. ft. referred to in the plans, an additional quantity of 200 sq. ft. for Item 815, Interim covering for signs, have been included to cover signs as directed by the engineer.

## 816 CONSTRUCTION LAYOUT STAKES FOR SIGNS AND TRAFFIC SIGNALS

The Contractor shall stake out all sign and traffic signal supports in accordance with Supplemental Specification 816 prior to installation of any foundations or supports.

After stakeout the Contractor shall notify the Engineer a minimum of (7) seven days in advance of scheduled work. Support locations for each support will be field checked and approved by the Engineer who shall coordinate with the Division Traffic Engineer and or City Traffic Engineer prior to proceeding with construction work required.

If both major and minor type supports are included within the project it will be permissible to perform the construction stakeout and field inspection in two (2) stages, one for major supports and one for minor supports.

Cost for this item of work will be incidental to Item 623.

## 816 SIGN SUPPORT IDENTIFICATION DECALS

Each sign support installation shall be identified by a combination of letters and numbers which will indicate the County, Route, and Straight Line Mileage (Samples: LAK-2-0.02, CUY-90-17.58).

Identifying numbers shall be as indicated on sheet 255 in these plans or as specified by the maintaining agency.

Identification shall be by adhesive type decals with silver white reflective characters on a reflective interstate green background in accordance with Military Specifications Mil-R-13689A.

The top legend of the decal shall be located approximately 8 feet above the ground line, on the quadrant of the surface of the sign support that faces on-coming traffic.

Two identification decals shall be furnished for sign support installation spanning opposing directions of traffic.

The cost of furnishing and attaching the sign support decals shall be an incidental item to the various sign support items.

## 816 OVERHEAD SIGN AND TRAFFIC SIGNAL SUPPORT FABRICATION

In lieu of Plan details the following are fabrication requirements for supports in this project:

All handholes fabricated for supports shall be 4" X 8" in size with face flush with pole exterior at the required locations described in Plans.

The electrical service entry through each vertical sign support pole shall be provided by means of a two inch (2") half-coupling centered at a height of 5'-0" above the bottom of the base plate.

The type "Y" disconnect switch enclosure shall be mounted in such a manner that the bottom of the enclosure will be 4'-9 1/2" (2 1/4") above bottom of base plate.

Payment for the fabrication requirement specified above shall be incidental to the cost of each support structure.

## 625 GROUND RODS

This item of work shall consist of furnishing and installing ground rod and cable as detailed and specified on Sheet 249.

Basis of payment for this item shall be at contract unit price per each, which shall include all labor, materials and equipment required to complete this item of work.

## 816 ROCK EXCAVATION

Where solid rock is encountered in excavation for sign support foundations, the depth to be excavated below rock surface may be decreased as directed by the Engineer to a maximum of thirty-five (35) percent of depth specified in the Plans.

# SIGNING NOTES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

228  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

## THERMO-PLASTIC PAVEMENT MARKING, AS PER PLAN

### General

This work shall consist of furnishing and installing all thermo-plastic pavement markings, as shown on the plans,

This work shall also include all service, labor, materials, equipment, and incidentals necessary for the required surface cleaning, preparation and construction of thermo-plastic pavement markings under traffic-maintained-by-Contractor operation conditions.

### A. Maintenance of Traffic

In the event of an emergency, the Highway Department reserves the right to stop work in order to relieve traffic congestion. No work shall be done during the rush hours as determined by the Engineer. Any marking may be omitted by the Engineer where there is pending construction. No lane of traffic shall be closed for more than ten (10) minutes in the application of the lane line marking.

### B. Thermo-Plastic Pavement Marking Materials

This pavement marking material shall be reflectorized "Permaline" thermo-plastic compounds as manufactured by Permaline Corp. of America or reflectorized "Catatherm" thermo-plastic compound as manufactured by Cataphote Corporation, or approved equal and in addition the thermo-plastic materials furnished on this contract shall meet the following specifications:

Glass beads meeting Ohio Specifications No. 712.05 shall be uniformly mixed throughout the material at the rate of not less than 250 lbs. of beads per 1,000 lbs. of thermo-plastic material. Immediate reflectorization shall be accomplished by an application of beads to the surface of the compound at the time the thermo-plastic material is applied. A glass bead dispenser of approved design shall be used for a uniform surface application of beads at a rate of not less than two (2) pounds of beads per 33 square feet of line.

The material shall withstand temperature variation from minus 20 degrees F. to plus 120 degrees F., without deformation or discoloration, and shall maintain its original dimension and placement, free from tack, chipping or spalling. White thermo plastic material shall be free of dirt or tint.

### C. Samples

The Contractor shall furnish a 10 lb. material sample of white thermo-plastic compounds he proposes to furnish and also white typical samples of line four inches wide by ten inches long.

Materials installed on the road on this contract in accordance with the Contractor's standard practice shall be compared with the original samples at least 90 days after construction and shall show no darkening or discoloration. The material shall harden sufficiently within 15 minutes after application to allow traffic over the line without pickup or impression.

### D. Construction Details

Thermo-plastic material shall be used and extruded to the pavement to a uniform minimum thickness of  $\frac{1}{4}$  inch for rumble strips and  $\frac{1}{8}$  inch for all other pavement marking by a single application and shall be straight and true.

The contractor shall prepare all pavement surface to insure adhesion. Where thermo-plastic rumble strips exist they shall be removed completely to insure proper bonding for the new rumble strips. All thermo-plastic pavement markings shall be placed over an epoxy resin primer.

#### For Concrete Application

The primer shall be a two component solventless epoxy adhesive compound of spraying consistency especially compounded for traffic marking. Resin and hardener shall be mixed in the exact proportion recommended by the manufacturer. Mixing and proportioning shall be accomplished immediately before the spray nozzle by an automatic metering and mixing device.

#### For Asphalt Application

The primer shall be a two component solvent epoxy adhesive compound of spraying consistency especially compounded for traffic marking. Resin and hardener shall be mixed in the exact proportion recommended by the manufacturer.

The primer shall be applied with a minimum tolerance of 1-inch on each side of all pavement markings, except for the rumble strips. The primer for the rumble strips shall be applied to the whole pad instead of priming each individual strip. All thermo-plastic rumble strips placed on concrete shall have an epoxy spray applied.

Placement of all pavement markings shall be in accordance with the plan, subject to any adjustments as directed by the Project Engineer.

The air temperature at the time of application shall not be less than 50 degrees F., the temperature of the compound during application shall never fall below 375 degrees F.

### E. Method of Measurement

The length paid for shall be the number of lineal feet or miles of the several types of lines installed and accepted, measured in place. Measurements shall be made by a representative of the Contractor and the Engineer. The length of lines to be paid for shall be the actual number of miles, exclusive of gaps, measured in place, completed and accepted. Pavement arrows shall be measured per each.

### F. Basis of Payment

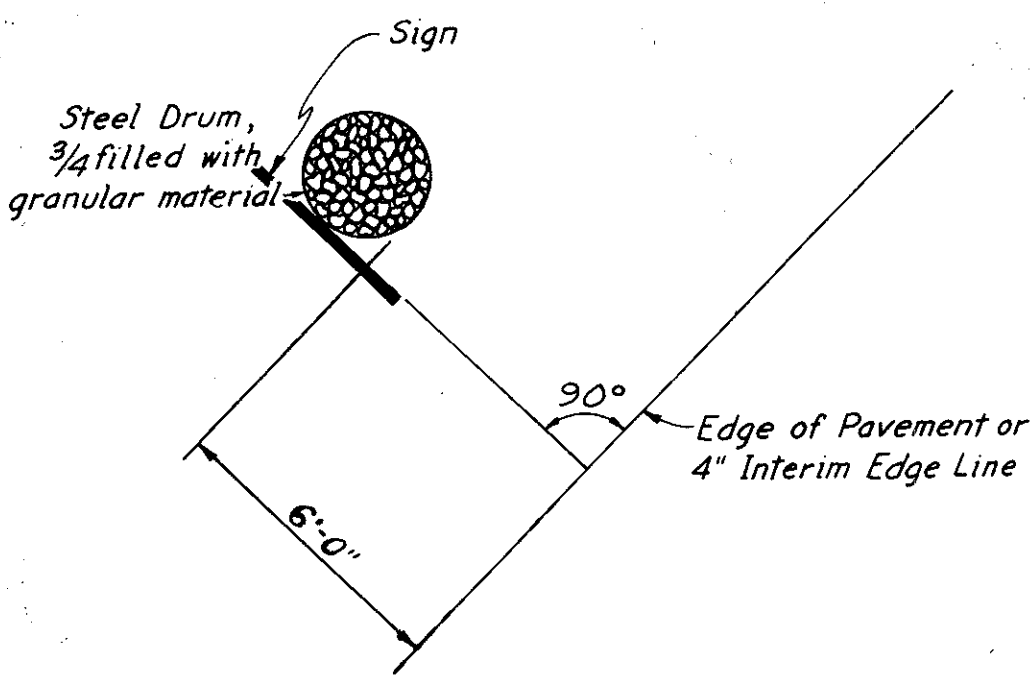
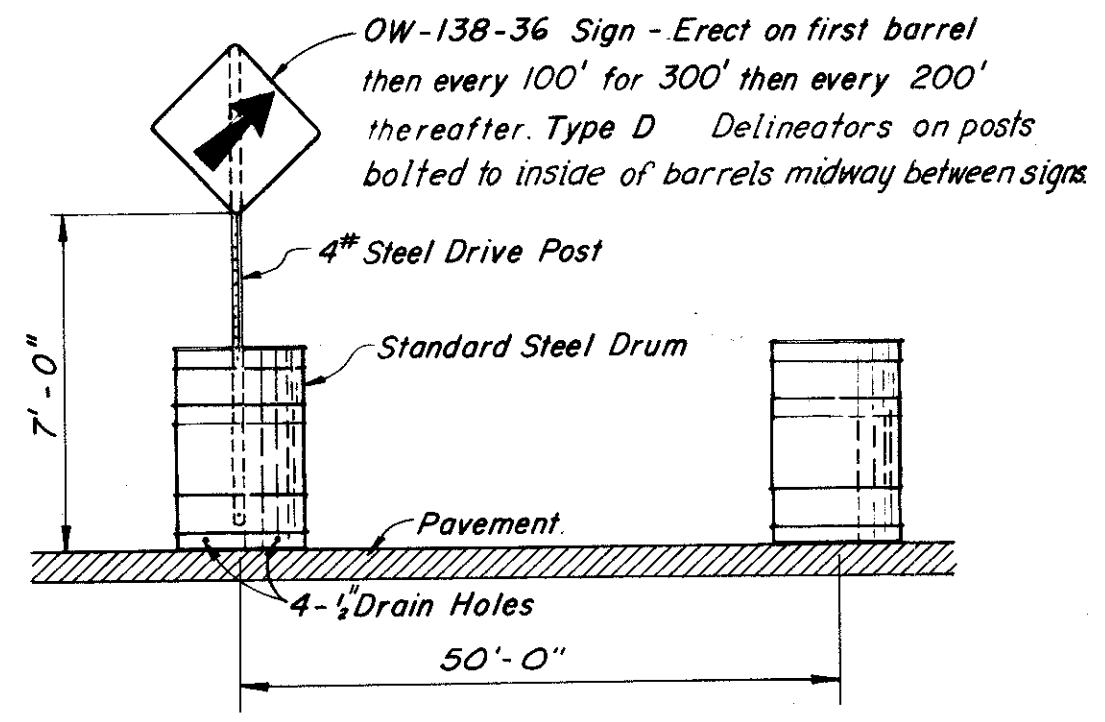
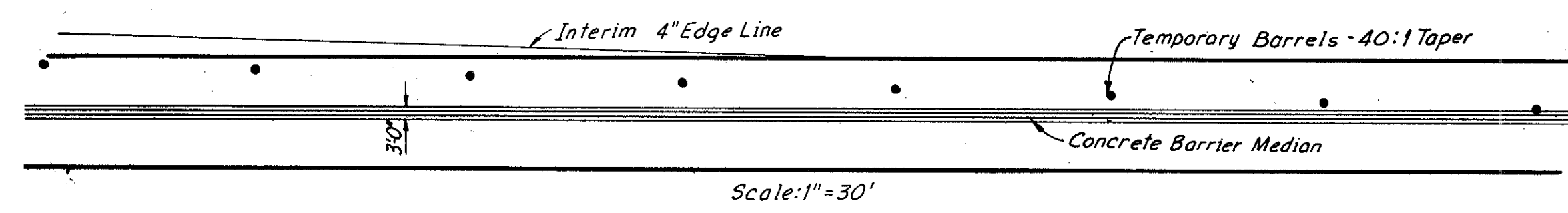
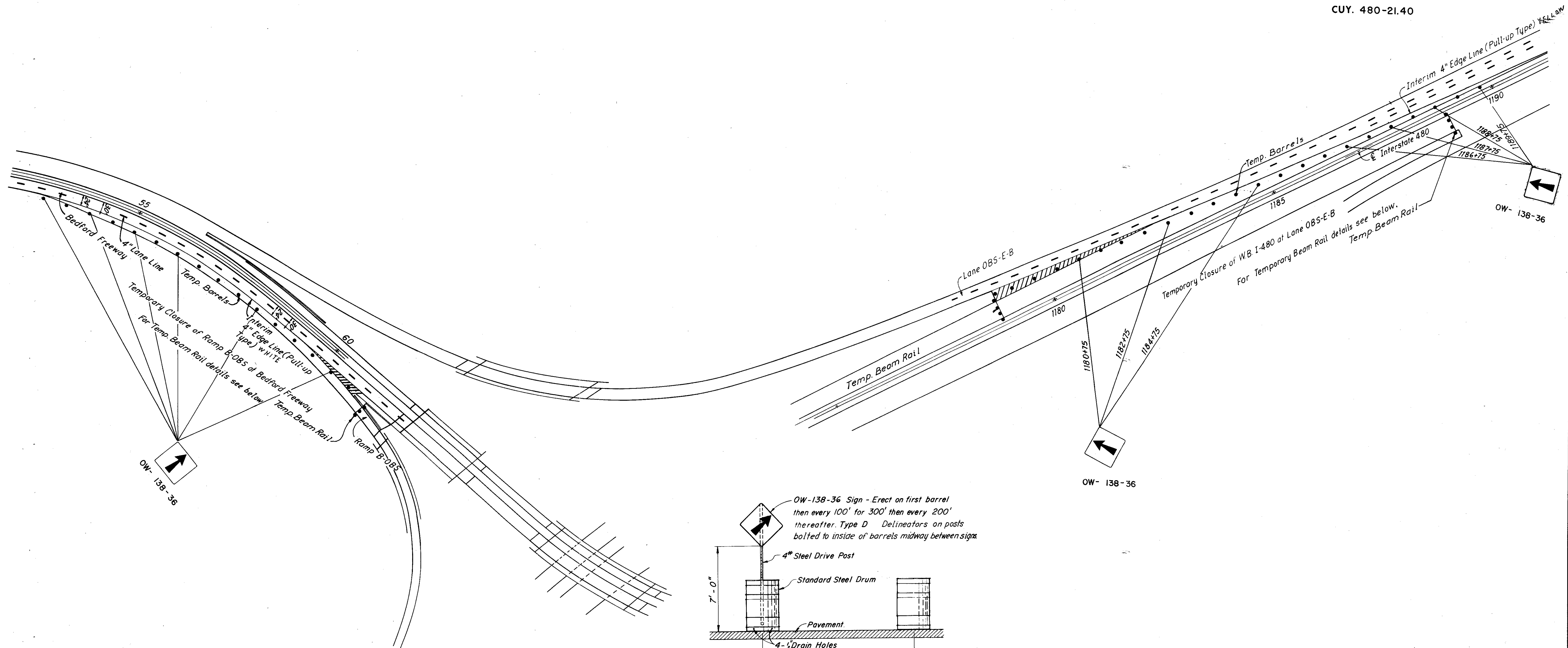
These items shall be paid for in accordance with Item 621.

# TERMINAL TREATMENT

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

229  
390

CUYAHOGA COUNTY  
CUY. 480-21.40



SCALE  
 MADE JEN DATE 2-9-70  
 TRCD JEN DATE 2-5-70  
 CKD RJK DATE 2-20-70  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

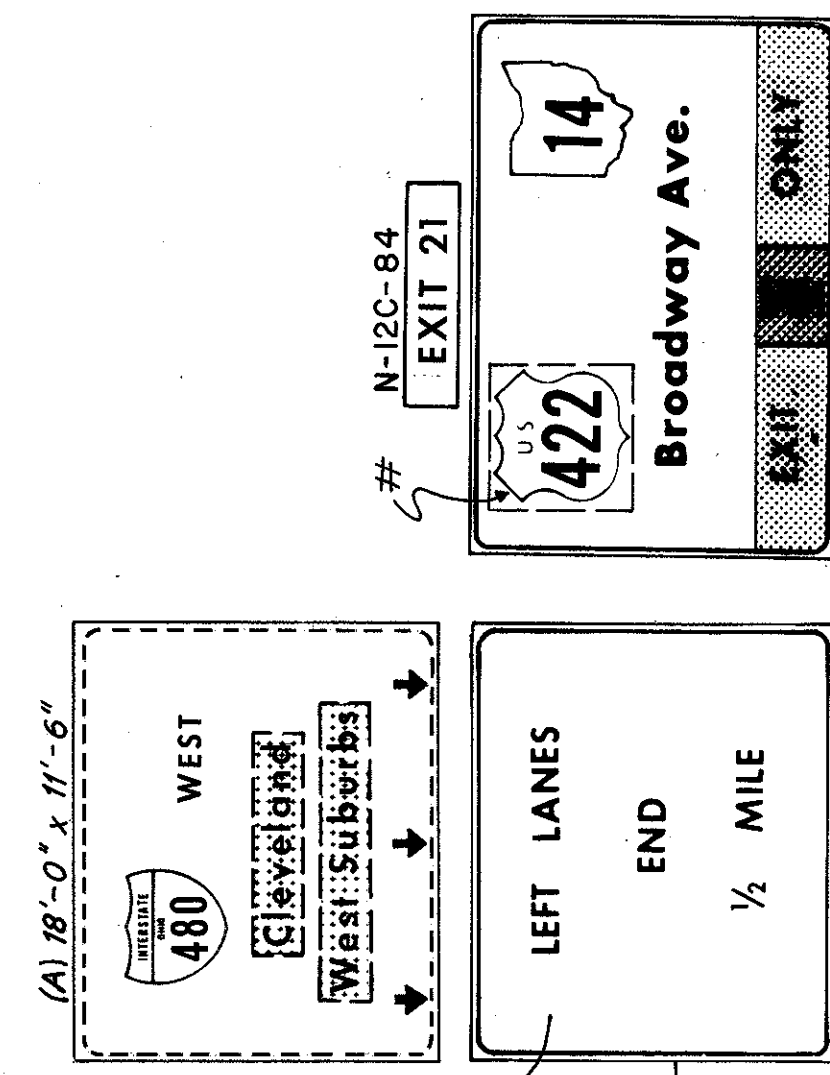
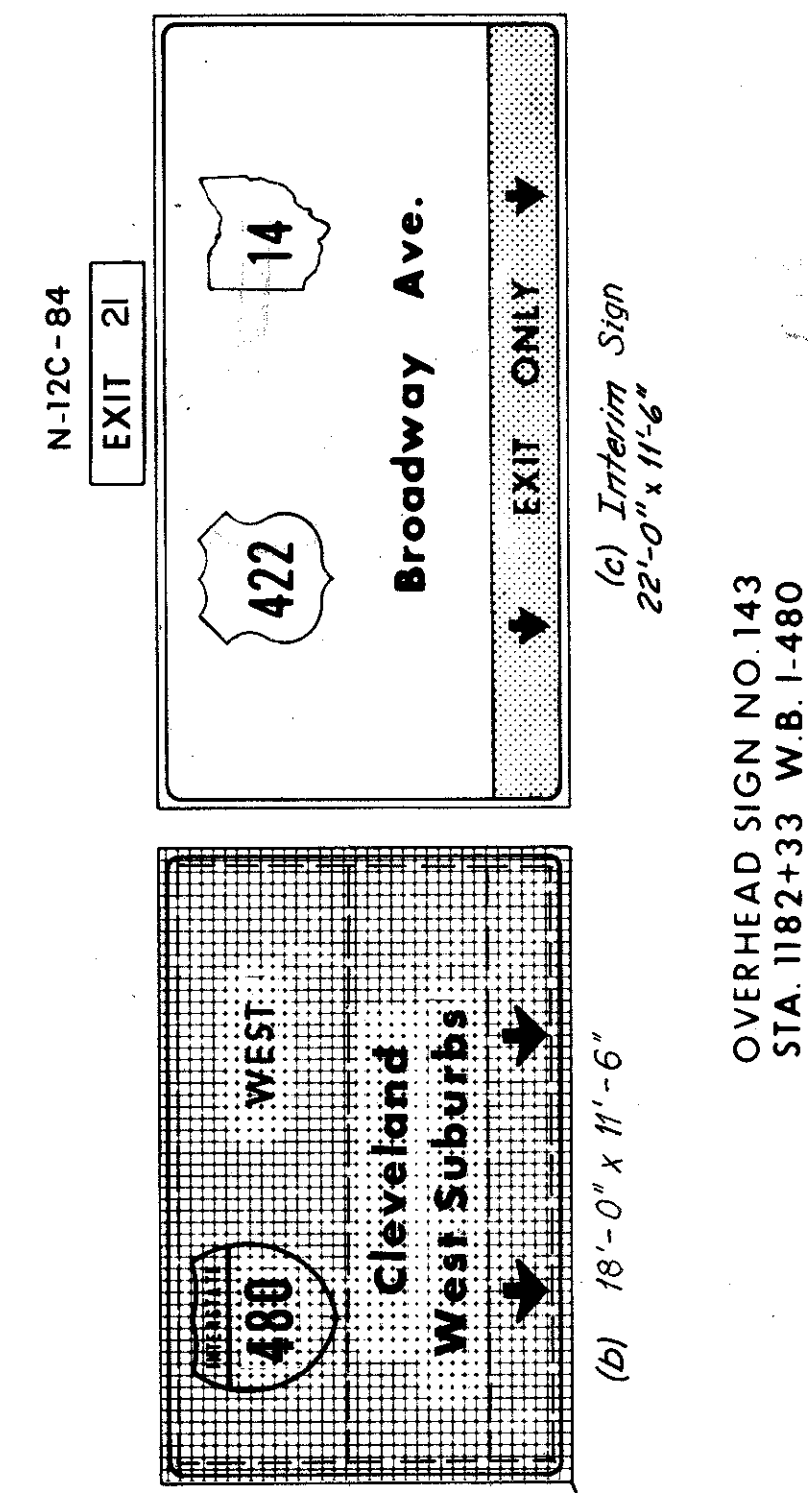
# TERMINAL

# TREATMENT

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

230  
390

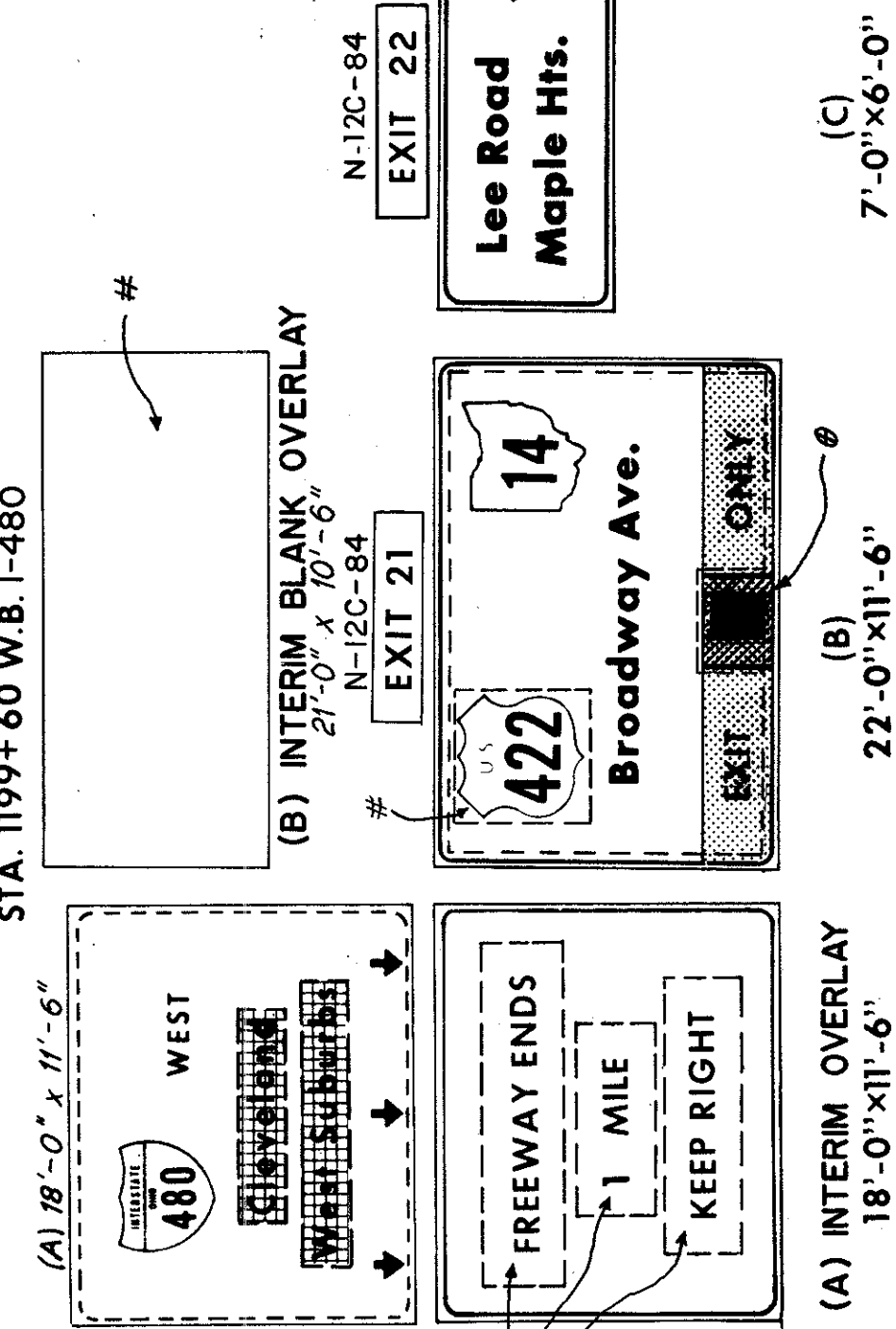
CUYAHOGA COUNTY  
CUY. 480-21.40



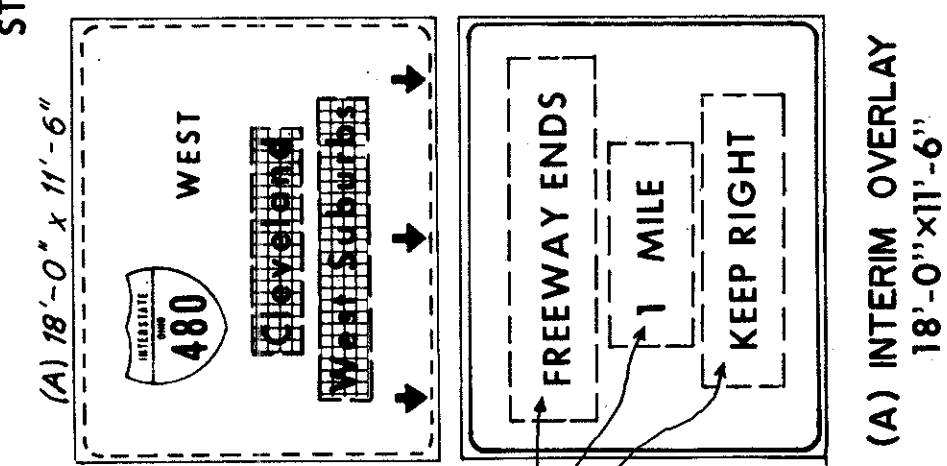
(A) INTERIM OVERLAY  
18'-0" x 11'-6"

(B) INTERIM SIGN  
22'-0" x 11'-6"

OVERHEAD SIGN NO. 199  
STA. 1199+60 W.B. I-480



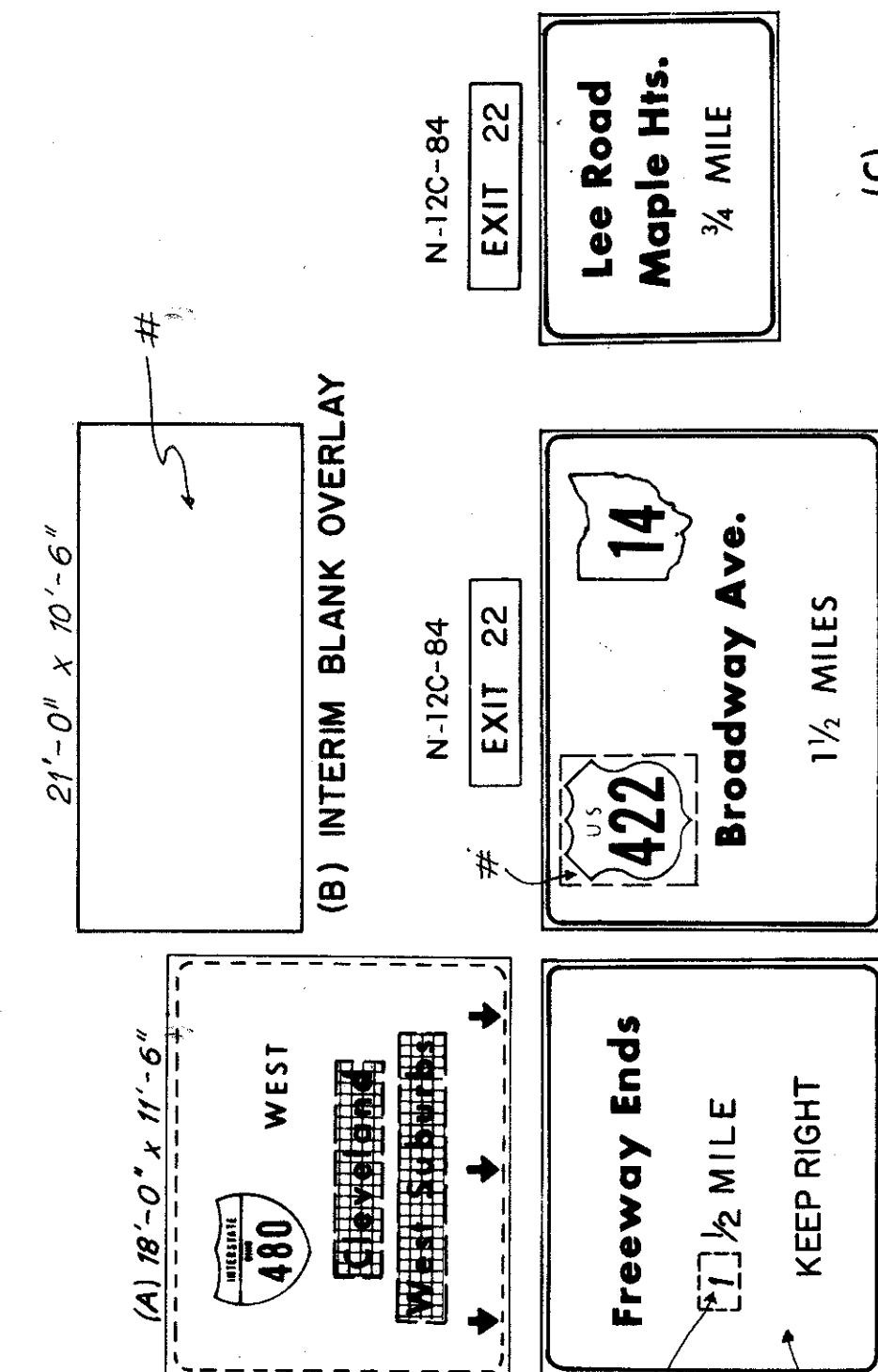
OVERHEAD SIGN NO. 201  
STA. 1221+75 W.B. I-480



(A) INTERIM OVERLAY  
18'-0" x 11'-6"

(B) INTERIM SIGN  
22'-0" x 11'-6"

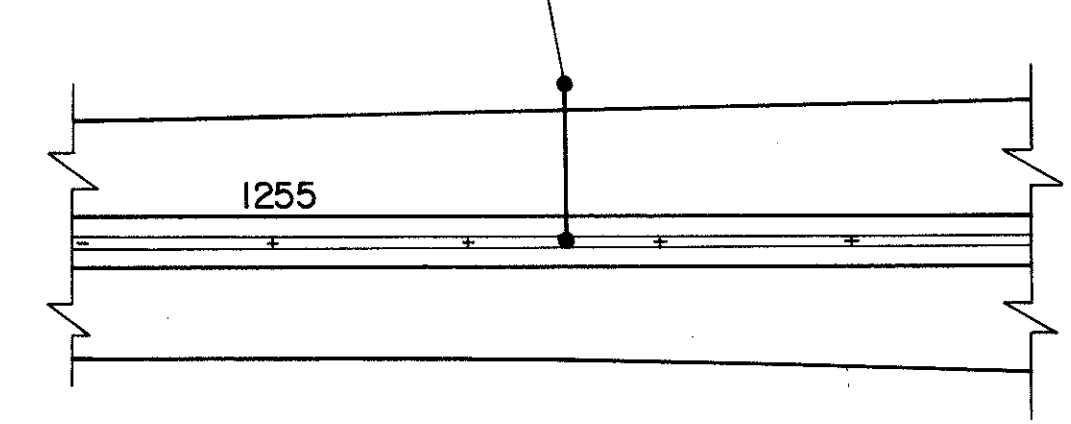
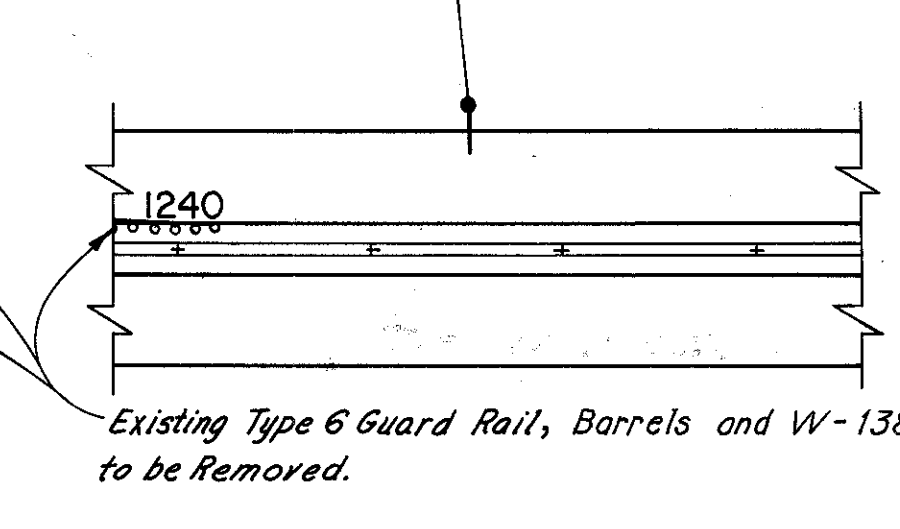
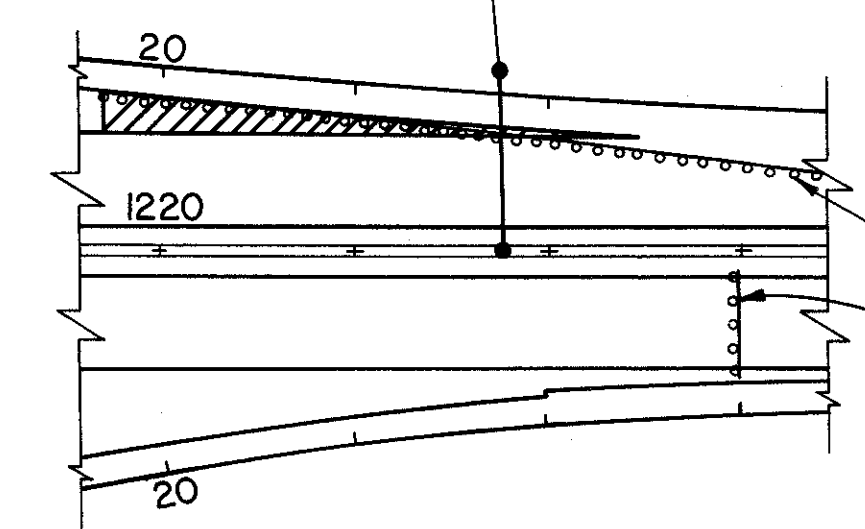
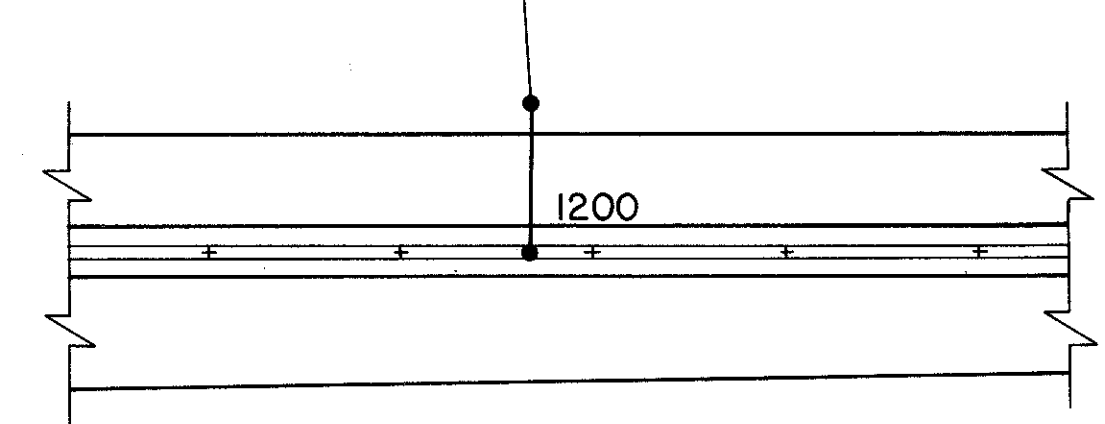
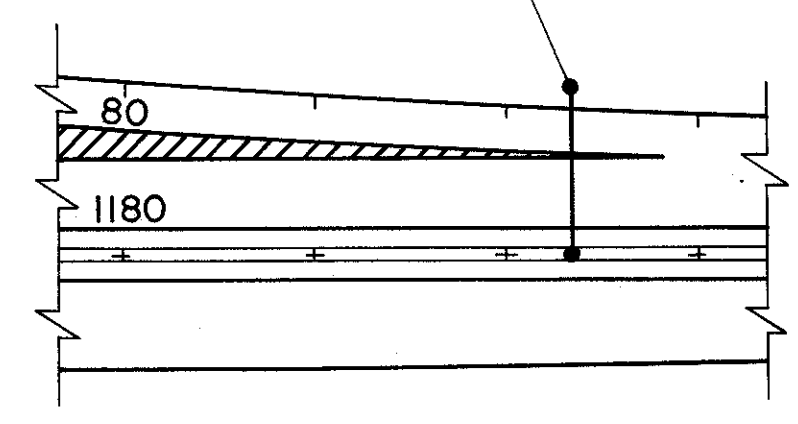
OVERHEAD SIGN NO. 205  
STA. 1256+50 W.B. I-480



(A) INTERIM OVERLAY  
18'-0" x 11'-6"

(B) INTERIM SIGN  
22'-0" x 11'-6"

OVERHEAD SIGN NO. 205  
STA. 1256+50 W.B. I-480



Notes:  
Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.  
## - Existing interim overlay to be removed when existing Type 6 guard rail is removed.  
@ - Existing overlay to remain after Type 6 guard rail removal.  
[Grid Pattern] Permanent sign to be erected with blank green overlay.  
[Yellow Background] Indicates black letters on yellow background.

# TERMINAL TREATMENT NOTES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

231  
390

CUYAHOGA COUNTY  
CUY.-480-21.40

## 816 INTERIM STEEL DRIVE POSTS, 4 LBS. PER FOOT, AS PER PLAN

This work shall consist of furnishing and installing 4 pound per linear foot steel drive posts as specified for interim lane width transitions.

This item shall include 4 pounds per foot steel drive posts 11'-0" long bolted to the inside of interim barrels furnished under 606 using a minimum of three 5/16" steel bolts spaced on 12" centers.

Post flanges shall be 90 degrees to interim edge lines facing approaching traffic. Steel bearing plates 3" x 2" shall be used at each bolt outside the barrel to prevent pull through. Mounting of signs on the drive posts with the bottom of the signs 7' above the pavement shall be included in Item 815.

The quantity furnished and installed will be paid for at the price bid per Lin.Ft. which price shall be full compensation for furnishing and installing drive posts including necessary hardware, labor and equipment.

## 620 INTERIM DELINEATORS, AS PER PLAN

This work shall consist of furnishing and installing interim delineators as specified on plan sheets.

This item shall include 2 pounds per foot steel drive posts 4'-0" long bolted to inside of interim barrels furnished under 606 using a minimum of three 5/16" steel bolts spaced on 12" centers. Post flanges shall be 90 degrees to interim edge lines facing approaching traffic. Type D delineator shall be mounted on the drive post flanges with the top of the delineator 4' above the pavement.

The quantity furnished and installed will be paid for at the price bid per each which price shall be full compensation for furnishing and installing drive posts and delineators including necessary hardware, labor and equipment.

## 606 INTERIM BARRELS, AS PER PLAN

This work shall consist of furnishing and placement of 55 gallon barrels as specified on Plan Sheets.

The barrels shall be painted Orange and  $\frac{3}{4}$  filled with granular material. In addition to painting requirements, two 4"-6" wide bands of white reflectorized sheeting, Type E, shall be provided around the circumference of each barrel at the top and bottom. Reflectorization and application of the sheeting shall be in accordance with supplemental specification 815.

For drainage of steel drums, 4 each one-half inch ( $\frac{1}{2}$ ") diameter holes shall be provided on the circular surface near the bottom of each drum.

The quantity furnished and installed will be paid for at the price bid per each which price shall be full compensation for furnishing and installing barrels including painting, reflectorized sheeting, granular material and necessary labor and equipment.

## 621 INTERIM PAVEMENT MARKING, AS PER PLAN

This work shall consist of the furnishing and installation of interim removable markings as specified herein and shown on the plans.

### 1. MATERIAL

Material shall consist of a backing coated with a pressure-sensitive adhesive and a weather and traffic resistant reflective white or yellow-colored surface and additional requirements as follows:

- A. REFLECTION - The white and yellow striping material shall be reflex-reflective, reflecting white or yellow respectively and shall be readily visible when viewed with automobile headlights at night.

B. ADHESIVE - The striping material shall have a precoated pressure-sensitive adhesive which shall not require a liner for protection from contamination, preadhesion, or blocking within the roll as delivered.

C. CONFORMITY - The striping material shall be thin, flexible, formable, and following application, shall remain conformed to the texture of the pavement surface.

The average thickness of the material, as determined by five micrometer readings shall not be less than 20 mils nor more than 30 mils.

D. REMOVABILITY - The striping material backing shall permit removal without requiring sandblast, solvent, or grinding methods.

E. DURABILITY - The striping material applied in accordance with recommended procedures shall be weather resistant and show no appreciable fading, lifting or shrinkage, prior to completion of this project.

F. GENERAL - The striping material as supplied shall be of good appearance, free from cracks and edges shall be true, straight, and unbroken. The striping material shall be supplied in rolls and there shall be no more than 3 splices per 60 yards of length.

The striping material shall be prepared for delivery in standard commercial containers so constructed as to insure acceptance by the carrier and prevent damage during proper shipment and storage.

The Contractor shall store the material in a cool, dry location where temperature will not exceed 100° prior to application of marking on roadway surfaces.

### 2. APPLICATION

ROAD SURFACE PREPARATION - The road surface must be clean and dry, free of oils and grease, dust and dirt. All surfaces must be primed. Concrete pavement shall be surface treated in accordance with Section 621.04. Surfaces shall be generously flushed with clean water and allowed to dry thoroughly prior to application of primer and interim markings.

### 3. PRIMING

Method of priming shall be as approved by the Engineer. The Contractor shall submit a proposal for type of priming to be used as required in the General Notes. Cost for priming surfaces shall be included in the cost of the various items included in Item 615, Temporary Roads, as per plan.

### 4. APPLICATION

Interim lines shall be applied to the road surface with a roller type applicator and rolled immediately afterwards by rubber-tired roller with approximately single wheel load between one Thousand (1000) and two Thousand (2000) pounds.

### 5. SPECIAL PLAN DETAILS

Details for location of interim markings are shown on Sign location plan sheets.

### 6. BASIS OF PAYMENT

- 4" INTERIM EDGE LINES, AS PER PLAN, per linear foot. (White or Yellow)
- 4" INTERIM CHANNELIZATION LINES, WHITE, AS PER PLAN, per linear foot.
- 4" or 16" TRANSVERSE (Diagonal) STRIPES, per lin.ft. of actual line length, in place. Work shall include all material, labor, tools, and equipment necessary to perform the various items of work within contract bid prices for interim markings.

# TERMINAL TREATMENT QUANTITIES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

232  
390

CUYAHOGA COUNTY  
CUY.480-21.40  
Quantity Calculations

Made By JEN Date 2-2-70  
Checked By RJK Date 2-19-70

Station		Side	Space	D Barrel Mounted Each
From	To			
Westbound I-480				
1179+75	1185+75	Lt.	200	4
1187+25	1189+25	Lt.	100	3
Bedford Freeway				
53+50	55+50	Rt.	100	3
57+08	59+08	Rt.	200	2
Total				12

Station		Side	Calculations	Lin. Ft.
From	To			
Westbound I-480				
1182+00	1187+40	Lt.	1 x 540	540
1184+40	1192+25	Lt.	1 x 745	745
TOTAL				1285
				1285 ÷ 5280 = 0.243 Miles

Sign Location	Sign Code No. and Size					Total Sign Area Flat Sheet Type Sq. Ft.	Standard 4 Lb. Drive Post Lin. Ft.
	1	2	3	4	5		
Sta. 1180+75 W.B. I-480	1					9.0	11
Sta. 1182+75 W.B. I-480	1					9.0	11
Sta. 1184+75 W.B. I-480	1					9.0	11
Sta. 1186+75 W.B. I-480	1					9.0	11
Sta. 1187+75 W.B. I-480	1					9.0	11
Sta. 1188+75 W.B. I-480	1					9.0	11
Sta. 1189+75 W.B. I-480	1					9.0	11
Sta. 53+00 Bedford Freeway	1					9.0	11
Sta. 54+00 Bedford	1					9.0	11
Sta. 55+00 Bedford	1					9.0	11
Sta. 56+03 Bedford	1					9.0	11
Sta. 58+13 Bedford	1					9.0	11
Sta. 60+20 Bedford	1					9.0	11
TOTAL						117.0	143

Station		Side	Calculation	Each
From	To			
Westbound I-480				
1179+00	1190+00	Lt.	1x23	23
Bedford Freeway				
53+00	60+70	Rt.	1x16	16
TOTAL				39

Station		Side	Calculations	Lin. Ft.
From	To			
Westbound I-480				
1178+90		Lt.	1x38	38
Eastbound I-480				
1189+00		Rt.	1x38	38
Ramp B-OBS				
20+56			1x25	25
TOTAL				101

Station		Side	Calculation	Lin. Ft.
From	To			
Westbound I-480				
1219+70	1240+20	Lt.	1x2050	2050
Eastbound I-480				
1223+00	-	Rt.	1x50	50
TOTAL				3000

Station		Side	Calculation	Lin. Ft.
From	To			
Westbound I-480				
1219+70	1240+20	Lt.	1x2050	2050
TOTAL				2050

Station		Side	Calculations	Lin. Ft.
From	To			
Westbound I-480				
1182+65	1192+25	Lt.	1 x 960	960 *
Bedford Freeway				
52+90	59+12	Rt.	1 x 662	662 *
TOTAL				1582

\* YELLOW  
# WHITE

143	NUMBERED SIGNS					UNNUMBERED SIGNS	INTERIM TRAFFIC CONTROL DEVICES	100% STATE COST PART.	TOTAL	UNIT	ITEM	DESCRIPTION
	144	146	147	148	149							
						117.0	117.0		117.0	Sq. Ft.	815	Sign Erection Flat Sheet Type
	66	6	85	12	6				175	Sq. Ft.	815	+ Interim Flat Sheet Overlay Type
						143.0	143.0		143.0	Lin. Ft.	816	Interim Steel Drive Post, 4 Lbs. per Ft., as per plan
							12		12	Each	620	Interim Delineators, as per plan
									2050	Lin. Ft.	621	Existing Interim Pavement Marking Removed
									1582	Lin. Ft.	621	Interim 4" Edge Line (Pull-up-Type), as per plan (YELLOW or WHITE)
									39	Each	606	Interim Barrels, as per plan
									101	Lin. Ft.	606	Guardrail, Type 6
									3000	Lin. Ft.	202	Interim Guard Rail, Removed and Disposed of, as per plan

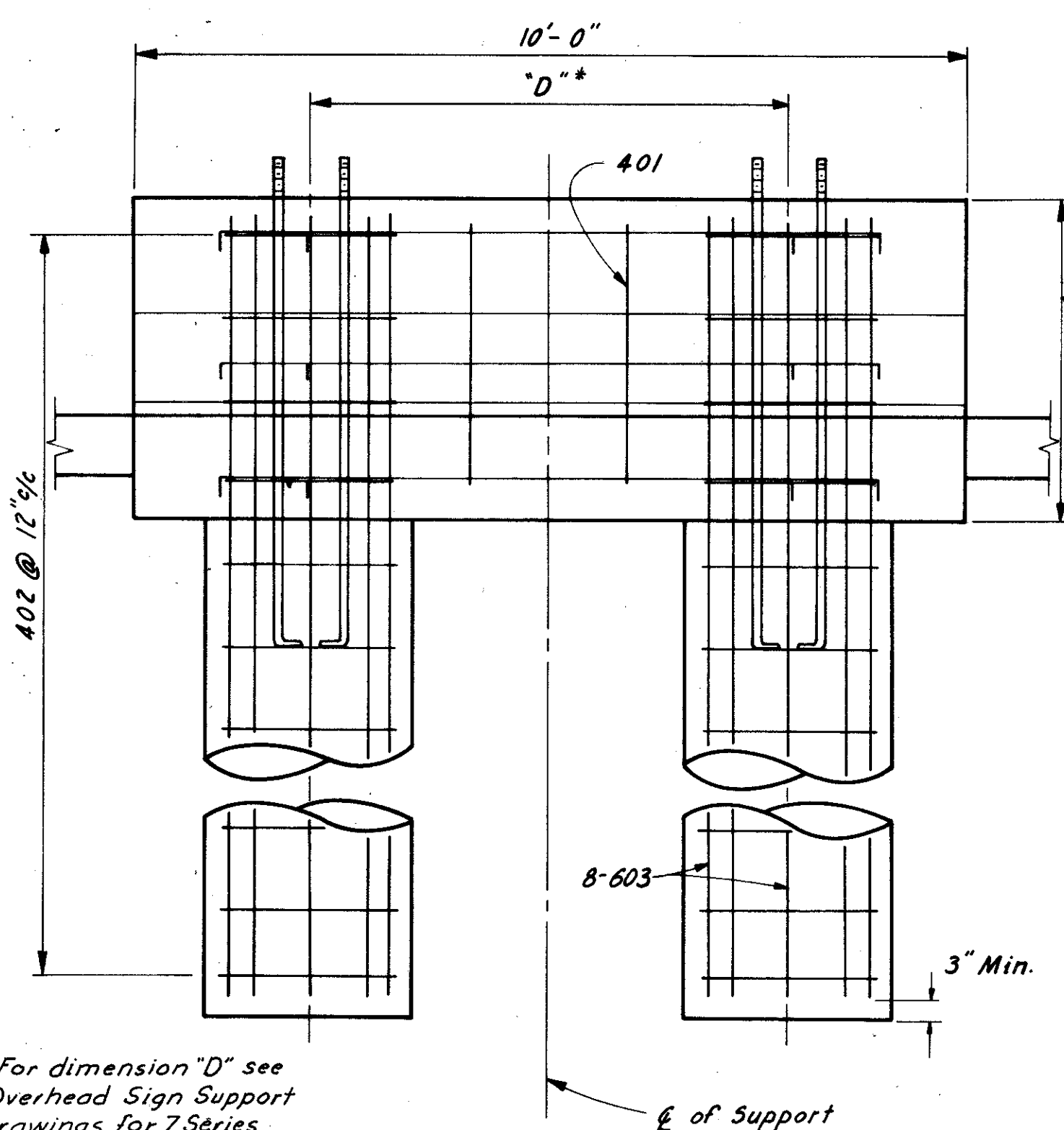
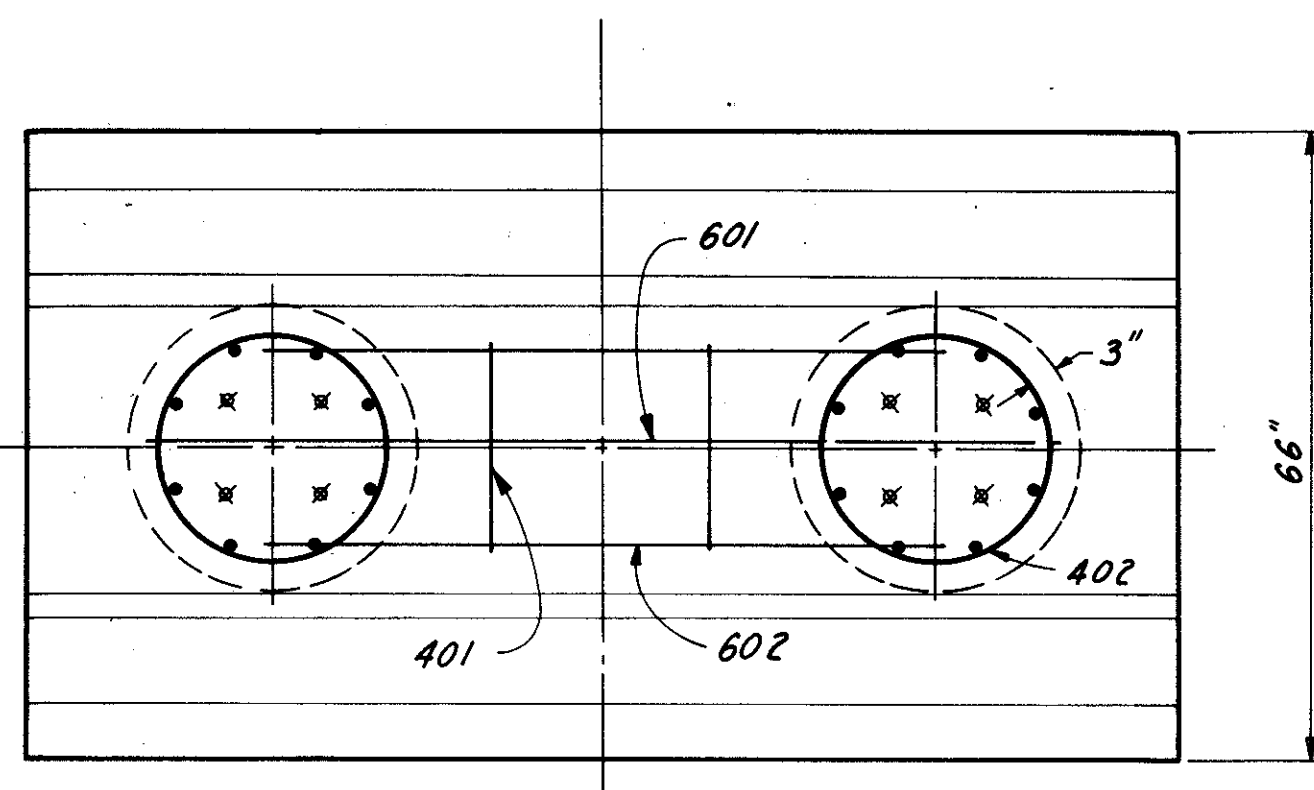
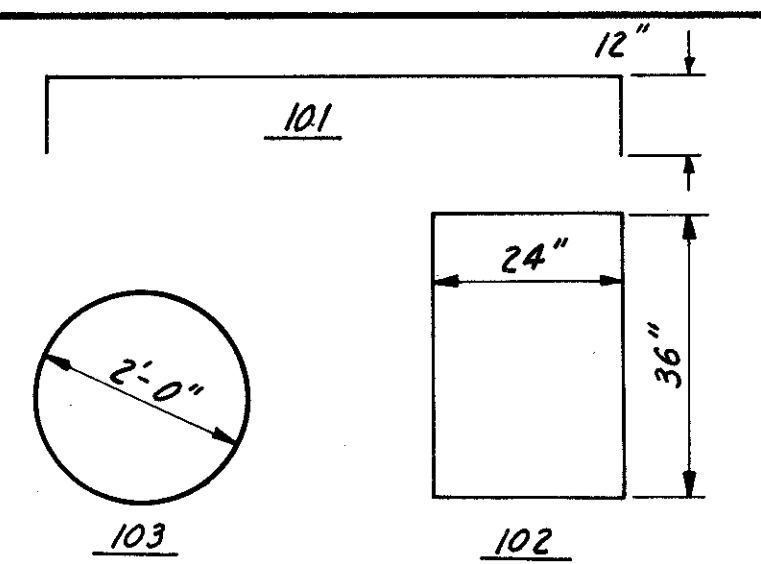
SCALE \_\_\_\_\_ HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE JEN DATE 2-2-70 CONSULTING ENGINEERS  
TRCD. RJK DATE 2-3-70  
CRD. RJK DATE 2-19-70 KANSAS CITY CLEVELAND NEW YORK

\* For information purposes only.



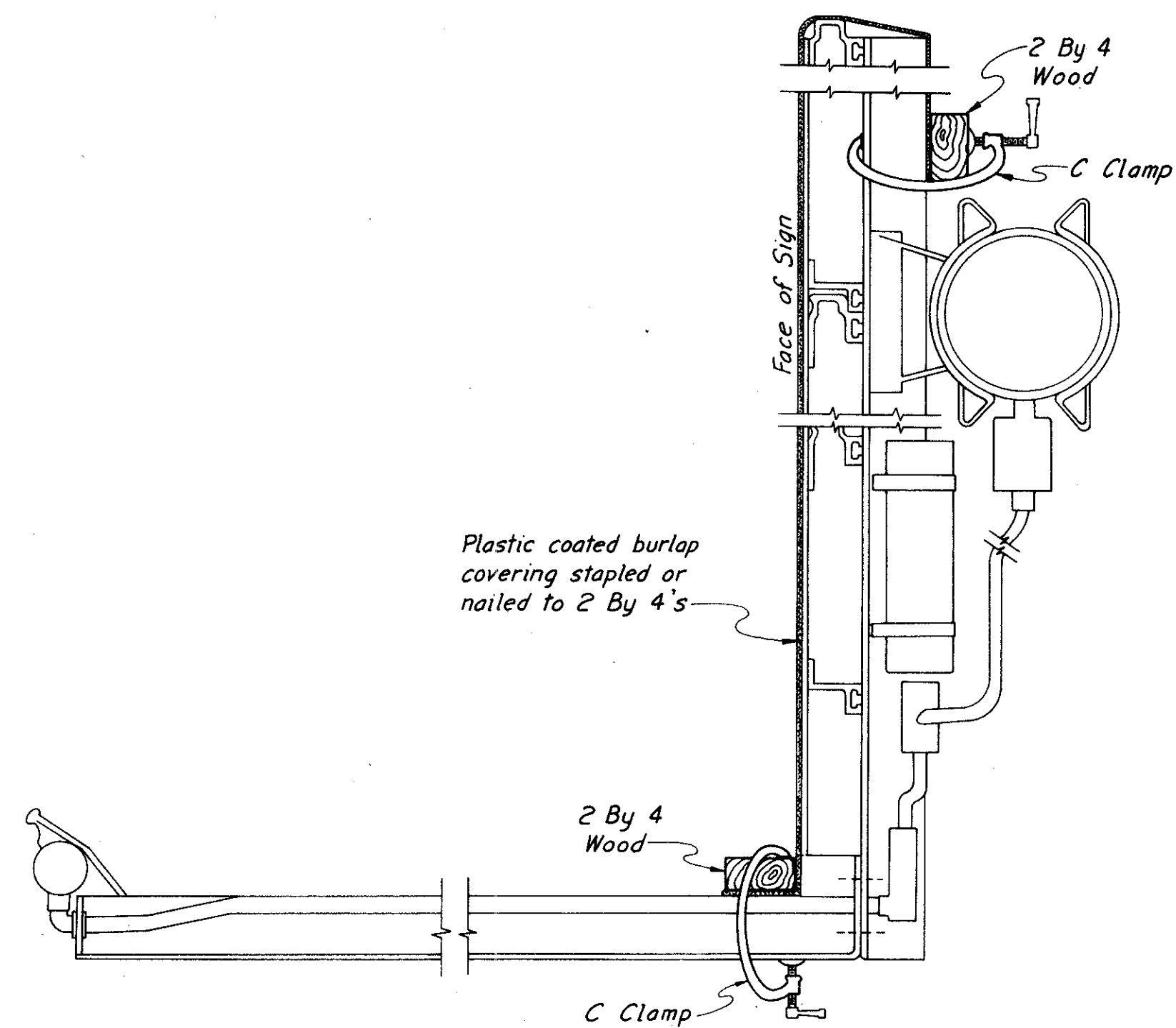
CUYAHOGA COUNTY  
C.U.Y. - 480-21.40

REINFORCEMENT SCHEDULE			
MARK	NO.	LENGTH	TYPE
401	12" $\phi$ c	10'-6"	102
402	12" $\phi$ c	7'-6"	103
601	3	D+48"	101
602	6	D+24"	101
603	16	Dmin+38"	Str.

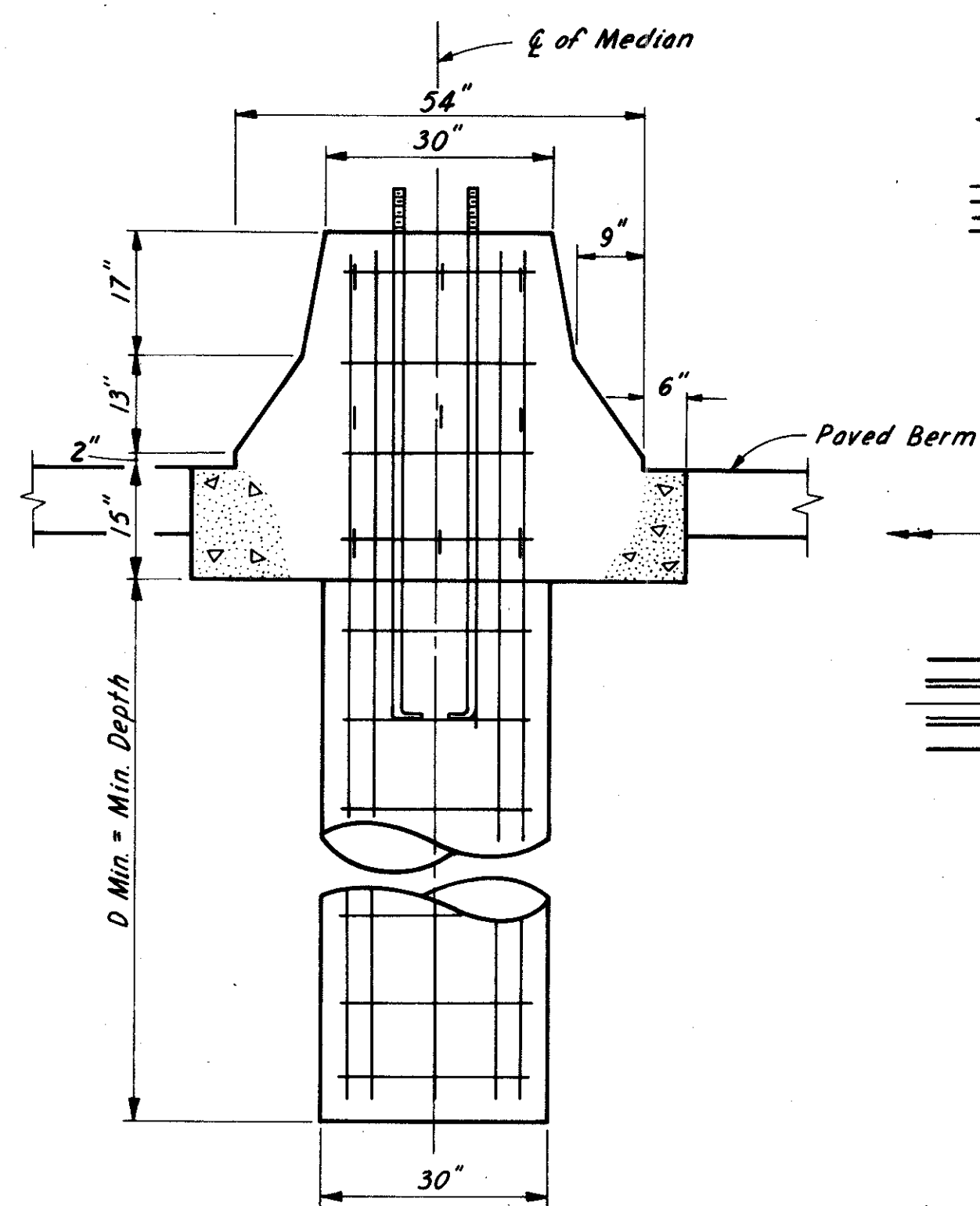


\* For dimension "D" see Overhead Sign Support drawings for 7 Series and for 15.8 Series.

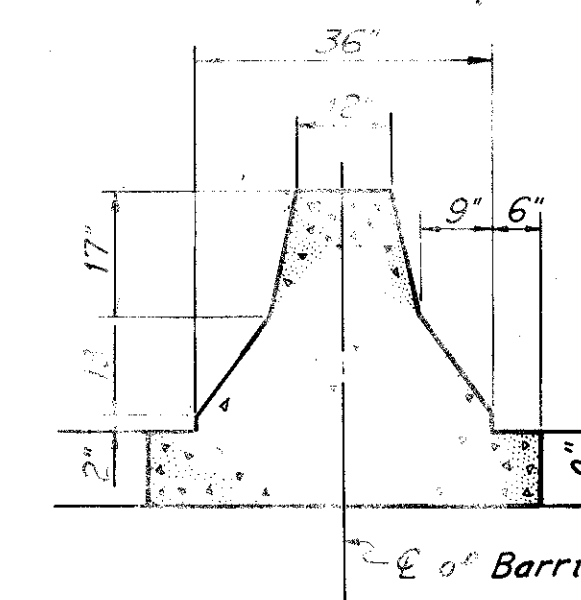
SIGN SUPPORT  
FOUNDATION DETAILS  
FOR  
CONCRETE MEDIAN BARRIER



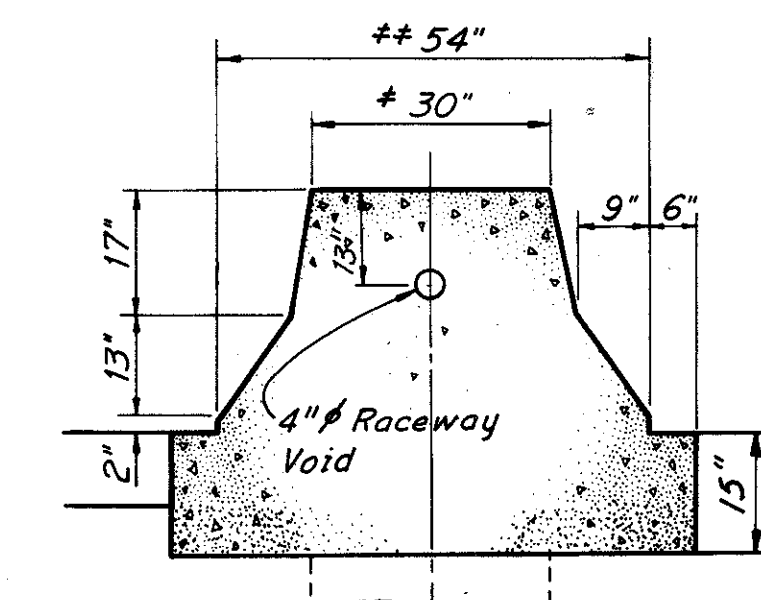
ATTACHMENT OF INTERIM  
COVERING DETAIL



Note: Payment for the ten (10) foot foundation section of the barrier median will be included in the item "Concrete for Overhead Sign Support Foundations." The flare sections will be included in the regular roadway quantities for the barrier median.



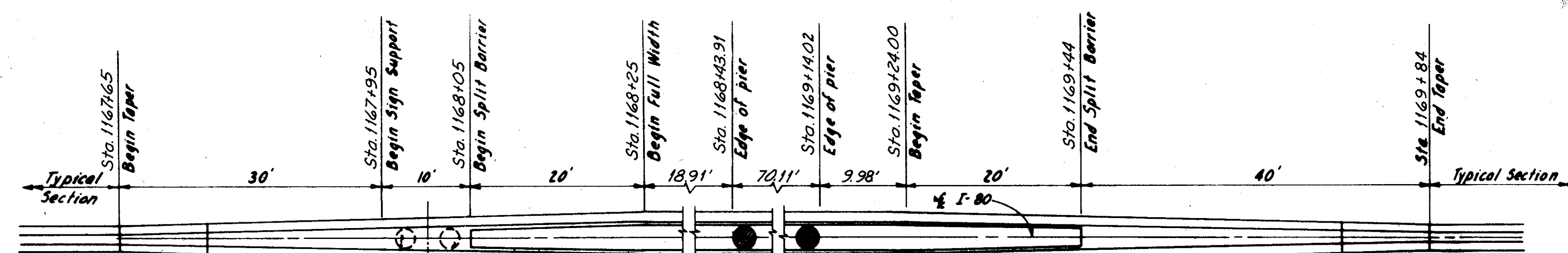
TYPICAL SECTION



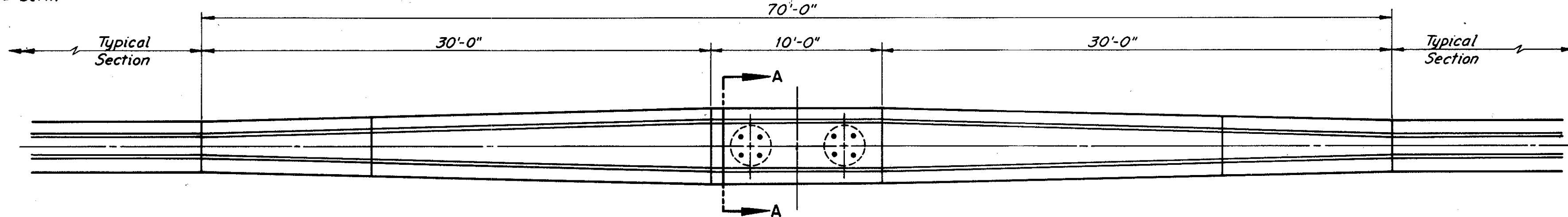
SECTION A - A

\* Width is 33" for Overhead Sign No. 142  
\*\* Width is 57" for Overhead Sign No. 142

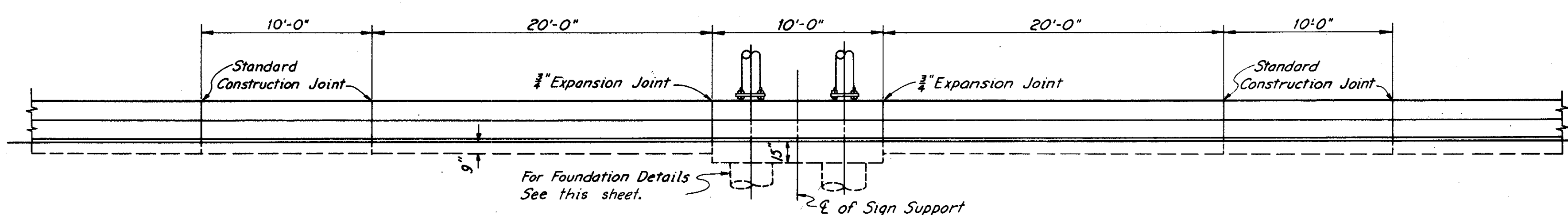
CONCRETE BARRIER MEDIAN DETAILS  
AT SIGN NOS. 141, 142, 143, 144 & 145



BRIDGE PIER APPROACH FLARE  
I-480 AND BEDFORD FREEWAY  
(Flare shall be 40:1 taper)



STANDARD MEDIAN BARRIER FLARE  
(Flare shall be 40:1 taper)

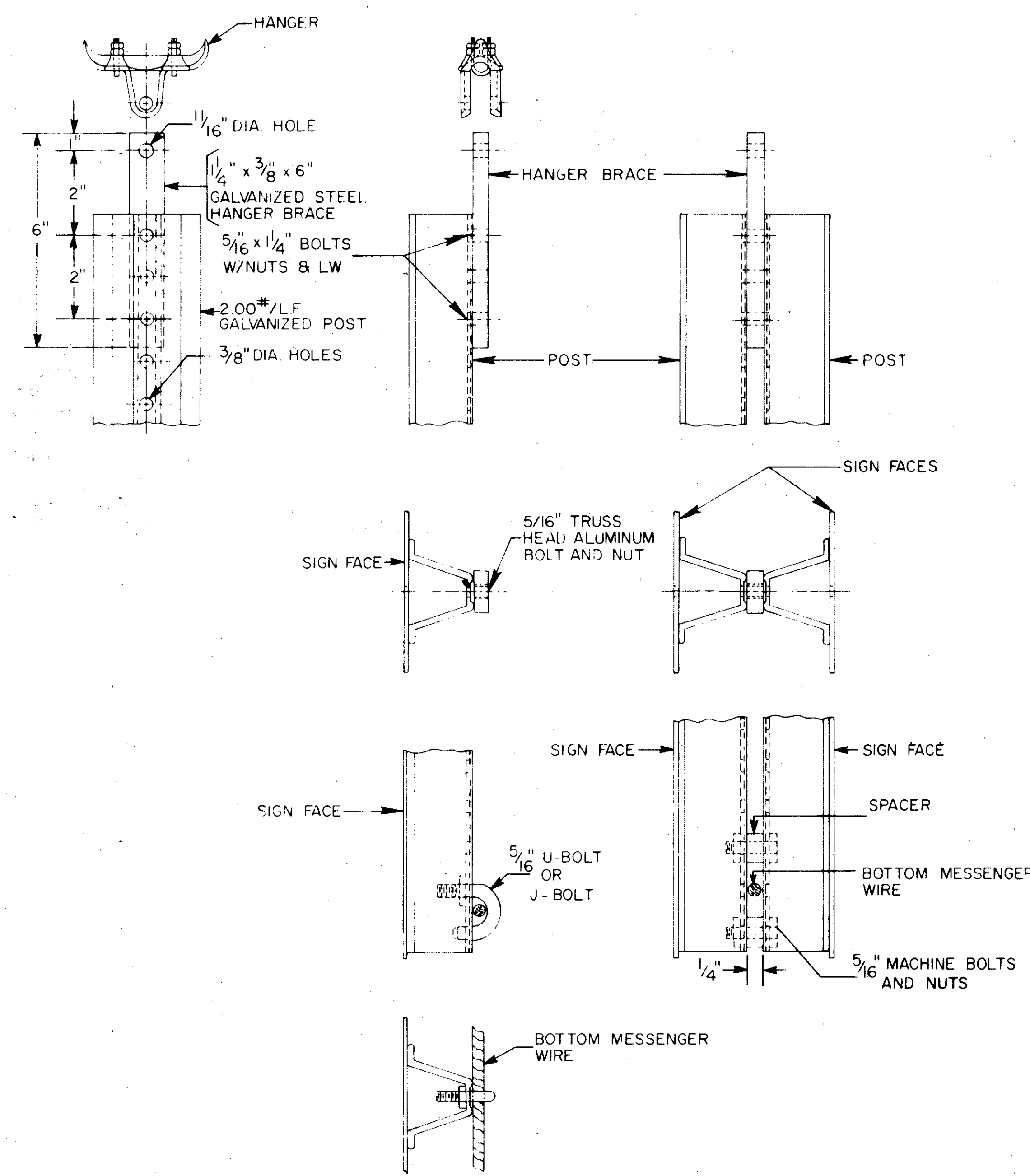


CONSTRUCTION JOINT LOCATIONS



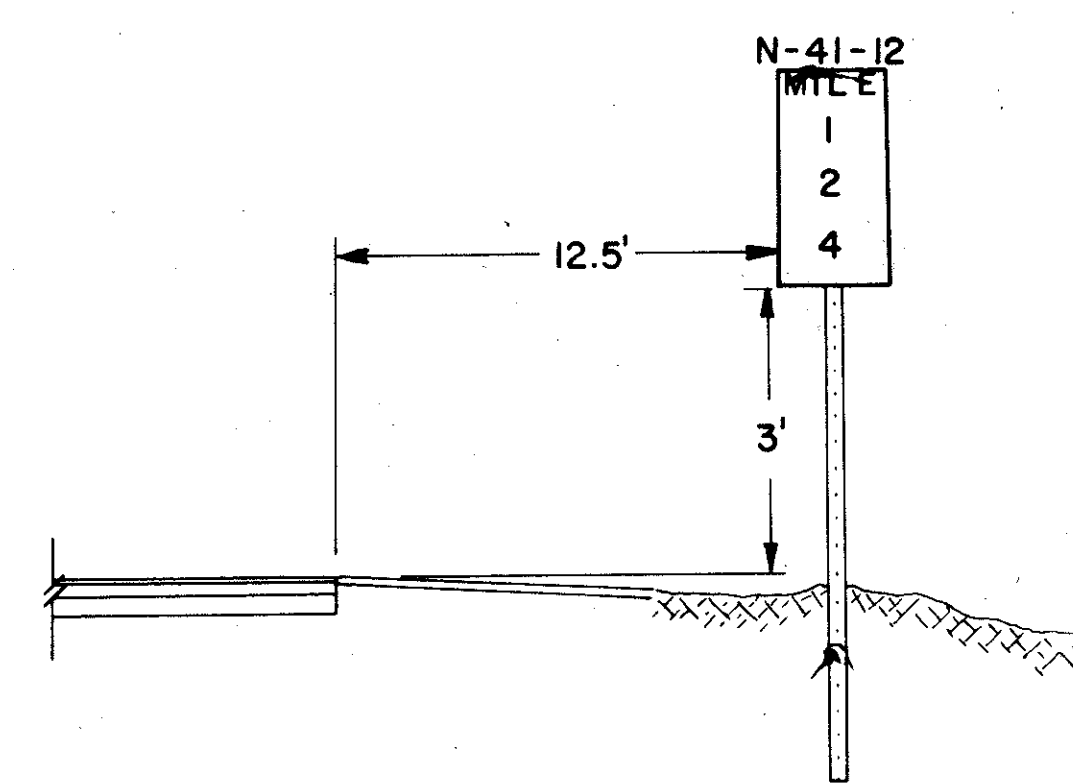
CUYAHOGA COUNTY  
CUY.-480-21.40

QUANTITY CALCULATIONS  
MADE BY KJK DATE 8-22-73  
CHECKED BY D.S.P DATE 8-23-73



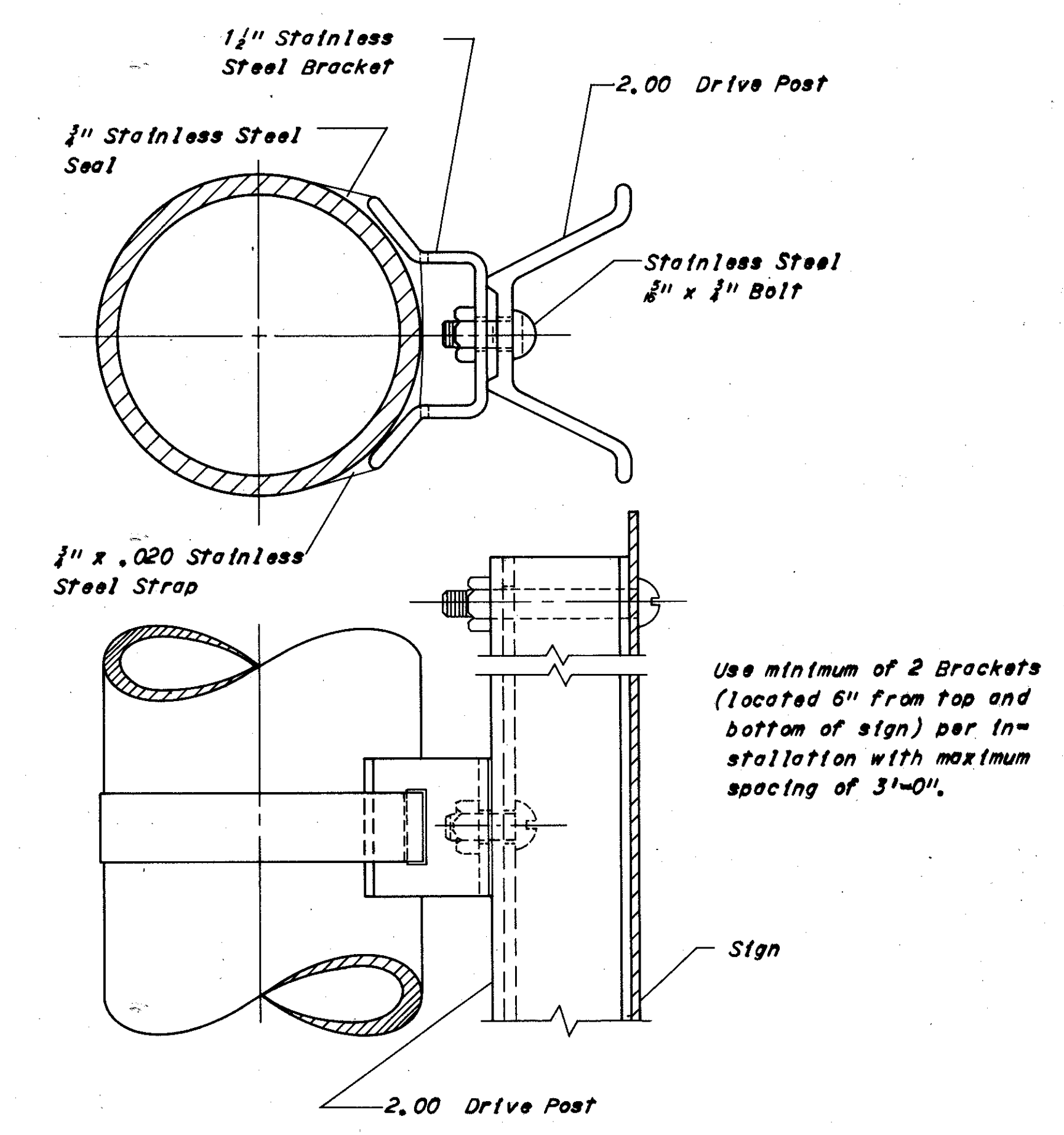
SPAN WIRE SIGN ATTACHMENT DETAILS

12' POST - 3 Digit  
11' POST - 2 Digit  
10' POST - 1 Digit



MILE MARKER PLACEMENT

Mile No.	Station I-480	MILE MARKER		QUANTITIES	
		Side	Side	N-41-12 1' x 3' Flat Sheet	Item 816 Steel Driven Post 2 lb/ft.
22	1184 + 44	Lt	Rt	Sq. Ft.	Lin. Ft.
Totals				6	22



POLE MOUNTED SIGNS ATTACHMENT DETAIL

(No Scale)

# COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

235  
390

CUYAHOGA COUNTY  
Quantity Calculations  
CUY. 480-21.40  
Made By JEN. Date 7-31-70  
Checked By BJK. Date 7-31-70

Item 621 4" Lane Line				
Station	Side	Calculations	Lin. Ft.	
From	To			
<b>Ramp OBS-W-B</b>				
7+95	9+55	Rt.	1 x 160	160 *
<b>Ramp B-OBS</b>				
5+25	7+65	Lt.	1 x 240	240 *
<b>Rel. McCracken Road</b>				
51+02	52+52	Rt.	1 x 150	150
52+52	84+89	Rt. & Lt.	2 x 3237	6474
<b>Bedford Freeway</b>				
56+62	59+12	Rt.	1 x 250	250 *
<b>TOTAL</b>				1.38 Miles 7274

Item 621 4" Edge Line						
Station		Side	Calculations	Lin. Ft.		
From	To			White	Yellow	
<b>Eastbound I-480</b>						
1152+77	1189+00	Rt. & Lt.	2 - 1 x 3623	3623	3623	
1189+00	1193+00	Rt. & Lt.	2 - 1 x 400	400	400	
1189+00	1193+00	Rt.	1 x 400	400 *		
<b>Westbound I-480</b>						
1152+77	1155+25	Rt. & Lt.	2 - 1 x 248	248	248	
1155+25	1159+65	Rt. & Lt.	3 - 1 x 440	880 *	440 *	
1159+65	1193+00	Rt. & Lt.	2 - 1 x 3335	3335	3335	
<b>Bedford Freeway</b>						
35+65	36+08	Rt.	1 x 43		43	
36+08	74+54	Rt. & Lt.	2 - 1 x 3846	3846	3846	
35+65	36+02	Lt.	1 x 37		37	
36+02	53+41	Rt. & Lt.	2 - 1 x 1739	1739	1739	
53+41	56+41	Rt. & Lt.	2 - 1 x 300	300	300	
53+41	56+41	Lt.	1 x 300		300 *	
56+41	57+41	Lt.	1 x 100		100	
57+41	74+54	Rt. & Lt.	2 - 1 x 1713	1713	1713	
<b>Lane OBS-E-B</b>						
61+75	78+92	Rt. & Lt.	2 - 1 x 717		1434	
<b>Ramp B-OBS</b>						
9+65	12+25	Rt.	1 x 260		260	
12+25	20+56	Rt. & Lt.	2 - 1 x 831		831	
<b>Lane B-OBS-E</b>						
74+54	89+00	Rt. & Lt.	2 - 1 x 1446		1446	
<b>Ramp OBS-W-B</b>						
13+44	19+75		2 - 1 x 631		631	
<b>TOTAL</b>				4.05 mi. (White) + 3.56 mi. (Yellow) = 7.60 Mi.	21,386	18,732

Item 621 6" Lane Line				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Eastbound I-480</b>				
1152+77	1180+60	Rt.	3 x 2783	8349 *
1180+60	1189+00	Rt.	2 x 840	1680 *
1189+00	1193+00	Rt.	3 x 400	1200 *
<b>Westbound I-480</b>				
1152+77	1155+25	Lt.	3 x 248	744 *
1155+25	1178+91	Lt.	2 x 2366	4732 *
1178+91	1193+00	Lt.	3 x 1409	4227 *
<b>Bedford Freeway</b>				
35+30	46+41	Rt.	1 x 1111	1111 **
46+41	74+54	Rt.	1 x 2813	2813 *
35+46	46+41	Lt.	1 x 1095	1095 **
46+41	53+41	Lt.	1 x 700	700 *
53+41	56+41	Lt.	2 x 300	600 *
<b>Lane OBS-E-B</b>				
56+41	78+92	Lt.	1 x 2251	2251 *
<b>Lane B-OBS-E</b>				
74+54	89+00	Rt.	1 x 1446	1446 *
<b>TOTAL</b>				5.44 Miles 28,742
<b>TOTAL 100% STATE</b>				0.42 Miles 2206 **

Item 621 Word "Only"				
Station	Side	Calculations	Each	
From	To			
<b>Bedford Freeway</b>				
35+89	36+64	Lt.	2 * 2 * 1	5 **
<b>Rel. McCracken Road</b>				
51+45	52+95	Lt.	3	3
<b>TOTAL</b>				3
<b>TOTAL 100% STATE</b>				5 **

Item 621 Crosswalk Lines (White)				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Rel. McCracken Road</b>				
50+92	50+98	Rt. & Lt.	89+79	168
<b>Bedford Freeway</b>				
35+36	35+42	Rt. & Lt.	120+110	230 **
<b>TOTAL</b>				168
<b>TOTAL 100% STATE</b>				230 **

Item 621 Curb Markings (White)				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Ramp B-OBS</b>				
9+65	13+25		1 x 360	360
<b>Bedford Freeway</b>				
56+40	59+40	Lt.	1 x 300	300
<b>Lane B-OBS-E</b>				
75+00	75+60	Lt.	1 x 60	60
85+40	89+00		1 x 360	360
<b>Ramp OBS-W-B</b>				
18+85	19+50		1 x 65	65
<b>TOTAL</b>				1145

Item 621 Lane Arrows				
Station	Side	Calculations	Each	
From	To			
<b>Rel. McCracken Road</b>				
51+27	52+77		Turn Arrow	3
<b>Bedford Freeway</b>				
35+71	36+46		Turn Arrow	4
35+71			Turn Arrow	1
<b>TOTAL</b>				8

Item 621 8" Channelizing Line (White)				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Eastbound I-480</b>				
1169+55	1173+56	Rt.	2 x 401	802 *
1189+00	1193+00	Rt.	1 x 400	400 *
<b>Westbound I-480</b>				
1157+65	1159+65	Lt.	1 x 200	200 *
1178+91	1182+65	Lt.	2 x 374	748 *
<b>Bedford Freeway</b>				
35+46	36+16	Lt.	1 x 70	70 **
53+41	56+41	Lt.	1 x 300	300 *
59+12	60+88	Rt.	2 x 176	352 *
60+88	61+88	Rt.	1 x 100	100 *
<b>Rel. McCracken Road</b>				
51+02	52+52	Lt.	1 x 150	150
<b>TOTAL</b>				3052
<b>TOTAL 100% STATE</b>				70 **

Item 621 4" Double Yellow Centerline				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Bedford Freeway</b>				
35+30	35+71	℄	1 x 41	41 **
<b>Rel. McCracken Road</b>				
50+98	64+00	℄	1 x 1302	1302
64+60	76+60	℄	1 x 1200	1200
77+10	82+55	℄	1 x 545	545
83+00	84+89	℄	1 x 189	189
<b>E. 154th St</b>				
3+75	4+60	℄	1 x 85	85
<b>Blase Ave.</b>				
13+00	13+94	℄	1 x 94	94
<b>Orchard Road</b>				
5+00	11+00	℄	1 x 600	600
<b>Osborne Road</b>				
0+20	5+74	℄	1 x 554	554
<b>Rel. Greenhurst Road</b>				
8+30	15+36	℄	1 x 706	706
<b>TOTAL</b>				1.00 Miles 5275
<b>TOTAL 100% STATE</b>				0.01 Miles 41 **

DELINEATOR LOCATIONS AND ESTIMATED QUANTITIES							
Location		Side	Space	No. of Delineators			
From	To			Type D			
From	To			Post	Bracket		
<b>I-480 Eastbound</b>							
1165+50	1166+50	Rt.	100		2		
1189+25	1192+25	Rt.	100		4		
<b>I-480 Westbound</b>							
1154+10	1159+10	Lt.	100		2	4	
<b>Bedford Freeway</b>							
46+41	56+21	Lt.	70		15		
58+30	65+30	Lt.	100		6	2	
66+11	74+11	Lt.	50		12	5	
52+90	54+90	Rt.	100		3		
61+85	65+85	Rt.	100		1	4	
66+85	74+15	Rt.	50		12	4	
<b>Lane B-OBS-E</b>							
74+65	77+65	Rt.	50		7		
78+45	82+45	Rt.	100		4		
82+45	85+45	Lt.	60		6		
85+45	87+25	Rt.	60		4		
88+25	-	Rt.	-		1		
<b>Lane OBS-E-B</b>							
62+55	64+55	Lt.	100		3		
64+55	65+55	Rt.	100		2		
66+15	74+15	Rt.	60		11	4	
75+55	76+15	Rt.	100		2		
76+55	87+55	Lt.	100		12		
<b>Ramp OBS-WB</b>							
7+58	13+58	Rt.	100		7		
13+58	14+58	Lt.	100		2		
15+18	19+38	Lt.	30		15		
<b>Ramp B-OBS</b>							
10+10	13+10	Lt.	100		2	2	
13+10	14+10	Rt.	100		2		
14+80	19+60	Rt.	40		8	5	
19+60	22+80	Lt.	80		5		
<b>TOTAL</b>						150	30

Item 621 24" Broad Transverse Stripes (White)				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Eastbound I-480</b>				
1169+55	1173+56	Rt.	1 x 830	830 *
<b>Westbound I-480</b>				
1178+91	1182+33	Lt.	1 x 695	695 *
<b>Bedford Freeway</b>				
59+12	60+88	Rt.	1 x 216	216 *
<b>TOTAL</b>				1741

Item 621 24" Stop Bar (White)				
Station		Side	Calculations	Lin. Ft.
From	To			
<b>Orchard Road</b>				
5+00			1 x 23	23
<b>Rel. McCracken Road</b>				
51+02			1 x 36	36
<b>E. 154th St.</b>				
3+75			1 x 18	18
<b>Blase Ave.</b>				
13+00			1 x 18	18
<b>Bedford Freeway</b>				
35+46			1 x 50	50 **
<b>Osborne Road Cann.</b>				
0+20			1 x 10	10
<b>TOTAL</b>				105
<b>TOTAL 100% STATE</b>				50 **

Item 621 Island Markings (White)				
Station		Side	Calculations	Sq. Ft.
From	To			
<b>Bedford Freeway</b>				
60+88	61+06	Rt.	(4+10) ÷ 2 x 18	125
<b>TOTAL</b>				125

Item 621 Curb Markings (Yellow)				
From	To	Side	Calculations	Lin. Ft.
<b>Osborn Road</b>				
18+60	19+70	Cul-de-Sac	263	263
<b>TOTAL</b>				263

\*\* 100% State  
\* Temporary Painting At Project Participation With Thermoplastic; Markings To Be Provided Later By A Stage Construction Pavement Marking Contract.



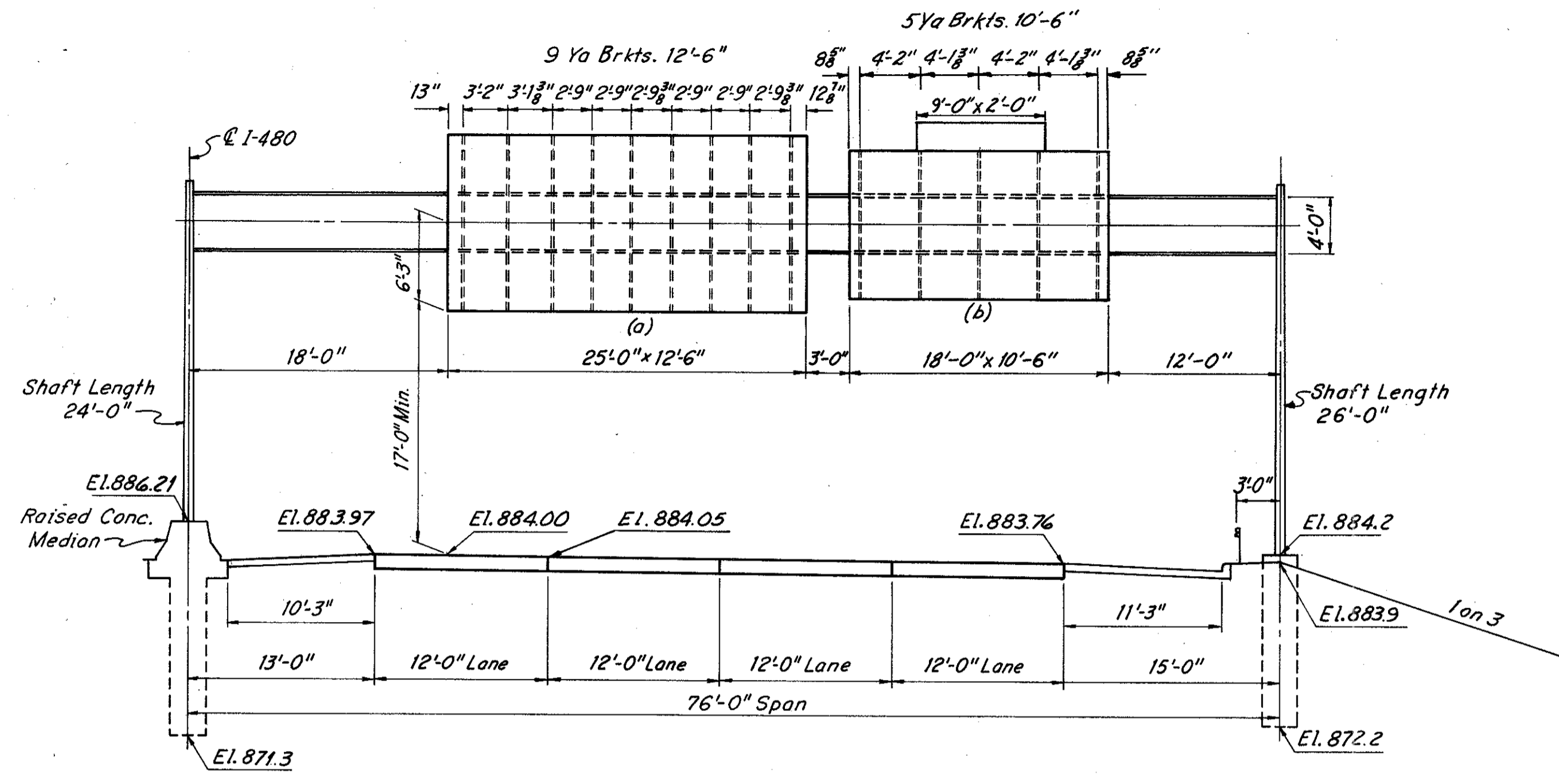


# SIGN SUPPORT DETAILS

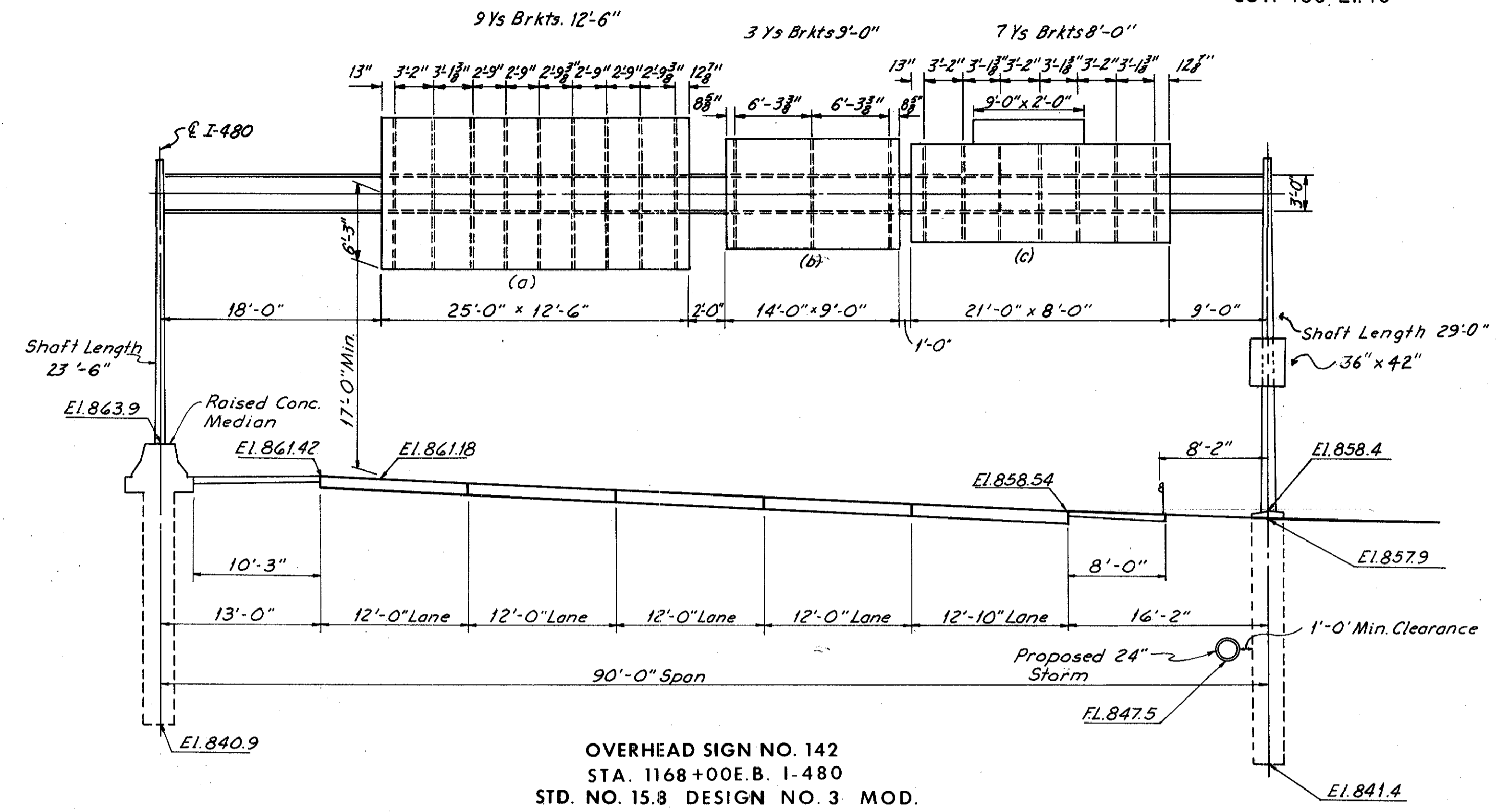
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

238  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

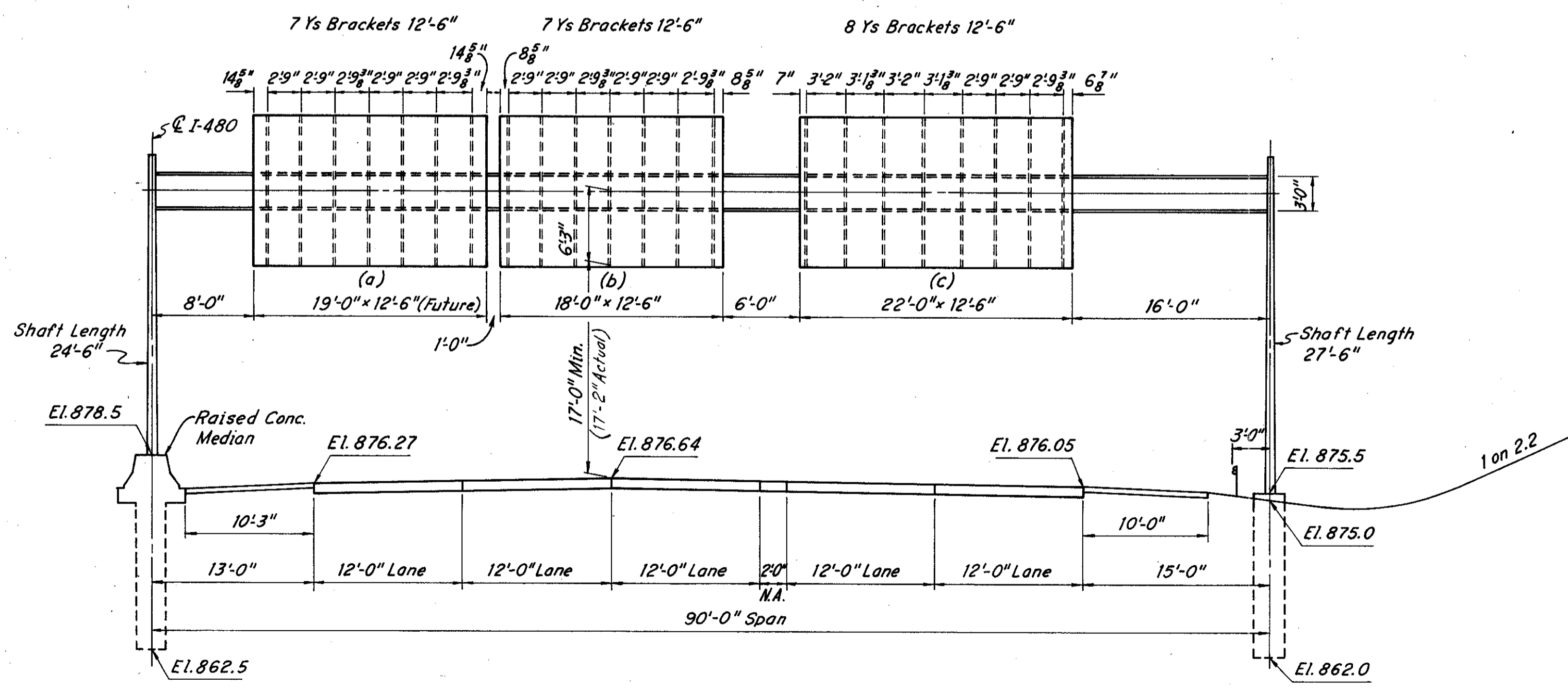


OVERHEAD SIGN NO. 141  
STA. 1159+00 E.B. I-480  
STD. NO. 7.6 DESIGN NO. 3 MOD.  
76' - 0" SPAN

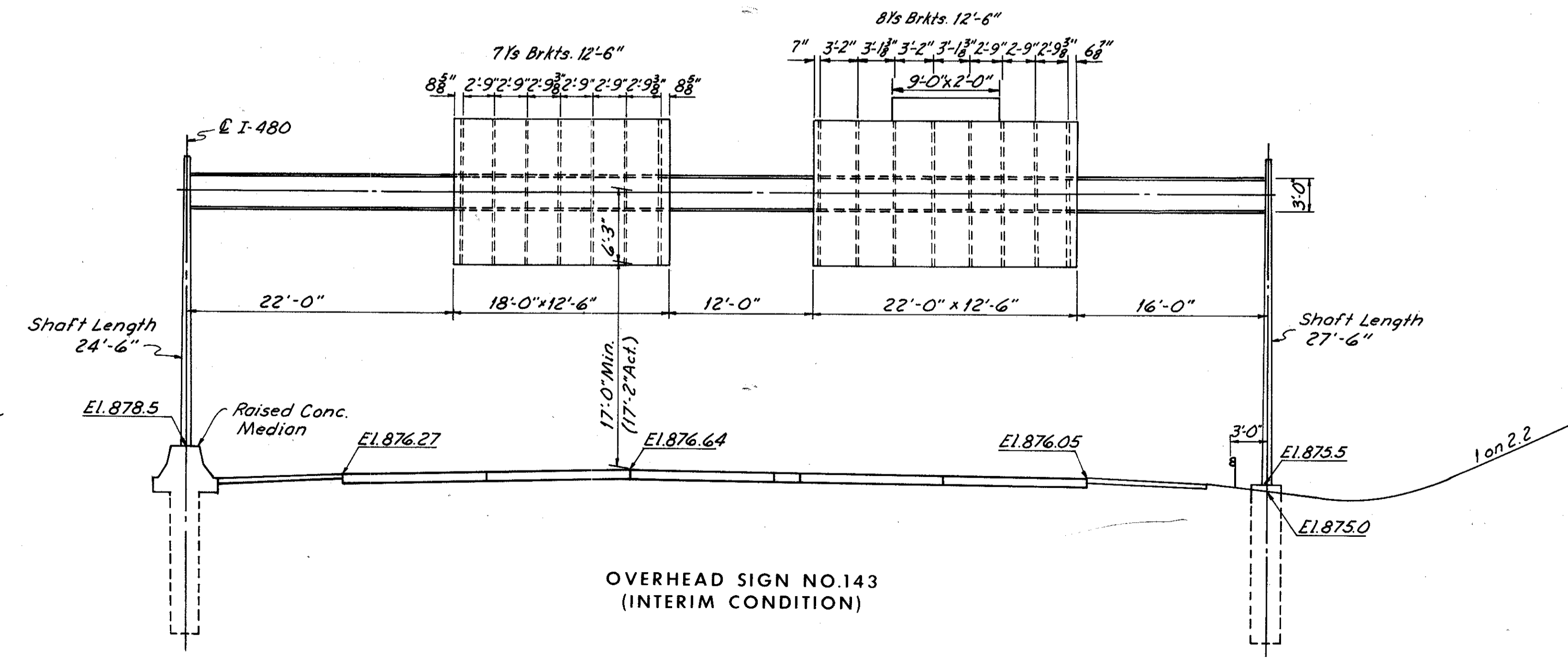


OVERHEAD SIGN NO. 142  
STA. 1168+00 E.B. I-480  
STD. NO. 15.8 DESIGN NO. 3 MOD.  
90' - 0" SPAN

Foundations are located in Sandy Silt.  
Increase "D" Min. by 50%.



OVERHEAD SIGN NO. 143  
STA. 1182+33 W.B. I-480  
STD. NO. 15.8-DESIGN NO. 3 MOD.  
90' - 0" SPAN



OVERHEAD SIGN NO. 143  
(INTERIM CONDITION)

SCALE 1/4" = 1'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

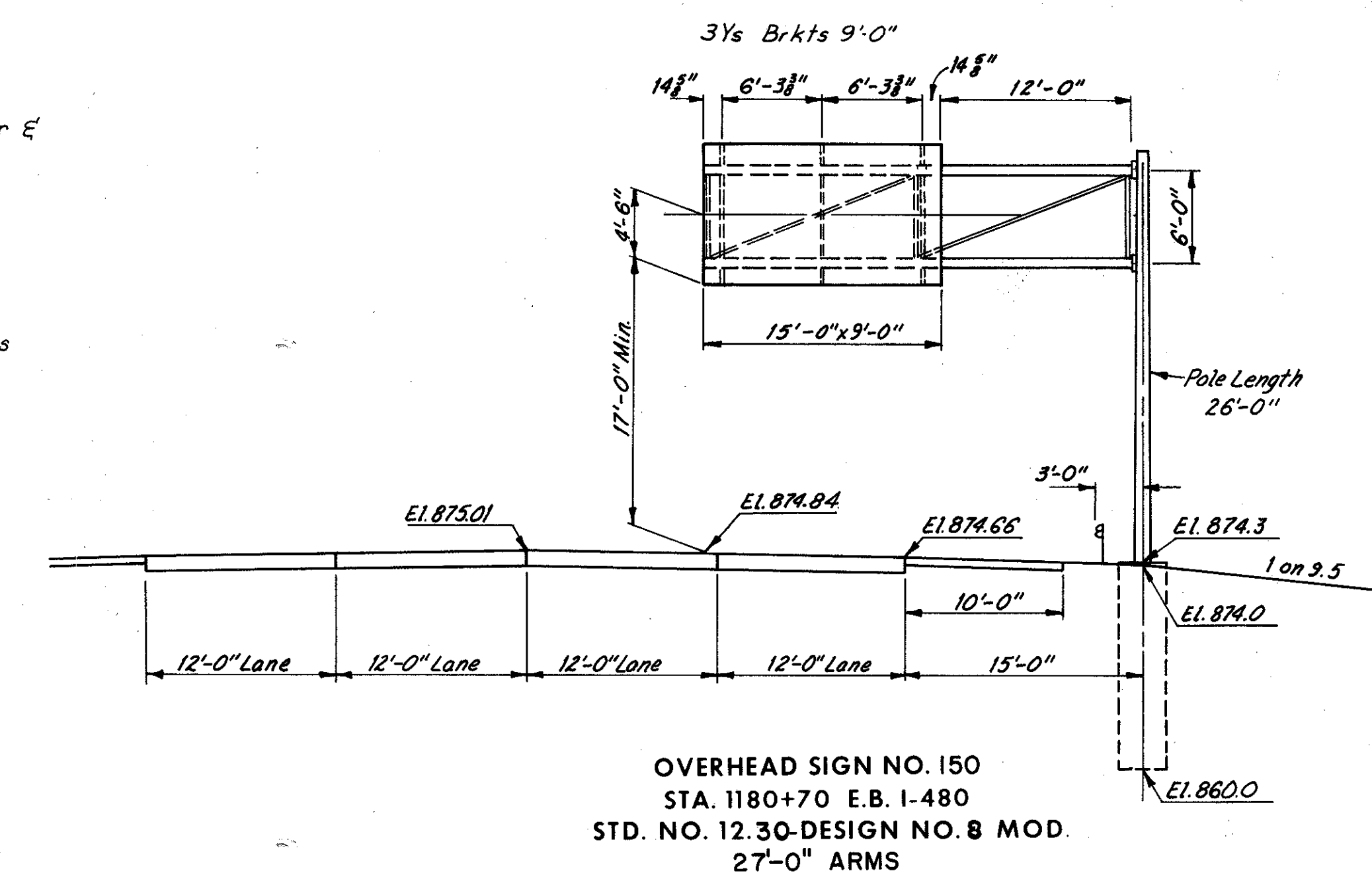
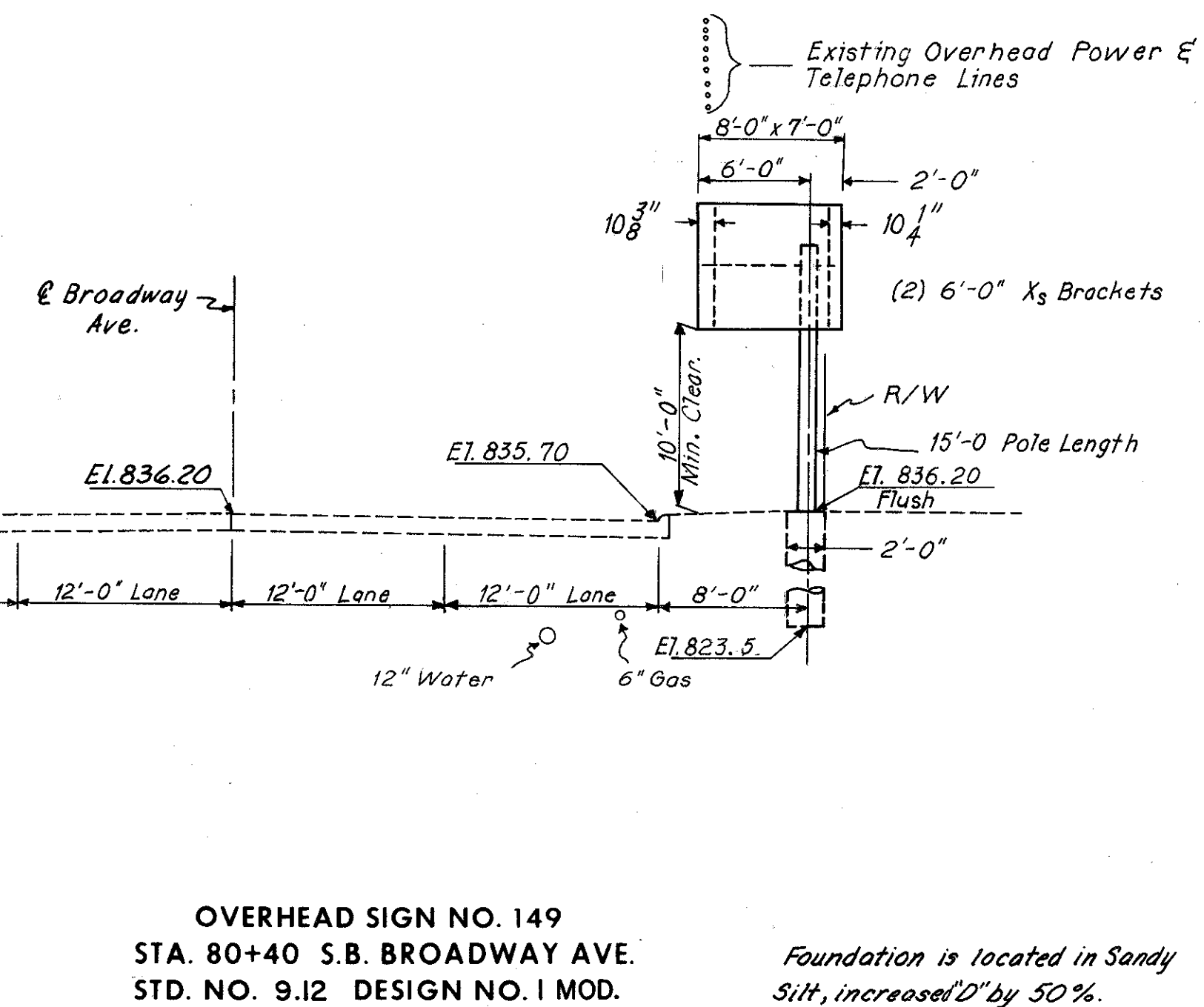
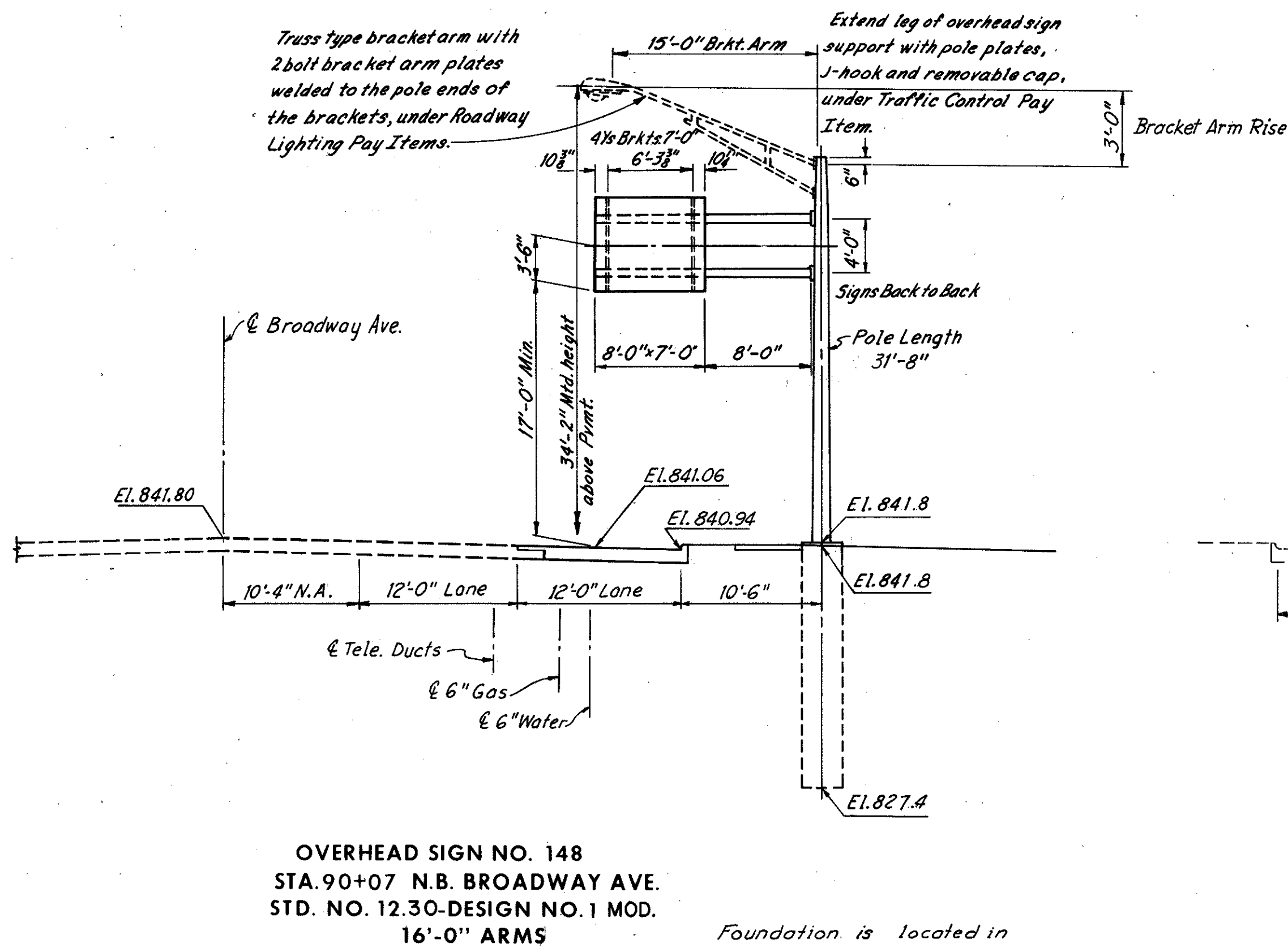
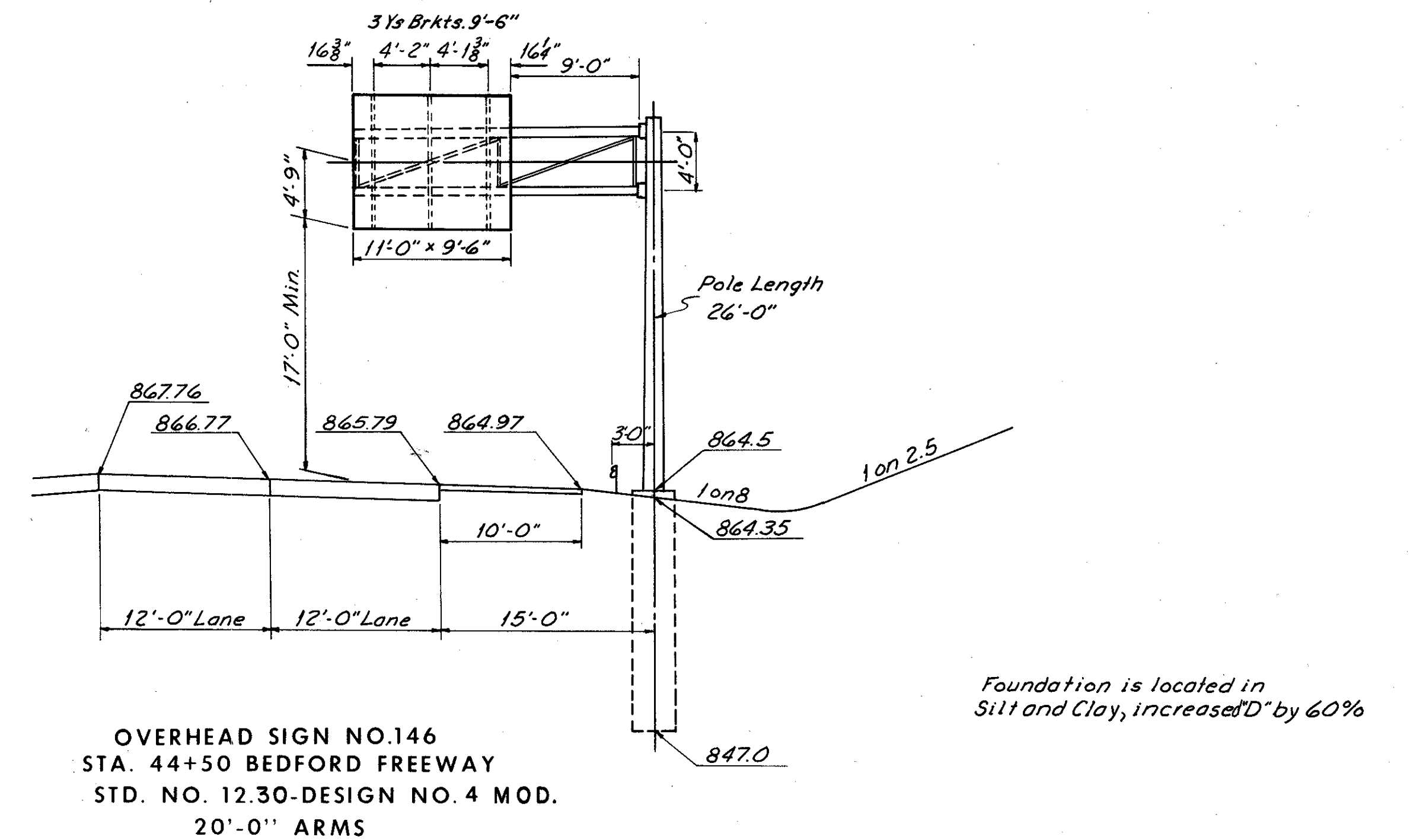
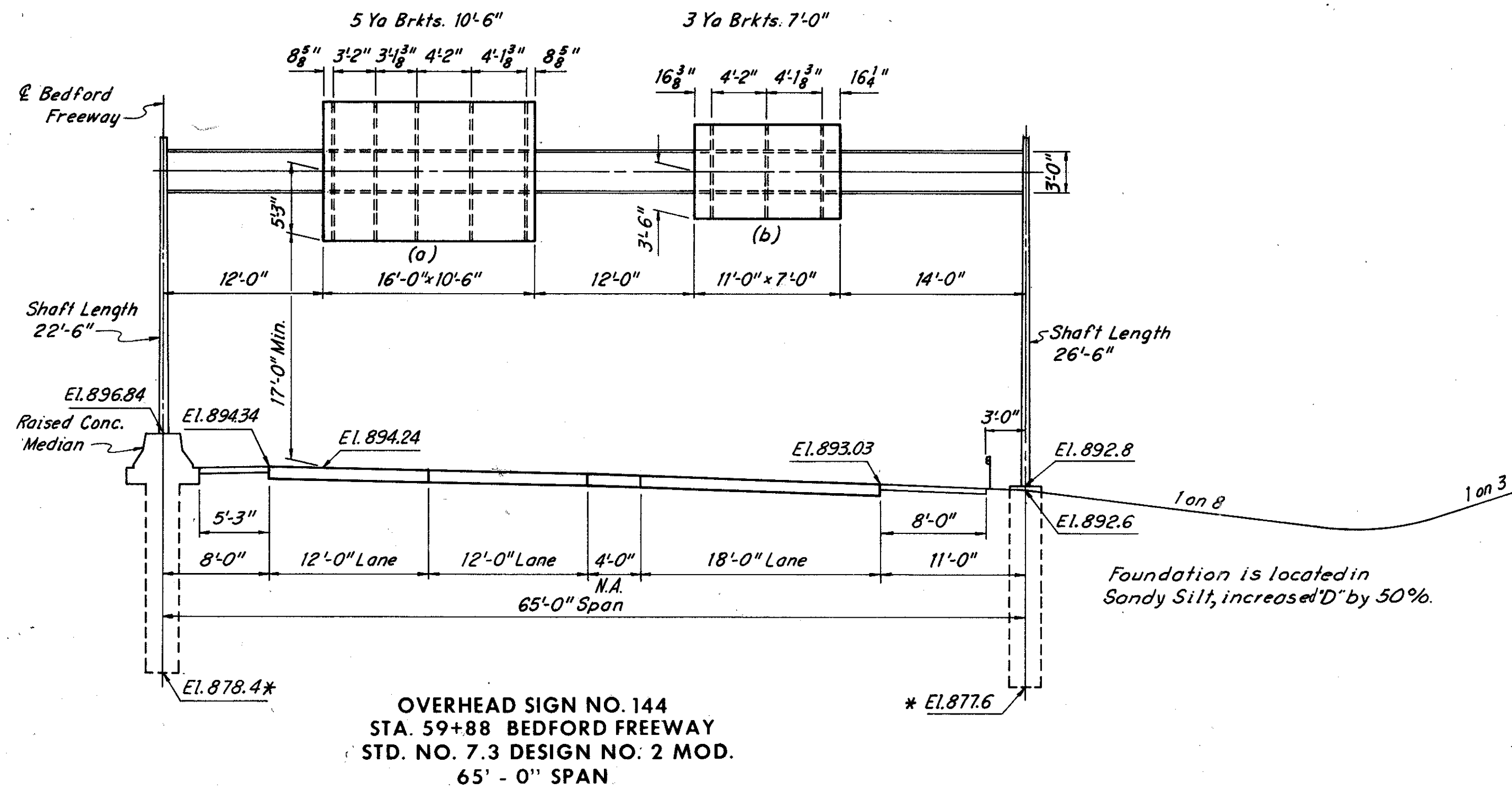
Note:  
Sign sizes shown on this sheet are actual  
and include the added 1'-0" for glare shields.  
Signs shown on this sheet are those which  
will be a part of the permanent installation.

# SIGN SUPPORT DETAILS

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

239  
390

CUYAHOGA COUNTY  
C.U.Y. 480-21.40



SCALE 1/4" = 1'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

Note:  
Sign sizes shown on this sheet are actual and include the added 1'-0" for glare shields.  
Signs shown on this sheet are those which will be a part of the permanent installation.

CUYAHOGA COUNTY  
CUY. 480-21.40

**NOTES**

**MATERIALS**  
THE OVERHEAD SPAN TRUSS SHALL BE ALUMINUM AND THE END FRAMES SHALL BE STEEL.  
SPAN TRUSS AND END FRAMES, INCLUDING HARDWARE, SHALL BE IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 816 UNLESS OTHERWISE NOTED.  
STEEL POLE BASES AND GUSSETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A-373.  
AFTER FABRICATION THE TAPERED POLES SHALL HAVE A MINIMUM YIELD STRENGTH OF 48,000 PSI.

**FABRICATION**  
THE ENTIRE STEEL END FRAME SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SEC. M-74(D). MAXIMUM LENGTH OF SPAN SECTIONS IS 30 FT.

**ERECTION**  
USE A MINIMUM OF 1" CAMBER IN SPAN TRUSS MEMBER FOR A 50' SPAN; ADD 1/4" OF CAMBER FOR EACH 5' OF INCREASE IN SPAN OVER 50'.

**PAYMENT**  
PAYMENT FOR THE GALVANIZED CONDUIT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS.

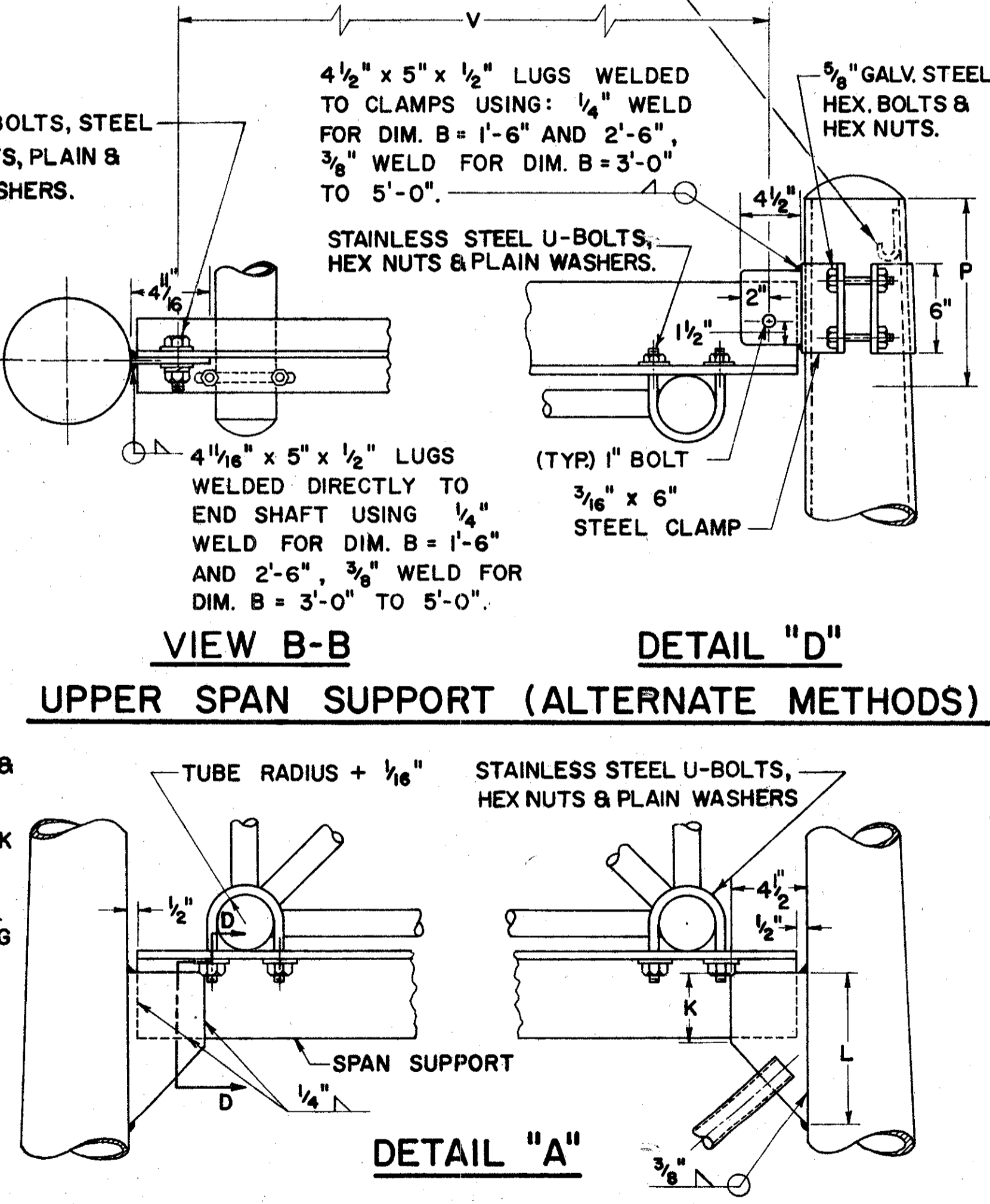
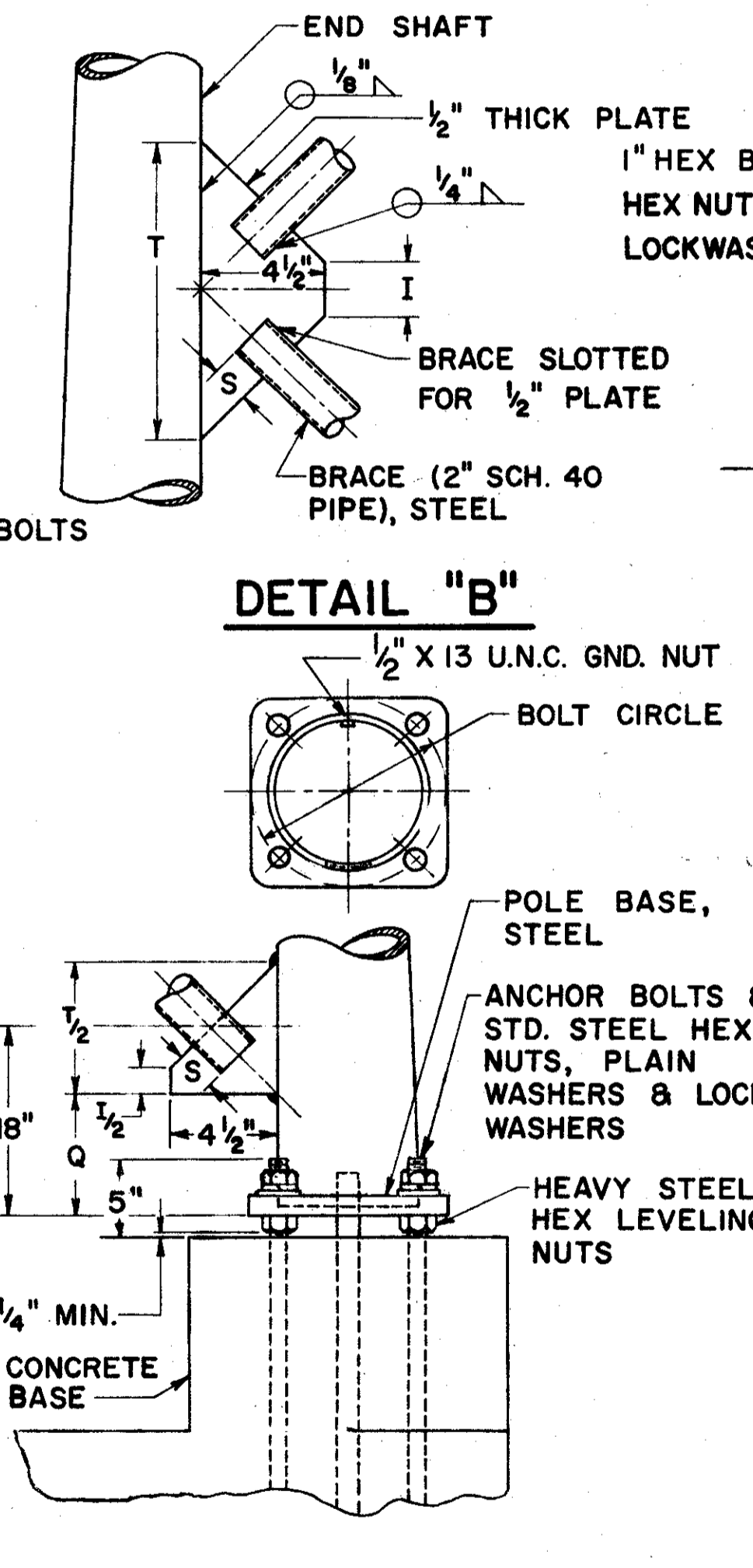
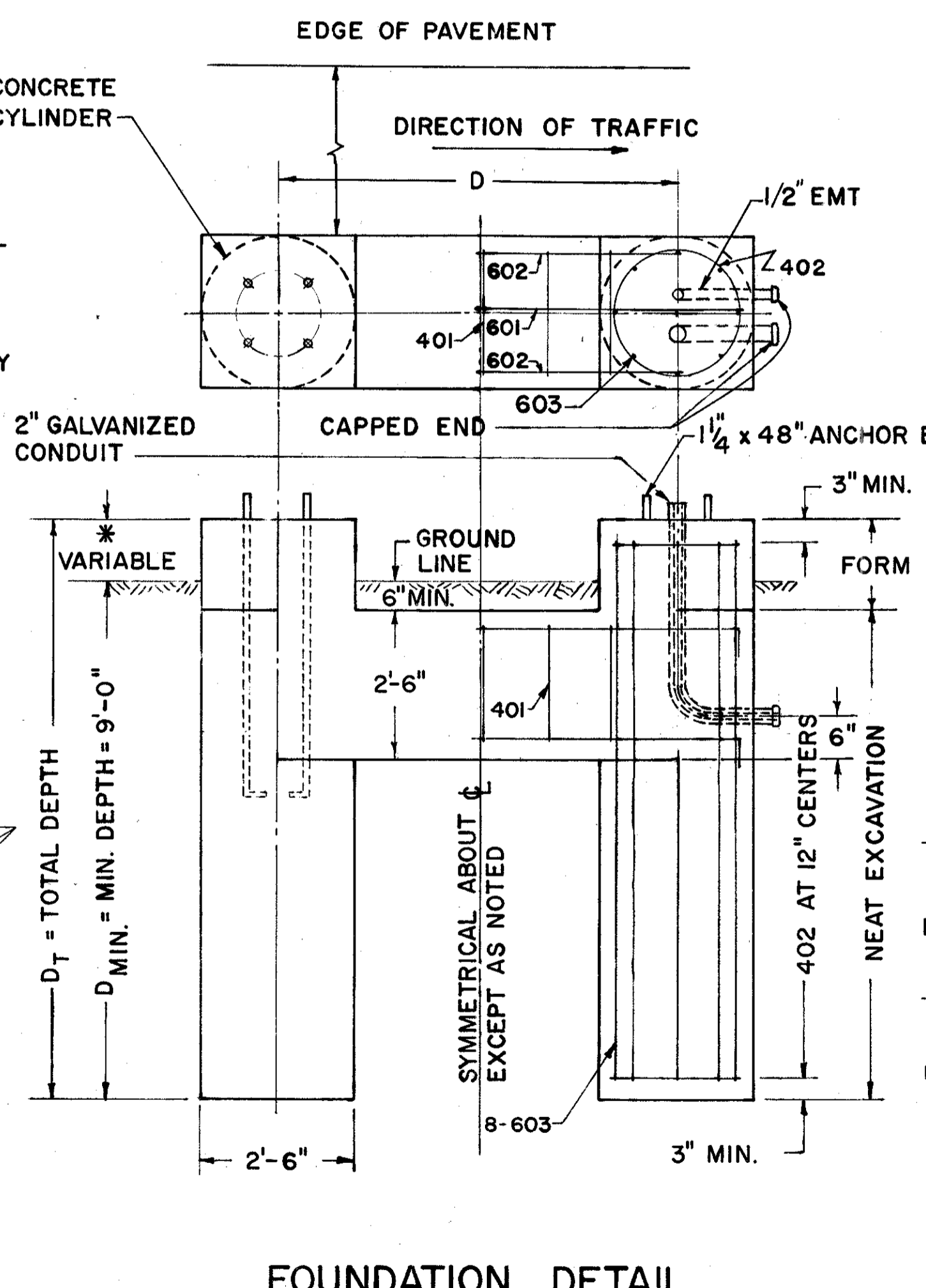
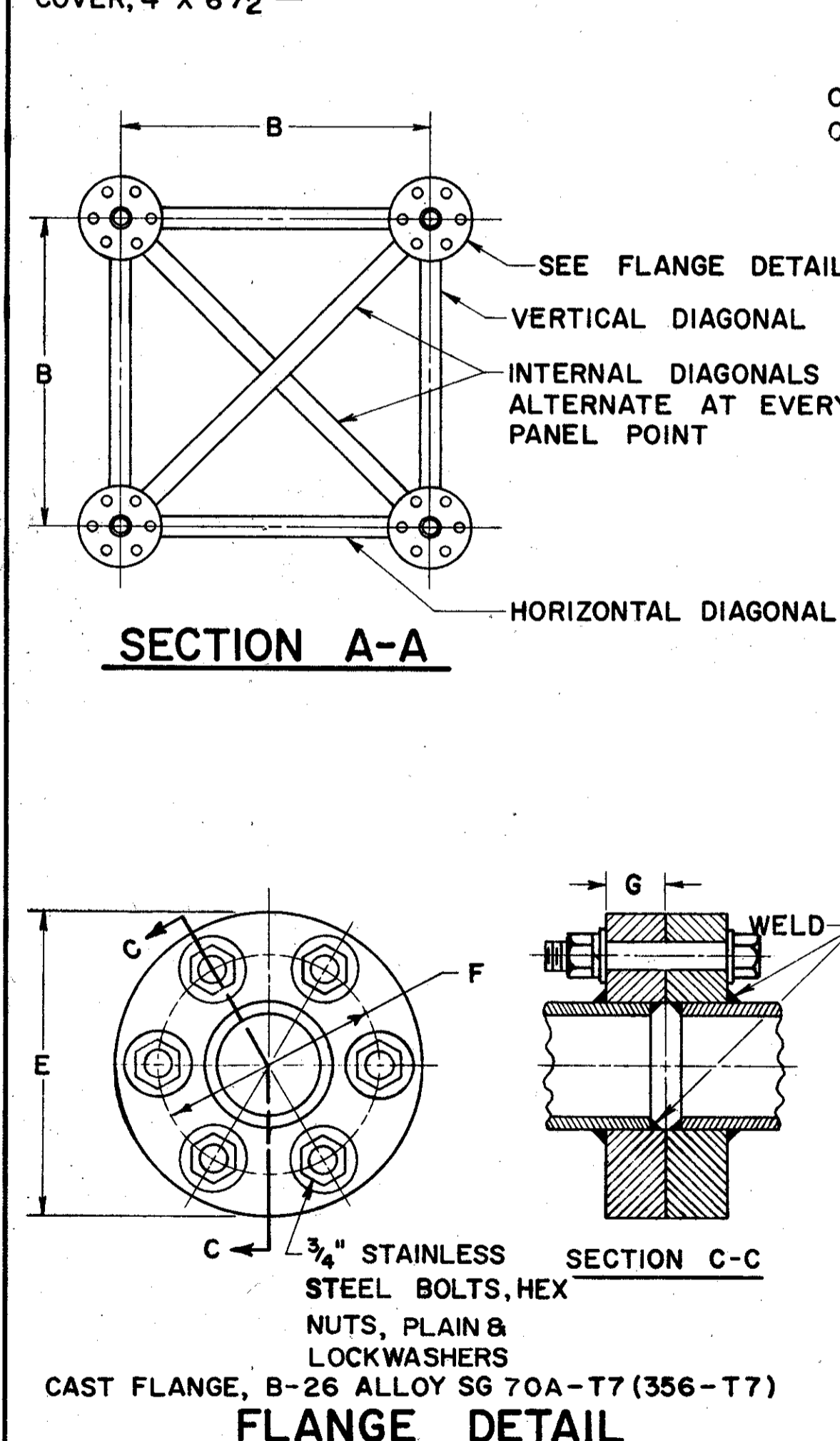
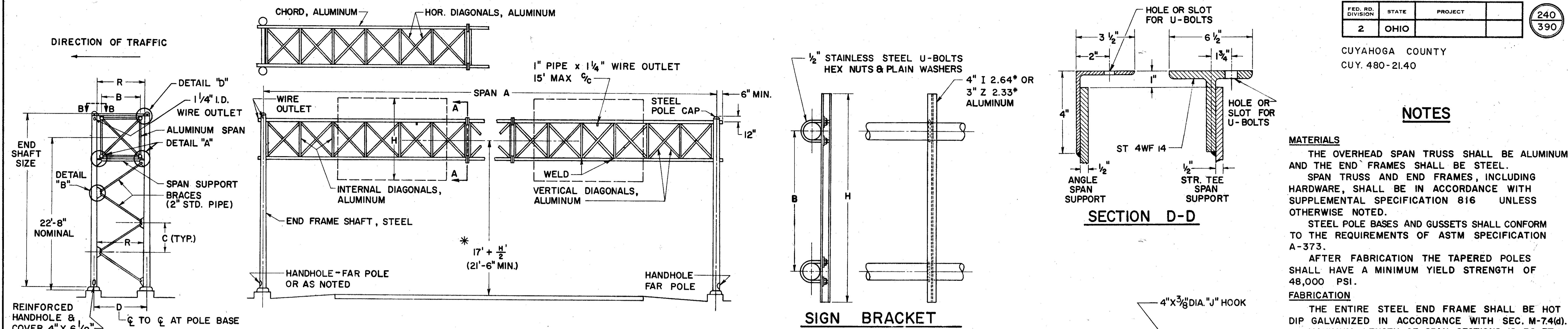
**SOILS**  
THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY, OR STIFF CLAY). FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

**REINFORCING STEEL**  
COST OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 816 CONCRETE FOR SIGN SUPPORT FOUNDATIONS.

BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST DIGIT WHERE THREE DIGITS ARE USED AND THE FIRST TWO DIGITS WHERE FOUR ARE USED, INDICATE THE BAR SIZE NUMBER.

**\*FOUNDATION ELEVATION**  
ELEVATION OF TOPS OF FOUNDATIONS SHALL BE BUILT UP SO THAT 17' CLEARANCE IS MAINTAINED OVER THE ENTIRE WIDTH OF THE PAVEMENT AND SHOULDERS.

**DESIGN**  
THE DESIGN OF OVERHEAD SUPPORTS IS IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 12, 1961.



DESIGN NO.	SPAN A	B	C	D	E	END SHAFT	BRACE LENGTH	F	G	I	K	L	P	Q	R	S	T	U BOLTS	V	BOLT CIRCLE	SPAN SUPPORT SECTION D-D	CHORDS	HORIZONTAL AND INTERNAL DIAGONAL	VERTICAL DIAGONAL	REINFORCEMENT SCHEDULE
1	50' Thru 55'	3'-0"	4'-11 3/4"	4'-5"	7"	8" x 4.5" x 25'-0" 3GA	5'-10 13/16"	5 1/2"	1 1/4"	3 1/2"	4 3/4"	8"	12"	6 5/8"	3'-9"	1 1/2"	10"	5 5/8"	3'-3 5/8"	11"	SPLIT TEE 3'-8"	3 1/2" x .188"	1.660" x .140"	1.660" x .140"	101
2	56' Thru 80'	3'-0"	4'-11 3/4"	4'-5"	9 1/4"	8" x 4.5" x 25'-0" 3GA	5'-10 13/16"	7 7/16"	1 3/8"	3 1/2"	4 3/4"	8"	12"	6 5/8"	3'-9"	1 1/2"	10"	5 5/8"	3'-3 5/8"	11"	SPLIT TEE 3'-8"	4 3/4" x .188"	1.900" x .145"	1.660" x .140"	102
3	81' Thru 90'	4'-0"	4'-10 1/4"	5'-7"	9 1/4"	8" x 6.22" x 25'-6" 3GA	6'-7 1/8"	7 7/16"	1 3/8"	5 5/8"	4 3/8"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5 5/8"	4'-5 5/8"	11"	SPLIT TEE 4'-10"	4 3/4" x .188"	1.900" x .145"	1.900" x .145"	103
4	91' Thru 105'	4'-0"	4'-10 1/4"	5'-7"	9 1/4"	8" x 6.22" x 25'-6" 3GA	6'-7 1/8"	7 7/16"	1 3/8"	5 5/8"	4 3/8"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5 5/8"	4'-5 5/8"	11"	SPLIT TEE 4'-10"	4 3/4" x .188"	2" x .188"	1.900" x .145"	103

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

**OVERHEAD SIGN SUPPORTS No. 7.3**

DATE 7-25-62  
5-5-64

APPROVED *Robert E. Lower*  
ENGINEER OF TRAFFIC

CUYAHOGA COUNTY  
CUY. 480-2140

**NOTES**

**MATERIALS**  
THE OVERHEAD SPAN TRUSS SHALL BE ALUMINUM AND THE END FRAMES SHALL BE STEEL.  
SPAN TRUSS AND END FRAMES, INCLUDING HARDWARE, SHALL BE IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 816 UNLESS OTHERWISE NOTED.  
STEEL POLE BASES AND GUSSETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A-373.  
AFTER FABRICATION THE TAPERED POLES SHALL HAVE A MINIMUM YIELD STRENGTH OF 48,000 PSI.

**FABRICATION**  
THE ENTIRE STEEL END FRAME SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SEC. 711.02. MAXIMUM LENGTH OF SPAN SECTIONS IS 30 FT.

**ERECTION**  
USE A MINIMUM OF 1" CAMBER IN SPAN TRUSS MEMBER FOR A 50' SPAN; ADD 1/4" OF CAMBER FOR EACH 5' OF INCREASE IN SPAN OVER 50'.

**PAYMENT**  
PAYMENT FOR THE GALVANIZED CONDUIT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS.

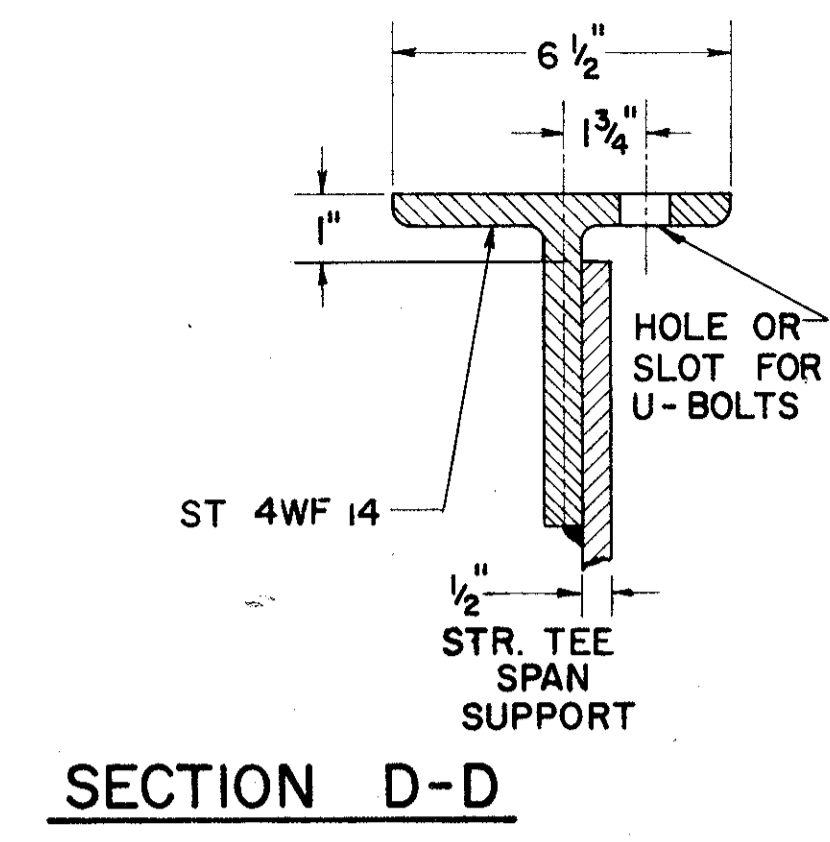
**SOILS**  
THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY, OR STIFF CLAY). FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

**REINFORCING STEEL**  
COST OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 816 CONCRETE FOR SIGN SUPPORT FOUNDATIONS.

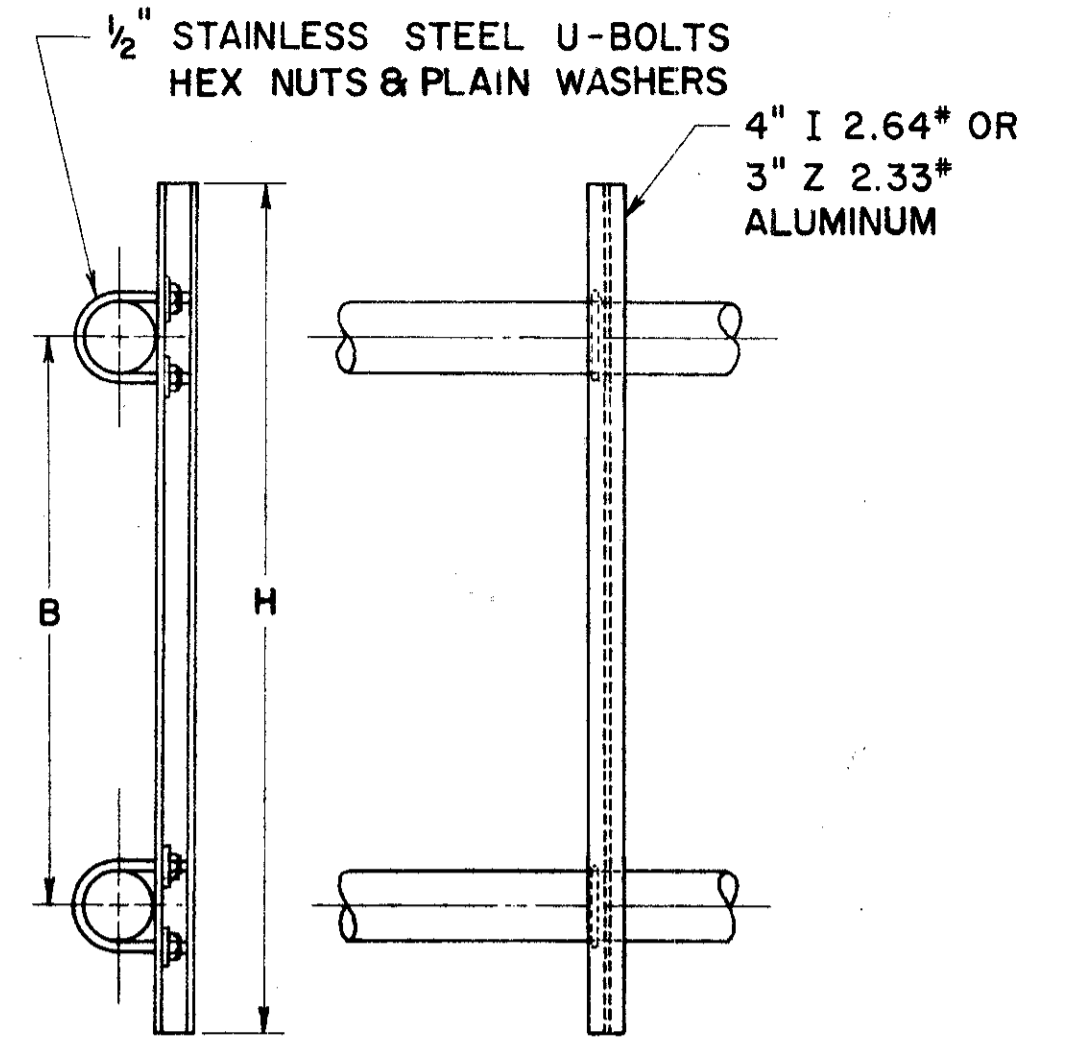
BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST DIGIT WHERE THREE DIGITS ARE USED AND THE FIRST TWO DIGITS WHERE FOUR DIGITS ARE USED, INDICATE THE BAR SIZE NUMBER.

**\*FOUNDATION ELEVATION**  
ELEVATION OF TOPS OF FOUNDATIONS SHALL BE BUILT UP SO THAT 17' CLEARANCE IS MAINTAINED OVER THE ENTIRE WIDTH OF THE PAVEMENT AND SHOULDERS.

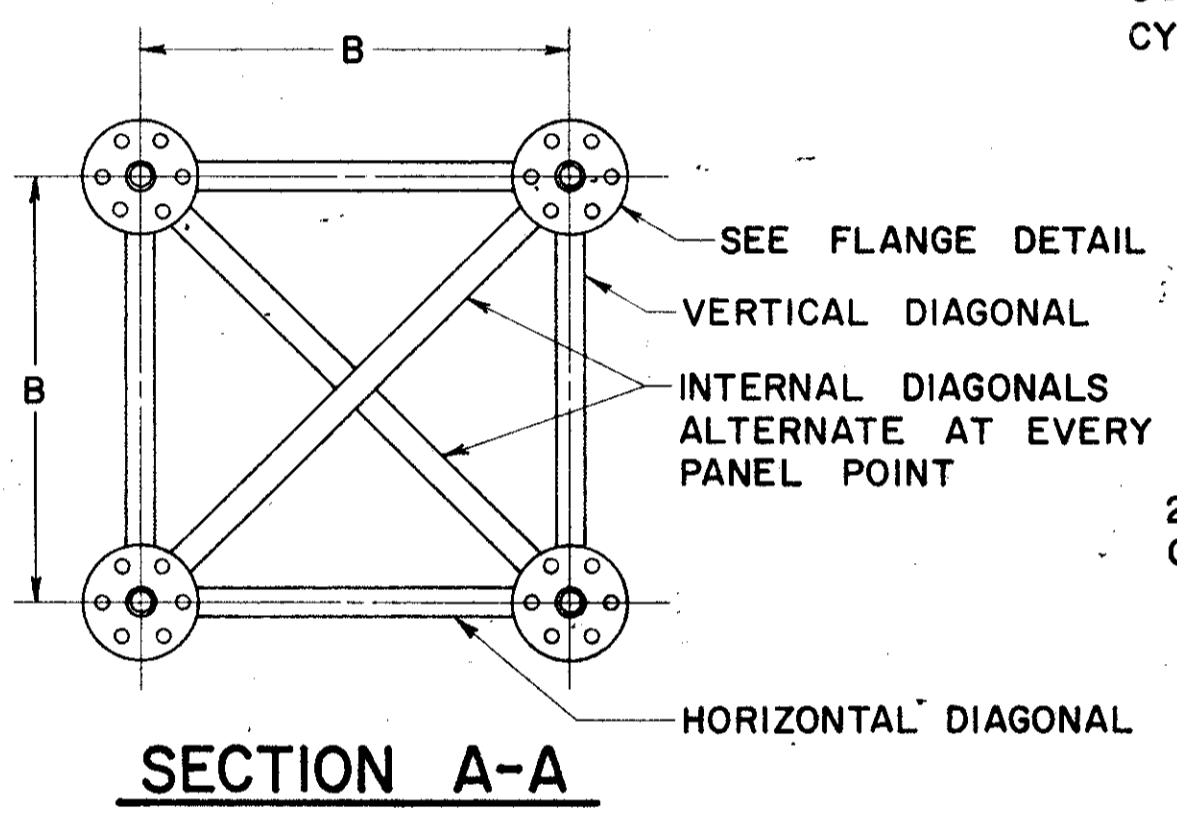
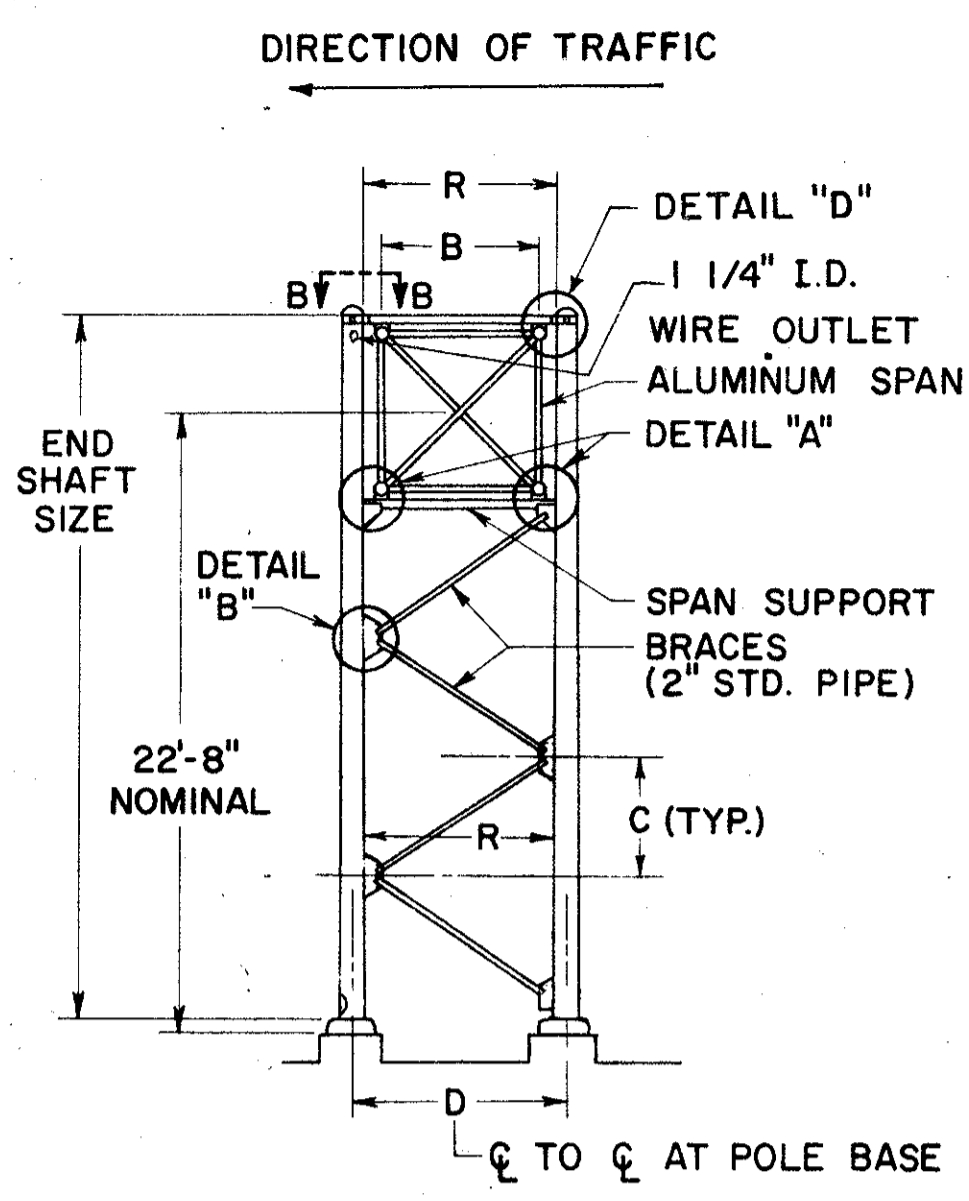
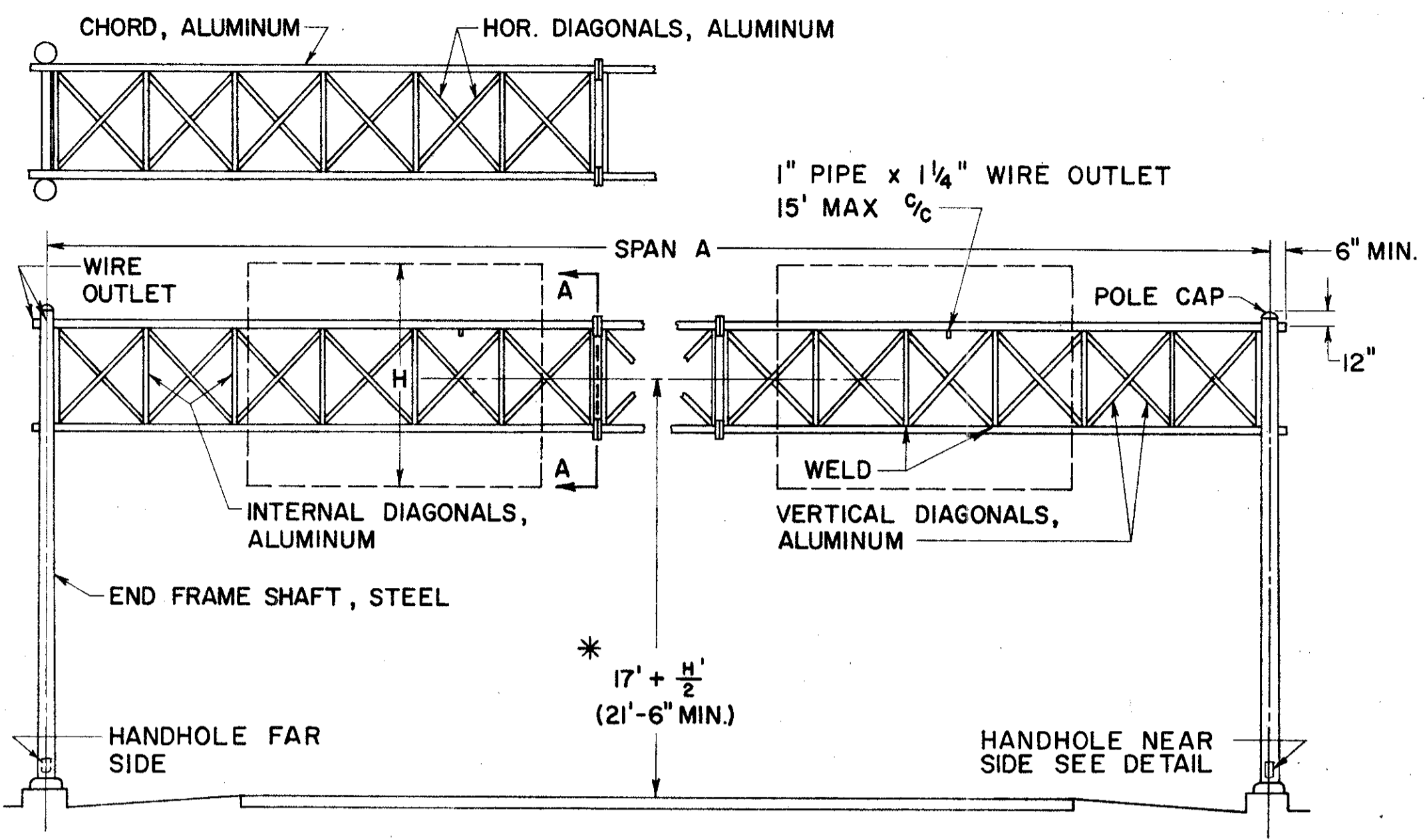
**DESIGN**  
THE DESIGN OF OVERHEAD SUPPORTS IS IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 12, 1961.



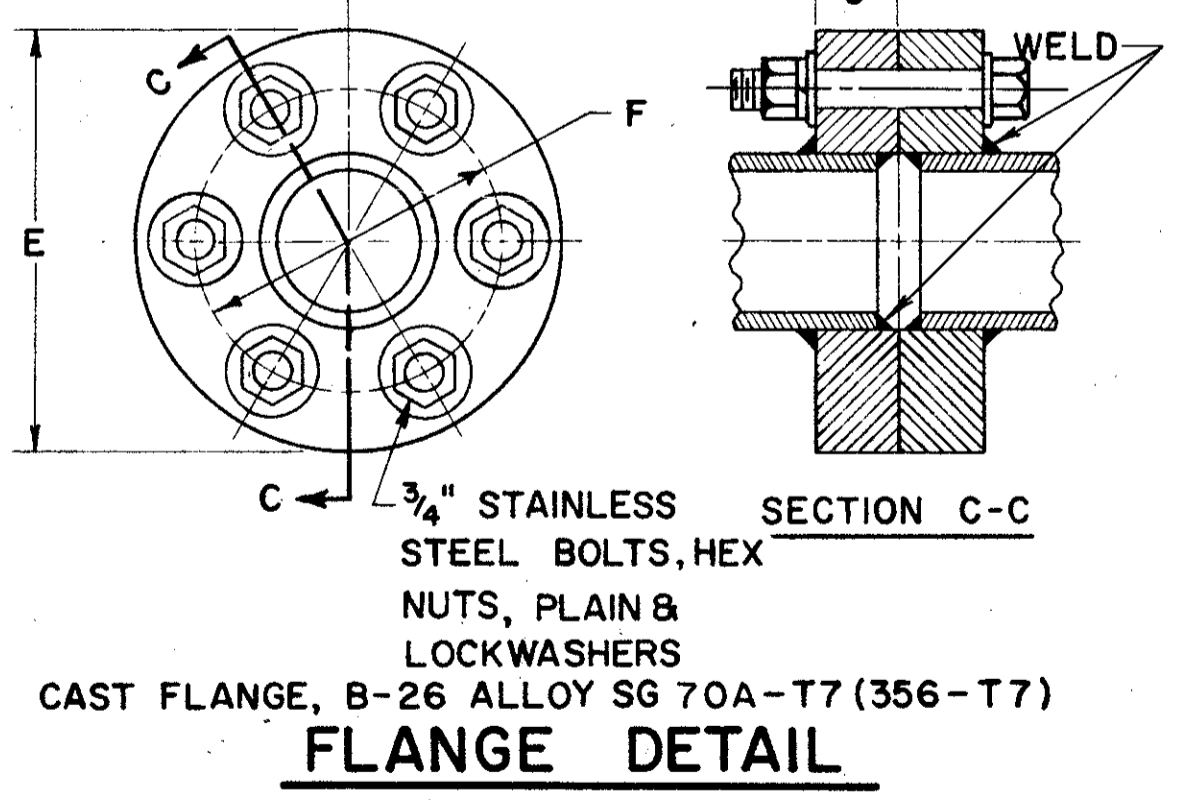
**SECTION D-D**



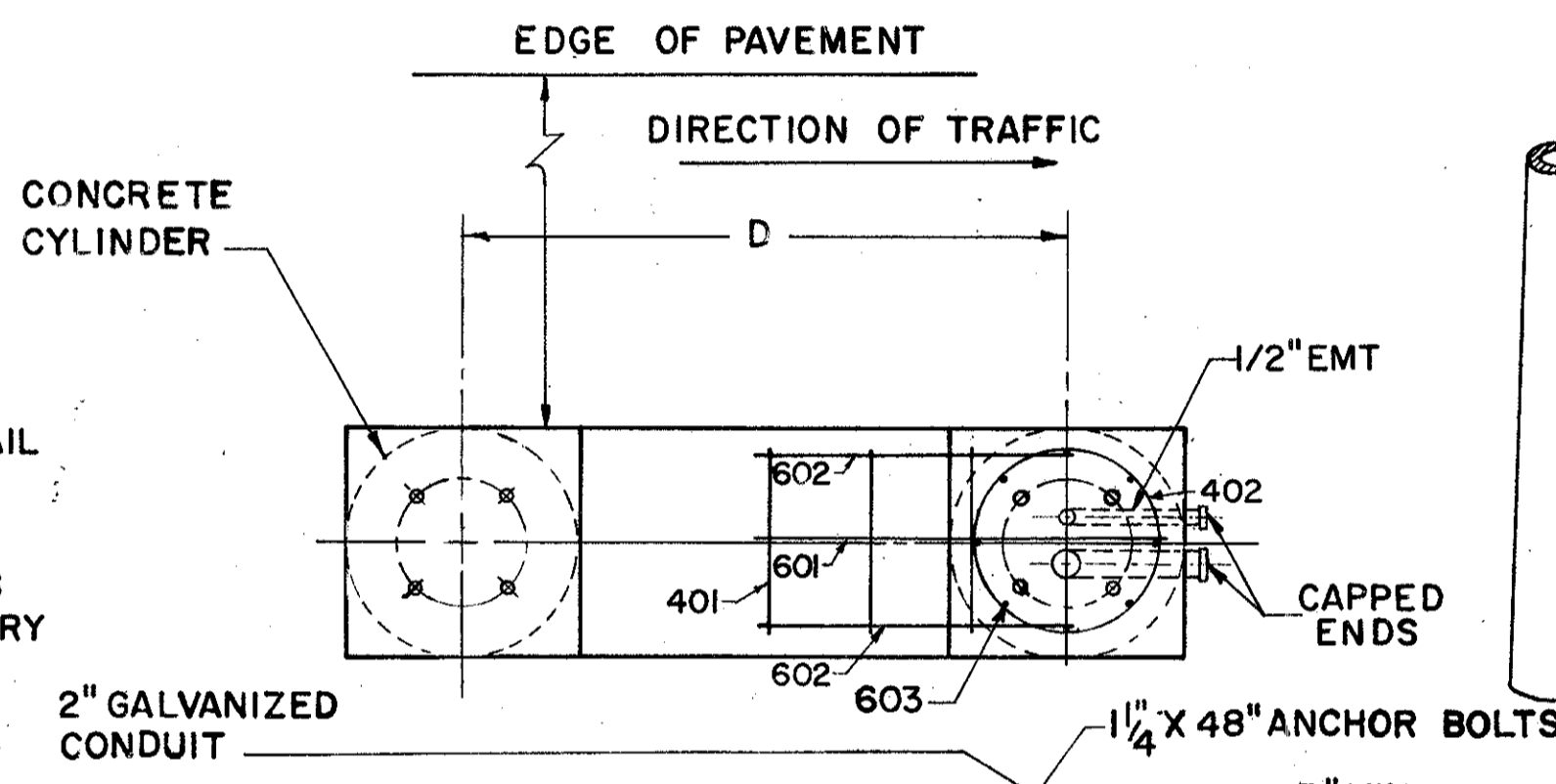
**SIGN BRACKET**



**SECTION A-A**

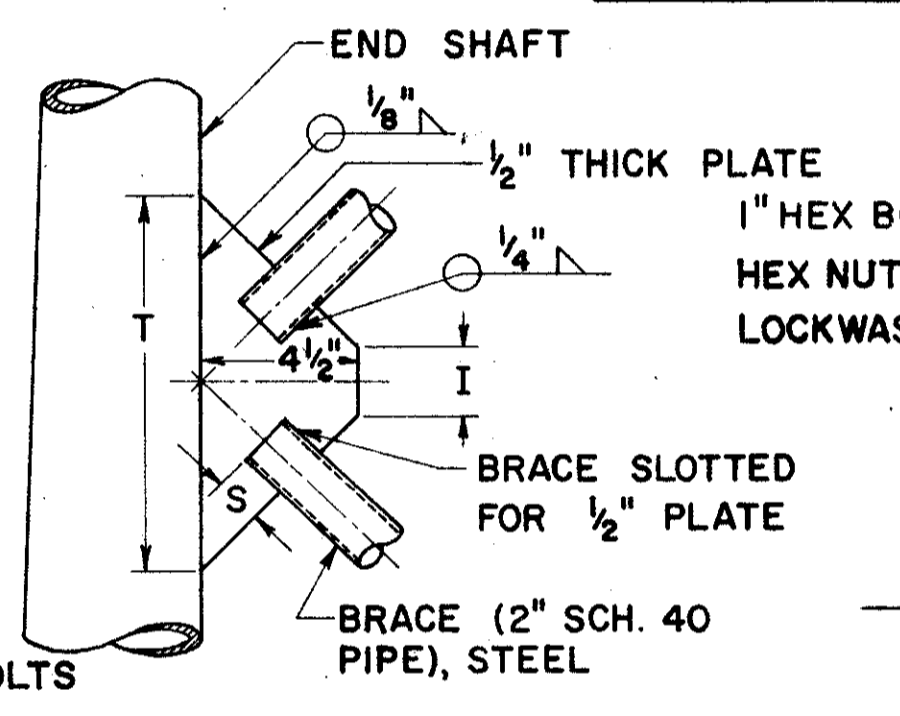


**FLANGE DETAIL**

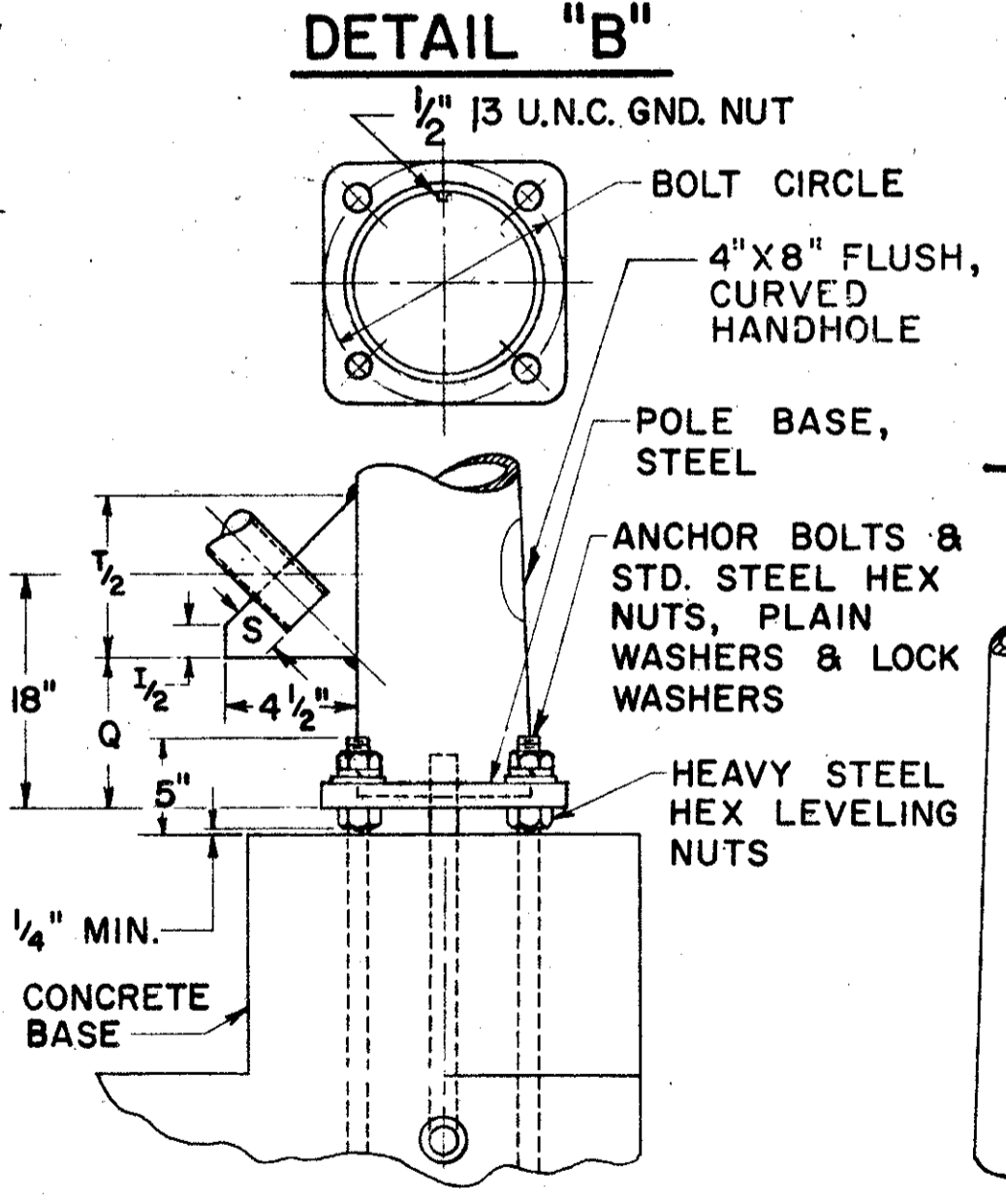


**FOUNDATION DETAIL**

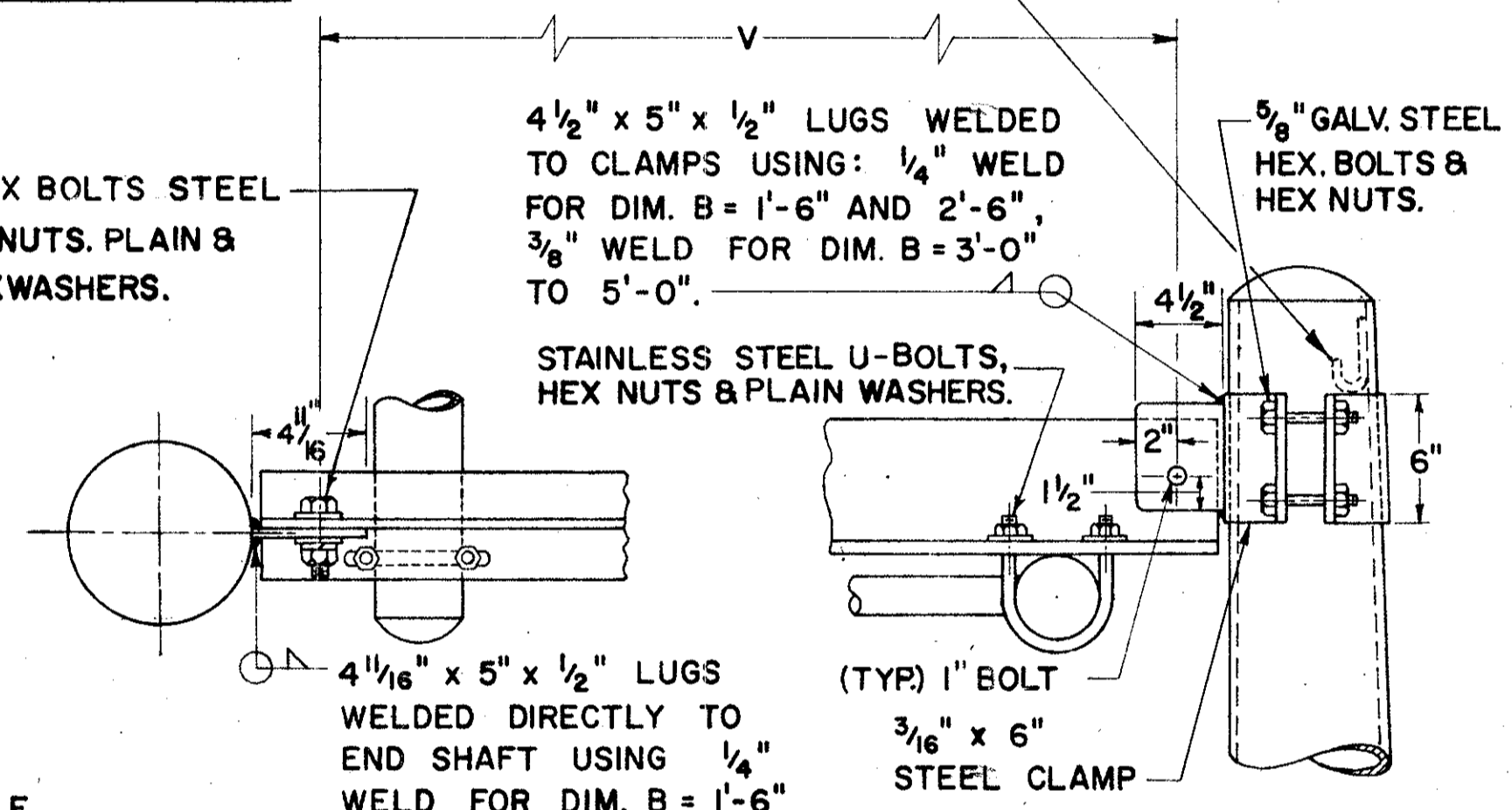
(RIGHT HAND SHOWN—LEFT HAND OPPOSITE)



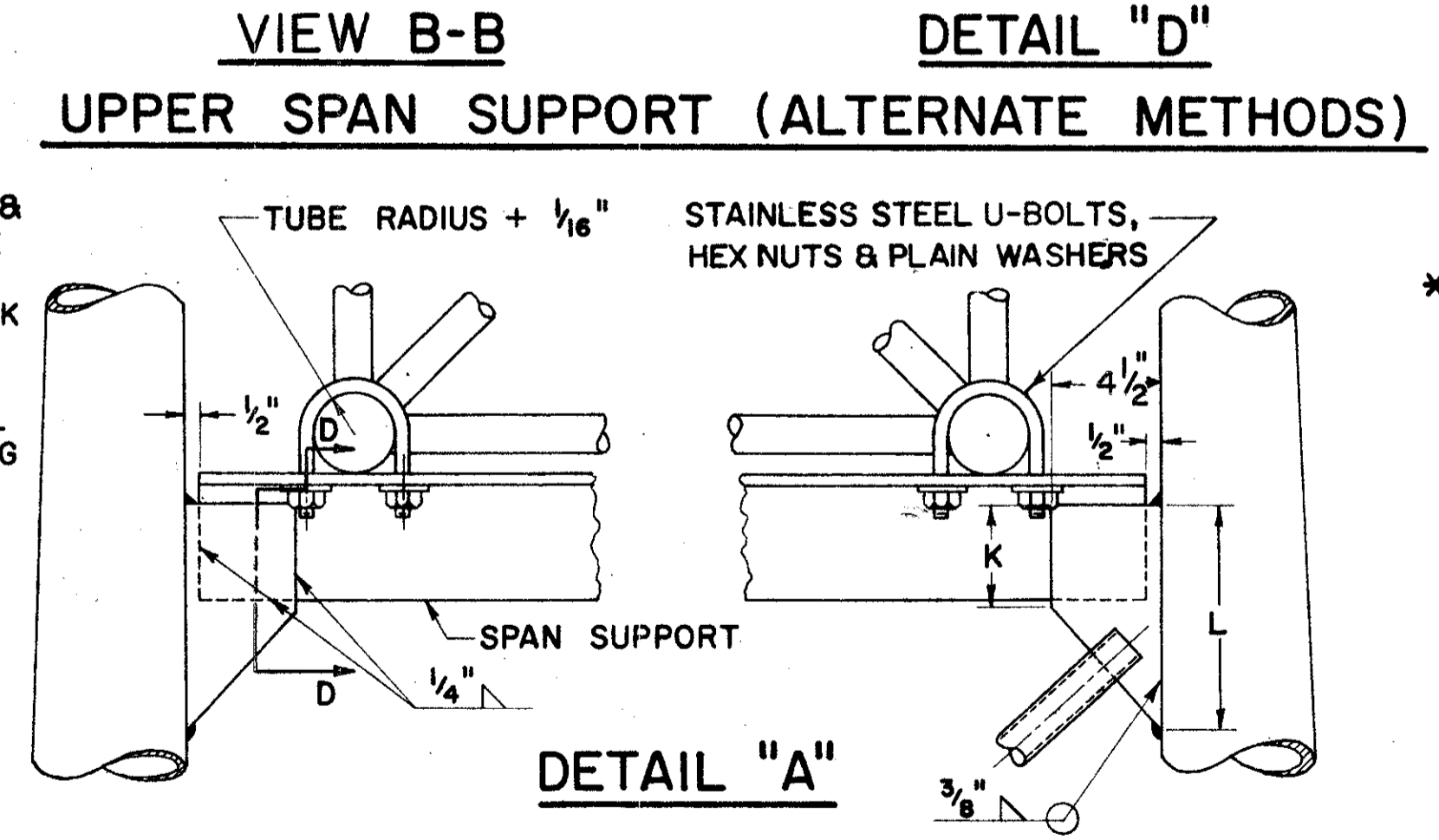
**DETAIL 'B'**



**POLE BASE DETAIL**



**VIEW B-B UPPER SPAN SUPPORT (ALTERNATE METHODS)**



**LOWER SPAN SUPPORT**

DESIGN NO.	SPAN A	B	C	D	E	END SHAFT	BRACE LENGTH	F	G	I	K	L	P	Q	R	S	T	U / BOLTS	V	BOLT CIRCLE	SPAN SUPPORT SECTION D-D	CHORDS	HORIZONTAL AND INTERNAL DIAGONAL	VERTICAL DIAGONAL	REINFORCEMENT SCHEDULE				
																										MARK	NO.	LENGTH	TYPE
1.	50' thru 65'	3'-0"	4'-11 3/4"	4'-5"	9 1/4"	8" X 4.5 X 25'-0", 3GA	5'-10 3/16"	7 1/16"	1 3/8"	3 1/2"	4 3/4"	8"	12"	6 5/8"	3'-9"	1 1/2"	10"	5 5/8"	3'-3 5/8"	11"	Split Tee 3'-8"	4 3/4" X .188"	2" X .188"	1.660" X .140"	401	12" C/C	8'-6"	102	
2.	70' thru 75'	4'-0"	4'-10 1/4"	5'-7"	9 1/4"	8" X 6.22 X 25'-6", 3GA	6'-7 1/8"	7 1/16"	1 3/8"	5 5/8"	4 3/4"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5 5/8"	4'-5 5/8"	11"	Split Tee 4'-10"	4 3/4" X .188"	2" X .188"	1.900" X .145"	402	12" C/C	7'-6"	103	
3.	76' thru 80'	4'-0"	4'-10 1/4"	5'-7"	11"	8" X 6.22 X 25'-6", 3GA	6'-7 1/8"	8 1/2"	1 1/2"	5 5/8"	4 3/8"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5 5/8"	4'-5 5/8"	11"	Split Tee 4'-10"	5 1/2" X .250	2 1/2" X .188"	1.900" X .145"	601	4	D+4'-0"	101	
4.	81' thru 110'	5'-0"	4'-8 1/2"	6'-7"	11"	8" X 6.18 X 26'-0", 3GA	7'-3 1/4"	8 1/2"	1 1/2"	—	3 1/2"	7 3/4"	12"	7 1/4"	5'-11"	1 3/4"	11 1/4"	3 3/4"	5'-5 5/8"	11"	Split Tee 5'-10"	5 1/2" X .250	2 1/2" X .188	2 1/2" X .188	602	8	D+2'-0"	101	
																									603	32	D+2'-6"	STR.	

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

**OVERHEAD SIGN SUPPORTS 816 No.7.6**

DATE  
5-6 64  
5-5 64  
6-20-60

APPROVED \_\_\_\_\_ ENGINEER OF TRAFFIC



**NOTES**

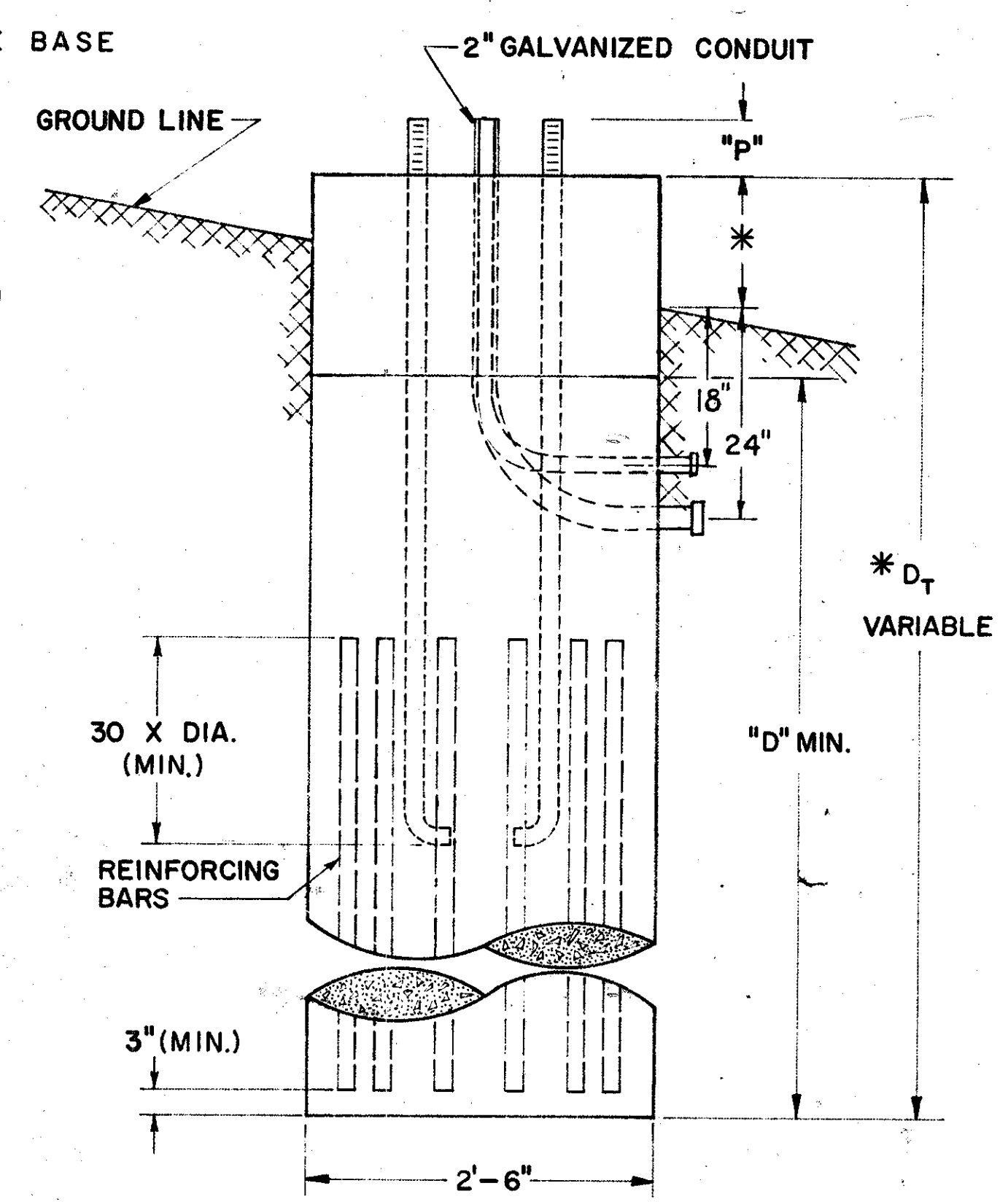
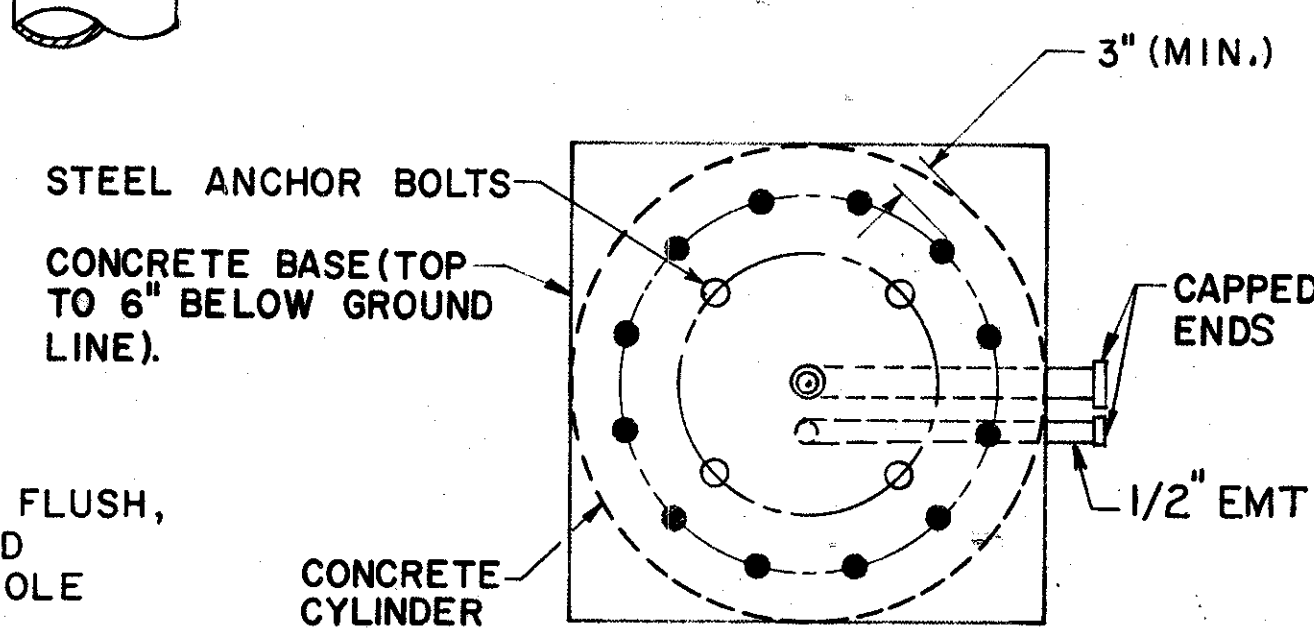
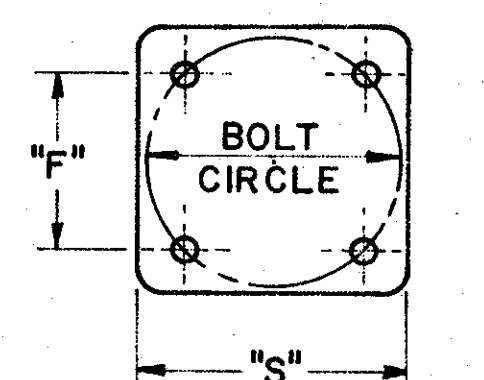
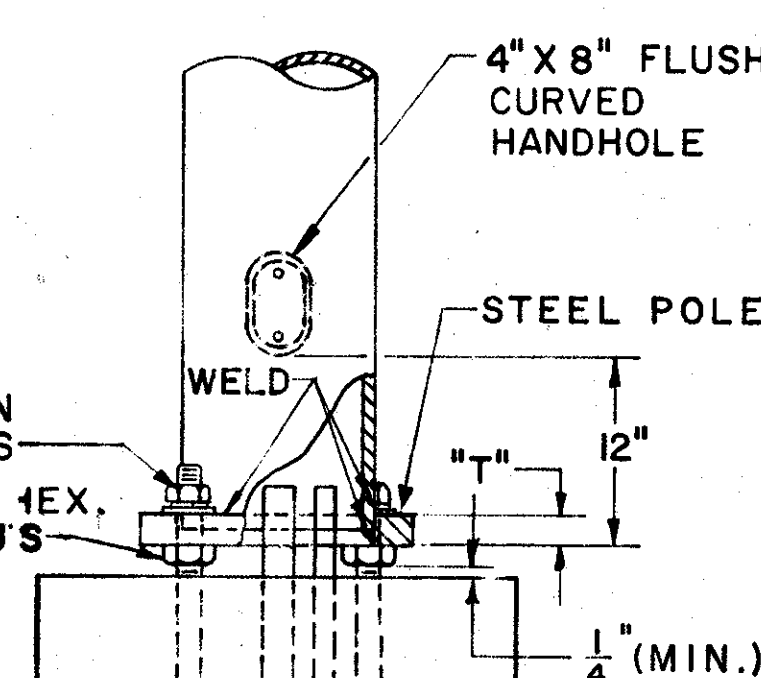
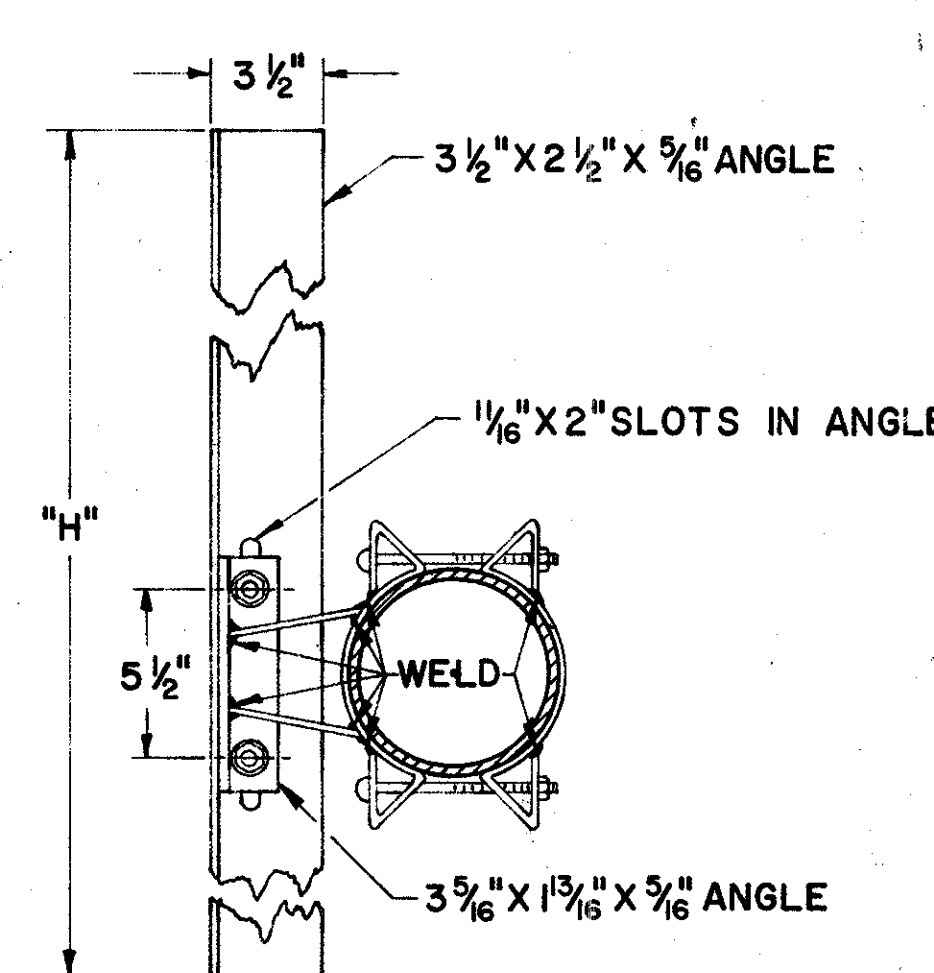
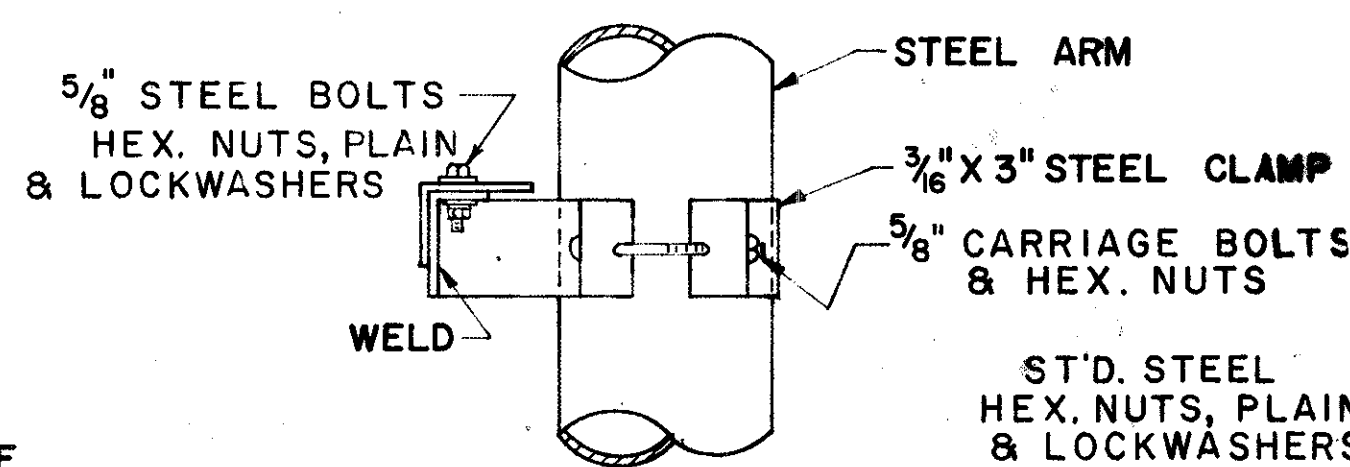
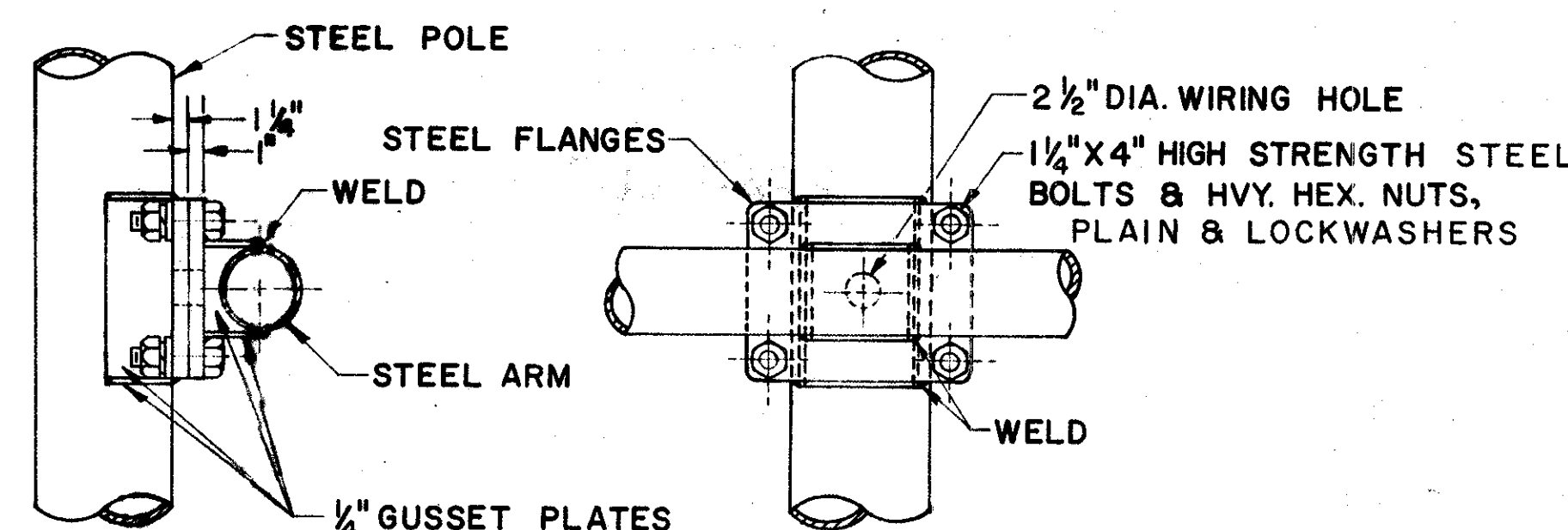
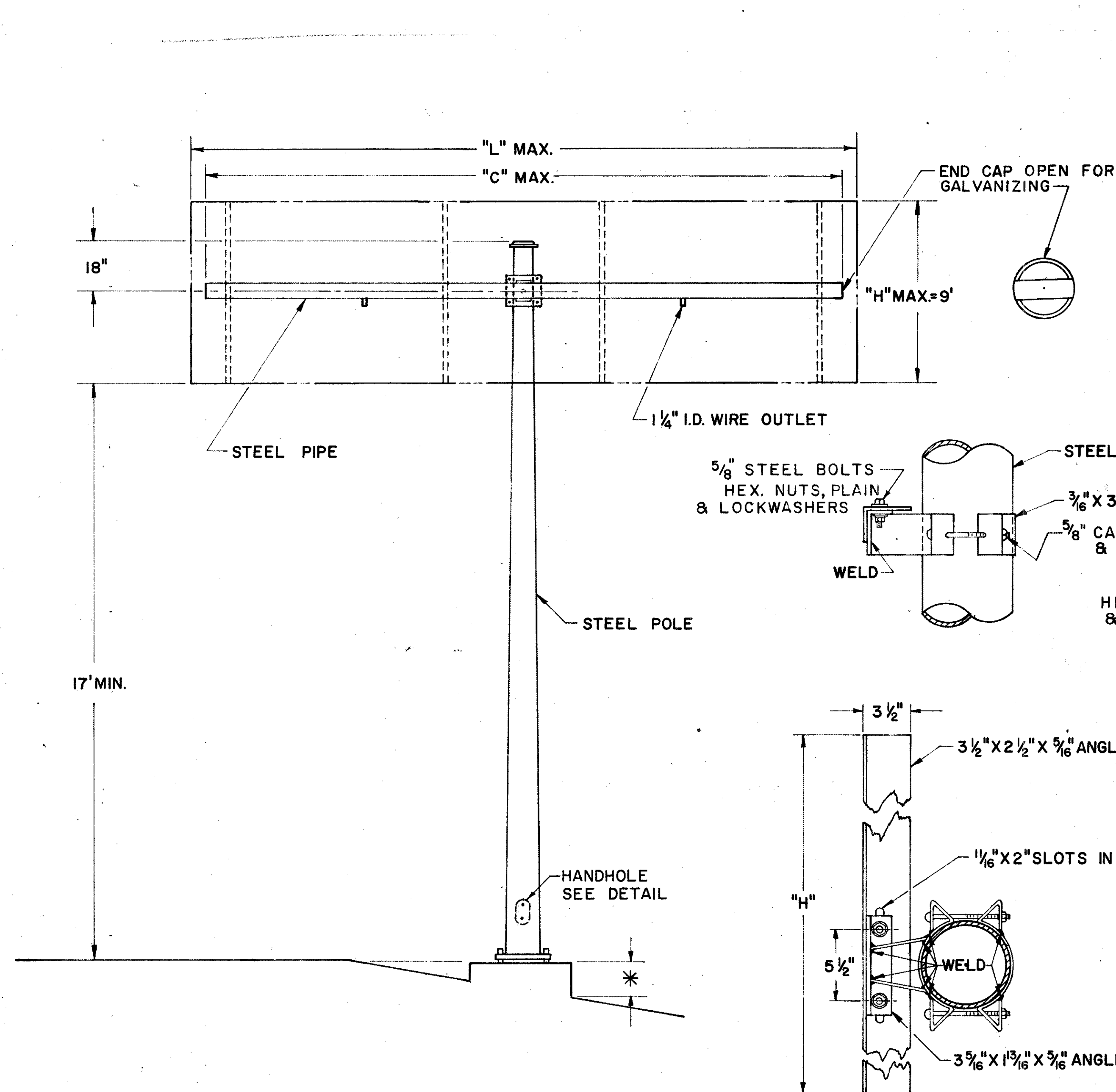
**FABRICATION**—ALL PORTIONS OF THE SIGN SUPPORT, INCLUDING SIGN ATTACHMENTS, SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF A.S.T.M. DESIGNATIONS A-123 AND A-153. THE CONDUIT SHALL BE GALVANIZED IN ACCORDANCE WITH SEC. 625.13 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS FOR PAYMENT.

\* **FOUNDATION**—THE TOP ELEVATION OF FOUNDATIONS SHALL BE VARIED SO AS TO MAINTAIN A MINIMUM CLEARANCE OF 17' BETWEEN THE BOTTOM OF THE SIGN AND THE HIGHWAY CROWN.

**MATERIAL**—STEEL POLE BASES, FLANGES, AND END CAPS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 30 GRADE B. HIGH STRENGTH STEEL BOLTS SHALL CONFORM TO ASTM SPECIFICATION A 193 GRADE B7. AFTER FABRICATION TAPERED POLES SHALL HAVE A MINIMUM YIELD STRENGTH OF 48,000 PSI.

**SOILS**—THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY, OR STIFF CLAY). FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

**REINFORCING STEEL**—REINFORCING STEEL AS SHOWN IN TABLE SHALL BE INSTALLED WHEN "D<sub>T</sub>" EXCEEDS THE ANCHOR BOLT LENGTH BY MORE THAN 3 FT. THE COST AND PLACEMENT OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR 816 CONCRETE FOR SIGN SUPPORT FOUNDATION.



**SIGN ATTACHMENT DETAIL**

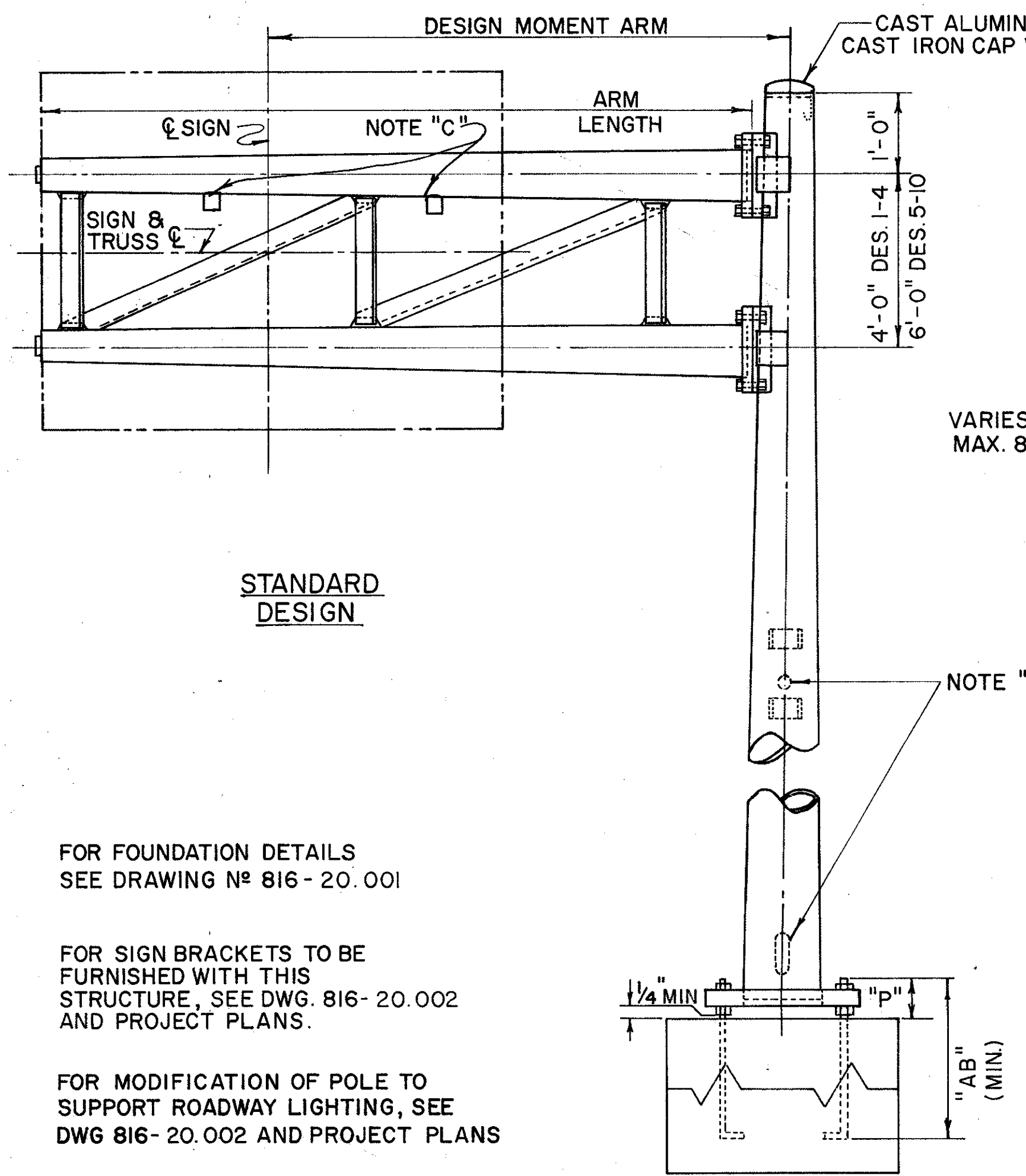
**POLE DETAIL**

**FOUNDATION DETAIL**

DESIGN NO.	POLE SIZE	PIPE SIZE	DIM C	DIM F	DIM P	DIM S	DIM T	BOLT CIRCLE	ANCHOR BOLT SIZE	MAX SIGN AREA	MAX. "L" WITH MAX. SIGN AREA	"D" MIN	REINF. BARS	
													TYPE	NO.
1	7ga, 11" X 7.99 X 21'-6"	4" SCH. 40 GRADE A	18'	10 5/8"	6 1/2"	15 5/8"	1 1/2"	15"	1 1/2" X 60"	60	24'-9"	7'-0"	#6	8
2	3ga, 13" X 9.99 X 21'-6"	4" SCH. 80 GRADE A	14'	12 3/4"	7 3/4"	18 1/2"	2"	18"	3/4" X 90"	120	16'-9"	8'-6"	#7	12
3	3ga, 13" X 9.99 X 21'-6"	6" SCH. 40 GRADE A	20'	12 3/4"	7 3/4"	18 1/2"	2"	18"	3/4" X 90"	120	24'-0"	9'-0"	#7	12
1 MOD.	3ga, 8" X 5.9 X 15'-0"	4" SCH. 40 GRADE A	18'	7 3/4"	5 1/4"	11 1/2"	1 1/2"	11"	1/4" X 48"	60	20'-0"	8'-0"	#4	8

**DESIGN**  
THE DESIGN OF OVERHEAD SUPPORTS IS IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 12, 1961.

BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		DATE 1-19-62 3-30-62
OVERHEAD SIGN SUPPORT	816 No.912	
APPROVED <i>Robert E. Linn</i> ENGINEER OF TRAFFIC		

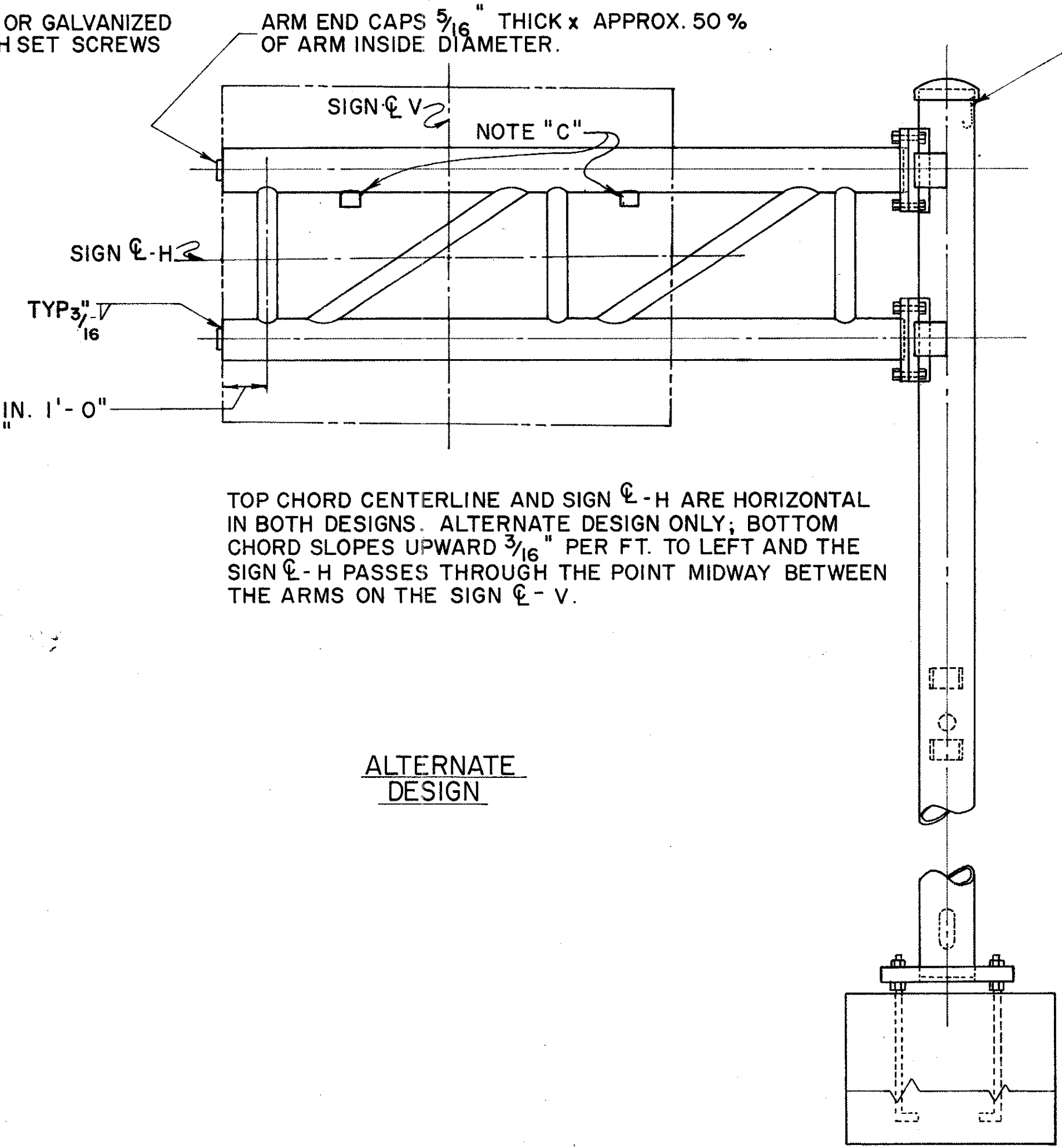


**STANDARD DESIGN**

FOR FOUNDATION DETAILS  
SEE DRAWING NO 816-20.001

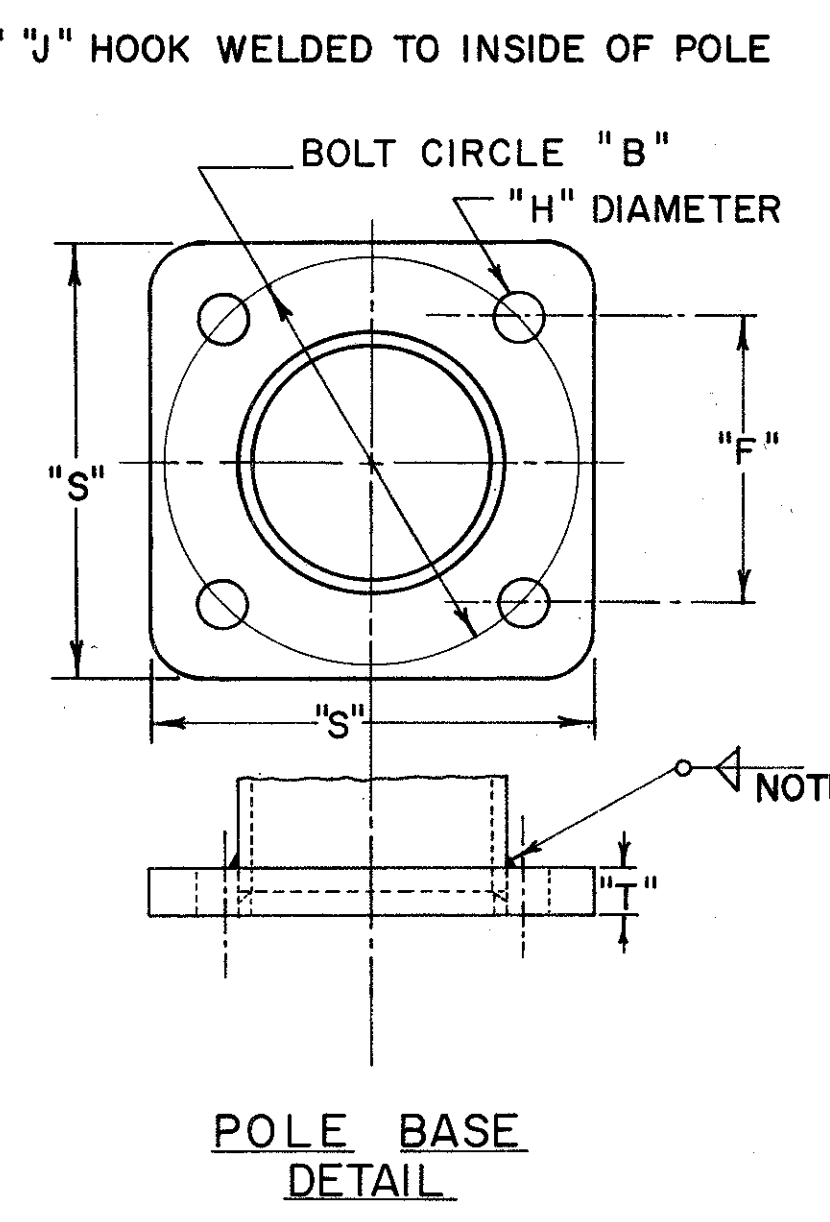
FOR SIGN BRACKETS TO BE  
FURNISHED WITH THIS  
STRUCTURE, SEE DWG. 816-20.002  
AND PROJECT PLANS.

FOR MODIFICATION OF POLE TO  
SUPPORT ROADWAY LIGHTING, SEE  
DWG 816-20.002 AND PROJECT PLANS

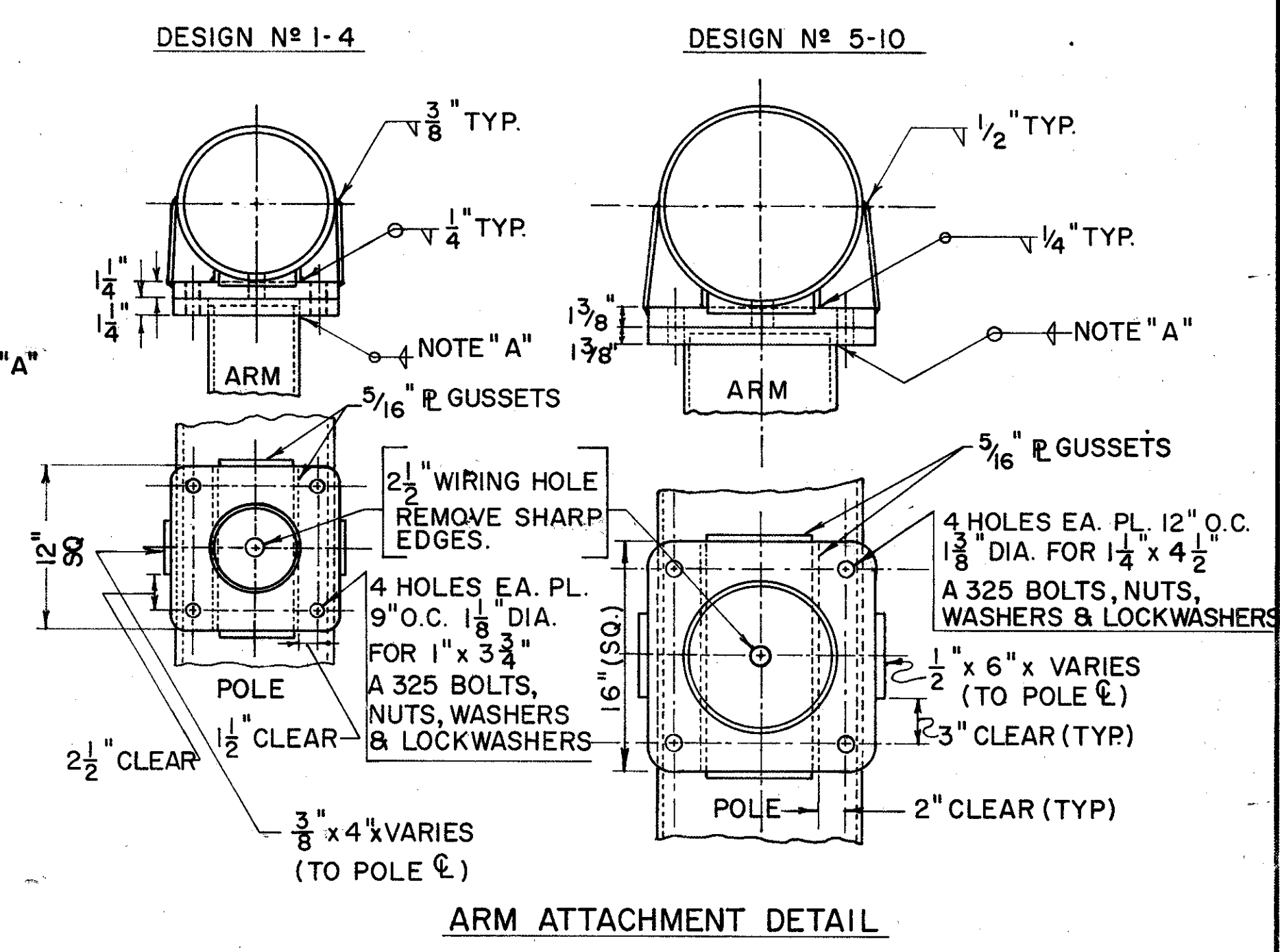


**ALTERNATE DESIGN**

TOP CHORD CENTERLINE AND SIGN & H ARE HORIZONTAL IN BOTH DESIGNS. ALTERNATE DESIGN ONLY; BOTTOM CHORD SLOPES UPWARD 3/16" PER FT. TO LEFT AND THE SIGN & H PASSES THROUGH THE POINT MIDWAY BETWEEN THE ARMS ON THE SIGN & V.



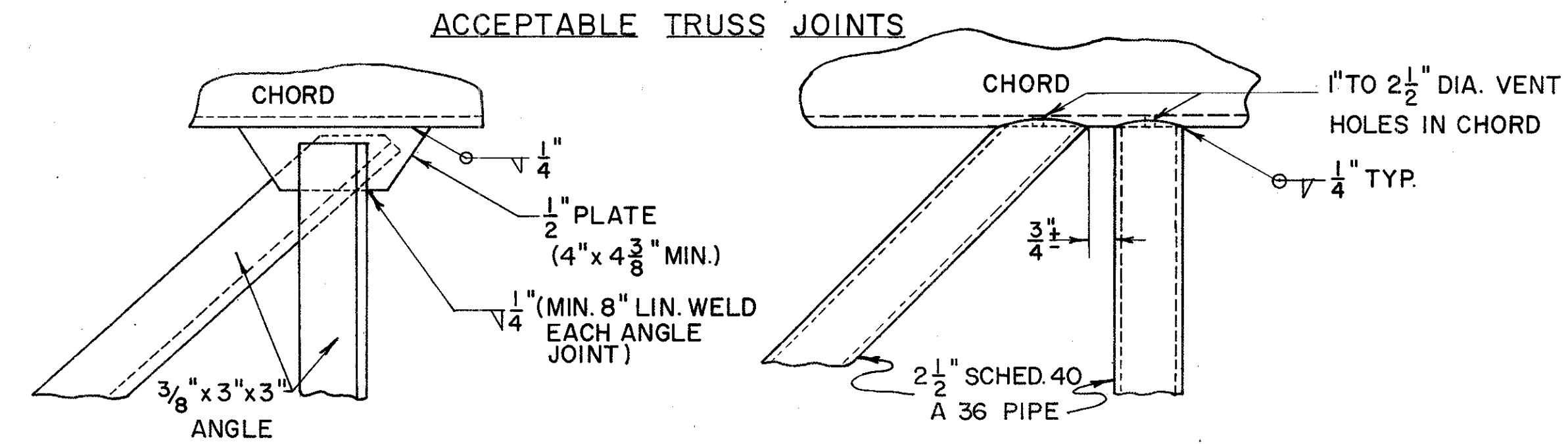
**POLE BASE DETAIL**



**ARM ATTACHMENT DETAIL**

- NOTE "A"**  
POLE BASE AND ARM ATTACHMENT PLATE TO BE WELDED INSIDE AND OUTSIDE WITH FILLET WELDS. EACH FILLET WELD SHALL BE EQUAL TO THE WALL THICKNESS OF THE RESPECTIVE TUBING.
- NOTE "B"**  
CONSTRUCTION DETAILS AND LOCATION OF HANDHOLE AND SWITCH GEAR MOUNTING BRACKETS ARE SHOWN ON DRAWING 816-20.002
- NOTE "C"**  
SIGNS UNDER 20'-0" LONG, ONE 1 1/2" PIPE COUPLING WELDED TO THE TOP CHORD APPROXIMATELY 12" OUTBOARD OF FIRST SIGN BRACKET. FOR SIGNS 20'-0" OR OVER, A SECOND 1 1/2" PIPE COUPLING IS REQUIRED APPROXIMATELY 12" OUTBOARD OF THE SECOND SIGN BRACKET. ALL SHARP EDGES INSIDE THE CHORD AND PIPE COUPLING MUST BE REMOVED.

- UNLESS OTHERWISE NOTED, DIMENSIONS AND INSTRUCTIONS APPLY TO BOTH THE STANDARD DESIGN AND ALTERNATE DESIGN.
- SIGN SUPPORT ARMS UNDER 18'-0" LONG DO NOT REQUIRE TRUSSING.
- THE DESIGN OF THESE OVERHEAD SIGN SUPPORTS IS IN ACCORDANCE WITH THE AASHO SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS AS REVISED IN 1968.



**ACCEPTABLE TRUSS JOINTS**

DESIGN NUMBER	POLE SIZE	ARM SIZE
	OUTSIDE DIAMETERS	OUTSIDE DIAMETERS
1	2 PLY. 7 GA. 10" x 6.50" x 25'-0"	7 GA. 6" x 3.76" x 16'-0"
1ALT	8 5/8" x .500" WALL x 25'-0"	5 9/16" x .258" WALL x 16'-0"
2	2 PLY. 7 GA. 10" x 6.50" x 25'-0"	3 GA. 6" x 4.60" x 20'-0"
2ALT	8 5/8" x .562" WALL x 25'-0"	5 9/16" x .344" WALL x 20'-0"
3	0 GA. 13" x 9.22" x 27'-0"	7 GA. 8" x 5.76" x 16'-0"
3ALT	10 3/4" x .438 WALL x 27'-0"	6 5/8" x .250" WALL x 16'-0"
4	0 GA. 13" x 9.22" x 27'-0"	7 GA. 9" x 6.20" x 20'-0"
4ALT	10 3/4" x .500" WALL x 27'-0"	6 5/8" x .344" WALL x 20'-0"
5	0 GA. 15" x 11.08" x 28'-0"	7 GA. 9.5" x 6.42" x 22'-0"
5ALT	12 3/4" x .500" WALL x 28'-0"	8 5/8" x .250" WALL x 22'-0"
6	2 PLY. 7 GA. 15" x 11.08" x 28'-0"	3 GA. 10" x 6.36" x 26'-0"
6ALT	12 3/4" x .562" WALL x 28'-0"	8 5/8" x .322" WALL x 26'-0"
7	2 PLY. 7 GA. 16.5" x 12.58" x 28'-0"	3 GA. 10" x 6.64" x 24'-0"
7ALT	14" x .562" WALL x 28'-0"	8 5/8" x .322" WALL x 24'-0"
8	2 PLY. 3 GA. 16.5" x 12.58" x 28'-0"	3 GA. 11" x 7.08" x 28'-0"
8ALT	14" x .594" WALL x 28'-0"	10 3/4" x .279" WALL x 28'-0"
9	2 PLY. 3 GA. 16.5" x 12.30" x 30'-0"	3 GA. 11" x 7.36" x 26'-0"
9ALT	14" x .688" WALL x 30'-0"	10 3/4" x .279" WALL 26'-0"
10	2 PLY. 3 GA. 18" x 13.80" x 30'-0"	3 GA. 13" x 8.80" x 30'-0"
10ALT	16" x .656" WALL x 30'-0"	10 3/4" x .438" WALL x 30'-0"

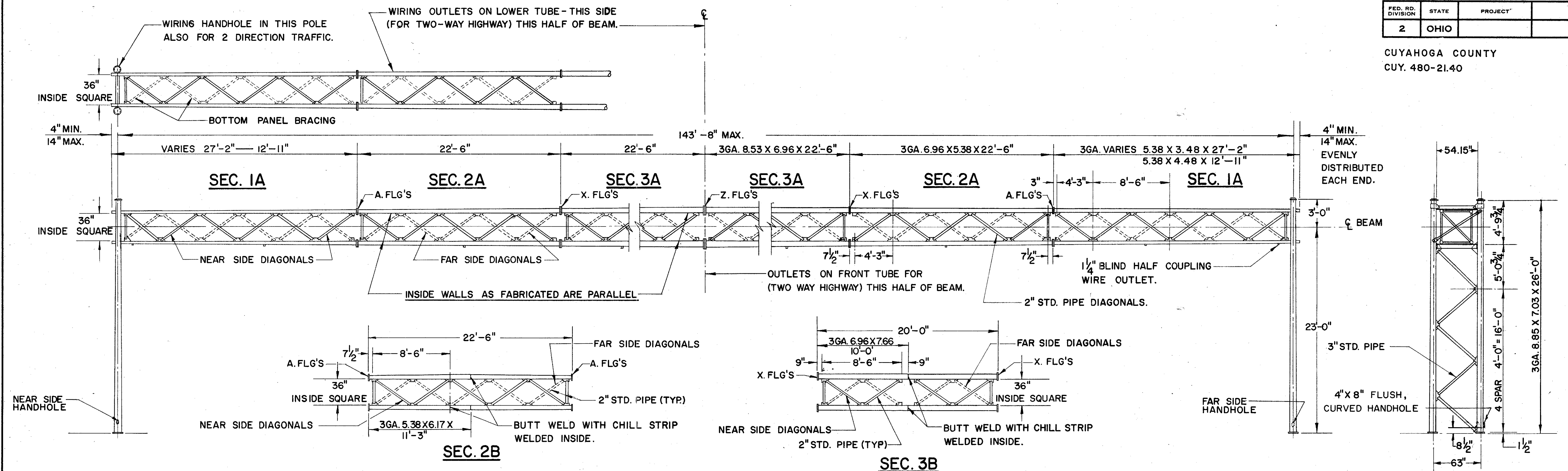
DESIGN NUMBER	DESIGN SIZE (SQ. FT.)	DESIGN MOMENT ARM (FT.)	DIM. "F" (IN.)	DIM. "S" (IN.)	DIM. "T" (IN.)	DIM. "H" (IN.)	BOLT CIRCLE "B" (IN.)	ANCHOR BOLTS "AB" (IN.)	DIM. "H" (IN.)
1	80	12	10 5/8	7 3/4	15 5/8	2	15	3/4 x 84	2 1/8
2	80	16	10 5/8	7 3/4	15 5/8	2	15	3/4 x 84	2 1/8
3	120	12	12 3/4	8 1/2	18 1/2	2	18	2 x 90	2 1/8
4	120	16	12 3/4	8 1/2	18 1/2	2	18	2 x 90	2 1/8
5	180	14	15 1/2	8 1/2	23	2	22	2 x 90	2 1/8
6	180	18	15 1/2	8 1/2	23	2	22	2 x 90	2 1/8
7	240	14	16 5/8	9 3/4	24 1/2	2 1/2	23 1/2	2 1/2 x 114	2 7/8
8	240	18	16 5/8	9 3/4	24 1/2	2 1/2	23 1/2	2 1/2 x 114	2 7/8
9	300	15 1/2	16 5/8	9 3/4	24 1/2	2 1/2	23 1/2	2 1/2 x 114	2 7/8
10	300	19 1/2	18	9 3/4	26 1/2	2 1/2	25 1/2	2 1/2 x 114	2 7/8

**MATERIAL SPECIFICATIONS**

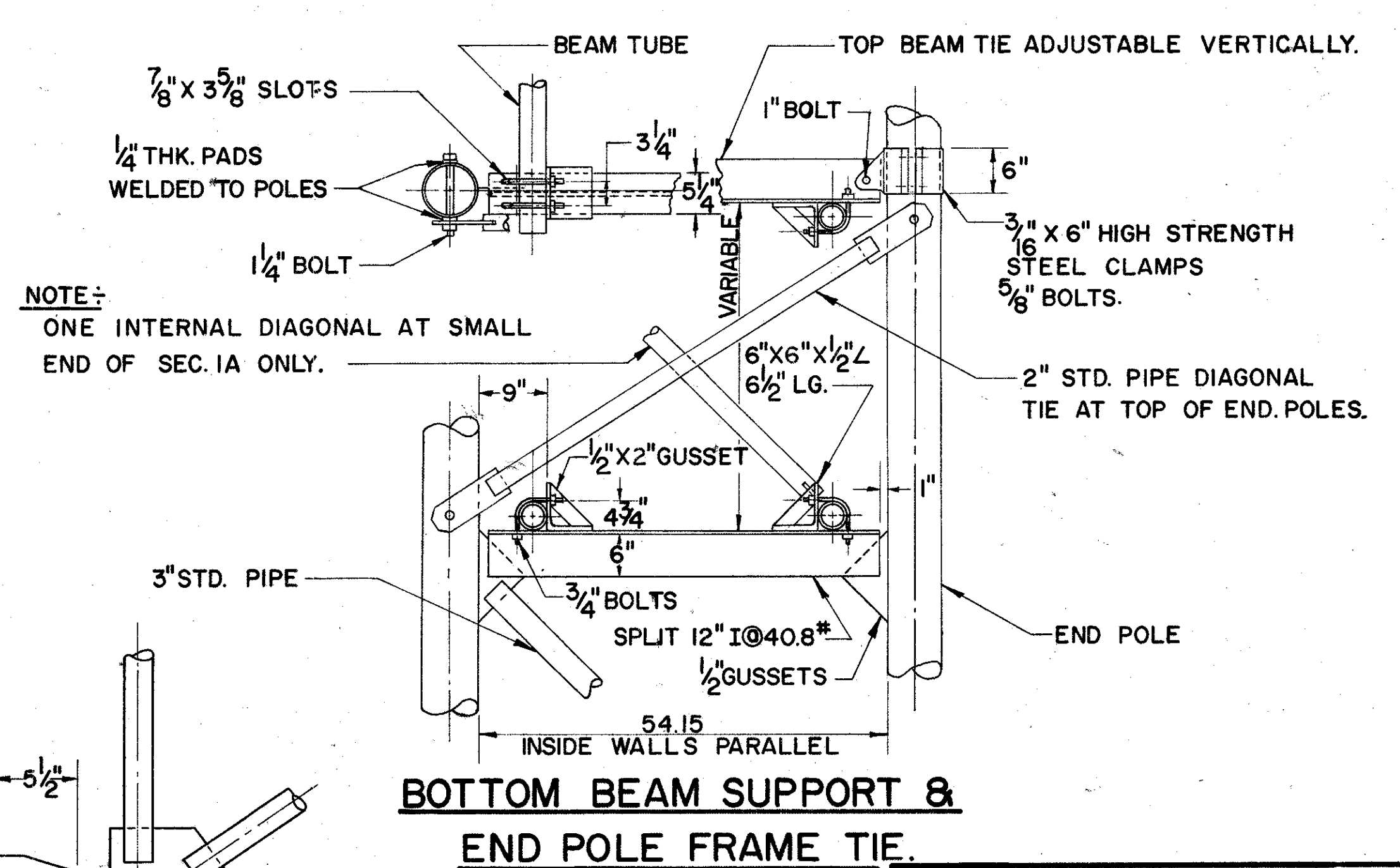
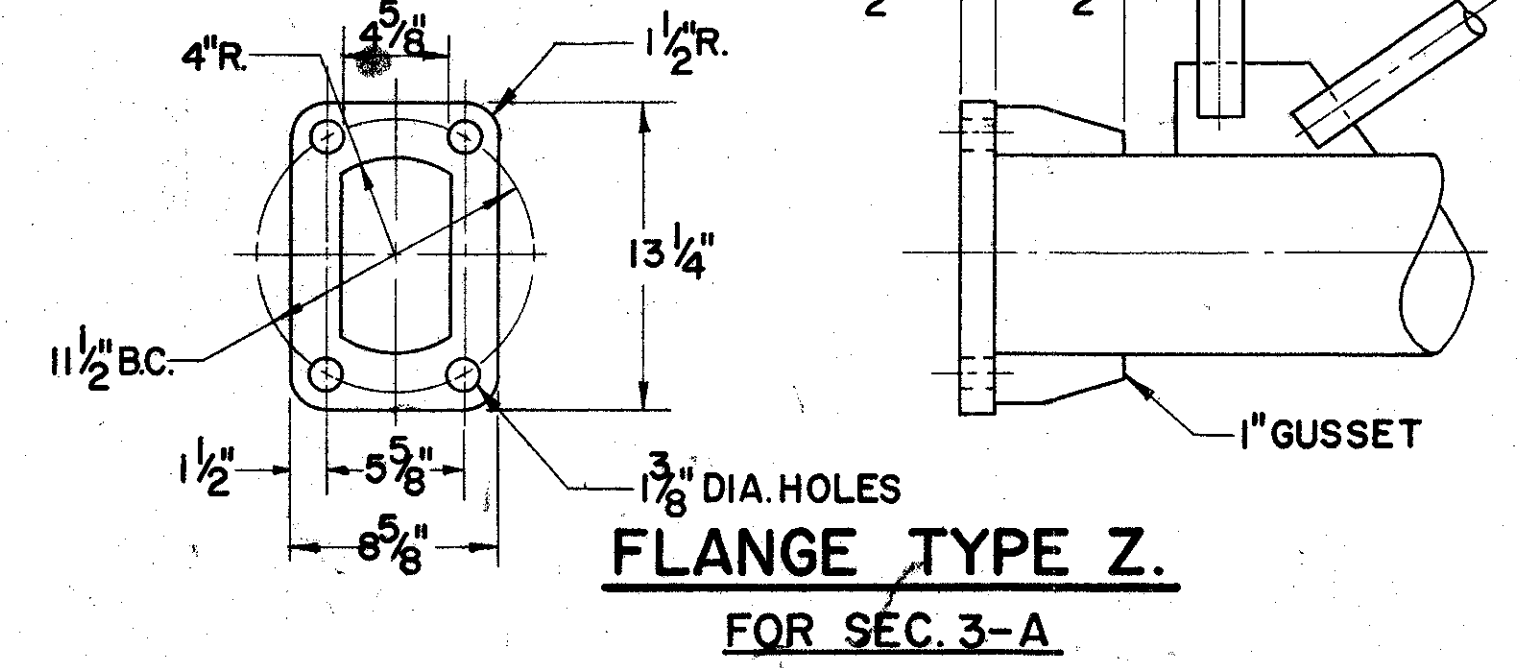
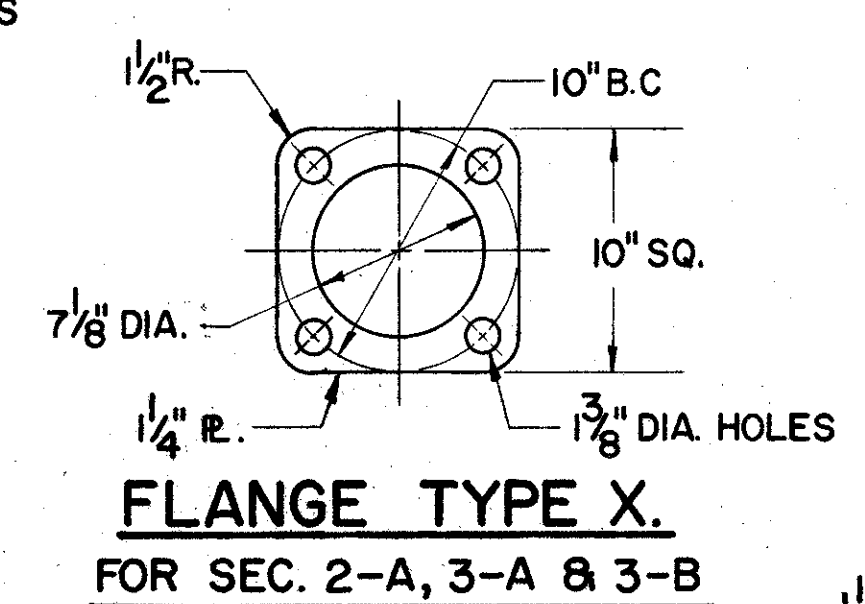
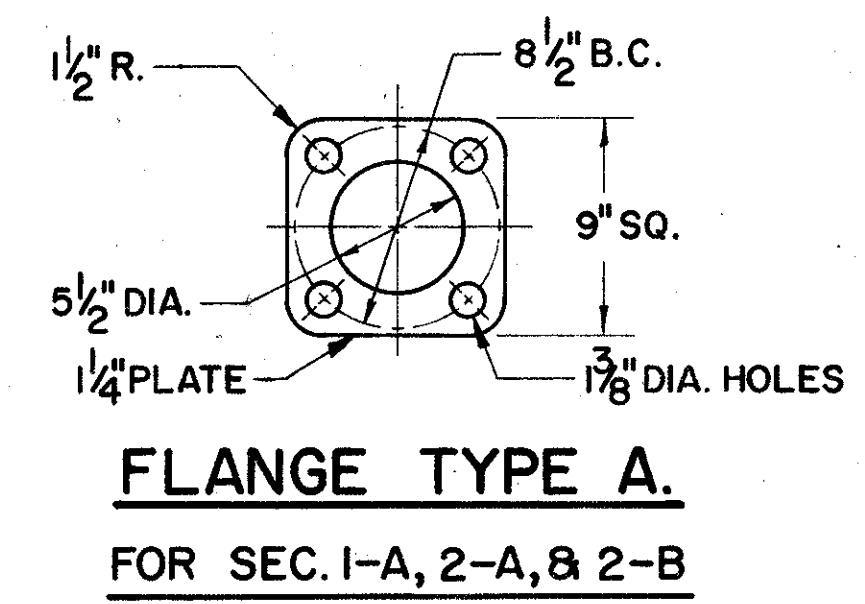
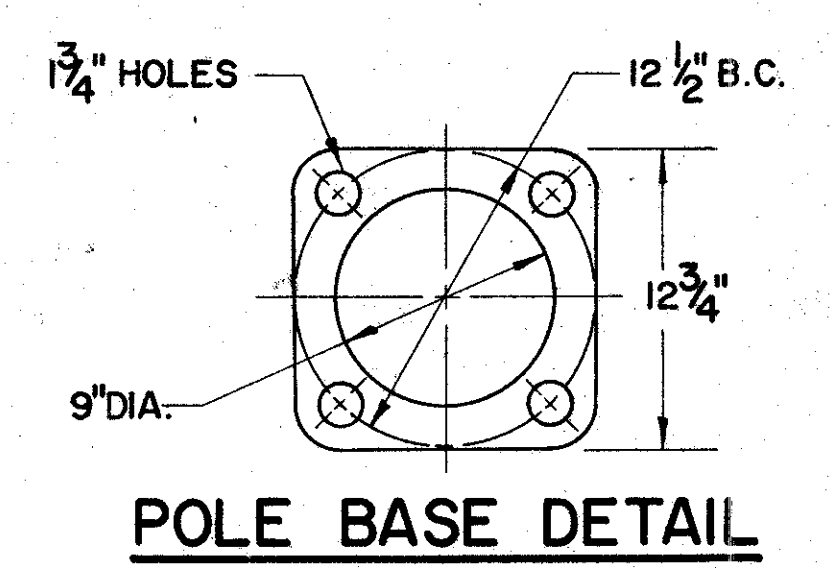
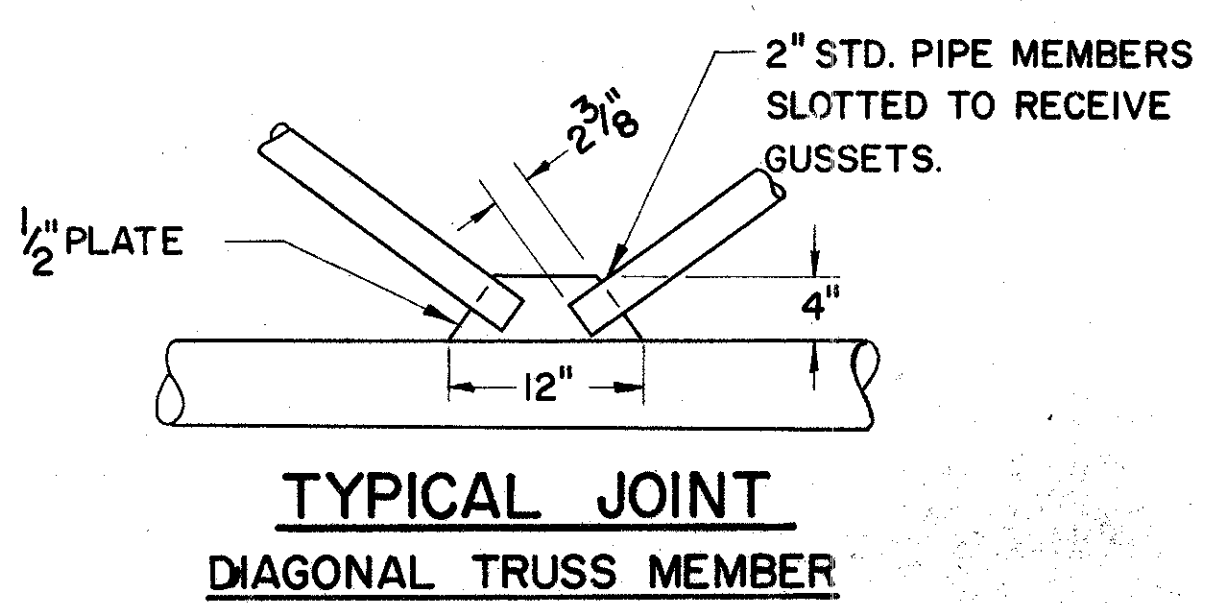
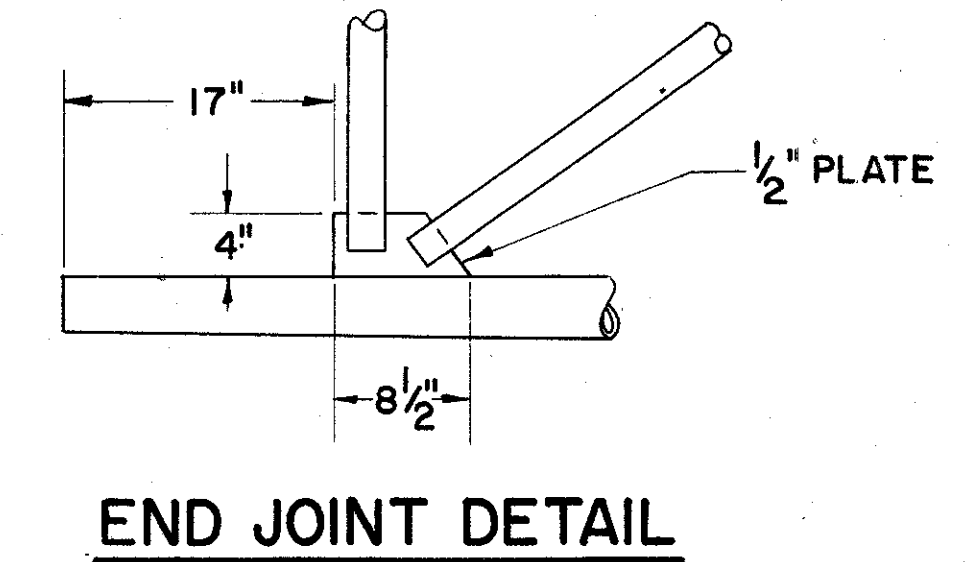
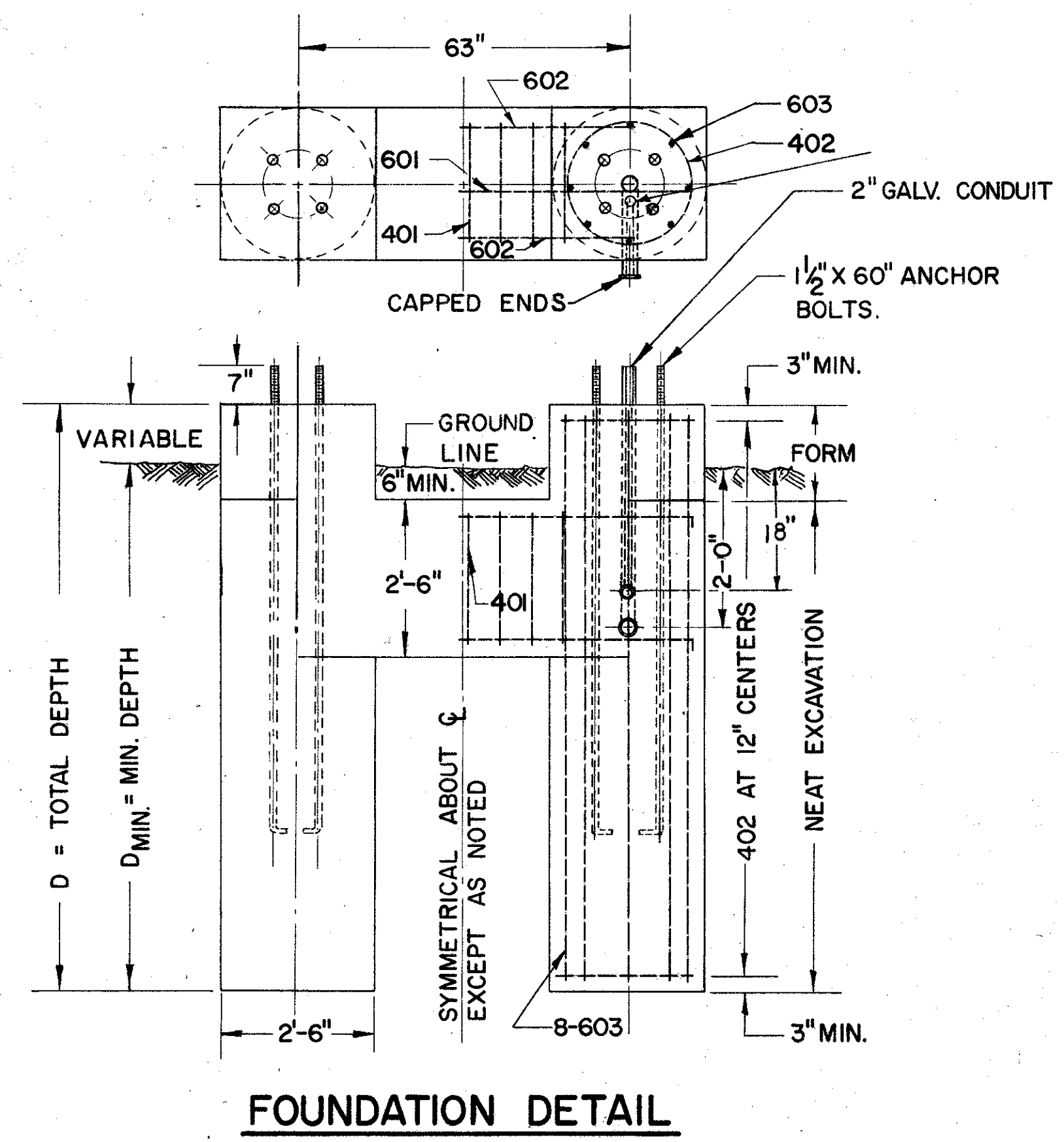
**POLE & ARMS:** ANY STEEL WITH MIN. 52,000 P.S.I. YIELD STRESS AFTER ERECTION.  
**TRUSS MEMBERS:** ASTM A-36  
**BASE & OTHER PLATE STOCK:** ASTM A-36  
**ANCHOR BOLTS:** MIN. 54,000 P.S.I. YIELD STRESS AS ERECTED.  
**ARM ATTACHMENT BOLTS:** ASTM A-325  
**MISC. BOLTS & NUTS:** ASTM A-307 (GALVANIZED PER ASTM A-153)  
**WELDING:** SECTION 513.17, OHIO CONST. & MAT. SPECIFICATIONS  
**GALVANIZING AFTER FABRICATION, ALL STRUCTURAL PARTS:** ASTM A-123

GALVANIZE ONLY TOP 16" OF ALL ANCHOR BOLTS PER ASTM A-123

<b>BUREAU OF DESIGN SERVICES</b> OHIO DEPARTMENT OF HIGHWAYS	
OVERHEAD SIGN SUPPORT	
STANDARD CONSTRUCTION DRAWING	816-12.30
APPROVED	<i>M. J. Cunningham</i> ENGINEER OF DESIGN SERVICES



**BOTH END FRAMES ALIKE  
UNLESS OTHERWISE NOTED**



BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		
<b>OVERHEAD SIGN SUPPORT</b>	<b>816 15.8</b>	DATE 6-24-64 7-1-66
APPROVED _____ ENGINEER OF TRAFFIC		

SUPPORT						ACTUAL SIGN AREA	SIGN AREA SPREAD	ALLOWABLE DESIGN SIGN AREA	ACTUAL MAX. SIGN HEIGHT	END SECTION				INTERNAL SECTION				CENTER SECTION				END OVER-HANG	LEFT END FRAME				RIGHT END FRAME			
NO.	STATION	LOCATION	TYPE	DESIGN	SPAN					NO.	GA.	SIZE	LENGTH	NO.	GA.	SIZE	LENGTH	NO.	GA.	SIZE	LENGTH		NO.	GA.	SIZE	LENGTH	NO.	GA.	SIZE	LENGTH
142	1168+00	E.B. I-480	15.8	3 Mod.	90'0"	624.5	63'0"	743	12'6"	2	3	5.38 x 3.74	23'6"	2	3	6.96 x 5.38	22'6"					1'-0"	1	3	8.85 x 7.21	23'6"	1	3	8.85 x 6.82	29'-0"
143	1182+33	W.B. I-480	15.8	3 Mod.	90'0"	737.5	66'0"	751	12'6"	2	3	5.38 x 3.74	23'6"	2	3	6.96 x 5.38	22'6"					1'-0"	1	3	8.85 x 7.13	24'6"	1	3	8.85 x 6.93	27'6"

**NOTES**

**DESIGN**  
 THE DESIGN OF OVERHEAD SUPPORTS SHALL BE IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 13, 1961.

**FOUNDATION**  
 THE TOP ELEVATION OF FOUNDATIONS SHALL BE VARIED SO AS TO MAINTAIN A MINIMUM CLEARANCE OF 17' BETWEEN THE BOTTOM OF THE SIGN AND THE HIGHWAY CROWN.

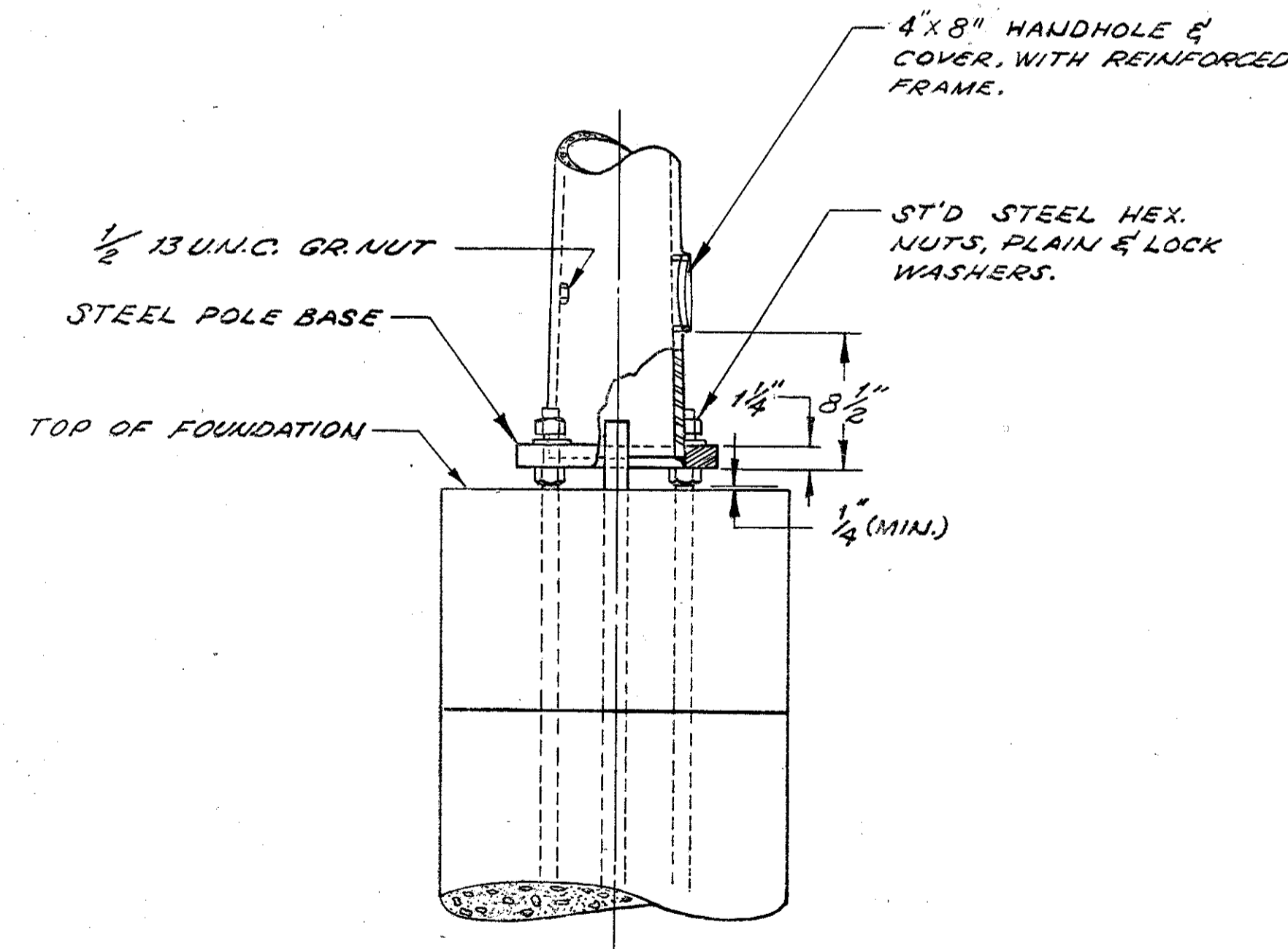
**SOILS**  
 THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY OR STIFF CLAY). FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

**FINISH**  
 ALL STRUCTURAL PORTIONS OF THE SIGN SUPPORTS, SIGN BRACKETS, HARDWARE AND CONDUIT SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH S.S. 816.02 (EXCEPT AS OTHERWISE SHOWN).

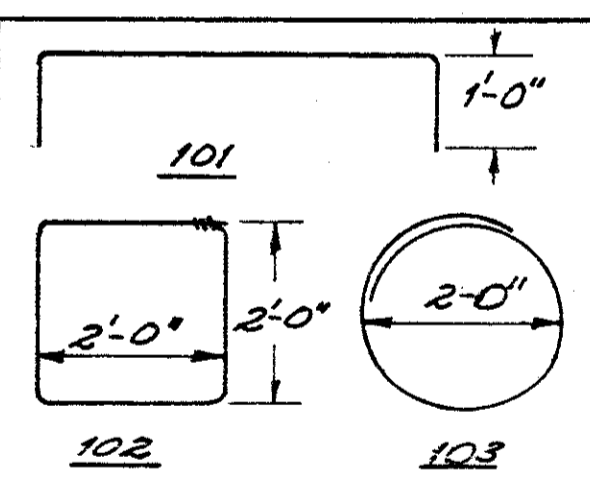
**MATERIALS**  
 ALL MATERIALS TO BE FURNISHED SHALL BE IN ACCORDANCE WITH S.S. 816.02 WITH THE FOLLOWING ADDITIONS:  
 TAPERED TUBES SHALL BE STEEL, SAE 1015 AND COLD ROLLED TO OBTAIN A MINIMUM YIELD STRENGTH OF 48,000 PSI.  
 STEEL PIPE: 4" DIAMETER AND UNDER SHALL BE STEEL-ASTM-A102 OVER 4" DIAMETER SHALL BE ASTM-A53, GRADE B.  
 ANCHOR BOLTS SHALL BE HIGH STRENGTH STEEL-ASTM-A107, GRADE C-1035.  
 HIGH STRENGTH CLAMPS SHALL BE STEEL ASTM-A242.

**REINFORCING STEEL**  
 COST OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 816 CONCRETE FOR SIGN SUPPORT FOUNDATIONS.  
 BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST DIGIT WHERE THREE DIGITS ARE USED AND THE FIRST TWO DIGITS WHERE FOUR ARE USED, INDICATE THE BAR SIZE NUMBER.

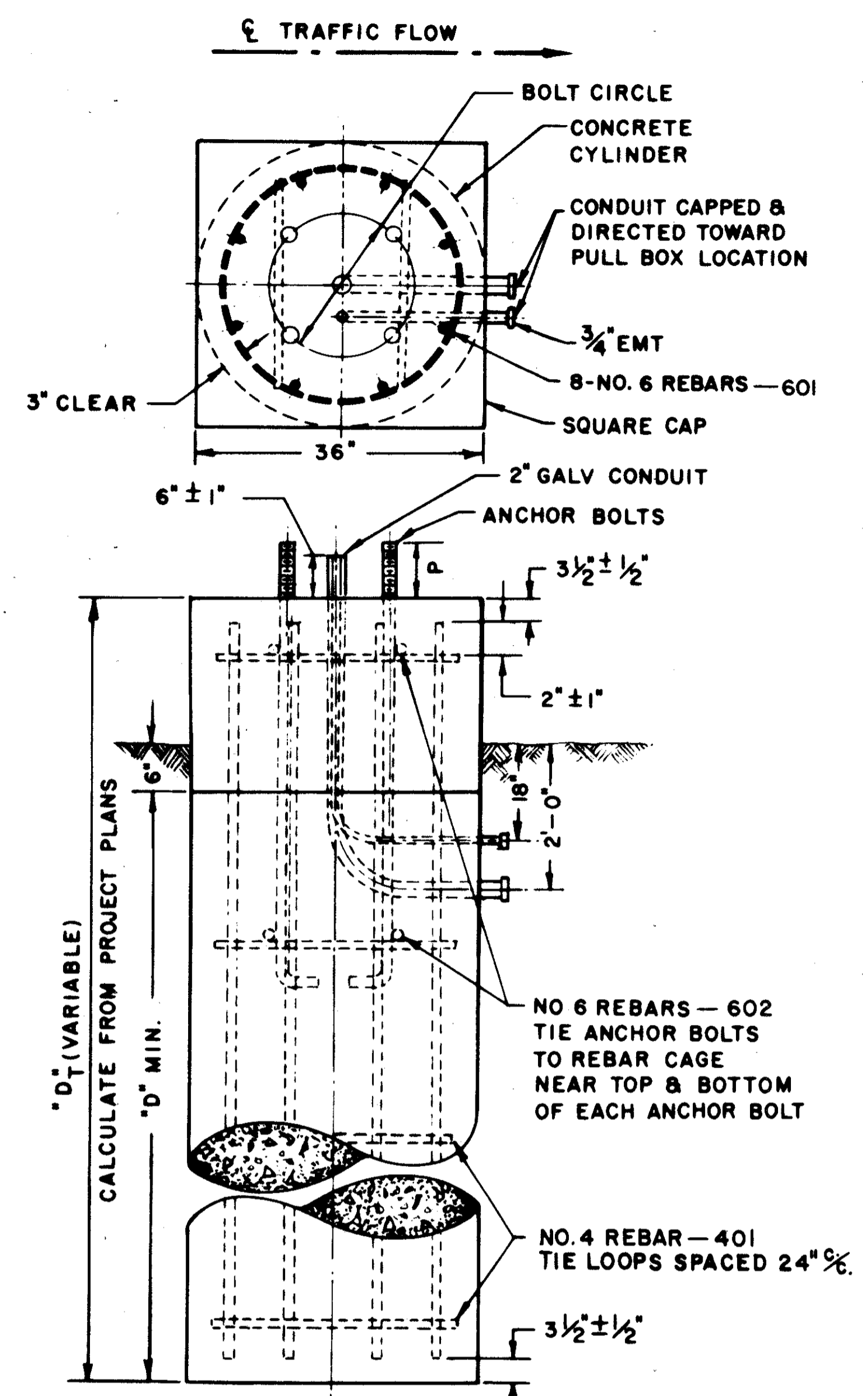
**PAYMENT FOR CONDUIT**  
 PAYMENT FOR THE GALVANIZED CONDUIT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS.



MARK	NO.	LENGTH	TYPE
401	12' 9/16"	8'-6"	102
402	12' 9/16"	7'-6"	103
601	4	D+4'-0"	101
602	8	D+2'-0"	101
603	32	D+6"	STR.



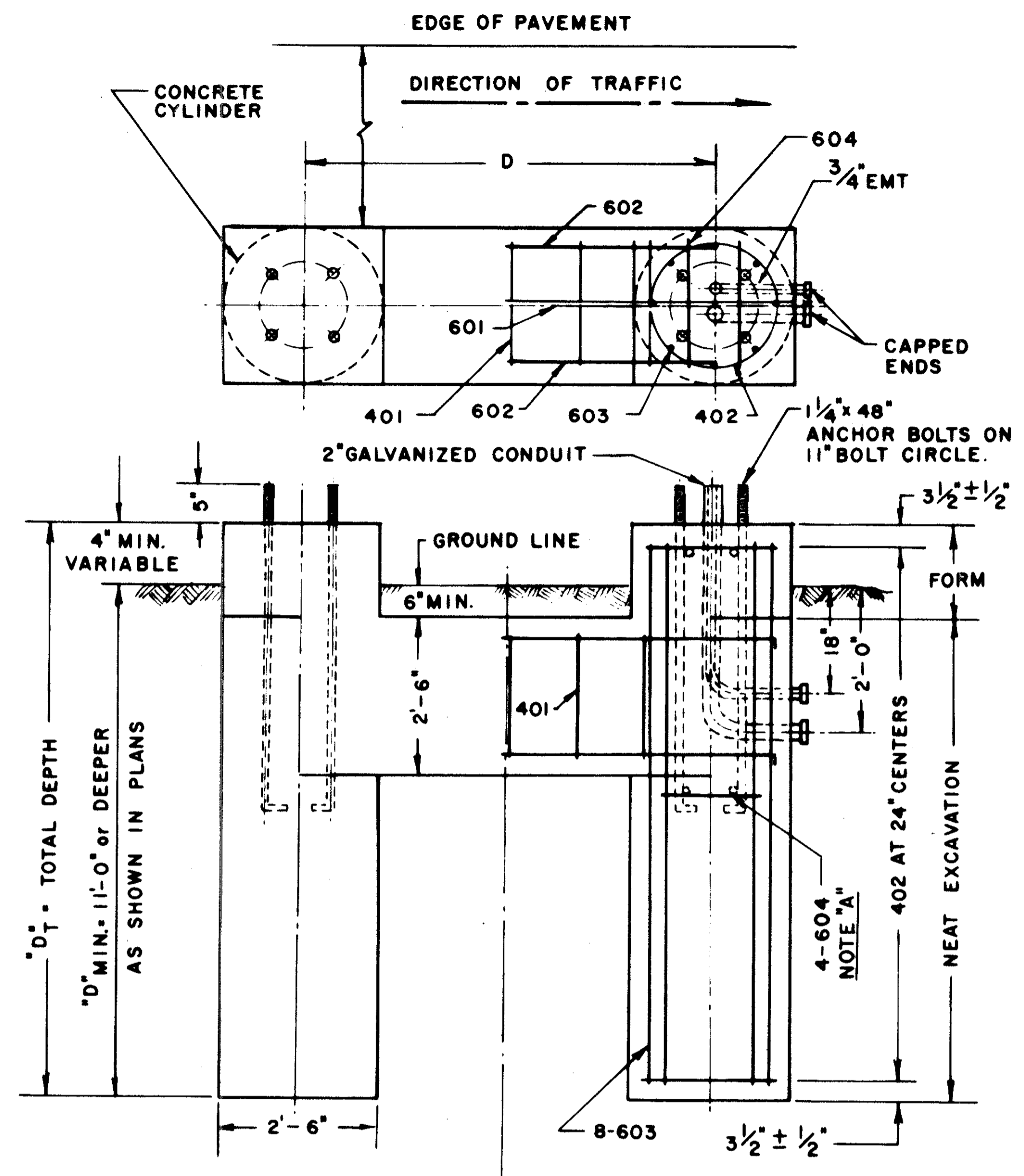
BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		
<b>OVERHEAD SIGN SUPPORT NOTES</b>	<b>816 15.8</b>	DATE 6-24-64 7-1-66
APPROVED _____ ENGINEER OF TRAFFIC		



**816-12.30 FOUNDATIONS**

DESIGN NUMBERS	ANCHOR BOLTS (in.)	BOLT CIRCLE (in.)	"P" (in.)	"D" (ft.)
1 & 2	1 3/4 x 84	15	7 3/4	9
3 & 4	2 x 90	18	8 1/2	11
5 & 6	2 x 90	22	8 1/2	11
7, 8 & 9	2 1/2 x 114	23 1/2	9 3/4	15
10	2 1/2 x 114	25 1/2	9 3/4	17

MARK	NO.	LENGTH	TYPE
401	24 5/8	8'-6"	401
601	8	D <sub>T</sub> 6"	STR.
602	4	2'-5"	STR.

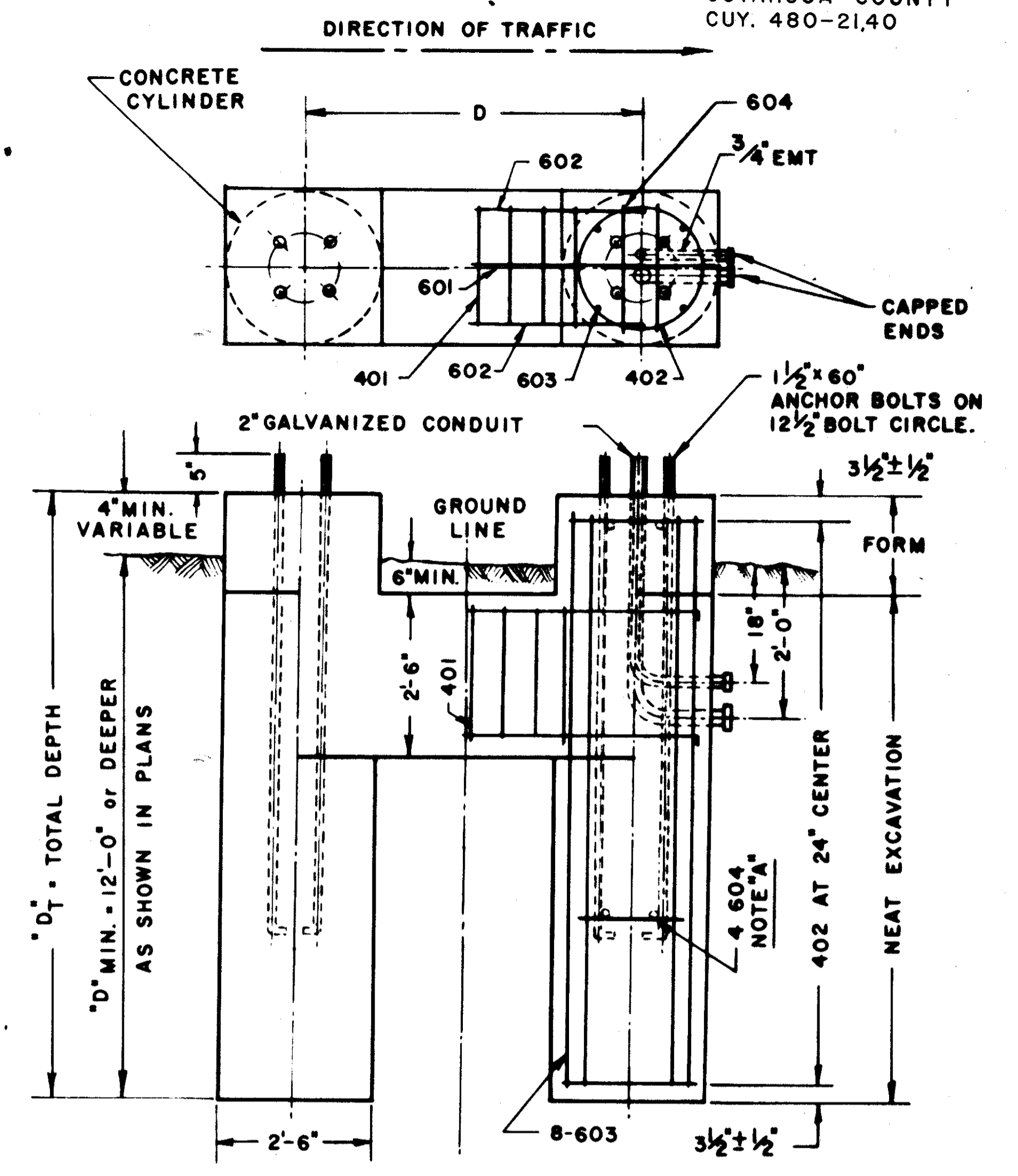


**816-7. x x FOUNDATIONS**  
(RIGHT HAND SHOWN - LEFT HAND OPPOSITE)

NOTE "A" TIE ANCHOR BOLTS TO REBAR CAGE NEAR TOP & BOTTOM OF ANCHOR BOLTS.

ALUMINUM TRUSS BOX SIZE	"D"
3'-0"	4'-5"
4'-0"	5'-7"
5'-0"	6'-7"

MARK	NO.	LENGTH	TYPE
401	12 5/8	8'-6"	401
402	24 5/8	7'-6"	402
601	4	D=4'-0"	601
602	8	D=2'-0"	602
603	32	D=0'-6"	STR.
604	16	2'-0"	STR.



**816-15. x x FOUNDATIONS**  
(RIGHT HAND SHOWN - LEFT HAND OPPOSITE)

STEEL TRUSS BOX SIZE	"D"
3'-4" ±	5'-3"
5'-0"	6'-7"

MARK	NO.	LENGTH	TYPE
401	12 5/8	8'-6"	401
402	24 5/8	7'-6"	402
601	4	D ± 4'-0"	601
602	8	D ± 2'-0"	602
603	32	D ± 0'-6"	STR.
604	16	2'-0"	STR.

NOTE "A" TIE ANCHOR BOLTS TO REBAR CAGE NEAR TOP & BOTTOM OF ANCHOR BOLTS

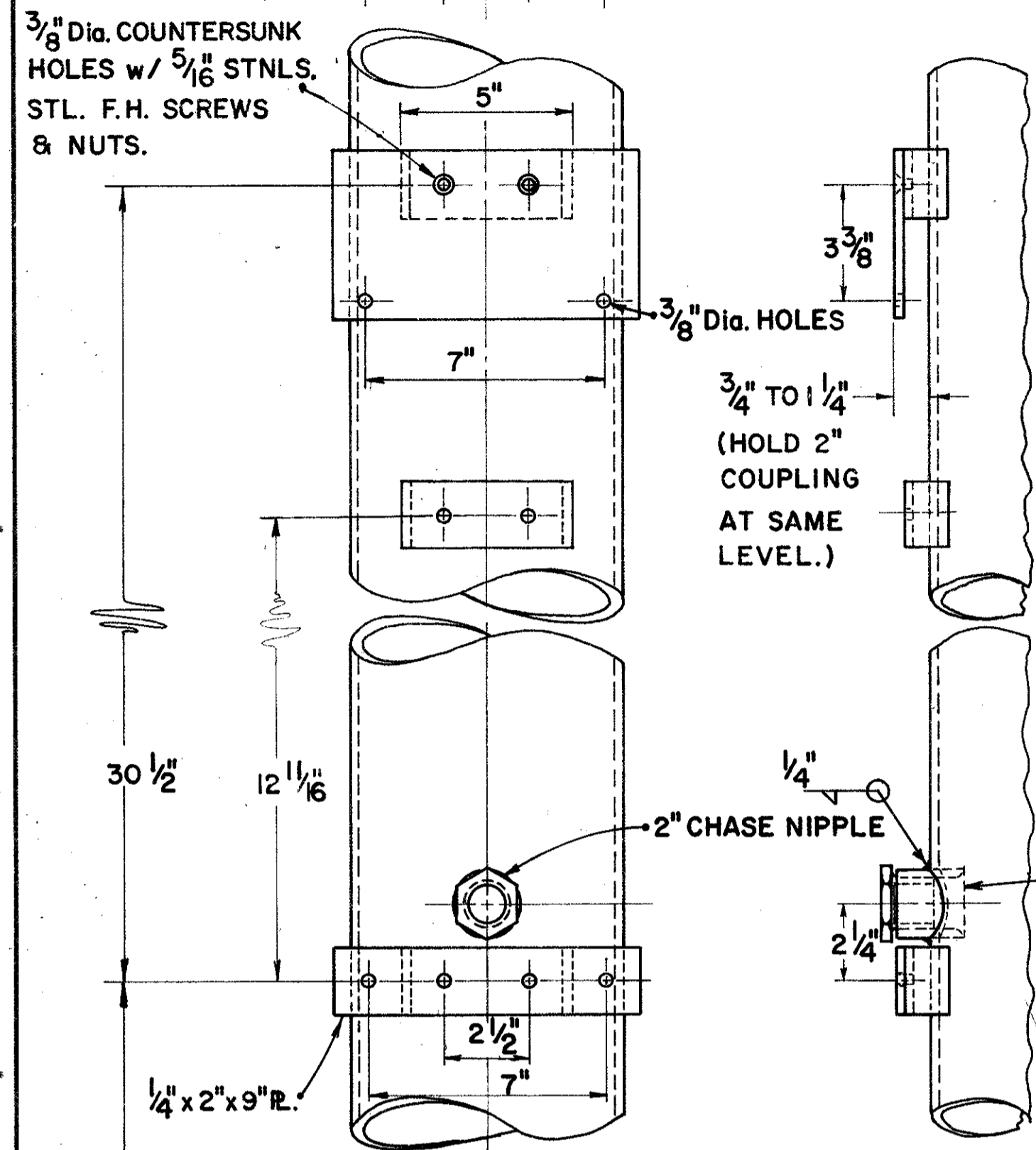
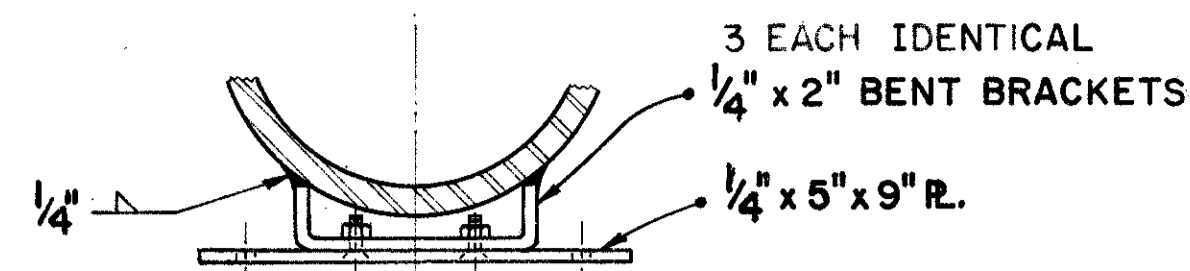
**BUREAU OF DESIGN SERVICES**  
**OHIO DEPARTMENT OF HIGHWAYS**

**SIGN SUPPORT FOUNDATIONS**

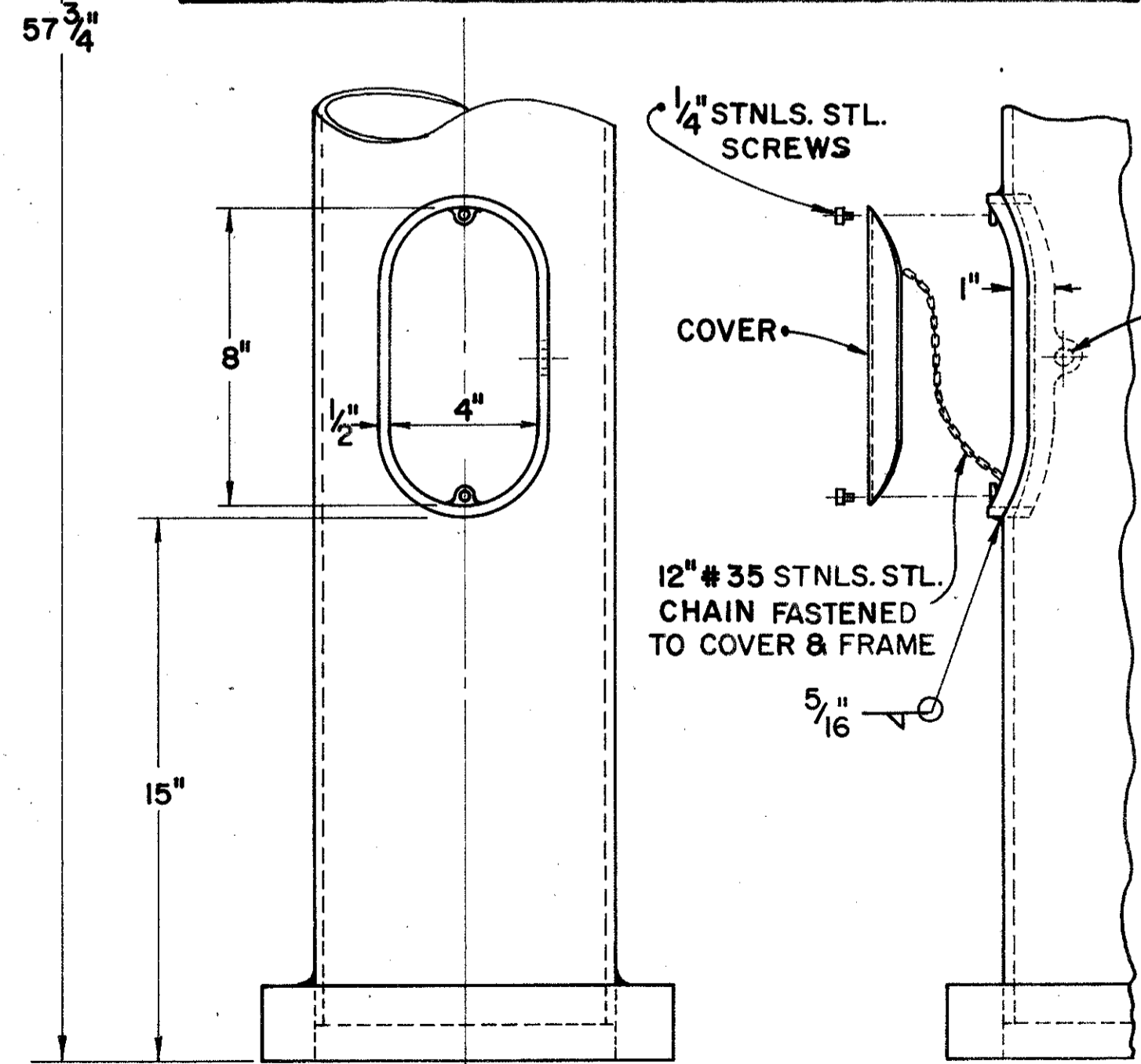
STANDARD CONSTRUCTION **816-20.001**  
DRAWING

APPROVED *M. J. Cunningham*  
ENGINEER OF DESIGN SERVICES

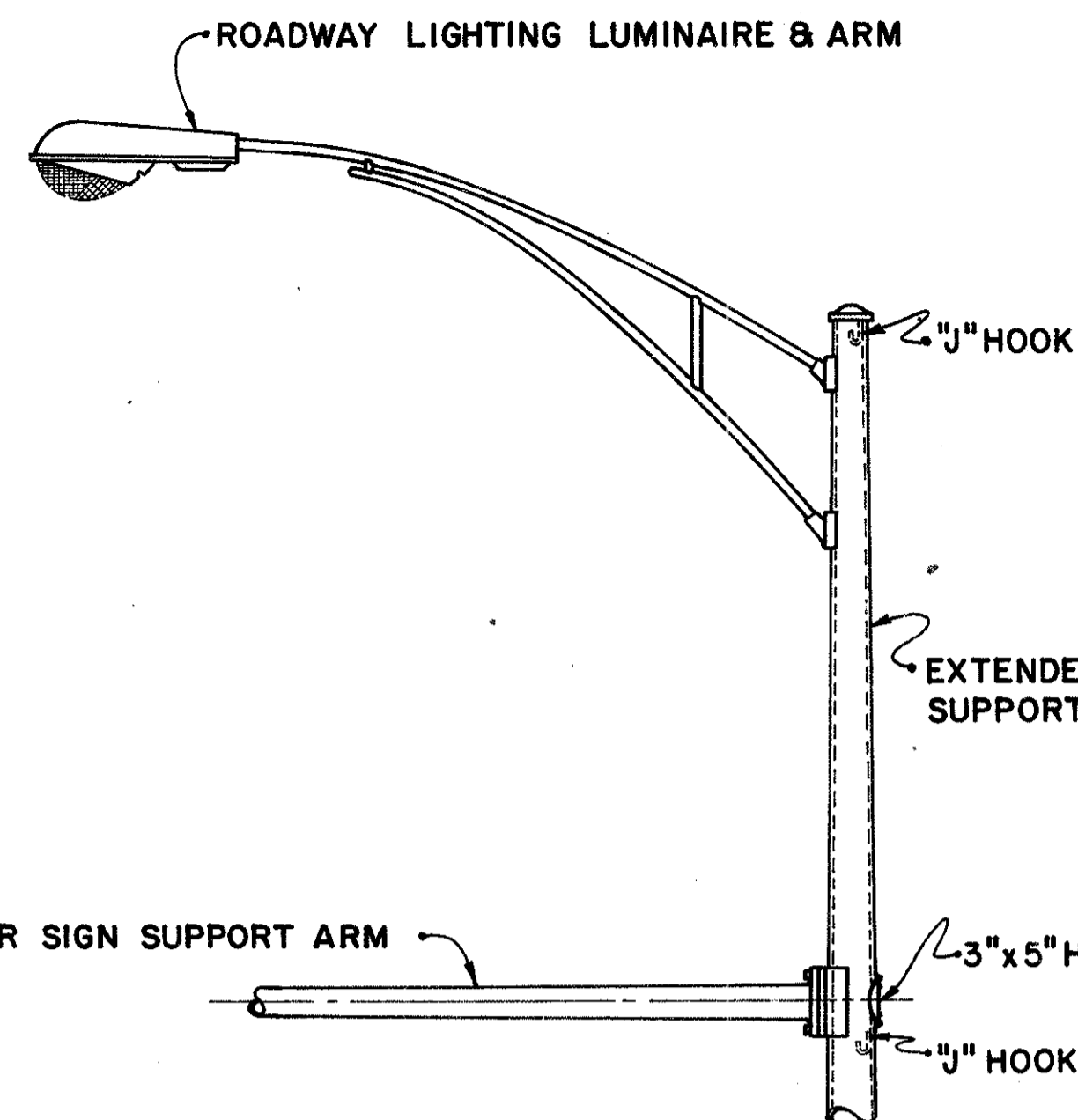
DATE 3-23-72



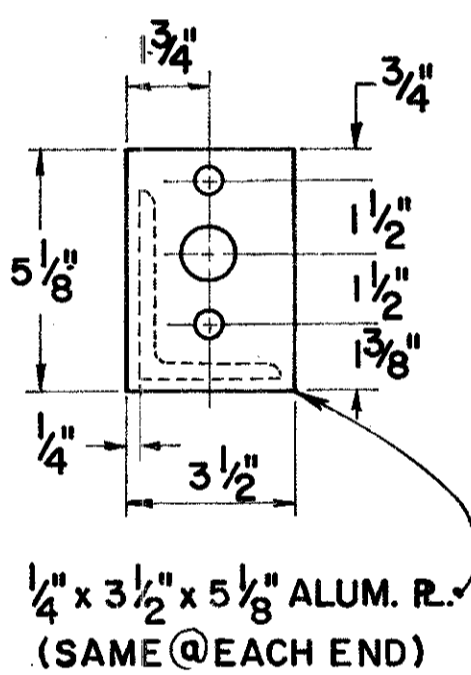
**SWITCH ENCLOSURE BRACKET**



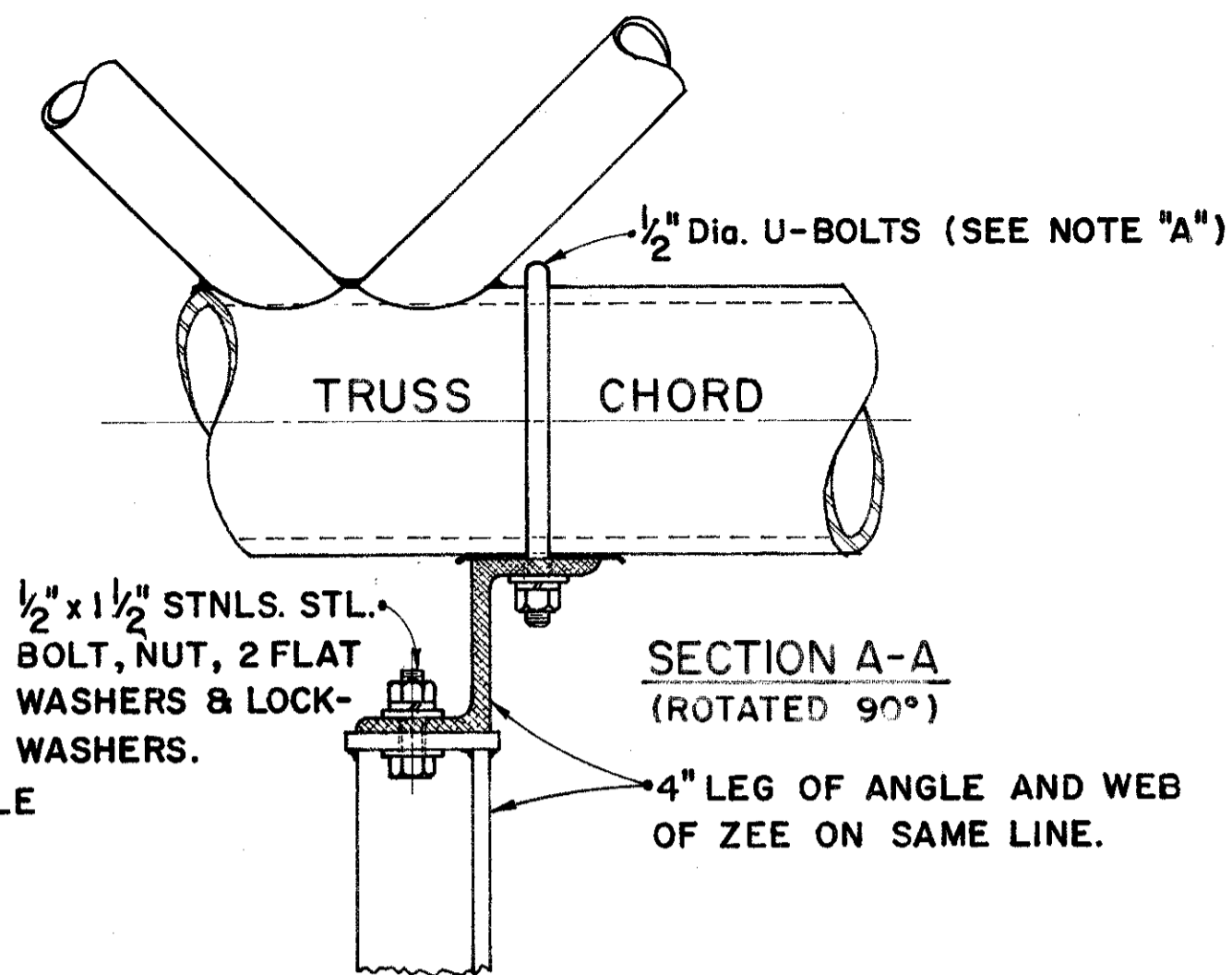
**4" x 8" CURVED HANDHOLE.**



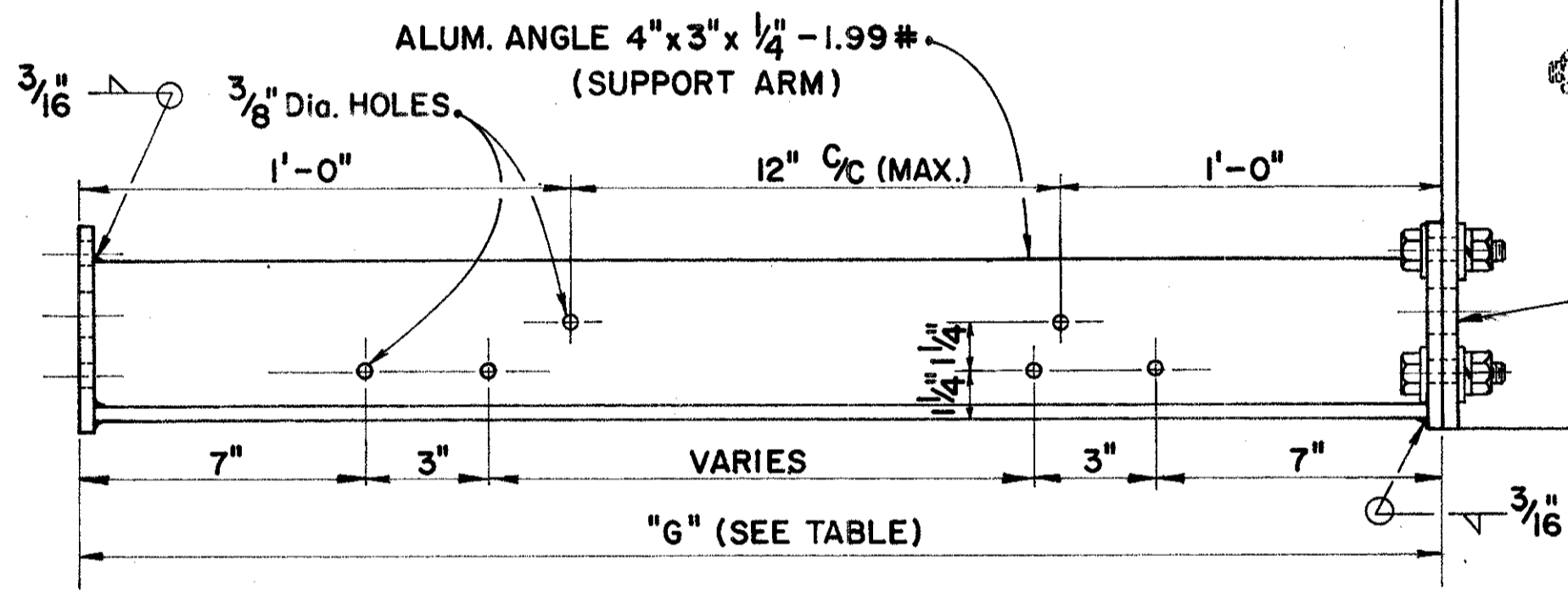
**POLE EXTENSION FOR LIGHTING LUMINAIRE**



**SWITCH ENCLOSURE & HANDHOLE ORIENTATION**



**SIGN ATTACHMENT FOR BOX TRUSS**



**SUPPORT ARM & SIGN BRACKET**  
(MAKE AS LEFTS & RIGHTS FOR EACH SIGN)

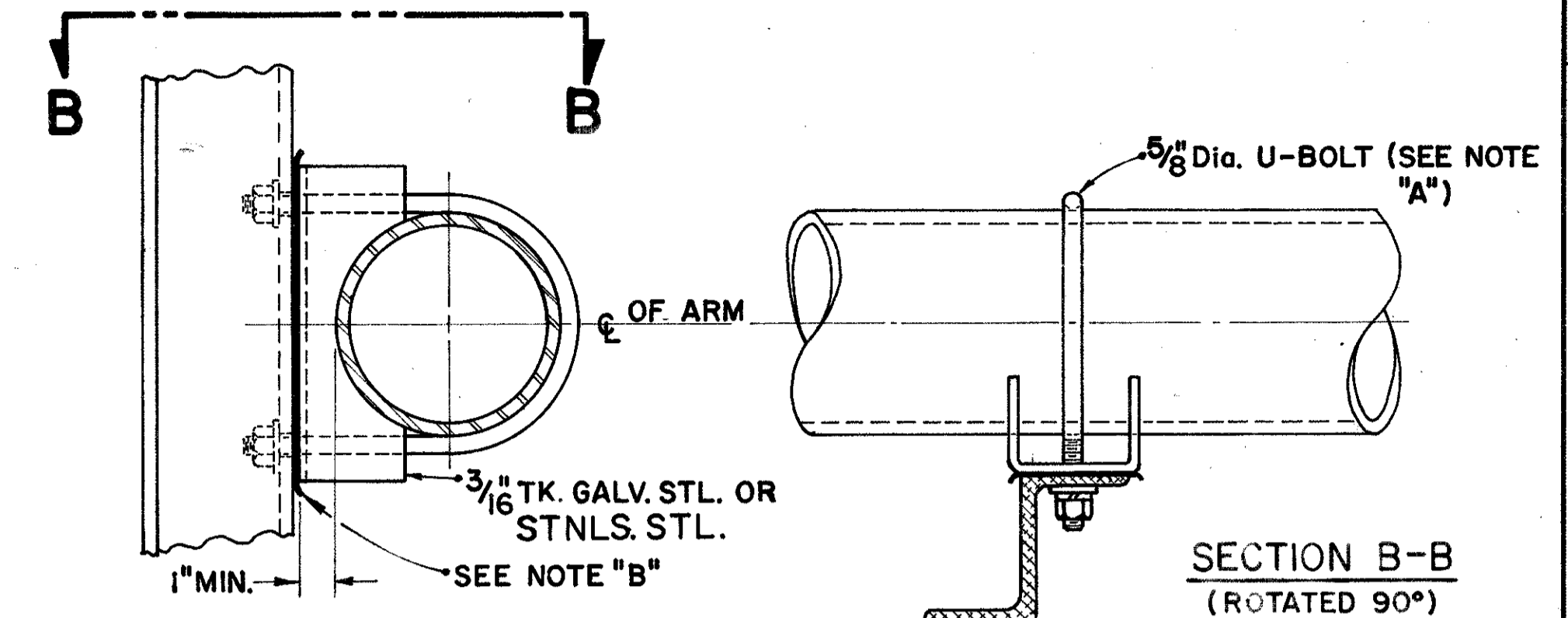
SIGN HEIGHT	SUPPORT ARM LENGTH "G"	BRACING ROD REQUIRED
4'-0" to 6'-0"	2'-9"	NO
6'-6" to 7'-6"	3'-3"	NO
8'-0" to 11'-0"	4'-3"	YES
11'-6" to 14'-0"	5'-9"	YES

**NOTE:**  
FOR LENGTH AND QUANTITY OF SIGN BRACKETS SEE PROJECT PLAN.  
UNLESS OTHERWISE NOTED, MIDPOINT OF SIGN BRACKETS AND TRUSS CENTER-LINE SHALL BE AT THE SAME ELEVATION.

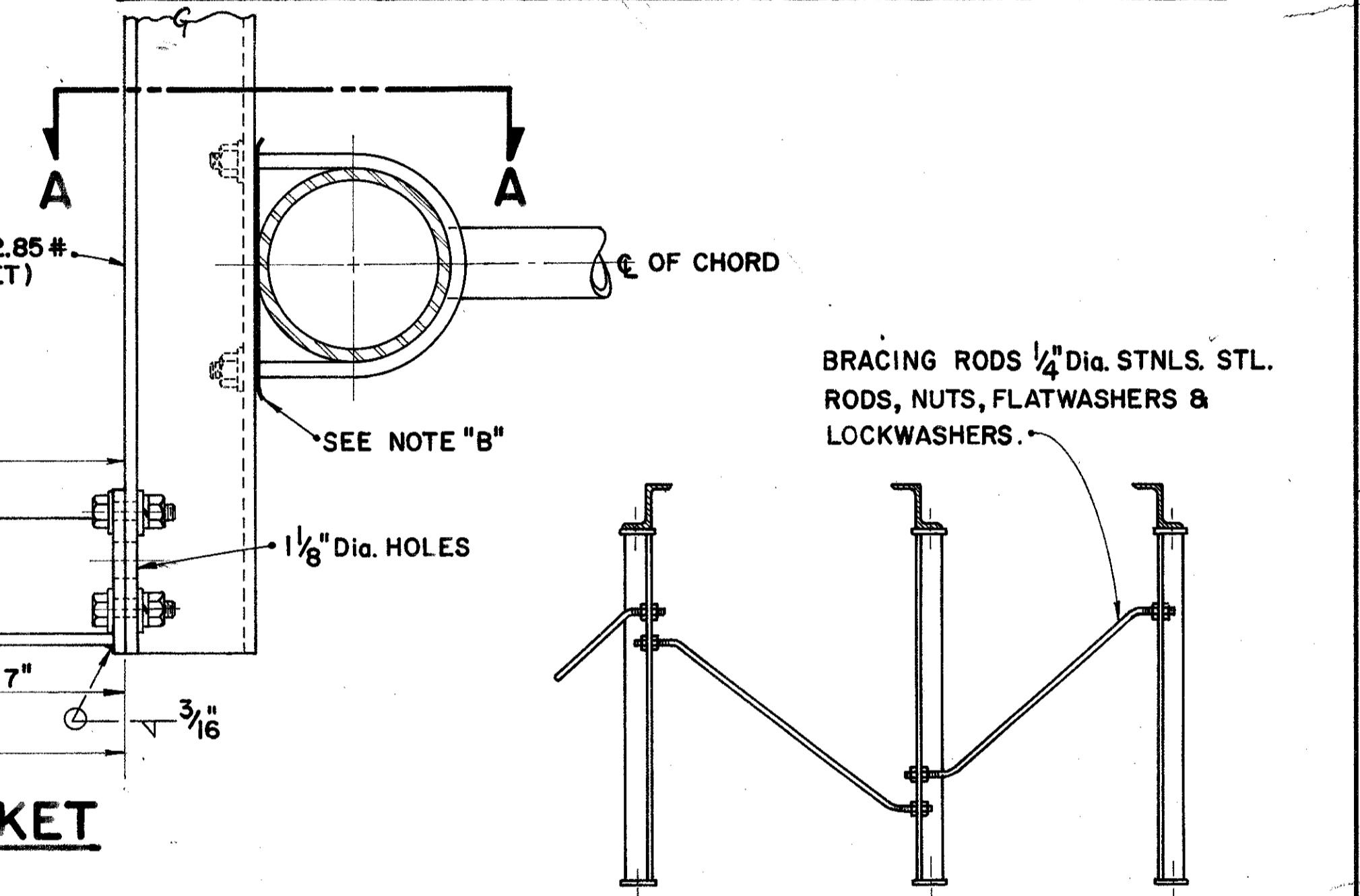
**NOTE "A"**  
U-BOLTS, NUTS & WASHERS SHALL BE STAINLESS STEEL FOR USE WITH ALUMINUM TRUSS CHORDS. WHEN USED WITH GALVANIZED CHORDS, THE U-BOLT ONLY MAY BE GALVANIZED STEEL.

**NOTE "B"**  
CONTACT BETWEEN ALUMINUM AND GALVANIZED PARTS MUST BE PREVENTED WITH A MIN. 1/16" THICK NEOPRENE GASKET OR APPROVED SUBSTITUTE. NO GASKET IS REQUIRED BETWEEN STAINLESS STEEL AND ALUMINUM.

**NOTE:**  
ALL STL. PARTS (EXCEPT STNLS.) SHALL BE GALVANIZED AFTER FABRICATION PER ASTM A-123.



**SIGN ATTACHMENT FOR SINGLE CHORDS**



**BRACING ROD ARRANGEMENT**

WHEN ONLY TWO SUPPORT ARMS REQ'D PER SIGN, USE TWO BRACING RODS TO FORM "X" BRACING.

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OHIO DEPARTMENT OF HIGHWAYS

**MISCELLANEOUS OVERHEAD SIGN SUPPORT DETAILS**

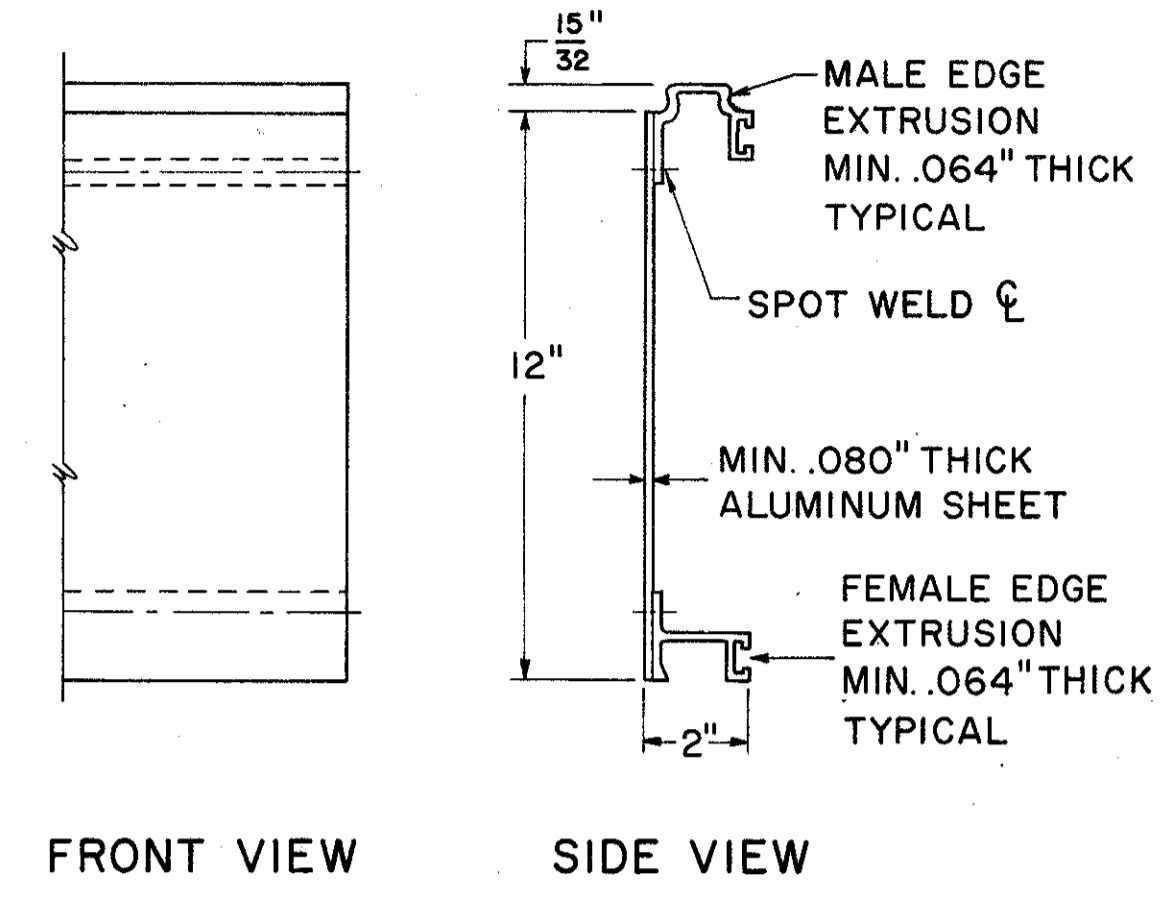
STANDARD CONSTRUCTION 816-20.002  
DRAWING

APPROVED *M. J. Cunningham*  
ENGINEER OF DESIGN SERVICES

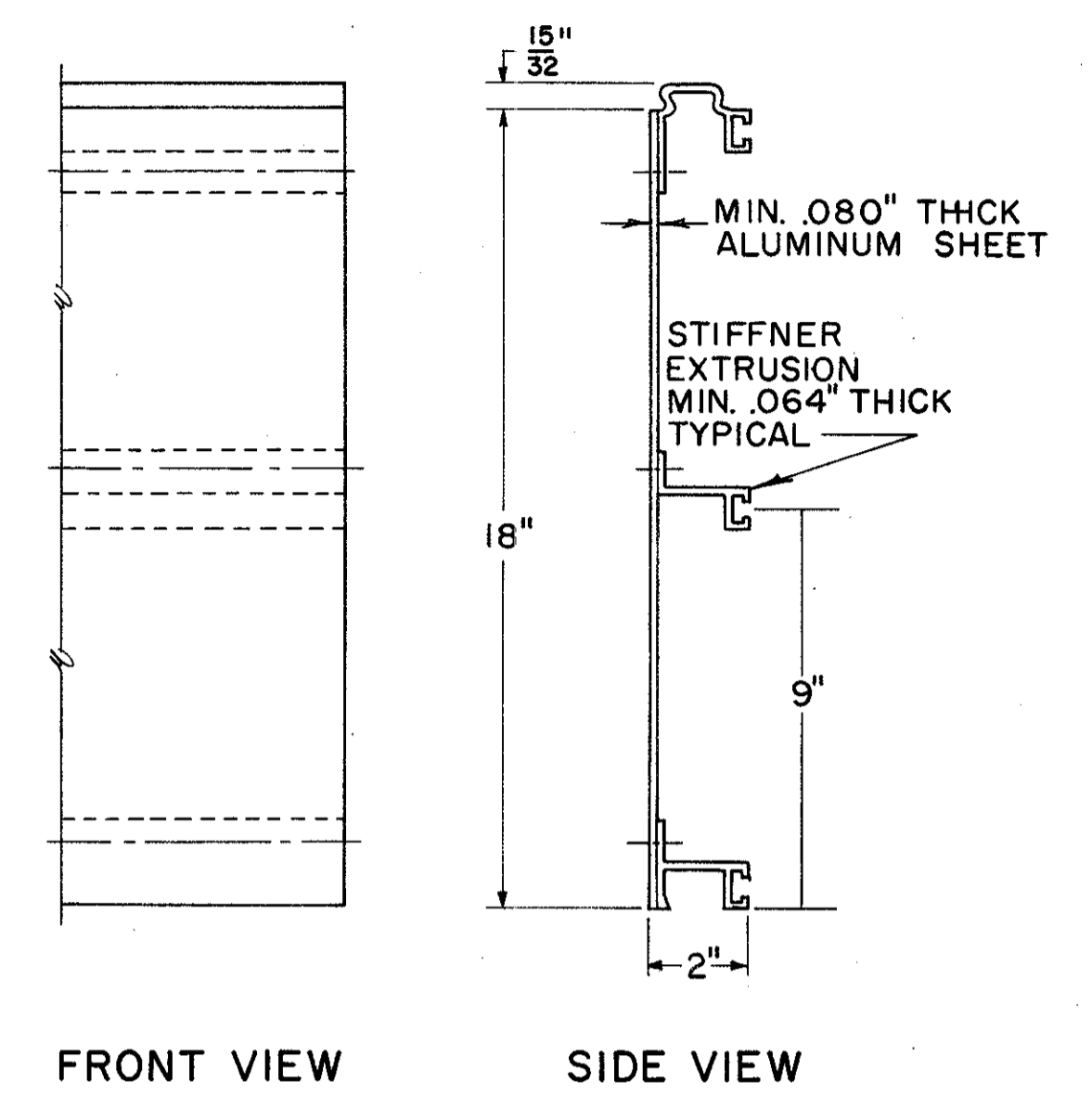
DATE 3-23-72

CUYAHOGA COUNTY  
CUY. 480-21.40

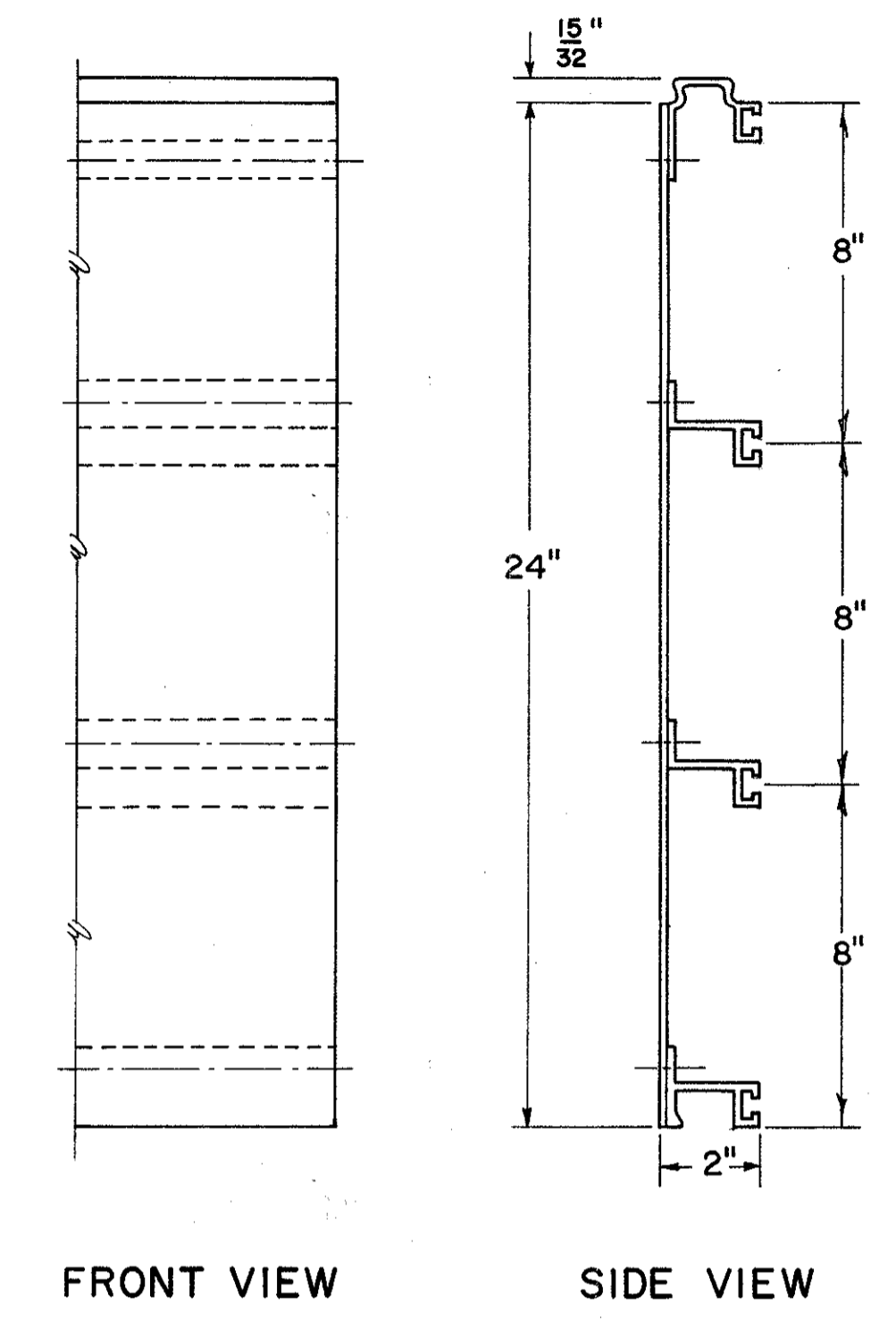
12" EXTRUSHEET PANEL



18" EXTRUSHEET PANEL

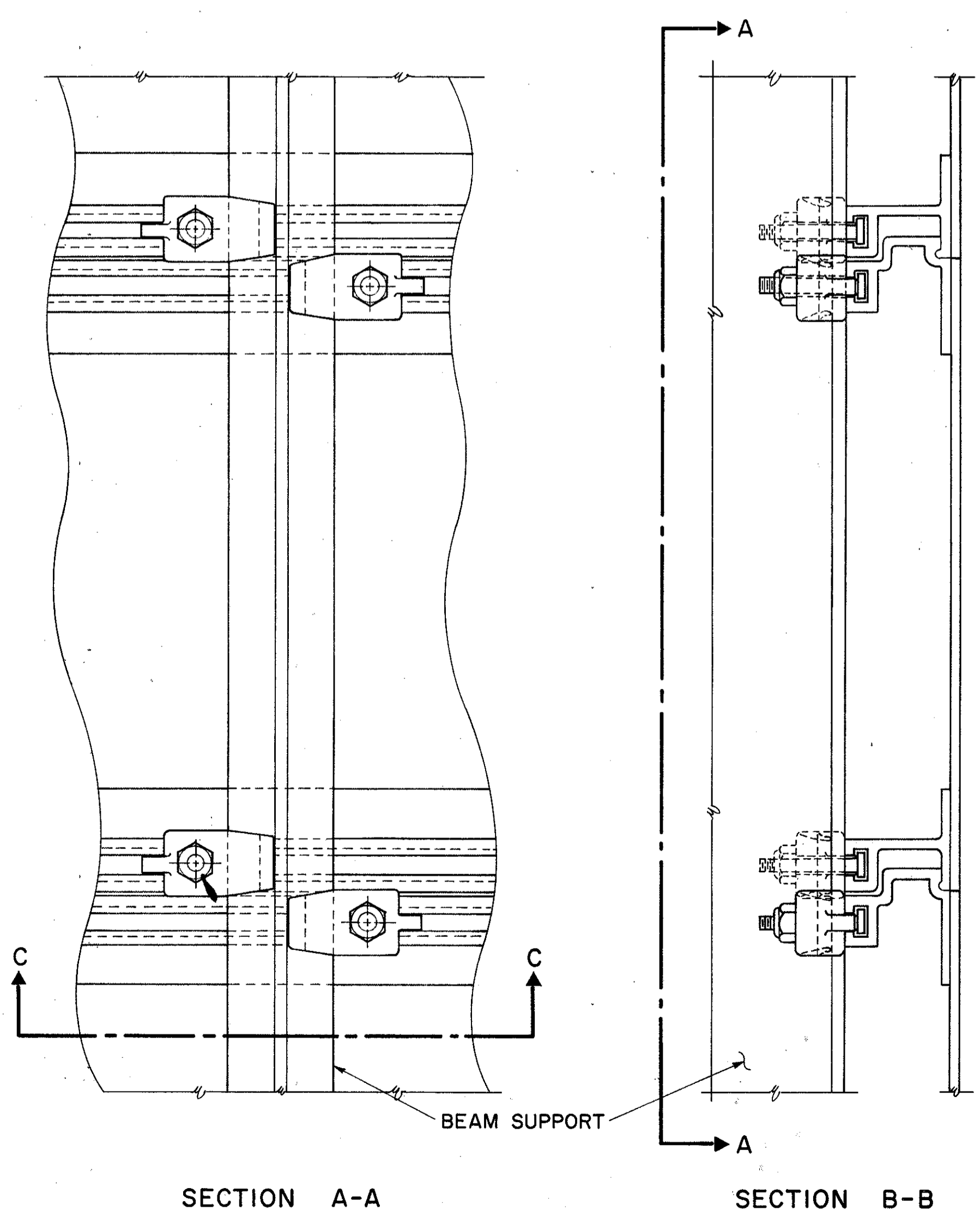


24" EXTRUSHEET PANEL

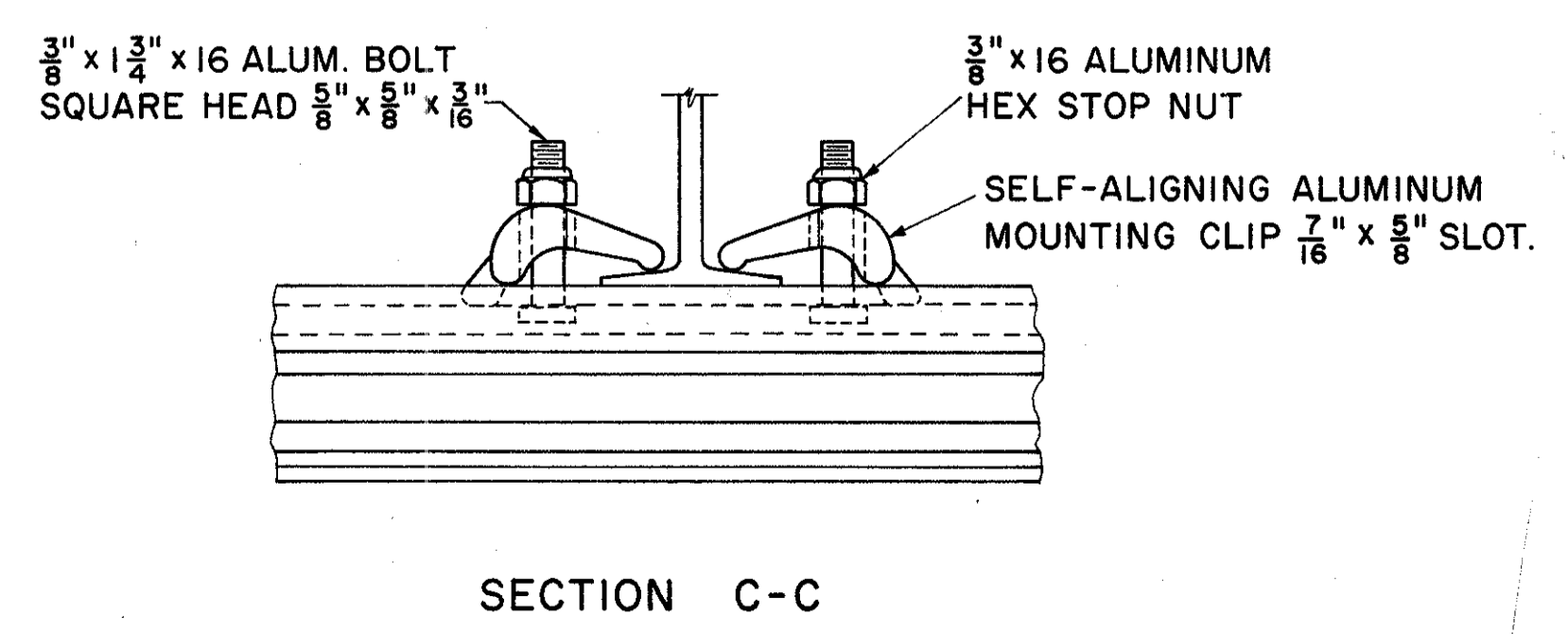
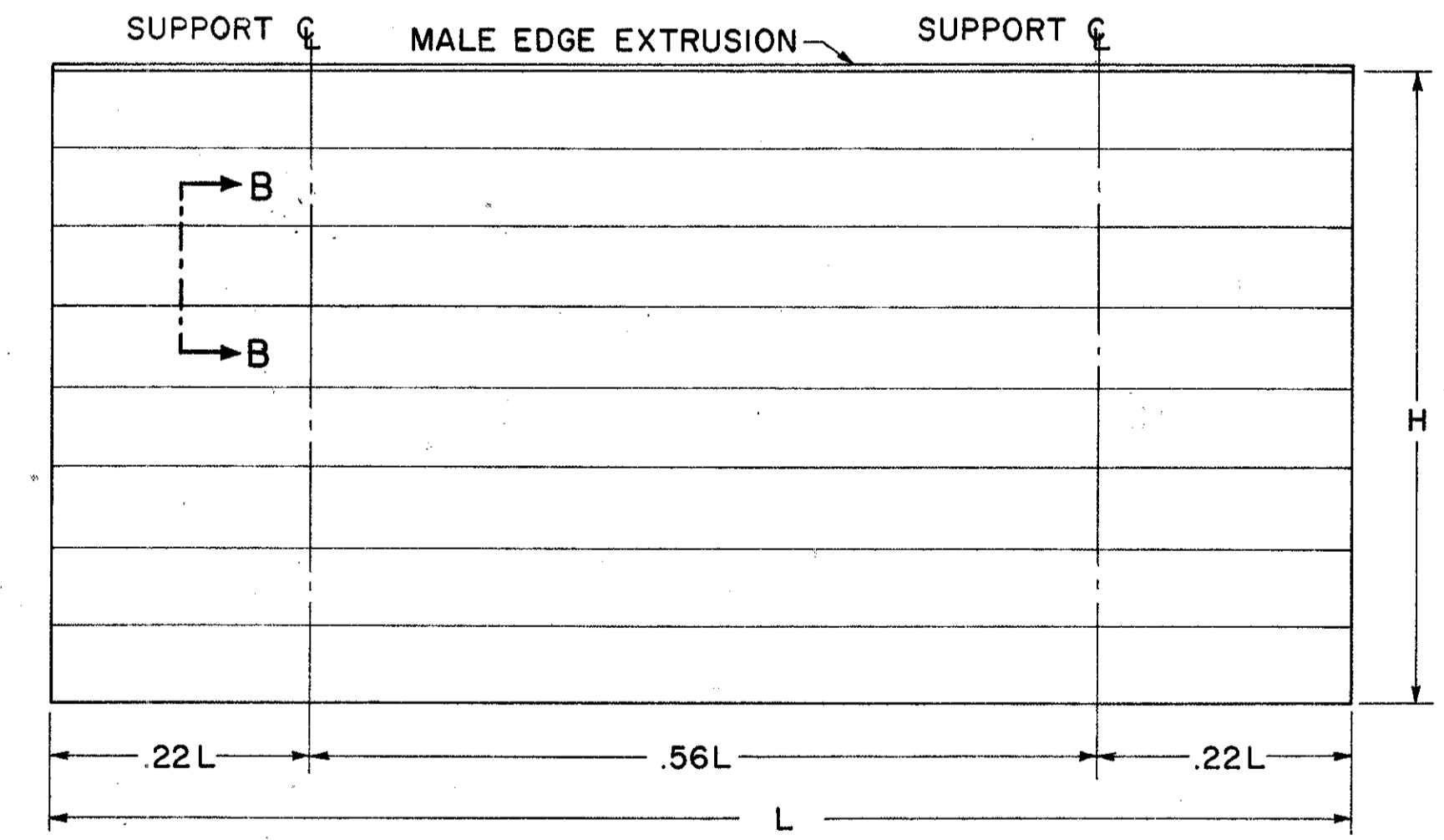


NOTES:

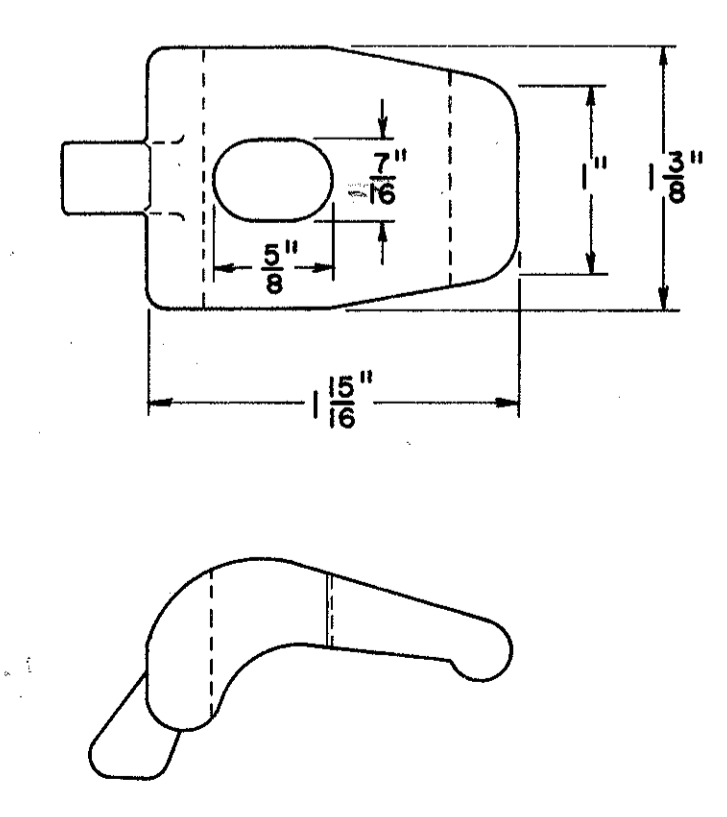
- EXTRUSHEET PANELS SHALL BE ALUMINUM; SPOT WELDING AND ALL MATERIALS SHALL CONFORM WITH SUPPLEMENTAL SPECIFICATION 815.
- COMBINATIONS OF 12", 18", AND 24" PANELS ARE USED TO ATTAIN REQUIRED SIGN HEIGHT.
- INDIVIDUAL PANELS SHALL BE THE SAME LENGTH AS THE HORIZONTAL LENGTH OF SIGN WITH NO SPLICES.
- PANELS SHALL BE INTERLOCKED AND ERECTED WITH THE MALE EXTRUSION LOCATED AT THE TOP EDGE OF THE SIGN.
- EXTRUSHEET PANELS SHALL BE FASTENED TO EACH VERTICAL SUPPORT MEMBER WITH MOUNTING CLIPS; ALTERNATELY AT EACH HORIZONTAL EXTRUSION; BOTH SIDES AT EACH JOINT, AND ON BOTH SIDES AT TOP AND BOTTOM EDGE OF SIGN.
- THE PANELS SHALL BE DESIGNED TO WITHSTAND A WIND LOAD OF 35 POUNDS PER SQUARE FOOT, IN ACCORDANCE WITH THE A.A.S.H.O. SPECIFICATION FOR DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS.
- THE MAXIMUM SIGN LENGTH FOR TWO SUPPORTS IS 19'-0".
- THE MAXIMUM SIGN LENGTH FOR THREE SUPPORTS IS 29'-0".



GENERAL ARRANGEMENT



CLIP DETAIL



SPOT WELDS

PANEL SIZE	MAXIMUM SPOT WELD SPACING CENTER TO CENTER	BETWN ROWS
12 INCH	4 INCH	10 INCH
18 & 24 INCH	4 INCH	8 INCH

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OHIO DEPARTMENT OF HIGHWAYS

**ALUMINUM EXTRUSHEET PANEL SIGN**

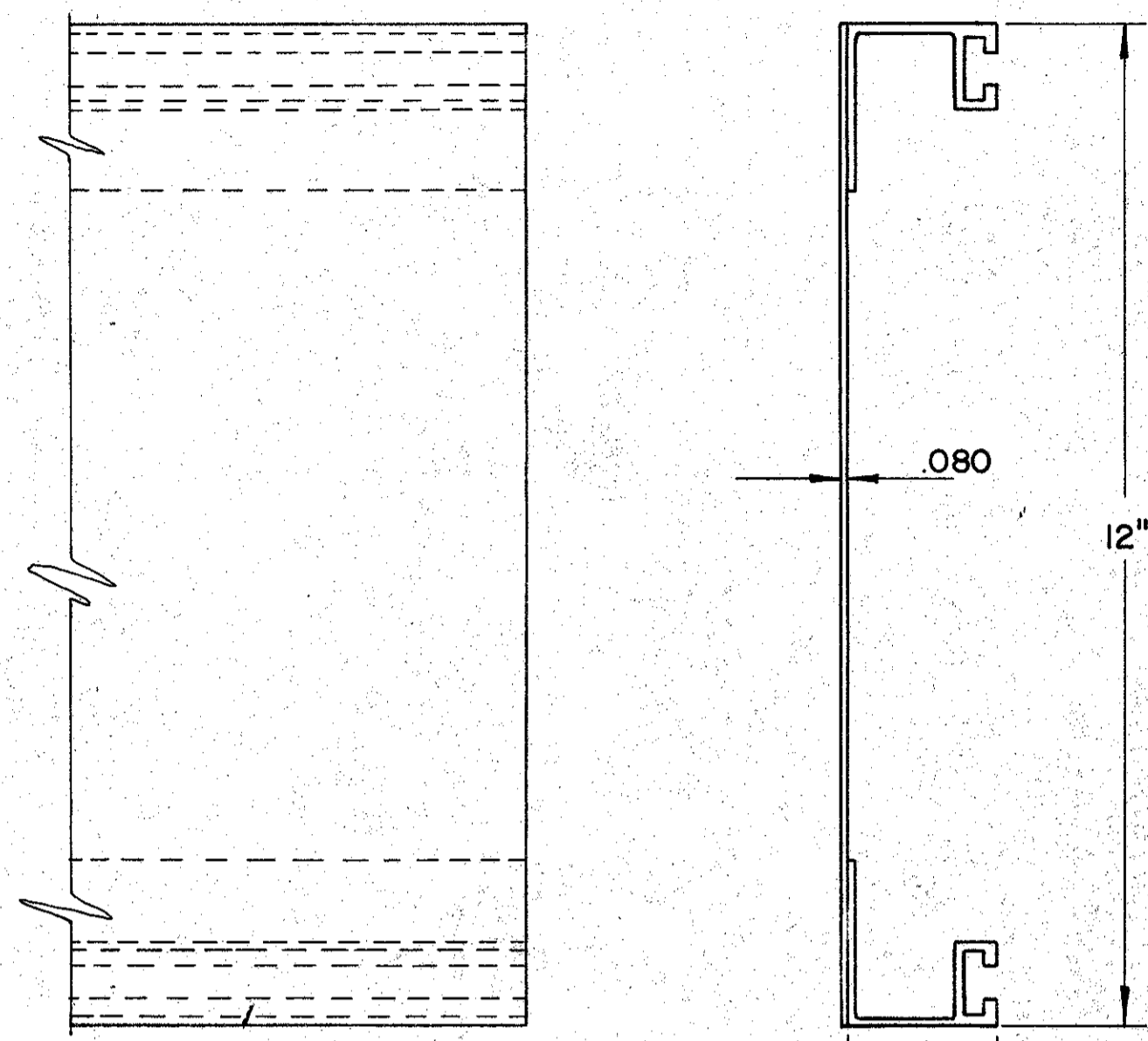
APPROVED *Fred C. Galley*  
ENGINEER OF TRAFFIC

DATE  
9-25-63  
5-19-64  
10-21-65  
5-24-67

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CUYAHOGA COUNTY  
CUY. 480-21.40

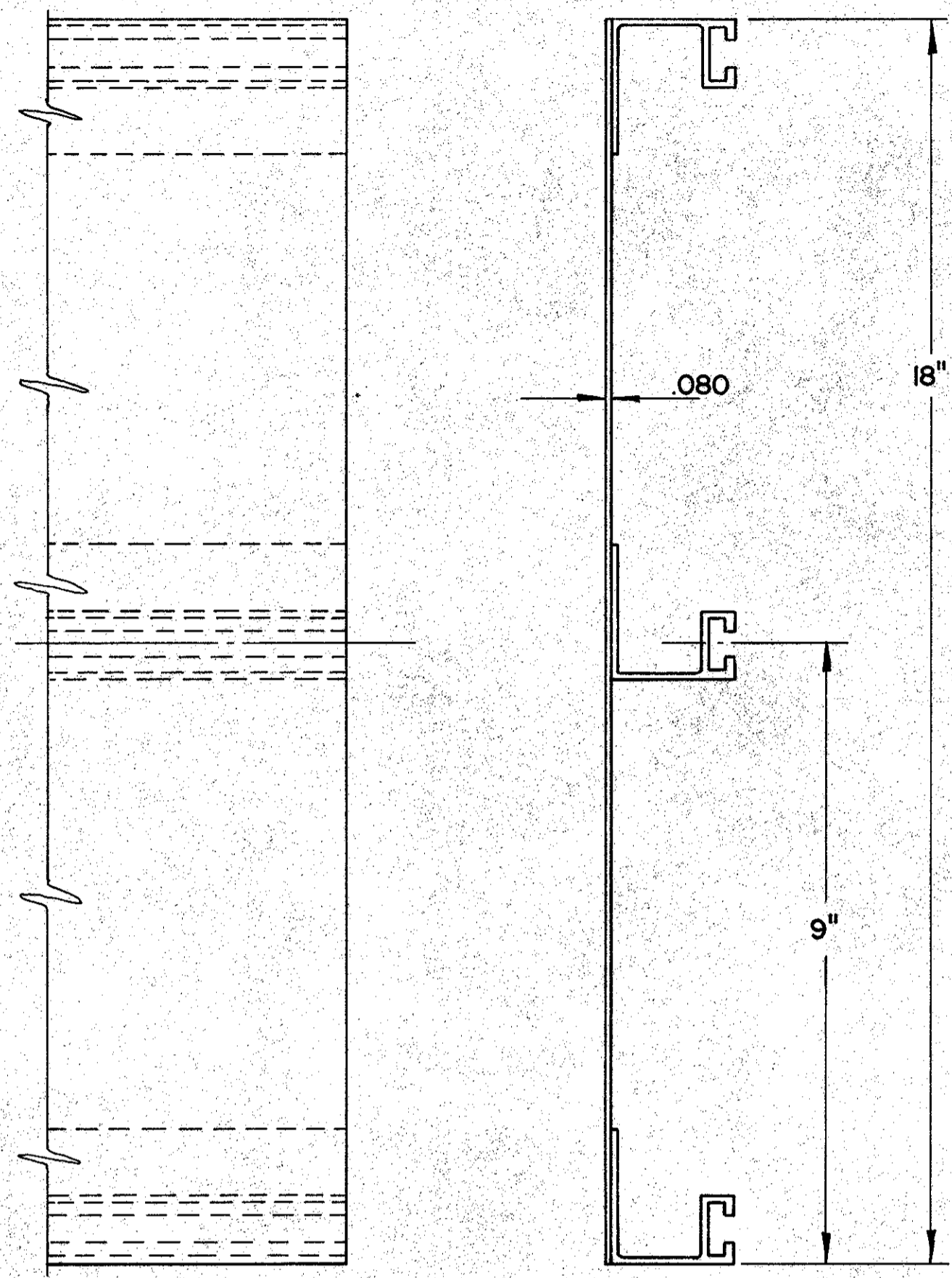
12" BOLTED-EXTRUSHEET PANEL



FRONT VIEW

SIDE VIEW

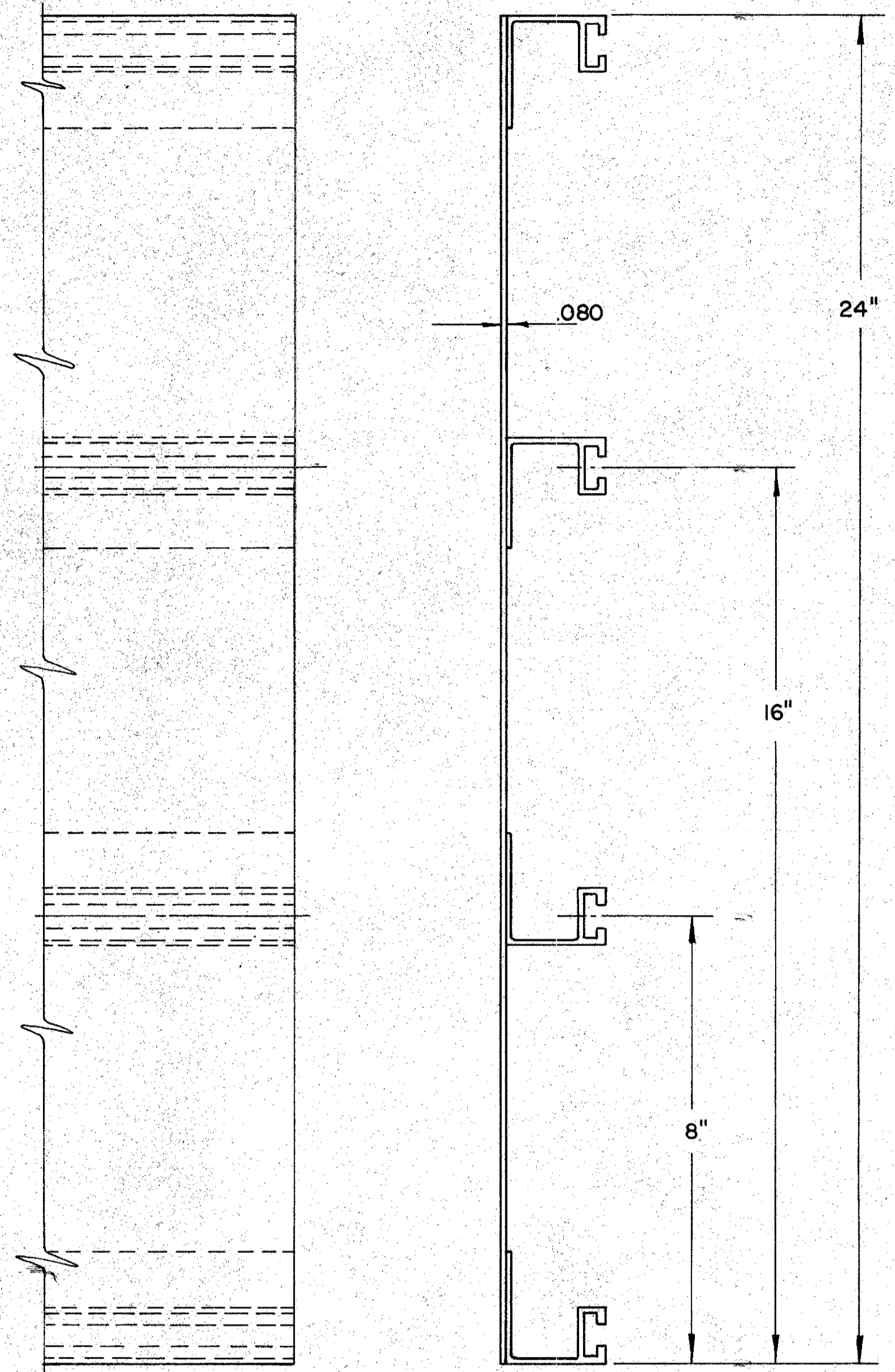
18" BOLTED-EXTRUSHEET PANEL



FRONT VIEW

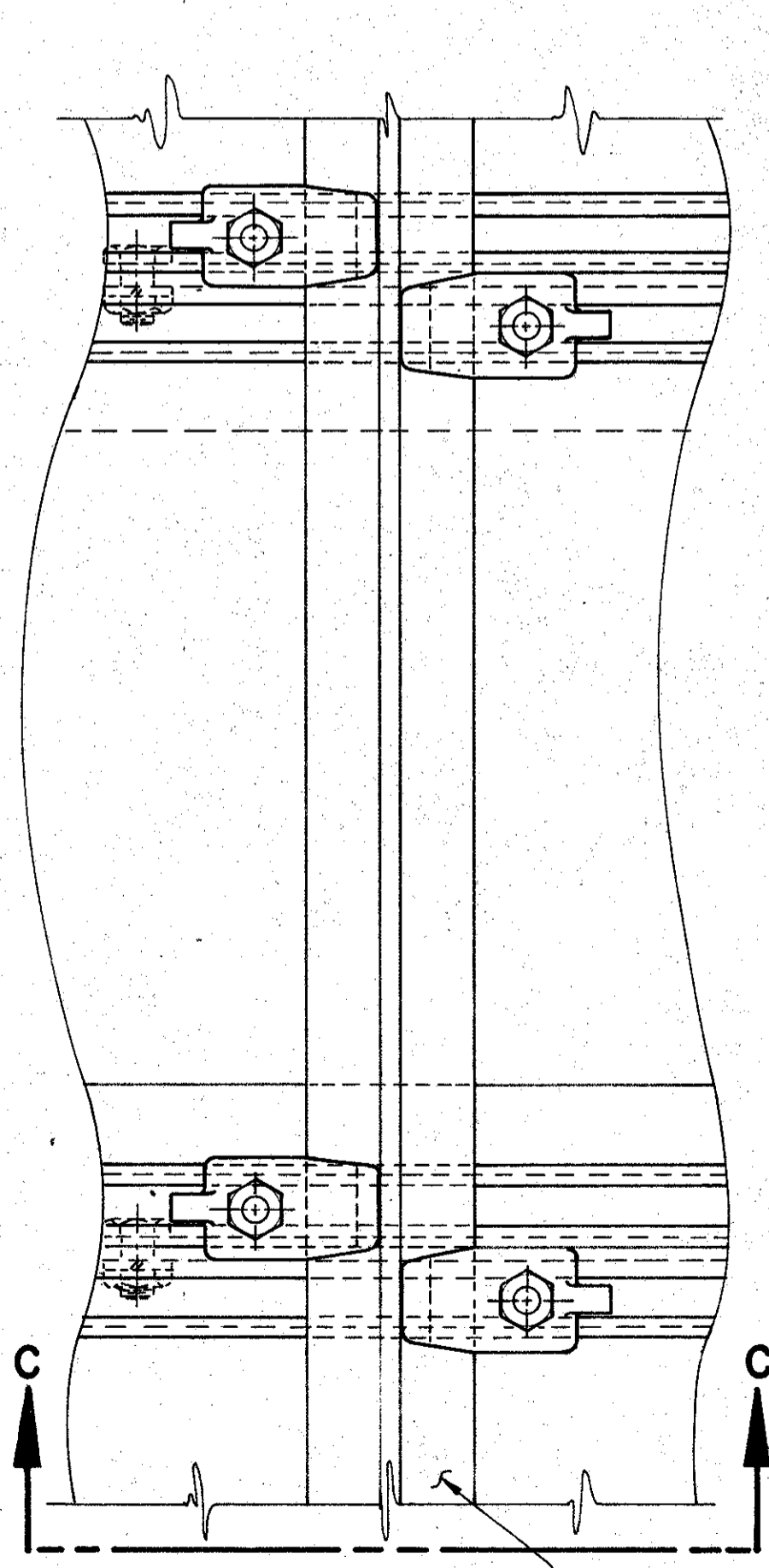
SIDE VIEW

24" BOLTED-EXTRUSHEET PANEL



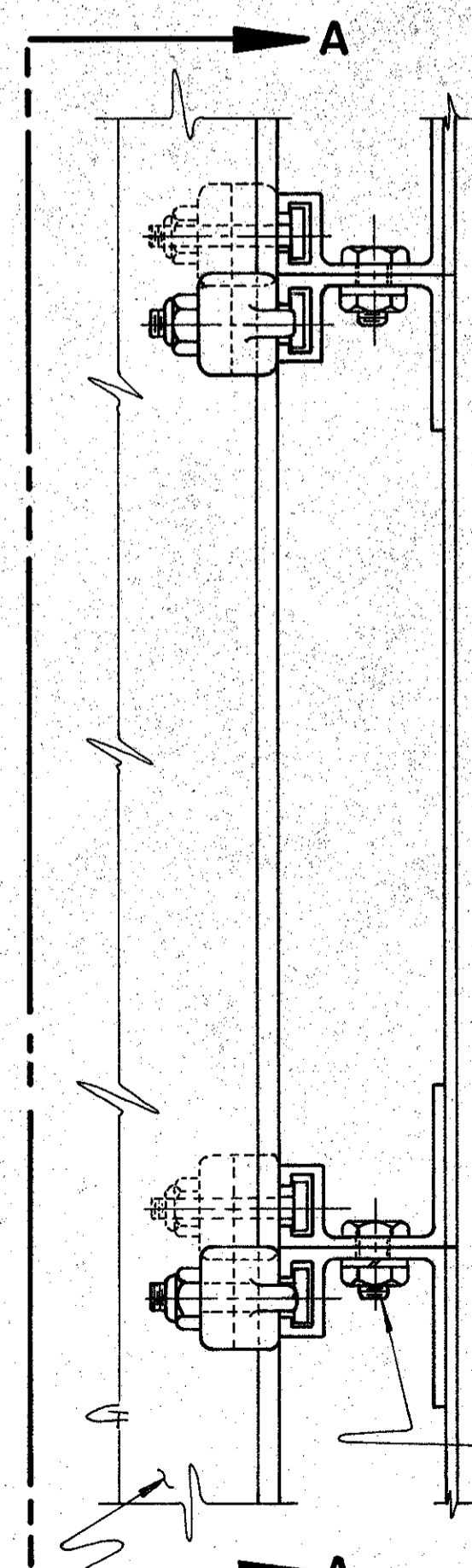
FRONT VIEW

SIDE VIEW

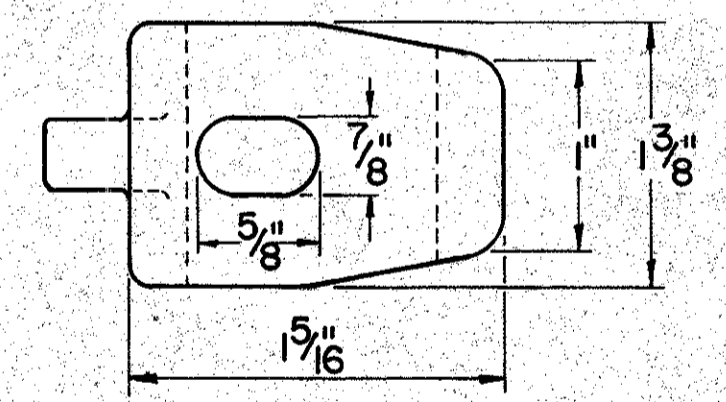


SECTION A-A

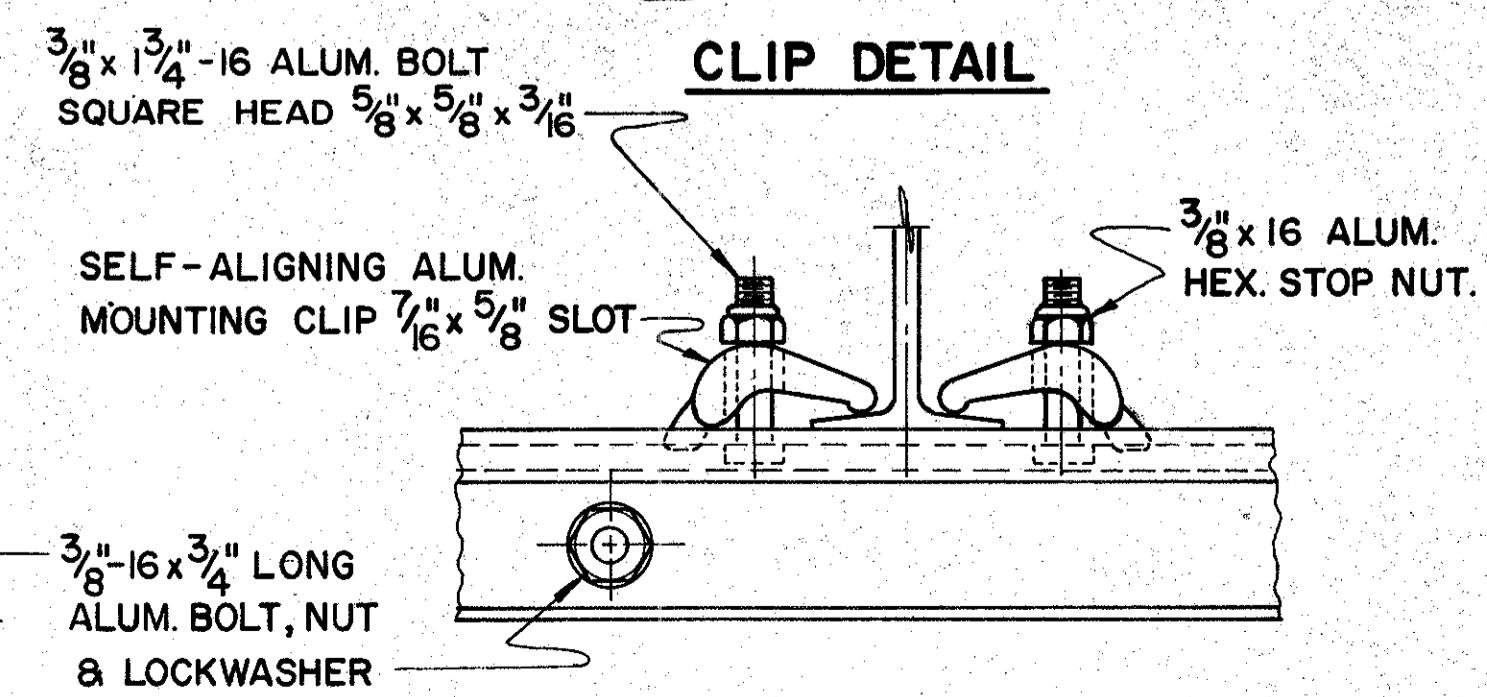
BEAM SUPPORT



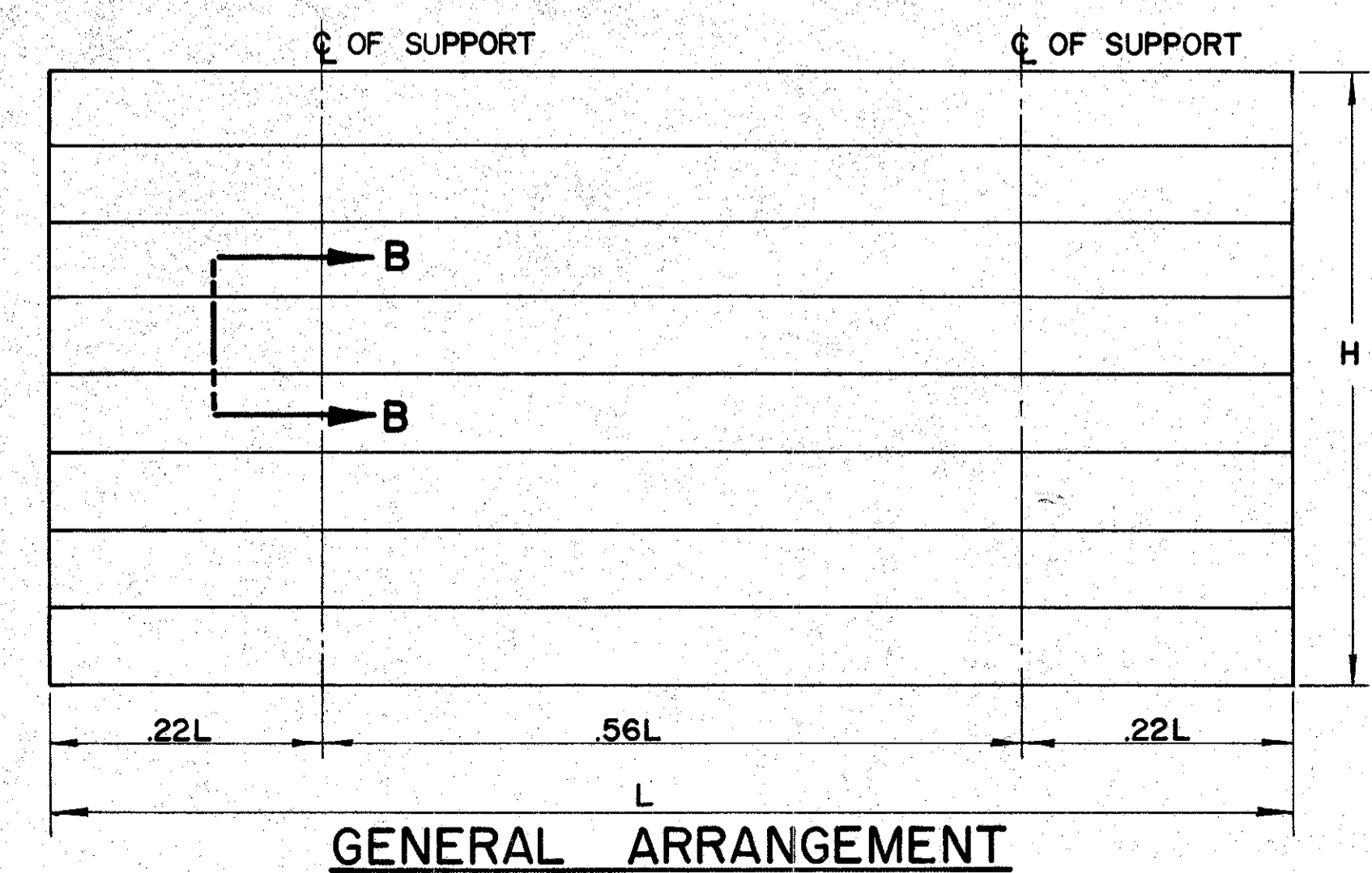
SECTION B-B



CLIP DETAIL



SECTION C-C



GENERAL ARRANGEMENT

NOTES

EXTRU-SHEET PANELS SHALL BE ALUMINUM; SPOT WELDING, MATERIALS AND HARDWARE SHALL CONFORM WITH SPECIFICATION NO. 815

COMBINATIONS OF 12", 18" AND 24" PANELS ARE TO BE USED TO ATTAIN REQUIRED SIGN HEIGHT.

INDIVIDUAL PANELS SHALL BE THE SAME LENGTH AS THE HORIZONTAL LENGTH OF SIGN, WITH NO SPLICES.

THE PANELS SHALL BE ERECTED HORIZONTALLY AND BOLTED ON 24" CENTERS.

THE PANELS SHALL BE FASTENED TO EACH VERTICAL SUPPORT MEMBER WITH MOUNTING CLIPS; ALTERNATELY AT EACH HORIZONTAL EXTRUSION; BOTH SIDES AT EACH JOINT, AND BOTH SIDES AT TOP AND BOTTOM EDGES OF SIGN.

THE PANELS SHALL BE DESIGNED IN ACCORDANCE WITH THE A.A.S.H.O SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, BASE ON A WIND LOAD OF 35#/SQ.FT.

THE MAXIMUM SIGN LENGTH FOR TWO SUPPORTS IS 19'-0". THE MAXIMUM SIGN LENGTH FOR THREE SUPPORTS IS 29'-0".

SPOT WELDS

PANEL SIZE	MAXIMUM SPOT WELD SPACING CENTER TO CENTER BETWEEN ROWS	
12 INCH	4 INCH	10 INCH
18 & 24 INCH	4 INCH	8 INCH

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

ALUMINUM BOLTED EXTRUSHEET PANEL SIGN

APPROVED *Fred C. Taylor*  
ENGINEER OF TRAFFIC

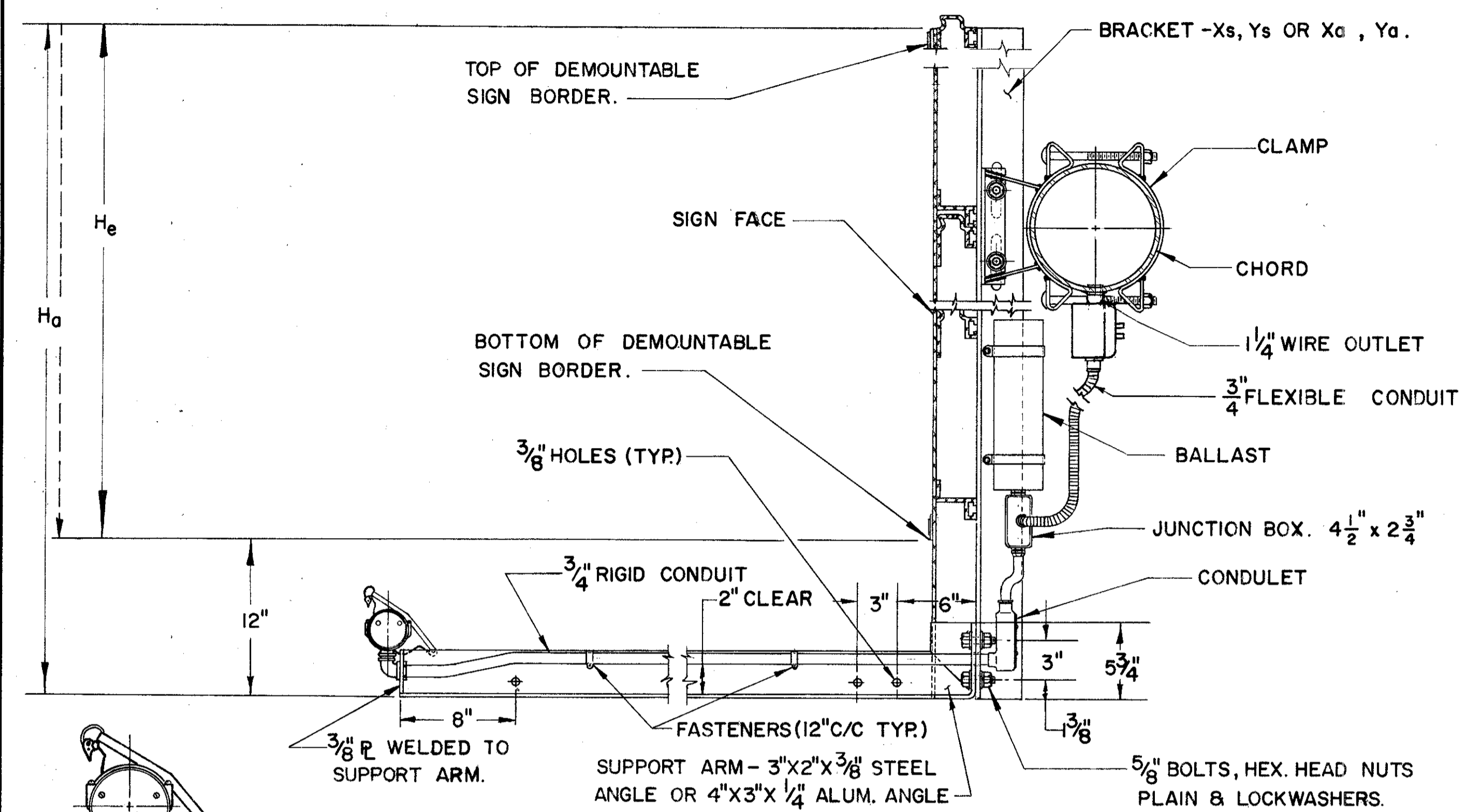
ECD  
2

DATE  
10-14-65

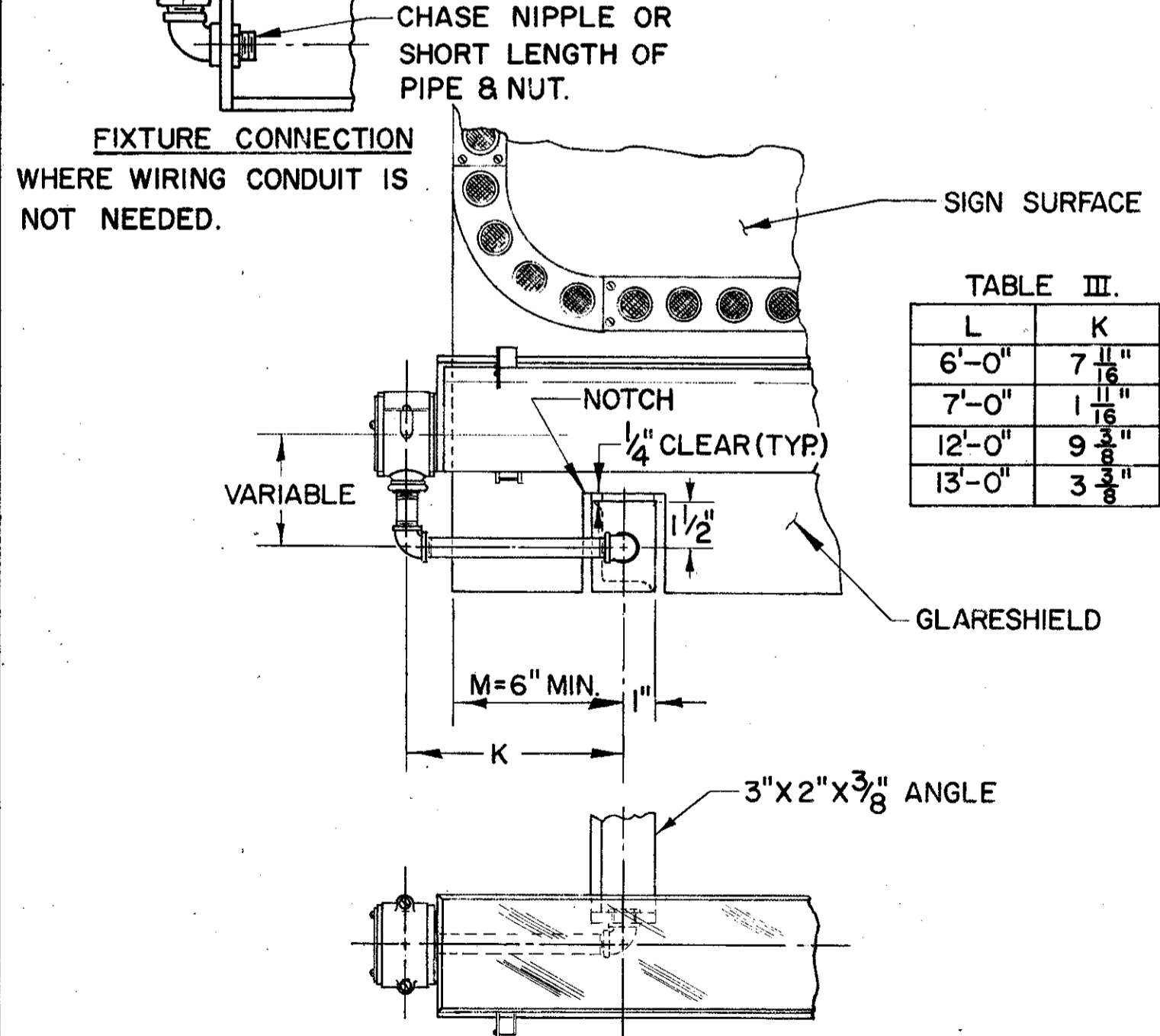
ALUMINUM BOLTED-EXTRUSHEET PANEL SIGN



CUYAHOGA COUNTY  
CUY. 480-21.40



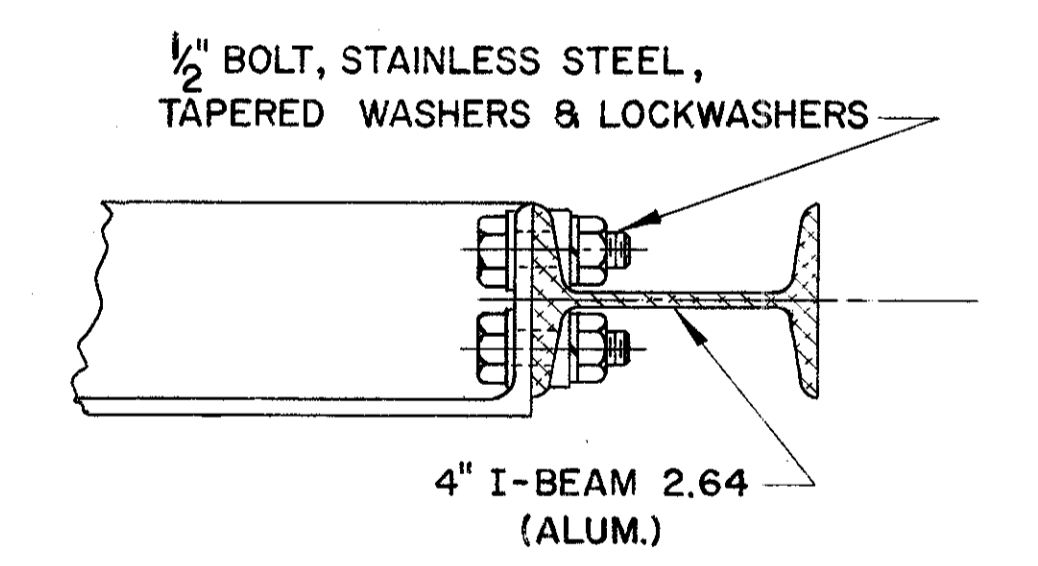
**STANDARD FIXTURE LOCATION (BELOW)**



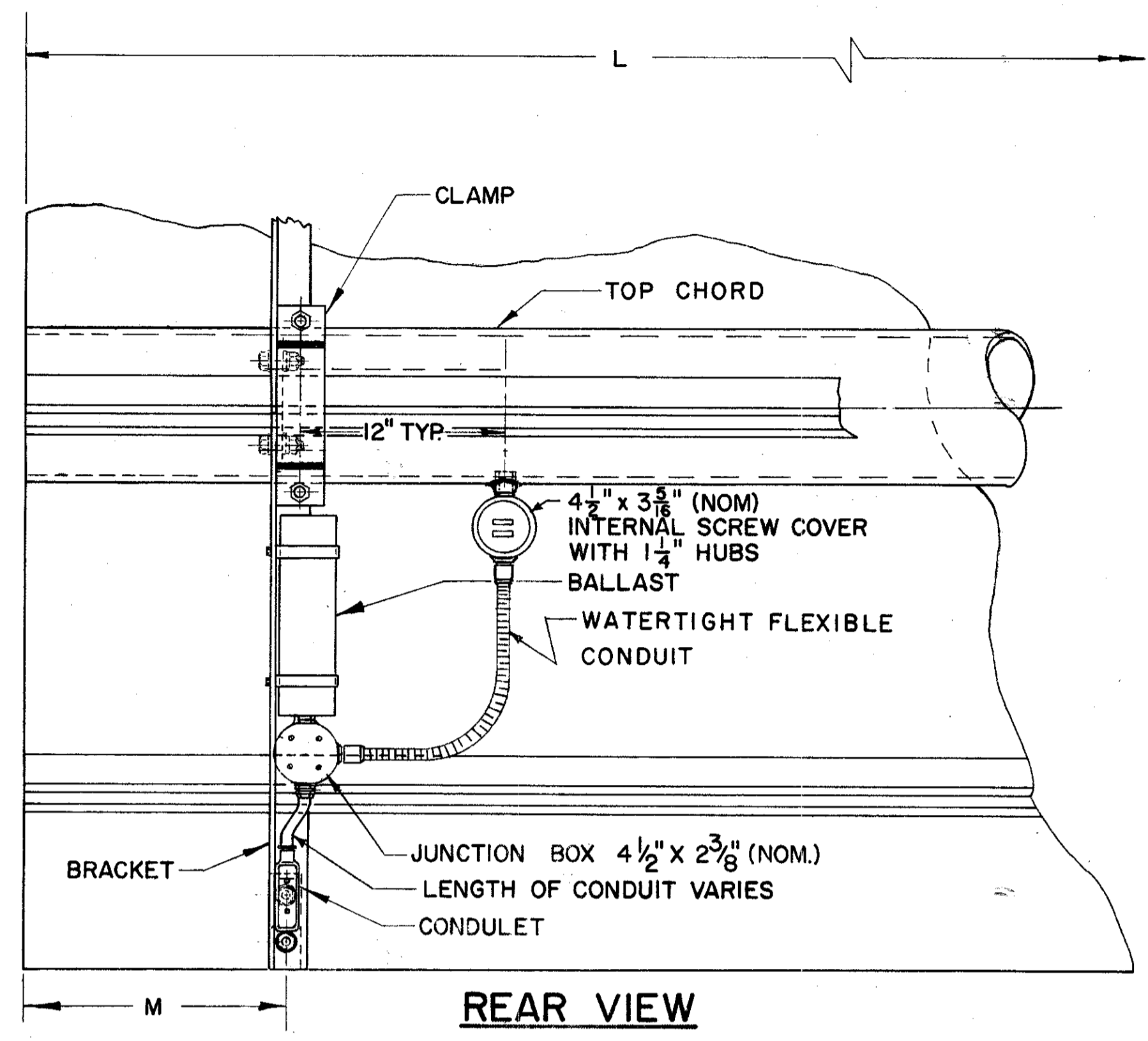
**DETAIL A.**

TABLE III.

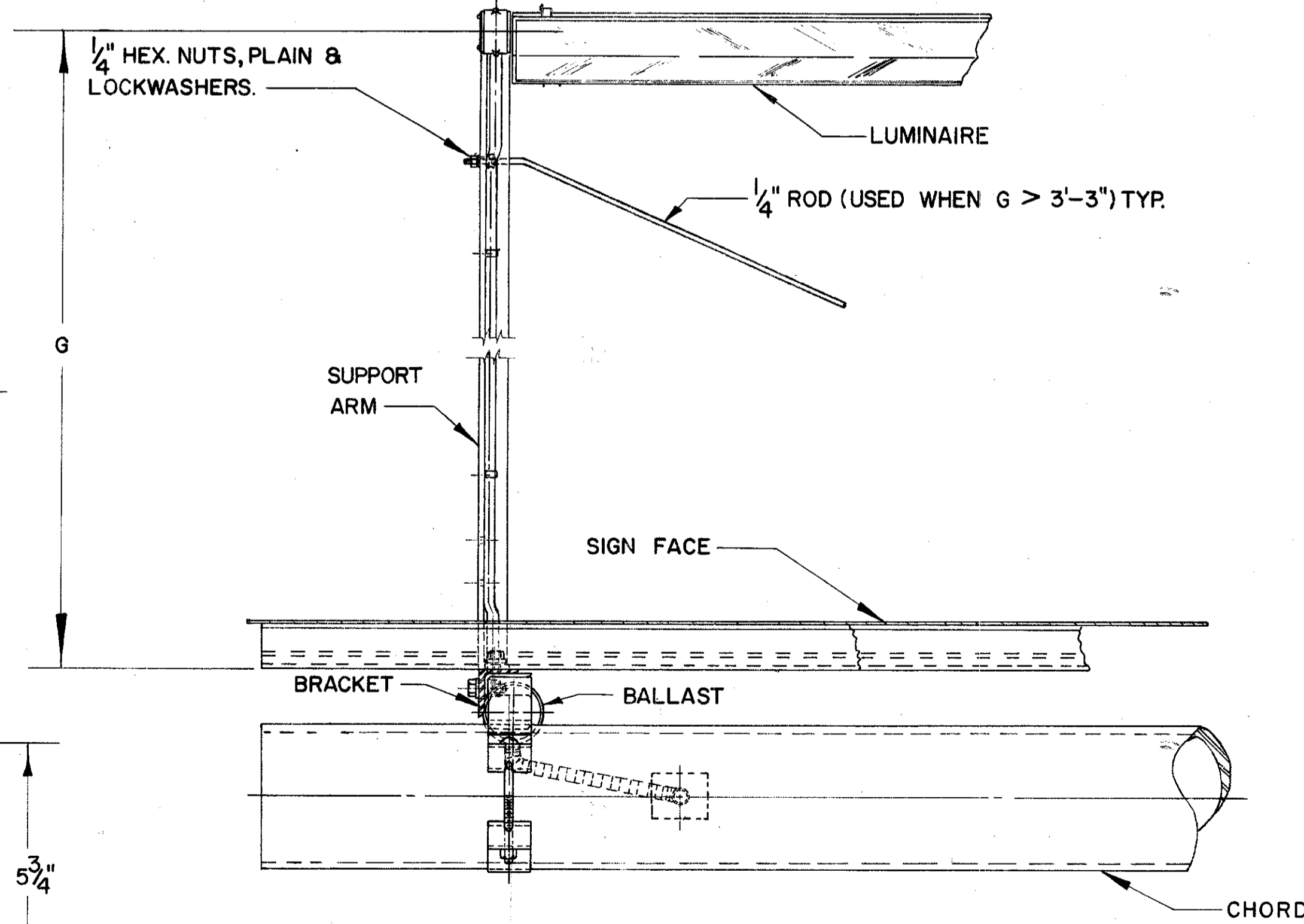
L	K
6'-0"	7 11/16"
7'-0"	1 11/16"
12'-0"	9 3/8"
13'-0"	3 3/8"



**DETAIL B.**



**REAR VIEW**



**TOP VIEW**

**FABRICATION**— ALL STRUCTURAL COMPONENTS SHOWN ON THIS SHEET SHALL CONFORM TO SUPPLEMENT SPECIFICATIONS 816.  
**MATERIALS**— THE MATERIALS USED IN THE COMPONENTS SHOWN ON THIS SHEET SHALL BE IN CONFORMANCE WITH THE MATERIALS USED IN THE SIGN SUPPORT

TABLE I.

SIGN LENGTH	"L" A	"L" B	FIXTURES OF	"M" EDGE DISTANCE				NO. BALLAST
				LT.	RT.	LT.	RT.	
6'-0"	7'-0"	1	75, 99, 93	6"	6"	6"	6"	1
8'-0"	9'-0"	1		10 3/8"	10 1/4"	16 3/8"	16 1/4"	1
10'-0"	11'-0"	1		10 3/8"	10 1/4"	16 3/8"	16 1/4"	1
12'-0"	13'-0"	2		6"	6"	6"	6"	1
14'-0"	15'-0"	2		8 5/8"	8 3/8"	14 5/8"	14 3/8"	1
16'-0"	17'-0"	1		8 5/8"	8 3/8"	14 5/8"	14 3/8"	1
18'-0"	19'-0"	2		8 5/8"	8 3/8"	14 5/8"	14 3/8"	1
20'-0"	21'-0"	3		7"	6 7/8"	13"	12 7/8"	2
22'-0"	23'-0"	2		7"	6 7/8"	13"	12 7/8"	2
24'-0"	25'-0"	1		7"	6 7/8"	13"	12 7/8"	2
26'-0"	27'-0"	3		7"	6 7/8"	13"	12 7/8"	2

Sn = Nominal Fixture Length, 72" & 96" respectively.  
Sa = Actual Fixture Length, for mounting purposes, 75 3/8" and 99 3/8" respectively. (Slight variation for different manufacturers.)  
M = Distance from edge of sign to center of notch, min. 6". When the length of the sign minus 1'-0" is less than the sum of the actual fixture lengths, an offset "K" is used. For additional details see detail A and table III.

TABLE II.  
MAX. BRACKET SPACING FOR EXTERNALLY ILLUMINATED SIGNS

ACTUAL SIGN HEIGHT "Ha"	SUPPORT TYPES			
	9.12, 11.08, 13.2, 7.2		9.24, 10.48, 12.24, 14.5, 15.8, 7.2 to 7.6	
	SINGLE TUBE	DOUBLE TUBE	SINGLE TUBE	DOUBLE TUBE
	C/C 36"-42"		C/C 48"-54" C/C 60"-72"	
	MAXIMUM BRACKET SPACING			
to 5'-0"	6'-4" with X 8'-4" with Y	8'-4" with X	8'-4" with X	8'-4" with X
5'-6" to 8'-0"	6'-4" with Y	4'-2" with X 6'-4" with Y	6'-4" with X 8'-4" with Y	8'-4" with X
8'-6" to 10'-0"	3'-2" with X 4'-2" with Y	6'-4" with Y	6'-4" with Y	8'-4" with Y
10'-6" to 12'-0"		4'-2" with Y	6'-4" with Y	6'-4" with Y
12'-6" to 14'-0"		3'-2" with Y	3'-2" with Y	4'-2" with Y

Ha = ACTUAL SIGN HEIGHT  
He = EFFECTIVE SIGN HEIGHT  
BRACKET SIZE: Xs = 3 1/2" x 2 1/2" x 5/16" - L @ 6.1 LB. STEEL } 9.12, 10.48, 11.08,  
Ys = 4" x 3 1/8" x 1/4" - Z @ 8.2 LB. STEEL } 12.24, 14.5 & 15.8  
Xa = 3" x 2 1/16" x 1/4" - Z @ 2.33 LB. ALUM. } 7.2 Thru 7.6  
Ya = 4" x 2 2/32" x 3/16" - I @ 2.64 LB. ALUM. }

WHEN MAX. ALLOWABLE SPACING IS LESS THAN ACTUAL FIXTURE LENGTHS, Sa, ADDITIONAL STANDARD BRACKETS MUST BE FURNISHED, EQUAL IN HEIGHT TO "Ha".

SUPPORTS 7.2 THROUGH 7.6 SHALL HAVE AN ALUMINUM FIXTURE ARM, 4" X 3" X 1/4" ANGLE. SEE DETAIL B. BOLTS AND ACCESSORIES SHALL BE STAINLESS STEEL.

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

STRUCTURAL DETAILS FOR EXTERNALLY ILLUMINATED SIGNS

DATE: 10-16-63  
5-6-64  
10-29-64  
6-21-66  
3-29-67

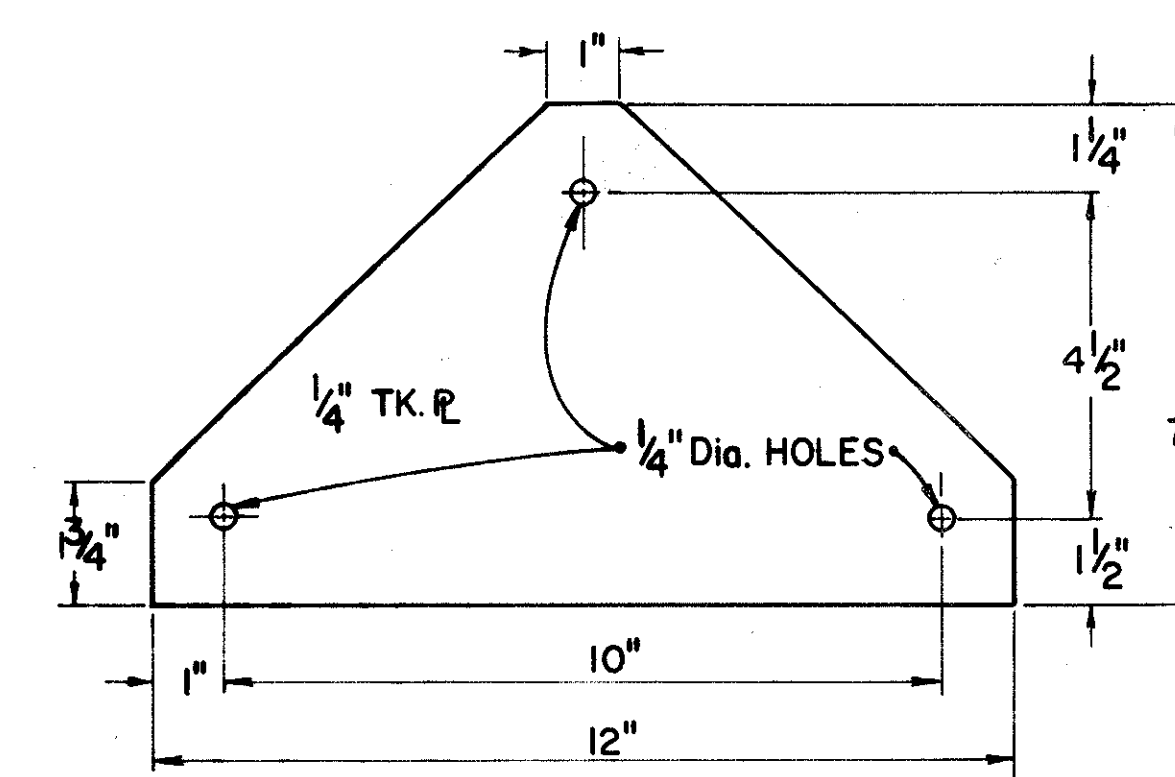
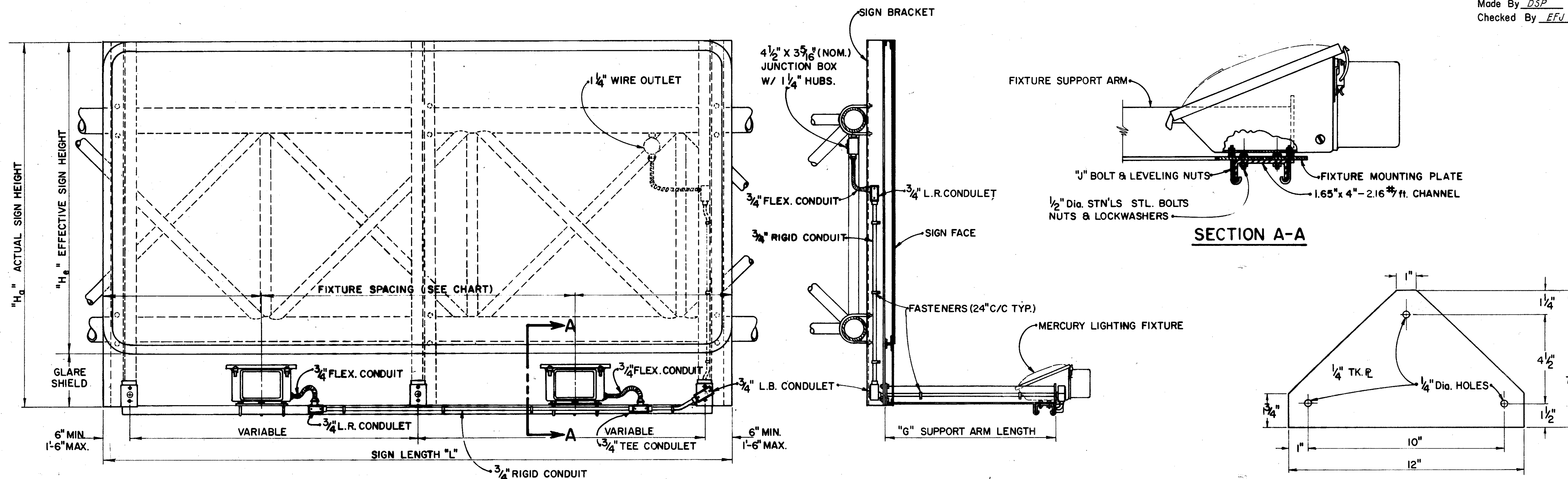
APPROVED: *John C. Taylor*  
ENGINEER OF TRAFFIC

CUYAHOGA COUNTY  
CUY. 480-21.40

QUANTITY CALCULATIONS

Made By DSP Date 8-27-73

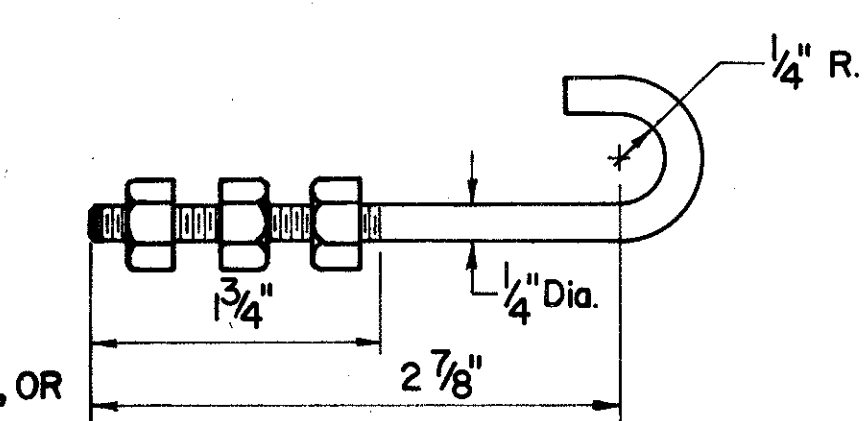
Checked By EFJ Date 9-4-73



EFFECTIVE SIGN HEIGHT "H"	SUPPORT ARM LENGTH "G"	APPROX. AIMING ANGLE	LAMP WATTS	ANSI LAMP CODE	BALLAST TYPE
3'-0" to 5'-0"	2'-9"	0°	100	H38-4HT	CMRI-100-(a)
5'-1" to 6'-6"	3'-3"	0°	175	H39-22KB	CMRI-175-(a)
6'-7" to 10'-0"	4'-3"	2°	175	H39-22KB	CMRI-175-(a)
10'-1" to 13'-0"	5'-9"	8°	250	H37-5KB	CMRI-250-(a)
13'-1" to 15'-0"	7'-3"	8°	250	H37-5KB	CMRI-250-(a)

(a) = OPERATING VOLTAGE (120V, 208V, 240V, 277V, OR 480V.)

FIXTURE MOUNTING PLATE (ALUMINUM)



J" BOLT (STAINLESS STEEL BOLT, NUTS & LOCKWASHERS)

SIGN LENGTH "L"	NO. OF FIXTURES	LIGHT FIXTURE SPACING				SUPPORT ARM SPACING				NO. OF SIGN BRACKETS	
		2'-0"	2'-0"			6"	36"	6"			
4'-0"	1	2'-0"	2'-0"			6"	36"	6"		2	
5'-0"	1	2'-6"	2'-6"			6"	48"	6"		2	
6'-0"	1	3'-0"	3'-0"			6"	60"	6"		2	
7'-0"	1	3'-6"	3'-6"			6"	72"	6"		2	
8'-0"	1	4'-0"	4'-0"			10 3/8"	75 3/8"	10 1/4"		2	
9'-0"	1	4'-6"	4'-6"			16 3/8"	75 3/8"	16 1/4"		2	
10'-0"	1	5'-0"	5'-0"			10 3/8"	99 3/8"	10 1/4"		2	
11'-0"	1	5'-6"	5'-6"			16 3/8"	99 3/8"	16 1/4"		2	
12'-0"	2	3'-0"	6'-0"	3'-0"		6"	66"	66"	6"	3	
13'-0"	2	3'-6"	6'-0"	3'-6"		6"	72"	72"	6"	3	
14'-0"	2	4'-0"	6'-0"	4'-0"		8 5/8"	75 3/8"	75 3/8"	8 5/8"	3	
15'-0"	2	4'-6"	6'-0"	4'-6"		14 5/8"	75 3/8"	75 3/8"	14 5/8"	3	
16'-0"	2	4'-0"	8'-0"	4'-0"		8 5/8"	75 3/8"	99 3/8"	8 5/8"	3	
17'-0"	2	4'-6"	8'-0"	4'-6"		14 5/8"	75 3/8"	99 3/8"	14 5/8"	3	
18'-0"	2	4'-0"	10'-0"	4'-0"		8 5/8"	99 3/8"	99 3/8"	8 5/8"	3	
19'-0"	2	4'-6"	10'-0"	4'-6"		14 5/8"	99 3/8"	99 3/8"	14 5/8"	3	
20'-0"	3	4'-0"	6'-0"	6'-0"	4'-0"	7"	75 3/8"	75 3/8"	75 3/8"	6 7/8"	4
21'-0"	3	4'-6"	6'-0"	6'-0"	4'-6"	13"	75 3/8"	75 3/8"	75 3/8"	12 1/8"	4
22'-0"	3	4'-0"	7'-0"	7'-0"	4'-0"	7"	75 3/8"	75 3/8"	99 3/8"	6 7/8"	4
23'-0"	3	4'-6"	7'-0"	7'-0"	4'-6"	13"	75 3/8"	75 3/8"	99 3/8"	12 1/8"	4
24'-0"	3	4'-0"	8'-0"	8'-0"	4'-0"	7"	75 3/8"	99 3/8"	99 3/8"	6 7/8"	4
25'-0"	3	4'-6"	8'-0"	8'-0"	4'-6"	13"	75 3/8"	99 3/8"	99 3/8"	12 1/8"	4
26'-0"	4	4'-0"	6'-0"	6'-0"	6'-0"	7"	99 3/8"	99 3/8"	99 3/8"	6 7/8"	4
27'-0"	4	4'-6"	6'-0"	6'-0"	6'-0"	13"	99 3/8"	99 3/8"	99 3/8"	12 1/8"	4

Sign Numbers	Roadway	Reference	Station	Effective Sign Size	Fixtures With Lamps AN-51 Lamp 6000	Watts Per Sign		Sign Switch	Sign Panel/ Wire Complete	Sign Service Complete	Ground Rod
						Ea.	Ea.				
141	I-480	A	1159+00 E.B.	25'-0" x 11'-6"	3	250	3	1	1	1	1
		B		18'-0" x 9'-6"	2	175	2	1	1	1	1
142	I-480	A	1168+00 E.B.	25'-0" x 11'-6"	3	250	3	1	1	1	1
		B		14'-0" x 8'-0"	2	175	2	1	1	1	1
		C		21'-0" x 7'-0"	3	175	3	1	1	1	1
143	I-480	B	1182+33 W.B.	18'-0" x 11'-6"	2	250	2	1	1	1	1
		C		22'-0" x 11'-6"	3	250	3	1	1	1	1
144	Bedford Frwy.	A	59+88	16'-0" x 9'-6"	2	175	2	1	1	1	1
		B		11'-0" x 6'-0"	1	175	1	1	1	1	1
146	Bedford Ave.	A	44+50	11'-0" x 8'-6"	1	175	1	1	1	1	1
148	Broadway	A	90+07 N.B.	8'-0" x 6'-0"	1	175	1	1	1	1	1
		B		8'-0" x 6'-0"	1	175	1	1	1	1	1
149	Broadway	B	80+40 S.B.	8'-0" x 6'-0"	1	175	1	1	1	1	1
150	I-480	A	1180+70 E.B.	15'-0" x 8'-0"	2	175	2	1	1	1	1
TOTAL						11	16	11	16	8	8

BUREAU OF DESIGN SERVICES  
OHIO DEPARTMENT OF HIGHWAYS

MERCURY VAPOR SIGN LIGHTING DETAILS

STANDARD CONSTRUCTION DRAWING

APPROVED \_\_\_\_\_  
ENGINEER OF DESIGN SERVICES

DATE  
4-13-72

CUYAHOGA COUNTY  
CUY. 480-21.40

**NOTES**

**GENERAL**

DETAILS OF THIS SHEET SHALL APPLY TO EACH OVERHEAD SIGN STRUCTURE TO SUPPORT EXTERNALLY ILLUMINATED SIGNS.

**SERVICE**

ELECTRIC SERVICE SHALL ENTER THROUGH A 2" GALVANIZED RIGID STEEL CONDUIT INSTALLED IN STRUCTURE FOUNDATION AS PER DETAIL. SIGN SERVICE OR CIRCUITRY SHALL BE CONTROLLED AS REQUIRED BY THE SYSTEM DESIGN AT THE PRIMARY SOURCE.

SERVICE CONDUCTORS SHALL BE THE SIZE AND TYPE AS SPECIFIED.

**COMBINATION SWITCH AND TRANSFORMER**

(TYPE Y OR Z ENCLOSURE REQUIRED AS PER SCHEDULE ON THIS SHEET)

THIS COMBINATION SHALL BE A 30 OR 60 AMPERE 600 VOLT SWITCH WITH A .25 TO 3.0 KVA TRANSFORMER. THE COMBINATION AND ENCLOSURE SHALL BE AS SQUARE D CLASS 9421, COLUMBUS ELECTRIC WORKS CLASS 101, PANALS INCORPORATED-CLASS 9400, OR APPROVED EQUAL.

**TRANSFORMER**

THE TRANSFORMER SHALL BE DRY TYPE SINGLE PHASE 240/480 VOLT PRIMARY 120/240 VOLT SECONDARY, THE TYPE AND CAPACITY AS SPECIFIED IN DETAILED SCHEDULE ON THIS SHEET.

**ENCLOSURE**

THE ENCLOSURE SHALL BE NEMA #4 WATER TIGHT .063 GAGE STAINLESS STEEL ASTA 302-303. A DISCONNECT HANDLE SHALL BE FLANGE MOUNTED AND CAPABLE OF BEING LOCKED IN EITHER POSITION. THE ENCLOSURE SHALL BE EQUIPPED WITH A DOOR LOCKING MECHANISM WITH A DEFEATER THAT NECESSITATES TWO HANDS TO OPERATE MECHANISM WITH THE SWITCH IN OFF POSITION. SPACE FOR A 2" INSULATED CHASE NIPPLE SHALL BE PROVIDED APPROXIMATELY 2 1/4" ABOVE THE CENTER LINE OF THE LOWER MOUNTING SLOT. THIS ENCLOSURE AND STRUCTURE SHALL BE FIELD DRILLED AND TAPPED FOR THE REQUIRED NIPPLE AS SHOWN ON THE DETAIL ON THIS SHEET.

THIS ENCLOSURE SHALL BE FLANGE MOUNTED ON BRACKETS WITH 5/16"-18x3/4" HEX HEAD CADMIUM PLATED MACHINE BOLTS. ENCLOSURES SHALL BE TYPE Y OR Z AS SPECIFIED AND DIMENSIONED ON THIS SHEET.

**ENCLOSURE MOUNTING BRACKET**

THE ENCLOSURE MOUNTING BRACKET SHALL BE FABRICATED THEN GALVANIZED BEFORE ASSEMBLY. THE BRACKET SHALL BE FIELD MOUNTED WITH 5/16" HEX HEAD SELF TAPPING CADMIUM PLATED SCREWS. THE SIGN SUPPORT SHALL BE FIELD DRILLED, AS PER DETAIL.

**WIRE AND CABLE**

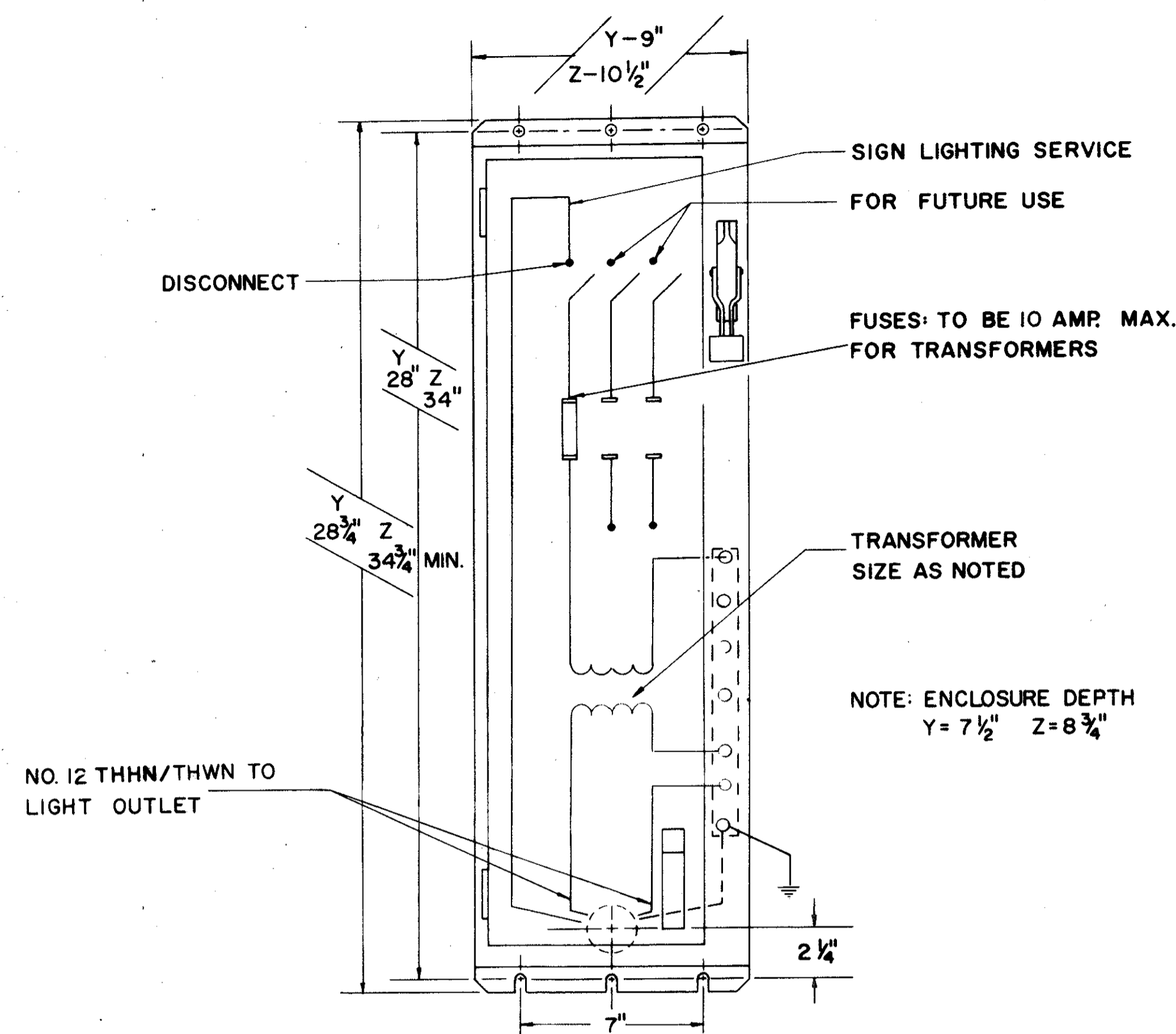
ALL WIRE AND CABLE SHALL BE 600 VOLT AND CONFORM TO SECTION 713.02

**GROUNDING**

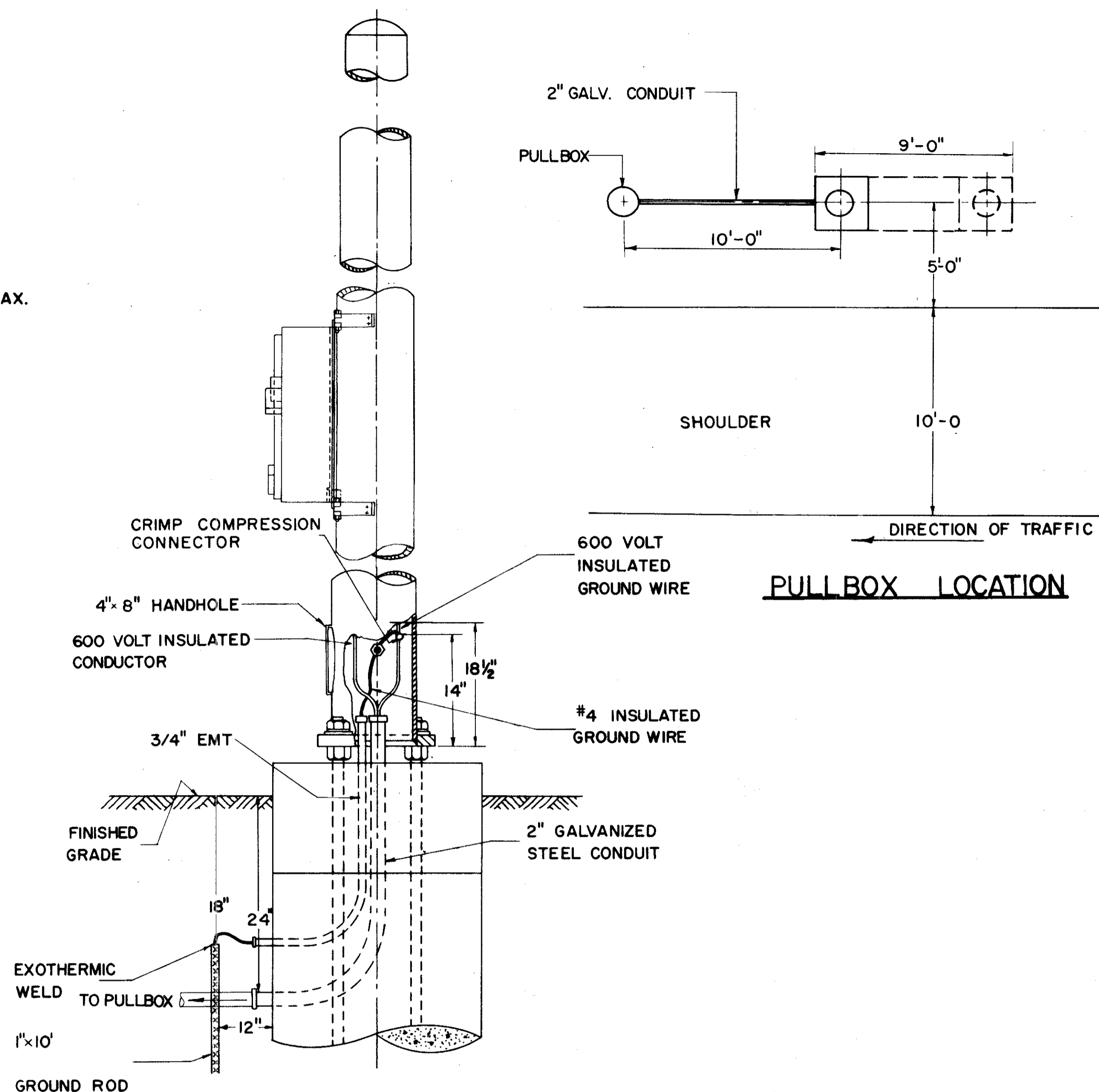
EACH SIGN SUPPORT OR STRUCTURE SHALL BE GROUNDED WITH A #4 INSULATED CONDUCTOR. THE GROUNDING

CONDUCTOR SHALL BE CONNECTED TO THE SWITCH THEN TO THE COMPRESSION CONNECTOR IN THE SIGN SUPPORT THEN TO A 1"x10" GROUND ROD. GROUND CONDUCTOR SHALL BE

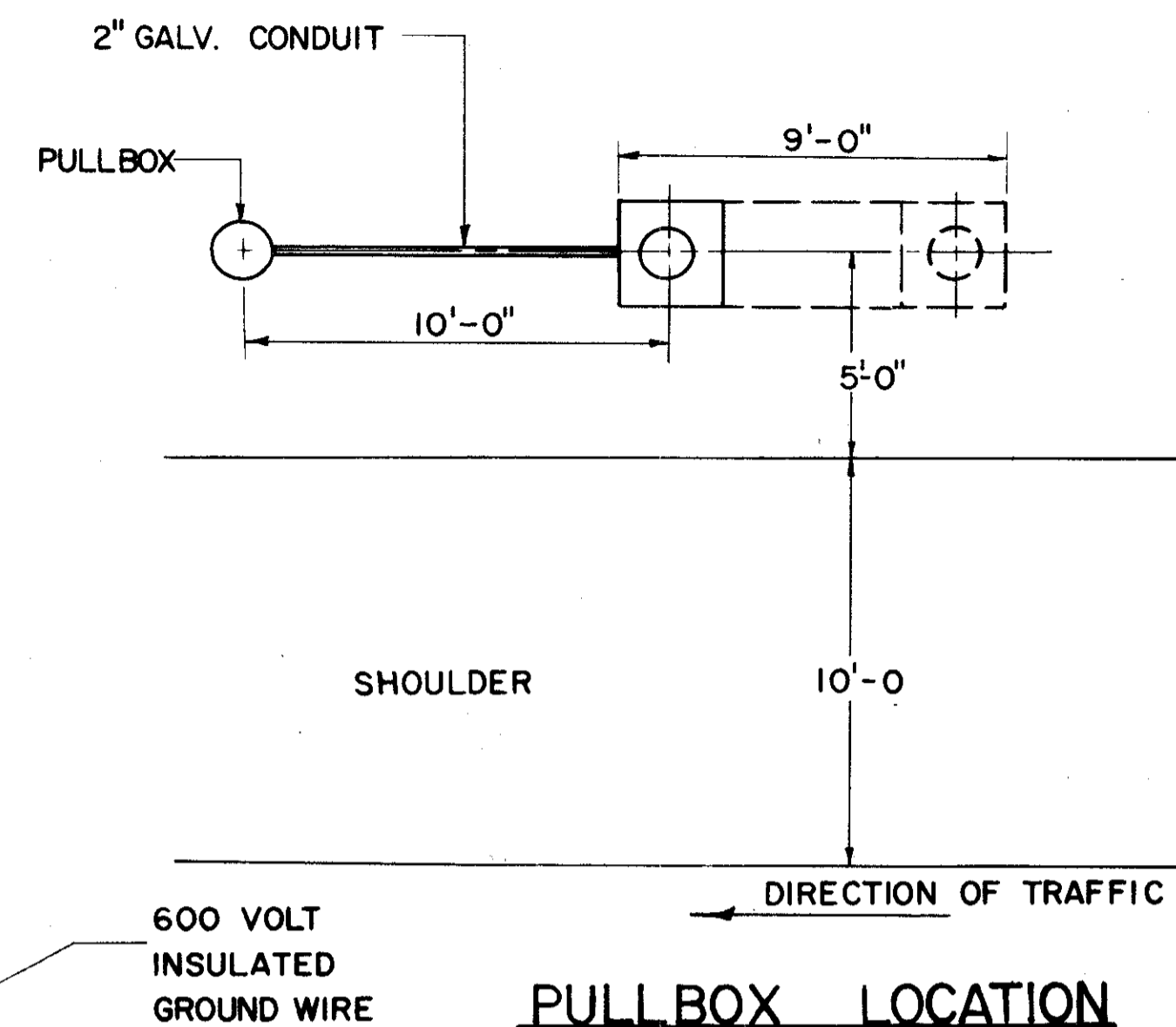
EXOTHERMICALLY WELDED TO GROUND ROD AND THEN TAPED WITH PLASTIC ELECTRICAL TAPE AT EACH EXPOSED PORTION OF CONDUCTOR. THE WELDED CONNECTION AND TAPED PORTION SHALL BE PAINTED 2 COATS OF INSULATING ENAMEL.



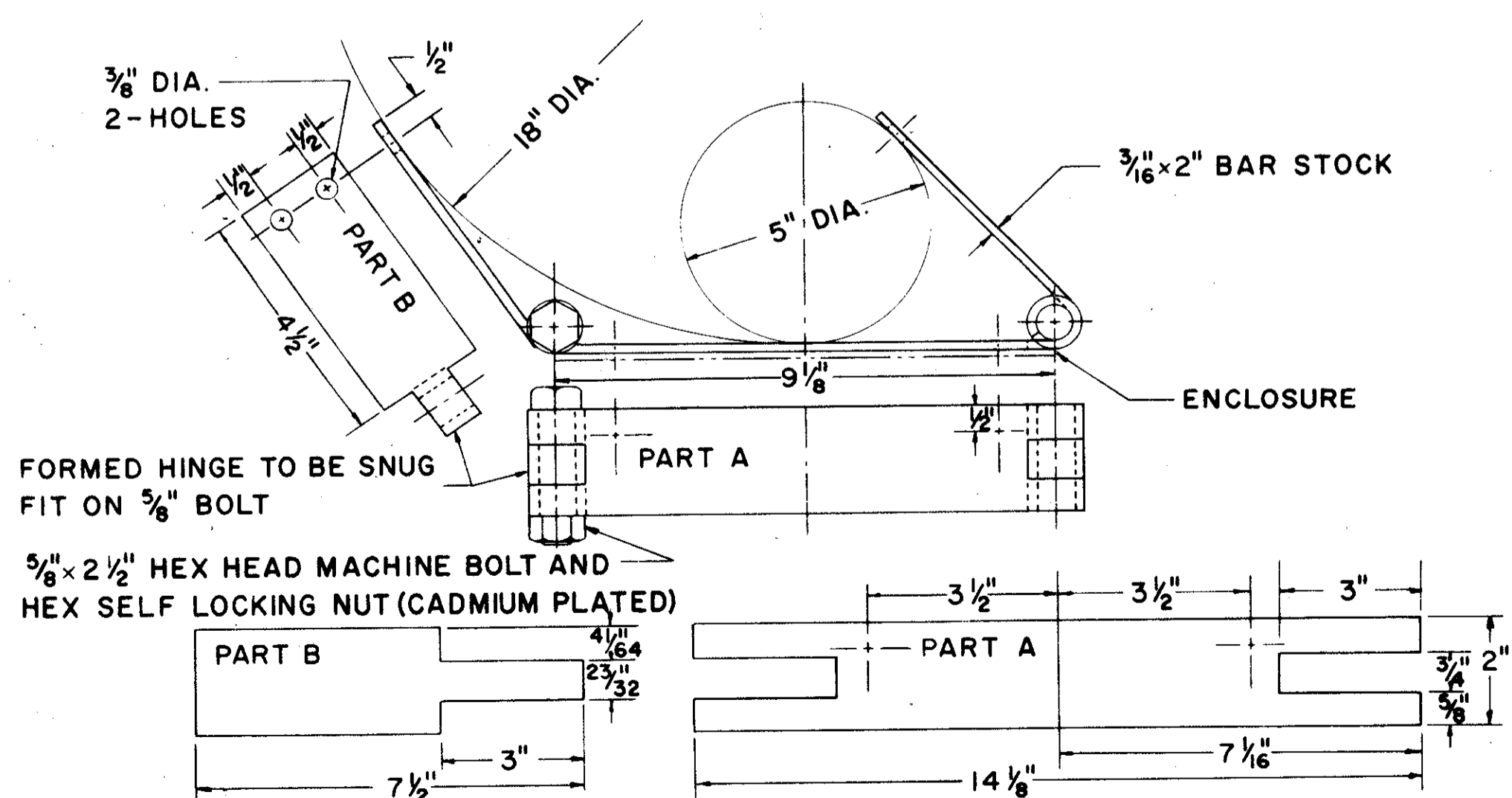
**TYPICAL ENCLOSURE DETAIL**  
480 VOLT SIGN LIGHTING SERVICE



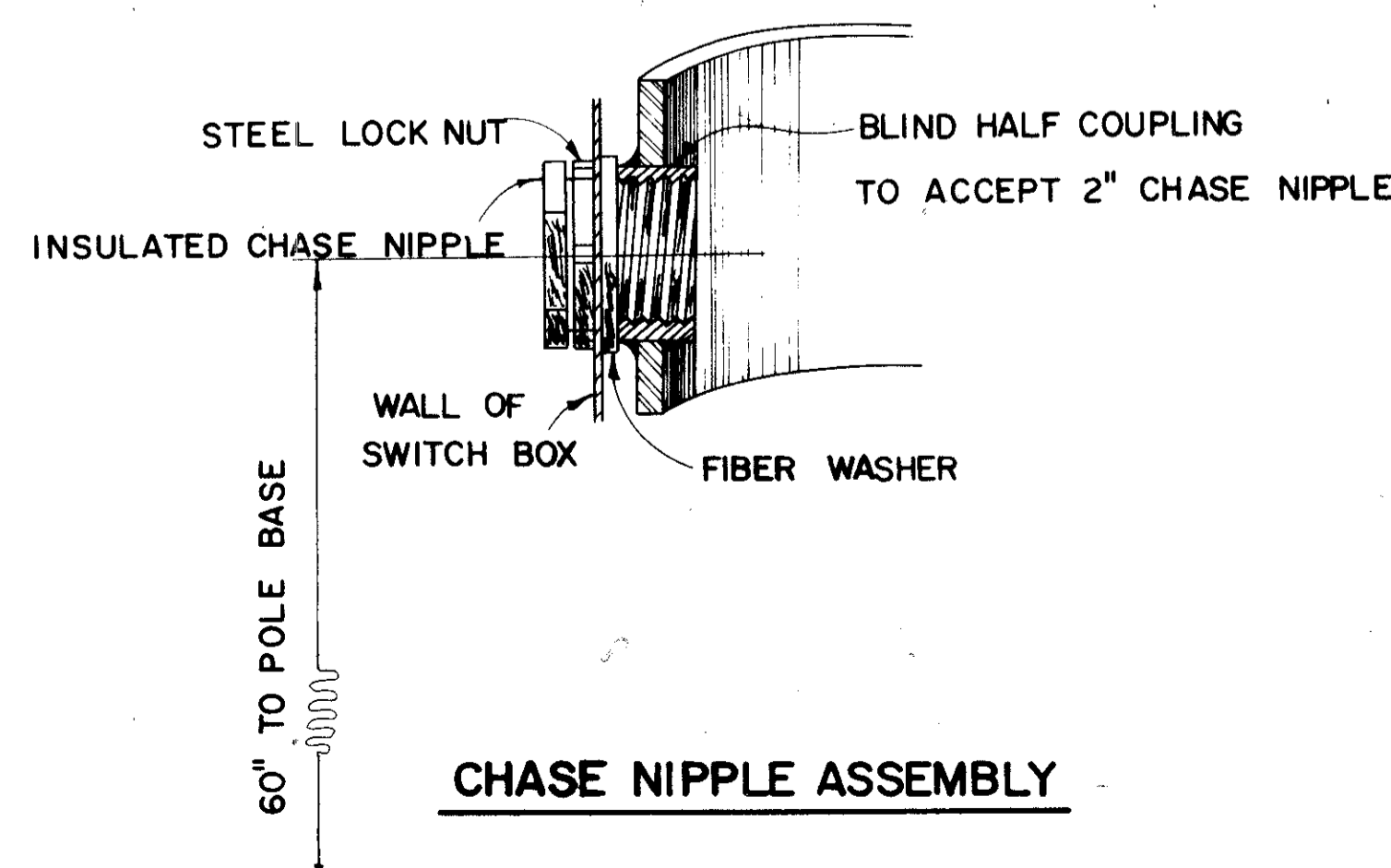
**SIGN SUPPORT DETAIL FOR ILLUMINATED SIGNS**



**PULL BOX LOCATION**



**ENCLOSURE MOUNTING BRACKET**



**CHASE NIPPLE ASSEMBLY**

**TRANSFORMERS**

TYPE	MANUFACTURERS G.E.	JEFFERSON	OUTPUT K.V.A.	SWITCH TRANSFORMER ENCLOSURE
I	9T51Y7	211-041	.25	Y
II	9T51Y8	211-051	.50	Y
III	9T51Y9	211-061	.75	Y
IV	9T51Y10	211-071	1.00	Z
V	9T51Y11	211-081	1.50	Z
VI	9T51Y12	211-091	2.00	Z
VII	9T51Y13	211-2102	3.00	Z

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

ELECTRICAL SIGN  
SERVICE DETAILS  
480 VOLT SYSTEM

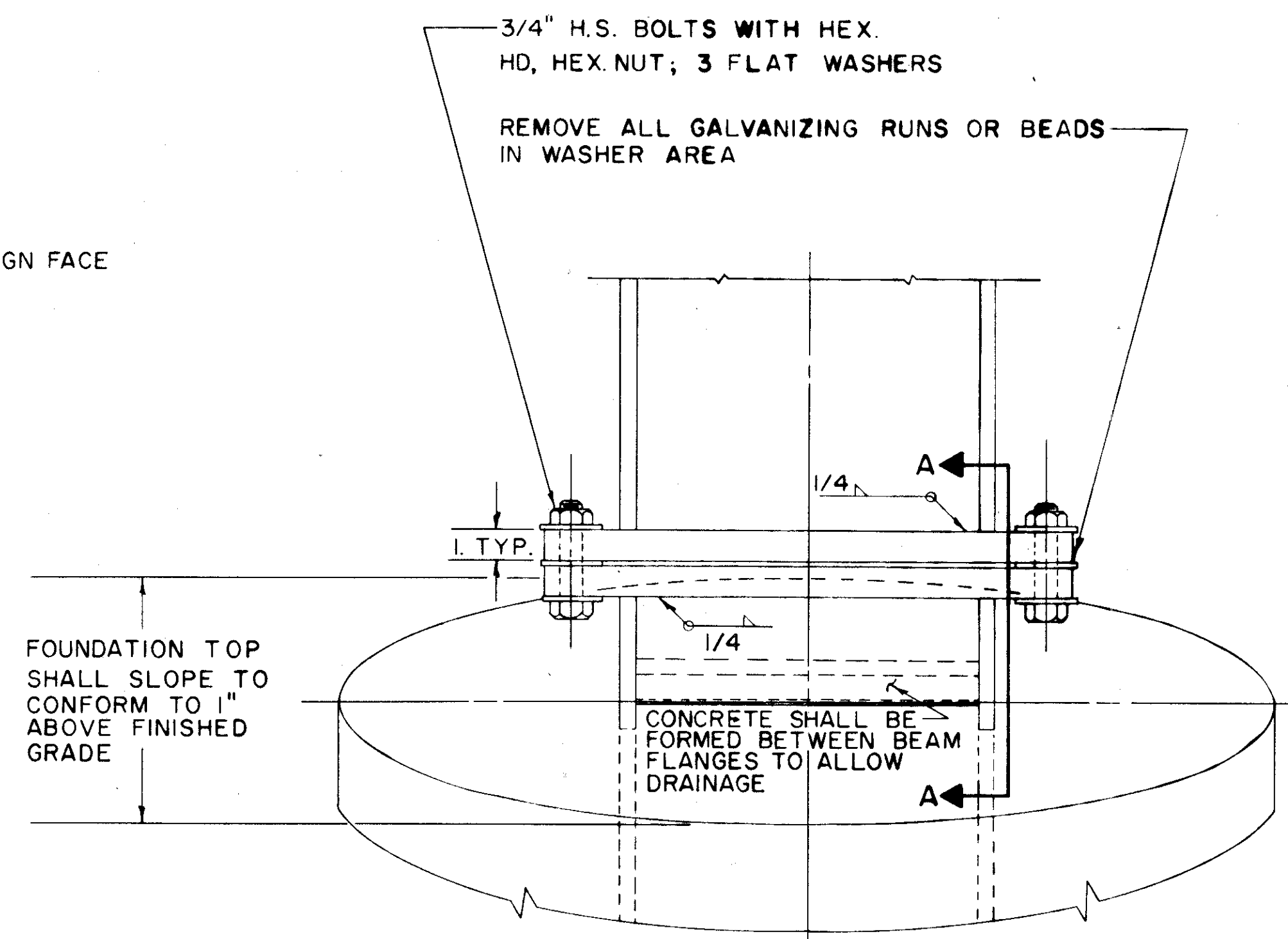
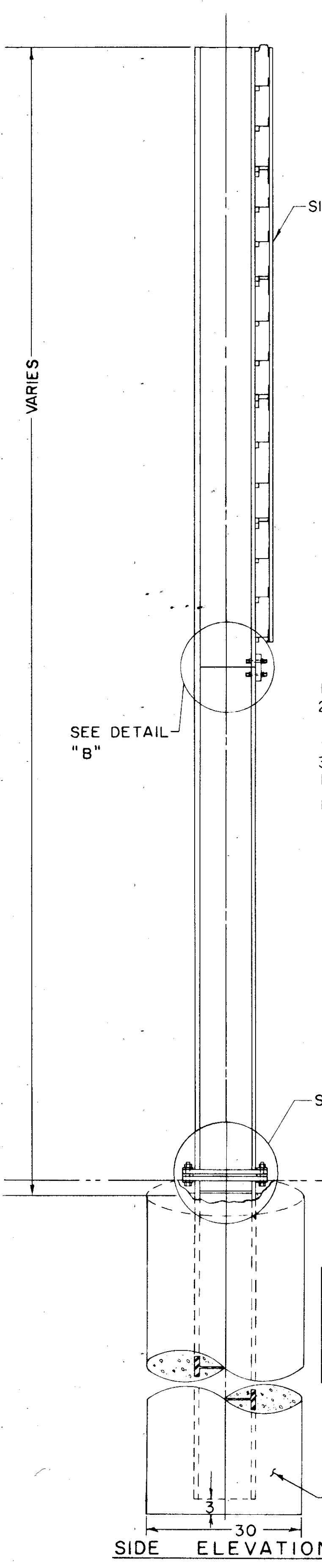
DATE  
6-18-64  
9-15  
7-31-70  
2-03-72

APPROVED \_\_\_\_\_  
ENGINEER OF TRAFFIC

L-1

FED. RD. DIVISION	STATE	PROJECT	250
2	OHIO		390

CUYAHOGA COUNTY  
CUY. 480-21.40

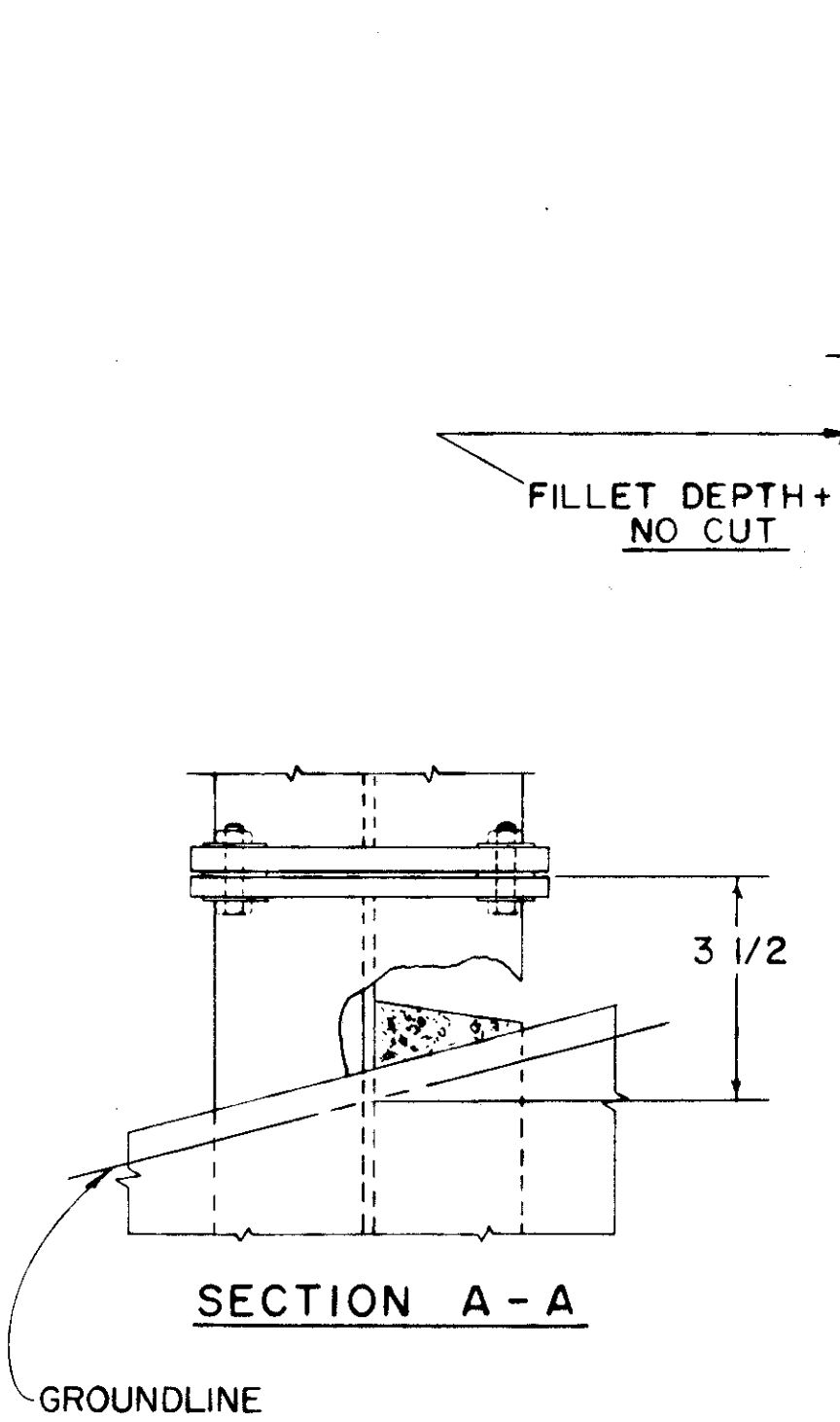


**BOLTING PROCEDURE**

1. ASSEMBLE POST TO STUB W/BOLTS & ONE FLAT WASHER ON EACH BOLT BETWEEN PLATES.
2. TIGHTEN ALL BOLTS THE MAXIMUM POSSIBLE W/12" TO 15" WRENCH TO BED & TO CLEAN BOLT THREADS. LOOSEN EACH BOLT IN TURN & RETIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE OF 750 IN. LBS.
3. BURR THREADS AT JUNCTION W/NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

NOTE: TIGHTEN THE H.S. BOLTS IN THE BASE CONNECTION ONLY TO GIVEN TORQUE DO NOT OVER TIGHTEN

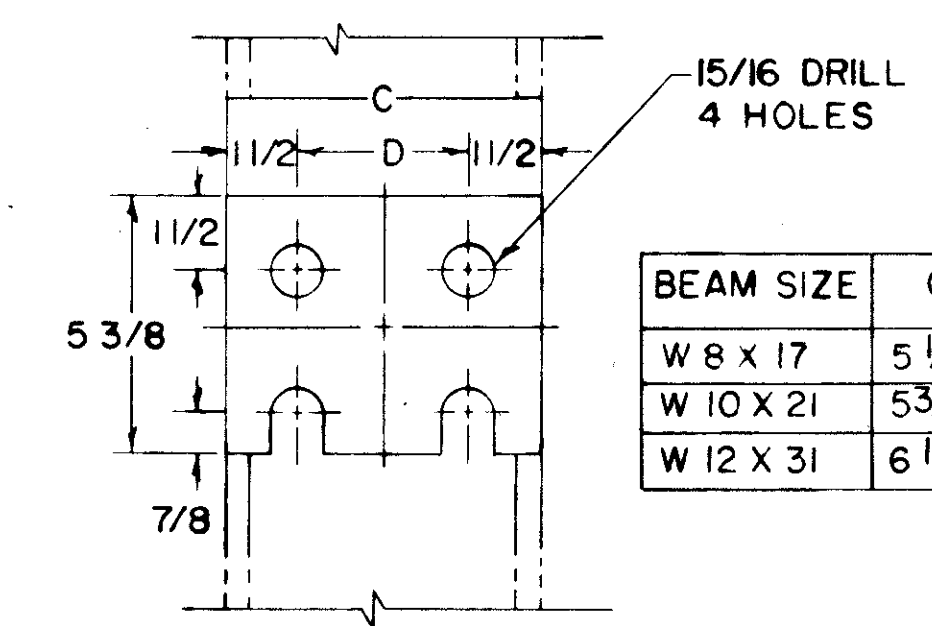
VIEW "A" ROTATED 180°



FABRICATOR NOTE: ALL FRICTION FUSE BOLTS SHALL BE TIGHTENED IN THE SHOP FOLLOWING A METHOD APPROVED BY THE ENGINEER. TIGHTENING SHALL BE TO SUCH A DEGREE AS TO OBTAIN MINIMUM RESIDUAL TENSION IN EACH BOLT OF 36,050 LBS.

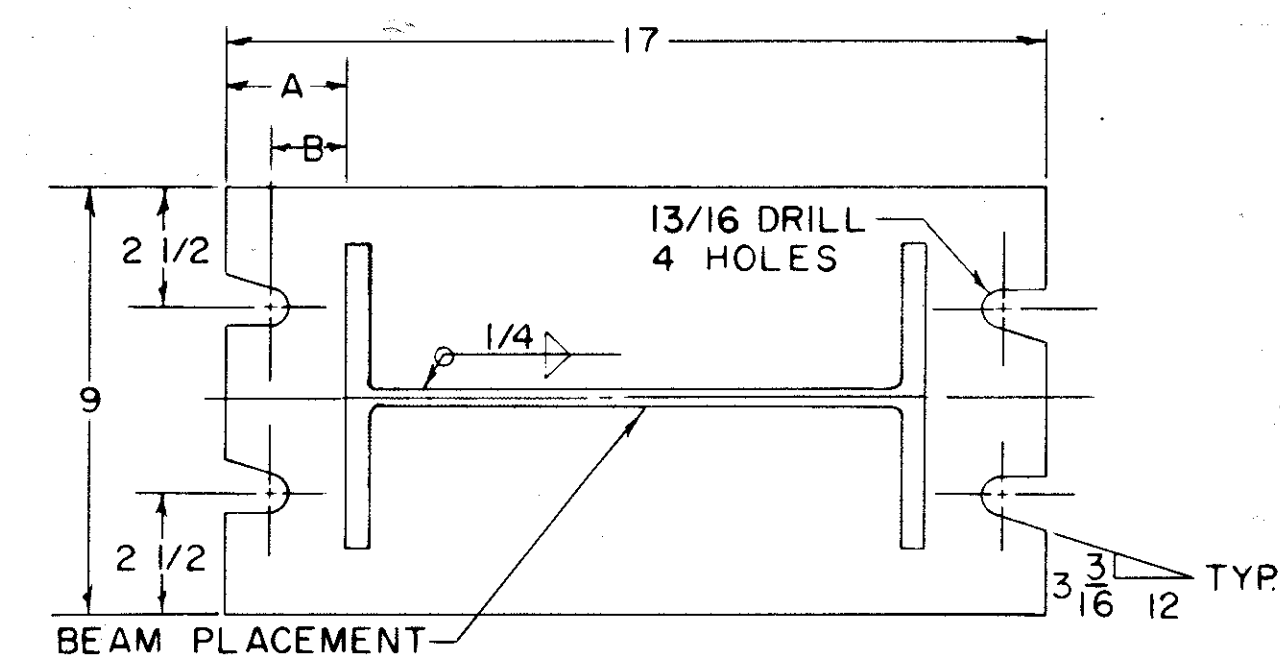
NOTE: INSTALL FUSE PLATE WITH NOTCHES TOWARD BASE

DETAIL "B"



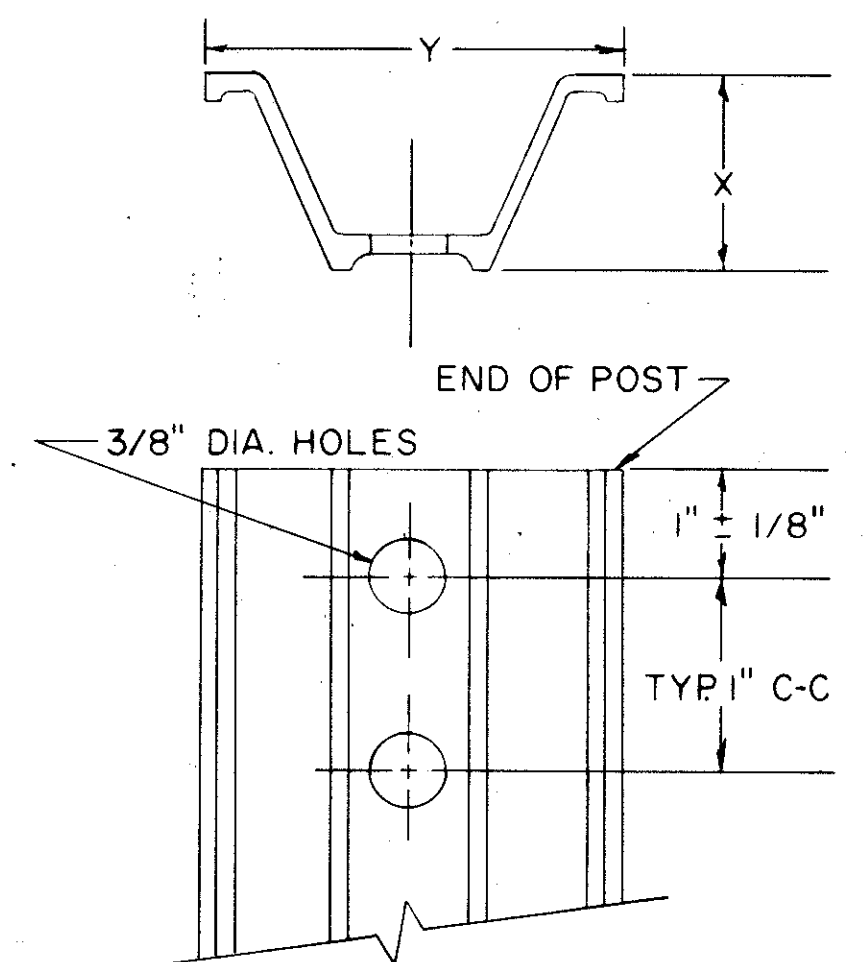
BEAM SIZE	C	D
W 8 X 17	5 1/4"	2 1/4"
W 10 X 21	5 3/4"	2 3/4"
W 12 X 31	6 1/2"	3 1/2"

FUSE PLATE DETAIL



BEAM SIZE	A	B
W 8 X 17	4 1/2"	3 5/8"
W 10 X 21	3 1/2"	2 5/8"
W 12 X 31	2 1/2"	1 5/8"

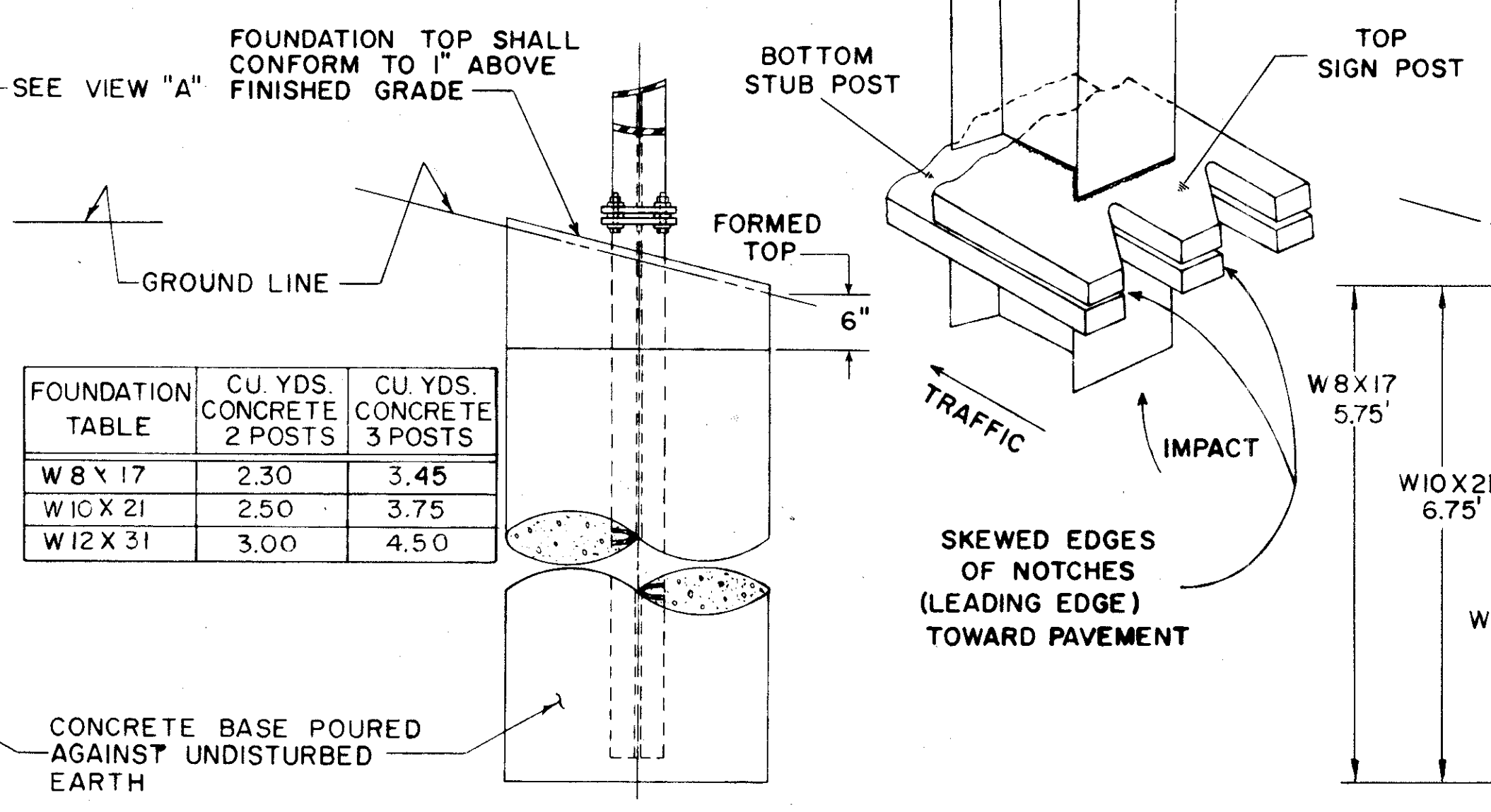
BASE PLATE DETAIL (TOP VIEW)



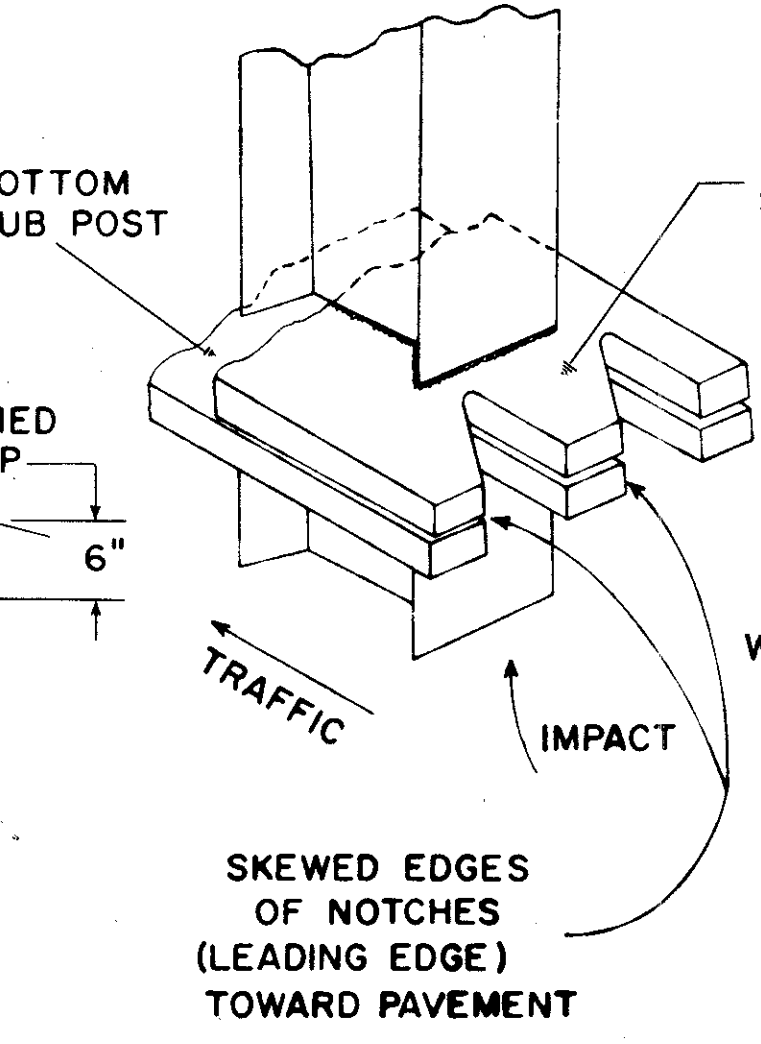
WEIGHT PER FOOT	X ± 3/32"	Y ± 1/8"
2.00 #	1 15/32"	3 1/16"
3.00 #	1 7/8"	3 1/2"
4.00 #	2"	3 5/8"

DRIVE POST DETAIL

BREAKAWAY SIGN SUPPORT BASE PLATE ORIENTATION

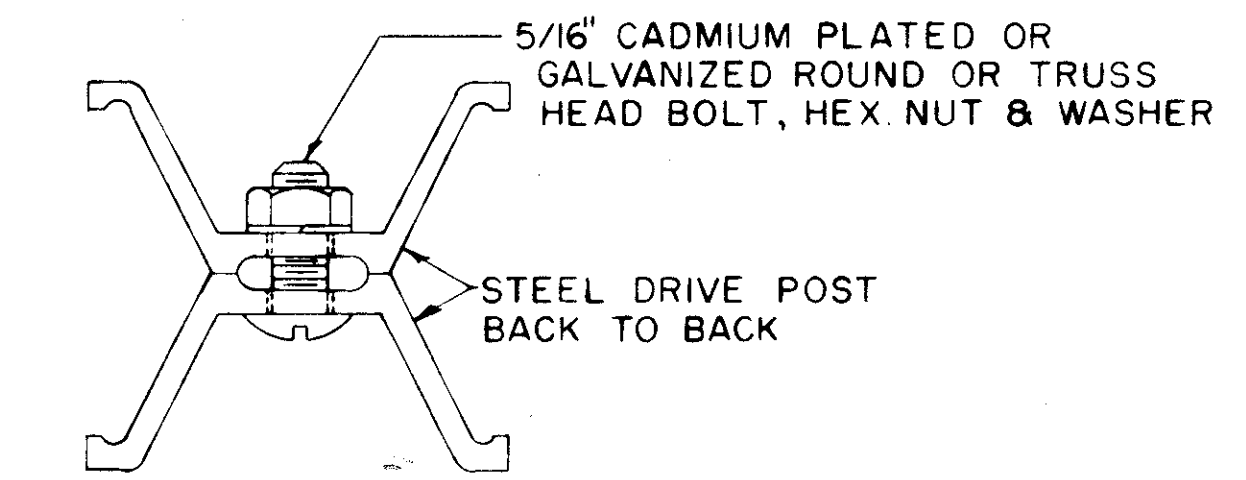


FOUNDATION TABLE	CU. YDS. CONCRETE 2 POSTS	CU. YDS. CONCRETE 3 POSTS
W 8 X 17	2.30	3.45
W 10 X 21	2.50	3.75
W 12 X 31	3.00	4.50



FOUNDATION TABLE	CU. YDS. CONCRETE 2 POSTS	CU. YDS. CONCRETE 3 POSTS
W 8 X 17	2.30	3.45
W 10 X 21	2.50	3.75
W 12 X 31	3.00	4.50

FRONT ELEVATION STANDARD SUPPORT



6# BEAM DETAIL

NOTES: ALL MATERIALS SHALL CONFORM TO THE STATE OF OHIO, CONSTRUCTION & MATERIALS SPECIFICATIONS OR AS OTHERWISE SPECIFIED

- 1) 5# FOUNDATIONS
- 2) 7# 10# STRUCTURAL STEEL SHAPES & PLATES
- 3) 7# 10# H.S. STEEL BOLTS, NUTS & WASHERS

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SHOWN

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

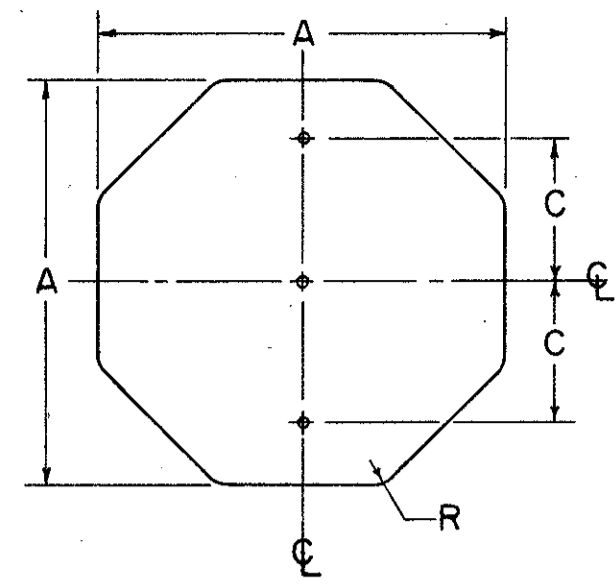
**GROUND MOUNTED SIGN SUPPORTS**

DATE  
5-10-68  
7-12-68  
5-23-69  
9-16-69  
12-20-71

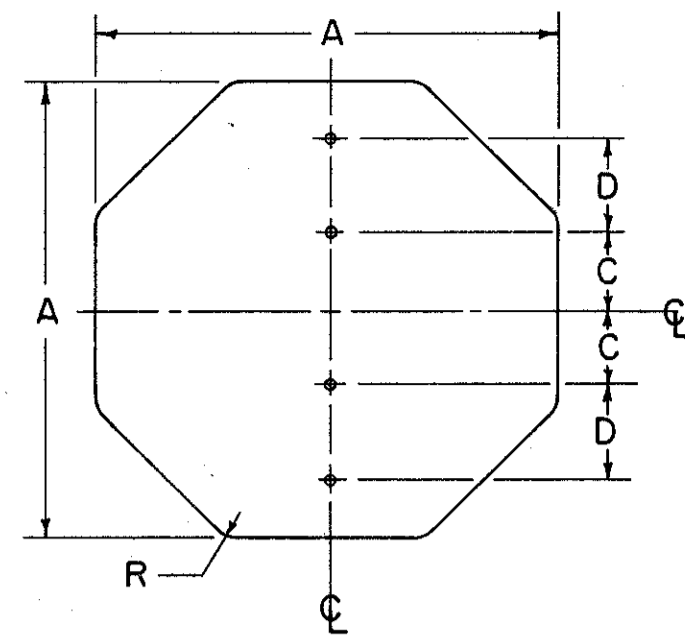
APPROVED \_\_\_\_\_ ENGINEER OF TRAFFIC

STRUCTURAL SUPPORTS

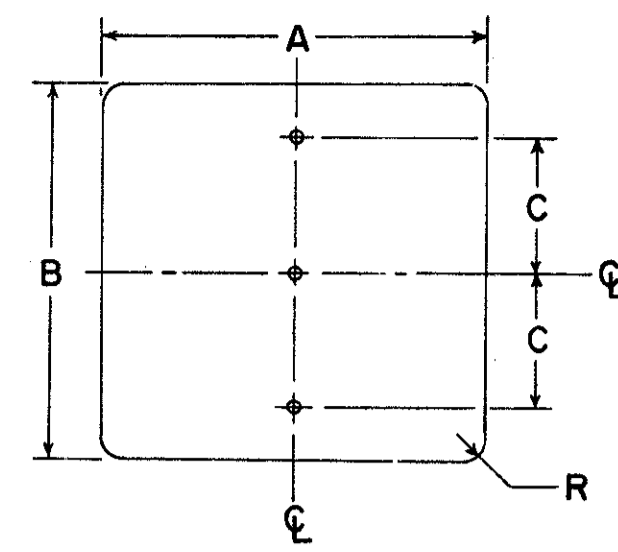
CUYAHOGA COUNTY  
CUY. 480-21.40



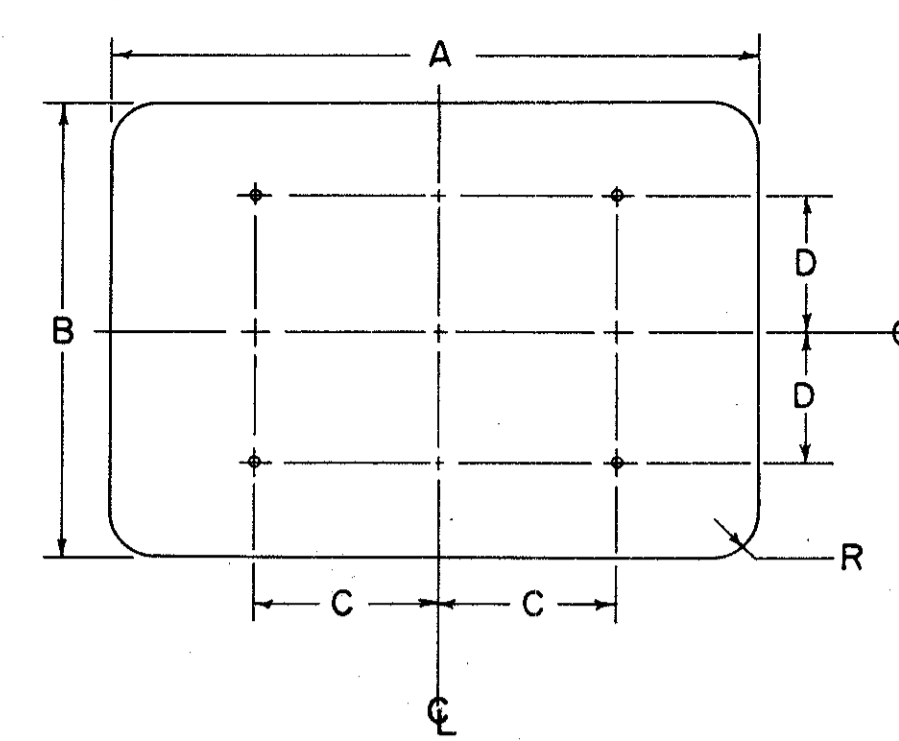
A	C	R	GAUGE
30	8	1 1/2	.080
36	8	1 1/2	.080



A	C	D	R	GAUGE
48	8	10	1 1/2	.100

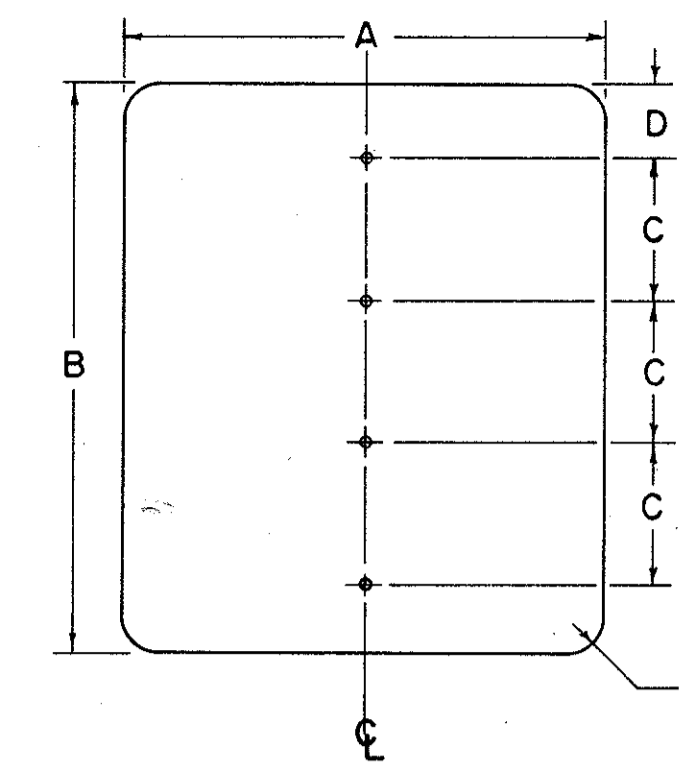


A	B	C	R	GAUGE
24	30	8	1 1/2	.063
24	48	15	1 1/2	.100
30	36	11	1 1/2	.080
30	42	12	1 1/2	.080
36	36	11	1 1/2	.080
36	42	15	1 1/2	.080
36	48	15	1 1/2	.080
48	24	10	3	.100
48	36	13	3	.100

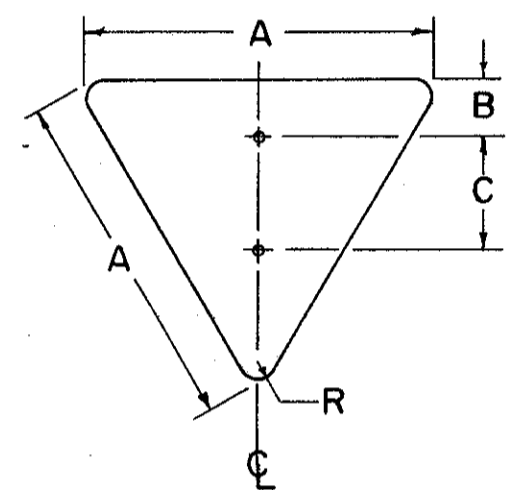


A	B	C	D	R	GAUGE
48	48	22	16	3	.100
48	60	22	22	3	.100

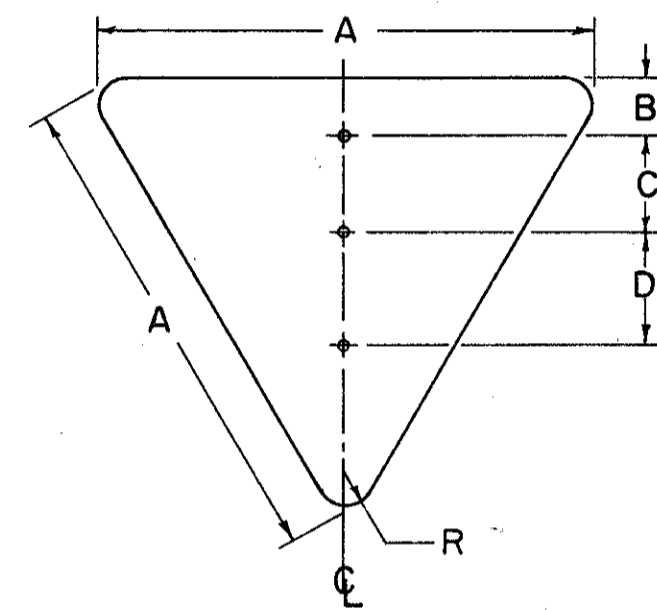
SPEED LIMIT SIGNS ON TWO SUPPORTS



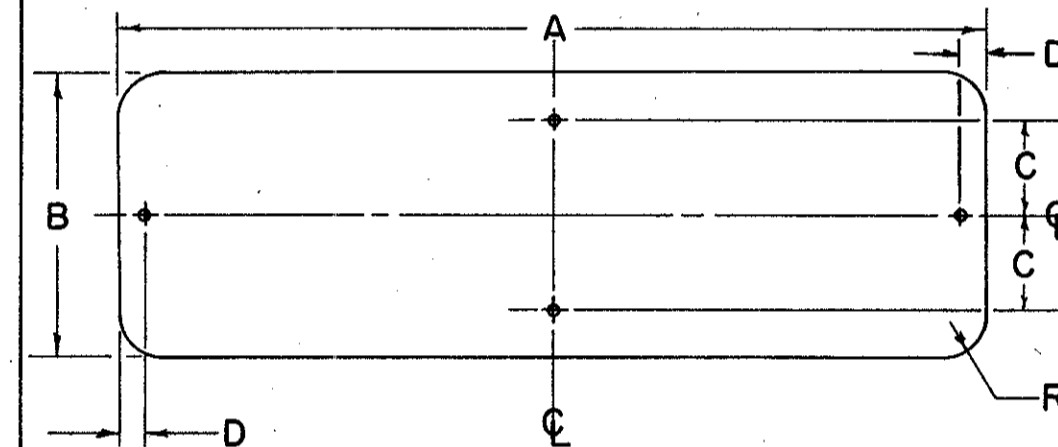
A	B	C	D	R	GAUGE
48	48	12	6	3	.100
48	60	15	7 1/2	3	.100



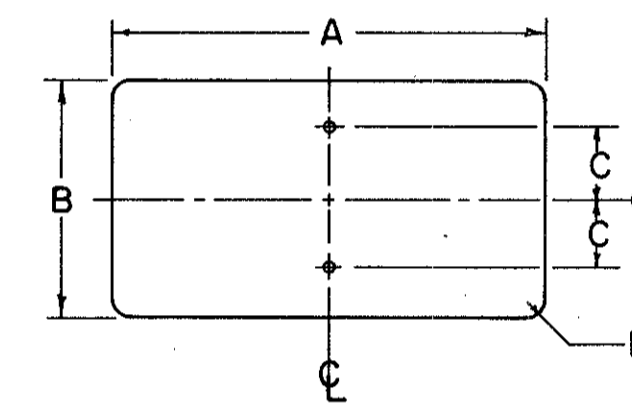
A	B	C	R	GAUGE
36	3	16	2 1/2	.080



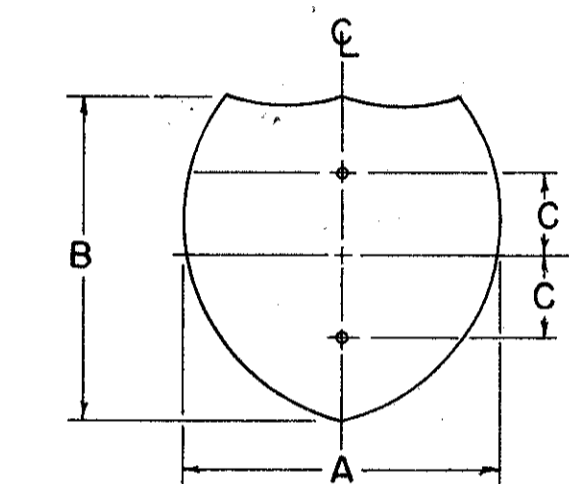
A	B	C	D	R	GAUGE
48	4	10	15	3	.100
60	5	10	15	4	.100



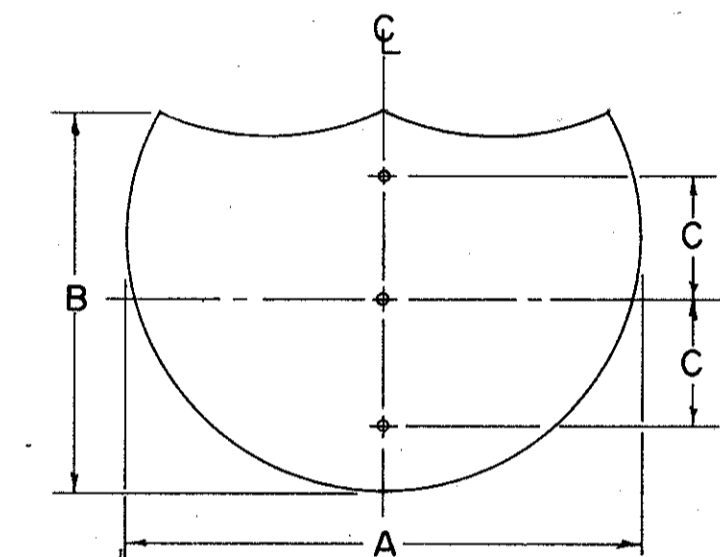
A	B	C	D	R	GAUGE
36	12	4	1	1 1/2	.080
72	12	-	16	1 1/2	.100
60	12	-	13	1 1/2	.100



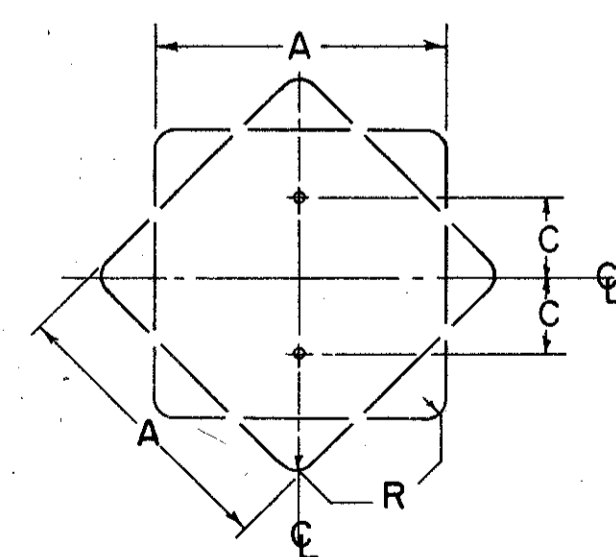
A	B	C	R	GAUGE
12	6	1 1/2	1 1/2	.063
20	15	6	1 1/2	.063
24	12	4 1/2	1 1/2	.063
24	18	7 1/2	1 1/2	.063
8	26	8	1	.063
36	18	7 1/2	1 1/2	.080



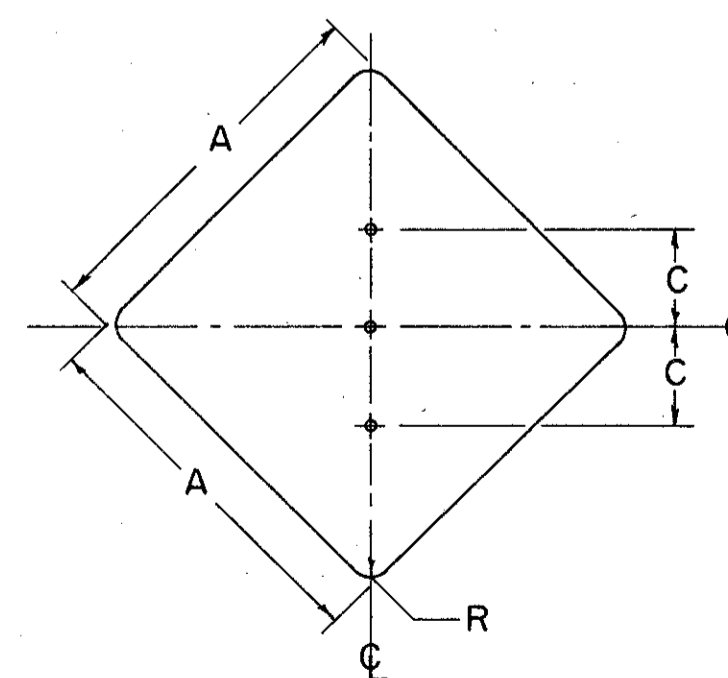
A	B	C	GAUGE
24	24	8	.063
30	24	8	.080



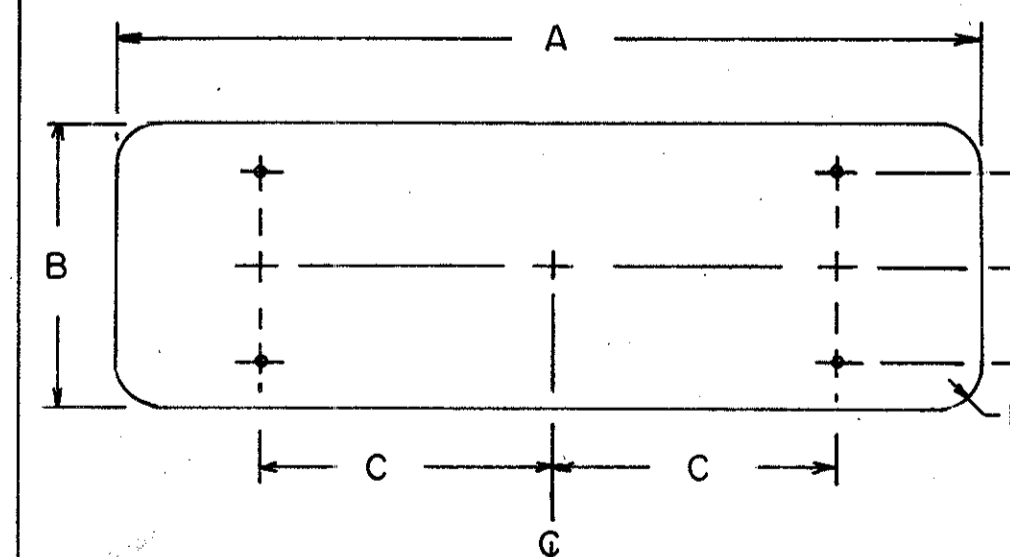
A	B	C	GAUGE
36	36	11	.080
48	36	11	.100



A	C	R	GAUGE
18	7 1/2	1 1/2	.063
24	8	1 1/2	.063
30	8	1 1/2	.080

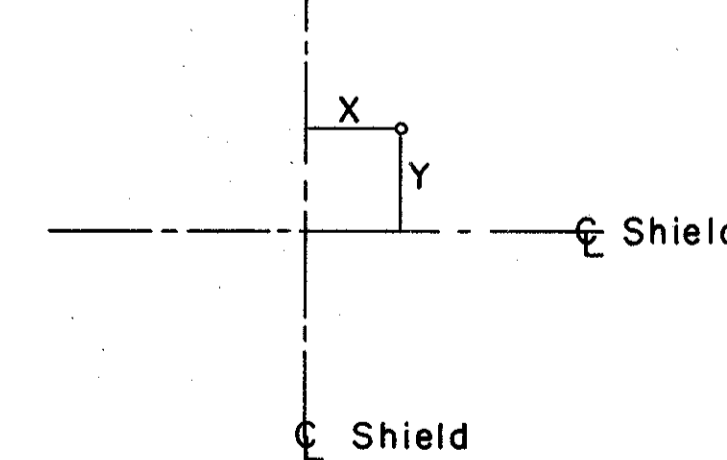


A	C	R	GAUGE
36	12	1 1/2	.080
48	14	3	.100



A	B	C	D	R	GAUGE
72	18	20	6	1 1/2	.100
72	24	20	8	1 1/2	.100
60	30	17	10	1 1/2	.100
96	18	27	6	1 1/2	.100

Location of holes on "Demountable Shields"  
(attached to guide signs)



SIZE	NO. HOLES	X	Y
(26) 24X24	4	7	7
30X24	4	8	8
(39) 36X36	4	10	10
		0	10
48X36	6	15	10

For notes on fastening see drawing for miscellaneous "Signing Items" sheet.

NOTES:

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SHOWN.

**MATERIAL**

FLAT SIGN BLANKS SHALL BE FURNISHED IN ALUMINUM ALLOY 6061-T6, (ASTM-B209, GS11A-T6) WITH MILL FINISH.

**BOLT HOLES**

THE BOLT HOLES SHALL BE 3/8" IN DIAMETER, AND MAY BE DRILLED, BLANKED OR PUNCHED TO FINISHED SIZE. Additional Bolt Hole Patterns will be supplied by the Engineer as needed.

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

SIGN BLANK  
DETAILS

SBD

APPROVED \_\_\_\_\_  
ENGINEER OF TRAFFIC

DATE  
4-14-67  
5-10-68  
10-1-68  
5-27-69  
6-18-69  
10-3-73

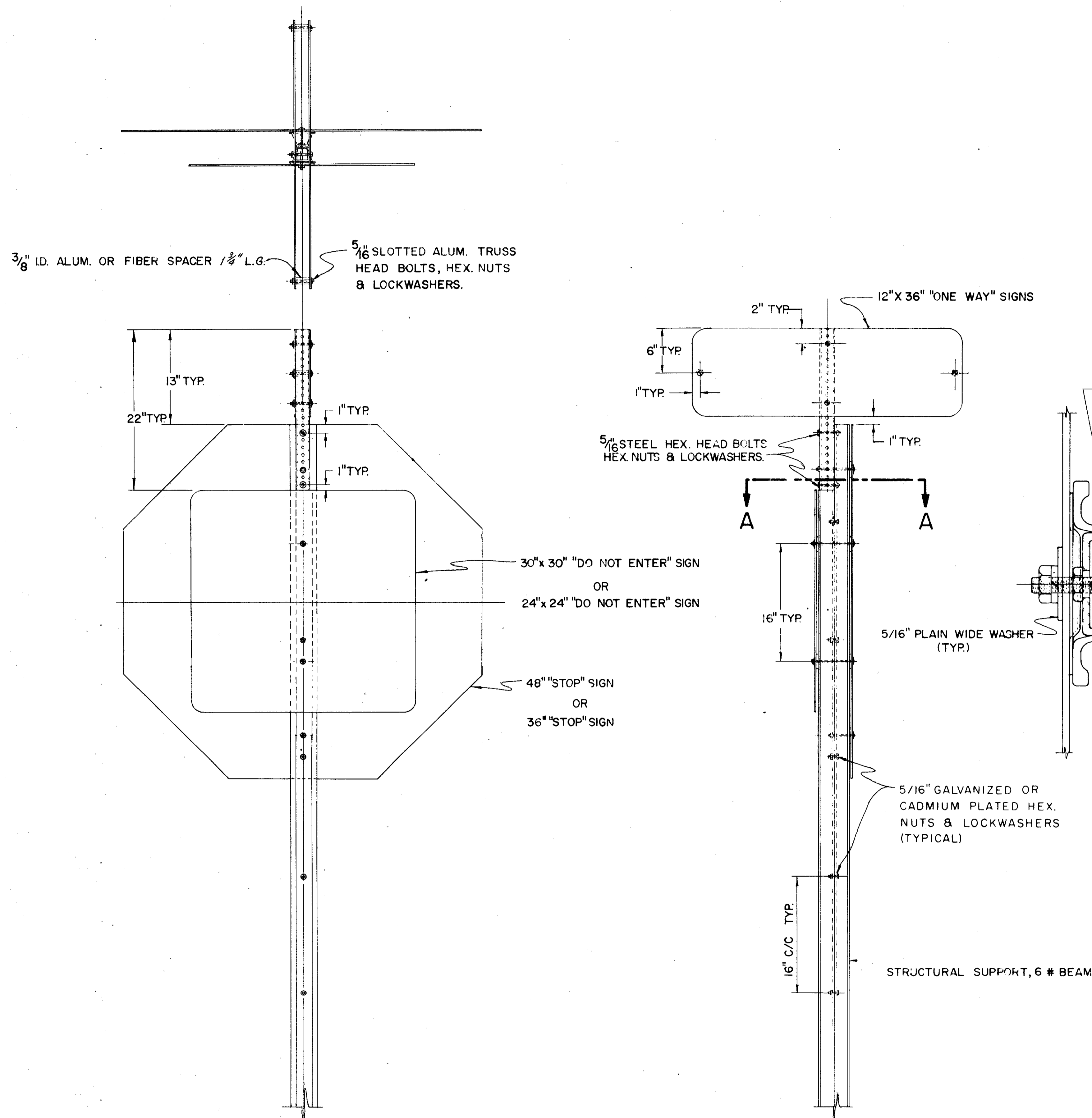
**NOTES**

**MATERIALS**

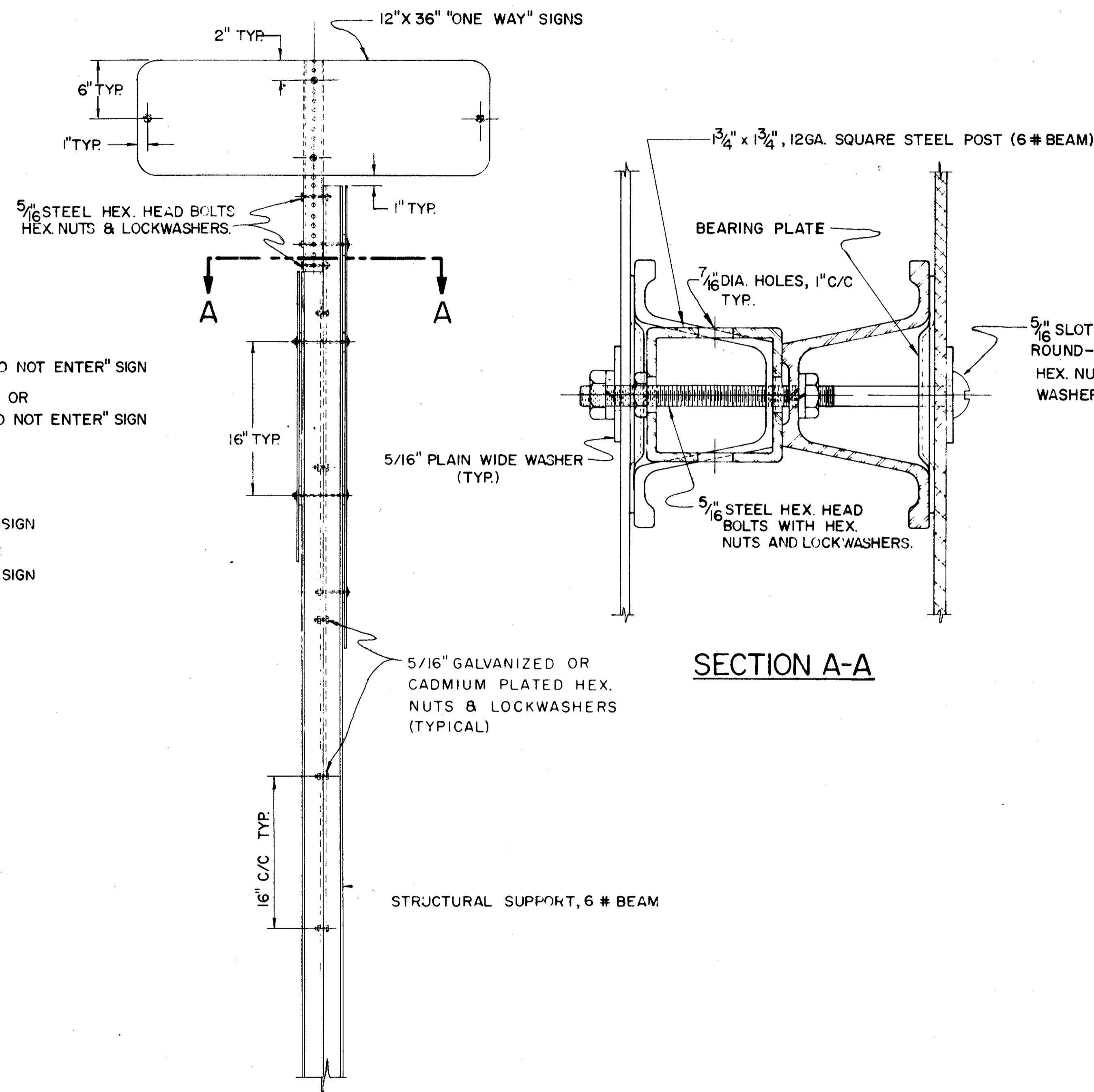
ALL SIGN MATERIALS SHALL BE IN ACCORDANCE WITH SUPPLEMENT SPECIFICATION 815.

ALL STRUCTURAL MATERIALS SHALL BE IN ACCORDANCE WITH SUPPLEMENT SPECIFICATION 816.

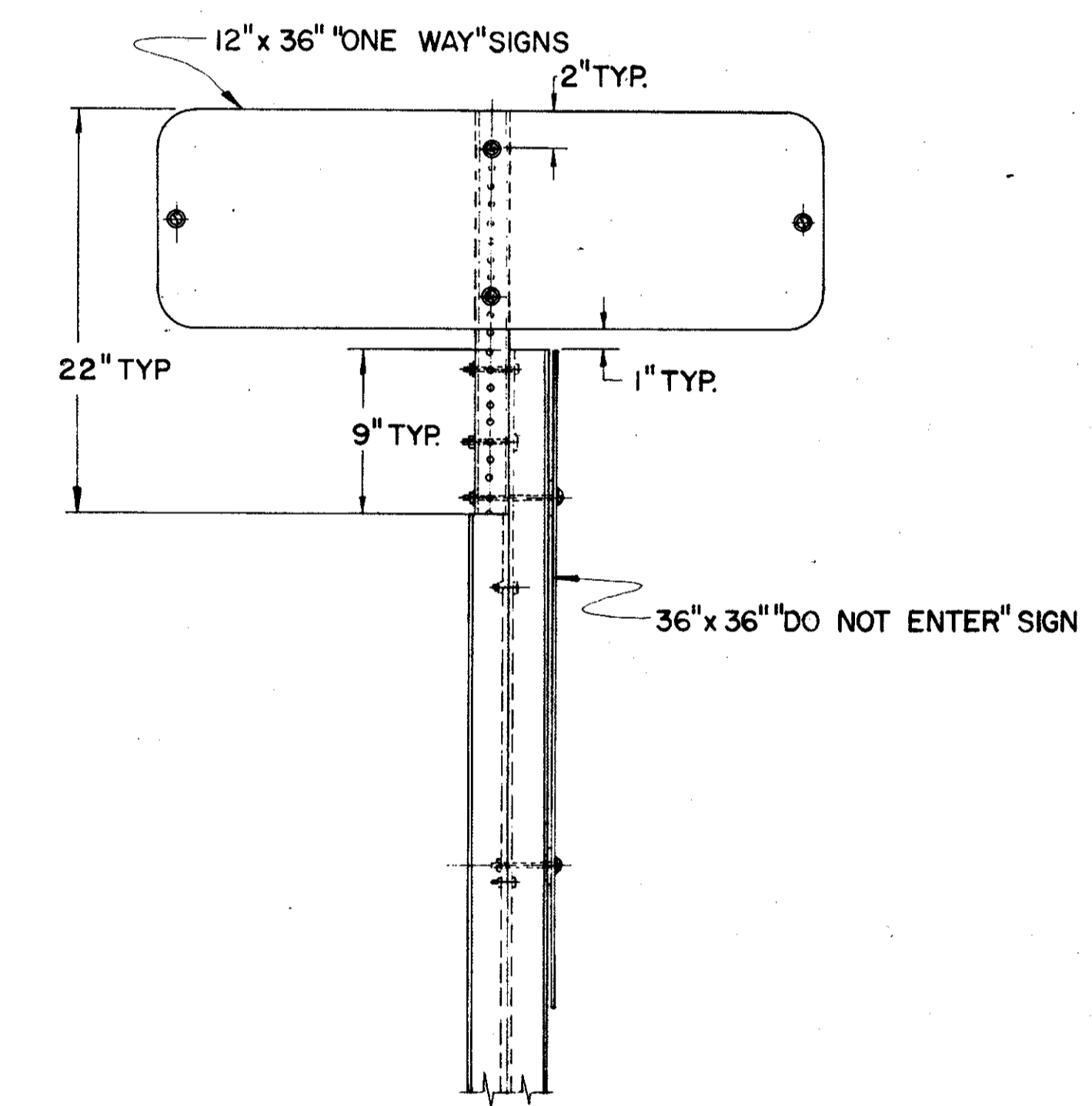
FOR SPECIFICATIONS FOR THE 1 3/4" SQUARE STEEL POST SEE GENERAL NOTES, SHEET NO. 5.



**"ONE WAY", "STOP", "DO NOT ENTER",  
SIGN INSTALLATION.**



**SECTION A-A**



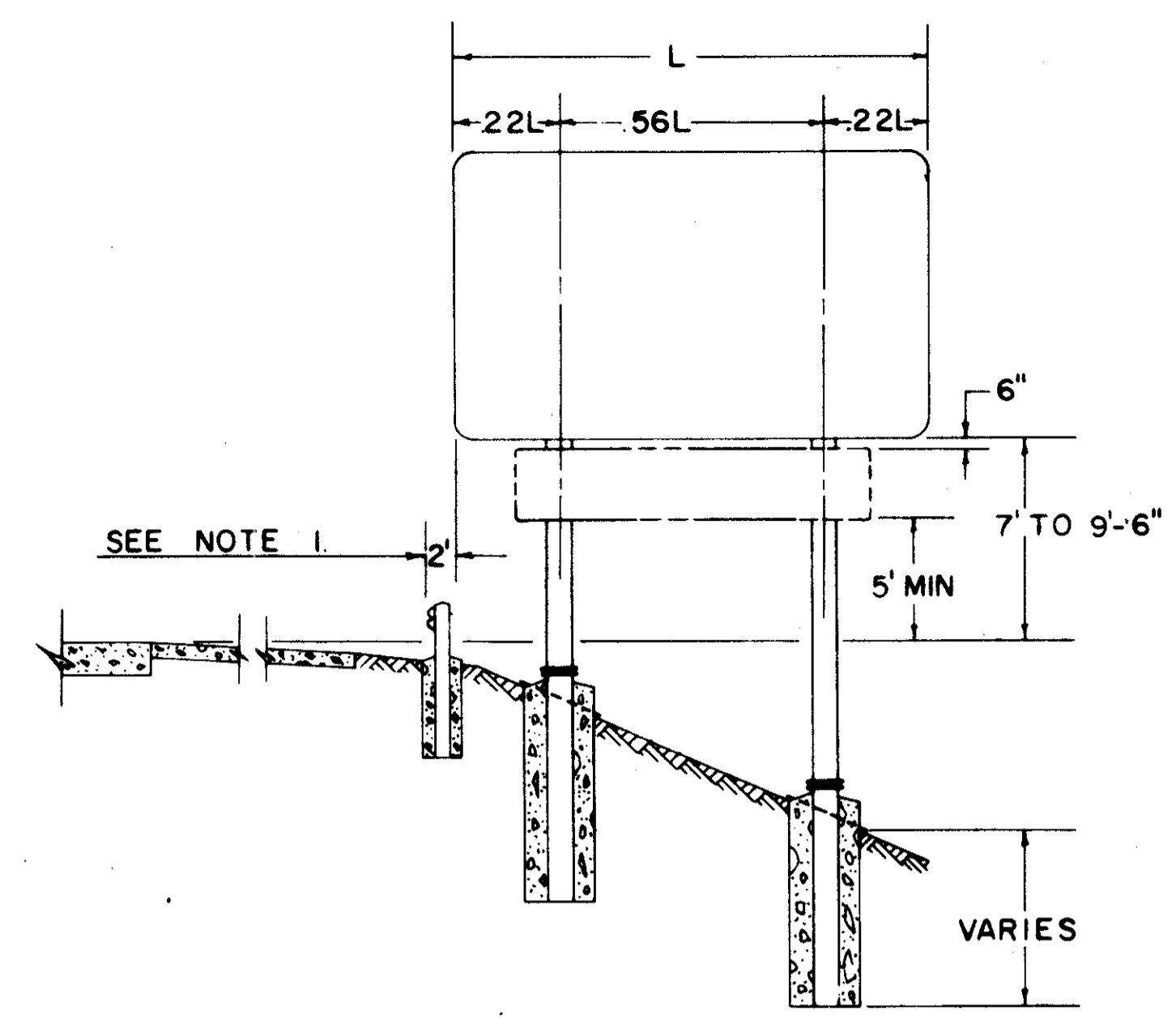
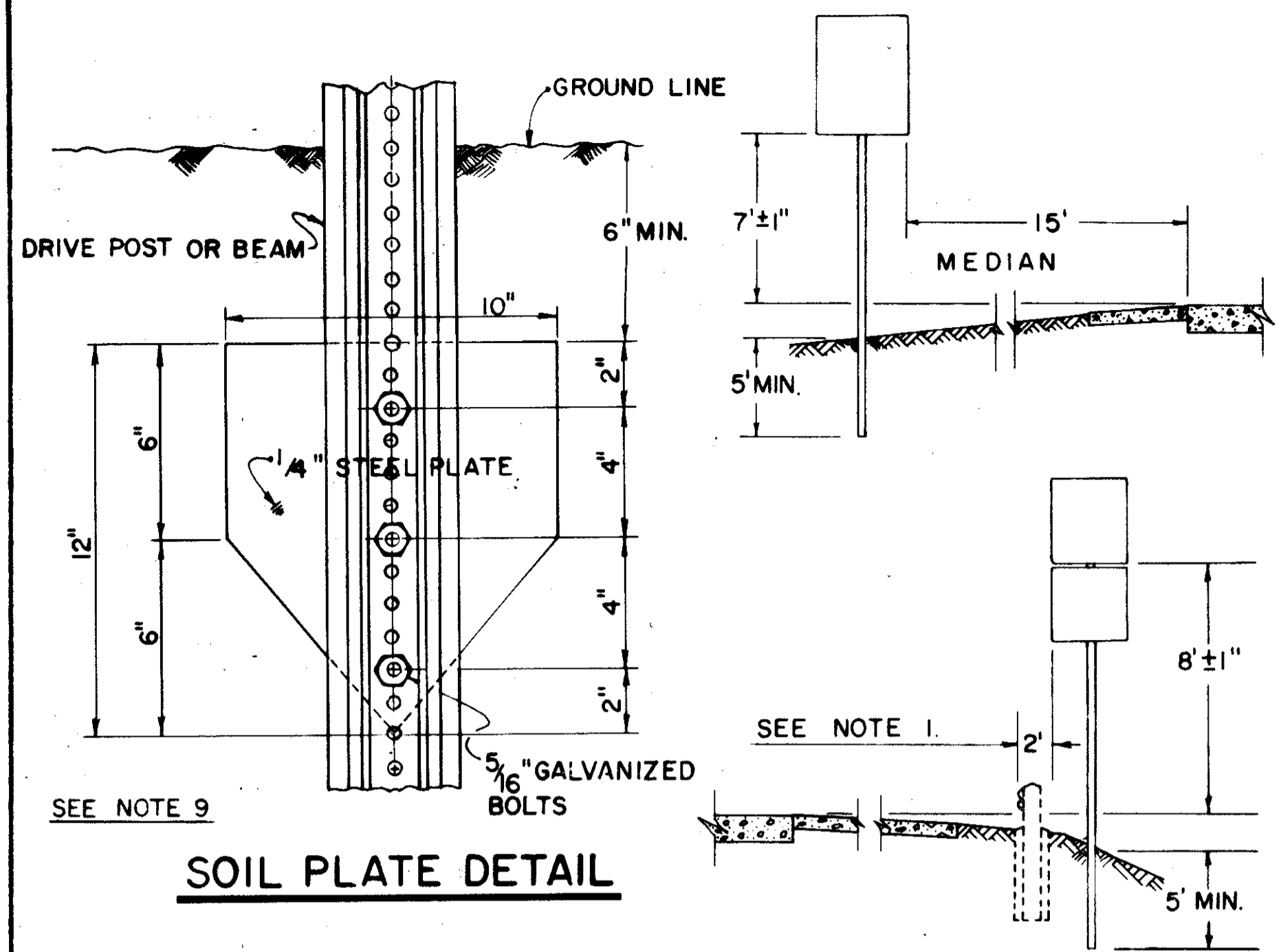
**"ONE WAY", "DO NOT ENTER"  
SIGN INSTALLATION**

BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		
SPECIAL "ONE WAY" SIGN SUPPORT DETAILS	SOW	DATE 2-7-66 4-18-67
APPROVED _____ ENGINEER OF TRAFFIC		

CUYAHOGA COUNTY  
CUY. 480-21.40

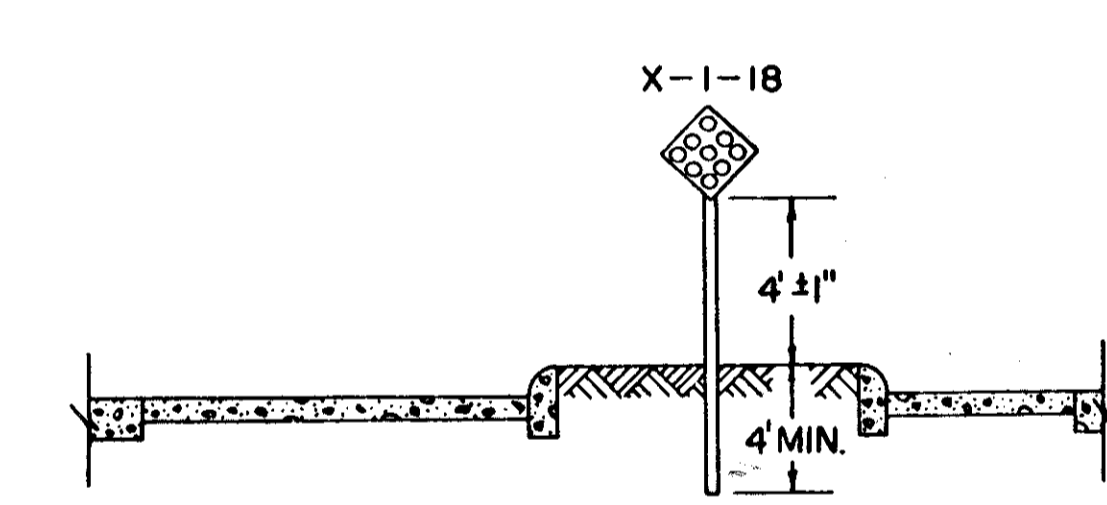
**NOTES**

- THE NEAR EDGE OF ALL MAIN LINE SIGNS, EXCEPT GORE INSTALLATIONS, SHALL BE LOCATED TWO FEET (2') BACK OF GUARD RAIL FACE. THIS DIMENSION SHALL BE DETERMINED BY ROADWAY TYPICAL SECTION B USED WHETHER OR NOT GUARD RAIL IS PRESENT.  
ON RAMP THE NEAR EDGE OF SIGNS SHALL BE LOCATED TWO FEET (2') BACK OF GUARD RAIL FACE. THIS DIMENSION WILL BE DETERMINED AND USED AS FOR MAIN LINE ABOVE.  
ON APPROACHES THE NEAR EDGE OF SIGNS SHALL BE  
(A) TWO FOOT (2') BEHIND EXISTING GUARD RAIL  
(B) TWO FEET (2') FROM THE EDGE OF PAVED OR TRAVELED SHOULDER WITH A MINIMUM OF 6' FROM EDGE OF ROADWAY PAVEMENT.
- POSTS PLACED IN CONCRETE MEDIANS SHALL BE INSTALLED BY DRIVING THROUGH A 6" SLEEVE OR CORE DRILLED HOLE. THE HOLE SHALL BE FILLED WITH ASPHALTIC CONCRETE AFTER THE POST IS IN THE PROPER POSITION.
- HORIZONTAL BACK BRACING SHALL ALWAYS BE MOUNTED ON THE FRONT FLANGE OF THE SUPPORT EXCEPT WHERE SIGNS ARE MOUNTED BACK TO BACK. BACK BRACING SHALL NEVER EXTEND ABOVE TOP EDGE OF UPPERMOST SIGN PLATE AND SHALL BE ATTACHED TO SUPPORTS USING 5/16" GALVANIZED STEEL BOLTS.
- SCREWS, NUTS, AND WASHERS FOR SIGN ERECTION SHALL BE ALUMINUM EXCEPT AS NOTED ABOVE. 5/16" TRUSS HEAD SLOTTED MACHINE SCREWS WITH HEX. NUTS PLAIN AND LOCKWASHERS SHALL BE USED. PLAIN WASHERS SHALL BE 5/16" WIDE, USED ON SIGN FACE ONLY.
- SIGN INSTALLATIONS SHALL BE PLACED SO THAT SUPPORTS ARE NOT PLACED IN DRAINAGE DITCHES.
- HORIZONTAL CLEARANCES SHOWN PERTAIN TO NON-CURBED SECTIONS. SECTIONS WITH UNMOUNTABLE CURB SHALL HAVE A HORIZONTAL CLEARANCE OF 2'-0" MINIMUM FROM THE CURB FACE TO THE SIGN EDGE.
- VERTICAL AND HORIZONTAL CLEARANCE BETWEEN SIGNS ON ONE ASSEMBLY SHALL BE A MAXIMUM OF 2" AND A MINIMUM OF 1".
- GALVANIZED STEEL BEARING PLATES SHALL BE INCLUDED BETWEEN ALL SHEET ALUMINUM SIGNS ATTACHED TO VERTICAL SUPPORTS AT EACH SIGN BOLT LOCATION.
- SOIL PLATES SHALL BE ATTACHED TO ALL 6 LB. BEAMS BETWEEN POSTS AS DETAILED ON THIS SHEET, EXCEPT WHERE BEAMS ARE PLACED IN CONCRETE MEDIANS AS COVERED IN NOTE 2.



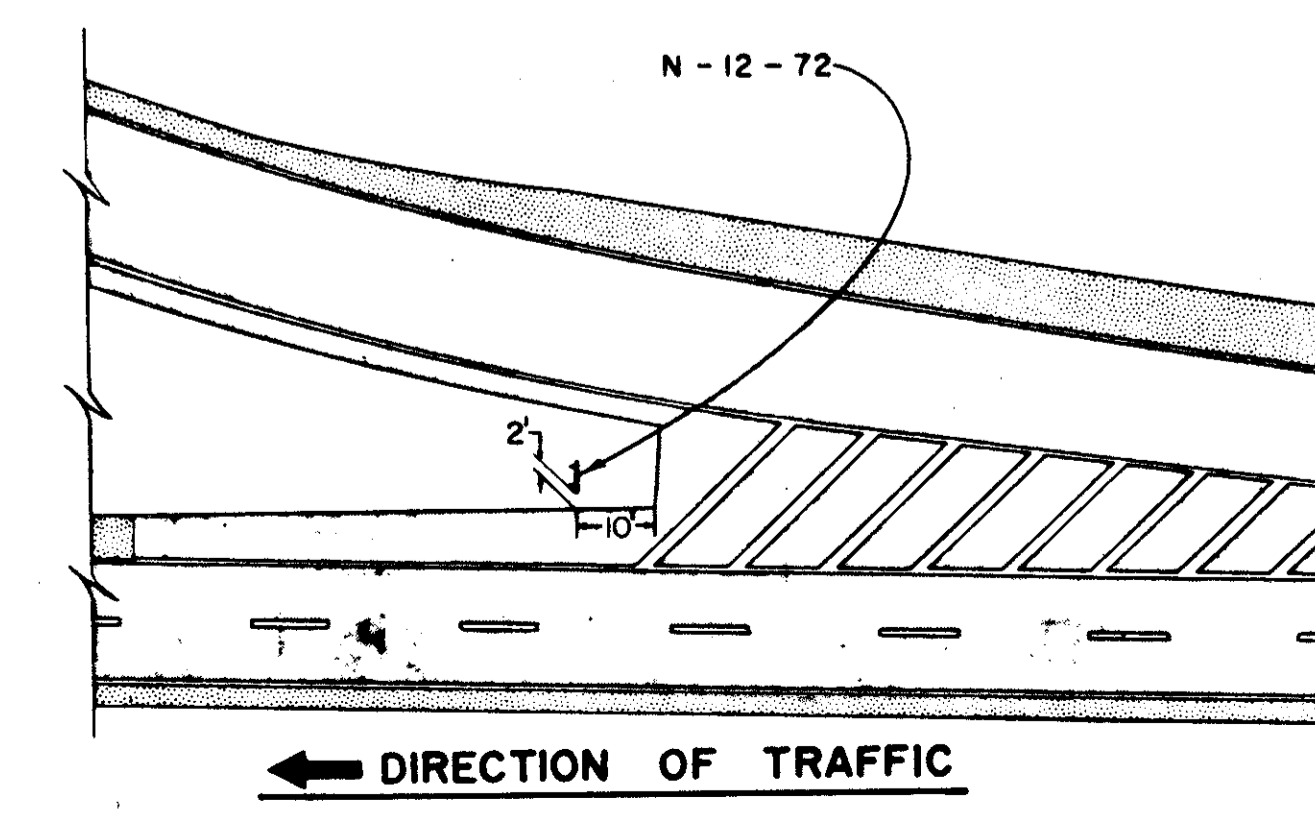
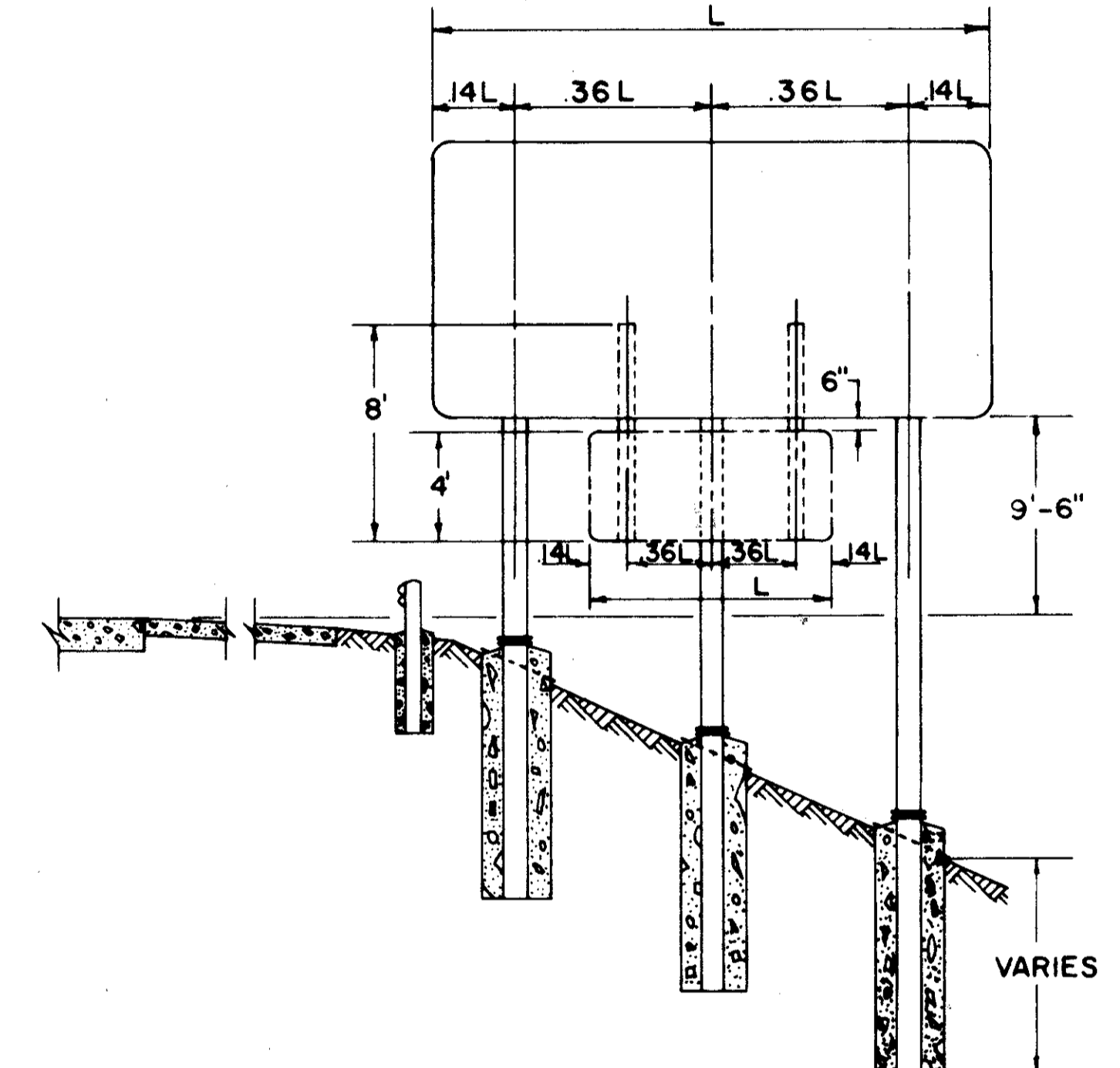
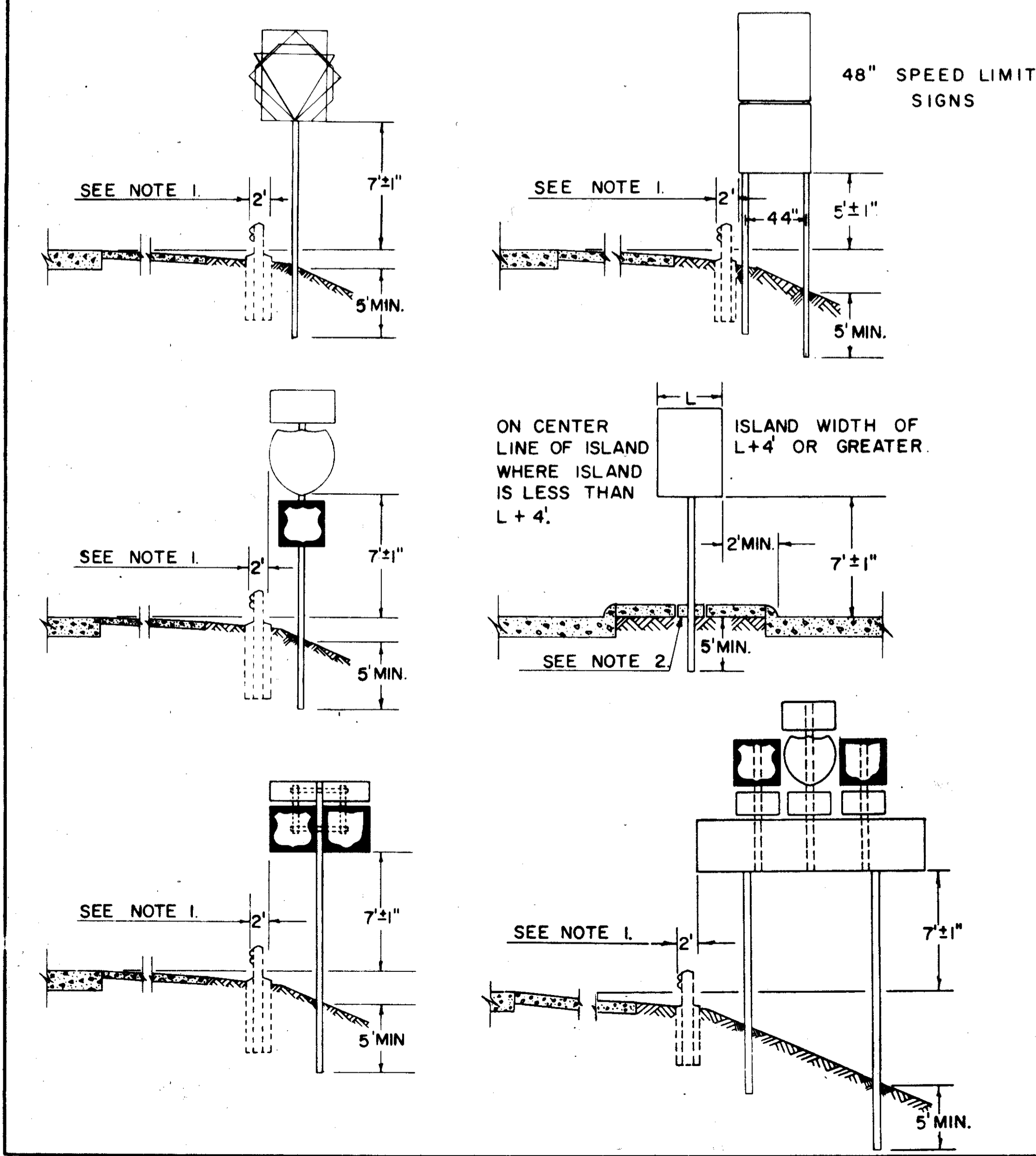
NOTE: THE PLATE IS SYMMETRICAL ABOUT EITHER CENTERLINE. METAL SHALL BE 16 GAUGE STEEL. ALL DIMENSIONS ARE IN INCHES.

**BEARING PLATE DETAIL**



**SIGN SUPPORT SPACING**

L+FT	2 SUPPORTS		3 SUPPORTS		L+FT	2 SUPPORTS		3 SUPPORTS	
	.22	.56	.14	.36		.22	.56	.14	.36
5.0	1.10	2.80	0.70	1.80	17.0	3.74	9.52	2.38	6.12
6.0	1.32	3.36	0.84	2.16	18.0	3.96	10.08	2.52	6.48
7.0	1.54	3.92	0.98	2.52	19.0	4.18	10.64	2.66	6.84
8.0	1.76	4.48	1.12	2.88	20.0			2.80	7.20
9.0	1.98	5.04	1.26	3.24	21.0			2.94	7.56
10.0	2.20	5.60	1.40	3.60	22.0			3.08	7.92
11.0	2.42	6.16	1.54	3.96	23.0			3.22	8.28
12.0	2.64	6.72	1.68	4.32	24.0			3.36	8.64
13.0	2.86	7.28	1.82	4.68	25.0			3.50	9.00
14.0	3.08	7.84	1.96	5.04	26.0			3.64	9.36
15.0	3.30	8.40	2.10	5.40	27.0			3.78	9.72
16.0	3.52	8.96	2.24	5.76	28.0			3.92	10.08



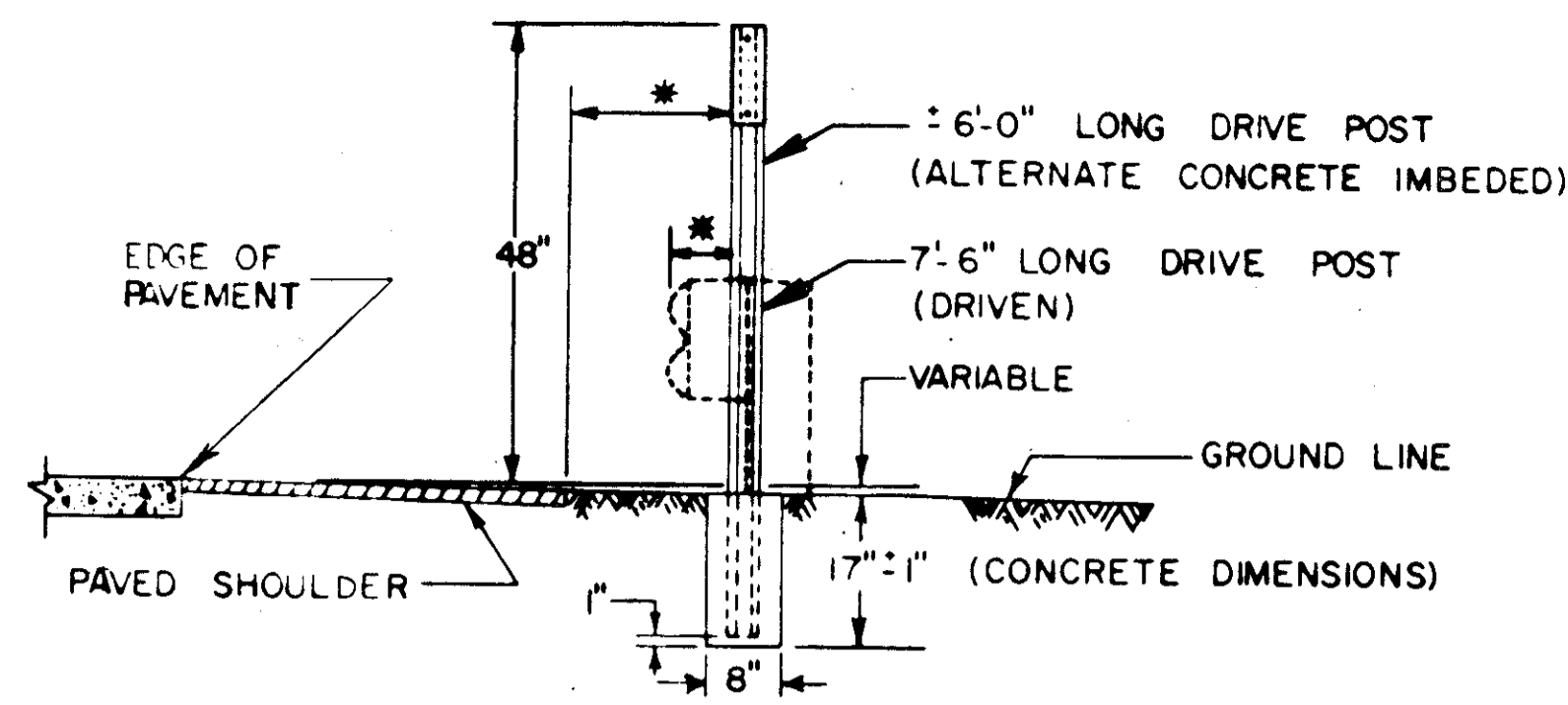
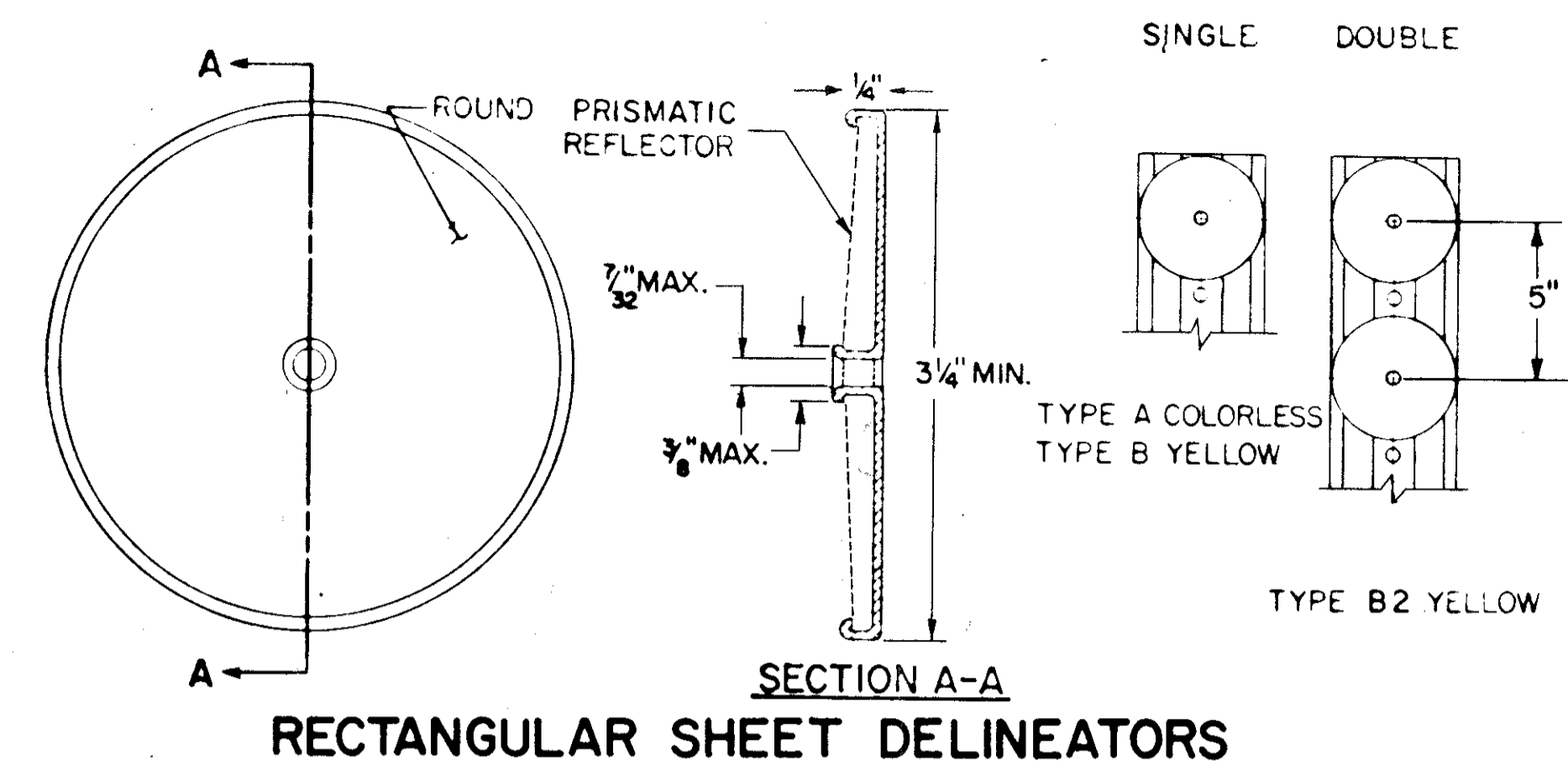
BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

**TYPICAL PLACEMENT OF SIGNS**

DATE: 9-27-67, 7-12-68, 5-13-69, 3-5-71, 12-21-71, 3-7-72

APPROVED: \_\_\_\_\_ ENGINEER OF TRAFFIC

### ROUND DELINEATORS

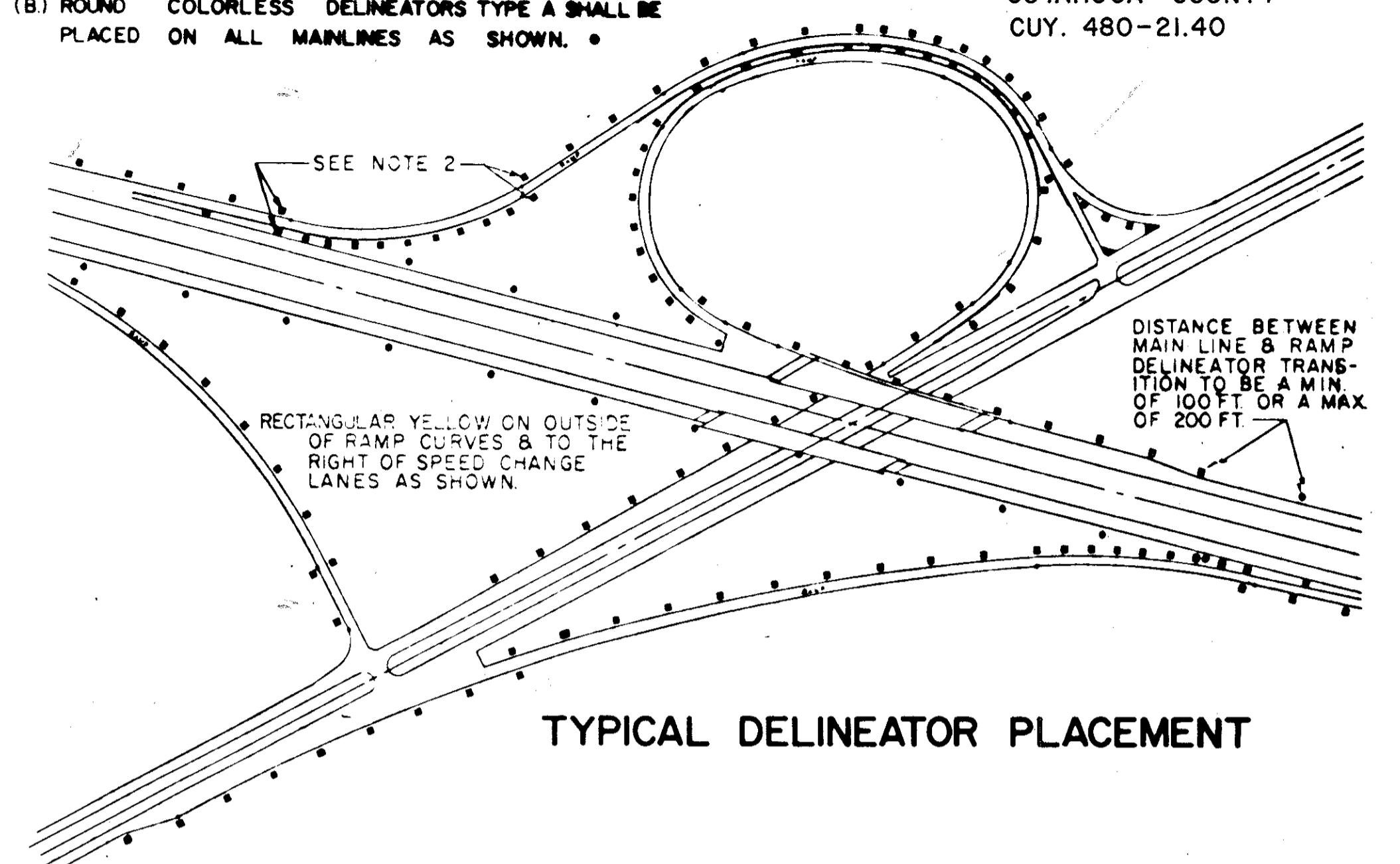


### LATERAL PLACEMENT OF DELINEATORS

\* DELINEATORS SHALL BE 6" BEHIND FACE OF TYPICAL GUARDRAIL LOCATION BUT WITH A MINIMUM DISTANCE OF 2' 6" FROM EDGE OF PAVED SHOULDER WHERE GUARDRAIL IS NOT PRESENT.

NOTE:  
 (A) RECTANGULAR YELLOW DELINEATORS TYPE D SHALL BE PLACED ON ALL RAMPS AS SHOWN.  
 (B) ROUND COLORLESS DELINEATORS TYPE A SHALL BE PLACED ON ALL MAINLINES AS SHOWN.

CUYAHOGA COUNTY  
 CUY. 480-21.40

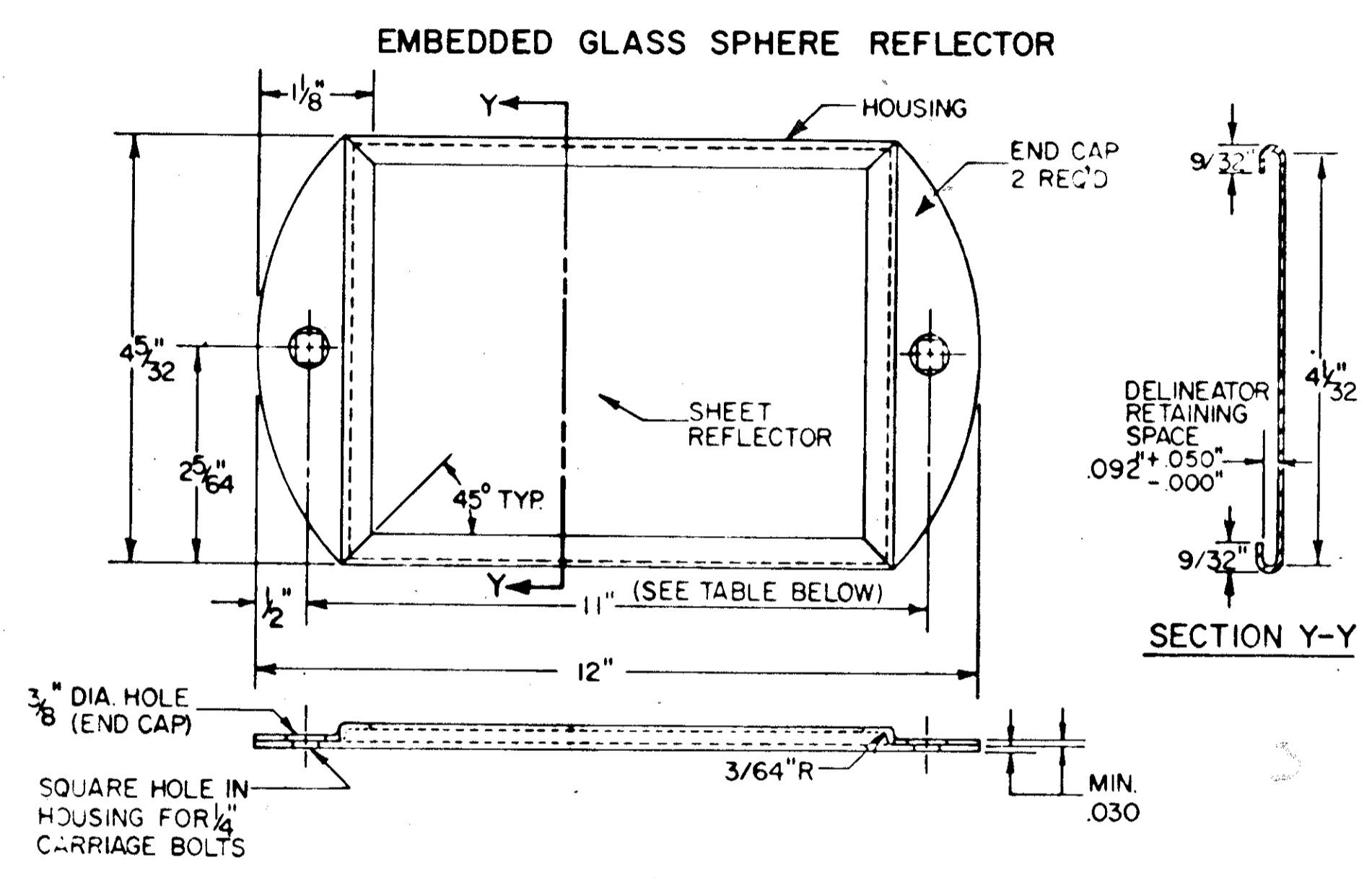


### TYPICAL DELINEATOR PLACEMENT

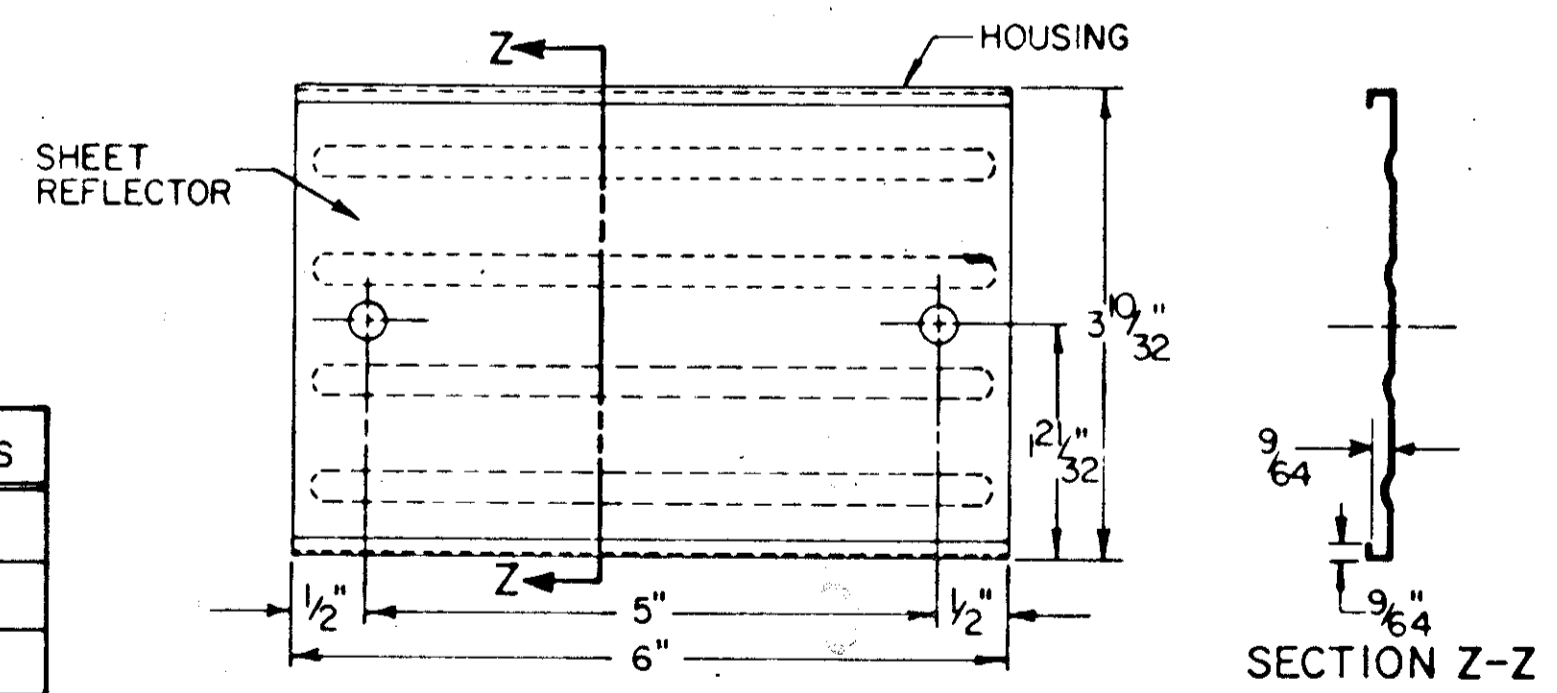
### NOTES

- TYPE A DELINEATORS ON THE RIGHT OF THE THROUGH ROADWAY ARE TO BE SPACED AT 200 FT. INTERVALS THROUGHOUT, REGARDLESS OF CURVES.
- WHEN CROSSING FROM LEFT TO RIGHT OR FROM RIGHT TO LEFT ON THE RAMPS THE DELINEATORS AT THE POINT OF CROSSOVER ARE TO BE AT THE SAME STATION ON EACH SIDE.
- NO DELINEATORS ARE TO BE PLACED IN PAVED BERM.
- WHEN RADII OF CURVE ON RAMPS REQUIRE 100' SPACING THE DELINEATORS SHALL BE PLACED ON THE RIGHT IN RELATION TO THE FLOW OF TRAFFIC.
- IN ADDITION TO MATERIALS LISTED IN 620.02, RECTANGULAR SHEET REFLECTORS MAY CONSIST OF REFLECTIVE SHEETING COMPOSED OF GLASS SPHERES IMBEDDED IN A WEATHER PROOF SYNTHETIC RESIN SHEET, THE REFLECTIVE FACE OF WHICH SHALL BE PLACED BEHIND AND SEALED TO A WEATHERPROOF RIGID PLASTIC FACE OF METHYL METHACRYLATE OF 0.060 INCHES MINIMUM THICKNESS.
- SUPPLEMENTING THE DRIVE POST DETAILS SHOWN, ALTERNATE POST SECTIONS MAY BE FURNISHED. ANY ALTERNATE SECTION FURNISHED SHALL MEET ALL THE MATERIAL REQUIREMENTS OF 620, HAVE A SHAPE APPROXIMATELY AS DETAILED, AND HAVE A MOMENT OF INERTIA EQUAL TO OR GREATER THAN THE SECTION DETAILED. THE REQUIREMENTS OF 712.20 RELATIVE TO MAXIMUM WEIGHT TOLERANCE ARE HEREBY WAIVED. NO ALTERNATE SECTION FURNISHED SHALL EXCEED THE WEIGHT OF THE CORRESPONDING SECTION BY MORE THAN 10 PERCENT.

### RECTANGULAR SHEET DELINEATORS

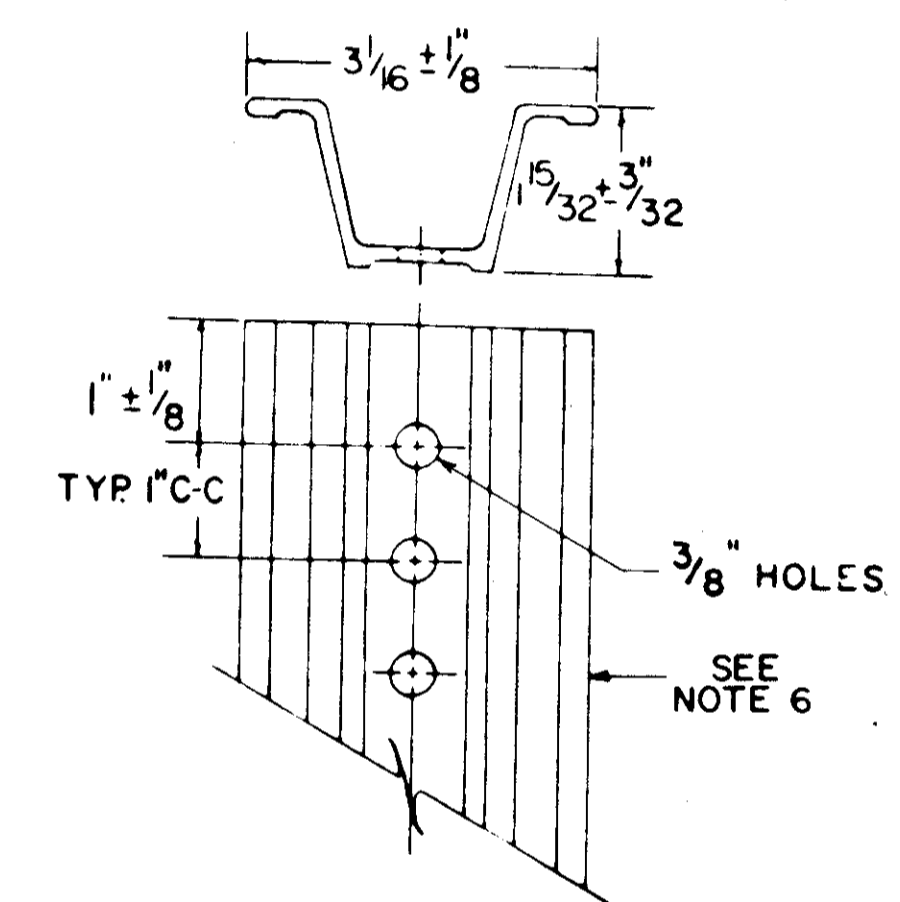
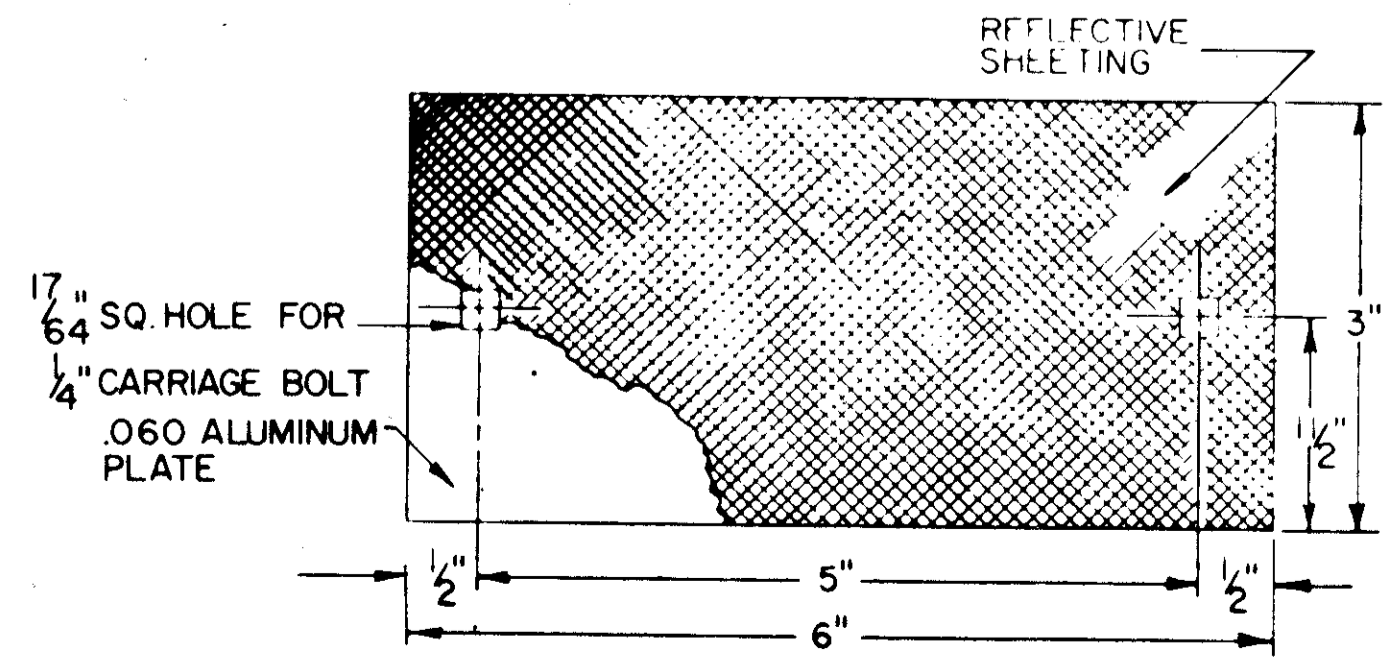


### ACRYLIC PLASTIC PRISMATIC REFLECTOR

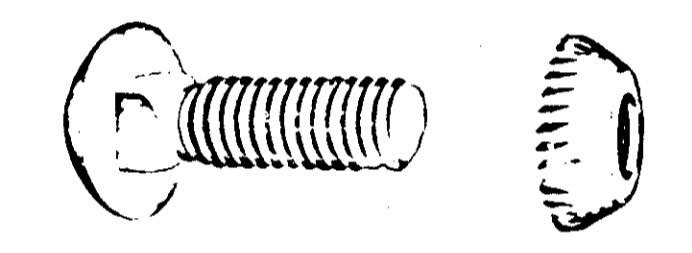


RECTANGULAR TYPES	
C -	COLORLESS
D -	YELLOW
E -	RED

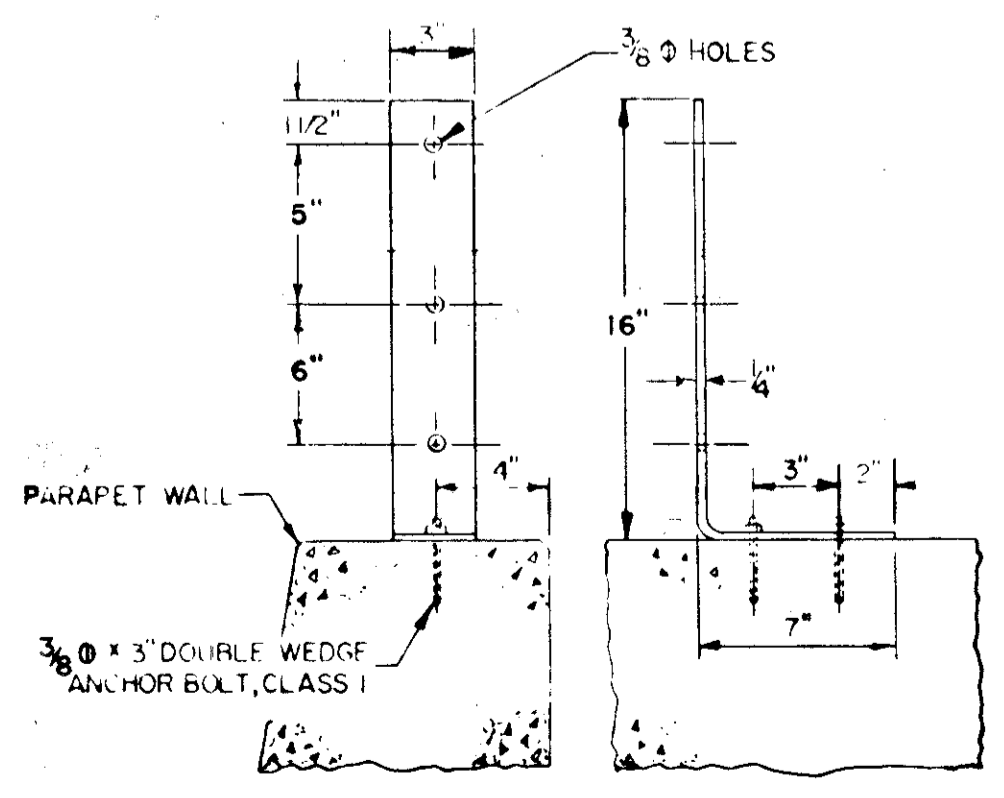
### REFLECTIVE SHEETING REFLECTOR



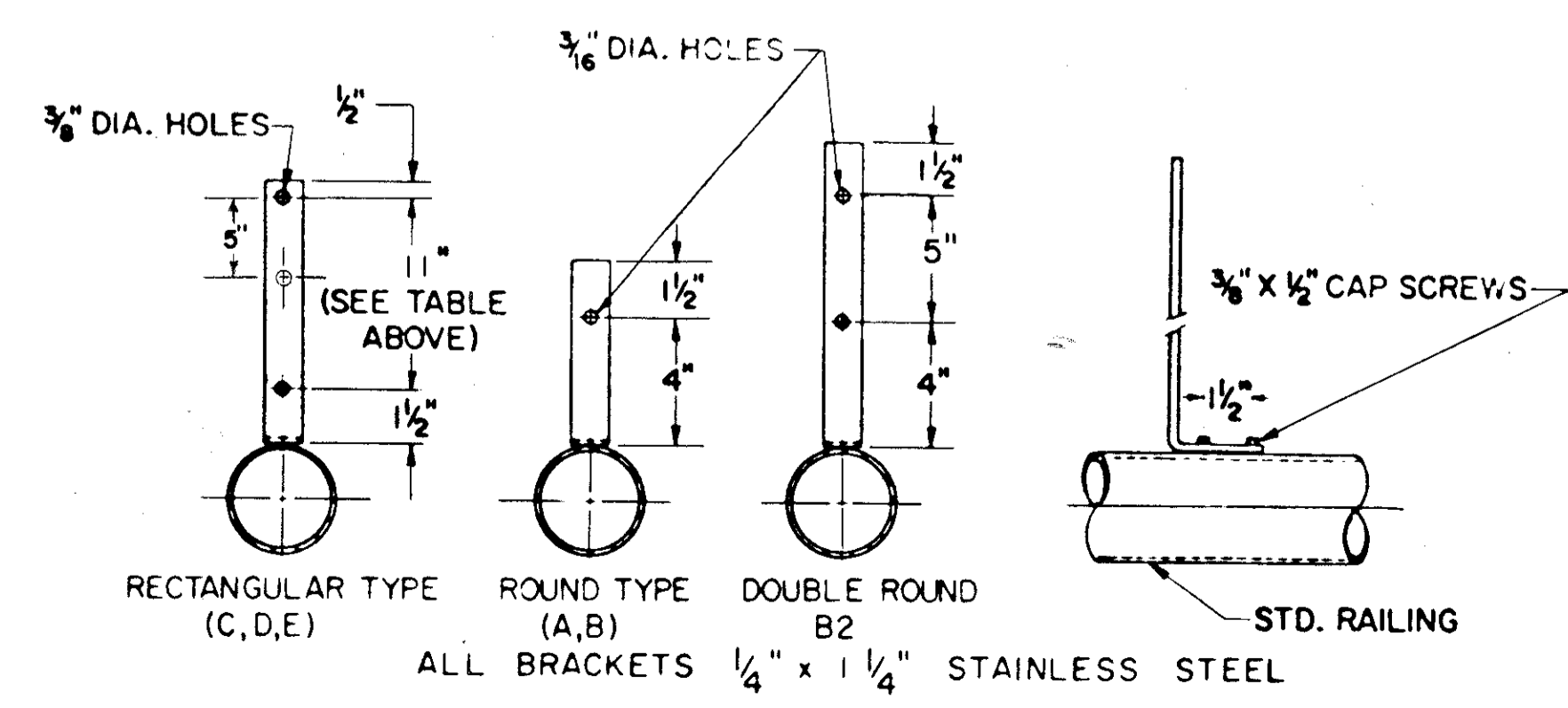
### 2 LB./FT. DELINEATOR DRIVE POST



TAMPER RESISTANT FASTENERS SHALL BE USED TO FASTEN DELINEATORS TO POST AS/OR SIMILAR TO ONE SHOWN ABOVE.



### BRIDGE PARAPET BRACKET



### BRIDGE RAIL BRACKET

### DELINATOR SPACING ON RAMP HORIZONTAL CURVES

RADI, FT.		SPACING ON CURVE	* TRANSITION SPACING	
FROM	TO			
TANGENT	1,801	100'	100'	100'
1,800	1,401	80'	100'	100'
1,400	1,001	70'	100'	100'
1,000	751	60'	100'	100'
750	551	50'	80'	100'
550	326	40'	70'	100'
325		30'	60'	100'

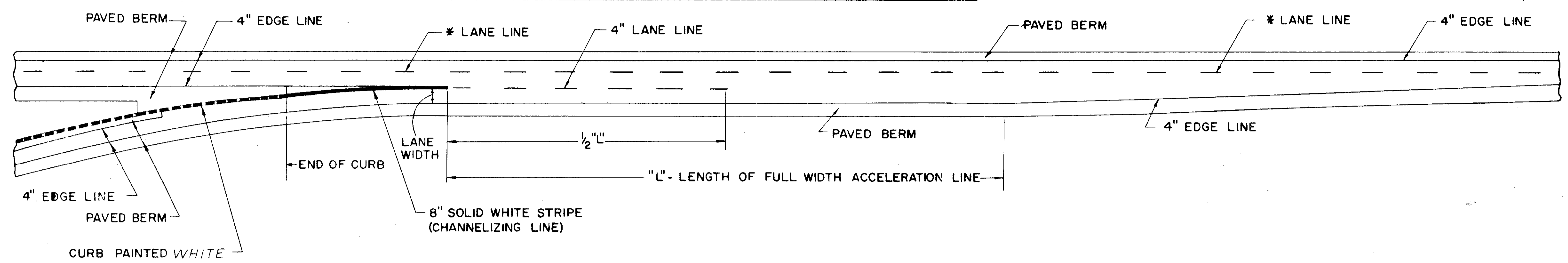
\* SUCH AS 40' TO 70' TO 100' OR 100' TO 80' TO 50' OR ANY OTHER COMBINATION SHOWN ABOVE.

BUREAU OF DESIGN SERVICES DIVISION OF HIGHWAYS OHIO DEPARTMENT OF TRANSPORTATION	
<b>DELINATOR DETAILS</b>	
DATE 1/1/73 3/12/73	
APPROVED _____ ENGINEER OF DESIGN SERVICES	

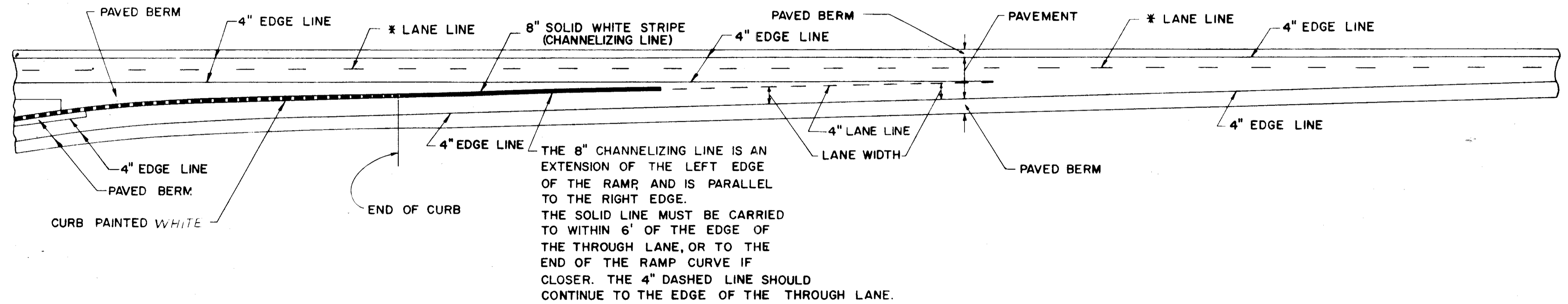


CUYAHOGA COUNTY  
CUY. 480-21.40

### ENTRANCE TERMINAL - PARALLEL ACCELERATION LANE

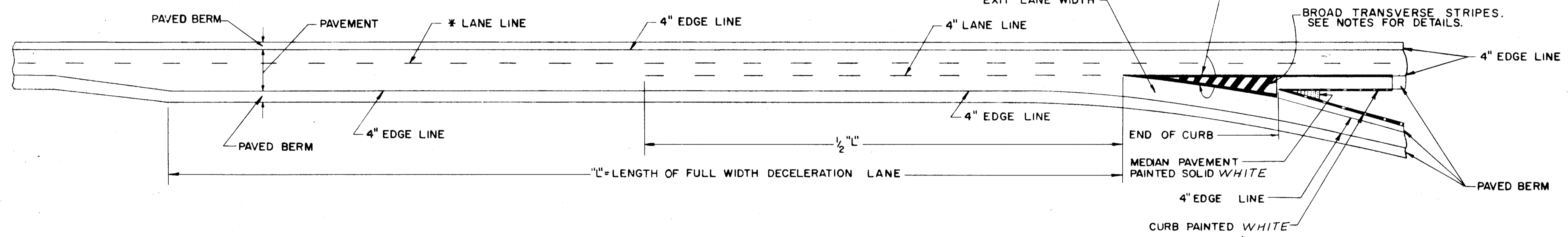


### ENTRANCE TERMINAL - TAPERED ACCELERATION LANE

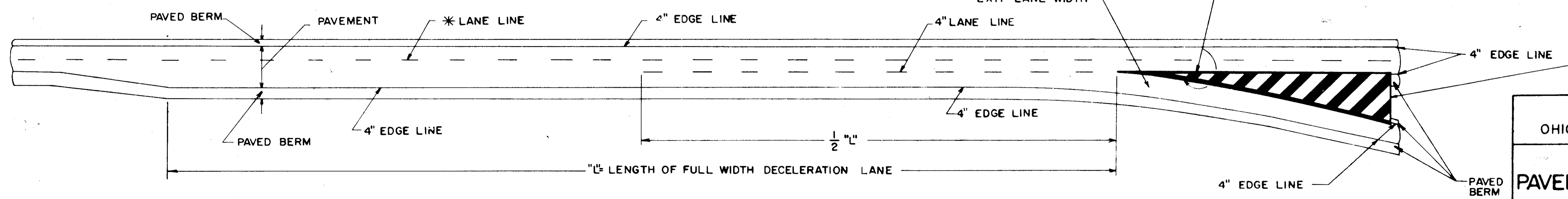


THE 8" CHANNELIZING LINE IS AN EXTENSION OF THE LEFT EDGE OF THE RAMP AND IS PARALLEL TO THE RIGHT EDGE. THE SOLID LINE MUST BE CARRIED TO WITHIN 6' OF THE EDGE OF THE THROUGH LANE, OR TO THE END OF THE RAMP CURVE IF CLOSER. THE 4" DASHED LINE SHOULD CONTINUE TO THE EDGE OF THE THROUGH LANE.

### CURBED EXIT TERMINAL - PARALLEL DECELERATION LANE



### UNCURBED EXIT TERMINAL - PARALLEL DECELERATION LANE



#### NOTES

- DIAGONAL STRIPES AT EXIT RAMP SHALL BE 24" BROAD TRANSVERSE STRIPES, 621.11, WITH A 6' SPACE BETWEEN STRIPES.
- \* 6" LANE LINE ON INTERSTATE HIGHWAYS ONLY.
- 4" LANE LINE ON ALL OTHER HIGHWAYS.

BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS	
PAVEMENT MARKING 621	DATE 7-17-61 4-6-62 5-24-65 9-2-67 4-17-68 1-11-72
	APPROVED <i>Robert E. Lower</i> ENGINEER OF TRAFFIC



# GENERAL TRAFFIC SIGNAL NOTES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

256  
390

CUYAHOGA COUNTY  
CUY. -480-21.40

1  
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## SCOPE

The contractor shall install traffic signals at the interesections of Broadway Avenue-Relocated McCracken Road and Broadway-Temporary Bedford Freeway as shown in the plans. The contractor shall furnish all labor, materials, and equipment necessary so that the traffic signals will be complete, accepted and ready for service.

## GENERAL

Any items of labor, materials, and equipment required, but not shown as a separate pay item in the proposal shall be furnished and installed as incidental to the contract.

The reference to any name, make and model number is intended to be descriptive and not restrictive and is to indicate to bidders the design that will be acceptable. Bids on other names, makes and numbers will be considered. Before any equipment is ordered or installation of a traffic signal system is begun, a complete schedule of materials and equipment shall be submitted to and approved by the Engineer. The schedule shall include fourteen (14) sets (3 sets each to be sent to the Mayor's office, City of Garfield Heights and the Mayor's office, City of Maple Heights) of catalog cuts, diagrams, drawings, brochures, data sheets, manufacturer's certificates of compliance or other descriptive data as may be required and shall include complete descriptive data on the signals, wiring diagrams, complete cable descriptions, test data, make and capacity of all apparatus. The contractor shall identify the item on each sheet and shall mark all prints "record drawing". One copy will be returned marked "Approved", if found satisfactory. In the event any items of material or equipment contained in the schedule fail to comply with the specification requirements, such items will be rejected.

All materials and equipment furnished under these specifications shall be new, first quality, of the latest design, and free from defects and poor workmanship. The contractor shall be responsible not to scratch or damage the paint or galvanized finish of any material or equipment being installed. Minor scratches shall be touched up with two coats of the final paint color. Deep scratches on galvanized finish on poles or other equipment will not be acceptable.

All major items of equipment such as controllers, signals, detectors, poles, specific types of cables, etc. shall be of the same manufacture and same type in order to assure uniformity, interchangeability of components, single responsibility and most satisfactory service.

## INSTALLATION

- The contractor shall conform to all applicable requirements of the National Electric Code, the Ohio Manual of Uniform Traffic Control Devices for streets and highways, 1963 edition with latest revisions, and the State of Ohio's Construction and Material Specifications dated January 1, 1973, the Institute of Traffic Engineers, and the Standards of EEI-NEMA and the Underwriter's Laboratories in performing contract work and in the equipment furnished. He shall observe the regulations of utilities in the area of their equipment and exercise due caution in construction work near their facilities.
- Prior to beginning construction, the contractor shall contact all utilities having installations in the area to secure and affirm data on utility locations. These agencies and utilities shall be notified at least 24 hours prior to any excavation in areas containing their installations.

- The contractor shall install the power to the controller cabinet and provide 120/240 volts, 30 amp service as required. The contractor shall be responsible for arranging and providing the power in the manner shown in the plans through the Cleveland Electric Illuminating Company. The cost of obtaining the power shall be included in the bid price for "Underground Power Cable".
- Traffic signal cable shall enter the controller cabinets and run continuously from signal head to signal head without splices. Pressure type connectors will be used to make connections inside the controller cabinet. Cable entrances shall be protected by a suitable weather head and drip loop when entering traffic fixtures.
- All wires in the controller cabinet shall be labeled, neatly lashed and fastened to the cabinet with clamps. This shall include wires to signal heads, and all miscellaneous equipment.
- All splices in pull boxes shall be of the weather-proof poured type.
- All current carrying wires shall be copper unless otherwise specified.
- No splices shall be permitted in any electrical conductor.

## EQUIPMENT

All equipment shall be furnished with two wiring diagrams, service manual and instructions on installation and maintenance. To facilitate later maintenance, the contractor shall provide the City of Garfield Heights and the City of Maple Heights with a complete list of the replacement parts for all equipment installed.

## MARKING OF CABLE

All cables shall be marked or tagged at all pull boxes, signal supports, and controllers with tag, so as to be individually identified.

The tag shall be not less than 0.031" thick copper, brass or plastic, and shall be embossed or engraved with letters or numbers of not less than 1/4" high. It shall be securely attached with an AWG 14 copper wire. Markings shall consist of the following or variations thereof: Ground, Grd.; Phase A;  $\phi$ A; Common, Com; power, ac+ or ac-; etc.

Payment for this work shall be incidental to the installation of the various cables.

## TESTING OF TRAFFIC SIGNALS

The contractor shall furnish all personnel, equipment and appliances required to successfully test the completed installations.

The contractor shall test and demonstrate to the satisfaction of the engineer or his authorized representative, that the circuits are properly connected, continuous and free from short circuits, crosses and unspecified grounds, and that they are connected in accordance with the wiring instructions and that each circuit is operating correctly and independently of any other circuit.

The contractor shall test each ungrounded circuit and spare wires terminating at the traffic controller cabinet for resistance to ground. This resistance to ground shall be not less than ten (10) megohms. The contractor shall furnish a complete report of all megohm readings of each circuit and spare conductors in cable appearing at the controller base. The ground rod at the traffic controller shall have a resistance of not more than 25 OHMS to ground.

After all circuits and spare conductors have been tested, the contractor will install the traffic controller and connect the field wiring to the terminal contacts of the traffic controller. The completed installation shall operate continuously for a period of one week without interruption or failure attributable to poor workmanship or defective material prior to acceptance and after any defective parts have been replaced and all faults corrected.

The contractor shall have the responsibility of correcting malfunctions of the installation. Power for the test will be furnished from the service installed as a part of this contract. The cost of the power to conduct the test will be borne by the contractor. Costs of conducting tests by the contractor shall be included in the bid price for the item tested.

## METHOD OF MEASUREMENT

Supplementing item 625.24, linear measurements for payment of various traffic signal bid items shall be made as follows:

- Signal Cable, Power Cable, Interconnect Cable, Loop Detector Lead in Cable, Service Cable.

The length measured horizontally from center to center of pullboxes, poles, foundations, or signal heads, plus the following:

- Five feet per each pullbox, pole, or termination at controller or signal head to allow for slack and splicing of leads.
  - The length measured vertically from trench bottom to pole outlet or span wire attachment on vertical runs.
- Multipliers as contained in 625.24 paragraph (c) and (e) shall not be used for multi conductor cables covered in this note.

- Loop Detector Wire

Measured horizontally from center line of pullbox to pavement edge, to loop through sawslots for the number of turns required and thence returning to the pullbox, plus five feet at each end to allow for slack and splices.

- Loop Detector Pavement Cutting

Measured along the sawcut from outside edge of pavement or curb, to loop and around the loop, using the rectangular perimeter dimensions shown on the plans or directed by the engineer but not including chamfer cuts at loop corners.

- Messenger Wire With Accessories

Measured horizontally from center to center of pole to pole; or bullring (aerial corner) to pole; or bullring to bullring; but not including any additional messenger required for attachment of messenger to poles, bullrings or strain insulators by wrapping or bending.

## CERTIFICATION AND APPROVAL OF TRAFFIC SIGNAL MATERIALS

The Contractor shall submit through proper channels the drawings, information and samples as required below:

- 8 copies of shop drawings and material lists for approval
- 8 copies of catalog cuts descriptions of samples of fabricators standard items as shown in the plans or their equals for approval of their use.
- Certifications and or samples for all material which have been approved above under 1, a and b.
- Approval of items under 1, a and b shall be in the hand of the Contractor prior to any purchase of installation.
- Certifications of samples under 3 must be in hand and approved prior to contract completion.

SCALE  
MADE L.J.G. DATE 11-23-71  
TRCD J.M.C. DATE 9-11-72  
C.K.D. DATE 8-20-74  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

# GENERAL TRAFFIC SIGNAL NOTES

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

257  
390

CUYAHOGA COUNTY  
CUY. -480-21.40

2  
13

## 625 TRAFFIC SIGNAL HEADS, BY TYPE

This work shall consist of furnishing and installing vehicular traffic signal heads of the type and size shown on the plans and installing them as shown on the detail sheet and as herein specified.

All traffic signals shall meet the latest ITE (Institute of Traffic Engineers) standards for "Adjustable Face Traffic Control Signal Head Standards". The traffic signals shall also meet the following requirements:

- Twelve (12") traffic signal sections shall be installed with a combination tunnel type hood twelve (12") long, with an open slot at the bottom of the hood.
- Reflectors shall be highly polished, specular aluminum type.
- All traffic signals shall be arranged for span wire mounting.
- Glass lenses, number and size, shall be as indicated on the intersection drawing. These lenses shall meet the latest ITE standards for lenses.
- All signal optical units shall produce standard (ITE definition) light distributions.
- All traffic signals and signal service entrance fixtures shall be painted in accordance with the following.

A. Finish on body of signal, outside of hood, doors and service entrance fixture - Federal Yellow, Standard 595 Color 13655-two coats.

Finish on inside of hood - Flat Black.

B. Paint Requirements:

1st coat (all surfaces) - Epon oxide baking primer, Federal Spec. TT-P-636.

2nd coat (all surfaces) - Medium gray alkyd urea exterior baking enamel, Federal Spec. TT-E-489B

3rd coat (yellow surfaces) - Federal Yellow alkyd urea exterior baking enamel, Federal Spec. TT-E-489B, color 13538

3rd coat (Flat Black surfaces) - Alkyd urea black synthetic, heat-resisting glyceryl phthalate type 4, instrument black, military spec E-5557

- Stainless steel latching devices shall not be painted.
- Balance adjusters shall be installed if necessary to maintain the traffic signals in a vertical position.
- Traffic Signal Head, 3 Section, 12" Lens, One Way-A-completed one way, three section signal assembly shall consist of the following component parts for span wire mounting:
    - Galvanized span wire hanger for  $\frac{3}{8}$ " messenger
    - Balance adjuster
    - 1- $\frac{1}{2}$ " service entrance head with galvanized nipple
    - 1- $\frac{1}{2}$ " galvanized lock nuts
    - 1- $\frac{1}{2}$ " diameter top bracket assembly
    - One, twelve inch three-section traffic signal including red, yellow, and green lens with all required components to lock the signals in place and provide a water and dust tight installation.
    - All other incidentals necessary to make the assembly complete.

B. Traffic Signal Head, 4 Section, 12" lens. One way w/arrow-A completed one way four section signal assembly shall consist of the following component parts for span wire mounting.

- Galvanized span wire hanger for  $\frac{3}{8}$ " messenger wire.
- Balance adjuster
- 1- $\frac{1}{2}$ " service entrance head with galvanized nipple
- 1- $\frac{1}{2}$ " galvanized lock nuts
- 1- $\frac{1}{2}$ " diameter top bracket assembly
- One twelve inch, four section traffic signal including red, yellow, green and green arrow lenses with all required components to lock the signals in place and provide a water and dust tight installation.
- All other incidentals necessary to make the assembly complete.

C. Traffic Signal Head, 3 Section 12" Lense, Two-Way-A completed two-way three-section traffic signal assembly shall consist of the following component parts for span wire mounting:

- Galvanized span wire hanger for  $\frac{3}{8}$ " messenger wire
- Balance adjuster
- 1- $\frac{1}{2}$ " service entrance head with galvanized nipple
- 1- $\frac{1}{2}$ " galvanized lock nuts
- 1- $\frac{1}{2}$ " diameter top bracket assembly
- Bottom bracket assembly
- Two, twelve inch, three-section traffic signal including red, yellow and green lenses with all required components to lock the signals in place and provide a water and dust tight installation.
- All other incidentals necessary to make the assembly complete.

10. The contractor shall furnish and install a traffic signal lamp in each traffic signal section. Signal lamps shall conform to the requirements of "A Standard for Traffic Signal Lamps" as approved by the Institute of Traffic Engineers (ITE) Board of Direction on December 26, 1967, with the following exceptions and qualifications:

- Brass screw bases shall be required.
- Lamp sizes shall be as follows:

	watts	rated life hours	light center length
(1) 12" diameter red, green, green arrow	150	6000	3"
(2) 12" diameter yellow, yellow arrow	69	6000	3"

Lamps shall be installed with the open portion of the filament in the upward position.

Cost of furnishing and installing lamps shall be included in the bid price of each item requiring lamps.

11. Signals shall be installed such that the lowest point of the signal is sixteen (16) to seventeen (17) feet above the pavement surface except where noted in plans.

Payment for Item 625 "Traffic Signals" will be made at the contract unit price for each signal assembly (by type) mounted in place, tested and accepted.

## 625 SIGNAL CONTROLLER, 3 PHASE SEMI-ACTUATED WITH INTERCONNECT AND CABINET (CROUSE-HINDS)

The Contractor shall furnish and install a semi-actuated, three-phase, solid state traffic signal controller. It shall be capable of providing the basic signal sequence in accordance with signal operation drawings.

The controller shall have the following features, as manufactured by CROUSE-HINDS:

- All red clearance on all phases
- Overlap capability
- Local flashing for all approaches
- Voltage supply surge protection
- Capable of coordinated operation
- Base mounted cabinet meeting the requirements shown in the plans including police door, ventilating plan, an extra shelf, and a duplex utility outlet.
- Necessary solid state load switches and green monitor.
- Local Coordinating Unit which provides the background cycle and offset shown. The unit shall be of the expansible type capable of providing up to three dials with three offsets per dial by means of mechanically and electrically jack-mounted dial units. As furnished it shall have one dial.

Payment for Item 625 "Signal Controller 3-Phase Semi-Actuated w/interconnect & cabinet (Crouse-Hinds)" will be made at the contract price for each controller in place, including prewired cabinet, all connections and testing.

## 625 SIGNAL CONTROLLER, 3 PHASE SEMI-ACTUATED WITH INTERCONNECT AND CABINET (ALTERNATE BID)

The Contractor shall furnish and install a semi-actuated, three-phase, solid state traffic signal controller. Continuously rotating dials are not acceptable. It shall be capable of providing the basic signal sequence and operation in accordance with signal operation drawings.

The Controller shall be manufactured by Crouse-Hinds Company or Eagle Signal Company or approved functional equal.

The Controller shall be furnished with all of the appurtenances and features described in the specific brand name bid for this item.

Payment for Item 625 "Signal Controller 3-Phase, Semi-actuated, w/interconnect and cabinet (Alternate Bid)" will be made at the contract price for each controller complete and in place, including prewired cabinet, all connections and testing.

## 625 MASTER SIGNAL CONTROLLER, 3 PHASE SEMI-ACTUATED WITH INTERCONNECT AND CABINET (CROUSE-HINDS BRAND)

The Contractor shall furnish and install a semi-actuated phase, solid state traffic signal controller. Continuously relating dials are not acceptable. It shall be capable of providing the basic signal sequence in accordance with signal operation drawings:

The Controller shall be manufactured by Crouse Hinds Company.

The Controller shall have the following features:

- All red clearance on all phases
- Overlap capability
- Local flashing for all approaches
- Voltage supply surge protection
- Capable of coordinated operation
- Base mounted cabinet meeting the requirements shown in the plans including police door, ventilating plan, an extra shelf, and a duplex utility outlet.
- Necessary solid state load switches and green monitor.
- Local Coordinating Unit which provides the background cycle and offset shown. The unit shall be the expansible type capable of providing up to three dials with three offsets per dial by means of mechanically and electrically jack mounted dial units. As furnished it shall have one dial.
- In addition a master controller which is capable of supervising local units of the type described above shall be provided.

Payment for Item 625 "Master Signal Controller, 3-Phase, Semi-Actuated w/interconnect cabinet (Crouse-Hinds)" will be made at the contract price for each controller in place, including prewired cabinet, all connections and testing.

## 625 MASTER SIGNAL CONTROLLER, 3 PHASE SEMI-ACTUATED WITH INTERCONNECT AND CABINET (ALTERNATE BID)

The Contractor shall furnish and install a semi-actuated, three-phase, solid state traffic signal controller. Continuously rotating dials are not acceptable. It shall be capable of providing the basic signal sequence and operation in accordance with signal operation drawings.

The Controller shall be manufactured by Crouse Hinds Company or Eagle Signal Company or approved functional equal.

The Controller shall be furnished with all of the appurtenances and features described in the specific brand name bid for this item.

Payment for Item 625 "Signal Controller 3-Phase, semi-actuated, w/interconnect and cabinet (Alternate Bid)" will be made at the contract price for each controller complete and in place, including prewired cabinet, all connections and testing.

# GENERAL TRAFFIC SIGNAL NOTES

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## 625 SIGNAL CABLE, 1-5/C OR 1-7/C NO. 12 AWG, IMSA 19-1-67

Traffic signal cable shall be weatherproof and shall consist of the number of conductors as specified on the plans. All conductors shall be AWG No. 12. Cables shall be insulated, jacketed, rated 600 volts for use in underground conduit. It shall be color coded and in every respect follow the International Municipal Signal Association Specification No. 19-1-1967. Wires may be solid or stranded.

Payment for Item 625 "Signal Cable, 1-5/C or 1-7/C No. 12 AWG, IMSA 19-1-67" shall be made at the contract unit price per linear foot, by type, in place, completed and accepted, including wiring, terminals, connections, testing, and all incidentals necessary. Cable lengths shown in the plans are for estimating purposes only; the Contractor shall determine for himself the exact quantity required.

## 625 INTERCONNECT CABLE 7/C #14 AWG, IMSA 19-1-67

Interconnect cable shall be weatherproof and shall consist of the number of conductors as specified on the plans. All conductors shall be A.W.G. #14. Cables shall be insulated, jacketed, rated at 600 volts for use in underground conduit or as aerial cable supported by a messenger. It shall be color coded and in every respect follow the International Municipal Signal Association Specification 19-1-67. Conductors may be solid or stranded.

Payment for Item 625 "Interconnect Cable, 7/C #14 AWG" will be made at the linear price bid per linear foot, in place, completed, and accepted including wiring, terminals, connections, splicing, testing and all incidentals necessary.

## 624 LOOP DETECTOR AMPLIFIER

The loop detector amplifier is an electronic device that will detect the presence or motion of a mass of metal. This detection is accomplished by the passage of a car over a wire loop imbedded in the roadway.

The amplifier shall conform to the following:

1. The detector shall operate satisfactory at any temperature between -30°F. and +165°F.
2. The operating voltage shall be 115 volt, 60 cycle.
3. The internal circuitry shall be incorporated into printed circuit board assemblies.
4. The detector design shall include a fixed frequency crystal which will generate a sine wave form of signal.
5. No external equipment shall be necessary for installation, tuning, or sensitivity adjustments.
6. Various types of outputs shall be available including pulse and presence. These outputs shall be available by switching from one to the other without changing any internal parts.
7. All transistors, crystals, and relays shall be of the plug-in type to facilitate replacement.
8. The amplifier and power supply shall be capable of driving several loops from the one source. The amplifier shall be capable of detecting vehicles in a total area of up to 400 sq. ft. and shall properly function with lead-in lengths totaling up to 750 feet.

Payment for Item 624 "Loop Detector Amplifier" will be made at the contract unit price for each detector amplifier, completely wired and installed in controller cabinet.

## 625 LOOP DETECTOR WIRE AND LEAD-IN CABLE

Loop detector wire shall consist of single conductor, insulated, No. 14 AWG, RHW or RHW type, 600 V. stranded copper wire, and be installed in accordance with the typical loop detector detail. Each wire loop shall consist of the number of turns as required by the manufacturer of the loop detector. The loop wire shall run continuously to the adjacent pull box where it shall be spliced to the loop detector lead-in cable.

Payment for Item 625 "Loop Detector Wire" will be made at the contract unit price per linear foot in place for #14 AWG wire and shall include detector wire, installation, jacket, conduit from roadway edge to pullbox splice and all incidentals necessary to complete the installation. The estimated quantities of loop detector wire shown on the plans is based on an anticipated required number of turns. Payment will be based on the actual linear feet installed as controlled by the detector manufacturer's requirements for loops.

Payment for Item 625 "Loop Detector Lead-in Cable" will be made at the contract unit price per linear foot in place for #14 AWG, 2-cond., polyethylene insulated, twisted pair, shielded and jacketed cable, including soldered, water-proof poured splice.

## 625 LOOP DETECTOR PAVEMENT CUTTING

Loop detector pavement cutting shall consist of a 1-1/4 inch or 2 inch x 1/4 inch wide saw cut in accordance with typical loop detector installation detail. The saw cut shall be filled with a joint sealer after the wire has been installed. The joint sealer shall be as specified in the plans on Sheet 12.

Payment for Item 625 "Loop Detector Pavement Cutting" will be made at the contract unit price per linear foot for saw cutting and treatment including joint sealer.

## 625 POWER CABLE, 3/C #8 AWG, 600 V RHW, STRANDED

Power cable shall be weatherproof and shall be 3 conductor AWG No. 8, 600V RHW or RHW-type stranded copper. Power cable shall be installed from the controller cabinet through the appropriate conduit, signal pole, and weatherhead. It shall be attached by the Cleveland Electric Illuminating Company to the service cable with pressure connectors covered with mastic insulation. Three single conductor No. 8 RHW wires may be substituted; however, payment will be based upon the equivalent length of 3-conductor cable.

Payment for Item 625 Power Cable, 3/C #8 AWG " will be made at the contract unit price per linear foot, in place, complete and accepted, including wiring, terminals, connections, testing, and all incidentals necessary and shall also include any costs incurred to arrange the service installation by the Cleveland Electric Illuminating Company.

## 625 CABLE SUPPORT ASSEMBLY

A cable support assembly shall be installed for each group of cables passing through each wire outlet near the top of pole, it shall be attached to the "U" hook as shown in the plans and shall consist of the following major items:

1. One bronze or stainless steel cable grip with single "U" eye bale.
2. All other miscellaneous items that may be necessary to make the assembly complete.

The cable grip shall have a single "U" eye bale. The grips shall be of the proper size to fit the cable and shall have a minimum rated breaking strength of 250 lbs.

The grip shall be either the "closed", or "split with rod" type.

When a signal support will also support a luminaire bracket arm, the following additional items shall be included:

3. One piece of three-strand copper-clad messenger, length as required.
4. Two hot-dipped galvanized thimbles.
5. Two No. 6 split bolt connectors.

The messenger shall be 0.164 inches in diameter consisting of three strands of 0.075 inch copper covered steel wires twisted in the form of a cable. Guy thimble shall be grooved to fit the guy strand and bent to the proper radius to prevent the strand from being sharply bent.

Payment for Item 625 Cable Support Assembly will be made at the contract unit price each, completely assembled in place and accepted.

## 625 CAPPING OF CONDUIT

All conduit in foundations which will not have wire or cable pulled into it during construction shall have the ends closed with capped bushings or otherwise sealed in an approved manner to completely keep all moisture and foreign matter out of the conduit.

## 625 COVERING OF TRAFFIC SIGNAL HEADS

All traffic signal heads, both vehicular and pedestrian, erected at locations where traffic will be maintained prior to energizing of the signal, shall be covered.

The covering shall be plastic coated burlap blankets as per Item 705.06. They shall be firmly attached and completely cover the signal head without damage to the head. The covering shall be maintained in place at all times while traffic is using the area and the signal is not in operation.

Payment shall be at the unit price bid per each for Item 625 "Covering of Traffic Signal Heads" which shall be full compensation for all labor, materials and equipment required to erect, maintain and remove the covering.

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## 816 CONSTRUCTION LAYOUT STAKES FOR TRAFFIC SIGNALS

The contractor shall stake out all traffic signal supports in accordance with Supplemental Specification 816 prior to installation of any foundations or supports.

After stakeout the contractor shall notify the engineer a minimum of seven (7) days in advance of scheduled work. Support locations for each support will be field checked and approved by the Engineer who shall coordinate with the District and/or City Engineer prior to proceeding with construction work required.

Cost for this item of work will be incidental to the various 816 items of work contained in the project.

## 816 MESSENGER WIRE 7-STRAND (BY SIZE) WITH ACCESSORIES

Messenger wire shall be utility grade galvanized steel as per ASTM A-475 Class B. It shall consist of seven strand ( $\frac{3}{8}$ " nominal diameter with a breaking load of 11,500 lbs.) Galvanized steel lashing rods shall be used to suspend the signal cable from the messenger wire, tightly secured. Wet-porcelain strain insulators (600 volt), guy clamps, and Galvanized performed guy grip dead ends, thimbles, and bull rings (when required) with a rated loading strength equal to or greater than the breaking load of the messenger wire shall be installed as shown on the plans and as specified by the Engineer. The messenger wire shall be installed so that the entire load of the signal equipment will not cause sag to exceed a maximum of 5% or a minimum of 3% of the span.

Payment for Item 625 "Messenger Wire (By Size) 7-Strand, with Accessories" will be made at the contract unit price per linear foot (measured to center of pole or aerial corners) completely assembled in accordance with the typical signal installation details and shall include messenger wire, lashing rods, strain insulators, performed guy grips, thimbles, guy clamps, and aerial corner bull rings, as described above and shown on the details on sheets 8 & 10.

## 816 SIGNAL STRAIN POLE (BY SIZE)

This item of work shall consist of furnishing and erection of poles as shown and specified in the plans.

Shafts shall be tapered tubes.

Each pole shall be galvanized and include the furnishing of anchor bolts, Type III rigid ferrous metal 3" conduit ell and a  $\frac{3}{4}$ " electrical metallic tubing ell for grounding lead for installation in foundations plus handhole with cover, "U" hook, pole clamp, and cable service entrance with blind half-coupling for each pole in accordance with details as shown in the plans.

The poles shall be installed and adjusted to the proper rake so that the weight of the signal installation will not cause the poles to be off vertical alignment by more than 1%.

Basis of payment shall be at the contract bid price per each 816 "Signal Strain Pole, (by size)," including all labor, material, equipment and incidentals related to this item of work.

## COVER BASES

Cover bases shall be provided for all overhead signal support foundations that are located in sidewalks, tree lawns or in traffic islands used as walks. Payment for cover bases and all tools, materials, and labor necessary to erect the cover bases shall be included in the price bid for "Item 816 Signal Strain Pole."

## 816 CONCRETE FOR SIGNAL AND COMBINATION SUPPORT POLE FOUNDATIONS

Traffic signal pole foundations shall be constructed as shown in the plans. The contractor shall stake the longitudinal and lateral location and the elevation of the top of each foundation subject to the approval of the Engineer. The contractor shall be responsible for the proper elevation, offset and level of each foundation. Excavations shall be made to the dimensions shown on the plans and shall be performed by means of an earth auger of the specified diameter unless otherwise directed by the Engineer. Where sub-surface obstructions are encountered, the Engineer may require the Contractor to remove the obstruction or to replace the excavated material and relocate the foundation. If caving of the foundation occurs, the Contractor shall excavate to the specified depth, maintaining the sidewalls as nearly vertical as possible. No payment shall be made for any excavation, concrete or reinforcing steel used in excess of the planned quantities. Portland cement concrete shall be used and shall conform with class "C" of the current Construction and Material Specifications by the Department of Transportation of the State of Ohio.

The concrete shall be placed against undisturbed soil or compacted embankment. The foundation shall have anchor bolts and conduit accurately held in position with a template when concrete is poured. Forms shall be used for the upper portion of all foundations and no backfilling shall be permitted from the bottom to within 6 inches below ground level. No grouting of concrete shall be permitted between the foundation and the steel pole.

One (1) or more, 2 or 3 inch, 90 degree Type III conduit elbows with 24 inch radius shall be installed from the bottom of the pole through each base as detailed in the plans.

Payment for Item 816 "Concrete for Signal and Combination Support Pole Foundations" shall be made per cubic yard for each foundation constructed in accordance with the typical foundation details and shall include concrete, reinforcing steel, excavation, backfill and all incidentals.

## 816 CONCRETE FOR SIGNAL CONTROLLER AND PEDESTAL FOUNDATION

Controller and pedestal foundations shall be constructed as shown in the plans. The contractor shall stake the longitudinal and lateral location and elevation of the top of each foundation subject to the approval of the Engineer. The contractor shall be responsible for the proper elevation, offset and level of each foundation. Excavations shall be made to the dimensions shown on the plans. Where sub-surface obstructions are encountered, the Engineer may require the contractor to remove the obstruction or to replace the excavated material and relocate the foundation. If caving of the excavation occurs, the contractor shall excavate to the specified depth, maintaining the sidewalls as nearly vertical as possible. No payment shall be made for any excavation or concrete used in excess of the planned quantities.

Portland cement concrete shall be used and shall conform with Class "C" of the current Construction and Material Specifications prepared by the Department of Transportation of the State of Ohio. The concrete shall be placed against undisturbed soil or compacted embankment. The foundation shall have anchor bolts and conduit accurately held in position with a template when concrete is poured. Forms shall be used for the upper portion of all foundations and no backfilling shall be permitted from the bottom to within 6 inches below ground level.

Concrete for service step in front of controller as shown in detail in the plans will be included in the above described concrete.

Payment for Item 816 "Concrete for Signal Controller and Pedestal Foundation" shall be made per cubic yard for each foundation constructed in accordance with the typical foundation details and shall include concrete, excavation, and backfill.

## 625 MAINTENANCE OF EXISTING SIGNAL INSTALLATION

The existing traffic signal shall be kept in operation until the new signal is operational. If existing items are to be incorporated into the new signal, such items shall not be reinstalled until all other new work which can be done prior to the relocation work is completed. At this time, the existing signal may be turned off. When not in operation, signal heads shall be bagged. When no signal is in operation at the location, traffic shall be maintained through the use of police officers provided by the Contractor.

Signal control of the intersection shall not be interrupted during the hours of 7 AM to 9 AM and 3 PM to 6 PM on weekdays. Signals shall be inoperative no longer than six hours.

Payment will be included in the lump sum price bid for "Item 625, Maintaining Traffic."

## 202 REMOVAL OF EXISTING SIGNAL INSTALLATION

In accordance with standard Specification 202, this item shall include the removal of the signal heads, controller, strain poles, pole foundations cables, messenger wires, and all other portions of the existing traffic signal which are not to be reused in the new installation.

With the exception of items to be relocated and incorporated into the new installations or whose removal is otherwise necessary to permit the installation of the new signal equipment, no item shall be removed until the new installation is in full operation unless otherwise directed by the Engineer.

Payment for "Item 202, Removal of Existing Signal Installation" will be made at the unit price bid per each intersection wherein existing signal equipment is to be removed.

# ESTIMATED QUANTITIES

QUANTITY CALCULATIONS

MADE BY MEE DATE 8-22-73

CHECKED BY EFJ DATE 8-23-73

TYPE CODE 7221

FED. RD. DIVISION	STATE	PROJECT
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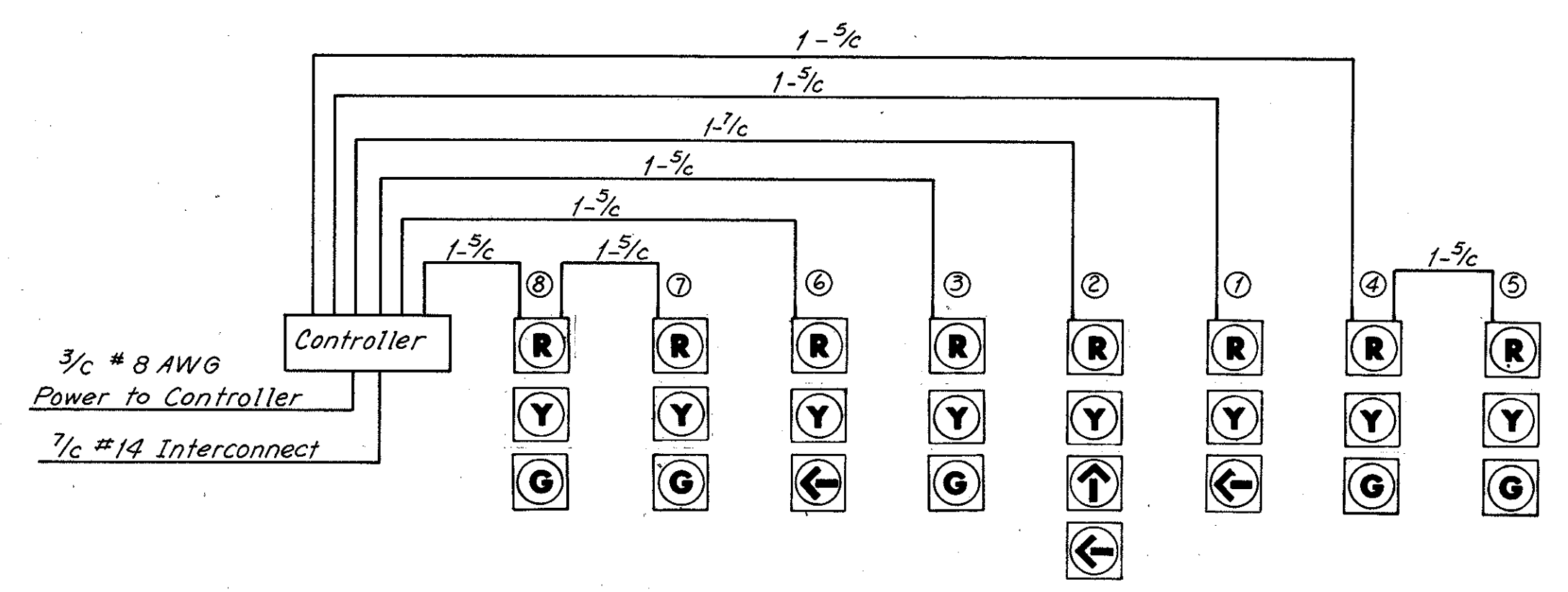
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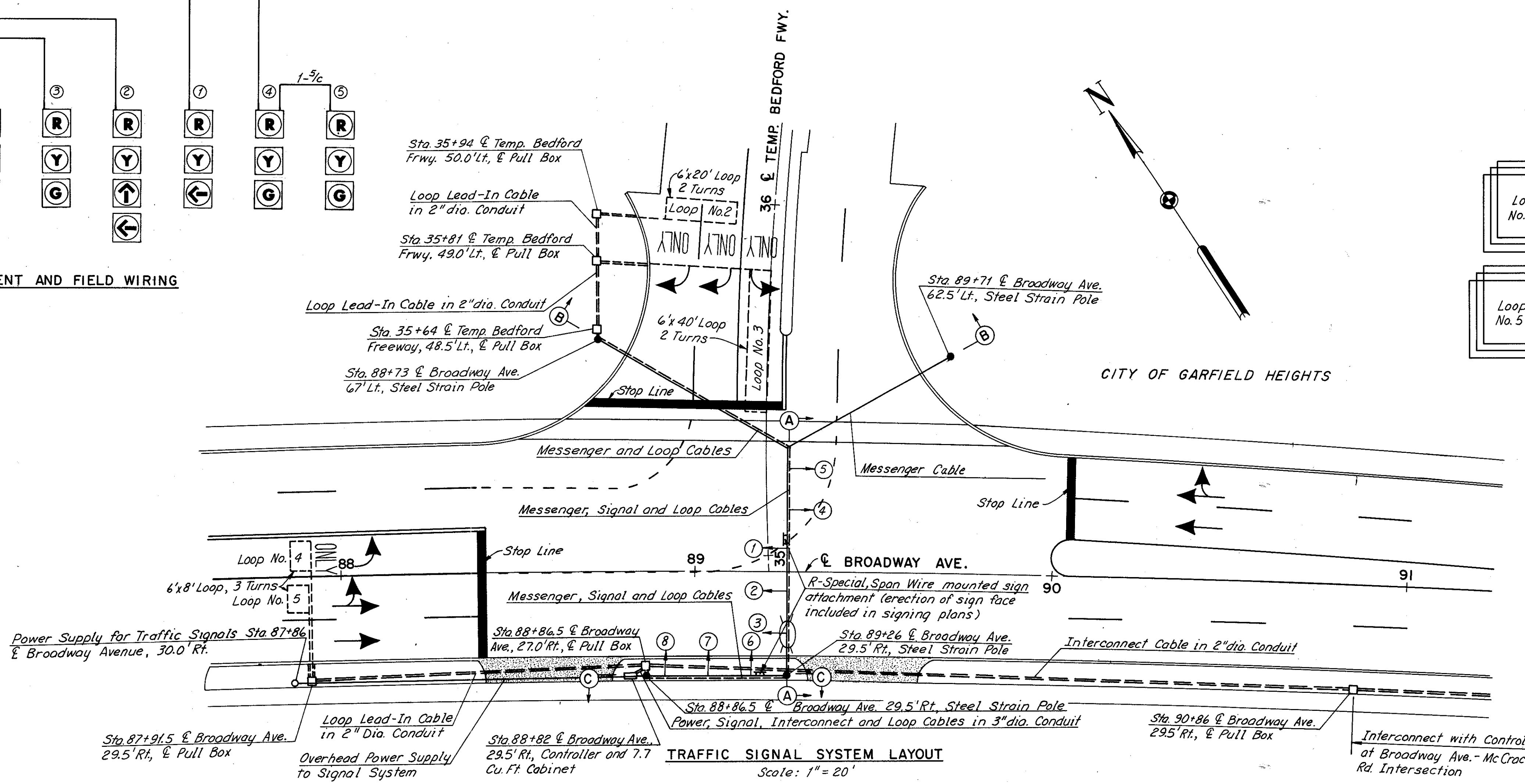
SHEET NUMBER										COST PARTICIPATION			TOTAL	UNIT	ITEM NO.	DESCRIPTION
										NORMAL	100 %					
										III	STATE					
6																
										1	1	1	Each	202	Removal of Existing Signal Installation	
										2	1	1	Each	625	Maintenance of existing signal installation	
										12	7	5	Each	625	Traffic Signal Head, 3 Section, 12" Lens, Oneway	
										2		2	Each	625	Traffic Signal Head, 3 Section, 12" Lens, Oneway with Arrow	
										1		1	Each	625	Traffic Signal Head, 4 Section, 12" Lens, Oneway with Arrows	
										1	1		Each	625	Traffic Signal Head, Tway, 4 Section, 12" Lens, with Arrow	
															3 Section, 12" Lens	
										1366'	756	610	Lin. Ft.	625	Signal Cable, 5/C #12 AWG, IMSA 19-1-67	
										328'	197	131	Lin. Ft.	625	Signal Cable, 7/C #12 AWG, IMSA 19-1-67	
										8	4	4	Each	625	Cable Support Assembly	
										488	210	278	Lin. Ft.	625	Loop Detector Pavement Cutting	
										1232	508	724	Lin. Ft.	625	Loop Detector Wire, Stranded, 1/C #14 AWG, RHW Type	
										1248	356	892	Lin. Ft.	625	Loop Detector Lead-in Cable, Stranded, 2/C #14 AWG, Twisted Pair Shielded	
										118	12	106	Lin. Ft.	625	Power Cable, 3/C, No. 8 AWG, 600 Volt RHW or RHW Type, Stranded	
										2	1	1	Each	625	Power Service	
										1786		1786	Lin. Ft.	625	Interconnect Cable, 7/C #14 AWG, 600 Volt, IMSA 19-1-67	
										12	6	6	Each	625	Ground Rod	
										1984		1984	Lin. Ft.	625	Trench	
										1968		1968	Lin. Ft.	625	Conduit, 2", 713.04, Type III	
										16		16	Lin. Ft.	625	Conduit, 3", 713.04, Type III	
										17	5	12	Each	625	Pull Box, 24" X 24", Concrete, as per plan	
										2	2		Each	625	Covering of Traffic Signal Heads	
										1		1	Each	625	Signal Controller, 3 Phase, Semi-actuated with Interconnect Cabinet (Crouse-Hinds)	
										1		1	Each	625	Signal Controller, 3 Phase, Semi-actuated with Interconnect Cabinet (Alternate Bid)	
										1	0.8	0.2	Each	625	Master Signal Controller, 3 Phase, Semi-actuated with Interconnect Cabinet (Crouse-Hinds)	
										1	0.8	0.2	Each	625	Master Signal Controller, 3 Phase, Semi-actuated with Interconnect Cabinet (Alternate)	
										7	3	4	Each	625	Loop Detector Amplifier	
										2	1	1	Each	816	Signal Strain Pole, 3 Ga. 12" X 7. 94" X 29'-0"	
										1		1	Each	816	Signal Strain Pole, 3 Ga. 10" X 5. 80" X 30'-0"	
										1		1	Each	816	Signal Strain Pole, 3 Ga. 12" X 7. 80" X 30'-0"	
										1		1	Each	816	Signal Strain Pole, 3 Ga. 14" X 9. 80" X 34'-0" as per plan	
										1	1		Each	816	Signal Strain Pole, 3 Ga. 11" X 6. 24" X 34'-0"	
										1	1		Each	816	Signal Strain Pole, 3 Ga. 13" X 7. 96" X 36'-0"	
										1	1		Each	816	Signal Strain Pole, 3 Ga. 11" X 5. 68" X 38'-0"	
										570	351	219	Lin. Ft.	816	Messenger Wire, 7 Stranded (3") with Accessories	
										28.8	16.2	12.6	Cu. Yd.	816	Concrete for Signal and Combination Support Pole Foundation	
										1.9	1.0	0.9	Cu. Yd.	816	Concrete for Controller and Pedestal Foundation	



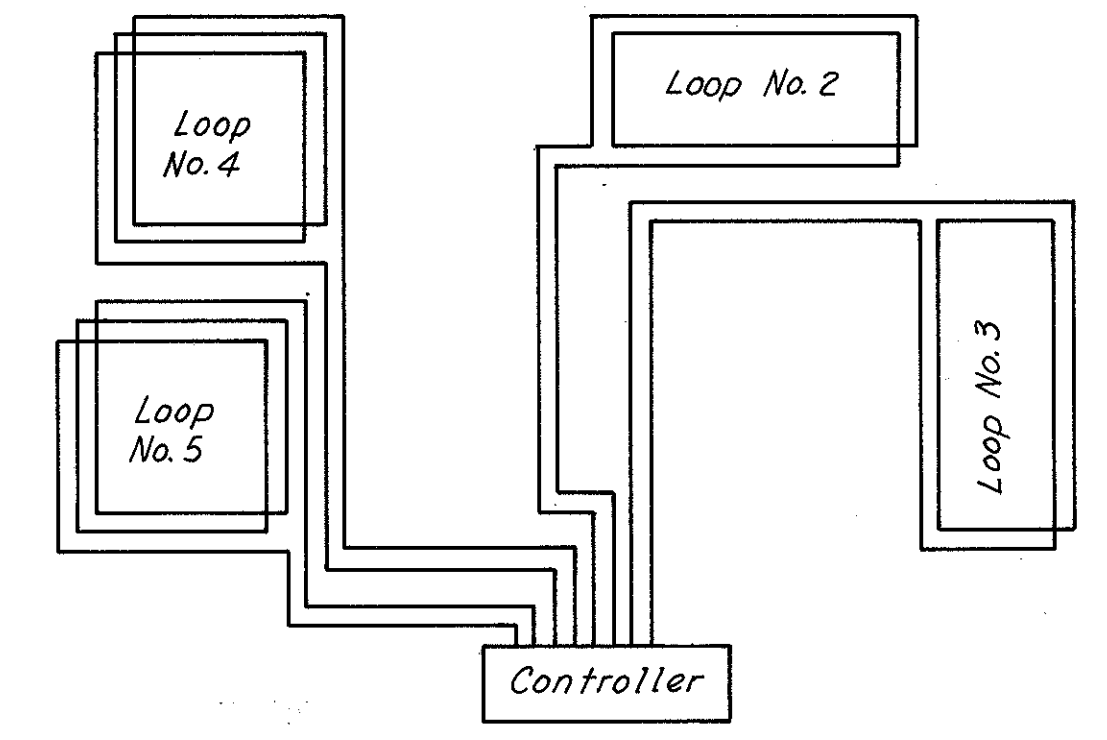




SIGNAL HEAD ARRANGEMENT AND FIELD WIRING



TRAFFIC SIGNAL SYSTEM LAYOUT  
Scale: 1" = 20'



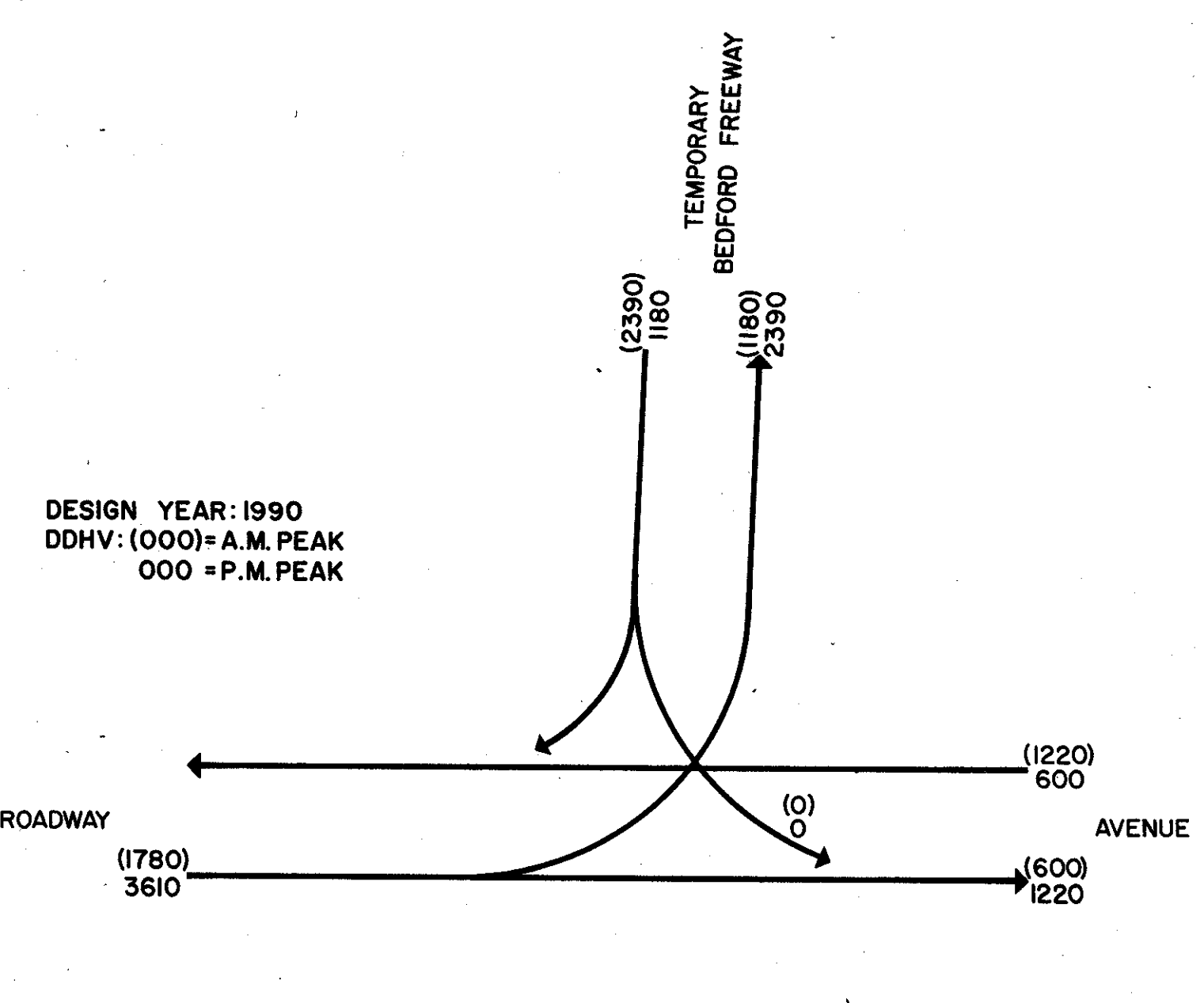
DETECTION LOOPS FIELD WIRING

LOOP DETECTOR AMPLIFIERS

Phase	Wired to Operate
I	—
II	Loops 2 & 4
III	Loop 3

Note: Loop 5 is for future use. After installation and testing, lead shall be marked, disconnected and taped off.

Note: Existing underground utilities are not shown, see Utility Plans. The Contractor is responsible for making his own determinations as to the type and location of underground utilities as may be necessary to avoid damage thereto.



TRAFFIC SIGNAL PHASING

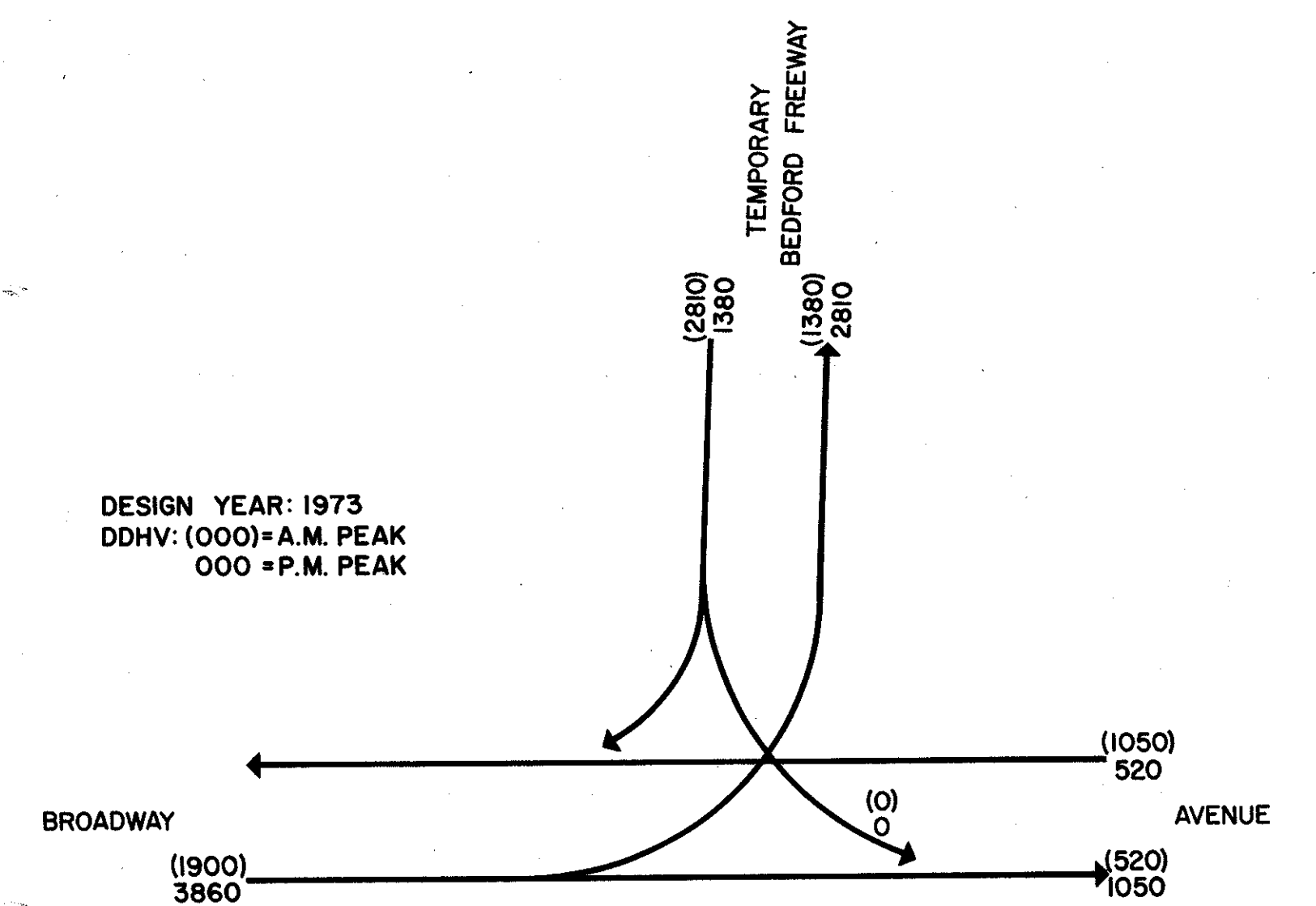
SIGNAL TIMING

Phase	I	II	III
Minimum	28	—	—
Initial	—	15	4
Vehicle	—	3	1
Maximum	—	45	5
Clear	4	4	4

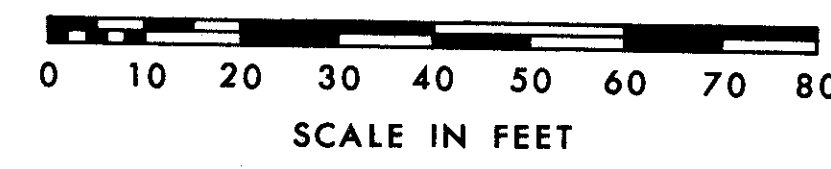
SIGNAL DISPLAY CHART

Signal Number	φ I		φ II		φ III	
	R/W	Clear	R/W	Clear	R/W	Clear
1	R	R	G←	Y	R	R
2	G↑	G↑	G←	Y	R	R
3	G	G*	G	Y	R	R
4	G	Y	R	R	R	R
5	G	Y	R	R	R	R
6	R	R	R	R	G←	Y
7	R	R	G	G*	G	Y
8	R	R	G	G*	G	Y

\* Becomes  if φ II is skipped  
\* Becomes  if φ III is skipped  
Note: Time intervals shown are estimates only and may be changed as directed by the Engineer. The controller is to have full phase skipability and, in absence of a call, dwell in Phase I. Coordination: Begin Phase I green at 55 sec. of a 90 sec. background dial.



TRAFFIC SIGNAL LAYOUT



DESIGN YEAR: 1990  
DDHV: (000)=A.M. PEAK  
000=P.M. PEAK

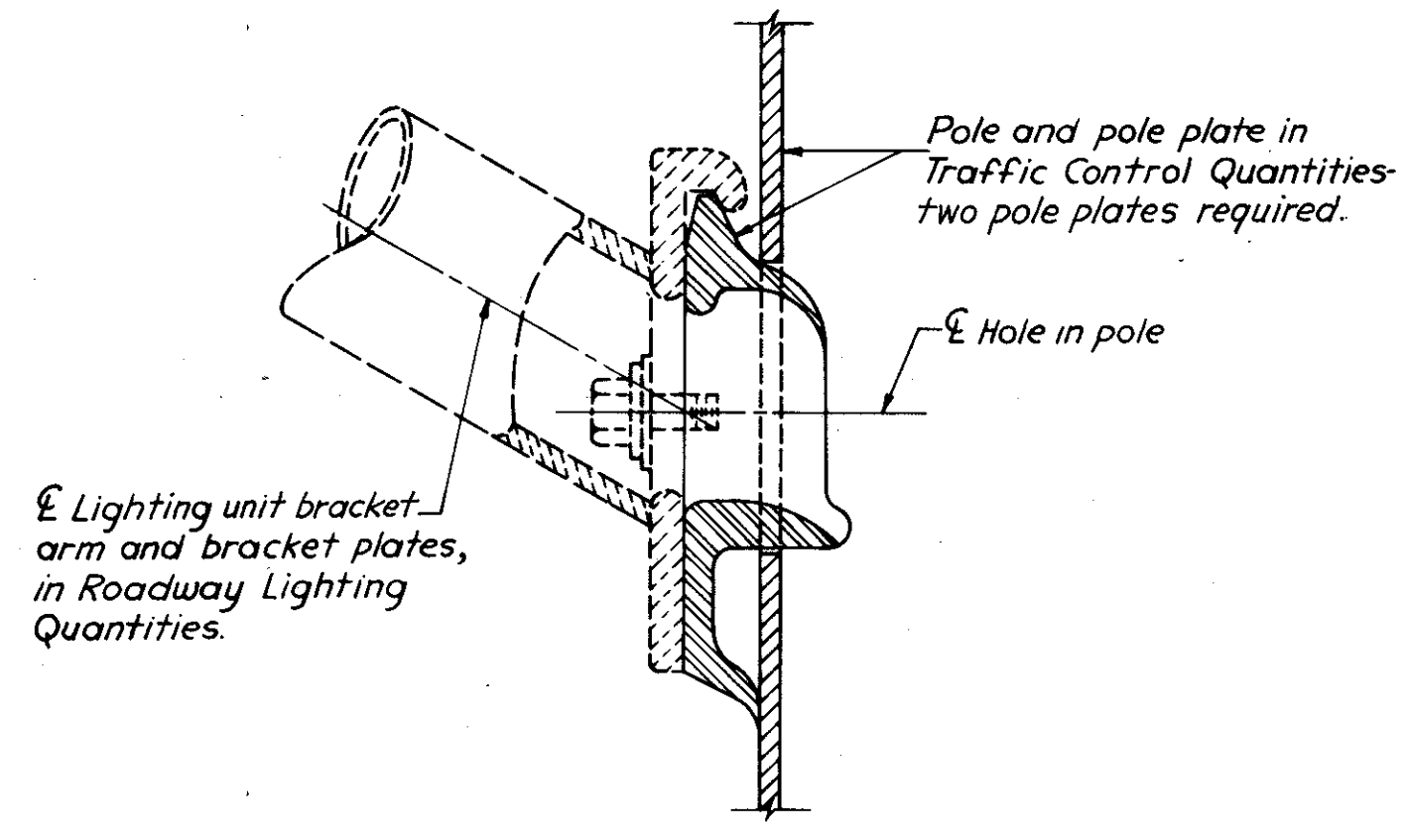
DESIGN YEAR: 1973  
DDHV: (000)=A.M. PEAK  
000=P.M. PEAK

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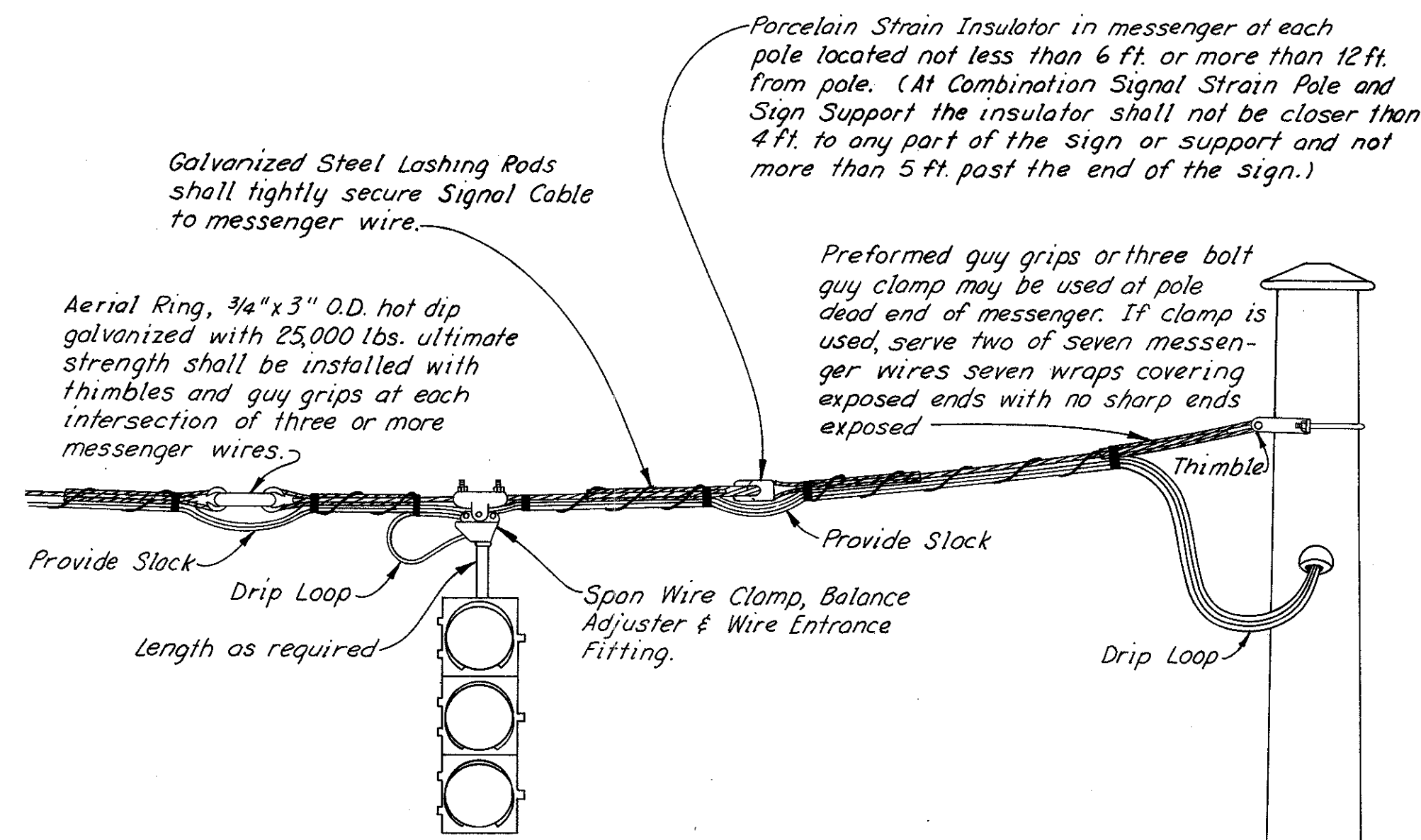
CUYAHOGA COUNTY  
CUY. 480-21.40

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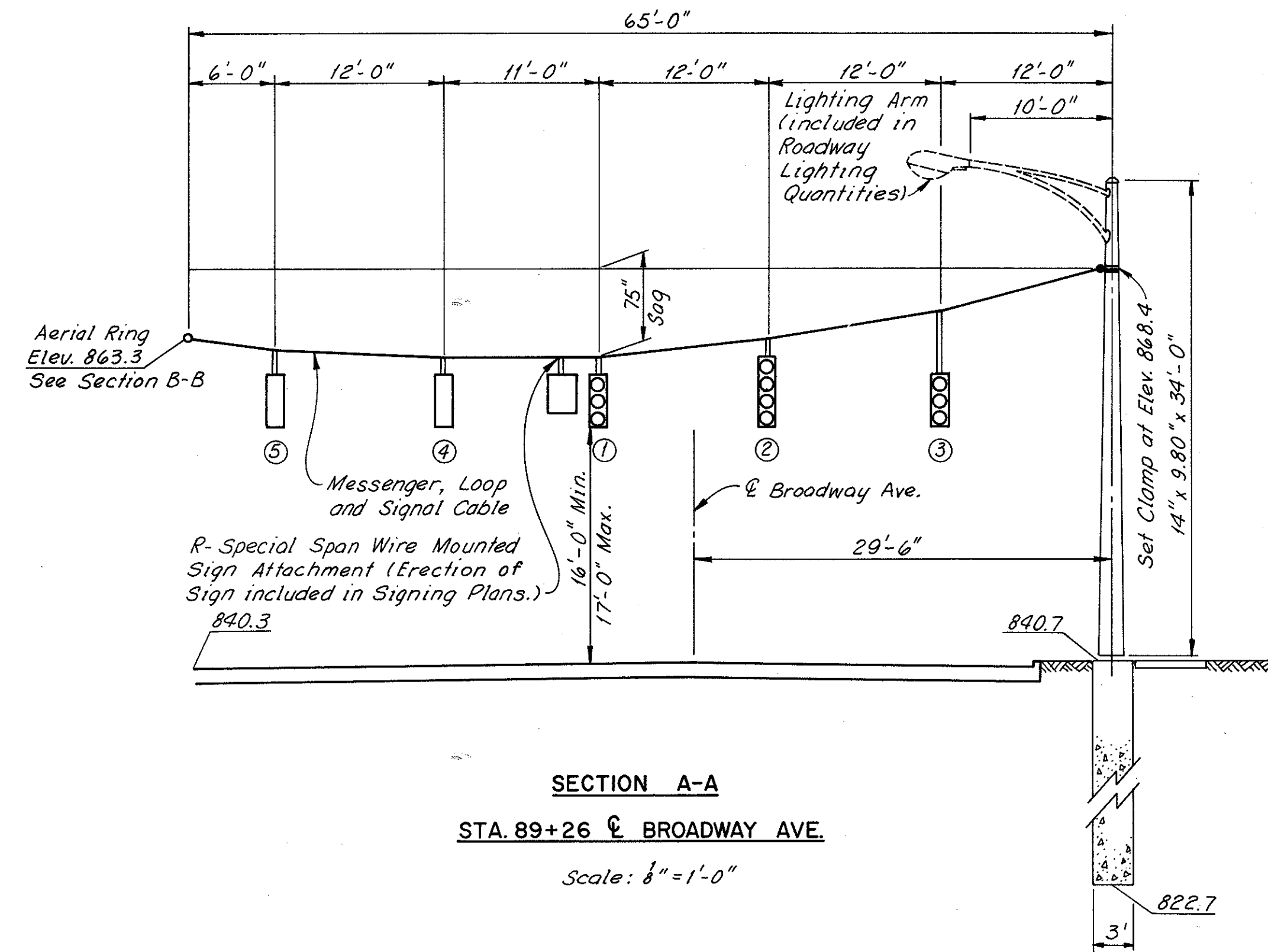


SECTION A-A

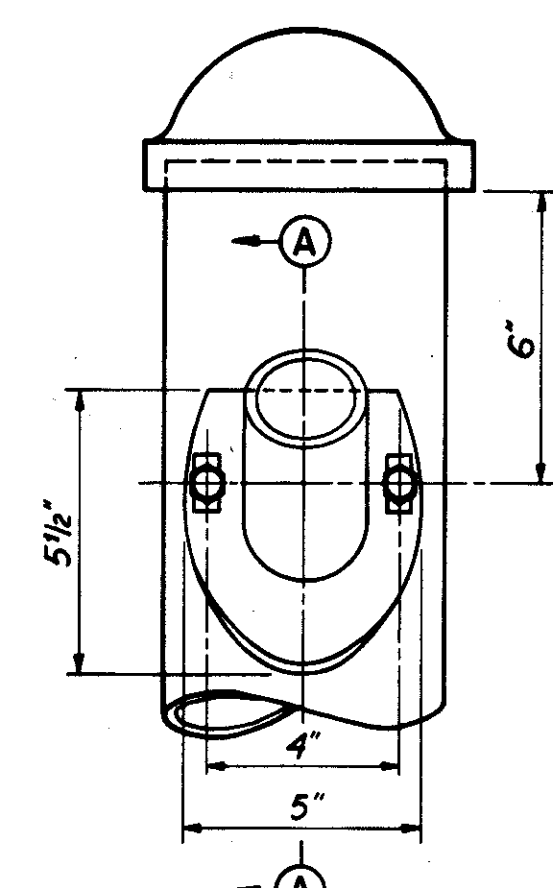
☒ Lighting unit bracket arm and bracket plates, in Roadway Lighting Quantities.



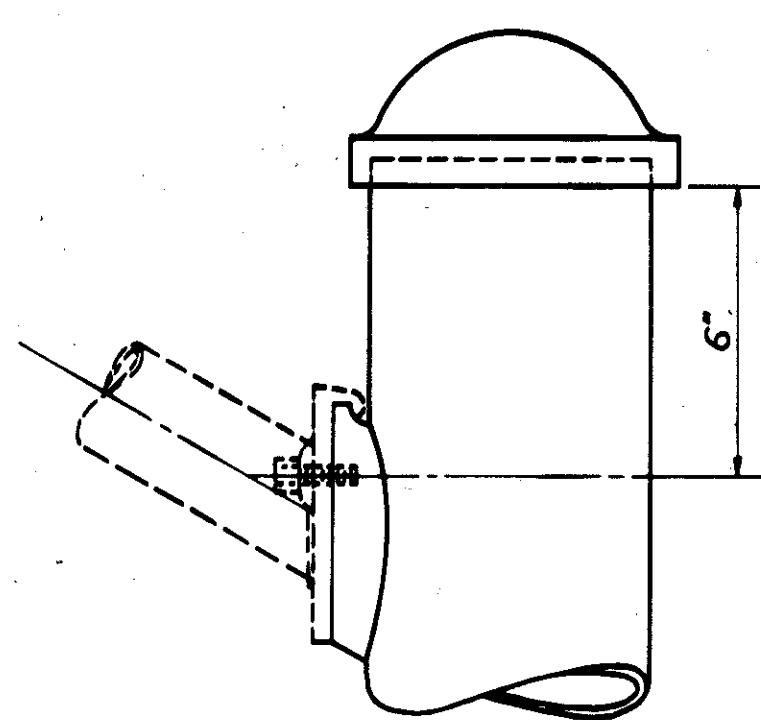
TYPICAL MESSENGER WIRE DETAILS



SECTION A-A  
STA. 89+26 @ BROADWAY AVE.  
Scale: 1/8" = 1'-0"

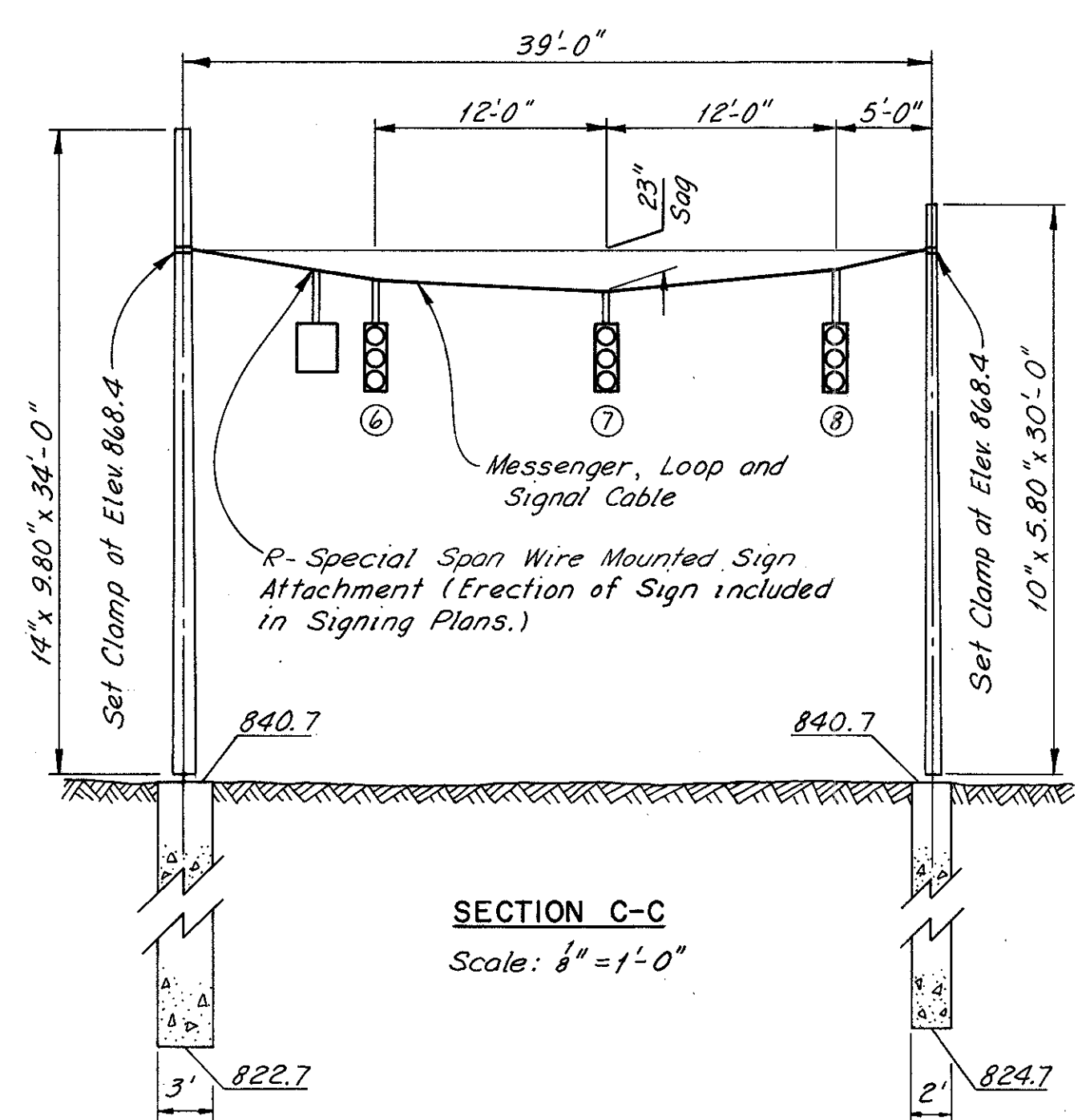


FRONT ELEVATION

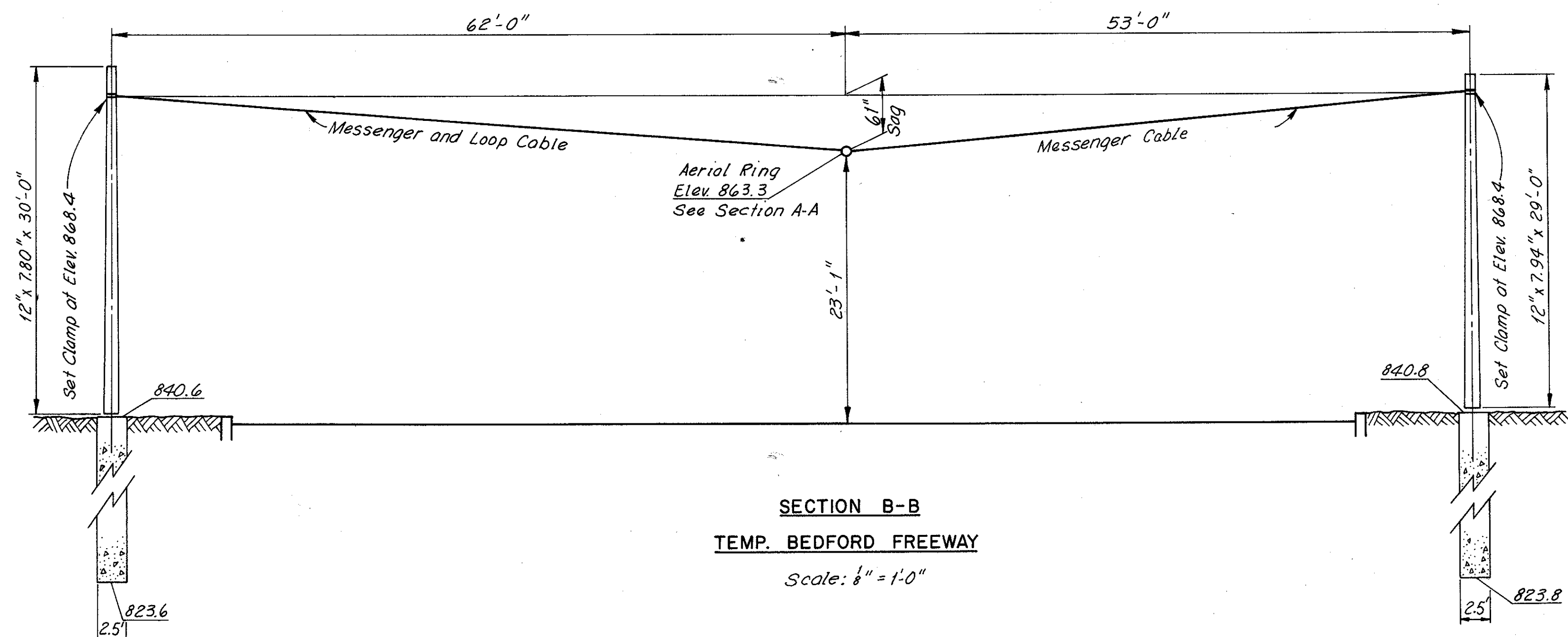


SIDE ELEVATION

LIGHTING UNIT BRACKET ARM ATTACHMENT TO TRAFFIC SIGNAL POLE  
Scale: 3" = 1'-0"

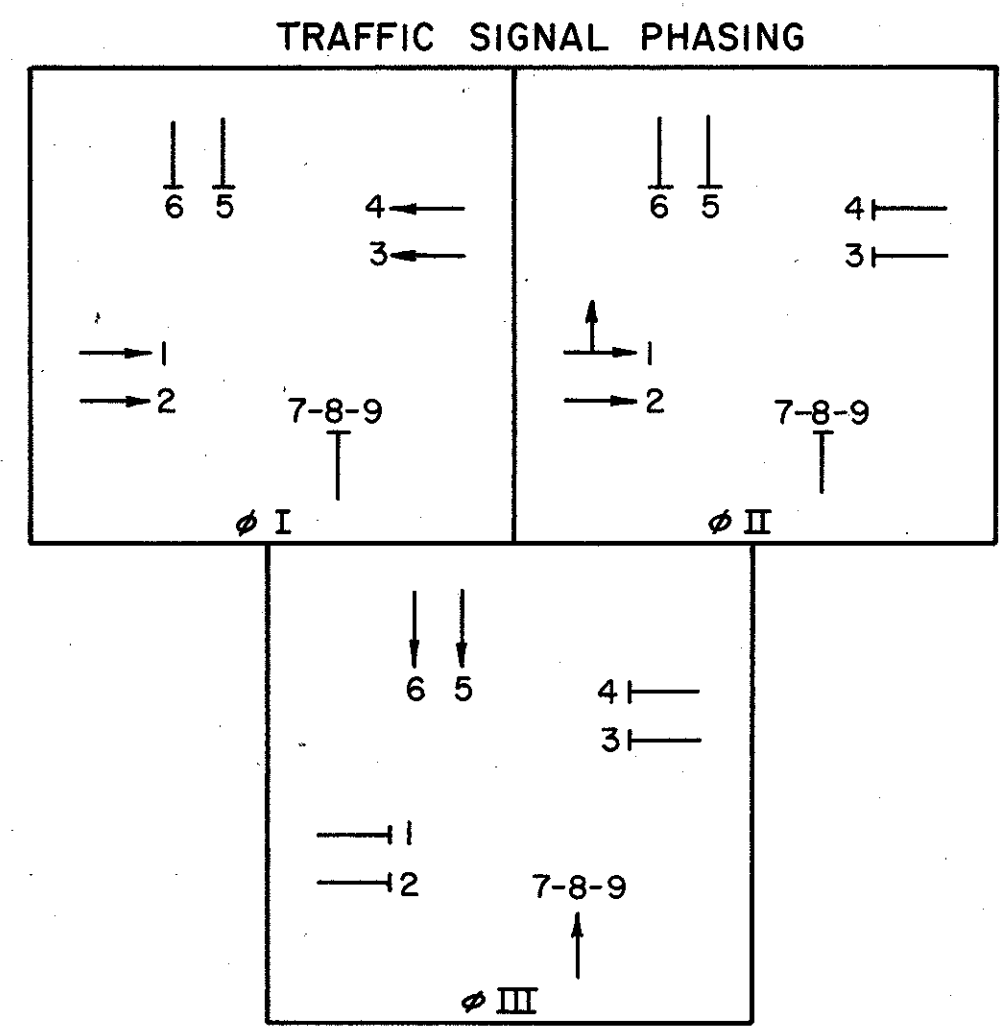


SECTION C-C  
Scale: 1/8" = 1'-0"



SECTION B-B  
TEMP. BEDFORD FREEWAY  
Scale: 1/8" = 1'-0"

SCALE: As Noted HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE J.M.C. DATE 12-10-72 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 12-11-72  
CKD E.F.U. DATE 8-20-73 KANSAS CITY CLEVELAND NEW YORK



### SIGNAL TIMING

Phase	I	II	III
Minimum	45	-	-
Initial	-	6	13
Vehicle	-	2	4
Maximum	-	8	35
Clear	4	4	4

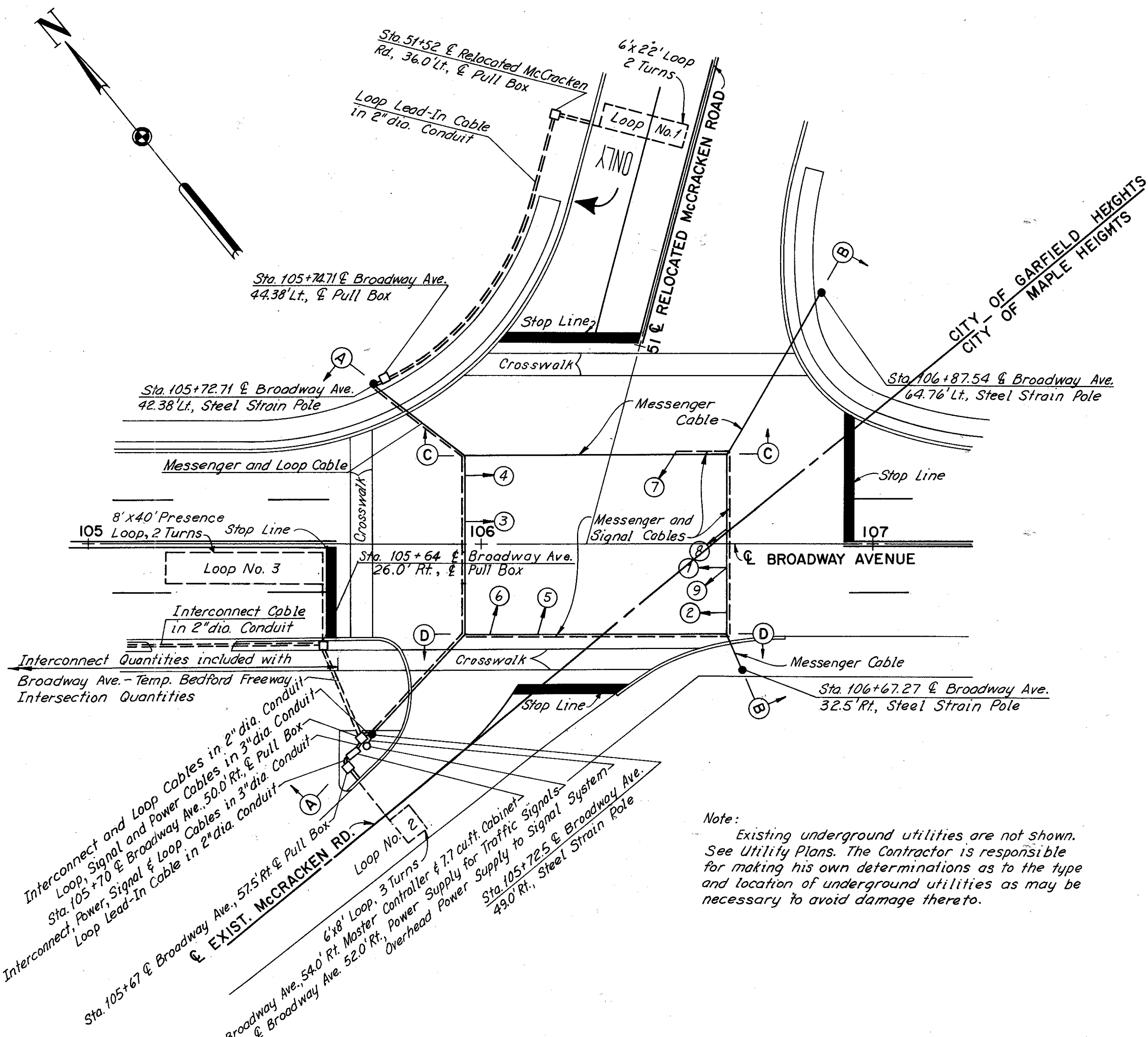
  

### SIGNAL DISPLAY CHART

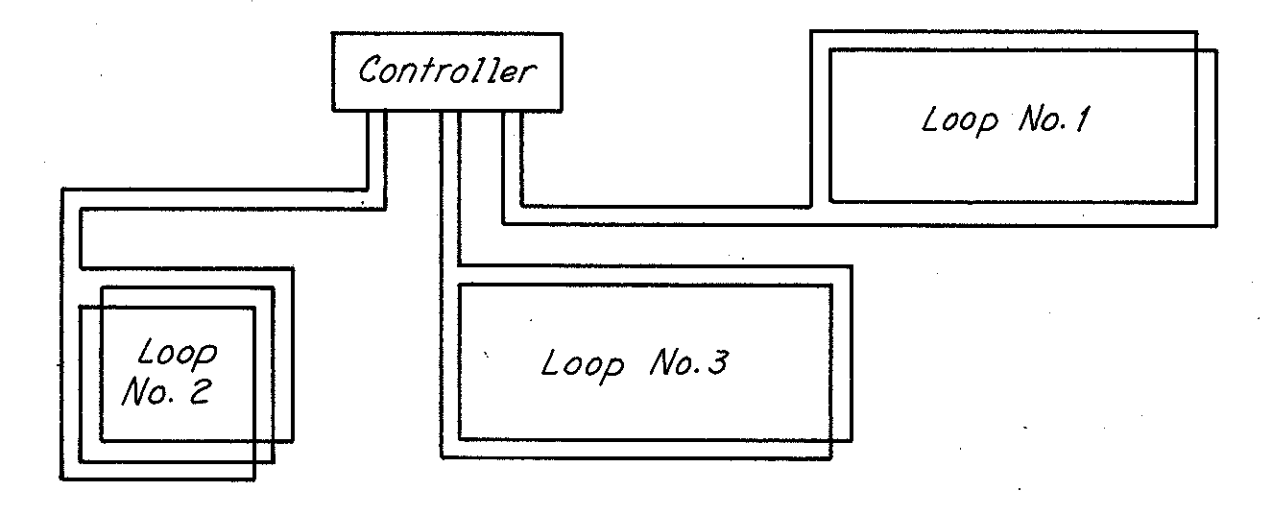
Signal Number	R/W	Clear	φ I	φ II	φ III
1	G	G	G	Y	R
2	G	G	G	Y	R
3	G	Y	R	R	R
4	G	Y	R	R	R
5	R	R	R	R	G
6	R	R	R	R	G
7	R	R	R	R	G
8	R	R	R	R	G
9	R	R	R	R	G

\* Becomes  if φ II is skipped

Note: In absence of call, dwell in Phase I. Enter Phase II only on call.  
 Coordination: Phase I green to begin at 0 sec. on 90 sec. background dial.  
 Time intervals shown are estimates only and may be changed as directed by the Engineer.

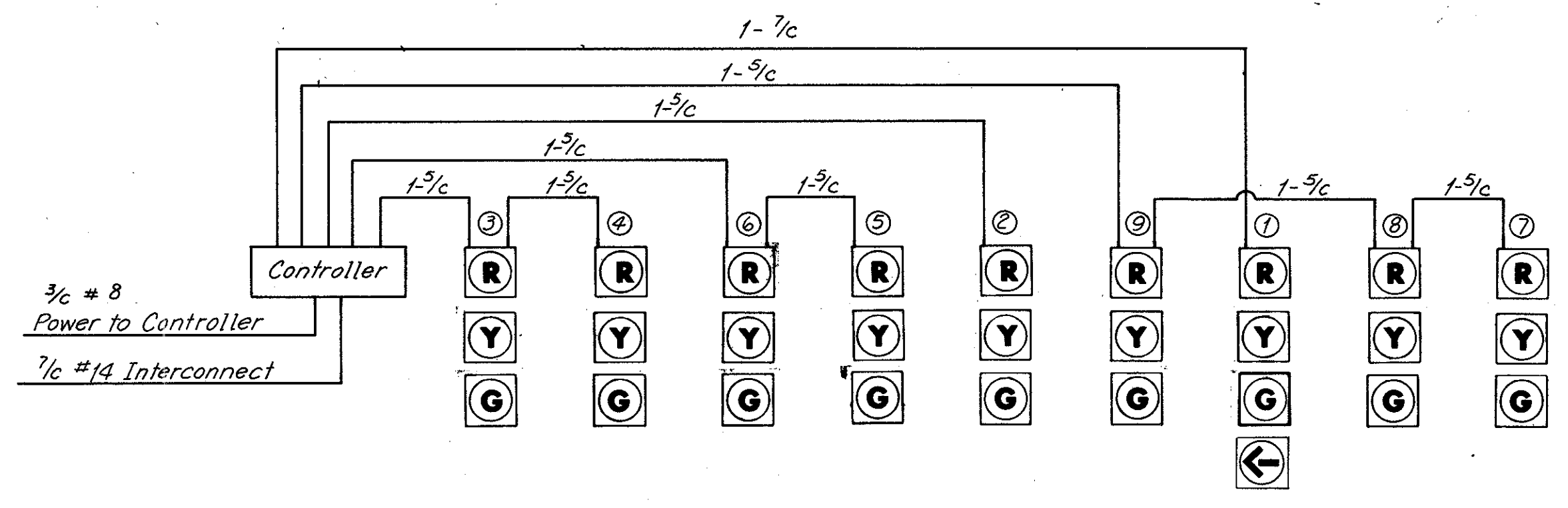
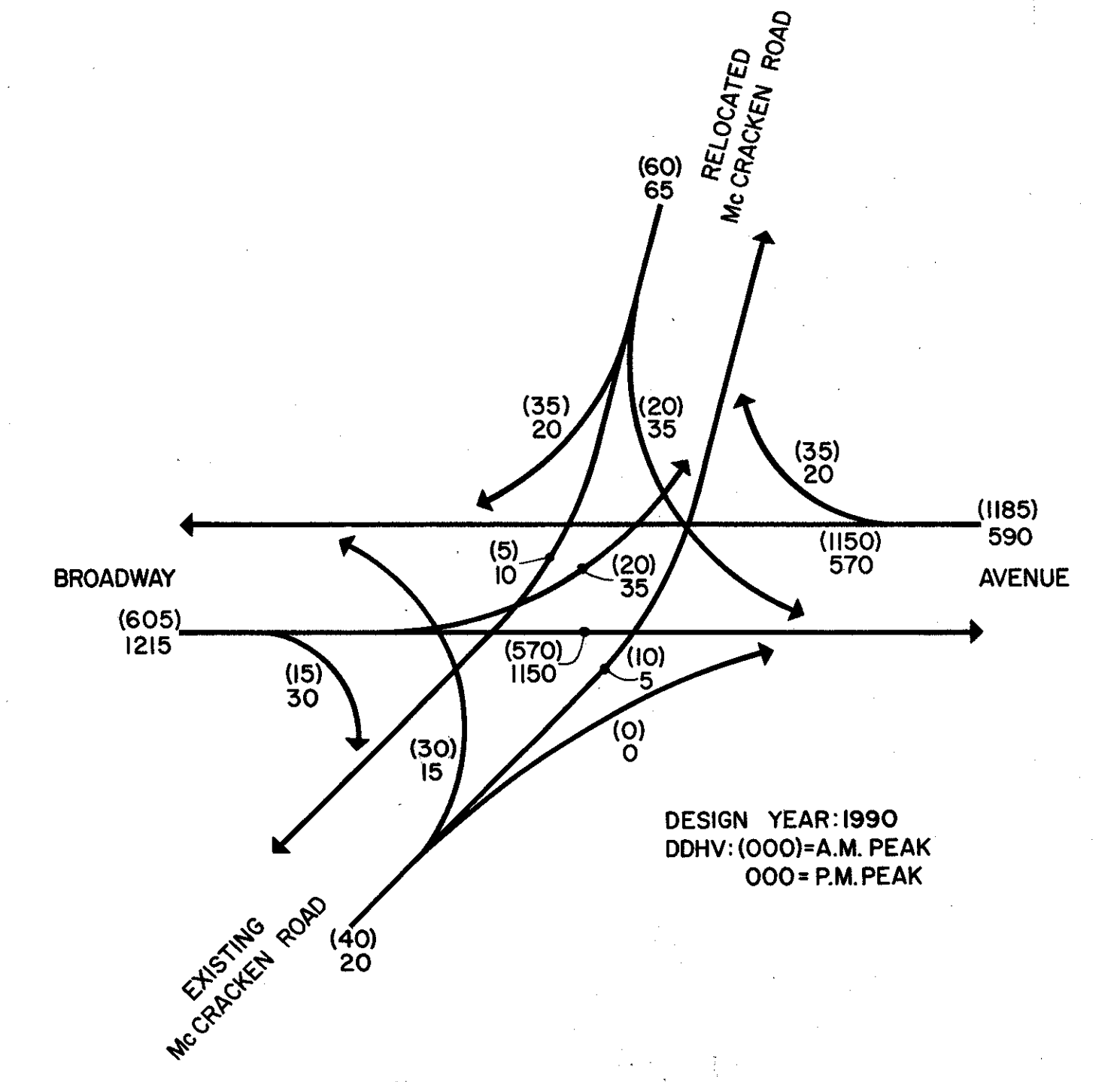
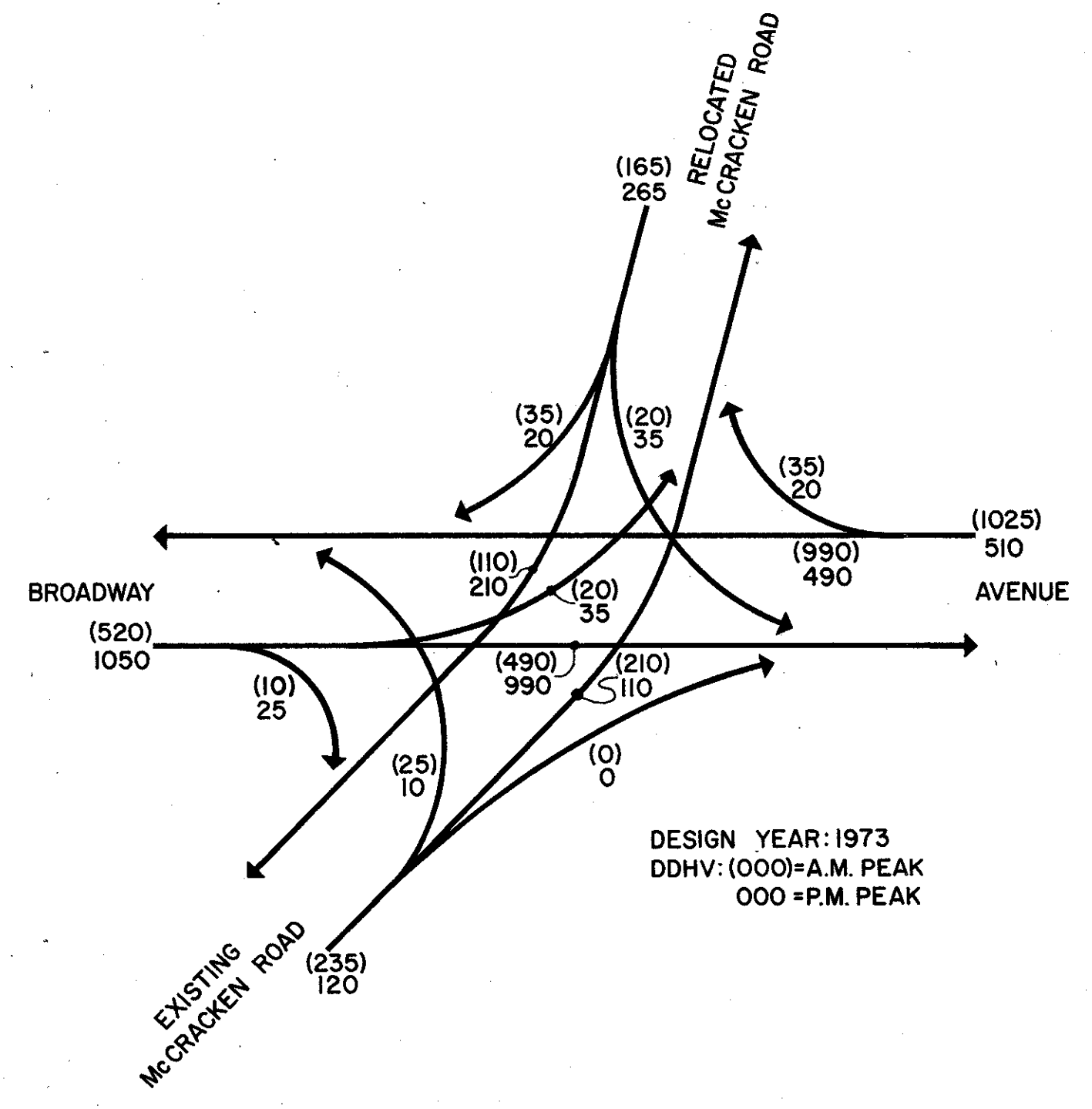


Note: Existing underground utilities are not shown. See Utility Plans. The Contractor is responsible for making his own determinations as to the type and location of underground utilities as may be necessary to avoid damage thereto.

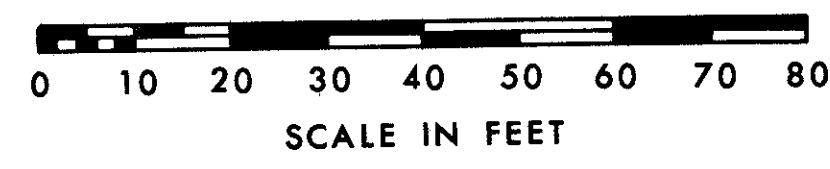


### LOOP DETECTOR AMPLIFIERS

Phase	Wired to Operate
I	Loop 3
II	Loops 1 and 2
III	Loops 1 and 2



SIGNAL HEAD ARRANGEMENT AND FIELD WIRING

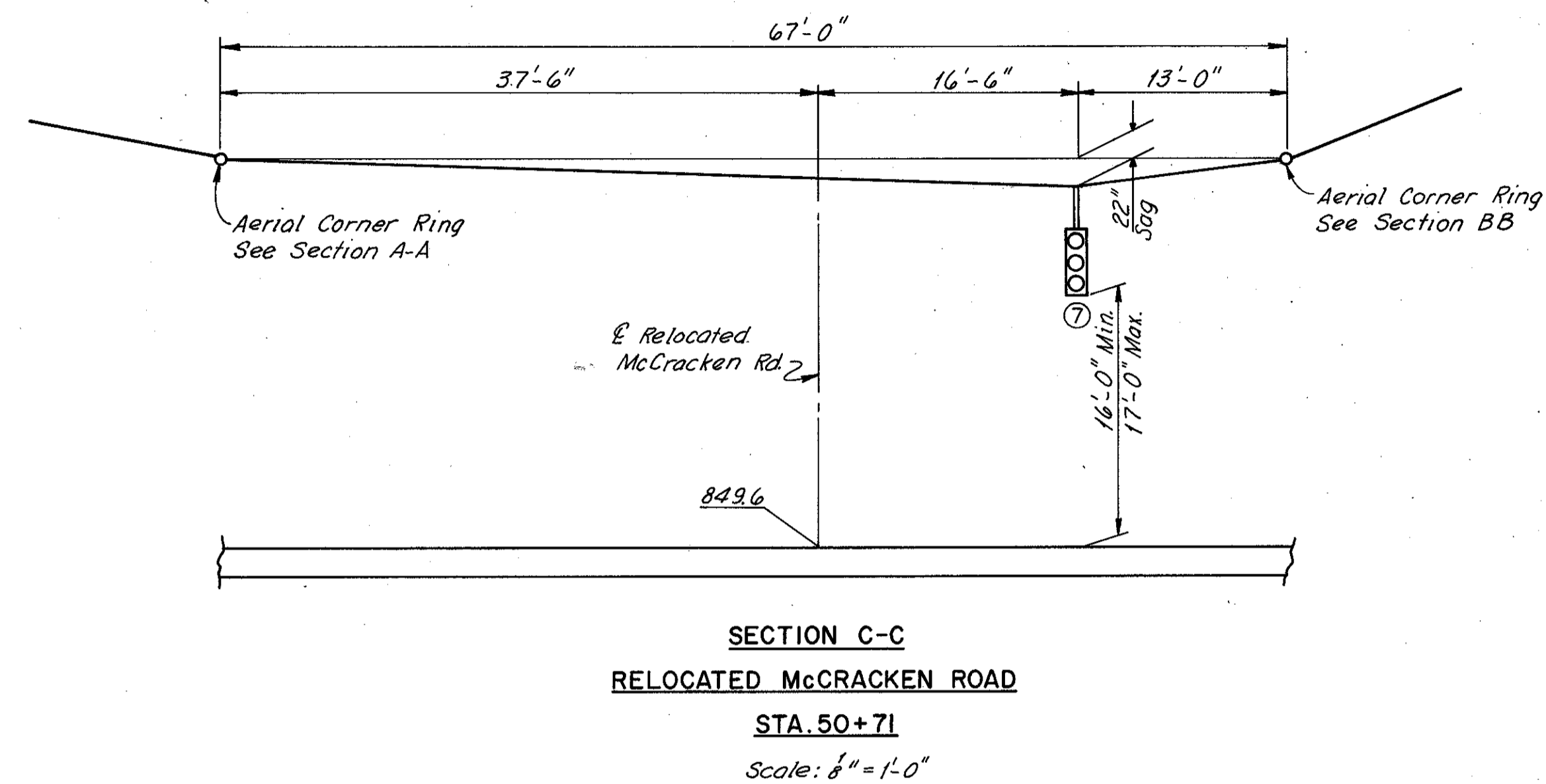
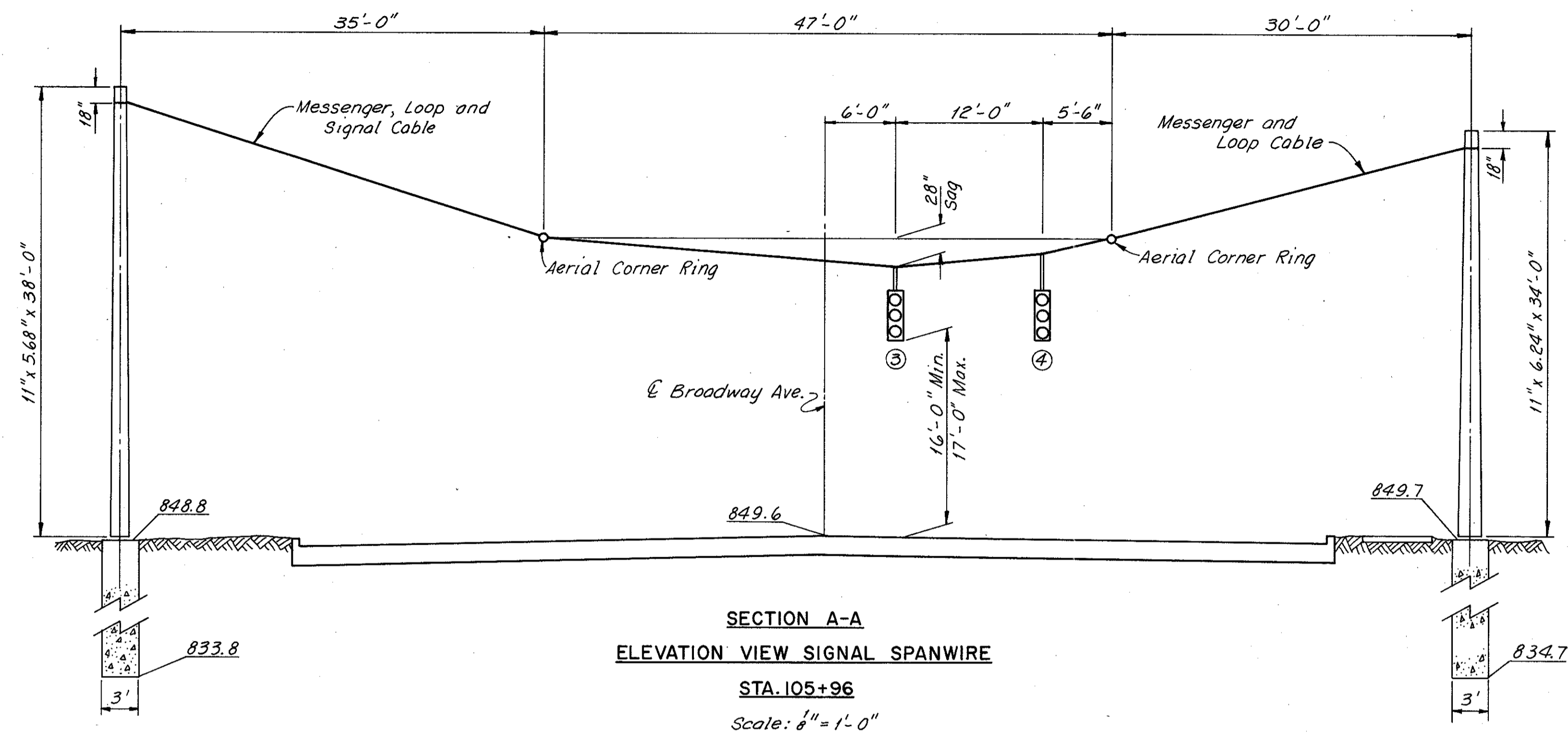


FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

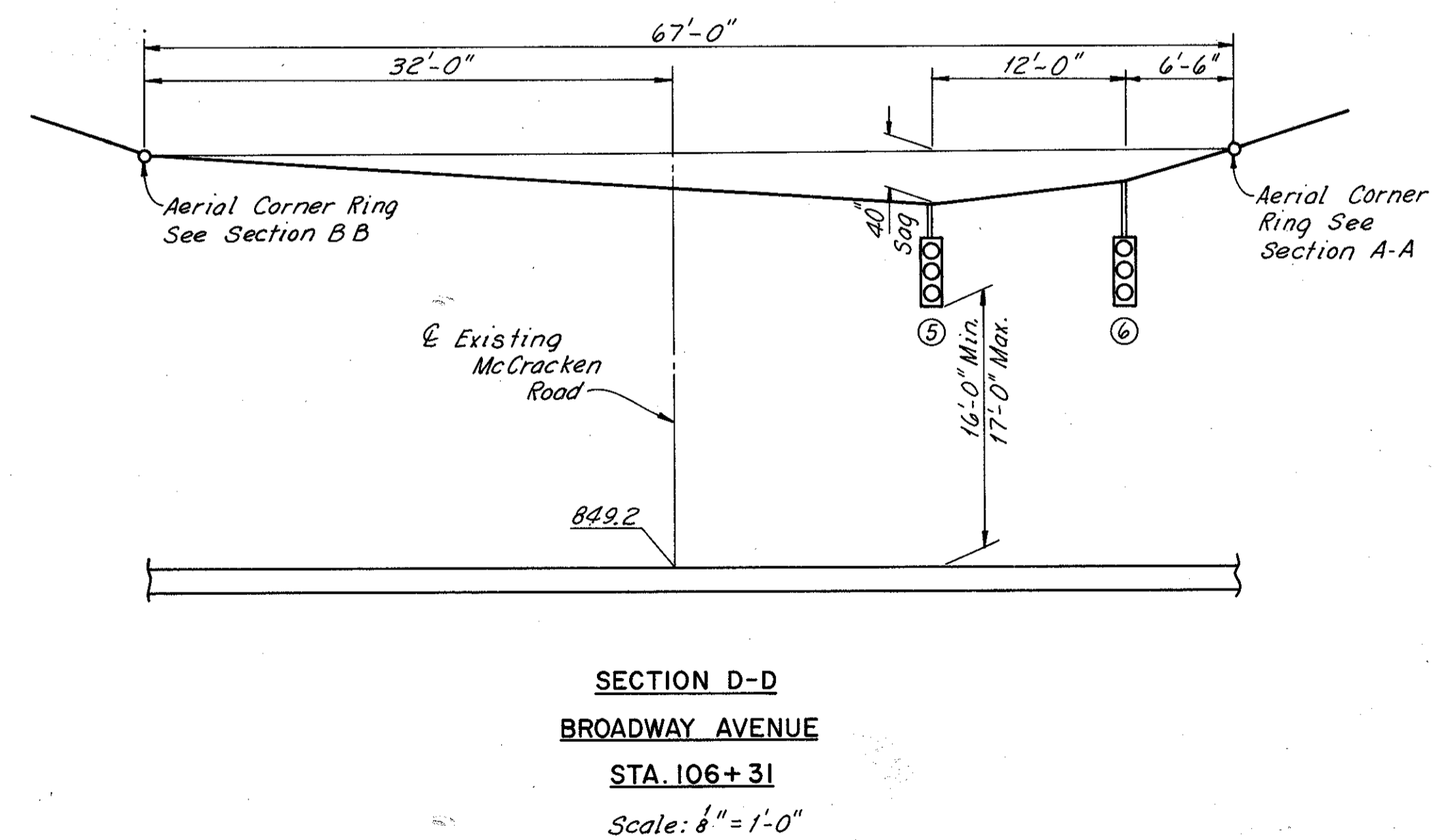
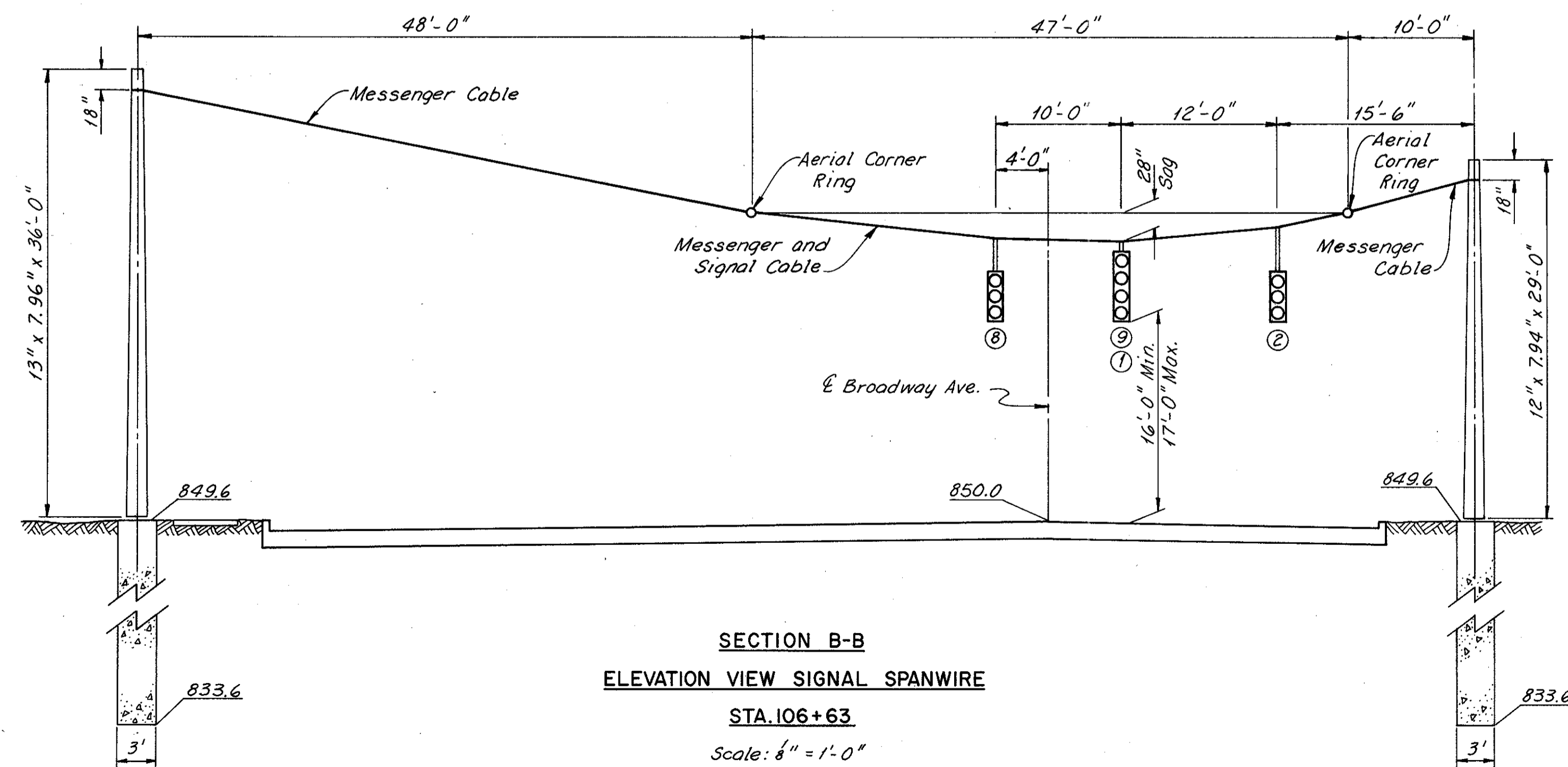
265  
390

CUYAHOGA COUNTY  
CUY. 480-21.40

10  
13



Note:  
The bottom of all signal heads shall  
be within 3 inches of level.



SCALE  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE J.M.C. DATE 12-14-72 CONSULTING ENGINEERS  
TRCD J.M.C. DATE 12-15-72  
CKD. E.F.V. DATE 8-22-72 KANSAS CITY CLEVELAND NEW YORK

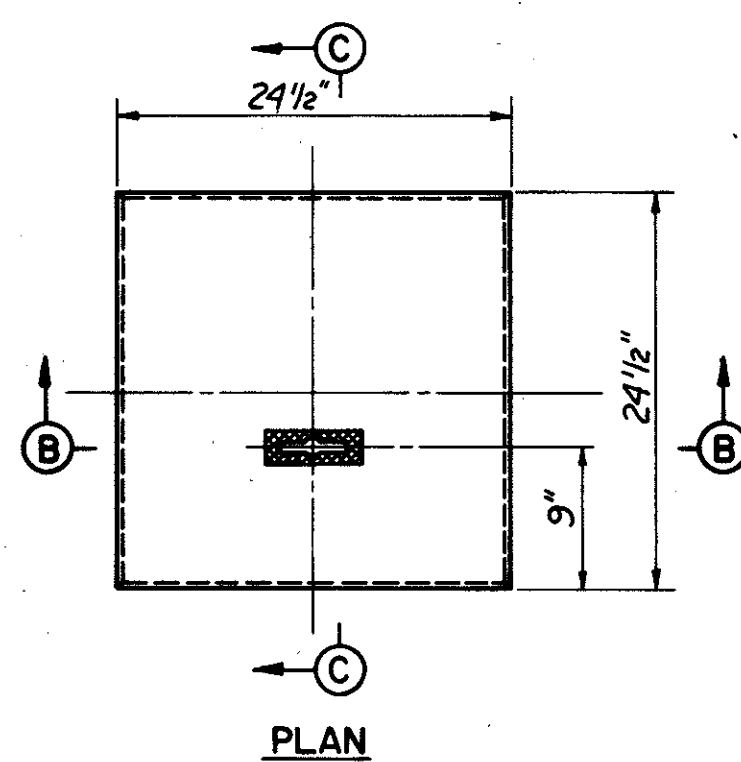
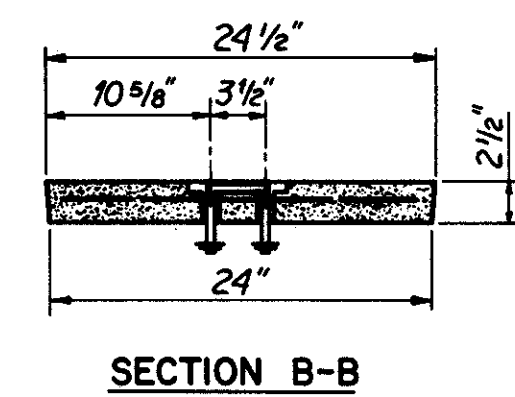
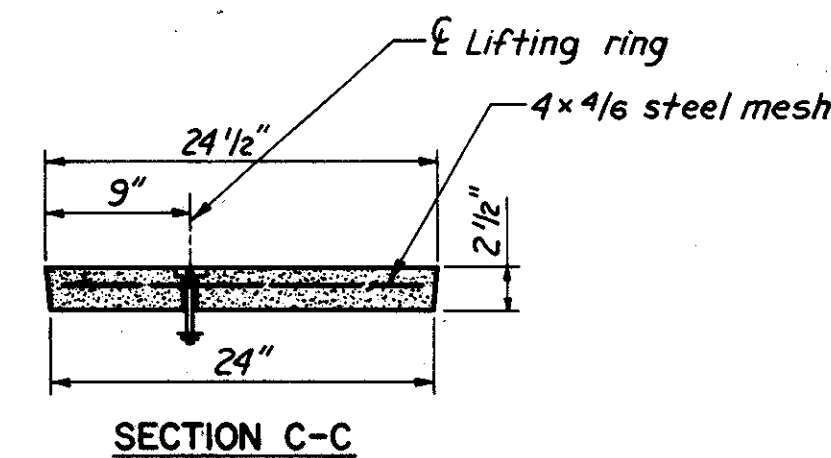
# MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

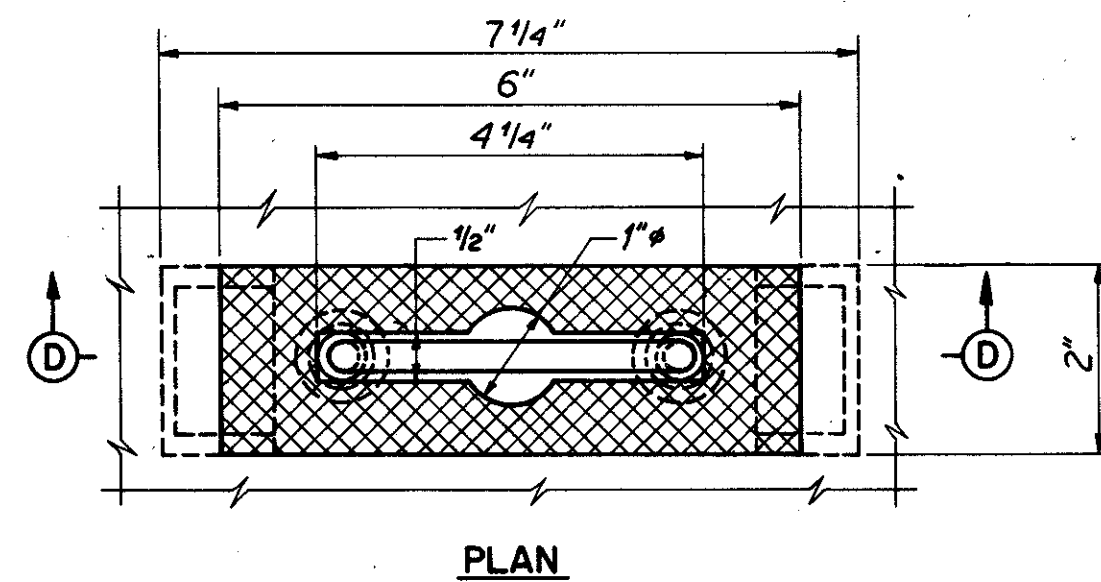
265 A  
390

CUYAHOGA COUNTY  
CUY. -480-21.40

11  
13

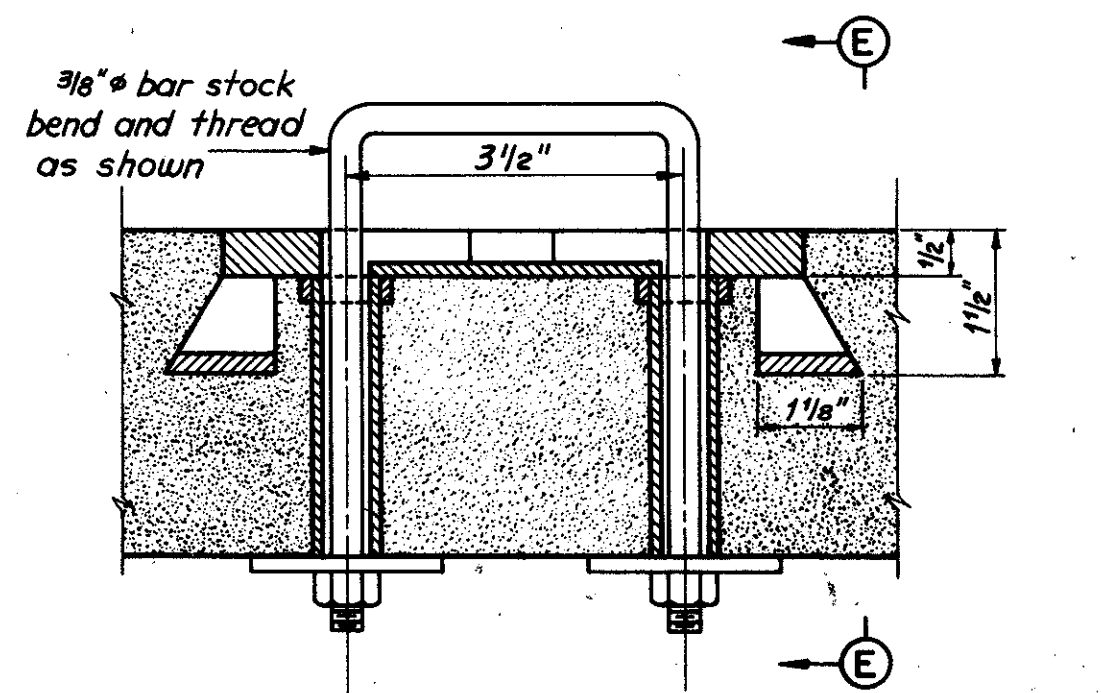


COVER DETAIL  
Scale 1" = 1'-0"

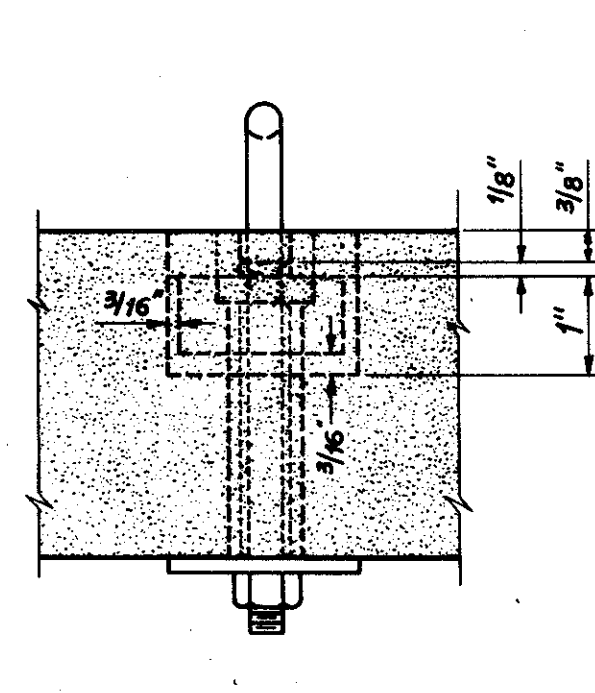


Note:  
4 x 4/16 steel mesh reinforcing to be used in box and cover. All reinforcing to be covered by a minimum of 1" of concrete. All conduit entrance holes shall be oval shaped.

TRAFFIC SIGNAL PULL BOX DETAIL  
Scale 1" = 1'-0"

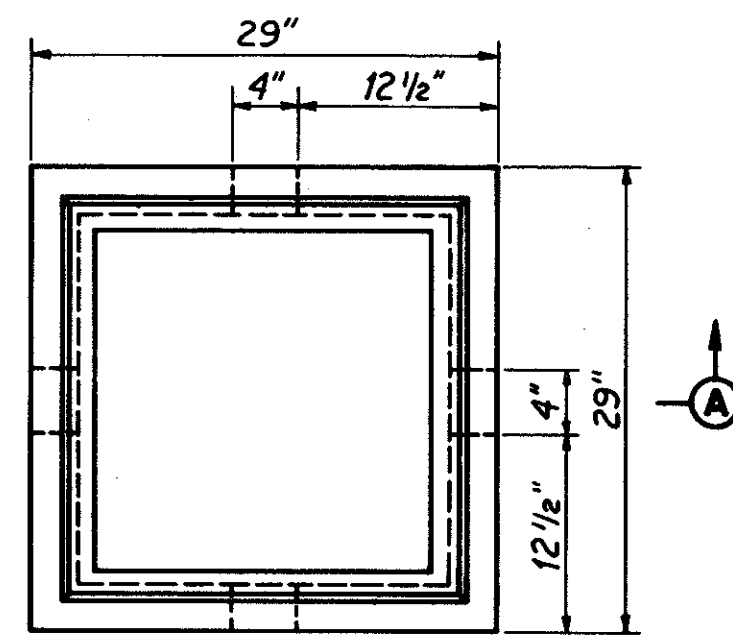


SECTION D-D PULL BOX COVER  
LIFTING RING DETAIL  
Scale: 1/2" = 1'-0"

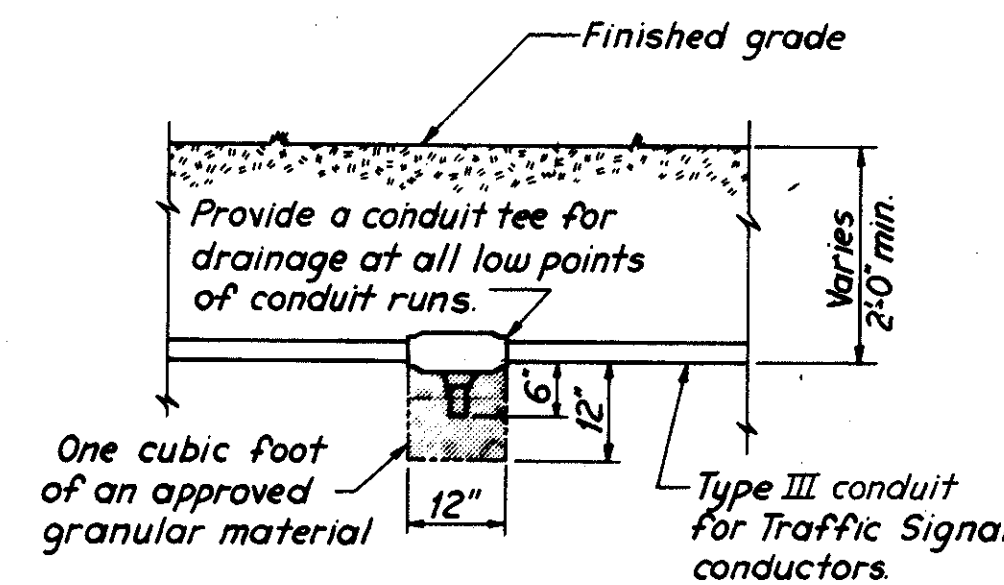


SECTION E-E

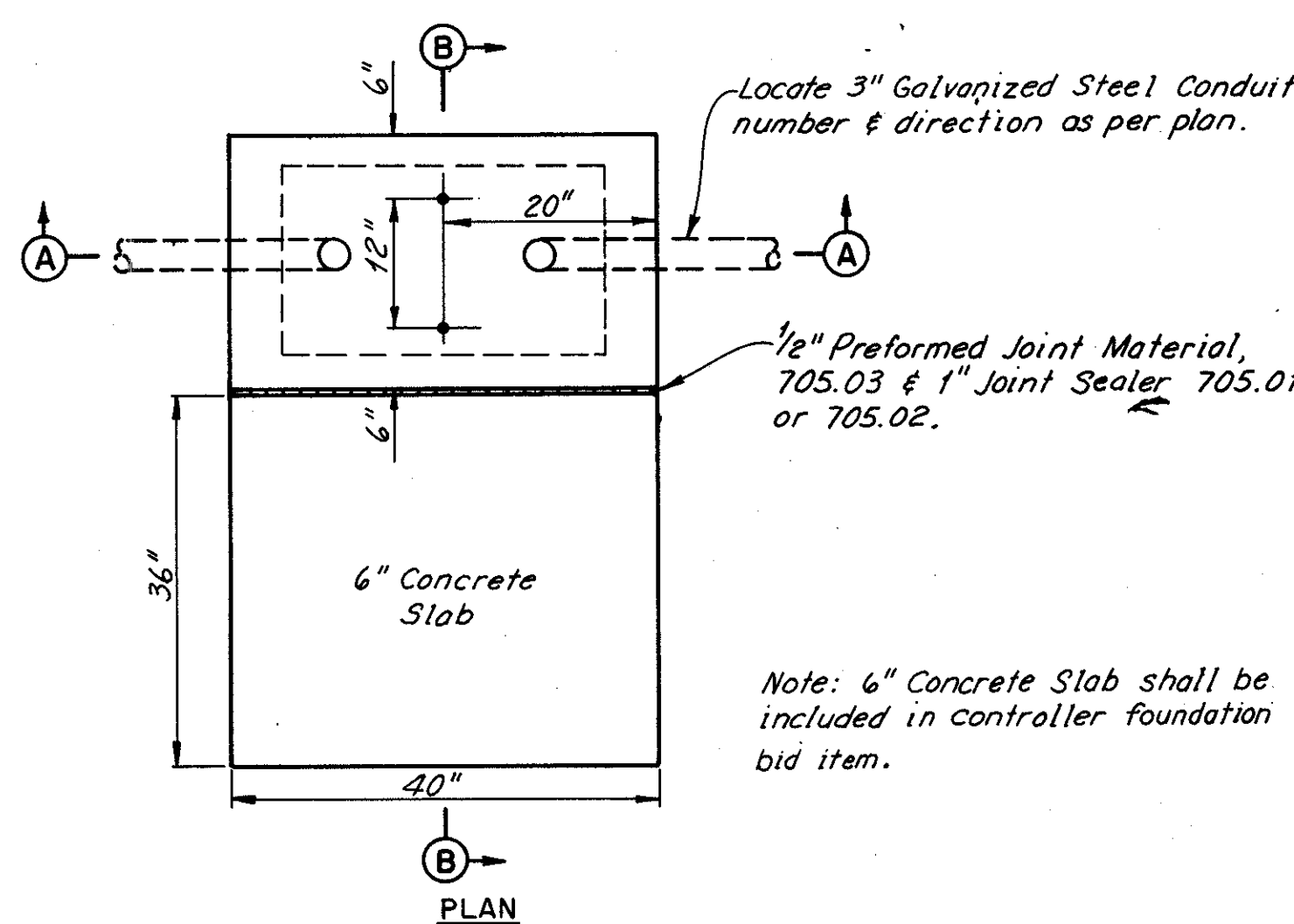
Note:  
The 1/4" opening around the cover shall be filled with a lubricant adhesive filler as specified in Item 705.11.



PLAN

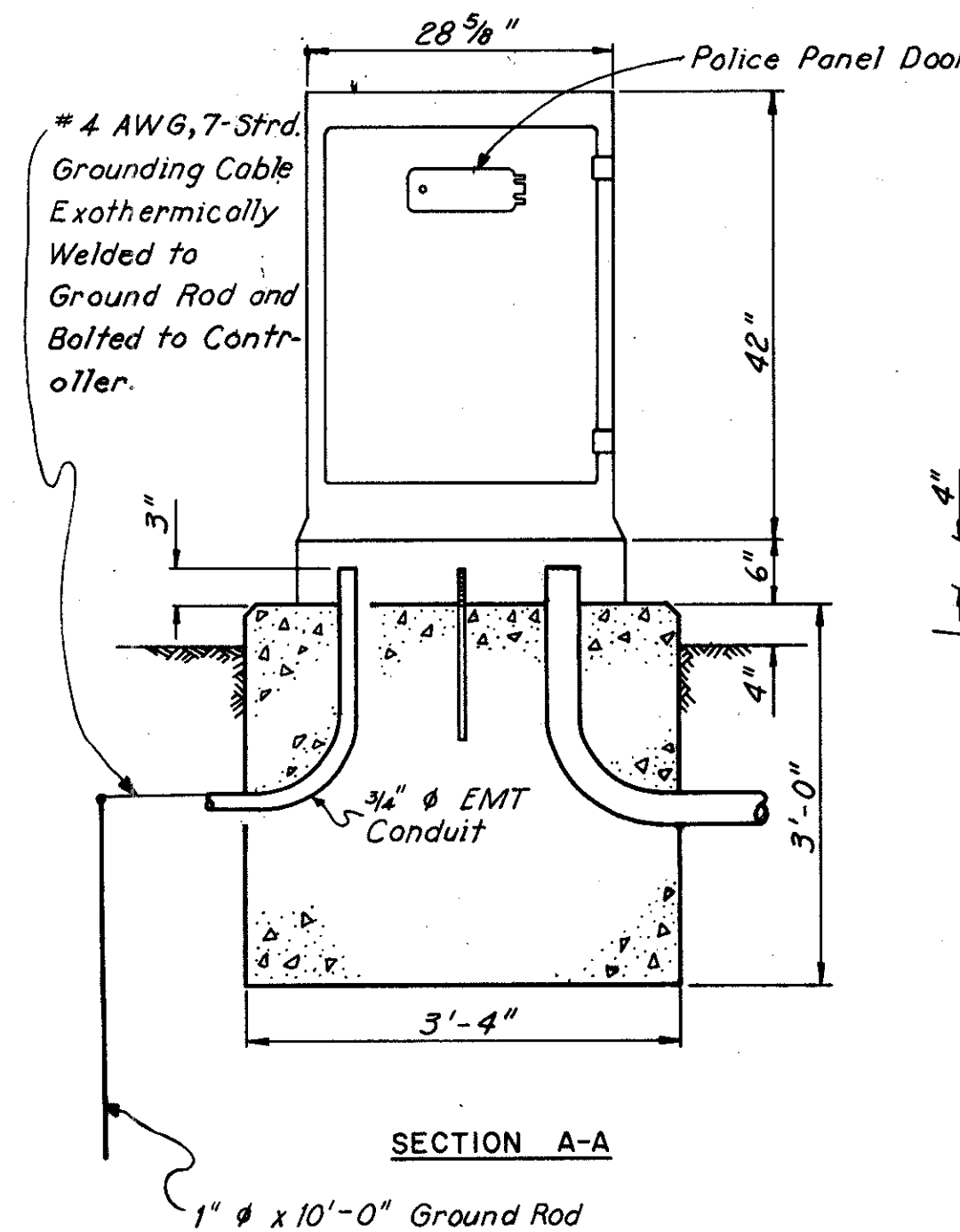


CONDUIT DRAIN FOR TRAFFIC SIGNAL CONDUIT  
No scale

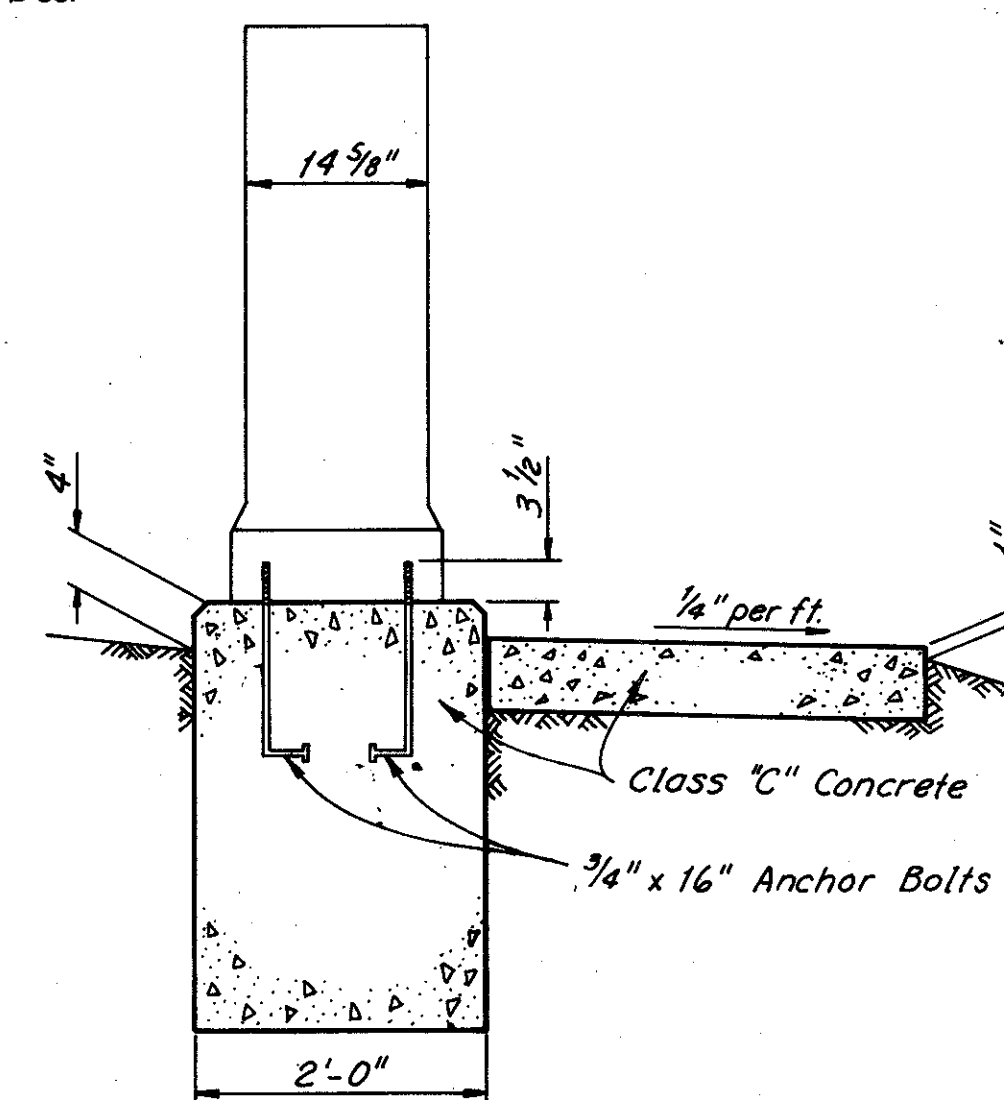


PLAN

Note: 6" Concrete Slab shall be included in controller foundation bid item.

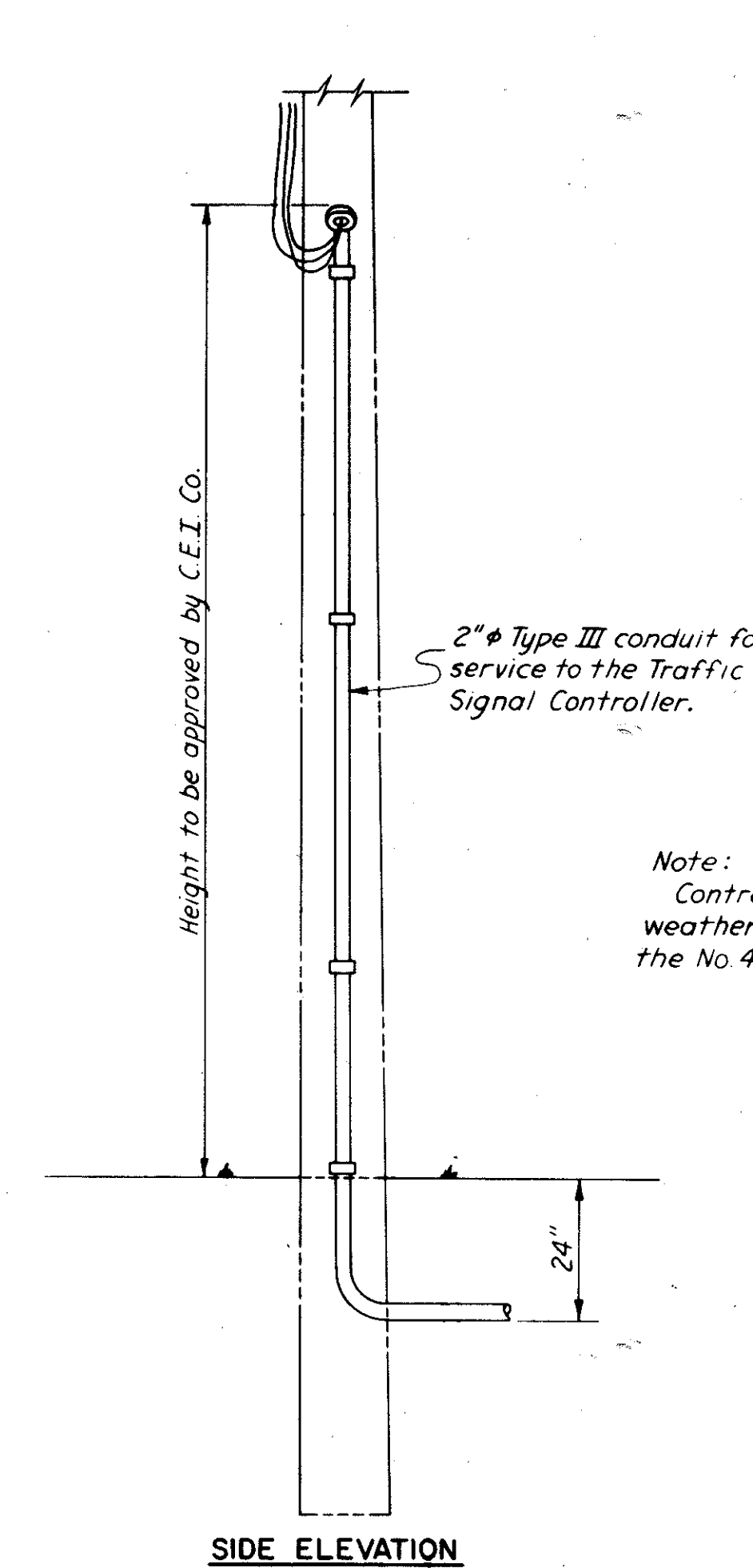


SECTION A-A



SECTION B-B

TYPICAL BASE FOR 7.7 CONTROLLER HOUSING



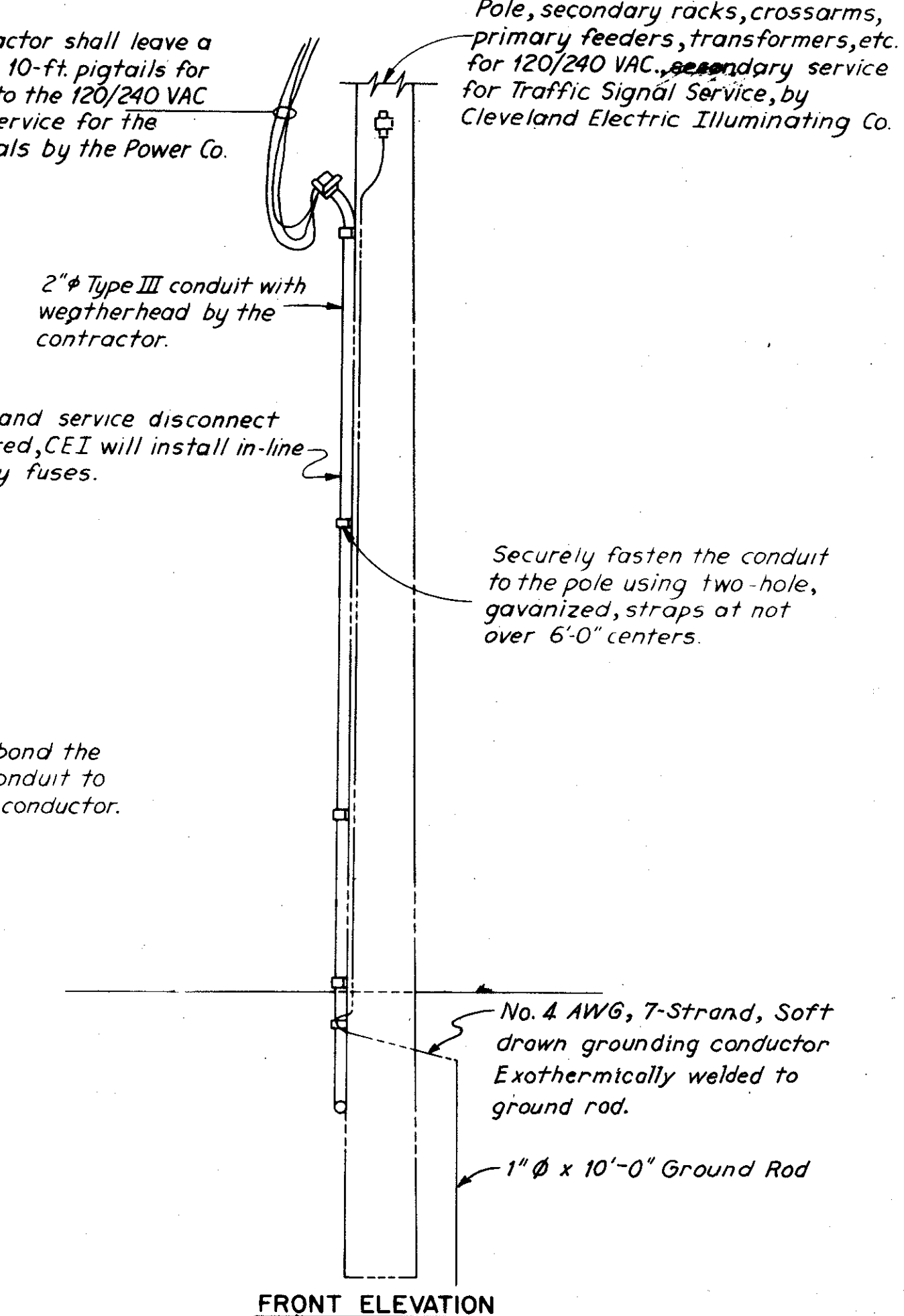
SIDE ELEVATION

The contractor shall leave a minimum of 10-ft. pigtails for connections to the 120/240 VAC secondary service for the traffic signals by the Power Co.

Meter and service disconnect not required, CEI will install in-line secondary fuses.

Note:  
Contractor shall bond the weatherhead and conduit to the No. 4 AWG ground conductor.

120/240 VAC TRAFFIC SIGNAL POWER SERVICE  
Scale 3/8" = 1'-0"



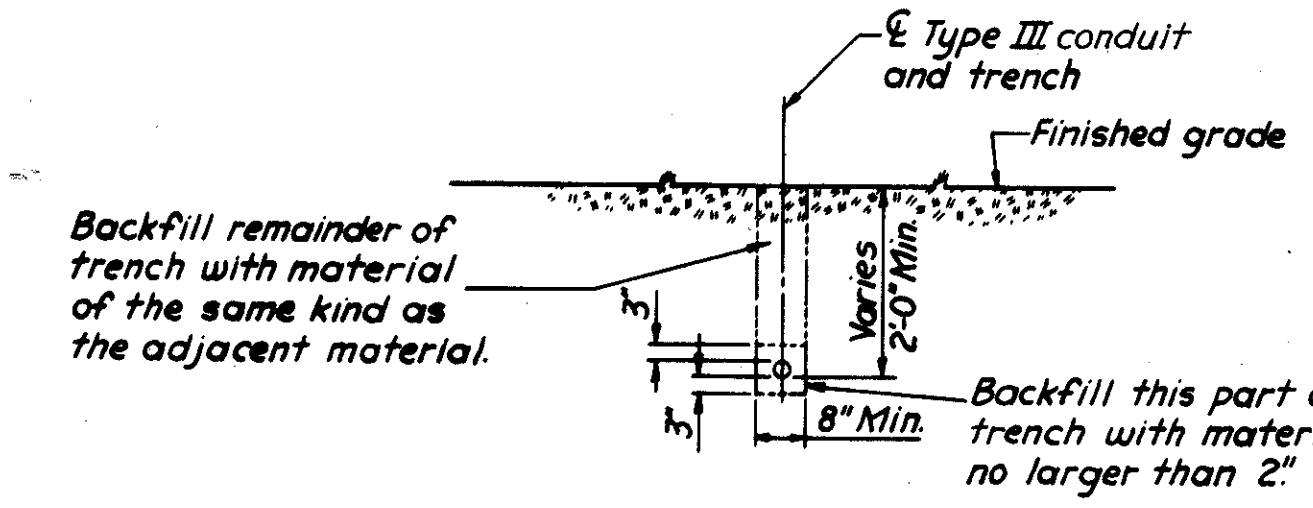
FRONT ELEVATION

Pole, secondary racks, crossarms, primary feeders, transformers, etc. for 120/240 VAC secondary service for Traffic Signal Service, by Cleveland Electric Illuminating Co.

Securely fasten the conduit to the pole using two-hole, galvanized, straps at not over 6'-0" centers.

No. 4 AWG, 7-Strand, Soft drawn grounding conductor Exothermically welded to ground rod.

1" x 10'-0" Ground Rod



Backfill remainder of trench with material of the same kind as the adjacent material.

Backfill this part of trench with material no larger than 2"

TRAFFIC SIGNAL CONDUIT TRENCH  
Scale: 3/8" = 1'-0"

Note:  
All circuit cables shall extend a minimum of 10ft. beyond top of concrete foundation and be suitably protected.  
The contractor shall place the conduits in the controller foundation as shown on the Traffic Signal Layout Sheet.  
Conduits shall be 2" or 3" Type III, as shown on the Traffic Signal Layout Sheet.

SCALE: As Noted HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE LUG DATE 11-22-71 CONSULTING ENGINEERS  
TRCD LFL DATE 11-23-71  
CKD EFV DATE 8-20-73 KANSAS CITY CLEVELAND NEW YORK

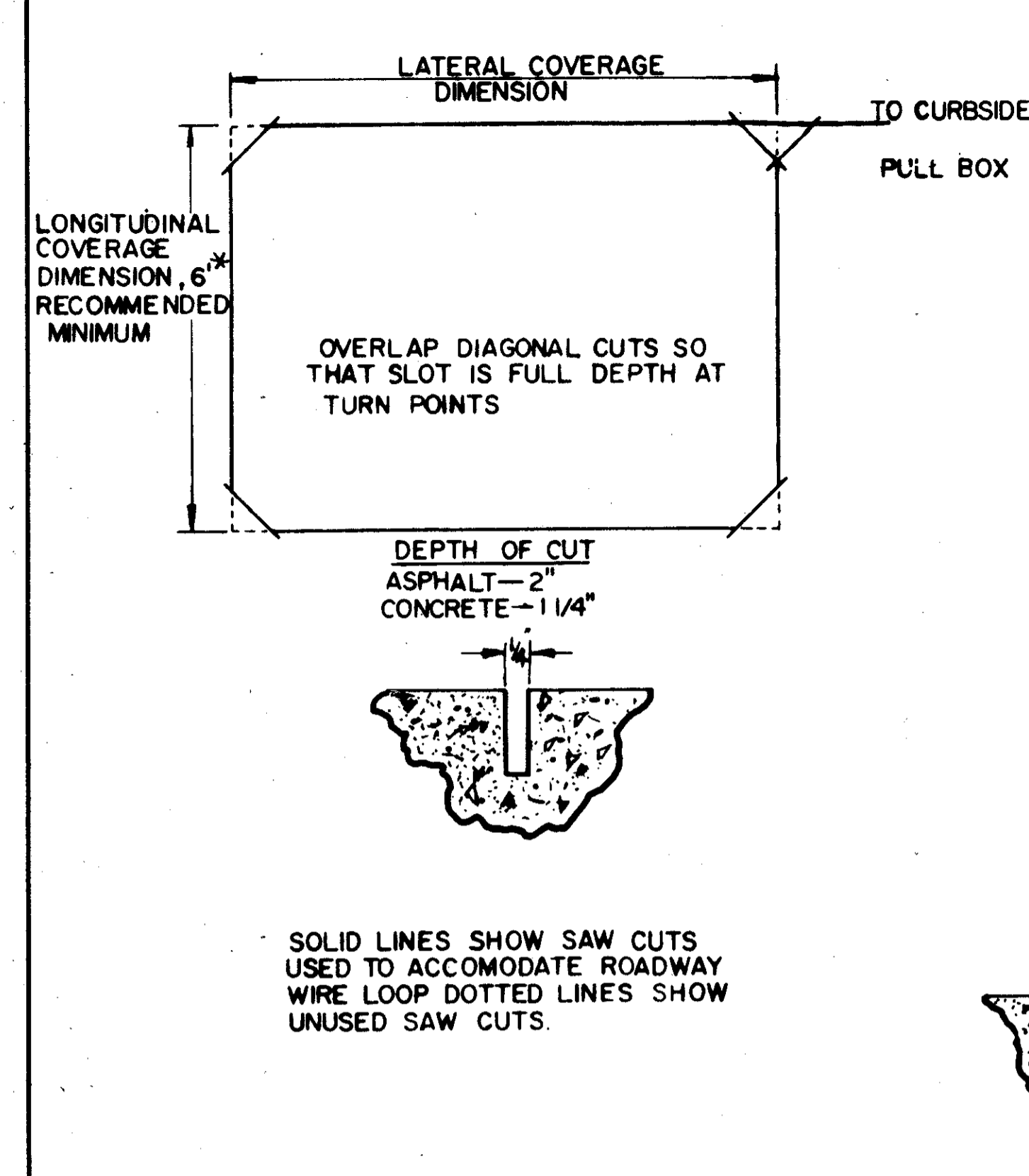


FIGURE 1  
TYPICAL LOOP SLOT CONSTRUCTION

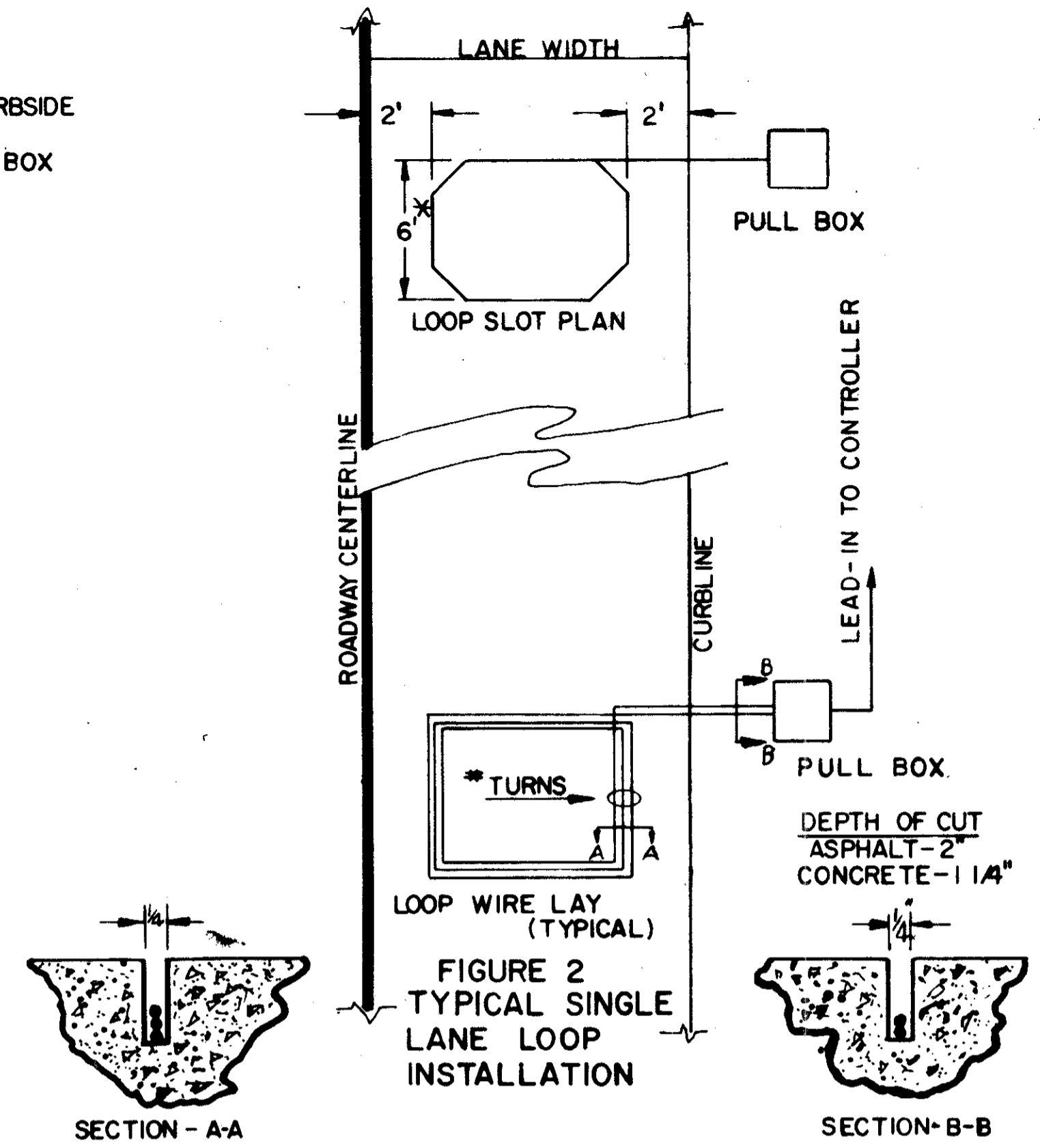


FIGURE 2  
TYPICAL SINGLE LANE LOOP INSTALLATION

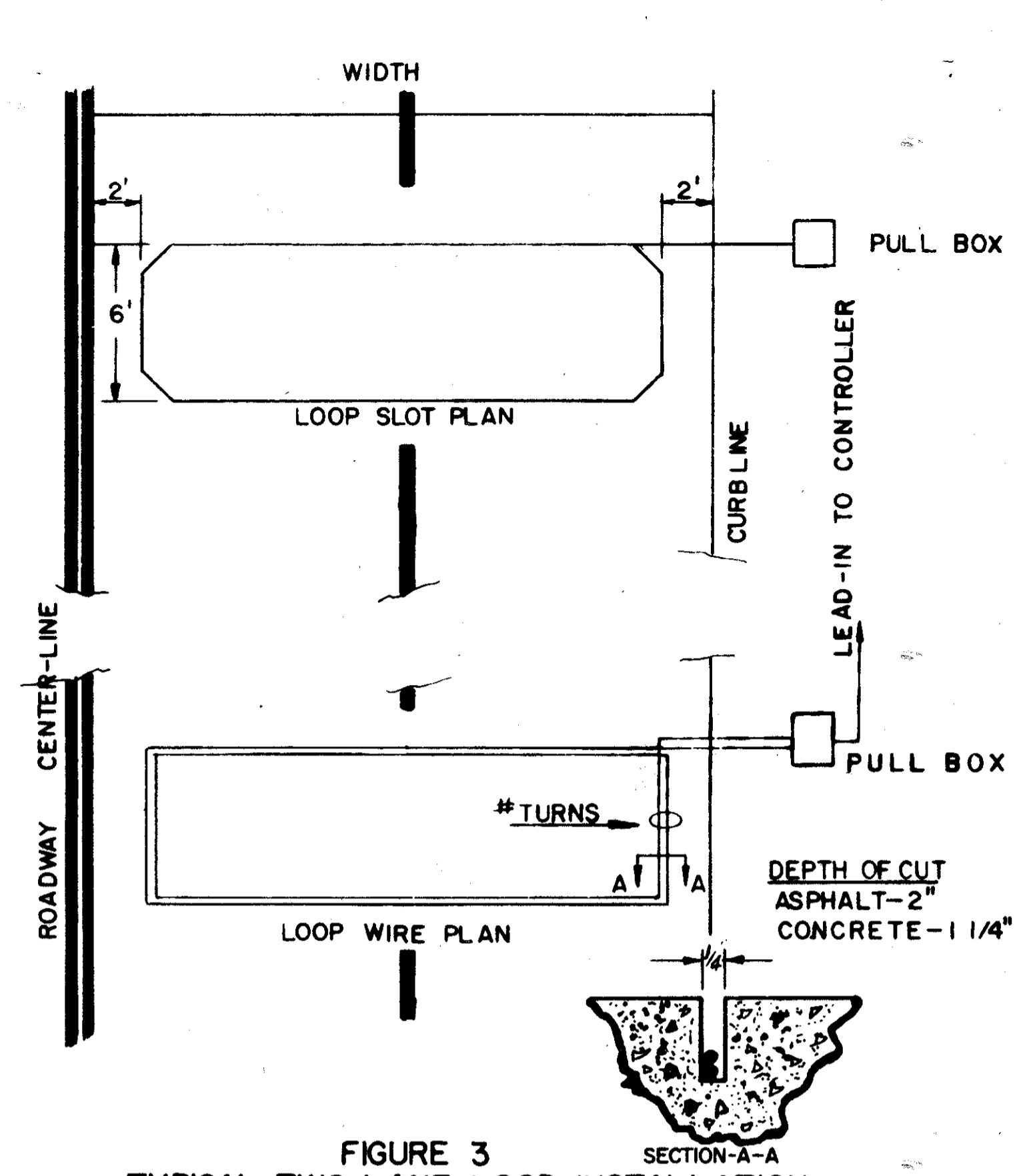


FIGURE 3  
TYPICAL TWO LANE LOOP INSTALLATION

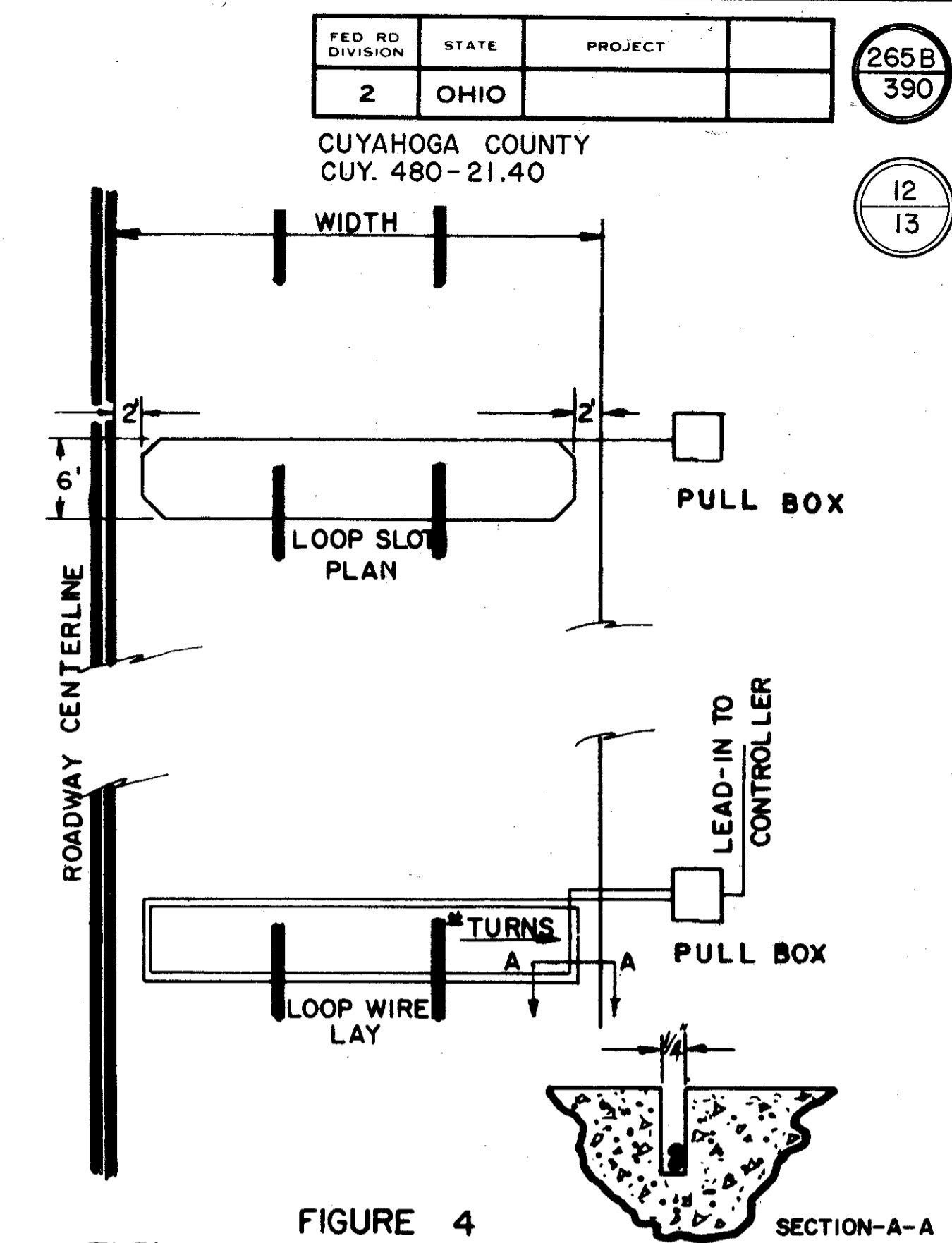


FIGURE 4  
TYPICAL THREE LANE LOOP INSTALLATION

LOOP PERIMETER	NO. OF TURNS
UP TO 40 FEET	3
40 TO 160 FEET	2
160 AND UP	1

MAINTAIN 6' MINIMUM DIMENSION IN DIRECTION OF TRAVEL.

WHERE PAVEMENT EDGE HAS CURB SECTION, THE CONDUIT SHALL BE PLACED BEFORE CURB SECTION IS POURED OR CAREFULLY DRILLED THROUGH CURB

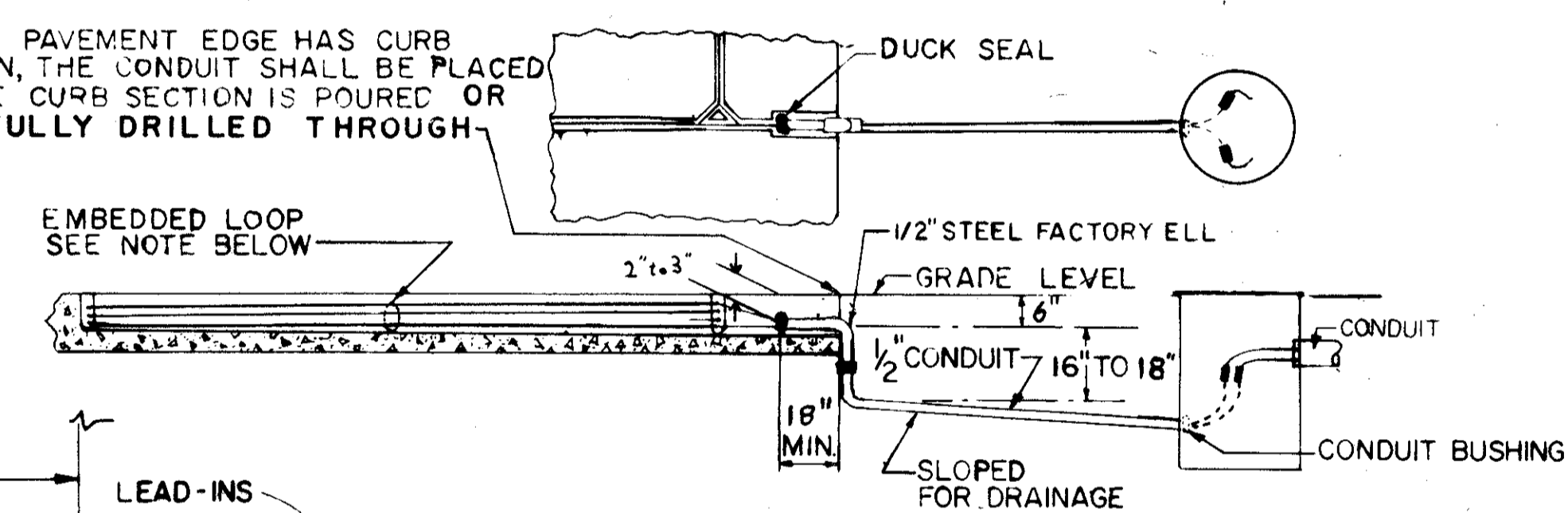


FIGURE 8  
INTERFACE BETWEEN EMBEDDED LOOP AND ROAD SIDE PULL BOX

**ROADWAY LOOP INSTALLATION**

THE ROADWAY WIRE LOOP IS POSITIONED IN THE PAVEMENT IN A SAWSLOT THAT OUTLINES THE REQUIRED DETECTION AREA. THE SLOT SHALL BE 1/4" WIDE AND FROM 1/4" OR 2" DEEP. RIGHT ANGLE TURNS SHALL BE CHAMFERED TO PREVENT SHARP BENDS OF WIRE (SEE FIG. 1). THE SLOT MUST BE BRUSHED AND BLOWN CLEAN OF ALL LOOSE MATERIAL. THE LOOP WIRE MUST BE CAREFULLY PUSHED INTO THE SLOT WITH A BLUNT STICK TO AVOID DAMAGING ITS INSULATION. RESISTANCE OF THE WIRE LOOP TO GROUND SHOULD BE CHECKED AFTER THE WIRE IS PLACED IN THE SLOT, BOTH BEFORE AND AFTER THE SLOT IS SEALED. THIS IS ESPECIALLY IMPORTANT IF THE ROADWAY WIRE LOOP IS SPLICED TO LEAD-IN CABLE AT CURBSIDE JUNCTION BOX. A RESISTANCE OF LESS THAN 10 MEGOHMS INDICATES A FAULTY SPlice OR WIRE INSTALLATION WHICH MUST BE CORRECTED BEFORE THE ROADWAY LOOP IS SEALED IN PLACE. INSTALLATIONS IN NEW ASPHALT PAVEMENT SHALL BE MADE IN THE SUBBASE PRIOR TO PLACING THE TOP COURSE.

**SEALING**

A FLEXIBLE EMBEDDING SEALANT NO. 491-HR MANUFACTURED BY EUCLID CHEMICAL CO. OF CLEVELAND, OHIO OR E-702 MANUFACTURED BY THE BOND CO. OF NORTHFORD, CONNECTICUT OR EQUIVALENT, SHALL BE MIXED ACCORDING TO DIRECTIONS, POURED INTO THE SAWSLOTS AND LEFT UNDISTURBED UNTIL CURED INTO A SOLID MASS.

**\* DIMENSIONS**

IN CASES WHERE THE LATERAL DIMENSION WOULD BE LESS THAN EIGHT (8) FEET, THE LONGITUDINAL DIMENSION SHALL BE INCREASED TO OBTAIN A MINIMUM AREA OF 48 S.F.

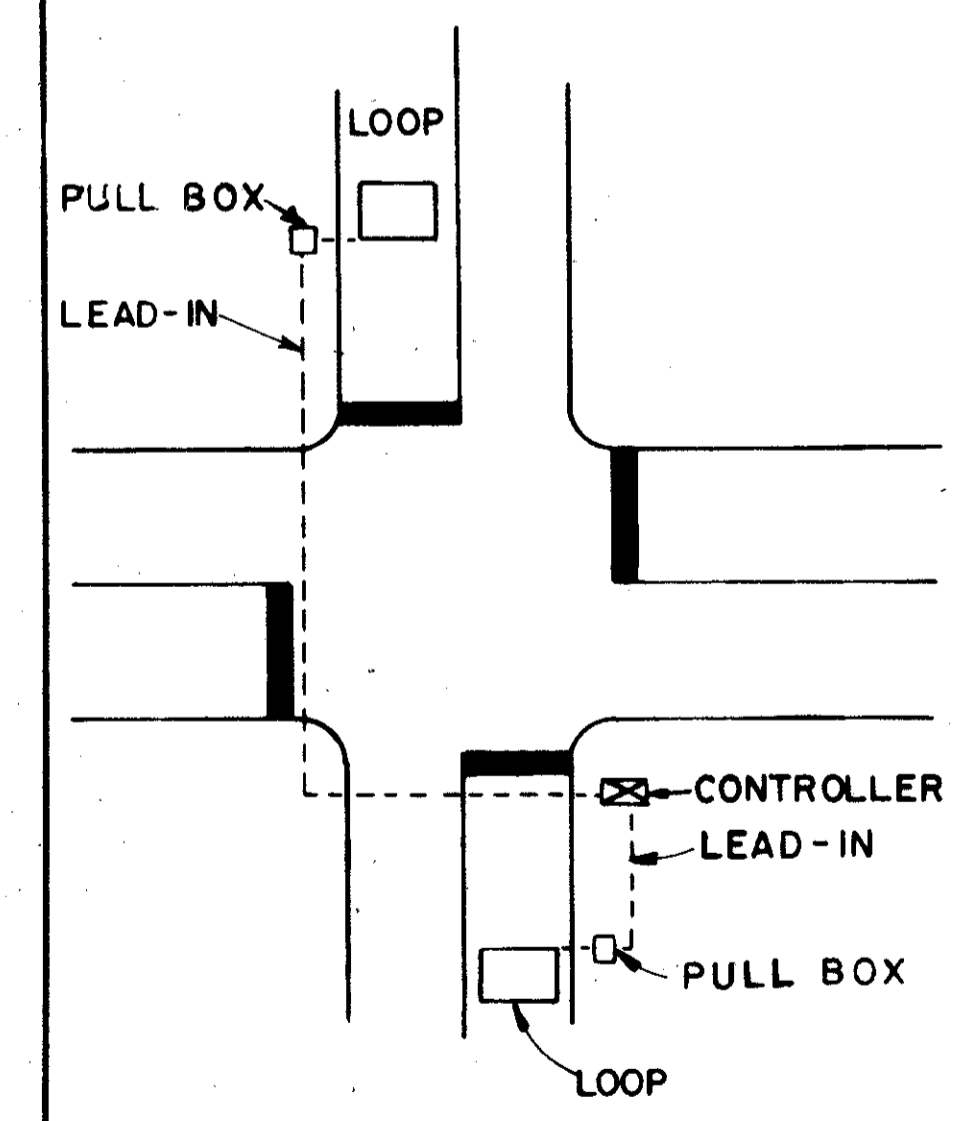


FIGURE 5  
TYPICAL LEAD-IN DETAIL

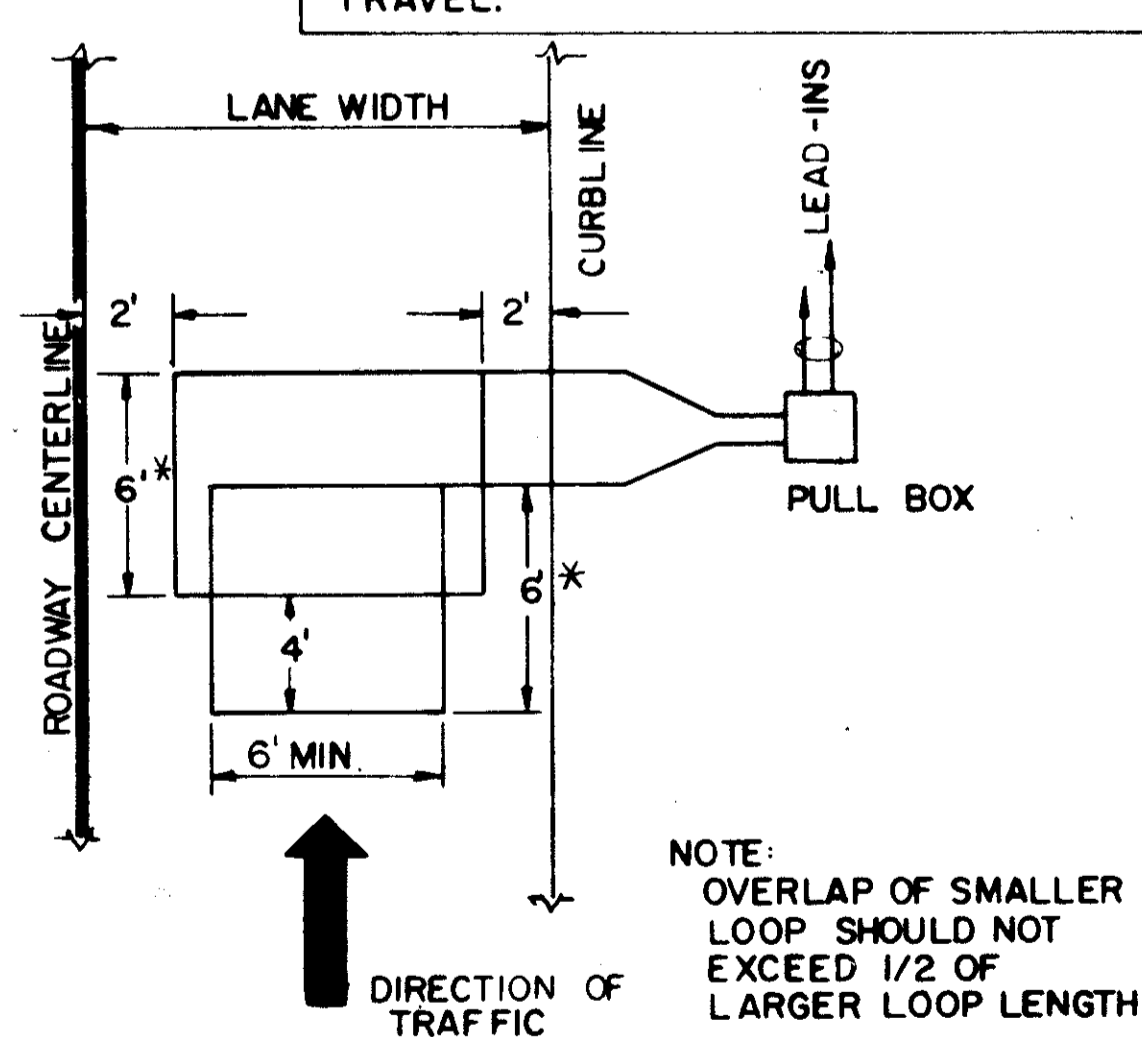


FIGURE 6  
TYPICAL DIRECTIONAL DETECTION LOOP INSTALLATION (OVERLAPPED)

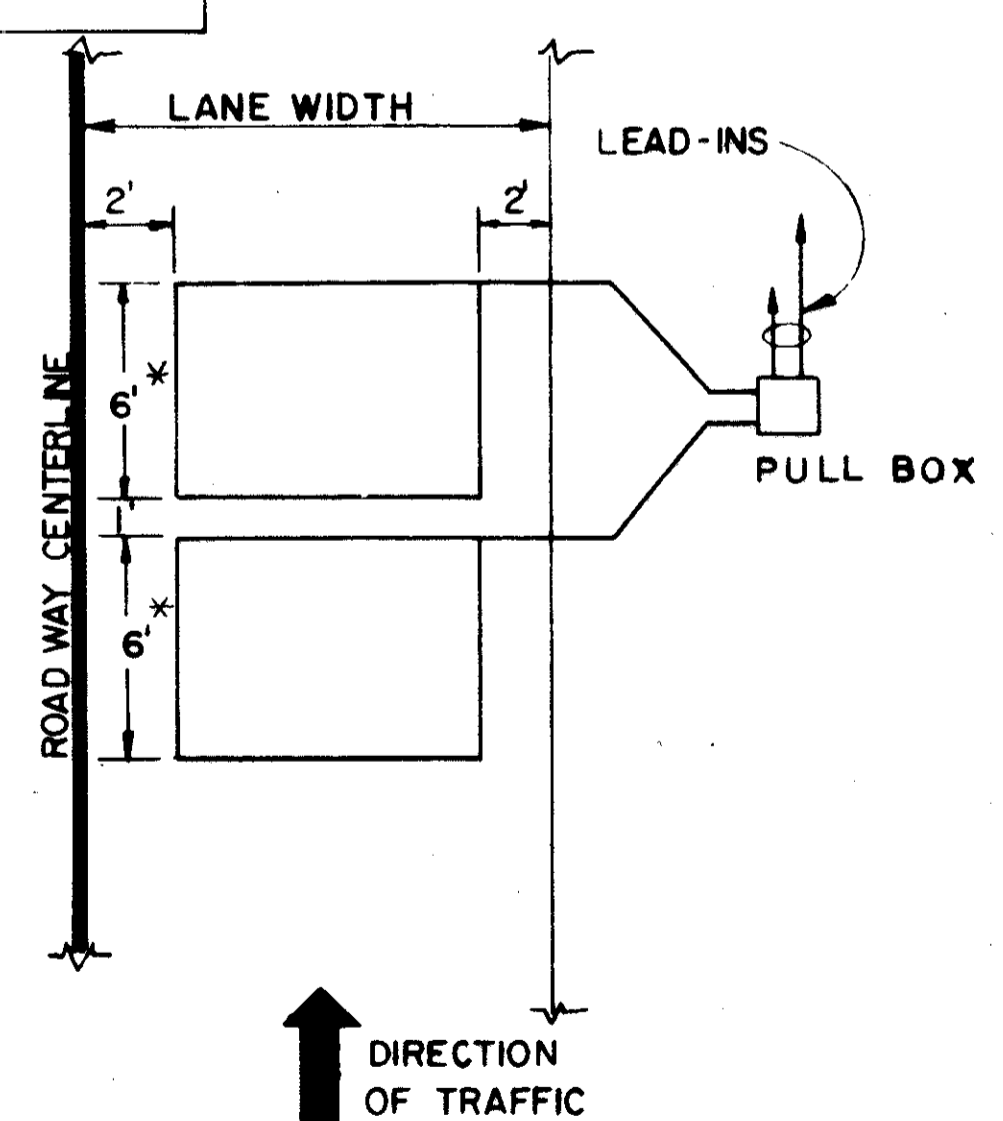


FIGURE 7  
TYPICAL DIRECTIONAL DETECTION LOOP INSTALLATION (ADJACENT)

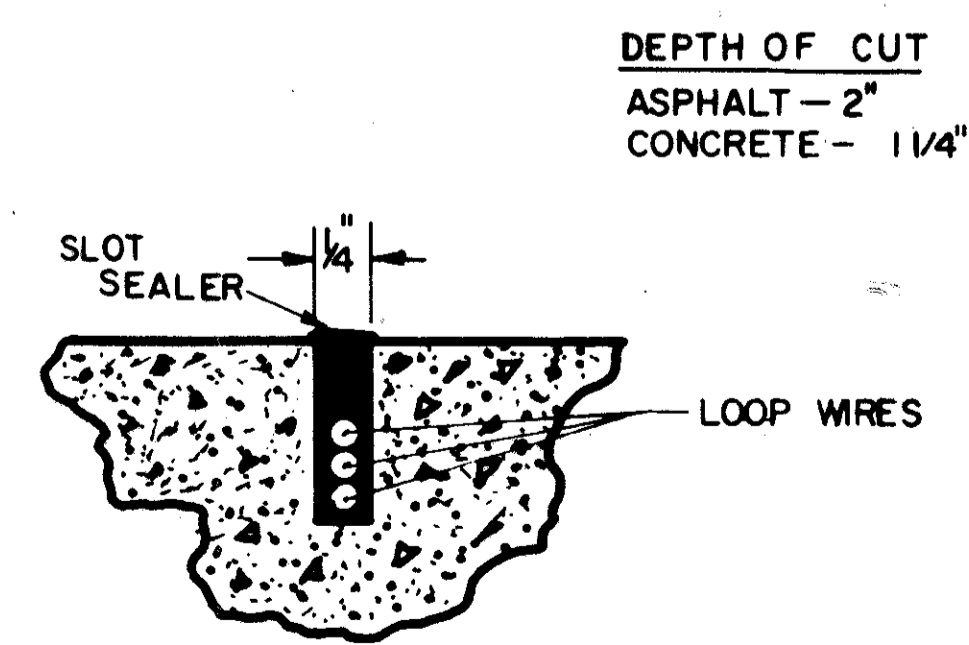


FIGURE 9  
TYPICAL SLOT SEALING DETAIL

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

EMBEDDED VEHICLE  
DETECTOR LOOP DETAILS

APPROVED \_\_\_\_\_  
ENGINEER OF TRAFFIC

Rev 11-3-67  
Rev 6-1-71  
Rev 2-3-72

NOTES:

- MATERIAL SPECIFICATIONS**
- TAPERED TUBES (S.A.E.-1020 STEEL PROCESSED TO MINIMUM YIELD STRESS OF 55,000 P.S.I.)
  - CAST ANCHOR BASE & HANDHOLE FRAME - ASTM-A27- GRADE 65-35.
  - HANDHOLE COVER PLATE - 11 GA. STEEL SAE-1015
  - CAST ALUMINUM POLE TOP - ALUMINUM ALLOY 43
  - SPAN WIRE CLAMP - LOW ALLOY, HIGH STRENGTH STEEL ASTM-A242 - OR 375, LOAD PRODUCING DISTORTION 12,500 LBS. DIRECT TENSION
  - ALL BOLTS & NUTS LESS THAN 5/8" DIA. PASSIVATED STAINLESS STEEL AISI-300 SERIES - COMMERCIAL GRADE.
  - ALL OTHER NUTS & BOLTS 5/8" DIA. & OVER - ASTM-A307 AND GALVANIZED IN ACCORDANCE WITH ASTM-A153
  - ANCHOR BASE & U-BOLTS - HIGH STRENGTH STEEL - MINIMUM YIELD STRESS 55,000 LBS. SQ. IN. - MIN. ULTIMATE 90,000 P.S.I.
  - WELDING ROD - ASTM-A233 - CLASS E60XX OR 70XX.
  - GALVANIZING - WHEN SPECIFIED ASTM-A123.

**TRAFFIC SIGNAL POLE FOUNDATIONS**

THE CONTRACTOR SHALL STAKE THE LONGITUDINAL AND LATERAL LOCATION, AND THE ELEVATION OF THE TOP OF EACH FOUNDATION SUBJECT TO THE APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ELEVATION, OFFSET, AND LEVEL OF EACH FOUNDATION. THE FOUNDATION LOCATIONS MAY BE CHANGED AS DIRECTED BY THE ENGINEER, IN CASE OF SLOPE OR SUBSURFACE DIFFICULTIES. EXCAVATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 503. EXCAVATION SHALL BE TO THE DIMENSIONS SHOWN ON THE PLANS, AND SHALL BE PERFORMED BY MEANS OF AN EARTH AUGER OF THE SPECIFIED DIA. UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

WHERE SUBSURFACE OBSTRUCTIONS ARE ENCOUNTERED, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO REMOVE THE OBSTRUCTION OR TO REPLACE THE EXCAVATED MATERIAL AND RELOCATE THE FOUNDATION. IF CAVING OF THE EXCAVATION OCCURS, THE CONTRACTOR SHALL EXCAVATE THE SPECIFIED DEPTH MAINTAINING THE SIDES AS NEARLY VERTICAL AS POSSIBLE. NO PAYMENT SHALL BE MADE FOR ANY EXCAVATION, CONCRETE, OR REINFORCING STEEL USED IN EXCESS OF THE PLAN QUANTITIES.

CONCRETE, CLASS C, SHALL BE PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 511, AND SHALL BE PLACED AGAINST UNDISTURBED SOIL OR COMPACTED EMBANKMENT. STEEL REINFORCEMENT BARS, WHERE REQUIRED, SHALL BE POSITIONED AS SHOWN ON THE PLANS AND PLACED IN ACCORDANCE WITH ITEM 509.

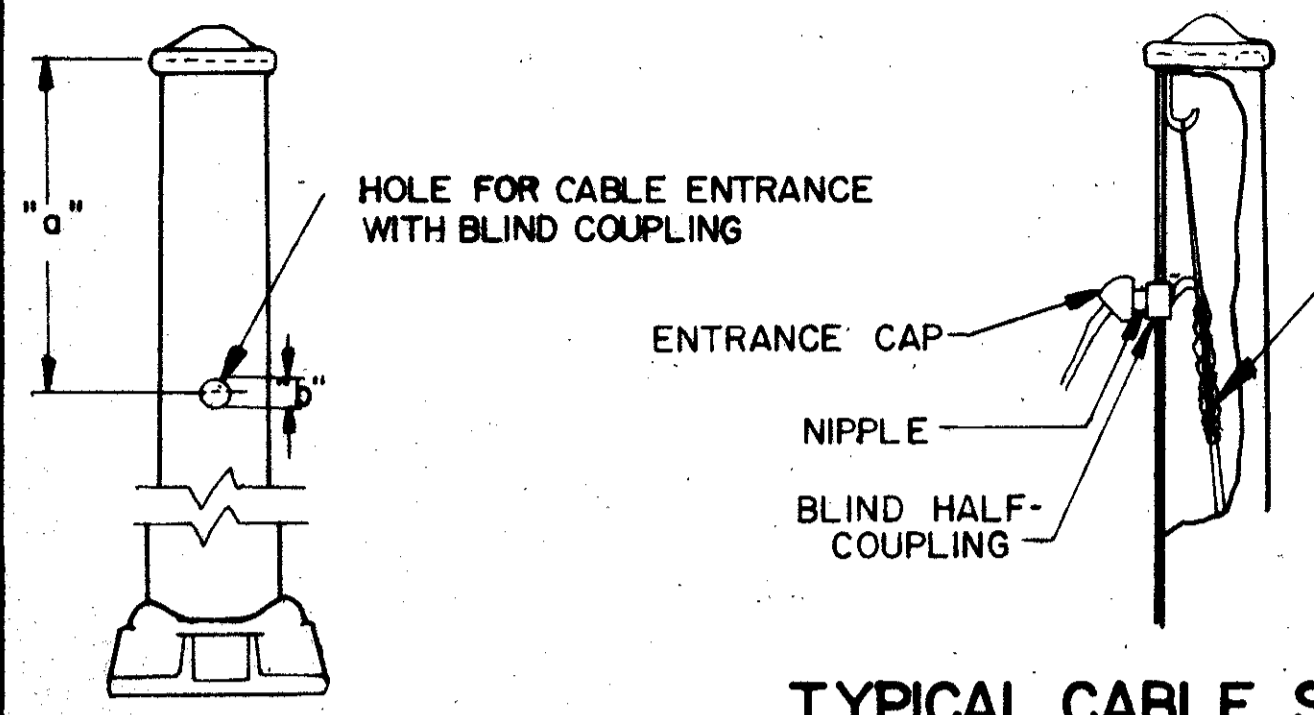
CYLINDRICAL ANCHOR BASE TYPE FOUNDATIONS FOR TRAFFIC SIGNAL POLES SHALL HAVE ANCHOR BOLTS AND CONDUIT ACCURATELY HELD IN POSITION WITH A TEMPLAT WHILE CONCRETE IS PLACED. FORMS SHALL BE USED FOR THE UPPER PORTIONS OF ALL FOUNDATIONS AND NO BACKFILLING SHALL BE PERMITTED FROM THE BOTTOM TO SIX INCHES BELOW THE GRADE LEVEL. NO GROUTING OF CONCRETE SHALL BE PERMITTED BETWEEN THE FOUNDATION TOP AND THE POLE BASE.

**TRAFFIC SIGNAL POLE**

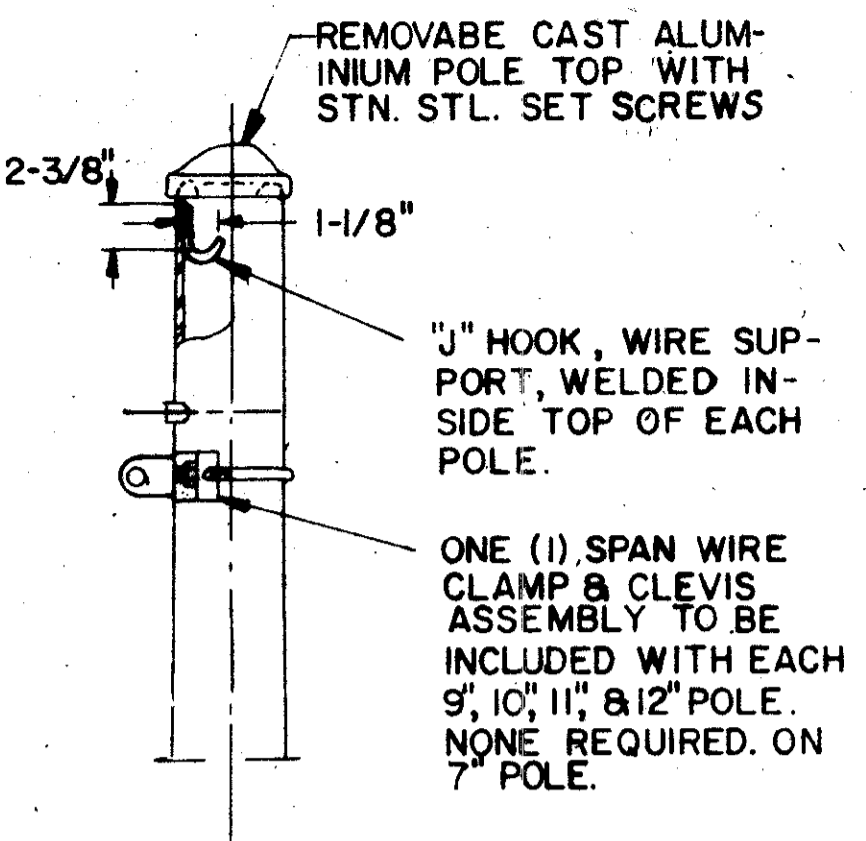
WHERE A WIRE ENTRANCE IS REQUIRED, THE SERVICE ENTRANCE HEAD SHALL BE LOCATED APPROXIMATELY 12" BELOW SPAN WIRE CLAMP.

**GROUND ROD**

GROUND ROD SHALL BE IN ACCORDANCE WITH TYPICAL GROUND ROD DETAIL AND TESTED IN ACCORDANCE WITH 625.22 CONSTRUCTION AND MATERIAL SPECIFICATIONS.



TYPICAL CABLE STRAIN RELIEF & ENTRANCE CAP DETAILS



POLE TOP DETAILS

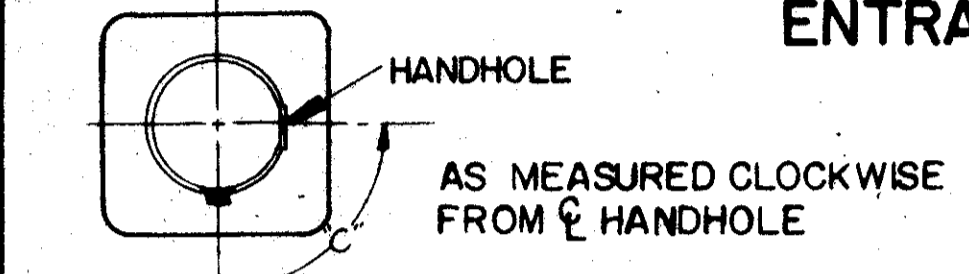
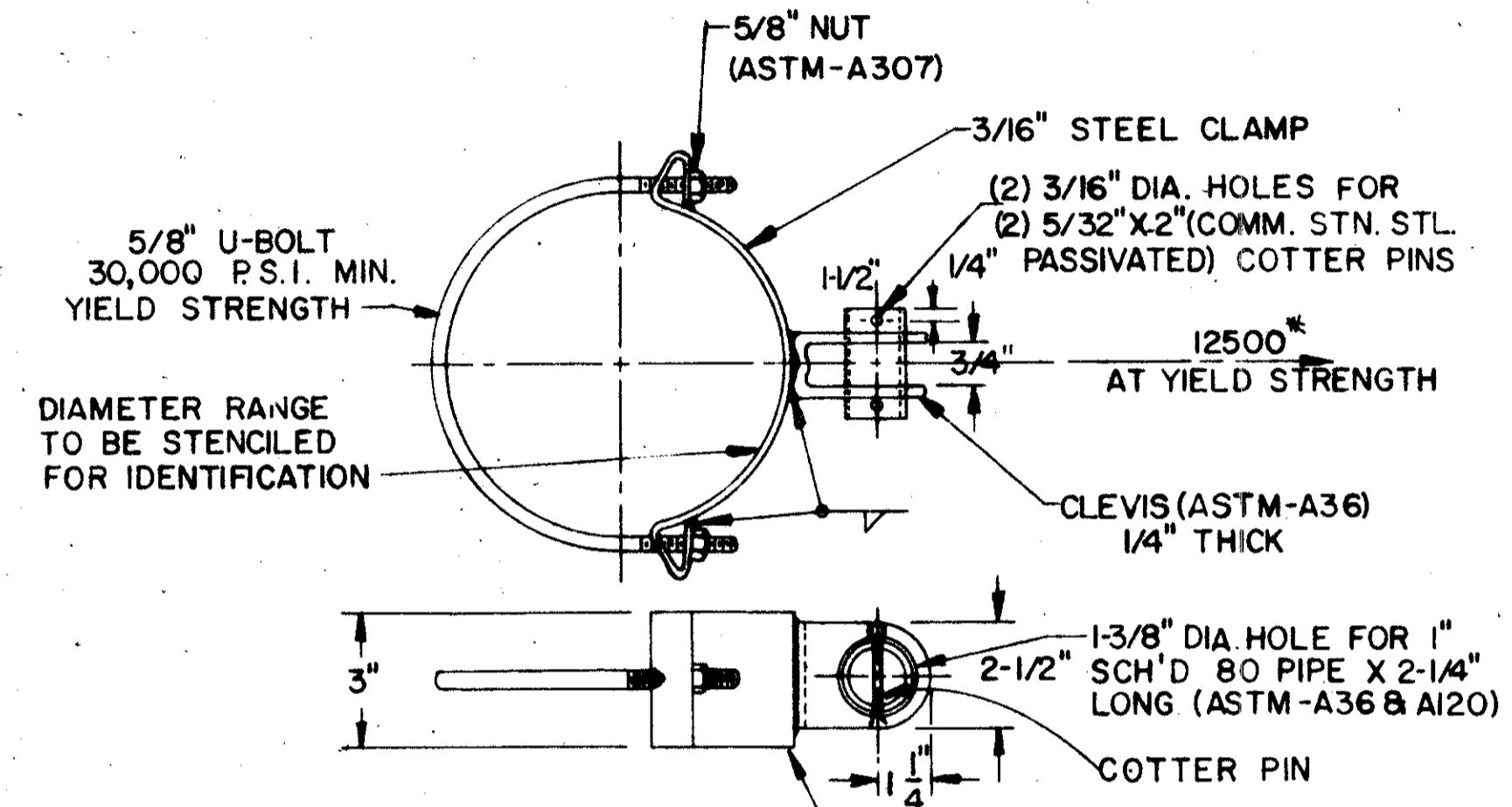


TABLE 2

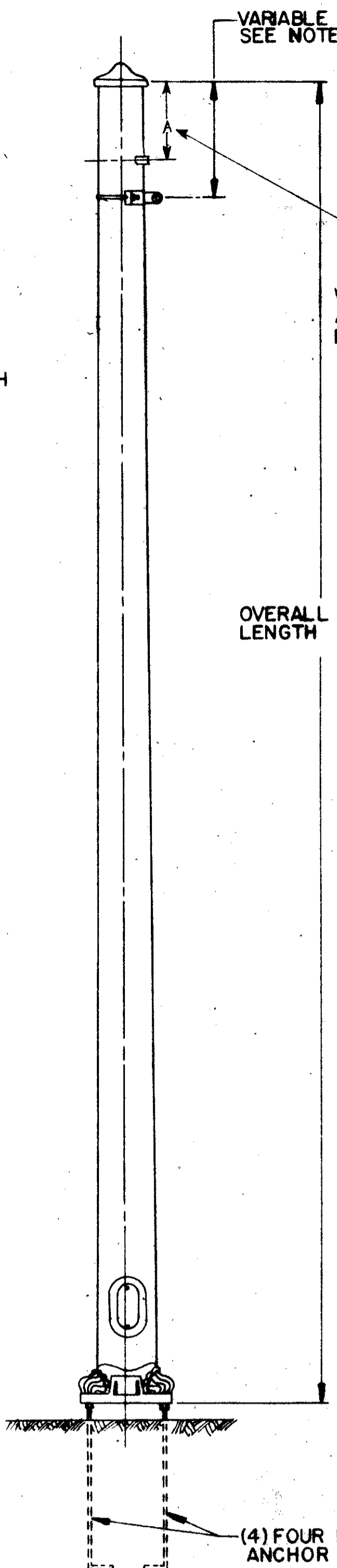
CONFIG.	"a"	"b"	"c"
A	30"	2"	90°
B	30"	2"	180°
C	30"	2"	270°
D	48"	2"	90°
E	48"	2"	180°
F	48"	2"	270°
G	NO HOLE REQUIRED		

CABLE ENTRANCE LOCATION DETAIL



TYPE	CLAMP RANGE MIN.	CLAMP RANGE MAX.
I	3.1"	3.6"
II	3.6"	4.4"
III	4.4"	5.2"
IV	5.2"	5.8"
V	5.8"	6.8"
VI	6.8"	7.9"
VII	7.9"	9.0"
VIII	9.0"	10.1"
IX	10.1"	11.3"
X	11.3"	12.1"
XI	12.1"	13.4"
XII	13.4"	14.5"
XIII	14.5"	15.5"
XIV	15.5"	16.5"

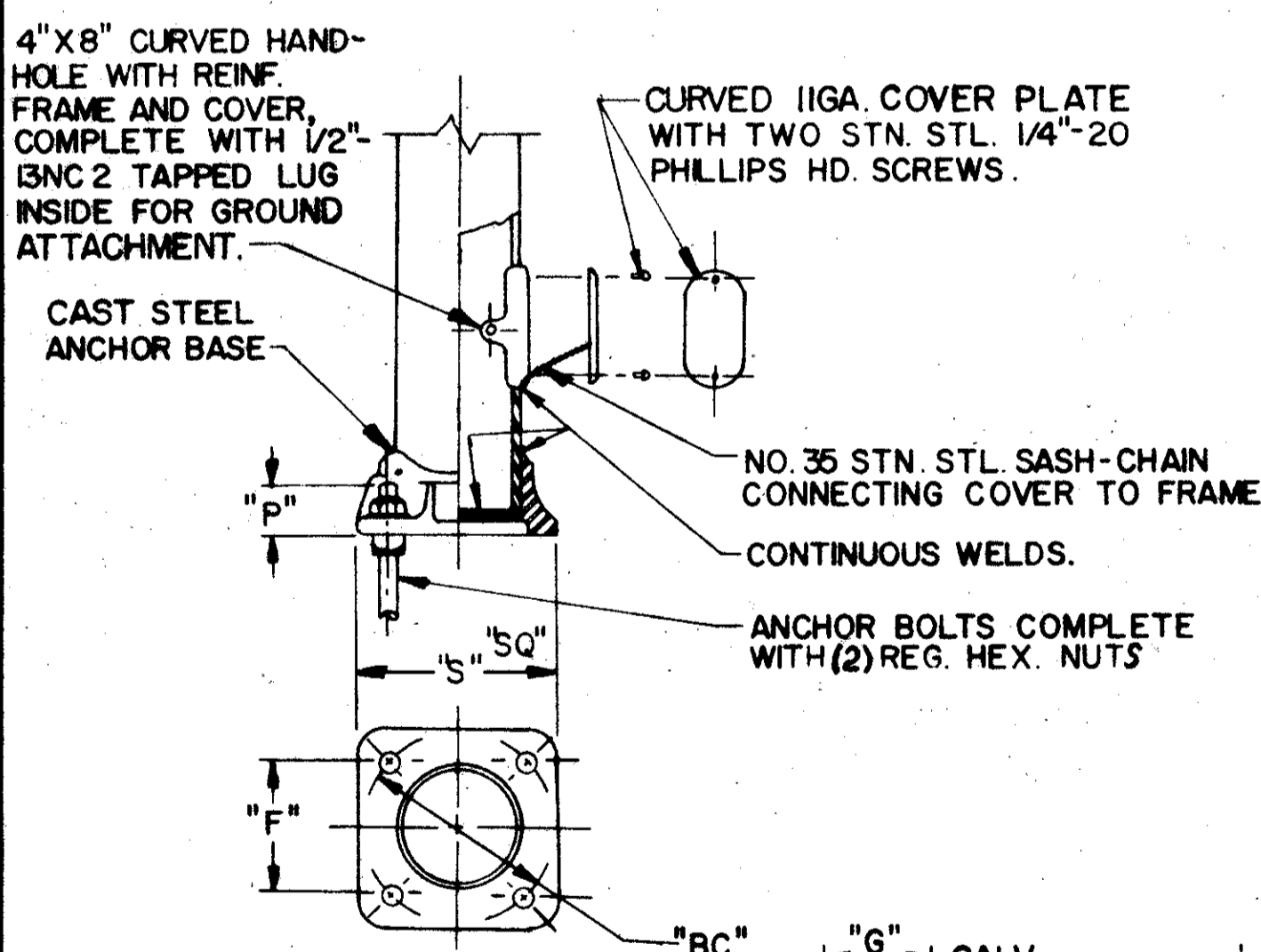
SPAN WIRE CLAMP DETAILS



STEEL STRAIN POLE

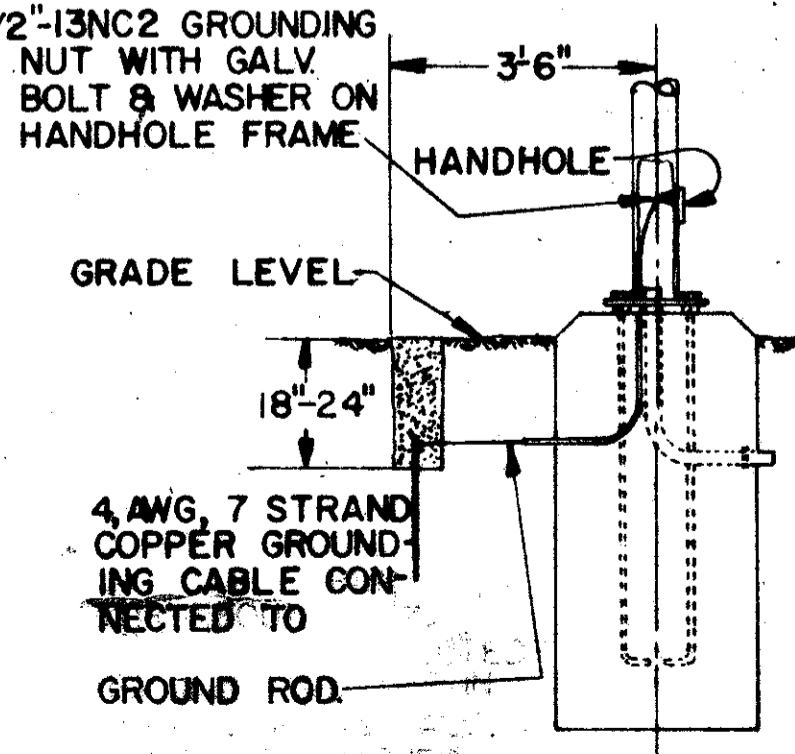
BASE TYPE	BASE DIA.	TOP DIA.	OVERALL LENGTH	WALL THICKNESS	DESIGN DATA FOR TRANSVERSE LOAD AT 18" DOWN FROM TOP		"H"	"D"
					ELAST. DEFL. LD. AT YIELD STRENGTH	RATE		
1	7.0"	4.20"	20.0'	(3 GA.) .250"	59/100"	2135"	42"	24"
2	9.0"	5.36"	26.0'		64/100"	2730"	54"	24"
3	10.0"	6.36"			44/100"	3400"	54"	24"
4	11.0"	7.36"	28.0'		32/100"	440"	84"	30"
5	12.0"	8.36"			24/100"	4960"	84"	36"
6	9.0"	5.08"	30.0'		64/100"	2520"	54"	24"
7	10.0"	6.08"			54/100"	3140"	54"	24"
8	11.0"	7.08"	30.0'		41/100"	3650"	84"	30"
9	12.0"	8.08"			31/100"	4590"	84"	36"
10	9.0"	4.80"	30.0'		110/100"	2350"	54"	24"
11	10.0"	5.80"			74/100"	2920"	54"	24"
12	11.0"	6.80"	30.0'		53/100"	3560"	84"	30"
13	12.0"	7.80"		39/100"	4260"	84"	36"	

STRAIN POLE TYPES

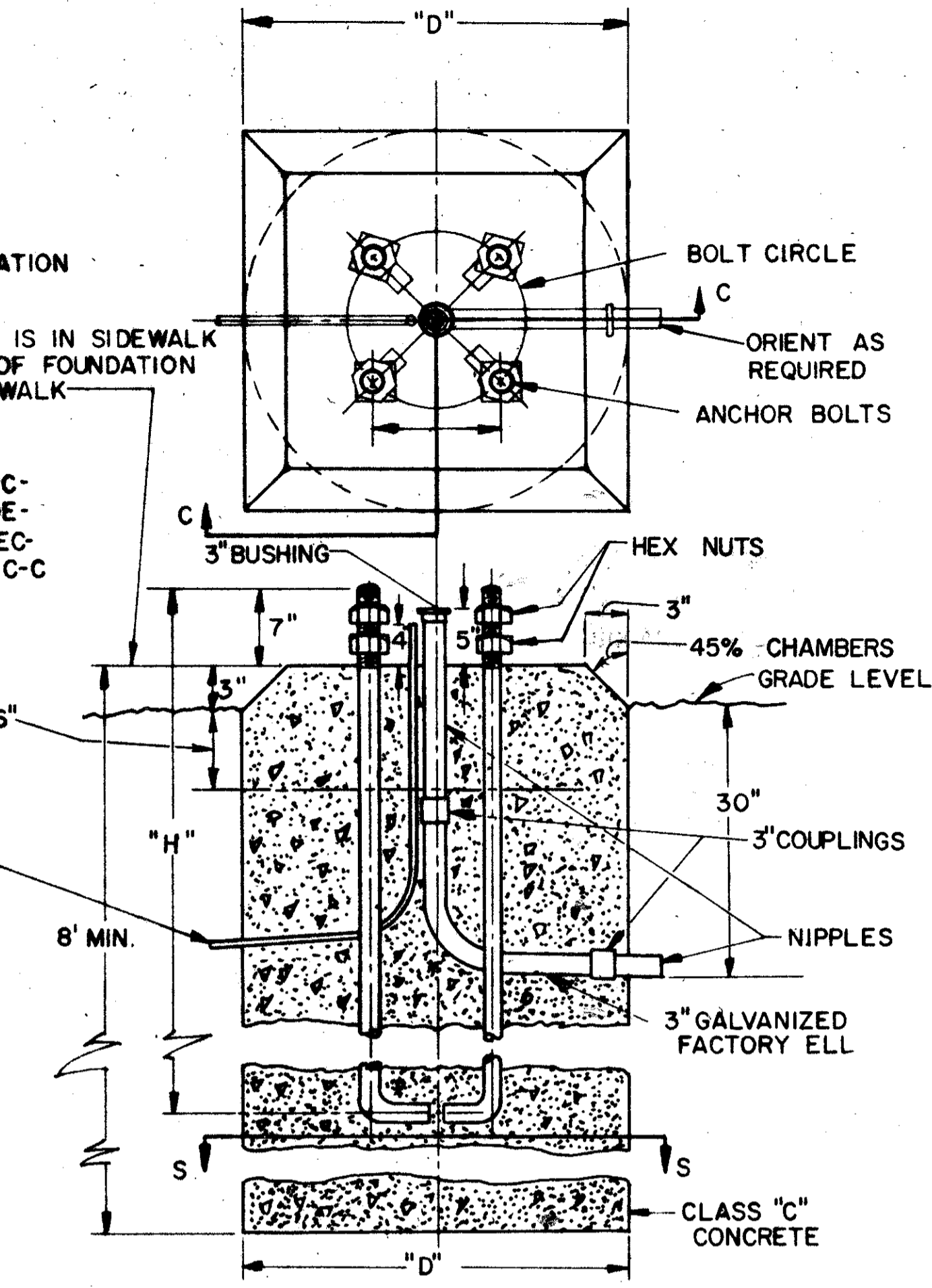


ANCHOR BASE DATA					ANCHOR BOLT DATA		
POLE DIA.	"BC"	"F"	"S"	"P"	SIZE	"L"	"G"
7"	10"	7 1/16"	10 1/2"	2 1/4"	1/4" X 48"	40"	8"
9"	12 1/2"	8 7/8"	12 3/4"	3"	1/2" X 60"	54"	9"
10"	13 1/2"	9 9/16"	14 1/8"	3 3/8"	1/2" X 60"	54"	9"
11"	15"	10 5/8"	15 5/8"	3 5/8"	3/4" X 90"	84"	9"
12"	16"	11 5/16"	17"	4"	3/4" X 90"	84"	9"

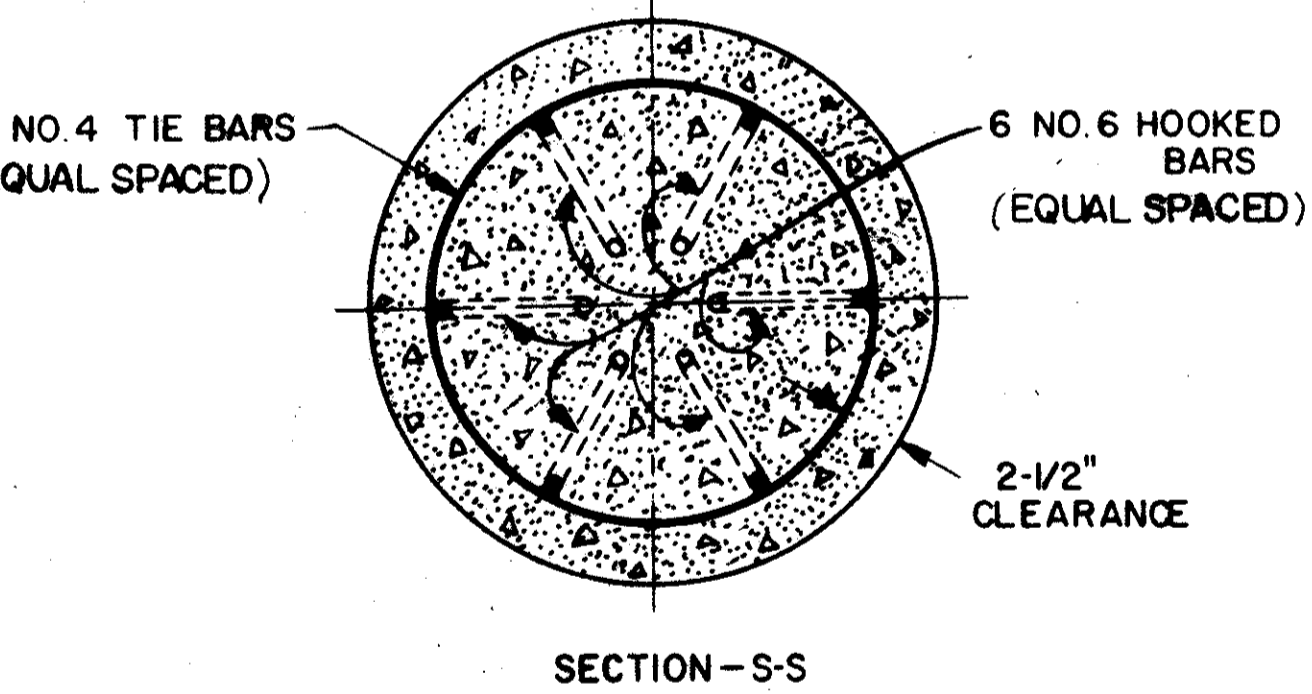
TYPICAL HANDHOLE, ANCHOR BASE & ANCHOR BOLT DETAILS



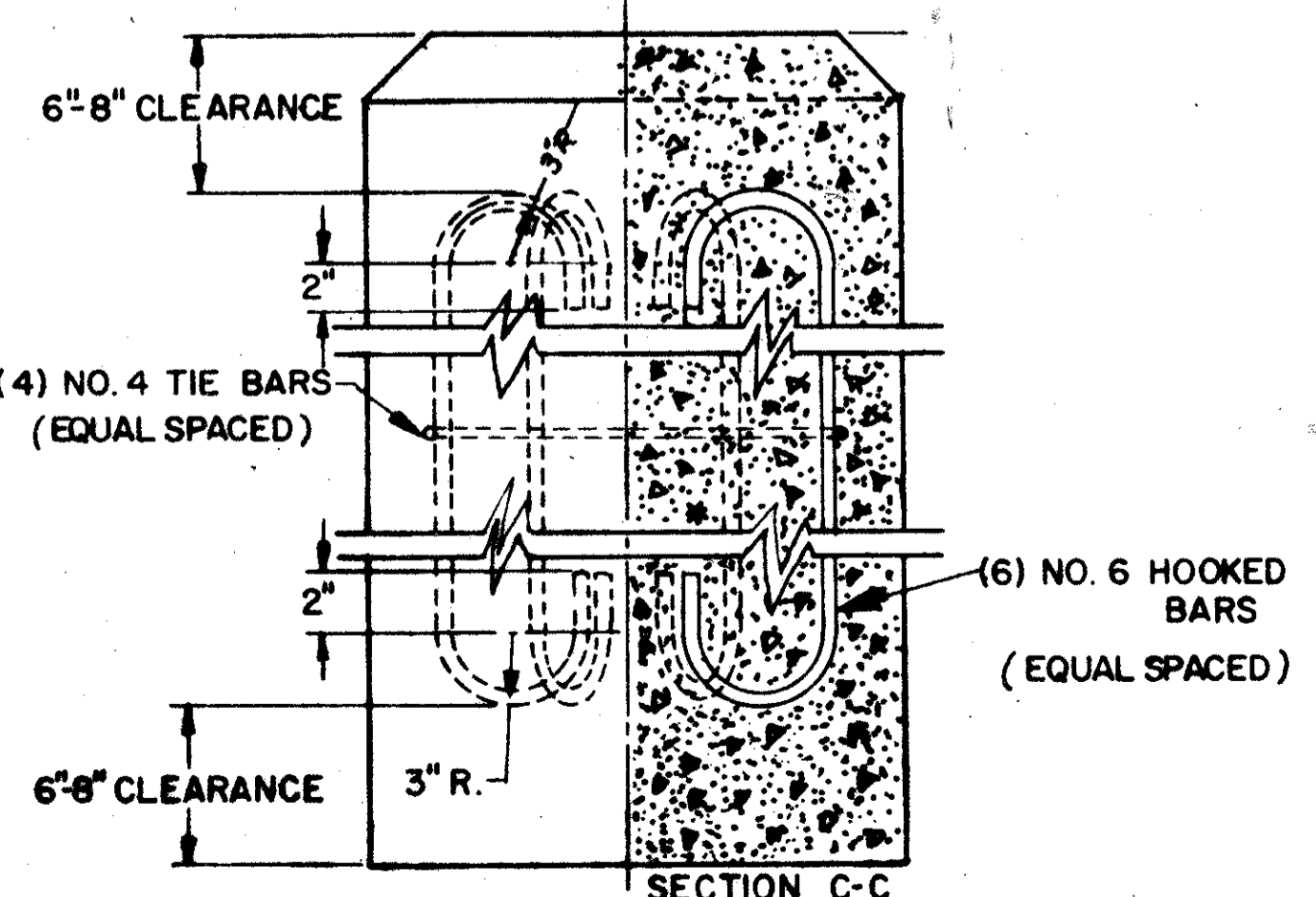
TYPICAL GROUND ROD DETAIL



TYPICAL STRAIN POLE FOUNDATION



SECTION - S-S



TYPICAL REINFORCING STEEL SECTIONS

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

**STEEL STRAIN POLE & FOUNDATION DETAILS**

APPROVED \_\_\_\_\_  
ENGINEER OF TRAFFIC

NOTES:

- MATERIAL SPECIFICATIONS**
- TAPERED TUBES (S.A.E.-1020 STEEL PROCESSED TO MINIMUM YIELD STRESS OF 55,000 P.S.I.)
  - CAST ANCHOR BASE & HANDHOLE FRAME - ASTM-A27- GRADE 65-35.
  - HANDHOLE COVER PLATE - 11 GA. STEEL SAE-1015
  - CAST ALUMINUM POLE TOP - ALUMINUM ALLOY 43
  - SPAN WIRE CLAMP - LOW ALLOY, HIGH STRENGTH STEEL ASTM-A242 - OR 375, LOAD PRODUCING DISTORTION 12,500 LBS. DIRECT TENSION
  - ALL BOLTS & NUTS LESS THAN 5/8" DIA. PASSIVATED STAINLESS STEEL AISI-300 SERIES - COMMERCIAL GRADE.
  - ALL OTHER NUTS & BOLTS 5/8" DIA. & OVER - ASTM-A307 AND GALVANIZED IN ACCORDANCE WITH ASTM-A153
  - ANCHOR BASE & U-BOLTS - HIGH STRENGTH STEEL - MINIMUM YIELD STRESS 55,000 LBS. SQ. IN. - MIN. ULTIMATE 90,000 P.S.I.
  - WELDING ROD - ASTM-A233 - CLASS E60XX OR 70XX.
  - GALVANIZING - WHEN SPECIFIED ASTM-A123.

**TRAFFIC SIGNAL POLE FOUNDATIONS**

THE CONTRACTOR SHALL STAKE THE LONGITUDINAL AND LATERAL LOCATION, AND THE ELEVATION OF THE TOP OF EACH FOUNDATION SUBJECT TO THE APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ELEVATION, OFFSET, AND LEVEL OF EACH FOUNDATION. THE FOUNDATION LOCATIONS MAY BE CHANGED AS DIRECTED BY THE ENGINEER, IN CASE OF SLOPE OR SUBSURFACE DIFFICULTIES. EXCAVATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 503. EXCAVATION SHALL BE TO THE DIMENSIONS SHOWN ON THE PLANS, AND SHALL BE PERFORMED BY MEANS OF AN EARTH AUGER OF THE SPECIFIED DIA. UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

WHERE SUBSURFACE OBSTRUCTIONS ARE ENCOUNTERED, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO REMOVE THE OBSTRUCTION OR TO REPLACE THE EXCAVATED MATERIAL AND RELOCATE THE FOUNDATION. IF CAVING OF THE EXCAVATION OCCURS, THE CONTRACTOR SHALL EXCAVATE THE SPECIFIED DEPTH MAINTAINING THE SIDES AS NEARLY VERTICAL AS POSSIBLE. NO PAYMENT SHALL BE MADE FOR ANY EXCAVATION, CONCRETE, OR REINFORCING STEEL USED IN EXCESS OF THE PLAN QUANTITIES.

CONCRETE, CLASS C, SHALL BE PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 511, AND SHALL BE PLACED AGAINST UNDISTURBED SOIL OR COMPACTED EMBANKMENT. STEEL REINFORCEMENT BARS, WHERE REQUIRED, SHALL BE POSITIONED AS SHOWN ON THE PLANS AND PLACED IN ACCORDANCE WITH ITEM 509.

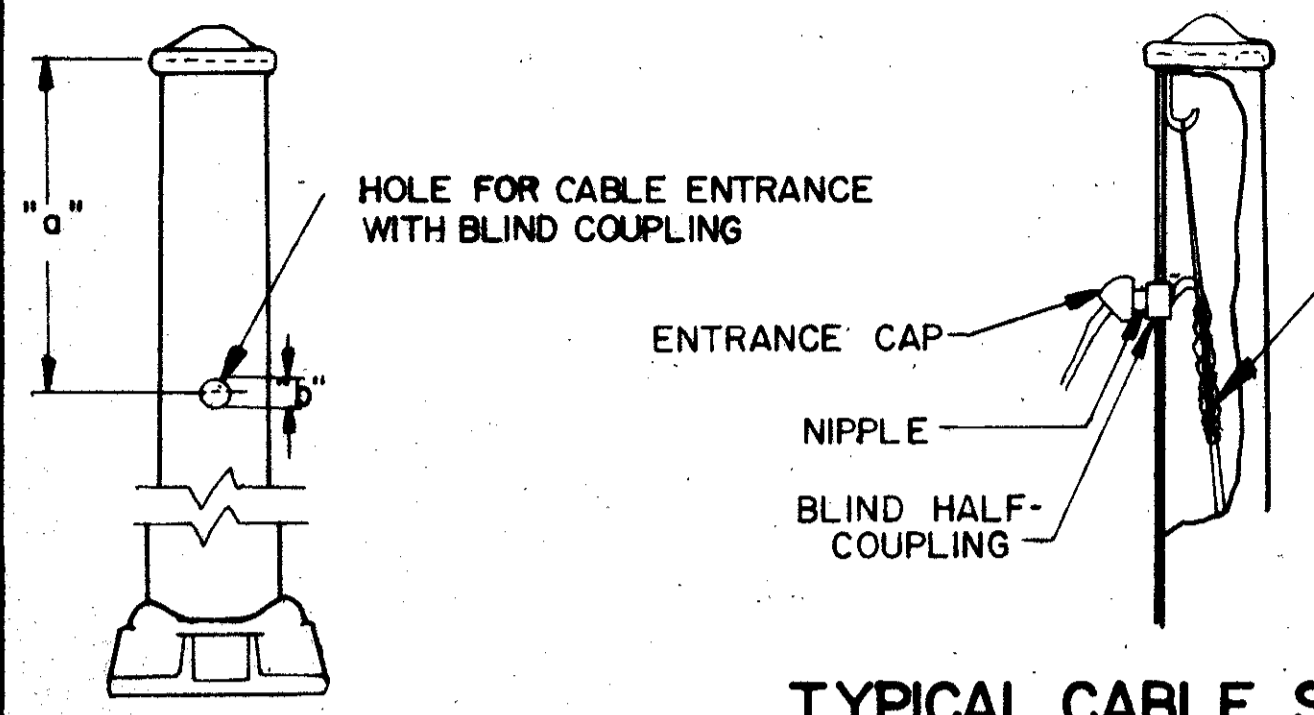
CYLINDRICAL ANCHOR BASE TYPE FOUNDATIONS FOR TRAFFIC SIGNAL POLES SHALL HAVE ANCHOR BOLTS AND CONDUIT ACCURATELY HELD IN POSITION WITH A TEMPLAT WHILE CONCRETE IS PLACED. FORMS SHALL BE USED FOR THE UPPER PORTIONS OF ALL FOUNDATIONS AND NO BACKFILLING SHALL BE PERMITTED FROM THE BOTTOM TO SIX INCHES BELOW THE GRADE LEVEL. NO GROUTING OF CONCRETE SHALL BE PERMITTED BETWEEN THE FOUNDATION TOP AND THE POLE BASE.

**TRAFFIC SIGNAL POLE**

WHERE A WIRE ENTRANCE IS REQUIRED, THE SERVICE ENTRANCE HEAD SHALL BE LOCATED APPROXIMATELY 12" BELOW SPAN WIRE CLAMP.

**GROUND ROD**

GROUND ROD SHALL BE IN ACCORDANCE WITH TYPICAL GROUND ROD DETAIL AND TESTED IN ACCORDANCE WITH 625.22 CONSTRUCTION AND MATERIAL SPECIFICATIONS.



TYPICAL CABLE STRAIN RELIEF & ENTRANCE CAP DETAILS

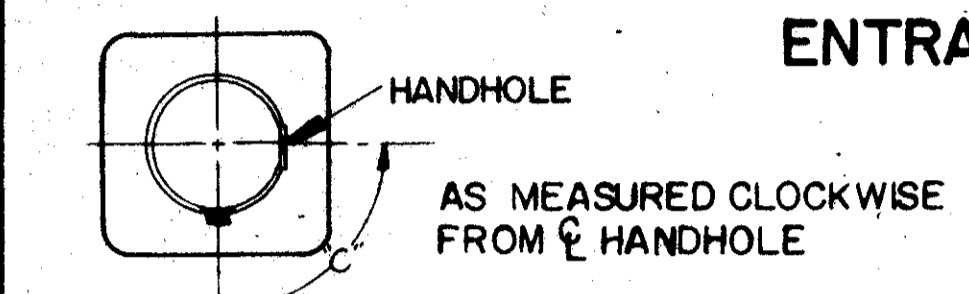
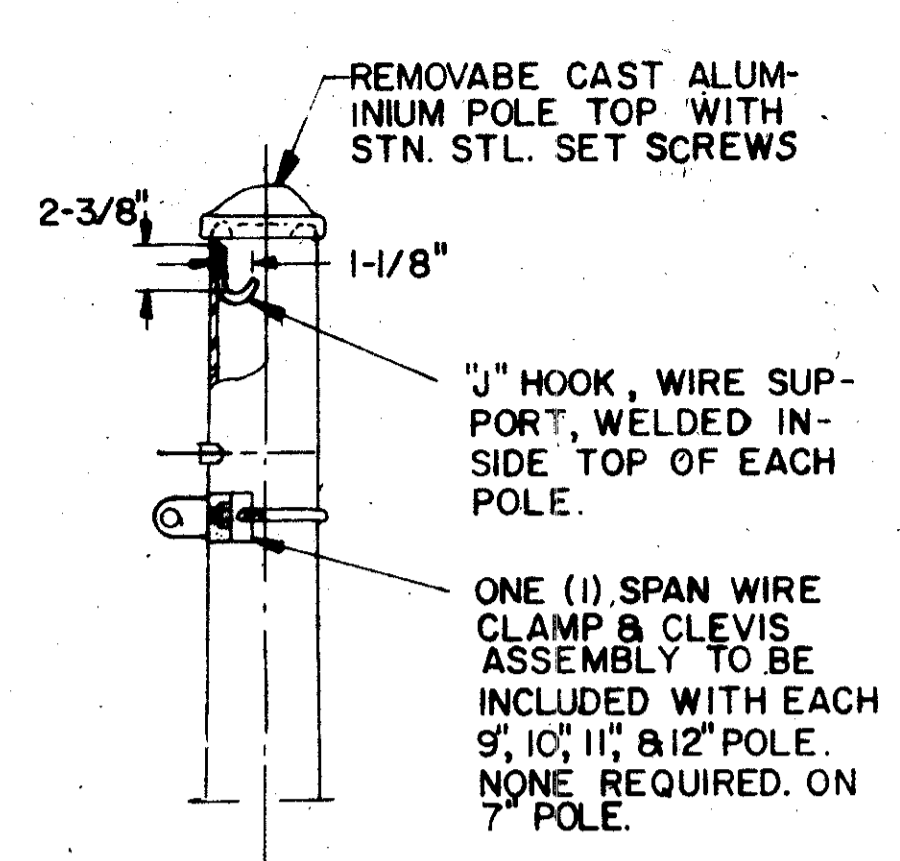


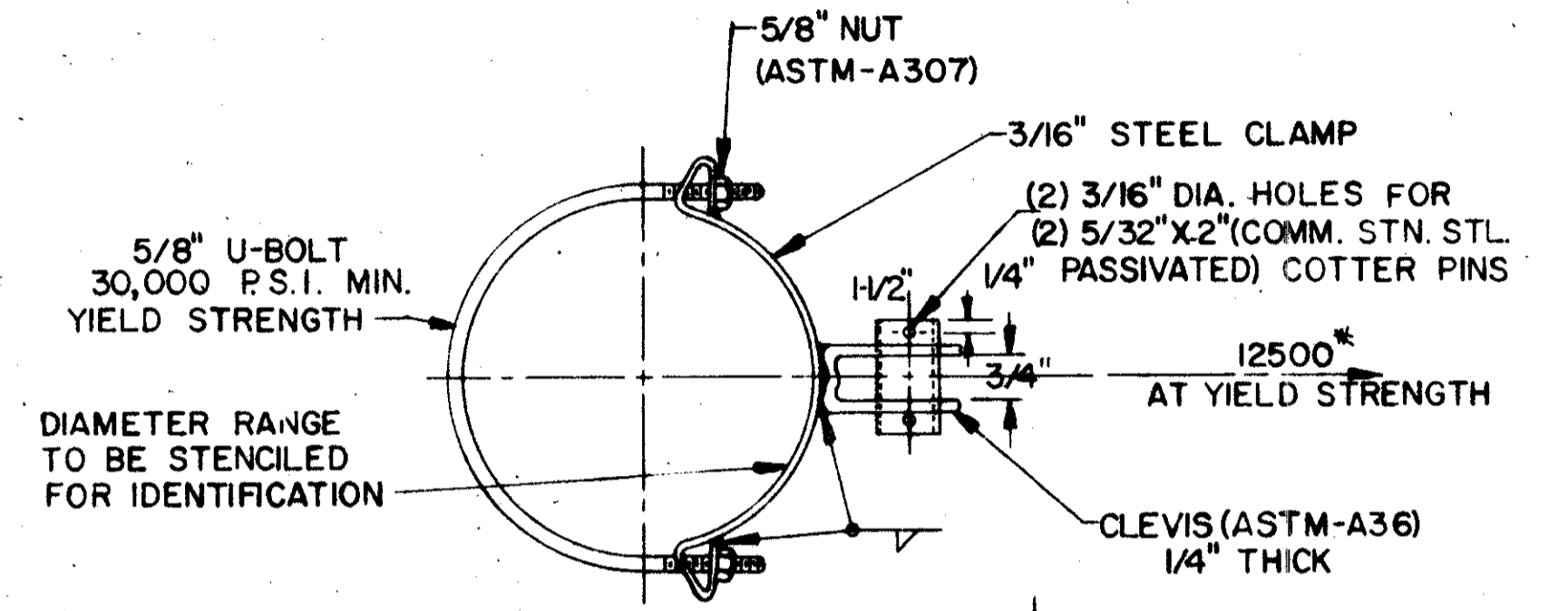
TABLE 2

CONFIG.	"a"	"b"	"c"
A	30"	2"	90°
B	30"	2"	180°
C	30"	2"	270°
D	48"	2"	90°
E	48"	2"	180°
F	48"	2"	270°
G	NO HOLE REQUIRED		

CABLE ENTRANCE LOCATION DETAIL

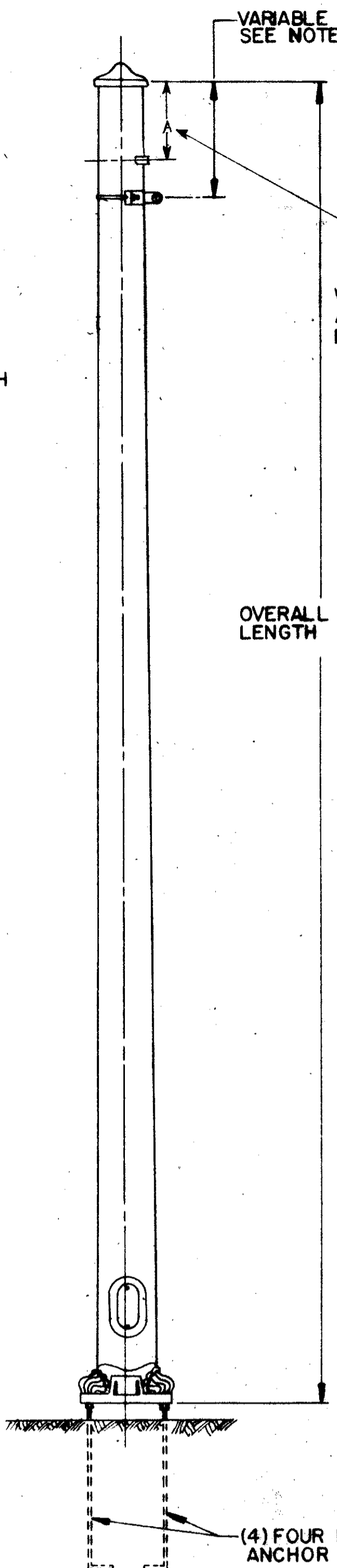


POLE TOP DETAILS



TYPE	CLAMP RANGE MIN.	CLAMP RANGE MAX.
I	3.1"	3.6"
II	3.6"	4.4"
III	4.4"	5.2"
IV	5.2"	5.8"
V	5.8"	6.8"
VI	6.8"	7.9"
VII	7.9"	9.0"
VIII	9.0"	10.1"
IX	10.1"	11.3"
X	11.3"	12.1"
XI	12.1"	13.4"
XII	13.4"	14.5"
XIII	14.5"	15.5"
XIV	15.5"	16.5"

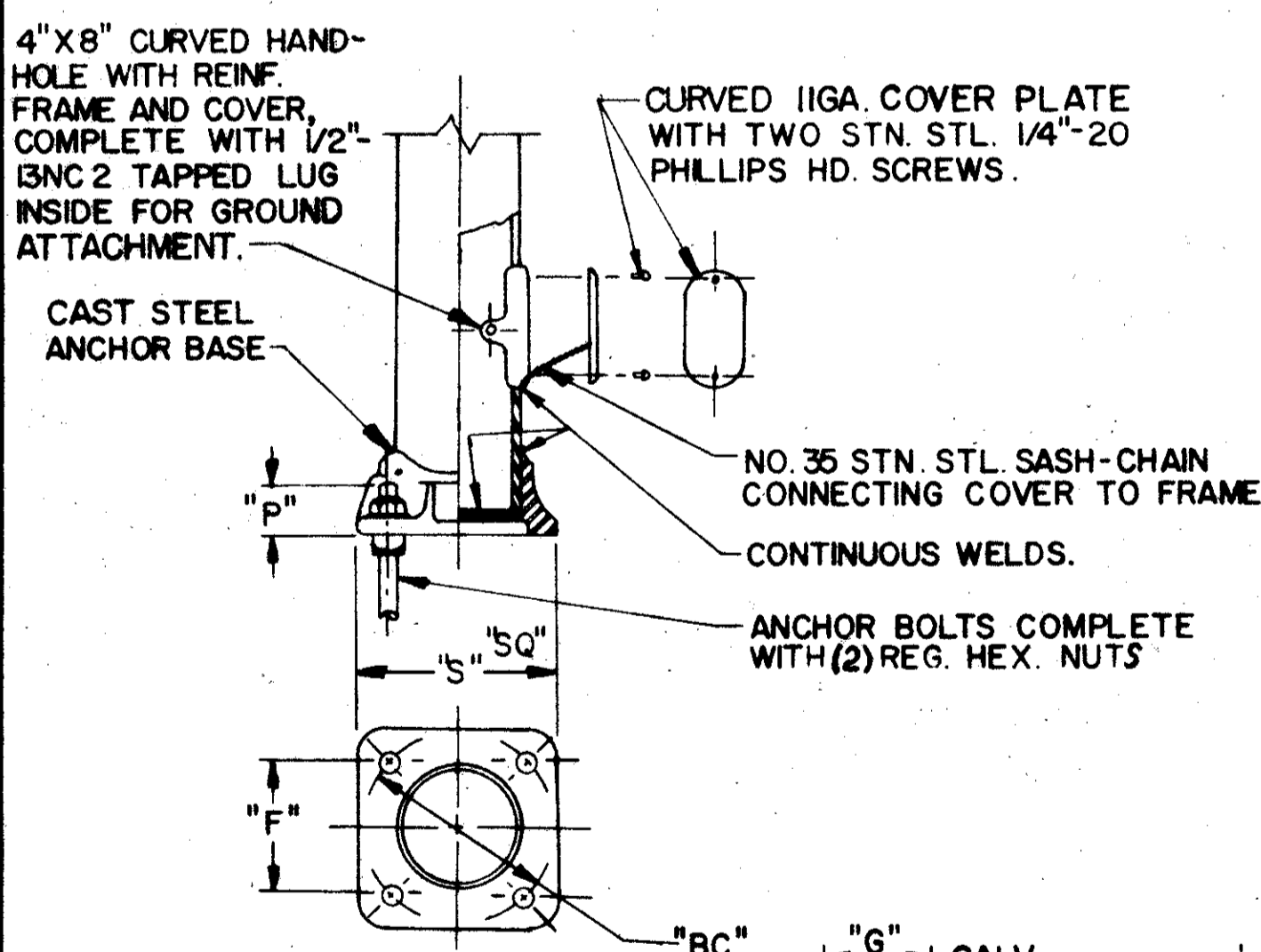
SPAN WIRE CLAMP DETAILS



STEEL STRAIN POLE

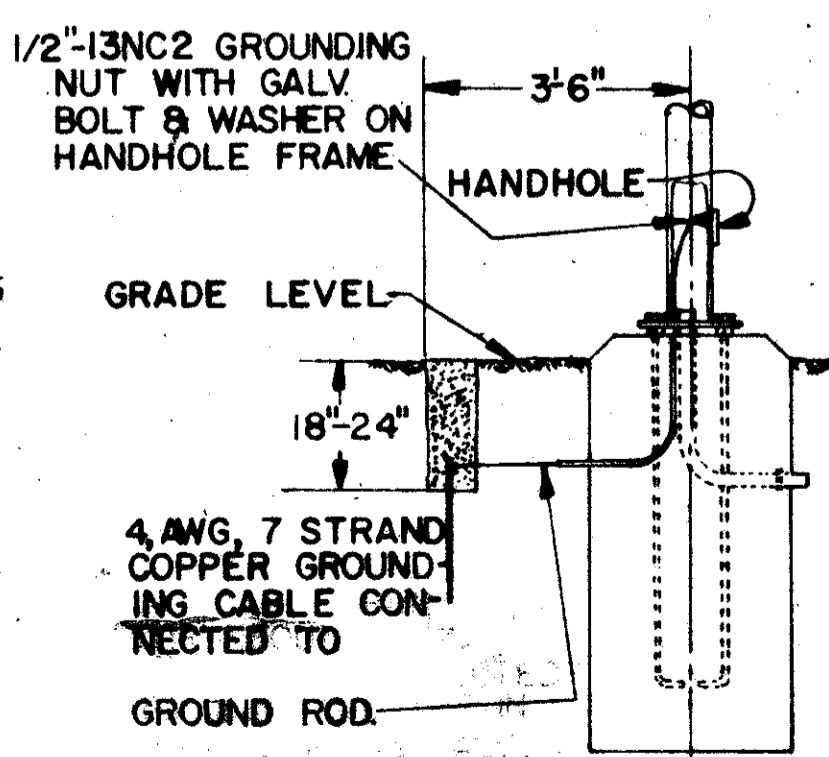
BASE TYPE	BASE DIA.	TOP DIA.	OVERALL LENGTH	WALL THICKNESS	DESIGN DATA FOR TRANSVERSE LOAD AT 18" DOWN FROM TOP		"H"	"D"
					ELAST. DEFL. LD. AT YIELD STRENGTH	RATE		
1	7.0"	4.20"	20.0'	(3 GA.) .250"	59/100"	2135"	42"	24"
2	9.0"	5.36"	26.0'		64/100"	2730"	54"	24"
3	10.0"	6.36"			44/100"	3400"	54"	24"
4	11.0"	7.36"	28.0'		32/100"	440"	84"	30"
5	12.0"	8.36"			24/100"	4960"	84"	36"
6	9.0"	5.08"	30.0'		64/100"	2520"	54"	24"
7	10.0"	6.08"			54/100"	3140"	54"	24"
8	11.0"	7.08"	30.0'		41/100"	3650"	84"	30"
9	12.0"	8.08"			31/100"	4590"	84"	36"
10	9.0"	4.80"	30.0'		110/100"	2350"	54"	24"
11	10.0"	5.80"			74/100"	2920"	54"	24"
12	11.0"	6.80"			53/100"	3560"	84"	30"
13	12.0"	7.80"			39/100"	4260"	84"	36"

STRAIN POLE TYPES

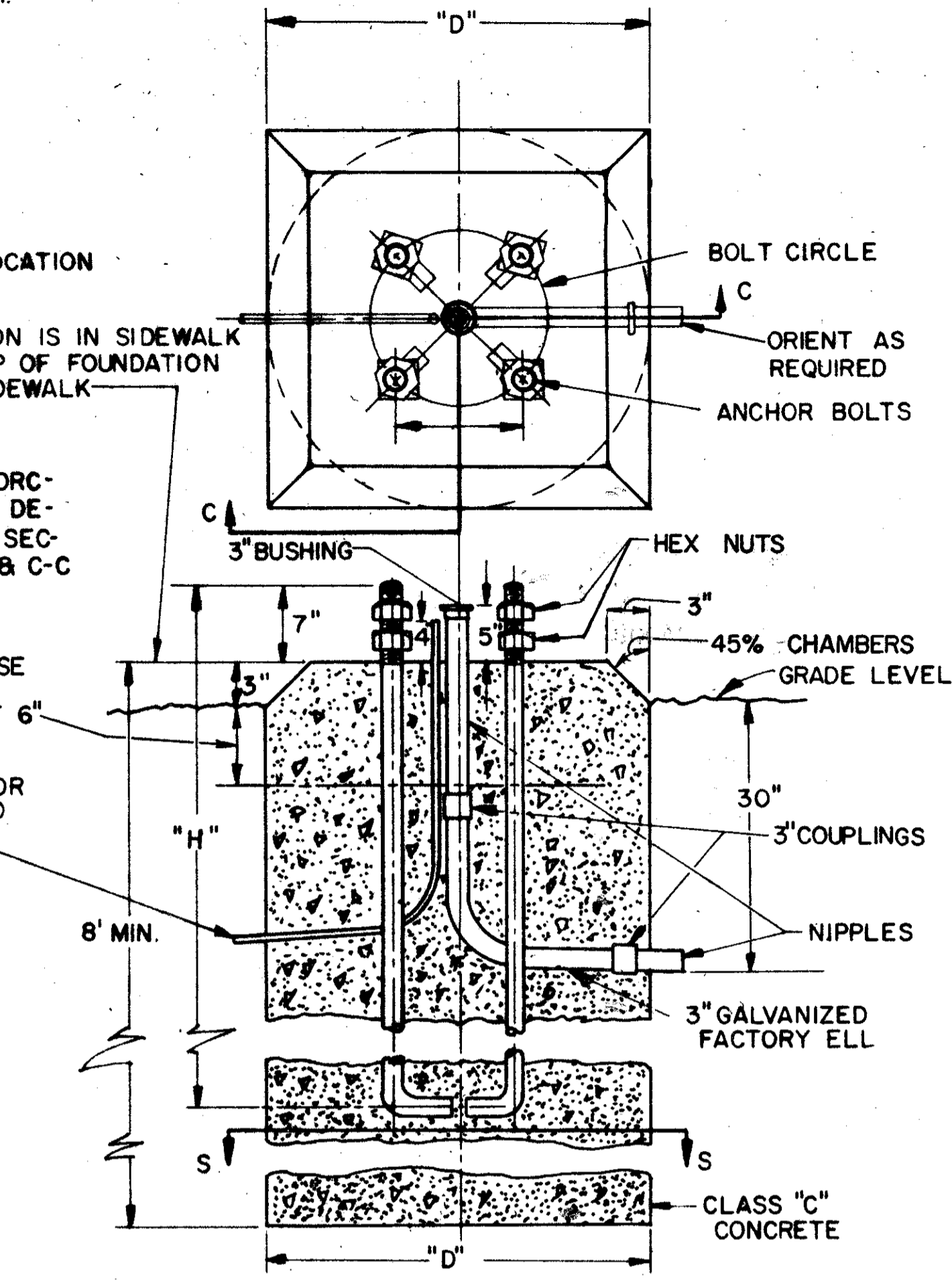


ANCHOR BASE DATA					ANCHOR BOLT DATA				
POLE DIA.	"BC"	"F"	"S"	"P"	SIZE	"L"	"T"	"G"	
7"	10"	7 1/16"	10 1/2"	2 1/4"	1/4" X 48"	40"	8"	10"	
9"	12 1/2"	8 7/8"	12 3/4"	3"	1/2" X 60"	54"	9"	11"	
10"	13 1/2"	9 9/16"	14 1/8"	3 3/8"	1/2" X 60"	54"	9"	11"	
11"	15"	10 5/8"	15 5/8"	3 5/8"	3/4" X 90"	84"	9"	11"	
12"	16"	11 5/16"	17"	4"	3/4" X 90"	84"	9"	11"	

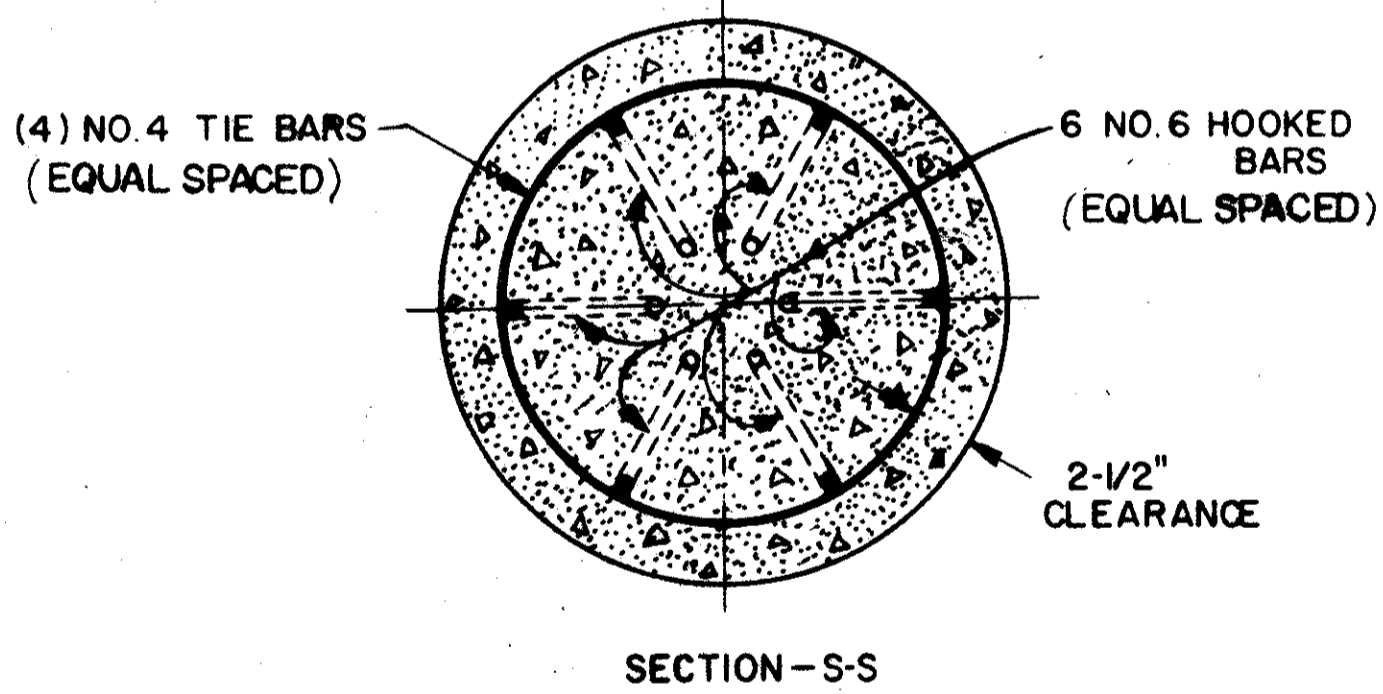
TYPICAL HANDHOLE, ANCHOR BASE & ANCHOR BOLT DETAILS



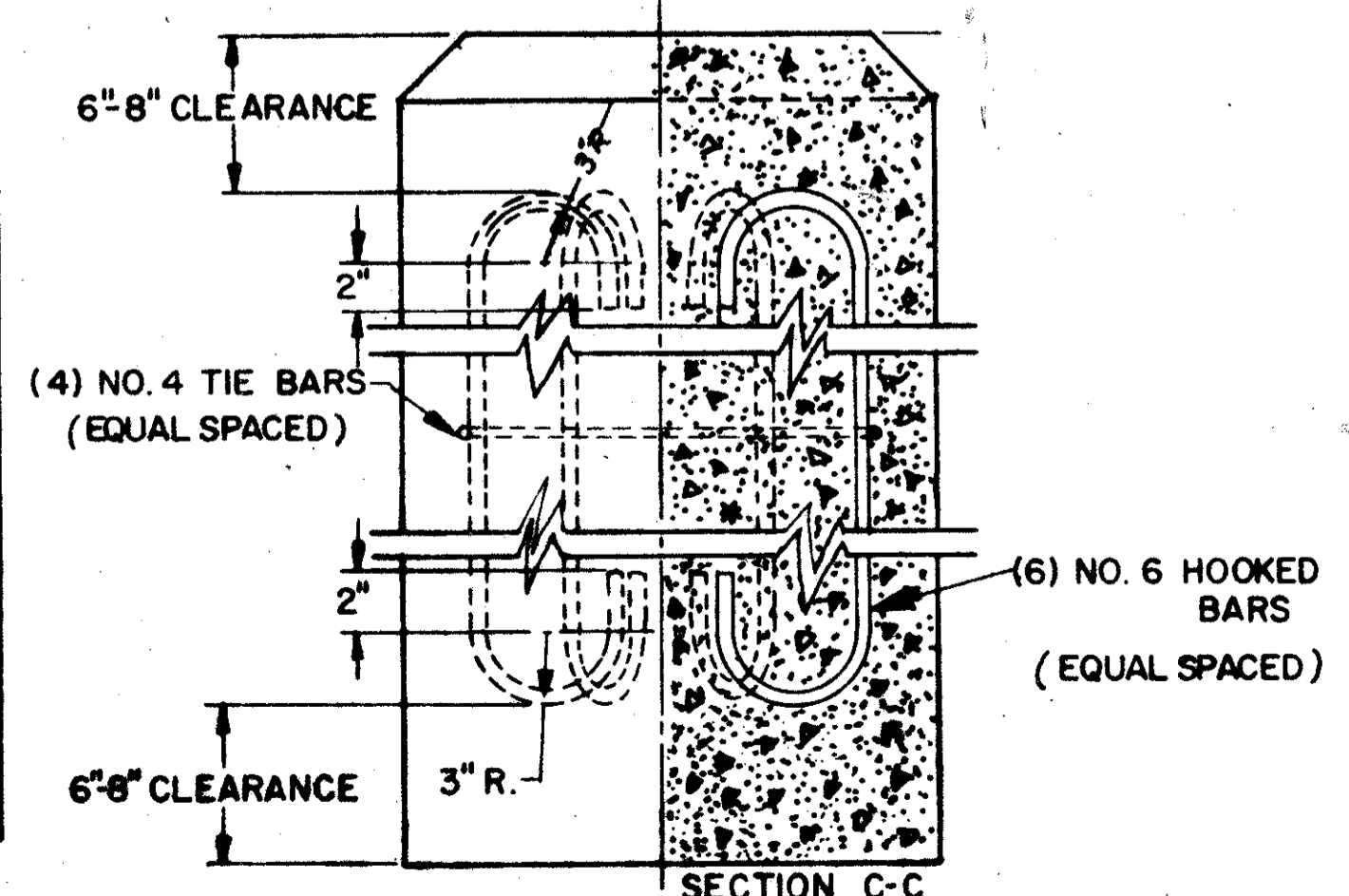
TYPICAL GROUND ROD DETAIL



TYPICAL STRAIN POLE FOUNDATION



SECTION - S-S



TYPICAL REINFORCING STEEL SECTIONS

BUREAU OF TRAFFIC  
OHIO DEPARTMENT OF HIGHWAYS

**STEEL STRAIN POLE & FOUNDATION DETAILS**

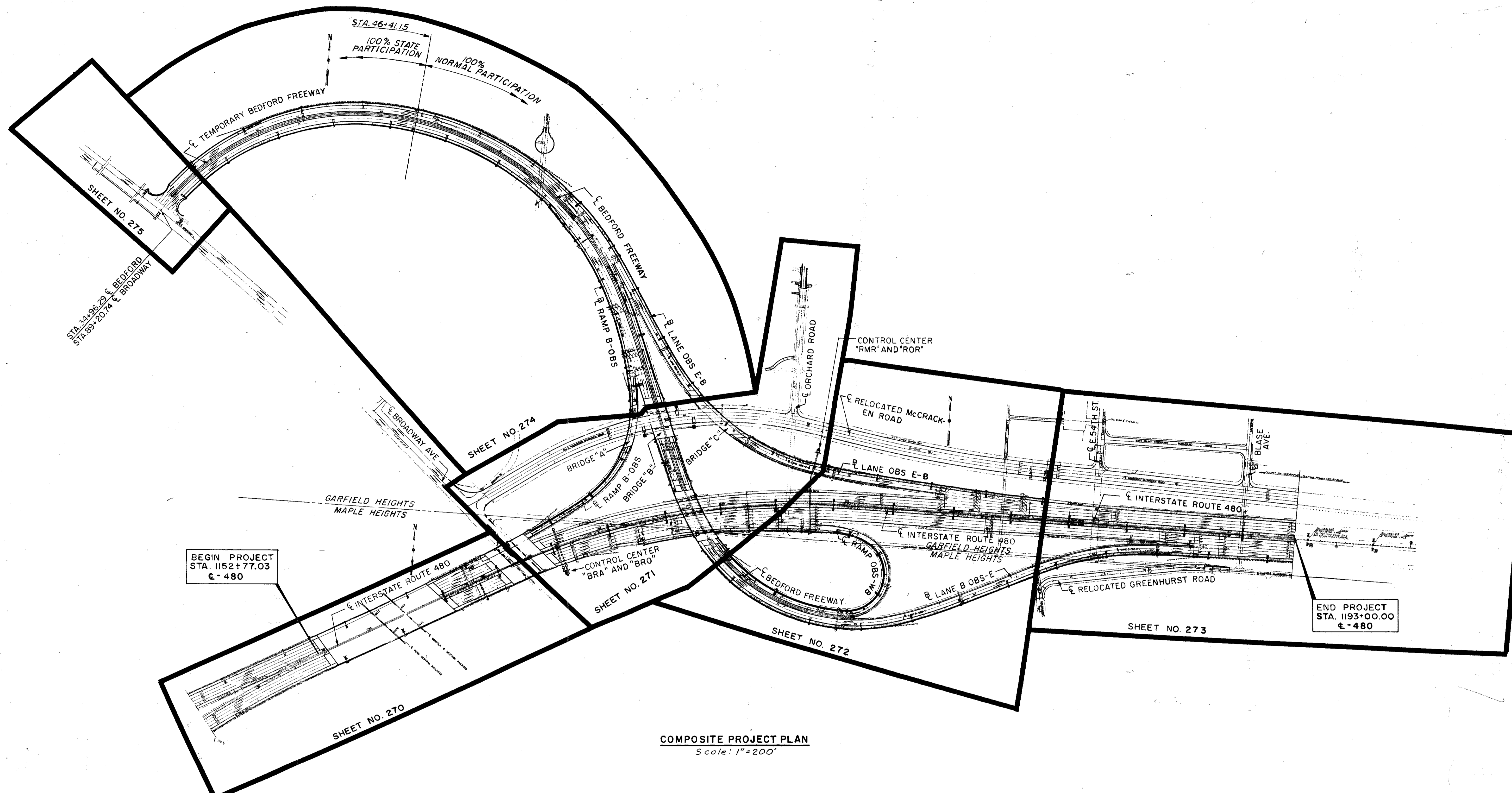
APPROVED \_\_\_\_\_  
ENGINEER OF TRAFFIC



FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

266  
390

CUYAHOGA COUNTY  
CUY-480-21.40



COMPOSITE PROJECT PLAN  
Scale: 1"=200'

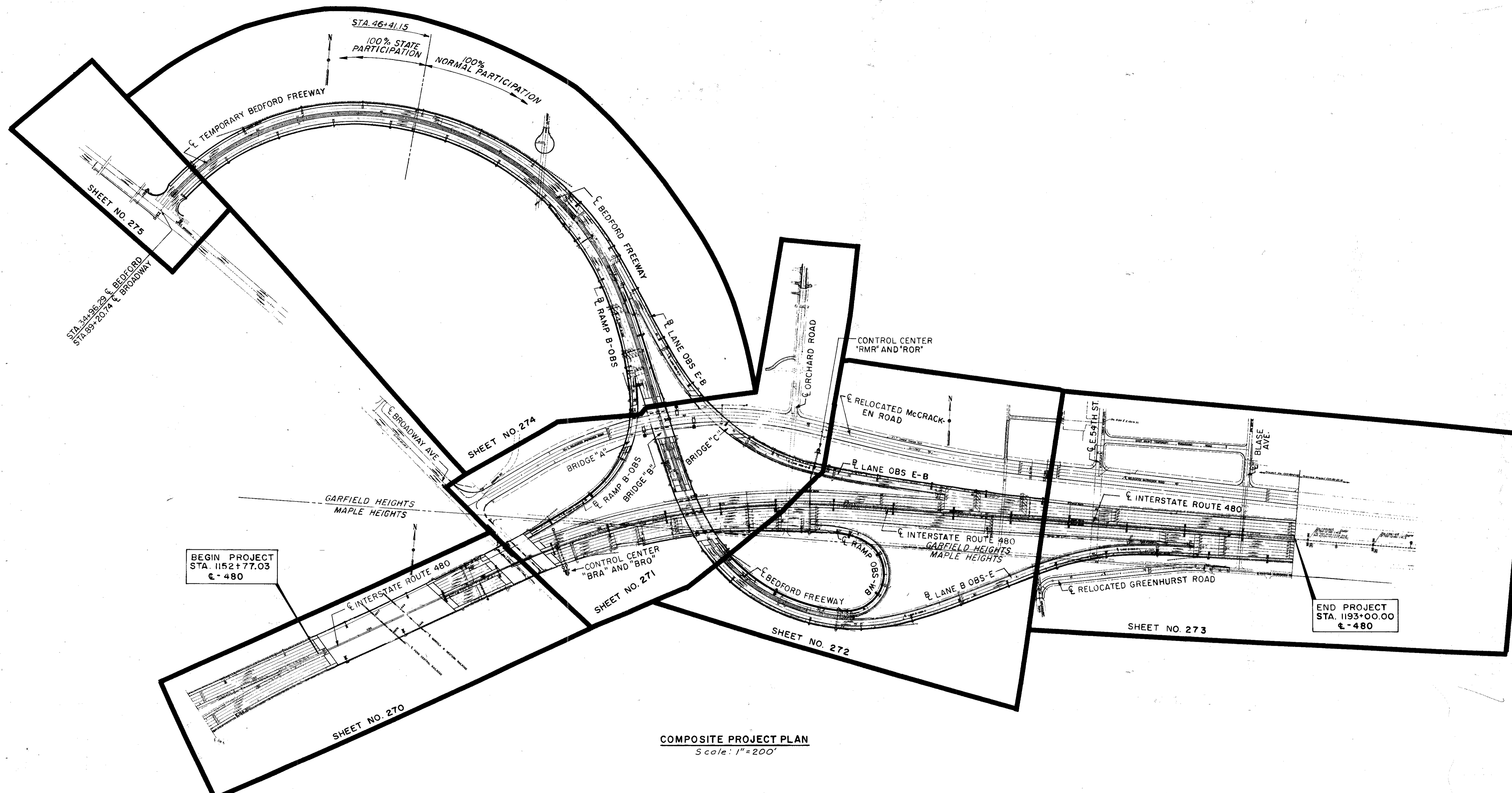
SCALE 1"=200'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE LWL DATE 5-6-70 CONSULTING ENGINEERS  
TRCD LWL DATE 5-6-70  
CKD GJC DATE 9-6-72 KANSAS CITY CLEVELAND NEW YORK

SCHMATIC LIGHTING PLAN LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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390

CUYAHOGA COUNTY  
CUY-480-21.40



COMPOSITE PROJECT PLAN  
Scale: 1"=200'

SCALE 1"=200'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE LWL DATE 5-6-70 CONSULTING ENGINEERS  
TRCD LWL DATE 5-6-70  
CKD GJC DATE 9-6-72 KANSAS CITY CLEVELAND NEW YORK

SCHMATIC LIGHTING PLAN LAYOUT

# LIGHTING NOTES

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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390

CUYAHOGA COUNTY  
CUY-480-21.40

GENERAL - 625.03

All construction methods, materials and workmanship shall conform to Items 625 and 713, except as modified or supplemented herein or on the drawings, of the State of Ohio Department of Highways' Construction and Material Specifications dated January 1, 1971.

Reference shall be made to Standard Construction Drawings

The Contractor shall cooperate with the Cleveland Electric Illuminating Company whose address is:  
Cleveland Electric Illuminating Company  
Illuminating Building  
Public Square  
Cleveland, Ohio

mailing address  
Post Office Box 5000  
Cleveland, Ohio 44101

The Contractor will not be required to furnish or install the primary distribution lines, transformers, transformer poles, primary controllers, metering equipment or housings for the same. The Contractor shall provide connections to branch circuits and grounds as hereinafter specified.

The project has been designed on the basis of 5% maximum voltage drop permissible on branch circuits. The project will receive 480-volt controlled secondary service from C.E.I. Co. This project has been designed on the basis of 1.2 Ft. C. initial with a maximum uniformity ratio of 4.0 to 1.0.

LIGHT POLE - 625.05 and 713.01

Reference Letter	Light Pole		Foundation Anchor Bolts		Transformer Base Style	Foundation Size
	* Design Number	Sheet Size	Size	Bolt Circle Diameter		
A	A12BB39.0D	9" x 5.80" x 32'-0"	1 1/4" φ Rect. x 42"	8" x 8"	Med	4' x 14' x 7'-5"
B	AT15B41.7	9" x 5.65" x 33'-6"	1" φ x 40"	15"	AFA	24" x 8'-0"
C	T15B41.7	9" x 5.65" x 33'-6"	1" φ x 40"	15"	AFA	24" x 8'-0"
D	T15B36.7	8 5/8" x 5.65" x 28'-6"	1" φ x 40"	15"	AFA	24" x 6'-0"
E	AT15B36.7	8 5/8" x 5.65" x 28'-6"	1" φ x 40"	15"	AFA	24" x 6'-0"
F	AT15B34.2	9" x 4.87" x 29'-6"	1" φ x 40"	15"	AFA	24" x 6'-0"
G	AT10B34.2	8" x 3.87" x 29'-6"	1" φ x 40"	15"	AFA	24" x 6'-0"
H	A15B40	9" x 5.65" x 33'-6"	1 1/4" x 85" U-bolts	12 1/2"	None	Bridge
I	A15B35	9" x 5.01" x 28'-6"	1 1/4" x 85" U-bolts	12 1/2"	None	Bridge
J	A10B32.5	8" x 3.87" x 29'-6"	1 1/4" x 85" U-bolts	11"	None	Bridge
K	T25B36.7	9" x 6.15" x 28'-6"	1" φ x 40"	15"	AT-A	24" x 8'-0"
L	T25B34.2	9" x 6.3" x 27'-0"	1" φ x 40"	15"	AT-A	24" x 8'-0"
M	AT15B26.7	8" x 4.92" x 22'-0"	1" φ x 40"	15"	AT-A	24" x 6'-0"
N	AT25B41.7	9 5/8" x 6.15" x 33'-6"	1" x 40"	15"	AT-A	24" x 8'-0"

ESTIMATED QUANTITIES

An estimated quantity of "14 Each of 625 Markers" is provided in the lighting general summary for use as directed by the Engineer in providing ground surface indication of the location of underground circuits. The markers shall be located directly over the centerline of the cable or duct. It is intended that a marker shall be provided at a point midway between adjacent side-mounted light units where the distance between units exceeds 300 feet but does not exceed 450 feet, and at intervals of approximately 200 feet on all other circuit sections located outside of paved areas.

An estimated quantity of "120 lin. ft. of 605, 4-inch shallow pipe underdrains" is provided in the lighting general summary for use as directed by the Engineer in providing positive drainage for pull boxes in fill areas. It is intended that all pull boxes in these areas be provided with such drainage, provided the length of underdrain necessary to obtain a satisfactory outfall does not exceed 20 feet approximately. A perforated PVC pipe or conduit material approved by the Engineer may be used in the construction of this item.

SCALE: No Scale HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE M.A.C. DATE 6-12-72 CONSULTING ENGINEERS  
TRCB MAC DATE 6-12-72  
CRD GJC DATE 9-5-72 KANSAS CITY CLEVELAND NEW YORK

STANDARD CONSTRUCTION DRAWING HL-3

Pole base details shown on this drawing are essentially for galvanized steel poles. For aluminum designs, or other permitted steel material design, variations from these details will be acceptable, as approved by the Engineer.

STANDARD CONSTRUCTION DRAWING HL-15

Weephole diameters of 1/8 inch shown on this drawing shall be increased to 1/4 inch.

LIGHT POLE FOUNDATIONS - 625.06

Where 3" crossover conduit terminates in a light pole foundation it shall continue into the foundation as a 3" conduit. The light pole concrete foundations shall be constructed to the depth as shown on the detail sheets unless so directed by the Engineer. If any caving is encountered, the Contractor shall drive a steel casing, of sufficient weight and strength, and remove the soil from within by an auger. The steel casing may be reused if pulling is coordinated with the pouring of concrete.

LUMINAIRES - 625.07 and 713.11

400-Watt luminaires shall have dual rated 240/480-volt (120/240-volt for C.E.I. servicing), integral, regulator ballasts, Type II-M-C or III-M-C distribution, and shall be General Electric M400, Westinghouse OV-25, McGraw-Edison "Unistyle", or equal approved by the Engineer. 700-Watt luminaires shall have single rated 480-volt, 700-watt, integral regulator ballasts, Type III-M-C distribution and shall be General Electric M-1000, Westinghouse OV-50, McGraw-Edison "Unistyle" or equal approved by the Engineer.

UNDERDECK LUMINAIRES - 625.07 - 713.13

250-Watt underdeck luminaires shall have dual rated 240/480V (120/240V for C.E.I. integral, regulator ballasts and shall be Holophane "Underpass Wallpack", Westinghouse, McGraw-Edison underpass unit approved by the Engineer, and shall be furnished with an integral fuse holder and fuse.

LAMPS - 625.08 and 713.14

Mercury lamps shall be General Electric's "Bonus Line", Westinghouse's "Life-guard", Sylvania's "Rough Service", or equal approved by the Engineer.

CONDUIT, 3-INCH, 713.04 TYPE III, JACKED UNDER PAVEMENT, AS PER PLAN

This item shall consist of installing conduit of the 3" diameter size under the existing pavement and contiguous shoulders by an approved method such as "drilling" or "jacking".

The Contractor shall place the conduit with the least amount of disturbance to the existing pavement, subbase, berm pavement, or shoulders of the roadway. All push pits or any necessary excavations shall be backfilled and restored in accordance with 625.01.

CONDUIT - 625.13 and 713.04

Expansion fittings for conduit in structures shall be OZ Type AX, Spring City Type AF, Appleton Type XJ, or equal approved by the Engineer, and shall be included for payment with conduit in structures.

SERVICE TO UNDERDECK LIGHTING, AS PER PLAN - 625

This item shall consist of providing complete electrical service, except for luminaires, lamps and grounding systems for underdeck lighting system on Bridge No. CUY-480-2154 over Broadway and Bridge No. CUY-480-2169 over I-480. The installation work shall include conduits, mounting all items required to be mounted, fittings, junction boxes, cables, and all incidentals necessary to complete, ready for use, the service as detailed.

The underdeck lighting service for Bridge C over Relocated McCracken Road, shall include installation of the underdeck units on 120 V. system, pull box, conduit, weatherhead, conductors from pull box up to connection on C.E.I. pole and all incidentals necessary to complete, ready for use, the service as detailed.

The underdeck lighting service for Bridge A and B over Relocated McCracken Road shall be installed as detailed in plan on 120 V. system, and shall include all items from pull box to lighting units, mounting conduit, conductors, fittings and all incidentals necessary to complete, ready for use.

The lump sum price bid for "Item 625 - "Service to Underdeck Lighting", as per plan, shall include payment for all equipment, labor, and materials necessary to complete the work as specified. Component parts not specifically mentioned but required for satisfactory operation of this item shall be furnished and considered paid for as part of this item.

Payment for the 120 Volt service on Relocated McCracken Road shall be included in the lump sum price bid for "Service to Underdeck Lighting Bridge C".

HIGH VOLTAGE DIRECT CURRENT TESTS

A High Voltage Test, as described in Supplemental Specification 839, shall be performed on all distribution cable and duct cable systems to be installed on this project, after all construction is completed, including guardrail, fences, delineator posts, signs, etc.

Basis of payment for this testing item shall be at the contract lump price bid, which shall include all labor, recording the data from control center to the disconnect switch at each sign, materials and equipment required to complete this item of work.

CONTROL CENTERS - 625.19 and 713.20

The Contractor shall furnish and install all control centers, located as per the plans, to serve the roadway and sign circuits. The control centers shall include the control equipment, located and mounted as shown on the Lighting Layout and Control Center Detail Sheets, and as specified below. The Contractor shall install the secondary distribution panels in the Control Center enclosure furnished and installed by the Contractor for Control Centers "BRA", "BRO", "RRM" and "RRP". The Contractor shall provide all incidentals required for the 480-volt, secondary, branch circuits for roadway and sign lighting at the locations where indicated on the plans.

Each switch enclosure shall be furnished with one padlock. Padlocks shall have a brass body and wrought iron shackle equal to Russwin No. 2882 KA or Master No. 4KA or approved equal. Padlocks shall be all keyed alike with master key 3476.

POLYVINYL CHLORIDE PLASTIC CONDUIT

1. Scope. This specification covers polyvinyl chloride conduit for encasement in concrete and shall be of the size and type specified.

2. Detail Requirements. Conduit furnished under this specification shall comply with one of the following:

(a) Conduit conforming to NEMA Standards Publication No. TC 1 with the exception that the conduit and conduit fittings composed of styrene polymers or copolymers shall not be acceptable and (2) the physical requirements TC1-3.03 and TC1-3.04, and the test methods TC1-4.05 and TC1-4.06 shall not be required.

(b) Conduit conforming to NEMA Standards Publication No. TC 6 with the exception that conduit and conduit fittings composed of acrylonitrile-butadiene-styrene (ABS) shall not be acceptable.

(c) Conduit conforming to the requirements of (a), above, with the additional exceptions that where 4 inch nominal size conduit is to be encased in concrete it shall be permissible to use conduit having a minimum wall thickness of 0.075 inch and an outside diameter of 4.202 to 4.360 inches instead of those specified in NEMA Standards Publication No. TC 1.

For any given installation the mixed use of the conduits described in (a) and (b) shall be prohibited.

When the conduit described in (c) is used, all such conduit used in a given installation shall be the product of a single manufacturer.

CABLE CONNECTORS AND CONNECTOR KITS 625.17 - 713.15

In lieu of the fuse amperage rating shown elsewhere, the following shall apply to this project:

No. of Lamps Served	Lamp Rating (Watts)	Fuse Rating (Amps)
1	250	10
1	400	10
1	700	10
2	700	15

REV. 1-9-74  
REV. 12-7-73

LIGHTING NOTES

# LIGHTING NOTES

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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CUYAHOGA COUNTY  
CUY-480-21.40

**GENERAL - 625.03**

All construction methods, materials and workmanship shall conform to Items 625 and 713, except as modified or supplemented herein or on the drawings, of the State of Ohio Department of Highways' Construction and Material Specifications dated January 1, 1971.

Reference shall be made to Standard Construction Drawings

The Contractor shall cooperate with the Cleveland Electric Illuminating Company whose address is:  
Cleveland Electric Illuminating Company  
Illuminating Building  
Public Square  
Cleveland, Ohio

mailing address  
Post Office Box 5000  
Cleveland, Ohio 44101

The Contractor will not be required to furnish or install the primary distribution lines, transformers, transformer poles, primary controllers, metering equipment or housings for the same. The Contractor shall provide connections to branch circuits and grounds as hereinafter specified.

The project has been designed on the basis of 5% maximum voltage drop permissible on branch circuits. The project will receive 480-volt controlled secondary service from C.E.I. Co. This project has been designed on the basis of 1.2 Ft. C. initial with a maximum uniformity ratio of 4.0 to 1.0.

**LIGHT POLE - 625.05 and 713.01**

Reference Letter	Light Pole		Foundation		Transformer Base Style	Foundation Size
	* Design Number	Sheet Size	Size	Bolt Circle Diameter		
A	A12BB39.0D	9"x5.80" x 32'-0"	1 1/4" $\phi$ Rect. x 42"	8"x8"	Med	4'x14' x7'-5"
B	AT15B41.7	9"x5.65" x 33'-6"	1" $\phi$ x 40"	15"	AFA	24"x 8'-0"
C	T15B41.7	9"x5.65" x 33'-6"	1" $\phi$ x 40"	15"	AFA	24"x 8'-0"
D	T15B36.7	8 1/2"x5.65" x 28'-6"	1" $\phi$ x 40"	15"	AFA	24"x 6'-0"
E	AT15B36.7	8 1/2"x5.65" x 28'-6"	1" $\phi$ x 40"	15"	AFA	24"x 6'-0"
F	AT15B34.2	9"x4.87" x 29'-6"	1" $\phi$ x 40"	15"	AFA	24"x 6'-0"
G	AT10B34.2	8"x3.87" x 29'-6"	1" $\phi$ x 40"	15"	AFA	24"x 6'-0"
H	A15B40	9"x5.65" x 33'-6"	1 1/4"x85" U-bolts	12 1/2"	None	Bridge
I	A15B35	9"x5.01" x 28'-6"	1 1/4"x85" U-bolts	12 1/2"	None	Bridge
J	A10B32.5	8"x3.87" x 29'-6"	1 1/4"x8 3/4" U-bolts	11"	None	Bridge
K	T25B36.7	9"x6.15" x 28'-6"	1" $\phi$ x 40"	15"	AT-A	24"x 8'-0"
L	T25B34.2	9"x6.3" x 27'-0"	1" $\phi$ x 40"	15"	AT-A	24"x 8'-0"
M	AT15B26.7	8"x4.92" x 22'-0"	1" $\phi$ x 40"	15"	AT-A	24"x 6'-0"
N	AT25B41.7	9 1/2"x6.15" x 33'-6"	1" $\phi$ x 40"	15"	AT-A	24"x 8'-0"

**ESTIMATED QUANTITIES**

An estimated quantity of "14 Each of 625 Markers" is provided in the lighting general summary for use as directed by the Engineer in providing ground surface indication of the location of underground circuits. The markers shall be located directly over the centerline of the cable or duct. It is intended that a marker shall be provided at a point midway between adjacent side-mounted light units where the distance between units exceeds 300 feet but does not exceed 450 feet, and at intervals of approximately 200 feet on all other circuit sections located outside of paved areas.

An estimated quantity of "120 lin. ft. of 605, 4-inch shallow pipe underdrains" is provided in the lighting general summary for use as directed by the Engineer in providing positive drainage for pull boxes in fill areas. It is intended that all pull boxes in these areas be provided with such drainage, provided the length of underdrain necessary to obtain a satisfactory outfall does not exceed 20 feet approximately. A perforated PVC pipe or conduit material approved by the Engineer may be used in the construction of this item.

**STANDARD CONSTRUCTION DRAWING HL-3**

Pole base details shown on this drawing are essentially for galvanized steel poles. For aluminum designs, or other permitted steel material design, variations from these details will be acceptable, as approved by the Engineer.

**STANDARD CONSTRUCTION DRAWING HL-15**

Weephole diameters of 1/8 inch shown on this drawing shall be increased to 1/4 inch.

**LIGHT POLE FOUNDATIONS - 625.06**

Where 3" crossover conduit terminates in a light pole foundation it shall continue into the foundation as a 3" conduit. The light pole concrete foundations shall be constructed to the depth as shown on the detail sheets unless so directed by the Engineer. If any caving is encountered, the Contractor shall drive a steel casing, of sufficient weight and strength, and remove the soil from within by an auger. The steel casing may be reused if pulling is coordinated with the pouring of concrete.

**LUMINAIRES - 625.07 and 713.11**

400-Watt luminaires shall have dual rated 240/480-volt (120/240-volt for C.E.I. servicing), integral, regulator ballasts, Type II-M-C or III-M-C distribution, and shall be General Electric M400, Westinghouse OV-25, McGraw-Edison "Unistyle", or equal approved by the Engineer. 700-Watt luminaires shall have single rated 480-volt, 700-watt, integral regulator ballasts, Type III-M-C distribution and shall be General Electric M-1000, Westinghouse OV-50, McGraw-Edison "Unistyle" or equal approved by the Engineer.

**UNDERDECK LUMINAIRES - 625.07 - 713.13**

250-Watt underdeck luminaires shall have dual rated 240/480V (120/240V for C.E.I. integral, regulator ballasts and shall be Holophane "Underpass Wallpack", Westinghouse, McGraw-Edison underpass unit approved by the Engineer, and shall be furnished with an integral fuse holder and fuse.

**LAMPS - 625.08 and 713.14**

Mercury lamps shall be General Electric's "Bonus Line", Westinghouse's "Life-guard", Sylvania's "Rough Service", or equal approved by the Engineer.

**CONDUIT, 3-INCH, 713.04 TYPE III, JACKED UNDER PAVEMENT, AS PER PLAN**

This item shall consist of installing conduit of the 3" diameter size under the existing pavement and contiguous shoulders by an approved method such as "drilling" or "jacking".

The Contractor shall place the conduit with the least amount of disturbance to the existing pavement, subbase, berm pavement, or shoulders of the roadway. All push pits or any necessary excavations shall be backfilled and restored in accordance with 625.01.

**CONDUIT - 625.13 and 713.04**

Expansion fittings for conduit in structures shall be OZ Type AX, Spring City Type AF, Appleton Type XJ, or equal approved by the Engineer, and shall be included for payment with conduit in structures.

**SERVICE TO UNDERDECK LIGHTING, AS PER PLAN - 625**

This item shall consist of providing complete electrical service, except for luminaires, lamps and grounding systems for underdeck lighting system on Bridge No. CUY-480-2154 over Broadway and Bridge No. CUY-480-2169 over I-480. The installation work shall include conduits, mounting all items required to be mounted, fittings, junction boxes, cables, and all incidentals necessary to complete, ready for use, the service as detailed.

The underdeck lighting service for Bridge C over Relocated McCracken Road, shall include installation of the underdeck units on 120 V. system, pull box, conduit, weatherhead, conductors from pull box up to connection on C.E.I. pole and all incidentals necessary to complete, ready for use, the service as detailed.

The underdeck lighting service for Bridge A and B over Relocated McCracken Road shall be installed as detailed in plan on 120 V. system, and shall include all items from pull box to lighting units, mounting conduit, conductors, fittings and all incidentals necessary to complete, ready for use.

The lump sum price bid for "Item 625 - "Service to Underdeck Lighting", as per plan, shall include payment for all equipment, labor, and materials necessary to complete the work as specified. Component parts not specifically mentioned but required for satisfactory operation of this item shall be furnished and considered paid for as part of this item.

Payment for the 120 Volt service on Relocated McCracken Road shall be included in the lump sum price bid for "Service to Underdeck Lighting Bridge C".

**HIGH VOLTAGE DIRECT CURRENT TESTS**

A High Voltage Test, as described in Supplemental Specification 839, shall be performed on all distribution cable and duct cable systems to be installed on this project, after all construction is completed, including guardrail, fences, delineator posts, signs, etc.

Basis of payment for this testing item shall be at the contract lump price bid, which shall include all labor, recording the data from control center to the disconnect switch at each sign, materials and equipment required to complete this item of work.

**CONTROL CENTERS - 625.19 and 713.20**

The Contractor shall furnish and install all control centers, located as per the plans, to serve the roadway and sign circuits. The control centers shall include the control equipment, located and mounted as shown on the Lighting Layout and Control Center Detail Sheets, and as specified below. The Contractor shall install the secondary distribution panels in the Control Center enclosure furnished and installed by the Contractor for Control Centers "BRA", "BRO", "RRM" and "RRP". The Contractor shall provide all incidentals required for the 480-volt, secondary, branch circuits for roadway and sign lighting at the locations where indicated on the plans.

Each switch enclosure shall be furnished with one padlock. Padlocks shall have a brass body and wrought iron shackle equal to Russwin No. 2882 KA or Master No. 4KA or approved equal. Padlocks shall be all keyed alike with master key 3476.

**POLYVINYL CHLORIDE PLASTIC CONDUIT**

1. Scope. This specification covers polyvinyl chloride conduit for encasement in concrete and shall be of the size and type specified.

2. Detail Requirements. Conduit furnished under this specification shall comply with one of the following:

(a) Conduit conforming to NEMA Standards Publication No. TC 1 with the exception that conduit and conduit fittings composed of styrene polymers or copolymers shall not be acceptable and (2) the physical requirements TC1-3.03 and TC1-3.04, and the test methods TC1-4.05 and TC1-4.06 shall not be required.

(b) Conduit conforming to NEMA Standards Publication No. TC 6 with the exception that conduit and conduit fittings composed of acrylonitrile-butadiene-styrene (ABS) shall not be acceptable.

(c) Conduit conforming to the requirements of (a), above, with the additional exceptions that where 4 inch nominal size conduit is to be encased in concrete it shall be permissible to use conduit having a minimum wall thickness of 0.075 inch and an outside diameter of 4.202 to 4.360 inches instead of those specified in NEMA Standards Publication No. TC 1.

For any given installation the mixed use of the conduits described in (a) and (b) shall be prohibited.

When the conduit described in (c) is used, all such conduit used in a given installation shall be the product of a single manufacturer.

**CABLE CONNECTORS AND CONNECTOR KITS 625.17 - 713.15**

In lieu of the fuse amperage rating shown elsewhere, the following shall apply to this project:

No. of Lamps Served	Lamp Rating (Watts)	Fuse Rating (Amps)
1	250	10
1	400	10
1	700	10
2	700	15

SCALE: No Scale HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE M.A.C. DATE 6-12-72 CONSULTING ENGINEERS  
TRCB MAC DATE 6-12-72  
CRD GJC DATE 9-5-72 KANSAS CITY CLEVELAND NEW YORK

REV. 1-9-74  
REV. 12-7-73

**LIGHTING NOTES**

# GENERAL SUMMARY LIGHTING QUANTITIES

Quantity Calculations  
 Made By LWL Date 6-12-72  
 Checked By JRK Date 7-7-72  
**CUYAHOGA COUNTY**  
 CUY-480-21.40  
 TYPE CODE 7221

## LIGHTING NOTES-CONTINUED

### LIGHT POLE ANCHOR BOLTS FOR BRIDGES AND RETAINING WALLS - 713.01

Anchor bolts for mounting light poles on bridges and retaining walls shall conform to the requirements of 713.01 and details shown on the plans and standard drawings or the approved shop drawings, for the respective poles to be placed thereon. Payment shall be made at the unit price bid for each set of bolts of the size required and necessary to install one pole, and this payment shall constitute full compensation for furnishing and placing the bolts.

### ELECTRICAL SERVICE FOR ILLUMINATED SIGNS

The pay items in the Lighting General Summary include the pull box, adjacent to each lighted sign, and the connector kits, in the pull box, of type indicated on the plan sheets. Quantities for electrical service from the connector kits in the pull box to the sign are included in the Traffic Control General Summary.

\* Normal Participation, these quantities are included in Total column under Roadway Normal Participation

LINE NO.	STRUCTURES											ROADWAY						GRAND TOTAL	ITEM	UNIT	DESCRIPTION	REFERENCE LETTER	LINE NO.		
	BRIDGE "C"		BRIDGE "B"		BRIDGE "A"		CUY-480-2169	CUY-480-2154	CUY-480-2140	100% STATE PARTICIPATION		NORMAL PARTICIPATION				TOTAL	SHEET NO.								
	274	271	274	271	274	271	271	271	270	270	275	274	I	274	273	272	271	270	III						
1														4	4	5	2	15	15	625	Each	Light Pole Design No. A12BB39.0 D	A	1	
2															3		1	4	4	625	Each	Light Pole Design No. A715B41.7	B	2	
3														2		2		4	4	625	Each	Light Pole Design No. T15B41.7	C	3	
4															3	2		5	5	625	Each	Light Pole Design No. T15B36.7	D	4	
5										1	7	8	15	3	6			24	32	625	Each	Light Pole Design No. A715B36.7	E	5	
6										1		1				2		2	3	625	Each	Light Pole Design No. A715B34.2	F	6	
7														4	2			6	6	625	Each	Light Pole Design No. A710B34.2	G	7	
8																		5	5	625	Each	Light Pole Design No. A15B40, Bridge Mounted	H	8	
9										2								5	5	625	Each	Light Pole Design No. A15B35, Bridge Mounted	I	9	
10																		1	1	625	Each	Light Pole Design No. A10B32.5, Bridge Mounted	J	10	
11																		2	3	625	Each	Light Pole Design No. T25B36.7	K	11	
12																		1	1	625	Each	Light Pole Design No. T25B34.2	L	12	
13																		1	1	625	Each	Light Pole Design No. AT15B26.7	M	13	
14																		1	1	625	Each	Light Pole Design No. AT25B41.7	N	14	
15										1		1							1	625	Each	Bracket Arm 10'-0" Truss		15	
16										1		1							1	625	Each	Bracket Arm 15'-0" Truss		16	
17														4	4	5	2	15	15	625	Each	Special 14 Root Concrete Barrier Section for Light Pole Foundation		17	
18										1	1	1	1	2	4	4	1	12	13	625	Each	Light Pole Foundation 24"φ x 8'-0"		18	
19										2	7	9	15	3	13	7		38	47	625	Each	Light Pole Foundation 24"φ x 6'-0"		19	
20														1	10	11	12	5	44	44	625	Each	Luminaire, Type III, M-C, 700W, 713.11, 480V.		20
21																		23	35	625	Each	Luminaire, Type III, M-C, 400W, 713.11, 480V.		21	
22																		3	3	625	Each	Luminaire, Type III, M-C, 400W, 713.11, 120V.		22	
23														2	3	10	4		21	21	625	Each	Luminaire, Type II, M-C, 400W, 713.11, 480V.		23
24																		19	19	625	Each	Luminaire, Underdeck, 250W, 713.13, 480V.		24	
25																		8	8	625	Each	Luminaire, Underdeck, 250W, 713.13, 120V.		25	
26																		44	44	625	Ea.	Lamp, 700Watt, Clear Mercury, 713.14		26	
27																		47	59	625	Ea.	Lamp, 400Watt, Clear Mercury, 713.14		27	
28																		27	27	625	Ea.	Lamp, 250Watt, Clear Mercury, 713.14		28	
29																		4	4	625	Ea.	Glare Shield, 700 W, 713.11, as per plan		29	
30																		3	3	625	Ea.	Glare Shield, 400W, 713.11, as per plan		30	
31																				625	Ea.	Ground Rod		31	
32																		19	6	625	Ea.	Pull Box, 18-inch Circular, 713.09		32	
33																				625	Lin.Ft.	Trench, 24-inch Deep		33	
34																		100	100	625	Lin.Ft.	Conduit 2-inch, 713.04, Concrete Encased		34	
35																		390	430	625	Lin.Ft.	Conduit, 3-inch, 713.04, As per Plan		35	
36																		65	65	625	Lin.Ft.	Conduit, 3-inch, 713.04, Jacked Under Pav't as per Plan		36	
37																				625	Lin.Ft.	Conduit, 2-inch, 713.04, As per Plan		37	
38																				625	Lin.Ft.	4-inch Shallow Pipe Underdrains		38	
39																				625	Lin.Ft.	1 No.4AWG,600V. Distribution Cable		39	
40																				625	Lin.Ft.	1 No.10AWG,600V.Pole and Bracket Cable Type RHH-RHW		40	
41																				625	Lin.Ft.	1/2"φ Duct-Cable, 2-1/2 No.4 AWG,600V.Cables		41	
42																				625	Ea.	Markers		42	
43																				625	Ea.	Connector Kit, Type I As Per Plan		43	
44																				625	Ea.	Connector Kit, Type II As Per Plan		44	
45																				625	Ea.	Connector Kit, Type III As Per Plan		45	
46																				625	Ea.	Connector Kit, Type VIII-B As Per Plan		46	
47																				625	Lu.	Control Center "BRA" and "BRO", 713.20 As Per Plan		47	
48																				625	Lu.	Control Center "RMR" and "ROR", 713.20 As Per Plan		48	
49																				625	Ea.	Special Median Barrier Pull Box, as per plan		49	
50																				625	Ea.	Junction Box, 18"x8"x6"		50	
51																				625	Lu.	Service to Underdeck Lighting, Br. No.CUY-480-2154		51	
52																				625	Lu.	Service to Underdeck Lighting, Br.No.CUY-480-2169		52	
53																				625	Lu.	Service to Underdeck Lighting, Bridge A.		53	
54																				625	Lu.	Service to Underdeck Lighting, Bridge B.		54	
55																				625	Lu.	Service to Underdeck Lighting, Bridge C.		55	
56																				625	Lu.	High Voltage Test		56	
57																				625	Set	Light Pole Anchor Bolts		57	
58																				625	Lu.	Struct. Grounding System, Br.No.CUY-480-2140		58	
59																				625	Lu.	Struct. Grounding System, Br.No.CUY-480-2154		59	
60																				625	Lu.	Struct. Grounding System, Br.No.CUY-480-2169		60	
61																				625	Lu.	Struct. Grounding System - Bridge "A"		61	
62																				625	Lu.	Struct. Grounding System - Bridge "B"		62	
63																				625	Lu.	Struct. Grounding System - Bridge "C"		63	
64																								64	
65																								65	









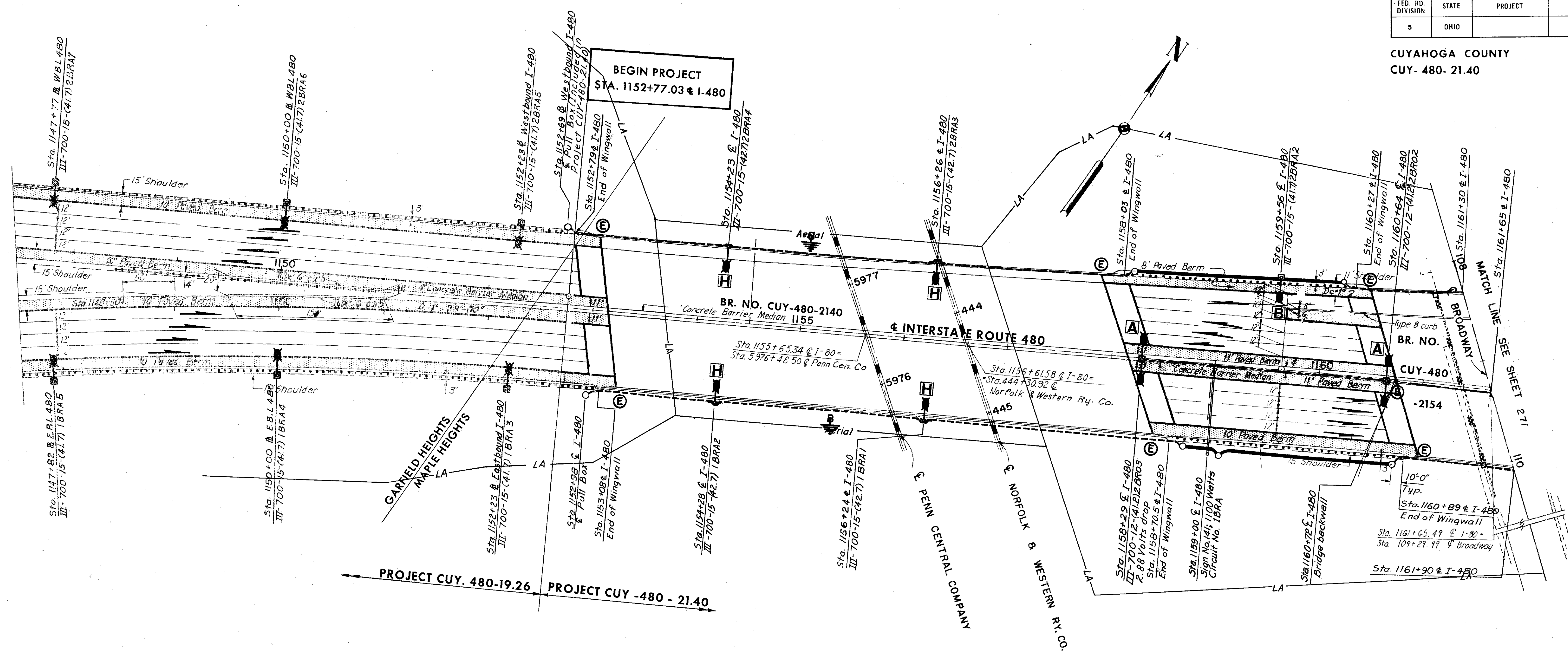








CUYAHOGA COUNTY  
CUY-480-21.40



**LIGHTING KEY**

- Typical Concrete Pole Base; with pole, on Transformer base.
- Typical Pole Base on Structure; with pole
- Typical Pole Base on Barrier Median; with pole
- Typical Lighting Unit; 1000 Watt luminaire with clear, 700 Watt, mercury vapor lamp, ANSI-IES Type III, with bracket arm, on pole base of Type shown.
- Typical Lighting Unit; 400 Watt luminaire with clear, 400 Watt, mercury vapor lamp, ANSI-IES Type III, with bracket arm, on pole base of Type shown.
- Typical Lighting Unit; 400 Watt luminaire with clear, 400 Watt, mercury vapor lamp, ANSI-IES Type II, with bracket arm, on pole base of Type shown.
- Typical Underdeck Lighting Unit; units installed on pier caps, 480 Volts, Type A mounting.
- Typical Underdeck Lighting Unit; units installed between girders, 480 Volts, Type B mounting.
- Typical Underdeck Lighting Unit; units installed between girders, 120 Volts, Type C mounting.

- Typical Light Pole Reference Letter, for type and size see "Lighting Notes".
- Glare Shield
- Duct Cable, directly buried, 24-inches deep.
- Circuit Cables in 2-inch diam. 713.04 Type III, conduit buried in the ground (or in Structures to the nearest pull box off structures).
- Circuit Cables in 3-inch diam. 713.04 Type III, conduit under paved areas.
- Circuit Cables in the 4-inch raceway void in the barrier median.
- Conduit in Structures, (size as per plan).
- Circuit Cables, pole and bracket cable, in 1 1/4-inch diam. 713.04 Type III, conduit in structures for underpass lighting units.

- Pull Box, 18-inch diameter.
- Junction Box, in structures, 18" x 8" x 6"
- Pull Box in barrier median.
- Control Center
- Typical Light Pole Identification; II is ANSI-IES Type; 400 is the lamp wattage; 10 is the bracket length; (34.2) is the luminaire mounting height; 1 is the circuit number, RMT is the control center, and 3 is the pole number in the circuit.
- Bridge Ground
- Expansion Joint in the conduit in Structures.
- Conduit Marker

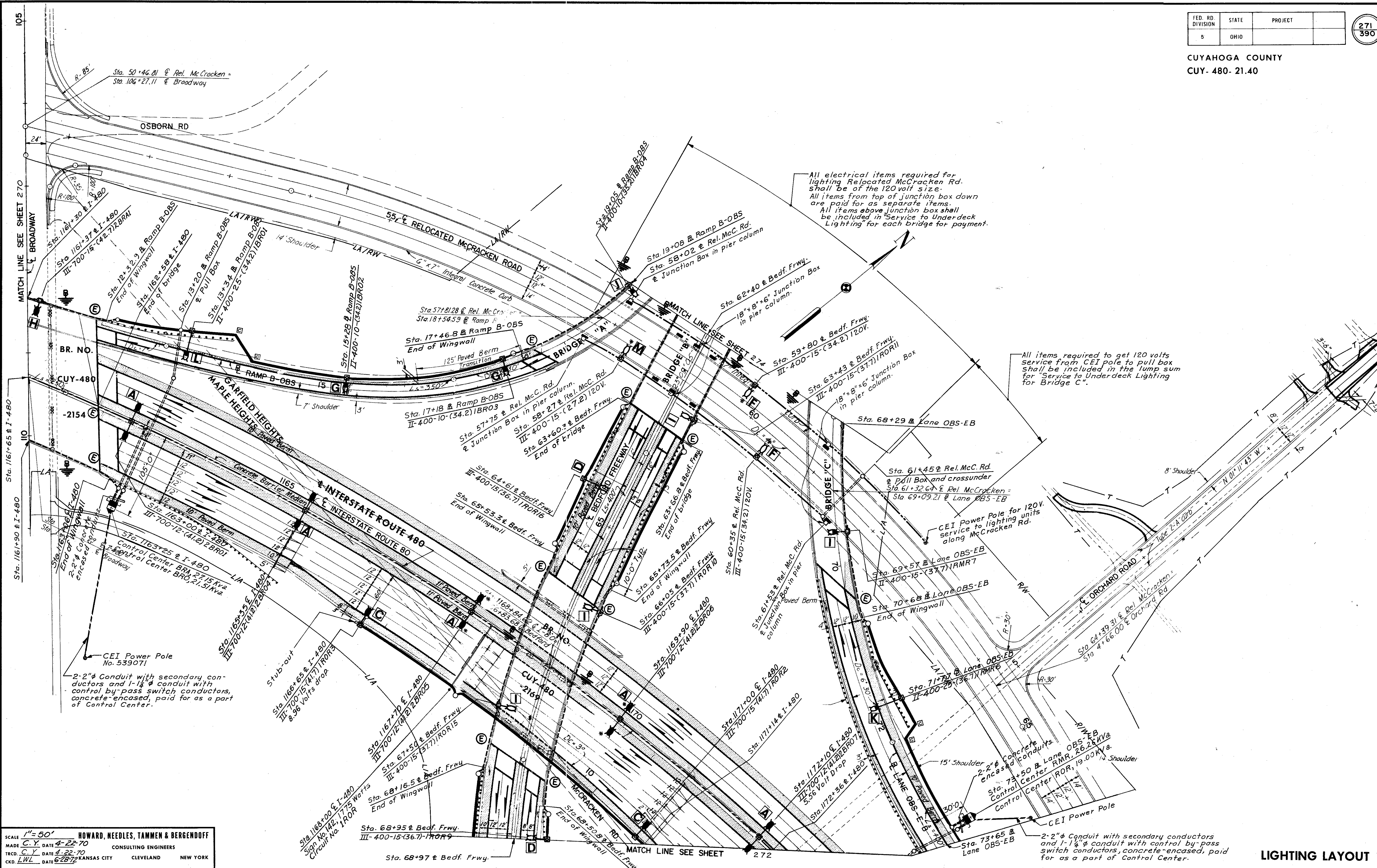
*Note: The Bridge Grounds and Expansion Joints indicated on the plans should not be considered to be accurate in location or correct in quantity.*

SCALE 1" = 50'  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 MADE LWL DATE 6-2-72 CONSULTING ENGINEERS  
 TRCD LWL DATE 6-2-72  
 CKD. GJC DATE 9-7-72 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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All electrical items required for lighting Relocated McCracken Rd. shall be of the 120 volt size. All items from top of junction box down are paid for as separate items. All items above junction box shall be included in "Service to Underdeck Lighting" for each bridge for payment.

All items required to get 120 volts service from CEI pole to pull box shall be included in the lump sum for "Service to Underdeck Lighting for Bridge C".

2-2" Conduit with secondary conductors and 1-1/2" conduit with control by-pass switch conductors, concrete-encased, paid for as a part of Control Center.

2-2" Conduit with secondary conductors and 1-1/2" conduit with control by-pass switch conductors, concrete-encased, paid for as a part of Control Center.

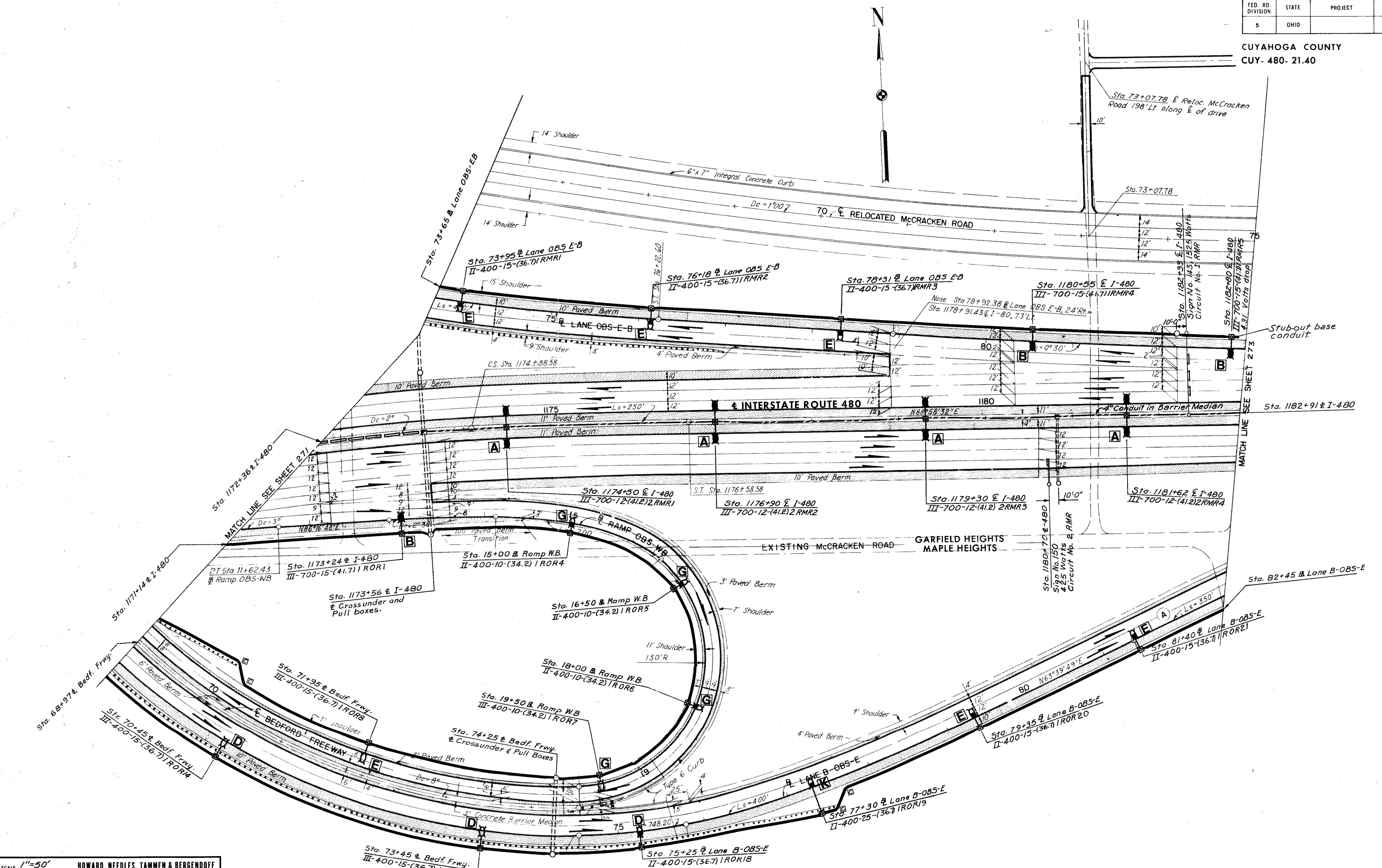
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 CKD L.W.L. DATE 6-28-72  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT
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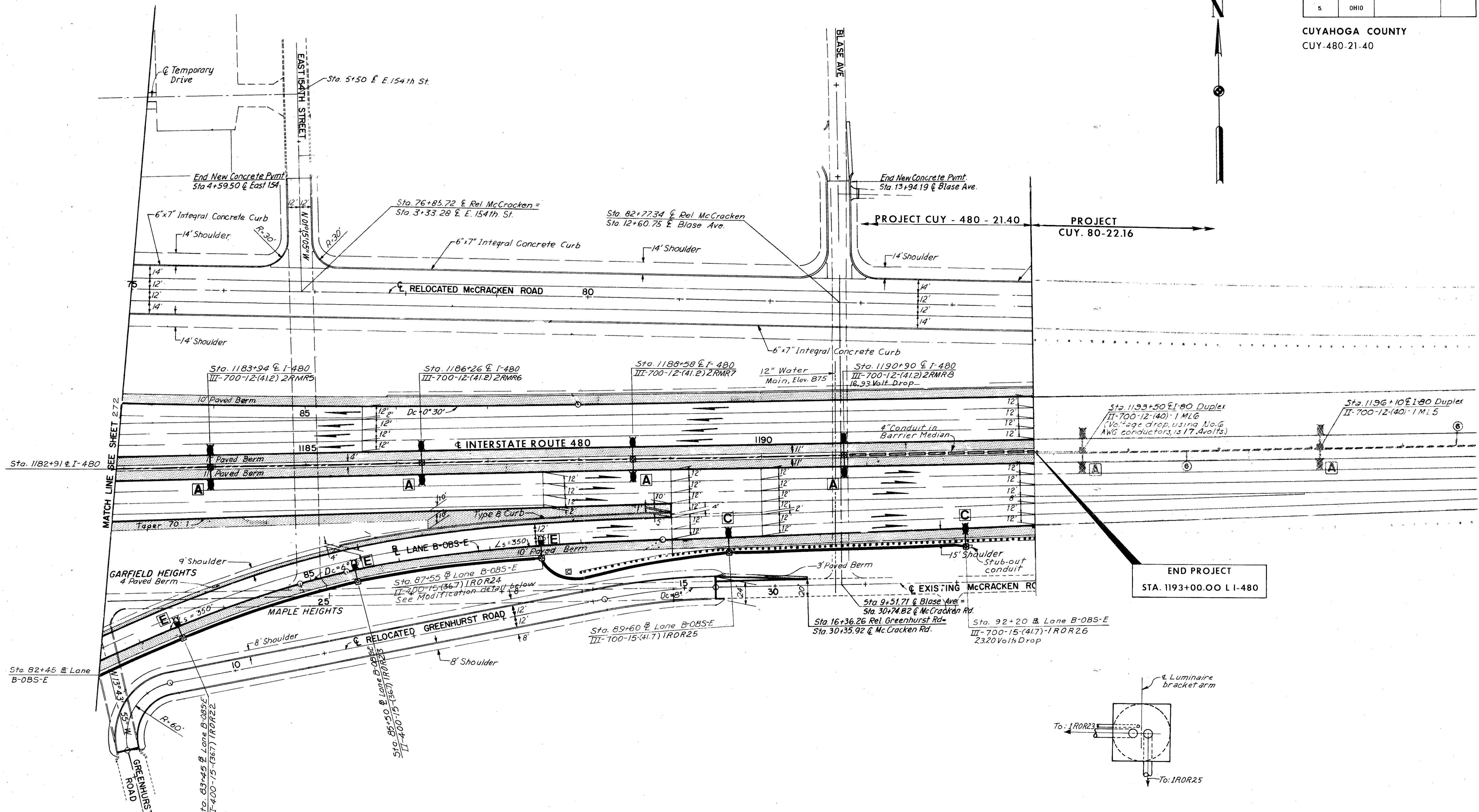
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 TRCD. C.Y. DATE 4-17-70  
 CKD. LWL DATE 6-27-72  
**HOWARD, NEEDLES, TAMMEN & BERGENDOFF**  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

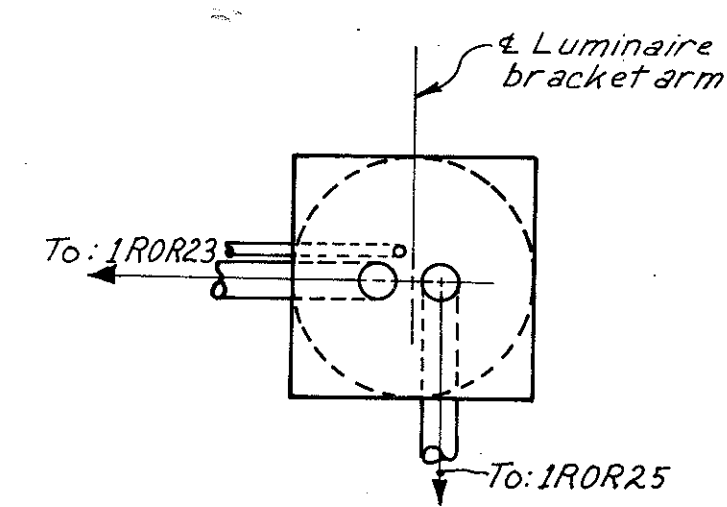
FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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CUYAHOGA COUNTY  
CUY. 480-21-40



END PROJECT  
STA. 1193+00.00 I-480



MODIFICATION OF POLE FOUNDATION  
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No Scale

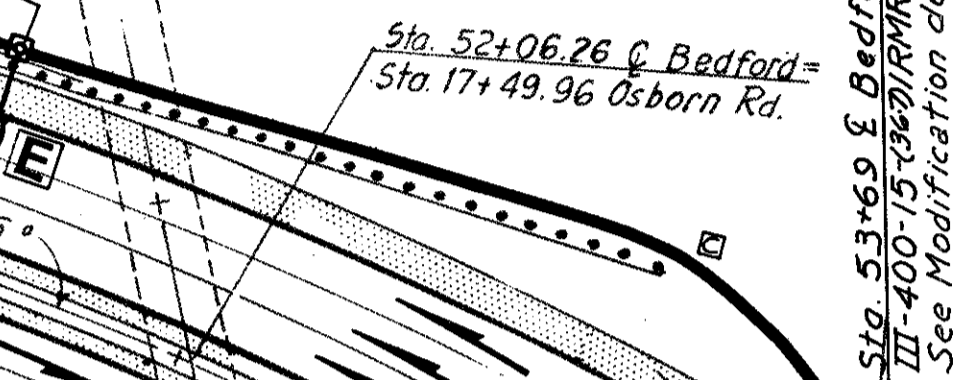
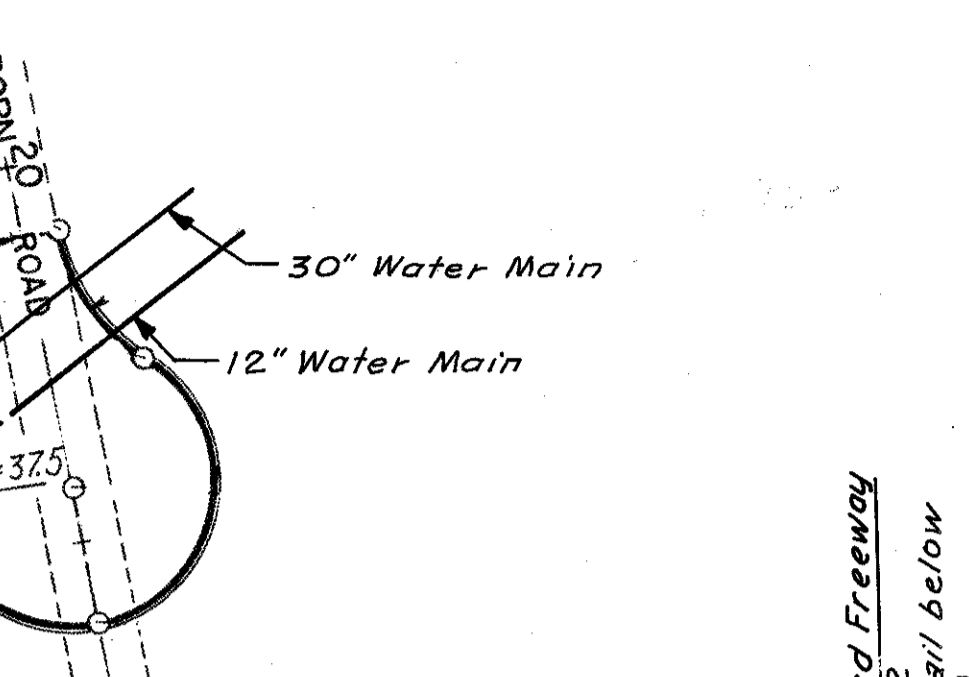
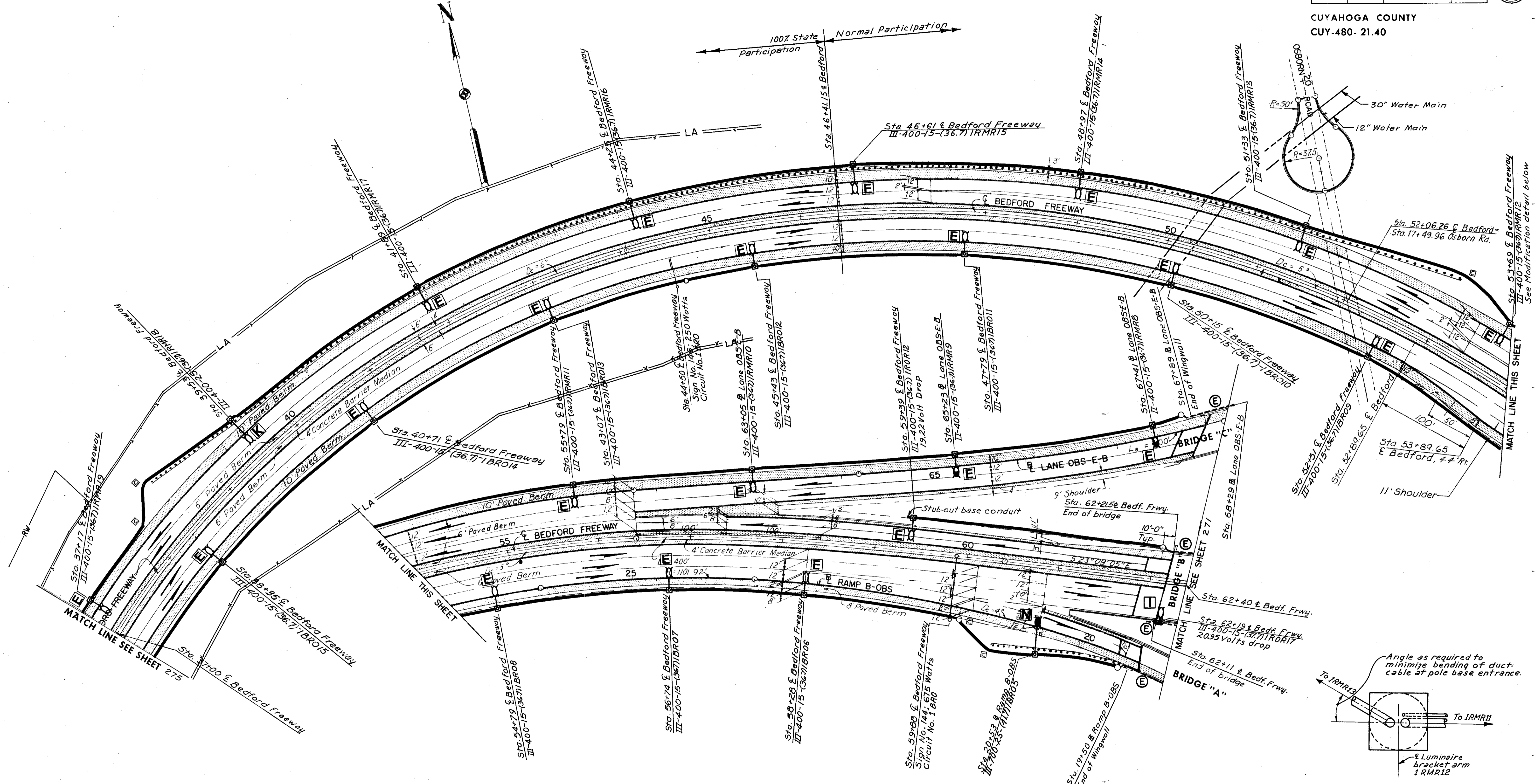
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HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE C.Y. DATE 4-16-70 CONSULTING ENGINEERS  
TRCD C.Y. DATE 4-16-70  
CKD LWL DATE 6-26-72 KANSAS CITY CLEVELAND NEW YORK



FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

274  
390

CUYAHOGA COUNTY  
CUY-480- 21.40



**MODIFICATION OF POLE FOUNDATION**  
**STA. 53+69 & BEDFORD FREEWAY**  
No Scale

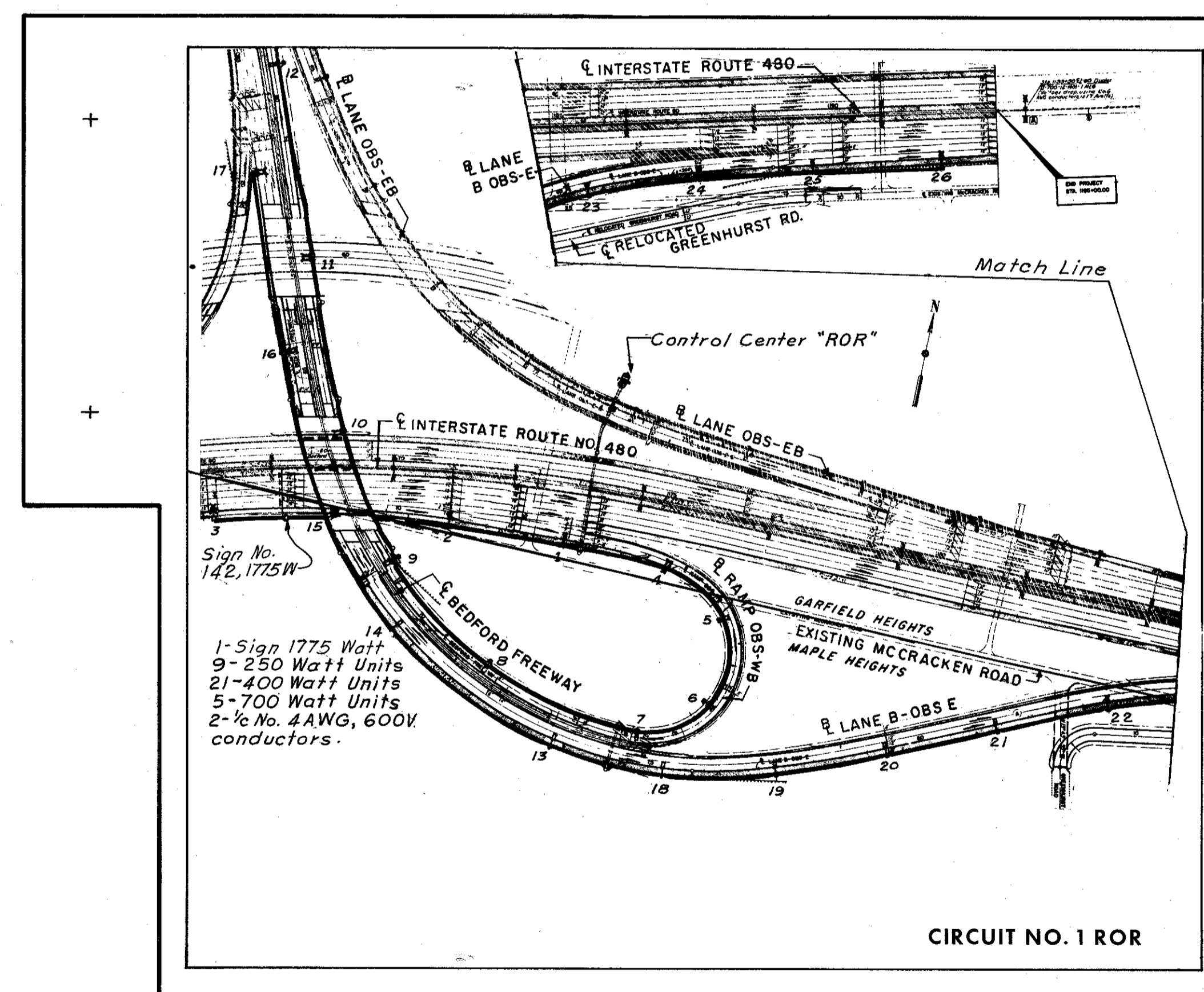
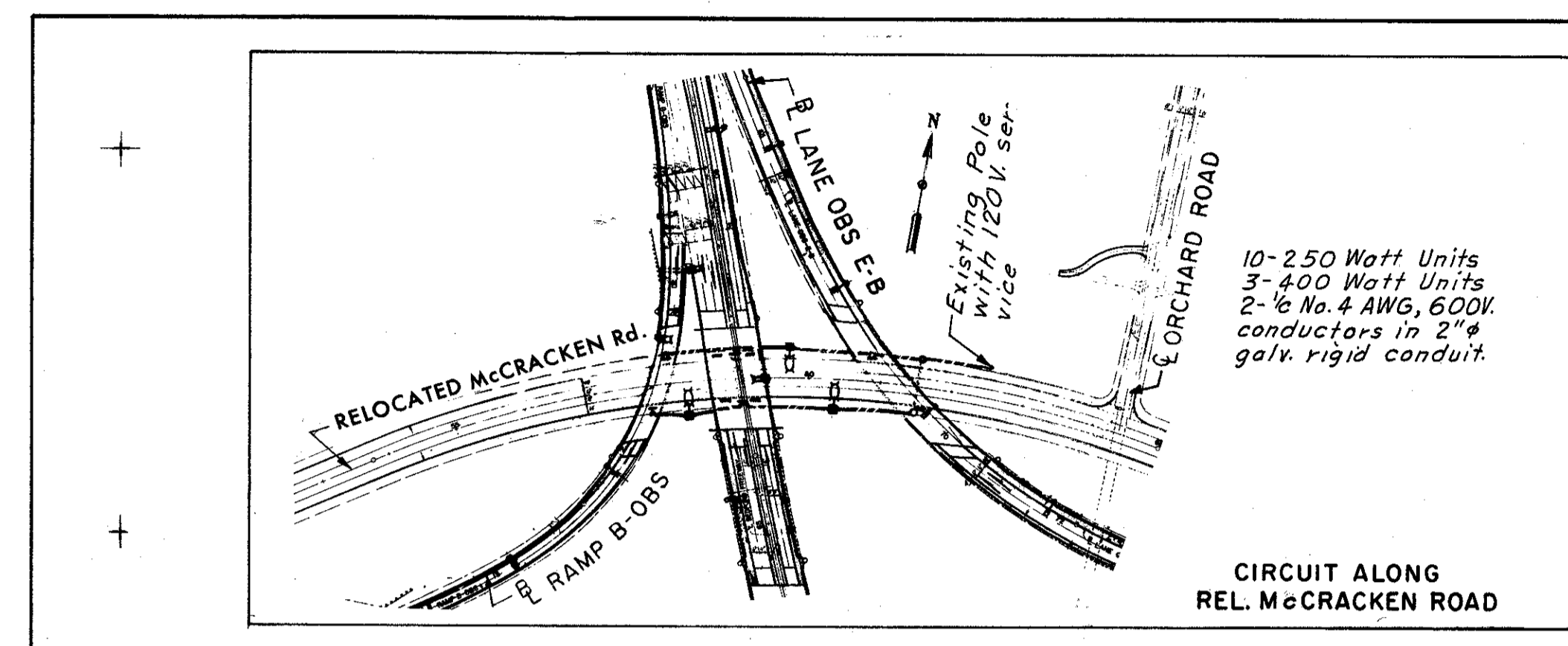
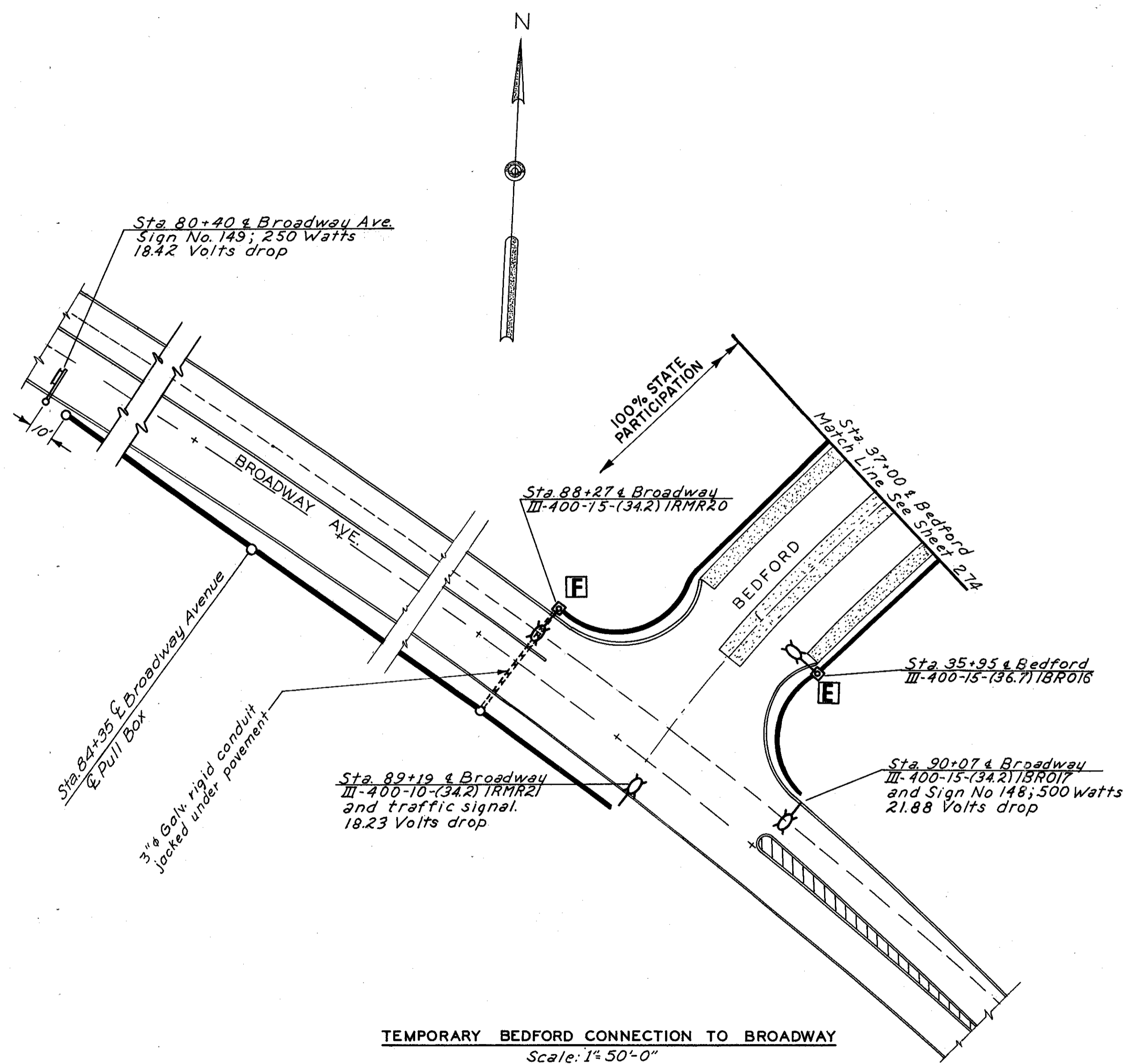
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HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE C.Y. DATE 4-23-70 CONSULTING ENGINEERS  
TRCD. C.Y. DATE 4-23-70  
CKD. LWL DATE 5-16-70 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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CUYAHOGA COUNTY  
CUY - 480 - 21.40



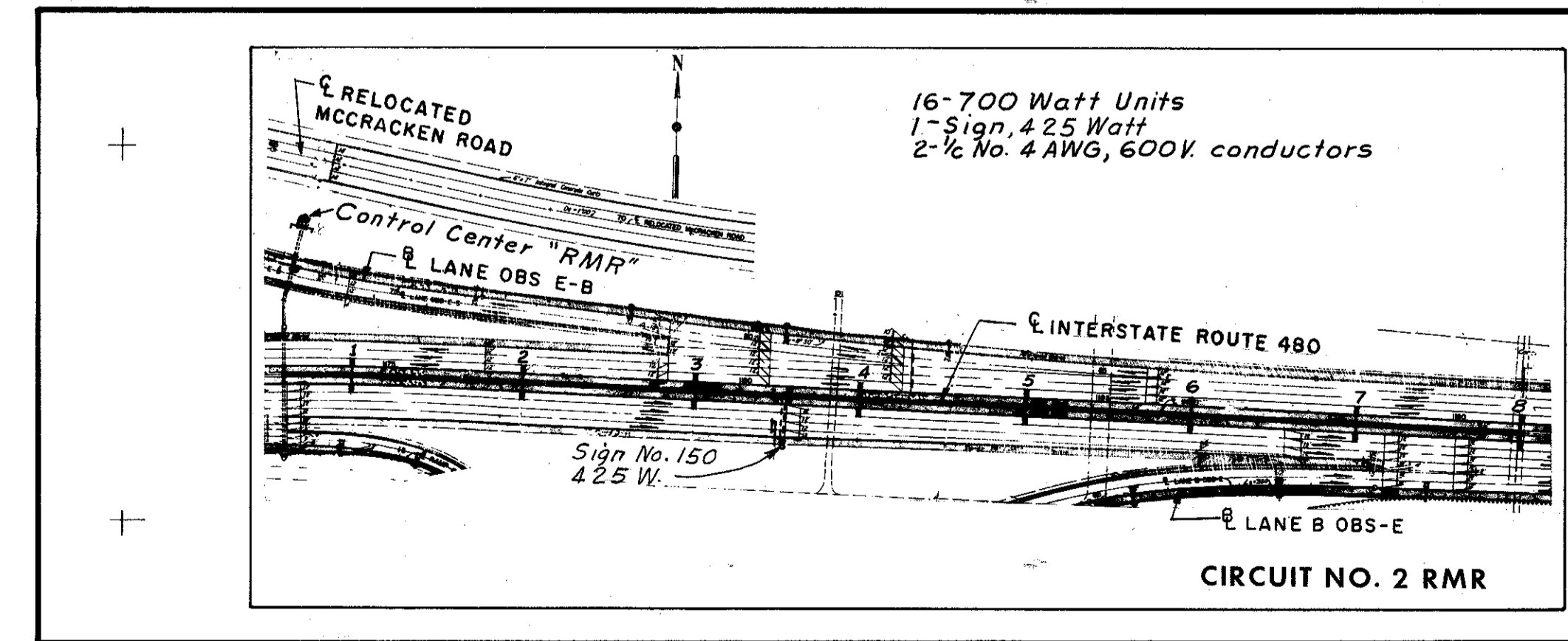
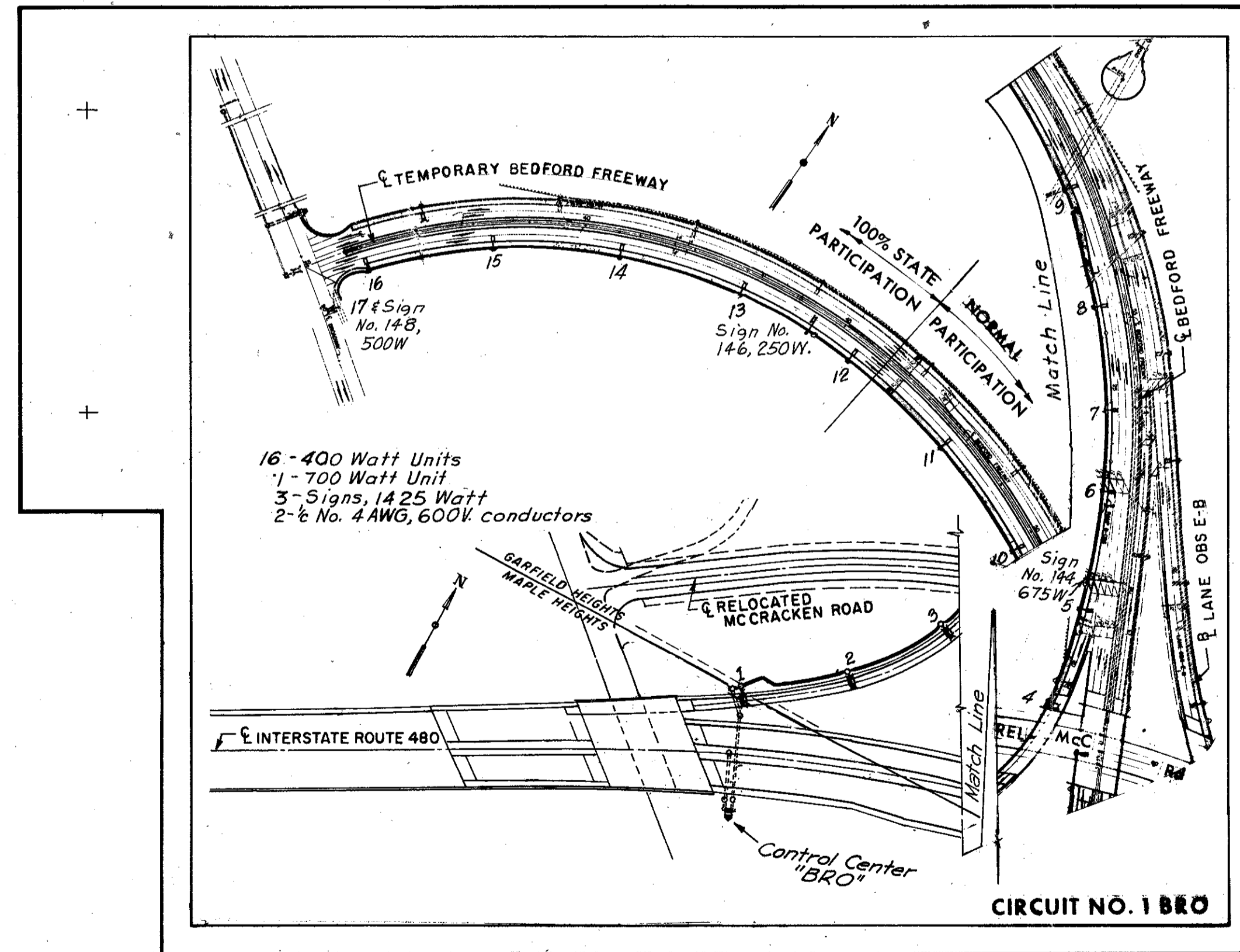
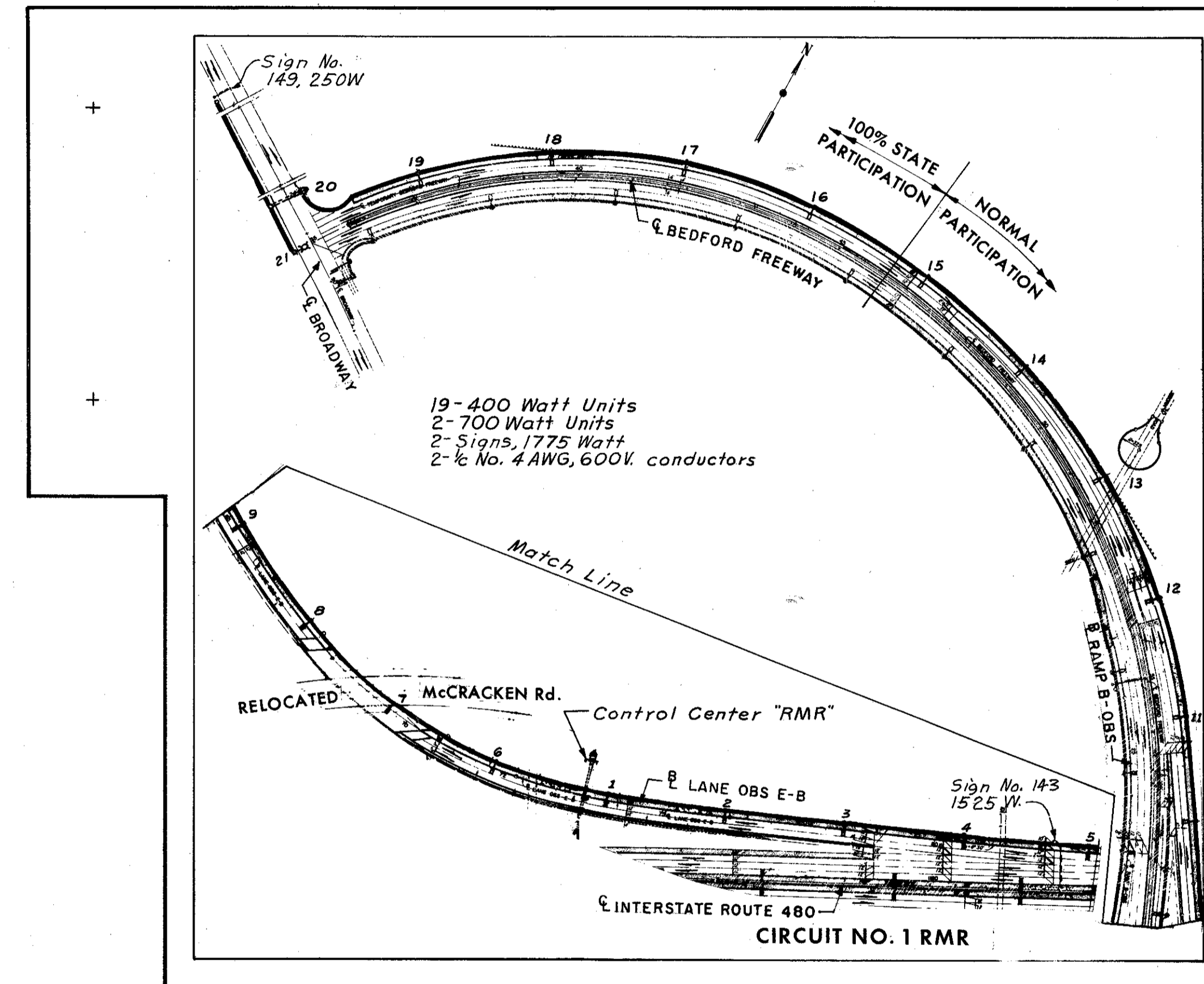
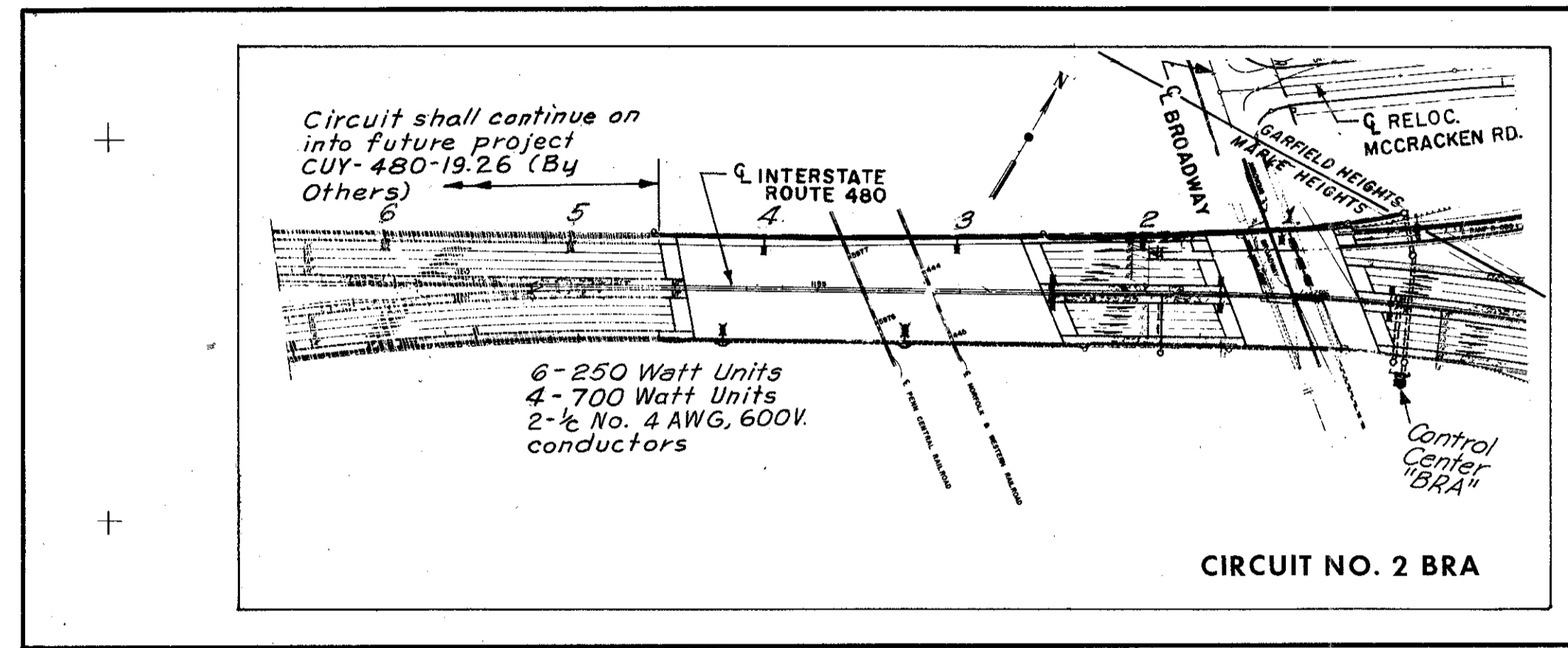
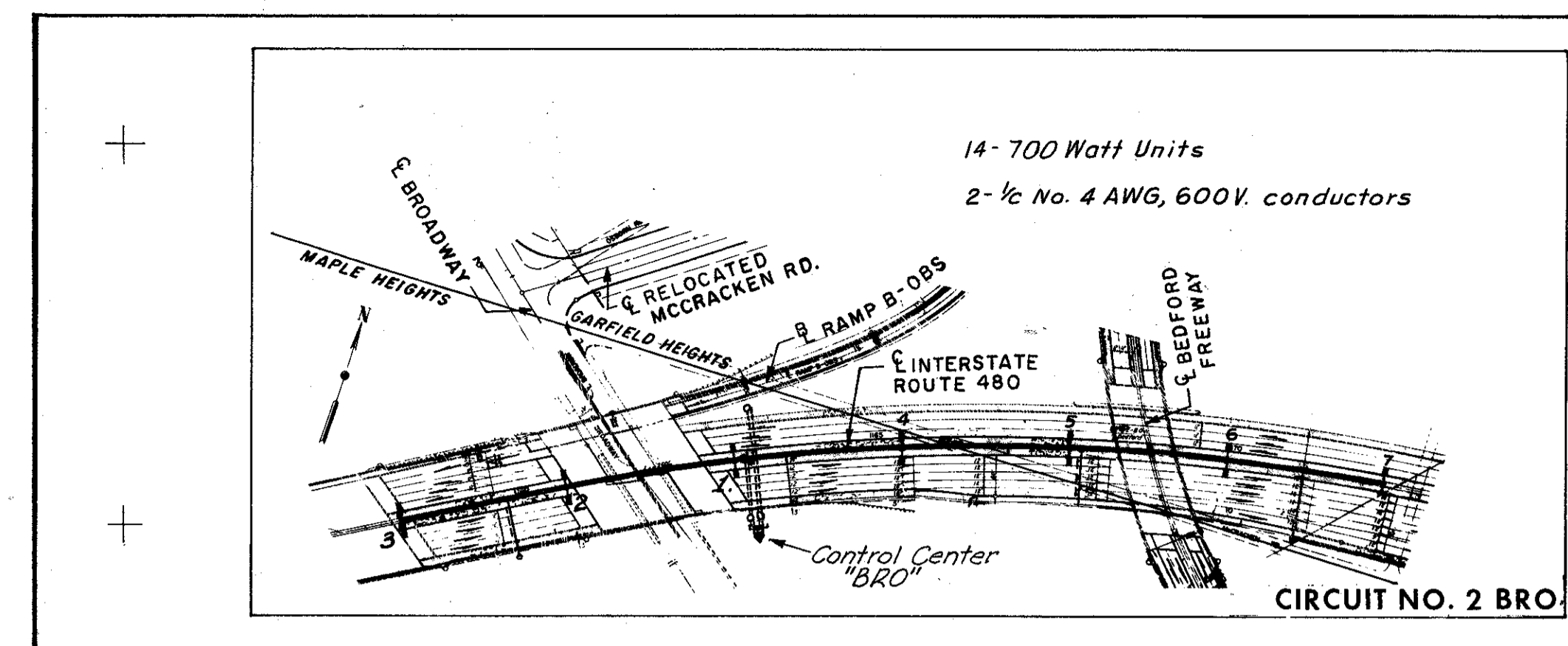
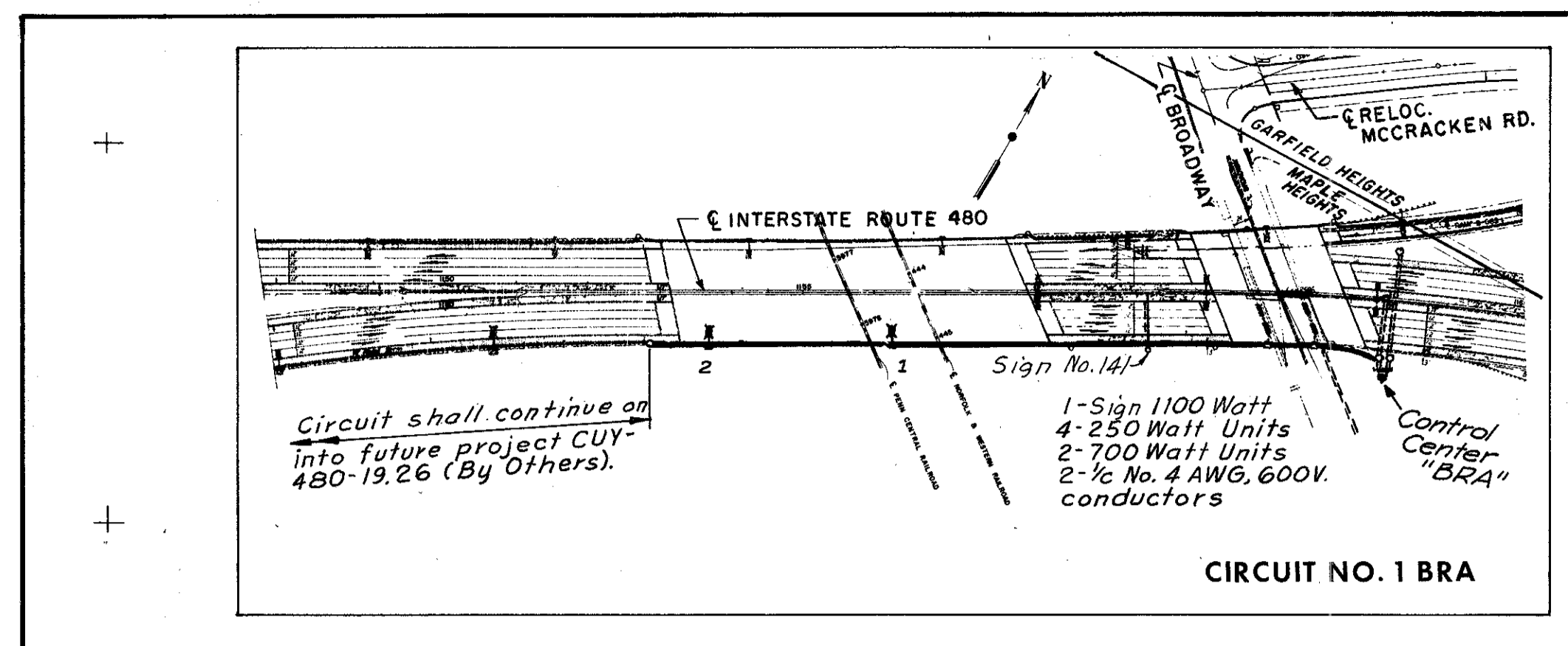
SCALE 1" = 50'  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE LWL DATE 6-18-72 CONSULTING ENGINEERS  
TRCD LWL DATE 6-18-72  
CKD GJC DATE 9-6-72 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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CUYAHOGA COUNTY  
CUY- 480- 21.40



SCALE 1" = 200'  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
MADE LWL DATE 6-15-72 CONSULTING ENGINEERS  
TRCD. LWL DATE 6-15-72  
CKD. GJC DATE 9-7-72 KANSAS CITY CLEVELAND NEW YORK

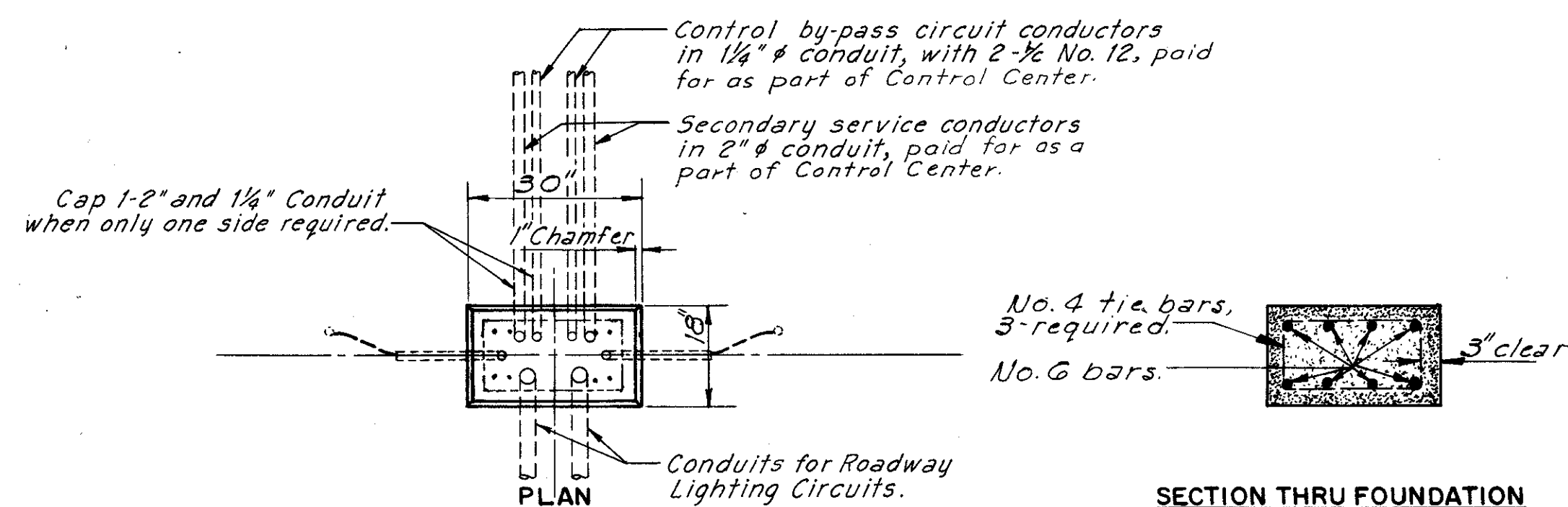
CUYAHOGA COUNTY  
CUY. 480-21.40

### CONTROL CENTER DATA

CONTROL CENTER	LOCATION		CONNECTED LOAD KVA	SERVICE CONDUCTORS SIZE	SAFETY SWITCH AMP	CIRCUIT NO.	FIXTURE				CIRCUIT CONDUCTORS SIZE	CIRCUIT FUSE AMP
	STA.	SIDE					700 WATTS	400 WATTS	250 WATTS	SIGN WATTS		
BRA	1163+25 & I480	105'-0" Rt.	27.15*	2-1/2 No. 4	60	1BRA	2		4	1100	2-1/2 No. 4	40
						2BRA	4		6		2-1/2 No. 4	40
BRO			21.51	2-1/2 No. 4	60	1BRO	1	16		1425	2-1/2 No. 4	30
						2BRO	14				2-1/2 No. 4	30
RMR	73+50 & Lane OBS-EB	55'-0" Lt.	26.26	2-1/2 No. 4	60	1RMR	2	19		1775	2-1/2 No. 4	40
						2RMR	16			425	2-1/2 No. 4	40
ROR			19.00	2-1/2 No. 4	60	1ROR	5	21	9	1775	2-1/2 No. 4	50

\*Note: Load shown for Circuit "BRA" is ultimate connected load. Only luminaires shown are installed in this contract, remainder of load is utilized in adjacent contract

Note: Safety switch shall be equal to Square D Company's Catalog No. W999FA 231, Columbus Electric Works Catalog No. CEW10ISS 4660



Notes: See "Lighting Layout" sheets for direction and placement of conduits out of foundation. Spacing and placement of anchor bolts in foundation is dependent upon the enclosure manufacturer's dimensions. Enclosure dimensions are inside measurements.

All conduits shall conform to the requirements of Section 713.04 of the Ohio Construction and Material Specifications and shall be Type III.

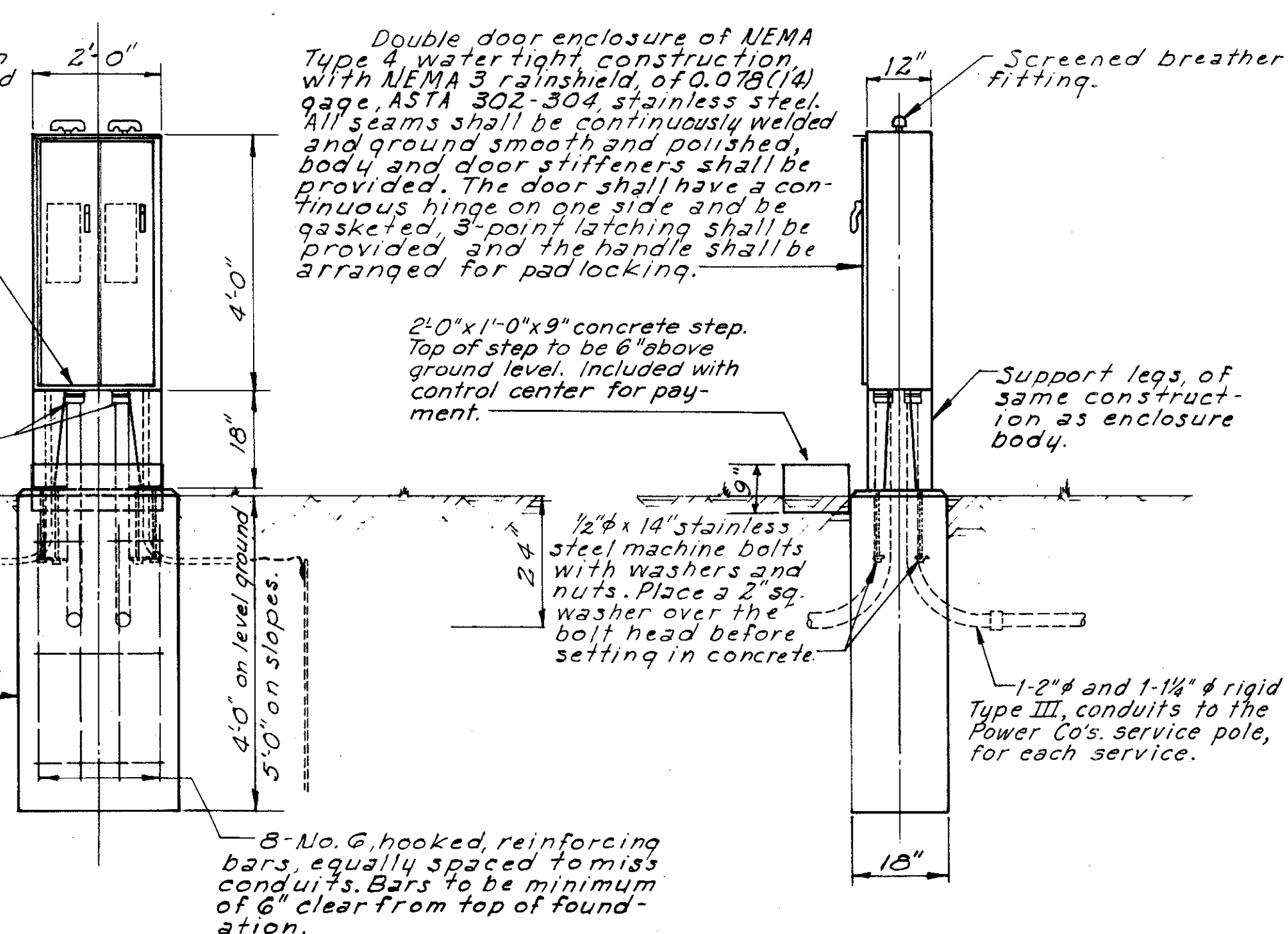
Stainless steel enclosure shall conform with requirements of 713.20 with exception that bottom shall be reinforced with 2 layers of 14 ga. material.

Conduits shall enter the enclosure body by means of water tight, rigid, factory installed conduit hubs.

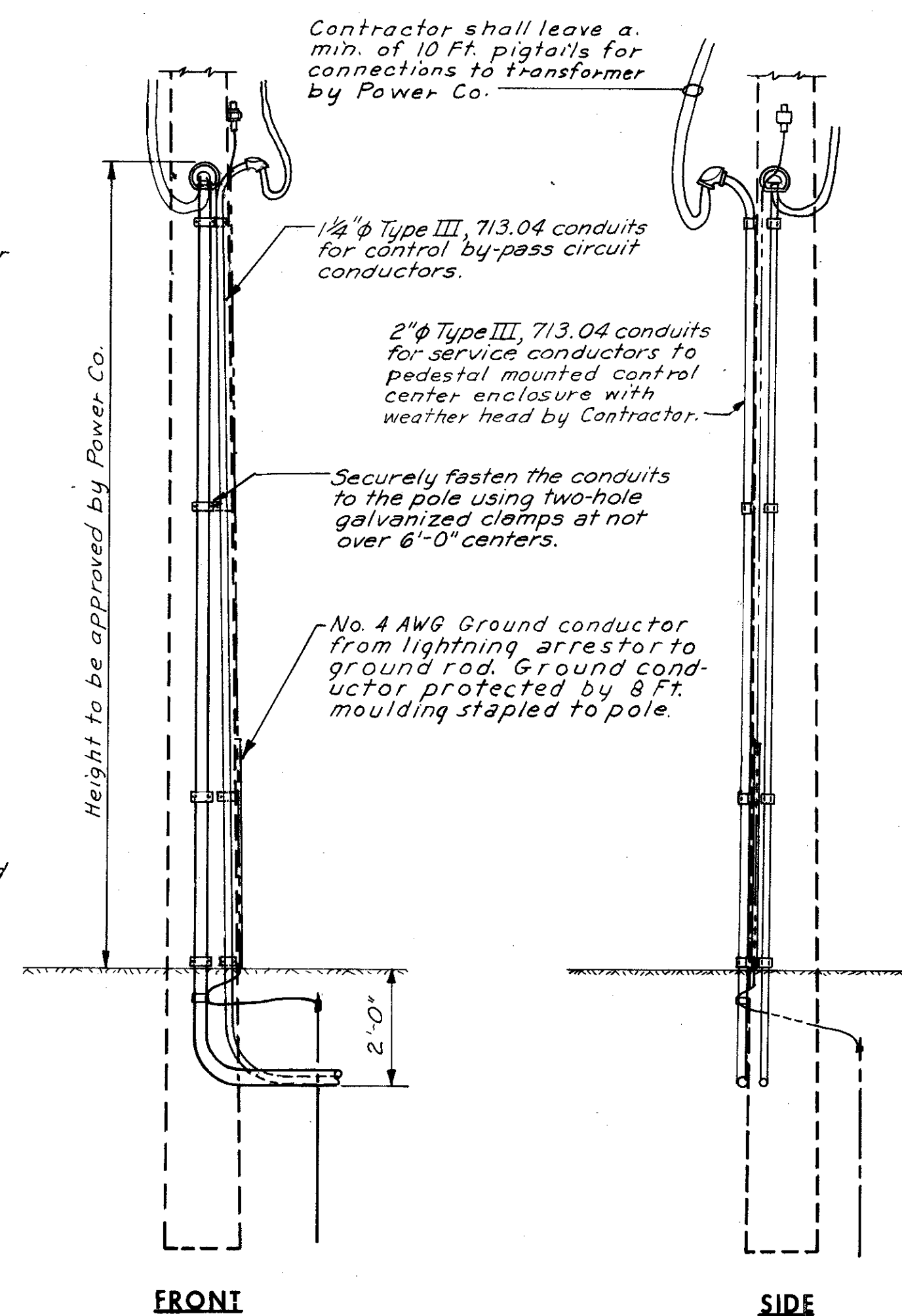
3/4" EMT conduit for ground wire entrance into enclosure

Conduits 12" out from foundation shall be paid for as a part of Control Center.

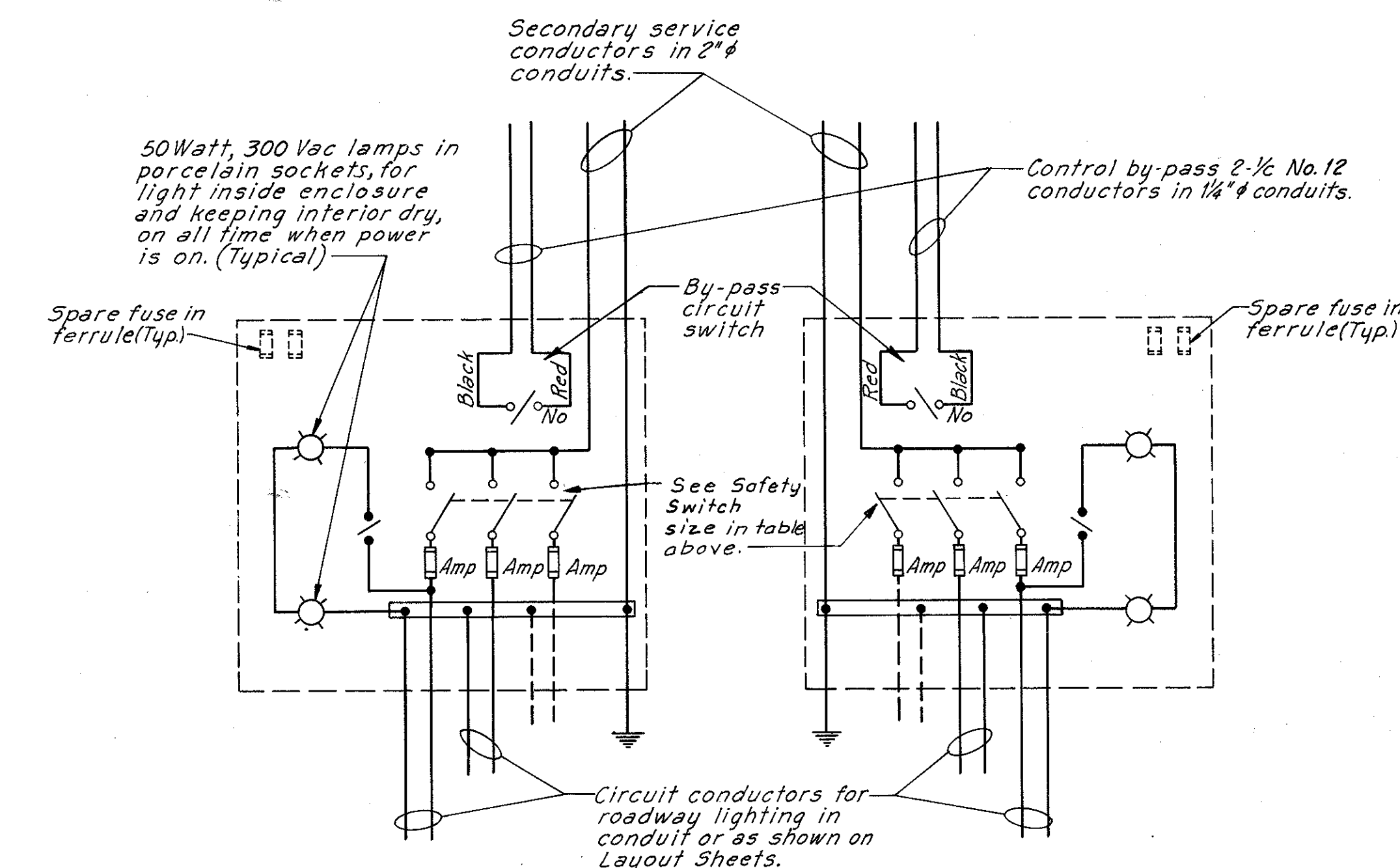
Provide ground rod(s), as required for maximum of 25 ohms resistance to ground. Exothermic weld the No. 4 AWG ground conductor to the ground rod(s) and brush on two coats of an insulating varnish on the welded area.



CONTROL CENTER DETAILS  
Scale: 1/2" = 1'-0"

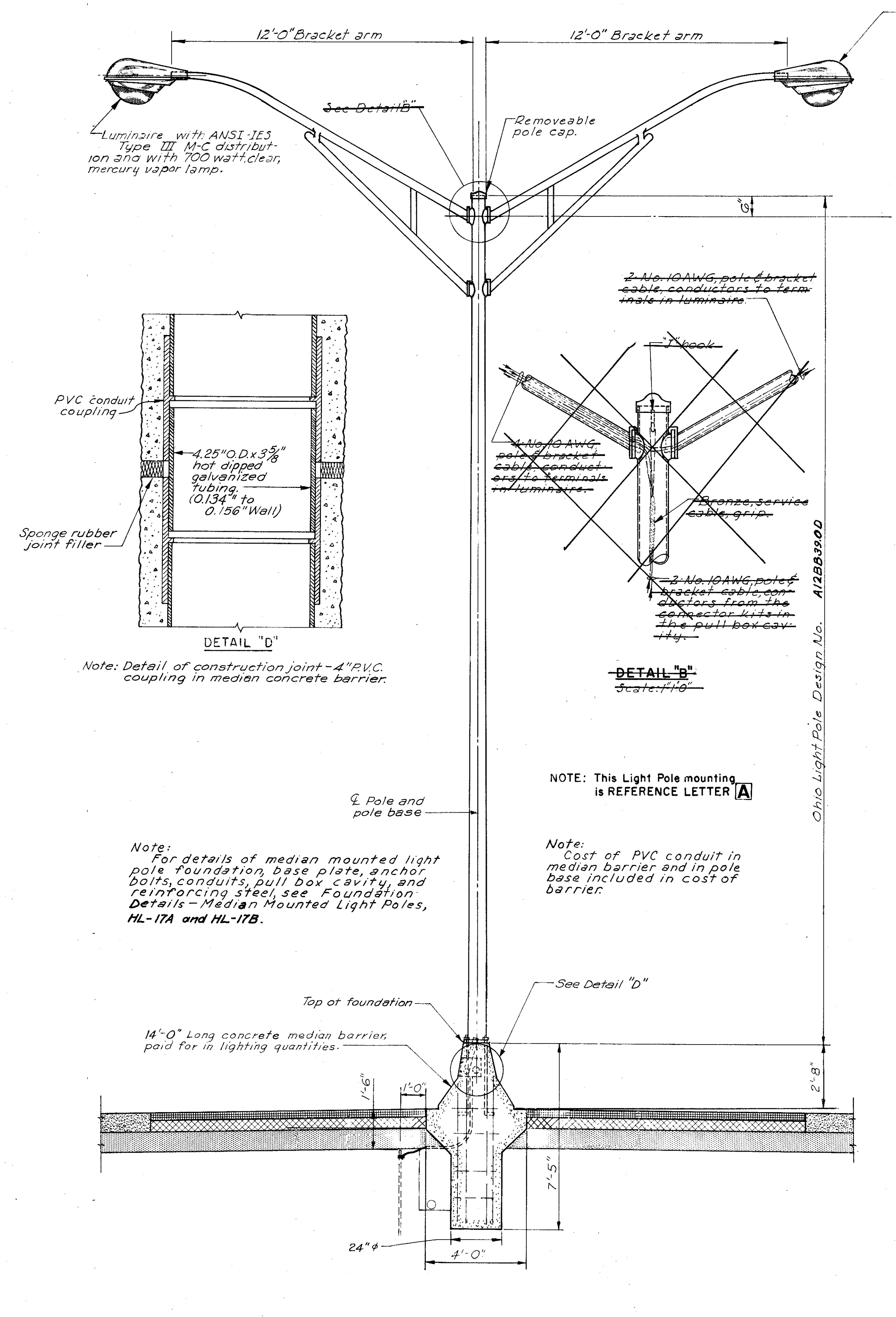


ELECTRICAL SERVICE POWER POLE DETAIL  
No Scale



TYPICAL WIRING DIAGRAM IN CONTROL CENTER ENCLOSURE  
No Scale

CUYAHOGA COUNTY  
CUY-480-21.40



Note: Detail of construction joint - 4" PVC coupling in median concrete barrier.

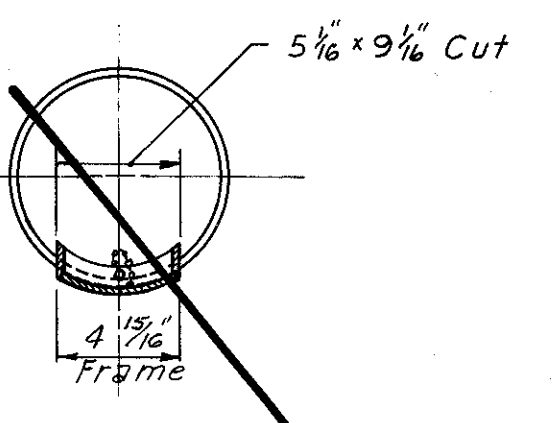
Note: For details of median mounted light pole foundation, base plate, anchor bolts, conduits, pull box cavity, and reinforcing steel, see Foundation Details - Median Mounted Light Poles, HL-17A and HL-17B.

NOTE: This Light Pole mounting is REFERENCE LETTER **A**

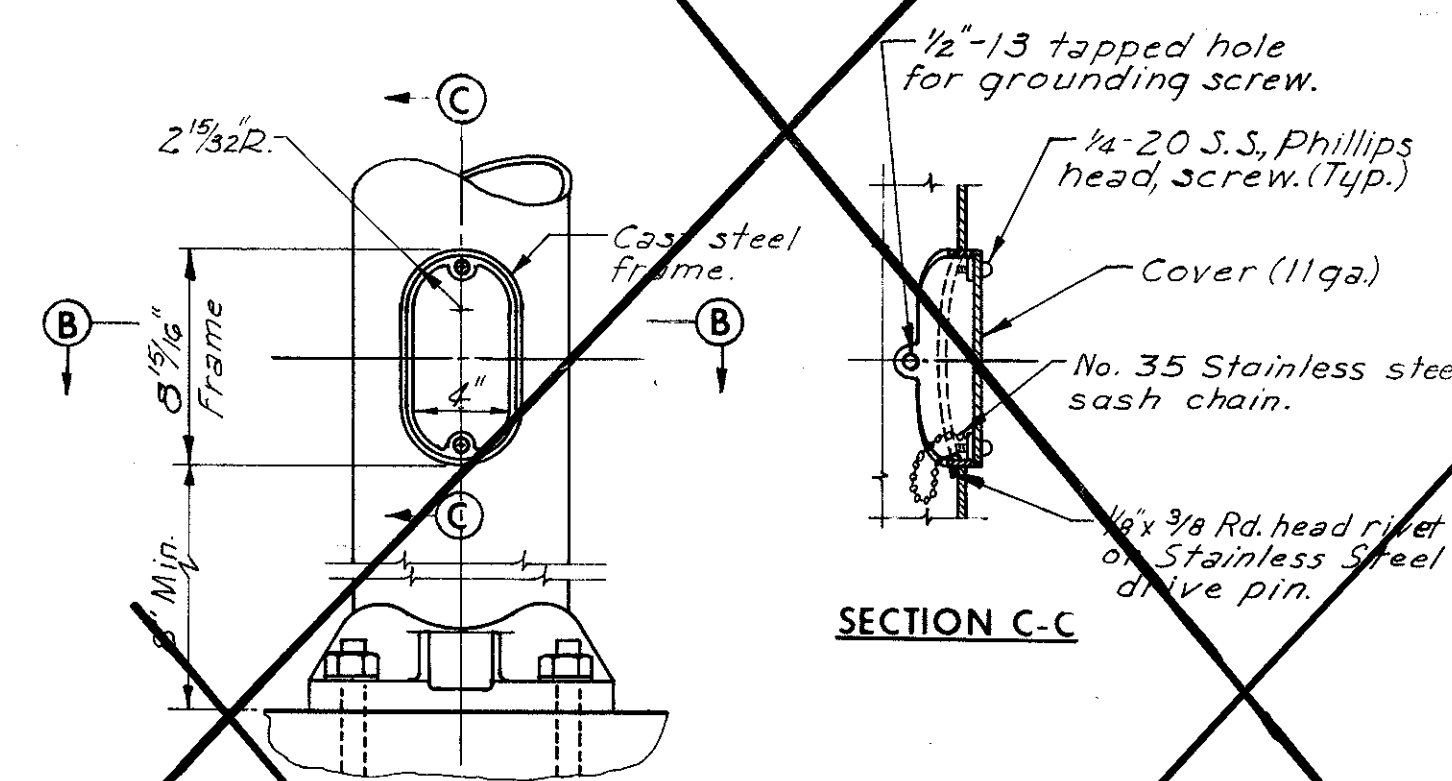
Note: Cost of PVC conduit in median barrier and in pole base included in cost of barrier.

**MEDIAN BARRIER POLE MOUNTING**  
Scale: 3/8" = 1'-0"

1000 Watt size luminaire with integral ballast for 700 Watt, clear, mercury vapor lamp. (Typical)



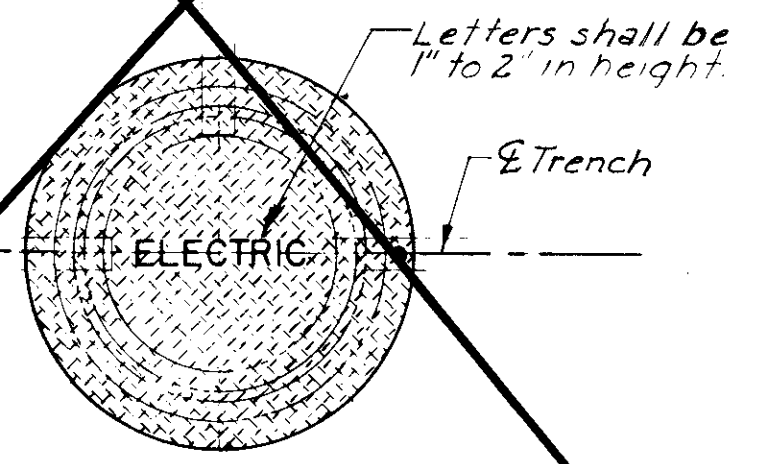
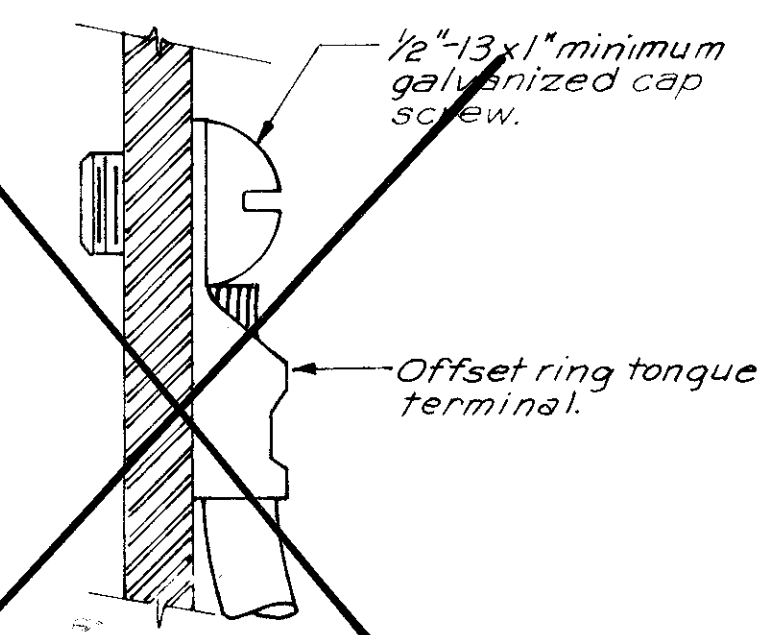
**SECTION B-B**



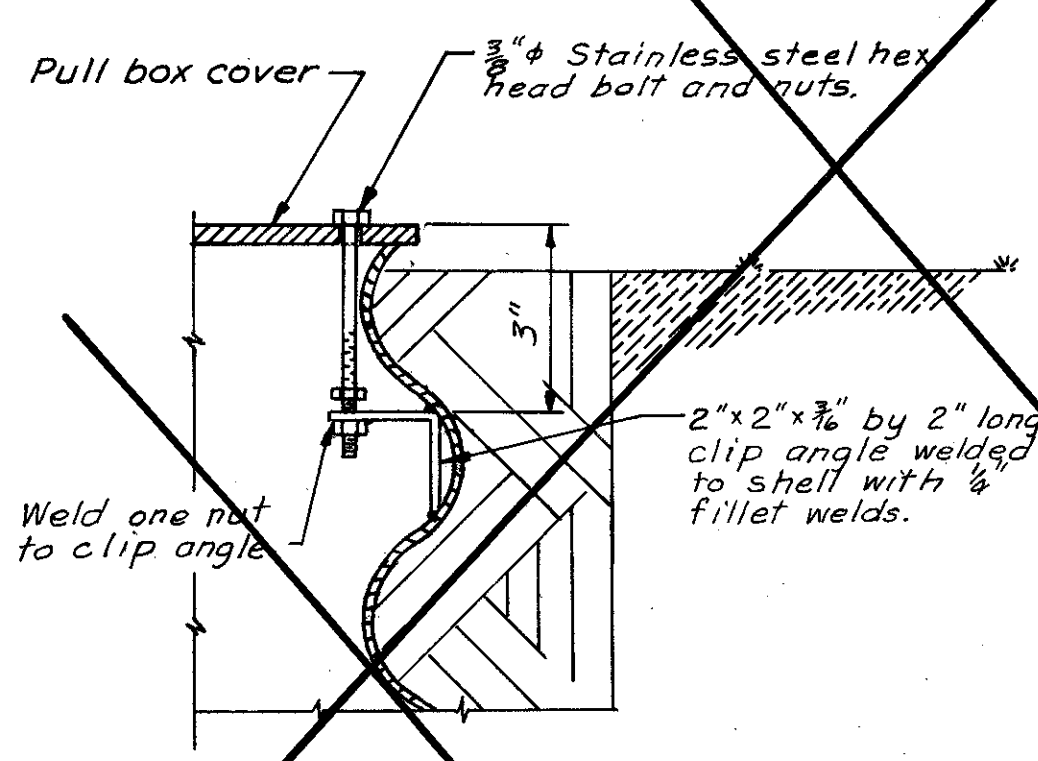
**SECTION C-C**

**ALTERNATE HANDHOLE DETAIL**  
4"x4" CURVED HANDHOLE FRAME AND COVER  
Scale: 1/2" = 1'-0"

**GROUND WIRE TERMINALS**  
Full Size



**PLAN**



**PULL BOX COVER ATTACHMENT**  
No Scale

Selected original earth material to be hand tamped in 6" layers around pipe. Do not use frozen fill, sod, cinders or stone.

Polyethylene air bell, 16 3/4" diam. by 20 1/2" high.

Polypropylene rope for air bell restraint or other approved fastening.

See "PULL BOX COVER ATTACHMENT" detail on this sheet.

Finished grade.

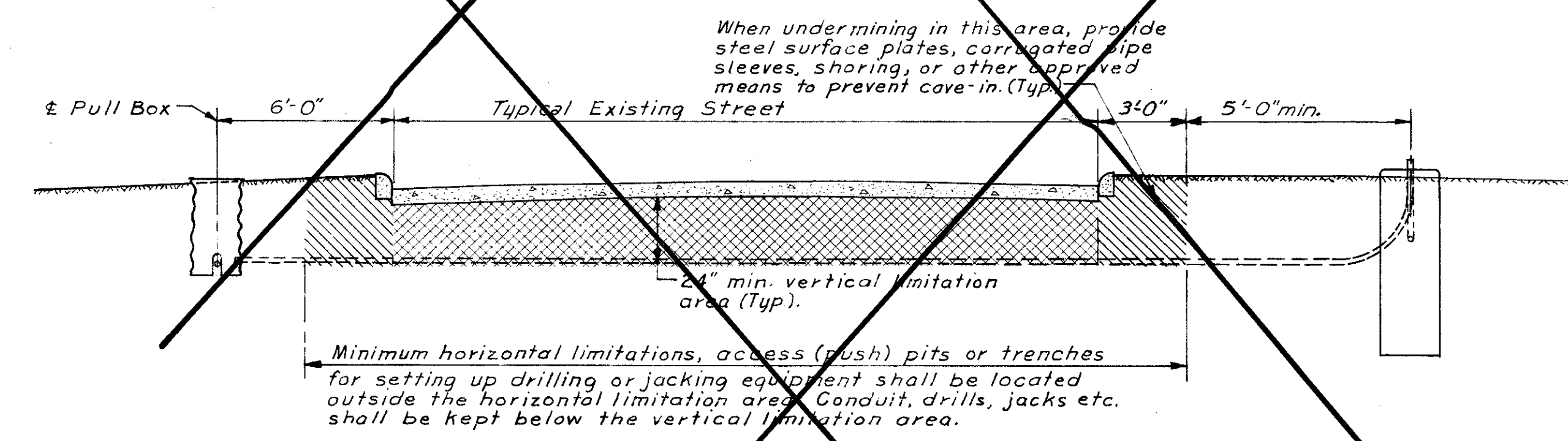
Attach connector kits to a metal pin by taping. Per 625.11

4"x10" slot cut in the sides of the pipe for each cable duct entrance. No more than 3 in each pull box.

No. 7 or 8 aggregate, under pull box for French type drain.

**SECTION THRU CORRUGATED BOX**

**PULL BOX DETAILS**  
Scale: 1" = 1'-0"

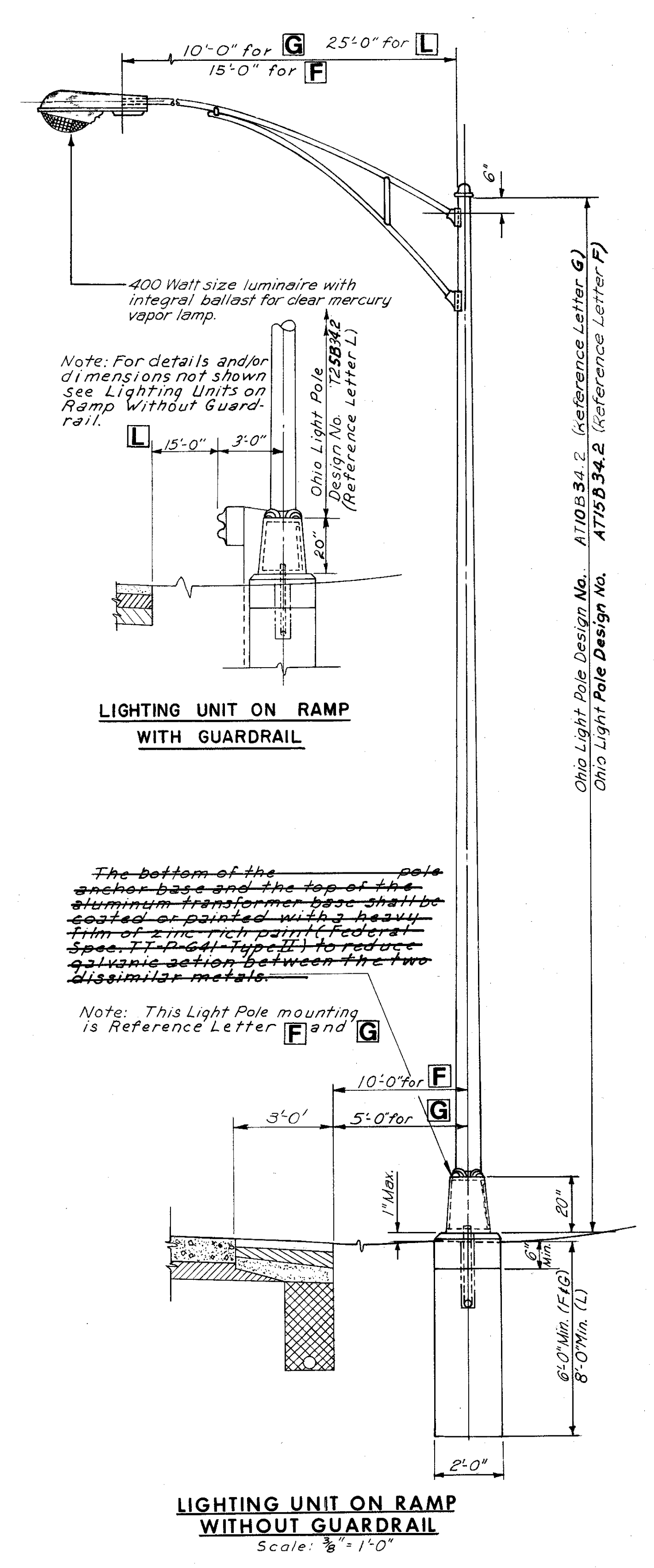
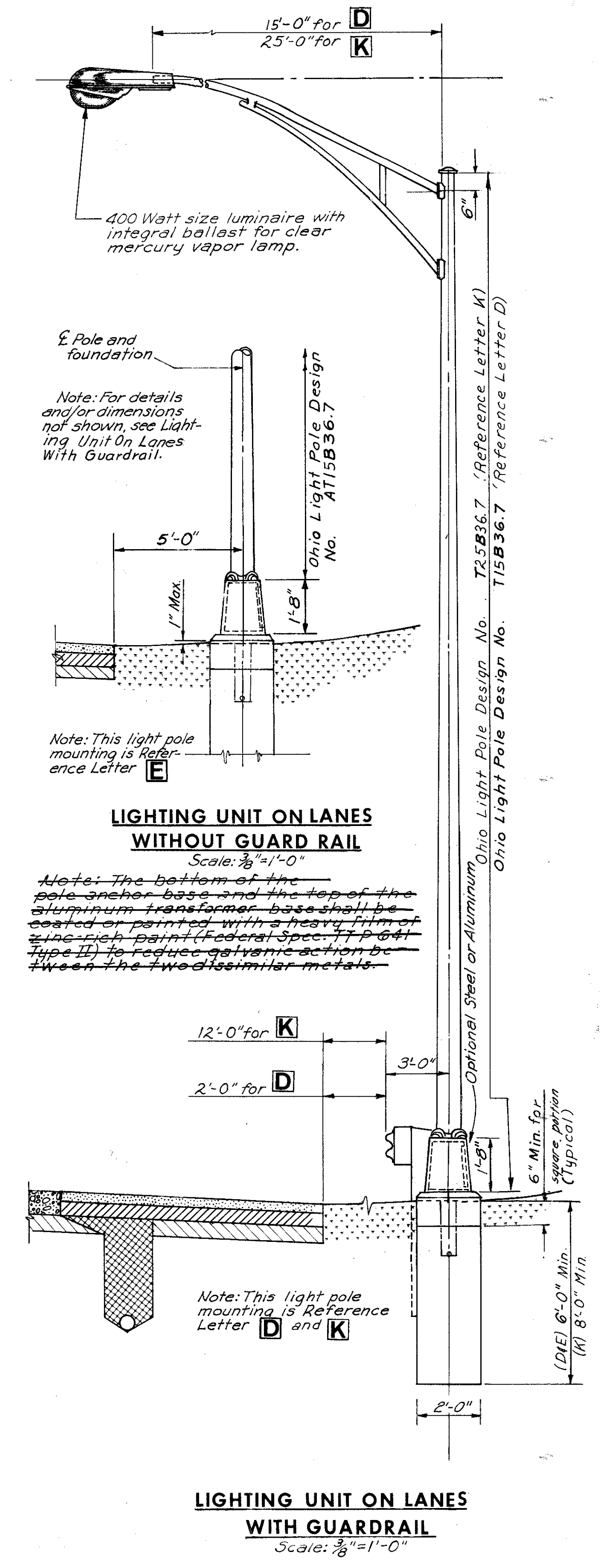
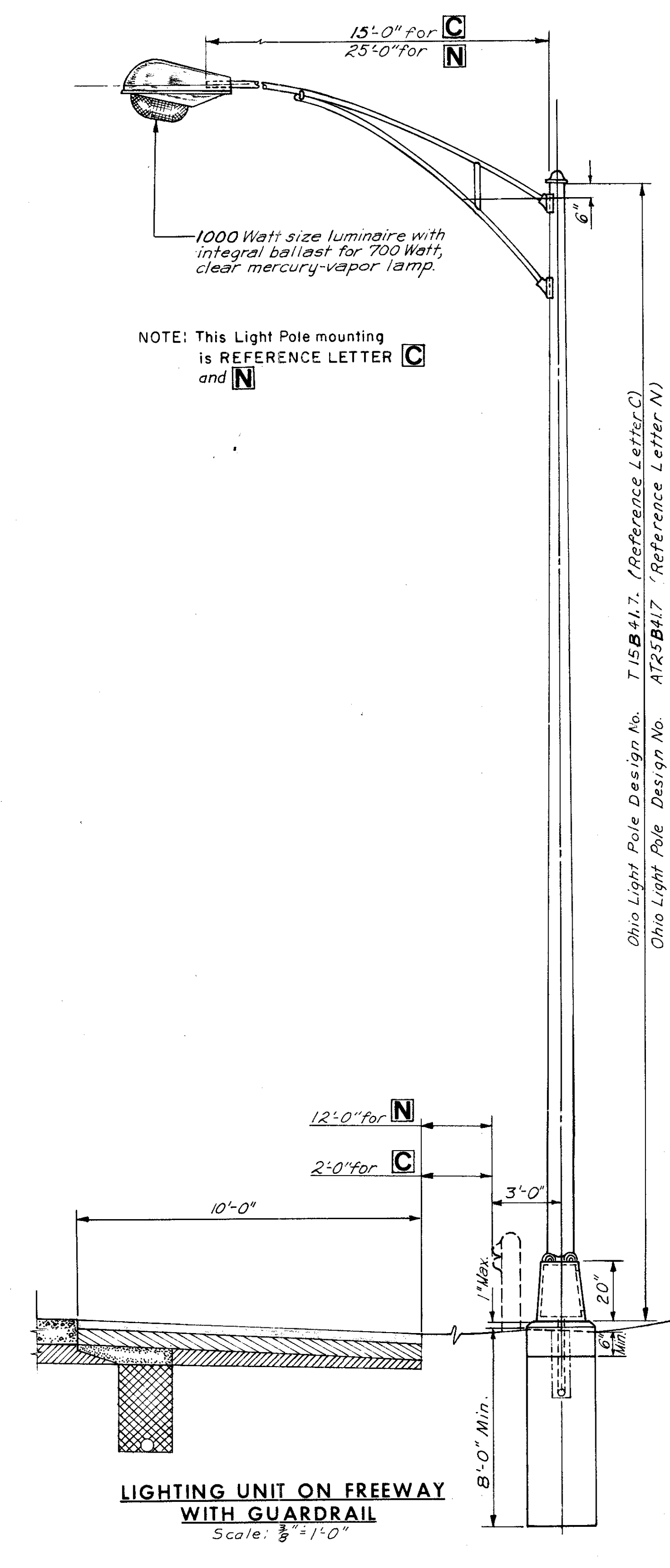
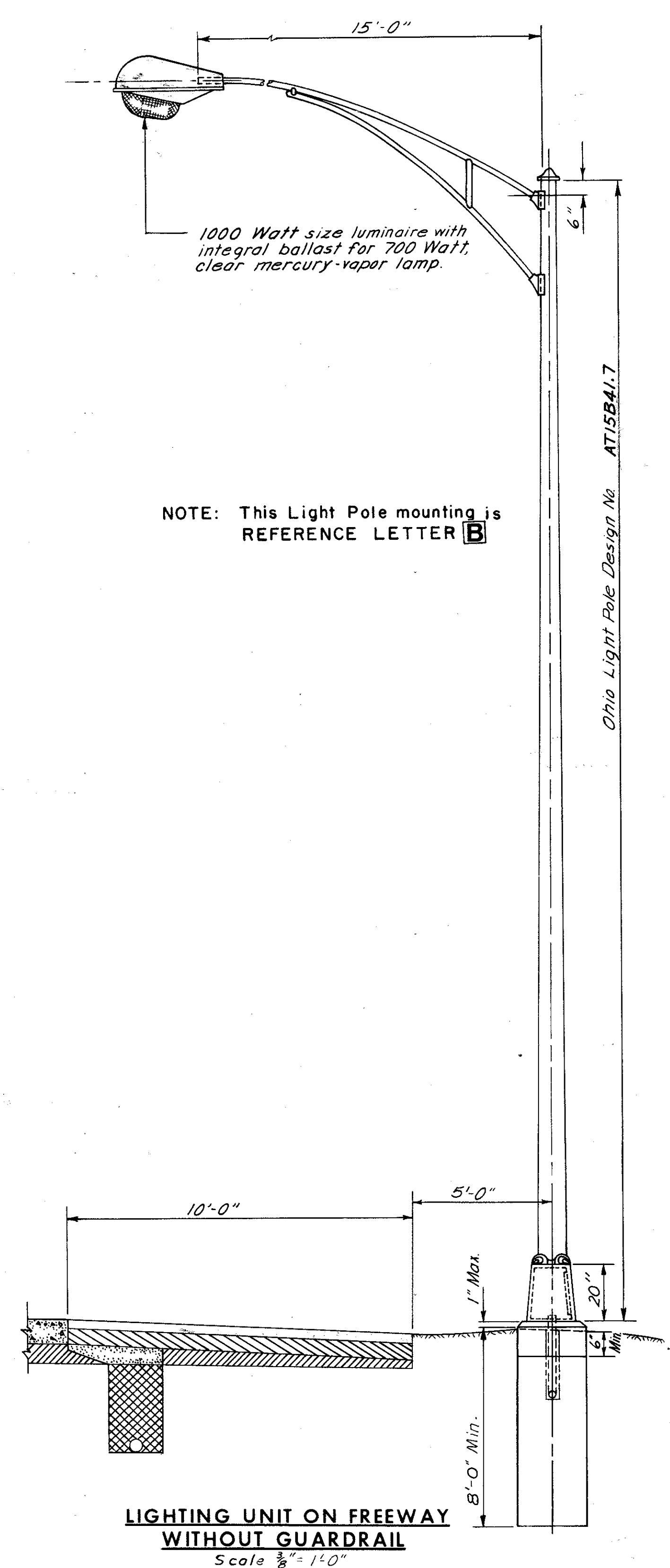


**CONDUIT CROSSUNDER EXISTING STREET**  
Scale: 1/4" = 1'-0"

FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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CUYAHOGA COUNTY  
CUY. 480. 21.40



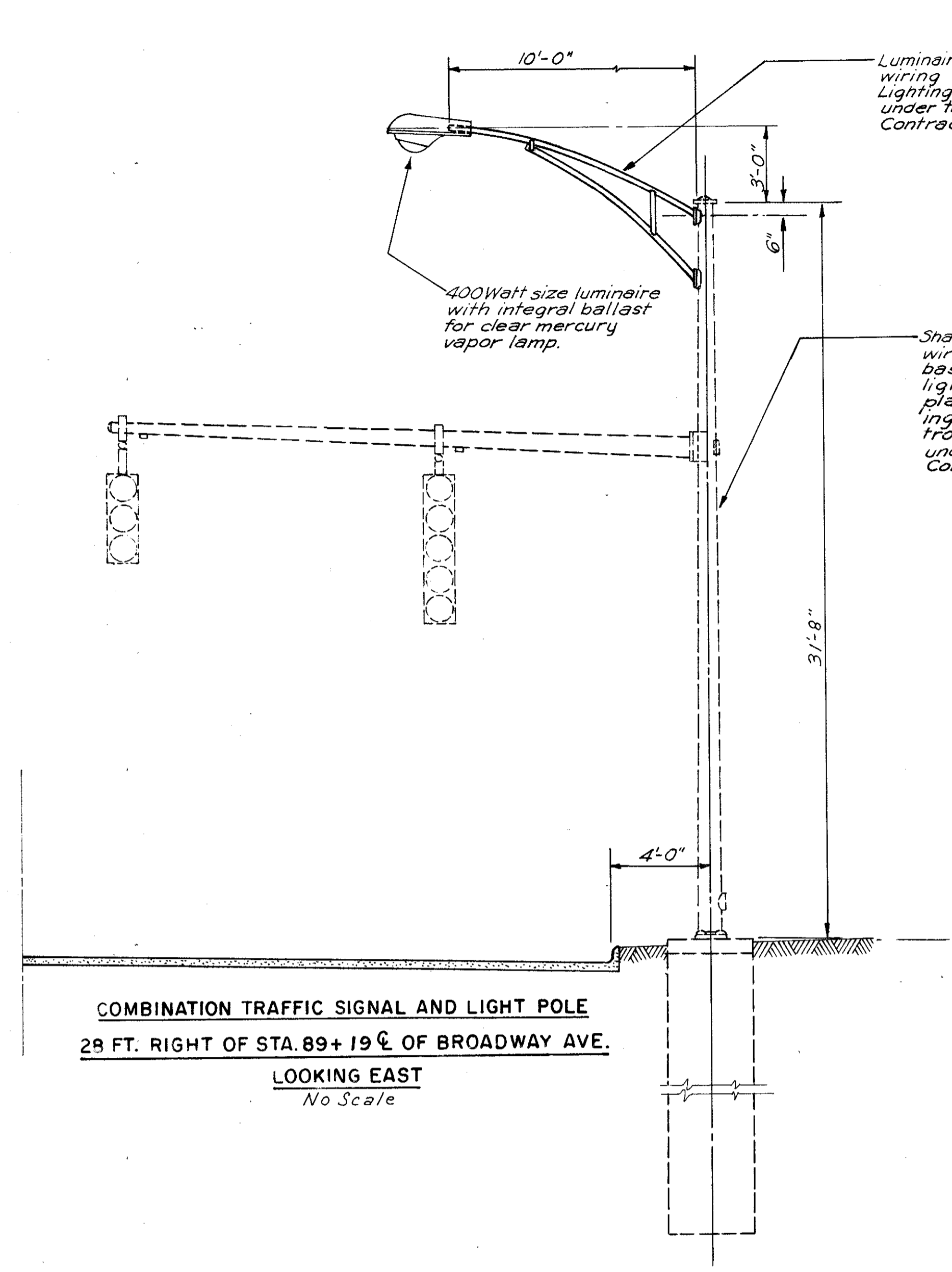
SCALE As Noted HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE C.Y. DATE 4-28-70 CONSULTING ENGINEERS  
TRCD C.Y. DATE 4-28-70  
CKD LWL DATE 6-22-72 KANSAS CITY CLEVELAND NEW YORK

GROUND MOUNT LIGHTING UNITS  
Rev. 1-9-74

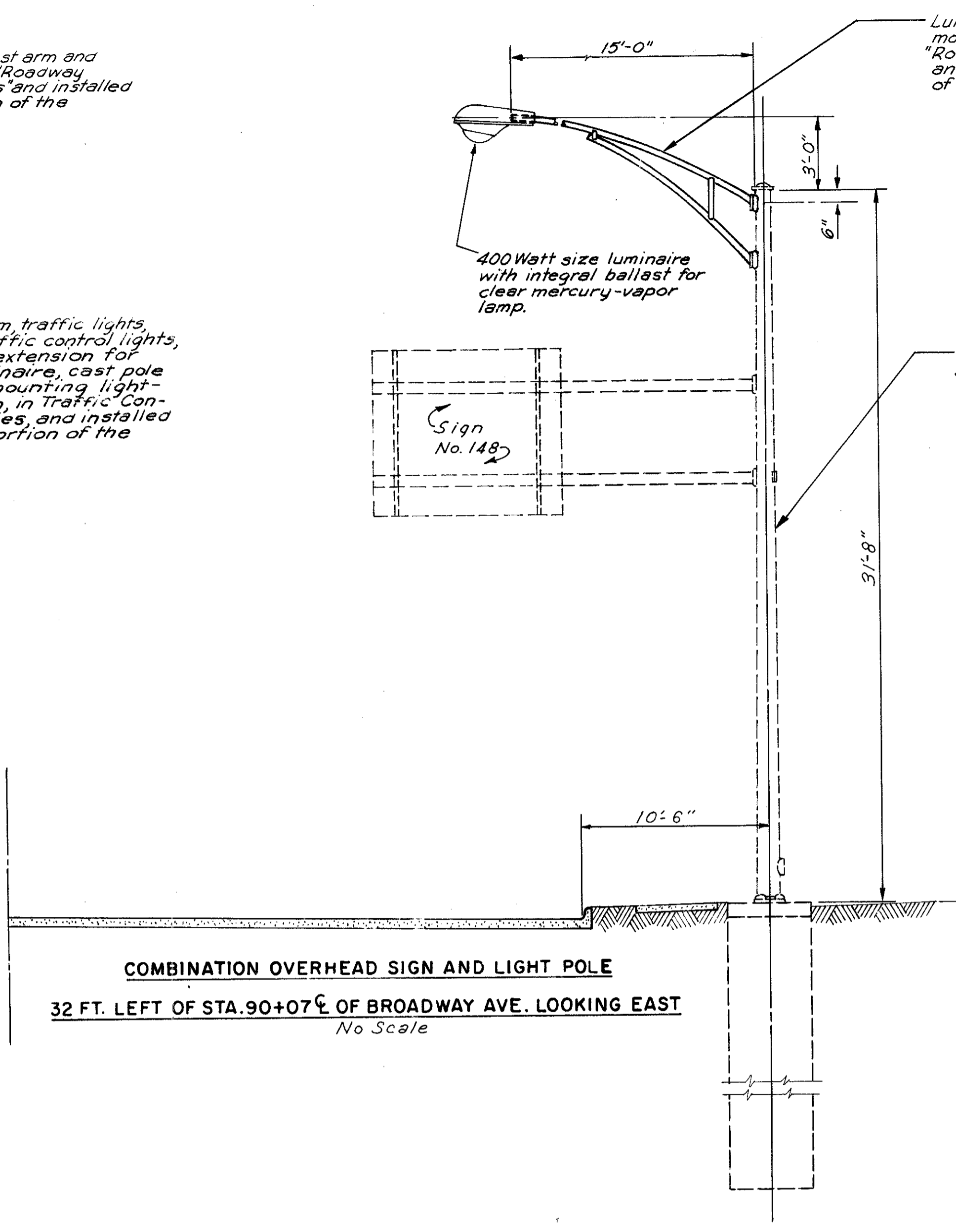
FED. RD. DIVISION	STATE	PROJECT
5	OHIO	

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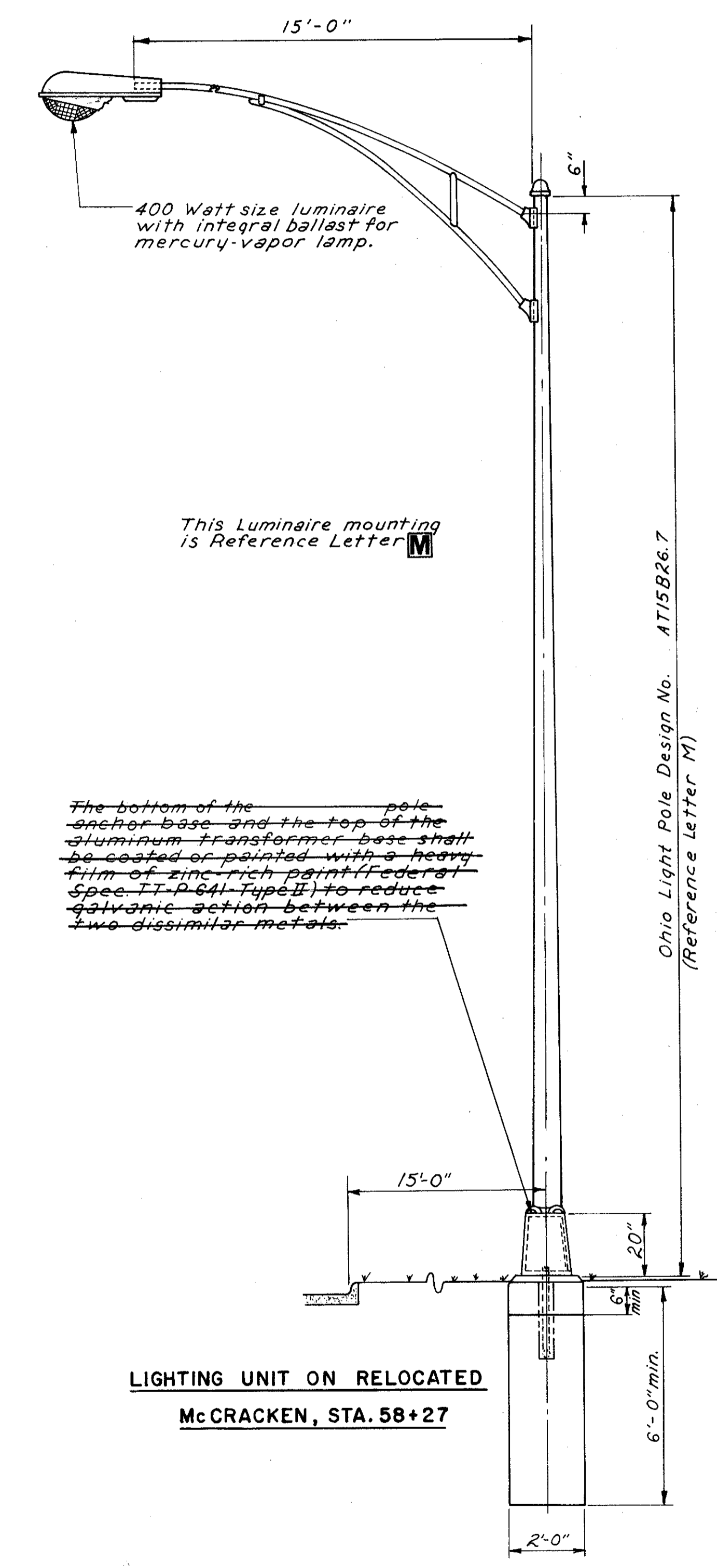
CUYAHOGA COUNTY  
CUY-480-21.40



COMBINATION TRAFFIC SIGNAL AND LIGHT POLE  
28 FT. RIGHT OF STA. 89+19 C OF BROADWAY AVE.  
LOOKING EAST  
No Scale



COMBINATION OVERHEAD SIGN AND LIGHT POLE  
32 FT. LEFT OF STA. 90+07 C OF BROADWAY AVE. LOOKING EAST  
No Scale



LIGHTING UNIT ON RELOCATED  
McCRACKEN, STA. 58+27

This Luminaire mounting is Reference Letter M

The bottom of the pole anchor base and the top of the aluminum transformer base shall be coated or painted with a heavy film of zinc-rich paint (Federal Spec. TT-P-641 Type II) to reduce galvanic action between the two dissimilar metals.

Ohio Light Pole Design No. AT15B26.7  
(Reference Letter M)

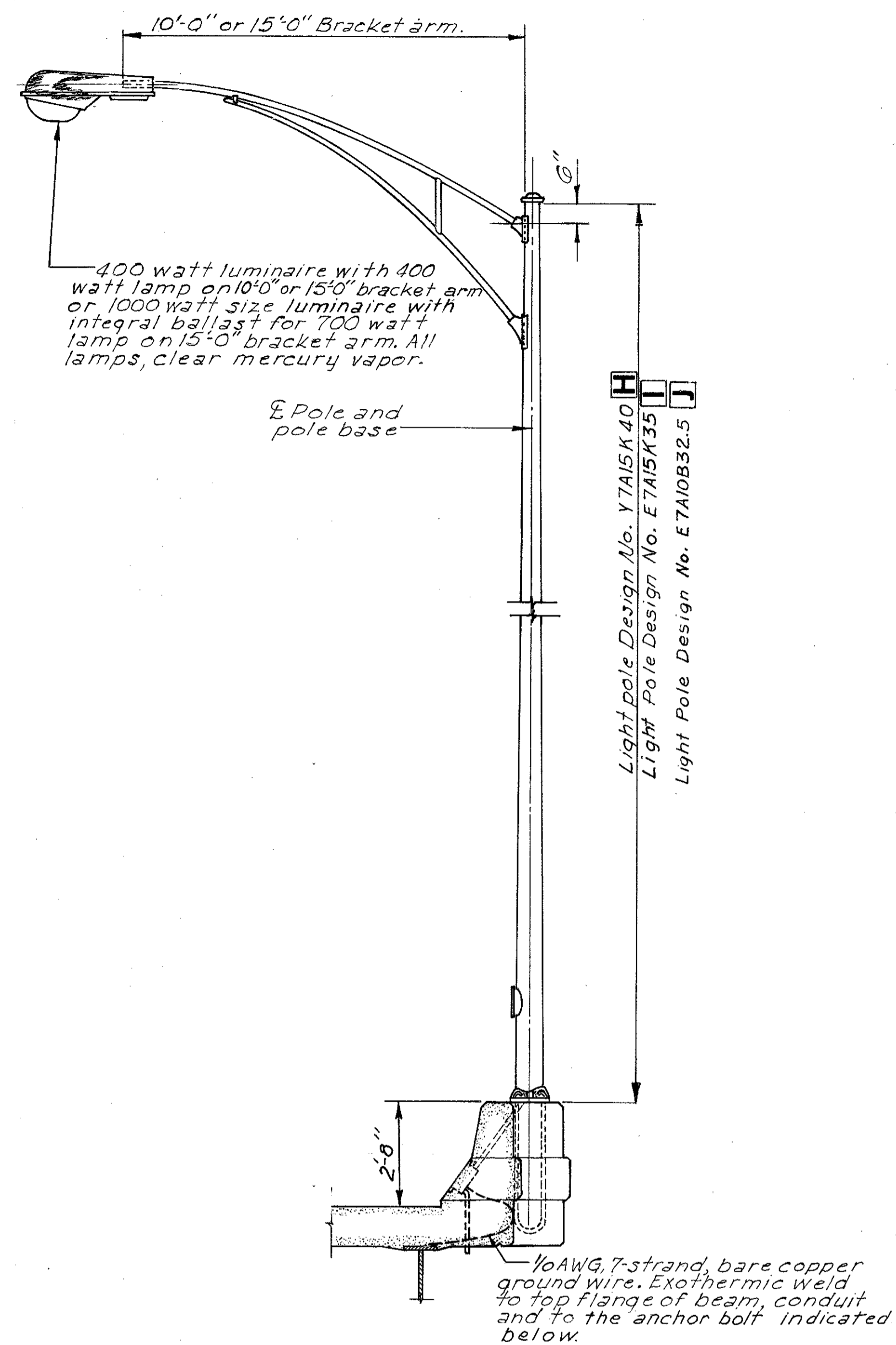
SCALE As Noted  
MADE M.A.C. DATE 9-22-71  
TRCD M.A.C. DATE 9-22-71  
CKD L.W.L. DATE 8-17-72  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

COMBINATION POLE DETAILS  
AND GROUND MOUNT LIGHTING UNIT  
Rev. 1-9-74

FED. RD. DIVISION	STATE	PROJECT
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CUYAHOGA COUNTY  
CUY- 480- 21.40

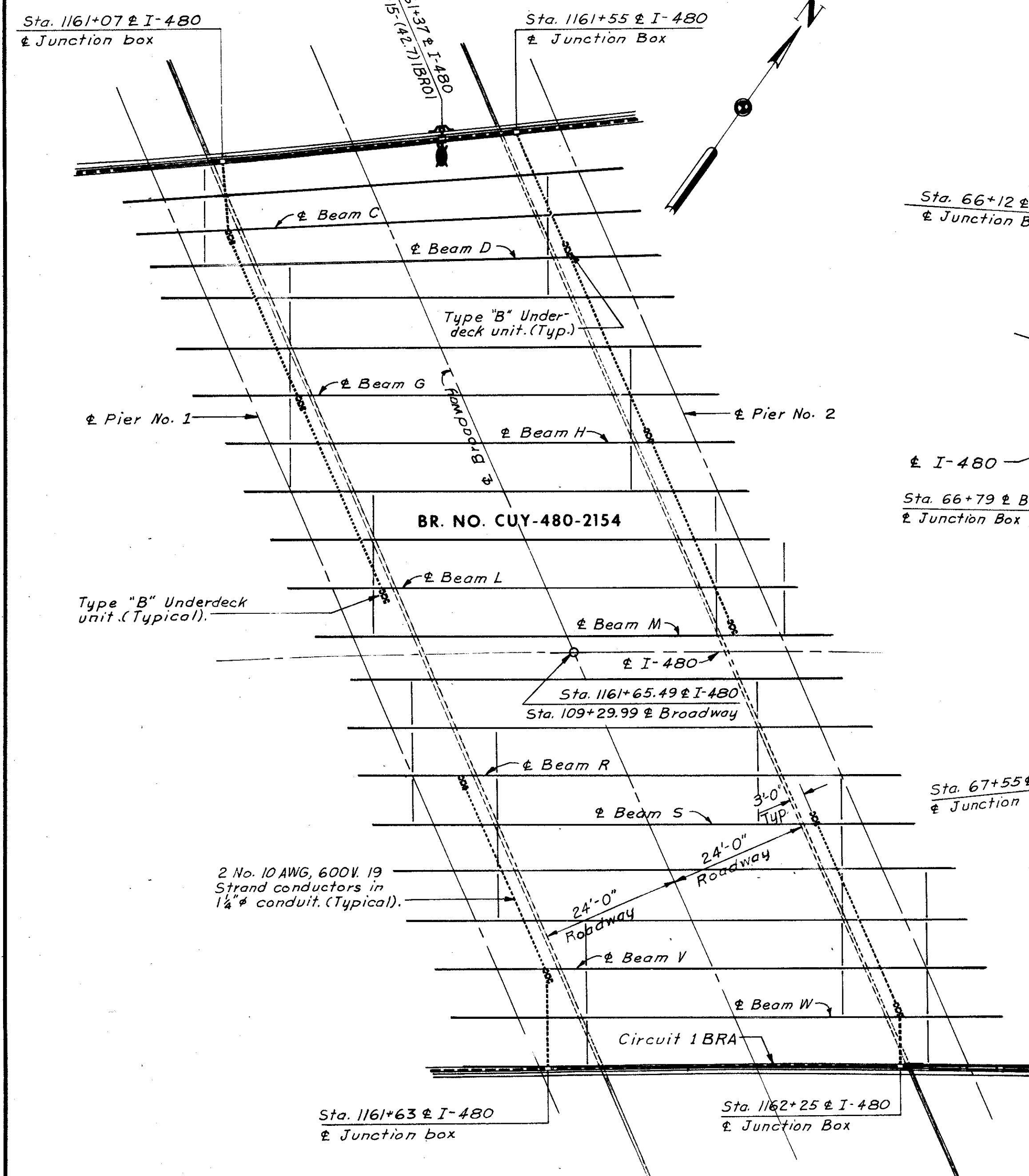


**LIGHTING UNIT ON STRUCTURES**  
Scale: 3/8" = 1'-0"

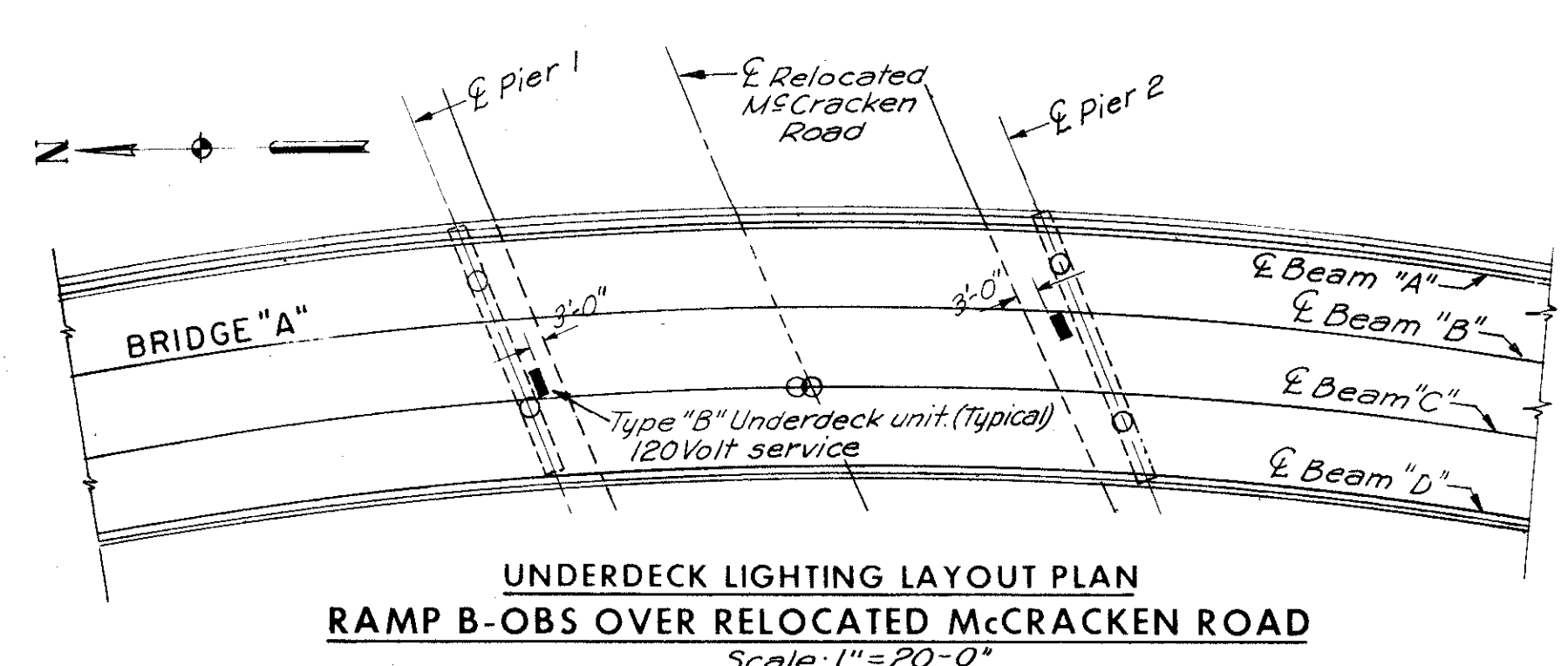
SCALE *As Noted* HOWARD, NEEDLES, TAMMEN & BERGENOFF  
 MADE *C.Y.* DATE *4-27-70* CONSULTING ENGINEERS  
 TRCD *C.Y.* DATE *4-27-70*  
 CKD *LWL* DATE *6-19-70* KANSAS CITY CLEVELAND NEW YORK



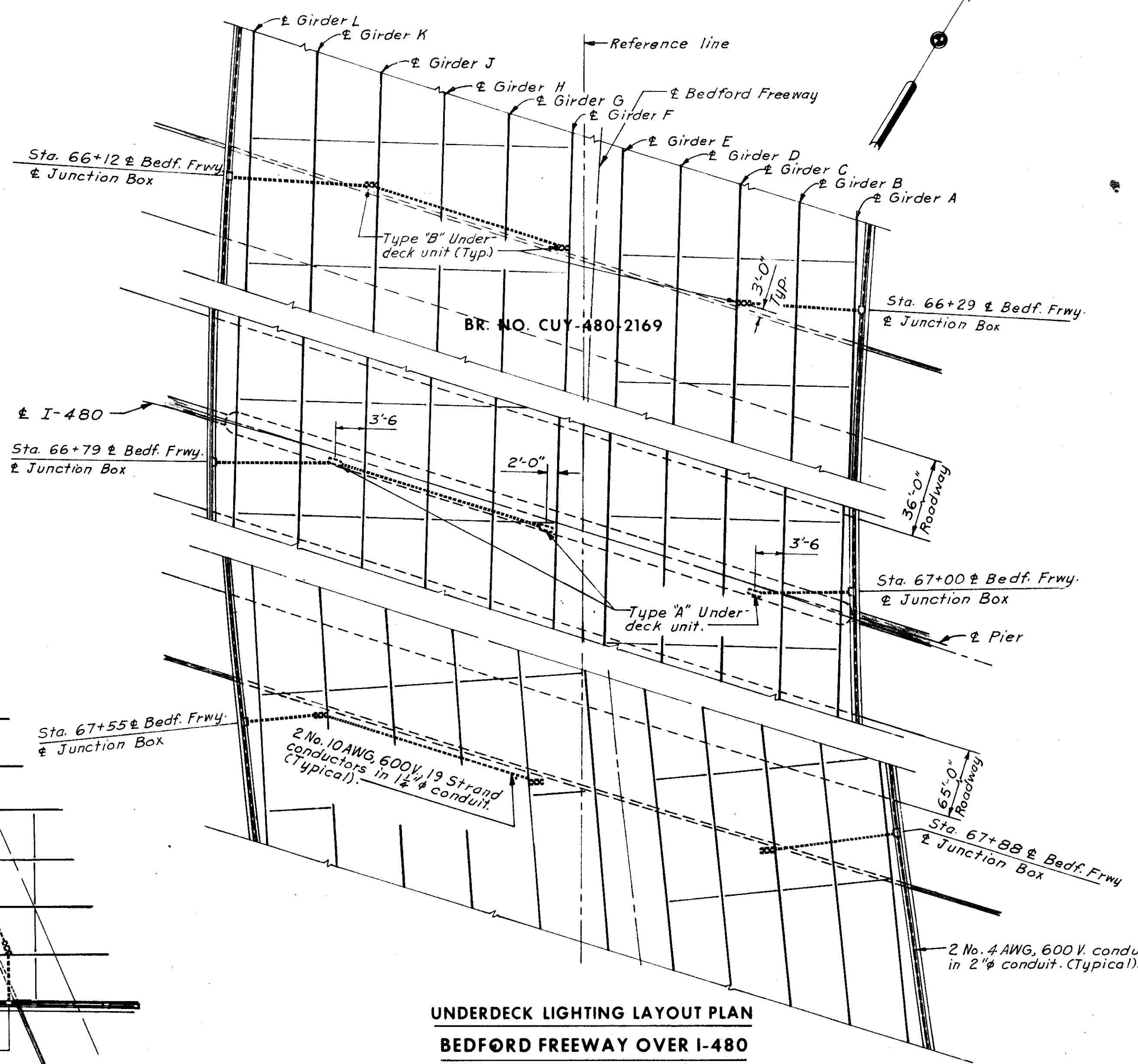
CUYAHOGA COUNTY  
CUY-480-21.40



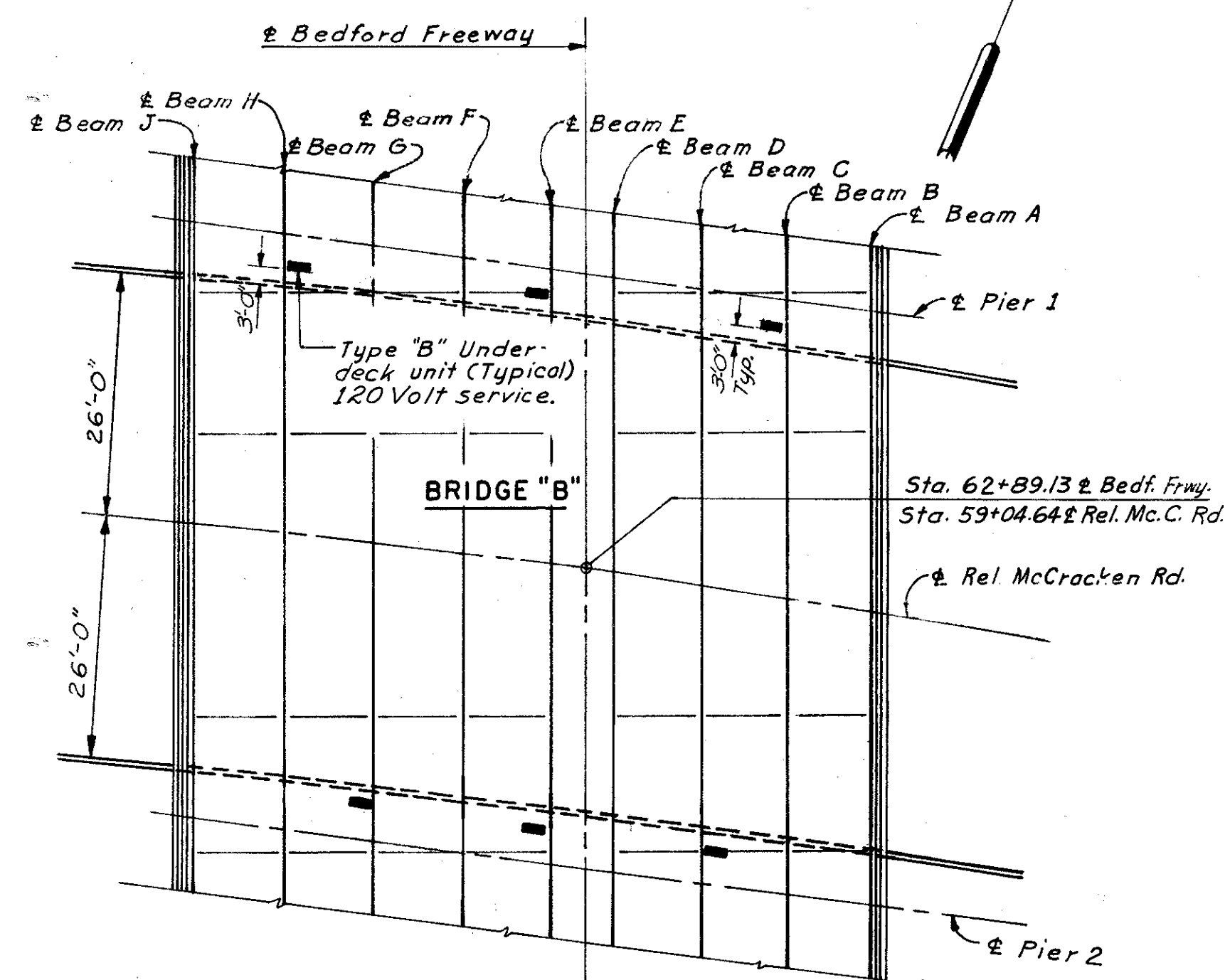
UNDERDECK LIGHTING LAYOUT PLAN  
I-480 OVER BROADWAY  
No Scale



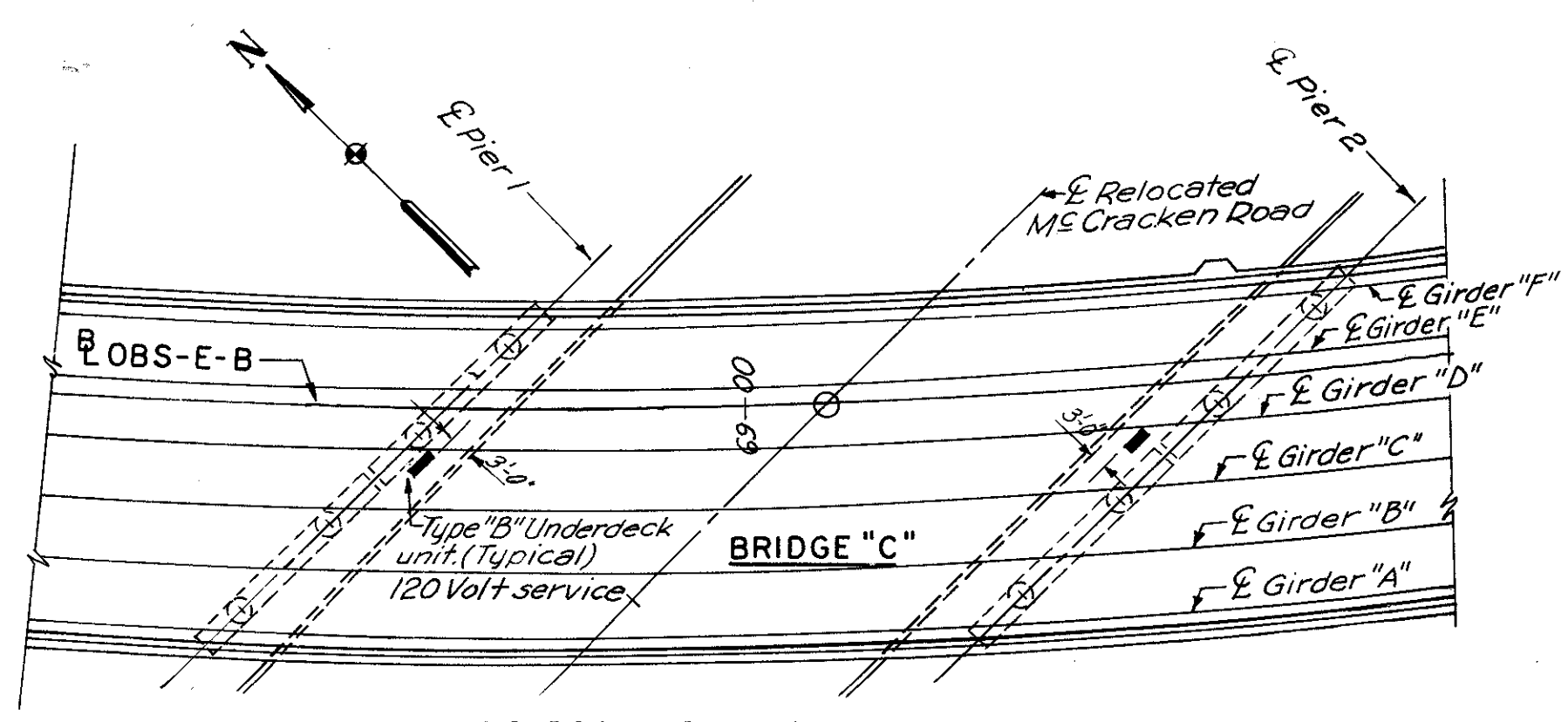
UNDERDECK LIGHTING LAYOUT PLAN  
RAMP B-OBS OVER RELOCATED McCRACKEN ROAD  
Scale: 1"=20'-0"



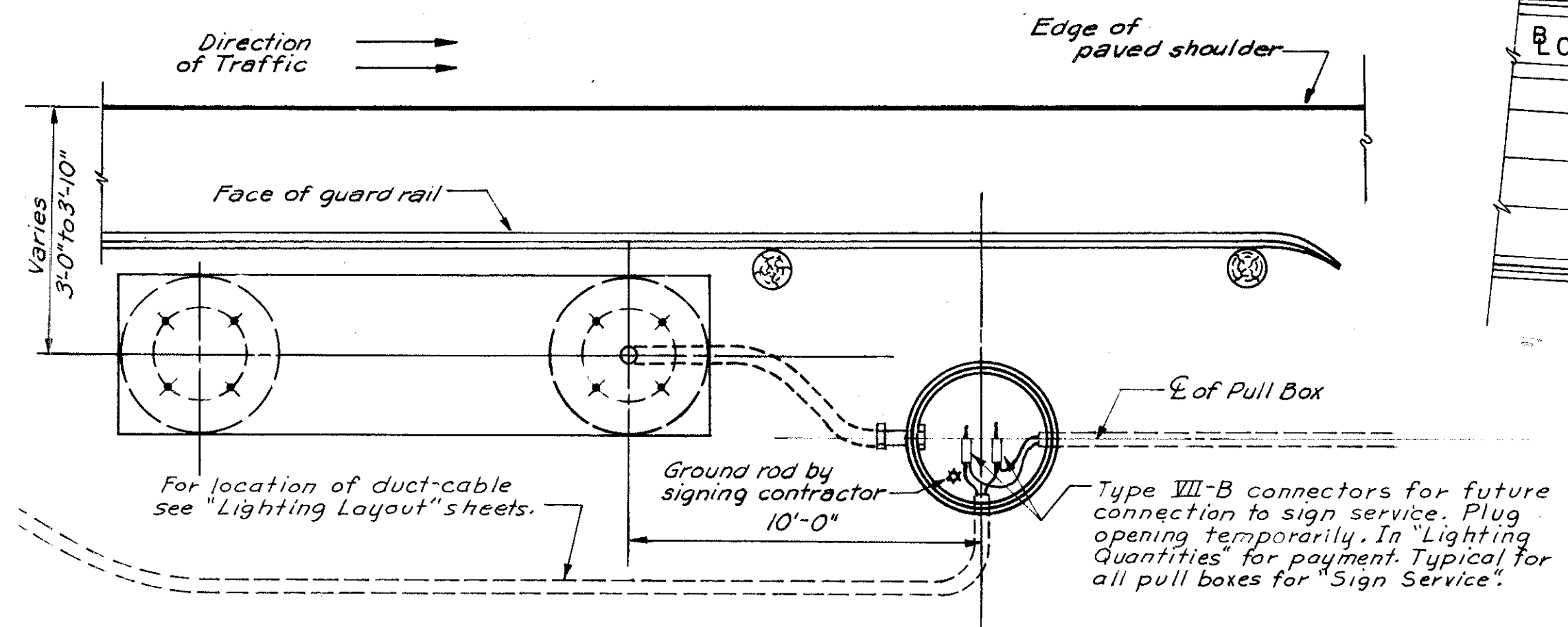
UNDERDECK LIGHTING LAYOUT PLAN  
BEDFORD FREEWAY OVER I-480  
No Scale



UNDERDECK LIGHTING LAYOUT PLAN  
BEDFORD FREEWAY OVER RELOCATED McCRACKEN ROAD  
No Scale



UNDERDECK LIGHTING LAYOUT PLAN  
LANE OBS-E-B OVER RELOCATED McCRACKEN ROAD  
Scale: 1"=20'-0"



OVERHEAD SIGN BASE AND FEEDER SERVICE DETAILS  
No Scale

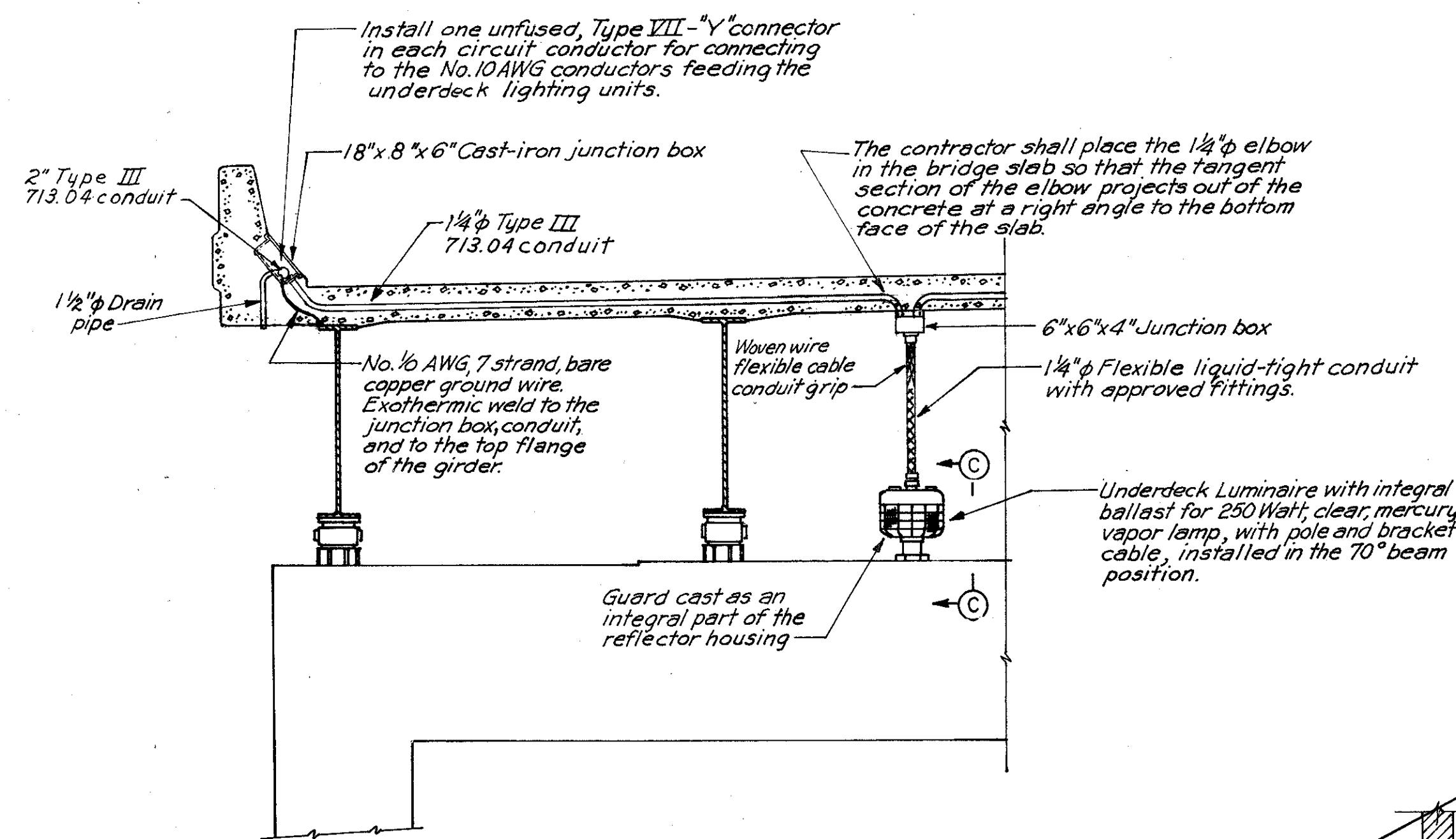
Note:  
Underdeck lighting units on Bridge "A" "B" and "C" are on 120V circuit running along Relocated McCracken Road. See Sheet 271

SIGN SERVICE CONNECTOR DETAILS  
AND UNDERDECK LIGHTING LAYOUT

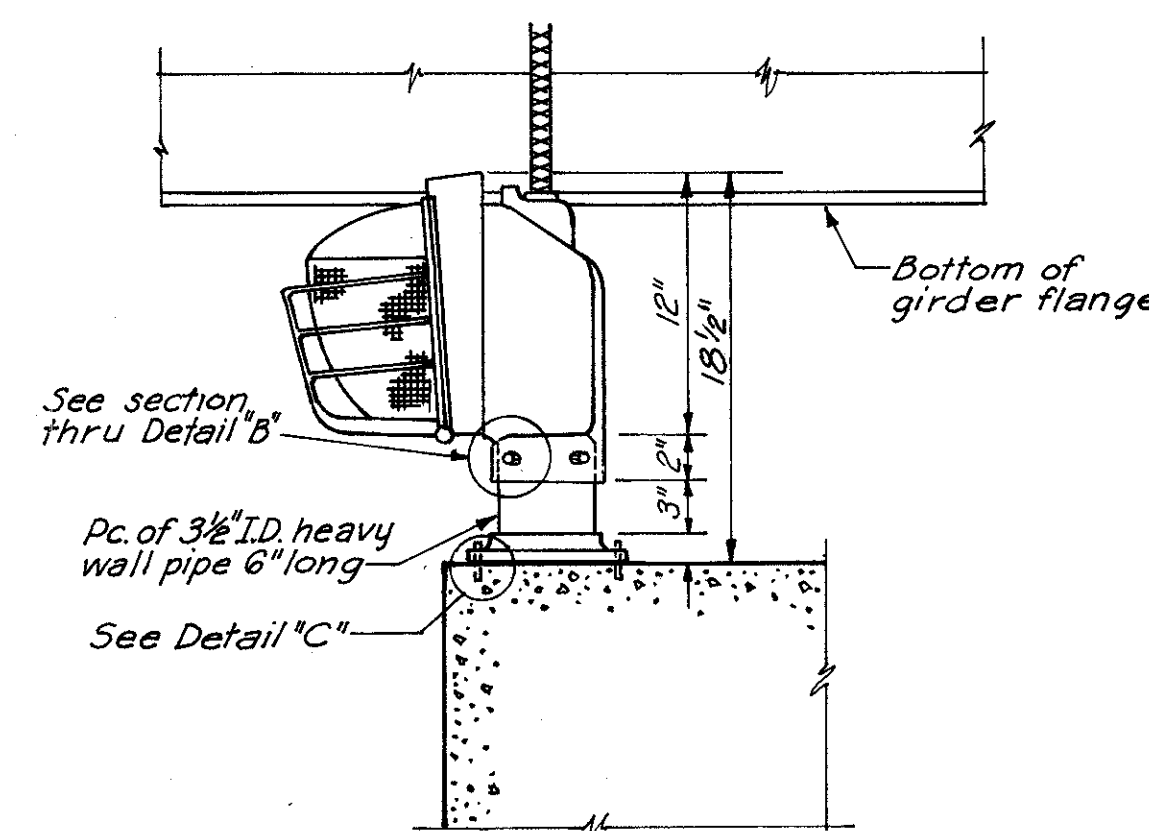
FED. RD. DIVISION	STATE	PROJECT
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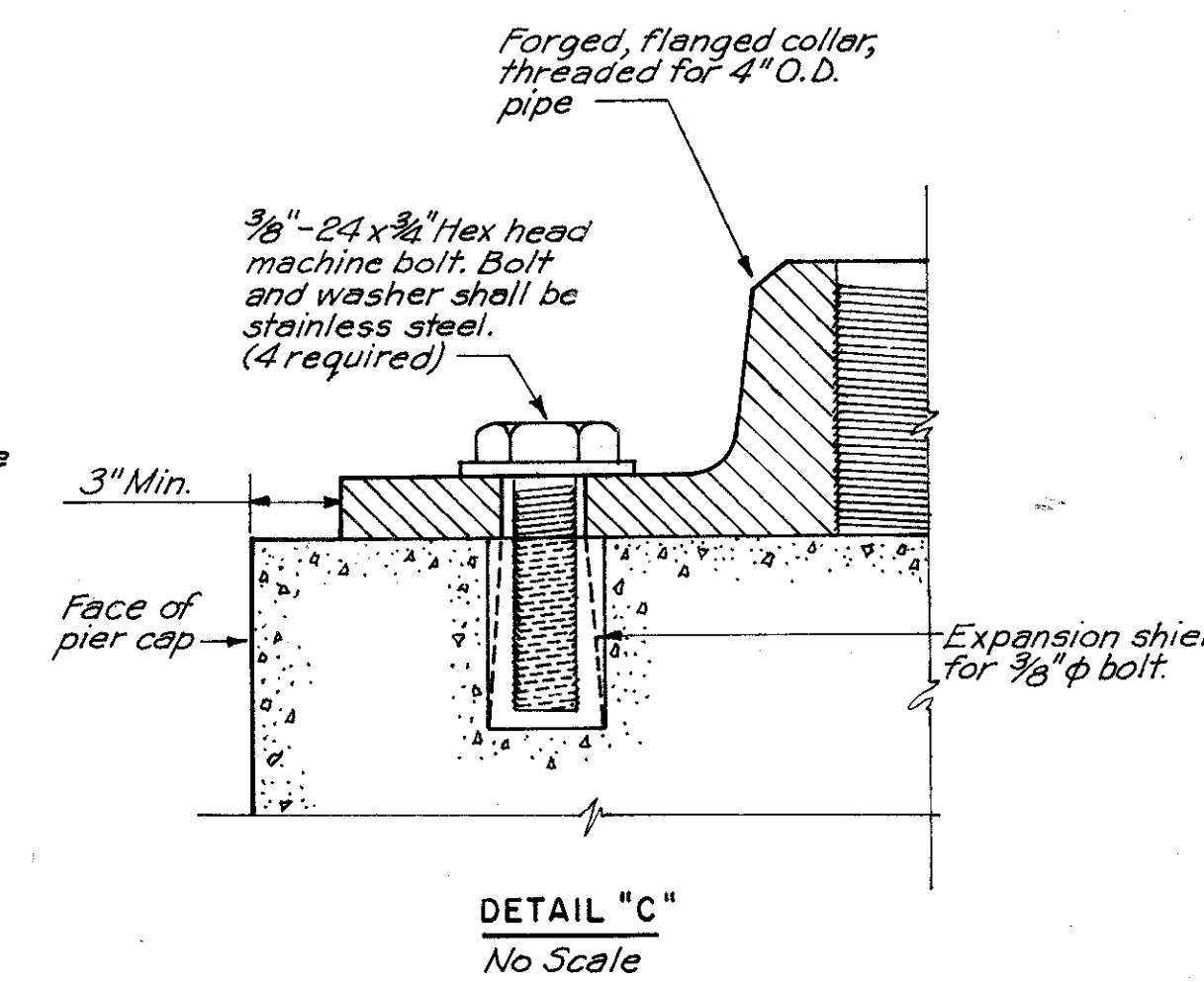
CUYAHOGA COUNTY  
CUY-480-21.40



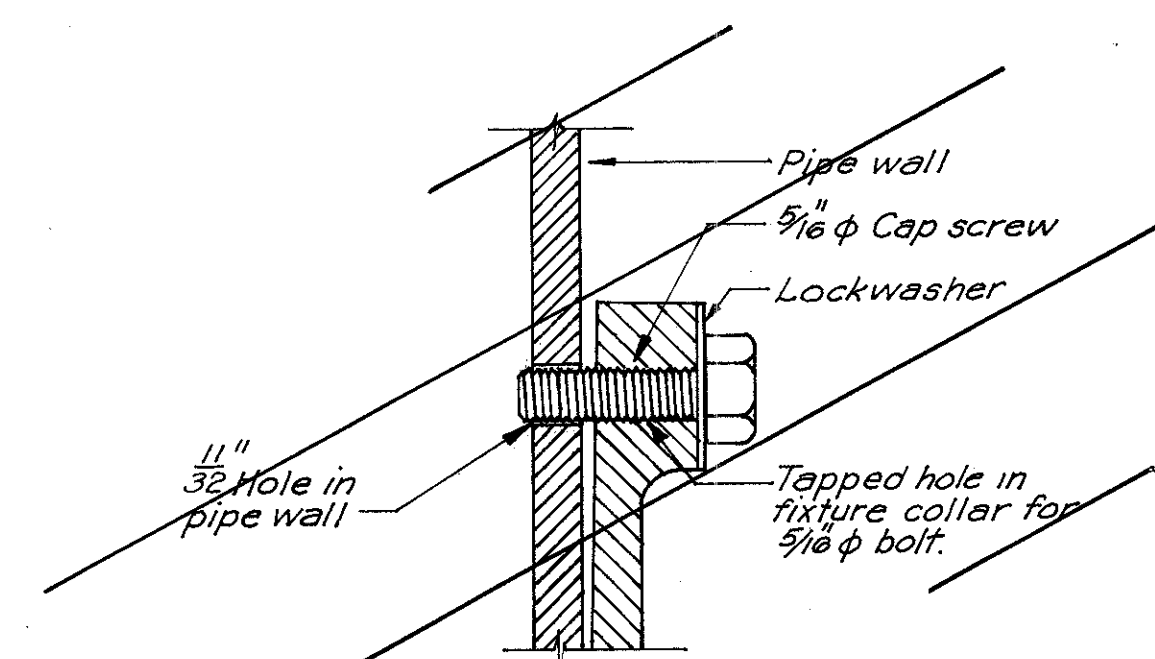
**UNDERDECK LIGHTING UNIT ON PIER CAP, TYPE "A" MOUNTING**  
Scale: 3/8"=1'-0"



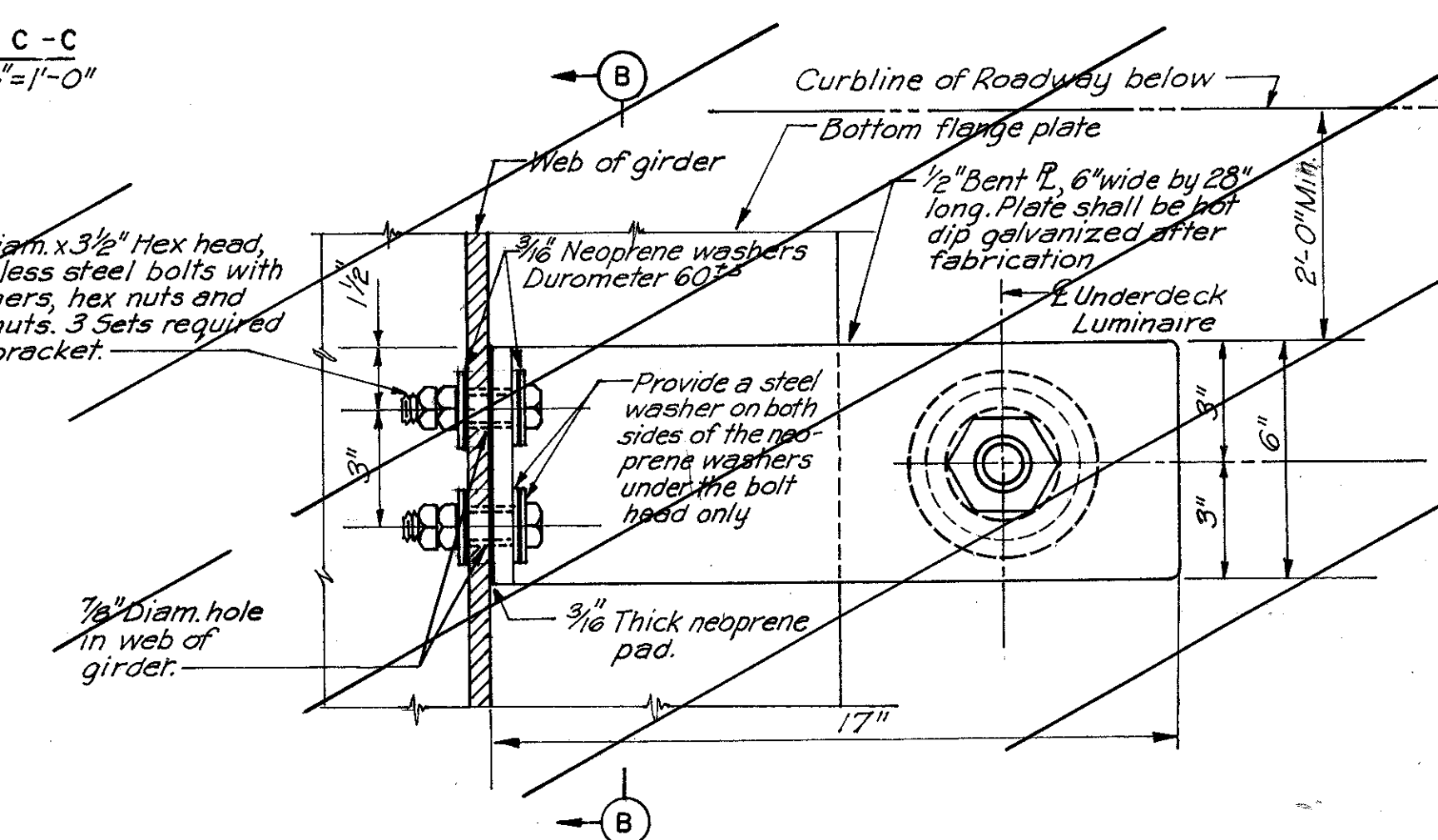
**SECTION C-C**  
Scale: 3/4"=1'-0"



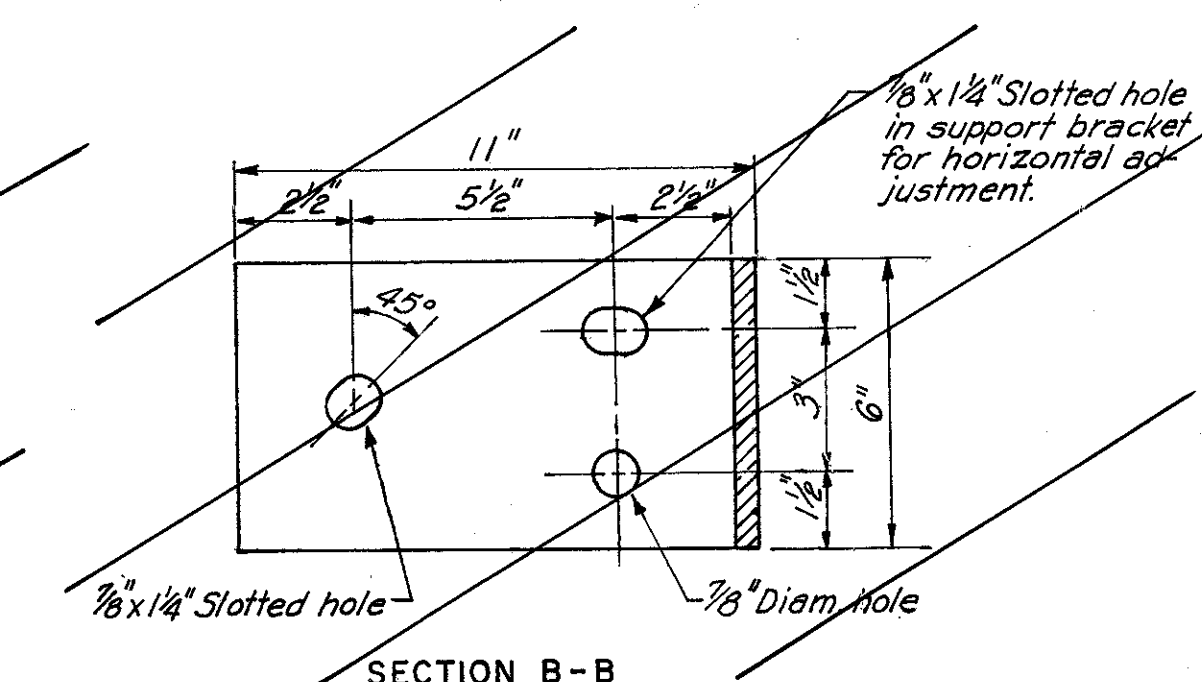
**DETAIL "C"**  
No Scale



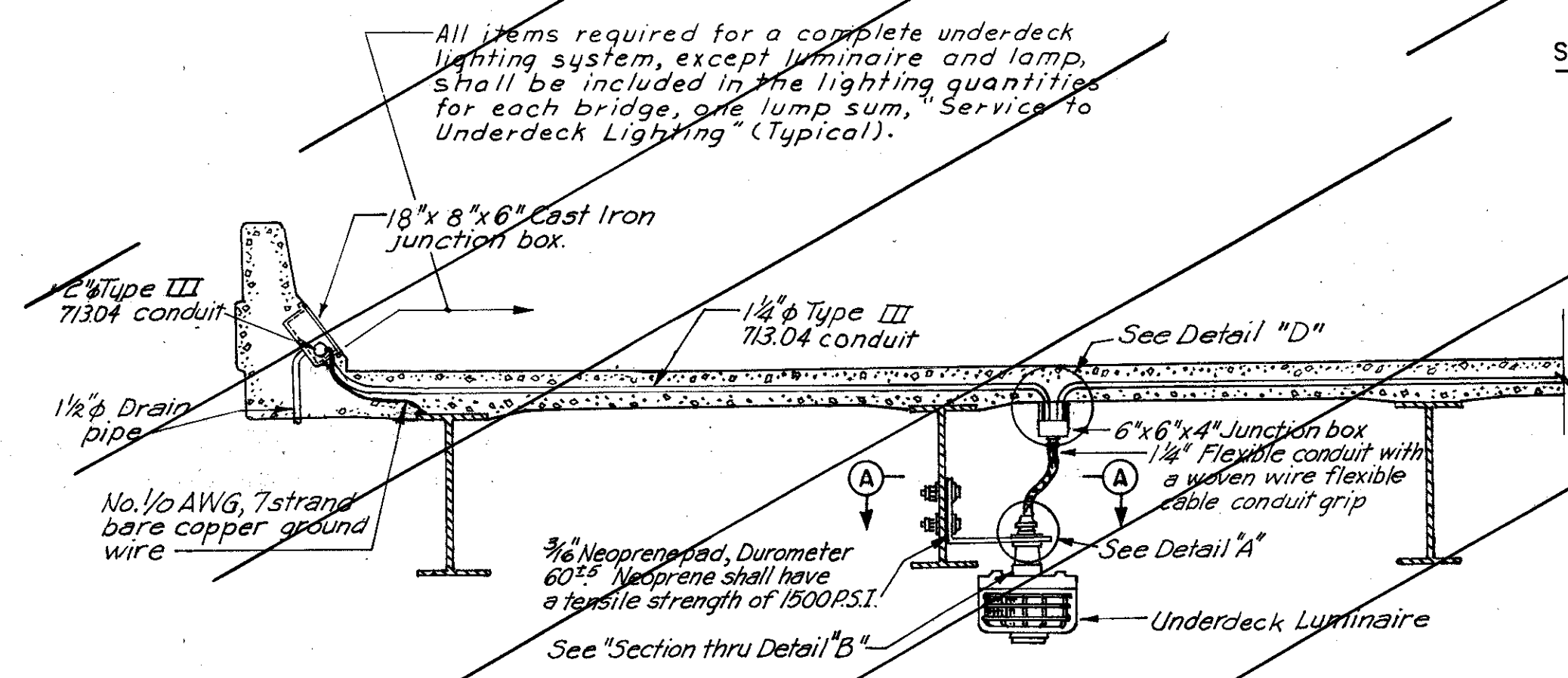
**SECTION THRU DETAIL "B"**  
Full Scale



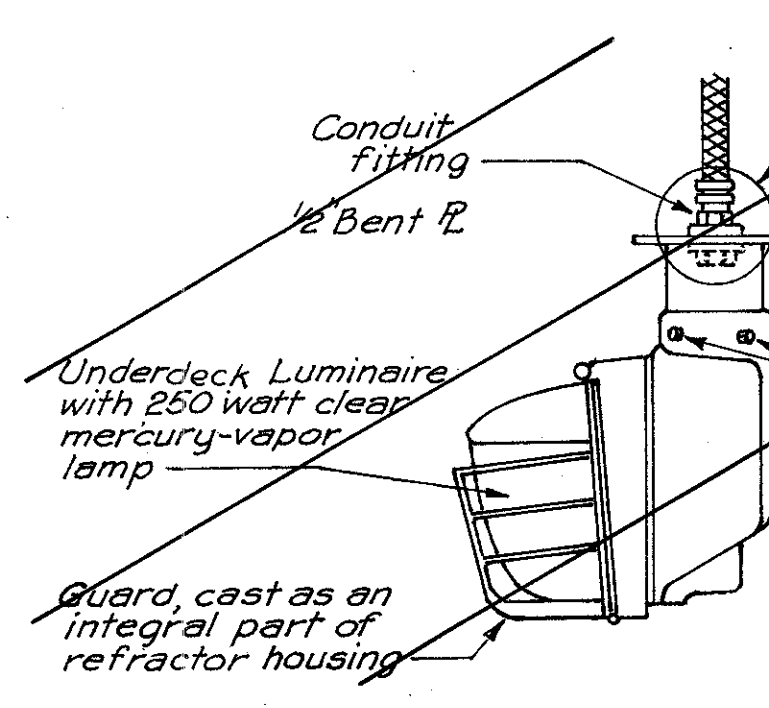
**SECTION A-A**  
No Scale



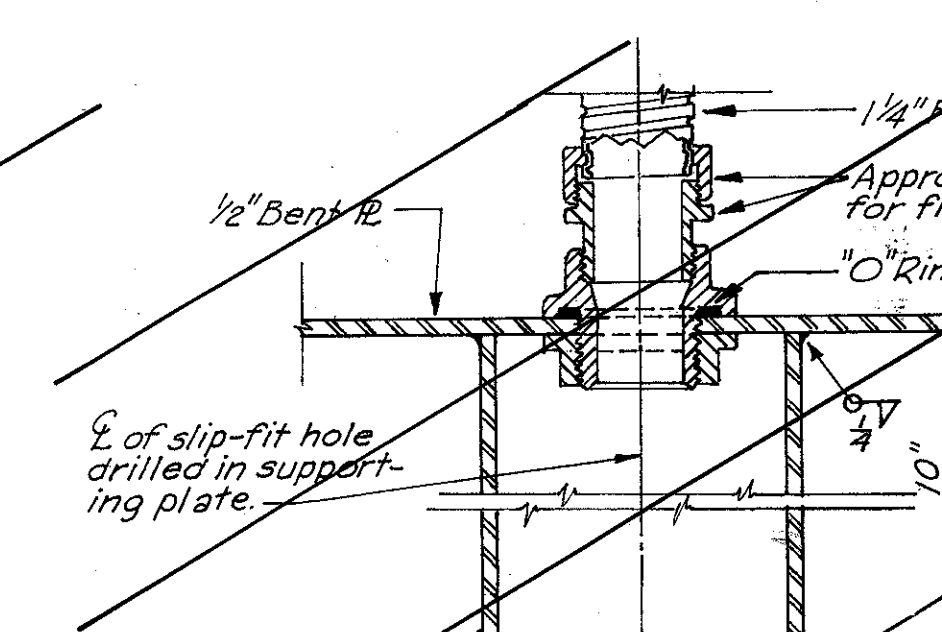
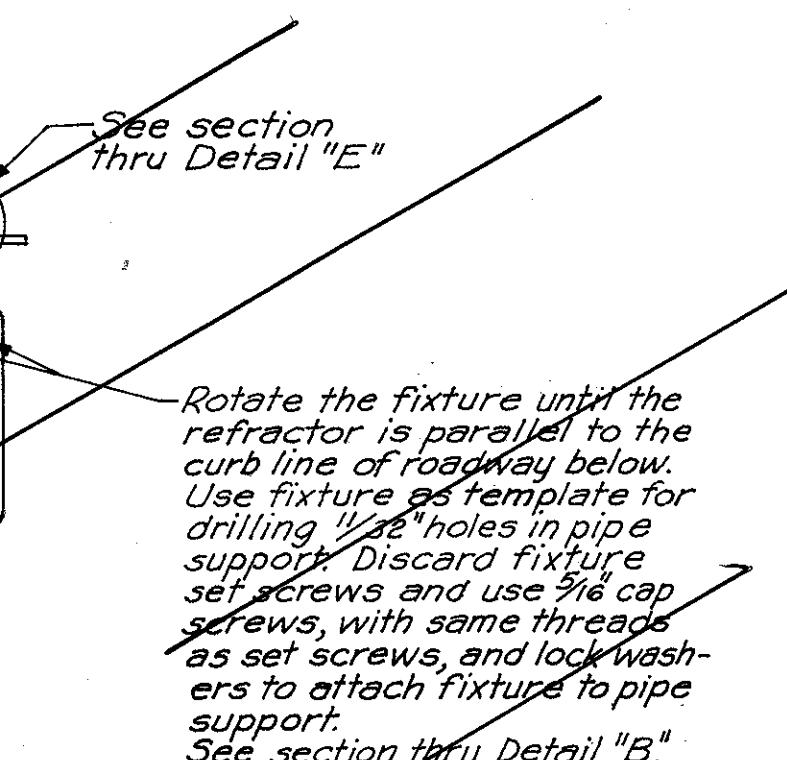
**SECTION B-B**



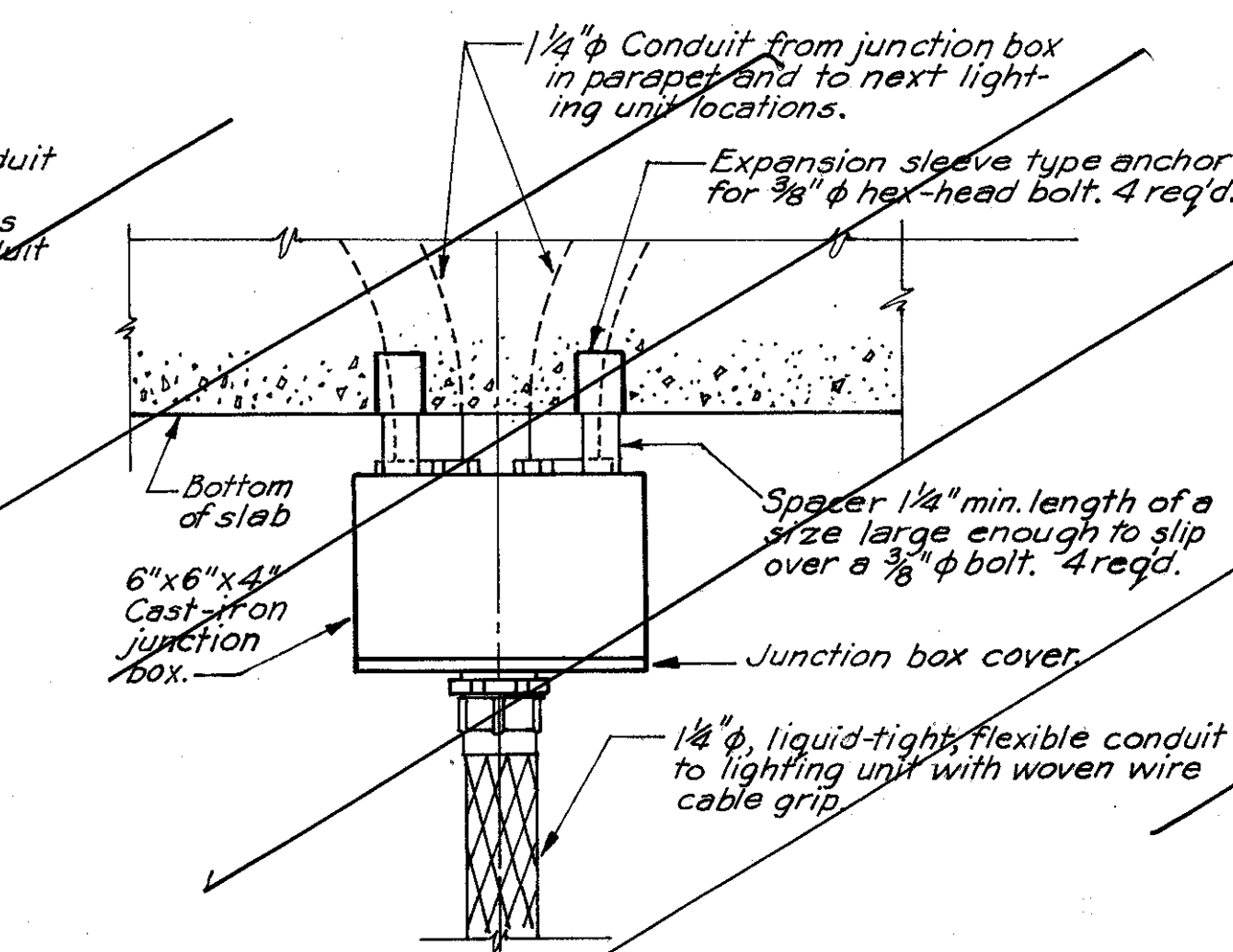
**UNDERDECK LIGHTING UNIT - TYPE "B" MOUNTING**  
Scale: 3/8"=1'-0"



**DETAIL "A"**  
No Scale



**SECTION THRU DETAIL "E"**  
No Scale



**DETAIL "D"**  
Scale: 3/8"=1'-0"

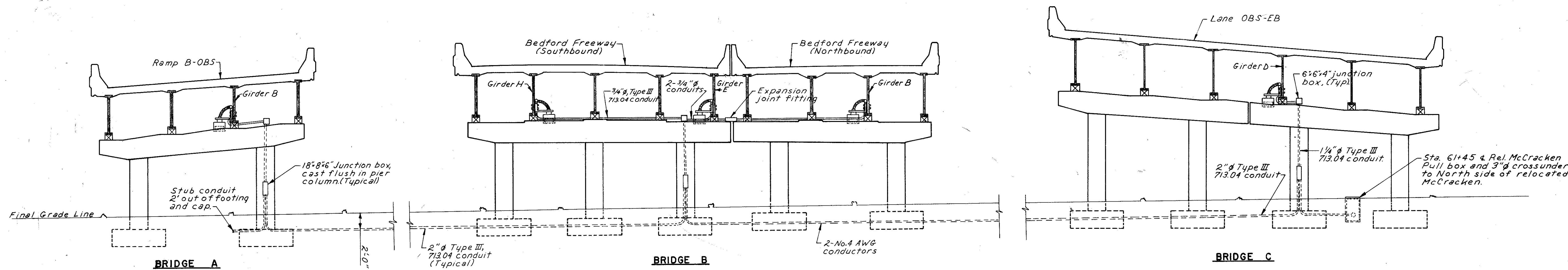
SCALE As Noted  
MADE C.Y. DATE 4-30-70  
TRCD. C.Y. DATE 4-30-70  
CKD. L.W.L. DATE 6-13-72  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
CLEVELAND NEW YORK

**UNDERDECK LIGHTING DETAILS**  
Rev. 1-9-74

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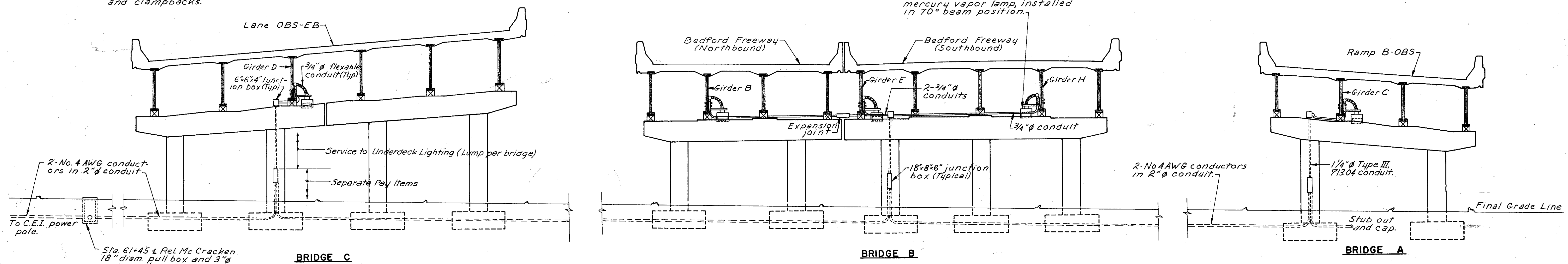
**SOUTH OF PIER 2 - LOOKING NORTH**

Note:  
Flexible conduit to be 3/4" liquid tight, with a woven wire flexible cable conduit grip and approved connectors.  
All rigid conduit on pier caps and/or girders to be supported at 6'-0" min. centers with approved J-hole clamps and clampsbacks.

Note:  
Install one Type VIII, unfused connector in each conductor at the pier column junction box. No 10 AWG conductors from pier column junction box to underdeck luminaires.

Note:  
Underdeck luminaires to be 3'-0" outside of roadway and minimum of 15'-0" above edge of roadway. Luminaire to be positioned so beam is perpendicular to centerline of roadway being illuminated.

Typical Underdeck Luminaire over Rel. McCracken, with Integral 120 Volt ballast for 250 Watt clear mercury vapor lamp, installed in 70° beam position.



**NORTH OF PIER 1 - LOOKING SOUTH**

**UNDERDECK LIGHTING FOR RELOCATED McCracken ROAD**

Note:  
All underdeck luminaires over Relocated McCracken at Bridges A, B, & C are to be ballasted for 120 Volt operation.  
Mounting of luminaires to bridge girder shall be identical with Type B mounting except that electrical service conduits will be run along the top of the pier caps and/or along the girders.

SCALE None HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE C.C.G. DATE 7-1-72 CONSULTING ENGINEERS  
TRCD C.C.G. DATE 7-1-72  
CKD LWL DATE 8-4-72 KANSAS CITY CLEVELAND NEW YORK

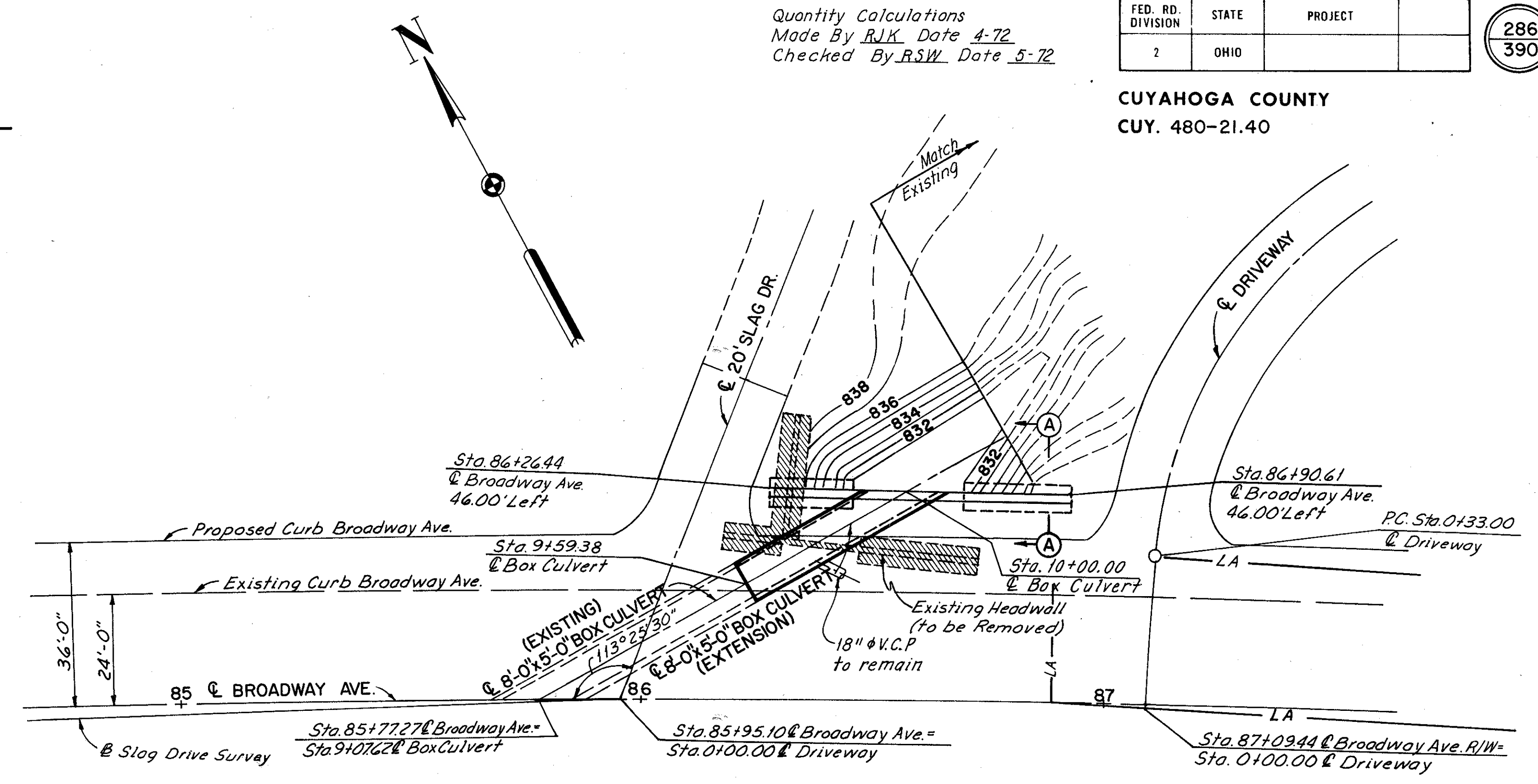
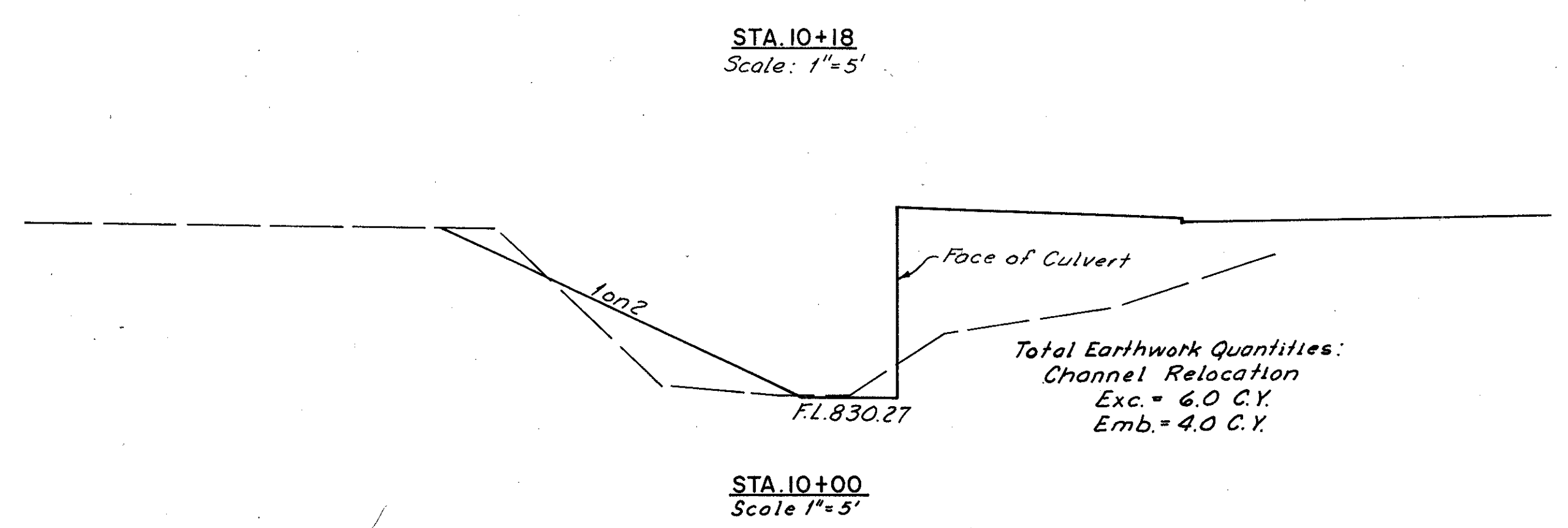
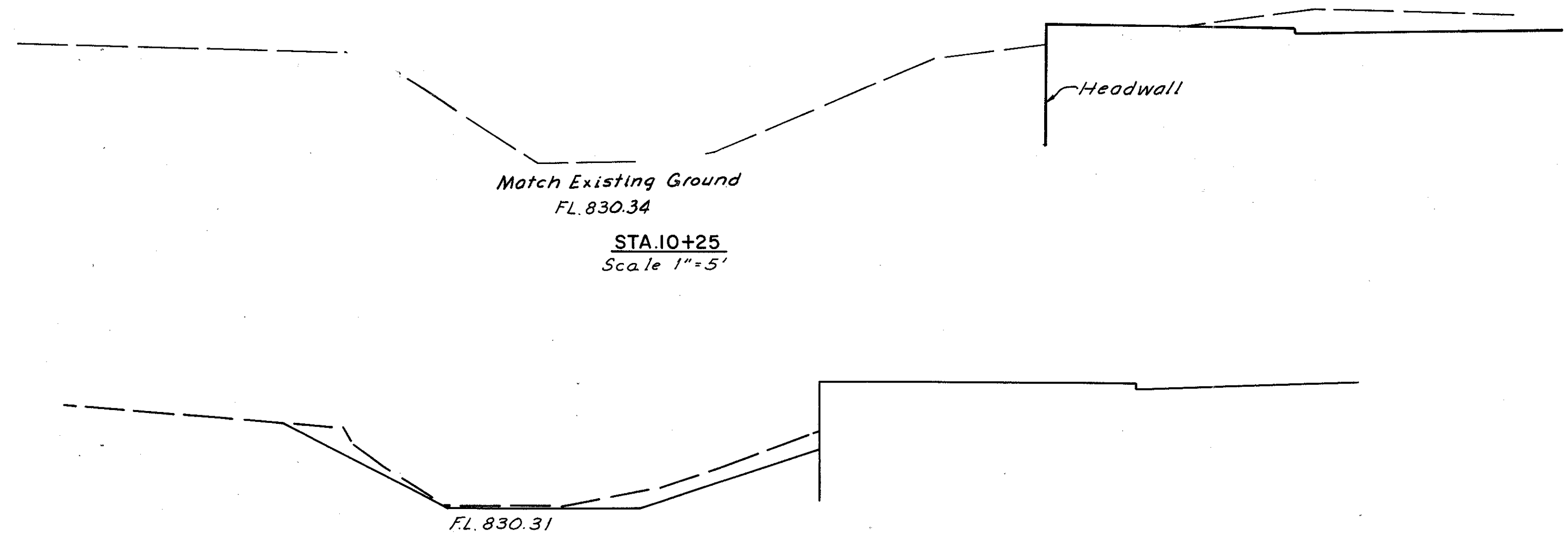
U-7  
L-7

Quantity Calculations  
Made By RJK Date 4-72  
Checked By RSW Date 5-72

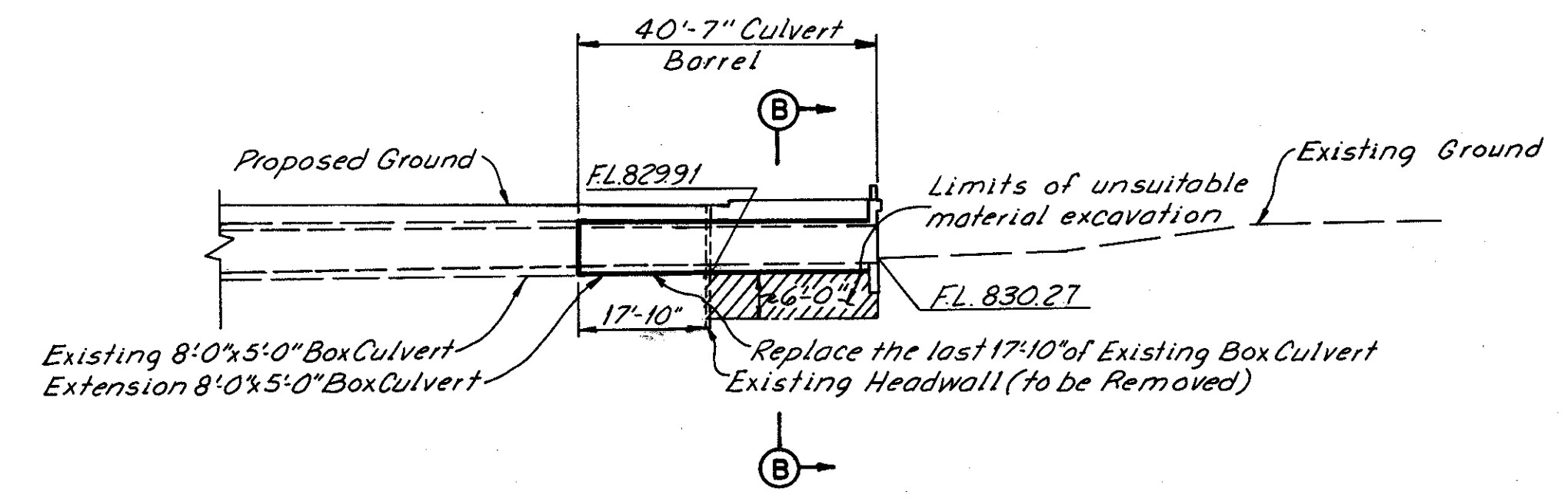
FED. RD. DIVISION	STATE	PROJECT
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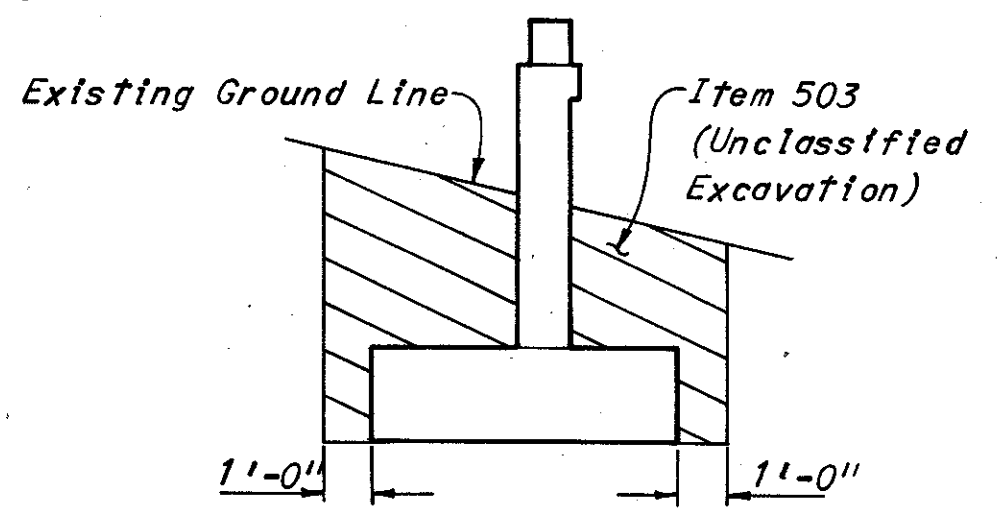
CUYAHOGA COUNTY  
CUY. 480-21.40



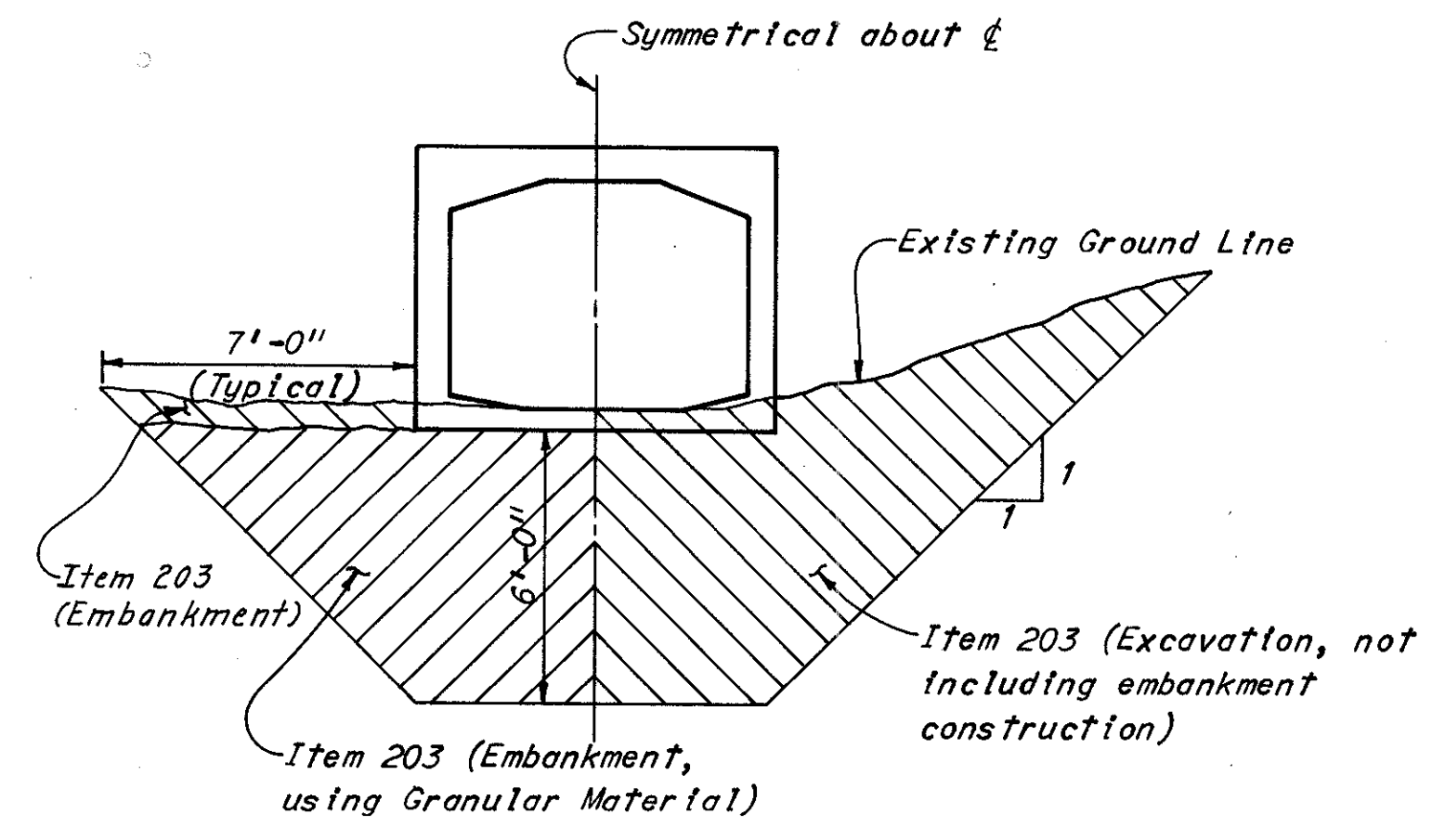
PLAN  
Scale: 1"=20'



ELEVATION  
Scale 1"=20'



SECTION A-A  
No Scale



SECTION B-B  
No Scale

After the above excavation is completed, backfill to the level of the bottom of the culvert with well compacted "Granular Material" as defined in Section 203.02.

ESTIMATED QUANTITIES			
ITEM	TOTAL	UNIT	DESCRIPTION
202	Lump	Lump	Portion of Structures Removed
203	87	Cu. Yd.	Excavation, not including embankment construction
203	23	Cu. Yd.	Embankment
203	81	Cu. Yd.	Embankment, using Granular Material as per plan
503	113	Cu. Yd.	Unclassified Excavation
509	14,809	Pounds	Reinforcing Steel
511	100	Cu. Yd.	Class "C" Concrete
512	20	Lin. Ft.	Premolded Sealing Strip
517	65	Lin. Ft.	Railing (Bridge Sidewalk)
Special	Lump	Lump	Cleanout and Repair to Existing Box Culvert

Quantity Calculations  
Made By RJK Date 4-21-72  
Checked By RSW Date 5-1-72

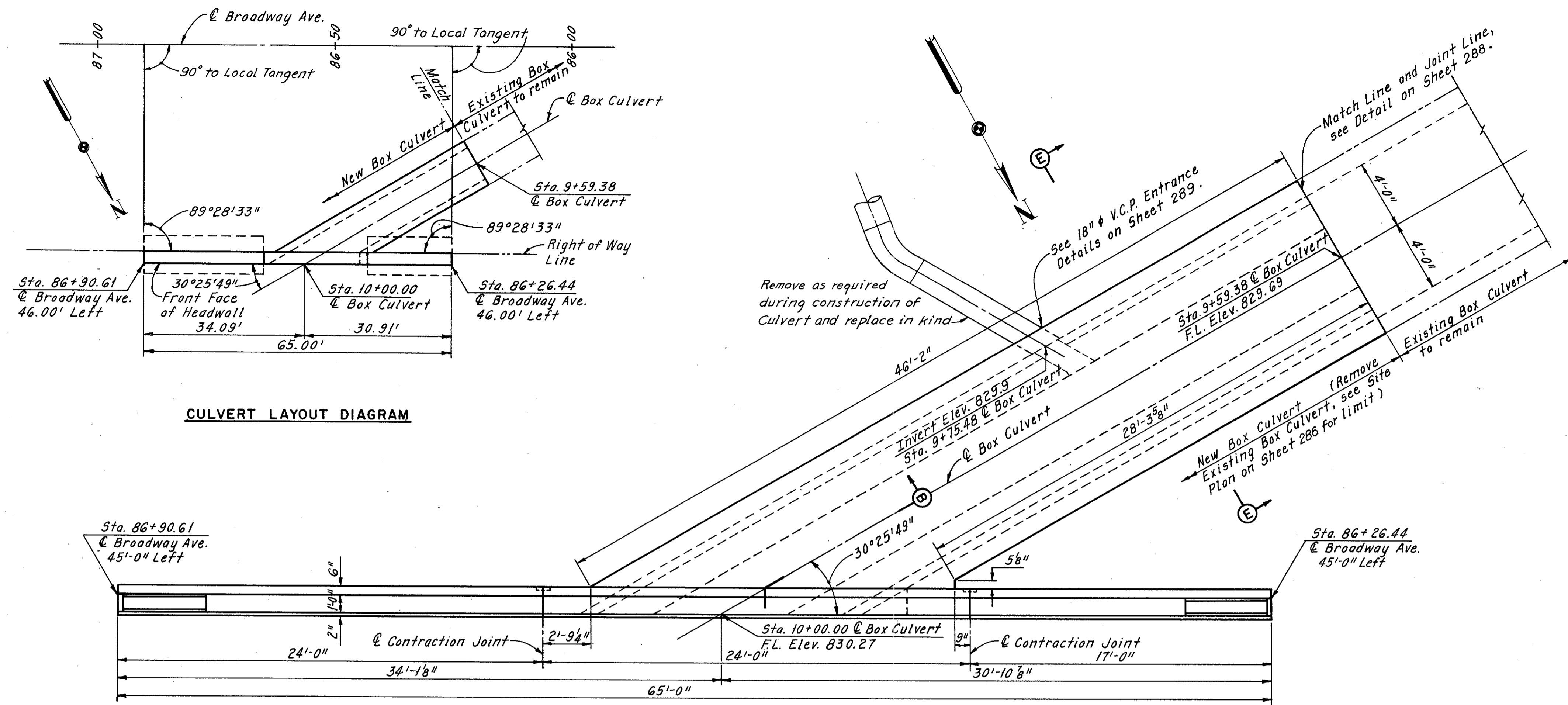
Notes:  
Item 202 includes 62 cu. yds. of concrete and 108 ft. of 2 1/2" Galvanized Wrought Iron Pipe Handrail Removal.  
The Class "C" Concrete shall have a unit stress of 1333 psi.  
The embankment above existing ground at headwalls and culvert is included with roadway embankment for payment.  
The Item Special, Cleanout and Repair to Existing Box Culvert includes the removal and disposal of all sediment from the bottom slab; the removal of the overlaying material at top slab joints, sealing the joint with Type A Waterproofing in accordance with 512.05 and replacing the overlaying material in kind; and the repair to honeycombed areas of the existing culvert walls and top slab with pneumatically placed mortar in accordance with 520.  
All work shown on this sheet is in Participation I.

SCALE: 1"=20'  
MADE BY RJK DATE 04-21-72 CONSULTING ENGINEERS  
TRCD BY RJK DATE 4-21-72 ANSAS CITY CLEVELAND NEW YORK  
CHKD BY RSW DATE 05-01-72

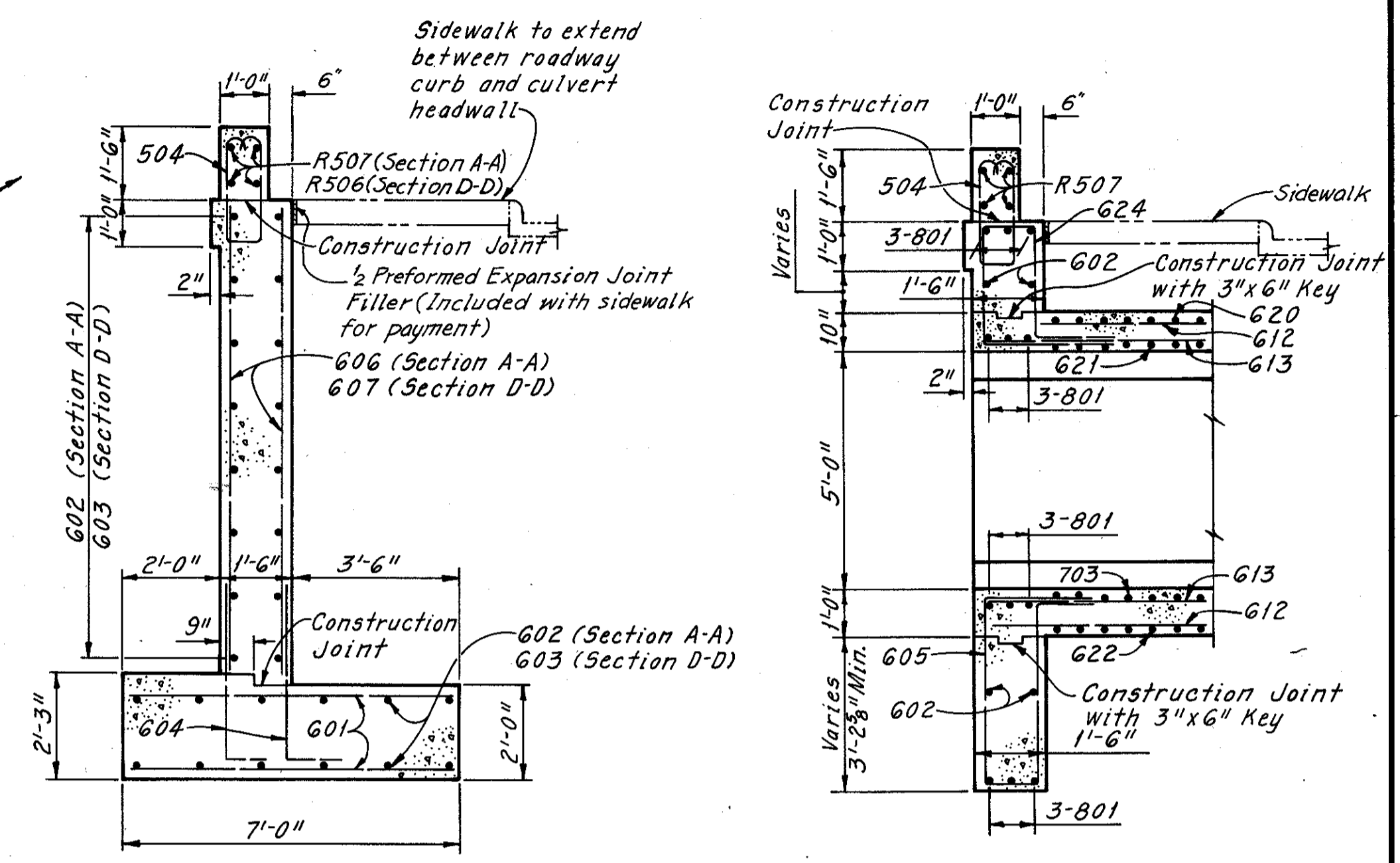
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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CUYAHOGA COUNTY  
CUY-480-21.40



CULVERT LAYOUT DIAGRAM

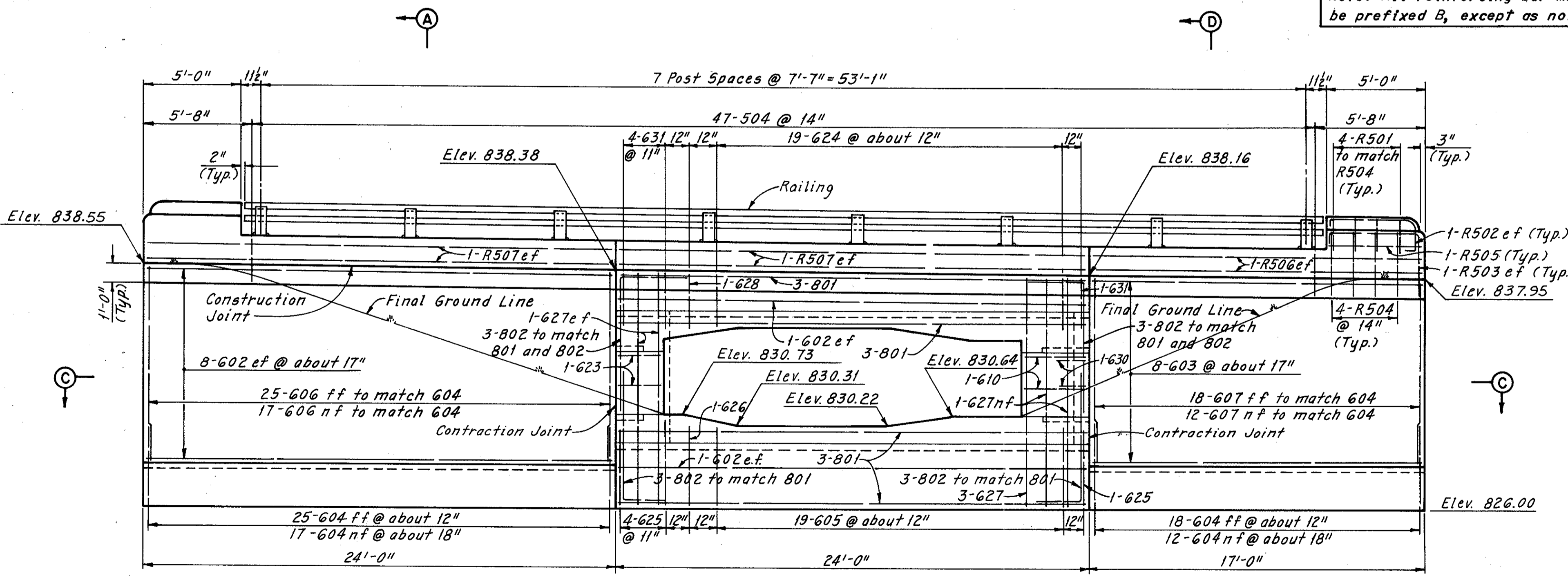


SECTION A-A  
(SECTION D-D similar, except as noted)  
(Railing not shown)

PART SECTION B-B  
(Railing not shown)

PLAN  
(Railing and Footings under  
sidewalls not shown)

Note: All reinforcing bar marks shall be prefixed B, except as noted.



ELEVATION

**RAILING NOTES:**

Railing shall be fabricated in lengths not less than three panels unless otherwise shown, and finished railing shall be free of burrs, sharp corners and rough surfaces.

Railing posts shall be normal to grade.

Payment for railing shall be made at the contract unit price bid for "Item 517". Pay length shall be the overall length of the parapets and shall include cost of anchor bolts, set screws, nuts, shims, etc., necessary to complete the installation of railing. Concrete, expansion joint material, longitudinal reinforcing steel, and end post reinforcing steel in the parapets shall be included with "Item 517" for payment. All other reinforcing steel in the parapets shall be included with "Item 509" for payment.

For additional Railing, Parapet and End Post Details and Notes, see Ohio Standard Drawing BR-2-67, Revision 10-15-71. Guard rail anchor bolts are not required at either end. For Railing Reinforcement Schedule see Sheet 289.

**Notes:**

Embankment shall be placed symmetrically on both sides of the culvert after the top slab is in place. Embankment over the barrel shall be placed in horizontal layers simultaneously with that on each side of the culvert.

For Sections C-C and E-E see Sheet 288.

For Existing 18" Sewer Entrance Details and Reinforcement Schedule, see Sheet 289.

The following abbreviations are used:

- ef = each face
- nf = near face
- ff = far face

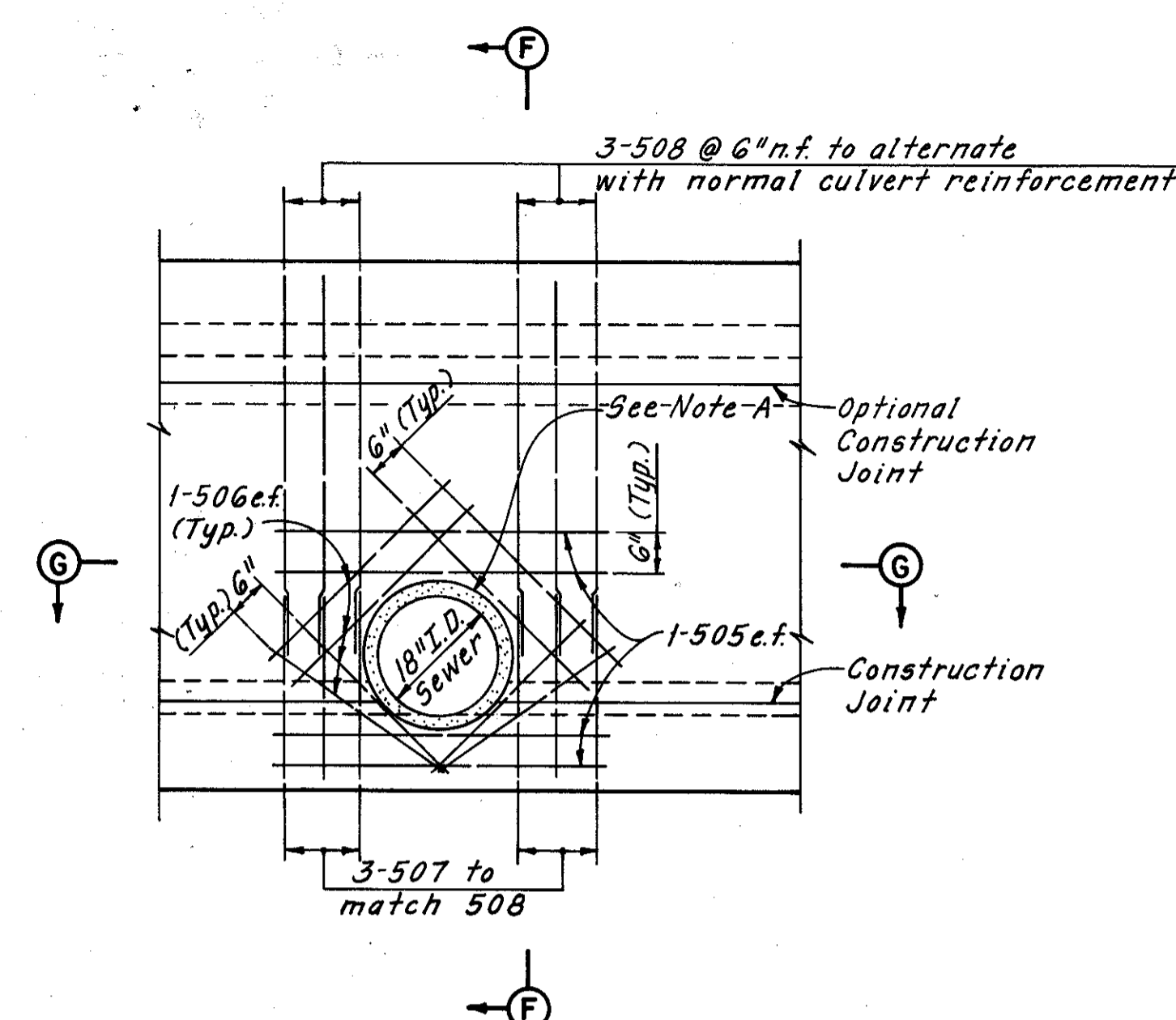
**FOUNDATION NOTE:**

Foundation material of approximately uniform bearing capacity is contemplated. Spots of soft earth shall be removed and be replaced with thoroughly compacted granular material.

SCALE: 1"=10'-0"  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
MADE 5/15/72 DATE 4-17-72 CONSULTING ENGINEERS  
TRCD, WB DATE 4-19-72  
CKD, DHS DATE 4-25-72 KANSAS CITY CLEVELAND NEW YORK

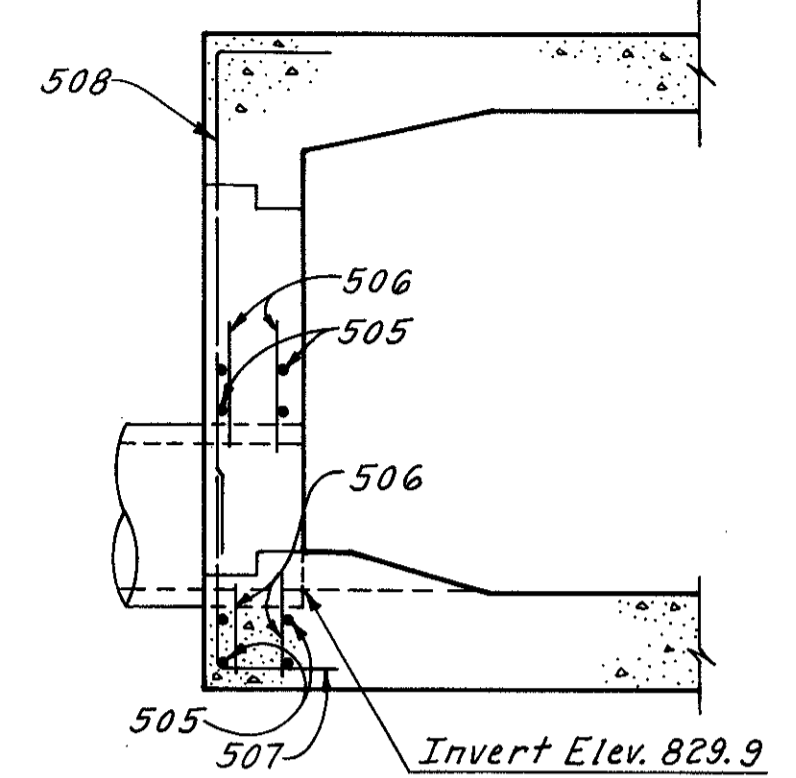


CUYAHOGA COUNTY  
CUY.-480-21.40



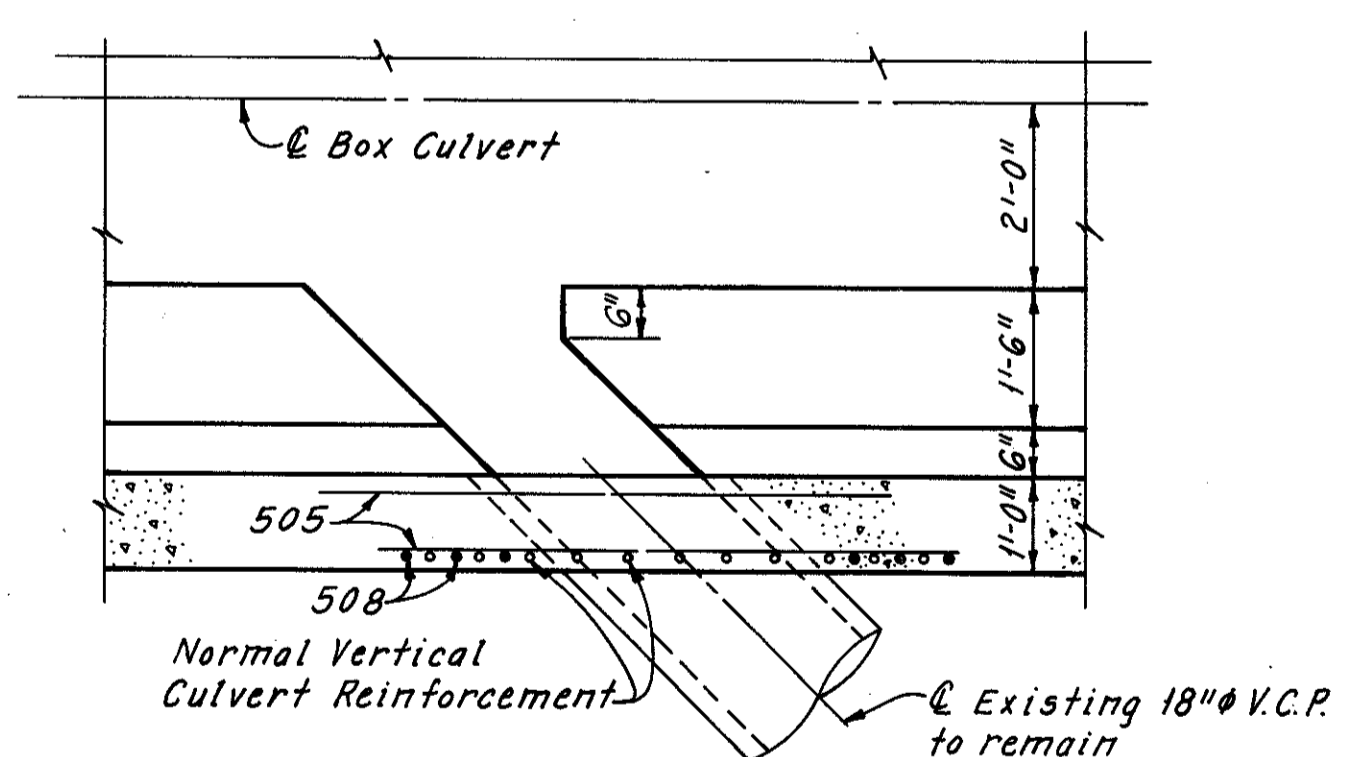
ELEVATION

Note A: Provide 2-3/4" layers (full thickness of wall) of Item 705.03, Preformed Filler material (Included with concrete for payment).



SECTION F-F  
(Normal Box Culvert Reinforcement not shown)

Note: All reinforcing bar marks shall be prefixed B, except as noted.



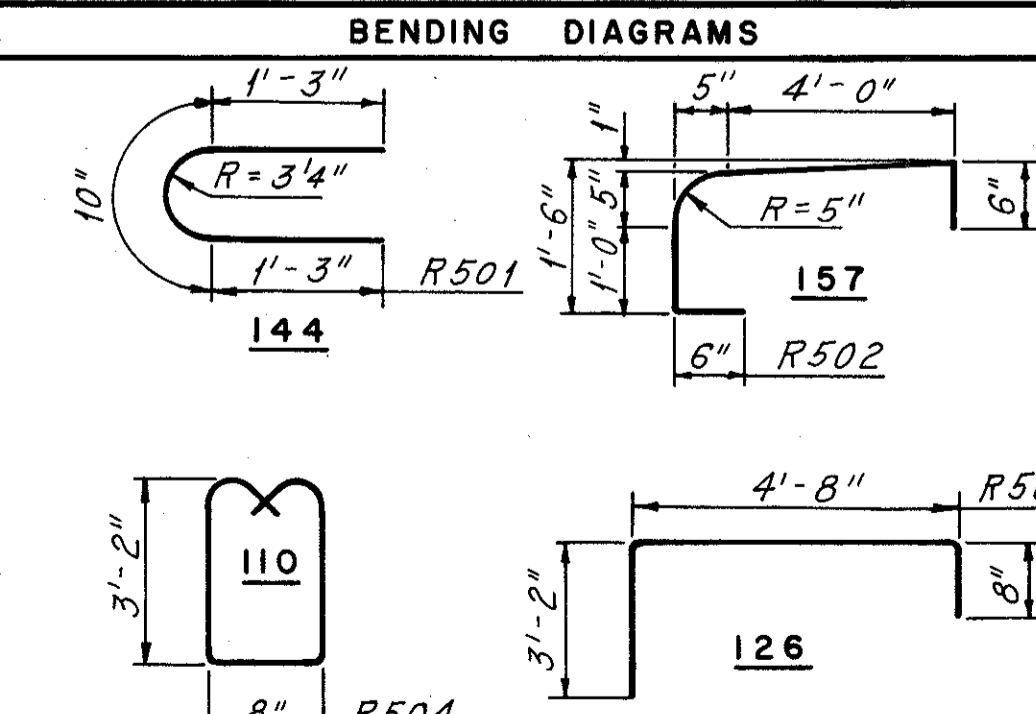
SECTION G-G  
(506 bars not shown)

EXISTING 18" SEWER ENTRANCE DETAILS

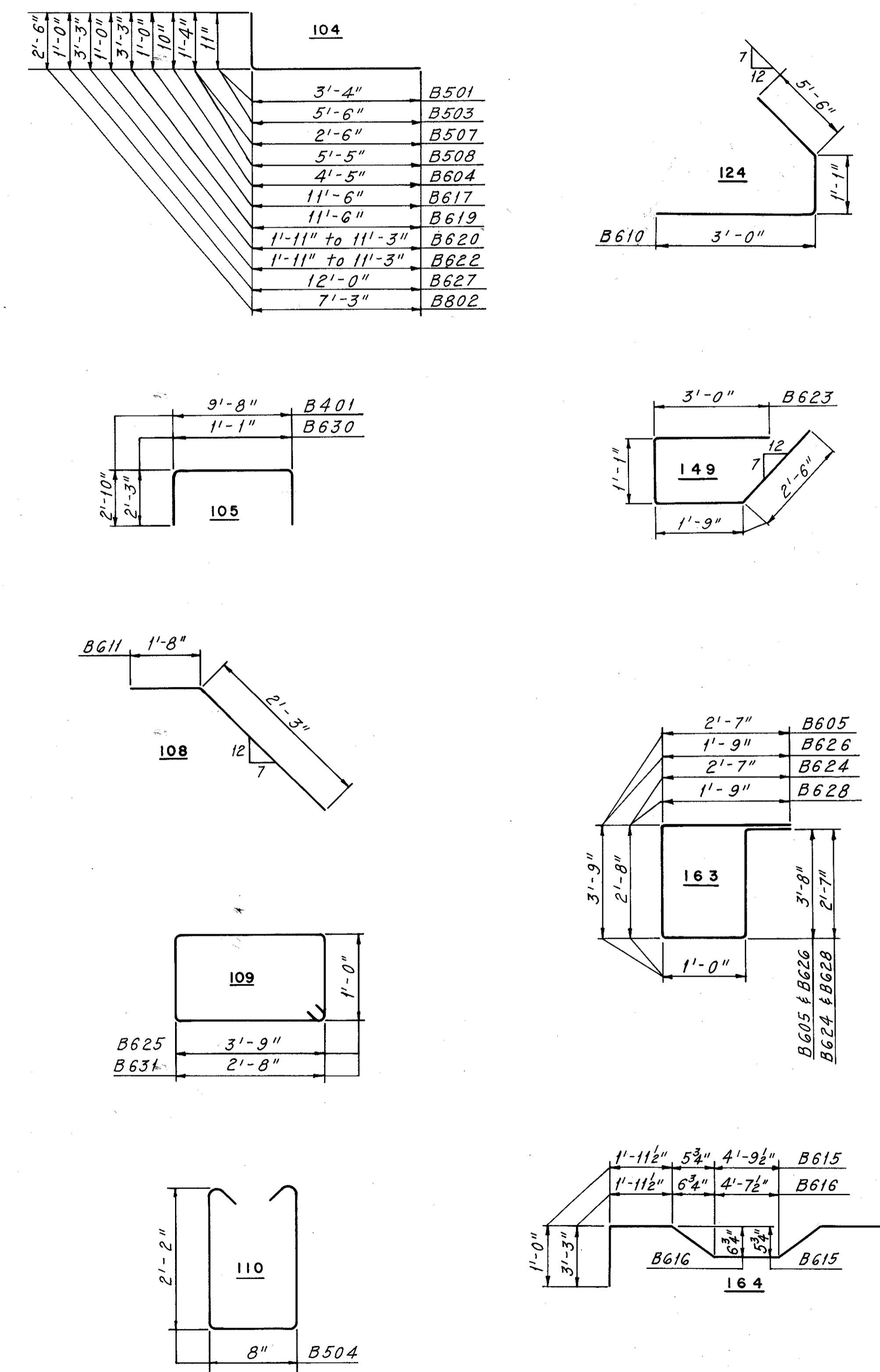
REINFORCEMENT SCHEDULE					
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS)
B401	29	15'-1"	105		292
B402	29	9'-6"	Str.		184
B501	34	4'-1"	104		145
B502	33	5'-0"	Str.		172
B503	151	6'-4"	104		997
B504	47	5'-7"	110		274
B505	8	4'-6"	Str.		38
B506	16	3'-3"	Str.		54
B507	6	3'-9"	104		23
B508	6	6'-8"	104		42
B601	86	6'-6"	Str.		840
B602	32	23'-6"	Str.		1,130
B603	28	16'-6"	Str.		694
B604	72	5'-1"	104		550
B605	19	12'-0"	163		342
B606	42	10'-0"	Str.		631
B607	30	9'-9"	Str.		439
B608	38	28'-0"	Str.		1,598
B609	8	22'-6"	Str.		270
B610	2	9'-4"	124		28
B611	2	3'-10"	108		12
B612	2 Ser. 6	9'-6" 18'-6"	Str. 1'-9"		252
B613	2 Ser. 5	10'-0" 18'-0"	Str. 2'-0"		210
B614	29	9'-6"	Str.		414
B615	28	11'-5"	164		480
B616	28	16'-0"	164		673
B617	2	12'-4"	104		37
B618	2	11'-3"	Str.		34
B619	2	14'-7"	104		44
B620	1 Ser. 32	2'-9" 12'-1"	104 3 5/8"		356
B621	1 Ser. 32	1'-9" 11'-0"	Str. 3 9/16"		306
B622	1 Ser. 32	5'-0" 14'-4"	104 3 5/8"		465
B623	2	7'-11"	149		24
B624	19	9'-10"	163		281
B625	5	10'-3"	109		77
B626	1	10'-4"	163		16
B627	9	12'-10"	104		173
B628	1	8'-2"	163		12
B629	4	7'-0"	Str.		42
B630	2	5'-3"	105		16
B631	5	8'-1"	109		61
B701	29	9'-6"	Str.		563
B702	2	10'-0"	Str.		41
B703	1 Ser. 32	1'-9" 11'-0"	Str. 3 9/16"		417
B801	12	23'-6"	Str.		753
B802	12	9'-7"	104		307
TOTAL WEIGHT =					14,809

REPLACEMENT BAR SCHEDULE			
Size	No.	Length	Type
4	1	6'-3"	Str.
5	1	6'-9"	Str.
6	1	7'-0"	Str.
7	1	7'-3"	Str.
8	1	7'-5"	Str.

RAILING REINFORCING STEEL				
MARK	NO.	LENGTH	WEIGHT	SHAPE
R501	8	3'-3"	144	
R502	4	6'-7"	157	
R503	4	8'-3"	126	
R504	8	7'-7"	110	
R505	4	4'-8"	Str.	
R506	4	16'-6"	Str.	
R507	8	23'-6"	Str.	



BENDING DIAGRAMS



1. DESIGN SPECIFICATIONS

These structures conform to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Officials, 1969, including the 1970 Interim Specifications and the Ohio "Supplement" to these specifications. The design loadings are HS 20-44 and the Interstate Alternate Loading for Bridges No. 6 and 7 and HS 20-44 for Bridges No. 8, 13L & R and 14.

The class of concrete and the grades of structural steel and reinforcing steel, together with the working stresses for each are as follows:

- Concrete, Class C - Superstructure - basic unit stress 1,200 p.s.i.
- Concrete, Class C - Abutments, Piers and Footings - basic unit stress 1,333 p.s.i.
- Structural Steel (Bridge No. 6) - ASTM A588 Unpainted - basic unit stress 27,000 p.s.i.
- Structural Steel (Bridges No. 7, 8, 13L and R and 14) - ASTM A36 - basic unit stress 20,000 p.s.i.
- Reinforcing Steel - ASTM A615, A616 or A617 - unit stress 20,000 p.s.i..  
If bars in accordance with ASTM A616 are provided they shall be subject to bend tests as per AASHTO Designation M42-70.  
Spiral reinforcement may be plain bars ASTM A82, A306, A499 or A615.

2. SUPPLEMENTAL SPECIFICATIONS

Reference shall be made to Supplemental Specifications No. 808, Chemical Admixture for Concrete, Type A, B or D, dated 1-1-71, No. 836, Concrete Curing and Protective Membrane, dated 1-1-71, and to No. 838, Special Pile Tests, dated 3-18-70

3. REFERENCE DRAWINGS

Reference shall be made to Standard Drawings RB-1-55 revised 2-2-59, BR-1-67, Revised 10-15-71 (Sheet 1 of 3), SD-1-69 dated 6-12-69 (Sheets 1 thru 4 of 4), and to AS-1-67 revised 6-12-69.

4. DIMENSIONS

Dimensions given are measured horizontally and at 60°F. unless otherwise noted.

5. UTILITIES

Any existing privately owned utility facilities encountered at the site of the work which will interfere with portions of the finished roadways or structures shall be removed or relocated by the owner unless otherwise noted on the plans. All expenses involved in relocating the affected utility lines shall be borne by the Owner. The Contractor and Owner are requested to cooperate by arranging their work in such a manner that inconvenience to either would be held to a minimum.

6. CONCRETE DECK

- (a) The steel beams and girders shall be fabricated with camber, as specified on the plans, to compensate for the deflections due to weight of concrete and steel and for vertical curvature and superelevation of the roadway. The theoretical deflections are tabulated on the plans.
- (b) The final surface of the roadway shall conform to the elevations shown on the plans. To compensate for deflections due to dead load of the concrete, the screeds used to strike off the surface of the concrete to the final desired grade line shall be adjusted by amounts equal to deflections shown for this dead load. Screeds may require further adjustments due to irregularities in the fabricated steel. The theoretical top of pavement elevations at the gutter lines before the deflections from the concrete have occurred are tabulated on the plans.

(c) The depth of concrete over each beam or girder (top of concrete to top of flange or top of web) at the supports is given on the plans. The concrete slab shall be of uniform thickness between beams or girders with adjustments obtained by varying the thickness of the haunches over the beams or girders.

(d) The aforementioned depth of concrete over each beam or girder is the design dimension. The quantity of deck concrete to be paid for shall be based upon this dimension, even though deviation from it may be necessary because the top flange of the beam or girder may not have the exact camber or conformation required to place it parallel to the finished grade. Deduction shall be made for the volume of encased steel plates as per Section 511.18.  
(e) Texturing of the deck surface as provided in 451.09 shall not be done.

7. REINFORCING STEEL

(a) All bars are designated on the plans by bar numbers. The bar size is indicated by the first digit of three-digit numbers and by the first two digits of four-digit numbers.

All bar dimensions are given out to out.  
All bars of a series shall vary in length by a constant increment.

(b) The clear distance between reinforcing steel and face of concrete shall be 3" in footings, 2 1/2" at bar mats under shoes and 2" elsewhere unless otherwise shown on the plans.

8. CONSTRUCTION ADJACENT TO RAILROAD TRACKS (BRIDGE NO. 6)

Construction clearance of 20'-0" vertically above the top of the railroad rails and 8'-0" horizontally from the center of tracks shall be maintained at all times.

Railroad aerial lines will be relocated by the Railroad. The Contractor shall use all precautions necessary to see that the lines are not disturbed during the construction stage and shall cooperate with the Railroad in the relocation of these lines. The cost of the relocation shall be included in the railroad force account work.

9. ITEMS NOT INCLUDED IN BRIDGE PLANS

The following items are not included in the bridge plans. See Roadway Plans for details.

- (1) Grading and approach pavements and slabs.
- (2) Curb transition at end of wingwalls.
- (3) Relocation or removal of existing utilities.
- (4) Lighting.

10. APPROACH SLAB JACKING HOLES shown on Standard Drawing AS-1-67 need not be provided.

H. N. T. B. BR. NO.	STATE BR. NO.	DESCRIPTION
6	CUY-80-2140	I-80 Over Penn-Central Railroad, Norfolk Western Railway and Mill Creek
7	CUY-80-2154	I-80 and Ramp B-OBS Over Broadway (S.R. 14)
8 13L & 13R	CUY-80-2169	I-80 Under Bedford Freeway Bedford Freeway and Ramp B-OBS Over Relocated McCracken Road
14	-	Lane OBS-E-B Over Relocated McCracken Road

H.N.T.B. BR. NOS. 6, 7, 8, 13L & R and 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES



CUYAHOGA COUNTY  
CUY-80-21.40

**PROPOSED STRUCTURE**

TYPE: Continuous steel girder with reinforced concrete deck and substructure.

SPAN: 96'-6", 100'-0", 110'-2 1/2", 110'-2 1/2", 87'-0"  
(All spans are measured along @ I-80).

ROADWAY: Width varies - 146'-0" to 150'-5 1/2" face to face of parapets with Concrete Barrier.

LOADING: HS 20-44 and Interstate Alternate Loading.

SKEW: Varies (See Plan).

WEARING SURFACE: 2 1/2" Asphalt concrete

APPROACH SLABS: AS-1-67 (25 feet long).

ALIGNMENT: Tangent.

SUPERELEVATION: 0.0156 ft. per ft. and varies.

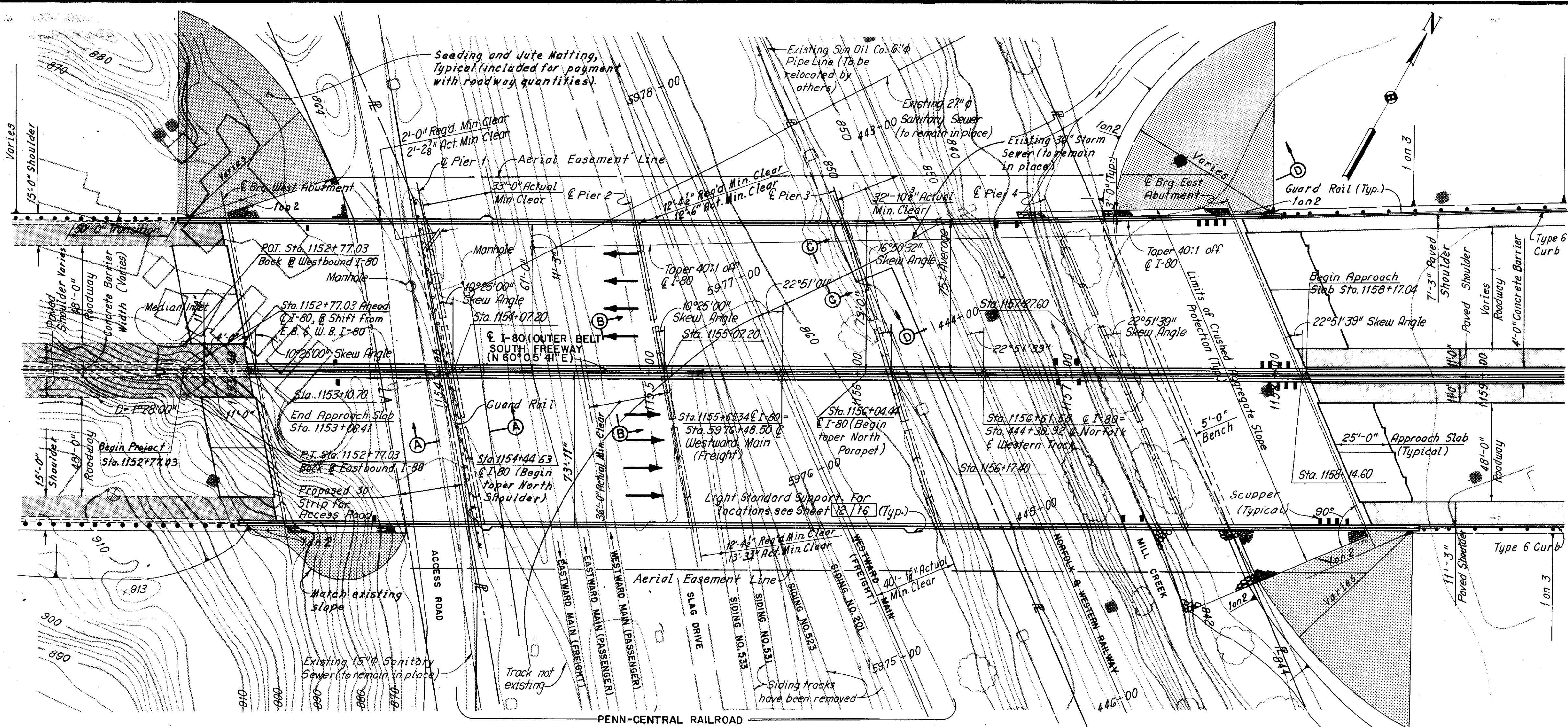
**TRAFFIC DATA**  
1991: 60,364 A.D.T.  
3,320 D.D.H.V.

**MAINTENANCE OF TRAFFIC - ACCESS ROAD**  
Two lanes of traffic with a minimum horizontal width of 20'-0" and a minimum vertical clearance of 13'-6" shall be maintained on the access road at all times.

**CURVE DATA**

**@ EASTBOUND I-80**

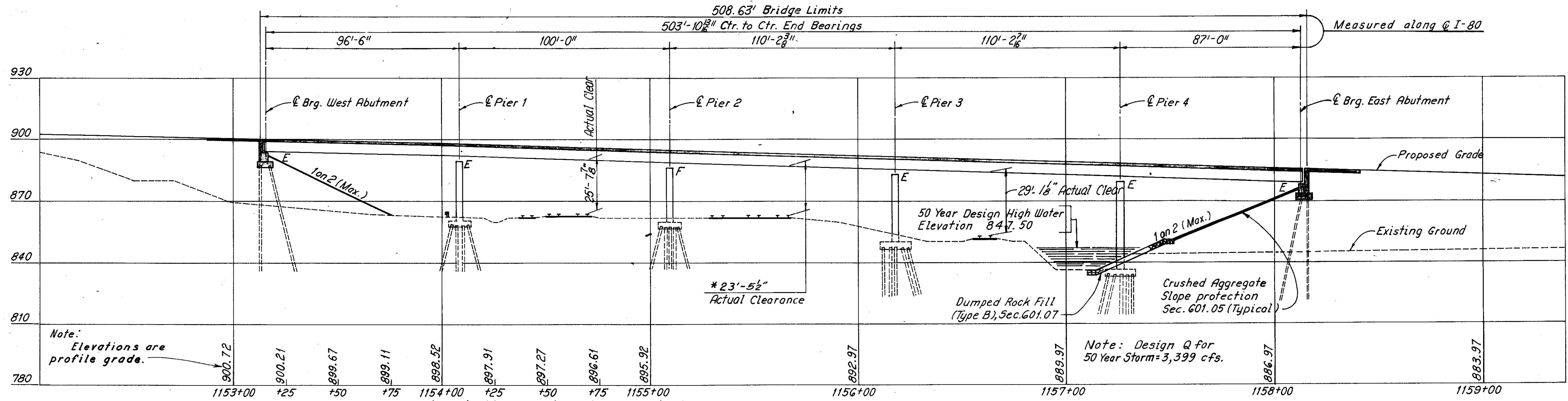
P. I. Sta.	= 1149+00.85
Δ	= 11°04'08"
D	= 1°28'00" Right
R	= 3,906.53'
T	= 378.53'
L	= 754.71'
E	= 18.30'



**PLAN**  
Scale: 1" = 30'-0"

Note: Earthwork limits shown are schematic.  
Actual slopes shall conform to plan cross-sections.

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**ELEVATION**  
Scale: Horiz. 1" = 30'-0"  
Vert. 1" = 30'-0"

\*Note: 23'-0" is the required minimum vertical clearance.  
Minimum vertical clearance occurs at the north rail of Westward main freight track and the outside edge of south exterior girder.

Notes: The embankments shall be constructed to the finish spill-thru slopes and to the level of the subgrades for a minimum distance of 200 feet back of the abutments before excavating or driving piles for the abutments and Pier 4.

All piles except at Pier 4 are 12" Ø cast-in-place reinforced concrete. All piles at Pier 4 are HP 12x53.

Piles at the abutments shall be driven to a minimum bearing capacity of 35 tons per pile and piles at the piers shall be driven to a minimum bearing capacity of 40 tons per pile.

The estimated average pay length of the piles are as follows:

- West Abutment = 53 feet
  - Pier 1 and Pier 2 = 23 feet
  - Pier 3 (North) = 20 feet
  - Pier 3 (Middle) = 23 feet
  - Pier 3 (South) = 25 feet
  - Pier 4 = 20 feet
  - East Abutment = 48 feet
- For Section A-A thru D-D see Sheet 2/16.

H.N.T.B. BR. NO. 6

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**SITE PLAN**

I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

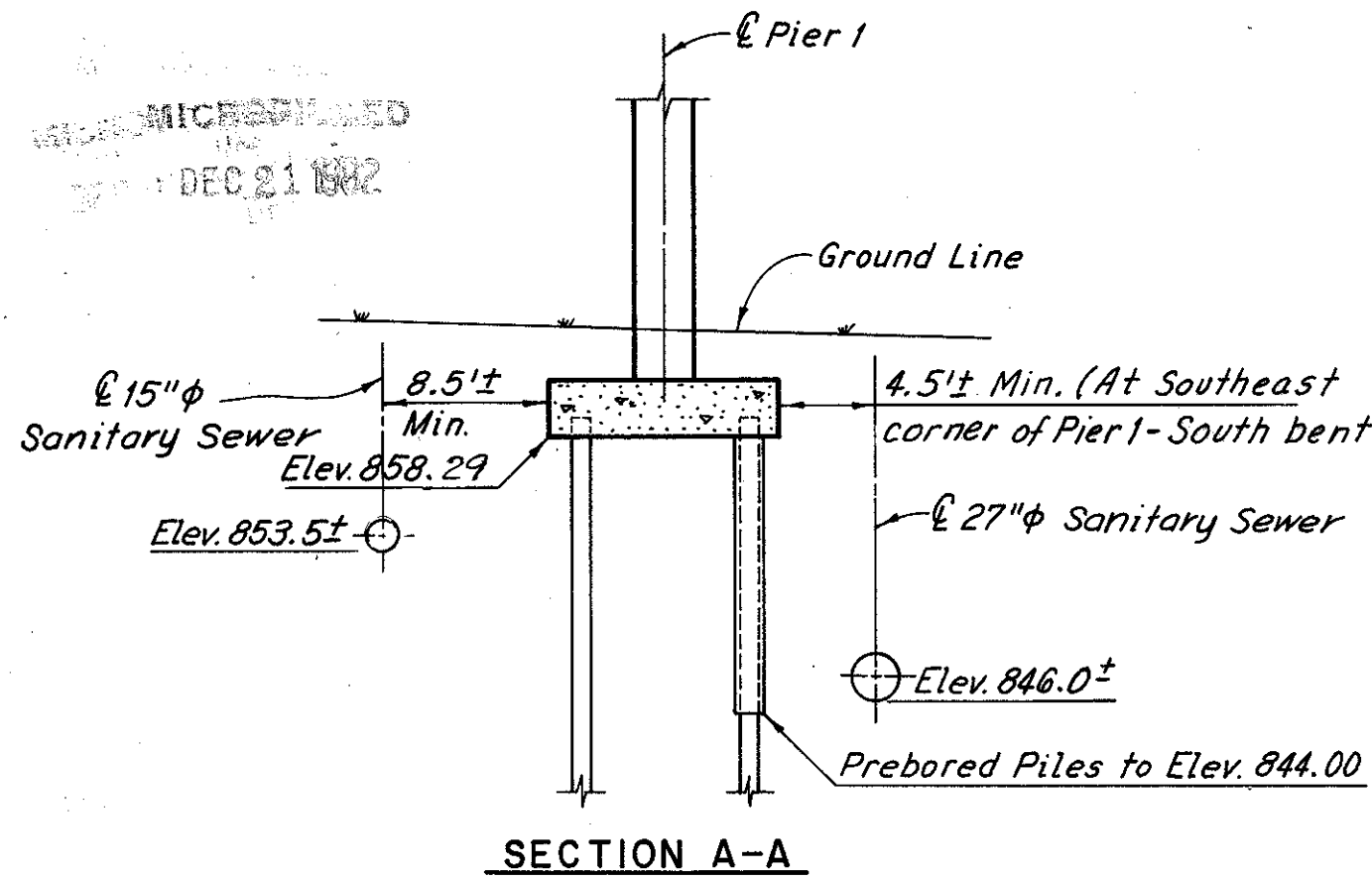
BR. NO. CUY-80-21.40 STA. 1153+08.41 TO STA. 1158+17.04

CUYAHOGA COUNTY OHIO

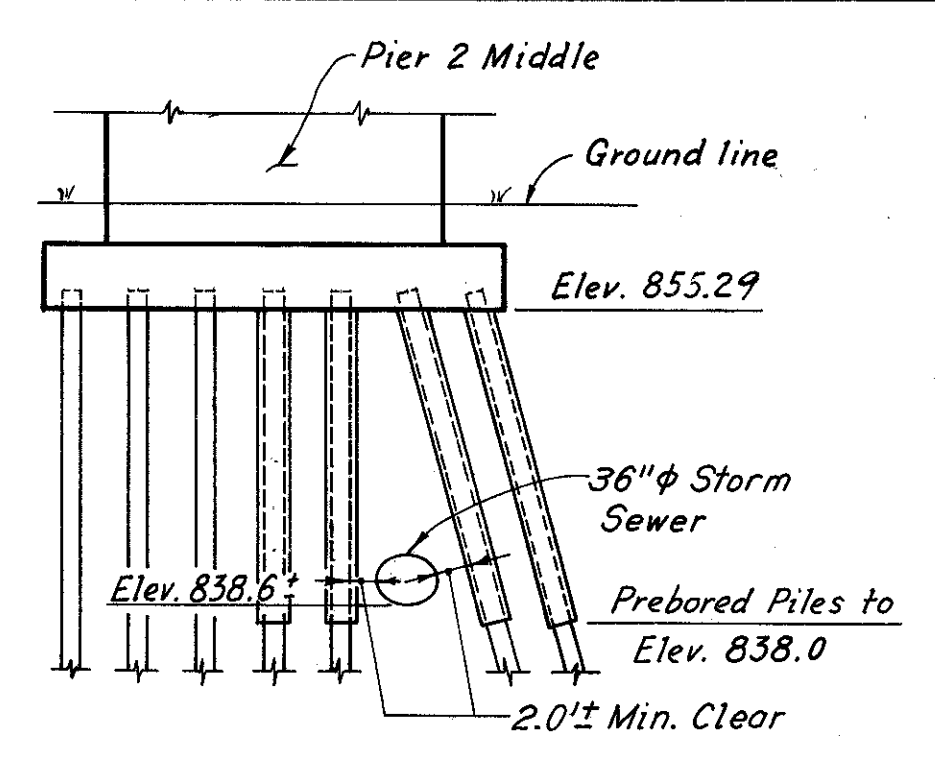
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DATE 8-30-67	DATE 5-22-70	DATE	DATE	DATE

SHEET 1/16

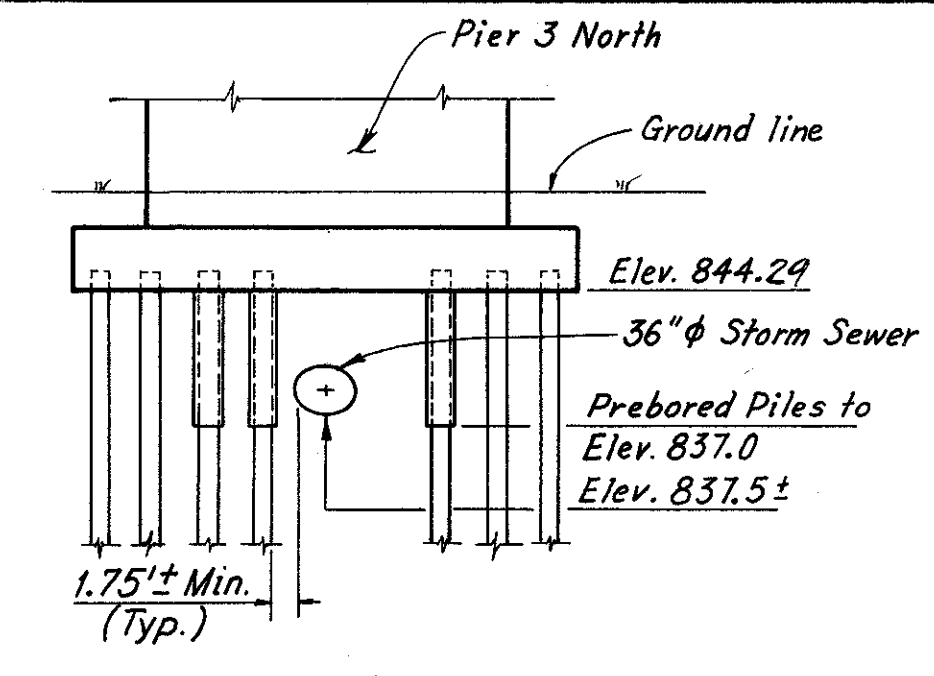
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DEC 21 1982



SECTION A-A



SECTION B-B  
South row of piles shown.



SECTION C-C  
South row of piles shown

Notes:  
For location of Sections A-A  
thru D-D see Sheet 7/16.  
See Sheet 7/16 for pile  
locations and batter.

Quantity Calculations  
Made By CAR Date 8-67  
Checked By DHS Date 5-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

CUYAHOGA COUNTY  
CUY-80-21.40

292  
390

ESTIMATED QUANTITIES				H.N.T.B. Bridge No. 6			
ITEM	TOTAL	UNIT	DESCRIPTION	ABUT- MENTS	PIERS	SUPER- STRUCTURE	GENERAL
503	2,014	Cu. Yd.	Unclassified Excavation	819	1,195		
503	Lump	Lump	Cofferdams, cribs and sheeting		Lump		
505	Lump	Lump	Test Pile				Lump
506	Lump	Lump	Pile Test Load				Lump
506	One	Each	Subsequent Pile Test Load				One
507	12,450	Lin. Ft.	12" C. J. P. Reinforced Concrete Piles	5,600	6,850		
507	2,320	Lin. Ft.	Steel Piles, HP 12x53		2,320		
507	533	Lin. Ft.	Prebored Holes		533		
509	981,402	Pounds	Reinforcing Steel	44,075	240,988	691,339	
511	2,321	Cu. Yd.	Class "C" Concrete, Superstructure			2,321	
511	1,184	Cu. Yd.	Class "C" Concrete, Piers Above Footing		1,184		
511	394	Cu. Yd.	Class "C" Concrete, Abutments Above Footing	394			
511	771	Cu. Yd.	Class "C" Concrete, Footings	241	530		
512	72	Lin. Ft.	Premolded Sealing Strip	72			
513	1,997,200	Pounds	Structural Steel, ASTM A 588 Unpainted			1,997,200	
516	72	Sq. Ft.	1" Preformed Expansion Joint Filler	72			
518	2020	Lin. Ft.	Subdrainage for wearing course, as per plan			2,020	
518	238	Cu. Yd.	Porous Backfill	238			
518	298	Lin. Ft.	6" Perforated, Helical C.M.P., 707.01	298			
518	146	Lin. Ft.	6" Non-Perforated Helical C.M.P., including specials, 707.01	146			
518	28	Each	Scuppers Including Supports			28	
601	2,500	Sq. Yd.	Crushed Aggregate Slope Protection				2,500
601	469	Cu. Yd.	Dumped Rock Fill, Type B				469
808	2321	Units	Chemical Admixture for Concrete, Type A, B or D			2321	
Spec.	3238	Sq. Yd.	Protective coating of concrete surfaces (see Note A)	364	2874		
404	444	Cu. Yd.	Asphalt concrete (70-85 or AC-20)			444	
Spec.	111	Cu. Yd.	Sand Asphalt (see Proposal Note)			111	
Spec.	8043	Sq. Yd.	Membrane Waterproofing, sheet type (see Proposal Note)			8043	

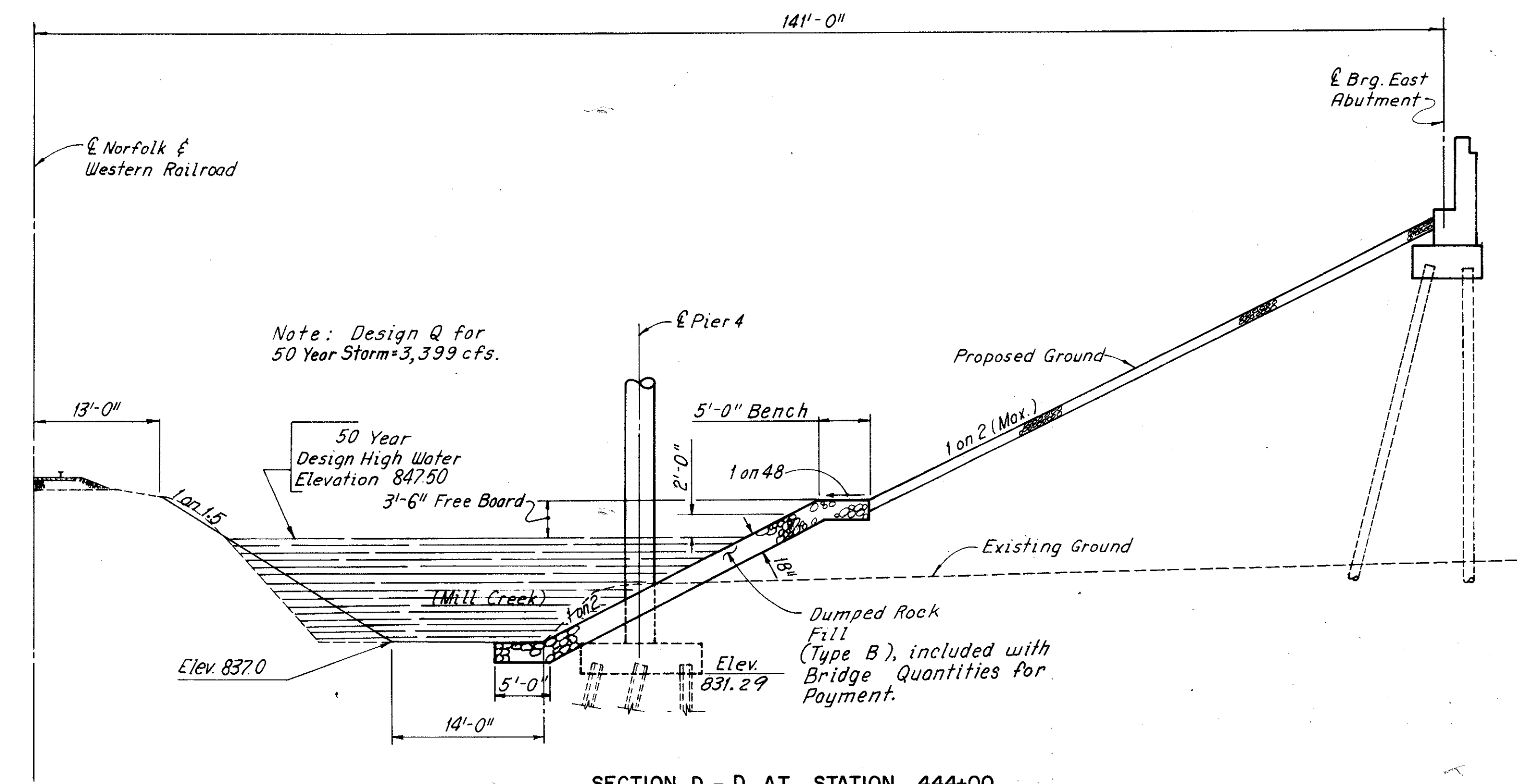
Note A:  
All surfaces of the piers above footings and visible surfaces of the abutments which will be exposed to rust-laden water from corrosion resistant steel during initial weathering shall receive a clear vinyl resin coating to protect against absorptive staining. The coating shall be applied after the concrete has received a final surface finish including any grout cleaning or rubbing and before the erection of the structural steel.

Waterproof membrane curing compound and concrete curing and protective membrane, Supplemental Specification 836, shall not be used on the surfaces coated with clear protective coating. Such surfaces shall be water cured or, at the Contractor's option, two full coats of clear protective coating, each approximately 1-1/3 mils dry film thickness, may be applied to act as a combination curing compound and anti-staining agent.

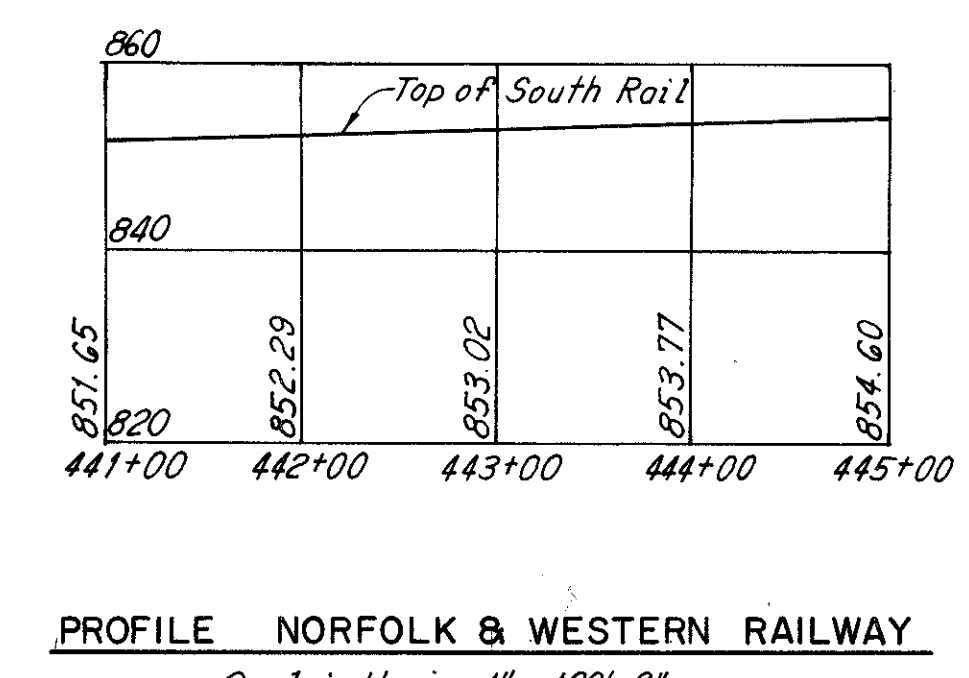
The agent shall be applied by brush or roller, or by spraying, so that the surface of the concrete is completely and uniformly coated at the rate of one gallon per 200 square feet. This rate of application will provide a dry film thickness of 1-1/3 mils. If running or sagging occurs, the material shall be applied in two or more coats of approximately equal thickness. Not less than 10 minutes shall elapse between applications. When applied by spraying, the coating material may be thinned with not more than 10 percent toluene.

The composition of the clear protective coating shall be as follows:

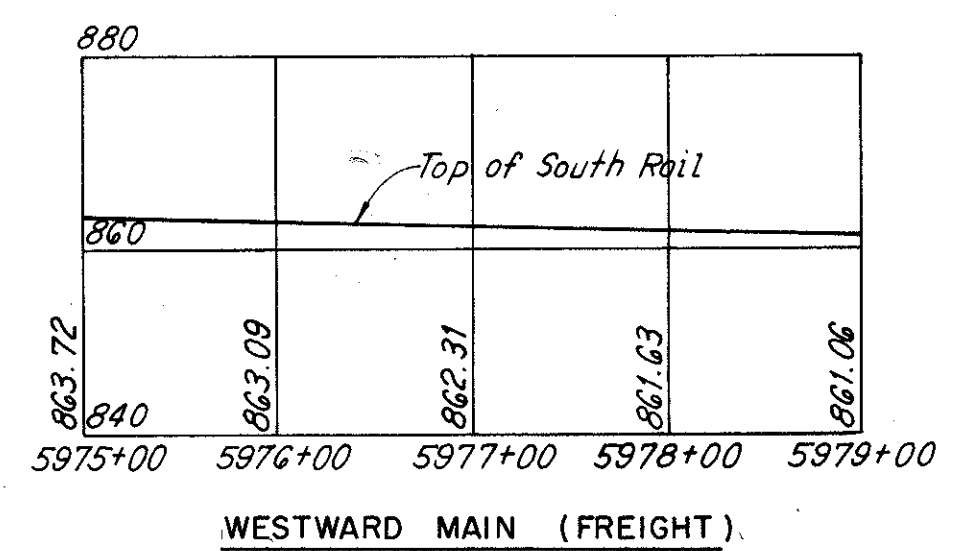
Vinyl Resin*	Percent by Weight	25.0 min.
Methyl Ethyl Ketone Solvent		37.0 min.
Toluene Solvent		37.0 min.
*The resin shall be a vinyl chloride-acetate copolymer containing 86 percent vinyl chloride and 14 percent vinyl acetate. The viscosity of a 22 percent by weight solution of resin in a solvent, consisting of equal parts of Methyl Isobutyl Ketone and Toluene, shall be 250-500 centipoises at 77° F. The resin shall be Union Carbide's VYHH grade, or approved equal.		
Coating Properties:	Weight per gallon at 77° F, lb.	7.6 min.
	Consistency, Viscosity at 77° F, KU	60-70
	Color	Clear and Colorless
	Drying Time, hr.	1/2 max.



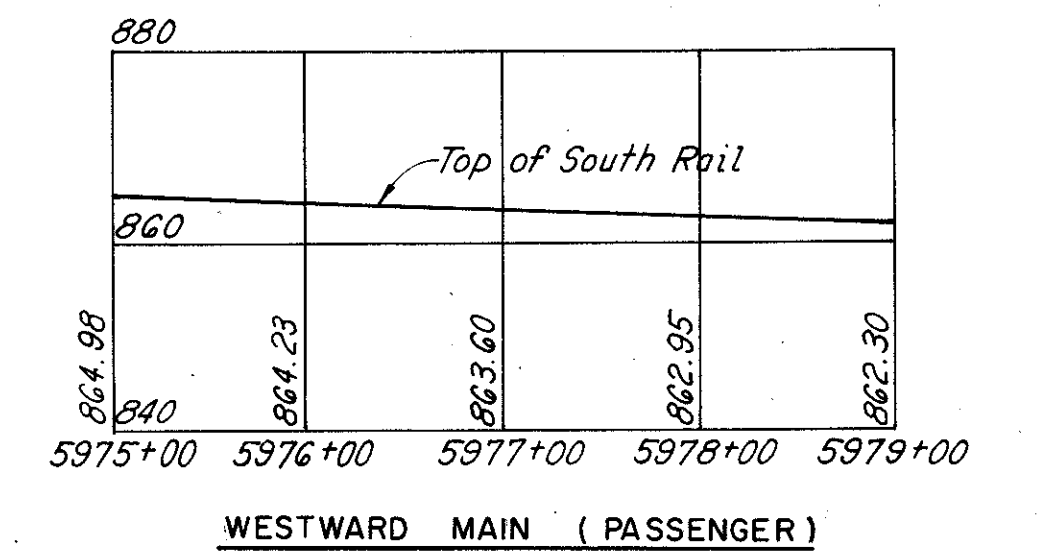
SECTION D - D AT STATION 444+00



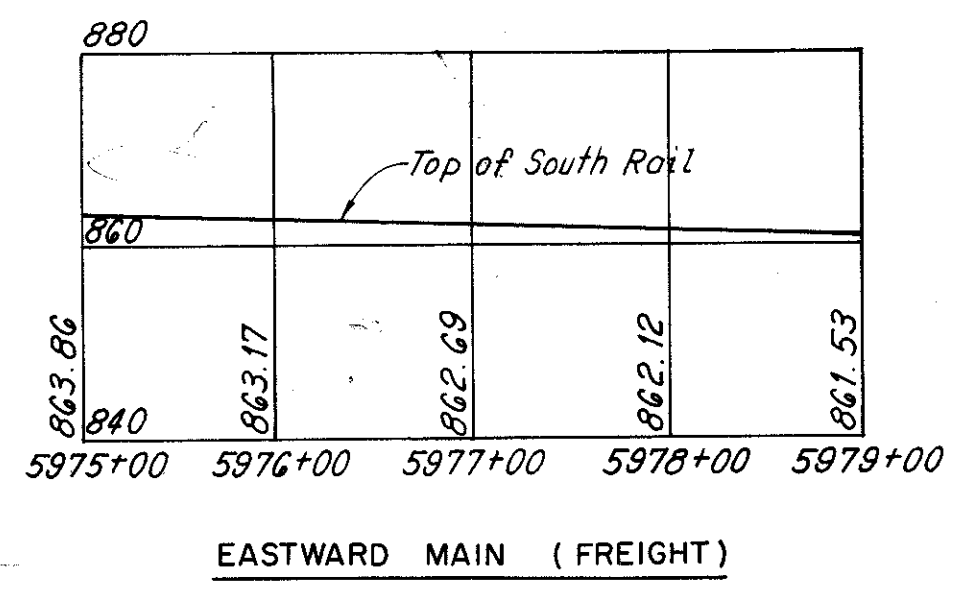
PROFILE NORFOLK & WESTERN RAILWAY  
Scale: Horiz. 1" = 100'-0"  
Vert. 1" = 20'-0"



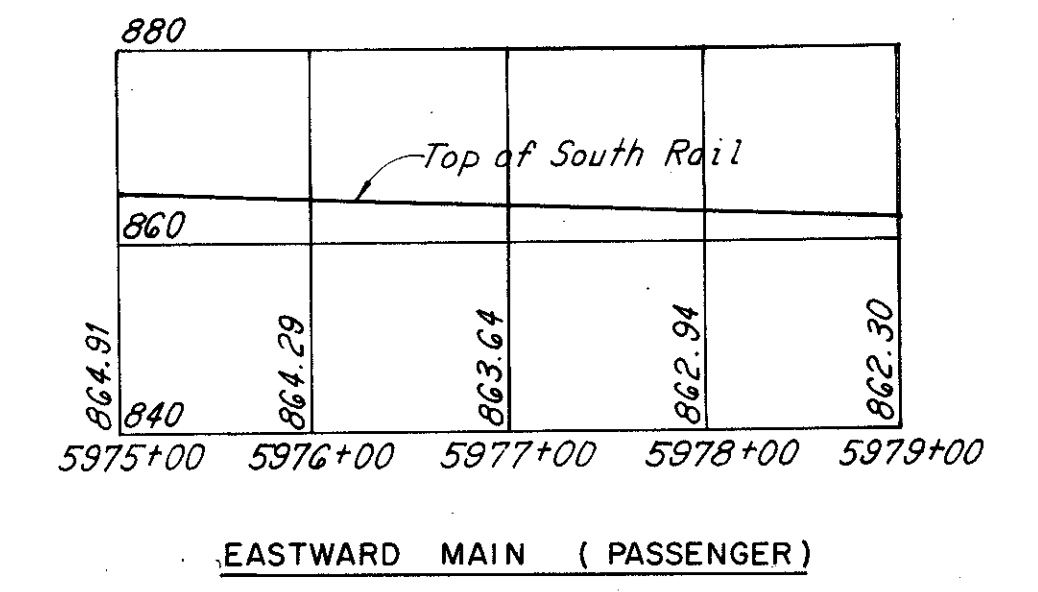
WESTWARD MAIN (FREIGHT)



WESTWARD MAIN (PASSENGER)



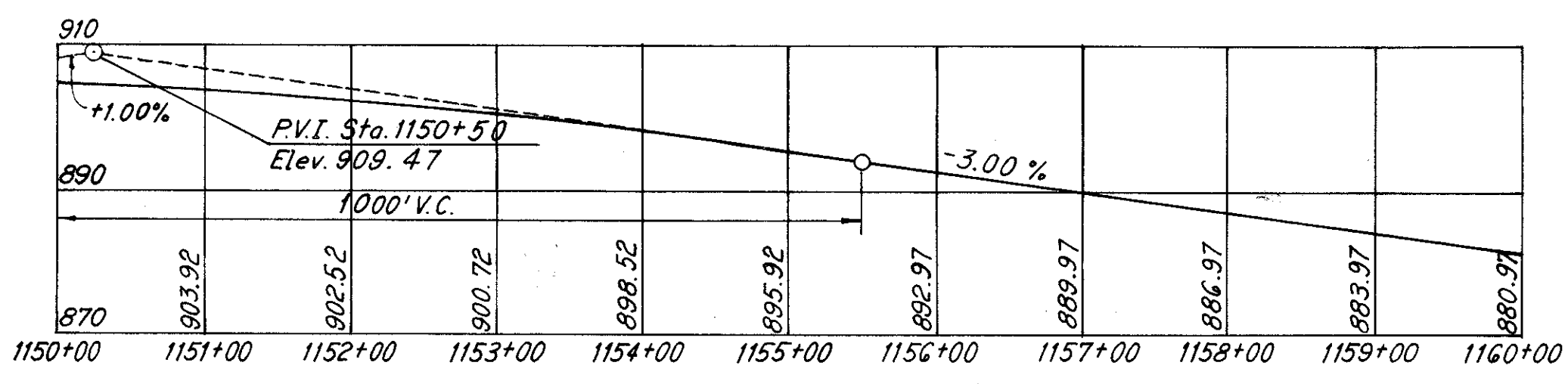
EASTWARD MAIN (FREIGHT)



EASTWARD MAIN (PASSENGER)

PROFILES - PENN-CENTRAL RAILROAD

Scale: Horiz. 1" = 100'-0"  
Vert. 1" = 20'-0"



PROFILE I-80

H.N.T.B. BR. NO. 6  
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KANSAS CITY CLEVELAND NEW YORK

ESTIMATED QUANTITIES AND PROFILES  
I-80 OVER PENN-CENTRAL RAILWAY  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-21.40 STA. 1153+08.41 TO STA. 1158+17.04

CUYAHOGA COUNTY OHIO

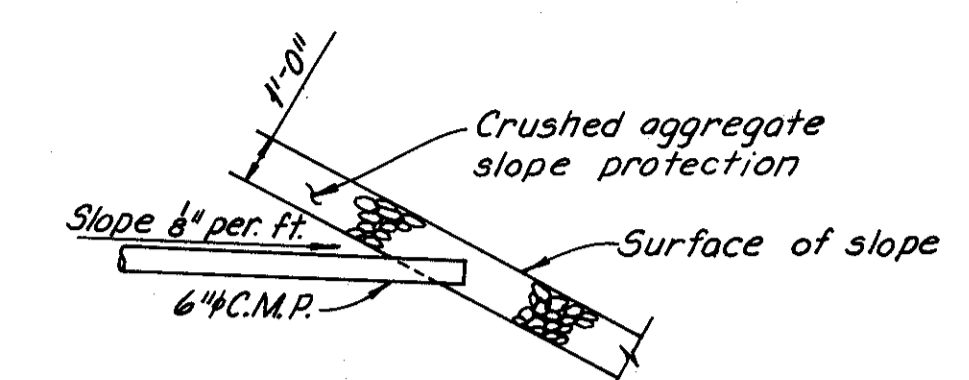
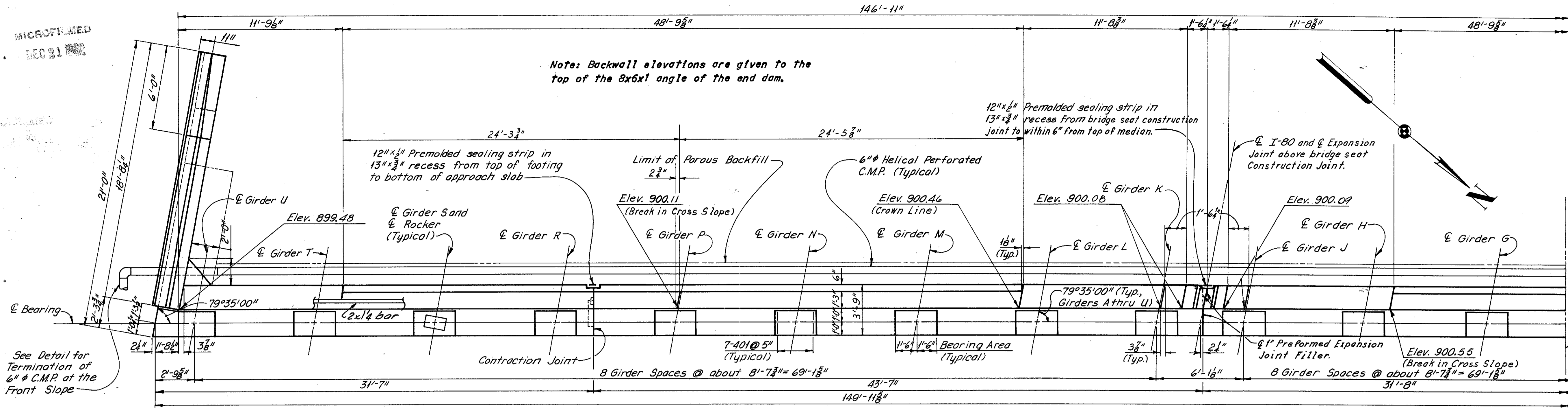
DRAWN	TRACED	CHECKED	REVIEWED	REVISION
DATE 8-21-67	DATE 8-30-67	DATE 5-22-70	DATE	DATE

SHEET 2/16

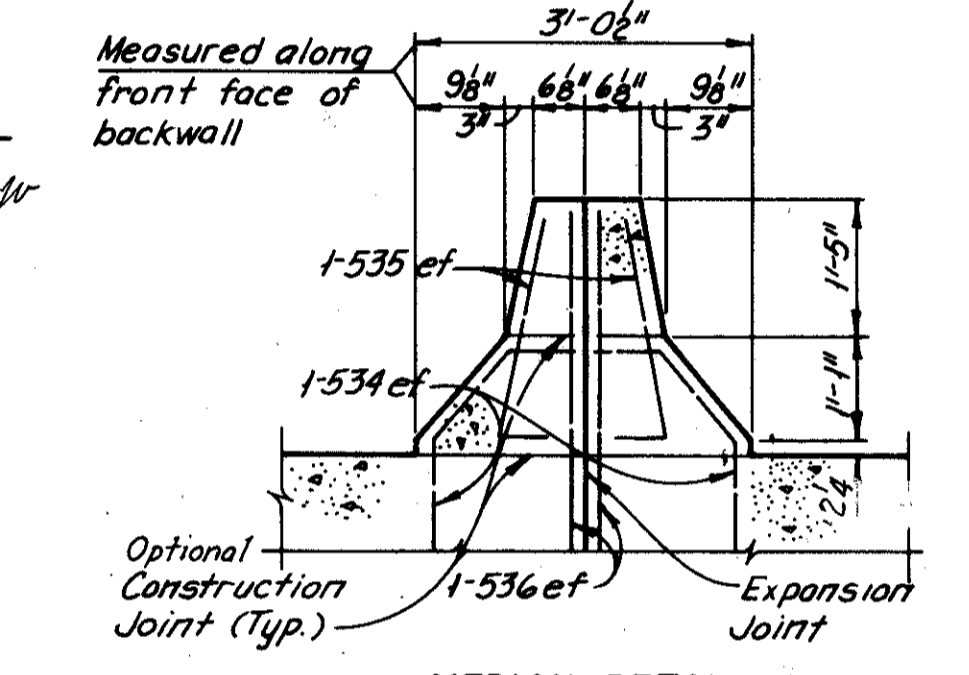
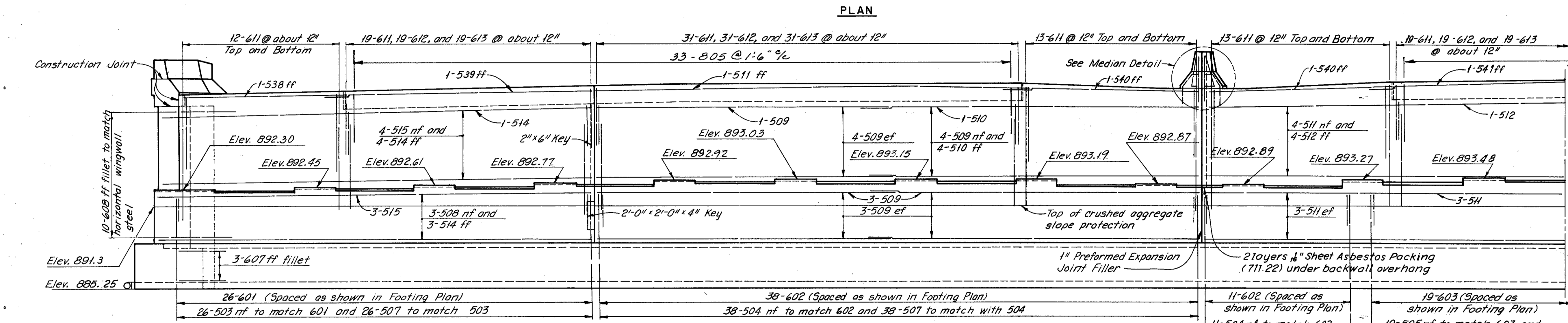
MICROFILMED  
DEC 21 1982

FED. RD. DIVISION	STATE	PROJECT	293 390
2	OHIO		

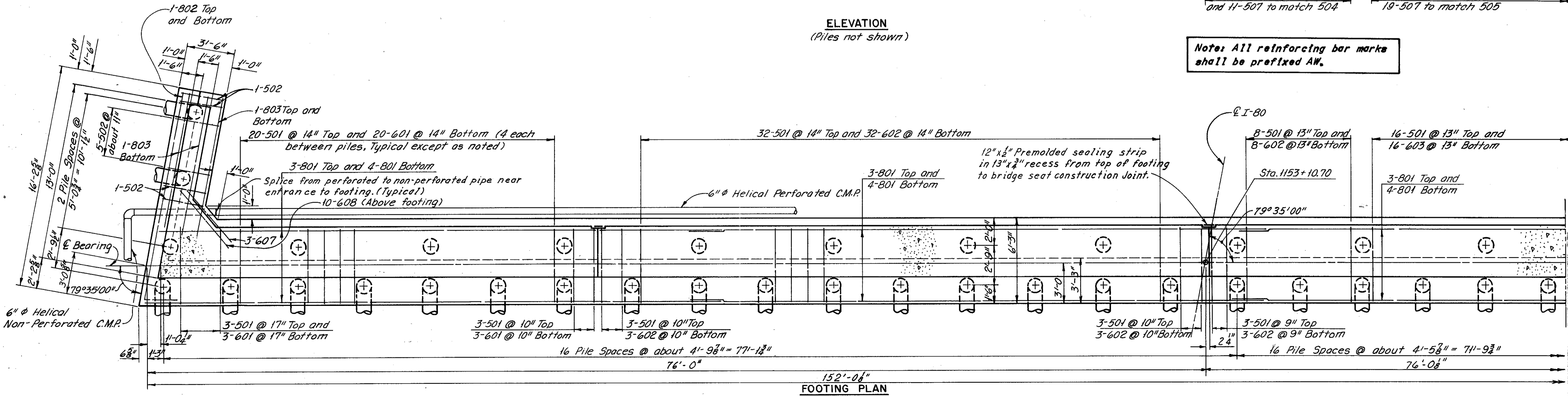
CUYAHOGA COUNTY  
CUY-80-21.40



TERMINATION OF 6" C.M.P.  
AT THE FRONT SLOPE



MEDIAN DETAIL



Note: All reinforcing bar marks shall be prefixed AW.

Notes:

- All piles are 12"  $\phi$  C.I.P. reinforced concrete.
- All battered piles shall be inclined 3 in 12 in the direction shown.
- For roadway and dam and curb plate details see Ohio Standard Drawing SD-1-69, sheets 1 and 2 of 4 and Sheet 9/16.
- The 2 Layers of 1/2" Sheet Asbestos Packing (711.22) shall be included for payment with Class "C" Concrete, Abutments Above Footings.
- The following abbreviations are used:  
nf = near face  
ff = far face  
ef = each face

H.N.T.B. BR. NO. 6

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WEST ABUTMENT  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

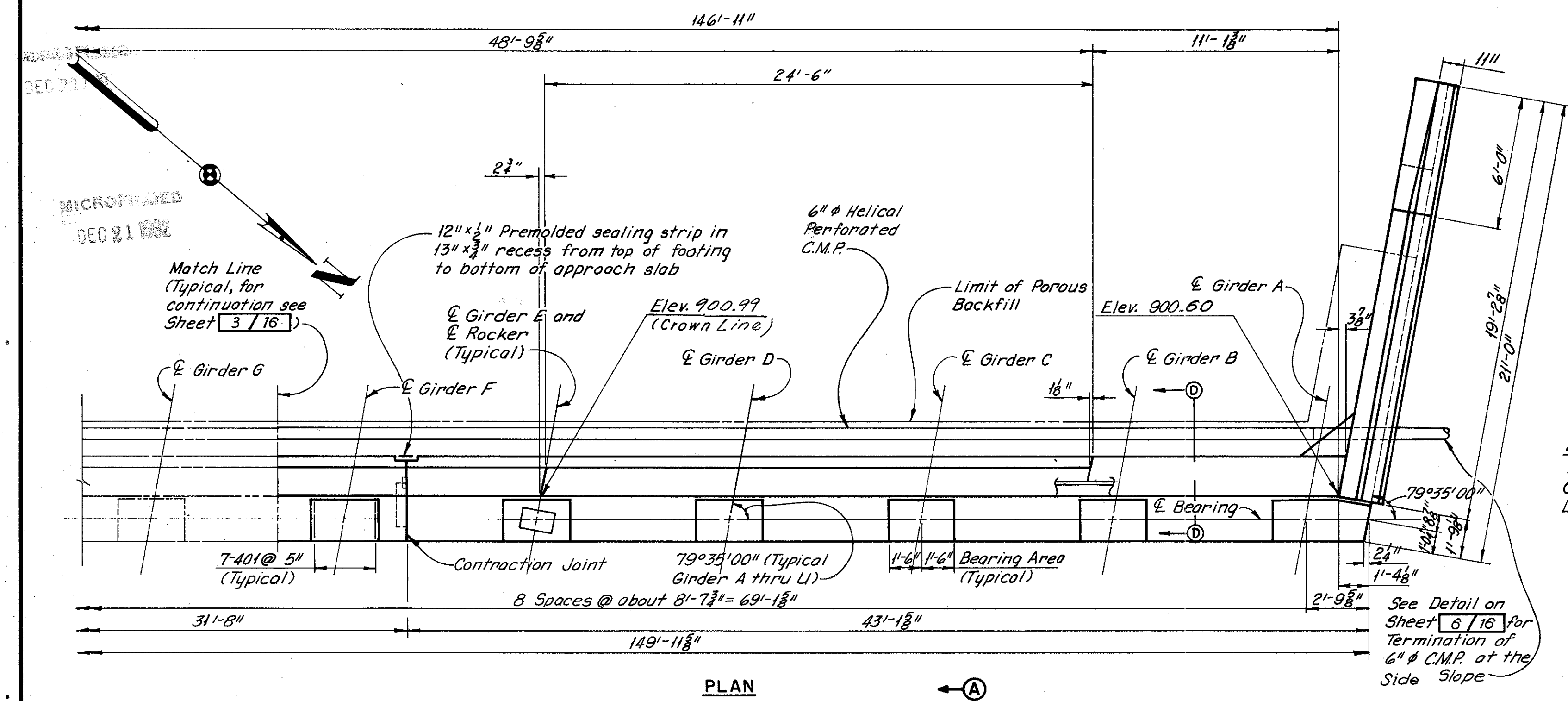
BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

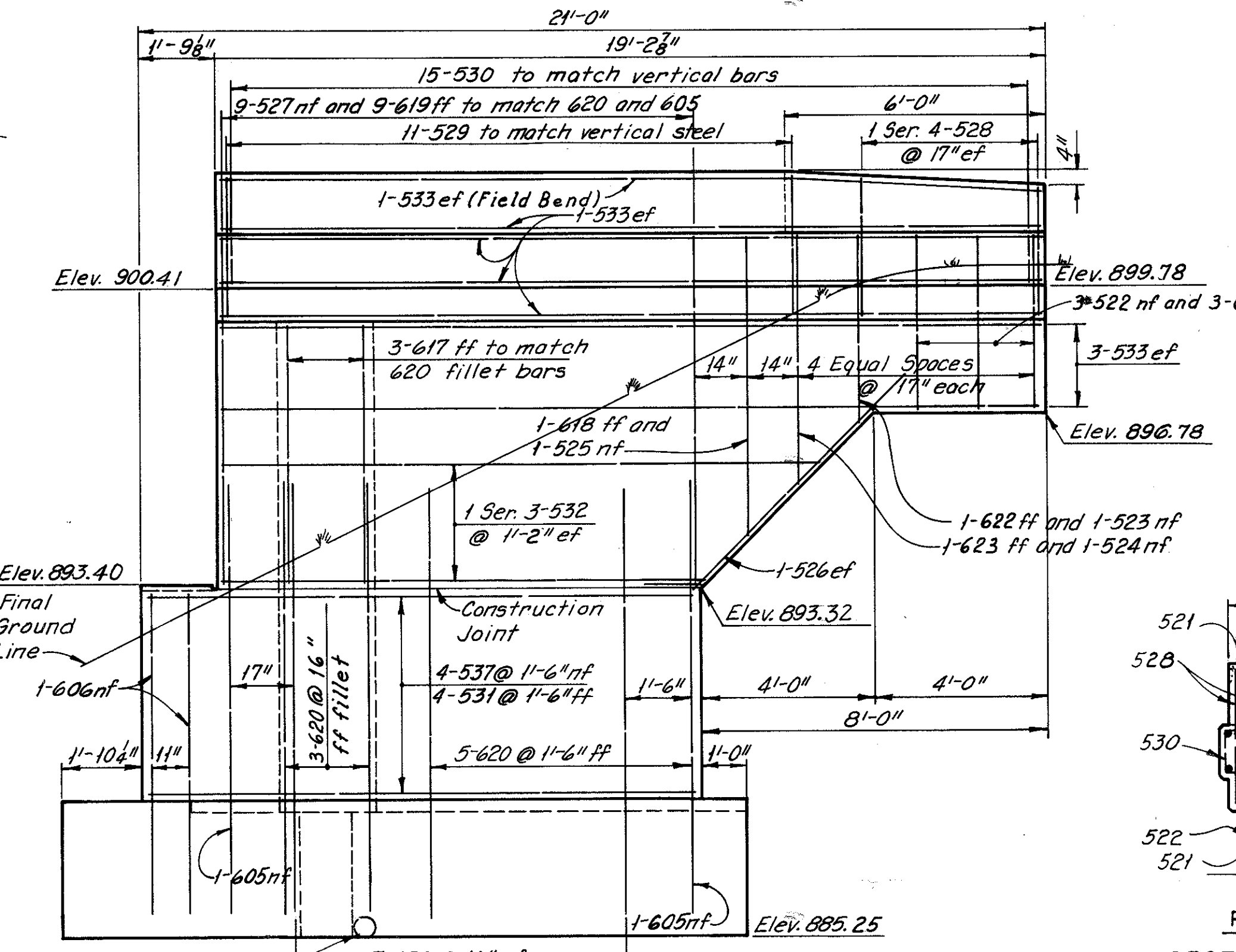
DATE 4-13-70 TRACED 11/81 CHECKED 11/81 REVIEWED 11/81  
DATE 4-13-70 DATE 4-20-70 DATE 5-1-70 DATE

SHEET 3/16

CUYAHOGA COUNTY  
CUI-80-21.40

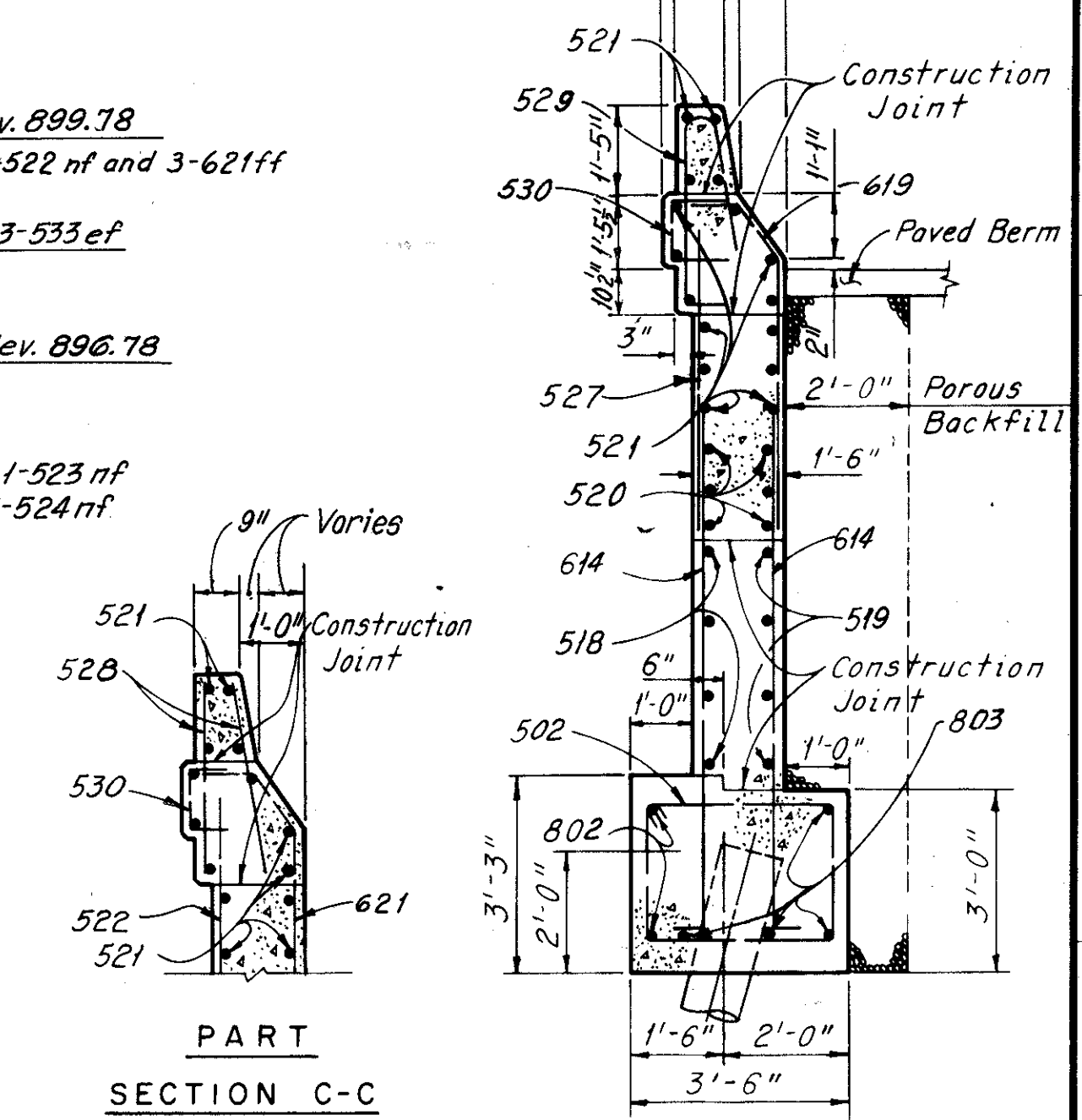


PLAN

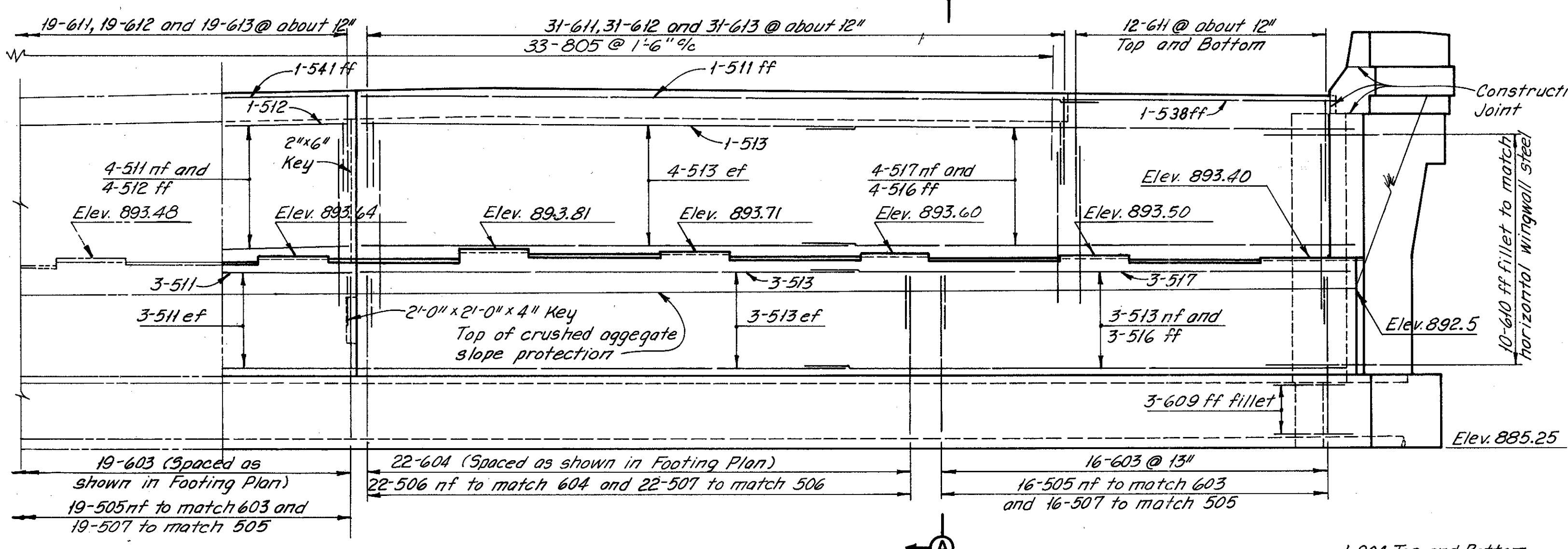


NORTH WINGWALL  
(Piles not shown)

PART SECTION D-D

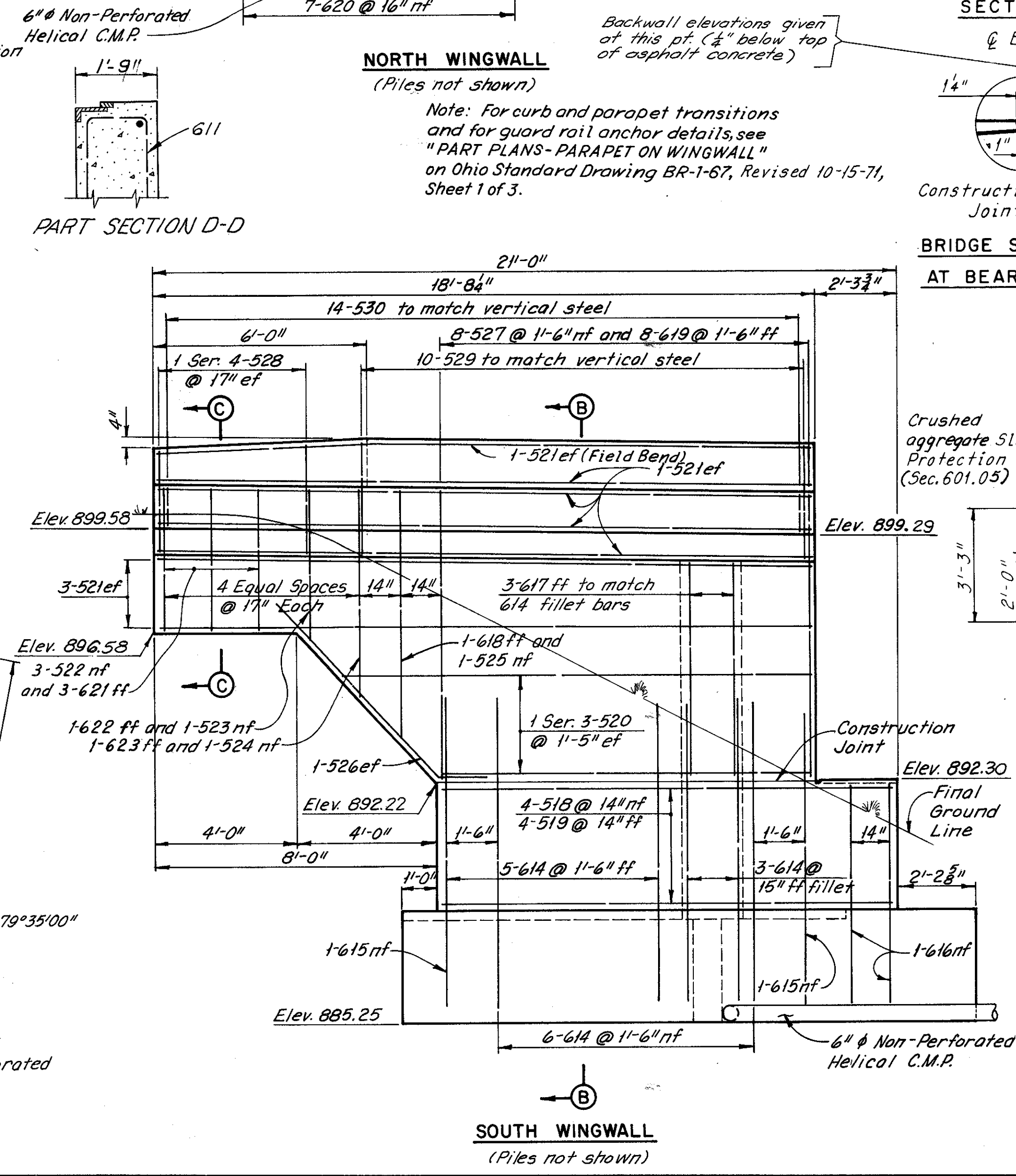
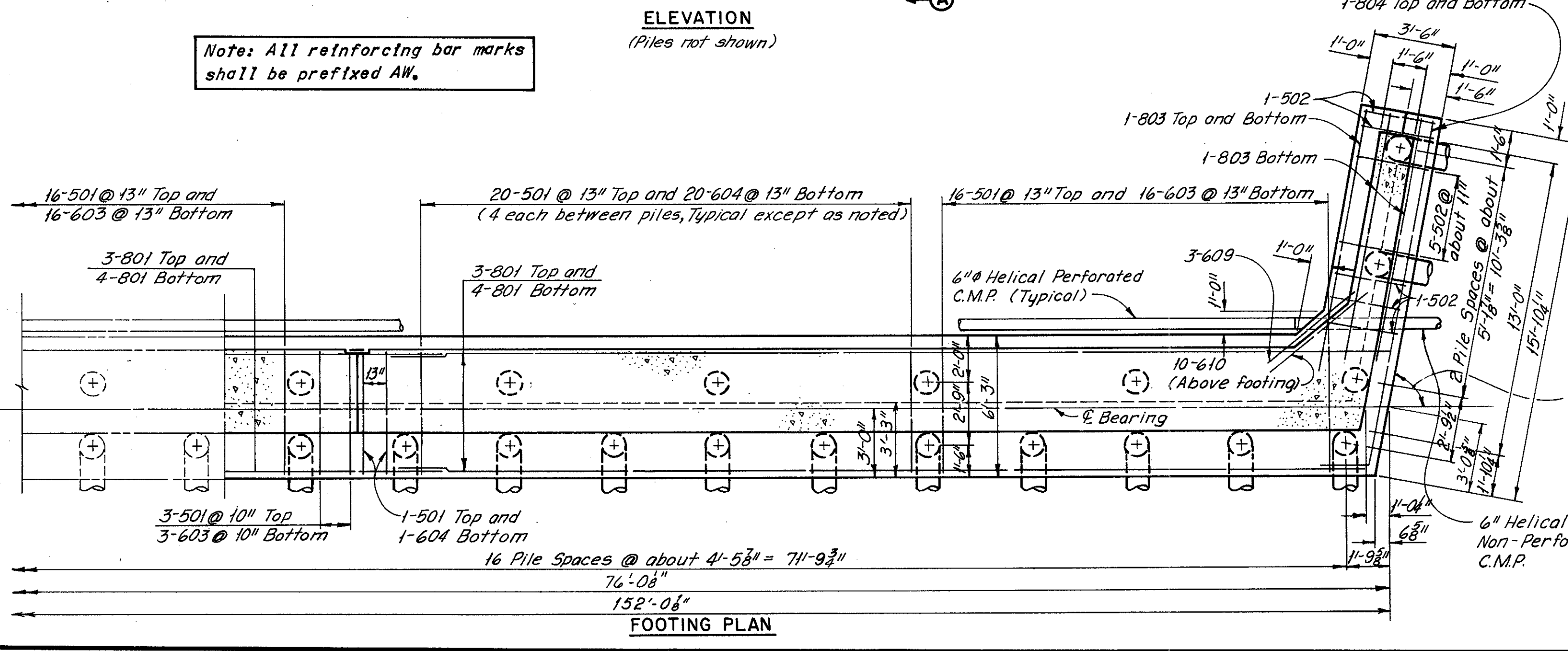


SECTION B-B

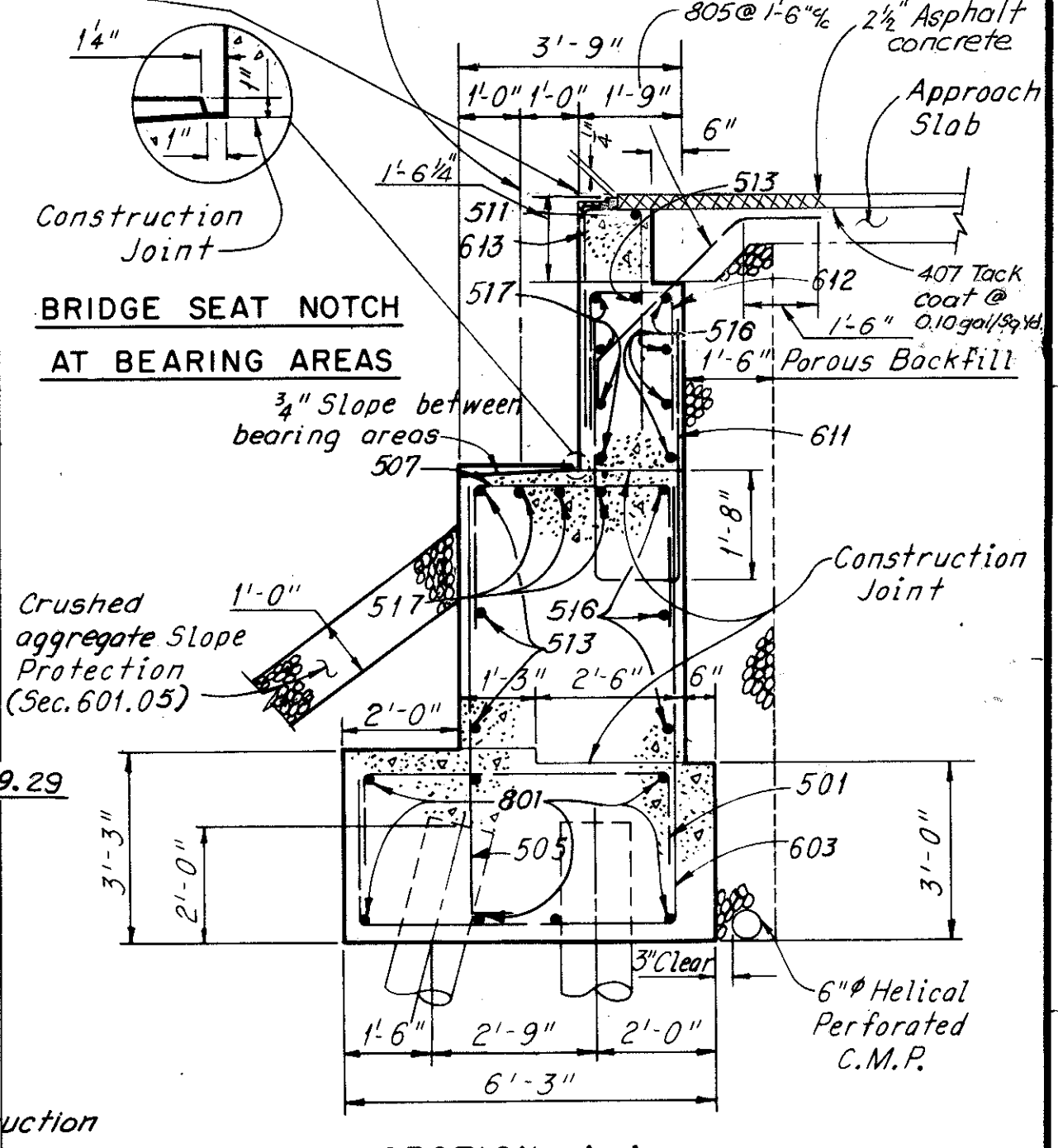


ELEVATION  
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AW.



SOUTH WINGWALL  
(Piles not shown)



SECTION A-A  
(East Abutment similar except for bar numbering)  
Notes: For notes see Sheet 3/16.

H.N.T.B. BR. NO. 6  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY, CLEVELAND, NEW YORK

WEST ABUTMENT  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 4-15-70	DATE 4-24-70	DATE 5-1-70	DATE	

SHEET 4/16

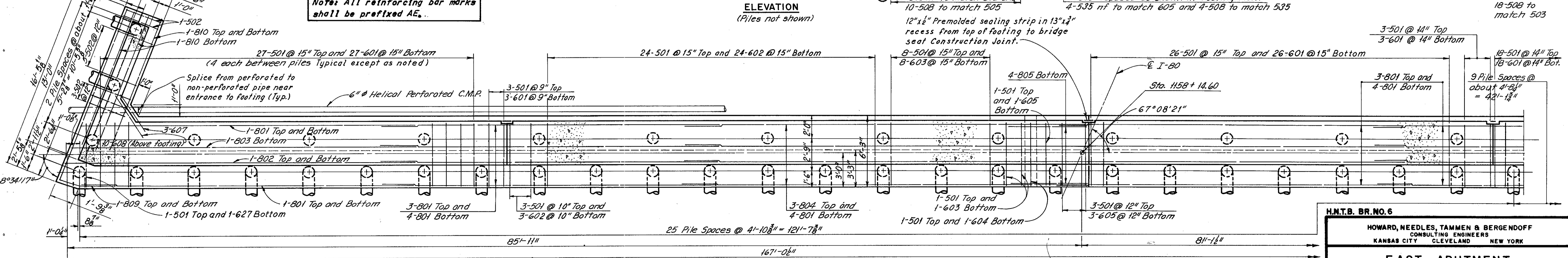
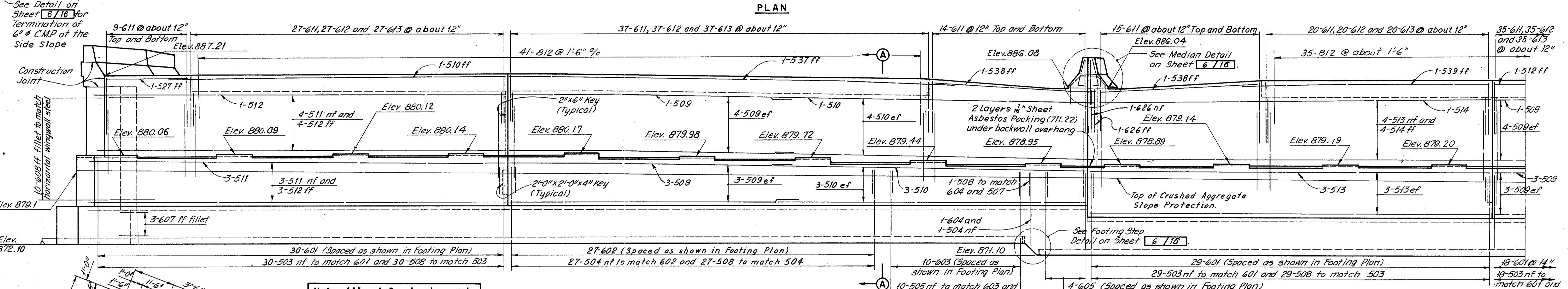
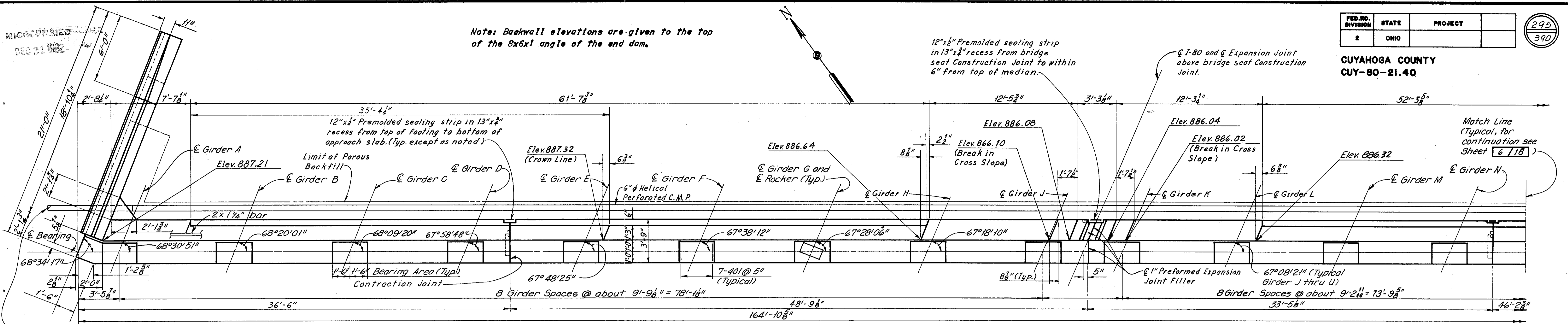
MICROFILMED  
DEC 21 1982

Note: Backwall elevations are given to the top of the 8x6x1 angle of the end dam.

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

CUYAHOGA COUNTY  
CUY-80-21.40

295  
390



H.N.T.B. BR. NO. 6  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

EAST ABUTMENT  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

DATE	BY	DATE	BY	DATE	BY	DATE	BY
DRAWN	TRACED	CHECKED	REVIEWED	REVISOR			
DATE 5-1-70	DATE 5-6-70	DATE 5-9-70	DATE				

Notes:  
For notes see Sheet 316  
For Section A-A see Sheet 415

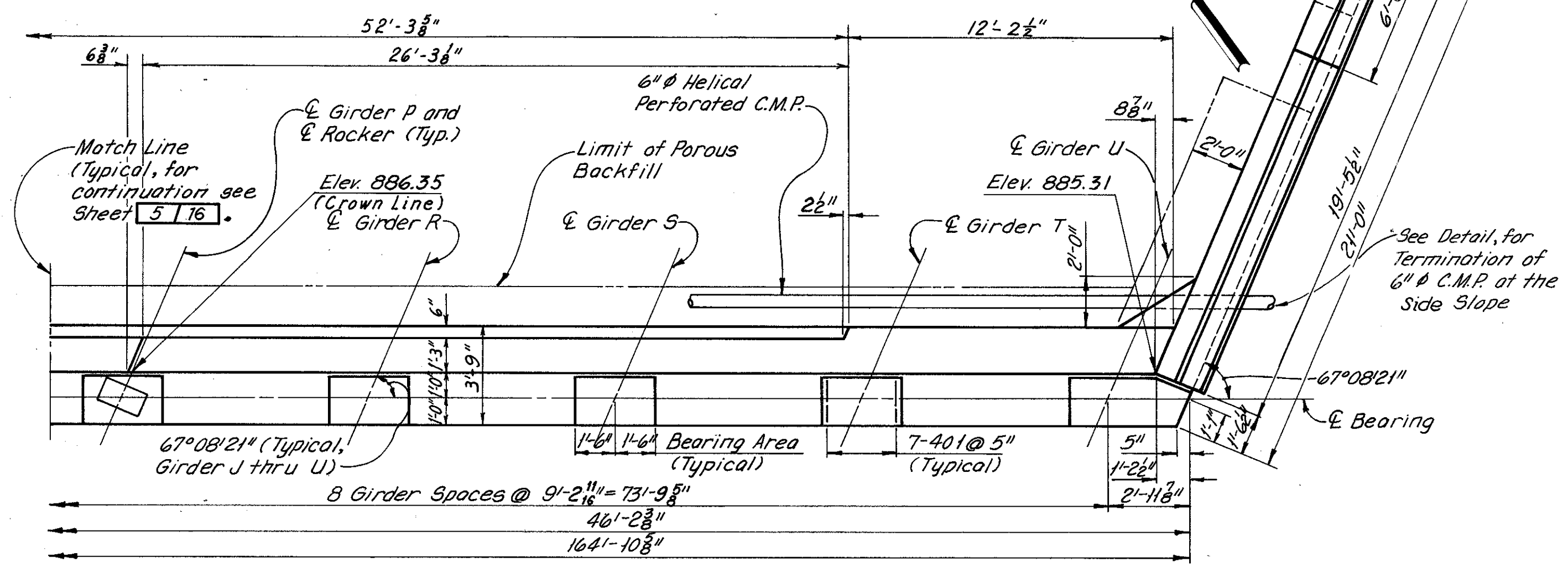
DEC 21 1968

Note: Backwall elevations are given to the top of the 8x6x1 angle of the end dam.

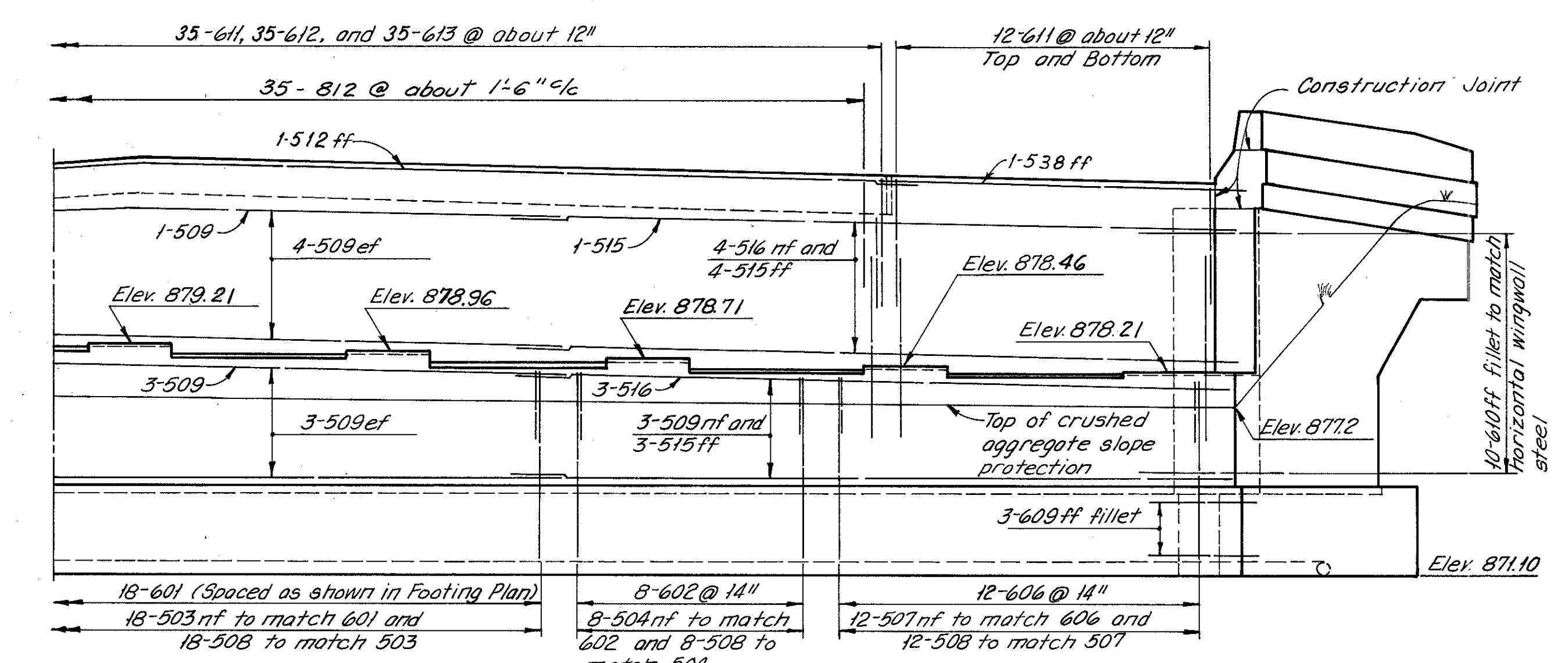
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

CUYAHOGA COUNTY  
CUY-80-21.40

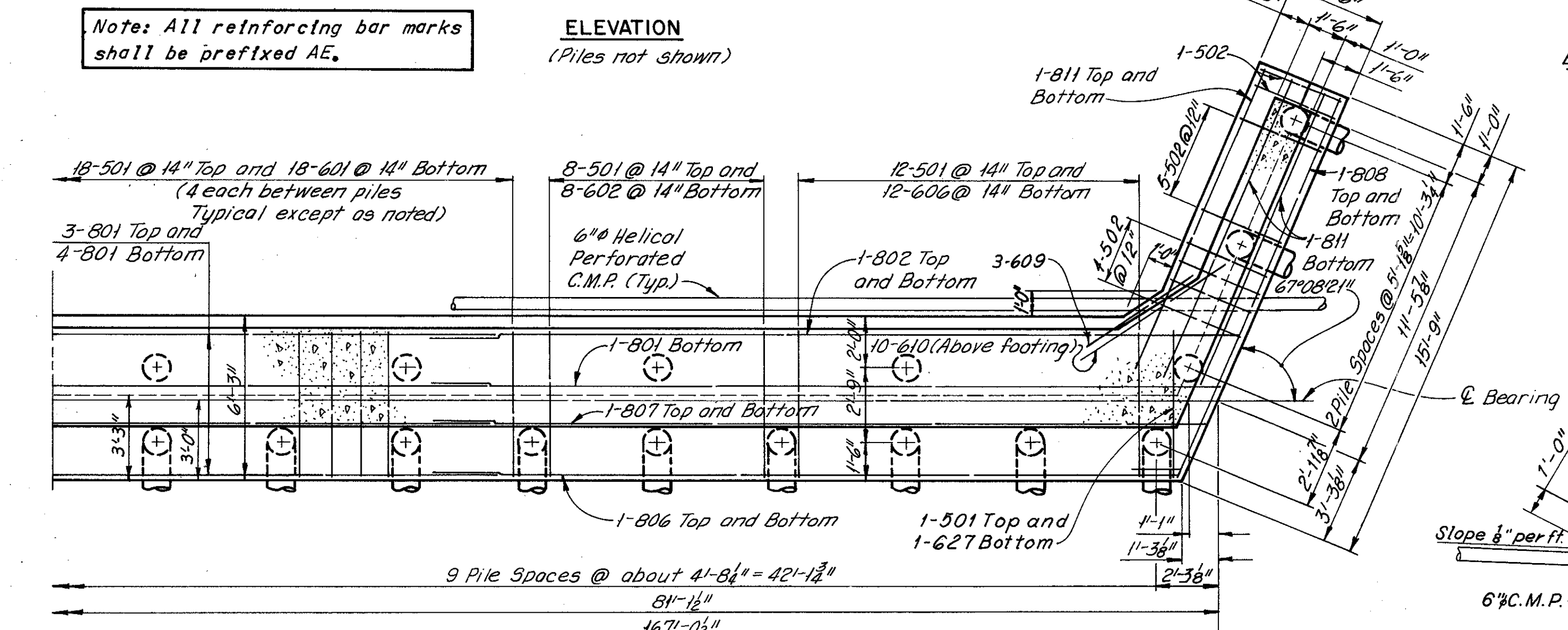
296  
390



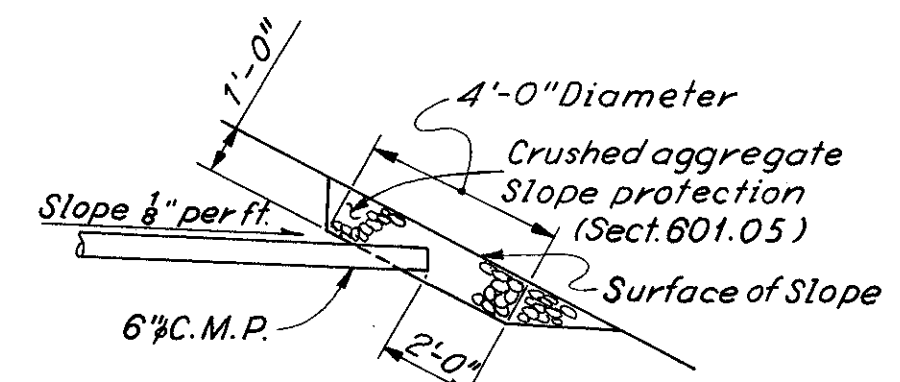
PLAN



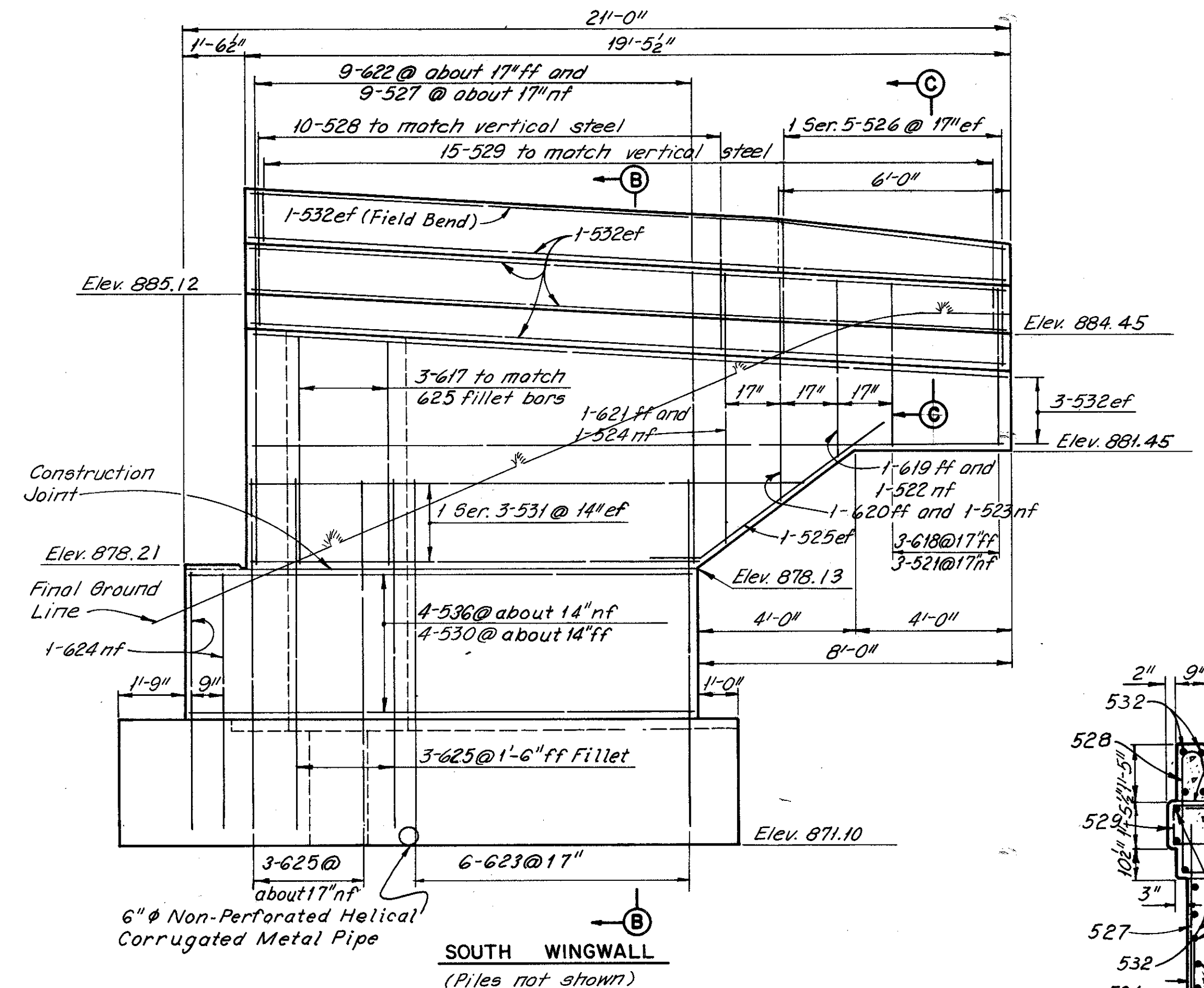
ELEVATION  
(Piles not shown)



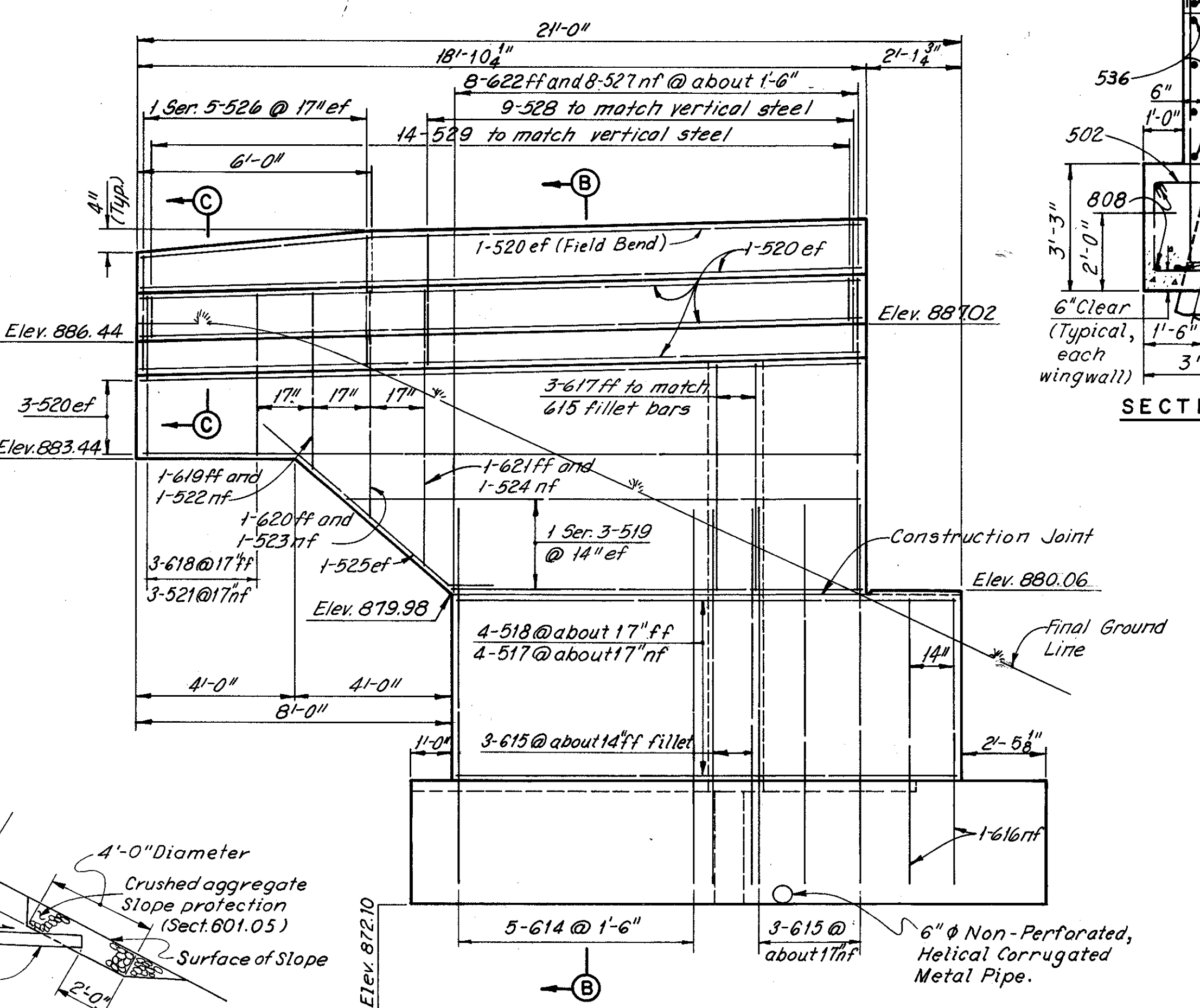
FOOTING PLAN



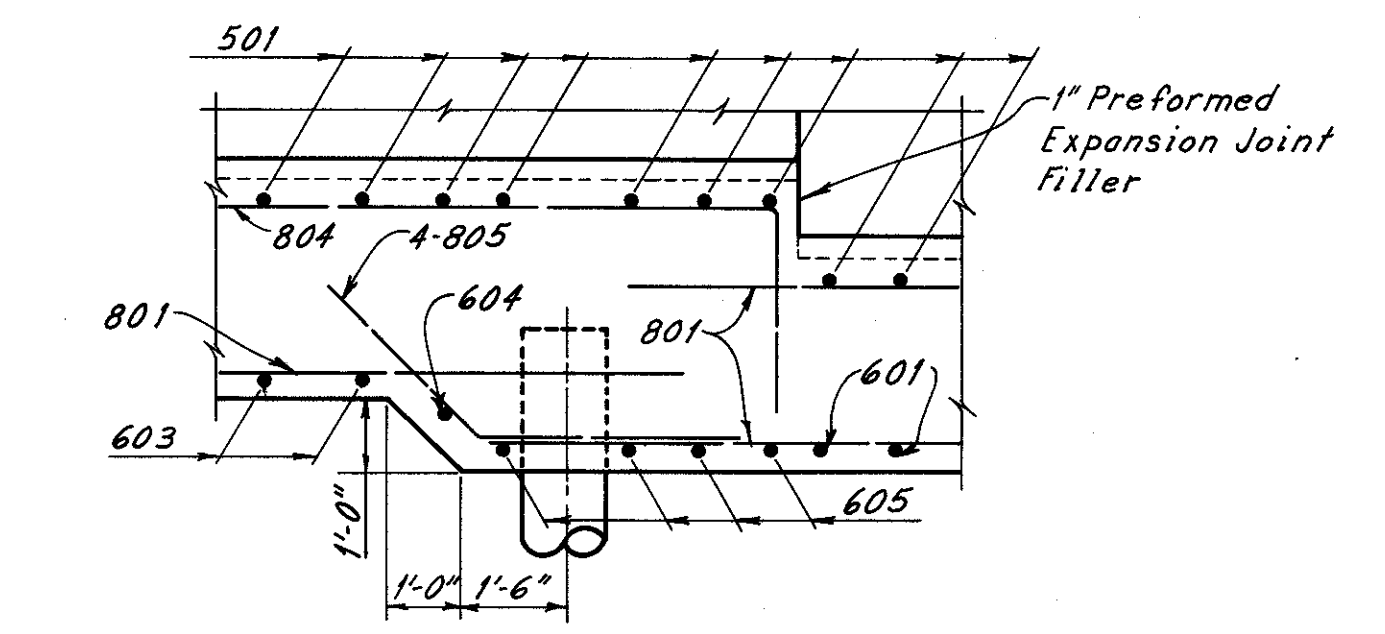
TERMINATION OF 6" C.M.P.  
AT THE SIDE SLOPE



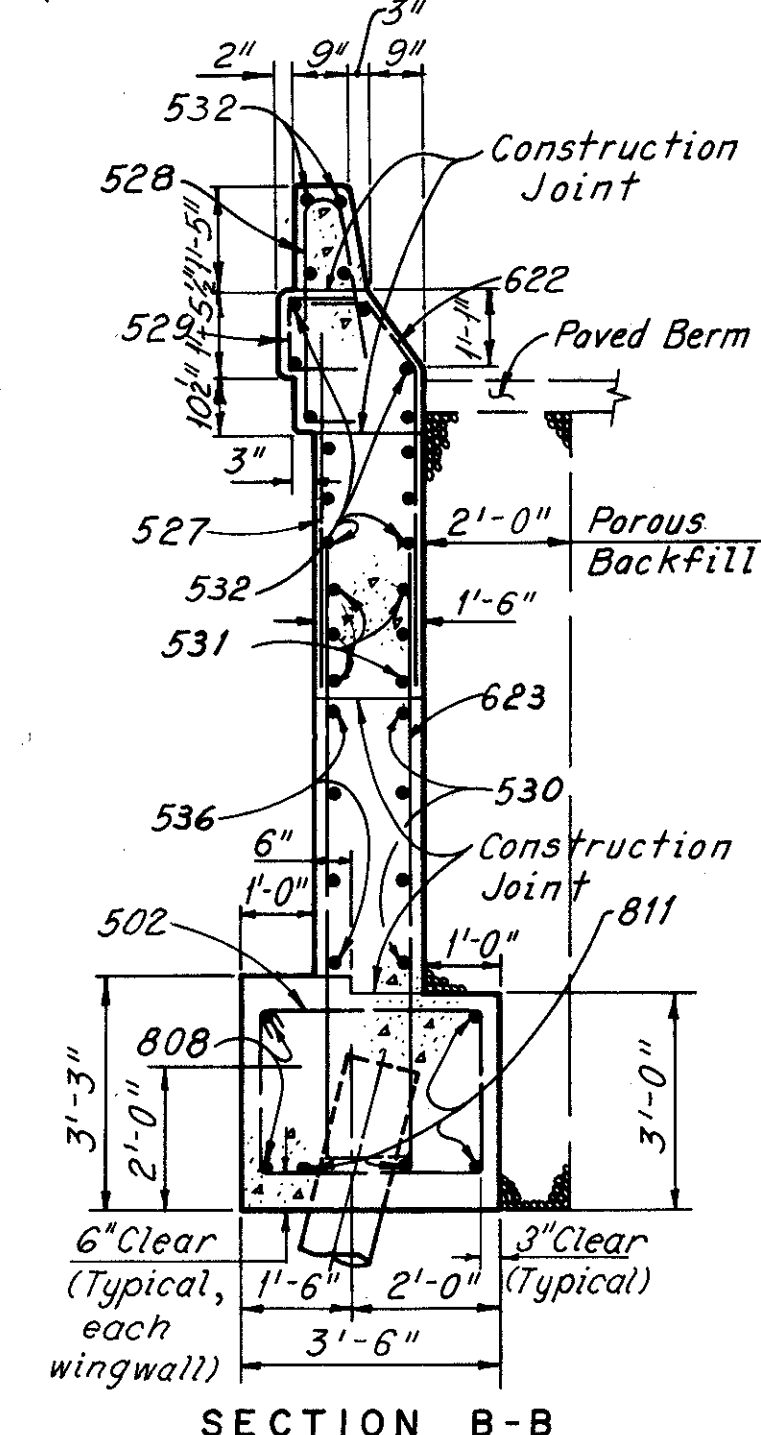
SOUTH WINGWALL  
(Piles not shown)



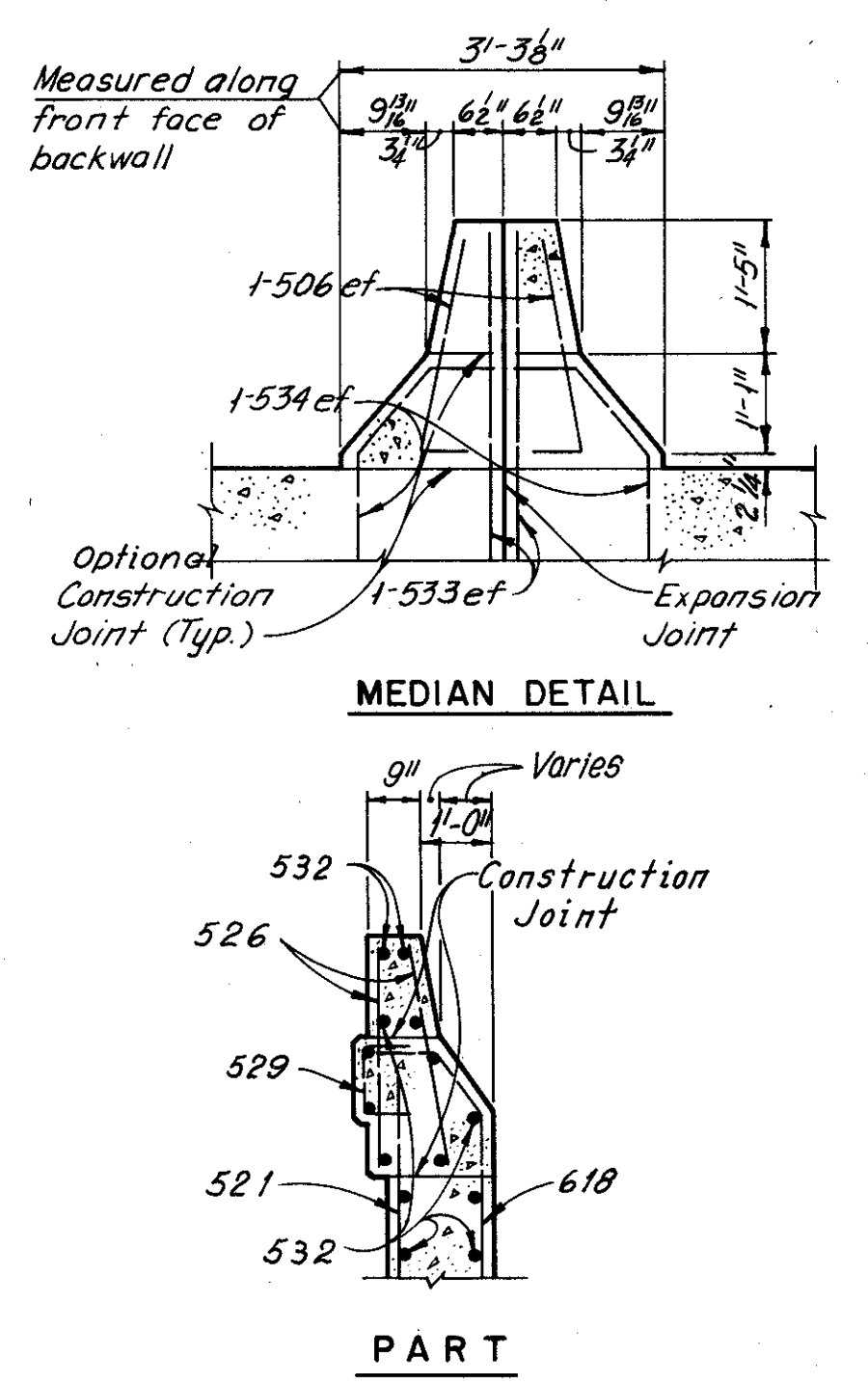
NORTH WINGWALL  
(Piles not shown)



FOOTING STEP DETAIL



SECTION B-B



PART SECTION C-C

Notes:  
Sections B-B and C-C are shown for South Wingwall, North Wingwall similar except for bar marks.  
For curb and parapet transitions and for guard rail anchor details, see "PART PLANS-PARAPET ON WINGWALL" on Ohio Standard Drawing BR-1-67, Revised 10-15-71, Sheet 1 of 3.  
For additional notes see Sheet 3/16.

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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KANSAS CITY CLEVELAND NEW YORK

**EAST ABUTMENT**  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

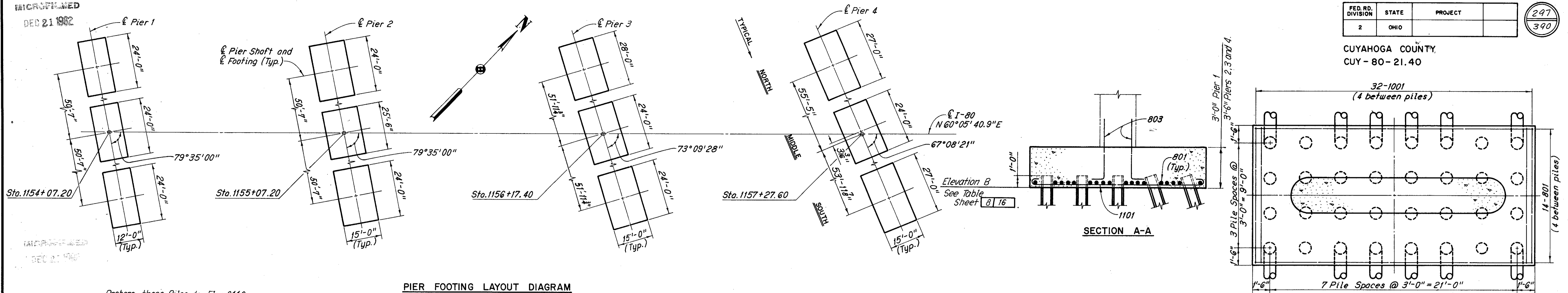
DRAWN/MS	TRACED/MS	CHECKED/MS	REVIEWED	REVISED
DATE 5-1-70	DATE 5-11-70	DATE 5-9-70	DATE	

SHEET 6/16

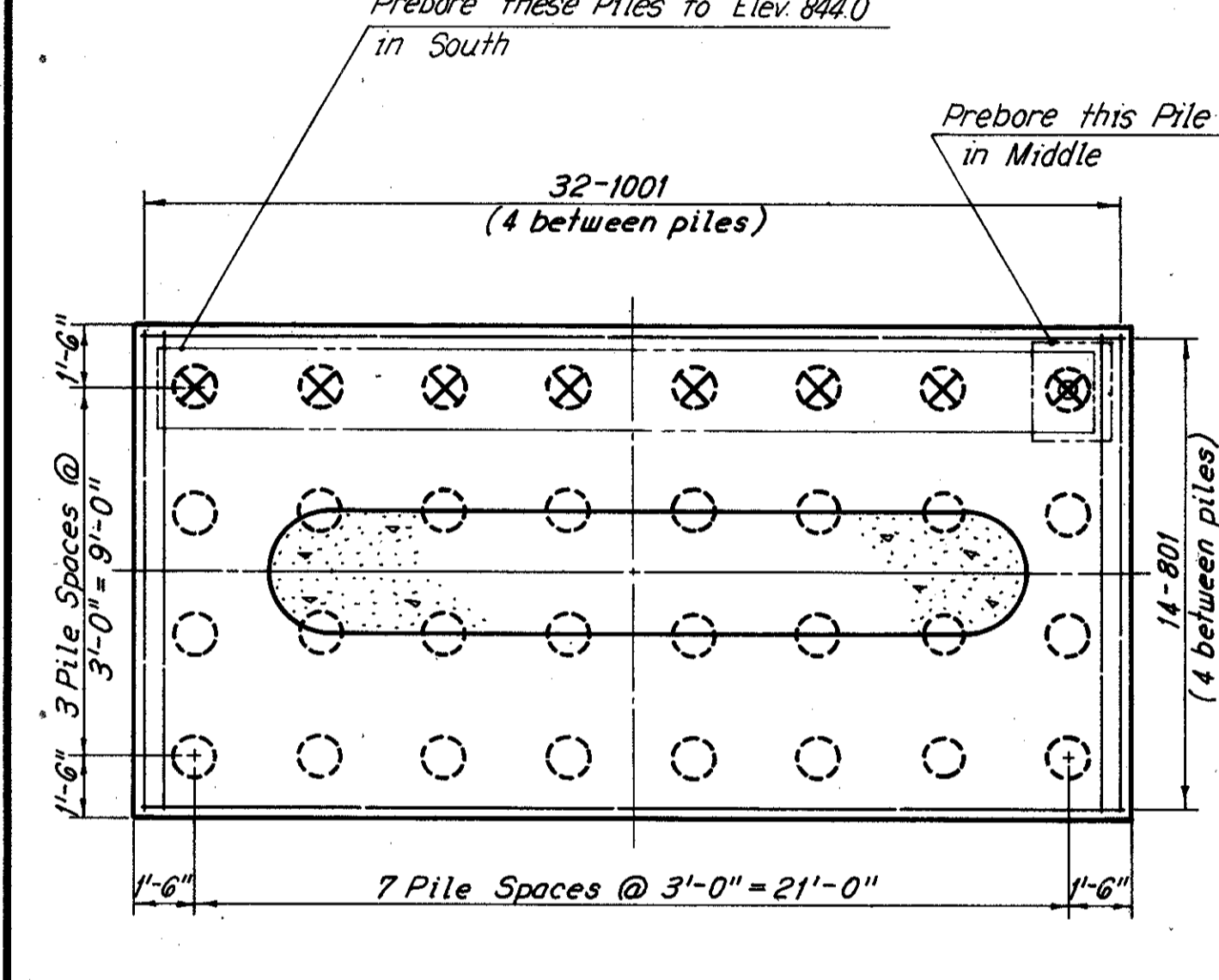
MICROFILMED  
DEC 21 1982

FED. RD. DIVISION	STATE	PROJECT	297 390
2	OHIO		

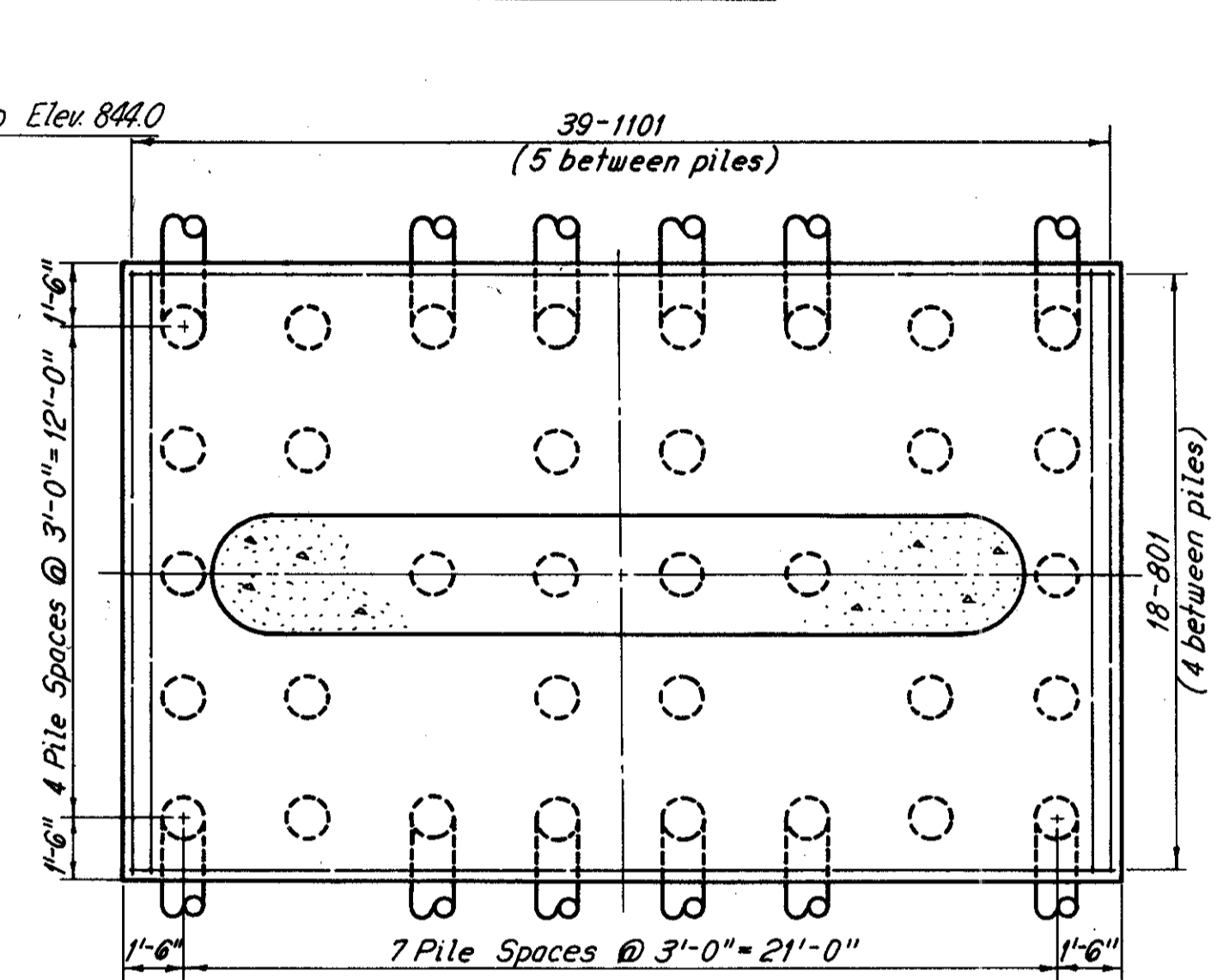
CUYAHOGA COUNTY  
CUY-80-21.40



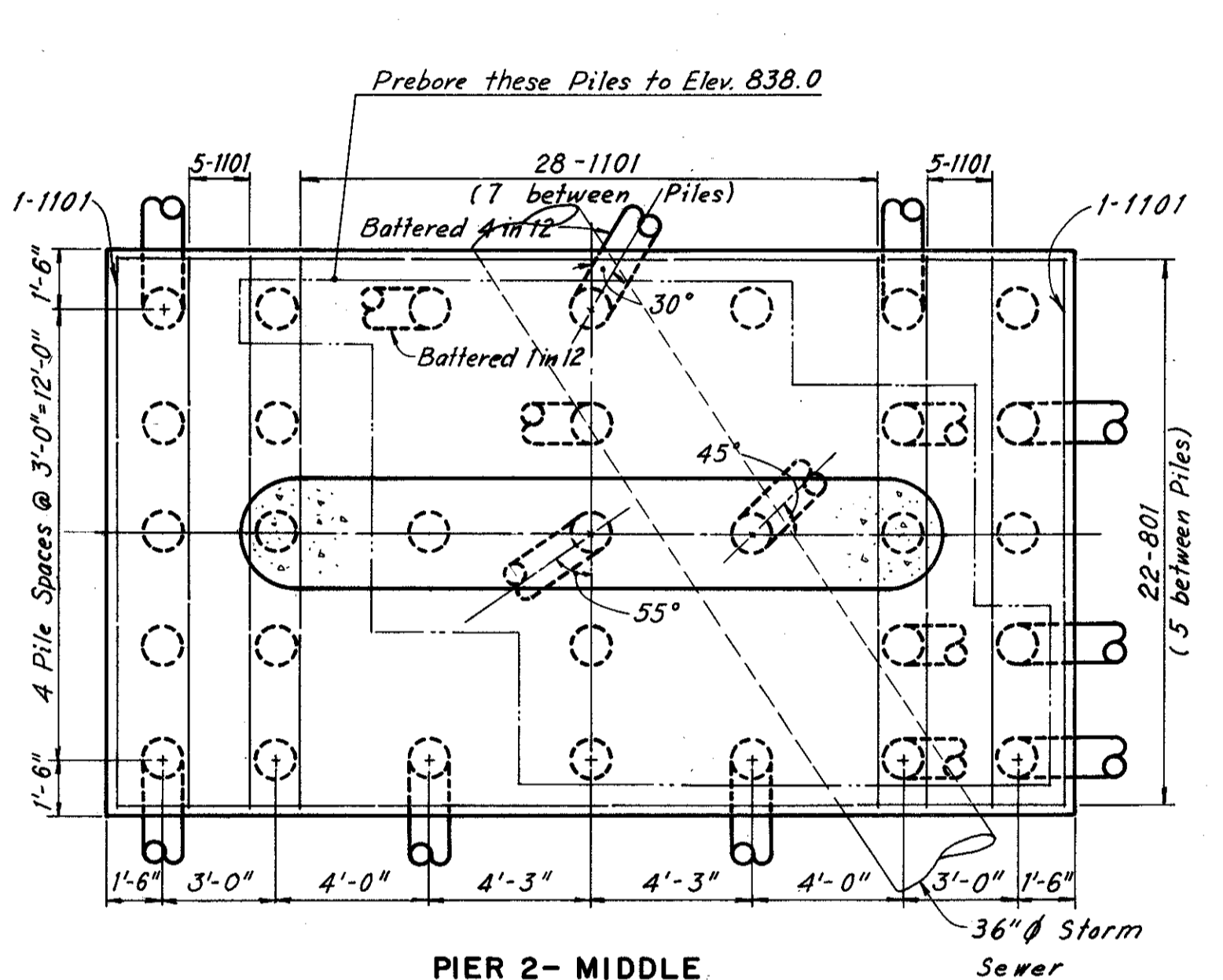
PIER FOOTING LAYOUT DIAGRAM



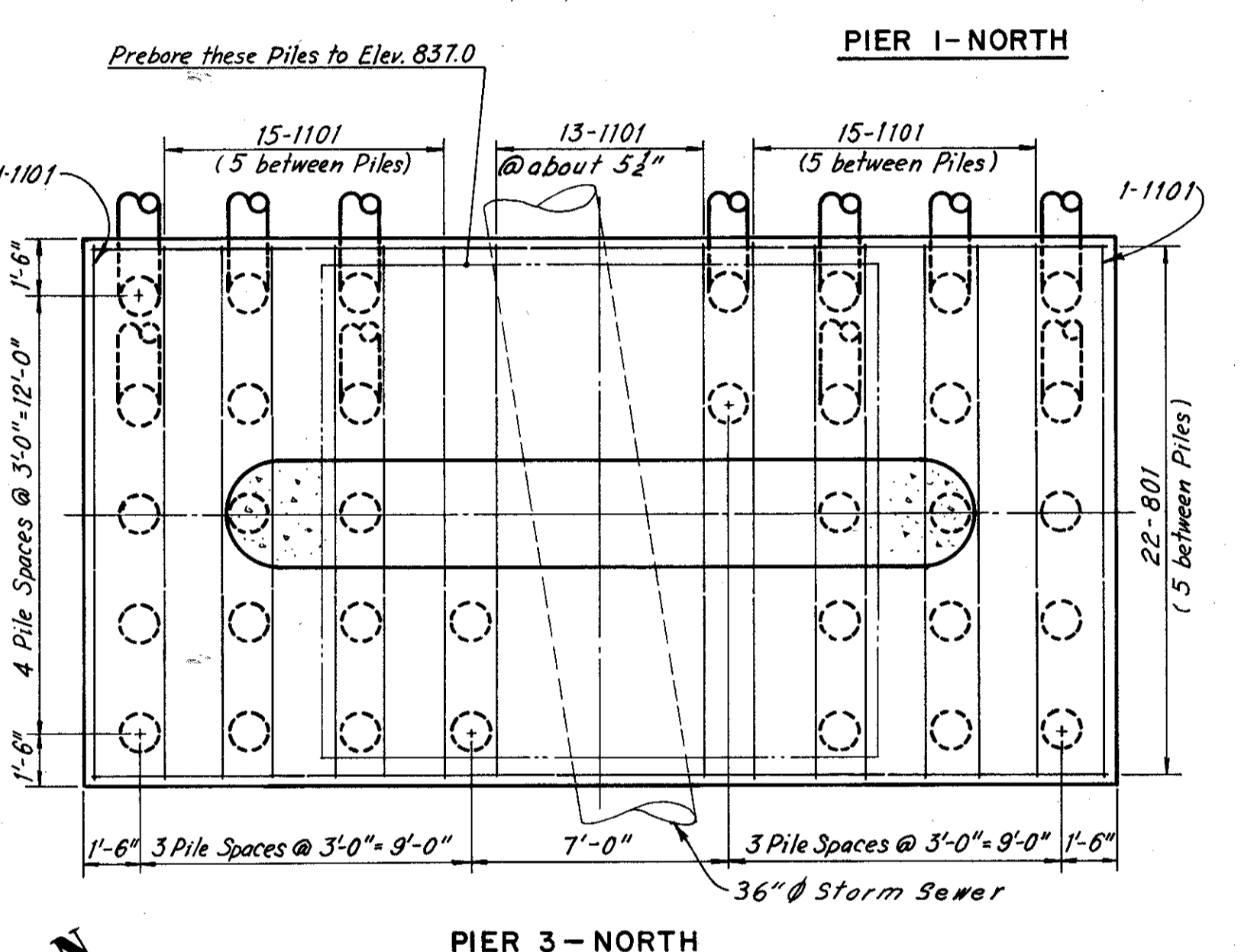
PIER 1-MIDDLE AND SOUTH



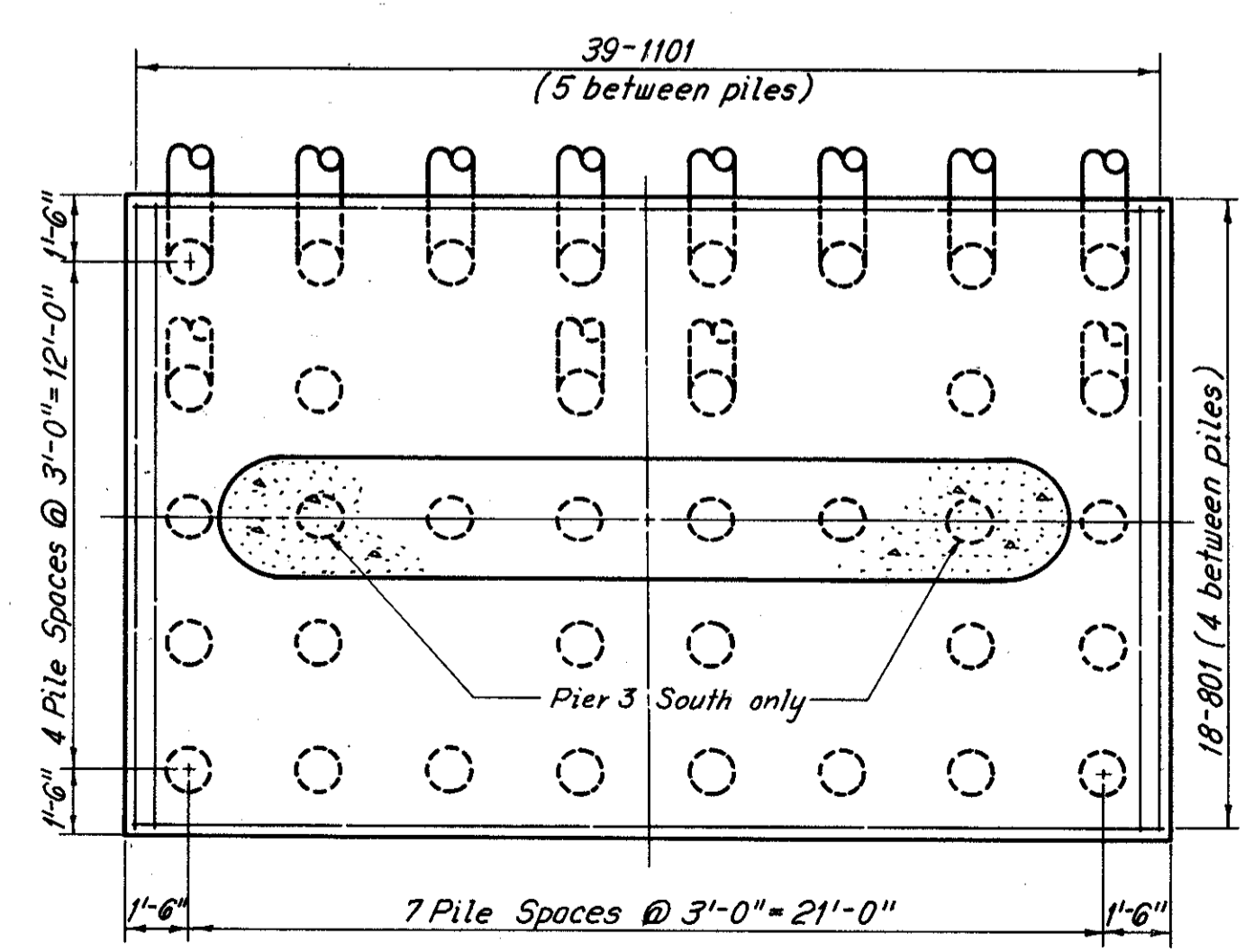
PIER 2-NORTH AND SOUTH



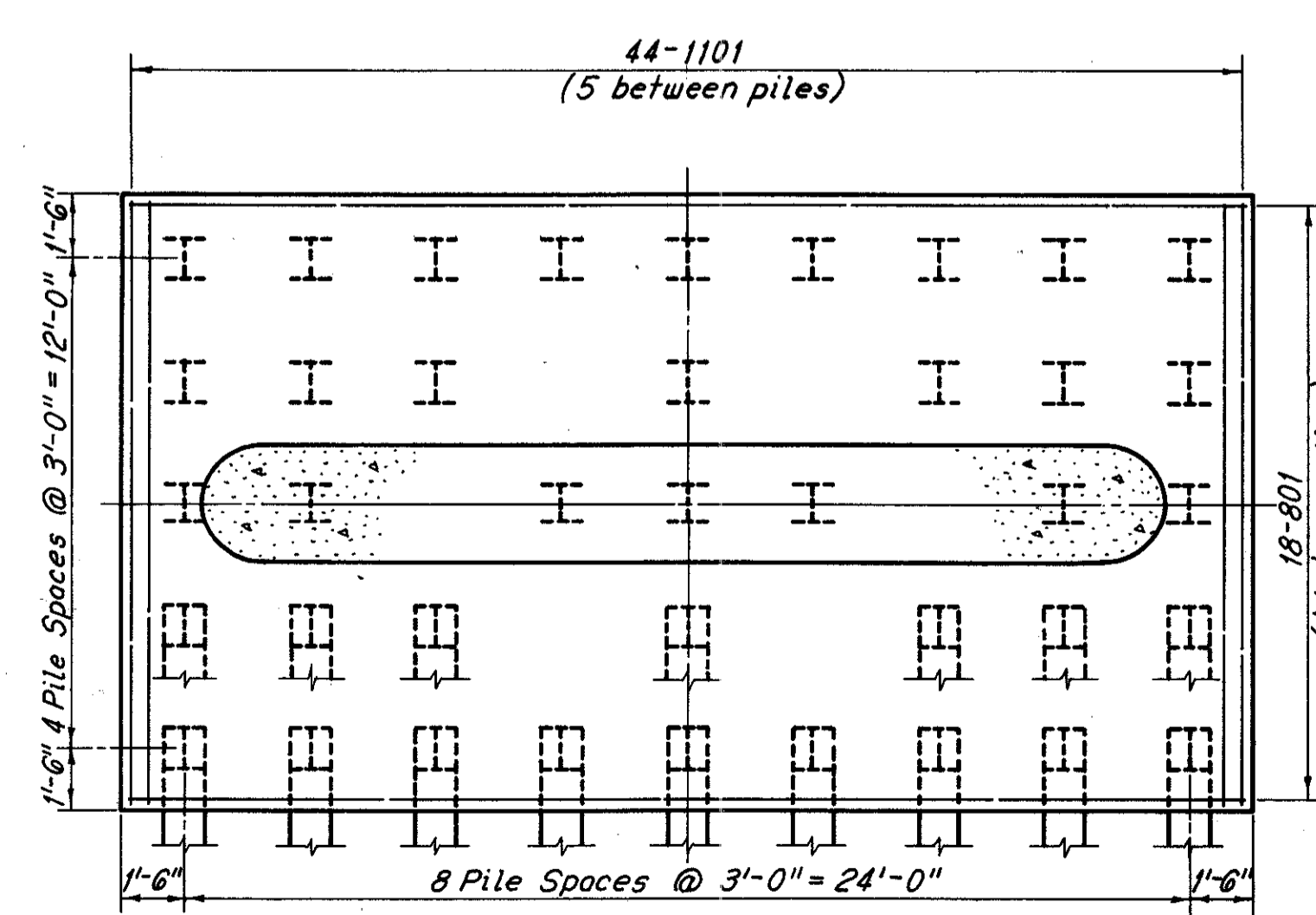
PIER 2-MIDDLE



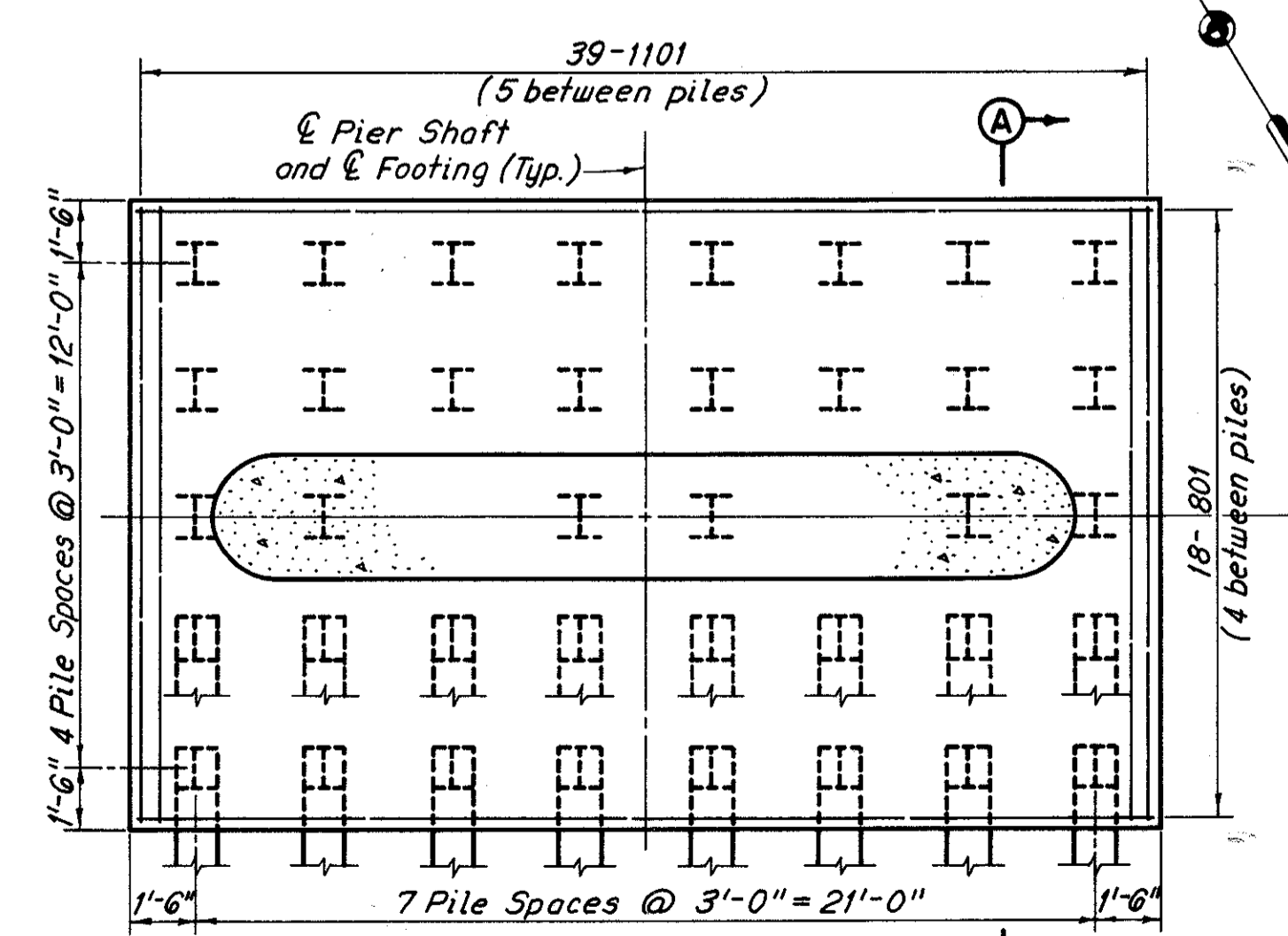
PIER 3-NORTH



PIER 3-MIDDLE AND SOUTH



PIER 4-NORTH AND SOUTH



PIER 4-MIDDLE

FOOTING PLANS

Notes:  
The Contractor shall take all necessary precautions to insure against damage to 15"  $\phi$ , 27"  $\phi$  and 36"  $\phi$  sewer lines. For location of sewer lines with respect to Piers 1, 2 and 3 see Sheet 2176 and Sections A-A, B-B and C-C on Sheet 2176.  
All piles are 12"  $\phi$  C.I.P. reinforced concrete for Piers 1, 2 and 3 and HP12x53 for Pier 4.  
All battered piles shall be inclined 3 in 12 in the direction shown, except as otherwise noted.  
Pile spacings are measured along bottom of footing.  
For reinforcing bar mark prefixes see Notes on Sheet 2176.

H.N.T.B. BR. NO. 6  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

PIER LAYOUT AND FOOTING DETAILS  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO  
STA. 1156+17.04

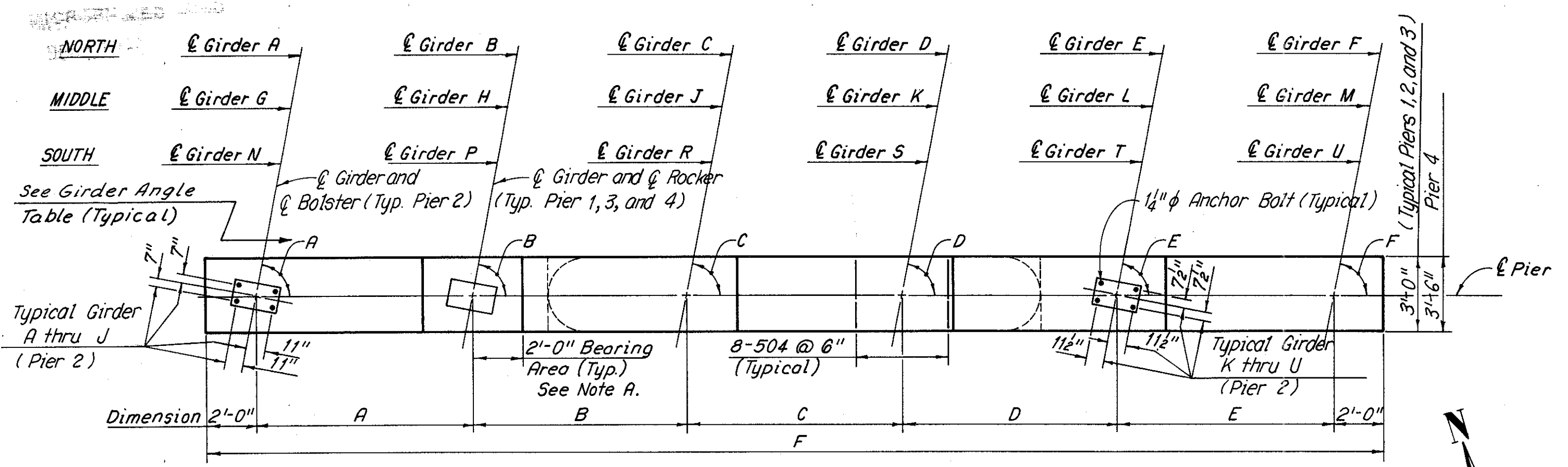
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN J.L.	TRACED L.L.A.	CHECKED J.L.	REVIEWED	REVISED
DATE 6-11-70	DATE 6-25-70	DATE 7-19-70	DATE	DATE

SHEET 7/16

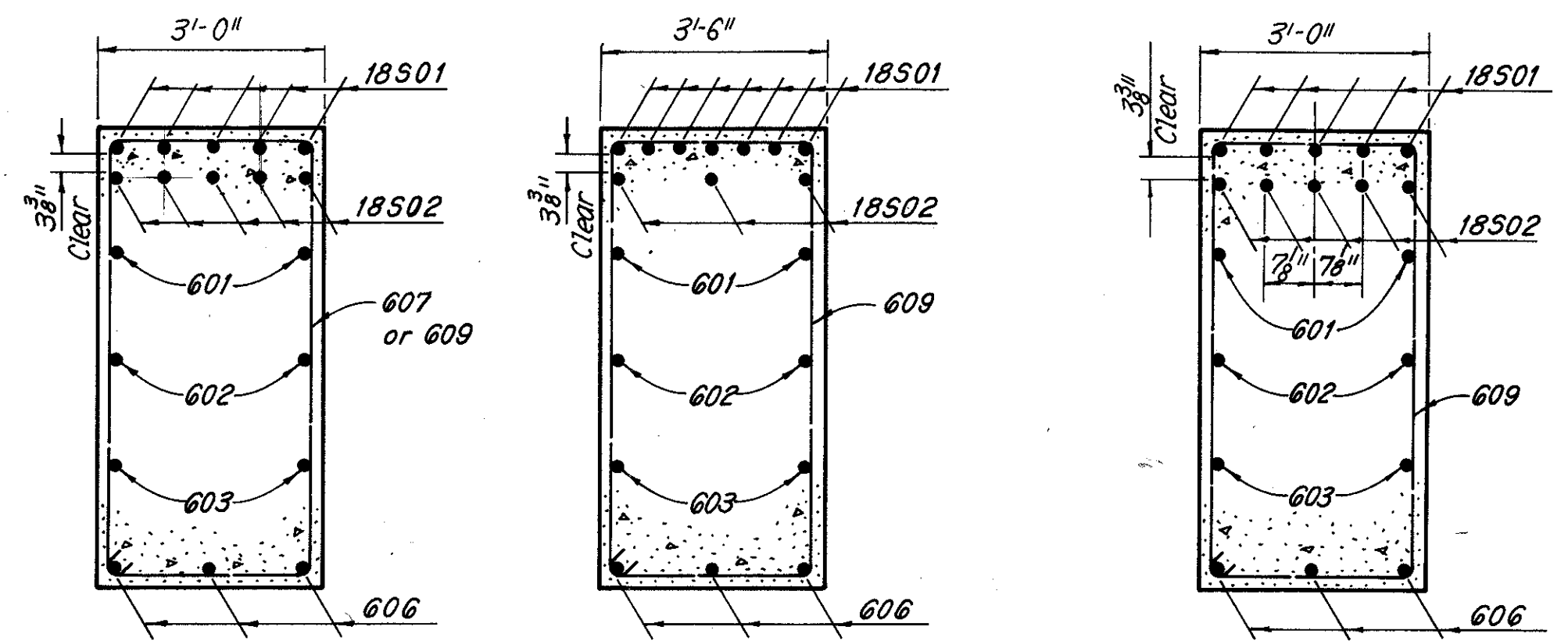
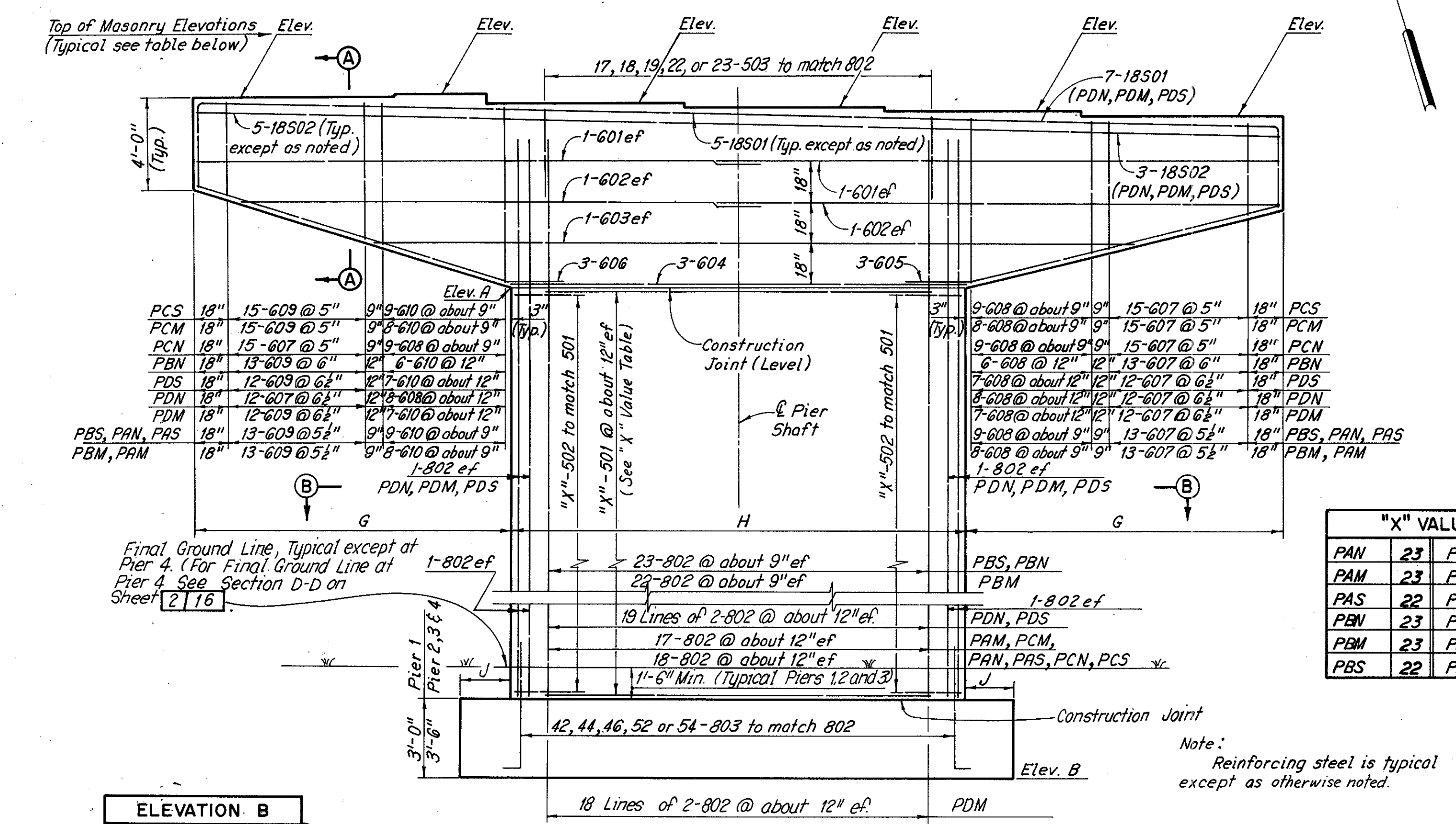
CUYAHOGA COUNTY  
CUY-80-21.40

		A	B	C	D	E	F	G	H	J
Pier 1	North	8'-7 1/8"	8'-7 1/8"	8'-7 3/4"	8'-7 1/8"	8'-7 1/8"	47'-2 1/2"	13'-9"	19'-8 1/2"	21'-1 3/4"
	Middle	8'-7 1/8"	8'-7 1/8"	6'-1 1/4"	8'-7 1/8"	8'-7 1/8"	44'-8"	13'-0"	18'-8"	21'-8"
	South	8'-7 1/8"	8'-7 1/8"	8'-7 3/4"	8'-7 1/8"	8'-7 1/8"	47'-2 1/2"	13'-9"	19'-8 1/2"	21'-1 3/4"
Pier 2	North	8'-7 1/8"	8'-7 1/8"	8'-7 3/4"	8'-7 1/8"	8'-7 1/8"	47'-2 1/2"	13'-9"	19'-8 1/2"	21'-1 3/4"
	Middle	8'-7 1/8"	8'-7 1/8"	6'-1 1/4"	8'-7 1/8"	8'-7 1/8"	44'-8"	13'-0"	18'-8"	31'-5"
	South	8'-7 1/8"	8'-7 1/8"	8'-7 3/4"	8'-7 1/8"	8'-7 1/8"	47'-2 1/2"	13'-9"	19'-8 1/2"	21'-1 3/4"
Pier 3	North	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	48'-4 1/2"	14'-1"	20'-2 7/8"	31'-10 3/8"
	Middle	8'-10 3/8"	8'-10 3/8"	6'-3 1/4"	8'-10 3/8"	8'-10 3/8"	45'-9 1/2"	13'-4"	19'-1 1/2"	21'-5 1/4"
	South	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	8'-10 3/8"	48'-4 1/2"	14'-1"	20'-2 7/8"	11'-10 3/8"
Pier 4	North	9'-5 5/8"	9'-5 5/8"	9'-5 5/8"	9'-5 5/8"	9'-5 5/8"	51'-4 3/4"	15'-0"	21'-4 3/4"	21'-9 1/2"
	Middle	9'-5 5/8"	9'-5 5/8"	6'-6 1/4"	9'-5 5/8"	9'-5 5/8"	47'-11 3/8"	14'-0"	19'-11 3/8"	21'-0 3/4"
	South	9'-2 1/8"	9'-2 1/8"	9'-2 1/8"	9'-2 1/8"	9'-2 1/8"	50'-1 1/2"	14'-7"	20'-11 1/2"	31'-0 1/4"



**PLAN**  
Note A:  
2'-0" measured in the direction of lower girder elevation. Cap beam steps of South caps shown.

RECORDED  
DEC 21 1982



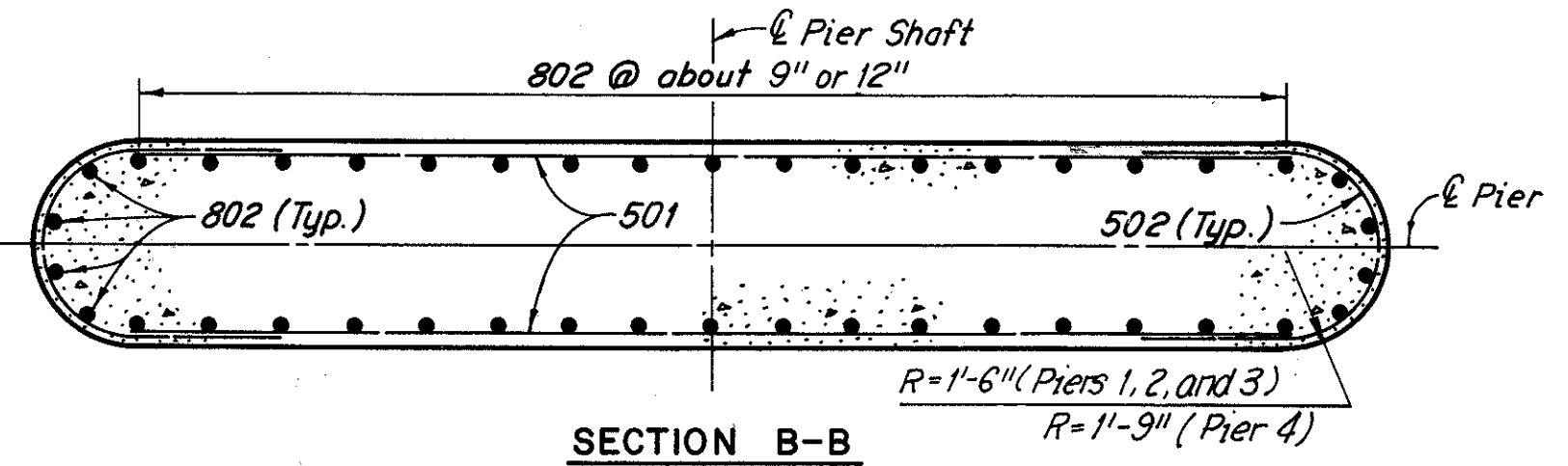
**SECTION A-A**  
(Typ. PAN, PAM, PAS, PCN, PCM, PCS)  
**SECTION A-A**  
(Typ. PDN, PDM, PDS)  
**SECTION A-A**  
(Typ. PBN, PBM, PBS)

**Notes:**  
The anchor bolts in Pier 2 shall be cast in place, by the use of a template for support, to insure against the reinforcing steel interfering with the anchor bolt setting. Extreme care shall be taken to assure agreement with plan dimensions. For anchor bolt details see Ohio Standard Drawing RB-1-55.  
The following abbreviations are used:

- PAN = Pier 1 North
- PAM = Pier 1 Middle
- PAS = Pier 1 South
- PBN = Pier 2 North
- PBM = Pier 2 Middle
- PBS = Pier 2 South
- PCN = Pier 3 North
- PCM = Pier 3 Middle
- PCS = Pier 3 South
- PDN = Pier 4 North
- PDM = Pier 4 Middle
- PDS = Pier 4 South
- ef = each face

The reinforcing bar marks shall be prefixed the same as above.  
All cap stirrups shall be placed with the hook at the bottom of the cap.

"X" VALUE	
PAN	23
PAM	23
PAS	22
PBN	23
PBM	23
PBS	22
PCN	31
PCM	28
PCS	26
PDN	40
PDM	40
PDS	39



**SECTION B-B**

ELEVATION B	
PAN	858.29
PAM	858.29
PAS	858.29
PBN	855.29
PBM	855.29
PBS	855.29
PCN	844.29
PCM	846.29
PCS	847.99
PDN	831.29
PDM	831.29
PDS	831.29

ELEVATION A			
	North	Middle	South
Pier 1	883.30	883.28	882.44
Pier 2	880.81	880.70	879.98
Pier 3	877.66	877.20	876.27
Pier 4	874.25	873.74	872.67

TOP OF MASONRY ELEVATIONS																		
Girder	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
Pier 1	890.74	890.84	890.93	891.03	891.12	890.95	890.78	890.57	890.18	890.15	890.47	890.53	890.53	890.54	890.38	890.21	890.04	889.88
Pier 2	888.25	888.34	888.43	888.51	888.59	888.42	888.24	888.03	887.63	887.52	887.83	887.95	888.04	888.12	887.95	887.77	887.59	887.42
Pier 3	885.18	885.24	885.30	885.34	885.40	885.19	884.97	884.72	884.29	884.16	884.44	884.53	884.57	884.63	884.42	884.21	884.00	883.79
Pier 4	882.13	882.15	882.18	882.19	882.22	882.00	881.76	881.48	881.00	880.92	881.17	881.24	881.26	881.29	881.04	880.80	880.56	880.32

GIRDER ANGLE TABLE								
		Angle	A	B	C	D	E	F
Pier 1	North		79°35'00"					79°35'00"
	Middle							
	South							
Pier 2	North							
	South		79°35'00"					79°35'00"
Pier 3	North		73°09'28"					73°09'28"
	South		73°09'28"					73°09'28"
Pier 4	North		68°30'51"	68°20'01"	68°09'42"	67°58'48"	67°48'26"	67°38'12"
	South		67°28'06"	67°18'10"	67°08'12"			67°08'12"

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**PIERS - SHAFTS AND CAPS**  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

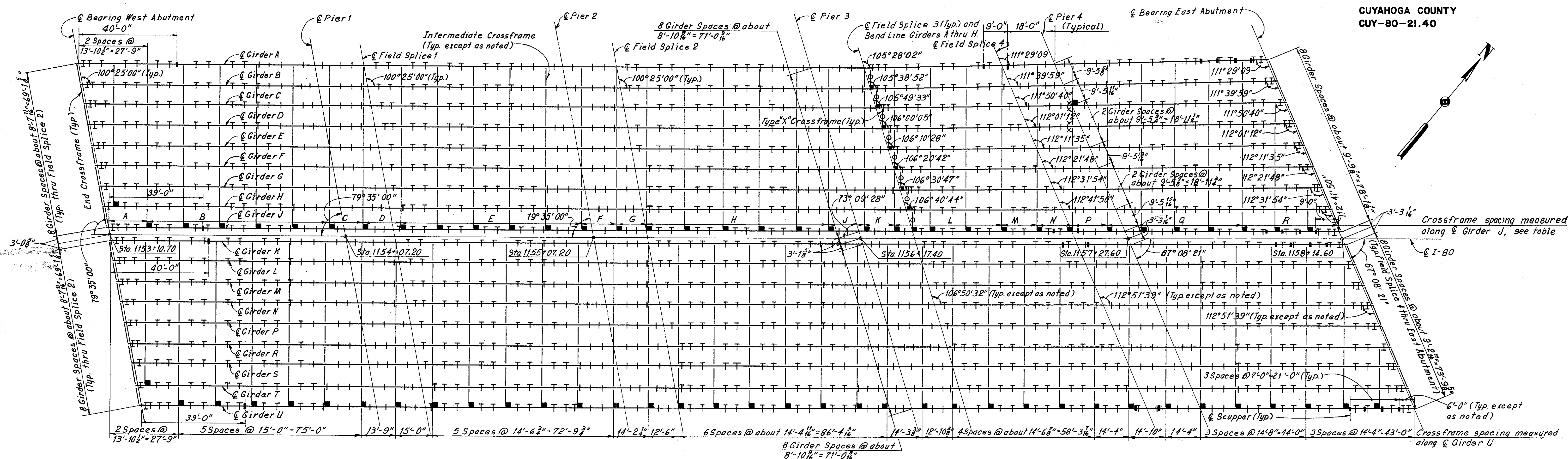
BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

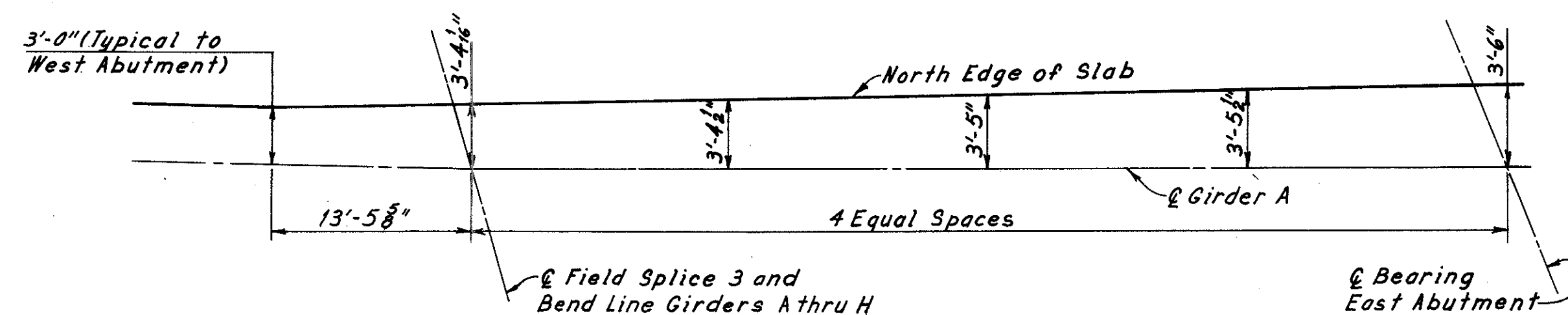
DRAWN J.T. TRACED/L.A. CHECKED R.W. REVIEWED DATE 6/23/70 DATE 6/30/70 DATE 7/15/70 DATE

SHEET 8 / 16





FRAMING PLAN



HORIZONTAL OFFSETS TO NORTH EDGE OF SLAB  
Note: Offsets are measured perpendicular to Girder.

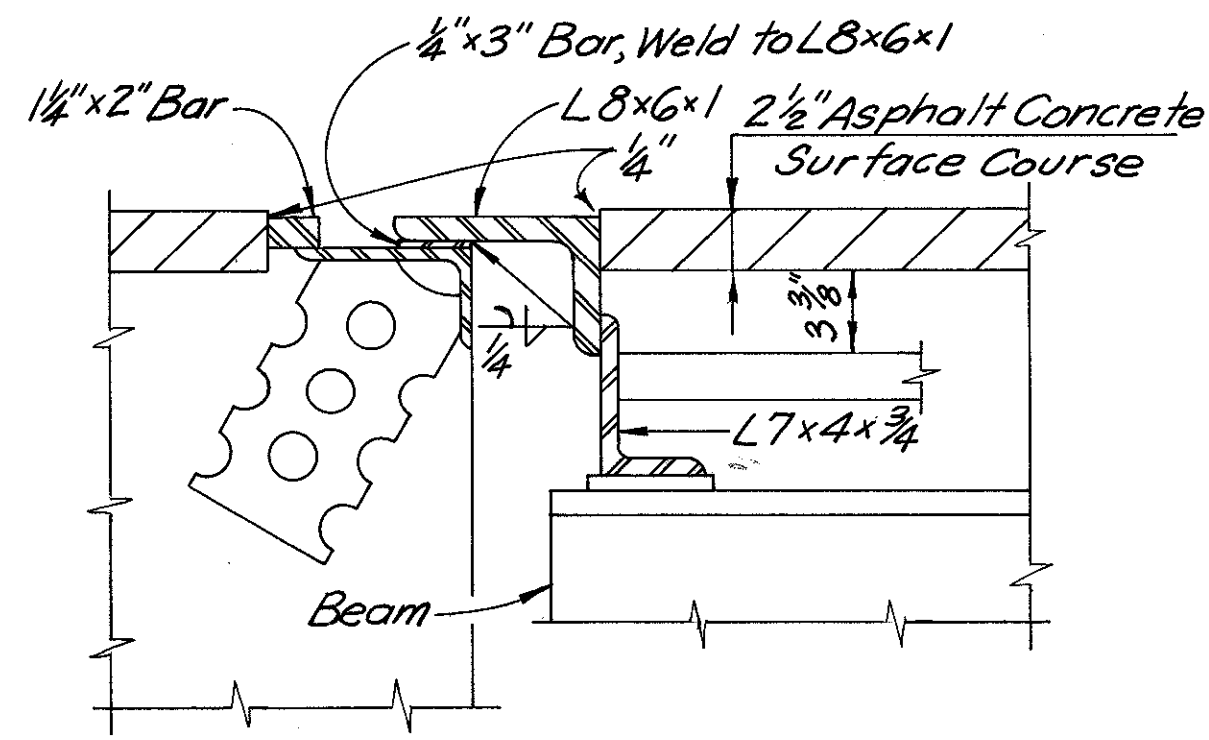
**Notes:**  
Intermediate stiffeners located at crossframes are shown in the "Framing Plan" only if contact bearing with the flange changes adjacent to the crossframe.

**FRAMING PLAN LEGEND**

- ⊗ Indicates point at which crossframe changes direction.
- Indicates 90°
- + Indicates intermediate stiffeners having contact bearing with the bottom flange.
- ⊕ Indicates intermediate stiffeners having contact bearing with the top flange.
- ⊚ Indicates intermediate stiffeners at one-half normal stiffener spacing. (See Girder Notes Sheet 10/16 for stiffener spacing.)

Intermediate stiffeners shall have contact bearing with top and bottom flanges. Stiffeners shall be located at all crossframes.

Dimension	Line Description
A	15'-3"
B	5 Spaces @ 15'-0" = 75'-0"
C	13'-9"
D	15'-0"
E	5 Spaces @ 14'-6 3/4" = 72'-9 3/4"
F	14'-2 1/8"
G	12'-6"
H	5 Spaces @ about 15'-0" = 74'-11 3/4"
J	14'-3 3/8"
K	12'-10 3/8"
L	3 Spaces @ about 14'-9 1/4" = 44'-3 3/4"
M	14'-7 3/8"
N	14'-7 3/8"
P	14'-7 1/2"
Q	4 Spaces @ about 13'-9" = 55'-0"
R	3 Spaces @ 13'-1 1/2" = 39'-4 1/2"



For additional end dam details see Standard Drawing SD-1-69, Sheet 1 of 4.

END DAM DETAILS

**Note:**  
For details of End Crossframes, Roadway End Dams and curb plates see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4.

For Girder Notes see Sheet 10/16.  
For details of Intermediate and Type 'X' Crossframes and Drainage Details see Sheet C07 and C02.

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**FRAMING PLAN**

I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

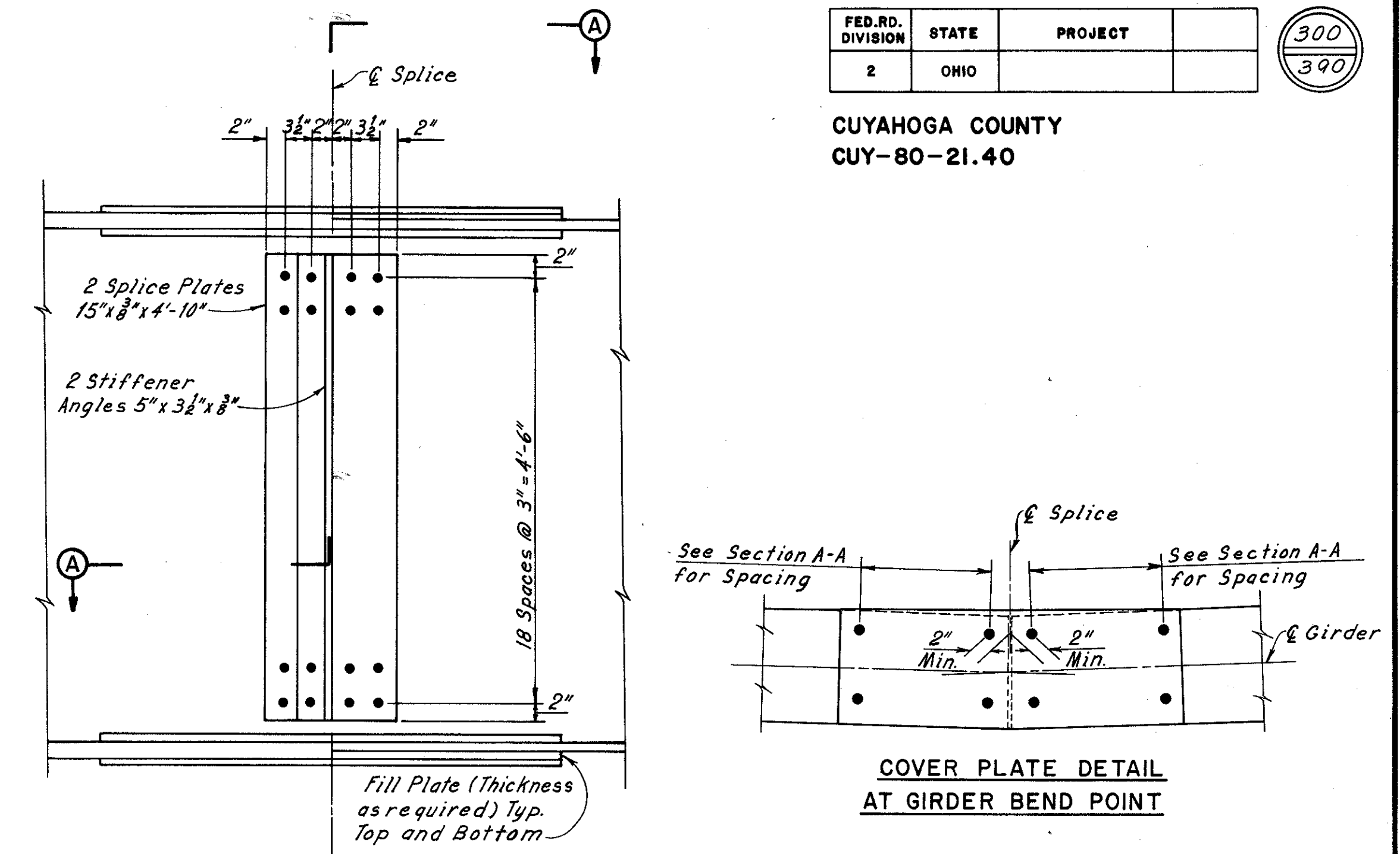
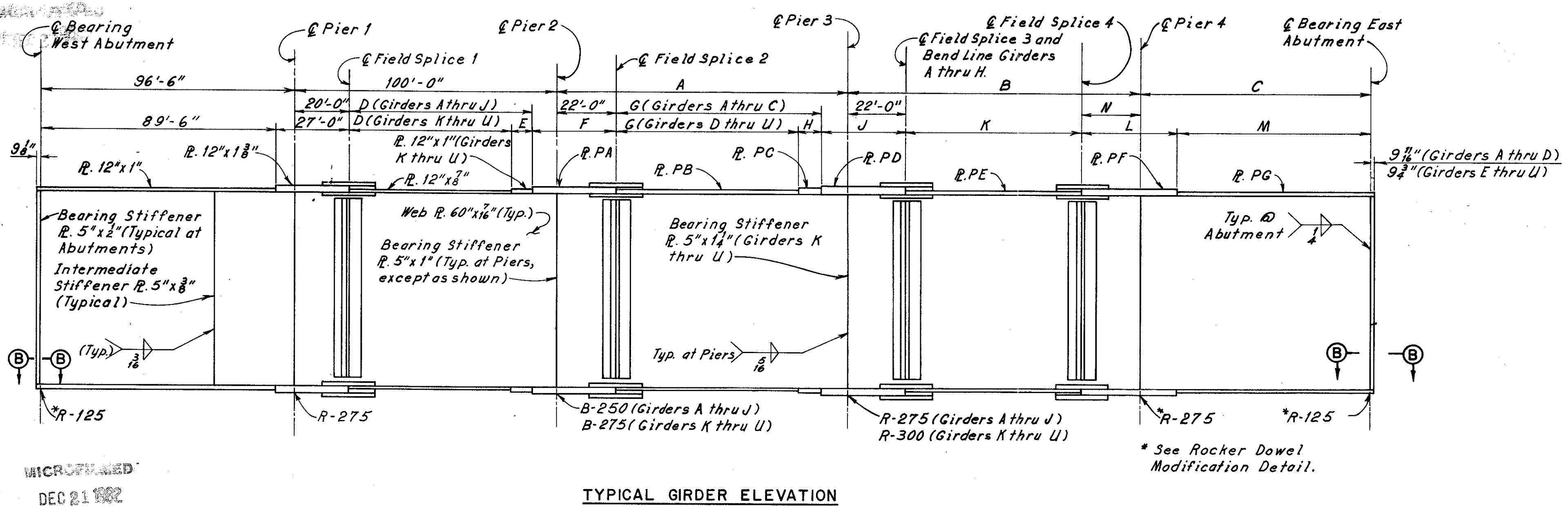
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN S.M.S. TRACER, S.C. CHECKED J.S. REWIS  
DATE 5-7-70 DATE 5-13-70 DATE 6-30-70 DATE

REVIS  
DATE

SHEET 9/16

CUYAHOGA COUNTY  
CUY-80-21.40



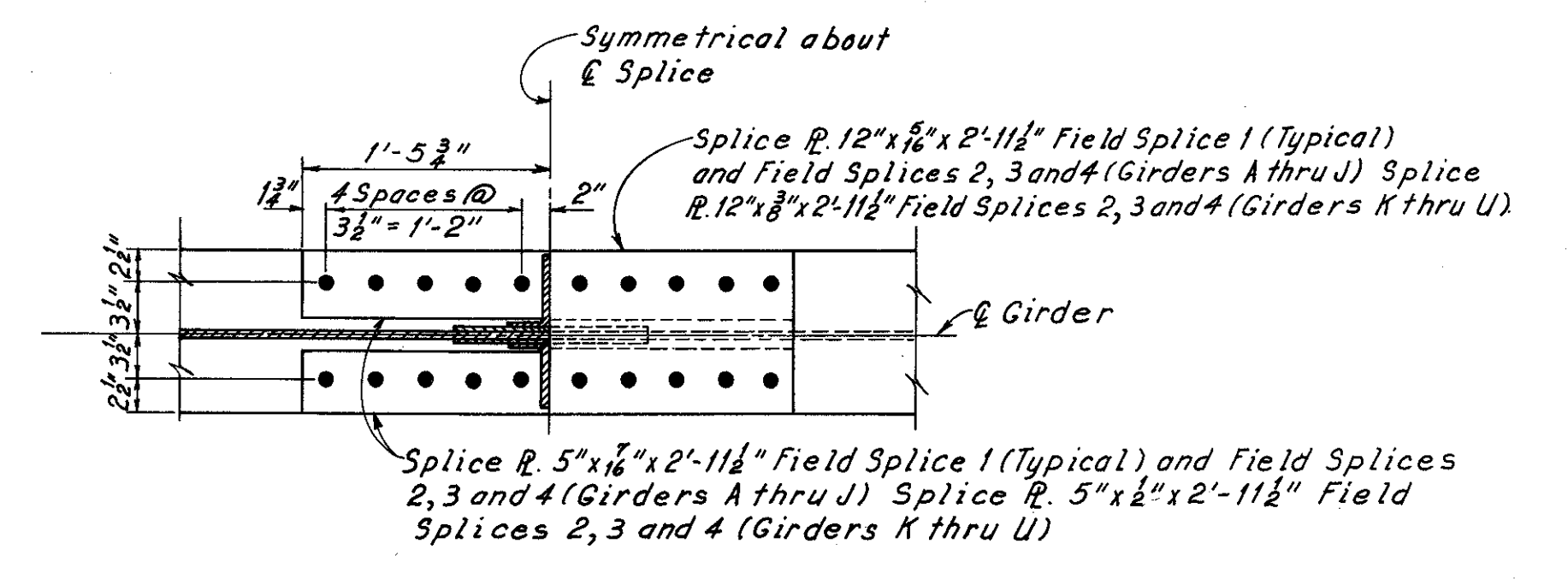
MICROFILMED  
DEC 21 1982

\* See Rocker Dowel Modification Detail.

TABLE OF GIRDER DIMENSIONS

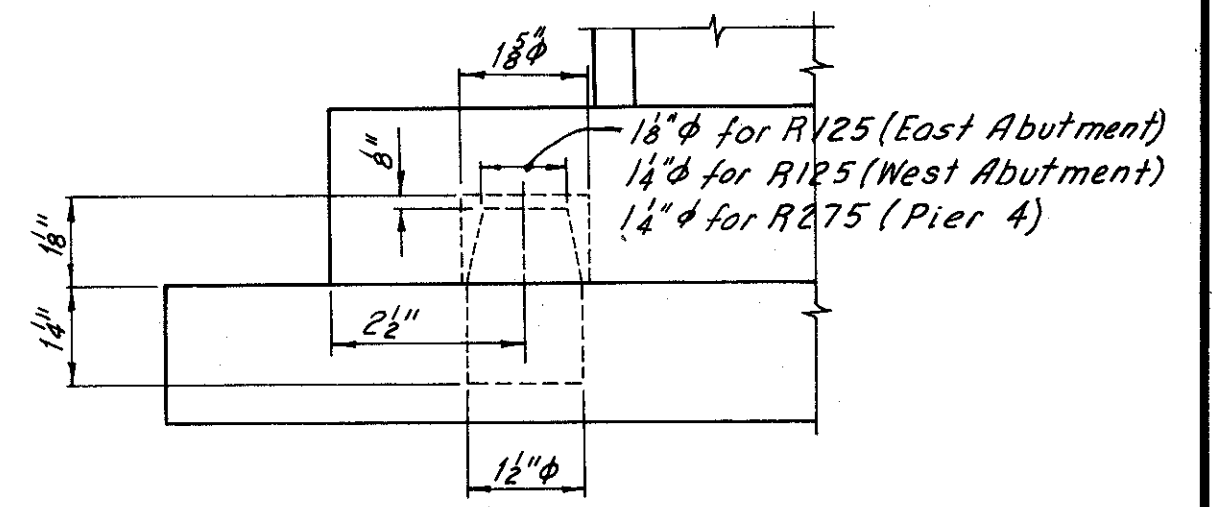
GIRDERS	DIMENSIONS																			
	A	B	C	D	E	F	G	H	J	K	L	M	N	R.P.A	R.P.B	R.P.C	R.P.D	R.P.E	R.P.F	R.P.G
A	101'-9 1/8"	100'-11 1/8"	86'-1 1/8"	69'-0"		33'-0"	66'-9 1/8"		35'-0"	57'-2 3/8"	29'-9 1/8"	78'-1 1/8"	21'-9 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
B	102'-9 1/8"	102'-1"	86'-3 1/8"	69'-0"		33'-0"	67'-9 1/8"		35'-0"	58'-4 1/8"	29'-9 1/8"	78'-3 1/8"	21'-9 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
C	103'-9 1/8"	103'-2 1/8"	86'-4 1/8"	69'-0"		33'-0"	68'-9 1/8"		35'-0"	59'-4 1/8"	29'-10 1/8"	78'-4 1/8"	21'-10 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
D	104'-9 1/8"	104'-3 1/8"	86'-5 1/8"	67'-0"		35'-0"	67'-9 1/8"	7'-0"	30'-0"	60'-5 1/8"	29'-10 1/8"	78'-5 1/8"	21'-10 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
E	105'-9 1/8"	105'-4 1/8"	86'-6 1/8"	67'-0"		35'-0"	68'-9 1/8"	7'-0"	30'-0"	61'-6"	29'-10 1/8"	78'-6 1/8"	21'-10 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
F	106'-9 1/8"	106'-6 1/8"	86'-8 1/8"	66'-0"		36'-0"	67'-9 1/8"	8'-0"	31'-0"	62'-7"	30'-11 1/8"	77'-11 1/8"	21'-11 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
G	107'-9 1/8"	107'-7 1/8"	86'-9 1/8"	66'-0"		36'-0"	68'-9 1/8"	8'-0"	31'-0"	63'-9"	30'-11 1/8"	77'-9 1/8"	21'-11 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
H	108'-10"	108'-8 3/8"	86'-10 3/8"	66'-0"		36'-0"	69'-10"	8'-0"	31'-0"	64'-9 1/8"	30'-11 1/8"	77'-10 3/8"	21'-11 1/8"	12"x1 1/4"	12"x 3/8"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
J	109'-10 1/8"	109'-10 1/8"	87'-0"	66'-0"		36'-0"	70'-10 1/8"	8'-0"	31'-0"	65'-10 1/8"	31'-0"	78'-0"	22'-0"	12"x1 1/4"	12"x 3/8"	12"x1"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
K	110'-6 1/8"	110'-6 1/8"	87'-0"	65'-0"	8'-0"	29'-0"	73'-6 1/8"	7'-0"	30'-0"	66'-6 1/8"	34'-0"	75'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
L	111'-6 1/8"	111'-6 1/8"	87'-0"	64'-0"		30'-0"	72'-6 1/8"	8'-0"	31'-0"	67'-6 1/8"	35'-0"	74'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
M	112'-6 1/8"	112'-6 1/8"	87'-0"	64'-0"		30'-0"	73'-6 1/8"	8'-0"	31'-0"	68'-6 1/8"	35'-0"	74'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
N	113'-7 1/8"	113'-7 1/8"	87'-0"	64'-0"		30'-0"	74'-7 1/8"	8'-0"	31'-0"	69'-7 1/8"	35'-0"	74'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
P	114'-7 1/8"	114'-7 1/8"	87'-0"	64'-0"	8'-0"		75'-7 1/8"	8'-0"	31'-0"	70'-7 1/8"	35'-0"	74'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
R	115'-7 1/8"	115'-7 1/8"	87'-0"	63'-0"	9'-0"		74'-7 1/8"	9'-0"	32'-0"	71'-7 1/8"	36'-0"	73'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
S	116'-7 1/8"	116'-7 1/8"	87'-0"	63'-0"	9'-0"		75'-7 1/8"	9'-0"	32'-0"	72'-7 1/8"	36'-0"	73'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
T	117'-7 1/8"	117'-7 1/8"	87'-0"	63'-0"	9'-0"	30'-0"	76'-7 1/8"	8'-0"	33'-0"	73'-7 1/8"	36'-0"	73'-0"		12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"
U	118'-7 1/8"	118'-7 1/8"	87'-0"	63'-0"	9'-0"	30'-0"	77'-7 1/8"	8'-0"	33'-0"	74'-7 1/8"	36'-0"	73'-0"	22'-0"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x1 1/4"	12"x 3/8"	12"x1 1/4"	12"x 3/8"

TYPICAL FIELD WEB SPlice



SECTION A-A TYPICAL FIELD FLANGE SPlice

FIELD SPlice DETAILS



GIRDER NOTES:

The girders shall be fabricated to compensate for the effects of vertical curvature, superelevation and dead load deflections. The top of the girder webs shall parallel the profile of the roadway surface directly over the center line of girder.

Top and bottom flange plates are to be the same and shall be spliced at points shown on the girder elevation. The web plates may be shop spliced as required by available plate lengths. The locations of shop web splices and the locations and details of any additional shop flange splices shall be submitted to the Director for approval prior to ordering of materials.

Intermediate stiffeners shall be placed as shown on the Framing Plan equally spaced between crossframes, or crossframes and bearing stiffeners or crossframes and field splices, except the first two stiffener spaces from the abutments shall be one-half of this spacing. Stiffeners shall be placed in pairs and shall have contact bearing with both flanges.

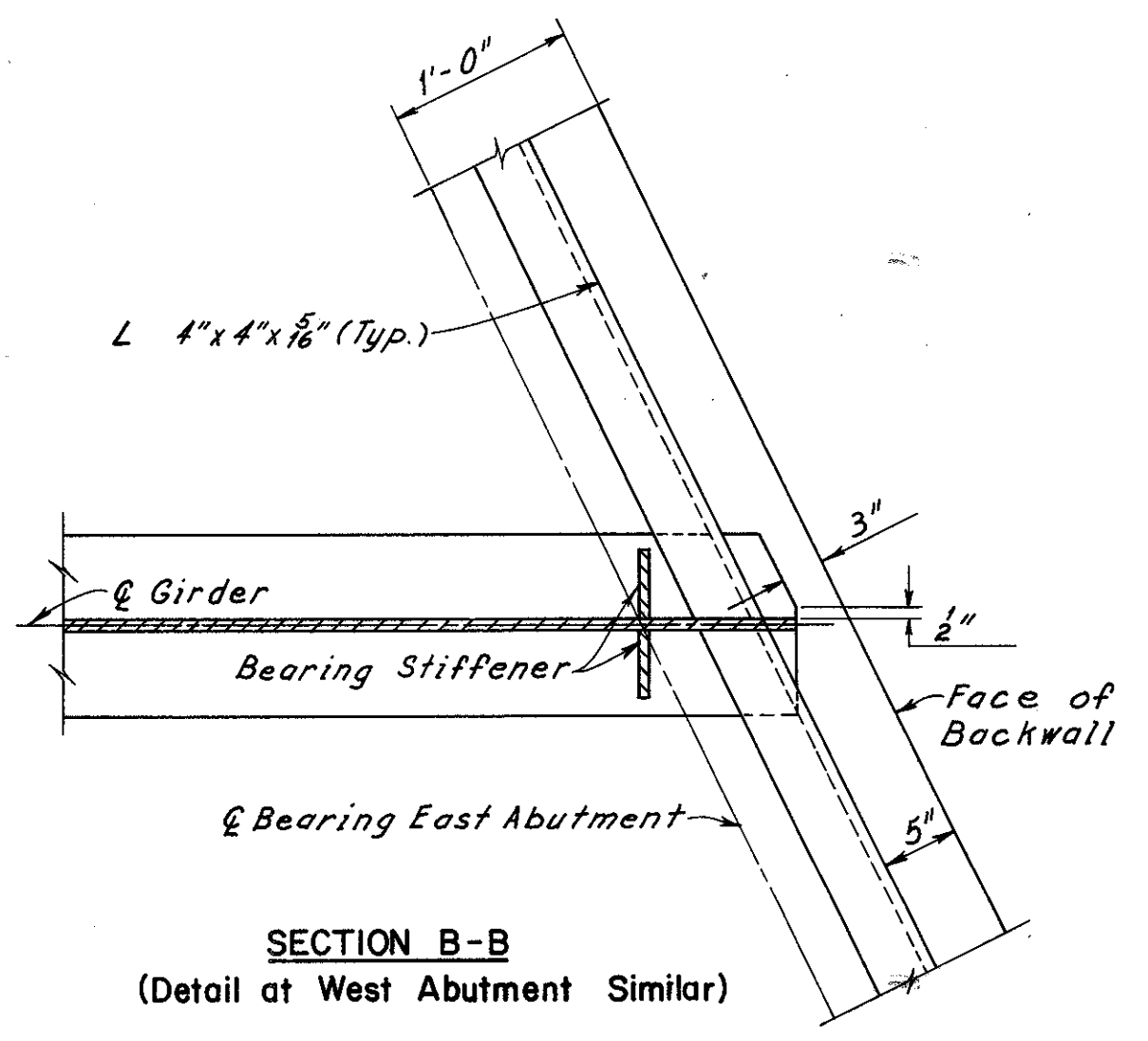
Bearing stiffeners at piers and abutments shall be placed in pairs on all girders. Intermediate stiffeners and bearing stiffeners at the piers shall be normal to girder flange. Bearing stiffeners at abutments shall be vertical.

All girder field splices shall be made with 1" diameter high strength steel bolts. The bolts shall have the corrosion resistance and coloring characteristics of ASTM A588 steel and all the mechanical properties of ASTM A325 High Strength Steel Bolts. The bolts shall be placed with their heads on the outside face of the exterior girders and on the bottom of all flange plates.

The Contractor shall submit to the Director for approval three prints showing his proposed erection procedure.

For Details of Rockers and Bolsters see Ohio Standard Drawing RB-1-55, and the Rocker Dowel Modification Detail on this sheet. The 1/2" side plates attached to the sole plates should be left off the bearings for Girders A, J, K and U at all substructure units.

WELD SIZE WEB TO FLANGE	
Flange R Thickness	Fillet Weld Size
7/8 to 1 1/2	5/8
1 5/8 and 1 3/4	3/4



H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**GIRDER ELEVATIONS AND FIELD SPlice DETAILS**  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN S.M.S. TRACER/S.C. CHECKED W.D.S. REVIEWED  
DATE 4-21-70 DATE 5-15-70 DATE 6-30-70 DATE

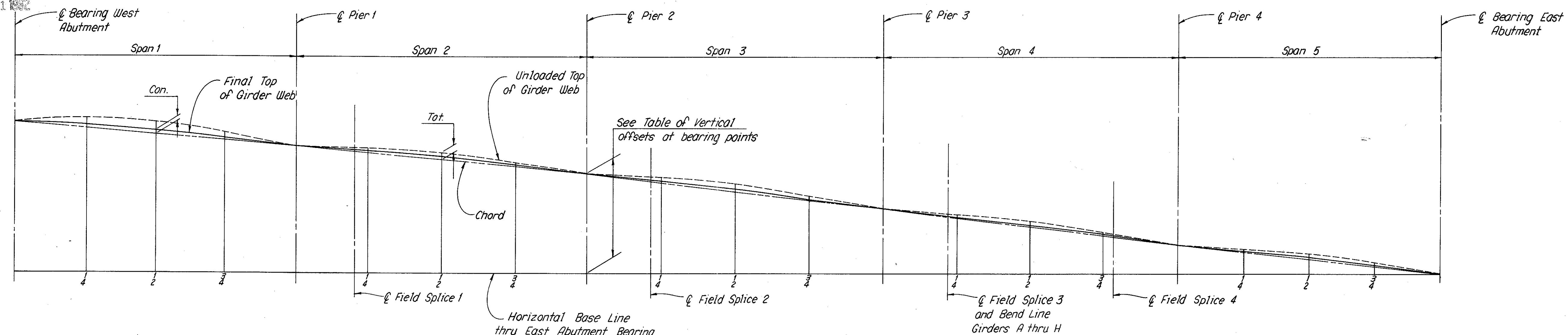
SHEET 10/16

DEC 21 1938

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

301  
390

CUYAHOGA COUNTY  
CUY-80-21.40



CAMBER DIAGRAM

Girder	Span 1				Span 2				Span 3				Span 4				Span 5				Girder
	Field Splice 1				Field Splice 2				Field Splice 3				Field Splice 4								
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	
A	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	A
B	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	B
C	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	C
D	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	D
E	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	E
F	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	F
G	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	G
H	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	H
J	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	J
K	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	K
L	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	L
M	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	M
N	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	N
P	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	P
R	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	R
S	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	S
T	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	T
U	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	U

Girder	TOP OF CONCRETE SLAB ELEVATION																				
	ε Bearing West Abutment	Span 1			Span 2			Span 3			Span 4			Span 5			ε Bearing East Abutment				
		1	2	3	ε Pier 1	1	2	3	ε Pier 2	1	2	3	ε Pier 3	1	2	3	ε Pier 4	1	2	3	ε Bearing East Abutment
A	899.40	899.91	899.39	898.86	898.29	897.69	897.06	896.40	895.72	895.00	894.25	893.49	892.73	891.97	891.20	890.44	889.67	889.01	888.36	887.71	887.05
B	900.50	900.01	899.49	898.95	898.39	897.78	897.15	896.49	895.81	895.08	894.32	893.55	892.78	892.02	891.24	890.47	889.69	889.04	888.39	887.73	887.08
C	900.60	900.11	899.59	899.05	898.49	897.88	897.24	896.58	895.90	895.16	894.39	893.62	892.84	892.06	891.28	890.50	889.72	889.07	888.41	887.76	887.11
D	900.71	900.21	899.69	899.15	898.58	897.97	897.33	896.67	895.98	895.24	894.47	893.68	892.89	892.11	891.32	890.53	889.75	889.09	888.44	887.79	887.13
E	900.81	900.31	899.79	899.24	898.68	898.06	897.42	896.76	896.07	895.32	894.54	893.74	892.95	892.16	891.36	890.57	889.77	889.12	888.47	887.81	887.16
F	900.64	900.14	899.62	899.07	898.51	897.89	897.25	896.59	895.90	895.13	894.34	893.54	892.74	891.94	891.15	890.35	889.56	888.91	888.26	887.61	886.97
G	900.48	899.98	899.45	898.91	898.33	897.72	897.08	896.41	895.72	894.95	894.15	893.34	892.53	891.72	890.92	890.11	889.31	888.66	888.01	887.36	886.71
H	900.27	899.77	899.25	898.70	898.13	897.51	896.87	896.20	895.51	894.72	893.91	893.10	892.28	891.47	890.65	889.84	889.03	888.38	887.73	887.08	886.43
J	899.89	899.38	898.86	898.31	897.73	897.11	896.47	895.80	895.11	894.32	893.50	892.67	891.85	891.02	890.20	889.38	888.55	887.90	887.25	886.60	885.94
K	899.87	899.36	898.83	898.28	897.71	897.09	896.44	895.77	895.08	894.28	893.45	892.62	891.79	890.97	890.14	889.31	888.48	887.83	887.17	886.52	885.87
L	900.19	899.68	899.15	898.60	898.02	897.40	896.75	896.08	895.39	894.58	893.75	892.91	892.07	891.23	890.40	889.56	888.72	888.07	887.42	886.77	886.11
M	900.15	899.67	899.14	898.64	898.08	897.48	896.85	896.19	895.51	894.70	893.85	893.01	892.17	891.32	890.48	889.63	888.79	888.14	887.48	886.83	886.17
N	900.03	899.60	899.14	898.63	898.09	897.50	896.89	896.26	895.59	894.78	893.93	893.07	892.22	891.37	890.52	889.67	888.81	888.16	887.51	886.85	886.18
P	899.92	899.53	899.10	898.62	898.10	897.53	896.94	896.33	895.67	894.85	894.00	893.14	892.28	891.42	890.56	889.70	888.84	888.19	887.53	886.87	886.19
R	899.77	899.37	898.94	898.45	897.93	897.36	896.77	896.16	895.50	894.67	893.80	892.93	892.07	891.20	890.33	889.47	888.60	887.95	887.29	886.63	885.94
S	899.61	899.22	898.78	898.29	897.76	897.19	896.60	895.99	895.32	894.48	893.61	892.73	891.86	890.98	890.11	889.23	888.36	887.71	887.05	886.38	885.69
T	899.45	899.06	898.61	898.12	897.59	897.03	896.43	895.81	895.15	894.29	893.41	892.53	891.65	890.77	889.88	889.00	888.12	887.47	886.81	886.14	885.44
U	899.30	898.90	898.45	897.95	897.43	896.86	896.26	895.64	894.97	894.11	893.22	892.33	891.44	890.55	889.66	888.77	887.88	887.23	886.57	885.89	885.19

Girder	VERTICAL OFFSETS AT BEARING POINTS				
	West Abutment	Pier 1	Pier 2	Pier 3	Pier 4
A	13'-4 1/2"	11'-2 7/8"	8'-8"	5'-8 1/2"	2'-7 1/2"
B	13'-5 1/2"	11'-3 3/8"	8'-8 1/2"	5'-8 1/2"	2'-7 1/2"
C	13'-6"	11'-4 3/8"	8'-9 1/2"	5'-8 1/2"	2'-7 1/2"
D	13'-6 1/2"	11'-5 1/8"	8'-10 1/4"	5'-9 1/4"	2'-7 1/2"
E	13'-7 3/8"	11'-6 3/8"	8'-11 1/4"	5'-9 1/2"	2'-7 1/2"
F	13'-8 1/2"	11'-6 3/4"	8'-11 3/4"	5'-9 1/4"	2'-7 1/2"
G	13'-9 3/8"	11'-7 1/8"	9'-0 1/4"	5'-9 3/4"	2'-7 1/2"
H	13'-10 1/4"	11'-8 1/8"	9'-0 7/8"	5'-10 1/8"	2'-7 1/2"
J	13'-11 1/2"	11'-9 1/2"	9'-1 1/8"	5'-10 7/8"	2'-7 1/2"
K	14'-0"	11'-10 1/8"	9'-2 1/4"	5'-11 1/2"	2'-7 1/2"
L	14'-0 1/2"	11'-10 3/4"	9'-3 1/4"	5'-11 1/2"	2'-7 1/2"
M	13'-11 3/8"	11'-10 3/8"	9'-4 1/8"	5'-11 1/8"	2'-7 1/2"
N	13'-10 1/2"	11'-10 1/2"	9'-4 1/2"	5'-11 1/2"	2'-7 1/2"
P	13'-8 1/2"	11'-10 1/8"	9'-5 1/8"	6'-1 1/8"	2'-7 1/2"
R	13'-9 1/2"	11'-11 1/2"	9'-6 1/2"	6'-1 1/2"	2'-7 1/2"
S	13'-11 1/4"	12'-0 1/4"	9'-7 1/4"	6'-2 1/4"	2'-8"
T	14'-0 1/2"	12'-1 1/2"	9'-8 1/2"	6'-2 1/2"	2'-8 1/2"
U	14'-1 1/4"	12'-2 1/4"	9'-9 1/4"	6'-2 3/4"	2'-8 1/2"

Note:  
Negative value for deflection indicates value above the chord line.  
Deflections and convexities are given to the nearest 1/8 inch.  
The following abbreviations are used:  
Stl. = Dead load deflections due to the weight of steel.  
Rem. D.L. = Remaining dead load deflection.  
Con. = Convexity.  
Tot. = Total required camber.

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

TOP OF PAVEMENT ELEVATIONS,  
DEAD LOAD DEFLECTIONS & CAMBER.

I-80 OVER PENN-CENTRAL RAILROAD  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-21.40 STA. 1153+08.41 TO STA. 1158+17.04

CUYAHOGA COUNTY OHIO

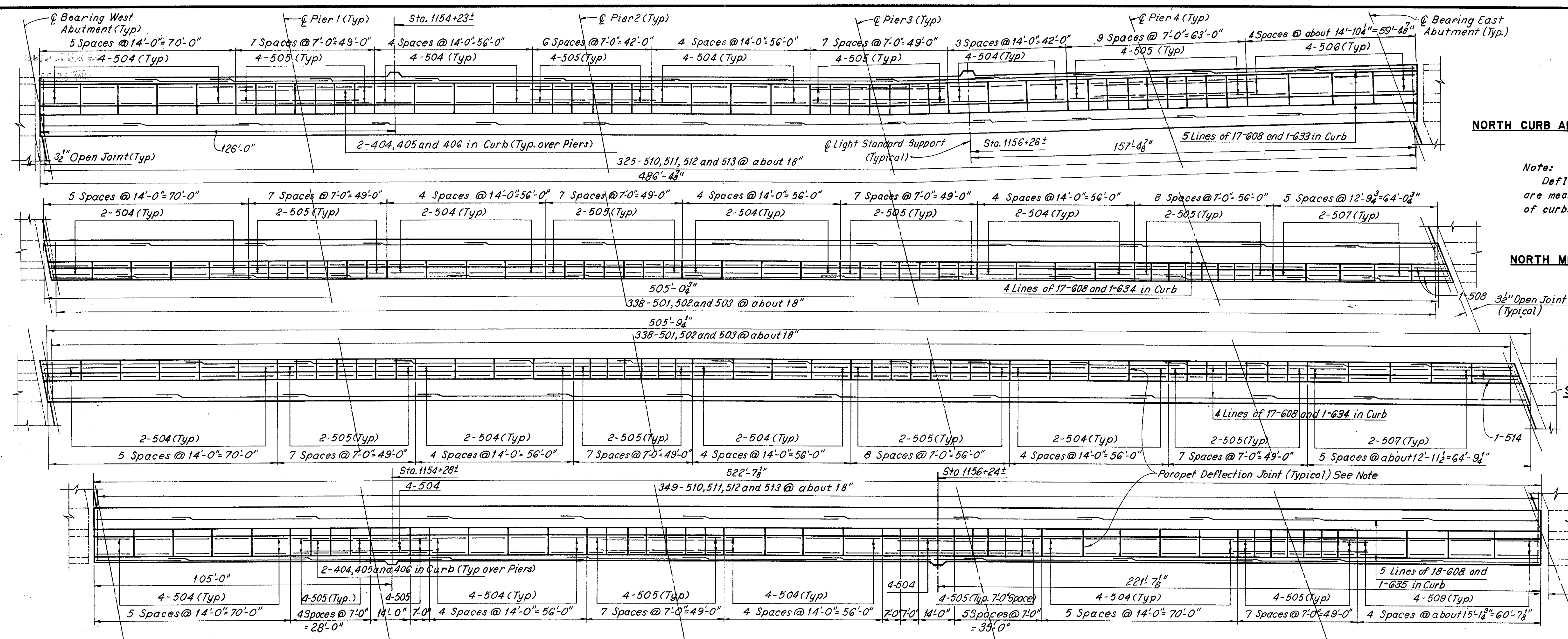
DRAWN S.M.S.	TRACED H.U.	CHECKED M.C.B.	REVIEWED	REVISED
DATE 7-8-70	DATE 7-20-70	DATE 7-13-70	DATE	DATE

SHEET 11/16

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

302  
390

CUYAHOGA COUNTY  
CUY-80-21.40



**NORTH CURB AND PARAPET**

Note:  
Deflection Joint Spacings  
are measured along inside edge  
of curbs.

**NORTH MEDIAN CURB AND PARAPET**

**SOUTH MEDIAN CURB AND PARAPET**

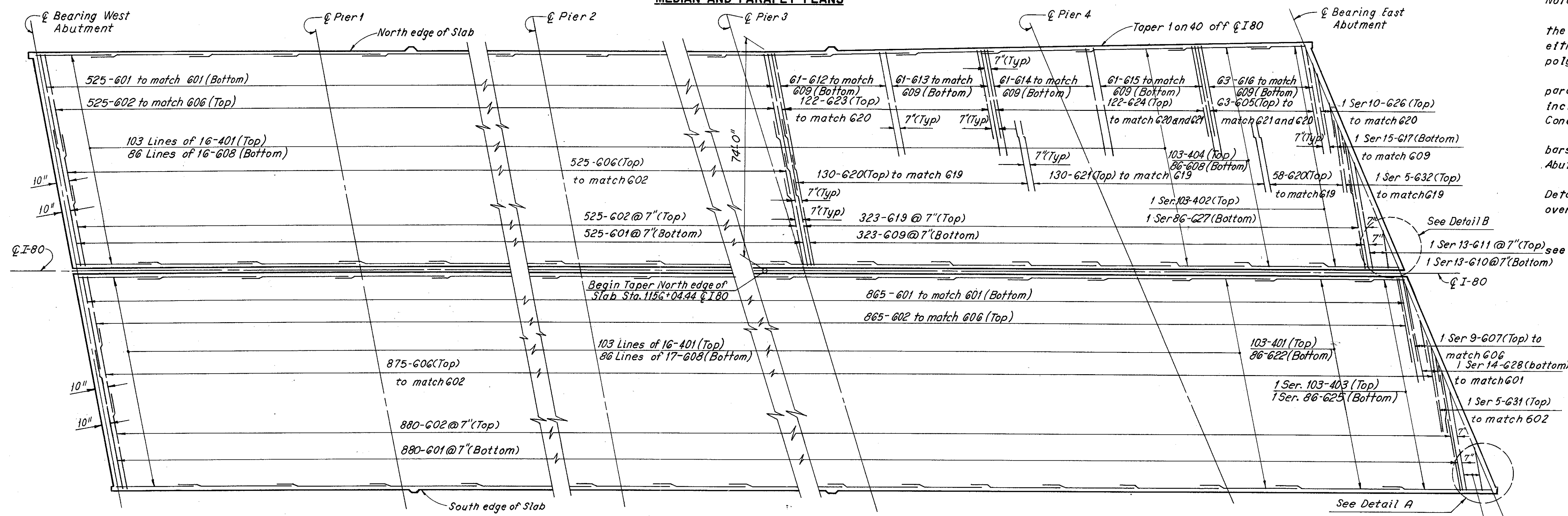
Note:  
All reinforcing bar marks  
shall be prefixed S.

**SOUTH CURB AND PARAPET**

Notes:  
The preformed expansion joint filler in the railing parapet deflection joints may be either 1/2" gray sponge rubber or 1/2" gray cellular polyvinyl chloride (PVC) sponge.  
The deflection joint extends from top of parapet to first construction joint and is included for payment with Superstructure Concrete.  
Transverse reinforcement except for fanned bars in corner is placed parallel to the West Abutment.  
For placement of longitudinal reinforcement, Details A and B and for additional reinforcement over Piers see Sheet 13/16.

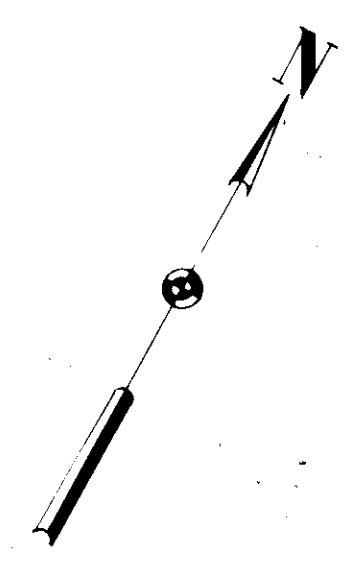
For Light Standard Support Details see Sheet CDT.

**MEDIAN AND PARAPET PLANS**



**SLAB PLAN**

REVISIONS  
DEC 21 1982



H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY, CLEVELAND, NEW YORK

**SLAB PLAN**

**I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK**

BR. NO. CUY-80-2140 STA. 1153+08.41 TO STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN JMS	TRACED PCA	CHECKED MZ	REVIEWED	REVISED
DATE 4-1-70	DATE 4-7-70	DATE 4-13-70	DATE	

SHEET 12/16

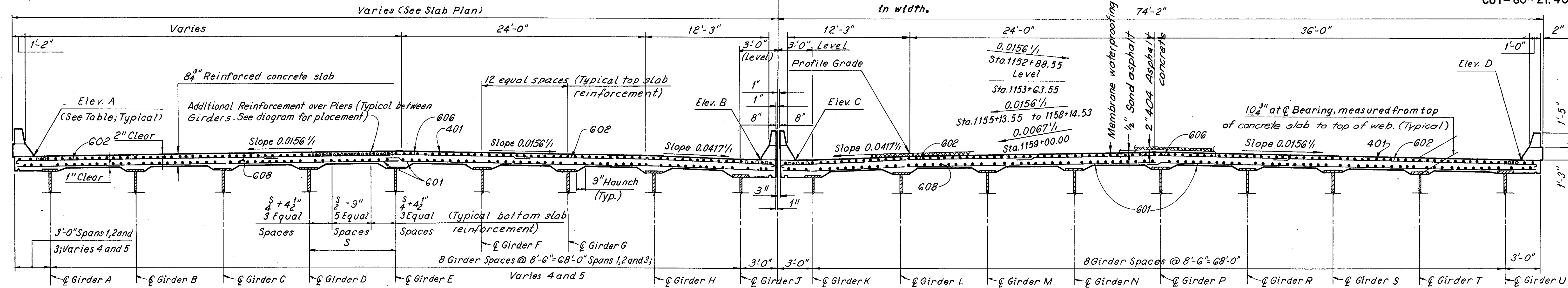
MICROFILMED  
DEC 21 1982

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

303  
390

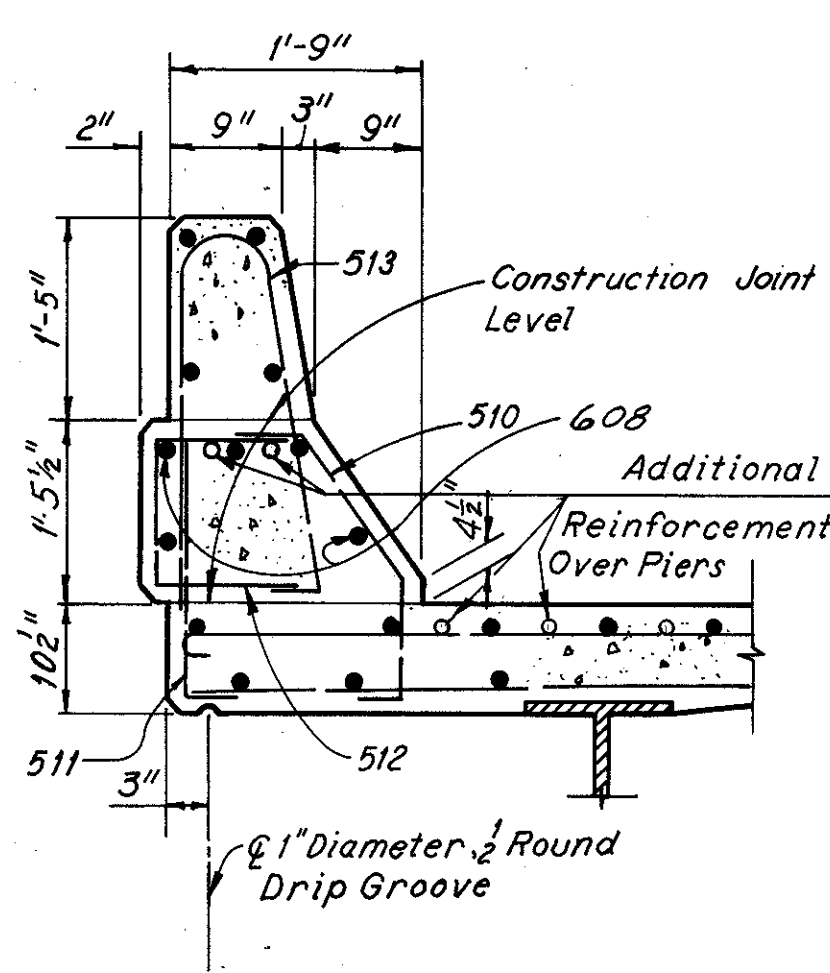
CUYAHOGA COUNTY  
CUI-80-21.40

Note:  
A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided the slope shall be not more than 1:4 for a haunch less than 9" in width.

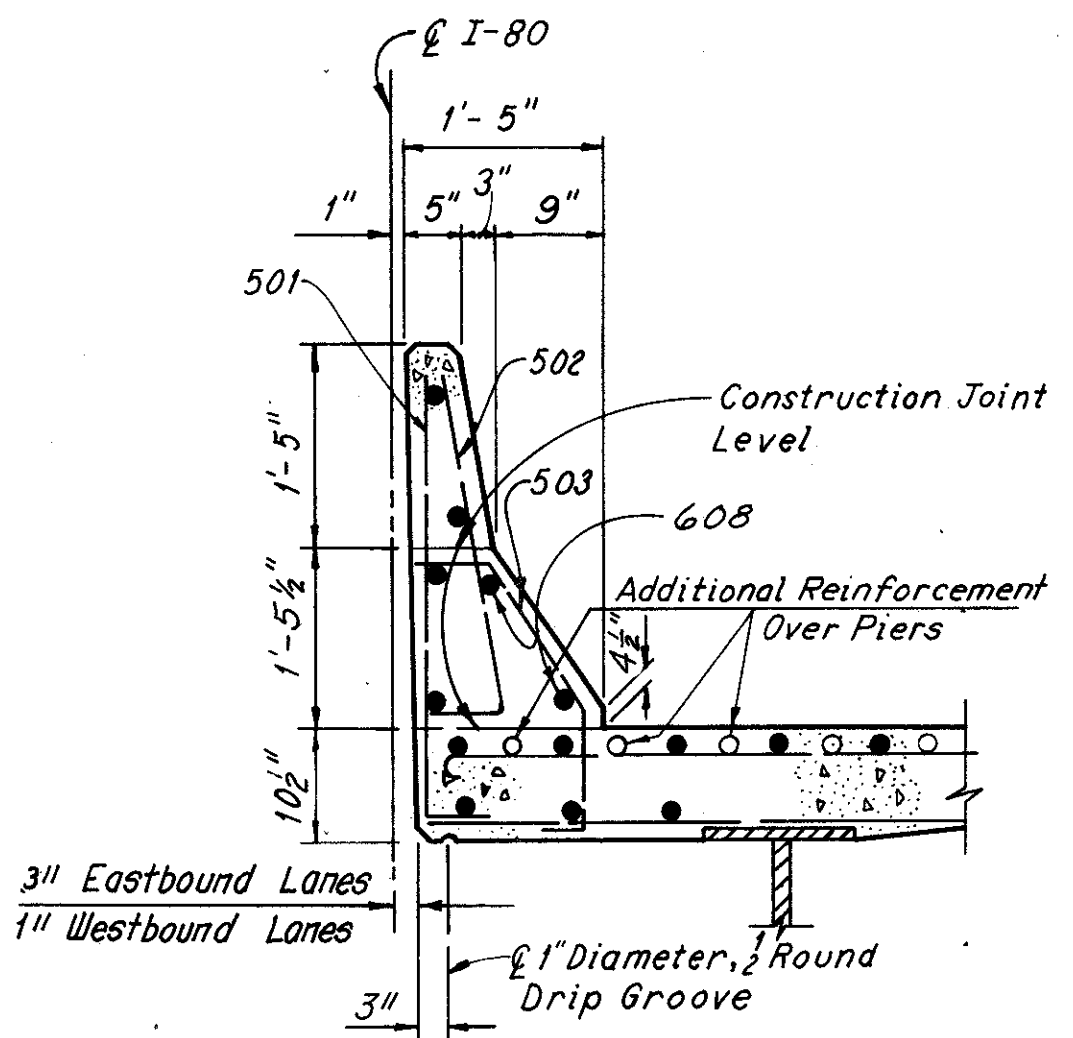


DECK REINFORCING BARS: At the Contractor's option, a portion (not to exceed 25%) of the upper longitudinal bars (S401) in the deck slab may be placed beneath the upper transverse bars for support of the top mat.

For subdrainage details see sheet CD2

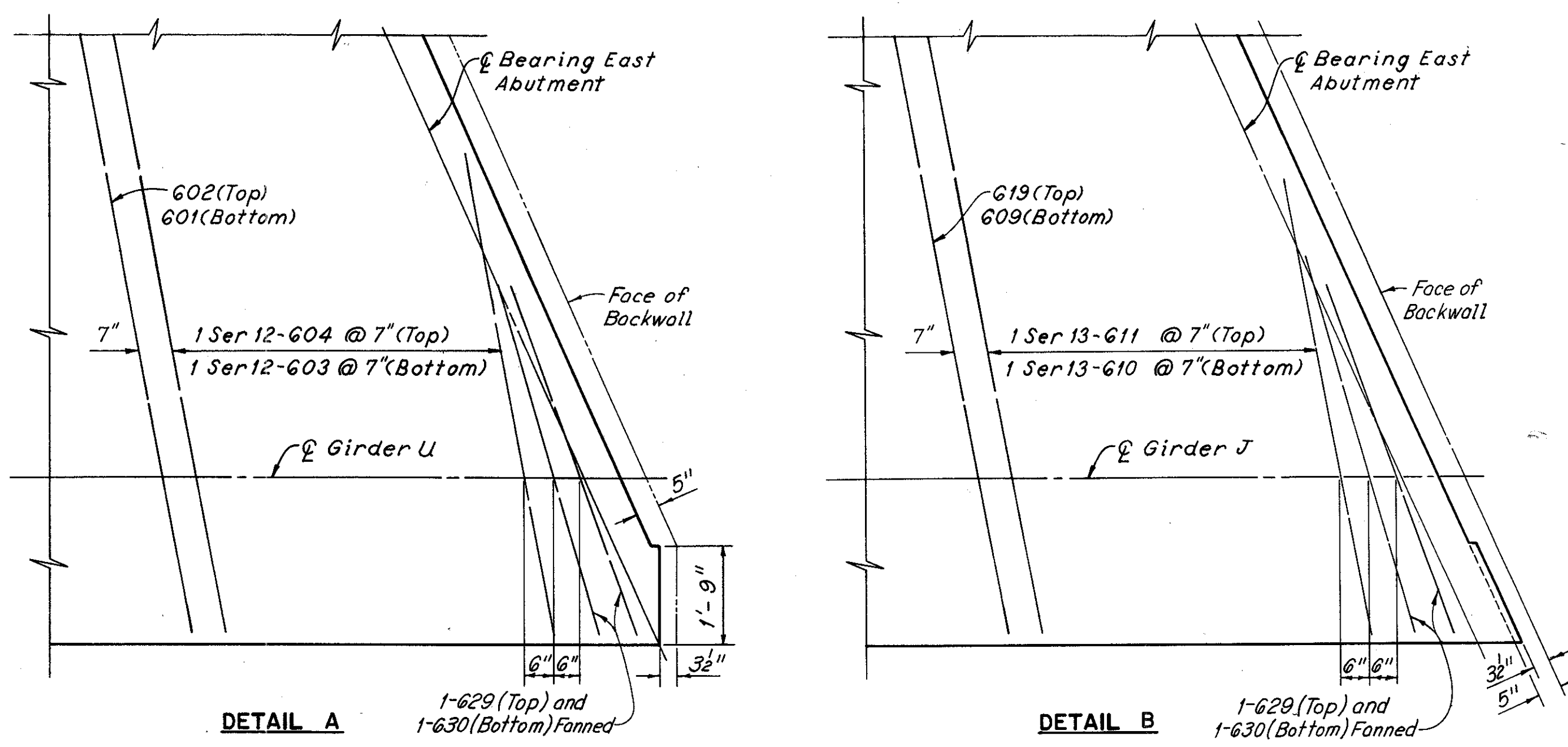


EXTERIOR CURB AND PARAPET DETAIL  
(Wearing surface not shown)

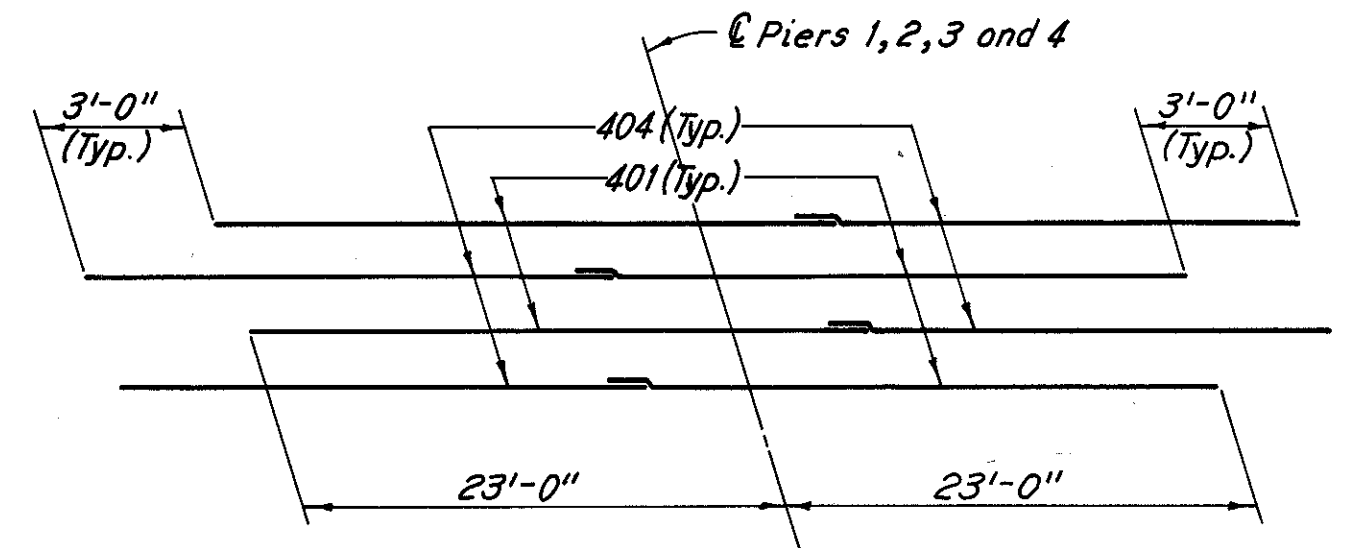


MEDIAN CURB AND PARAPET DETAIL  
(Wearing surface not shown)

TYPICAL CROSS SECTION



Note:  
All reinforcing bar marks shall be prefixed S.



ADDITIONAL REINFORCEMENT OVER PIERS

FACE OF CURB ELEVATIONS - TOP OF CONCRETE SLAB:

CURB ELEV.	E WEST ABUTMENT	PIER 1				PIER 2				PIER 3				PIER 4				E EAST ABUTMENT								
		0.20	0.40	0.60	0.80	0.20	0.40	0.60	0.80	0.20	0.40	0.60	0.80	0.20	0.40	0.60	0.80									
Elev. A	900.39	900.05	899.67	899.23	898.76	898.28	897.80	897.32	896.81	896.26	895.70	895.16	894.60	893.99	893.35	892.73	892.13	891.55	890.94	890.30	889.68	889.17	888.68	888.16	887.62	887.06
Elev. B	899.88	899.54	899.15	898.70	898.22	897.73	897.23	896.74	896.22	895.66	895.10	894.50	893.89	893.22	892.52	891.83	891.19	890.56	889.90	889.21	888.52	888.01	887.52	887.00	886.47	885.91
Elev. C	899.87	899.52	899.13	898.69	898.21	897.71	897.22	896.72	896.20	895.64	895.08	894.48	893.86	893.19	892.50	891.81	891.17	890.54	889.88	889.19	888.51	888.00	887.50	886.99	886.45	885.90
Elev. D	899.27	899.01	898.70	898.31	897.86	897.40	896.95	896.49	896.00	895.48	894.94	894.30	893.63	892.91	892.15	891.40	890.71	890.04	889.33	888.58	887.83	887.32	886.82	886.30	885.74	885.14

Note:  
The elevations shown at the face of curb are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete.

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**TYPICAL CROSS SECTION**  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO  
STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN MS	TRACED RZA	CHECKED MCA	REVIEWED	REVISED
DATE 4-1-70	DATE 4-9-70	DATE 4-10-70	DATE	DATE

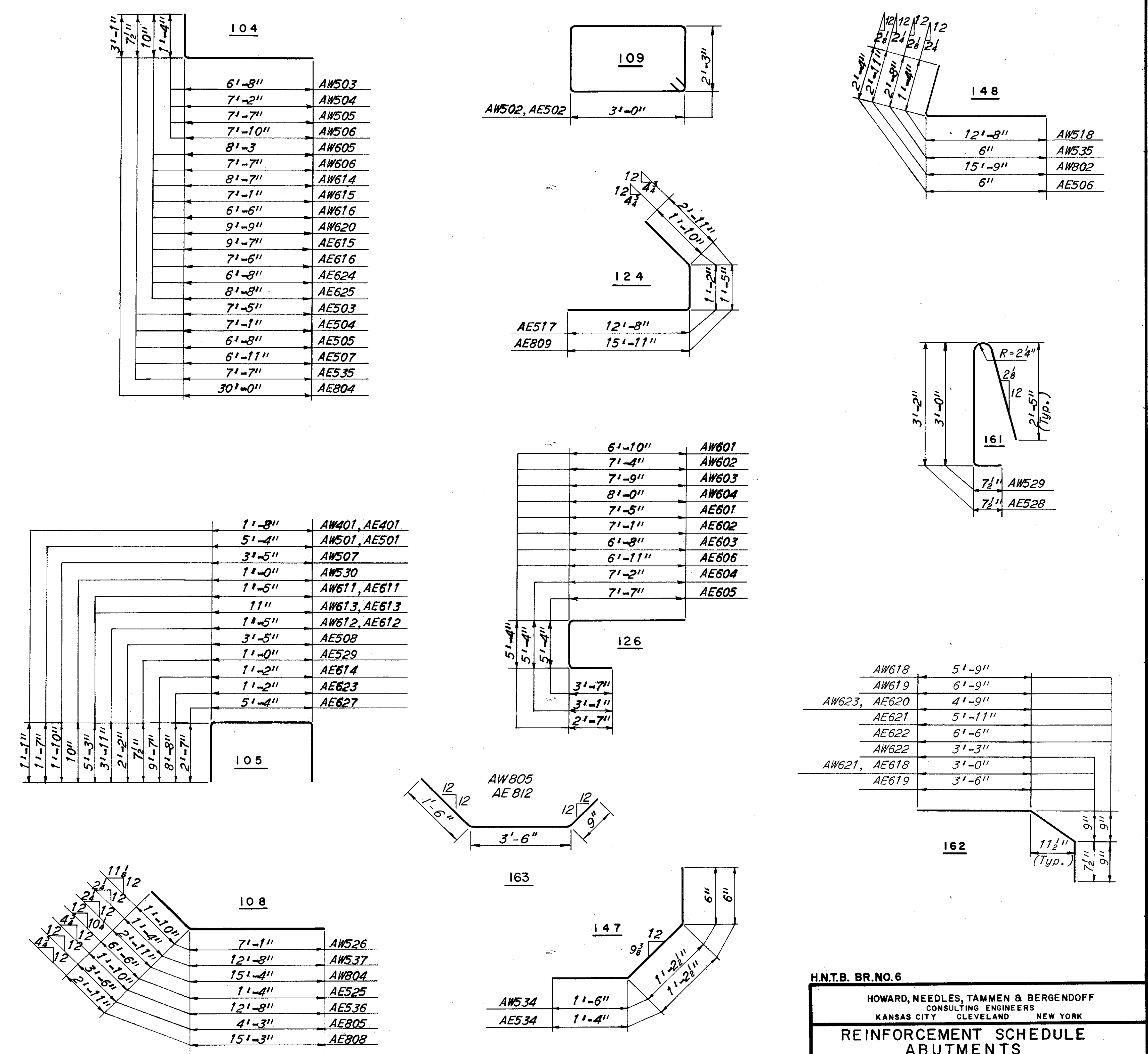
SHEET 13/16

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
WEST ABUTMENT				EAST ABUTMENT				AE808	2	18'-1"	108	97					
								AE809	2	20'-0"	124	107					
								AE810	4	12'-9"	Str.	136					
								AE811	4	12'-0"	Str.	128					
								AE812	76	5'-9"	163	1167					
								TOTAL WEIGHT = 25,787									
AW401	126	3'-7"	105		302	AE401	126	3'-7"	105		302						
AW501	132	8'-3"	105		1,136	AE501	141	8'-3"	105		1,213						
AW502	19	10'-11"	109		216	AE502	21	11'-0"	109		239						
AW503	26	7'-11"	104		215	AE503	77	7'-11"	104		638						
AW504	49	8'-5"	104		430	AE504	36	7'-7"	104		285						
AW505	35	8'-10"	104		322	AE505	10	7'-2"	104		75						
AW506	22	9'-1"	104		208	AE506	4	2'-9"	148		11						
AW507	132	6'-10"	105		941	AE507	12	7'-5"	104		93						
AW508	3	31'-3"	Str.		98	AE508	139	7'-5"	105		1,075						
AW509	31	22'-6"	Str.		727	AE509	39	23'-9"	Str.		966						
AW510	5	22'-9"	Str.		119	AE510	18	27'-6"	Str.		516						
AW511	15	32'-3"	Str.		505	AE511	10	36'-0"	Str.		375						
AW512	5	32'-0"	Str.		167	AE512	9	35'-0"	Str.		329						
AW513	21	21'-9"	Str.		476	AE513	13	33'-0"	Str.		447						
AW514	8	30'-9"	Str.		257	AE514	5	32'-3"	Str.		168						
AW515	7	31'-0"	Str.		226	AE515	8	25'-3"	Str.		211						
AW516	8	22'-3"	Str.		186	AE516	7	24'-9"	Str.		181						
AW517	7	22'-0"	Str.		161	AE517	4	15'-6"	124		65						
AW518	4	13'-10"	148		58	AE518	4	8'-0"	Str.		33						
AW519	4	8'-0"	Str.		33	AE519	2 Ser. 3	10'-3"	13'-0"	Str.	144	73					
AW520	2 Ser. 3	10'-6"	13'-3"	Str.	114	AE520	16	18'-6"	Str.		309						
AW521	16	18'-3"	Str.		305	AE521	6	3'-3"	Str.		20						
AW522	6	3'-0"	Str.		19	AE522	2	3'-9"	Str.		8						
AW523	2	3'-3"	Str.		7	AE523	2	5'-0"	Str.		10						
AW524	2	4'-9"	Str.		10	AE524	2	6'-3"	Str.		13						
AW525	2	6'-0"	Str.		13	AE525	4	7'-9"	108		32						
AW526	4	8'-10"	108		37	AE526	20	3'-3"	Str.		68						
AW527	17	7'-3"	Str.		129	AE527	18	7'-3"	Str.		136						
AW528	4 Ser. A	2'-9"	3'-0"	Str.	11	AE528	19	6'-1"	161		121						
AW529	21	6'-1"	161		133	AE529	29	2'-0"	105		60						
AW530	29	2'-5"	105		73	AE530	4	8'-9"	Str.		37						
AW531	4	9'-3"	Str.		39	AE531	2 Ser. 3	11'-3"	14'-0"	Str.	114	79					
AW532	2 Ser. 3	11'-0"	13'-9"	Str.	114	AE532	16	19'-3"	Str.		321						
AW533	16	19'-0"	Str.		317	AE533	4	4'-0"	Str.		17						
AW534	4	3'-1"	147		13	AE534	4	2'-11"	147		12						
AW535	4	3'-1"	148		13	AE535	4	8'-1"	104		34						
AW536	4	4'-0"	Str.		17	AE536	4	14'-5"	108		60						
AW537	4	13'-11"	108		58	AE537	1	37'-0"	Str.		39						
AW538	2	12'-0"	Str.		25	AE538	3	13'-0"	Str.		41						
AW539	1	19'-6"	Str.		20	AE539	1	20'-9"	Str.		22						
AW540	2	12'-6"	Str.		26												
AW541	1	20'-6"	Str.		21	AE601	77	15'-0"	126		1,735						
AW601	26	14'-5"	126		563	AE602	35	14'-9"	126		771						
AW602	49	14'-11"	126		1,098	AE603	10	14'-3"	126		214						
AW603	35	15'-4"	126		806	AE604	1	15'-4"	126		23						
AW604	22	15'-7"	126		515	AE605	4	16'-2"	126		97						
AW605	2	8'-11"	104		27	AE606	12	14'-6"	126		261						
AW606	2	8'-3"	104		25	AE607	3	5'-3"	Str.		24						
AW607	3	4'-6"	Str.		20	AE608	10	5'-6"	Str.		83						
AW608	10	5'-9"	Str.		86	AE609	3	6'-0"	Str.		27						
AW609	3	4'-9"	Str.		21	AE610	10	6'-9"	Str.		101						
AW610	10	6'-3"	Str.		94	AE611	218	11'-7"	105		3,793						
AW611	200	11'-7"	105		3,480	AE612	118	8'-11"	105		1,580						
AW612	100	8'-11"	105		1,339	AE613	118	11'-1"	105		1,964						
AW613	100	11'-1"	105		1,665	AE614	5	20'-2"	105		150						
AW614	14	9'-3"	104		195	AE615	6	10'-3"	104		92						
AW615	2	7'-9"	104		23	AE616	2	8'-2"	104		25						
AW616	4	7'-2"	104		43	AE617	6	6'-0"	Str.		54						
AW617	6	6'-0"	Str.		54	AE618	6	4'-9"	162		44						
AW618	2	7'-7"	162		24	AE619	2	5'-3"	162		16						
AW619	17	8'-7"	162		226	AE620	2	6'-7"	162		20						
AW620	15	10'-5"	104		235	AE621	2	7'-9"	162		24						
AW621	6	4'-9"	162		44	AE622	17	8'-4"	162		213						
AW622	2	5'-0"	162		15	AE623	6	18'-2"	105		164						
AW623	2	6'-7"	162		20	AE624	2	7'-4"	104		22						
						AE625	6	9'-4"	104		84						
						AE626	2	6'-6"	Str.		20						
						AE627	2	10'-2"	105		31						
AW801	28	40'-0"	Str.		2,990	AE801	30	30'-0"	Str.		2,403						
AW802	2	18'-6"	148		99	AE802	4	31'-0"	Str.		331						
AW803	8	10'-0"	Str.		214	AE803	1	30'-6"	Str.		81						
AW804	2	18'-1"	108		97	AE804	3	32'-11"	104		264						
AW805	66	5'-9"	163		1013	AE805	4	7'-8"	108		82						
						AE806	2	27'-9"	Str.		148						
						AE807	2	28'-9"	Str.		154						
TOTAL WEIGHT = 23,288																	

Quantity Calculations  
 Made By KRS Date 7-70  
 Checked By JWC Date 8-70

FED. RD. DIVISION 2	STATE OHIO	PROJECT CUYAHOGA COUNTY CUY-80-21.40	304 390
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### BENDING DIAGRAMS



Note:  
 For Replacement Bar Schedule see  
 Sheet 12/12 of BR. NO. CUY-80-2169.

H.N.T.B. BR. NO. 6

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

REINFORCEMENT SCHEDULE  
 ABUTMENTS  
 I-80 OVER PENN-CENTRAL RAILROAD,  
 NORFOLK & WESTERN RAILWAY  
 AND MILL CREEK

BR. NO. CUY-80-2140 STA. 1153+08.41 TO  
 STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN KRS TRACED LMQ CHECKED JWC REVIEWED REVISOR  
 DATE 7/10/70 DATE 8/5/70 DATE 8/10/70 DATE

SHEET 14 / 16

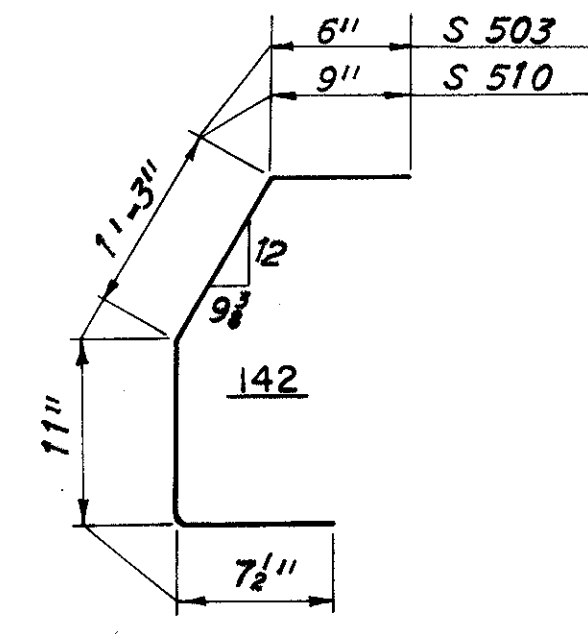
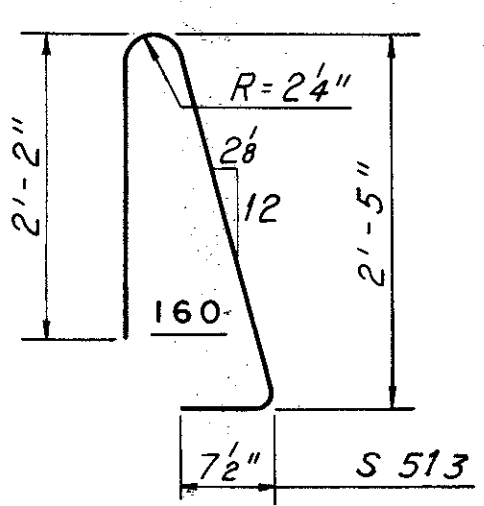
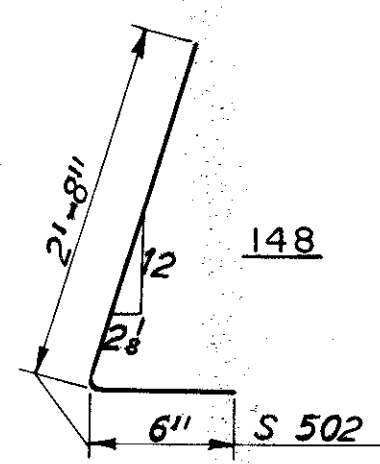
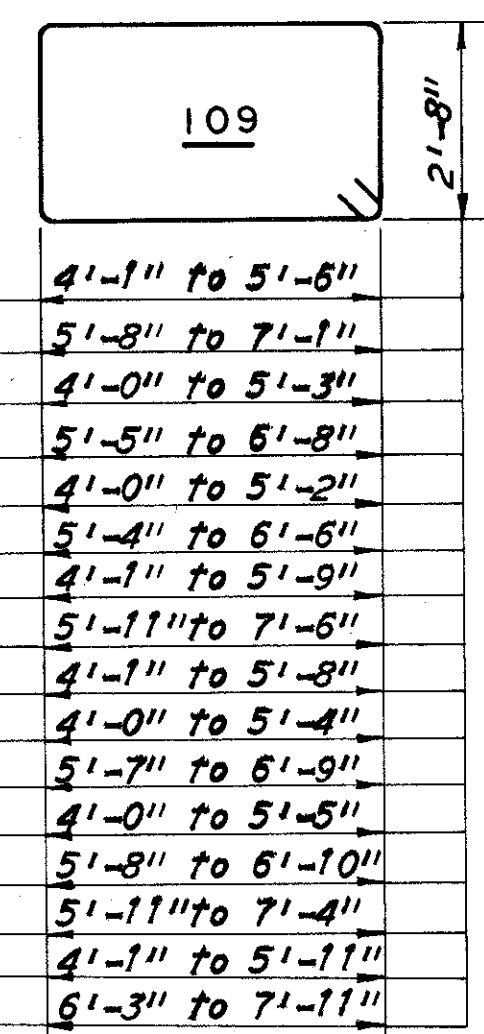
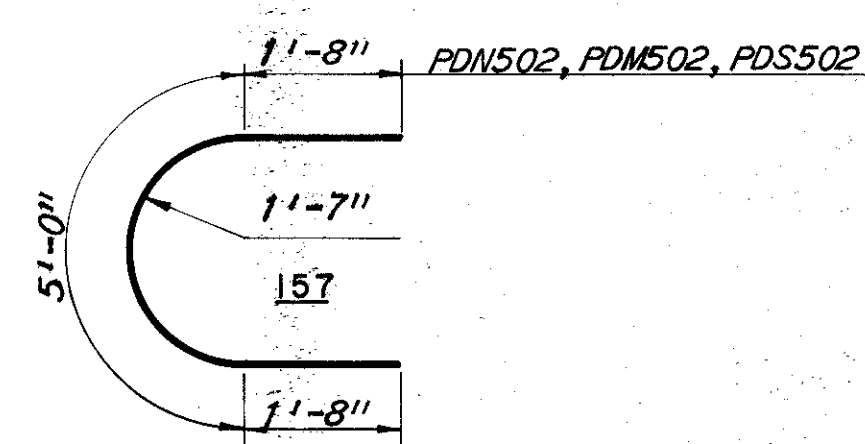
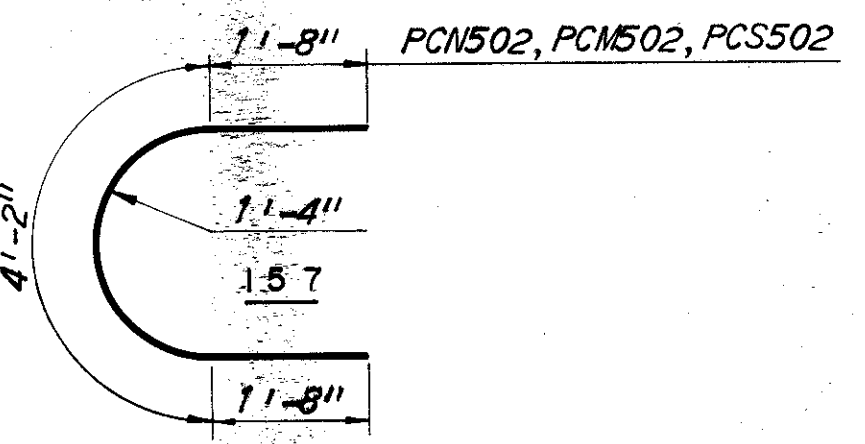
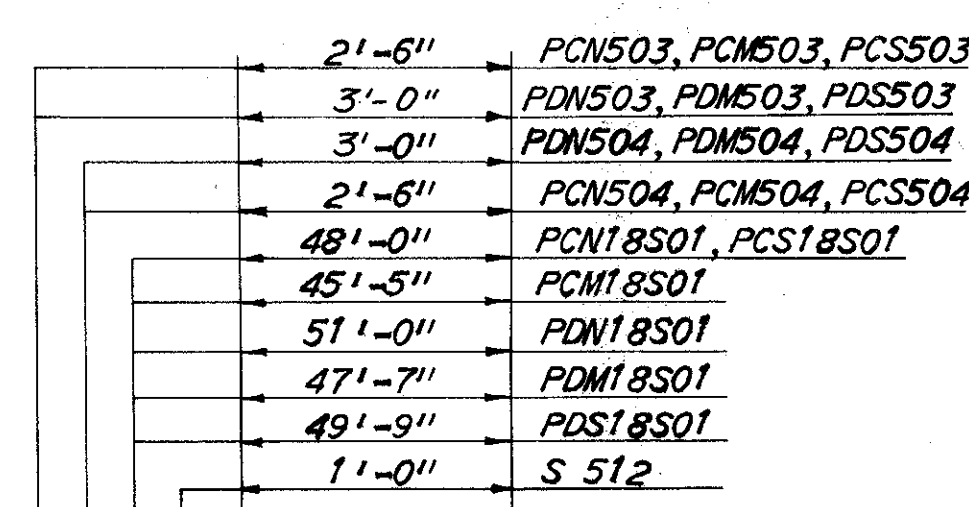
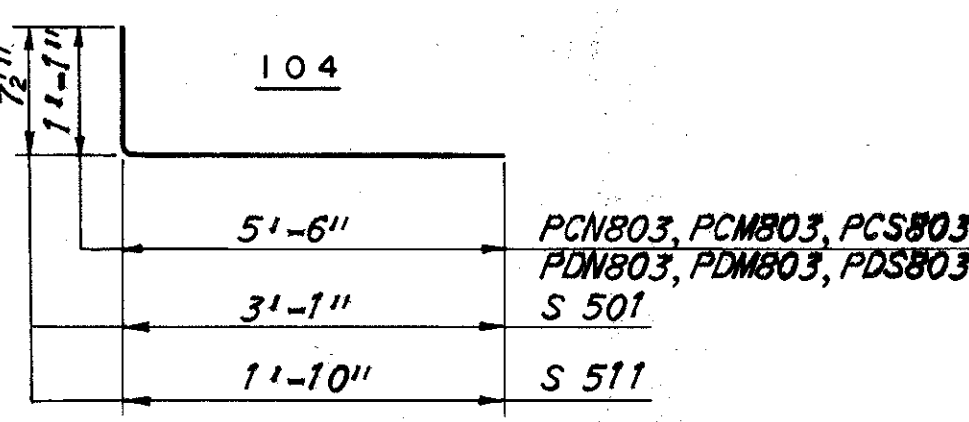
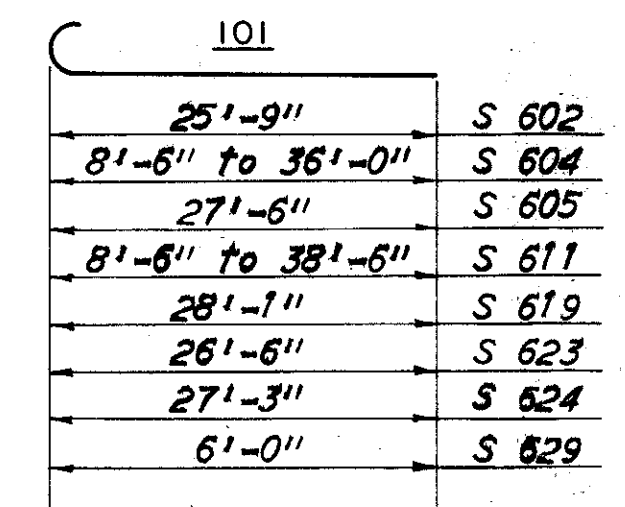
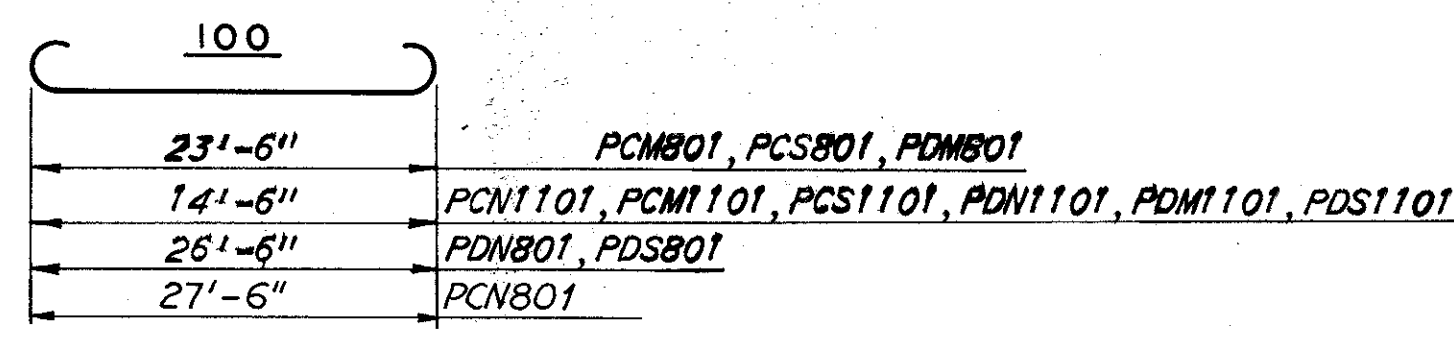
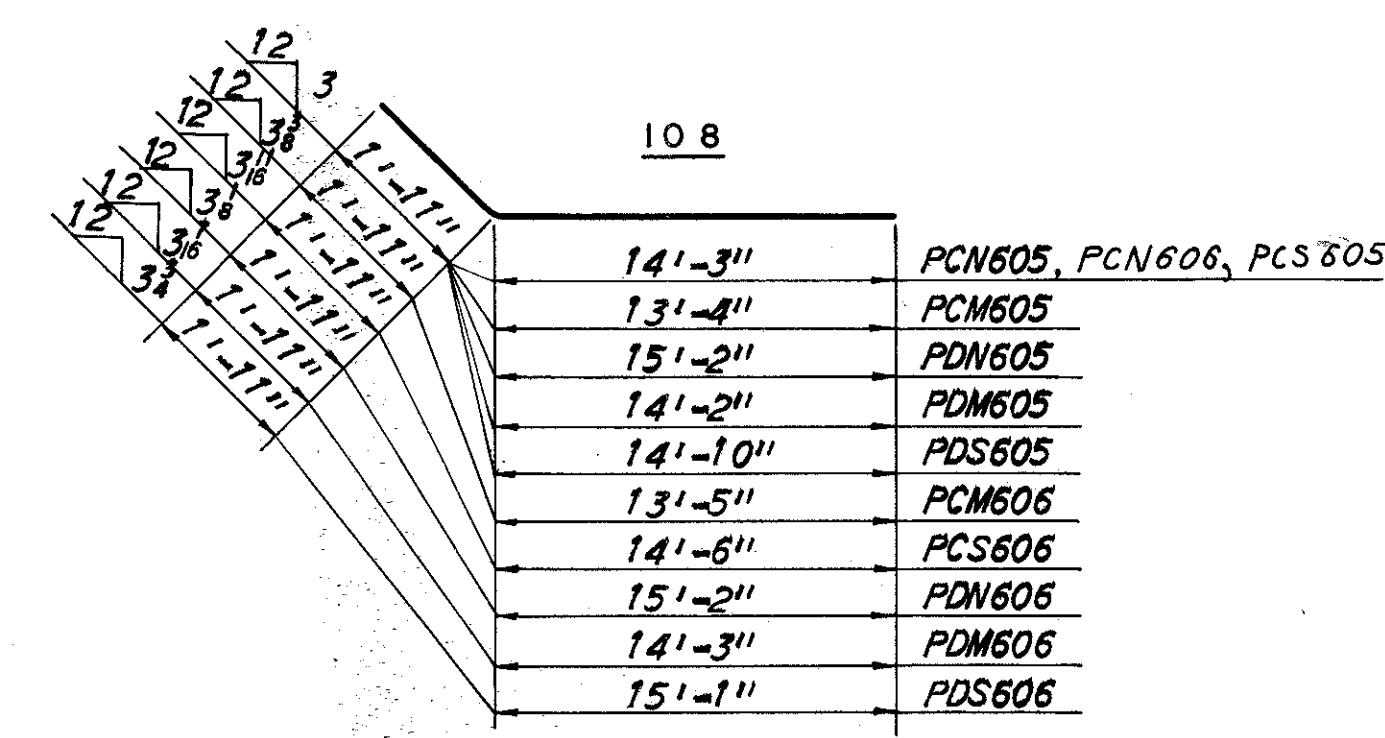


BENDING DIAGRAMS

CUYAHOGA COUNTY  
CUY-80-21.40

Quantity Calculations  
Made By KRS Date 7-70  
Checked By JWC Date 8-70

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)		
PIER 3 - NORTH BENT						PCS18S01	5	54'-1"	105		3678	PDS803	46	6'-5"	104		788		
PCN501	62	17'-0"	Str.		1099	PCS18S02	5	48'-0"	Str.		3264	PDS1101	44	17'-8"	100		4130		
PCN502	62	7'-6"	157		485	TOTAL WEIGHT = 19,847													
PCN503	18	6'-9"	105		127	PIER 4 - NORTH BENT						PDS18S01	7	55'-10"	105		5315		
PCN504	48	4'-11"	105		246	PDS18S02	3	49'-9"	Str.		2030	TOTAL WEIGHT = 23,657							
PCN601	4	25'-0"	Str.		150	PDN501	80	17'-9"	Str.		1481	SUPERSTRUCTURE							
PCN602	4	24'-9"	Str.		149	PDN502	80	8'-4"	157		695	S 401	4223	30'-0"	Str.		84,629		
PCN603	2	32'-0"	Str.		96	PDN503	19	7'-3"	105		144	S 402	1 Ser. 103	7'-0" to 25'-6"	Str.	2 1/2"	1118		
PCN604	3	20'-0"	Str.		90	PDN504	48	5'-5"	105		271	S 403	1 Ser. 103	16'-0" to 33'-3"	Str.	2"	1711		
PCN605	3	16'-1"	108		72	PDN601	4	26'-6"	Str.		159	S 404	927	20'-3"	Str.		12,540		
PCN606	3	16'-1"	108		72	PDN602	4	26'-0"	Str.		156	S 501	676	3'-7"	104		2526		
PCN607	2 Ser. 15	14'-3" to 17'-1"	109	2 1/2"	706	PDN603	2	33'-0"	Str.		99	S 502	676	3'-1"	148		2174		
PCN608	2 Ser. 9	17'-5" to 20'-3"	109	4 1/2"	509	PDN604	3	21'-3"	Str.		96	S 503	676	3'-0"	142		2115		
PCN801	22	29'-8"	100		1743	PDN605	3	17'-0"	108		77	S 504	212	13'-9"	Str.		3040		
PCN802	44	36'-9"	Str.		4317	PDN606	3	17'-0"	108		77	S 505	336	6'-9"	Str.		2366		
PCN803	44	6'-5"	104		754	PDN607	2 Ser. 12	15'-3" to 18'-5"	109	3 3/8"	606	S 506	16	14'-6"	Str.		242		
PCN1101	45	17'-8"	100		4224	PDN608	2 Ser. 8	18'-11" to 22'-1"	109	5 1/8"	492	S 507	16	12'-6"	Str.		209		
PCN18S01	5	54'-1"	105		3678	PDN801	18	28'-8"	100		1378	S 508	2	12'-9"	Str.		27		
PCN18S02	5	48'-0"	Str.		3264	PDN802	92	24'-9"	Str.		6080	S 509	16	14'-9"	Str.		246		
TOTAL WEIGHT = 21,781						PDN803	46	6'-5"	104		788	S 510	674	3'-3"	142		2285		
PIER 3 - MIDDLE BENT						PDN1101	44	17'-8"	100		4130	S 511	674	2'-4"	104		1640		
PCM501	56	16'-0"	Str.		935	PDN18S01	7	57'-1"	105		5434	S 512	674	2'-0"	105		1406		
PCM502	56	7'-6"	157		438	PDN18S02	3	51'-0"	Str.		2081	S 513	674	5'-4"	160		3749		
PCM503	17	6'-9"	105		120	TOTAL WEIGHT = 24,244						S 514	2	12'-0"	Str.		25		
PCM504	48	4'-11"	105		246	PIER 4 - MIDDLE BENT						S 601	2795	38'-6"	Str.		161,626		
PCM601	4	23'-9"	Str.		143	PDM501	80	16'-3"	Str.		1356	S 602	2795	26'-5"	101		110,900		
PCM602	4	23'-6"	Str.		141	PDM502	80	8'-4"	157		695	S 603	1 Ser. 12	8'-6" to 36'-0"	Str.	2 1/2"	401		
PCM603	2	30'-3"	Str.		91	PDM503	18	7'-3"	105		136	S 604	1 Ser. 12	9'-2" to 36'-9"	Str.	2 1/2"	413		
PCM604	3	19'-0"	Str.		86	PDM504	48	5'-5"	105		271	S 605	63	28'-2"	101		2665		
PCM605	3	15'-2"	108		68	PDM601	4	24'-9"	Str.		149	S 606	1400	28'-0"	Str.		58,878		
PCM606	3	15'-3"	108		69	PDM602	4	24'-0"	Str.		144	S 607	1 Ser. 9	3'-6" to 23'-6"	Str.	2 1/2"	182		
PCM607	1 Ser. 15	14'-1" to 16'-7"	109	2 1/2"	345	PDM603	2	30'-9"	Str.		92	S 608	3235	30'-0"	Str.		145,769		
PCM608	1 Ser. 8	16'-11" to 19'-5"	109	4 1/2"	218	PDM604	3	19'-9"	Str.		89	S 609	323	40'-0"	Str.		19,406		
PCM609	1 Ser. 15	14'-1" to 16'-5"	109	2 1/2"	344	PDM605	3	16'-0"	108		72	S 610	1 Ser. 13	8'-6" to 38'-6"	Str.	2 1/2"	459		
PCM610	1 Ser. 8	16'-9" to 19'-1"	109	4 1/2"	215	PDM606	3	16'-1"	108		72	S 611	1 Ser. 13	9'-2" to 39'-2"	Str.	2 1/2"	472		
PCM801	18	25'-8"	100		1234	PDM607	1 Ser. 12	15'-1" to 17'-9"	109	2 1/2"	296	S 612	61	37'-6"	Str.		3436		
PCM802	42	33'-9"	Str.		3785	PDM608	1 Ser. 7	18'-3" to 20'-7"	109	4 1/2"	204	S 613	61	38'-6"	Str.		3527		
PCM803	42	6'-5"	104		720	PDM609	1 Ser. 12	15'-7" to 17'-11"	109	3 1/2"	292	S 614	61	39'-6"	Str.		3619		
PCMT1101	39	17'-8"	100		3661	PDM610	1 Ser. 7	18'-5" to 20'-9"	109	4 1/2"	206	S 615	61	40'-6"	Str.		3711		
PCMT18S01	5	51'-6"	105		3502	PDM801	18	25'-8"	100		1234	S 616	63	41'-6"	Str.		3927		
PCMT18S02	5	45'-6"	Str.		3094	PDM802	88	24'-0"	Str.		5639	S 617	1 Ser. 15	3'-6" to 38'-6"	Str.	2 1/2"	473		
TOTAL WEIGHT = 19,455						PDM803	44	6'-5"	104		754	S 619	323	28'-9"	101		13,948		
PIER 3 - SOUTH BENT						PDM801	18	25'-8"	100		1234	S 620	188	28'-9"	Str.		8118		
PCSS01	52	17'-0"	Str.		922	PDM802	88	24'-0"	Str.		5639	S 621	130	28'-6"	Str.		5565		
PCSS02	52	7'-6"	157		407	TOTAL WEIGHT = 22,414						S 622	86	20'-0"	Str.		2583		
PCSS03	18	6'-9"	105		127	PDM1101	39	17'-8"	100		3661	S 623	122	27'-2"	101		4978		
PCSS04	48	4'-11"	105		246	PDM18S01	7	53'-8"	105		5109	S 624	122	27'-11"	101		5116		
PCS601	4	25'-0"	Str.		150	PDM18S02	3	47'-6"	Str.		1938	S 625	1 Ser. 86	8'-9" to 26'-6"	Str.	2 1/2"	2341		
PCS602	4	24'-0"	Str.		144	TOTAL WEIGHT = 22,414						S 626	1 Ser. 10	3'-6" to 26'-0"	Str.	2 1/2"	222		
PCS603	2	30'-9"	Str.		92	PDS501	78	17'-3"	Str.		1403	S 627	1 Ser. 86	8'-6" to 27'-0"	Str.	2 1/2"	2293		
PCS604	3	20'-0"	Str.		90	PDS502	78	8'-4"	157		678	S 628	1 Ser. 14	3'-6" to 36'-0"	Str.	2 1/2"	415		
PCS605	3	16'-1"	108		72	PDS503	19	7'-3"	105		144	S 629	4	6'-8"	101		40		
PCS606	3	16'-4"	108		74	PDS504	48	5'-5"	105		271	S 630	4	6'-0"	Str.		36		
PCS607	1 Ser. 15	14'-3" to 17'-1"	109	2 1/2"	353	PDS601	4	25'-9"	Str.		155	S 631	1 Ser. 5	15'-8" to 25'-6"	Str.	2 1/2"	154		
PCS608	1 Ser. 9	17'-5" to 20'-3"	109	4 1/2"	255	PDS602	4	24'-0"	Str.		144	S 632	1 Ser. 5	16'-3" to 26'-3"	Str.	2 1/2"	160		
PCS609	1 Ser. 15	14'-3" to 17'-1"	109	2 1/2"	359	PDS603	2	31'-6"	Str.		95	S 633	5	8'-6"	Str.		64		
PCS610	1 Ser. 9	17'-11" to 21'-1"	109	4 1/2"	264	PDS604	3	20'-9"	Str.		93	S 634	8	27'-6"	Str.		330		
PCS801	18	25'-8"	100		1234	PDS605	3	16'-8"	108		75	S 635	5	16'-6"	Str.		124		
PCS802	44	31'-6"	Str.		3701	PDS606	3	16'-11"	108		76	4 Light Standard Supports = 2940							
PCS803	44	6'-5"	104		754	PDS607	1 Ser. 12	15'-3" to 18'-5"	109	3 3/8"	303	TOTAL WEIGHT = 691,339							
PCS1101	39	17'-8"	100		3661	PDS608	1 Ser. 7	18'-11" to 21'-9"	109	5 1/8"	214								
						PDS609	1 Ser. 12	15'-3" to 18'-11"	109	4 1/2"	308								
						PDS610	1 Ser. 7	19'-7" to 22'-11"	109	6 1/8"	223								
						PDS801	18	28'-8"	100		1378								
						PDS802	92	23'-9"	Str.		5834								



Notes:  
For Replacement Bar Schedule see Sheet 1212 of BR. NO. CUY-80-2169.  
For Light Standard Support Reinforcement Schedule and Bending Diagrams see Sheet CD1.

H.N.T.B. BR. NO. 6  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**REINFORCEMENT SCHEDULE  
PIERS 3 AND 4 AND SUPERSTRUCTURE  
I-80 OVER PENN-CENTRAL RAILROAD,  
NORFOLK & WESTERN RAILWAY  
AND MILL CREEK**

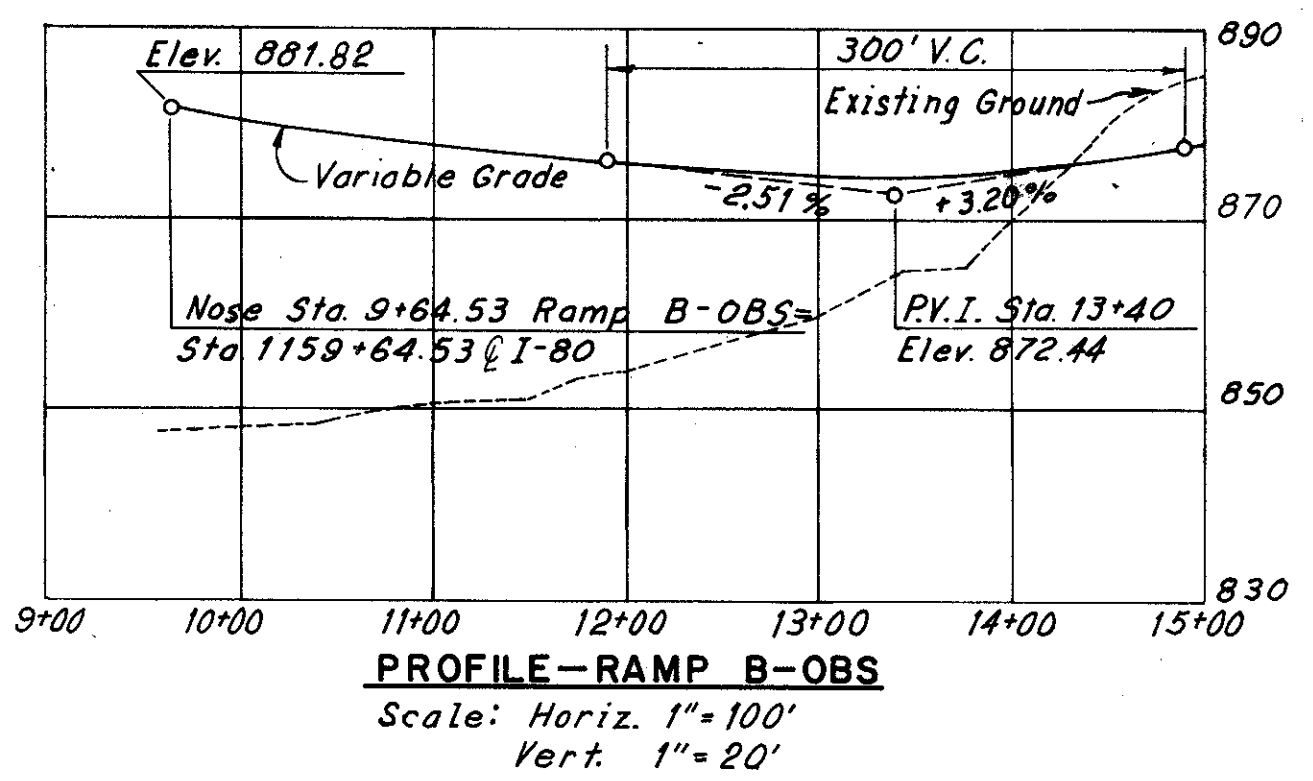
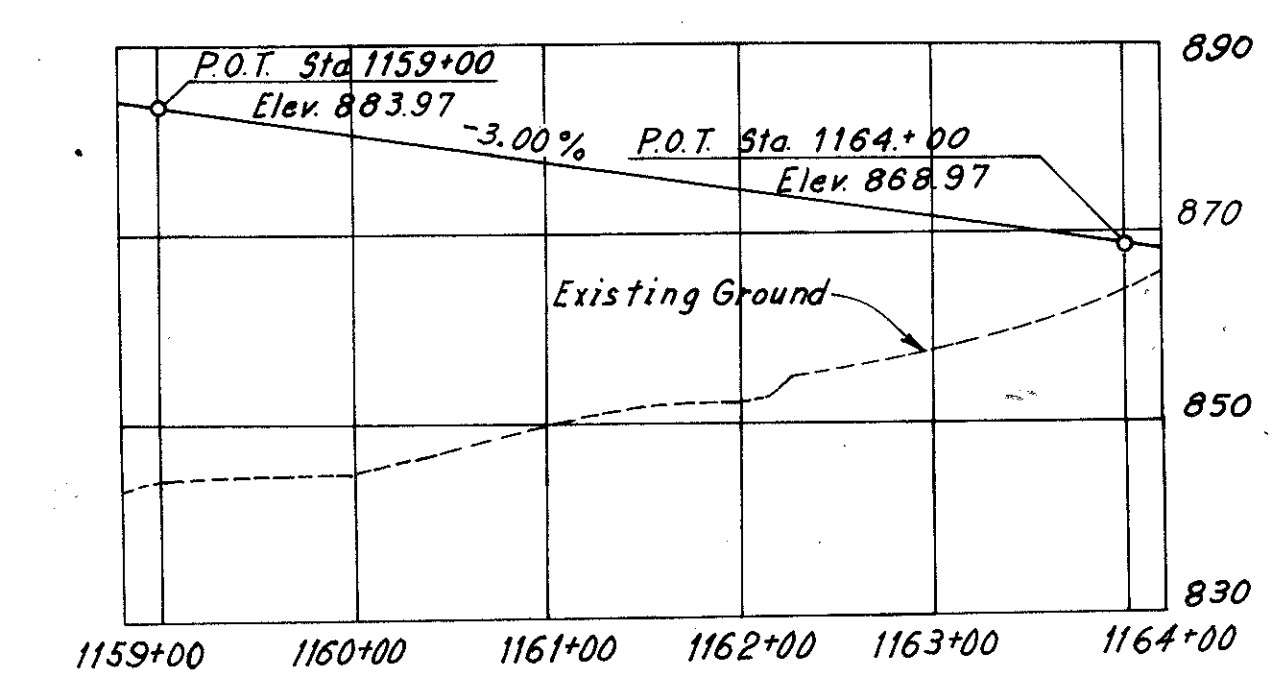
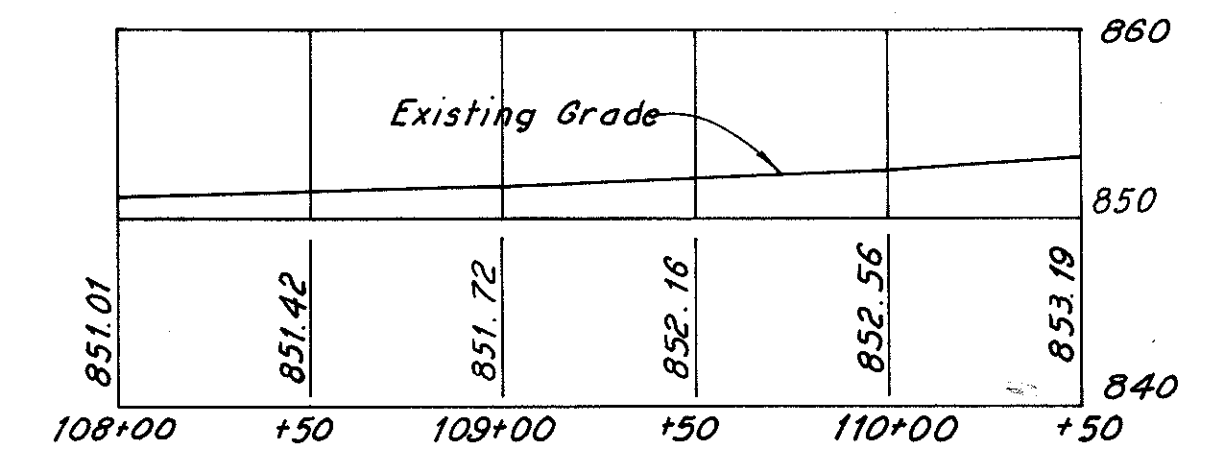
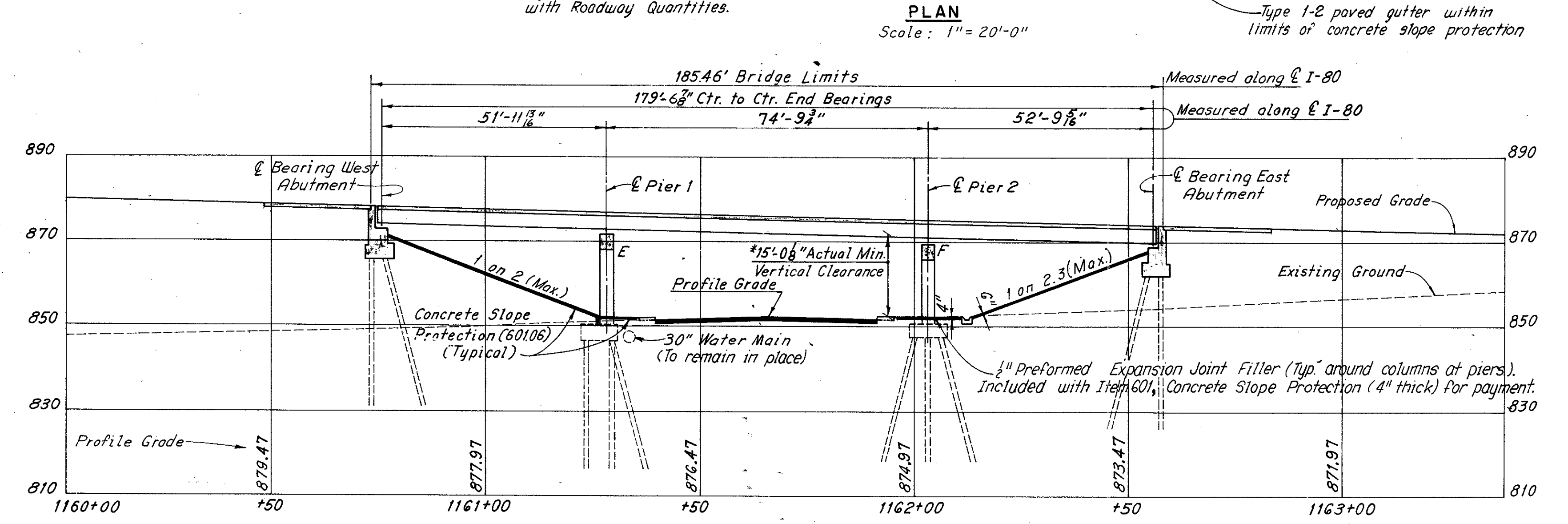
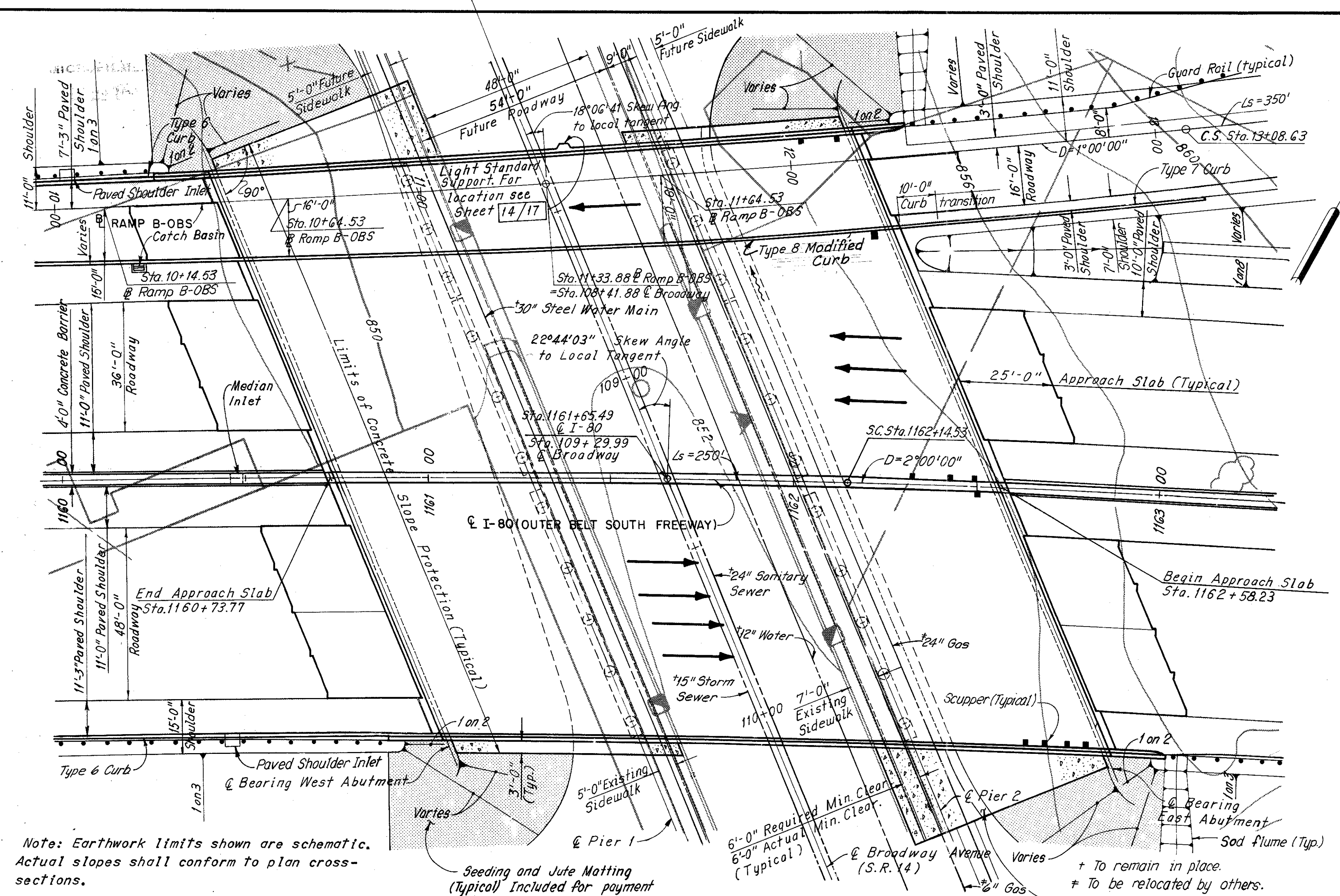
BR. NO. CUY-80-2140 STA. 1153+08.41 TO  
STA. 1158+17.04

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN KRS	TRACED JMC	CHECKED JWC	REVIEWED	REVISED
DATE 7-30-70	DATE 8-16-70	DATE 8-21-70	DATE	

SHEET 16/16





**CURVE DATA**

@ I-80		@ RAMP B-OBS	
P.I. Sta. 1168+27.47	$\Delta = 28^{\circ}52'52''$	P.I. Sta. 11+43.54	$\Delta = 3^{\circ}18'10''$
D = 2'00'00" Right	Ls = 1194.05'	D = 1'00'00" Left	R = 5729.58'
Ts = 862.94'	$\theta_s = 2^{\circ}30'00''$	T = 165.19'	L = 330.28'
Ls = 250.0'		E = 2.38'	

Note:  
Nose at Sta. 9+64.53 @ Ramp B-OBS = Sta. 1159+64.53 @ I-80, 74' Right.

**PROPOSED STRUCTURE**

TYPE: Continuous rolled beam with reinforced concrete deck and substructure.

SPANS: 51'-11 $\frac{1}{2}$ ", 74'-9 $\frac{3}{4}$ ", 52'-9 $\frac{3}{4}$ "

ROADWAY: Width varies - 160'-4" to 170'-2 $\frac{3}{4}$ " face to face of parapets, with Concrete Barrier.

DESIGN LOAD: HS20-44 and Interstate Alternate Loading.

SKEW: 22°44'03" Right Forward

WEARING SURFACE: 2 $\frac{1}{2}$ " Asphalt Concrete

APPROACH SLABS: AS-1-67 (25 feet long)

ALIGNMENT: Spiral and 2°00'00" Curve Right (@ I-80)

SUPERELEVATION: I-80 - Varies .0156 ft. per ft. to .047 ft. per ft., Ramp B-OBS - .0156 ft. per ft.

**TRAFFIC DATA**

1991: 60,364 A.D.T.  
3,320 D.D.H.V.

**MAINTENANCE OF TRAFFIC**

Four lanes of traffic with a minimum horizontal width of 48'-0" and a minimum vertical clearance of 13'-6" shall be maintained on Broadway Avenue (S.R.14) at all times.

Notes:

Embankment shall be placed and compacted to the finish spill-thru slopes and to the level of the subgrades for a minimum distance of 200 feet back of the abutments before excavating or driving piles for the abutments and piers.

All Abutments and Piers are founded on 12"  $\phi$  C.I.P. Reinforced Concrete Piles with estimated average pay lengths as follows:

- West Abutment 37'
- Pier 1 and Pier 2 30'
- East Abutment 36'

The piles at the abutments shall be driven to a minimum bearing capacity of 35 tons per pile. The piles at the piers shall be driven to a minimum bearing capacity of 40 tons per pile.

For underpass lighting details see Lighting Plans.

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SITE PLAN**

I-80 AND RAMP B-OBS OVER BROADWAY (S.R.14)

BR. NO. CUY-80-2154 STA. 1160+73.77 TO STA. 1162+58.23

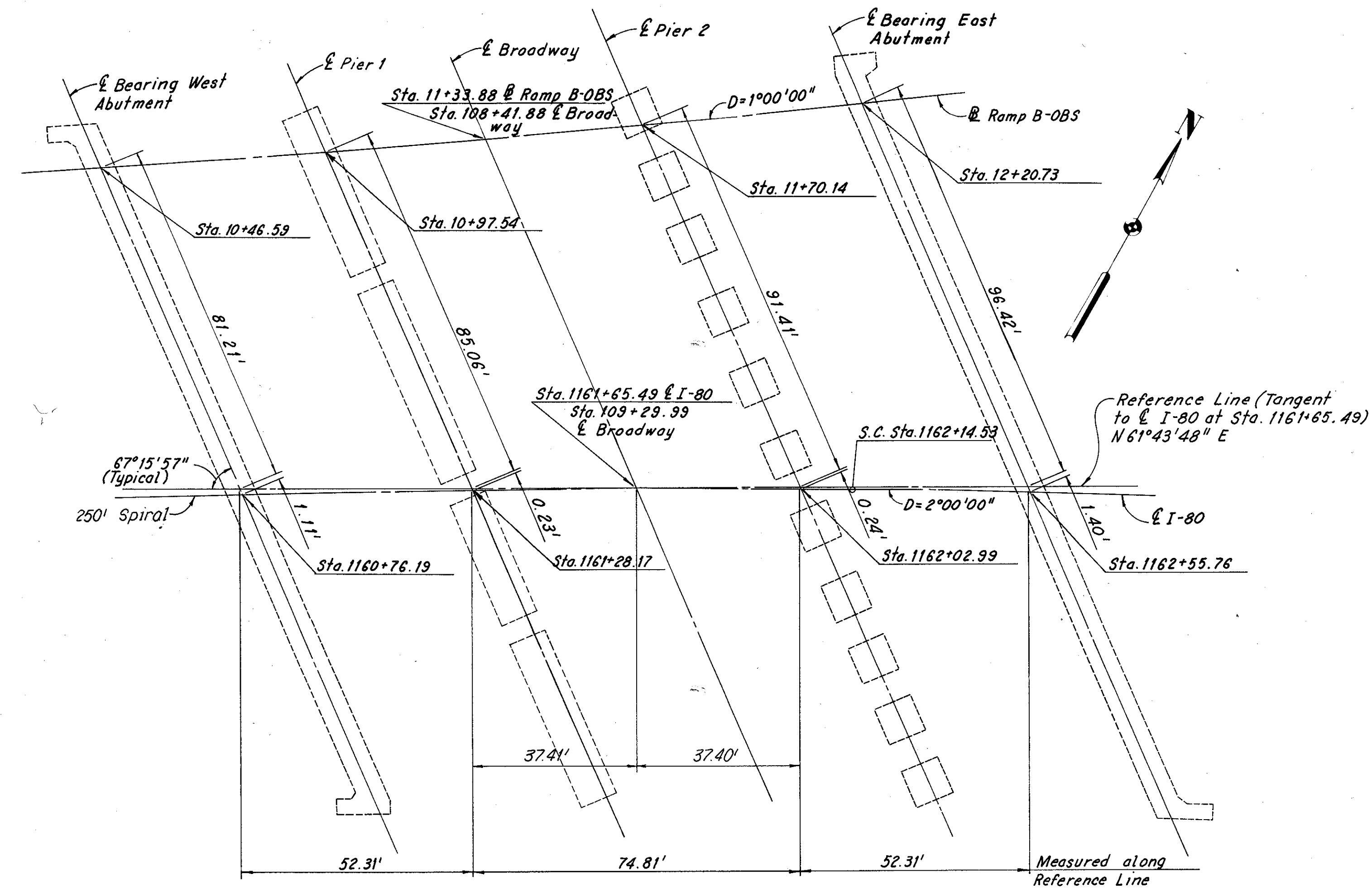
CUYAHOGA COUNTY OHIO

DRAWN Lee	TRACED DLR	CHECKED YH	REVIEWED
DATE 6-22-67	DATE 8-17-67	DATE 6-12-69	DATE

SHEET 1/17

CUYAHOGA COUNTY  
CUY-80-2140

Quantity Calculations  
Made By KYH Date 6-69  
Checked By MCB Date 2-70



BRIDGE LAYOUT DIAGRAM

ESTIMATED QUANTITIES				CUY-80-2154 H.N.T.B. BRIDGE NO. 7			
ITEM	TOTAL	UNIT	DESCRIPTION	ABUTMENTS	PIERS	SUPER-STRUCTURE	GENERAL
503	Lump	Lump	Cofferdams, Cribbs and Sheeting		Lump		
503	1,518	Cu. Yd.	Unclassified Excavation	945	573		
505	Lump	Lump	Test Pile				Lump
507	277	Lin. Ft.	Prebored Holes		277		
507	8,520	Lin. Ft.	12" $\phi$ C.I.P. Reinforced Concrete Piles	4,230	4,290		
509	453,077	Pounds	Reinforcing Steel	48,323	89,378	305,376	
511	895	Cu. Yd.	Class "C" Concrete, Superstructure			895	
511	250	Cu. Yd.	Class "C" Concrete, Pier Caps and Columns		250		
511	427	Cu. Yd.	Class "C" Concrete, Abutments Above Footing	427			
511	544	Cu. Yd.	Class "C" Concrete, Footings	271	273		
512	64	Lin. Ft.	Premolded Sealing Strip	64			
513	746,600	Pounds	Structural Steel			746,600	
514	746,600	Pounds	Field Painting of Structural Steel			746,600	
516	60	Sq. Ft.	1" Preformed Expansion Joint Filler	60			
518	245	Cu. Yd.	Porous Backfill	245			
518	196	Lin. Ft.	6" Non-perforated Helical C.M.P. Including Specials, 707.01	196			
518	346	Lin. Ft.	6" Perforated Helical C.M.P., 707.01	346			
518	11	Each	Scuppers, Including Supports			11	
601	207	Lin. Ft.	Paved Gutter (Type 1-2)				207
601	1,965	Sq. Yd.	Concrete Slope Protection (6" thick)				1,965
601	731	Sq. Yd.	Concrete Slope Protection (4" thick)				731
808	895	Units	Chemical Admixture for Concrete, Type A, B or D			895	
838	3	Hours	Special Pile Tests				3
404	178	Cu. Yd.	Asphalt concrete (70-85 or Ac-20)			178	
Special	44	Cu. Yd.	Sand-asphalt (See proposal Note)			44	
Special	3,232	Sq. Yd.	Membrane Water proofing sheet type (See Proposal Note)			3,232	
518	894	Lin. Ft.	Subdrainage for wearing course, as per plan			894	

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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KANSAS CITY CLEVELAND NEW YORK

**BRIDGE LAYOUT DIAGRAM  
AND ESTIMATED QUANTITIES**

I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77 TO STA. 1162+58.23

CUYAHOGA COUNTY OHIO

DRAWN KYH	TRACED/SC	CHECKED MCB	REVIEWED	REVISED
DATE 6-12-69	DATE 1-13-70	DATE 2-23-70	DATE	DATE

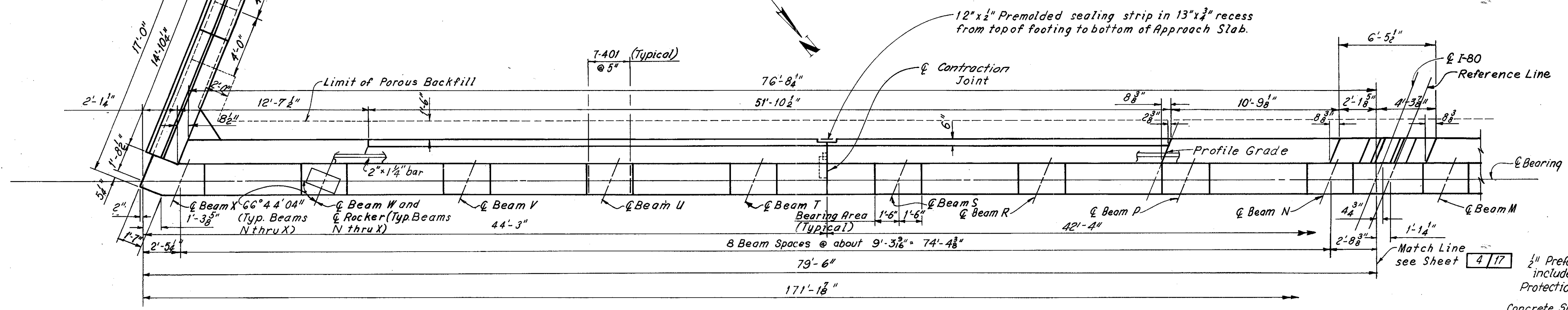
SHEET 2/17

MICROFILMED  
DEC 22 1982

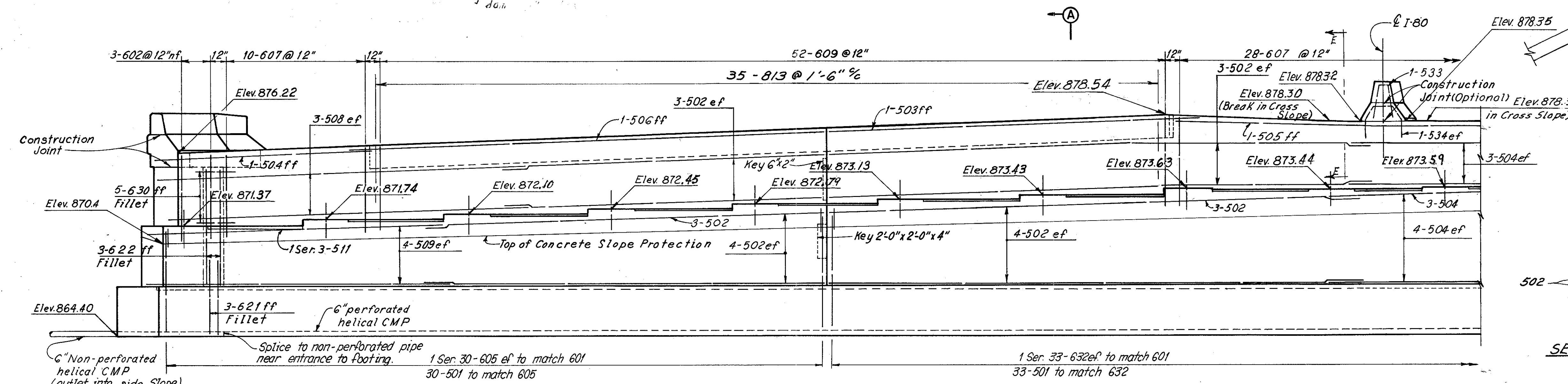
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

309  
390

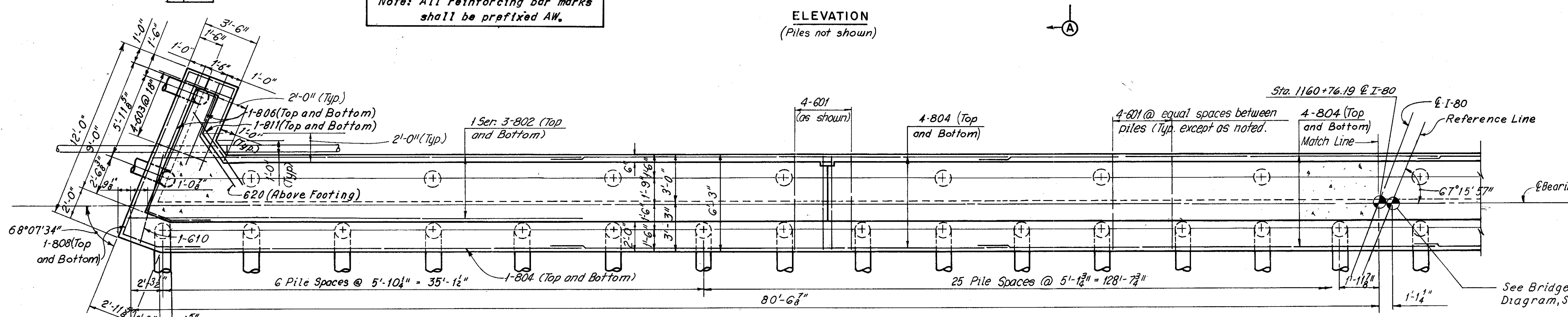
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CUY-80-21.40



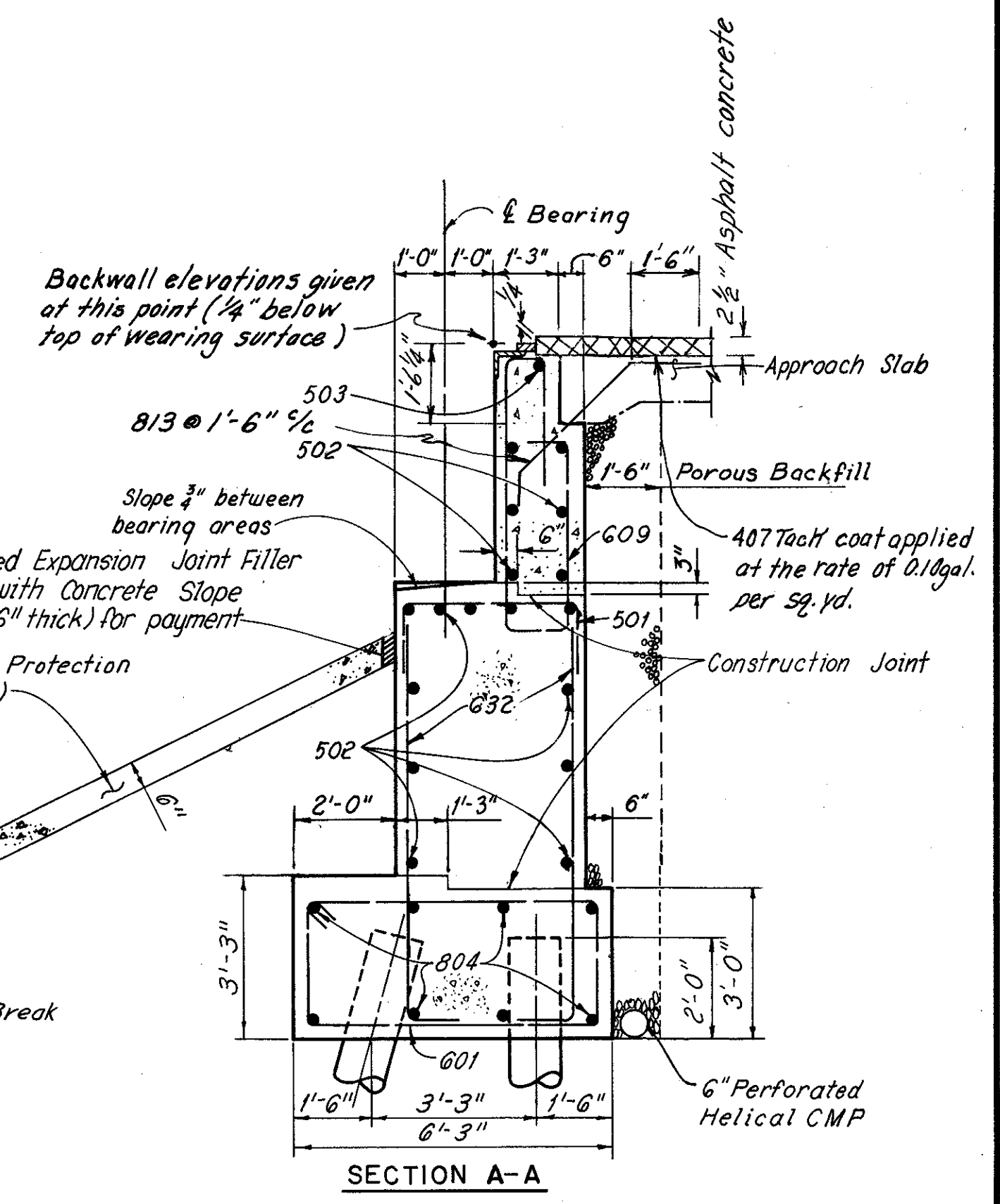
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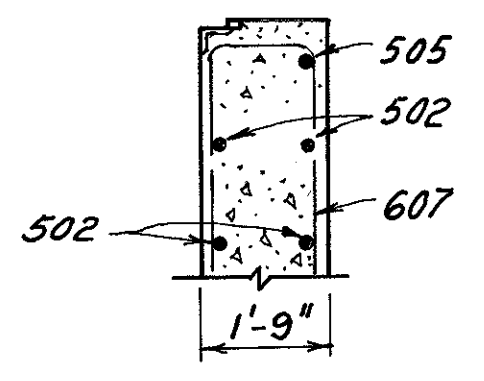
ELEVATION  
(Piles not shown)



FOOTING PLAN



SECTION A-A



SECTION E-E

MEDIAN DETAIL  
(Reinforcement not shown)

Note:  
All piles are 12"  $\phi$  C.I.P. reinforced concrete. All battered piles shall be inclined 3 in 12 in the direction shown.  
For roadway end dam and curb plate details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4 and Sheet 12/17.  
The following abbreviations are used:  
nf = near face  
ff = far face  
ef = each face

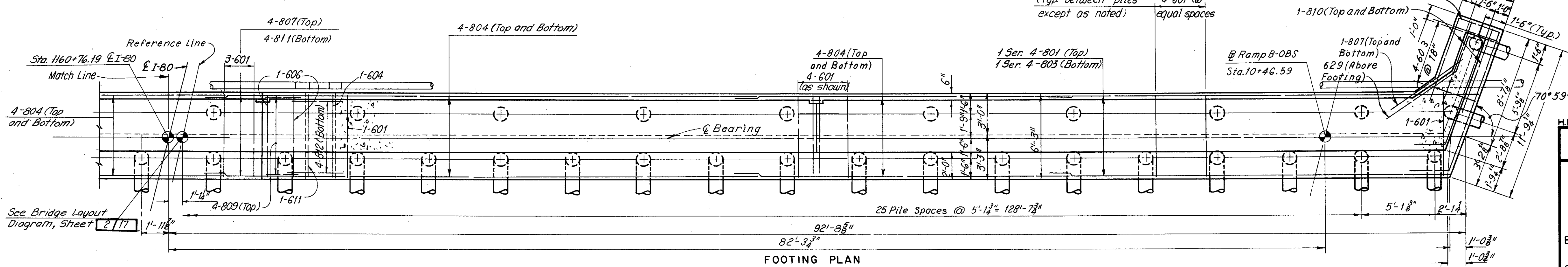
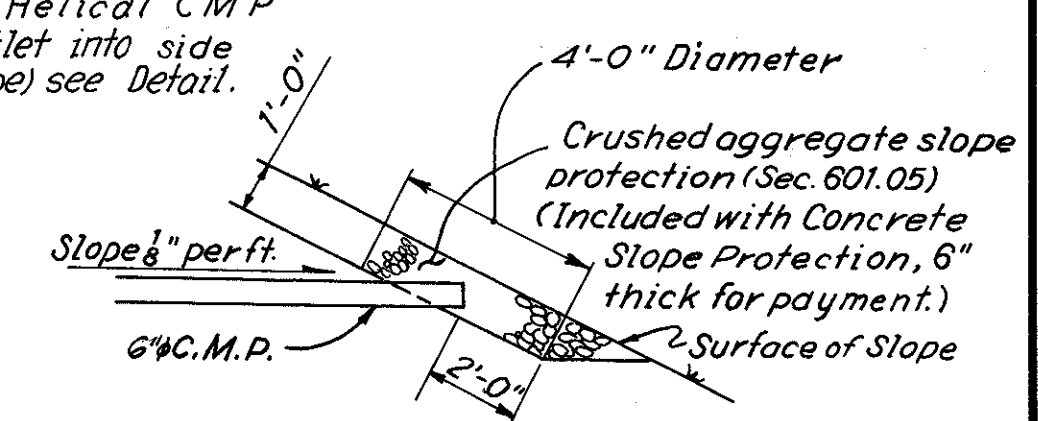
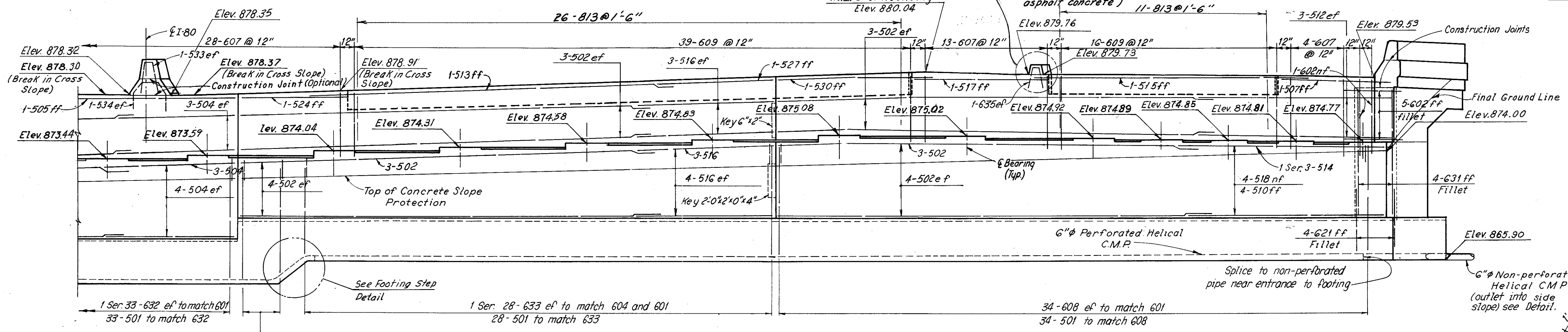
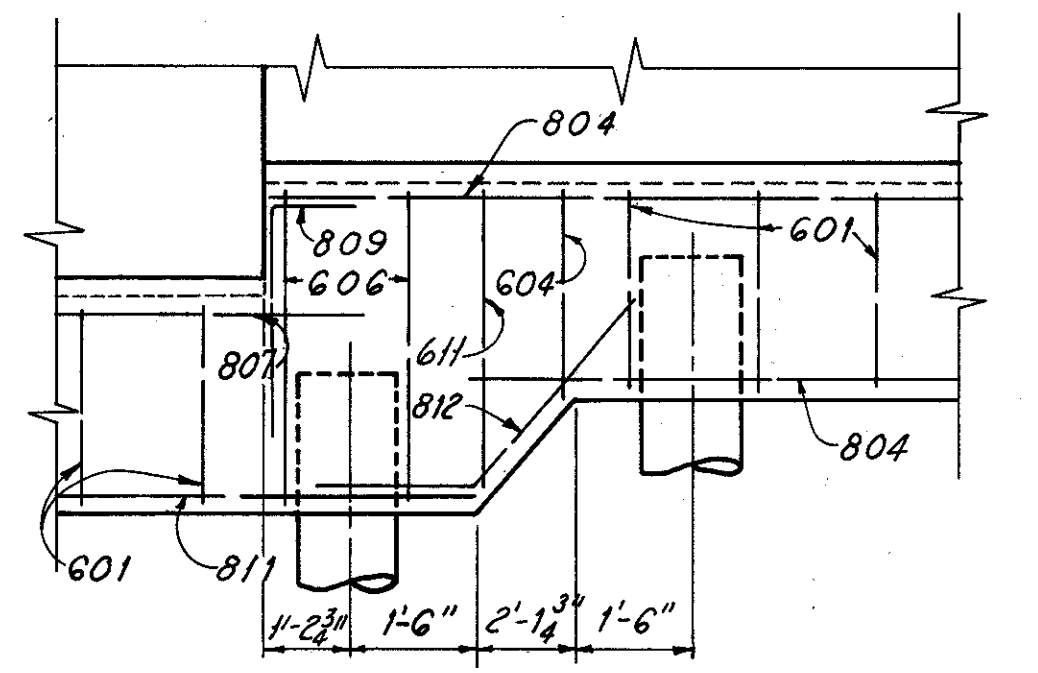
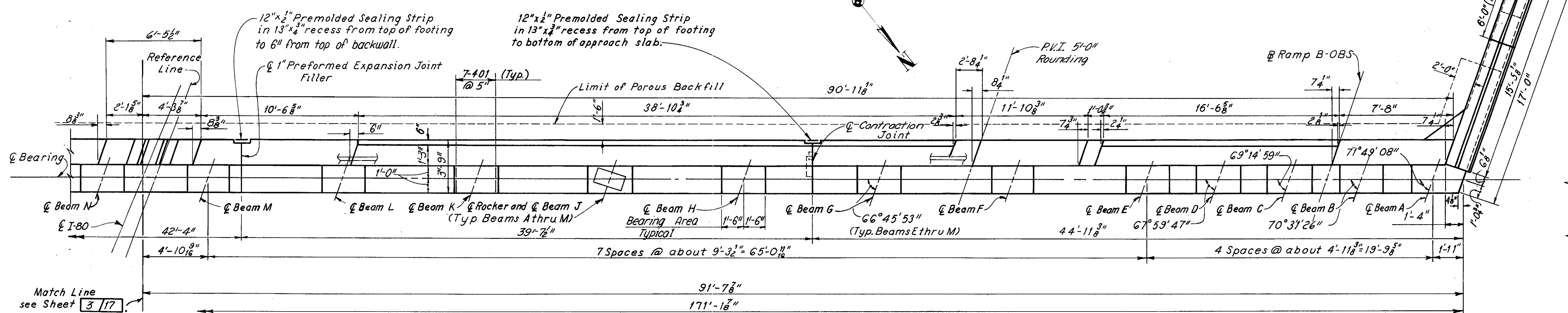
H.N.T.B. BR. NO. 7  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

<b>WEST ABUTMENT</b>				
I-80 AND RAMP B-OBS OVER BROADWAY				
BR. NO. CUY-80-2154	STA. 1160+73.77	STA. 1162+58.23		
CUYAHOGA COUNTY		OHIO		
DRAWN BY	TRACED BY	CHECKED BY	REVIEWED	REVISED
DATE 4-11-68	DATE 4-23-68	DATE 3-2-70	DATE	DATE
				SHEET 3/17

MICROFILMED  
DEC 22 1982

FED. RD. DIVISION	STATE	PROJECT	310 390
2	OHIO		

CUYAHOGA COUNTY  
CUY-80-21.40



H.N.T.B. BR. NO. 7  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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KANSAS CITY CLEVELAND NEW YORK

**WEST ABUTMENT**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
CUYAHOGA COUNTY OHIO STA. 1162+58.23

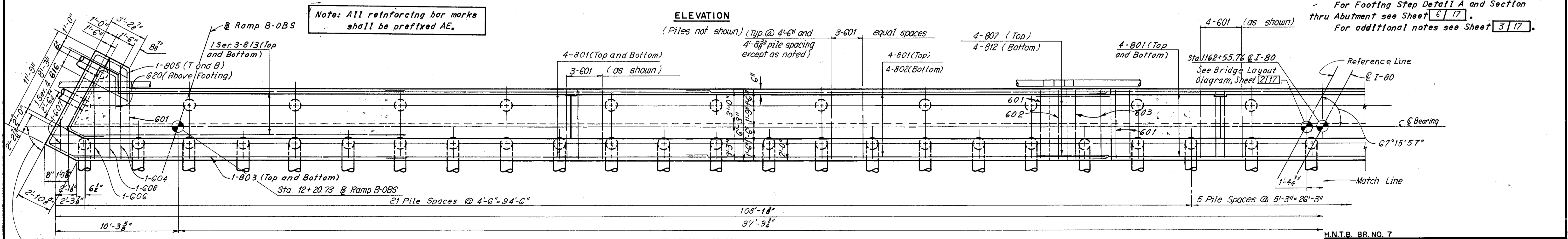
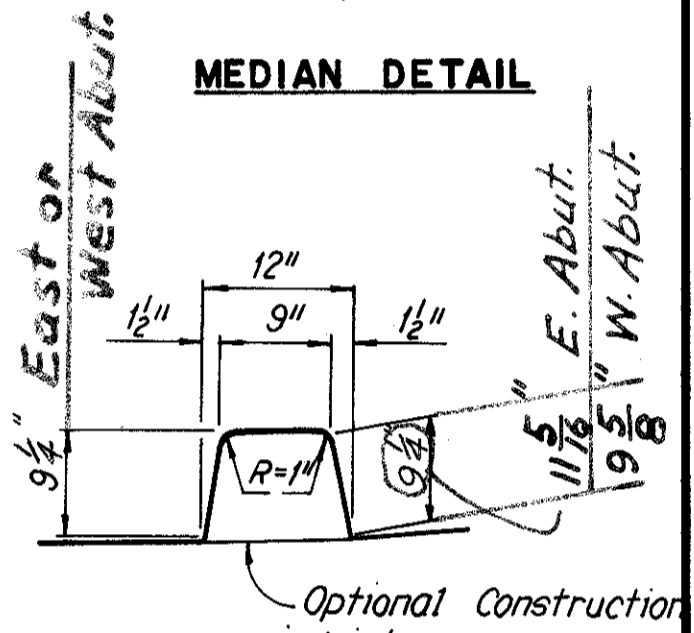
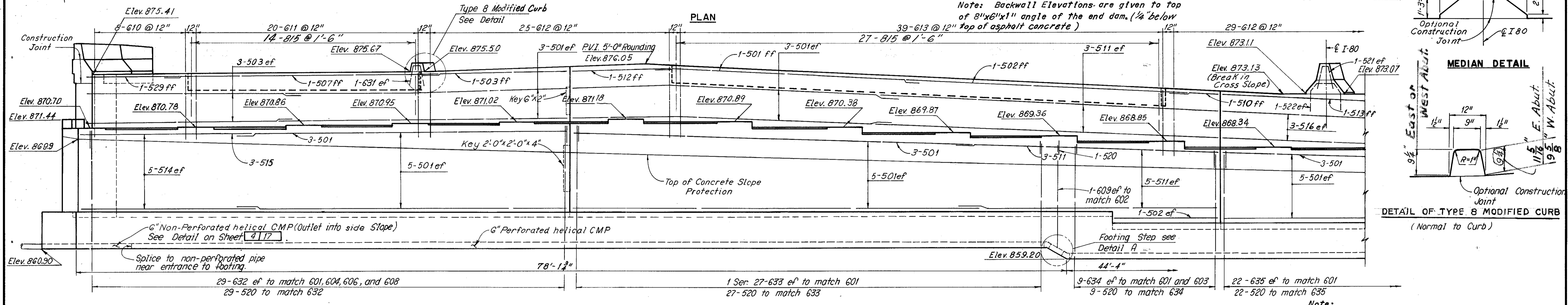
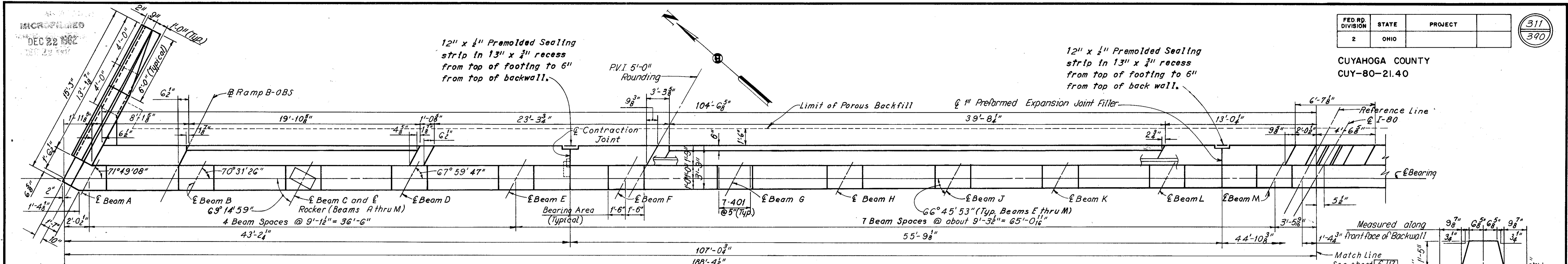
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DATE 4-11-68	DATE 4-23-68	DATE 3-2-70	DATE	DATE

SHEET 4/17

Note: For Notes see Sheet 3/17

MICROFILMED  
DEC 22 1962

FED. RD. DIVISION 2	STATE OHIO	PROJECT CUYAHOGA COUNTY CUY-80-21.40	311 390
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H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**EAST ABUTMENT**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
STA. 1162+58.23

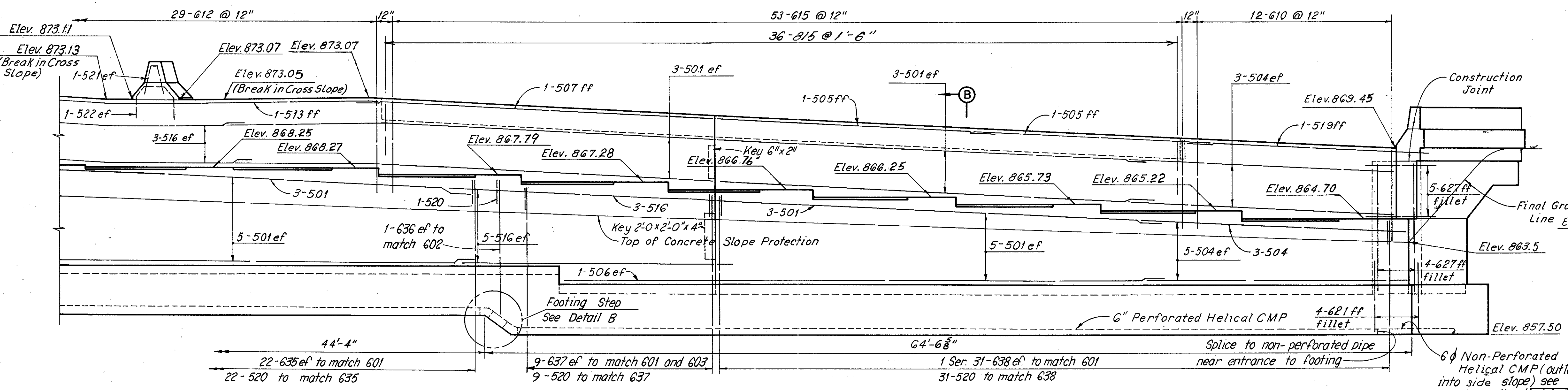
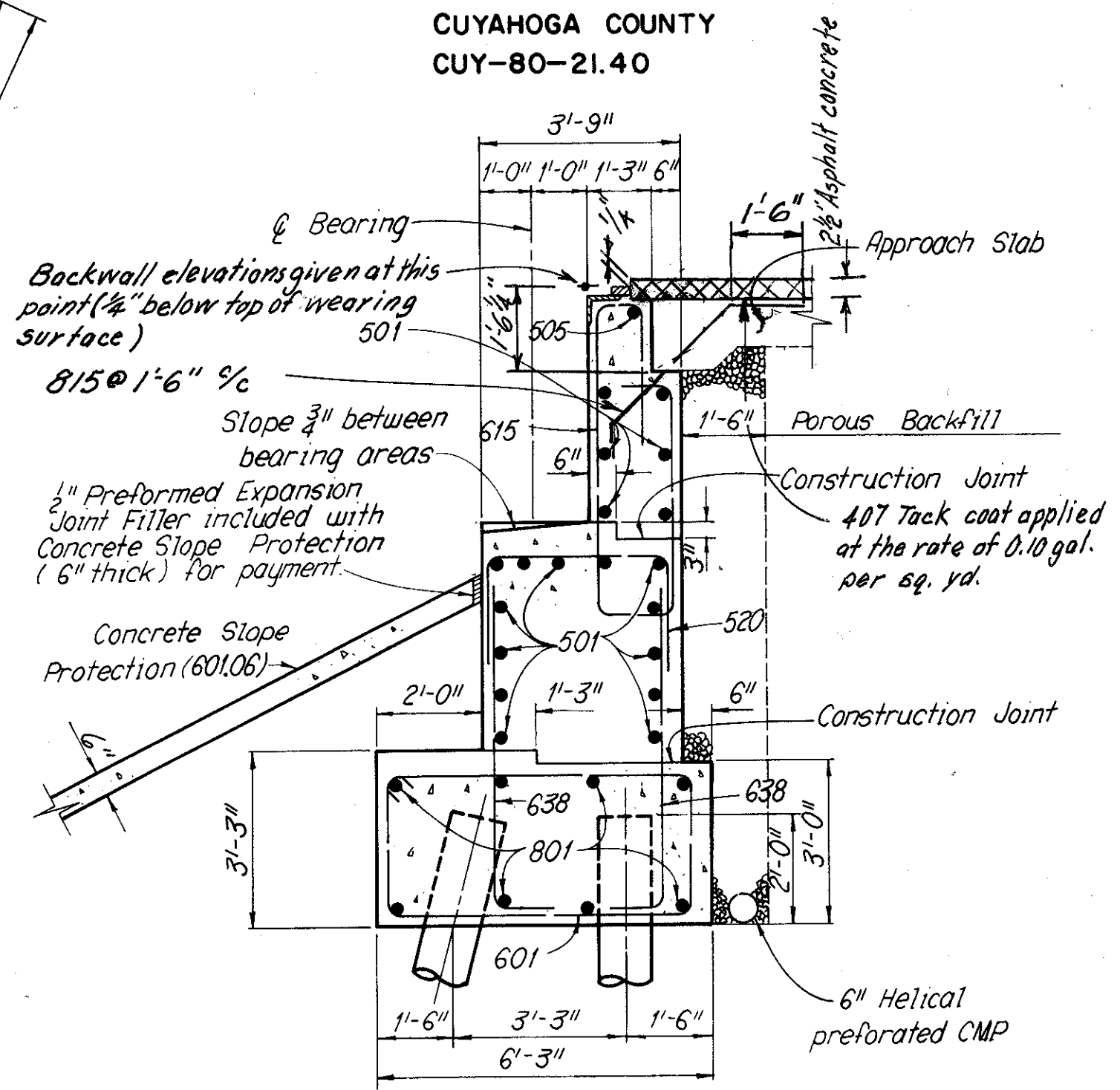
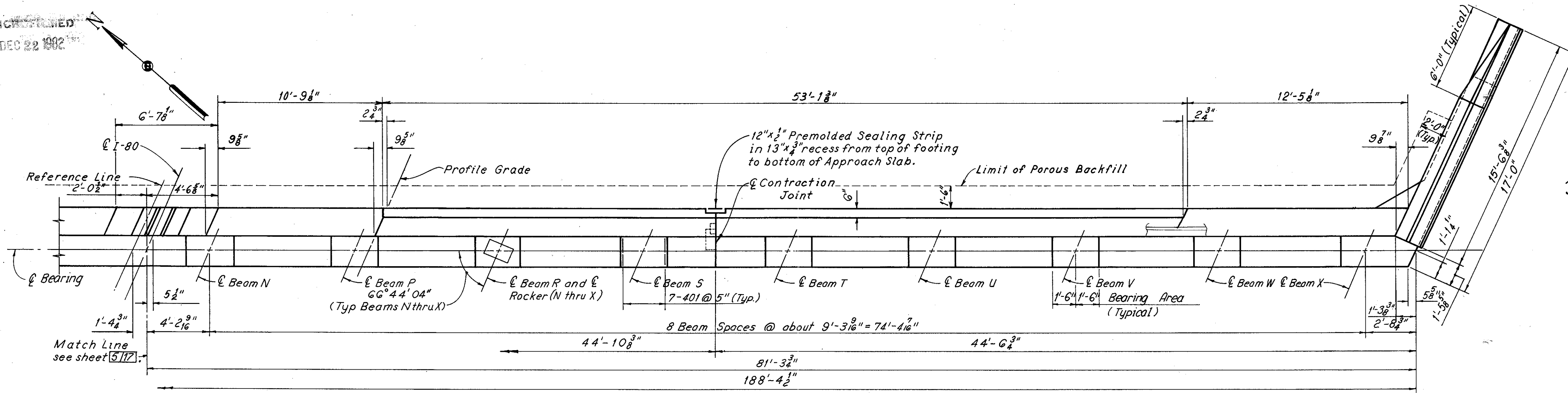
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DATE 4-11-68 TRACED B.M.P. CHECKED J.T. REVIEWED 2-27-74  
DATE 4-23-68 DATE 3-17-70 DATE SHEET 5/17

DEC 22 1962

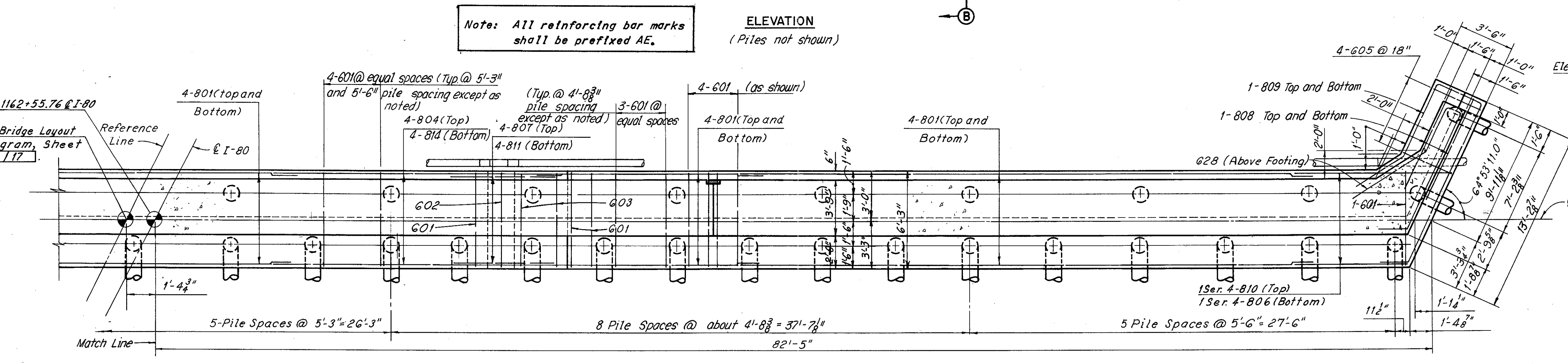
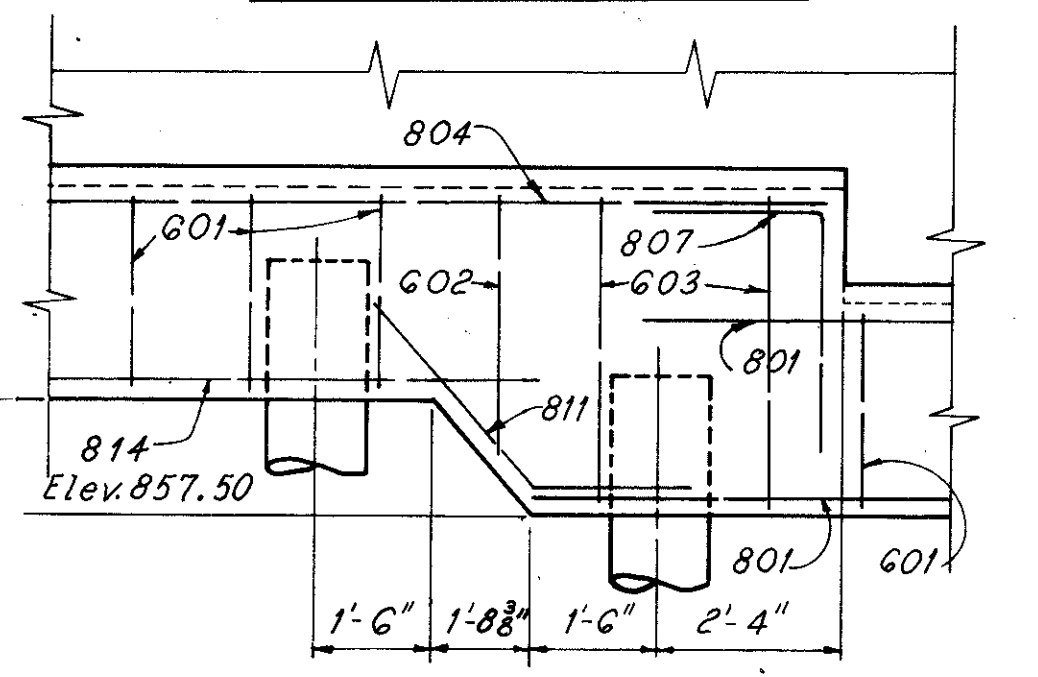
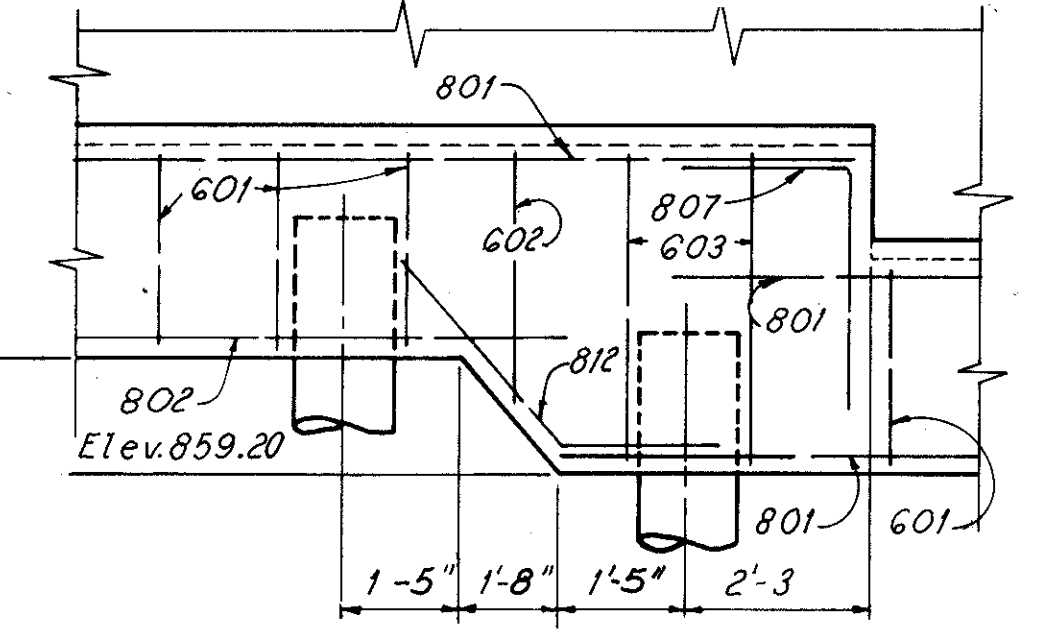
FED. RD. DIVISION	STATE	PROJECT	312 390
2	OHIO		

CUYAHOGA COUNTY  
CUY-80-21.40



Note: All reinforcing bar marks shall be prefixed AE.

ELEVATION (Piles not shown)



H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

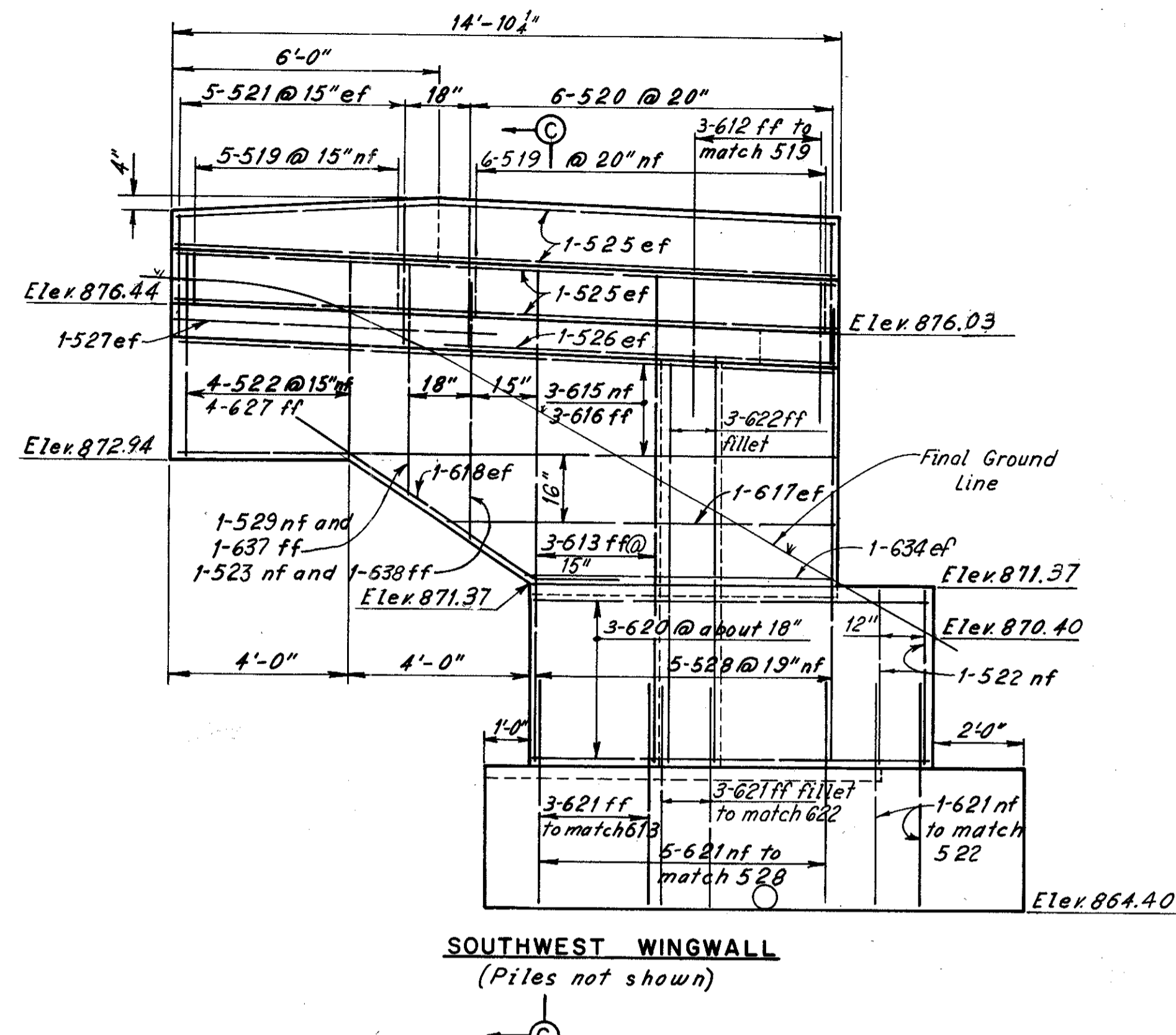
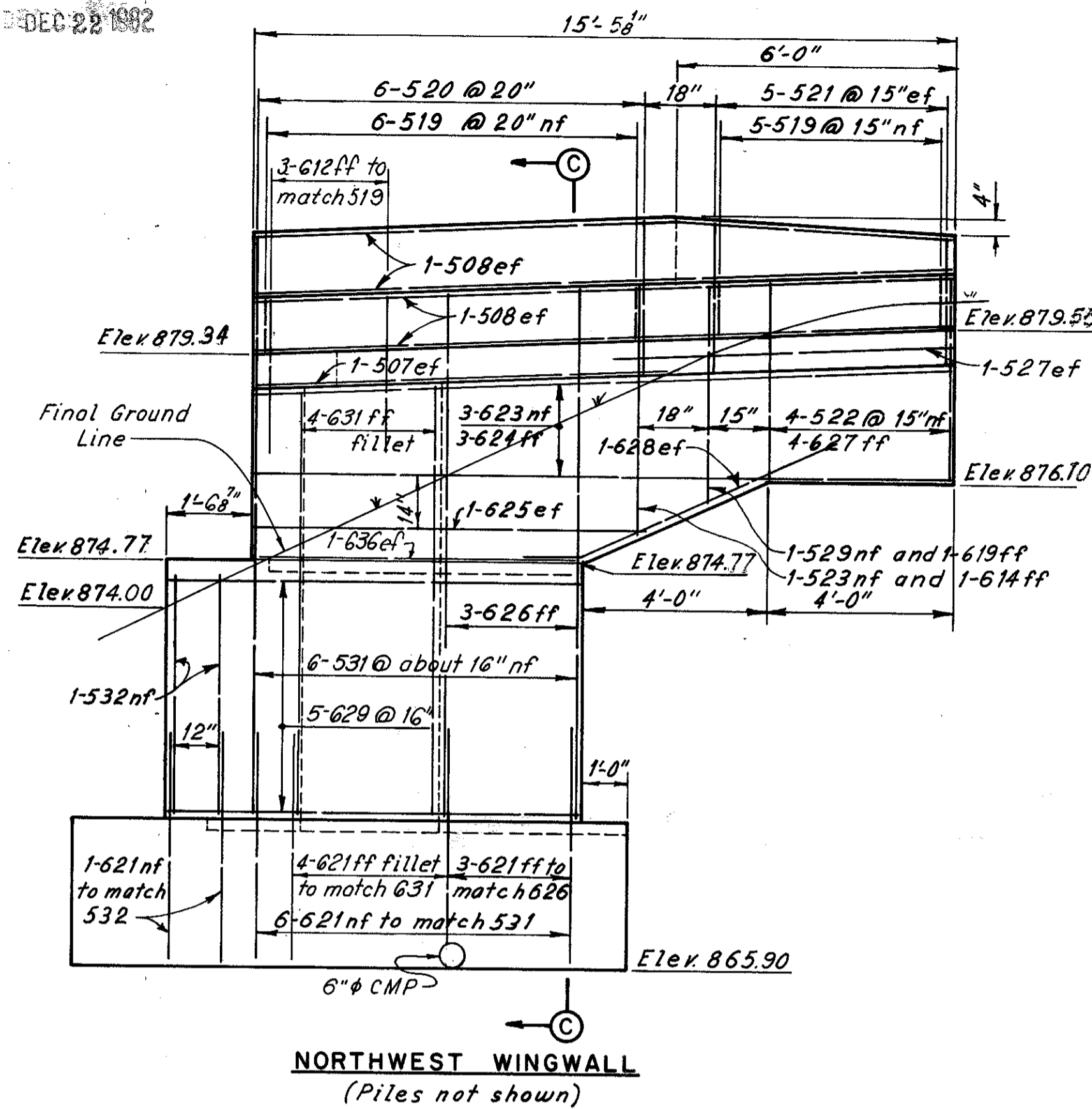
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I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
CUYAHOGA COUNTY OHIO STA. 1162+58.23

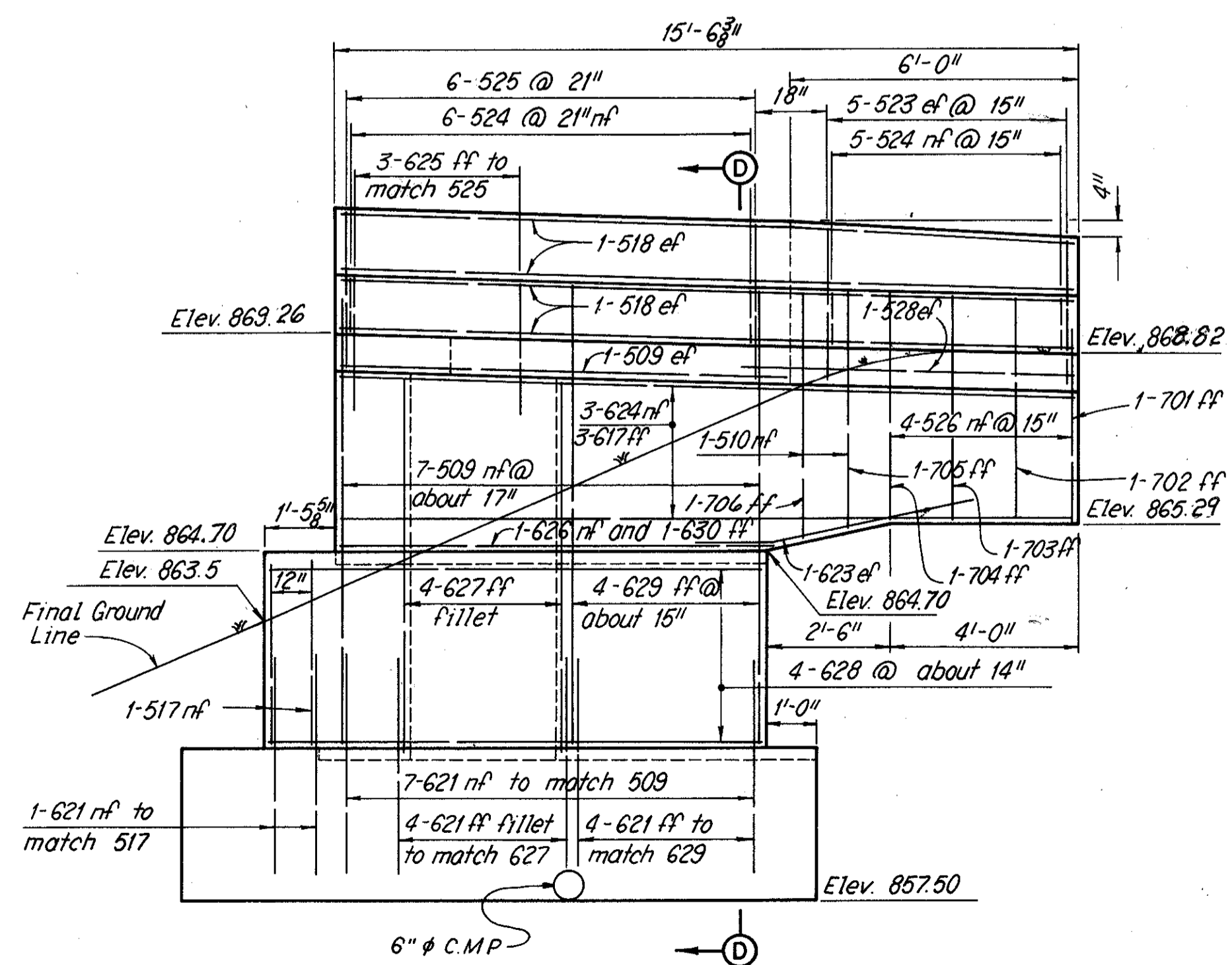
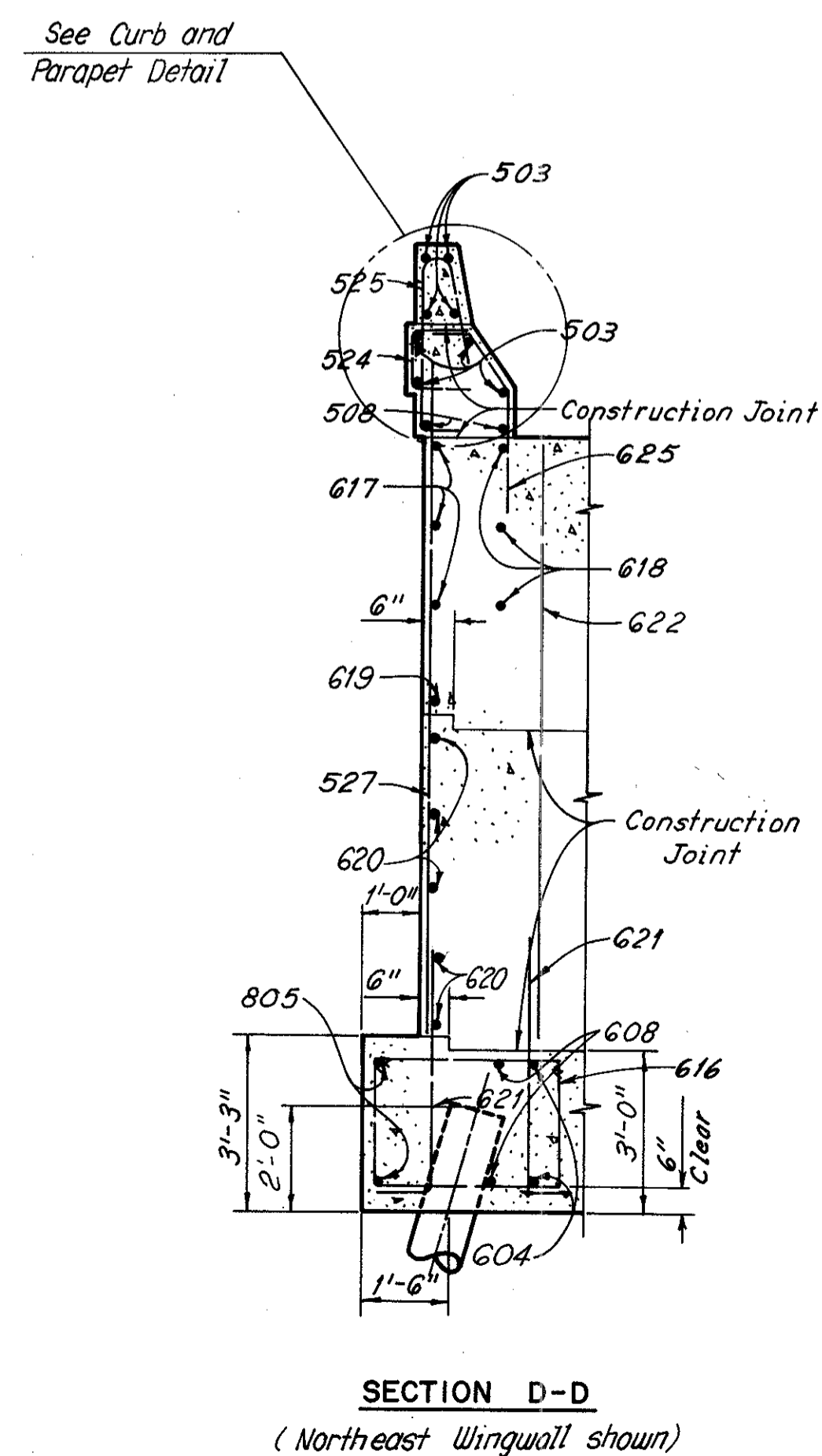
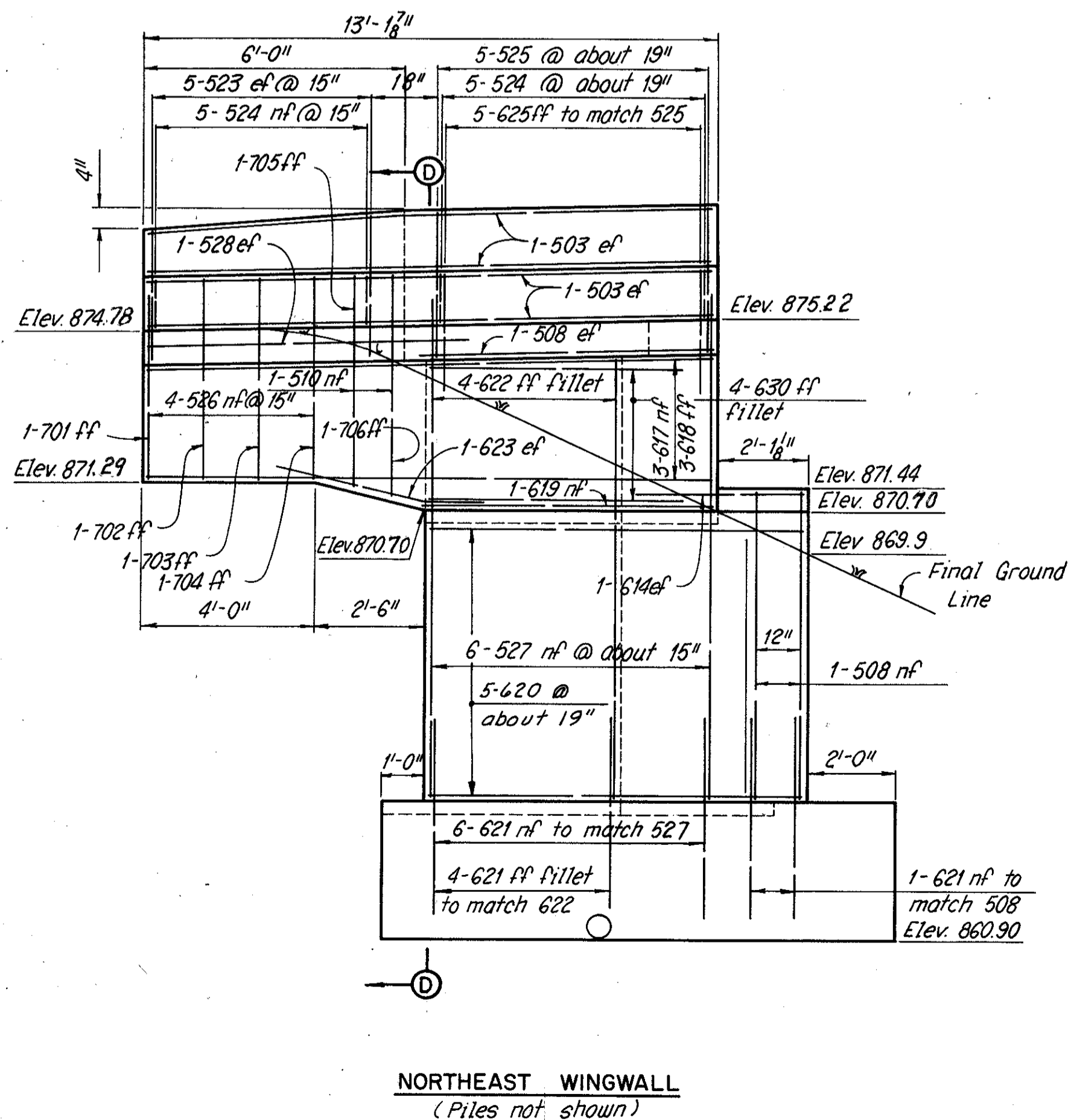
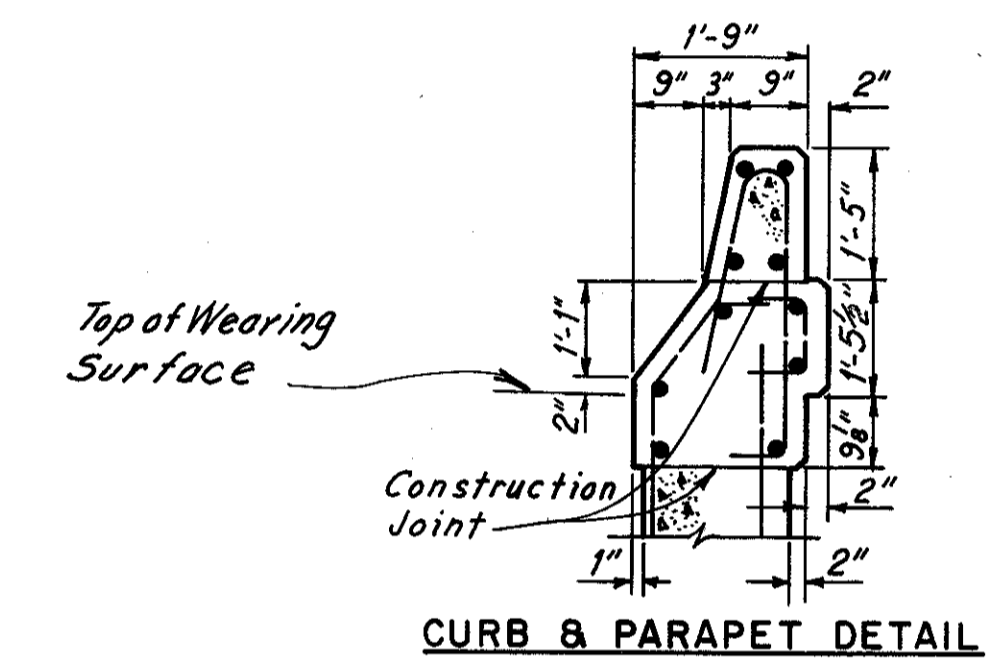
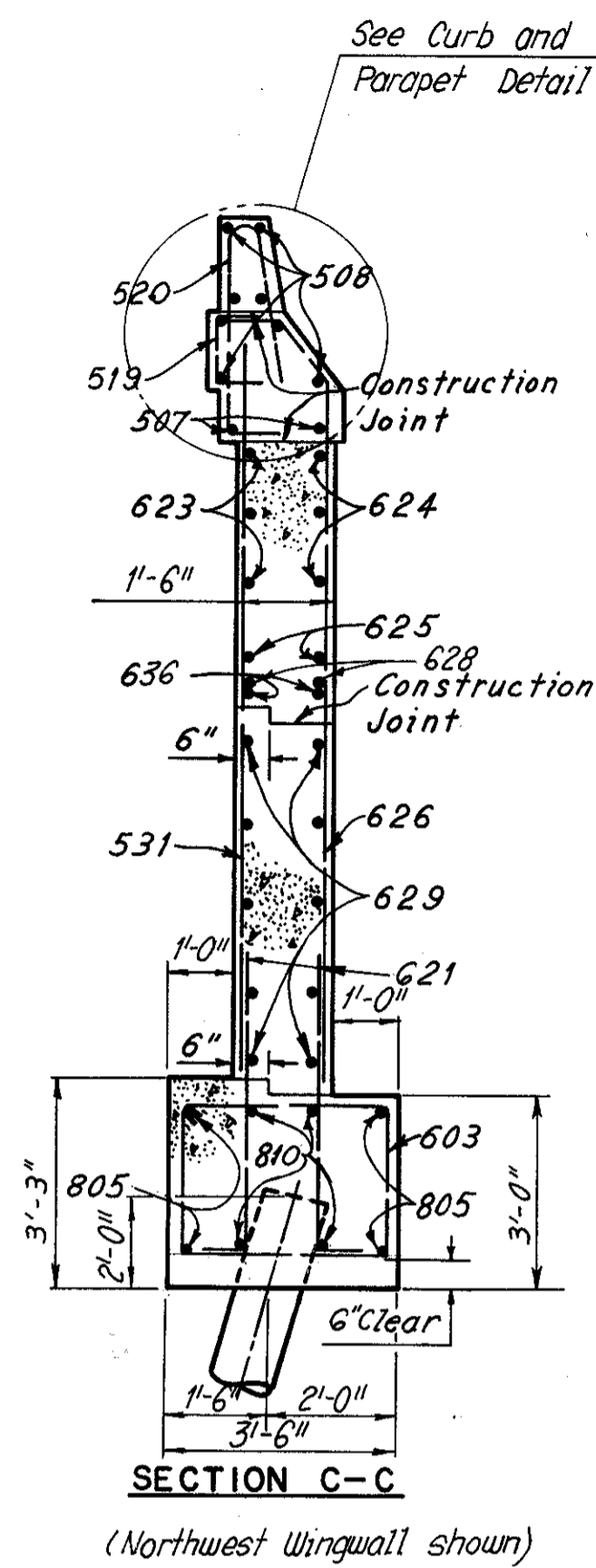
DRAWN BY	TRACED BY	CHECKED BY	REVIEWED	REVISED
DATE 11-68	DATE 1-23-69	DATE 3-17-70	DATE	DATE

SHEET 6/17

CUYAHOGA COUNTY  
CUY-80-21.40



Note: Northwest and Southwest Wingwall Reinforcement shall be prefixed AW.



Note: Northeast and Southeast Wingwall reinforcement shall be prefixed AE.

Notes:  
For curb and parapet transitions and for guard rail anchor details, see "PART PLANS - PARAPET ON WINGWALL" on Ohio Standard Drawing BR-1-67, Revised 10-15-71, Sheet 1 of 3.  
For additional notes see Sheet 3/17.

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN, & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**WINGWALLS**

I-80 AND RAMP B-OBS OVER BROADWAY

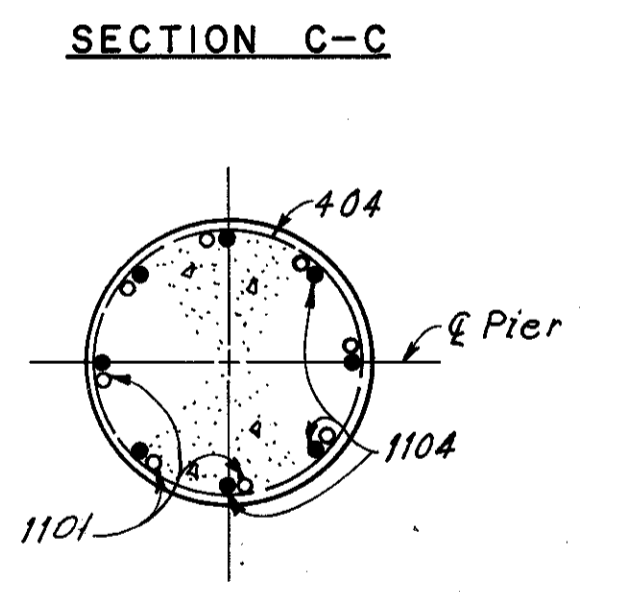
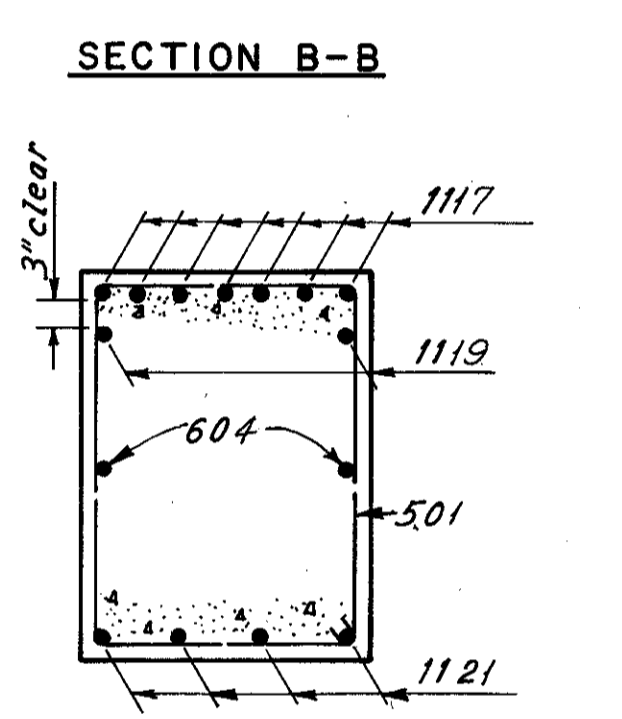
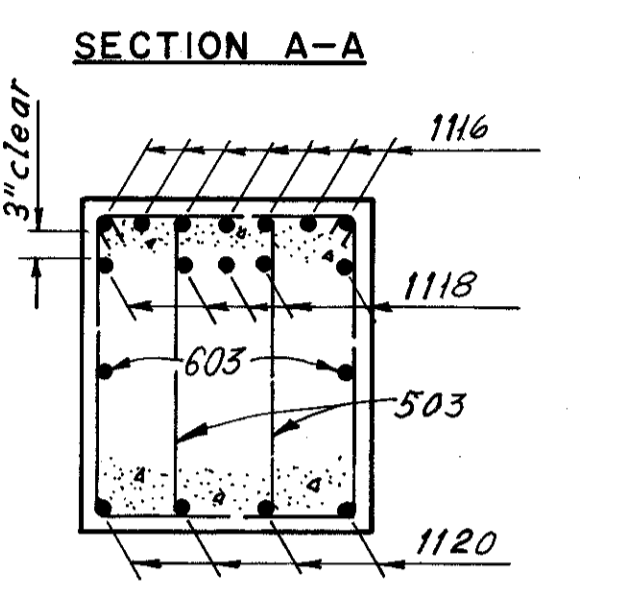
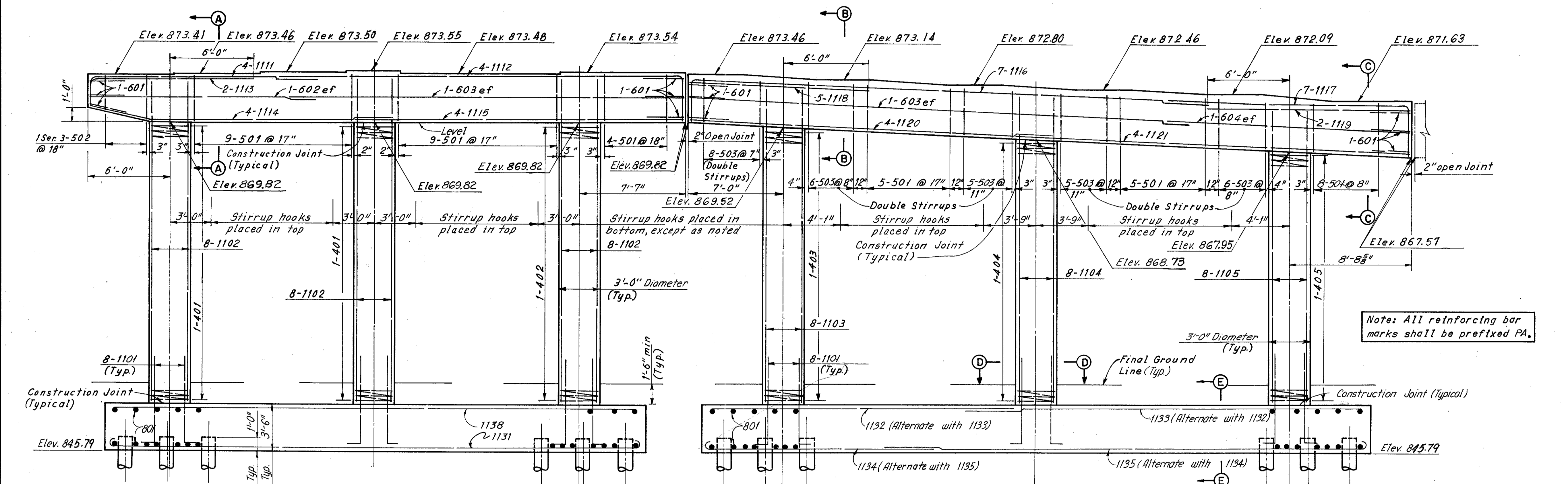
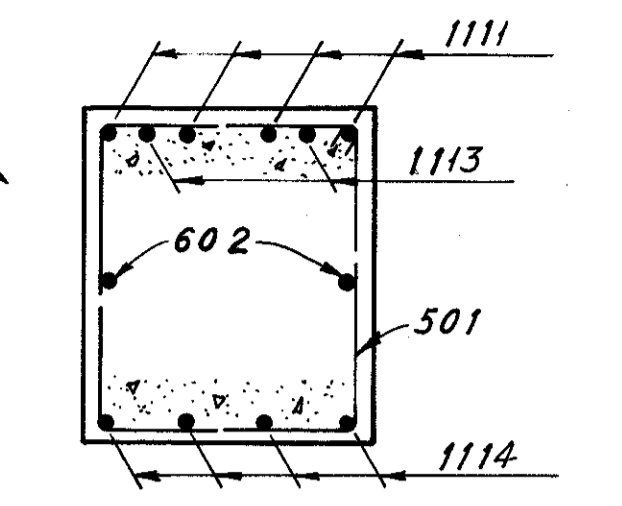
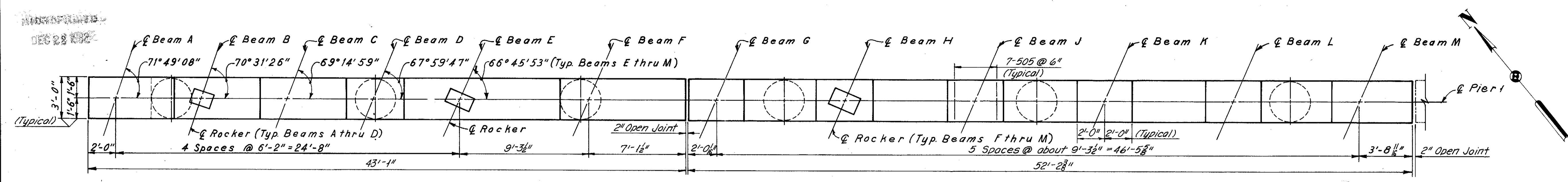
BR. NO. CUY-80-2154. STA. 1160+73.77  
STA. 1162+58.23

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 2/11/83	DATE 2/23/83	DATE 3-17-83	DATE	

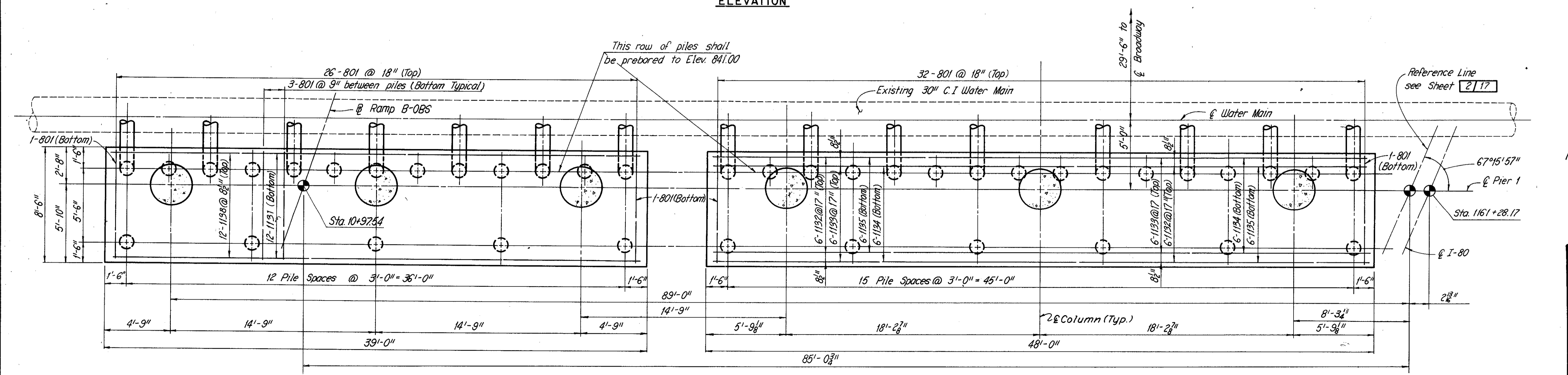
SHEET 7/17

CUYAHOGA COUNTY  
CUY-80-21.40



Note: All reinforcing bar marks shall be prefixed PA.

Note: For Section E-E see Sheet 9/17. For Notes see Sheet 9/17.



H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN, & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**PIER I-NORTH HALF**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
STA. 1162+58.23

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED
J.T.	U.S.C.	J.S.C.	J.S.C.
DATE 5-7-69	DATE 5-23-69	DATE 7-2-69	DATE

SHEET 8/17



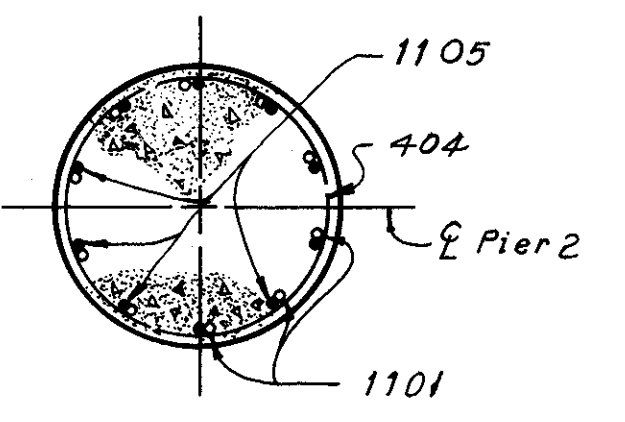
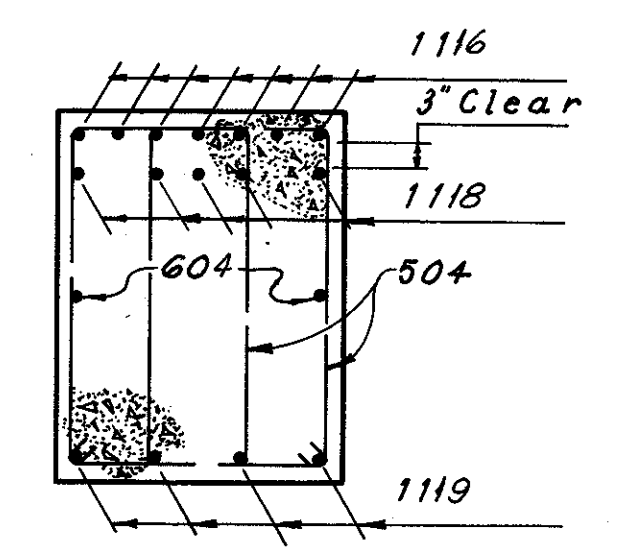
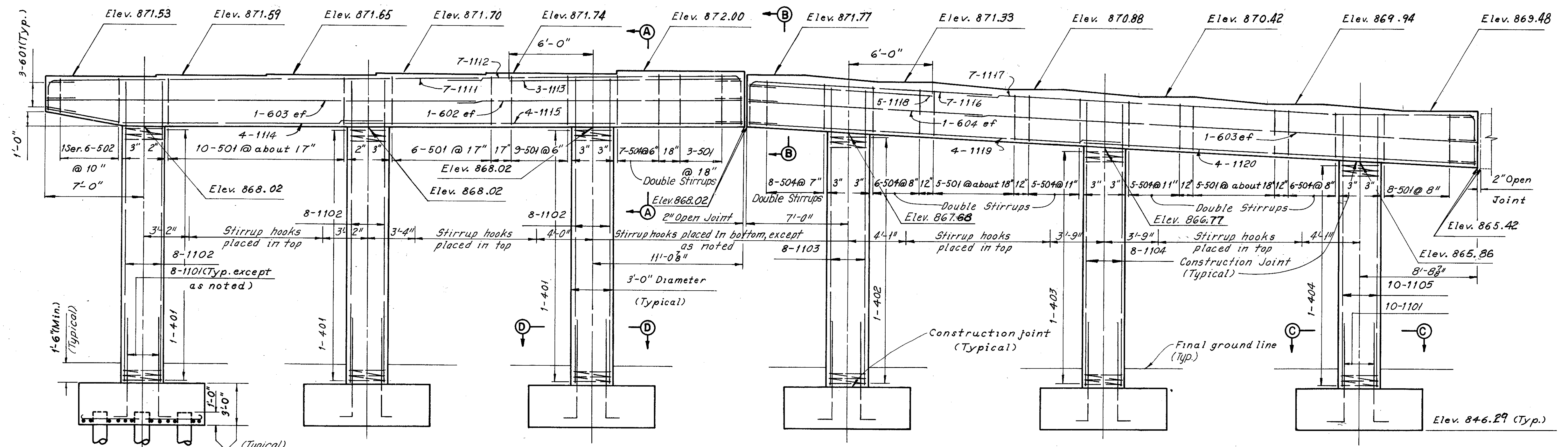
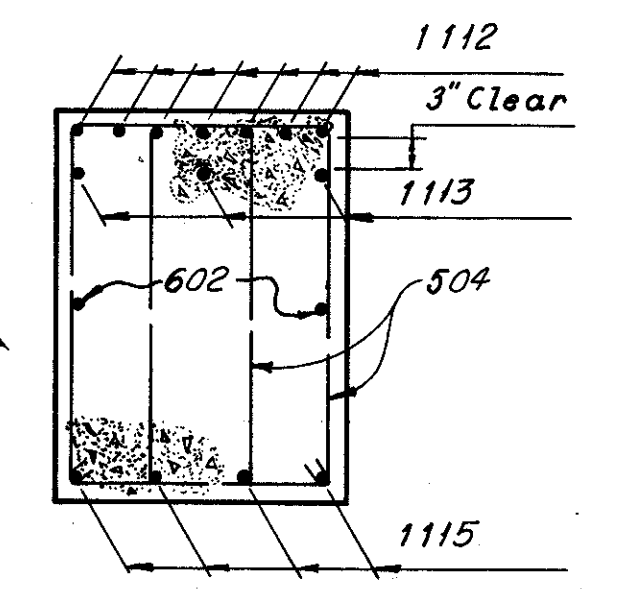
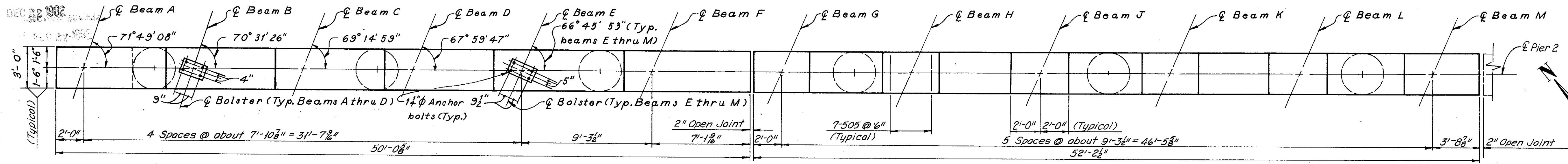


INCH PLOTTED  
DEC 22 1982

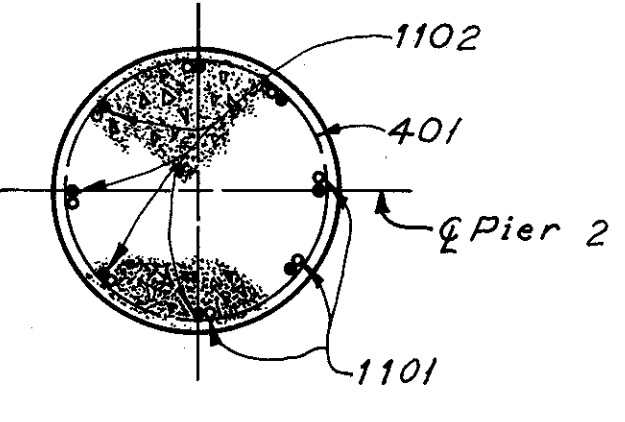
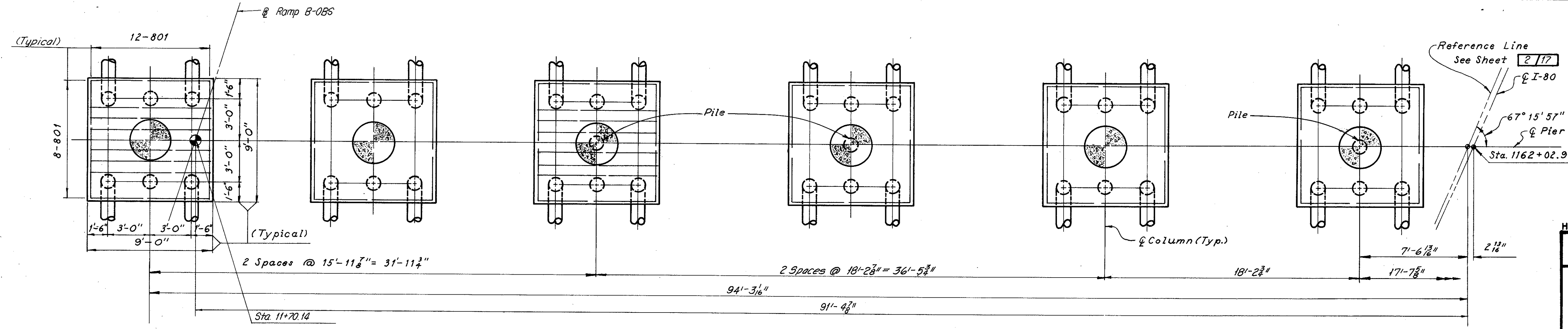
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

316  
390

CUYAHOGA COUNTY  
CUY.-80-21.40



Note: All reinforcing bar marks shall be prefixed PB.



Note: Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes. For anchor bolt details see Ohio Standard Drawing RB-1-55. For additional Notes see Sheet 9/17.

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN, & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**PIER 2-NORTH HALF**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154      STA. 1160+73.77  
CUYAHOGA COUNTY      STA. 1162+58.23      OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE: 5/10/69	DATE: 5/28/69	DATE: 7-9-69	DATE:	

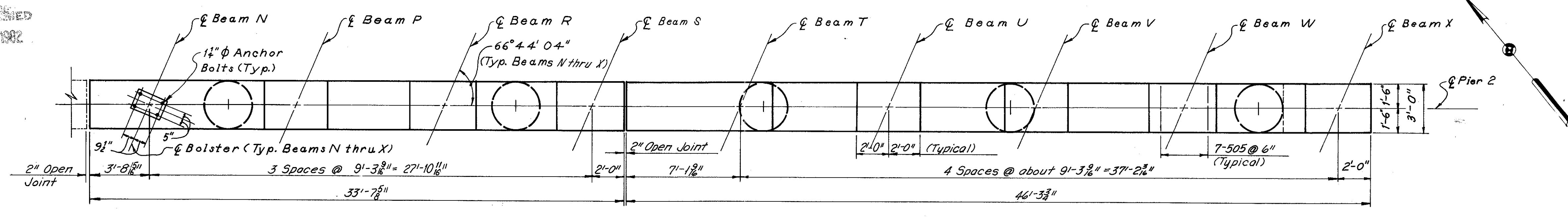
SHEET 10/17

MICROFILMED  
DEC 22 1982

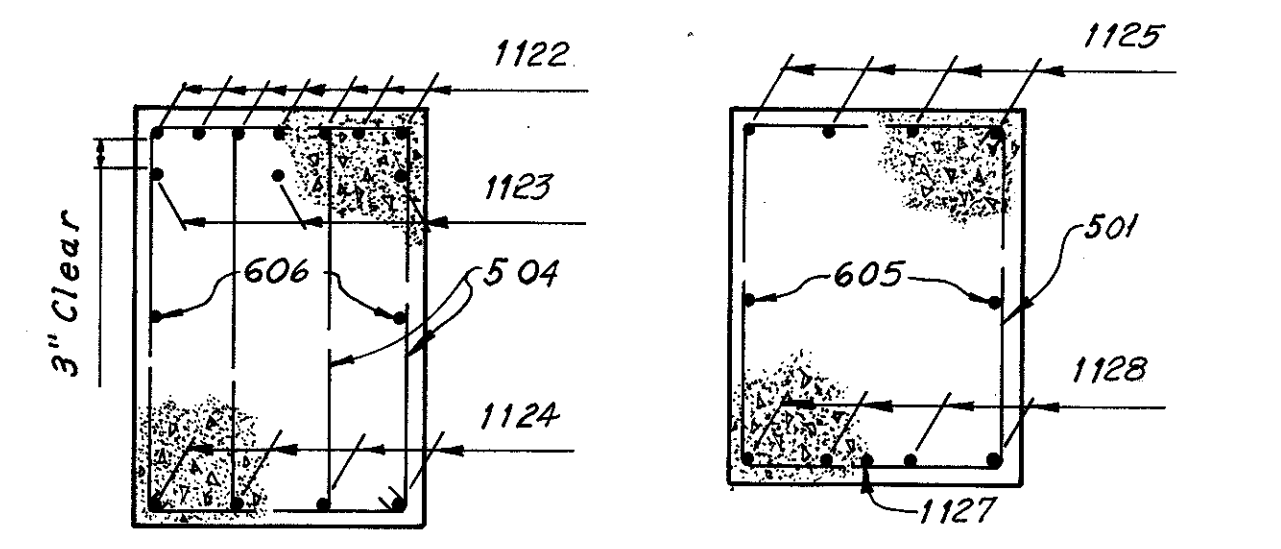
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

317  
390

CUYAHOGA COUNTY  
CUY.-80-21.40

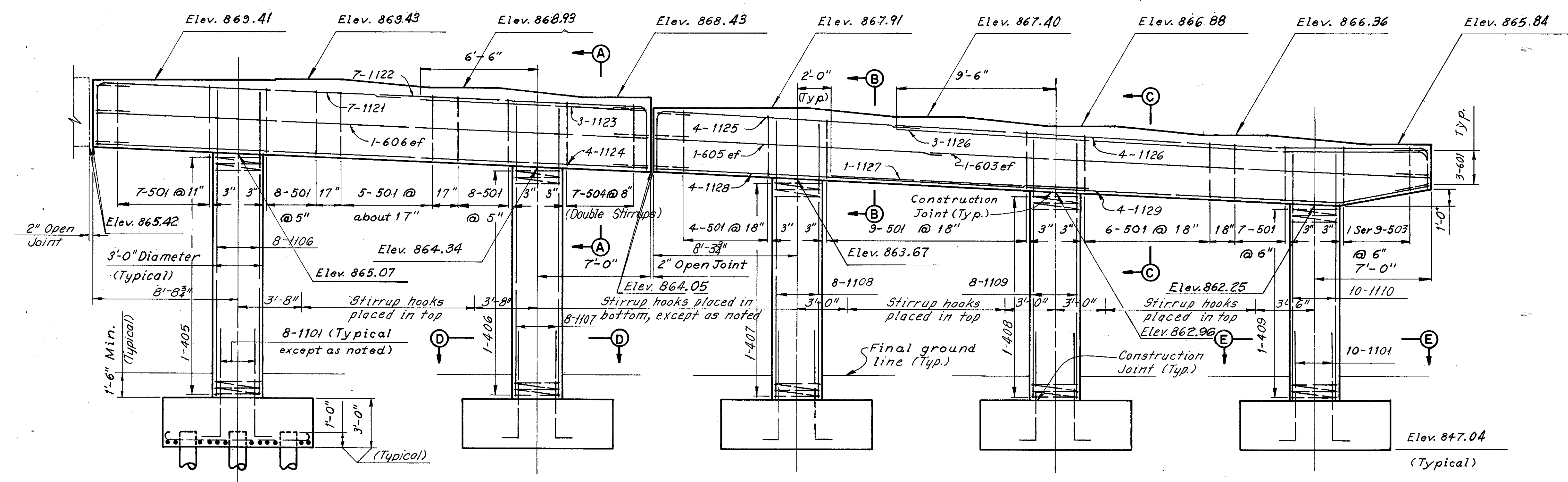


PLAN

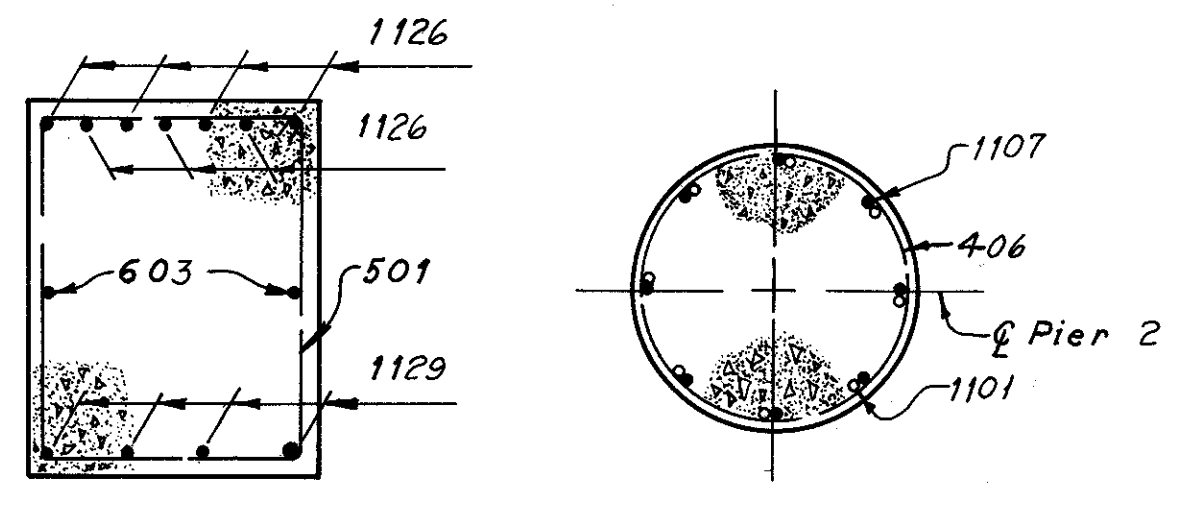


SECTION A-A

SECTION B-B

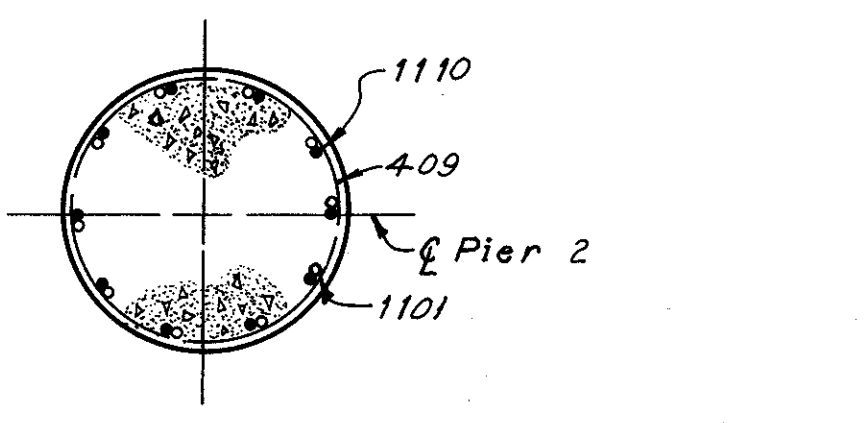


ELEVATION



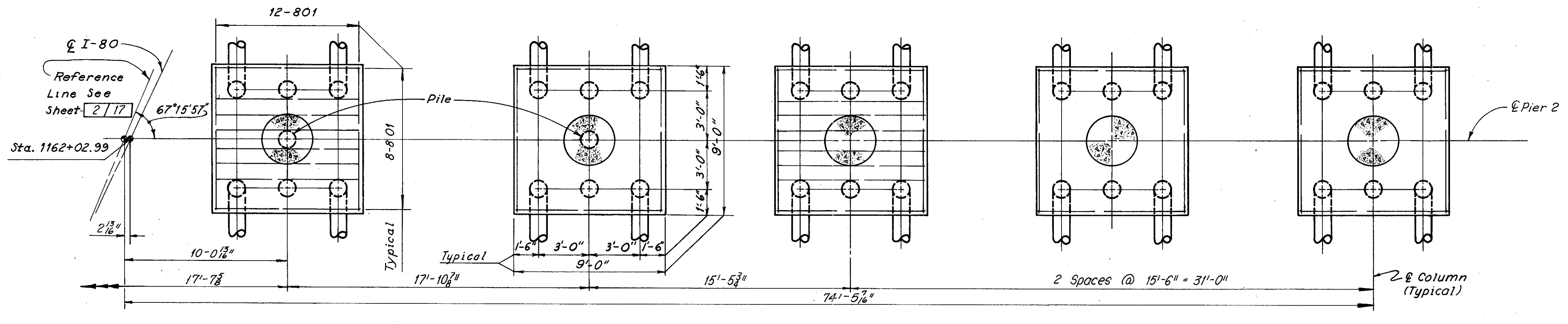
SECTION C-C

SECTION D-D



SECTION E-E

Note: All reinforcing bar marks shall be prefixed PB.



FOOTING PLAN

Note:  
Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes.  
For anchor bolt details see Ohio Standard Drawing RB-1-55.  
For additional Notes see Sheet 9/17.

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN, & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**PIER 2-SOUTH HALF**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
STA. 1162+58.23

CUYAHOGA COUNTY OHIO

DRAWN BY	TRACED BY	CHECKED BY	REVIEWED	REVISED
DATE 5-12-69	DATE 6-3-69	DATE 7-9-69	DATE	DATE

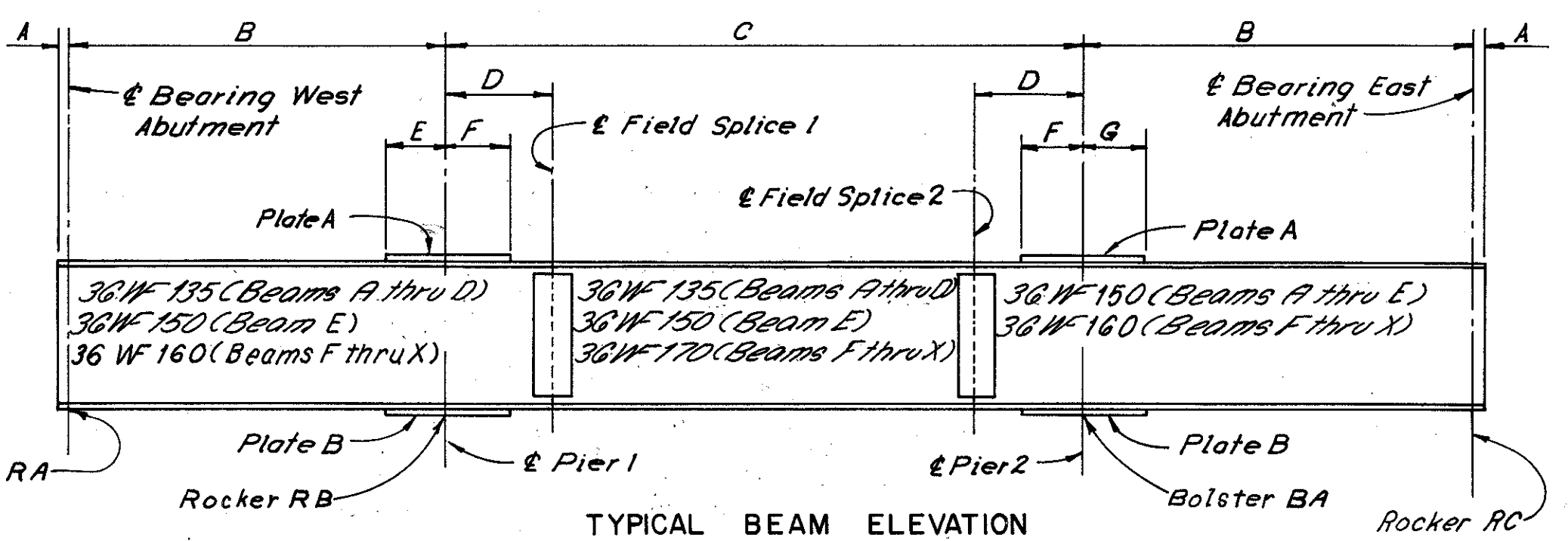
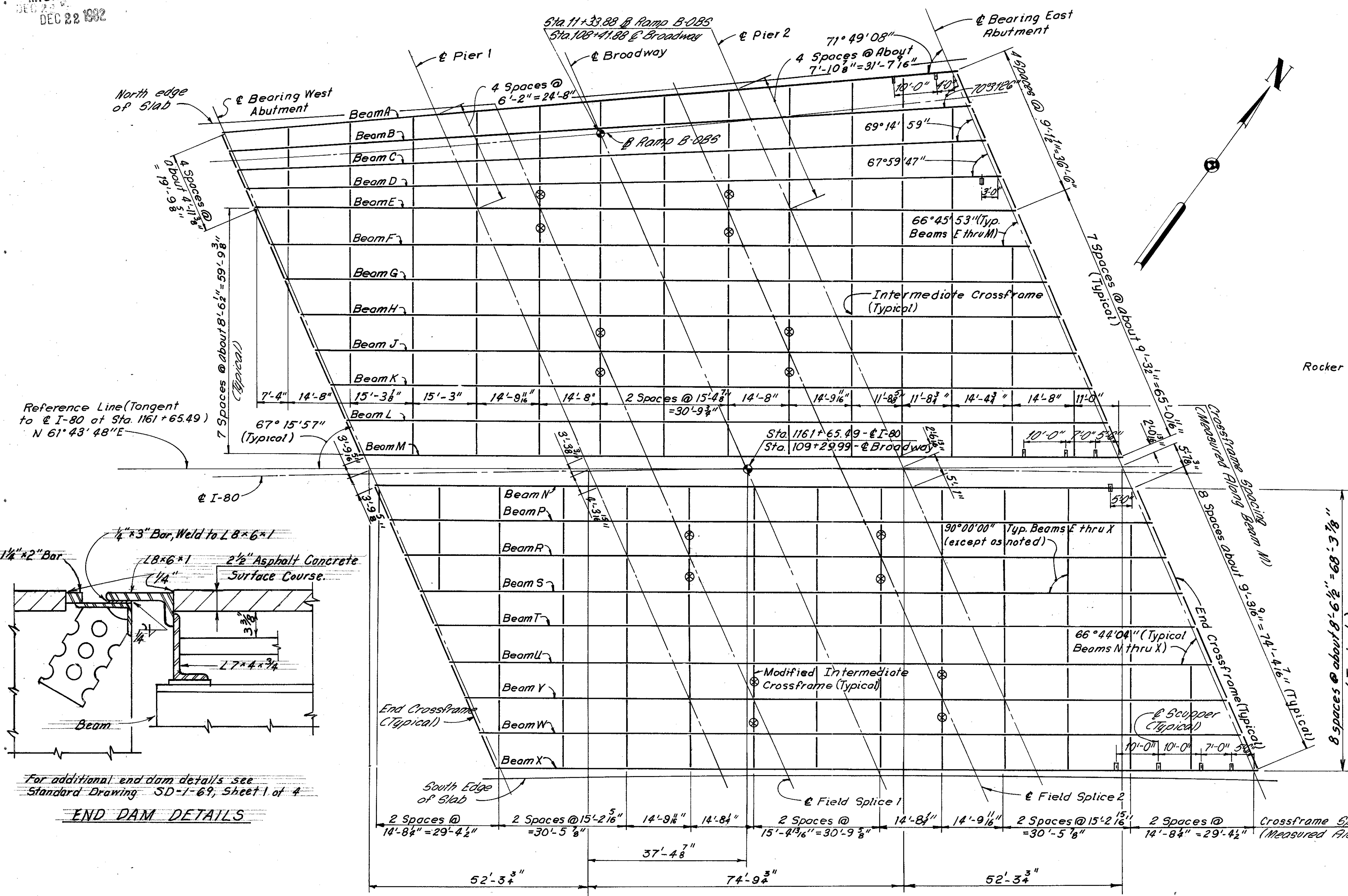
SHEET 11/17

MICROFILMED  
DEC 22 1992

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

318  
390

CUYAHOGA COUNTY  
CUY-80-21.40



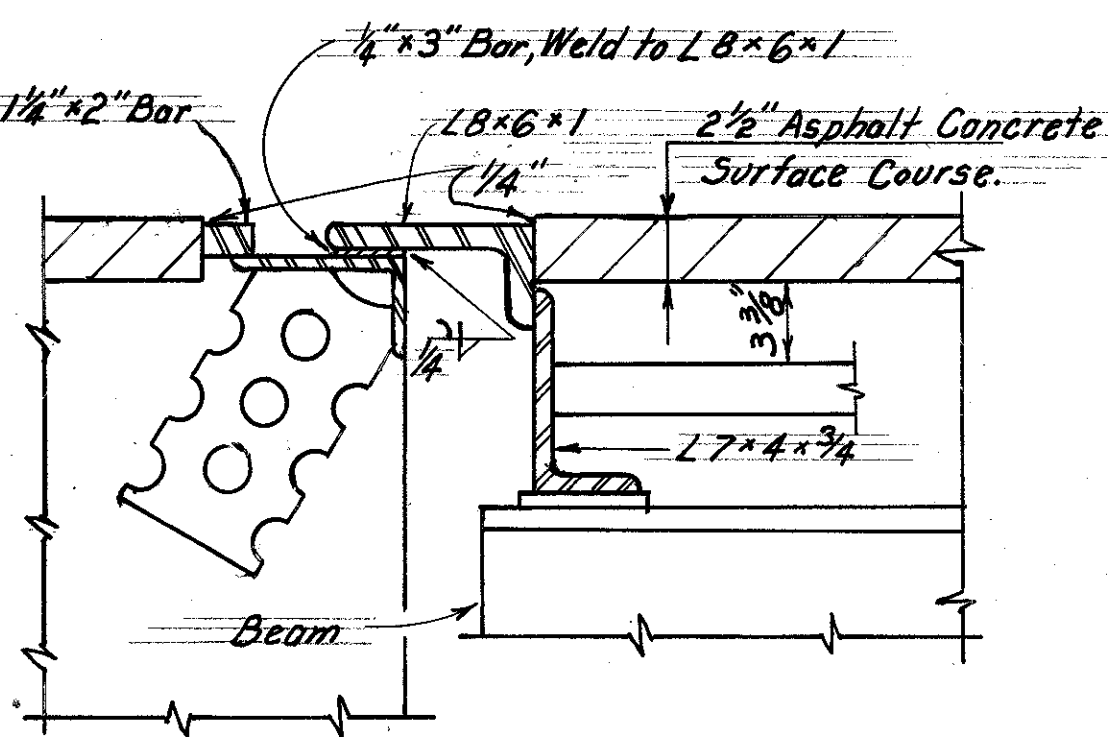
Note: Cover Plate lengths are typical top and bottom.

Beam	Dimensions							Plate Sizes	
	A	B	C	D	E	F	G	A	B
A	9 3/8"	50'-9 7/8"	72'-7 1/2"	14'-3 3/8"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
B	9 7/8"	51'-2 1/4"	73'-2 1/4"	14'-5 5/8"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
C	9 1/2"	51'-7 7/8"	73'-9 7/8"	14'-6 3/8"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
D	9 3/8"	52'-0 1/2"	74'-5 1/4"	14'-8 1/4"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
E	9 1/8"	52'-6 1/4"	75'-1 1/4"	14'-9 1/4"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
F thru M	9 1/8"	52'-6 1/4"	75'-1 1/4"	14'-9 1/4"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"
N thru X	9 1/8"	52'-6 1/4"	75'-1 1/4"	14'-9 1/4"	7'-0"	7'-0"	7'-0"	10 1/2" x 7/8"	13 1/2" x 1/2"

Beam	Rocker RA	Rocker RB	Bolster BA	Rocker RC
A thru D	R-75	R-125	B-150	R-75
E	R-75	R-150	B-175	R-75
F thru X	R100	R-175	B-175	R-100

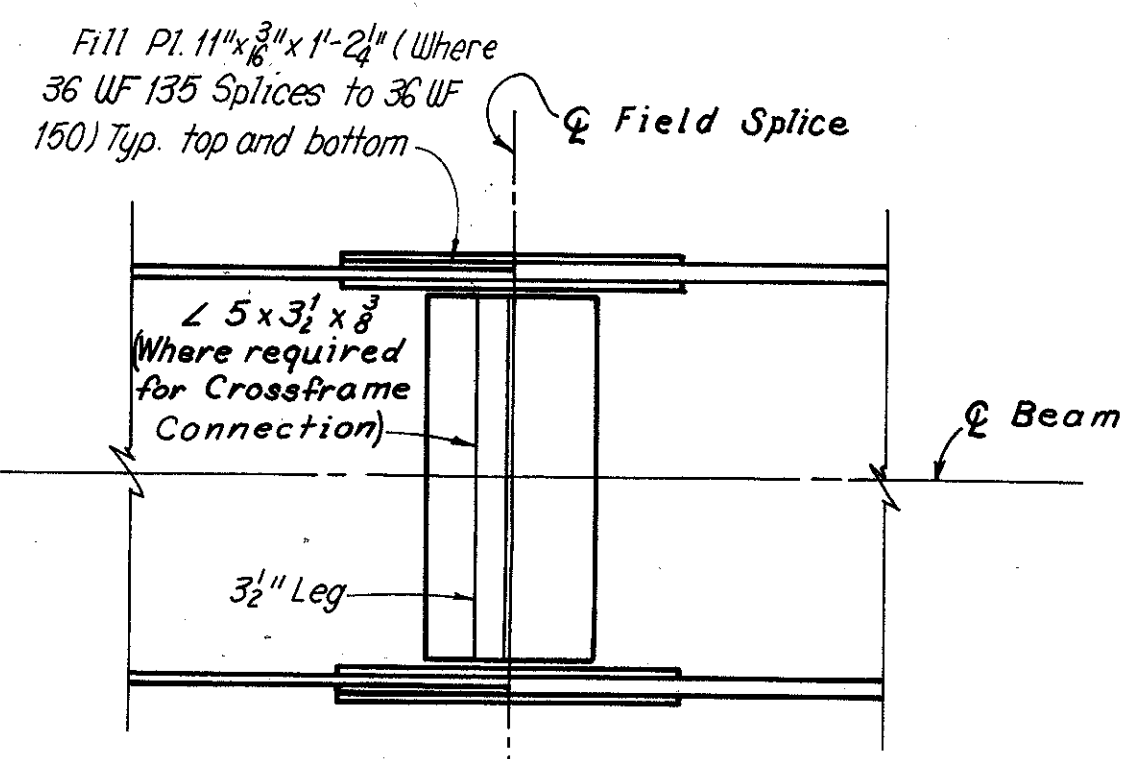
Note: Delete 1/2" side plates attached to both sides of sole plates for all rockers and bolsters on beams A, B, L, M, N and X.

Notes:  
 For details of Rockers and bolsters see Ohio Standard Drawing RB-1-55.  
 For additional details of end crossframes, roadway end dams and curb plates see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4. Curb plate details for the Type 8 Modified Curb shall be similar to the details shown for "Sidewalks, Safety Curbs and Raised Medians" on Sheet 2 of 4, except they shall be 6" high. The supporting angle (7x4x1/2) shall be continuous below the Type 8 Modified Curb.  
 For moment plate welding details see Ohio Standard Drawing SD-1-69, Sheet 3 of 4.  
 For drainage details see Sheets [CD1] & [CD2].  
 For horizontal offsets from exterior beams to edges of slab see sheet [13] [17].  
 For locations and details of underpass luminaire supports see Lighting Plans. The supports are included with the Lighting Quantities for payment.  
 H.N.T.B. BR. NO. 7

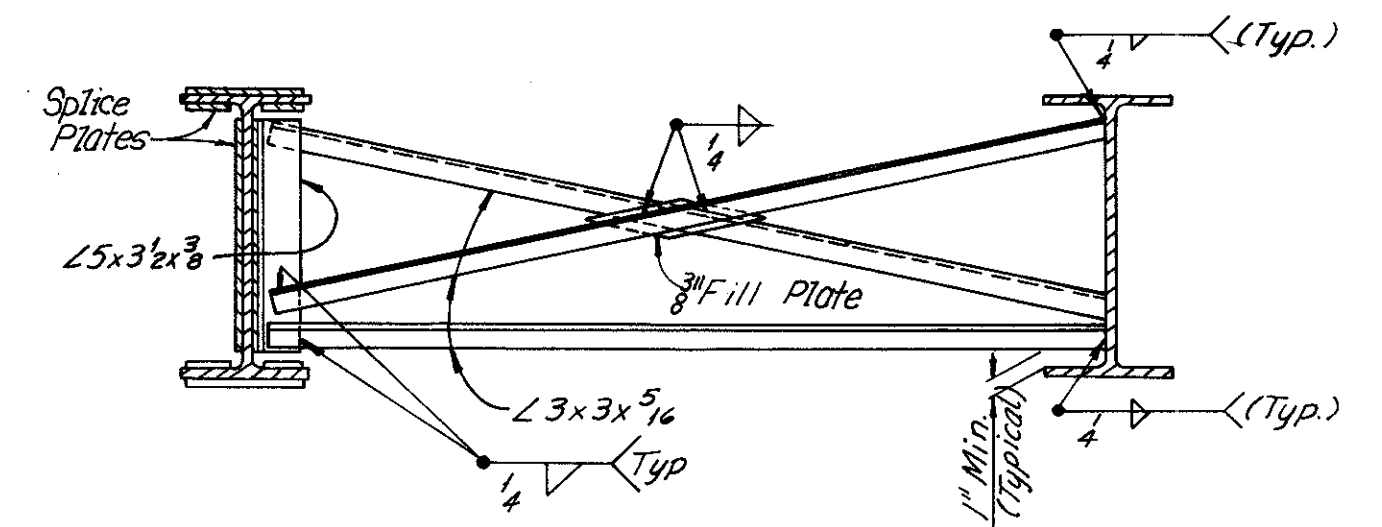


For additional end dam details see Standard Drawing SD-1-69, Sheet 1 of 4

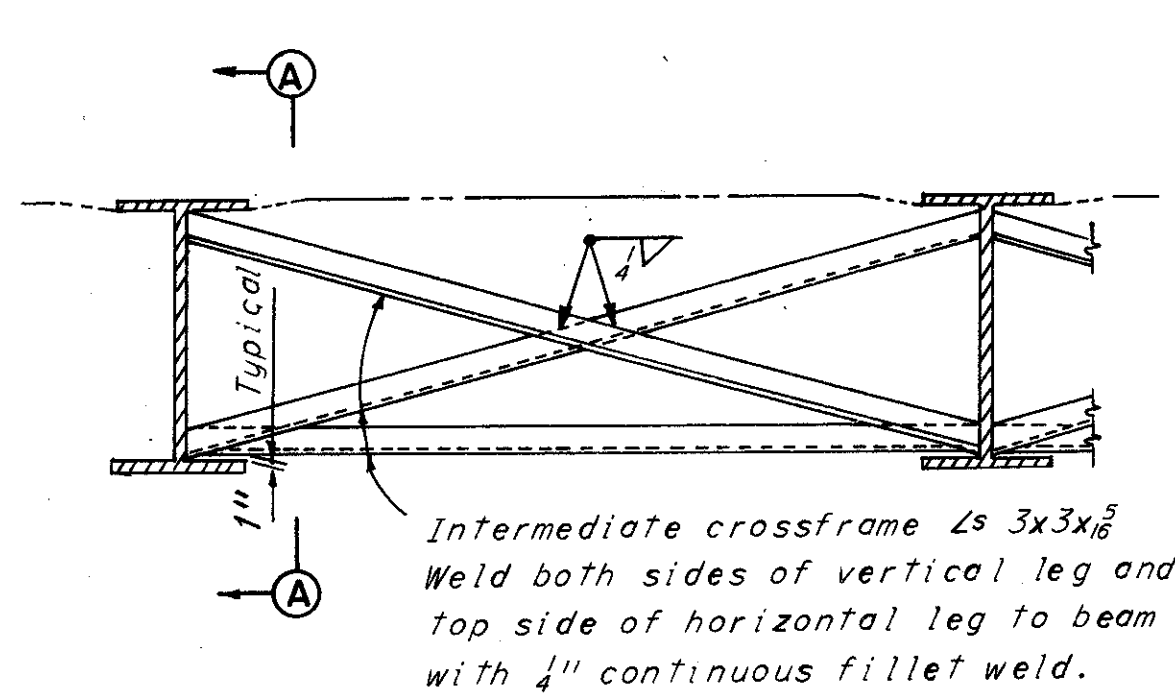
END DAM DETAILS



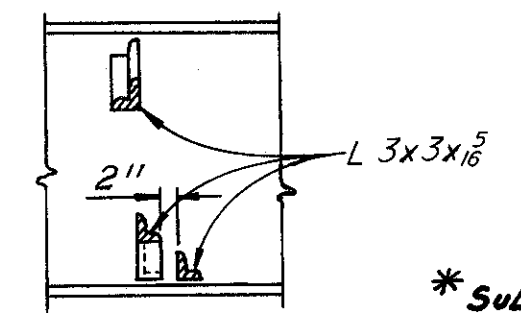
(For additional details see Ohio Standard Drawing SD-1-69, Sheet 4 of 4)



MODIFIED INTERMEDIATE CROSSFRAME



INTERMEDIATE CROSSFRAME



SECTION A-A

\* Subdrainage as per Sheet [CD2] shall not be provided on the ramp side of Type 8 Modified curb.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

FRAMING PLAN

I-80 AND RAMP B-OBS OVER BROADWAY (S.R. 14)

BR. NO. CUY-80-2154 STA. 1160+73.77  
CUYAHOGA COUNTY OHIO STA. 1162+58.23

DRAWN J.S.	TRACED MS	CHECKED L.J.G.	REVIEWED	REVISED
DATE 5/14/68	DATE 6-3-68	DATE 7-23-68	DATE	DATE

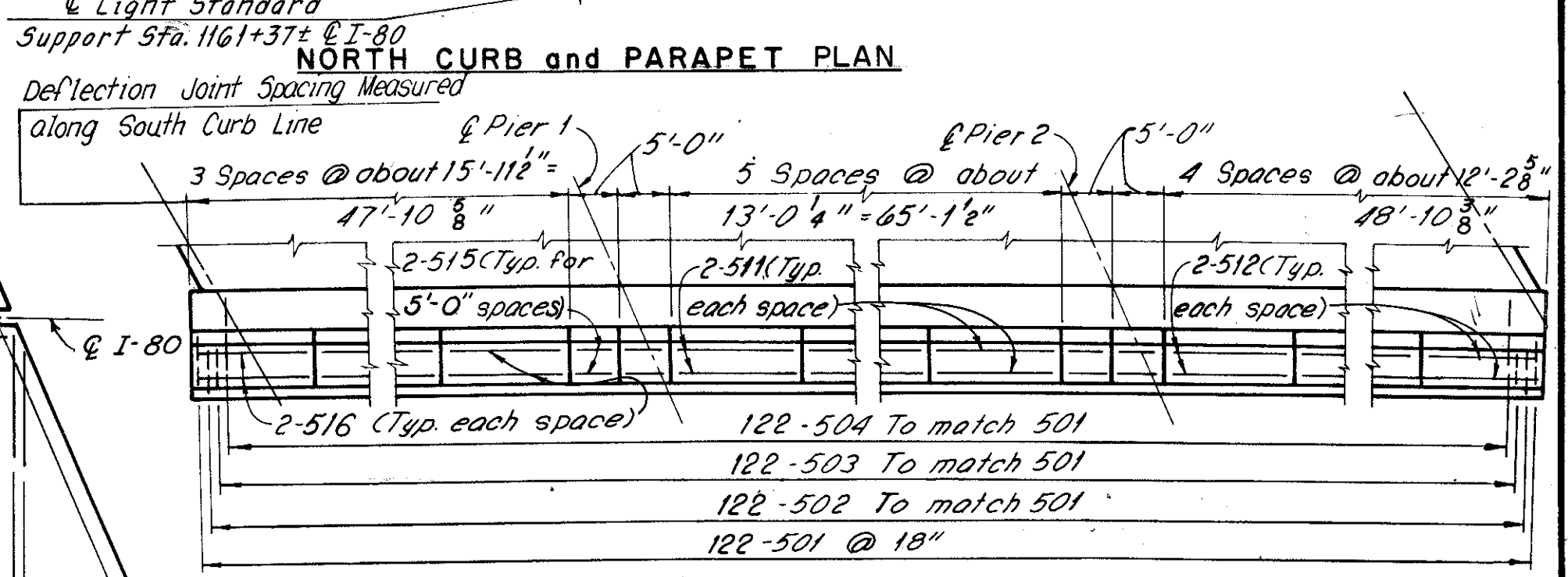
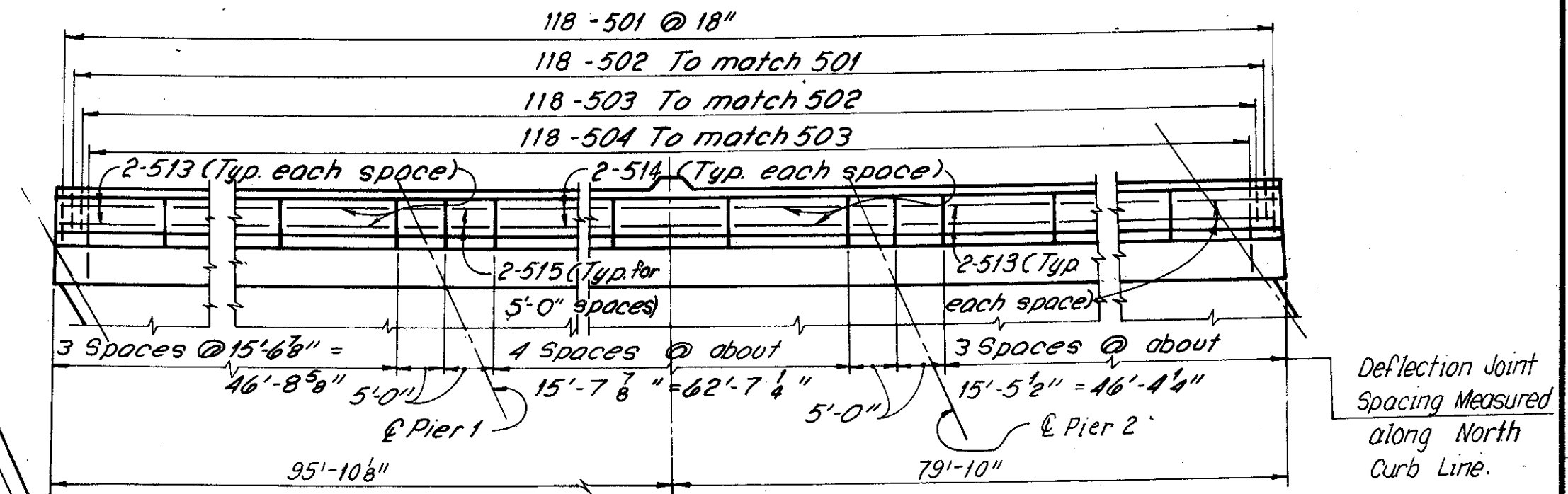
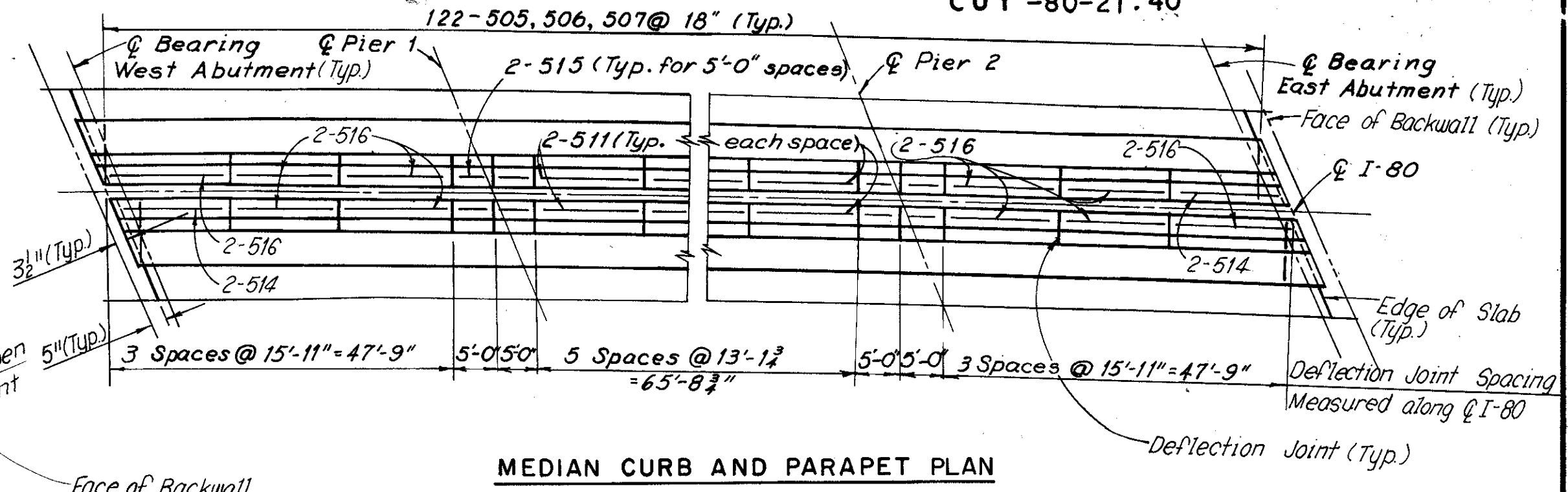
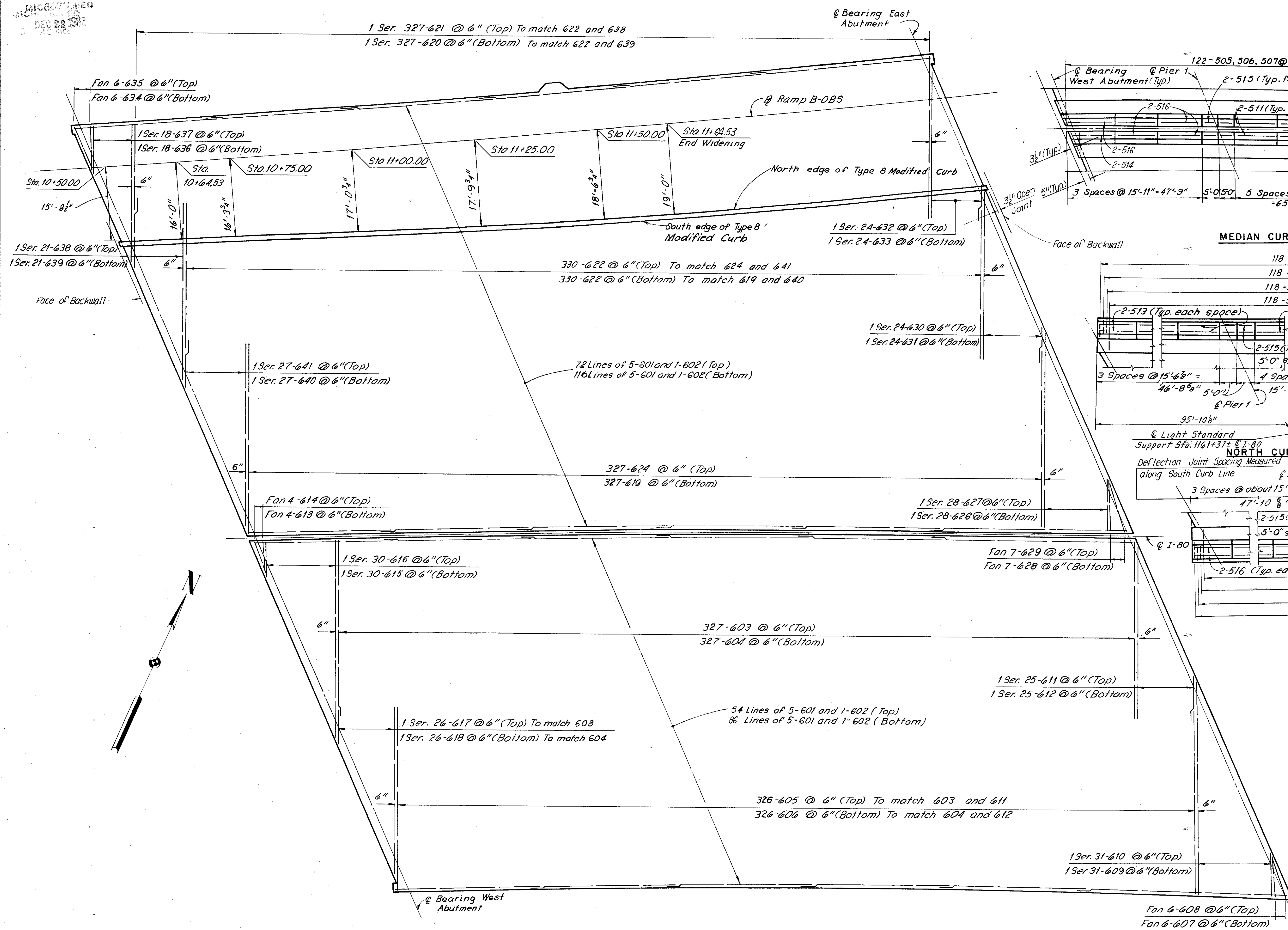


MICROFILMED  
DEC 22 1982

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

320  
390

CUYAHOGA COUNTY  
CUY-80-21.40



SOUTH CURB and PARAPET PLAN

Notes: The preformed expansion joint filler in the railing parapet deflection joints may be either 4" gray sponge rubber or 4" gray cellular polyvinyl chloride (PVC) sponge.  
The deflection joint extends from top of parapet to first construction joint and is included for payment with Superstructure Concrete.  
All transverse reinforcement North of open joint is placed perpendicular to Beam M and all transverse reinforcement South of open joint is placed perpendicular to Beam N, except for the fanned bars in the corners.  
All reinforcing bar marks shall be prefixed S.  
For longitudinal reinforcement placement and additional reinforcement over piers and in curbs see Sheet 15/17.  
For additional Notes see Sheet 12/17.  
For Light Standard Support Details see Sheet CD 1.

DECK PLAN

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**DECK PLAN**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
STA. 1160+58.23

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
JJS	AW	LJG		
DATE 3-11-68	DATE 4-12-68	DATE 8-5-68	DATE	DATE

SHEET 14/17

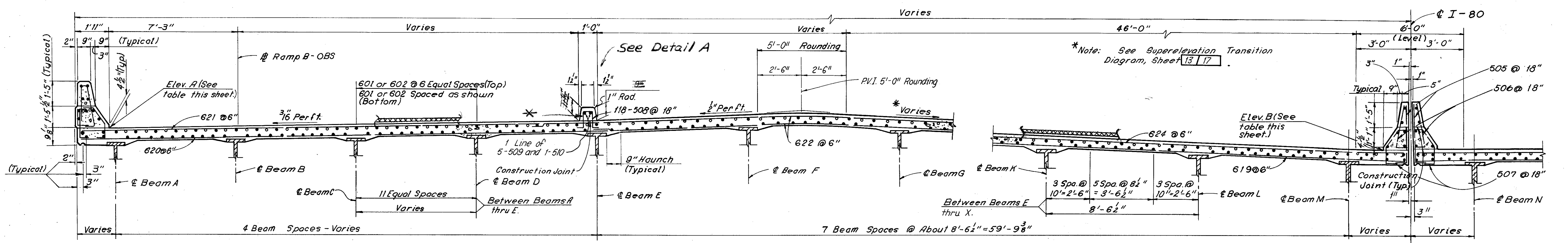
NOTES: \* Field bend reinforcing steel as required under type B modified curb.

\*\* When beams D or E fall under the Type B modified curb the elevation shown is to a horizontal line extending from the top of concrete slab at the curb line nearest the beam.

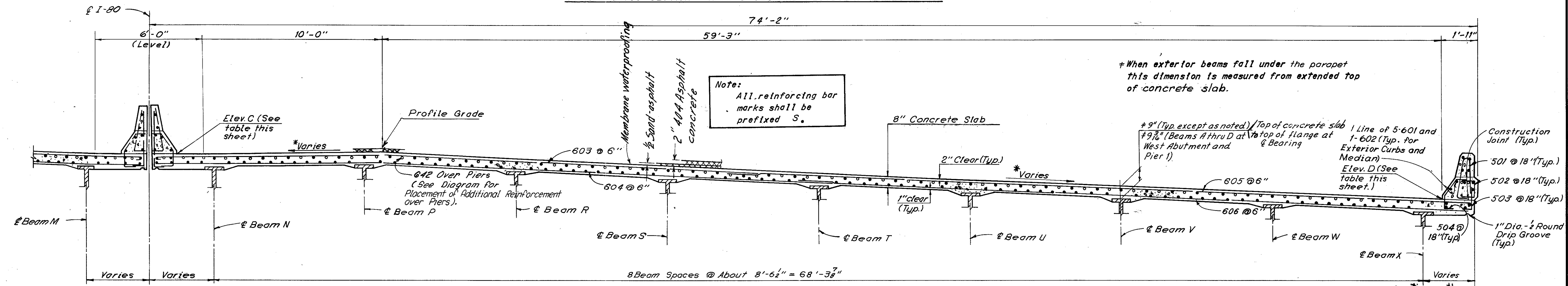
FED. RD. DIVISION	STATE	PROJECT	321
2	OHIO		390

CUYAHOGA COUNTY  
CUY-80-21.40

Note: A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.



TYPICAL CROSS SECTION - RAMP B-OBS AND WESTBOUND LANES I-80



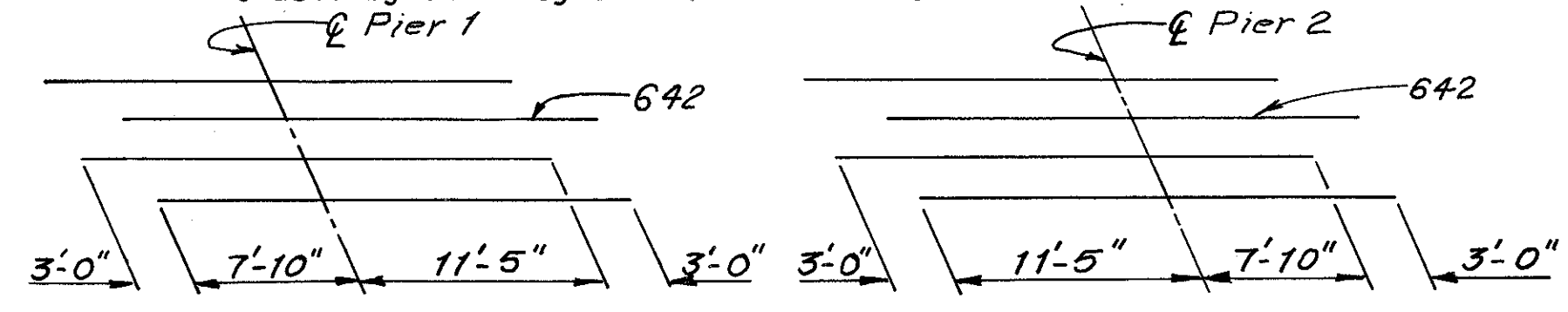
TYPICAL CROSS SECTION - EASTBOUND LANES I-80

Beam	TOP OF CONCRETE SLAB												
	Span 1				Span 2				Span 3				
€ Brg. W. Abut.	1/4 Point	1/2 Point	3/4 Point	€ Pier 1	1/4 Point	1/2 Point	3/4 Point	€ Pier 2	1/4 Point	1/2 Point	3/4 Point	€ Brg. E. Abut.	
A	879.31	879.04	878.77	878.49	878.20	877.78	877.34	876.89	876.44	876.12	875.80	875.51	875.25
B	879.35	879.08	878.81	878.53	878.25	877.82	877.39	876.95	876.49	876.18	875.87	875.58	875.33
C	879.39	879.13	878.85	878.58	878.29	877.87	877.44	877.00	876.55	876.24	875.93	875.66	875.42
D	879.43	879.17	878.90	878.62	878.34	877.92	877.49	877.05	876.61	876.30	876.00	875.74	875.50
E	879.47	879.21	878.94	878.67	878.38	877.97	877.54	877.12	876.79	876.52	876.24	875.92	875.57
F	879.67	879.40	879.13	878.87	878.61	878.23	877.85	877.46	877.07	876.80	876.51	876.18	875.82
G	879.72	879.42	879.13	878.83	878.53	878.11	877.68	877.26	876.83	876.55	876.24	875.90	875.54
H	879.48	879.16	878.84	878.53	878.21	877.75	877.30	876.85	876.39	876.09	875.75	875.40	875.03
J	879.22	878.89	878.55	878.21	877.87	877.39	876.90	876.42	875.94	875.61	875.26	874.90	874.52
K	878.96	878.60	878.24	877.89	877.53	877.01	876.50	875.99	875.48	875.13	874.76	874.39	874.01
L	878.68	878.30	877.92	877.54	877.16	876.61	876.08	875.54	875.01	874.64	874.26	873.88	873.49
M	878.23	877.85	877.48	877.08	876.70	876.25	875.63	875.09	874.55	874.15	873.76	873.37	872.98
N	878.09	877.72	877.35	876.99	876.63	876.10	875.57	875.03	874.48	874.08	873.69	873.29	872.89
P	878.28	877.90	877.52	877.13	876.75	876.19	875.63	875.07	874.50	874.10	873.71	873.31	872.91
R	878.08	877.66	877.24	876.82	876.39	875.79	875.19	874.59	874.00	873.60	873.21	872.82	872.44
S	877.76	877.32	876.88	876.44	875.99	875.36	874.72	874.10	873.49	873.09	872.69	872.31	871.92
T	877.43	876.97	876.51	876.04	875.58	874.91	874.25	873.60	872.98	872.57	872.18	871.79	871.41
U	877.09	876.61	876.13	875.64	875.15	874.46	873.77	873.09	872.47	872.06	871.67	871.28	870.89
V	876.75	876.24	875.74	875.23	874.72	873.99	873.27	872.58	871.95	871.54	871.15	870.76	870.38
W	876.38	875.86	875.33	874.80	874.27	873.51	872.76	872.06	871.43	871.03	870.64	870.25	869.86
X	876.01	875.47	874.92	874.36	873.81	873.02	872.24	871.53	870.91	870.51	870.12	869.73	869.35

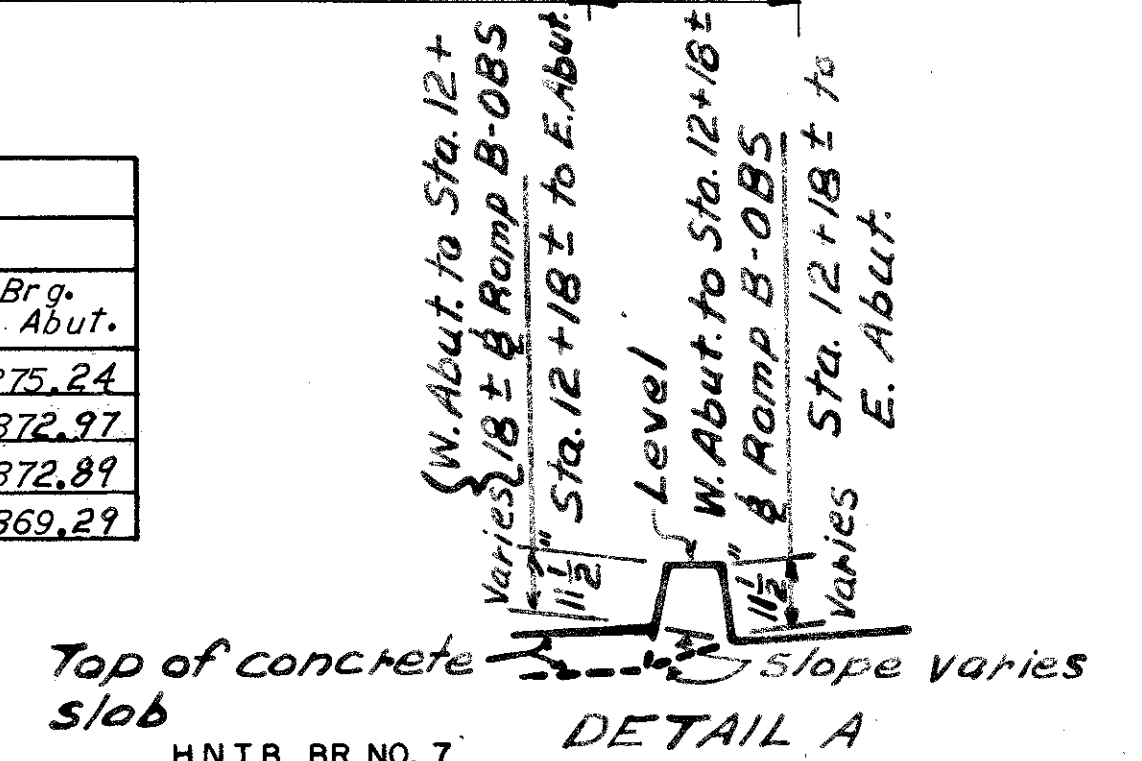
Note: When Beams A and X fall underneath the curb the elevation shown is to an extended top of concrete slab.

Elevation	FACE OF CURB ELEVATIONS AT TOP OF CONCRETE SLAB												
	Span 1				Span 2				Span 3				
€ Brg. Abut.	1/4 Point	1/2 Point	3/4 Point	€ Pier 1	Point	1/2 Point	3/4 Point	€ Pier 2	1/4 Point	1/2 Point	3/4 Point	€ Brg. Abut.	
A	879.31	879.05	878.78	878.49	878.20	877.80	877.37	876.92	876.44	876.19	875.81	875.52	875.24
B	878.15	877.80	877.44	877.06	876.68	876.18	875.67	875.12	874.55	874.16	873.77	873.39	872.97
C	878.08	877.73	877.36	876.98	876.62	876.11	875.60	875.04	874.41	874.08	873.69	873.30	872.89
D	875.98	875.46	874.92	874.37	873.83	873.07	872.30	871.58	870.93	870.51	870.12	869.71	869.29

Note: The elevations shown at the face of curb are those required before concrete is placed. Proper allowance has been made for the deadload deflections caused by the weight of the concrete.



PLACEMENT OF ADDITIONAL REINFORCEMENT OVER PIERS



H.N.T.B. BR. NO. 7  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**TYPICAL CROSS SECTION**  
I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
STA. 1162+58.23

CUYAHOGA COUNTY OHIO

DRAWN T.J.S.	TRACED M.S.	CHECKED J.G.	REVIEWED	REVISED 12-27-74
DATE 3-13-68	DATE 4-11-68	DATE 5-8-68	DATE	SHEET 15/17

MARK	NO.	LENGTH	TYPE	SER INCR	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER INCR	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER INCR	WEIGHT (LBS.)	
WEST ABUTMENT																		
						AW801	1 Ser. 4	29'-3"	Str.	8"	323	AE632	58	101'-2"	104		886	
						AW802	2 Ser. 3	30'-6"	Str.	9"	501	AE633	2 Ser. 27	8'-8"	104	3"	771	
AW401	147	31'-5"	105		336	AW803	1 Ser. 4	26'-10"	Str.	8"	297	AE634	18	91'-8"	104		261	
						AW804	34	301'-0"	Str.		2,723	AE635	44	91'-2"	104		606	
AW501	128	7'-2"	105		957	AW805	2	231'-6"	149		125	AE636	2	91'-8"	104		29	
AW502	68	301'-0"	Str.		2,128	AW806	4	51'-9"	Str.		61	AE637	16	91'-10"	104		236	
AW503	1	251'-0"	Str.		26	AW807	6	61'-0"	Str.		96	AE638	2 Ser. 31	7'-5"	91'-6"	104	18"	784
AW504	18	131'-6"	Str.		253	AW808	2	241'-9"	158		132	AE701	2	41'-10"	101		16	
AW505	1	191'-6"	Str.		20	AW809	4	51'-10"	104		62	AE702	2	41'-10"	162		20	
AW506	1	31'-0"	Str.		32	AW810	4	71'-3"	Str.		77	AE703	2	41'-11"	162		21	
AW507	3	91'-0"	Str.		28	AW811	2	51'-6"	Str.		29	AE704	2	51'-0"	162		21	
AW508	14	151'-0"	Str.		219	AW812	4	71'-8"	108		82	AE705	2	51'-7"	162		23	
AW509	8	141'-6"	Str.		121	AW813	72	51'-9"	165		1,105	AE706	2	51'-10"	162		24	
AW510	4	171'-3"	Str.		72			TOTAL WEIGHT			22,991							
AW511	1 Ser. 3	151'-0"	Str.	3"	48	EAST ABUTMENT						AE801	36	301'-0"	Str.		2,884	
AW512	6	171'-0"	Str.		106							AE802	4	261'-9"	Str.		286	
AW513	1	281'-3"	Str.		29							AE803	2	281'-6"	Str.		152	
AW514	1 Ser. 3	161'-0"	Str.	6"	52	AE401	147	31'-5"	105		336	AE804	4	191'-0"	Str.		203	
AW515	1	191'-3"	Str.		20	AE501	77	301'-0"	Str.		2,409	AE805	2	251'-5"	Str.		136	
AW516	17	111'-0"	Str.		195	AE502	3	131'-9"	Str.		43	AE806	1 Ser. 4	71'-6"	101'-0"	Str.	10"	93
AW517	1	121'-6"	Str.		13	AE503	17	121'-9"	Str.		226	AE807	8	61'-1"	104		130	
AW518	4	161'-0"	Str.		67	AE504	19	151'-6"	Str.		307	AE808	4	81'-0"	Str.		85	
AW519	22	21'-0"	105		46	AE505	2	171'-0"	Str.		35	AE809	2	281'-10"	159		154	
AW520	12	51'-11"	161		74	AE506	2	141'-3"	Str.		30	AE810	1 Ser. 4	61'-0"	81'-6"	Str.	10"	77
AW521	20	21'-9"	Str.		57	AE507	2	221'-9"	Str.		47	AE811	4	71'-5"	108		79	
AW522	10	31'-9"	Str.		39	AE508	4	61'-9"	Str.		28	AE812	4	71'-5"	108		79	
AW523	2	51'-0"	Str.		10	AE509	9	91'-0"	Str.		84	AE813	2 Ser. 3	29'-6"	301'-9"	Str.	7 1/2"	483
AW524	1	71'-6"	Str.		8	AE510	5	41'-6"	Str.		23	AE814	4	171'-3"	Str.		184	
AW525	8	141'-6"	Str.		121	AE511	19	271'-0"	Str.		535	AE815	77	51'-9"	165		1,182	
AW526	2	81'-6"	Str.		18	AE512	1	111'-0"	Str.		11			TOTAL WEIGHT		25,332		
AW527	5	71'-3"	Str.		38	AE513	1	231'-0"	Str.		24							
AW528	5	91'-3"	Str.		48	AE514	10	131'-3"	Str.		138							
AW529	2	41'-6"	Str.		19	AE515	3	141'-6"	Str.		45							
AW530	1	81'-9"	Str.		9	AE516	19	161'-3"	Str.		322							
AW531	6	101'-9"	Str.		67	AE517	2	31'-9"	Str.		8							
AW532	2	51'-3"	Str.		11	AE518	8	151'-0"	Str.		125							
AW533	2	51'-6"	141		13	AE519	1	121'-3"	Str.		13							
AW534	2	61'-1"	140		13	AE520	129	71'-2"	105		964							
AW601	125	171'-3"	109		3,239	AE521	2	51'-6"	141		11							
AW602	5	61'-0"	Str.		45	AE522	2	61'-3"	140		13							
AW603	8	111'-3"	109		135	AE523	20	21'-9"	Str.		57							
AW604	1	171'-7"	109		26	AE524	21	21'-0"	105		44							
AW605	2 Ser. 30	71'-2"	104	9 1/16"	710	AE525	11	51'-11"	161		68							
AW606	2	201'-3"	109		61	AE526	8	41'-0"	Str.		33							
AW607	55	151'-7"	109		1,287	AE527	6	111'-9"	Str.		74							
AW608	74	91'-5"	104		1,047	AE528	4	71'-3"	Str.		30							
AW609	107	161'-4"	112		2,625	AE529	1	81'-9"	Str.		9							
AW610	1	161'-3"	109		24	AE601	119	171'-3"	109		3,083							
AW611	1	191'-9"	109		30	AE602	2	181'-11"	109		57							
AW612	6	41'-4"	162		39	AE603	4	201'-7"	109		124							
AW613	3	101'-4"	162		47	AE604	1	281'-11"	109		40							
AW614	1	51'-11"	162		9	AE605	4	111'-3"	109		68							
AW615	3	141'-6"	Str.		65	AE606	1	171'-7"	109		26							
AW616	3	121'-3"	Str.		55	AE607	1	141'-9"	109		22							
AW617	2	81'-0"	Str.		24	AE608	1	271'-7"	109		41							
AW618	2	71'-10"	108		8	AE609	1	91'-8"	104		14							
AW619	1	51'-4"	162		8	AE610	20	151'-7"	109		468							
AW620	3	181'-10"	157		85	AE611	20	161'-5"	112		493							
AW621	28	51'-10"	104		245	AE612	54	161'-1"	109		1,304							
AW622	3	71'-6"	Str.		34	AE613	39	161'-11"	112		991							
AW623	3	151'-0"	Str.		68	AE614	2	31'-6"	Str.		11							
AW624	3	131'-3"	Str.		60	AE615	53	171'-5"	112		1,387							
AW625	2	91'-0"	Str.		27	AE616	1 Ser. 4	111'-7"	109	110"	79							
AW626	3	121'-3"	162		55	AE617	6	121'-9"	Str.		115							
AW627	8	41'-11"	162		60	AE618	3	81'-0"	Str.		36							
AW628	2	71'-9"	108		23	AE619	1	61'-6"	Str.		10							
AW629	5	191'-11"	158		150	AE620	5	181'-3"	157		137							
AW630	4	51'-6"	Str.		33	AE621	29	51'-10"	104		254							
AW631	4	91'-3"	Str.		56	AE622	4	101'-3"	Str.		62							
AW632	2 Ser. 33	81'-7"	91'-5"	104	892	AE623	4	51'-7"	108		34							
AW633	2 Ser. 28	71'-11"	91'-2"	104	718	AE624	3	151'-0"	Str.		68							
AW634	2	61'-6"	Str.		20	AE625	8	41'-4"	162		52							
AW635	2	41'-2"	141		13	AE626	1	81'-9"	Str.		13							
AW636	2	71'-0"	Str.		8	AE627	8	71'-6"	Str.		90							
AW637	1	51'-5"	162		8	AE628	4	221'-11"	159		138							
AW638	1	61'-0"	162		9	AE629	4	101'-4"	162		62							
						AE630	5	51'-9"	Str.		43							
						AE631	2	41'-2"	141		13							

NOTED  
 104  
 105

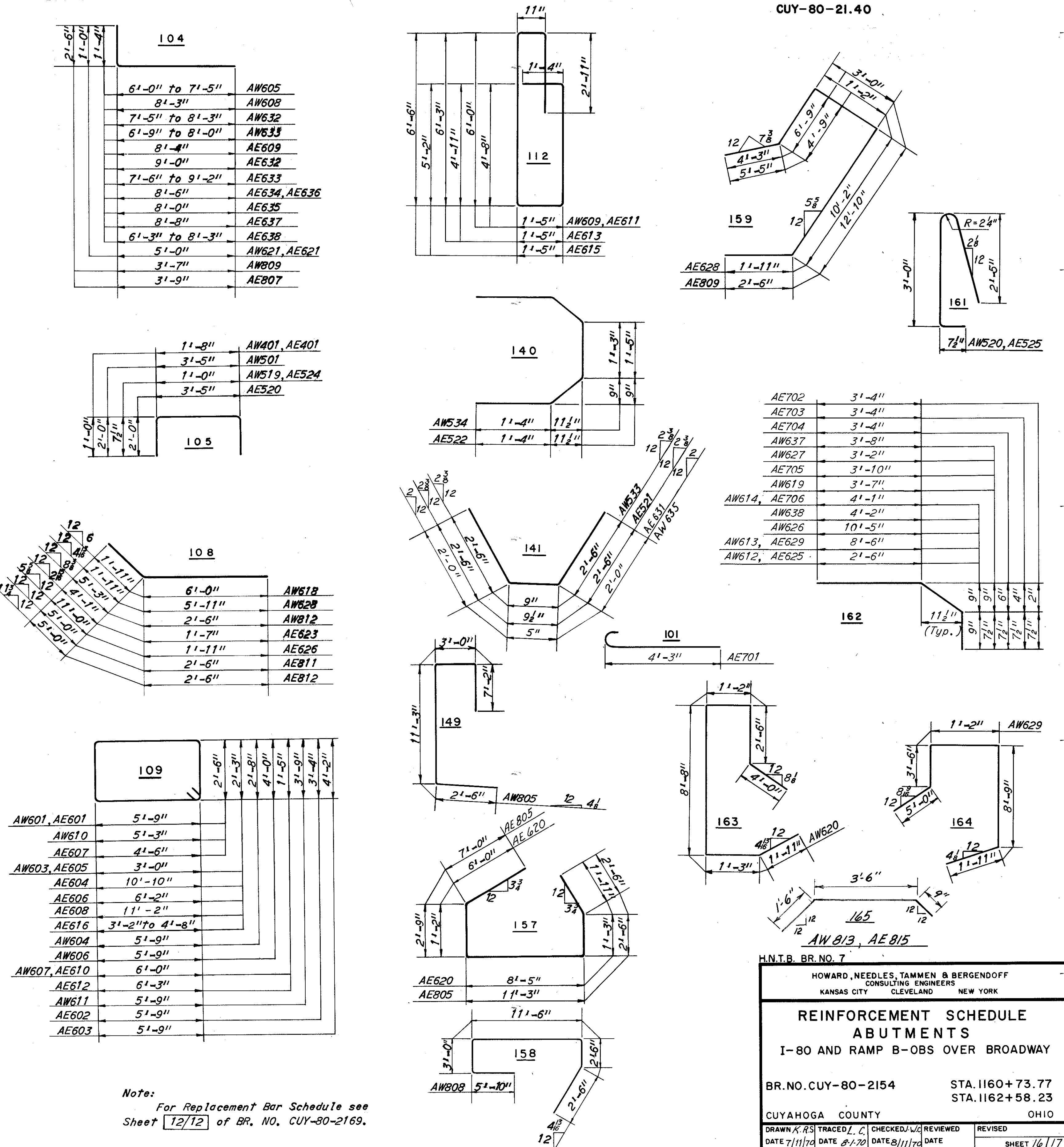
BENDING DIAGRAMS

Quantity Calculations  
 Made By KRS Date 7-70  
 Checked By JWC Date 8-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

322  
 390

CUYAHOGA COUNTY  
 CUY-80-21.40



Note:  
 For Replacement Bar Schedule see  
 Sheet 12/12 of BR. NO. CUY-80-2169.

H.N.T.B. BR. NO. 7

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

**REINFORCEMENT SCHEDULE  
 ABUTMENTS**  
 I-80 AND RAMP B-OBS OVER BROADWAY

BR. NO. CUY-80-2154 STA. 1160+73.77  
 STA. 1162+58.23

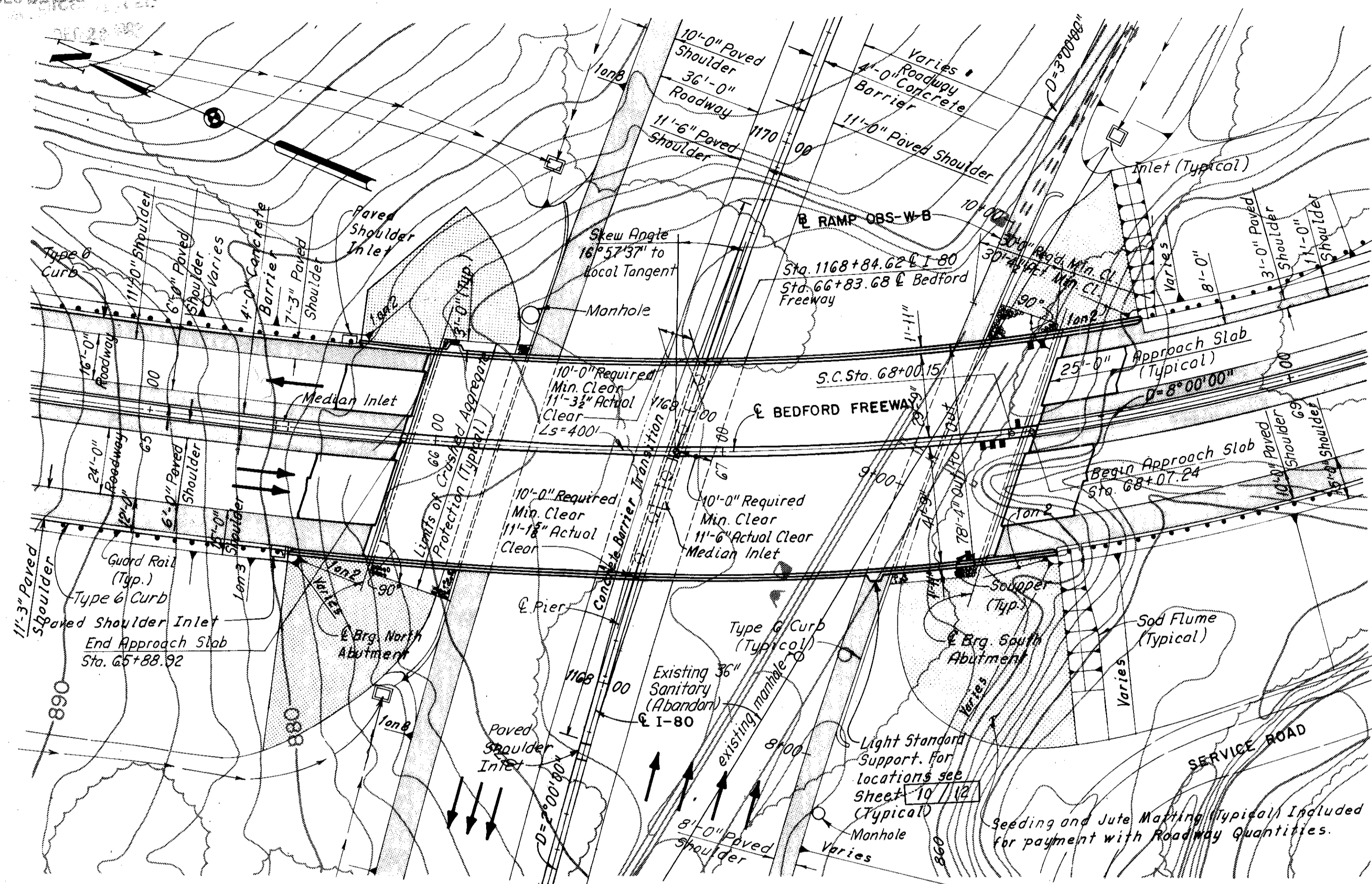
CUYAHOGA COUNTY OHIO

DRAWN KRS	TRACED L.C.	CHECKED WJC	REVIEWED	REVISED
DATE 7/11/70	DATE 8/1/70	DATE 8/11/70	DATE	



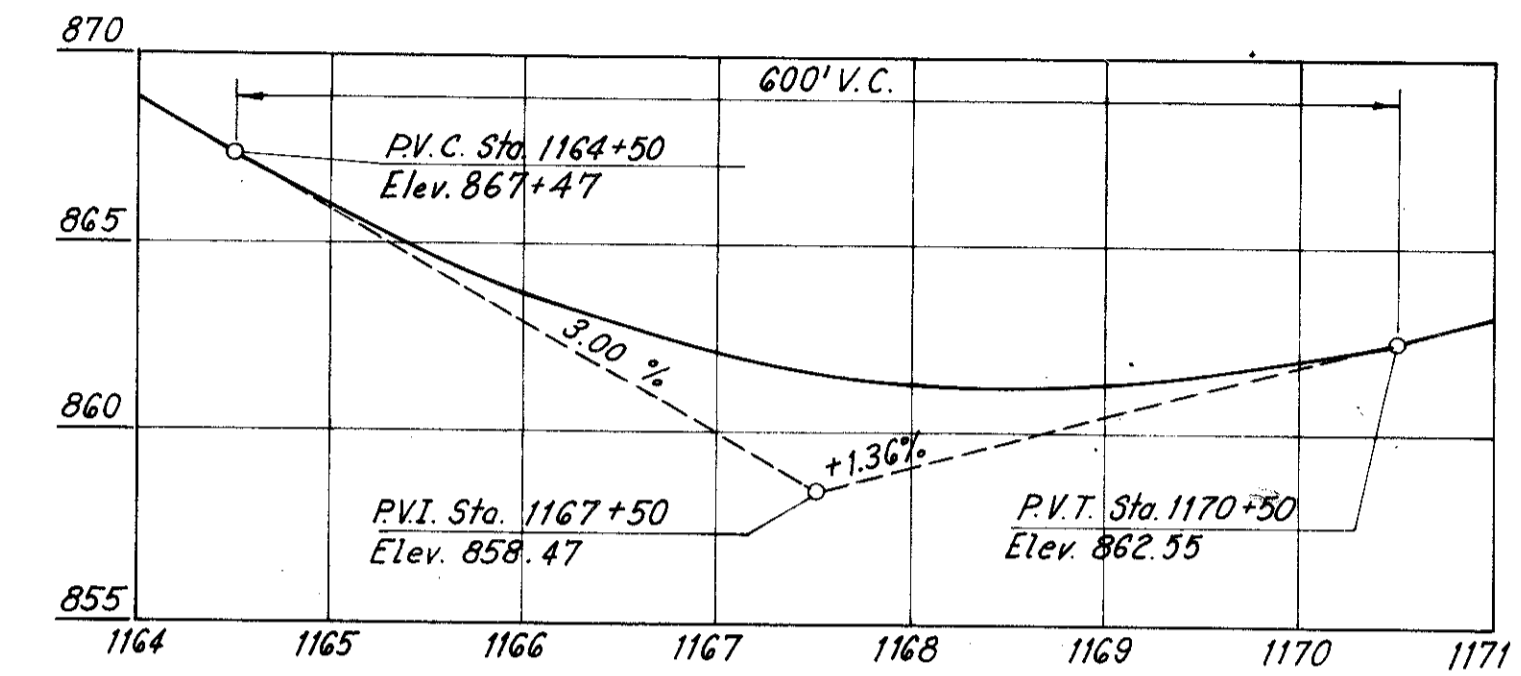


CUYAHOGA COUNTY  
CUY-80-21.40

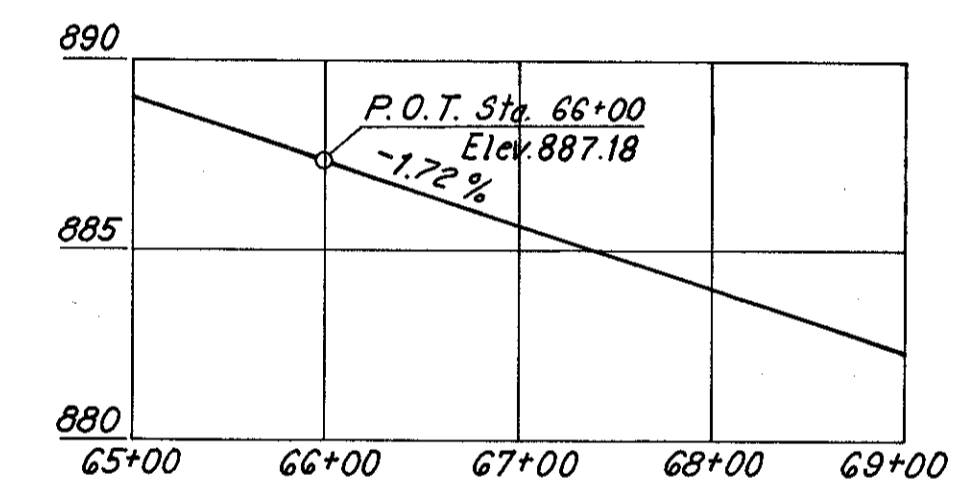


**PLAN**  
Scale: 1"=30'

Note: Earthwork limits shown are schematic. Actual slopes shall conform to plan cross-sections.



**PROFILE I-80**  
Scale: Horiz. 1"=100'  
Vert. 1"=5'



**PROFILE-BEDFORD FREEWAY**  
Scale: Horiz. 1"=100'  
Vert. 1"=5'

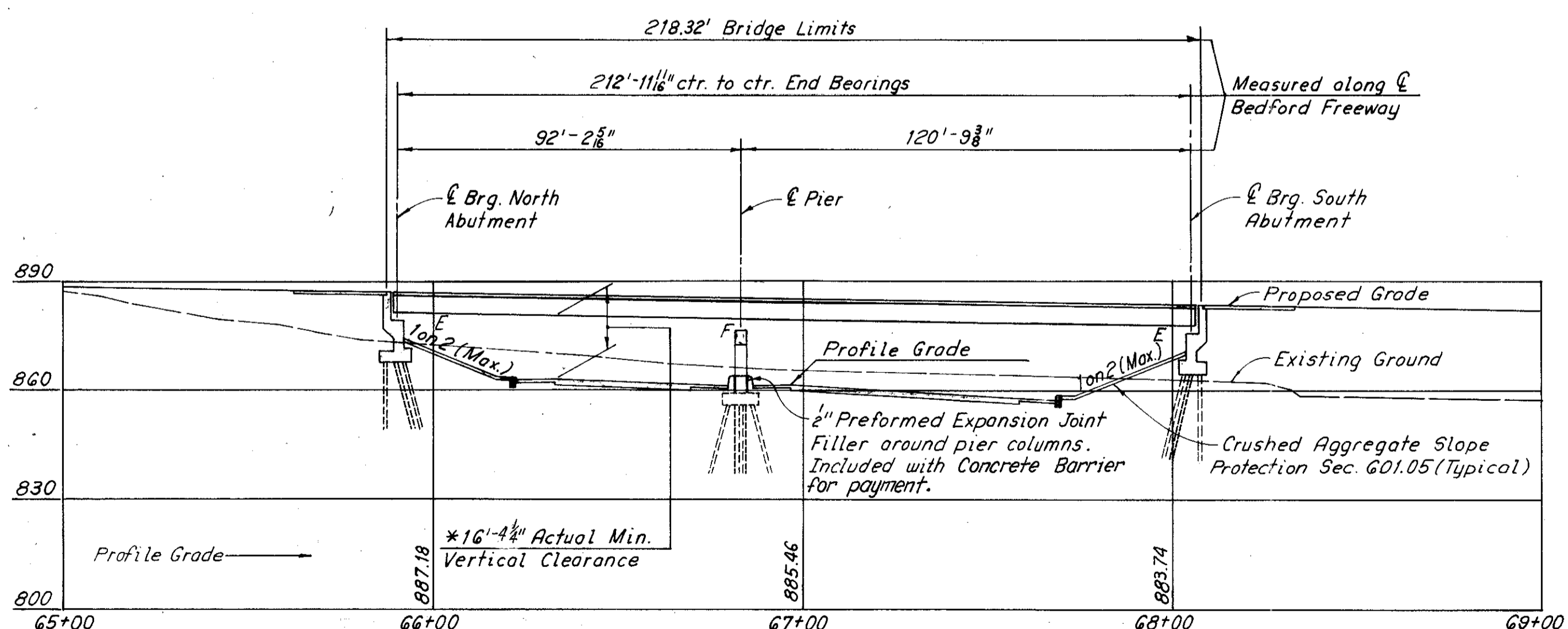
**PROPOSED STRUCTURE**  
TYPE: Continuous steel girder with reinforced concrete deck and substructure.  
SPANS: 92'-2 3/8", 120'-9 3/8"  
ROADWAY: 76'-0" face to face of parapet with Concrete Barrier  
LOADING: HS20-44  
SKEW: 16°57'37" Left. Forward to Local Tangent  
WEARING SURFACE: 1 1/2" Asphalt Concrete  
APPROACH SLABS: AS-1-67 (25 feet long)  
ALIGNMENT: Spiral  
SUPERELEVATION: Varies .0156 ft. per ft. to .083 ft. per ft.

**TRAFFIC DATA**  
1991 26,854 A.D.T.  
1,800 D.D.H.V.

**Notes:**  
Roadway excavation in cut sections shall be completed and embankments shall be placed and compacted to the finish spill-thru slopes and to the level of the subgrades for a minimum distance of 200 feet back of the South Abutment and to the limits of the embankment behind the North Abutment before excavating and driving piles for the abutments.  
Roadway excavation shall be completed to the level of the subgrade before excavating and driving piles for the pier.  
All piles are HP 12x53. The piles at the abutments shall be driven to a minimum bearing capacity of 35 tons per pile and the piles at the pier shall be driven to a minimum bearing capacity of 40 tons per pile.  
The estimated average pay lengths of the piles are as follows:

- North Abutment - 20 feet
- Pier - 20 feet
- South Abutment - 25 feet

For underpass lighting details see Lighting Plans.



**ELEVATION**  
Scale: Horiz. 1"=30'  
Vert. 1"=30'

\* Note:  
16'-4" Required minimum vertical clearance. Minimum vertical clearance occurs at the north edge of pavement of the westbound lanes of I-80 and the outside edge of the east exterior girder of Bridge No. 8.

CURVE DATA		
<b>☐ I-80</b>	<b>☐ BEDFORD FREEWAY</b>	<b>☐ RAMP OBS-W-B</b>
P. I. Sta. 1168+27.47	P. I. Sta. 71+52.03	P. I. Sta. 9+19.68
Δ = 28°52'52"	Δ = 52°19'53"	Δ = 14°38'42"
Dc = 2°00'00" Right	Dc = 8°00'00" Left	D = 3°00'00" Right
Lc = 1194.05'	Lc = 654.14'	R = 1909.86'
Ts = 862.94'	T.S. = Sta. 64+00.15	T = 245.42'
Θs = 2°30'00"	Θs = 16°00'00"	L = 488.17'
Ls = 250.00'	Ls = 400.00'	E = 15.70'
Es = 94.40'	Es = 81.77'	

H.N.T.B. BR. NO. 8  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SITE PLAN**  
I-80 UNDER BEDFORD FREEWAY  
BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24  
CUYAHOGA COUNTY OHIO  
DRAWN/LEE TRACED/DLN CHECKED/MLL REVIEWED/MLL  
DATE 7-27-67 DATE 7-28-67 DATE 5-22-69 DATE  
SHEET 1 / 12

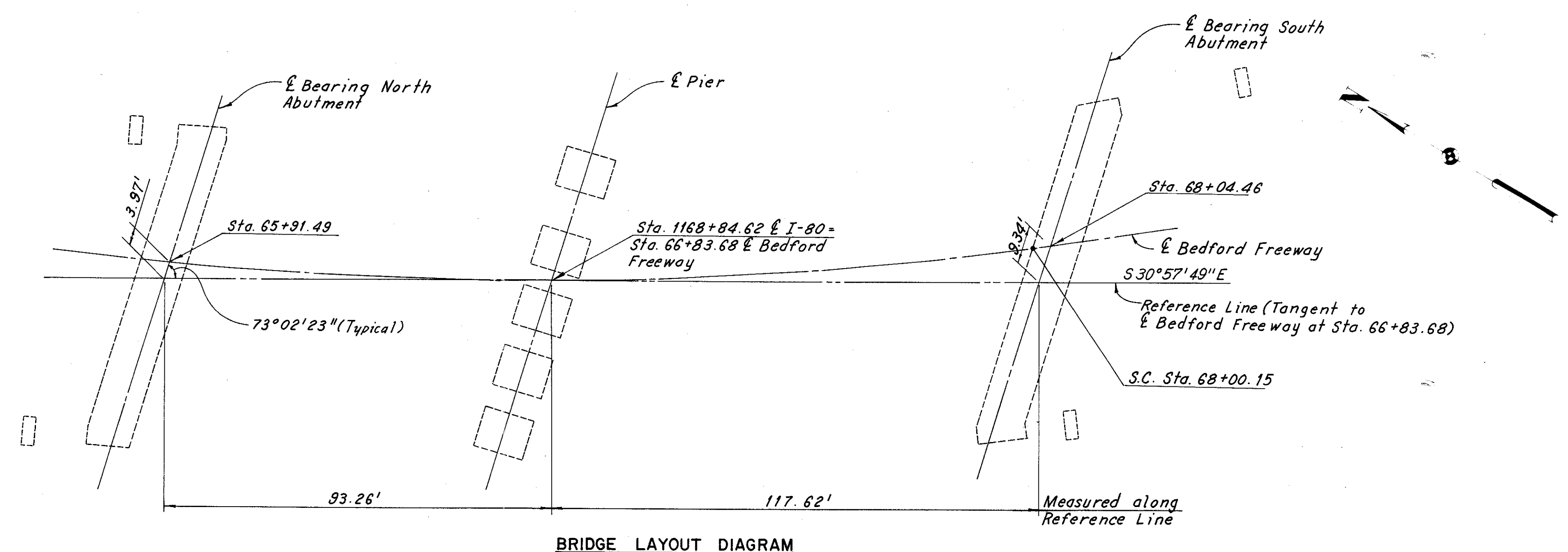
L-0

U-7

DEC 22 1969  
 DEC 22 1969

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY  
 CUY-80-21.40  
 Quantity Calculations  
 Made By K.Y.H. Date 5-22-69  
 Checked By M.C.B. Date 6-19-70



BRIDGE LAYOUT DIAGRAM

ESTIMATED QUANTITIES							
ITEM	TOTAL	UNIT	DESCRIPTION	CUY-80-2169 H.N.T.B. BRIDGE NO. 8			GENERAL
				ABUTMENTS	PIERS	SUPER-STRUCTURE	
503	1011	Cu. Yd.	Unclassified Excavation	756	255		
505	Lump	Lump	Test Pile				Lump
503	Lump		Cofferdams, cribs & sheeting				Lump
507	3430	Lin. Ft.	Steel Piles, HP 12 x 53	2,310	1,120		
509	235,378	Pounds	Reinforcing Steel	40,751	30,905	163,722	
511	517	Cu. Yd.	Class "C" Concrete, Superstructure				517
511	61	Cu. Yd.	Class "C" Concrete, Pier Caps and Columns		61		
511	328	Cu. Yd.	Class "C" Concrete Abutments Above Footings	328			
511	301	Cu. Yd.	Class "C" Concrete, Footings	223	78		
512	45	Lin. Ft.	Premolded Sealing Strip	45			
513	693,300	Pounds	Structural Steel			693,300	
514	693,300	Pounds	Field Painting of Structural Steel			693,300	
516	110	Sq. Ft.	1" Prefomed Expansion Joint Filler	110			
518	231	Cu. Yd.	Porous Backfill		231		
518	115	Lin. Ft.	6" Helical C.M.P. (Section 707.01) Non-Perforated*		115		
518	146	Lin. Ft.	6" Perforated, Helical C.M.P. (Section 707.01)		146		
518	70	Lin. Ft.	8" Perforated C.M.P., Including Specials (70% of)		70		
518	148	Each	Subdrainage for wearing surface, as per plan			148	
518	7	Each	Scuppers, Including Supports			7	
601	477	Sq. Yd.	Crushed Aggregate Slope Protection				477
808	517	Units	Chemical Admixture for Concrete Type AB or D			517	
404	48	Cu. Yd.	Asphalt Concrete (70-85 or AC-20)			48	
Special	24	Cu. Yd.	Sand-asphalt (see proposal note)			24	
Special	1740	Sq. Yd.	Membrane Waterproofing, sheet type (see proposal note)			1740	

\*Including specials

H.N.T.B. BR. NO. 8

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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BRIDGE LAYOUT DIAGRAM  
 AND ESTIMATED QUANTITIES

I-80 UNDER BEDFORD FREEWAY

BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24

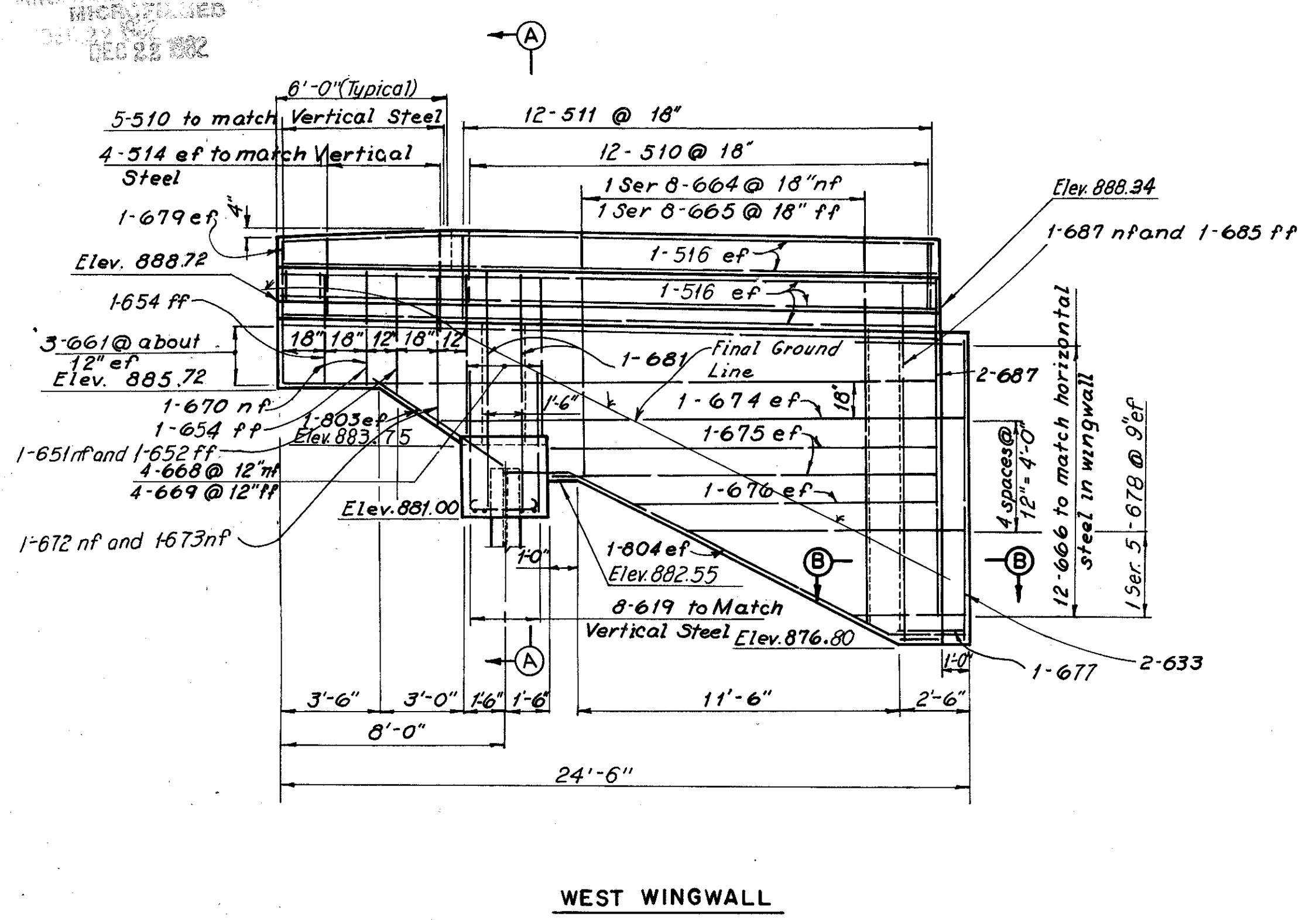
CUYAHOGA COUNTY OHIO

DRAWN BY: Y.H.	TRACED BY: J.S.C.	CHECKED BY: M.C.B.	REVIEWED BY:	REVISED BY:
DATE: 5-22-69	DATE: 6-1-70	DATE: 6-19-70	DATE:	DATE:

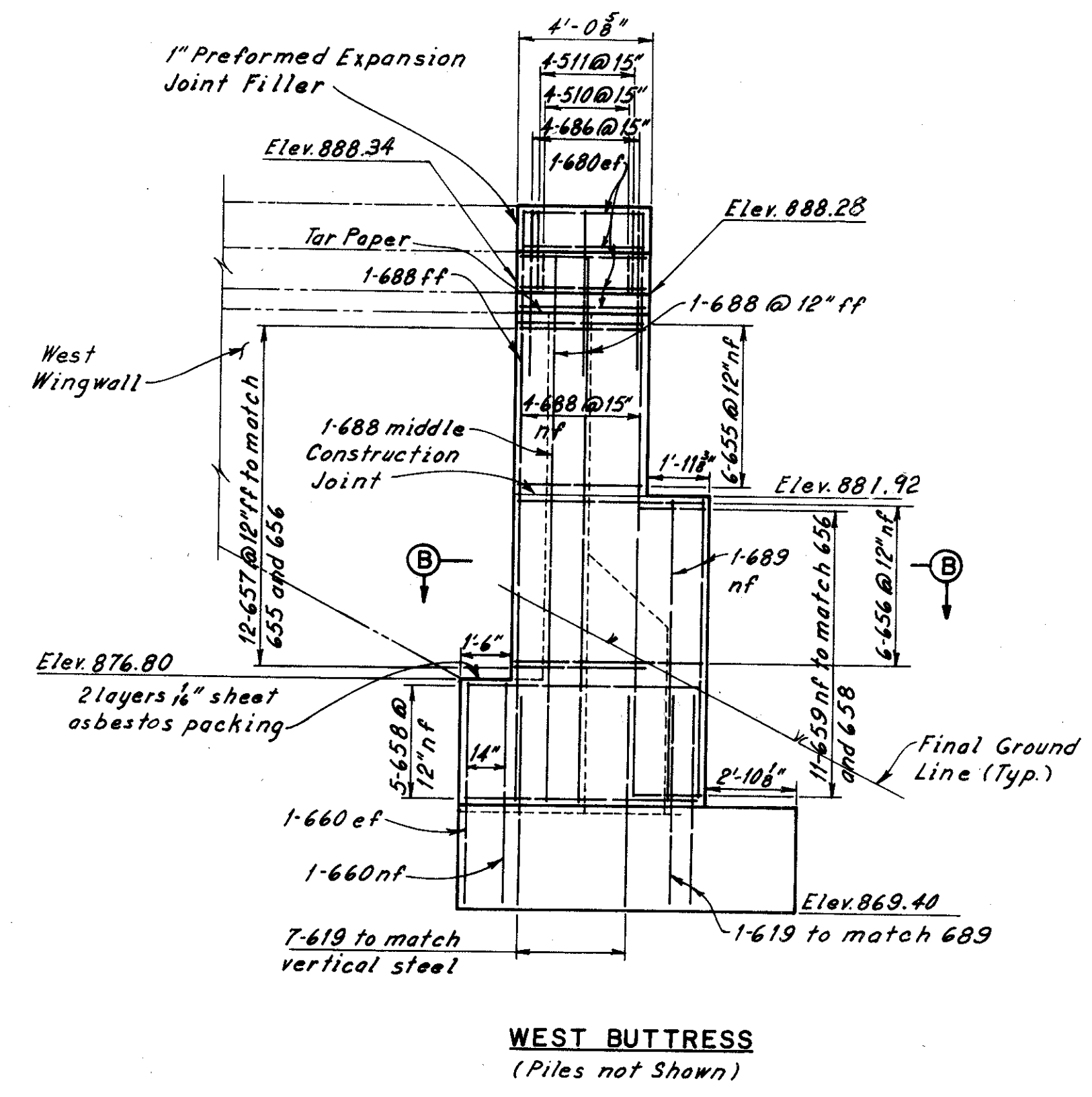
SHEET 2/12



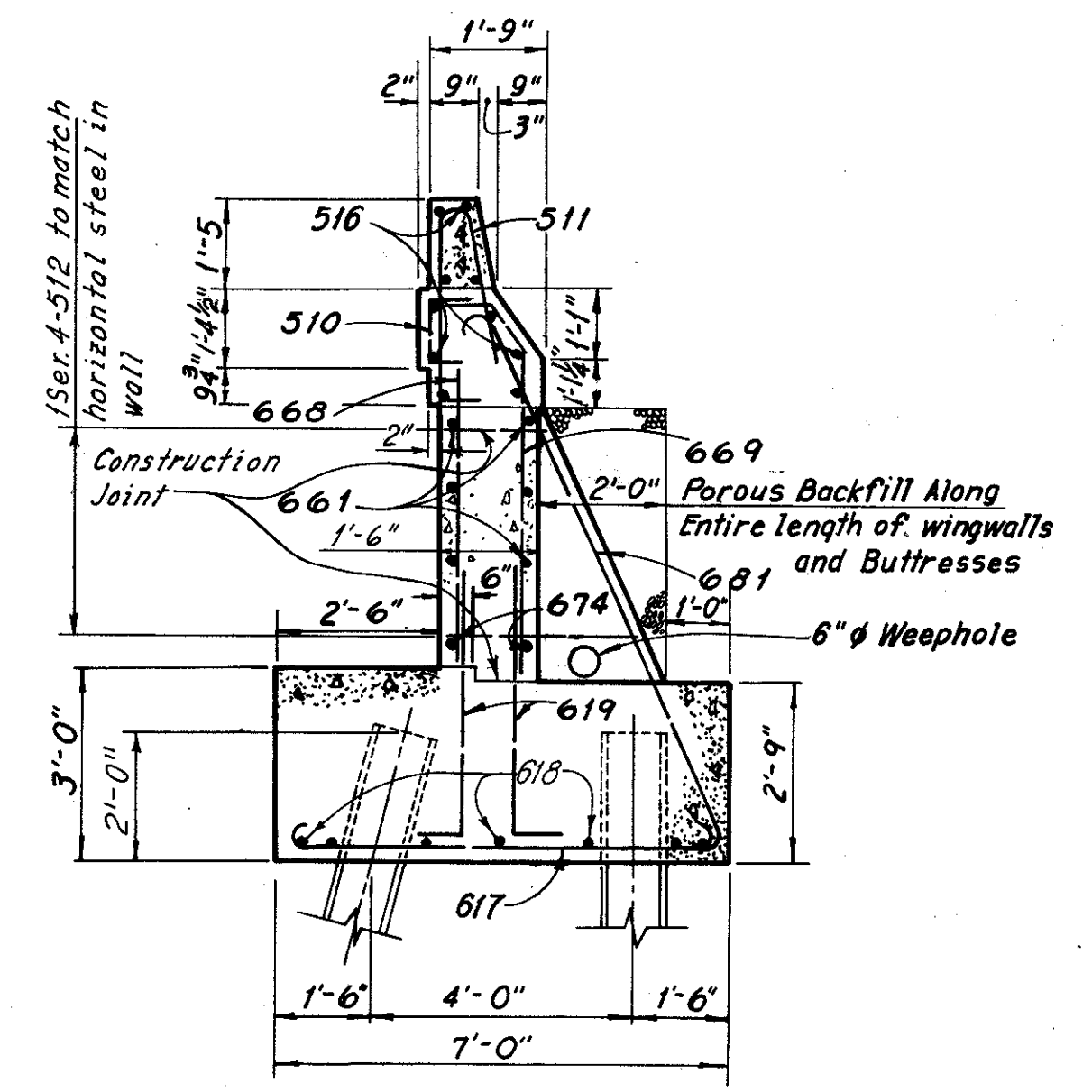
CUYAHOGA COUNTY  
CUY-80-21.40



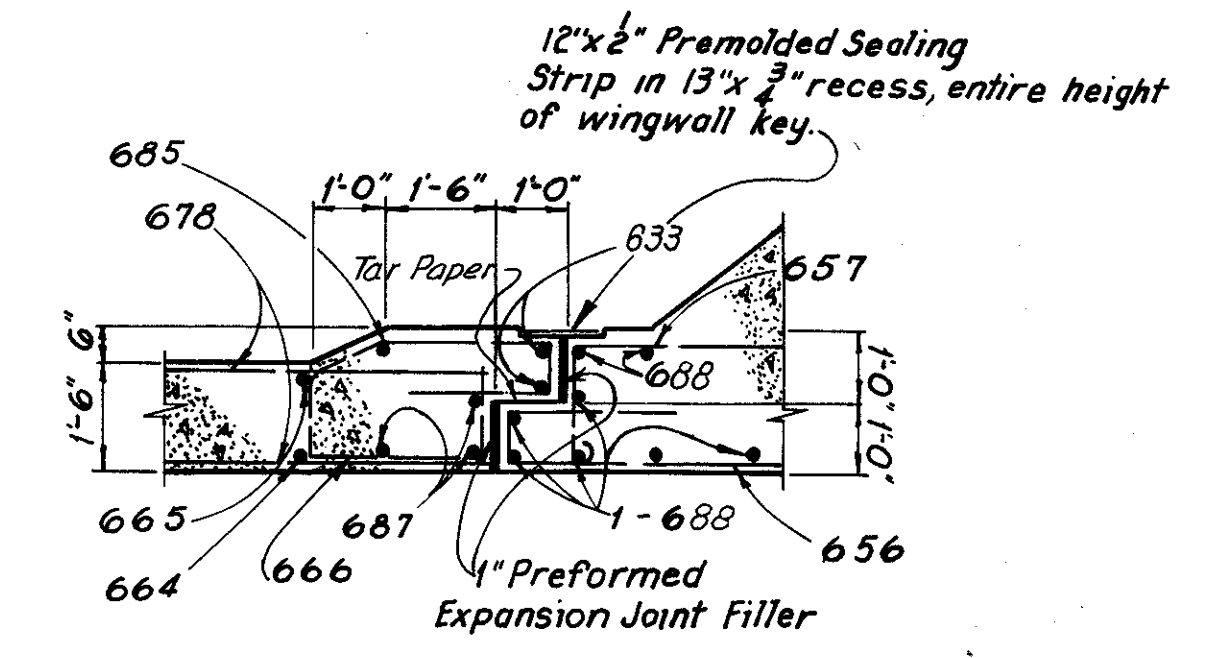
**WEST WINGWALL**



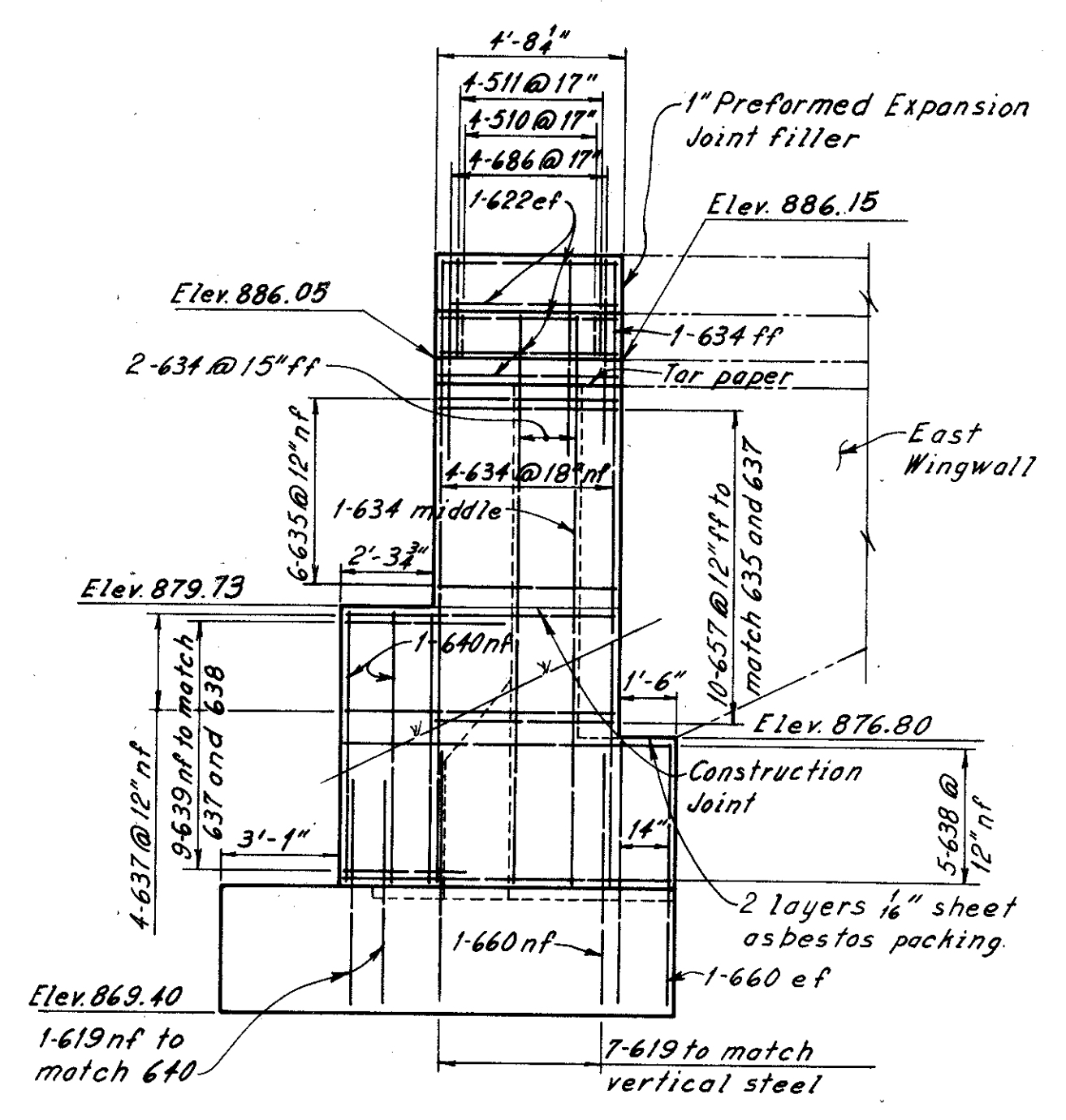
**WEST BUTTRESS**  
(Piles not shown)



**SECTION A-A**  
(East wingwall Section Similar)

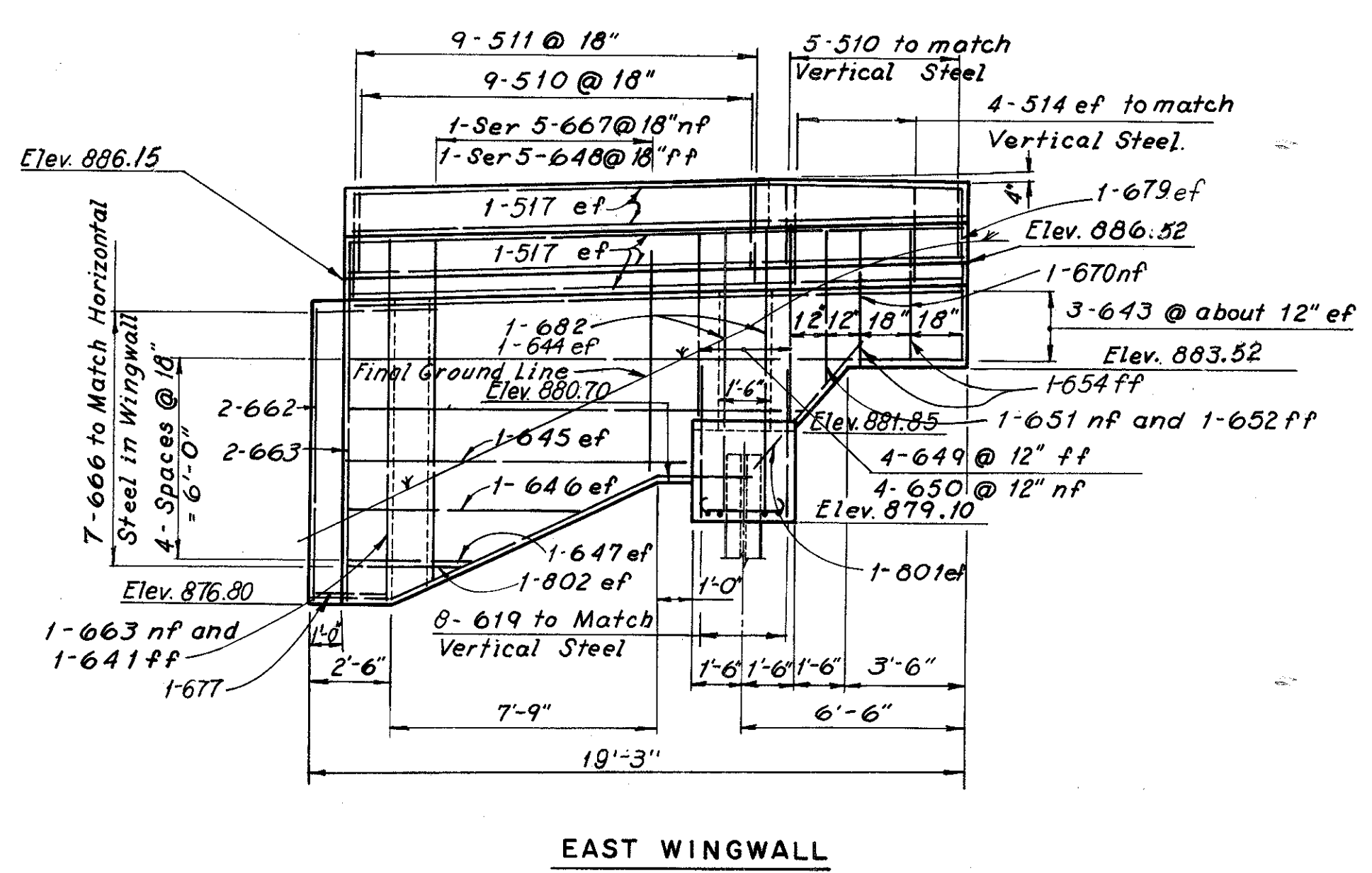


**SECTION B-B**  
(East wingwall Section Similar)



**EAST BUTTRESS**  
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AN.



**EAST WINGWALL**

Notes:  
For curb and parapet transitions and for guard rail anchor details, see "Part Plans - Parapet on Wingwall (Curbs on Approaches)" on Ohio Standard Drawing BR-1-67, Revised 10-15-71, Sheet 1 of 3.  
For additional notes see Sheet 3/12.

Note:  
Sheet Asbestos Packing (711.22) and Tar Paper shall be included with "Item 511, Class C Concrete, Abutments (Above Footing) for payment."

H.N.T.B. BR. NO. 8

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**NORTH ABUTMENT WINGWALLS**  
I-80 UNDER BEDFORD FREEWAY

BR. NO. CUY-80-2169 STA. 65+88.92 TO  
STA. 67+07.24

CUYAHOGA COUNTY OHIO

DRAWN DLR	TRACED HCH	CHECKED MCB	REVIEWED	REVISED
DATE 8-2-69	DATE 8-7-69	DATE 2-12-70	DATE	

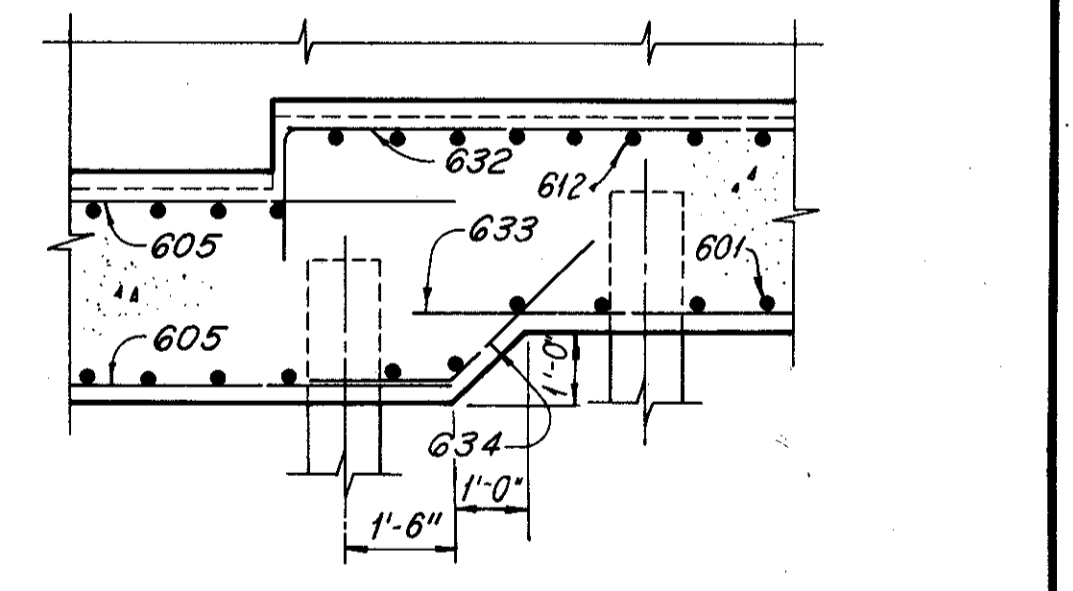
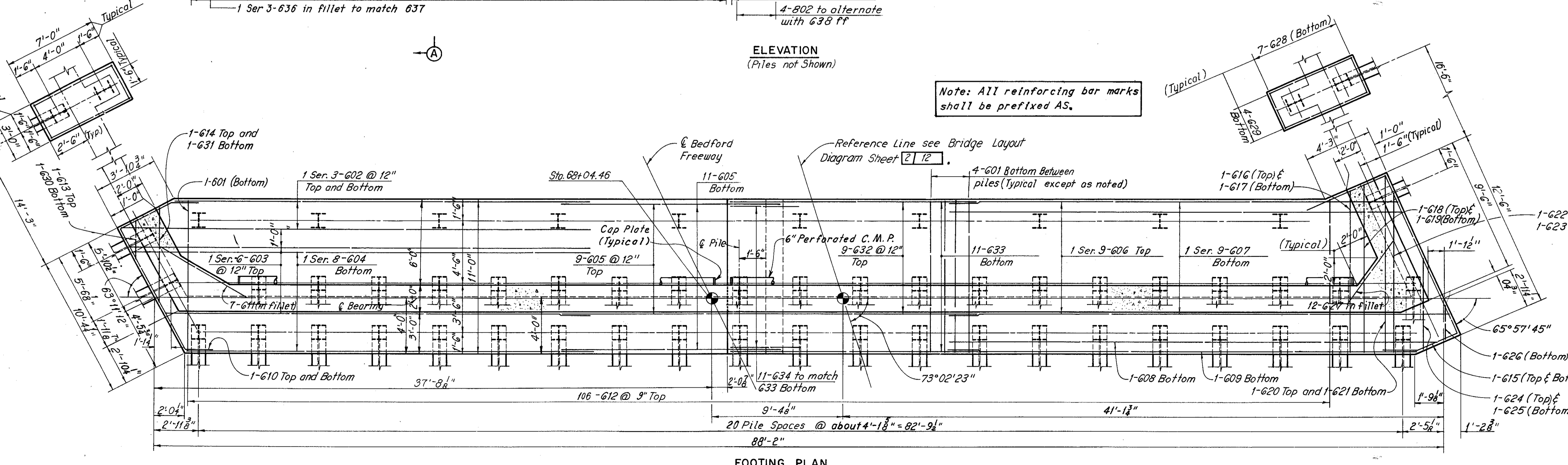
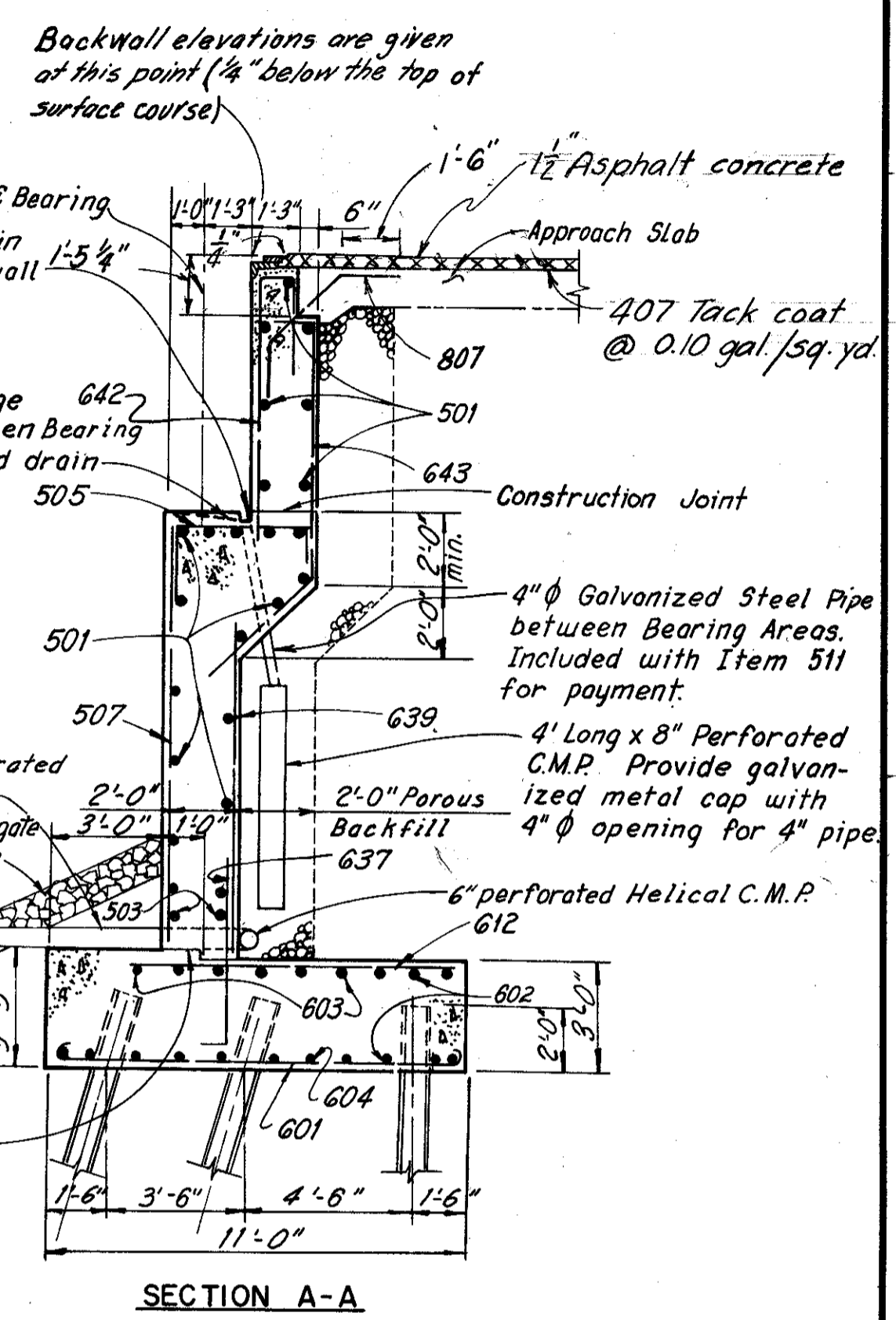
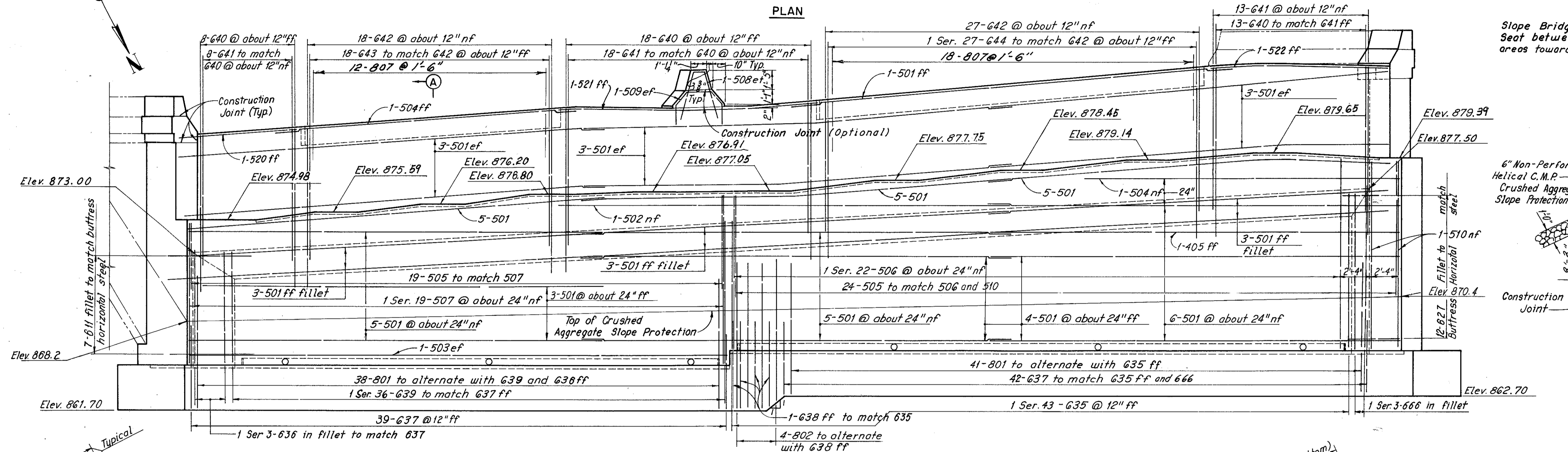
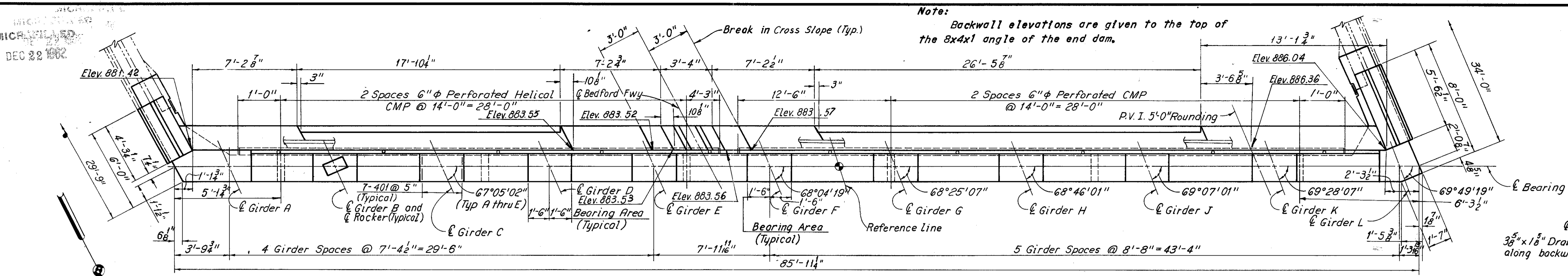
SHEET 4/12

MICHAEL BAKER  
DEC 22 1962

FED. RD. DIVISION	STATE	PROJECT	328 390
2	OHIO		

CUYAHOGA COUNTY  
CUI-80-21.40

Note: Backwall elevations are given to the top of the 8x4x1 angle of the end dam.



Note: All reinforcing bar marks shall be prefixed AS.

Notes:  
For Notes see Sheet 3/12.

H.N.T.B. BR. NO. 8

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SOUTH ABUTMENT**  
I-80 UNDER BEDFORD FREEWAY

BR. NO. CUY-80-2169 STA. 65 + 88.92 TO  
STA. 68 + 07.24

CUYAHOGA COUNTY OHIO

DRAWN D.L.R. TRACED D.L.R. CHECKED M.C.B. REVIEWED  
DATE 6-6-69 DATE 8-8-69 DATE 1-28-70 DATE

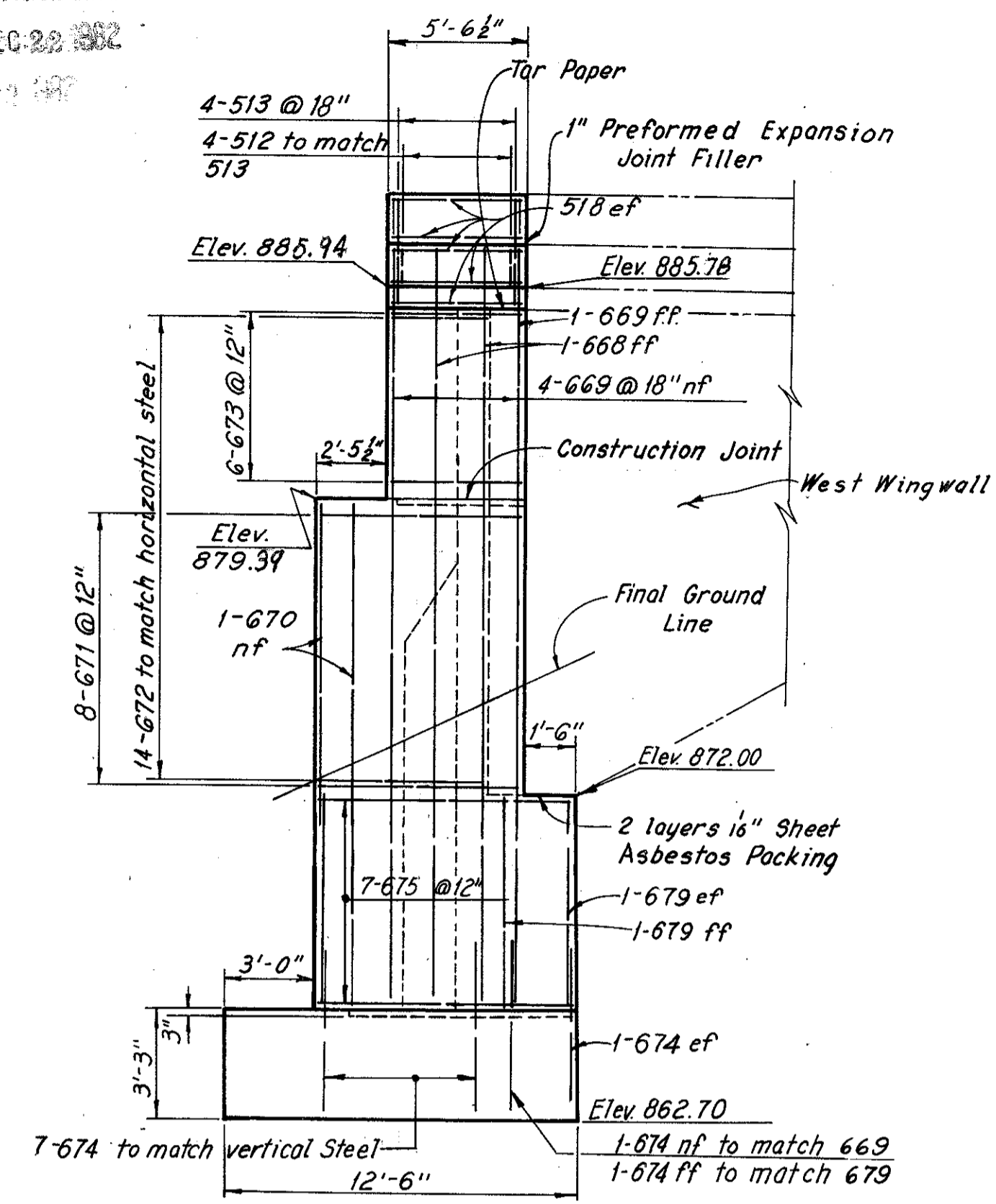
SHEET 5/12

REPRODUCED  
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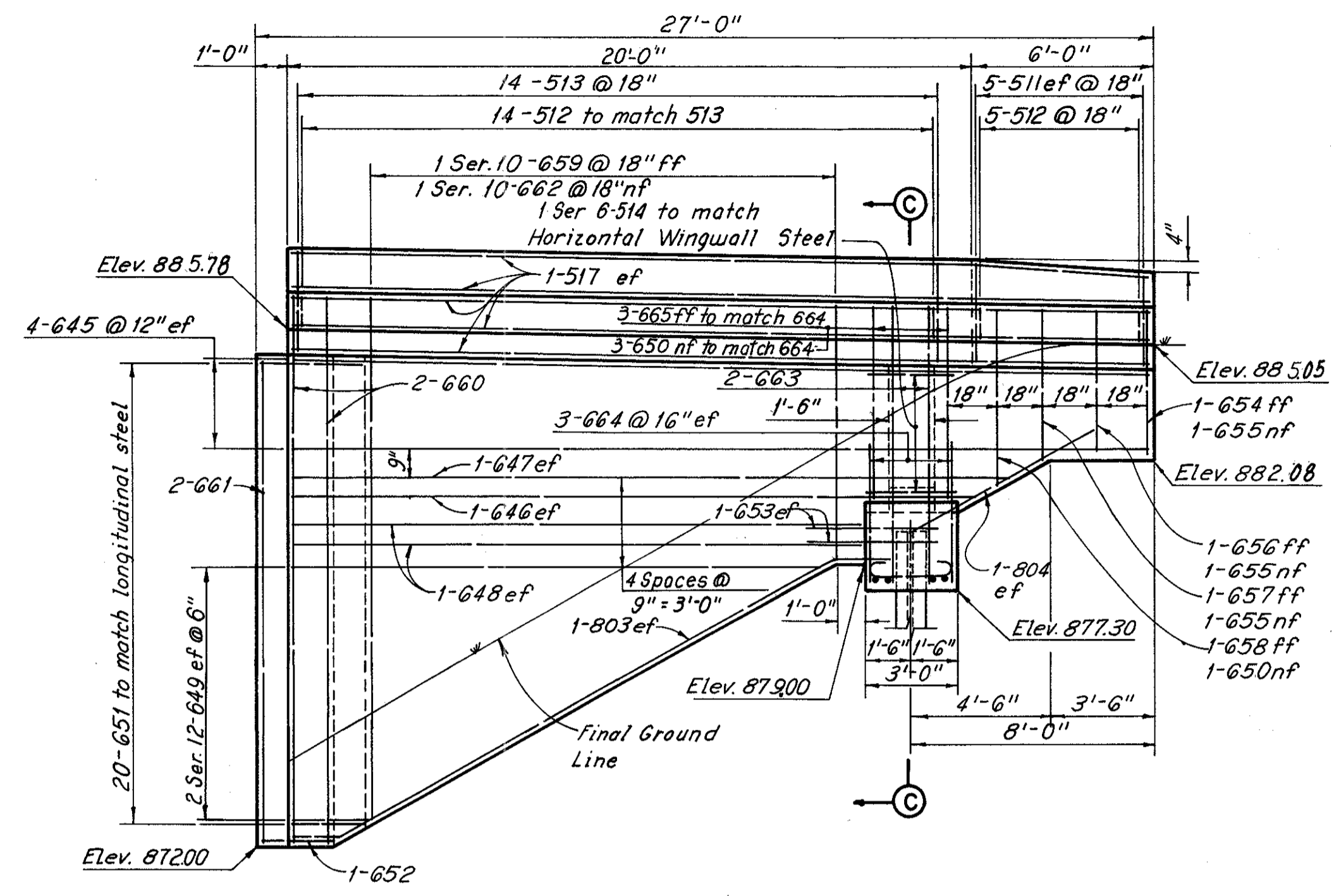
FED RD DIVISION	STATE	PROJECT	
2	OHIO		

329  
 390

CUYAHOGA COUNTY  
 CUY-80-21.40

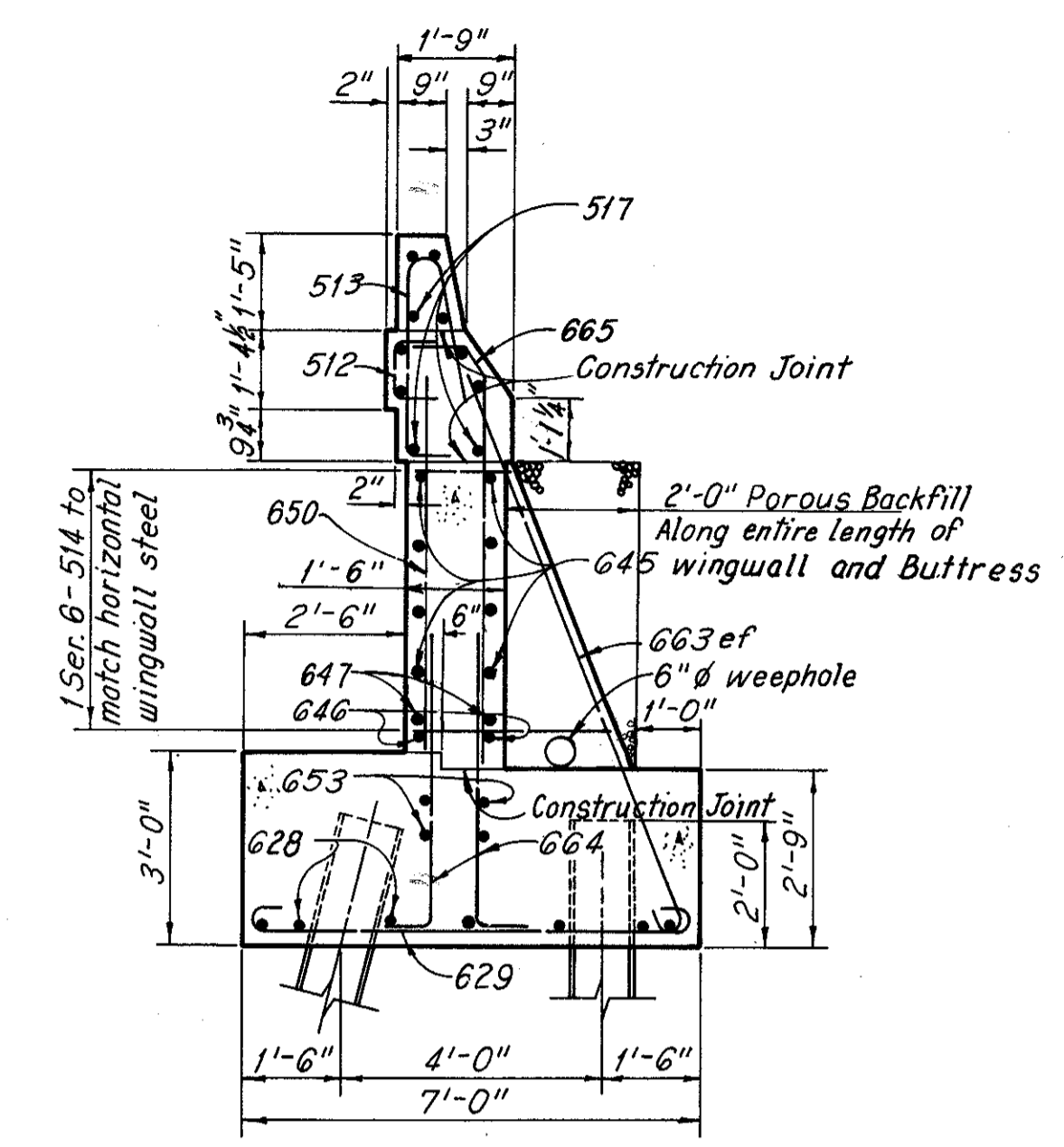


**WEST BUTRESS**  
 (Piles not shown)



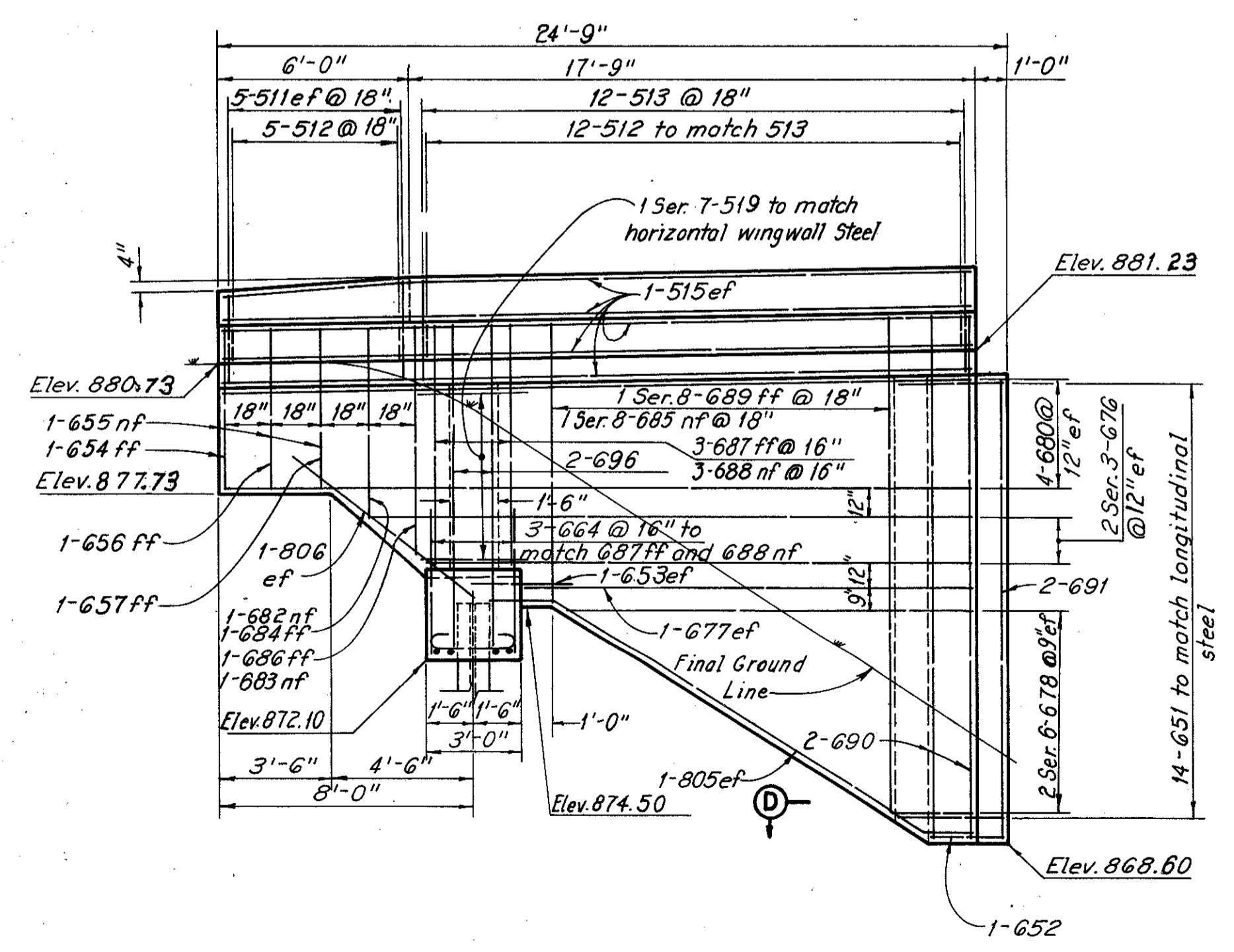
**WEST WINGWALL**

Note:  
 Sheet Asbestos Packing (711.22) and  
 Tar Paper shall be included with Item  
 511, Class C Concrete, Abutments Above  
 Footing for payment.

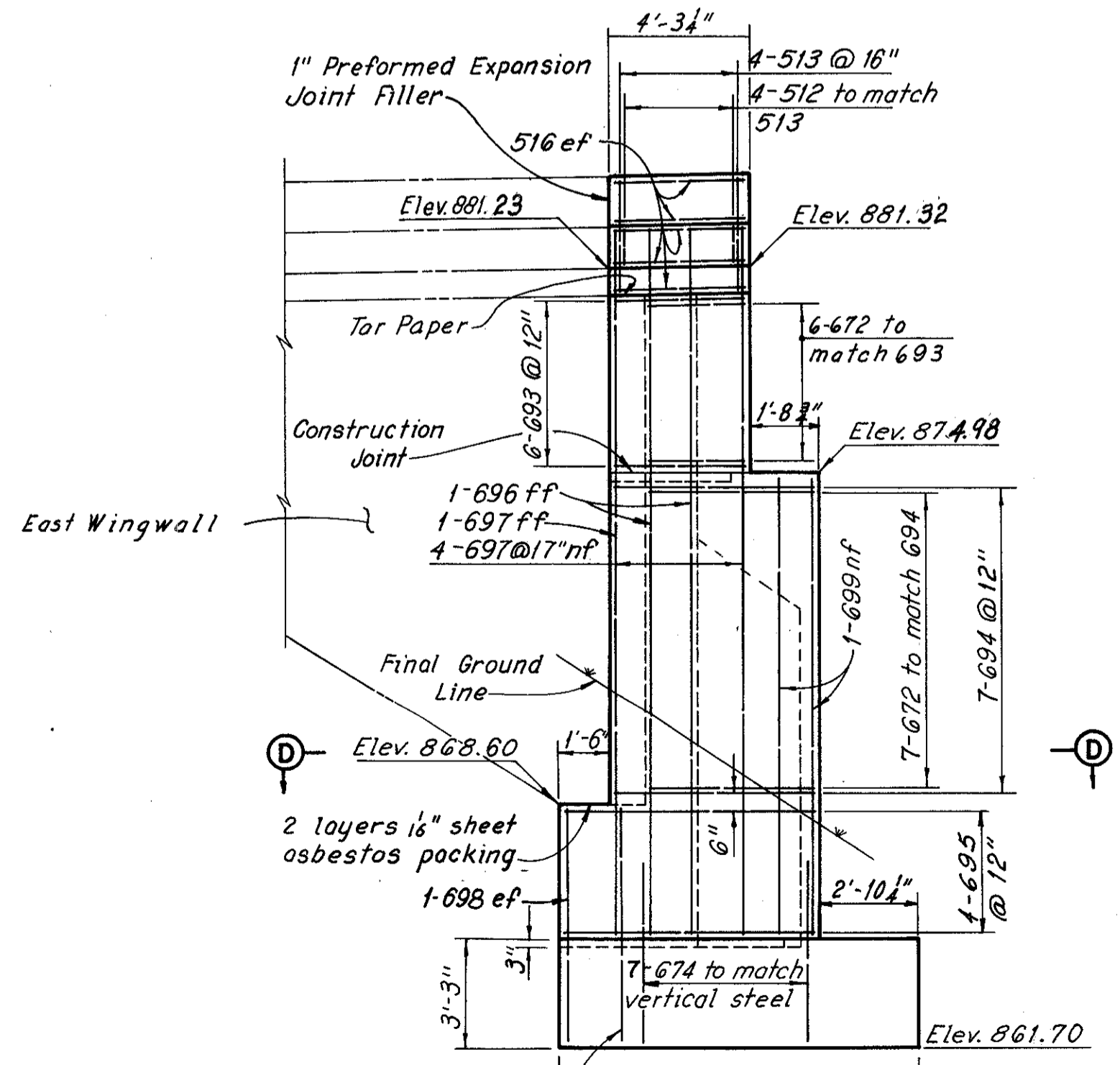


**SECTION C-C**  
 (Section shown thru West Wingwall,  
 East Wingwall is similar)

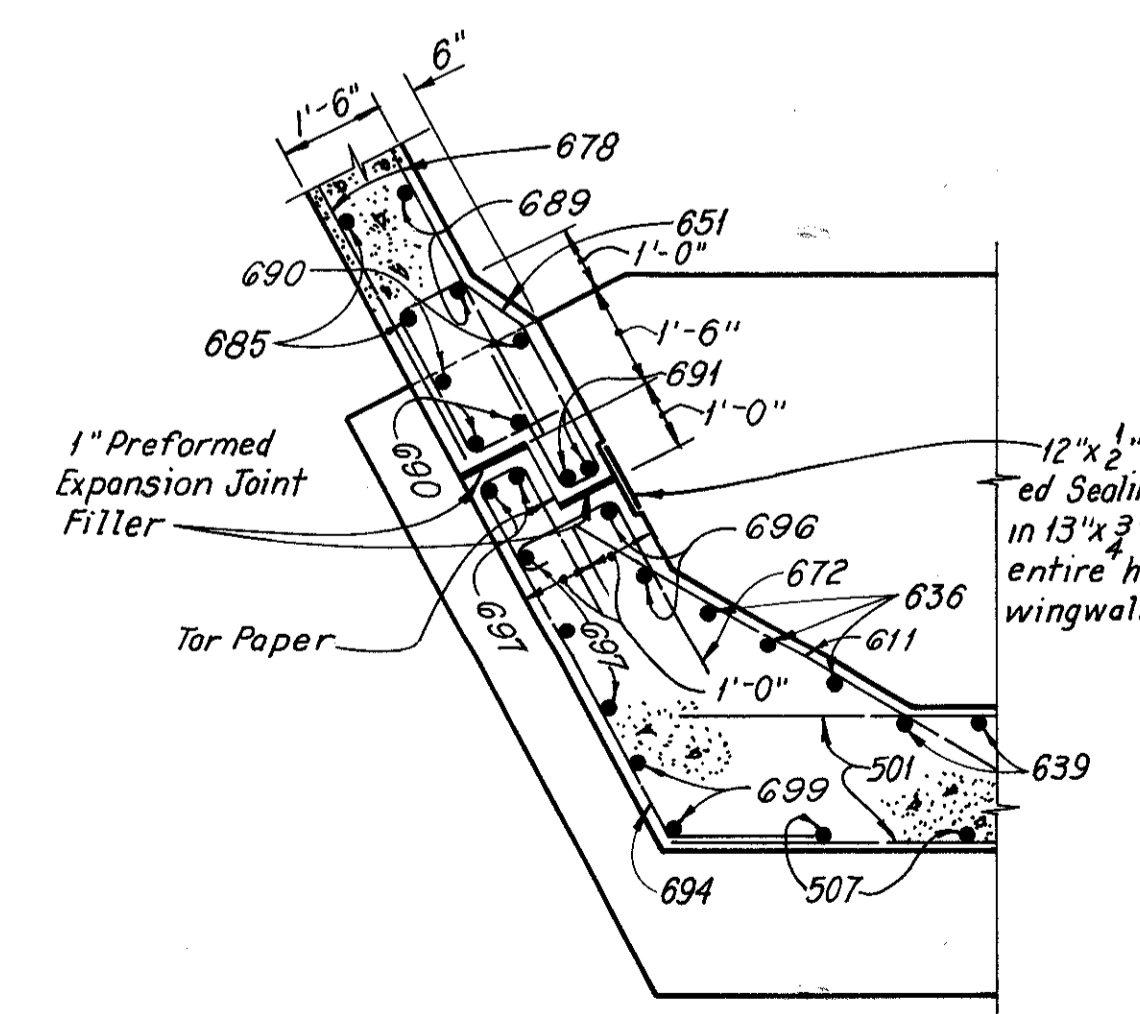
Note: All reinforcing bar marks  
 shall be prefixed AS.



**EAST WINGWALL**



**EAST BUTRESS**  
 (Piles not shown)



**SECTION D-D**  
 (Section shown thru East Wingwall and Buttress,  
 West Wingwall and Buttress is similar)

Notes:  
 For curb and parapet transitions and for guard  
 rail anchor details see "Part Plans - Parapet on  
 Wingwall (No Curb on Approaches)" on Ohio Standard  
 Drawing BR-1-67, Revised 10-15-71, Sheet 1 of 3.  
 For additional notes see Sheet 3/12.

H.N.T.B. BR. NO. 8

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**SOUTH ABUTMENT WINGWALLS**  
 I-80 UNDER BEDFORD FREEWAY

BR. NO. CUY-80-2169 STA. 65 + 88.92  
 STA. 68 + 07.24

CUYAHOGA COUNTY OHIO

DRAWN/DLR	TRACED/DLR	CHECKED/MCB	REVIEWED	REVISED
DATE 2-2-70	DATE 2-3-70	DATE 2-5-70	DATE	DATE

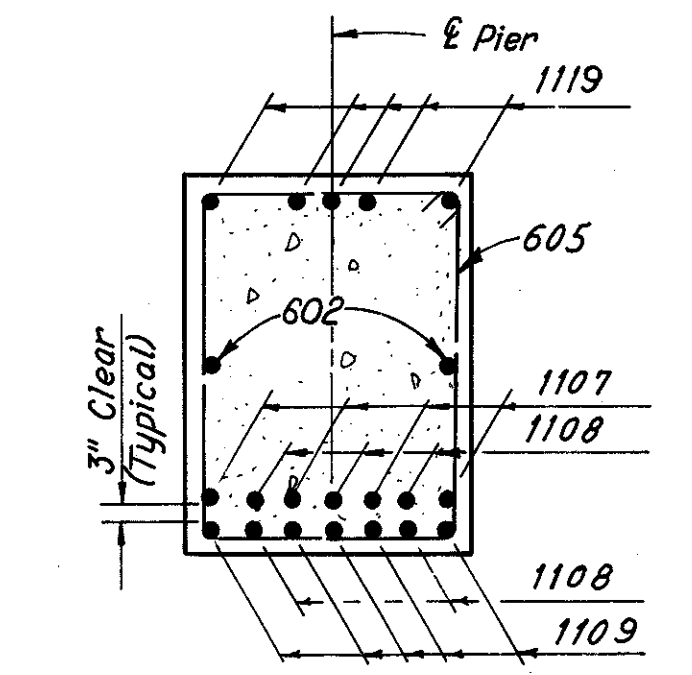
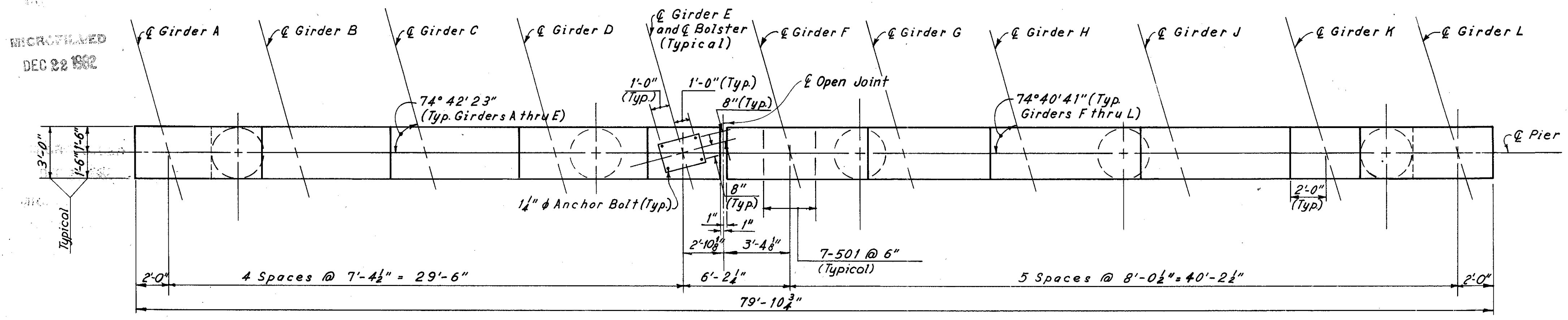
SHEET 6/12

RECORDED  
DEC 22 1982

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

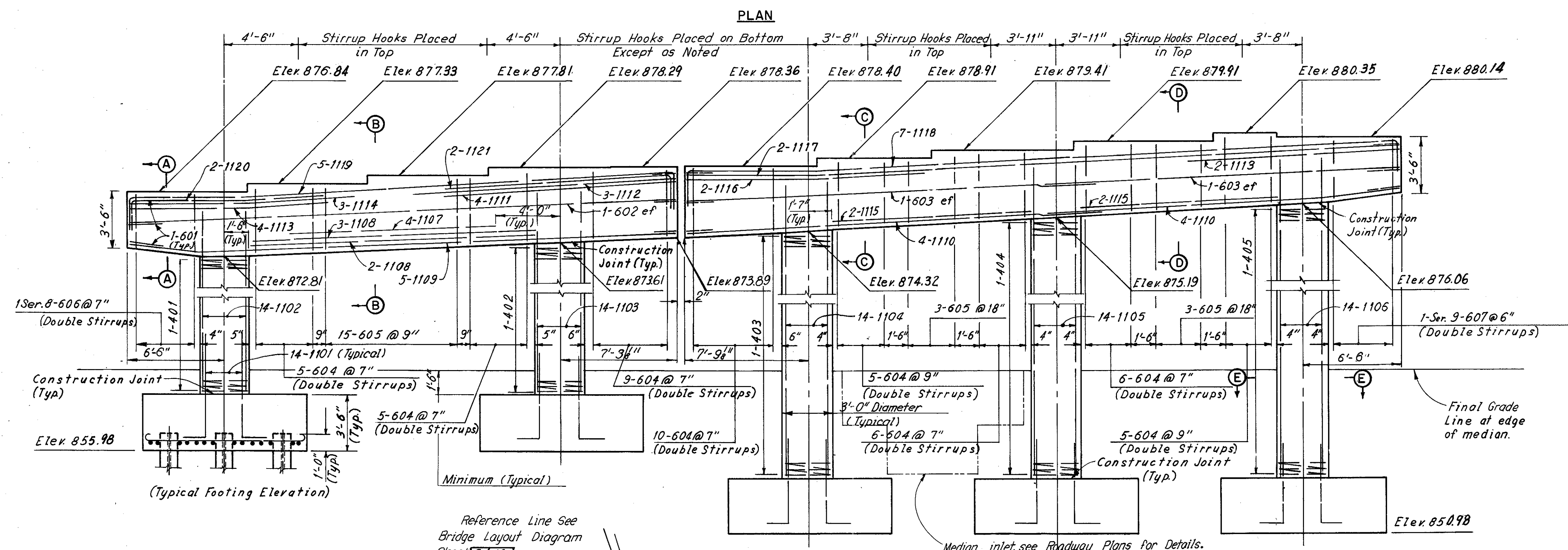
330  
390

CUYAHOGA COUNTY  
CUY.-80-21.40

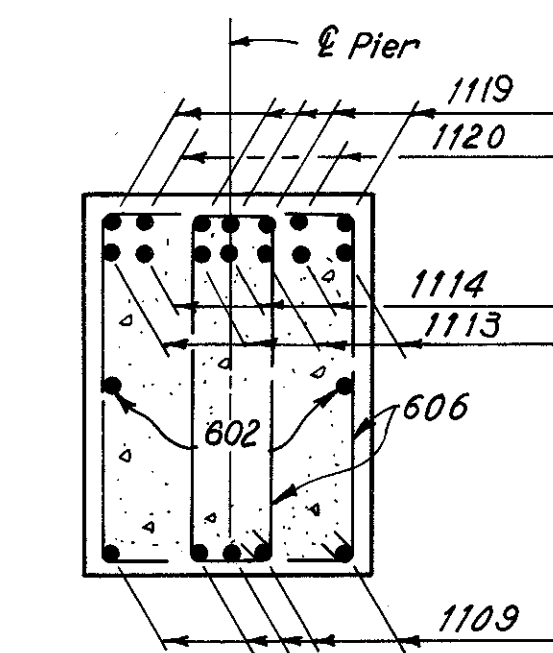


SECTION B-B

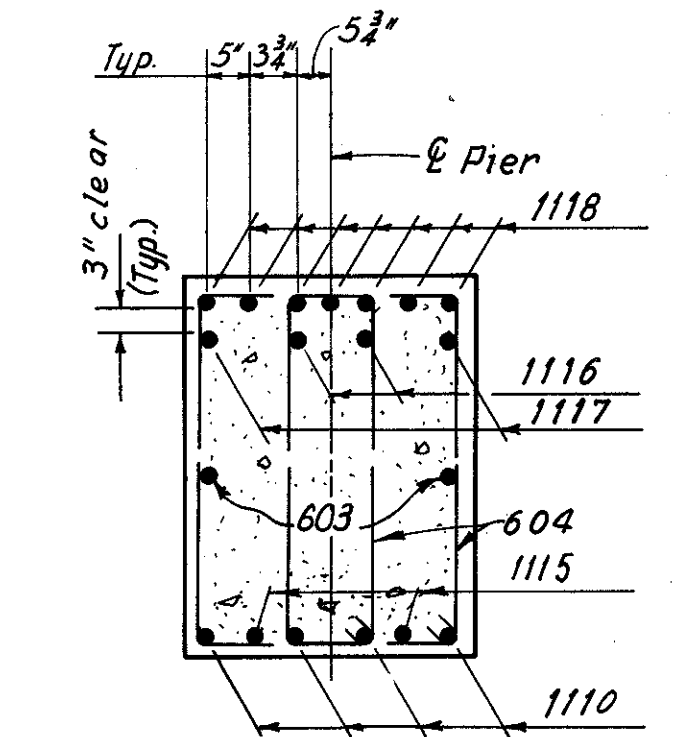
Notes:  
All reinforcing bar marks shall be prefixed PA.



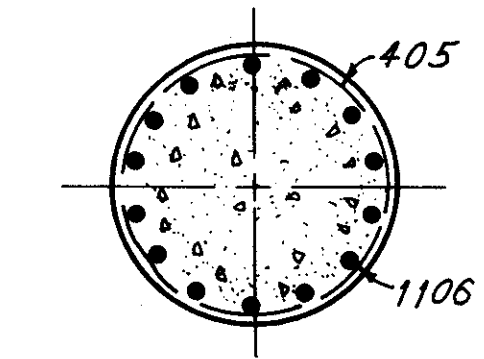
ELEVATION



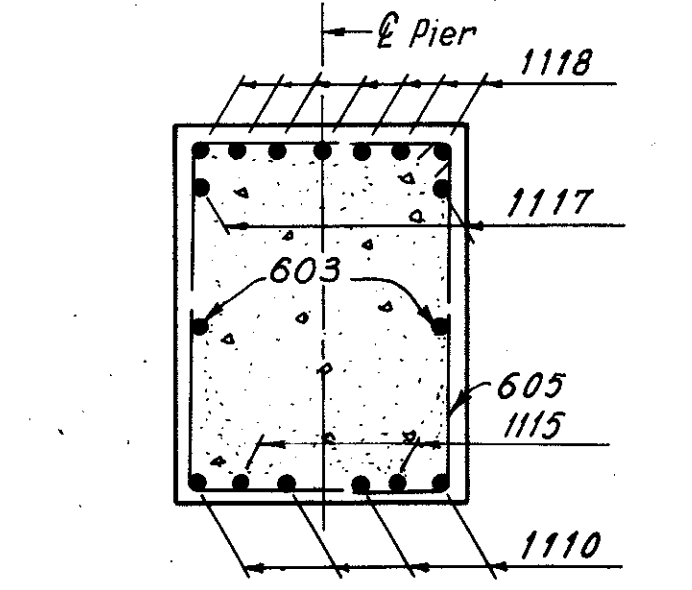
SECTION A-A



SECTION C-C

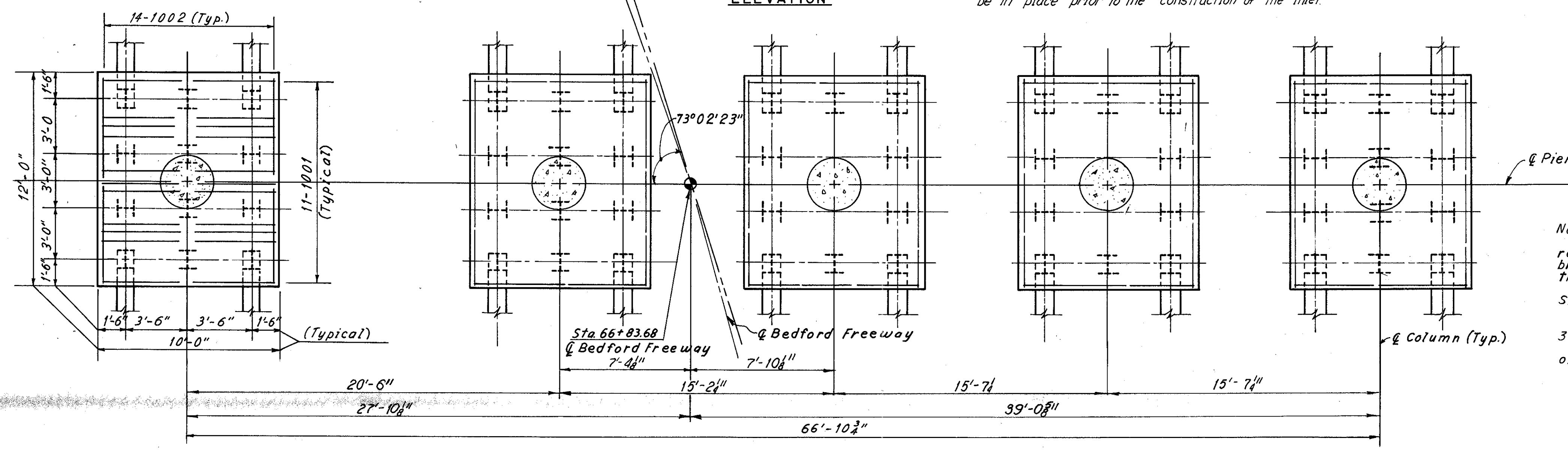


SECTION E-E



SECTION D-D

Median inlet, see Roadway Plans for Details.  
The Pier footings adjacent to the inlet, shall be in place prior to the construction of the inlet.



FOOTING PLAN

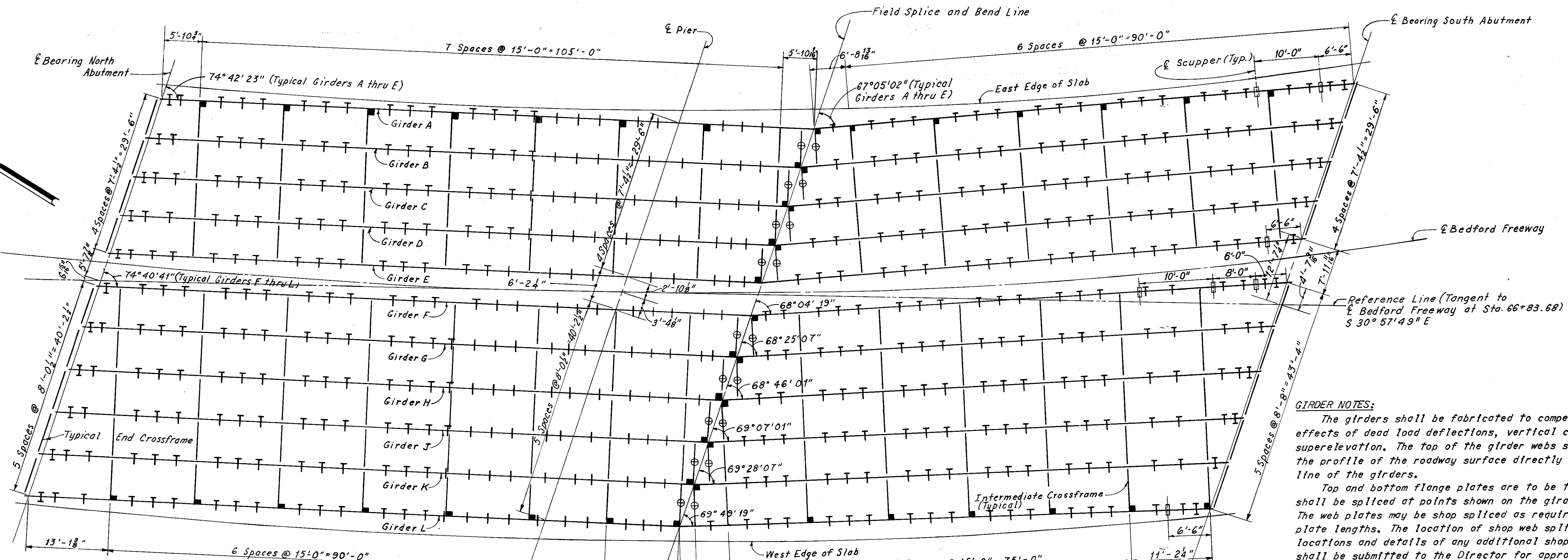
Notes:  
Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes.  
For anchor bolt details see Ohio Standard Drawing RB-1-55.  
All piles are HP 12 x 53.  
All battered piles shall be inclined 3 in 12 in the direction shown.  
Pile spacings are measured along bottom of footing.  
The following abbreviation is used:  
ef = each face

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<b>PIER</b>	
I-80 UNDER BEDFORD FREEWAY	
BR. NO. CUY-80-2169	STA. 65 + 23.94 STA. 67 + 42.25
CUYAHOGA COUNTY	OHIO
DRAWN BY M. J. TRACED A. J. 1/77	CHECKED BY J. J. 1/77
DATE 6-11-69	DATE 6-17-69
DATE 5-1-70	DATE
	REVIEWED
	REVIS
	SHEET 7/12

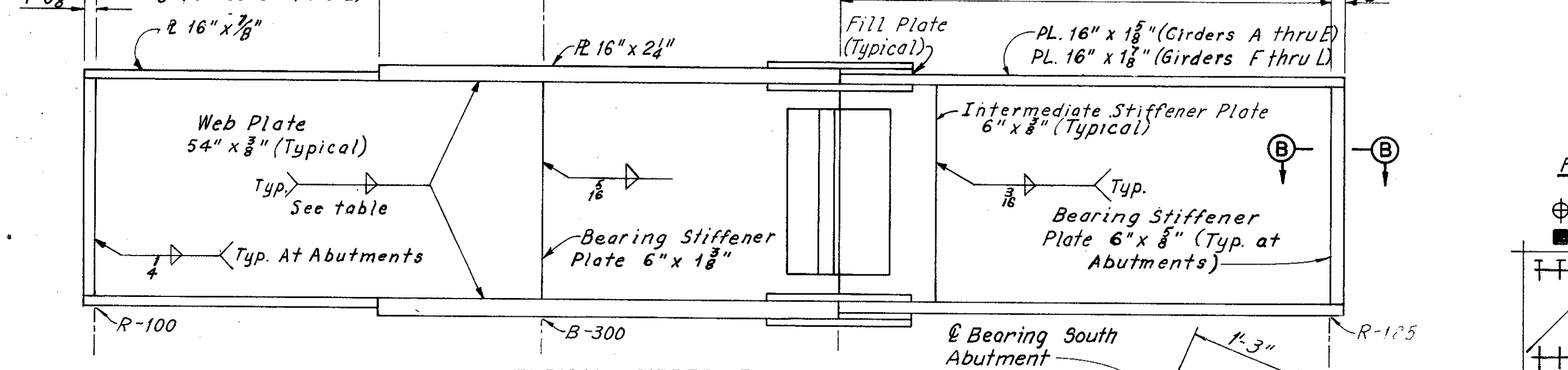
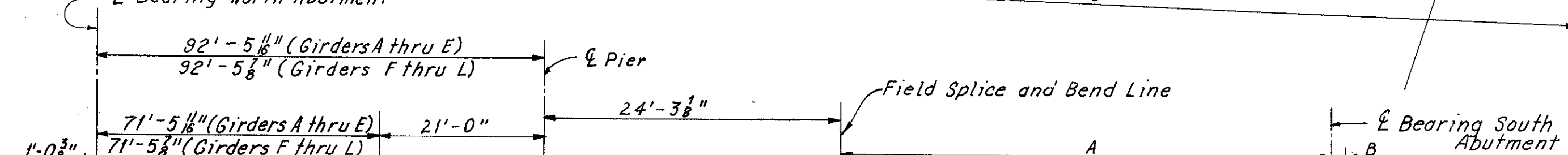


Location	¢ Brg. N Abut.	1	2	3	¢ Field Splice	4	5	6	¢ Brg. S Abut.
¢ Girder A to East Edge of slab	2'-7 <sup>1</sup> / <sub>2</sub> "	1'-9 <sup>3</sup> / <sub>8</sub> "	1'-5 <sup>1</sup> / <sub>2</sub> "	1'-11 <sup>1</sup> / <sub>2</sub> "	3'-6"	2'-4 <sup>3</sup> / <sub>8</sub> "	2'-0 <sup>1</sup> / <sub>2</sub> "	2'-5"	3'-7"
¢ Girder E to East Edge of open joint	1'-6 <sup>3</sup> / <sub>8</sub> "	2'-5 <sup>3</sup> / <sub>8</sub> "	2'-11 <sup>1</sup> / <sub>2</sub> "	2'-9 <sup>1</sup> / <sub>2</sub> "	1'-6 <sup>3</sup> / <sub>8</sub> "	2'-11 <sup>1</sup> / <sub>2</sub> "	3'-7 <sup>3</sup> / <sub>8</sub> "	3'-7 <sup>3</sup> / <sub>8</sub> "	2'-10 <sup>3</sup> / <sub>8</sub> "
¢ Girder L to West Edge of slab	1'-4 <sup>3</sup> / <sub>8</sub> "	2'-5 <sup>3</sup> / <sub>8</sub> "	3'-1 <sup>1</sup> / <sub>8</sub> "	3'-3 <sup>3</sup> / <sub>8</sub> "	2'-6 <sup>3</sup> / <sub>8</sub> "	3'-3 <sup>3</sup> / <sub>8</sub> "	3'-3 <sup>3</sup> / <sub>8</sub> "	2'-7 <sup>1</sup> / <sub>2</sub> "	1'-4 <sup>1</sup> / <sub>2</sub> "

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DEC 22 1982

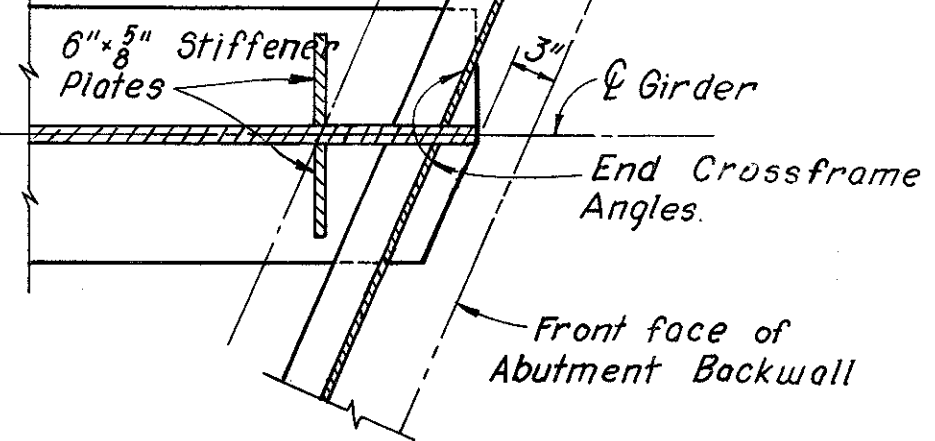


**GIRDER NOTES:**  
The girders shall be fabricated to compensate for the effects of dead load deflections, vertical curvature and superelevation. The top of the girder webs shall parallel the profile of the roadway surface directly over the center line of the girders.  
Top and bottom flange plates are to be the same and shall be spliced at points shown on the girder elevation. The web plates may be shop spliced as required by available plate lengths. The location of shop web splices and the locations and details of any additional shop flange splices shall be submitted to the Director for approval prior to ordering of materials.  
Intermediate stiffeners shall be placed as shown on the framing plan equally spaced between crossframe, or crossframes and bearing stiffeners, or crossframes and field splices, except the first two stiffener spaces at the ends of simply supported girders shall be one-half of this spacing. Stiffeners shall be placed in pairs and shall have contact bearing with both flanges.



Girder	Dimensions	
	A	B
A thru E	96'-3 <sup>3</sup> / <sub>8</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
F	96'-0 <sup>3</sup> / <sub>8</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
G	95'-9 <sup>3</sup> / <sub>8</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
H	95'-7 <sup>1</sup> / <sub>2</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
J	95'-4 <sup>3</sup> / <sub>8</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
K	95'-1 <sup>3</sup> / <sub>2</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "
L	94'-11 <sup>1</sup> / <sub>8</sub> "	1'-0 <sup>1</sup> / <sub>8</sub> "

FLANGE PLATE THICKNESS	FILLET WELD SIZE
7/8"	5/16"
1 <sup>1</sup> / <sub>8</sub> ", 1 <sup>1</sup> / <sub>2</sub> " and 2"	3/8"



FRAMING PLAN

Framing Plan Legend

- ⊕ Indicates Type "X" Crossframe
- Indicates 90°
- ⊥⊥⊥ Indicates intermediate stiffeners having contact bearing with the top flange.
- ⊥⊥⊥ Indicates intermediate stiffeners having contact bearing with the bottom flange.
- ⊥⊥⊥ Indicates intermediate stiffeners at one-half normal stiffener spacing.

See girder notes for stiffener spacing.  
Note: Intermediate stiffeners located at crossframes are shown in the "Framing Plan" only at places where contact bearing with the flange changes adjacent to the crossframe.

**Notes:**  
For details of Rockers and Bolsters see Ohio Standard Drawing RB-1-55.  
For details of end crossframes, roadway end dams and curb plates, see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4, and sheet 9/12

For Intermediate and Type "X" Crossframes and for Scupper details see Sheets CD1 and CD2  
For locations and details of underpass luminaire supports see Lighting Plans. The supports are included with the Lighting Quantities for payment.

Intermediate stiffeners shall have contact bearing with top and bottom flanges.  
Stiffeners shall be located at all crossframes.

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**FRAMING PLAN AND GIRDER ELEVATION**  
I-80 UNDER BEDFORD FREEWAY  
BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24  
CUYAHOGA COUNTY OHIO

DRAWN J.T.	TRACED A.J.T.	CHECKED K.Y.H.	REVIEWED
DATE 5-4-69	DATE 6-17-69	DATE 5-14-69	DATE

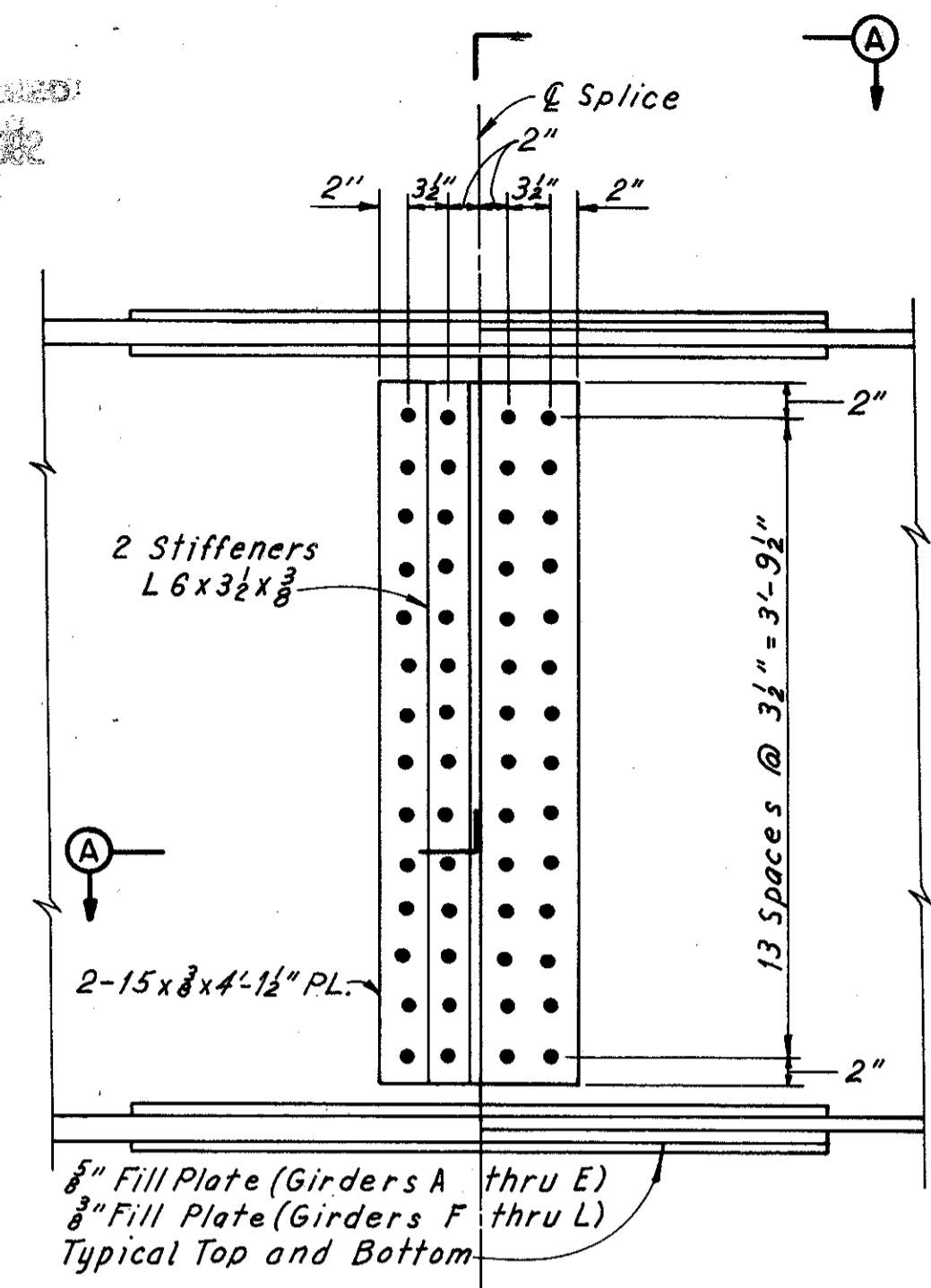
REVISED 9-27-74  
SHEET 8/12

Girder	TOP OF REINFORCED CONCRETE DECK ELEVATIONS										
	¢ Brg. N. Abut.	SPAN 1			¢ Pier	SPAN 2			¢ Brg. S. Abut.		
	a	b	c		a	b	c				
A	886.07	885.53	885.00	884.49	884.01	883.41	882.66	882.00	881.51		
B	886.43	885.92	885.43	884.95	884.50	883.94	883.23	882.60	882.12		
C	886.78	886.31	885.85	885.40	884.98	884.46	883.79	883.20	882.73		
D	887.13	886.70	886.26	885.85	885.46	884.98	884.35	883.79	883.33		
E	887.12	886.72	886.33	885.93	885.53	885.01	884.49	883.98	883.44		
F	887.21	886.78	886.36	885.96	885.57	885.11	884.53	884.02	883.60		
G	887.58	887.19	886.80	886.42	886.08	885.66	885.13	884.68	884.31		
H	887.95	887.59	887.24	886.89	886.58	886.20	885.73	885.33	885.00		
J	888.31	887.98	887.66	887.35	887.07	886.74	886.32	885.97	885.69		
K	888.55	888.30	888.05	887.77	887.52	887.20	886.86	886.53	886.20		
L	888.25	888.03	887.80	887.56	887.31	886.97	886.67	886.33	885.94		

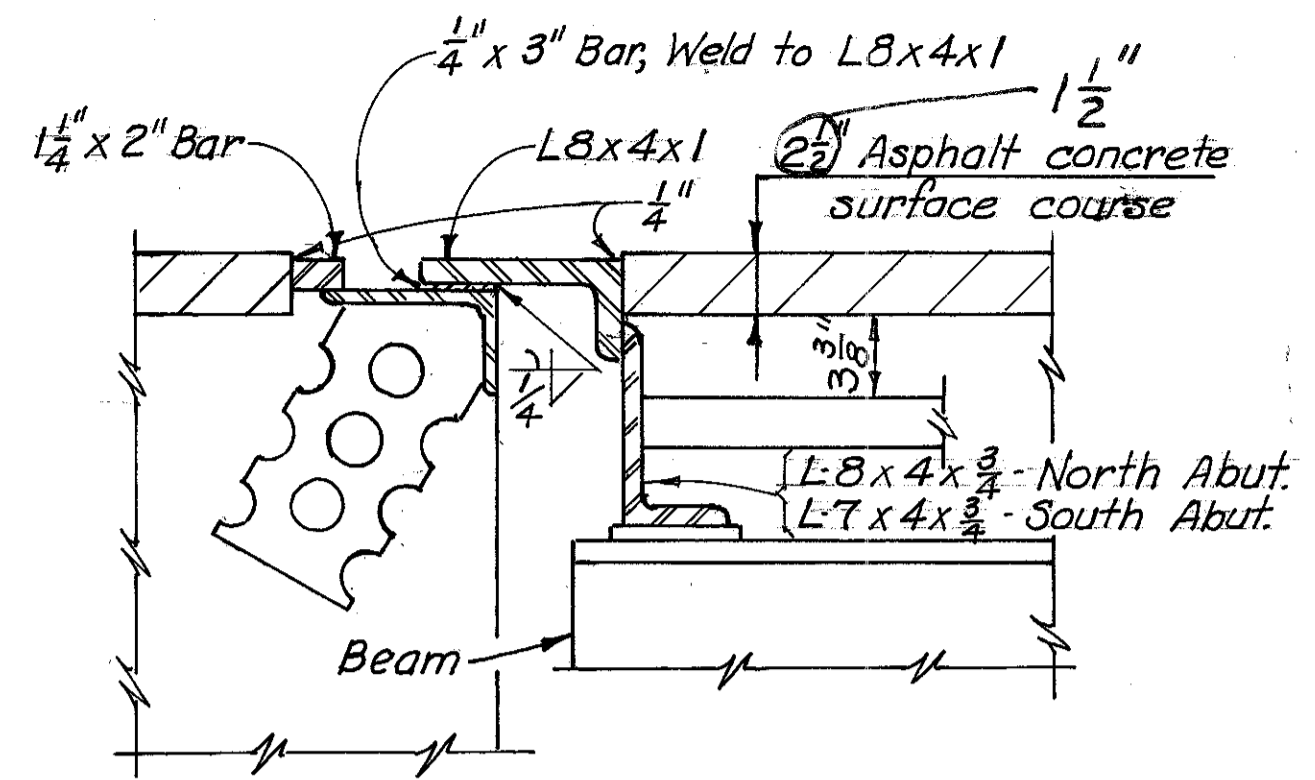
Note: When Girders A and L are underneath the curb, the elevation shown is to an extended top of concrete deck.

Girder	Offset at ¢ Pier
A	-1 1/8"
B	-3/4"
C	-1 1/8"
D	-5/8"
E	0
F	-1 1/8"
G	-5/8"
H	-1 1/8"
J	-1 1/8"
K	-1 1/8"
L	1 1/8"

Note: Positive values of vertical offsets at bearing points indicates an offset above the base line.



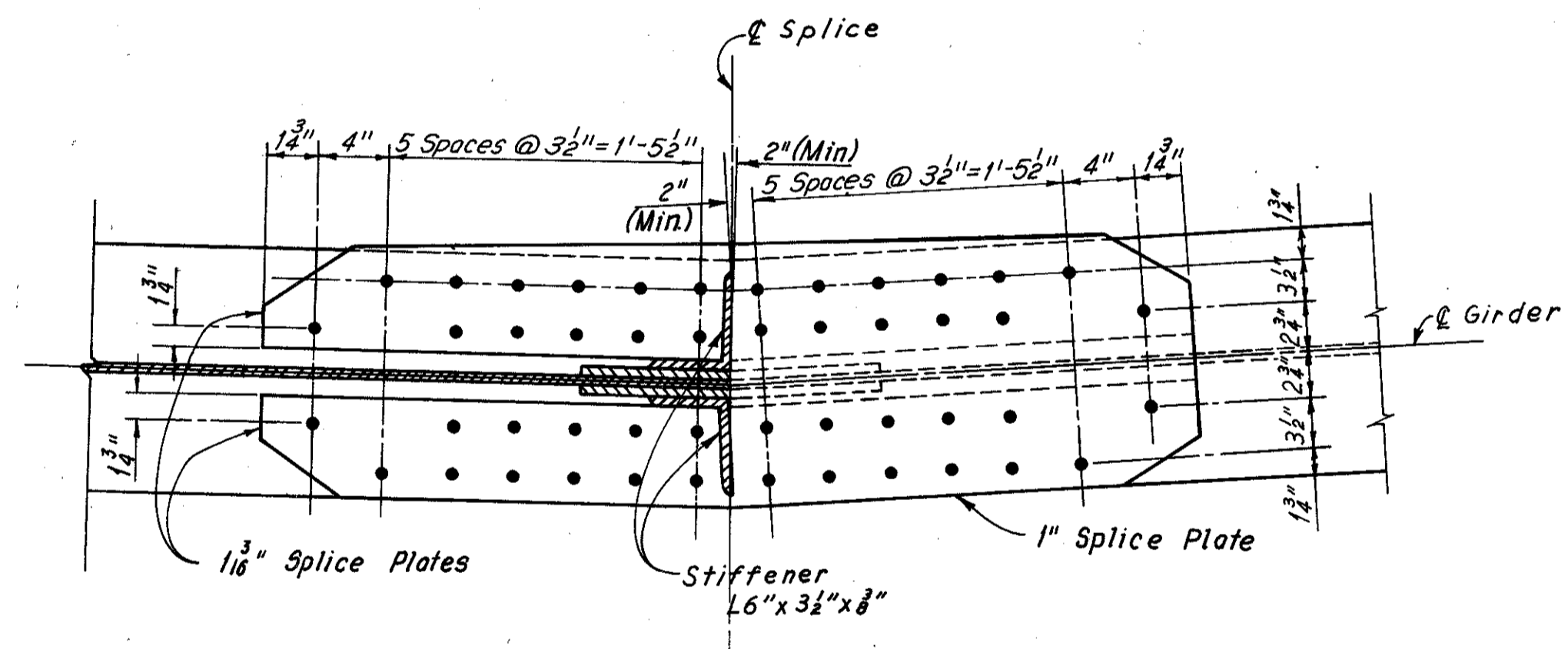
TYPICAL FIELD WEB SPLICE



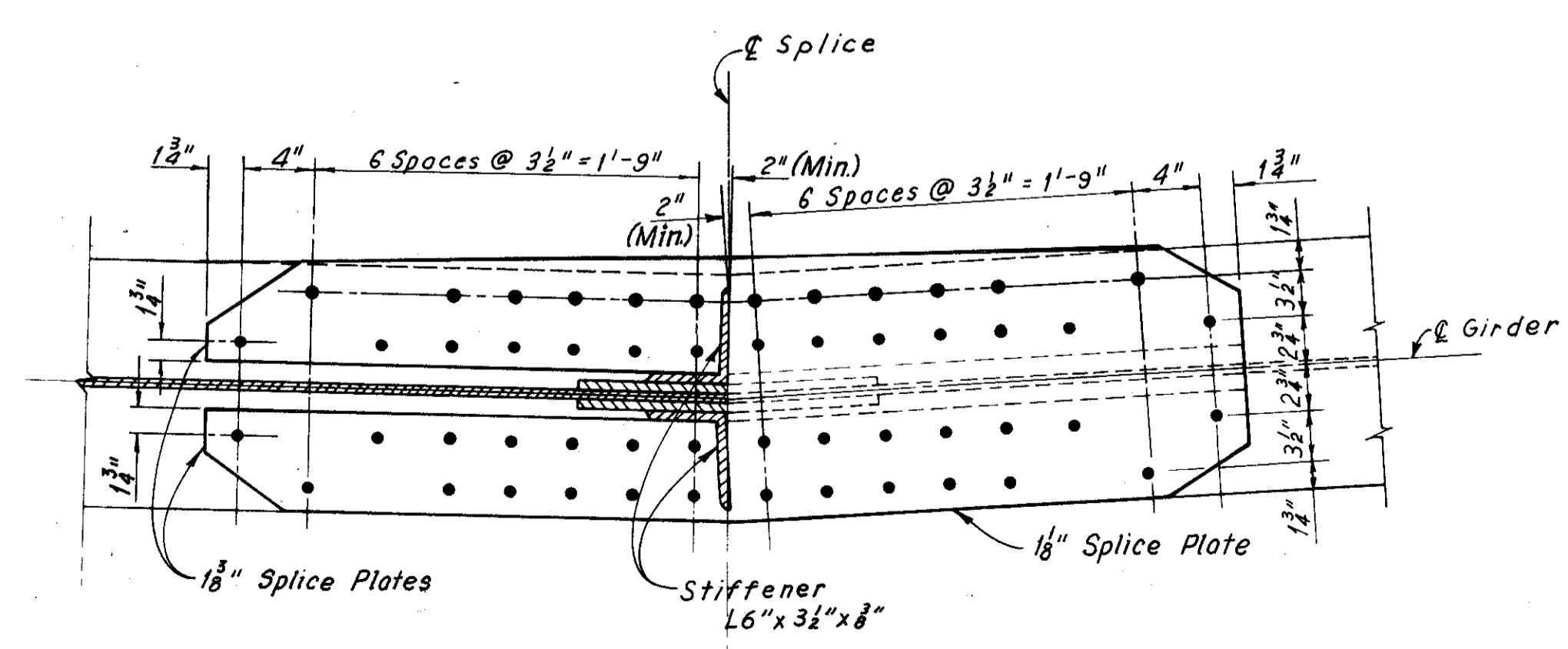
For additional end dam details see Standard Drawing SD-1-69, Sheet 1 of 4.

END DAM DETAILS

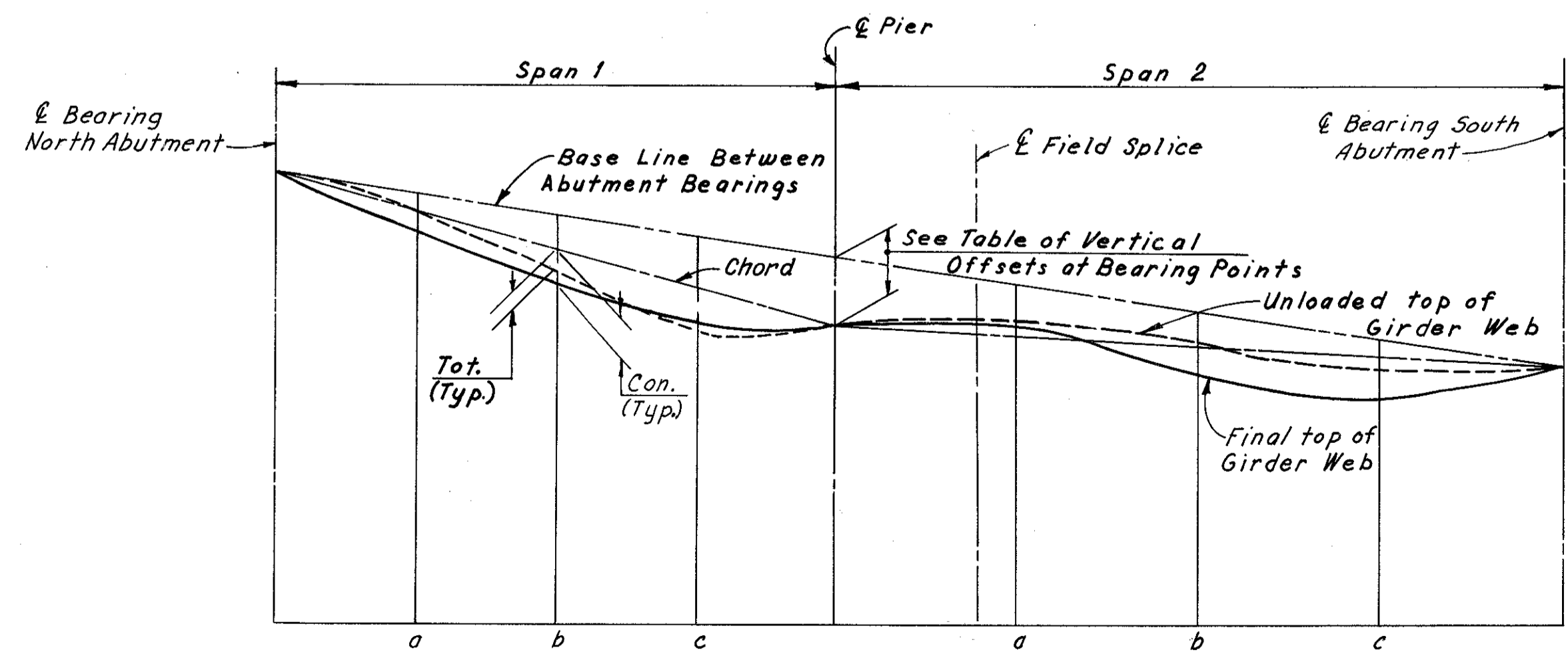
Girder	DEAD LOAD DEFLECTION AND CAMBER																										
	Span 1												Span 2														
	a				b				c				¢ Field Splice				a				b				c		
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.			
A	1/16	1/16	-4	0	0	1/16	-3	-2	0	-1/16	-1/16	-8	1/16	5	1/16	1	1/16	4	1/16	2	1/16	1	1/16	-1	-1/16		
B	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
C	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
D	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
E	1/16	1/16	0	1/16	1/16	1/16	0	1/16	0	-1/16	0	-1/16	0	1/16	1/16	1/16	0	1/16	2	1/16	1/16	1/16	1/16	1/16	1/16		
F	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
G	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
H	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
J	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
K	1/16	1/16	-4	1/16	1/16	1/16	-7	-10	0	-1/16	-1/16	-9	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	-1/16		
L	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	4	1/16	2	1/16	1/16	1/16	1/16	1/16		



SECTION A-A (Girders A thru E)



SECTION A-A (Girders F thru L)



CAMBER DIAGRAM (Girder A shown)

Notes:  
Negative values for deflection indicate deflections above chord line.  
Negative values for convexity or concavity and total required camber indicate values below the chord line.  
Points a, b and c represent the 1/4, 1/2 and 3/4 points of the span respectively.  
Deflections and convexities or concavities are given to the nearest 1/16 inch.  
The following abbreviations are used:  
Stl. = Dead load deflection due to the weight of steel.  
Rem. D.L. = Remaining dead load deflection.  
Con. = Convexity or concavity.  
Tot. = Total required camber.

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FIELD SPLICE DETAILS AND CAMBER DIAGRAM  
I-80 UNDER BEDFORD FREEWAY  
BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24  
CUYAHOGA COUNTY OHIO

DRAWN J.T.	TRACED GEM	CHECKED R.P.H.	REVIEWED	REVISED 9-27-74
DATE 5-1-69	DATE 5-5-69	DATE 5-15-69	DATE	SHEET 9/12

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DEC 22 1982

Note: A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.

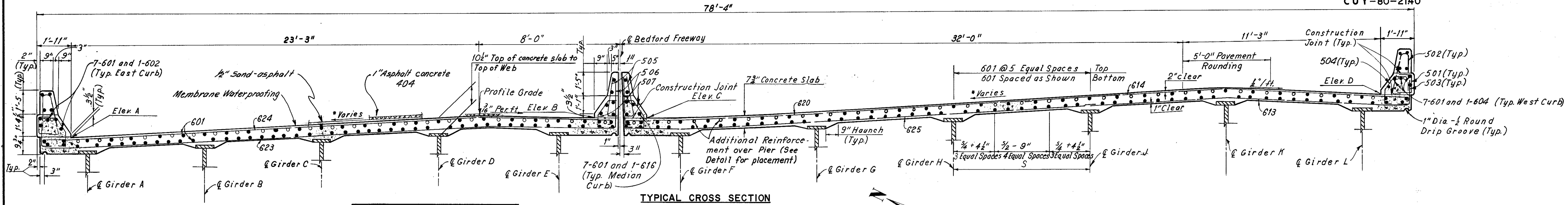
\* See Superelevation Transition Diagram.

For Superstructure Drainage  
Detail see sheet CDR

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

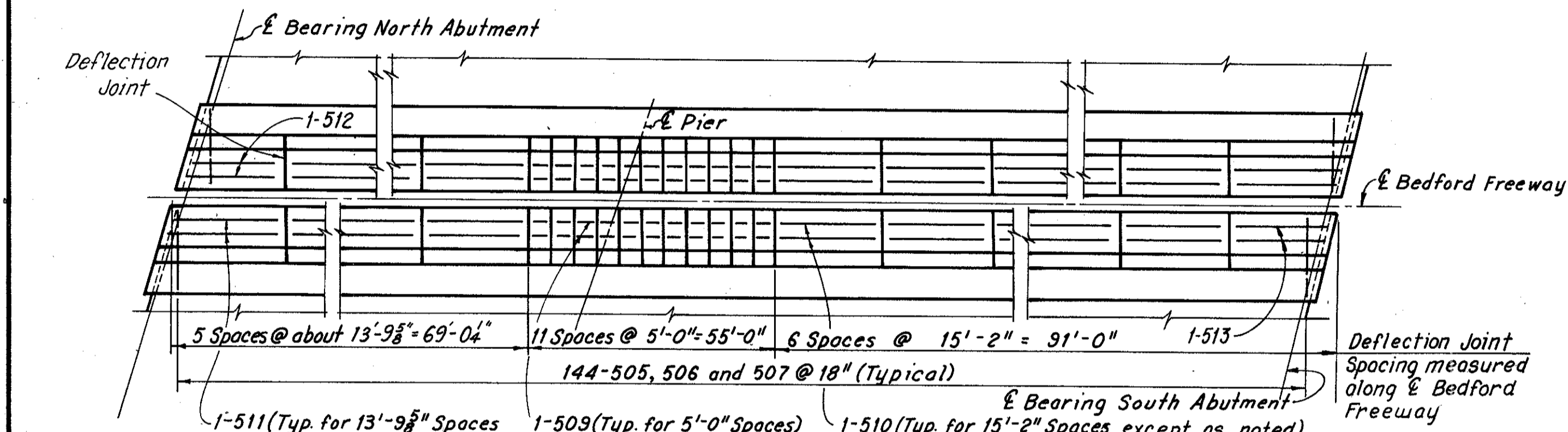
333  
390

CUYAHOGA COUNTY  
CUY-80-2140

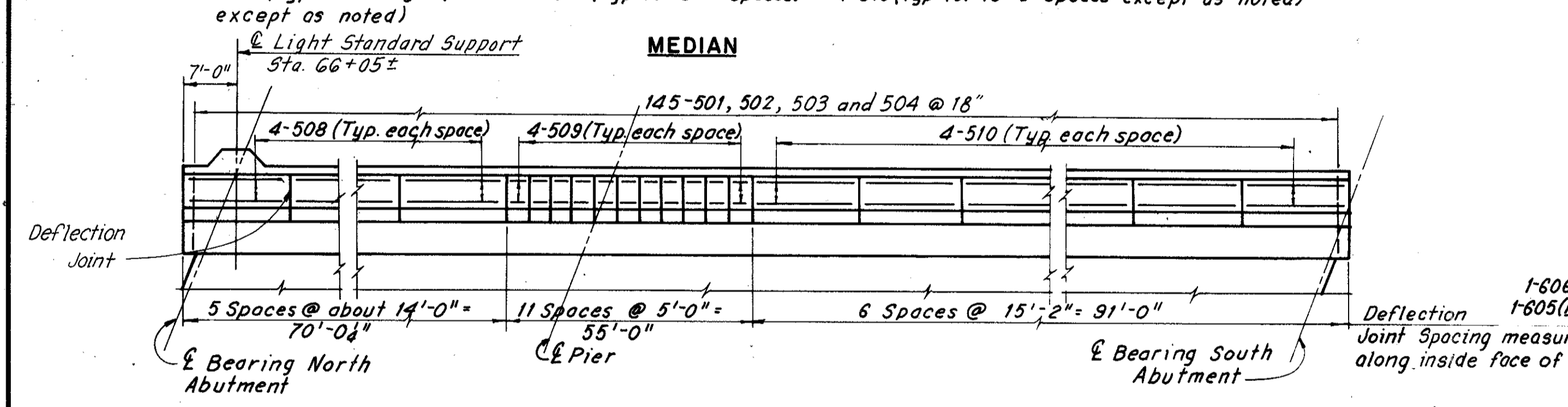


Note:  
All reinforcing bar marks shall be prefixed S.

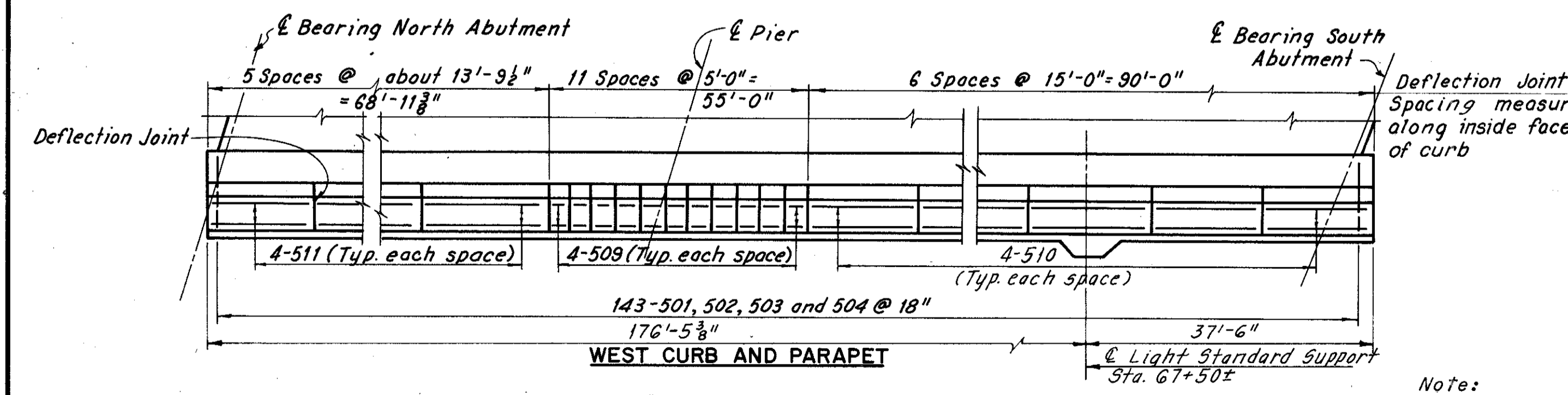
TYPICAL CROSS SECTION



MEDIAN



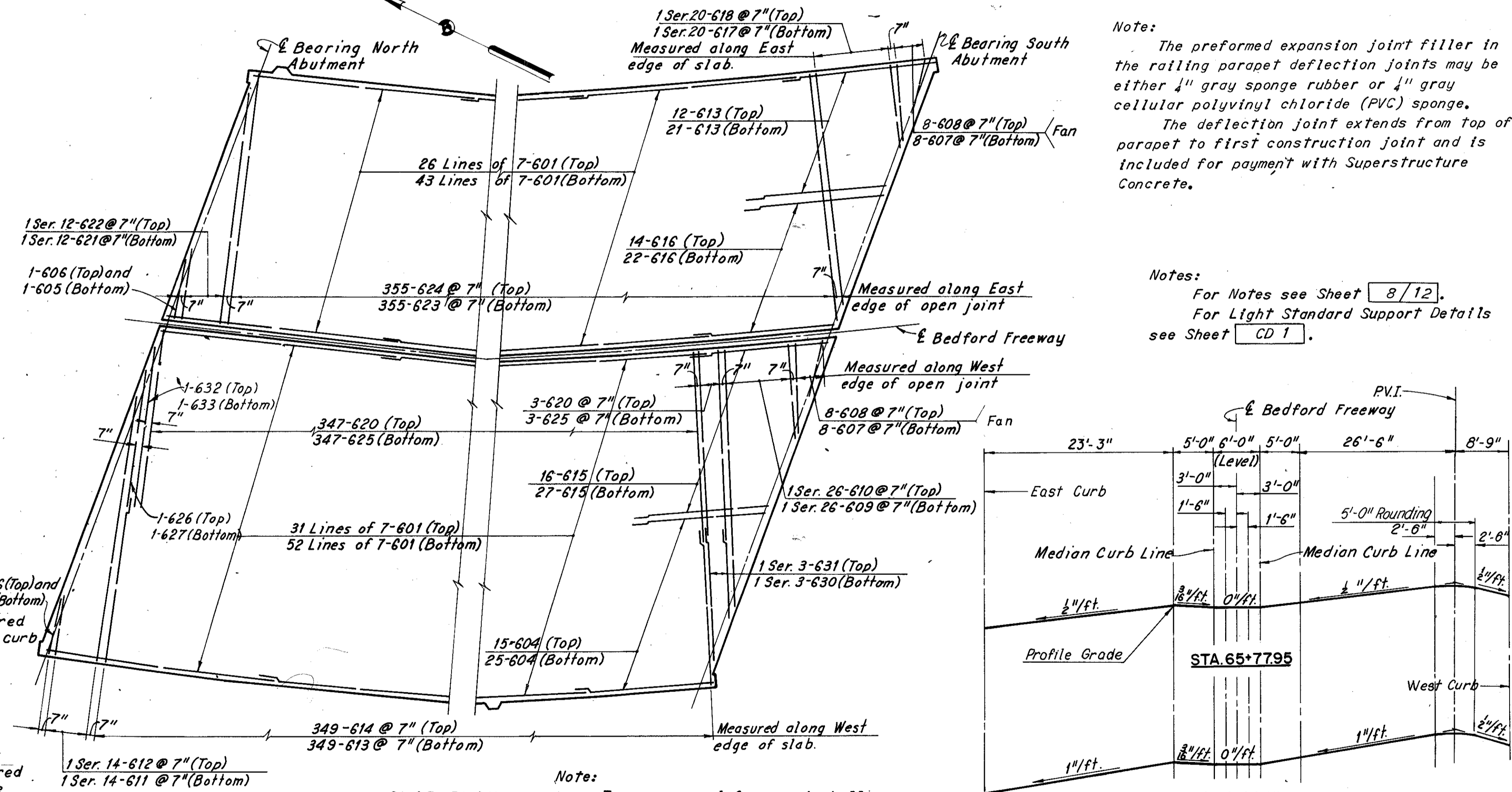
EAST CURB AND PARAPET



WEST CURB AND PARAPET

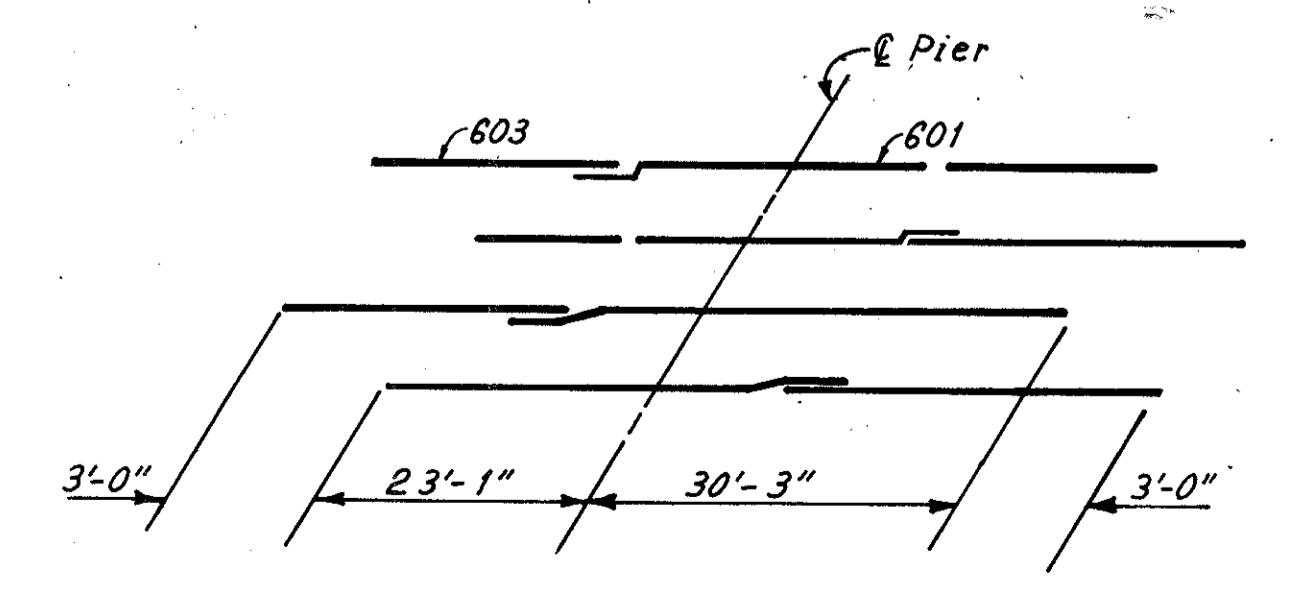
Elevation	Span 1					Span 2					E. Brg. S. Abut.
	1	2	3	4	5	1	2	3	4	5	
A	886.02	885.63	885.22	884.80	884.38	883.98	883.47	883.00	882.47	881.90	881.35
B	887.12	886.81	886.49	886.16	885.83	885.53	885.17	884.81	884.41	883.95	883.44
C	887.14	886.84	886.53	886.19	885.87	885.56	885.18	884.82	884.41	883.97	883.44
D	888.27	888.09	887.88	887.66	887.44	887.25	887.04	886.83	886.58	886.29	885.96

Note:  
The elevations shown at the face of curb are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete.



SLAB PLAN

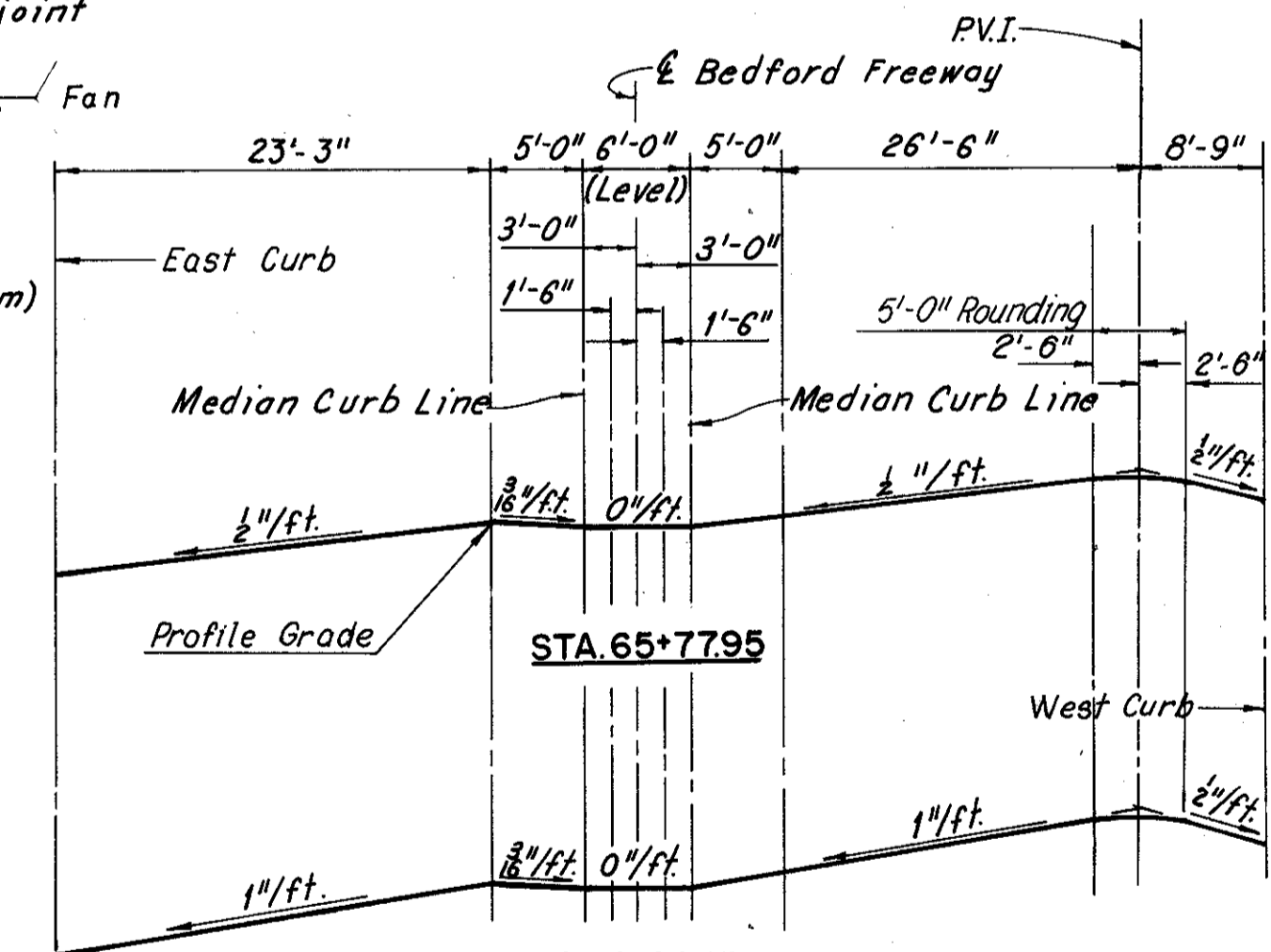
Note:  
Transverse reinforcement shall be placed radially to the edges of slab.



PLACEMENT OF ADDITIONAL REINFORCEMENT OVER PIER

Note:  
The preformed expansion joint filler in the railing parapet deflection joints may be either 1/4" gray sponge rubber or 1/4" gray cellular polyvinyl chloride (PVC) sponge. The deflection joint extends from top of parapet to first construction joint and is included for payment with Superstructure Concrete.

Notes:  
For Notes see Sheet 8/12.  
For Light Standard Support Details see Sheet CD 1.



SUPERELEVATION TRANSITION DIAGRAM

H.N.T.B. BR. NO. 8  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SLAB PLAN AND TYPICAL CROSS SECTION**  
I-80 UNDER BEDFORD FREEWAY  
BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24  
CUYAHOGA COUNTY OHIO

DRAWN J.T.	TRACED/S.C.	CHECKED R.H.	REVIEWED	REVISED
DATE 4-23-69	DATE 5-15-69	DATE 5-27-69	DATE	DATE

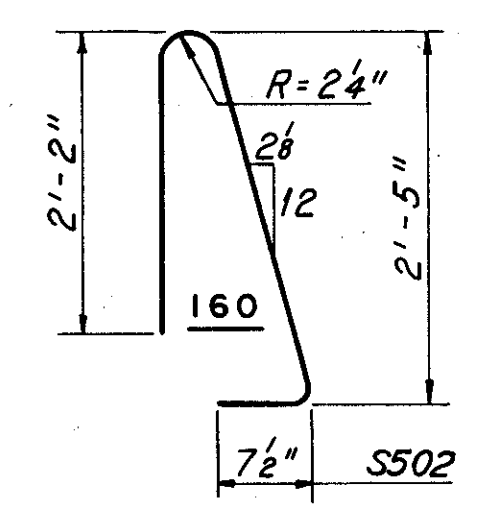
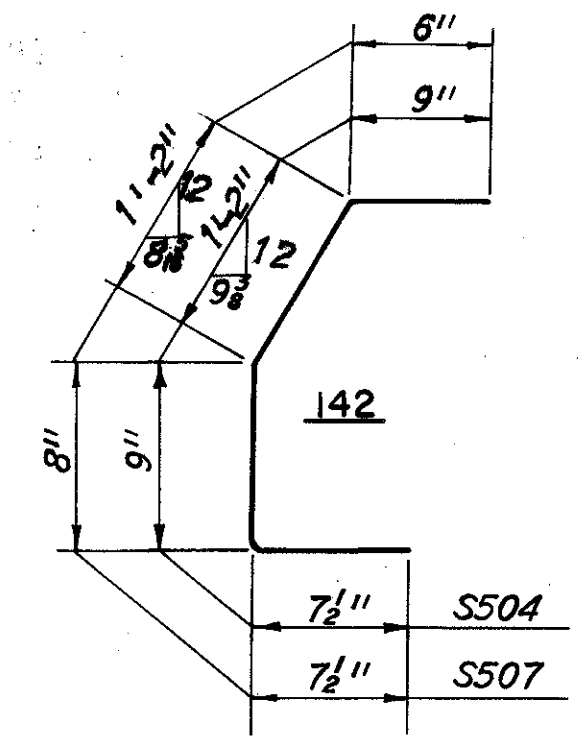
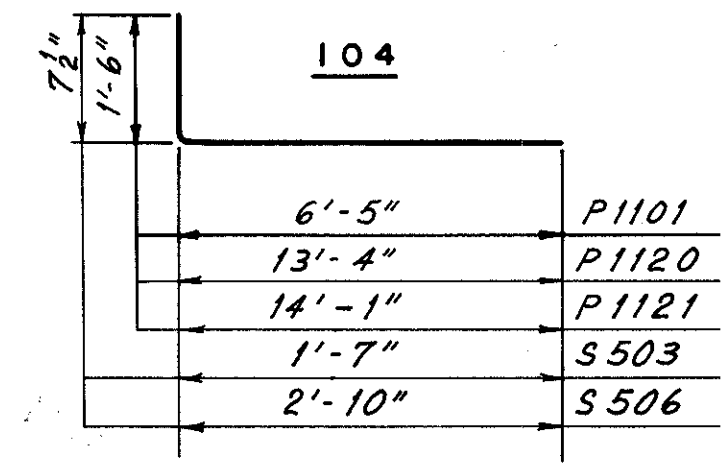
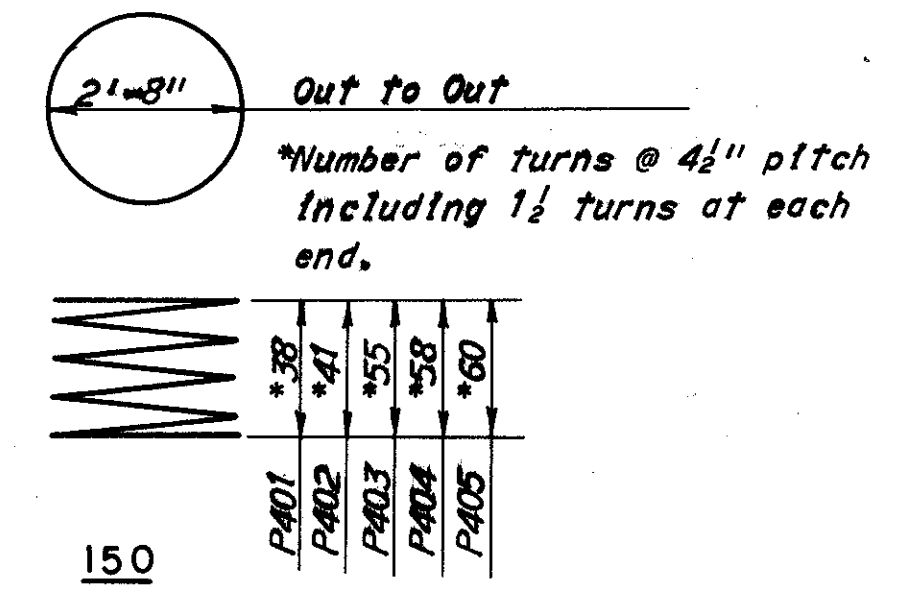
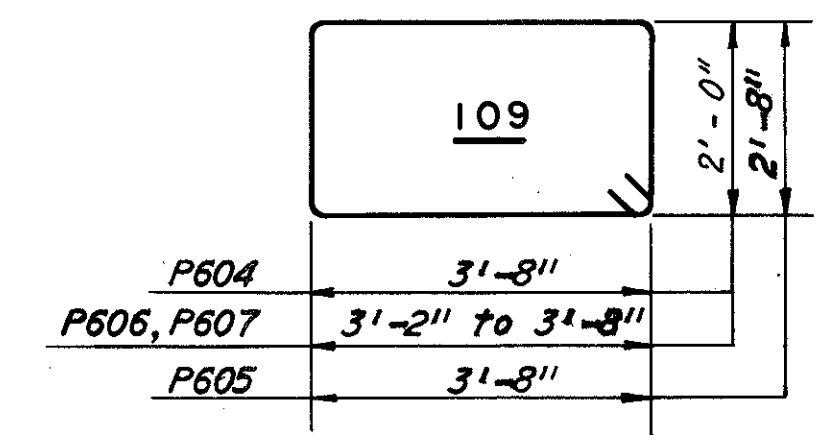
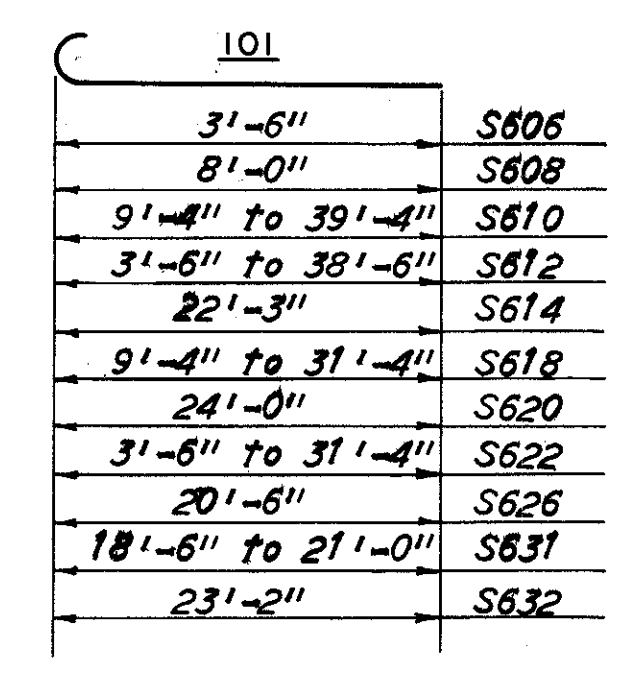
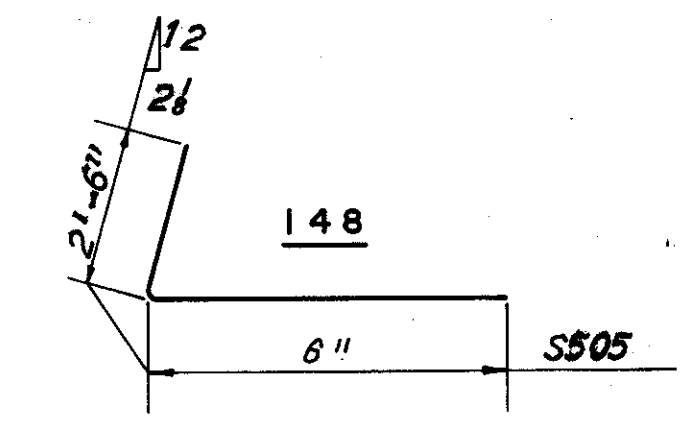
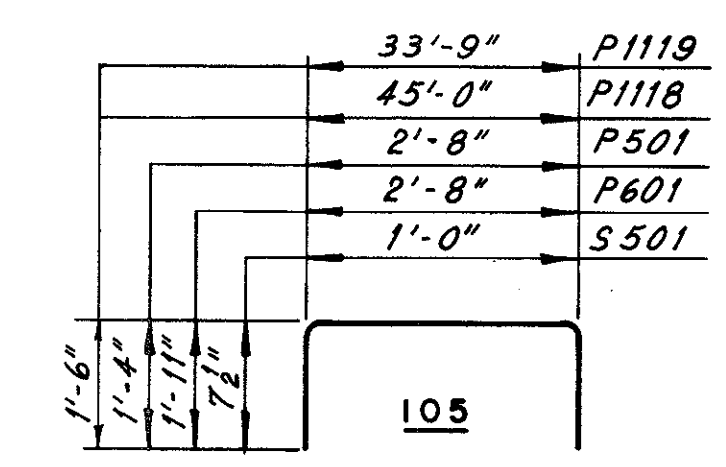
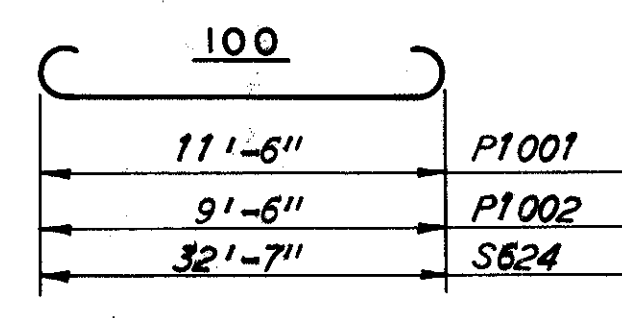
SHEET 10/12

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)		
NORTH ABUTMENT																			
						AN666	19	11'-1"	135		316	AS626	1	4'-1"	100		6		
						AN667	1 Ser. 5	10'-3"	7'-3"	Str.	9"	66	AS627	12	5'-6"	Str.		99	
AN401	77	3'-7"	105		184	AN668	4	5'-9"	Str.		35	AS628	14	3'-10"	100		81		
ANS01	6	37'-6"	Str.		235	AN669	4	6'-9"	162		41	AS629	8	7'-10"	100		94		
ANS02	4	39'-9"	Str.		166	AN670	2	4'-0"	Str.		12	AS630	1	3'-6"	100		5		
ANS03	41	6'-6"	105		278	AN673	1	6'-6"	162		10	AS632	9	19'-8"	104		266		
ANS04	34	40'-9"	Str.		1,445	AN674	2	17'-6"	Str.		53	AS633	11	15'-3"	Str.		252		
ANS05	1	19'-0"	Str.		20	AN675	4	13'-6"	Str.		81	AS634	11	4'-11"	108		81		
ANS06	1	8'-9"	Str.		9	AN676	2	10'-9"	Str.		32	AS635	1 Ser. 4.3	9'-3"	11'-6"	Str.	3"	670	
ANS07	1	16'-3"	Str.		17	AN677	2	6'-6"	112		20	AS636	1 Ser. 3	11'-6"	13'-6"	Str.	1'-0"	56	
ANS08	1	27'-3"	Str.		28	AN678	1 Ser. 5	8'-9"	2'-9"	Str.	1'-6"	43	AS637	81	5'-8"	104		689	
ANS09	1	12'-9"	Str.		13	AN679	4	5'-0"	Str.		30	AS638	3	6'-8"	104		30		
ANS10	39	2'-0"	105		81	AN680	10	3'-9"	Str.		56	AS639	1 Ser. 3.6	8'-0"	10'-0"	Str.	3"	487	
ANS11	29	6'-11"	161		184	AN681	2	10'-4"	100		31	AS640	39	12'-5"	108		727		
ANS12	1 Ser. 4	9'-6"	6'-10"	155	108	AN682	2	9'-10"	100		30	AS641	39	12'-7"	126		737		
ANS13	2	6'-3"	141		13	AN685	1	11'-6"	Str.		17	AS642	45	12'-11"	126		817		
ANS14	16	3'-3"	Str.		54	AN686	8	4'-2"	162		50	AS643	18	12'-3"	124		331		
ANS15	2	6'-6"	140		14	AN687	3	12'-9"	Str.		57	AS644	1 Ser. 2.7	12'-3"	13'-2"	Str.	1/2"	515	
ANS16	10	23'-0"	Str.		240	AN688	8	14'-0"	Str.		168	AS645	8	25'-6"	Str.		306		
ANS17	10	17'-9"	Str.		185	AN689	2	9'-3"	Str.		28	AS646	2	20'-0"	Str.		60		
ANS18	12	9'-0"	Str.		113							AS647	2	21'-0"	Str.		63		
ANS19	7	8'-3"	Str.		60	AN801	2	5'-6"	Str.		29	AS648	4	16'-3"	Str.		98		
ANS20	11	7'-9"	Str.		89	AN802	2	12'-6"	118		67	AS649	2 Ser. 1.2	2'-6"	16'-0"	Str.	1/4"	333	
ANS21	11	7'-0"	Str.		80	AN803	2	6'-9"	Str.		36	AS650	6	5'-6"	Str.		50		
						AN804	2	16'-9"	118		89	AS651	34	10'-8"	135		545		
						AN805	28	5'-9"	141		430	AS652	2	8'-6"	112		26		
AN601	29	41'-9"	Str.		1,811							AS653	6	3'-8"	Str.		32		
AN602	7	39'-9"	Str.		407							AS654	2	3'-8"	101		11		
AN603	3	40'-9"	Str.		184							AS655	6	4'-0"	Str.		36		
AN604	1	39'-9"	Str.		60							AS656	2	4'-8"	162		14		
AN607	1 Ser. 3	11'-6"	4'-6"	100	366							AS657	2	4'-7"	162		14		
AN608	2	17'-11"	163		52	AS401	77	3'-7"	105		184	AS658	1	5'-11"	162		9		
AN609	2	20'-8"	149		62							AS659	1 Ser. 1.0	8'-0"	16'-0"	Str.	9/8"	173	
AN610	3	12'-4"	100		56	AS501	70	30'-0"	Str.		2,190	AS660	4	13'-3"	Str.		80		
AN612	69	11'-10"	100		1,226	AS502	1	31'-0"	Str.		32	AS661	2	12'-6"	Str.		38		
AN615	5	5'-3"	Str.		39	AS503	2	37'-0"	Str.		78	AS662	1 Ser. 1.0	6'-9"	13'-9"	Str.	9/8"	154	
AN616	5	6'-3"	Str.		47	AS504	3	22'-0"	Str.		69	AS663	2	9'-8"	101		29		
AN617	8	7'-10"	100		94	AS505	43	7'-2"	126		321	AS664	12	5'-5"	104		98		
AN618	14	3'-10"	100		81	AS506	1 Ser. 2.2	11'-3"	13'-6"	Str.	1 3/8"	284	AS665	3	6'-7"	162		30	
AN619	34	5'-6"	104		281	AS507	1 Ser. 1.9	10'-0"	12'-3"	Str.	1 1/2"	220	AS666	1 Ser. 3	10'-0"	8'-0"	Str.	1'-0"	41
AN620	34	10'-10"	104		553	AS508	2	8'-6"	141		18	AS667	2	19'-9"	Str.		59		
AN622	10	4'-3"	Str.		64	AS509	2	6'-9"	140		14	AS668	5	20'-6"	Str.		154		
AN623	39	9'-10"	104		576	AS510	2	13'-6"	Str.		28	AS669	2	13'-3"	Str.		40		
AN629	81	8'-3"	Str.		1,004	AS511	20	2'-9"	Str.		57	AS670	2	13'-3"	Str.		170		
AN630	43	11'-2"	126		721	AS512	44	2'-11"	105		96	AS671	8	14'-2"	157		220		
AN631	45	12'-6"	124		807	AS513	34	6'-2"	161		219	AS672	27	5'-5"	103		98		
AN632	37	21'-6"	149		1,195	AS514	1 Ser. 6	6'-6"	9'-6"	Str.	7/8"	50	AS673	6	11'-5"	157		143	
AN633	2	10'-9"	Str.		32	AS515	10	23'-3"	Str.		242	AS674	17	5'-7"	104		204		
AN634	4	13'-6"	Str.		162	AS516	10	3'-9"	Str.		39	AS675	7	19'-5"	157		162		
AN635	6	7'-11"	126		64	AS517	10	25'-6"	Str.		266	AS676	2 Ser. 3	17'-0"	19'-0"	Str.	12"	41	
AN637	4	9'-5"	126		57	AS518	10	5'-0"	Str.		52	AS677	2	13'-9"	Str.		131		
AN638	5	15'-2"	126		114	AS519	1 Ser. 7	6'-6"	9'-6"	Str.	6"	58	AS678	2 Ser. 6	2'-6"	12'-0"	Str.	1'-10 1/2"	44
AN639	9	3'-2"	148		43	AS520	1	7'-9"	Str.		8	AS679	3	9'-8"	104		282		
AN640	2	7'-0"	Str.		21	AS521	1	17'-3"	Str.		13	AS680	8	23'-6"	Str.		8		
AN641	1	9'-6"	Str.		14	AS522	1	12'-9"	Str.			AS681	1	5'-4"	Str.		10		
AN643	6	18'-0"	Str.		162							AS682	1	5'-8"	162		9		
AN644	2	13'-3"	Str.		40	AS601	77	11'-10"	100		1,369	AS683	1	5'-8"	162		126		
AN645	2	10'-0"	Str.		30	AS602	2 Ser. 3	29'-0"	32'-6"	Str.	1'-9"	277	AS685	1 Ser. 8	13'-0"	7'-6"	Str.	9 1/2"	11
AN646	2	7'-0"	Str.		21	AS603	1 Ser. 6	29'-6"	32'-0"	Str.	6"	277	AS686	1	8'-6"	162		35	
AN647	2	3'-9"	Str.		11	AS604	1 Ser. 8	28'-0"	32'-0"	Str.	6 1/2"	360	AS687	3	9'-0"	162		33	
AN648	1 Ser. 5	11'-0"	8'-3"	162	8 1/2"	AS605	20	15'-0"	Str.		451	AS688	3	7'-3"	Str.		135		
AN649	4	6'-6"	162		39	AS606	1 Ser. 9	31'-6"	35'-0"	Str.	5 1/4"	449	AS689	1 Ser. 7	10'-3"	17'-3"	Str.	1'-0"	80
AN650	4	5'-6"	Str.		33	AS607	1 Ser. 9	31'-0"	35'-0"	Str.	6"	446	AS690	2	18'-0"	Str.		35	
AN651	2	4'-6"	Str.		14	AS608	1	34'-0"	Str.		49	AS691	2	12'-3"	Str.		34		
AN652	2	5'-6"	162		17	AS609	1	32'-6"	Str.		49	AS692	2	11'-8"	101		76		
						AS610	2	16'-11"	158		51	AS693	6	8'-5"	149		105		
AN654	4	4'-9"	162		29	AS611	7	7'-0"	Str.		74	AS694	7	10'-0"	149		93		
AN655	6	6'-7"	126		59	AS612	106	9'-0"	Str.		1,433	AS695	4	15'-6"	149		48		
AN656	6	8'-7"	126		77	AS613	1	2'-2"	Str.		3	AS696	2	16'-0"	162		130		
AN657	22	5'-10"	103		193	AS614	1	6'-6"	Str.		10	AS697	5	17'-3"	Str.		33		
AN658	5	12'-6"	126		109	AS615	2	22'-9"	149		68	AS698	3	7'-4"	104		30		
AN659	11	3'-2"	108		52	AS616	1	8'-9"	Str.		13	AS699	2	10'-0"	Str.				
AN660	6	7'-7"	104		68	AS617	1	12'-10"	100		19								
AN661	6	23'-0"	Str.		207	AS618	1	9'-0"	Str.		14	AS801	79	9'-11"	104		2,092		
AN662	2	8'-9"	Str.		26	AS619	1	13'-11"	100		20	AS802	4	10'-11"	104		117		
AN663	2	10'-6"	Str.		32	AS620	1	10'-6"	Str.		16	AS803	2	18'-10"	118		101		
AN664	1 Ser. 8	12'-3"	7'-3"	Str.	8 1/2"	AS621	1	13'-7"	100		20	AS804	2	7'-8"	Str.		40		
AN665	1 Ser. 8	13'-2"	6'-2"	162	110"	AS622	1	8'-6"	Str.		13	AS805	2	16'-5"	118		88		
						AS623	1	11'-10"	100		18	AS806	2	7'-3"	Str.		39		

CUYAHOGA COUNTY  
 CUY-80-2140  
 Quantity Calculations  
 Made By K.B.S. Date 7-13-70  
 Checked By R.E.K. Date 8-17-70

BENDING DIAGRAMS

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER						SUPERSTRUCTURE					
P401	1	13'-1"	150		251	S501	288	2'-0"	105		601
P402	1	14'-3"	150		272	S502	288	5'-4"	160		1602
P403	1	19'-7"	150		366	S503	288	2'-1"	104		626
P404	1	20'-6"	150		385	S504	288	3'-1"	142		926
P405	1	21'-4"	150		399	S505	288	2'-10"	148		851
P501	77	5'-1"	105		408	S506	288	3'-4"	104		1001
						S507	288	2'-9"	142		826
						S508	20	13'-9"	Str.		287
P601	12	6'-3"	105		113	S509	132	4'-9"	Str.		654
P602	2	34'-0"	Str.		102	S510	70	14'-9"	Str.		1077
P603	4	23'-6"	Str.		141	S511	38	13'-6"	Str.		535
P604	102	12'-1"	109		1851	S512	2	13'-3"	Str.		28
P605	21	13'-4"	109		421	S513	2	14'-6"	Str.		31
P606	1 Ser. 8	11'-1" to 12'-4"	109	1 1/2"	139						
P607	1 Ser. 9	11'-1" to 12'-4"	109	1 1/2"	157	S601	1245	30'-0"	Str.		56,100
						S602	5	19'-0"	Str.		143
P1001	55	14'-8"	100		3471	S603	55	28'-3"	Str.		2334
P1002	70	12'-8"	100		3815	S604	45	17'-0"	Str.		1149
						S605	2	3'-6"	Str.		11
P1101	70	7'-8"	104		2851	S606	2	4'-2"	101		13
P1102	14	16'-9"	Str.		1246	S607	16	8'-0"	Str.		192
P1103	14	17'-9"	Str.		1320	S608	16	8'-8"	101		208
P1104	14	23'-3"	Str.		1729	S609	1 Ser. 26	9'-3" to 39'-3"	Str.	142 1/2"	947
P1105	14	24'-0"	Str.		1785	S610	1 Ser. 26	10'-0" to 40'-0"	101	142 1/2"	976
P1106	14	25'-0"	Str.		1860	S611	1 Ser. 14	3'-6" to 38'-6"	Str.	2'-6"	442
P1107	8	12'-6"	Str.		532	S612	1 Ser. 14	4'-2" to 39'-2"	101	2'-6"	456
P1108	5	17'-6"	Str.		465	S613	382	18'-6"	Str.		10,615
P1109	5	34'-0"	Str.		903	S614	349	22'-11"	101		12,013
P1110	8	24'-3"	Str.		1031	S615	43	17'-6"	Str.		1131
P1111	4	14'-0"	Str.		298	S616	44	18'-0"	Str.		1190
P1112	3	16'-0"	Str.		255	S617	1 Ser. 20	9'-3" to 31'-3"	Str.	14 1/2"	608
P1113	6	13'-3"	Str.		422	S618	1 Ser. 20	10'-0" to 32'-0"	101	14 1/2"	631
P1114	3	15'-3"	Str.		243						
P1116	2	14'-6"	Str.		154	S620	350	24'-8"	101		12,967
P1117	2	45'-0"	Str.		478	S621	1 Ser. 12	3'-6" to 31'-3"	Str.	2'-6"	313
P1118	7	47'-5"	105		1763	S622	1 Ser. 12	4'-2" to 32'-0"	101	2'-6"	326
P1119	5	36'-2"	105		961	S623	355	32'-6"	Str.		17,329
P1120	2	17'-7"	104		155	S624	355	33'-11"	100		18,085
P1121	2	15'-4"	104		163	S625	350	28'-0"	Str.		14,720
						S626	1	21'-2"	101		32
						S627	1	24'-0"	Str.		36
						S630	1 Ser. 3	14'-6" to 17'-0"	Str.	14 3/4"	71
						S631	1 Ser. 3	19'-2" to 21'-8"	101	14 3/4"	92
						S632	1	23'-10"	101		36
						S633	1	27'-0"	Str.		41
						2 Light Standard Supports					1470
											TOTAL WEIGHT = 163,722



Size	No.	Length	Type
4	1	6'-3"	*Spiral Bar
4	6	6'-3"	Str.
5	8	6'-9"	Str.
6	65	7'-0"	Str.
7	1	7'-3"	Str.
8	7	7'-6"	Str.
10	1	8'-3"	Str.
11	9	8'-6"	Str.
18S	5	2'-6"	Str.

\*Bent bar and bent to diameter of spiral.

SPIRAL REINFORCEMENT NOTE

The "Length" shown in the reinforcement schedule for the spiral bars is the distance from the top of the footing to the bottom of the Pier cap.  
 Four steel channels, tee or angle spacers, weighing approximately 0.80 lbs. per foot of spacer shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers based on 0.80 lbs. per foot will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.  
 Spiral reinforcement may be plain bars but shall in other respects conform to Item 509.

Notes:  
 The 18S reinforcing bars shall be spliced with an approved positive mechanical method designed to develop 125% of the yield strength of the bar.  
 For Light Standard Support Reinforcement Schedule and Bending Diagrams see Sheet CD 1.

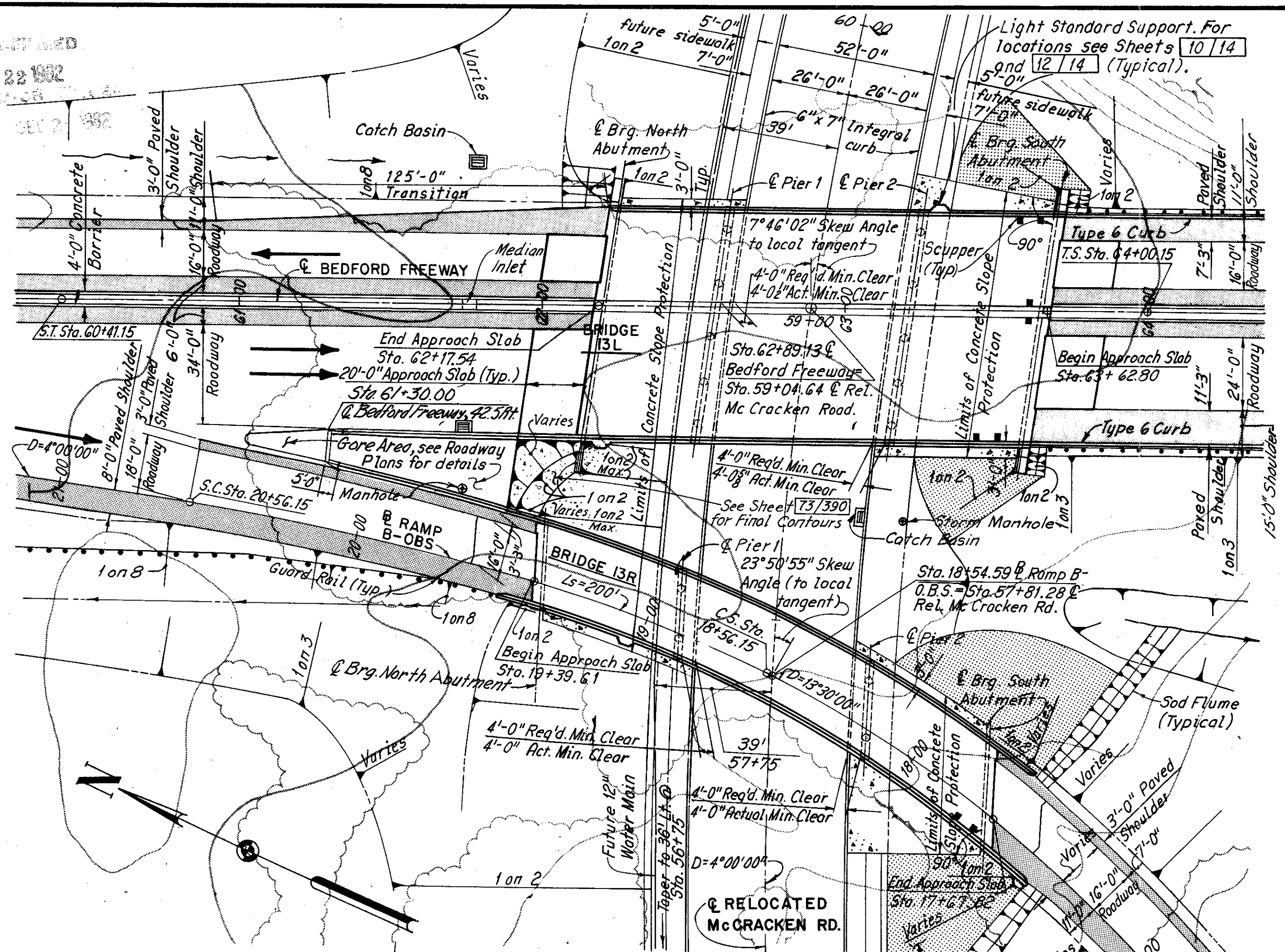
H.N.T.B. BR. NO. 8  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

**REINFORCEMENT SCHEDULE**  
 PIER AND SUPERSTRUCTURE  
 I-80 UNDER BEDFORD FREEWAY

BR. NO. CUY-80-2169 STA. 65+88.92 TO STA. 68+07.24  
 CUYAHOGA COUNTY OHIO

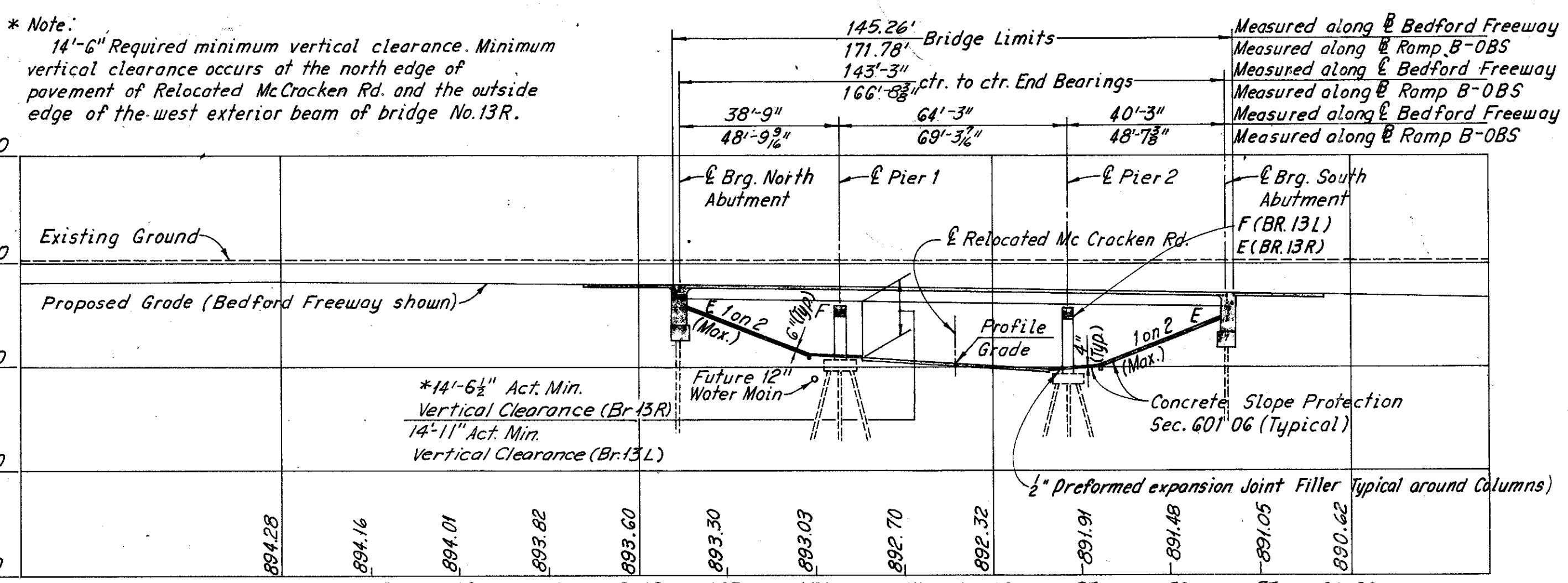
DRAWN R.R.S.	TRACED M.C.	CHECKED R.C.A.	REVIEWED	REVISED
DATE 7-30-70	DATE 8-13-70	DATE 8-17-70	DATE	DATE

SHEET 12/12



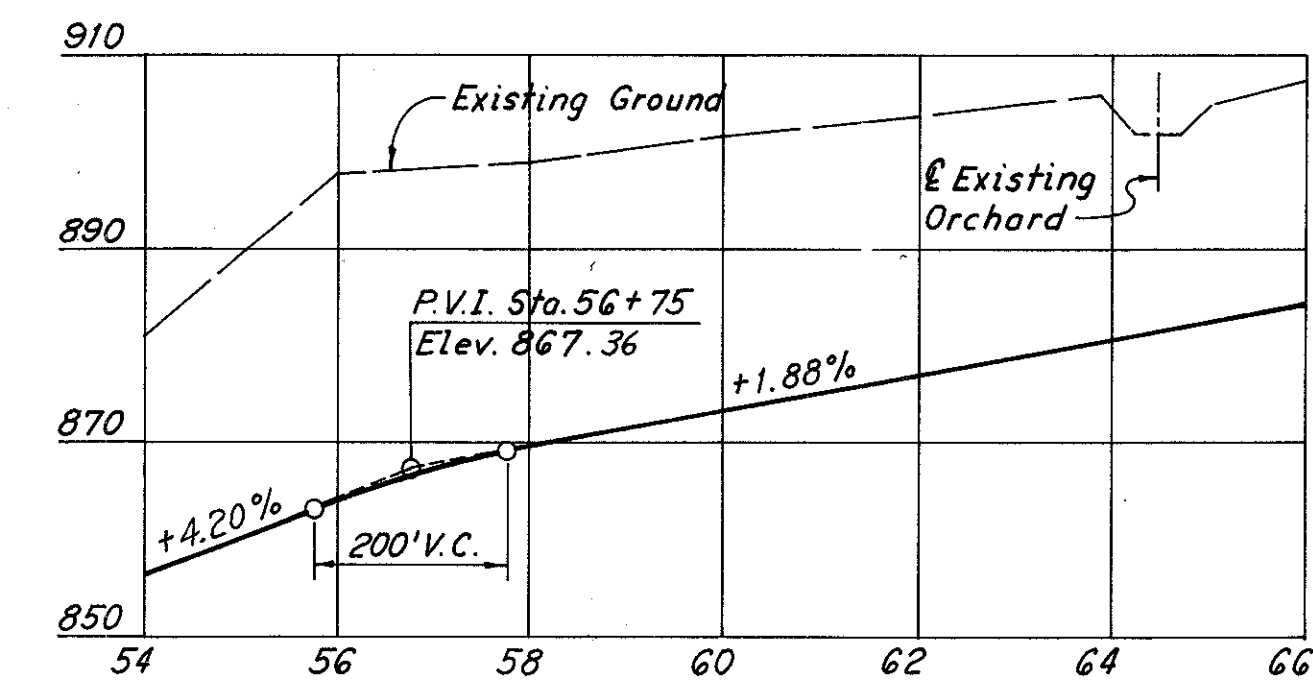
**PLAN**  
Scale: 1"=30'

Notes: Earthwork limits shown are schematic. Actual slopes shall conform to plan cross-sections.  
The 12" Water main north of Pier 1 shall be set in place after the construction of Pier 1 footings.



**ELEVATION**  
Scale: Horiz. 1"=30'  
Vert. 1"=30'

Notes: BR. 13L elevation shown. Stationing and Elevations are given for Bedford Freeway. Elevations shown are profile grade.



**PROFILE - RELOCATED Mc CRACKEN ROAD**  
Scale: Horiz. 1"=200'  
Vert. 1"=20'

**CURVE DATA**

RAMP B-OBS	
C.S. Sta.	18+56.15
S.C. Sta.	20+56.15
Δs	17°30'00"
R1	424.41'
R2	1432.39'
TS1	82.64'
TS2	118.93'
Ls	200.00'
P	2.76'

REL. Mc CRACKEN ROAD	
P.I. Sta.	59+67.96
Δ	44°51'07" Rt.
Dc	4°00'00"
R	1432.39'
T	591.15'
L	1121.30'
E	117.19'

RAMP B-OBS	
P.I. Sta.	17+59.21
Δ	26°39'53" Lt.
Dc	13°30'00"
R	424.41'
T	100.58'
L	197.52'
E	11.76'

**TRAFFIC DATA**

1991 Br. No. 13L 26,854 A.D.T.  
2902 D.D.H.V.  
Br. No. 13R 5205 D.A.D.T.  
698 D.D.H.V.

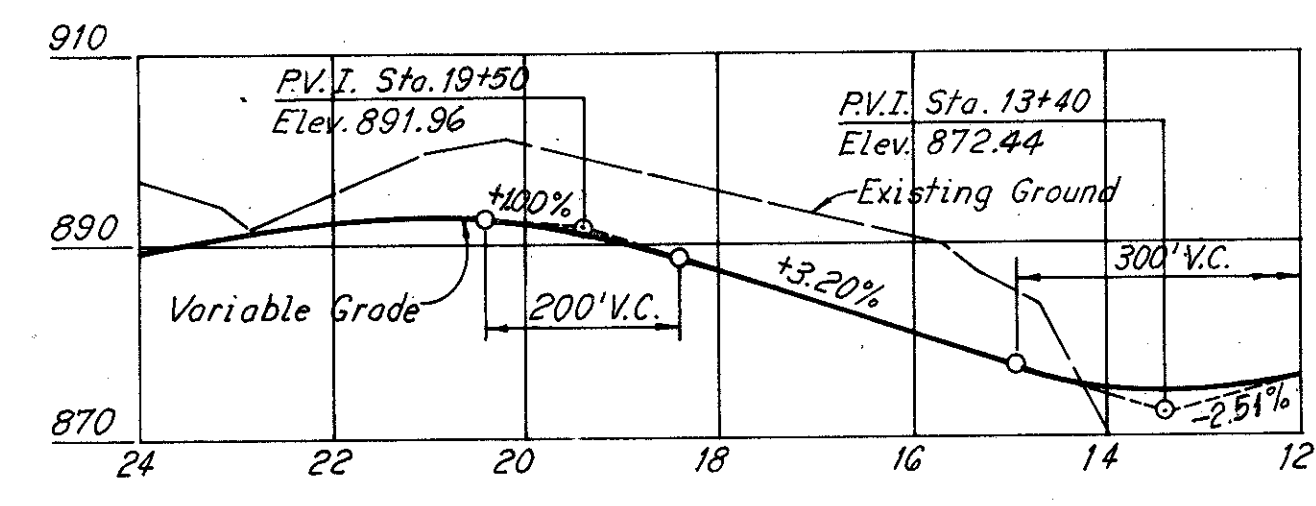
**MAINTENANCE OF TRAFFIC**

Two lanes of traffic with a minimum horizontal width of 26'-0" and a minimum vertical clearance of 13'-6" shall be maintained on Relocated McCracken Road at all times.

Notes:  
Roadway excavation shall be completed to the finish spill-thru slopes and to the level of the subgrades before excavating and driving piles for the abutments and piers.  
All piles are 12" φ C.I.P. Reinforced Concrete at the abutments and HP12x53 at the piers. The piles at the abutments shall be driven to a minimum bearing capacity of 35 tons per pile and piles at the piers shall be driven to a minimum bearing capacity of 40 tons per pile.  
The estimated average pay lengths of the piles are as follows:

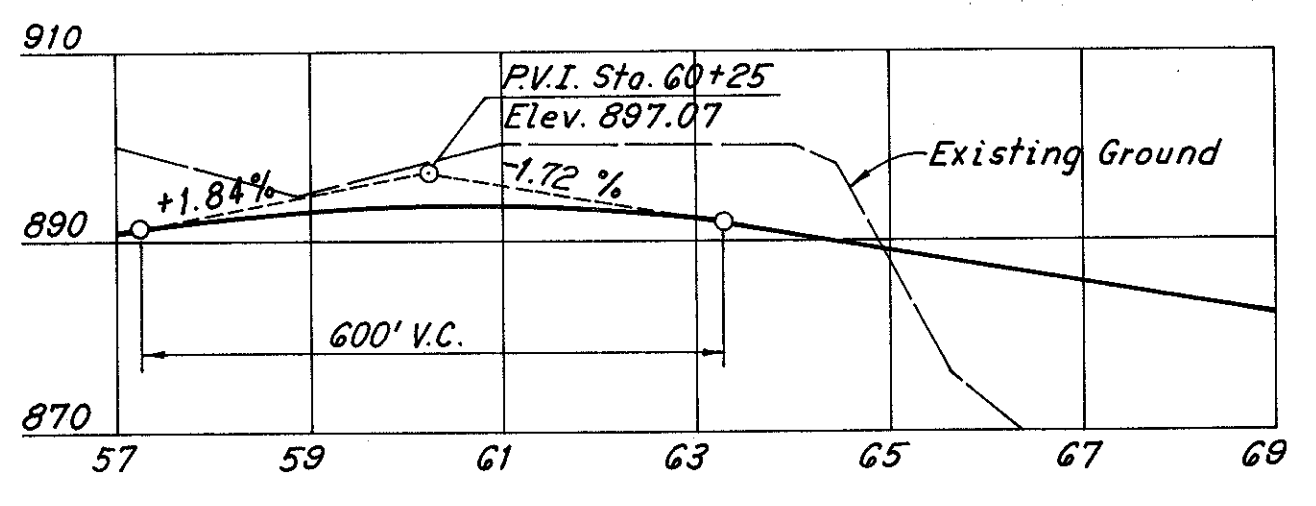
- North Abutment (BR13L) - 26 ft.
- North Abutment (BR13R) - 23 ft.
- Pier 1 (BR13L & R) - 20 ft.
- Pier 2 (BR13L & R) - 15 ft.
- South Abutment (BR13L) - 22 ft.
- South Abutment (BR13R) - 16 ft.

For underpass lighting details see Lighting Plans.



**PROFILE - RAMP B-OBS**  
Scale: Horiz. 1"=200'  
Vert. 1"=20'

Note: The 1/2" preformed expansion joint filler around pier columns are included for payment with Concrete Slope Protection (4" thick).



**PROFILE - BEDFORD FREEWAY**  
Scale: Horiz. 1"=200'  
Vert. 1"=20'

H.N.T.B. BR. NO. 13L & 13R  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SITE PLAN**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCRACKEN ROAD

STA. 62+17.54  
STA. 63+62.80  
(BEDFORD FREEWAY)

REVISIONS  
 DEC 22 1969  
 DEC 22 1969

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

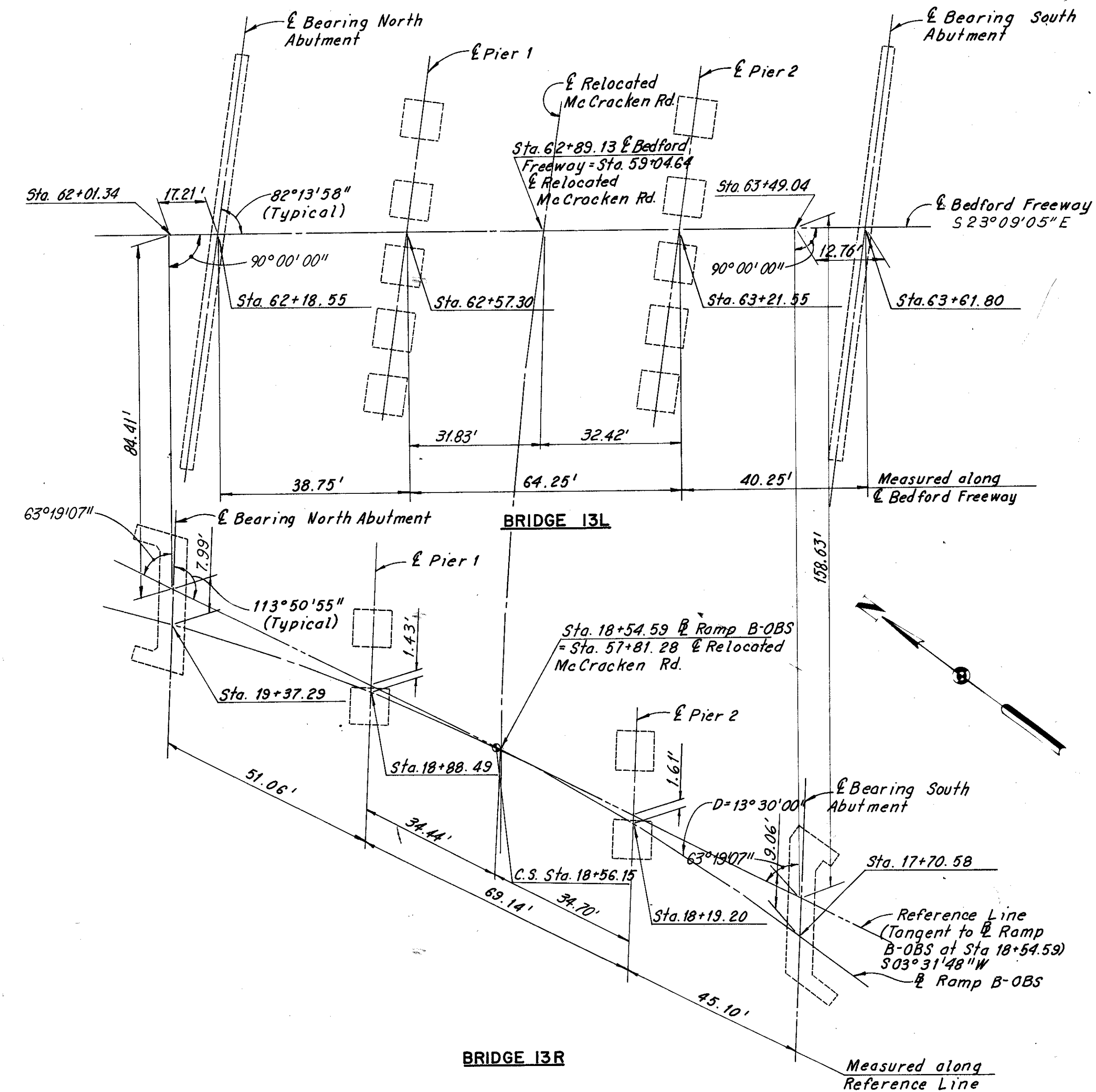
337  
390

Quantity Calculations  
 Made By KYH Date 6-69  
 Checked By DHS Date 7-70

CUYAHOGA COUNTY  
 CUY-80-21.40

ESTIMATED QUANTITIES											
ITEM	TOTAL	UNIT	DESCRIPTION	H.N.T.B. BRIDGE NO. 13L				H.N.T.B. BRIDGE NO. 13R			
				ABUTMENTS	PIERS	SUPER STRUCTURE	GENERAL	ABUTMENTS	PIERS	SUPER STRUCTURE	GENERAL
503	779	Cu. Yd.	Unclassified Excavation	236	227			224	92		
505	Lump	Lump	Test Pile								
503	Lump	Lump	Cofferdams, cribs & sheeting				Lump				Lump
507	1,240	Lin. Ft.	12" $\phi$ C.I.P. Reinforced Concrete Piles	770				470			
507	1,440	Lin. Ft.	Steel Piles, HP 12x53		1,020			420			
509	255,005	Pounds	Reinforcing Steel	14,917	32,908	124,683		12,462	13,500	56,535	
511	599	Cu. Yd.	Class "C" Concrete, Superstructure			424				175	
511	138	Cu. Yd.	Class "C" Concrete, Pier Caps and Columns		100				38		
511	172	Cu. Yd.	Class "C" Concrete, Abutments Above Footings	81				91			
511	249	Cu. Yd.	Class "C" Concrete, Footings	66	90			57	36		
512	184	Lin. Ft.	Premolded Sealing Strip	184							
513	354,200	Pounds	Structural Steel			224,700			129,500		
514	354,200	Pounds	Field Painting of Structural Steel			224,700			129,500		
516	18	Each	Elastomeric Bearing Pads		18						
516	160	Sq. Ft.	1" Preformed Expansion Joint Filler	160							
516	153	Sq. Ft.	1/2" Preformed Expansion Joint Filler	153							
516	67	Lin. Ft.	Preformed Elastic Joint Sealer and Lubricant Adhesive						67		
518	154	Cu. Yd.	Porous Backfill	107				47			
518	235	Lin. Ft.	6" Perforated Helical C.M.P. 707.01	186				49			
518	116	Lin. Ft.	6" Non-perforated Helical C.M.P. (Including Specials, 707.01)	60				56			
518	8	Each	Scuppers Including Supports		6				2		
518	585	Lin. Ft.	Subdrainage for wearing course, as per plan		585						
518	29	Each	Subdrainage for wearing course, as per plan						29		
601	1,245	Sq. Yds.	Concrete Slope Protection (6" Thick)	1,025				220			
601	490	Sq. Yds.	Concrete Slope Protection (4" Thick)	386				104			
808	599	Units	Chemical Admixture for Concrete, Type AB or D			424			175		
404	79	Cu. Yd.	Asphalt Concrete (70-85 or AC-20)			65			14		
Special	24	Cu. Yd.	Sand Asphalt (See Proposal Note)			16	1		7		
Special	1701	Sq. Yd.	Membrane Waterproofing, sheet type (See Proposal Note)			1174	20		507		

Test pile: Payment will be made for only one test pile. It may be driven for either the right or left bridge.



BRIDGE 13R  
 BRIDGE LAYOUT DIAGRAMS

H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

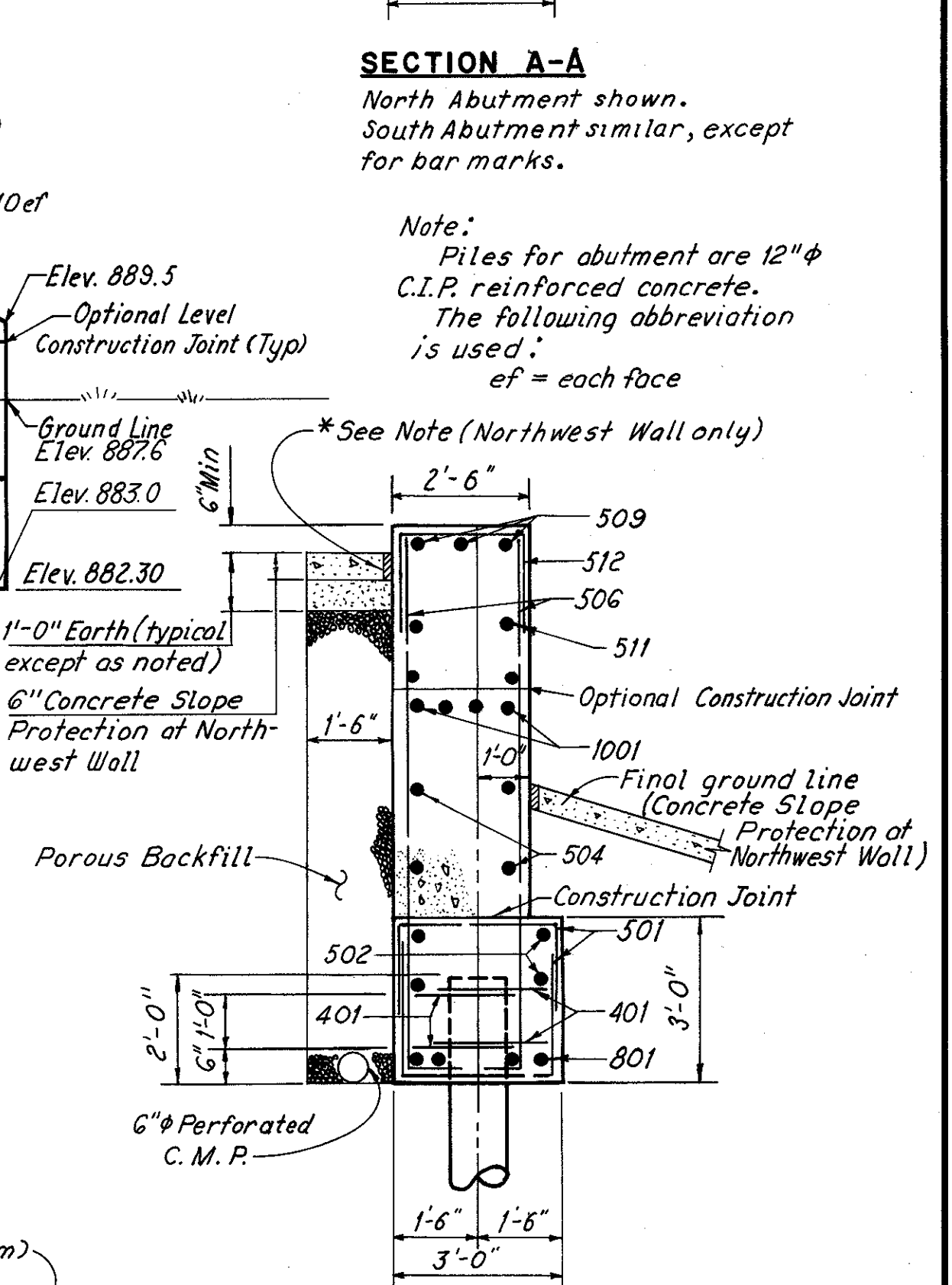
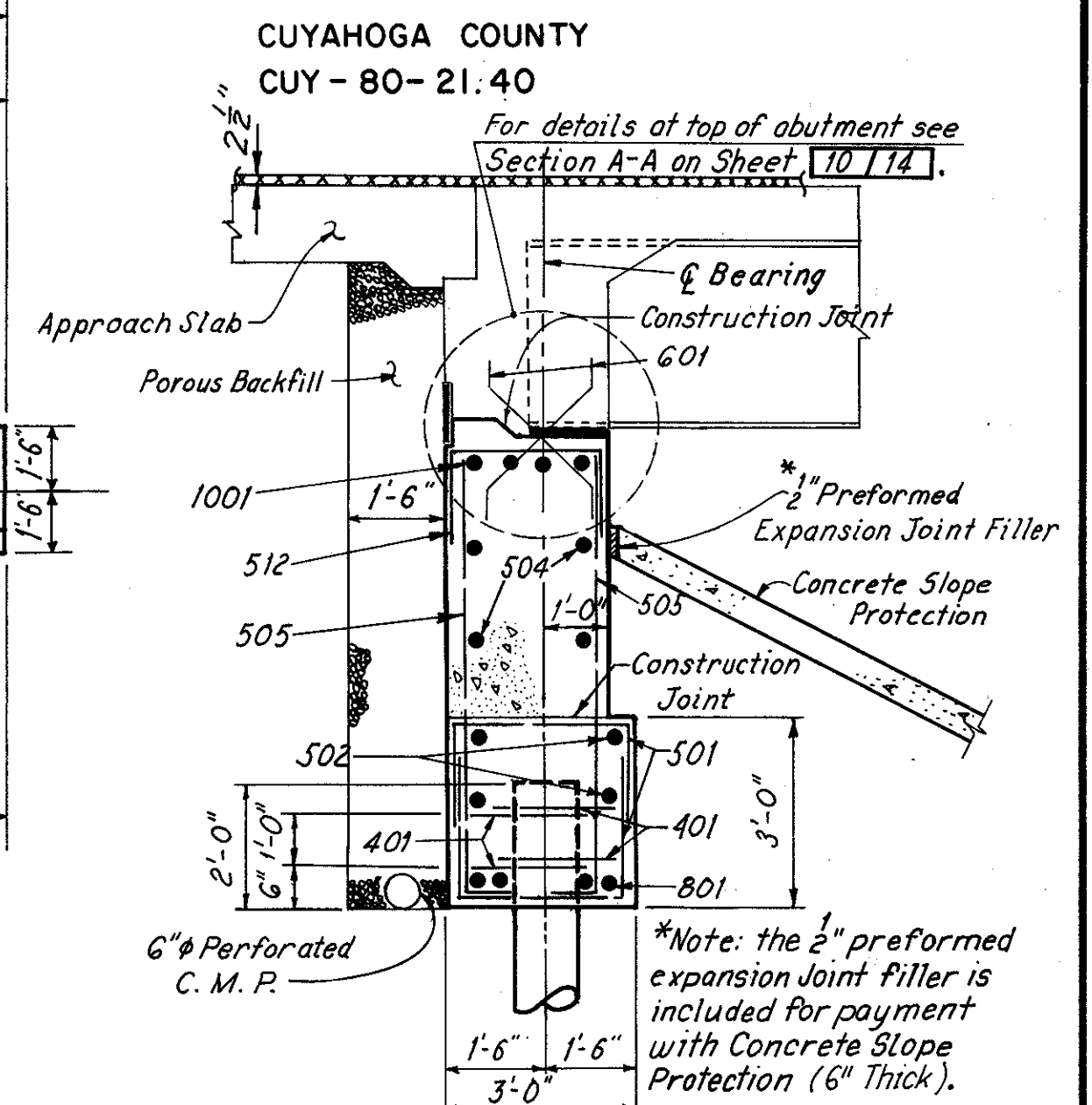
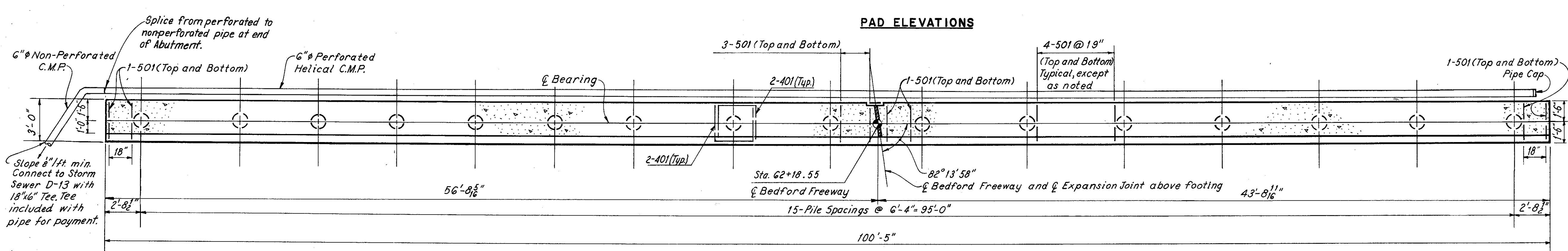
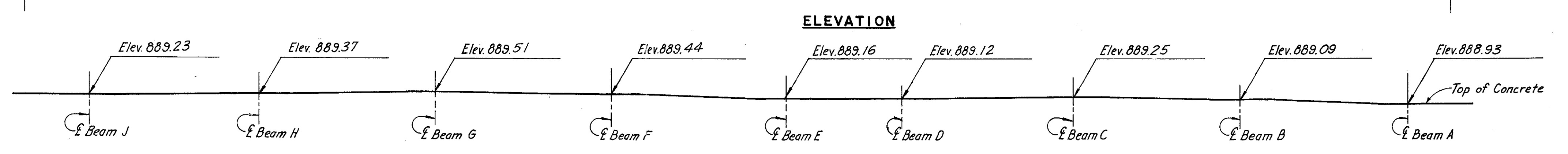
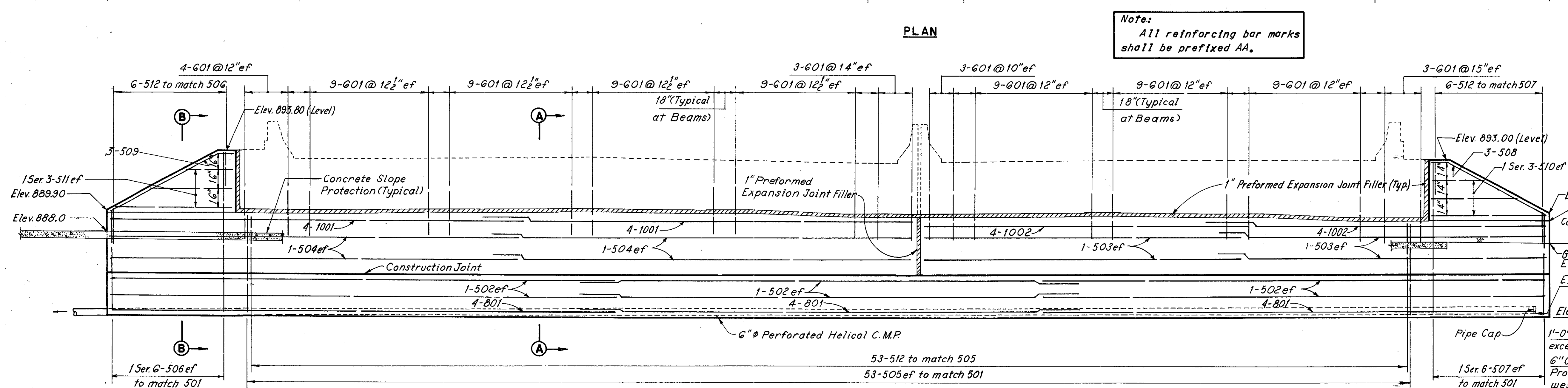
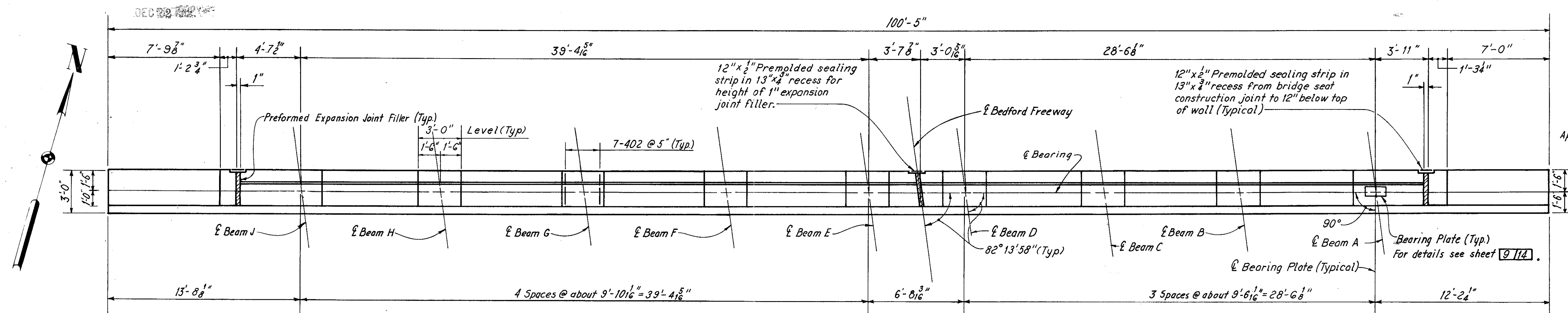
**BRIDGE LAYOUT DIAGRAM  
 AND ESTIMATED QUANTITIES  
 BEDFORD FREEWAY AND RAMP B-OBS  
 OVER RELOCATED MCCRACKEN ROAD**

STA. 62+17.54 TO  
 STA. 63+62.80  
 (BEDFORD FREEWAY)

CUYAHOGA COUNTY OHIO

DRAWN KYH	TRACED GEM	CHECKED DHS	REVIEWED	REVISED
DATE 6-12-69	DATE 7-11-69	DATE 7-9-70	DATE	DATE

SHEET 2/14



M.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**LEFT BRIDGE-NORTH ABUTMENT**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCracken Road

STA. 62+17.54 TO  
STA. 63+62.80  
(BEDFORD FREEWAY)

CUYAHOGA COUNTY OHIO

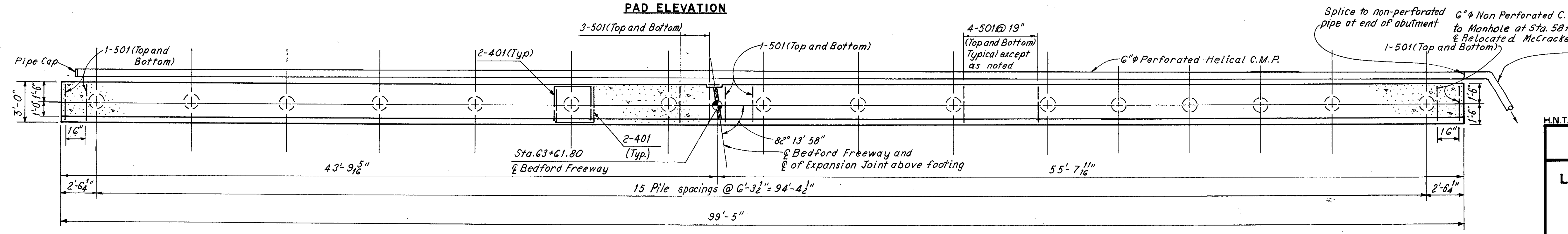
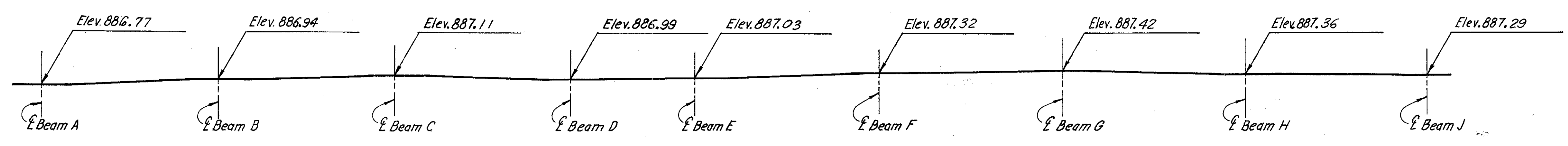
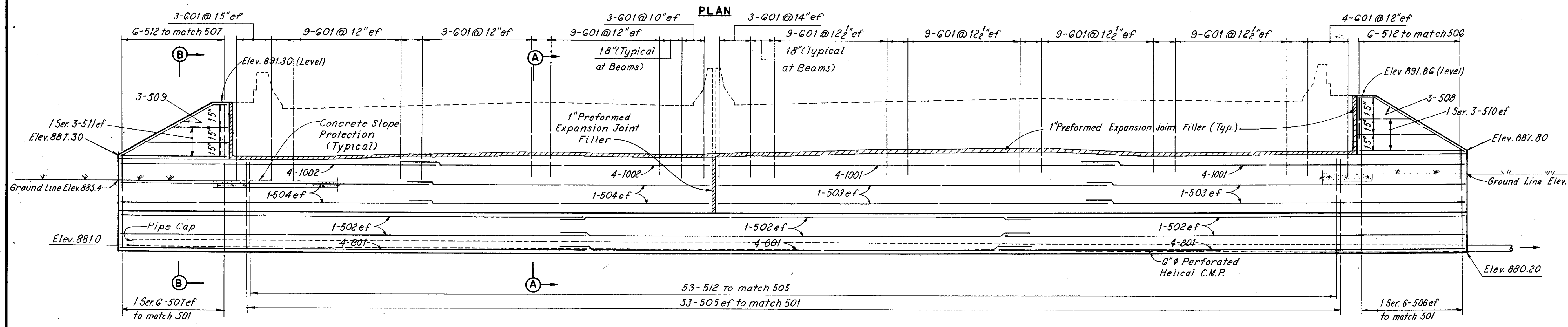
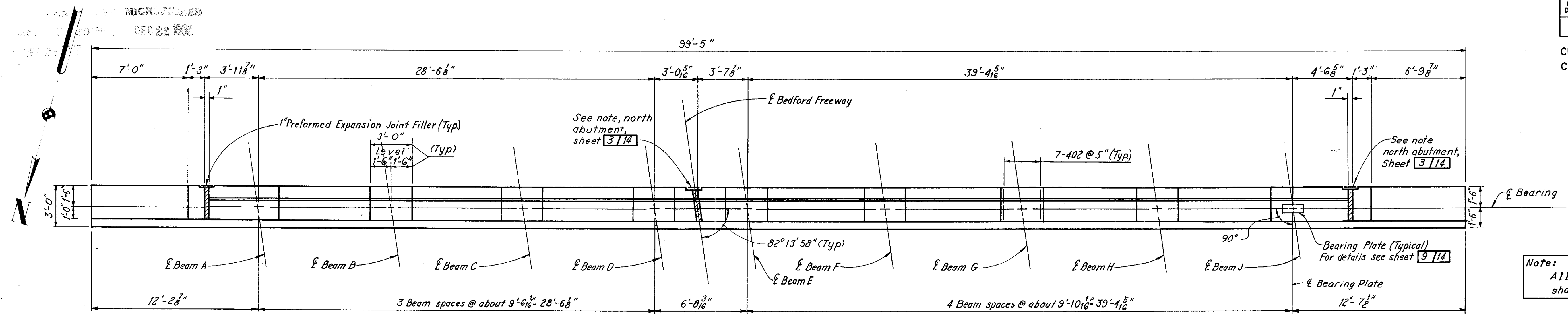
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DATE 6-10-08	DATE 6-23-08	DATE 2-20-10	DATE	DATE

SHEET 3/14

Note:  
For Longitudinal Steel Reinforcement  
in Footing, See Elevation.



CUYAHOGA COUNTY  
CUY-80-21.40



Notes:  
Piles for abutment are 12" Ø C. I. P. reinforced concrete.  
For Sections A-A and B-B see sheet 3/14.  
The following abbreviation is used:  
ef = each face.

Note:  
For Longitudinal Steel Reinforcement in Footing See Elevation.

H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**LEFT BRIDGE-SOUTH ABUTMENT**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED MCCRACKEN ROAD  
STA. 62+17.54 TO  
STA. 63+62.80  
(BEDFORD FREEWAY)

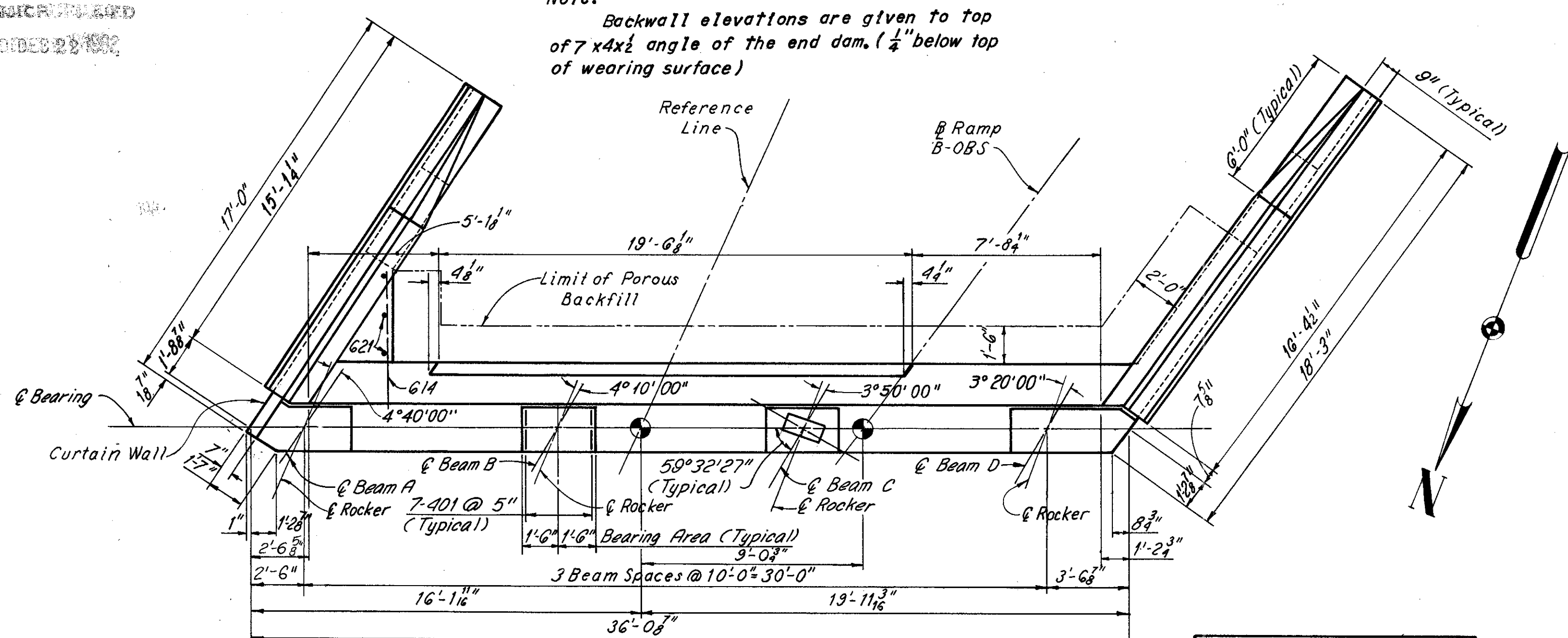
CUYAHOGA COUNTY OHIO

DRAWN/EF	TRACED/EF	CHECKED/MS	REVIEWED	REVISED
DATE 6-10-68	DATE 6-24-68	DATE 7-20-70	DATE	DATE

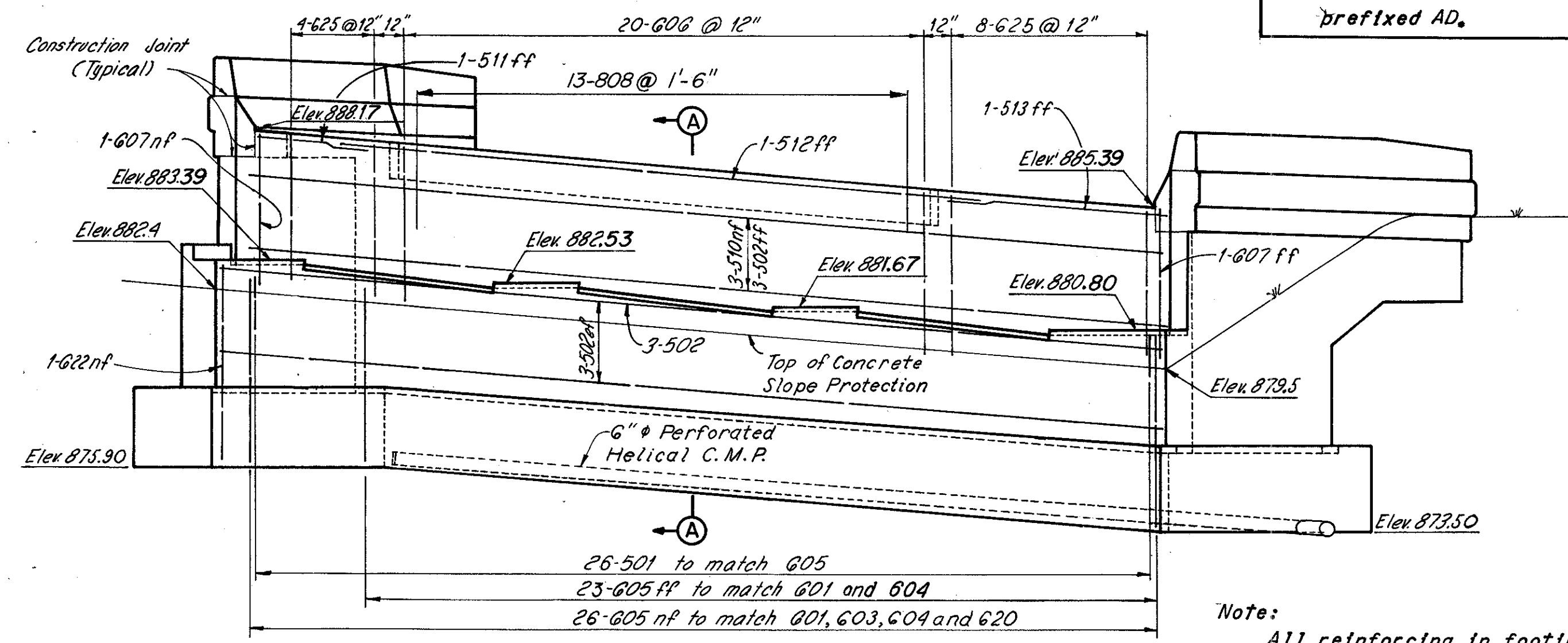
SHEET 4/14



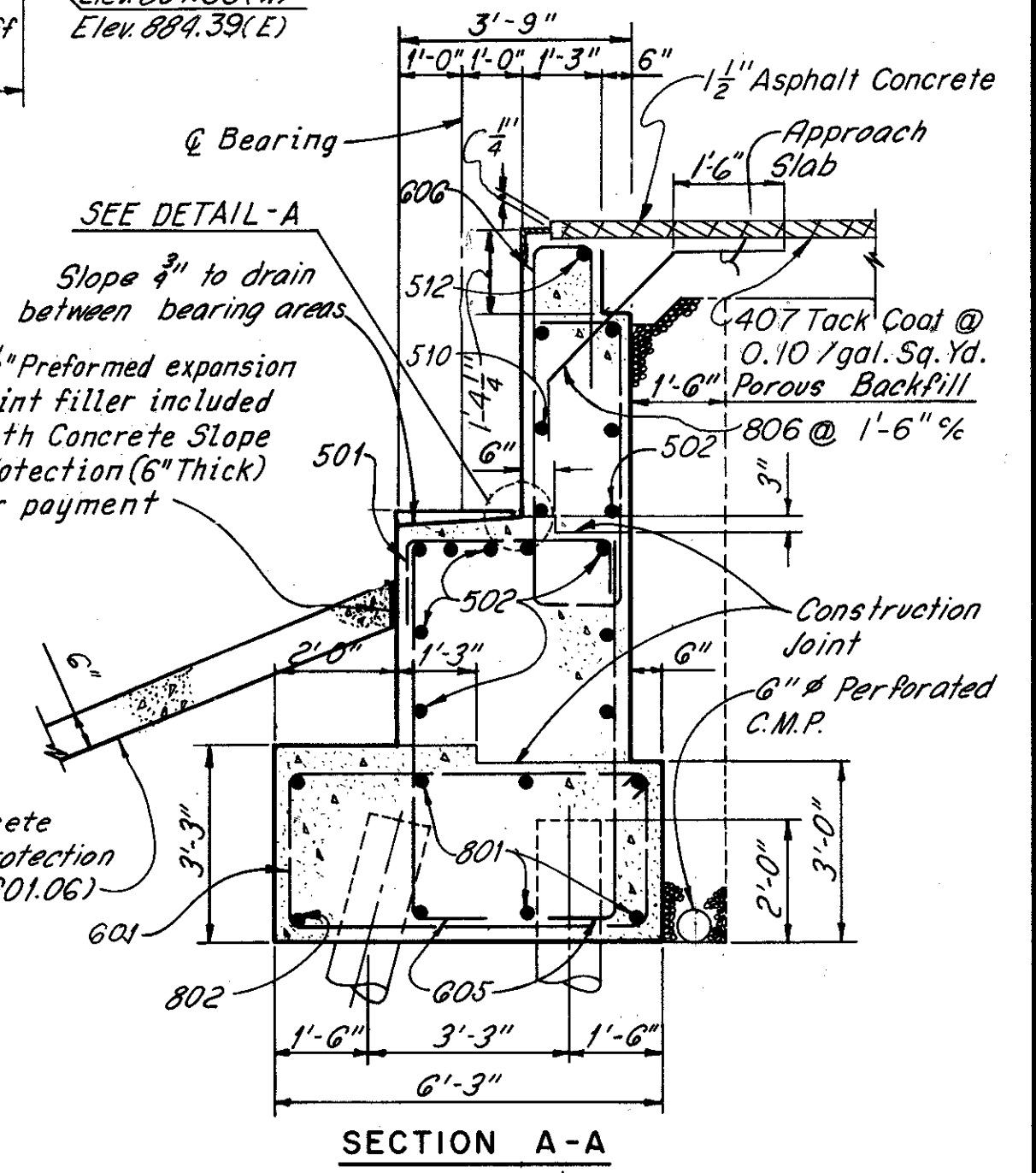
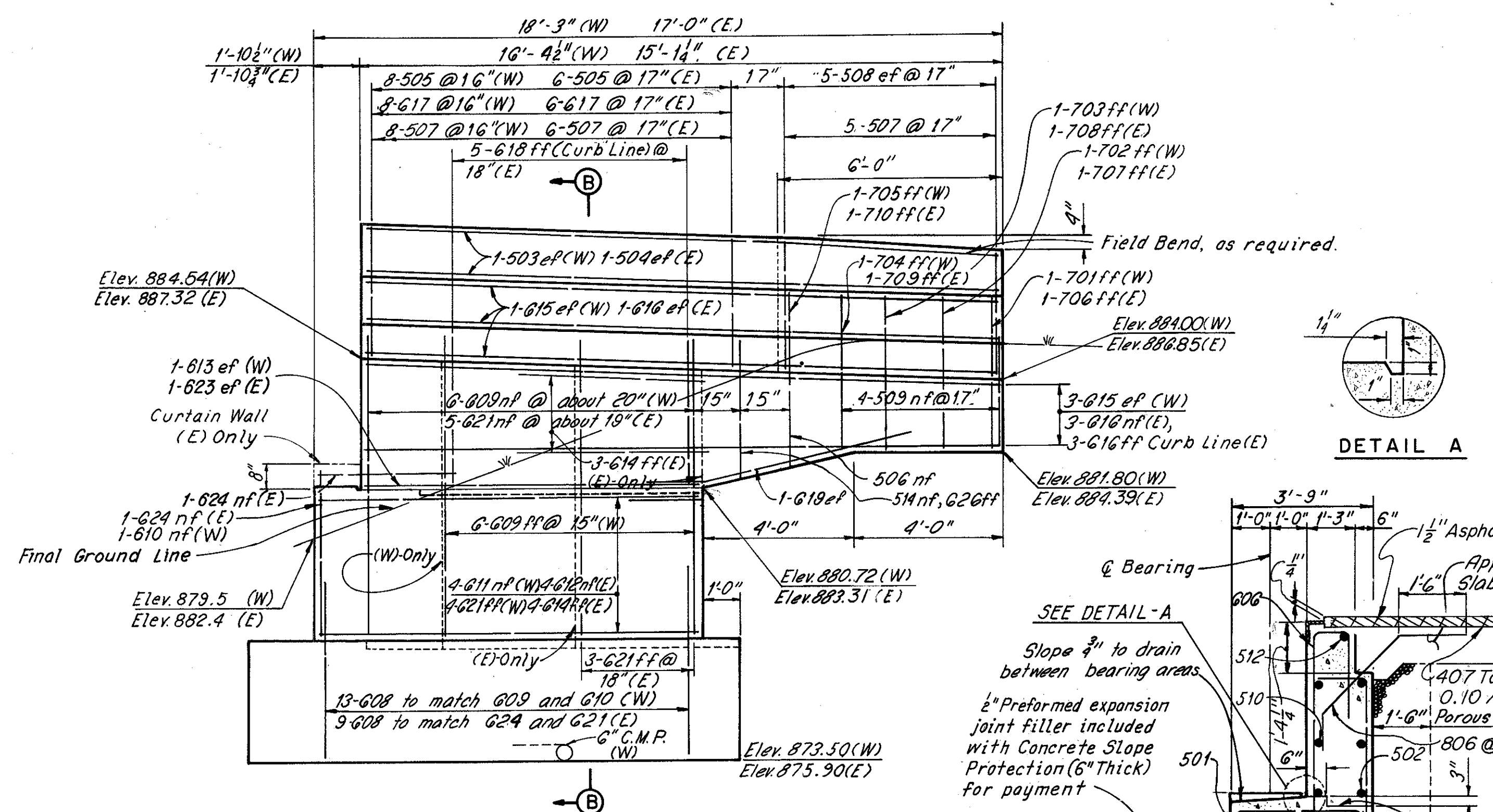
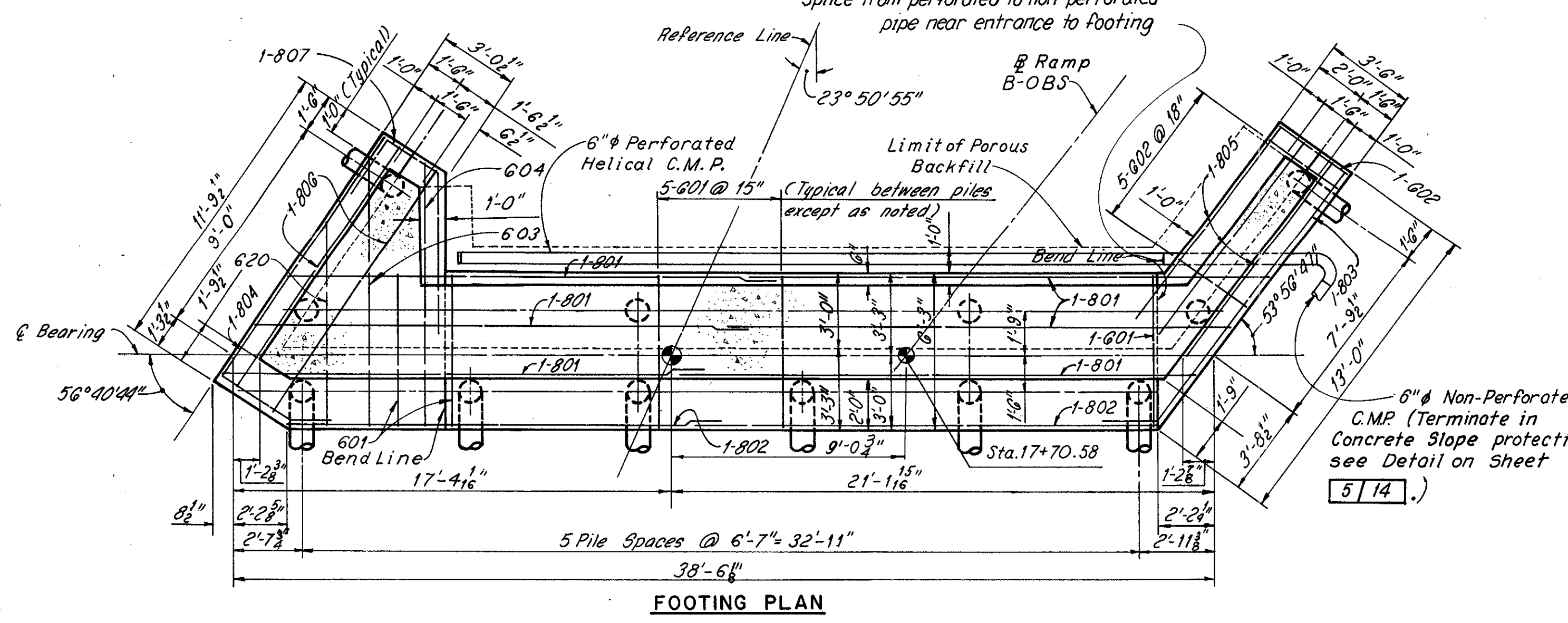
Note:  
Backwall elevations are given to top of 7x4x1/2 angle of the end dam, (1/4" below top of wearing surface)



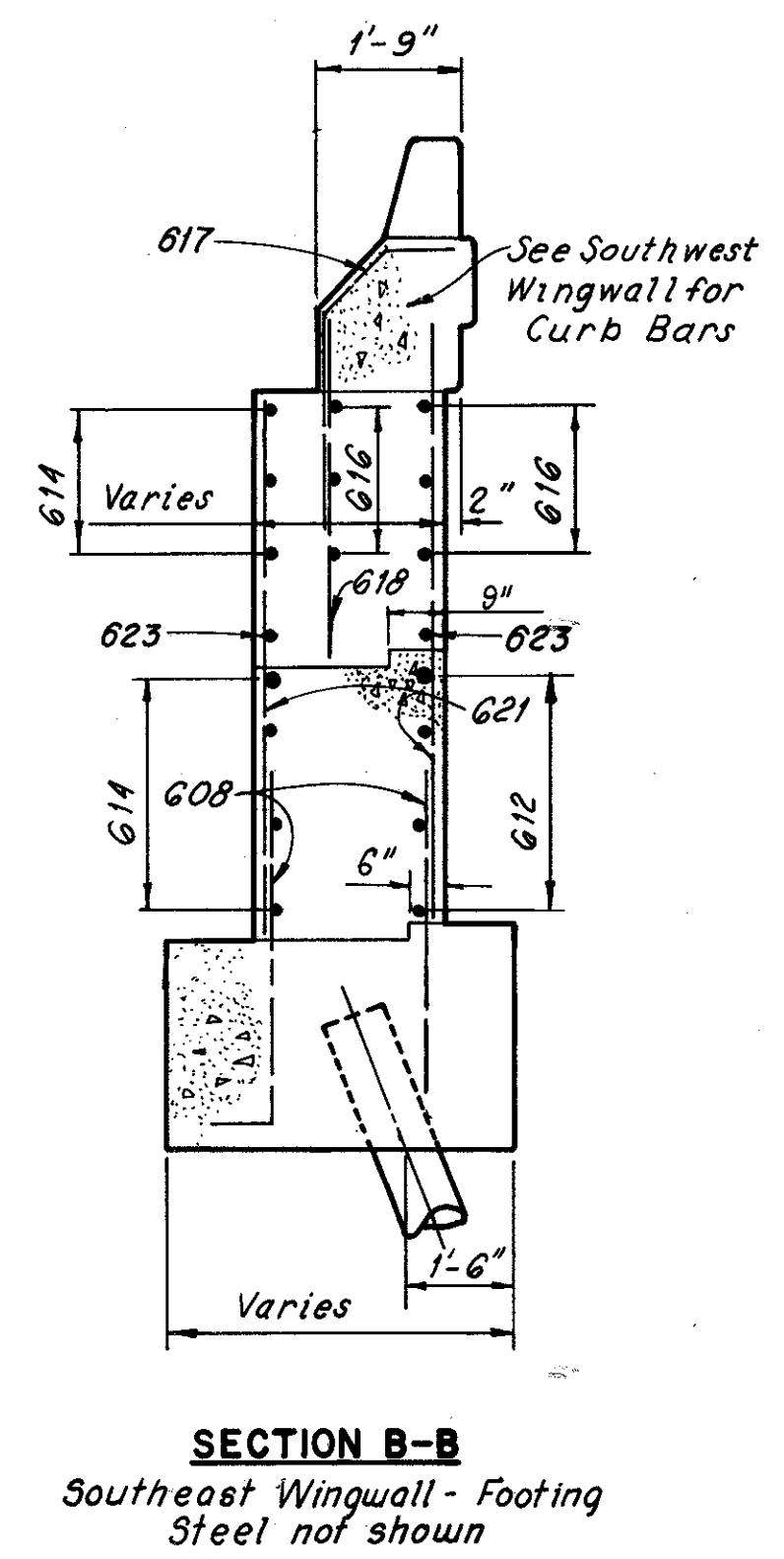
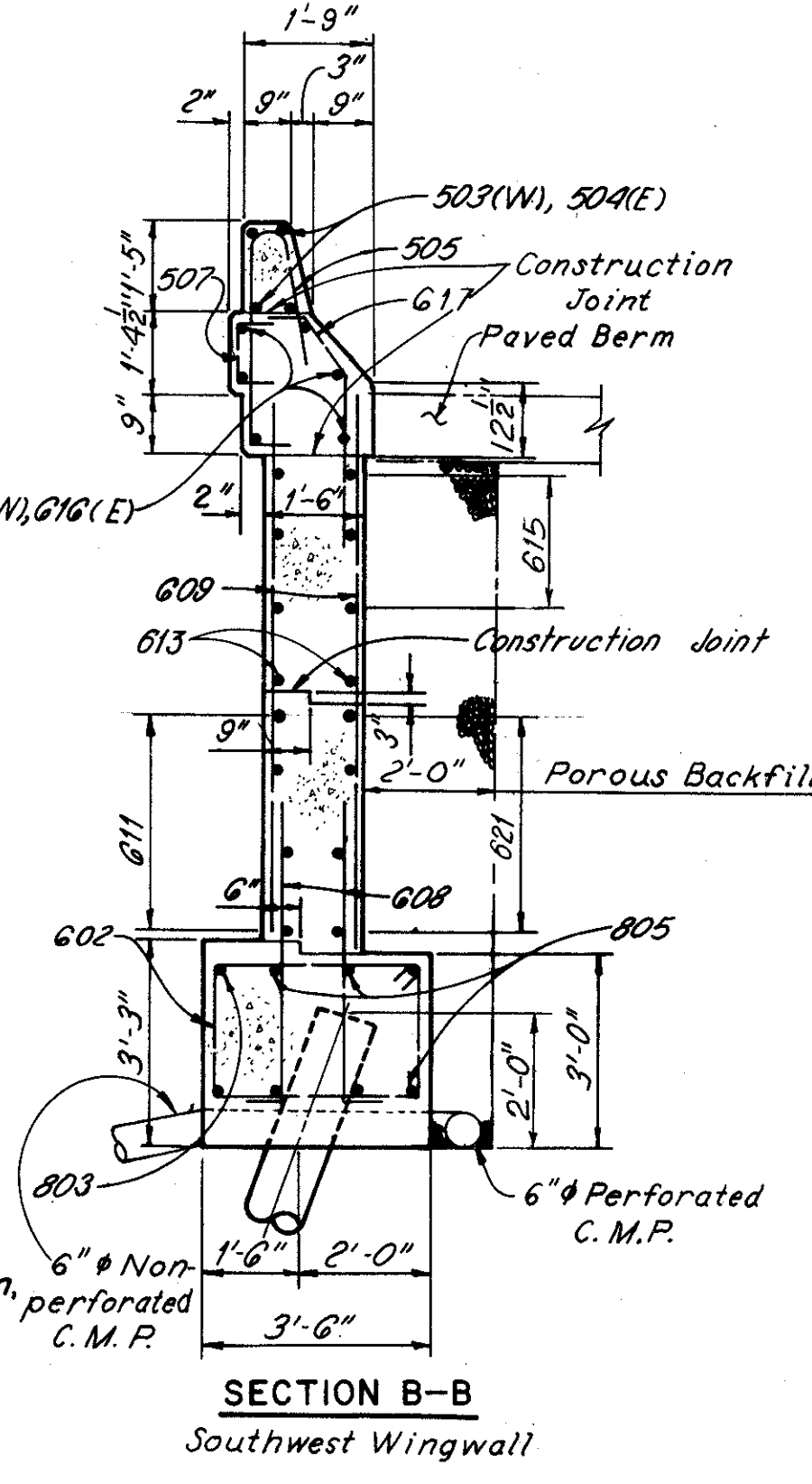
Note:  
All reinforcing bars, marks shall be prefixed AD.



Note:  
All reinforcing in footing plan, except stirrup bars, is typical for top and bottom.



Notes:  
For curb and parapet transitions see "PART PLANS-PARAPET ON WINGWALL" on Ohio Standard Drawing BR.-1-67, Revised 10-15-71, Sheet No. 1 of 3.  
All piles are 12"Ø C.I.P. reinforced concrete.  
All battered piles shall be inclined 3 in 12 in the direction shown.  
For Roadway End Dam details see Sheet 12/14.  
The following abbreviations are used:  
nf = near face    W = West Wingwall  
ff = far face    E = East Wingwall  
ef = each face



H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY    CLEVELAND    NEW YORK

**RIGHT BRIDGE—SOUTH ABUTMENT**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCRACKEN ROAD  
STA. 62+17.54 TO  
STA. 63+62.80  
(Ø BEDFORD FREEWAY)

CUYAHOGA COUNTY    OHIO

DRAWN IN W	TRACED BY W	CHECKED BY MS	REVIEWED
DATE 3-3-68	DATE 10-28-68	DATE 2-26-70	DATE

SHEET 6/14

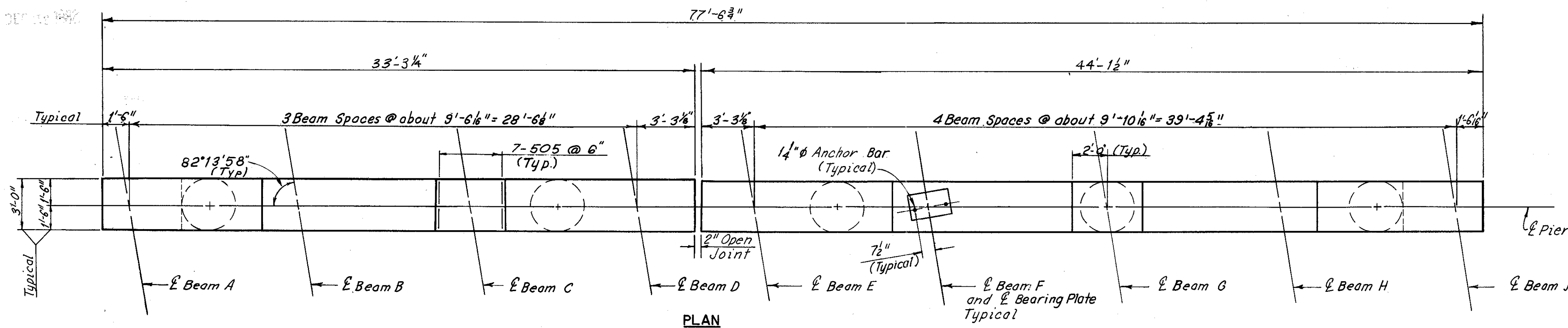
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DEC 22 1982  
NCR

Note: Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bar holes.

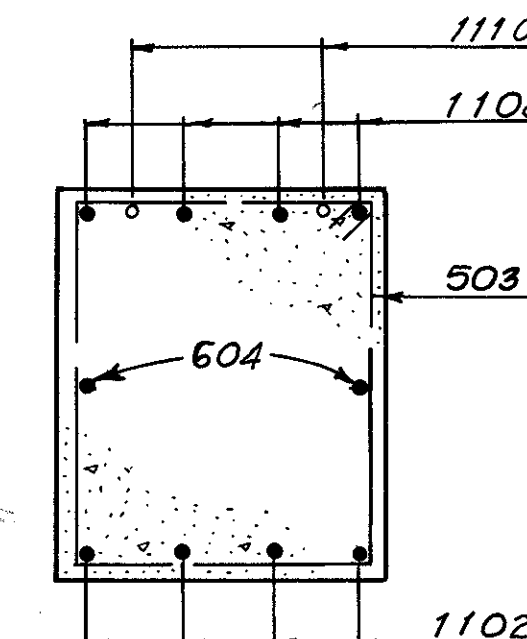
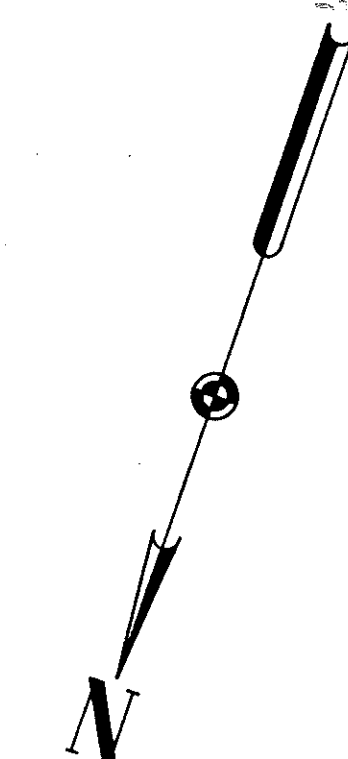
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

342  
390

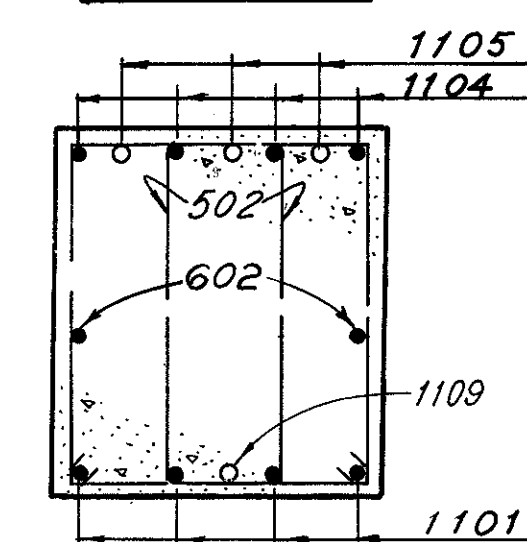
CUYAHOGA COUNTY  
CUY-80-21.40



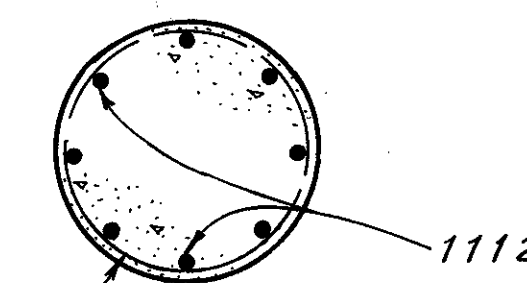
PLAN



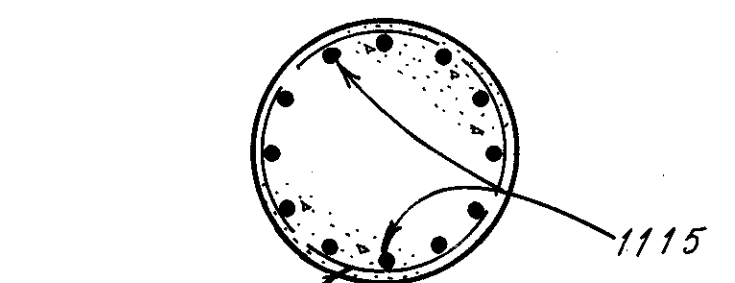
SECTION A-A



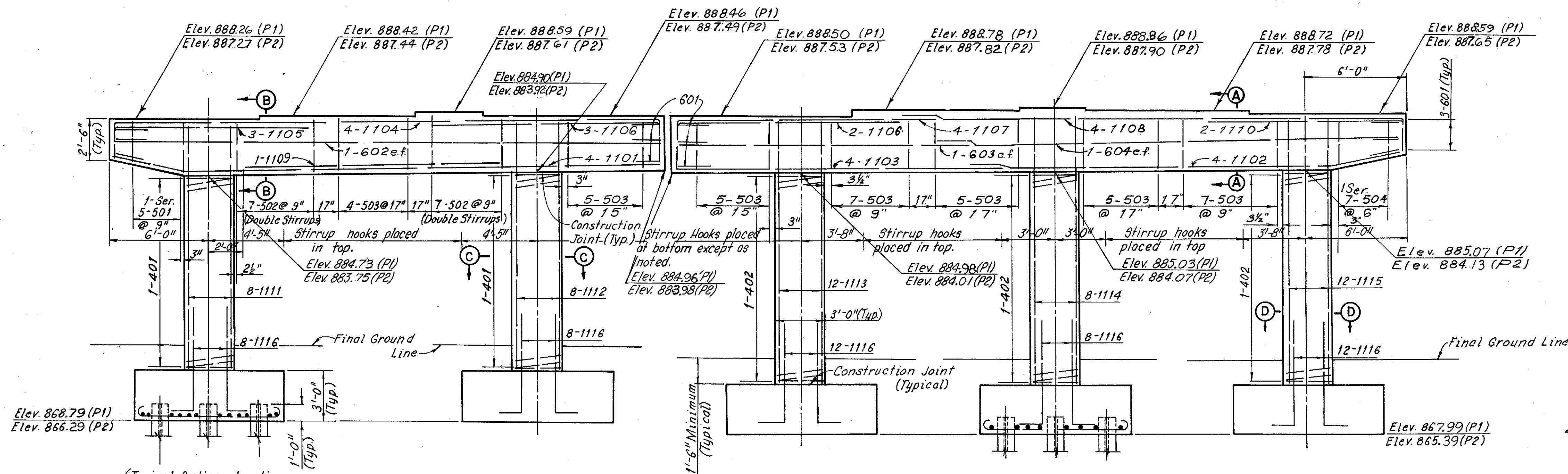
SECTION B-B



SECTION C-C



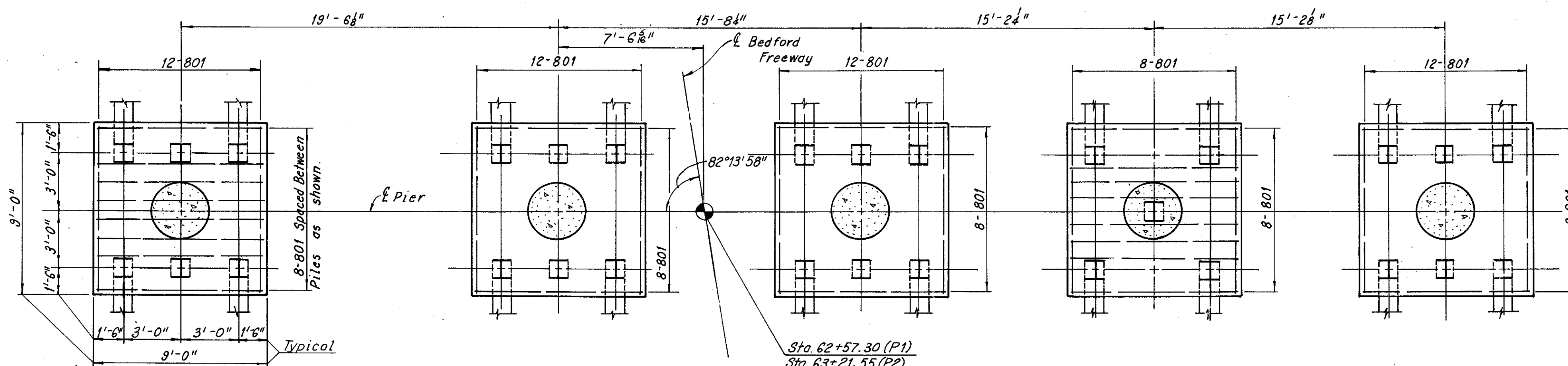
SECTION D-D



ELEVATION

Notes:  
For anchor bar details see Pier Bearing Plate Detail on Sheet 9/14.  
All piles are HP 12 x 53.  
All battered piles shall be inclined 3 in 12 in the direction shown.  
Pile layout dimensions are measured along the bottom of footing.  
The following abbreviations are used:

- P1 = Pier 1
- P2 = Pier 2
- ef = each face



FOOTING PLAN

Note:  
All Reinforcing Bars shall be prefixed as follows:  
Pier 1 = PA  
Pier 2 = PB

H.N.T.B. BR. NO. 13L & 13R  
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**LEFT BRIDGE-PIERS 1 AND 2**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCRACKEN ROAD  
STA. 62+17.54 TO  
STA. 63+62.80  
(BEDFORD FREEWAY)

CUYAHOGA COUNTY OHIO

DRAWN R.J.M.	TRACED G.E.M.	CHECKED M.A.	REVIEWED	REVISED
DATE 8-10-68	DATE 8-30-68	DATE 3-11-70	DATE	

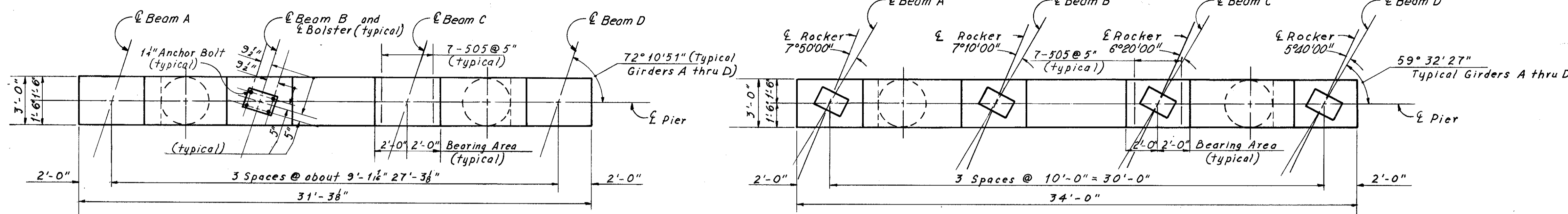
SHEET 7/14

RECORDED  
MICROFILMED  
DEC 22 1982

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

343  
390

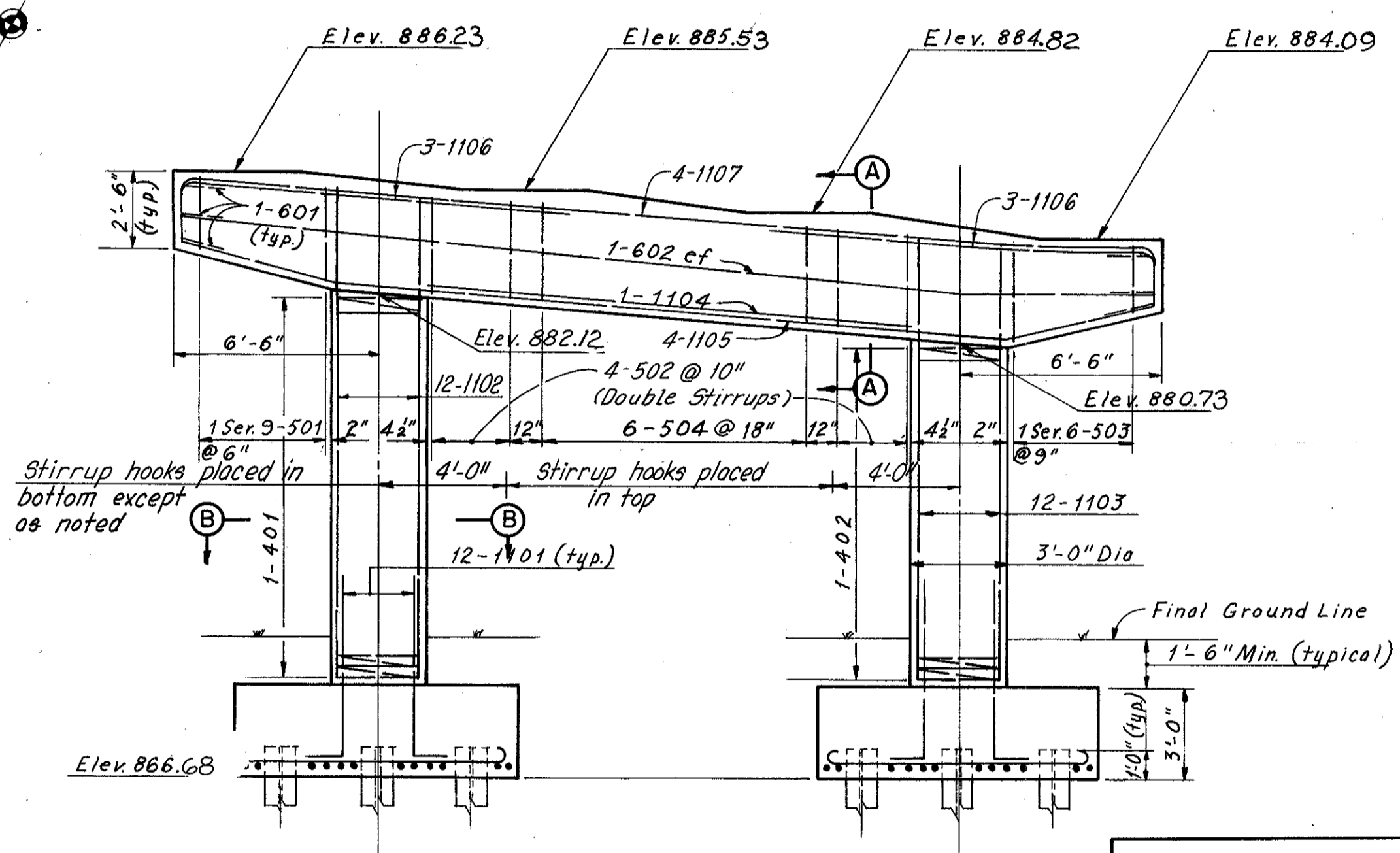
CUYAHOGA COUNTY  
CUY. - 80 - 21.40



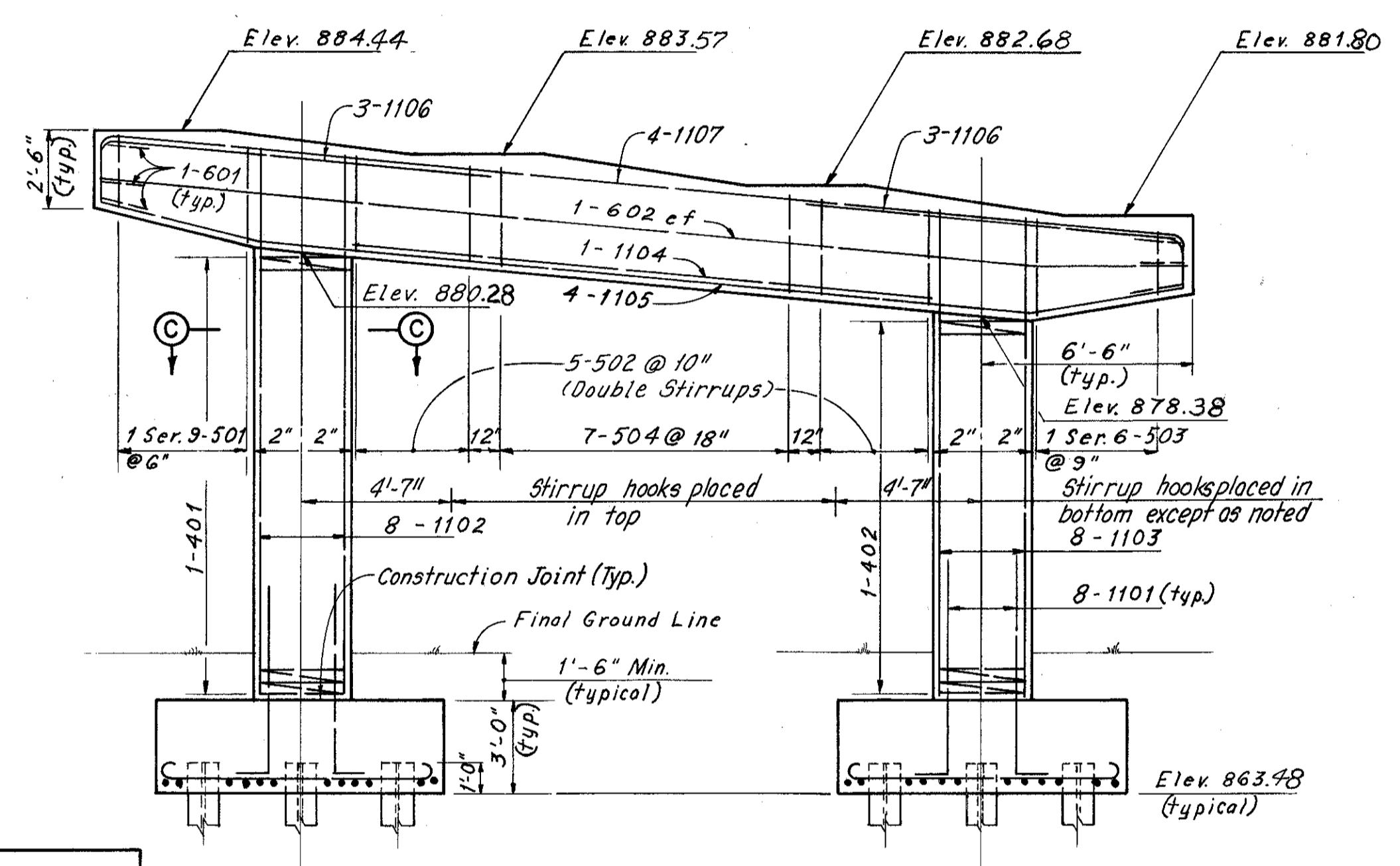
PLAN

PLAN

Note:  
Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes.

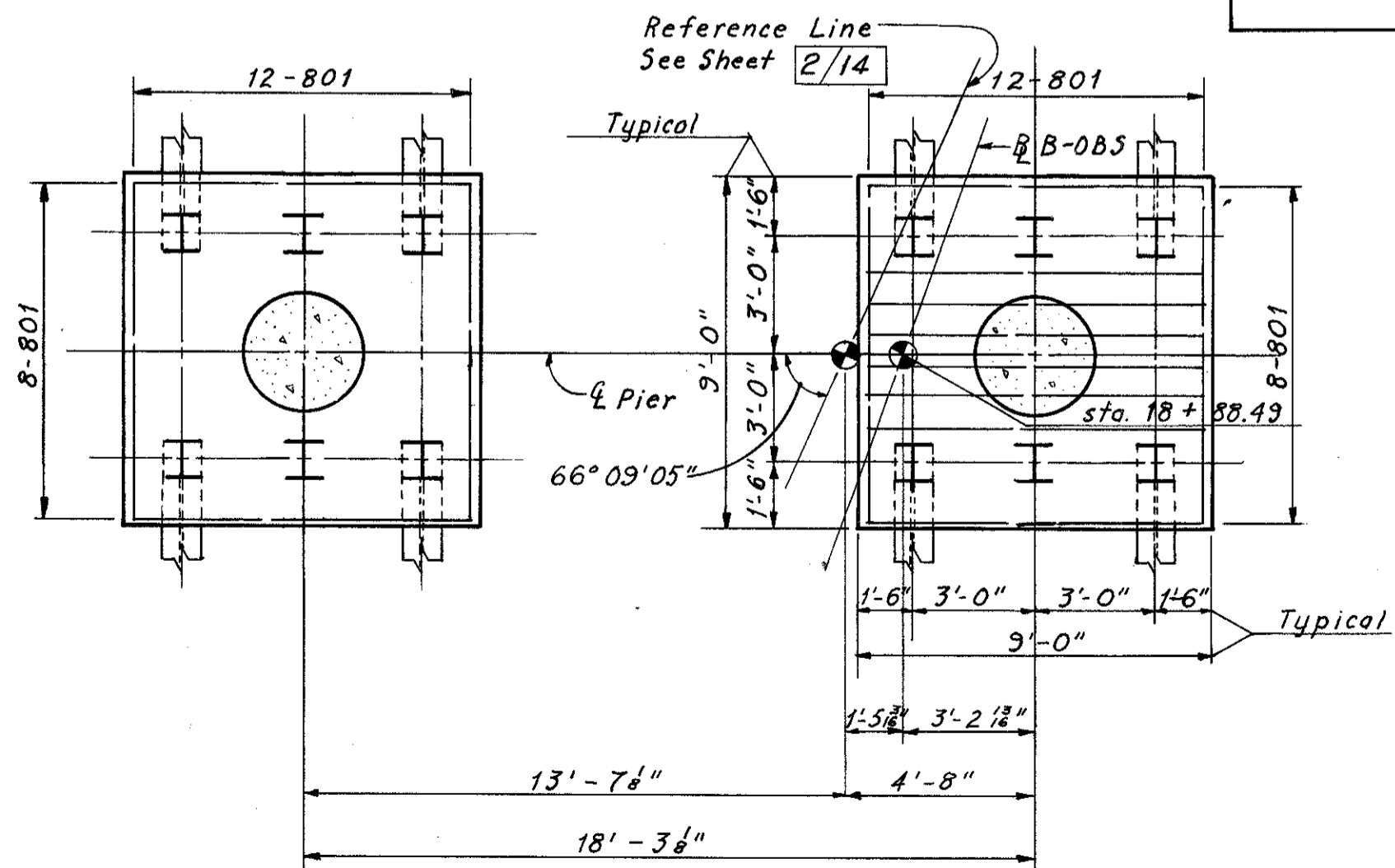


ELEVATION



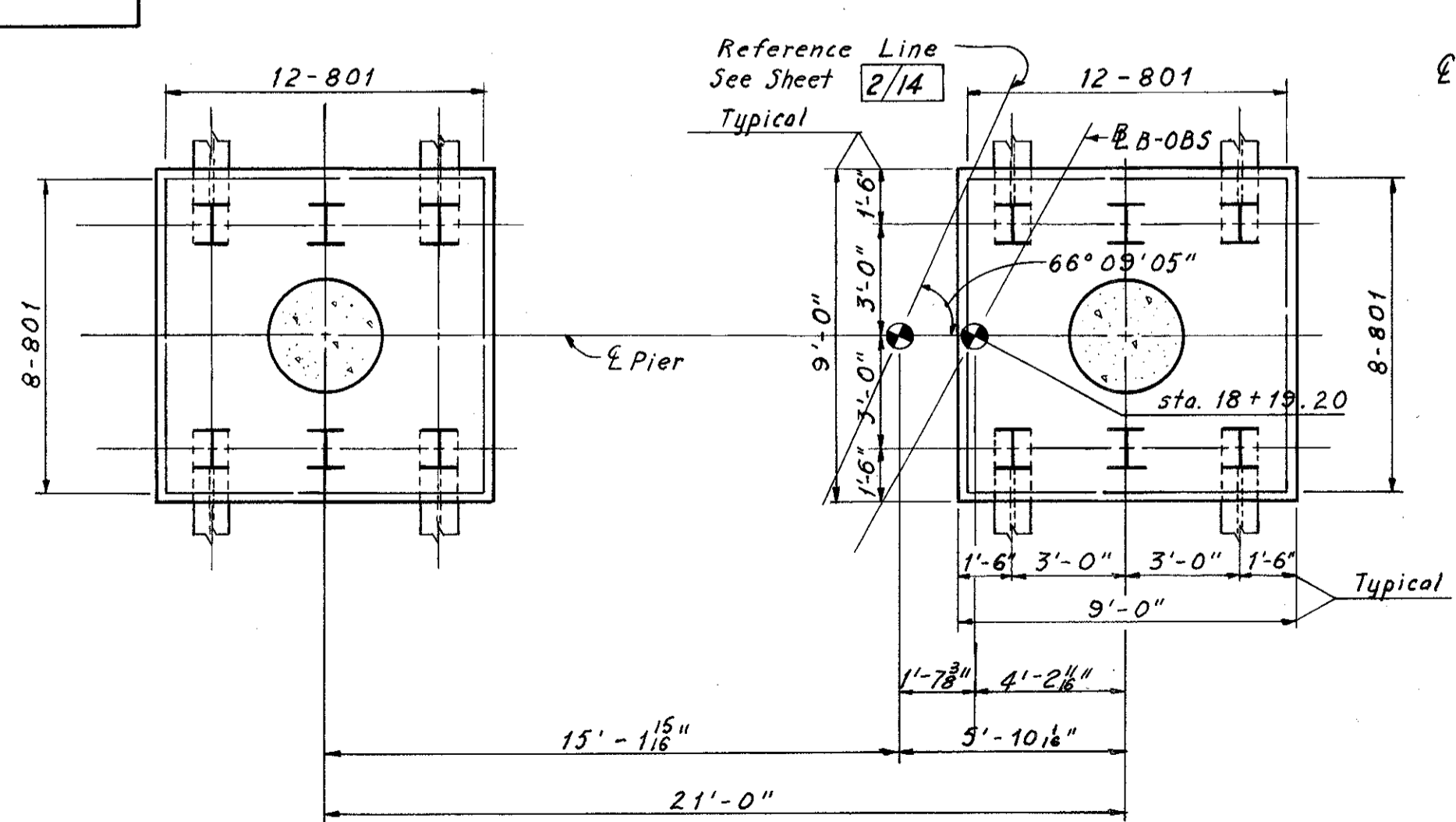
ELEVATION

Note: All reinforcing bar marks shall be prefixed as follows:  
Pier 1 - PA  
Pier 2 - PB



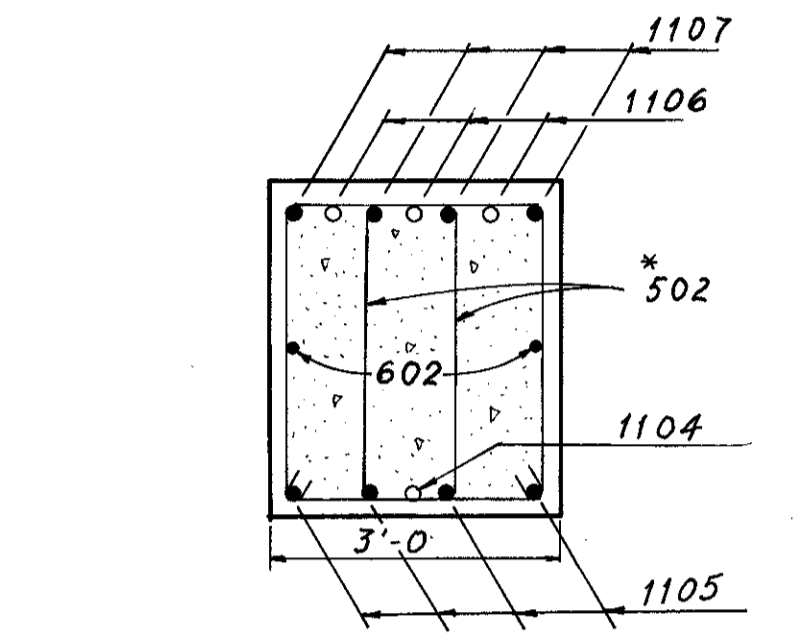
FOOTING PLAN

PIER 1

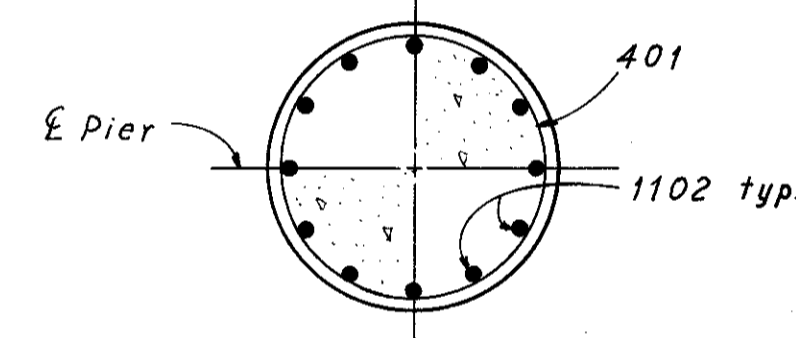


FOOTING PLAN

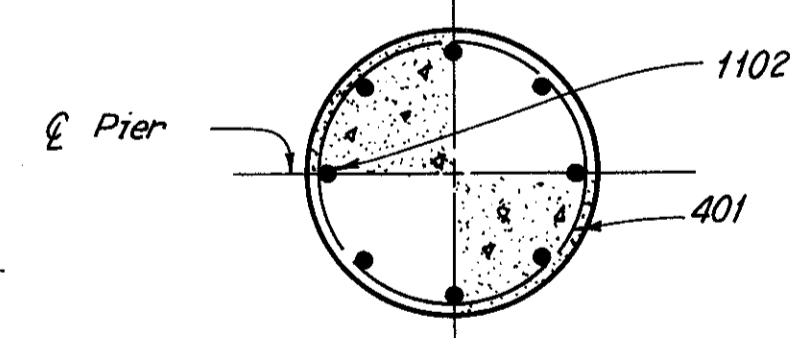
PIER 2



SECTION A A



SECTION B B



SECTION C-C

Notes:  
All piles are HP 12 x 53.  
All battered piles shall be inclined 3 in 12 in the direction shown.  
Pile layout dimensions are measured along bottom of footing.  
For anchor bolt details see Ohio Standard Drawing RB-1-55.  
The following abbreviation is used:  
ef = each face

H.N.T.B. BR. NO. 13L & 13R

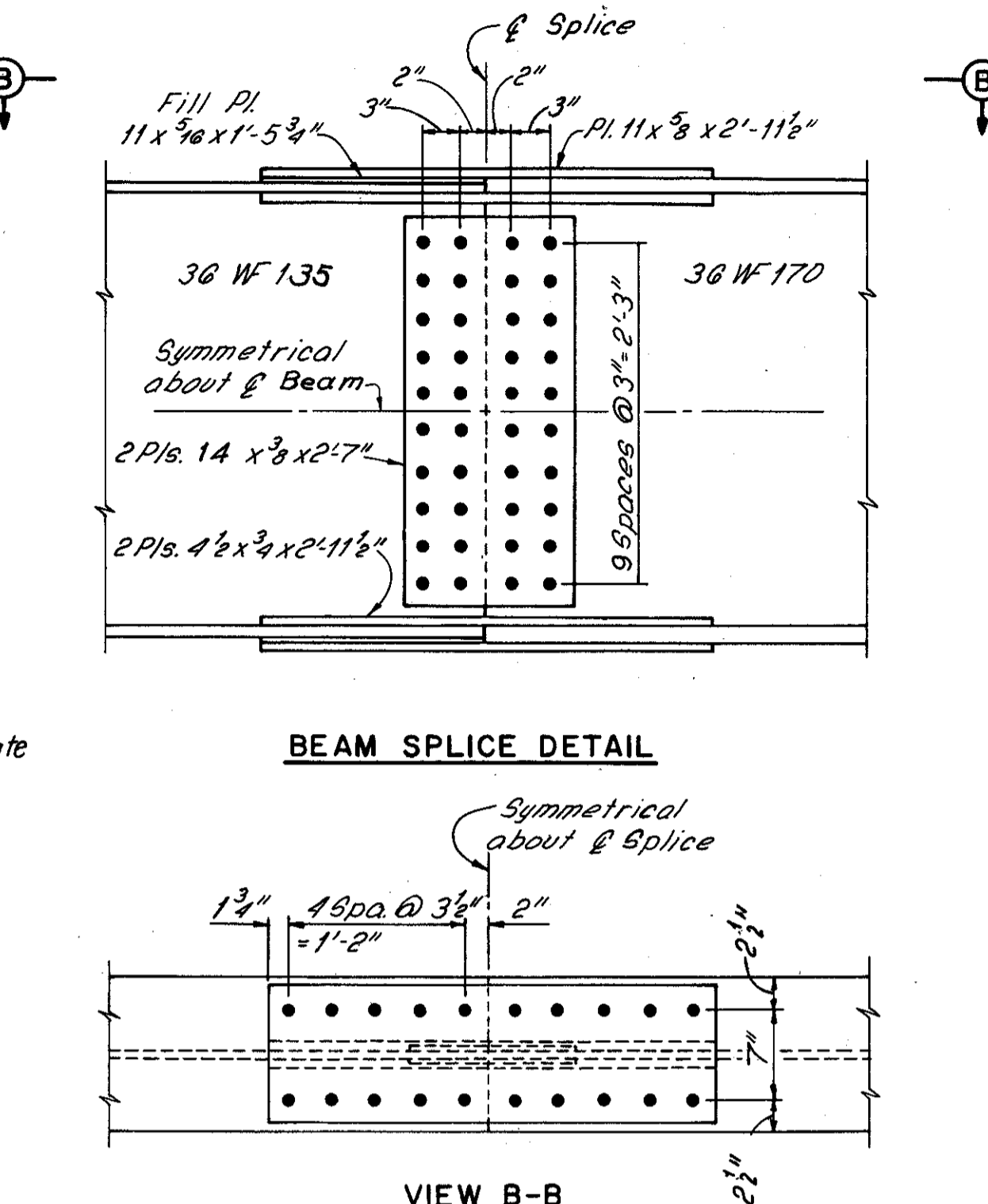
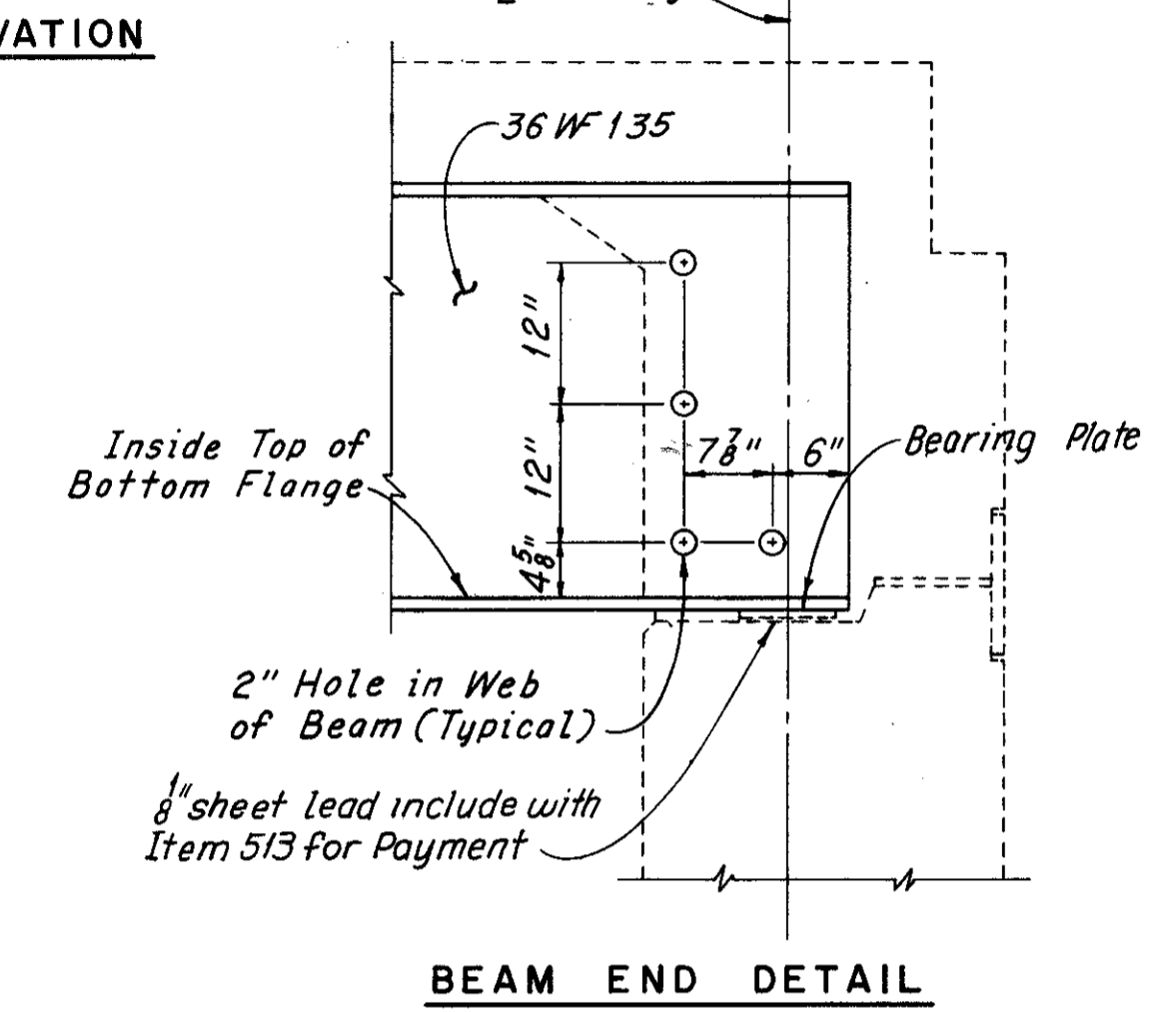
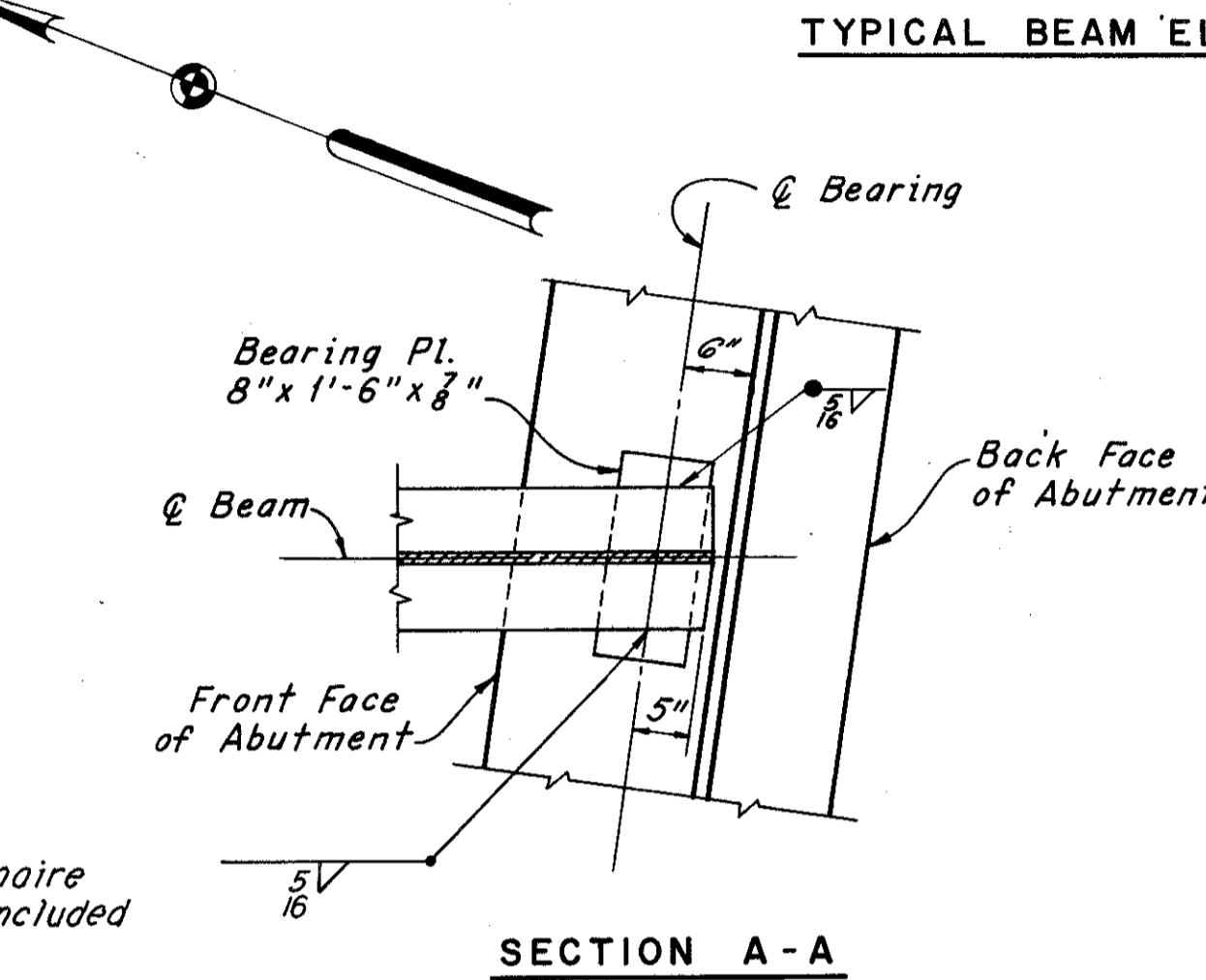
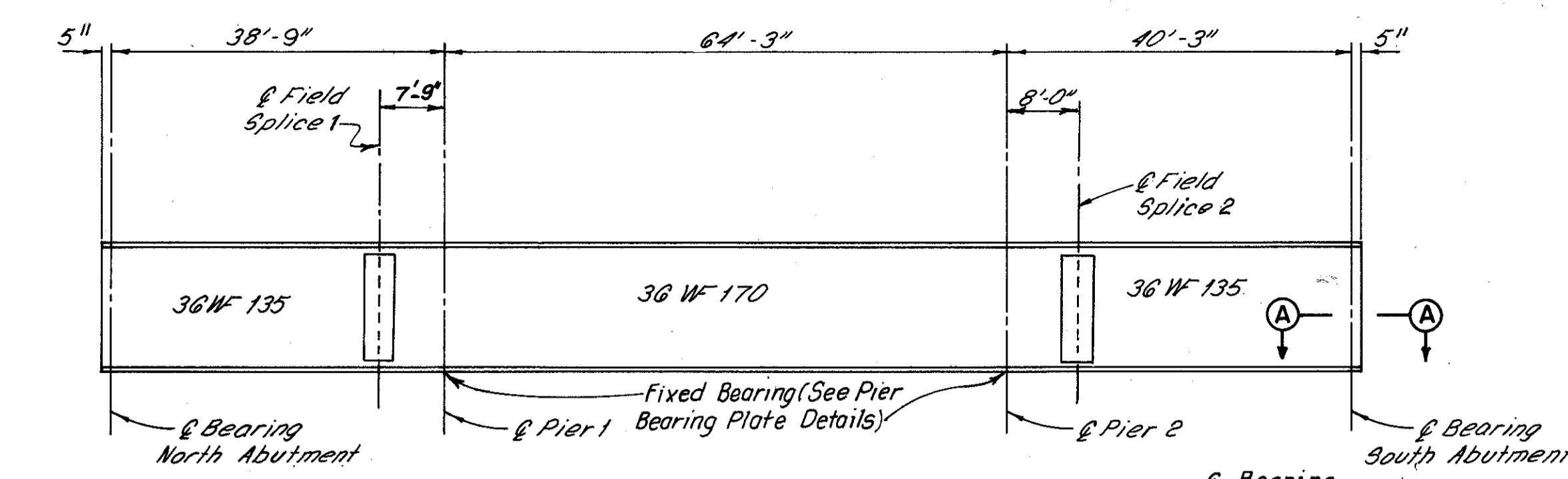
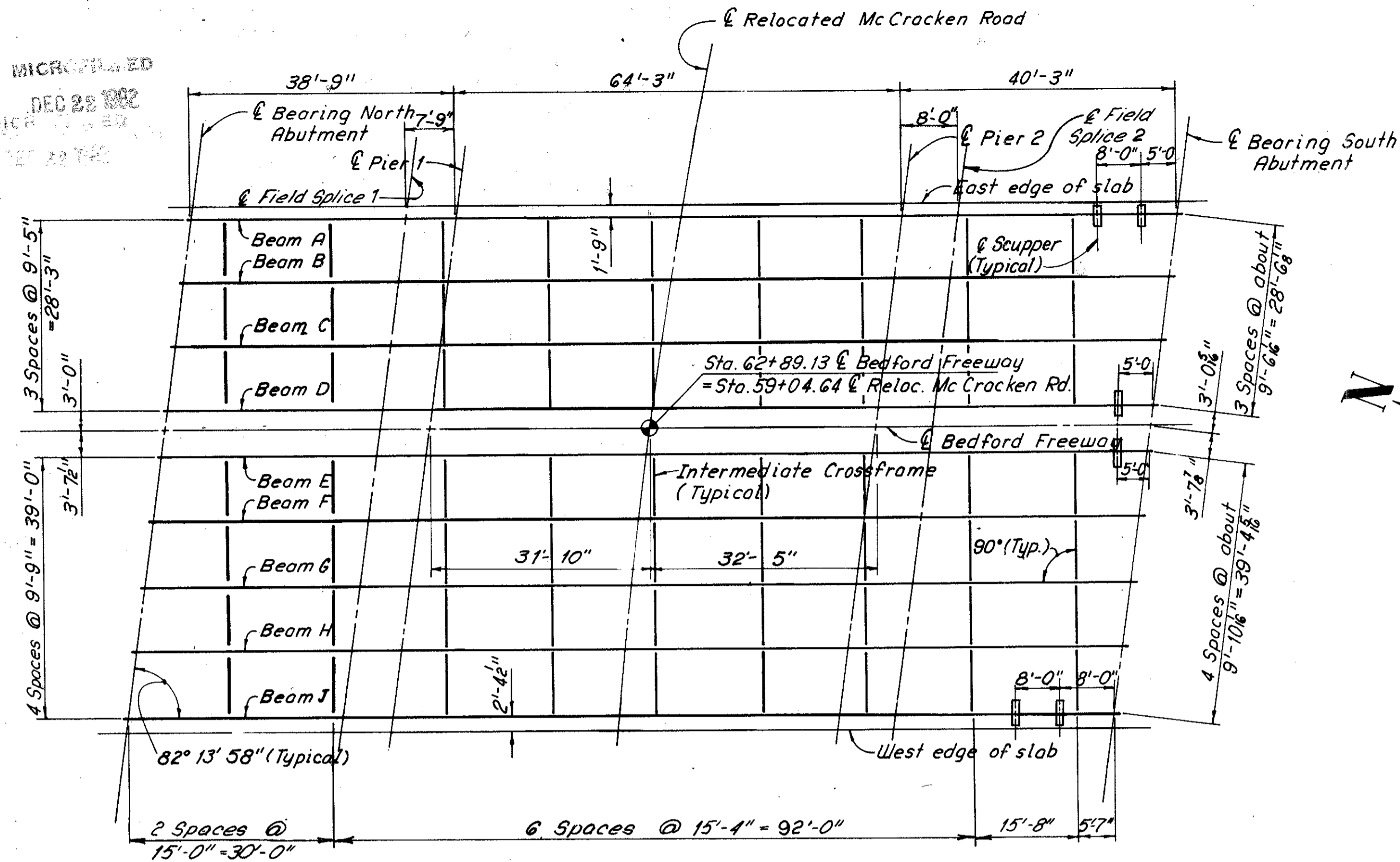
HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

RIGHT BRIDGE PIERS 1 AND 2  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCracken Road  
STA. 62+17.54 TO  
STA. 63+62.80  
(BEDFORD FREEWAY)

DRAWN D.D.G.	TRACED D.D.G.	CHECKED M.A.	REVIEWED	REVISED
DATE 4-15-69	DATE 4-29-69	DATE 3-12-70	DATE	SHEET 8/14

MICROFILMED  
DEC 22 1982

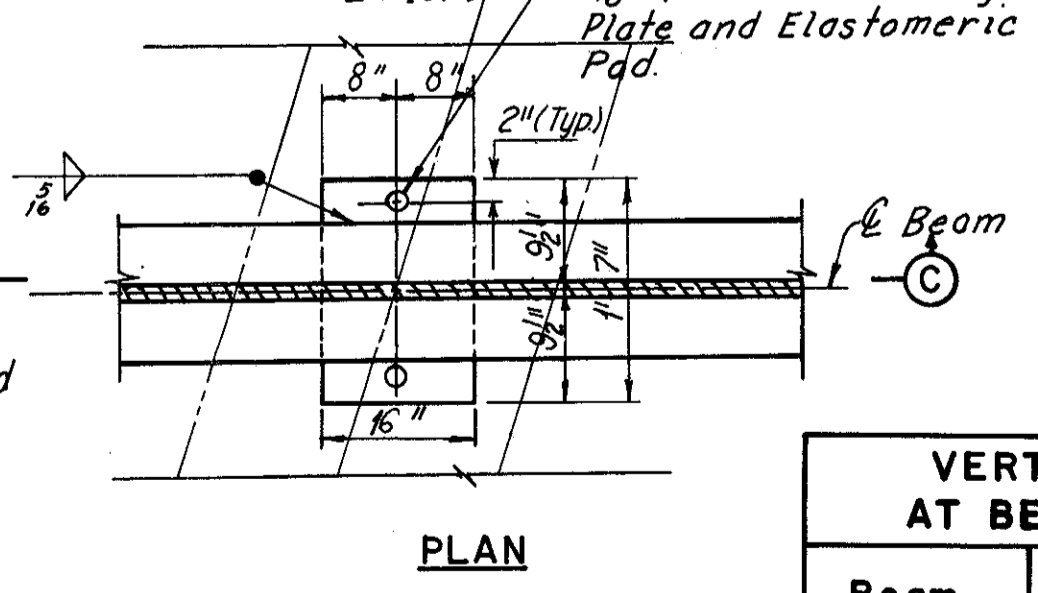
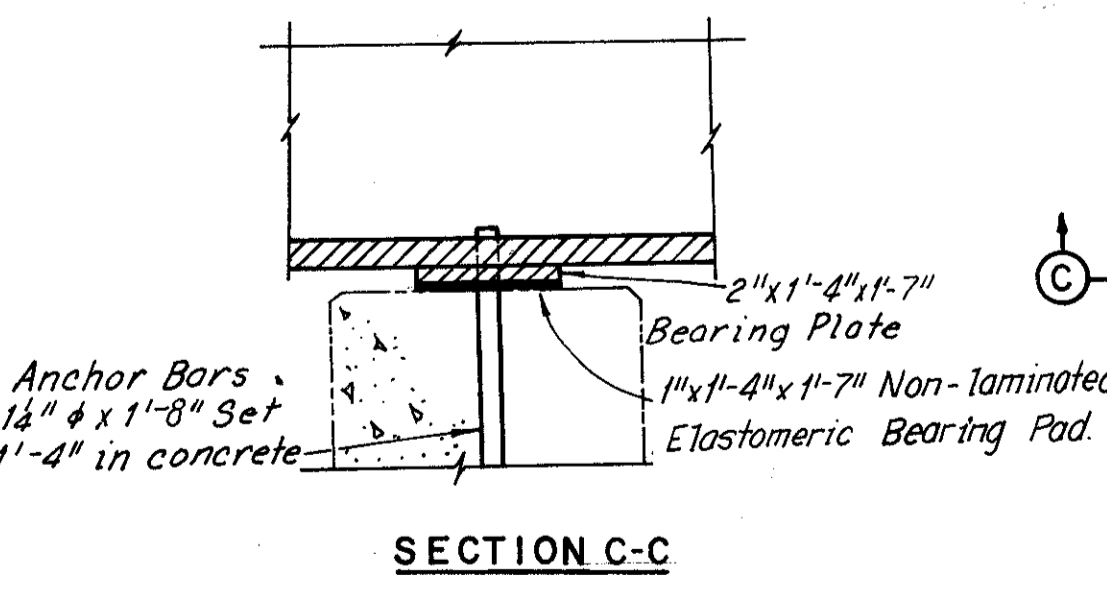
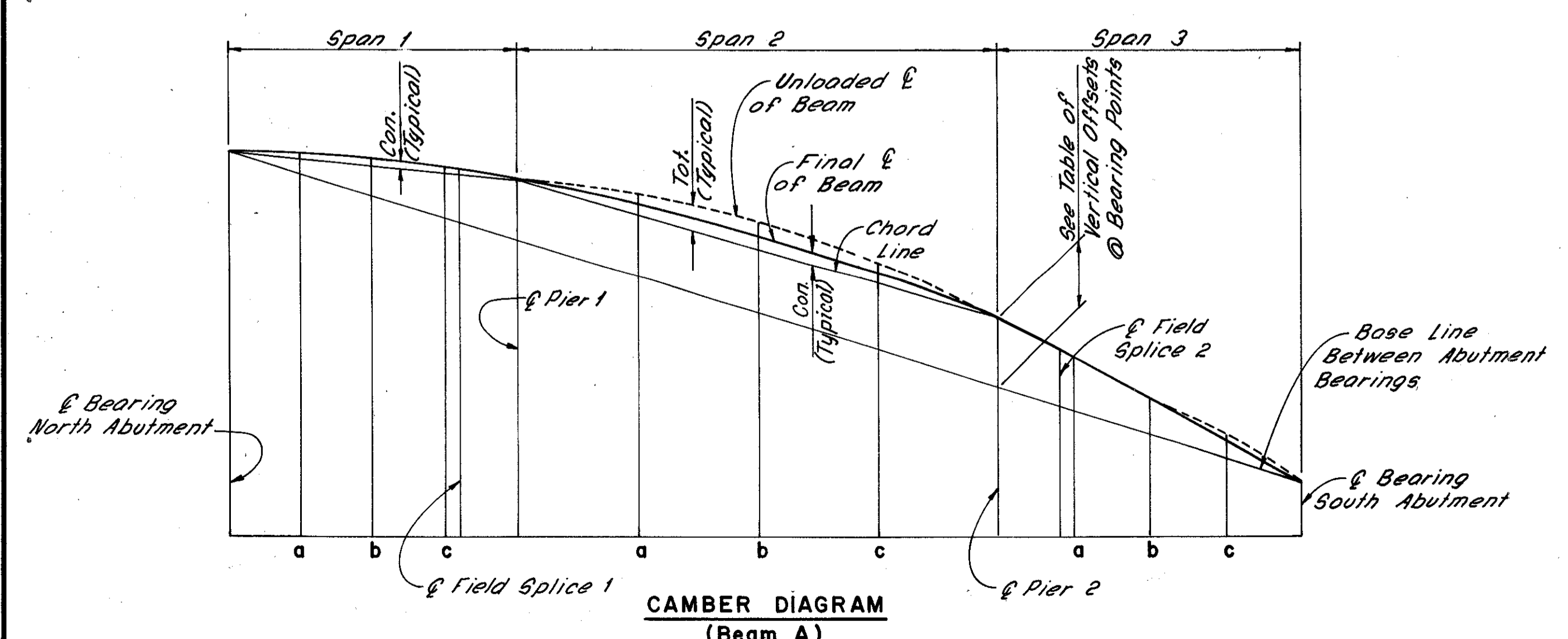
CUYAHOGA COUNTY  
CUY-80-21.40



	DEAD LOAD DEFLECTION AND CAMBER																											
	Span 1						Span 2						Span 3															
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:  
All bolts are 1" diameter high strength. The bolts shall be placed with their heads on the outside face of the exterior beams and on the bottom of the flange splice plates.

Notes:  
Negative values for deflection indicate deflections above the chord line.  
Negative values for convexity and total required camber indicates values below the chord line.  
Points a, b, and c represent the 1/4, 1/2 and 3/4 points of the span respectively.  
Deflections and convexities are given to the nearest 1/16 inch.  
The following abbreviations are used:  
Stl. = Dead load deflection due to the weight of steel  
Rem. D. L. = Remaining dead load deflection.  
Con. = Convexity.  
Tot. = Total required camber.  
For details of Intermediate Crossframes see Sheet CD1.  
For drainage details see Sheet CD1 and CD2.  
Bearing Pls. shall be beveled to match grade. The thickness given for the plates is along the Bearing.  
Four 2" holes shall be drilled in each beam web at abutment bearings to accommodate reinforcing bars as shown on Sheet 10/14.



PIER BEARING PLATE DETAILS  
The elastomeric bearing pads shall meet the requirements of Item 711.23

Beam	Q Pier 1	Q Pier 2
A	1 1/4"	1"
B	1 1/4"	1 1/8"
C	1 1/8"	1 1/8"
D	1 1/8"	1 1/8"
E	1 1/4"	1 1/4"
F	1 1/8"	1 1/4"
G	1 1/4"	1"
H	1"	3/8"
J	3/8"	1"

H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**LEFT BRIDGE - FRAMING PLAN**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCracken Road  
STA. 62+17.54 TO  
STA. 63+62.80  
(Q BEDFORD FREEWAY)

CUYAHOGA COUNTY OHIO

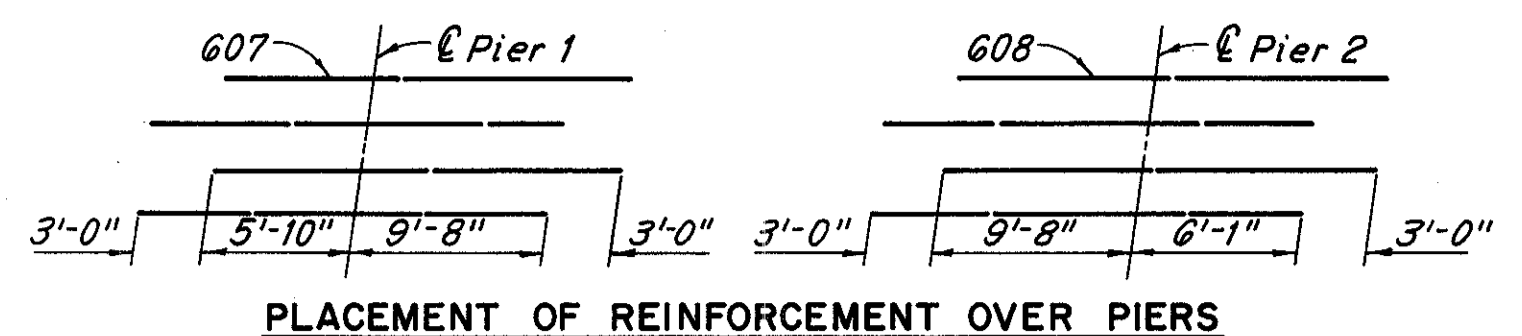
DRAWN 7/5	TRACED 7/5	CHECKED	REVIEWED	REVISOR
DATE 8-3-68	DATE 8-17-68	DATE L.J.G.	DATE	

SHEET 9/14

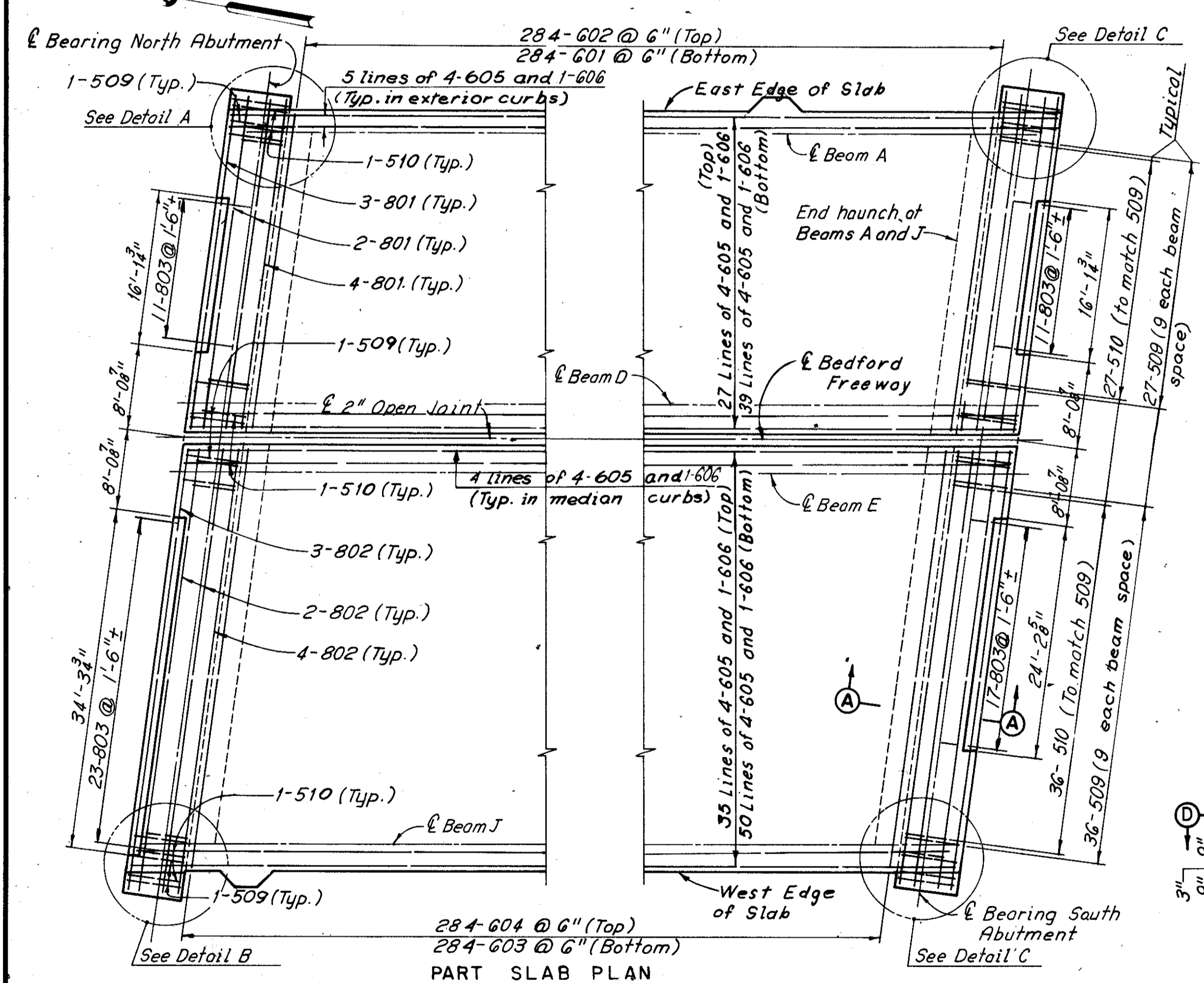
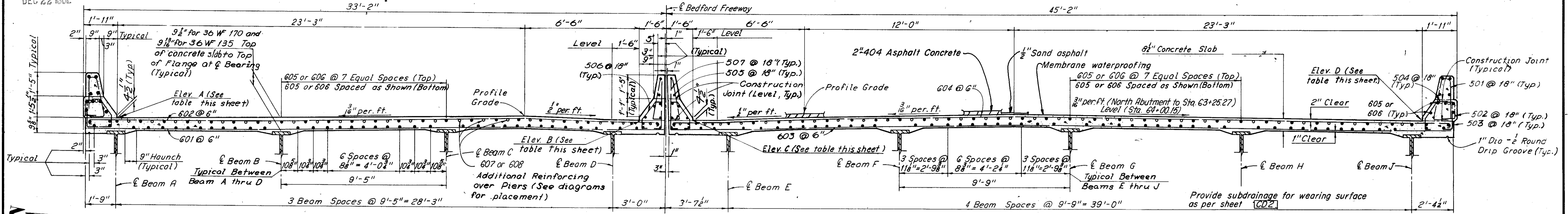
CUYAHOGA COUNTY  
CUY-80-21.40

Note: A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.

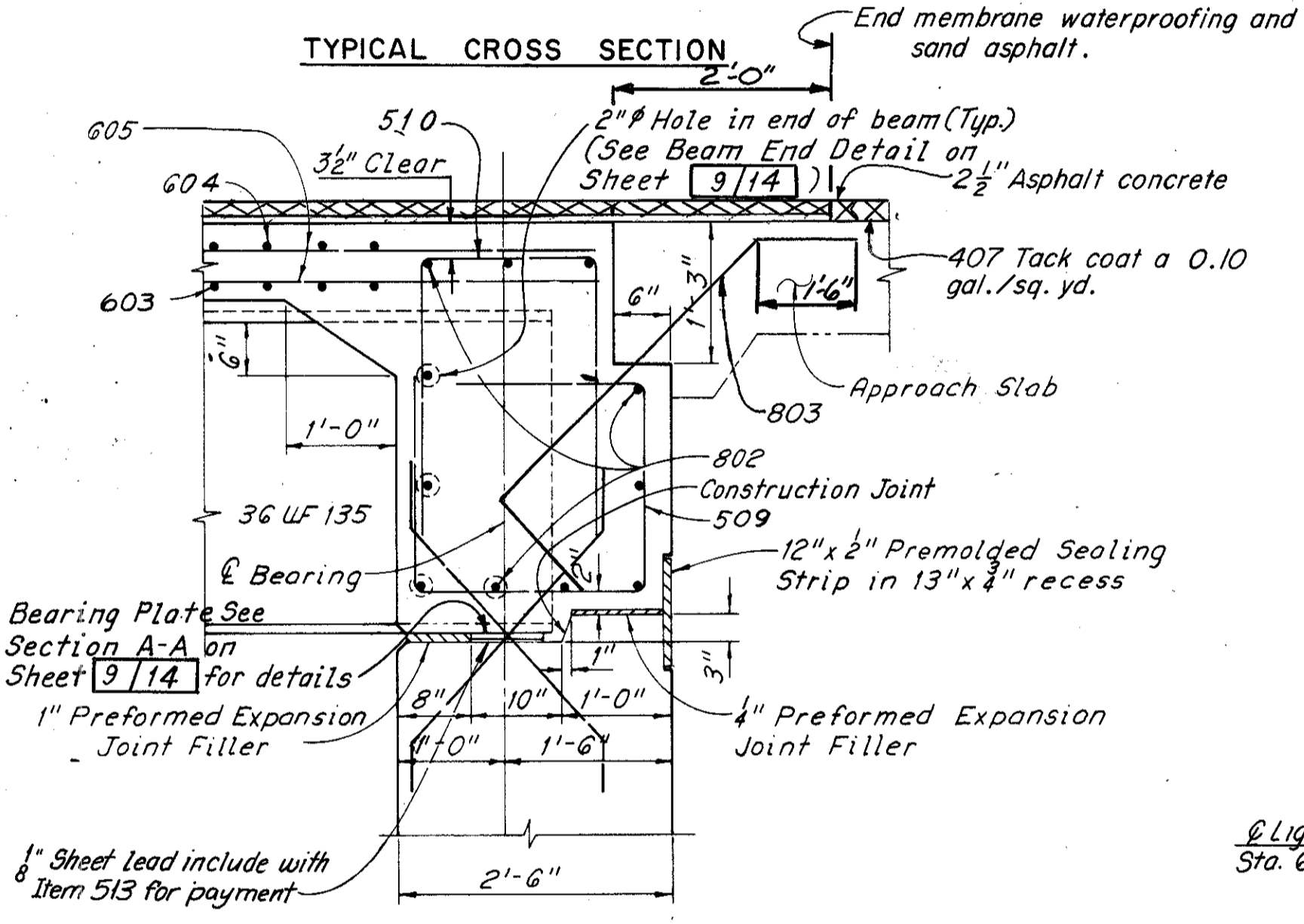
Note: Each Line of Longitudinal deck and curb reinforcement shall consist of 4-605 and 1-606. The 606 bars will be placed in the center span.



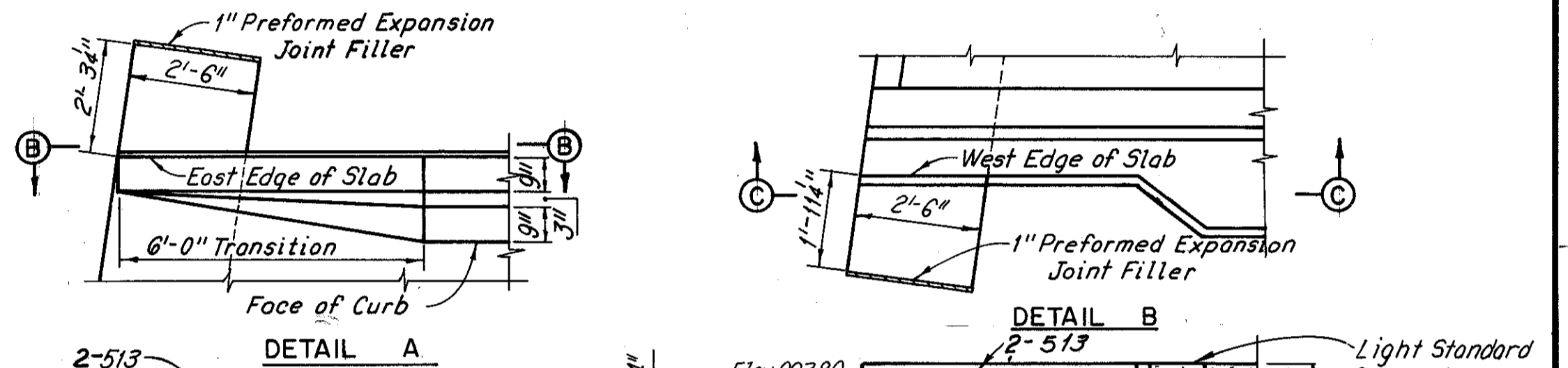
PLACEMENT OF REINFORCEMENT OVER PIERS



PART SLAB PLAN

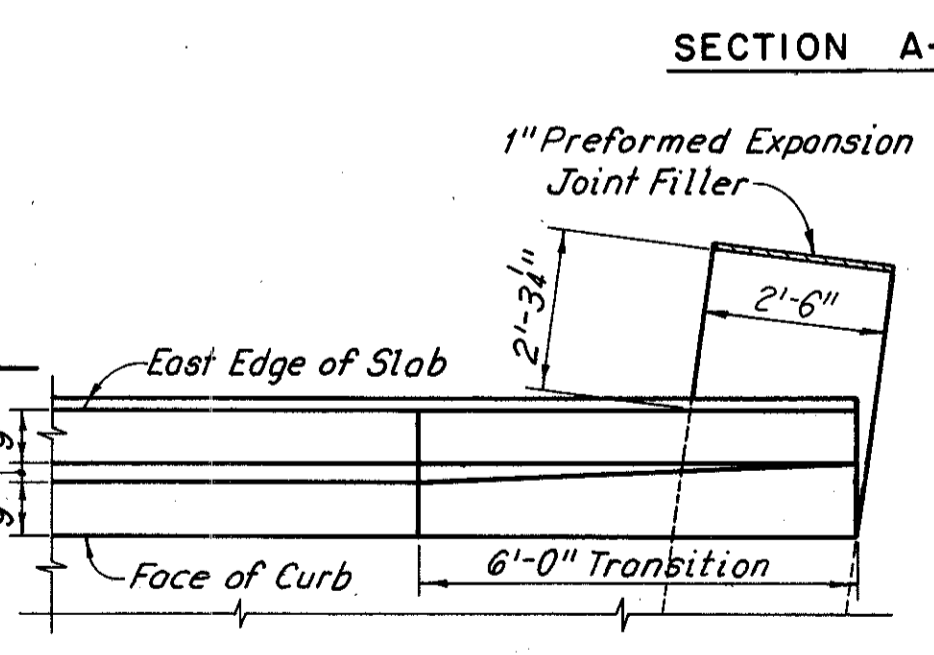


TYPICAL CROSS SECTION

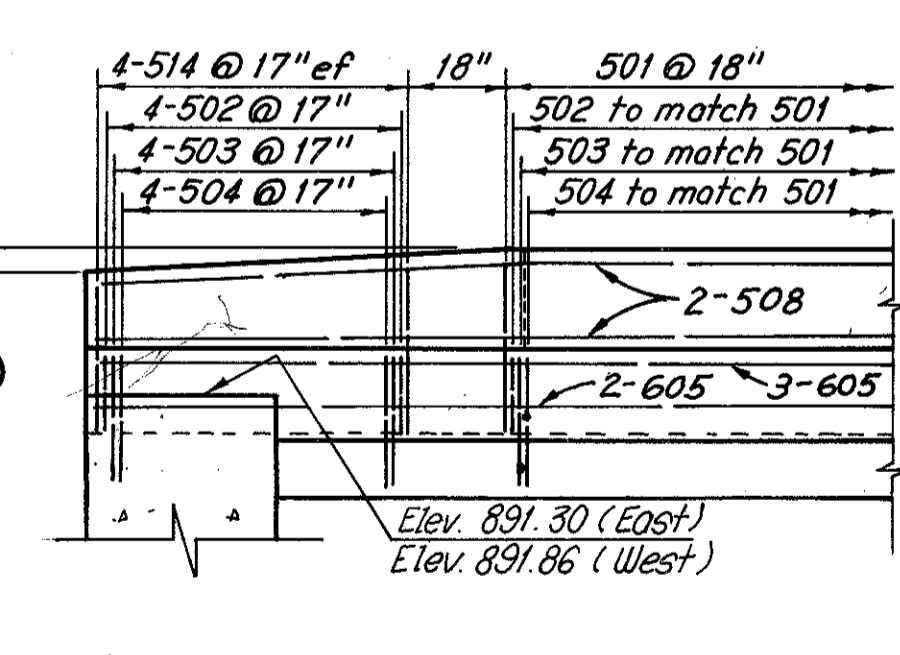


DETAIL A

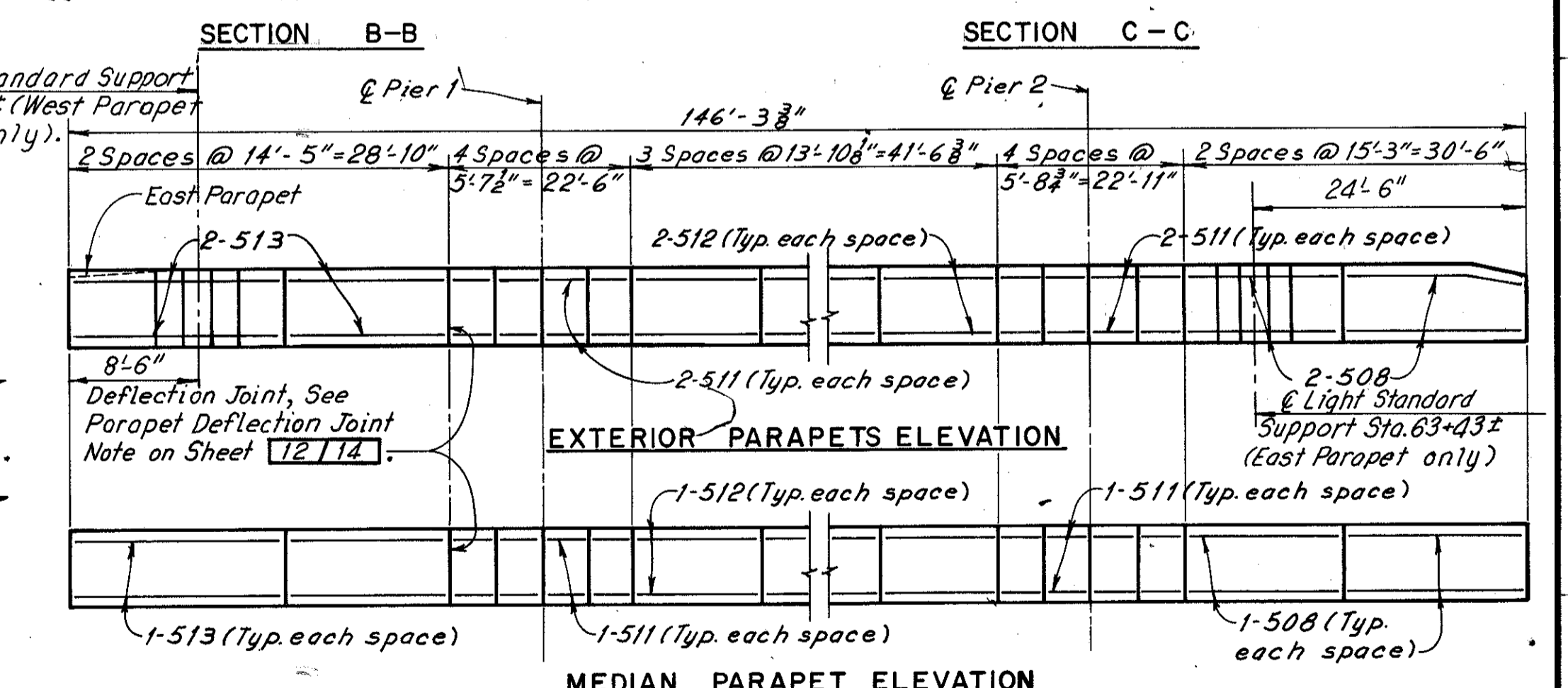
DETAIL B



SECTION A-A



SECTION D-D



SECTION B-B

SECTION C-C

DETAIL "C" (East end shown, West end similar)

Note: The elevations shown at the face of curb are those which are required before concrete is placed. Proper allowance has been made for the dead load deflection caused by the weight of the concrete.

Note: All reinforcing bar marks shall be prefixed SL.

Elevation	Span 1				Span 2				Span 3				Brg. S. Abut.
	Brg. N. Abut.	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	
A	892.79	892.68	892.56	892.44	892.31	892.09	891.85	891.59	891.32	891.15	890.98	890.80	890.63
B	892.98	892.87	892.76	892.64	892.52	892.32	892.09	891.83	891.54	891.37	891.20	891.03	890.85
C	892.99	892.88	892.77	892.65	892.53	892.33	892.10	891.84	892.56	891.39	891.21	891.04	890.87
D	893.08	892.98	892.87	892.75	892.63	892.44	892.22	891.96	891.69	891.54	891.40	891.27	891.14

Beam	Span 1				Span 2				Span 3				Brg. Abut.
	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	Point	
A	892.79	892.68	892.56	892.44	892.31	892.09	891.85	891.59	891.32	891.15	890.98	890.80	890.63
B	892.98	892.87	892.76	892.64	892.52	892.32	892.09	891.83	891.54	891.37	891.20	891.03	890.85
C	893.11	893.00	892.88	892.76	892.64	892.42	892.18	891.93	891.66	891.49	891.32	891.14	890.97
D	892.98	892.87	892.76	892.64	892.52	892.30	892.06	891.81	891.54	891.37	891.20	891.03	890.85
E	893.02	892.91	892.80	892.68	892.55	892.33	892.10	891.85	891.59	891.41	891.24	891.07	890.89
F	893.30	893.19	893.08	892.96	892.84	892.62	892.39	892.14	891.87	891.70	891.53	891.36	891.18
G	893.37	893.26	893.15	893.03	892.91	892.69	892.46	892.21	891.95	891.78	891.62	891.45	891.28
H	893.23	893.12	893.01	892.89	892.77	892.56	892.33	892.08	891.83	891.67	891.51	891.36	891.22
J	893.09	892.99	892.88	892.76	892.64	892.43	892.20	891.95	891.70	891.55	891.41	891.27	891.15

Note: For curb and parapet transition details see "PART PLANS - PARAPET ON WINGWALL" on Ohio Standard Drawing BR-1-67, Revised 10-15-71, Sheet 1 of 3. For Light Standard Support Details see Sheet CD1.

H.N.T.B. BR NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

LEFT BRIDGE-SLAB PLAN AND  
TYPICAL CROSS SECTION  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCRACKEN ROAD

STA. 62+17.54 TO  
STA. 63+62.80  
(BEDFORD FREEWAY)

CUYAHOGA COUNTY OHIO

DRAWN J.S. TRACED M.S. CHECKED D.R.L. REVIEWED REVISION  
DATE 5-11-68 DATE 5-17-68 DATE 4-23-69 DATE

SHEET 10/14





MISS. FILLED  
DEC 22 1962

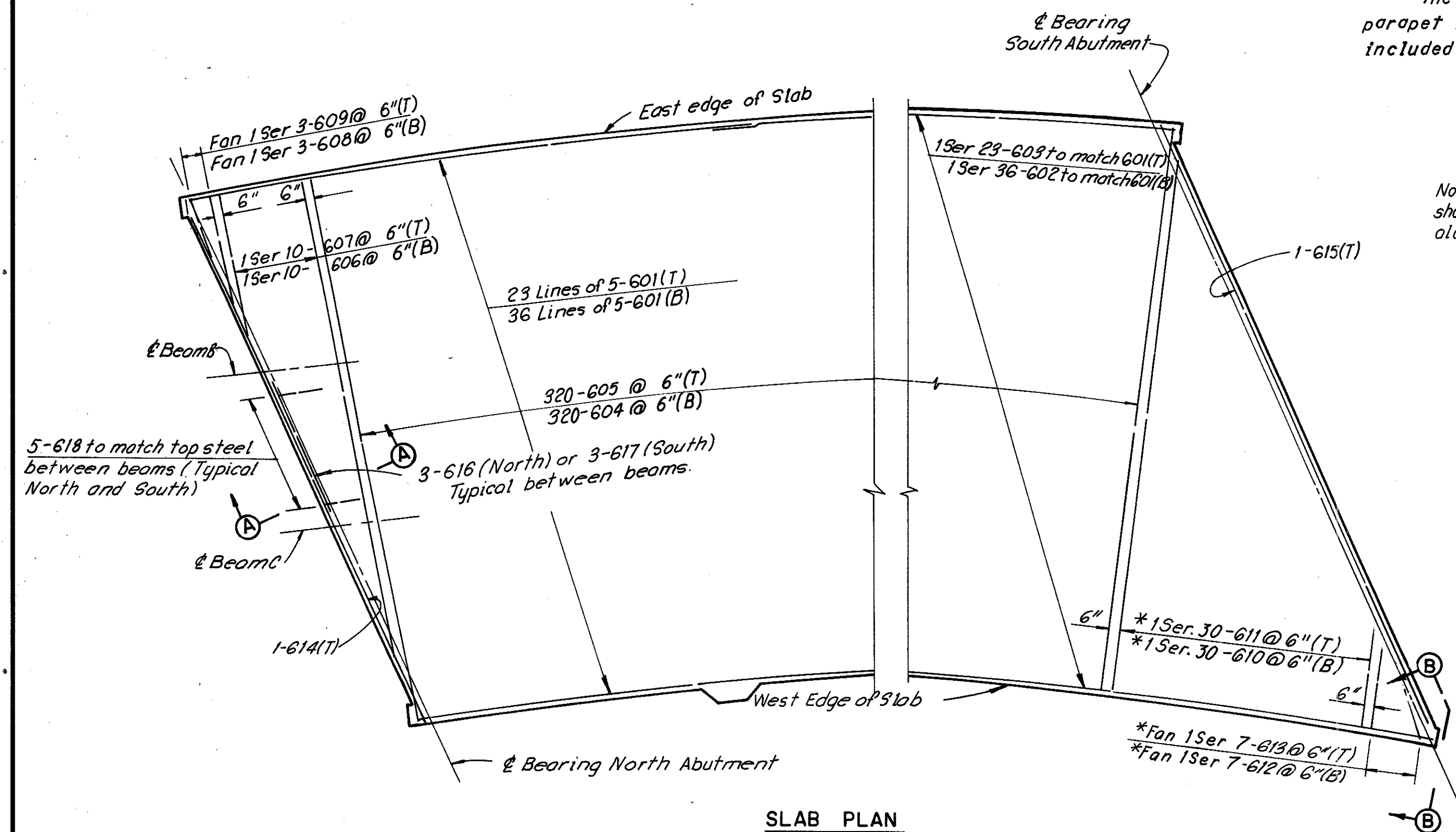
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

347  
390

CUYAHOGA COUNTY  
CUY.80-21.40

**PARAPET DEFLECTION JOINT NOTE**  
The preformed expansion joint filler in the railing parapet deflection joints may be either 1/4" gray sponge rubber or 1/4" gray cellular polyvinylchloride (PVC) sponge.  
The deflection joint extends from top of parapet to first construction joint and is included for payment with Superstructure Concrete.

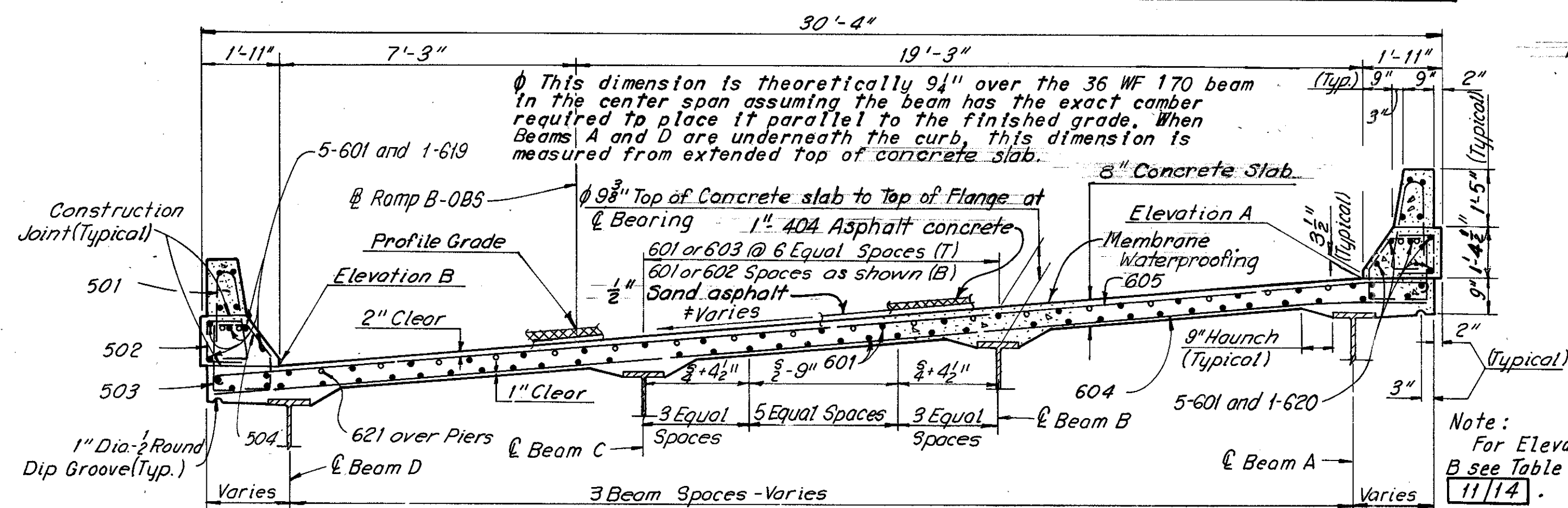
Note: All transverse reinforcing steel shall be placed radially and measured along East Edge of Slab (except as noted).



SLAB PLAN

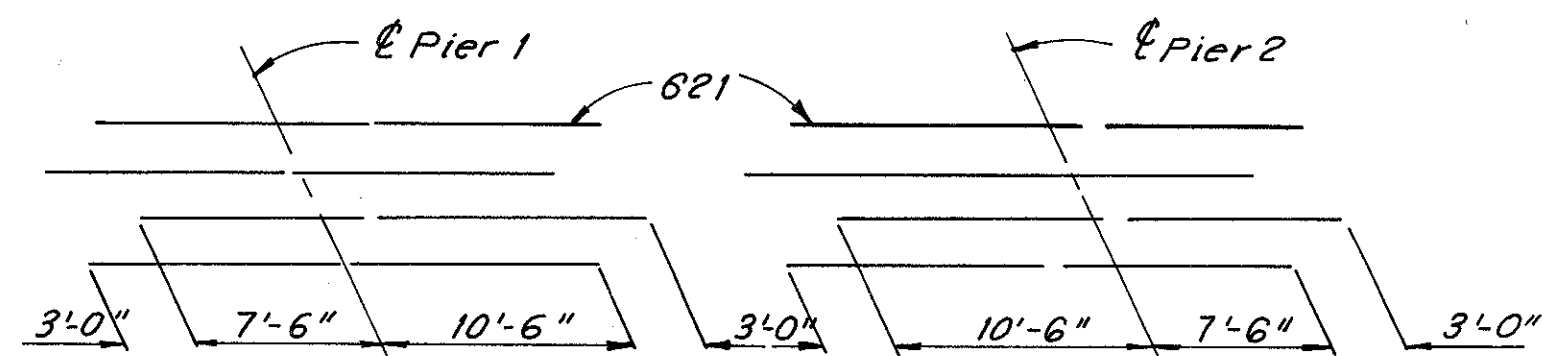
\* Measured along West Edge of Slab.

Note:  
All reinforcing bar marks shall be prefixed SR.



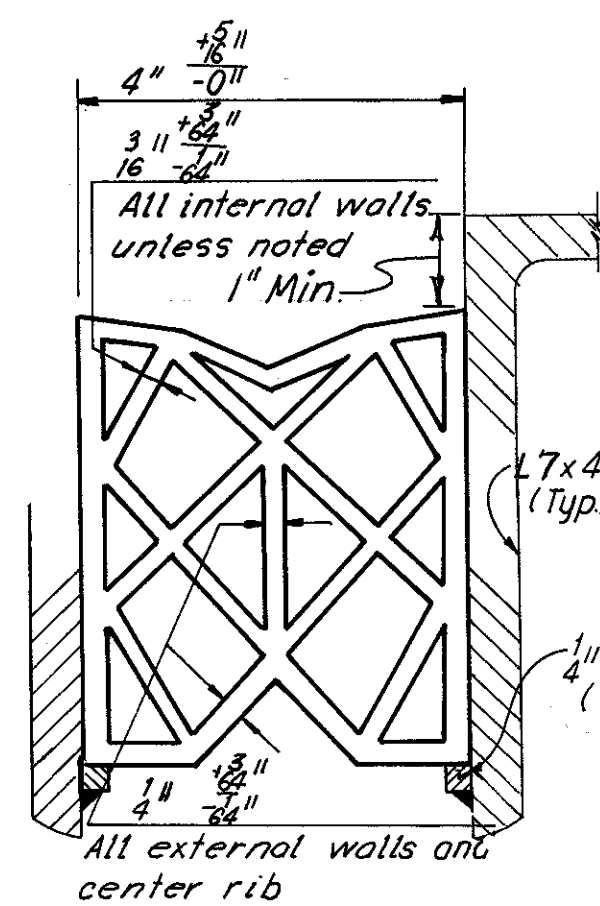
TYPICAL CROSS SECTION  
(Section Looking North)

Provide subdrainage for wearing surface as per Sheet CD2 at low curb line only.



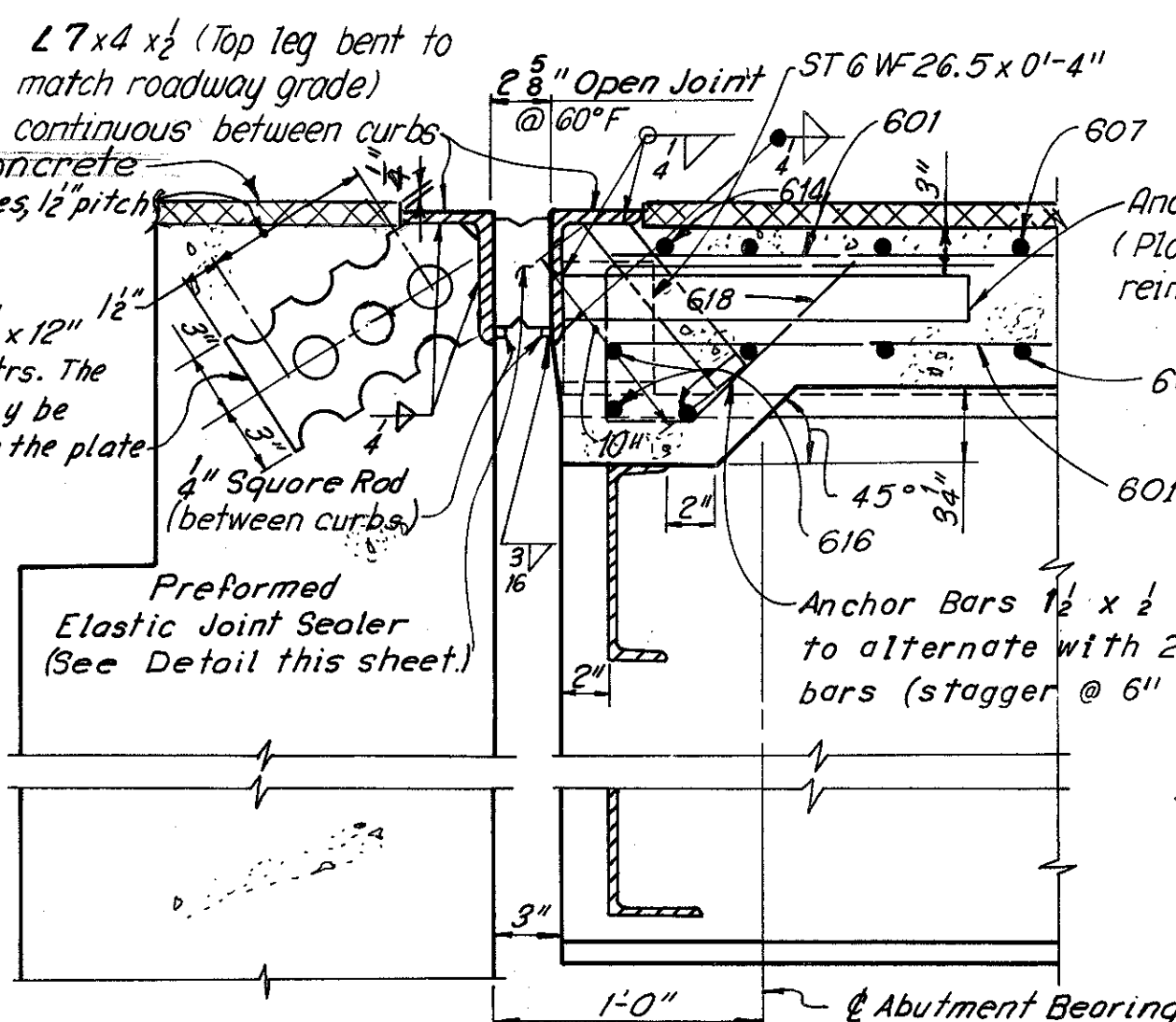
PLACEMENT OF REINFORCEMENT OVER PIERS

Note: A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.



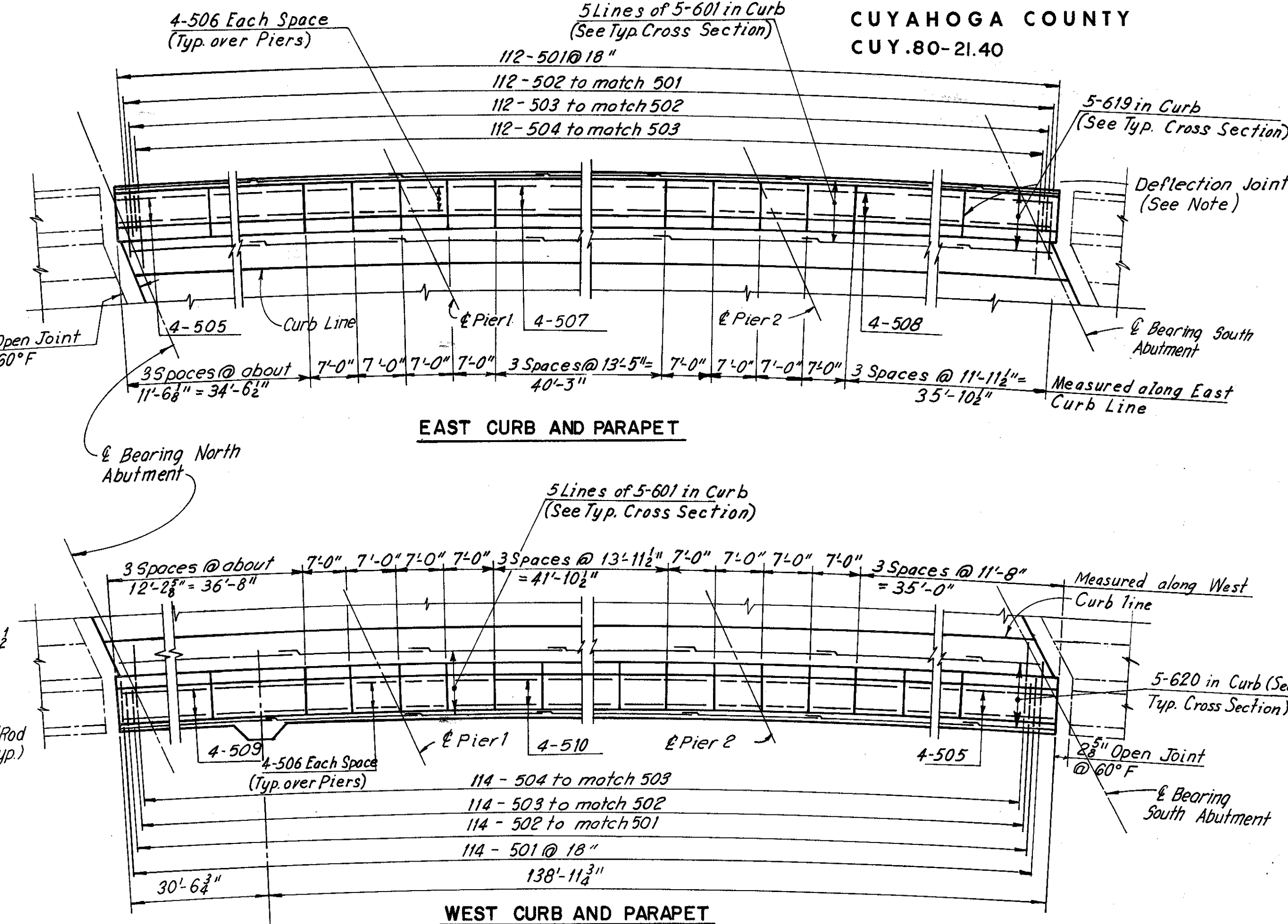
PREFORMED ELASTIC JOINT SEALER

(D.S. Brown CU-4000, Acme B-462 or equivalent)



SECTION A-A  
(Abutment reinforcing steel not shown)

Note: Above dimensions are measured normal to abutment. Portions of end dam angles in contact with concrete shall not be painted. All other portions shall be cleaned and painted in accordance with Item 514.

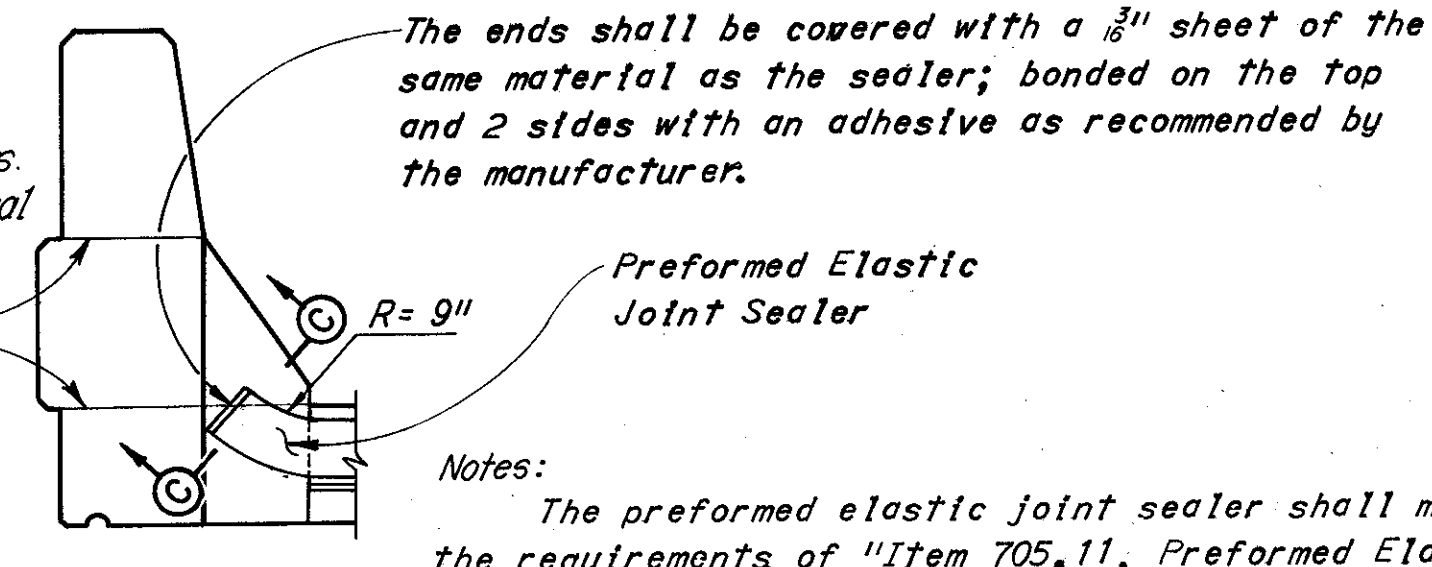


EAST CURB AND PARAPET

WEST CURB AND PARAPET

Note: All openings for preformed elastic joint sealers are to be accurately formed and constructed to smooth straight lines.

The ends shall be covered with a 3/8" sheet of the same material as the sealer; bonded on the top and 2 sides with an adhesive as recommended by the manufacturer.

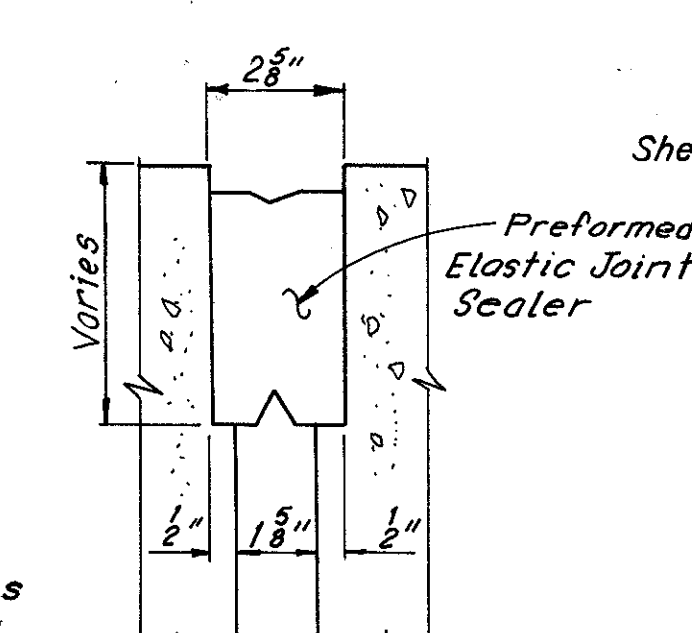


SECTION B-B

Notes:  
The preformed elastic joint sealer shall meet the requirements of "Item 705.11, Preformed Elastic Joint Sealer and Lubricant Adhesive". Installation shall be according to manufacturers' recommendations.

The following abbreviations are used:  
(T) = Top (B) = Bottom

For Light Standard Support Details see Sheet CD1.



SECTION C-C

H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**RIGHT BRIDGE SLAB PLAN**  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCracken Road  
STA. 62+17.54 TO  
STA. 63+62.80  
CUYAHOGA COUNTY OHIO

DRAWN L.J.G.	TRACED M.S.	CHECKED W.C.	REVIEWED	REVISED
DATE 8-28-62	DATE 9-13-62	DATE 5-13-63	DATE	DATE

SHEET 12/14



MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)							
BR. NO. 13L - PIER 1						BR. NO. 13R - PIER 1						BR. NO. 13R - SUPERSTRUCTURE												
PA401	2	12'-6"	150		477	PC401	1	12'-0"	150		231	SL604	284	46'-2"	100		19,693							
PA402	3	13'-6"	150		775	PC402	1	10'-6"	150		205	SL605	676	30'-0"	Str.		30,461							
PA501	1 Ser.5	10'-10"	109	4"	60	PC501	1 Ser.9	12'-2"	109	2"	108	SL606	169	32'-6"	Str.		8250							
PA502	28	10'-4"	109		302	PC502	16	10'-4"	109		172	SL607	58	18'-6"	Str.		1612							
PA503	38	12'-2"	109		482	PC503	1 Ser.6	12'-2"	109	3 1/2"	72	SL608	58	18'-9"	Str.		1633							
PA504	1 Ser.7	10'-10"	109	2 1/8"	84	PC504	6	12'-2"	109		76	SL801	22	32'-9"	Str.		1924							
PA505	63	5'-1"	105		334	PC505	28	5'-1"	105		148	SL802	22	45'-0"	Str.		2643							
PA601	12	6'-2"	105		111	PC601	6	6'-2"	105		56	SL803	62	6'-0"	Str.		993							
PA602	2	32'-9"	Str.		99	PC602	2	30'-9"	Str.		92	2 Light Standard Supports						1,470						
PA603	2	18'-6"	Str.		56	PC801	40	10'-8"	100		1139	TOTAL WEIGHT						124,683						
PA604	2	27'-0"	Str.		81	PC1101	24	7'-5"	104		957	BR. NO. 13R - SUPERSTRUCTURE												
PA801	96	10'-8"	100		2734	PC1102	12	15'-6"	Str.		988	SR501	226	5'-4"	160		1257							
PA1101	4	32'-11"	108		700	PC1103	12	14'-0"	Str.		893	SR502	226	2'-0"	105		471							
PA1102	4	25'-10"	108		549	PC1104	1	15'-3"	Str.		81	SR503	226	2'-1"	104		491							
PA1103	4	21'-6"	Str.		457	PC1105	4	30'-9"	141		653	SR504	226	3'-1"	142		727							
PA1104	4	37'-8"	126		800	PC1106	6	14'-3"	104		454	SR505	24	11'-3"	Str.		282							
PA1105	3	13'-9"	104		219	PC1107	4	34'-9"	105		739	SR506	64	6'-6"	Str.		434							
PA1106	5	16'-6"	104		438	TOTAL WEIGHT						7064	SR507	12	13'-0"	Str.		163						
PA1107	4	20'-1"	104		427	PD401	1	13'-4"	150		258	SR508	12	11'-6"	Str.		144							
PA1108	4	32'-8"	104		694	PD402	1	11'-5"	150		219	SR509	12	11'-9"	Str.		147							
PA1109	1	15'-6"	Str.		82	PD501	1 Ser.9	12'-2"	109	2"	108	SR510	12	13'-6"	Str.		169							
PA1110	2	13'-9"	104		146	PD502	20	10'-4"	109		216	SR601	345	30'-0"	Str.		15,546							
PA1111	8	15'-6"	Str.		659	PD503	1 Ser.6	12'-2"	109	3 1/2"	72	SR602	1 Ser.36	26'-3"	28'-0"	Str.	8"	1467						
PA1112	8	15'-9"	Str.		669	PD504	7	12'-2"	109		89	SR603	1 Ser.23	26'-3"	28'-0"	Str.	1"	937						
PA1113	12	16'-6"	Str.		1052	PD505	28	5'-1"	105		148	SR604	320	29'-6"	Str.		14,179							
PA1114	8	17'-3"	Str.		733	TOTAL WEIGHT						16,179	SR605	320	31'-0"	100		14,900						
PA1115	12	16'-9"	Str.		1068	BR. NO. 13L - PIER 2						SR606	1 Ser.10	7'-6"	26'-3"	Str.	2 1/2"	253						
PA1116	48	7'-5"	104		1891	PD601	6	6'-2"	105		56	SR607	1 Ser.10	8'-2"	26'-1 1/2"	101	2 1/4"	263						
TOTAL WEIGHT											16,179	PD602	2	34'-0"	Str.		102	SR608	1 Ser.3	3'-6"	6'-0"	Str.	1 1/2"	21
BR. NO. 13L - PIER 2						PD801	40	10'-8"	100		1139	SR609	1 Ser.3	4'-2"	6'-8"	101	1 1/2"	24						
PB401	2	14'-0"	150		531	PD801	40	10'-8"	100		1139	SR610	1 Ser.30	5'-9"	28'-3"	Str.	9"	766						
PB402	3	15'-1"	150		856	PD1101	16	7'-5"	104		632	SR611	1 Ser.30	6'-5"	28'-1 1/2"	101	9"	796						
PB501	1 Ser.5	10'-10"	109	4"	60	PD1102	8	17'-0"	Str.		722	SR612	1 Ser.7	3'-0"	3'-0"	Str.	4"	42						
PB502	28	10'-4"	109		302	PD1103	8	15'-0"	Str.		638	SR613	1 Ser.7	3'-8"	5'-8"	101	4"	49						
PB503	38	12'-2"	109		482	PD1104	1	18'-3"	Str.		97	SR614	1	29'-0"	Str.		44							
PB504	1 Ser.7	10'-10"	109	2 1/8"	84	PD1105	4	33'-6"	141		712	SR615	1	34'-3"	Str.		51							
PB505	63	5'-1"	105		334	PD1106	6	13'-9"	104		438	SR616	9	8'-6"	Str.		115							
PB601	12	6'-2"	105		111	PD1107	4	37'-2"	105		790	SR617	9	9'-6"	Str.		128							
PB602	2	32'-9"	Str.		99	TOTAL WEIGHT						6436	SR618	30	3'-1"	149		139						
PB603	2	18'-6"	Str.		56	BR. NO. 13L - SUPERSTRUCTURE						SR619	5	26'-3"	Str.		197							
PB604	2	27'-0"	Str.		81	SL501	184	5'-4"	160		1024	SR620	5	28'-0"	Str.		210							
PB801	96	10'-8"	100		2734	SL502	196	2'-0"	105		409	SR621	44	21'-0"	Str.		1388							
PB1101	4	32'-11"	108		700	SL503	196	2'-2"	104		443	1 Light Standard Support						735						
PB1102	4	25'-10"	108		549	SL504	192	3'-2"	142		634	TOTAL WEIGHT						56,535						
PB1103	4	21'-6"	Str.		457	SL505	196	2'-10"	148		579	BR. NO. 13R - SUPERSTRUCTURE												
PB1104	4	37'-8"	126		800	SL506	196	2'-10"	142		579	SL501	184	5'-4"	160		1024							
PB1105	3	13'-9"	104		219	SL507	196	3'-5"	104		698	SL502	196	2'-0"	105		409							
PB1106	5	16'-6"	104		438	SL508	24	14'-9"	Str.		369	SL503	196	2'-2"	104		443							
PB1107	4	20'-1"	104		427	SL509	138	7'-5"	127		1068	SL504	192	3'-2"	142		634							
PB1108	4	32'-8"	104		694	SL510	138	6'-11"	105		996	SL505	196	2'-10"	148		579							
PB1109	1	15'-6"	Str.		82	SL511	96	5'-3"	Str.		526	SL506	196	2'-10"	142		579							
PB1110	2	13'-9"	104		146	SL512	36	13'-6"	Str.		507	SL507	196	3'-5"	104		698							
PB1111	8	17'-0"	Str.		723	SL513	24	14'-0"	Str.		350	SL508	24	14'-9"	Str.		369							
PB1112	8	17'-3"	Str.		733	SL514	24	2'-9"	Str.		69	SL509	138	7'-5"	127		1068							
PB1113	12	18'-6"	Str.		1179	SL515	4	3'-0"	142		13	SL510	138	6'-11"	105		996							
PB1114	8	18'-9"	Str.		797	TOTAL WEIGHT									16,729	SL511	96	5'-3"	Str.		526			
PB1115	12	18'-3"	Str.		1164	SL601	284	32'-9"	Str.		13,970	SL512	36	13'-6"	Str.		507							
PB1116	48	7'-5"	104		1891	SL602	284	34'-2"	100		14,574	SL513	24	14'-0"	Str.		350							
TOTAL WEIGHT											16,729	SL603	284	45'-0"	Str.		19,196	SL514	24	2'-9"	Str.		69	

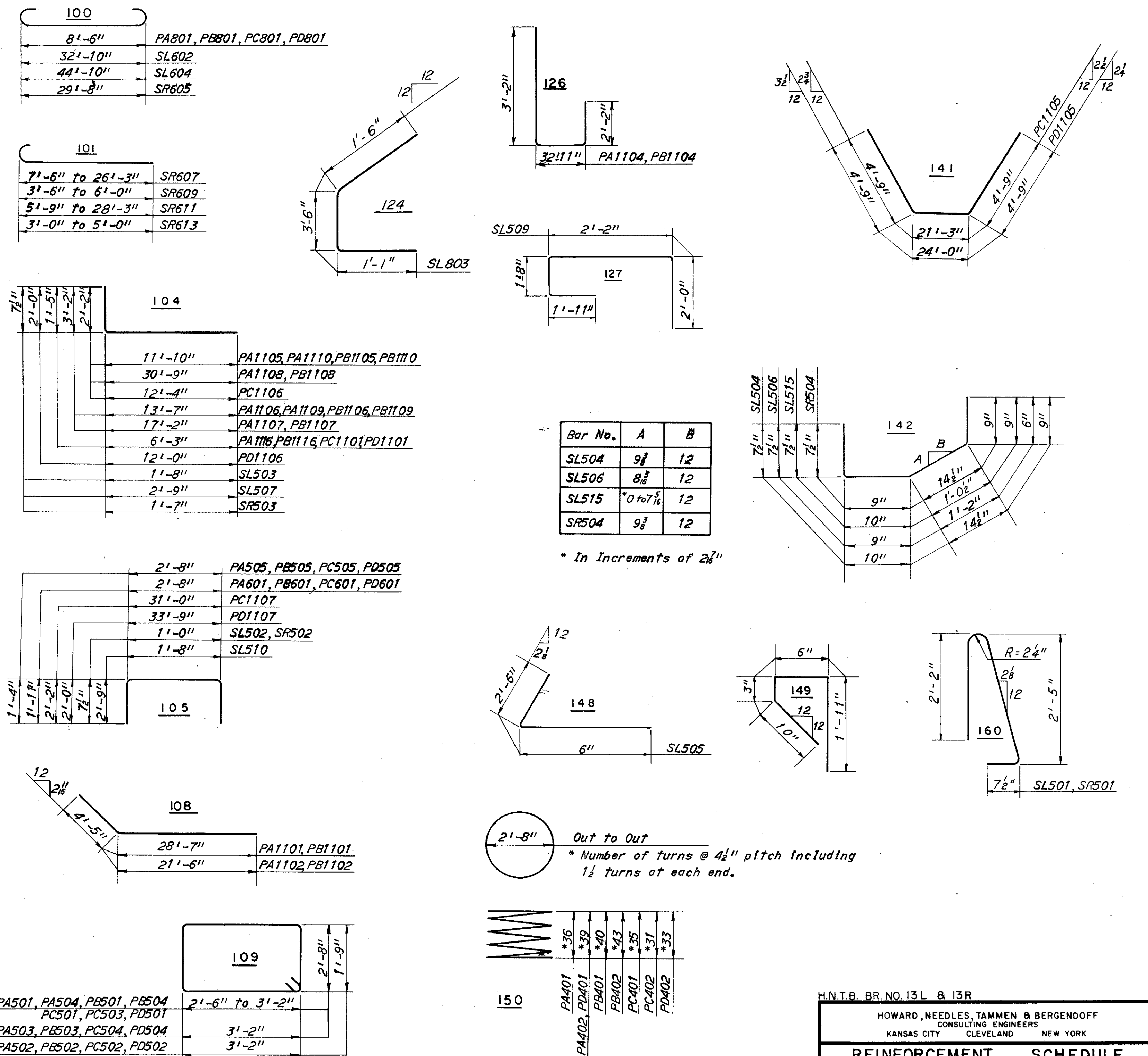
ENCLOSURE  
NO. 22 1992

BENDING DIAGRAMS

Quantity Calculations  
Made By KRS Date 8-70  
Checked By DMP Date 8-70

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

CUYAHOGA COUNTY  
CUY-80-21.40



Notes:  
For Spiral Reinforcement Note and for Replacement Bar Schedule see Sheet 12/12 of BR. NO. CUY-80-2169.  
For Light Standard Support Reinforcement Schedule and Bending Diagrams see Sheet CD1.

H.N.T.B. BR. NO. 13L & 13R

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

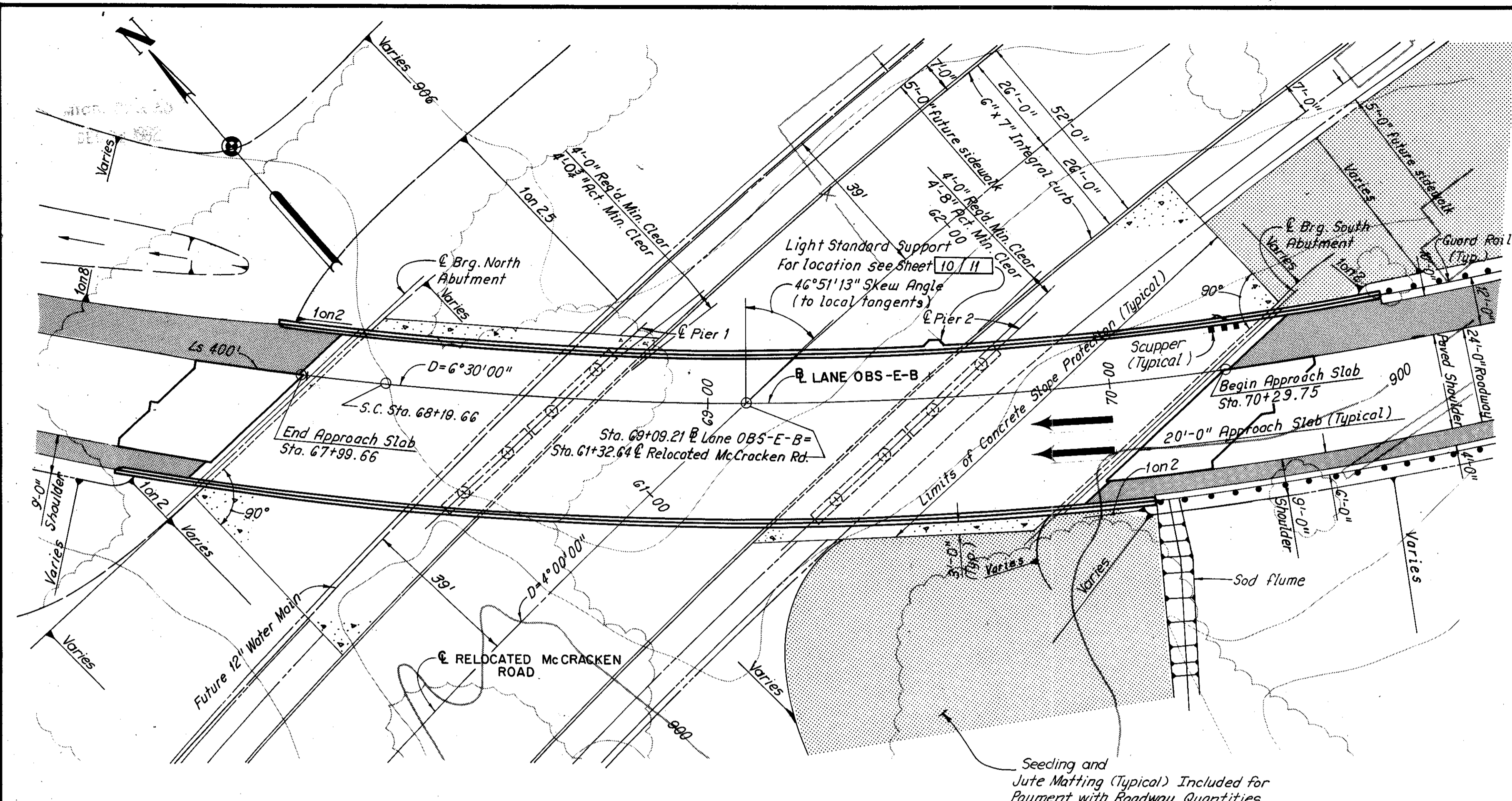
REINFORCEMENT SCHEDULE  
PIERS AND SUPERSTRUCTURE  
BEDFORD FREEWAY AND RAMP B-OBS  
OVER RELOCATED McCRACKEN ROAD

STA. 62+17.54 TO  
STA. 63+62.80  
(E) BEDFORD FREEWAY

CUYAHOGA COUNTY OHIO

DRAWN K.R.S.	TRACED J.M.P.	CHECKED D.M.P.	REVIEWED	REVISED
DATE 8-5-70	DATE 1-18-70	DATE 8-18-70	DATE	DATE

SHEET 14/14



LANE OBS-E-B	
P. I. Sta.	70+54.74
$\Delta$	= 52°11'29"
$D_c$	= 6°30'00"
$L_c$	= 402.95'
$T_s$	= 635.08'
$\theta_s$	= 13°00'00"
$L_s$	= 400.00'
$E_s$	= 108.48'

RELOCATED McCracken Rd.	
P. I. Sta.	= 59+67.96
$\Delta$	= 44°51'07"
$D_c$	= 4°00'00"
$R_c$	= 1432.39'
$T$	= 591.15'
$L$	= 1121.30'
$E$	= 117.19'

**PROPOSED STRUCTURE**

TYPE: Continuous steel girders with reinforced concrete deck and sub-structures.

SPAN: 61'-8 1/2", 95'-1 1/8" and 66'-5" (Measured along @ Lane OBS-E-B)

ROADWAY: 42'-0" face to face of parapets.

DESIGN LOAD: HS 20-44

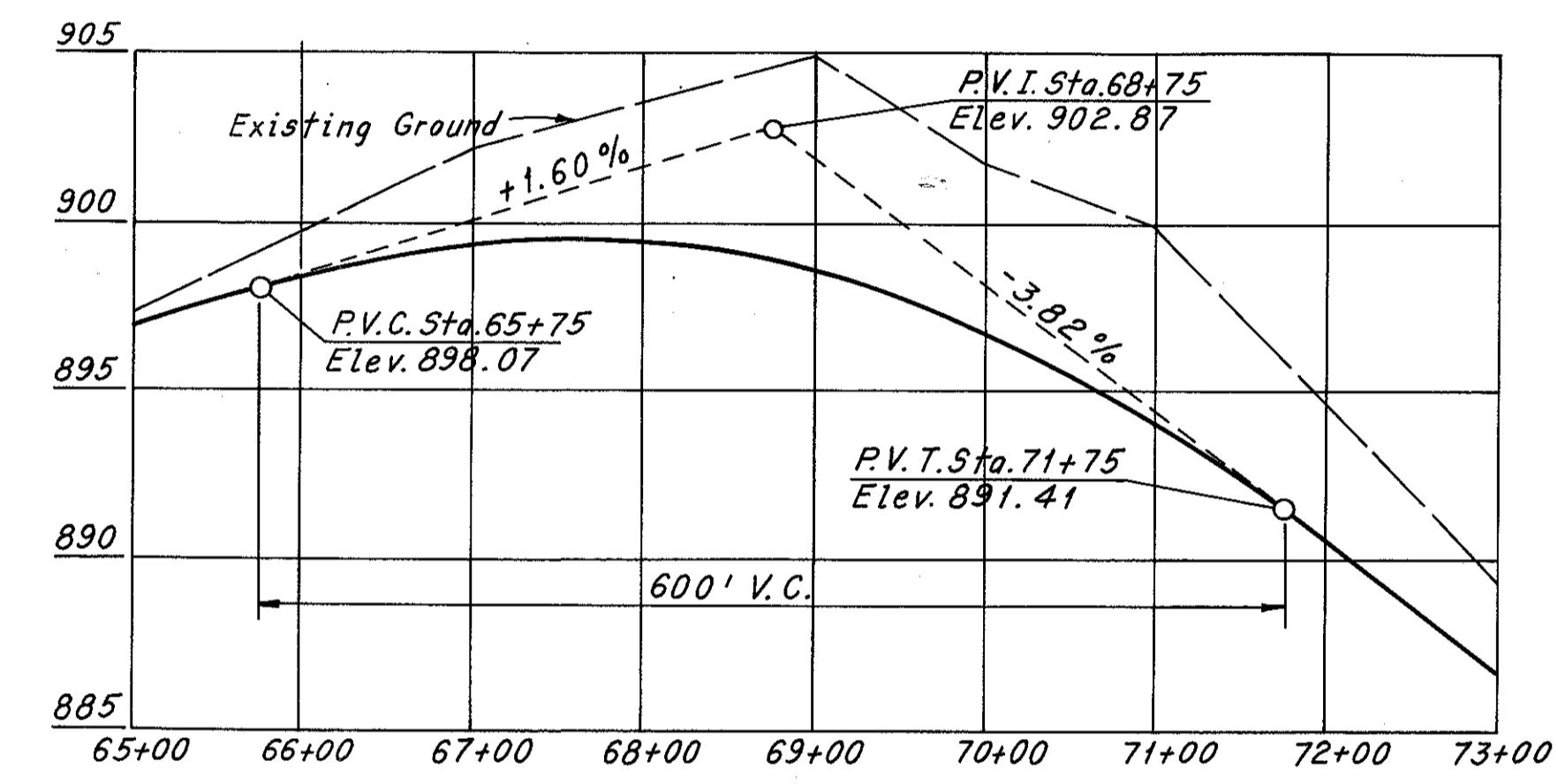
SKEW: 46°51'13" Left Forward

WEARING SURFACE: 2 1/2" Asphalt Concrete

APPROACH SLABS: AS-1-67 (20 feet long)

ALIGNMENT: Spiral, 6°30'00" Left

SUPERELEVATION: .083 ft. per ft.



**PROFILE - LANE OBS-E-B**  
Scale: Horiz. 1"=100'  
Vert. 1"=5'

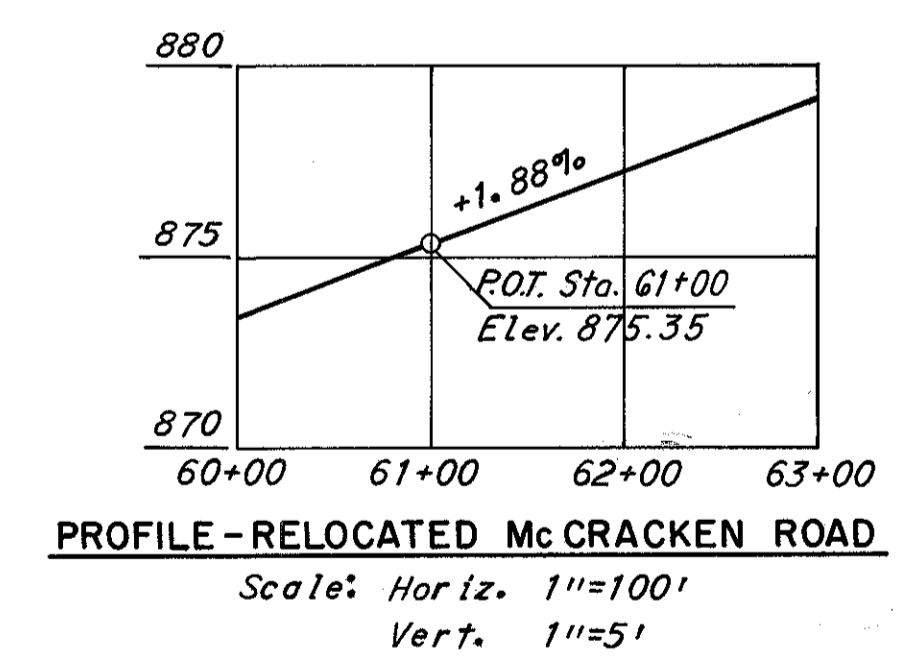
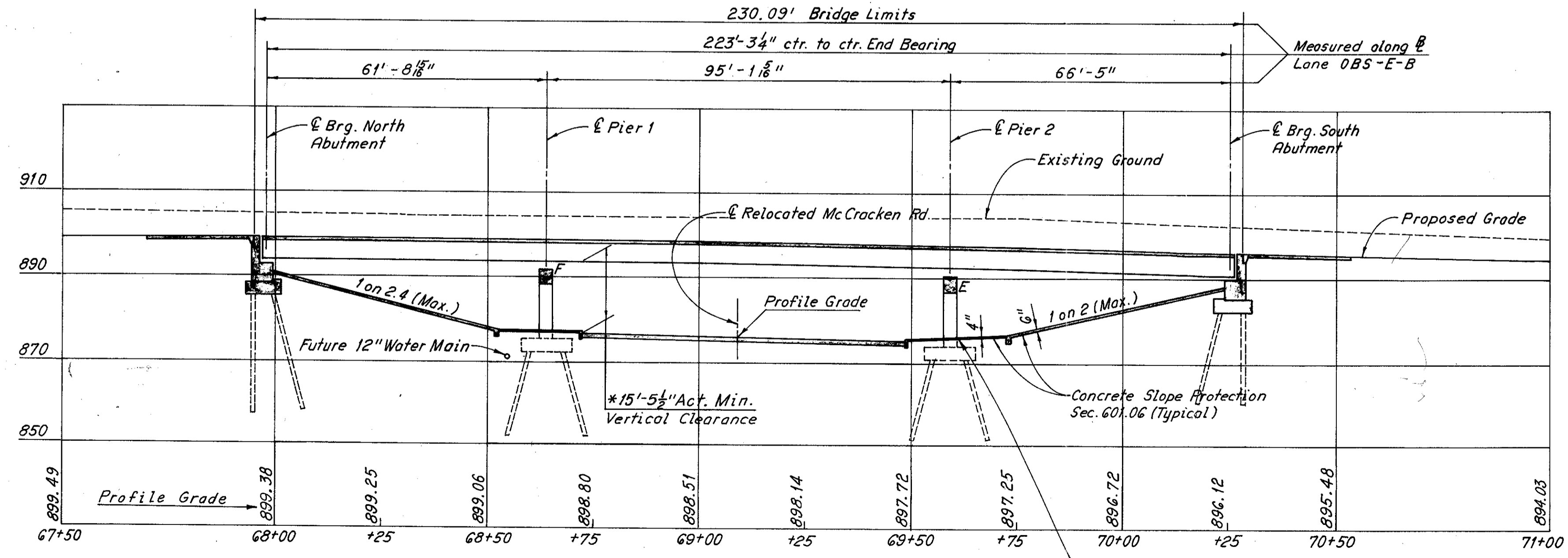
**TRAFFIC DATA:**

1991	Initial Construction:
	A.D.T. 16,417
	D.S.D.H.V. 2,267

Notes:  
Earthwork limits shown are schematic. Actual slopes shall conform to plan cross-sections.  
The 12" water main north of Pier 1 shall be set in place after the construction of Pier 1 footings.

REVISIONS  
DEC 22 1992

**PLAN**  
Scale: 1"=20'



**PROFILE - RELOCATED McCracken ROAD**  
Scale: Horiz. 1"=100'  
Vert. 1"=5'

Notes:  
Roadway excavation shall be completed to the finish spill-thru slopes and to the level of the subgrades before excavating or driving piles for the abutments and piers.  
All piles are 12"  $\phi$  C.I.P. reinforced concrete at the abutments and HP12x53 at the piers. The estimated average pay lengths are as follows:  
North Abutment = 29 ft.  
Pier 1 = 20 ft.  
Pier 2 = 20 ft.  
South Abutment = 21 ft.  
The piles at the abutments shall be driven to a minimum bearing capacity of 35 tons per pile. The piles at the piers shall be driven to a minimum bearing capacity of 40 tons per pile.  
For underpass lighting details see Lighting Plans.

Notes:  
\*14'-6" Required minimum vertical clearance. Minimum vertical clearance occurs at the north edge of pavement of the westbound lanes of Relocated McCracken Road and the outside edge of the east exterior girder of Bridge No. 14

**ELEVATION**  
Scale: Horiz. 1"=20'  
Vert. 1"=20'

1" Preformed Expansion Joint Filler (Typ. around columns at piers). Included with Item 601 Concrete Slope Protection (4" thick) for payment.

**MAINTENANCE OF TRAFFIC**  
Two lanes of traffic with a minimum horizontal width of 26'-0" and a minimum vertical clearance of 13'-6" shall be maintained on Relocated McCracken Road at all times.

H.N.T.B. BR. NO. 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SITE PLAN**  
LANE OBS-E-B OVER  
RELOCATED McCracken ROAD

STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY OHIO

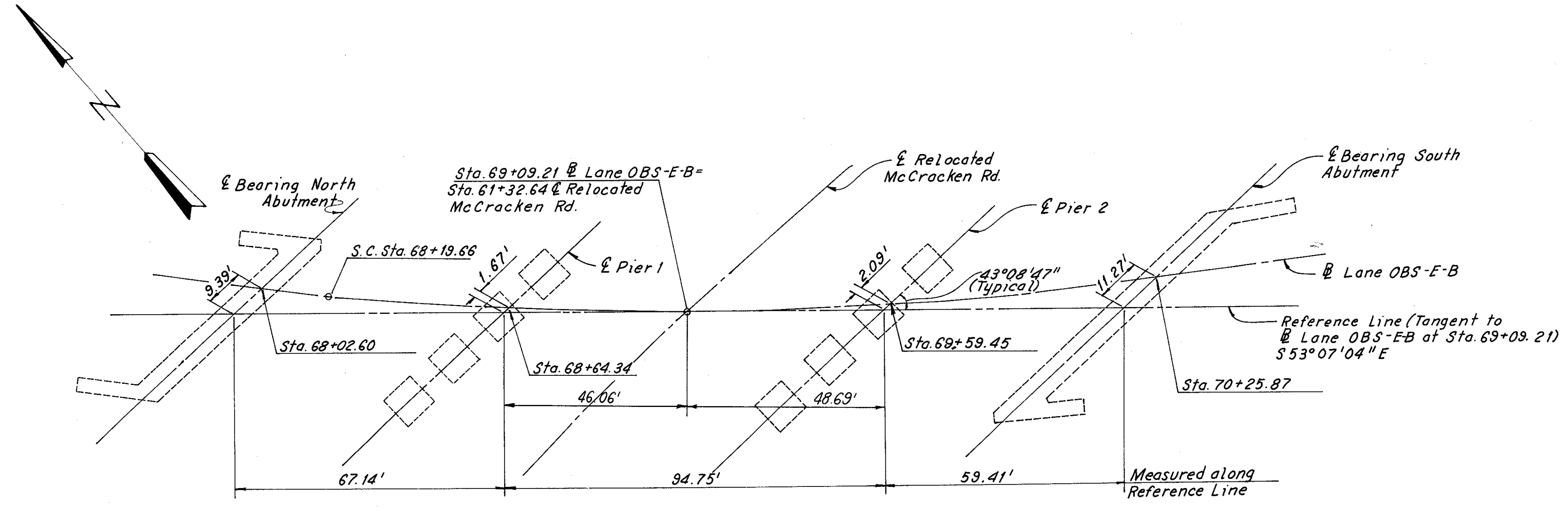
DRAWN G.L.	TRACED D.L.R.	CHECKED J.H.	REVIEWED	REVISED
DATE: 8-16-67	DATE: 8-23-67	DATE: 5-8-69	DATE	SHEET 1/11

MICROFILMED  
DEC 22 1962

FED. RD. DIVISION	STATE	PROJECT	351 390
2	OHIO		

CUYAHOGA COUNTY  
CUY-80-21.40

Quantity Calculations  
Made By K.Y.H. Date 5-69  
Checked By M.C.B. Date 2-70



BRIDGE LAYOUT DIAGRAM

ESTIMATED QUANTITIES								
ITEM	TOTAL	UNIT	DESCRIPTION	H.N.T.B. BRIDGE NO. 14				
				ABUT-MENTS	PIERS	SUPER-STRUCTURE	GENERAL	
503	619	Cu. Yd.	Unclassified Excavation	433	186			
505	Lump	Lump	Test Pile				Lump	
503	Lump		Cofferdams, Cribs & Sheet piling				Lump	
507	1,110	Lin. Ft.	12" $\phi$ C.I.P. Reinforced Concrete Piles	1,110				
507	960	Lin. Ft.	Steel Piles, HP 12x53		960			
509	144,298	Pounds	Reinforcing Steel	24,510	25,368	94,420		
511	327	Cu. Yd.	Class "C" Concrete, Superstructure			327		
511	78	Cu. Yd.	Class "C" Concrete, Pier Caps and Columns		78			
511	181	Cu. Yd.	Class "C" Concrete, Abutments Above Footing	181				
511	191	Cu. Yd.	Class "C" Concrete, Footings	119	72			
512	10	Lin. Ft.	Premolded Sealing Strip	10				
513	277,700	Pounds	Structural Steel			277,700		
514	277,700	Pounds	Field Painting of Structural Steel			277,700		
404	56	Cu. Yd.	Asphalt Concrete (70-85 or AC-20)				56	
Special	14	Cu. Yd.	Sand Asphalt (see proposal note)				14	
Special	1018	Sq. Yd.	Membrane Waterproofing, sheet type (see proposal note)				1018	
518	104	Cu. Yd.	Porous Backfill	104				
518	112	Lin. Ft.	6" Perforated, Helical C.M.P., 707.01	112				
518	65	Lin. Ft.	6" Non-Perforated Helical C.M.P. Including specials, 707.01	65				
518	3	Each	Scuppers Including Supports				3	
518	229	Lin. Ft.	Subdrainage for wearing course, as per plan				229	
601	438	Sq. Yd.	Concrete Slope Protection (4" Thick)				438	
601	779	Sq. Yd.	Concrete Slope Protection (6" Thick)				779	
808	327	Units	Chemical admixture for Concrete, Type A, B or D			327		

H.N.T.B. BR. NO. 14

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**BRIDGE LAYOUT DIAGRAM  
AND ESTIMATED QUANTITIES**  
LANE OBS-E-B OVER  
RELOCATED MCCRACKEN ROAD  
STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY OHIO

DRAWN BY K.Y.H.	TRACED BY J.S.C.	CHECKED BY M.C.B.	REVIEWED	REVISED
DATE 5-9-69	DATE 2-20-70	DATE 2-2-70	DATE	DATE

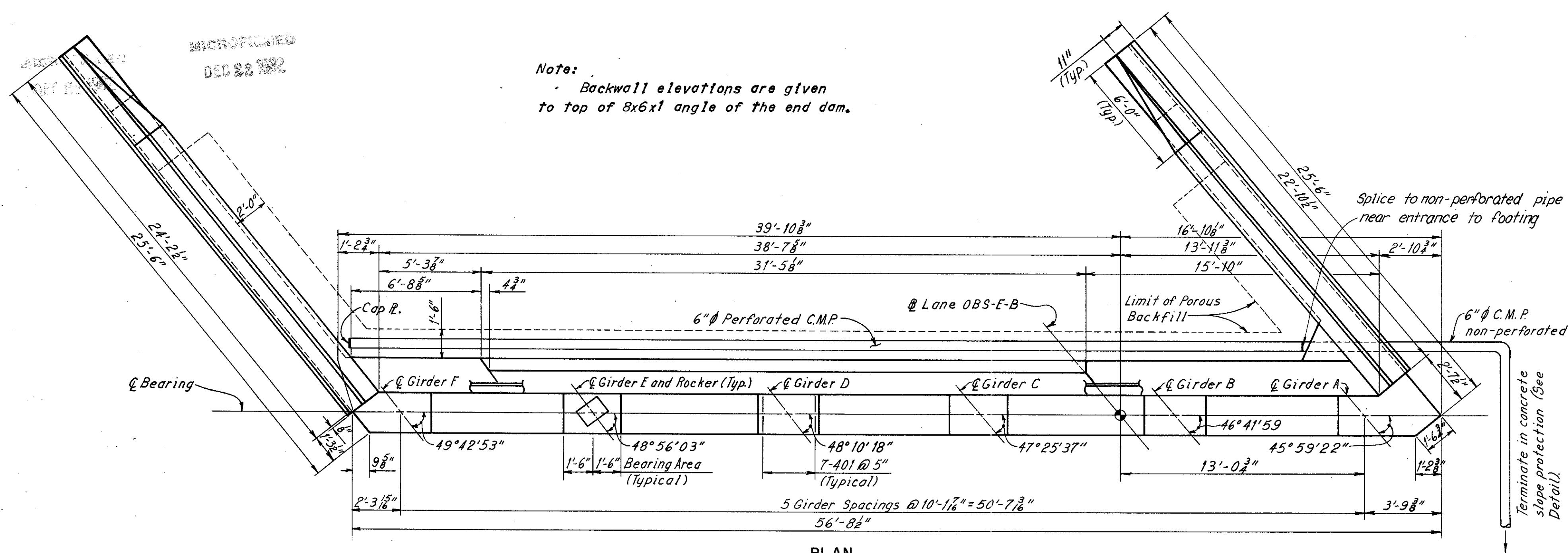
SHEET 2/11

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

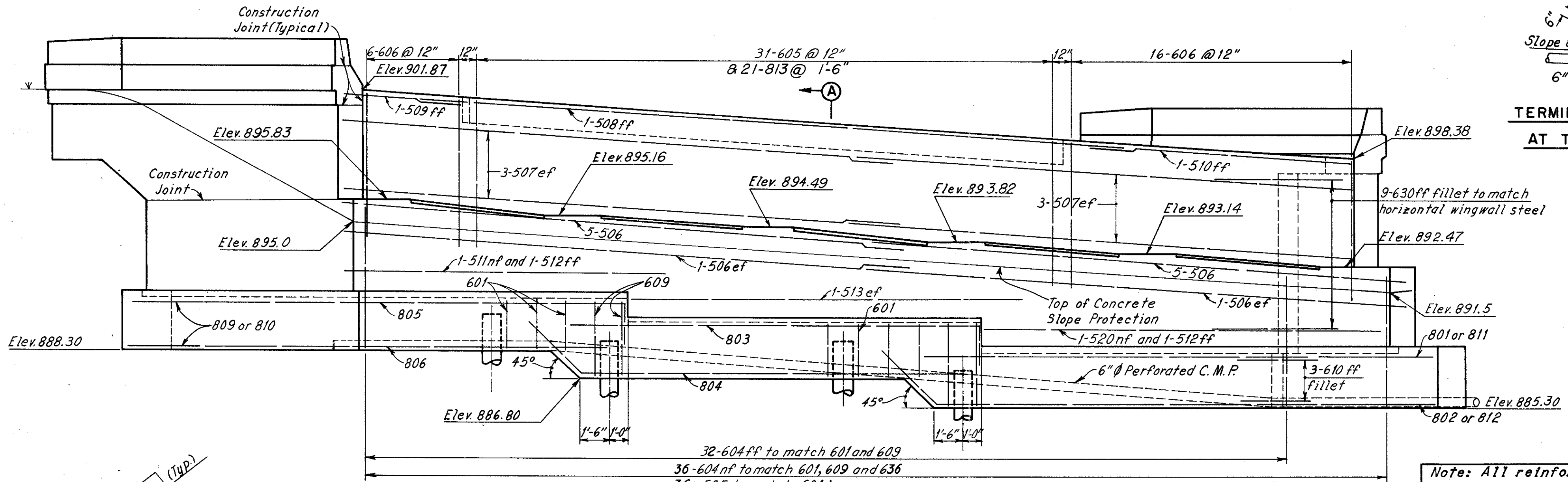
352  
390

CUYAHOGA COUNTY  
CUY-80-21.40

Note:  
Backwall elevations are given to top of 8x6x1 angle of the end dam.

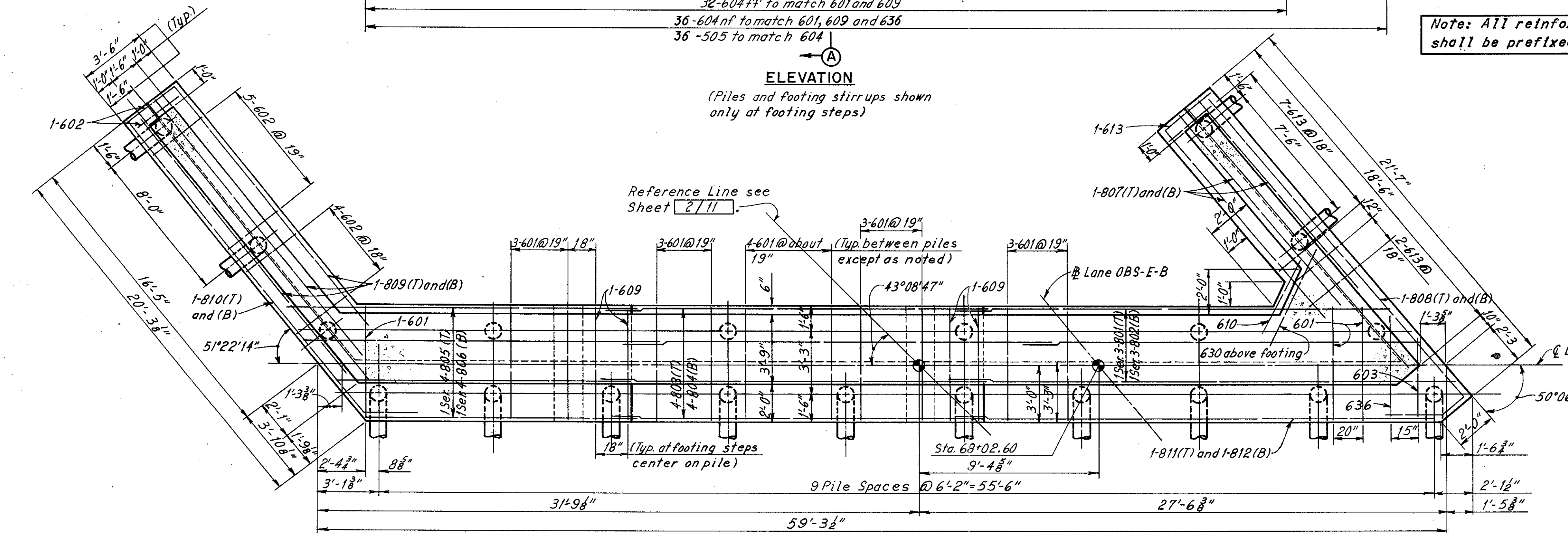


PLAN

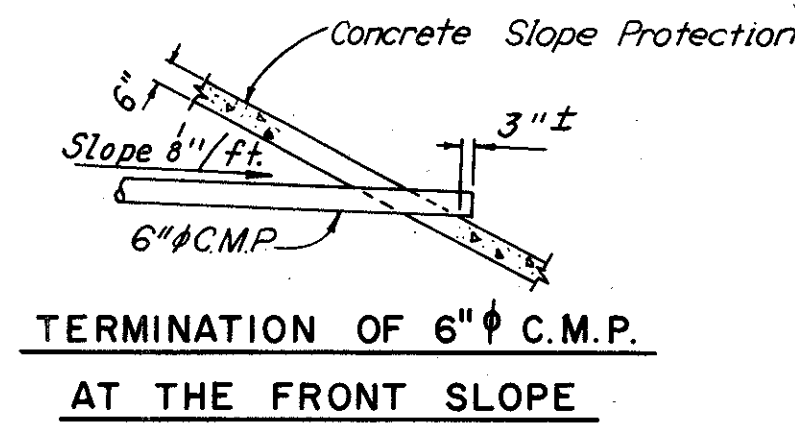
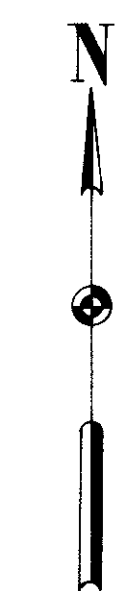


ELEVATION

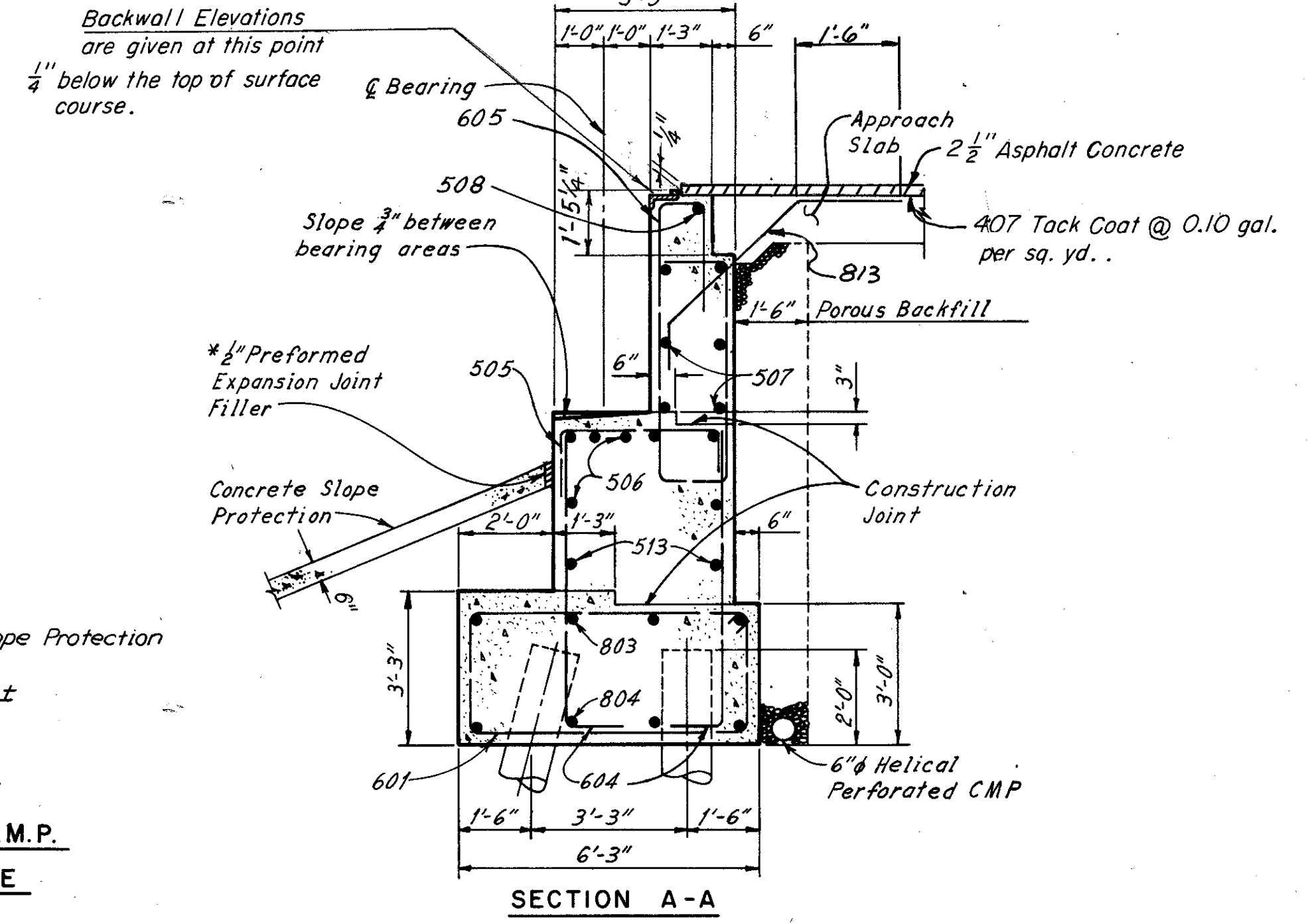
(Piles and footing stirrups shown only at footing steps)



FOOTING PLAN



TERMINATION OF 6" C.M.P. AT THE FRONT SLOPE



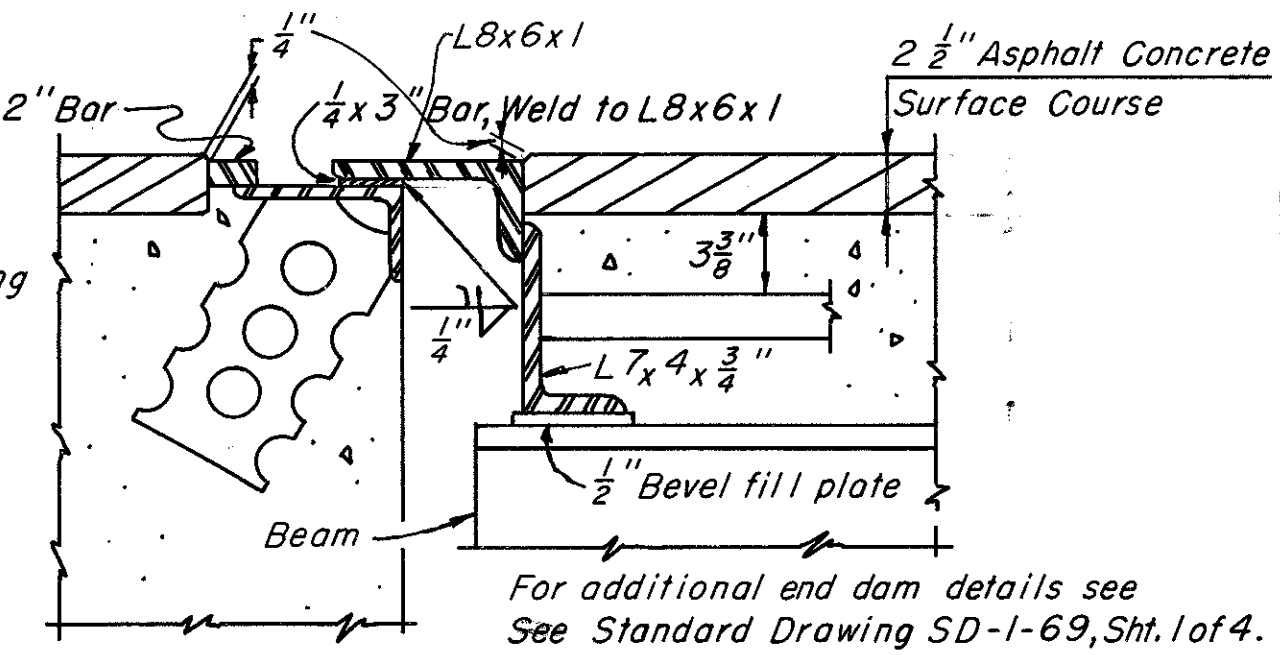
SECTION A-A

\*Note: The 1/2" preformed expansion joint filler is included for payment with "Item 601, Concrete Slope Protection" (6" thick).

Note:  
All piles are 12"  $\phi$  C.I.P. reinforced concrete.  
All battered piles shall be inclined 3 in 12 in the direction shown.

For additional roadway end dam and curb plate details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4.

- The following abbreviations are used:
- nf = near face
  - ff = far face
  - ef = each face
  - B = Bottom face
  - T = Top face



END DAM DETAILS

H.N.T.B. BR. NO. 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**NORTH ABUTMENT**  
LANE OBS-E-B OVER  
RELOCATED McCRACKEN ROAD

STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY OHIO

DRAWN/EEF	TRACED/ISC	CHECKED/MS	REVIEWED
DATE 5-11-68	DATE 3-10-70	DATE 5-7-70	DATE

SHEET 3/11

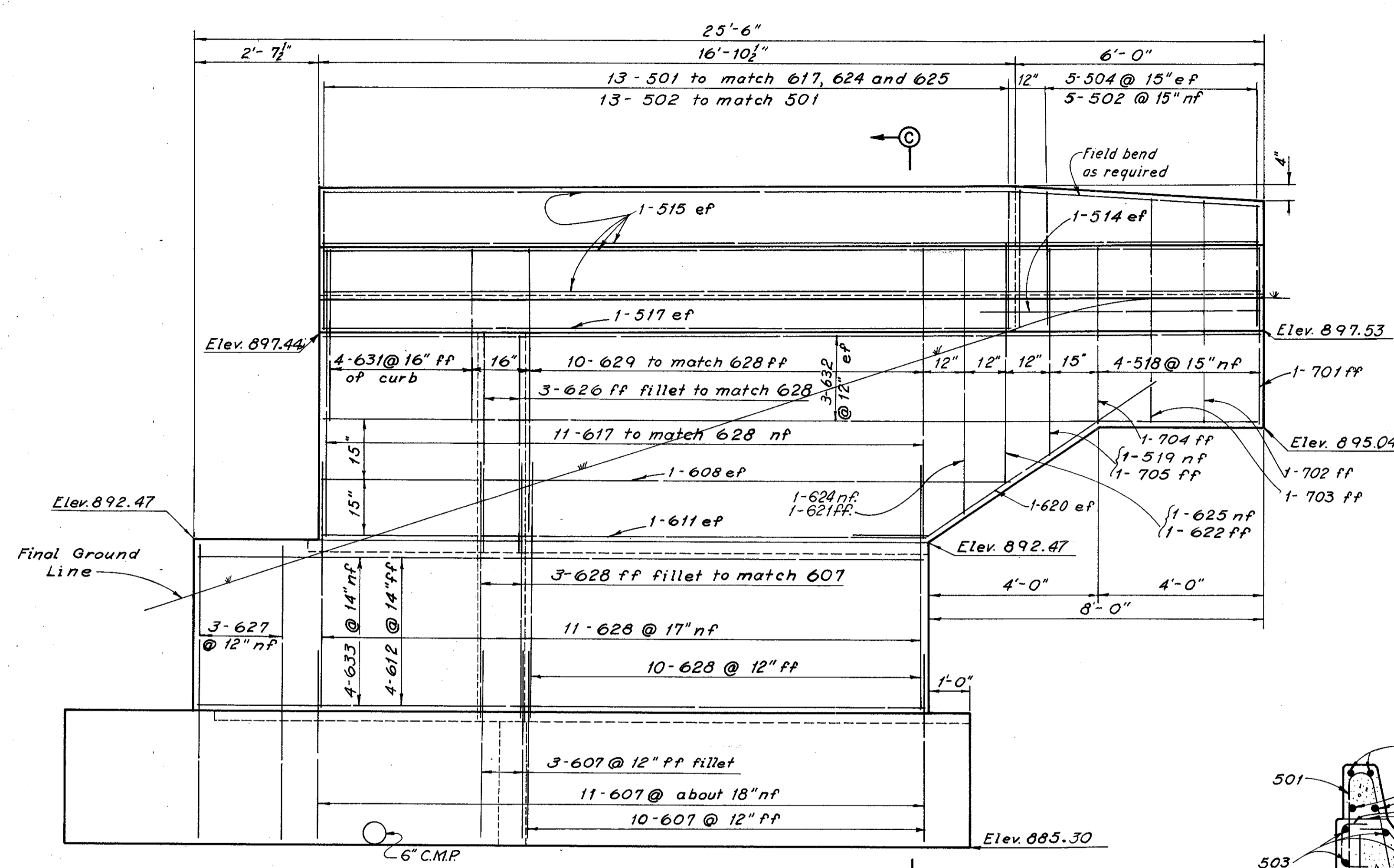
MICROFILMED  
DEC 22 1962

PROJ. FILED  
200 27 14

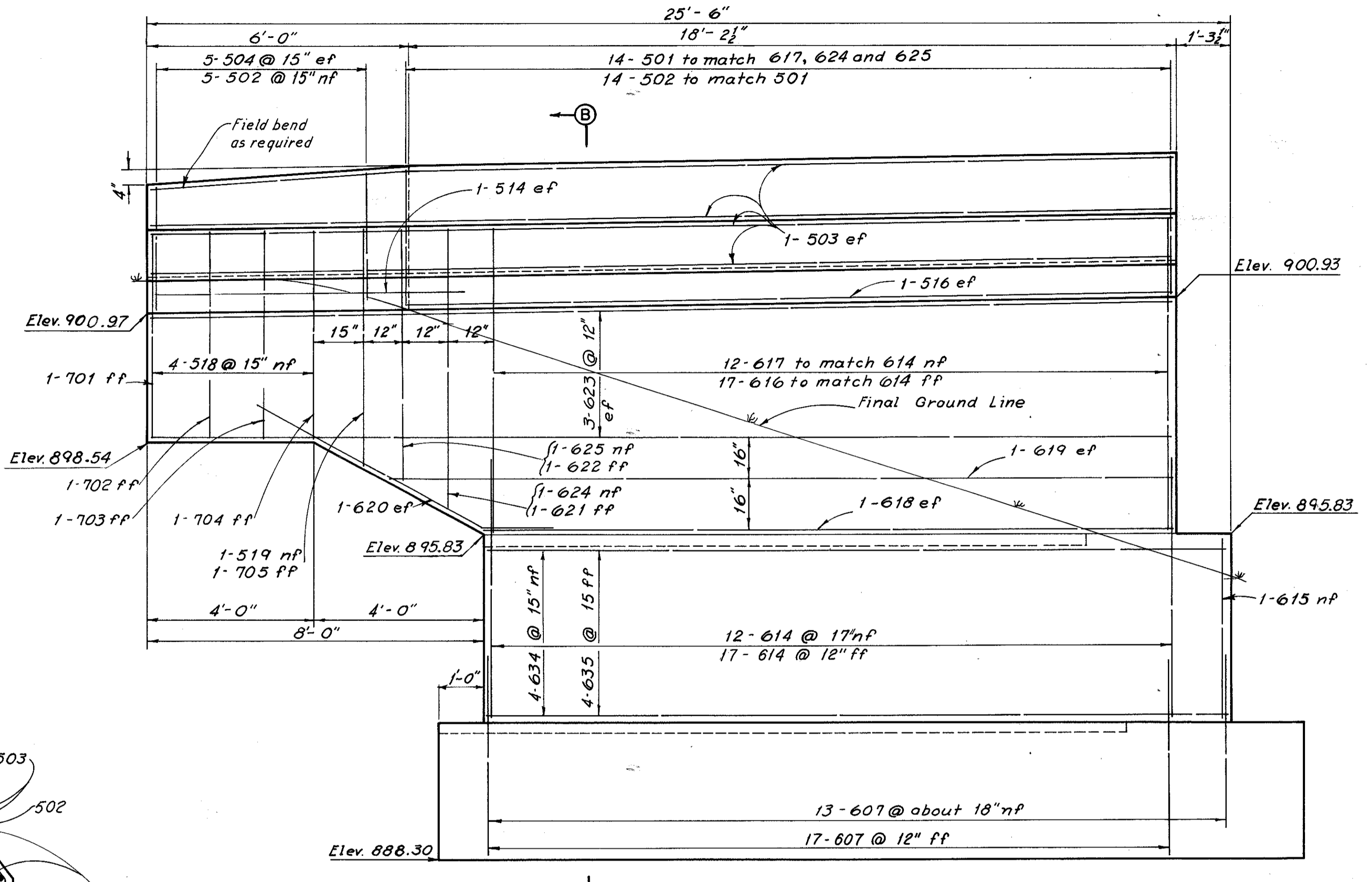
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

353  
390

CUYAHOGA COUNTY  
CUY.-80-21.40

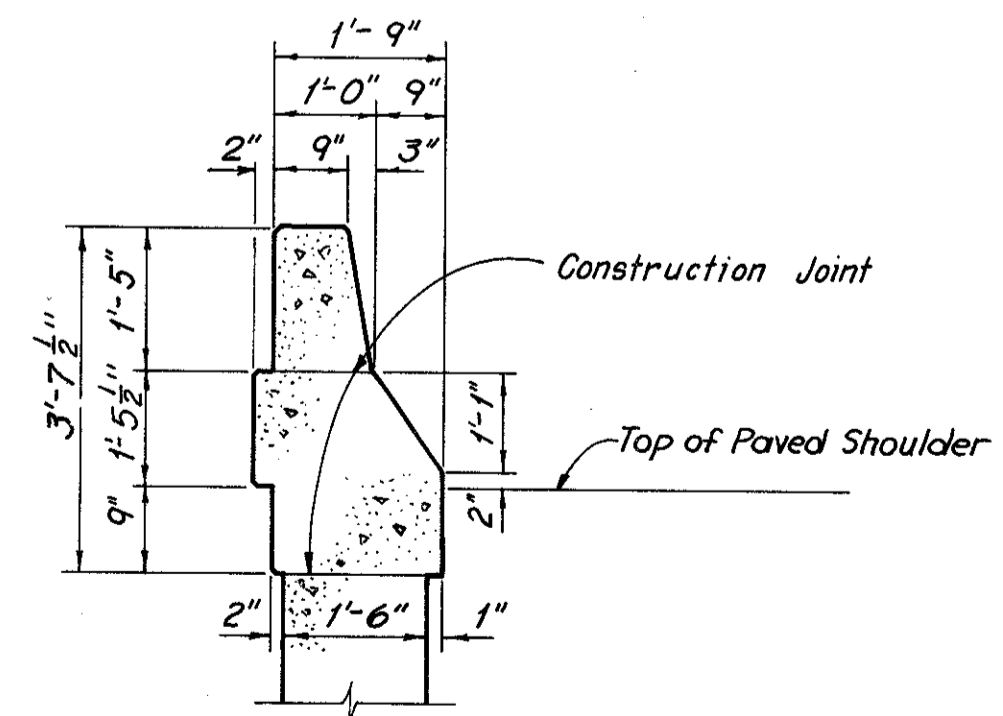


NORTHEAST WINGWALL ELEVATION  
(Piles not shown)

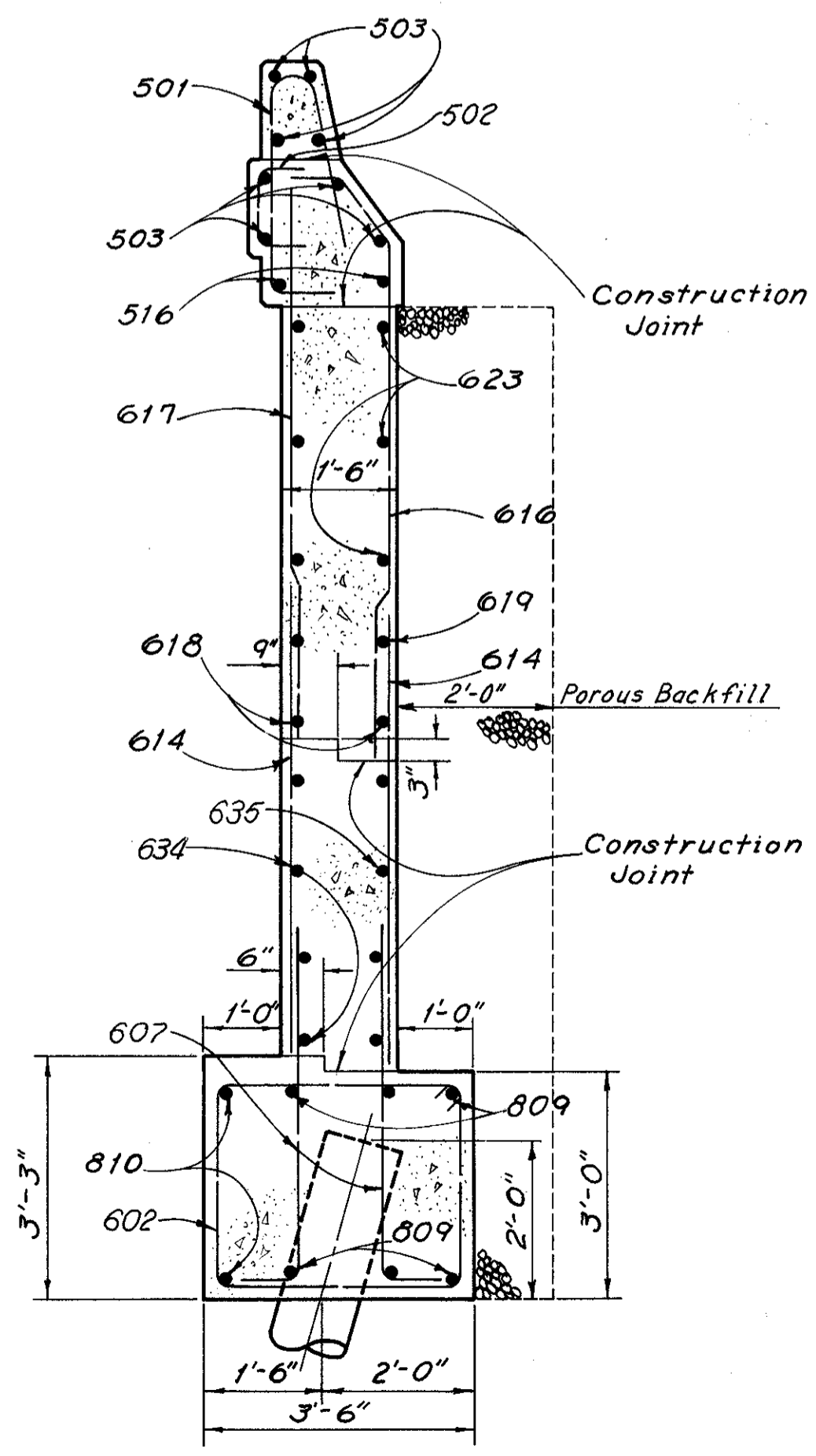


NORTHWEST WINGWALL ELEVATION  
(Piles not shown)

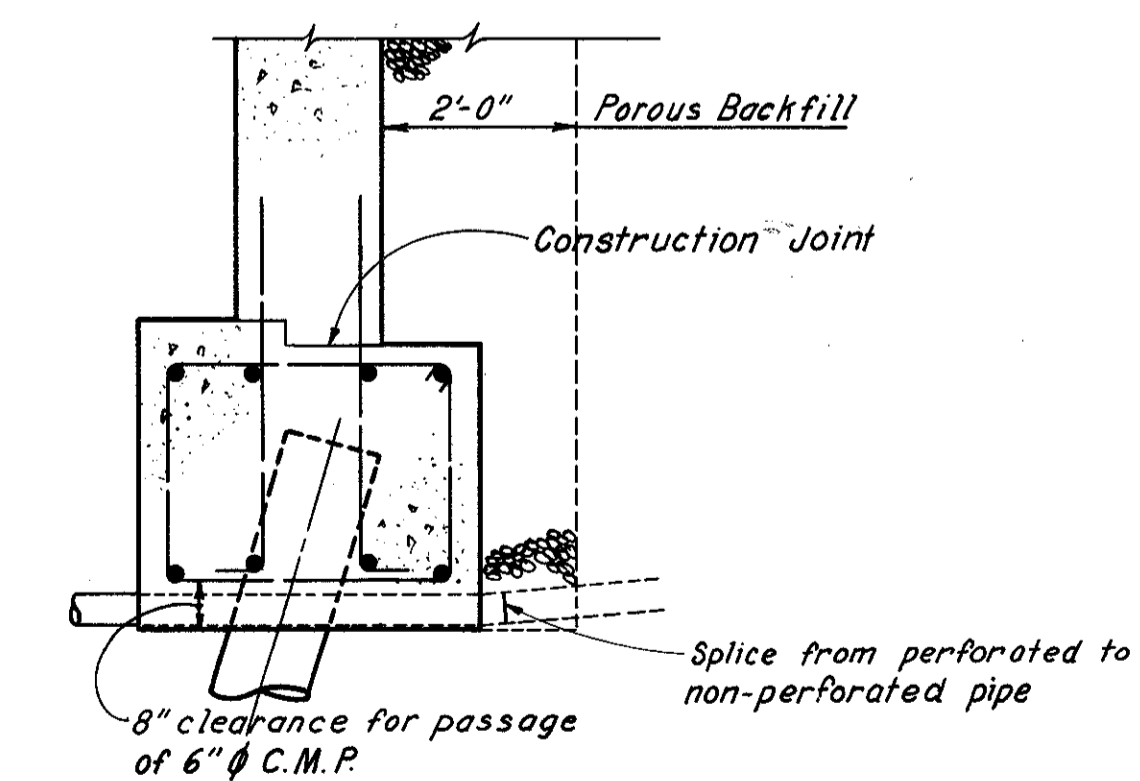
Note:  
All reinforcing bar marks shall be prefixed AN.



CURB DETAIL  
(Reinforcement not shown)



SECTION B-B  
Northwest Wingwall Shown



SECTION C-C  
Details not shown are similar to Section B-B, except for bar marks.

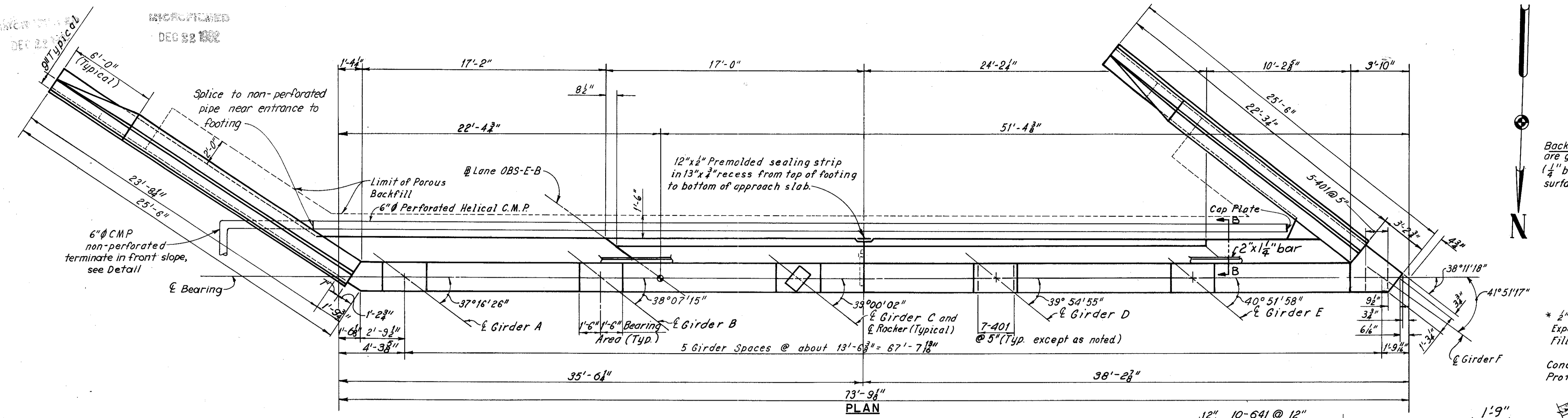
Note:  
For curb and parapet transitions, see "Part Plans-Parapet on Wingwall" on Ohio Standard Drawing BR-1-67, Sheet 1 of 3, Revised 10-15-71.

H.N.T.B. BR. NO. 14			
HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS KANSAS CITY CLEVELAND NEW YORK			
<b>NORTH ABUTMENT WINGWALLS</b>			
LANE OBS-E-B OVER RELOCATED McCRACKEN ROAD			
			STA. 67+99.66 TO STA. 70+29.75
CUYAHOGA COUNTY OHIO			
DRAWN	TRACED	CHECKED	REVIEWED
DATE 6-11-68	DATE 3-10-70	DATE 5-7-70	DATE

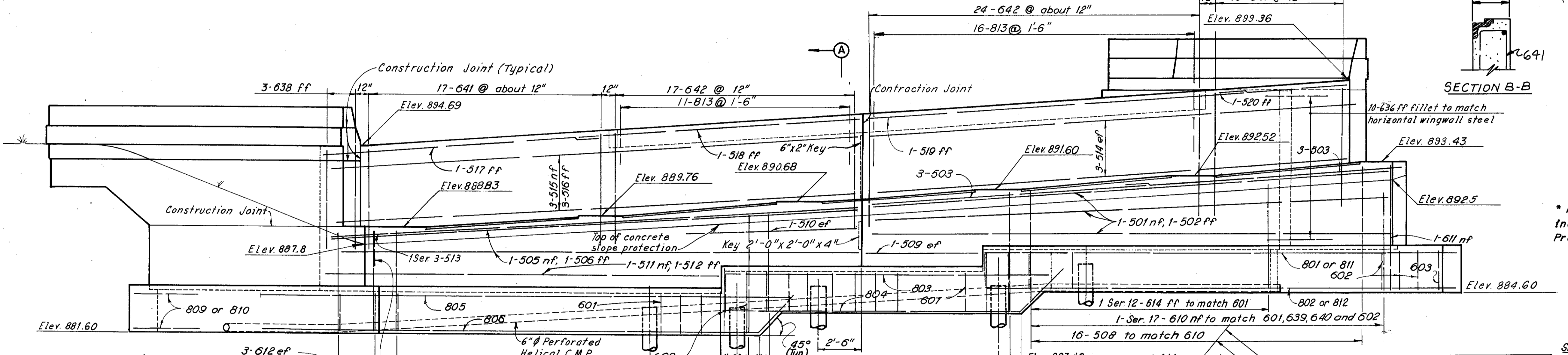
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2	OHIO		

354  
390

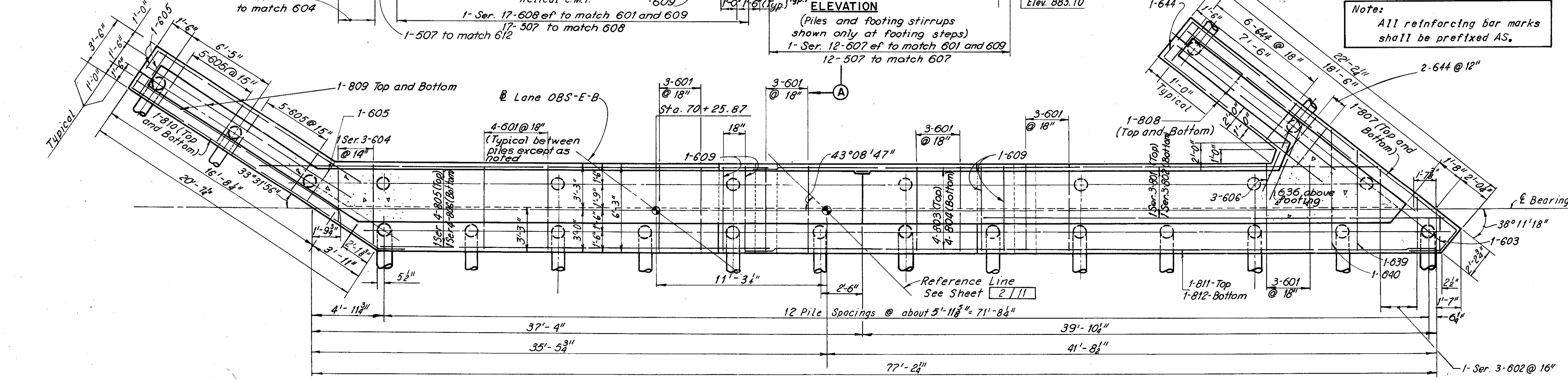
CUYAHOGA COUNTY  
CUY-80-21.40



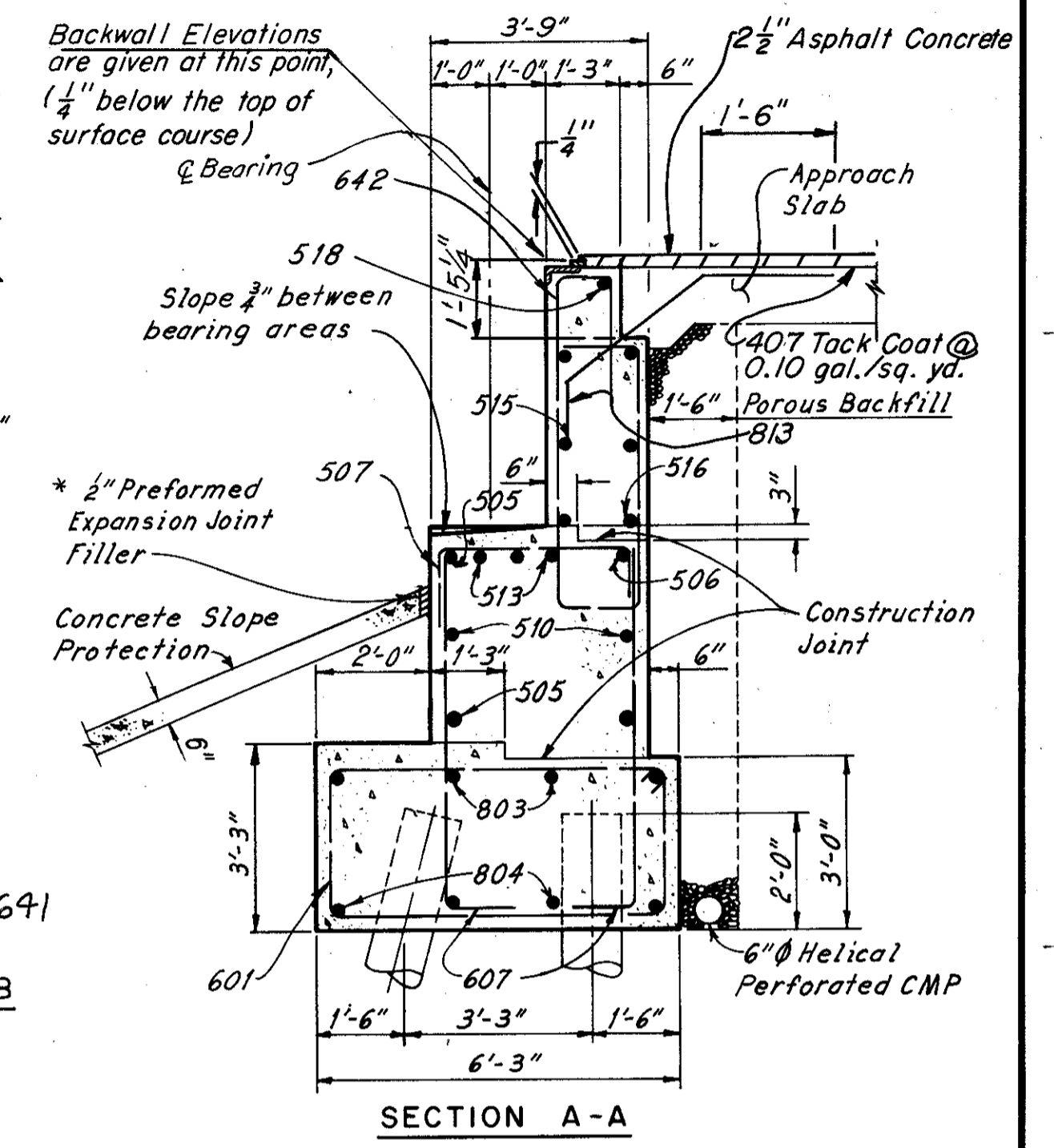
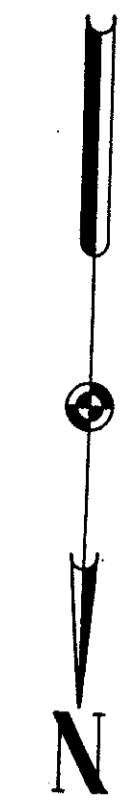
PLAN



ELEVATION



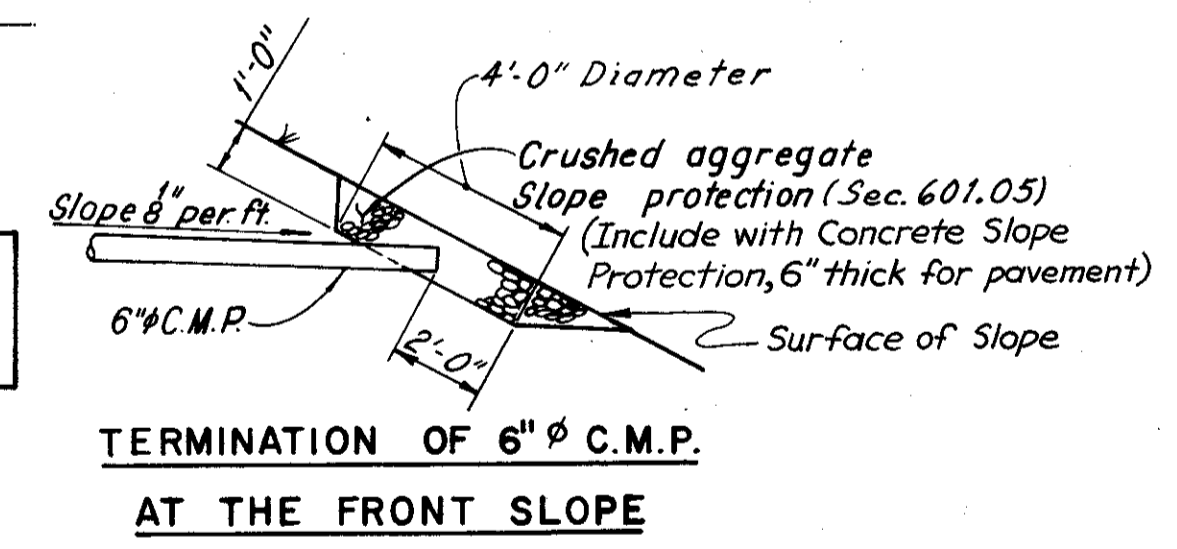
FOOTING PLAN



SECTION B-B

SECTION A-A

\* Note: The 1/2" preformed expansion joint filler is included for payment with "Item 601, Concrete Slope Protection" (6" thick).



TERMINATION OF 6" C.M.P. AT THE FRONT SLOPE

Note: All reinforcing bar marks shall be prefixed AS.

Note: For Notes see Sheet 3/11.

H.N.T.B. BR. NO. 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

**SOUTH ABUTMENT**  
LANE OBS-E-B OVER  
RELOCATED McCRACKEN ROAD

STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY OHIO

DRAWN F.E.F.	TRACED M.A.S.	CHECKED J.M.S.	REVIEWED
DATE 6-11-68	DATE 6-13-68	DATE 5-7-70	DATE

SHEET 5/11

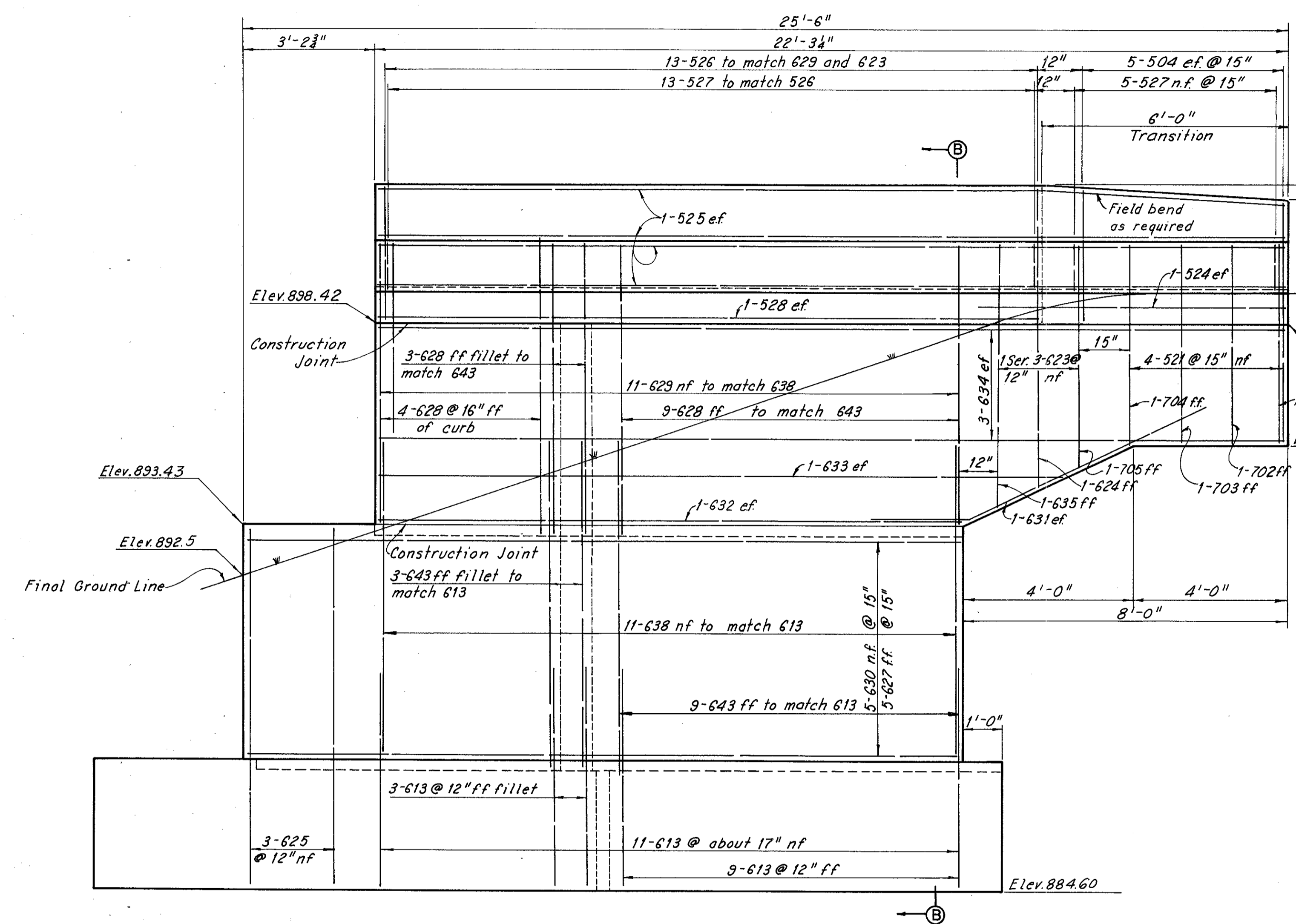


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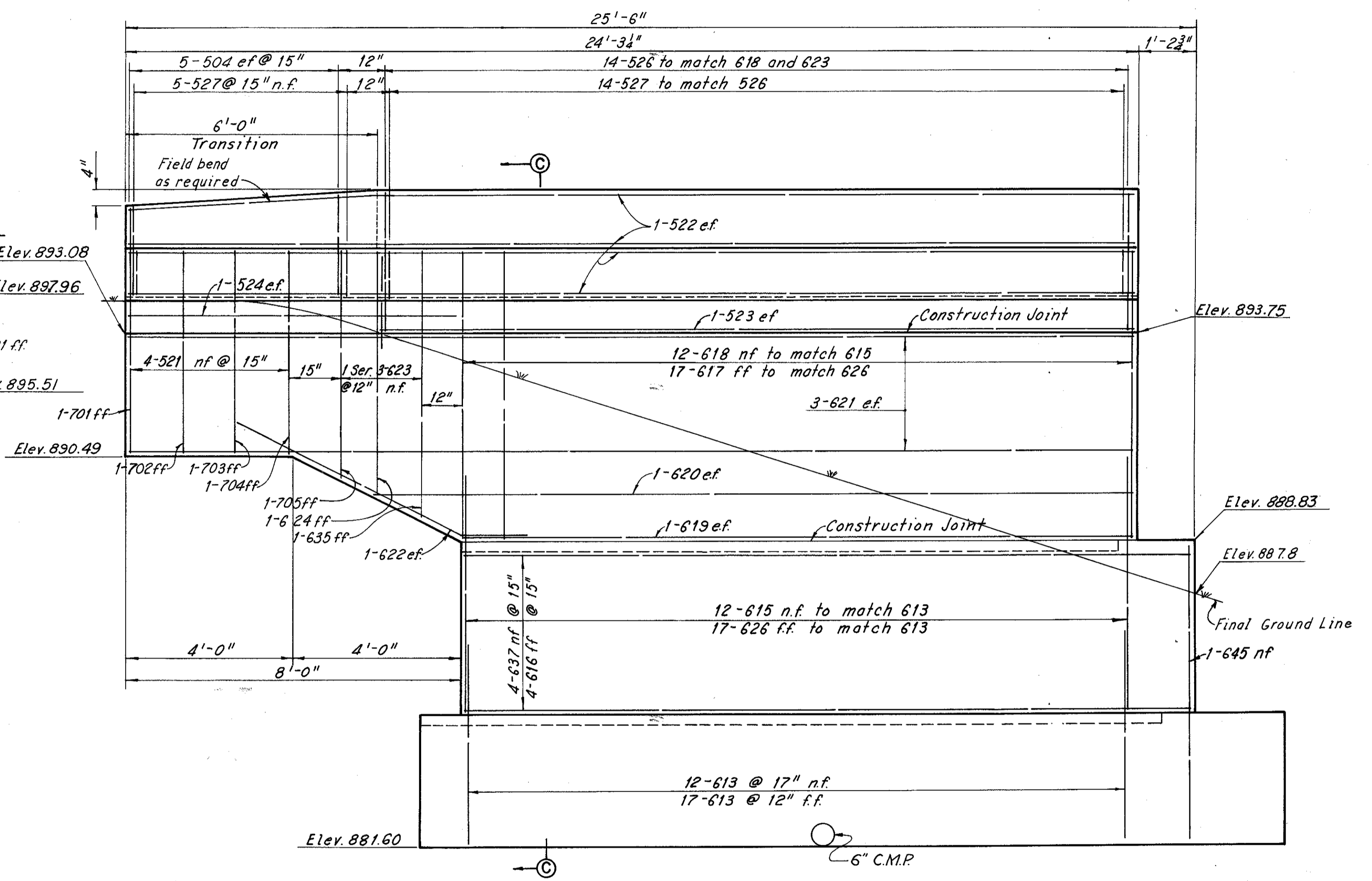
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

355  
390

CUYAHOGA COUNTY  
CUY-80-21.40



**SOUTHWEST WINGWALL ELEVATION**  
(Piles not shown)



**SOUTHEAST WINGWALL ELEVATION**  
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AS.

Notes:  
For curb and parapet transitions and for guard rail anchor details, see "Part Plans-Parapet on Wingwall" on Ohio Standard Drawing BR-1-67, Sheet 1 of 3, Revised 10-15-71.  
For Section B-B, C-C and Typical Curb Detail see Sheet 4/11.

H.N.T.B. BR. NO. 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
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KANSAS CITY CLEVELAND NEW YORK

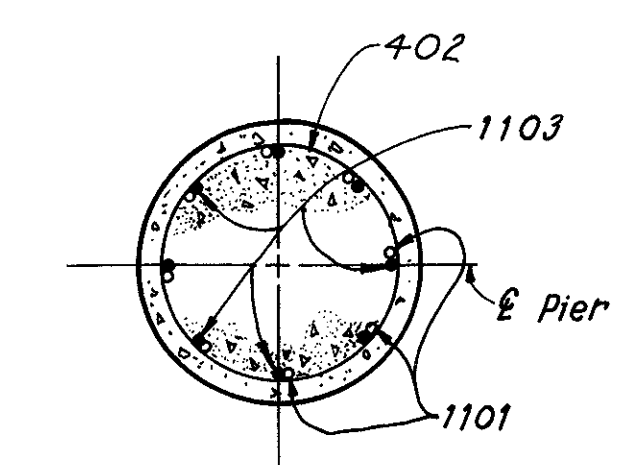
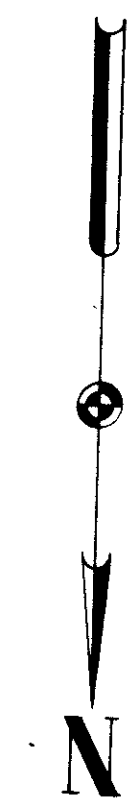
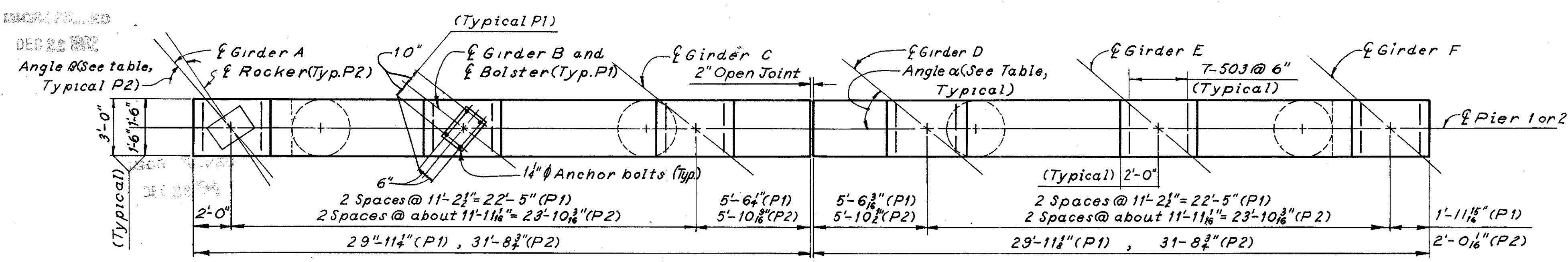
**SOUTH ABUTMENT WINGWALLS**  
LANE OBS-E-B OVER  
RELOCATED McCRACKEN ROAD

STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY OHIO

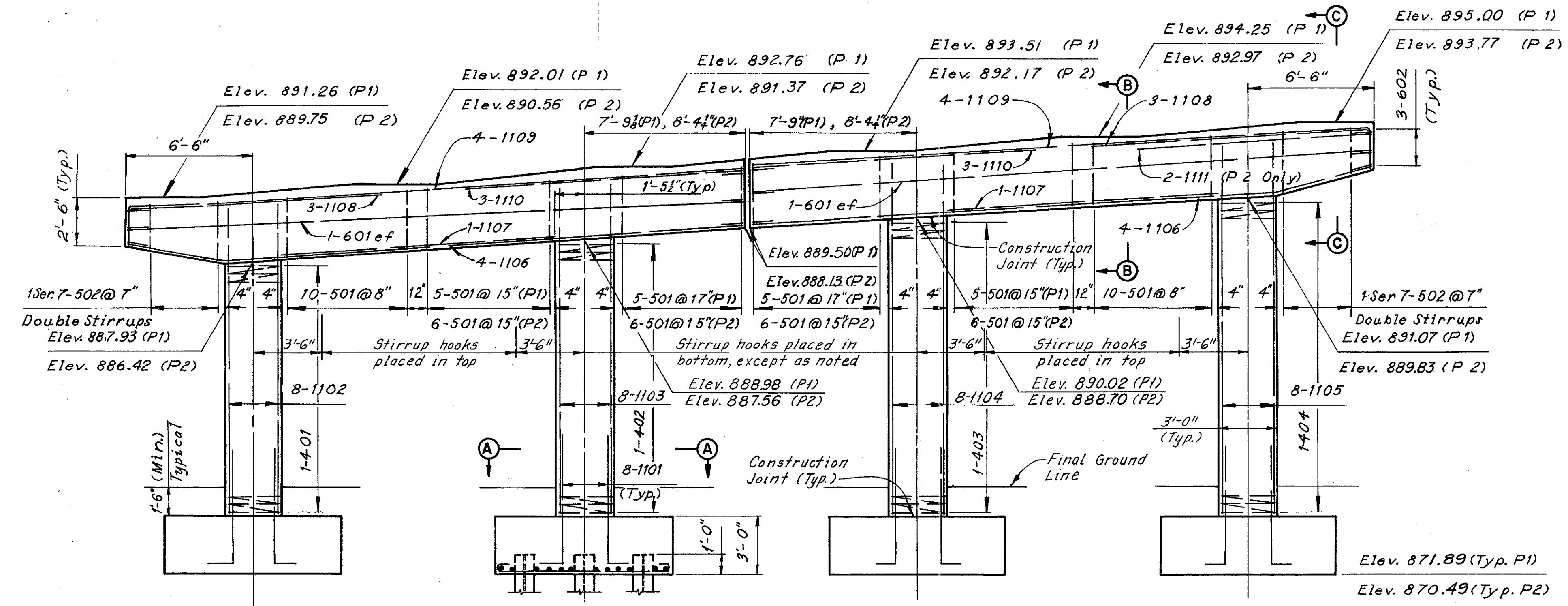
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DATE 6-11-68	DATE 6-13-68	DATE 6-13-68	DATE 6-13-68	DATE 6-13-68

SHEET 6/11



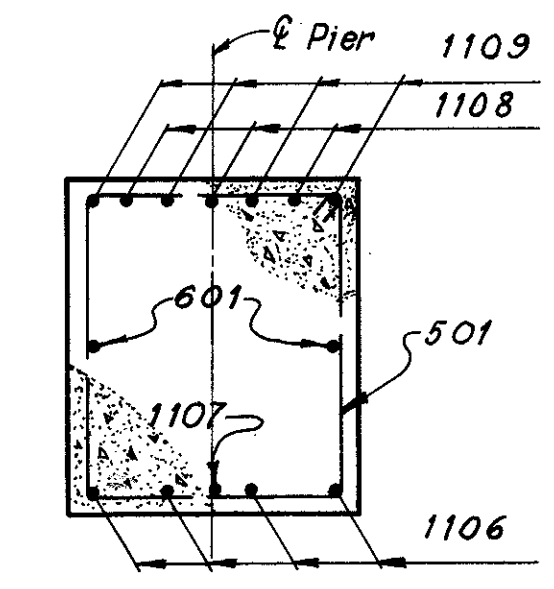
SECTION A-A

Girder	α		β
	Pier 1	Pier 2	
A	45°59'22"	37°16'26"	5°20'00"
B	46°41'59"	38°07'15"	4°40'00"
C	47°25'37"	39°00'02"	4°00'00"
D	48°10'18"	39°54'55"	3°20'00"
E	48°56'03"	40°51'58"	2°50'00"
F	49°42'53"	41°51'17"	2°10'00"

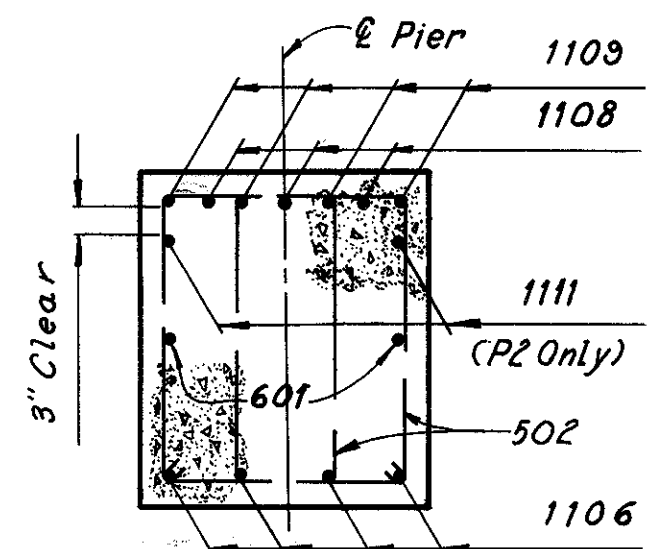
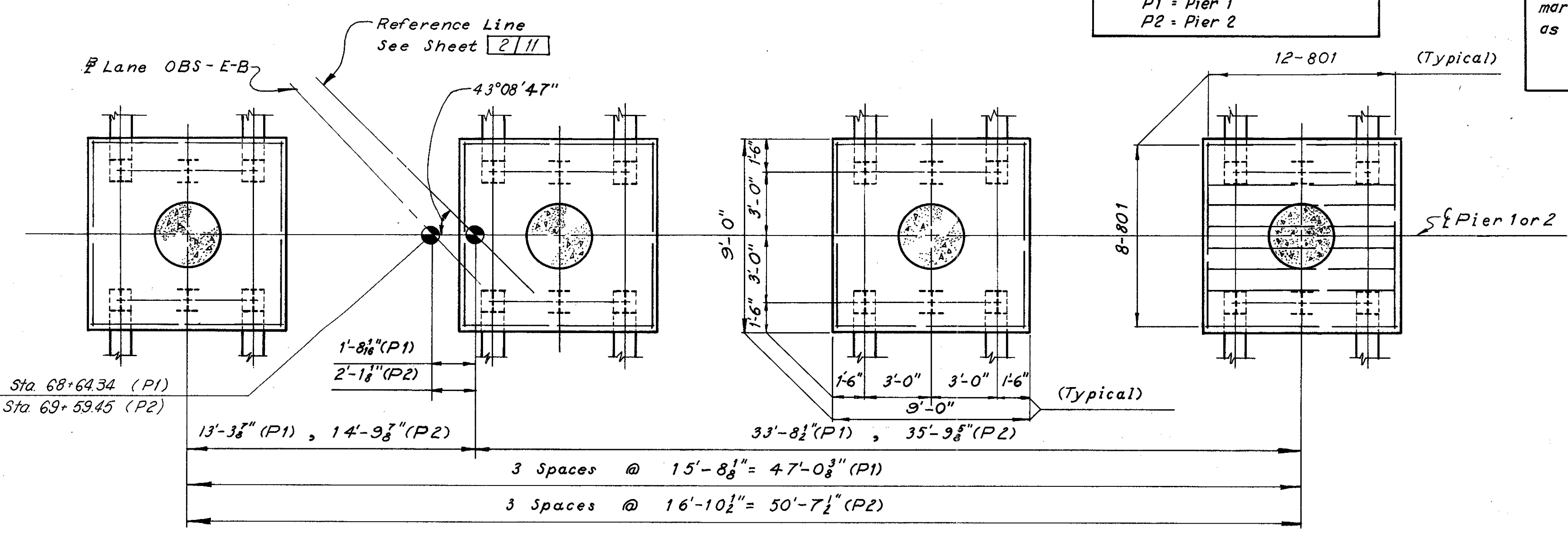


Note:  
The following abbreviations are used:  
P1 - Pier 1  
P2 - Pier 2

Note:  
All reinforcing bar marks shall be prefixed as follows:  
Pier 1, PA  
Pier 2, PB



SECTION B-B



SECTION C-C

Notes:  
Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat for Pier 1 so as to avoid interference with the drilling of anchor bolt holes.  
All dimensions and reinforcements are typical for both piers, except as noted.  
For anchor bolt details see Ohio Standard Drawing RB-1-55.  
All piles are HP 12x53.  
All battered piles shall be inclined 3 in 12 in the direction shown.  
Pile spacings are measured along bottom of footing.  
The following abbreviation is used:  
ef = each face

H.N.T.B. BR. NO. 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY      CLEVELAND      NEW YORK

**PIERS 1&2**  
LANE OBS-E-B OVER  
RELOCATED McCRACKEN ROAD

STA. 67+99.66 TO  
STA. 70+29.75

CUYAHOGA COUNTY      OHIO

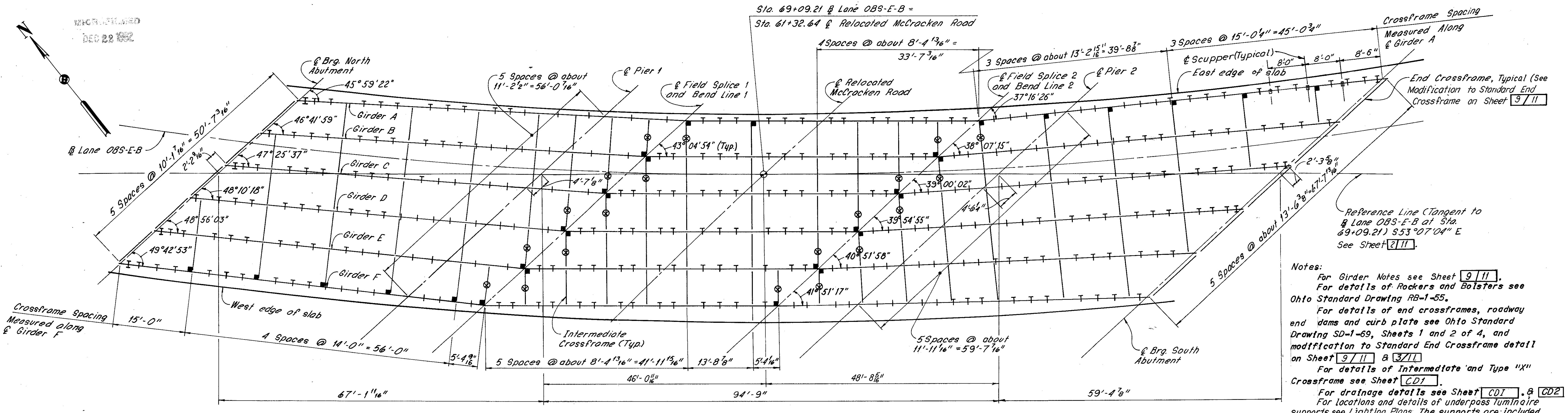
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SHEET 7 / 11

CUYAHOGA COUNTY  
CUY-80-21.40

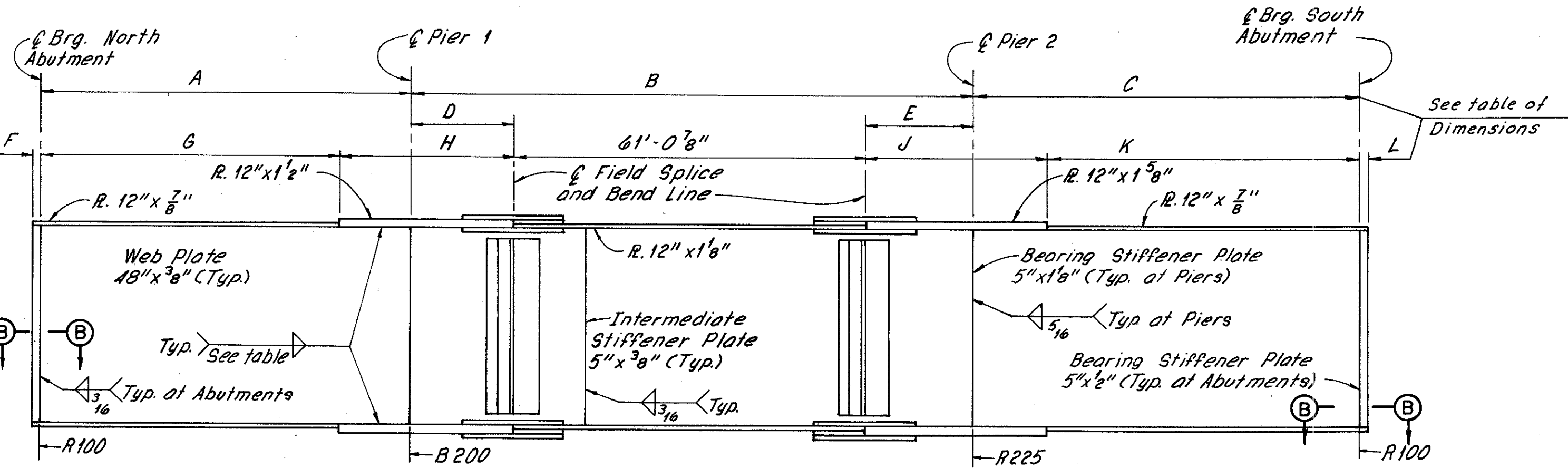
Note: The 1/4, 1/2 and 3/4 points are measured between the center of Abutment Bearing and Field Splice or between Field Splices. Horizontal offsets are given perpendicular to center of Girder.

LOCATION	HORIZONTAL OFFSETS TO EDGE OF SLAB												
	Center of N. Abut.	1/4	1/2	3/4	Center of Bend Line 1	1/4	1/2	3/4	Center of Bend Line 2	1/4	1/2	3/4	Center of S. Abut.
Center of Girder A to East edge of slab	3'-0 1/2"	2'-0 3/4"	1'-5 3/4"	1'-4 3/4"	1'-9 3/4"	1'-7 3/4"	1'-9"	2'-1 1/2"	2'-9 1/4"	1'-11 3/8"	1'-7 3/8"	1'-10 1/2"	2'-7 1/4"
Center of Girder F to West edge of slab	1'-11 1/8"	2'-4"	2'-3 3/4"	1'-11 3/8"	1'-2 3/8"	2'-0 3/8"	2'-7 3/8"	2'-11 3/8"	3'-0 3/8"	3'-2 3/8"	2'-11 3/8"	2'-4 3/8"	1'-5 3/8"



FRAMING PLAN

Notes:  
 For Girder Notes see Sheet 9/11.  
 For details of Rockers and Bolsters see Ohio Standard Drawing RB-1-55.  
 For details of end crossframes, roadway end dams and curb plate see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4, and modification to Standard End Crossframe detail on Sheet 9/11 & 3/11.  
 For details of Intermediate and Type "X" Crossframe see Sheet 3/11.  
 For drainage details see Sheet CD1 & CD2.  
 For locations and details of underpass Tunnair supports see Lighting Plans. The supports are included with the Lighting Quantities for payment.

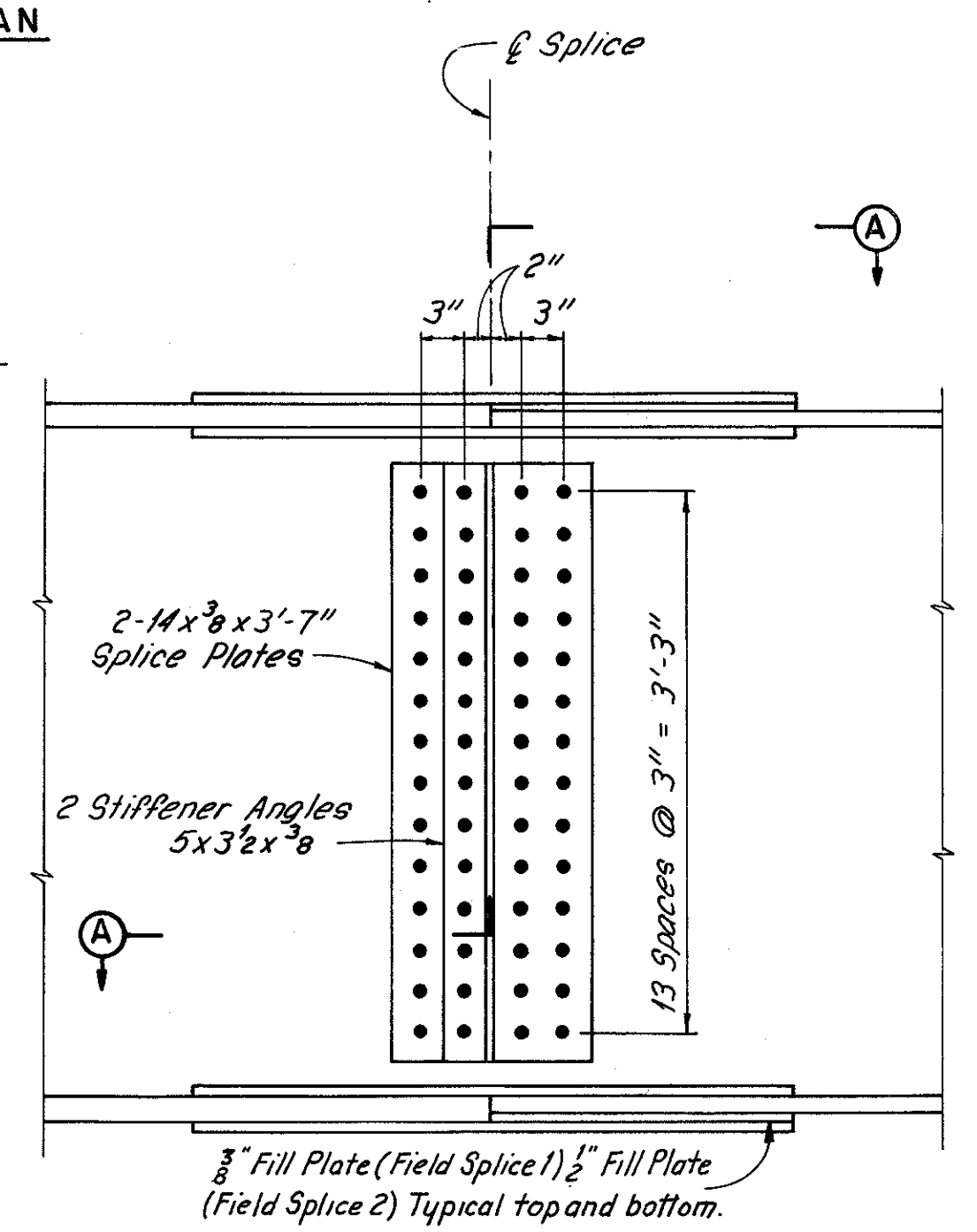


TYPICAL GIRDER ELEVATION

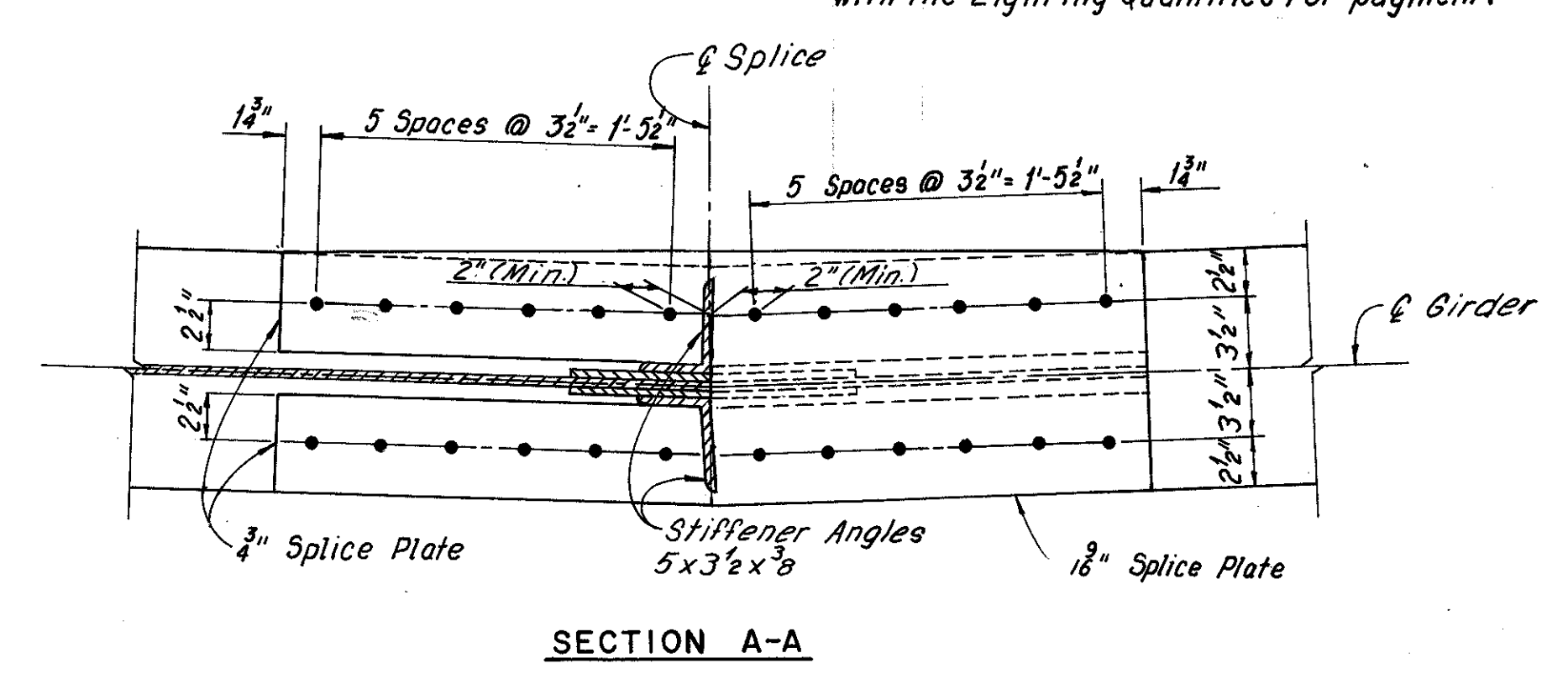
Note: For Section B-B see Sheet 9/11

GIRDER	DIMENSIONS										
	A	B	C	D	E	F	G	H	J	K	L
A	63'-10 1/2"	95'-11 3/8"	67'-1"	17'-2 1/2"	17'-8 3/8"	11'-0 3/8"	52'-10 1/2"	28'-2 1/2"	29'-8 3/8"	55'-1"	11'-2 3/8"
B	63'-1 1/8"	95'-5 1/2"	65'-9 3/8"	16'-11 3/8"	17'-4 3/8"	11'-0 3/8"	52'-1 1/8"	27'-11 3/8"	29'-4 3/8"	53'-9 3/8"	11'-2 3/8"
C	62'-4 3/8"	94'-10 3/8"	64'-6 3/8"	16'-9 1/4"	17'-0 3/8"	11'-0 3/8"	51'-4 3/8"	27'-9 1/4"	29'-0 3/8"	52'-6 3/8"	11'-2 3/8"
D	61'-7 1/8"	94'-4 3/8"	63'-3 3/8"	16'-6 3/8"	16'-8 1/2"	11 3/8"	50'-7 1/8"	27'-6 3/8"	27'-8 1/2"	52'-1 3/8"	11'-1 3/8"
E	60'-10 1/8"	93'-10 1/8"	62'-1 1/8"	16'-4 3/8"	16'-4 3/8"	11 3/8"	49'-10 1/8"	27'-4 3/8"	27'-4 3/8"	51'-1 1/8"	11'-1 3/8"
F	60'-2 1/4"	93'-4 3/8"	60'-10 1/8"	16'-2 1/4"	16'-1"	11 3/8"	49'-2 1/4"	27'-2 1/4"	27'-1"	49'-10 1/8"	11'-1 3/8"

WELD SIZE	
WEB TO FLANGE	
FLANGE PLATE THICKNESS	FILLET WELD SIZE
7/8"	5/16"
1/8" and 1/2"	5/16"
1 5/8"	3/8"



TYPICAL FIELD WEB SPLICE



SECTION A-A

**FRAMING PLAN LEGEND**

- ⊕ Indicates Type "X" Crossframe
- ⊙ Indicates 90°
- ⊥ Indicates intermediate stiffeners having contact bearing with the top flange.
- ⊥ Indicates intermediate stiffeners having contact bearing with the bottom flange.
- ⊥ Indicates intermediate stiffeners at one-half normal stiffener spacing having contact bearing with the top flange. See girder notes for stiffener spacing.

Note: Intermediate stiffeners located at crossframes are shown in the "Framing Plan" only at places where contact bearing with the flange changes adjacent to the crossframe.

H.N.T.B. BR. NO. 14  
 HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
 CONSULTING ENGINEERS  
 KANSAS CITY CLEVELAND NEW YORK

**FRAMING PLAN**  
 LANE OBS-E-B OVER  
 RELOCATED MCCRACKEN ROAD

CUYAHOGA COUNTY OHIO  
 STA. 67+99.66 TO  
 STA. 70+29.75

DRAWN: J.S. TRACED: J.J. CHECKED: L.J.G. REVIEWED: DATE: 6-28-68  
 DATE: 3-2-68 DATE: 1-18-68 DATE: 6-28-68

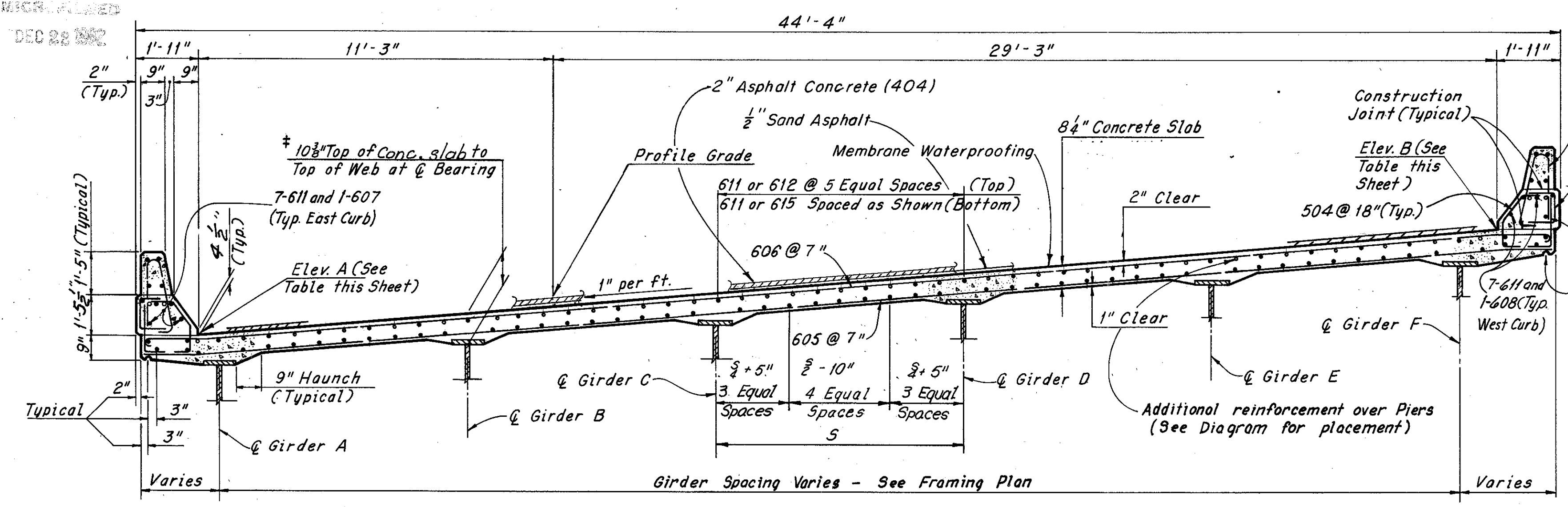
SHEET 8/11



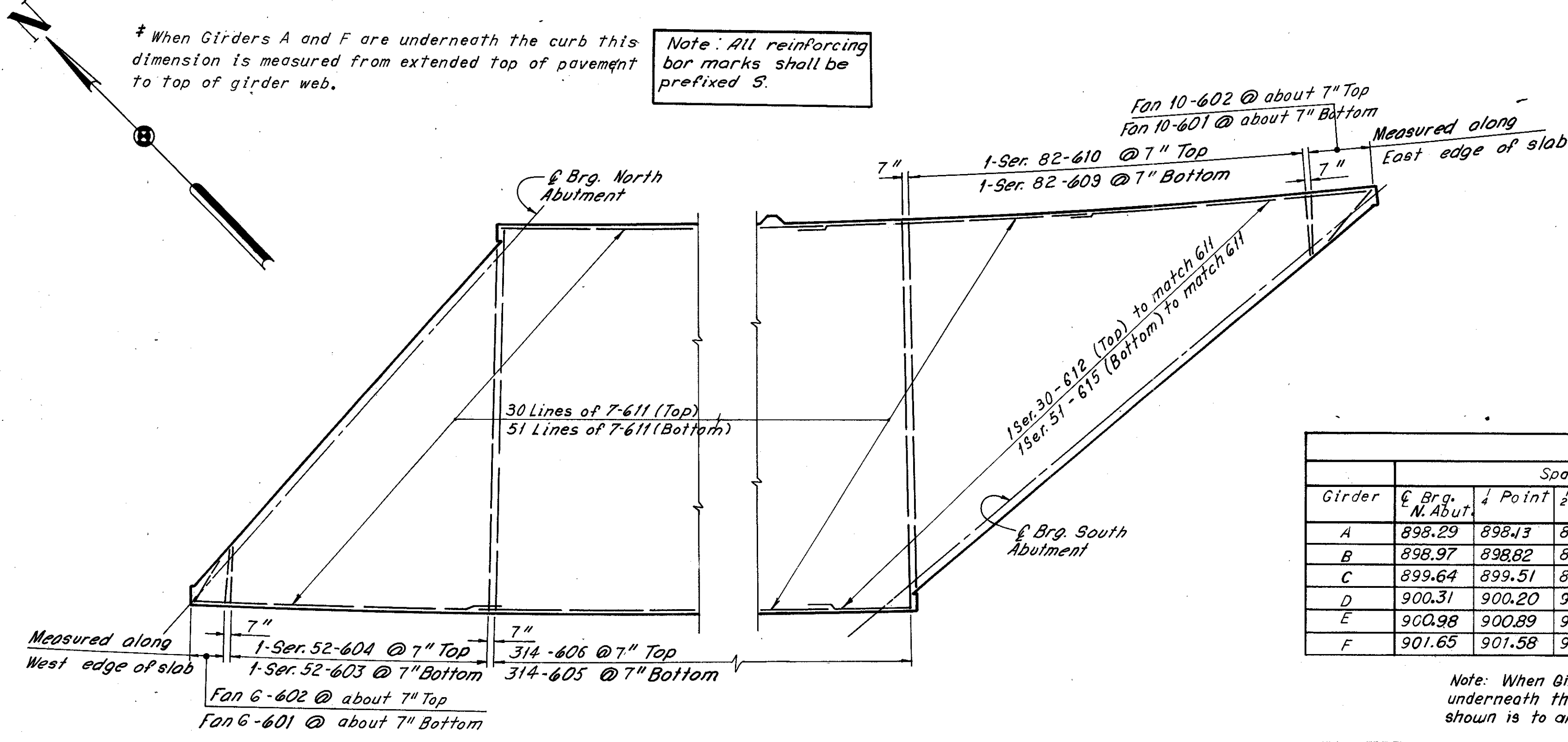
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DEC 28 1962

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CUY-80-21.40

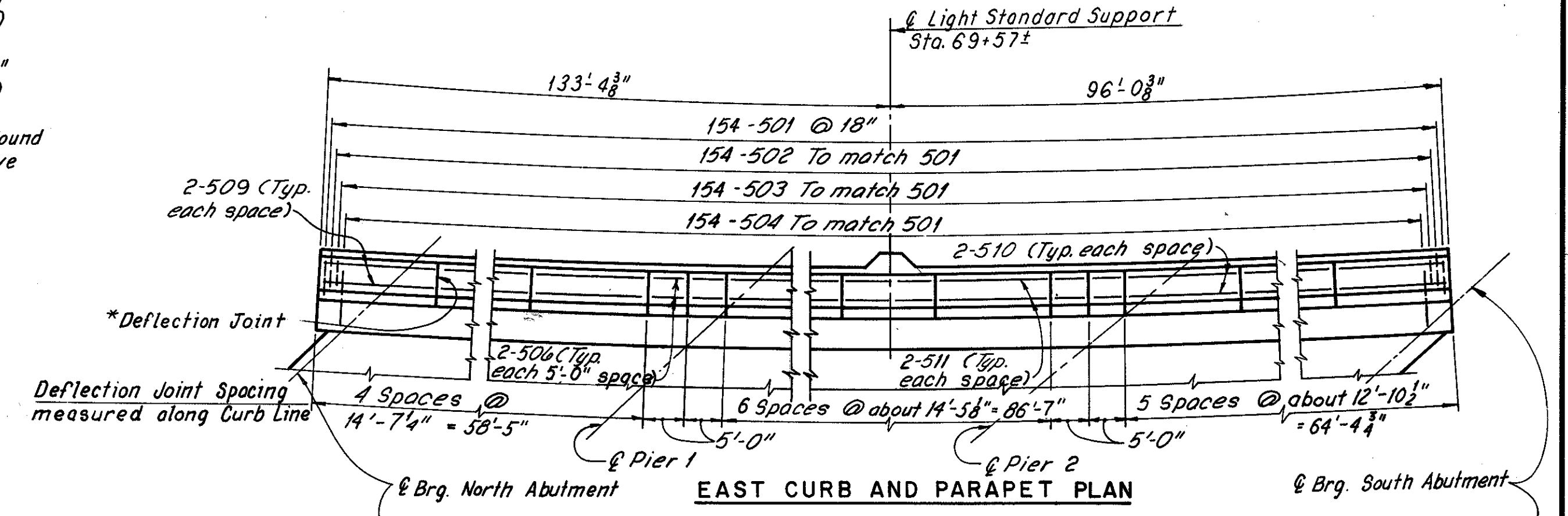
NOTE:  
A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.



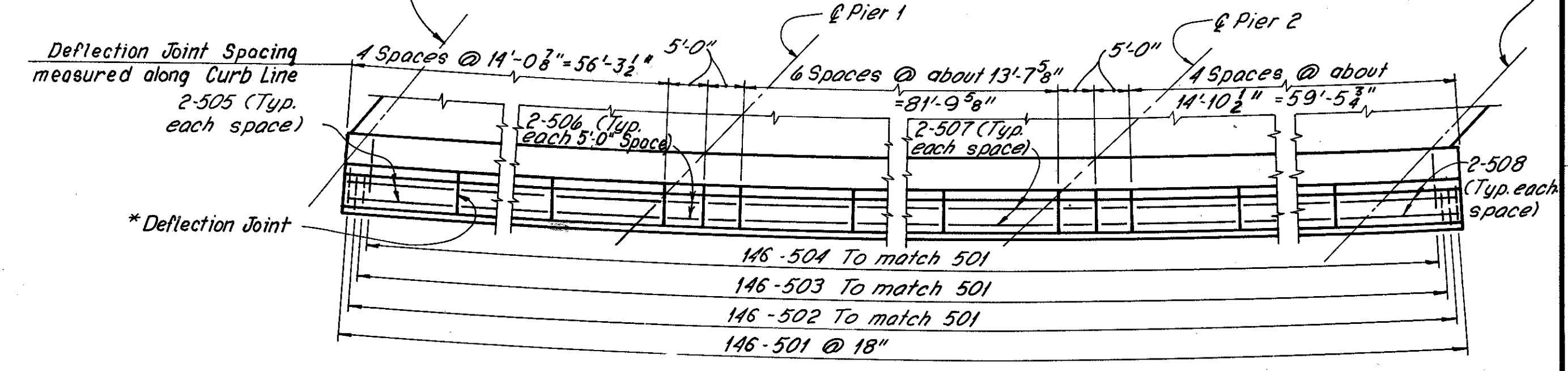
Provide subdrainage for wearing surface as per sheet CD2 at low curb line only  
**TYPICAL CROSS SECTION**



**PART SLAB PLAN**



**EAST CURB AND PARAPET PLAN**



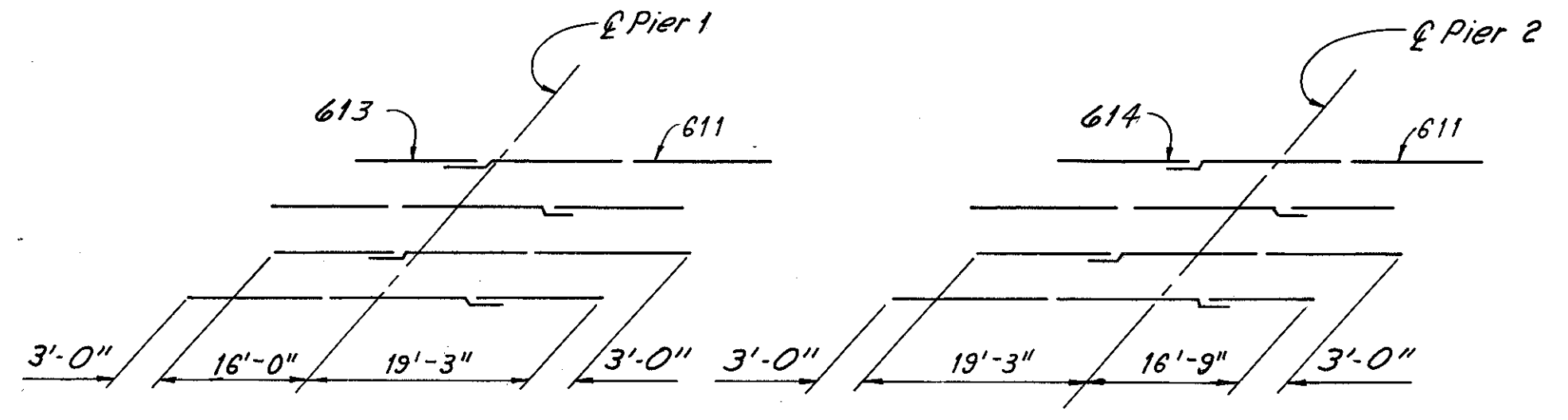
**WEST CURB AND PARAPET PLAN**

Girder	TOP OF REINFORCED CONCRETE DECK												
	Brig. N. Abut.	Span 1			Span 2			Span 3			Brig. S. Abut.		
	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	
A	898.29	898.13	897.96	897.79	897.63	897.35	897.01	896.66	896.17	895.79	895.41	895.03	894.65
B	898.97	898.82	898.67	898.52	898.38	898.12	897.78	897.44	896.98	896.63	896.28	895.93	895.58
C	899.64	899.51	899.38	899.25	899.13	898.89	898.55	898.22	897.78	897.46	897.14	896.82	896.51
D	900.31	900.20	900.09	899.98	899.87	899.66	899.32	898.99	898.59	898.29	898.00	897.71	897.43
E	900.98	900.89	900.80	900.71	900.62	900.43	900.09	899.77	899.39	899.12	898.86	898.60	898.34
F	901.65	901.58	901.51	901.44	901.37	901.19	900.86	900.54	900.19	899.95	899.72	899.49	899.26

Note: When Girders A and F are underneath the curb the elevation shown is to an extended top of concrete deck.

Elevation	FACE OF CURB, ELEVATIONS (TOP OF REINFORCED CONCRETE DECK)												
	Brig. N. Abut.	Span 1			Span 2			Span 3			Brig. S. Abut.		
	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	4 Point	1/2 Point	3/4 Point	
A	898.18	898.09	897.97	897.82	897.66	897.39	897.06	896.63	896.14	895.78	895.41	895.00	894.55
B	901.67	901.63	901.57	901.47	901.38	901.22	901.00	900.70	900.33	900.08	899.82	899.53	899.20

Note: The elevations shown at the face of curbs are those which are required before concrete is placed. Proper allowance has been made for the dead load deflection caused by the weight of the concrete.



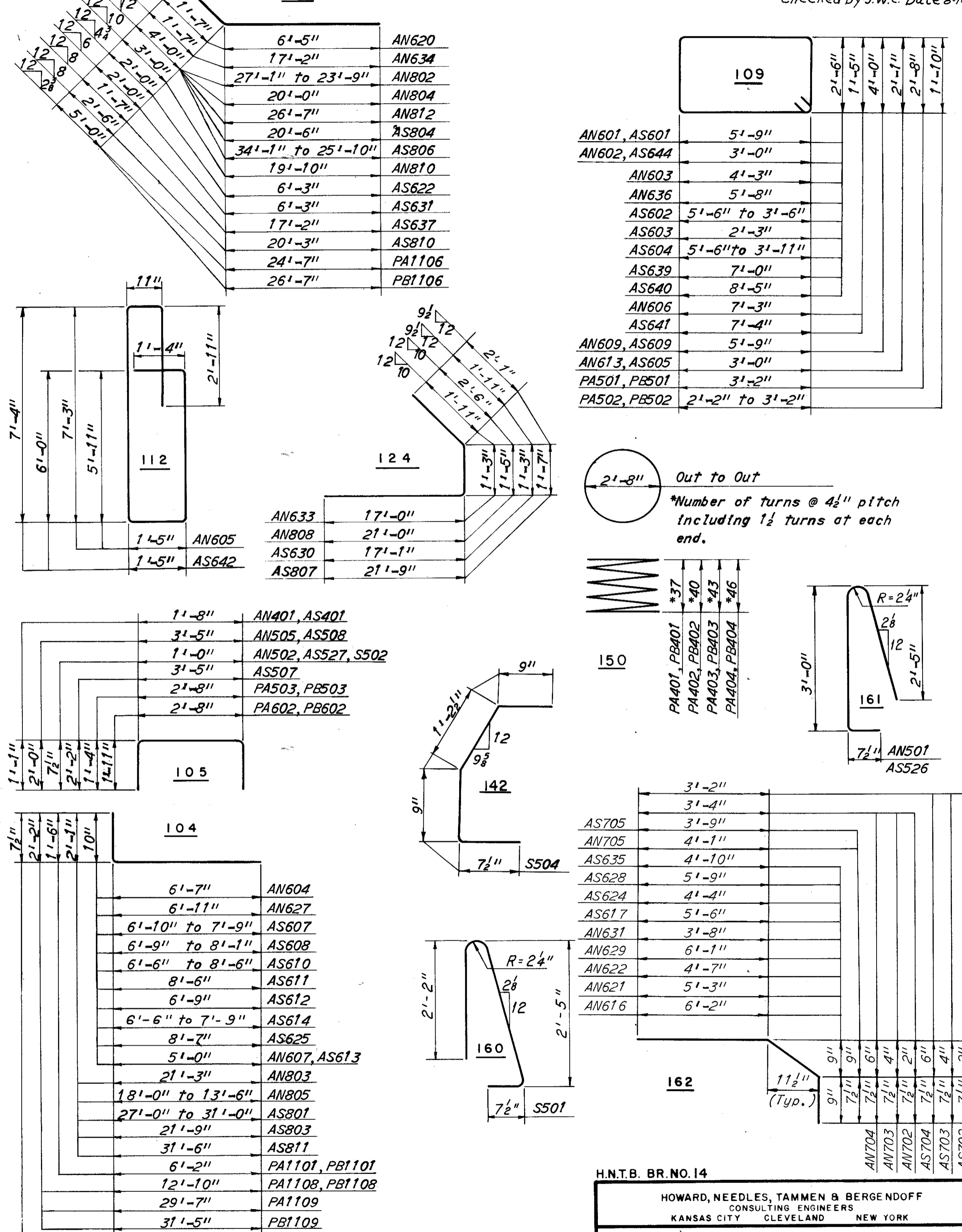
**PLACEMENT OF ADDITIONAL REINFORCEMENT OVER PIERS**

Note:  
The preformed expansion joint filler in the railing parapet deflection joints may be either 1" gray sponge rubber or 1" gray cellular polyvinylchloride (P.V.C.) sponge.  
The deflection joint extends from top of parapet to first construction joint and is included for payment with Superstructure Concrete.

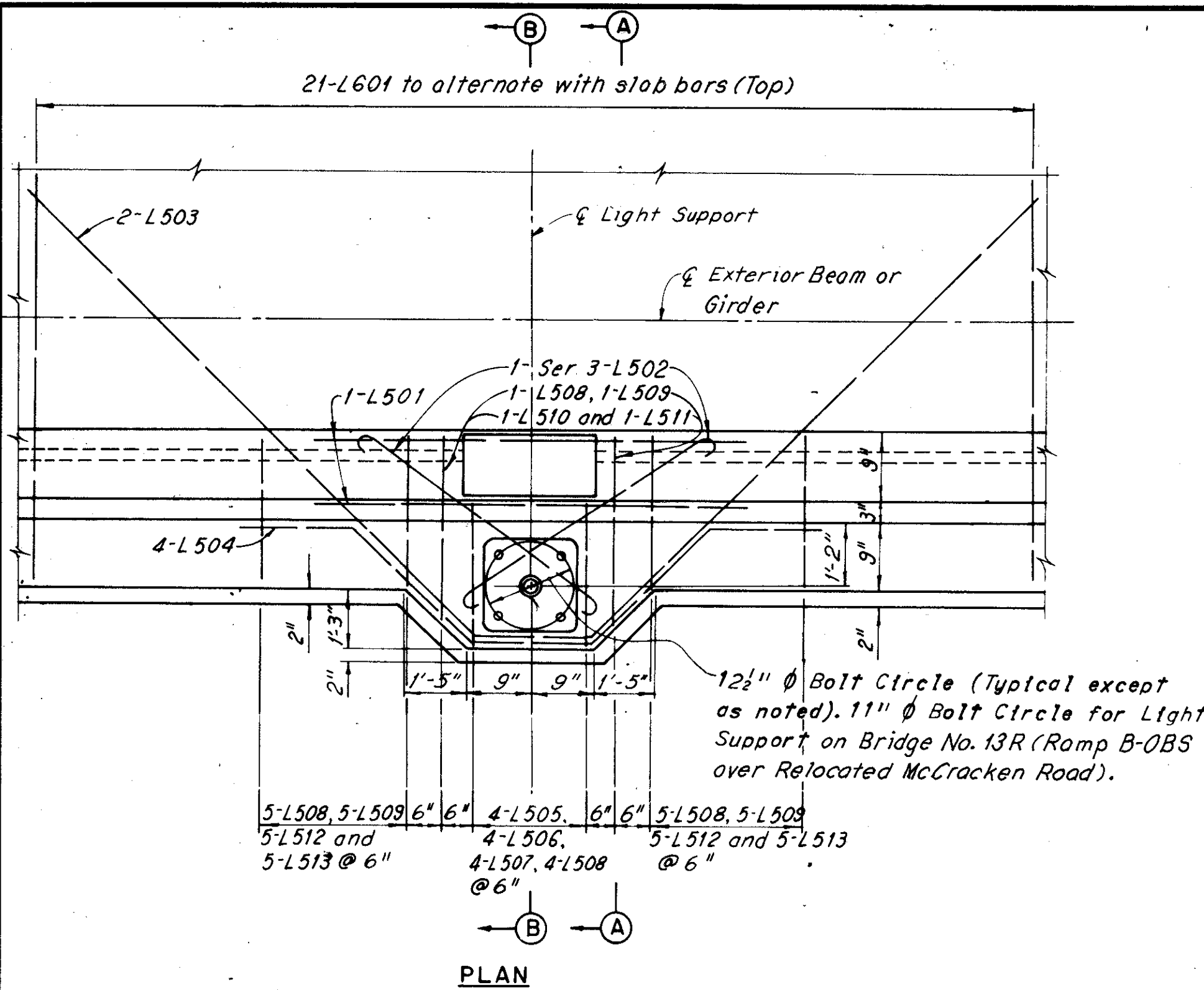
Notes:  
For notes see Sheet 8/11.  
For Light Standard Support Details see Sheet CD1.

H.N.T.B. BR. NO. 14  
HOWARD, NEEDLES, TAMMEN & BERGENOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK  
**TYPICAL CROSS SECTION AND SLAB PLAN**  
LANE OBS-E-B OVER  
RELOCATED McCRACKEN ROAD  
STA. 67+99.66 TO STA. 70+29.75  
CUYAHOGA COUNTY OHIO  
DRAWN T.J.S. TRACED A.J.A. CHECKED L.J.G. REVIEWED REVERED  
DATE 3-12-68 DATE 4-17-68 DATE 8-7-68 DATE  
SHEET 10/11

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)		
NORTH ABUTMENT						SOUTH ABUTMENT						SUPERSTRUCTURE													
AN401	42	3'-7"	105		101	AN809	6	17'-3"	Str.		276	AS637	4	18'-9"	108		113	PB602	12	6'-2"	105		111		
AN501	27	5'-11"	161		167	AN810	2	22'-10"	108		122	AS638	14	7'-9"	Str.		163	PB801	80	10'-8"	100		2,278		
AN502	37	2'-0"	105		77	AN811	1	27'-3"	Str.		73	AS639	1	19'-9"	109		30	PB1101	32	7'-5"	104		1,261		
AN503	8	23'-9"	Str.		198	AN812	1	30'-7"	108		82	AS640	1	22'-7"	109		34	PB1102	8	15'-6"	Str.		659		
AN504	20	2'-9"	Str.		57	AN813	21	5'-9"	163		322	AS641	27	18'-3"	109		740	PB1103	8	16'-9"	Str.		712		
AN505	36	7'-1"	105		266							AS642	41	19'-1"	112		1,175	PB1104	8	17'-9"	Str.		754		
AN506	14	29'-0"	Str.		423							AS643	12	8'-0"	Str.		144	PB1105	8	19'-0"	Str.		808		
AN507	12	27'-9"	Str.		347	AS401	40	3'-7"	105		96	AS644	9	11'-9"	109		159	PB1106	8	31'-6"	108		1,339		
AN508	1	34'-3"	Str.		36	AS501	3	36'-6"	Str.		114	AS701	2	4'-10"	101		16	PB1107	2	14'-0"	Str.		149		
AN509	1	7'-0"	Str.		7	AS502	3	34'-6"	Str.		108	AS702	2	4'-8"	162		19	PB1108	6	14'-9"	104		470		
AN510	1	15'-6"	Str.		16	AS503	6	19'-6"	Str.		122	AS703	2	4'-9"	162		20	PB1109	8	33'-4"	104		1,417		
AN511	1	16'-6"	Str.		17	AS504	20	2'-9"	Str.		57	AS704	2	4'-10"	162		20	PB1110	6	14'-3"	Str.		454		
AN512	2	19'-0"	Str.		40	AS505	2	34'-0"	Str.		71	AS705	2	5'-6"	162		23	PB1111	2	12'-9"	Str.		135		
AN513	2	20'-6"	Str.		43	AS506	2	38'-9"	Str.		81	AS801	1 Ser. 3	32'-4"	104	240'	248								
AN514	4	7'-6"	Str.		31	AS507	30	7'-6"	105		235	AS802	1 Ser. 3	31'-0"	27'-0"	Str.	240'	232							
AN515	8	22'-6"	Str.		188	AS508	16	7'-3"	105		121	AS803	4	23'-8"	104		253								
AN516	2	17'-9"	Str.		37	AS509	2	8'-0"	Str.		17	AS804	4	24'-6"	108		262								
AN517	2	16'-3"	Str.		34	AS510	2	11'-6"	Str.		24	AS805	1 Ser. 4	35'-6"	27'-3"	Str.	249'	335							
AN518	8	4'-0"	Str.		33	AS511	1	24'-6"	Str.		26	AS806	1 Ser. 4	38'-1"	28'-10"	108	249'	363							
AN519	2	4'-9"	Str.		10	AS512	1	29'-3"	Str.		31	AS807	2	25'-2"	124		134								
AN520	1	21'-3"	Str.		22	AS513	1 Ser. 3	36'-6"	34'-6"	Str.	110"	111	AS808	6	12'-0"	Str.		192							
AN601	31	17'-3"	109		803	AS514	6	34'-0"	Str.		213	AS809	6	16'-6"	Str.		264								
AN602	11	11'-9"	109		194	AS515	3	36'-0"	Str.		113	AS810	2	22'-9"	108		121								
AN603	1	14'-3"	109		21	AS516	3	38'-0"	Str.		119	AS811	1	33'-5"	104		89								
AN604	68	7'-3"	104		740	AS517	1	21'-0"	Str.		22	AS812	1	31'-6"	Str.		84								
AN605	31	18'-11"	112		881	AS518	1	18'-6"	Str.		19	AS813	27	5'-9"	163		415								
AN606	22	18'-1"	109		598	AS519	1	25'-6"	Str.		27														
AN607	54	5'-8"	104		460	AS520	1	9'-6"	Str.		10														
AN608	2	16'-6"	Str.		50	AS521	8	3'-9"	Str.		31														
AN609	4	20'-3"	109		122	AS522	8	23'-9"	Str.		198	PA401	1	12'-10"	150		245								
AN610	3	4'-6"	Str.		20	AS523	2	18'-3"	Str.		38	PA402	1	13'-11"	150		265								
AN611	2	14'-6"	Str.		44	AS524	4	7'-6"	Str.		31	PA403	1	14'-11"	150		285								
AN612	4	13'-0"	Str.		78	AS525	8	21'-9"	Str.		181	PA404	1	16'-0"	150		305								
AN613	10	10'-11"	109		164	AS526	27	5'-11"	161		167														
AN614	29	6'-6"	Str.		283	AS527	37	2'-0"	105		77	PA501	40	12'-2"	109		508								
AN615	1	4'-3"	Str.		6	AS528	2	16'-3"	Str.		34	PA502	4 Ser. 7	8'-6"	10'-6"	109	4"	277							
AN616	17	8'-0"	162		204	AS601	39	17'-3"	109		1,010	PA503	42	5'-1"	105		223								
AN617	23	6'-3"	Str.		216	AS602	1 Ser. 3	16'-9"	12'-9"	109	240'	66	PA601	4	29'-6"	Str.		177							
AN618	2	15'-9"	Str.		47	AS603	1	10'-3"	109		15	PA602	12	6'-2"	105		111								
AN619	2	17'-9"	Str.		53	AS604	1 Ser. 3	16'-9"	13'-7"	109	147"	68	PA801	80	10'-8"	100		2,278							
AN620	4	8'-0"	108		48	AS605	13	10'-11"	109		213														
AN621	2	7'-1"	162		21	AS606	3	4'-6"	Str.		20														
AN622	2	6'-5"	162		19	AS607	2 Ser. 12	8'-5"	7'-6"	104	1"	287	PA1101	32	7'-5"	104		1,261							
AN623	6	23'-9"	Str.		214	AS608	2 Ser. 17	8'-9"	7'-5"	104	1"	413	PA1102	8	15'-6"	Str.		659							
AN624	2	5'-9"	Str.		17	AS609	4	20'-3"	109		122	PA1103	8	16'-6"	Str.		701								
AN625	2	5'-0"	Str.		15	AS610	1 Ser. 17	9'-2"	7'-2"	104	1 1/2"	209	PA1104	8	17'-9"	Str.		754							
AN626	3	4'-9"	Str.		21	AS611	1	9'-2"	104		14	PA1105	8	18'-9"	Str.		797								
AN627	3	7'-7"	104		34	AS612	6	7'-5"	104		67	PA1106	8	29'-6"	108		1,254								
AN628	24	6'-0"	Str.		216	AS613	52	5'-8"	104		443	PA1107	2	12'-9"	Str.		135								
AN629	10	7'-11"	162		119	AS614	1 Ser. 12	8'-5"	7'-2"	104	1 3/8"	140	PA1108	6	14'-9"	104		470							
AN630	9	5'-6"	Str.		74	AS615	12	6'-3"	Str.		113	PA1109	8	31'-6"	104		1,339								
AN631	4	5'-6"	162		33	AS616	4	14'-1"	Str.		89	PA1110	6	13'-6"	Str.		430								
AN632	6	22'-6"	Str.		203	AS617	17	7'-4"	162		187														
AN633	4	19'-7"	124		118	AS618	12	6'-0"	Str.		108														
AN634	4	18'-9"	108		113	AS619	2	16'-0"	Str.		48														
AN635	4	16'-0"	Str.		96	AS620	2	18'-3"	Str.		55														
AN636	1	17'-1"	109		26	AS621	6	23'-9"	Str.		214														
AN701	2	4'-10"	101		16	AS622	2	8'-3"	108		25	PB401	1	12'-9"	150		245								
AN702	2	4'-10"	162		20	AS623	2 Ser. 3	6'-0"	5'-0"	Str.	6"	50	PB402	1	13'-10"	150		265							
AN703	2	4'-11"	162		20	AS624	2	6'-2"	162		19	PB403	1	15'-0"	150		285								
AN704	2	5'-0"	162		21	AS625	3	9'-3"	104		42	PB404	1	16'-2"	150		305								
AN705	2	5'-10"	162		21	AS626	17	6'-9"	Str.		172														
AN801	1 Ser. 3	27'-9"	24'-3"	Str.	1'-9"	208	AS627	5	13'-0"	Str.		98	PB501	44	12'-2"	109		558							
AN802	1 Ser. 3	31'-1"	27'-9"	108	1'-8"	236	AS628	16	7'-7"	162		182	PB502	4 Ser. 7	8'-6"	10'-6"	109	4"	277						
AN803	4	23'-2"	104		247	AS629	11	6'-3"	Str.		103	PB503	42	5'-1"	105		223								
AN804	4	24'-0"	108		256	AS630	5	20'-0"	124		150														
AN805	1 Ser. 4	19'-4"	18'-5"	104	1'-6"	189	AS631	2	8'-3"	108		25	PB601	4	31'-6"	Str.		189							
AN806	1 Ser. 4	18'-0"	18'-0"	Str.	1'-8"	166	AS632	2	14'-0"	Str.		42													
AN807	6	17'-0"	Str.		272	AS633	2	16'-0"	Str.		48														
AN808	2	24'-8"	124		132	AS634	6	21'-9"	Str.		196														
						AS635	2	6'-9"	162		20														
						AS636	10	5'-6"	Str.		83														



CUYAHOGA COUNTY  
CUY-80-21.40



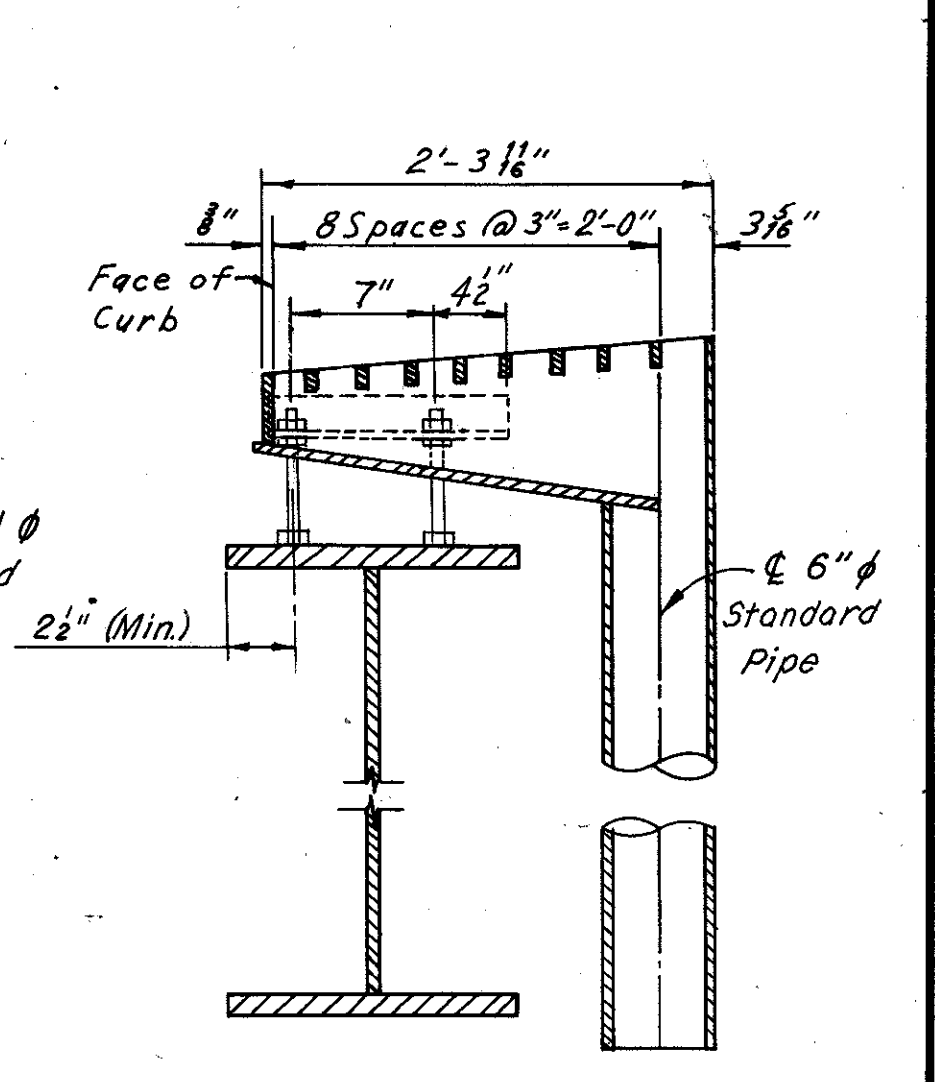
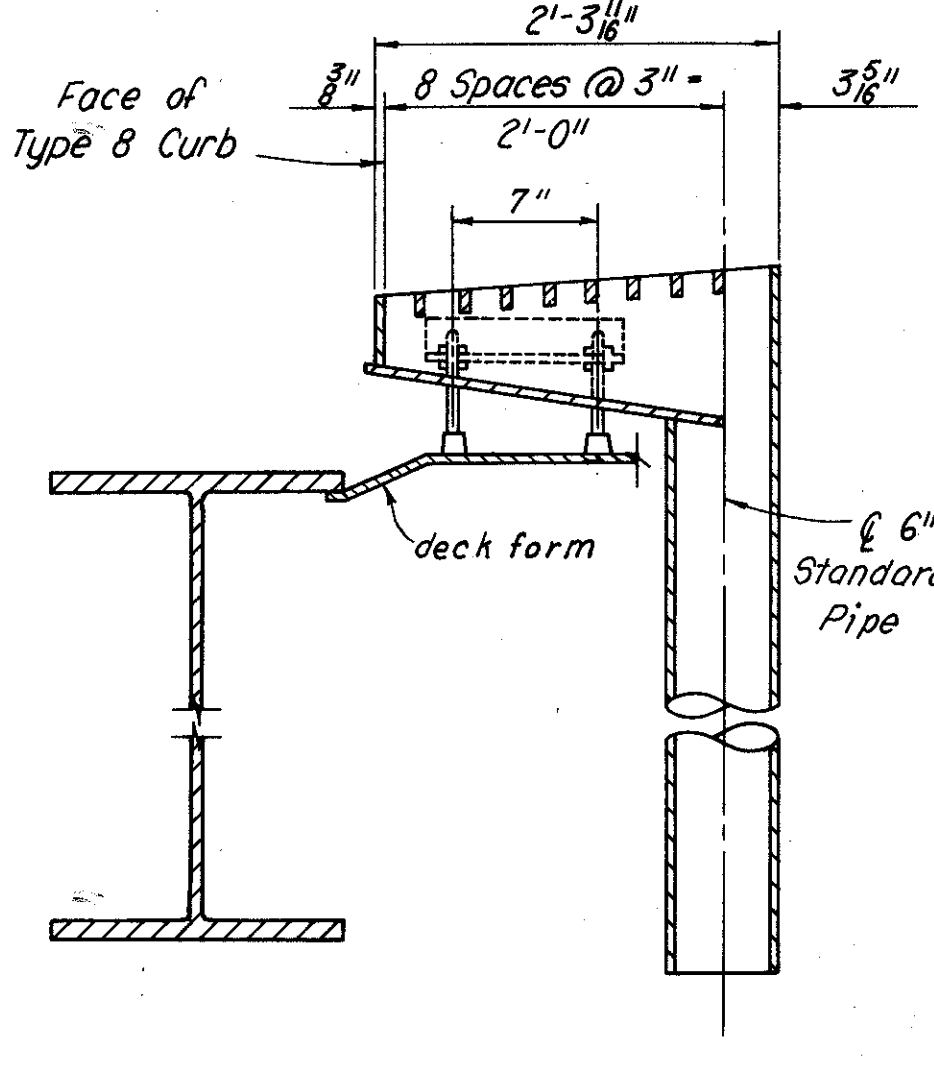
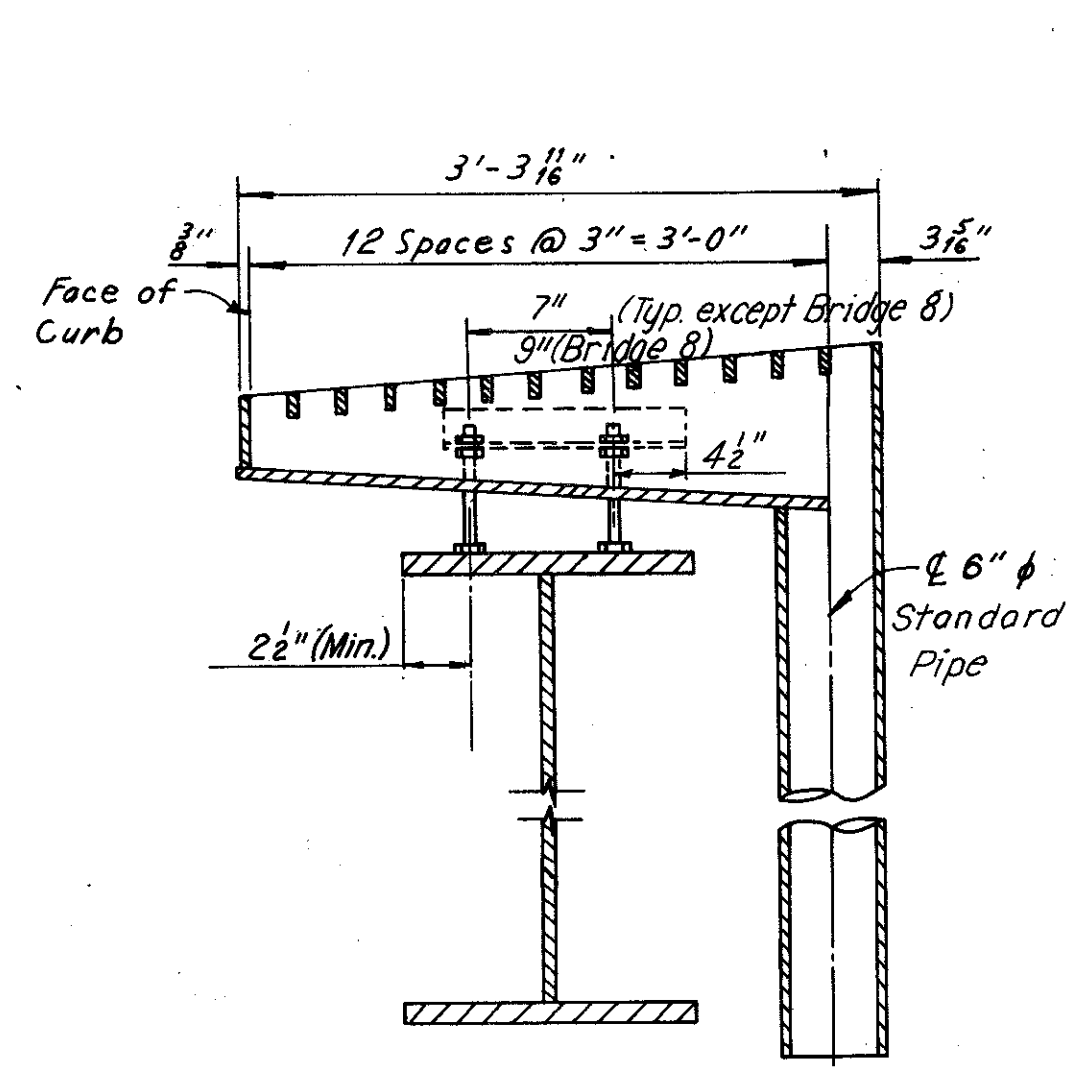
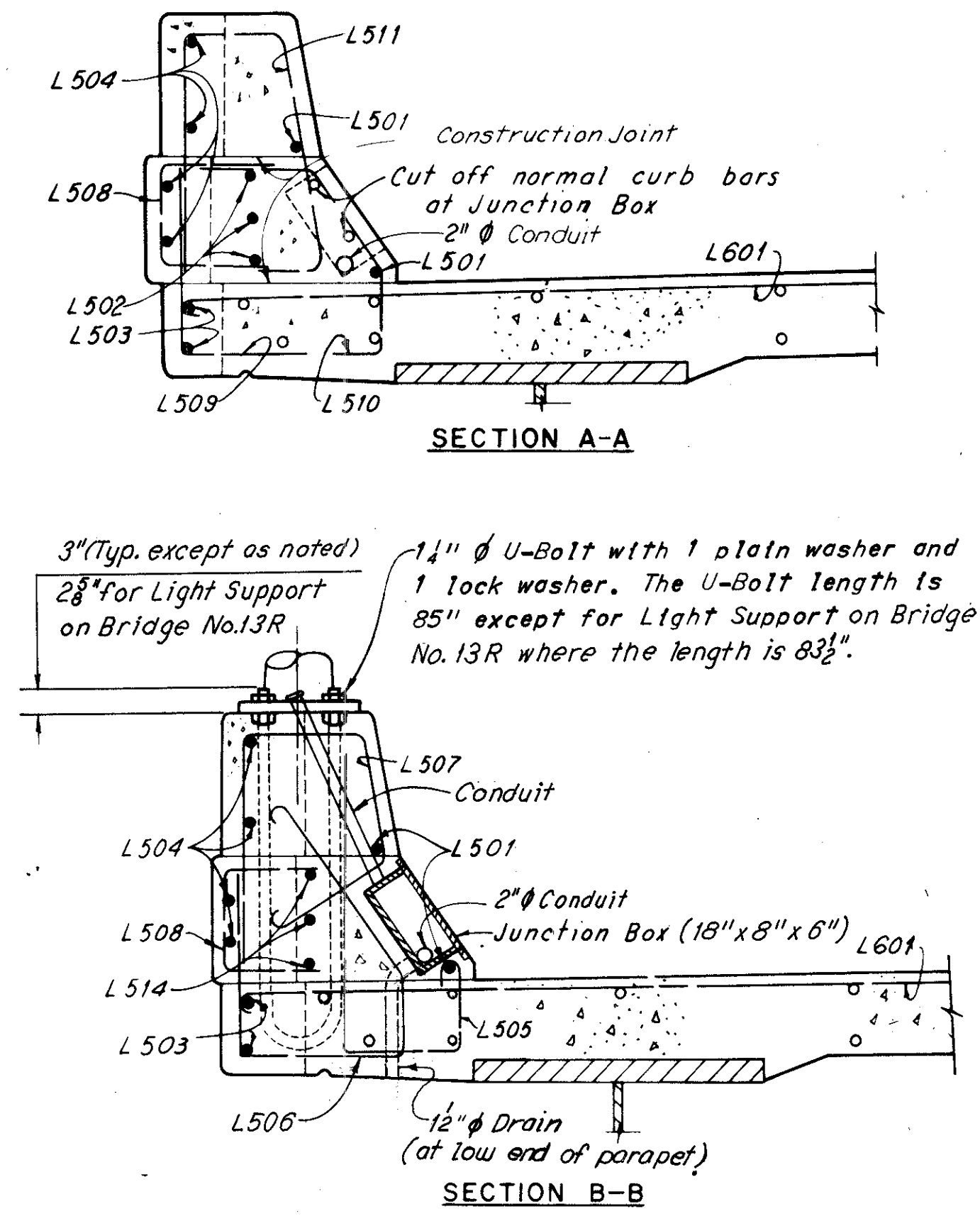
Notes:

For location of conduit in structures, additional lighting details and lighting quantities see Lighting Plans.

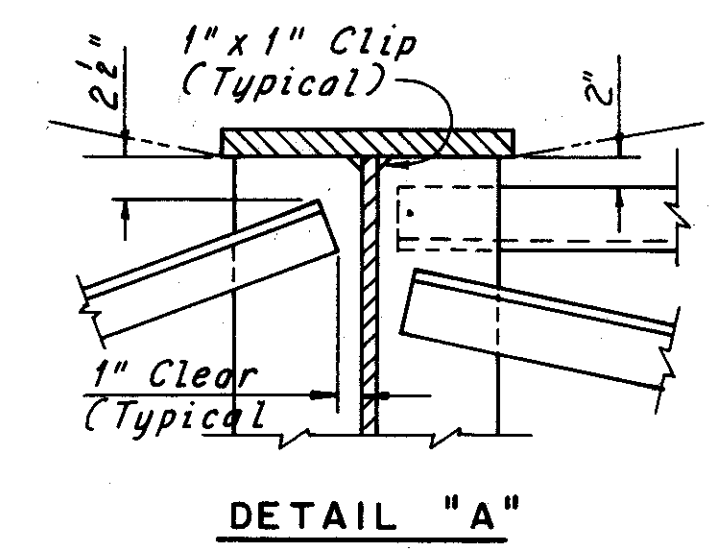
For Light Standard Locations see Slab Plans.

Light standard support reinforcement is included for payment with slab reinforcement; see Reinforcement Schedules for weight summary.

Normal parapet reinforcement not shown; normal longitudinal reinforcement is continuous through Light Support except as noted.



DRAINAGE DETAILS

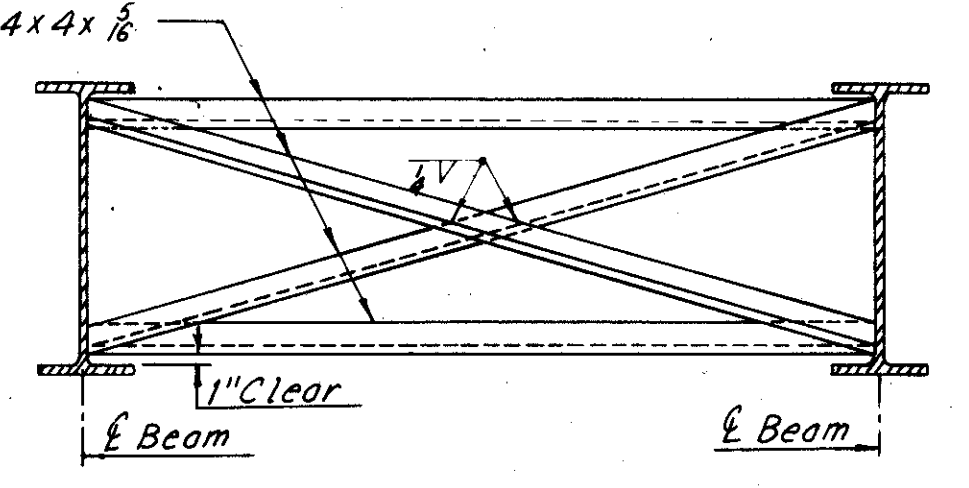
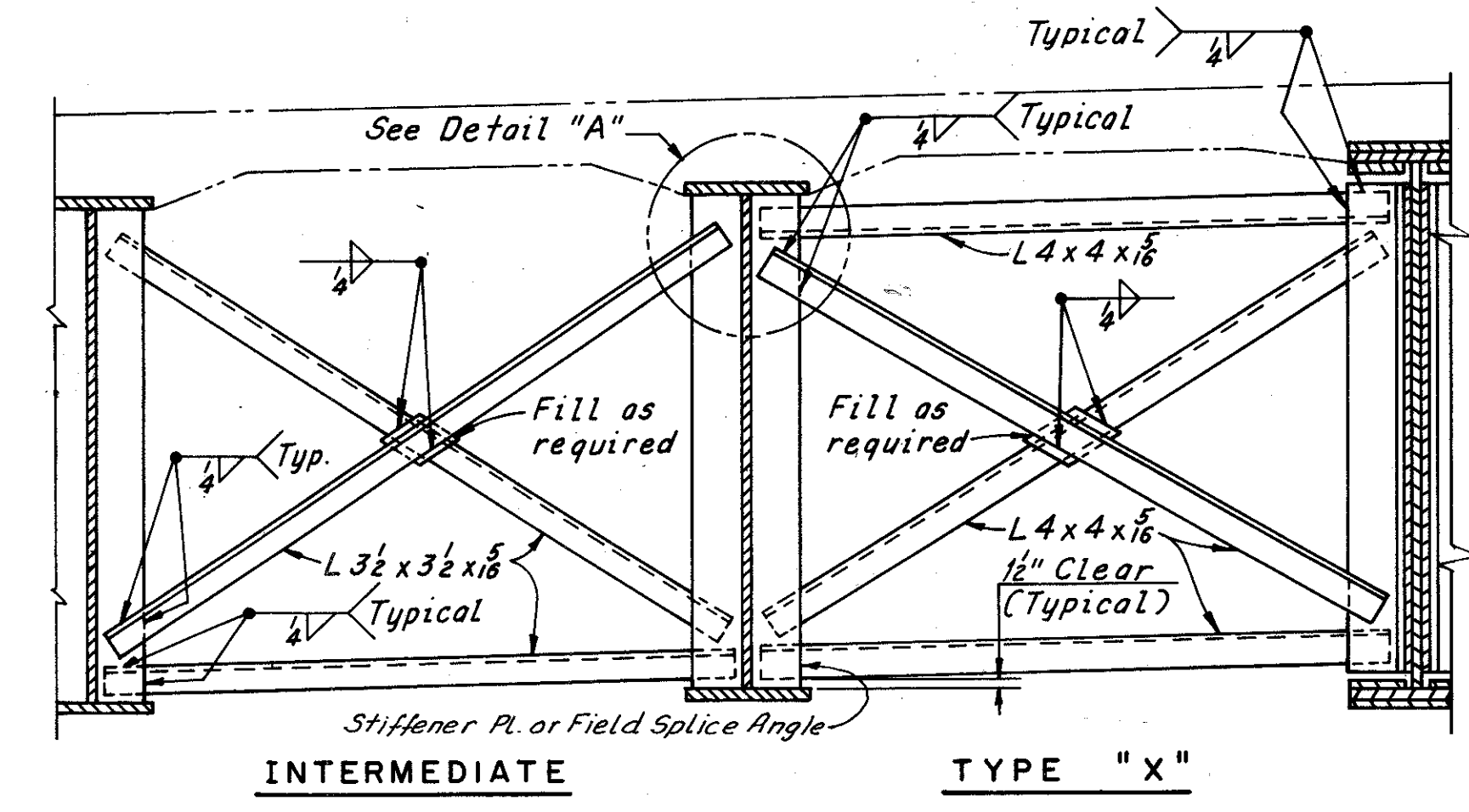


Note:

For Scupper Details not shown, see Ohio Standard Drawing SD-1-69, Sheet 3 of 4. The scupper shall extend 8" below the bottom of the beams or girders instead of 2".

For Scupper locations see Framing Plan.

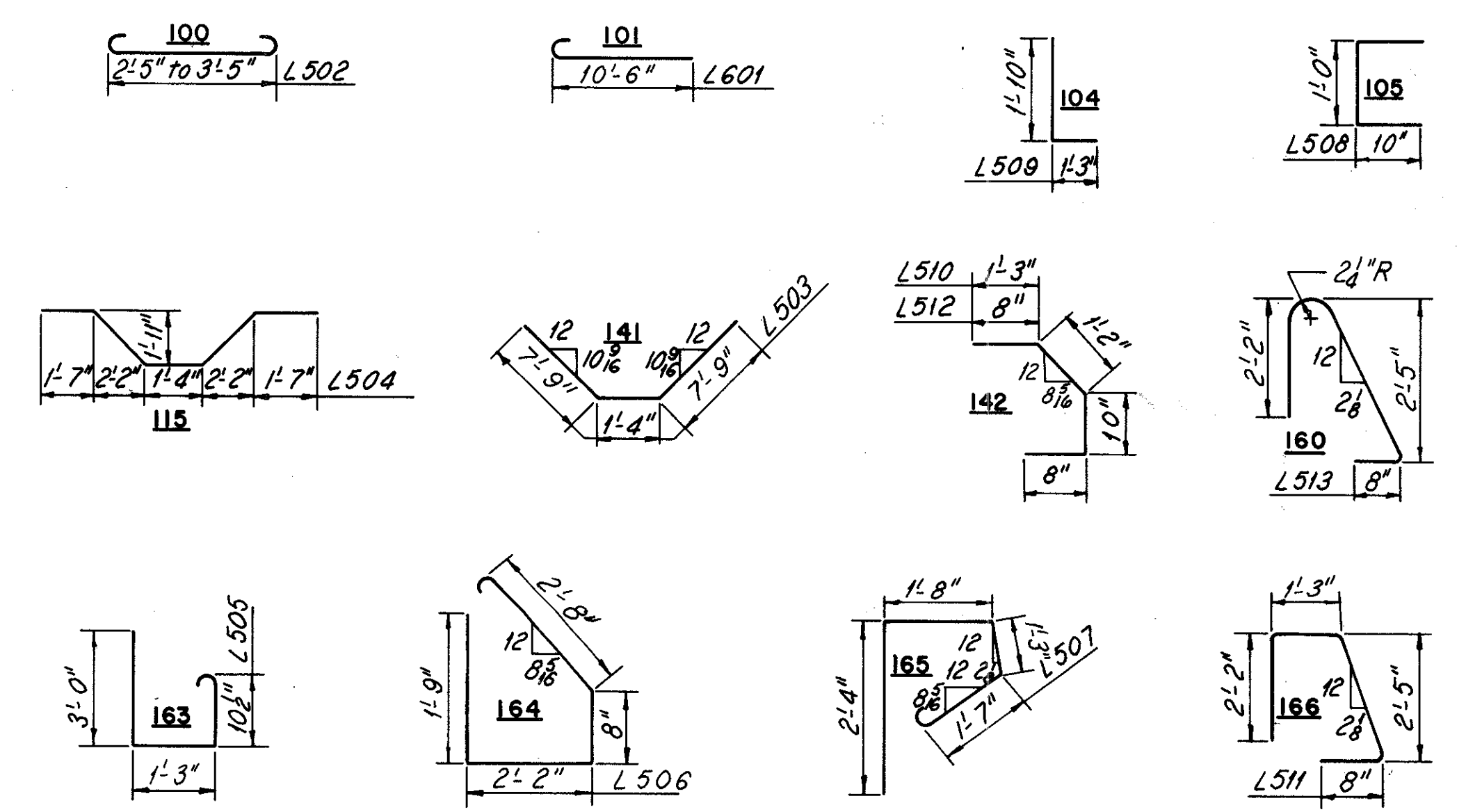
Scuppers, including two support angles 2 1/2 x 2 1/2 x 1/4, 6" Ø pipes, supports and accessories, shall be included for payment with "Item 518, Scuppers."



CROSSFRAME DETAILS

REINFORCING SCHEDULE LIGHT STANDARD SUPPORT					
MARK	NO.	LENGTH	SHAPE	SER. INCR.	WEIGHT
L501	2	5'-0"	5#4		10
L502	2	3'-7"	3#4	100	26
L503	2	16'-8"	1#11		34
L504	4	10'-1"	1#15		42
L505	4	5'-6"	1#16		23
L506	4	7'-6"	1#16		31
L507	4	7'-2"	1#16		30
L508	16	2'-5"	1#10		40
L509	12	3'-0"	1#10		38
L510	2	3'-8"	1#12		8
L511	2	6'-2"	1#16		13
L512	10	3'-1"	1#12		32
L513	10	5'-4"	1#16		56
L601	21	11'-2"	1#10		352
For 1 (one) Light Standard Support on Bridge					
TOTAL WEIGHT =					735

BAR BENDING DIAGRAMS

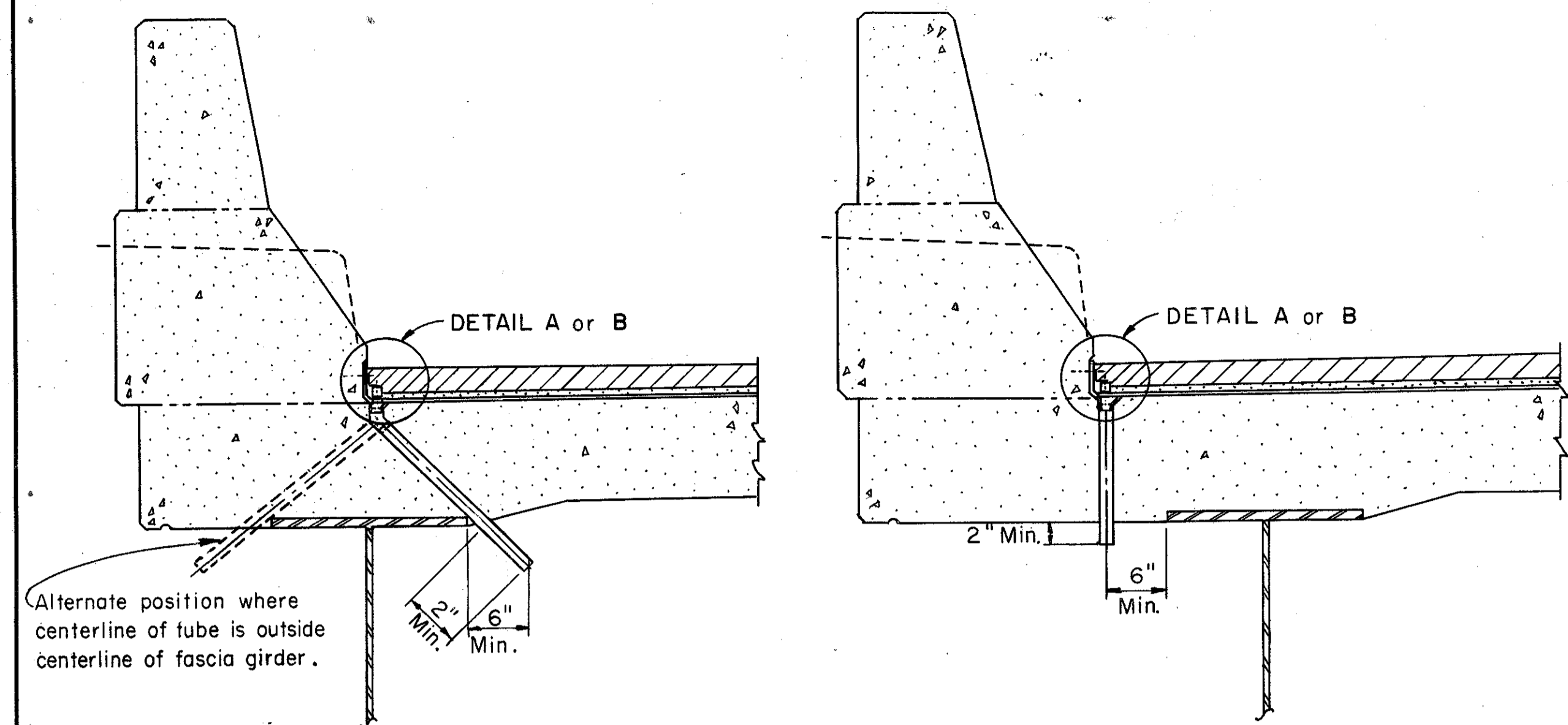


LIGHT SUPPORT DETAILS

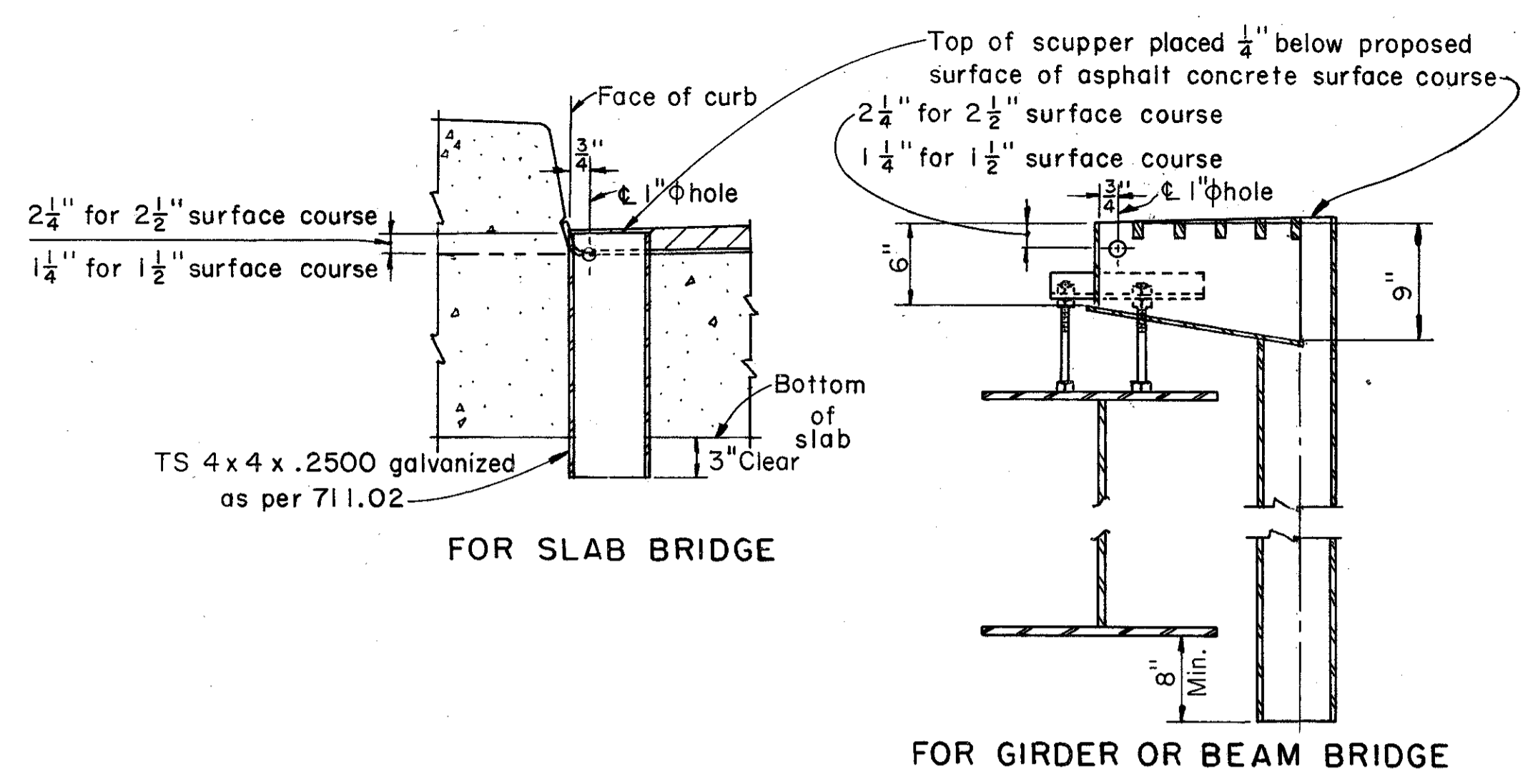
H.N.T.B. BR. NO. 6, 7, 8, 13L, 13R AND 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF  
CONSULTING ENGINEERS  
KANSAS CITY CLEVELAND NEW YORK

CROSSFRAMES, DRAINAGE AND LIGHT STANDARD SUPPORT DETAILS



STRUCTURAL STEEL BELOW CURB LINE NO STRUCTURAL STEEL BELOW CURB LINE  
DRAINAGE TUBE ARRANGEMENT



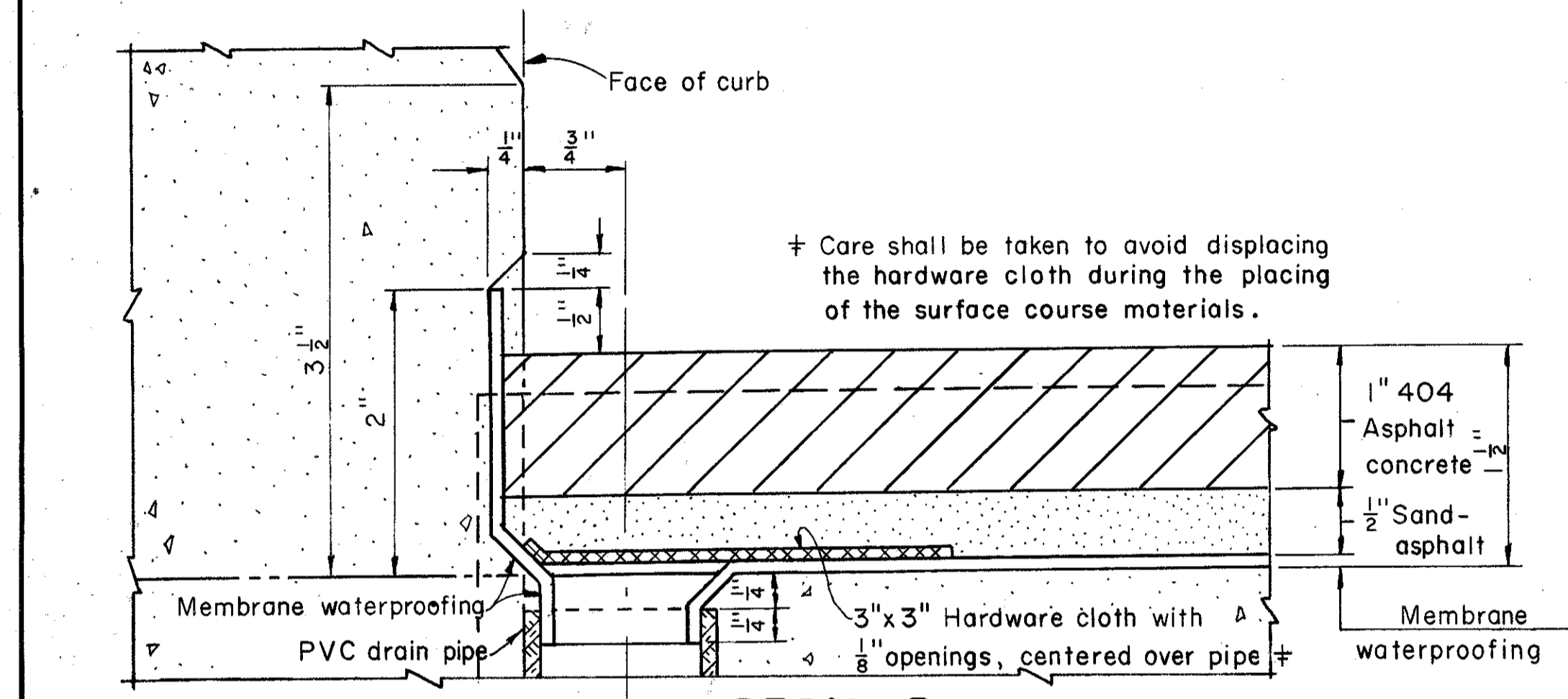
SCUPPER DETAILS  
(Scupper details conform to SD-1-69 except as noted)

**SUBDRAINAGE FOR ASPHALT CONCRETE SURFACE COURSE**  
The subdrainage system shall consist of PVC pipes and fittings and structural tubes as specified on this sheet. The pipes shall be spaced at approximately six foot intervals with a pipe placed within one foot of each expansion joint, except that they shall be relocated or extended as necessary for any discharge to clear bridge seats, structural members such as beams, diaphragms and crossbracing by at least six (6) inches. Pipes shall not be placed over or within four (4) feet of a pavement or sidewalk, within ten (10) feet of the centerline of a railroad track or along curb lines where the deck configuration does not permit water to accumulate.

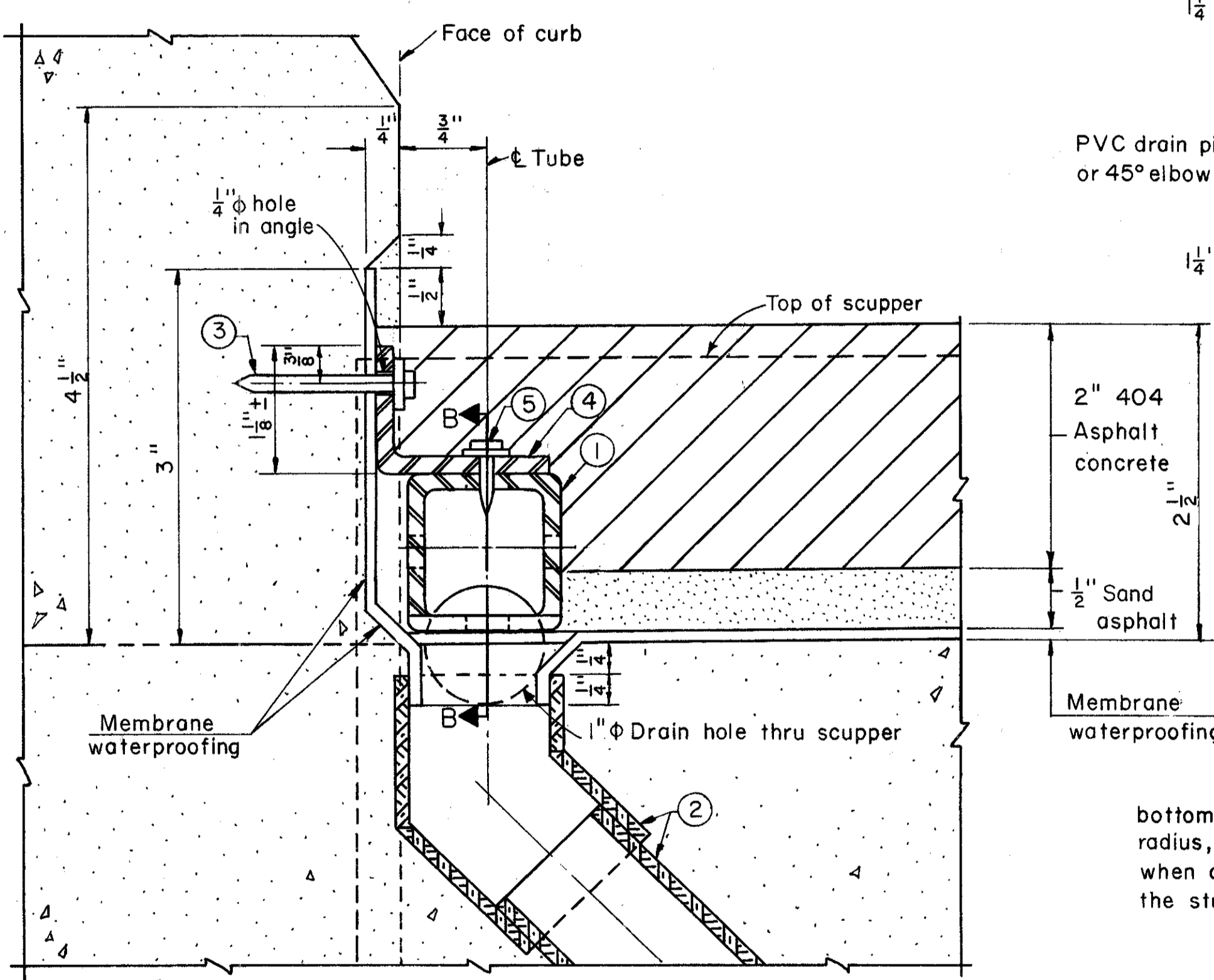
Where the plans specify a two and one half (2 1/2) inch surface course, the subdrainage shall be as shown on Detail A. The structural tube may be placed in any convenient lengths using butt joints. The price bid per linear foot for this drainage system shall include all PVC pipe and fittings, structural tubes, and all labor necessary to complete the item. The quantity will be the actual length of structural tube required. Payment will be made at the contract price for: Item 518, Lin. Ft., Subdrainage for wearing course, as per plan.

Where the plans specify a one and one half (1 1/2) inch surface course, the subdrainage shall be as shown in Detail B. The price bid for each drain shall include the PVC pipe and fitting, the hardware cloth and all necessary labor to complete the item. Payment will be made at the contract price for: Item 518, E.a., Subdrainage for wearing course, as per plan.

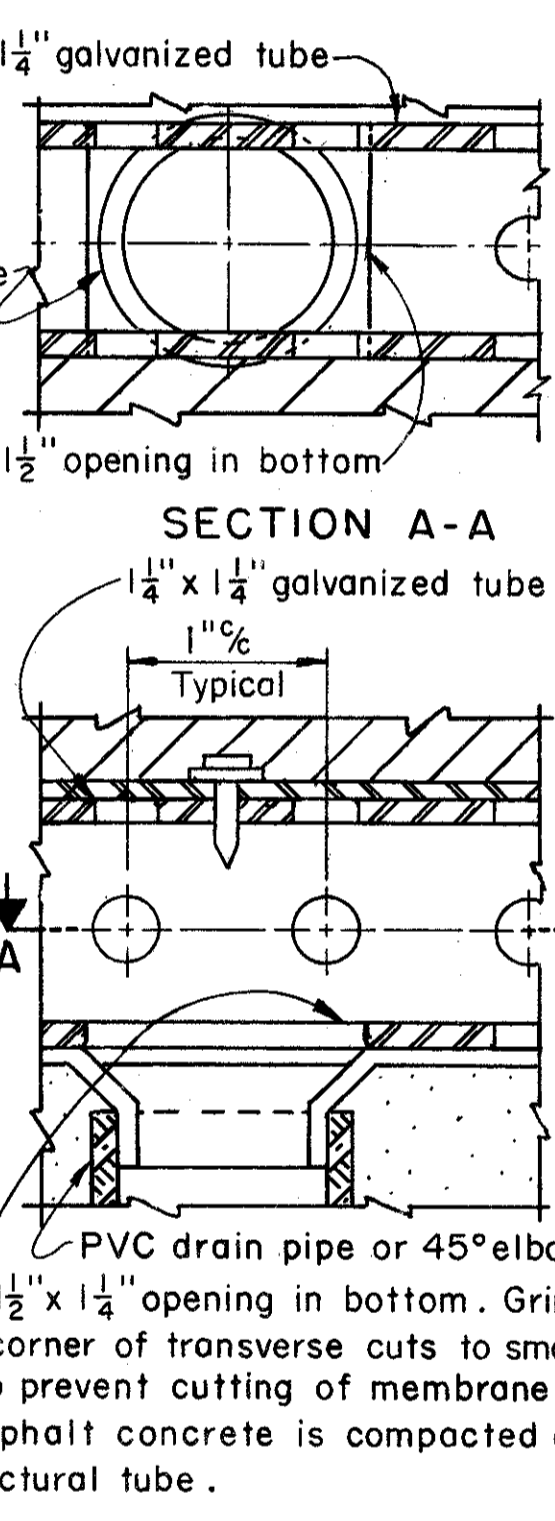
If no sand-asphalt is specified, the 404 shall be either 2 1/2" placed in two 1 1/4" courses or 1 1/2" placed in one course.



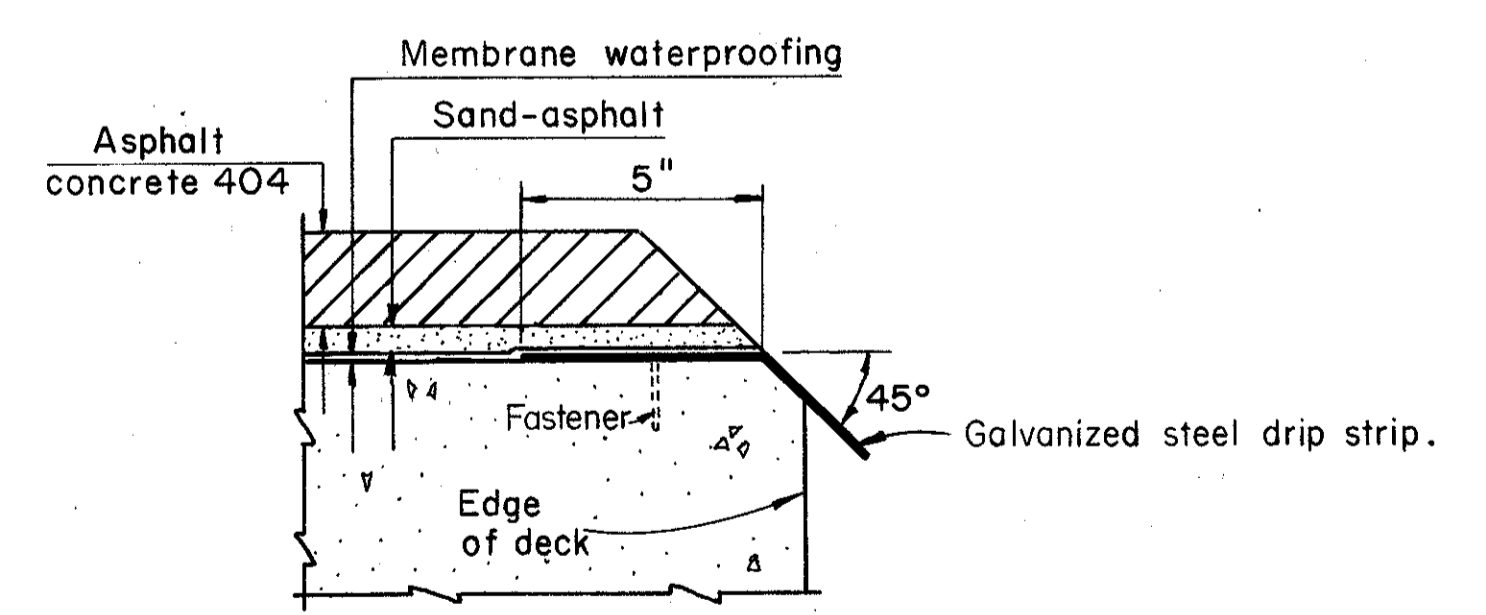
DETAIL B  
SUBDRAINAGE FOR 1 1/2" SURFACE COURSE



DETAIL A  
SUBDRAINAGE FOR 2 1/2" SURFACE COURSE

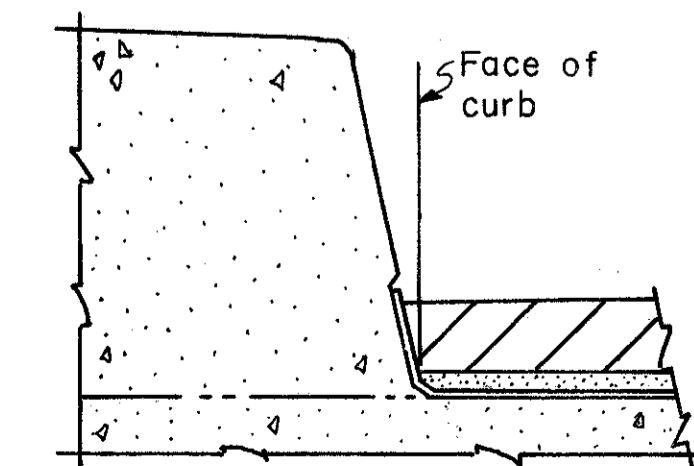


- 1 1/4" x 1/4" galvanized, perforated, structural tube with 1/2" ± φ holes 1" on centers on all four sides as shown. Cut 1/2" ± x 1/4" opening in bottom, centered over each PVC drain pipe. The steel for the structural tube shall conform to the following:  
PREGALVANIZED, ASTM A446, Grade A Steel, Galvanizing as per ASTM A525.  
POSTGALVANIZED, ASTM A569 or A366, Galvanizing as per 711.02.  
The minimum steel thickness shall be 0.105".  
Any damaged galvanizing shall be repaired as per AASHO M36.
- 1" PVC DRAIN PIPE AND 45° ELBOW, SCHEDULE 40. Position accurately to match 1/2" x 1/4" openings in perforated tube. Place membrane to lap into the pipe, and seal the hole around the lip of the pipe. (This operation is important to the servicability of the membrane.) The drain pipe and elbow shall comply with the dimensions and markings of ASTM D1785 and ASTM D2466, Type I and II respectively. The elbow shall be used only where structural steel is below curb line. Where the elbow is not adequate to provide clearance between the PVC pipe and the structural steel, the elbow shall be canted as required and cut on a line 1/4" below and parallel with the deck surface. The solvent cement for the pipe and fittings shall conform to ASTM D2564.
- 1/4" x 5/32" x 1/4" flat head drive pin and washer. Fastening of the structural tube by methods other than shown shall be subject to approval by the Engineer. (Driving pins into bridge deck is prohibited.)
- 1 1/2" x 1/2" x 1/8" x 3" long, clipped and galvanized, or bent galvanized steel plate 2 1/2" x 3" x 0.105" thick. Attach to curb at approximately 10'-0" except near joints, where the angle shall be placed within 6" of the end of each tube section.
- 1/2" x 1/8" x 1/4" flat head drive pin and washer driven thru angle and tube.



DRIP STRIP  
BRIDGES WITHOUT CURBS

**Galvanized Steel Drip Strip:** Prior to applying deck membrane waterproofing a bent galvanized steel drip strip, 8" x 0.105" shall be installed along the edges of the deck as shown. The strips shall be fastened at 3'-0" maximum with power driven pins or #10 galvanized expansion screws, subject to the approval of the Engineer. The strips shall be placed the full length of the deck. Where splices are required a 3" (min.) lap shall be used, with a fastener through the lap. Steel shall meet the requirements of ASTM A568 and galvanizing shall be in accordance with 711.02. Payment shall be at the contract price bid for Item Special, Sq. Ft., Galvanized steel drip strip, which shall include all materials, labor, tools and incidentals necessary to complete the item.



SHAPE OF SIDEWALK CURB

STATE OF OHIO DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS BUREAU OF BRIDGES						
DECK DRAINAGE DETAILS FOR BRIDGES WITH ASPHALT CONCRETE SURFACE COURSE						
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	SHEET
DLM	GF		CPD	WJJ	7-27-73	CD 2