CUY-90-14.90

PID 77332/85531

APPENDIX EX-39

CUY-490-0100 PID 03570
(Reference Document)

State of Ohio
Department of Transportation
Jolene M. Molitoris, Director

Innerbelt Bridge
Construction Contract Group 1 (CCG1)

Revision Date: 1986

L/-n

DESIGN DESIGNATION

1986 A.D.T.	64,234
2006 A.D.T.	87,120
D.H.V.	8712
D	60%-40%
T	5%
V	60 M.P.H.

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

CUY-490-1.00 I-490-3(10)28

PHASE I-SUBSTRUCTURE

CITY OF CLEVELAND, CUYAHOGA COUNTY

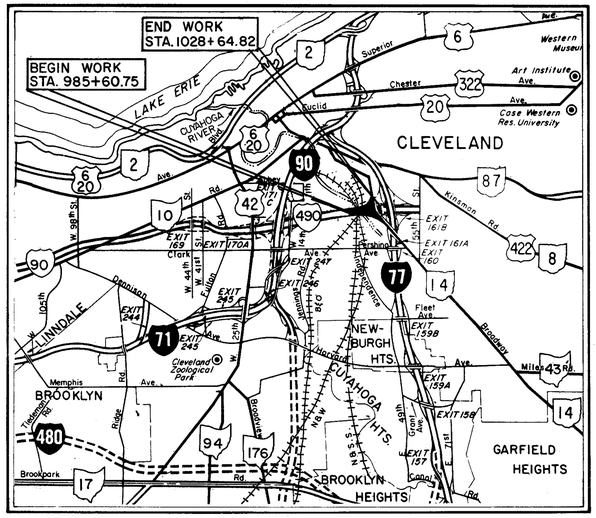
GRADE SEPARATION WITH BALTIMORE AND OHIO RAILROAD COMPANY
NORFOLK AND WESTERN RAILWAY COMPANY,
NEWBURG AND SOUTH SHORE RAILWAY COMPANY, AND
RIVER TERMINAL RAILWAY COMPANY

CUYAHOGA COUNTY CUY-490-1.00	OHIO FHWA REGION 5	1 174
I-490-3(10)28	FEDERAL PROJECT	

CONVENTIONAL SIGNS

PROPERTY LINE
EXISTING RIGHT OF WAY
SUBDIVISION LINE
SUBLOT LINE OR EXISTING EASEMENT
ORIGINAL TOWNSHIP LOT LINE
CORPORATION LINE
LIMITED ACCESS LINE
LIMITED ACCESS LINE AND RIGHT OF WAY LINE
RIGHT OF WAY LINE AND HIGHWAY EASEMENT LINE
AERIAL EASEMENT LINE
TEMPORARY RIGHT OF WAY
SEWER EASEMENT LINE
SLOPE EASEMENT LINE
CHANNEL EASEMENT
PARTICIPATION LINE
CENTER LINE
FENCE LINE
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
TELEPHONE CONDUIT
EXISTING SEWERS (R/W PLANS)
EXISTING STORM SEWER (DRAINAGE PLANS)
EXISTING SANITARY SEWER (DRAINAGE PLANS)
OIL LINE
FIRE HYDRANT (EXISTING)
FIRE HYDRANT (PROPOSED)
MANHOLE (EXISTING)
MANHOLE (PROPOSED STORM)
MANHOLE (PROPOSED SANITARY)
CATCH BASIN OR INLET (EXISTING)
CATCH BASIN OR INLET (PROPOSED)
SLOPE LINE (CUT)
SLOPE LINE (FILL)



LOCATION MAP

SCALE IN MILES
0 2 4 6 8

PORTION TO BE IMPROVED
INTERSTATE
U.S. HIGHWAY
STATE
OTHERS
UNDER CONSTRUCTION

MICROFILMED
APR 20 1992

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 in accordance with the provisions of Section 5511.02 of the Revised Code of Ohio.

1985 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.

I hereby approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenance and safety of traffic will be as set forth on the plans and estimates.

REVISED SHT. 71 - 10/2/86 - WTF

APPROVED: Martin A. Gallito
DATE: 2-5-1986 DISTRICT DEPUTY DIRECTOR OF TRANSPORTATION

APPROVED: Walter J. Jastiff
DATE: 3-14-1986 ENGINEER, BUREAU OF BRIDGES AND STRUCTURAL DESIGN

APPROVED: Wayne H. Kauble
DATE: 5-16-86 CHIEF ENGINEER, PLANNING AND DESIGN

APPROVED: Warren J. Smith
DATE: 5-16-86 DIRECTOR, DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS

UNDERGROUND UTILITIES
TWO WORKING DAYS BEFORE YOU DIG Call-800-362-2764 (Toll free) OHIO UTILITIES PROTECTION SERVICE NON-MEMBERS MUST BE CALLED DIRECTLY

SCALES

Plan 0 50 100

Profile: Horizontal 0 100 200, Vertical 0 10 20

Cross Section: Horizontal 0 10 20, Vertical 0 10 20

SPECIAL PROVISIONS
FUSION BONDED EPOXY COATING
4-15-86.

SUPPLEMENTAL SPECIFICATIONS	
824	10-8-82
847	10-17-83
836	11-12-85
947	10-17-83
932	3-25-85

I-290 and CUY-290-0.27 appearing throughout these plans shall be considered to read I-490 and CUY-490-1.00 respectively throughout these plans.

FED. RD. DIVISION
2

appearing throughout the plans shall be considered to read.

FHWA REGION
5

LINE DATA

BEGIN WORK: STA. 985+60.75
STA. EQUATION 1022+51.53 BACK = STA. 1023+49.97 AHEAD
END WORK: STA. 1028+64.82
NET LENGTH OF WORK: 4205.63 LIN.FT. OR 0.797 MILES

Plan Prepared By:
Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO
HNTB

Ralph E. Robison
RALPH E. ROBISON

SEAL

SUPPLEMENTAL PRINTS OF STANDARD CONSTRUCTION DRAWINGS							
BP-3	12-6-76	BP-5	1-11-85				
BP-7	12-6-76	MC-1	6-13-69	TC.-41.20	3-26-79		
BP-4	1-11-85			TC-42.20	3-26-79		
CB-2-2-A&B	5-1-79	MC-4	7-26-76	TC-52.20	4-3-79		
CB-3	5-1-79	MC-5	6-12-75				
CB-5	11-10-83			LA-1	6-1-79		
CB-2-3&4	5-1-79	MC-10	5-1-76	F-1	11-10-83		
CB-7	12-18-84	MC-11	8-1-78	F-3	5-1-76		
GR-2A	2-5-82	MH-1	12-18-84	F-4	11-10-83		
GR-1	1-11-85	MH-3	12-18-84	F-5	5-1-76		
		MH-5	6-12-75				
I-2A	12-18-84						

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

Project: CUY-490-1.00
Date of Letting 19 , Contract No.

LD0300 Rev. 11-21-73

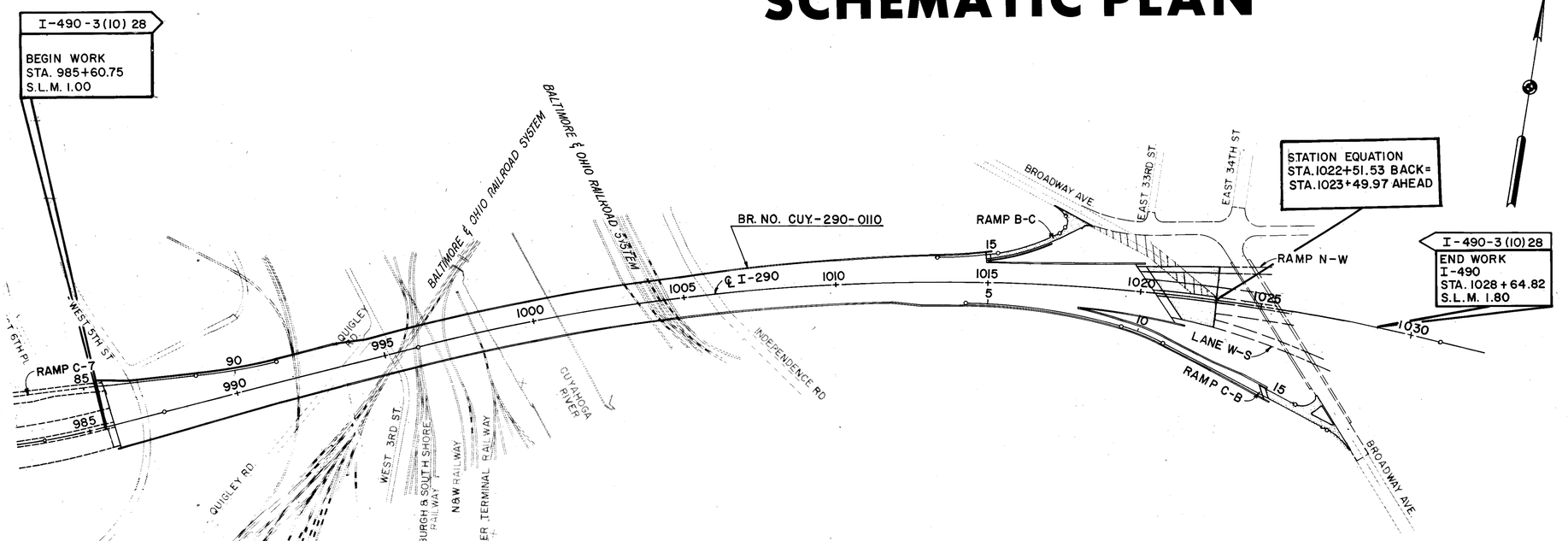
REVISED 10/2/86

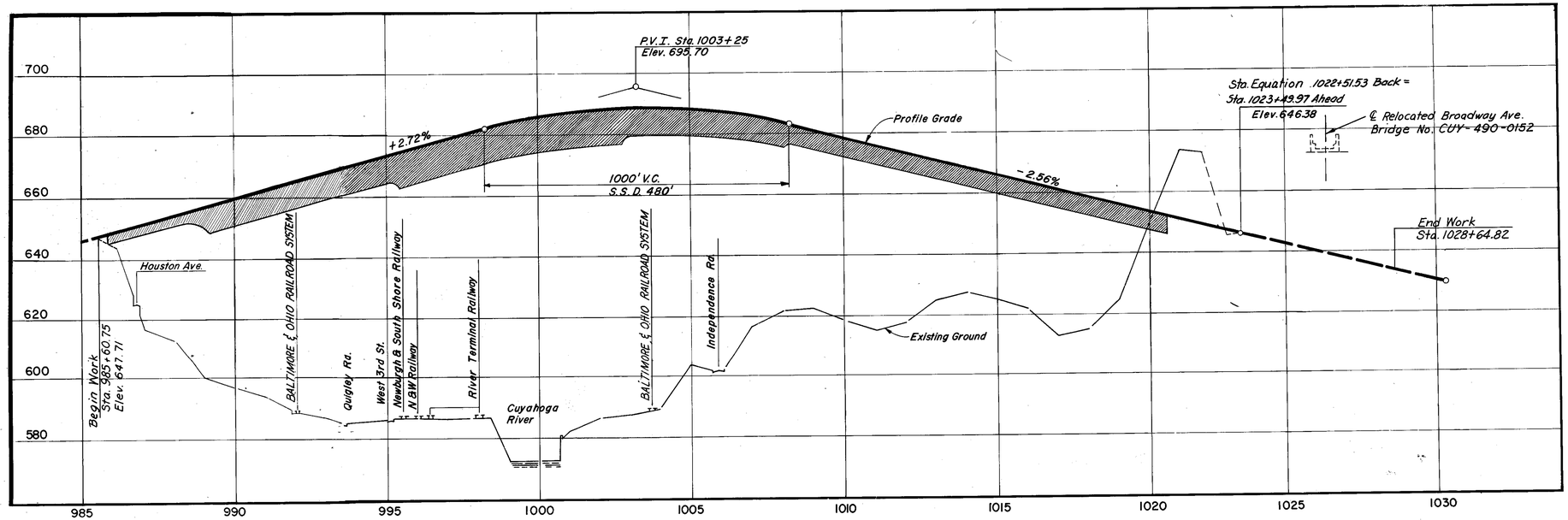
SCHEMATIC PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

2
174

CUYAHOGA COUNTY
CUY.-290-0.27





PROPOSED STRUCTURE

TYPE: Continuous steel beam (Unit 1) continuous welded steel girder with floor system (Units 2, 3 and 4), continuous multiple welded steel girder (Units 5, 6 and C-B) with reinforced concrete deck and substructure.

SPANS: Spans are measured along ℄ I-490:
Unit 1 - 53'-0⅛", 67'-0", 53'-0"
Unit 2L- 151'-0" Cantilever, 131'-6", 180'-6", 180'-6", 180'-6".
Unit 3L- 201'-0" Cantilever, 237'-0", 330'-0", 174'-0", 201'-0" Cantilever.
Unit 4L- 178'-0⅛", 188'-11⅛", 145'-0⅛", 151'-0" Cantilever.
Unit 2R- 151'-0" Cantilever, 131'-6", 131'-6", 131'-6", 182'-6", 147'-0".
Unit 3R- 201'-0" Cantilever, 201'-0", 340'-0", 185'-0", 201'-0" Cantilever.
Unit 4R- 164'-0⅛", 166'-11⅛", 145'-0⅛", 151'-0" Cantilever.
Unit 5 - 119'-0", 135'-0", 135'-2", 134'-9⅜", 124'-11⅞", 101'-0" Cantilever.
Unit 6 - 104'-9¼", 117'-7½", 119'-8⅜", 122'-9½", 96'-10⅛".
Spans are measured along ℄ Ramp C-B:
Unit 6C-B - 141'-6", 122'-11", 124'-9", 124'-9" 96'-0"

ROADWAYS: I-490 - Width Varies face to face of parapets, 67'-0" to 143'-5"± Left Bridge and 67'-0" to 103'-9"± Right Bridge. There is an 2" open joint between Left and Right Bridge.

Ramp C-B- Width Varies, 28'-0" to 36'-0" face to face of parapets.

LOADING: HS 20-44 and Interstate Alternate Loading.

SKEW: Unit 1 - None with respect to local tangent at S.T. Sta. 987+54.50
Unit 2 - None
Unit 3 - None
Units 4,5 and 6 - Varies (See Plan)
Unit 6C-B - 45° Right Forward with respect to local tangent at P.T. Sta. 10+89.88

WEARING SURFACE: 1¼" Latex Modified Concrete

APPROACH SLABS: AS-1-81 (25' long)

ALIGNMENT: Units 1 thru 6 - Spiral left, Tangent and 0°50' Curve Right.

Unit 6C-B - 3° Curve Right, ,8° Curve Right and Tangent.

SUPERELEVATION:
Unit 1 - Varies: -0.0156 ft. per ft. to +0.169 ft. per ft.
Unit 2 - Varies level to .0156 ft. per ft.
Unit 3 - Varies .0156 ft. per ft. to .02 ft. per ft.
Units 4,5 and 6 - .02 ft. per ft.
Unit 6C-B - Varies .0156 ft. per ft. to .064 ft. per ft.

SUPERSTRUCTURE AND ROADWAY PAVEMENT ARE NOT PART OF THIS CONTRACT.

LEGEND

Abandoned

Note: For Curve Data See Sheet 3 and 4.

200 0 200 400 600 800 HORIZ.
20 0 20 40 60 80 VERT.
SCALE IN FEET

SCALE 1"=20' Vert. 1"=200' Horiz.
MADE DCF DATE 9/17/69
TRCD WLD DATE 9/24/69
CKD RSW DATE 3/5/70

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

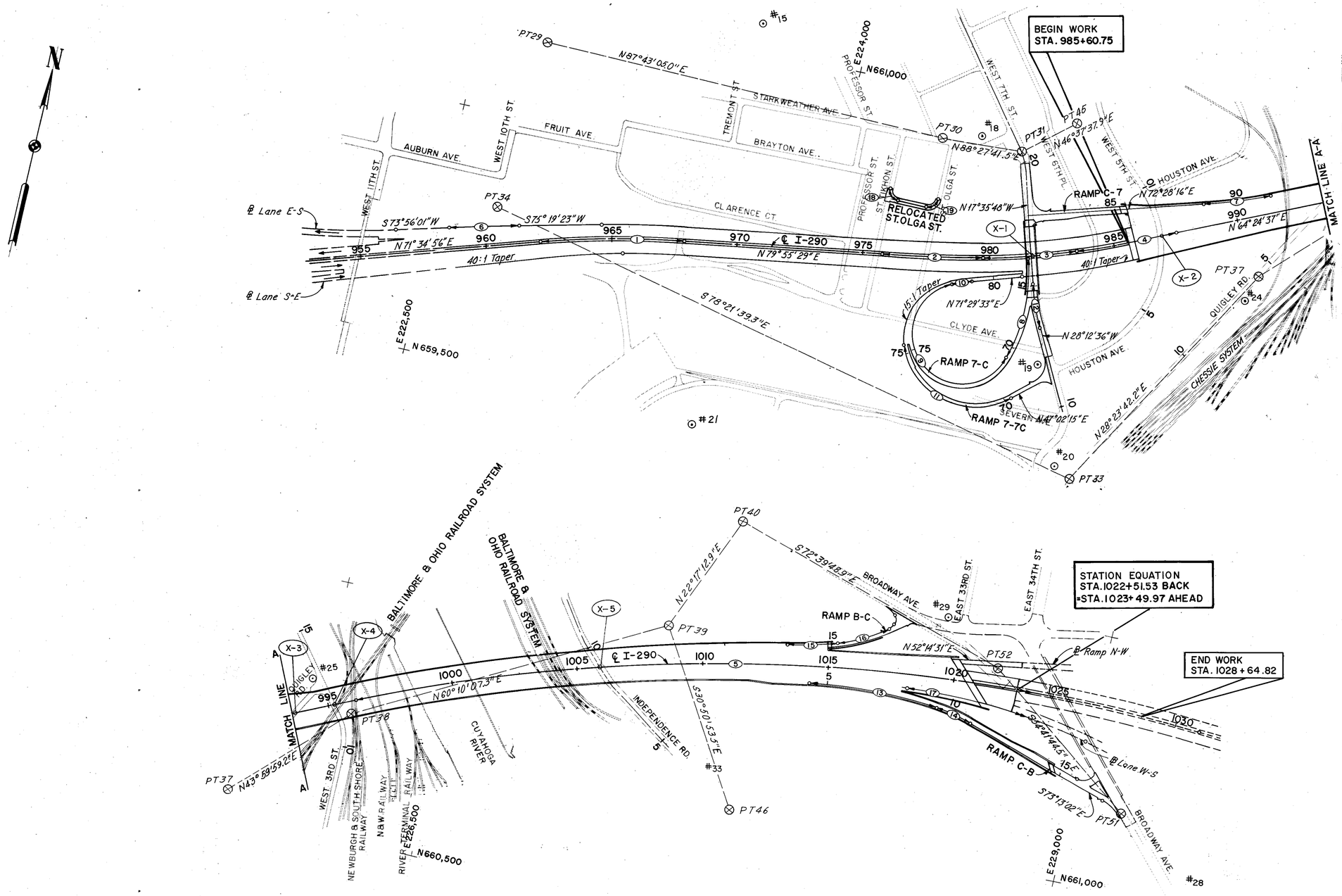
SCHEMATIC PLAN

SCHEMATIC GEOMETRIC PLAN

FED. RD. DIVISION	STATE	PROJECT	
7	OHIO		

3 / 174

CUYAHOGA COUNTY
CUY.-290-0.27



INTERSECTION DATA

Point	Location	Station	Coordinates North	Coordinates East
X-1	℄ I-290 & West 7 st.	981+68.954 16+11.275	660 452.134	224 833.386
X-2	℄ I-290 & Houston	986+82.51 8 +12.46	660648.020	225307.655
X-3	℄ I-290 & Quigley	993+62.952 1+57.67	660941.873	225921.377
X-4	℄ I-290 & West 3 st.	995+12.065 11+82.33	661021. 822	226071.408
X-5	℄ I-290 & Independence Rd.	1005+85.949 8+82.91	661406.242	227051.210

BENCH MARKS

No.	Description	Elevation
15.	N.E. Flange Bolt, Top of Hydrant on N. side of Starkweather at #1022.	682.81
18.	N. Flange Bolt, Top of Hydrant 100' W. of West 7th on N. side Starkweather.	672.533
19.	N.E. Flange Bolt, Top of Hydrant on W. side of West 7th at Houston.	628.146
20.	"a" Cut on S.E. corner of concrete base at S.E. corner of Tower at West 7th and Quigley.	594.477
21.	"a" Cut on N.W. corner of concrete base at N.W. corner of Air Products and Chemicals Fence.	591.319
24.	"a" Cut in concrete base of S.W. Leg of Tower 125' S. of Pt 37 on E side of Quigley.	590.291
25.	N.E. Flange Bolt, Top of Hydrant on N. side of 3rd and Quigley. B.M. has been disturbed	584.72
28.	N.E. Flange Bolt, Top of Hydrant on S. side of Broadway at gate 5 to Sohio.	665.44
29.	N.E. Flange Bolt, Top of Hydrant on S. side of Broadway and E. 33rd.	672.29
33.	N. Flange Bolt, Top of Hydrant on S. side of Independence Rd. at # 2981.	593.70

Note:
For Curve Data See Sheet 4.
For Survey Data see Sheet 5.

LEGEND

Intersection Data _____ (X-5)
Bench Mark _____ ⊙#20
Traverse Points _____ ⊗ PT29
Curve Data _____ (2)

Note:
Add 2,000,000 to all East Coordinates.

SCALE 1"=200'
MADE WLD DATE 9/25/69
TRCD WLD DATE 9/25/69
CKD L.J.D. DATE 9/30/69

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

GEOMETRICS TABLE

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

4
174

CUYAHOGA COUNTY
CUY.- 290- 027

LINE	CURVE	P. C.			P. I.			P. T.			△	D	R	T	L	E
		STATION	N. COORD.	E. COORD.	STATION	N. COORD.	E. COORD	STATION	N. COORD.	E. COORD.						
I-290	1	962+16.45	660,042.01	222,926.47	965+01.35	660,132.03	223,196.78	967+85.25	660,181.87	223,477.29	8°20'33"	1°28'00"	3,906.53'	284.90'	568.80'	10.38'
	2	See Spiral	Table Below													
	3	979+78.77	660,399 80	224,650.59	981+66.91	660,445.55	224,833.07	983+54.50	660,514.77	225,008.00	7°30'52"	2°00'00"	2,864.79'	188.13'	375.72'	6.17'
	4	See Spiral	Table Below													
	5	996+09.63	661,048.42	226,143.86	1009+47.08	661626.10	227350.12	1022+51.53	661709.47	228684.96	22°00'57"	0°50'00"	6,875.49'	1337.45'	2641.90'	128.88'
Lane E-S	6	3+39.31	660,082.92	222,828.78	4+78.24	660,047.72	222,694.37	6+17.17	660,009.26	222,560.86	1°23'22"	0°30'00"	11,459.16'	138.94'	277.86'	0.84'
Ramp C-7	7	88+80.25	660,812.11	225,449.30	90+14.82	660,852.64	225,577.63	91+48.95	660,910.77	225,699.00	8°03'39"	3°00'00"	1,909.86'	134.57'	268.70'	4.74'
Ramp 7-C	8	66+36.50	660,439.88	224,823.63	68+47.14	660,239.10	224,887.32	70+46.24	660,035.80	224,832.15	32°46'44"	8°00'00"	716.20'	210.64'	409.74'	30.33'
	9	70+46.24	660,035.80	224,832.15	-	660,088.18	224,639.13	78+48.77	660,269.58	224,554.90	229°54'38"	28°38'52"	200.00'	-	802.54'	-
	10	78+48.77	660,269.58	224,554.90	78+88.82	660,286.44	224,591.22	79+28.77	660,299.15	224,629.19	6°24'00"	8°00'00"	716.20'	40.04'	80.00'	1.12'
Ramp 7-7C	11	69+75.27	659,884.00	224,889.03	73+98.95	659,595.26	224,578.98	75+34.62	659,990.55	224,426.50	111°52'09"	20°00'00"	286.48'	423.68'	559.35'	224.96'
West 7th	12	13+22.75	660,183.13	224,935.84	14+11.44	660,261.29	224,893.92	14+99.64	660,345.84	224,867.10	10°36'48"	6°00'00"	954.93'	88.70'	176.89'	4.11'
Ramp C-B	13	4+26.94	661,542.02	227,879.36	6+86.60	661,589.10	228,134.71	9+43.08	661,566.30	228,393.36	15°29'03"	3°00'00"	1,909.86'	259.65'	516.14'	17.57'
	14	9+43.08	661,566.30	228,393.36	10+16.74	661,559.82	228,466.73	10+89.88	661,538.56	228,537.25	11°44'38"	8°00'00"	716.20'	73.66'	146.80'	3.78'
Ramp B-C	15	See Spiral	Table Below													
	16	15+32.54	661,724.01	227,950.97	16+39.57	661,761.95	228,051.04	17+45.02	661,827.48	228,135.66	16°59'53"	8°00'00"	716.20'	107.02'	212.48'	7.95'
Lane W-S	17	0+00.00	661,607.91	228,219.00	4+02.12	661,660.66	228,617.65	7+96.13	661,574.55	229,010.44	19°54'12"	2°30'00"	2291.83'	402.12'	796.13'	35.01'
Reloc.St.Olga	18	1+76.36	660,529.23	224,270.40	2+17.84	660,527.09	224,228.96	2+40.65	660,568.57	224,228.34	92°05'25"	143°14'22"	40.00'	41.49'	64.29'	17.63'
	19	0+00.00	660,575.72	224,423.14	0+38.58	660,537.15	224,423.74	0+61.39	660,535.16	224,385.21	87°55'59"	143°14'22"	40.00'	38.58'	61.39'	15.58'

LINE	CURVE	T. S.	S. C.	C. S.	S. T.	θ_s	T_s	L_s	P	K	ST	LT	E_s
I-290	2	975+78.77 N 660,320.69 E 224,258.57	979+78.77 N 660,399.80 E 224,650.59	- - -	- - -	4°00'00"	590.53'	400.00'	2.33'	199.97'	133.40'	266.74'	28.81'
I-290	4	-	-	983+54.50 N 660,514.77 E 225,008.00	987+54.50 N 660,679.07 E 225,372.61	4°00'00"	590.53'	400.00'	2.33'	199.97'	133.40'	266.74'	28.81'
Ramp B-C	15	13+32.54 N 661,670.86 E 227,758.34	15+32.54 N 661,724.01 E 227,950.97	-	-	8°00'00"	253.71'	200.00'	2.32'	99.94'	66.79'	133.47'	18.60'

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.

Note:
Add 2,000,000 to all East Coordinates.

SCALE None
MADE DCF DATE 8-4-70
TRCD MMD DATE 8-13-70
CKD RSH DATE 8-14-70

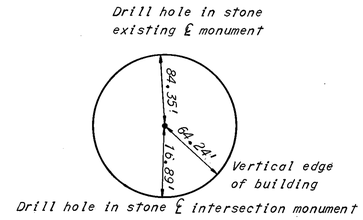
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

TRAVERSE TIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

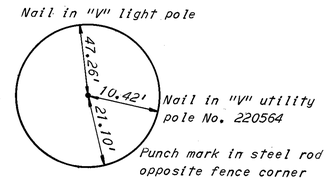
5
174

CUYAHOGA COUNTY
CUY.-290-0.27



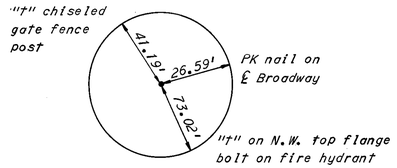
POINT 31

West 7th St. @ Starkweather
Punch mark in iron rod
driven through brick pavement



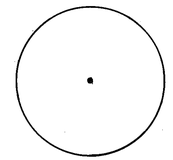
POINT 39

H.N.T.B. survey
marker on steel rod driven
into ground with concrete
paved around it.



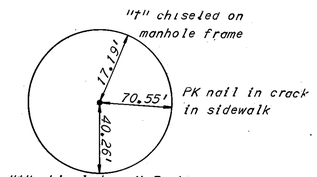
POINT 40

Stud driven into concrete
sidewalk with screw
inserted into it



POINT 50

Broadway Ave. @ Dille
existing C.R.G.S.
monument No.O.M. 914



POINT 52

Punch mark in head of
PK nail driven into
asphalt pavement on ℄
Broadway near E.34th St.

Traverse Points

Point No.		Distance		Length	Bearing	Coordinates	
C.R.G.S.	H.N.T.B.	From Pt.	To Pt.			North	East
				Line No. 1			
	29					660,759.89	2,222,752.68
	30	29	30	1,621.05	N87°43'05"E	660,824.44	2,224,372.44
	31	30	31	328.85	N88°27'42"E	660,833.26	2,224,701.17
	45	31	45	253.87	N46°37'38"E	661,007.61	2,224,885.72
				Line No. 2			
	34					660,132.38	2,222,738.96
	33	34	33	2,506.74	S78°21'39"E	659,626.66	2,225,194.15
	37	33	37	1,082.28	N28°23'42"E	660,578.73	2,225,708.88
	38	37	38	585.37	N43°59'59"E	660,999.81	2,226,115.47
	39	38	39	1,319.79	N60°10'07"E	661,656.34	2,227,260.37
	46	39	46	791.73	S30°50'54"E	660,976.61	2,227,666.35
				Line No. 3			
	40					662,108.96	2,227,445.85
	52	40	52	1,185.33	S72°39'49"E	661,755.75	2,228,577.37
	51	52	51	747.58	S54°41'44"E	661,323.71	2,229,187.46
914	50	51	50	879.79	S42°21'36"E	660,673.61	2,229,780.25

SCALE No Scale
MADE C.M.D. DATE 12-26-67
TRCD. ____ DATE ____
CKD. R.H.A DATE 11-28-67

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

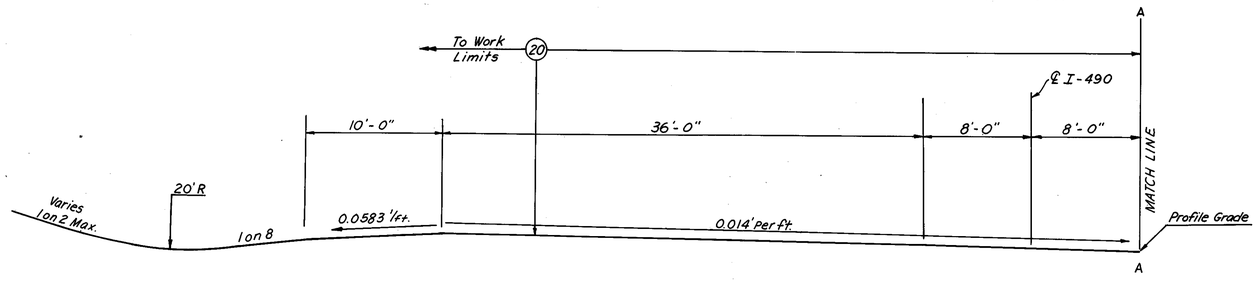
TYPICAL SECTIONS

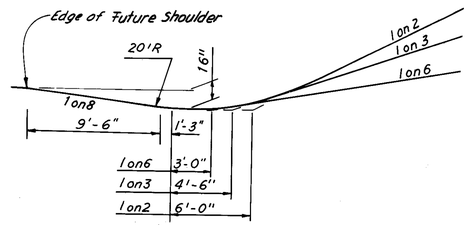
FHWA REGION	STATE	PROJECT	
5	OHIO		

6
174

CUYAHOGA COUNTY
CUY- 490-1.00

ITEM 203 EARTHWORK





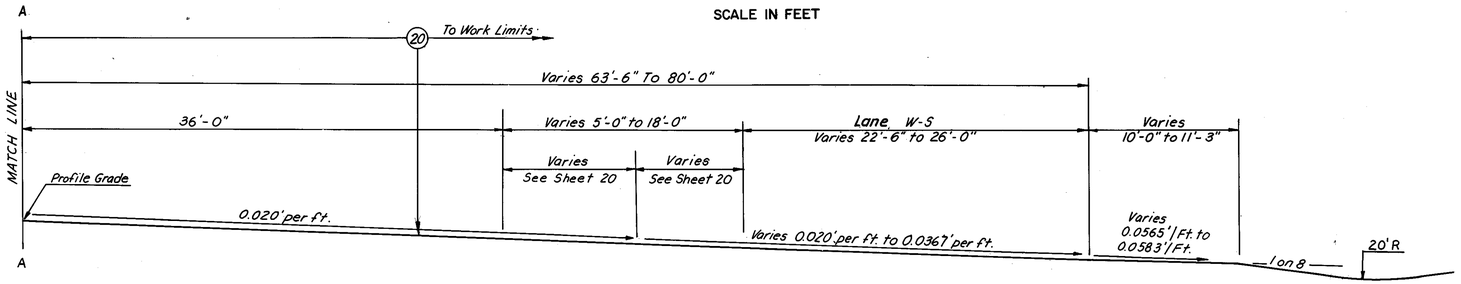
20'R DITCH DETAIL
No Scale

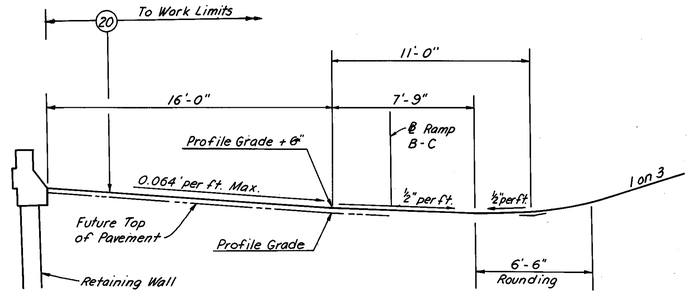
I-490 WESTBOUND

Sta. 1020+47.57 to Sta. 1022+51.53

3 0 3 6 9

SCALE IN FEET



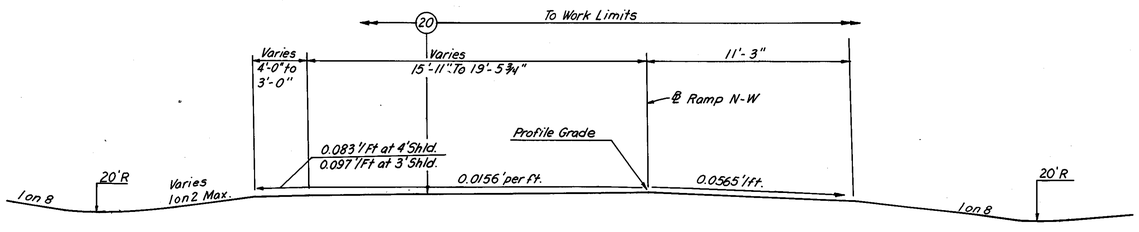


I-490 EASTBOUND

Sta. 1020+47.57 to Sta. 1022+51.53

3 0 3 6 9

SCALE IN FEET

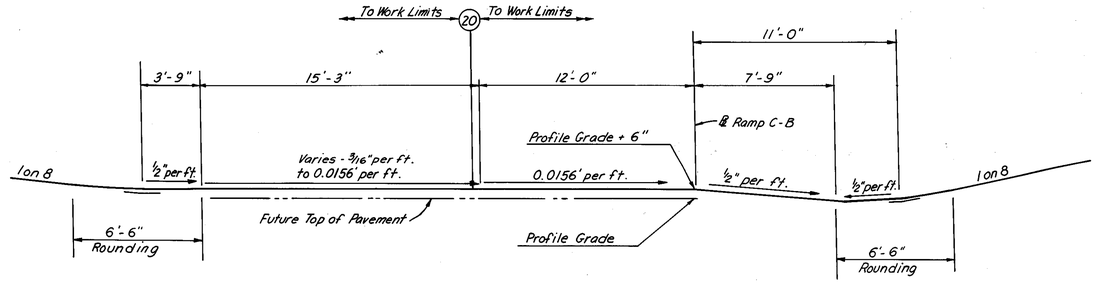


RAMP N-W

Sta. 17+88.00 to Sta. 20+27.61

4 0 4 8

SCALE IN FEET



RAMP C-B

Sta. 14+82.18 to Sta. 17+37.29

4 0 4 8

SCALE IN FEET

LEGEND

(20) Item 659 SEEDING AND MULCHING

Note:
For grading under bridge, see grading plans and cross sections.

MADE R.L.N. DATE 1-30-83
TRACED T.D. DATE 1-1-84
CHECKED A.H.S. DATE 1-5-84
SCALE As Shown

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

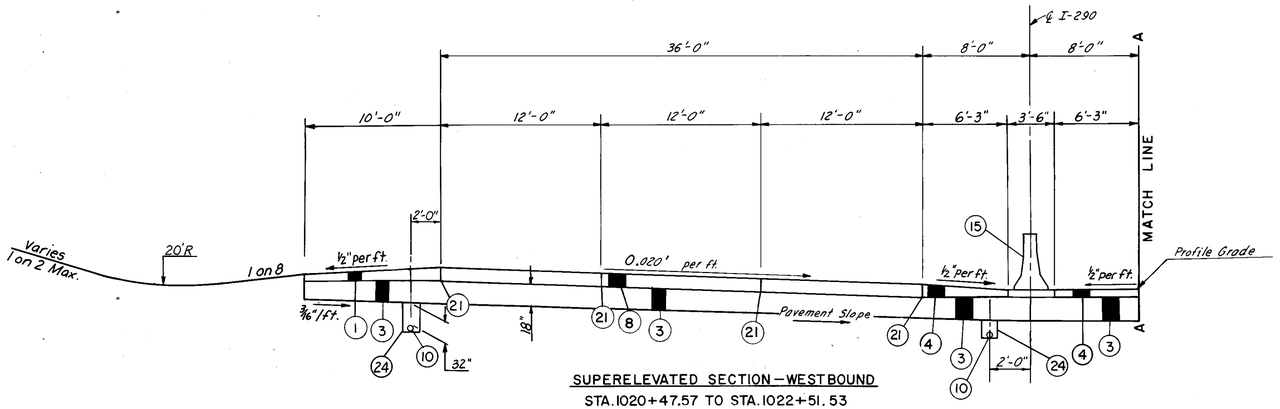
TYPICAL SECTIONS

FHWA REGION	STATE	PROJECT	
5	OHIO		

7
174

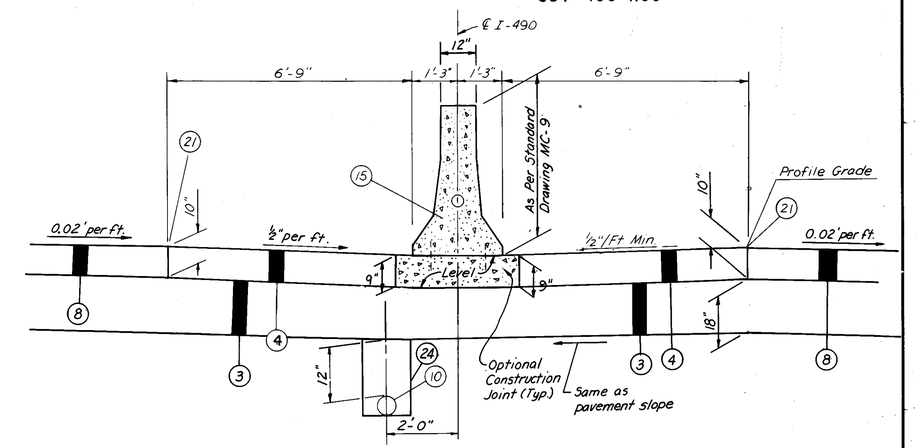
CUYAHOGA COUNTY
CUY- 490-1.00

TYPE 451 ON 310

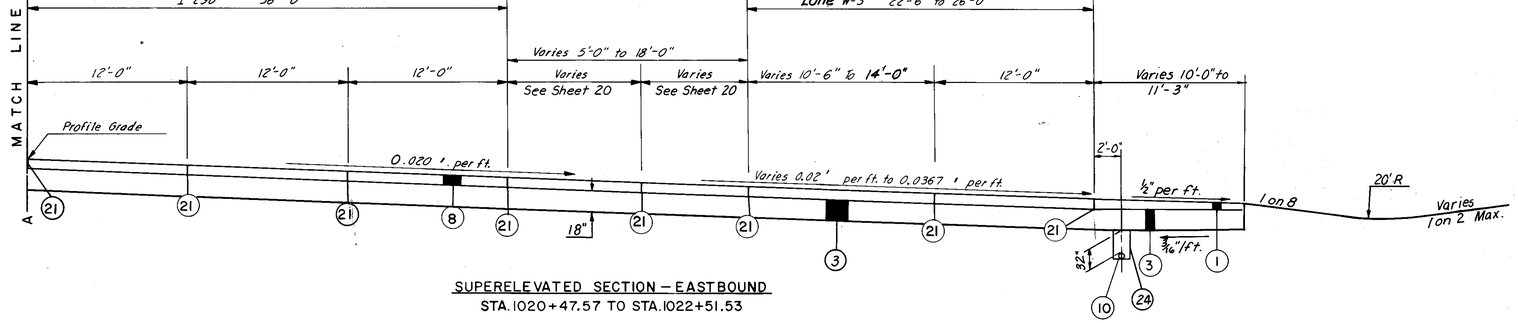


SUPERELEVATED SECTION — WESTBOUND
STA. 1020+47.57 TO STA. 1022+51.53

3 0 3 6 9
SCALE IN FEET



CONCRETE BARRIER MEDIAN DETAIL
Superelevated Section



SUPERELEVATED SECTION — EASTBOUND
STA. 1020+47.57 TO STA. 1022+51.53

3 0 3 6 9
SCALE IN FEET

THIS SHEET IS INCLUDED FOR INFORMATION ONLY

LEGEND

1	ITEM 452	8" AVERAGE DEPTH, PLAIN CONCRETE PAVEMENT, AS PER PLAN
3	ITEM 310	SUBBASE, TYPE II
4	ITEM 452	9-1/2" AVERAGE DEPTH, PLAIN CONCRETE PAVEMENT, AS PER PLAN
7	ITEM 451	9" REINFORCED CONCRETE PAVEMENT
8	ITEM 451	10" REINFORCED CONCRETE PAVEMENT
10	ITEM 605	6" PIPE UNDERDRAINS
12	ITEM 452	7-1/2" AVERAGE DEPTH, PLAIN CONCRETE PAVEMENT, AS PER PLAN
14	ITEM 606	GUARD RAIL, TYPE 5
15	ITEM 622	CONCRETE BARRIER, STANDARD TYPE B-50
17	ITEM 609	CURB STANDARD, TYPE 6
19	ITEM 452	9" PLAIN CONCRETE PAVEMENT, AS PER PLAN
21		STANDARD LONGITUDINAL JOINT
24	ITEM SPECIAL	FILTER FABRIC
25	ITEM SPECIAL	HERBICIDES FOR WEED CONTROL
26	ITEM 301	3" BITUMINOUS AGGREGATE BASE FOR WEED CONTROL

NOTES:

For Paved Shoulder Details see sheet 9
Typical Sections show the general roadway features only. For details see the Pavement Plans, Paved Shoulder Typical Sections and Cross-Section sheets.

SCALE As Shown
MADE RSN DATE 3-3-70
TRCD MAG DATE 3-3-70
CKD. LJD DATE 3-4-70

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

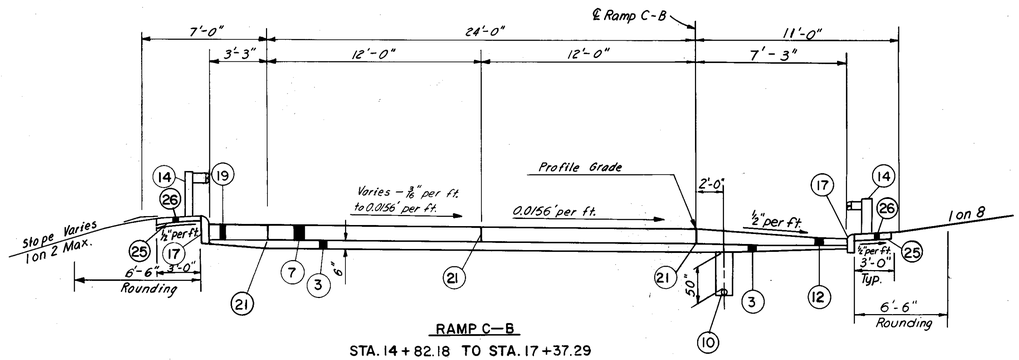
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

8
174

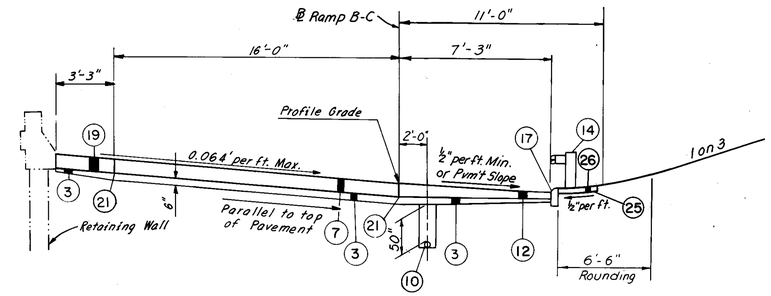
CUYAHOGA COUNTY
CUY. 290–0.27

TYPICAL SECTIONS

TYPE 451 ON 310

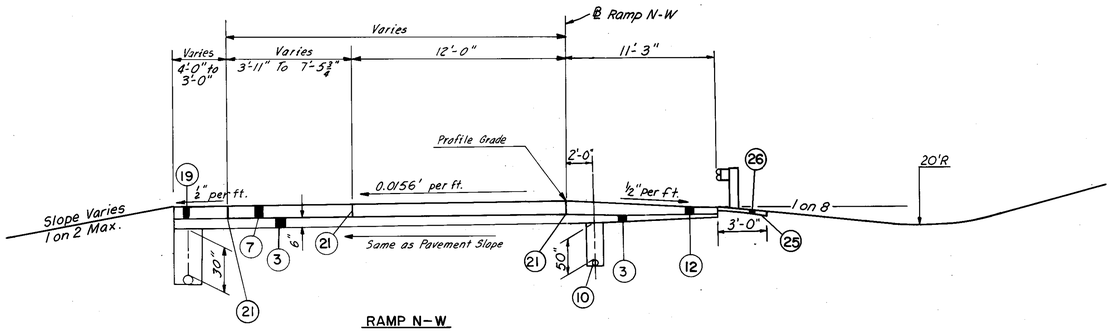


RAMP C–B
STA. 14 + 82.18 TO STA. 17 + 37.29

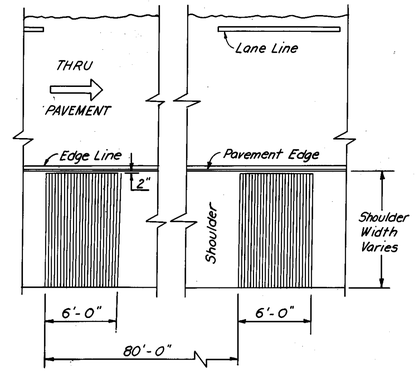


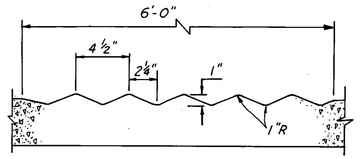
RAMP B–C
STA. 15 + 02.57 TO STA. 18 + 18.91

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY



RAMP N–W
STA. 20 + 27.61 TO STA. 17 + 88.00





DETAIL OF CORRUGATIONS

Note: All concrete shoulders are to receive rumble strip treatment. Rumble strips are to be located between transverse joints. Payment for rumble strip treatment of new concrete shoulders shall be included in the contract price for Item 452 - Plain Portland Cement Concrete Pavement, as per plan.

RUMBLE STRIP TREATMENT
FOR CONCRETE SHOULDER
No Scale

NOTES:
For Legend see sheet 7.

For Paved Shoulder Details see sheet 9.
Typical Sections show the general roadway features only.
For details see Pavement Plans, Paved Shoulder Typical Sections and cross-section sheets.

4 0 4 8 12 16
SCALE IN FEET

SCALE 1/4"=1'-0" HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE LJD DATE 2/16/70
TRCD. MAG DATE 2/18/70
CKD. RSW DATE 2/20/70 KANSAS CITY CLEVELAND NEW YORK
CONSULTING ENGINEERS

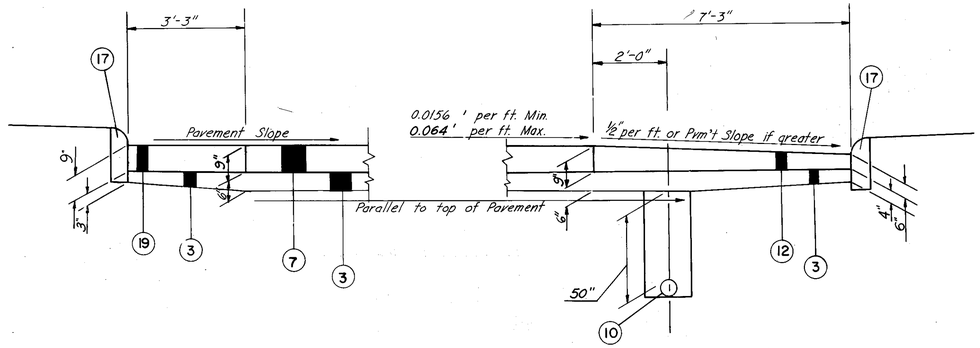
FHWA REGION	STATE	PROJECT	
5	OHIO		

9
174

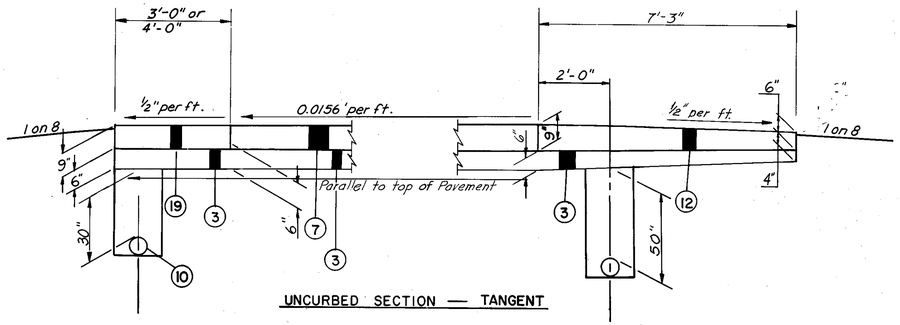
CUYAHOGA COUNTY
CUY- 490-1.00

TYPICAL SECTIONS

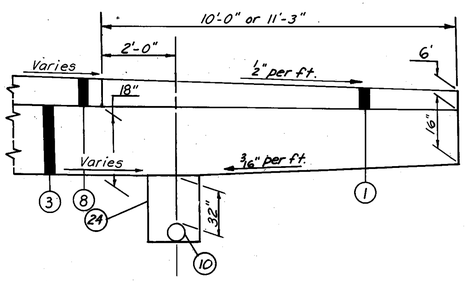
TYPE 451 ON 310



CURBED SECTION — TANGENT OR CURVE RIGHT



UNCURBED SECTION — TANGENT



TYPICAL SECTION - I-490 SHOULDER

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

NOTE :
For Legend see sheet 7.

Typical Sections show the general roadway features only. For details see the Pavement Plans, Paved Shoulder Typical Sections and Cross-Section sheets.

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.

The paved shoulder details shown on this sheet, shall apply for any width of pavement .

2 0 2 4 6 8
SCALE IN FEET

SCALE 1/2" = 1'-0" HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE R.S.W. DATE 2-2-70
TRCD. T.R.M. DATE 2-11-70
CKD. L.J.D. DATE 2-18-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL NOTES

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 1-9-84
CHECKED BY R.L.N. DATE 3-22-84

FHWA REGION	STATE	PROJECT	
5	OHIO		

10
174

CUYAHOGA COUNTY
CUY- 490-1.00

GENERAL

ITEMS OF WORK
THE PRINCIPAL ITEMS OF WORK TO BE PERFORMED UNDER THIS CONTRACT ARE:
1. COMPLETE THE CONSTRUCTION OF ITEMS OF WATERWORK, GRADING AND DRAINAGE AS SHOWN IN THESE PLANS. PAVEMENT ROADWAY, SUPERSTRUCTURE AND APPROACH SLABS ARE NOT PARTS OF THIS CONTRACT.

2. COMPLETE CONSTRUCTION OF SUBSTRUCTURE AS SHOWN IN STRUCTURE PLANS.

MAINTENANCE OF TRAFFIC
FOR NOTES AND PLANS, SEE SHEETS 12, 13 AND 13A.

ELEVATION DATUM
ALL ELEVATIONS SHOWN ON THESE PLANS ARE BASED ON THE U.S. GEODETIC SURVEY AND ARE IN FEET ABOVE SEA LEVEL.

FIELD OFFICE
THE CONTRACTOR SHALL PROVIDE A SUITABLE FIELD OFFICE HAVING A MINIMUM OF 800 SQ.FT OF FLOOR SPACE. PAYMENT SHALL BE AT THE LUMP SUM PRICE BID FOR ITEM 619 - "FIELD OFFICE".

CONTINGENCY QUANTITIES
THE CONTRACTOR SHALL NOT ORDER MATERIALS OR PERFORM WORK LISTED IN THE GENERAL SUMMARY FOR ITEMS DESIGNATED BY PLAN NOTE TO BE USED "AS DIRECTED BY THE ENGINEER" UNLESS AUTHORIZED BY THE ENGINEER. THE ACTUAL WORK LOCATIONS SHALL BE MADE A MATTER OF RECORD BY INCORPORATION INTO THE FINAL CHANGE ORDER GOVERNING COMPLETION OF THIS PROJECT.

ROUNDING OF CORNERS SHOWN ON CROSS SECTIONS
THE ROUNDED CORNERS SHOWN ON THE TYPICAL SECTIONS, APPLY TO ALL CROSS SECTIONS, EVEN THOUGH OTHERWISE SHOWN ON THESE PLANS.

UTILITIES
THE FOLLOWING UTILITIES AND OWNERS ARE LOCATED WITHIN THE WORK LIMITS OF THIS PROJECT.

CLEVELAND PUBLIC POWER
1201 LAKESIDE AVENUE
CLEVELAND, OHIO 44114
216-664-3346

EAST OHIO GAS COMPANY
1717 EAST 9TH STREET
CLEVELAND, OHIO 44113
216-432-3232

CLEVELAND ELECTRIC ILLUMINATING COMPANY
55 PUBLIC SQUARE
CLEVELAND, OHIO 44101
216-622-9800

CITY OF CLEVELAND WATER DEPARTMENT
1201 LAKESIDE AVENUE
CLEVELAND, OHIO 44114
216-664-3060

OHIO BELL TELEPHONE COMPANY
820 SUPERIOR AVENUE WEST - ROOM 730
CLEVELAND, OHIO 44113
216-822-6241

CITY OF CLEVELAND SEWER DEPARTMENT
1201 LAKESIDE AVENUE
CLEVELAND, OHIO 44114
(216)664-2513

E.I. DUPONT DE NEMOURS & COMPANY
2981 INDEPENDENCE ROAD
CLEVELAND, OH. 44115; 216-271-1856

OHIO ENVIRONMENTAL PROTECTION AGENCY
NORTHEAST DISTRICT OFFICE
2110 E. AURORA ROAD
TWINSBURG, OH. 44087; 216-425-9171

INLAND OIL COMPANY
POST OFFICE BOX 188
VANDALIA, OHIO 45377
513-898-3971

LAUREL PIPE LINE COMPANY
POST OFFICE BOX 426
CAMP HILL, PENNSYLVANIA 17011
717-737-8611

THE STANDARD OIL COMPANY
POST OFFICE BOX 188
VANDALIA, OHIO 44113
513-898-3971

AIR PRODUCTS AND CHEMICALS, INC.
2820 QUIGLEY ROAD
CLEVELAND, OHIO 44113
216-695-5695

UNITED STATES STEEL CORPORATION
1807 EAST 28TH STREET
LORAIN, OHIO 44055
216-277-2433

DIVISION OF ENGINEERING & CONSTRUCTION
CITY OF CLEVELAND, CITY HALL
601 LAKESIDE AVENUE
CLEVELAND, OHIO 44114
216-664-2384

OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 12
BOX 05931 NEWBURGH STATION
CLEVELAND, OHIO 44105-0931
216-641-1926

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE _____ DATE _____ CONSULTING ENGINEERS
TRCD. _____ DATE _____ KANSAS CITY CLEVELAND NEW YORK
CKD. _____ DATE _____

ROADWAY

HAZARDOUS WASTE MATERIAL AND GROUND CONTAMINATION AT E.I. DUPONT DE NEMOURS AND COMPANY PROPERTY
MANUFACTURE OF CHEMICALS BY E.I. DUPONT DE NEMOURS AND COMPANY, MAY HAVE RESULTED IN GROUND CONTAMINATION BY RAW MATERIALS, INTERMEDIATES, SUPPORT CHEMICALS OR FINISHED PRODUCTS, SOME OF WHICH MAY BE HAZARDOUS. THERE ALSO IS THE POSSIBILITY THAT WASTES AND/OR PIPES AND/OR TANKS MAY HAVE BEEN DISPOSED OF ON THE PLANT SITE.

THE CONTRACTOR SHALL BE AWARE OF POTENTIAL RISKS THAT MAY BE PRESENT AND TAKE APPROPRIATE PRECAUTIONS DURING ANY EXCAVATION OR CONSTRUCTION WORK OR IN DISPOSING OF ANY MATERIALS REMOVED FROM THE SITE. IF DURING THE CONSTRUCTION OPERATIONS ANY EQUIPMENT (TANKS, PIPES, ETC.) OR ATYPICAL SOIL APPEARANCE IS ENCOUNTERED, THE CONTRACTOR, FOR NECESSARY COORDINATION AND MITIGATING MEASURES SHALL CONTACT THE PLANT COORDINATOR AND THE OHIO ENVIRONMENTAL PROTECTION AGENCY.
IF ANY HAZARDOUS WASTE MATERIAL IS ENCOUNTERED, IT SHALL BE DISPOSED OF AT A PERMITTED HAZARDOUS WASTE DISPOSAL FACILITY, AND IT SHALL BE PAID FOR AS "EXTRA AND FORCE ACCOUNT WORK" IN ACCORDANCE WITH SECTION 109.04 OF THE SPECIFICATIONS.

DRAINAGE AT E.I. DUPONT DE NEMOURS AND COMPANY PROPERTY
THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE WITHIN PARCEL NOS. 6525, 6527 AND 6528, AND PREVENT RUNOFF WATERS FROM FLOWING ONTO DUPONT'S PROPERTY BY ANY APPROPRIATE MEANS (E.G., DIKING, CURBING, DRAINS OR OTHER PROTECTIVE DEVICES) ON SAID PARCELS TO INSURE THAT SURFACE WATER FROM SAID PARCELS DOES NOT GET INTO THE PLANT'S WATER TREATMENT SYSTEM.

ACCESS ROAD ACROSS PARCEL NO. 6525
THE CONTRACTOR SHALL MAINTAIN AT ALL TIMES A 20-FT WIDE ACCESS ROADWAY BETWEEN GATES F-14 AND F-15, FOR DUPONT'S USE DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES SHALL NOT INTERFERE WITH DUPONT'S ACCESS ACROSS PARCEL NO. 6525 OR WITH THE OPERATION OF IT'S PLANT. UPON COMPLETION OF THE PROJECT, THE ACCESS ROAD SHALL BE RESTORED TO IT'S PRECONSTRUCTION CONDITION.

COORDINATION WITH DUPONT
THE CONTRACTOR SHALL COORDINATE IT'S CONSTRUCTION WORK ACTIVITIES ON PARCEL NOS. 6525, 6527 AND 6528 WITH DUPONT PERSONNEL MR. BILL LULL OR MR. JAMES MONDOCK. TELEPHONE NO. (216)271-2111.

RESTORATION OF PARKING AREAS
EXISTING DUPONT PARKING AREAS WHICH ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR NEAR THE END OF THE PROJECT. PAYMENT SHALL BE INCLUDED WITH ITEM 503 - STRUCTURE EXCAVATION.

REMOVAL OF TREES AND STUMPS
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 EXCEPT THAT THOSE TREES FOR WHICH PROTECTION AND PRESERVATION WORK IS INDICATED ELSEWHERE IN THESE PLANS SHALL NOT BE REMOVED.

THE FOLLOWING IS AN APPROXIMATE ESTIMATE OF THE NUMBER OF TREES AND STUMPS TO BE REMOVED:

SIZES	NO. TREES	NO. STUMPS
18"	1	1
30"	1	1

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.

BENCHING OF FOUNDATION SLOPES
ALTHOUGH CROSS SECTIONS ON THIS PLAN INDICATE SPECIFIC WIDTHS AND DEPTHS OF PROPOSED BENCHING OF THE EMBANKMENT FOUNDATION IN CERTAIN AREAS, NO WAIVER OF THE SPECIFICATIONS IS INTENDED AND ALL OTHER SLOPED FOUNDATION AREAS SHALL BE BENCHED AS SET FORTH IN 203.09. NO ADDITIONAL PAYMENT WILL BE MADE FOR BENCHING REQUIRED BY THE PROVISIONS OF 203.09.

REFERENCE MONUMENTS
REFERENCE MONUMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN ON STANDARD CONSTRUCTION DRAWING MC-1 DATED 6-13-69.

MONUMENTS ASSEMBLY, CITY CLEVELAND
MONUMENT ASSEMBLY SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAILS SHOWN ON STANDARD CONSTRUCTION DRAWING MC-1 DATED 6-13-69. THE FRAME AND COVER FOR THE MONUMENT ASSEMBLY SHALL BE CITY OF CLEVELAND AS DETAILED ON SHEET 38.

LOCATION 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. THE ENGINEER SHALL BE SATISFIED THAT ALL THE INSTALLATIONS WILL AFFORD MAXIMUM PROTECTION FOR TRAFFIC.

ROADWAY (CONT.)

PLUGGING OIL AND GAS WELLS
ALL OIL AND GAS WELLS LOCATED WITHIN THE LIMITS OF THE RIGHT-OF-WAY, EXCEPT THOSE WHICH HAVE BEEN PLUGGED TO THE SATISFACTION OF THE DEPARTMENT OF NATURAL RESOURCES, SHALL BE PLUGGED BY THE CONTRACTOR BEFORE ANY OTHER CONSTRUCTION IS STARTED IN THE VICINITY OF THE WELLS. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STATE OF OHIO, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF OIL AND GAS, COLUMBUS, OHIO. ALL WORK CONNECTED WITH PLUGGING OF THE WELLS MUST BE PERFORMED UNDER THE SUPERVISION OF A REPRESENTATIVE OF THE DIVISION OF OIL AND GAS. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND THE DIVISION OF OIL AND GAS AT LEAST 14 DAYS IN ADVANCE OF THE DATE ON WHICH HE INTENDS TO BEGIN WORK.

RECORDED INFORMATION REGARDING THESE WELLS, AND PERMITS TO PLUG THE WELLS, SHALL BE OBTAINED BY THE CONTRACTOR AT THE DIVISION OF OIL AND GAS.

PAYMENT FOR THE WORK SHALL BE MADE PER EACH UNDER "ITEM SPECIAL, PLUGGING OIL AND GAS WELL", WHICH PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, LABOR, TOOLS AND EQUIPMENT, AND ALL INCIDENTALS NECESSARY TO COMPLETE THIS ITEM.

THE FOLLOWING ESTIMATED QUANTITY OF "PLUGGING OIL AND GAS WELLS" WAS CARRIED TO THE GENERAL SUMMARY, IN THE EVENT THE CONTRACTOR ENCOUNTERS _____ WELLS REQUIRING PLUGGING, OR THE ENGINEER REQUIRES WELLS THAT WERE PLUGGED PRIOR TO THIS PROJECT, TO BE REPLUGGED.

ITEM SPECIAL 1 EACH PLUGGING OIL OR GAS WELLS.

VENTING OIL AND GAS WELLS
ALL OIL AND GAS WELLS LOCATED WITHIN THE RIGHT-OF-WAY, WHETHER PREVIOUSLY PLUGGED TO THE SATISFACTION OF THE DEPARTMENT OF NATURAL RESOURCES, OR WHICH ARE TO BE PLUGGED AS PART OF THIS PROJECT SHALL BE VENTED AS DETAILED ON SHEET NO. 34.

TEMPORARY SOIL EROSION AND SEDIMENT CONTROL
THE FOLLOWING ESTIMATED QUANTITIES ARE TO BE USED AS DIRECTED BY THE ENGINEER FOR EROSION AND SEDIMENT CONTROL MEASURES.

207 TEMPORARY SEEDING & MULCHING	3,526 SQ.YDS.
207 STRAW OR HAY BALES	40 EACH
207 TEMPORARY SLOPE DRAINS	160 LIN.FT.
207 TEMPORARY BENCHES, DIKES, DAMS & SEDIMENT BASINS	800 CU.YDS.
601 ROCK CHANNEL PROTECTION, TYPE C WITHOUT FILTER	7 CU.YDS.
659 WATER	20 M GAL.
659 MOWING	39 M SQ.FT.
659 COMMERCIAL FERTILIZER	0.2 TON
659 REPAIR SEEDING & MULCHING	882 SQ.YDS.

WATERING AND MOWING PERMANENT SEEDED AREAS
THE FOLLOWING ESTIMATED QUANTITIES ARE TO BE USED AS DIRECTED BY THE ENGINEER TO PROMOTE GROWTH AND TO CARE FOR THE PERMANENT SEEDED AREAS, AS PER 659.09:

659 WATER 50 M GAL.
659 MOWING 100 M SQ.FT.

659 SEEDING AND MULCHING
QUANTITIES FOR SEEDING ARE CALCULATED EAST OF STA. 1009+00 FOR THE SOIL AREAS BETWEEN THE RIGHT-OF-WAY FENCE LINES, AND 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 SLOPE EASEMENT. AREAS WHICH ARE TO RECEIVE SLOPE PROTECTION HAVE BEEN EXCLUDED.

EXISITNG FENCE
THE EXISTING FENCE ALONG WEST SIDE OF HOUSTON AVENUE BETWEEN STA. 986+35.68, REFERENCE CENTERLINE I-490, 106.92-FT RIGHT AND STA. 986+32.97, REFERENCE CENTERLINE I-490, 159.66-FT LEFT (SEE RIGHT-OF-WAY PLAN SHEET 7/21) SHALL BE REMOVED DURING CONSTRUCTION AND REPLACED JUST BEFORE THE END OF THE CONSTRUCTION.

THE EXISTING FENCE ALONG BALTIMORE AND OHIO RAILROAD PROPERTY LINE BETWEEN STA. 1003+15, 88.17-FT LEFT AND STA. 1004+07, 88.17 RIGHT SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.

GENERAL NOTES

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 1-9-84
CHECKED BY R.L.N. DATE 2-22-84

FHWA REGION	STATE	PROJECT	
5	OHIO		

11
174

CUYAHOGA COUNTY
CUY- 490-1.00

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 AND THE CONTRACTOR, ALONG WITH LOCAL REPRESENTATIVES, SHALL MAKE AN INSPECTION OF THE EXISTING SEWERS WITHIN THE WORK LIMITS WHICH ARE TO REMAIN IN SERVICE AND THEIR APPURTENANCES SHALL BE DETERMINED FROM FIELD OBSERVATIONS. 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 OPERATORS 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.

SANITARY FLOW INTO I-290 HIGHWAY 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.

PLUGGING PIPE
ALL SEWER HOUSE CONNECTIONS SHALL BE BULKHEADED AT THE CURB LINE WHERE HOUSE CONNECTIONS TO BE ABANDONED AND THE TRUNK SEWER OF LESS THAN 4-FT IN DIAMETER WILL REMAIN IN SERVICE. VITRIFIED PIPE STOPPERS BACKED WITH 6-IN. OF CLASS C CONCRETE MAY BE USED TO BULKHEAD EXISTING PIPES 12 INCHES OR LESS IN DIAMETER.

ALL ABANDONED HOUSE CONNECTIONS CONNECTED TO SEWERS 4-FT AND OVER IN DIAMETER THAT WILL REMAIN IN SERVICE SHALL BE BULKHEADED WITH BRICK HEADER COURSES FROM THE INSIDE OF THE SEWER.

ALL BULKHEADING OF PIPES SHALL BE IN ACCORDANCE WITH DETAILS SHOWN ON SHEET 34.

PAYMENT FOR THE ABOVE WORK SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 203 ROADWAY EXCAVATION, NOT INCLUDING EMBANKMENT CONSTRUCTION.

SPRING DRAINS
REFERENCE IS MADE TO THE DETAILED DRAWING ON STANDARD 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-IN, UNCLASSIFIED PIPE UNDERDRAIN, 707.01 TYPE III OR 707.21 TYPE III, AS PER PLAN = 150 L.F.
ITEM 605 - AGGREGATE DRAINS FOR SPRING = 75 L.F.

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.

DRAINAGE (CONT.)

INTERCEPTOR DRAINS

THE FOLLOWING QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY AND ARE INTENDED FOR USE AS INTERCEPTOR DRAINS IN WET CUT SLOPES AS DIRECTED BY THE ENGINEER:

ITEM 605 - 6-IN, UNCLASSIFIED PIPE UNDERDRAINS, 707.01 TYPE III OR 707.21 TYPE III, AS PER PLAN = 1,000 L.F.
ITEM 603 - TYPE F CONDUIT 6-IN. = 150 L.F.
ITEM 601 - CRUSHED AGGREGATE SLOPE PROTECTION = 50 SQ.YDS.

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 AND IF NONE ARE NEEDED THE ITEM SHALL BE NONPERFORMED. FOR DETAIL SEE SHEET 34

HOUSE CONNECTIONS

ALL EXISTING PRIVATE ROOF DRAINS, FOOTER DRAINS OR YARD DRAINS DISTURBED BY THE PROPOSED WORK SHALL BE PROVIDED WITH UNOBSTRUCTED OUTLETS UNDER THE DIRECTION OF THE ENGINEER. 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-IN. TYPE B CONDUIT = 300 LIN.FT.

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.

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.

EROSION CONTROL
ITEMS 601, AND 670 ARE PROVIDED IN THE PLANS FOR EROSION CONTROL. ROCK OF A STABLE NATURE WILL NOT BE REMOVED IN ORDER TO PLACE ANY OF THESE ITEMS AND TURF OF A STABLE NATURE WILL NOT BE REMOVED IN ORDER TO PLACE ITEM 670. THE ENGINEER SHALL CHECK AND NONPERFORM QUANTITIES OR ADJUST LOCATIONS AND QUANTITIES FOR THESE ITEMS WHERE INDICATED BY FIELD CONDITIONS DURING CONSTRUCTION.

ITEM 603(JACKING PIPE) UNDER RAILROAD, AS PER PLAN
AS A PART OF THIS CONTRACT, IT WILL BE NECESSARY TO INSTALL A (P-62) 12IN. CONDUIT UNDER THE EXISTING RAILROAD TRACKS BETWEEN STA. 995+52 AND STA. 995+62, A (P-73) 30-IN. CONDUIT UNDER THE EXISTING RAILROAD TRACKS BETWEEN STA. 1002+70 AND STA. 1005+00 AND A (SP-7) 24-IN. CONDUIT UNDER EXISTING RAILROAD TRACKS BETWEEN STA. 994+91 AND STA. 995+51, BY THE METHOD OF BORING AND JACKING.

NO TRENCH EXCAVATION OR EQUIPMENT SHALL BE CLOSER THAN 10-FT TO THE EDGE OF RAIL. TRENCHES SHALL BE ADEQUATELY SUPPORTED AND THE SPECIFICATION REQUIREMENT FOR CLASS B BEDDING SHALL BE DISREGARDED.
SEE PROPOSAL NOTE

DRAINAGE (CONT.)

UNRECORDED SANITARY CONNECTIONS

ANY UNRECORDED ACTIVE CONNECTION TO A SANITARY SEWER ENCOUNTERED DURING CONSTRUCTION SHALL BE RECONNECTED TO THE EXISTING SEWER, AS DIRECTED BY THE ENGINEER. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED IN THE GENERAL SUMMARY FOR THE WORK NOTED ABOVE:

ITEM 603-6" CONDUIT, TYPE C 706.01, 706.02, 706.08 WITH JOINTS AS PER 706.11 OR 706.12 — 150 LIN.FT
ITEM 603-6" CONDUIT, TYPE B, 706.01 C1.3, 706.02 OR 706.08 WITH JOINTS, AS PER 706.11 OR 706.12 — 150 LIN.FT

NONE OF THE ABOVE MATERIALS SHALL BE ORDERED BY THE CONTRACTOR UNTIL AUTHORIZED BY THE ENGINEER.

MANHOLES, CATCH BASINS AND INLETS REMOVED OR ABANDONED

THE CASTINGS SHALL BE CAREFULLY REMOVED AND STORED WITHIN THE RIGHT-OF-WAY FOR SALVAGE BY CITY FORCES.

PAYMENT FOR ALL OF THE ABOVE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PERTINENT 202 ITEM.

SEWER PIPES
STORM SEWERS AND SANITARY SEWERS UNDER THE BRIDGE SHALL BE BUILT BEFORE THE FOOTINGS.

SCALE None
MADE A.H.S. DATE 1-9-84
TRCD. DATE
CKD R.L.N. DATE 2-22-84

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

MAINTENANCE OF TRAFFIC NOTES

QUANTITY CALCULATIONS
MADE BY CD DATE 2-16-84
CHECKED BY RLN DATE 2-27-84

FHWA REGION	STATE	PROJECT	
5	OHIO		

CUYAHOGA COUNTY.
CUY- 490-1.00

GENERAL

WHERE ANY OF THE WORK CALLED FOR UNDER THIS CONTRACT INVOLVES THE CLOSING OF EXISTING ROADS AND OR THE RE-ROUTING OF TRAFFIC, THE CONTRACTOR FOR THIS PROJECT SHALL PROSECUTE TO THE FULLEST EXTENT THE WORK INVOLVED SO AS TO REDUCE TO A MINIMUM THE LENGTH OF TIME THAT THE ROADWAY WILL BE CLOSED TO TRAFFIC. NO ROAD WILL BE CLOSED UNTIL NECESSARY FOR CONSTRUCTION AS DETERMINED BY THE PROJECT ENGINEER.

TRAFFIC CONTROL DEVICES

THE CONTRACTOR SHALL FURNISH, INSTALL, OPERATE, MAINTAIN AND SUBSEQUENTLY REMOVE ALL TRAFFIC CONTROL DEVICES REQUIRED TO MAINTAIN TRAFFIC INCLUDING BARRIERS, DRUMS, SIGNING, PAVEMENT MARKING, DELINEATORS, LIGHTS, TEMPORARY TRAFFIC SIGNALS, FLASHING ARROW PANELS, AND FLAGGERS. ALL TRAFFIC CONTROL DEVICES SHALL BE INSTALLED, MAINTAINED AND OPERATED IN CONFORMANCE WITH THE REQUIREMENTS OF THE "OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAY" (OMUTCD).

INDEPENDENCE ROAD (REFER TO LAYOUTS ON SHEET 13A)

THE FOLLOWING ITEMS OF WORK UNDER OR ADJACENT TO THE INDEPENDENCE ROAD PAVEMENT SHOULD BE CONSTRUCTED WITHIN A PROTECTED WORK AREA WHILE TRAFFIC IS MAINTAINED:

1. 30" STORM SEWER CONSTRUCTION ACROSS INDEPENDENCE ROAD (P-74).
2. STORM MANHOLE CONSTRUCTION JUST EAST OF INDEPENDENCE ROAD (S-67).
3. CONSTRUCTION OF TYPE 6 CURB AND CONCRETE SLOPE PROTECTION ALONG EAST EDGE OF INDEPENDENCE ROAD BENEATH THE PROPOSED I-490 BRIDGE.

THE SUGGESTED CONSTRUCTION SEQUENCE WHICH FOLLOWS IS INTENDED TO PROVIDE FOR CONSTRUCTION OF THE ABOVE WORK WHILE MAINTAINING 2-WAY TRAFFIC AT ALL TIMES:

STAGE I

1. MAINTAIN ALTERNATING 2-WAY TRAFFIC IN ONE 10' LANE ON INDEPENDENCE ROAD AS SHOWN.
2. THE CONTRACTOR SHALL CONTROL TRAFFIC WITH ONE (1) FLAGGER ON EACH APPROACH AT ALL TIMES ANY LANE REDUCTIONS ARE IN EFFECT, PROCEDURES FOR WHICH ARE DESCRIBED IN THE OMUTCD. DURING NON-WORK HOURS THE CONTRACTOR WILL NOT BE REQUIRED TO MAINTAIN ALTERNATING 2-WAY TRAFFIC WITH FLAGGER CONTROL. INSTEAD, THE CONTRACTOR HAS THE OPTION OF BACKFILLING OR PLATING ANY OPEN EXCAVATION OR TRENCH WITHIN THE TRAVELED PAVEMENT. BACKFILLING SHALL BE TOPPED OFF WITH 6" THICK TRAFFIC COMPACTED SURFACE AS SPECIFIED UNDER ITEM 410. PLATING SHALL BE DONE WITH 1" THICK STEEL PLATE AND SECURED FROM MOVEMENT BY PINNING. ASPHALT CONCRETE SHALL BE PLACED TO FORM A FEATHERED WEDGE ALONG ANY STEEL PLATE EDGES THAT WILL RECEIVE TRAFFIC.
3. DURING NON-WORK HOURS, ALL CONSTRUCTION WARNING SIGNS, DRUMS FORMING LANE REDUCTIONS, AND OTHER TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED OR COVERED SO AS NOT TO RESTRICT NORMAL TRAFFIC OPERATIONS.
4. CONSTRUCT A PORTION OF THE 30" STORM SEWER (P-74) WITHIN THE WORK LIMITS SHOWN.

STAGE II

1. (REFER TO NOTES 1-3 FROM STAGE I).
2. CONSTRUCT THE REMAINING PORTION OF (P-74) AND (S-67) AS WELL AS THE CONCRETE SLOPE PROTECTION AND TYPE 6 CONCRETE CURB WITHIN THE WORK LIMITS SHOWN.

QUIGLEY RD./WEST 3RD ST. INTERSECTION (REFER TO LAYOUTS ON SHEET 13A)

THE FOLLOWING ITEMS OF WORK UNDER OR ADJACENT TO THE QUIGLEY RD./WEST 3RD ST. INTERSECTION PAVEMENT SHOULD BE CONSTRUCTED WITHIN A PROTECTED WORK AREA WHILE TRAFFIC IS MAINTAINED:

1. 12" WATERMAIN RELOCATION IN W. 3RD ST.
2. 12" SANITARY SEWER CONSTRUCTION ACROSS QUIGLEY RD.
3. 24" STORM SEWER CONSTRUCTION ACROSS QUIGLEY RD.
4. 24" SANITARY SEWER UNDER W. 3RD ST. AND B&O TRACKS.

THE SUGGESTED CONSTRUCTION SEQUENCE WHICH FOLLOWS IS INTENDED TO PROVIDE FOR CONSTRUCTION OF THE ABOVE WORK WHILE MAINTAINING 2-WAY TRAFFIC ON ALL ROADWAY APPROACHES AT ALL TIMES:

STAGE I

1. MAINTAIN 2 - 10' LANES ON QUIGLEY RD. AS SHOWN.
2. CONSTRUCT A PORTION (30'±) OF THE 12" SANITARY SEWER WITHIN THE WORK LIMITS SHOWN.

STAGE II

1. MAINTAIN 2 - 10' LANES ON QUIGLEY RD. AS SHOWN.
2. CONSTRUCT A PORTION (13'±) OF THE 12" SANITARY SEWER AND CONSTRUCT A PORTION (5'±) OF THE 24" STORM SEWER WITH ITS CONNECTION INTO THE 7' DIAMETER COMBINED BRICK SEWER WITHIN THE WORK LIMITS SHOWN.

STAGE III

1. MAINTAIN 2 - 10' LANES ON QUIGLEY RD. AS SHOWN.
2. CONSTRUCT THE REMAINING PORTIONS OF THE 12" SANITARY SEWER (87'±) AND THE 24" STORM SEWER (73'±) BACK TO THE SEPARATOR MANHOLE SS-7.

STAGE IV

1. MAINTAIN FULL WIDTH PAVEMENT ON QUIGLEY RD. WITH NO RESTRICTIONS.
2. MAINTAIN ALTERNATING 2-WAY TRAFFIC IN ONE 10' LANE ON W. 3RD ST. AROUND THE 12" WATERMAIN RELOCATION WORK AREA AS SHOWN. THE CONTRACTOR SHALL CONTROL TRAFFIC WITH ONE (1) FLAGGER ON EACH OF THE THREE APPROACHES AT ALL TIMES ANY LANE REDUCTIONS ARE IN EFFECT, PROCEDURES FOR WHICH ARE DESCRIBED IN THE OMUTCD. DURING NON-WORK HOURS THE CONTRACTOR WILL NOT BE REQUIRED TO MAINTAIN ALTERNATING 2-WAY TRAFFIC WITH FLAGGER CONTROL. INSTEAD, THE CONTRACTOR HAS THE OPTION OF BACKFILLING OR PLATING ANY OPEN EXCAVATION OR TRENCH WITHIN THE TRAVELED PAVEMENT. BACKFILLING SHALL BE TOPPED OFF WITH 6" THICK TRAFFIC COMPACTED SURFACE AS SPECIFIED UNDER ITEM 410. PLATING SHALL BE DONE WITH 1" THICK STEEL PLATE AND SECURED FROM MOVEMENT BY PINNING. ASPHALT CONCRETE SHALL BE PLACED TO FORM A FEATHERED WEDGE ALONG ANY STEEL PLATE EDGES THAT WILL RECEIVE TRAFFIC.
3. DURING NON-WORK HOURS, ALL CONSTRUCTION WARNING SIGNS, DRUMS FORMING LANE REDUCTIONS, AND OTHER TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE REMOVED OR COVERED SO AS NOT TO RESTRICT NORMAL TRAFFIC OPERATIONS.
4. CONSTRUCT THE 12" WATERMAIN RELOCATION AND THE 24" SANITARY SEWER UNDER W. 3RD ST. AND THE B&O RAILROAD TRACKS WITHIN THE WORK LIMITS SHOWN.

MAINTENANCE OF TRAFFIC QUANTITIES

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.

LAW ENFORCEMENT OFFICER WITH CAR (LEO'S) SHALL BE USED DURING THE SET-UP, CHANGE-OVER AND REMOVAL OF TRAFFIC CONTROL DEVICES USED TO MAINTAIN TRAFFIC. PRIOR TO HIRING ANY LEO'S THE CONTRACTOR SHALL PRESENT HIS REQUEST FOR SUCH USE TO THE ENGINEER FOR APPROVAL. THE REQUEST SHALL IDENTIFY THE NUMBER OF LEO'S AND MANHOURS.

ITEM	DESCRIPTION	QUANTITY	UNIT
410	TRAFFIC COMPACTED SURFACE TYPE A OR B	50	CU.YDS.
410	TRAFFIC COMPACTED SURFACE TYPE C	50	CU.YDS.
616	CALCIUM CHLORIDE	100	TONS
616	WATER	1000	M.GALS.
404	BITUMINOUS CONCRETE FOR MAINTAINING TRAFFIC	100	CU.YDS.
SPECIAL	LAW ENFORCEMENT OFFICER WITH CAR	20	HRS.

PAVEMENT MARKINGS

THE CONTRACTOR SHALL FURNISH, INSTALL AND REMOVE TEMPORARY AND PERMANENT PAVEMENT MARKINGS IN THE LOCATIONS SHOWN.

THE FOLLOWING QUANTITIES ASSOCIATED WITH THE LAYOUTS ON THE MAINTENANCE OF TRAFFIC PLAN HAVE BEEN CARRIED TO THE GENERAL SUMMARY:

ITEM	DESCRIPTION	QUANTITY
614	TEMPORARY STOP LINES, CLASS I	20 L.F.
614	TEMPORARY EDGE LINES, CLASS I	0.08 MI.
614	TEMPORARY CENTER LINES, CLASS I	0.08 MI.
621	REMOVAL OF PAVEMENT MARKINGS	600 L.F.
621	CENTER LINES	0.11 MI.

COOPERATION BETWEEN CONTRACTORS
THE CONTRACTOR SHALL COOPERATE AND COORDINATE HIS OPERATIONS WITH CONTRACTORS ON ADJACENT PROJECTS THAT MAY BE IN FORCE DURING THE LIFE OF THIS CONTRACT. THESE PROJECTS INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING.
CUY-490-1.69 EAST APPROACH, CUY-490-0.99 SUPERSTRUCTURE
NO WAIVER OF ANY PROVISIONS OF 105.07 OF CONSTRUCTION AND MATERIAL SPECIFICATIONS IS INTENDED.

SCALE NONE
MADE CD DATE 2-16-84
TRCD JAG DATE 2-1-84
CKD. ____ DATE ____

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

FHWA REGION	STATE	PROJECT	
5	OHIO		

13
174

CUYAHOGA COUNTY
CUY - 490 - 1.00

614 WORK ZONE PAVEMENT MARKINGS

GENERAL

THE CONTRACTOR SHALL FURNISH, INSTALL, MAINTAIN AND WHEN NECESSARY, REMOVE WORK ZONE RETROREFLECTIVE PAVEMENT MARKINGS ON EXISTING, RECONSTRUCTED, RESURFACED OR TEMPORARY ROADS WITHIN THE WORK LIMITS, IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS.

THE MARKINGS SHALL BE MAINTAINED IN GOOD CONDITION TO PROVIDE DAY AND NIGHT VISIBILITY. THE MARKINGS SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE ENGINEER TO MAINTAIN REQUIRED VISUAL EFFECTIVENESS AND NIGHT VISIBILITY AT NO ADDITIONAL COST TO THE STATE.

THE CONTRACTOR SHALL, IN ADVANCE OF ANY SECTION OF ROADWAY LACKING OMUTCD FULL PATTERN STANDARD DIMENSION EDGE LINE OR CENTER LINE MARKINGS, ERECT A "NO EDGE LINES" (OW-167) SIGN OR "UNMARKED NO PASSING ZONES" (OW-168) SIGN OR BOTH AS MAY BE APPROPRIATE. THESE SIGNS SHALL BE IN PLACE PRIOR TO EXPOSING THE ROADWAY TO TRAFFIC. THESE SIGNS SHALL BE REPEATED EVERY 1 TO 2 MILES AND AT OTHER LOCATIONS AS NECESSARY. THESE SIGNS SHALL BE REMOVED WHEN THEY NO LONGER APPLY. THE COST FOR FURNISHING AND ERECTING AND SUBSEQUENTLY REMOVING THESE SIGNS SHALL BE INCLUDED IN 614 MAINTAINING TRAFFIC, UNLESS SPECIFICALLY ITEMIZED.

TEMPORARY PAVEMENT MARKING MATERIALS

UNLESS OTHERWISE INDICATED ON THE PLANS, TEMPORARY PAVEMENT MARKINGS MAY BE EITHER 621.02 PAINT OR 947.03 TYPE B OR C PREFORMED MATERIAL. *Where pavement marking are not liable to be tracked, either conventional or fast-drying paint may may be used for 621.02.*

PAINT

PAINTED MARKINGS SHALL BE IN ACCORDANCE WITH 621 EXCEPT THAT THE INCREASE OF 25 PERCENT IN THE APPLICATION RATE FOR NEW BITUMINOUS PAVEMENT AND PARAGRAPH 621.14 SHALL NOT APPLY.

TYPE B AND TYPE C PREFORMED MATERIAL

PREFORMED MATERIAL SHALL COMPLY WITH 947.03 EXCEPT THAT NO PREFORMED MATERIAL CONTAINING METAL SHALL BE PLACED ON ANY SURFACE UNLESS IT WILL BE REMOVED LATER BY THE CONTRACTOR. TEMPORARY PAVEMENT MARKINGS OF 947.03 PREFORMED MATERIAL SHALL BE REMOVED PRIOR TO PLACEMENT OF 621 OR 847 SURFACE COURSE MARKINGS AT THAT LOCATION. PREFORMED MATERIAL SHALL BE APPLIED IN ACCORDANCE WITH 847 EXCEPT AS MODIFIED HEREIN.

PLACEMENT

TEMPORARY MARKINGS SHALL BE COMPLETE AND IN PLACE ON ALL PAVEMENT PRIOR TO EXPOSING IT TO TRAFFIC. WHEN TEMPORARY MARKINGS CONFLICT WITH THE TRAFFIC PATTERN, THEY SHALL BE REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH 621.134.

TEMPORARY MARKING CLASSES

CLASS I MARKINGS

CLASS I MARKINGS SHALL BE APPLIED TO THE FULL DIMENSIONS AS DEFINED IN 621 WITH THE FOLLOWING ADDITIONS OR EXCEPTIONS:

1) LANE LINES SHALL BE 4-INCHES IN WIDTH.
2) TRANSVERSE LINES SHALL BE 8-INCHES IN WIDTH.
3) STOP LINES SHALL BE 12-INCHES IN WIDTH.
4) CROSS WALK LINES SHALL BE 8-INCHES IN WIDTH.

CLASS II MARKINGS

CLASS II MARKINGS (ABBREVIATED) SHALL BE DEFINED AS FOLLOWS:

CENTER LINES SHALL CONSIST OF SINGLE, YELLOW 4-INCH WIDE BY A MINIMUM OF 48-INCH LONG DASHES SPACED AT A MAXIMUM OF 40-FOOT INTERVALS.

LANE LINES SHALL CONSIST OF WHITE 4-INCH WIDE BY A MINIMUM OF 48-INCH LONG DASHES SPACED AT A MAXIMUM OF 40-FOOT INTERVALS.

GORE MARKINGS SHALL BE TWO CONTINUOUS, WHITE 4-INCH LINES PLACED AT THE THEORETICAL GORE OF AN EXIT RAMP OR DIVERGING ROADWAYS.

THE PAINT APPLICATION RATE SHALL BE NOT LESS THAN 1.6 GALLONS PER MILE FOR LANE LINE AND CENTER LINE AND 16 GALLONS PER MILE FOR GORE MARKINGS.

CONFLICTING EXISTING MARKINGS

THE CONTRACTOR SHALL, PRIOR TO PLACING TEMPORARY MARKINGS, REMOVE ALL CONFLICTING EXISTING MARKINGS VISIBLE TO THE TRAVELING PUBLIC DURING DAYLIGHT OR NIGHTTIME HOURS IN ACCORDANCE WITH 621.134. THE COST FOR REMOVAL OF CONFLICTING MARKINGS SHALL BE INCLUDED IN 614 MAINTAINING TRAFFIC UNLESS SPECIFICALLY ITEMIZED.

THE CONTRACTOR SHALL ALSO REMOVE THE PRISMATIC RETRO-REFLECTOR WITHIN ANY RAISED PAVEMENT MARKER (RPM) WHICH IS IN CONFLICT WITH THE TEMPORARY PAVEMENT MARKINGS. WHEN THE TEMPORARY PAVEMENT MARKINGS ARE REMOVED AND THE RPM IS NO LONGER IN CONFLICT, THE CONTRACTOR SHALL THOROUGHLY CLEAN THE RECESSED REFLECTOR ATTACHMENT AREA OF THE CASTING AND INSTALL A NEW PRISMATIC RETRO-REFLECTOR OF THE SAME KIND AND COLOR. THE COST FOR THIS WORK SHALL BE INCIDENTAL TO THE VARIOUS PAY ITEMS.

INTERIM MARKINGS

WITHIN 21 CALENDAR DAYS AFTER OPENING ANY LENGTH OF PAVEMENT TO TRAFFIC, THE 621 OR 847 PAVEMENT MARKINGS CALLED FOR IN THE PLANS OR EQUIVALENT 614 CLASS I, PAINT MARKINGS SHALL BE APPLIED. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT, AND MATERIAL NECESSARY TO PLACE AND MAINTAIN 614 CLASS I PAINT MARKINGS AS PART OF THE LUMP SUM BID FOR 614 MAINTAINING TRAFFIC.

FOR EACH CALENDAR DAY BEYOND 21 DAYS THAT THIS WORK SHALL REMAIN UNCOMPLETED, THE PROVISIONS OF 108.07 WILL BE INVOKED, EXCEPT THAT BETWEEN NOVEMBER 15 AND APRIL 15 WEATHER CONDITIONS SHALL NOT BE AN ACCEPTABLE REASON FOR EXTENSION.

METHOD OF MEASUREMENT

TEMPORARY PAVEMENT MARKINGS WILL BE MEASURED COMPLETE IN PLACE, BY CLASS AND MATERIAL, IN THE UNITS DESIGNATED. LINE QUANTITIES WILL BE THE LENGTH OF THE COMPLETED STRIPE, INCLUDING GAPS, INTERSECTIONS, AND OTHER SECTIONS OF PAVEMENT NOT NORMALLY MARKED, IN ACCORDANCE WITH 621.15.

TEMPORARY PAVEMENT MARKINGS WILL INCLUDE THE LAYOUT, APPLICATION AND REMOVAL OF THE MARKINGS, WHEN REQUIRED.

BASIS OF PAYMENT

PAYMENT FOR ACCEPTED QUANTITIES COMPLETE IN PLACE WILL BE MADE AT THE CONTRACT UNIT PRICE. PAYMENT SHALL BE FULL COMPENSATION FOR ALL MATERIALS, LABOR, INCIDENTALS AND EQUIPMENT FOR PLACEMENT, MAINTENANCE AND NECESSARY REMOVAL OF THE MARKINGS.

ITEM	UNIT	DESCRIPTION
614	MILES	TEMPORARY CENTER LINES, CLASS I, *
614	MILES	TEMPORARY EDGE LINES, CLASS I, *
614	LIN. FT.	TEMPORARY STOP LINES, CLASS I, *

NOTE : FOR QUANTITIES, SEE SHEET 12.

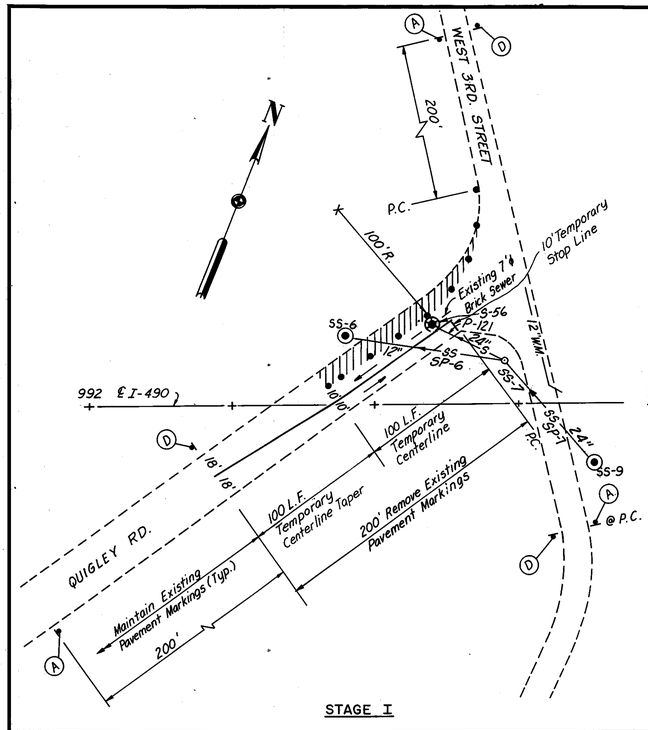
*621 PAINT, 947.03 TYPE B OR 947.03 TYPE C

July 25, 1984

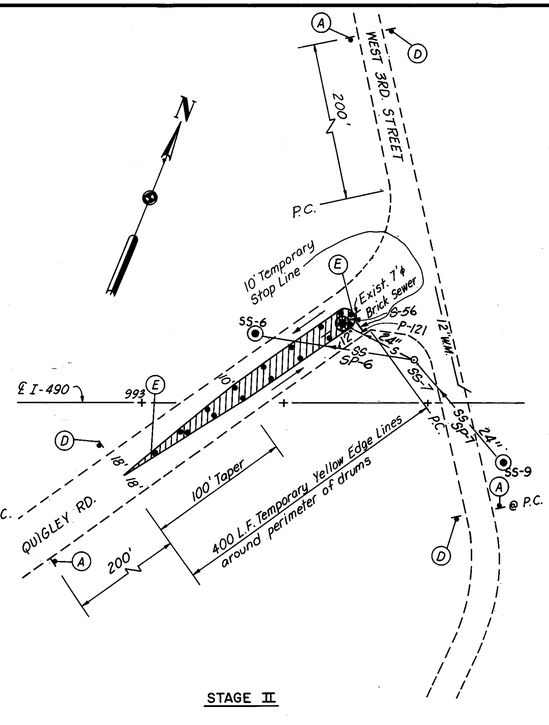
FHWA REGION	STATE	PROJECT	
5	OHIO		

13A / 174

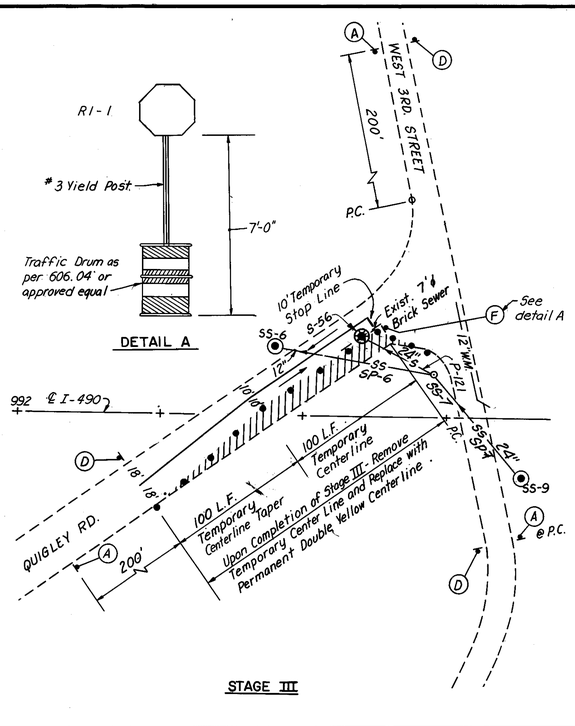
CUYAHOGA COUNTY
CUY- 490-1.00



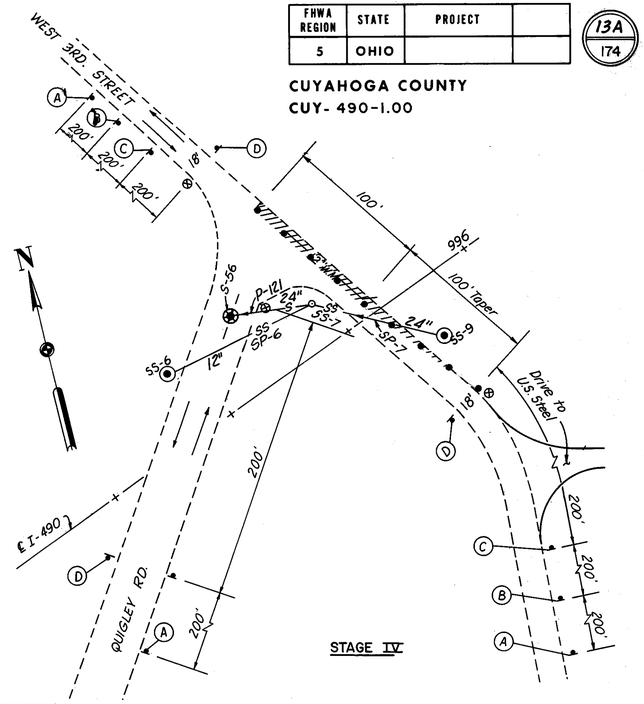
STAGE I



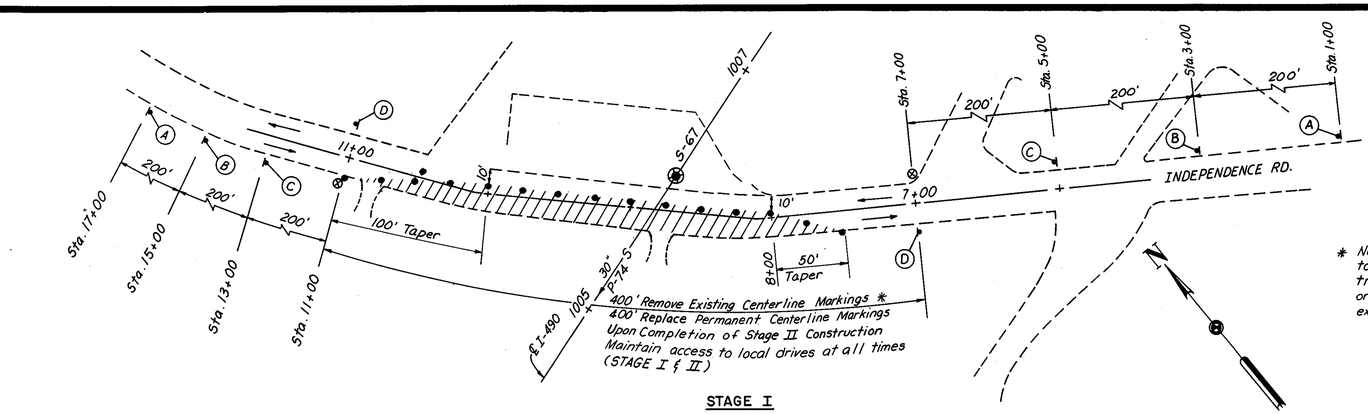
STAGE II



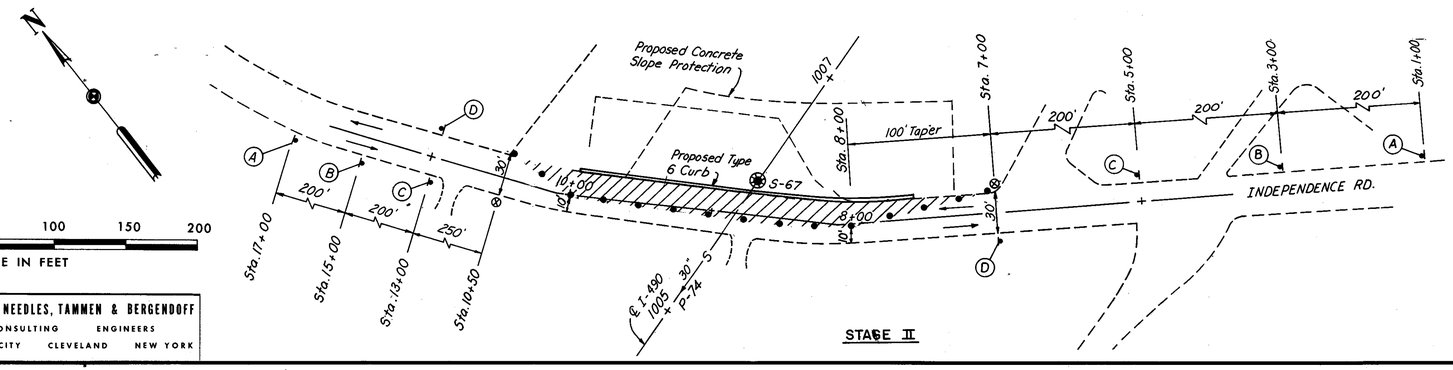
STAGE III



STAGE IV



STAGE I



STAGE II

* Note that if contractor elects to alternate method of traffic control, ie, backfilling or plating, do not remove existing centerline markings.

50 0 50 100 150 200
SCALE IN FEET

SCALE 1" = 50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE C.D. DATE 2-15-84
TRCD. T.D DATE 2-22-84 CONSULTING ENGINEERS
CKD. RLN DATE 2-27-84 KANSAS CITY CLEVELAND NEW YORK

LEGEND

•	Traffic Drum	P.C.	Point of Curve
→	Number of Traffic Lanes	—S→	Proposed Storm Sewer
▨	Protected Work Limits	—SS→	Proposed Sanitary Sewer
	Construction Sign Installation	—W.M.—	Proposed Water Main
(A)	Sign Reference Code	⊙	Proposed Sanitary Manhole
⊗	Flagger Location	⊛	Proposed Storm Manhole
		⊙	Proposed Separator Manhole

SIGNING LEGEND

SIGN REFERENCE CODE	OMUTCD CODE NO.	SIGN LEGEND
(A)	OW-128-36	ROAD CONSTRUCTION AHEAD
(B)	OW-121-36	ONE LANE ROAD AHEAD
(C)	OW-125-36	FLAGGER AHEAD
(D)	OC-8	END CONSTRUCTION
(E)	R-37-R-24	KEEP RIGHT
(F)	R-1	STOP

NOTE :

REFER TO DRAINAGE PLAN FOR LOCATION OF STORM AND SANITARY SEWER CONSTRUCTION, SHEETS 25, 27, 32 & 33 .

REFER TO DRAINAGE PLAN FOR LOCATION OF TYPE 6 CURB AND CONCRETE SLOPE PROTECTION CONSTRUCTION, SHEET 27 .

REFER TO WATERWORK PLAN FOR LOCATION OF 12" WATER MAIN RELOCATION IN W. 3RD ST., SHEET 68 .

REFER TO TC-41.20 TC-42.20 & TC-52.20 FOR SIGN ATTACHMENT AND SUPPORT DETAILS .

MAINTENANCE OF TRAFFIC PLAN

COMPUTATIONS AND SUB SUMMARIES

FHWA REGION	STATE	PROJECT	
5	OHIO		

14
174

CUYAHOGA COUNTY
CUY- 490-1.00

QUANTITY CALCULATIONS

MADE BY R.L.N. DATE 2-2-84
CHECKED BY A.H.S/T.D. DATE 2-4-84

ITEM 203 EMBANKMENT & ITEM 203 EXCAVATION NOT INCLUDING EMBANKMENT CONSTRUCTION

STATION FROM	STATION TO	EXCAVATION C.Y.	EMBANKMENT C.Y.
INTERSTATE 490 - EASTBOUND & WESTBOUND			
1009+00	1022+51.53	93,935	3125
RAMP C-B			
8+00	BROADWAY	38,013	175
RAMP B-C			
ABUTMENT	BROADWAY	2,091	70
	TOTAL	134,039	3370

ITEM 609, CURB, STD. TYPE 6

STATION FROM	STATION TO	SIDE	STD. TYPE 6 LIN.FT.
INDEPENDENCE ROAD			
7+56	10+00	RT.	244
		TOTAL	244

ITEM 202 CURB REMOVED

STATION FROM	STATION TO	SIDE	LENGTH LIN.FT.	REMARKS
1006+35	1007+10	RT.	123	INDEPENDENCE RD.
		TOTAL	123	

ITEM 604

LOCATION	SIDE	MONUMENT ASSEMBLY CITY CLEVELAND	REFERENCE MONUMENTS
I-490			
987+54.50	℄		1
1012+00.00	℄		1
1020+00.00	℄		1
993+62.91	℄	1	
996+87.54	℄	1	
1005+85.80	℄	1	
	TOTAL	3	3

ITEM 659 - SEEDING AND MULCHING

STATION	DISTANCE FT.	WIDTH FT.	AVERAGE WIDTH FT.	AREA SQ.YD.
I-490				
1009+35 LT.		7		
	65		5	36
1010+00 LT		3		
1009+00 RT.		0		
	100		10	111
1010+00 RT.		19		
I-490 EASTBOUND & WESTBOUND				
1010+00		22		
	100		32	356
1011+00		42		
	100		40	444
1012+00		37		
	100		42	467
1013+00		47		
	100		39	433
1014+00		31		
	100		30	333
1015+00		28 BK. 22 AH.		
	100		12	133
1016+00		2		
	100		6	67
1017+00		9		
	100		5	56
1018+00		0		
	100		1	11
1019+00		1		
	100		28	311
1020+00		56		
I-490 EASTBOUND				
1020+00		0		
	100		19	211
1021+00		37		
	100		65	722
1022+00		93		
	51.53		96	550
1022+51.53		98		
I-490 WESTBOUND				
1020+00		56		
	100		112	1,244
1021+00		168		
	100		157	1,744
1022+00		145		
	51.53		144	825
1022+51.53		142		
		SUB TOTAL		8054

ITEM 659 - SEEDING AND MULCHING

STATION	DISTANCE FT.	WIDTH FT.	AVERAGE WIDTH FT.	AREA SQ.YD.
RAMP B-C				
ABUTMENT		13		
	100		25	278
16+00		37		
	100		35	389
17+00		32		
BROADWAY				*900
RAMP C-B				
8+00		16		
	100		15	167
9+00		14		
	100		13	144
10+00		12		
	100		23	256
11+00		33		
	100		32	356
12+00		30		
	100		70	778
13+00		109		
	100		115	1,278
14+00		120		
	100		134	1,489
15+00		148		
	100		135	1,500
16+00		122		
	100		91	1,011
17+00		59		
BROADWAY				*1,031
		TOTAL		17,631

*PLANIMETER

ITEM 659 - AGRICULTURAL LIMING

17,631 S.Y. @ 100 LB. PER 1,000 S.F. = 8 TONS

ITEM 659 - COMMERCIAL FERTILIZER

17,631 S.Y. @ 20 LB. PER 1,000 S.F. = 1.6 TONS

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE RLN DATE 2/2/84
TRCD KBV DATE 2/7/84
CKD. AHS DATE 2/4/84
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

K&E-19-1253 7-74

GENERAL SUMMARY

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 3-24-84
CHECKED BY R.L.N. DATE 7-18-85

FHWA REGION	STATE	PROJECT	
5	OHIO		

CUYAHOGA COUNTY
CUY - 490 - 1.00

15
174

SHEET NUMBER

10	11	12	14	26	28	29	30	34	39	157	163	164 165	TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
																ROADWAY
Lump													Lump		201	Clearing and Grubbing
					Lump	Lump							Lump		202	Portions of Structures Removed
							115						115	Lin. Ft.	202	Pipe Removed, 24" and Under
			123										123	Lin. Ft.	202	Curb Removed
					325								325	Lin. Ft.	202	Guardrail Removed
							175						175	Lin. Ft	202	Pipe Removed, over 24"
				6			1						7	Each	202	Manhole Removed
										268			268	Lin. Ft.	202	Fence Removed for Re-use
										1,017			1,017	Lin. Ft.	202	Fence Removed
							1						1	Each	202	Catch Basin or Inlet Abandoned
										2,459			2,459	Lin. Ft.	607	Fence, Type C.L.
										782			782	Lin. Ft.	607	Fence, Type C.L.T.
			134,039										134,039	Cu. Yd.	203	Excavation not including embankment construction
			3370										3370	Cu. Yd.	203	Embankment
										268			268	Lin. Ft	607	Fence Rebuilt
		100											100	Cu. Yd.	404	Bituminous Concrete for Maintaining Traffic
		50											50	Cu. Yd.	410	Traffic Compacted Surface, Type A or B
		50											50	Cu. Yd.	410	Traffic Compacted Surface, Type C
			3										3	Each	604	Monument Assembly, City of Cleveland
			3										3	Each	604	Reference Monument, Standard
										2			2	Each	607	12' Gate, Type CLT,
					75								75	Lin. Ft.	606	Guardrail, Type 7
										2,410			2,410	Lin. Ft.	607	Fence Type CL, Modified as per plan
										695			695	Lin. Ft.	607	Fence Type CLT, Modified as per plan
			244										244	Lin. Ft.	609	Curb, Standard Type 6
		1000											1000	M. Gal	616	Water
		100											100	Ton	616	Calcium Chloride
1													1	Each	Special	Plugging Oil or Gas Well
																EROSION CONTROL
40									252				292	Each	207	Straw or Hay Bales
3526													3526	Sq. Yd.	207	Temporary Seeding and Mulching
160													160	Lin. Ft.	207	Temporary Slope Drains
800									552				1,352	Cu. Yd.	207	Temporary Benches, Dikes, Dams, and Sediment Basins
	50												50	Sq. Yd.	601	Crushed Aggregate Slope Protection
7													7	Cu. Yd.	601	Rock Channel Protection, Type C without Filter
							1,414						1414	Lin. Ft.	601	Paved Gutter, Type A
139													139	M. Sq. Ft.	659	Mowing
70													70	M. Gal.	659	Water
			17631										17,631	Sq. Yd.	659	Seeding and Mulching
882													882	Sq. Yd.	659	Repair Seeding and Mulching
0.2			1.6										1.8	Ton	659	Commercial Fertilizer
			8										8	Ton	659	Agricultural Liming
							134						134	S.Y.	670	Ditch Erosion Protection
																BUILDING REMOVAL
											Lump		Lump		202	Parcel No. 6525 WR, Removal of one Story
																Brick and Frame Building and Metal Storage Bins
											Lump	Lump	Lump		202	Parcel No. 6528 WL, T, Removal of one
																Story Brick Garage T-1, T-2, T-3, T-4
												Lump	Lump		202	Parcel No. 6529 WL, Removal of One 1-Story Metal Storage Building and
																Concrete pad including supporting 23-2" Gasoline vent pipes;
																Barrel Racks with concrete pads and trench drains; One-1 Story metal
																Storage Building including disconnecting overhead wires and pipes;
																One-1 Story Block Building, ; One Butane Trailer.
																PAVEMENT MARKINGS
		0.08											0.08	Mile	614	Temporary Center Lines, Class I
		600											600	Lin. Ft.	621	Removal of Pavement Markings
		0.11											0.11	Mile	621	Center Lines
		0.08											0.08	Mile	614	Temporary Edge Lines, Class I
		20											20	Lin. Ft.	614	Temporary Stop Lines, Class I

MADE A.H.S. DATE 3-23-84
TRACED T.D. DATE
CHECKED R.L.N. DATE
SCALE

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

GENERAL SUMMARY

QUANTITY CALCULATIONS
MADE BY R.L.N. DATE 3-22-84
CHECKED BY A.H.S. DATE 7-18-85

FHWA REGION	STATE	PROJECT	
5	OHIO		

16
174

SHEET NUMBER	TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
				DRAINAGE
50	50	Lin. Ft.	603	3" Conduit, Type F, 707.08 Standard Weight, Bituminous Coated
300	300	Lin. Ft.	603	6" Conduit, Type B
150	150	Lin. Ft.	603	6" Conduit, Type F
394, 292	686	Lin. Ft.	603	12" Conduit, Type C
40	40	Lin. Ft.	603	12" Conduit, Type C, 706.02 2000 D-Load or 707.13
145	145	Lin. Ft.	603	12" Conduit, Type C, 706.01 Cl. 2 or 706.08 E.S. or 706.02 or 707.13
61, 140	201	Lin. Ft.	603	12" Conduit, Type C, 707.13
93	93	Lin. Ft.	603	12" Conduit, Type C, 706.02 3000 D-Load Pipe, as per plan, under Railroad
46	46	Lin. Ft.	603	15" Conduit, Type B
612	612	Lin. Ft.	603	15" Conduit, Type C
361	361	Lin. Ft.	603	15" Conduit, Type C, 707.13
60	60	Lin. Ft.	603	24" Conduit, Type B,
355	355	Lin. Ft.	603	24" Conduit, Type C, 706.02 2000 D-Load or 707.13
300	300	Lin. Ft.	603	27" Conduit, Type C, 706.02 2000 D-Load or 707.13
250	250	Lin. Ft.	603	27" Conduit, Type C, 706.02 3000 D-Load or 707.13.
84	84	Lin. Ft.	603	30" Conduit, Type B
112	112	Lin. Ft.	603	30" Conduit, Type B, 706.02 2000 D-Load or 707.13
230	230	Lin. Ft.	603	30" Conduit, Type B, 706.02 3000 D-Load, as per plan, under Railroad
98	98	Lin. Ft.	603	30" Conduit, Type C
296	296	Lin. Ft.	603	30" Conduit, Type C, 706.02 3250 D-Load or 707.13 (0.079)
19	19	Lin. Ft.	603	30" Conduit, Type C, 706.02 1500 D-Load
1	1	Each	604	Catch Basin, Standard No. 2-2-A Modified as per plan
1	1	Each	604	Catch Basin, Standard No. 3, Modified as per plan
1	1	Each	604	Catch Basin, Standard No. 5
2	2	Each	604	Paved Shoulder Inlet, Standard No. I-2A, Modified as per plan
2, 11	13	Each	604	Manhole, Standard No. 3
1	1	Each	604	Manhole, Standard No. 5, Modified as per plan
4, 3	7	Each	604	Catch Basin, Standard No. 2-4
1,150	1150	Lin. Ft.	605	6" Unclassified Pipe Underdrain, 707.01 Type III or 707.21 Type III as per plan
75	75	Lin. Ft.	605	Aggregate Drains for Springs
11, 2	13	Each	604	Catch Basin, Standard No. 7
2	2	Cu. Yd.	602	Concrete Masonry, as per plan
				SANITARY - TYPE CODE Y060
150	150	Lin. Ft.	603	6" Conduit, Type B, 706.01 , 706.02 or 706.08 with joints as per 706.11 or 706.12
150	150	Lin. Ft.	603	6" Conduit, Type C 706.01, 706.02, 706.08 with joints as per 706.11 or 706.12
112	112	Lin. Ft.	603	12" Conduit Type B 706.08 : with 706.12 joints
95	95	Lin. Ft.	603	24" Conduit Type B, 706.03 3000 D-Load Under Railroad, as per plan
53	53	Lin. Ft.	603	24" Conduit, Ductile Iron A.N.S.I. Cl. 56 with Push-on-Joint A.N.S.I.-A-21.11
257	257	Lin. Ft.	603	33" Conduit, Type C 706.03, 1750 D-Load with 706.11 Joints
7	7	Each	604	Manhole, Standard No. 3 Modified as per plan
1	1	Each	604	Separator Manhole
				WATERWORK - TYPE CODE Y060
78	78	Lin. Ft.	Special	12" Water Main-A.N.S.I. Class 56 Ductile Iron Cement Lined Pipe with Push-on-Joints and
				Class "D" Lead Joints and Fittings, Cement Lined
1	1	Each	Special	Remove Abandoned Curb shut-off and Valve Box
1	1	Each	Special	Water Meter Vault Frame and cover set to grade
187	187	LBS.	Special	Miscellaneous Metal and Plastic
2	2	MBM	Special	Sheeting Left in place
1	1	Each	Special	12" Cut-in-Valve and Valve Box, complete
20	20	Hours	Special	Law Enforcement Officer with Patrol Car
Lump	Lump		614	Maintaining Traffic
Lump	Lump		619	Field Office
Lump	Lump		623	Construction Layout Stakes
Lump	Lump		624	Mobilization

Notes: For Structure General Summary See Sheet 81.
For Retaining Wall Summary See Sheet 73.

MADE _____ DATE _____
TRACED _____ DATE _____
CHECKED _____ DATE _____
SCALE _____

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

FHWA REGION	STATE	PROJECT	
5	OHIO		

17
174

CUYAHOGA COUNTY
CUY- 490-1.00

I-490-3(10)28
BEGIN WORK
STA. 985+60.75

Existing Utilities Cable
Bldg. (Typ.)
Underground Utilities Conduit (Typical)
WEST 5TH STREET
8" Water
Exist. Hydrant
Exist. Hydrant
HOUSTON AVE.
6" Water
Begin Approach Slab Sta 85+56.92 ℄ Ramp C-7
End Approach Slab Sta 85+81.92 ℄ Ramp C-7
7'-5"
Nose Sta. 88+41.74 ℄ Ramp C-7 23' Rt. = Sta. 908+39.74 ℄ I-290, 69' Lt.
85
RAMP C-7
N 72°28'16"E
P.C. Sta. 88+80.25
P.T. Sta. 91+48.95
℄ Pier Typical
WEST 3 RD STREET
Curb Type 2A (Typ.)
11'-3"
1'-9"
Dc = 3°
90
56'
Exist M.H.
S.T. Sta. 987+54.50
N 64°24'37"E
990
℄ Interstate Route 290
995
BR. NO. CUY-490-0110
Concrete barrier modified as per plan
8'
62.20'
40:1 Taper
Existing C.E.I. Tower
7'-5"
R-1
End Approach Slab Sta. 985+86.75
Begin Approach Slab Sta. 985+60.75
HOUSTON AVE.
Bldg. (Typ.)
Boiler Plant
Existing Utilities Cable
QUIGLEY ROAD
8" Water
Existing C.E.I. Tower
BALTIMORE & OHIO RAILROAD SYSTEM
MATCH LINE STA. 995+00 SEE SHEET 18

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

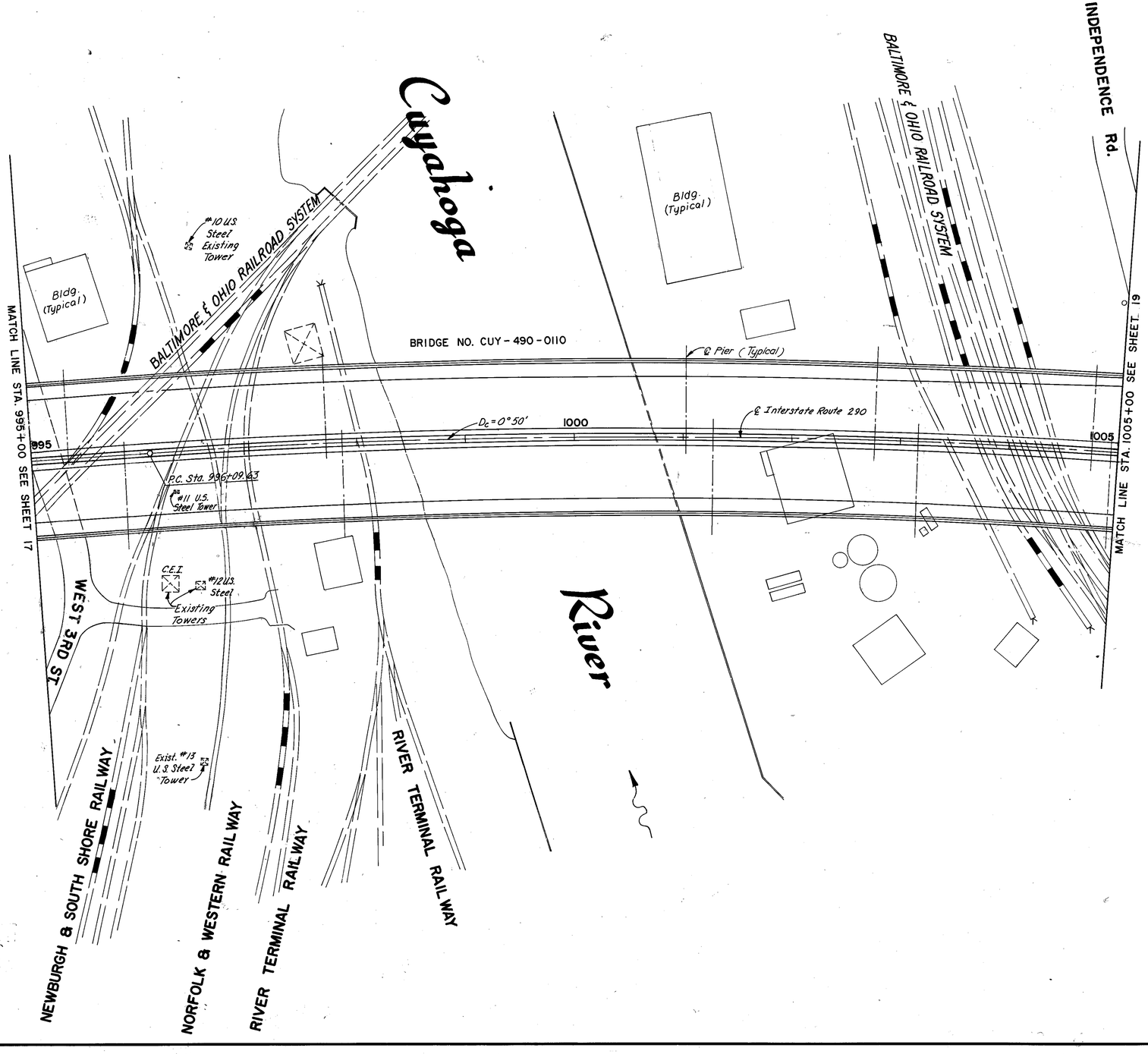
50 0 50 100 150 200
SCALE IN FEET

SCALE 1" = 50'
TRACED M.A.G. DATE 8-10-70
CK'D L.J.D. 8-12-70
WARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

18
174

CUYAHOGA COUNTY
CUY.-290-0.27



THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

50 0 50 100 150 200
SCALE IN FEET

SCALE 1"=50'
MADE T.P.M. DATE 5-3-69
TRCD M.A.G. DATE 8-7-70
CKD. L.J.D DATE 8-13-70

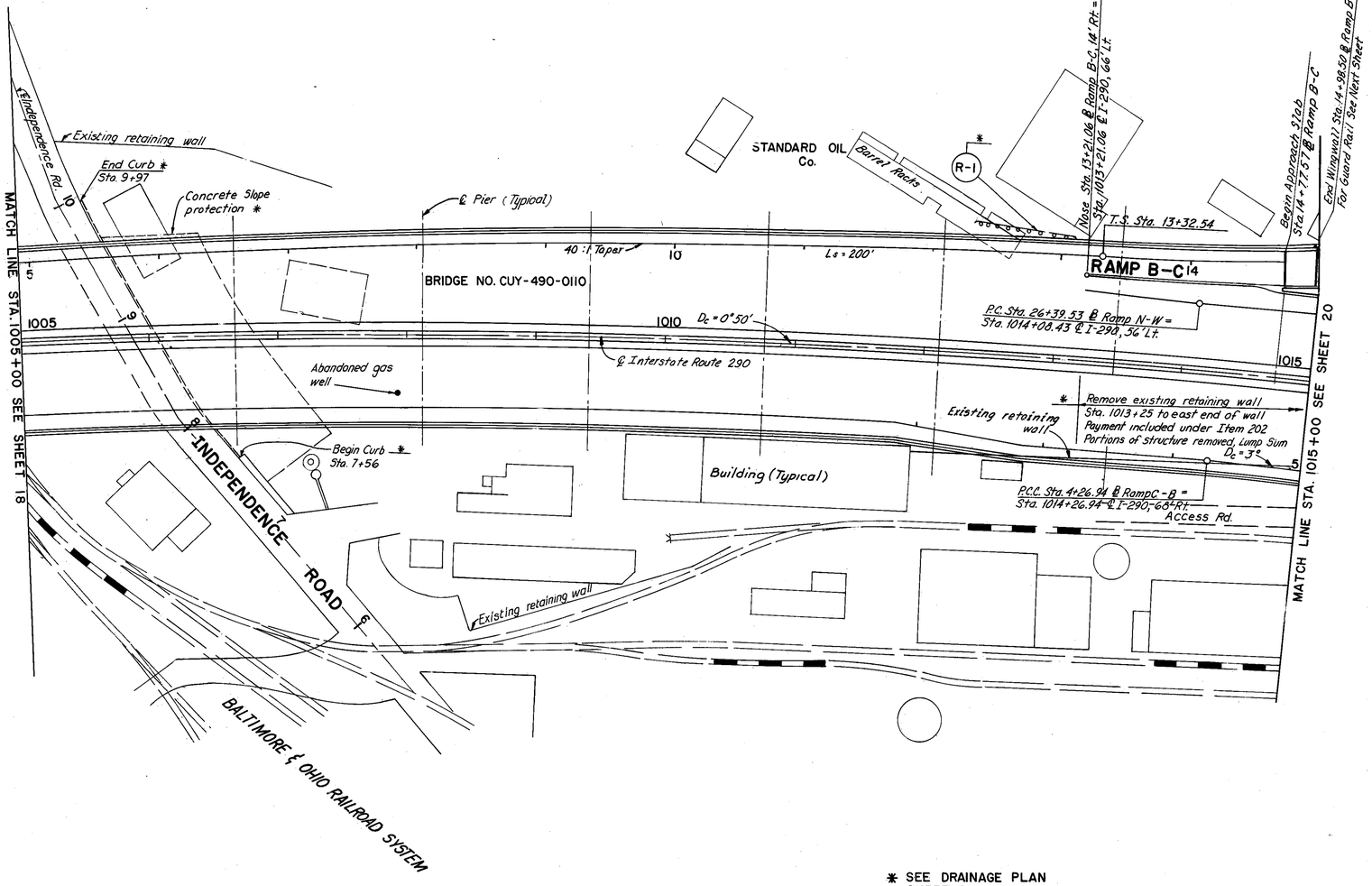
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PAVEMENT PLAN STA. 995+00 TO STA. 1005+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

19
174

CUYAHOGA COUNTY
CUY.-290-0.27



N

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

* SEE DRAINAGE PLAN SHEET 28

SCALE 1" = 50'
MADE T.P.M. DATE 5-3-69
TRCD. M.A.G. DATE 8-7-70
CKD. L.J.D. DATE 8-11-70

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

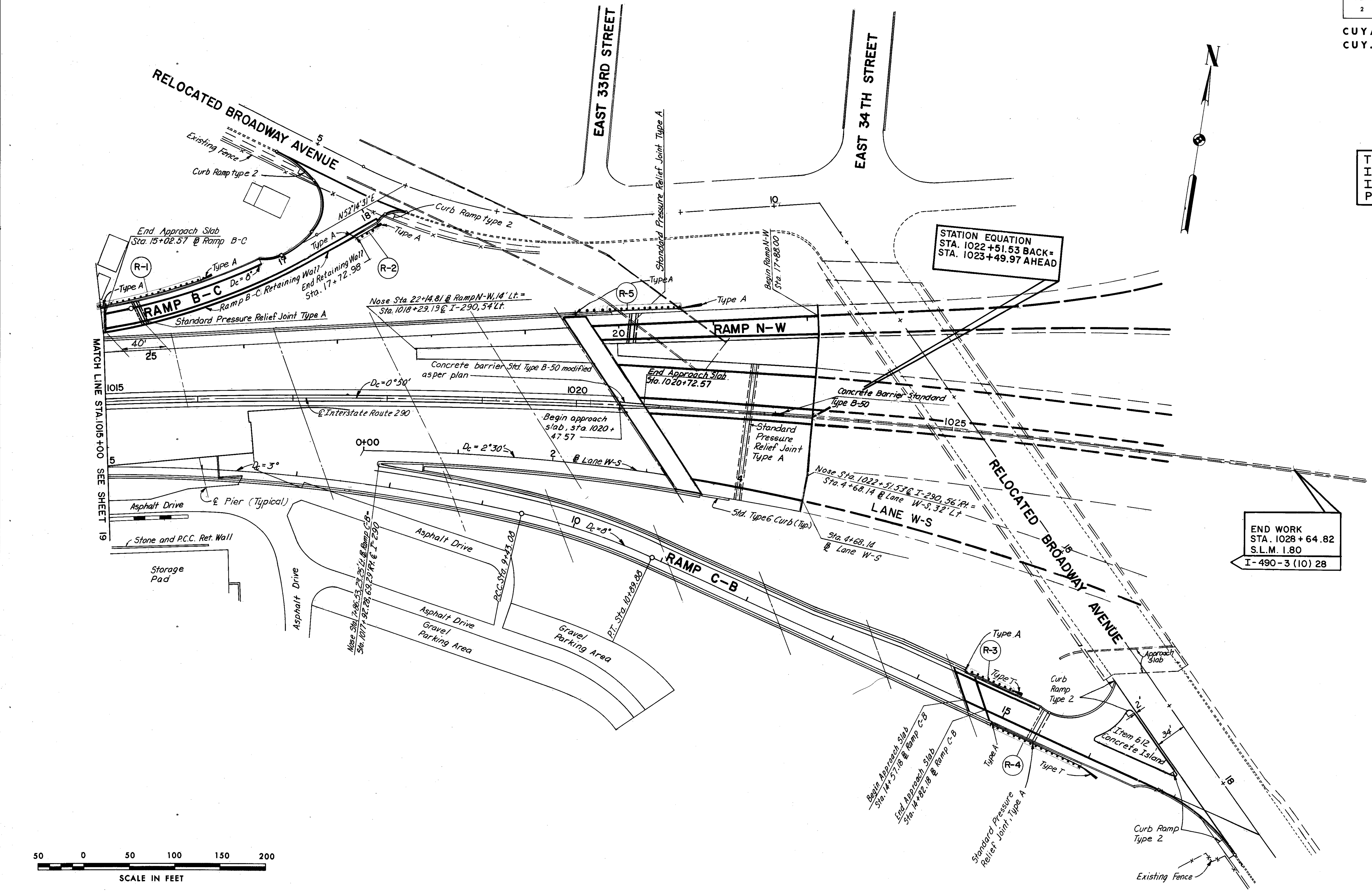
PAVEMENT PLAN STA. 1005+00 TO STA. 1015+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

20
174

CUYAHOGA COUNTY
CUY.-290-0.27

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY



RELOCATED BROADWAY AVENUE
EAST 33RD STREET
EAST 34 TH STREET
N
Existing Fence
Curb Ramp type 2
End Approach Slab Sta. 15+02.57 ℄ Ramp B-C
Type A
RAMP B-C
Dc=6°
Ramp B-C Retaining Wall
End Retaining Wall Sta. 17+72.98
N52°14'31"E
R-1
R-2
R-3
R-4
R-5
Standard Pressure Relief Joint Type A
Nose Sta. 22+14.81 ℄ Ramp N-W, 14' Lt. = Sta. 1018+29.19 ℄ I-290, 54' Lt.
RAMP N-W
Begin Ramp N-W Sta. 17+88.00
STATION EQUATION STA. 1022+51.53 BACK= STA. 1023+49.97 AHEAD
Concrete barrier Std. Type B-50 modified as per plan
Dc=0°50'
℄ Interstate Route 290
End Approach Slab Sta. 1020+72.57
Concrete Barrier Standard Type B-50
Begin approach slab, sta. 1020+47.57
Standard Pressure Relief Joint Type A
MATCH LINE STA. 1015+00 SEE SHEET 19
Dc=2°30'
℄ Lane W-S
Dc=3°
℄ Pier (Typical)
Asphalt Drive
Stone and P.C.C. Ret. Wall
Storage Pad
Nose Sta. 1022+51.53 ℄ I-290, 56' Rt. = Sta. 4+68.14 ℄ Lane W-S, 32' Lt.
LANE W-S
Sta. 4+68.14 ℄ Lane W-S
Std. Type 6 Curb (Typ.)
END WORK STA. 1028+64.82 S.L.M. 1.80
I-490-3 (10) 28
Dc=6°
RAMP C-B
P.C. Sta. 9+43.00
P.T. Sta. 10+89.88
Gravel Parking Area
Asphalt Drive
Type T
Curb Ramp Type 2
Approach Slab
Item 612 Concrete Island
Begin Approach Slab Sta. 14+57.18 ℄ Ramp C-B
End Approach Slab Sta. 14+82.18 ℄ Ramp C-B
Standard Pressure Relief Joint, Type A
Curb Ramp Type 2
Existing Fence
50 0 50 100 150 200
SCALE IN FEET

SCALE 1" = 50'
MADE T.P.M. DATE 5-2-69
TRCD. D.C.F. DATE 7-2-70
CKD. L.J.D. DATE 7-22-70

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

PAVEMENT PLAN STA. 1015+00 TO STA. 1022+51.53

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

21
174

CUYAHOGA COUNTY
CUY. -290-0.27

Profile Grade	648.79	651.50	654.22	656.94	659.66	662.38	665.10	667.82	670.54	673.26	675.98	678.70	681.42	683.99	686.05	687.58	688.59	689.06	689.01	688.43	687.32	685.69	683.58	680.98	678.42	675.86	673.30	670.74	668.18	665.62	663.06	660.50	657.94
Existing Ground	647.9	616.6	612.5	600.0	596.5	593.7	588.5	586.7	585.5	586.0	586.5	586.5	586.5	586.5	572.7	572.7	582.3	586.4	587.2	589.0	603.8	600.9	616.6	621.8	622.5	618.4	615.1	617.6	624.9	627.4	625.0	621.8	612.8	605.2

700
690
680
670
660
650
640
630
620
610
600
590
580
570
560

Sta. 985+35.75

Nose Ramp C-7

Begin Project
Sta. 985+60.75
Elev. 647.71

Existing Ground

+2.72%

PVI Sta. 1003+25
Elev. 695.70

P.V.C. Sta. 998+25

1000' V.C.
S.S.D. 480'

P.V.T. Sta. 1008+25

Profile Grade

-2.56%

Nose Ramp B-C

Nose Ramp C-B

SEE SHEET 22

℄ Houston Avenue

Baltimore & Ohio Railroad System

℄ Quigley Road

℄ West 3rd Street

Baltimore & Ohio Railroad System

Newburgh & South Shore Railway

Norfolk & Western Railway

River Terminal Railway

River Terminal Railway

CUYAHOGA RIVER

Baltimore & Ohio Railroad System

℄ Independence Road

Existing Ground

W.B. LANE

E.B. LANE

985+00 990+00 995+00 1000+00 1005+00 1010+00 1015+00

SCALE 1"=10' Vert
1"=100' Horiz
MADE C.M.D. DATE 10-31-67
TRCD _____ DATE _____
CKD R.H.A. DATE 11-2367

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

Vert
Horiz.
10 0 10 20
100 0 100 200
Scale in feet

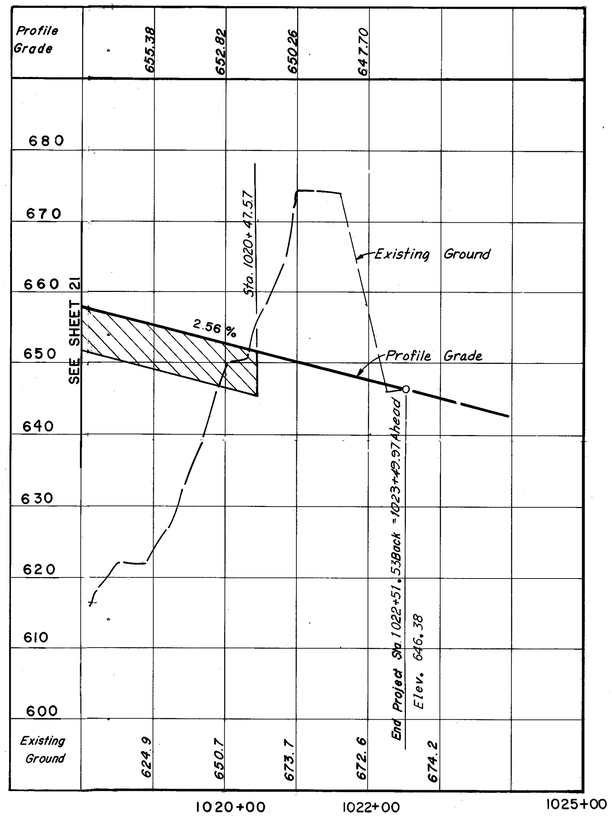
Note: For pavement elevations on bridge see Bridge Pavement Plans.

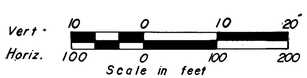
PROFILE I-290

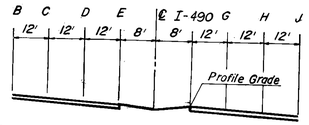
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

22
174

CUYAHOGA COUNTY
CUY.-290-0.27







STATION				ELEV. B	ELEV. C	ELEV. D	ELEV. E	PROFILE GRADE	ELEV. G	ELEV. H	ELEV. J			
1020+25.00				652.90	652.66	652.42	652.18	652.18	651.94	651.70	651.46			
1020+50.00				652.26	652.02	651.78	651.54	651.54	651.30	651.06	650.82			
1020+75.00				651.59	651.35	651.11	650.87	650.90	650.66	650.42	650.18			
1021+00.00				650.93	650.69	650.45	650.21	650.26	650.02	649.78	649.54			
1021+25.00				650.29	650.05	649.81	649.57	649.62	649.38	649.14	648.90			
1021+50.00				649.65	649.41	649.17	648.93	648.98	648.74	648.50	648.26			
1021+75.00				649.01	648.77	648.53	648.29	648.34	648.10	647.86	647.62			
1022+00.00				648.37	648.13	647.89	647.65	647.70	647.46	647.22	646.98			
1022+25.00				647.73	647.49	647.25	647.01	647.06	646.82	646.58	646.34			
1022+50.00				647.09	646.85	646.61	646.37	646.42	646.18	645.94	645.70			

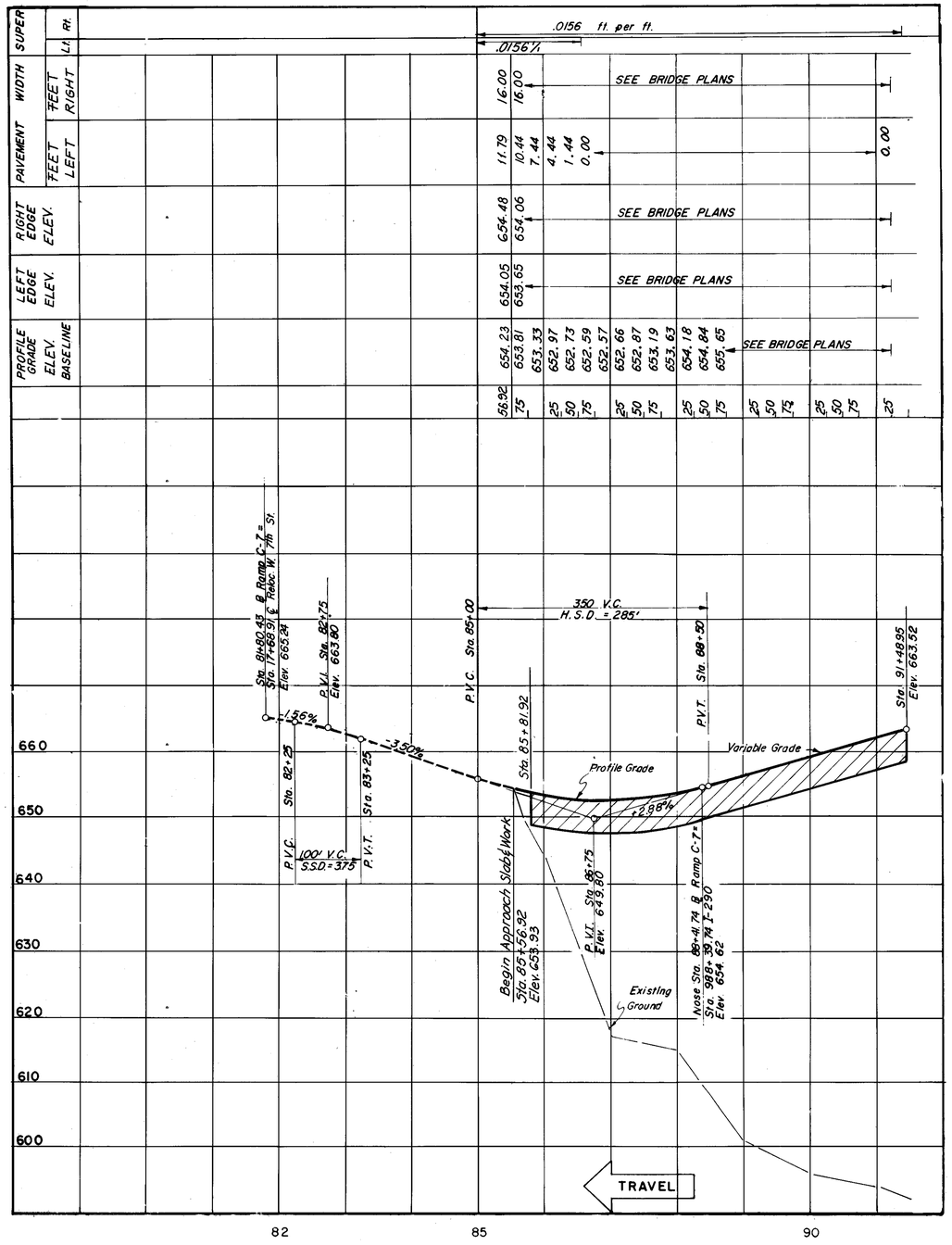
THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

SCALE 1" = 10' Vert. 1" = 100' Horiz.
MADE C.M.D. DATE 10-31-67
TRCD ___ DATE ___
CKD. R.H.A. DATE 11-23-67

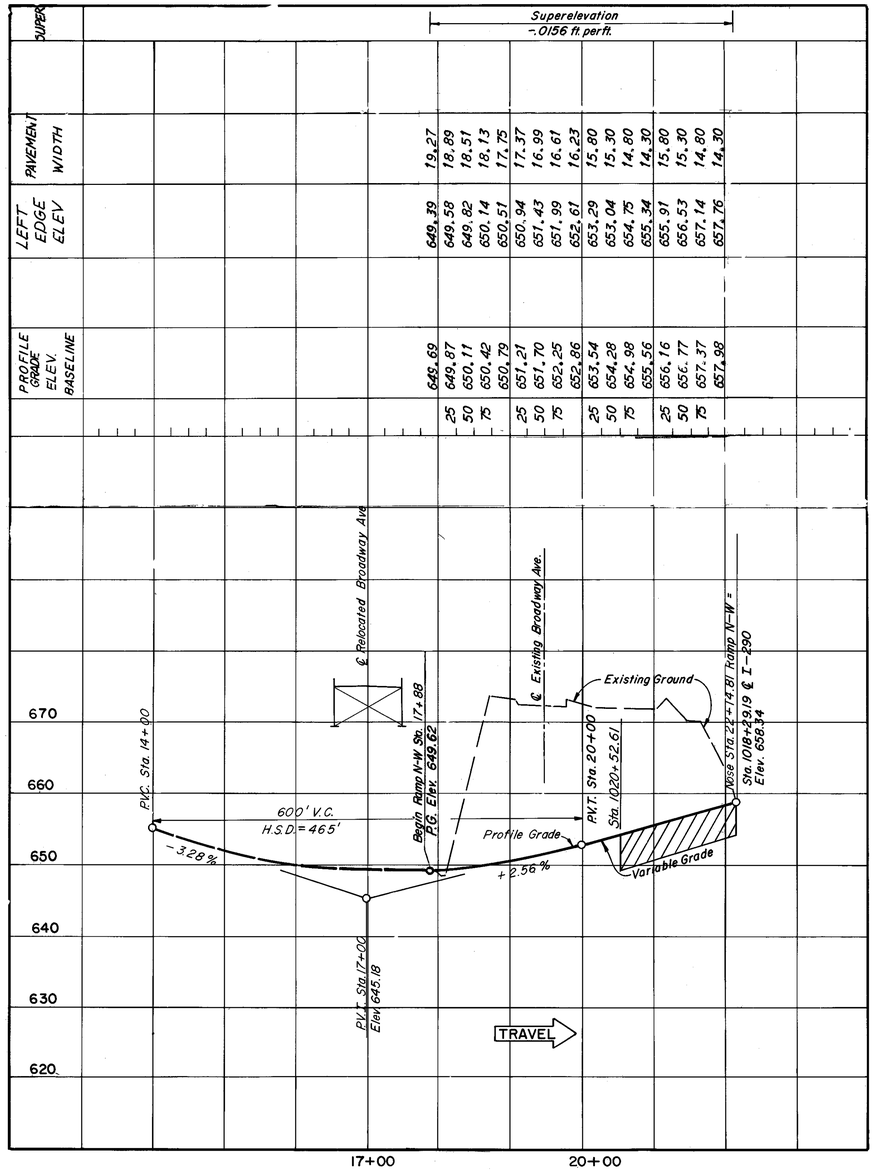
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FHWA REGION	STATE	PROJECT	
5	OHIO		

CUYAHOGA COUNTY
CUY- 490-1.00



RAMP C-7



RAMP N-W

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

100 0 100 200 300 400 HORIZ.
10 0 10 20 30 40 VERT.
SCALE IN FEET

SCALE _____
MADE _____ DATE _____
TRCD. _____ DATE _____
CKD. _____ DATE _____

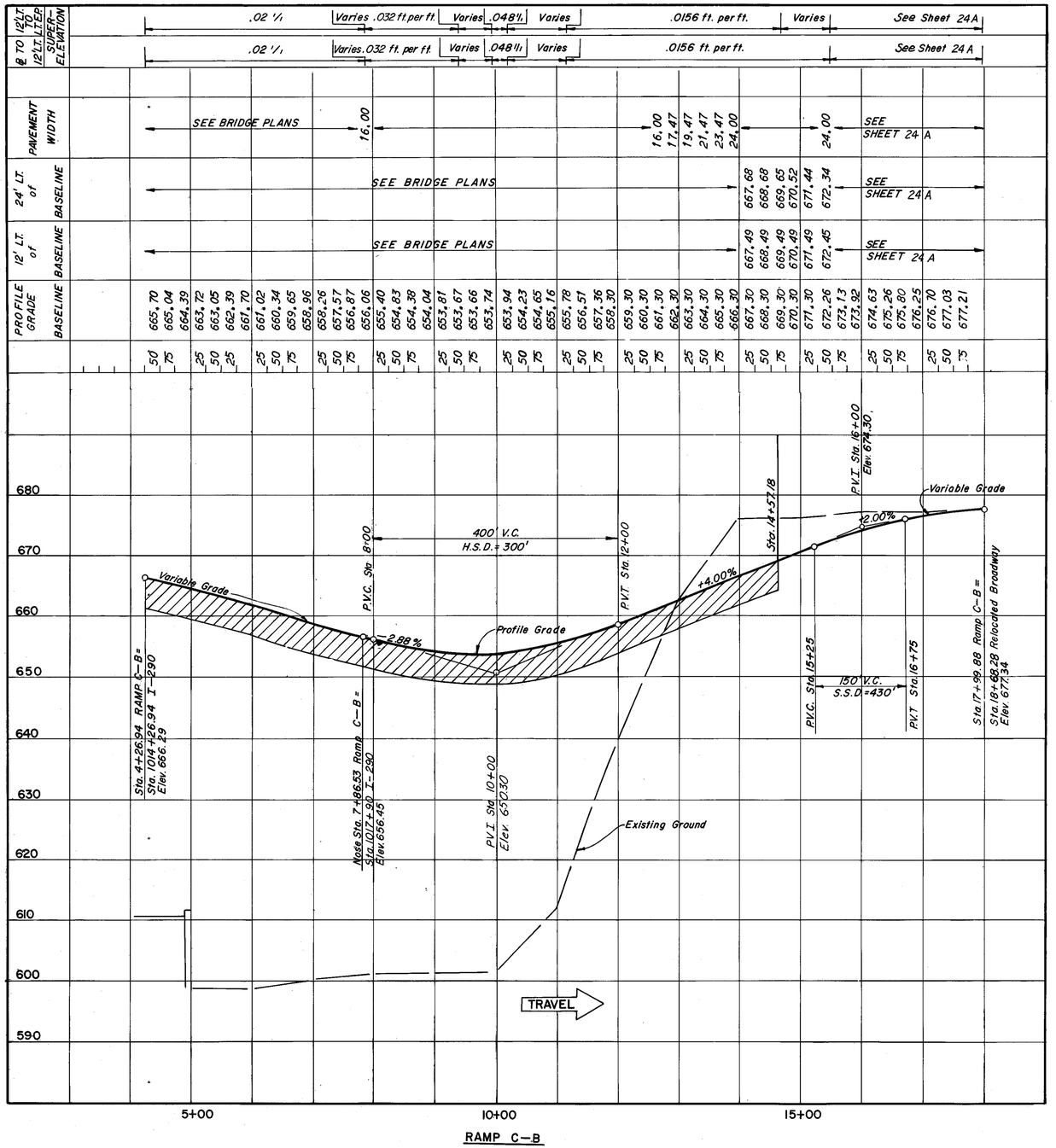
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PROFILE – RAMP C-7 AND RAMP N-W

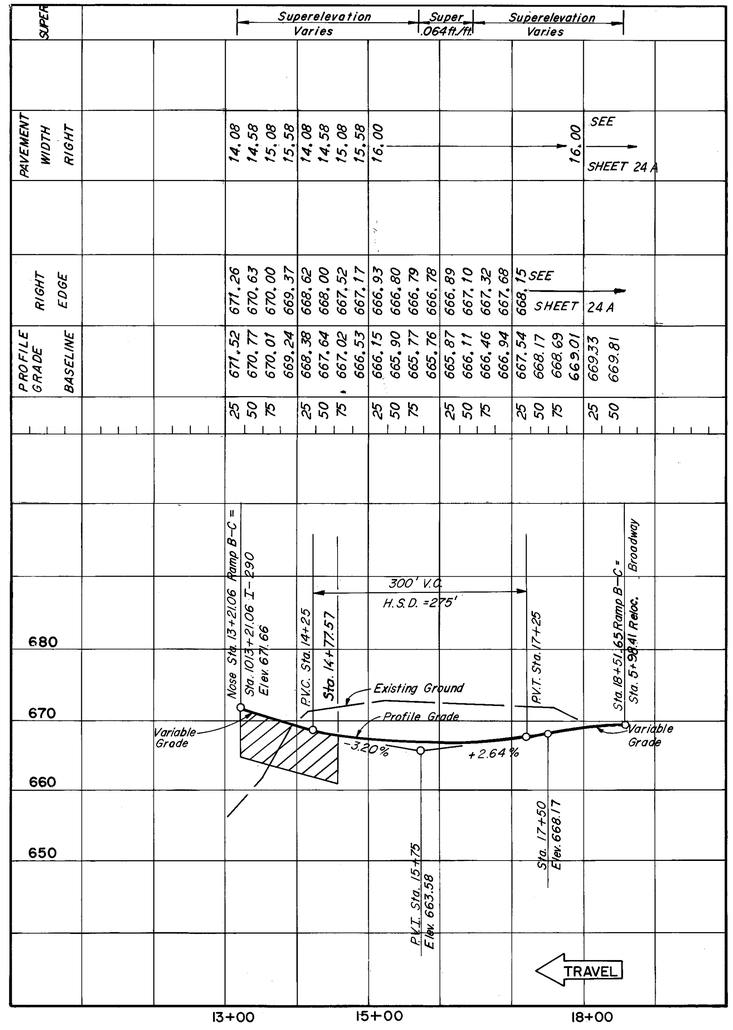
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

24
174

CUYAHOGA COUNTY
CUY. 290- 0.27



RAMP C—B



RAMP B—C

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

100 0 100 200 300 400 HORIZ.
10 0 10 20 30 40 VERT.
SCALE IN FEET

SCALE	None	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE	R.S.W.	DATE 2-5-70	CONSULTING ENGINEERS
TRCD	M.M.D.	DATE 2-6-70	
CKD	L.J.D.	DATE 8-19-70	KANSAS CITY CLEVELAND NEW YORK

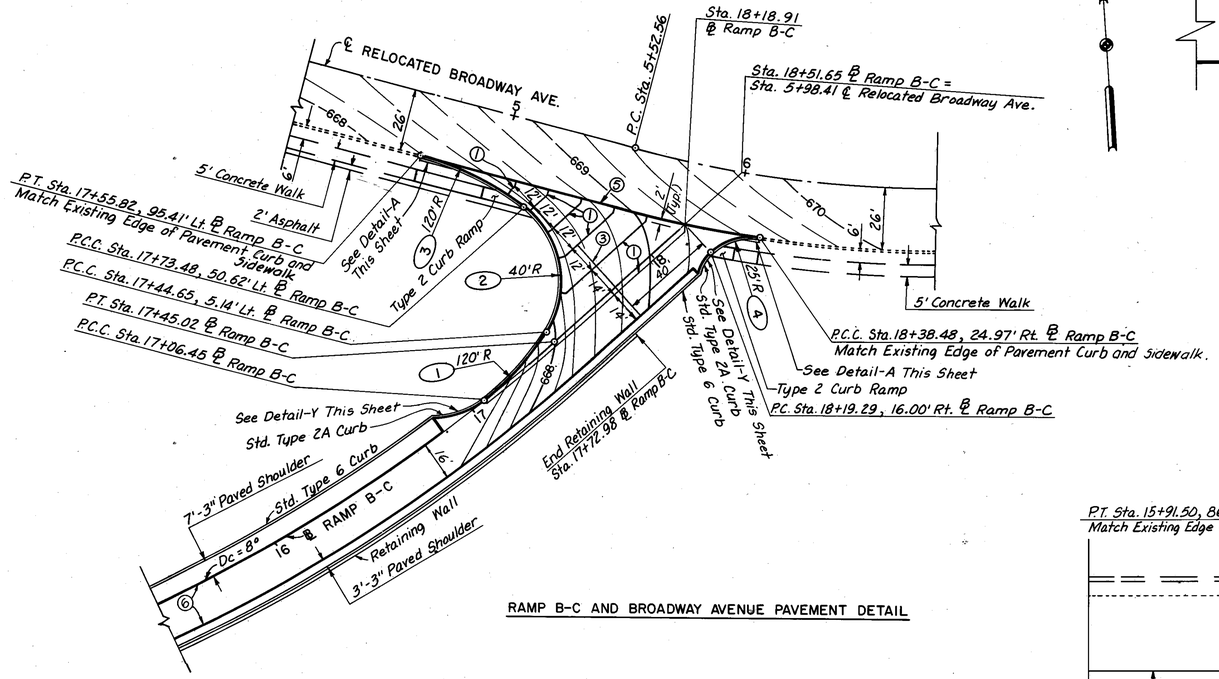
PROFILE - RAMP C-B, RAMP B-C

PAVEMENT DETAILS

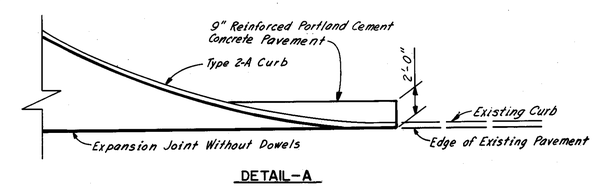
FHWA REGION	STATE	PROJECT	
5	OHIO		

24A
174

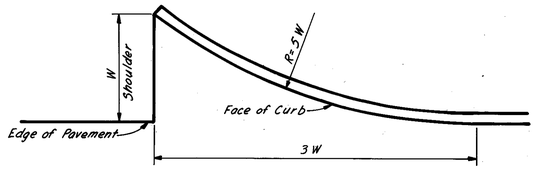
CUYAHOGA COUNTY
CUY- 290-0.27



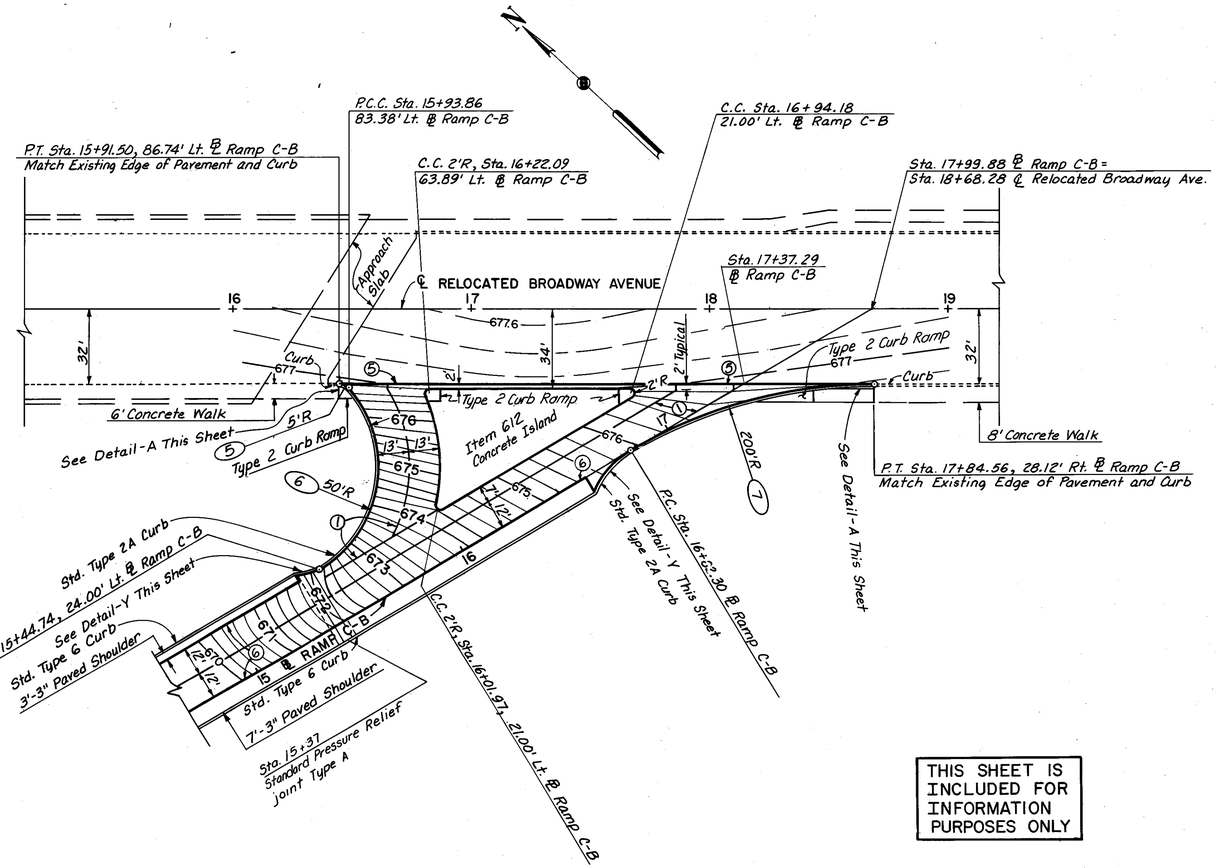
RAMP B-C AND BROADWAY AVENUE PAVEMENT DETAIL



DETAIL-A



DETAIL-Y
No Scale



RAMP C-B AND BROADWAY AVENUE PAVEMENT DETAIL

THIS SHEET IS INCLUDED FOR INFORMATION PURPOSES ONLY

CURVE 1
Δ = 18° 25' 02"
R = 120.00'
T = 19.45'
L = 38.57'
E = 1.57'

CURVE 2
Δ = 84° 36' 51"
R = 40.00'
T = 36.41'
L = 59.07'
E = 14.09'

CURVE 3
Δ = 23° 08' 42"
R = 120.00'
T = 24.57'
L = 48.48'
E = 2.49'

CURVE 4
Δ = 50° 07' 17"
R = 25.00'
T = 11.69'
L = 21.87'
E = 2.60'

CURVE 5
Δ = 48° 26' 08"
R = 5.00'
T = 2.25'
L = 4.23'
E = 0.48'

CURVE 6
Δ = 100° 48' 52"
R = 50.00'
T = 60.46'
L = 87.98'
E = 28.45'

CURVE 7
Δ = 30° 45' 00"
R = 200.00'
T = 55.00'
L = 107.34'
E = 7.42'

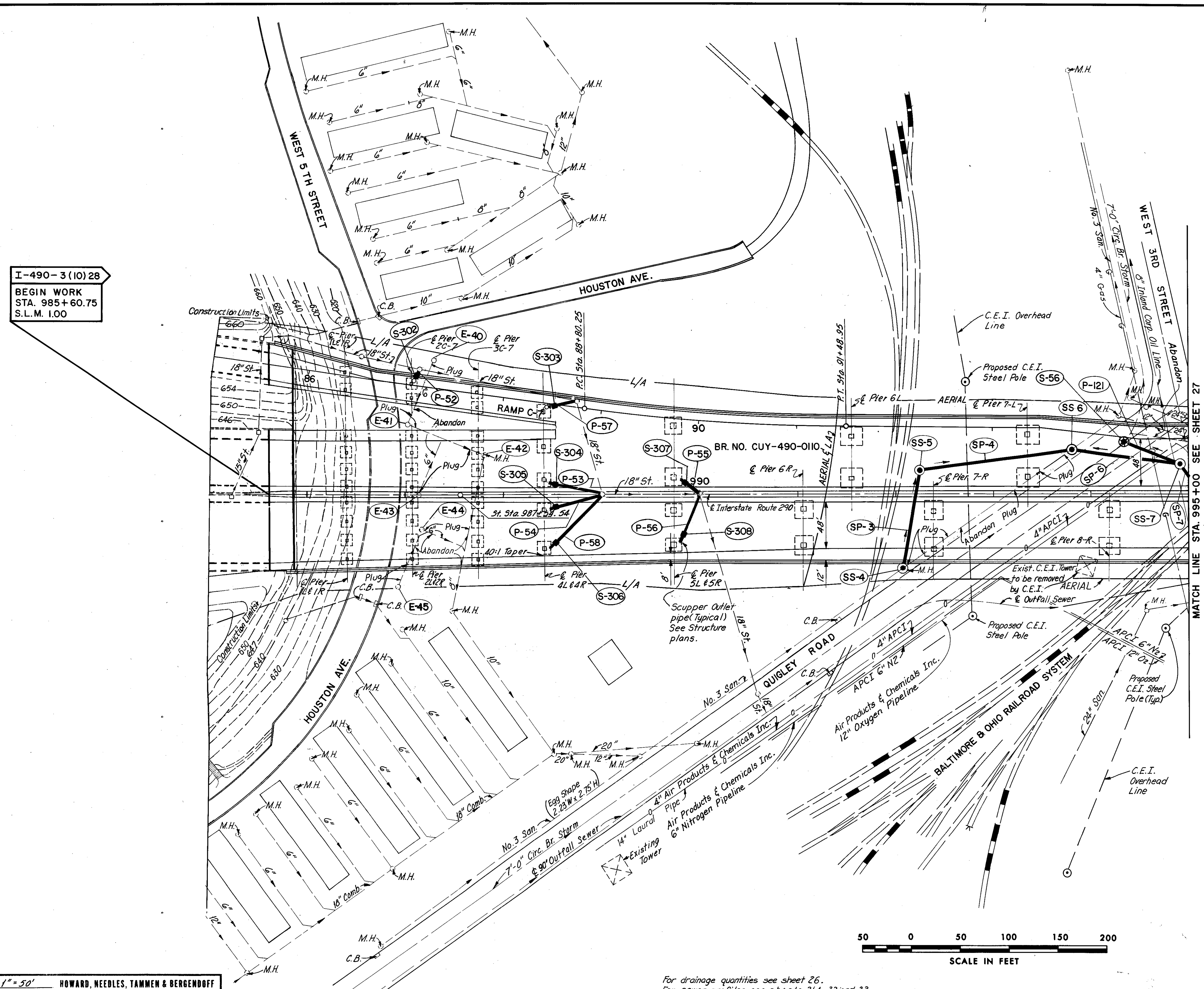
① STANDARD LONGITUDINAL JOINT
② STANDARD EXPANSION JOINT
③ STANDARD CONTRACTION JOINT
⑤ EXPANSION JOINT WITHOUT DOWELS
⑥ EXPANSION BOLT JOINT

30 0 30 60 90 120
SCALE IN FEET

SCALE 1" = 30'
MADE JAG DATE 4-01-83
TRCD. JAG DATE 4-20-83
CKD. ____ DATE ____

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

CUYAHOGA COUNTY
CUY.-290-0.27



I-490-3(10)28
BEGIN WORK
STA. 985+60.75
S.L.M. 1.00
WEST 5 TH STREET
HOUSTON AVE.
WEST 3RD STREET
QUIGLEY ROAD
BALTIMORE & OHIO RAILROAD SYSTEM
BR. NO. CUY-490-0110
RAMP C
℄ Interstate Route 290
MATCH LINE STA. 995+00 SEE SHEET 27
Construction Limits
C.E.I. Overhead Line
Proposed C.E.I. Steel Pole
Scupper Outlet pipe (Typical) See Structure plans.
Air Products & Chemicals Inc. 12" Oxygen Pipeline
Air Products & Chemicals Inc. 6" Nitrogen Pipeline
Existing Tower
7'-0" Circ. Br. Storm
℄ 90" Outfall Sewer
No. 3 San.
Egg Shape 2.23'W x 2.75'H
Exist. C.E.I. Tower to be removed by C.E.I.

DRAINAGE LEGEND

Item	Symbol
Proposed Ditch Inlet	
Proposed Paved Shoulder Inlet	
Proposed Pavement Catch Basin	
Proposed Storm Sewer Manhole	
Proposed Sanitary Sewer Manhole	
Proposed Storm or Sanitary Sewer	
Ditch Erosion Protection	
Existing Manhole	
Existing Catch Basin or Inlet	
Existing Storm, Sanitary or Combined Sewer	
Paved Gutter, Type A	
Sodding	
Top of Cut Slope	
Toe of Fill Slope	

SUPERSTRUCTURE, ROADWAY (EXCEPT GRADING & DRAINAGE) AND PAVEMENT ITEMS ARE NOT PART OF THIS CONTRACT.

50 0 50 100 150 200
SCALE IN FEET

For drainage quantities see sheet 26.
For sewer profiles see sheets 31A, 32 and 33.

SCALE 1" = 50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE TPM. DATE 5-2-69 CONSULTING ENGINEERS
TRCD. DATE
CKD. LJD DATE 7-6-70 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

26
174

QUANTITY CALCULATIONS

MADE BY A.H.S. DATE 3-22-84
CHECKED BY R.L.N. DATE 12-12-85

CUYAHOGA COUNTY
CUY. - 290-0.27

DRAINAGE SHEET 25

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B Conduit 24"	603 Type C Conduit 12"	604 Standard No. 5 M.H. Modified As Per Plan *	604 Standard No. 7 C.B.
					Lin. Ft.		Each	
P-121	994+91	994+35	Lt.	32	60			
S-56	994+35		Lt	32			1	
P-52	987+10	987+15	Lt.	31A		5		
P-53	988+53	989+00	Lt.	31A		47		
P-54	988+53	989+00	Rt.	31A		47		
P-55	989+85	990+00	Lt.	31A		17		
P-56	989+82	990+00	Rt.	31A		46		
P-57	988+53	988+75	Lt.	31A		23		
P-58	988+53	989+00	Rt.	31A		72		
S-302	987+10		Lt.					1
S-303	988+53		Lt.					1
S-304	988+53		Lt.					1
S-305	988+53		Rt.					1
S-306	988+53		Rt.					1
S-307	989+85		Lt.					1
S-308	989+82		Rt.					1
		TOTAL			60	257	1	7

* Frame City requirement and cover shall be Neenah No. R-1729, East Jordan No. 1700 with Type B perforated cover or approved equal.

** See Note on sheet 11.

DRAINAGE SHEET 27

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B Conduit 706.02 3000 D Load Pipe As Per Plan ** 30"	603 Type C Conduit 706.02 1500 D Load 30"	603 Type B Conduit 30"	603 Type C Conduit 706.02 3000 D Load Pipe As Per Plan 12"**	603 Type C Conduit 12"	603 Type C Conduit 707.13 12"	604 Std. No. 3 Manhole	604 Std. No. 2-4 C.B.	604 Std. No. 7 C.B.
					Lin. Ft.						Each		
P-59	995+62	995+74	Rt.	31A					18				
P-62	995+52	995+62	Lt.	31A				93					
P-63	995+62	995+61.5	Rt.	31A						44			
P-64	995+62	995+74	Rt.	31A					15				
P-65	997+65	997+70	Rt.	31A					54				
P-66	997+66.5	997+70	Rt.	31A						17			
P-67	1002+70	1002+99	Rt.	31A					50				
P-70	1000+76	1000+95	℄	31		19							
P-71	1000+95	1001+98	Lt.	31			98						
P-72	1001+98	1002+70	Lt.	31				84					
P-73	1002+70	1005+00	Lt.	31	230								
S-58	995+52		Lt.	31A								1	
S-59	995+62		Rt.	31A							1		
S-60	997+68		Rt.	31A								1	
S-63	1000+97		Rt.	31							1		
S-64	1001+90		Lt.	31								1	
S-65	1002+70		℄	31								1	
S-309	995+74		Rt.	31A									1
S-310	995+74		Rt.	31A									1
S-311	997+65		℄	31A									1
S-312	1002+99		Rt.	31A									1
		TOTAL			230	19	98	84	93	137	61	2	4	4

SANITARY SHEET 25

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type C Conduit 706.03 1500 D-Load, WITH 706.11 JOINTS 33"	604 * Std. No. 3 Manhole Modified As Per Plan	603 Type B Conduit 706.08 E.S. with 706.12 Joints △ 12"	604 Separator Manhole
					Lin. Ft.	Each	Lin. Ft.	Each
SP-3	992+07.5	992+25	Lt. & Rt.	33	100			
SP-4	992+25	993+80	Lt.	33	157			
SP-6	994+91	993+80	Lt.	33			112	
SS-4	992+07.5		Rt.	33		1		
SS-5	992+25		Lt.	33		1		
SS-6	993+80		Lt.	33		1		
SS-7	994+91		Lt.	33				1
		Total			257	3	112	1

△ or 706.03 WITH 706.11 Joints

DRAINAGE SHEET 25

Ref No.	Station From	Station To	Side		202 Manhole Removed		
					Each		
E-40	987+30		Lt.		1		
E-41	987+02		Lt.		1		
E-42	987+80		Lt.		1		
E-43	987+15		℄		1		
E-44	987+18		Rt.		1		
E-45	986+94		Rt.		1		
		Total			6		

SANITARY SHEET 27

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 D.I. Conduit A.N.S.I. C1.56 with Push-on Joints A.N.S.I. A-21.11 24"	603 Type B Conduit 706.03 3000 D-Load, W/Conduit Joints As Per Plan 24"	604 Std. No. 3 M.H. Modified As Per Plan *
					Lin. Ft.		Each.
	From	To					
SP-7	994+91	995+51	Lt. & Rt.	33		95	
SP-8	995+70	995+72	Rt.	33	26		
SP-9	995+72	995+98.5	℄	33	27		
SS-9	995+51		Rt.	33			1
SS-10	995+70		Rt.	33			1
SS-11	995+72		℄	33			1
SS-12	995+98.5		℄	33			1
		Total			53	95	4

SCALE _____
MADE A.H.S. DATE 3-21-84
TRCD. T.D. DATE 3-22-84
CKD. R.L.N. DATE 3-23-84

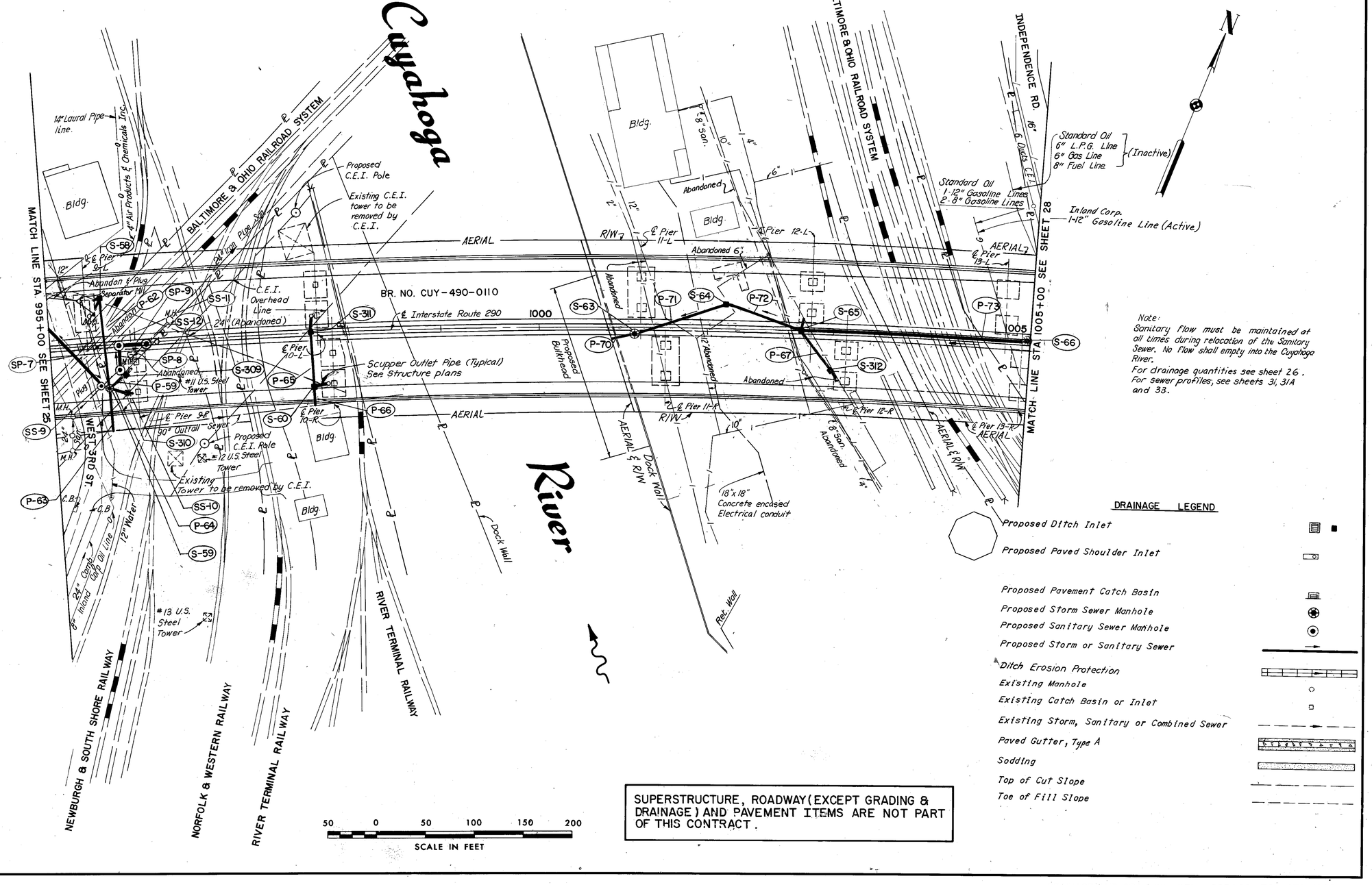
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

DRAINAGE QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

27
174

CUYAHOGA COUNTY
CUY.-290-0.27



Note:
Sanitary Flow must be maintained at all times during relocation of the Sanitary Sewer. No Flow shall empty into the Cuyahoga River.
For drainage quantities see sheet 26.
For sewer profiles, see sheets 31, 31A and 33.

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Ditch Erosion Protection
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Combined Sewer
- Paved Gutter, Type A
- Sodding
- Top of Cut Slope
- Toe of Fill Slope

SUPERSTRUCTURE, ROADWAY (EXCEPT GRADING & DRAINAGE) AND PAVEMENT ITEMS ARE NOT PART OF THIS CONTRACT.

SCALE 1"=50'
MADE T.P.M. DATE 5-3-69
TRCD. M.A.G. DATE 6-17-70
CKD. L.W.D. DATE 7-4-70

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

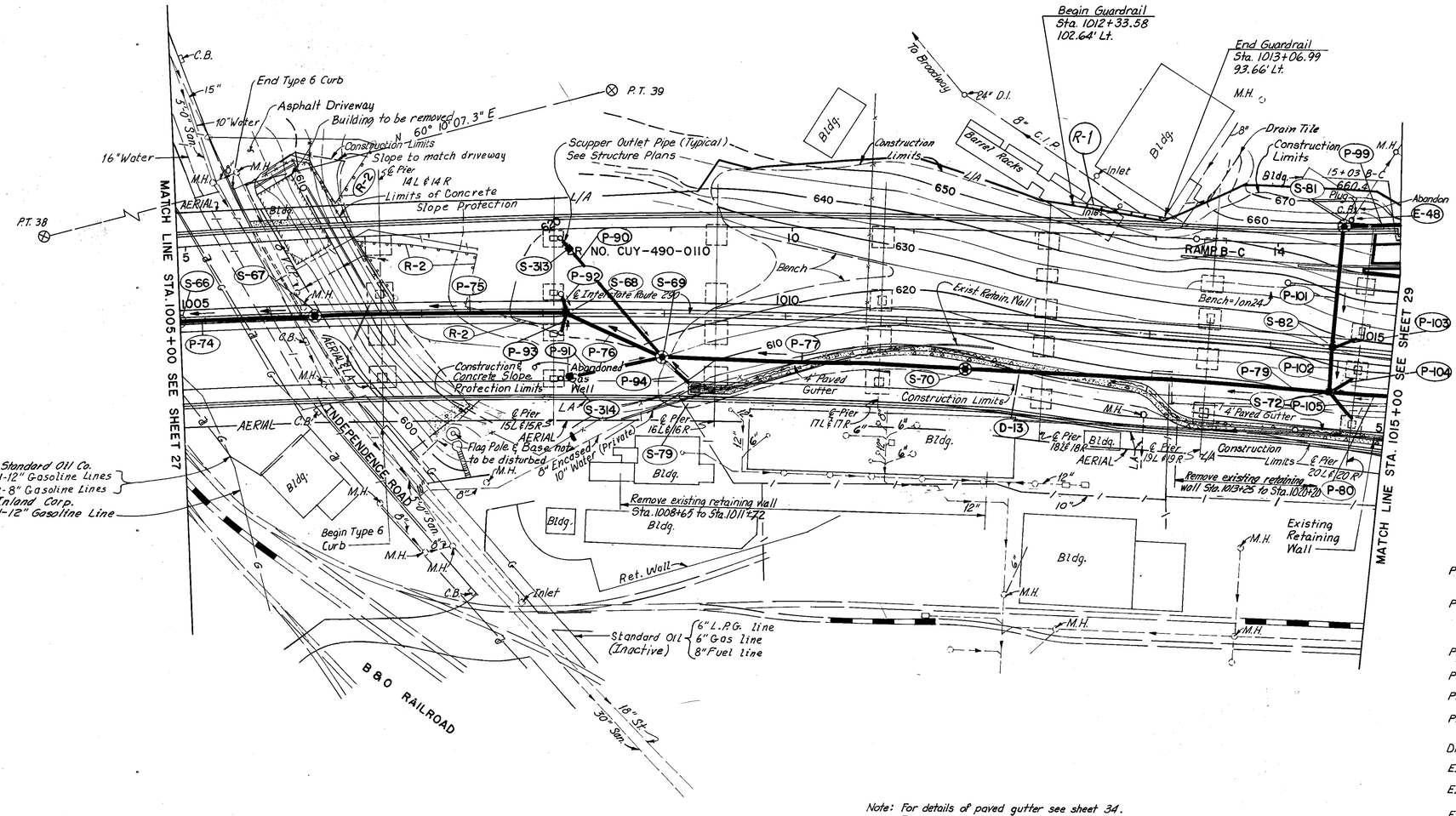
DRAINAGE AND GRADING STA. 995+00 TO STA. 1005+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

28
174

CUYAHOGA COUNTY
CUY.-290-0.27

QUANTITY CALCULATIONS
MADE BY RLN DATE 2-3-84
CHECKED BY JAG DATE 2-4-84



GUARD RAIL					
Ref. No.	Station		Side	606 Std Type 7 Guard Rail	202 Guard-rail Removed
	From	To		Lin. Ft.	Lin. Ft.
R-1	1012+33.58	1013+06.99	Lt.	75	
R-2	1006+11	1008+97	Lt. Rt.		325
	Total			75	325

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Ditch Erosion Protection
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Combined Sewer
- Paved Gutter, type A
- Sodding
- Top of Cut Slope
- Toe of Fill Slope

Note: For details of paved gutter see sheet 34.
For drainage quantities see sheet 30.
For Traverse points P.T. 38 & P.T. 39 See Sheet 3.
For Sewer Profiles see sheets 31, 32 & 32A.

For Concrete slope protection quantities see structure plans.
For Gas well vent detail, see sheet 34.

SUPERSTRUCTURE, ROADWAY (EXCEPT GRADING & DRAINAGE) AND PAVEMENT ITEMS ARE NOT PART OF THIS CONTRACT.

SCALE 1" = 50'
MADE T.P.M. DATE 5-3-69
TRCD. M.Ac. DATE 6-19-70
CKD. L.J.D. DATE 7-3-70
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

50 0 50 100 150 200
SCALE IN FEET

DRAINAGE AND GRADING STA. 1005+00 TO STA. 1015+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

29
174

CUYAHOGA COUNTY
CUY.-290-0.27

The contractor shall not abandon or remove the existing No. 8 brick sewer between sta. 19+77 ± 17'± Lt. Ramp N-W and 1023+09 ± 7' Lt. I-490 until the proposed sewer work to intercept the existing East 34th, East 35th and East 37th Street systems is completed. (Refer sheets 43, 44 and 45 of CUY.-490-1.69)

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet
- Proposed Median Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Combination Inlet
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Ditch Erosion Protection
- Existing Manhole
- Existing Inlet or Catch Basin
- Existing Storm, Sanitary or Combined Sewer
- Future Work
- Future Inlets
- Paved Gutter type A

STA. EQUATION
STA. 1022+51.53 BACK=
STA. 1023+49.97 AHEAD

END WORK
STA. 1028+64.82
S.L.M. 1.80
I-490-3(10)28

SUPERSTRUCTURE, UNDERDRAINS, ROADWAY (EXCEPT GRADING & DRAINAGE) AND PAVEMENT ITEMS ARE NOT PART OF THIS CONTRACT.

Notes:
For Drainage Quantities see Sheet 30.
For Sewer Profiles, see sheets 31, 32, 32A, & 32B.

SCALE IN FEET: 50 0 50 100 150 200

SCALE 1" = 50'
MADE T.P.M. DATE 5-2-69
TRCD. M.A.G. DATE 6-17-70
CKD. ____ DATE ____

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

DRAINAGE AND GRADING STA. 1015+00 TO STA. 1028+64.82

DRAINAGE SHEET 28

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type C Conduit 12"	603 Type C Conduit 706.02 2000 D-Load or 707.13 12"	603 Type C Conduit 706.01 Cl.2 or 706.08 ES or 706.02 or 707.13 12"	603 Type C Conduit, 707.13 12"	603 Type C Conduit 706.02 2000 D-Load or 707.13 24"	603 Type C Conduit 706.02 2000 D-Load or 707.13 27"	603 Type C Conduit 706.02 3000 D-Load or 707.13 27"	603 Type B Conduit 706.02 2000 D-Load or 707.13 30"	603 Type C Conduit 706.02 3250 D-Load or 707.13 (0.079) 30"	603 19° Bend 12"	603 20° Bend 12"
					Lin. Ft.										
P-74	1005+00	1006+12	℄	31								112			
P-75	1006+12	1008+20	℄	31									208		
P-76	1008+20	1009+00	℄	31									88		
P-77	1009+00	1011+50	Rt.	31							250				
P-79	1011+50	1014+50	Rt.	31						300					
P-80	1014+50	8+00 Ramp C-B		31					355						
P-94	1009+00	1009+25	Rt.	32		40									
P-99	16+00 Ramp B-C	1014+50	Lt.	32			145								
P-101	1014+50		Lt.	32				104						2	
P-102	1014+50		Rt.	32				36							1
P-90	1008+22	1009+00	Lt.	32A	118										
P-91	1008+22	1009+00	Rt.	32A	77										
				Total	195	40	145	140	355	300	250	112	296		

DRAINAGE SHEET 29

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type C Conduit 12"	603 Type B Conduit 15"	603 Type C Conduit 15"	603 Type C Conduit, 707.13 15"	603 12° Bend 15"	603 13° Bend 15"	603 15° Bend 15"
					Lin. Ft.				Each		
P-80	For Quantity See Table to left			31							
P-81	8+00 Ramp C-B	1020+00 I-290	Rt.	31			193				
P-82	1020+00	1021+00	Rt.	31				105	1		
P-83	1021+00	13+60 Ramp C-B	Rt.	31			183	91		1	
P-84	13+60 Ramp C-B	15+25 Ramp C-B	Lt.	31			82	87			2
P-99	For Quantity See table to left			32							
P-109	8+00 Ramp C-B		Lt. & Rt.	32			30				
P-120	15+00 Ramp C-B	15+25 Ramp C-B	Lt. & Rt.	32		46					
P-300	3+75 Ramp W-S	1021+00 I-290		31				78			
P-117	1019+60	1020+15		32A	97						
P-118	1020+15	1021+00	Rt.	32A			124				
	Totals				97	46	612	361			

DRAINAGE SHEET 28

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	601 Paved Gutter Type A	202 Catch Basin Abandon	604 Std No. 3 Manhole	604 Std. No. 2-2-A C.B. mod. as per plan *	604 Std. No. 2-4 C.B.	604 Std. No. 7 C.B.
					Lin. Ft.		Each			
S-66	1005+00		℄				1			
S-67	1006+12		℄				1			
S-68	1008+20		℄						1	
S-69	1009+00		Rt.				1			
S-70	1011+50		Rt.				1			
S-313	1008+22									1
S-72	1014+50		Rt.						1	
S-79	1009+25		Rt.					1		
S-81	1014+50		Lt.				1			
S-82	1014+50		℄						1	
E-48	1014+56		Lt.			1				
D-13	1009+25	1015+00	Rt.		588					
S-314	1008+22									1
		Total			588	1	5	1	3	2

* Omit Downstream Window

DRAINAGE SHEET 29

Ref No.	Station From	Station To	Side	Sewer Profile Sheet No.	604 Std. No. 5 C.B.	604 Std. No. 3 C.B mod. as per plan	604 Std. No. 2A Paved Shoulder Inlet mod. as per plan	604 Std. No. 3 Manhole	601 Paved Gutter, TYPE A	670 Ditch Erosion Protection	202 Manhole Removed	202 Pipe Removed 24" and Under	202 Pipe Removed Over 24"
					Each				Lin. Ft.	S.Y.	Each	Lin. Ft	Lin. Ft.
S-73	8+00 Ramp C-B		Lt.					1					
S-74	1020+00		Rt.					1					
S-75	1021+00		Rt.					1					
S-76	13+60 Ramp C-B		Lt					1					
S-77	15+25 Ramp C-B		Lt.				1						
S-80	16+00 Ramp B-C		Lt.			1							
S-83	8+00 Ramp C-B		Rt.		1								
S-84	1019+60		Lt.					1					
S-85	1020+15		Rt.					1					
S-86	15+00 Ramp C-B		Rt.				1						
E-46	1018+10		Rt.								1		
E-47	1017+06	1018+10	Rt.									115	
E-48	19+77 N-W	1023+09	Lt.										175
D-14	1015+00	13+75 Ramp C-B	Rt.						826				
D-15	1021+01.53	1022+51.53	Lt.							134			
		Totals			1	1	2	6	826	134	1	115	175

SCALE None
MADE D.D.S. DATE 7-3-70
TRCD. M.M.D. DATE 7-5-70
CKD. L.J.D. DATE 7-7-70
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

K&E 17 0483 8-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

31
174

CUYAHOGA COUNTY
CUY-290-0.27

5-28-70 & 6-3-70 69-70
DDS (Mode) WHB (Traced)
RSW (Checked)

(S-63) Std. No. 3 M.H. 1000+97, 6' Rt. ℄ I-490 T/C = 582.6
Exist. High Water 575.5
Dock Wall
Mean Low Water 570.52
565.00
565.19
19'-30" @ 1.00% Type C Conduit, 706.02 1500 D-Load
680 (P-70)
573.18
574.16
(P-71)
84'-30" @ 1.00% Type B Conduit
575.00
98'-30" @ 1.00% Type C Conduit
(P-72)
(S-64) Std. No. 2-4 C.B. 1001+90 ℄ I-490, 24' Lt. T/C. 583.7
18"x 18" Concrete encased Electrical Duct
2" Gas Line
12" Fire Line
2" Force Main
8" Sanitary Sewer
8" Water Line
12" Fire Line
(S-65) Std. No. 2-4 C.B. 1002+70 ℄ I-490 T/C = 584.5
4" Storm Sewer
B&O Railroad
Electric Ducts (Private)
576.66
230'-30" @ 1.00% Type B Conduit 706.02 3000 D-Load as per plan
(P-73)
(S-66) Std. No. 3 M.H. 1005+00 ℄ I-490 T/C = 602.0
16" Water Line
6 CEI Ducts
8" (12") Gasoline Lines
6" (12") Gasoline Lines
15" Storm Sewer
10" Water Line
578.96
112'-30" @ 0.95% Type B Conduit 706.02 2000 D-Load or 707.13
60" San. Sewer
(P-74)
℄ Independence Rd.
(S-67) Std. No. 3 M.H. 1006+12 ℄ I-490 T/C = 600.5
580.02
208'-30" @ 0.70% Type C Conduit 706.02 3250 D-Load or 707.13 (0.079)
581.48
(P-75)
(S-68) Std. No. 2-4 C.B. 1008+20 ℄ I-490 T/C = 622.0
Scupper pipes
582.01
88'-30" @ 0.60% Type C Conduit 706.02 3250 D-Load or 707.13 (0.079)
(P-76)
(S-69) Std. No. 3 M.H. 1009+00 35' Rt. ℄ I-490 T/C = 615.2
Existing Ground
P-90
Proposed Ground
P-91
582.28
250'-27" @ 0.82% Type C Conduit 706.02 3000 D-Load or 707.13
(P-77)
(S-70) Std. No. 3 M.H. 1011+50 38' Rt. ℄ I-490 T/C = 605.8
584.32
300'-27" @ 0.80% Type C Conduit 706.02 2000 D-Load or 707.13
586.72
(P-79)
(S-72) Std. No. 2-4 C.B. 1014+50 35' Rt. ℄ I-490 T/C = 611.5
Scupper pipes
24" @ 0.70 % 586.98
A
620
610
600
590
580
A

(S-77) Std. I-2A Pvd. Shld. Inlet mod. as per plan 15+25, 27.25 Lt. ℄ Ramp C-B T/C. = 671.80
12" Gas Line
12" Water Line
10'
15"-15° Bend
Conc. Collar Std. Drwg. MC-4
(S-76) Std. No. 3 M.H. 13+60 55' Lt. ℄ Ramp C-B T/C = 647.5
82'-15" @ 0.40% Type C Conduit
662.55
(P-84)
P-120
662.88
76'-15" @ 27.1% Type C Conduit, 707.13
(P-84)
(S-75) Std. No. 3 M.H. 1021+00 118' Rt. ℄ I-490 T/C = 624.5
15"-13° Bend
10'
640.87
Concrete Collar as per Std. Drawing MC-4
642.74
642.70
183'-15" @ 1.00% Type C Conduit
(P-83)
11'-15" @ 0.4% Type C Conduit, 707.13
(P-84)
91'-15" @ 22.6% Type C Conduit, 707.13
(P-83)
(S-74) Std. No. 3 M.H. 1020+00 90' Rt. ℄ I-490 T/C = 602.7
P-300
620.76
617.90
83'-15" @ 25.2% Type C Conduit, 707.13
(P-82)
15"-12° Bend
597.96
22'-15" @ 3.5 % Type C Conduit, 707.13
(P-82)
620
600
580
(S-73) Std. No. 3 M.H. 8+00 22' Lt. ℄ Ramp C-B T/C = 600.0
P-109
193'-15" @ 2.57 % Type C Conduit
592.23
(P-81)
597.19
355'-24" @ 0.70% Type C Conduit 706.02, 2000 D-Load or 707.13
589.45
(P-80)

Future Std. I-3B 50 Median Inlet ℄ I-490 1021+00 N/G 650.00
Future Std. No. 2-A-20 Paved Shoulder Inlet 3+83 11.5' Rt. ℄ Lane W-5 N/G 647.03
Existing Ground
Proposed Ground
Plug
645.00
114'-15" @ 1.9% Type B Conduit (Future)
642.88
68'-15" @ 5.0% Type C Conduit 707.13
(P-300)
(S-75)
25° Bend
618.50
618.10
10'-15" @ 4% Type C Conduit 707.13
(P-300)
650
640
630
620
610

50 0 50 100
10 0 10 20
Horz. 1" = 50'
Vert. 1" = 10'
Scale in Feet

Note: Future Work ——··——··——

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

SEWER PROFILE (P-70), (P-71), (P-73) TO (P-77), (P-79) TO (P-84), (P-300)

KME 17 0483 8-69+

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

31A
174

CUYAHOGA COUNTY
CUY-290-0.27

RSW (Made) 6-1-70
MAB (Traced) 9-7-70
DDS (Checked) 6-22-70

(S-302)
Std. No. 7 C.B.
987+10
122.5 Lt., ℄ I-490
T/G. 616.00

Existing Ground
Exist. M.H. 987+15 127 Lt. ℄ I-490
See Bridge Plans
Elev. 610.00 Bridge Footing Pier 2C-7 North
613.29
613.50
607.62
5'-12"@ 4.2% Type C Conduit

(P-52)

(S-308)
Std. No. 7 C.B.
989+82
42' Rt., ℄ I-490
T/G 596.00

See Bridge Plans
Existing Ground
Exist. M.H. 990+00 T/C 596.5
Exist. 18" Storm Sewer
Elev. 594.00 Bridge Footing Pier 5 Rt, South
593.50
591.57
590.66
593.50
46'-12"@ 4.2% Type C Conduit

(S-304)
Std. No. 7 C.B.
988+53
10' Lt. ℄ I-490
T/G 602.2

See Bridge Plans
Existing Ground
Exist. M.H. 989+00 ℄ I-490 T/C 600.00
Elev. 600.00 Bridge Footing Pier 4 Lt. South
599.50
595.74
594.41
599.50
47'-12"@ 8.0% Type C Conduit

(P-53)

(P-56)

(S-309)
Std. No. 7 C.B.
995+74, 33' Rt. ℄ I-490
T/C 586.80

(S-59)
Std. No. 3 M.H.
995+62 43' Rt. ℄ I-490
T/C 586.5

See Bridge Plans
Existing Ground
P-63
582.95
583.71
583.71
579.40
18'-12"@ 4.20% Type C Conduit

(P-59)

(S-58)
Std. No. 2-4 C.B.
995+52
47' Lt. ℄ I-490
T/C 586.5

See Bridge Plans
590
B&O Railroad Tracks
Existing Ground
P-59, & P-64
881.84
579.86
93'-12"@ 0.50% Type C Conduit 706.02
3000 D Load Pipe as per plan
579.40
Existing 24" Sanitary

(P-62)

(S-59)
Std. No. 3 M.H.
995+62, 43' Rt. ℄ I-490
T/C 586.5

Exist. 90" Outfall Sewer 995+61.5 88' Rt. ℄ I-490
44'-12"@ 18.41% Type C Conduit, 707.13
571.30
Tee (Payment included in item 603) See Detail Sheet 37

(P-63)

(S-305)
Std. No. 7 C.B.
988+53
10' Rt. ℄ I-490
T/G 602.10

See Bridge Plans
Existing Ground
Exist. M.H. 989+00 ℄ I-490 T/C 600.00
Elev. 600.00 Bridge Footing Pier 4 Rt. North
599.50
599.50
597.53
594.41
47'-12"@ 4.2% Type C Conduit

(P-54)

(S-307)
Std. No. 7 C.B.
989+85
12' Lt., ℄ I-490
T/G 597.0

Existing Ground
Exist. M.H. 990+00 ℄ I-490 T/C 596.5
See Bridge Plans
Elev. 594.00 Bridge Footing Pier 5 Lt. South
593.91
17'-12"@ 4.2% Type C Conduit
590.66
593.91
593.15

(P-55)

(S-310)
Std. No. 7 C.B.
995+74, 50' Rt. ℄ I-490
T/C 586.30

(S-59)
Std. No. 3 M.H.
995+62 43' Rt. ℄ I-490
T/C 586.5

See Bridge Plans
Existing Ground
P-63
583.63
583.63
583.00
579.40
15'-12" @ 4.20% Type C Conduit

(P-64)

(S-311)
Std. No. 7 C.B.
997+65, ℄ I-490
T/C 586.80

(S-60)
Std. No. 2-4 C.B.
997+70
54' Rt. ℄ I-490
T/C 586.4

See Bridge Plans
Existing Ground
583.66
583.66
581.39
577.05
Exist. 90" Outfall Sewer 997+66.5 73.5 Rt. ℄ I-490
17'-12"@ 27.9% Type C Conduit, 707.13
572.30
Tee (Payment included in item 603) See Detail Sheet 37

(P-65)
54'-12"@ 4.20% Type C Conduit

(P-66)

(S-303)
Std. No. 7 C.B.
988+53, 91' Lt. ℄ I-490
T/G 602.00

See Bridge Plans
Existing Ground
Exist. M.H. 988+75, 95' Lt. ℄ I-490 T/C 603.0
Existing 18" Storm Sewer
Elev. 600.00 Bridge Footing Pier 4 Lt. North
598.53
597.84
599.50
599.50
23'-12"@ 4.2% Type C Conduit

(P-57)

(S-306)
Std. No. 7 C.B.
988+53
49' Rt. ℄ I-490
T/G 601.90

See Bridge Plans
Existing Ground
Exist. M.H. 989+00 ℄ I-490 T/C 600.00
Elev. 600.00 Bridge Footing 4 Rt., South
599.50
599.50
595.9
594.41
72'-12"@ 5.0% Type C Conduit

(P-58)

(S-312)
Std. No. 7 C.B.
1002+99, 40' Rt.
T/C 586.70

(S-65)
Std. No. 2-4 C.B.
1002+70, ℄ I-490
T/C 584.50

See Bridge Plans
Existing Ground
P-72
581.99
584.00
575.00
50'-12"@ 4.00% Type C Conduit

(P-67)

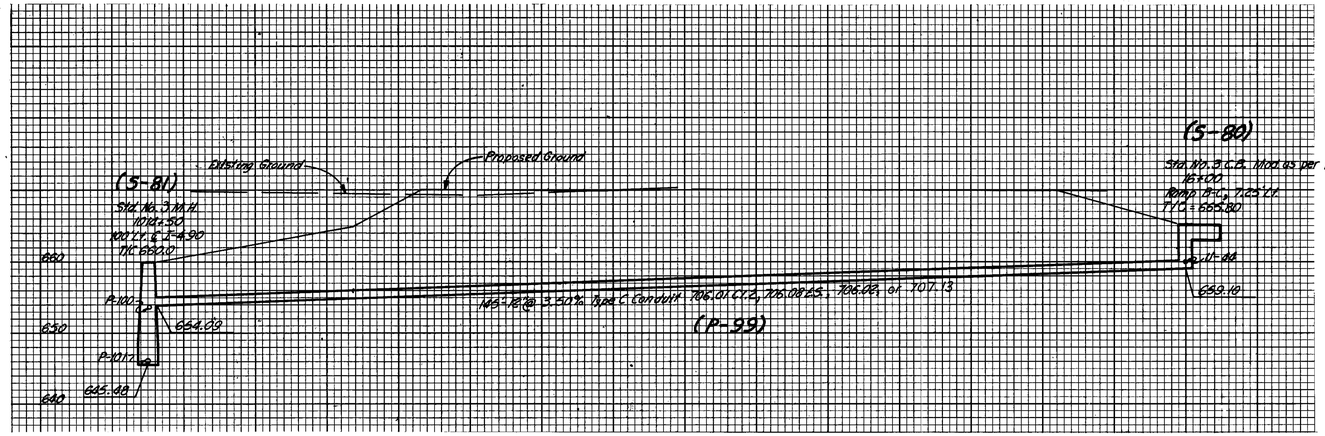
10 0 10 20
Scale in Feet
1"=10' Horz. & Vert.

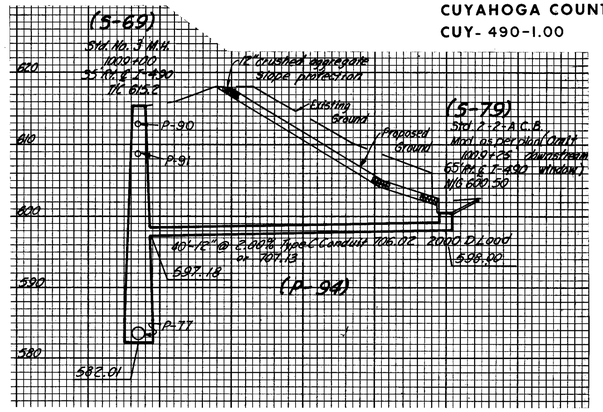
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

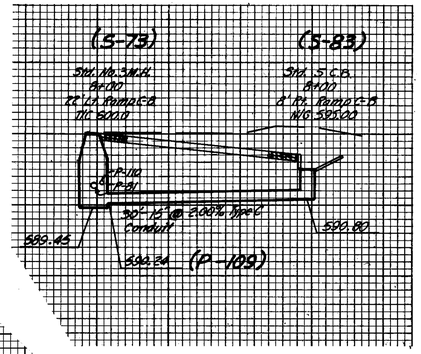
SEWER PROFILES (P-52) TO (P-67)

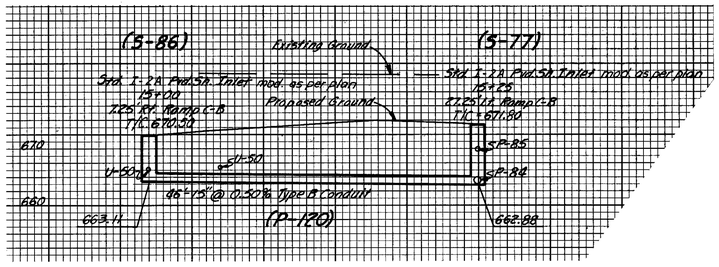
FHWA REGION	STATE	PROJECT	
5	OHIO		

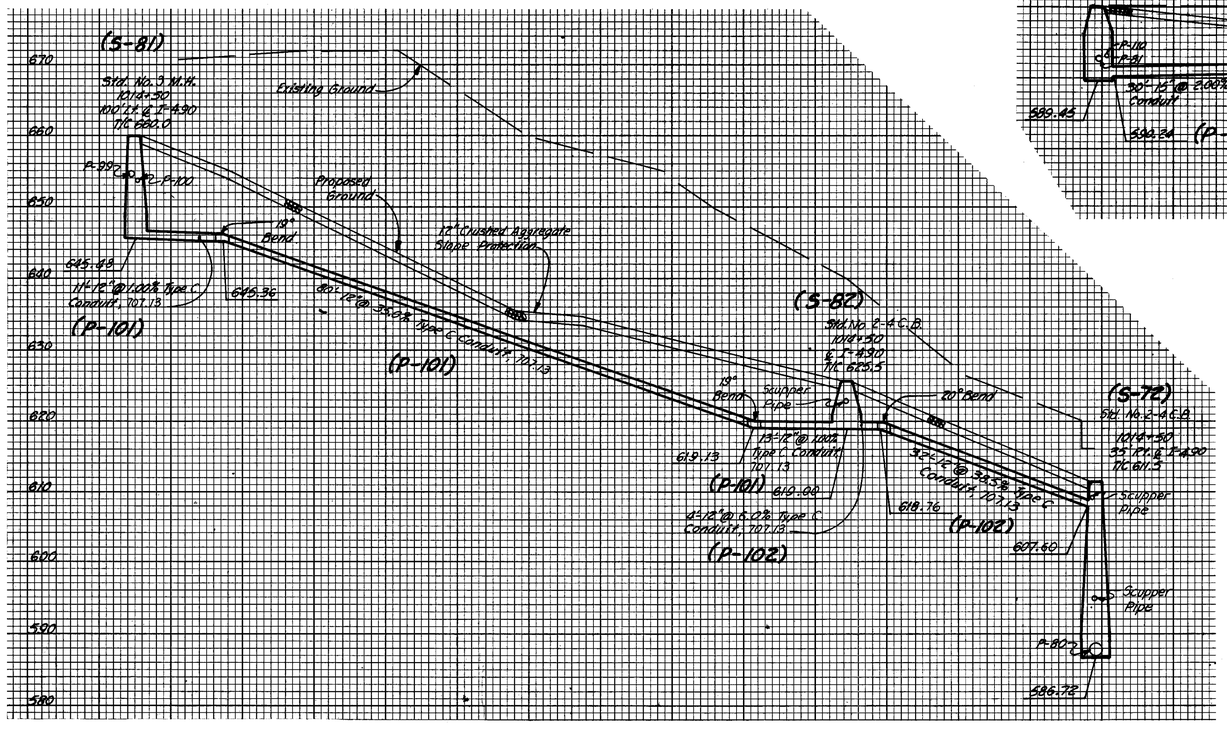
CUYAHOGA COUNTY
CUY- 490-1.00

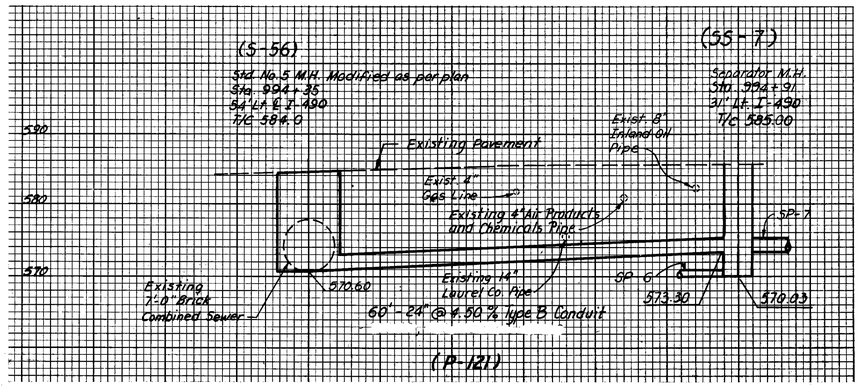












HORIZONTAL 10 0 10 20 30 40
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

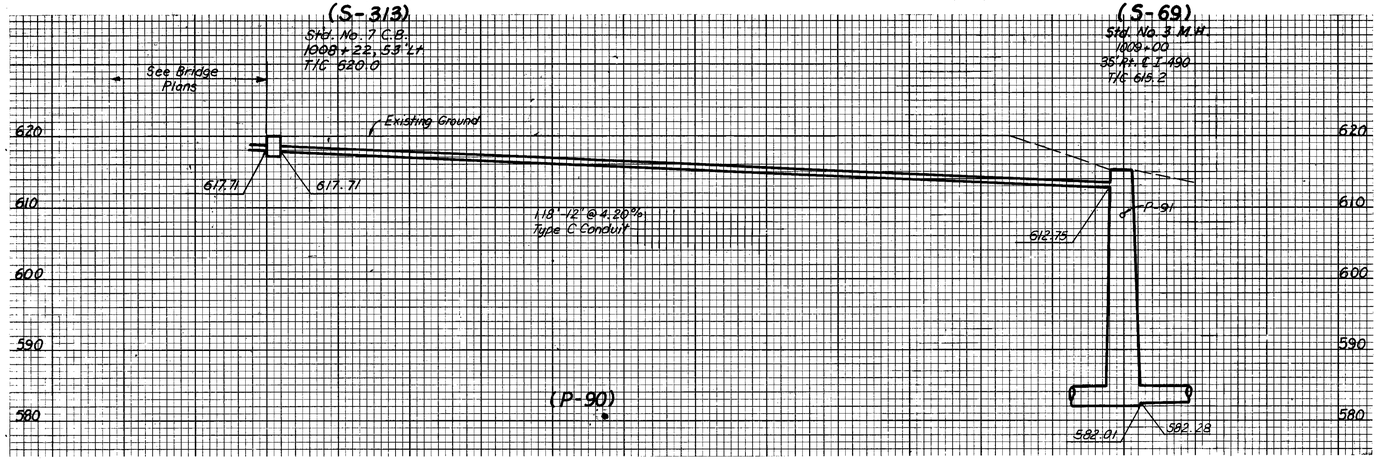
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

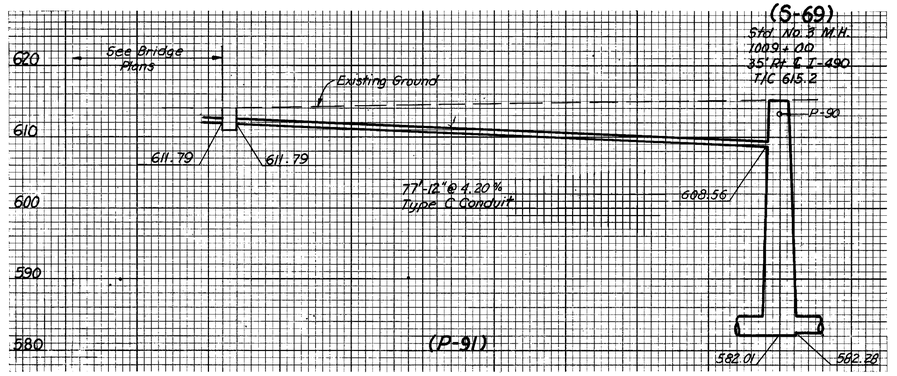
SEWER PROFILES (P-94) & (P-99) & (P-101) & (P-102) & (P-109) & (P-120) & (P-121)

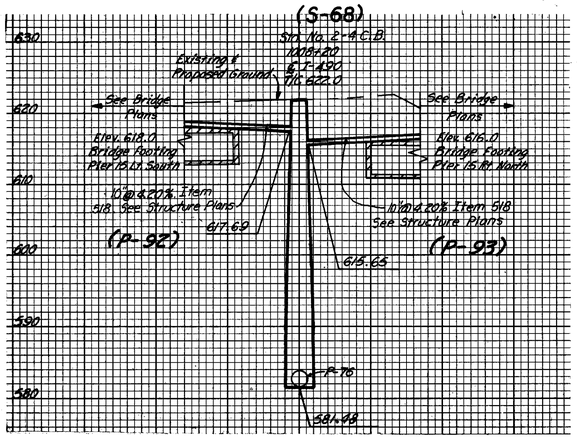
FHWA REGION	STATE	PROJECT	
5	OHIO		

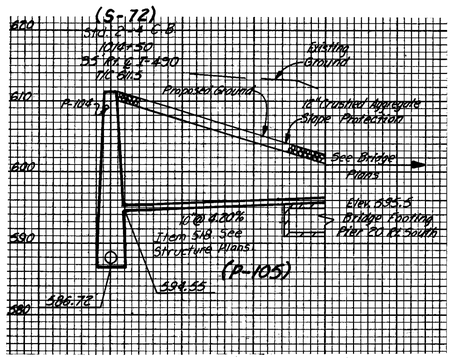
32A
174

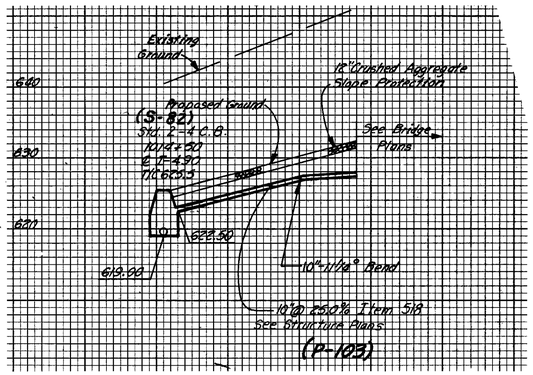
CUYAHOGA COUNTY
CUY- 490-1.00

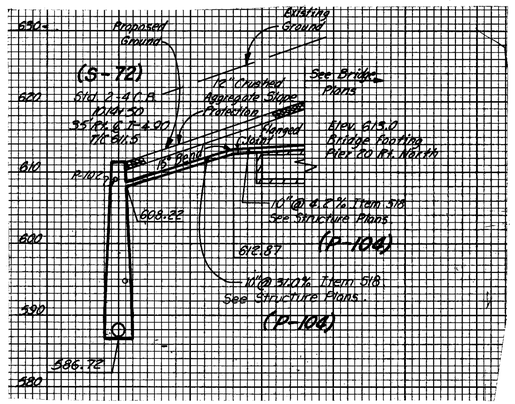


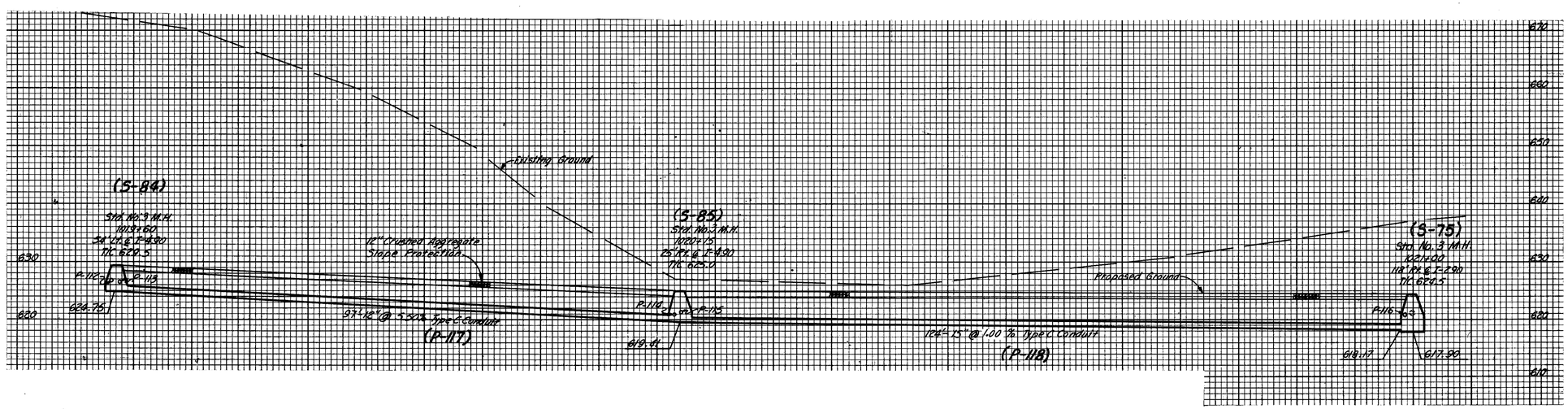












HORIZONTAL 10 0 10 20 30
VERTICAL 10 0 10 20 30
SCALE IN FEET

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

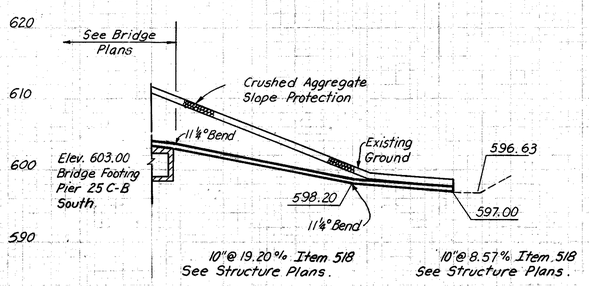
K&E 17 0483 9-69•

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

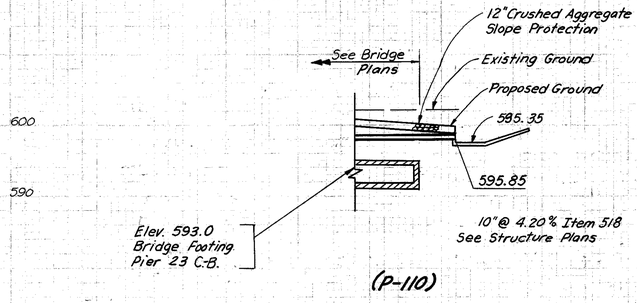
32B
174

CUYAHOGA COUNTY
CUY-290-0.27

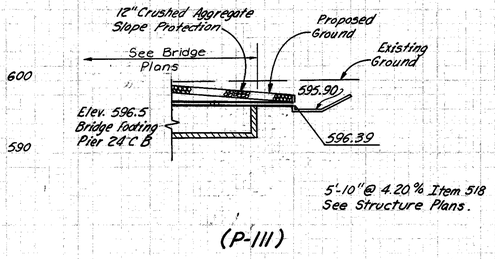
RSW (Made) 6-4-70
RMS (Traced) 6-4-70
DDS (Checked) 6-3-70



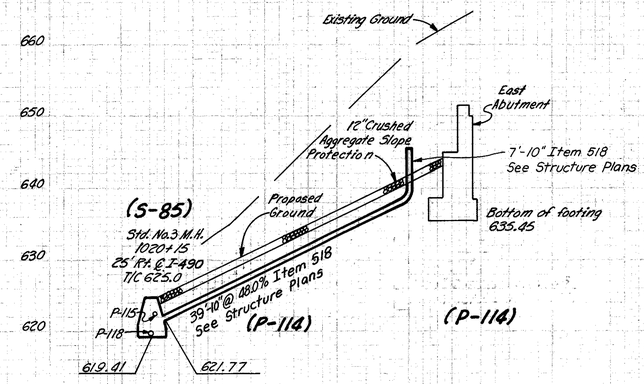
(P-108)

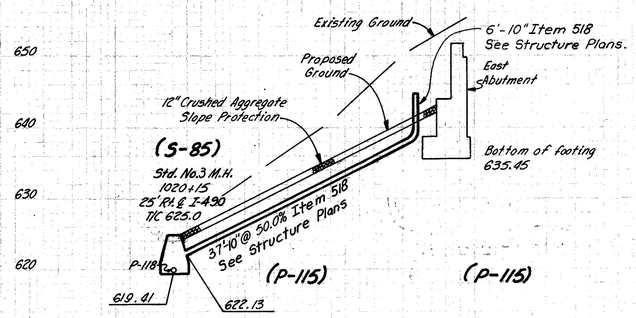


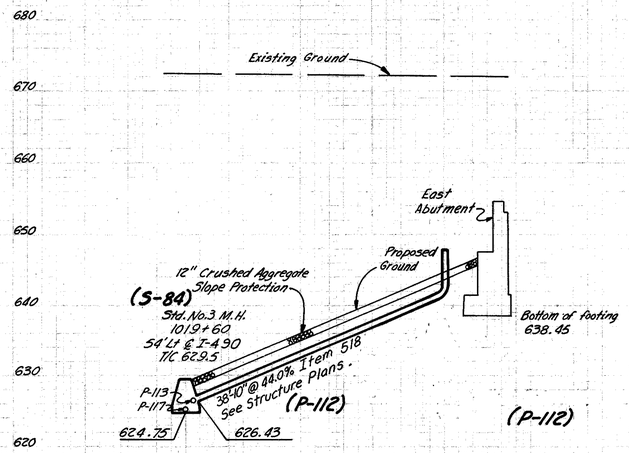
(P-110)

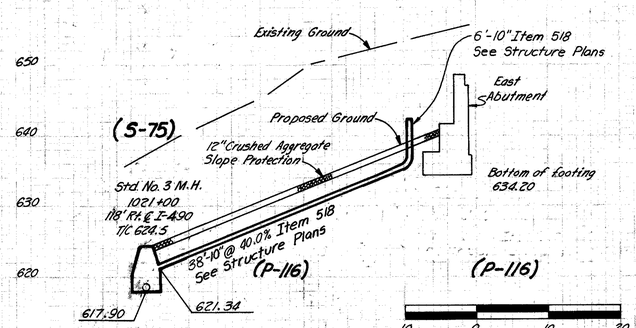


(P-111)









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

SEWER PROFILES (P-107) TO (P-108) & (P-110) TO (P-116)

FED. RD. DIVISION	STATE	PROJECT	
4	OHIO		

33
174

CUYAHOGA COUNTY
CUY-290-0.27

FINAL SURVEY	BY	DATE
SURVEYED		
PLOTTED	CSW (Made)	6-2-72
TEMPLATE	MAG (Traced)	7-12-70
AREAS		
AREAS CHECKED	DDS (Checked)	6-3-72
NOTE BOOK NO.		

ORIGINAL SURVEY	BY	DATE
SURVEYED		
PLOTTED		
TEMPLATE		
AREAS		
AREAS CHECKED		
NOTE BOOK NO.		

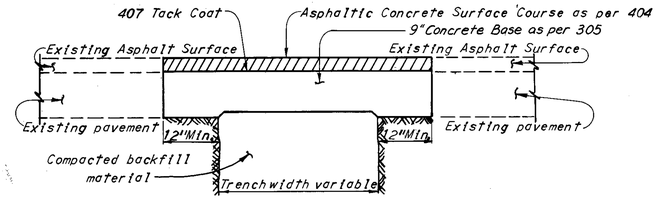
SANITARY SEWER PROFILES (SP-3) TO (SP-4) & (SP-6) TO (SP-9)

MISCELLANEOUS DETAILS

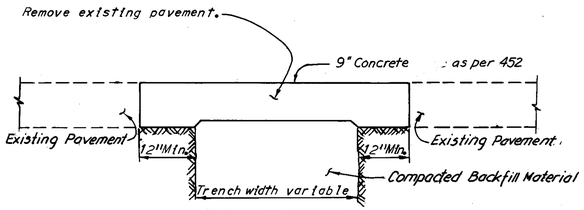
FHWA REGION	STATE	PROJECT	
5	OHIO		

34
174

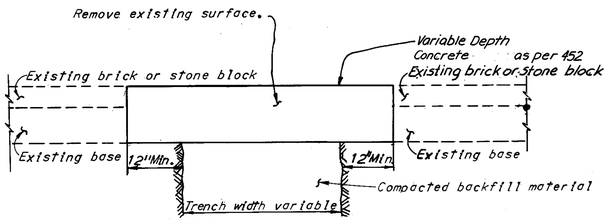
CUYAHOGA COUNTY
CUY- 490-1.00



TYPICAL SECTION
REPAVING OVER SEWER TRENCH
IN ASPHALT PAVEMENTS



TYPICAL SECTION
REPAVING OVER SEWER TRENCH
IN PAVEMENTS WITHOUT BASES



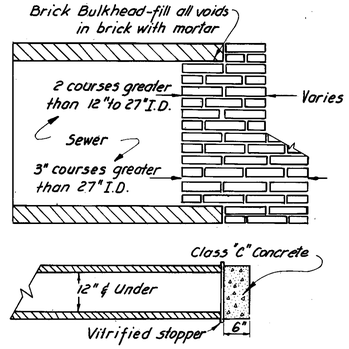
TYPICAL SECTION
REPAVING OVER SEWER TRENCH IN BRICK
OR STONE BLOCK PAVEMENTS WITH BASE

Notes:

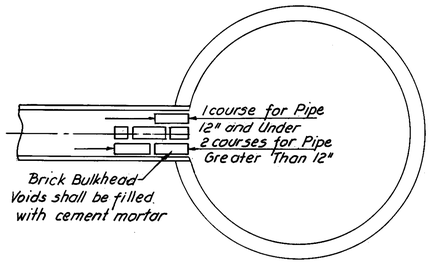
Compacted backfill material shall meet the requirements of 603.02.

For Concrete base work see standard drawings BP-3, BP-4 & BP-5.

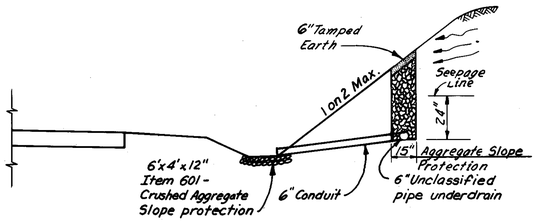
This detail shall be used to restore existing pavement where required by new sewer or water line conduit work.
Payment shall be included in the pertinent 603 Conduit Item or the pertinent water main Item.



PIPE BULKHEADS

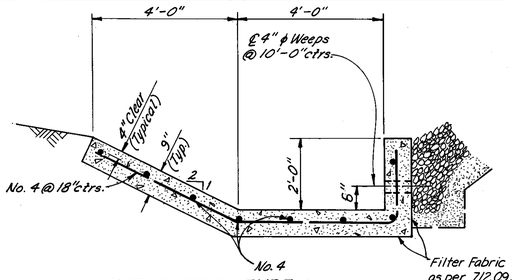


DETAIL FOR BULKHEAD PIPE CONNECTIONS
FROM WITHIN PIPES 4'-0" OR GREATER IN DIAMETER



UNDERDRAIN INTERCEPTOR ON SLOPE

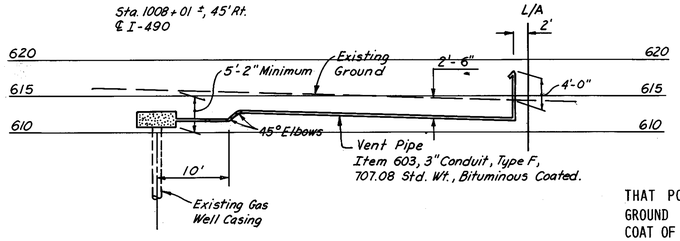
Note:
For Interceptor Drain note, see General Notes sheet 11



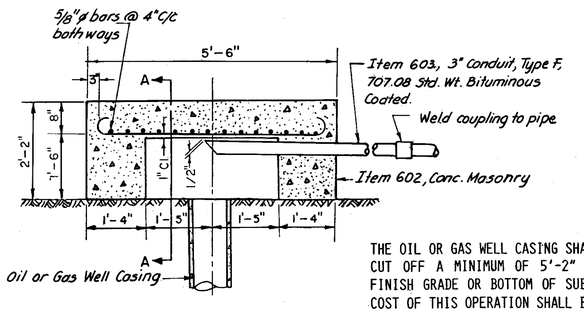
PAVED GUTTER, TYPE A
No Scale

MARK	NO.	LENGTH	SHAPE	BENDING DIAGRAM
401	1000	10'-6"	A	A
Total Reinforcing 14,485 lbs.				
Total Class "C" Concrete 448 Cu.Yds.				

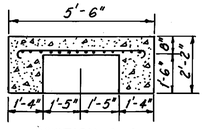
Note:
The above table of quantities is included with this drawing for estimating purposes only. The Cost of finishing & placing all Concrete & Reinforcing Steel and filterfabric shall be included in Item 601 for payment.



THAT PORTION OF THE PIPE ABOVE GROUND SHALL BE PRIMED WITH ONE COAT OF 708.06 AND PAINTED WITH TWO COATS OF 708.08 IN LIEU OF THE COAL TAR PAINT. THE PIPE OPENING SHALL BE PROTECTED WITH A WIRE SCREEN.



THE OIL OR GAS WELL CASING SHALL BE CUT OFF A MINIMUM OF 5'-2" BELOW FINISH GRADE OR BOTTOM OF SUBBASE. COST OF THIS OPERATION SHALL BE INCLUDED IN THE UNIT PRICE, BID FOR ITEM 602, CONCRETE MASONRY. THE PIPE SHALL BE COATED WITH TWO COATS OF COAL TAR PITCH PAINT AT 180 SQ.FT/GAL/COAT. COAL TAR PAINT SHALL BE INTERTOL 66, KOPPER BITUMASTIC 50 OR EQUAL.



SECTION A-A

GAS WELL
VENT DETAILS

QUANTITIES

602	CONCRETE MASONRY, AS PER PLAN	2 CU.YD.
603	3" CONDUIT, TYPE F, 707.08 STD. WT. BITUMINOUS COATED	50 LIN.FT.

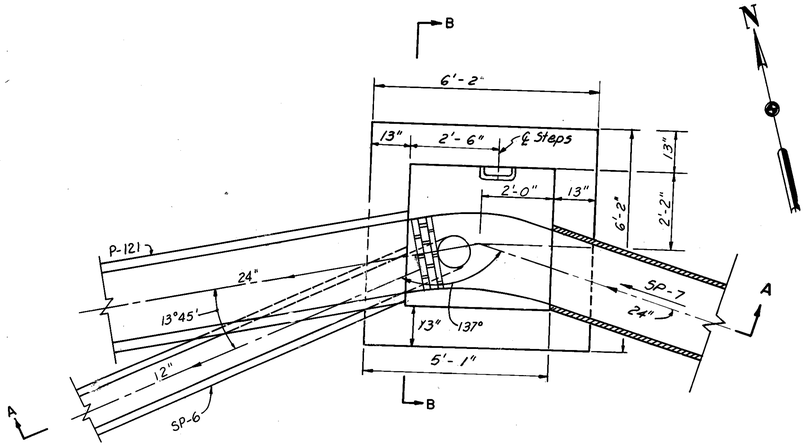
SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE _____ DATE _____ CONSULTING ENGINEERS
TRCD KDV DATE 2-7-94
CKD _____ DATE _____ KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

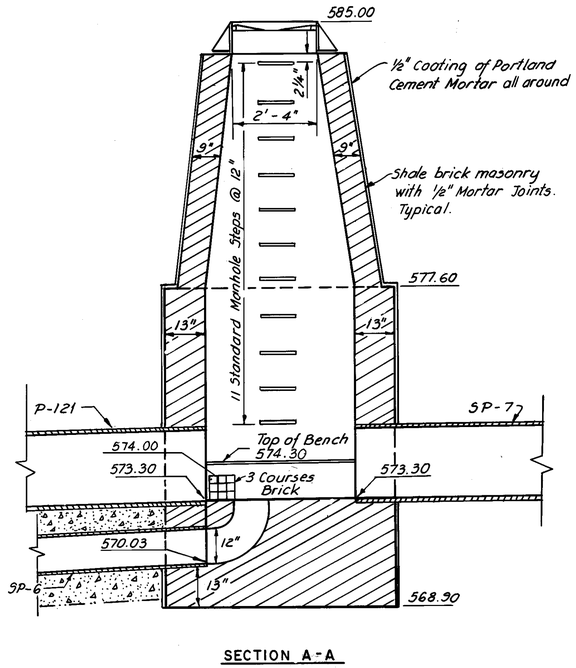
35
174

CUYAHOGA COUNTY
CUY. - 490 - 1.00

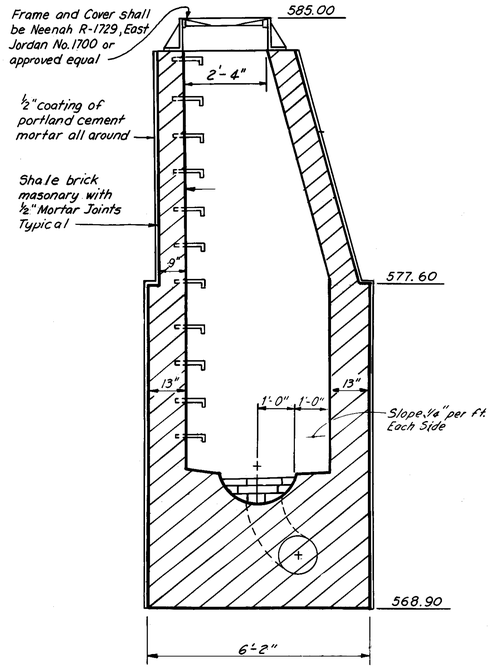
MISCELLANEOUS DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B

SEPARATOR MANHOLE SS-7

No Scale

Notes:
Steps shall conform with the requirements set forth on Standard drawing MH-1
Casting shall meet the requirements of 604.

SCALE	As Shown	HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE	LJD DATE 7-20-70	CONSULTING ENGINEERS
TRCD.	MAG DATE 7-21-70	KANSAS CITY CLEVELAND NEW YORK
CKD.	DDS DATE 7-27-70	

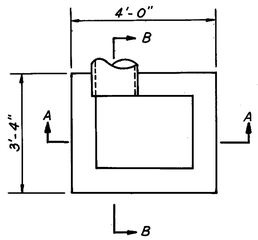
MISCELLANEOUS DETAILS

FHWA REGION	STATE	PROJECT	
5	OHIO		

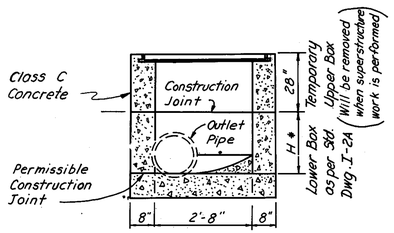
36
174

CUYAHOGA COUNTY
CUY- 490-1.00

Notes:
For additional notes and details see Standard Construction drawing I-2A.
For location of outlet pipe see drainage plans.

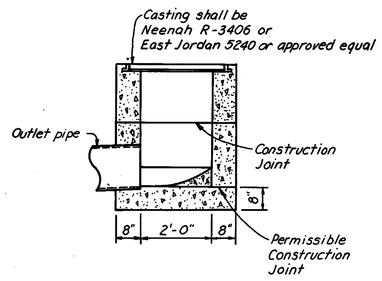


PLAN
(Casting not shown)



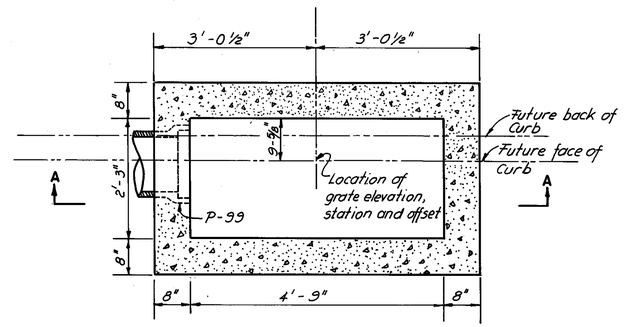
SECTION A-A

*H = 6.59' at (S-77)
H = 5.06' at (S-86)



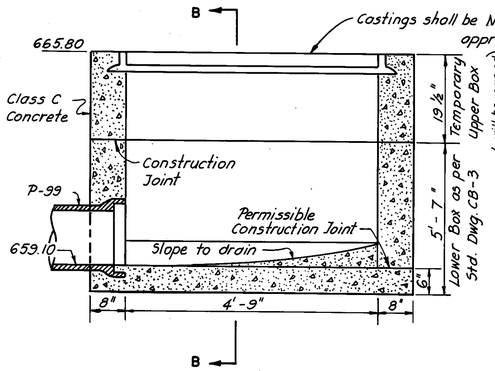
SECTION B-B

(S-77) AND (S-86)
STANDARD I-2A INLET MOD. AS PER PLAN

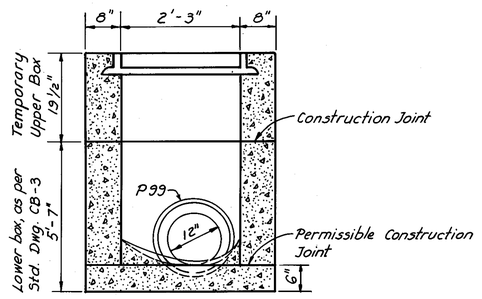


PLAN
(Casting not shown)

Note:
For additional notes and details, see Standard drawing CB-3.
For location of outlet pipe (P-99), see drainage plans.

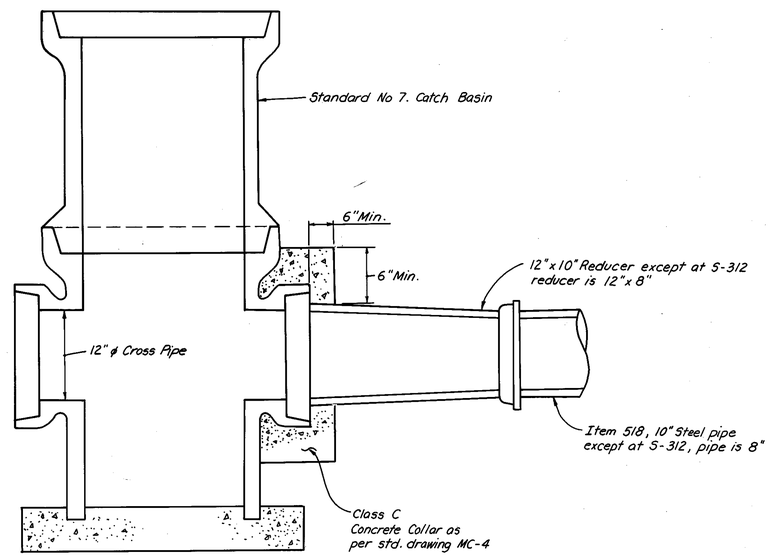


SECTION A-A



SECTION B-B

STANDARD NO.3 CATCH BASIN MODIFIED AS PER PLAN
(S-80)



Note:
Payment for reducer and concrete collar shall be included with Item 518. See bridge plan for quantities.

SCUPPER OUTLET PIPE CONNECTION AT STD. NO.7 C.B.

SCALE No Scale
MADE AHS DATE 3-8-84
TRCD KBV DATE 3-29-84
CKD RLN DATE 3-8-84
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

MISCELLANEOUS DETAILS

603 - SADDLE TYPE CONDUIT CONNECTION

FED. RD. DIVISION	STATE	PROJECT	
	OHIO		

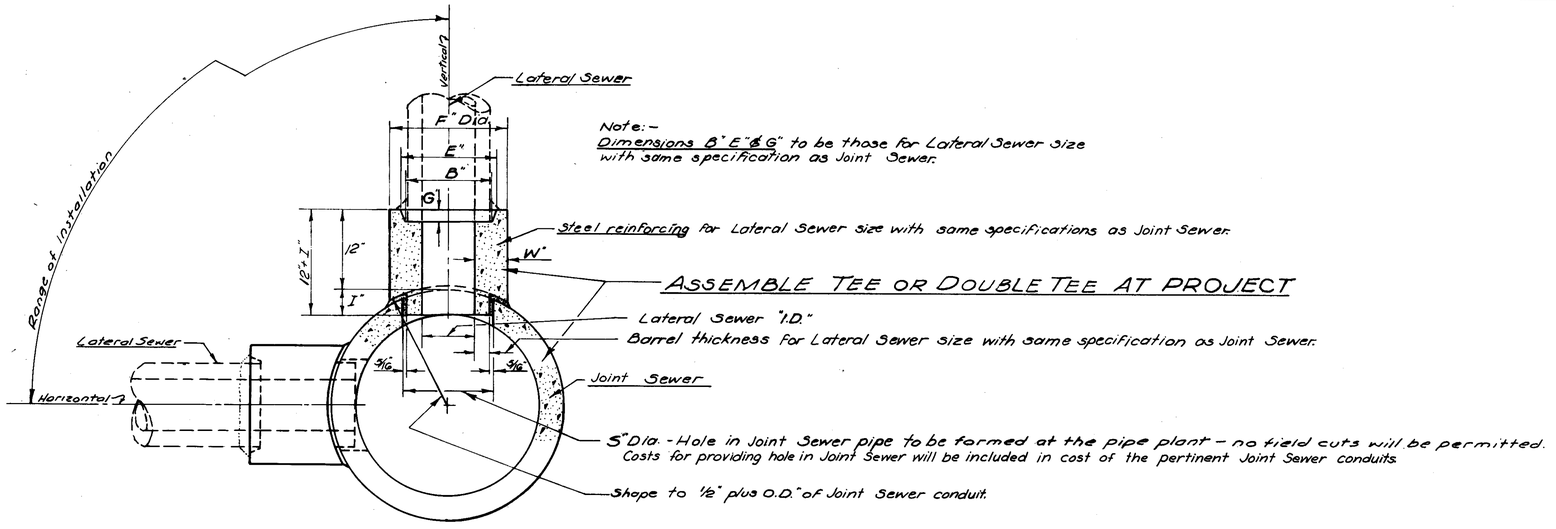
37
174

CUYAHOGA COUNTY
CUY.- 290-0.27

Note:- Concrete tees meeting the requirements of the plans and specifications, which are formed at the pipe plant and delivered as a complete unit, will be accepted as alternates to the concrete saddle type connections as shown hereon.

TABLE OF DIMENSIONS

JOINT SEWER Round	LATERAL SEWER (ROUND) 6" F	I	S	W	8" F	I	S	W	10" F	I	S	W	12" F	I	S	W	15" F	I	S	W	18" F	I	S	W	21" F	I	S	W	24" F	I	S	W	27" F	I	S	W	30" F	I	S	W	33" F	I	S	W	36" F	I	S	W	Remarks
	13½	2¾	10⅛	3¾																																												
21"		2¾																																														
24"		3"			15½	3"	12⅛	3¾	17½	3	14⅛	3¾	20	3"	16⅜	4"																																	
27"		3"				3"								3"																																		
30"		3½				3½			17½	3½	14⅛	3¾		3½																																	
33"		3½				3½				3½				3½																																		
36"		4"				4"				4"				4"			21½	4"	20⅛	4¾																											
39"		4"				4"				4"				4"				4"																													
42"		4½				4½				4½				4½				4½																													
48"		5"				5"				5"				5"				5"																													
54"		5½				5½				5½				5½				5½			28"	5"	23⅜	5"	31½	5½	27⅛	5¼																			
60"		6"				6"				6"				6"				6"				6½				6½				7"				7½				8"				8½				9"			
66"		6½				6½				6½				6½				6½				7"				7"			36"	6"	30⅜	6"	30⅜	6½	34⅛	6¼	43"	8"	37⅜	6½	46⅛	8"	41⅛	6¾				
72"		7"				7"				7"				7"				7"				7½				7½				7½			39½	7"	34⅛	6¼		8½				8½				8½			
78"		7½				7½				7½				7½				7½				8"				8"				8"																	
84"		8"				8"				8"				8"				8"				8½				8½				8½																	
90"		8"				8"				8"				8"				8"				9"				9"				9"																	
96"		8½				8½				8½				8½				8½				9"				9"				9"																	
108"		9"				9"				9"				9"				9"				9"				9"				9"																	
120"	13½	10"	10⅛	3¾	15½	10"	12⅛	3¾	17½	10"	14⅛	3¾	20	10"	16⅜	4"	21½	10"	20⅛	4¾	28	10"	23⅜	5"	31½	10"	27⅛	5¼	36"	10"	30⅜	6"	39½	10"	34⅛	6¼	43"	10"	37⅜	6½	46⅛	10"	41⅛	6¾	50"	10"	44⅜	7"	
114"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	"	10½"	"	"	



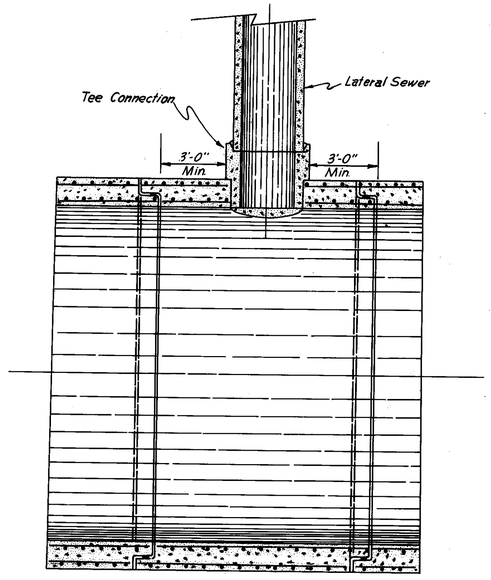
Note:- Dimensions B" E" & G" to be those for Lateral Sewer size with same specification as Joint Sewer.

DETAIL

SHOWING

- "ON - "SADDLE TYPE TEE
- "ON - "SADDLE TYPE DOUBLE TEE

FOR CONCRETE PIPE ONLY



SECTION

MINIMUM JOINT CLEARANCE

SCALE None
MADE DATE
TRCD DATE
CKD DATE

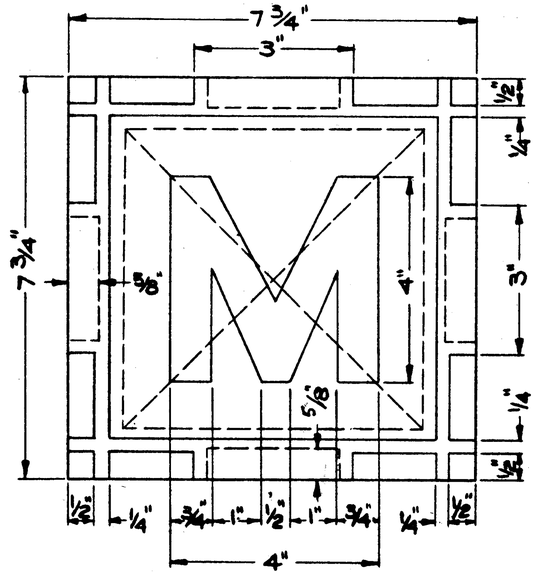
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

Revised HNTB 3-25-66
Prepared by O.S.H.D. 11-20-62

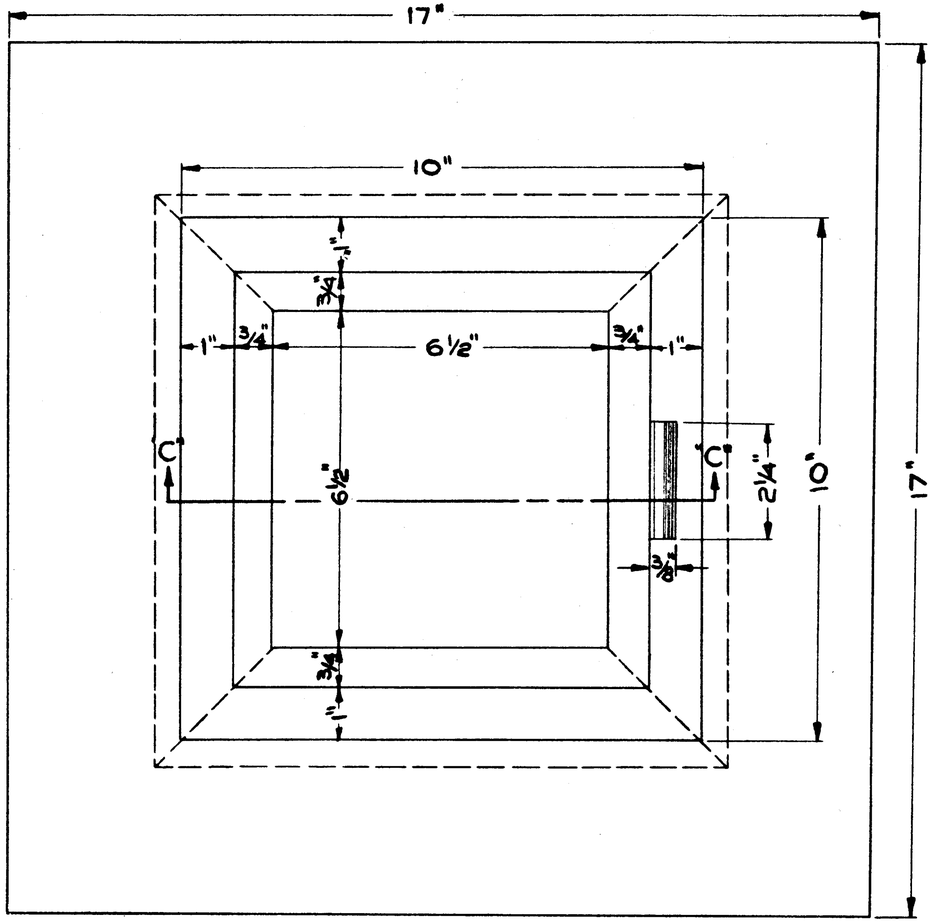
FHWA REGION	STATE	PROJECT	
5	OHIO		

38
174

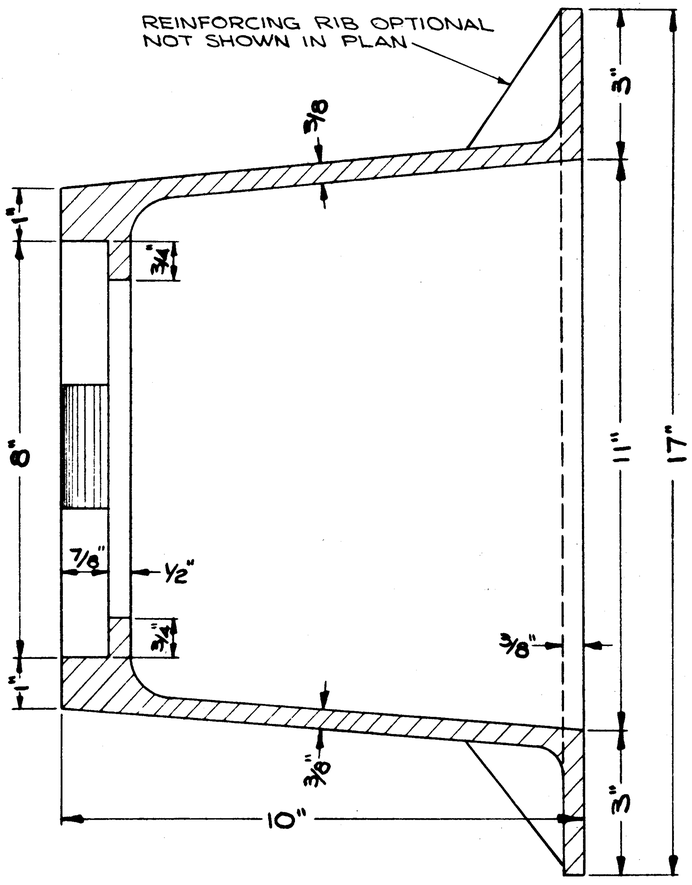
CUYAHOGA COUNTY
CUY-490-1.00



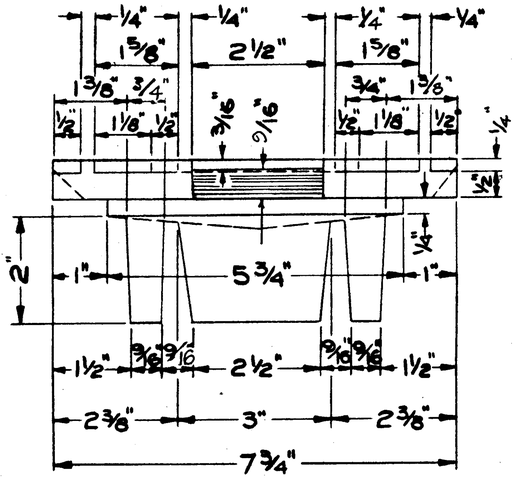
PLAN OF COVER



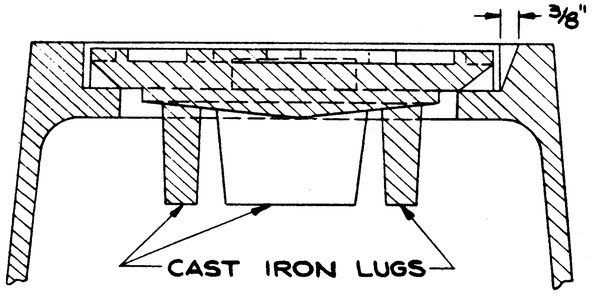
PLAN OF FRAME
(RIBS NOT SHOWN)



SECTION OF FRAME



SIDE VIEW OF COVER



SECTION "C"-"C"
SIDE VIEW
OF COVER
LID IN PLACE

MINIMUM WEIGHT OF COVER - 15 POUNDS
MINIMUM WEIGHT OF FRAME - 70 POUNDS

MADE JAG DATE 11-3-83
TRACED DATE
CHECKED DATE
SCALE NO SCALE

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

CITY OF CLEVELAND
ENGINEERING DIVISION
RALPH C. TYLER - DIRECTOR OF PUBLIC SERVICE

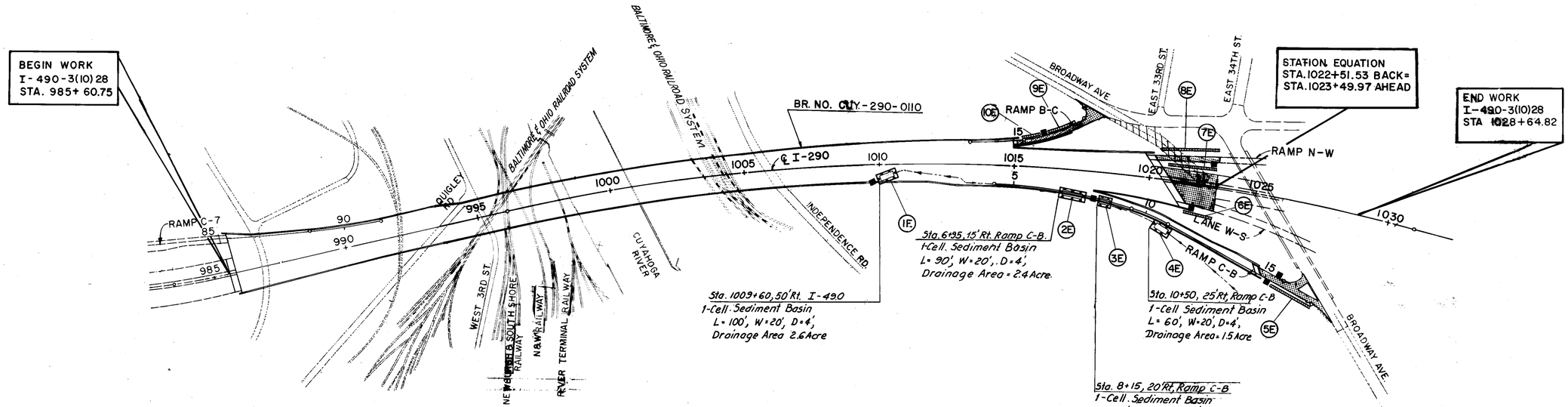
DETAIL OF
MONUMENT BOX FRAME & COVER

TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

FHWA REGION	STATE	PROJECT	
5	OHIO		

39
174

CUYAHOGA COUNTY
CUY- 490-1.00

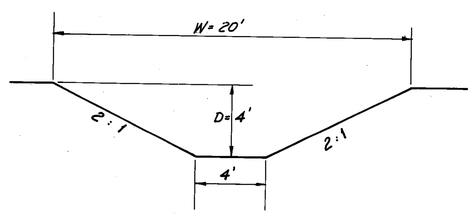


TEMPORARY EROSION AND SEDIMENT CONTROL					
CODE	LOCATION		SIDE	ITEM 207 STRAW OR HAY BALES	ITEM 207 TEMPORARY SEDIMENT BASIN
	FROM	TO		EACH	CU. YDS.
1E	I-490 1009+60	I-490 1010+50	Rt.		178
2E	Ramp C-B 6+95	Ramp C-B 7+85	Rt.		160
3E	Ramp C-B 8+15	Ramp C-B 8+75	Rt.		107
4E	Ramp C-B 10+50	Ramp C-B 11+10	Rt.		107
5E	Ramp C-B 15+30	Ramp C-B 17+10	Rt.	180 ÷ 3.5 = 51	
6E	I-490 1021+50	I-490 1022+50	Rt.	100 ÷ 3.5 = 29	
7E	I-490 1020+65	I-490 1022+51 Bk.	Lt.	186 ÷ 3.5 = 53	
8E	I-490 1020+35	I-490 1022+51 Bk.	Lt.	217 ÷ 3.5 = 62	
9E	Ramp B-C 15+80	Ramp B-C 18+00	Rt.	120 ÷ 3.5 = 34	
10E	Ramp B-C 15+00	Ramp B-C 18+00	Rt.	80 ÷ 3.5 = 23	
		TOTAL		252	552

PLAN

200 0 200 400 600 800

SCALE IN FEET



SEDIMENT BASIN - TYPICAL SECTION

4 0 4 8 12 16

SCALE IN FEET

LEGEND

- Straw or Hay Bales, Filter Dike
- Proposed Catch Basin
- Sediment Basin
- Proposed Ditch, or Paved Gutter

QUANTITY CALCULATIONS
MADE BY RLN DATE 1-28-84
CHECKED BY KBV DATE 1-29-84

MADE RLN DATE 1-28-84
TRACED KBV DATE 1-30-84
CHECKED KBV DATE 1-29-84
SCALE As Shown

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

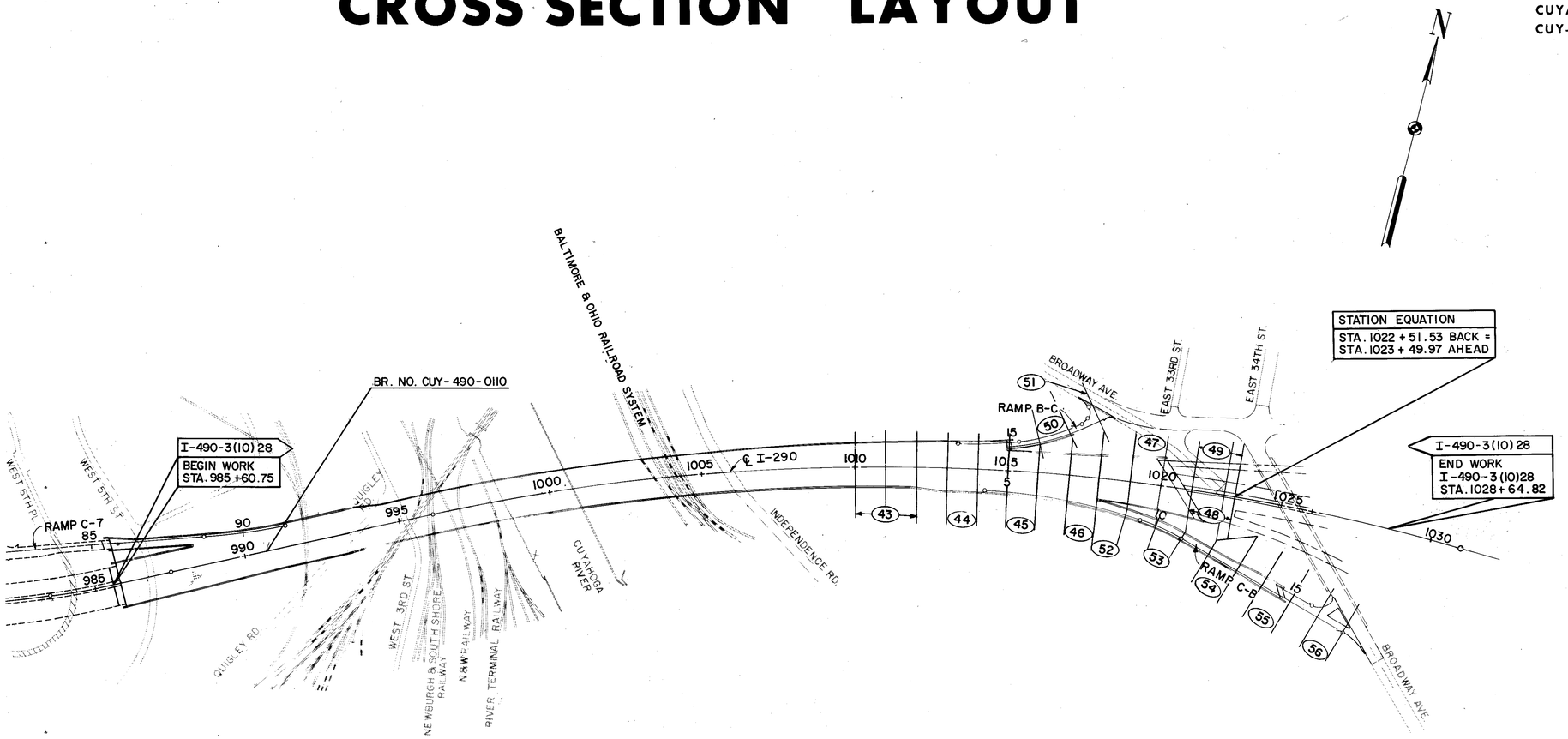
HNTB

FHWA REGION	STATE	PROJECT	
5	OHIO		

42
174

CUYAHOGA COUNTY
CUY- 490-1.00

CROSS SECTION LAYOUT



200 0 200 400 600 800

SCALE IN FEET

SCALE 1"=200' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE
TRCD. T.D. DATE CONSULTING ENGINEERS
CKD. R.L.M. DATE KANSAS CITY CLEVELAND NEW YORK

K&E 17 0483 9-69

L1-1

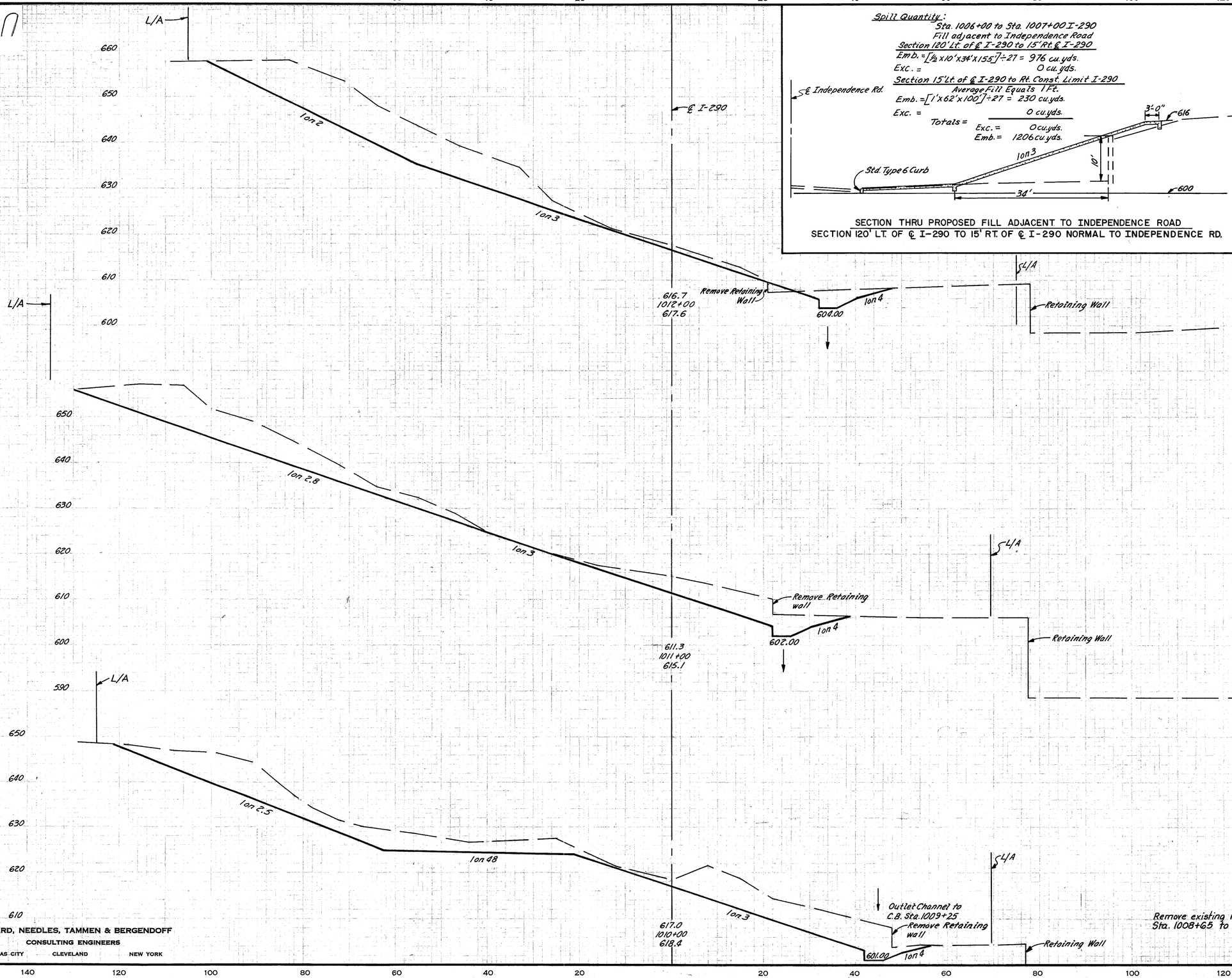
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

43
174

CUYAHOGA COUNTY
CUY-290-0.27

Spill Quantity:
Sta. 1006+00 to Sta. 1007+00 I-290
Fill adjacent to Independence Road
Section 120' Lt. of ℄ I-290 to 15' Rt. ℄ I-290
Emb. = [½ x 10' x 34' x 155] ÷ 27 = 976 cu. yds.
Exc. = 0 cu. yds.
Section 15' Lt. of ℄ I-290 to Rt. Const. Limit I-290
Average Fill Equals 1 Ft.
Emb. = [1' x 62' x 100] ÷ 27 = 230 cu. yds.
Exc. = 0 cu. yds.
Totals = Exc. = 0 cu. yds.
Emb. = 1206 cu. yds.

SECTION THRU PROPOSED FILL ADJACENT TO INDEPENDENCE ROAD
SECTION 120' LT. OF ℄ I-290 TO 15' RT. OF ℄ I-290 NORMAL TO INDEPENDENCE RD.



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
Spill Quantity		0	1206
630	6		
		2278	6
600	0		
		2430	0
712	0		
		555	0
		218	0

SPILL QUANTITY
1009+00 Rt. To 1010+00 Rt.
Exc. = [100 x (300/2)] ÷ 27
1009+35 Lt. To. 1010+00 Lt.
Exc. = [65 x (0+12/2) x ½] ÷ 27

Remove existing retaining wall
Sta. 1008+65 to Sta. 1011+72

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

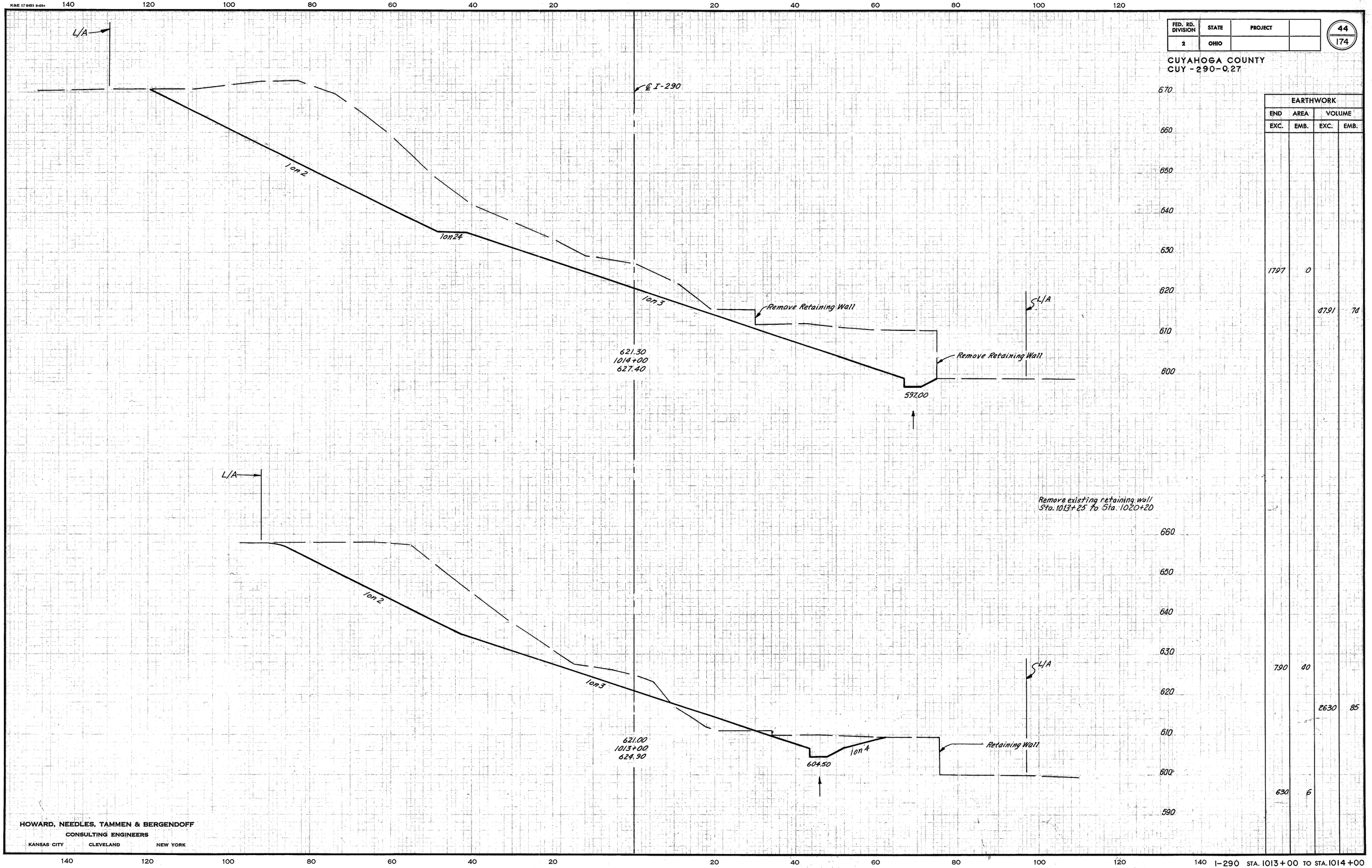
140 120 100 80 60 40 20 20 40 60 80 100 120 140 I-290 STA. 1010+00 TO STA. 1012+00

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

44
174

CUYAHOGA COUNTY
CUY - 290 - 0.27



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1797	0		
		4791	74
790	40		
		2630	85
630	6		

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

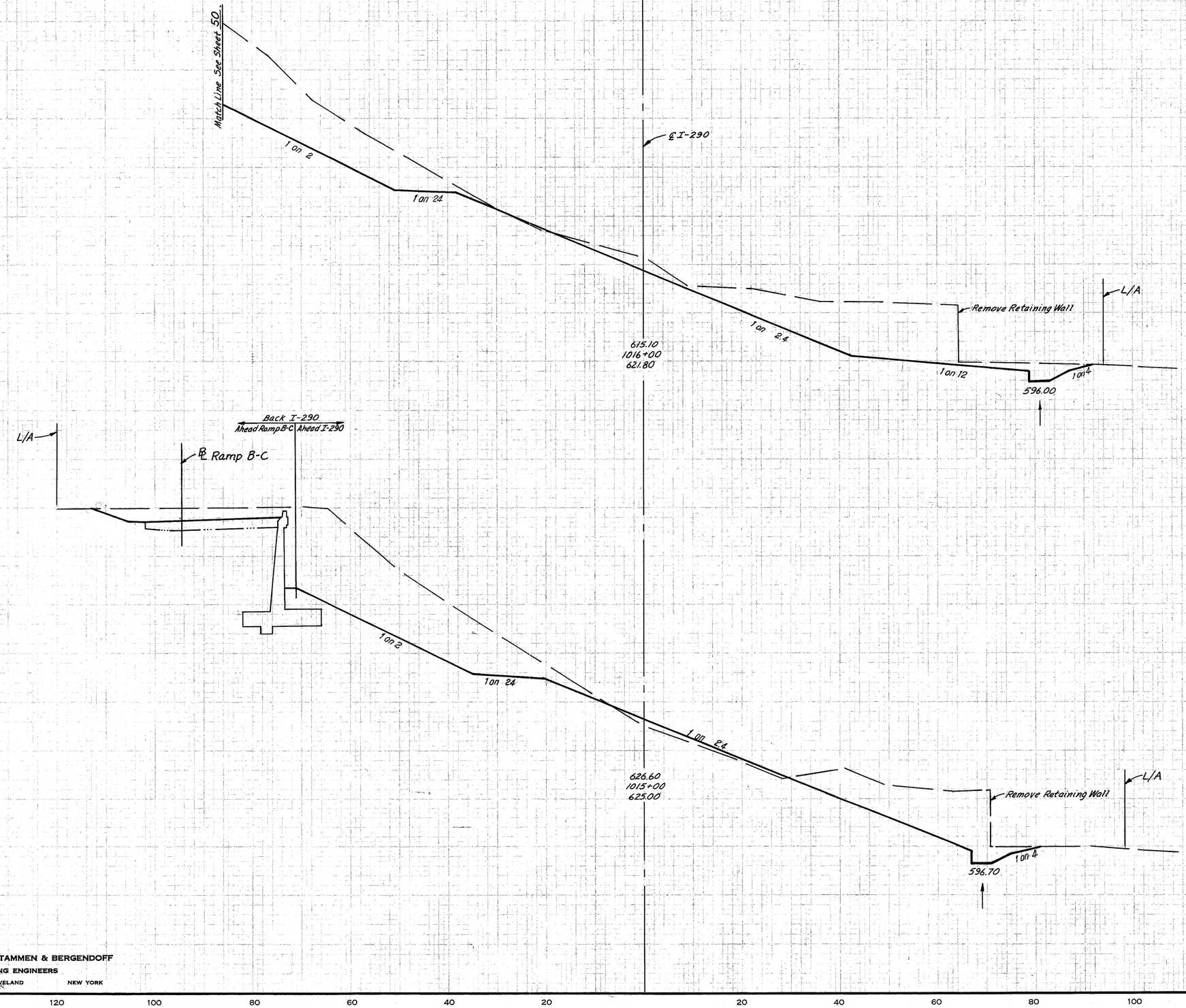
I-290 STA. 1013+00 TO STA. 1014+00

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

45
174

CUYAHOGA COUNTY
CUY - 290 - 0.27



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1030	1		
		377.9	65
B-C Ahead	141	0	
I-290 Ahead	1010	34	
I-290 Back	1151	34	
		5459	63
1797	0		

I-290 STA. 1015+00 TO STA. 1016+00

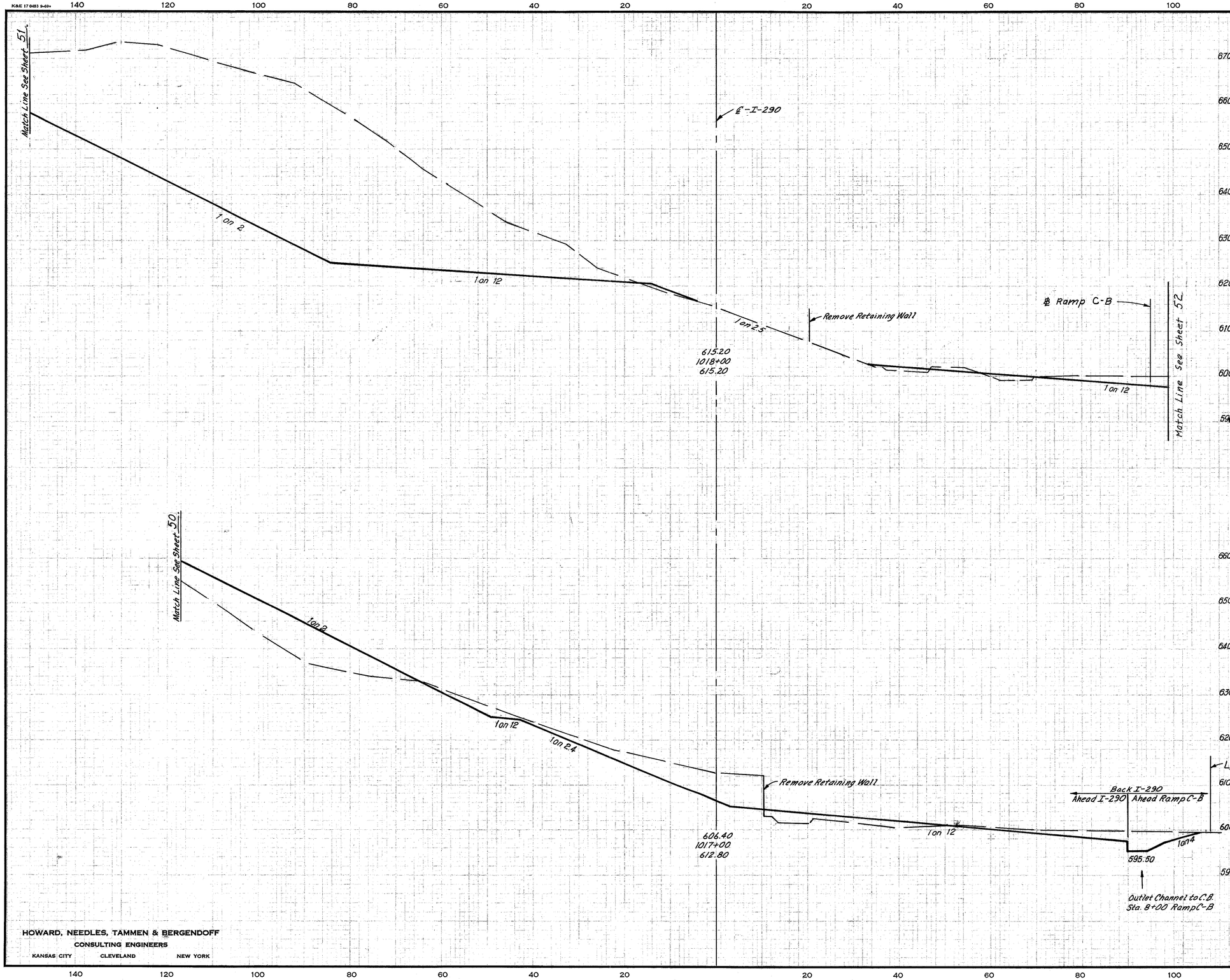
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

46
174

CUYAHOGA COUNTY
CUY - 290 - 0.27



EARTHWORK

	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	2924	14		
			5891	661
Ramp C-B Ahead	61	0		
I-290 Ahead	257	343		
I-290 Back	298	343		
			2459	657
	1030	1		

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

I-290 STA. 1017+00 TO STA. 1018+00

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

47
174

CUYAHOGA COUNTY
CUY-290-0.27

140 120 100 80 60 40 20 | 20 40 60 80 100 120

LA ℄ R/W 158'

℄ Ramp N-W

Back I-290
Ahead I-290 Lt. Ahead I-290 Rt.

1on 2

Wingwall

Abutment Ramp N-W

1on 3

1on 12

626.70
1020+00
650.70

1on 2

Remove Retaining Wall

1on 12

Match Line See Sheet 53

670 660 650 640 630 620 610 600 590

B
Match Line
B

LA ℄ R/W

1on 2

B
Match Line
B

670
660

160 150

1on 12

619.20
1019+00
624.90

1on 24

Remove Retaining Wall

1on 12

Match Line See Sheet 52

670 660 650 640 630 620 610 600 590

EARTHWORK

	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
Ahead I-290 Lt.	2790			
Ahead I-290 Rt.	670			
	3060	0		
			13,742	39
	3961	21		
			12,750	65
	2924	14		

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

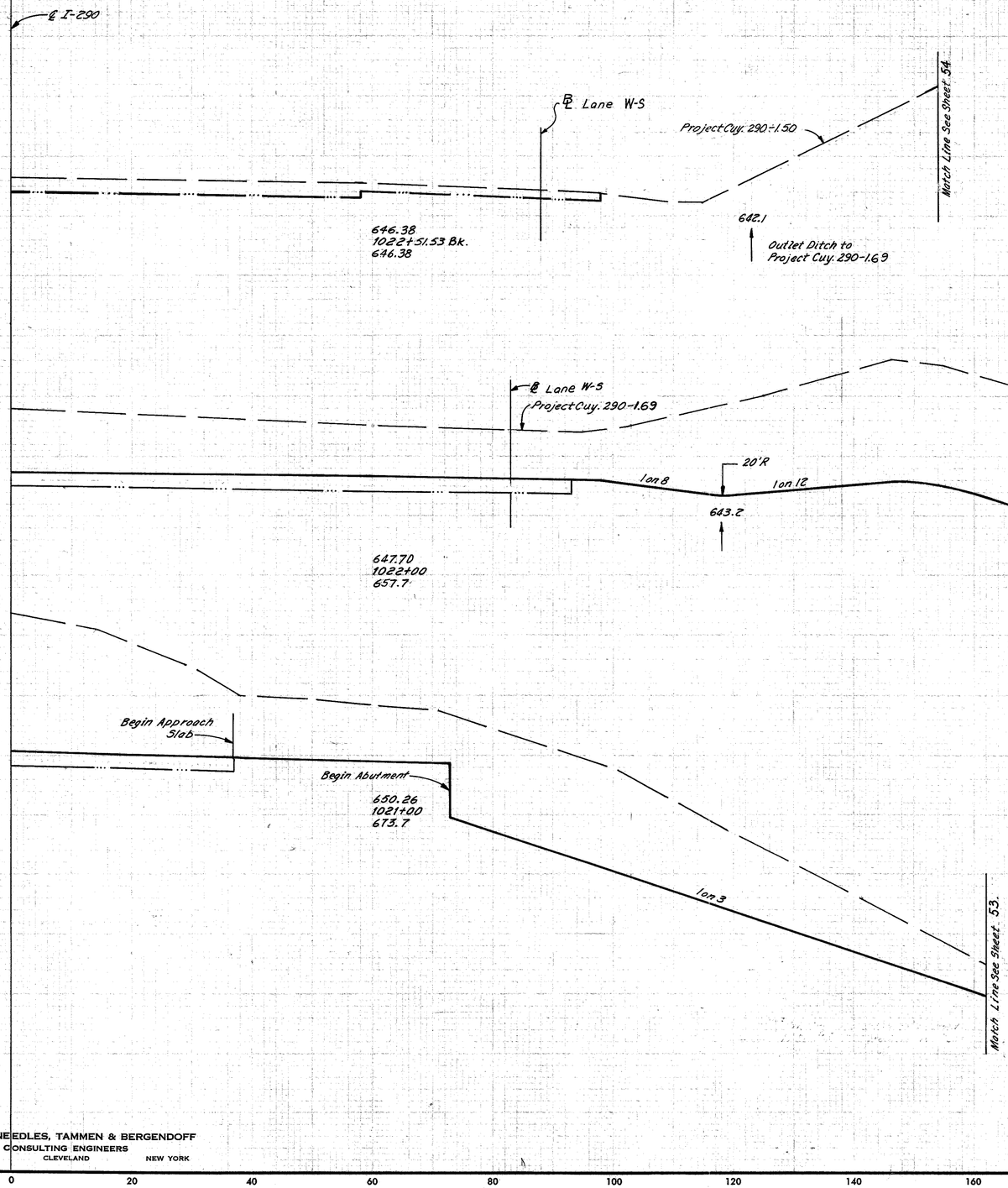
140 120 100 80 60 40 20 | 20 40 60 80 100 120 140

I-290 STA. 1019+00 TO STA. 1020+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

48
174

CUYAHOGA COUNTY
CUY-290-0.27



Estimated embankment between existing ditch, approximate Sta. 1022+22 and Sta. 1022+51.53

At 1021+72, use 1021+00 end area.

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
				0
				112
1022+22	0	0		
			972	0
1022+00	2387	0		
			2381	0
	2205	0		
			5880	0
	2205	0		
			5324	0
	670	0		

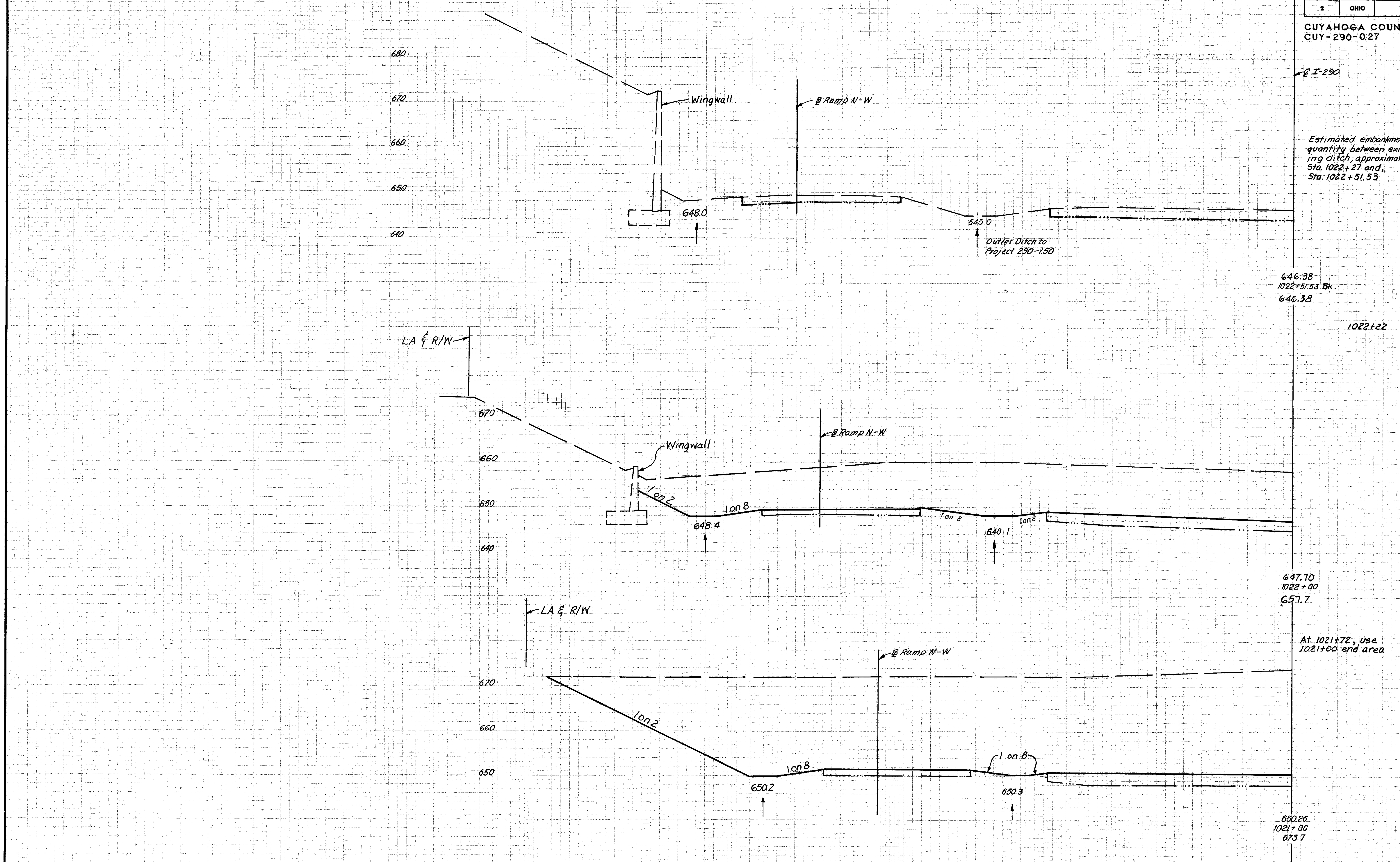
E. B. I-290 STA. 1021+00 RIGHT HALF TO STA. 1022+51.53

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

HNTB 8/17/89 MMD 10/2/89

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-290-0.27



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
Estimated embankment quantity between existing ditch, approximate Sta. 1022+27 and, Sta. 1022+51.53	–	–	–	112
1022+22	0	0		
			739	0
	1815	0		
			2539	0
At 1021+72, use 1021+00 end area	3081			
			8216	0
	3081	0		
			10872	0
	2790	0		

HLD 8/21/69 RRD 10/1/69 HLD 9/8/69

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

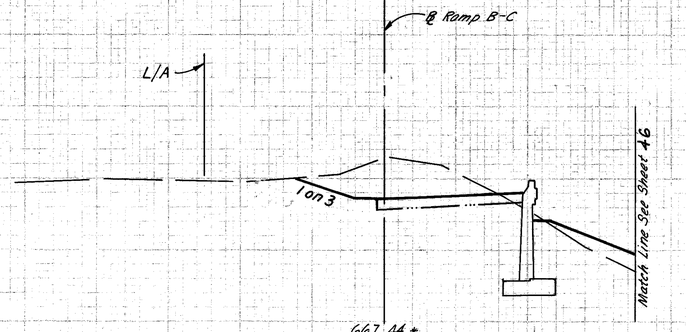
LEFT HALF
RAMP N-W & W.B. I-290 STA. 1021+00 TO STA. 1022+51.53

K&E 17 0483 9-69

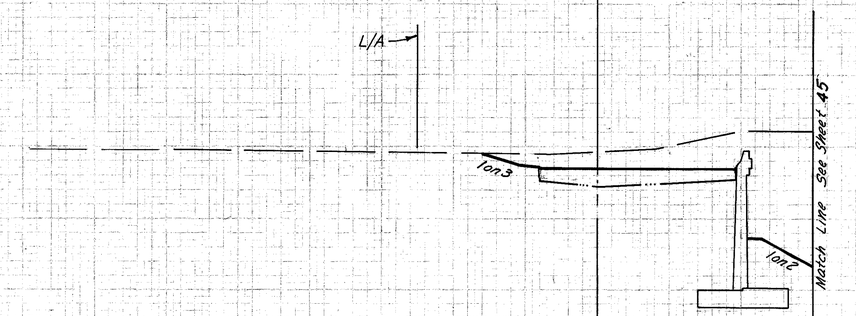
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

50
174

CUYAHOGA COUNTY
CUY-490-1.00



667.44 *
17+00
672.9



666.24 *
16+00
669.0

670
660
650
640
630
620

* P.G. Elev. +0.5'

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
80	19		
		643	35
267	0		
		756	0
141	0		

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

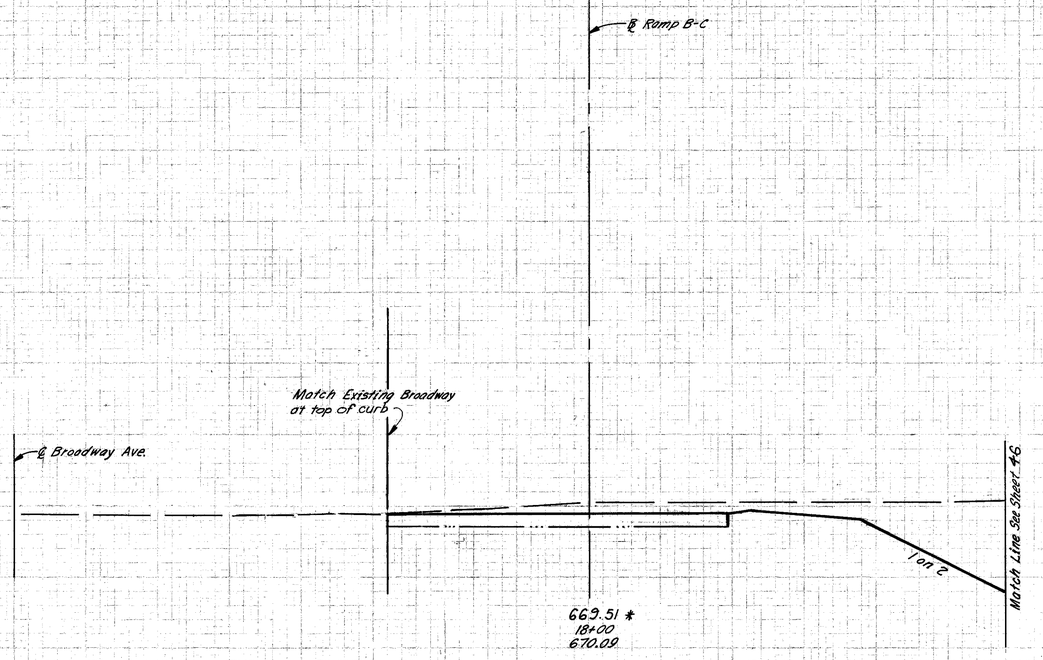
RAMP B-C STA. 16+00 TO STA. 17+00

KoE 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

51
174

CUYAHOGA COUNTY
CUY-490-1.00



Spill Quantity
Sta. 18+00 to 18+55
Exc. = $\left[55 \times \left(\frac{186}{2}\right) \times \frac{1}{2}\right] \div 27 = 186$ Cu. Yds.
Emb. = 0

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
0	0		
		186	0
193	0		
		506	35
80	19		

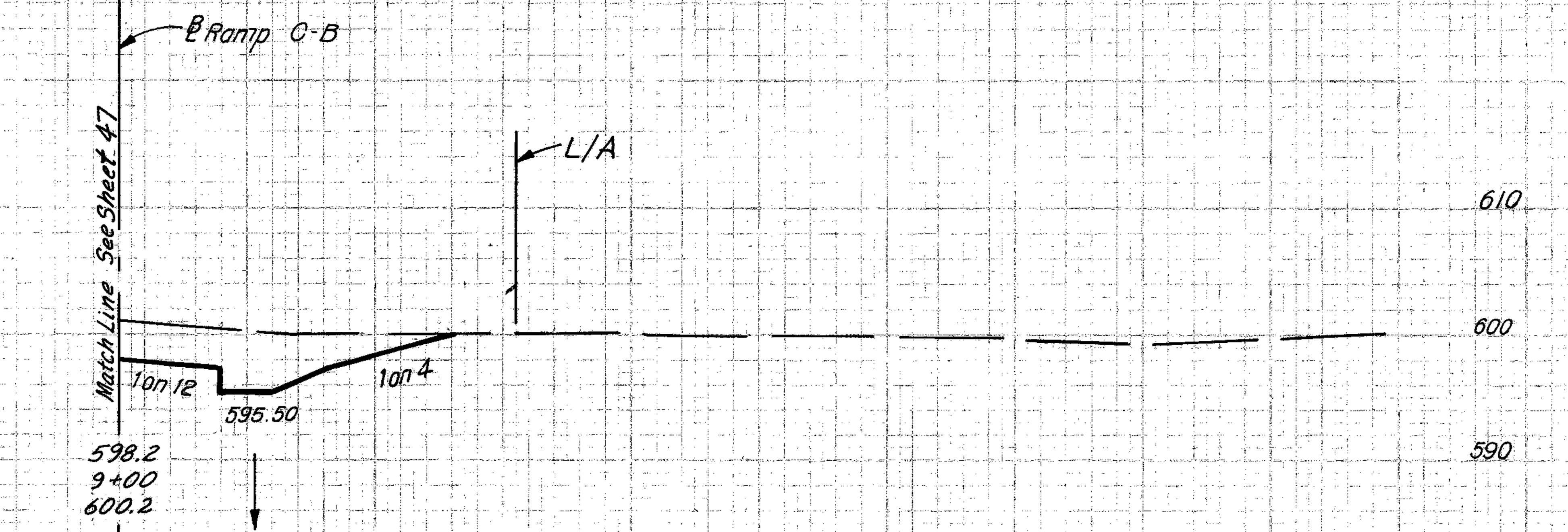
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY - CLEVELAND NEW YORK

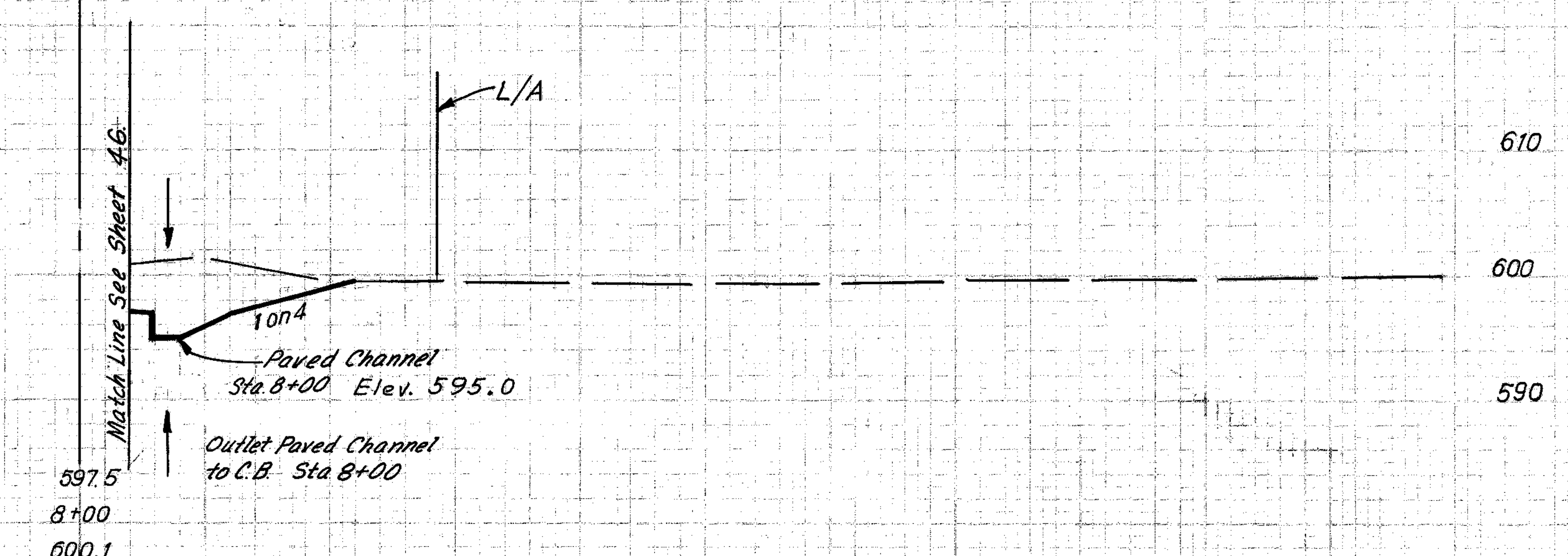
RAMP B-C STA. 18+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

52
174

CUYAHOGA COUNTY
CUY-490-1.00





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
68	0		
		233	0
58	0		
		183	0
41	0		

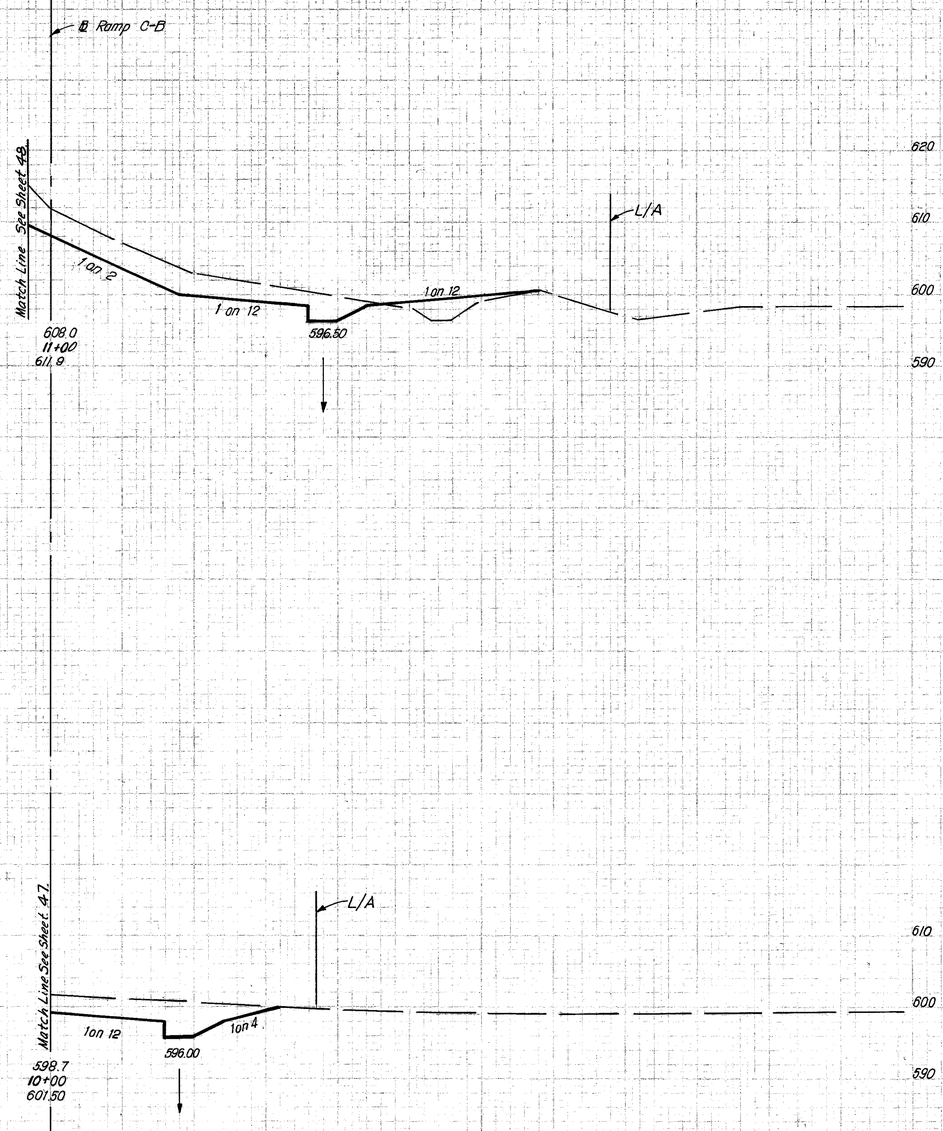
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

53
174

CUYAHOGA COUNTY
CUY -490- 1.00



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
152	23		
		431	21
81	0		
		276	0
68	0		

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

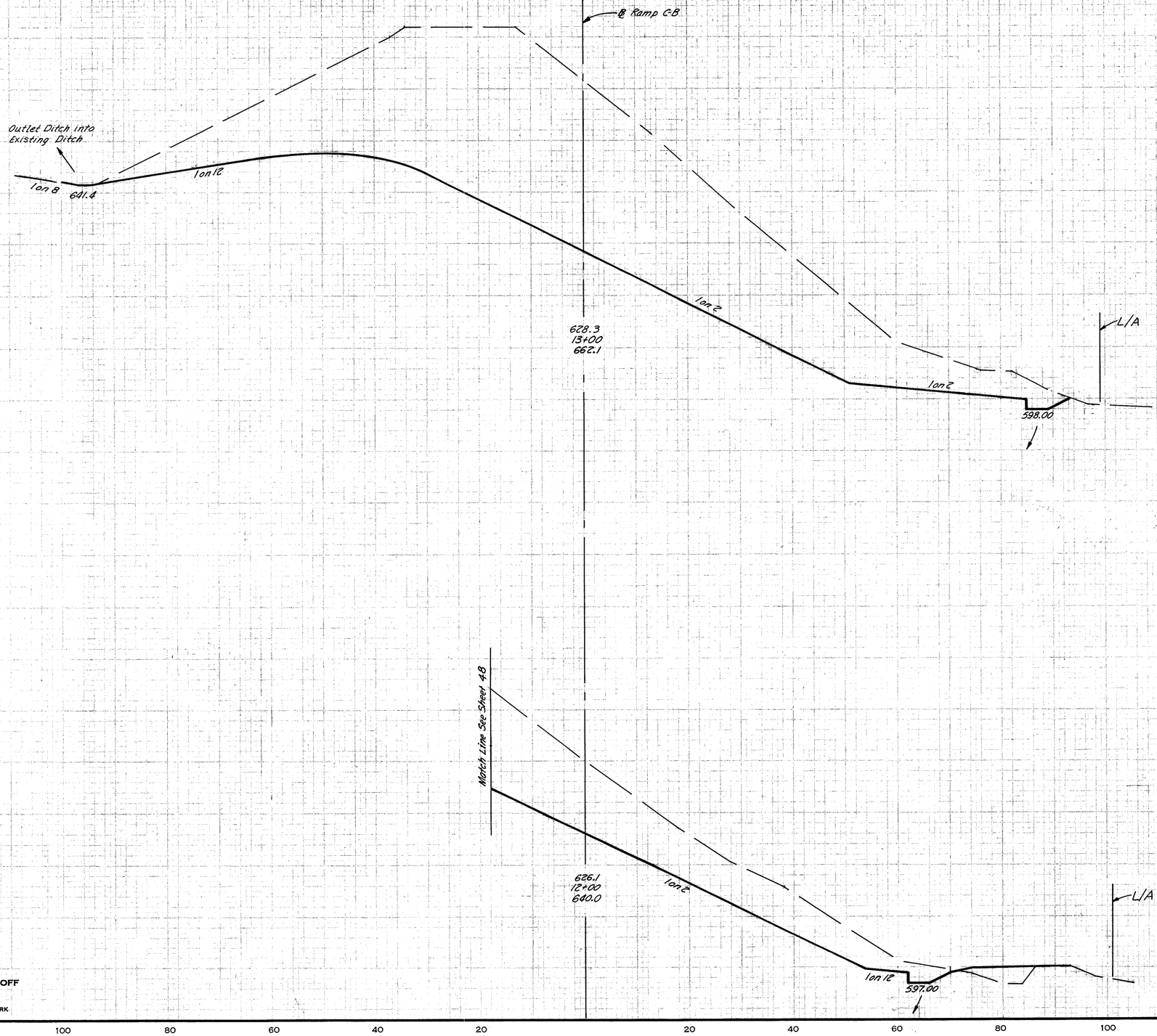
RAMP C-B STA. 10+00 TO STA. 11+00

K&E 17 0483 5-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

54
174

CUYAHOGA COUNTY
CUY-490-1.00



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3320	0		
		7715	56
846	30		
		1848	98
152	23		

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

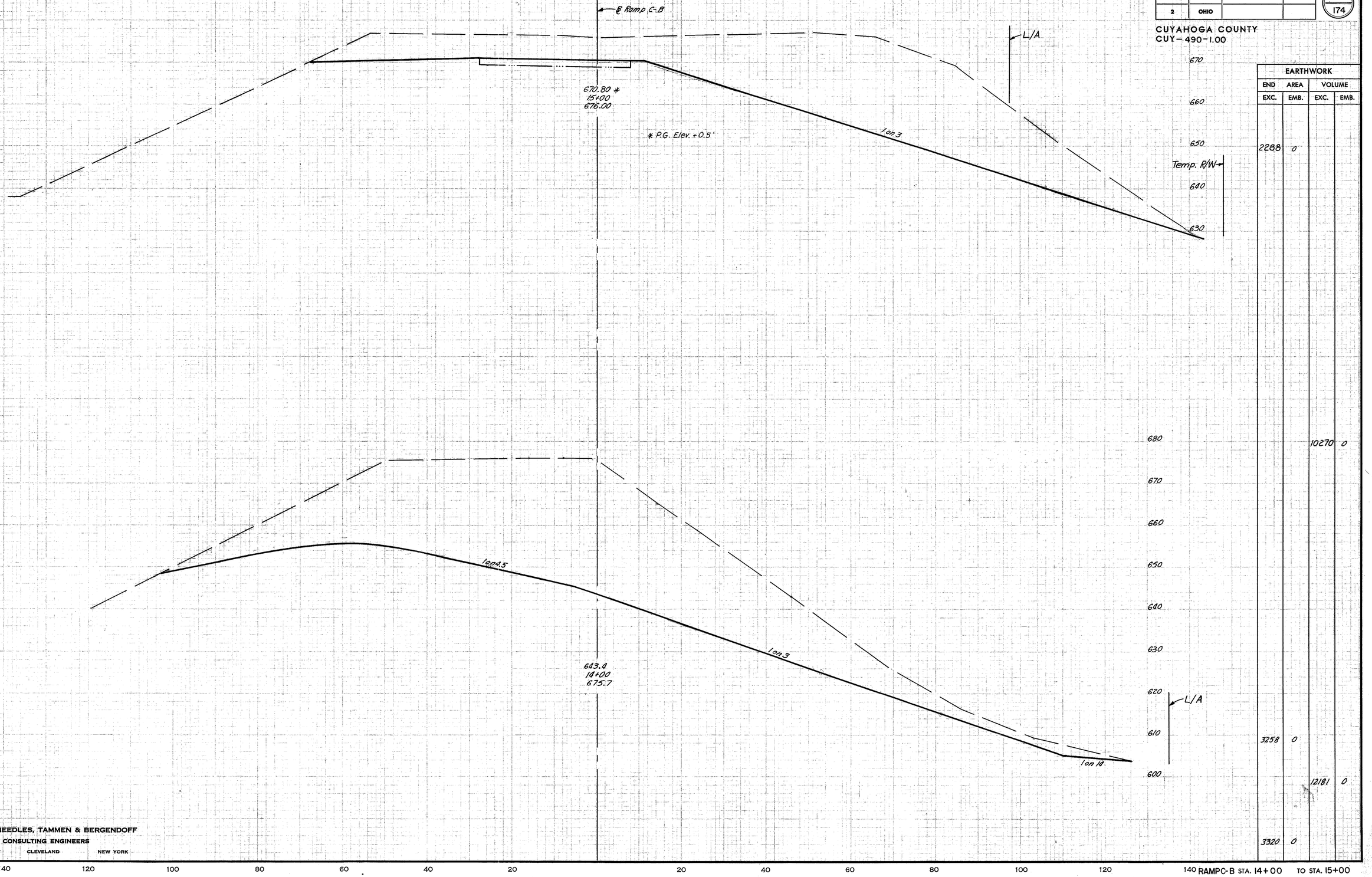
RAMP C-B STA. 12+00 TO STA. 13+00

K&E 17 0483 9-69

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

55
174

CUYAHOGA COUNTY
CUY-490-1.00



EARTHWORK

END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
2288	0		
		10270	0
3258	0		
		12181	0
3320	0		

RAMP C-B STA. 14+00 TO STA. 15+00

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

K&E 17 0483 9-69

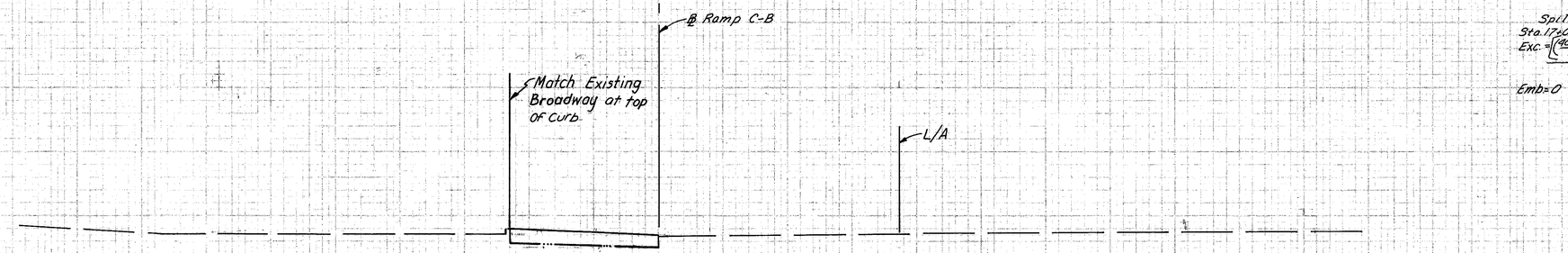
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

56
174

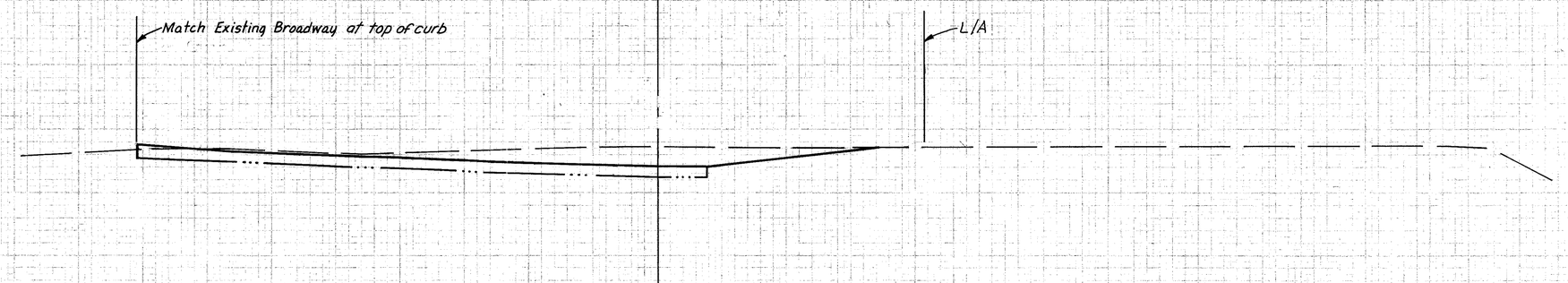
CUYAHOGA COUNTY
CUY- 490-1.00

Spill Quantity:
Sta. 17+00 to Sta. 17+55
Exc. $= \frac{\left(\frac{(90+0)}{2} \times 55 \times \frac{1}{2}\right)}{27} = 20$ Cu. Yds.
Emb = 0

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
		20	0
5	0		
		313	0
164	0		
		4541	0
		2288	0



* P.G. Elev. + 0.5'



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

RAMP C-B STA. 16+00 TO STA. 17+00

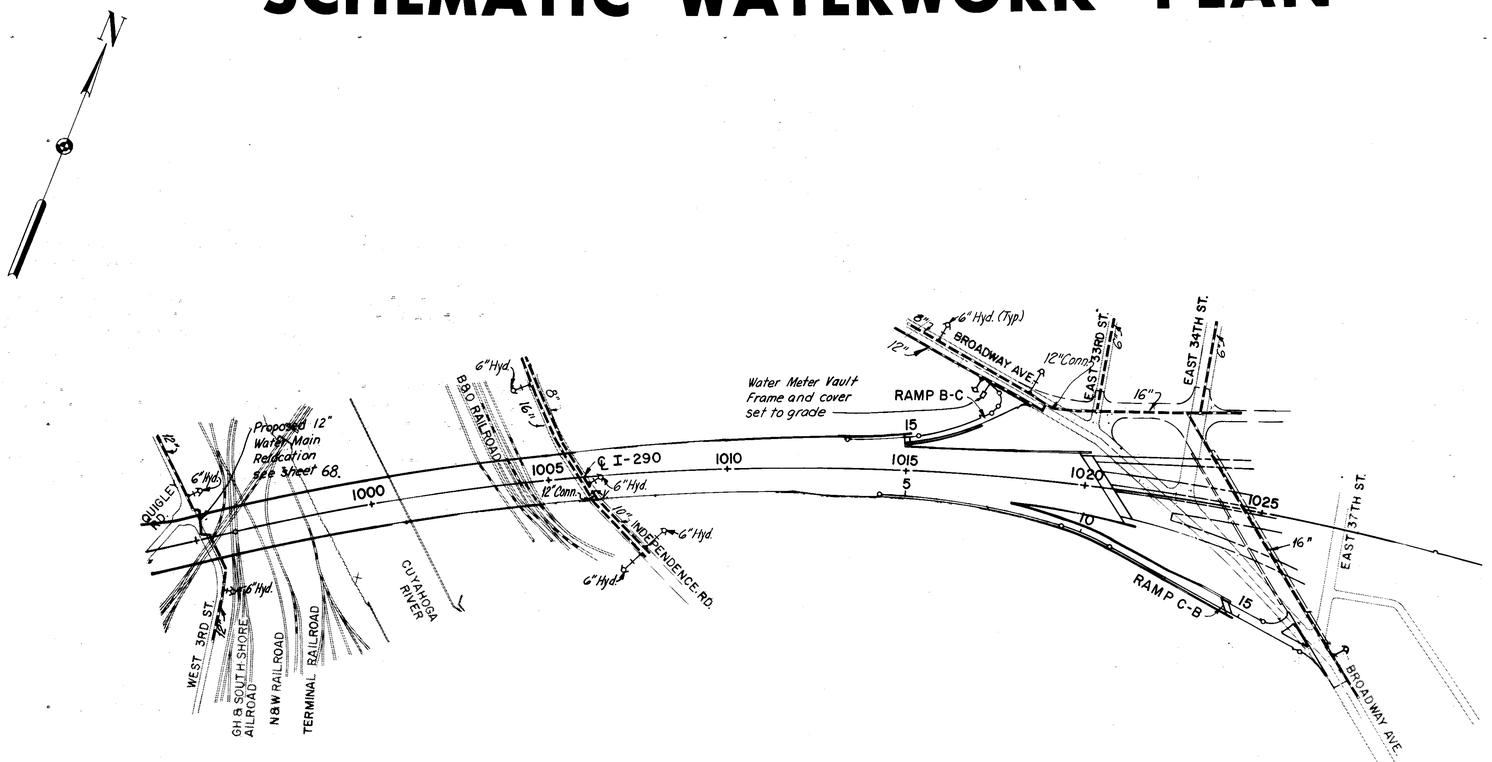
SCHEMATIC WATERWORK PLAN

FHWA REGION	STATE	PROJECT	
5	OHIO		

57/174

1/14

CUYAHOGA COUNTY
CUY- 490-1.00



LEGEND

Existing - - - - -

Proposed ———

200 0 200 400 600 800

SCALE IN FEET

George S Potoh
DIRECTOR OF PUBLIC UTILITIES
Acting

COMMISSIONER OF WATER AND HEAT

APPROVED _____ DATE 6/26/85

William J. Sweeney
ENGINEER OF DESIGN REVIEW

MADE R.L.N. DATE 2-7-84
TRACED T.D. DATE 2-7-84
CHECKED A.H.S. DATE 2-7-84
SCALE 1"=200'

Howard, Needles, Tammen & Bergendoff
CONSULTING ENGINEERS
CLEVELAND, OHIO

HNTB

HOLD

SCHEMATIC WATERWORK PLAN

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

58 / 174

CUYAHOGA COUNTY
CUY.- 490-1.00

2 / 14

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.

Existing 12" water main at future location of bridge pier is to be relocated. Water meter vault frame and cover is to be set to grade .

WORK TO BE DONE BY THE CITY OF CLEVELAND , DIVISION OF WATER

The Contractor will install all tapping sleeves, valves and valve boxes. In the case of new mains and new house service connections the city will make the tap . The contractor shall supply the tapping sleeves and valves , lead, and do all the necessary excavation, backfilling, and repaving required therefore. In addition to the above requirements the contractor shall furnish all air compressors required for the work under the specified item .

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. The charges include cost of labor , use of pipe cutting machine , and truck . The contractor shall do all necessary excavation, backfilling and repaving and air compressor equipment shall be furnished by the contractor. Charges may be obtained from the permit-sales section of the division of water and heat .

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, arrangements for City Inspectors are to be made by notifying Inspection & Enforcement, Division of Water 271-4264 within 3 weeks of construction. No work will be accepted unless inspected.

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 backfilled.

(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 determine 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, or pipe cutting by the contractor.

(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.

(F) In the period from May to October shutdowns may not be permitted due to system water demands without special approval of the Commissioner of Water and Heat.

(G) Service is to be maintained in the 6" water main under St Olga Street and the proposed Interstate-490 until the relocation of the West 7th Street has been completed and the new main placed into service.

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 & REPORTS

Notwithstanding the requirments 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 - January 1, 1983" shall govern.

HANDLING PIPE AND ACCESSORIES

(A) - Unloading: Cast iron or Ductile 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 _____

ENGINEER OF DESIGN REVIEW

SCALE	HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE E.R.H. DATE 3/16/70	CONSULTING ENGINEERS
TRCD. H.L.O. DATE 3/17/70	KANSAS CITY CLEVELAND NEW YORK
CKD. DATE	

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

59/174

CUYAHOGA COUNTY
CUY. - 490-1.00

3/14

GENERAL

(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

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, except branch sleeves and valves which will be installed by the Contractor with the pressure tap made by the City. 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

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. THE CHARGES 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. CHARGES MAY BE OBTAINED FROM THE PERMIT-SALES SECTION OF THE DIVISION OF WATER AND HEAT.

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 unsheeted 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 backfilled 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 Shut-off 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. 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 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, and dispose of the same.

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.

QUANTITY CALCULATIONS

MADE BY RLN DATE 7-8-83
CHECKED BY KBV DATE 7-11-83

APPROVED _____ DATE _____

ENGINEER OF DESIGN REVIEW

SCALE _____
MADE ERH DATE 3/10/70
TRCD. HJO DATE 3/12/70
CK'D _____ DATE _____

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

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY.- 490-1.00

60 / 174

4 / 14

GENERAL

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 relief valves, 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 removeable 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 3 weeks 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. System demands may control the time of day, week, month or year, when valves may be closed. No consideration for delays caused by such controlling demands will be allowed. The contractor shall thoroughly investigate possible conditions where closing of valves may be restructed to a certain time. The City Water department will specify the time and/or special conditions when work may be performed.

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 ordered by the engineer, 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 tampingshall 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 as specified in Section 703.02 of the State of Ohio Department of Transportation Construction Materials and Specifications - January 1, 1983."

(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 $\frac{3}{4}$ 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 $\frac{3}{4}$ 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 _____

ENGINEER OF DESIGN REVIEW

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE ERH DATE 3/10/70
TRCD. WLO DATE 3/13/70
CKD. _____ DATE _____
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

LOW SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

61/174

CUYAHOGA COUNTY
CUY.- 490-1.00

5/14

GENERAL

ROAD SURFACES, SIDEWALKS, DRIVEWAYS, AND CURBING

(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 TO THE CITY OF CLEVELAND "STANDARDS AND SPECIFICATIONS FOR CONSTRUCTION OF PAVEMENTS, SIDEWALKS AND SEWERS" OF THE MOST RECENT ISSUES.

THE CONTRACTOR SHALL BEAR THE ENTIRE COST OF THE WORK. THE BASE OF CONCRETE PAVEMENT, ITEM 305, SHALL BE INSTALLED ON A CAREFULLY PREPARED BED LEVEL WITH THE BOTTOM OF THE ABUTTING BASE OVER DISTURBED AREAS AND SHALL BE OF THE THICKNESS SPECIFIED, BUT IN NO CASE LESS THAN 7 INCHES THICK. WHERE PAVEMENT OR BASE OF PAVEMENT HAS BEEN DAMAGED BY CAVE-IN, OR BY TRENCH CUT LEAVING A PORTION OR PORTIONS OF PAVEMENT 18 INCHES OR LESS IN WIDTH BETWEEN SUCH CUT OR DAMAGE TO CURB OR OTHER SUBSTRUCTURE, THAT REMAINING PORTION OF PAVEMENT SHALL BE REMOVED AND RESTORED MONOLITHIC WITH THE TYPE AND KIND OF PAVEMENT SPECIFIED FOR THE ADJACENT TRENCH AREA. THE WEARING COURSE OVER TRENCH OR OTHER DISTURBED AREAS SHALL BE RESTORED TO MATCH EXISTING PAVEMENT UNLESS OTHERWISE SPECIFIED. ASPHALTIC CONCRETE WEARING COURSE OVER SUCH AREAS SHALL BE NEATLY AND SQUARELY CUT, BEFORE THE INSTALLATION OF A CAREFULLY TOOTHED-IN-TO ADJACENT PAVEMENT, UNLESS OTHERWISE SPECIFIED. EXPANSION JOINTS SHALL BE INSTALLED BETWEEN BRICK WEARING COURSE (IF GROUTED) AND CURB OR OTHER SUBSTRUCTURE, WHERE SUCH RESTORATION IS REQUIRED BY THESE SPECIFICATIONS, 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 E concrete, rammed in place.

(J) - TheContractor 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 per Sec. 104.04 and 107.10 of the State of Ohio Department of Transportation "Construction and Materials Specifications."

LIST AND INVOICES

(A) 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.

(B) - THE MATERIAL SHALL BE SHIPPED IN SUCH SECTIONS AS THE ENGINEER MAY ORDER.

SEEDING AND SODDING

(A) - IN PREPARATION FOR SEEDING OR SODDING, THE SURFACES SHALL BE HARROWED TO A DEPTH OF THREE (3) INCHES. ALL GRASS, WEEDS, ROOTS, STICKS, STONES, ETC., ARE TO BE REMOVED AND THE SOIL CAREFULLY BROUGHT TO THE EXACT FINISHED GRADE OR SUBBASE BY RAKING. AN APPLICATION OF NOT LESS THAN ONE POUND PER ONE HUNDRED (100) SQUARE FEET OF A HIGH NITROGEN CONTENT COMMERCIAL FERTILIZER HAVING AN ANALYSIS OF 10:6:4 SHALL THEN BE UNIFORMLY DISTRIBUTED AND CAREFULLY RAKED IN.

(B) - IMMEDIATELY AFTER THE PREPARATION AND FERTILIZING OF THE SEED BED, THE PREPARED SURFACE SHALL BE SEEDED WITH NOT LESS THAN THREE HUNDRED (300) POUNDS OF GRASS SEED PER ACRE. THE SEED SHALL BE CAREFULLY AND UNIFORMLY SOWN BY EXPERIENCED AND SKILLED WORKMEN. FOLLOWING THE SEEDING, THE SURFACE SHALL BE LIGHTLY RAKED AND ROLLED WITH A LIGHT ROLLER. THE GRASS SEED TO BE USED SHALL BE APPROVED BY THE DIRECTOR.

(C) - IMMEDIATELY AFTER THE PREPARATION OF THE SURFACE FOR SOD, THE FRESHLY CUT SOD SHALL BE CAREFULLY PLACED IN FINAL POSITION, STAKED WITH SUFFICIENT WOODEN STAKES TO PREVENT MOVEMENT, CAREFULLY TAMPED TO FINAL POSITION AND ALL JOINTS CAREFULLY FILLED WITH SCREENED TOPSOIL TO BRING ALL TO A UNIFORM SURFACE.

(D) - ALL SEEDED AND SODDED SURFACES SHALL BE CAREFULLY LOOKED AFTER AND TENDED BY THE CONTRACTOR; SHALL BE WATERED AND THE GRASS CUT WHEN NECESSARY. SETTLED AREAS SHALL BE REFILLED, LEVELED, AND TAMPED TO THE PROPER GRADE. ALL SEEDED AND SODDED SURFACES SHALL BE LEFT IN GOOD CONDITION ON THE COMPLETION OF THE WORK.

(E) - AS SEEDING AND SODDING CAN ONLY BE SUCCESSFULLY DONE AT CERTAIN SEASONS OF THE YEAR, THE PREPARATION OF THE SOD OR SEED BED, AND THE WORK OF SODDING AND SEEDING, SHALL ONLY BE DONE AT SUCH TIMES AS MAY BE APPROVED BY THE DIRECTOR.

CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

WORK INCLUDED

The Contractor shall furnish all the materials for and shall properly construct and connectin 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 AND DUCTILE 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) All pit cast pipe and fittings shall be cement lined and of the size and classes noted on the respective contract drawings. (C) - 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. A21.51-1965 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, 42,000 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:

STANDARD THICKNESS OF CENTRIFUGALLY CAST IRON PIPE AND DUCTILE IRON PIPE

DUCTILE IRON PIPE

SIZE	WORKING PRESSURE	THICKNESS	CLASS
6"	350 P.S.I.	0.43 IN.	56
8"	350 P.S.I.	0.45 IN.	56
12"	350 P.S.I.	0.49 IN.	56
4"	*350 P.S.I.*	*0.41 IN.*	*56*

CAST IRON PIPE

SIZE	WORKING PRESSURE	STANDARD THICKNESS	CLASS
6"	250 P.S.I.	0.48 IN.	25
8"	250 P.S.I.	0.52 IN.	25
12"	250 P.S.I.	0.60 IN.	25
4"	*250 P.S.I.*	*0.44 IN.*	*25*

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.** Joints for fittings may be of the boltless-restrained push-on type if approved by the Engineer. Drawings and assembly instructions along with pipe and fittings layout and schedule must be furnished. A minimum length of 18 feet of boltless restrained push on pipe shall be used on both sides of boltless restrained push on fittings.

APPROVED_____ DATE_____

ENGINEER OF DESIGN **REVIEW**

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

SCALE_____ MADE____ DATE____ TRCD.____ DATE____ CKD.____ DATE____

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

WATERWORK NOTES

(D) - 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.

(E) - Gaskets shall be of rubber or other equally effective protection against uneven distortion of the gasket.

(F) - 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.

(G) - 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 ($\frac{1}{2}$) inch joint opening) in the adjoining lengths of pipe. Pipe to be installed with air relief valves 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.

(H) - 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 relief valves connections.

(I) - Closure pieces shall be accurately measured and cut in the field and installed using solid type pattern sleeves as shown or as required, with minimal space at ends to permit closure piece insertion only.

(J) - Tests, inspection, reports and analyses of tests of samples for all materials shall be furnished as set forth elsewhere in these notes.

(K) - Bitumastic coating shall be applied on the exterior of all cast iron pipe and fittings in accordance with AWWA Specifications. All Ductile Iron Water Main and Fittings shall be given, in addition to that specified, a coating of Four (4) mills additional thickness, or protection with polyethelene encasement in accordance with ANSI A21.5-1972 (AWWA C 105-72), Class "C" installation method "B". All fittings shall have A 21.5-1972 protection.

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 ________

ENGINEER OF DESIGN REVIEW

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

63/174

7/14

CUYAHOGA COUNTY
CUY.-490-1.00

ITEM SPECIAL - MISCELLANEOUS METAL OR PLASTIC WORK

WORK INCLUDED

A. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MISCELLANEOUS METAL OR PLASTIC 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 OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIALS SPECIFICATIONS, EXCEPT THAT THE CAST IRON SHALL CONFORM TO ASTM DESIGNATION A48, CLASS 30-B FOR MANHOLE FRAME AND COVER. ALL STRUCTURAL STEEL SHALL MEET THE REQUIREMENTS OF THE ASTM SPECIFICATION A36. 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 TOBIN OR MANAGANESE BRONZE, OR OF SIMILAR APPROVED MATERIALS.

CAST IRON VALVE BOXES AND COVERS SHALL BE GRAY IRON CASTINGS, IN WHICH APPEARANCE AND DIMENSION TOLERANCES ARE PRIMARY CONSIDERATIONS AND STRENGTH IS NOT A PRIMARY OR MAJOR CONSIDERATION. VALVE BOXES AND COVERS SHALL BE ASTM DESIGNATION A48 WITH NO SPECIFIC REQUIREMENT AS TO CLASS. CHEMICAL COMPOSITION SHALL NOT BE CONSIDERED, BUT THE MATERIAL SHALL BE OF GOOD QUALITY AND OF SUCH CHARACTER AS SHALL MAKE THE METAL OF THE CASTINGS STRONG, TOUGH AND OF EVEN GRAIN. THE METAL SHALL BE MADE WITHOUT ANY ADMIXTURE OF CINDER IRON OR OTHER INFERIOR METAL.

PLASTIC VALVE BOX SHALL BE INJECTION MOLDED AND COMMERCIALLY MANUFACTURED UTILIZING A COMPOUND PER ASTM D-2853-70, CLASS 1212. MATERIAL SHALL BE A RIGID COMBINATION OF POLYOLEFIN WITH FIBROUS INORGANIC COMPONENT REINFORCING, AND U.V. STABILIZER ADDITIVES TO ASSURE RESISTANCE TO MATERIAL DEGRADATION FROM ULTRAVIOLET LIGHT. THE ENTIRE UPPER SECTION OF THE BOX SHALL BE MADE OF A MAGNETICALLY LOCATEABLE MATERIAL. THE USE OF MAGNETS WILL NOT BE PERMITTED. APPEARANCE AND DIMENSIONAL TOLERANCES ARE PRIMARY CONSIDERATIONS AND STRENGTH A MAJOR CONSIDERATION.

PLASTIC VALVE BOX SHALL HAVE A CAST IRON RING AND A CAST IRON 4-PRONGED TRAFFIC LID. CAST IRON SHALL HAVE A MINIMUM WEIGHT OF 18 LBS. AND MUST CONFORM TO ASTM A-148, CLASS 20 SPECIFICATIONS. BOX TO BE BUFFALO TYPE (SLIP) OR (SCREW) AND HAVE A SHAFT DIAMETER OF 5-1/4-IN. THE BOTTOM PART OF THE BOX SHALL HAVE A BELL MEASURING 7-5/8-IN HIGH BY 10-1/16-IN WIDE AND HAVE A KNOCKOUT AS STANDARD EQUIPMENT. A NO. 6 ROUND BASE AND A 20-IN. EXTENSION SECTION MUST BE AVAILABLE.

PHYSICAL PROPERTIES OF MOLDED PLASTIC

PROPERTIES	TEST METHOD ASTM	MINIMUM TEST VALUES
TENSILE STRENGTH (2.0"/MIN.)	D-638-72	3,400 PSI
FLEXURIAL MODULUS	D-790-71	191,000 PSI
COMPRESSIVE STRENGTH (.05"/MIN.)	D-695-69	3,350 PSI
IMPACT STRENGTH, IZOD	D-256-72	.6 FT LB/IN.
DUROMETER HARDNESS, TYPE D	D-2240-68	60
DEFLECTION TEMPERATURE @66 PSI STRESS	D-648-72	230F
SPECIFIC GRAVITY	D-692-66	1.15

WORKMANSHIP AND FINISH SHALL CONFORM SUBSTANTIALLY TO THE DIMENSIONS ON THE CONTRACT DRAWINGS OR FURNISHED DRAWINGS. THE CASTINGS OR MOLDINGS SHALL BE FREE FROM INJURIOUS DEFECTS, CRACKS, GAS HOLES, FLAWS, AND EXCESSIVE SHRINKAGE. ADDITIONAL INSPECTION MAY BE MADE AT THE PROJECT OR WORK SITE. INSPECTION SHALL BE VISUAL INSPECTION FOR APPEARANCE AND SURFACE SMOOTHNESS IN COMPARISON WITH SAMPLES ACCEPTED AS STANDARD.

SAMPLE CASTINGS OR MOLDINGS FROM EACH PATTERN, WHEN REQUIRED BY THE ENGINEER, SHALL BE SUBMITTED BY THE MANUFACTURER FOR THE PURPOSE OF ESTABLISHING STANDARDS OF APPEARANCE AND DIMENSIONAL TOLERANCES. EACH CERTIFICATION SO FURNISHED SHALL BE SIGNED BY AN AUTHORIZED AGENT OF THE MANUFACTURER.

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 SPECIFICATIONS 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, AND 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 WITH COVERS OF THE ASSEMBLED TYPES AND SIZES HEREINAFTER SPECIFIED OR INDICATED ON THE CONTRACT PLANS.

A. FOR WATER SERVICE CONNECTIONS AND VALVES TO EIGHT INCH (8") SIZE:
ROUND COVER WITH BOTTOM/BASE NO. 2 & 3, PLASTIC BOTTOM OR ALTERNATE NO. 1.

B. FOR VALVES OF TEN INCH (10") SIZE:
ROUND OR SQUARE COVER WITH BOTTOM/BASE NO. 4, ALTERNATE BOTTOM NO. 2 WITH NO. 6 BASE, OR PLASTIC BOTTOM WITH PLASTIC NO. 6 BASE.

C. FOR VALVE OF TWELVE INCH (12") SIZE:
ROUND OR SQUARE COVER WITH BOTTOM/BASE NO. 4, ALTERNATE BOTTOM NO. 2 WITH NO. 6 OR 8 BASE, OR PLASTIC BOTTOM WITH PLASTIC NO. 6 BASE.

D. FOR VALVES OF SIXTEEN INCH (16") SIZE:
ROUND OR SQUARE COVER WITH BOTTOM/BASE NO. 4, ALTERNATE BOTTOM NO. 2 WITH NO. 8 OR 160 BASE.

E. FOR AIR RELIEF AND FLUSHING ASSEMBLIES:
OVAL COVER VALVE BOX OR ALTERNATE DOUBLE ROUND COVER, ASSEMBLED TYPE A.

NOTE: VALVE BOXES FOR USE IN FLEXIBLE TYPE PAVEMENTS SHALL HAVE TOPS WITH FLANGE SUPPORT RING NO LESS THAN FIVE AND ONE-QUARTER INCHES (5-1/4") FROM COVER SURFACE. WHERE THE CONTRACTOR FURNISHES AN ALTERNATE SHORT TOP, 6-IN. SIZE SDR-21 PLASTIC PIPE CUT TO PROPER LENGTH SHALL BE USED AS EXTENSION PIECE WITH ANY ADJUSTABLE CAST IRON VALVE BOX BOTTOM.

ALL COVERS SHALL BE INTERCHANGEABLE IN TOPS OF THEIR RESPECTIVE BOXES: SLIP TYPE TOPS SHALL BE INTERCHANGEABLE WITH SLIP TYPE BOTTOMS OR EXTENSIONS. THESE ASSEMBLED TYPE VALVE BOXES SHALL EXTEND FROM VALVE BONNET TO FINISHED GRADE OR ELEVATION REQUIRED, BEING CAREFULLY LOCATED OVER THE VALVE OPERATING NUT(S) AND SHALL BE SET PLUMB AND TRUE AS REQUIRED.

VALVE BOXES AND COVER ASSEMBLIES SHALL BE COMPLETED AND THEIR PARTS SHALL COMPLY WITH THOSE PARTS SHOWN ON DRAWINGS WHICH ARE MADE A PART OF THESE

SPECIFICATIONS AND ENCLOSED HEREIN AND ALSO ON FILE IN THE WATER ENGINEERING SECTION OF THE DIVISION OF WATER AND HEAT, ROOM 553 PUBLIC UTILITIES BUILDING, 1201 LAKESIDE AVENUE, CLEVELAND, OHIO 44114.

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) COATS OF COAL TAR PITCH, USING INERTOL 50 OR BITUMASTIC 50, OR APPROVED EQUAL.

MEASUREMENT

THE MISCELLANEOUS METAL OR PLASTIC WORK SHALL BE THE METAL WORK ACTUALLY FURNISHED AND PLACED IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE DETAILED DRAWINGS APPROVED BY THE DIRECTOR. IN THE COMPUTING OF 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. THE WEIGHT OF CAST IRON SHALL BE USED FOR CAST IRON VALVE BOXES AND COVERS AND ANY CAST IRON SECTIONS OF VALVE BOXES AND COVERS. WHERE PLASTIC PIPE IS USED AS THE EXTENSION, THE PIPE SHALL BE INCLUDED IN THE CAST IRON WEIGHT WITH NO SEPARATE ALLOWANCE FOR LENGTH OR WEIGHT. THE WEIGHT OF PLASTIC VALVE BOXES SHALL BE THE ACTUAL WEIGHT FURNISHED WITH ANY CAST IRON PARTS CONSIDERED SEPARATELY AS CAST IRON.

PAYMENT

THE UNIT PRICE STIPULATED PER POUND FOR MISCELLANEOUS METAL OR PLASTIC WORK SHALL INCLUDE THE FURNISHING, ERECTING, MACHINING, FITTING, ADJUSTING, BOLTING, CLEANING AND PAINTING OF ALL MISCELLANEOUS METAL OR PLASTIC WORK, AND THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS AND APPLIANCES NECESSARY TO COMPLETE THE WORK AS SPECIFIED OR AS SHOWN.

APPROVED _____ DATE _____

ENGINEER OF DESIGN REVIEW

SCALE _____
MADE _____ DATE _____
TRCD. _____ DATE _____
CKD. _____ DATE _____

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

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

64/174

CUYAHOGA COUNTY
CUY.- 490-1.00

8/14

CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

LAYING

(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 (2½") 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.

PUSH-ON & BOLTLESS RESTRAINED JOINTS

WHERE LUGGED OR RESTRAINED JOINTS ARE USED IN PLACE OF BELL & BELL OR BELL AND SPIGOT JOINTS FOR CAST LEAD JOINTS AS INDICATED OR SHOWN ON THE DRAWINGS, THE CONTRACTOR SHALL SUPPLY PIPE AND FITTINGS HAVING LUGGED JOINTS OR POSITIVE RESTRAINED COMPRESSION LOCKED JOINT IN PUSH-ON OR SLIP-ON JOINT. LUGGED JOINTS SHALL IN ALL RESPECTS, COMPLY TO THE STANDARD A.W.W.A. SPECIFICATIONS AND DIMENSIONS FOR THE CLASS OF PIPE AND FITTINGS SPECIFIED. POSITIVE RESTRAINED COMPRESSION LOCKED JOINT PUSH-ON OR SLIP-ON JOINT SHALL HAVE ENDS WITH POSITIVE COMPRESSION LOCKED JOINT IN PUSH-ON OR SLIP-ON JOINT PROVIDING A RESTRAINED FLEXIBLE JOINT USING CORROSION RESISTANT LOCKING SO AS TO PROVIDE A MINIMUM OF STRESS IN THE JOINT, BUT PROVIDING A MINIMUM OF 400 LBS. PER INCH OF PIPE CIRCUMFERENCE RESISTANCE TO SEPARATION OF JOINT.

All bolt dimensions and other features shall strictly comply with those which have been established under the American Water Works Association Standards. Drawings shall be furnished in accordance with section A, sheet Nº 7 drawings, fully and distinctly illustrating and describing and giving complete layout and assembly direction for the joint to be furnished. Approval of The City of Cleveland, Division of Water will be required. Coating and protection shall be required in accordance with Section K, Cast Iron Pipe and Fittings.

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 and ductile iron push on and Boltless restrained joints 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

VALVES

discarded material, repaving, and for the furnishing as all labor, materials, equipment, tools 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 relief valves, drain valves, and gate valves and valve boxes and covers of the various sizes and types specified or ordered, all as required for the proper completion of the work included under this contract.

AIR RELIEF VALVES

All air relief valves or air vent valves shall be 2"-inch bronze angle meter valves with bronze water meter, 2 inch iron pipe thread, companion flange and a 2 inch extra heavy brass "close" (2 inch long) nipple. 2 inch air relief valves shall be equal in all respects to the 2 inch angle meter valve manufactured by JONES Co. No. J-1527-F, FORD METER BOX Co. No. FV-7, or MUELLER Co. No. 14286.

GATE 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- or latest revision thereof and in addition shall comply with the following supplementary requirements: All gate valves shall be of the 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.

THE DESIGN OF THE MECHANICAL WEDGING ACTION SHALL BE SUCH THAT SEATING FORCE IS APPLIED EQUALLY TO TWO OR MORE CONTACT POINTS NEAR THE OUTER EDGE OF EACH DISC AT OR ABOVE AND BELOW THE HORIZONTAL CENTERLINE OF DISC. THE MECHANISM SHALL BE DESIGNED SO THAT ALL WEDGING MEMBERS ARE ACTIVATED AT ONE TIME. IT SHOULD BE OF THE TYPE WHICH WILL ELIMINATE UNBALANCED SEATING PRESSURE AND MINIMIZE DISTORTION OF THE DISCS.

(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, Garlock Nº 8990 or National Nº 622731.

THE DIMENSIONS OF THE STUFFING BOX FLANGES SHALL BE OF A THICKNESS AND UNIFORMITY PROPORTIONED TO FIT THE VARIOUS EXTERNALLY APPLIED TORQUE AND INTERNAL THRUST PRESSURE. BOLT HOLES SHALL BE FITTED AND OF A NUMBER SUCH THAT WILL LEAVE A SUFFICIENT CROSS SECTIONAL AREA OF METAL THEREBY PROVIDING SATISFACTORY STRENGTH TO THE UPPER AND LOWER STUFFING BOX FLANGE.

(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 + or - ⅛" of that specified in the following tables Body seat rings shall be made of Grade One Bronze. Gate seat rings shall be made of Grade One Bronze.*

* *Unless otherwise approved by the Commissioner of Water.*

BODY AND GATE RINGS
(DIMENSIONS IN INCHES)
BOTTOM WEDGE

VALVE SIZE	BODY RINGS FACE	BODY RINGS DEPTH	BODY RINGS THICKNESS AT BASE OF THREADS	GATE RINGS FACE THICKNESS	GATE RINGS FACE	GATE RINGS FACE THICKNESS	GATE RINGS DEPTH
3"	7/16	9/16	3/16	3/16	1/2	5/32	1/4
4"	1/2	9/16	3/16	3/16	9/16	1/8	5/16
6"	1/2	9/16	3/16	5/32	9/16	1/8	5/16
8"	5/8	5/8	3/16	7/32	11/16	5/32	5/16
10"	3/4	5/8	3/16	7/32	11/16	5/32	11/32
12"	3/4	5/8	7/32	7/32	13/16	5/32	11/32
16"	1	3/4	1/4	9/32	1	3/16	1/2
20"	1-3/8	1-1/8	5/16	3/8	1-3/8	3/8	5/8
24"	1-3/8	1-1/8	5/16	3/8	1-3/8	3/8	5/8
30"	1-1/2	1-1/4	3/8	7/16	1-1/2	7/16	3/4

SIDE WEDGE

3"	13/32	1/2	3/16	3/16	ALL BRONZE DISC	
4"	7/16	9/16	3/16	3/16	1/2	5/32	21/64
6"	1/2	11/16	9/32	1/4	5 8	5/32	21/64
8"	17/32	11/16	9/32	1/4	11/16	5/32	21/64
10"	5/8	13/16	3/8	5/16	13/16	5/32	21/64
12"	5/8	13/16	3/8	5/16	13/16	5/32	21/64
16"	3/4	1	15/32	3/8	7/8	3/16	13/32
20"	7/8	1-5/16	17/32	7/16	1	1/4	17/32
24"	1-1/16	1-3/8	21/32	1/2	1-3/16	5/16	19/32
30"	1-5/16	1-1/2	25/32	1/2	1-7/16	5/16	19/32

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE _____ DATE _____ CONSULTING ENGINEERS
TRCD _____ DATE _____ KANSAS CITY CLEVELAND NEW YORK
CKD. _____ DATE _____

APPROVED _____ DATE _____

ENGINEER OF DESIGN REVIEW

LOW SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

WATERWORK NOTES

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

65
174

CUYAHOGA COUNTY
CUY.-490-1.00

9
14

VALVES

(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	1.772	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 rigns, 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 silicone 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, swells, 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.

APPROVED_____ DATE_____

ENGINEER OF DESIGN REVIEW

SCALE _____
MADE ERH DATE 3/10/70
TRCD. HLD DATE 3/13/70
CKD. _____ DATE _____

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

LOW SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

66/174

CUYAHOGA COUNTY
CUY. - 490-1.00

10/14

VALVES

MATERIAL SPECIFICATIONS

(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 shallconform 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 ½ hour
24" through 48"	300 P.S.I. for ½ 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, and after passing the hydraulic test, shall be given at least (2) two coats of an approved paint outside.

(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 Intertol 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 relief valve drain, gate and check cut-in valves, including by-pass valves, operating nuts, valve boxes and other accessories and appurtenances and the furnishing of all labor, tools, materials and appliances necessary to complete the work as specified or as shown.

VALVE BOXES

VALVE BOXES

Materials and specifications shall conform to State of Ohio Specification 604, "Miscellaneous Metal Work"; specifications and details as shown in the plans.

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 bitometer 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 OHIO DEPARTMENT OF TRANSPORTATION (ODOT).

(A) ALL BRICK FURNISHED AND USED SHALL BE NO. 2 SHALE BRICK SECTION 704.01 OF THE STATE OF OHIO STANDARD CONSTRUCTION AND MATERIAL SPECIFICATIONS, OR CONCRETE BRICK, ODOT SECTION 704.02.

(B) SECTION M-13 PORTLAND CEMENT (ASTM C-150, TYPE I). PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS FOR "TYPE I" OF THE SPECIFICATIONS FOR PORTLAND CEMENT, ASTM DESIGNATION C 150 AND ODOT 701.04.

THE COMPRESSIVE STRENGTH REQUIREMENTS SHALL GOVERN.

(C) SAND SHALL BE AS SPECIFIED IN SECTION 703.03 OF THE STATE OF OHIO STANDARD CONSTRUCTION AND MATERIAL SPECIFICATIONS.

(D) COURSE AGGREGATE SHALL BE AS SPECIFIED IN SECTION 703.02 OF THE STATE OF OHIO STANDARD CONSTRUCTION AND MATERIAL SPECIFICATIONS.

(E) ALL WATER SHALL BE CLEAN AND ACCURATELY MEASURED FOR EACH BATCH OF CONCRETE.

(F) ALL PLAIN CONCRETE SHALL BE ODOT 499 CLASS C AND SHALL BE MIXED IN THE PROPORTION OF ONE (1) PART OF CEMENT, TWO (2) PARTS OF SAND AND FOUR (4) PARTS OF COARSE AGGREGATE.

(G) 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 1:2 MIX.

(H) ALL REINFORCING STEEL SHALL BE ODOT ITEM 509.

PACKAGING AND MARKING

WHEN THE CEMENT IS DELIVERED IN PACKAGES, THE NAME AND BRAND OF THE MANUFACTURER SHALL BE PLAINLY INDICATED THEREON. SIMILAR INFORMATION SHALL BE PROVIDED IN THE SHIPPING INVOICES ACCOMPANYING THE SHIPMENT OF PACKAGED OR BULK CEMENT. A BAG SHALL CONTAIN 94 POUNDS NET. A BARREL SHALL CONSIST OF 376 POUNDS NET. ALL PACKAGES SHALL BE IN GOOD CONDITION AT THE TIME OF INSPECTION.

APPROVED _____ DATE _____

ENGINEER OF DESIGN REVIEW _____

SCALE _____
MADE E.R.H. DATE 3/16/70
TRCD. H.L.O. DATE 3/23/70
CKD. _____ DATE _____

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

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE CITY OF CLEVELAND

FHWA REGION	STATE	PROJECT	
5	OHIO		

67
174

CUYAHOGA COUNTY
CUY- 490-1.00

11
14

WATERWORK NOTES

MISCELLANEOUS ITEMS

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.

ITEM SPECIAL - REMOVE ABANDONED CURB SHUT-OFF AND VALVE BOX

WORK INCLUDED

The Contractor shall either remove or leave in place the abandoned curb shut-off. The valve box shall either be removedor 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 shut-off and 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 material labor, equipment, tools and incidentals necessary to complete this item. All removed material shall become the property of the Contractor.

ITEM SPECIAL CUTTING IN VALVE AND VALVE BOX COMPLETE

WORK INCLUDED

DUE TO OPERATING PRESSURES, CLASS OF CAST IRON PIPE AND USE DEMAND, IT IS NECESSARY THAT A HUB VALVE BE CUT-IN BY THE CONTRACTOR.

THE TIME OF INSTALLATION WILL BE SET BY THE DIVISON OF WATER AND HEAT.

THE CONTRACTOR WILL DO ALL PIPE CUTTING AND INSTALLING.

THE CONTRACTOR SHALL FURNISH THE HUB VALVE, AND VALVE BOX COMPLETE, STANDARD 38 DRESSER OR SMITH-BLAIR COUPLINGS, OR APPROVED EQUAL, CAST IRON PIPE AND LEAD FOR THE INSTALLATION. THE CONTRACTOR SHALL EXCAVATE, TIGHT SHEET AND SHORE AS NECESSARY THE WORK, PIT, BACKFILL AND REPAVE AS NECESSARY. THE WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF THE DIVISION OF WATER.

BASIS OF PAYMENT

THE WORK INCLUDED IN THIS ITEM SHALL BE PAID FOR AT THE UNIT PRICE BID FOR EACH "ITEM SPECIAL - CUTTING-IN-VALVE AND VALVE BOX, COMPLETE" AND CLASSIFIED AS TO SIZE. THE PRICE AND PAYMENT SHALL CONSTITUTE FULL COMPENSATION FOR PERFORMING ALL EXCAVATION, SHEETING, SHORING, BACKFILLING AND REPAVING AS NECESSARY AND THE FURNISHING OF ALL MATERIALS, LABOR, TOOLS, EQUIPMENT AND INCIDENTALS NECESSARY TO COMPLETE THIS ITEM.

SCALE _____
MADE _____ DATE _____
TRCD. _____ DATE _____
CKD. _____ DATE _____

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

APPROVED _____ DATE _____

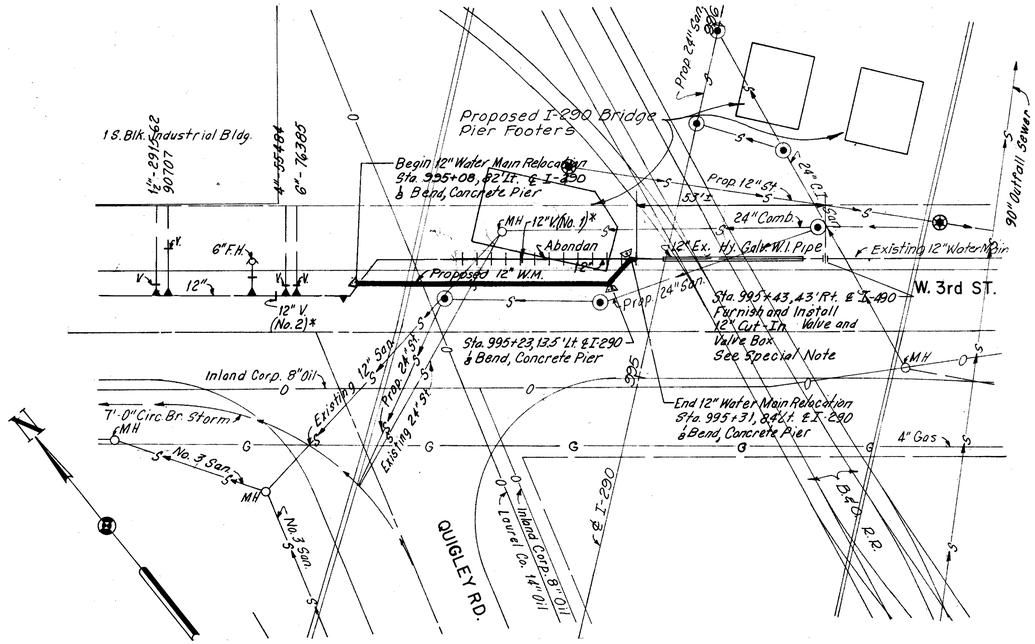
ENGINEER OF DESIGN REVIEW

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

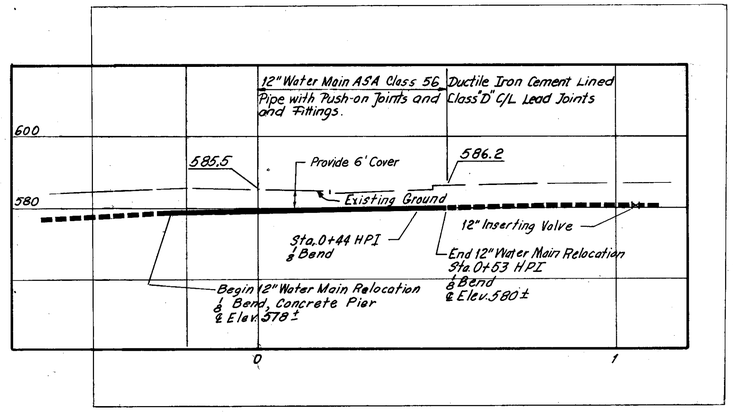
Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK NOTES



*See Construction Procedure

PLAN
Scale 1" = 20'



SCALE 1"=20' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE E.R.N. DATE 10/15/70 CONSULTING ENGINEERS
TRCD. H.L.D. DATE 10/22/70 KANSAS CITY CLEVELAND NEW YORK
CKD. ____ DATE ____

QUANTITY CALCULATIONS

MADE BY _____ DATE _____
CHECKED BY _____ DATE _____

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

68 / 174

CUYAHOGA COUNTY
CUY.- 490-1.00

12 / 14

CONSTRUCTION PROCEDURE

The Contractor shall notify Inspection & Enforcement of Div. of Water prior to starting waterwork. Telephone 271-4264

Sequence for construction of the relocated water main is as follows:

1. Install 12" Cut-In Valve as shown on plan. (See special note)
2. Install Relocated 12" Water Main to points shown on plans and temporary plug for testing. After chlorination and testing remove plugs.
3. Close existing 12" valve (No. 1) and New 12" Cut-In Valve, cut existing pipe and tie in new water main. (Sta. 995+31, 18' Lt. ℄ I-290)
4. Close existing 12" valve (No. 2), cut pipe and tie in new water main. (Sta. 995+08, 82'Lt. ℄ I-290
5. Open existing 12" valve (No. 2) and New 12" Cut-In Valve.
6. Water Department personnel will operate opening and closing of all valves.

Traffic is to be maintained on W. 3rd Street. For traffic control plan, see sheet 13A.

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	12" Water Main ANSI Class 56 Ductile Iron Cement Lined Pipe With Push-on Joints and Class "D" Lead Joints and Fittings C/L	78	Lin. Ft.
Special	12" Cut-In Valve & Valve Box Complete	1	Each
Special	Remove Abandoned Curb Shut-off and Valve Box	1	Each
Special	Miscellaneous Metal & Plastic	187	Lbs.

Note:
1. All Fittings shall be Lead Joints and Class "D."
2. Relocated 12" Water Main must be installed and in service prior to construction of bridge pier.
3. Existing 12" Water Main in W. 3rd St. is 12" Cast Iron Pipe, Class 200

APPROVED _____ DATE _____

ENGINEER OF DESIGN REVIEW

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

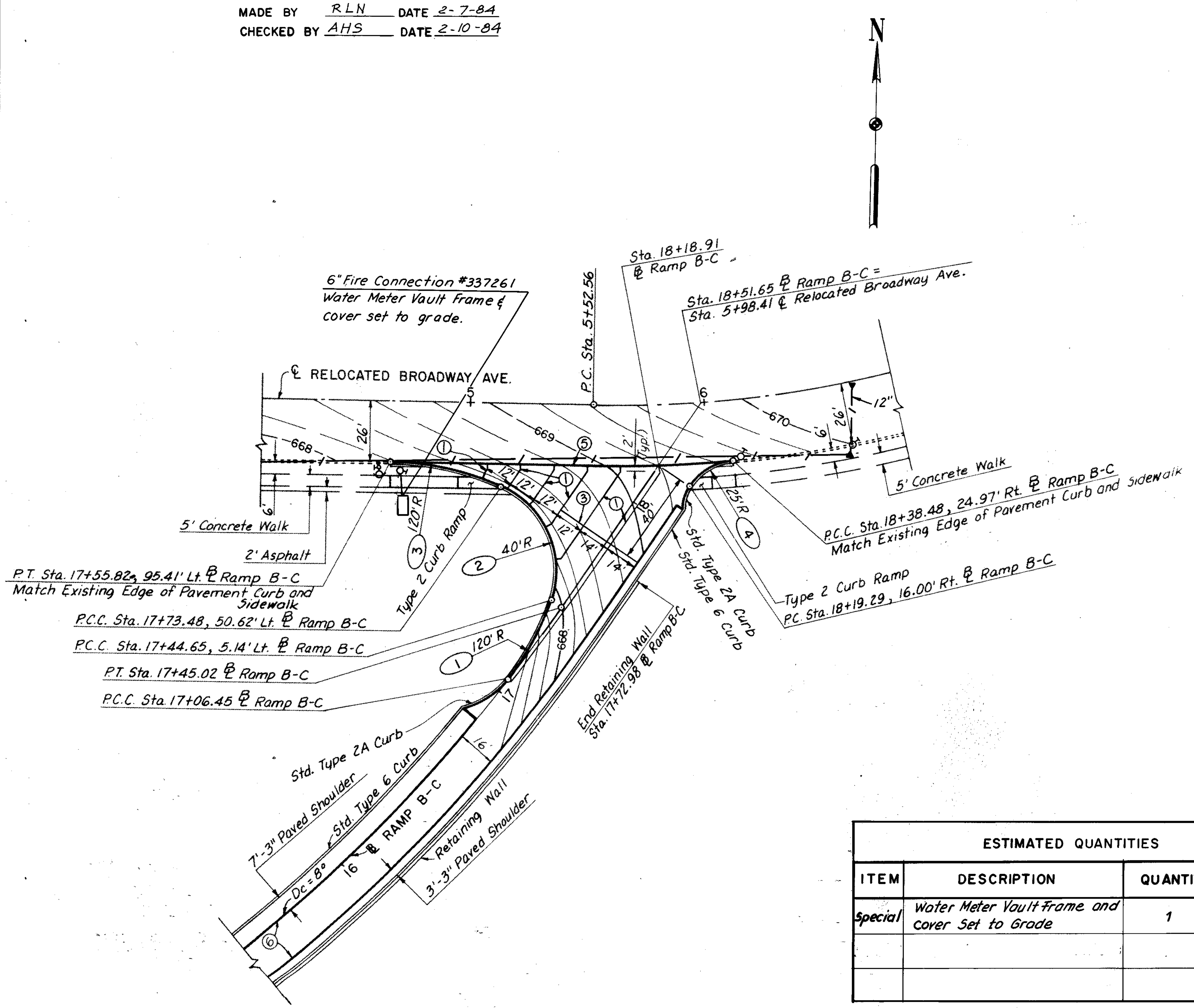
Subject: WATERWORK FOR THE CITY OF CLEVELAND

12" WATER MAIN RELOCATION IN W. 3RD ST.

WATERWORK PLAN

QUANTITY CALCULATIONS

MADE BY RLN DATE 2-7-84
CHECKED BY AHS DATE 2-10-84



RAMP B-C AND BROADWAY AVENUE PAVEMENT DETAIL

30 0 30 60 90 120
SCALE IN FEET

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	Water Meter Vault Frame and Cover Set to Grade	1	Each

APPROVED ____________ DATE ____________

ENGINEER OF DESIGN REVIEW

SCALE ______
MADE ______ DATE ______
TRCD KBV DATE 2-11-84
CKD. ______ DATE ______

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

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

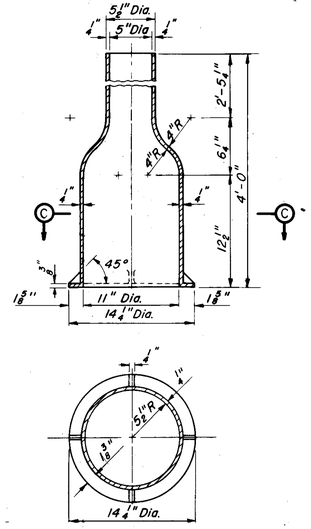
Subject: WATERWORK FOR THE CITY OF CLEVELAND

FHWA REGION	STATE	PROJECT	
5	OHIO		

70 / 174

14 / 14

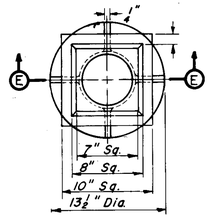
CUYAHOGA COUNTY
CUY- 490-1.00



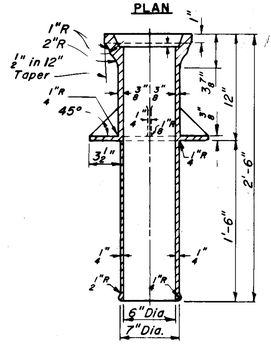
SECTION C-C

BASE NO. 4

For 10" 12 and 16 Valves
Estimated Weight 79 Lbs.

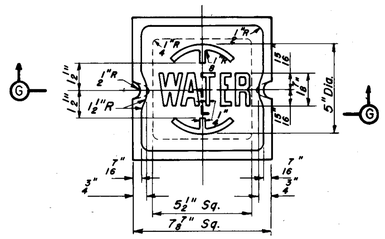


PLAN

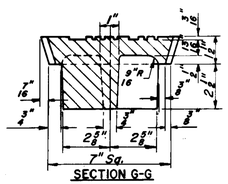


SECTION E-E

TOP WITH SQUARE HEAD
NO. 3 AND NO. 4
Estimated Weight 85 Lbs.



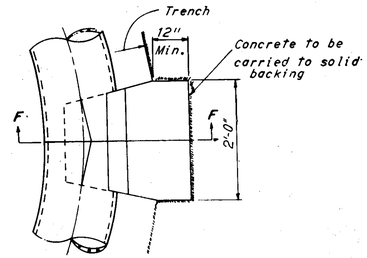
PLAN



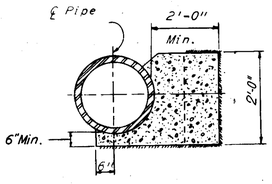
SECTION G-G

SQUARE COVER FOR NO. 3 AND NO. 4 TOP

Estimated Weight 23 Lbs.



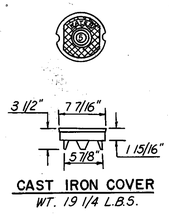
PLAN



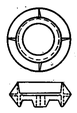
SECTION F-F

CONCRETE PIER FOR BENDS

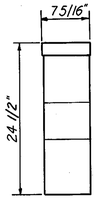
STANDARD DETAILS- VALVE BOXES



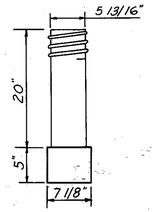
CAST IRON COVER
WT. 19 1/4 L.B.S.



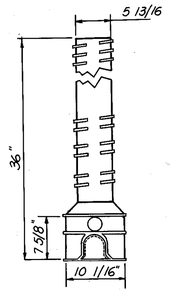
C.I. FULL FLANGED RING
WT. 14 L.B.S.



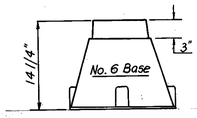
TOP



EXTENSION



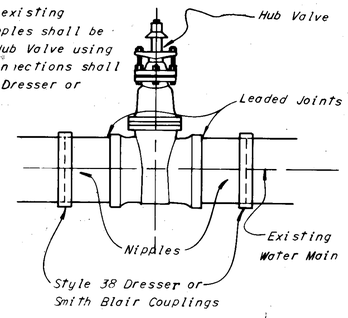
BOTTOM



PLASTIC VALVE BOX
with polyiron top section, cast iron full flanged ring, and cast iron cover.

No Scale

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 _____

ENGINEER OF DESIGN REVIEW

SCALE	HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE ____ DATE ____	CONSULTING ENGINEERS
TRCD ____ DATE ____	KANSAS CITY CLEVELAND NEW YORK
CKD. ____ DATE ____	

LOW SERVICE DISTRICT

DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

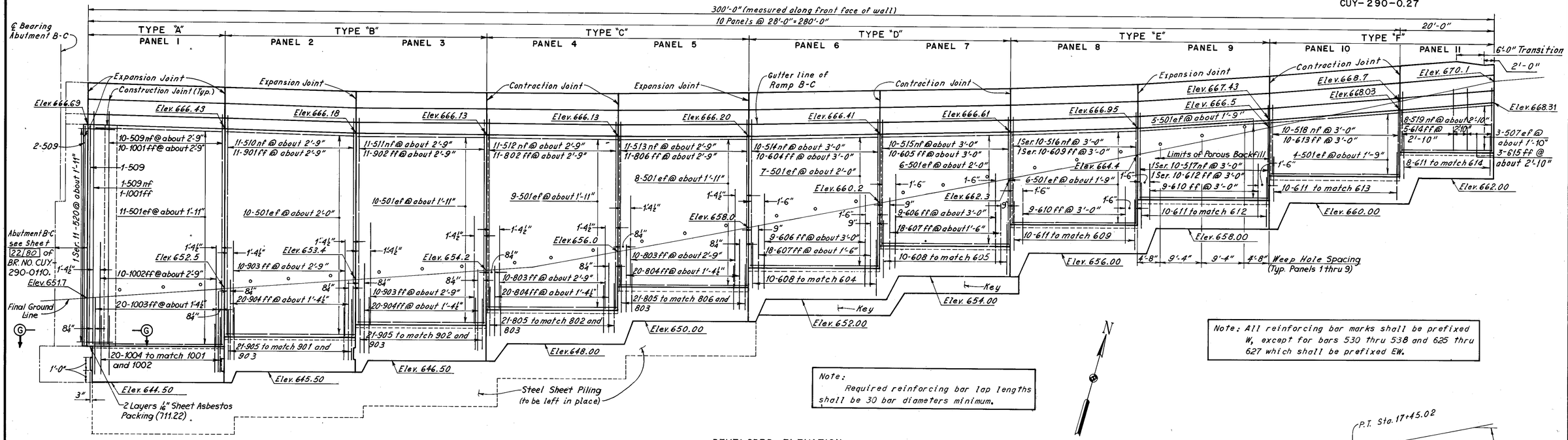
Subject: WATERWORK FOR THE CITY OF CLEVELAND

WATERWORK DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

71
174

CUYAHOGA COUNTY
CUY-290-0.27



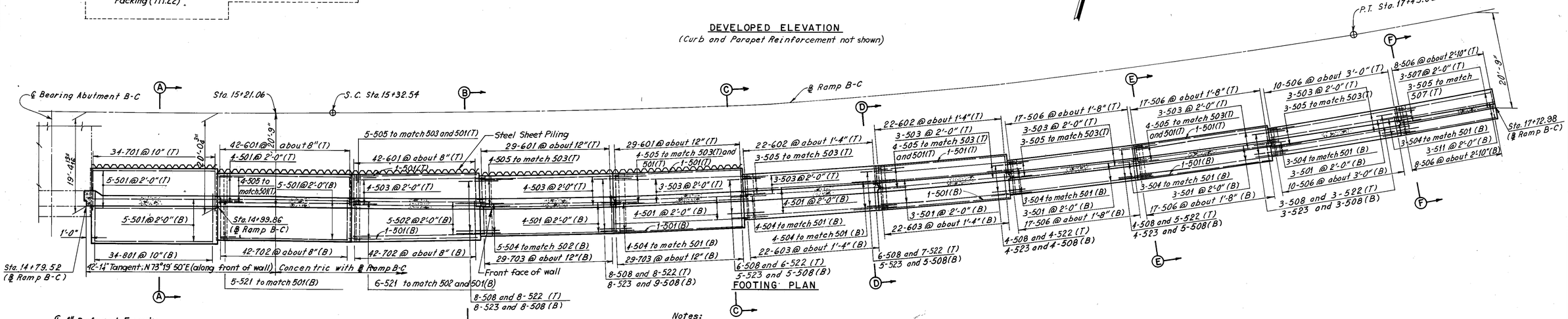
Note: All reinforcing bar marks shall be prefixed W, except for bars 530 thru 538 and 625 thru 627 which shall be prefixed EW.

Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

N

DEVELOPED ELEVATION

(Curb and Parapet Reinforcement not shown)



FOOTING PLAN

Notes:

See the Substructure Construction Procedure Note 11 on Sheet 9/80 of BR. NO. CUY-290-0110 as it relates to construction of Retaining Wall 82.

Backfill shall be placed and compacted in front of the wall ~~prior to or~~ simultaneous with the placing of backfill behind the wall.

The footing keys shall be placed in carefully made trenches against undisturbed earth.

The spread footings are designed for a maximum bearing pressure of 1½ tons per square foot.

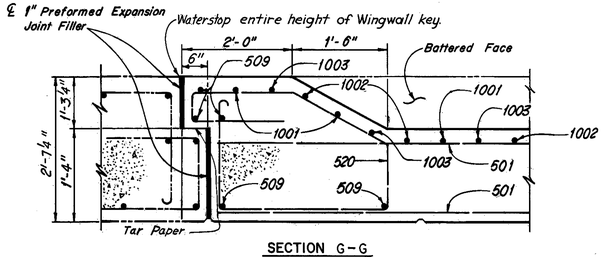
Vertical rustications shall be provided at all contraction and expansion joints and at 4'-0" intervals between joints on the south side of the wall in Panels 1 thru 9. The rustication shall extend from top of footing to the construction joint at the bottom of curb.

Locations of construction joints in the footing are optional but shall be located a minimum of 5'-0" from wall joints.

For wall sections, curb and parapet reinforcement, curb transition details, footing step details and joint and rustication details see Sheet 2/3.

The following abbreviations are used:

nf = near face
ff = far face
ef = each face
(T) = Top
(B) = Bottom



SECTION G-G

H.N.T.B. WALL NO. 82

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

RETAINING WALL ALONG RAMP B-C

STA. 14+79.52 TO STA. 17+72.98 (Along ℄ Ramp B-C)

CLEVELAND CUYAHOGA COUNTY OHIO

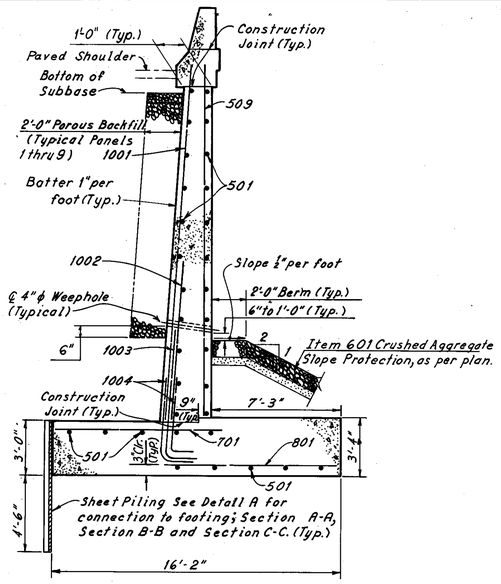
DRAWN L.J.W.	TRACED J.S.C.	CHECKED J.T	REVIEWED	REVISED
DATE 7-28-70	DATE 8-11-70	DATE 9-10-70	DATE 10-16-86	SHEET 1/3

REVISED 10/2/86

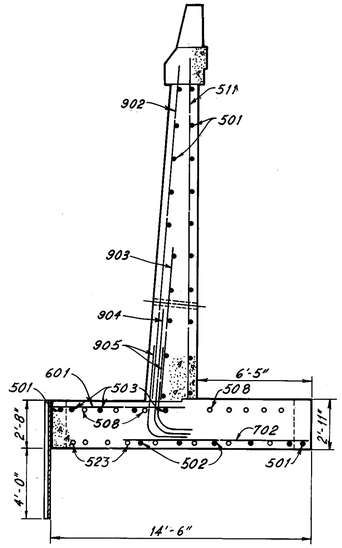
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

72
174

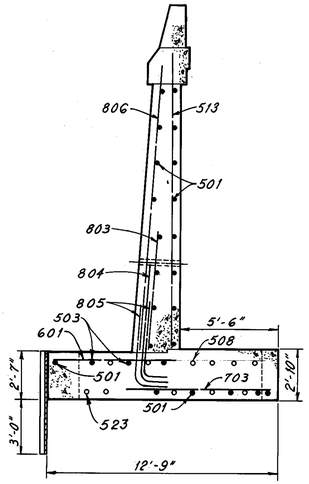
CUYAHOGA COUNTY
CUY-290-0.27



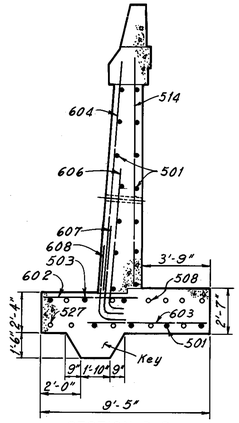
SECTION A-A



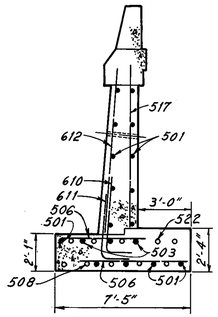
SECTION B-B



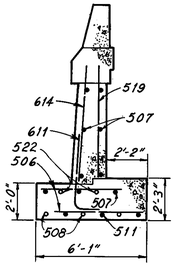
SECTION C-C



SECTION D-D

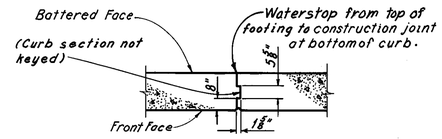


SECTION E-E

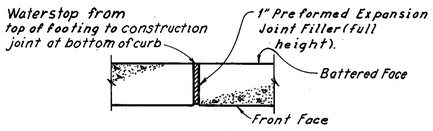


SECTION F-F

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.



CONTRACTION JOINT DETAIL
(Reinforcement not shown)



EXPANSION JOINT DETAIL
(Reinforcement not shown)

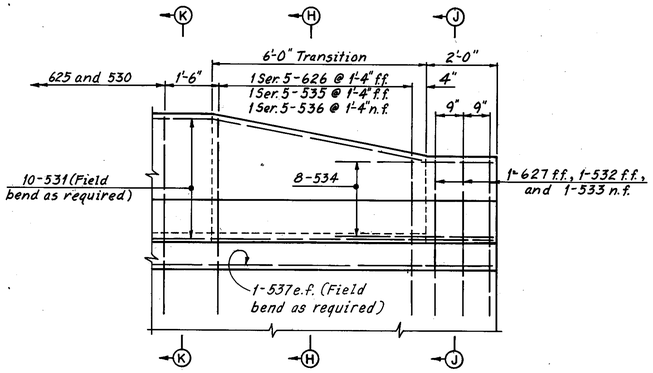
Note: For additional details of Type "B" thru Type "F" Wall Sections see Type "A" Wall Section.

Note: For locations of sections see sheet 1/3

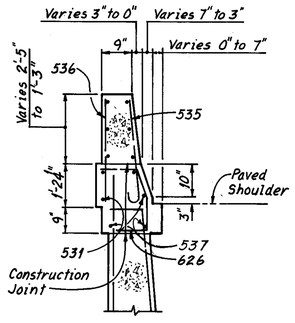
WALL SECTIONS

(Curb and parapet reinforcing not shown)

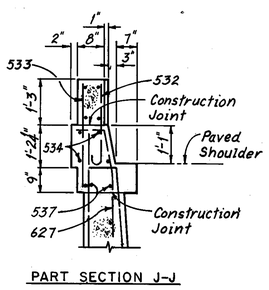
Note: All reinforcing bar marks shall be prefixed W, except for bars 530 thru 538 and 625 thru 627 which shall be prefixed EW.



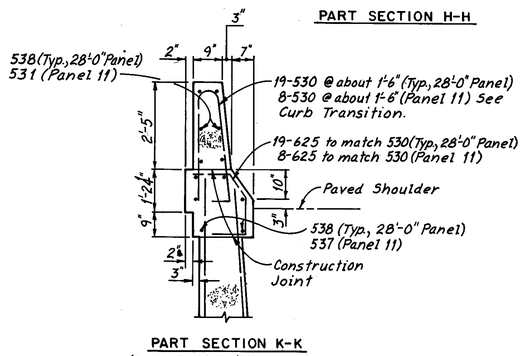
CURB TRANSITION



PART SECTION H-H

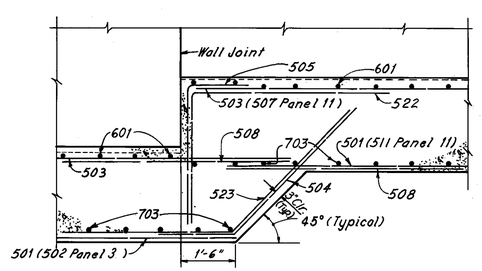


PART SECTION J-J



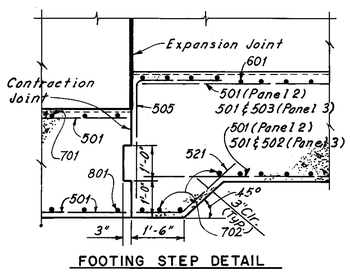
PART SECTION K-K
(Typical, except in transition)

CURB AND PARAPET DETAILS



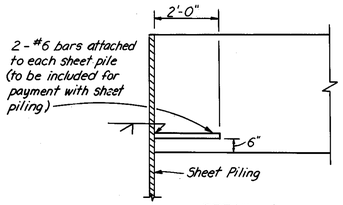
FOOTING STEP DETAIL
TYPICAL EXCEPT AS NOTED

(Transverse footing reinforcement shown at Panel 4 to Panel 5.)



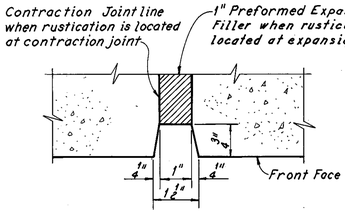
FOOTING STEP DETAIL
PANEL 1 TO PANEL 2 AND PANEL 2 TO PANEL 3

(Transverse footing reinforcement shown at Panel 1 to Panel 2.)



DETAIL A
(Reinforcing steel not shown)

STEEL SHEET PILING	
Min. Yield Point	Req'd. Section Modulus / Ft.
p.s.i.	in³
55,000	7.6
50,000	8.4
45,000	9.1
36,500	10.7



RUSTICATION DETAIL
(Reinforcement not shown)

Notes:

For Waterstop details see Sheet 21/80

Waterstops shall be included with Item 511, Class "C" Concrete, Retaining Wall (Above Footing), for payment.

Concrete insert assemblies, as shown on Standard Construction Drawnings GR-1 and GR-3, shall be provided for the attachment of guardrail terminal connectors. Include with Item 511, Class "C" Concrete, Retaining Wall (Above Footing), for payment.

H.N.T.B. WALL NO. 82

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

RETAINING WALL ALONG RAMP B-C

STA. 14+79.52 TO STA. 17+72.98
(Along ℄ Ramp B-C)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
L.J.W.	J.S.C.	T.T.	C.A.B.	
DATE 7-28-70	DATE 8-13-70	DATE 9-18-70	DATE 10-18-88	SHEET 2/3

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

73
174

CUYAHOGA COUNTY
CUY-290-0.27

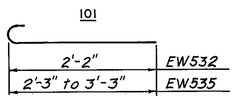
REINFORCEMENT SCHEDULE

MARK	NO.	LENGTH	TYPE	SER INCR	WEIGHT (LBS.)
NON-EPOXY COATED BARS					
W501	203	27'-6"	Str.		5,823
W502	5	29'-0"	Str.		151
W503	26	30'-6"	Str.		827
W504	29	7'-2"	108		217
W505	37	4'-6"	104		174
W506	104	5'-0"	Str.		542
W507	9	19'-6"	Str.		183
W508	84	6'-6"	Str.		569
W509	14	19'-9"	Str.		288
W510	11	19'-0"	Str.		218
W511	14	18'-0"	Str.		263
W512	11	16'-6"	Str.		189
W513	11	14'-6"	Str.		166
W514	10	12'-9"	Str.		133
W515	10	11'-0"	Str.		115
W516	1 Ser. 10	9'-6" / 3'-11"	Str.	1/8"	101
W517	1 Ser. 10	7'-11" / 8'-4"	Str.	1/8"	85
W518	10	6'-9"	Str.		70
W519	8	5'-0"	Str.		42
W520	1 Ser. 11	11'-6" / 12'-5"	135	1/8"	137
W521	11	3'-10"	108		44
W522	44	8'-5"	104		386
W523	40	10'-6"	108		438
W601	142	7'-0"	Str.		1,493
W602	44	5'-0"	Str.		330
W603	44	9'-0"	Str.		463
W604	10	13'-3"	Str.		199
W605	10	11'-6"	Str.		173
W606	18	9'-8"	148		261
W607	36	7'-2"	148		388
W608	20	4'-7"	148		138
W609	1 Ser. 10	9'-3" / 10'-2"	Str.	1/8"	150
W610	18	6'-5"	148		173
W611	38	4'-4"	148		247
W612	1 Ser. 10	8'-2" / 8'-7"	Str.	1/8"	126
W613	10	7'-0"	Str.		105
W614	5	5'-6"	Str.		41
W615	3	5'-6"	104		25
W701	34	9'-6"	Str.		660
W702	84	9'-0"	Str.		1,545
W703	58	7'-6"	Str.		889
W801	34	10'-0"	Str.		908
W802	11	16'-9"	Str.		492
W803	20	9'-6"	Str.		507
W804	40	9'-8"	148		1,032
W805	42	5'-8"	148		635
W806	11	15'-0"	Str.		441
W901	11	19'-6"	Str.		729
W902	11	18'-3"	Str.		683
W903	20	11'-0"	Str.		748
W904	40	10'-10"	148		1,473
W905	42	6'-2"	148		881
W1001	11	20'-6"	Str.		970
W1002	10	12'-0"	Str.		516
W1003	20	11'-9"	148		1,011
W1004	20	6'-11"	148		595
		TOTAL WEIGHT	=		30,188

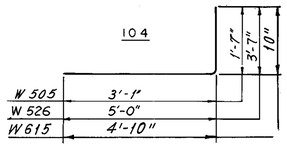
MARK	NO.	LENGTH	TYPE	SER. INCR	WEIGHT (LBS.)
EPOXY COATED BARS					
EW530	198	6'-11"	160		1,428
EW531	10	18'-0"	Str.		188
EW532	3	2'-9"	101		9
EW533	3	2'-9"	Str.		9
EW534	8	4'-4"	Str.		36
EW535	1 Ser. 5	3'-10" / 2'-10"	101	3"	17
EW536	1 Ser. 5	3'-10" / 2'-10"	Str.	3"	17
EW537	2	19'-6"	Str.		41
EW538	120	27'-6"	Str.		3,442
EW625	198	3'-3"	142		967
EW626	1 Ser. 5	2'-8" / 2'-10"	142	1"	20
EW627	3	3'-8"	162		17
		TOTAL WEIGHT	=		6,191

BENDING DIAGRAMS

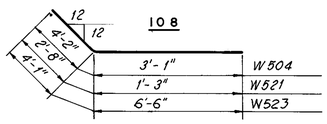
101



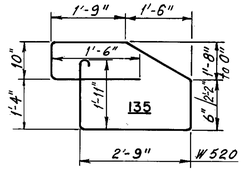
104



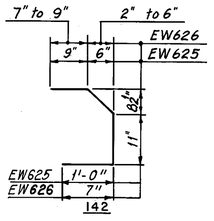
108



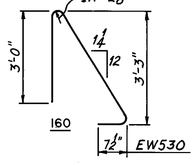
135



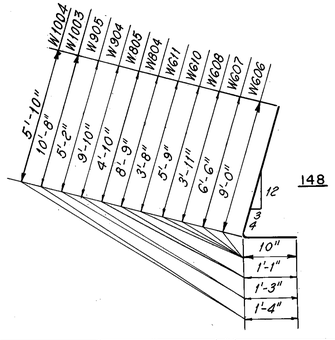
142



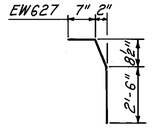
160



148



162



ESTIMATED QUANTITIES RETAINING WALL 82

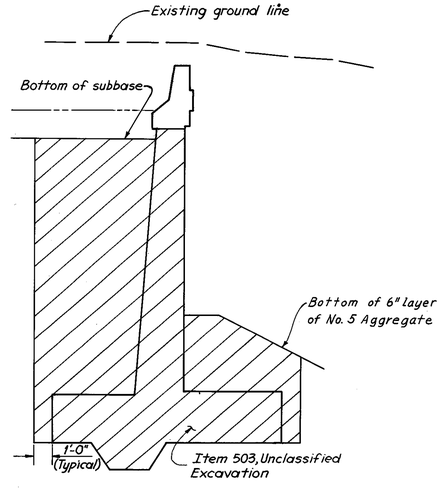
ITEM	DESCRIPTION	UNIT	QUANTITY
503	Cofferdams, cribs and sheeting	Lump Sum	Lump Sum
503	Unclassified Excavation	Cu. Yd.	1,580
504	Steel Sheet Piling Left in Place (minimum section modulus as per plan)	Sq. Ft.	896
509	Reinforcing Steel, Grade 60	Pounds	30,188
511	Class C Concrete, Retaining Wall Footing	Cu. Yd.	337
511	Class C Concrete, Retaining Wall (Above Footing)	Cu. Yd.	275
516	1" Preformed Expansion Joint Filler	Sq. Ft.	182
518	Porous Backfill	Cu. Yd.	143
824	Epoxy Coated Reinforcing Steel, Grade 60	Pounds	6,191
Special	Sealing of Concrete Surfaces (Epoxy) See Proposal Note	Sq. Yds.	524

Notes:

The Class "C" Concrete shall have a minimum ultimate compressive strength of 3,333 p.s.i. at 28 days.

The 1" Expansion Joint Filler, Waterstop, 2 layers of 1/8" Sheet Asbestos Packing and Tar Paper between Abutment B-C and Retaining Wall 82 are included with Abutment B-C quantities for payment.

Note:
An epoxy sealer shall be applied to all surfaces of the retaining wall and borriers above ground line as per proposal note.



TYPICAL SECTION USED TO DETERMINE UNCLASSIFIED EXCAVATION

H.N.T.B. WALL NO. 82

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

RETAINING WALL ALONG RAMP B-C REINFORCEMENT SCHEDULE AND ESTIMATED QUANTITIES

STA. 14+79.52 TO STA. 17+72.98 (Along ℄ Ramp B-C)

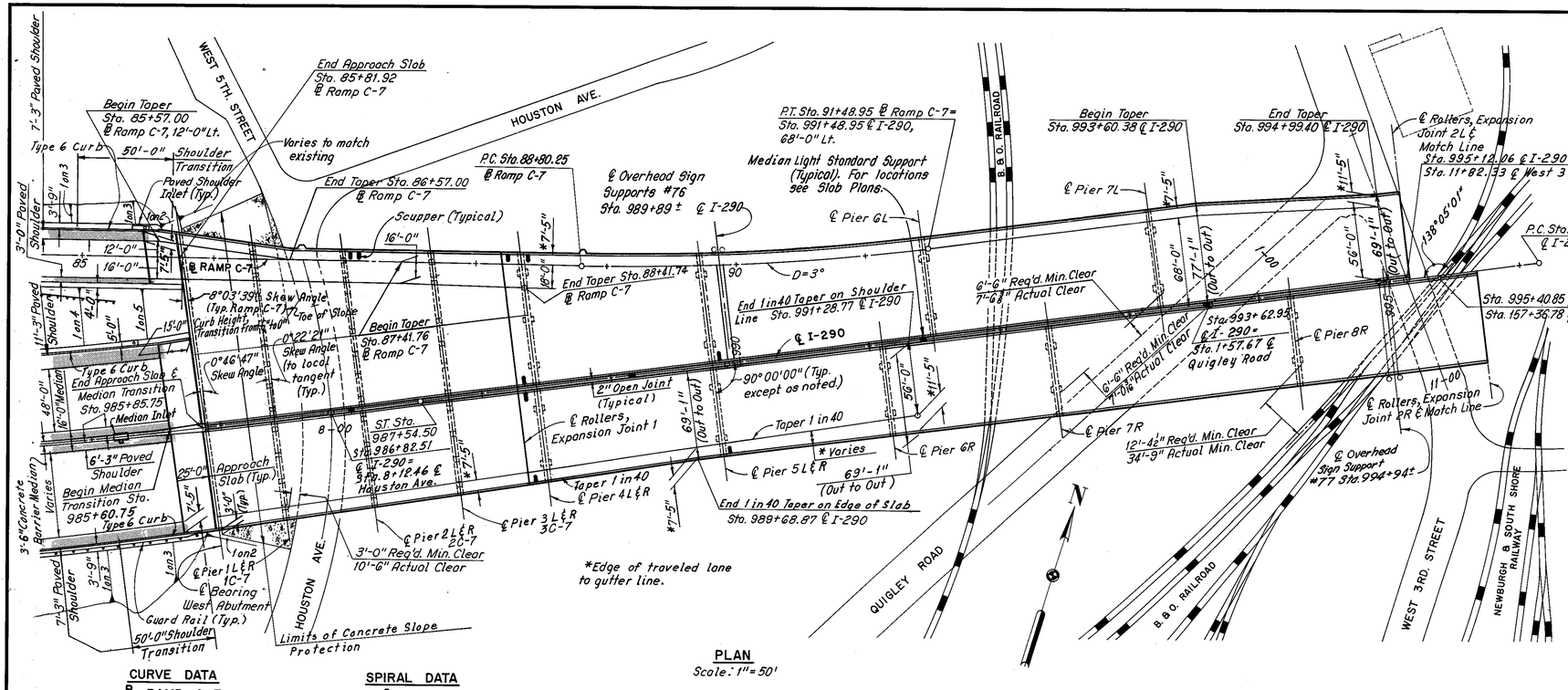
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
LJW	JSO		C.A.B.	
DATE 7-28-70	DATE 8-17-70	DATE 11-13-70	DATE 10-18-88	SHEET 3/3

FHWA REGION	STATE	PROJECT	
5	OHIO		

74
174

CUYAHOGA COUNTY
CUY- 290-027



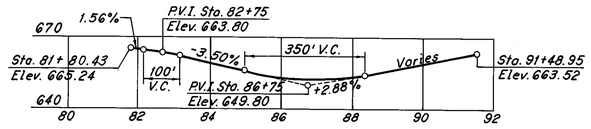
PLAN
Scale: 1"=50'

CURVE DATA
℄ RAMP C-7

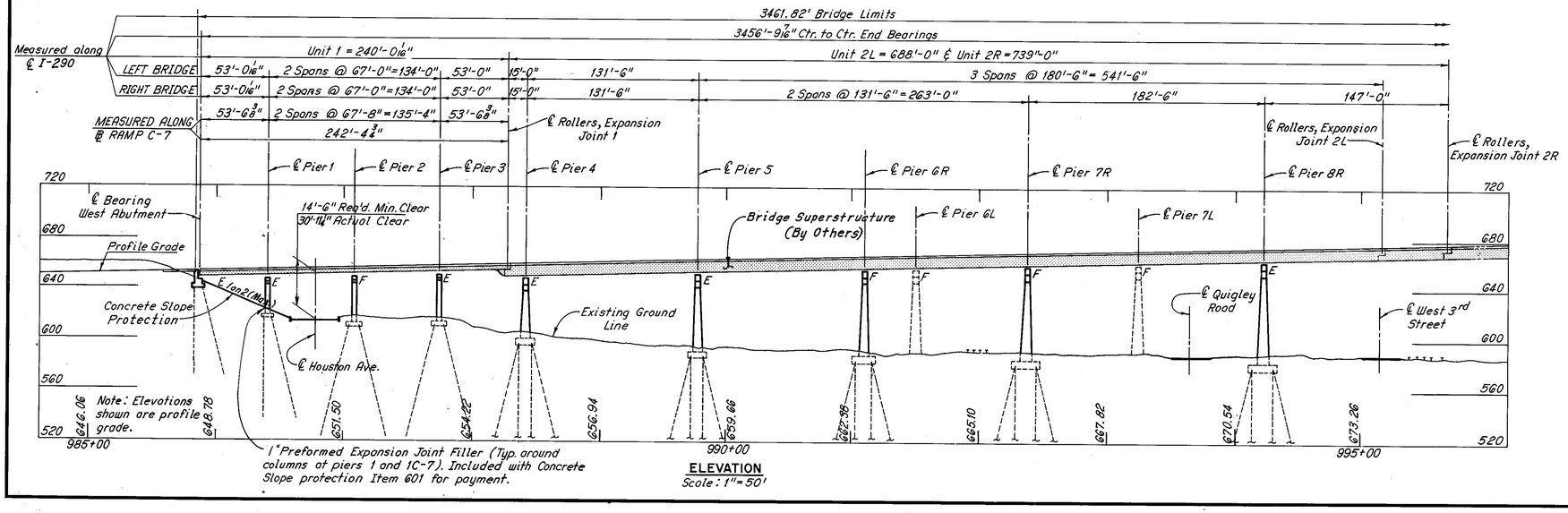
P.I. Sta. 90+14.82
Δ = 8°03'39"
D = 3°00'00" Left
R = 1,909.86'
T = 134.57'
L = 268.70'
E = 4.74'

SPIRAL DATA
℄ I-290

C.S. Sta. 983+54.50
S.T. Sta. 987+54.50
θs = 4°00'00"
Ts = 590.53'
Ls = 400.00'
P = 2.33'
K = 199.97'
S.T. = 133.40'
L.T. = 266.74'
Es = 28.81'



PROFILE RAMP C-7
Scale: Horiz. 1"=200'
Vert. 1"=30'



ELEVATION
Scale: 1"=50'

PROPOSED STRUCTURE

TYPE: Continuous steel beam (Unit 1) continuous welded steel girder with floor system (Units 2, 3 and 4), continuous multiple welded steel girder (Units 5, 6 and C-B) with reinforced concrete deck and substructure.

SPANS: Spans are measured along ℄ I-290:
Unit 1 - 53'-0 1/16", 67'-0", 67'-0" 53'-0"
Unit 2L - 153'-0" Cantilever, 131'-6", 180'-6", 180'-6", 180'-6"
Unit 3L - 201'-0" Cantilever, 237'-0", 330'-0", 174'-0", 201'-0" Cantilever.
Unit 4L - 178'-0 5/8", 188'-11 3/8", 145'-0 5/8", 15'-0" Cantilever.
Unit 2R - 153'-0" Cantilever, 131'-6", 131'-6", 131'-6", 182'-0", 147'-0",
Unit 3R - 201'-0" Cantilever, 201'-0", 340'-0", 185'-0", 201'-0" Cantilever.
Unit 4R - 164'-0 5/8", 166'-11 3/8", 145'-0 5/8", 15'-0" Cantilever.
Unit 5 - 119'-0", 135'-0", 135'-2½", 134'-9 5/8", 134'-11 3/8", 101'-0" Cantilever.
Unit 6 - 104'-9 5/8", 117'-7½", 119'-8 1/8", 122'-9½", 96'-10¾",
Spans are measured along ℄ Ramp C-B:
Unit 6C-B - 114'-6¼", 122'-11¾", 124'-9", 124'-9" 96'-0".

ROADWAYS: I-290 - Width Varies face to face of parapets, 67'-0" to 143'-2 1/2" ± Left Bridge and 67'-0" to 103'-9 1/2" ± Right Bridge. There is an 2" open joint between Left and Right Bridge.

Ramp C-B- Width Varies, 28'-0" to 36'-0" face to face of parapets.

LOADING: HS 20-44 and Interstate Alternate Loading.

SKEW: Unit 1 - None with respect to local tangent at S.T. Sta. 987+54.50
Unit 2 - None
Unit 3 - None
Units 4, 5 and 6 - Varies (See Plan)
Unit 6C-B - 45° Right Forward with respect to local Tangent at P.T. Sta. 10+89.88

WEARING SURFACE: 1½" Latex Modified Concrete

APPROACH SLABS: AS-1-81 (25' long)

ALIGNMENT: Units 1 thru 6 - Spiral left, Tangent and 0°50' Curve Right.

Unit 6C-B - 3° Curve Right, ,8° Curve Right and Tangent.

SUPERELEVATION: Unit 1 - Varies: -0.0156 ft. per ft. to +0.169 ft. per ft.

Unit 2 - Varies level to .0156 ft. per ft.
Unit 3 - Varies .0156 ft. per ft. to .02 ft. per ft.
Units 4, 5 and 6 - .02 ft. per ft.
Unit 6C-B - Varies .0156 ft. per ft. to .064 ft. per ft.

TRAFFIC DATA: (2005)
I-290 87,120 A.D.T.
8,172 D.H.V.
TRUCK 5 %

Maintenance of Traffic

Two lanes of traffic with a minimum vertical clearance of 14'-6" and a minimum horizontal width of 18'-0" on Houston Avenue, 35'-0" on Quigley Road and 30'-0" on West 3rd Street and Independence Road shall be maintained at all times.

Foundation Data

See General Note No. 14.

Notes:
For existing contours, buildings and underground utilities see Site Plan Sheets.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

GENERAL PLAN AND ELEVATION UNITS 1 AND 2

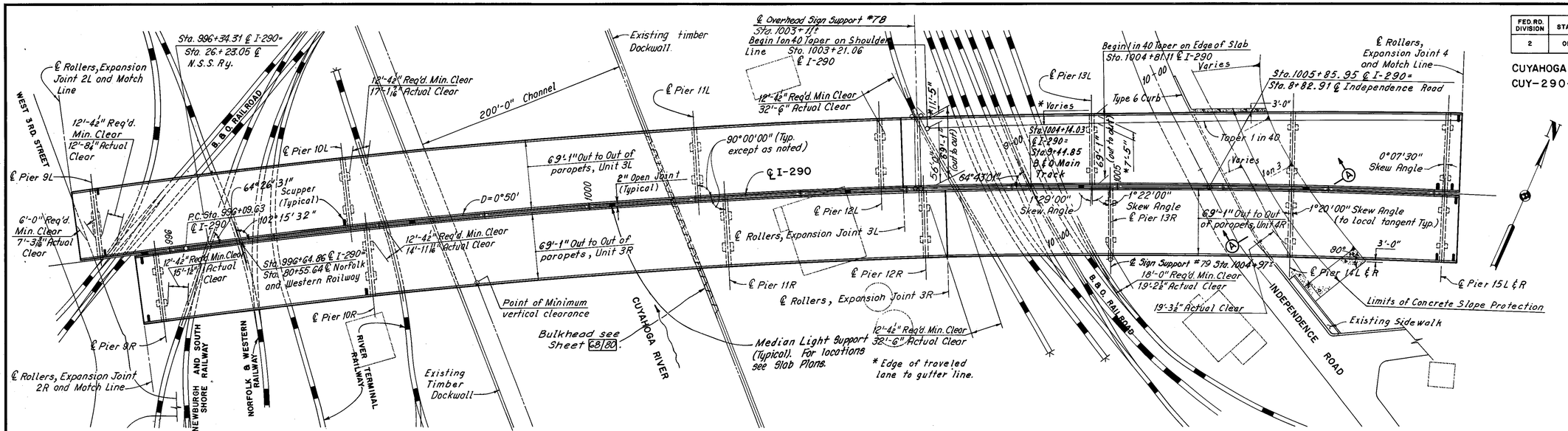
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110
STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
JWC	DLR	D.H.S.	C.A.B.	
DATE 3-10-70	DATE 4-1-70	DATE 10-8-70	DATE 10-18-85	SHEET 1 / 80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

75/174

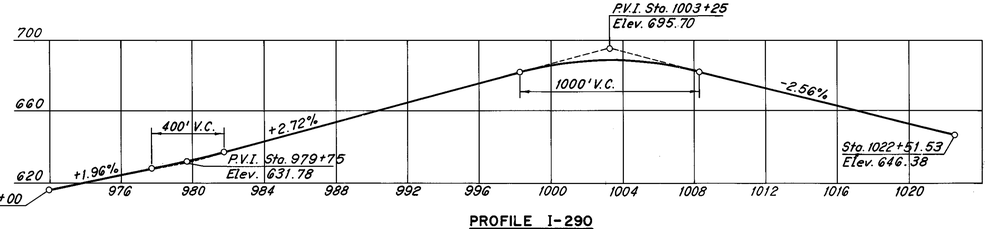
CUYAHOGA COUNTY
CUY-290-0.27



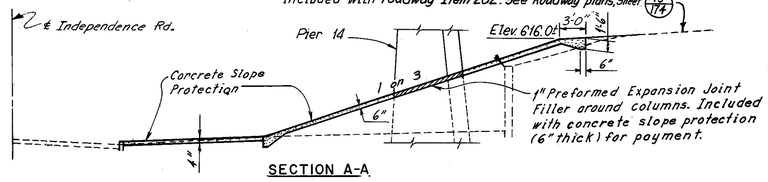
PLAN
Scale: 1"=50'

CURVE DATA
℄ I-290

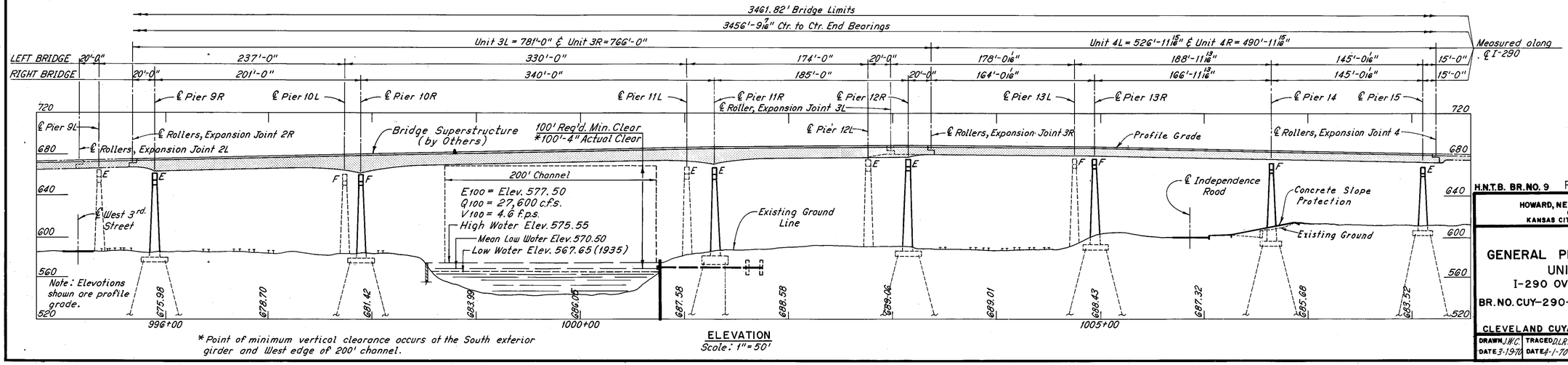
P.I. Sta. 1009+47.08
Δ = 22°00'57"
D = 0°50'00" Right
R = 6,875.49'
T = 1,337.45'
L = 2,641.90'
E = 128.88'



PROFILE I-290
Scale: Horiz. 1"=400'
Vert. 1"=40'



SECTION A-A



*Point of minimum vertical clearance occurs at the South exterior girder and West edge of 200' channel.

ELEVATION
Scale: 1"=50'

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

GENERAL PLAN AND ELEVATION
UNITS 3 AND 4
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

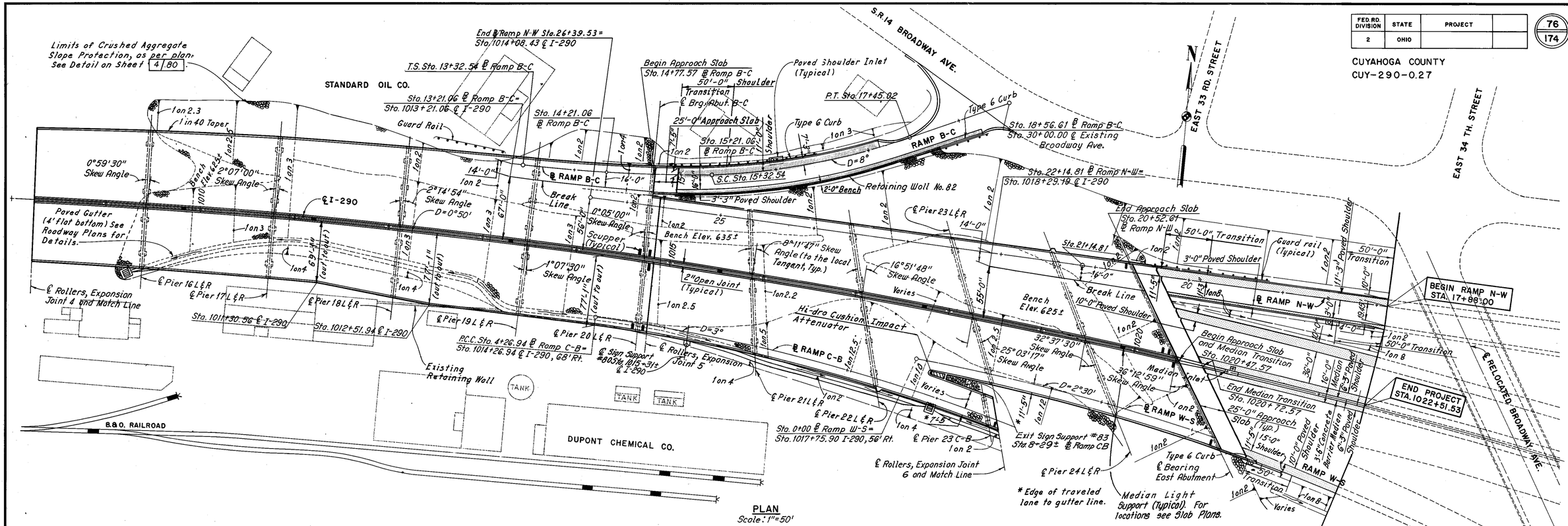
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
JWC	DLR	DHS	CAB	
DATE 3-1970	DATE 4-1-70	DATE 10-8-70	DATE 10-18-88	SHEET 2/80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

76
174

CUYAHOGA COUNTY
CUY-290-0.27



PLAN
Scale: 1"=50'

SPIRAL DATA
℄ RAMP B-C

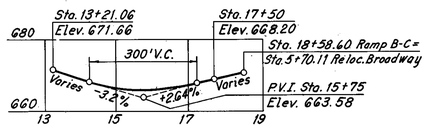
T.S. Sta. 13+32.54
S.C. Sta. 15+32.54
Θs = 8°00'00"
Ts = 253.71'
Ls = 200.00'
P = 2.32'
K = 99.94'
S.T. = 66.79'
L.T. = 133.47'
Es = 18.60'

CURVE DATA
℄ RAMP B-C

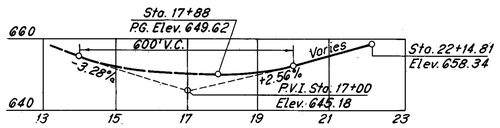
P.I. Sta. 16+39.57
Δ = 16°59'53"
D = 8°00'00"
R = 716.20'
T = 107.02'
L = 212.48'
E = 7.95'

CURVE DATA
℄ RAMP W-S

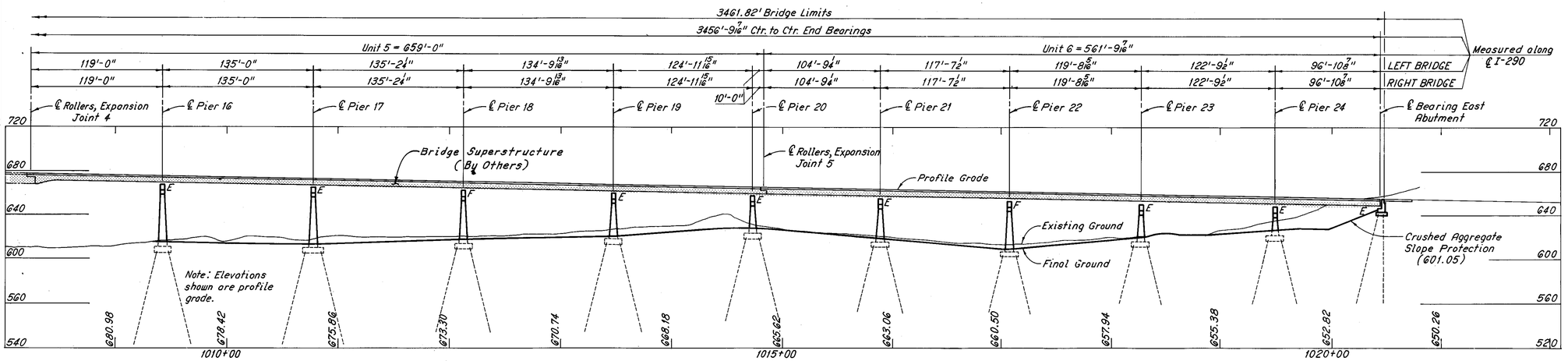
P.I. Sta. 4+02.12
Δ = 19°54'12"
D = 2°30'00"
R = 2,291.83'
T = 402.12'
L = 796.13'
E = 35.01'



PROFILE RAMP B-C
Scale: Horiz. 1"=200'
Vert. 1"=20'



PROFILE RAMP N-W
Scale: Horiz. 1"=200'
Vert. 1"=20'



ELEVATION
Scale: 1"=50'

Note:
See Roadway Plans for final grading of cut slopes.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

GENERAL PLAN AND ELEVATION UNITS 5 AND 6
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

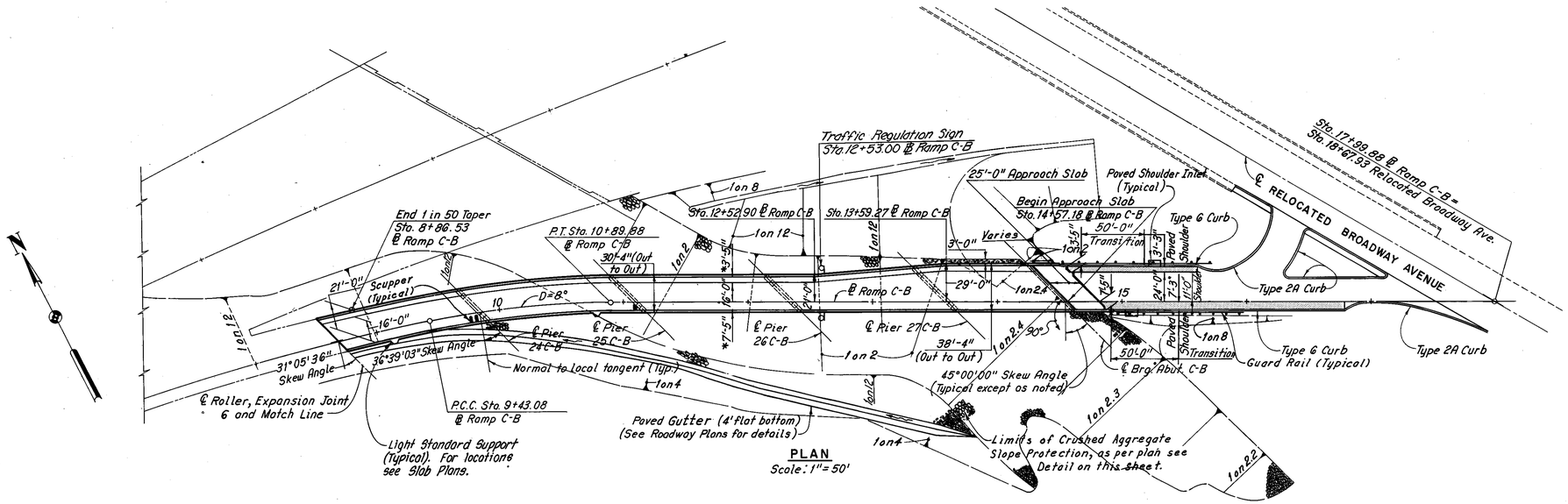
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

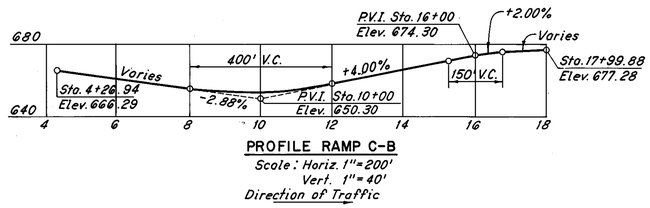
DRAWN J.W.C.	TRACED D.L.R.	CHECKED D.H.S.	REVIEWED C.A.S.	REVISED
DATE 3-10-70	DATE 4-1-70	DATE 10-8-70	DATE 10-18-85	SHEET 3 80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

77
174

CUYAHOGA COUNTY
CUY-290-0.27

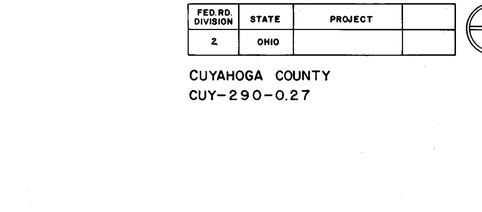




PROFILE RAMP C-B
Scale: Horiz. 1"=200'
Vert. 1"=40'
Direction of Traffic

CURVE DATA
℄ RAMP C-B

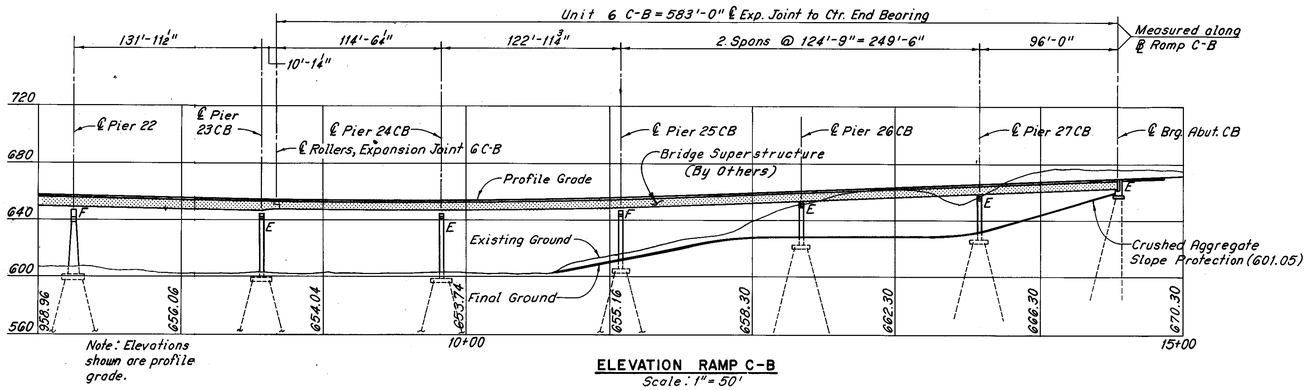
P.I. Sta. 6+86.60	P.I. Sta. 10+16.74
Δ = 15°29'03"	Δ = 11°44'38"
D = 3°00'00" Right	D = 8°00'00" Right
R = 1,909.86'	R = 716.20'
T = 259.65'	T = 73.66'
L = 516.14'	L = 146.80'
E = 17.57'	E = 3.78'



CRUSHED AGGREGATE SLOPE PROTECTION DETAIL

Note: The Crushed Aggregate Slope Protection shall be placed within the limits specified on Sheet 3/80 and on this Sheet. The 6" bed of No. 5 Aggregate shall be placed to the same limits and shall be included with Item 601, Crushed Aggregate Slope Protection, as per plan, for payment.

Note:
See Roadway Plans for final grading of cut slopes.



Note: Elevations shown are profile grade.

ELEVATION RAMP C-B
Scale: 1"=50'

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

GENERAL PLAN AND ELEVATION RAMP C-B

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

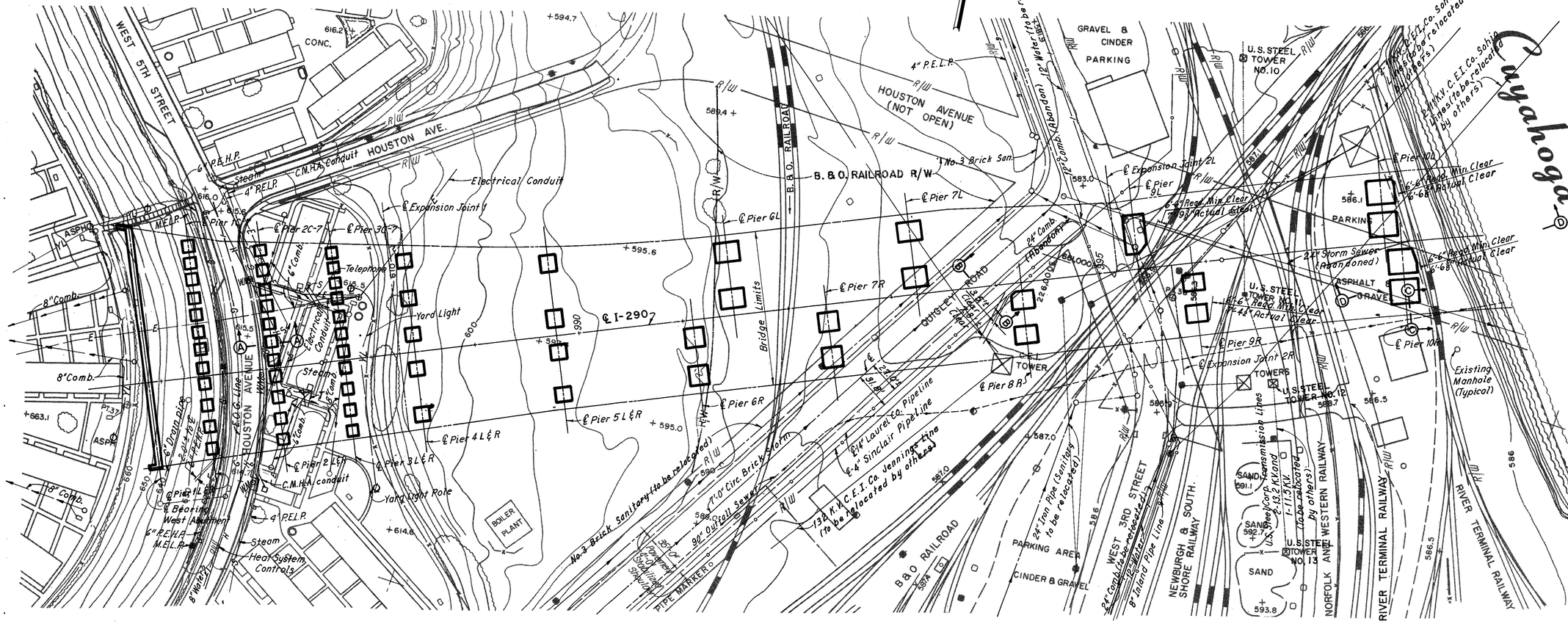
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
J.W.C.	D.L.R.	D.M.S.	C.A.B.	
DATE 3-10-70	DATE 4-1-70	DATE 10-8-70	DATE 10-18-88	SHEET 4/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

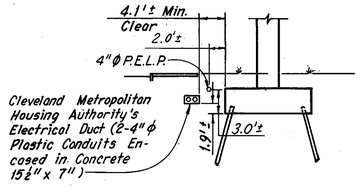
78
174

CUYAHOGA COUNTY
CUY-290-0.27

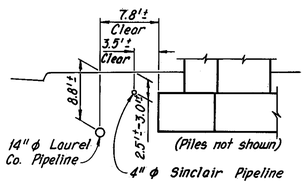


Note: The utilities shown west of Pier 4L and R, with the exception of the gas and water line under Houston Avenue, the gas lines on both sides of Houston Avenue and the Cleveland Metropolitan Housing Authority's electrical duct west of Pier 2, are abandoned.

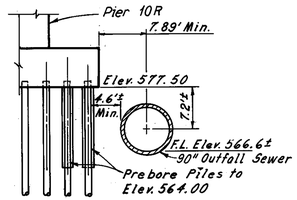
SITE PLAN
Scale: 1" = 50'-0"



SECTION A-A



SECTION B-B



SECTION C-C

Notes:

The information shown on this drawing concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. 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.

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.

For Section D-D see Sheet 6/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

SITE PLAN

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

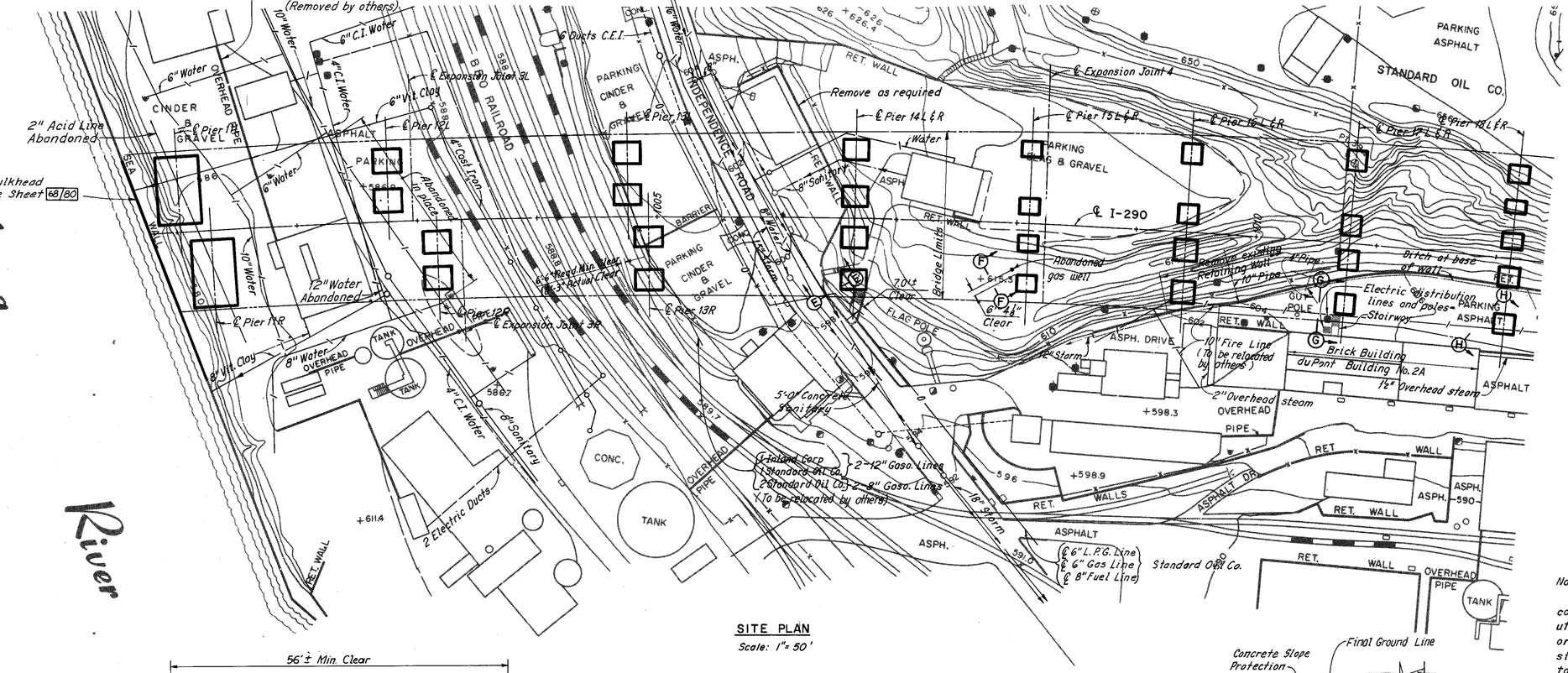
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
J.W.C.	D.L.R.	R.A.B.	C.A.B.	
DATE 3-10-70	DATE 4-1-70	DATE 10-8-70	DATE 10-18-85	SHEET 5/80.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

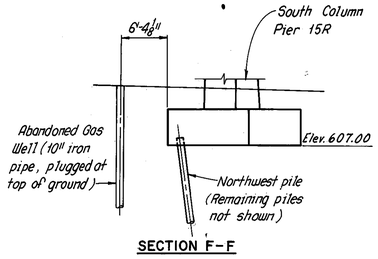
79
174

CUYAHOGA COUNTY
CUY-290-0.27

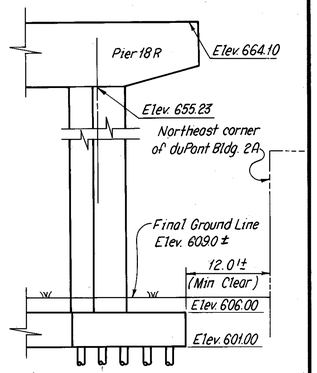
Cuyahoga River



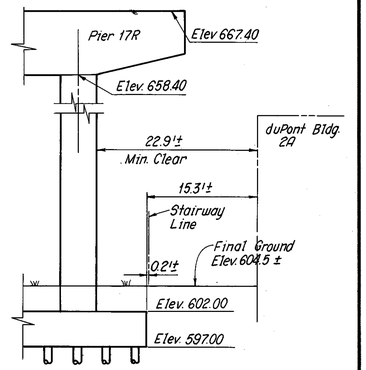
SITE PLAN
Scale: 1" = 50'



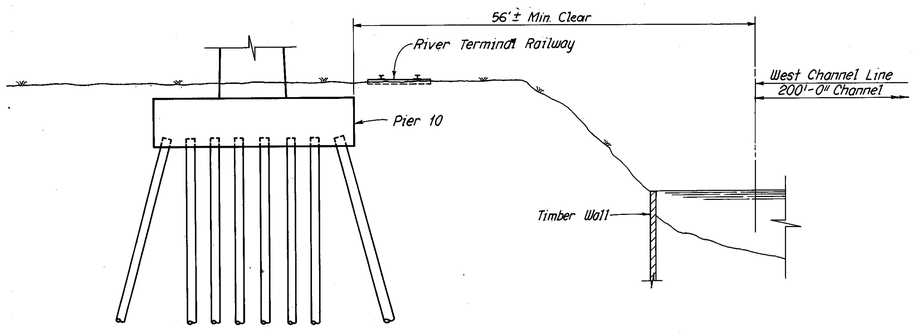
SECTION F-F



SECTION H-H

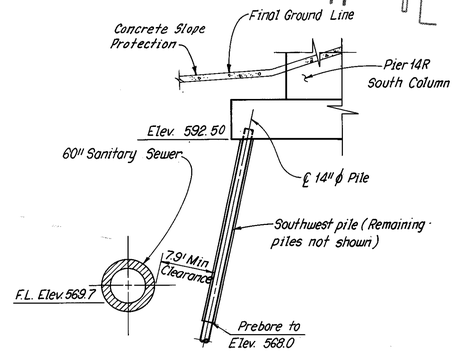


SECTION G-G



SECTION D-D

Note: For location of Section D-D see sheet 5/80



SECTION E-E

Note: Standard Oil Co. gas lines not shown.

Notes:

The information shown on this drawing concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. 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.

Existing timber dockwall tie rods and anchorages are not shown. Locations of tie rods and anchorages shall be determined by the Contractor. See Notes pertaining to work in and over the Cuyahoga River on the General Note Sheet.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

SITE PLAN

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

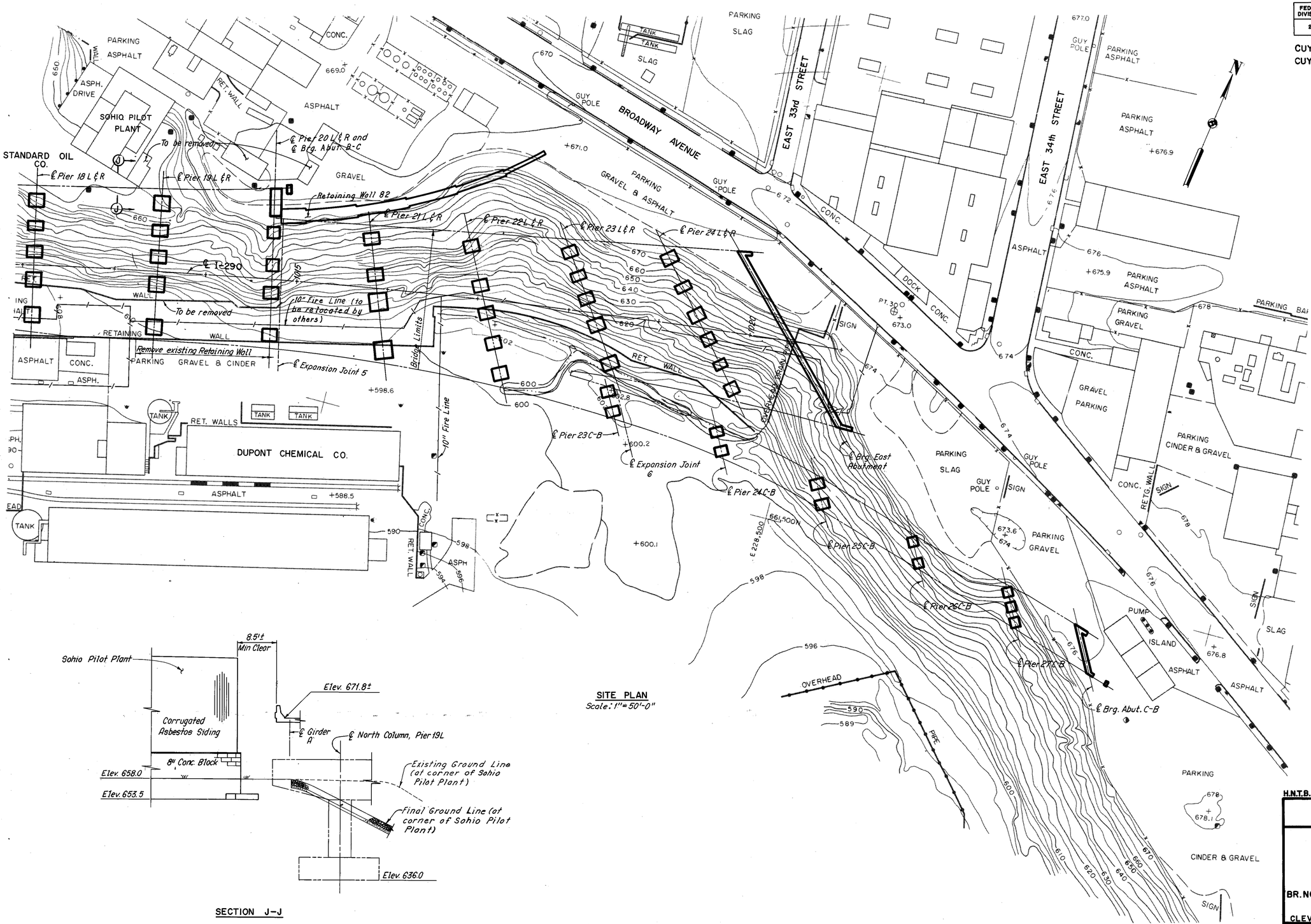
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 3-10-70	DATE 4-1-70	DATE 10-8-70	DATE 10-18-85	SHEET 6/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

80
174

CUYAHOGA COUNTY
CUY-290-0.27



SITE PLAN
Scale: 1" = 50'-0"

SECTION J-J

Notes:

The information shown on this drawing concerning type and location of underground utilities is not guaranteed to be accurate or all inclusive. 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.

The existing underground utilities in Broadway Avenue are not shown. For details see Roadway Plans.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

SITE PLAN

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290) OHIO

CLEVELAND CUYAHOGA COUNTY

DRAWN T.W.C.	TRACED D.L.P.	CHECKED R.P.B.	REVIEWED C.A.B.	REVISED
DATE 3-10-70	DATE 4-1-70	DATE 10-1-70	DATE 10-18-85	SHEET 7/80

FHWA REGION	STATE	PROJECT	
2	OHIO		

81
174

GENERAL NOTES - STRUCTURES OVER 20 - FT SPAN

CUYAHOGA COUNTY
CUY- 290-027

ESTIMATED QUANTITIES

ITEM	TOTAL	UNIT	DESCRIPTION	ABUTMENTS	PIERS	GENERAL		
202	LUMP SUM	LUMP SUM	PORTIONS OF STRUCTURE REMOVED	——	——	LUMP SUM		
503	LUMP SUM	LUMP SUM	COFFERDAMS, CRIBS AND SHEETING	LUMP SUM	LUMP SUM	——		
503	17,278	CU.YDS.	UNCLASSIFIED EXCAVATION AS PER PLAN	1,363	15,325	590		
505	LUMP SUM	LUMP SUM	PILE DRIVING EQUIPMENT MOBILIZATION	——	——	LUMP SUM		
506	LUMP SUM	LUMP SUM	STATIC LOAD TEST	——	——	LUMP SUM		
506	10 ↓ 0	EACH	SUBSEQUENT STATIC LOAD TESTS	——	——	10		
507	207,490	LIN.FT.	14" CAST-IN-PLACE REINFORCED CONCRETE PILES, AS PER PLAN	12,000	195,490	——		
507	1,275	LIN.FT.	PREBORED HOLES	——	1,275	——		
509	3,267,450	LBS.	REINFORCING STEEL, GRADE 60	56,885	3,183,231	27,334		
511	308	CU.YDS.	CLASS C CONCRETE, DEADMAN ANCHORS	——	——	308		
511	11,617	CU.YDS.	CLASS C CONCRETE, PIERS ABOVE FOOTINGS	——	11,617	——		
511	607	CU.YDS.	CLASS C CONCRETE, ABUTMENTS ABOVE FOOTINGS	607	——	——		
511	7,717	CU.YDS	CLASS C CONCRETE, FOOTINGS	429	7,288	——		
516	233	SQ.FT.	1" PREFORMED EXPANSION JOINT FILLER	233	——	——		
518	383	CU.YD.	POROUS BACKFILL	383	——	——		
518	44	LIN.FT.	8"Ø STD. PIPE DOWNSPOUT, GALVANIZED STEEL 707.08, INCLUDING SPECIALS	——	44	——		
518	640	LIN.FT.	10"Ø STD. PIPE DOWNSPOUT, GALVANIZED STEEL 707.08, INCLUDING SPECIALS	177	463	——		
518	497	LIN.FT.	6"Ø PERFORATED HELICAL C.S.P., 707.01	497	——	——		
518	175	LIN.FT.	6"Ø NON-PERFORATED HELICAL C.S.P., INCLUDING SPECIALS 707.01	175	——	——		
523	30	HRS.	DYNAMIC LOAD TEST	——	——	30		
601	32,304	SQ.YD.	CRUSHED AGGREGATE SLOPE PROTECTION, AS PER PLAN	——	——	32,304		
601	413	SQ.YD.	CONCRETE SLOPE PROTECTION, AS PER PLAN (4" THICK)	——	——	413		
601	3,328	SQ.YD.	CONCRETE SLOPE PROTECTION, AS PER PLAN (6" THICK)	——	——	3,328		
824	152,634	LBS.	EPOXY COATED REINFORCING STEEL, GRADE 60	26,779	125,855	——		
SPECIAL	24,618	SQ.YD.	SEALING OF CONCRETE SURFACES, SEE PROPOSAL NOTE	654	23,964	——		
SPECIAL	3,870	SQ.FT.	STEEL SHEET PILING	——	——	3,870		
SPECIAL	196	LIN.FT.	BULKHEAD, WALE AND CAP ASSEMBLIES	——	——	196		
SPECIAL	LUMP SUM	LUMP SUM	BULKHEAD ANCHORAGE SYSTEM	——	——	LUMP SUM		
SPECIAL	LUMP SUM	LUMP SUM	CRACK AND CONDITION SURVEY					
SPECIAL	20	DAYS	DYNAMIC LOAD TEST BY CONSULTANTS	——	——	20		

Note:
For Items included in Item 202 Portions of Structures Removed, see Sheet 68|80.

1. DESIGN SPECIFICATIONS
STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, DATED 1969, INCLUDING THE 1970 INTERIM SPECIFICATIONS AND THE OHIO "SUPPLEMENT" TO THESE SPECIFICATIONS. THE DESIGN LOADING IS HS20-44 CASE I AND THE ALTERNATE MILITARY LOADING.

THE CLASSES OF CONCRETE AND THE GRADES OF REINFORCING STEEL, TOGETHER WITH THE STRENGTH FOR EACH ARE AS FOLLOWS:

CONCRETE CLASS C - UNIT STRESS 1,333 PSI FOR SUBSTRUCTURE
REINFORCING STEEL - ASTM A615, A616, A617 - GRADE 60, UNIT STRESS 24,000 PSI

2. SUPPLEMENTAL SPECIFICATIONS
REFERENCE SHALL BE MADE TO SUPPLEMENTAL SPECIFICATIONS 824 DATED 10-8-82 AND 836 DATED 11-12-85.

3. 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.

4. UTILITIES NOTIFICATION
AT LEAST TWO WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS IN AN AREA WHICH MAY INVOLVE UNDERGROUND UTILITY FACILITIES, THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER, THE REGISTERED UTILITY PROTECTION SERVICE AND THE OWNERS OF EACH UNDERGROUND UTILITY FACILITY SHOWN IN THE PLANS.

THE OWNER OF THE UNDERGROUND UTILITY FACILITY SHALL, WITHIN FORTY-EIGHT HOURS, EXCLUDING SATURDAYS, SUNDAYS AND LEGAL HOLIDAYS, AFTER NOTICE IS RECEIVED, STAKE, MARK OR OTHERWISE DESIGNATE THE LOCATION OF THE UNDERGROUND UTILITY FACILITIES IN THE CONSTRUCTION AREA IN SUCH MANNER AS TO INDICATE THEIR COURSE TOGETHER WITH THE APPROXIMATE DEPTH AT WHICH THEY WERE INSTALLED. THE MARKING OR LOCATING SHALL BE COORDINATED TO STAY APPROXIMATELY TWO DAYS AHEAD OF THE PLANNED CONSTRUCTION.

5. REINFORCING STEEL

THE CLEAR DISTANCE BETWEEN REINFORCING STEEL AND FACE OF CONCRETE SHALL BE 3-IN. FOR ALL BARS IN FOOTINGS AND PIERS ABOVE FOOTINGS, 2-1/2-IN. AT BAR MATS UNDER SHOES AT ABUTMENTS AND 2-IN. ELSEWHERE UNLESS OTHERWISE SHOWN ON THE PLANS.

ALL BAR DIMENSIONS ARE GIVEN OUT TO OUT.

ALL BARS OF A SERIES SHALL VARY BY A CONSTANT INCREMENT.

6. SEALING OF CONCRETE SURFACES
AN EPOXY SEALER SHALL BE APPLIED TO THE EXPOSED CONCRETE SURFACES OF THE PIERS, ABUTMENTS, AND WINGWALLS ABOVE GROUND LINE PER PROPOSAL NOTE.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

ESTIMATED QUANTITIES AND GENERAL NOTES

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
B.B. DATE 9-28-85	C.P. DATE 9-25-85	C.A.B. DATE 10-18-85	C.A.B. DATE 10-18-85	6-11-86

SHEET 8 80

FHWA REGION	STATE	PROJECT	
2	OHIO		

82/174

GENERAL NOTES - STRUCTURES OVER 20 - FT SPAN

CUYAHOGA COUNTY
CUY- 290-027

7. WORK IN AND OVER THE CUYAHOGA RIVER
ALL CONSTRUCTION OPERATIONS IN THE CUYAHOGA RIVER SHALL CONFORM TO THE REQUIREMENTS OF THE U.S. COAST GUARD. THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL NECESSARY COAST GUARD PERMITS FOR CONSTRUCTING FALSEWORK OR OTHER TEMPORARY CONSTRUCTION IN THE RIVER.

ALL WORK SHALL BE SO CONDUCTED THAT THE FREE NAVIGATION OF THE WATERWAY IS NOT UNREASONABLY INTERFERED WITH AND THE PRESENT NAVIGABLE DEPTHS ARE NOT IMPAIRED. THE CONSTRUCTION OF FALSEWORK, PILINGS OR OTHER OBSTRUCTIONS, IF REQUIRED, SHALL BE ACCOMPLISHED IN ACCORDANCE WITH PLANS SUBMITTED TO AND APPROVED BY THE COMMANDER, NINTH COAST GUARD DISTRICT, PRIOR TO CONSTRUCTION OF THE BRIDGE. THE CHANNEL THROUGH THE STRUCTURE SHALL BE PROMPTLY CLEARED OF ALL OBSTRUCTIONS PLACED THEREIN OR CAUSED BY THE CONSTRUCTION OF THE BRIDGE, TO THE SATISFACTION OF THE DISTRICT COMMANDER, WHEN IN HIS JUDGMENT THE CONSTRUCTION WORK HAS REACHED A POINT WHERE SUCH ACTION SHOULD BE TAKEN, AND IN ANY CASE NOT LATER THAN NINETY DAYS AFTER THE BRIDGE HAS BEEN OPENED TO TRAFFIC.

THE CONTRACTOR SHALL NOTIFY THE COMMANDER, NINTH COAST GUARD DISTRICT, TEN DAYS IN ADVANCE OF COMMENCEMENT OF WORK ON THE SUBSTRUCTURE UNITS FLANKING THE RIVER, SO THAT NAVIGATION INTERESTS MAY BE NOTIFIED OF THE PRESENCE OF CONSTRUCTION EQUIPMENT. THE CONTRACTOR SHALL NOTIFY THE SAME OFFICE WHEN WORK IN THE RIVER IS COMPLETED. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN NAVIGATION LIGHTS AND OTHER NAVIGATION SIGNALS OR FACILITIES WHICH MAY BE REQUIRED BY THE U.S. COAST GUARD ON TEMPORARY CONSTRUCTION OR VESSELS.

IN THE CONSTRUCTION OF PIERS 10, 11 AND THE BULKHEAD AT PIER 11 THE CONTRACTOR WILL BE COMPLETELY RESPONSIBLE FOR THE EXISTING DOCKWALLS AND BULKHEADS THAT ARE TO REMAIN IN PLACE. IF ANY PORTION IS DISTURBED INCLUDING THE EXISTING ANCHORAGES, THE DAMAGE SHALL BE REPAIRED OR RESTORED AT THE CONTRACTOR'S EXPENSE. PREBORING HOLES BEFORE DRIVING PILES WILL BE PERMITTED IF THE CONTRACTOR FINDS THIS PROCEDURE NECESSARY TO PREVENT DAMAGE. THESE COSTS WILL BE INCLUDED IN THE COFFERDAM ITEMS.

8. CONSTRUCTION ADJACENT TO AND OVER DUPONT CORPORATION PROPERTY
THE CONTRACTOR SHALL PROTECT THE PLANT, THE EMPLOYEES AND THE PUBLIC FROM DAMAGE OR INJURIES RESULTING FROM FALLING OBJECTS OR FIRE RESULTING FROM CONSTRUCTION OVER THE BUILDINGS AND ADJACENT PROPERTY OF THE E.I. DUPONT DE NEMOURS AND COMPANY, HEREINAFTER REFERRED TO AS DU PONT.

THE CONTRACTOR WILL EXERCISE EXTREME CARE DURING THE CONSTRUCTION OF PIERS 17R AND 18R ADJACENT TO DUPONT BUILDING NO. 2A TO INSURE AGAINST DAMAGE TO THE BUILDING AND EQUIPMENT. THE CONTRACTOR SHALL SUBMIT HIS PROPOSED CONSTRUCTION PROCEDURE AT THESE LOCATIONS TO THE DIRECTOR FOR APPROVAL.

PRIOR TO THE START OF CONSTRUCTION OF PIERS 17R AND 18R, THE CONTRACTOR WILL MAKE A "CRACK AND CONDITION SURVEY," INCLUDING SUITABLE PHOTOGRAPHS OF THE BUILDING. COPIES OF THIS SURVEY WILL BE FURNISHED TO DUPONT AND TO THE DIRECTOR FOR HIS USE AND FILE PRIOR TO CONSTRUCTION.

THE CONTRACTOR WILL, DURING CONSTRUCTION OF PIERS 17R AND 18R, USE MONITORING DEVICES, THE NATURE AND LOCATION OF WHICH SHALL BE SATISFACTORY TO DUPONT, IN ORDER TO DETECT ANY POSSIBLE ADVERSE EFFECTS CAUSED BY THE CONSTRUCTION OPERATION. DUPONT SHALL AT ALL TIMES BE ALLOWED COMPLETE ACCESS TO SAID MONITORING DEVICES AND ANY INFORMATION COMPILED FROM SAID DEVICES. THE DIRECTOR SHALL BE FURNISHED WITH THE LOCATION OF ALL MONITORING DEVICES AND COPIES OF ALL INFORMATION COMPILED THEREIN FOR HIS USE AND FILE.

FOLLOWING COMPLETION OF THE CONSTRUCTION ADJACENT TO THE DUPONT BUILDING NO. 2A, THE "CRACK AND CONDITION SURVEY" WILL BE REPEATED, AND DAMAGE TO THE BUILDING AND EQUIPMENT, IF ANY, RESULTING FROM THE CONSTRUCTION OPERATIONS SHALL BE REPAIRED TO THE SATISFACTION OF DUPONT BY THE CONTRACTOR AT HIS OWN EXPENSE.

IT IS UNDERSTOOD THAT THE RESPONSIBILITY FOR THE CONSTRUCTION ADJACENT TO DUPONT BUILDING NO. 2A REMAINS ENTIRELY WITH THE CONTRACTOR, AND HE ALONE SHALL BE RESPONSIBLE FOR ANY DAMAGE, INJURY OR LOSS RESULTING TO DUPONT FROM SAID CONSTRUCTION.

THIS ITEM SHALL BE PAID FOR AT THE LUMP SUM PRICE BID FOR ITEM SPECIAL - CRACK AND CONDITION SURVEY.

9. HAZARDOUS WASTE MATERIAL AND GROUND CONTAMINATION AT E.I. DUPONT DE NEMOURS AND COMPANY PROPERTY
MANUFACTURE OF CHEMICALS BY E.I. DUPONT DE NEMOURS AND COMPANY, MAY HAVE RESULTED IN GROUND CONTAMINATION BY RAW MATERIALS, INTERMEDIATES, SUPPORT CHEMICALS OR FINISHED PROUDCTS, SOME OF WHICH MAY BE HAZARDOUS. THERE ALSO IS THE POSSIBILITY THAT WASTES AND/OR PIPES AND/OR TANKS MAY HAVE BEEN DISPOSED OF ON THE PLANT SITE.

THE CONTRACTOR SHALL BE AWARE OF POTENTIAL RISKS THAT MAY BE PRESENT AND TAKE APPROPRIATE PRECAUTIONS DURING ANY EXCAVATION OR CONSTRUCTION WORK OR IN DISPOSING OF ANY MATERIALS REMOVED FROM THE SITE. IF DURING THE CONSTRUCTION OPERATIONS ANY EQUIPMENT (TANKS, PIPES, ETC.) OR ATYPICAL SOIL APPEARANCE IS ENCOUNTERED, THE CONTRACTOR, FOR NECESSARY COORDINATION AND MITIGATING MEASURES SHALL CONTACT THE PLANT COORDINATOR.

10. CONSTRUCTION ADJACENT TO RAILROAD TRACKS
CONSTRUCTION CLEARANCE OF 23'-0" VERTICALLY ABOVE THE TOP OF THE RAILROAD RAILS AND 8'-0" HORIZONTALLY FROM THE CENTER OF TRACKS SHALL BE MAINTAINED AT ALL TIMES. SHEETING FOR FOOTINGS AT PIERS 9L, 9R, 10L AND 10R CLOSER THAN 8'-0" OR AS NOTED BELOW SHALL BE CUT OFF AT THE ELEVATION OF THE RAILROAD TIES. THE HORIZONTAL CLEARANCE REQUIRED AT CURVED TRACKS SHALL BE INCREASED 1" PER DEGREE OF CURVATURE. △ BOTTOM

11. SUBSTRUCTURE CONSTRUCTION PROCEDURE
THE CONTRACTOR SHALL SUBMIT A DETAILED CONSTRUCTION PROCEDURE AND SEQUENCE OF OPERATIONS TO THE DIRECTOR FOR APPROVAL AT PIERS 13, 14, 16 THRU 24, 25 C-B, 26 C-B, 27 C-B, ABUTMENT B-C AND RETAINING WALL 82. PARTICULAR ATTENTION SHALL BE GIVEN TO THE COMBINED CONSTRUCTION EFFECTS AT PIERS 20L, 21L AND 22L WITH ABUTMENT B-C AND RETAINING WALL 82. THE CONTRACTOR'S PROCEDURE SHALL INCLUDE PROPOSED EXCAVATION SLOPES, COFFERDAM DETAILS, ORDER OF INSTALLING PILES, AND SEQUENCE FOR BACKFILLING AND FINAL GRADING. BEFORE PLACING CONCRETE FOR ANY SUBSTRUCTURE UNIT, (PIER, ABUTMENT OR WALL), PILING FOR ADJACENT SUBSTRUCTURE UNITS SHALL HAVE BEEN DRIVEN.

IN ORDER TO EXPEDITE SUPERSTRUCTURE CONSTRUCTION THE CONTRACTOR SHALL INITIALLY COMPLETE THE WORK IN UNIT 3. CONCURRENTLY OR SUBSEQUENT TO THIS WORK THE CONTRACTOR SHALL COMPLETE THE SUBSTRUCTURE UNITS IN THE FOLLOWING ORDER: UNIT 2, UNIT 1, UNIT 4, UNIT 5, UNIT 6 AND UNIT 6CB.

THE SUBSTRUCTURE CONTRACTOR AND THE SUPERSTRUCTURE CONTRACTOR ARE REQUESTED TO COOPERATE BY ARRANGING THEIR WORK IN SUCH A MANNER THAT INCONVENIENCE TO EITHER WOULD BE HELD TO A MINIMNUM.

12. EXCAVATION AND EMBANKMENT
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, AS SHOWN ON THE PLANS BEFORE EXCAVATION OR ANY CONSTRUCTION WORK IS STARTED ON THE ABUTMENTS AND PIERS 1, 14, 16 THRU 24 AND 23C-B THRU 27C-B.

SEWER NOS. 72 THRU 77, 79, 80, P101, P117, P118, SP3, SP4 AND SP7 THRU SP9 AND THEIR MANHOLES SHALL BE IN PLACE AND THE TRENCHES BACKFILLED AND COMPACTED BEFORE EXCAVATING OR DRIVING PILES FOR THE ADJACENT PIERS OR ABUTMENTS. THE LATERALS WHICH CONNECT DOWNSPOUTS TO CATCH BASINS OR MANHOLES SHALL BE INSTALLED AFTER THE PIERS AND ABUTMENTS ARE CONSTRUCTED. FOR DETAILS OF THE UNDERGROUND SEWER SYSTEM SEE THE ROADWAY PLANS.

13. SPECIAL PRECAUTIONARY NOTE
THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS IN THE DRIVING OF PILES AND IN THE CONSTRUCTION OF THE FOOTINGS AT THE FOLLOWING PIERS TO INSURE AGAINST DAMAGE TO THE ADJACENT EXISTING UTILITIES OR STRUCTURES:

- PIER 1R - EAST OHIO GAS CO. 6" P.E.H.P. LINE (SEE SHEET *5/80*).
- PIERS 2L&R & 2C-7 - EAST OHIO GAS CO. 4" P.E.L.P. LINE AND CLEVELAND METROPOLITAN HOUSING AUTHORITY ELECTRICAL DUCT (SEE SHEET *5/80*).
- PIER 8R (NORTH FTG.) - LAUREL & SINCLAIR CO. PIPELINES (SEE SHEET *5/80*).
- PIER 10R (SOUTH FTG.) - 90" OUTFALL SEWER (SEE SHEET *5/80*).
- PIERS 10L&R - EXISTING DOCKWALLS AND ANCHORAGES (SEE "WORK IN AND OVER THE CUYAHOGA RIVER" IN GENERAL NOTES).
- PIER 14R (SOUTH FTG.) - 60" SANITARY SEWER AND STANDARD OIL CO. PIPELINES (SEE SHEET *6/80*).
- PIER 15R (SOUTH FTG.) - ABANDONED GAS WELL (SEE SHEET *6/80*).
- PIERS 17R&18R (SOUTH FTG.) - DUPONT BUILDING NO. 2A (SEE SHEET *6/80* AND NOTE IN GENERAL NOTES).
- PIER 19L (NORTH FTG.) - SOHIO PILOT PLANT BUILDING (SEE SHEET *7/80*).

PILES SHALL BE PREBORED AS NOTED HEREIN AT THE FOLLOWING PIERS: PIERS 7R, 9L, 9R, 10R, 12L, 13L, 13R, 14L, 14R, 16R, 17R, 18R, 19R, 20R AND 21R.

IN ADDITION TO THE ABOVE MENTIONED AREAS EXTREME CARE SHALL ALSO BE TAKEN BY THE CONTRACTOR TO INSURE AGAINST DAMAGE TO THE SEWERS, SPECIFIED IN THE EXCAVATION AND EMBANKMENT NOTE, WHICH ARE REQUIRED TO BE IN PLACE PRIOR TO CONSTRUCTION OF THE ADJACENT PIERS AND ABUTMENTS. SEE ROADWAY PLANS FOR LOCATION OF UNDERGROUND SEWER SYSTEM.

14. FOUNDATION DATA
ALL ABUTMENTS AND PIERS ARE FOUNDED ON 14 IN. Ø C.I.P. REINFORCED CONCRETE PILES WITH ESTIMATED AVERAGE PAY LENGTHS AS FOLLOWS:

ABUTMENTS	75 FT
PIERS 1 THRU 4, 16, 17 AND 18	90 FT
PIERS 5, 6 AND 19	80 FT
PIERS 7 THRU 10, 12 AND 13	110 FT
PIER 11	100 FT
PIERS 14 AND 15	120 FT
PIERS 20 AND 21	75 FT
PIERS 22, 23, 24 AND 23CB THRU 27CB	70 FT

THE PILES AT THE ABUTMENTS SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 40 TONS PER PILE. THE PILES AT THE PIERS SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 65 TONS PER PILE.

15. SPECIAL PILING CONSIDERATIONS
THE PILE HAMMER USED TO INSTALL THE CAST-IN-PLACE REINFORCED CONCRETE PILES SHALL HAVE A STATE'S ENERGY RATING OF NOT LESS THAN 16,500 FOOT-POUNDS. THIS REQUIREMENT DOES NOT RELIEVE THE CONTRACTOR FROM 108.05 WHICH STATES THAT THE CONTRACTOR IS TO PROVIDE SUFFICIENT EQUIPMENT FOR PROSECUTING THE REQUIRED WORK. REFER TO ODOT'S MANUAL OF PROCEDURES FOR STRUCTURES TO OBTAIN THE STATE'S ENERGY RATING.

THE RESPONSIBILITY OF CHOOSING AND PROVIDING A SATISFACTORY PILE WALL THICKNESS FOR THIS PROJECT SHALL BE BORNE BY THE CONTRACTOR EXCEPT THAT THE PILE WALL THICKNESS SHALL NOT BE LESS THAN 0.200 INCHES. IF A PILE WALL THICKNESS GREATER THAN 0.200 INCHES IS NECESSARY TO RESIST THE LATERAL EARTH PRESSURES AND THE PILE INSTALLATION DRIVING STRESSES, THE CONTRACTOR SHALL MAKE THIS DETERMINATION AND SHALL FURNISH A PILE WITH AN ACCEPTABLE WALL THICKNESS.

MONOTUBE PILES ARE NOT REQUIRED TO COMPLY WITH THE ABOVE SPECIFIED MINIMUM PILE WALL THICKNESS. IF MONOTUBE PILES ARE USED, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING A MONOTUBE PILE WITH A WALL THICKNESS THAT WILL CONFORM TO ALL APPLICABLE REQUIREMENTS OF 507.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

GENERAL NOTES

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED 6-11-86
R.H.W. DATE 9-20-85	U.S. DATE 9-20-85	C.A.B. DATE 10-18-85	C.A.B. DATE 10-18-85	SHEET 9 80

REVISED 6-24-86

FHWA REGION	STATE	PROJECT	
2	OHIO		

83
174

GENERAL NOTES - STRUCTURES OVER 20 - FT SPAN

CUYAHOGA COUNTY
CUY-290-027

16. COAL TAR EPOXY COATING

A. DESCRIPTION

1. THIS WORK SHALL CONSIST OF PROVIDING ALL MATERIALS, SUPERVISION, LABOR, EQUIPMENT, TOOLS AND SUPPLIES NECESSARY TO PROVIDE A PROTECTIVE COAL TAR EPOXY COATING SYSTEM FOR THE BULKHEAD REPLACEMENT AT PIER 11.

2. THE COATING SHALL BE APPLIED TO ALL SURFACES OF THE SHEET PILING, WITH THE EXCEPTION OF THE INTERIOR CONTACTING SURFACES OF THE INTERLOCKS AND THE FACE OF THE DEADMAN ANCHOR SHEETING IN CONTACT WITH CONCRETE. THE BULKHEAD CAP, THE ENTIRE WALE ASSEMBLY, THE TIE RODS, TURNBUCKLES AND ALL BOLTS SHALL BE COATED IN THEIR ENTIRETY, EXCEPT FOR THE THREADS AND NUTS WHICH SHALL BE COATED IN THE FIELD AFTER ASSEMBLY.

B. COATING MATERIALS

1. THE COATING SHALL BE SELF-CURING CONSISTING OF TWO COMPONENTS. THE MATERIAL USED SHALL MEET OR EXCEED ALL THE RQUIREMENTS OF THE CORPS OF ENGINEERS SPECIFICATION C-200, GOVERNMENT SPECIFICATION MIL-P-23236 AND STEEL STRUCTURES PAINTING COUNCIL PAINT SYSTEM SSPC-PAINT NO. 16, COAL TAR EPOXY - POLYAMIDE BLACK.

2. ALL COATINGS SHALL BE SO PROCESSED AND PACKAGED AS TO INSURE THAT WITHIN A PERIOD OF ONE YEAR FROM DATE OF MANUFACTURE, THEY WILL NOT GEL, LIVER OR THICKEN DELETERIOUSLY OR FORM GAS IN THE CLOSED CONTAINER.

C. PACKAGING AND LABELING

COATINGS AND VEHICLES SHALL BE PACKAGED IN STANDARD CONTAINERS NOT LARGER THAN 5 GALLONS IN SIZE, WITH REMOVABLE FRICTION OR LUG-TYPE COVERS. EACH CONTAINER OF SEPARATELY PACKAGED COMPONENT SHALL BE CLEARLY AND DURABLY LABELED TO INDICATE THE PURCHASER'S ORDER NUMBER, DATE OF MANUFACTURE, MANUFACTURER'S BATCH NUMBER, QUANTITY, COLOR, COMPONENT IDENTIFICATION, AND THE DESIGNATED NAME AND FORMULA OR SPECIFICATION NUMBER OF THE COATING TOGETHER WITH SPECIAL INSTRUCTIONS.

D. CERTIFICATIONS

1. IN ADDITION TO MEETING THE OTHER QUALIFICATIONS, THE COATING MANUFACTURE SHALL CERTIFY THAT:

A. HE HAS BEEN A PRODUCER OF COATINGS OF THIS CLASS FOR A PERIOD OF AT LEAST TWO YEARS.

B. THE COATING BEING OFFERED UNDER THIS SPECIFICATION IS THE SAME FORMULATION WHICH HAS BEEN MANUFACTURED AND DISTRIBUTED BY HIM DURING THIS TWO YEAR PERIOD.

C. THE COATING BEING OFFERED UNDER THIS SPECIFICATION HAS BEEN SUCCESSFULLY USED IN SEA WATER, IMMERSION SERVICE FOR AT LEAST TWO YEARS.

E. SURFACE PREPARATION

1. ALL SURFACES SHALL BE THOROUGHLY PREPARED FOR COATING APPLICATION IN STRICT ACCORDANCE WITH THE COATING MANUFACTURER'S RECOMMENDATION. ALL CLEANING AND COATING WORK MUST BE PERFORMED IN A HEATED BUILDING. PRECEDING GRIT BLASTING, STEEL MUST BE HEATED TO AT LEAST 100°F TO ELIMINATE POSSIBILITY OF MOISTURE ON THE SURFACES TO BE CLEANED AND COATED.

2. GRIT BLASTING SHALL BE TO CLEAN NEAR WHITE METAL BLAST AS DEFINED BY SSPC SPECIFICATION SP-10. ALL WORK BLASTED IN ONE DAY MUST BE COATED ON THAT DAY.

3. ANY AREAS OF THE SURFACE WHICH SHOW TRACES OF OIL, GREASE OR OTHER ORGANIC MATTER SHALL BE REMOVED PRIOR TO COATING. THE CONTAMINATION SHALL BE REMOVED BY USING A SOLVENT WASH AS DEFINED BY STEEL STRUCTURES PAINTING COUNCIL SPECIFICATION SP-1.

4. ALL SURFACES TO BE COATED MUST BE COMPLETELY DRY, FREE OF MOISTURE, SOIL, DUST, GRIT, AT THE TIME THE COATING IS APPLIED.

5. THE FINISHED COATING SHALL BE POST-CURED UNDER COVER AT A TEMPERATURE OF APPROXIMATELY 110°F WHEREVER THE AMBIENT AVERAGE TEMPERATURE FALLS BELOW 70°F.

F. APPLICATION OF COATING

ALL COATINGS SHALL BE APPLIED BY BRUSH OR SPRAY, USING COMMERCIALLY AVAILABLE SPRAY EQUIPMENT. THE COATINGS SHALL EXHIBIT REASONABLE LEVELING WITHOUT EXCESSIVE SAGGING WHEN APPLIED AT THE REQUIRED FILM THICKNESS. COATING MANUFACTURER'S RECOMMENDATIONS SHALL BE ADHERED TO STRICTLY. THE TEMPERATURE OF THE COATING SHALL NOT BE LESS THAN THE TEMPERATURE OF THE STEEL AT THE TIME OF APPLICATION THE TEMPERATURE OF THE SUBSTRATE MUST BE AT LEAST 5°F ABOVE THE DEW POINT TEMPERATURE.

G. PROGRESS OF COATING WORK

WHERE COATING ON ANY TYPE OF SURFACE HAS COMMENCED, THE COMPLETE COATING OPERATION, INCLUDING PRIMING AND FINISHING COATS WHEN MULTIPLE COATS ARE USED ON THAT PORTION OF THE WORK, SHALL BE COMPLETED AS SOON AS PRACTICABLE, WITHOUT PROLONGED DELAYS, WHERE NECESSARY, SUFFICIENT TIME SHALL ELAPSE BETWEEN SUCCESSIVE COATS TO PERMIT THEM TO DRY PROPERLY FOR RECOATING AND THIS PERIOD SHALL BE MODIFIED AS NECESSARY TO SUIT SHOP CONDITIONS. FASTER BETWEEN-COAT APPLICATIONS ARE POSSIBLE AT HIGHER TEMPERATURES; FOR EXAMPLE, IF INITIAL COAT IS APPLIED AT 100°F BY USE OF AN IN-LIVE HEATER, A SECOND COAT MAY USUALLY BE APPLIED WITHIN THREE HOURS AFTER THE FIRST COAT.

H. COATING THICKNESS

1. A MINIMUM THICKNESS (NOT AVERAGE) OF 16 MILS DRY FILM IS REQUIRED ON ALL SURFACES TO BE COATED.

2. WHERE TWO COATS ARE REQUIRED TO ACHIEVE THE RECOMMENDED FILM BUILD, THE INTERVAL BETWEEN THE COATS SHOULD BE AS SHORT AS POSSIBLE. TO INSURE MAXIMUM INTERCOAT ADHESION, IT IS RECOMMENDED THAT:

A. THE NEXT COAT BE APPLIED AS SOON AS POSSIBLE AFTER THE PREVIOUS COAT IS FIRM.

B. IF PREVIOUS COAT HAS CURED FOR MORE THAN RECOAT TIME SPECIFIED BY MANUFACTURER, BRUSH SANDBLAST, FOLLOWED BY DRY CLEANING SUCH AS VACUUMING, USE OF AIR HOSE OR SWEEPING TO REMOVE DIRT. ALL SURFACES TO BE RECOATED MUST SHOW A SURFACE PROFILE SUFFICIENT TO PROVIDE AN ADEQUATE MECHANICAL BOND. SURFACE PROFILE IS ESSENTIAL FOR INTERCOAT ADHESION.

I. FINAL CURING TIME

COATING SURFACES SHALL BE PERMITTED AS LONG A DRYING TIME AS PRACTICABLE BUT IN ANY EVENT THE FOLLOWING MINIMUM REQUIREMENTS SHALL BE MET. THE STEEL COATED WITH THE COAL TAR EPOXY SYSTEM SHALL NOT BE DRIVEN UNTIL THE FINISHED COATING HAS CURED AT LEAST 7 DAYS AT 77°F, OR BEEN POST-CURED AT HIGHER TEMPERATURES FOR A SHORT PERIOD OF TIME IN ACCORDANCE WITH THE COATING MANUFACTURER'S RECOMMENDATIONS.

J. THINNING

THIN THE COATING FOR APPLICATION IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

K. INSPECTION

1. SATISFACTORY PERFORMANCE WILL BE BASED ON ACCEPTANCE OF THE COMPLETED WORK BY THE ENGINEER. ALL WORK WILL BE SUBJECT TO THE INSPECTION BY THE ENGINEER. THE GRIT BLASTING IS TO BE APPROVED BEFORE THE START OF THE COATING APPLICATION.

2. INSPECTION OF THE COMPLETED COATING WILL BE BASED UPON A NORDSON MIKROTEST OR OTHER MAGNETIC DETECTOR READINGS. DETECTION OF INADEQUATELY COATED SECTIONS WILL BE INDICATED BY CIRCLING WITH CHALK THE AREAS TO BE RECOATED.

L. APPEARANCE OF FINISHED COATING

1. THE FINISHED COATING SHALL BE GENERALLY SMOOTH AND FREE OF SHARP PROTUBERANCES WHICH COULD BE REMOVED BY ABRASION. A MINOR AMOUNT OF SAGS, DIMPLING OR CURTAINING WHICH DOES NOT EXCEED 2 TO 3% OF THE SURFACE WILL NOT BE CONSIDERED CAUSE FOR REJECTION UNLESS THEY PRESENT SHARP EDGES WHICH MIGHT BE REMOVED BY ABRASION.

2. SHARP PROTUBERANCES SHALL BE CUT OFF USING A SHARP WOOD CHISEL LAID FLAT AGAINST THE SURFACE. THE AREAS FROM WHICH MATERIAL HAS BEEN REMOVED SHALL BE RECOATED TO SMOOTH THE SURFACE.

M. PROTECTION OF COATED STEEL

THE CONTRACTOR SHALL EXERCISE EXTREME CARE IN THE HANDLING OF ALL COARSE STEEL SO AS NOT TO DAMAGE THE COATED SURFACE. ANY DAMAGE TO THE COATING DUE TO HANDLING OR CONSTRUCTION OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE.

N. SAFETY

1. IF THE COATING IS APPLIED BY SPRAY IT SHALL BE PERFORMED IN AN ENCLOSED PLACE WITH A FORCED VENTILATION SYSTEM. THE SYSTEM SHALL BE CAPABLE OF POSITIVELY EXCHANGING THE AIR IN THE ENCLOSED PLACE FOR FRESH AIR AT THE RATE OF NOT LESS THAN 5,000 CUBIC FEET PER MINUTE FOR EACH SPRAY GUN IN OPERATION, AND ALL PARTS OF THE SPACE SHALL BE SWEPT BY MOVING AIR. THE VENTILATING SYSTEM SHALL BE OPERATED DURING THE ENTIRE OPERATION OF APPLICATION AND SHALL BE CONTINUED AFTER SPRAYING HAS BEEN HALTED UNTIL THE APPLIED FILM IS NO LONGER GIVING OFF APPRECIABLE SOLVENT VAPORS. THE AIR IN THE ENCLOSED PAINTING SPACE SHALL BE SAFE AT ALL TIMES FROM FIRE AND EXPLOSION HAZARDS AS DETERMINED BY THE EXPLOSIMETER, MANUFACTURED BY THE MINE SAFETY APPLIANCE COMPANY. WHERE SPRAYING IS BEING CARRIED OUT IN ENCLOSED OR OTHER SPACES NOT FREELY SWEPT BY NATURAL WIND CURRENTS, WORKMEN SHALL WEAR RESPIRATORS FED BY FRESH AIR. GRIT BLAST NOZZLE OPERATORS SHALL WEAR FRESH-AIR-FED HELMETS UNDER ALL CIRCUMSTANCES.

2. IN ADDITION TO NORMAL SAFETY PRECAUTIONS, WORKMEN SHALL TAKE EXTRA CARE TO AVOID CONTACT OF THE PAINT WITH THE SKIN AND TO AVOID INHALING FUMES OR ATOMIZED PARTICLES OF THE COATING.

O. MEASUREMENT AND PAYMENT

SEPARATE MEASUREMENT AND PAYMENT WILL NOT BE MADE FOR COAL TAR EPOXY COATING. THE COST CONNECTED THEREWITH SHALL BE INCLUDED WITH THE APPROPRIATE ITEM AS SPECIFIED.

17. STEEL SHEET PILING

A. DESCRIPTION

THIS WORK SHALL CONSIST OF FURNISHING AND DRIVING STEEL SHEET PILING FOR THE BULKHEAD SIDEWALL AND DEADMAN ANCHORS AS DETAILED ON THE PLANS, SHEETS 68 THRU 70.

B. MATERIALS

THE STEEL SHEET PILING SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572-82, GRADE 50, COPPER-BEARING STEEL.

C. PILING PROPERTIES

THE SHEET PILING SHALL BE Z PILES SIMILAR AND EQUAL TO BETHLEHEM STEEL CORPORATION SECTION PZ-22.

D. CORROSION PROTECTION

THE STEEL SHEET PILING SHALL BE COATED WITH A COAL TAR EPOXY, AS SPECIFIED IN GENERAL NOTE 16.

E. MEASUREMENT AND PAYMENT

THE QUANTITY SHALL BE THE NUMBER OF SQUARE FEET MEASURED IN THE PLANE OF THE FACE OF THE SHEETING, COMPLETE IN PLACE AS REQUIRED BY THE PLANS. PAYMENT WILL BE MADE AT THE CONTRACT PRICE BID FOR ITEM SPECIAL, STEEL SHEET PILING. THIS PRICE SHALL BE PAYMENT IN FULL FOR FURNISHING ALL MATERIALS, EQUIPMENT AND LABOR TO COMPLETE THE WORK AS SPECIFIED INCLUDING THE COAL TAR EPOXY COATING.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

GENERAL NOTES

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
R.H.W.	D.S.	C.A.B.	C.A.B.	
DATE 9-20-85	DATE 9-20-85	DATE 10-18-85	DATE 10-18-85	SHEET 10 / 80

GENERAL NOTES - STRUCTURES OVER 20 - FT SPAN

FHWA REGION	STATE	PROJECT	
2	OHIO		

84
174

CUYAHOGA COUNTY
CUY- 290-027

18. BULKHEAD, WALE AND CAP ASSEMBLY

A. DESCRIPTION
THIS WORK SHALL CONSIST OF FURNISHING AND DRIVING THE STEEL SHEET PILE BULKHEAD AND FURNISHING AND INSTALLING THE WALE AND CAP ASSEMBLIES ALONG THE BULKHEAD.

B. MATERIALS
THE STEEL SHEET PILING, WALE AND MISCELLANEOUS PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572-82, GRADE 50, COPPER-BEARING STEEL.

THE ANGLES AND PLATES FOR THE BULKHEAD CAP ASSEMBLY SHALL CONFORM TO ASTM A3E ALL HIGH STRENGTH BOLTS SHALL BE ASTM A325.

C. CONSTRUCTION REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF THE EXISTING TIMBER DOCKWALL AND STEEL SHEET PILE WALL AT THE ENDS OF THE NEW BULKHEAD.

2. SEE GENERAL NOTE 7 ON SHEET 9/80 FOR RIVER TRAFFIC REQUIREMENTS.

3. THE PILES FOR PIERS 11L AND 11R SHALL BE PLACED PRIOR TO PLACEMENT OF THE BULKHEAD.

4. PRIOR TO PLACING BACKFILL AGAINST THE BULKHEAD THE CONTRACTOR SHALL INSURE THAT THE RIVER CHANNEL BOTTOM ADJACENT TO THE FACE OF THE BULKHEAD MATCHES THE DESIGN CHANNEL BOTTOM DETAILED ON THE PLANS.

5. THE CONTRACTOR SHALL SUBMIT A DETAILED CONSTRUCTION PROCEDURE AND SEQUENCE OF OPERATIONS TO THE DIRECTOR FOR APPROVAL.

D. PILING PROPERTIES
THE SHEET PILING SHALL BE Z PILES SIMILAR AND EQUAL TO BETHLEHEM STEEL CORPORATION SECTION PZ-40.

E. CORROSION PROTECTION
THE STEEL SHEET PILING, WALE AND CAP ASSEMBLIES SHALL BE COATED WITH COAL TAR EPOXY AS SPECIFIED IN GENERAL NOTE 16. THE COST OF THIS COATING SHALL BE INCLUDED IN THE PRICE BID FOR BULKHEAD, WALE AND CAP ASSEMBLIES.

F. MEASUREMENT AND PAYMENT
THE QUANTITY SHALL BE MEASURED BY LINEAR FEET OF BULKHEAD, WALE AND CAP ASSEMBLIES COMPLETED AND IN PLACE AS REQUIRED BY THE PLANS. PAYMENT WILL BE MADE AT THE CONTRACT PRICE BID FOR ITEM SPECIAL, BULKHEAD, WALE AND CAP ASSEMBLIES. THIS PRICE SHALL BE PAYMENT IN FULL FOR FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND INCIDENTALS TO COMPLETE THE WORK AS SPECIFIED INCLUDING THE COAL TAR EPOXY COATING.

19. BULKHEAD ANCHORAGE SYSTEM

A. DESCRIPTION
THIS WORK SHALL CONSIST OF FURNISHING AND INSTALLING THE TIE-BACK ANCHORS BETWEEN THE BULKHEAD AT PIER 11 AND THE DEADMAN ANCHORS AS DETAILED ON THE PLANS.

B. MATERIAL
THE TIE RODS AND MISCELLANEOUS METAL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572-82, GRADE 50, COPPER-BEARING STEEL.

C. CONSTRUCTION REQUIREMENTS AND CONSIDERATIONS

1. THE CONTRACTOR MAY PROPOSE AN ALTERNATE METHOD TO THE TIE RODS AS SPECIFIED IN THE PLANS PROVIDED IT MEETS THE APPROVAL OF THE DIRECTOR. THE ALTERNATE SHALL BE CAPABLE OF CARRYING A DESIGN LOAD OF 164 KIP PER ANCHOR BASED ON A 10'-0" ANCHORAGE SPACING.

2. THE TIE RODS OR APPROVED ALTERNATE SHALL BE PLACED BY TRENCHING OR OTHER METHODS AS APPROVED BY THE DIRECTOR.

IF TRENCHING IS USED THE TRENCH SHALL BE CENTERED ABOUT THE ANCHOR ROD WITH A MINIMUM WIDTH OF 18-IN. AND A MINIMUM DEPTH OF 6-IN. BELOW THE ANCHOR ROD. AFTER PLACEMENT OF THE ANCHOR ROD THE TRENCH SHALL BE CAREFULLY BACKFILLED. FROM THE TRENCH BOTTOM TO A DISTANCE 18-IN. ABOVE THE ANCHOR ROD THE BACKFILL SHALL MEET THE REQUIREMENTS OF ITEM 310, GRADING A. THE REMAINING BACKFILL SHALL MEET THE REQUIREMENTS OF ITEM 203.

3. THE TIE ROD CONNECTIONS SHALL BE SNUG TIGHTENED PRIOR TO ANY PLACEMENT OF BACKFILL AGAINST THE BULKHEAD.

D. CORROSION PROTECTION
THE BULKHEAD ANCHORAGE SYSTEM SHALL BE COATED WITH COAL TAR EPOXY AS SPECIFIED IN GENERAL NOTE 16.

E. PAYMENT
THE BULKHEAD ANCHORAGE SYSTEM SHALL BE MEASURED AS A UNIT AND WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE BID FOR, BULKHEAD ANCHORAGE SYSTEM. THIS PRICE SHALL BE PAYMENT IN FULL FOR FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND INCIDENTALS TO COMPLETE THE WORK AS SPECIFIED OR APPROVED INCLUDING THE COAL TAR EPOXY COATING. CONCRETE AND REINFORCING STEEL ARE INCLUDED FOR PAYMENT WITH ITEMS 511 AND 509 RESPECTIVELY.

20. CONCRETE SLOPE PROTECTION (6" THICK)

A. DESCRIPTION
THIS WORK SHALL INCLUDE FURNISHING AND INSTALLING CONCRETE SLOPE PROTECTION PLACED ON A FILTER BLANKET AND REINFORCED WITH WELDED WIRE FABRIC IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

B. CONCRETE SLOPE PROTECTION
THE CONCRETE SLOPE PROTECTION SHALL BE IN ACCORDANCE WITH 601.06.

C. FILTER BLANKET
THE FILTER BLANKET SHALL BE IN ACCORDANCE WITH C.M.S. 712.09, TYPE B.

D. WELDED WIRE FABRIC
THE WELDED WIRE FABRIC SHALL BE 6 X 6 - W2.0 X W2.0

E. MEASUREMENT AND PAYMENT
CONCRETE SLOPE PROTECTION WILL BE MEASURED BY THE SQUARE YARD OF FINISHED SURFACE COMPLETE IN PLACE AND SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR ITEM 601, CONCRETE SLOPE PROTECTION, AS PER PLAN (6" THICK). THIS PRICE SHALL BE PAYMENT IN FULL FOR FURNISHING ALL MATERIALS, EQUIPMENT AND LABOR TO COMPLETE THE WORK AS SPECIFIED.

21. CONCRETE SLOPE PROTECTION (4" THICK)

A. DESCRIPTION
THIS WORK SHALL INCLUDE FURNISHING AND INSTALLING CONCRETE SLOPE PROTECTION REINFORCED WITH WELDED WIRE FABRIC IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

B. CONCRETE SLOPE PROTECTION
THE CONCRETE SLOPE PROTECTION SHALL BE IN ACCORDANCE WITH 601.06, EXCEPT THE THICKNESS SHALL BE 4" AS DETAILED ON THE PLANS.

C. WELDED WIRE FABRIC
THE WELDED WIRE FABRIC SHALL BE 6 X 6 - W2.0 X W2.0.

D. MEASUREMENT AND PAYMENT
CONCRETE SLOPE PROTECTION WILL BE MEASURED BY THE SQUARE YARD OF FINISHED SURFACE COMPLETE IN PLACE AND SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR ITEM 601, CONCRETE SLOPE PROTECTION, AS PER PLAN (4" THICK). THIS PRICE SHALL BE PAYMENT IN FULL FOR FURNISHING ALL MATERIALS, EQUIPMENT AND LABOR TO COMPLETE THE WORK AS SPECIFIED.

22. ITEMS NOT INCLUDED IN BRIDGE PLANS
THE FOLLOWING ITEMS ARE NOT INCLUDED IN THE SUBSTRUCTURE BRIDGE PLANS. SEE ROADWAY PLANS FOR DETAILS.

(1) GRADING, APPROACH PAVEMENTS AND APPROACH SLABS.
(2) CURB TRANSITION AT END OF WINGWALLS.
(3) RELOCATION OR REMOVAL OF EXISTING UTILITIES.

23. "PILE TESTING: A PILE LOAD TEST SHALL BE CONDUCTED AT EACH SUBSTRUCTURE UNIT. THE LOAD TEST WILL BE EITHER A STATIC LOAD TEST BY THE CONTRACTOR, A DYNAMIC LOAD TEST BY THE STATE, OR A DYNAMIC LOAD TEST BY THE CONSULTANT. THE PROJECT ENGINEER SHALL CONSULT WITH THE DIRECTOR FOR INSTRUCTIONS AS TO WHICH TYPE OF LOAD TEST WILL BE CONDUCTED AT EACH INDIVIDUAL PIER."

24. ITEM SPECIAL DYNAMIC LOAD TEST BY CONSULTANT: THIS ITEM IS PROVIDED TO COMPENSATE THE CONTRACTOR FOR EMPLOYING A CONSULTANT TO CONDUCT DYNAMIC LOAD TESTS ON SERVICE PILES AS REQUIRED BY THE DIRECTOR. TESTING INSTRUMENTATION AND PERSONNEL ARE TO BE FURNISHED BY THE CONSULTANT. THE CONSULTANT SHALL HAVE HAD NOT LESS THAN THREE YEARS OF EXPERIENCE IN PERFORMING DYNAMIC LOAD TESTS ON PILES. THE CONTRACTOR SHALL FURNISH THE NAME OF HIS CONSULTANT AT THE PRECONSTRUCTION MEETING. THE DIRECTOR WILL REVIEW THE CONSULTANT'S BACKGROUND AND WILL EITHER APPROVE OR REJECT THE CONTRACTOR'S CONSULTANT.

THE CONSULTANT SHALL FURNISH A TYPED REPORT FOR EACH DAY'S WORK WHICH SUMMARIZES ALL TESTING RESULTS AND STATES HIS CONCLUSIONS. A FINAL REPORT SHALL BE FURNISHED AFTER THE CONCLUSION OF THE PILING WORK.

THE CONTRACTOR WILL BE EXPECTED TO DRIVE PILES AND ASSIST THE CONSULTANT DURING THE DYNAMIC PILE TESTS AS PER ITEM 523.

THE UNIT OF PAYMENT FOR THIS WORK BY THE CONSULTANT SHALL BE PER DAY. THE CONSULTANT IS EXPECTED TO TEST AS MANY PILES AS PRACTICAL IN AN EIGHT HOUR WORK DAY TIME PERIOD. THE CONSULTANT SHALL ALSO PERFORM ONE CAPWAP OR ONE WAVE EQUATION ANALYSIS FOR EACH DAY'S WORK. PAYMENT FOR ALL INSTALLED PILES WILL BE PROVIDED AS PER 505 AND 507. THE CONTRACTOR WILL BE PAID FOR LAPSED TIME DURING ALL DYNAMIC LOAD TESTING AS PER ITEM 523. (GOBLE, RAUSCHE AND LIKINS ASSOCIATES, INC., 4432 EMERY INDUSTRIAL PARKWAY, CLEVELAND, OHIO 44128, PHONE 216-831-6131 AND SOIL EXPLORATION, INC., 662 CROMWELL AVENUE, ST. PAUL, MINN. 55114 ARE ACCEPTABLE PILE TESTING CONSULTANTS)."

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

GENERAL NOTES

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

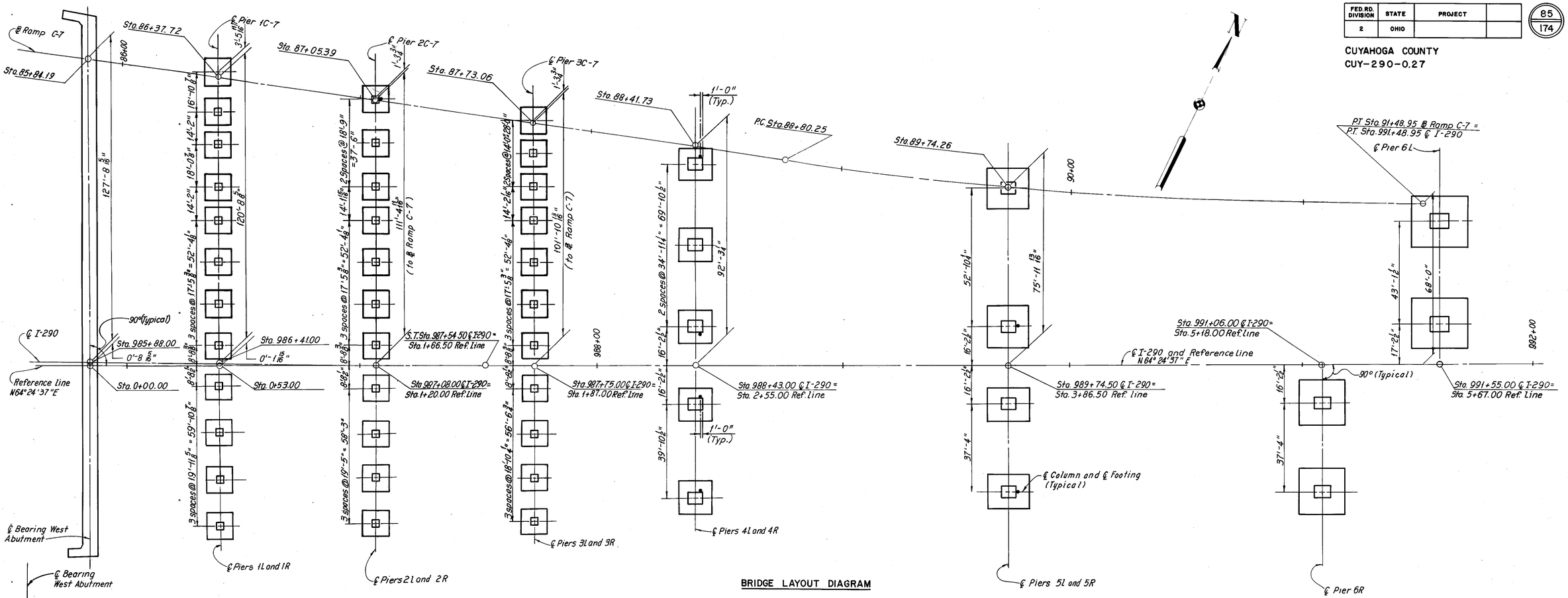
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
R.H.W. 9-20-85	D.S. 9-20-85	C.A.B. 10-18-85	C.A.B. 10-18-85	

SHEET 11 | 80

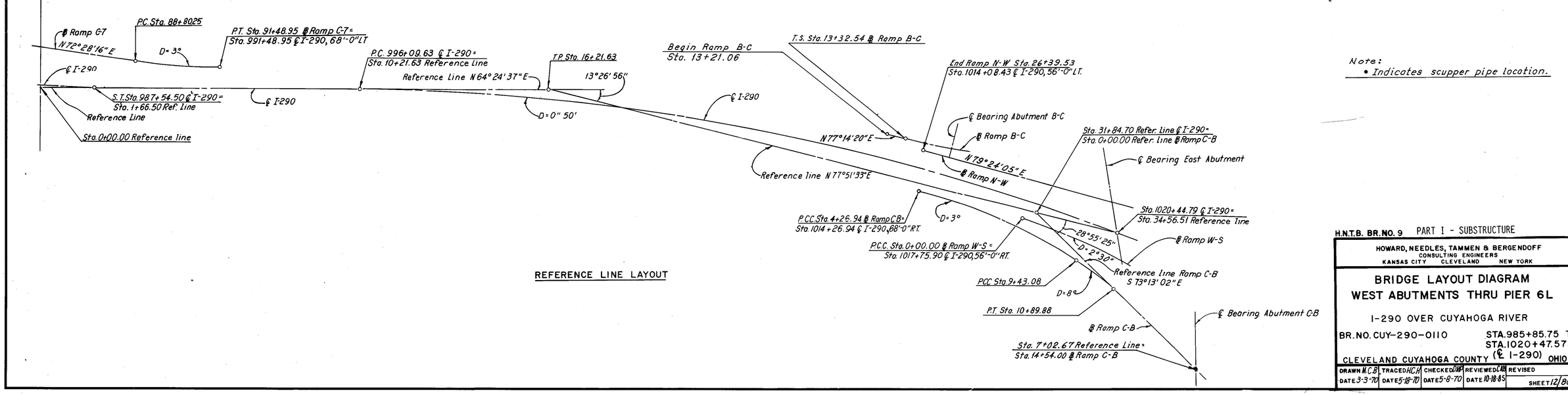
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

85
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
• Indicates scupper pipe location.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM
WEST ABUTMENTS THRU PIER 6L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

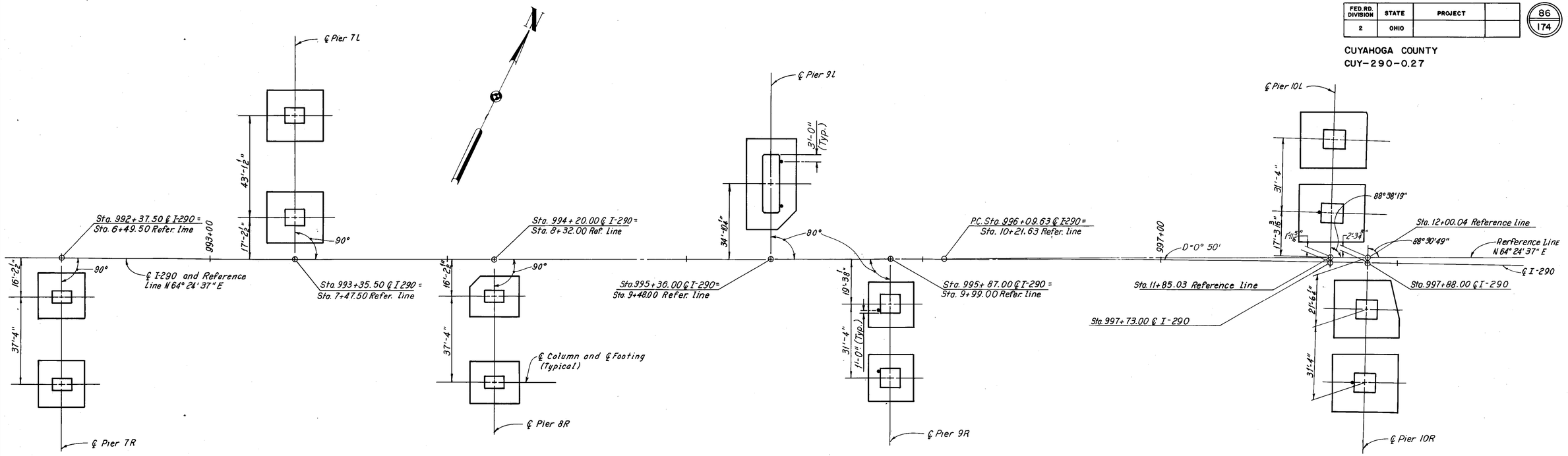
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN M.C.B.	TRACED H.C.H.	CHECKED D.W.	REVIEWED C.B.	REVISED
DATE 3-3-70	DATE 5-18-70	DATE 5-8-70	DATE 10-18-85	SHEET 12/80

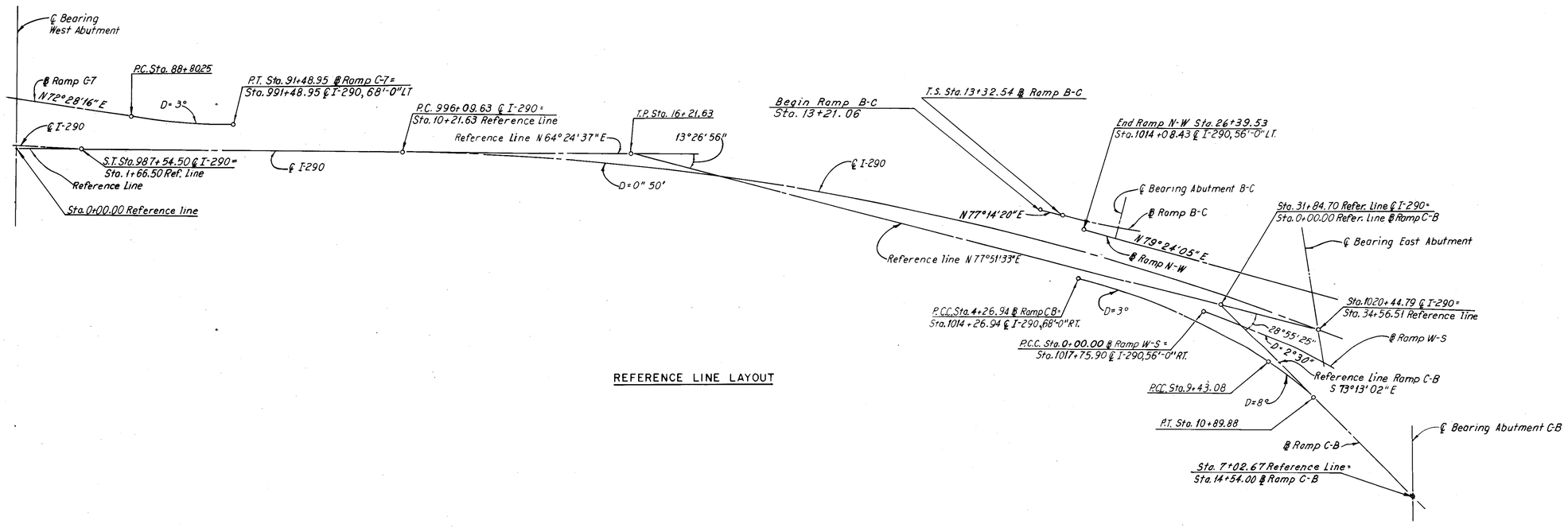
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

86
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
• Indicates scupper pipe location.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM
PIER 7R THRU PIER 10R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-011.0 STA. 985+85.75 TO STA. 1020+47.57

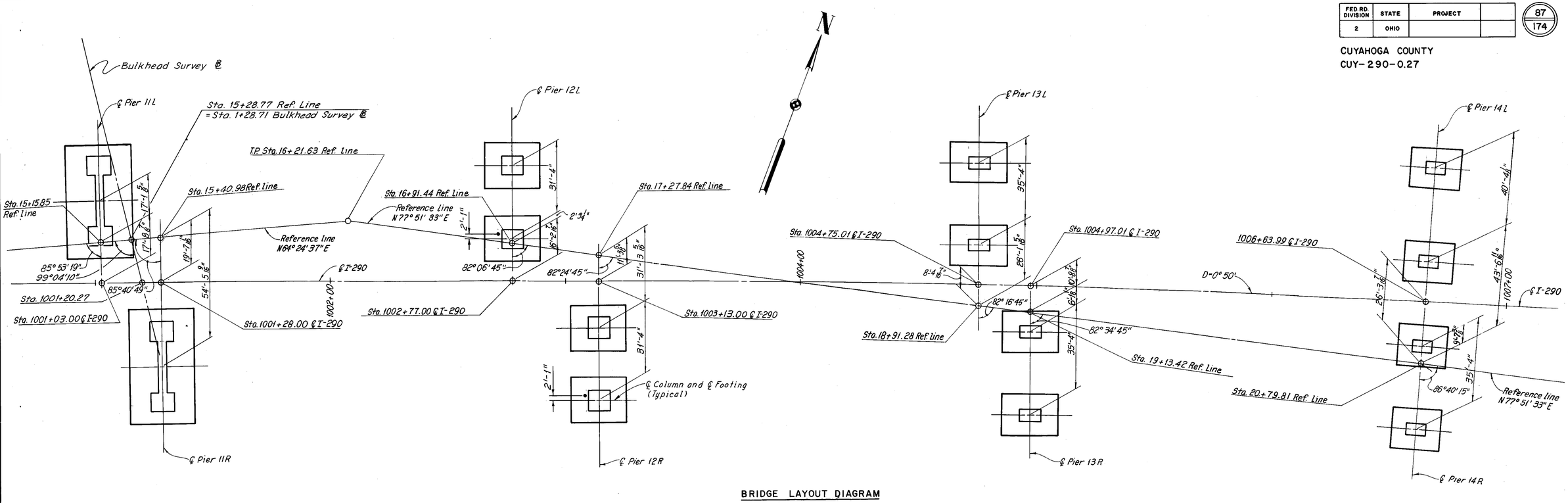
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN M.C.B	TRACED H.C.H	CHECKED D.M.P	REVIEWED C.A.B	REVISED
DATE 3-6-70	DATE 5-16-70	DATE 5-11-70	DATE 10-18-85	SHEET 13/80

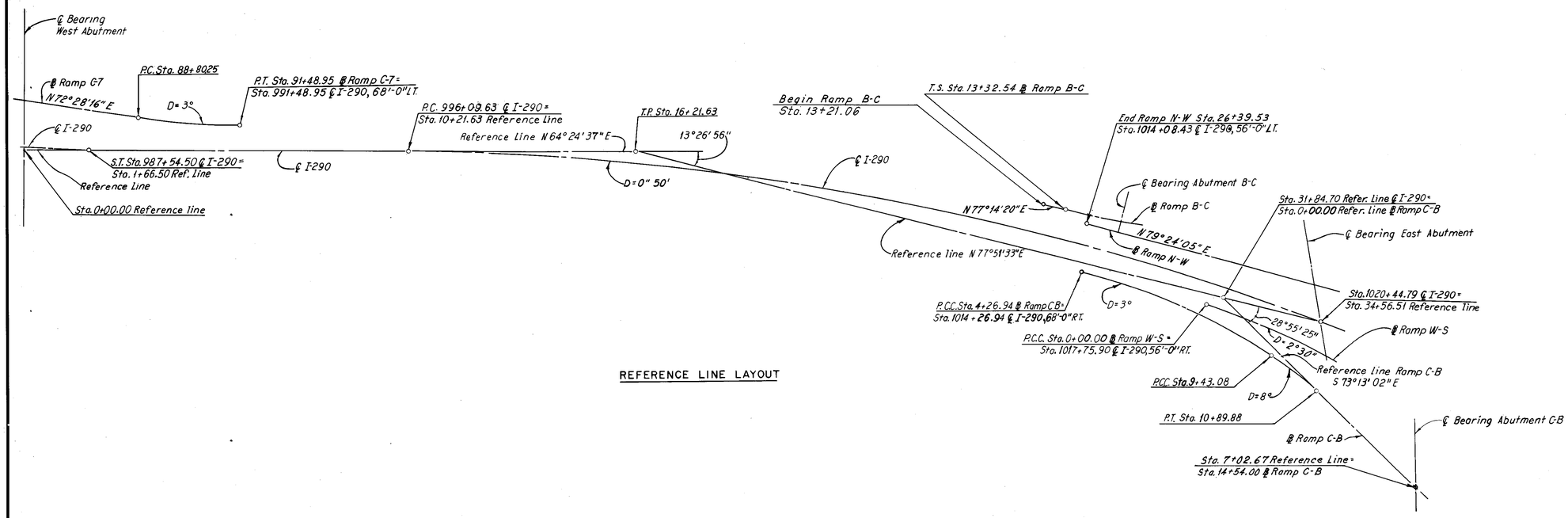
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

87
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
• Indicates scupper pipe location.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM
PIER 11L THRU PIER 14

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

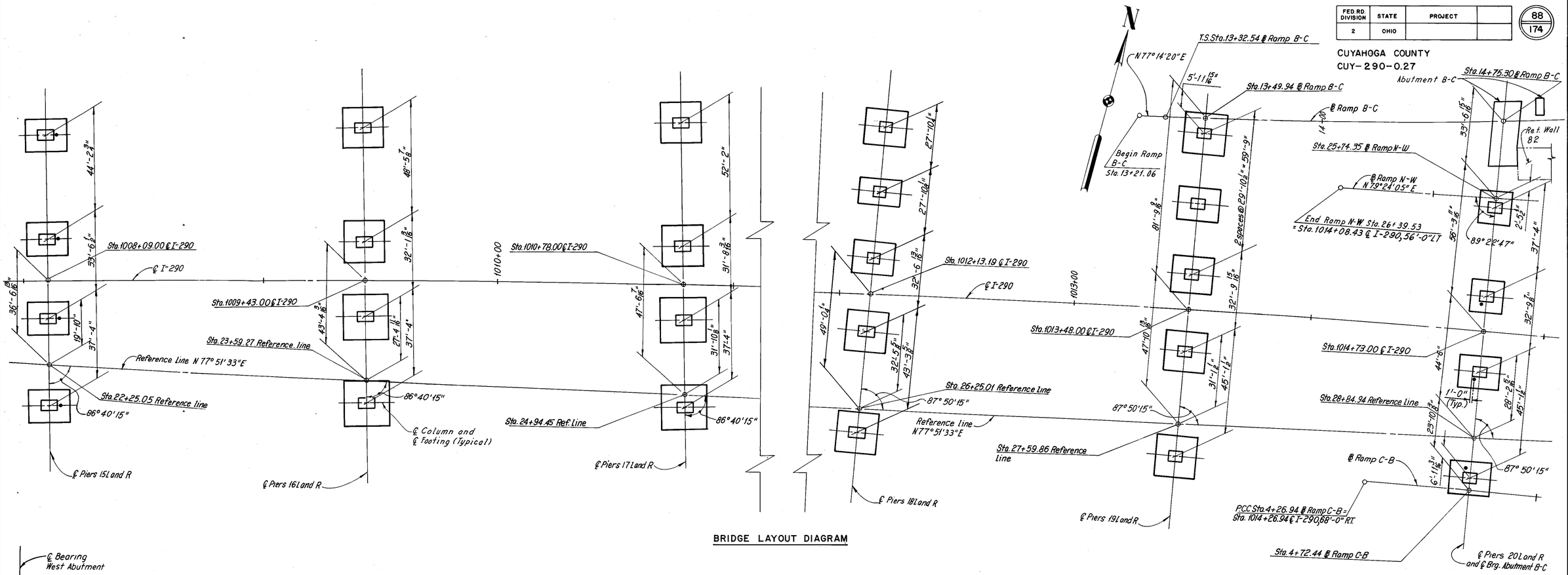
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN MCB	TRACED HCA	CHECKED DWM	REVIEWED CLM	REVISED
DATE 6-20-70	DATE 8-29-70	DATE 7-1-70	DATE 10-18-85	SHEET 14/80

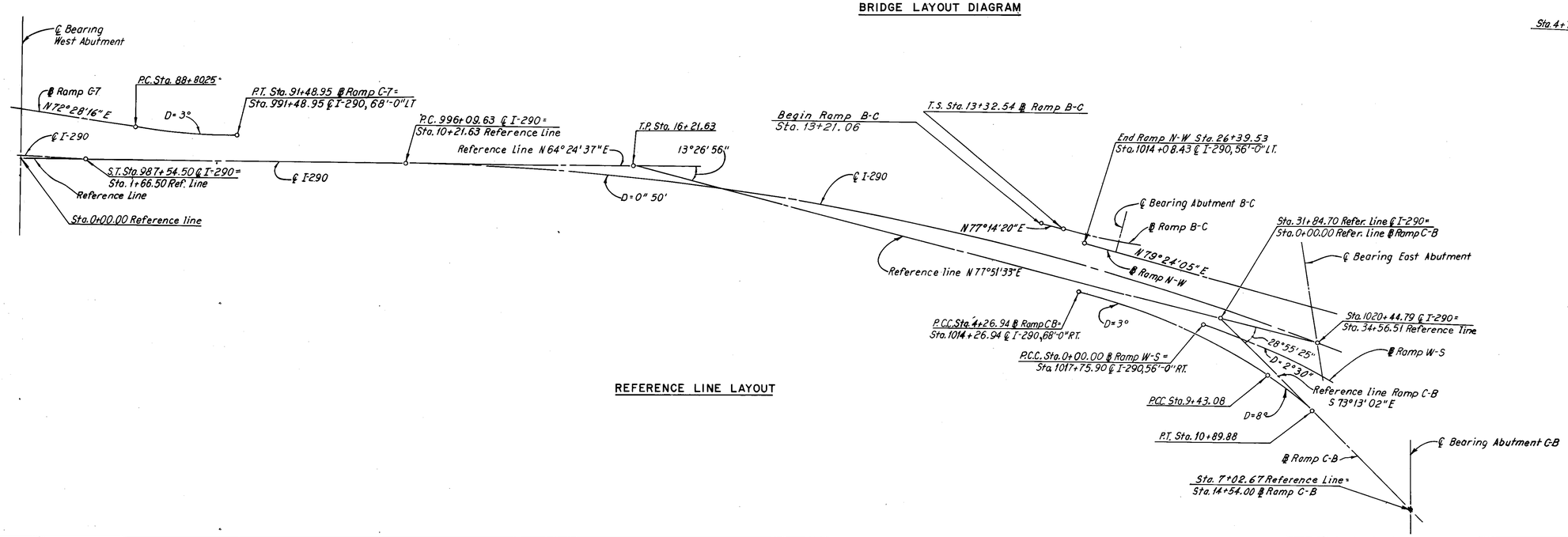
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

88
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
• Indicates scupper pipe location

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM PIER 15 THRU PIER 20 AND ABUTMENT B-C

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

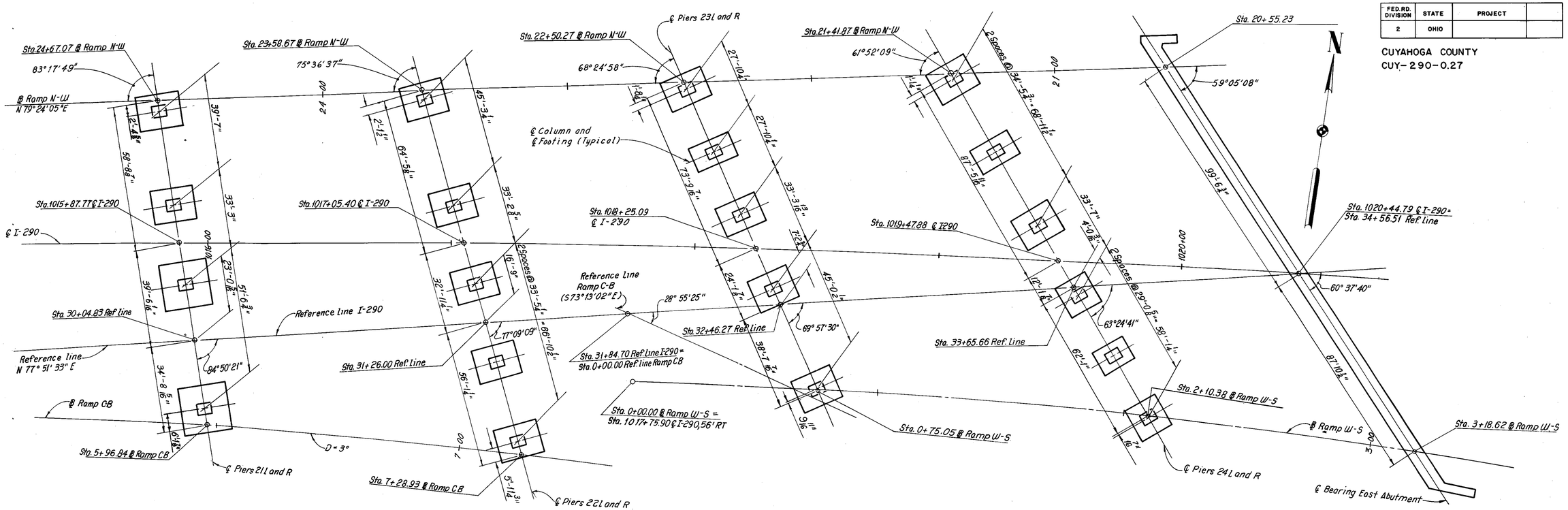
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN M.C.B.	TRACED H.C.H.	CHECKED D.M.P.	REVIEWED C.H.B.	REVISED
DATE 4-9-70	DATE 6-23-70	DATE 6-25-70	DATE 10-18-85	SHEET 15/80

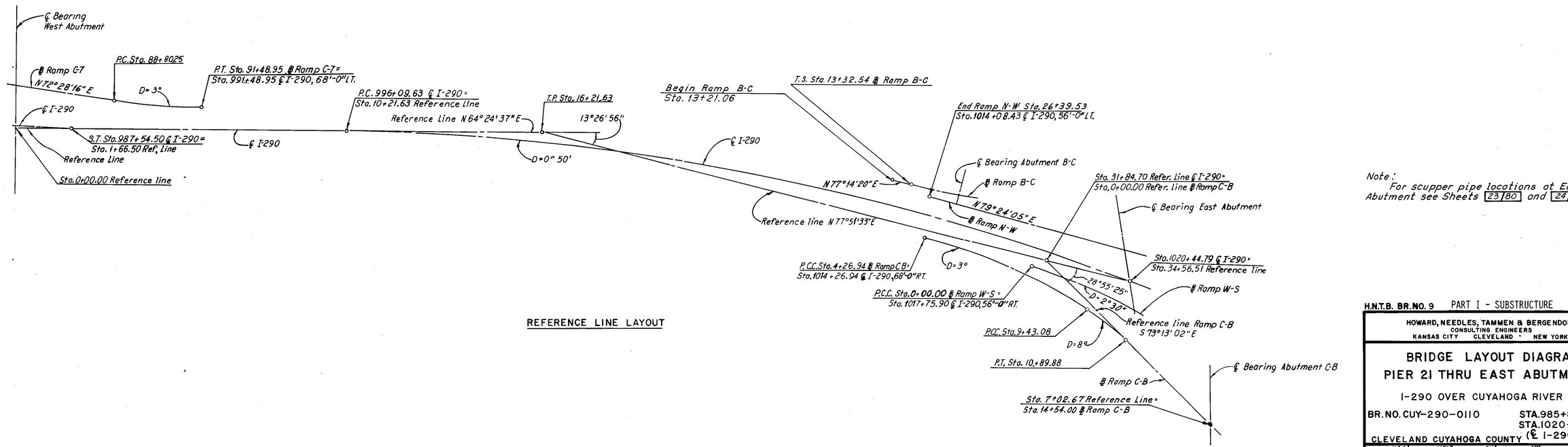
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

89
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
For scupper pipe locations at East Abutment see Sheets 23|80 and 24|80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM
PIER 21 THRU EAST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

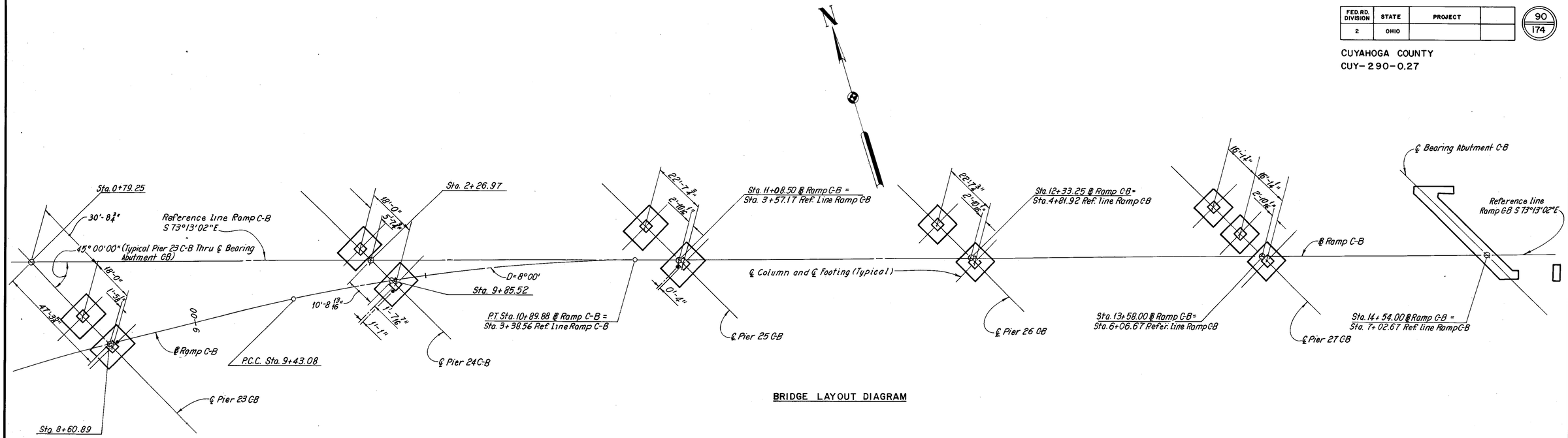
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN M.C.B.	TRACED H.C.H.	CHECKED D.M.A.	REVIEWED C.A.B.	REVISED
DATE 3-12-70	DATE 6-17-70	DATE 6-9-70	DATE 10-18-85	SHEET 16|80

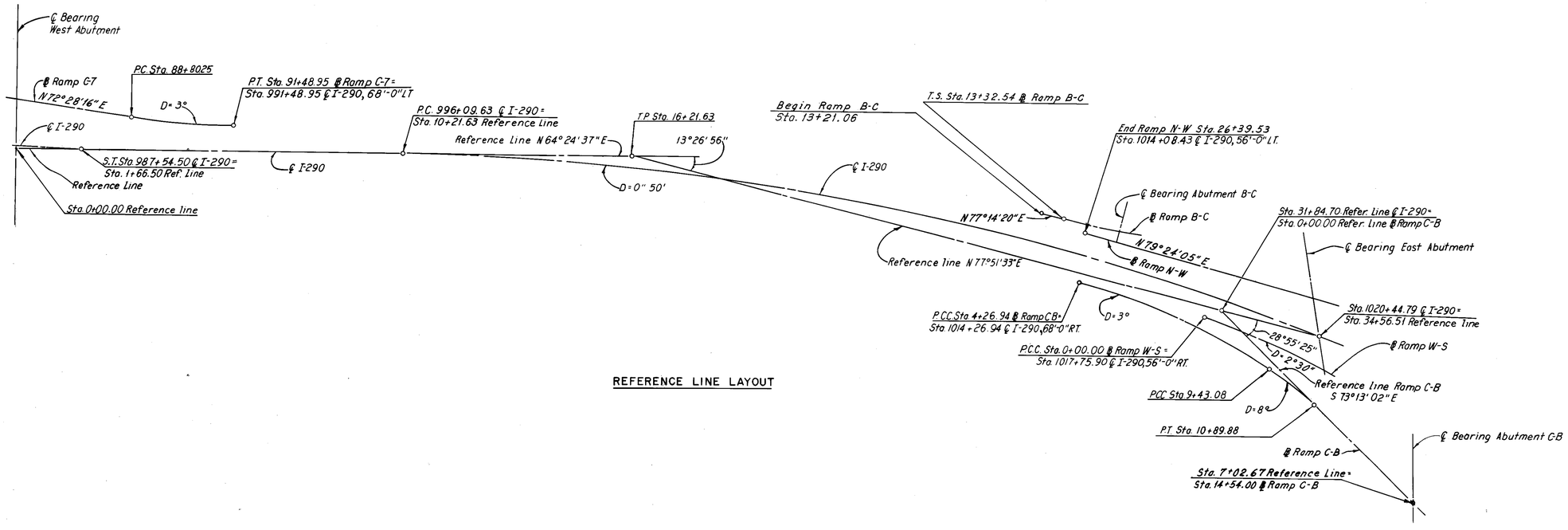
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

90
174

CUYAHOGA COUNTY
CUY-290-0.27



BRIDGE LAYOUT DIAGRAM



REFERENCE LINE LAYOUT

Note:
• Indicates scupper pipe location.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

BRIDGE LAYOUT DIAGRAM
PIER 23 CB THRU ABUTMENT CB

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

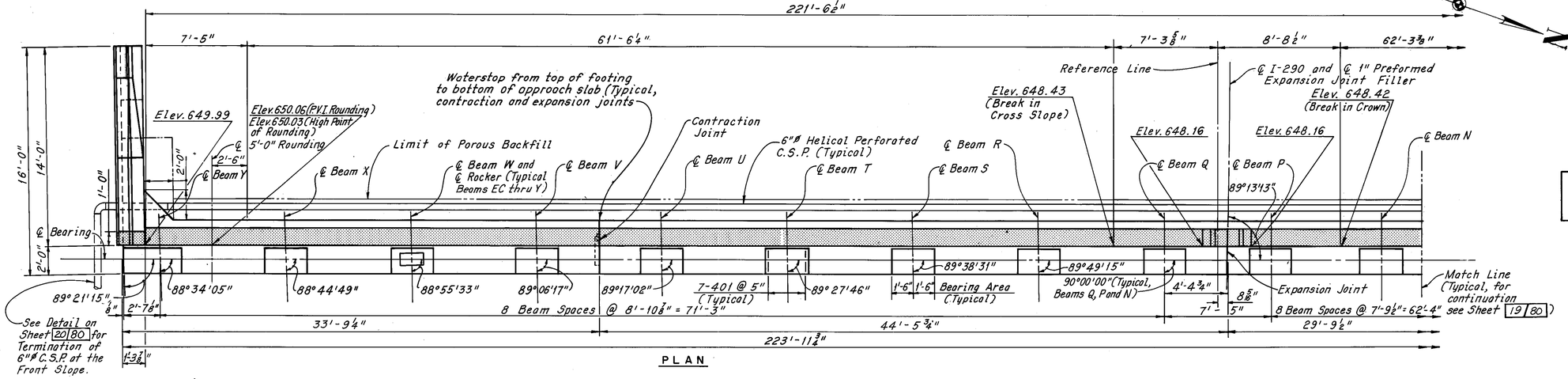
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN MCB	TRACED MCH	CHECKED DMC	REVIEWED CJB	REVISED
DATE 3-12-70	DATE 6-16-70	DATE 6-9-70	DATE 10-18-85	SHEET 17 80

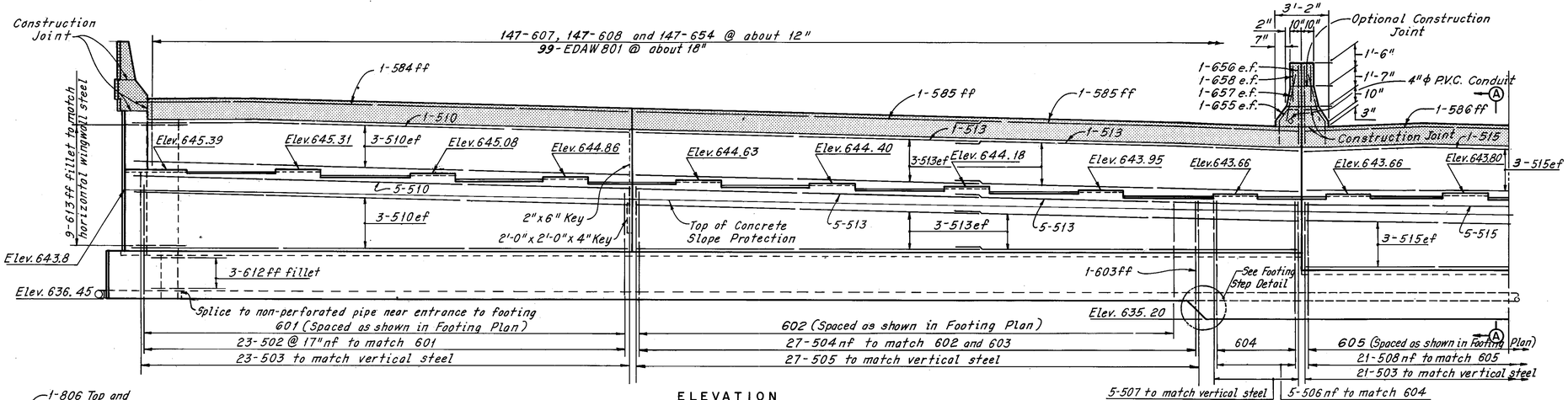
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

91
174

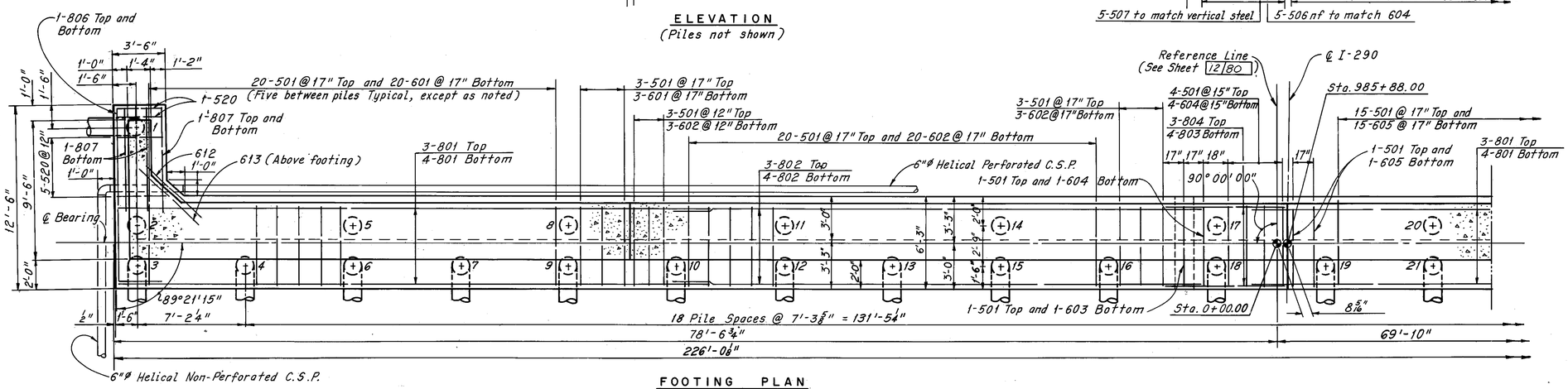
CUYAHOGA COUNTY
CUY-290-0.27



PLAN



ELEVATION
(Piles not shown)



FOOTING PLAN

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note:
Bars 515 and 586 shall be field bent as required.

Note:
All reinforcing bar marks shall be prefixed as follows:

401, 501 thru 549, 601 thru 630 and 801 thru 811 - AW

575 thru 593 and 650 thru 658 - EAW

▨ Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by others.

Notes:
All piles are 14"ø C.I.P. reinforced concrete.
All battered piles shall be inclined 3 in 12 in the direction shown.
For contraction and expansion joint details, see Sheet 21/80.
For Section A-A, see Sheet 20/80.
For footing step detail, see Sheet 20/80.
The following abbreviations are used:
nf = near face
ff = far face
ef = each face

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

WEST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

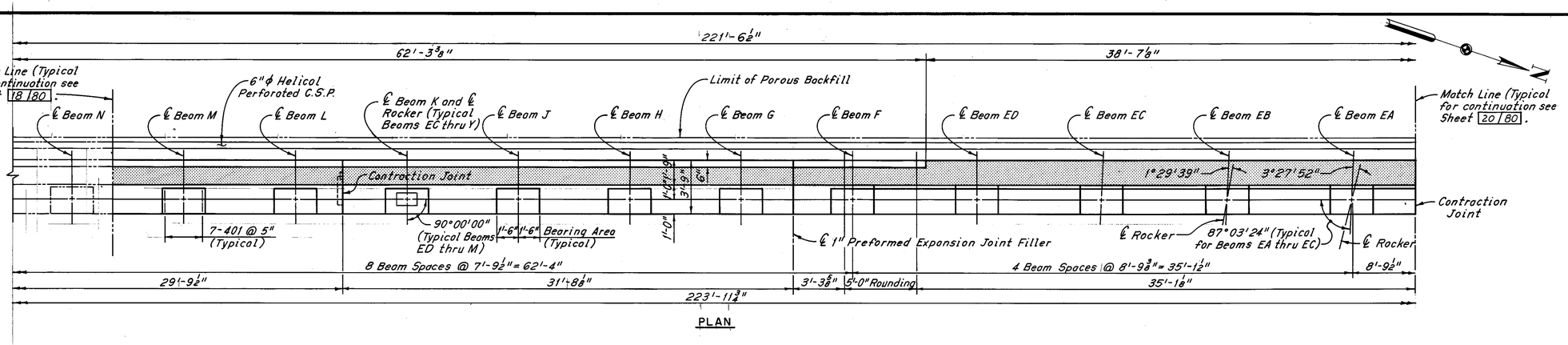
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN C.P.	TRACED C.P.	CHECKED E.K.B.	REVIEWED C.M.	REVISED
DATE 10-11-83	DATE 10-11-83	DATE 10-18-83	DATE 10-18-85	SHEET 18/80

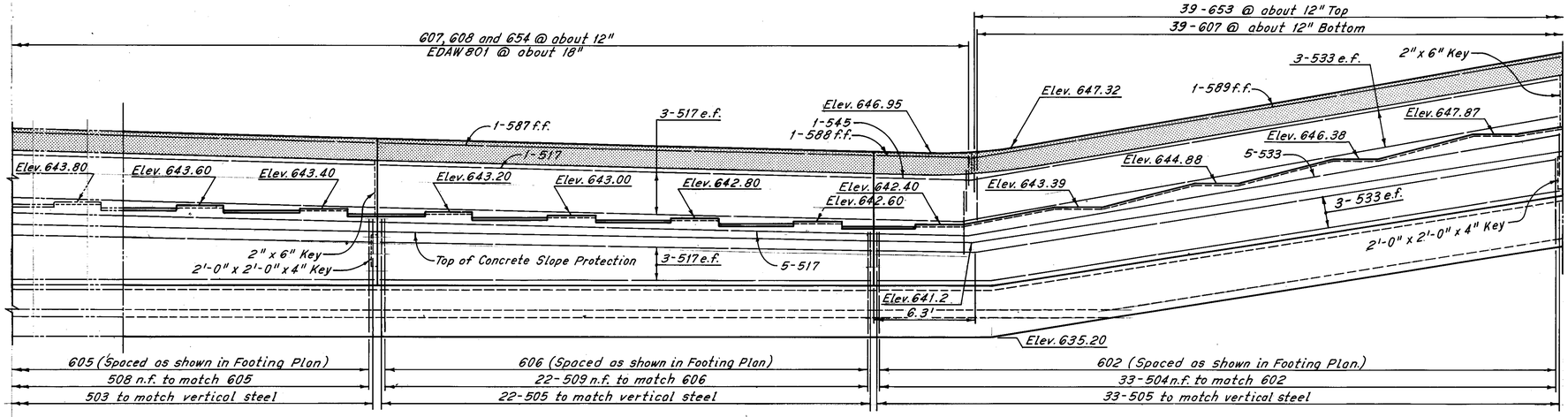
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

92
174

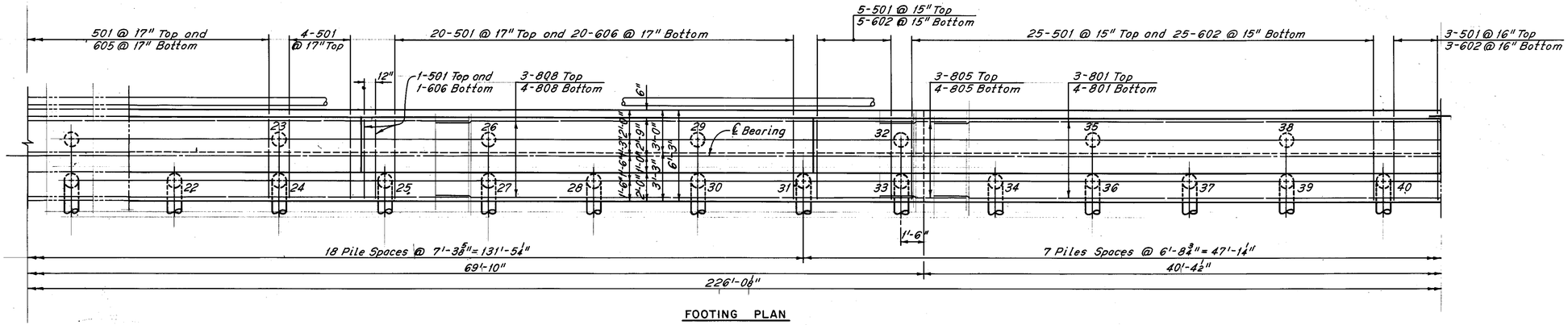
CUYAHOGA COUNTY
CUY-290-0.27



PLAN



ELEVATION
(Piles not shown)



FOOTING PLAN

Note:
All reinforcing bar marks shall be prefixed as follows:

401, 501 thru 549, 601 thru 630 and 801 thru 811 - AW

575 thru 593 and 650 thru 658 - EAW

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by others.

Note:
Bars 533 shall be field bent as required.

Note:
For notes, see Sheet 18/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

WEST ABUTMENT

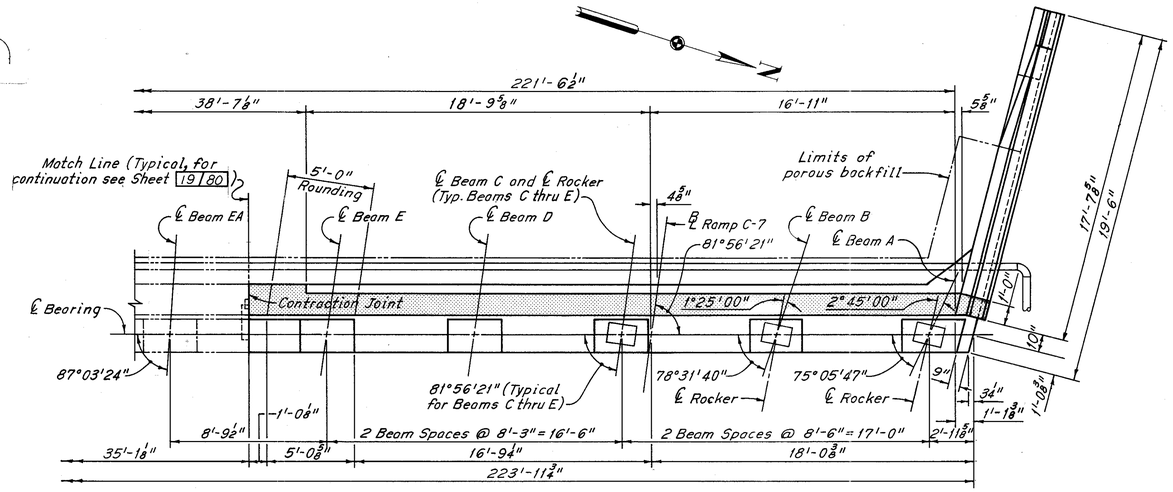
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

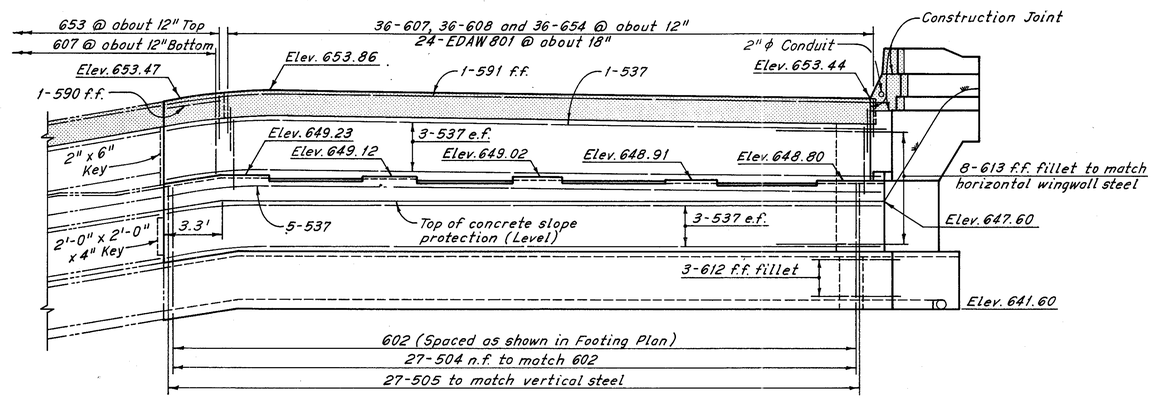
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R.	D.L.R.	G.E.B.	CAB	
DATE 10-11-83	DATE 10-11-83	DATE 10-18-83	DATE 10-18-85	SHEET 19/80

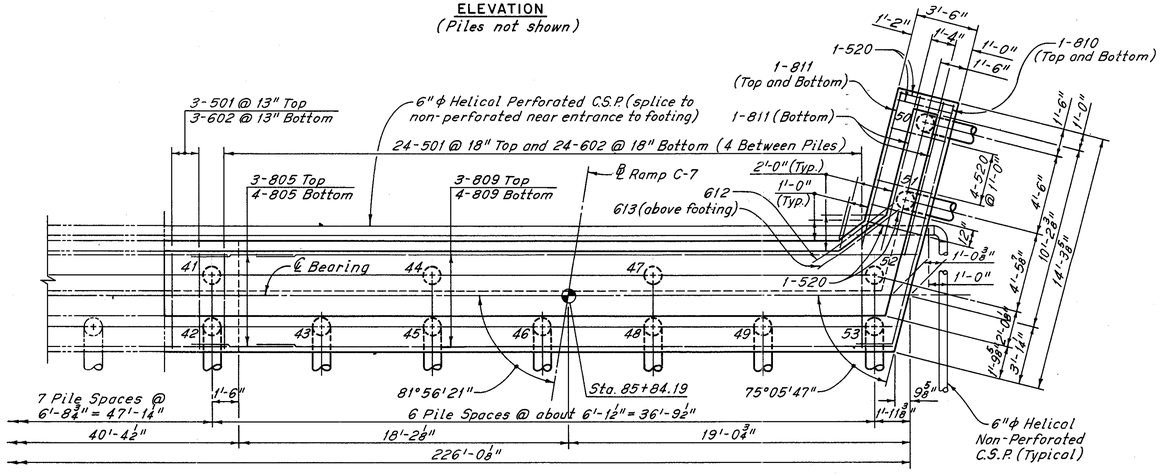
L10



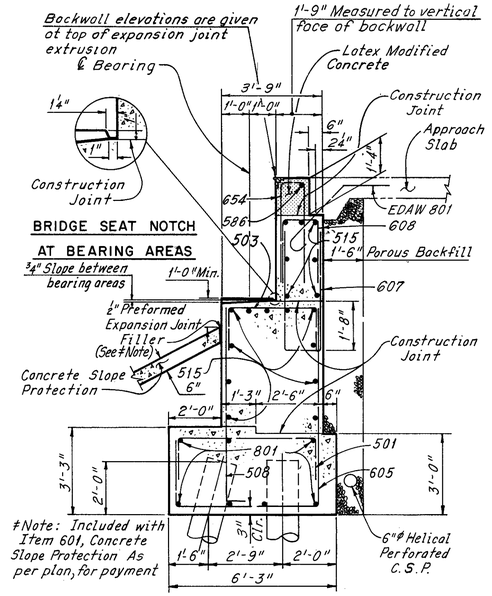
PLAN



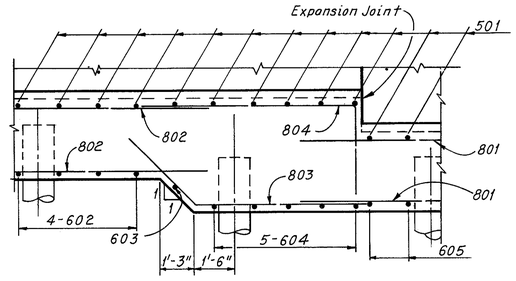
ELEVATION
(Piles not shown)



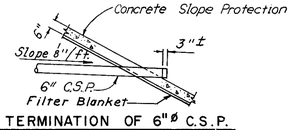
FOOTING PLAN



SECTION A-A



FOOTING STEP DETAIL



TERMINATION OF 6"ϕ C.S.P. AT THE FRONT SLOPE

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

93
174

CUYAHOGA COUNTY
CUY-290-0.27

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by others.

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note:
Bars 537 and 591 shall be field bent as required.

Note:
All reinforcing bar marks shall be prefixed as follows:

401, 501 thru 549, 601 thru 630 and 801 thru 811 - AW

575 thru 593 and 650 thru 658 - EAW

Note:
For notes, see Sheet 18/80.
For location of Section A-A, see Sheet 18/80.

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

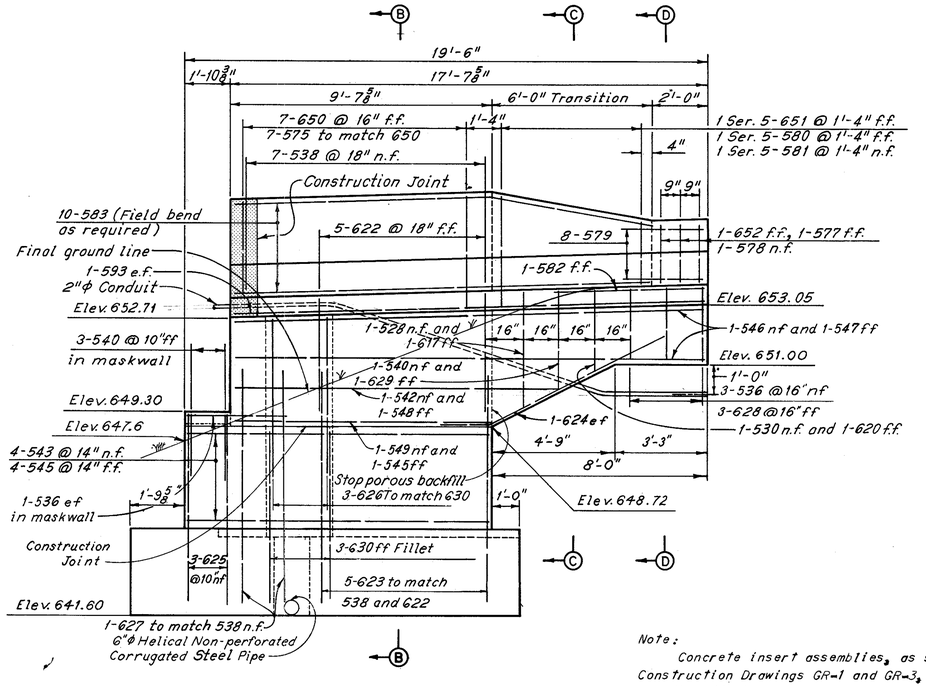
WEST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

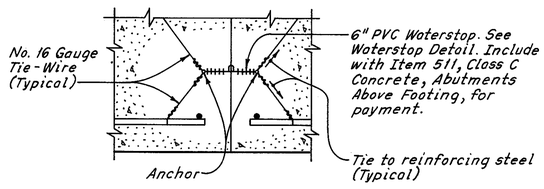
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R.	D.L.R.	C.K.B.	C.A.B.	
DATE 10-11-83	DATE 10-11-83	DATE 10-18-83	DATE 10-18-85	SHEET 20/80



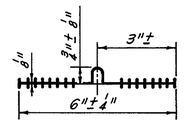
NORTH WINGWALL
(Piles not shown)

Note:
Concrete insert assemblies, as shown on Standard Construction Drawings GR-1 and GR-3, shall be provided for the attachment of guardrail terminal connectors. Include with Item 511, Class C Concrete, Abutments Above Footings, for payment.



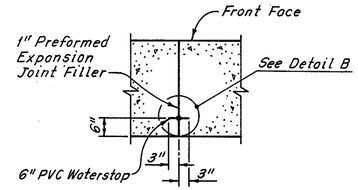
DETAIL B
(Contraction Joint Shown, Expansion Joint Similar)

For the first pour, the waterstop shall be held securely in place by the use of split forms and tie-wires. For the second pour, secure the free end of waterstop in proper position with tie wires.

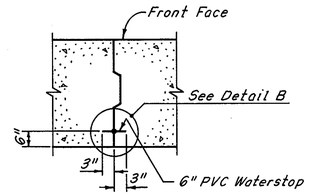


WATERSTOP

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by others.



EXPANSION JOINT



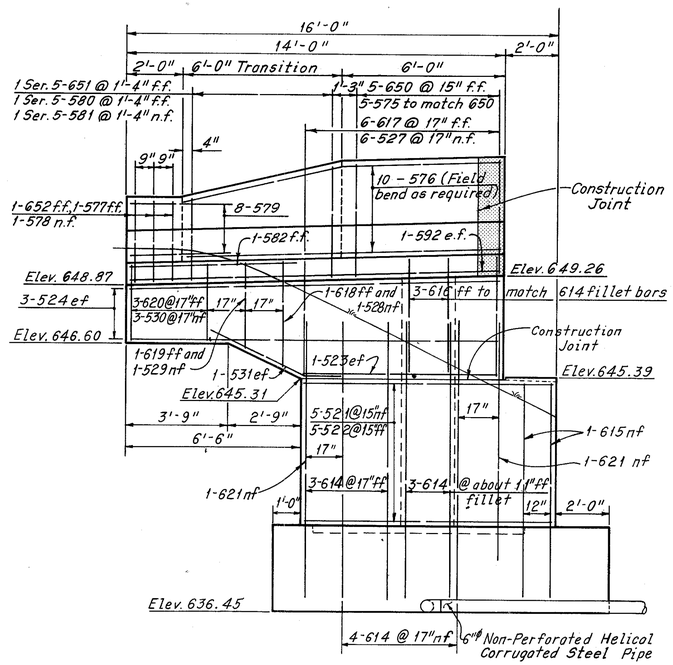
CONTRACTION JOINT

Note:
All reinforcing bar marks shall be prefixed as follows:

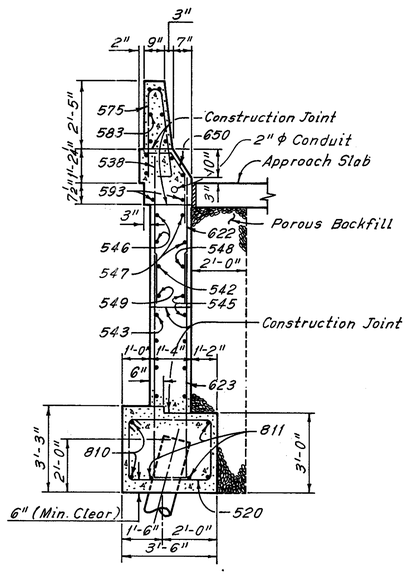
401, 501 thru 549, 601 thru 630, and 801 thru 811 - AW

575 thru 593 and 650 thru 658 - EAW

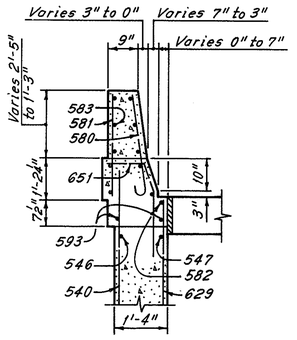
JOINT DETAILS



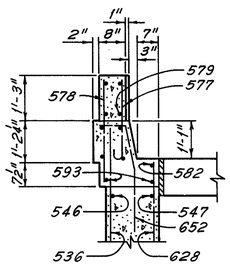
SOUTH WINGWALL
(Piles not shown)



SECTION B-B
(Section thru South Wingwall similar except for bar marks)

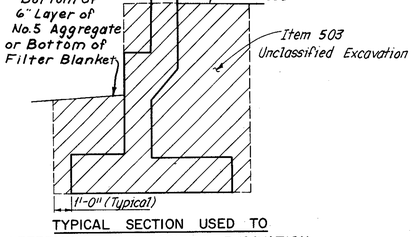


PART SECTION C-C



PART SECTION D-D

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.



TYPICAL SECTION USED TO DETERMINE UNCLASSIFIED EXCAVATION

Note:
For notes, see Sheet 18/80.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

94
174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

WEST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

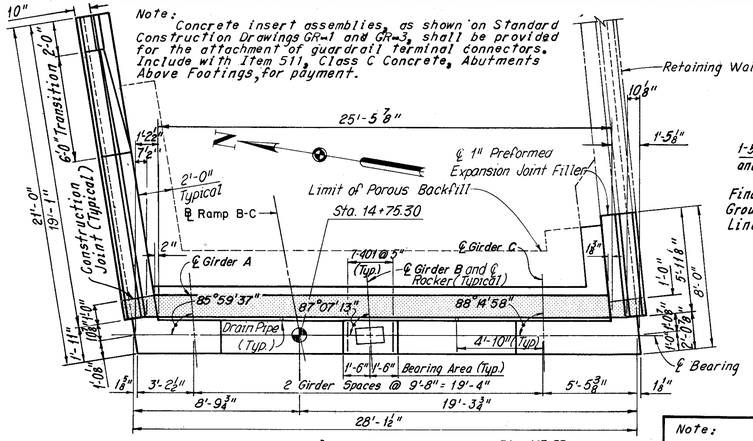
CLEVELAND CUYAHOGA COUNTY OHIO

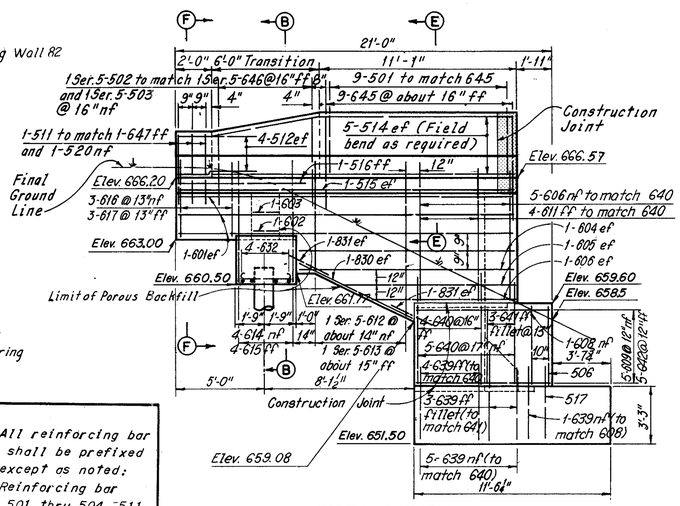
DRAWN D.L.R.	TRACED D.L.R.	CHECKED C.F.B.	REVIEWED C.A.B.	REVISED
DATE 10-11-83	DATE 10-11-83	DATE 10-18-83	DATE 10-18-85	SHEET 21/80

FED. RD. DIVISION	STATE	PROJECT		95 / 174
2	OHIO			

CUYAHOGA COUNTY
CUY-290-0.27

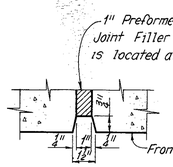
Note: Concrete insert assemblies, as shown on Standard Construction Drawings GR-1 and GR-3, shall be provided for the attachment of guardrail terminal connectors. Include with Item 511, Class C Concrete, Abutments Above Footings, for payment.



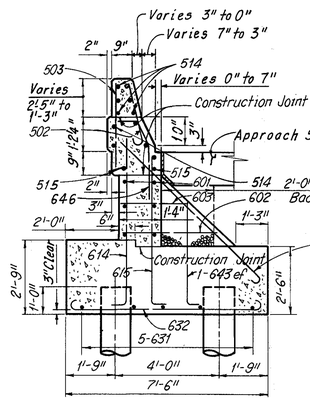


NORTH WINGWALL
(Piles not shown)

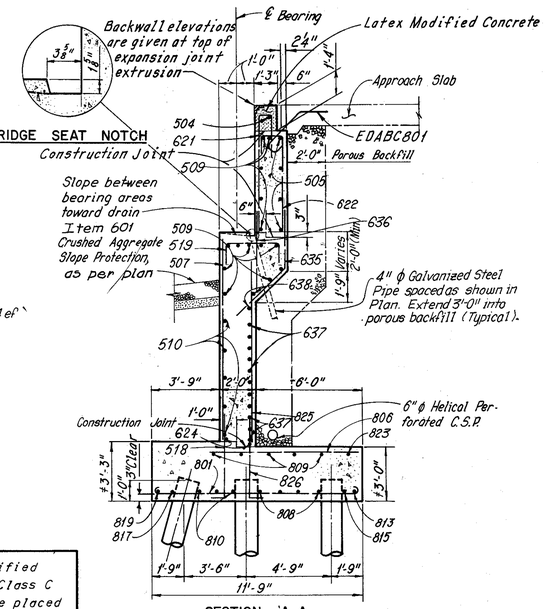
Note: All reinforcing bar marks shall be prefixed ABC, except as noted: Reinforcing bar marks 501 thru 504, 511 thru 516, 520, 621, 645 thru 647 shall be prefixed EABC.



RUSTICATION DETAIL
(Reinforcement not shown)

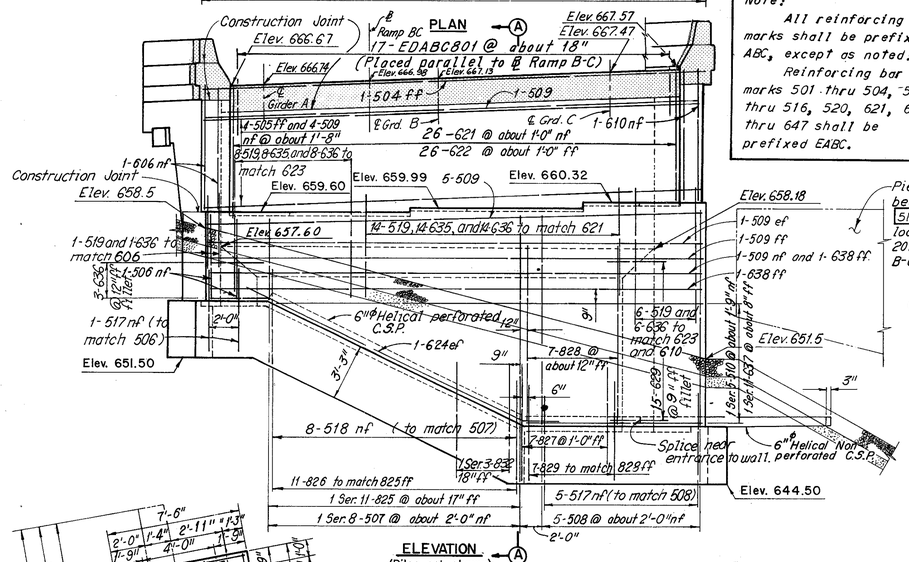


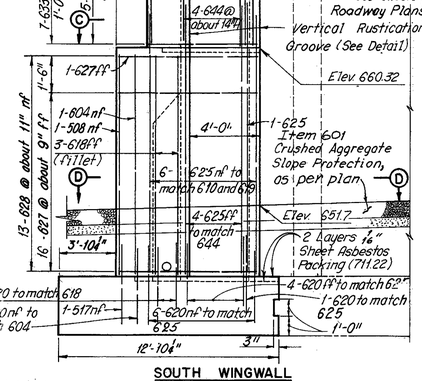
SECTION B-B



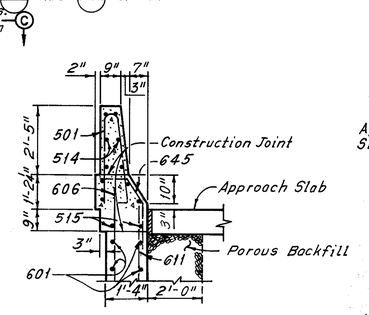
SECTION A-A
* Dimension normal to Footing

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers to be placed by others.

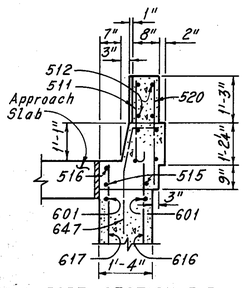




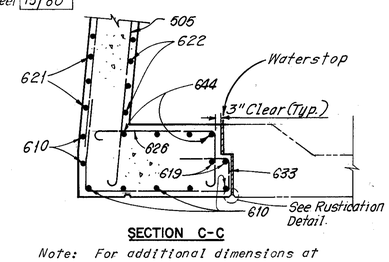
SOUTH WINGWALL
(Piles not shown)



PART SECTION E-E
(Section thru South Wingwall Similar, except for reinforcing bar marks and fillet)



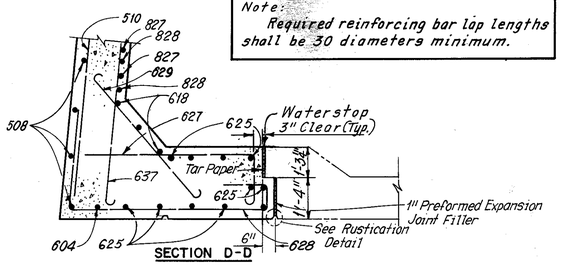
PART SECTION F-F



SECTION C-C

Note: For additional dimensions at Joint see Section D-D.

Note: Required reinforcing bar lap lengths shall be 30 diameters minimum.



SECTION D-D

Notes:

The 1" Preformed Expansion Joint Filler between Abutment B-C and Retaining Wall 82 is included with the bridge quantities for payment. The 4" ϕ Galvanized Steel Pipes, Waterstop, Tar Paper and two layers of 1/16" Sheet Asbestos Packing (711.22) shall be included with Item 511, Class C Concrete, Abutments Above Footing for payment.

For Waterstop Details, see Sheet 21/80.

The backfill shall be placed and compacted in front of the abutment to final ground line prior to or simultaneous with backfill behind the abutment. Before the backwall is constructed the backfill shall be constructed up to the level of the subgrade with a 1:1 slope from the bridge seat to the subgrade.

See the Substructure Construction Procedure Note on Sheet 9/80 as it relates to construction of Abutment B-C.

For Typical Section used to determine unclassified excavation, see Sheet 21/80.

For additional piling notes, see Sheet 18/80.

H.N.T.B. BR. NO. 9 PART 1 - SUBSTRUCTURE

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

ABUTMENT B-C

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN LJW	TRACED BMA	CHECKED JT	REVIEWED CAB	REVISED
DATE 8-8-70	DATE 8-15-70	DATE 9-23-70	DATE 10-18-83	SHEET 22/80

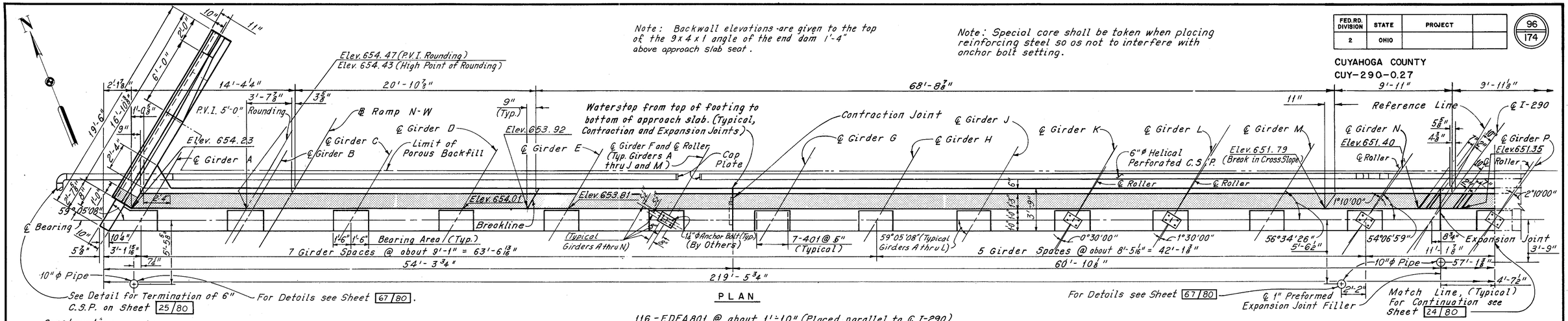
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

96
174

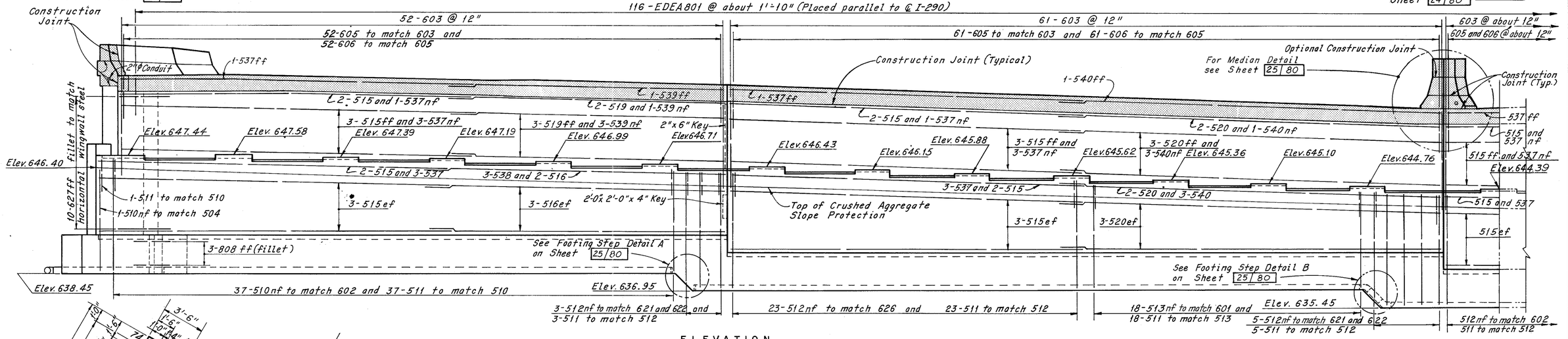
CUYAHOGA COUNTY
CUY-290-0.27

Note: Backwall elevations are given to the top of the 9x4x1 angle of the end dam 1'-4" above approach slab seat.

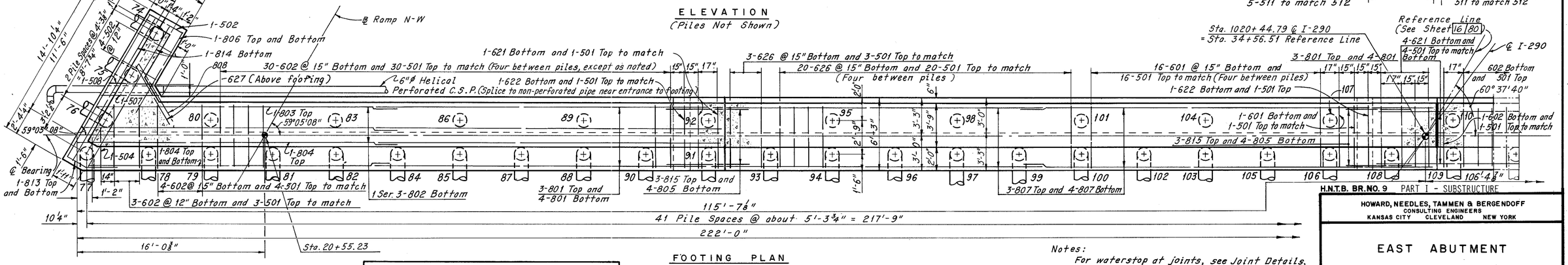
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



PLAN



ELEVATION
(Piles Not Shown)



FOOTING PLAN

Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note: All reinforcing bar marks shall be prefixed AE, except as noted.
Reinforcing bar marks 401, 511, 536 thru 540, 603, 605 and 606 shall be prefixed EAE.

▨ Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by Others.

Notes:
For waterstop at joints, see Joint Details, Sheet 21/80.
For additional piling notes see Sheet 18/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

EAST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S. DATE 2-2-70	C.P. DATE 2-16-70	S.M.S. DATE 2-24-70	C.A.B. DATE 10-18-82	SHEET 23/80

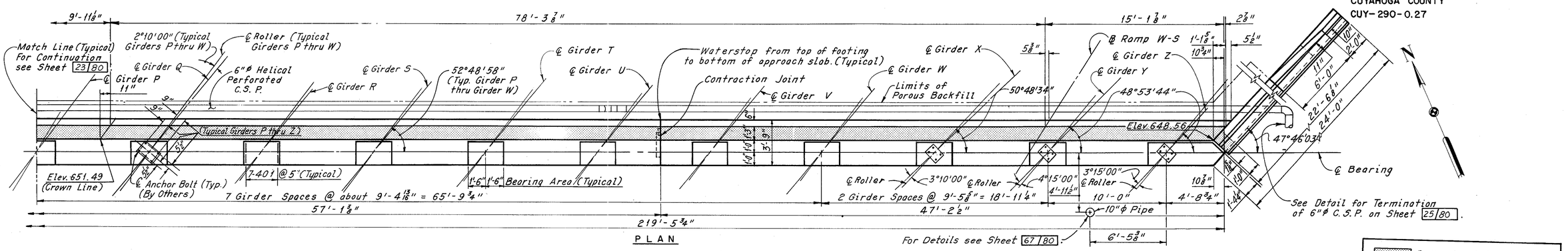
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

97
174

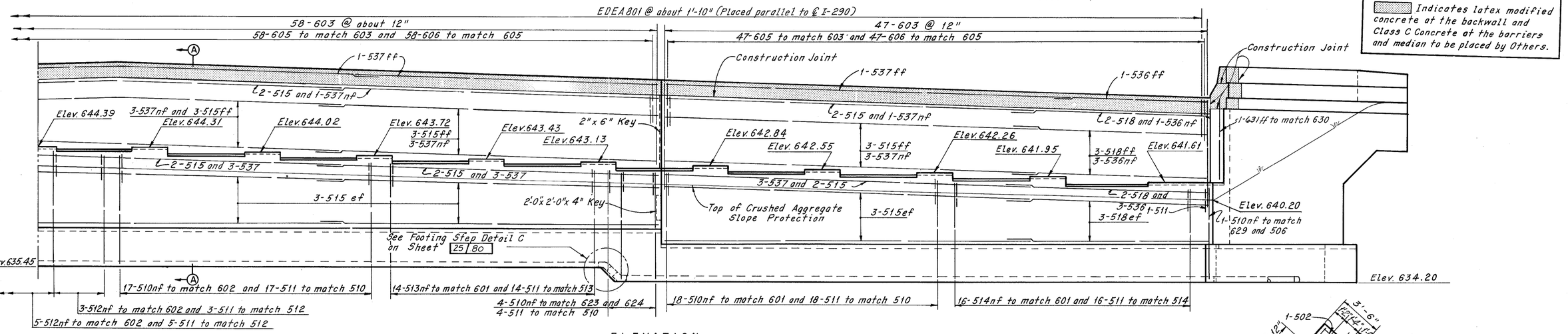
CUYAHOGA COUNTY
CUY-290-0.27

Note: Backwall elevations are given to the top of the 9 x 4 x 1 angle of the end dam, 1'-4" above the approach slab seat.

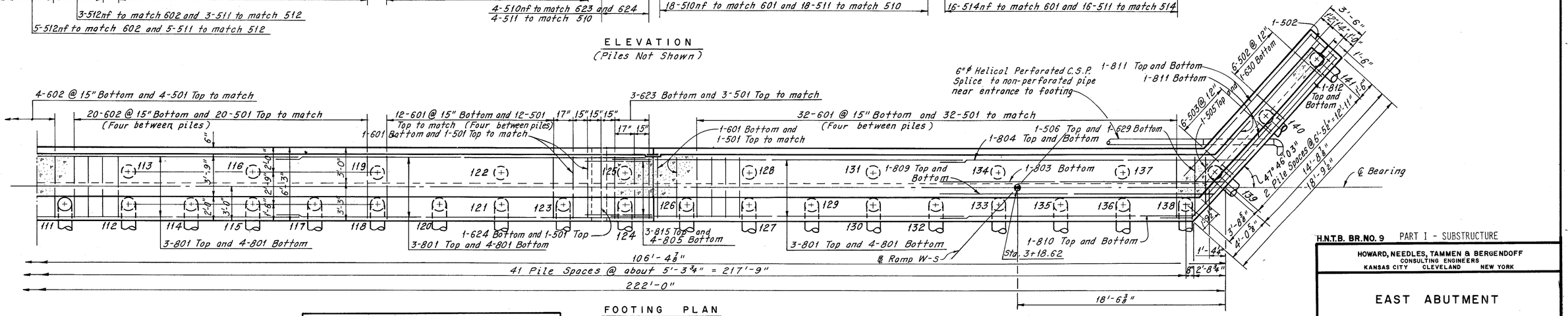
Note: Speciol core shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



PLAN



ELEVATION
(Piles Not Shown)



FOOTING PLAN

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by Others.

Notes:

For Section A-A see Sheet 25|80
For additional piling notes see sheet 18|80
For Waterstop Details see sheet 21|80

Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note: All reinforcing bar marks shall be prefixed AE, except as noted.
Reinforcing bar marks 401, 511, 536 thru 540, 603, 605 and 606 shall be prefixed EAE.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

EAST ABUTMENT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

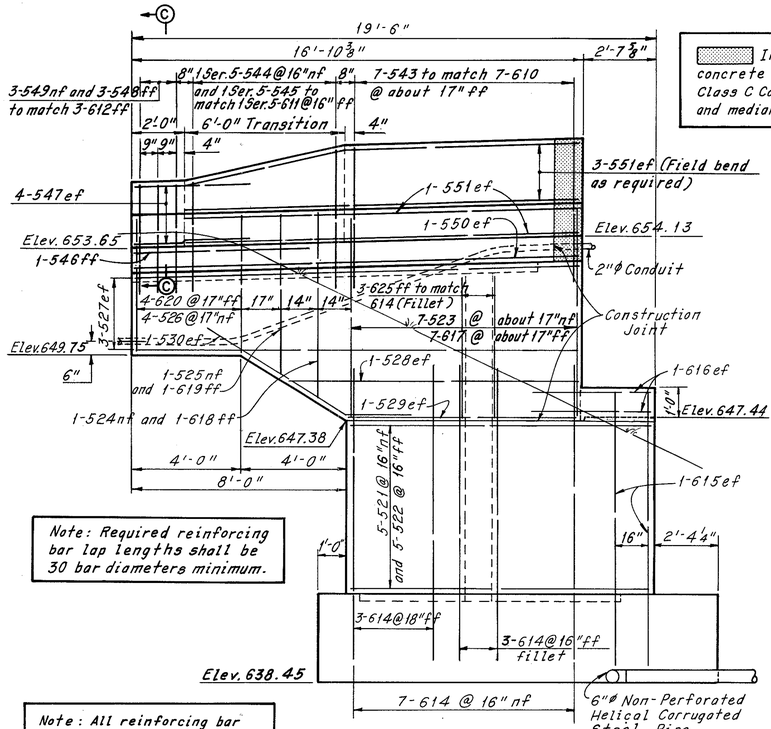
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S. & C.P.	C.P.	S.M.S.	C.A.B.	
DATE 2-3-10	DATE 2-17-10	DATE 2-24-10	DATE 10/18/85	SHEET 24 80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

98
174

CUYAHOGA COUNTY
CUY-290-0.27

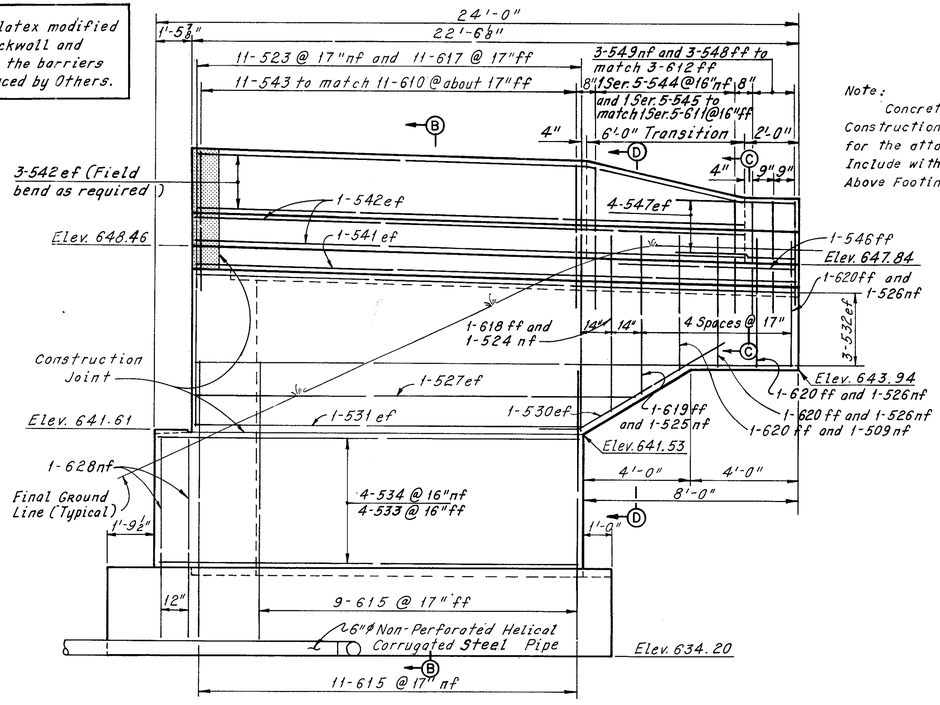
Indicates latex modified concrete at the backwall and Class C Concrete at the barriers and median to be placed by Others.



NORTH WINGWALL
(Piles Not Shown)

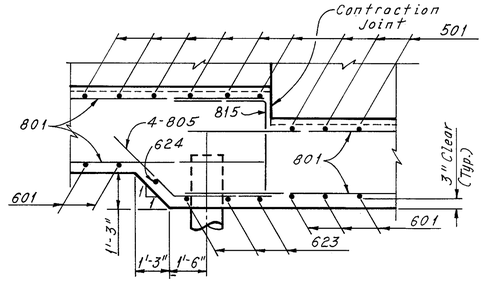
Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note: All reinforcing bar marks shall be prefixed AE, except as noted.
Reinforcing bar marks 511, 541 thru 551 and 603 thru 612 shall be prefixed EAE.



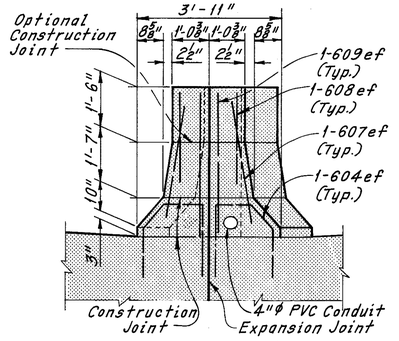
SOUTH WINGWALL
(Piles Not Shown)

Note:
Concrete insert assemblies, as shown on Standard Construction Drawings GR-1 and GR-3, shall be provided for the attachment of guardrail terminal connectors. Include with Item 511, Class C Concrete, Abutments Above Footings, for payment.



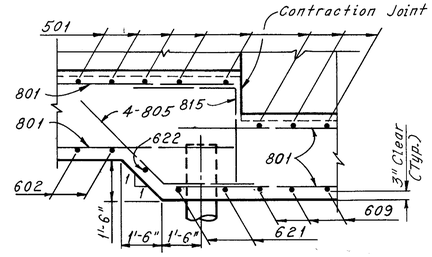
FOOTING STEP DETAIL C

Note: For location of Detail C see Sheet 24 80 .



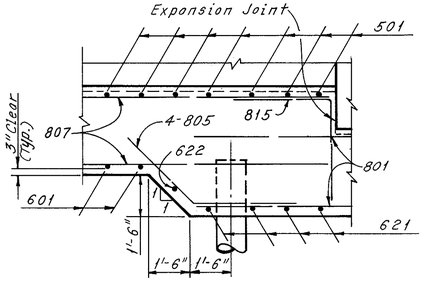
MEDIAN DETAIL

Note: For location of Median Detail see Sheet 23 80 .



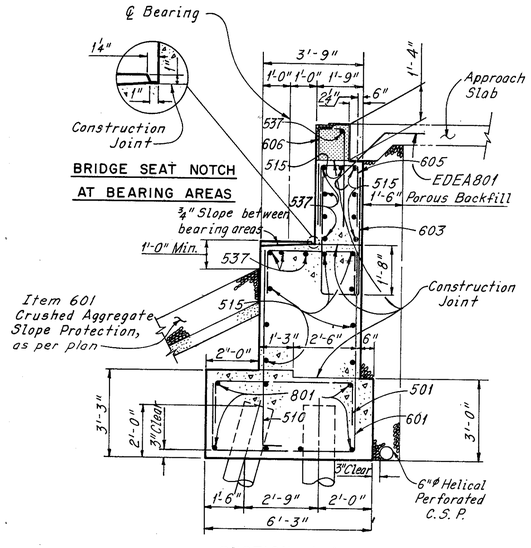
FOOTING STEP DETAIL A

Note: For location of Detail A see Sheet 23 80 .



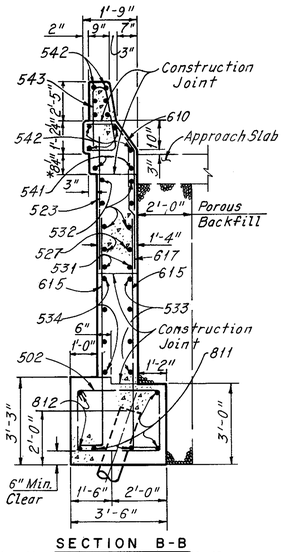
FOOTING STEP DETAIL B

Note: For location of Detail B see Sheet 23 80 .

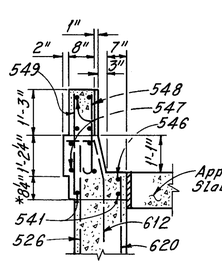


SECTION A-A
(For location of Section A-A see Sheet 24 80)

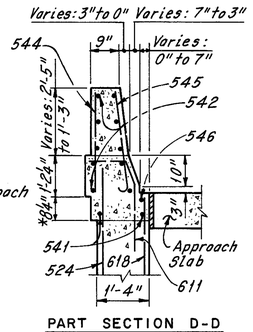
*Note: For North wingwall this dimension is 7¾".



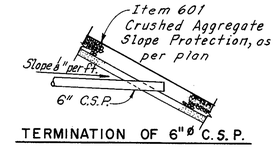
SECTION B-B
(Section thru North Wingwall Similar, except for bar marks)



PART SECTION C-C



PART SECTION D-D



TERMINATION OF 6"ϕ C.S.P. AT THE FRONT SLOPE

Notes:
The following abbreviations are used:
nf = near face ef = each face
ff = far face Typ. = Typical
For Piling notes, see Sheet 18 80 .

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

EAST ABUTMENT WINGWALLS, SECTIONS AND DETAILS

I-290 OVER CUYAHOGA RIVER

BR.NO. CUY-290-0110 STA.985+85.75 TO STA.1020+47.57

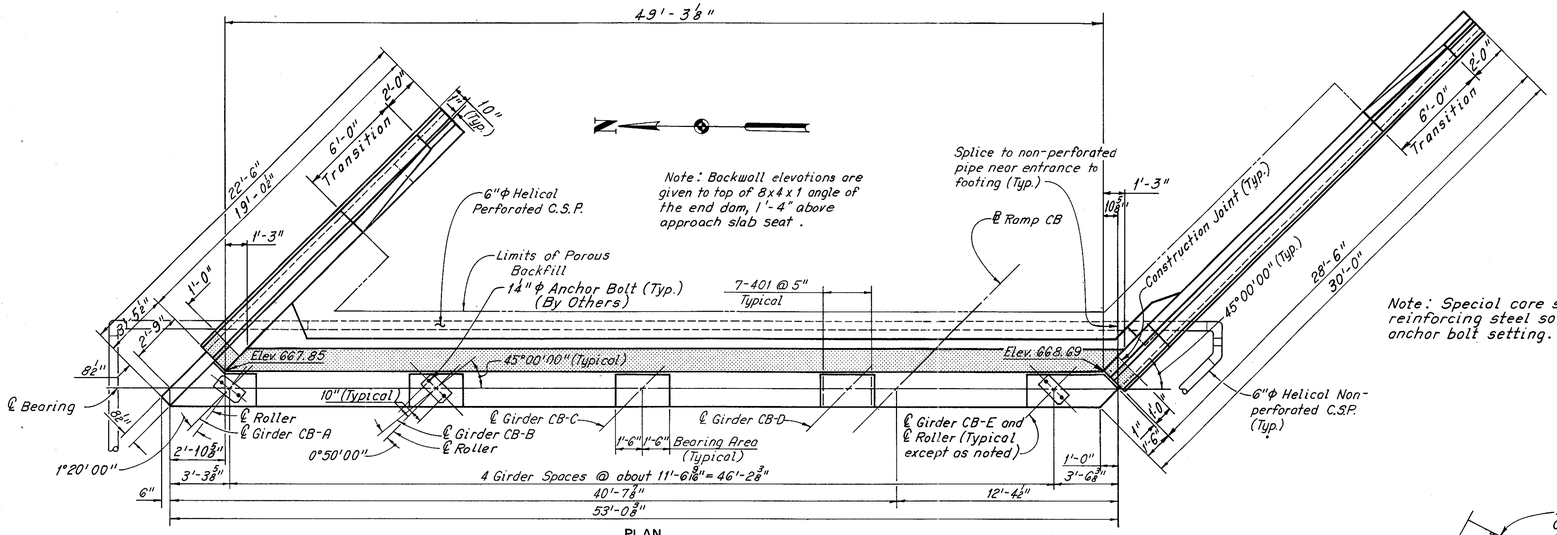
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S. & C.J.T.	C.P.	S.M.S.	A.B.	
DATE 2-4-70	DATE 2-12-70	DATE 2-24-70	DATE 10-18-85	SHEET 25/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

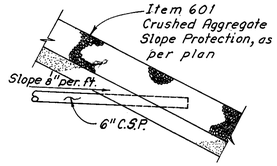
99
174

CUYAHOGA COUNTY
CUY-290-0.27

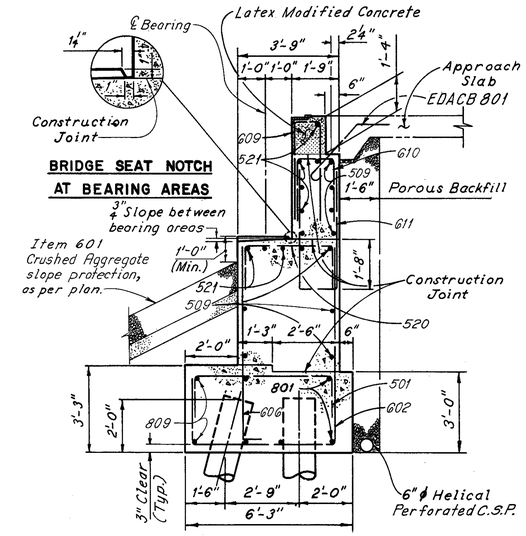


PLAN

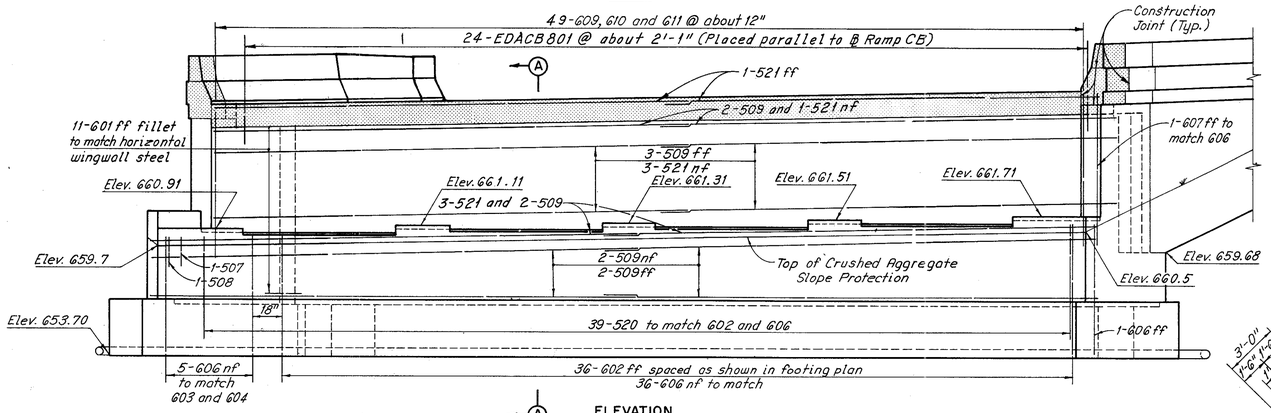
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

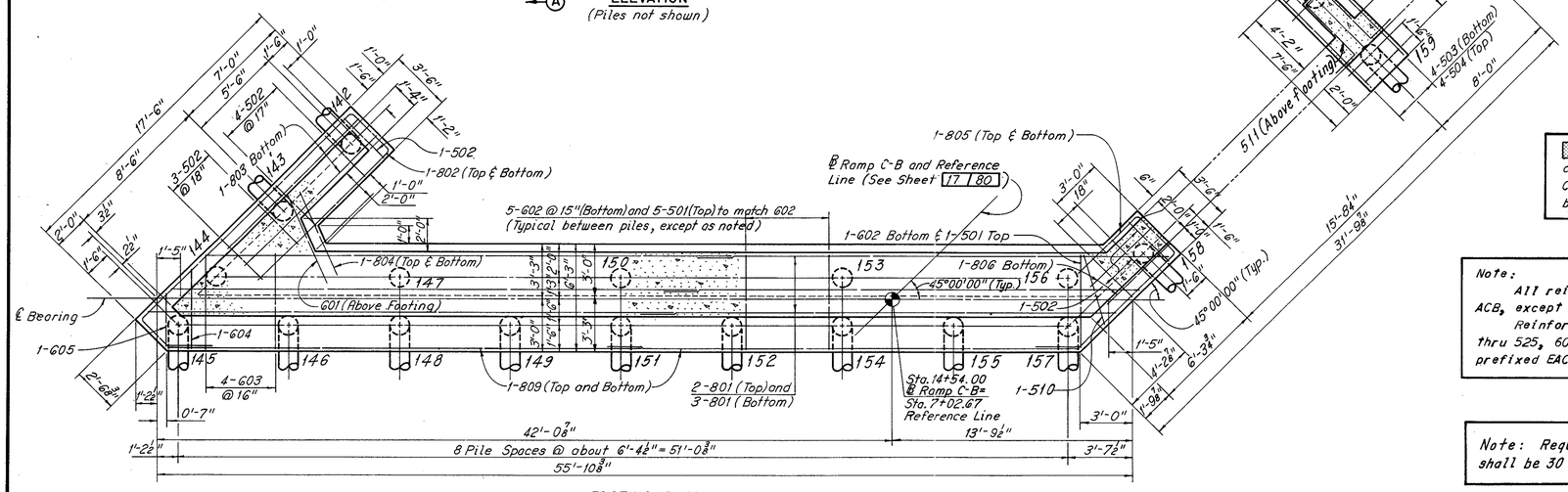


METHOD TO TERMINATE 6" C.S.P. AT THE FRONT SLOPE



SECTION A-A





FOOTING PLAN

Indicates latex modified concrete at the backwall and Class C Concrete at the barriers to be placed by others.

Note:
All reinforcing bar marks shall be prefixed ACB, except as noted.
Reinforcing bar marks 401, 507, 508, 512 thru 525, 609 thru 611 and 656 thru 658 shall be prefixed EACB.

Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note:
For Piling notes see Sheet 18 80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

ABUTMENT C-B

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R.	D.L.R.	D.M.P.	C.A.B.	
DATE 6-7-70	DATE 6-7-70	DATE 6-11-70	DATE 10-18-85	SHEET 26 80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

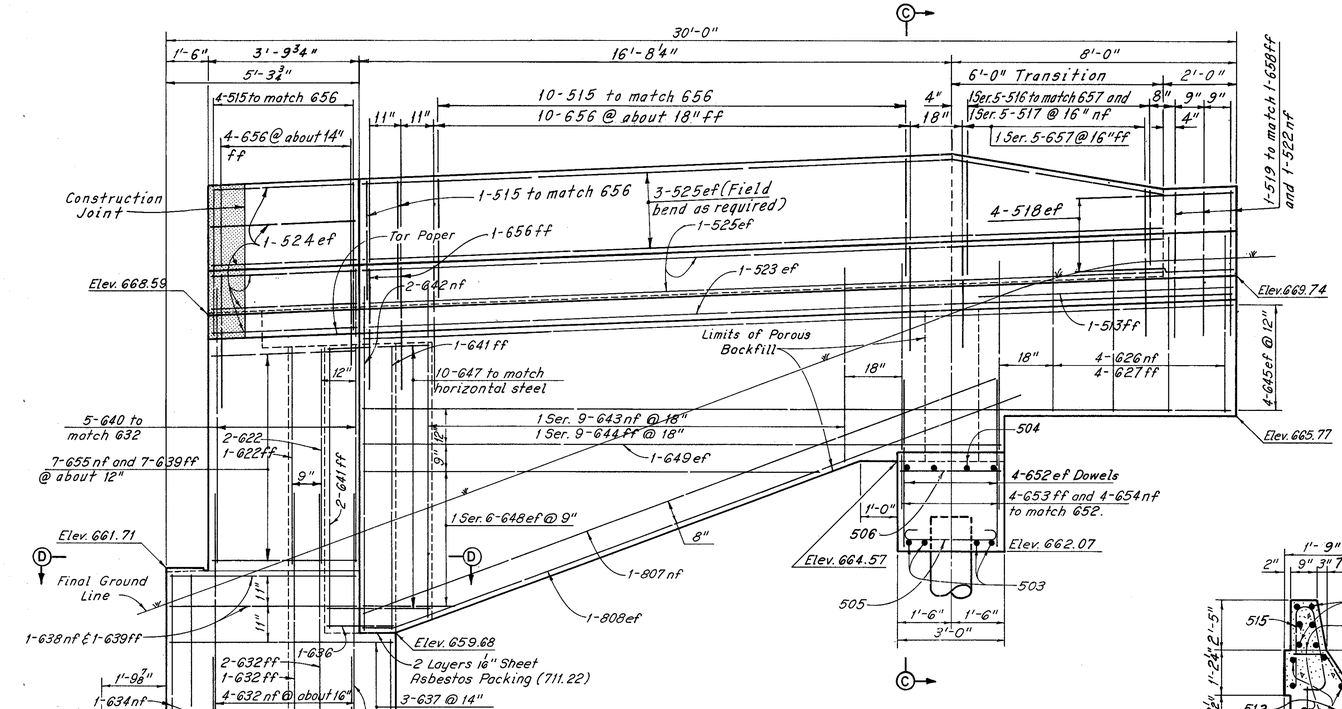
100
174

CUYAHOGA COUNTY
CUY-290-0.27

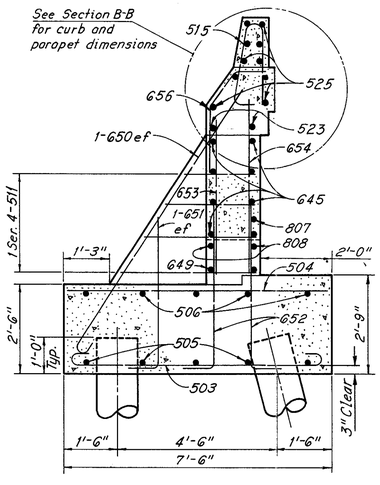
Indicates Class C Concrete, by others.

Note: Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

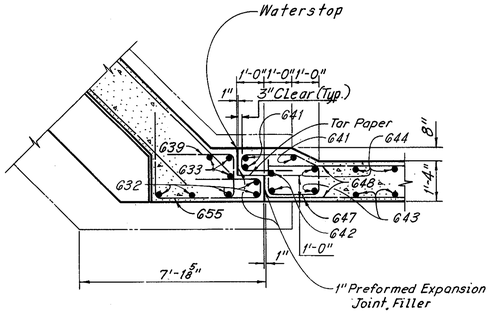
Note:
Concrete insert assemblies, as shown on Standard Construction Drawings GR-1 and GR-3, shall be provided for the attachment of guardrail terminal connectors. Include with Item 511, Class C Concrete, Abutments Above Footings, for payment.



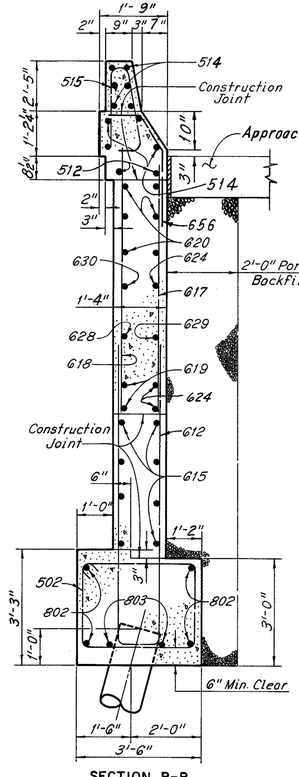
SOUTH WINGWALL ELEVATION
(Piles Not Shown)



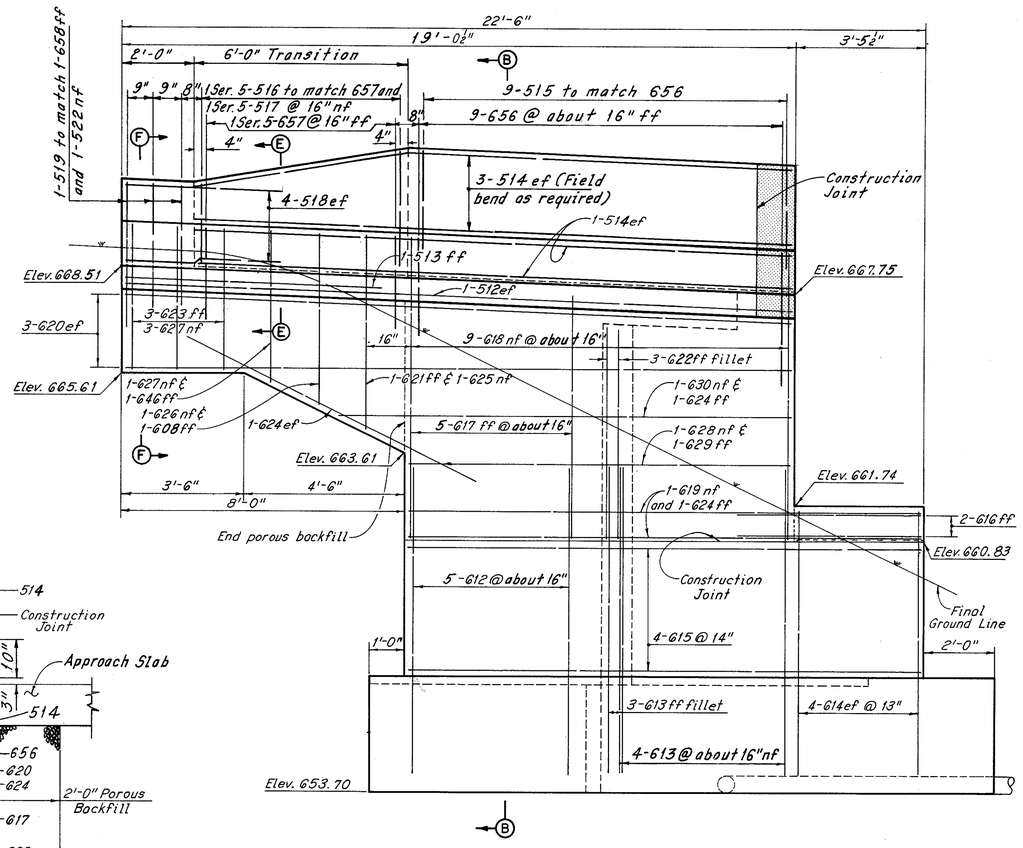
SECTION C-C



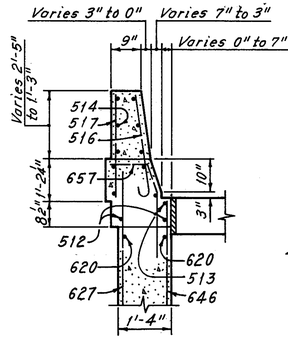
SECTION D-D



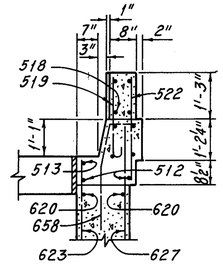
SECTION B-B
(North Wingwall Shown, South Similar)



NORTH WINGWALL ELEVATION
(Piles Not Shown)



PART SECTION E-E



PART SECTION F-F

(North Wingwall Shown, South Similar)

Notes:
For Waterstop Details, see Sheet 21/80.
Waterstop, Sheet Asbestos Packing (711.22) and Tar Paper shall be included with Item 511, Class C Concrete, Abutments Above Footing for payment.
For reinforcing bar mark prefixes, see Sheet 26/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

ABUTMENT C-B WINGWALLS

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

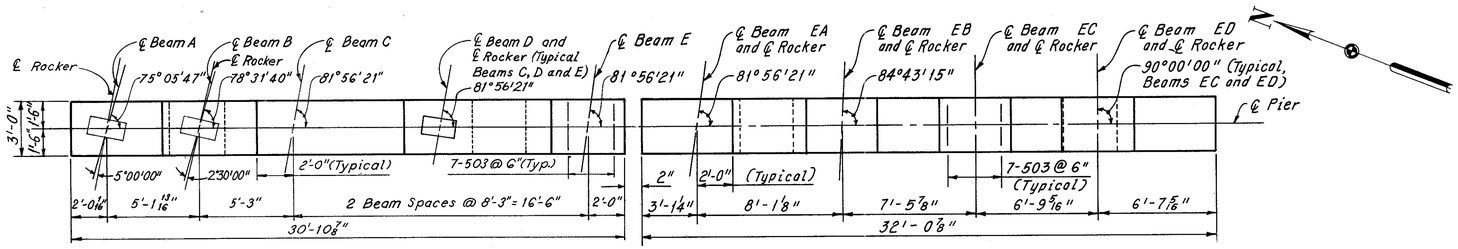
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DLR	DLR	RMP	CAB	
DATE 11-28-69	DATE 11-28-69	DATE 6-11-70	DATE 10-18-82	SHEET 27/80

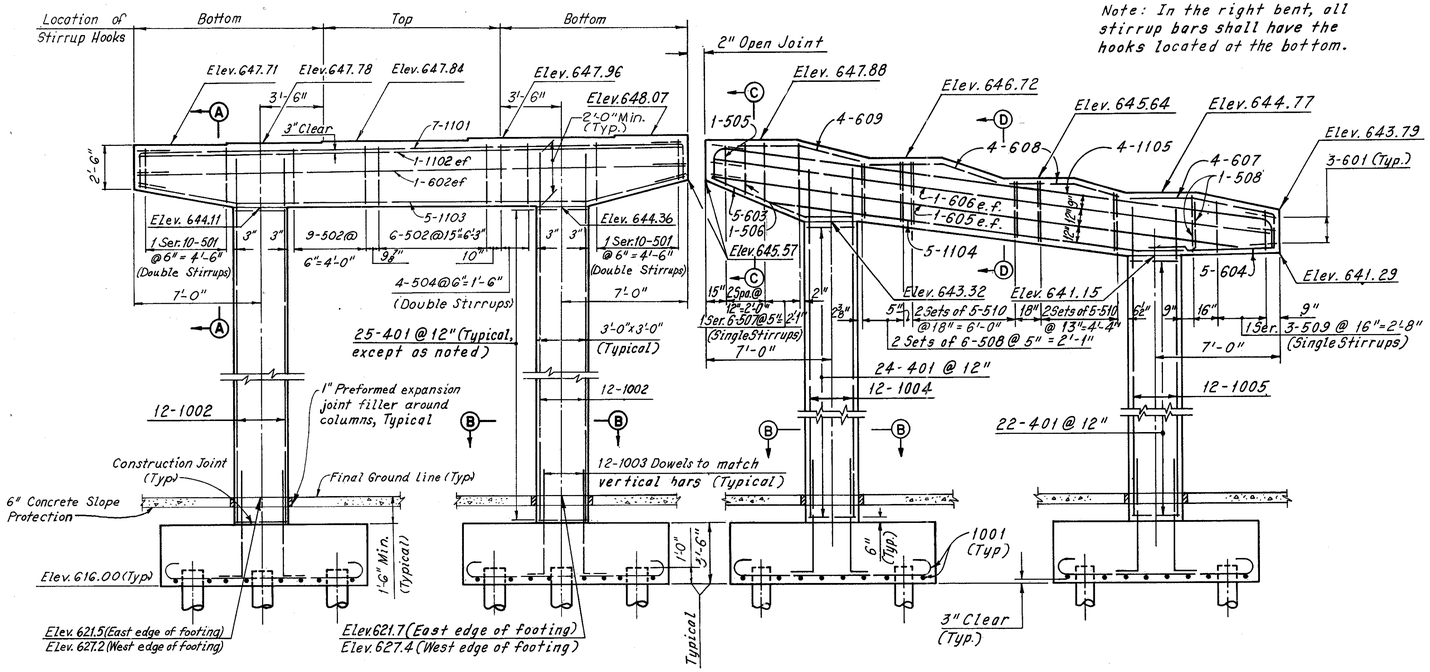
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

101
174

CUYAHOGA COUNTY
CUY-290-027

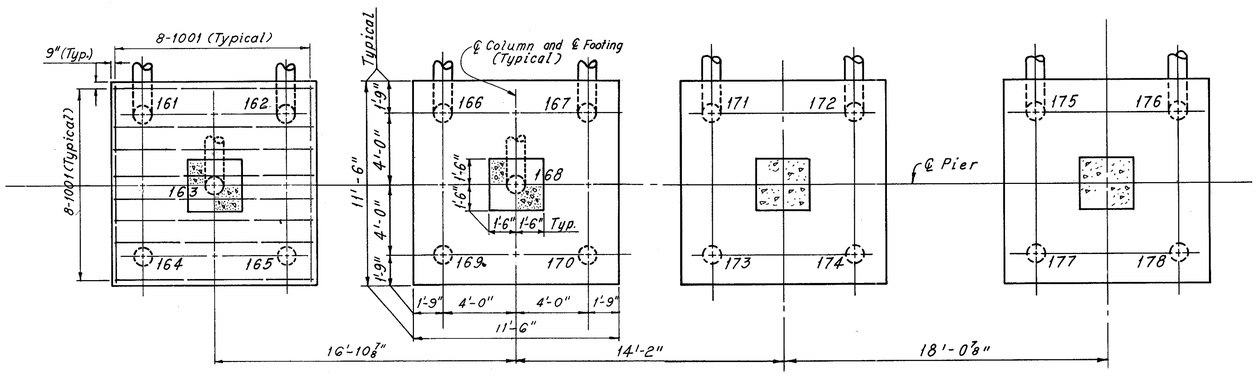


PLAN



ELEVATION

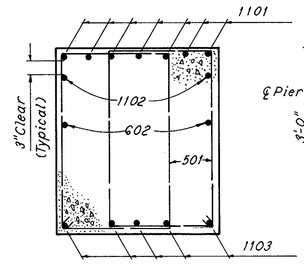
Note: In the right bent, all stirrup bars shall have the hooks located at the bottom.



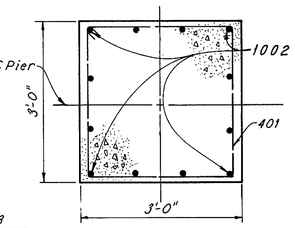
FOOTING PLAN

LEFT BENT

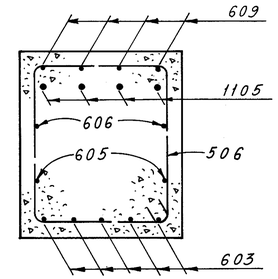
RIGHT BENT



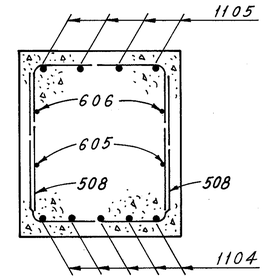
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

Notes:

For footing locations see Bridge Layout Diagram Sheet 12/80

All piles are 14" Ø C.I.P. reinforced concrete.

All battered piles shall be inclined 3 in 12 in the direction shown except as noted.

Pile layout dimensions are measured along bottom of footing.

The following abbreviation is used:
ef = each face

For piers set in sloped areas (Piers 1, 11, 13, 14, 16 thru 24, 25C-B, 26C-B and 27C-B) the final required ground line elevations above the footings are tabulated on the pier sheets. The elevations shown are at the intersection of the centerline pier or centerline column and footing, and the edge of footing. Generally, when only two elevations per footing are tabulated the slope is uniform over the footing, when four elevations per footing are tabulated the slope varies over the footing. For the final grading configuration within the footing limits see the Roadway Plans. Final ground shall be established prior to pier construction. Pier backfill shall be placed and compacted on the low side of the column prior to or simultaneous with the placing of backfill on the high side of the column.

For additional notes relating to the construction of the Piers see Sheet 9/80

Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

Note:
All reinforcing bar marks shall be prefixed PA, except as noted.
Reinforcing bar marks 401 and 1002 thru 1005 shall be prefixed EPA.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER IC-7

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

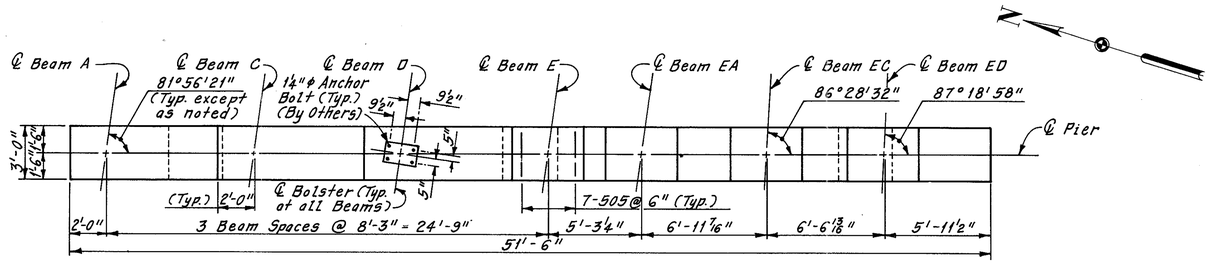
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
C.J.S. DATE 3-1-70	DATE 3-1970	L.J.W. DATE 4-1-70	C.A.S. DATE 10-18-85	SHEET 28/80

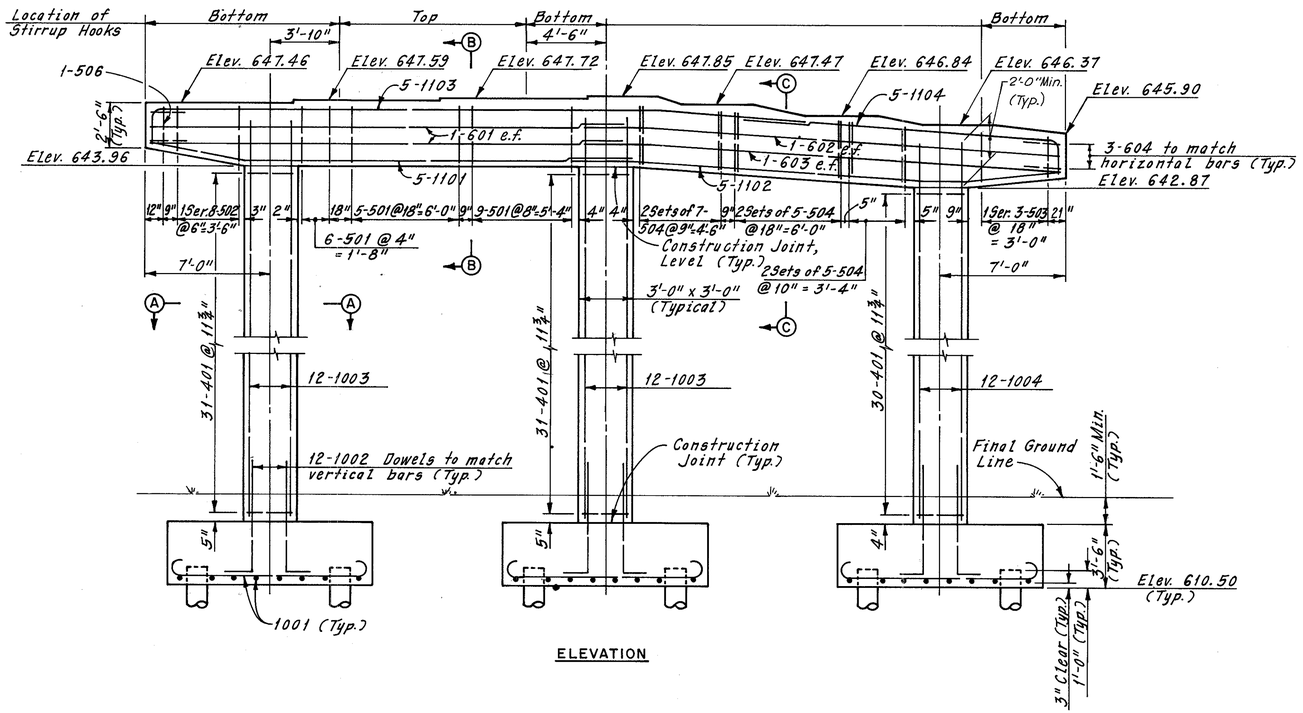
FHWA REGION	STATE	PROJECT	
5	OHIO		

CUYAHOGA COUNTY
CUY-290-0.27

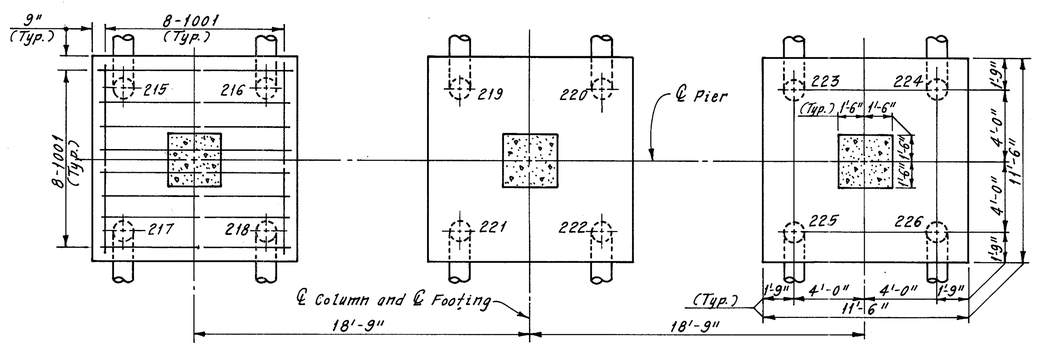
Notes: Special care shall be taken when placing reinforcing steel so as not to interfere with the anchor bolt setting.



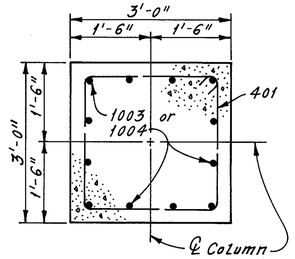
PLAN



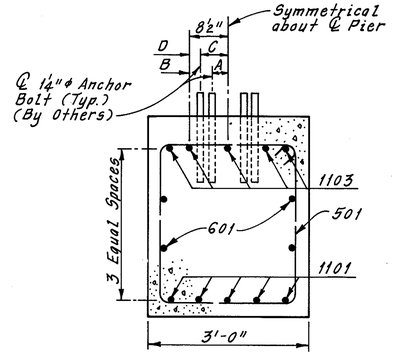
ELEVATION



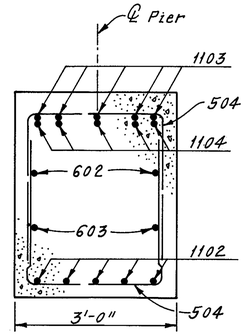
FOOTING PLAN



SECTION A-A



SECTION B-B



SECTION C-C

TABLE OF DIMENSIONS				
Beam	Dimension			
	A	B	C	D
A thru EA	3⅜"	4⅞"	6½"	2¼"
EC	4⅜"	4⅛"	5 9/16"	2 1/16"
ED	4 9/16"	3 1/16"	5 1/16"	3/16"

Notes:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.

The following abbreviations are used:
Typ. = Typical
Elev. = Elevation
Ser. = Series
Min. = Minimum
e.f. = each face

For additional notes, see Sheet 28/80

Note:
All reinforcing bar marks shall be prefixed PB except as noted.
Reinforcing bar marks 401, 1002, 1003 and 1004 shall be prefixed EPB.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

PIER 2C-7

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

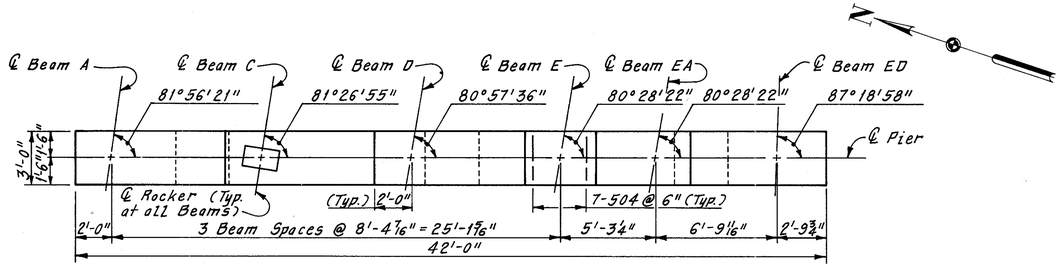
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
W.E.B.	W.E.B.	C.P.	C.A.B.	
DATE 6-30-83	DATE 7-1-83	DATE 7-11-83	DATE 10-18-85	

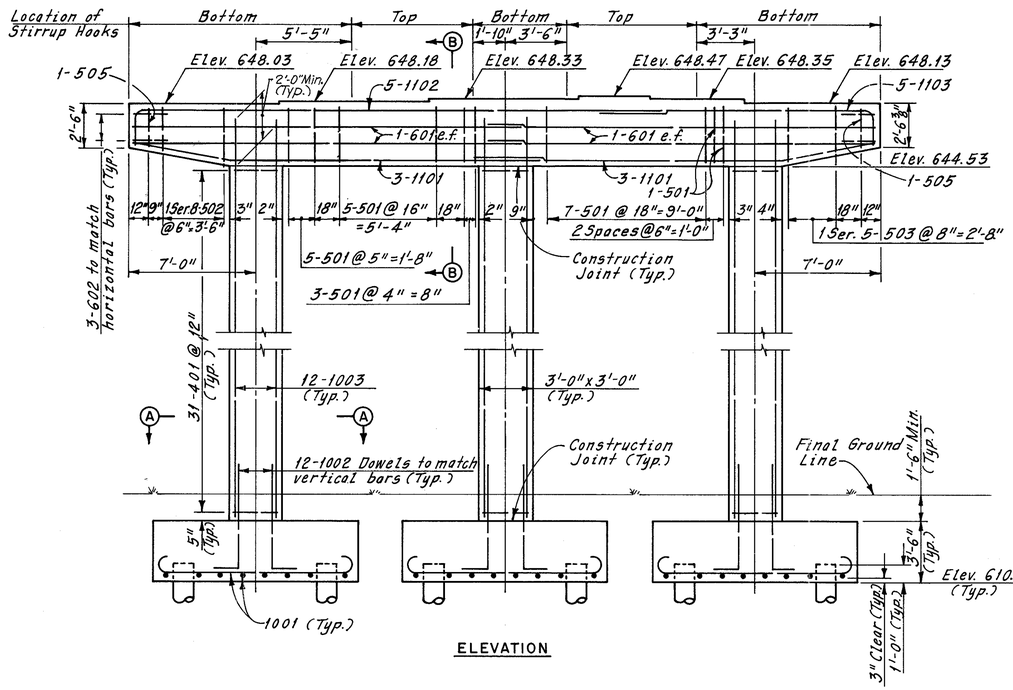
FHWA REGION	STATE	PROJECT	
5	OHIO		

103/174

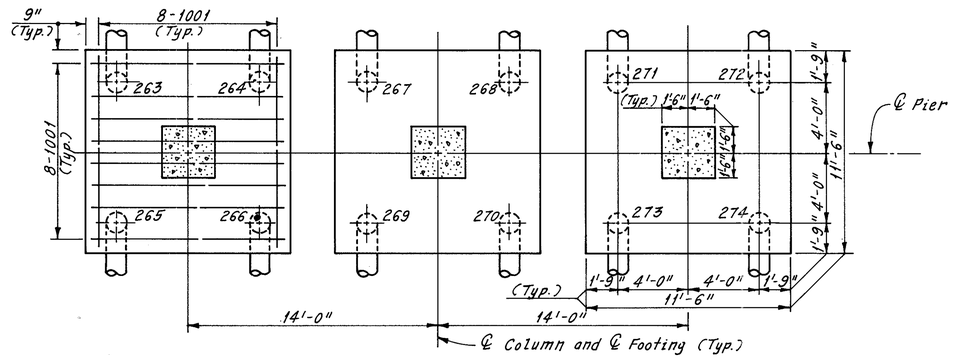
CUYAHOGA COUNTY
CUY-290-0.27



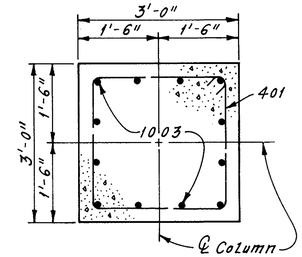
PLAN



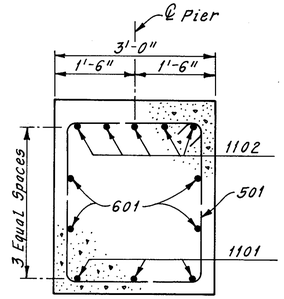
ELEVATION



FOOTING PLAN



SECTION A-A



SECTION B-B

Notes:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.
The following abbreviations are used:
Typ. = Typical
Elev. = Elevation
Ser. = Series
Min. = Minimum
e.f. = each face
For additional notes, see Sheet 28/80

Note: All reinforcing bar marks shall be prefixed PC.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

PIER 3C-7

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

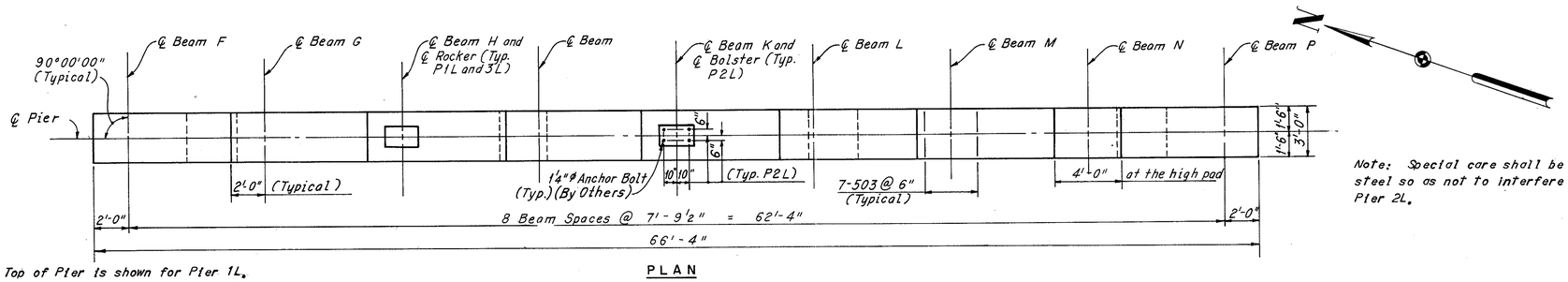
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
W.E.B.	W.E.B.	C.P.	C.A.B.	
DATE 7-5-83	DATE 7-6-83	DATE 7-11-83	DATE 10-18-85	SHEET 30/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

104
174

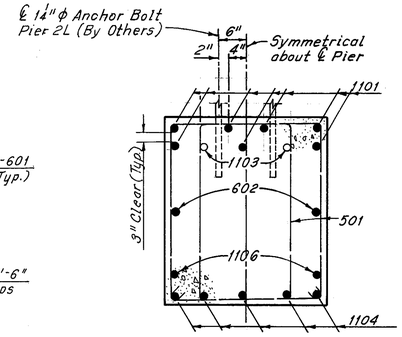
CUYAHOGA COUNTY
CUY-290-0.27



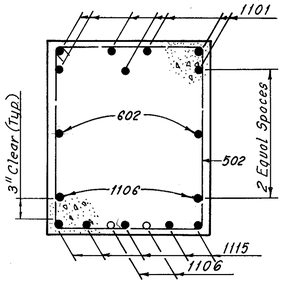
PLAN

Note: Top of Pier is shown for Pier 1L. Stirrup placement is symmetrical about ℄ Pier Cap.

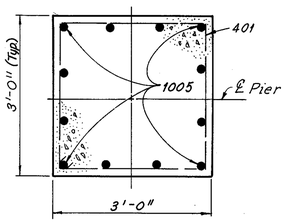
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting for Pier 2L.



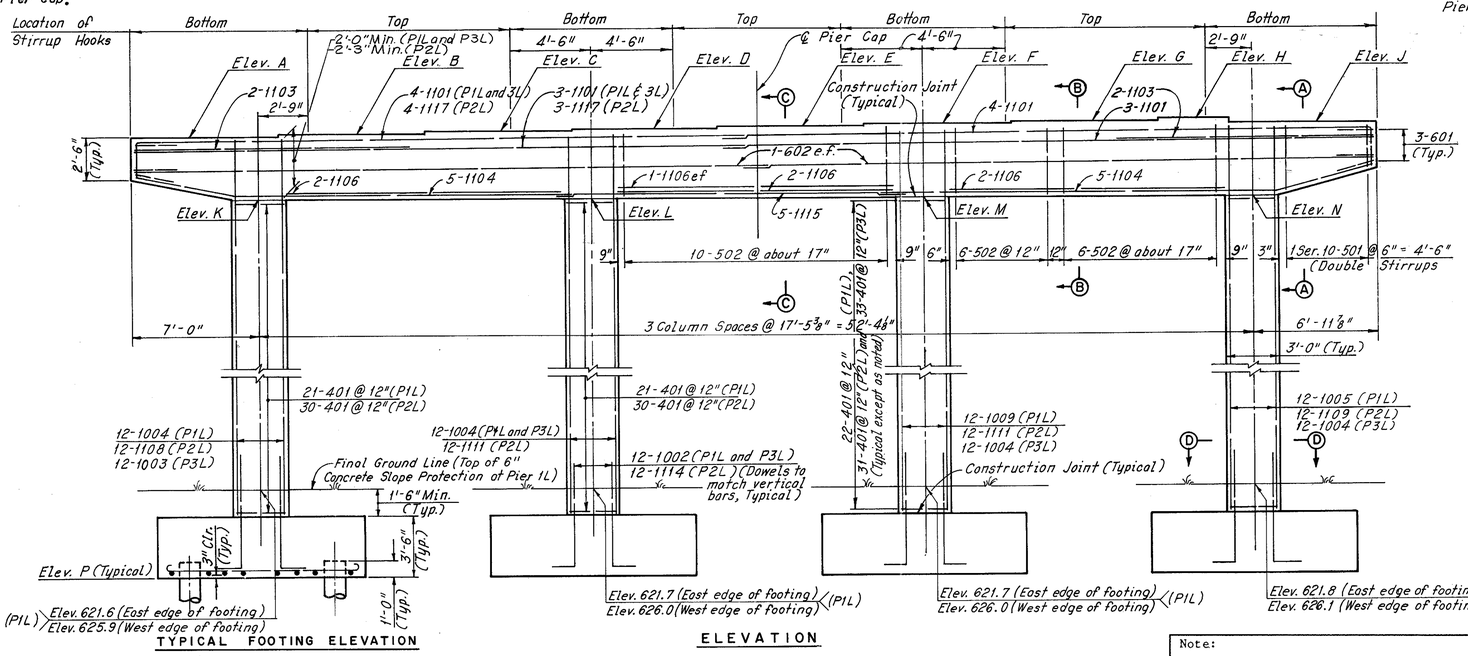
SECTION A-A



SECTION C-C

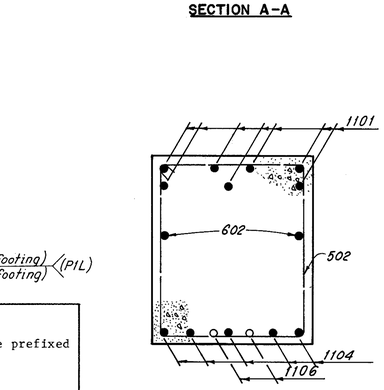


SECTION D-D
(P1L Shown)



TYPICAL FOOTING ELEVATION

ELEVATION



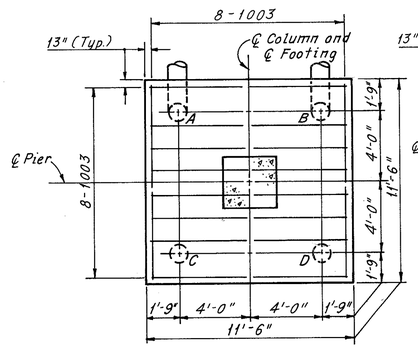
SECTION B-B

Note:

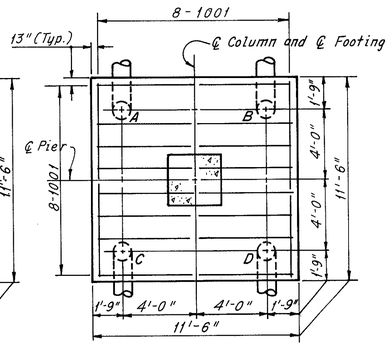
All reinforcing bar marks shall be prefixed as follows except as noted:

P1L = PD
P2L = PE
P3L = PF

Reinforcing bar marks 401, 1002, 1004, 1005 and 1009 at Pier 1L shall be prefixed EPD. Reinforcing bar marks 401, 1108, 1109, 1111 and 1114 at Pier 2L shall be prefixed EPE.



TYPICAL FOOTING PLAN
PIER 1L



TYPICAL FOOTING PLAN
PIERS 2L AND 3L

ELEVATION TABLE

Elevations / Piers	Elev. A	Elev. B	Elev. C	Elev. D	Elev. E	Elev. F	Elev. G	Elev. H	Elev. J	Elev. K	Elev. L	Elev. M	Elev. N	Elev. P
P1L	643.79	643.94	644.10	644.25	644.41	644.56	644.72	644.87	644.75	640.24	640.56	640.87	641.20	616.50
P2L	645.90	646.02	646.14	646.26	646.38	646.48	646.55	646.63	646.48	642.35	642.54	642.79	642.93	609.50
P3L	648.10	648.22	648.35	648.47	648.59	648.62	648.61	648.59	648.40	644.58	644.68	644.78	644.88	609.00

Notes:

For location of Cleveland Metropolitan Housing Authority electrical duct and East Ohio Gas Company 4" ϕ P.E.L.P. line, with respect to Pier 2L footings, see Section A-A on Sheet 5/80

The following abbreviations are used:

P1L = Pier 1L
P2L = Pier 2L
P3L = Pier 3L
ef = each face

Dimensions and reinforcing bar numbers are typical for Piers 1L, 2L and 3L except as noted.

For Notes see Sheet 28/80

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

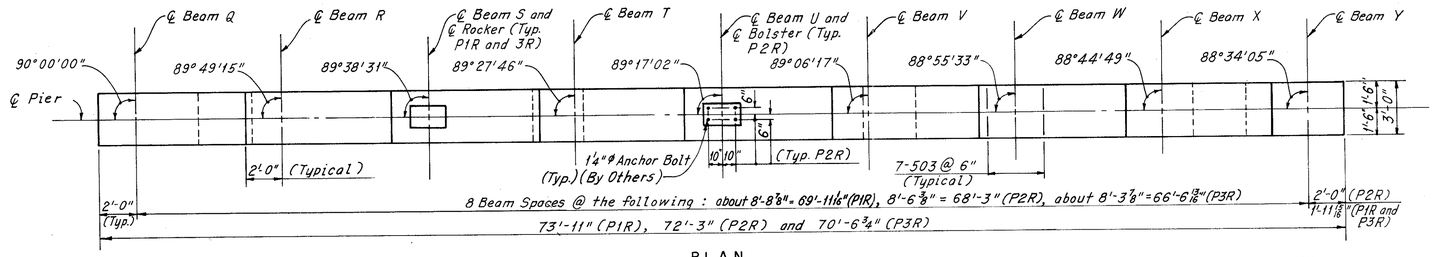
PIERS 1L, 2L AND 3L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

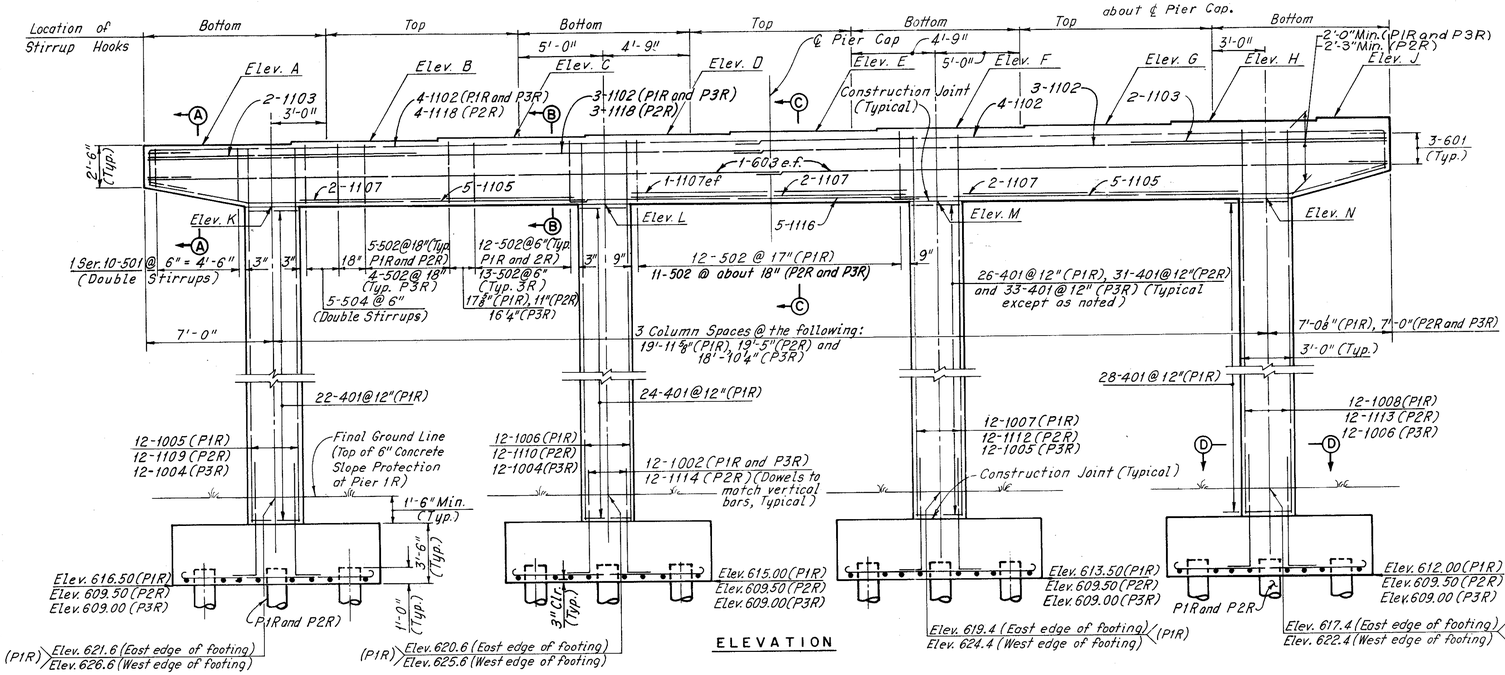
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN S.M.S	TRACED E.G.E.S	CHECKED J.W.	REVIEWED C.M.	REVISED
DATE 3-1870	DATE 3-2070	DATE 3-2370	DATE 10-1885	SHEET 31/80



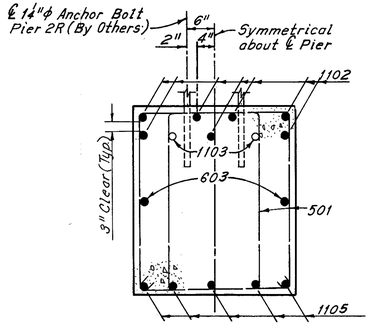
PLAN

Note: Top of pier is shown for Pier 1R. Stirrup placement is symmetrical about ℄ Pier Cap.

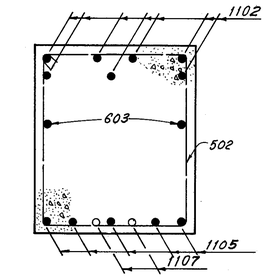


ELEVATION

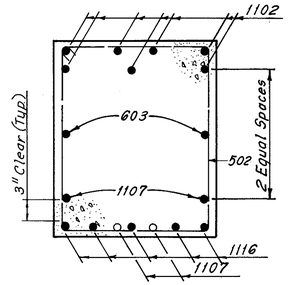
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting for Pier 2R.



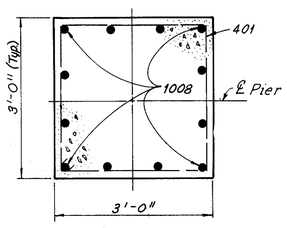
SECTION A-A



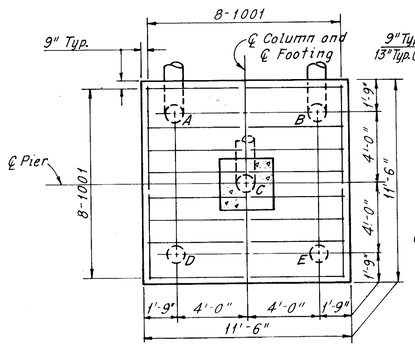
SECTION B-B



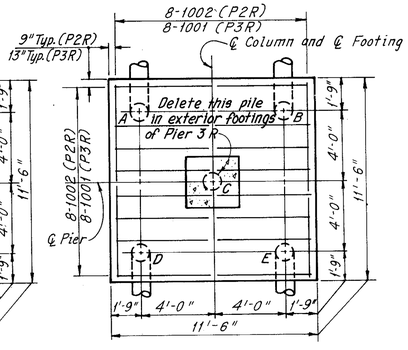
SECTION C-C



SECTION D-D
(Pier 1R Shown)



TYPICAL FOOTING PLAN
PIER 1R



TYPICAL FOOTING PLAN
PIERS 2R AND 3R

Note:

All reinforcing bar marks shall be prefixed as follows except as noted:

P1R = PD
P2R = PE
P3R = PF

Reinforcing bar marks 401, 1002, 1005 thru 1008 at Pier 1R shall be prefixed EPD. Reinforcing bar marks 401, 1109, 1110, 1112, 1113 and 1114 at Pier 2R shall be prefixed EPE.

ELEVATION TABLE

Elevations / Piers	Elev. A	Elev. B	Elev. C	Elev. D	Elev. E	Elev. F	Elev. G	Elev. H	Elev. J	Elev. K	Elev. L	Elev. M	Elev. N
P1R	644.69	644.96	645.13	645.30	645.48	645.65	645.82	645.99	646.06	641.14	641.60	642.05	642.51
P2R	646.41	646.65	646.79	646.92	647.02	647.10	647.18	647.27	647.27	642.88	643.17	643.45	643.74
P3R	648.33	648.57	648.70	648.83	648.87	648.86	648.84	648.82	648.77	644.81	644.96	645.10	645.25

Notes:

For location of Cleveland Metropolitan Housing Authority electrical duct and East Ohio Gas Company 6" ϕ P.E.H.P. and 4" ϕ P.E.L.P. lines, with respect to Piers 1R and 2R footings, see Sheet 5/80

The following abbreviations are used:

P1R = Pier 1R
P2R = Pier 2R
P3R = Pier 3R

Dimensions and reinforcing bar numbers are typical for Piers 1R, 2R and 3R except as noted.

For Notes see Sheet 28/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

105/174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 1R, 2R AND 3R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

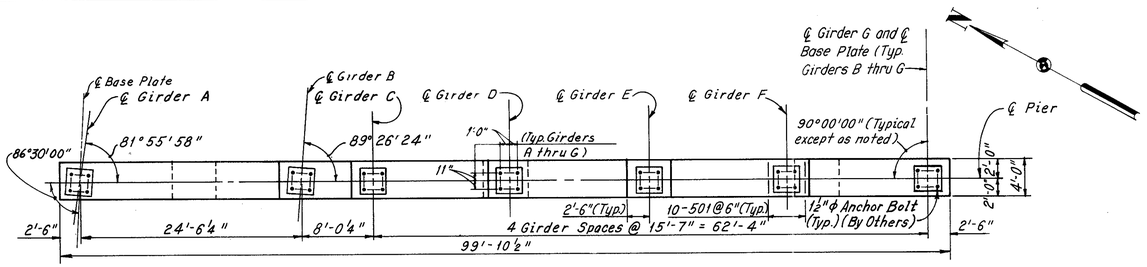
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN S.M.S.	TRACED C.E.S.	CHECKED Z.J.N.	REVIEWED C.A.B.	REVISED
DATE 3-18-70	DATE 3-20-70	DATE 3-23-70	DATE 10-18-85	SHEET 32/80

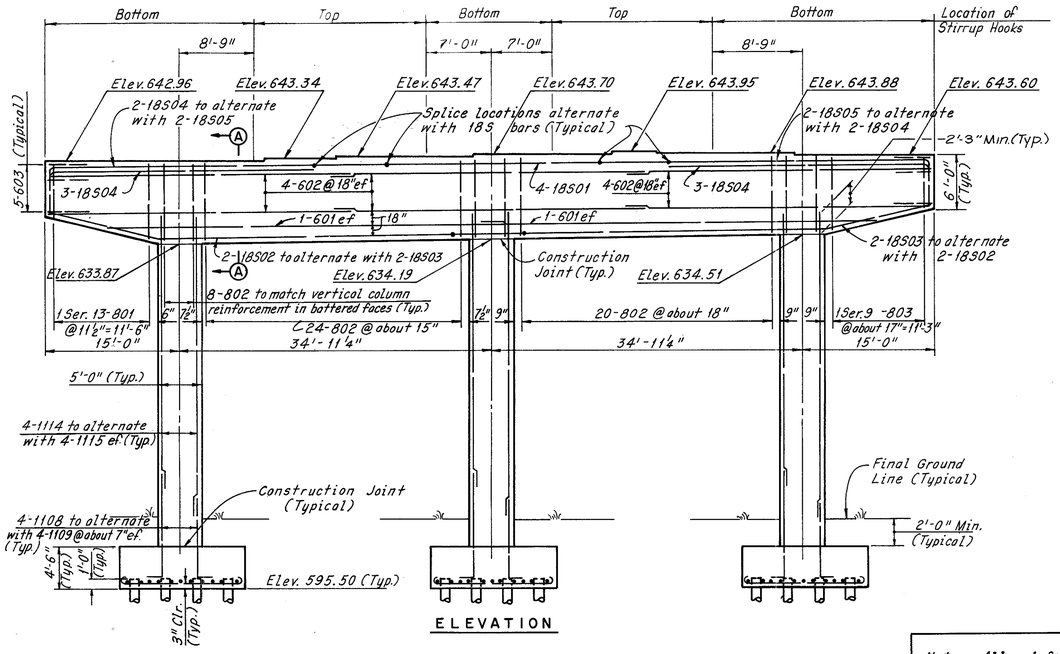
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

106
174

CUYAHOGA COUNTY
CUY-290-0.27



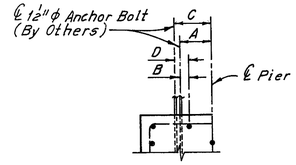
PLAN



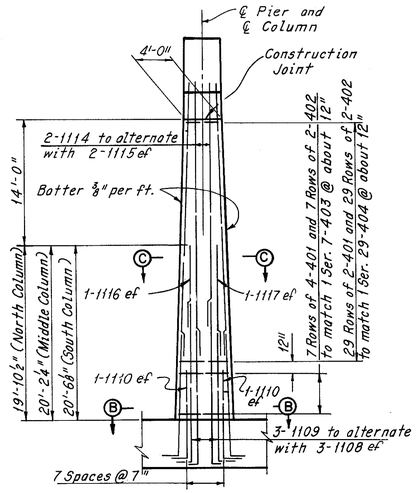
ELEVATION

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

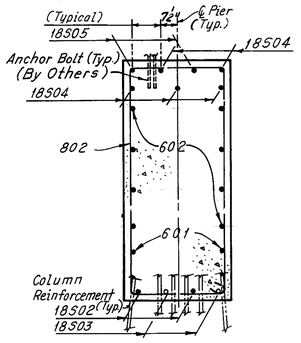
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 4L				
A	10 1/4"	2 3/8"	11 3/8"	4 1/4"
B	10 3/8"	3 3/8"	11 1/8"	3 3/8"
C thru G	11"	3 1/2"	11"	3 1/2"



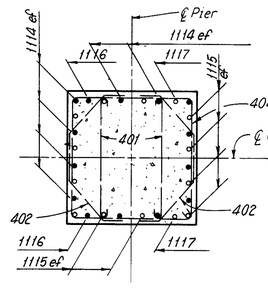
ANCHOR BOLT SETTING



TYPICAL COLUMN END VIEW

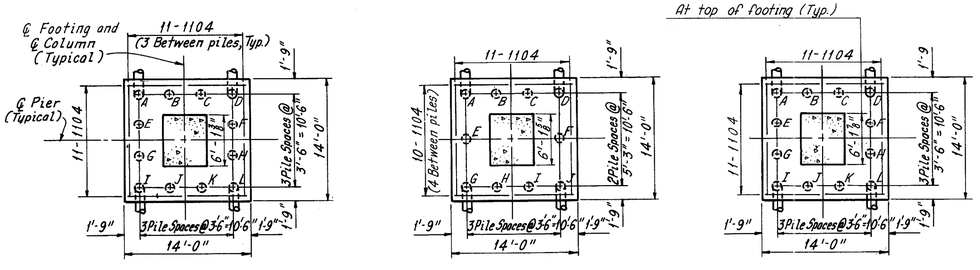


SECTION A-A

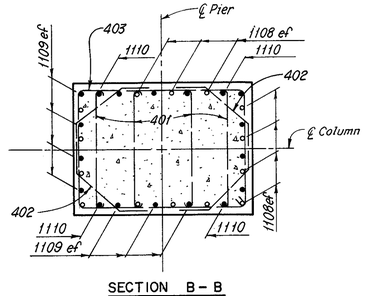


SECTION C-C

Note: All reinforcing bar marks shall be prefixed PGL.



FOOTING PLAN



SECTION B-B

Note:
For Notes see Sheet 28/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 4L

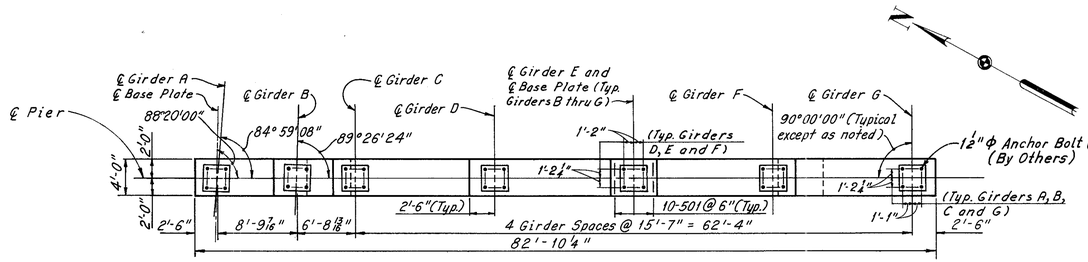
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN J.D.S	TRACED C.P.	CHECKED J.W.	REVIEWED C.A.B.	REVISED
DATE 3-18-70	DATE 4-7-70	DATE 4-10-70	DATE 6-18-85	SHEET 33/80

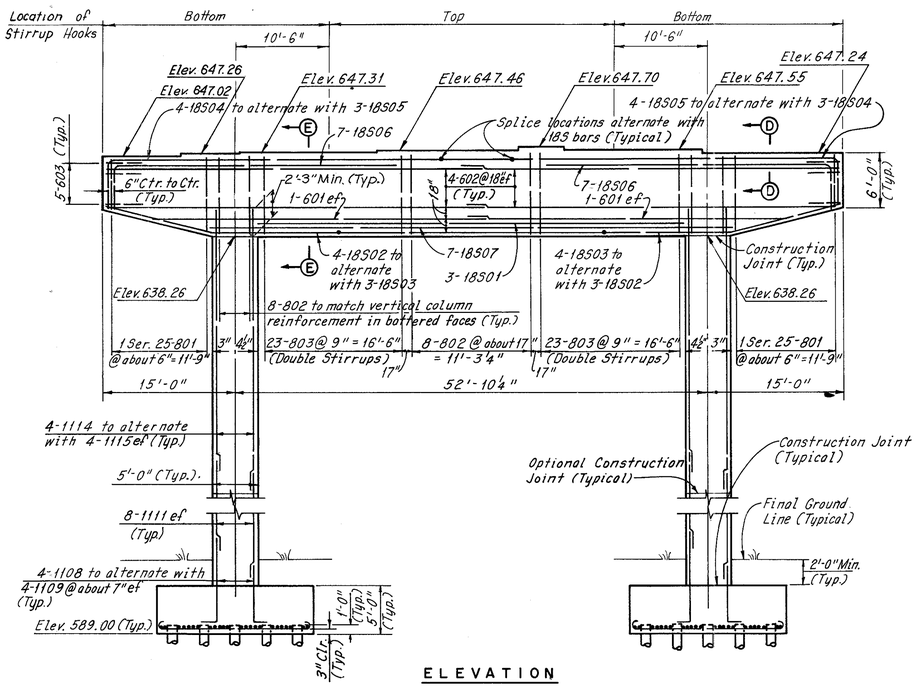
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

107
174

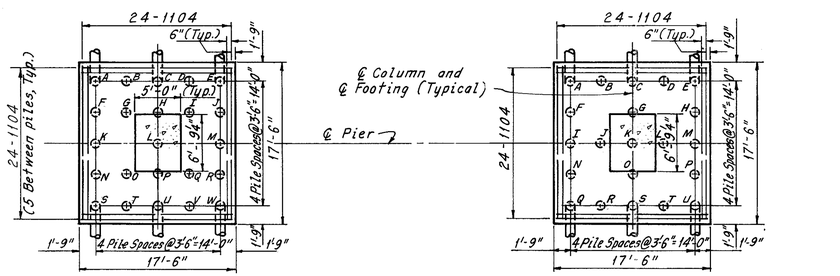
CUYAHOGA COUNTY
CUY-290-0.27



PLAN



ELEVATION

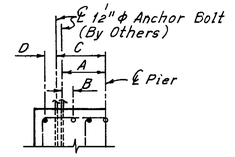


FOOTING PLAN

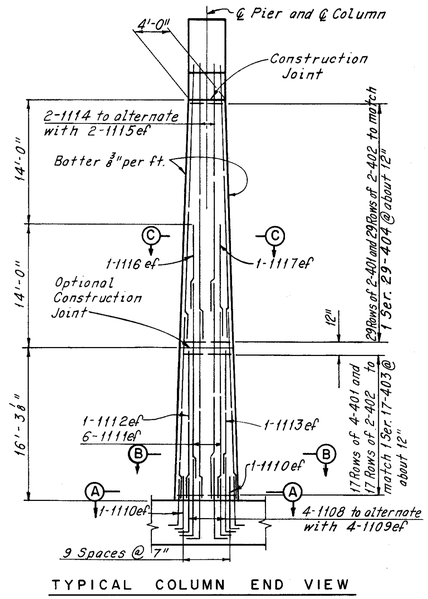
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
A	13⅞"	3⅛"	14⅝"	4¼"
B	14⅛"	3⅜"	14⅜"	4½"
C thru G	14¼"	3½"	14¼"	4⅜"

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

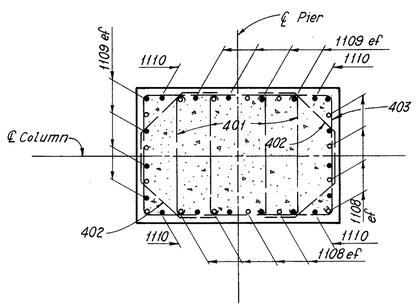
Note: All reinforcing bar marks shall be prefixed PHL.



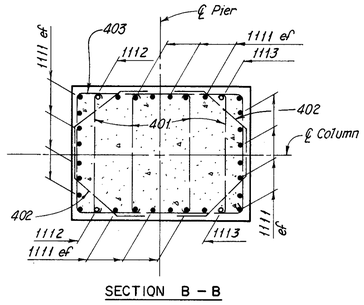
ANCHOR BOLT SETTING



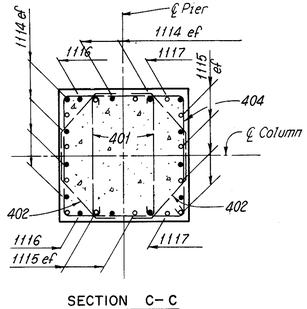
TYPICAL COLUMN END VIEW



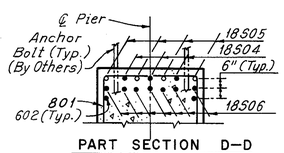
SECTION A-A



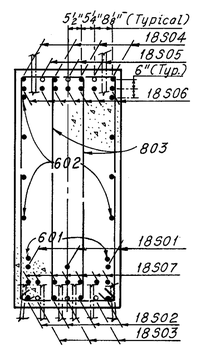
SECTION B-B



SECTION C-C



PART SECTION D-D



SECTION E-E

Note:
For Notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 5L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

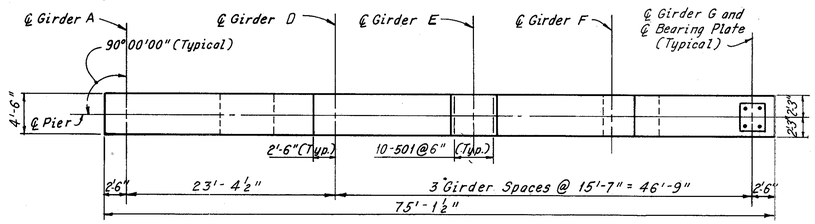
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN J.D.S.	TRACED C.P.	CHECKED J.W.	REVIEWED K.A.B.	REVISED
DATE 3-18-70	DATE 4-7-70	DATE 4-10-70	DATE 10-18-85	SHEET 34/80

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

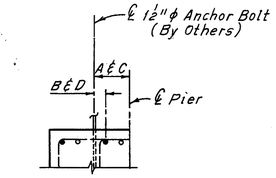
108
174

CUYAHOGA COUNTY
CUY-290-0.27



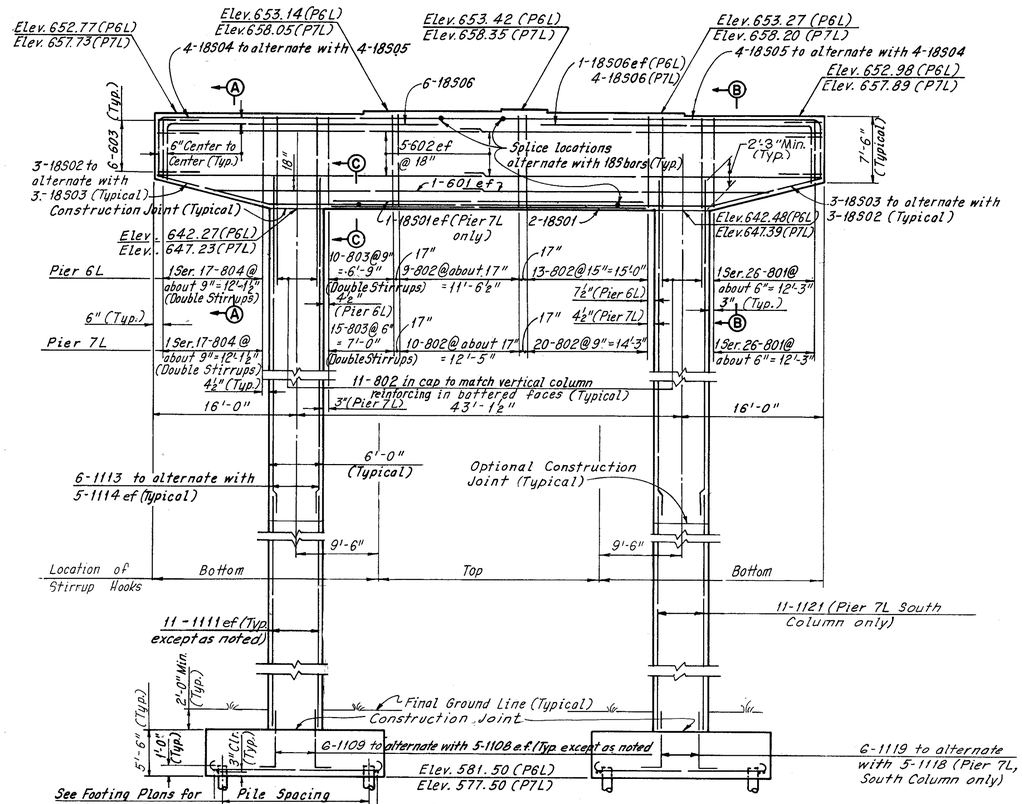
PLAN (PIER 6L AND 7L)

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 6L				
A℄D	11"	3"	11"	3"
E thru G	10"	2"	10"	2"
PIER 7L				
A, E, F℄G	11"	3"	11"	3"
D	12"	4"	12"	4"

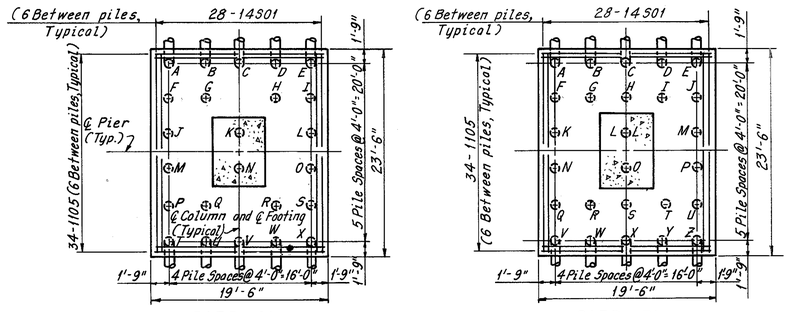


ANCHOR BOLT SETTING

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



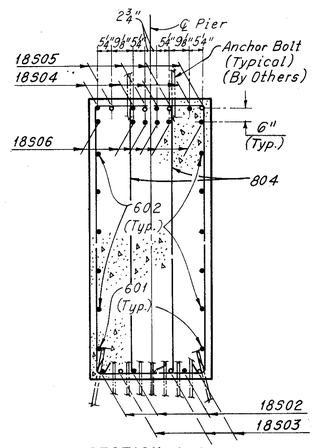
ELEVATION



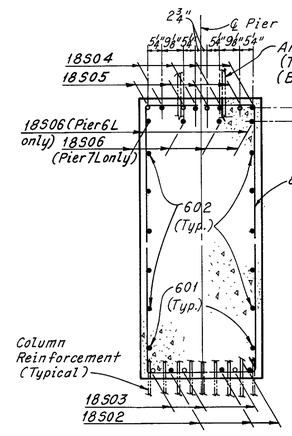
PIER 6L (Typical, both footings)

PIER 7L (Typical, both footings)

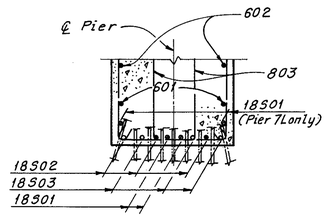
FOOTING PLANS



SECTION A-A



SECTION B-B



PART SECTION C-C

Note:

All reinforcing bar marks shall be prefixed as follows except as noted:

P6L = PJL
P7L = PKL

Reinforcing bar marks 405 thru 407 and 1118 thru 1122 at Pier 7L shall be prefixed EPKL.

Notes:
The following abbreviations are used:
P6L = Pier 6L
P7L = Pier 7L
ef = each face
For additional notes see Sheet 28/80
For Sections thru columns see Sheet 36/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 6L AND 7L FOOTINGS AND CAPS

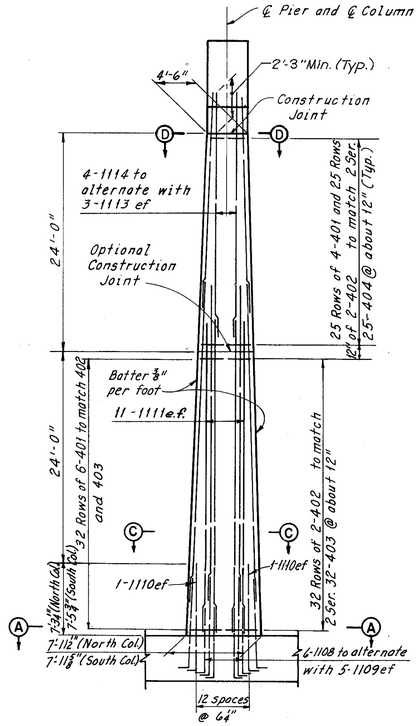
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

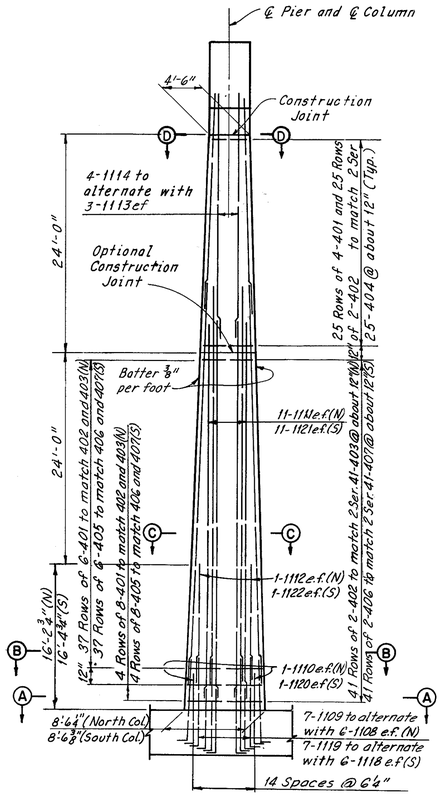
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN J.D.S.	TRACED C.P.	CHECKED J.M.	REVIEWED C.A.B.	REVISED
DATE 3-16-70	DATE 4-2-70	DATE 5-5-70	DATE 10-18-85	SHEET 35/80

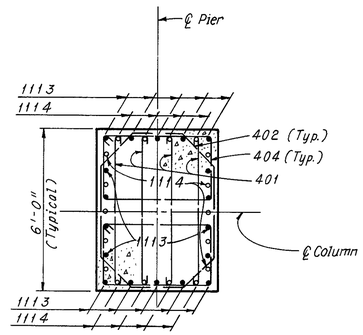
CUYAHOGA COUNTY
CUY-290-0.27



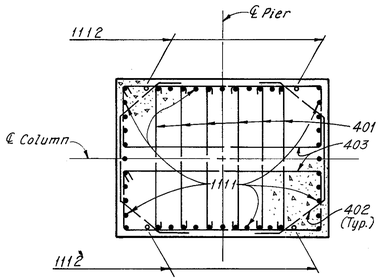
TYPICAL COLUMN END VIEW
PIER 6L



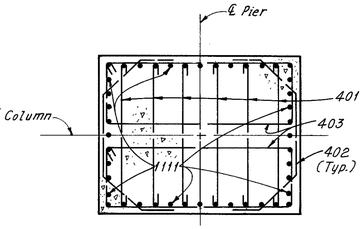
TYPICAL COLUMN END VIEW
PIER 7L



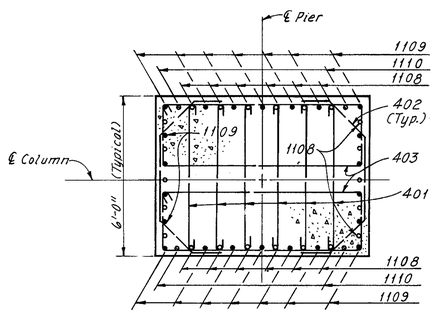
SECTION D-D



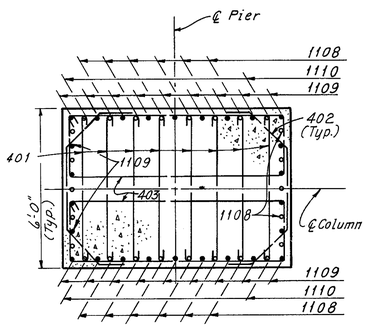
SECTION B-B
(PIER 7L ONLY)
(North Column Shown South Column Similar)



SECTION C-C
(Pier 6L and 7L, North Column Shown, Pier 7L South Column Similar)



SECTION A-A (PIER 6L)



SECTION A-A (PIER 7L)
(North Column Shown South Column Similar)

Note:

All reinforcing bar marks shall be prefixed as follows except as noted:

P6L = PJL
P7L = PKL

Reinforcing bar marks 405 thru 407 and 1118 thru 1122 at Pier 7L shall be prefixed EPKL.

Notes:

The following abbreviations are used:

P6L = Pier 6L
P7L = Pier 7L
N = North Column
S = South Column
e.f. = Each Face

For additional notes see Sheets 28 / 80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 6L AND 7L COLUMNS

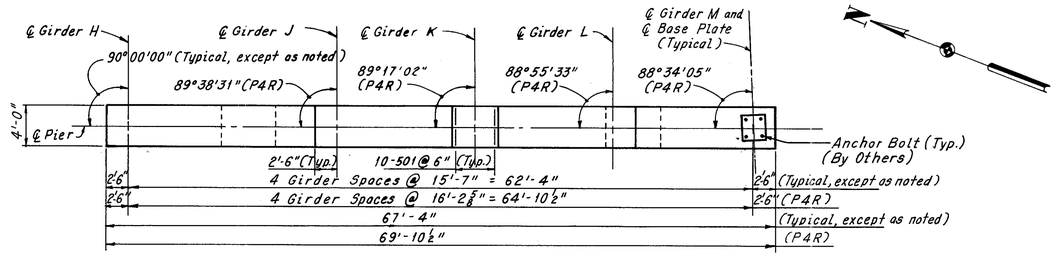
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN J.D.S.	TRACED C.P.	CHECKED J.J.W.	REVIEWED C.A.B.	REVISED
DATE 3-16-70	DATE 4-2-70	DATE 5-5-70	DATE 10-18-85	SHEET 36/80

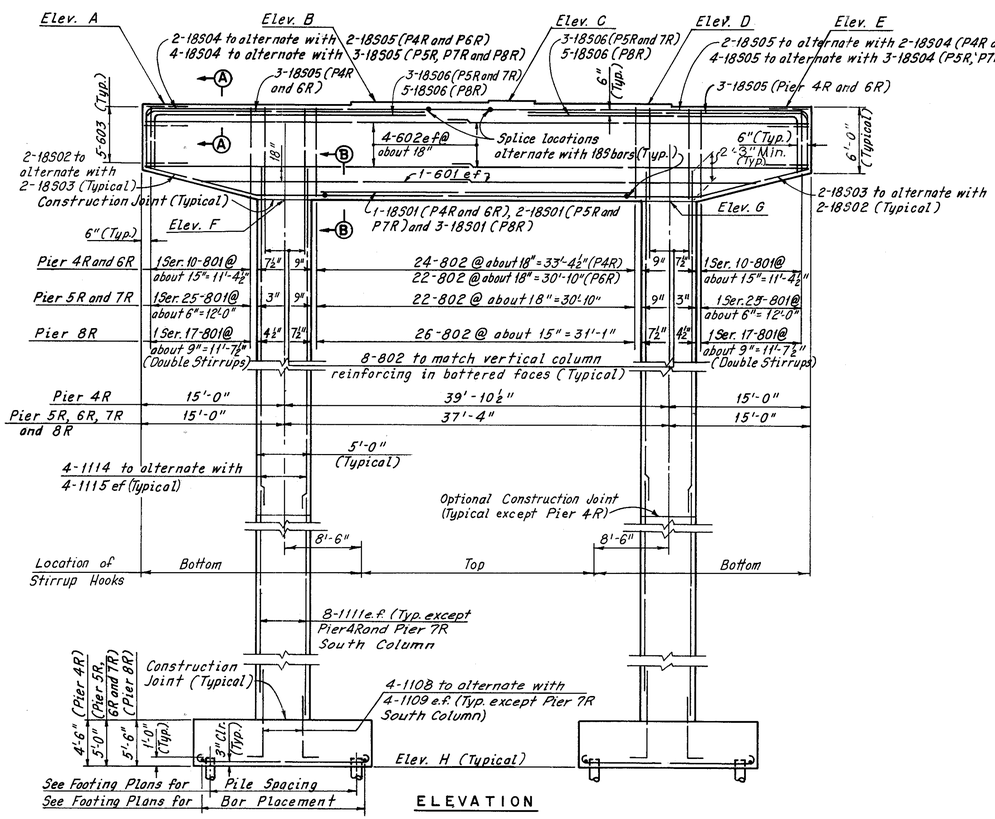
FED RD DIVISION	STATE	PROJECT	
2	OHIO		

110 / 174

CUYAHOGA COUNTY
CUY-290-0.27

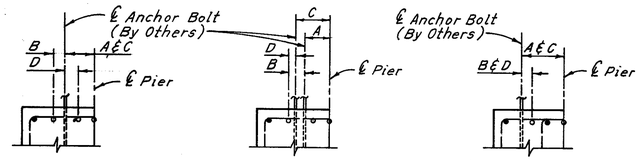


PLAN



ELEVATION

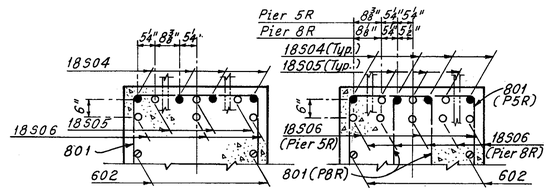
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 4R				
H	11"	2 5/8"	11"	2 5/8"
J ℄ K	10 3/8"	2 3/4"	11 1/8"	2 1/2"
L ℄ M	10 1/4"	2 5/8"	11 1/4"	2 3/8"
PIER 5R				
H thru M	14 1/4"	3 3/4"	14 1/4"	3 3/4"
PIER 6R				
H ℄ M	10"	3 5/8"	10"	4 3/4"
J thru L	11"	2 5/8"	11"	5 3/4"
PIER 7R				
H ℄ M	11"	2 5/8"	11"	5 3/4"
J thru L	8"	5 3/8"	8"	2 3/4"
PIER 8R				
H thru L	14 1/4"	3 1/2"	14 1/4"	3 1/2"



ANCHOR BOLT SETTINGS

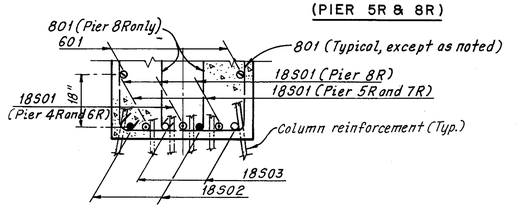
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

TABLE OF ELEVATIONS					
Elev.	Pier 4R	Pier 5R	Pier 6R	Pier 7R	Pier 8R
A	643.60	647.27	651.99	655.34	659.35
B	643.93	647.57	652.14	655.58	659.60
C	644.08	647.72	652.29	655.73	659.71
D	643.93	647.48	652.05	655.49	659.47
E	643.79	647.29	652.01	655.36	659.29
F	634.60	638.27	642.99	646.34	650.29
G	634.79	638.27	642.99	646.34	650.29
H	595.50	589.00	582.00	580.00	576.50

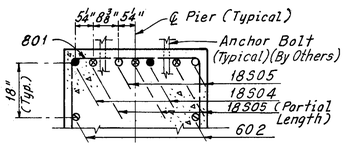


PART SECTION A-A (PIER 7R)

PART SECTION A-A (PIER 5R & 8R)



PART SECTION B-B
(PIER 4R, 5R, 6R, 7R & 8R)



PART SECTION A-A (PIER 4R & 6R)

Note:

All reinforcing bar marks shall be prefixed as follows except as noted:

Pier 4R = PGR
Pier 5R = PHR
Pier 6R = PJR
Pier 7R = PKR
Pier 8R = PL

Reinforcing bar marks 405 thru 407 and 1118 thru 1125 at Pier 7R shall be prefixed EPKR.

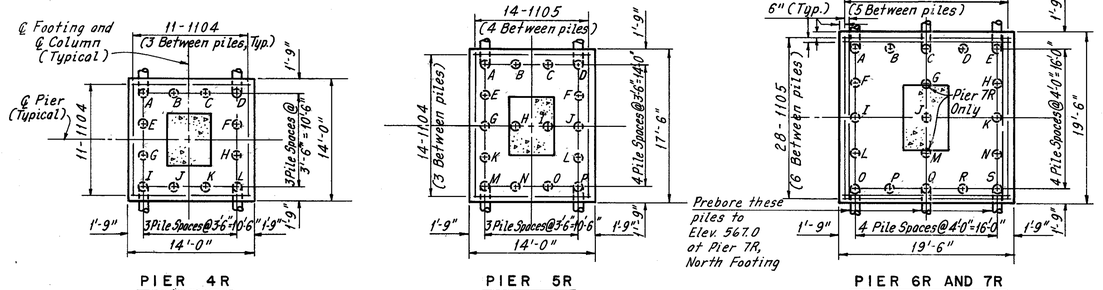
Notes:

For location of underground pipelines adjacent to Pier 8R, North Footing, see Sheet 5 / 80.

The following abbreviation is used:
P = Pier

For additional notes see Sheet 28 / 80.

For Sections thru columns see Sheet 38 / 80.



FOOTING PLANS

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 4R, 5R, 6R, 7R AND 8R

I-290 OVER CUYAHOGA RIVER

BR NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

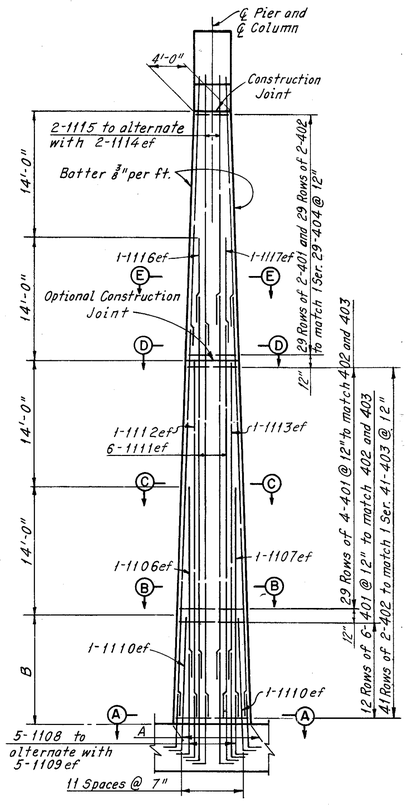
DRAWN J.D.S.	TRACED C.P.	CHECKED L.J.W.	REVIEWED C.A.B.	REVISED
DATE 3-14-70	DATE 3-26-70	DATE 4-1-70	DATE 10-18-85	SHEET 37/80

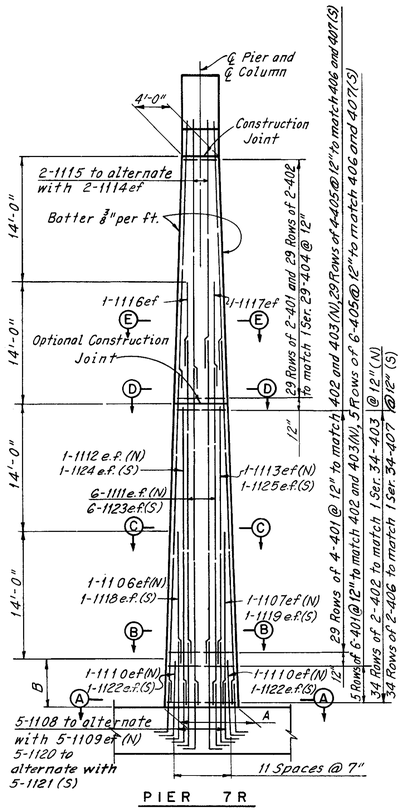
TABLE OF DIMENSIONS				
Pier	North Column		South Column	
	A	B	A	B
4R	6'-1⅛"	6'-7¼"	6'-2½"	6'-9½"
5R	6'-9¼"	2'-3¾"	6'-9¼"	2'-3¾"
6R	7'-6"	13'-11⅞"	7'-6"	13'-11⅞"
7R	7'-10"	5'-4⅛"	7'-10"	5'-4⅛"
8R	8'-3¼"	12'-3½"	8'-3¼"	12'-3½"

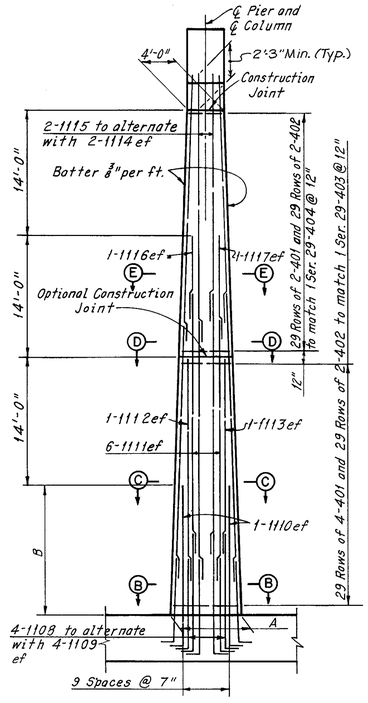
FED RD DIVISION	STATE	PROJECT	
2	OHIO		

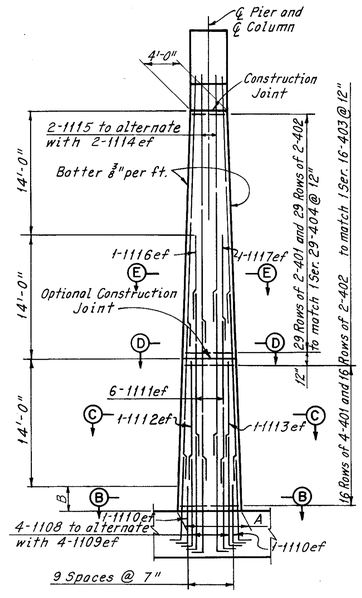
111
174

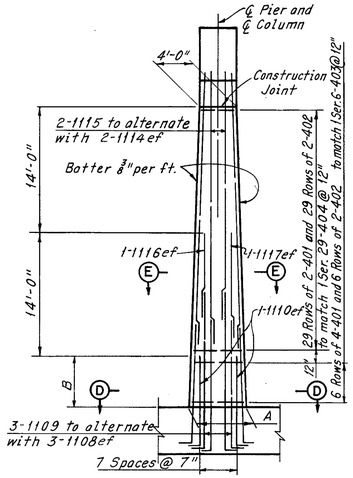
CUYAHOGA COUNTY
CUY-290-0.27



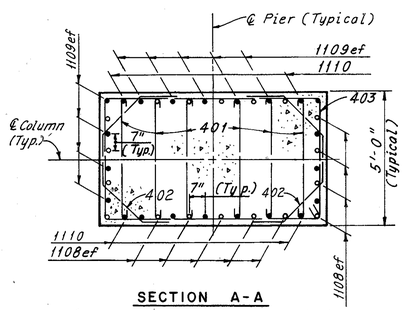




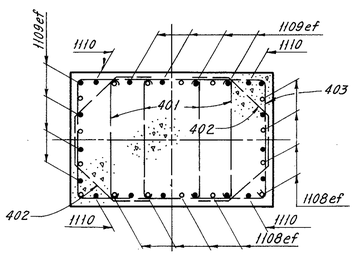




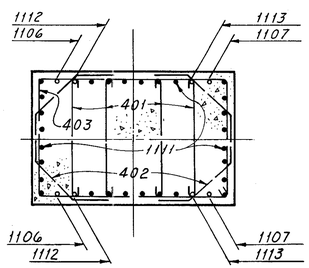
TYPICAL COLUMN END VIEWS



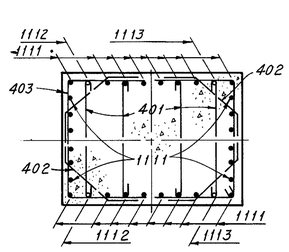
SECTION A-A
(Piers 7R North Column and 8R shown Pier 7R South Column similar)



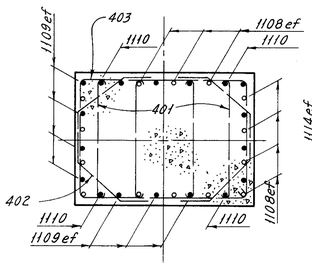
SECTION B-B
(Piers 5R and 6R)



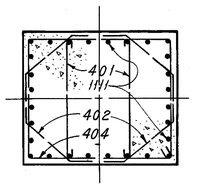
SECTION B-B
(Piers 7R North Column and 8R shown Pier 7R South Column similar)



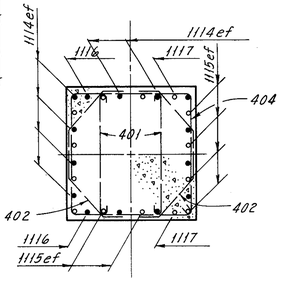
SECTION C-C
(Piers 5R, 6R, 7R North Column and 8R shown, Pier 7R South Column similar)



SECTION D-D
(Pier 4R)



SECTION D-D
(Piers 5R, 6R, 7R and 8R)



SECTION E-E
(Piers 4R, 5R, 6R, 7R and 8R)

Note:

All reinforcing bar marks shall be prefixed as follows except as noted:

Pier 4R = PGR
Pier 5R = PHR
Pier 6R = PJR
Pier 7R = PKR
Pier 8R = PL

Reinforcing bar marks 405 thru 407 and 1118 thru 1125 at Pier 7R shall be prefixed EPKR.

NOTES:

The following abbreviations are used:

N = North Column
S = South Column

For additional notes see Sheet 28 | 80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

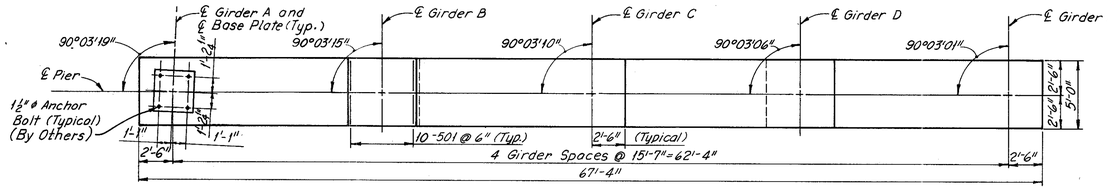
PIERS 4R, 5R, 6R, 7R AND 8R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

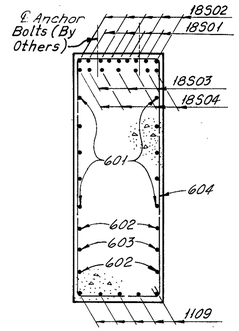
DRAWN J.D.S.	TRACED C.P.	CHECKED L.J.W.	REVIEWED C.A.B.	REVISED
DATE 3-16-70	DATE 3-26-70	DATE 4-1-70	DATE 10-18-85	SHEET 38/80



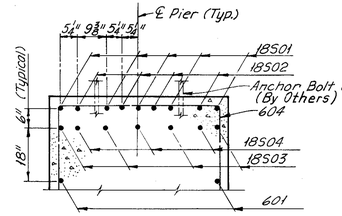
PLAN

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

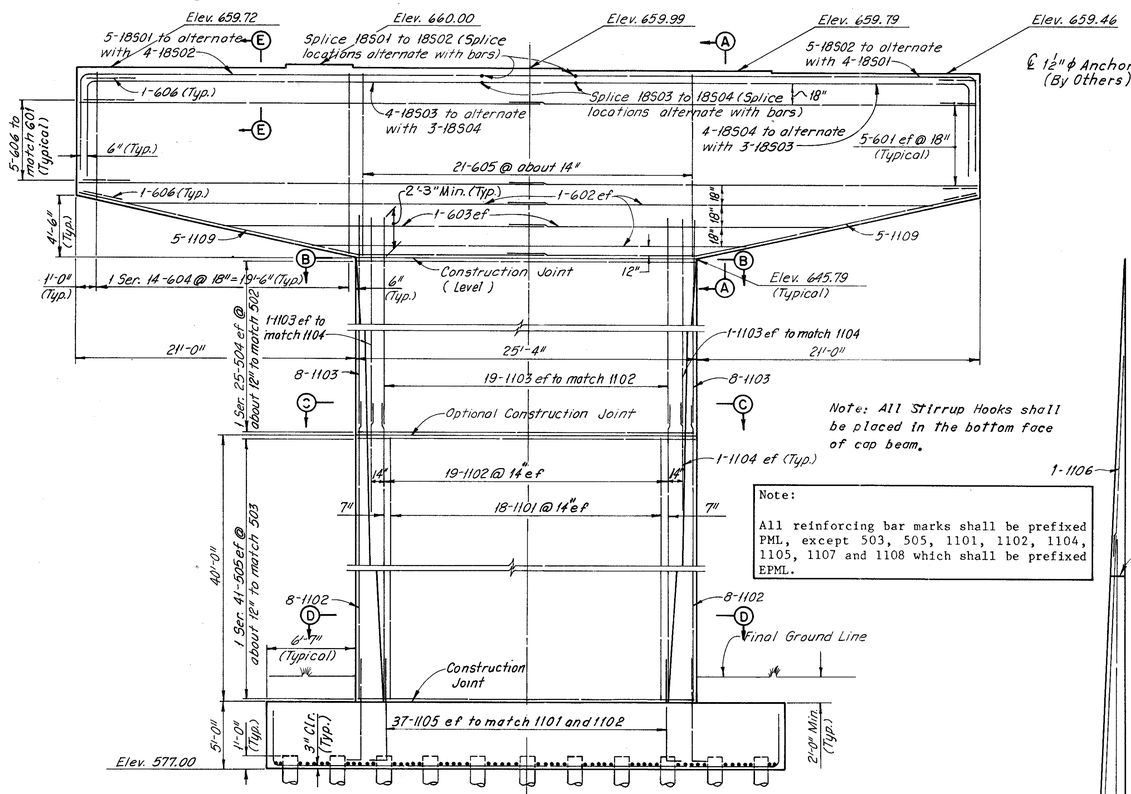
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
A thru E	14¼"	3⅜"	14¼"	3⅜"



SECTION A-A



PART SECTION E-E



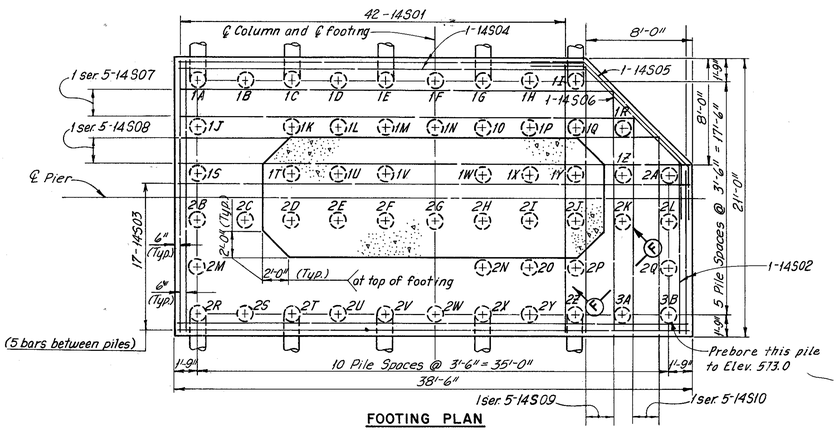
ELEVATION

Note: All Stirrup Hooks shall be placed in the bottom face of cap beam.

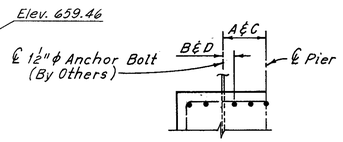
Note:

All reinforcing bar marks shall be prefixed PML, except 503, 505, 1101, 1102, 1104, 1105, 1107 and 1108 which shall be prefixed EPML.

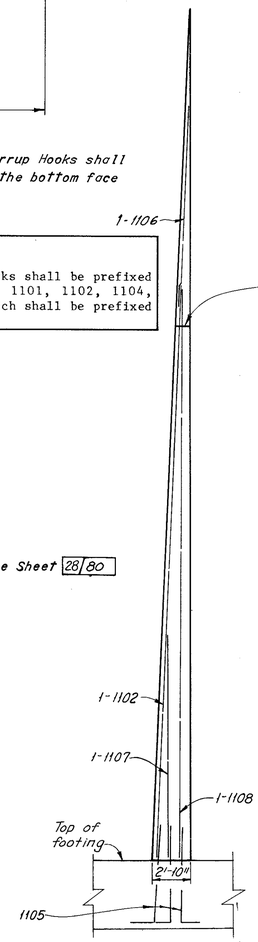
Note: For Notes see Sheet 28/80



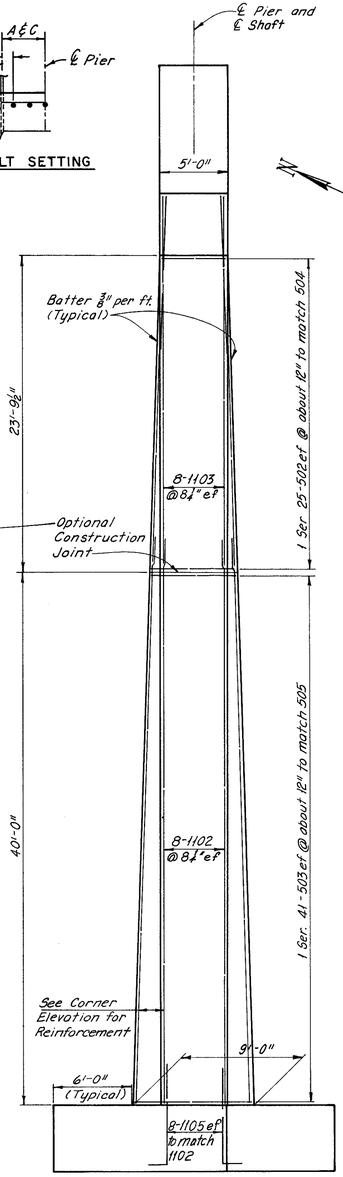
FOOTING PLAN



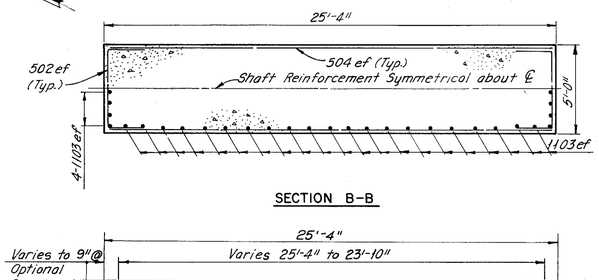
ANCHOR BOLT SETTING



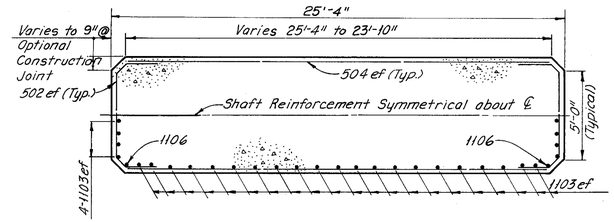
TYPICAL CORNER ELEVATION (VIEW F-F)



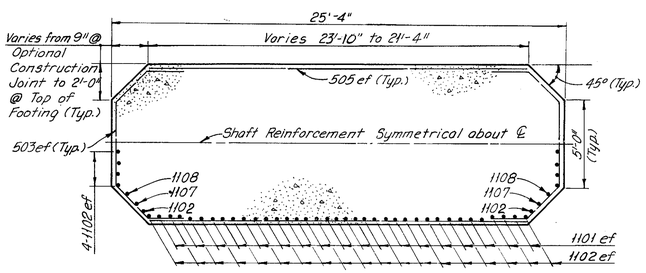
TYPICAL SHAFT END VIEW
(Piles not shown)



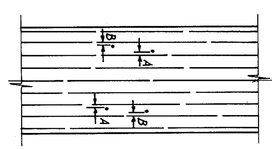
SECTION B-B



SECTION C-C



SECTION D-D



A = 1⅞"
B = 3¾"

PARTIAL PLAN
(Minimum clearance between cap beam reinforcement and anchor bolt)

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

112/174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 9L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

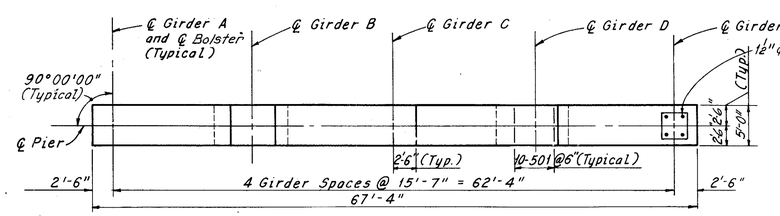
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

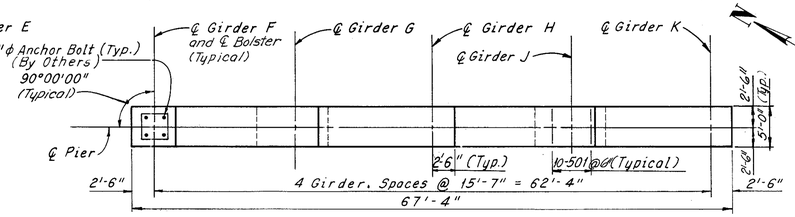
DRAWN DMP	TRACED WB	CHECKED WJH	REVIEWED C.A.B.	REVISED
DATE 4-7-70	DATE 4-14-70	DATE 4-17-70	DATE 10-18-85	SHEET 39/80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

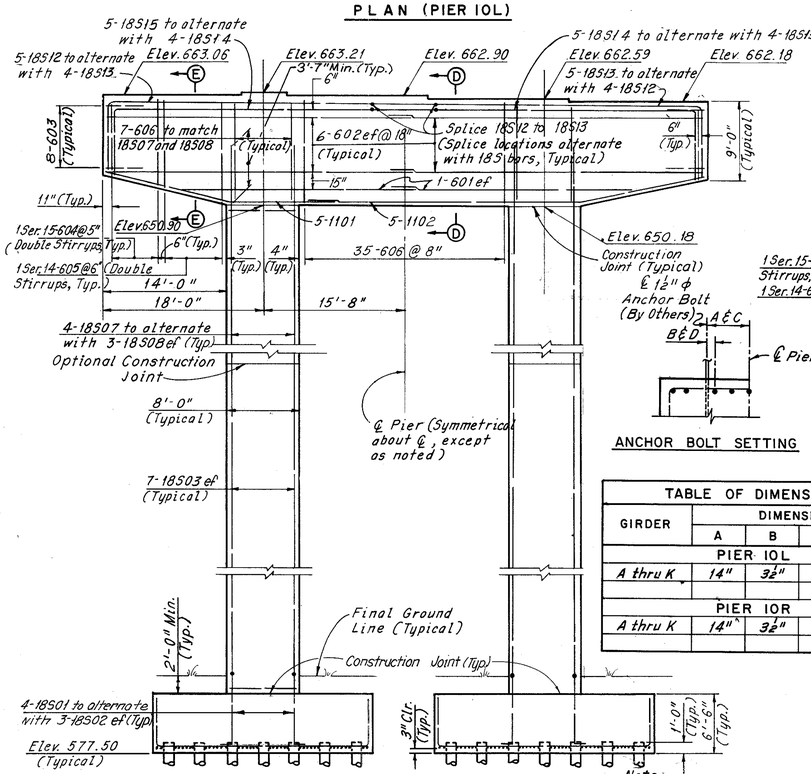
113
174

CUYAHOGA COUNTY
CUY-290-0.27





PLAN (PIER 10L)

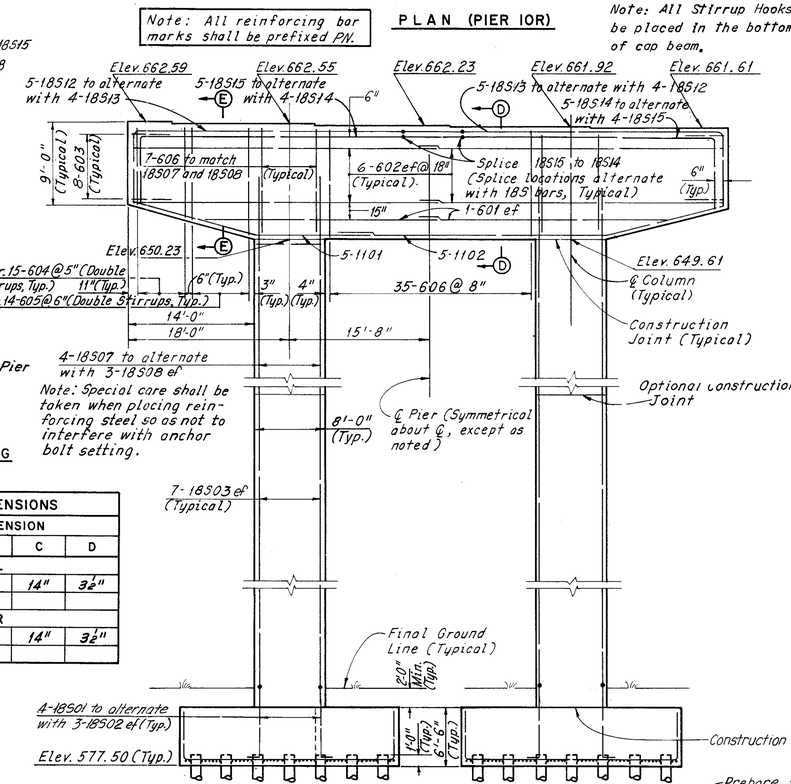


ELEVATION

ANCHOR BOLT SETTING

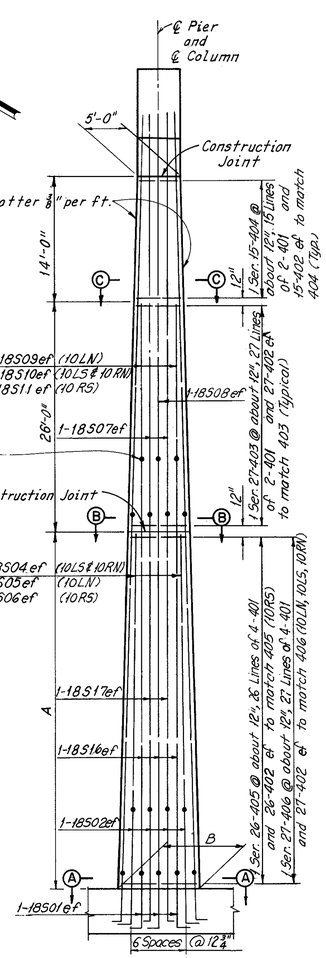
Note: All reinforcing bar marks shall be prefixed P/N.

PLAN (PIER 10R)

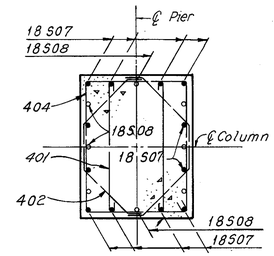


ELEVATION

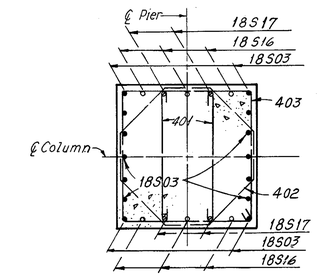
Note: All Stirrup Hooks shall be placed in the bottom face of cap beam.



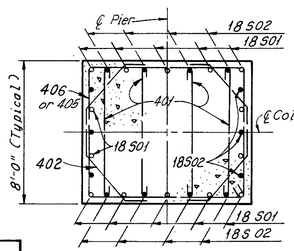
TYPICAL COLUMN END VIEW



SECTION C-C



SECTION B-B

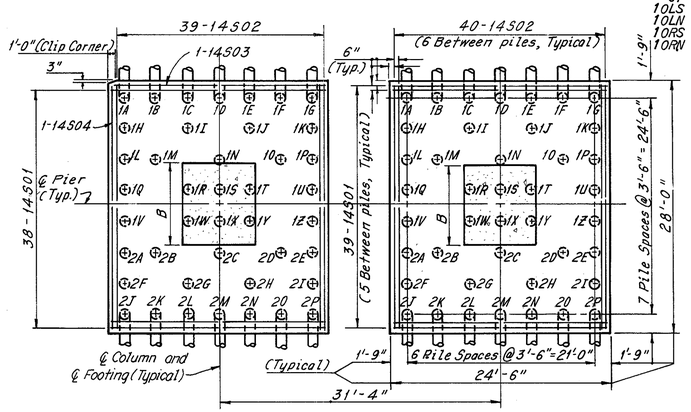


SECTION A-A

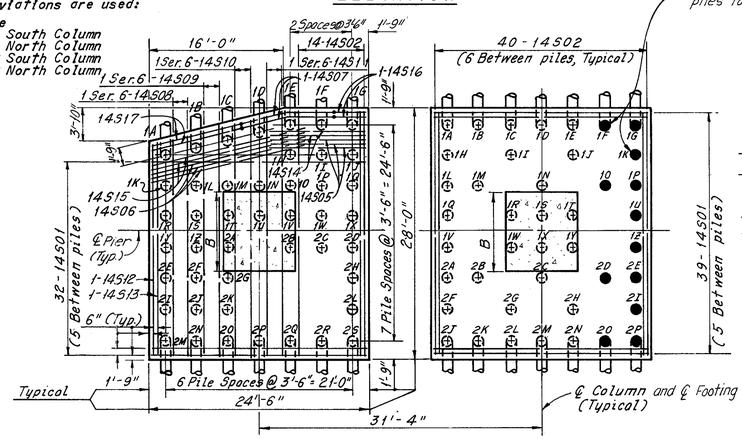
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 10L				
A thru K	14"	32½"	14"	32½"
PIER 10R				
A thru K	14"	32½"	14"	32½"

The following abbreviations are used:
ef = each face
10LS = Pier 10L South Column
10LN = Pier 10L North Column
10RS = Pier 10R South Column
10RN = Pier 10R North Column

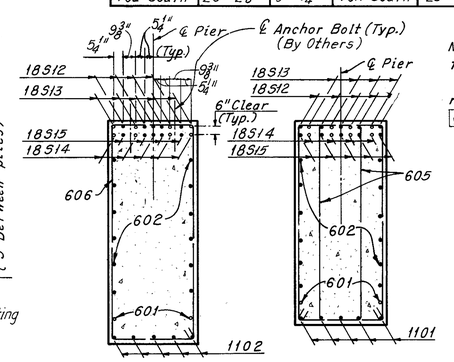
TABLE OF DIMENSIONS				
Column	A	B	Column	A	B
10L North	26'-10¾"	9'-2¼"	10R North	26'-2¾"	9'-1¾"
10L South	26'-2¾"	9'-1¾"	10R South	25'-7¾"	9'-1¼"



FOOTING PLAN



FOOTING PLAN



SECTION D-D SECTION E-E

Notes: For location of 90" Outfall Sewer adjacent to Pier 10 R South Footing, see Sheet 5/80
For location of Pier 10 L and R with respect to the River see Section D-D on Sheet 6/80.
For additional notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 10L AND 10R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

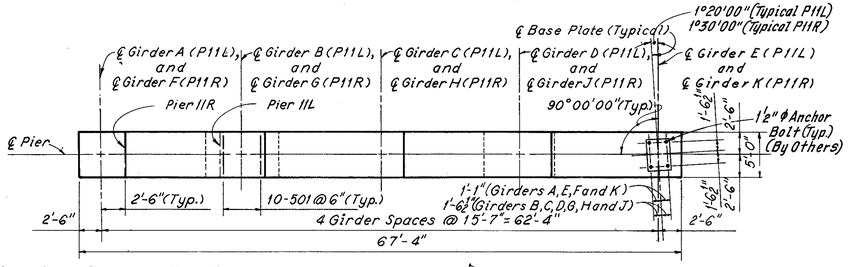
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN L.J.W.	TRACED C.P.	CHECKED DHS	REVIEWED C.A.B.	REVISED
DATE 4-6-70	DATE 4-13-70	DATE 4-17-70	DATE 10-18-88	SHEET 40/80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

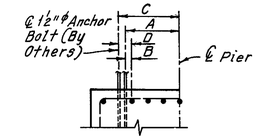
114
174

CUYAHOGA COUNTY
CUY-290-0.27



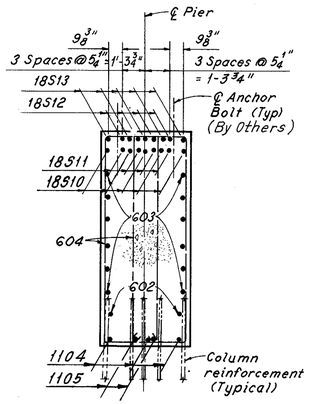
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

PLAN

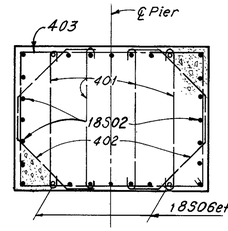


ANCHOR BOLT SETTING

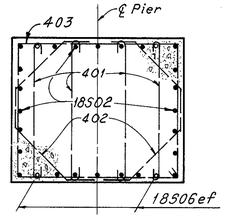
GIRDER	DIMENSION			
	A	B	C	D
PIER IIL				
A thru E	18 1/4"	2 1/2"	18 3/4"	3"
F thru K	18 5/8"	2 3/8"	18 1/2"	3"
PIER IIR				
A thru E	18 1/4"	2 1/2"	18 3/4"	3"
F thru K	18 5/8"	2 3/8"	18 1/2"	3"



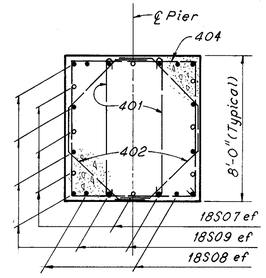
SECTION C-C



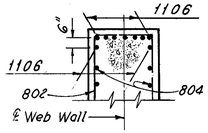
SECTION D-D



SECTION E-E

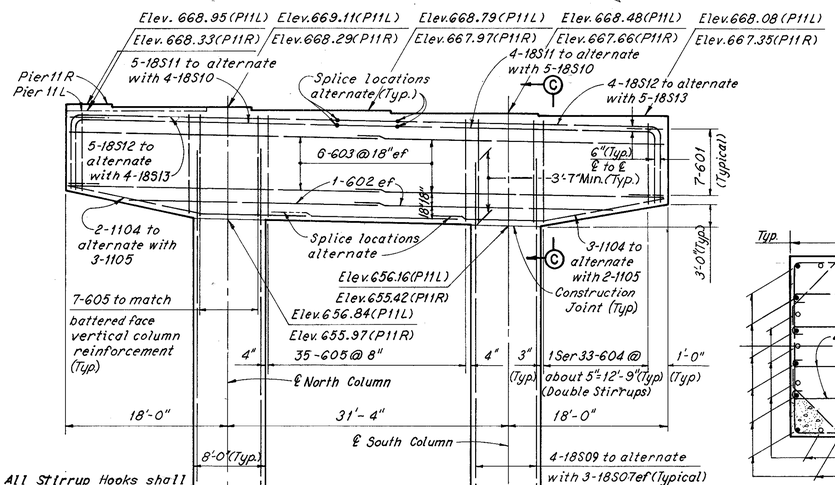


SECTION F-F



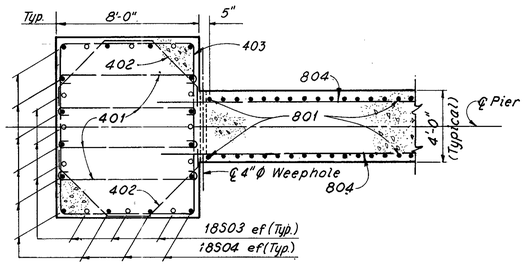
PART SECTION B-B

TABLE OF DIMENSIONS				
Pier	11L		11R	
Dimension	North Column	South Column	North Column	South Column
A	9'-9 3/4"	9'-9 1/4"	9'-9 1/8"	9'-8 5/8"
B	36'-10 1/8"	36'-1 7/8"	35'-11 5/8"	35'-5"

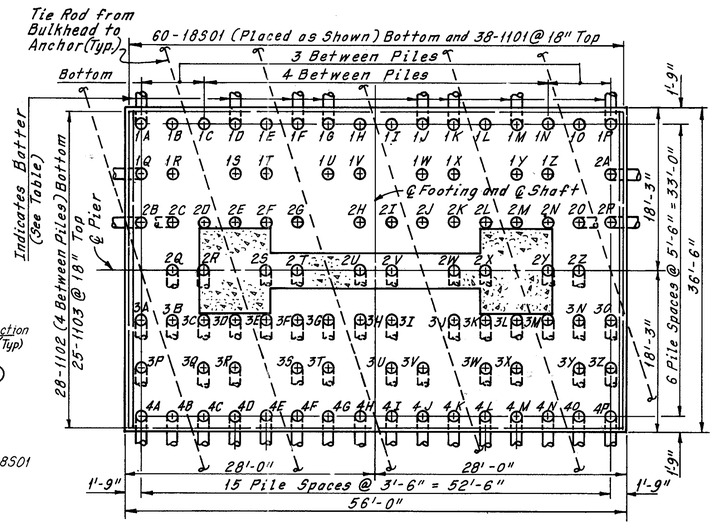


Note: All Stirrup Hooks shall be placed in the bottom face of cap beam.

ELEVATION

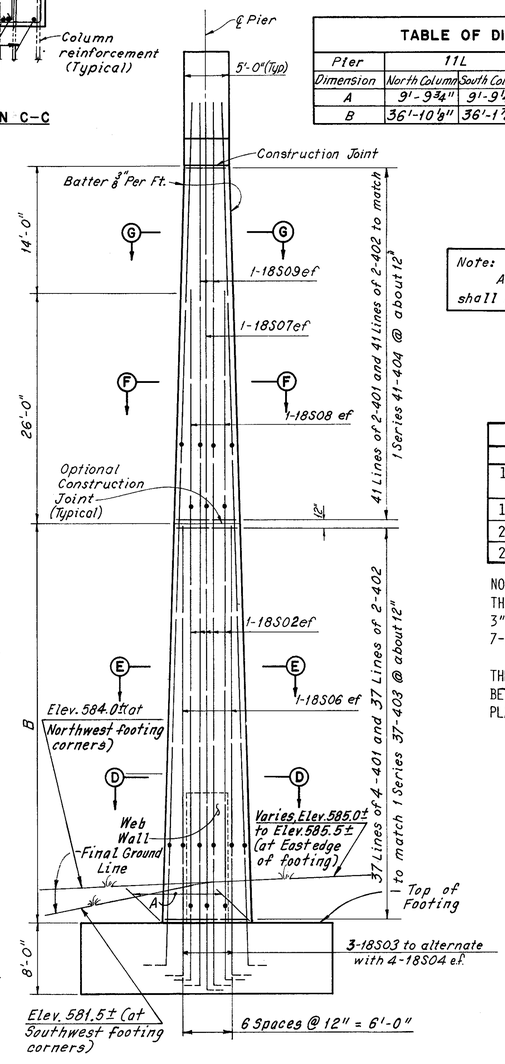


PART SECTION A-A



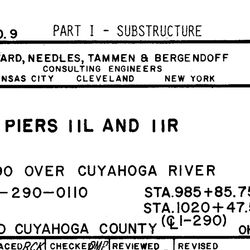
FOOTING PLAN

NOTE: PILES ARE BAITERED IN DIRECTION SHOWN



TYPICAL COLUMN END VIEW
(Piles and footing reinforcement not shown)

Note:
All reinforcing bar marks shall be preftxed PP.



SECTION G-G

TABLE OF PILE BATTERS	
BATTER	PILE NUMBERS
1 IN 12	1A, 1D, 1F, 1G, 1J, 1K, 1M, 1P, 2C, 2O, 2Q THRU 2Z, 3A THRU 3D, 3L THRU 3R, AND 3X THRU 3Z
1-1/2 IN 12	4A THRU 4D AND 4M THRU 4P
2 IN 12	1Q, 2A, 2B, 2P AND 3E THRU 3K
2-1/2 IN 12	3S THRU 3W AND 4E THRU 4L

NOTE:
THE CALCULATED MINIMUM CLEAR DISTANCE BETWEEN THE 3"ø TIE RODS AND THE 14"ø CAST IN PLACE PILE IS 7-1/2" AT PILE 2B.

THE PILES ADJACENT TO THE BULKHEAD TIE RODS SHALL BE ACCURATELY PLACED TO AVOID INTERFERENCE WITH THE PLACEMENT OF THE TIE RODS.

Notes:
The following abbreviations are used:
P11L = Pier 11 Left
P11R = Pier 11 Right
ef = each face

For Bulkhead Replacement at Pier II see sheets 68/80 Thru 70/80

For additional notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS IIL AND IIR

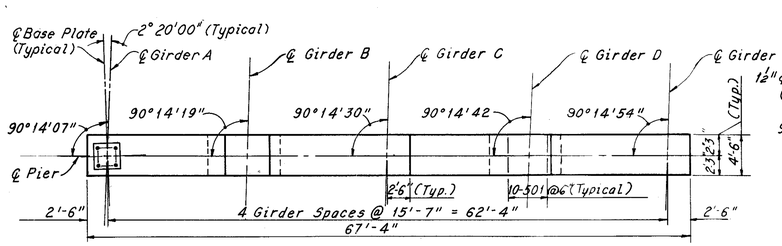
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN TJS	TRACED RCK	CHECKED DWP	REVIEWED	REVISED
DATE 6-29-70	DATE 7-7-70	DATE 7-17-70	DATE C.A.B. 10.18.89	SHEET 41/80

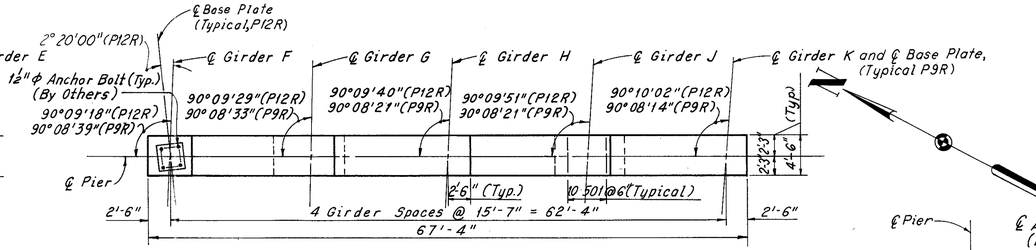
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

115
174

CUYAHOGA COUNTY
CUY-290-0.27

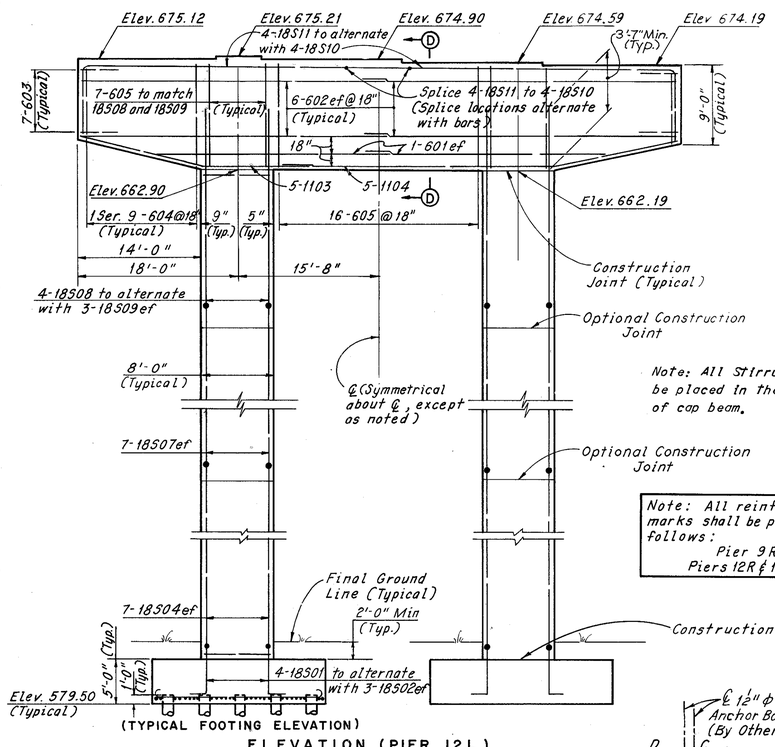


PLAN (PIER 12L)



PLAN (PIERS 9R AND 12R)

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

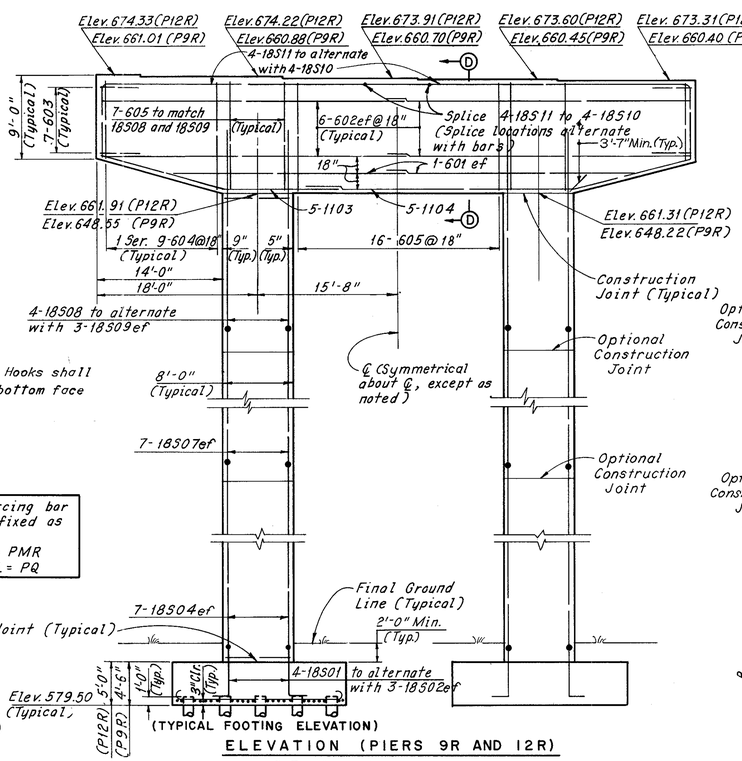


(TYPICAL FOOTING ELEVATION)

ELEVATION (PIER 12L)

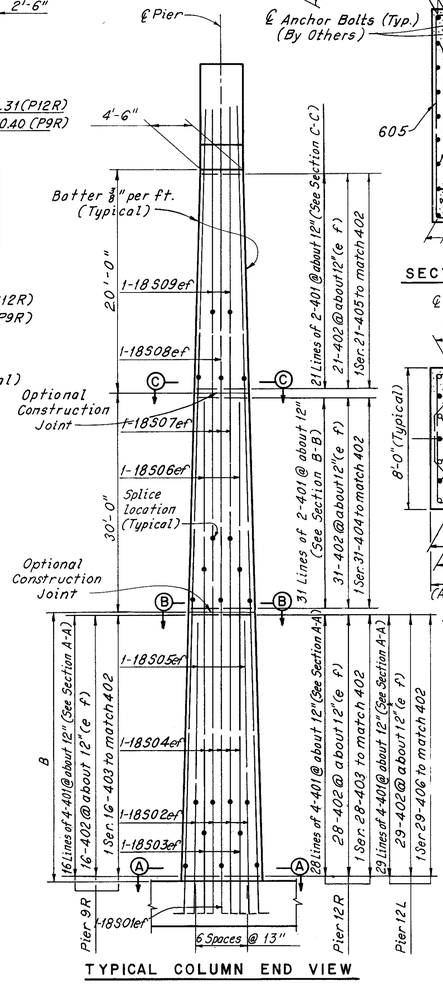
Note: All Stirrup Hooks shall be placed in the bottom face of cap beam.

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 9R = PMR
Piers 12R & 12L = PQ

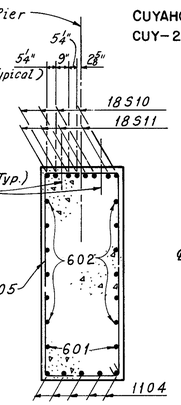


(TYPICAL FOOTING ELEVATION)

ELEVATION (PIERS 9R AND 12R)

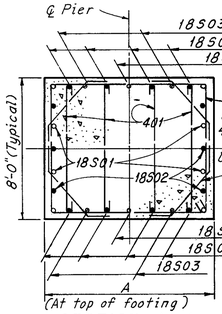


TYPICAL COLUMN END VIEW

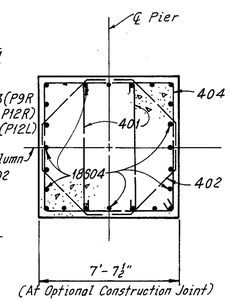


SECTION D-D

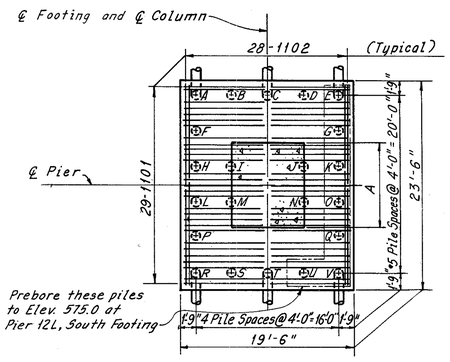
SECTION C-C



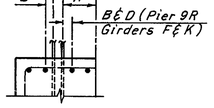
SECTION A-A



SECTION B-B

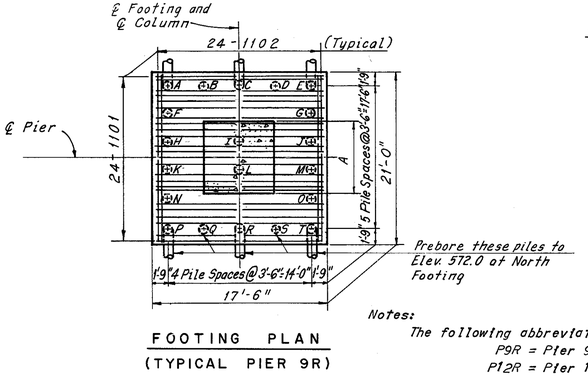


FOOTING PLAN
(TYPICAL PIERS 12L AND 12R)



ANCHOR BOLT SETTING

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 9R				
F & K	11"	3⅜"	11"	3⅜"
G thru J	14¼"	2⅝"	14¼"	2⅝"
PIER 12L				
A thru K	13¾"	3⅜"	14⅞"	2⅛"
PIER 12R				
A thru K	13¾"	3⅜"	14⅞"	2⅛"



FOOTING PLAN
(TYPICAL PIER 9R)

Notes:
The following abbreviations are used:
P9R = Pier 9R
P12R = Pier 12R
P12L = Pier 12L
ef = each face

For additional notes see Sheet 28/80

COLUMN DIMENSIONS			
Pier	Column	B	A
9R	North	14'-6⅝"	8'-6½"
9R	South	14'-2⅝"	8'-6¼"
12R	North	27'-4⅞"	9'-4"
12R	South	26'-9¾"	9'-3⅜"
12L	North	28'-4⅜"	9'-4⅜"
12L	South	27'-8¼"	9'-4¼"

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 9R, 12R AND 12L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
J.D.S	C.P.	D.H.B	C.H.B	
DATE 3-3-70	DATE 3-18-70	DATE 4-28-70	DATE 10/18/95	SHEET 42/80

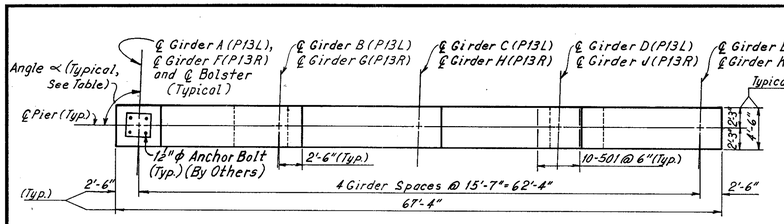
FED.RD DIVISION	STATE	PROJECT	
2	OHIO		

116
174

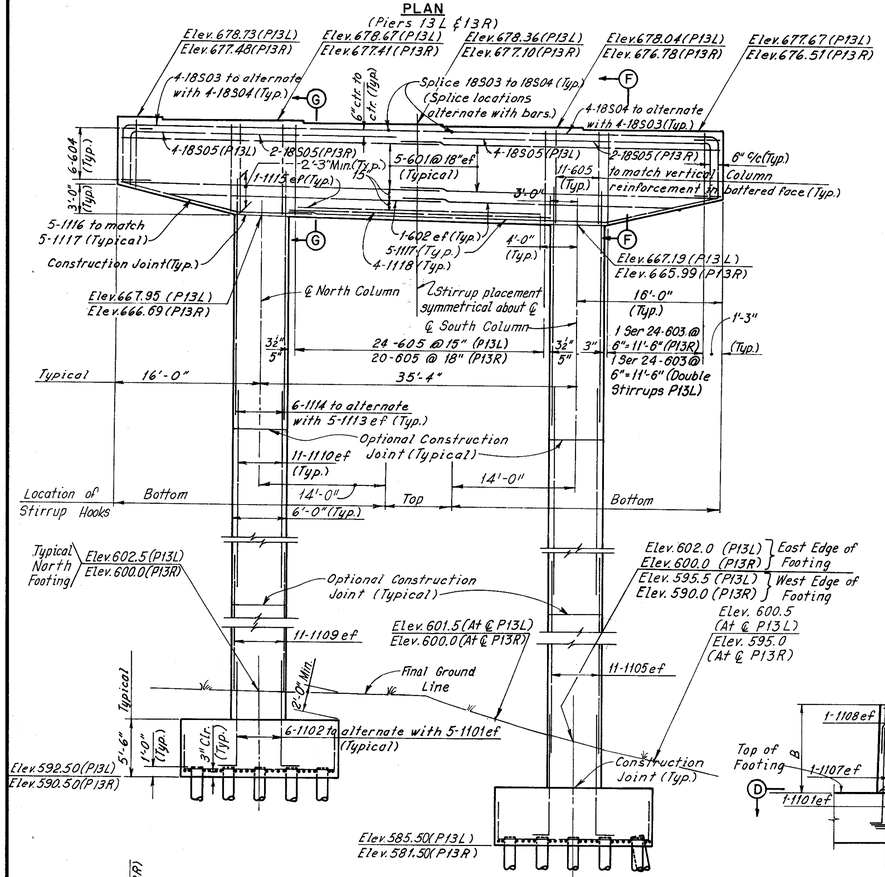
CUYAHOGA COUNTY
CUY-290-0.27

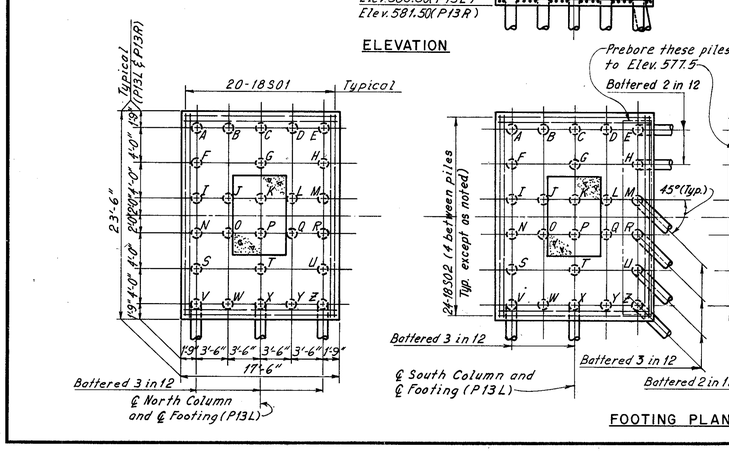
GIRDERS	ANGLE ∝
A thru E (P13L)	91°36'29"
F thru K (P13R)	91°17'20"

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 13L				
A & E	9 5/8"	2"	10 3/8"	2 3/8"
B thru D	10 5/8"	3"	11 3/8"	3 3/8"
PIER 13R				
F thru K	9 3/8"	2 1/8"	10 1/4"	2 5/8"

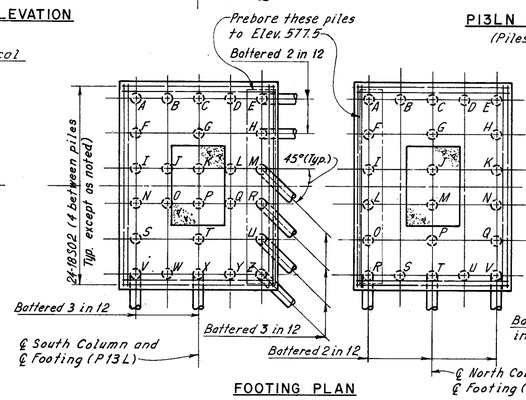


PLAN
(Piers 13L & 13R)



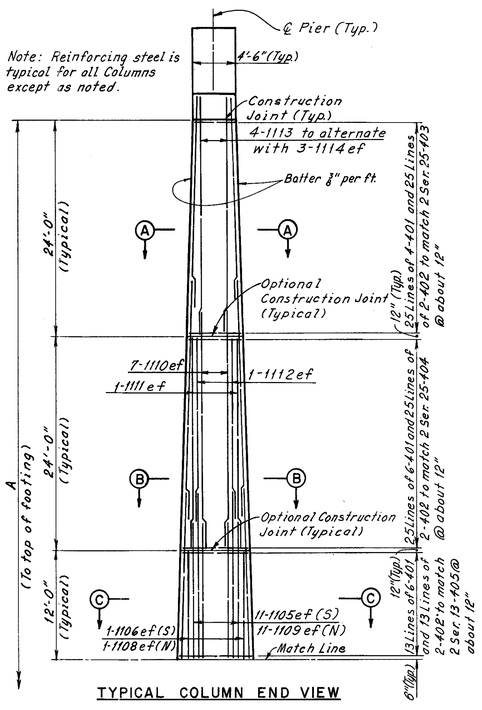


ELEVATION

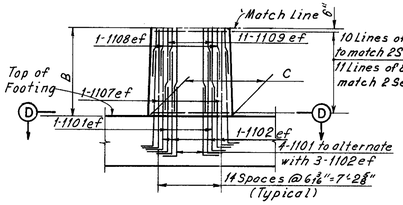


FOOTING PLAN

Note: Reinforcing steel is typical for all Columns except as noted.

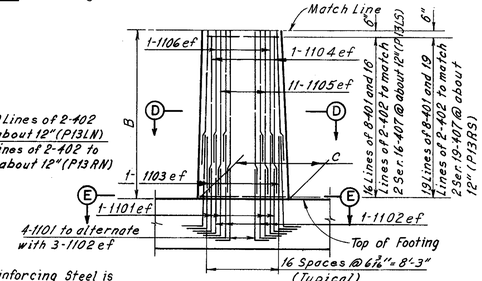


TYPICAL COLUMN END VIEW



P13LN AND P13RN
(Piles not shown)

Note: Reinforcing steel is typical for both Columns except as noted.



P13LS AND P13RS
(Piles not shown)

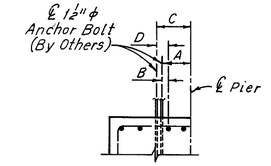
FOOTING DOWEL DETAILS

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 13L = P1L
Pier 13R = P1R

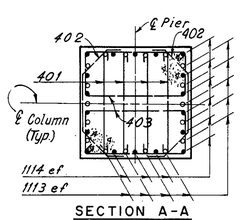
TABLE OF DIMENSIONS						
PIER	NORTH COLUMN			SOUTH COLUMN		
	A	B	C	A	B	C
13L	69'-11 3/8"	9'-11 3/8"	8'-10 1/2"	76'-2 1/4"	16'-2 1/4"	9'-3 1/4"
13R	70'-8 1/4"	10'-8 1/4"	8'-11"	78'-11 7/8"	18'-11 7/8"	9'-5 1/4"

Note: All battered piles shall be inclined as indicated in the Footing Plan.

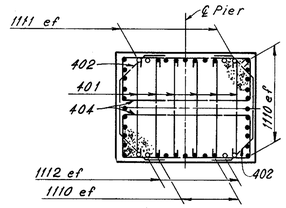
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



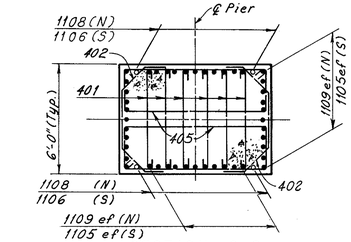
ANCHOR BOLT SETTING



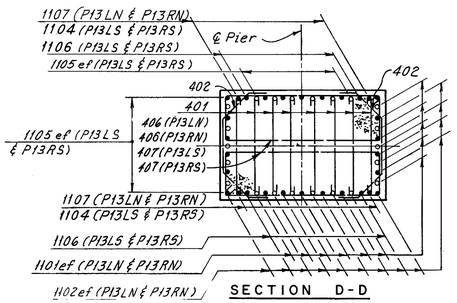
SECTION A-A



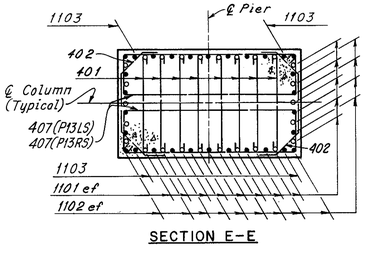
SECTION B-B



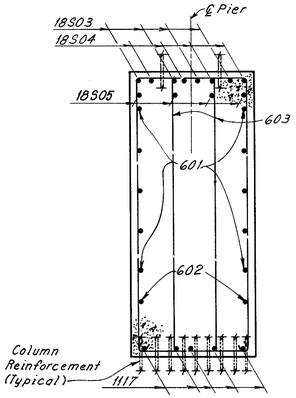
SECTION C-C



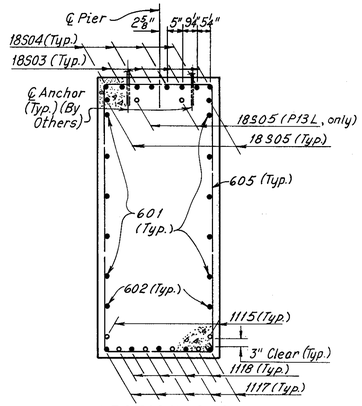
SECTION D-D



SECTION E-E



SECTION F-F
(Section at P13L Shown)



SECTION G-G

Notes:
The following abbreviations are used:
P13LN = Pier 13L North Column
P13RN = Pier 13R North Column
P13LS = Pier 13L South Column
P13RS = Pier 13R South Column
S = South Columns
N = North Columns
P13R = Pier 13R
P13L = Pier 13L
ef = each face

For additional notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 13L & 13R

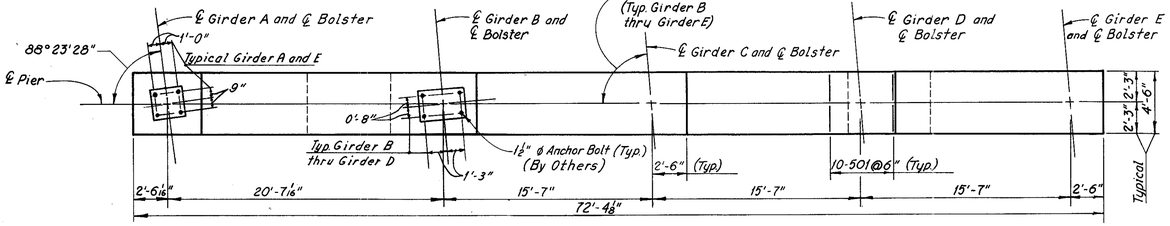
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN D.M.P	TRACED J.S.C.	CHECKED A.Y.H.	REVIEWED C.A.B.	REVISED
DATE 6-29-70	DATE 7-10-70	DATE 7-15-70	DATE 10-18-85	SHEET 43/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

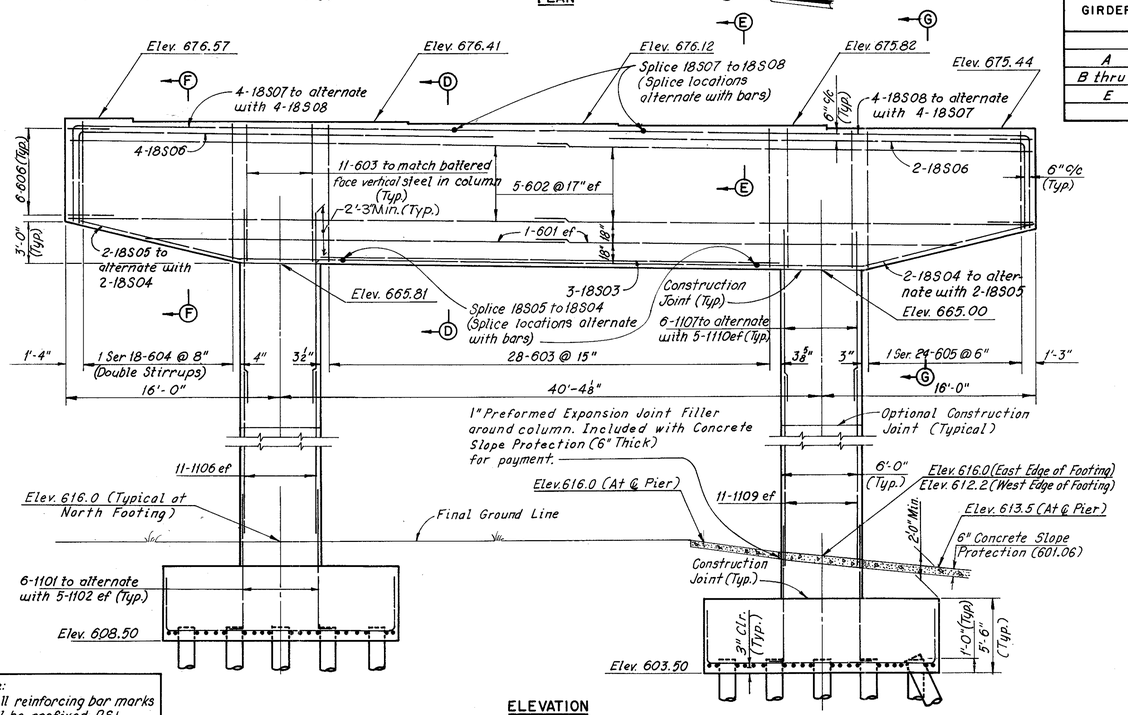
117
174

CUYAHOGA COUNTY
CUY-290-0.27



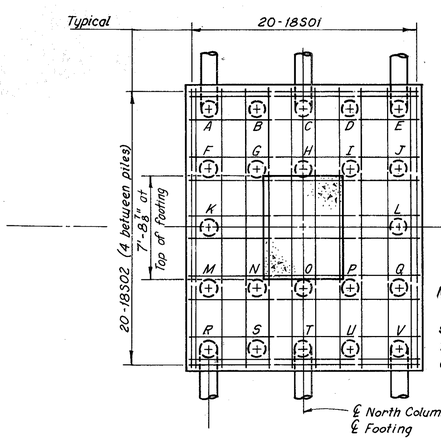
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

PLAN

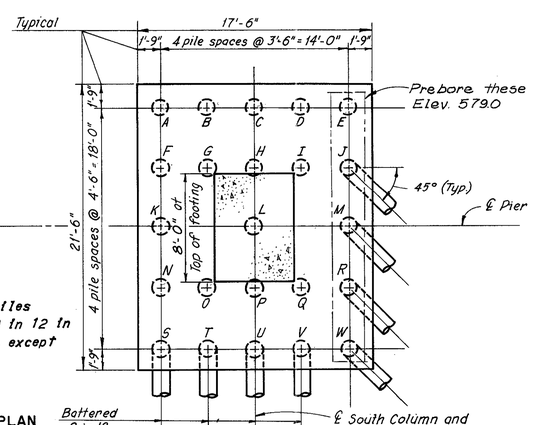


ELEVATION

Note: All reinforcing bar marks shall be prefixed PSL

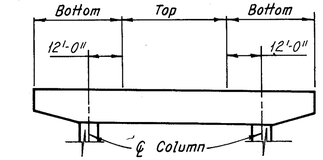


Note: All battered piles shall be inclined 3 in 12 in the direction shown except as noted.

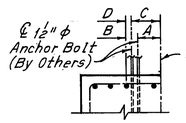


FOOTING PLAN

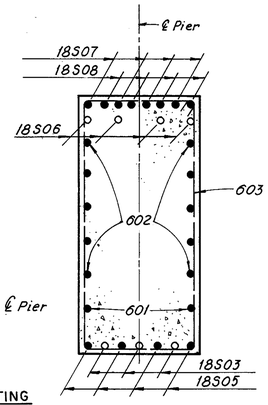
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 14L				
A	8 5/8"	3"	9 3/8"	2 1/4"
B thru D	7 5/8"	4"	8 3/8"	3 1/4"
E	8 5/8"	3"	9 1/4"	2 3/8"



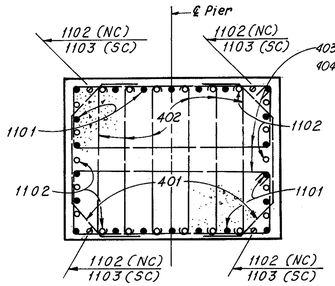
STIRRUP HOOKS LOCATION



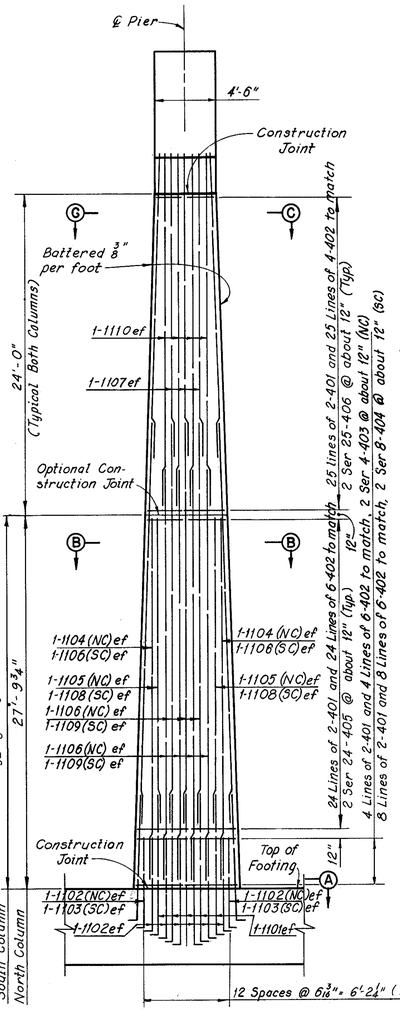
ANCHOR BOLT SETTING



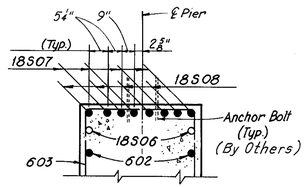
SECTION D-D



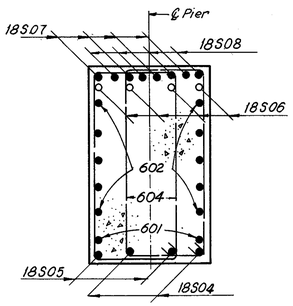
SECTION A-A



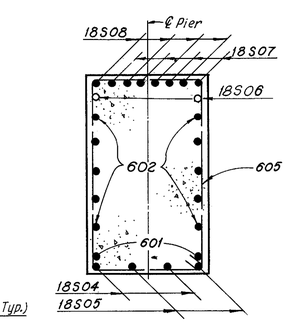
TYPICAL COLUMN END VIEW
(Piles not Shown)



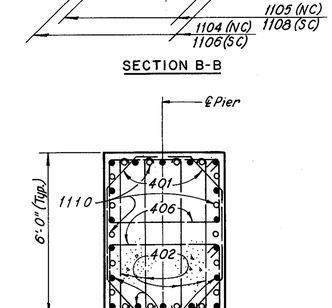
SECTION E-E



SECTION F-F



SECTION G-G



SECTION B-B

SECTION C-C

Notes:
The following abbreviations are used:
NC = North Column
SC = South Column
ef = each face

For additional notes see Sheet 28/30

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 14L

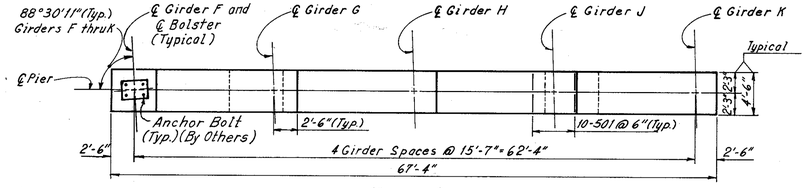
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

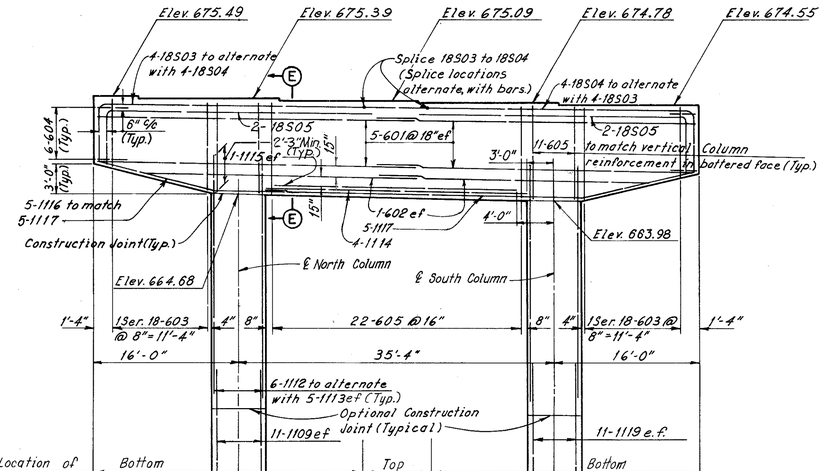
CLEVELAND CUYAHOGA COUNTY OHIO

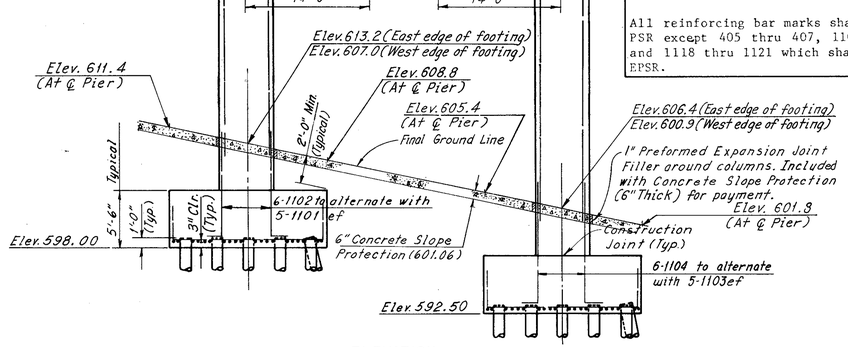
DRAWN DHS	TRACED B.M.P.	CHECKED DWA	REVIEWED	REVISED
DATE 6-28-70	DATE 7-2-70	DATE 7-7-70	DATE C.A.B. 10-18-85	SHEET 44/30

CUYAHOGA COUNTY
CUY-290-0.27

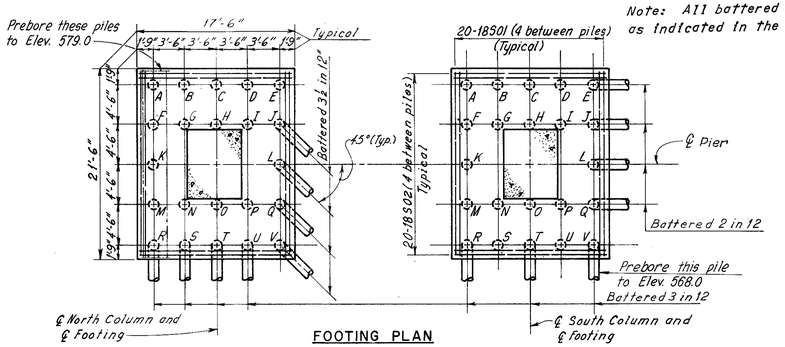


PLAN





ELEVATION



FOOTING PLAN

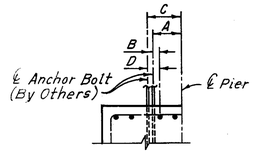
Note: All battered piles shall be inclined as indicated in the Footing Plan.

Note:

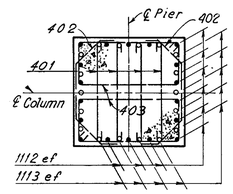
All reinforcing bar marks shall be prefixed PSR except 405 thru 407, 1103, 1104, 1106 and 1118 thru 1121 which shall be prefixed EPSR.

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 14R				
F	10 5/8"	3"	11 3/8"	3 3/4"
G thru J	9 5/8"	2"	10 3/4"	2 5/8"
K	10 3/8"	3"	11 3/8"	3 3/4"

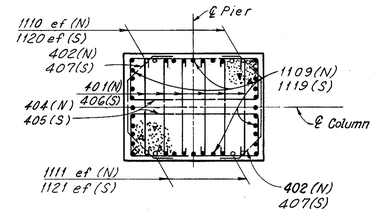
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



ANCHOR BOLT SETTING

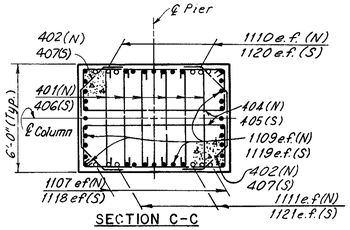


SECTION A-A

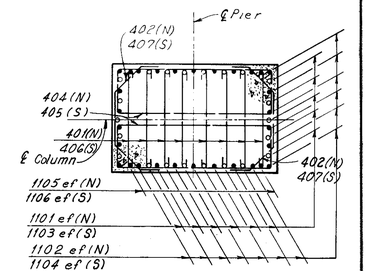


SECTION B-B

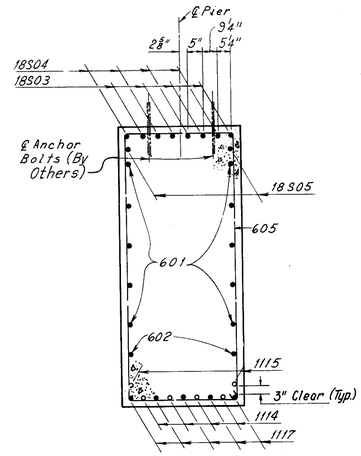
Note Reinforcing Steel is typical for both Columns except as noted.



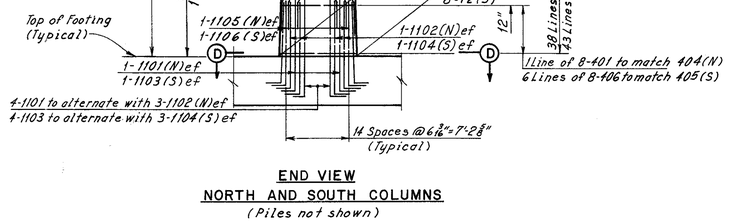
SECTION C-C



SECTION D-D



SECTION E-E



END VIEW
NORTH AND SOUTH COLUMNS
(Piles not shown)

Notes:

For location of 5'-0" sanitary sewer and Standard Oil Company pipe lines adjacent to Pier 14R, South Footing, see Sheet 6/80.

The following abbreviations are used:

N = North Column
S = South Column
ef = each face

For additional Notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 14R

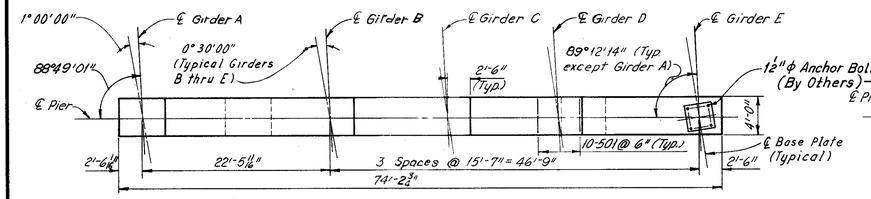
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN D.M.P.	TRACED S.C.	CHECKED K.Y.H.	REVIEWED C.A.B.	REVISED
DATE 6-29-70	DATE 7-10-70	DATE 7-14-70	DATE 10-1885	SHEET 45/80

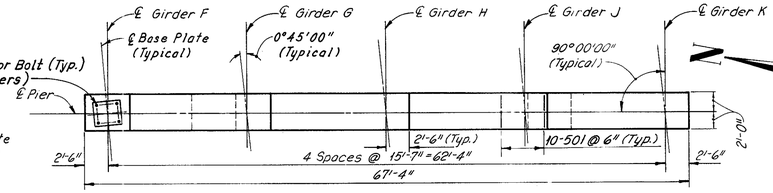
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

119
174

CUYAHOGA COUNTY
CUY-290-0.27

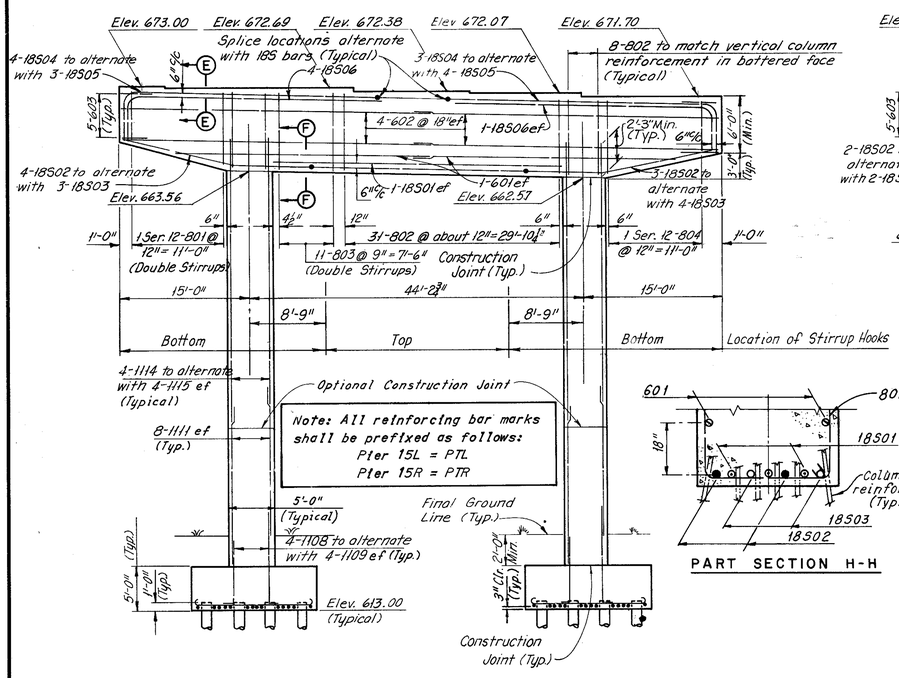


PLAN

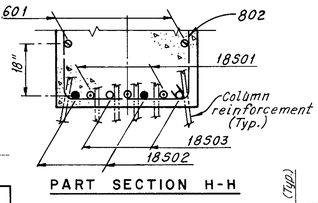


PLAN

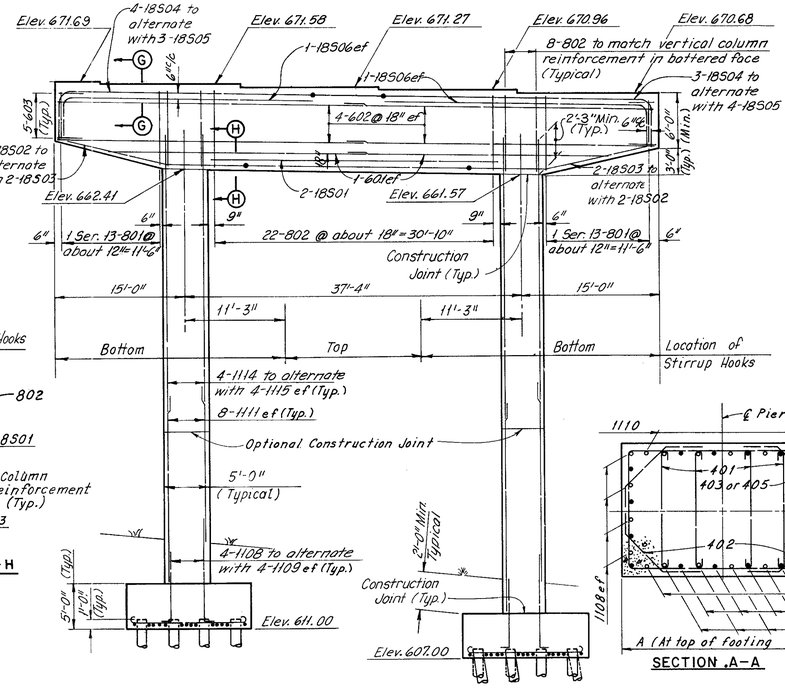
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



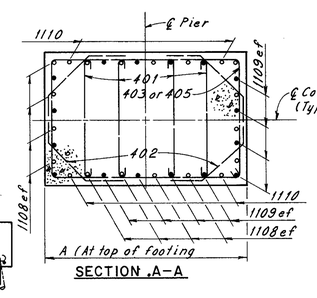
ELEVATION (PIER 15L)



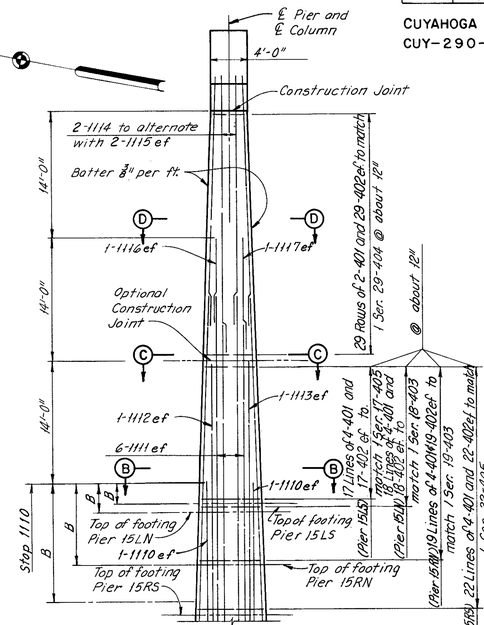
PART SECTION H-H

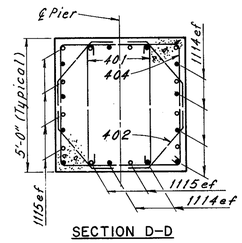


ELEVATION (PIER 15R)

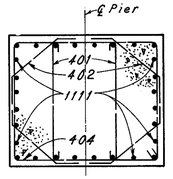


TYPICAL COLUMN END VIEW

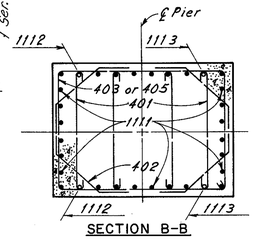




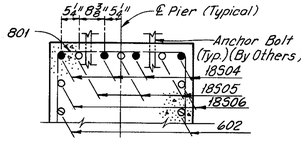
SECTION D-D



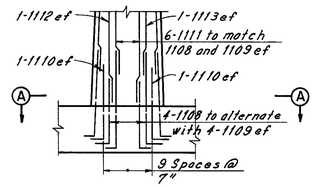
SECTION C-C



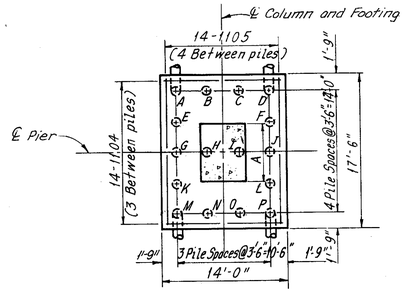
SECTION B-B



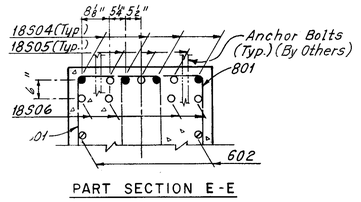
PART SECTION G-G



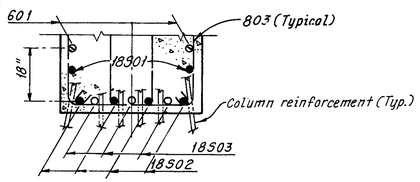
FOOTING REINFORCING



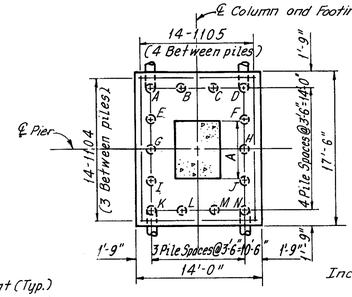
FOOTING PLAN
(PIER 15L)
(Typical, both footings)



PART SECTION E-E



PART SECTION F-F



FOOTING PLAN
(PIER 15R)

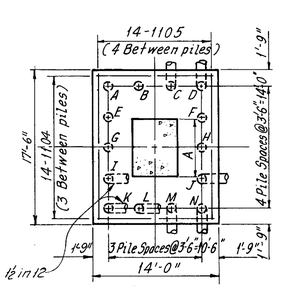
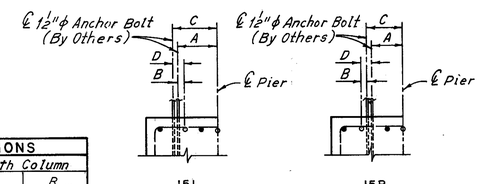


TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 15L				
A	13 3/4"	3"	14 3/4"	4"
B thru E	14"	3 1/4"	14 1/2"	3 3/4"
PIER 15R				
F thru K	10 5/8"	2 3/4"	11 1/8"	2 1/2"

TABLE OF DIMENSIONS				
Pier	North Column		South Column	
	A	B	A	B
15L	61'-10 1/4"	3'-6 3/4"	61'-9 3/8"	2'-6 5/8"
15R	61'-10 3/4"	4'-4 3/8"	71'-1 1/8"	7'-6 3/8"

Note:
All battered piles inclined 3 in 12 in the direction shown except as noted.



ANCHOR BOLT SETTING

Notes:
The following abbreviations are used:
15LN = Pier 15L North Column
15LS = Pier 15L South Column
15RN = Pier 15R North Column
15RS = Pier 15R South Column
ef = each face
For location of abandoned gas well adjacent to Pier 15R, South Footing, see Sheet 6 80. For details of capping gas well see Roadway Plans, Sheet 10
For additional notes see Sheet 28 80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

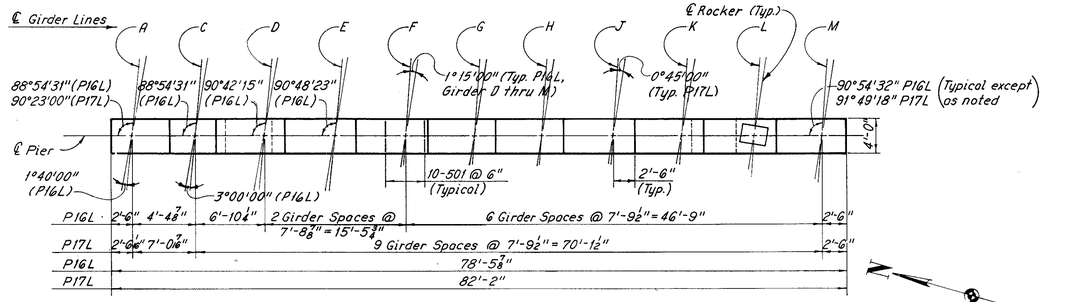
PIERS 15L AND 15R

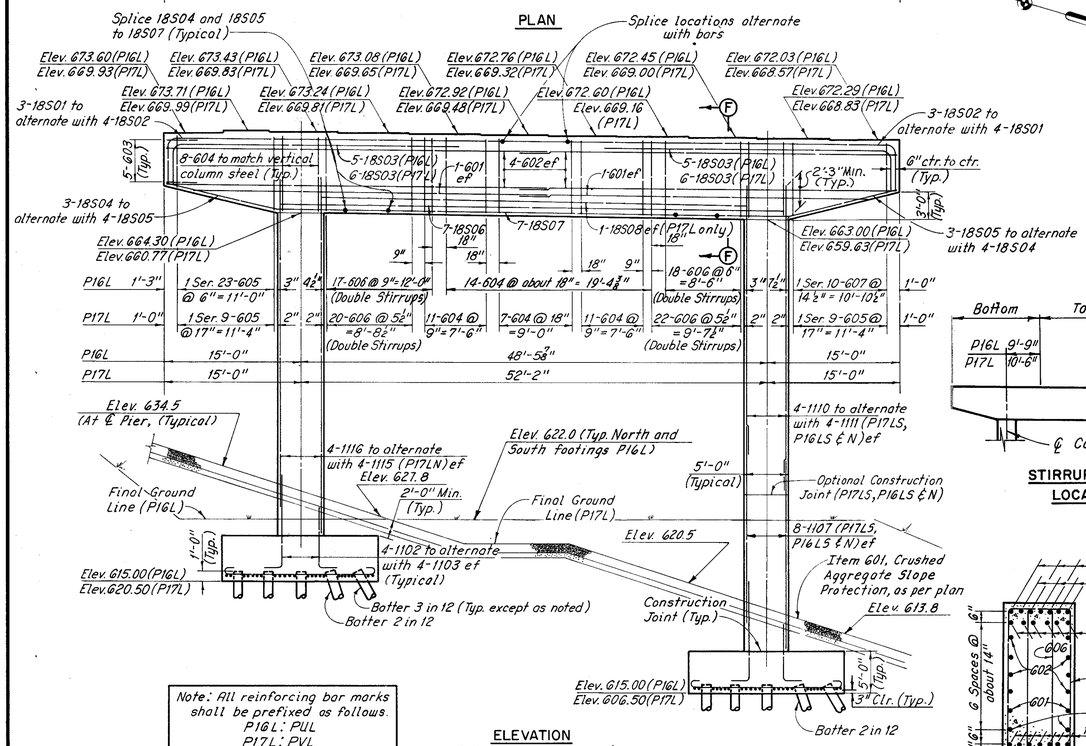
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

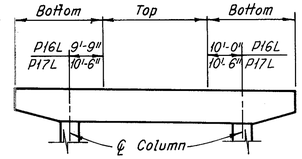
DRAWN JDS	TRACED WB	CHECKED JJW	REVIEWED CAB	REVISED
DATE 5-20-70	DATE 4-8-70	DATE 5-4-70	DATE 10-18-85	SHEET 46 80





ELEVATION
(Footings for P17L shown)

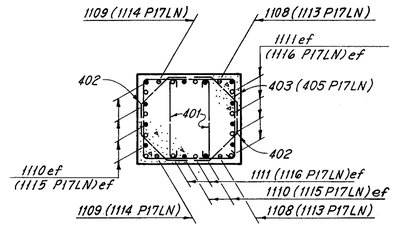
Note: All reinforcing bar marks shall be prefixed as follows.
P16L: PVL
P17L: PVL



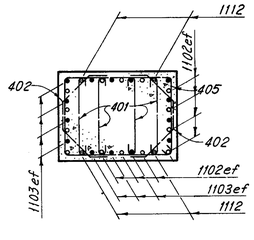
STIRRUP HOOKS LOCATION

Note:
Reinforcement is typical for all columns except as otherwise noted.

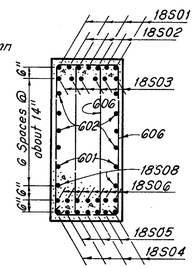
TABLE OF DIMENSIONS				
PIER	North Column		South Column	
	A	B	A	B
P16L	6'-9¼"	2'-3⅝"	6'-8¼"	1'-0"
P17L	6'-2⅝"	7'-3¼"	7'-0"	6'-12"



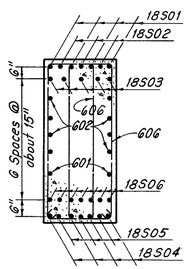
SECTION A-A



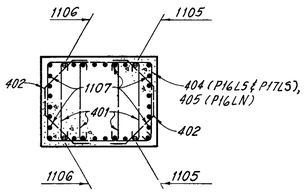
SECTION B-B



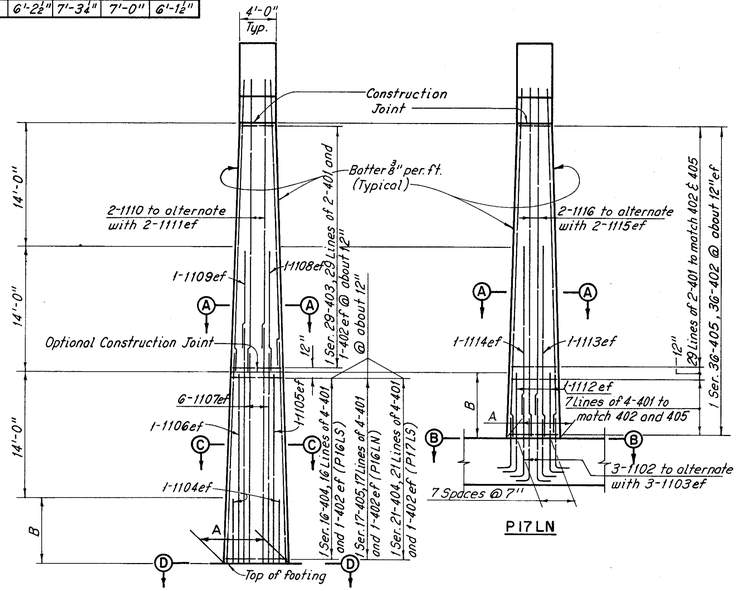
SECTION F-F (P17L)



SECTION F-F (P16L)

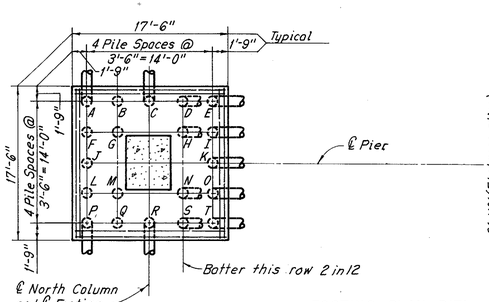


SECTION C-C

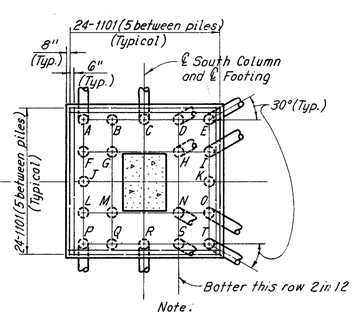


P17LS, P16LS & P16LN
COLUMN END VIEW

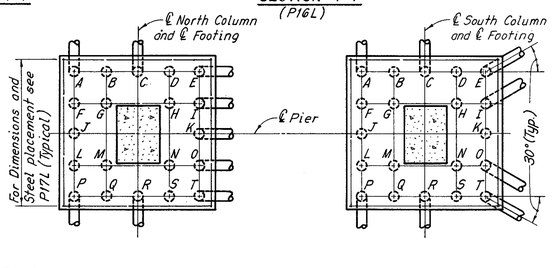
FOOTING DOWEL DETAIL (P17LS, P16LS & P16LN)



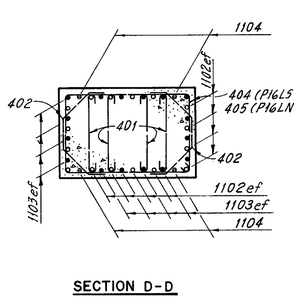
FOOTING PLAN P17L



Note.
All bottered piles shall be inclined 3 in 12 in the direction shown except as noted.



FOOTING PLAN P16L



SECTION D-D

The following abbreviations are used:
P16L - Pier 16 Left
P17L - Pier 17 Left
P16LN - Pier 16 Left North Column
P16LS - Pier 16 Left South Column
P17LN - Pier 17 Left North Column
P17LS - Pier 17 Left South Column
ef - each face
For additional notes see sheet 28 / 80.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

120 / 174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 16L AND 17L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

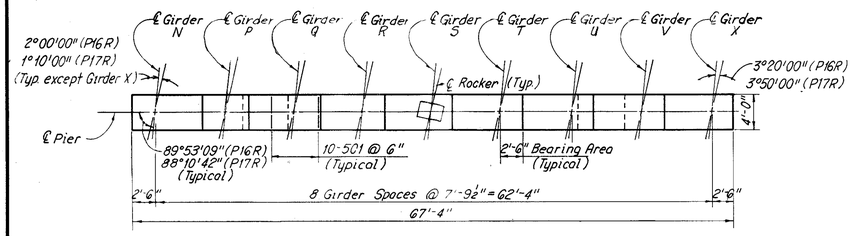
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 5-6-70	DATE 5-14-70	DATE 5-18-70	DATE 10-18-85	SHEET 47 / 80

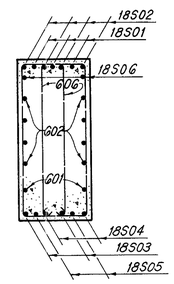
FED RD. DIVISION	STATE	PROJECT	
2	OHIO		

121
174

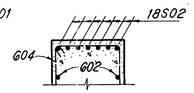
CUYAHOGA COUNTY
CUY-290-0.27



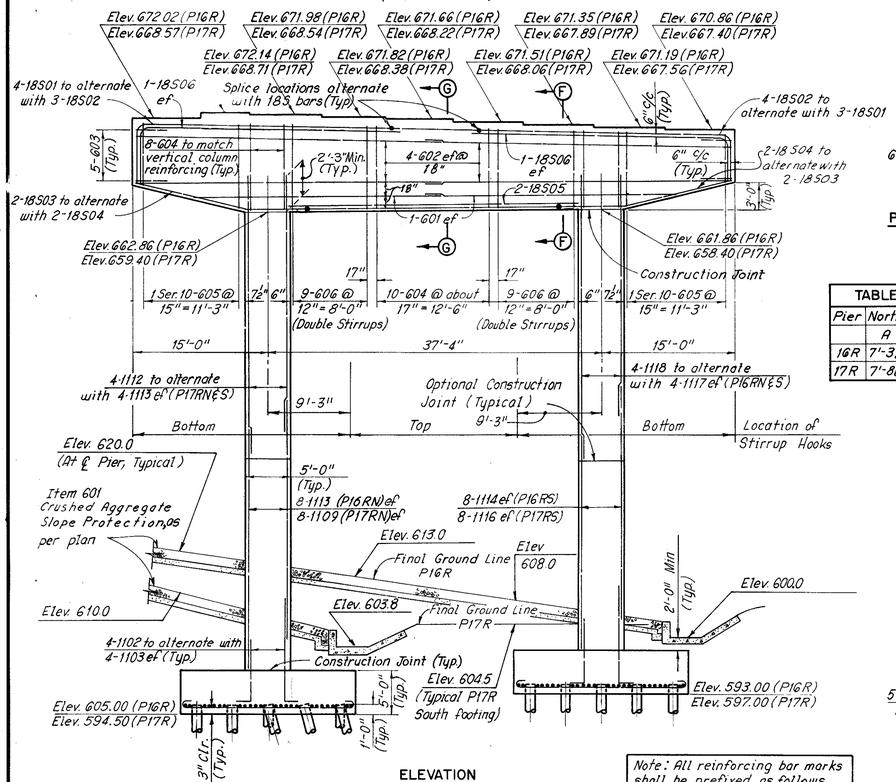
PLAN
(P16R and P17R)



SECTION F-F



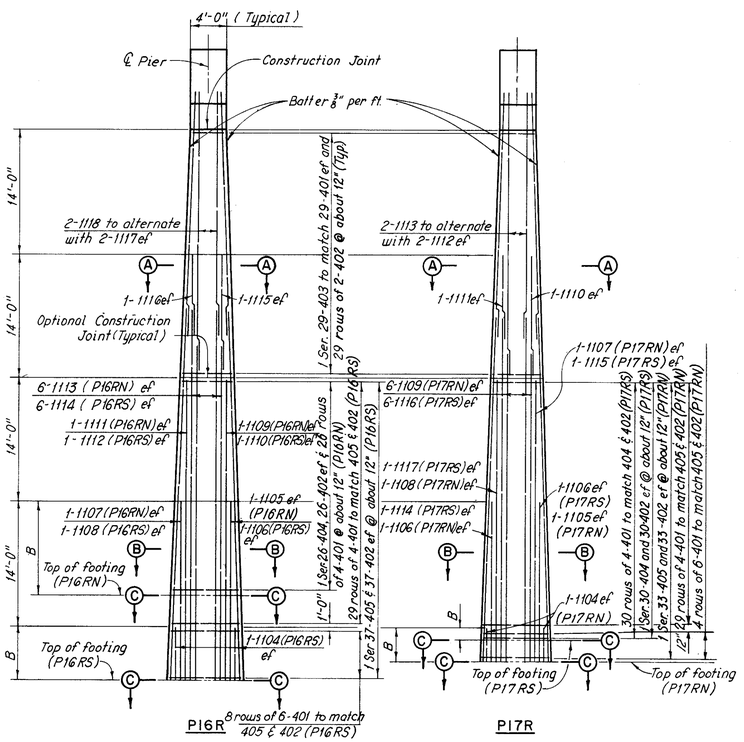
PART SECTION G-G



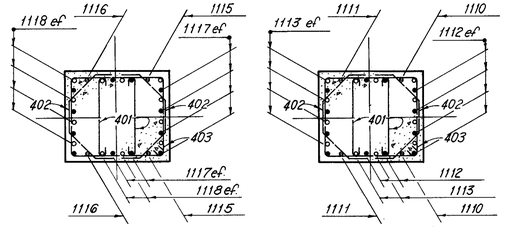
ELEVATION
(P16R and P17R) (Footings for P17R shown)

TABLE OF DIMENSIONS				
Pier	North Column		South Column	
	A	B	A	B
16R	7'-3⅜"	10'-10¾"	7'-11⅞"	7'-10¾"
17R	7'-8⅝"	3'-10¾"	7'-6¼"	0'-4¾"

Note: All reinforcing bar marks shall be prefixed as follows.
PUR - Pier 16R
PVR - Pier 17R

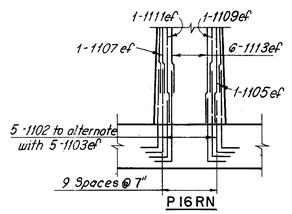


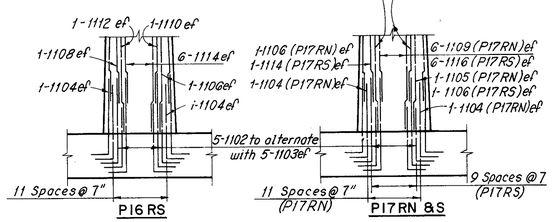
COLUMN END VIEWS



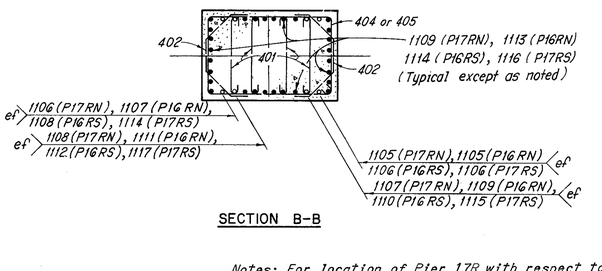
SECTION A-A
(P16RN ℄ S)

SECTION A-A
(P17RN ℄ S)



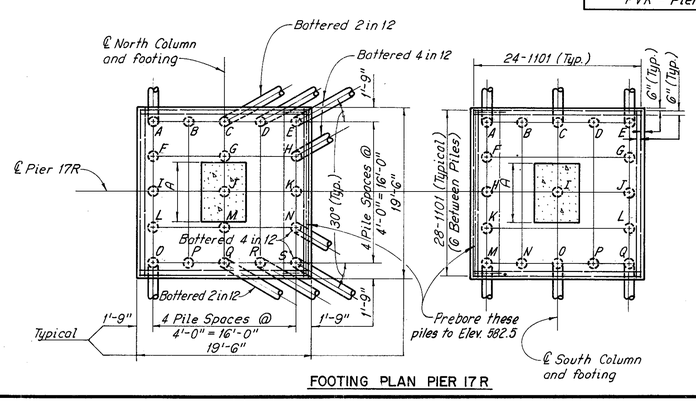


FOOTING DOWEL DETAILS

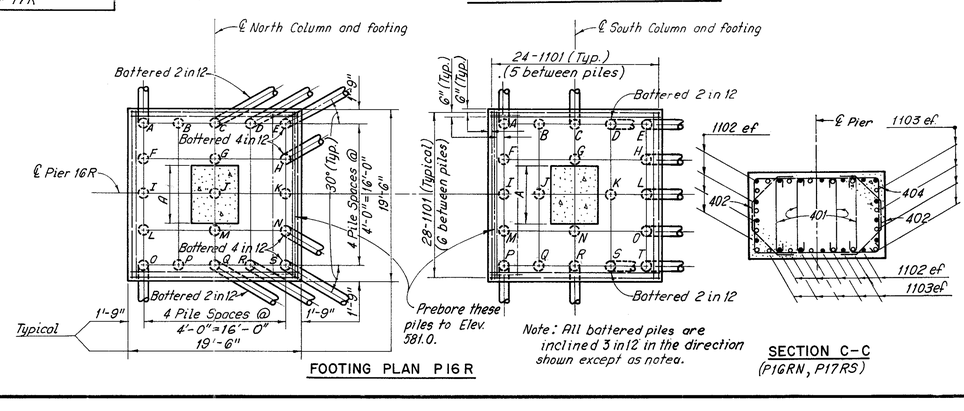


SECTION B-B

Notes: For location of Pier 17R with respect to Du Pont Building No. 2A see Sheet 6 | 80.
The following abbreviations are used:
P16R = Pier 16R
P17R = Pier 17R
P16RS = Pier 16R South Column
P16RN = Pier 16R North Column
P17RS = Pier 17R South Column
P17RN = Pier 17R North Column
For additional Notes see Sheet 28 | 80



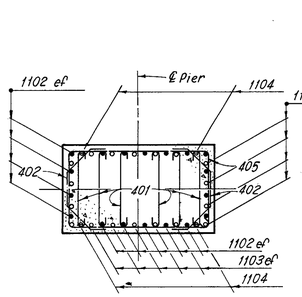
FOOTING PLAN PIER 17R



FOOTING PLAN P16R

Note: All battered piles are inclined 3 in 12 in the direction shown except as noted.

SECTION C-C
(P16RN, P17RS)



SECTION C-C
(P16RS, P17RN)

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 16R AND 17R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
J.W.	D.L.P.	D.H.S.	A.B.	
DATE 5-3-70	DATE 5-13-70	DATE 5-5-70	DATE 10-18-85	SHEET 48 | 80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

122
174

CUYAHOGA COUNTY
CUY-290-0.27

℄ Girder A 86°00'23" (Typ. Girders A and B) | ℄ Girder B | ℄ Girder C | ℄ Girder D | ℄ Girder E | ℄ Girder F | ℄ Girder G | ℄ Girder H | ℄ Girder J | ℄ Girder K | ℄ Girder L | ℄ Girder M and ℄ Bolster (Typical)

8-501 Typical Girders A and B

87°24'41" | 87°24'44" | 87°24'47" | 87°24'50" | 87°24'53" | 87°24'56" | 87°24'59" | 87°25'02" | 87°25'05" | 87°25'09"

1½" ϕ Anchor Bolt (Typ.) (By Others)

℄ Pier

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

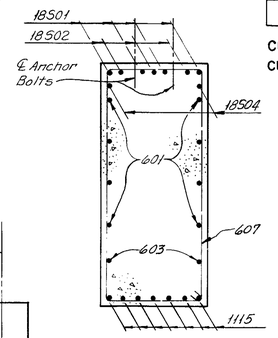
1'-9" | 10-501@6" Typical except as noted | 2'-6" Typical except as noted | 1'-0" | 1'-0"

2'-6" | 3'-6⅝" | 7'-0¾" | 9 Girder Spaces @ 7'-9½" = 70'-1½" | 2'-6"

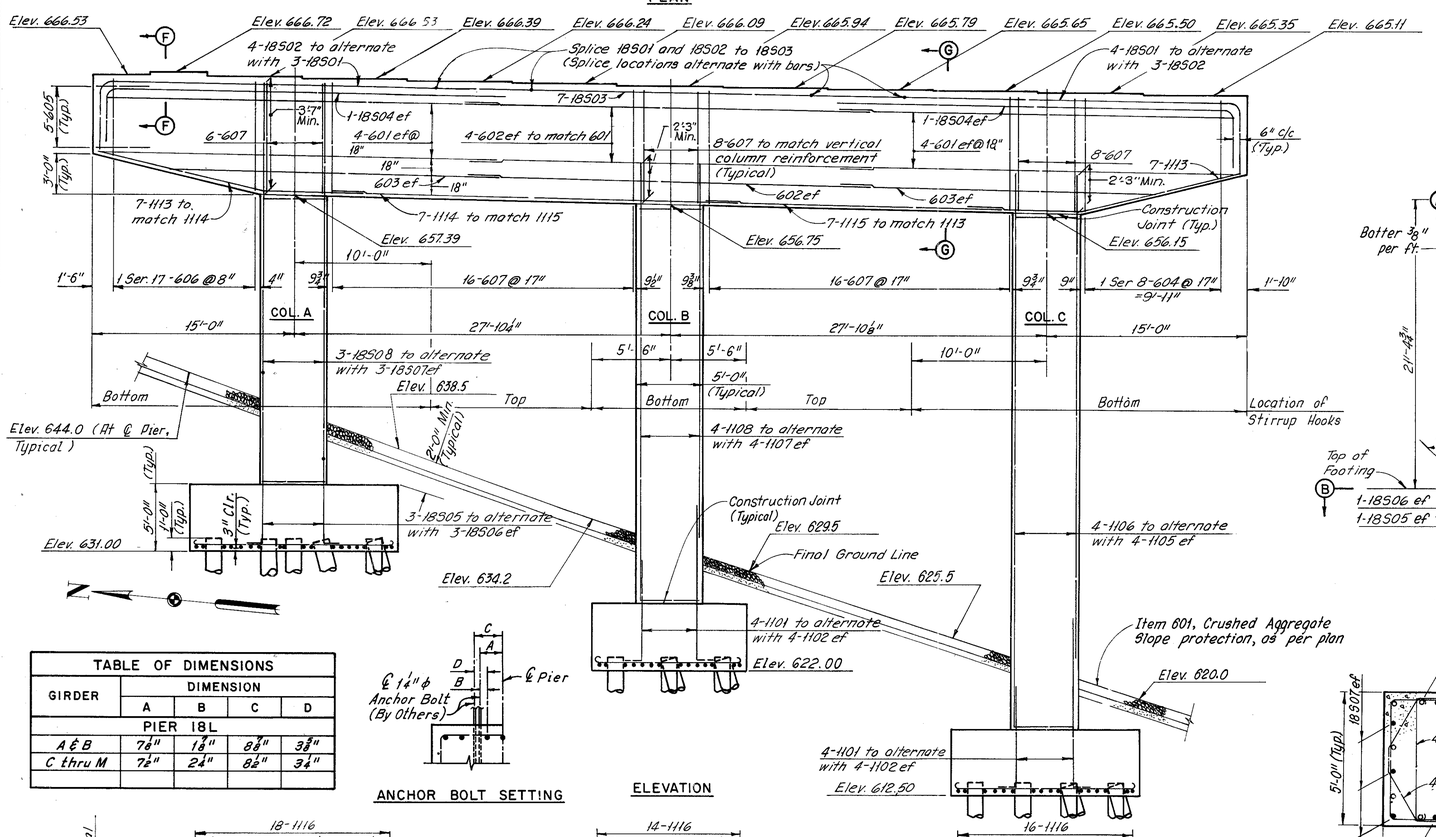
85'-8⅝"

PLAN

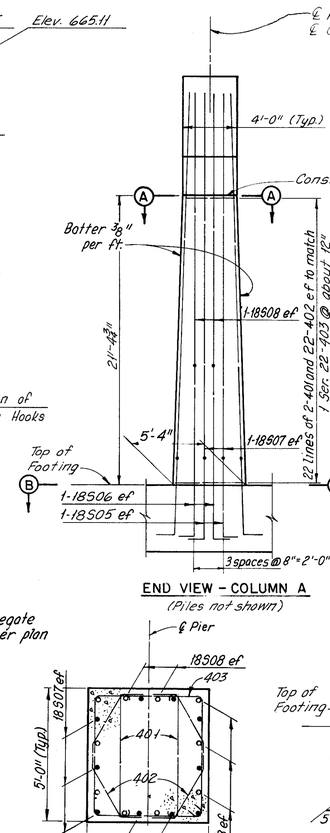
Note: All reinforcing bar marks shall be prefixed PWL.



SECTION G - G



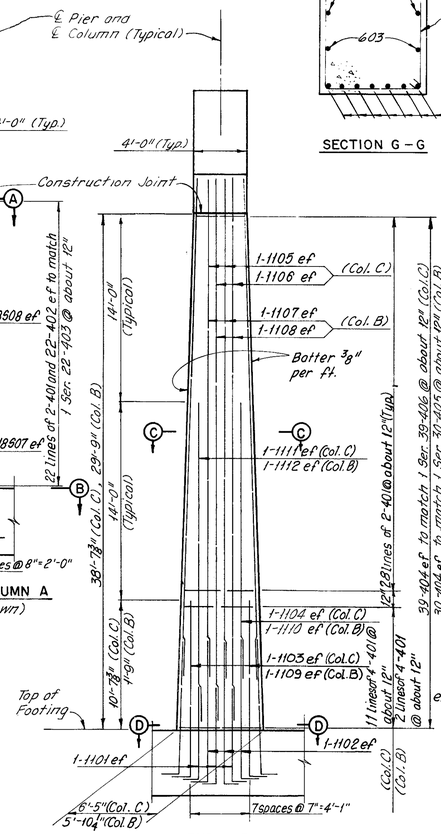
ELEVATION



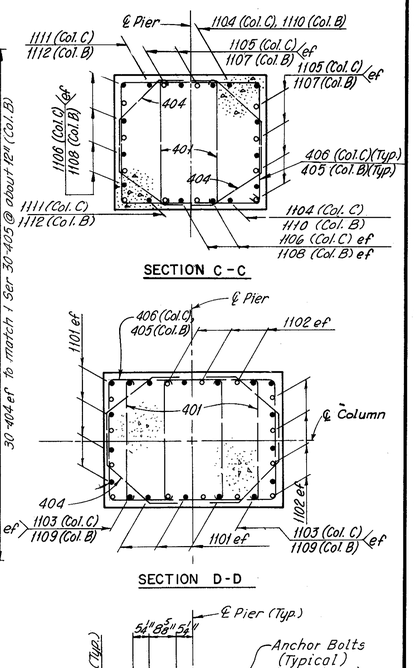
END VIEW - COLUMN A
(Piles not shown)

SECTION A-A

SECTION B-B

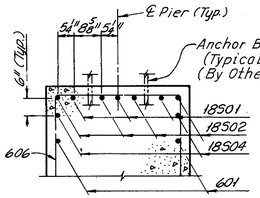


END VIEW
COLUMNS B AND C
(Piles not shown)



SECTION C - C

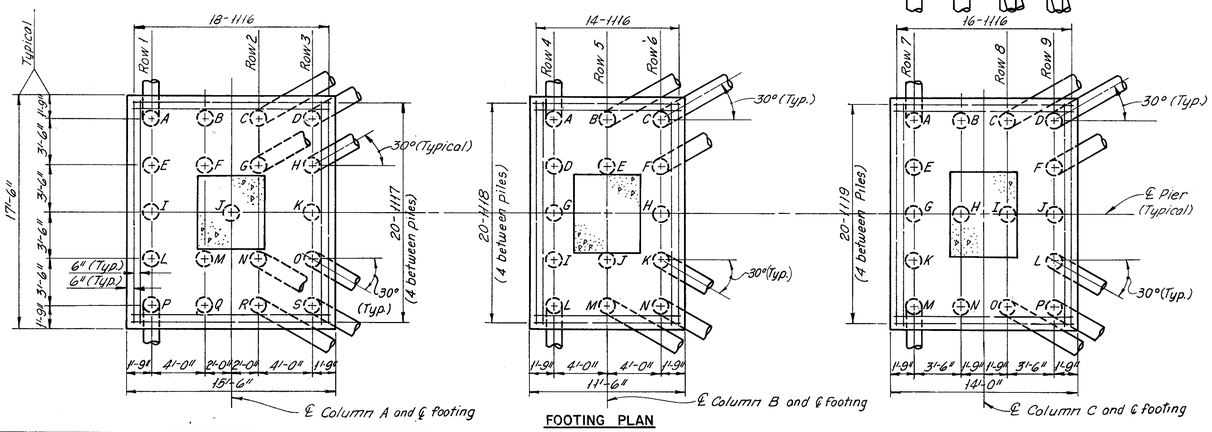
SECTION D-D



PART SECTION F-F

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 18L				
A & B	7⅝"	18"	8⅝"	3¾"
C thru M	7½"	24"	8½"	3¼"

ANCHOR BOLT SETTING



FOOTING PLAN

PILE BATTER TABLE	
Row	*All Battered Piles Shall be Inclined
1	3 in 12
2	2 in 12
3	3 in 12
4	3 in 12
5	2 in 12
6	3 in 12
7	3 in 12
8	2 in 12
9	3 in 12

*See Footing Plans for pile directions.

Note:
For Notes see Sheet 28 80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 18L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

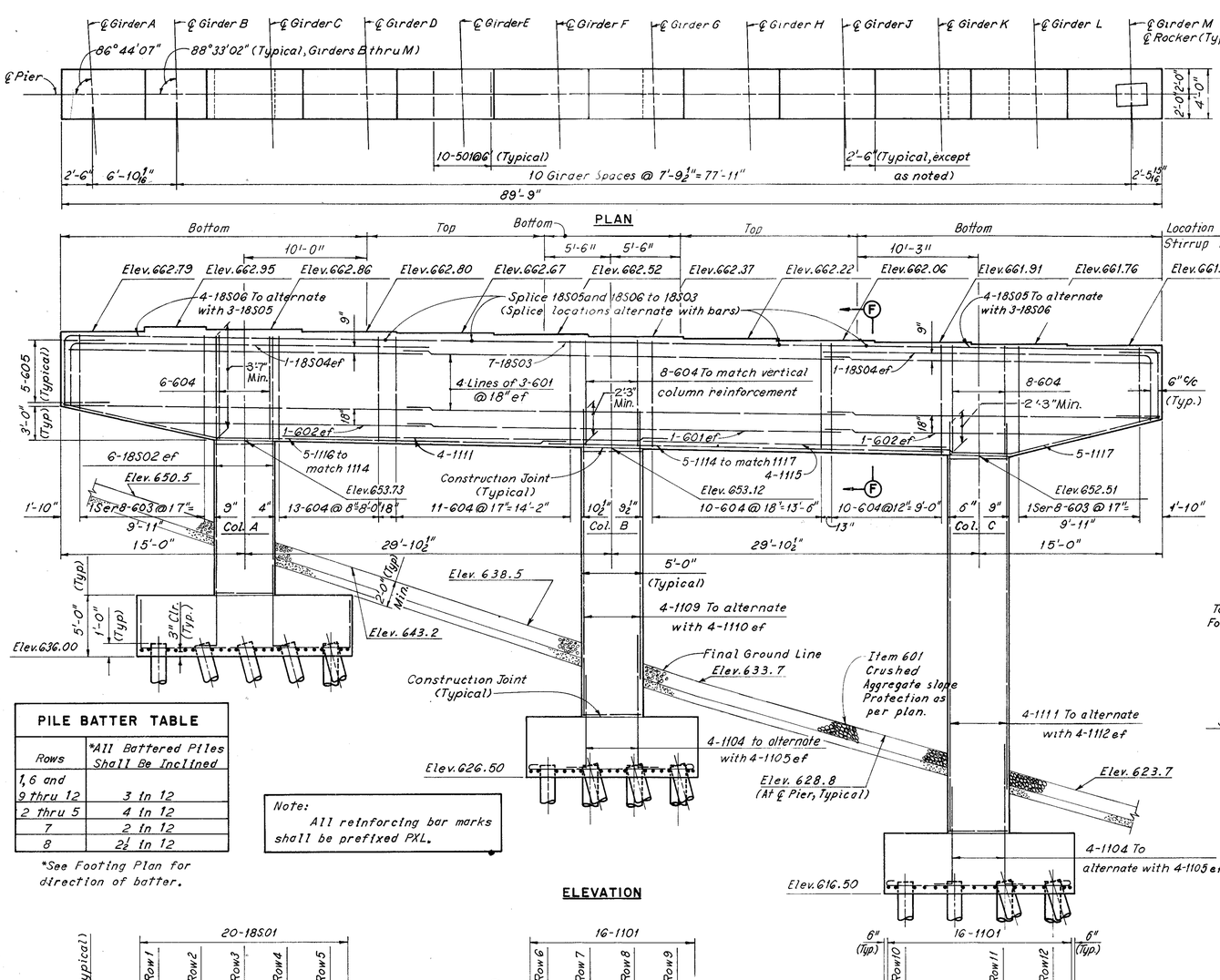
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN DMP	TRACED WB	CHECKED JJH	REVIEWED C. A. B.	REVISED
DATE 4-22-70	DATE 4-30-70	DATE 5-1-70	DATE 10-1885	SHEET 49 80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

123
174

CUYAHOGA COUNTY
CUY-290-0.27



Notes:
For location of Pier 19L with respect to Sohio Pilot Plant building see Sheet 7/80.
For additional Notes see Sheet 28/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 19L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

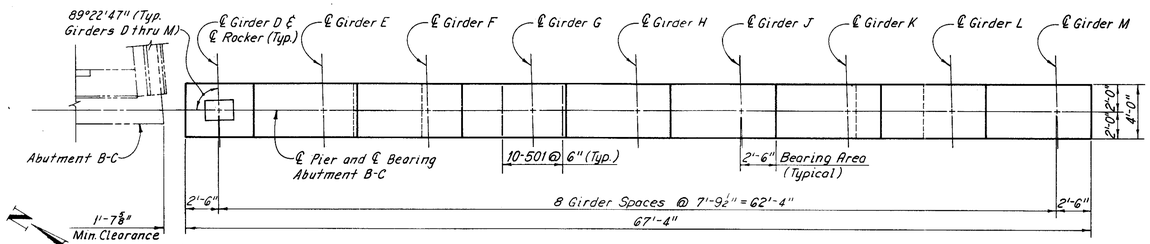
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED C.A.B.	REVISED
DMP	PCK	JW		
DATE 5-18-70	DATE 5-28-70	DATE 6-3-70	DATE 10-18-85	SHEET 50/80

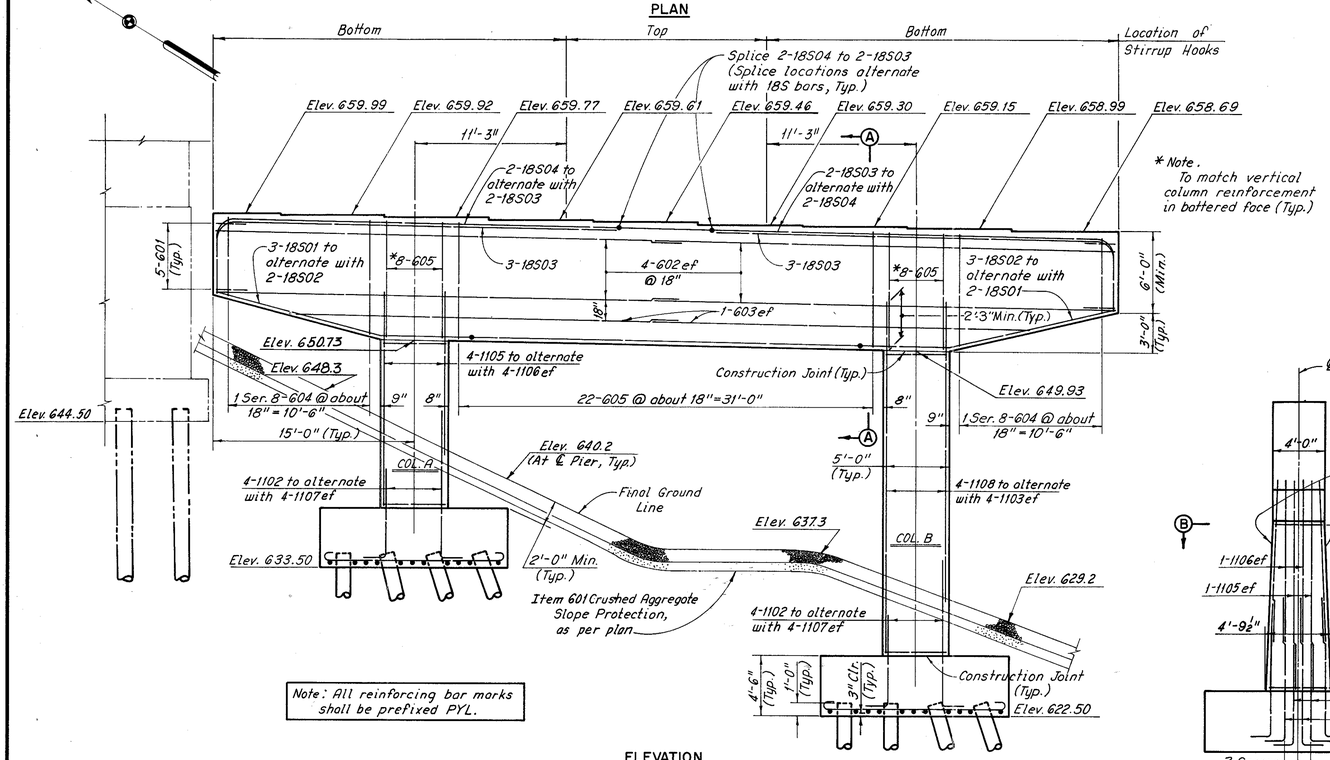
FED RD. DIVISION	STATE	PROJECT	
2	OHIO		

124
174

CUYAHOGA COUNTY
CUY-290-0.27

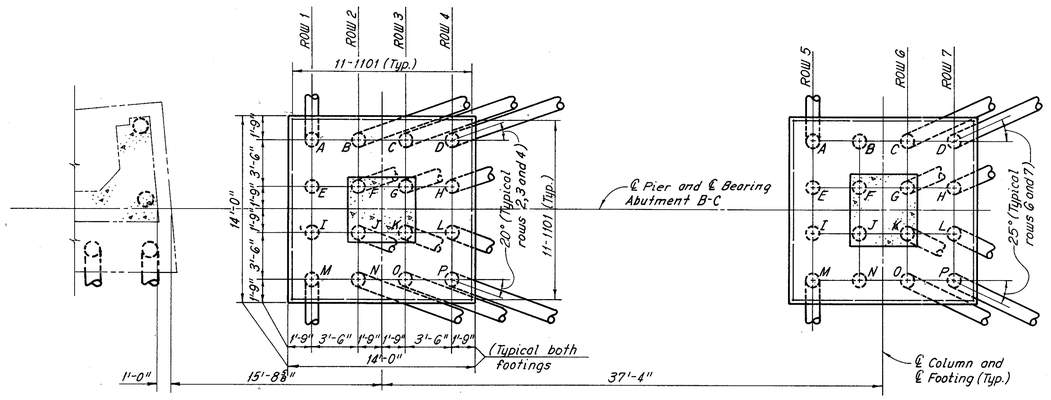


PLAN

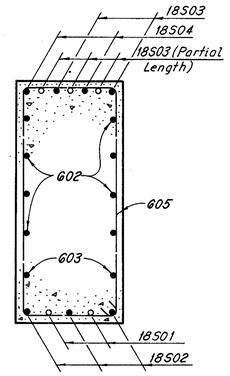


Note: All reinforcing bar marks shall be prefixed PYL.

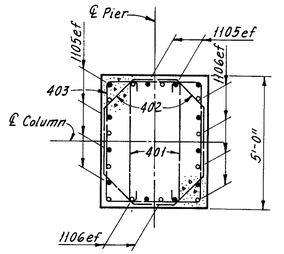
ELEVATION



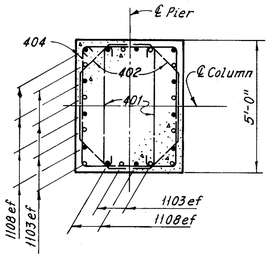
FOOTING PLAN



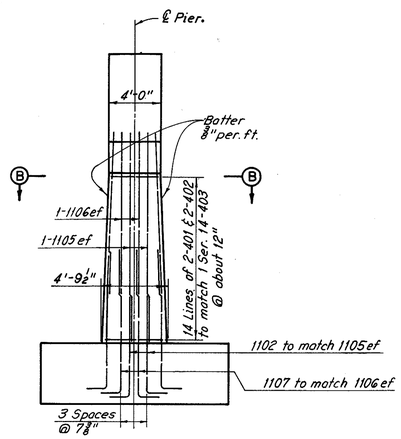
SECTION A-A



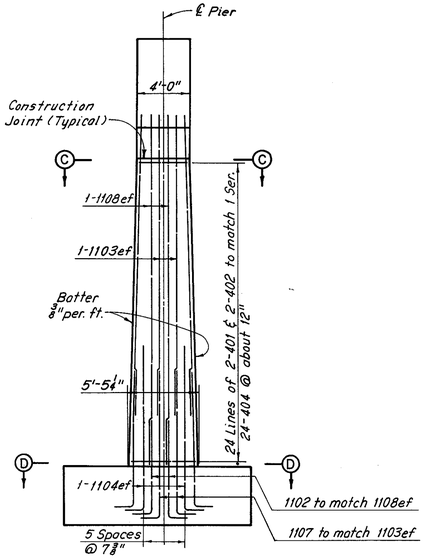
SECTION B-B



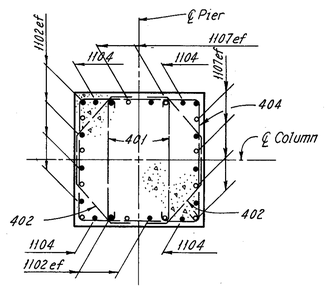
SECTION C-C



TYPICAL COLUMN A END VIEW



TYPICAL COLUMN B END VIEW



SECTION D-D

Note: For Notes see sheet 28/80

ROW	ALL BATTERED PILES SHALL BE INCLINED:
1	3 in 12
2	3 in 12
3	3½ in 12
4	4 in 12
5	3 in 12
6	3½ in 12
7	4 in 12

Note: See Footing Plan for direction of batter.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 20 L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

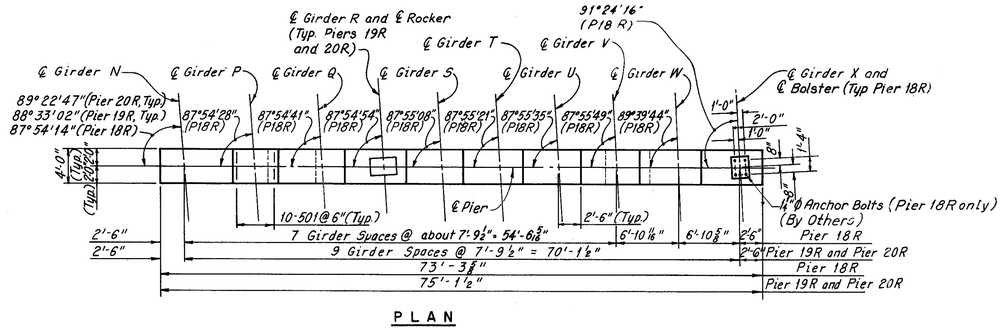
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R.	D.L.R.	4/	C.A.B.	
DATE 4-1070	DATE 4-20-70	DATE 5-1-70	DATE 10-1885	SHEET 51/80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

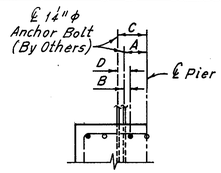
125
174

CUYAHOGA COUNTY
CUY-290-0.27



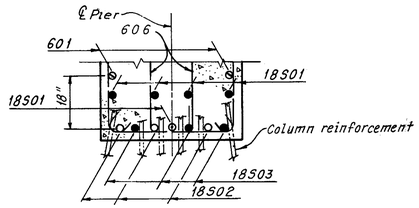
PLAN

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 18R				
N thru V	7½"	2¼"	8⅜"	3⅛"
W	7⅞"	2⅝"	8⅝"	2⅜"
X	8¼"	3"	7¾"	2⅛"



ANCHOR BOLT SETTING

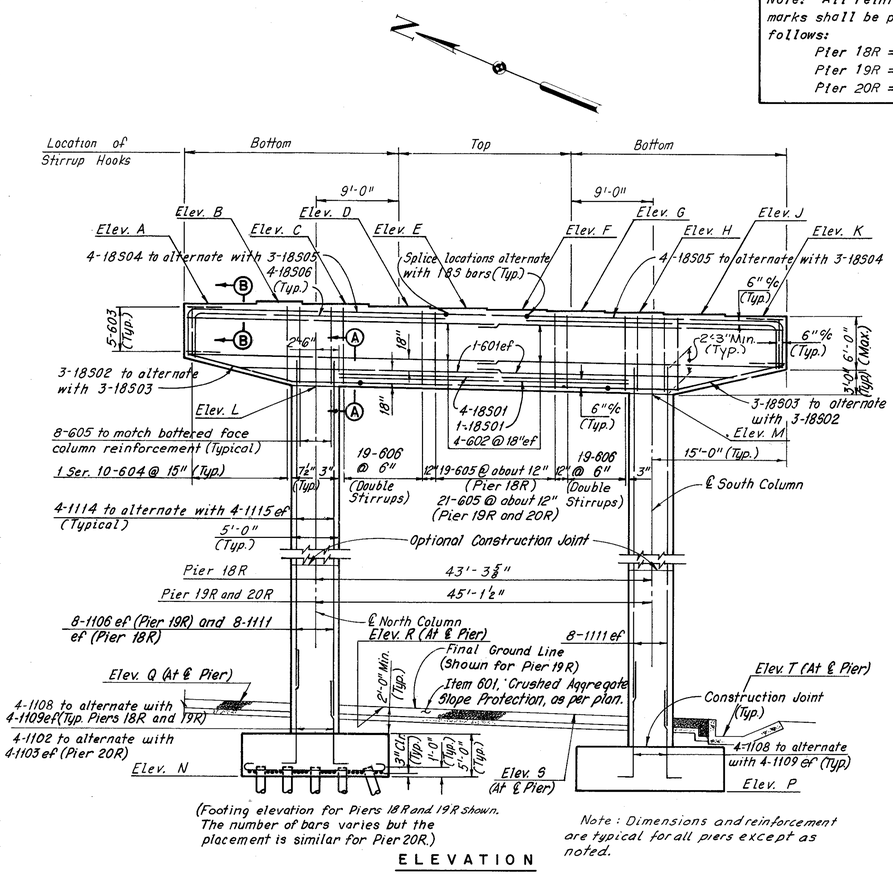
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



PART SECTION A-A

TABLE OF ELEVATIONS			
Elev.	Pier 18R	Pier 19R	Pier 20R
A	665.16	661.53	658.68
B	665.25	661.62	658.84
C	665.10	661.47	658.69
D	664.96	661.32	658.53
E	664.81	661.17	658.38
F	664.66	661.02	658.22
G	664.51	660.86	658.07
H	664.36	660.69	657.85
J	664.28	660.56	657.69
K	664.10	660.39	657.54
L	656.07	652.44	649.65
M	655.23	651.50	648.67
N	601.00	605.00	608.00
P	601.00	591.00	590.50
Q	614.0	618.2	622.5
R	608.0	612.5	617.0
S	609.0	603.7	604.5
T	609.0	598.0	597.5

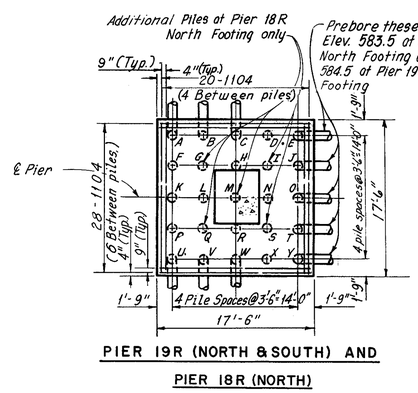
Note: All reinforcing bar marks shall be prefixed as follows:
Pier 18R = PWR
Pier 19R = PXR
Pier 20R = PYR



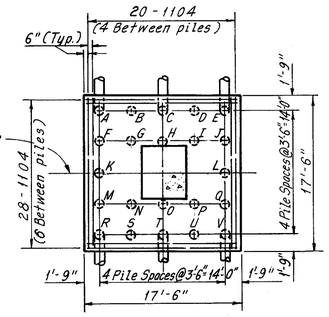
(Footing elevation for Piers 18R and 19R shown. The number of bars varies but the placement is similar for Pier 20R.)

ELEVATION

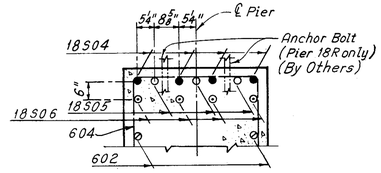
Note: Dimensions and reinforcement are typical for all piers except as noted.



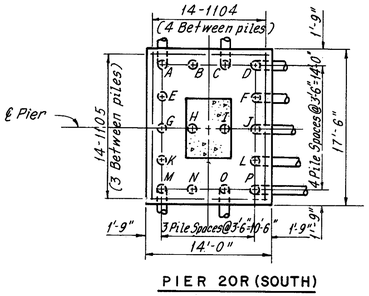
PIER 19R (NORTH & SOUTH) AND PIER 18R (NORTH)



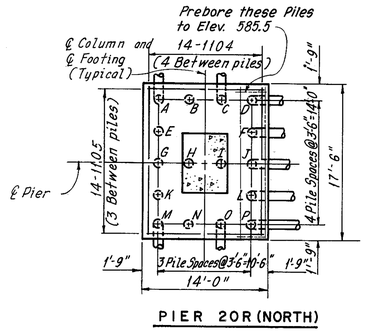
PIER 18R (SOUTH)



PART SECTION B-B



PIER 20R (SOUTH)



PIER 20R (NORTH)

FOOTING PLANS

Notes:
For location of Pier 18R with respect to duPont Building No. 2A see Sheet 6/80
For Sections thru columns see Sheet 53/80.
For Notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 18R, 19R AND 20R
FOOTINGS AND CAPS
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

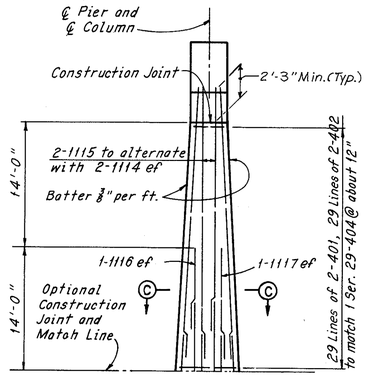
DRAWN JDS	TRACED CP	CHECKED KH	REVIEWED C.A.B.	REVISED
DATE 5-19-70	DATE 8-1-70	DATE 6-25-70	DATE 10-1885	SHEET 52/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

126
174

CUYAHOGA COUNTY
CUY-290-0.27

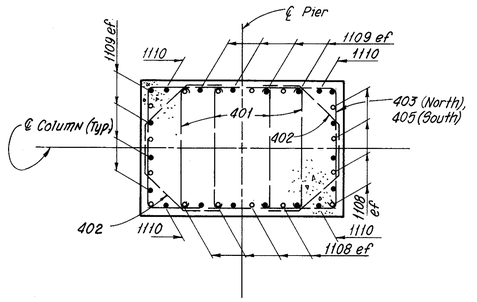
Note: All reinforcing bar marks shall be prefixed as follows:
Pier 18R = PWR
Pier 19R = PXR
Pier 20R = PYR



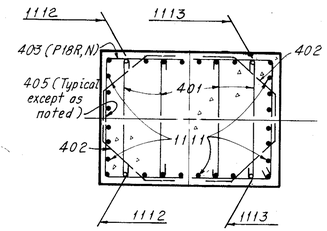
TYPICAL PARTIAL COLUMN END VIEW

TABLE OF DIMENSIONS				
	North Column		South Column	
Pier	A	B	A	B
18R	71'-1½"	22'-0⅝"	71'-0⅝"	21'-2¾"
19R	61'-7⅞"	14'-5¼"	71'-5⅞"	27'-6"
20R	61'-3½"	8'-7⅜"	71'-3⅞"	25'-2"

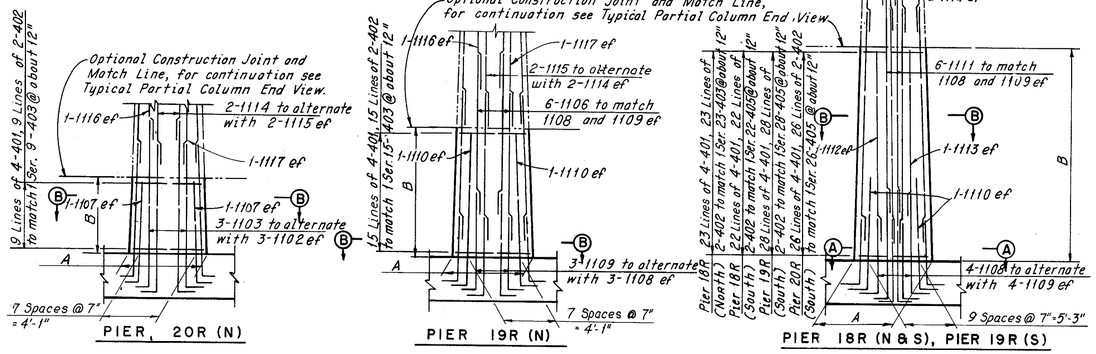
Note: Dimension A is measured at top of footing.



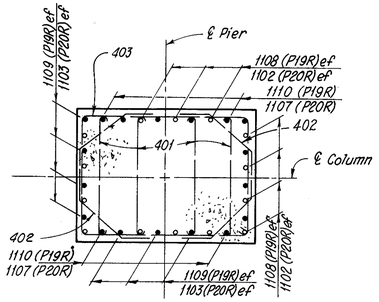
SECTION A-A
(Pier 18R, North and South Pier 19R South and Pier 20P South)



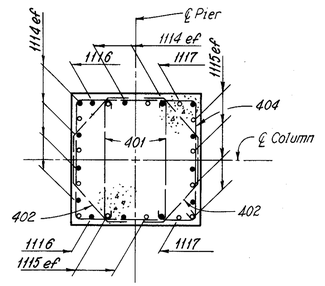
SECTION B-B
(Pier 18R, North and South, Pier 19R, South and Pier 20R, South)



PARTIAL COLUMN END VIEWS AND FOOTING DOWEL DETAILS



SECTION B-B
(Pier 19R, North)
(Pier 20R, North)



SECTION C-C

Note:
For Notes see Sheet 28/80

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

PIERS 18R, 19R AND 20R
COLUMNS

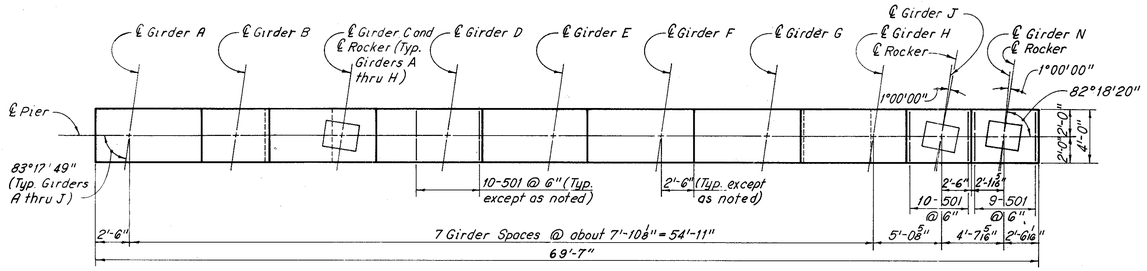
I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN JDS	TRACED CP	CHECKED KH	REVIEWED C.A.B.	REVISED
DATE 5-19-10	DATE 6-1-10	DATE 6-25-10	DATE 10-18-85	SHEET 53/80

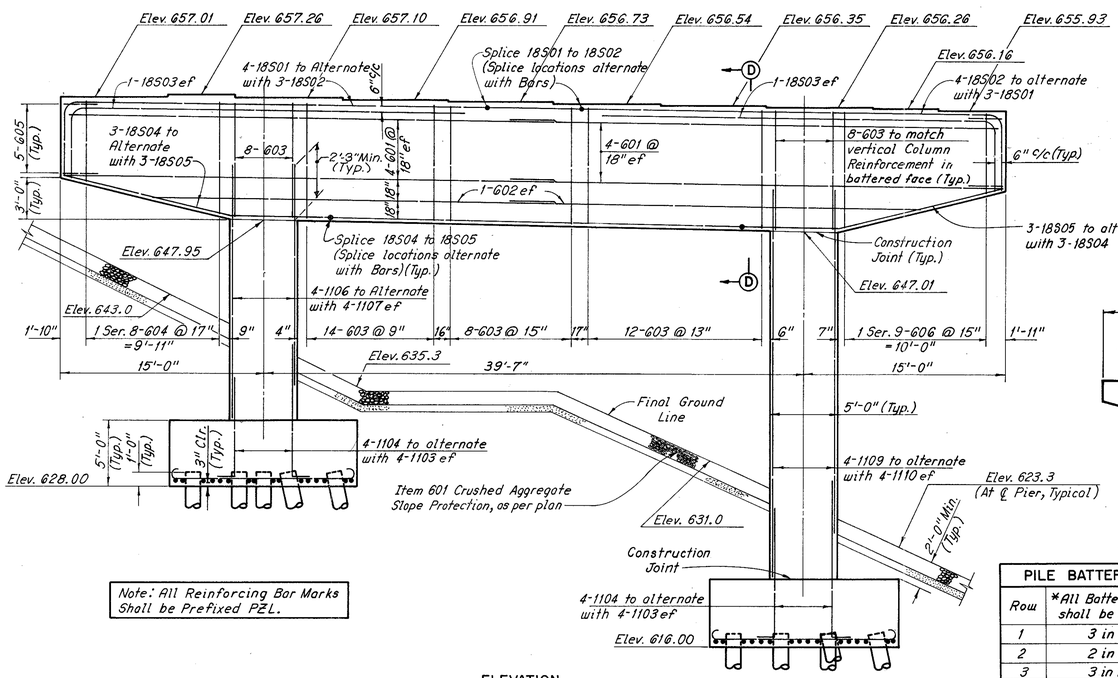
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

127
174

CUYAHOGA COUNTY
CUY-290-0.27

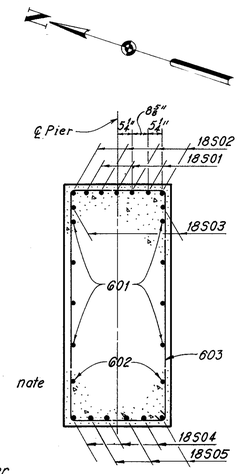


PLAN



Note: All Reinforcing Bar Marks Shall be Prefixed PZL.

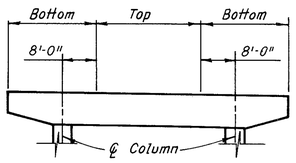
ELEVATION



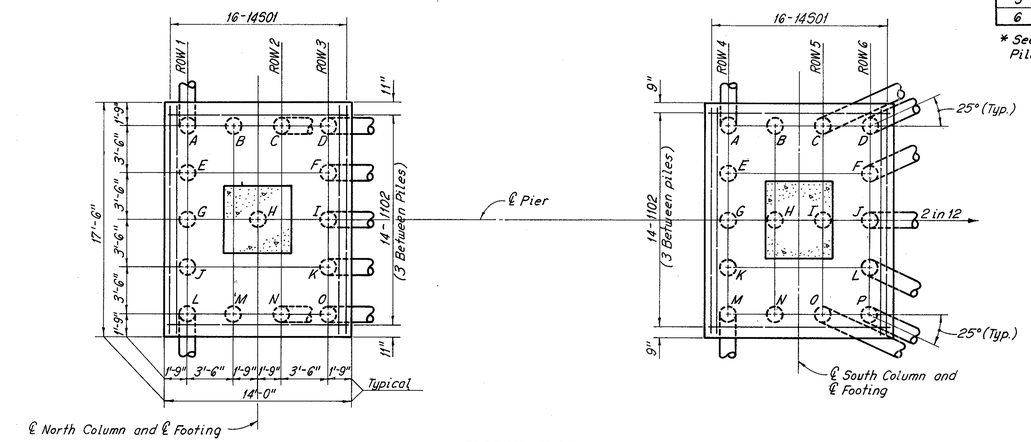
SECTION D-D

PILE BATTER TABLE	
Row	*All Battered piles shall be inclined
1	3 in 12
2	2 in 12
3	3 in 12
4	3 in 12
5	2 in 12
6	3 in 12 (Except as shown)

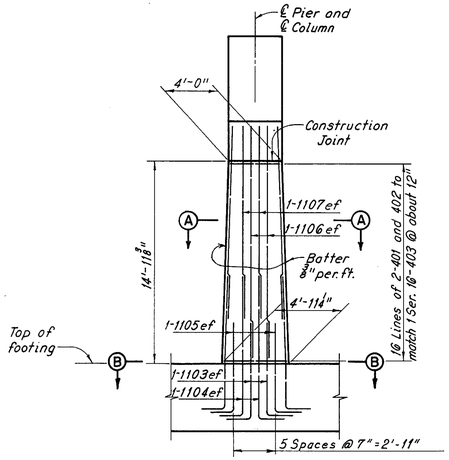
* See Footing Plan for Pile Direction.



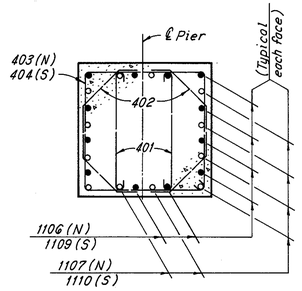
STIRRUP HOOKS LOCATION



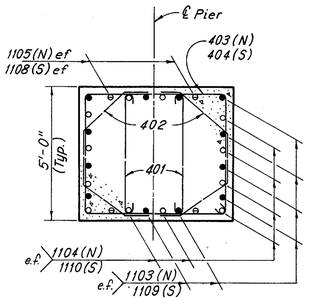
FOOTING PLAN



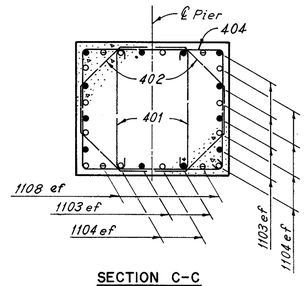
END VIEW - NORTH COLUMN
(Piles not shown)



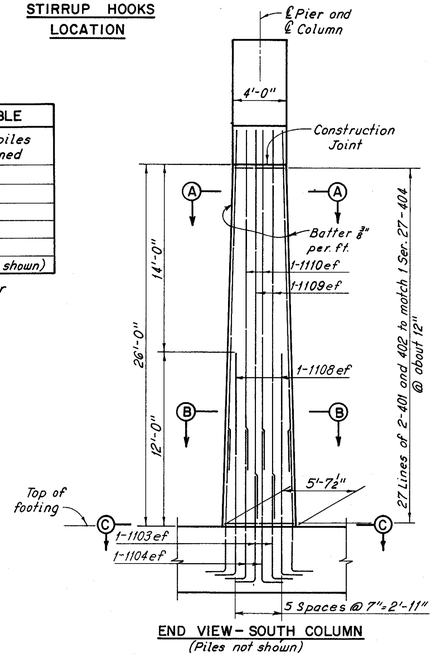
SECTION A-A



SECTION B-B



SECTION C-C



END VIEW - SOUTH COLUMN
(Piles not shown)

Notes:
For Notes See Sheet 28 / 80
The following abbreviations are used:
N = North Column
S = South Column
ef = each face

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 21 L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

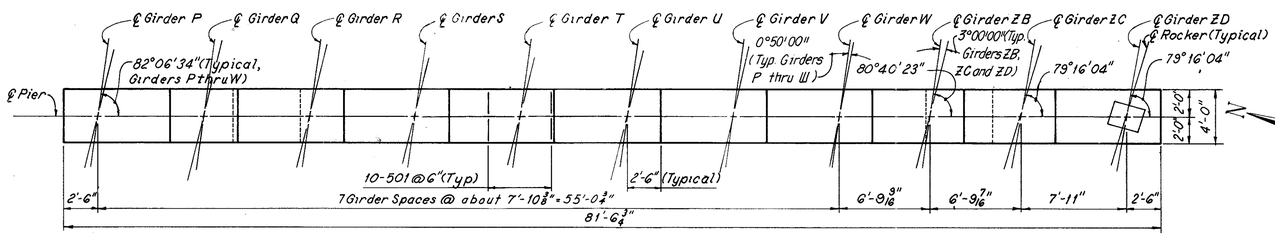
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.M.P.	D.L.A.	J.D.S.	C.A.B.	
DATE 5-27-70	DATE 6-9-70	DATE 7-22-70	DATE 10-1885	SHEET 54/80

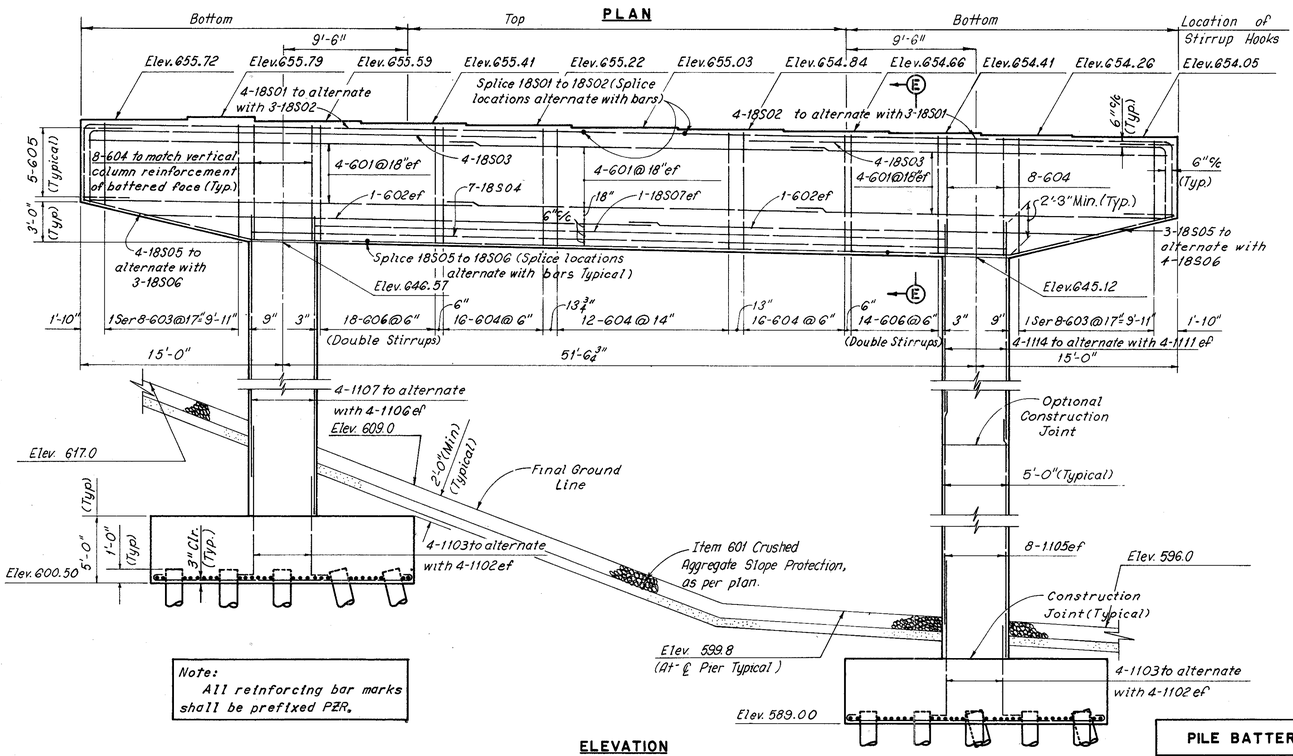
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

128 / 174

CUYAHOGA COUNTY
CUY-290-0.27



PLAN

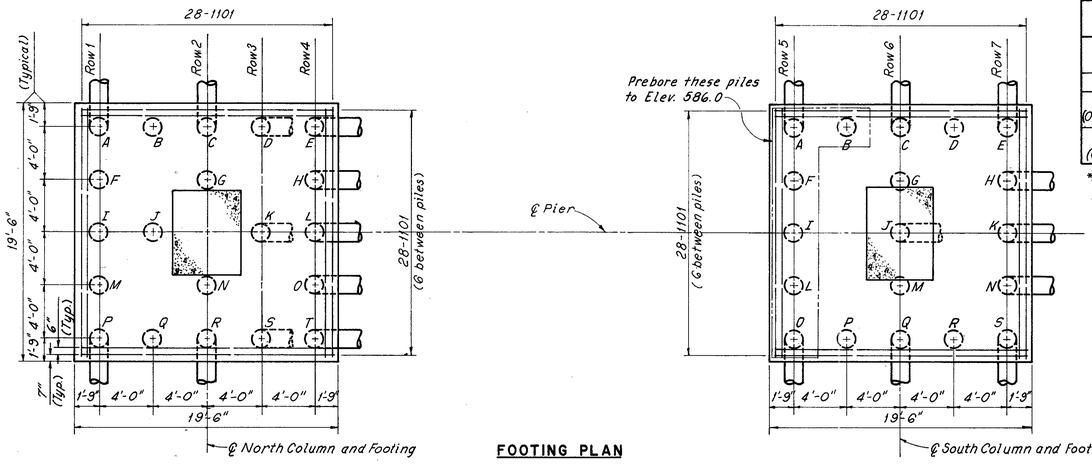


ELEVATION

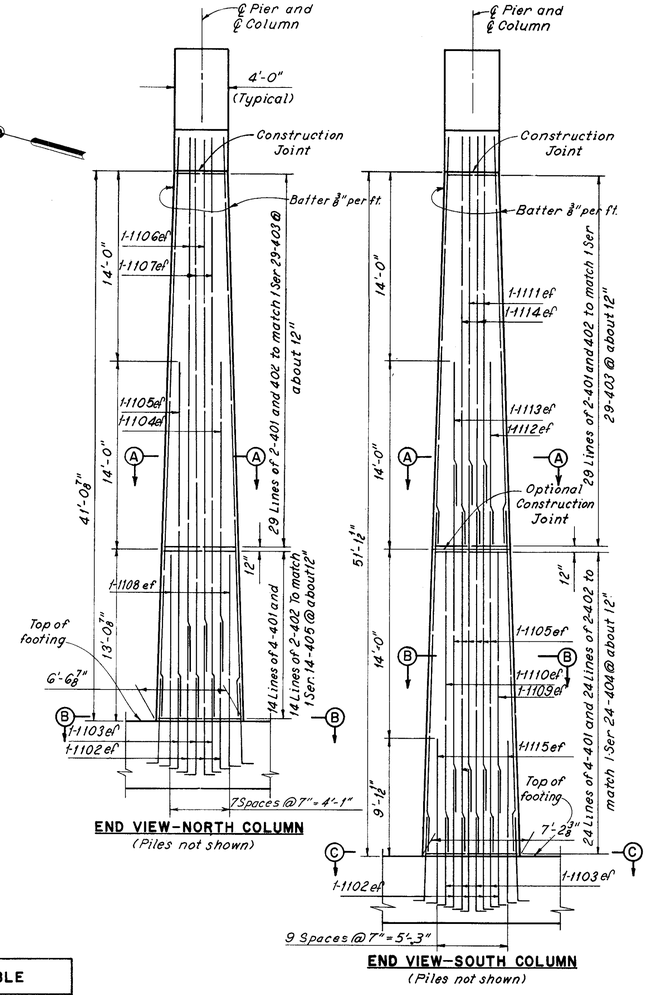
Note:
All reinforcing bar marks shall be prefixed PIR.

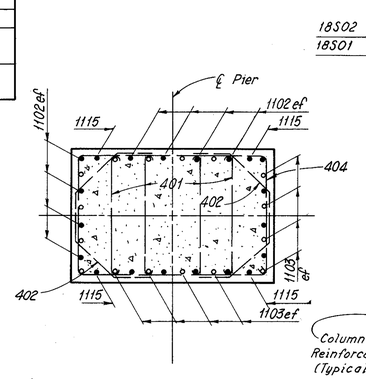
PILE BATTER TABLE	
ROW	*All Battered Piles Shall Be Inclined
1 thru 3, 5 and 7	3 in 12
4	4 in 12
6 (Outside Piles)	3 in 12
6 (Center Pile)	2 in 12

*See Footing Plan For Pile Directions.

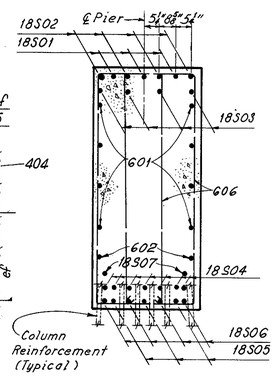


FOOTING PLAN

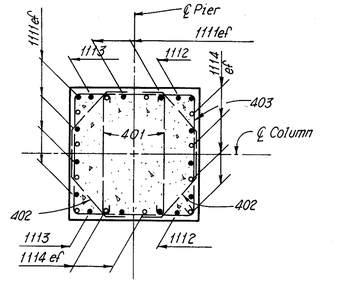




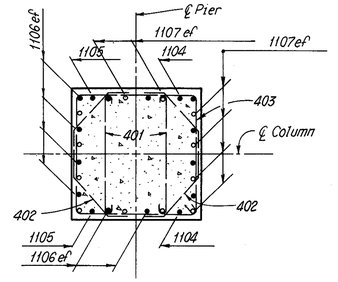
SECTION C-C



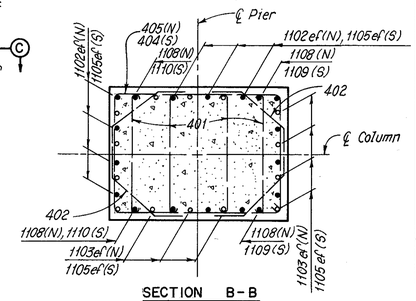
SECTION E-E



SECTION A-A
SOUTH COLUMN



SECTION A-A
NORTH COLUMN



SECTION B-B

Notes:
For Notes see Sheet 28/80.
The following abbreviations are used:
N = North Column
S = South Column
ef = each face

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 2IR

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

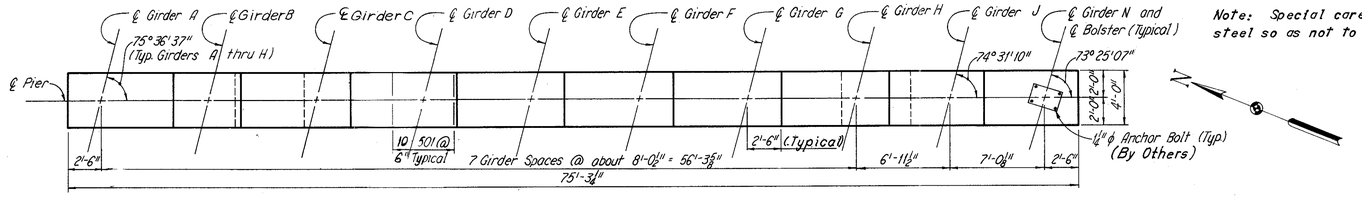
DRAWN MP	TRACED RCA	CHECKED TJS	REVIEWED C.A.B.	REVISED
DATE 5-2570	DATE C-1070	DATE 6-26-70	DATE 10-1085	SHEET 55/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

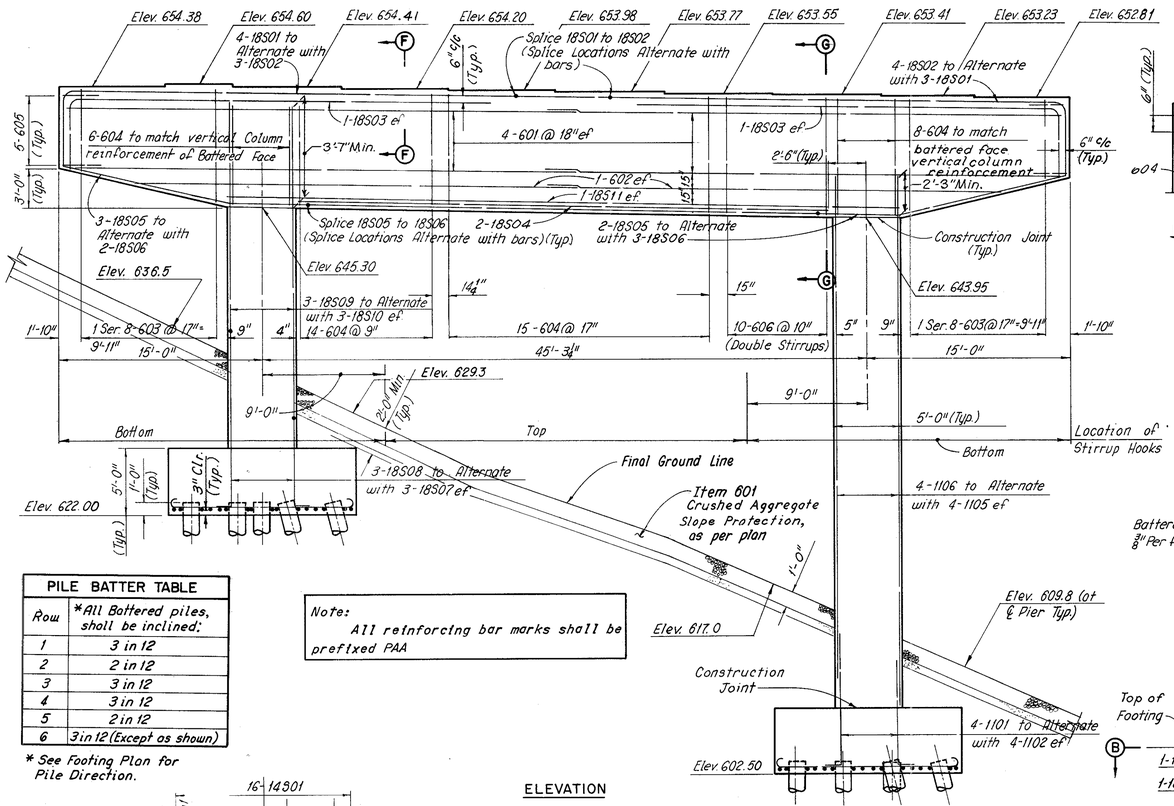
129
174

CUYAHOGA COUNTY
CUY-290-0.27

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.



PLAN

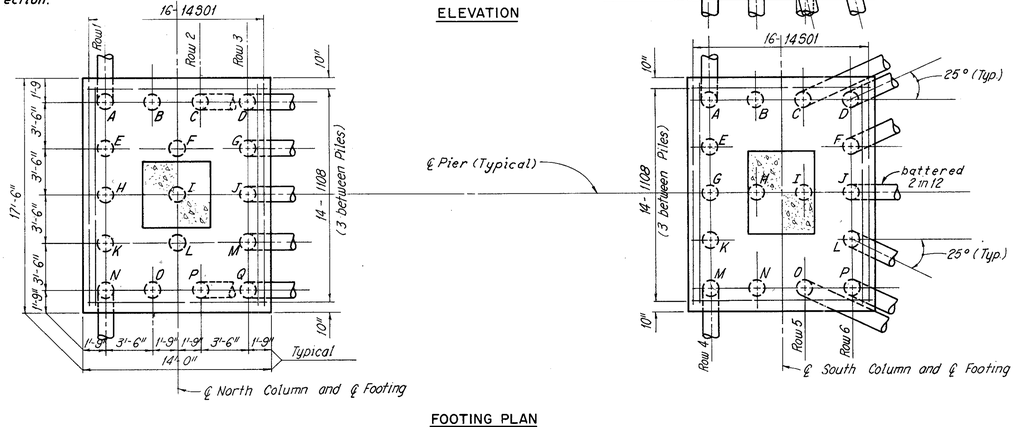


PILE BATTER TABLE	
Row	*All Battered piles, shall be inclined:
1	3 in 12
2	2 in 12
3	3 in 12
4	3 in 12
5	2 in 12
6	3 in 12 (Except as shown)

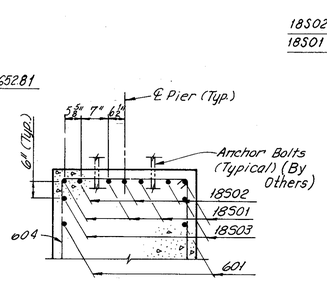
* See Footing Plan for Pile Direction.

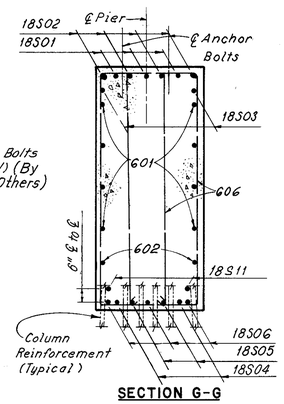
Note: All reinforcing bar marks shall be prefixed PAA

ELEVATION



FOOTING PLAN





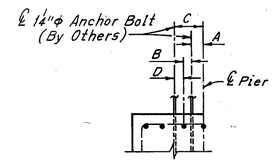
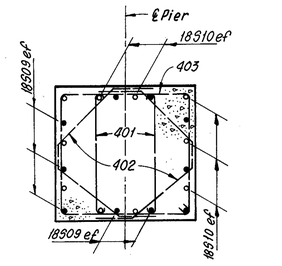
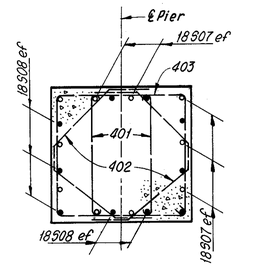
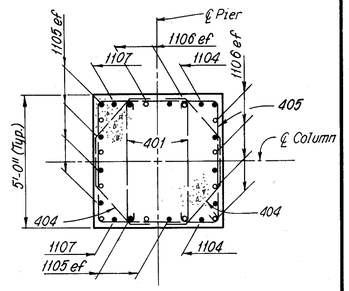


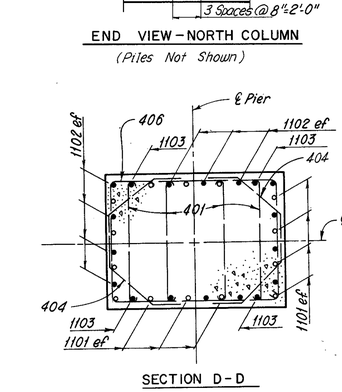
TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 22L				
A thru G	4"	2½"	9½"	3"
H	3⅜"	2⅜"	8⅝"	2⅜"
J	3½"	3"	9⅛"	2⅜"
N	3⅜"	2⅝"	10½"	4"

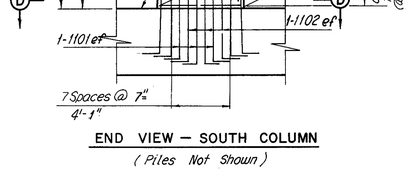






Note:
For Notes, see Sheet 28/80.
The following abbreviations are used:
ef = each face





H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 22L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN D.M.P.	TRACED A.J.T.	CHECKED T.D.S.	REVIEWED C.A.B.	REVISED
DATE 5-28-70	DATE 6-15-70	DATE 6-29-70	DATE 10-18-85	SHEET 56/80

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

130
174

CUYAHOGA COUNTY
CUY-290-0.27

Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting.

℄ Girder P | ℄ Girder Q | ℄ Girder R | ℄ Girder S and ℄ Bolster (Typical, Girders Q thru T) | ℄ Girder T | ℄ Girder U and ℄ Bolster (Typical, Girders P,U, V and W) | ℄ Girder V | ℄ Girder W | ℄ Girder ZA | ℄ Girder ZB and ℄ Bolster (Typical, Girders ZA thru ZD) | ℄ Girder ZC | ℄ Girder ZD

73°38'28" | 73°36'41" | 73°34'54" | 73°33'11" | 73°31'30" | 73°29'48" | 73°28'11" | 73°26'35" | 71°25'58" | 68°52'28" | 68°03'48" | 67°26'10"

℄ Pier

10-501 @ 6" (Typical)

2'-6" | 7 Girder Spaces @ about 8'-1¾" = 57'-0⅝" | 2'-6" (Typical) | 7'-5⅞" | 8'-7" | 9'-4⅜" | 9'-5¼" | 2'-6"

96'-10½"

1¼" ϕ Anchor Bolt (Typ) (By Others)

2'-0" | 4'-0" (Typical)

PLAN

Bottom | Top | Bottom | Top | Bottom | Location of Stirrup Hooks

Elev. 652.68 | Elev. 652.80 | Elev. 652.58 | Elev. 652.37 | Elev. 652.15 | Elev. 651.86 | Elev. 651.64 | Elev. 651.42 | Elev. 650.88 | Elev. 650.61 | Elev. 650.37 | Elev. 650.12

3-18S06 to alternate with 2-18S07 | 10'-0" | Splice 18S06 and 18S07 to 18S08 (splice locations alternate with bars) | 10'-0" | 10'-3" | 15'-0" | Splice 18S12 and 18S11 to 18S08, (splice locations alternate with bars) | 10'-0" | 2-18S12 to alternate with 3-18S11

5'-6¼" (Typ.) | 3'-0" (Typ.) | 2-18S09 | 2-18S01 to alternate with 2-18S02 | 4-605 @ 17" ef | 5-18S08 | 2'-6" | 1-18S10 | 1-18S03 | 4-605 @ 17" ef | 1-606 ef | 18'-18" | 1-606 ef | 1-18S05 ef | 2-18S09 6" c/c (Typ.) | 2'-3" Min. (Typ.)

Construction Joint (Typical) Elev. 643.52

Splice 18S01 to 18S02 (splice locations alternate with bars) 19-601 @ about 18"

Elev. 642.35 | Elev. 641.18

2-18S01 to alternate with 2-18S02

1 Ser. 9-603 @ 17" | 9" | 9" | 10-601 @ 12" | 18" | 12-601 @ about 18" | 9" | 6" | 1 Ser. 12-602 @ 12"

8-601 to match battered face vertical column reinforcement (Typ.)

15'-0" | 33'-5¼" | 33'-5¼" | 15'-0"

5'-0" (Typ.)

4-1121 to alternate with 4-1122 ef (Typ.)

℄ Column A | ℄ Column B | ℄ Column C

Optional Construction Joint (Typical)

Note: All reinforcing bar marks shall be prefixed PBB.

Elev. 603.5 (At ℄ Pier, Typical) | 2'-0" Min. (Typical) | Final Ground Line

Elev. 604.5 | 8-1115 ef | 8-1114 ef | 8-1113 ef

Construction Joint (Typ.)

Item 601, Crushed Aggregate Slope Protection, as per plan.

Elev. 598.0'

4-1106 to alternate with 4-1107 ef (Typ.)

Elev. 596.00 | Elev. 601.9 | Elev. 600.7 | Elev. 599.0 | Elev. 593.00 | Elev. 588.50

3" Clr. (Typ.) | 5'-0" (Typical) | 1'-0" (Typ.)

ELEVATION

℄ Pier and ℄ Column

4'-0"

Construction Joint

9'-0" (Min.) (Typical)

14'-0"

1-1121 ef

1-1122 ef

Batter 3" per Foot

1-1118 (Col. A) ef
1-1117 (Col. B) ef
1-1116 (Col. C) ef

1-1120 (Col. A) ef
1-1119 (Col. B) ef
1-1119 (Col. C) ef

Optional Construction Joint

1-1110 (Col. A) ef
1-1109 (Col. B) ef
1-1108 (Col. C) ef
1-1115 (Col. A) ef
1-1114 (Col. B) ef
1-1113 (Col. C) ef

1-1112 (Col. A) ef
1-1111 (Col. B) ef
1-1109 (Col. C) ef

12" | 29 Lines of 2-407 and 2-406 to match 1 Ser. 29-405 @ about 12"

See Footing Dowel Details | For reinforcing see Footing Dowel Details | Match Line B

TYPICAL COLUMN END VIEW

℄ Pier

1122 ef | 1121 ef | 1121 ef

405 | ℄ Column | 407 | 406 | 406

1118 (Col. A), 1117 (Col. B) 1116 (Col. C) ef | 1122 ef | 1120 (Col. A), 1116 (Col. B) 1119 (Col. C) ef

SECTION C-C

1118 (Col. A) 1117 (Col. B) 1116 (Col. C) | 1120 (Col. A) 1116 (Col. B) 1119 (Col. C) | 1112 (Column A) 1111 (Column B) 1109 (Column C)

1110 (Col. A) 1109 (Col. B) 1108 (Col. C)

404 | 407 | 406 | 1115 (Col. A) 1114 (Col. B) 1113 (Col. C) (Typical except as noted)

1110 (Col. A) | 1112 (Col. A)

1118 (Col. A) 1117 (Col. B) 1116 (Col. C) | 1109 (Col. B) 1108 (Col. C) | 1120 (Col. A) 1116 (Col. B) 1119 (Col. C) | 1111 (Col. B) 1109 (Col. C)

SECTION B-B

Optional Construction Joint

Match Line, for continuation see Typical End Column View

4-1113 ef

19'-8¼"

1-1108 ef | 1-1109 ef
1-1116 ef | 1-1119 ef

15 Lines of 4-407 and 2-406 to match 1 Ser. 15-404 @ about 12"

1-1105 ef | 12"

7 Lines of 4-407 and 2-406 to match 1 Ser. 7-403 @ about 12"

1-1107 ef | 1-1106 ef

COLUMN C

Match Line, for continuation see Typical End Column View

Optional Construction Joint

14'-6¼" (Col. A) 16'-4¼" (Col. B)

1-1118 (Col. A) ef
1-1117 (Col. B) ef
1-1110 (Col. A) ef
1-1109 (Col. B) ef

1-1115 (Col. A) ef
1-1114 (Col. B) ef

15 Lines of 4-404 and 2-406 to match 1 Ser. 15-404 @ about 12"

3 Lines of 4-407 and 2-406 to match 1 Ser. 3-402 @ about 12" (Column B)

1-1112 (Col. A) ef
1-1111 (Col. B) ef
1-1120 (Col. A) ef
1-1116 (Col. B) ef

1-401 | 4-407 and 2-406 (Col. A)

1-1106 ef

1-1103 (Col. A) ef
1-1104 (Col. B) ef

1-1103 (Col. A) ef
1-1104 (Col. B) ef

1-1107 ef

9 Spaces @ 7"=5'-3"

COLUMN A AND COLUMN B

FOOTING DOWEL DETAILS

14-1102

℄ Column A and ℄ Footing

Column A Top of Footing

14-1101 (3 Between piles, Typical)

6'-7¾"

℄ Pier

3'-6" | 3'-6" | 3'-6" | 3'-6" | 1'-9" | 1'-9"

17'-6"

1'-9" | 3'-6" | 1'-9" | 1'-9" | 3'-6" | 1'-9" (Typical)

14'-0"

FOOTING PLAN

14-1102

℄ Column B or C and ℄ Footing

Pile for Column C Footing, only

Column B Top of Footing | Column C Top of Footing

6'-9½" | 6'-11¾"

℄ Pier

A B C D E F G H I J K L M N O P Q R S

18S12 | 18S11 | 18S09 | 18S05 | 601 | 605 | 606 | 18S03 | 18S02 | 18S01

SECTION E-E

(Typical) 5" 7⅞" 6" ℄ Pier

18S06 | 18S09 | 18S07 | 603 | 605

Anchor Bolt (Typ.) (By Others)

PART SECTION F-F

℄ Pier

606 | 601 | 18S01 | 18S02

PART SECTION G-G

1107 ef | 1106 ef

℄ Column

406 | 407 | 406

401 (Col. A), 402 (Col. B), 403 (Col. C)

1103 (Col. A), 1104 (Col. B) 1105 (Col. C) ef | 1103 (Col. A), 1104 (Col. B), 1105 (Col. C) ef | 1106 ef | 1107 ef

℄ Pier

SECTION A-A

Notes:
For Notes see Sheet 28/80
For anchor bolt setting detail, see Sheet 58/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 22R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

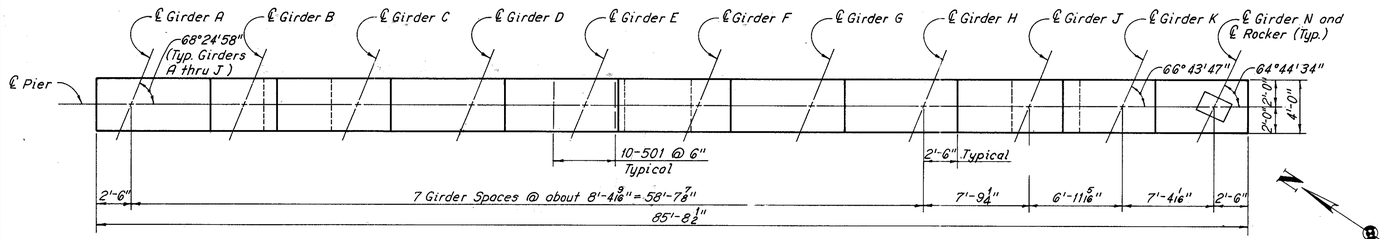
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED T.H.S.	REVIEWED A.G.	REVISED
DATE 6-2-70	DATE 6-11-70	DATE 6-23-70	DATE 10-18-85	SHEET 57/80

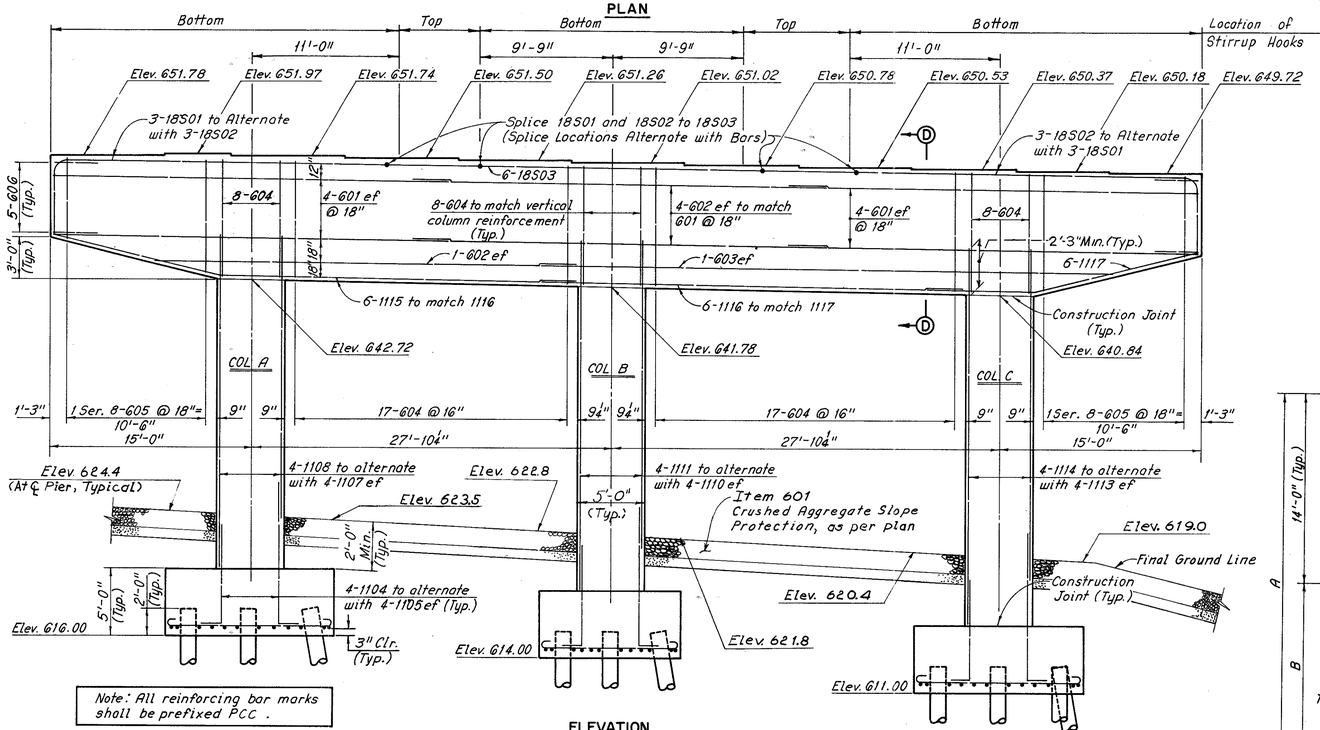
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

131
174

CUYAHOGA COUNTY
CUY-290-0.27

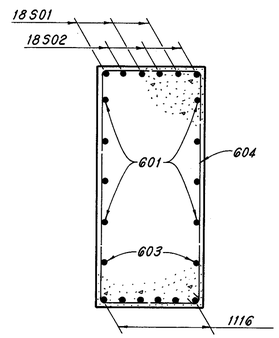


PLAN

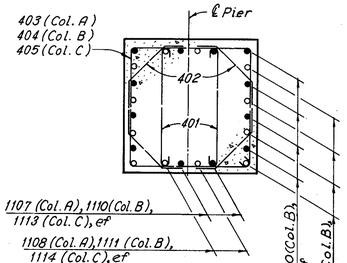


Note: All reinforcing bar marks shall be prefixed PCC.

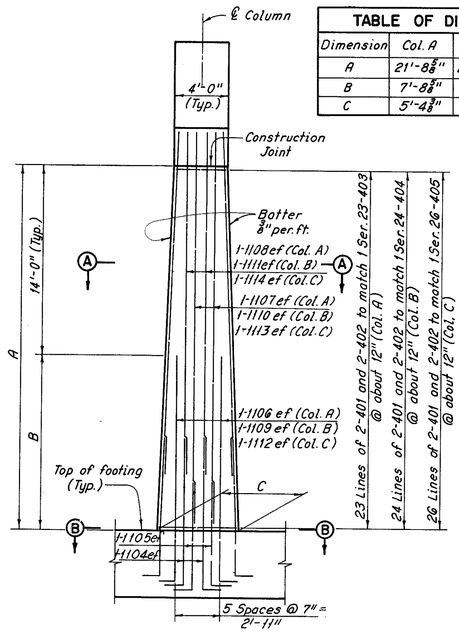
ELEVATION



SECTION D-D

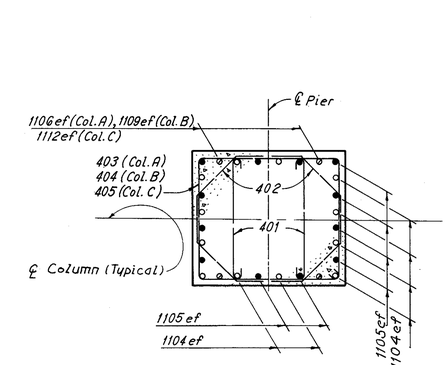


SECTION A-A

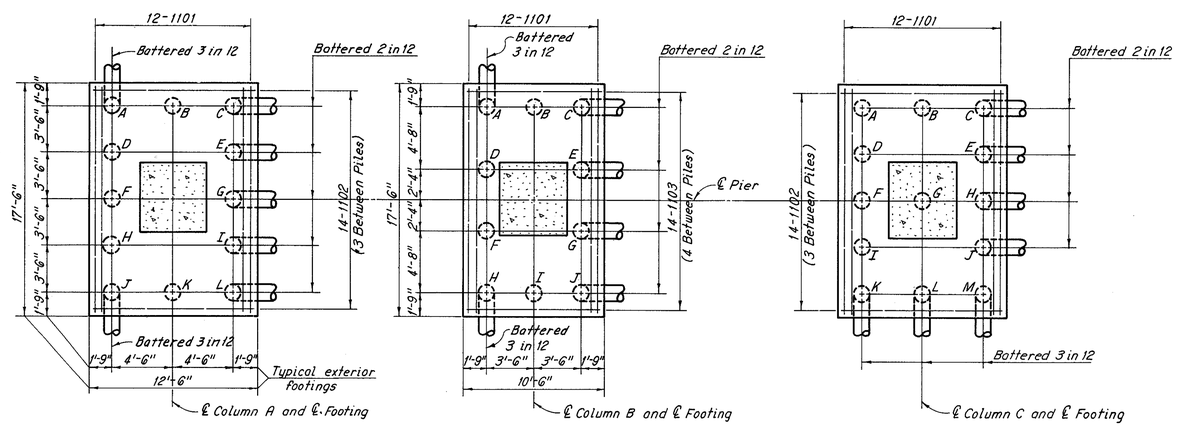


TYPICAL END VIEW
(Piles not shown)

TABLE OF DIMENSIONS			
Dimension	Col. A	Col. B	Col. C
A	21'-8 5/8"	22'-9 3/8"	24'-10 1/4"
B	7'-8 5/8"	8'-9 3/8"	10'-10 1/4"
C	5'-4 3/8"	5'-5 1/4"	5'-6 3/8"

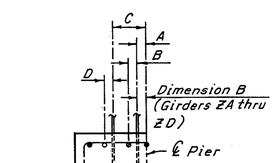


SECTION B-B



FOOTING PLAN

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 22R				
Q thru T	3 5/8"	2 3/8"	9 1/4"	4"
U thru W	3 6/8"	2 6/8"	10 2/8"	3 3/8"
ZA	3 4/8"	2 3/8"	11 2/8"	2 3/8"
ZB	2 2/8"	2 6/8"	11 6/8"	2"
ZC	2 3/8"	2 3/8"	12"	1 3/8"
ZD	2 6/8"	2 6/8"	12 6/8"	1 3/8"
P	4"	2"	10 3/8"	3 1/2"



ANCHOR BOLT SETTING
(Pier 22R)

Note:
For Notes see Sheet 28/80
The following abbreviations are used:
nf = near face
ff = far face
ef = each face

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 23 L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

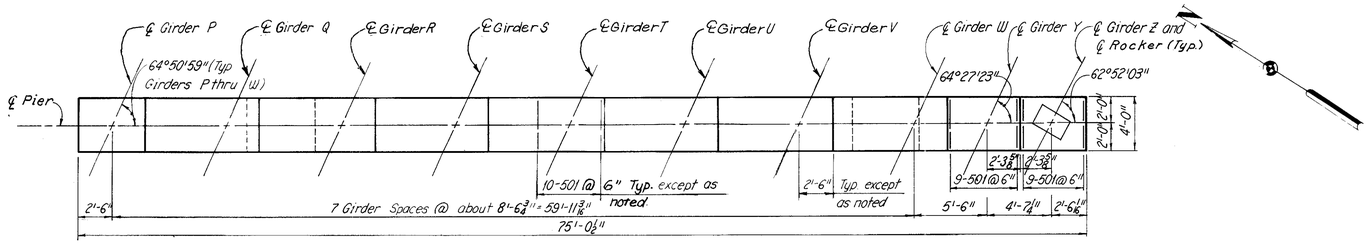
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

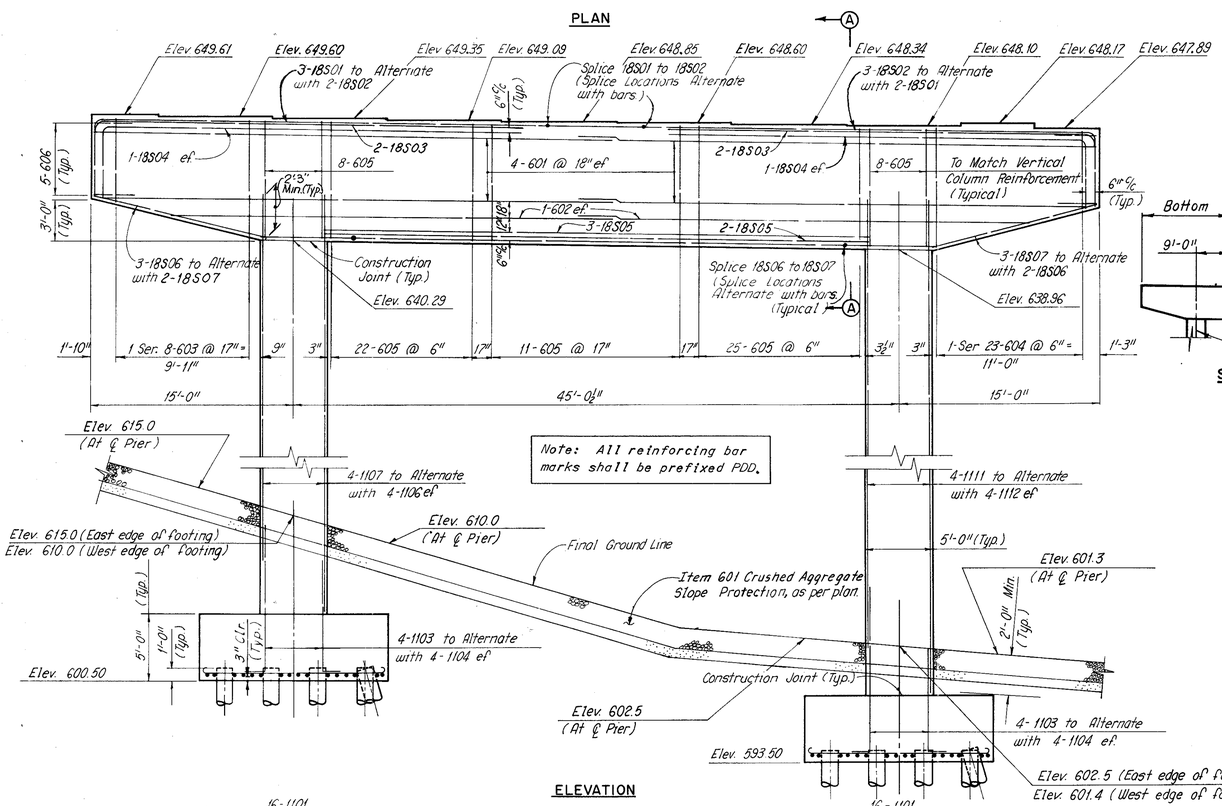
DRAWN D.M.P.	TRACED D.L.R	CHECKED S.M.S	REVIEWED C.A.B	REVISED
DATE 6-5-70	DATE 6-15-70	DATE 6-19-70	DATE 10-1885	SHEET 58/80

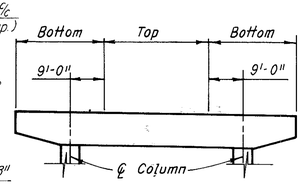
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

132
174

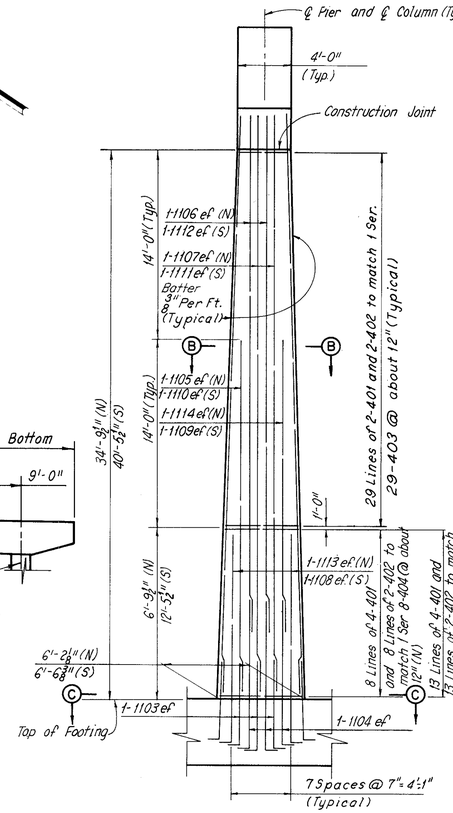
CUYAHOGA COUNTY
CUY-290-0.27





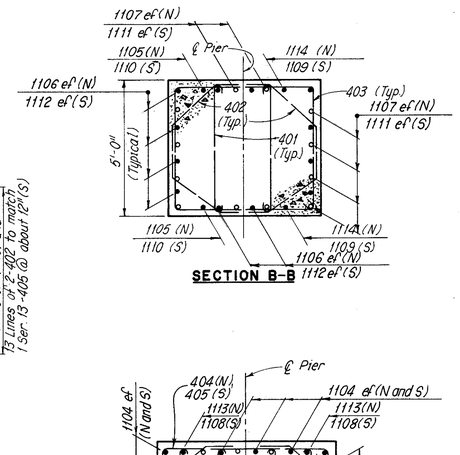


STIRRUP HOOKS LOCATION

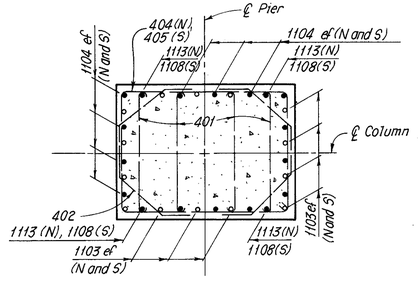


END VIEW – NORTH AND SOUTH COLUMNS

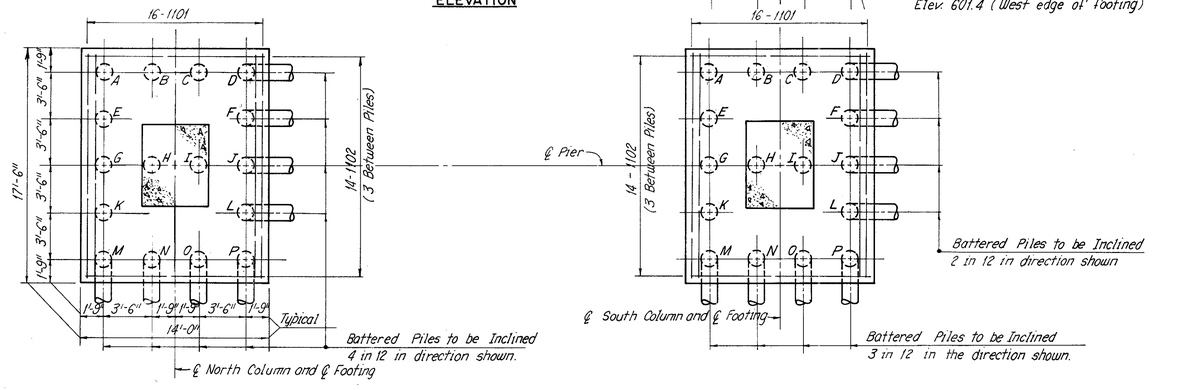
(Piles not shown)



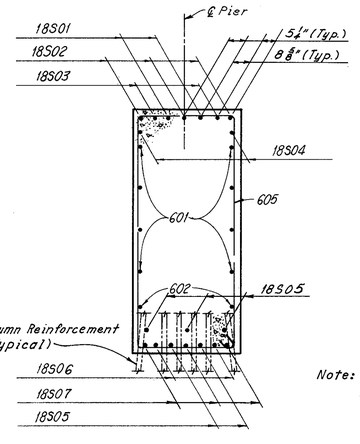
SECTION B-B



SECTION C–C



FOOTING PLAN



SECTION A-A

Note:
The following abbreviations are used:
(N) = North Column
(S) = South Column

Note:
For Notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 23R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

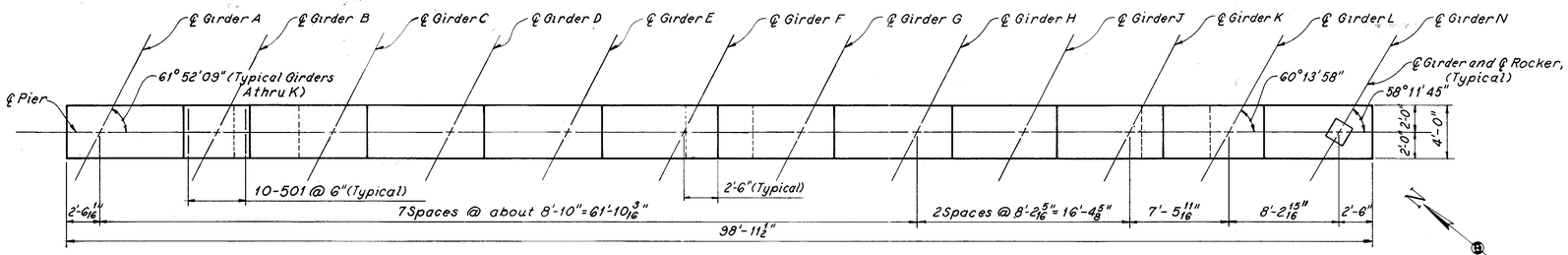
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN DMP	TRACED AJT	CHECKED TT	REVIEWED C.A.B.	REVISED
DATE 6-3-70	DATE 6-8-70	DATE 6-10-70	DATE 10-18-85	SHEET 59/80

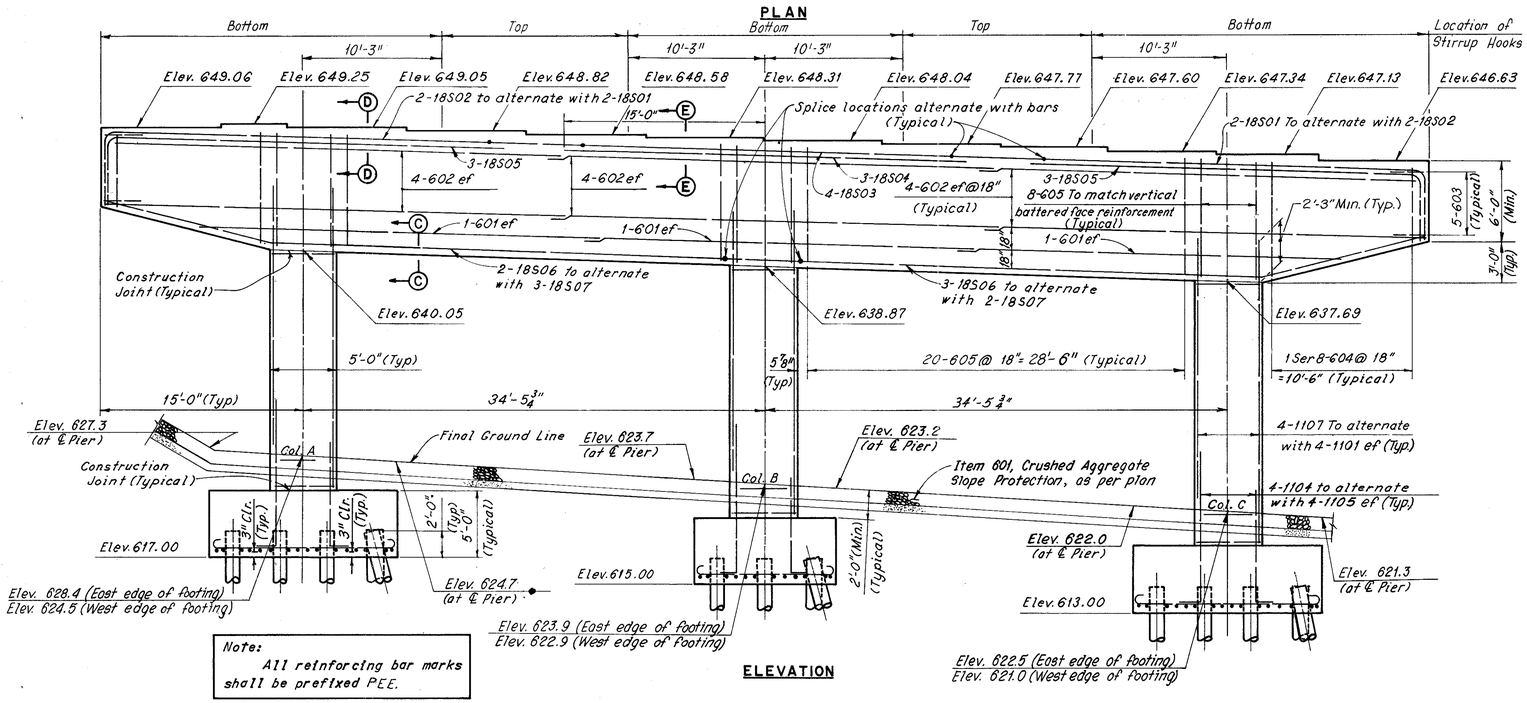
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

133
174

CUYAHOGA COUNTY
CUY-290-0.27

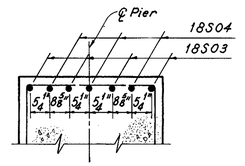


PLAN

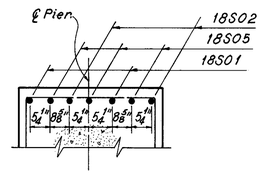


ELEVATION

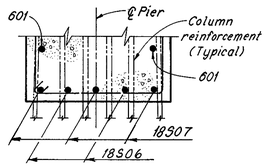
Note:
All reinforcing bar marks shall be prefixed PEE.



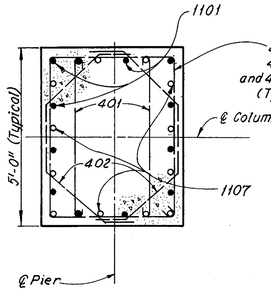
PART SECTION E-E



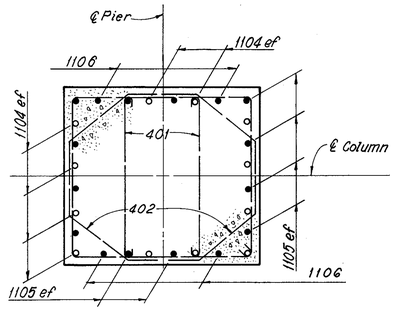
PART SECTION D-D



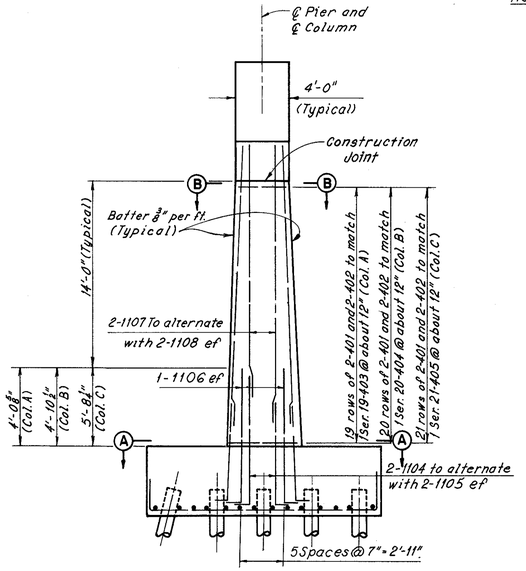
PART SECTION C-C



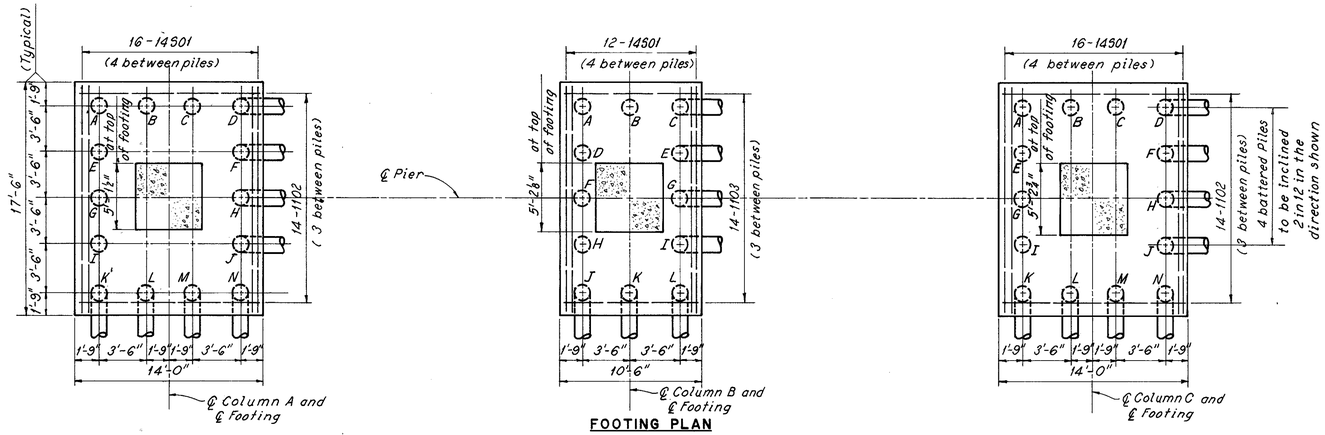
SECTION B-B



SECTION A-A



TYPICAL COLUMN END VIEW



FOOTING PLAN

Note:
For Notes see Sheet 28/80

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 24L

I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

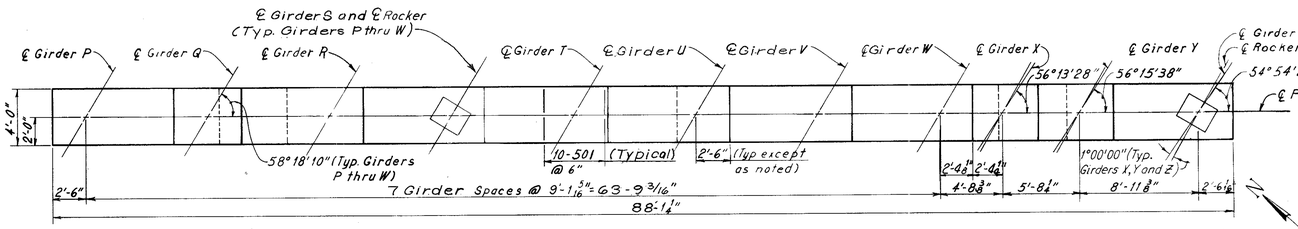
DRAWN JDS	TRACED R.C.K.	CHECKED S.M.S.	REVIEWED C.A.B.	REVISED
DATE 5-5-70	DATE 6-17-70	DATE 6-29-70	DATE 10-18-85	SHEET 60/80

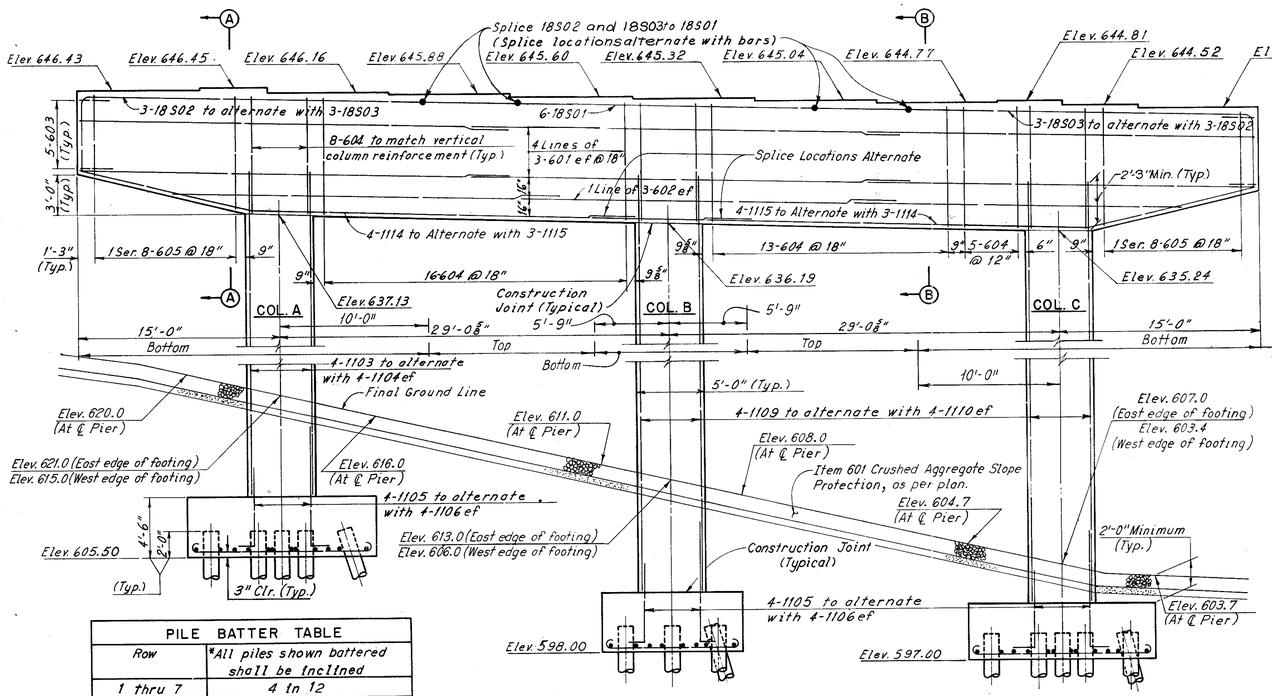
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

134
174

CUYAHOGA COUNTY
CUY-290-0.27

PLAN



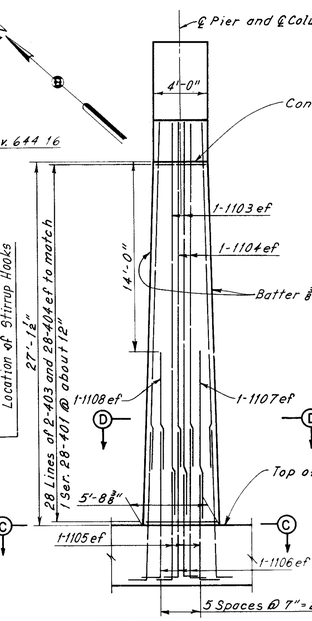


PILE BATTER TABLE	
Row	*All piles shown battered shall be inclined
1 thru 7	4 in 12
8 thru 11	3 in 12

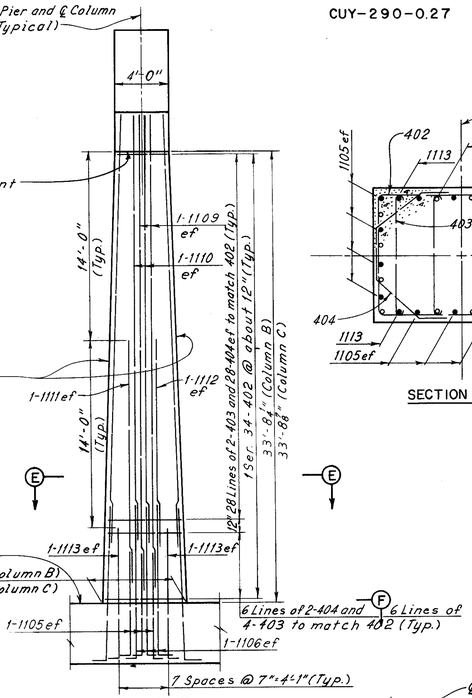
*See Footing Plans for pile directions.

ELEVATION

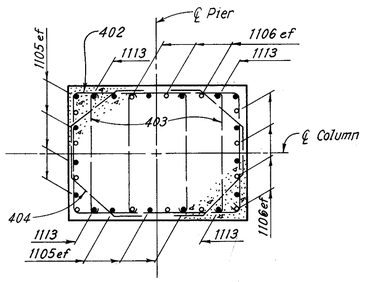
Note: All reinforcing bar marks shall be prefixed: PFF.



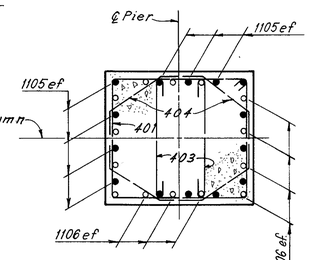
END VIEW - COLUMN A
(Piles not shown)



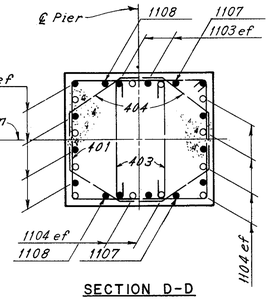
END VIEW
COLUMN B AND C
(Piles not shown)



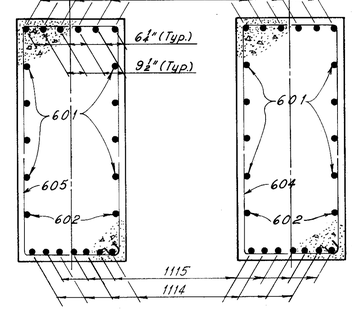
SECTION F-F



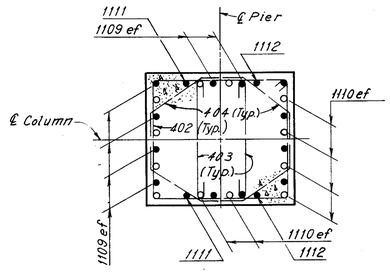
SECTION C-C



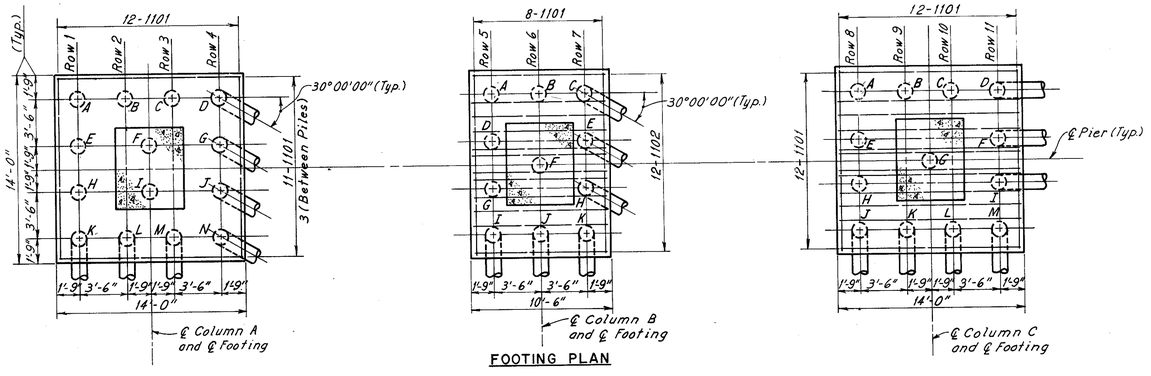
SECTION D-D



SECTION A-A SECTION B-B



SECTION E-E



FOOTING PLAN

Note:
For Notes see Sheet 28/80.

H.N.T.B. BR. NO. 9 PART 1 - SUBSTRUCTURE

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

PIER 24R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

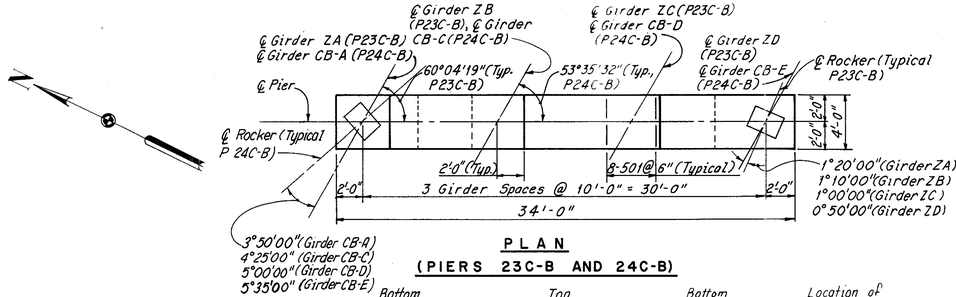
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN J.T.	TRACED W.S.C.	CHECKED D.M.P.	REVIEWED C.E.S.	REVISED
DATE 6-9-70	DATE 6-18-70	DATE 6-22-70	DATE 10-1885	SHEET 61/80

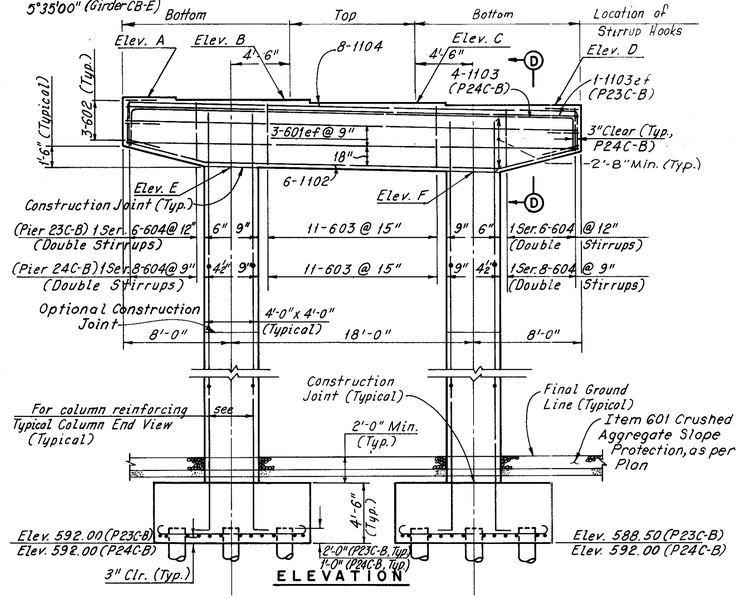
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

135
174

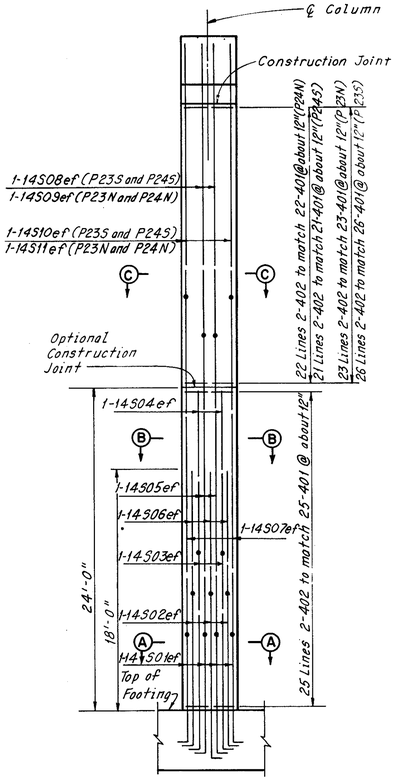
CUYAHOGA COUNTY
CUY-290-0.27



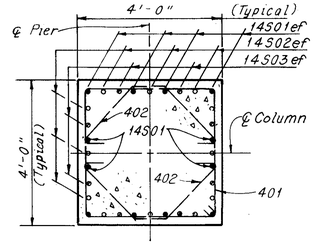
PLAN
(PIERS 23C-B AND 24C-B)



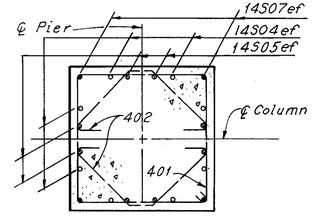
ELEVATION



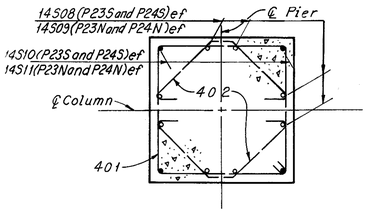
PIER 23C-B AND PIER 24C-B
TYPICAL COLUMN END VIEW



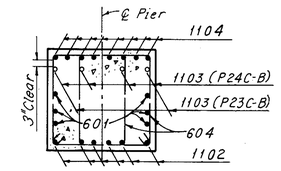
SECTION A-A



SECTION B-B



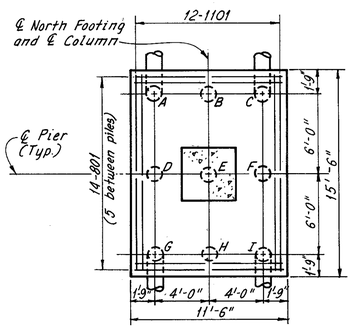
SECTION C-C



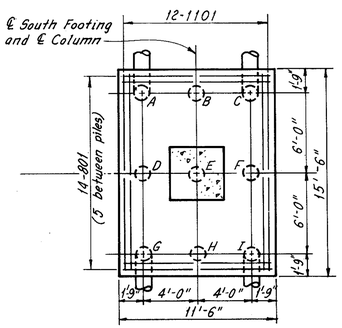
SECTION D-D

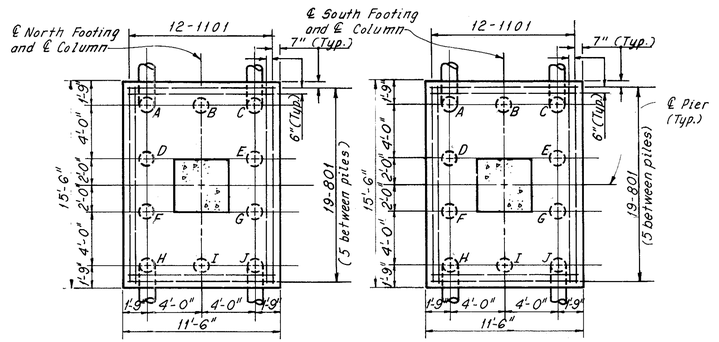
TABLE OF DIMENSIONS		
Elev.	Pier 23C-B	Pier 24C-B
A	648.01	646.66
B	647.52	646.35
C	647.15	646.02
D	646.78	645.67
E	642.29	641.23
F	641.86	640.50

Notes:
The following abbreviations are used:
P23N = Pier 23C-B North Column
P23S = Pier 23C-B South Column
P24N = Pier 24C-B North Column
P24S = Pier 24C-B South Column
ef = each face
For additional notes see Sheet 28/80



PIER 23C-B





PIER 24C-B

FOOTING PLANS

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 23C-B = PGG
Pier 24C-B = PHH

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIERS 23C-B AND 24C-B

I-290 OVER CUYAHOGA RIVER
BR NO CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED S.M.S.	REVIEWED C.A.B.	REVISED
DATE 6-9-70	DATE 6-24-70	DATE 7-17-70	DATE 10-18-85	SHEET 62/80

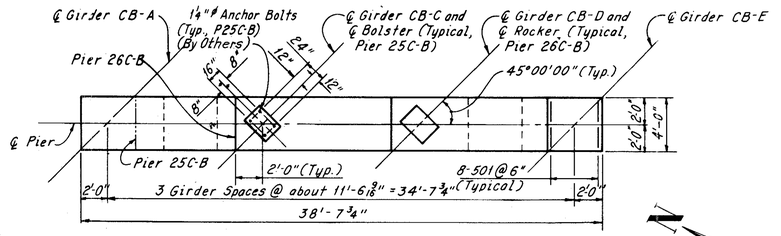
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

136
174

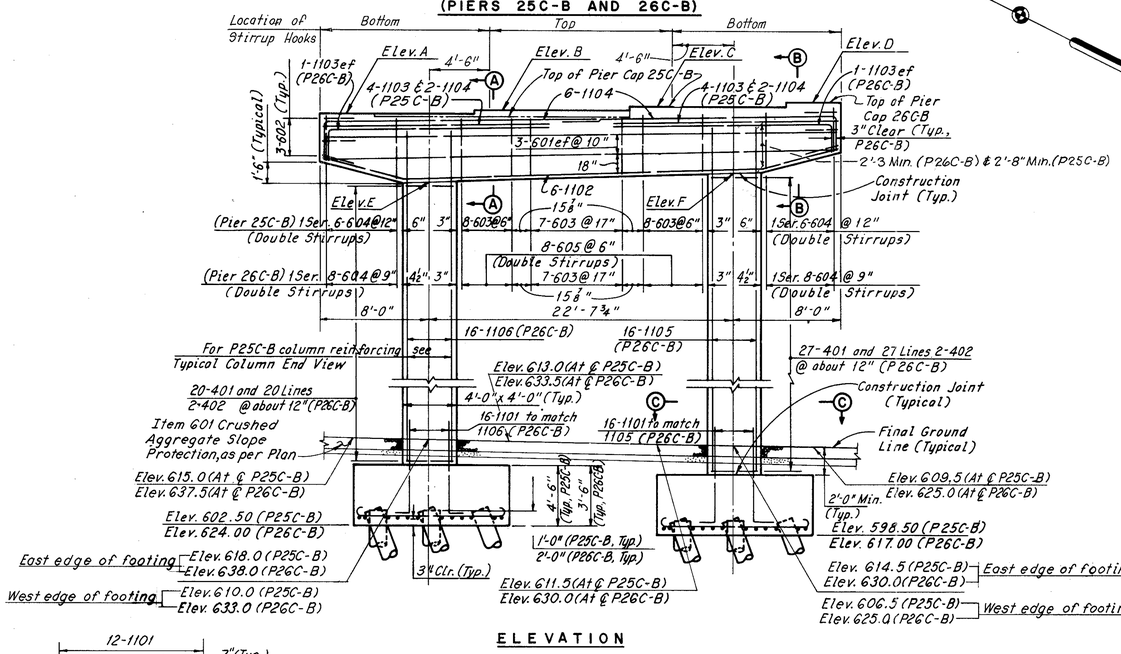
CUYAHOGA COUNTY
CUY-290-0.27

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 25C-B = PJJ
Pier 26C-B = PKK

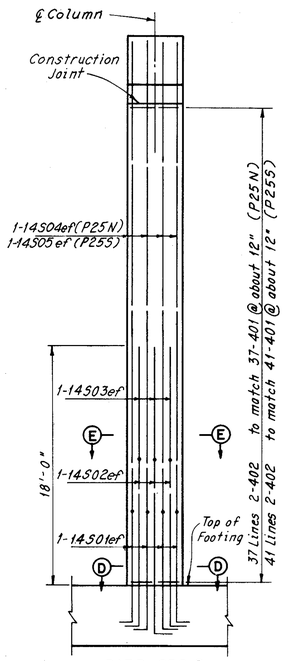
Note: Special care shall be taken when placing reinforcing steel so as not to interfere with anchor bolt setting for Pier 25C-B.



PLAN
(PIERS 25C-B AND 26C-B)

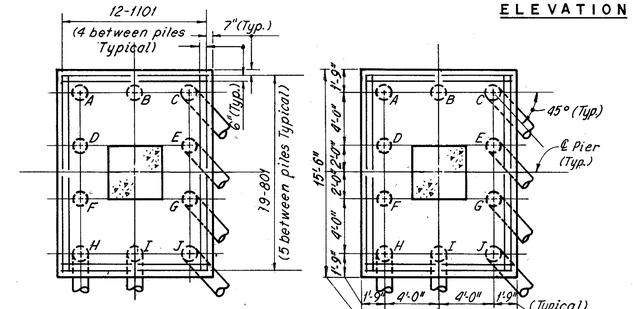


ELEVATION

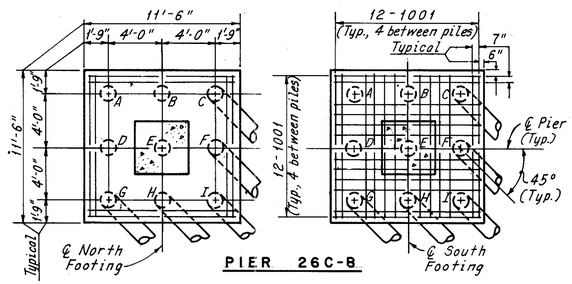


PIER 25C-B

TYPICAL COLUMN END VIEW



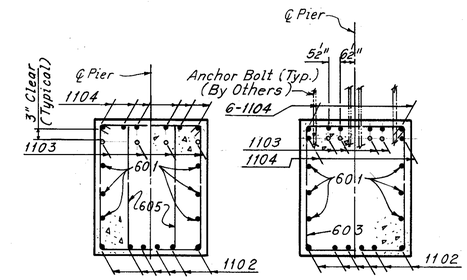
PIER 25C-B



PIER 26C-B

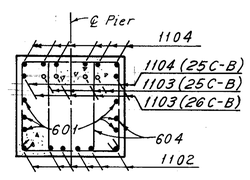
FOOTING PLANS

Note:
All piles shown battered shall be inclined 4 in 12 in the direction shown.

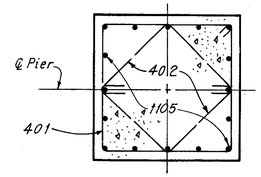


SECTION A-A
(Pier 26C-B)

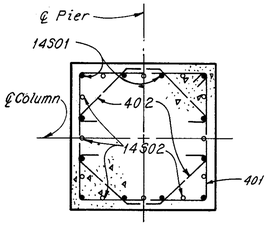
SECTION A-A
(Pier 25C-B)



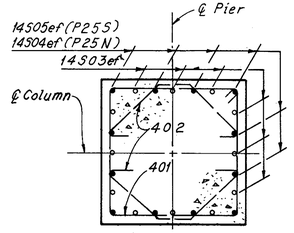
SECTION B-B



SECTION C-C
(Pier 26C-B)



SECTION D-D

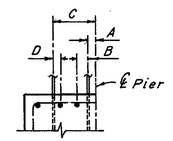


SECTION E-E

TABLE OF DIMENSIONS		
Elev.	Pier 25C-B	Pier 26C-B
A	647.82	651.46
B	647.78	651.66
C	647.79	651.85
D	647.84	652.05
E	642.75	646.35
F	642.75	646.80

Notes:
The following abbreviations are used:
P25N = Pier 25C-B North Column
P25S = Pier 25C-B South Column
ef = each face
For additional notes see Sheet 28/80

TABLE OF DIMENSIONS				
GIRDER	DIMENSION			
	A	B	C	D
PIER 25C-B				
A, C, D & E	28"	28⅛"	14⅛"	28"



ANCHOR BOLT SETTING

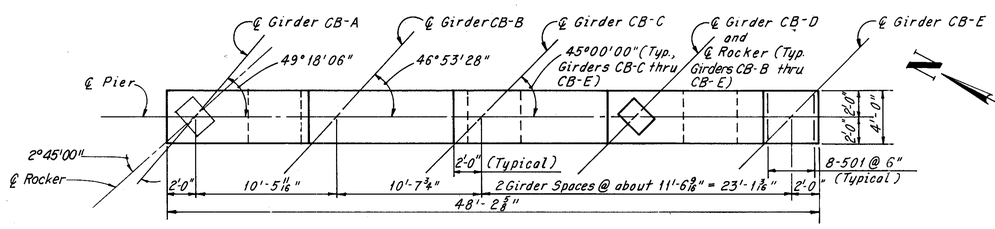
H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

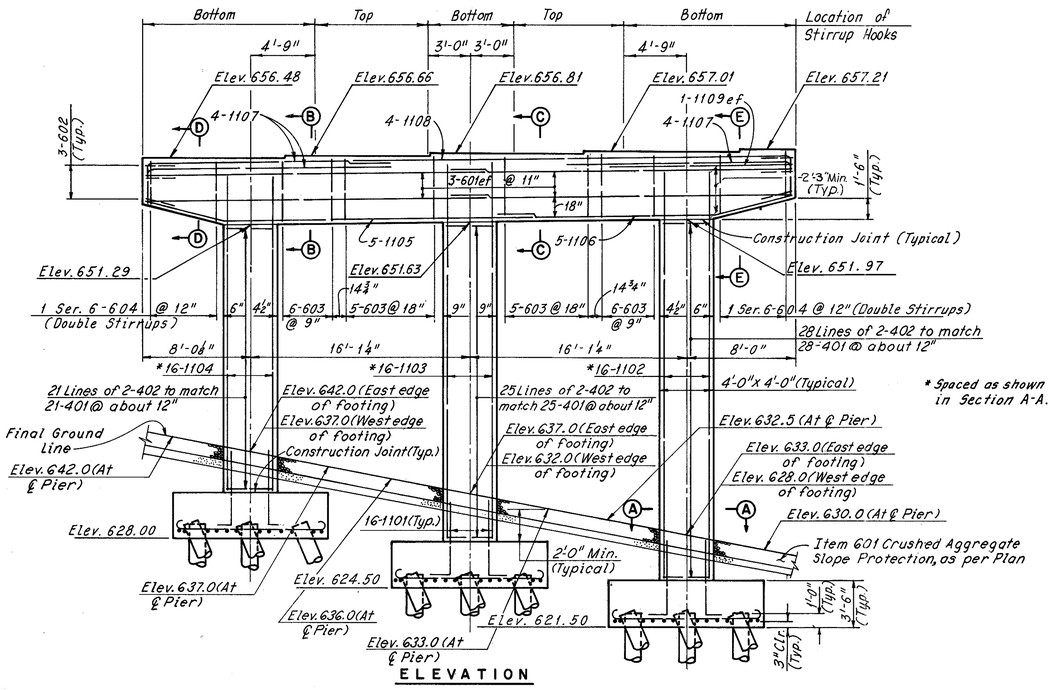
PIERS 25C-B AND 26C-B

I-290 OVER CUYAHOGA RIVER
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57
CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED S.A.S.	REVIEWED C.A.B.	REVISED
DATE 6-9-70	DATE 6-24-70	DATE 7-17-70	DATE 10-18-85	SHEET 63/80

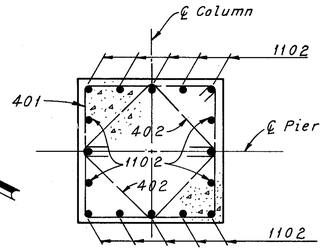


PLAN

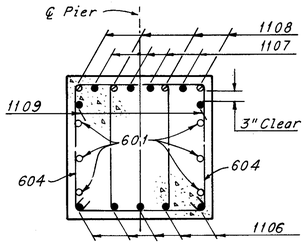


ELEVATION

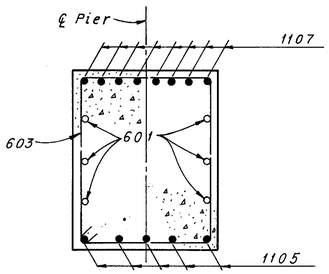
* Spaced as shown in Section A-A.



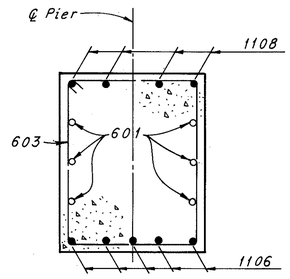
SECTION A-A



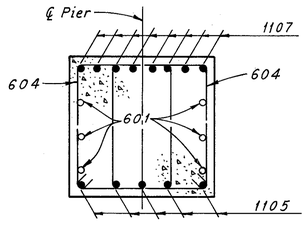
SECTION E-E



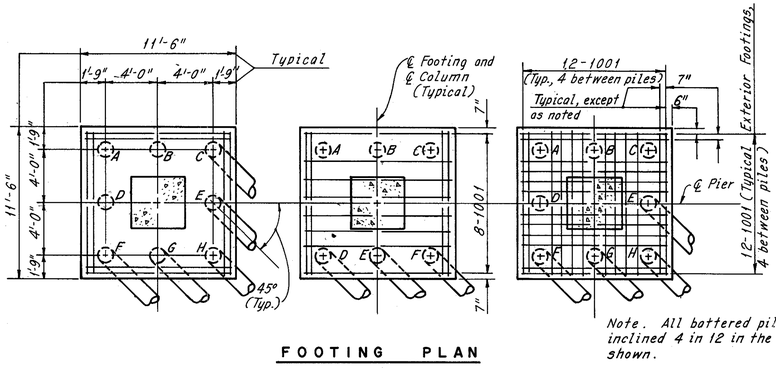
SECTION B-B



SECTION C-C



SECTION D-D



FOOTING PLAN

Note. All battered piles shall be inclined 4 in 12 in the direction shown.

Note: All reinforcing bar marks shall be prefixed PLL.

Note:
For Notes see Sheet 28/80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

137/174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

PIER 27C-B

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DMP DLS	C.P.	S.W.S.	K.A.B.	
DATE 6-13-70	DATE 6-25-70	DATE 7-17-70	DATE 10-18-85	SHEET 64/80

FHWA REGION	STATE	PROJECT	
2	OHIO		

138/174

CUYAHOGA COUNTY
CUY-290-0.27

	PIER 1L				PIER 1R				PIER 2L				PIER 2R				PIER 3L				PIER 3R			
	FOOTING				FOOTING				FOOTING				FOOTING				FOOTING				FOOTING			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
A	179	183	187	191	195	200	205	210	227	231	235	239	243	248	253	258	275	279	283	287	291	295	300	305
B	180	184	188	192	196	201	206	211	228	232	236	240	244	249	254	259	276	280	284	288	292	296	301	306
C	181	185	189	193	197	202	207	212	229	233	237	241	245	250	255	260	277	281	285	289	---	297	302	---
D	182	186	190	194	198	203	208	213	230	234	238	242	246	251	256	261	278	282	286	290	293	298	303	307
E	---	---	---	---	199	204	209	214	---	---	---	---	247	252	257	262	---	---	---	---	294	299	304	308

	PIER 4L			PIER 4R		PIER 5L		PIER 5R		PIER 6L		PIER 6R		PIER 7R		PIER 7L		PIER 8R	
	FOOTING			FOOTING		FOOTING		FOOTING		FOOTING		FOOTING		FOOTING		FOOTING		FOOTING	
	1	2	3	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
A	309	321	331	343	355	367	390	411	427	443	460	477	501	525	544	563	589	615	637
B	310	322	332	344	356	368	391	412	428	444	461	478	502	526	545	564	590	616	638
C	311	323	333	345	357	369	392	413	429	445	462	479	503	527	546	565	591	617	639
D	312	324	334	346	358	370	393	414	430	446	463	480	504	528	547	566	592	618	640
E	313	325	335	347	359	371	394	415	431	447	464	481	505	529	548	567	593	619	641
F	314	326	336	348	360	372	395	416	432	448	465	482	506	530	549	568	594	620	642
G	315	327	337	349	361	373	396	417	433	---	---	483	507	531	550	569	595	621	643
H	316	328	338	350	362	374	397	418	434	449	466	484	508	532	551	570	596	622	644
I	317	329	339	351	363	375	398	419	435	450	467	485	509	533	552	571	597	623	645
J	318	330	340	352	364	376	399	420	436	451	468	486	510	534	553	572	598	624	646
K	319	---	341	353	365	377	400	421	437	452	469	487	511	535	554	573	599	625	647
L	320	---	342	354	366	378	401	422	438	453	470	488	512	536	555	574	600	626	648
M	---	---	---	---	---	379	402	423	439	---	---	489	513	537	556	575	601	627	649
N	---	---	---	---	---	380	403	424	440	454	471	490	514	538	557	576	602	628	650
O	---	---	---	---	---	381	404	425	441	455	472	491	515	539	558	577	603	629	651
P	---	---	---	---	---	382	405	426	442	456	473	492	516	540	559	578	604	630	652
Q	---	---	---	---	---	383	406	---	---	457	474	493	517	541	560	579	605	631	653
R	---	---	---	---	---	384	407	---	---	458	475	494	518	542	561	580	606	632	654
S	---	---	---	---	---	385	408	---	---	459	476	495	519	543	562	581	607	633	655
T	---	---	---	---	---	386	409	---	---	---	---	496	520	---	---	582	608	634	656
U	---	---	---	---	---	387	410	---	---	---	---	497	521	---	---	583	609	635	---
V	---	---	---	---	---	388	---	---	---	---	---	498	522	---	---	584	610	636	---
W	---	---	---	---	---	389	---	---	---	---	---	499	523	---	---	585	611	---	---
X	---	---	---	---	---	---	---	---	---	---	---	500	524	---	---	586	612	---	---
Y	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	587	613	---	---
Z	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	588	614	---	---

	PIER 9L					PIER 9R		PIER 10L							
	FOOTING					FOOTING		FOOTING							
	1		1		1	1	2		1		1		2		2
1A	657	2A	683	3A	709	A	711	731	1A	751	2A	777	1A	793	2A	819
1B	658	2B	684	3B	710	B	712	732	1B	752	2B	778	1B	794	2B	820
1C	659	2C	685	--	---	C	713	733	1C	753	2C	779	1C	795	2C	821
1D	660	2D	686	--	---	D	714	734	1D	754	2D	780	1D	796	2D	822
1E	661	2E	687	--	---	E	715	735	1E	755	2E	781	1E	797	2E	823
1F	662	2F	688	--	---	F	716	736	1F	756	2F	782	1F	798	2F	824
1G	663	2G	689	--	---	G	717	737	1G	757	2G	783	1G	799	2G	825
1H	664	2H	690	--	---	H	718	738	1H	758	2H	784	1H	800	2H	826
1I	665	2I	691	--	---	I	719	739	1I	759	2I	785	1I	801	2I	827
1J	668	2J	692	--	---	J	720	740	1J	760	2J	786	1J	802	2J	828
1K	667	2K	693	--	---	K	721	741	1K	761	2K	787	1K	803	2K	829
1L	668	2L	694	--	---	L	722	742	1L	762	2L	788	1L	804	2L	830
1M	669	2M	695	--	---	M	723	743	1M	763	2M	789	1M	805	2M	831
1N	670	2N	696	--	---	N	724	744	1N	764	2N	790	1N	806	2N	832
1O	671	2O	697	--	---	O	725	745	1O	765	2O	791	1O	807	2O	833
1P	672	2P	698	--	---	P	726	746	1P	766	2P	792	1P	808	2P	834
1Q	673	2Q	699	--	---	Q	727	747	1Q	767	--	---	1Q	809	--	---
1R	674	2R	700	--	---	R	728	748	1R	768	--	---	1R	810	--	---
1S	675	2S	701	--	---	S	729	749	1S	769	--	---	1S	811	--	---
1T	676	2T	702	--	---	T	730	750	1T	770	--	---	1T	812	--	---
1U	677	2U	703	--	---	U	--	---	1U	771	--	---	1U	813	--	---
1V	678	2V	704	--	---	V	--	---	1V	772	--	---	1V	814	--	---
1W	679	2W	705	--	---	W	--	---	1W	773	--	---	1W	815	--	---
1X	680	2X	706	--	---	X	--	---	1X	774	--	---	1X	816	--	---
1Y	681	2Y	707	--	---	Y	--	---	1Y	775	--	---	1Y	817	--	---
1Z	682	2Z	708	--	---	Z	--	---	1Z	776	--	---	1Z	818	--	---

	PIER 10R					PIER 11L							PIER 11R							
	FOOTING					FOOTING							FOOTING							
	1		1		2		2		1		1		1		1		2		2		2		2
1A	835	2A	861	1A	880	2A	906	1A	922	2A	948	3A	974	4A	1000	1A	1022	2A	1048	3A	1074	4A	1100
1B	836	2B	862	1B	881	2B	907	1B	923	2B	949	3B	975	4B	1001	1B	1023	2B	1049	3B	1075	4B	1101
1C	837	2C	863	1C	882	2C	908	1C	924	2C	950	3C	976	4C	1002	1C	1024	2C	1050	3C	1076	4C	1102
1D	838	2D	864	1D	883	2D	909	1D	925	2D	951	3D	977	4D	1003	1D	1025	2D	1051	3D	1077	4D	1103
1E	839	2E	865	1E	884	2E	910	1E	926	2E	952	3E	978	4E	1004	1E	1026	2E	1052	3E	1078	4E	1104
1F	840	2F	866	1F	885	2F	911	1F	927	2F	953	3F	979	4F	1005	1F	1027	2F	1053	3F	1079	4F	1105
1G	841	2G	867	1G	886	2G	912	1G	928	2G	954	3G	980	4G	1006	1G	1028	2G	1054	3G	1080	4G	1106
1H	842	2H	868	1H	887	2H	913	1H	929	2H	955	3H	981	4H	1007	1H	1029	2H	1055	3H	1081	4H	1107
1I	843	2I	869	1I	888	2I	914	1I	930	2I	956	3I	982	4I	1008	1I	1030	2I	1056	3I	1082	4I	1108
1J	844	2J	870	1J	889	2J	915	1J	931	2J	957	3J	983	4J	1009	1J	1031	2J	1057	3J	1083	4J	1109
1K	845	2K	871	1K	890	2K	916	1K	932	2K	958	3K	984	4K	1010	1K	1032	2K	1058	3K	1084	4K	1110
1L	846	2L	872	1L	891	2L	917	1L	933	2L	959	3L	985	4L	1011	1L	1033	2L	1059	3L	1085	4L	1111
1M	847	2M	873	1M	892	2M	918	1M	934	2M	960	3M	986	4M	1012	1M	1034	2M	1060	3M	1086	4M	1112
1N	848	2N	874	1N	893	2N	919	1N	935	2N	961	3N	987	4N	1013	1N	1035	2N	1061	3N	1087	4N	1113
1O	849	2O	875	1O	894	2O	920	1O	936	2O	962	3O	988	4O	1014	1O	1036	2O	1062	3O	1088	4O	1114
1P	850	2P	876	1P	895	2P	921	1P	937	2P	963	3P	989	4P	1015	1P	1037	2P	1063	3P	1089	4P	1115
1Q	851	2Q	877	1Q	896	--	---	1Q	938	2Q	964	3Q	990			1Q	1038	2Q	1064	3Q	1090		
1R	852	2R	878	1R	897	--	---	1R	939	2R	965	3R	991			1R	1039	2R	1065	3R	1091		
1S	853	2S	879	1S	898	--	---	1S	940	2S	966	3S	992			1S	1040	2S	1066	3S	1092		
1T	854	--	---	1T	899	--	---	1T	941	2T	967	3T	993			1T	1041	2T	1067	3T	1093		
1U	855	--	---	1U	900	--	---	1U	942	2U	968	3U	994			1U	1042	2U	1068	3U	1094		
1V	856	--	---	1V	901	--	---	1V	943	2V	969	3V	995			1V	1043	2V	1069	3V	1095		
1W	857	--	---	1W	902	--	---	1W	944	2W	970	3W	996	--	-----	1W	1044	2W	1070	3W	1096	--	-----
1X	858	--	---	1X	903	--	---	1X	945	2X	971	3X	997	--	-----	1X	1045	2X	1071	3X	1097	--	-----
1Y	859	--	---	1Y	904	--	---	1Y	946	2Y	972	3Y	998	--	-----	1Y	1046	2Y	1072	3Y	1098	--	-----
1Z	860	--	---	1Z	905	--	---	1Z	947	2Z	973	3Z	999	--	-----	1Z	1047	2Z	1073	3Z	1099	--	-----

Note:
Footings are numbered from north to south.

Note:
Pile numbers 4Q-1016 thru 4V-1021 for Pier 11L and 4Q-1116 thru 4V-1121 for Pier 11R have been deleted.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

PILE NUMBER IDENTIFICATION PIERS 1L THRU 11R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R.	D.L.R.	C.K.B.	C.A.B.	
DATE 10-13-83	DATE 10-13-83	DATE 10-24-83	DATE 10-18-83	

SHEET 65/80

FHWA REGION	STATE	PROJECT	
2	OHIO		

139/174

CUYAHOGA COUNTY
CUY-290-0.27

	PIER 12L		PIER 12R		PIER 13L		PIER 13R			
	FOOTING		FOOTING		FOOTING		FOOTING			
	1	2	1	2	1	2	1	2		2
A	1122	1144	1166	1188	1210	1236	1262	1284	1A	1310
B	1123	1145	1167	1189	1211	1237	1263	1285	1B	1311
C	1124	1146	1168	1190	1212	1238	1264	1286	1C	----
D	1125	1147	1169	1191	1213	1239	1265	1287	1D	----
E	1126	1148	1170	1192	1214	1240	1266	1288	1E	----
F	1127	1149	1171	1193	1215	1241	1267	1289	1F	----
G	1128	1150	1172	1194	1216	1242	1268	1290	1G	----
H	1129	1151	1173	1195	1217	1243	1269	1291	1H	----
I	1130	1152	1174	1196	1218	1244	1270	1292	1I	----
J	1131	1153	1175	1197	1219	1245	1271	1293	1J	----
K	1132	1154	1176	1198	1220	1246	1272	1294	1K	----
L	1133	1155	1177	1199	1221	1247	1273	1295	1L	----
M	1134	1156	1178	1200	1222	1248	1274	1296	1M	----
N	1135	1157	1179	1201	1223	1249	1275	1297	1N	----
O	1136	1158	1180	1202	1224	1250	1276	1298	1O	----
P	1137	1159	1181	1203	1225	1251	1277	1299	1P	----
Q	1138	1160	1182	1204	1226	1252	1278	1300	1Q	----
R	1139	1161	1183	1205	1227	1253	1279	1301	1R	----
S	1140	1162	1184	1206	1228	1254	1280	1302	1S	----
T	1141	1163	1185	1207	1229	1255	1281	1303	1T	----
U	1142	1164	1186	1208	1230	1256	1282	1304	1U	----
V	1143	1165	1187	1209	1231	1257	1283	1305	1V	----
W	----	----	----	----	1232	1258	----	1306	1W	----
X	----	----	----	----	1233	1259	----	1307	1X	----
Y	----	----	----	----	1234	1260	----	1308	1Y	----
Z	----	----	----	----	1235	1261	----	1309	1X	----

	PIER 14L		PIER 14R		PIER 15L		PIER 15R		PIER 16L		PIER 16R	
	FOOTING		FOOTING		FOOTING		FOOTING		FOOTING		FOOTING	
	1	2	1	2	1	2	1	2	1	2	1	2
A	1312	1334	1357	1379	1401	1417	1433	1447	1461	1481	1501	1520
B	1313	1335	1358	1380	1402	1418	1434	1448	1462	1482	1502	1521
C	1314	1336	1359	1381	1403	1419	1435	1449	1463	1483	1503	1522
D	1315	1337	1360	1382	1404	1420	1436	1450	1464	1484	1504	1523
E	1316	1338	1361	1383	1405	1421	1437	1451	1465	1485	1505	1524
F	1317	1339	1362	1384	1406	1422	1438	1452	1466	1486	1506	1525
G	1318	1340	1363	1385	1407	1423	1439	1453	1467	1487	1507	1526
H	1319	1341	1364	1386	1408	1424	1440	1454	1468	1488	1508	1527
I	1320	1342	1365	1387	1409	1425	1441	1455	1469	1489	1509	1528
J	1321	1343	1366	1388	1410	1426	1442	1456	1470	1490	1510	1529
K	1322	1344	1367	1389	1411	1427	1443	1457	1471	1491	1511	1530
L	1323	1345	1368	1390	1412	1428	1444	1458	1472	1492	1512	1531
M	1324	1346	1369	1391	1413	1429	1445	1459	1473	1493	1513	1532
N	1325	1347	1370	1392	1414	1430	1446	1460	1474	1494	1514	1533
O	1326	1348	1371	1393	1415	1431	----	----	1475	1495	1515	1534
P	1327	1349	1372	1394	1416	1432	----	----	1476	1496	1516	1535
Q	1328	1350	1373	1395	----	----	----	----	1477	1497	1517	1536
R	1329	1351	1374	1396	----	----	----	----	1478	1498	1518	1537
S	1330	1352	1375	1397	----	----	----	----	1479	1499	1519	1538
T	1331	1353	1376	1398	----	----	----	----	1480	1500	----	1539
U	1332	1354	1377	1399	----	----	----	----	----	----	----	----
V	1333	1355	1378	1400	----	----	----	----	----	----	----	----
W	----	1356	----	----	----	----	----	----	----	----	----	----
X	----	----	----	----	----	----	----	----	----	----	----	----
Y	----	----	----	----	----	----	----	----	----	----	----	----
Z	----	----	----	----	----	----	----	----	----	----	----	----

	PIER 17L		PIER 17R		PIER 18L			PIER 18R		PIER 19L			PIER 19R		PIER 20L		PIER 20R		PIER 21L		PIER 21R	
	FOOTING		FOOTING		FOOTING			FOOTING		FOOTING			FOOTING		FOOTING		FOOTING		FOOTING		FOOTING	
	1	2	1	2	1	2	3	1	2	1	2	3	1	2	1	2	1	2	1	2	1	2
A	1540	1560	1580	1599	1616	1635	1649	1665	1690	1712	1732	1748	1766	1786	1806	1822	1838	1854	1870	1885	1901	1921
B	1541	1561	1581	1600	1617	1636	1650	1666	1691	1713	1733	1749	1767	1787	1807	1823	1839	1855	1871	1886	1902	1922
C	1542	1562	1582	1601	1618	1637	1651	1667	1692	1714	1734	1750	1768	1788	1808	1824	1840	1856	1872	1887	1903	1923
D	1543	1563	1583	1602	1619	1638	1652	1668	1693	1715	1735	1751	1769	1789	1809	1825	1841	1857	1873	1888	1904	1924
E	1544	1564	1584	1603	1620	1639	1653	1669	1694	1716	1736	1752	1770	1790	1810	1826	1842	1858	1874	1889	1905	1925
F	1545	1565	1585	1604	1621	1640	1654	1670	1695	1717	1737	1753	1771	1791	1811	1827	1843	1859	1875	1890	1906	1926
G	1546	1566	1586	1605	1622	1641	1655	1671	1696	1718	1738	1754	1772	1792	1812	1828	1844	1860	1876	1891	1907	1927
H	1547	1567	1587	1606	1623	1642	1656	1672	1697	1719	1739	1755	1773	1793	1813	1829	1845	1861	1877	1892	1908	1928
I	1548	1568	1588	1607	1624	1643	1657	1673	1698	1720	1740	1756	1774	1794	1814	1830	1846	1862	1878	1893	1909	1929
J	1549	1569	1589	1608	1625	1644	1658	1674	1699	1721	1741	1757	1775	1795	1815	1831	1847	1863	1879	1894	1910	1930
K	1550	1570	1590	1609	1626	1645	1659	1675	1700	1722	1742	1758	1776	1796	1816	1832	1848	1864	1880	1895	1911	1931
L	1551	1571	1591	1610	1627	1646	1660	1676	1701	1723	1743	1759	1777	1797	1817	1833	1849	1865	1881	1896	1912	1932
M	1552	1572	1592	1611	1628	1647	1661	1677	1702	1724	1744	1760	1778	1798	1818	1834	1850	1866	1882	1897	1913	1933
N	1553	1573	1593	1612	1629	1648	1662	1678	1703	1725	1745	1761	1779	1799	1819	1835	1851	1867	1883	1898	1914	1934
O	1554	1574	1594	1613	1630	----	1663	1679	1704	1726	1746	1762	1780	1800	1820	1836	1852	1868	1884	1899	1915	1935
P	1555	1575	1595	1614	1631	----	1664	1680	1705	1727	1747	1763	1781	1801	1821	1837	1853	1869	----	1900	1916	1936
Q	1556	1576	1596	1615	1632	----	----	1681	1706	1728	----	1764	1782	1802	----	----	----	----	----	----	1917	1937
R	1557	1577	1597	----	1633	----	----	1682	1707	1729	----	1765	1783	1803	----	----	----	----	----	----	1918	1938
S	1558	1578	1598	----	1634	----	----	1683	1708	1730	----	----	1784	1804	----	----	----	----	----	----	1919	1939
T	1559	1579	----	----	----	----	----	1684	1709	1731	----	----	1785	1805	----	----	----	----	----	----	1920	----
U	----	----	----	----	----	----	----	1685	1710	----	----	----	----	----	----	----	----	----	----	----	----	----
V	----	----	----	----	----	----	----	1686	1711	----	----	----	----	----	----	----	----	----	----	----	----	----
W	----	----	----	----	----	----	----	1687	----	----	----	----	----	----	----	----	----	----	----	----	----	----
X	----	----	----	----	----	----	----	1688	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Y	----	----	----	----	----	----	----	1689	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Z	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

	PIER 22L		PIER 22R			PIER 23L			PIER 23R		PIER 24L			PIER 24R			PIER 23C-B		PIER 24C-B		PIER 25C-B	
	FOOTING		FOOTING			FOOTING			FOOTING		FOOTING			FOOTING			FOOTING		FOOTING		FOOTING	
	1	2	1	2	3	1	2	3	1	2	1	2	3	1	2	3	1	2	1	2	1	2
A	1940	1957	1973	1990	2008	2027	2039	2049	2062	2078	2094	2108	2120	2134	2148	2159	2172	2181	2190	2200	2210	2220
B	1941	1958	1974	1991	2009	2028	2040	2050	2063	2079	2095	2109	2121	2135	2149	2160	2173	2182	2191	2201	2211	2221
C	1942	1959	1975	1992	2010	2029	2041	2051	2064	2080	2096	2110	2122	2136	2150	2161	2174	2183	2192	2202	2212	2222
D	1943	1960	1976	1993	2011	2030	2042	2052	2065	2081	2097	2111	2123	2137	2151	2162	2175	2184	2193	2203	2213	2223
E	1944	1961	1977	1994	2012	2031	2043	2053	2066	2082	2098	2112	2124	2138	2152	2163	2176	2185	2194	2204	2214	2224
F	1945	1962	1978	1995	2013	2032	2044	2054	2067	2083	2099	2113	2125	2139	2153	2164	2177	2186	2195	2205	2215	2225
G	1946	1963	1979	1996	2014	2033	2045	2055	2068	2084	2100	2114	2126	2140	2154	2165	2178	2187	2196	2206	2216	2226
H	1947	1964	1980	1997	2015	2034	2046	2056	2069	2085	2101	2115	2127	2141	2155	2166	2179	2188	2197	2207	2217	2227
I	1948	1965	1981	1998	2016	2035	2047	2057	2070	2086	2102	2116	2128	2142	2156	2167	2180	2189	2198	2208	2218	2228
J	1949	1966	1982	----	2017	2036	2048	2058	2071	2087	2103	2117	2129	2143	2157	2168	----	----	2199	2209	2219	2229
K	1950	1967	1983	1999	2018	2037	----	2059	2072	2088	2104	2118	2130	2144	2158	2169	----	----	----	----	----	----
L	1951	1968	1984	2000	2019	2038	----	2060	2073	2089	2105	2119	2131	2145	----	2170	----	----	----	----	----	----
M	1952	1969	1985	2001	2020	----	----	2061	2074	2090	2106	----	2132	2146	----	2171	----	----	----	----	----	----
N	1953	1970	1986	2002	2021	----	----	----	2075	2091	2107	----	2133	2147	----	----	----	----	----	----	----	----
O	1954	1971	1987	2003	2022	----	----	----	2076	2092	----	----	----	----	----	----	----	----	----	----	----	----
P	1955	1972	1988	2004	2023	----	----	----	2077	2093	----	----	----	----	----	----	----	----	----	----	----	----
Q	1956	----	1989	2005	2024	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
R	----	----	----	2006	2025	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
S	----	----	----	2007	2026	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
T	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
U	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
V	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
W	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
X	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Y	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Z	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

	PIER 26C-B		PIER 27C-B		
	FOOTING		FOOTING		
	1	2	1	2	3
A	2230	2239	2248	2256	2262
B	2231	2240	2249	2257	2263
C	2232	2241	2250	2258	2264
D	2233	2242	2251	2259	2265
E	2234	2243	2252	2260	2266
F	2235	2244	2253	2261	2267
G	2236	2245	2254	----	2268
H	2237	2246	2255	----	2269
I	2238	2247	----	----	----

Note:
Footings are numbered from north to south.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

PILE NUMBER IDENTIFICATION
PIERS 12L THRU 27C-B

I-290 OVER CUYAHOGA RIVER

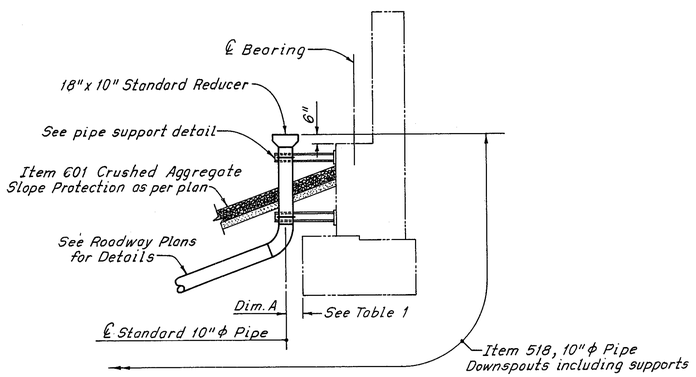
BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

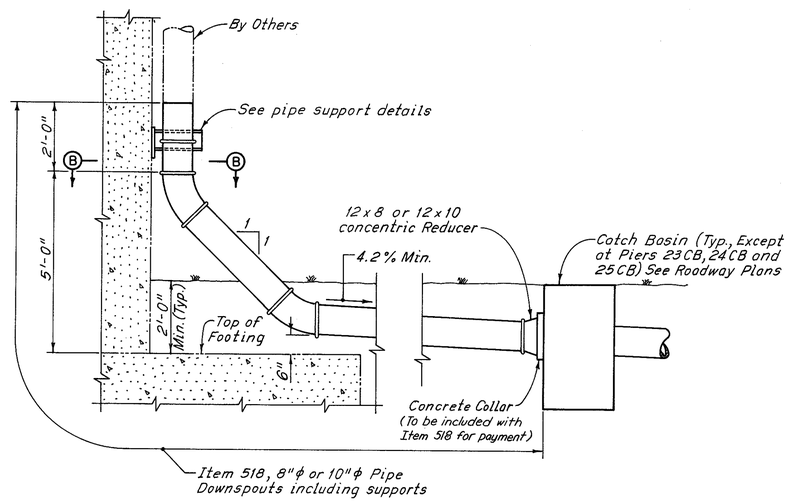
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.L.R. DATE 10-13-82	D.L.R. DATE 10-13-85	C.K.B. DATE 10-24-85	C. A.B. DATE 10-18-85	SHEET 66 80

FHWA REGION	STATE	PROJECT	
2	OHIO		

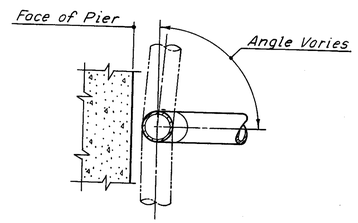
CUYAHOGA COUNTY
CUY- 290-027



DRAINAGE PIPE DETAIL AT EAST ABUTMENT

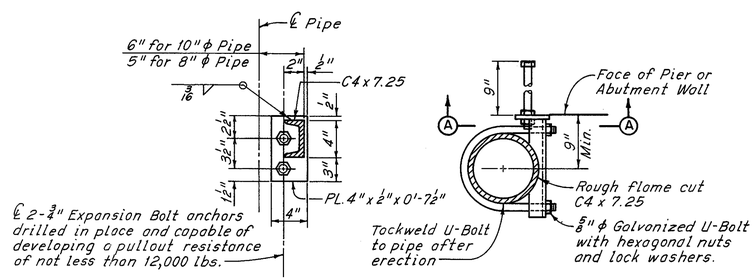


DRAINAGE PIPE DETAIL AT PIERS



SECTION B-B

TABLE I	
Location	Dim. A
N. Gtr. Ramp NW	2'-5⅝"
N. Median	2'-6½"
S. Median	9"
S. Gutter	1'-11½"



SECTION A-A PLAN

PIPE SUPPORT DETAIL ON PIERS AND EAST ABUTMENT

Support angles, expansion bolts, and U-bolts shall be included with Item 518, 8"ϕ Pipe Downspouts, for payment.

Note:
For locations of downspout pipes see Bridge Layout Diagrams Sheets 12/80 thru 17/80.
The minimum radius on all pipe bends shall be 18".

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

SUBSTRUCTURE DRAINAGE DETAILS

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
B.B. DATE 7-22-85	D.L.R DATE 7-22-85	R.H.W. DATE 7-23-85	C.A.B. DATE 10-18-86	SHEET 67 80

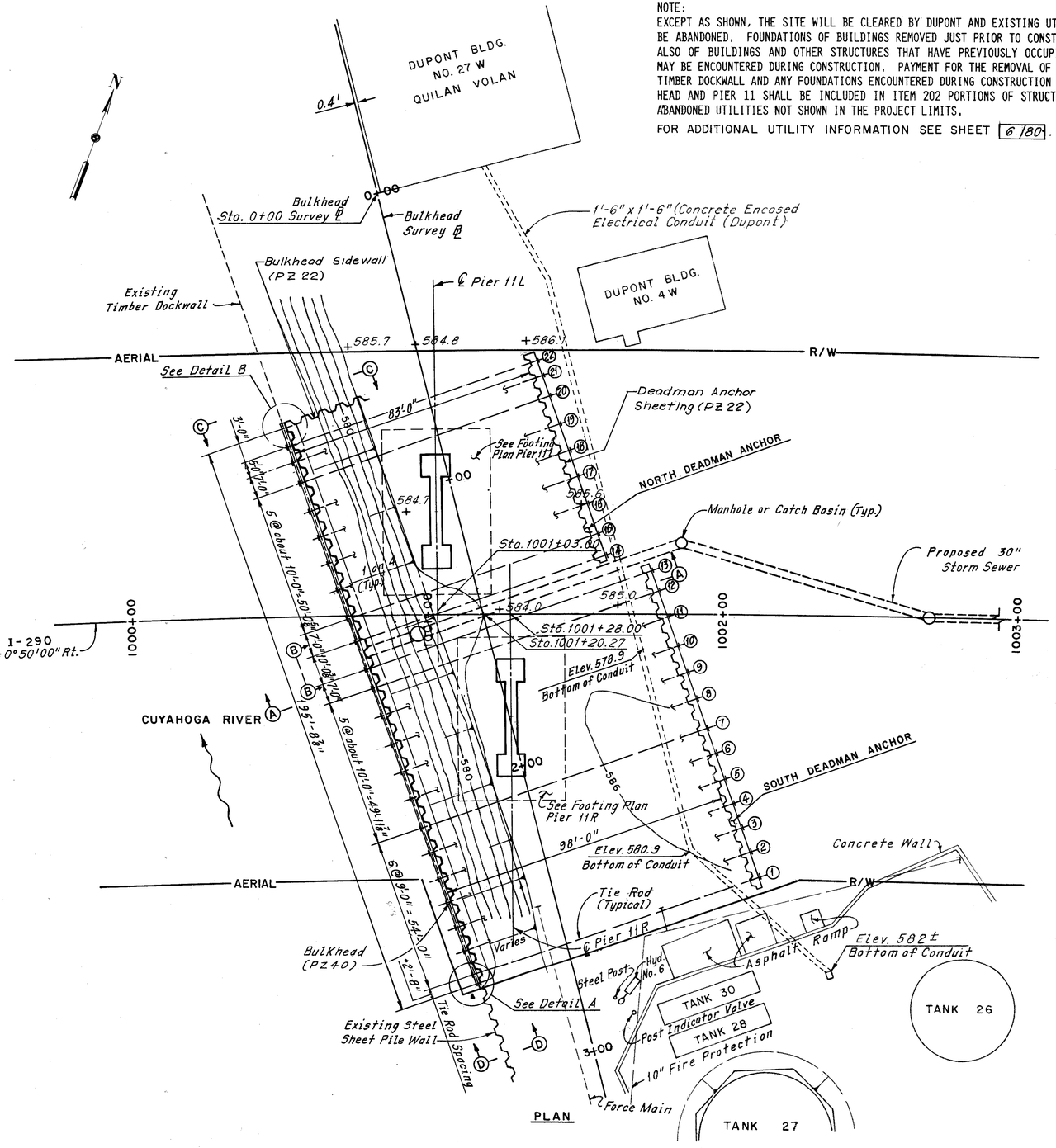
FHWA REGION	STATE	PROJECT	
2	OHIO		

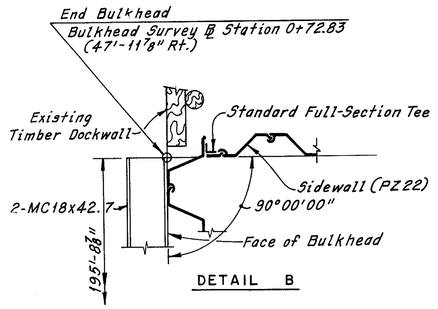
141
174

CUYAHOGA COUNTY
CUY- 290-027

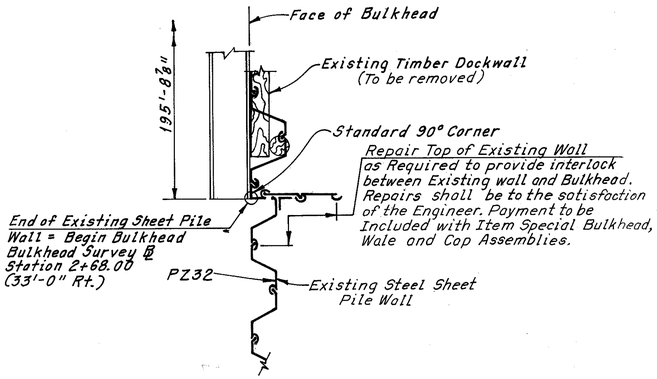
NOTE:
EXCEPT AS SHOWN, THE SITE WILL BE CLEARED BY DUPONT AND EXISTING UTILITIES WILL BE ABANDONED. FOUNDATIONS OF BUILDINGS REMOVED JUST PRIOR TO CONSTRUCTION, AND ALSO OF BUILDINGS AND OTHER STRUCTURES THAT HAVE PREVIOUSLY OCCUPIED THE SITE MAY BE ENCOUNTERED DURING CONSTRUCTION. PAYMENT FOR THE REMOVAL OF THE EXISTING TIMBER DOCKWALL AND ANY FOUNDATIONS ENCOUNTERED DURING CONSTRUCTION OF THE BULKHEAD AND PIER 11 SHALL BE INCLUDED IN ITEM 202 PORTIONS OF STRUCTURE REMOVED. ABANDONED UTILITIES NOT SHOWN IN THE PROJECT LIMITS.

FOR ADDITIONAL UTILITY INFORMATION SEE SHEET 6/80.





DETAIL B



DETAIL A

Notes:
For Section A-A and Elevation C-C, see Sheet 69/80.
For Elevation B-B and Section D-D, see Sheet 70/80.
For Bulkhead Survey ℄ Layout see Sheet 14/80.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

BULKHEAD REPLACEMENT AT PIER 11 LAYOUT

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110

STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

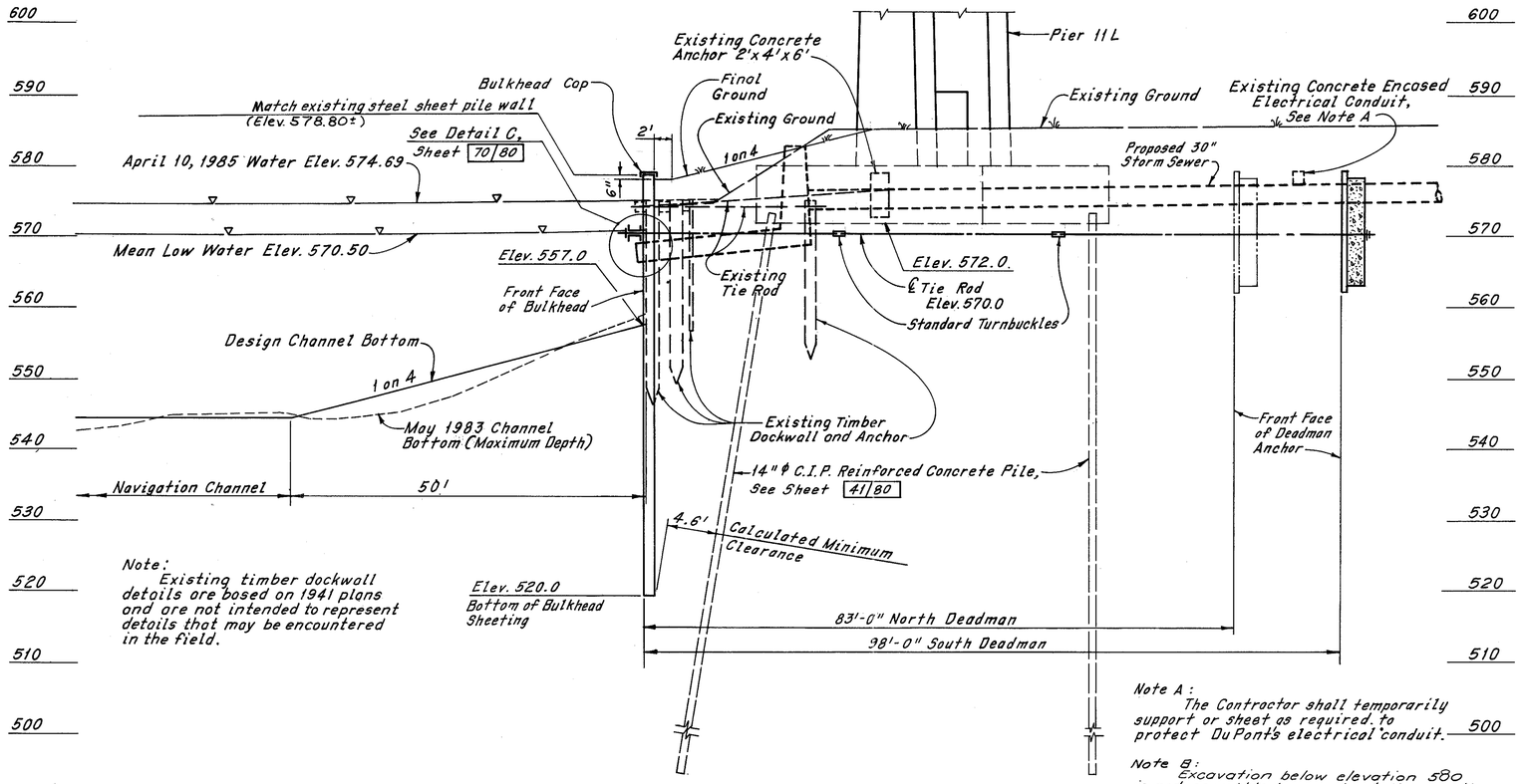
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
R.H.W. DATE 9-3-85	C.P. DATE 9-11-85	B.B. DATE 9-13-85	C.A.B. DATE 10-18-85	

SHEET 68/80

FHWA REGION	STATE	PROJECT	
2	OHIO		

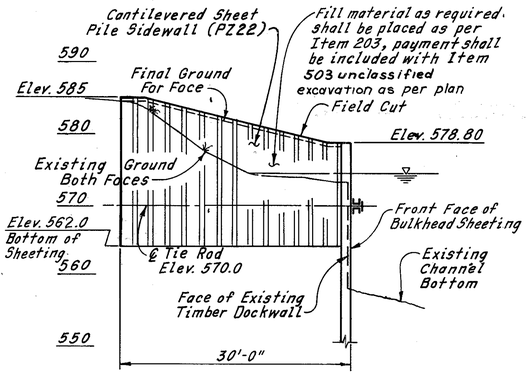
142 / 174

CUYAHOGA COUNTY
CUY- 290-027

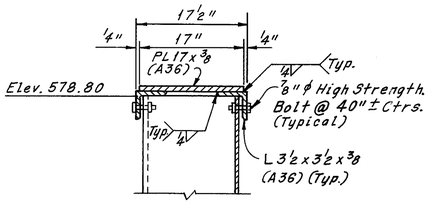


SECTION A-A

Note:
For location of Section A-A and Elevation C-C, see Layout on Sheet 68/80.

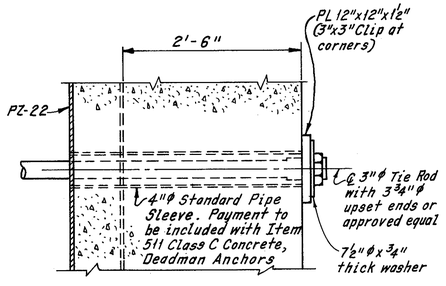


ELEVATION C-C
Scale: 1"=1'-0"

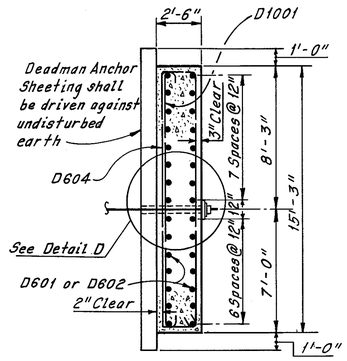


BULKHEAD CAP

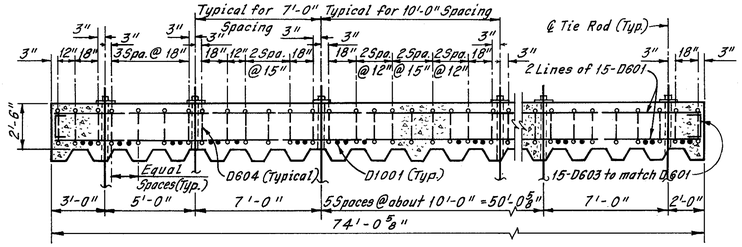
Note:
Required reinforcing bar lap lengths shall be 30 bar diameters minimum.



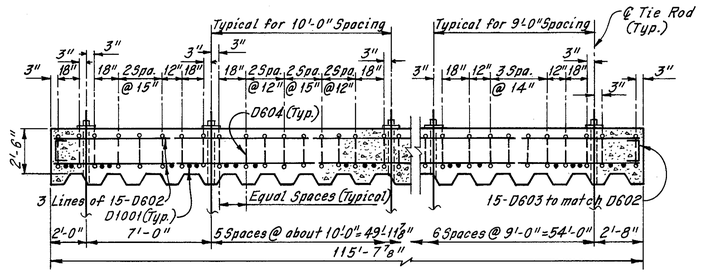
DETAIL D
(Reinforcing bars not shown)



TYPICAL SECTION



PLAN - NORTH DEADMAN REINFORCEMENT



PLAN - SOUTH DEADMAN REINFORCEMENT

DEADMAN REINFORCEMENT SCHEDULE

MARK	NO.	LENGTH	TYPE	WEIGHT	BENDING DIAGRAMS
D601	60	38'-0"	Str.	3,424	
D602	90	40'-0"	Str.	5,407	
D603	60	5'-7"	105	503	100, 105, 1'-11" D603
D604	169	34'-3"	109	8,694	
D1001	123	17'-7"	100	3,306	14'-9" D1001, 2'-0"
		TOTAL	=	27,334	109, 14'-9", 2'-1" D604

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

BULKHEAD REPLACEMENT AT PIER 11

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110

STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

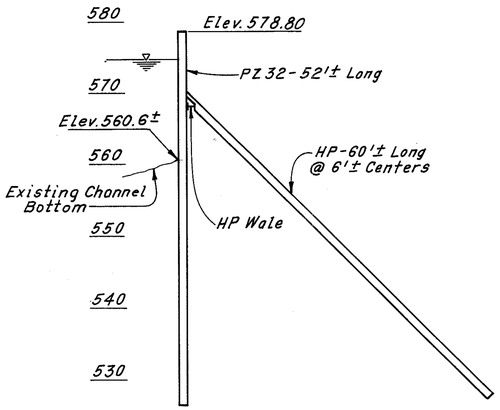
CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
R.H.W. DATE 9-9-85	C.P. DATE 9-20-85	B.B. DATE 9-20-85	C.A.B. DATE 10-18-85	SHEET 69/80

FHWA REGION	STATE	PROJECT	
2	OHIO		

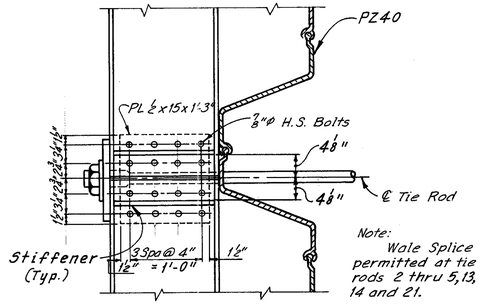
143
174

CUYAHOGA COUNTY
CUY- 290-027

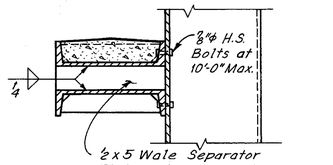


SECTION D-D

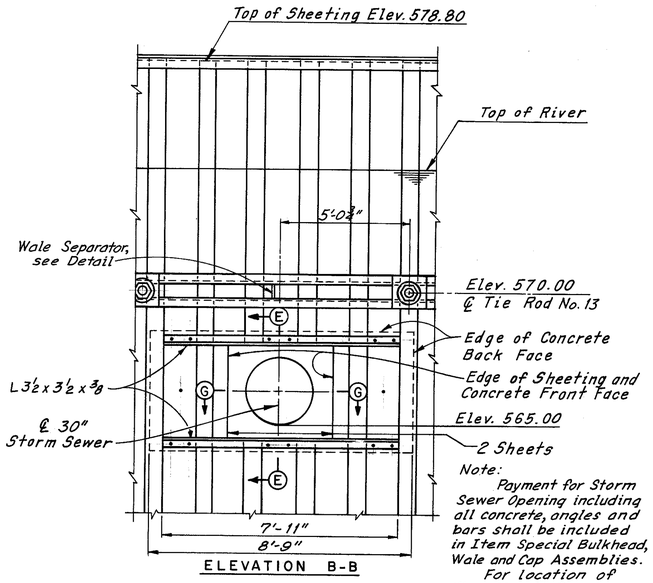
Note: For location of Section D-D see Sheet 68|80.



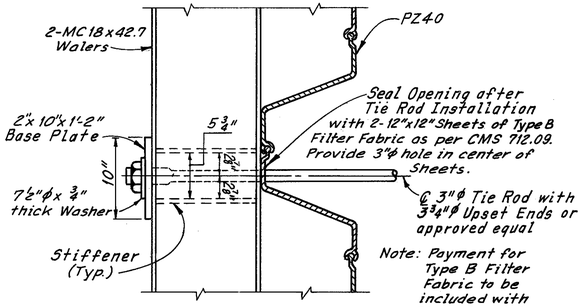
WALE SPLICE
(Concrete filler not shown)



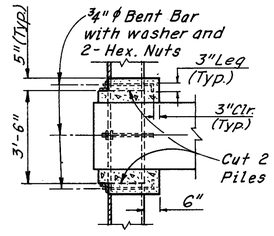
WALE SEPARATOR DETAIL



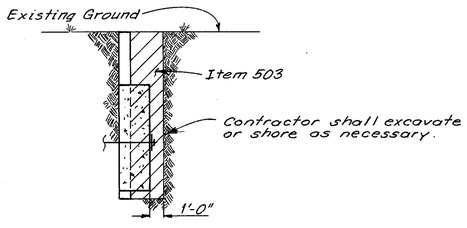
ELEVATION B-B



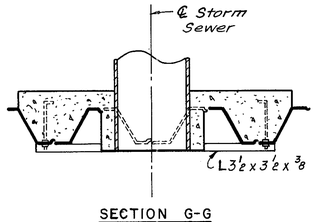
SECTION F-F
(Typical at all tie rods except splice locations)



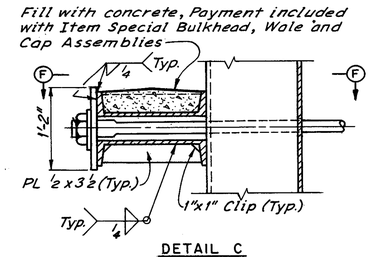
SECTION E-E



PAYMENT LIMITS OF EXCAVATION FOR DEADMAN ANCHOR



SECTION G-G



DETAIL C

Note: For location of Detail C see Sheet 69|80.
(Typical at all tie rods, except splice locations)

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS CLEVELAND — HNTB

BULKHEAD REPLACEMENT AT PIER 11 DETAILS

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
R.H.W.	I.T.	B.B.	O.A.B.	
DATE 5-15-85	DATE 5-16-85	DATE 5-17-85	DATE 10-18-85	SHEET 70 80

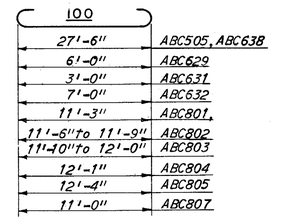
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
WEST ABUTMENT					
NON-EPOXY COATED					
AW401	189	3'-7"	105		452
AW501	158	8'-3"	105		1360
AW502	23	8'-10"	104		212
AW503	44	7'-6"	105		344
AW504	87	7'-10"	104		711
AW505	109	8'-4"	105		947
AW506	5	9'-0"	104		47
AW507	5	6'-4"	105		33
AW508	21	8'-6"	104		186
AW509	22	7'-7"	104		174
AW510	18	33'-3"	Str.		624
AW513	36	23'-0"	Str.		864
AW515	18	29'-3"	Str.		549
AW517	18	31'-3"	Str.		587
AW520	15	10'-11"	109		171
AW521	5	10'-1"	104		53
AW522	5	5'-0"	Str.		26
AW523	2	7'-3"	Str.		15
AW524	6	13'-6"	Str.		84
AW527	6	4'-9"	Str.		30
AW528	2	4'-6"	Str.		9
AW529	1	3'-9"	Str.		4
AW530	4	3'-3"	Str.		14
AW531	2	5'-8"	108		12
AW533	17	43'-6"	Str.		771
AW536	5	3'-0"	Str.		16
AW537	18	40'-3"	Str.		756
AW538	7	5'-6"	Str.		40
AW540	4	4'-0"	Str.		17
AW542	1	11'-9"	Str.		12
AW543	4	13'-1"	108		55
AW545	6	7'-6"	Str.		47
AW546	2	17'-3"	Str.		36
AW547	2	15'-6"	Str.		32
AW548	1	9'-9"	Str.		10
AW549	1	9'-6"	Str.		10
AW601	23	15'-3"	126		527
AW602	86	14'-3"	126		1841
AW603	1	14'-8"	126		22
AW604	5	16'-8"	126		125
AW605	21	14'-11"	126		471
AW606	22	14'-0"	126		463
AW607	222	9'-3"	105		3084
AW608	183	6'-11"	105		1901
AW612	6	5'-0"	Str.		45
AW613	17	6'-0"	Str.		153
AW614	10	11'-4"	104		170
AW615	2	8'-10"	104		27
AW616	3	3'-6"	Str.		16
AW617	7	4'-0"	Str.		42
AW618	1	3'-9"	Str.		6
AW619	1	3'-0"	Str.		5
AW620	4	21-9"	Str.		17
AW621	2	9'-8"	104		29
AW622	5	4'-3"	Str.		32
AW623	5	18'-2"	105		136
AW624	2	8'-8"	108		26
AW625	3	7'-10"	104		35
AW626	3	6'-3"	Str.		28
AW627	2	9'-9"	104		29
AW628	3	2'-3"	Str.		10
AW629	1	3'-3"	Str.		5
AW630	3	7'-1"	104		32

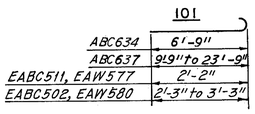
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
AW801	21	40'-0"	Str.		2243
AW802	7	35'-9"	Str.		668
AW803	4	9'-9"	108		104
AW804	3	11'-2"	104		89
AW805	14	7'-1"	108		265
AW806	2	14'-4"	104		77
AW807	4	7'-0"	Str.		75
AW808	7	33'-9"	Str.		631
AW809	7	36'-3"	Str.		678
AW810	2	16'-4"	108		87
AW811	4	9'-9"	Str.		104
TOTAL WEIGHT =					23,608
WEST ABUTMENT					
EPOXY COATED					
EAW575	12	6'-11"	160		87
EAW576	10	12'-0"	STR		125
EAW577	6	2'-9"	101		17
EAW578	6	2'-9"	STR		17
EAW579	16	4'-4"	STR		72
EAW580	2 SER 5	3'-10" 24'-10"	101	3"	35
EAW581	2 SER 5	3'-10" 24'-10"	STR	3"	35
EAW582	2	6'-6"	STR		14
EAW583	10	15'-9"	STR		164
EAW584	1	33'-3"	STR		35
EAW585	2	23'-0"	STR		48
EAW586	1	29'-3"	STR		31
EAW587	1	31'-3"	STR		33
EAW588	1	7'-6"	STR		8
EAW589	1	37'-6"	STR		39
EAW590	1	3'-9"	STR		4
EAW591	1	38'-6"	STR		40
EAW592	2	13'-6"	STR		28
EAW593	2	17'-3"	STR		36
EAW650	12	3'-10"	162		69
EAW651	2 SER 5	3'-10" 3'-8"	162	1/2"	56
EAW652	6	3'-8"	162		33
EAW653	39	9'-3"	105		542
EAW654	183	7'-1"	105		1,947
EAW655	4	4'-8"	142		28
EAW656	4	4'-0"	STR		24
EAW657	4	3'-6"	STR		21
EAW658	4	2'-3"	STR		14
EDAW801	123	5'-2"	107		1,697
TOTAL WEIGHT =					5,299
B-C ABUTMENT					
NON-EPOXY COATED					
ABC401	21	31'-4"	105		47
ABC505	4	28'-8"	100		120
ABC506	2	41'-3"	Str.		9
ABC507	1 Ser. 8	4'-3" 11'-9"	Str.	1'-0 7/8"	67
ABC508	5	11'-9"	Str.		61
ABC509	14	27'-9"	Str.		405
ABC510	1 Ser. 5	9'-9" 23'-9"	Str.	3'-6"	87
ABC517	7	5'-3"	104		38
ABC518	8	5'-7"	104		47
ABC519	30	41'-5"	105		138
ABC601	6	18'-9"	Str.		169
ABC602	1	8'-10"	155		13
ABC603	1	7'-2"	155		11
ABC604	5	12'-0"	Str.		90
ABC605	2	9'-6"	Str.		29
ABC606	9	7'-6"	Str.		101
ABC608	1	4'-3"	Str.		6
ABC609	5	9'-4"	108		70
ABC610	7	7'-9"	Str.		81
ABC611	4	6'-9"	Str.		41
ABC612	1 Ser. 5	5'-0" 7'-6"	Str.	7/8"	47
ABC613	1 Ser. 5	4'-3" 6'-9"	Str.	7/8"	41
ABC614	4	6'-8"	104		40
ABC615	4	6'-1"	104		37

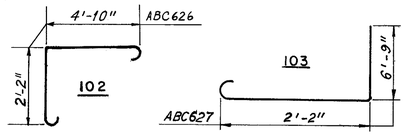
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
ABC616	3	3'-9"	Str.		17
ABC617	3	3'-0"	Str.		14
ABC618	3	11'-6"	Str.		52
ABC619	2	7'-3"	Str.		22
ABC620	15	5'-7"	104		126
ABC622	26	6'-9"	104		264
ABC624	2	19'-3"	108		58
ABC625	11	14'-3"	Str.		235
ABC626	5	8'-2"	102		61
ABC627	17	9'-5"	103		240
ABC628	13	11'-9"	157		229
ABC629	15	7'-4"	100		165
ABC631	5	4'-4"	100		33
ABC632	4	8'-4"	100		50
ABC633	7	9'-5"	157		99
ABC634	2	7'-5"	101		22
ABC635	22	8'-3"	108		273
ABC636	33	4'-9"	Str.		235
ABC637	1 Ser. 11	10'-5" 24'-5"	101	1'-4 1/8"	288
ABC638	2	28'-10"	100		87
ABC639	13	5'-8"	104		111
ABC640	9	6'-9"	Str.		91
ABC641	3	41'-3"	Str.		19
ABC642	5	5'-6"	Str.		41
ABC643	2	4'-3"	104		13
ABC644	4	7'-3"	Str.		44
ABC801	21	13'-5"	100		752
ABC802	1 Ser. 5	13'-8" 13'-11"	100	3/4"	184
ABC803	1 Ser. 3	14'-0" 14'-2"	100	1"	113
ABC804	1	14'-3"	100		38
ABC805	1	14'-6"	100		39
ABC806	29	9'-0"	Str.		697
ABC807	1	13'-2"	100		35
ABC808	1 Ser. 4	19'-5" 19'-10"	108	1 1/16"	210
ABC809	1 Ser. 5	19'-11" 20'-8"	108	2 1/16"	271
ABC810	1 Ser. 3	19'-2" 19'-0"	108	1"	153
ABC811	1 Ser. 4	13'-9" 14'-1"	108	1 3/16"	149
ABC812	1 Ser. 3	14'-2" 14'-5"	108	1 1/2"	114
ABC813	1	19'-11"	108		53
ABC814	1	13'-6"	108		36
ABC815	1	20'-0"	108		53
ABC816	1	13'-8"	108		36
ABC817	1	18'-9"	108		50
ABC818	1	14'-6"	108		39
ABC819	1	18'-8"	108		50
ABC820	1	14'-8"	108		39
ABC821	1 Ser. 6	12'-10" 13'-6"	108	1 5/8"	211
ABC822	2	10'-9"	Str.		57
ABC823	1	20'-8"	108		55
ABC824	2	14'-7"	148		78
ABC825	1 Ser. 11	3'-6" 10'-6"	Str.	1 1/16"	206
ABC826	11	6'-11"	104		203
ABC827	7	7'-11"	104		148
ABC828	7	10'-9"	Str.		201
ABC829	7	6'-7"	104		123
ABC830	2	6'-9"	Str.		36
ABC831	4	4'-9"	Str.		51
ABC832	1 Ser. 3	6'-2" 7'-9"	104	9 1/2"	56
ABC833	2	7'-0"	124		37
ABC834	2	13'-5"	108		72
TOTAL WEIGHT =					9,329
B-C ABUTMENT					
EPOXY COATED					
EABC501	14	6'-11"	160		101
EABC502	1 SER 5	3'-10" 2'-10"	101	3"	17
EABC503	1 SER 5	3'-10" 2'-10"	STR	3"	17
EABC504	1	27'-9"	STR		29
EABC511	3	2'-9"	101		9
EABC512	8	4'-4"	STR		36
EABC513	12	5'-6"	STR		69
EABC514	10	17'-0"	STR		177
EABC515	2	18'-9"	STR		39
EABC516	1	6'-6"	STR		7

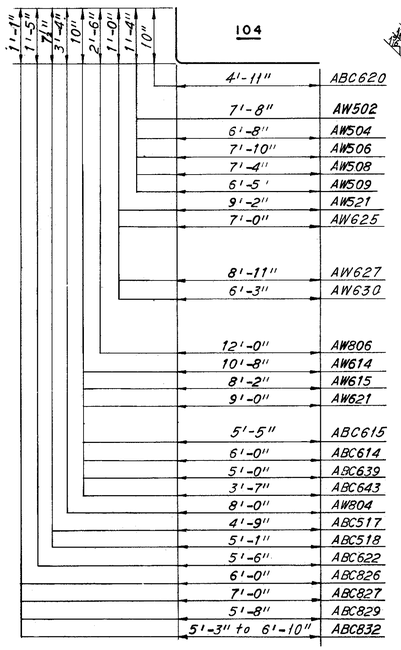
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
EABC520	3	2'-9"	Str.		9
EABC621	26	9'-11"	126		387
EABC645	14	3'-10"	162		81
EABC646	1 Ser. 5	3'-10" 3'-8"	162	1/2"	28
EABC647	3	3'-8"	162		17
EDABC801	17	5'-1"	107		231
TOTAL WEIGHT =					1,254

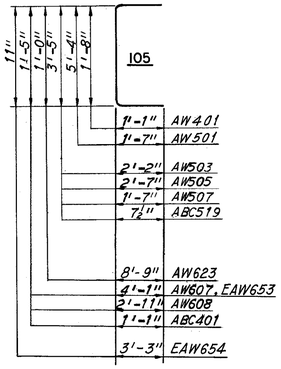
BENDING DIAGRAMS

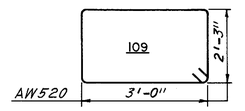


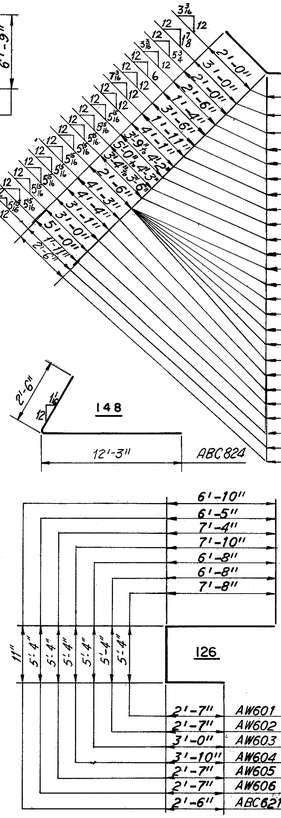


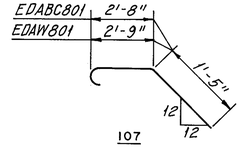


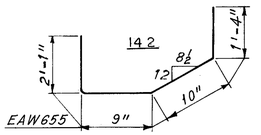


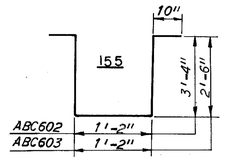


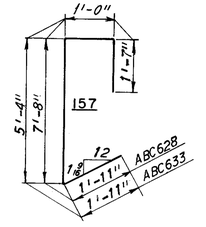


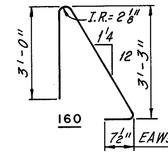


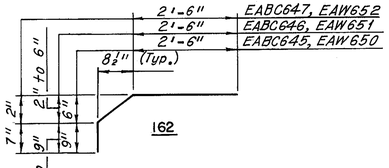












REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

144
174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
WEST AND B-C ABUTMENTS

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (I-290) OHIO

DRAWN K.R.S.	TRACED JMC	CHECKED D.T.	REVIEWED C.A.B.	REVISED
DATE 9-3-70	DATE 10-19-70	DATE 11-12-70	DATE 10-1985	SHEET 71/180

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

145
174

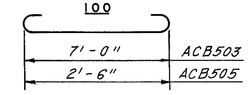
CUYAHOGA COUNTY
CUY-290-0.27

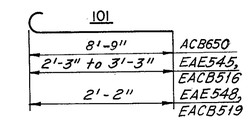
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
EAST ABUTMENT					
NON-EPOXY COATED					
AE501	163	8'-0"	105		1360
AE502	12	11'-6"	109		144
AE503	6	10'-10"	109		68
AE504	1	12'-6"	109		13
AE505	1	6'-6"	105		7
AE506	1	7'-10"	105		8
AE507	1	14'-4"	109		15
AE508	1	12'-2"	109		13
AE509	1	5'-0"	Str.		5
AE510	78	8'-0"	104		651
AE512	39	8'-6"	104		346
AE513	32	7'-6"	104		250
AE514	16	7'-3"	104		121
AE515	65	30'-0"	Str.		2034
AE516	8	25'-6"	Str.		213
AE518	13	18'-0"	Str.		244
AE519	5	24'-0"	Str.		125
AE520	13	33'-0"	Str.		447
AE521	5	13'-7"	124		71
AE522	5	5'-6"	Str.		29
AE523	18	7'-6"	Str.		141
AE524	2	6'-6"	Str.		14
AE525	2	5'-9"	Str.		12
AE526	7	4'-6"	Str.		33
AE527	8	16'-6"	Str.		138
AE528	2	10'-6"	Str.		22
AE529	2	8'-6"	Str.		18
AE530	4	7'-6"	108		31
AE531	2	14'-3"	Str.		30
AE532	6	22'-0"	Str.		138
AE533	4	13'-6"	Str.		56
AE534	4	17'-2"	108		72
AE601	66	14'-7"	126		1446
AE602	62	15'-1"	126		1405
AE614	13	11'-2"	104		218
AE615	24	9'-10"	104		354
AE616	4	4'-6"	Str.		27
AE617	18	6'-6"	Str.		176
AE618	2	5'-9"	Str.		17
AE619	2	4' 9"	Str.		14
AE620	8	3'-9"	Str.		45
AE621	6	17'-0"	126		153
AE622	2	16'-0"	126		48
AE623	3	16'-10"	126		76
AE624	1	15'-3"	126		23
AE625	3	5'-0"	Str.		23
AE626	23	15'-7"	126		538
AE627	10	5'-0"	Str.		75
AE628	2	7'-2"	104		22
AE629	1	14'-4"	126		22
AE630	1	14'-9"	126		22
AE631	1	6'-6"	Str.		10
AE801	28	30'-0"	Str.		2243
AE802	1 Ser. 3	26'6" 28'0"	Str.	9"	218
AE803	2	26'-6"	Str.		142
AE804	5	28'-0"	Str.		374
AE805	12	6'-0"	108		192
AE806	2	8'-0"	Str.		43
AE807	14	33'-0"	Str.		1234
AE808	3	4'-0"	Str.		32
AE809	2	24'-9"	Str.		132
AE810	2	22'-9"	Str.		121
AE811	4	16'-0"	Str.		171
AE812	2	21'-2"	108		113
AE813	2	18'-3"	124		97
AE814	2	14'-3"	Str.		76
AE815	9	5'-7"	104		134
		TOTAL WEIGHT =			16,905

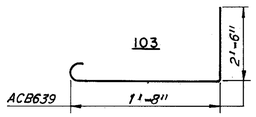
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
EAST ABUTMENT					
EPOXY COATED					
EAE401	168	3'- 5"	105		383
EAE511	164	8'- 8"	105		1,482
EAE536	8	18'- 0"	STR		150
EAE537	40	30'- 0"	STR		1,252
EAE538	3	25'- 6"	STR		80
EAE539	5	24'- 0"	STR		125
EAE540	8	33'- 0"	STR		275
EAE541	2	22'- 0"	STR		46
EAE542	10	20'- 3"	STR		211
EAE543	18	6'-11"	160		130
EAE544	2 SER 5	2'-10" 3'-10"	STR	3"	35
EAE545	2 SER 5	2'-10" 3'-10"	101	3"	35
EAE546	2	6'- 6"	STR		14
EAE547	16	4'- 4"	STR		72
EAE548	6	2'- 9"	101		17
EAE549	6	2'- 9"	STR		17
EAE550	2	16'- 6"	STR		34
EAE551	10	14'- 6"	STR		151
EAE603	218	14'- 1"	105		4,611
EAE604	4	5'- 0"	142		30
EAE605	218	6'- 1"	105		1,992
EAE606	218	7'- 7"	105		2,483
EAE607	4	3'- 6"	STR		21
EAE608	4	2'- 3"	STR		14
EAE609	4	4'- 0"	STR		24
EAE610	18	3'-10"	162		104
EAE611	2 SER 5	3'-8" 3'-10"	162	2"	56
EAE612	6	3'- 8"	162		33
EDAE801	116	5'- 1"	107		1,574
		TOTAL WEIGHT =			15,451
C-B ABUTMENT					
NON-EPOXY COATED					
ACB501	36	8'-7"	105		322
ACB502	11	11'-3"	109		129
ACB503	4	8'-2"	100		34
ACB504	4	7'-0"	Str.		29
ACB505	5	3'-8"	100		19
ACB506	5	2'-6"	Str.		13
ACB509	22	27'-0"	Str.		620
ACB510	2	14'-7"	109		30
ACB511	1 Ser. 4	7'-4" 10'-10"	155	1'-2"	38
ACB601	11	5'-6"	Str.		91
ACB602	36	14'-4"	126		775
ACB603	4	16'-7"	109		100
ACB604	1	14'-11"	109		22
ACB605	1	11'-11"	109		18
ACB606	41	7'-5"	104		457
ACB607	1	8'-9"	Str.		13
ACB608	1	3'-3"	Str.		5
ACB612	5	18'-8"	105		140
ACB613	7	9'-5"	104		99
ACB614	8	8'-2"	104		98
ACB615	4	24'-11"	157		150
ACB616	4	5'-0"	Str.		30
ACB617	5	6'-9"	Str.		51
ACB618	9	7'-3"	Str.		98
ACB619	2	14'-2"	Str.		43
ACB620	6	18'-6"	Str.		167
ACB621	1	3'-9"	Str.		5
ACB622	6	5'-9"	Str.		52
ACB623	3	2'-6"	Str.		11
ACB624	5	9'-0"	Str.		68
ACB625	1	4'-6"	Str.		7
ACB626	5	4'-0"	Str.		30
ACB627	8	3'-6"	Str.		42
ACB628	1	10'-6"	Str.		16
ACB629	1	8'-0"	Str.		12

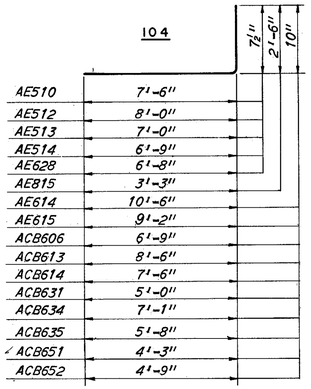
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
ACB630	1	12'-6"	Str.		19
ACB631	8	5'-9"	104		68
ACB632	8	6'-9"	Str.		81
ACB634	2	7'-9"	104		23
ACB635	2	6'-4"	104		19
ACB636	1	7'-2"	112		11
ACB637	3	13'-11"	149		63
ACB638	2	9'-9"	149		29
ACB639	9	4'-8"	103		63
ACB640	4	7'-6"	Str.		45
ACB641	3	7'-9"	Str.		35
ACB642	2	9'-6"	Str.		29
ACB643	1 Ser. 9	5'-6" 9'-3"	Str.	5/8"	101
ACB644	1 Ser. 9	4'-9" 8'-6"	Str.	5/8"	90
ACB645	8	24'-3"	Str.		291
ACB646	1	2'-9"	Str.		4
ACB647	10	9'-10"	135		148
ACB648	2 Ser. 6	2'-6" 12'-9"	Str.	2'-0 5/8"	137
ACB649	2	17'-9"	Str.		53
ACB650	2	9'-5"	101		28
ACB651	2	4'-11"	104		15
ACB652	8	5'-5"	104		65
ACB653	4	4'-3"	Str.		26
ACB654	4	5'-3"	Str.		32
ACB655	7	9'-0"	127		95
ACB801	10	29'-0"	Str.		774
ACB802	2	34'-8"	157		185
ACB803	2	10'-6"	Str.		56
ACB804	2	5'-6"	Str.		29
ACB805	2	17'-10"	149		95
ACB806	4	5'-0"	Str.		53
ACB807	1	19'-0"	Str.		51
ACB808	2	19'-8"	108		105
ACB809	4	27'-3"	Str.		291
		TOTAL WEIGHT =			7,043
C-B ABUTMENT					
EPOXY COATED					
EACB401	35	3'- 7"	105		84
EACB507	1	5'- 3"	105		5
EACB508	1	4'- 6"	105		5
EACB512	2	18'- 6"	STR		39
EACB513	2	6'- 6"	STR		14
EACB514	10	16'- 6"	STR		172
EACB515	25	6'-11"	160		180
EACB516	2 SER 5	2'-10" 3'-10"	101	3"	35
EACB517	2 SER 5	2'-10" 3'-10"	STR	3"	35
EACB518	16	4'- 4"	STR		72
EACB519	6	2'- 9"	101		17
EACB520	39	7'- 2"	105		292
EACB521	16	27'- 0"	STR		451
EACB522	6	2'- 9"	STR		17
EACB523	2	24'- 3"	STR		51
EACB524	12	3'- 6"	STR		44
EACB525	10	22'- 3"	STR		232
EACB609	49	13'- 1"	105		963
EACB610	49	8'- 5"	105		619
EACB611	49	12'- 1"	105		889
EACB656	25	3'-10"	162		144
EACB657	2 SER 5	3'-10" 3'-8"	162	2"	56
EACB658	6	3'- 8"	162		33
EDACB801	24	5'- 1"	107		326
		TOTAL WEIGHT =			4,775

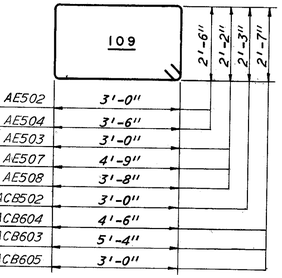
BENDING DIAGRAMS

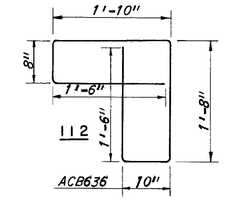


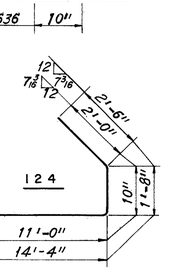


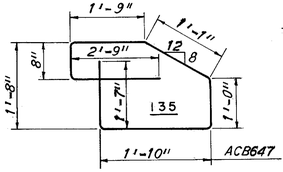


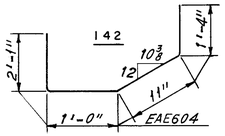


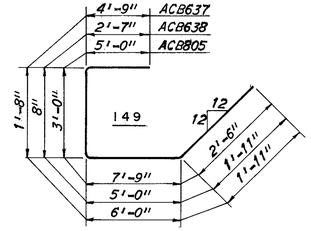


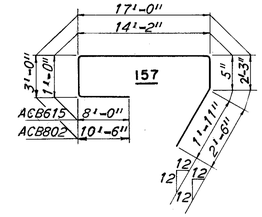


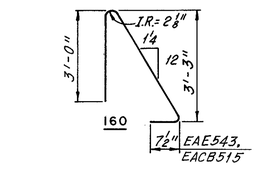


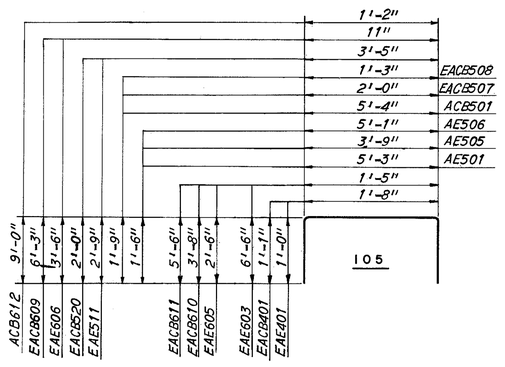


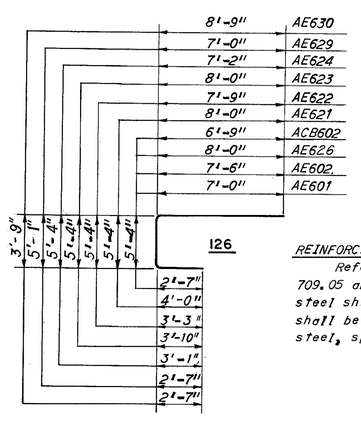


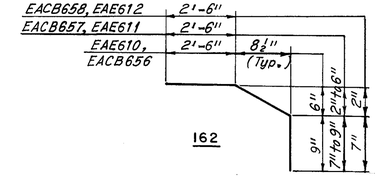


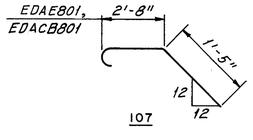


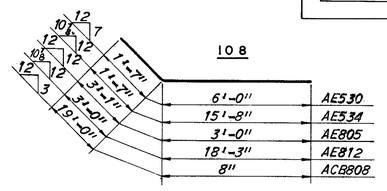


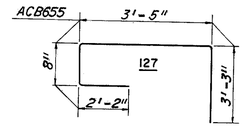












REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
EAST & C-B ABUTMENTS
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (I-290) OHIO

DRAWN K.R.S.	TRACED JWB	CHECKED K.Y.H.	REVIEWED C.A.B.	REVISED
DATE 9-10-70	DATE 9-28-70	DATE 10-21-74	DATE 10-18-85	SHEET 72 180

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER IC-7					
NON-EPOXY COATED					
PA501	4 Ser.10	~~7'-9"~~ ~~9'-5"~~	109	2½"	358
PA502	15	11'-6"	109		180
PA503	63	4'-11"	105		323
PA504	8	9'-9"	109		81
PA505	1	10'-2"	109		11
PA506	1	10'-8"	109		11
PA507	1Ser. 6	~~11'-10"~~ ~~13'-6"~~	109	4"	79
PA508	12	8'-3"	105		103
PA509	1Ser. 3	~~9'-10"~~ ~~11'-2"~~	109	8"	33
PA510	20	8'-5"	105		176
PA601	12	5'-11"	105		107
PA602	2	30'-6"	Str.		92
PA603	5	8'-3"	108		62
PA604	5	7'-0"	Str.		53
PA605	2	29'-6"	Str.		87
PA606	2	31'-9"	Str.		95
PA607	4	10'-0"	147		60
PA608	8	5'-5"	108		65
PA609	4	5'-11"	108		36
PA1001	64	13'-10"	100		3,810
PA1101	7	33'-10"	105		1258
PA1102	2	30'-6"	Str.		324
PA1103	5	30'-3"	141		804
PA1104	5	22'-6"	108		598
PA1105	4	34'-5"	165		731
TOTAL WEIGHT =					9,537
PIER IC-7					
EPOXY COATED					
EPA401	96	10'- 5"	109		668
EPA1002	24	27'- 6"	STR		2,840
EPA1003	48	7'-11"	104		1,635
EPA1004	12	26'- 6"	STR		1,368
EPA1005	12	24'- 3"	STR		1,252
TOTAL WEIGHT =					7,763
PIER 2C-7					
NON-EPOXY COATED					
PB501	20	11'- 6"	109		240
PB502	1 SER 8	10'- 2" to 11'- 5"	109	2⅛"	90
PB503	1 SER 3	9'-10" to 10'-10"	109	6"	32
PB504	34	7'-11"	105		281
PB505	49	4'-11"	105		251
PB506	1	9'-10"	109		10
PB601	4	26'- 6"	STR		159
PB602	2	26'- 6"	108		80
PB603	2	26'- 6"	108		80
PB604	6	5'-11"	105		53
PB1001	48	13'-10"	100		2,857
PB1101	5	27'- 0"	108		717
PB1102	5	27'- 7"	170		733
PB1103	5	38'- 5"	124		1,021
PB1104	5	19'- 6"	108		518
TOTAL WEIGHT =					7,122
PIER 2C-7					
EPOXY COATED					
EPB401	92	10'- 5"	109		640
EPB1002	36	7'-11"	104		1,226
EPB1003	24	32'- 9"	STR		3,382
EPB1004	12	31'- 9"	STR		1,639
TOTAL WEIGHT =					6,887

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 3C-7					
NON-EPOXY COATED					
PC401	93	10'- 5"	109		647
PC501	22	11'- 6"	109		264
PC502	1 SER 8	10'- 2" to 11'- 5"	109	2⅛"	90
PC503	1 SER 5	10'- 6" to 11'- 5"	109	3"	57
PC504	42	4'-11"	105		215
PC505	2	9'-10"	109		21
PC601	8	21'- 9"	STR		261
PC602	6	5'-11"	105		53
PC1001	48	13'-10"	100		2,857
PC1002	36	7'-11"	104		1,226
PC1003	36	33'- 0"	STR		5,112
TOTAL WEIGHT =					12,807
PIER IL AND IR					
NON-EPOXY COATED					
PD501	8 Ser. 10	~~7'-9"~~ ~~9'-5"~~	109	2½"	716
PD502	80	11'-6"	109		960
PD503	126	41'-11"	105		646
PD504	20	9'-9"	109		203
PD601	12	6'-0"	105		108
PD602	4	34'-0"	Str.		204
PD603	4	37'-9"	Str.		227
PD1001	64	12'-10"	100		3534
PD1003	64	12'-2"	100		3351
PD1101	14	36'-9"	104		2734
PD1102	14	40'-6"	104		3011
PD1103	8	14'-9"	Str.		627
PD1104	10	22'-8"	108		1204
PD1105	10	25'-3"	108		1342
PD1106	8	14'-6"	Str.		616
PD1107	8	17'-0"	Str.		723
PD1115	5	27'-6"	Str.		731
PD1116	5	30'-0"	Str.		797
TOTAL WEIGHT =					21,734
PIER IL AND IR					
EPOXY COATED					
EPD401	186	10'- 4"	109		1,284
EPD1002	96	7'- 4"	104		3,029
EPD1004	24	23'- 3"	STR		2,401
EPD1005	24	24'- 0"	STR		2,479
EPD1006	12	25'- 9"	STR		1,330
EPD1007	12	27'- 9"	STR		1,433
EPD1008	12	29'- 9"	STR		1,536
EPD1009	12	23'- 6"	STR		1,213
TOTAL WEIGHT =					14,705
PIER 2L AND 2R					
NON-EPOXY COATED					
PE501	8 Ser. 10	~~8'-0"~~ ~~9'-8"~~	109	2¼"	737
PE502	79	11'-6"	109		948
PE503	126	41'-11"	105		646
PE504	20	10'-0"	109		209
PE601	12	6'-0"	105		108
PE602	4	34'-0"	Str.		204
PE603	4	37'-0"	Str.		222

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PE1001	64	12'-2"	100		3351
PE1002	64	12'-10"	100		3534
PE1101	7	40'-1"	104		1491
PE1102	7	44'-0"	104		1636
PE1103	8	14'-9"	Str.		627
PE1104	10	22'-8"	108		1204
PE1105	10	24'-8"	108		1311
PE1106	8	14'-6"	Str.		616
PE1107	8	16'-6"	Str.		701
PE1115	5	27'-6"	Str.		731
PE1116	5	29'-6"	Str.		784
PE1117	7	33'-5"	104		1243
PE1118	7	35'-6"	104		1320
TOTAL WEIGHT =					21,623
PIER 2L AND 2R					
EPOXY COATED					
EPE401	246	10'-4"	109		1698
EPE1108	12	32'-6"	Str.		2072
EPE1109	24	33'-0"	Str.		4208
EPE1110	12	33'-3"	Str.		2120
EPE1111	24	32'-9"	Str.		4176
EPE1112	12	33'-6"	Str.		2136
EPE1113	12	33'-9"	Str.		2152
EPE1114	96	7'-6"	104		3823
TOTAL WEIGHT =					22,385
PIER 3L AND 3R					
NON-EPOXY COATED					
PF401	264	10'-4"	109		1822
PF501	8 Ser. 10	~~7'-9"~~ ~~9'-5"~~	109	2¼"	716
PF502	79	11'-6"	109		948
PF503	126	41'-11"	105		646
PF504	20	9'-9"	109		203
PF601	12	6'-0"	105		108
PF602	4	34'-0"	Str.		204
PF603	4	36'-3"	Str.		218
PF1001	128	12'-2"	100		6701
PF1002	96	7'-4"	104		3029
PF1003	12	34'-9"	Str.		1794
PF1004	60	35'-0"	Str.		9036
PF1005	12	35'-3"	Str.		1820
PF1006	12	35'-6"	Str.		1833
PF1101	14	36'-9"	104		2734
PF1102	14	38'-10"	104		2888
PF1103	8	14'-9"	Str.		627
PF1104	10	22'-8"	108		1204
PF1105	10	24'-1"	108		1280
PF1106	8	14'-6"	Str.		616
PF1107	8	15'-9"	Str.		669
PF1115	5	27'-6"	Str.		731
PF1116	5	29'-0"	Str.		770
TOTAL WEIGHT =					40,597
PIER 4L					
NON-EPOXY COATED					
PGL401	258	5'-6"	100		948
PGL402	216	7'-6"	140		1082
PGL403	3 Ser. 7	~~19'-11"~~ ~~20'-9"~~	109	1¼"	285
PGL404	3 Ser.29	~~16'-5"~~ ~~19'-11"~~	109	1½"	1056
PGL501	70	5'-11"	105		432
PGL601	4	44'-6"	Str.		267
PGL602	24	34'-9"	Str.		1253
PGL603	10	7'-2"	105		108
PGL801	1 Ser.13	~~19'-4"~~ ~~24'-10"~~	109	5¼"	767
PGL802	68	25'-2"	109		4569
PGL803	1 Ser. 9	~~19'-4"~~ ~~24'-10"~~	109	8¼"	531
PGL1104	65	16'-8"	100		5756

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PGL1108	42	15'-8"	104		3496
PGL1109	42	19'-2"	104		4277
PGL1110	12	11'-7"	104		739
PGL1114	36	27'-3"	Str.		5212
PGL1115	36	30'-9"	Str.		5881
PGL1116	6	10'-6"	Str.		335
PGL1117	6	14'-0"	Str.		446
PGL18S01	4	32'-3"	Str.		1754
PGL18S02	4	45'-6"	108		2475
PGL18S03	4	53'-9"	108		2924
PGL18S04	10	34'-11"	104		4749
PGL18S05	4	41'-11"	104		2280
TOTAL WEIGHT =					51,622
PIER 4R					
NON-EPOXY COATED					
PGR401	164	5'-6"	100		603
PGR402	140	7'-6"	140		701
PGR403	2 Ser. 6	~~19'-11"~~ ~~20'-9"~~	109	2"	163
PGR404	2 Ser. 29	~~16'-5"~~ ~~19'-11"~~	109	1½"	704
PGR501	50	5'-11"	105		309
PGR601	4	30'-9"	Str.		185
PGR602	16	35'-9"	Str.		859
PGR603	10	7'-2"	105		108
PGR801	2 Ser. 10	~~19'-4"~~ ~~24'-10"~~	109	7⅞"	1179
PGR802	40	25'-2"	109		2688
PGR1104	44	16'-8"	100		3896
PGR1108	28	15'-11"	104		2368
PGR1109	28	19'-5"	104		2888
PGR1110	8	11'-11"	104		506
PGR1114	24	27'-6"	Str.		3507
PGR1115	24	31'-0"	Str.		3953
PGR1116	4	10'-6"	Str.		223
PGR1117	4	14'-0"	Str.		298
PGR18S01	1	35'-0"	Str.		476
PGR18S02	4	18'-10"	108		1025
PGR18S03	4	50'-5"	108		2743
PGR18S04	4	43'-2"	104		2348
PGR18S05	10	35'-11"	104		4885
TOTAL WEIGHT =					36,615

BENDING DIAGRAMS

100

11'-0"	PA1001, PB1001, PC1001
9'-4"	PD1003, PE1001, PF1001
4'-6"	PGL401, PGR401, PHL401
13'-6"	PGL1104, PGR1104
17'-0"	PHL1104
10'-0"	PD1001, PE1002

104

EPA1003, PC1002	6'-9"
EPB1002	6'-9"
EPE1114	6'-3"
PGL1108	14'-6"
PGL1109	18'-0"
PGL1110	10'-5"
PGR1108	14'-9"
PGR1109	18'-3"
PGR1110	10'-9"
PHL1108	8'-6"
PHL1109	12'-0"
PHL1110	7'-0"
EPD1002, PF1002	6'-3"
PD1101, PF1101	35'-0"
PD1102	38'-9"
PE1101	38'-4"
PE1102	42'-3"
PE1117	31'-8"
PE1118	33'-9"
PF1102	37'-1"
PGL18S04	30'-0"
PGL18S05	37'-0"
PGR18S04	38'-3"
PGR18S05	31'-0"
PHL18S04	37'-8"
PHL18S05	44'-8"
PHL18S06	23'-0"
PC1103	15'-6"
PC1102	29'-6"

11'-5" 11'-6" 11'-4" 21'-0" 51'-6" 51'-3" 11'-11"

109

EPA401, EPB401, PC401	2'-6"
EPD401, EPE401, PF401	
PA502, PB501, PC501	3'-0"
PD502, PE502, PF502	
PB502, PC502	2'-4" to 2'-11½"
PA501, PD501, PF501	2'-0" to 2'-10"
PC503	2'-6" to 3'-0"
PA504, PD504, PF504	3'-0"
PB503	2'-2" to 2'-8"
PC505, PB506	2'-2"
PE501	2'-0" to 2'-10"
PE504	3'-0"
PGL801, PGR801	5'-7" to 8'-3"
PGL802, PGR802, PHL802	8'-6"
PGL803, PHL801	5'-7" to 8'-4"
PGL403, PGR403, PHL403	5'-3" to 5'-8"
PGL404, PGR404, PHL404	3'-6" to 5'-3"
PHL803	8'-6"
PA505	2'-4"
PA506	2'-7"
PA507	3'-2" to 4'-0"
PA509	2'-2" to 2'-10"

2'-6" 2'-6" 11'-9" 21'-0" 31'-6" 41'-6" 21'-5"

108

17'-2"	PF1104, PD1104, PE1104
19'-9"	PD1105
19'-2"	PE1105
18'-7"	PF1105
33'-3"	PGL18S02
41'-6"	PGL18S03
6'-7"	PGR18S02
38'-2"	PGR18S03
14'-2"	PHL18S02
43'-6"	PHL18S03
3'-2"	PB602
2'-6"	PB603
11'-9"	PB1104
21'-9"	PB1101
17'-4"	PC1101
19'-9"	PA1104
51'-10"	PA603
21'-9"	PA608
21'-9"	PA609

105

2'-6"	PA510
2'-6"	PA508
2'-6"	PB504
3'-6"	PGL603, PGR603, PHL603
30'-5"	PA1101
21'-5"	PA601, PB604, PC602
21'-6"	PD601, PE601, PF601
3'-6"	PGL501, PGR501, PHL501
21'-6"	PA503, PB505, PC504, PD503, PE503, PF503

2'-10" 3'-1" 3'-0" 21'-0" 11'-11" 11'-4"

170

PB1102 3'-6" 12 13/16 12 13/16 15'-11" 21'-9" 5'-5"

165

1¾ 12 1¾ 12 5'-1" 11'-11" PA1105 31'-9"

147

12 2¾ 2'-0" 41'-6" PA607 3'-9"

141

12 2 7/16 12 2 7/16 5'-6" 5'-6" 19'-5" PA1103

140

12 12 1'-11½" 1'-8" PGL402, PHL402, PGR402 1'-3"

124

12 13/16 8'-9" 28'-0" PB1103 1'-11"

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

146 / 174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE PIERS IC-7, 2C-7, 3C-7, IL&R, 2L&R, 3L&R AND 4L&R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN K.R.S.	TRACED JMC	CHECKED SMS	REVIEWED C.A.B.	REVISED
DATE 7-3-70	DATE 10-30-70	DATE 11-10-70	DATE 10-1985	SHEET 73/80

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 5L					
NON-EPOXY COATED					
PHL401	252	5'-6"	100		926
PHL402	184	7'-6"	140		922
PHL403	2 Ser.17	19'-11" to 21'-11"	109	1 1/2"	475
PHL404	2Ser.29	16'-5" to 19'-11"	109	1 1/2"	704
PHL501	70	5'-11"	105		432
PHL601	4	23'-0"	Str.		138
PHL602	16	42'-3"	Str.		1015
PHL603	10	7'-2"	105		108
PHL801	2 Ser. 25	19'-4" to 24'-10"	109	2 3/4"	2948
PHL802	24	25'-2"	109		1613
PHL803	92	23'-0"	109		5650
PHL1104	96	20'-2"	100		10,286
PHL1108	32	9'-8"	104		1643
PHL1109	32	13'-2"	104		2239
PHL1110	8	8'-2"	104		347
PHL1111	56	19'-9"	Str.		5876
PHL1112	4	15'-9"	Str.		335
PHL1113	4	12'-3"	Str.		260
PHL1114	24	27'-6"	Str.		3507
PHL1115	24	31'-0"	Str.		3953
PHL1116	4	10'-6"	Str.		223
PHL1117	4	14'-0"	Str.		298
PHL18S01	3	47'-9"	Str.		1948
PHL18S02	7	26'-9"	108		2547
PHL18S03	7	55'-9"	108		5307
PHL18S04	7	42'-7"	104		4054
PHL18S05	7	49'-7"	104		4720
PHL18S06	14	27'-8"	104		5268
PHL18S07	7	58'-0"	Str.		5522
		TOTAL WEIGHT =			73,264
PIER 5R					
NON-EPOXY COATED					
PHR401	244	5'-6"	100		896
PHR402	180	7'-6"	140		902
PHR403	2 Ser.16	19'-11" to 21'-11"	109	1 1/2"	447
PHR404	2 Ser.29	16'-5" to 19'-11"	109	1 1/2"	704
PHR501	50	5'-11"	105		309
PHR601	4	28'-6"	Str.		171
PHR602	16	34'-6"	Str.		829
PHR603	10	7'-2"	105		108
PHR801	2 Ser.25	19'-4" to 24'-10"	109	2 3/4"	2948
PHR802	38	25'-2"	109		2553
PHR1104	28	16'-8"	100		2479
PHR1105	28	20'-2"	100		3000
PHR1108	32	9'-8"	104		1643
PHR1109	32	13'-2"	104		2239
PHR1110	8	8'-2"	104		347
PHR1111	56	19'-9"	Str.		5876
PHR1112	4	15'-9"	Str.		335
PHR1113	4	12'-3"	Str.		260
PHR1114	24	27'-6"	Str.		3507
PHR1115	24	31'-0"	Str.		3953
PHR1116	4	10'-6"	Str.		223
PHR1117	4	14'-0"	Str.		298
PHR18S01	2	32'-6"	Str.		884
PHR18S02	4	18'-10"	108		1025
PHR18S03	4	47'-11"	108		2602
PHR18S04	7	41'-11"	104		3990
PHR18S05	7	34'-9"	104		3308
PHR18S06	6	34'-3"	104		2795
		TOTAL WEIGHT =			48,631
PIER 6L					
NON-EPOXY COATED					
PJL401	584	5'-6"	100		2536
PJL402	228	7'-6"	140		1282
PJL403	4 Ser.32	15'-11" to 19'-11"	109	1 1/2"	1532
PJL404	4 Ser.25	12'-11" to 15'-11"	109	1 1/2"	963
PJL501	50	5'-11"	105		335
PJL601	4	32'-0"	Str.		192
PJL602	20	38'-3"	Str.		1149
PJL603	12	7'-8"	105		138
PJL801	1 Ser.26	23'-2" to 29'-2"	109	2 3/4"	1816
PJL802	44	29'-2"	109		3426
PJL803	20	26'-7"	109		1420
PJL804	2 Ser.17	20'-9" to 26'-7"	109	4 3/8"	2148
PJL1105	68	22'-2"	100		8008
PJL1108	44	10'-2"	104		2377
PJL1109	44	13'-8"	104		3195
PJL1110	8	13'-5"	104		570
PJL1111	88	35'-0"	Str.		16,364
PJL1113	36	24'-0"	Str.		4590
PJL1114	36	27'-0"	Str.		5164
PJL14S01	56	31'-7"	105		13,530
PJL18S01	2	37'-3"	Str.		1013
PJL18S02	6	20'-4"	108		1659
PJL18S03	6	54'-1"	108		4413
PJL18S04	8	47'-5"	104		5159
PJL18S05	8	39'-11"	104		4343
PJL18S06	8	37'-11"	104		4125
		TOTAL WEIGHT =			91,447
PIER 6R					
NON-EPOXY COATED					
PJR401	348	5'-6"	100		1279
PJR402	232	7'-6"	140		1162
PJR403	2 Ser. 29	19'-11" to 23'-5"	109	1 1/2"	839
PJR404	2 Ser. 29	16'-5" to 19'-11"	109	1 1/2"	704
PJR501	50	5'-11"	105		309
PJR601	4	28'-6"	Str.		171
PJR602	16	34'-6"	Str.		829
PJR603	10	7'-2"	105		108
PJR801	2 Ser.10	19'-4" to 24'-10"	109	7 3/8"	1179
PJR802	38	25'-2"	109		2553
PJR1105	104	22'-2"	100		12,248
PJR1108	32	9'-8"	104		1643
PJR1109	32	13'-2"	104		2239
PJR1110	8	19'-8"	104		836
PJR1111	56	31'-6"	Str.		9372
PJR1112	4	27'-6"	Str.		584
PJR1113	4	24'-0"	Str.		510
PJR1114	24	27'-6"	Str.		3507
PJR1115	24	31'-0"	Str.		3953
PJR1116	4	10'-6"	Str.		223
PJR1117	4	14'-0"	Str.		298
PJR18S01	1	32'-6"	Str.		442
PJR18S02	4	18'-10"	108		1025
PJR18S03	4	47'-10"	108		2602
PJR18S04	4	41'-11"	104		2280
PJR18S05	10	31'-9"	104		4726
		TOTAL WEIGHT =			55,621
PIER 7L					
NON-EPOXY COATED					
PKL401	454	6'-6"	100		1971
PKL402	182	8'-11"	140		1084
PKL403	2 Ser.41	15'-11" to 20'-11"	109	1 1/2"	1009
PKL404	4 Ser.25	12'-11" to 15'-11"	109	1 1/2"	963
PKL501	50	5'-11"	105		335
PKL601	2	32'-0"	Str.		96
PKL602	10	38'-3"	Str.		575
PKL603	12	7'-8"	105		138
PKL801	1 Ser.26	23'-2" to 29'-2"	109	2 3/4"	1816
PKL802	52	29'-2"	109		4049
PKL803	30	26'-7"	109		2129
PKL804	2 Ser.17	20'-9" to 26'-7"	109	4 3/8"	2148
PKL1105	68	22'-2"	100		8008
PKL1108	22	10'-2"	104		1888
PKL1109	26	13'-8"	104		1888
PKL1110	4	10'-5"	104		221
PKL1111	44	44'-0"	Str.		10,286
PKL1112	4	12'-6"	Str.		266
PKL1113	36	23'-6"	Str.		4590
PKL1114	36	27'-0"	Str.		5164
PKL14S01	56	31'-7"	105		13,530
PKL18S01	4	37'-3"	Str.		2026
PKL18S02	6	20'-4"	108		1659
PKL18S03	6	54'-1"	108		4413
PKL18S04	8	47'-5"	104		5159
PKL18S05	8	39'-11"	104		4343
PKL18S06	10	37'-11"	104		5157
		TOTAL WEIGHT =			84,040
PIER 7L					
EPOXY COATED					
EPKL405	254	6'-6"	100		1,103
EPKL406	82	8'-11"	140		488
EPKL407	2 SER 41	15'-11" to 20'-11"	109	1 1/2"	1,009
EPKL1118	22	10'-2"	104		1,189
EPKL1119	26	13'-8"	104		1,888
EPKL1120	4	10'-5"	104		222
EPKL1121	44	44'-0"	STR		10,285
EPKL1122	4	12'-6"	STR		265
		TOTAL WEIGHT =			16,449
PIER 7R					
NON-EPOXY COATED					
PKR401	262	5'-6"	100		963
PKR402	184	7'-6"	140		922
PKR403	1 Ser.34	19'-11" to 24'-2"	109	1 1/2"	500
PKR404	2 Ser.29	16'-5" to 19'-11"	109	1 1/2"	704
PKR501	50	5'-11"	105		309
PKR601	4	28'-6"	Str.		171
PKR602	16	34'-6"	Str.		829
PKR603	10	7'-2"	105		108
PKR801	2 Ser.25	19'-4" to 24'-10"	109	2 3/4"	2948
PKR802	38	25'-2"	109		2553
PKR1105	104	22'-2"	100		12,248
PKR1106	2	16'-0"	Str.		170
PKR1107	2	19'-0"	Str.		202
PKR1108	18	9'-8"	104		925
PKR1109	18	13'-2"	104		1259
PKR1110	4	11'-3"	104		239
PKR1111	28	37'-0"	Str.		5505
PKR1112	2	32'-9"	Str.		348
PKR1113	2	29'-3"	Str.		311
PKR1114	24	27'-6"	Str.		3507
PKR1115	24	31'-0"	Str.		3953
PKR1116	4	10'-6"	Str.		223
PKR1117	4	14'-0"	Str.		298
PKR18S01	2	32'-6"	Str.		884
PKR18S02	4	18'-10"	108		1025
PKR18S03	4	47'-10"	108		2602
PKR18S04	7	41'-11"	104		3990
PKR18S05	7	34'-9"	104		3308
PKR18S06	6	34'-3"	104		2795
		TOTAL WEIGHT =			53,799

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 7R					
EPOXY COATED					
EPKR405	146	5'- 6"	100		536
EPKR406	68	7'- 6"	140		341
EPKR407	1 SER 34	19'-11" to 24'- 2"	109	1 9/16"	499
EPKR1118	2	16'- 0"	STR		170
EPKR1119	2	19'- 0"	STR		202
EPKR1120	18	9'- 8"	104		924
EPKR1121	18	13'- 2"	104		1,259
EPKR1122	4	11'- 3"	104		239
EPKR1123	28	37'- 0"	STR		5,504
EPKR1124	2	32'- 9"	STR		348
EPKR1125	2	29'- 3"	STR		311
		TOTAL WEIGHT =			10,333
PIER 8R					
NON-EPOXY COATED					
PL401	492	5'-6"	100		1808
PL402	280	7'-6"	140		1403
PL403	2 Ser.41	19'-11" to 24'-11"	109	1 1/2"	1228
PL404	2 Ser.29	16'-5" to 19'-11"	109	1 1/2"	704
PL501	50	5'-11"	105		309
PL601	4	28'-6"	Str.		171
PL602	16	34'-6"	Str.		829
PL603	10	7'-2"	105		108
PL801	4 Ser.17	17'-2" to 22'-8"	109	4"	3601
PL802	42	25'-2"	109		2822
PL1101	1	11'-6"	141		61
PL1102	1 Ser. 5	21'-4" to 23'-9"	100	7"	598
PL1103	1 Ser. 5	17'-10" to 20'-2"	100	7"	505
PL1104	41	23'-8"	100		5155
PL1105	51	20'-2"	100		5464
PL1106	4	22'-6"	Str.		478
PL1107	4	26'-0"	Str.		553
PL1108	36	10'-2"	104		1945
PL1109	36	13'-8"	104		2614
PL1110	8	18'-5"	104		783
PL1111	56	43'-9"	Str.		13,017
PL1112	4	39'-9"	Str.		845
PL1113	4	36'-3"	Str.		770
PL1114	24	27'-6"	Str.		3507
PL1115	24	31'-0"	Str.		3953
PL1116	4	10'-6"	Str.		223
PL1117	4	14'-0"	Str.		298
PL1118	1	19'-11"	100		106
PL1119	1	19'-5"	100		103
PL1120	1	15'-11"	100		85
PL1121	1	16'-5"	100		87
PL18S01	3	32'-3"	Str.		1316
PL18S02	4	18'-10"	108		1025
PL18S03	4	47'-10"	108		2602
PL18S04	7	41'-11"	104		3990
PL18S05	7	34'-9"	104		3308
PL18S06	10	34'-3"	104		4658
		TOTAL WEIGHT =			71,032

BENDING DIAGRAMS

100

4'-6"	PHR401, PJR401, PKR401, PL401, EPKR405
13'-6"	PHR1104
17'-0"	PHR1105, PL1105
5'-6"	PJL401, PKL401, EPKL405
19'-0"	PJL1105, PJR1105, PKL1105, PKR1105
16'-0" to 20'-6"	PL1102
12'-6" to 17'-0"	PL1103
20'-6"	PL1104
16'-9"	PL1118
16'-3"	PL1119
12'-9"	PL1120
13'-3"	PL1121

105

3'-6"	PHR501, PJR501, PKR501, PL501
4'-0"	PJL501, PKL501
3'-6"	PHR603, PJR603, PKR603, PL603
4'-0"	PJL603, PKL603
25'-0"	PJL14S01
23'-0"	PKL14S01

1'-4" 2'-0" 4'-9"

104

EPKR1120, PHR1108, PJR1108, PKR1108	8'-6"
EPKR1121, PHR1109, PJR1109, PKR1109	12'-0"
PHR1110	7'-0"
EPKL1118, PJL1108, PKL1108, PL1108	9'-0"
EPKL1119, PJL1109, PKL1109, PL1109	12'-6"
PJL1110	12'-3"
PJR1110	18'-6"
EPKL1120, PKL1110	9'-3"
EPKR1122, PKR1110	10'-1"
PL1110	17'-3"
PHR18S04, PJR18S04, PKR18S04, PL18S04	37'-0"
PHR18S05, PJR18S05, PKR18S05, PL18S05	29'-10"
PHR18S06, PKR18S06, PL18S06	29'-10"
PJL18S04, PKL18S04	41'-0"
PJL18S05, PKL18S05	33'-6"
PJL18S06, PKL18S06	32'-0"

1'-6" 5'-6" 5'-3" 7'-0" 6'-8"

140

12 12 1'-11 1/4" 3'-3"

EPKR406, PHR402, PJR402 PKR402, PL402	1'-3"
PJL402, PKL402, EPKL406	1'-3"

1'-8" 1'-8"

108

12 12 2 3/4" 12'-4 1/4" 12'-10 1/4"

6'-7"	PHR18S02, PJR18S02, PKR18S02, PL18S02
35'-7"	PHR18S03, PJR18S03, PKR18S03, PL18S03
7'-7"	PJL18S02, PKL18S02
41'-4"	PJL18S03, PKL18S03

141

12 12 12 12 3'-0" 3'-0" 6'-0" PL1101

109

PHR403	5'-3" to 6'-3"
PHR404, PJR404, PKR404, PL404	3'-6" to 5'-3"
PJL403	5'-6" to 7'-6"
PJL404	4'-0" to 5'-6"
PJR403	5'-3" to 7'-0"
EPKR407, PKR403	5'-3" to 7'-4"
PL403	5'-3" to 7'-9"
PHR801, PJR801, PKR801	5'-7" to 8'-3"
PHR802, PJR802, PKR802, PL802	8'-6"
PJL801, PKL801	7'-1" to 10'-0"
PJL802, PKL802	10'-0"
PJL803, PKL803	10'-0"
PJL804, PKL804	7'-1" to 10'-0"
EPKL407, PKL403	5'-6" to 8'-0"
PKL404	4'-0" to 5'-6"
PL801	5'-7" to 8'-3"

41'-6" 31'-6" 41'-0" 21'-8 1/2" 21'-3" 21'-5"

Note:
For Pier 5L Bar Bending Diagrams, see Sheet 73/80.

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

147/174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 5L&R, 6L&R, 7L&R AND 8R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN KKS	TRACED Jmo.	CHECKED SMS	REVIEWED C.A.B.	REVISED
DATE 8-5-70	DATE 10-15-70	DATE 11-10-70	DATE 10-16-85	SHEET 74/80

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

148 / 174

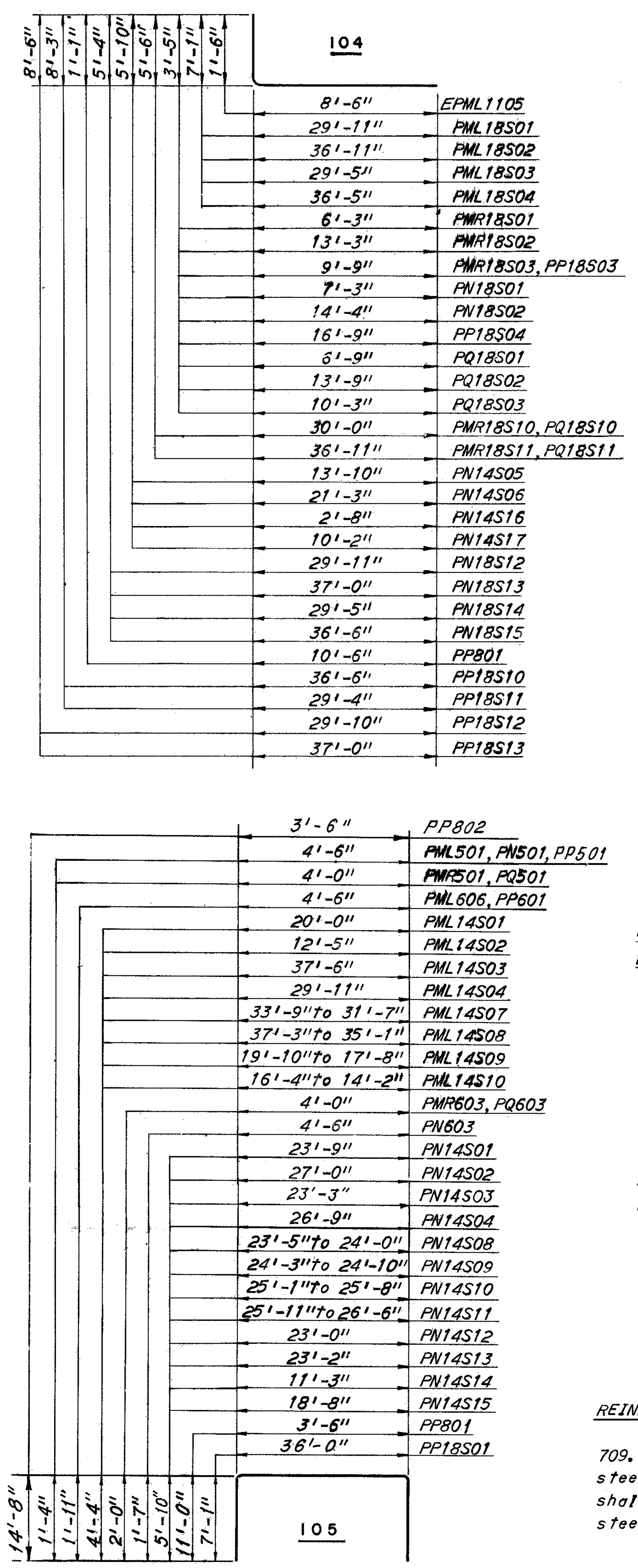
CUYAHOGA COUNTY
CUY-290-0.27

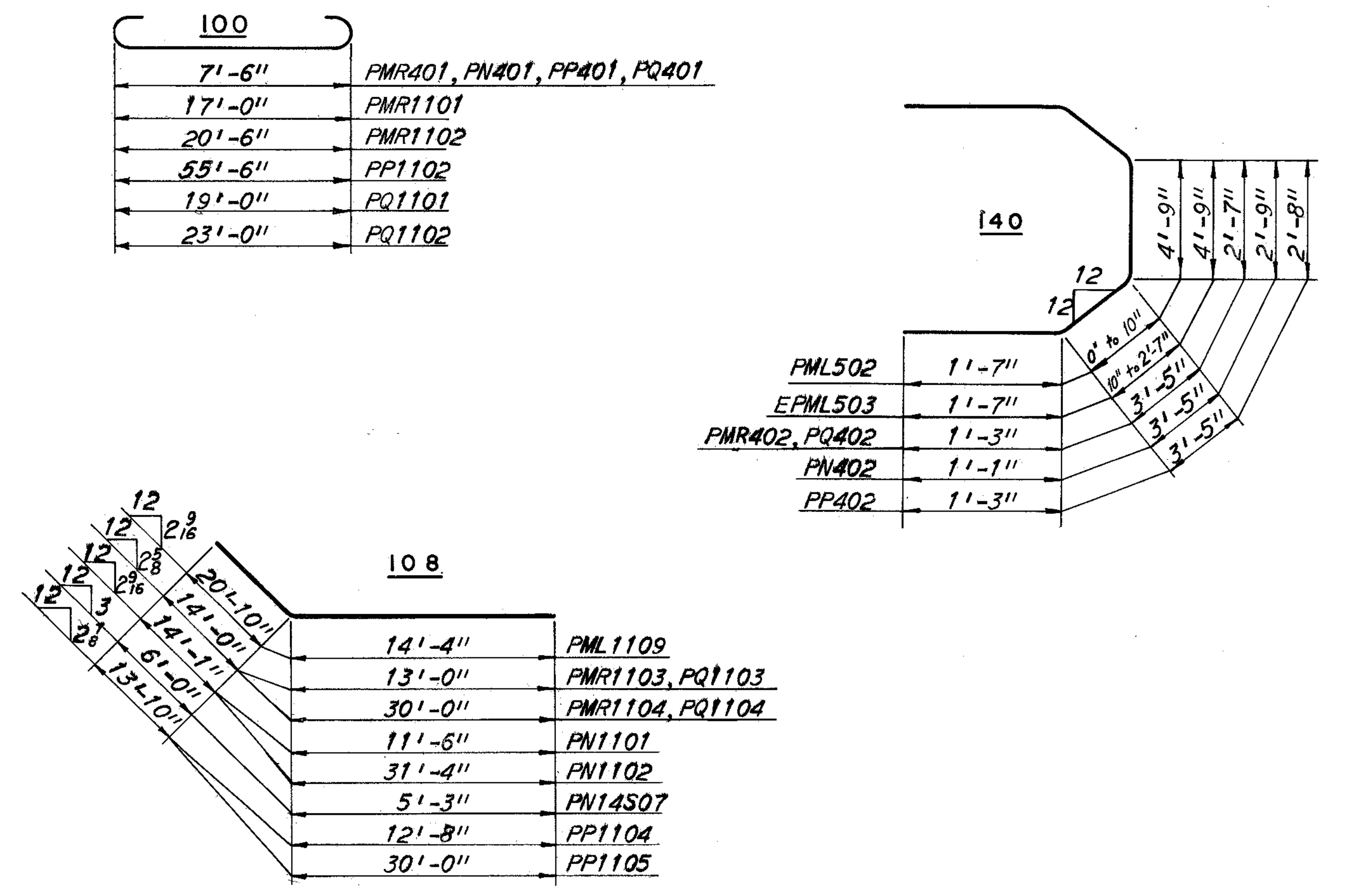
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 9L					
NON-EPOXY COATED					
PML501	50	6'-11"	105		361
PML502	2 Ser. 25	9'-4" / 7'-8"	140	13/16"	443
PML504	2 Ser. 25	24'-10" / 23'-10"	Str.	1/2"	1269
PML601	20	34'-6"	Str.		1036
PML602	6	31'-0"	Str.		279
PML603	4	23'-6"	Str.		141
PML604	2 Ser. 14	36'-7" / 28'-1"	109	7 7/8"	1360
PML605	21	36'-9"	109		1159
PML606	14	8'-0"	105		168
PML1103	58	26'-6"	Str.		8166
PML1106	4	23'-6"	Str.		499
PML1109	10	35'-1"	108		1864
PML14S01	42	27'-9"	105		8916
PML14S02	2	20'-2"	105		309
PML14S03	17	45'-4"	105		5896
PML14S04	2	37'-8"	105		576
PML14S05	1	21'-2"	141		162
PML14S06	1	20'-11"	141		160
PML14S07	1 Ser. 5	41'-6" / 39'-4"	105	6 1/2"	1546
PML14S08	1 Ser. 5	45'-0" / 42'-10"	105	6 1/2"	1680
PML14S09	1 Ser. 5	27'-7" / 25'-5"	105	6 1/2"	1014
PML14S10	1 Ser. 5	24'-1" / 21'-11"	105	6 1/2"	880
PML18S01	9	36'-5"	104		4457
PML18S02	9	43'-5"	104		5314
PML18S03	7	35'-11"	104		3419
PML18S04	7	42'-11"	104		4086
		TOTAL WEIGHT	=		55,160
PIER 9L					
EPOXY COATED					
EPML503	2 Ser. 41	12'-10" / 9'-4"	140	1 1/16"	948
EPML505	2 Ser. 41	23'-10" / 21'-4"	Str.	3/4"	1931
EPML1101	36	39'-6"	Str.		7555
EPML1102	58	43'-6"	Str.		13,405
EPML1104	4	9'-6"	Str.		202
EPML1105	102	9'-8"	104		5239
EPML1107	4	17'-0"	Str.		361
EPML1108	4	43'-0"	Str.		914
		TOTAL WEIGHT	=		30,555
PIER 9R					
NON-EPOXY COATED					
PMR401	336	8'-6"	100		1908
PMR402	272	11'-8"	140		2120
PMR403	2 Ser. 16	31'-4" / 29'-6"	109	1 3/8"	650
PMR404	2 Ser. 31	29'-6" / 25'-10"	109	1 3/8"	1146
PMR405	2 Ser. 21	25'-10" / 23'-4"	109	1 1/2"	690
PMR501	50	6'-5"	105		335
PMR601	4	28'-0"	Str.		168
PMR602	24	35'-0"	Str.		1262
PMR603	14	7'-9"	105		163
PMR604	2 Ser. 9	26'-5" / 31'-9"	109	8"	786
PMR605	30	31'-9"	109		1431
PMR1101	48	20'-2"	100		5143
PMR1102	48	23'-8"	100		6036
PMR1103	5	27'-0"	108		717
PMR1104	5	44'-0"	108		1169
PMR18S01	20	9'-0"	104		2448
PMR18S02	28	16'-0"	104		6093

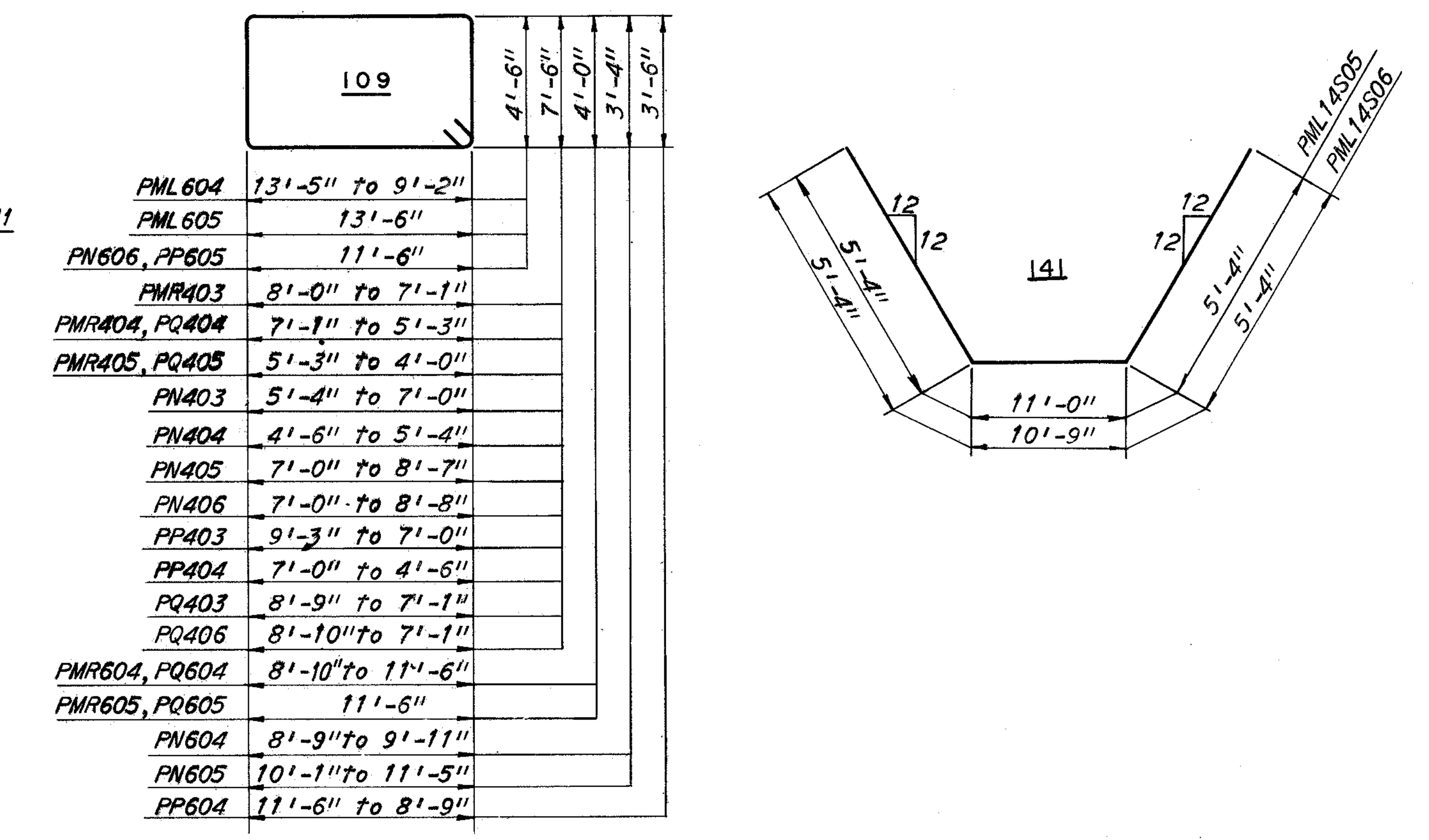
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PMR18S03	8	12'-6"	104		1360
PMR18S04	48	14'-6"	Str.		9466
PMR18S05	8	5'-0"	Str.		544
PMR18S06	8	23'-3"	Str.		2530
PMR18S07	40	30'-0"	Str.		16,320
PMR18S08	20	26'-0"	Str.		7072
PMR18S09	20	19'-0"	Str.		5168
PMR18S10	8	34'-10"	104		3790
PMR18S11	8	41'-9"	104		4542
		TOTAL WEIGHT	=		83,057
PIERS 10L AND 10R					
NON-EPOXY COATED					
PN401	764	8'-6"	100		4338
PN402	550	11'-8"	140		4286
PN403	4 Ser. 27	26'-0" / 29'-4"	109	1 9/16"	1996
PN404	4 Ser. 15	24'-4" / 26'-0"	109	1 7/16"	1009
PN405	1 Ser. 26	29'-4" / 32'-6"	109	1 1/2"	537
PN406	3 Ser. 27	29'-4" / 32'-8"	109	1 9/16"	1677
PN501	100	6'-11"	105		722
PN601	8	27'-3"	Str.		327
PN602	48	34'-6"	Str.		2487
PN603	32	7'-4"	105		352
PN604	8 Ser. 15	24'-11" / 27'-3"	109	2"	4702
PN605	8 Ser. 14	27'-7" / 30'-3"	109	2 7/16"	1390
PN606	98	32'-9"	109		4821
PN1101	10	25'-5"	108		1351
PN1102	10	45'-4"	108		2408
PN14S01	148	34'-3"	105		38,778
PN14S02	133	37'-9"	105		38,409
PN14S03	1	34'-0"	105		260
PN14S04	1	37'-6"	105		287
PN14S05	3	19'-3"	104		442
PN14S06	3	26'-8"	104		612
PN14S07	2	11'-0"	108		168
PN14S08	1 Ser. 6	34'-2" / 34'-9"	105	1 3/8"	1582
PN14S09	1 Ser. 6	35'-0" / 35'-7"	105	1 3/8"	1643
PN14S10	1 Ser. 6	35'-10" / 36'-5"	105	1 3/8"	1658
PN14S11	1 Ser. 6	36'-8" / 37'-3"	105	1 3/8"	1696
PN14S12	1	33'-9"	105		259
PN14S13	1	33'-11"	105		260
PN14S14	2	22'-0"	105		337
PN14S15	2	29'-5"	105		450
PN14S16	2	8'-1"	104		127
PN14S17	2	15'-7"	104		242
PN18S01	56	10'-0"	104		7616
PN18S02	56	17'-1"	104		13,010
PN18S03	56	27'-0"	Str.		20,563
PN18S04	8	17'-9"	Str.		1931
PN18S05	4	18'-6"	Str.		1006
PN18S06	4	17'-3"	Str.		938
PN18S07	48	46'-3"	Str.		30,192
PN18S08	32	39'-0"	Str.		16,973
PN18S09	4	17'-9"	Str.		966
PN18S10	8	17'-0"	Str.		1850
PN18S11	4	16'-3"	Str.		884
PN18S12	18	34'-7"	104		8465
PN18S13	18	41'-8"	104		10,200
PN18S14	18	34'-1"	104		8343
PN18S15	18	41'-2"	104		10,078
PN18S16	24	34'-0"	Str.		11,098
PN18S17	16	19'-9"	Str.		4298
		TOTAL WEIGHT	=		268,024
PIERS 11L AND 11R					
NON-EPOXY COATED					
PP401	920	8'-6"	100		5224
PP402	624	11'-9"	140		4898
PP403	4 Ser. 37	29'-6" / 34'-0"	109	1 1/2"	3139
PP404	4 Ser. 41	24'-6" / 29'-6"	109	1 1/2"	2958
PP501	100	6'-11"	105		721

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PP601	28	8'-0"	105		336
PP602	8	27'-6"	Str.		330
PP603	48	34'-6"	Str.		2487
PP604	8 Ser. 33	30'-9" / 25'-3"	109	2"	11,103
PP605	98	32'-9"	109		4821
PP801	80	25'-1"	105		5358
PP802	80	32'-5"	105		6924
PP804	60	27'-6"	Str.		4406
PP1101	76	36'-0"	Str.		14,536
PP1102	56	58'-8"	100		17,455
PP1103	50	55'-6"	Str.		14,744
PP1104	10	26'-5"	108		1404
PP1105	10	43'-9"	108		2324
PP18S01	120	48'-10"	105		79,696
PP18S02	96	36'-6"	Str.		47,654
PP18S03	48	12'-6"	104		8,160
PP18S04	64	19'-6"	104		16,973
PP18S06	16	22'-9"	Str.		4,950
PP18S07	32	45'-6"	Str.		19,802
PP18S08	16	25'-3"	Str.		5,494
PP18S09	48	38'-6"	Str.		25,133
PP18S10	18	44'-2"	104		10,812
PP18S11	18	37'-0"	104		9058
PP18S12	18	37'-9"	104		9241
PP18S13	18	44'-11"	104		10,996
		TOTAL WEIGHT	=		351,137
PIERS 12L AND 12R					
NON-EPOXY COATED					
PQ401	872	8'-6"	100		4951
PQ402	644	11'-8"	140		5019
PQ403	2 Ser. 28	32'-10" / 29'-6"	109	1 1/2"	1166
PQ404	4 Ser. 31	29'-6" / 25'-10"	109	1 7/16"	2278
PQ405	4 Ser. 21	25'-10" / 23'-4"	109	1 1/2"	1379
PQ406	2 Ser. 29	33'-0" / 29'-6"	109	1 1/2"	1211
PQ501	100	6'-5"	105		670
PQ601	8	28'-0"	Str.		336
PQ602	48	35'-0"	Str.		2523
PQ603	28	7'-9"	105		326
PQ604	4 Ser. 9	26'-5" / 31'-9"	109	8"	1573
PQ605	60	31'-9"	109		2861
PQ1101	116	22'-2"	100		13,662
PQ1102	112	26'-2"	100		15,571
PQ1103	10	27'-0"	108		1435
PQ1104	10	44'-0"	108		2338
PQ18S01	40	9'-6"	104		5168
PQ18S02	56	16'-6"	104		12,566
PQ18S03	16	13'-0"	104		2829
PQ18S04	96	27'-0"	Str.		35,251
PQ18S05	16	16'-9"	Str.		3645
PQ18S06	16	24'-0"	Str.		5222
PQ18S07	80	30'-0"	Str.		32,640
PQ18S08	40	26'-0"	Str.		14,144
PQ18S09	40	19'-0"	Str.		10,336
PQ18S10	16	34'-10"	104		7580
PQ18S11	16	41'-9"	104		9085
		TOTAL WEIGHT	=		195,765

BENDING DIAGRAMS







REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 9L&R, 10L&R, 11L&R AND 12L&R
I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN K.R.S. DATE 8-3-70	TRACED DATE 10-12-70	CHECKED S.M.S. DATE 11-10-70	REVIEWED C.A.B. DATE 10-18-85	REVISED

SHEET 75 / 80

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 13L					
NON-EPOXY COATED					
PRL401	864	6'-6"	100		3751
PRL402	304	8'-9"	140		1777
PRL403	4 Ser. 25	18'-11" to 12'-11"	109	1 1/4"	963
PRL404	4 Ser. 25	18'-11" to 16'-1"	109	1 3/8"	1169
PRL405	4 Ser. 13	20'-5" to 19'-1"	109	1 3/8"	686
PRL406	2 Ser. 10	21'-7" to 20'-7"	109	1 3/8"	282
PRL407	2 Ser. 16	22'-5" to 20'-7"	109	1 1/2"	460
PRL501	50	6'-5"	105		335
PRL601	20	34'-6"	Str.		1036
PRL602	4	29'-0"	Str.		174
PRL603	4 Ser. 24	26'-3" to 20'-9"	109	2 3/8"	3389
PRL604	12	7'-8"	105		138
PRL605	46	28'-9"	109		1986
PRL1101	48	10'-2"	104		2593
PRL1102	52	13'-8"	104		3776
PRL1103	4	10'-4"	104		220
PRL1104	4	15'-9"	Str.		335
PRL1105	44	31'-9"	Str.		7422
PRL1106	4	24'-0"	Str.		510
PRL1107	4	16'-3"	104		345
PRL1108	4	18'-0"	Str.		383
PRL1109	44	25'-6"	Str.		5961
PRL1110	72	27'-6"	Str.		10,520
PRL1111	8	23'-3"	Str.		988
PRL1112	8	19'-9"	Str.		839
PRL1113	36	26'-6"	Str.		5069
PRL1114	36	23'-0"	Str.		4399
PRL1115	2	27'-3"	Str.		290
PRL1116	5	22'-3"	108		591
PRL1117	5	47'-11"	108		1273
PRL1118	4	29'-3"	Str.		622
PRL18S01	40	28'-6"	105		15,558
PRL18S02	48	22'-6"	105		14,688
PRL18S03	8	43'-4"	104		4715
PRL18S04	8	36'-4"	104		3953
PRL18S05	8	36'-5"	104		3962
		TOTAL WEIGHT =			105,158
PIER 13R					
NON-EPOXY COATED					
PRR401	896	6'-6"	100		3890
PRR402	312	8'-9"	140		1824
PRR403	4 Ser. 25	15'-11" to 12'-11"	109	1 1/2"	963
PRR404	4 Ser. 25	18'-11" to 16'-1"	109	1 3/8"	1169
PRR405	4 Ser. 13	20'-5" to 19'-1"	109	1 3/8"	686
PRR406	2 Ser. 11	21'-9" to 20'-7"	109	1 3/8"	311
PRR407	2 Ser. 19	22'-9" to 20'-7"	109	1 1/2"	550
PRR501	50	6'-5"	105		335
PRR601	20	34'-6"	Str.		1036
PRR602	4	29'-0"	Str.		174
PRR603	2 Ser. 24	28'-9" to 23'-3"	109	2 7/8"	1874
PRR604	12	7'-8"	105		138
PRR605	42	28'-9"	109		1814
PRR1101	48	10'-2"	104		2593
PRR1102	52	13'-8"	104		3776
PRR1103	4	13'-2"	104		280
PRR1104	4	18'-6"	Str.		393
PRR1105	44	34'-6"	Str.		8065
PRR1106	4	26'-9"	Str.		568
PRR1107	4	17'-0"	104		361
PRR1108	4	18'-9"	Str.		398
PRR1109	44	26'-3"	Str.		6137
PRR1110	72	27'-6"	Str.		10,520
PRR1111	8	23'-3"	Str.		988
PRR1112	8	19'-9"	Str.		839
PRR1113	36	26'-6"	Str.		5069
PRR1114	36	23'-0"	Str.		4399
PRR1115	2	27'-3"	Str.		290

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PRR1116	5	22'-3"	108		591
PRR1117	5	47'-11"	108		1273
PRR1118	4	29'-3"	Str.		622
PRR18S01	40	28'-6"	105		15,558
PRR18S02	53	22'-6"	105		16,218
PRR18S03	8	43'-4"	104		4715
PRR18S04	8	36'-4"	104		3953
PRR18S05	4	36'-5"	104		1981
		TOTAL WEIGHT =			104,351
PIER 14L					
NON-EPOXY COATED					
PSL401	220	10'-2"	140		1494
PSL402	560	6'-6"	100		2432
PSL403	2 Ser. 4	18'-11" to 18'-3"	109	1 3/8"	102
PSL404	2 Ser. 8	18'-11" to 19'-9"	109	1 3/8"	208
PSL405	4 Ser. 24	16'-1" to 18'-9"	109	1 3/8"	1117
PSL406	4 Ser. 25	12'-1" to 15'-11"	109	1 1/2"	963
PSL501	50	6'-5"	105		335
PSL601	4	30'-6"	Str.		183
PSL602	20	37'-9"	Str.		1134
PSL603	50	28'-9"	109		2159
PSL604	2 Ser. 18	20'-3" to 26'-3"	109	4 3/8"	1253
PSL605	1 Ser. 24	22'-7" to 28'-7"	109	3 3/8"	922
PSL606	12	7'-8"	105		138
PSL1101	44	13'-8"	104		3195
PSL1102	48	10'-2"	104		2593
PSL1103	4	14'-2"	104		301
PSL1104	4	27'-0"	Str.		574
PSL1105	4	23'-9"	Str.		505
PSL1106	40	31'-3"	Str.		6641
PSL1107	36	23'-6"	Str.		4495
PSL1108	4	27'-9"	Str.		590
PSL1109	36	35'-6"	Str.		6790
PSL1110	36	27'-0"	Str.		5164
PSL18S01	40	26'-6"	105		14,416
PSL18S02	40	22'-6"	105		12,240
PSL18S03	3	34'-3"	Str.		1397
PSL18S04	4	20'-9"	108		1129
PSL18S05	4	50'-11"	108		2770
PSL18S06	6	37'-5"	104		3053
PSL18S07	8	35'-3"	104		3835
PSL18S08	8	49'-5"	104		5377
		TOTAL WEIGHT =			87,505
PIER 14R					
NON-EPOXY COATED					
PSR401	430	6'-6"	100		1867
PSR402	176	8'-9"	140		1029
PSR403	4 Ser. 25	15'-11" to 12'-11"	109	1 1/2"	963
PSR404	2 Ser. 38	20'-5" to 16'-1"	109	1 3/8"	927
PSR501	50	6'-5"	105		335
PSR601	20	34'-6"	Str.		1036
PSR602	4	29'-0"	Str.		174
PSR603	2 Ser. 18	28'-9" to 23'-3"	109	3 7/8"	1406
PSR604	12	7'-8"	105		138
PSR605	44	28'-9"	109		1900
PSR1101	22	14'-6"	104		1695
PSR1102	26	11'-0"	104		1520
PSR1105	4	9'-2"	104		195
PSR1107	4	12'-0"	Str.		255
PSR1109	36	40'-0"	Str.		7,651
PSR1110	4	32'-3"	Str.		686
PSR1111	4	35'-9"	Str.		760
PSR1112	36	26'-6"	Str.		5069
PSR1113	36	23'-0"	Str.		4399
PSR1114	4	29'-3"	Str.		622

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PSR1115	2	27'-3"	Str.		290
PSR1116	5	22'-3"	108		591
PSR1117	5	47'-11"	108		1273
PSR18S01	40	26'-6"	105		14,416
PSR18S02	40	22'-6"	105		12,240
PSR18S03	8	43'-4"	104		4715
PSR18S04	8	36'-4"	104		3953
PSR18S05	4	36'-5"	104		1981
		TOTAL WEIGHT =			72,086
PIER 14R					
EPOXY COATED					
EPSR405	2 SER 43	21'-1" to 16'-1"	109	1 3/8"	1,068
EPSR406	270	6'-6"	100		1,172
EPSR407	86	8'-9"	140		503
EPSR1103	22	19'-3"	104		2,250
EPSR1104	26	15'-9"	104		2,176
EPSR1106	4	12'-2"	104		259
EPSR1118	4	12'-0"	STR		255
EPSR1119	36	40'-0"	STR		7,650
EPSR1120	4	32'-3"	STR		685
EPSR1121	4	35'-9"	STR		760
		TOTAL WEIGHT =			16,778
PIER 15L					
NON-EPOXY COATED					
PTL401	256	5'-6"	100		941
PTL402	186	7'-6"	140		932
PTL403	1 Ser. 18	19'-11" to 22'-0"	109	1 1/2"	252
PTL404	2 Ser. 29	16'-5" to 19'-11"	109	1 1/2"	704
PTL405	1 Ser. 17	19'-11" to 21'-10"	109	1 1/2"	237
PTL501	50	5'-11"	105		309
PTL601	4	31'-3"	Str.		188
PTL602	16	38'-0"	Str.		913
PTL603	10	7'-2"	105		108
PTL801	2 Ser. 12	17'-6" to 22'-8"	109	5 3/8"	1287
PTL802	47	25'-2"	109		3158
PTL803	22	23'-0"	109		1351
PTL804	1 Ser. 12	19'-8" to 25'-0"	109	6 1/8"	716
PTL1104	28	16'-8"	100		2479
PTL1105	28	20'-2"	100		3000
PTL1108	32	9'-8"	104		1643
PTL1109	32	13'-2"	104		2239
PTL1110	8	13'-5"	104		570
PTL1111	56	25'-3"	Str.		7513
PTL1112	4	21'-0"	Str.		446
PTL1113	4	17'-6"	Str.		372
PTL1114	24	27'-6"	Str.		3507
PTL1115	24	31'-0"	Str.		3953
PTL1116	4	14'-0"	Str.		298
PTL1117	4	10'-6"	Str.		223
PTL18S01	2	39'-3"	Str.		1068
PTL18S02	7	18'-9"	108		1785
PTL18S03	7	54'-9"	108		5212
PTL18S04	7	36'-11"	104		3514
PTL18S05	7	46'-8"	104		4443
PTL18S06	6	35'-11"	104		2931
		TOTAL WEIGHT =			54,699
PIER 15R					
NON-EPOXY COATED					
PTR401	280	5'-6"	100		1029
PTR402	198	7'-6"	140		992
PTR403	1 Ser. 19	19'-11" to 22'-0"	109	1 3/4"	266
PTR404	2 Ser. 29	16'-5" to 19'-11"	109	1 1/2"	704
PTR405	1 Ser. 22	19'-11" to 22'-6"	109	1 1/2"	313

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PTR501	50	5'-11"	105		309
PTR601	4	23'-6"	Str.		141
PTR602	16	34'-6"	Str.		829
PTR603	10	7'-2"	105		108
PTR801	2 Ser. 13	19'-6" to 24'-10"	109	5 5/16"	1539
PTR802	38	25'-2"	109		2553
PTR1104	28	16'-8"	100		2479
PTR1105	28	20'-2"	100		3000
PTR1108	32	9'-8"	104		1643
PTR1109	32	13'-2"	104		2239
PTR1110	8	13'-5"	104		570
PTR1111	56	25'-3"	Str.		7513
PTR1112	4	21'-0"	Str.		446
PTR1113	4	17'-6"	Str.		372
PTR1114	24	27'-6"	Str.		3507
PTR1115	24	31'-0"	Str.		3953
PTR1116	4	14'-0"	Str.		298
PTR1117	4	10'-6"	Str.		223
PTR18S01	2	32'-6"	Str.		884
PTR18S02	4	18'-9"	108		1020
PTR18S03	4	47'-11"	108		2607
PTR18S04	7	34'-11"	104		3324
PTR18S05	7	41'-9"	104		3975
PTR18S06	4	33'-11"	104		1845
		TOTAL WEIGHT =			48,681

REINFORCING STEEL SAMPLES

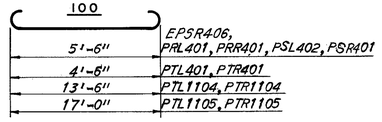
Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

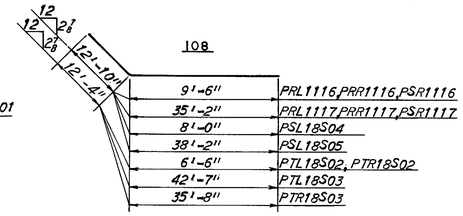
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

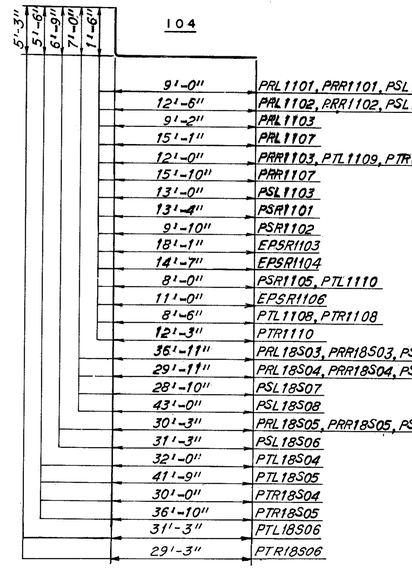
149 / 174

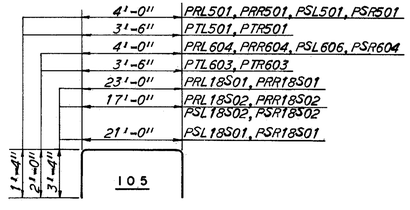
CUYAHOGA COUNTY
CUY-290-0.27

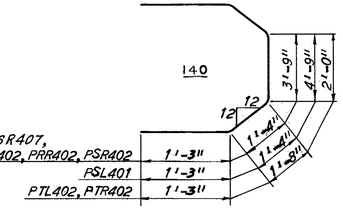
BENDING DIAGRAMS











H.N.T.B. BR. NO. 9 | PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 13L&R, 14L&R AND 15L&R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

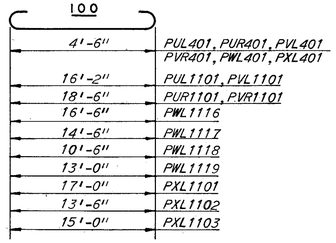
DRAWN K.R.S.	TRACED [illegible]	CHECKED R.V.H.	REVIEWED	REVISED
DATE 9-23-70	DATE 11-4-70	DATE 11-5-70	DATE C.A.B. 10-18-85	SHEET 76/80

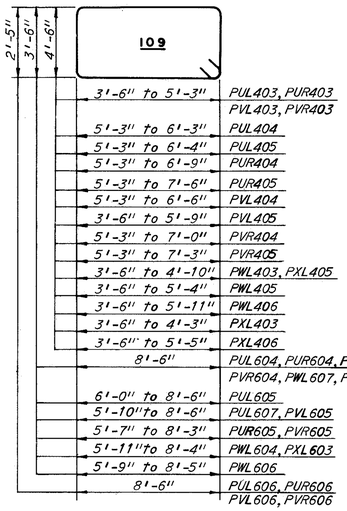
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 16L					
PUL401	248	5'-6"	100		911
PUL402	182	7'-2"	140		871
PUL403	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PUL404	1 Ser. 16	19'-11" 22'-11"	109	1½"	224
PUL405	1 Ser. 17	19'-11" 22'-5"	109	1½"	238
PUL501	110	5'-11"	105		679
PUL601	4	36'-0"	Str.		216
PUL602	16	40'-0"	Str.		961
PUL603	10	7'-0"	105		105
PUL604	30	24'-9"	109		1115
PUL605	1 Ser. 23	19'-9" 24'-9"	109	2¾"	769
PUL606	70	22'-7"	109		2374
PUL607	1 Ser. 10	19'-5" 24'-9"	109	7⅛"	332
PUL1101	96	19'-4"	100		9861
PUL1102	32	9'-8"	104		1644
PUL1103	32	13'-2"	104		2239
PUL1104	8	8'-4"	104		354
PUL1105	4	12'-6"	Str.		266
PUL1106	4	16'-0"	Str.		340
PUL1107	56	20'-0"	Str.		5951
PUL1108	4	13'-9"	Str.		292
PUL1109	4	10'-3"	Str.		218
PUL1110	24	27'-3"	Str.		3475
PUL1111	24	30'-9"	Str.		3921
PUL18S01	7	40'-5"	104		3848
PUL18S02	7	47'-5"	104		4514
PUL18S03	10	35'-11"	104		4885
PUL18S04	7	18'-1"	108		1722
PUL18S05	7	25'-3"	108		2404
PUL18S06	7	53'-6"	Str.		5093
PUL18S07	7	34'-6"	Str.		3284
		TOTAL WEIGHT		=	63,810
PIER 16R					
PUR401	384	5'-6"	100		1411
PUR402	242	7'-8"	140		1239
PUR403	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PUR404	1 Ser. 26	19'-11" 22'-11"	109	1½"	372
PUR405	1 Ser. 37	19'-11" 24'-5"	109	1½"	548
PUR501	90	5'-11"	105		555
PUR601	4	28'-6"	Str.		171
PUR602	16	34'-9"	Str.		835
PUR603	10	7'-0"	105		105
PUR604	26	24'-9"	109		967
PUR605	2 Ser. 10	18'-11" 24'-3"	109	7⅛"	648
PUR606	36	22'-7"	109		1221
PUR1101	104	21'-8"	100		11,972
PUR1102	36	9'-8"	104		1849
PUR1103	36	13'-2"	104		2518
PUR1104	4	13'-9"	104		2518
PUR1105	2	10'-6"	Str.		112
PUR1106	2	21'-9"	Str.		231
PUR1107	2	7'-6"	Str.		80
PUR1108	2	18'-3"	Str.		194
PUR1109	2	21'-0"	Str.		223
PUR1110	2	32'-3"	Str.		343
PUR1111	2	24'-6"	Str.		260
PUR1112	2	35'-9"	Str.		380
PUR1113	28	28'-6"	Str.		4240
PUR1114	28	39'-6"	Str.		5876
PUR1115	4	13'-9"	Str.		292
PUR1116	4	10'-6"	Str.		223
PUR1117	24	27'-3"	Str.		3475
PUR1118	24	30'-9"	Str.		3921
PUR18S01	7	34'-10"	104		3316
PUR18S02	7	41'-0"	104		3983
PUR18S03	4	19'-2"	108		1043

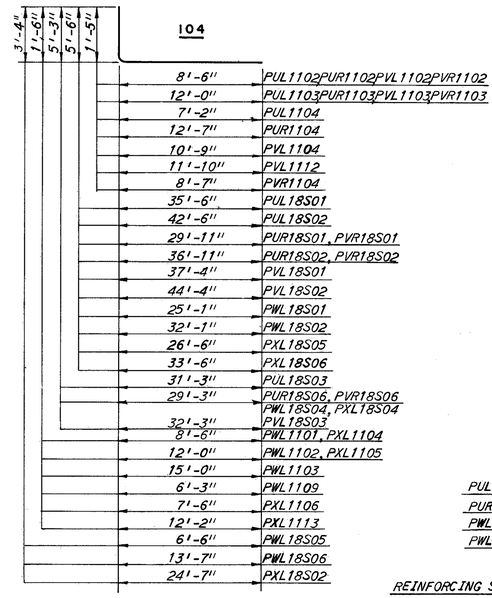
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PUR18S04	4	47'-6"	108		2584
PUR18S05	2	32'-6"	Str.		884
PUR18S06	4	33'-11"	104		1845
		TOTAL WEIGHT		=	58,912
PIER 17L					
PVL401	228	5'-6"	100		838
PVL402	172	7'-2"	140		823
PVL403	1 Ser. 29	16'-5" 19'-11"	109	1½"	352
PVL404	1 Ser. 21	19'-11" 22'-5"	109	1½"	297
PVL405	1 Ser. 36	16'-5" 20'-11"	109	1½"	449
PVL501	110	5'-11"	105		679
PVL601	4	39'-6"	Str.		237
PVL602	16	42'-0"	Str.		1009
PVL603	10	7'-0"	105		105
PVL604	45	24'-9"	109		1673
PVL605	2 Ser. 9	19'-5" 24'-9"	109	8"	597
PVL606	84	22'-7"	109		2849
PVL1101	96	19'-4"	100		9861
PVL1102	30	9'-8"	104		1541
PVL1103	30	13'-2"	104		2099
PVL1104	4	11'-11"	104		253
PVL1105	2	16'-0"	Str.		170
PVL1106	2	19'-6"	Str.		207
PVL1107	28	23'-9"	Str.		3533
PVL1108	2	13'-9"	Str.		146
PVL1109	2	10'-3"	Str.		109
PVL1110	12	27'-3"	Str.		1737
PVL1111	12	30'-9"	Str.		1960
PVL1112	1	13'-0"	104		276
PVL1113	2	21'-0"	Str.		223
PVL1114	2	17'-6"	Str.		186
PVL1115	12	34'-9"	Str.		2216
PVL1116	12	38'-3"	Str.		2439
PVL18S01	7	42'-3"	104		4022
PVL18S02	7	49'-3"	104		4689
PVL18S03	12	36'-11"	104		6025
PVL18S04	7	18'-3"	108		1737
PVL18S05	7	25'-3"	108		2404
PVL18S06	7	57'-3"	Str.		5450
PVL18S07	7	38'-0"	Str.		3618
PVL18S08	2	47'-3"	Str.		1285
		TOTAL WEIGHT		=	66,094
PIER 17R					
PVR401	376	5'-6"	100		1381
PVR402	242	7'-8"	140		1239
PVR403	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PVR404	1 Ser. 30	19'-11" 23'-5"	109	1½"	434
PVR405	1 Ser. 33	19'-11" 23'-7"	109	1⅞"	479
PVR501	90	5'-11"	105		555
PVR601	4	28'-6"	Str.		171
PVR602	16	34'-9"	Str.		835
PVR603	10	7'-0"	105		105
PVR604	26	24'-9"	109		967
PVR605	2 Ser. 10	18'-11" 24'-3"	109	7⅛"	648
PVR606	36	22'-7"	109		1221
PVL1101	104	21'-8"	100		11,972
PVL1102	36	9'-8"	104		1849
PVL1103	36	13'-2"	104		2518
PVL1104	4	13'-9"	104		2518
PVL1105	2	16'-0"	Str.		170
PVL1106	2	19'-6"	Str.		207
PVL1107	28	23'-9"	Str.		3533
PVL1108	2	13'-9"	Str.		146
PVL1109	2	10'-3"	Str.		109
PVL1110	12	27'-3"	Str.		1737
PVL1111	12	30'-9"	Str.		1960
PVL1112	1	13'-0"	104		276
PVL1113	2	21'-0"	Str.		223
PVL1114	2	17'-6"	Str.		186
PVL1115	12	34'-9"	Str.		2216
PVL1116	12	38'-3"	Str.		2439
PVL18S01	7	42'-3"	104		4022
PVL18S02	7	49'-3"	104		4689
PVL18S03	12	36'-11"	104		6025
PVL18S04	7	18'-3"	108		1737
PVL18S05	7	25'-3"	108		2404
PVL18S06	7	57'-3"	Str.		5450
PVL18S07	7	38'-0"	Str.		3618
PVL18S08	2	47'-3"	Str.		1285
PVR1101	104	21'-8"	100		11,972
PVR1102	36	9'-8"	104		1849
PVR1103	36	13'-2"	104		2518
PVR1104	4	9'-9"	104		207
PVR1105	2	17'-6"	Str.		186
PVR1106	4	13'-9"	Str.		292
PVR1107	2	27'-9"	Str.		295
PVR1108	2	31'-3"	Str.		332
PVR1109	28	35'-6"	Str.		5281
PVR1110	4	13'-9"	Str.		292
PVR1111	4	10'-6"	Str.		223

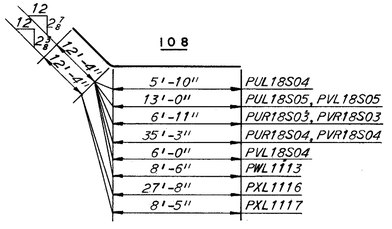
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PVR1112	24	27'-3"	Str.		3475
PVR1113	24	30'-9"	Str.		3921
PVR1114	2	10'-3"	Str.		109
PVR1115	2	24'-6"	Str.		260
PVR1116	28	32'-0"	Str.		4760
PVR1117	2	28'-0"	Str.		298
PVR18S01	7	34'-10"	104		3316
PVR18S02	7	41'-10"	104		3983
PVR18S03	4	19'-2"	108		1043
PVR18S04	4	47'-6"	108		2584
PVR18S05	2	32'-6"	Str.		884
PVR18S06	4	33'-11"	104		1845
		TOTAL WEIGHT		=	61,136
PIER 18L					
PWL401	208	5'-6"	100		764
PWL402	44	8'-0"	140		235
PWL403	1 Ser. 22	16'-5" 19'-1"	109	1½"	261
PWL404	138	7'-9"	140		714
PWL405	1 Ser. 30	16'-5" 20'-1"	109	1½"	366
PWL406	1 Ser. 39	16'-5" 21'-3"	109	1½"	491
PWL501	116	5'-11"	105		716
PWL601	16	29'-9"	Str.		715
PWL602	10	29'-6"	Str.		443
PWL603	4	24'-0"	Str.		144
PWL604	1 Ser. 8	19'-7" 24'-5"	109	8¼"	264
PWL605	10	6'-4"	105		95
PWL606	1 Ser. 17	19'-3" 24'-7"	109	4"	560
PWL607	54	24'-9"	109		2007
PWL1101	28	9'-8"	104		1438
PWL1102	28	13'-2"	104		1959
PWL1103	4	16'-2"	104		344
PWL1104	2	20'-6"	Str.		218
PWL1105	12	37'-9"	Str.		2407
PWL1106	12	41'-3"	Str.		2630
PWL1107	12	29'-0"	Str.		1849
PWL1108	12	32'-6"	Str.		2072
PWL1109	4	7'-5"	104		158
PWL1110	2	11'-9"	Str.		125
PWL1111	2	24'-0"	Str.		255
PWL1112	2	15'-3"	Str.		162
PWL1113	14	20'-8"	108		1537
PWL1114	7	31'-6"	Str.		1172
PWL1115	7	23'-0"	Str.		855
PWL1116	48	19'-8"	100		5015
PWL1117	20	17'-8"	100		1877
PWL1118	20	13'-8"	100		1452
PWL1119	20	16'-2"	100		1718
PWL18S01	7	30'-0"	104		2856
PWL18S02	7	37'-0"	104		3522
PWL18S03	7	28'-0"	Str.		2666
PWL18S04	4	33'-11"	104		1845
PWL18S05	10	9'-3"	104		1258
PWL18S06	10	16'-4"	104		2221
PWL18S07	10	26'-6"	Str.		3604
PWL18S08	10	19'-6"	Str.		2652
		TOTAL WEIGHT		=	55,642
PIER 19L					
PXL401	140	5'-6"	100		514
PXL402	26	8'-0"	140		139
PXL403	1 Ser. 13	17'-11" 16'-5"	109	1½"	149
PXL404	108	7'-9"	140		559
PXL405	1 Ser. 22	19'-1" 16'-5"	109	1½"	261
PXL406	1 Ser. 32	20'-3" 16'-5"	109	1½"	392
PXL501	120	5'-11"	105		741
PXL601	26	31'-3"	Str.		1220
PXL602	4	24'-0"	Str.		144
PXL603	2 Ser. 8	24'-9" 19'-7"	109	8¼"	529
PXL604	66	24'-9"	109		2454
PXL605	10	6'-4"	105		95
PXL1101	32	20'-2"	100		3429
PXL1102	14	16'-8"	100		1240
PXL1103	20	18'-2"	100		1930
PXL1104	26	9'-8"	104		1335
PXL1105	26	13'-2"	104		1819
PXL1106	4	8'-8"	104		184
PXL1107	2	13'-3"	Str.		141
PXL1108	2	16'-9"	Str.		178
PXL1109	12	20'-9"	Str.		1323
PXL1110	12	24'-3"	Str.		1546
PXL1111	16	33'-9"	Str.		2869
PXL1112	12	30'-3"	Str.		1929
PXL1113	4	13'-4"	104		283
PXL1114	5	35'-6"	Str.		943
PXL1115	4	25'-0"	Str.		531
PXL1116	5	29'-11"	108		1060
PXL1117	5	20'-8"	108		549
PXL18S01	40	22'-6"	105		12,240
PXL18S02	20	27'-4"	104		7435
PXL18S03	7	29'-3"	Str.		2785
PXL18S04	4	33'-11"	104		1845
PXL18S05	7	31'-5"	104		2991
PXL18S06	7	38'-5"	104		3657
		TOTAL WEIGHT		=	59,439

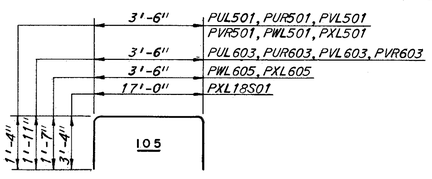
BENDING DIAGRAMS

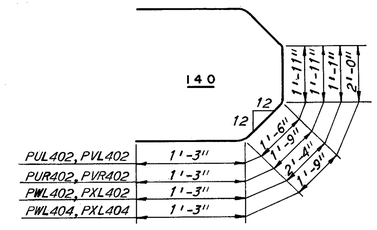












Note: All reinforcing bars are non-epoxy coated.

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

150 / 174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR.NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 16L&R, 17L&R, 18L AND 19L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 8-17-70	DATE 10-23-70	DATE 11-10-70	DATE 10-16-85	SHEET 77/80

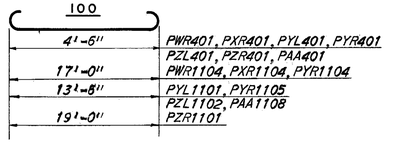
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 18R					
PWR401	296	5'-6"	100		1088
PWR402	206	7'-6"	140		1032
PWR403	1 Ser. 23	19'-11" 22'-7"	109	1½"	325
PWR404	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PWR405	1 Ser. 22	19'-11" 22'-5"	109	1½"	311
PWR501	100	5'-11"	105		617
PWR601	4	31'-0"	Str.		186
PWR602	16	37'-3"	Str.		895
PWR603	10	7'-2"	105		108
PWR604	2 Ser. 10	18'-11" 24'-3"	109	7⅛"	648
PWR605	35	24'-9"	109		1301
PWR606	76	22'-7"	109		2578
PWR1104	96	20'-2"	100		10,286
PWR1108	32	9'-8"	104		1643
PWR1109	32	13'-2"	104		2239
PWR1110	8	13'-5"	104		570
PWR1111	56	25'-9"	Str.		7661
PWR1112	4	21'-3"	Str.		452
PWR1113	4	17'-9"	Str.		377
PWR1114	24	27'-6"	Str.		3507
PWR1115	24	31'-0"	Str.		3953
PWR1116	4	10'-6"	Str.		223
PWR1117	4	14'-0"	Str.		298
PIER 19R					
PXR401	288	5'-6"	100		1058
PXR402	202	7'-6"	140		1012
PXR403	1 Ser. 15	19'-11" 21'-7"	109	1⅛"	208
PXR404	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PXR405	1 Ser. 28	19'-11" 23'-5"	109	1½"	405
PXR501	100	5'-11"	105		617
PXR601	4	32'-0"	Str.		192
PXR602	16	38'-3"	Str.		919
PXR603	10	7'-2"	105		108
PXR604	2 Ser. 10	18'-11" 24'-3"	109	7⅛"	648
PXR605	37	24'-9"	109		1376
PXR606	76	22'-7"	109		2578
PXR1104	96	20'-2"	100		10,286
PXR1106	28	17'-6"	Str.		2603
PXR1108	30	9'-8"	104		1541
PXR1109	30	13'-2"	104		2099
PXR1110	8	20'-2"	104		857
PXR1111	28	31'-0"	Str.		4612
PXR1112	2	27'-6"	Str.		292
PXR1113	2	24'-0"	Str.		255
PXR1114	24	27'-6"	Str.		3507
PXR1115	24	31'-0"	Str.		3953
PXR1116	4	10'-6"	Str.		223
PXR1117	4	14'-0"	Str.		298
PXR18S01	5	40'-0"	Str.		2720
PXR18S02	6	18'-10"	108		1537
PXR18S03	6	55'-8"	108		4542
PXR18S04	7	43'-11"	104		4347
PXR18S05	7	33'-8"	104		3681
PXR18S06	8	36'-11"	104		4017
PXR18S01	5	40'-0"	Str.		2720
PXR18S02	6	18'-10"	108		1537
PXR18S03	6	55'-8"	108		4542
PXR18S04	7	45'-8"	104		4347
PXR18S05	7	38'-8"	104		3681
PXR18S06	8	36'-11"	104		4017
PYL401	76	5'-6"	100		279

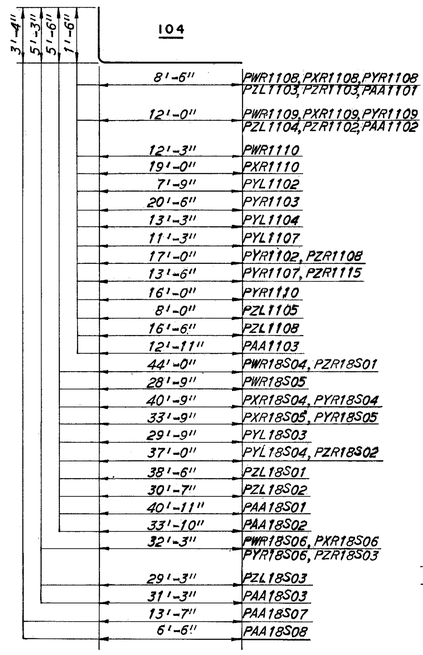
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PYL402	76	7'-6"	140		381
PYL403	1 Ser. 14	16'-5" 17'-11"	109	1½"	161
PYL404	1 Ser. 24	16'-5" 19'-3"	109	1½"	286
PYL501	90	5'-11"	105		555
PYL601	10	7'-2"	105		108
PYL602	16	34'-6"	Str.		829
PYL603	4	28'-6"	Str.		171
PYL604	2 Ser. 8	18'-11" 24'-3"	109	9⅛"	521
PYL605	38	24'-9"	109		1413
PYL1101	44	16'-8"	100		3896
PYL1102	24	8'-11"	104		1137
PYL1103	12	23'-0"	Str.		1466
PYL1104	4	14'-5"	104		306
PYL1105	12	15'-9"	Str.		1004
PYL1106	12	12'-3"	Str.		781
PYL1107	24	12'-5"	104		1583
PYL1108	12	26'-6"	Str.		1690
PYL18S01	5	19'-1"	108		1298
PYL18S02	5	47'-8"	108		3241
PYL18S03	10	34'-8"	104		4715
PYL18S04	4	41'-11"	104		2280
TOTAL WEIGHT			=		28,101
PIER 20R					
PYR401	256	5'-6"	100		940
PYR402	186	7'-6"	140		932
PYR403	1 Ser. 9	19'-11" 20'-9"	109	1¼"	122
PYR404	2 Ser. 29	16'-5" 19'-11"	109	1½"	704
PYR405	1 Ser. 26	19'-11" 23'-1"	109	1½"	373
PYR501	100	5'-11"	105		617
PYR601	4	32'-0"	Str.		192
PYR602	16	38'-3"	Str.		919
PYR603	10	7'-2"	105		108
PYR604	2 Ser. 10	18'-11" 24'-3"	109	7⅛"	648
PYR605	37	24'-9"	109		1376
PYR606	76	22'-7"	109		2578
PYR1102	14	18'-2"	104		1351
PYR1103	14	21'-8"	104		1612
PYR1104	28	20'-2"	100		3000
PYR1105	28	16'-8"	100		2479
PYR1107	4	14'-8"	104		312
PYR1108	16	9'-8"	104		822
PYR1109	16	13'-2"	104		1119
PYR1110	4	17'-2"	104		365
PYR1111	28	28'-9"	Str.		4277
PYR1112	2	24'-9"	Str.		263
PYR1113	2	21'-3"	Str.		226
PYR1114	24	27'-6"	Str.		3507
PYR1115	24	31'-0"	Str.		3953
PYR1116	4	10'-6"	Str.		223
PYR1117	4	14'-0"	Str.		298
PYR18S01	5	40'-0"	Str.		2720
PYR18S02	6	18'-10"	108		1536
PYR18S03	6	55'-8"	108		4542
PYR18S04	7	45'-8"	104		4347
PYR18S05	7	38'-8"	104		3681
PYR18S06	8	36'-11"	104		4017
TOTAL WEIGHT			=		54,159
PIER 21L					
PZL401	86	5'-6"	100		316
PZL402	86	7'-7"	140		435
PZL403	1 Ser. 16	18'-3" 16'-5"	109	1¼"	185
PZL404	1 Ser. 27	19'-7" 16'-5"	109	1½"	325
PZL501	99	5'-11"	105		611
PZL601	16.	35'-9"	Str.		859

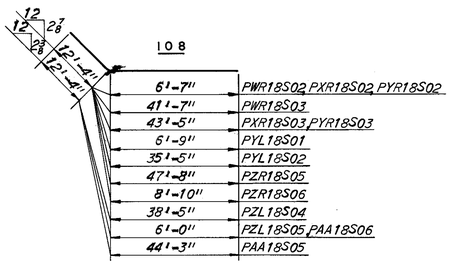
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PZL602	4	29'-6"	Str.		177
PZL603	50	24'-9"	109		1859
PZL604	1 Ser. 8	24'-5" 19'-7"	109	8¼"	264
PZL605	10	7'-2"	105		108
PZL606	1 Ser. 9	24'-7" 19'-7"	109	7½"	298
PZL1102	28	16'-8"	100		2480
PZL1103	24	9'-8"	104		1233
PZL1104	24	13'-2"	104		1679
PZL1105	4	9'-2"	104		195
PZL1106	12	18'-0"	Str.		1148
PZL1107	12	14'-6"	Str.		924
PZL1108	4	17'-8"	104		376
PZL1109	12	29'-0"	Str.		1849
PZL1110	12	25'-6"	Str.		1626
PZL14S01	32	21'-3"	105		5202
PZL18S01	7	43'-5"	104		4134
PZL18S02	7	35'-6"	104		3380
PZL18S03	4	33'-11"	104		1845
PZL18S04	6	50'-8"	108		4134
PZL18S05	6	18'-3"	108		1489
TOTAL WEIGHT			=		37,131
PIER 21R					
PZR401	268	5'-6"	100		985
PZR402	192	7'-7"	140		973
PZR403	2 Ser. 29	19'-11" 16'-5"	109	1½"	704
PZR404	1 Ser. 24	22'-8" 19'-11"	109	1½"	341
PZR405	1 Ser. 14	21'-5" 19'-11"	109	1½"	199
PZR501	110	5'-11"	105		679
PZR601	24	28'-3"	Str.		1018
PZR602	4	36'-3"	Str.		218
PZR603	2 Ser. 8	24'-5" 19'-7"	109	8¼"	529
PZR604	60	24'-9"	109		2230
PZR605	10	7'-0"	105		105
PZR606	64	22'-7"	109		2171
PZR1101	112	22'-2"	100		13,191
PZR1102	30	13'-2"	104		2099
PZR1103	30	9'-8"	104		1541
PZR1104	2	23'-0"	Str.		244
PZR1105	30	26'-6"	Str.		4224
PZR1106	12	40'-3"	Str.		2566
PZR1107	12	43'-9"	Str.		2789
PZR1108	4	18'-2"	104		386
PZR1109	2	19'-0"	Str.		202
PZR1110	2	22'-6"	Str.		239
PZR1111	12	28'-0"	Str.		1785
PZR1112	2	13'-6"	Str.		143
PZR1113	2	10'-0"	Str.		106
PZR1114	12	31'-6"	Str.		2008
PZR1115	4	14'-8"	104		312
PZR18S01	7	48'-11"	104		4657
PZR18S02	7	41'-11"	104		3991
PZR18S03	8	36'-11"	104		4017
PZR18S04	7	56'-6"	Str.		5379
PZR18S05	7	60'-0"	108		5712
PZR18S06	7	21'-2"	108		2015
PZR18S07	2	46'-6"	Str.		1265
TOTAL WEIGHT			=		69,017
PIER 22L					
PAA401	132	5'-6"	100		485
PAA402	38	8'-0"	140		203
PAA403	1 Ser. 19	18'-7" 16'-5"	109	1½"	222
PAA404	76	7'-7"	140		385
PAA405	1 Ser. 29	19'-11" 16'-5"	109	1½"	352
PAA406	1 Ser. 9	20'-11" 19'-11"	109	1½"	123
PAA501	100	5'-11"	105		617

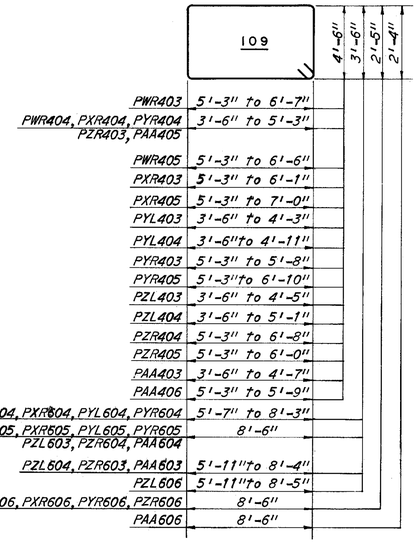
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PAA601	16	38'-6"	Str.		925
PAA602	4	33'-0"	Str.		198
PAA603	2 Ser. 8	24'-5" 19'-7"	109	8¼"	529
PAA604	43	24'-9"	109		1599
PAA605	10	6'-4"	105		95
PAA606	20	22'-5"	109		673
PAA1101	14	9'-8"	104		719
PAA1102	14	13'-2"	104		979
PAA1103	4	14'-1"	104		299
PAA1104	2	18'-6"	Str.		197
PAA1105	12	35'-6"	Str.		2263
PAA1106	12	39'-0"	Str.		2486
PAA1107	2	22'-0"	Str.		234
PAA1108	28	16'-8"	100		2480
PAA14S01	32	21'-3"	105		5202
PAA18S01	7	45'-10"	104		4363
PAA18S02	7	38'-9"	104		3689
PAA18S03	4	35'-11"	104		1954
PAA18S04	2	45'-3"	Str.		1231
PAA18S05	5	56'-7"	108		3847
PAA18S06	5	18'-4"	108		1246
PAA18S07	10	16'-4"	104		2221
PAA18S08	10	9'-3"	104		1258
PAA18S09	10	23'-3"	Str.		3162
PAA18S10	10	16'-3"	Str.		2210
PAA18S11	2	56'-0"	Str.		1523
TOTAL WEIGHT			=		47,969

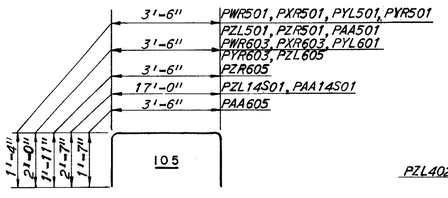
BENDING DIAGRAMS

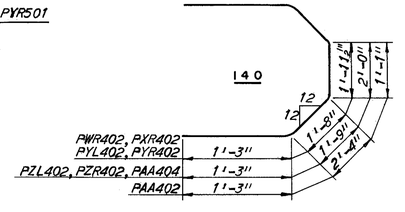












Note: All reinforcing bars are non-epoxy coated.

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

151 / 174

CUYAHOGA COUNTY
CUY-290-0.27

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 18R, 19R, 20L&R, 21L&R and 22L

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (℄ I-290) OHIO

DRAWN KKS DATE 7-30-70	TRACED JMG DATE 11-3-70	CHECKED SMS DATE 11-12-70	REVIEWED CAB DATE 10-1885	REVISED

SHEET 78 / 80

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 22R					
PBB401	1	21'-7"	109		14
PBB402	1 Ser. 3	21'-7" 21'-9"	109	1"	43
PBB403	1 Ser. 7	21'-7" 22'-6"	109	1 7/8"	103
PBB404	3 Ser. 15	20'-7" 21'-7"	109	1 1/4"	626
PBB405	3 Ser. 29	16'-5" 19'-1"	109	1 1/2"	1056
PBB406	286	6'-9"	140		1290
PBB407	398	5'-6"	100		1462
PBB501	120	5'-11"	105		741
PBB601	65	25'-5"	109		2481
PBB602	1 Ser. 12	19'-11" 25'-1"	109	5 5/8"	406
PBB603	1 Ser. 9	19'-5" 24'-11"	109	8 1/4"	300
PBB604	10	6'-4"	105		95
PBB605	24	33'-6"	Str.		1208
PBB606	6	29'-3"	Str.		264
PBB1101	42	16'-8"	100		3719
PBB1102	42	20'-2"	100		4500
PBB1103	4	6'-2"	104		131
PBB1104	4	7'-11"	104		168
PBB1105	4	11'-4"	104		241
PBB1106	48	12'-8"	104		3230
PBB1107	48	9'-2"	104		2338
PBB1108	2	19'-6"	Str.		207
PBB1109	4	16'-3"	Str.		345
PBB1110	2	14'-3"	Str.		151
PBB1111	2	12'-9"	Str.		135
PBB1112	2	11'-0"	Str.		117
PBB1113	24	23'-6"	Str.		2997
PBB1114	24	20'-0"	Str.		2550
PBB1115	24	18'-0"	Str.		2295
PBB1116	4	30'-3"	Str.		643
PBB1117	2	27'-0"	Str.		287
PBB1118	2	25'-0"	Str.		266
PBB1119	2	33'-9"	Str.		359
PBB1120	2	28'-3"	Str.		300
PBB1121	36	28'-0"	Str.		5356
PBB1122	36	31'-6"	Str.		6025
PBB18S01	4	44'-7"	108		2425
PBB18S02	4	51'-7"	108		2806
PBB18S03	1	28'-6"	Str.		388
PBB18S05	2	33'-9"	104		918
PBB18S06	3	35'-3"	104		1438
PBB18S07	2	27'-0"	104		734
PBB18S08	5	40'-0"	Str.		2720
PBB18S09	4	34'-3"	104		1863
PBB18S10	2	30'-0"	Str.		816
PBB18S11	3	30'-1"	104		1227
PBB18S12	2	38'-4"	104		1043
		TOTAL WEIGHT =			62,827
PIER 23L					
PCC401	146	5'-6"	100		536
PCC402	146	7'-7"	140		740
PCC403	1 Ser. 23	19'-1" 16'-5"	109	1 3/8"	273
PCC404	1 Ser. 24	19'-3" 16'-5"	109	1 3/8"	286
PCC405	1 Ser. 26	19'-5" 16'-5"	109	1 3/8"	311
PCC501	110	5'-11"	105		679
PCC601	16	26'-6"	Str.		637
PCC602	10	35'-0"	Str.		526
PCC603	2	40'-0"	Str.		120
PCC604	58	24'-9"	109		2156
PCC605	2 Ser. 8	24'-7" 19'-3"	109	9/16"	527
PCC606	10	7'-2"	105		108

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PCC1101	36	20'-2"	100		3857
PCC1102	28	15'-2"	100		2256
PCC1103	14	13'-2"	100		979
PCC1104	36	13'-2"	104		2518
PCC1105	36	9'-8"	104		1849
PCC1106	4	13'-10"	104		294
PCC1107	12	24'-9"	Str.		1578
PCC1108	12	21'-3"	Str.		1355
PCC1109	4	14'-7"	104		310
PCC1110	12	25'-9"	Str.		1642
PCC1111	12	22'-3"	Str.		1419
PCC1112	4	15'-8"	104		333
PCC1113	12	28'-0"	Str.		1785
PCC1114	12	24'-6"	Str.		1562
PCC1115	6	40'-0"	108		1275
PCC1116	6	31'-6"	Str.		1004
PCC1117	6	20'-8"	108		659
PCC18S01	6	37'-6"	104		3060
PCC18S02	6	30'-5"	104		2482
PCC18S03	6	27'-0"	Str.		2203
TOTAL WEIGHT =					39,319
PIER 23R					
PDD401	200	5'-6"	100		735
PDD402	158	7'-9"	140		818
PDD403	2 Ser. 29	19'-11" 16'-5"	109	1 1/2"	704
PDD404	1 Ser. 8	20'-9" 19'-11"	109	1 7/16"	109
PDD405	1 Ser. 13	21'-5" 19'-11"	109	1 1/2"	179
PDD501	98	5'-11"	105		605
PDD601	16	38'-3"	Str.		919
PDD602	4	32'-3"	Str.		194
PDD603	1 Ser. 8	24'-5" 19'-7"	109	8 2/16"	264
PDD604	1 Ser. 23	24'-5" 19'-5"	109	2 13/16"	757
PDD605	74	24'-9"	109		2751
PDD606	10	6'-4"	105		95
PDD1101	32	20'-2"	100		3429
PDD1102	28	16'-8"	100		2480
PDD1103	28	9'-9"	104		1450
PDD1104	28	13'-3"	104		1971
PDD1105	2	20'-3"	Str.		215
PDD1106	12	33'-9"	Str.		2152
PDD1107	12	37'-3"	Str.		2375
PDD1108	4	18'-3"	104		388
PDD1109	2	22'-6"	Str.		239
PDD1110	2	26'-0"	Str.		276
PDD1111	12	43'-0"	Str.		2742
PDD1112	12	39'-6"	Str.		2518
PDD1113	4	12'-6"	104		266
PDD1114	2	16'-9"	Str.		178
PDD18S01	5	45'-8"	104		3106
PDD18S02	5	38'-8"	104		2630
PDD18S03	4	36'-8"	104		1995
PDD18S04	4	36'-1"	104		1963
PDD18S05	5	40'-0"	Str.		2720
PDD18S06	5	18'-4"	108		1246
PDD18S07	5	56'-4"	108		3830
TOTAL WEIGHT =					46,299

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 24L					
PEE401	120	5'-6"	100		441
PEE402	120	7'-6"	140		601
PEE403	1 Ser. 19	16'-5" 18'-7"	109	1 3/16"	222
PEE404	1 Ser. 20	16'-5" 18'-9"	109	1 1/4"	235
PEE405	1 Ser. 21	16'-5" 18'-11"	109	1 5/16"	248
PEE501	120	5'-11"	105		741
PEE601	6	30'-0"	Str.		270
PEE602	24	34'-3"	Str.		1235
PEE603	10	7'-2"	105		108
PEE604	2 Ser. 8	19'-3" 24'-3"	109	8 5/16"	523
PEE605	64	24'-9"	109		2379
PEE1101	36	19'-0"	Str.		3634
PEE1102	28	16'-8"	100		2479
PEE1103	14	12'-2"	100		905
PEE1104	36	9'-5"	104		1801
PEE1105	36	12'-11"	104		2471
PEE1106	12	11'-8"	104		744
PEE1107	36	22'-6"	Str.		4304
PEE14S01	44	21'-3"	105		7153
PEE18S01	4	40'-5"	104		2199
PEE18S02	4	33'-5"	104		1818
PEE18S03	4	34'-6"	Str.		1877
PEE18S04	3	30'-0"	Str.		1224
PEE18S05	6	34'-5"	104		2808
PEE18S06	5	46'-8"	108		3173
PEE18S07	5	51'-8"	108		3513
		TOTAL WEIGHT =			47,106
PIER 24R					
PFF401	1 Ser. 28	16'-5" 19'-9"	109	1 3/8"	338
PFF402	2 Ser. 34	16'-5" 20'-7"	109	1 3/4"	840
PFF403	216	5'-6"	100		794
PFF404	192	7'-9"	140		994
PFF501	110	5'-11"	105		679
PFF601	24	30'-6"	Str.		1099
PFF602	6	26'-6"	Str.		239
PFF603	10	7'-0"	105		105
PFF604	58	24'-9"	109		2156
PFF605	2 Ser. 8	19'-3" 24'-3"	109	8 3/16"	523
PFF1101	55	16'-8"	100		4870
PFF1102	12	13'-2"	100		839
PFF1103	12	29'-3"	Str.		1865
PFF1104	12	25'-9"	Str.		1642
PFF1105	42	9'-8"	104		2157
PFF1106	42	13'-2"	104		2938
PFF1107	2	12'-6"	Str.		133
PFF1108	2	9'-0"	Str.		96
PFF1109	24	36'-0"	Str.		4590
PFF1110	24	32'-6"	Str.		4144
PFF1111	4	19'-0"	Str.		404
PFF1112	4	15'-6"	Str.		329
PFF1113	8	10'-11"	104		464
PFF1114	7	41'-3"	108		1534
PFF1115	7	49'-9"	108		1850
PFF18S01	6	30'-0"	Str.		2448
PFF18S02	6	37'-3"	104		3040
PFF18S03	6	30'-2"	104		2462
TOTAL WEIGHT =					43,572

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

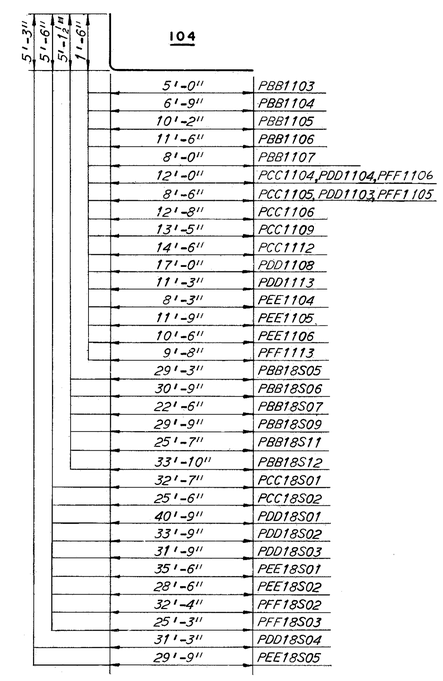
152
174

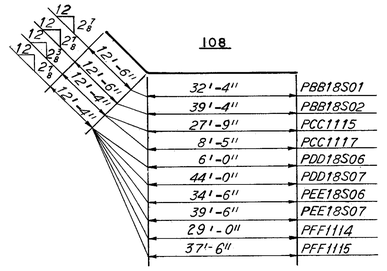
CUYAHOGA COUNTY
CUY-290-0.27

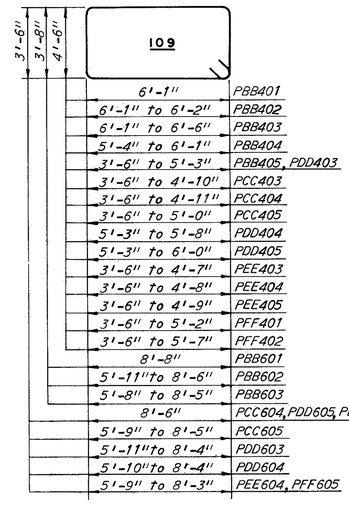
BENDING DIAGRAMS

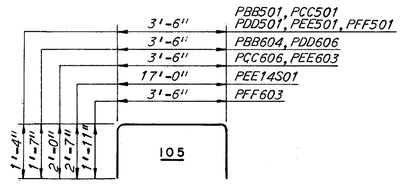
100

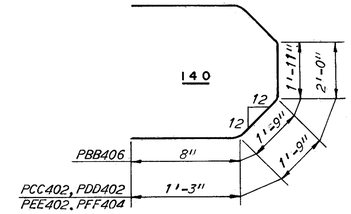
41'-6"	PBB407, PCC401, PDD401, PEE401, PFF403
13'-6"	PBB1101, PDD1102, PEE1102, PFF1101
17'-0"	PBB1102, PCC1101, PDD1101
12'-0"	PCC1102
10'-0"	PCC1103, PEE1103, PFF1102











Note: All reinforcing bars are non-epoxy coated.

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE
PIERS 22R, 23L&R AND 24L&R

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57

CLEVELAND CUYAHOGA COUNTY (I-290) OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 7-25-74	DATE 10-24-74	DATE 7-10-75	C.A.B. DATE 10-18-85	

SHEET 79/80

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 23 C-B					
PGG401	99	14'-5"	109		953
PGG402	198	5'-3"	158		694
PGG501	32	5'-11"	105		197
PGG601	6	33'-6"	Str.		302
PGG602	6	6'-4"	105		57
PGG603	11	16'-9"	109		277
PGG604	4 Ser. 6	12'-1" 14'-9"	109	6 8/8"	484
PGG801	28	13'-2"	100		984
PGG1101	24	18'-2"	100		2317
PGG1102	6	33'-8"	141		1073
PGG1103	2	33'-6"	Str.		356
PGG1104	8	38'-11"	105		1654
PGG14S01	24	11'-7"	104		2127
PGG14S02	24	14'-7"	104		2677
PGG14S03	16	17'-7"	104		2152
PGG14S04	16	12'-3"	Str.		1499
PGG14S05	16	24'-0"	Str.		2938
PGG14S06	24	9'-6"	Str.		1744
PGG14S07	8	29'-3"	Str.		1790
PGG14S08	8	23'-9"	Str.		1454
PGG14S09	8	21'-0"	Str.		1285
PGG14S10	4	18'-6"	Str.		566
PGG14S11	4	15'-9"	Str.		482
		TOTAL WEIGHT	=		28,062
PIER 24 C-B					
PHH401	93	14'-5"	109		896
PHH402	186	5'-3"	158		652
PHH501	32	5'-11"	105		197
PHH601	6	33'-6"	Str.		302
PHH602	6	6'-4"	105		57
PHH603	11	16'-9"	109		277
PHH604	4 Ser. 8	12'-1" 14'-9"	109	4 8/8"	645
PHH801	38	13'-2"	100		1336
PHH1101	24	18'-2"	100		2316
PHH1102	6	33'-8"	141		1073
PHH1103	4	36'-5"	105		774
PHH1104	8	38'-11"	105		1654
PHH14S01	24	11'-7"	104		2127
PHH14S02	24	14'-7"	104		2677
PHH14S03	16	17'-7"	104		2152
PHH14S04	16	12'-3"	Str.		1499
PHH14S05	16	24'-0"	Str.		2938
PHH14S06	24	9'-6"	Str.		1744
PHH14S07	8	29'-3"	Str.		1790
PHH14S08	8	19'-3"	Str.		1178
PHH14S09	8	20'-0"	Str.		1224
PHH14S10	4	14'-0"	Str.		428
PHH14S11	4	14'-9"	Str.		451
		TOTAL WEIGHT	=		28,387

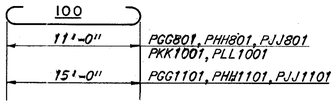
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 25 C-B					
PJJ401	78	14'-5"	109		751
PJJ402	156	5'-1"	158		530
PJJ501	32	5'-11"	105		197
PJJ601	6	38'-0"	Str.		342
PJJ602	6	6'-4"	105		57
PJJ603	23	16'-9"	109		579
PJJ604	4 Ser. 6	12'-3" 14'-11"	109	6 8/8"	490
PJJ801	38	13'-2"	100		1336
PJJ1101	24	18'-2"	100		2316
PJJ1102	6	38'-4"	141		1222
PJJ1103	8	16'-9"	Str.		712
PJJ1104	16	23'-11"	104		2033
PJJ14S01	24	11'-7"	104		2127
PJJ14S02	24	14'-7"	104		2677
PJJ14S03	24	9'-6"	Str.		1744
PJJ14S04	12	35'-0"	Str.		3213
PJJ14S05	12	39'-0"	Str.		3580
		TOTAL WEIGHT	=		23,906
PIER 26 C-B					
PKK401	47	14'-5"	109		453
PKK402	94	5'-6"	157		345
PKK501	32	5'-11"	105		197
PKK601	6	38'-0"	Str.		342
PKK602	6	6'-4"	105		57
PKK603	7	16'-9"	109		176
PKK604	4 Ser. 8	12'-1" 14'-9"	109	4 8/8"	645
PKK605	32	14'-11"	109		717
PKK1001	48	13'-10"	100		2857
PKK1101	32	7'-11"	104		1346
PKK1102	6	38'-4"	141		1222
PKK1103	4	18'-3"	104		388
PKK1104	16	23'-11"	104		2033
PKK1105	16	30'-0"	Str.		2550
PKK1106	16	23'-0"	Str.		1955
		TOTAL WEIGHT	=		15,283
PIER 27 C-B					
PLL401	74	14'-5"	109		713
PLL402	148	5'-6"	157		544
PLL501	40	5'-11"	105		247
PLL601	12	25'-0"	Str.		451
PLL602	6	6'-4"	105		57
PLL603	22	16'-9"	109		553
PLL604	4 Ser. 6	12'-1" 14'-9"	109	6 8/8"	484
PLL1001	68	13'-10"	100		4048
PLL1101	48	7'-5"	104		1891
PLL1102	16	30'-0"	Str.		2550
PLL1103	16	27'-0"	Str.		2295
PLL1104	16	23'-0"	Str.		1955
PLL1105	5	29'-4"	108		779
PLL1106	5	22'-1"	108		587
PLL1107	12	20'-8"	104		1318
PLL1108	4	36'-11"	104		785
PLL1109	2	14'-9"	Str.		157
		TOTAL WEIGHT	=		19,414

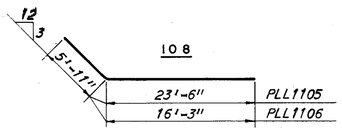
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

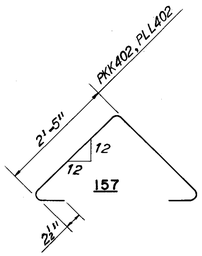
153
174

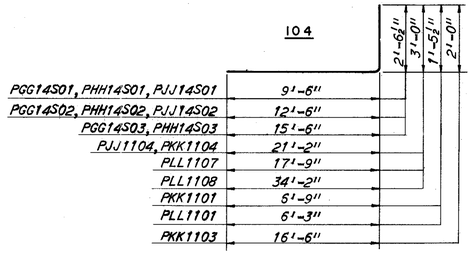
CUYAHOGA COUNTY
CUY-290-0.27

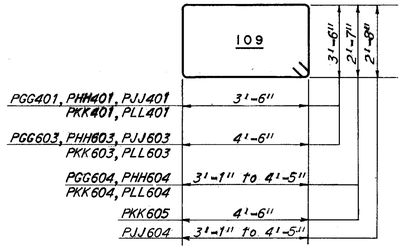
BENDING DIAGRAMS

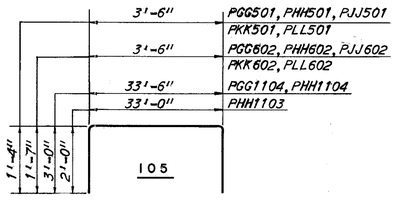


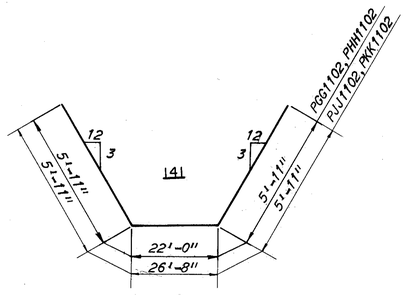


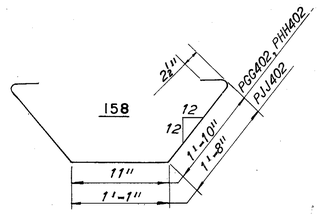












Note: All reinforcing bars are non-epoxy coated.

REINFORCING STEEL SAMPLES

Refer to CMS Sections 106.03, 700, 709.01 through 709.05 and 709.08. Sufficient additional reinforcing steel shall be provided for sampling. Random samples shall be replaced in the structures by the additional steel, spliced in accordance with 509.08.

H.N.T.B. BR. NO. 9 PART I - SUBSTRUCTURE

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

REINFORCEMENT SCHEDULE PIERS 23C-B, 24C-B, 25C-B, 26 C-B AND 27C-B

I-290 OVER CUYAHOGA RIVER

BR. NO. CUY-290-0110 STA. 985+85.75 TO STA. 1020+47.57 (℄ I-290)

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN K.R.S.	TRACED Jmc	CHECKED RMB	REVIEWED C.E.S.	REVISED
DATE 9-24-70	DATE 11-6-70	DATE 11-10-70	DATE 10-1885	SHEET 80/80