T-1

MICROFILMED
FEB 1 1980

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
CUY-480-15.81
CUYAHOGA COUNTY
CITY OF INDEPENDENCE, CITY OF CLEVELAND, CITY OF CUYAHOGA HTS. & CITY OF SEVEN HILLS AND VILLAGE OF BROOKLYN HTS.

F.H.W.A. REGION	STATE	PROJECT	
5	OHIO	I-480-4(25)169	

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I-480-4(25)169

LIMITED ACCESS

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

CUYAHOGA COUNTY
CUY-480-15.81

Project designation CUY-80-15.81 appearing throughout this plan shall be considered to read CUY-480-15.81.

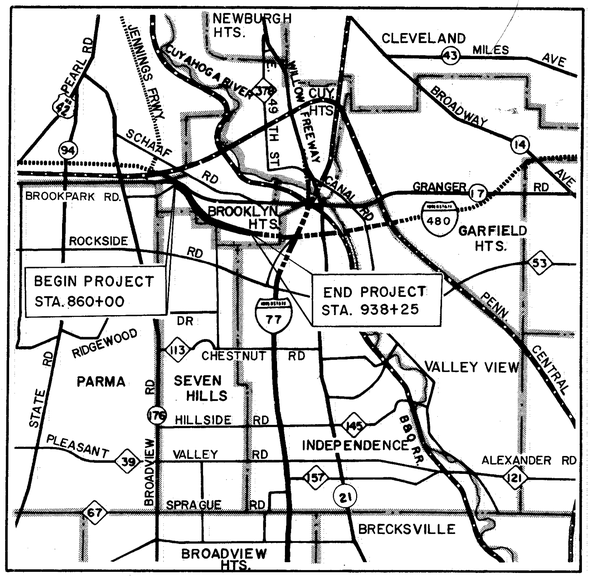
Federal Road Division 2 shall be considered to read F.H.W.A. Region 5

CONVENTIONAL SIGNS

PROPERTY LINE	P
EXISTING RIGHT OF WAY	
SUBDIVISION LINE	
SUBLOT LINE OR EXISTING EASEMENT	Z Z
ORIGINAL TOWNSHIP LOT LINE	
CORPORATION LINE	
LIMITED ACCESS LINE	LA
LIMITED ACCESS LINE AND RIGHT OF WAY LINE	LA & RW
RIGHT OF WAY LINE AND HIGHWAY EASEMENT LINE	R/W
AERIAL EASEMENT LINE	LA & AERIAL
TEMPORARY RIGHT OF WAY	T
SEWER EASEMENT LINE	S S
SLOPE EASEMENT LINE	SL SL
CHANNEL EASEMENT	X X
PARTICIPATION LINE	P P P
CENTER LINE	
FENCE LINE	x x
GUARD RAIL (EXISTING)	
GUARD RAIL (PROPOSED)	
RAILROAD	
POWER POLES	
TELEPHONE POLES	
POWER AND TELEPHONE POLES	
LIGHT POLES	
TREES (EXISTING)	
ELECTRICAL TOWER	
WATER LINE	/ /
GAS LINE	G G
TELEPHONE CONDUIT	T T
EXISTING SEWERS (R/W PLANS)	S S
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 (PROPOSED)	
INLET (PROPOSED)	
STORM SEWER (PROPOSED)	
CONSTRUCTION LINE (FILL)	
CONSTRUCTION LINE (CUT)	

INDEX OF SHEETS

Sheets Nº 230, 231, 241 & 379 Deleted



LOCATION MAP

SCALE
0 1 2 3 MILES

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

SCALE:
PLAN 1"=50' PROFILE HOR 1"=100'
CROSS SECTIONS 1"=10' PROFILE VERT 1"=10'

SUPPLEMENTAL SPECIFICATIONS

NUMBER	DATE	NUMBER	DATE
		934	1-1-69
808	1-1-71	941	11-28-73
		942	11-25-70
815	9-20-72	1001	9-20-72
816	9-20-72	948	2-19-74
		S625	1-11-74
		S713	1-11-74
836	1-1-71		
839	11-25-70		

LINE DATA

BEGIN PROJECT	STA. 860+00.00	
END PROJECT	STA. 938+25.00	
NET LENGTH OF PROJECT	7,825.00 LIN. FT.	OR 1.482 MILES
ADD WORK	STA. 858+15.00 TO STA. 860+00.00	185.00 LIN. FT.
	STA. 938+25.00 TO STA. 993+00.00	5475.00 LIN. FT.
GRANGER ROAD	STA: 2+61.00 TO STA. 28+20.29	2,559.29 LIN. FT.
TUXEDO AVENUE	STA. 4+00.00 TO STA. 7+26.19	326.19 LIN. FT.
	STA. 7+94.19 TO STA. 15+86.78 Bk	732.59 LIN. FT.
	STA. 16+32.38 Ahd. TO STA. 16+76.78	44.40 LIN. FT.
PORTAL DRIVE	STA. 3+90.00 TO STA. 9+57.00	567.00 LIN. FT.
I-77 (See Sh. 262A & 262B)	STA. 367+50.00 TO STA. 85+75.00	24,647.19 LIN. FT.
NET LENGTH OF WORK	EQN: STA 555+75.37 Bk. = STA. 27+53.18 Ahd. 42,421.66 LIN. FT.	OR 8.034 MILES

STANDARD DRAWINGS

NUMBER	DATE	NUMBER	DATE
AS-1-72	6-30-72	GR-3	11-9-71
BP-1	6-1-65	GR-4	11-9-71
BP-2	12-1-68	GR-5	1-1-71
BP-3	1-1-71	GR-6	1-1-71
BP-4	1-1-71	HL-11,12,16,17A,B	4-6-73
BP-5	6-1-72	HL-2, 3	7-27-73
BP-6	6-1-65	HL-1, 4, 5, 6, 7	9-6-73
BP-7	1-1-66	HL- 8, 9, 10	9-6-73
BR-2-67	10-15-71	HW-4	1-1-70
BP-9	1-1-71	I-2A	6-6-69
CB-2-2-A B	6-1-65	I-3	1-20-70
CB-3	6-1-65	L-1	6-1-73
CB-3A	6-1-65	MC-1	6-13-69
CB-4	9-1-69	MC-3	6-1-73
CB-5	9-1-69	MC-4	6-13-69
CB-458A	6-6-68	I-2	6-6-67
CB-6	6-1-65	MC-6	6-1-65
F-1	6-1-72	MC-7	10-1-68
		MH-1	10-1-68
F-3	3-10-69	MH-1A	10-1-68
		MH-2	10-1-68
F-5	3-10-69	MH-2A	10-1-68
RB-1-55	2-2-59	MC-9	1-1-74
SD-1-69 Sh. 12	6-12-69	816-12.30	9-19-73
GR-2A	1-1-71	816-20.901	9-19-73
GR-2B	11-9-71	816-20.002	9-19-73

Revised Sheets 34 & 237
12-6-74 A.W.G.
Sheet 364 revised
1-24-75 EBL
Sheets 324, 326, 347, & 350 revised 2-7-75 EBL
Sheet 366 revised 4-30-75 EBL
Sheets 362 thru 365 & 367, 368, 367 revised 7-18-75 WTF
Sheet 354 revised 8-8-75 E.B.L.
Sheet 339 revised 9-26-75 E.B.L.

1973 SPECIFICATIONS

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

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

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

APPROVED DATE 9-11-74	Joseph F. Powell	DISTRICT DEPUTY DIRECTOR OF TRANSPORTATION
APPROVED DATE 9-25-74	Robert B Speijer	ENGINEER, BUREAU OF BRIDGES
APPROVED DATE 9-25-74	E. J. Schaefer	ENGINEER, BUREAU OF ROADWAY DESIGN
APPROVED DATE 9-25-74	William E. Stoll	ASSISTANT DEPUTY DIRECTOR FOR HIGHWAY DESIGN
APPROVED DATE 9-25-74	Julius J. Deewey	ASSISTANT DEPUTY DIRECTOR FOR REAL ESTATE
APPROVED DATE 9-25-74	William Bunkley	ASSISTANT DEPUTY DIRECTOR FOR PROGRAM DEVELOPMENT
APPROVED DATE ____		CHIEF ENGINEER, DIVISION OF HIGHWAYS
APPROVED DATE 9-25-74	William W. Baker	DEPUTY DIRECTOR, DIVISION OF HIGHWAYS
APPROVED DATE 9-26-74	William P. McKenna	ASSISTANT DIRECTOR, DEPARTMENT OF TRANSPORTATION
APPROVED DATE 9/27/74	William Bunkley	DIRECTOR, DEPARTMENT OF TRANSPORTATION

PREPARED AND RECOMMENDED BY

HOWARD NEEDLES TAMMEN & BERGENDOFF

CONSULTING ENGINEERS

CLEVELAND

Browning Crow

BROWNING CROW

FILE NO.	CUYAHOGA COUNTY 00344
	DATE OF LETTING
	CONTRACT NO.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER ____ DATE

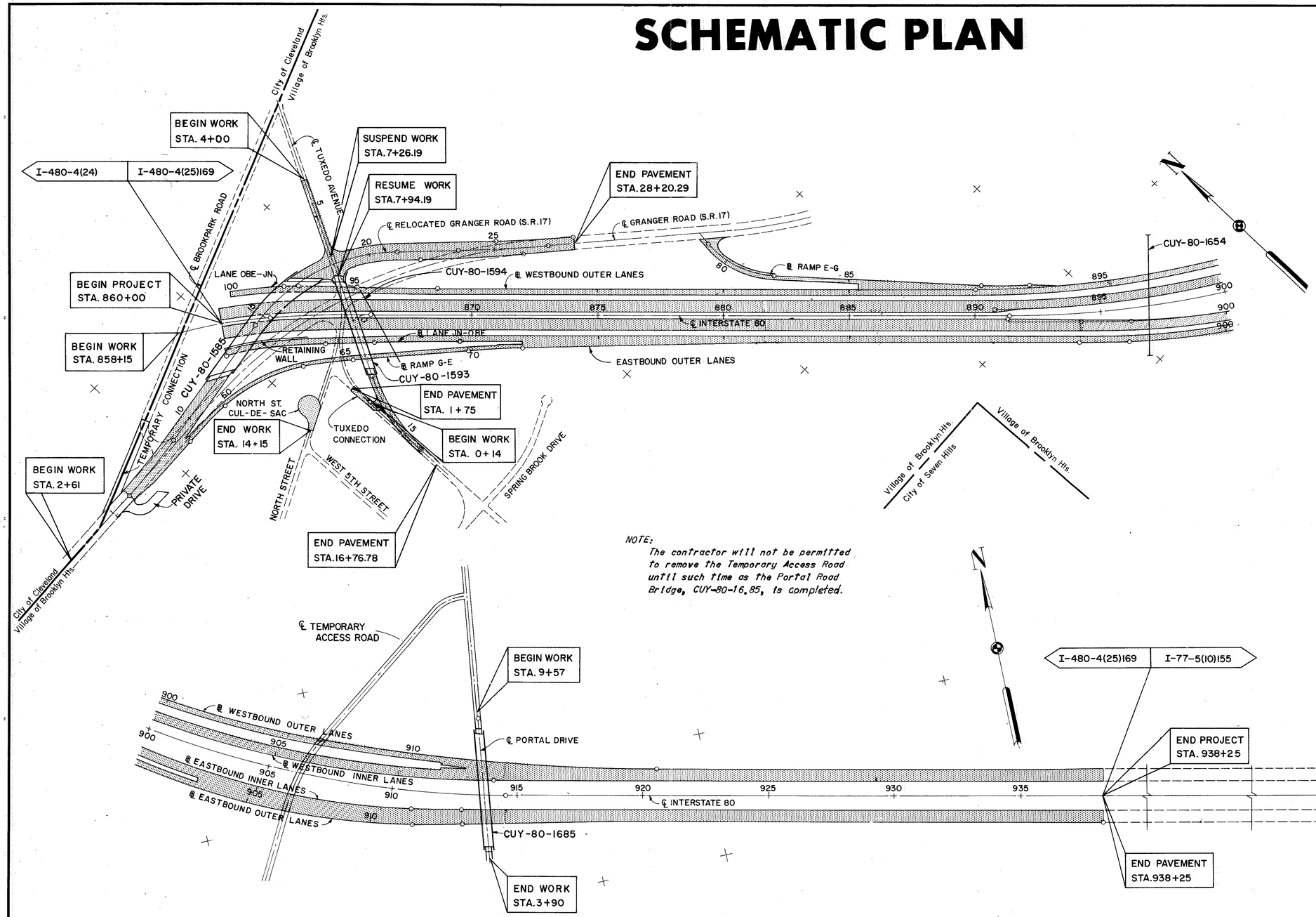
Rev. 10-16-74

SCHEMATIC PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

2/392

CUYAHOGA COUNTY
CUY.-80-15.81



NOTE:
The contractor will not be permitted to remove the Temporary Access Road until such time as the Portal Road Bridge, CUY-80-16.85, is completed.

PROPOSED STRUCTURE CUY-80-1585

TYPE: Continuous steel girders with reinforced concrete deck and substructure.
SPANS: 57'-0", 83'-0⅝", 120'-7½", 117'-2⅞", and 97'-2" (Measured along S.R. 17)
ROADWAY: Varies 60'-0" to 72'-0" Curb to Curb with raised median and two 5'-0" sidewalks.
LOADING: HS 20-44
SKEW: Varies (See Plan)
APPROACH SLABS: Southwest 20'-0" Northeast 30'-0"
ALIGNMENT: Tangent, 8°00'00" Right (Along ℄ S.R. 17)
SUPERELEVATION: Normal ±.0156 ft. per ft. to +.0156 ft. per ft.

PROPOSED STRUCTURE CUY-80-1593

TYPE: Continuous steel rolled beam with reinforced concrete deck and substructure.
SPANS: 57'-0", 2@81'-0½", 69'-6", 49'-0", and 34'-6".
ROADWAY: 28'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 18°48'41" Left Forward
WEARING SURFACE: 1" Latex Modified Concrete
APPROACH SLABS: 30'-0" Northeast and 20'-0" Southwest
ALIGNMENT: Tangent
SUPERELEVATION: Normal, 0.0156 ft. per ft. south of Pier 2, varies north of Pier 2.

PROPOSED STRUCTURE CUY-80-1685

TYPE: Continuous welded steel girder with reinforced concrete deck and substructure
SPANS: 68'-6", 105'-0", 90'-9", 109'-6" and 73'-3"
ROADWAY: 26'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 5°56'29" Left Forward
WEARING SURFACE: 1" Latex Modified Concrete.
APPROACH SLABS: AS-1-72 (20'-0" Long)
ALIGNMENT: Tangent
SUPERELEVATION: Normal cross slope-⅜" per ft.

PROPOSED STRUCTURE CUY-80-1654

20'-0"x15'-0" Reinforced Concrete Arch Culvert with paved stream bed and stilling basin at outlet.

PROPOSED STRUCTURE CUY-80-1594

TYPE: Continuous welded and seamless 24" O.D.x ½" thick steel pipe meeting the requirements of Section 707.11 with reinforced concrete substructure
SPANS: 15'-0", 35'-0", 71'-5½", 2@87'-7⅛" and 3@69'-2"
LOADING: Weight of full flow in 18" feeder pipe (80 lbs.per cu.ft.)
ALIGNMENT: Tangent

SCALE 1"=200' MADE RJT DATE 6-7-68 TRCD. HLD DATE 6-8-68 CKD. RAH DATE 6/18/70 M.B. 614-74

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

SCHEMATIC GEOMETRIC PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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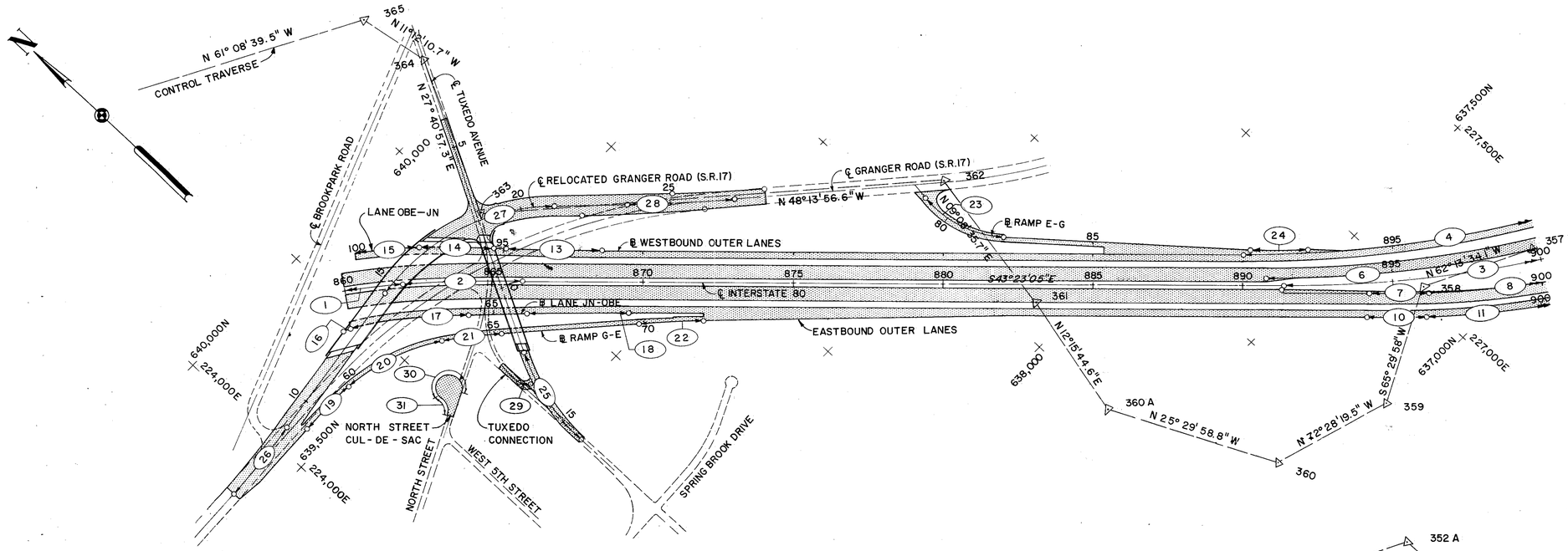
CUYAHOGA COUNTY
CUY.-80-15.81



Note:
Add 2,000,000 to all East Coordinates
See Sheet 5 for Centerline Traverse Ties

SCALE 1" = 200'
MADE RJT DATE 6-7-68
TRCD. AJD DATE 6-8-68
CKD. RRH DATE 6/19/70
MB 9-16-70

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

SCHEMATIC GEOMETRIC PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY. 80 – 15.81

GEOMETRICS TABLE

LINE	CURVE	P. C.			P. I.			P. T.			Δ	D	R	T	L	E
		STATION	N CO-ORD.	E CO-ORD.	STATION	N CO-ORD.	E CO-ORD.	STATION	N CO-ORD.	E CO-ORD.						
Interstate 80	1	845+62.10	640,262.87	2,223,195.69	854+15.01	640,250.48	2,224,047.52	861+94.38	639,684.70	2,224,684.42	40°46'55"	2°30'00"	2,291.83'	851.91'	1,631.28'	153.21'
	3	891+36.99	637,554.35	2,226,713.92	903+29.69	636,687.55	2,227,533.18	914+52.16	636,426.16	2,228,696.89	33°57'21"	1°28'00"	3,906.53'	1,192.70'	2,315.17'	178.02'
Westbound Outer Lanes	4	890+01.63	637,725.53	2,226,697.99	898+27.86	637,125.07	2,227,265.52	906+30.08	636,805.81	2,228,027.56	23°53'02"	1°28'00"	3,906.53'	826.22'	1,628.45'	86.42'
	5	906+30.08	636,805.81	2,228,027.56	913+03.28	636,545.68	2,228,648.47	919+73.00	636,398.14	2,229,305.30	10°04'19"	0°45'00"	7,639.44'	673.19'	1,342.92'	29.60'
Westbound Inner Lanes	6	890+77.91	637,614.46	2,226,691.51	902+62.98	636,753.20	2,227,505.53	913+78.26	636,493.49	2,228,661.79	33°57'21"	1°28'34"	3,881.53	1,185.07'	2,300.36'	176.88'
Eastbound Inner Lanes	8	896+21.58	637,186.61	2,227,030.29	903+88.02	636,648.31	2,227,575.87	911+19.38	636,454.35	2,228,317.36	29°57'21"	2° 00' 00"	2864.79'	766.44'	1497.79'	100.75'
Eastbound Outer Lanes	11	896+13.32	637,136.98	2,226,965.75	904+10.53	636,577.06	2,227,533.24	911+68.40	636,390.77	2,228,308.38	31°06'06"	2° 00' 00"	2864.79'	797.27'	1555.08	108.86
Lane OBE-JN	13	91+73.69	639,281.98	2,225,226.91		639,398.27	2,225,117.00	94+93.69	639,517.58	2,225,010.38	1°36'00"	0°30'00"	11,459.16'	160.01'	320.00'	1.12'
	15	97+83.88	639,730.25	2,224,813.02	99+76.19	639,864.96	2,224,675.78	101+67.21	639,969.60	2,224,514.43	11°30'00"	3°00'00"	1,909.86'	192.31'	383.33'	9.66'
Lane JN-OBE	16	59+87.61	639,718.60	2,224,427.67	60+02.11	639,712.11	2,224,440.64	60+16.61	639,705.10	2,224,453.33	2°19'12"	8°00'00"	716.20'	14.50'	29.00'	0.15'
	18	66+10.00	639,314.55	2,224,897.48	67+80.01	639,194.51	2,225,017.88	69+50.00	639,070.95	2,225,134.66	1°42'00"	0°30'00"	11,459.16'	170.01'	340.00'	1.26'
Ramp G-E	20	59+71.09	639,573.57	2,224,306.32	61+51.04	639,555.58	2,224,485.36	63+23.68	639,455.11	2,224,634.65	28°12'27"	8°00'00"	716.20'	179.95'	352.60'	22.26'
	22	69+84.01	639,020.92	2,225,131.73	70+92.03	638,948.72	2,225,212.08	72+00.00	638,872.09	2,225,288.22	3°14'24"	1°30'00"	3,819.72'	108.02'	215.99'	1.53'
Ramp E-G	23	79+00.00	638,624.14	2,226,102.66	80+59.44	638,465.96	2,226,082.68	82+00.00	638,345.27	2,226,186.86	48°00'00"	16°00'00"	358.10'	159.44'	300.00'	33.89'
	24	90+26.23	637,719.83	2,226,726.76	92+18.24	637,647.10	2,226,789.54	92+18.24	637,581.03	2,226,859.31	5°45'37"	3°00'00"	1,909.86'	96.09'	192.01'	2.42'
Relocated Tuxedo Road	25	12+31.37	639,230.30	2,224,795.21	14+12.82	639,069.64	2,224,710.89	15+86.78	638,888.21	2,224,713.24	28°26'00"	8°00'00"	716.20'	181.45'	355.42'	22.63'
Relocated Granger Road	26	6+05.00	639,602.10	2,223,780.20	7+46.78	639,607.70	2,223,921.87	8+88.33	639,627.26	2,224,062.30	5°40'00"	2°00'00"	2,864.79'	141.78'	283.33'	3.51'
	27	14+50.46	639,704.82	2,224,619.05	18+08.24	639,754.19	2,224,973.40	21+14.07	639,500.51	2,225,225.69	53°05'21"	8°00'00"	716.20'	357.78'	663.61'	84.39'
	28	23+56.72	639,328.45	2,225,396.80	25+36.78	639,200.78	2,225,523.77	27+16.72	639,081.33	2,225,658.50	3°36'00"	1°00'00"	5,729.58'	360.00'	180.06'	2.33'
Tuxedo Connection	29	00+28.44	639,139.88	2,224,755.45	00+48.54	639,1563l	2,224,709.77	00+63.60	639,176.42	2,224,709.51	69°28'32"	197°34'18"	29.00'	20.11'	35.16'	6.29'
North St. Cul-de-Sac	30	13+05.00	639,309.93	2,224,598.71	CC 13+05.50	639,346.01	2,224,581.45	PRC 13+42.50	639,343.75	2,224,541.52	247°39'59"		40.00'		172.90'	
	31	PRC 13+42.50	PRC 639343.75	2224,541.52	13+57.78	639,303.60	2,224,543.78	13+98.00	639,286.24	2,224,507.50	67° 40' 01"		60.00'	40.22'	70.86'	12.23'

LINE	CURVE	T.S.	S. C.	C.S.	S. T.	θ_S	L_S	ST	LT
Interstate 80	2			Sta. 861+94.38	Sta. 865+94.38	5°00'00"	400.00'	133.43'	266.77'
				N. 639,684.70	N. 639,402.21				
				E. 2,224,684.42	E. 2,224,967.42				
Eastbound Inner Lanes	7	Sta. 894+21.58	Sta. 896+21.58			2°00'00"	200.00'	66.67'	133.34'
		N. 637,330.35	N. 637,186.61						
		E. 2,226,891.24	E. 2,227,030.30						
	9			Sta. 911+19.38	Sta. 913+19.38	2°00'00"	200.00'	66.67'	133.34'
				N. 636,454.35	N. 636,408.25				
				E. 2,228,317.36	E. 2,228,511.96				
Eastbound Outer Lanes	10	Sta. 894+13.32	Sta. 896+13.32			2°00'00"	200.00'	66.67'	133.34'
		N. 637,280.71	N. 637,136.98						
		E. 2,226,826.70	E. 2,226,965.75						
	12			Sta. 911+68.40	Sta. 913+68.40	2°00'00"	200.00'	66.67'	133.34'
				N. 636,390.77	N. 636,348.58				
				E. 2,228,308.38	E. 2,228,503.87				
Lane OBE-JN	14	Sta. 95+33.88	Sta. 97+83.88			3°45'00"	250.00'	83.37'	166.70'
		N. 639,547.55	N. 639,730.25						
		E. 2,224,483.60	E. 2,224,813.02						
Lane JN-OBE	17			Sta. 60+16.61	Sta. 64+16.61	16°00'00"	400.00'	134.33'	267.76'
				N. 639,705.10	N. 639,451.09				
				E. 2,224,453.33	E. 2,224,760.54				
Ramp G-E	19	Sta. 57+71.09	Sta. 59+71.09			8°00'00"	200.00'	66.79'	133.47'
		N. 639,574.97	N. 639,573.57						
		E. 2,224,106.50	E. 2,224,306.32						
	21			Sta. 63+23.68	Sta. 65+23.68	8°00'00"	200.00'	66.79'	133.47'
				N. 639,455.11	N. 639,328.60				
				E. 2,224,634.65	E. 2,224,789.33				

NOTE:

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.

SCALE NONE
MADE R.V.T. DATE 2-25-69
TRCD. M.A.G. DATE 2-26-69
CKD. M.P. DATE 2-26-69
M.B. 9-6-74

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

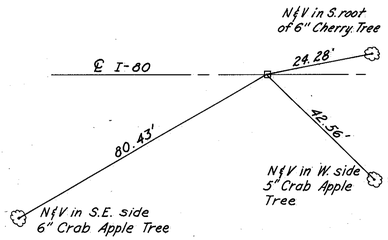
GEOMETRICS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

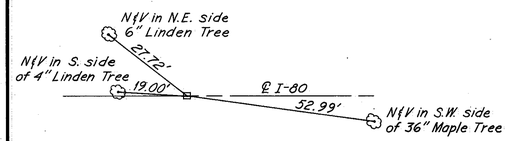
5/392

CUYAHOGA COUNTY
CUY. 80-15.81

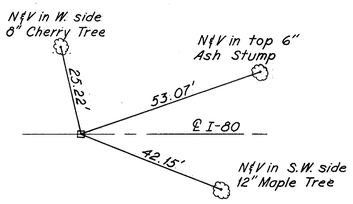
REFERENCE POINTS



P.T. STA. 883+00.00 ℄ I-80
Tack ℄ Hub



P.O.C. STA. 896+00.00 ℄ I-80
Tack ℄ Hub



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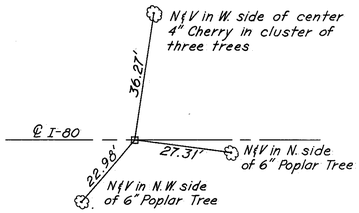

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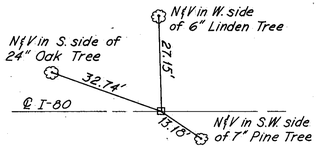
Tack ℄ Hub



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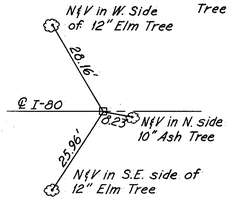

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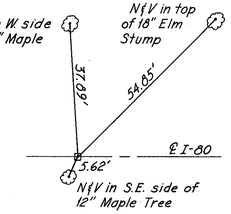

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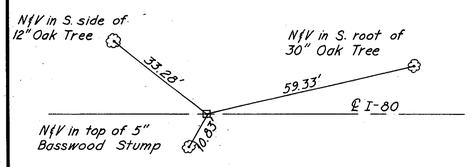

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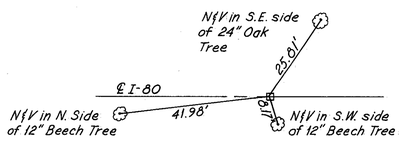
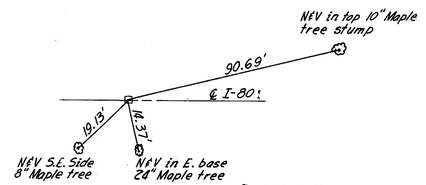
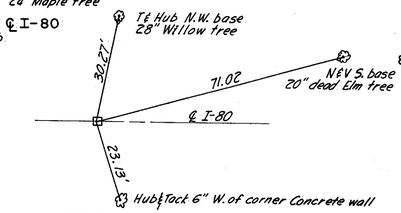


P.O.T. STA. 932+95.44 ℄ I-80
Tack ℄ Hub

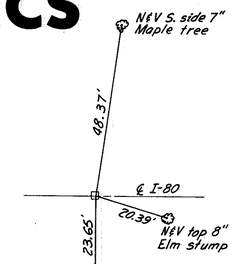
REFERENCE POINTS



C.S. 861+94.38 ℄ I-80
Tack ℄ Hub



S.T. 865+94.38 ℄ I-80
Tack ℄ Hub

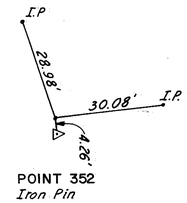


876+84.12 ℄ I-80
Tack ℄ Hub

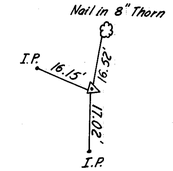
TRAVERSE POINTS		
POINT	COORDINATES	
	NORTH	EAST
352	636,316.48	2,231,471.60
352A	636,991.83	2,230,997.39
353	636,845.13	2,229,728.28
354	636,813.87	2,228,773.54
356	636,881.87	2,227,866.50
357	637,033.85	2,227,374.00
358	637,212.74	2,227,034.32
359	637,037.12	2,226,648.97
360	637,159.57	2,226,261.27
360A	637,692.97	2,226,006.86
361	638,117.77	2,226,099.19
362	638,619.09	2,226,179.88
363	639,656.14	2,225,018.69
364	640,159.95	2,225,283.00
365	640,394.26	2,225,236.59

BENCH MARKS		
NO.	DESCRIPTION	ELEV.
120	Rail Road spike in S.W. side Pole 346273 on N.E. corner of W.4th and Park Drive.	761.44
120A	N.W. flange bolt of F. Hyd., in front of 322 Tuxedo Ave.	759.90
120B	Top N.E. flange bolt of F. Hyd., 17'Rt. of Sta. 5+96.5 of existing Tuxedo Ave.	751.87
120C	Top of S.E. vertical bolt in concrete base of old sign in front of Sohio station on S.E. corner of Schaaf and Tuxedo.	771.62
120E	Top Nail spike in top of guard rail post 37.4'Lt. of Sta. 30+34 existing Granger Road.	728.05
120F	Top of I pin in Monument box at P.C. Sta. 33+50.26 existing Granger Road.	725.82

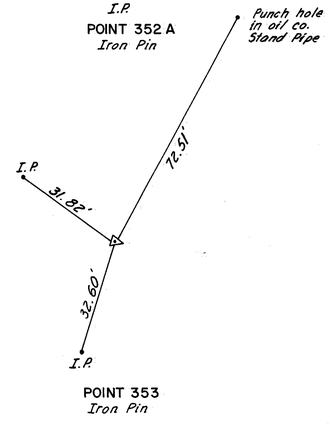
TRAVERSE TIES



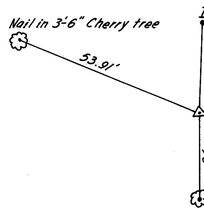
POINT 352
Iron Pin



POINT 352 A
Iron Pin



POINT 353
Iron Pin



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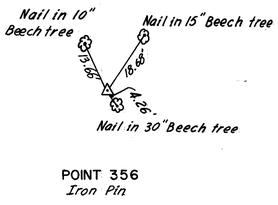
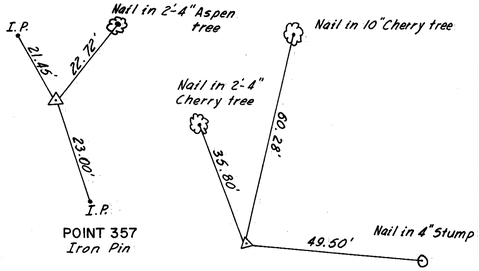
Iron Pin

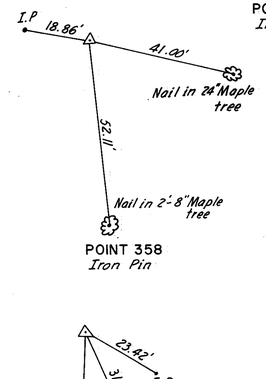


POINT 356
Iron Pin

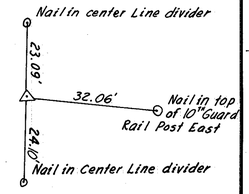


POINT 357
Iron Pin

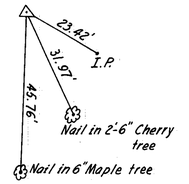
POINT 361
Iron Pin



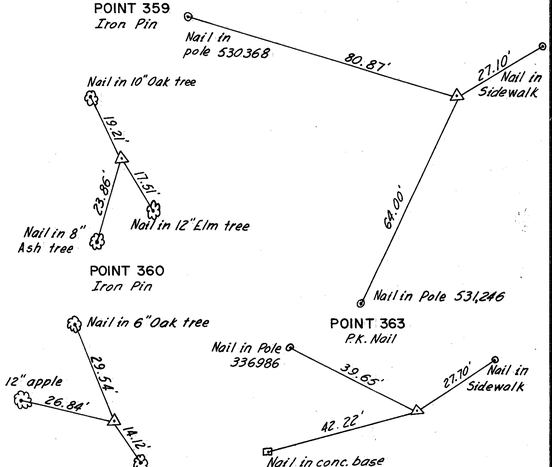
POINT 358
Iron Pin



POINT 362
Bolt in Concrete Median Curb

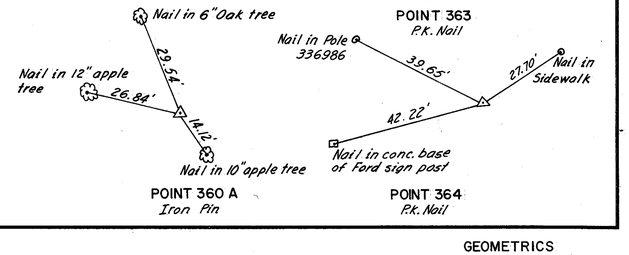


POINT 359
Iron Pin



POINT 360
Iron Pin

POINT 363
P.K. Nail



POINT 360 A
Iron Pin

POINT 364
P.K. Nail

SCALE 1"=20"	HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE AHS DATE 6-17-68	CONSULTING ENGINEERS
TRCD. MAG DATE 6-16-68	KANSAS CITY CLEVELAND NEW YORK
CKD. RBH DATE 6/19/70	

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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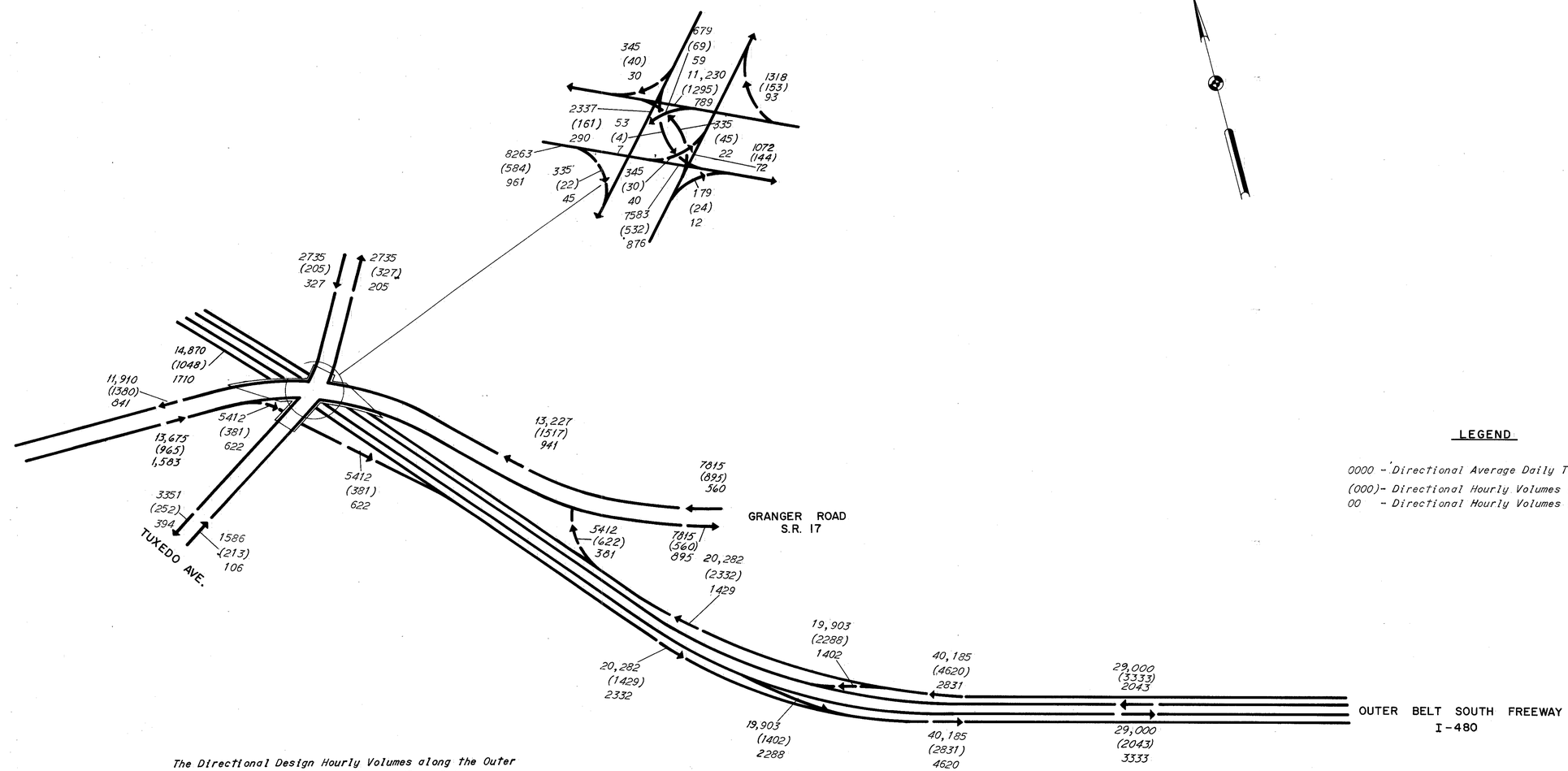
CUYAHOGA COUNTY
CUY.– 80 –15.81



N

LEGEND

0000 - Directional Average Daily Traffic
(000)- Directional Hourly Volumes (A.M. Peak)
00 - Directional Hourly Volumes (P.M. Peak)

The Directional Design Hourly Volumes along the Outer Belt South Freeway including the Granger Road Interchange were computed at 5.7474% of the A.D.T. (or 11.4948% of the Directional A.D.T.) based on a 9% peak hour factor, a 62%-38% distribution by direction and 3% trucks.

DESIGN DESIGNATION	INTERSTATE ROUTE 480		INTERSTATE ROUTE 480 FUTURE LANES IN MEDIAN
	WEST OF TUXEDO	EAST OF TUXEDO	
Current A. D. T. (1973)	60,853	70,324	50,750
Design Year (1993) A.D.T.	69,546	80,370	58,000
D. H. V.	12,055	7,451	5,376
D. (Directional Distrbution)	62%-38%	62%-38%	62%-38%
T. (percent B.C. Trucks)	3%	3%	3%
V. (Design Speed)	60 m.p.h.	60 m.p.h.	60 m.p.h.

SCALE NONE
MADE J.P.H. DATE 3-15-65
TRCD. T.P.M. DATE 6-11-68
CKD. R.B.H. DATE 7-14-70

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

FED. NO. DIVISION	STATE	PROJECT	
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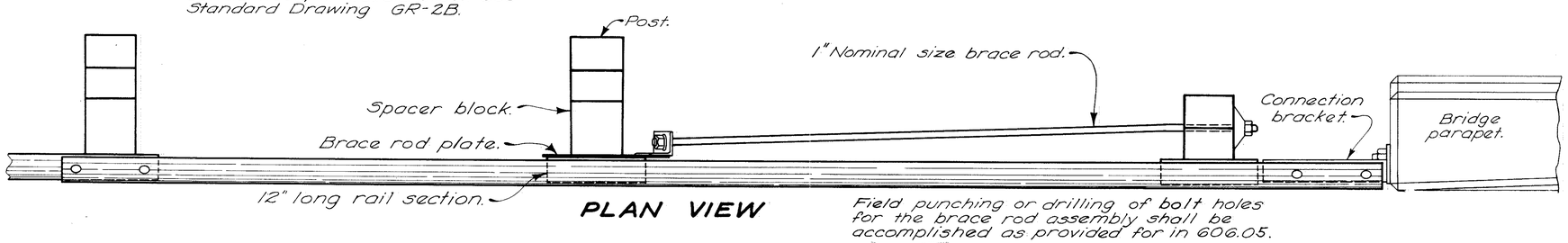
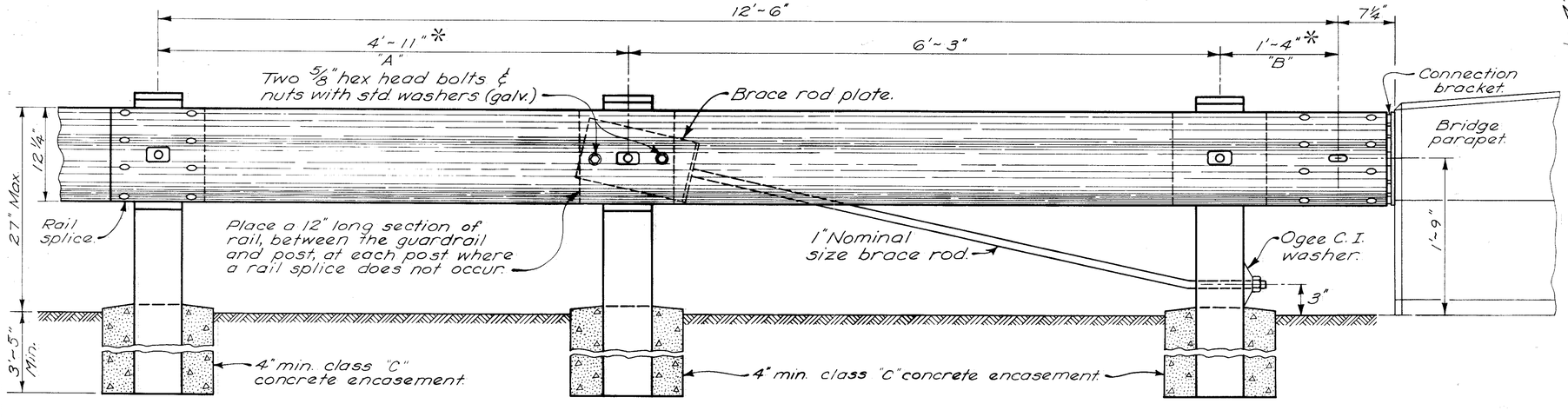
CUYAHOGA COUNTY
CUY.-80-15.81



PLAN VIEW

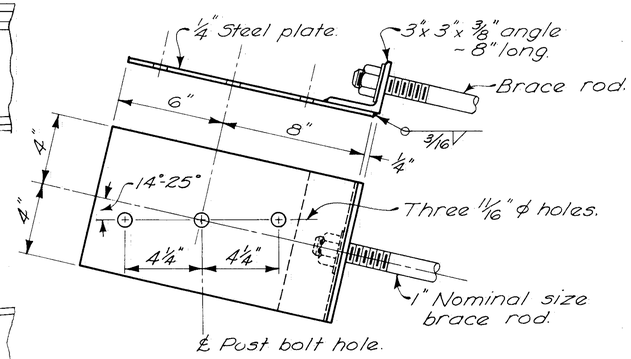
Field punching or drilling of bolt holes for the brace rod assembly shall be accomplished as provided for in 606.05.



ELEVATION

GUARDRAIL TERMINAL AT BRIDGE

* Dimension "A" shall decrease as dimension "B" increases to accommodate interference by the bridge substructure.



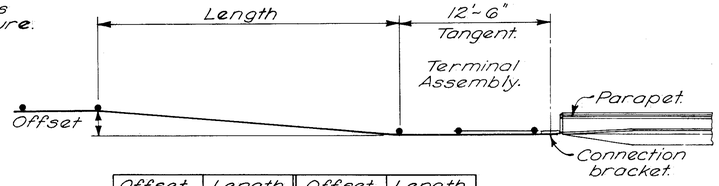
BRACE ROD PLATE

NOTES

BRIDGE TERMINAL ASSEMBLY, AS PER PLAN

The price bid for bridge terminal assembly, as per plan shall include the additional cost, in excess of normal guardrail cost, for concrete encasement, brace rod, brace rod plate and all component parts as detailed.

The connection bracket and anchor bolts are included with the Bridge Terminal Assembly, As Per Plan, for payment. See Std. Dwg. BR-2-67 for connection bracket details.



Offset	Length	Offset	Length
1'-0"	25.00'	5'-0"	100.00'
2'-0"	50.00'	6'-0"	100.00'
4'-0"	100.00'	7'-0"	100.00'

GUARDRAIL OFFSET DETAIL

Rev. 1-1-71

BRIDGE TERMINAL ASSEMBLY, AS PER PLAN

GENERAL NOTES

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GENERAL

ELEVATION DATUM

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

FIELD OFFICE

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

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.

UNDERGROUND UTILITIES

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

UTILITIES

Following is a list of the utilities within the limits of construction:
East Ohio Gas Company, 1201 East 55th Street, Cleveland, Ohio, 44103
Cleveland Electric Illuminating Company, 55 Public Square, Cleveland, Ohio, 44113
City of Cleveland Water Department, 1201 Lakeside Avenue, Cleveland, Ohio, 44114
Ohio Bell Telephone Company, Room 700, 820 Superior Avenue West, Cleveland, Ohio, 44113
Village of Brooklyn Heights Sewer Department, 225 Tuxedo Ave., Brooklyn Heights, Ohio, 44131
AT&T, outside Plant Engineer, One North Wacker Drive, Chicago, Illinois, 60606
Cuyahoga County Sanitary Engineer, 1219 Ontario Street, Cleveland, Ohio, 44113

ESTIMATED QUANTITIES

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

IMPACT ATTENUATOR ASSEMBLIES

This project requires bids for the impact attenuators to be supplied. The types have been limited to the HI-Dro Cushion System as manufactured by Energy Absorbtion Systems, Inc., Chicago, Illinois (Attenuator No.1), and the Fitch Inertial Barrier System as manufactured by Fibco, Inc., Douglaston, New York (Attenuator No.2).

The Attenuation Devices shall be constructed within the reserve area shown on the plan and shall be designed in accordance with the following criteria:

Performance Criteria:

Vehicle Weight Range	--- 2000 to 4500 pounds
Vehicle Speed	--- 60 mph
Impact Angle	--- 0 degrees to 25 degrees, measured from the direction of the roadways
Average Permissable Vehicle Deceleration	--- 12 g's while preventing actual impacting of the hazard or backup wall
Maximum occupant Deceleration onset rate	--- 500 g's per second

Dimensional Criteria:

Side taper rate	--- 10:1 minimum relative to the adjacent edge of pavement

The Impact Attenuator Assemblies shall be constructed in accordance with the manufacturer, see plan and recommendations. The work to be performed under this item shall include all labor, equipment, materials and incidentals necessary for furnishing and installing the attenuation device including foundations, backup walls, anchor blocks, surface treatment or any other items necessary for a complete and functional installation. Prior to ordering any of the impact attenuators the Contractor shall supply site plans and working drawing together with performance data for each location for approval by the Director.

The materials used in the installation shall be all new, first quality and free from defects. The method of measurement for this item shall be the actual number of impact attenuator assemblies completed and accepted.

The basis of payment shall be at the contract price for:

ITEM SPECIAL - Impact Attenuator Assembly No.1 (Hi-Dro Cushion)

ITEM SPECIAL - Impact Attenuator Assembly No.2 (Fitch)

TRAFFIC

COOPERATION-TRAFFIC CONTROL DEVICES

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

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

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

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

TRAFFIC MAINTENANCE

Two-way traffic shall be maintained at all times by use of existing pavement, the proposed pavement and temporary roadways.

The limits and duration of temporary roadways shall be held to an absolute minimum, and in all cases shall be subject to the approval of the Engineer.

Tuxedo Avenue will remain open during construction of Relocated Granger Road as long as practicable.

Existing Portal Drive Road will remain open during construction of this project. When such time as Portal Drive bridge is completed, traffic shall be diverted to bridge and existing road removed.

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

ITEM 410	TRAFFIC COMPACTED SURFACE, TYPE A OR B	200 Cu. Yds.
ITEM 410	TRAFFIC COMPACTED SURFACE, TYPE C	200 Cu. Yds.
ITEM 616	CALCIUM CHLORIDE, FOR DUST CONTROL	10 Tons
ITEM 616	WATER, FOR DUST CONTROL	5000 M. Gals.
ITEM 404	ASPHALT CONCRETE OR AN APPROVED BITUMINOUS PREMIXED SURFACE COURSE FOR MAINTAINING TRAFFIC (See note in Proposal)	200 Cu. Yds.

See sheet 250 for the suggested construction sequence.

LIGHTS AND SIGNS AT ADJACENT ROAD INTERSECTIONS

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

Provide, erect and maintain standard 48" x 30" size "Road Closed" signs, sign supports, and lights at the following locations during periods in which the affected roads are closed to traffic:

1. Tuxedo Avenue and West 4th Street just north of Spring Brook Drive.
2. North Street just east of West 5th Street.
3. Tuxedo Avenue just south of Brookpark Road.

Sign supports and lights for "Road Closed" signs shall be as detailed in the "Ohio Manual of Uniform Traffic Control Devices".
Payment for providing, erecting, maintaining and removing lights, signs and sign supports shall be included in the lump sum price bid for "Item 614 Maintaining Traffic".

ROADWAY

GRANULAR EMBANKMENT AREAS

In the area between Stations 869+00 and 871+00 120' Lt. of I-80, granular embankment indicated on the plans may be placed by the method of end dumping if surface water is present at the time of construction. End dumping methods may be used up to an elevation two feet above the water level. Above this elevation, embankment construction shall be in accordance with 203.07 to 203.12 inclusive. Where end dumping of granular material is permitted, normal clearing and grubbing shall be performed but the requirements of 201.04 for scalping shall be waived.

Material furnished for this item shall be as defined in 203.02 except that at least 85 per cent by weight of the grains or particles shall be retained on a No.200 sieve. Special attention shall be given to the compaction around this area because of the presence of the existing pier for the 24" aerial sanitary pipe crossing the roadway.

In the area between Sta. 860+00 to Sta. 864+00, Sta. 897+00, and Sta. 911+00 to Sta. 932+00, Granular Embankment Material indicated on the Grading and Drainage Plans should be placed in the existing stream bottom to a depth of 18 inches. Above the granular material, embankment construction shall be in accordance with 203.07 to 203.12 inclusive.

Payment for all of the above shall be included in the unit price bid for Item 203 Embankment, using Granular Material, as per plan.

ITEM 202 SEPTIC TANKS REMOVED

An estimated quantity of three (3 septic tanks removed is carried in the General Summary to be used as directed by the Engineer.

PAVEMENT DESIGN

Subsequent to completion of these plans the pavement design was changed from 8" Continuously Reinforced Portland Cement Concrete Pavement to 10" Reinforced Portland Cement Concrete Pavement. No changes were made in the cross sections, however the following earthwork quantity adjustments have been carried to the General Summary on Sheet No 30:

203	Excavation Not Including Embankment Construction	+ 3500 Cu. Yds.
203	Embankment	- 2500 Cu. Yds.

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"	1478	53
30"	66	22
48"	5	0
60"	0	0

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.

SCALE
MADE GL DATE 7-28-70
TRCD MAG DATE 7-29-70
CKD RBH DATE 7-29-70
MRB 3-5-74

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

GENERAL NOTES

QUANTITY CALCULATIONS
MADE BY G.L. DATE 7-29-70
CHECKED BY R.B.H. DATE 7-30-70

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ROADWAY

LOCATIONS OF GUARDRAIL

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

MONUMENTS

Standard Monument Assembly and Standard Centerline Reference Monuments shall be constructed in accordance with details shown on Standard Drawing MC-1. Centerline Reference Monument Modified, as per plan, shall be constructed as shown on Sheet No. 380. For location of Monuments, see Sheet No. 380 and 381.

SEEDING AND MULCHING

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

COMMERCIAL FERTILIZER

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

ITEM 203 PROOF ROLLING

An estimated quantity for this item has been provided in the General Summary for use in proof rolling of subgrade for the mainline and ramp pavements, and for paved shoulders, in accordance with Specification 203.14

Proof rolling should be provided with the calculated quantity based on a roller production of 3,000 square yards per hour and considering that proof rolling is not required for areas where extra depth subbase is provided and for shale subgrade.

AGRICULTURAL LIMING AS PER PLAN

The location and need for agricultural liming will be determined by laboratory tests, after rough grading operations have been performed. Quantities of agricultural liming, as shown on the plans, are sufficient for the entire project, but will be nonperformed for the areas where tests show that the liming is not required. Agricultural liming material shall be applied at the rate of 100 pounds per 1,000 square feet of surface area, except that on all surfaces of shale it shall be applied at the rate of 10 tons per acre.

EROSION CONTROL OF EMBANKMENT SLOPES

The following estimated quantities have been included in the general summary, for use as directed by the Engineer, in preventing the erosion of embankment slopes by a system of curbing and inlets at the edge of the paved shoulder at the top of the embankments as detailed on Sheet No. 115.

Item 603, 15" Type F Conduit = 400 Lin.Ft.
Item 604, Std. No. 2-A-10 Paved Shoulder Inlet = 4 Each
Item 609, Asphalt Concrete Curb = 3,000 Lin.Ft.

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.

REMOVAL OF EXISTING DRAINAGE FACILITIES

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

The removal and disposal of structures, not specifically abandoned or removed under Item 202 shall be paid for under "Item 203, Excavation Not Including Embankment Construction."

FUTURE LANE CONSTRUCTION

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

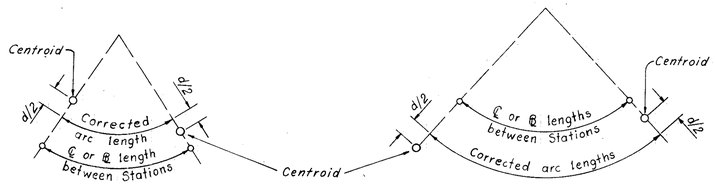
The above joints shall be placed at the following location: West Bound Inner Lanes, Sta. 888+95.07 to Sta. 916+88.52.

After the forms have been removed, the $\frac{5}{8}$" top bolt shall be re-inserted into the hook bolt to protect the threads and left in place in lieu of the male end of the hook bolt. The exposed metal shall then be painted with two coats of asphalt varnish.

Payment for all of the above shall be included in the unit price bid for Item 451 10"Reinforced Portland Cement Concrete Pavement.

EARTHWORK COMPUTATIONS

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



d = Radius difference between centroids

Corrected arc lengths are indicated on Cross Section plan sheets where applicable.

Centroids between curve center and centerline or baseline.

Centroids beyond centerline or baseline.

PAVEMENT REMOVAL OUTSIDE NORMAL CONSTRUCTION LIMITS

The existing pavement as indicated on the plans shall be removed and disposed of, the old roadway graded to the level of the surrounding ground, the old ditches filled, and the disturbed areas sloped to drain and left in a neat condition ready for seeding. Seeding shall be measured and paid for in accordance with Item 659 Seeding and Mulching. Payment for the above work, except seeding shall be included in the unit price bid for Item 202&203.

DRAINAGE

EROSION CONTROL

Items 601 and 660 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. The Engineer shall check and nonperform quantities or adjust locations and quantities for these items where indicated by field conditions during construction.

REINFORCED CONCRETE CATCH BASINS

Catch basins over 12 feet in depth shall be built entirely of Class C Concrete reinforced by placing $\frac{1}{2}$" diameter bars 12" center to center both vertically and horizontally with a 2" clearance from the inside face of the wall. Payment for furnishing and placing the reinforcing steel shall be included in the unit price bid for Item 604, Catch Basin.

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.

PIPE CUT OFFS

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

Y- BRANCH AND RISER CONCRETE ENCASED

Payment for the Y-Branch and Riser and all necessary bends, branches, conduit, joints and concrete shall be paid for under bid Item 8" x 5" Y-Branch and Riser Concrete Encased.

The conduit connecting from the Y-Branch and Riser to the property line shall be paid for under the pertinent conduit item.

PAVED BITUMINOUS COATED CORRUGATED METAL STRUCTURE

The metal plates that are incorporated into the lower ¼ circumference (circular pipe) of this sectional plate structure shall be shop coated in accordance with 707.04 and field paved with bituminous material. The remainder of the plates need not be bituminous coated.

The paving shall consist of a mixture of hot sand and 702.01 asphalt cement or other bituminous mixture acceptable to the Engineer and shall be spread and compacted to the satisfaction of the Engineer. The completed pavement shall be smooth and durable and shall have a minimum average thickness of approximately one inch over the inside crests of the corrugations. After installation of the structure, damaged or worn spots in the bituminous coating on the inside and outside of the structure shall be re-coated using materials and methods recommended by the manufacturer and as directed by the Engineer.

Payment for all of the above shall be included in the unit price bid for the Item 603 Conduit.

PIPE CONNECTIONS TO CORRUGATED METAL STRUCTURES

Connections of proposed longitudinal drainage to the proposed corrugated metal structure shall be by means of a shop fabricated (or field welded) stub on the structure. The stub shall meet the requirements of 707 and have a minimum length of two feet and a minimum gage of 14.

Location and elevation of the stub are to be considered approximate and may be adjusted by the Engineer to avoid cutting through joints in the structure.

The field welded joint, if used, shall be painted on the inside and outside with two coats of red lead paint, 708.06 and two coats of graphite paint, 708.13. Welding shall meet the requirements of 513.23.

Payment for cutting into the structure and providing the connection described shall be included in the unit price bid for Item 603.

SPRING DRAINS

Reference is made to the details 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" Unclassified Pipe Underdrain, 707.01 Type III or 707.12, as per plan= 100 Lin. Ft.
Item 605 - Aggregate Drains for Springs, as per plan = 6 Lin. Ft.

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

TEMPORARY WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL

The following estimated quantities are to be used as directed by the Engineer for temporary control measures.

Item 207,	Temporary seeding and mulching	65,910 Sq.Yds
Item 659,	Commercial fertilizer (12-12-12)	1.36 Tons
Item 207,	Water	15 8 M.Gals.
Item 207,	Temporary slope drains	544 Lin.Ft.
Item 207,	Temporary benches, dikes, dams and sediment basins	1,191 Cu.Yds.
Item 659,	Repair seeding and mulching	16,480 Sq.Yds.
Item 207,	Mowing	735 M.Sq.Ft.

STANDARD NO. 1-A MANHOLE WITH 706.11 JOINTS

The manhole used for this item shall be identical with the one shown on the Standard Construction Drawings for a Standard No. 1-A Manhole.

Manhole steps shall be made of cast iron and conform to the drawings on Shts. 117&118.

ITEM 604 STANDARD NO. 1-A MANHOLE, , (SS-11) WITH 706.11 JOINTS

The construction of Sanitary Manhole SS-11 shall conform to the details and notes on Sheets 117 and 118 with an adjustment made for the different pipe sizes.

MAINTENANCE OF SEWER FLOWS

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

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

SCALE
MADE G.L. DATE 7-29-70
TRCD. DATE
CKD. R.B.H. DATE 7-30-70
M.B. 7-6-74

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QUANTITY CALCULATIONS
MADE BY G.L. DATE 7-29-70
CHECKED BY R.B.H. DATE 7-30-70

GENERAL NOTES

DRAINAGE

ITEM 604 JUNCTION CHAMBER

The Contractor shall construct the Junction Chamber as detailed on Sheets 122-124 in accordance with applicable provisions of Item 604.

Payment will be made at the contract unit price bid for Item 604, Junction Chamber, which payment shall include full compensation for furnishing all labor, material, tools, equipment and incidentals necessary to complete the work.

PIPE ENDS

All culverts, whether terminating in headwalls or endwalls, shall begin and end with pipe ends as normally fabricated by the manufacturer. Ends shall not be cut to fit either skew or slope. If field cutting is found to be necessary to fit an exact length control, the cut end shall be located at an interior joint and cradle, collar or band shall be provided to assure a stable joint.

Payment for the joint shall be included in the price bid for the pertinent 603 conduit item.

SANITARY FLOW INTO I-480 FREEWAY DRAINAGE SYSTEMS

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

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

STREAM CROSSINGS

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

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" Unclassified Pipe Underdrains, 707.01 Type III or 707.12, as per plan = 3,000 Lin.Ft.
Item 603, 6" Type F Conduit = 500 Lin.Ft.
Item 601, Crushed Aggregate Slope Protection (Using No. 1 Stone) = 3 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.

ROOF AND FIELD DRAINS

All existing private roof or surface drains which are encountered during construction 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" Type B Conduit	300 Lin.Ft.

EXISTING UNDERDRAINS

Where existing underdrains are encountred and no provision has been made for new underdrains, they shall be connected to new inlet with 6inch Item 605 Unclassified Pipe Underdrains. The following estimated quantity has been included in the general summary for use as directed by the Engineer. The materials shall not be ordered by the Contractor unless prior approval is recieved from the Project Engineer.

Item 605	6" Unclassified Pipe Underdrain	300 Lin Ft.

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

The Standard No. 6 Catch Basin shall have a 2" additional depression of the grate by warping the shoulder pavement within 5 feet upstream of the basin. Payment for this work shall be included with Item 604 Standard No. 6 Catch Basin, modified as per plan.

6" PIPE UNDERDRAIN, AS PER PLAN

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

COATING CONCRETE PIPE FOR SANITARY SEWERS (SP-12)&(SP-13)

Pipe shall be coated inside with two coats of coal tar pitch paint at a rate of not more than 180 square feet per gallon per coat. Waterproofing material shall consist of "Inertal Standard Thick", "Koppers Super Service", "Pitt.-Chem 103" or an approved equal. Payment to be included in pertinent 603 item.

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.

EXTRA DEPTH CATCH BASINS

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

Spacing of steps shall be uniform with 12" minimum and 16" maximum.

ITEM SPECIAL - FILL AND PLUG EXISTING CULVERTS

This item shall consist of the construction of bulkheads in the existing culverts and filling the area thus sealed off with sand or other granular material approved by the Engineer.

Bulkheads shall be located at the limits of the area to be filled as indicated on the plans. The bulkheads shall consist of brick or concrete masonry with a minimum thickness of 12 inches.

The fill material shall be pumped into place or placed by some other means approved by the Engineer, so that, after settlement, at least 90 percent of the cross-sectional area of the culvert for its entire length shall be filled. Filling existing culverts may be used as an alternate to removing them.

The footage of filled and plugged culverts shall be the actual number of linear feet measured along the centerline of the culverts. For location of culverts to be removed or filled see E-11, 12 and E-30, sheets 66 and 68.

Payment for all operations described above shall be included in the contract unit price bid per linear foot for Item Special, Fill and Plug Existing Pipe and Box Culverts, which price shall include full compensation for furnishing, hauling and placing all necessary materials and furnishing all labor, equipment, materials and incidentals necessary to complete this item.

RESILIENT AND FLEXIBLE GASKET JOINTS 706.11 AND 706.12

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

ITEM 604 STANDARD MANHOLE NO. 1, MODIFIED AS PER PLAN

The frame and grate specified for Standard No. 6 Catch Basin shall be used in lieu of the frame and cover specified from Standard Manhole No. 1.

ITEMS 603 CONDUIT

Subsequent to completion of these plans the permissible pipe materials have been changed on various 603 conduit items. The conduit descriptions are shown correctly in the General Summary even though they may not have been changed through the rest of the plan.

REVIEW OF DRAINAGE FACILITIES

Before any work is started on the project, and again before final acceptance by the State, representatives of the State, the Municipalities and the Contractor shall make a visual inspection of the existing storm, sanitary, and combined sewers within the work limits which are to remain in service and which may be affected by the work. Records of the inspections shall be kept in writing by the State. All new conduits, inlets, catch basins and manholes constructed as a part of the project shall be free of all foreign matter and in a clean condition before the project will be accepted by the State. All existing sewers inspected initially by the above mentioned parties shall be maintained and left in a condition reasonably comparable to that determined by the original inspection. Any change in the condition resulting from the Contractor's operations shall be corrected by the Contractor to the satisfaction of the Engineer.

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

ITEM 603, 78" CONDUIT, TYPE C 707.07, AS PER PLAN

Use 78" Type C 707.07, 0.109" thick , asbestos bonded as per Suppl. Spec's. 942, fully coated and paved inverted. At the inlet, use Type A tapered section. Conduits shall be jointed with watertight connections with gaskets and coupling bands which match and mesh with the corrugations of the pipe. The requirements of 603.06 for field testing of joints for infiltration or exfiltration shall be waived.

ITEM 603, 66" CONDUIT, TYPE C 706.02, EPOXY COATED OR 707.13, AS PER PLAN

Use 66" Type C Conduit 706.02 CLY or 707.13, modified as hereinafter stated:

a.) 706.02 CLY Reinforced Concrete Pipe With Joints As Per 706.11
The requirements of 603.06 for field testing of joints for infiltration or exfiltration shall be waived.

The bottom one-half of the interior barrel and joint surface areas of the concrete pipes, P-90 to P-93, shall be prepared so as to remove all forms of oil, laitance and other deleterious materials and then be lined with a high build, polyamide-cured 2 component coal tar epoxy coating (Military Specification MIL-P-23236). The lining compound shall be sprayed so as to obtain a continuous and relatively uniform and smooth lining with a minimum dry film thickness of 0.030 inches. The interior barrel surface shall be thoroughly inspected for holidays, utilizing an electrical instrument specially designed for that purpose. Just prior to installation of each joint of pipe in the field, a fibrated coal tar joint compound shall be applied around the inside corner of the bell or groove in accordance with the manufacturer's recommendations. Coating of the conduit shall be a plant operation and care shall be taken in the field to center the coated portion along the flowline.

b.) 707.13 Corrugated Steel Pipe:
The pipe shall be 0.109" thick, as per 707.02, asbestos bonded as per Suppl. Spec's. 942, fully coated and paved. Conduits shall be jointed with watertight connections with gaskets and coupling bands which match and mesh with the corrugations of the pipe. The requirements of 603.06 for field testing of joints for infiltration or exfiltration shall be waived.

ITEM 603 - 96" CONDUIT, TYPE B 707.03 8-3 GAGE, AS PER PLAN

The Contractor may furnish 0.168" thick stainless steel for the bottom plates, as an alternate to the 0.249" thick galvanized bottom or invert plates.

ITEM 603 - 108" CONDUIT TYPE C 706.03 CLASS V, OR 707.13 (0.168" thick as per 707.02)

The Contractor will not be permitted to construct the 108"ϕ sewer with the use of an open trench in the area under the Relocated Tuxedo Avenue Bridge because of the proximity of the substructure units.

The Contractor shall submit in writing his proposed construction methods to the Director and receive approval before work is started on the construction of the pipe. For the exact limits to which the Contractor cannot open trench, see Sheet 345.

SCALE ____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE G.L. DATE 7-29-70 CONSULTING ENGINEERS
TRCD. ____ DATE ____
CKD. R.B.H. DATE 7-30-70 KANSAS CITY CLEVELAND NEW YORK

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GENERAL NOTES

PAVEMENT

ITEM 451, 9" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, AS PER PLAN

The pavement shall be modified by using mesh fabric pavement reinforcing of No. 00/4 gage steel wire spaced at 6" center to center in place of the wire specified in Standard Construction Drawing BP-2. Transverse contraction joints shall be placed with a maximum spacing of 75 linear feet between joints in lieu of the maximum spacing specified on Standard Construction Drawing BP-4.

Curing material for exposed concrete shall meet the latest requirements of Federal Specification TT-C-00800, Type 1, except that the unit moisture loss in (grams/sq|cm) at 72 hours shall not exceed 0.055. The Contractor shall submit the manufacturers certified analysis for the lot or lots shipped. A fugitive dye is required.

High Early Strength Portland Cement shall be used for base or pavement replacement unless otherwise directed by the Engineer.

JOINTS: Longitudinal key joints and vertical faces of existing rigid pavement shall be cleaned of foreign material and given an application of bituminous material meeting the requirements of 702.01, 702.02, 702.04 in a manner which results in a residual coating of ¼ gallon per square yard before the adjoining slab is poured.

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

LONGITUDINAL JOINTS: All longitudinal joints shall be tied.

HINGE JOINTS: When called for on the plans or in the proposal, two hinge joints shall be sawed into the pavement, at the points, between successive contraction joints or between adjacent contraction and expansion joints. Hinge joints shall not be placed as an extension of either a contraction, expansion or construction joint in an adjacent slab, but may be used to extend a longitudinal tied joint of a more or less perpendicular intersecting roadway when approved by the Engineer. In order to insure the correct identification of the sawed joint for extension when adjacent or future lanes are placed, a 3" block letter C, for contractin or construction and H, for hinge shall be impressed ¼" into the finished slab adjacent to and at each end of the joint. If it is not possible to place two successive hinge joints as herein specified, contraction joints shall be used. When hinged joints are used the spacing between successive contraction and or expansion joints shall not generally exceed 75 feet and the intermediate hinge joint spacing shall not exceed 25 feet except as approved by the Engineer.

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

SEALING JOINTS: Joints shall be sealed as per Section 451.13. Unless otherwise specified the widths of saw cuts and joint sealers for transverse joints shall be as listed in the following Table.

TYPE OF JOINT	SPACING BETWEEN JTS. (Ft.)	WIDTH OF SAW CUT (In.)	NEOPRENE COMP. SEAL WIDTH (In.)
*Contraction	60-75	3/16	13/16
Contraction	30	1/4	9/16
Contraction	25 and less	1/4	7/16
Hinge	-----	1/4	+ 7/16

* Hinge joints are used at the ⅓ points.

\+ The 7/16 inch width neoprene compressed seal shall meet the requirements of 705.11 except that the high temperature recovery (70 hours at 212° F under 50% deflection) shall not be less than 75%

In addition to the above reinforced concrete pavement specifications the following are included:

1. The placing of reinforcement by vibratory means will not be permitted.
2. Vibratory finishing will not be permitted.
3. The surface texture of the pavement shall be a broom finish using a broom of an approved type.
4. Saw cut depths shall be 2 inches and the recommended widths of saw cuts and performed joint sealers are listed in the above table.

ITEM 310 SUBBASE GRADING "A" AS PER PLAN

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

14" EXTRA DEPTH SUBBASE

Subbase thickness shall be increased as shown by the dashed lines on Typical Section Sheets in the following areas in order to prevent frost-heaving of anticipated frost susceptible soils:

Regular grading material shall be furnished and installed under 4" Bituminous Aggregate Base as shown on the Typical Sections.

℄ I-80	Stations 868+00 to 876+00
℄ I-80	Stations 880+00 to 890+00
℄ I-80	Stations 931+50 to 938+25
W.B.I.L. and E.B.I.L. I-80	Stations 890+00 to 893+50
W.B.O.L. I-80	Stations 868+60 to 876+00
W.B.O.L. I-80	Stations 880+00 to 893+50
E.B.O.L. I-80	Stations 872+00 to 876+00
E.B.O.L. I-80	Stations 880+00 to 892+50
Lane OBE-JN	Stations 91+74 to 92+35
Lane JN-OBE	Stations 68+00 to 72+00
Ramp G-E	Stations 69+00 to 72+00
Ramp E-G	Stations 83+50 to 85+00

The provisions of 203.13 relating to subgrade compaction are waived in these areas. For underdrain and shoulder treatment in these areas see details on Paved Shoulder and Typical Section Sheets.

CONTRACTION AND EXPANSION JOINTS

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

A standard expansion joint shall be used at the ends of the ramps to allow for differential movements of the adjoining pavements.

SCALE NONE
MADE GL DATE 7-29-70
TRCD. MAG DATE 9-30-70
CKD. RRH DATE 9-30-70

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TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

11: 392

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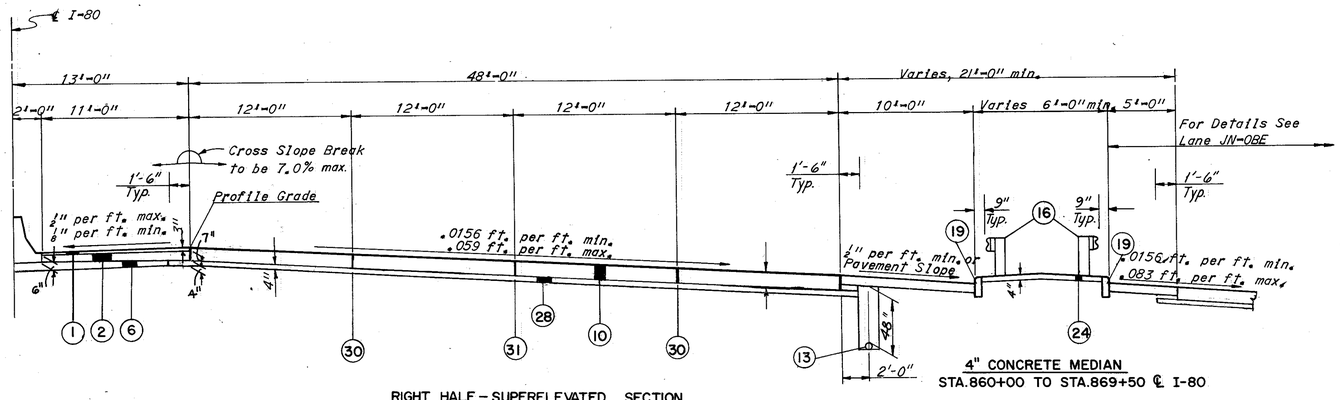
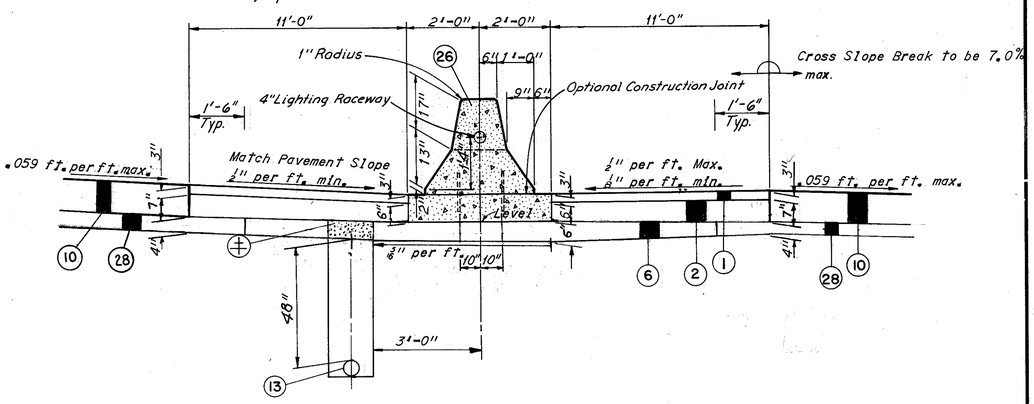


RIGHT HALF – SUPERELEVATED SECTION
STA. 860+00.00 TO STA. 867+44.14 ℄ I-80

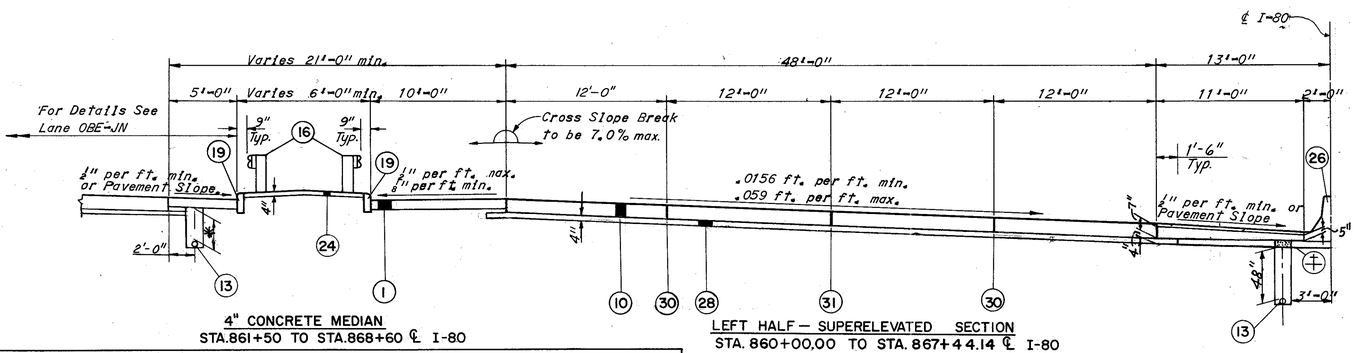
4" CONCRETE MEDIAN
STA.860+00 TO STA.869+50 ℄ I-80

For Details of Std. Concrete Barrier Type B, Modified As Per Plan at the bridge piers Sta. 861+00 to Sta. 866+22 and transitions see Sheet 107.



CONCRETE BARRIER TYPE B, SUPERELEVATED SECTION
For Details not shown see Standard Construction Drawing MC-9,

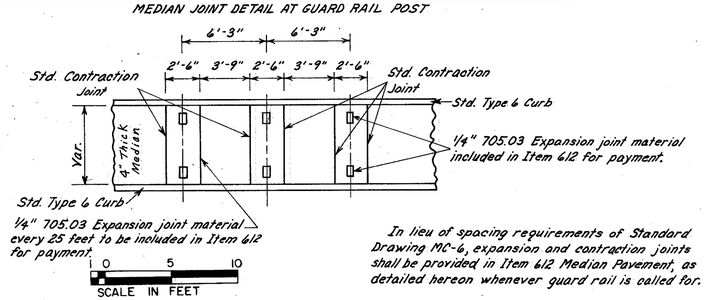
No Scale



4" CONCRETE MEDIAN
STA.861+50 TO STA.868+60 ℄ I-80

LEFT HALF – SUPERELEVATED SECTION
STA. 860+00.00 TO STA. 867+44.14 ℄ I-80

MEDIAN JOINT DETAIL AT GUARD RAIL POST



In lieu of spacing requirements of Standard Drawing MC-6, expansion and contraction joints shall be provided in Item 612 Median Pavement, as detailed hereon whenever guard rail is called for.

NOTES:

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

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

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

48" cover from bottom of subbase to top of pipe (cut)
28" cover from bottom of subbase to top of pipe (Fill)
Transition from shallow to deep (unclassified)

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

LEGEND

(1) *Item 301 Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12*
(2) *Item 304 Aggregate Base*
(6) *Item 310 Subbase Grading "A", as per plan (See General Notes).*
(10) *Item 451 10" Reinforced Portland Cement Concrete Pavement*
(13) *Item 605 6" Pipe Underdrain, as per plan. (See Note on Sh. 9)*
(16) *Item 606 Guard Rail, Type 5*
(19) *Item 609 Concrete Curb, Standard Type 6.*
(24) *Item 612 4" Concrete Median*
(26) *Item 622 Concrete Barrier, Type B*
(28) *Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12*
(30) ***Standard Longitudinal Joint (see note in proposal)***
(31) ***Standard Key Joint without Tie Bars***

SCALE 3/16"-1'-0" | HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE RTT DATE 11-15-68 | CONSULTING ENGINEERS
TRCD. NWS DATE 2-17-69 | KANSAS CITY CLEVELAND NEW YORK
CKD. RBH DATE 6/23/70

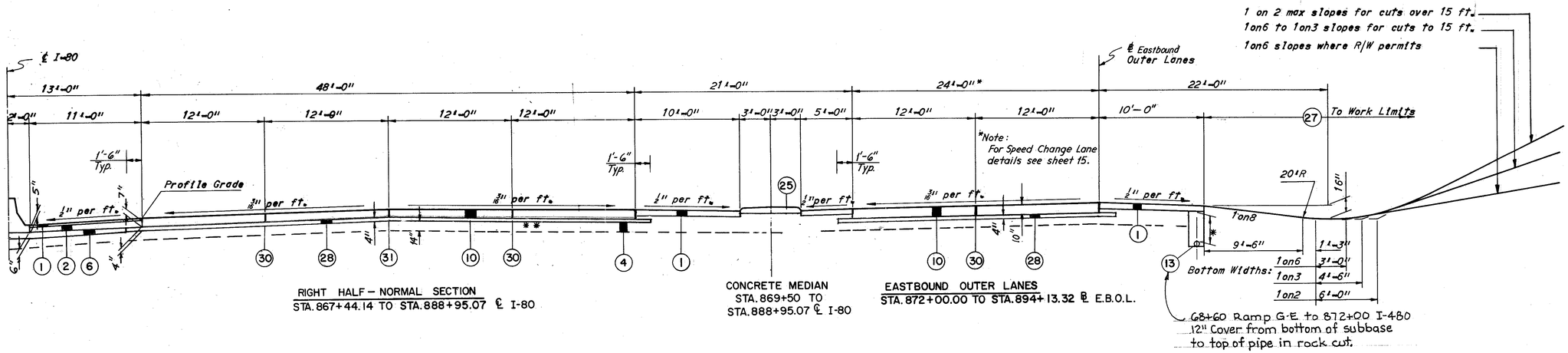
TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

12/392

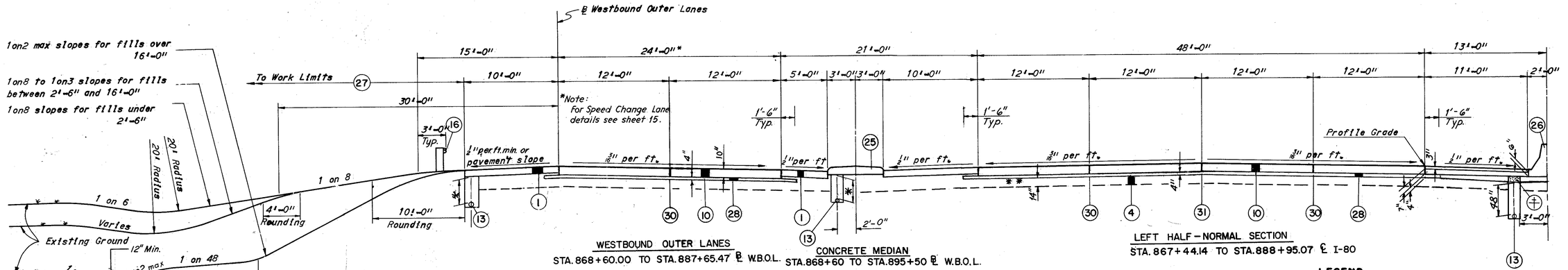
CUYAHOGA COUNTY
CUY. 80-15.81



RIGHT HALF – NORMAL SECTION
STA. 867+44.14 TO STA. 888+95.07 ℄ I-80

CONCRETE MEDIAN
STA. 869+50 TO STA. 888+95.07 ℄ I-80

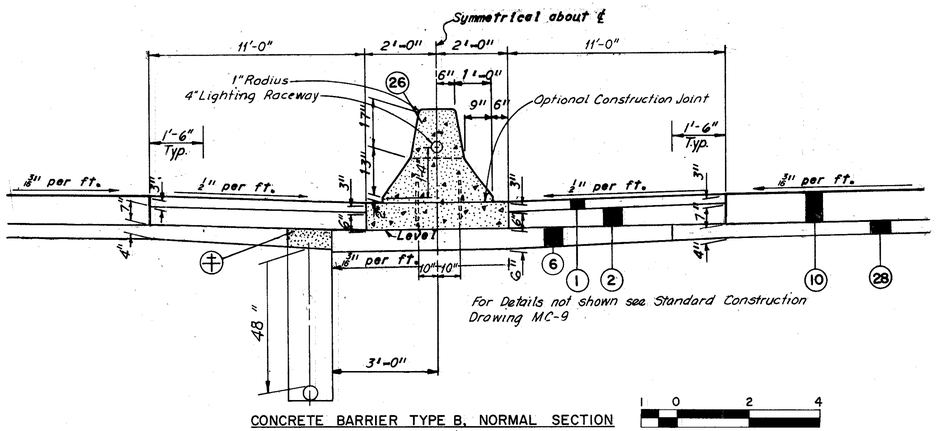
EASTBOUND OUTER LANES
STA. 872+00.00 TO STA. 894+13.32 ℄ E.B.O.L.



WESTBOUND OUTER LANES
STA. 868+60.00 TO STA. 887+65.47 ℄ W.B.O.L.

CONCRETE MEDIAN
STA. 868+60 TO STA. 895+50 ℄ W.B.O.L.

LEFT HALF – NORMAL SECTION
STA. 867+44.14 TO STA. 888+95.07 ℄ I-80



CONCRETE BARRIER TYPE B, NORMAL SECTION
Scale: 1/2" = 1'-0"

SCALE IN FEET (1 0 2 4)

LEGEND

(1) Item 301 Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(2) Item 304 Aggregate Base
(4) Item 310 Subbase (Regular Grading)
(6) Item 310 Subbase Grading "A", as per plan (See General Notes).
(10) Item 451 10" Reinforced Portland Cement Concrete Pavement
(13) Item 605 6" Pipe Underdrain, as per plan.
(16) Item 606 Guard Rail, Type 5
(25) Item 612 Concrete Median
(26) Item 622 Concrete Barrier, Type B
(27) Item 659 Seeding and Mulching
(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09, RT-11 or RT-12
(30) Standard Longitudinal Joint (see note in proposal)
(31) Standard Key Joint without Tie Bars

Notes:

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

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

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

48" cover from bottom of subbase to top of pipe	(cut)
28" cover from bottom of subbase to top of pipe	(fill)
Transition from shallow to deep	(unclassified)

** For areas where subbase thickness shall be increased as shown by the dashed lines in the above sections, see General Note Sheet 10

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

SCALE 1/8"=1'-0" MADE RJT DATE 10-7-68 TRCD. NWS DATE 9-26-69 CKD. RBH DATE 7/2/70

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

SCALE IN FEET (1 0 5 10)

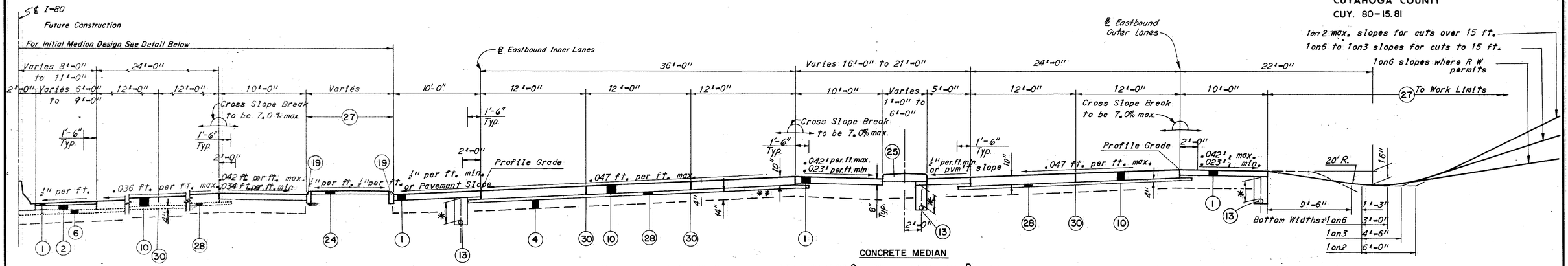
TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

13
392

CUYAHOGA COUNTY
CUY. 80-15.81

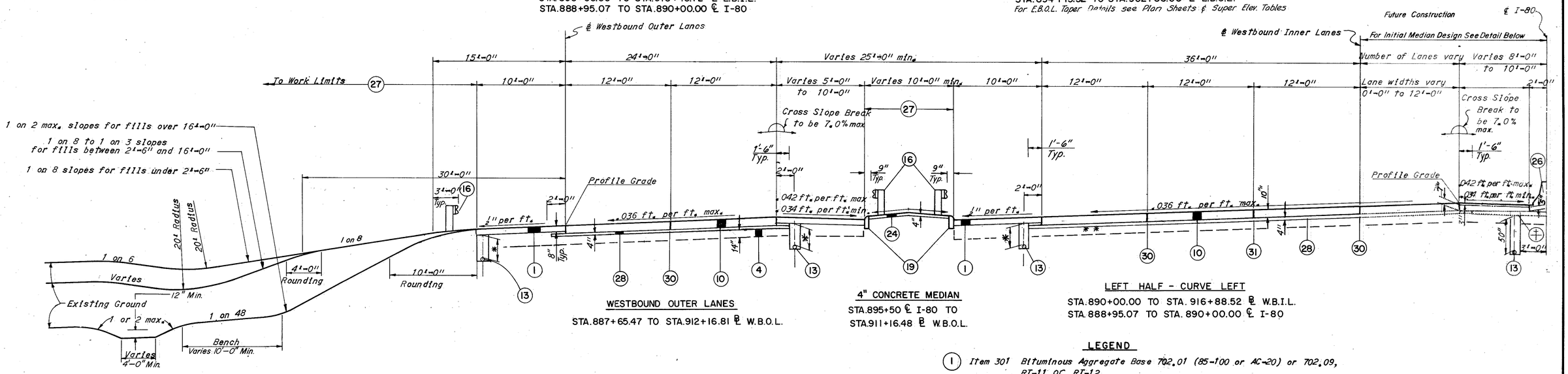


RIGHT HALF - CURVE LEFT
STA. 888+95.07 TO STA. 917+06.42

EASTBOUND INNER LANES
RIGHT HALF - CURVE LEFT
STA. 890+00.00 TO STA. 915+43.72 ℄ E.B.I.L.
STA. 888+95.07 TO STA. 890+00.00 ℄ I-80

CONCRETE MEDIAN
STA. 888+95.07 ℄ I-80 TO STA. 902+88 ℄ E.B.I.L.
For Median Taper see Nose Detail, Sheet 38.

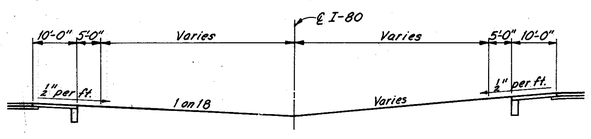
EASTBOUND OUTER LANES
RIGHT HALF - CURVE LEFT
STA. 894+13.32 TO STA. 902+88.00 ℄ E.B.O.L.
For E.B.O.L. Taper Details see Plan Sheets & Super Elev. Tables



WESTBOUND OUTER LANES
STA. 887+65.47 TO STA. 912+16.81 ℄ W.B.O.L.

4" CONCRETE MEDIAN
STA. 895+50 ℄ I-80 TO
STA. 911+16.48 ℄ W.B.O.L.

LEFT HALF - CURVE LEFT
STA. 890+00.00 TO STA. 916+88.52 ℄ W.B.I.L.
STA. 888+95.07 TO STA. 890+00.00 ℄ I-80



INITIAL MEDIAN DESIGN
STA. 892+16.99 TO STA. 914+52.16 ℄ I-80
Scale: 1/16" = 1'-0"

SCALE IN FEET
0 5 10

NOTE:

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

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

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

48" cover from bottom of subbase to top of pipe	(cut)
28" cover from bottom of subbase to top of pipe	(fill)
Transition from shallow to deep	(unclassified)

***For areas where subbase thickness shall be increased as shown by the dashed lines in the above sections, see General Note Sheet 10.*

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

LEGEND

(1)	Item 301	Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09, RT-11 or RT-12
(2)	Item 304	Aggregate Base
(4)	Item 310	Subbase (Regular Grading)
(6)	Item 310	Subbase Grading "A", as per plan (See General Notes).
(10)	Item 451	10" Reinforced Portland Cement Concrete Pavement
(13)	Item 605	6" Pipe Underdrain, as per plan.
(16)	Item 606	Guard Rail, Type 5
(19)	Item 609	Concrete Curb, Standard Type 6.
(24)	Item 612	4" Concrete Median
(25)	Item 612	Concrete Median
(26)	Item 622	Concrete Barrier, Type B
(27)	Item 659	Seeding and Mulching
(28)	Item 301	4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or 12
(30)		Standard Longitudinal Joint (see note in proposal).
(31)		Standard Key Joint without Tie Bars

SCALE 3/16" = 1'-0"
MADE RJT DATE 12-7-18
TRCD. RJWS DATE 3-21-19
CKD. RBH DATE 7/1/20
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY · CLEVELAND · NEW YORK

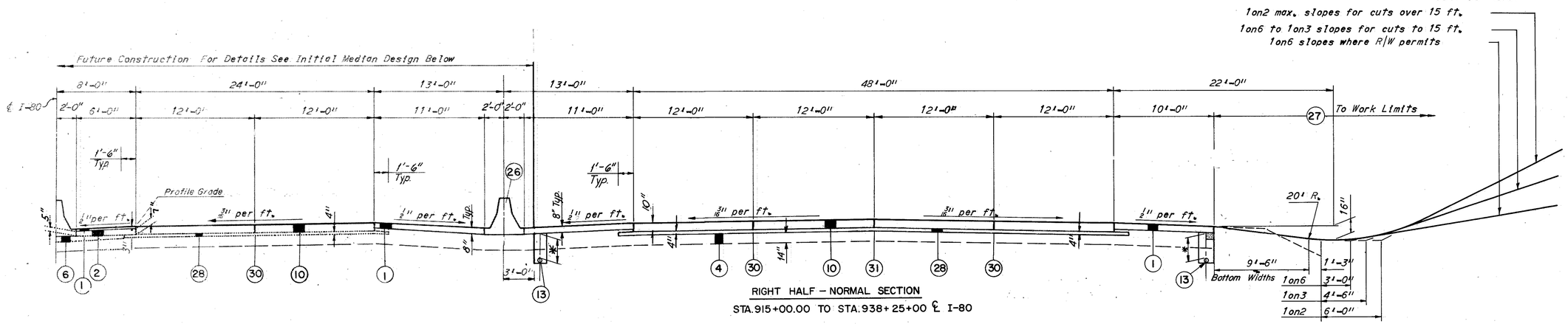
TYPICAL SECTIONS

TYPE 451

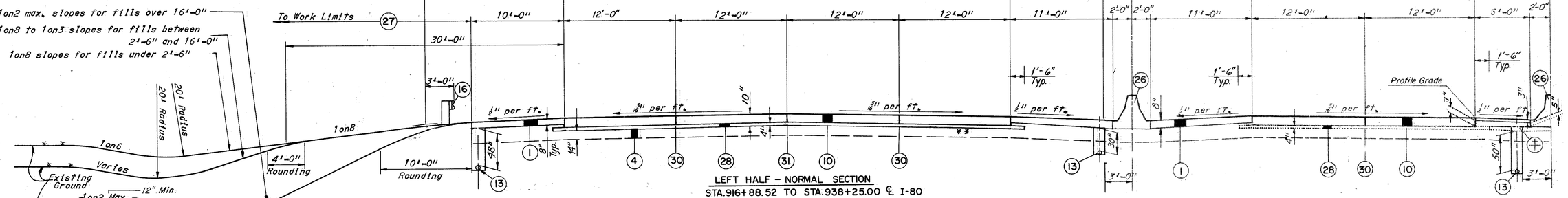
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

14
392

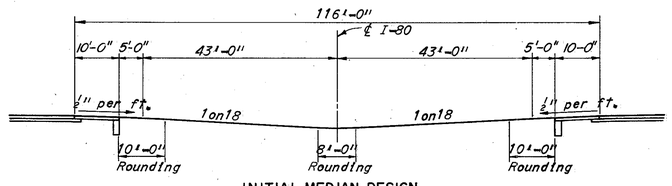
CUYAHOGA COUNTY
CUY. 80-15.81



RIGHT HALF – NORMAL SECTION
STA. 915+00.00 TO STA. 938+25.00 ℄ I-80



LEFT HALF – NORMAL SECTION
STA. 916+88.52 TO STA. 938+25.00 ℄ I-80



INITIAL MEDIAN DESIGN
STA. 914+52.16 TO STA. 938+25.00 ℄ I-80
Scale: 1/16" = 1'-0"

SCALE IN FEET
1 0 5 10

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

** For areas where subbase thickness shall be increased by the dashed lines in the above sections, see General Note Sheet 10.

NOTES:

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

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

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

4'-8" cover from bottom of subbase to top of pipe	(cut)
2'-8" cover from bottom of subbase to top of pipe	(fill)
Transition from shallow to deep	(unclassified)

LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12.
(2) Item 304 Aggregate Base
(4) Item 310 Subbase (Regular Grading)
(6) Item 310 Subbase Grading "A", as per plan (See General Notes).
(10) Item 451 10" Reinforced Portland Cement Concrete Pavement.
(13) Item 605 6" Pipe Underdrain, as per plan.
(16) Item 606 Guard Rail, Type 5
(19) Item 609 Concrete Curb, Standard Type 6.
(26) Item 622 Concrete Barrier, Type B
(27) Item 659 Seeding and Mulching
(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(30) Standard Longitudinal Joint (see note in proposal)
(31) Standard Key Joint without Tie Bars

SCALE 3/16" = 1'-0" HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE RJT DATE 10-28-68
TRCD. KWS DATE 3-27-69
CKD. RBH DATE 7/7/70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

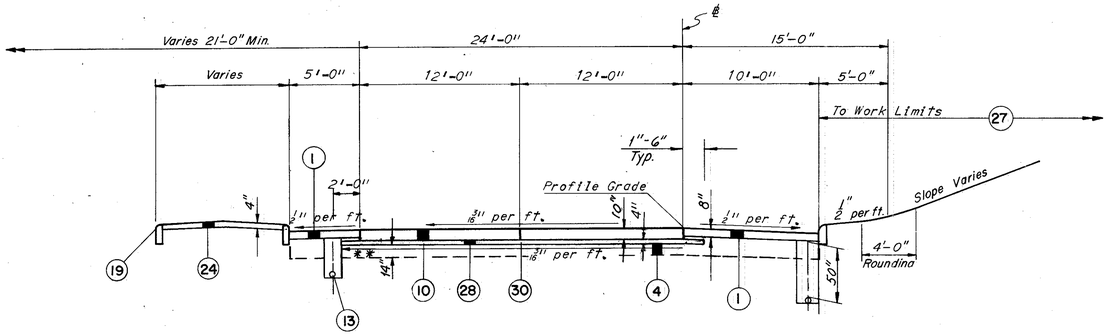
TYPICAL SECTIONS

TYPE 451

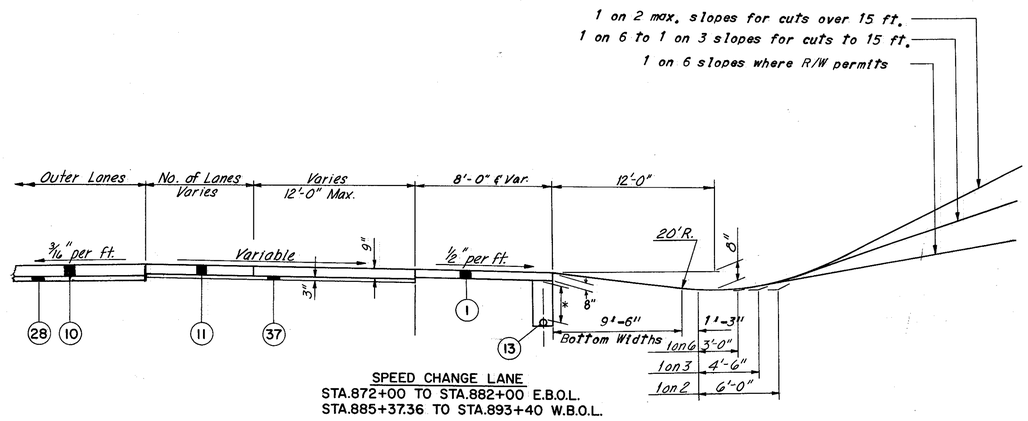
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

15/392

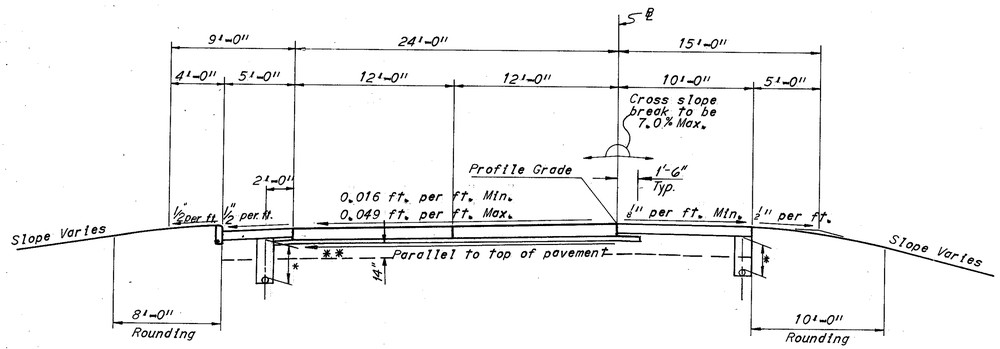
CUYAHOGA COUNTY
CUY. 80-15.81



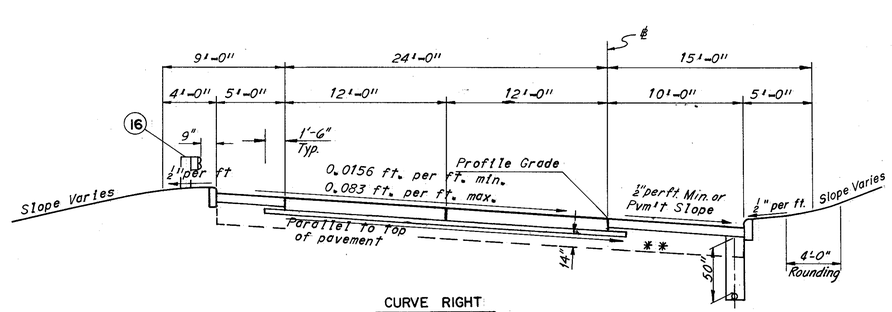
TANGENT SECTION
LANE JN-OBE STA. 65+66.38 TO STA. 72+00.00



SPEED CHANGE LANE
STA.872+00 TO STA.882+00 E.B.O.L.
STA.885+37.36 TO STA.893+40 W.B.O.L.



CURVE LEFT
LANE OBE-JN STA. 90+23.93 TO STA. 91+73.69
LANE OBE-JN STA. 95+33.88 TO STA. 100+00.00



CURVE RIGHT
LANE JN-OBE STA. 60+00.00 TO STA. 65+66.38
LANE OBE-JN STA. 91+73.69 TO STA. 95+33.68

0 5 10
SCALE IN FEET

SCALE 3/8" = 1'-0"
MADE RJT DATE 10-28-69
TRCD. NWS DATE 3-27-69
CKD. RBH DATE 7/7/70

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

LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(4) Item 310 Subbase (Regular Grading)
(10) Item 451 10" Reinforced Portland Cement Concrete Pavement
(11) Item 451 9" Reinforced Portland Cement Concrete Pavement
(13) Item 605 6" Pipe Underdrain, as per plan.
(16) Item 606 Guard Rail, Type 5
(19) Item 609 Concrete Curb, Standard Type 6.
(24) Item 612 4" Concrete Median
(27) Item 659 Seeding and Mulching
(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(30) Standard Longitudinal Joint (see note in proposal)
(37) Item 301 3" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12

NOTES:

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

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

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

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

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

50" cover from bottom of subbase to top of pipe (cut)
30" cover from bottom of subbase to top of pipe (fill)
Transition from shallow to deep (unclassified)

**For areas where subbase thickness shall be increased as shown by the dashed lines in the above sections, see General Note Sheet 10.

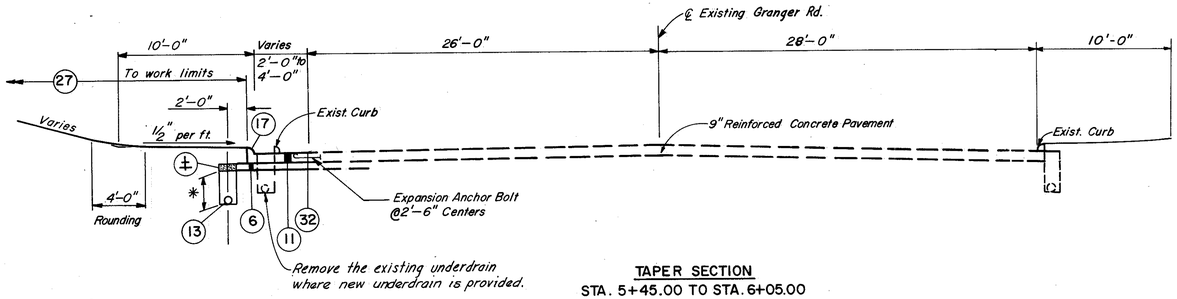
TYPICAL SECTIONS

TYPE 451

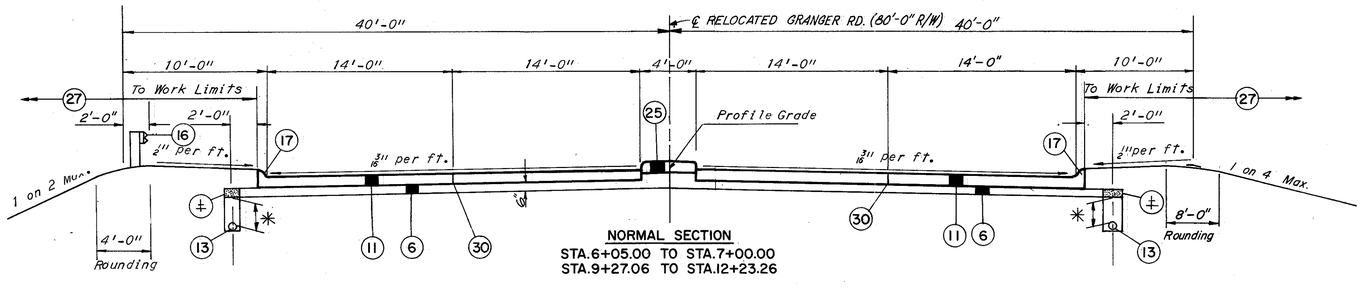
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

16
392

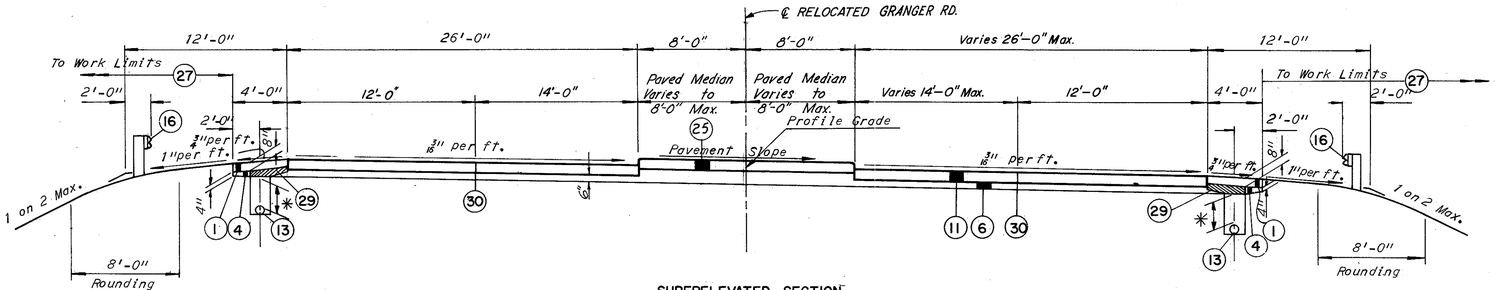
CUYAHOGA COUNTY
CUY.-80-15.81



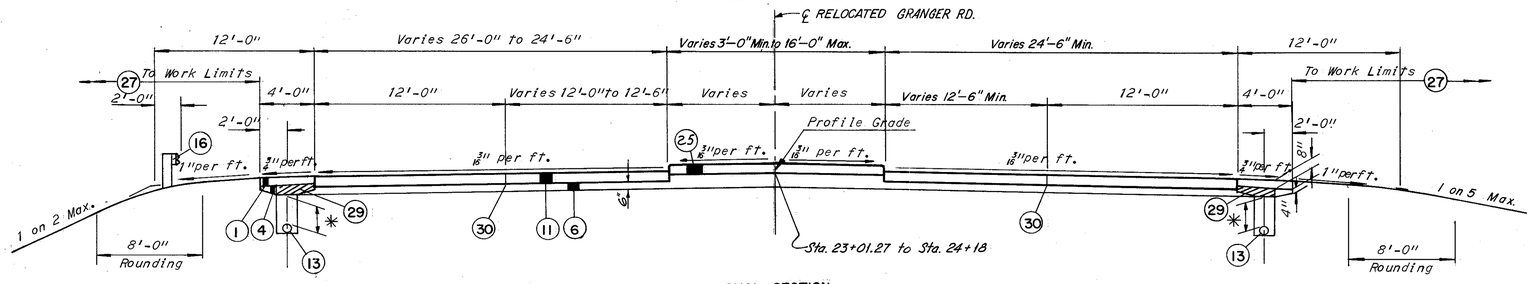
TAPER SECTION
STA. 5+45.00 TO STA. 6+05.00



NORMAL SECTION
STA.6+05.00 TO STA.7+00.00
STA.9+27.06 TO STA.12+23.26



SUPERELEVATED SECTION
STA.19+02.00 TO STA. 23+01.27



NORMAL SECTION
STA. 23+01.27 TO STA. 28+20.29

1 0 5 10
SCALE IN FEET

SCALE 3/16" = 1'-0"
MADE RJT DATE 2 2068
TRCD. DATE
CKD. RAH DATE 2/10/72

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

LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12.
(4) Item 310 Subbase (Regular Grading)
(6) Item 310 Subbase Grading "A", as per plan (See General Notes).
(11) Item 451 9" Reinforced Portland Cement Concrete Pavement
(13) Item 605 6" Pipe Underdrain, as per plan.
(16) Item 606 Guard Rail, Type 5
(17) Item 609 Concrete Curb, Standard Type 2-A
(25) Item 612 Concrete Median
(27) Item 659 Seeding and Mulching
(29) Item Special Drainage Connection using No. 8 Aggregate (See Note in Proposal)
(30) Standard Longitudinal Joint (see note in proposal)
(32) Expansion Anchor Bolt-Joint

NOTES:
Typical Sections are intended to show general roadway and pavement features only. For details see Paved Shoulder details, Plan Sheets and Cross-Section sheets.
Earth shoulders adjacent to uncurbed pavement or paved shoulders shall be finished 1" below the pavement or paved shoulder edge.
For Concrete Median Details not shown see Std. Drwg. MC-6 dated 6-1-65.

*Note:
The centerline of Relocated Granger Road as shown on the typicals is not necessarily the centerline of Right of Way.

± Remove subbase for width of Item 605 trench and replace with new backfill material in accordance with 605.03 (c) immediately prior to placing Item 310 Subbase Grading "A". Cost shall be included in price bid per lin. ft. for Item 605.

* Unless otherwise shown on the plans, underdrains shall be laid parallel to profile grade with 30" cover from bottom of subbase to top of pipe on fills, 50" cover from bottom of subbase to top of pipe in soil cuts and 12" cover from bottom of subbase to top of pipes in rock cuts.

TYPICAL SECTIONS-RELOCATED GRANGER ROAD

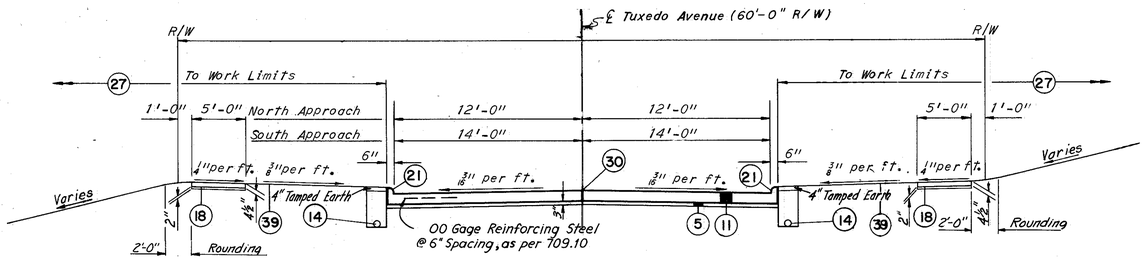
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

17
392

CUYAHOGA COUNTY
CUY.-80-15.81

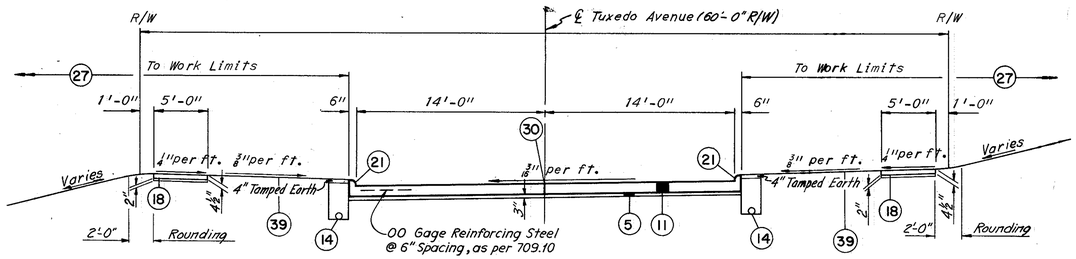
TYPICAL SECTIONS

TYPE 451



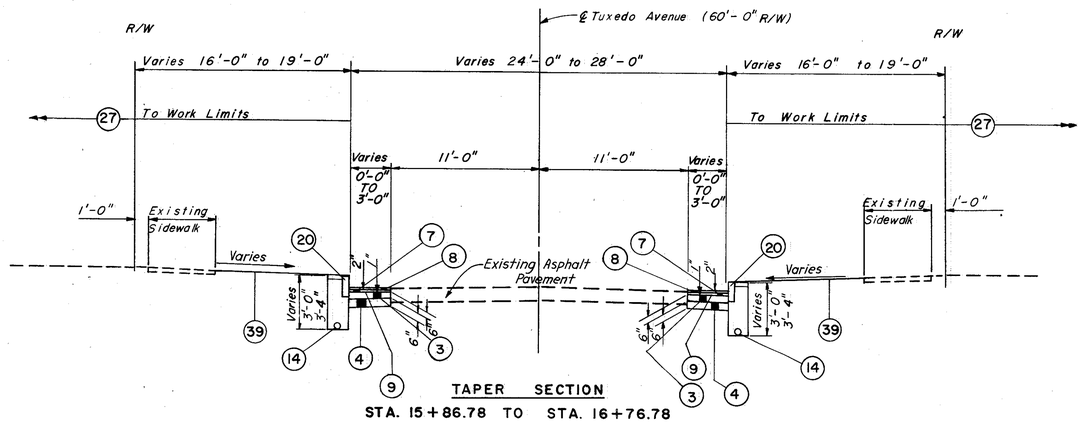
NORMAL SECTION

NORTH APPROACH: STA. 4+00.00 TO STA. 7+26.19
SOUTH APPROACH: STA. 7+94.19 TO STA. 12+31.37



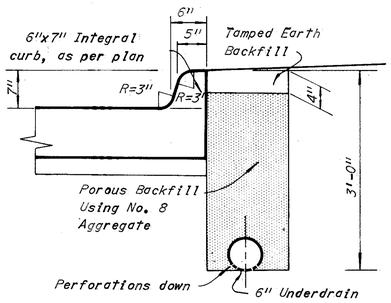
SUPERELEVATED SECTION

STA. 12+31.37 TO STA. 15+86.78



TAPER SECTION

STA. 15+86.78 TO STA. 16+76.78



ITEM 605 6" PIPE UNDERDRAINS 706.08, PERFORATED BELL AND SPIGOT

Note:

Underdrain 706.08 (perforated), shall have 3 centering lugs cast in bell end of the pipe. There shall also be a spacer cast in the bell end to provide a 3/8" gap between adjacent bell and spigot ends.

LEGEND

(3) Item 304 Aggregate Base (or 703.10 Screenings)
(4) Item 310 Subbase (Regular Grading)
(5) Item 310 Subbase, 703.08 or 703.10
(7) Item 402 Asphalt Concrete (70-85 or AC-20)
(8) Item 404 Asphalt Concrete (70-85 or AC-20)
(9) Item 408 Bituminous Prime Coat, 702.09 RT-1, RT-2 or RT-3; 702.02, MC-30 or MC-70 or 702.03 Primer 20, applied at a rate of 0.40 Gal. per Sq. Yd.
(11) Item 451 9" Reinforced Portland Cement Concrete Pavement, As Per Plan.
(14) Item 605 6" Pipe Underdrain, 706.08 Perforated Bell and Spigot, as per plan@
(18) Item 608 4½" Concrete Walk with 2" 703.08 Granulated Slag or 703.10 Screenings, as per plan
(20) Item 609 Concrete Curb, Standard Type 6, modified as per plan
(21) Item 609 Concrete Curb, Integral 6" x 7"
(27) Item 659 Seeding and Mulching
(30) Standard Longitudinal Key Joint
(39) Item 660 Sodding

NOTE:

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

1 0 5 10
SCALE IN FEET

SCALE 3/16" = 1' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE RJT DATE 2-20-68 CONSULTING ENGINEERS
TRCD. DATE
CKD. RBH DATE 7/10/72 KANSAS CITY CLEVELAND NEW YORK

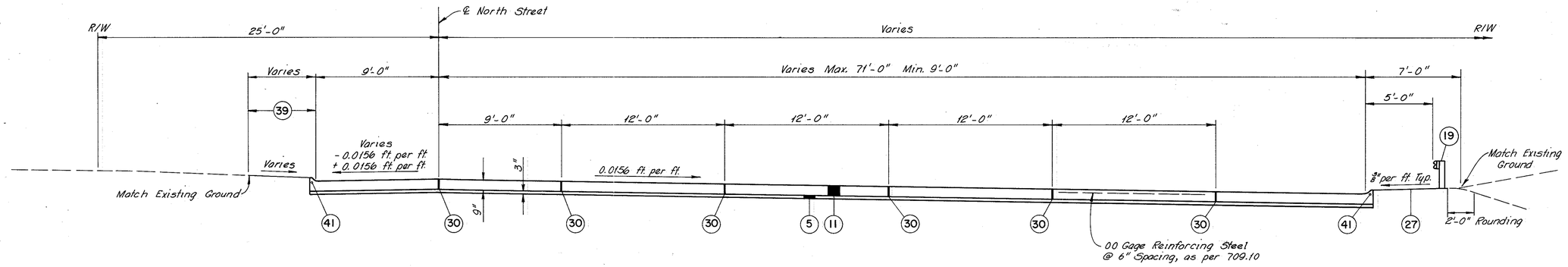
TYPICAL SECTIONS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

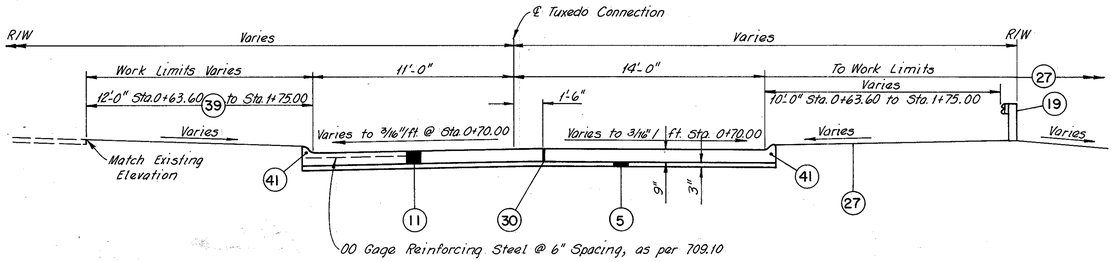
18
392

CUYAHOGA COUNTY
CUY.-80-15.81

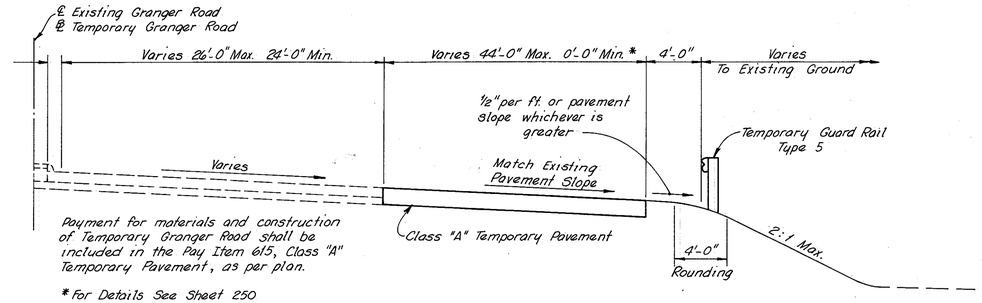
TYPE 451



NORTH STREET CUL-DE-SAC
STA. 12+64.50 TO STA. 14+10.00
Scale: ½" = 1'-0"



TUXEDO CONNECTION
STA.0+14.00 TO STA.1+75.00



TEMPORARY GRANGER ROAD
Scale: 3/16" = 1'-0"

0 2 4 8
SCALE IN FEET

SCALE 1" = 1'-0"
MADE RJT DATE 2/20/68
TRCD. MAG DATE 9/9/69
CKD. RBH DATE 7/10/70
m. 8. 9-6-74

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

LEGEND

- (5) Item 310 Subbase, 703.08 or 703.10
- (11) Item 451 9" Reinforced Portland Cement Concrete Pavement, as per plan
- (19) Item 606 Guard Rail, Type 5
- (27) Item 659 Seeding and Mulching
- (30) Standard Longitudinal Joint (see note in proposal)
- (39) Item 660 Sodding
- (41) Item 609 Concrete Curb, Standard Type 3-A

NOTE:

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

TYPICAL SECTIONS CUL-DE-SACS
& TEMPORARY GRANGER ROAD

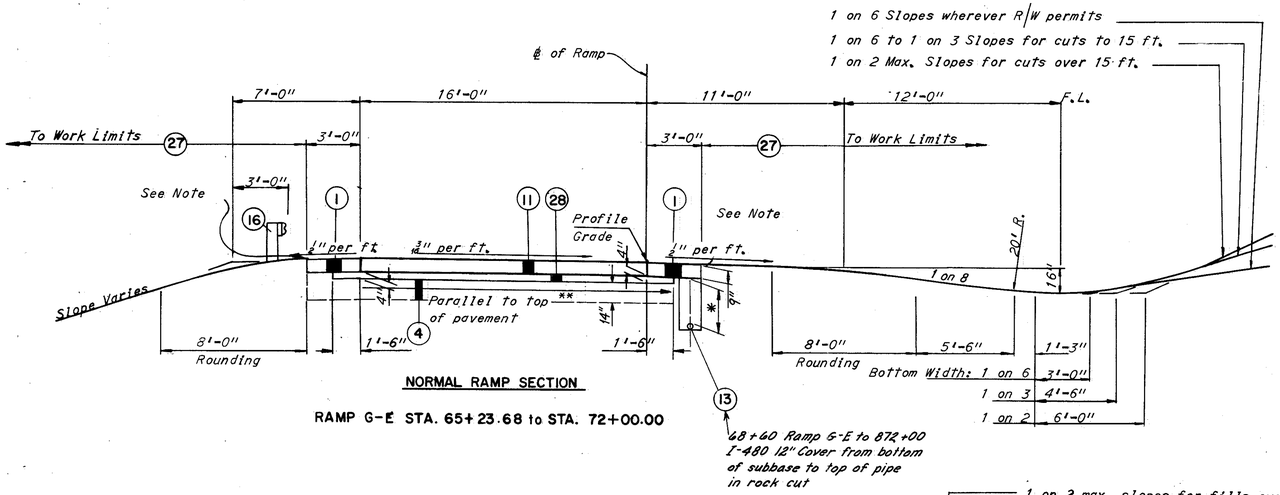
TYPICAL SECTIONS

TYPE 451

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

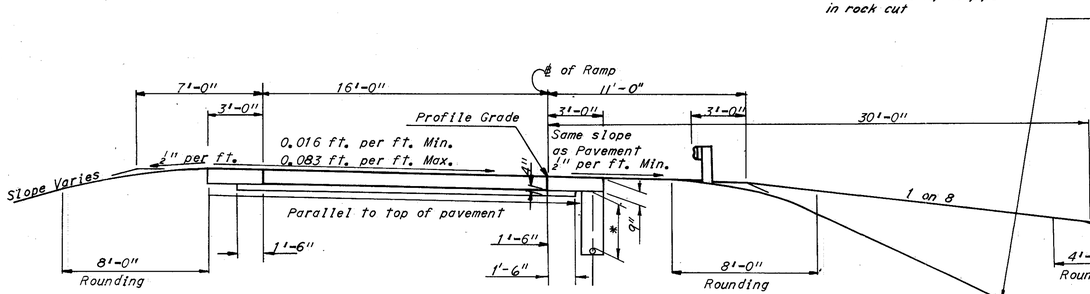
19/392

CUYAHOGA COUNTY
CUY.- 80 - 15.81



NORMAL RAMP SECTION

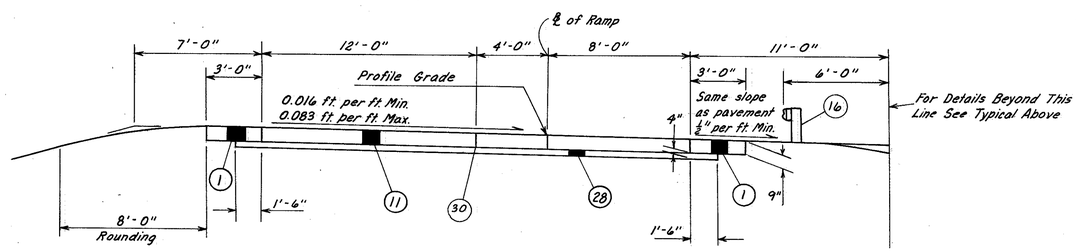
RAMP G-E STA. 65+23.68 to STA. 72+00.00



RAMP CURVE RIGHT

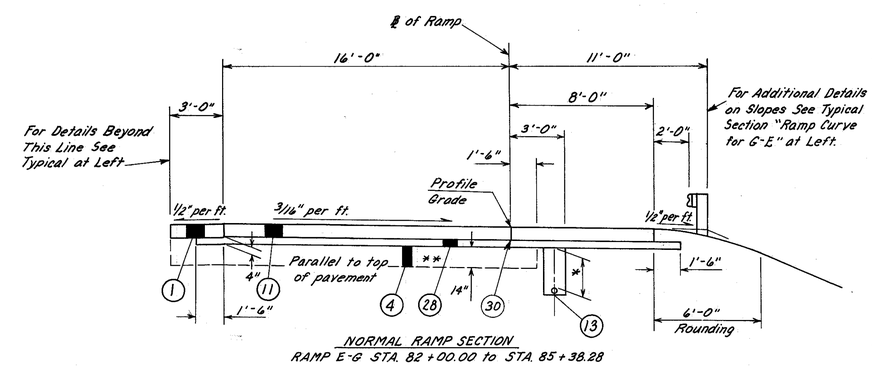
RAMP G-E STA. 58+71.09 to STA. 65+23.04

1 on 2 max. slopes for fills over 16'-0"
1 on 8 to 1 on 3 slopes for fills between 2'-6" and 16'-0"
1 on 8 slopes for fills under 2'-6"



RAMP CURVE RIGHT

RAMP E-G STA. 78+42.51 to STA. 82+00.00



NORMAL RAMP SECTION

RAMP E-G STA. 82+00.00 to STA. 85+38.28

4 0 4 8

SCALE IN FEET

LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(4) Item 310 Subbase (Regular Grading)
(11) Item 451 9" Reinforced Portland Cement Concrete Pavement
(13) Item 605 6" Pipe Underdrain, as per plan
(16) Item 606 Guard Rail, Type 5
(27) Item 659 Seeding and Mulching
(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(30) Standard Longitudinal Joint

NOTES:

All ramp typical sections are shown facing in the direction of travel.

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

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

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

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

50" cover from bottom of subbase to top of pipe	(cut)
30" cover from bottom of subbase to top of pipe	(fill)
Transition from shallow to deep	(unclassified)

**For areas where subbase thickness shall be increased as shown by the dashed lines in the above sections, see General Note Sheet 10.

SEQUENCE OF OPERATIONS:

(1) Install pipe underdrain on outside shoulder, where required.
(2) Place subbase 18 inches beyond edge of pavement. Payment shall be made for all subbase placed on this operation.
(3) Construct Item 451 pavement.
(4) Remove any contaminated backfill over drain and replace with new backfill material in accordance with 605.03(c).
(5) Complete shoulder construction.

SCALE 1/4"= 1'-0" MADE R.J.T. DATE 2-24-72 TRCD. N.J.S. DATE 2-24-72 CKD. R.B.V. DATE 2/29/72

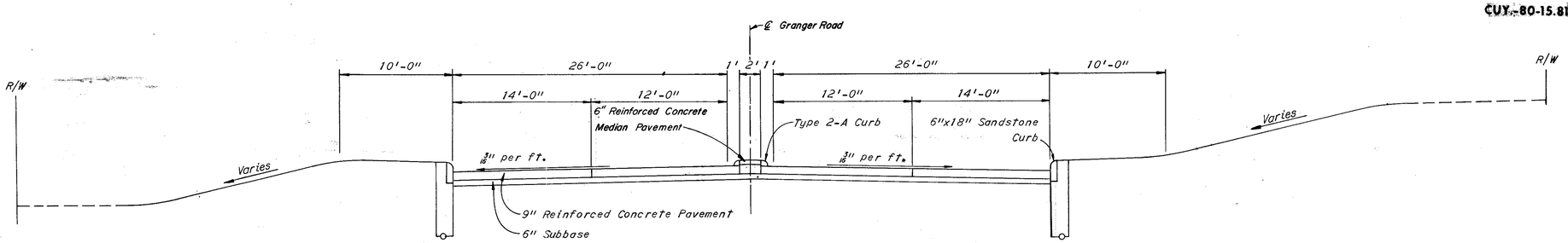
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

EXISTING TYPICAL SECTIONS

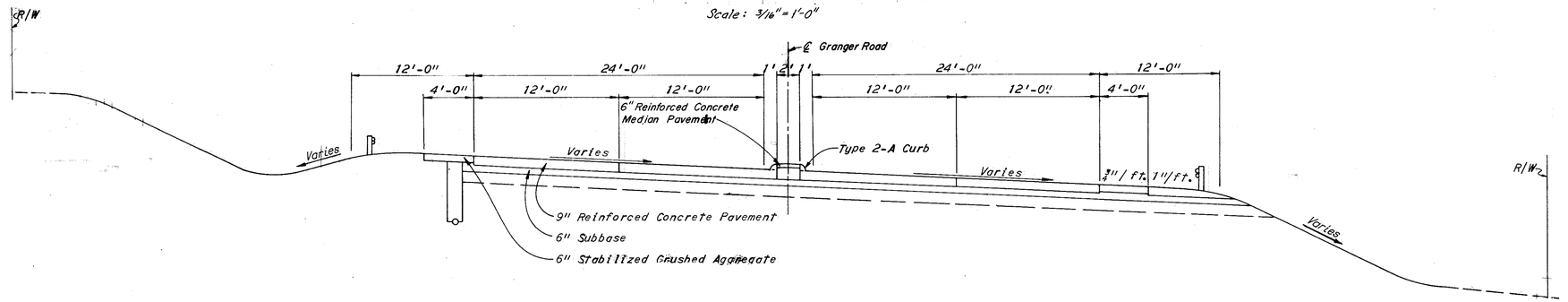
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

20
392

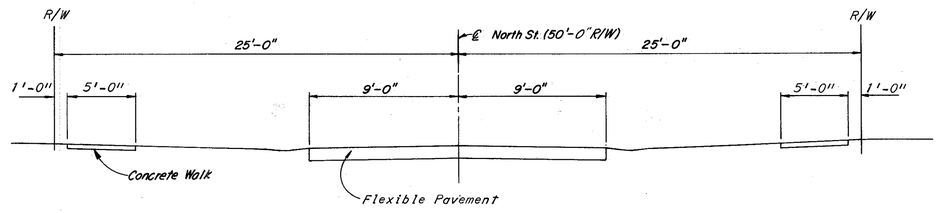
CUYAHOGA COUNTY
CUY.-80-15.81



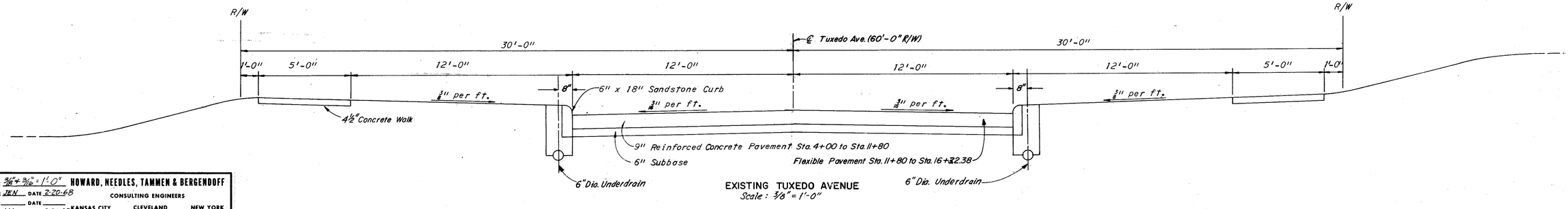
NORMAL SECTION EXISTING GRANGER ROAD
Scale: 3/16" = 1'-0"



SUPERELEVATED SECTION EXISTING GRANGER ROAD
Scale: 3/16" = 1'-0"



EXISTING NORTH STREET
Not Drawn To Scale



EXISTING TUXEDO AVENUE
Scale: 3/8" = 1'-0"

SCALE 3/16" + 3/16" = 1'-0" **HOWARD, NEEDLES, TAMMEN & BERGENDOFF**
MADE JEN DATE 2-20-68 CONSULTING ENGINEERS
TRCD. ____ DATE ____
CKD. IM DATE 2-20-68 KANSAS CITY CLEVELAND NEW YORK

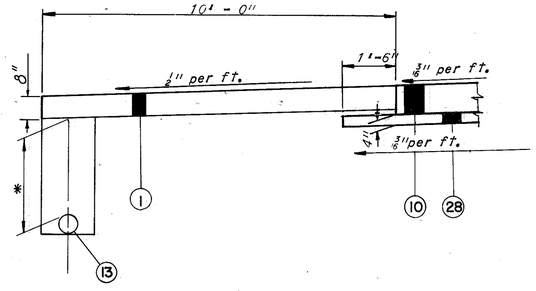
TYPICAL SECTIONS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

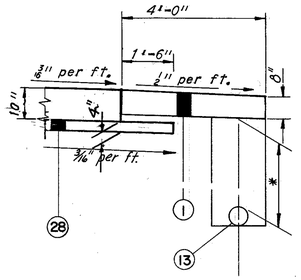
21
392

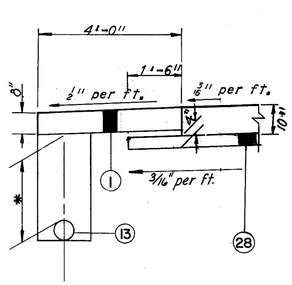
CUYAHOGA COUNTY
CUY. 80-15.81

PAVED SHOULDERS

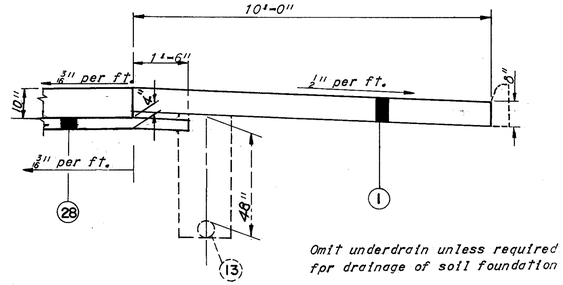


THREE PAVEMENT LANES OR MORE

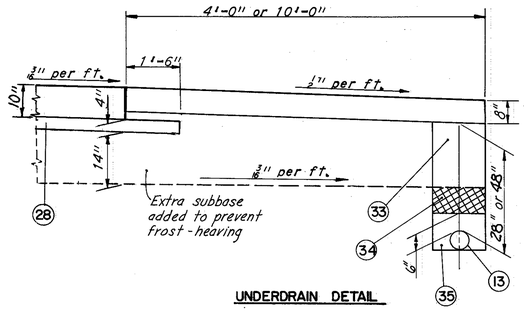




NORMAL SECTION

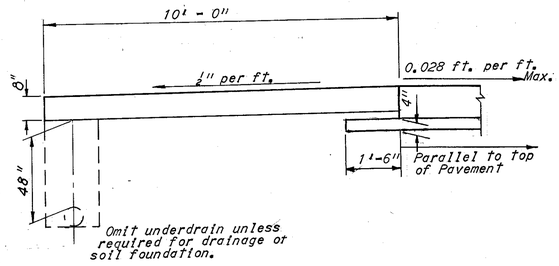


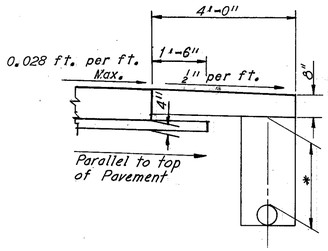
Omit underdrain unless required for drainage of soil foundation

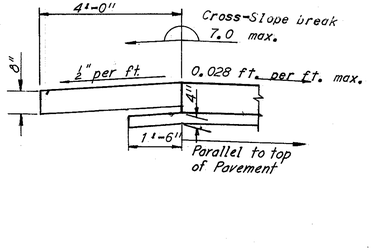


UNDERDRAIN DETAIL

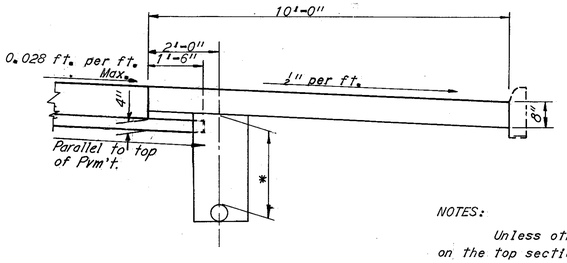
Note: Items (33), (34), and (35) are included for payment in Item 605.







TRANSITION SECTION



NOTES:

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

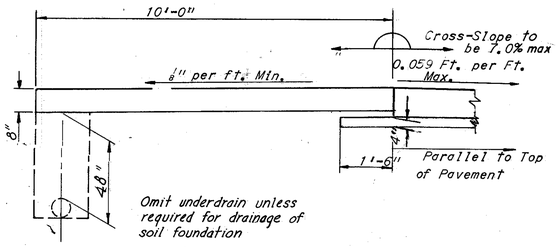
*Unless otherwise shown in the plans, underdrains shall be laid parallel to the pavement edge with:

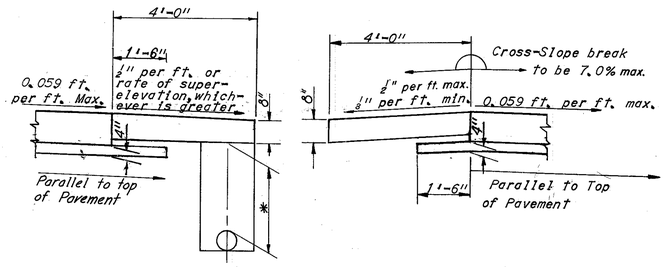
48" cover from bottom of subbase to top of pipe (cut)
28" cover from bottom of subbase to top of pipe (fill)
Transition from shallow to deep (unclassified)

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

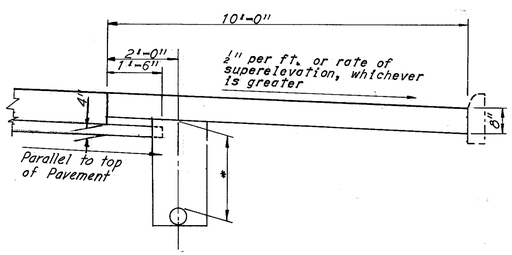
SEQUENCE OF OPERATIONS:

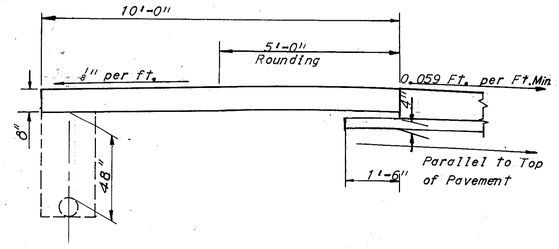
(1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
(2) Place subbase 18 inches beyond edge of pavement. Payment shall be made for all subbase placed in this operation.
(3) Construct Item 451 pavement.
(4) Remove any contaminated backfill over drain and replace with new backfill material in accordance with 605.03(c).
(5) Complete shoulder construction.

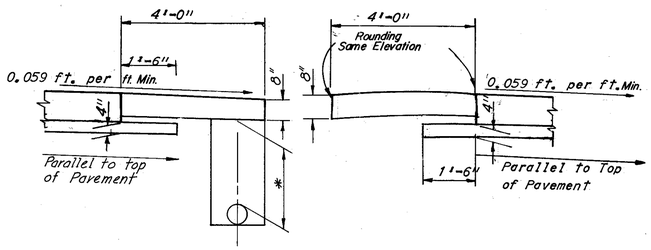




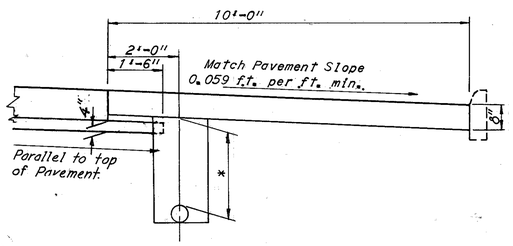
SUPERELEVATION NOT MORE THAN 0.059 FT. PER FT.







SUPERELEVATION MORE THAN 0.059 FT. PER FT.



LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(10) Item 451 10" Reinforced Portland Cement Concrete Pavement
(13) Item 605 6" Pipe Underdrain, as per plan.
(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or 12
(33) Backfill, using No. 8 or 9 Aggregate
(34) Backfill, using 703.02 Sand
(35) Backfill, using No. 8 or 9 Aggregate, 703.02 Sand or 703.08 Granulated Slag

0 2 4
SCALE IN FEET

SCALE 1/8" = 1'-0"
MADE RJT DATE 4-4-69
TRCD MWS DATE 4-7-69
CKD DATE

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

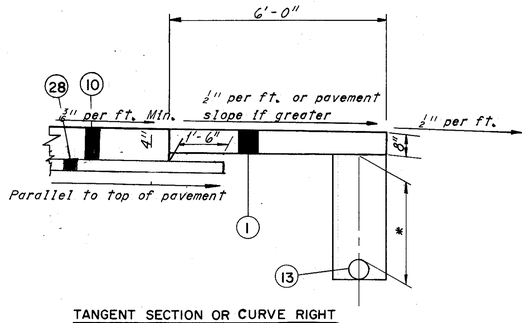
TYPICAL SECTIONS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

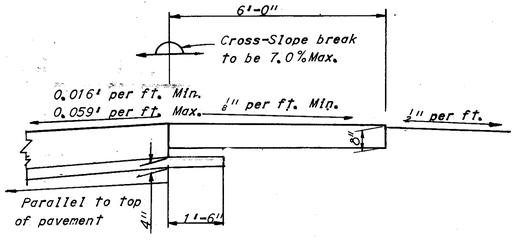
22
392

CUYAHOGA COUNTY
CUY.– 80– 15.81

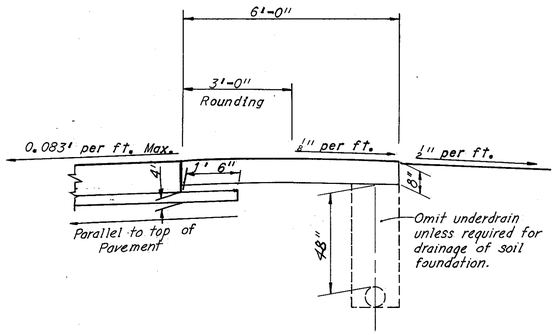
PAVED SHOULDERS



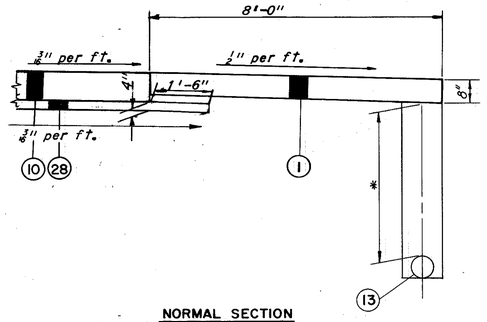
TANGENT SECTION OR CURVE RIGHT



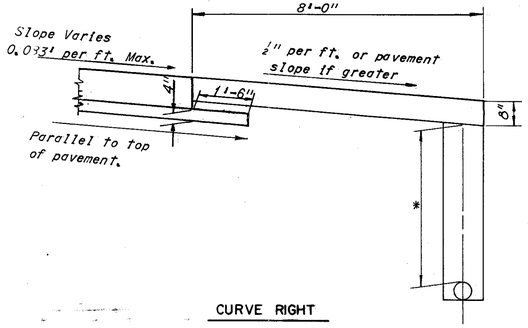
CURVE LEFT – S.E. NOT MORE THAN 0.059 FT. PER FT.



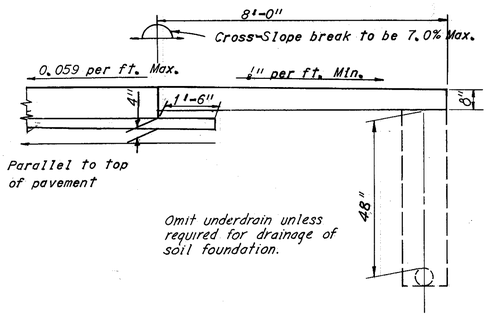
CURVE LEFT – S.E. MORE THAN 0.059 FT. PER FT.



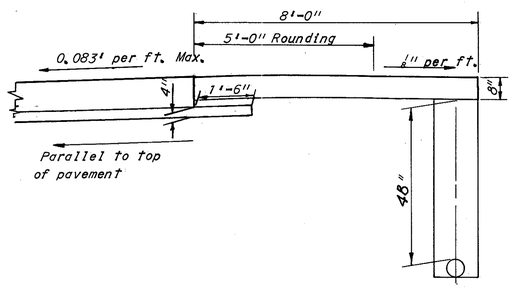
NORMAL SECTION



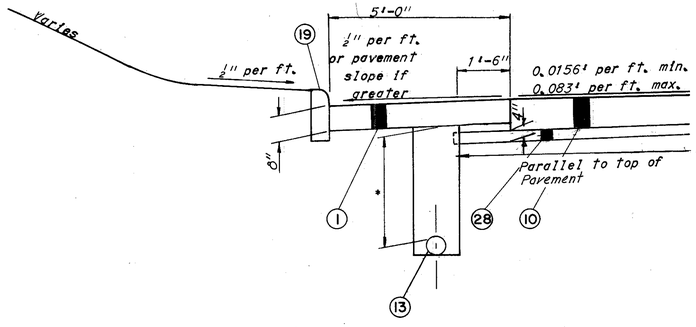
CURVE RIGHT



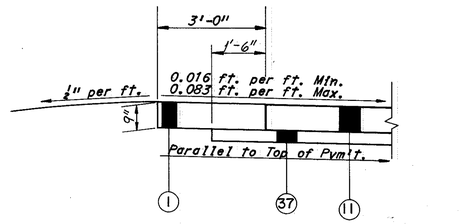
CURVE LEFT – S.E. NOT MORE THAN 0.059 FT. PER FT.



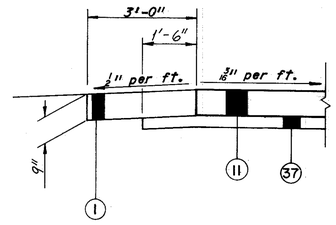
CURVE LEFT – S.E. MORE THAN 0.059 FT. PER FT.

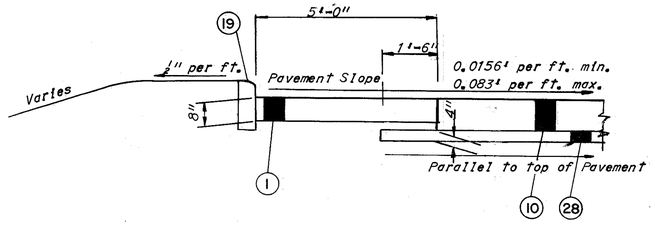


CURBED SECTION – TANGENT OR CURVE LEFT

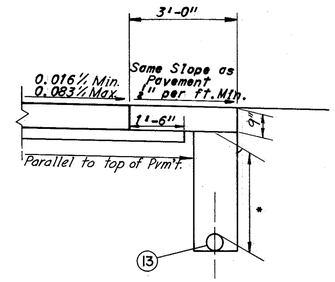


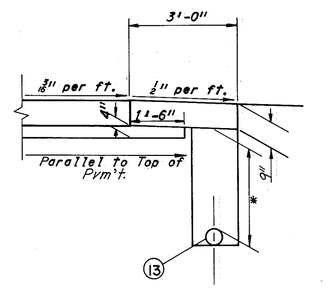
NORMAL SECTION CURVE RIGHT





CURBED SECTION – CURVE RIGHT





LEGEND

(1)	Item 301	Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12
(10)	Item 451	10" Reinforced Portland Cement Concrete Pavement
(11)	Item 451	9" Reinforced Portland Cement Concrete Pavement
(13)	Item 605	6" Pipe Underdrain, as per plan
(19)	Item 609	Curb, Type 6
(28)	Item 301	4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12.
(37)	Item 301	3" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12

NOTES:

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

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

48" cover from bottom of subbase to top of pipe (cut)
28" cover from bottom of subbase to top of pipe (fill)
Transition from shallow to deep (unclassified)

SEQUENCE OF OPERATIONS:

(1) Install pipe underdrain on outside shoulder, where required. Installation of shallow underdrain in median may be deferred until Item 451 is placed.
(2) Place subbase 18 inches beyond edge of pavement. Payment shall be made for all subbase placed in this operation.
(3) Construct Item 451 pavement.
(4) Remove any contaminated backfill over drain and replace with new backfill material in accordance with 605.03(c).
(5) Complete shoulder construction.

SCALE	1/2" = 1'-0"
MADE	R.I.T. DATE 2-27-69
TRCD.	N.W.S. DATE 2-27-69
CKD.	F.B.H. DATE 5-5-70

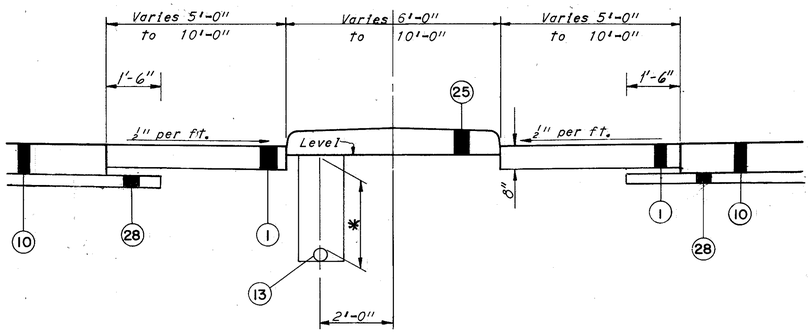
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

MEDIAN DETAILS

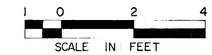
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

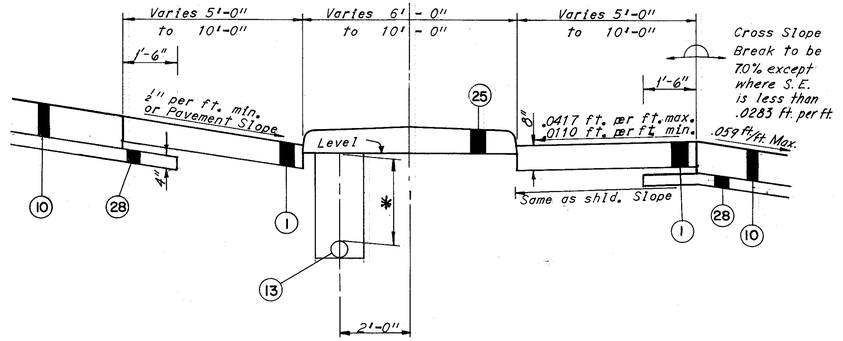
23
392

CUYAHOGA COUNTY
CUY. 80- 15.81

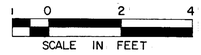


MEDIAN DETAIL – NORMAL
Scale 1/2" = 1'-0"





MEDIAN DETAIL – SUPERELEVATED
Scale 1/2" = 1'-0"



LEGEND

(1) Item 301 Bituminous Aggregate Base 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12

(10) Item 451 10" Reinforced Portland Cement Concrete Pavement

(13) Item 605 6" Pipe Underdrain, as per plan

(25) Item 612 Concrete Median

(28) Item 301 4" Bituminous Aggregate Base, 702.01 (85-100 or AC-20) or 702.09 RT-11 or RT-12.

NOTES:

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

For Details not shown see Std. Drawing MC-6 Dated 6-1-65.

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

48" cover from bottom of subbase to top of pipe	(cut)
28" cover from bottom of subbase to top of pipe	(fill)
Transition from shallow to deep	(unclassified)

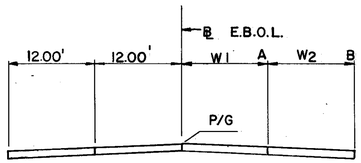
SCALE As Noted
MADE R.J.T. DATE 12-22-68
TRCD. W.W.S. DATE 3-19-69
CKD. _____ DATE _____

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

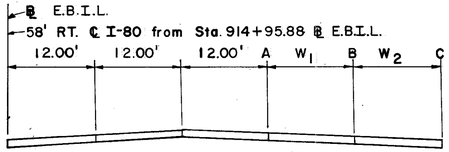
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

24
392

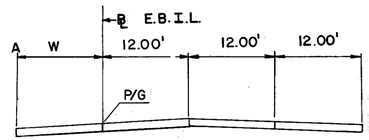
CUYAHOGA COUNTY
CUY. 80-1581



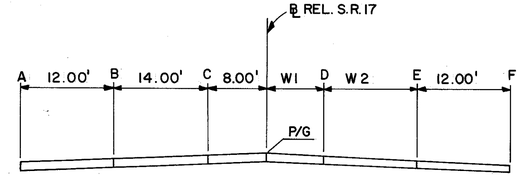
STA. E.B.O.L.	P.G. ELEV.	W1 FT.	A ELEV.	W2 FT.	B ELEV.
872+00	731.78	13.00	731.58	12.00	731.39
+25	731.98	12.88	731.79		731.60
+50	732.19	11.75	732.01		731.82
+75	732.39	11.12	732.22		732.03
873+00	732.60	10.50	732.44		732.25
+25	732.80	9.88	732.65		732.46
+50	733.01	9.25	732.87		732.68
+75	733.21	8.62	733.08		732.89
874+00	733.42	8.00	733.30		733.11
+25	733.61	7.38	733.49		733.30
+50	733.77	6.75	733.66		733.47
+75	733.89	6.12	733.79		733.60
875+00	733.99	5.50	733.90		733.71
+25	734.05	4.88	733.97		733.78
+50	734.08	4.25	734.01		733.82
+75	734.08	3.62	734.02		733.83
876+00	734.05	3.00	734.00		733.81
+25	733.99	2.38	733.95	12.00	733.76
+50	733.89	13.75	733.68	0.00	
+75	733.77	13.12	733.57		
877+00	733.61	12.50	733.41		
+25	733.42	11.88	733.23		
+50	733.20	11.25	733.02		
+75	732.94	10.62	732.77		
878+00	732.66	10.00	732.50		
+25	732.36	9.38	732.21		
+50	732.06	8.75	731.92		
+75	731.76	8.12	731.63		
879+00	731.46	7.50	731.34		
+25	731.16	6.88	731.05		
+50	730.86	6.25	730.76		
+75	730.56	5.62	730.47		
880+00	730.26	5.00	730.18		
+25	729.96	4.38	729.89		
+50	729.66	3.75	729.60		
+75	729.36	3.12	729.31		
881+00	729.06	2.50	729.02		
+25	728.76	1.88	728.73		
+50	728.46	1.25	728.44		
+75	728.16	0.62	728.15		
882+00	727.86	0.00	727.86	0.00	



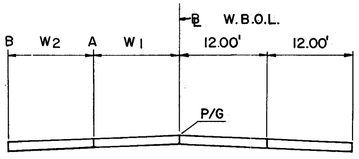
STA. E.B.I.L.	A ELEV.	W1 FT.	B ELEV.	W2 FT.	C ELEV.
913+24.56		12.00			
+25	692.47		692.74	11.99	693.01
+50	692.14		692.37	11.49	692.59
+75	691.75		691.95	10.99	692.13
914+00	691.30		691.45	10.49	691.59
+25	690.81		690.91	9.99	690.99
+50	690.34		690.39	9.49	690.43
+75	689.84		689.83	8.99	689.82
915+00	689.37		689.34	8.49	689.32
+25	689.00	12.00	688.95	7.99	688.92
STA. ℄ I-80					
915+00	688.66	12.00	688.59	7.62	688.54
+25	688.36		688.26	7.12	688.20
+50	688.06		687.84	6.62	687.87
+75	687.76		687.61	6.12	687.53
916+00	687.46		687.28	5.62	687.20
+25	687.16		686.97	5.12	686.89
+50	686.86		686.67	4.62	686.60
+75	686.56		686.37	4.12	586.31
917+00	686.26		686.07	3.62	686.01
+25	685.96		685.77	3.12	685.72
+50	685.66		685.47	2.62	685.43
+75	685.36	12.00	685.17	2.12	685.14
+80.83		14.00		0.00	See Detail A Sheet 37
918+00	685.06	13.62	684.85		
+25	684.76	13.12	684.55		
+5.	684.46	12.62	684.26		
+75	684.16	12.12	683.97		
+80.83		12.00		0.00	



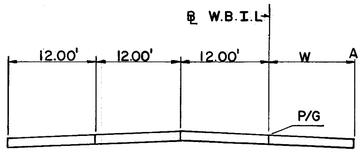
STA. E.B.I.L.	P.G. ELEV.	W FT.	A ELEV.
891+29.56		12.00	
+50	716.52	11.71	716.31
+75	716.22	11.35	716.02
892+00	716.93	10.99	715.73
+25	715.67	10.64	715.48
+50	715.41	10.28	715.23
+75	715.14	9.92	714.96
893+00	714.87	9.57	714.70
+25	714.60	9.21	714.43
+50	714.33	8.85	714.17
+75	714.06	8.50	713.91
894+00	713.79	8.14	713.64
+25	713.52	7.78	713.37
+50	713.29	7.42	713.12
+75	713.08	7.07	712.90
895+00	712.86	6.71	712.66
+25	712.64	6.35	712.43
+50	712.44	6.00	712.22
+75	712.26	5.64	712.03
896+00	712.10	5.28	711.87
+25	711.94	4.92	711.71
+50	711.79	4.57	711.57
+75	711.64	4.21	711.44
897+00	711.49	3.85	711.31
+25	711.32	3.50	711.16
+50	711.15	3.14	711.00
+75	710.96	2.78	710.83
898+00	710.71	2.43	710.60
+25	710.27	2.07	710.17
+50	709.80	1.71	709.72
+75	709.30	1.36	709.24
899+00	708.81	1.00	709.76
+25	708.35	0.64	708.32
+50	707.94	0.28	707.93
+69.56		0.00	



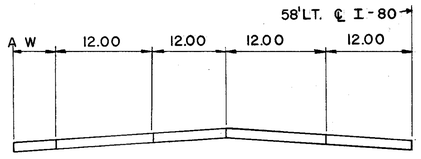
Rel. S.R. 17 Sta.	A Elev.	B Elev.	C Elev.	P.G. Elev.	W1 Ft.	D Elev.	W2 Ft.	E Elev.	F Elev.
17+00									
19+50	← See Contours →								
+75	747.56	747.36	747.14	747.02	8.00	746.91	14.00	746.68	746.50
20+00	747.15	746.96	746.74	746.62		746.50		746.28	746.09
+20.47									
+25	746.70	746.53	746.32	746.20		746.08		745.86	745.67
+50	746.11	745.99	745.84	745.75		745.63		745.41	745.22
+75	745.48	745.40	745.31	745.26		745.14		744.92	744.73
21+00	744.82	744.79	744.76	744.74		744.62		744.40	744.21
+14.07									
+25	744.17	744.18	744.19	744.20		744.08		743.86	743.67
+50	743.52	743.55	743.60	743.62		743.50		743.28	743.09
+75	742.83	742.89	742.96	743.00		742.88		742.66	742.47
22+00	742.12	742.20	742.30	742.36		742.24	14.00	742.02	741.83
+25	741.39	741.50	741.63	741.70		741.58	13.97	741.36	741.17
+50	740.66	740.79	740.95	741.04	8.00	740.92	13.85	740.70	740.51
+75	739.92	740.09	740.27	740.38	7.96	740.26	13.67	740.04	739.86
23+00	739.19	739.38	739.60	739.72	7.81	739.60	13.51	739.39	739.20
+01.27									



Sta. W.B.O.L.	P.G. Elev.	W1 Ft.	A. Elev.	W2 Ft.	B Elev.
885+37.36		12.00		8.00	
+50	723.66		723.47		723.35
+75	723.36		723.17		723.05
886+00	723.06		722.87		722.75
+25	722.76		722.57	8.00	722.45
+50	722.46		722.27	0.00	
+75	722.16		721.97		
887+00	721.86		721.67		
+25	721.56		721.37		
+50	721.26		721.07		
+75	720.94		720.76		
888+00	720.58		720.44		
+25	720.21	12.00	720.10	0.00	
892+18.24		12.00		0.00	
+25	712.79		712.36		
+40		12.00			
+50	712.33	10.80	711.94		
+75	711.96	7.80	711.68		
893+00	711.62	4.80	711.45		
+25	711.29	1.80	711.23		
+40		0.00		0.00	



STA. W.B.I.L.	P.G. ELEV.	W FT.	A ELEV.
890+77.91		12.00	
891+00	716.75	9.35	716.86
+25	716.40	6.35	716.50
+50	716.04	3.35	716.11
+75	715.68	0.35	715.69
+7791		0.00	



STA. ℄ I-80	W. FT..	A ELEV.
936+00	0.00	655.77
+25	0.50	655.31
+50	1.00	654.85
+75	1.50	654.40
937+00	2.00	653.58
+25	2.50	653.36
+50	3.00	652.84
+75	3.50	652.33
938+00	4.00	651.81
+25	4.50	651.28

SCALE NONE
MADE B.T.T. DATE 2-3-69
TRCD. K.W.S. DATE 2-3-69
CKD. S.P.V. DATE 2-11-69

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

PAVEMENT WIDTH & SUPERELEVATION TABLES

COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. -80-15.81

ITEM 203 EMBANKMENT USING GRANULAR MATERIAL AS DEFINED IN SECTION 203.02

Station From	Station To	EMBANKMENT Cu. Yds.
I-80		
860+00	864+00	323
897+00	897+00	800
911+00	915+00	450
915+00	920+00	491
920+00	925+00	413
925+00	930+00	461
930+00	932+00	278
Total		3216

ITEM 202 PAVEMENT REMOVED

STATION FROM	STATION TO	SIDE	WIDTH FT.	LENGTH FT.	AREA SQ. YDS.	REMARKS
SR-17						
4 + 30		Lt.	15	7.00	15.00	Driveway
5 + 21		Lt.	12	21.00	31.33	Driveway
5 + 41		Lt.	10	27.00	33.33	Driveway
5 + 88		Lt.	12	36.00	43.33	Driveway
6 + 09		Lt.	20	45.00	103.33	Driveway
6 + 56		Rt.	12	58.00	93.08	Driveway
6 + 90		Lt.	10	69.00	80.00	Driveway
7 + 27		Lt.	20	81.00	183.33	Driveway
8 + 25		Lt.	Varies	92.00	433.00	Brookpark Connection
9 + 40		Rt.	12	90.00	123.33	Driveway
5 + 45	6 + 05	Lt.	2	60.00	13.33	Taper
6 + 05	8 + 89	Lt. & Rt.	56	284.00	1,752.00	less 67 x 2 - 9
8 + 89	16 + 85	Lt. & Rt.	50	796.00	4,435.78	Incl. 61x 2 - 9
16 + 85	18 + 20	Lt. & Rt.	52	135.00	708.00	Tuxedo Intersection
18 + 20	27 + 28.79	Lt. & Rt.	50	908.79	5,048.80	
TUXEDO AVENUE						
5 + 12		Lt.	12	12	19.33	Driveway
5 + 71		Rt.	24	30	83.33	Driveway
6 + 40		Lt.	13	17	27.89	Driveway
4 + 00	8 + 82	Lt. & Rt.	24	482	1,357.00	Incl. Turnout at Exist. SR-17
9 + 38	11 + 80	Lt. & Rt.	Varies	242	1,333.33	Incl. Turnout at North St. SR-17
11 + 00		Lt.	16	130	234.44	Driveway
13 + 00		Lt.	24	105	496.56	
13 + 20		Rt.	9	12	14.00	Driveway
13 + 68		Rt.	9	12	14.00	Driveway
13 + 95		Lt.	60	60	311.55	Driveway
14 + 15		Rt.	10	12	13.33	Driveway
14 + 71		Rt.	9	12	14.67	Driveway
15 + 16		Rt.	8	12	14.67	Driveway
15 + 58		Lt.	24	23	84.44	Driveway
15 + 62		Rt.	10	12	21.33	Driveway
16 + 50		Rt.	10	12	16.00	Driveway
NORTH STREET						
12 + 35		Rt.	Varies	110	196.67	Driveway
13 + 45		Lt.	Varies	5.3	11.01	Driveway
13 + 78		Rt.	Varies	Varies	16.06	Driveway
TOTAL					17,375.58	

ITEM 203 PROOF ROLLING

DESCRIPTION	AREA SQ. YDS.
Under Item 451 10" RPCCP	103,245.6
Under Item 451 9" RPCCP	22,597
Under Item 301 Paved Shoulder: 4,009.84 x 3 x 12/3	48,118.1
Under Item 301 Paved Shoulder: 6,478.89 x 3 x 12/8	29,155.0
Under Item 301 Paved Shoulder: 344.25 x 3 x 12/9	1,377.0
Under Item 609 Concrete Curb Type 6	307.9
Under Item 612 Paved Median,	
	7,900.2
Under Item 622 Concrete Barrier	1,608.1
Deduct Area Under Item 310 Extra Depth Subbase 26,003.41 x 12/14 x 3	-66,865.9
TOTAL	153,443.0
Proof Rolling = 153,443.0 ÷ 3000	51.1 Hours

ITEM 202 SIDEWALK REMOVED

STATION FROM	STATION TO	SIDE	WIDTH FT.	LENGTH FT.	AREA SQ. FT.	REMARKS
TUXEDO AVENUE						
4 + 00	8 + 75	Lt. & Rt.	5	960	4,800.00	Sandstone Walk
9 + 50	12+53 North	Rt.	5	315	1,575.00	Sandstone Walk
9 + 50	16 + 30	Lt.	5	165	3,825.00	
12+15 North	12 + 25	Rt.	5	70	350.00	
12+50	15 + 80	Lt.	5	157	- 785.00	For Drives
NORTH STREET						
12 + 35		Rt.	Varies	Varies	580.00	Walk and Patio
12 + 35	13+64	Rt.	5	129	645.00	
TOTAL					10,990.00	

ITEM 202 CURB REMOVED

STATION FROM	STATION TO	SIDE	LENGTH LIN. FT.	REMARKS
SR-17				
7 + 47	7 + 86	℄	78	
8 + 61	9 + 10	℄	98	
9 + 71	16 + 85	℄	1,428	
18 + 20	27 + 28.79	℄	1,820	
TOTAL			3,424	

ITEM 202 STONE CURB REMOVED

STATION FROM	STATION TO	SIDE	LENGTH LIN. FT.	REMARKS
SR-17				
5 + 45	6 + 05	Lt.	60	
6 + 05	8 + 89	Lt. & Rt.	737	Incl. Brookpark Rd. Connection (297')
3 + 20	6 + 05	Rt.	185	Scaled
TUXEDO AVENUE				
4 + 00	8 + 82	Lt. & Rt.	1,026	Incl. Turnout at SR-17
9 + 38	16 + 32.38	Lt. & Rt.	1,658	Incl. Turnout Traffic Island at SR-17 and at North St.
16 + 32.38	17 + 22.38	Lt.	90	
16 + 32.38	16 + 62.38	Rt.	30	
TOTAL			3,786	

ITEM 202 PAVED MEDIAN REMOVED

STATION FROM	STATION TO	SIDE	WIDTH FT.	LENGTH FT.	AREA SQ. YDS.	REMARKS
SR-17						
7 + 47	7 + 86	℄	2	39.00	8.67	
8 + 61	9 + 10	℄	2	49.00	10.89	
9 + 71	16 + 85	℄	2	714.00	158.67	
18 + 20	27 + 28.79	℄	2	903.79	200.84	
TOTAL					379.07	

ITEM 203 SUBGRADE COMPACTION

	AREA Sq. Yds.
Under Item 451 10" RPCCP	109,466.4
" " " 9" RPCCP	19,109.8
" " " 9" RPCCP, as per plan	1,913.0
" " 301 Paved Shoulder: 4,009.84 x 3 x 12/3	48,118.1
" " 301 Paved Shoulder: 6,478.89x3x12/8 + 82.04x3x12/7	29,576.9
" " " Paved Shoulder: 344.25 x 3 x 12/9	1,377.0
" " 304 Subbase (or 703.10 Screenings)	598.6
" " 609 Concrete Curb Types 6, 7, 8 and 6 Modified	342.3
" " 611 Approach Slabs	961.2
" " 612 6" Paved Median; Excl. Appr. Slabs & SR-17	5,114.3
" " 612 4" Paved Median	2.785.9
" " 622 Concrete Barrier	1,608.1
Deduct Area under Item 310 Extra Depth Subbase 26,003.41x12/14x3	- 66,865.9

I-80				
920+51.92	931+50	Lt. Rt.	4x1098.08x1.5 ÷ 9	732.1
OBE-JN				
93+74	100+00	Rt.	626.00x1.5 ÷ 9	104.3
WESTBOUND OUTER LANES				
876+00	880+00	Lt.	400.00x1.5 ÷ 9	66.7
892+18.24	892+40	Lt.	21.76x1.5 ÷ 9	3.6
893+50	919+73	Lt.	2623.00x1.5 ÷ 9	437.2
EASTBOUND OUTER LANES				
876+00	880+00	Rt.	400.00x1.5 ÷ 9	66.7
892+50	921+39.61	Rt.	2889.61x1.5 ÷ 9	481.6
WESTBOUND INNER LANES				
893+50	920+27.03	Rt.	2667.03x1.5 ÷ 9	444.5
EASTBOUND INNER LANES				
893+50	920+95.64	Lt.	2745.64x1.5 ÷ 9	457.6
RAMP E-G				
78+64	82+00	Rt.	336.00x1.5 ÷ 9	56.0
33+57.35 Granger	82+00	Lt.	135.13x1.5 ÷ 9	22.5
82+00	83+50	Lt. Rt.	2 x 150.00x1.5 ÷ 9	50.0
SR-17				
19+18.52	28+20.29	Lt. Rt.	2 x 901.77x1.5 ÷ 9	300.6
TOTAL				157,329.1
				* Deduct 16,199.7
				USE 141,129

ITEM 203 ROADWAY EXCAVATION AND EMBANKMENT

Station From	Station To	EXCAVATION CU. YDS.	EMBANKMENT CU. YDS.
MAINLINE I-80			
859+00	875+00	300,769	25,860
875+00	890+00	310,350	42,407
890+00	905+00	158,598	605,255
905+00	920+00	497,316	113,629
920+00	935+00	169,179	251,204
935+00	938+25	11,719	14,319
RAMP G-E			
58+00	70+00	63,104	3,244
RAMP E-G			
79+00	85+00	6,876	42,106
GRANGER ROAD			
6+05	28+20.29	9,133	96,803
TUXEDO ROAD			
4+00	15+86.78	978	526
ADD FOR EXTRA DEPTH SUBBASE		28,579	0
DEDUCT GRANULAR MATERIAL		-0	-3,216
TOTAL		1,557,243	1,192,137

* See "QUANTITY ADJUSTMENTS" Note on Sheet 28

Rev. 10-16-74

SCALE No Scale
MADE AHS DATE 7/9/70
TRCD WLD DATE 9/3/70
CKD GL DATE 7/16/70
MB 9-6-74

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

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 7-9-70
CHECKED BY G.L. DATE 7-16-70

COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

26/392

CUYAHOGA COUNTY
CUY.-80-15.81

ITEM 301 BITUMINOUS AGGREGATE BASE (PAVED BERMS)

Station From	Station To	Side	Length Ft.	Width Ft.	Depth In.	Volume Cu. Yds.
I-80						
860+00.00	890+77.91	℄	3077.91	22.0	3	626.98
860+20.00	862+95.00	℄	2 x 275.00	Varies	3	-7.22
864+10.00	867+25.00	℄	2 x 315.00	Varies	3	-8.70
890+77.91	891+36.99	℄	59.08	25.54	3	13.97
860+00.00	891+36.99	Lt.f Rt.	3136.99	20.0	8	1549.13
918+80.83	920+51.92	Rt.	171.09	20.0	8	84.49
920+51.92	938+25.00	Lt.f Rt.	1773.08	40.0	8	1751.19
EASTBOUND OUTER LANES						
872+00.00	881+20.00	Rt.	920.00	8.0	8	181.73
881+20.00	882+00.00	Rt.	80.00	9.0	8	17.78
882+00.00	894+13.32	Rt.	1213.20	10.0	8	299.56
894+13.32	896+13.32	Rt.	½(200.00)+½(200.00)(2869.79÷2864.79)	10.0	8	49.41
896+13.32	911+68.40	Rt.	1555.08 (2869.79÷2864.79)	10.0	8	384.64
911+68.40	913+68.40	Rt.	½(200.00)+½(200.00)(2869.79÷2864.79)	10.0	8	49.41
913+68.40	919+68.52	Rt.	600.10	10.0	8	148.17
872+00.00	894+13.32	Lt.	2213.32	5.0	8	273.25
894+13.32	896+13.32	Lt.	½(200.00)+½(200.00)(2835.29÷2864.79)	5.0	8	24.56
896+13.32	902+88.00	Lt.	674.68 (2835.29÷2864.79)	5.0	8	82.44
EASTBOUND INNER LANES						
891+36.99	894+21.58	Rt.	284.59	10.0	8	70.27
894+21.58	896+21.58	Rt.	½(200.00)+½(200.00)(2905.79÷2864.79)	10.0	8	49.73
896+21.58	902+67.14	Rt.	645.56(2905.79÷2864.79)	10.0	8	161.78
891+36.99	899+69.56	Lt.	484.59 + 347.98(2857.54÷2864.79)	10.0	8	205.36
899+69.56	911+19.38	Lt.	1149.82	10.0	8	283.91
911+19.38	913+19.38	Lt.	½(200.00)+½(200.00)(2859.79÷2864.79)	10.0	8	49.33
913+19.38	919+20.10	Lt.	604.72	10.0	3	149.31
RAMP G-E						
58+71.09	59+71.09	Lt.	100.00(733.70÷716.20)	3.0	9	8.52
59+71.09	65+23.68	Lt.	352.59(733.70÷716.20)+½(200.00)			
			+½(200.00)(733.70÷716.20)	3.0	9	46.98
65+23.68	71+00.00	Lt.	576.32-(1'x 100.00 x 1½ Taper)	3.0	9	46.65
58+71.09	59+71.09	Rt.	100.00(714.70÷716.20)	3.0	9	8.31
59+71.09	65+23.68	Rt.	352.59(714.70÷716.20)+½(200.00)			
			+½(200.00)(714.70÷716.20)	3.0	9	46.20
65+23.68	70+00.00	Rt.	476.32	3.0	9	36.69
70+00.00	72+00.00	Rt.	200.00	5.5	9	30.54
RAMP E-G						
78+64.00	79+00.00	Rt.	36.00	3.0	9	3.00
79+00.00	82+00.00	Rt.	300.00(375.60÷358.10)	3.0	9	26.25
82+00.00	83+00.00	Rt.	100.00	3.0	9	8.34
83+00.00	85+38.28	Rt.	238.28	3.0	9	19.86
33+57.35 QR	79+94.05	Lt.	135.13	3.0	9	11.25
79+94.05	82+00.00	Lt.	205.95(348.60÷358.10)	3.0	9	16.71
82+00.00	82+25.00	Lt.	25.00	1.5 Av.	9	1.04
LANE OBE-JN						
100+00.00	97+83.88	Rt.	216.12(1914.86÷1909.86)	10.0	8	53.36
97+83.88	95+33.88	Rt.	½(250.00)+½(250.00(1914.86÷1909.86)	10.0	8	61.68
95+33.88	91+73.69	Rt.	40.19 + 320.00(11454.16÷11459.16)	10.0	8	88.91
100+00.00	97+83.88	Lt.	216.12(1883.36÷1909.86)	5.0	8	26.29
97+83.88	95+33.88	Lt.	½(250.00)+½(250.00)(1883.36÷1909.86)	5.0	8	30.64
95+33.88	91+73.69	Lt.	40.19 + 320.00(11485.66÷11459.16)	5.0	8	44.56
			Cont'd next column			

ITEM 301 BITUMINOUS AGGREGATE BASE (CONT'D) (PAVED BERMS)

Station From	Station To	Side	Length Ft.	Width Ft.	Depth In.	Volume Cu. Yds.
LANE JN-OBE						
60+00.00	60+16.61	Lt.	16.61 (742.70÷716.20)	5.0	8	2.13
60+16.61	64+16.61	Lt	½(400.00)+½(400.00)(742.70÷716.20)	5.0	8	50.29
64+16.61	66+10.00	Lt.	193.39	5.0	8	23.87
66+10.00	69+50.00	Lt.	340.00 (22944.83÷22918.32)	5.0	8	42.03
69+50.00	72+00.00	Lt.	250.00	5.0	8	30.85
60+00.00	60+16.61	Rt.	16.61(711.20÷716.20)	10.0	8	4.08
60+16.61	64+16.61	Rt.	½(400.00)+½(400.00)(711.20÷716.20)	10.0	8	98.43
64+16.61	66+10.00	Rt.	193.39	10.0	8	47.76
66+10.00	69+40.00	Rt.	330.00 (22913.32÷22918.32)	10.0	8	81.47
69+40.00	72+00.00	Rt.	260.00	15.0	8	96.29
WESTBOUND OUTER LANES						
868+60.00	885=37.36	Lt.	1677.36	10.0	8	414.16
85+38.28	89+00.00	Lt.	361.72	4.0	8	35.72
~~92+00.00~~	~~92+40.00~~	~~Lt.~~	~~340.00~~	~~6.0~~	~~8~~	~~67.76~~
~~92+40.00~~	~~93+40.00~~	~~Lt.~~	~~100.00~~	~~9.0~~	~~8~~	~~22.21~~
893+40.00	906+30.08	Lt.	1290.08 (3901.53÷3906.53)	10.0	8	318.13
906+30.08	919+17.01	Lt.	1342.92 (7634.44÷7639.44)	10.0	8	331.36
868+60.00	890+01.63	Rt.	2141.63	5.0	8	264.40
890+01.63	893+18.00	Rt.	316.37 (3934.53÷3906.53)	7.5	8	59.01
893+18.00	906+30.08	Rt.	1312.08 (3934.53÷3906.53)	10.0	8	326.32
906+30.08	911+16.84	Rt.	486.76 (7668.44÷7639.44)	10.0	8	120.64
WESTBOUND INNER LANES						
890+77.91	891+36.99	Rt.	59.08	10.0	8	14.59
891+36.99	913+78.26	Rt.	2241.27 (3886.53÷3981.53)	10.0	8	554.11
913+78.26	920+27.03	Rt.	648.77	10.0	8	160.21
891+36.99	891+77.91	Lt.	40.42	10.0	8	10.11
891+77.91	911+67.12	Lt.	1918.21 (3299.53÷3881.53)	10.0	8	402.62
S.R. 17						
19+34.20	28+20.29	Lt.f Rt.	886.09	4.0	7½	82.04
TOTAL						10,766.25
						* Deduct 1403.88
						USE 9362.37

ITEM 301 4" BITUMINOUS AGGREGATE BASE (UNDER PAVEMENT)

Station From	Station To	Side	Length x Width Lin. Ft. x Lin. Ft.	Area Sq. Yds.	Calculations	Remarks
I-80						
860+00.00	891+36.99	Lt.f Rt.	3136.99 x 102.0	35,552.55		
920+51.92	938+25.00	Lt.f Rt.	1773.08 x 102.0	20,094.91		
LANE JN-OBE						
60+00.00	60+16.61	Lt.f Rt.	16.90 x 27.0	50.71	L=16.61(728.8÷716.2)	
60+16.61	64+16.61	Lt.f Rt.	403.35 x 27.0	1210.05	L=(400.0+400.0 x 728.20÷716.20)÷2	
64+16.61	66+10.00	Lt.f Rt.	193.39 x 27.0	580.17		
66+10.00	69+50.00	Lt.f Rt.	340.34 x 27.0	1021.02	L=340.0(22930.32÷ 22918.32)	
69+50.00	72+00.00	Lt.f Rt.	250.00 x 27.0	750.00		
LANE OBE-JN						
100+00.00	97+83.88	Lt.f Rt.	214.76 x 27.0	644.28	L=216.12x1897.86÷ 1909.86	
97+83.88	95+33.88	Lt.f Rt.	249.21 x 27.0	747.63	L=(250.0+250.0 x 1897.86÷1909.86)÷2	
95+33.88	94+93.69	Lt.f Rt.	40.19 x 27.0	120.57		
94+93.69	91+73.69	Lt.f Rt.	320.32 x 27.0	960.96	L=320.0 x 11471.16÷ 11459.16	Cont'd next column

ITEM 301 4" BITUMINOUS AGGREGATE BASE (CONT'D) (UNDER PAVEMENT)

Station From	Station To	Side	Length x Width Lin. Ft. x Lin. Ft.	Area Sq. Yds.	Calculations	Remarks
EASTBOUND OUTER LANES						
872+00.00	882+00.00	Lt.f Rt.	1000.00 x 25.5	2833.33		
882+00.00	894+13.32	Lt.f Rt.	1213.32 x 27.0	3639.96		
894+13.32	896+13.32	Lt.f Rt.	199.47 x 27.0	598.41	L=(200.0+200.0 x 2849.54÷2864.79)÷2	Up to ℄ of Raised Median
896+13.32	902+88.00	Lt.f Rt.	671.09 x 27.0	2013.27	L=674.08(2849.54÷ 2864.79)	
902+88.00	907+73.00	Lt.f Rt.	479.24 x 76.0	4042.92	L=485.02(2830.77÷ 2864.79)	W=(79 + 73)÷2
907+73.00	919+68.52	Lt.f Rt.	1189.38 x 62.0	8193.51	L=678.52+517.0 (2830.77÷2864.79)	W=(73 + 51)÷2
EASTBOUND INNER LANES						
891+36.99	894+21.58	Lt.f Rt.	284.59 x 48.92	1546.90	W=(51+46.83)÷2	
894+21.58	896+21.58	Lt.f Rt.	200.74 x 45.16	1007.27	W=(46.83+43.5)÷2	
896+21.58	899+69.50	Lt.f Rt.	349.92 x 41.25	1603.80	W=(43.5+39.0)÷2	
899+69.50	902+67.14	Lt.f Rt.	299.01 x 39.0	1295.71	W=39.0	
WESTBOUND OUTER LANES						
868+60.00	885+37.36	Lt.f Rt.	1677.36 x 27.0	5032.08		
885+37.36	890+25.64	Lt.f Rt.	488.28 x 25.5	1383.46		
890+25.64	892+40.00	Lt.f Rt.	214.36 x 25.5	607.35		
892+40.00	893+40.00	Lt.f Rt.	100.32 x 25.5	284.24		
893+40.00	895+50.00	Lt.f Rt.	208.48 x 27.0	625.44	L=210(3887.53÷ 3906.53)	
895+50.00	906+30.08	Lt.f Rt.	1088.40 x 27.0	3265.20	L=1080.08(3918.53÷ 3906.53)	
906+30.08	911+16.84	Lt.f Rt.	487.49 x 27.0	1462.47	L=486.76(7651.44÷ 7639.44)	
911+16.84	912+16.84	Lt.f Rt.	100.25 x 90.0	1002.50	L=100.00(7658.19÷ 7639.44)	W=(93 + 87)÷2
912+16.84	913+35.50	Lt.f Rt.	118.95 x 82.0	1083.77	L=118.66(7658.19÷ 7639.44)	W=(87 + 77)÷2
913+35.50	919+73.00	Lt.f Rt.	637.50 x 64.0	4533.33	W=(77 + 51)÷2	
RAMP G-E						
57+71.09	58+71.09	Lt.f Rt.	101.10 x 19.0	213.43	W=(20 +18)÷2	
58+71.09	59+71.09	Lt.f Rt.	101.10 x 19.0	213.43		
59+71.09	63+23.68	Lt.f Rt.	356.54 x 19.0	752.70		
63+23.68	65+23.68	Lt.f Rt.	201.10 x 19.0	424.54		
65+23.68	70+00.00	Lt.f Rt.	476.32 x 19.0	1005.56		
70+00.00	71+00.00	Lt.f Rt.	100.20 x 18.0	200.40		
71+00.00	72+00.00	Lt.f Rt.	238.28 x 16.5	183.10		
RAMP E-G						
33+57.35	79+94.05	Lt.	1750.50	194.50	1530'+147' x 1.5'	From Item 451
78+75.00	82+00.00	Lt.f Rt.	328.35 x 27.0	985.05		
82+00.00	85+38.28	Lt.f Rt.	338.28 x 27.0	1014.84		
WESTBOUND INNER LANES						
891+36.99	891+77.91	Lt.f Rt.	40.92 x 41.5	188.69	W=(44 + 39)÷2	
891+77.91	893+18.00	Lt.f Rt.	139.44 x 39.0	604.24	L=140.09(3863.51÷ 3881.53)	
893+18.00	895+50.00	Lt.f Rt.	239.92 x 39.0	1039.65	L=232.0(3863.51÷ 3881.53)	
895+50.00	911+67.12	Lt.f Rt.	1609.61 x 39.0	6974.98	L=1617.12(3863.51÷ 3881.53)	
TOTAL					121,783.48 x 4 ÷ 36 = 13,531.50	
					* Deduct 1235.82	
					USE 12,295.68	

ITEM 301 3" BITUMINOUS AGGREGATE BASE (UNDER PAVEMENT)

Station From	Station To	Side	Length x Width Lin. Ft. x Lin. Ft.	Area Sq. Yds.	Calculations	Remarks
EASTBOUND OUTER LANES						
872+00.00	881+20.00	Rt.	920 x 15.0	1533.33	W=(26.5 + 3.5)÷2	
881+20.00	882+00.00	Rt.	80 x 3.50	31.11		
WESTBOUND OUTER LANES						
885+37.36	890+26.23	Lt.	488.87 x 29.47	1600.78	W=(40.5 + 18.44)÷2	
890+26.23	892+18.24	Lt.	192.01 x 15.97	340.71	W=(18.44 + 13.5)÷2	
892+18.24	892+40.00	Lt.	21.76 x 13.50	32.64		
892+40.00	893+40.00	Lt.	100 x 8.50	94.44	W=(13.5 + 3.5)÷2	
885+37.36	889+00.00	Lt.	362.64 x 4.0	161.17	W=(8.0 + 0.0)÷2	Pave. Trans.
TOTAL				3794.18 x 3 ÷ 36 = 316.18		

ITEM 301 RECAP

FROM PAVED BERM CALCULATIONS	=	9,362.37 Cu. Yds.
FROM UNDER PAVEMENT CALCULATIONS, 4"	=	12,295.68 Cu. Yds.
FROM UNDER PAVEMENT CALCULATIONS, 3"	=	316.18 Cu. Yds.
TOTAL	=	21,974.23 Cu. Yds.
USE		21,974 Cu. Yds.

QUANTITY CALCULATIONS

MADE BY A.H.S. DATE 7-17-69

CHECKED BY G.L. DATE 7-20-70

SCALE No Scale
MADE A.H.S. DATE 7/9/70
TRCD. G.L. DATE 7/14/70
CKD. G.L. DATE 7/14/70

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

* See "QUANTITY ADJUSTMENTS" Note on Sheet 28.

Rev. 10-16-74

COMPUTATIONS AND SUB-SUMMARIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY.-80-15.81

ITEM 622 CONCRETE BARRIER, TYPE B

Station From	Station To	LENGTH Lin. Ft.	REMARKS
892+45	893+25	80.00	End Terminal
860+00	860+40	40.00	Normal Section
860+40	861+00	60.00	Taper Section
866+22	866+82	60.00	" "
866+82	892+45	2563.00	Normal Section
913+40 Lt.℄	913+85 Lt.℄	45.00	At Bridge Pier
913+49 Rt.℄	913+93.50 Rt.℄	44.50	" " "
SUBTOTAL		2892.50	
Deduct for Median Inlets		- 100.00	(20×5)
Deduct for Cantilever Signs		- 20.00	(10×2)
TOTAL		2772.50	

ITEM 622 CONCRETE BARRIER, TYPE B, MODIFIED, AS PER PLAN

Station From	Station To	LENGTH Lin. Ft.	REMARKS
I-80 MEDIAN			
861+00	866+22	522.00	At Bridge Piers
TOTAL		522.00	

ITEM 622 CONCRETE BARRIER, TYPE D, MODIFIED, AS PER PLAN

Station From	Station To	LENGTH Lin. Ft.	REMARKS
I-80 MEDIAN			
913+29	913+49 Rt.℄	20.00	Transition
913+85	914+05 Lt.℄	20.00	"
TOTAL		40.00	

ITEM 304 AGGREGATE BASE

Station From	Station To	Side	Length Ft.	Width Ft.	Average Depth in.	Volume Cu. Yds.
I-80						
860+00.00	891+36.99	℄	3136.99	22.0	6.5	1384.53
860+20.00	862+95.00	℄	2 x 275.00	Varies	6.5	15.64
864+10.00	867+25.00	℄	2 x 315.00	Varies	6.5	18.85
TOTAL						1419.02

ITEM 304 AGGREGATE BASE (OR 703.10 SCREENINGS)

STATION FROM	STATION TO	SIDE	LENGTH FT.	WIDTH FT.	DEPTH IN.	VOLUME CU. YDS.
TUXEDO AVENUE						
15 + 86.78	16 + 76.78	Lt.	90.00	½(3 +0)	6	2.50
15 + 86.78	16 + 16.78	Rt.	30.00	½(3 +0)	6	.83
TOTAL						3.33

ITEM 310 SUBBASE (EXTRA DEPTH)

Station From	Station To	Side	Length Ft.	End Area Sq. Ft.	Volume Cu Yds	Remarks
I-80						
868+00.00	876+00.00	Lt/Rt	800	148' x 14/12	5116.05	
880+00.00	890+00.00	Lt/Rt	1000	148' x 14/12	6395.06	
931+00.00	936+00.00	Lt/Rt	450	136' x 14/12	2644.44	
936+00.00	938+25.00	Lt/Rt	225	½(136 + 140.5) x 14/12	1344.09	
868+00.00	876+00.00	Lt/Rt	800	(3x5/12) + (11.5 x 4/12)	150.61	74' Lt Rt
880+00.00	890+00.00	Lt/Rt	1000	(3x5/12) + (11.5 x 4/12)	188.26	of ℄ I-80
931+50.00	938+25.00	Lt/Rt	4x675	8.5 x 4/12	283.33	Four Sides
WESTBOUND OUTER LANES						
868+00.00	876+00.00	Lt/Rt	800	42 x 14/12	1451.85	
880+00.00	885+37.36	Lt/Rt	537.36	42 x 14/12	975.21	
885+37.36	890+01.63	Lt/Rt	464.27	½(79 + 58) x 14/12	1374.17	
890+01.63	892+40.00	Lt/Rt	239.37	½(58 + 49.8) x 14/12	557.49	
892+40.00	893+50.00	Lt/Rt	110	½(49.8 + 47.0) x 14/12	230.01	
868+00.00	876+00.00	Lt/Rt	800	(3.5+8.5)4/12 +((5+4)/12)3	185.19	
880+00.00	885+37.36	Lt/Rt	537.36	(3.5+8.5)4/12 +((5+4)/12)3	124.39	
885+37.36	890+01.63	Lt/Rt	464.27	(3.5+6.5)4/12 +((5+4)/12)3	96.00	
890+01.63	892+40.00	Lt/Rt	239.37	6.05	53.64	Transition
892+40.00	893+50.00	Lt/Rt	110.00	7.22	29.41	
EASTBOUND OUTER LANES						
872+00.00	876+00.00	Lt/Rt	400	½(65 + 53) x 4/12	291.35	
880+00.00	881+20.00	Lt/Rt	120	½(45 + 42) x 4/12	64.44	
881+20.00	892+50.00	Lt/Rt	1130	42 x 4/12	585.92	
872+00.00	876+00.00	Lt/Rt	400	(6.5+3.5)4/12 +((5+4)/12)3	82.71	
880+00.00	881+20.00	Lt/Rt	120	(6.5+3.5)4/12 +((5 +4)/12)3	24.81	
881+20.00	882+00.00	Lt/Rt	80	5.91	17.51	Transition
882+00.00	892+50.00	Lt/Rt	1050	(8.5+3.5)4/12 +((5+4)/12)3	243.06	
WESTBOUND INNER LANES						
890+00.00	891+36.99	Lt/Rt	136.99	74' x 14/12	438.03	
891+36.99	891+70.91	Lt/Rt	33.92	½(64 + 59) x 14/12	90.14	
890+70.91	893+50.00	Lt/Rt	179.09	59 x 14/12	456.57	
890+00.00	893+50.00	Lt/Rt	350	(8.5 + 8.5)4/12 +((5+4)/12)3	102.62	
EASTBOUND INNER LANES						
890+00.00	891+36.99	Lt/Rt	136.99	74' x 4/12	125.15	
891+36.99	893+50.00	Lt/Rt	213.01	½(71 + 67.85) x 14/12	639.00	
890+00.00	893+50.00	Lt/Rt	350	(8.5+8.5)4/12 +((5+4)/12)3	102.62	
LANE JN-OBE						
68+00.00	69+40.00	Lt/Rt	140	½(44 + 42) x 14/12	260.12	
69+40.00	72+00.00	Lt/Rt	260	½(52 + 52) x 14/12	584.20	
68+00.00	69+40.00	Lt/Rt	140	(8.5+3.5)4/12 +½(5+3)((5+4)/12)	36.30	Transition
69+40.00	72+00.00	Lt/Rt	260	(8.5+3.5)4/12 +((5+4)/12)	45.74	
RAMP G-E						
69+00.00	72+00.00	Lt/Rt	300	20.67 x 14/12	267.94	
69+00.00	70+00.00	Lt/Rt	300	(1.5+0.17) 4/12	6.19	
RAMP E-G						
83+50.00	85+00.00	Lt/Rt	150	½(22 + 25) 14/12	152.31	
TOTAL					25,815.93	

ITEM 310 SUBBASE GRADING 'A'

STATION From	STATION To	SIDE	LENGTH Ft.	END AREA Sq. Ft.	VOLUME Cu.Yds.
S.R. 17					
5 + 45	6 + 05	Lt.	60.00	6.125 x 0.5	6.81
6 + 05	9 + 27.06	Lt.&Rt.	322.06	63.125 x 0.5	376.48
6 + 05	7 + 00	Rt.	95.00	(0 + 16.215) x 0.5 x 0.5	14.26
7 + 00	9 + 27.06	Rt.	227.05	(16.215 + 32.625) x 0.5 x 0.5	102.68
9 + 27.06	10 + 27.06	Lt.&Rt.	100.00	(68.625 + 63.125) x 0.5 x 0.5	121.99
9 + 61	10 + 27.06	Rt.	66.06	3.125 x 0.5	3.82
10 + 27.06	12 + 03.13	Lt.&Rt.	176.07	66.25 x 0.5	216.01
17 + 36.79	19 + 34.50	Lt.&Rt.	200.00	78.0 x 0.5	288.89
at Tuxedo Avenue Intersection			Varies	Varies	42.13
19 + 34.50	22 + 05.72	Lt.&Rt.	271.12	73.25 x 0.5	367.77
22 + 05.72	28 + 20.29	Lt.&Rt.	614.57	(73.25 + 57.25) x 0.5 x 0.5	742.61
I-80					
860 + 00	891 + 36.99	℄	3136.99	23.00 x 0.460 Ave.	1229.24
891 + 36.99	891 + 96.07	Lt.	59.08	3.50 x 0.460 Ave.	3.52
TOTAL					3516.21

ITEM 310 SUBBASE 703.08 or 703.10,

STATION From	STATION To	SIDE	LENGTH Ft.	END AREA Sq. Ft.	VOLUME Cu.Yds.
TUXEDO AVENUE					
4 + 00	6 + 75.32		275.32	(3 x 12) ÷ 12	30.59
12 + 30.61	15 + 86.78		356.17	29 x 0.25	95.64
TOTAL					126.23

ITEM 310 SUBBASE

Station From	Station To	Side	Distance Lin. Ft.	End Area Sq. Ft.	Volume Cu. Yds.
S.R. 17					
19+28.50	28+20.29	Rt Lt	891.79	1.0312	34.04
TUXEDO AVENUE					
15+86.78	16+76.78	Lt.	90.00	(3+0)0.5 x 0.5	2.50
15+86.78	16+16.78	Rt.	30.00	(3+0)0.5 x 0.5	0.83
BROOKPARK TURN-AROUND					
	15+94	Rt.	Thickness = 6"	Area = 1,468.75	27.19
SUB-TOTAL					64.56
SUB-TOTAL (EXTRA DEPTH)					25,815.93
TOTAL					25,880.49

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7-1-70
CHECKED BY G.C. DATE 3-3-71

SCALE No Scale
MADE BWS DATE 7/9/70
TRCD. HLD DATE 7/14/70
CKD. GC DATE 7/16/70
11-8 8-6-74

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

COMPUTATIONS AND SUB-SUMMARIES

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CUY.– 80–15.81

QUANTITY ADJUSTMENTS

Subsequent to the completion of the plans, it was determined that the Westbound Outer Lanes (Lane OBE-JN), Sta. 100+00 to Sta. 91+73.69 = Sta. 868+60 to Sta. 885+37.36, and the Eastbound Outer Lanes (Lane JN-OBE) Sta. 60+00 to Sta. 72+00 would not be paved under this project. Deductions in the quantities for 10" 451 Reinforced Portland Cement Concrete Pavement, 4" 301 under the 451, 8" 301 Paved Shoulders and 203 Subgrade Compaction are shown on the Computation Sheets. These quantities and the quantities of other affected items will be adjusted at the time of construction. Plan details have not been changed. It is the intent that the earthwork be completed to the final lines shown on the cross sections.

ITEM 404 ASPHALT CONCRETE (70-85 or AC-20)

STATION FROM	STATION TO	SIDE	LENGTH FT.	WIDTH FT.	DEPTH IN.	VOLUME CU. YDS.	
TUXEDO AVENUE							
15 + 86.78	16 + 76.78	Lt.	90.00	½ (3 + 0)	3	1.25	
15 + 86.78	16 + 16.78	Rt.	30.00	½ (3 + 0)	3	0.42	
BROOKPARK	TURN-AROUND						
	15+94	Rt.	Area = 1468.75		2	9.07	Turn-Out Incl.
TOTAL						10.74	

ITEM 408 BITUMINOUS PRIME COAT

AREA OF TUXEDO AVENUE = 20.00 Sq. Yds.
TOTAL AREA = 20.00 Sq. Yds.

ITEM 408: 20.00 Sq. Yds. x 0.4 Gal./Sq. Yd. = 8.00 Gal.

ITEM 451 10" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT

STATION FROM	STATION TO	* SIDE	LENGTH x WIDTH Sq. Ft.	AREA Sq. Yds.	REMARKS
I-80					
860 + 00	861 + 94.38	Rt.	191.24 x 48	1,019.95	L = 194.38 x (2254.83 ÷ 2291.83)
861 + 94.38	865 + 94.38	Rt.	396.77 x 48	2,116.11	L=½x400+½x400x(2254.83÷2291.83)
865 + 94.38	891 + 29.56	Rt.	2,535.18 x 48	13,520.96	
913 + 68.40	919 + 68.52	Rt.	600.12 x 48	3,200.64	E.B.O.L. Stations.
918 + 80.83	938 + 25	Rt.	1,944.17 x 48	10,368.91	
880 + 00	861 + 94.38	Lt.	197.52 x 48	1,053.43	L = 194.38 x (2328.83÷2291.83)
861 + 94.38	865 + 94.38	Lt.	403.23 x 48	2,150.55	L=½x400+½x400x(2328.83÷2291.83)
865 + 94.38	891 + 29.56	Lt.	2,535.18 x 48	13,485.38	Incl. 35.58 S.Y. Taper deduction
912 + 67.12	920 + 27.03	Lt.	759.91 x 66	5,572.67	WBIL Sta. W = (84+48) ÷ 2
920 + 51.92	938 + 25	Lt.	1,773.08 x 48	9,523.79	100 x 2 + 125 (2+4.5)÷2 Taper
LANE JN-OBE					
60 + 00	60 + 16.61		16.89 x 24	45.04	L = 16.61 x (728.2 ÷ 716.2)
60 + 16.61	64 + 16.61		403.35 x 24	1,075.60	L=½x400+½x400x(728.2 ÷ 716.2)
64 + 16.61	66 + 10		193.39 x 24	515.71	
66 + 10	69 + 50		340.35 x 24	907.60	L = 340 x (11471.16 ÷ 11459.16)
69 + 50	72 + 00		250.00 x 24	666.67	
LANE OBE-JN					
100 + 00	97 + 83.88		214.76 x 24	572.69	L = 216.12 x (1897.86 ÷ 1909.86)
97 + 83.88	95 + 33.88		249.21 x 24	664.56	L=½x250+½x250x(1897.86÷1909.86)
95 + 33.88	94 + 93.69		40.19 x 24	107.17	
94 + 93.69	91 + 73.69		320.34 x 24	854.24	L = 320 x (11471.16 ÷ 11459.16)
EASTBOUND OUTER LANES					
872 + 00	882 + 00		1,000.00 x 24.0	2,666.67	
882 + 00	894 + 13.32		1,213.32 x 24	3,235.52	
894 + 13.32	896 + 13.32		199.58 x 24	532.21	L=½x200+½x200x (2852.79÷2864.79)
896 + 13.32	902 + 88		671.85 x 24	1,791.60	L = 674.68 x (2852.79 ÷ 2864.79)
902 + 88	913 + 68.40		1,080.40 x 68.88	8,268.06	W = (76 + 61.75) ÷ 2
EASTBOUND INNER LANES					
891 + 29.56	894 + 21.58		292.02 x 45.92	1,489.79	W = (48 + (48-4.17)) ÷ 2
894 + 21.58	896 + 21.58		202.97 x 42.17	951.03	
896 + 21.58	899 + 69.56		350.16 x 39.25	1,537.09	W =(40.5+38)÷2 Incl. 10 S.Y. Taper
899 + 70	902 + 67.14		299.45 x 36	1,197.80	L = 297.58 (2882.79 ÷ 2864.79)
WESTBOUND OUTER LANES					
868 + 60	885 + 37.36		1,677.36 x 24	4,472.96	
885 + 37.36	892 + 17.50		680.14 x 24	1,813.71	
892 + 17.50	893 + 37.50		120.00 x 24	320.00	
893 + 40	906 + 30.08		1,294.04 x 24	3,450.78	L = 1290.08x(3918.53 ÷ 3906.53)
906 + 30.08	911 + 16.84		487.52 x 24	1,300.06	L = 486.76 x(7651.44÷7639.44)
911 + 16.84	912 + 16.84		100.22 x 34	378.62	L = 100 x (7656.44 ÷ 7639.44)
WESTBOUND INNER LANES					
891 + 29.56	891 + 77.91		Varies	210.83	(48.35x38.90)÷(16.67 x 2/2) Taper
891 + 77.91	912 + 67.12		2,079.52 x 36	8,318.08	L = 2089.21 x(3863.53÷3881.53)
911 + 67.12	912 + 67.12		98.94 x 10	109.93	L = 100 x (3840.53 ÷ 3881.53)
TOTAL				109,466.41	
			* Deduct	9 882.24	
			USE	99,584	

ITEM 451 9" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT, AS PER PLAN

STATION FROM	STATION TO	SIDE	LENGTH x WIDTH Ft. Ft.	AREA Sq. Yds.	REMARKS
TUXEDO AVENUE					
4 + 00	6 + 75.32		275.53 x 25	765.36	Sta. 6+75.32 to Sta. 8+03.53
12 + 30.61	15 + 86.78		356.17 x 29	1,147.66	Quan. incl. with Reloc. S.R. 17
TOTAL				1,913.02	

ITEM 451 9" REINFORCED PORTLAND CEMENT CONCRETE PAVEMENT

STATION FROM	STATION TO	SIDE	LENGTH x WIDTH Sq. Ft.	AREA Sq. Yds.	REMARKS
RAMP G-E					
57 + 71.09	58 + 71.09		101.12 x 18	202.23	L = 100 x (724.2 ÷ 716.2)
58 + 71.09	59 + 71.09		101.12 x 16	179.76	L = 100 x (724.2 ÷ 716.2)
59 + 71.09	63 + 23.68		356.54 x 16	633.85	L = 352.6 x (724.2 ÷ 716.2)
63 + 23.68	65 + 23.68		201.12 x 16	357.54	L = ½x200+½x200(724.2 ÷ 716.2)
65 + 23.68	69 + 84.01		460.33 x 16	818.36	
69 + 84.01	71 + 00		116.12 x 15	193.53	L = 15.99 +100x(11474.16+11459.16)
71 + 00	72 + 00		100.13 x 15	166.88	L = 100 x (11474.16 + 11459.16)
RAMP E-G					
78 + 75	82 + 00		9,432.00	1,048.00	25'+300(362.10+358.10)+1550 S.F.
82 + 00	83 + 00		100.00 x 24	266.67	
83 + 00	85 + 38.28		238.28 x 24	635.41	
78 + 75	79 + 20	Lt.	57 x .5	3.17	Area under 2A curb
RELOCATED GRANGER ROAD (S.R. 17)					
5 + 45	6 + 05	Lt.	60 x 3.5	23.33	W = (2.5 + 4.5) 2
5 + 05	7 + 01	Lt.	96 x 28	298.67	
5 + 05	7 + 01	Rt.	96 x 32	341.33	W = (26 + 38) 2
7 + 01	9 + 27.06	Lt.	226.06 x 28	703.30	
7 + 01	9 + 27.06	Rt.	226.06 x 46	1155.42	W = (38 + 54) 2
9 + 27.06	10 + 27.06	Lt.	100 x 28	311.11	
9 + 27.06	10 + 27.06	Rt.	100 x 31	344.44	W = (34 + 28) 2
10 + 27.06	12 + 03.13	Lt.	176.07 x 28	547.77	
10 + 27.06	12 + 03.13	Rt.	176.07 x 28	547.77	
17 + 36.79	19 + 34.20	Lt Rt	16,281.56 S.F.	1809.06	By Planimeter
19 + 34.20	20 + 85	Lt.	150.8 x 38	636.71	
19 + 34.20	20 + 85	Rt.	150.8 x 26	435.64	
20 + 85	21 + 85	Lt.	100 x 32	355.56	W = (38 + 26) 2
20 + 85	21 + 85	Rt.	100 x 26	288.89	
21 + 85	24 + 00	Lt.	215 x 26	621.11	
21 + 85	24 + 00	Rt.	215 x 26	621.11	
24 + 00	26 + 13.16	Lt.	213.16 x 26	615.80	
24 + 00	26 + 13.16	Rt.	213.16 x 25.25	598.03	W = (26 + 24.5) 2
26 + 13.16	28 + 20.29	Lt.	207.13 x 25.25	581.11	W = (26 + 24.5) 2
26 + 13.16	28 + 20.29	Rt.	207.13 x 26	598.38	
EASTBOUND OUTER LANES					
872+00.00	881+20.00	Rt.	920 x 13.5	1380.00	W= (25 + 2) 2
881+20.00	882+00.00	Rt.	80 x 2.0	17.78	END TAPER
WESTBOUND OUTER LANES					
885+37.36	892+17.50	Lt.	680.14 x 25.5	1927.06	W=(39.0 + 12) 2
892+17.50	893+40.00	Lt.	22.5(12) + 100(6)	98.52	Incl. 1.85 S.Y. Taper
885+37.36	889+00.00	Lt.	362.64 x 4.0	161.17	W = (8+0) 2
TOTAL				19,324.47	

ITEM 611 REINFORCED CONCRETE APPROACH SLAB (T=12")

STATION FROM	STATION TO	LENGTH Ft.	WIDTH Ft.	AREA Sq. Yds.	
PORTAL DRIVE					
4 + 49.74	4 + 69.74	20.0	26.0	57.78	
9 + 21.26	9 + 41.26	20.0	26.0	57.78	
TOTAL				115.56	

ITEM 611 REINFORCED CONCRETE APPROACH SLAB (T=13")

STATION F FROM	STATION TO	LENGTH Ft.	WIDTH Ft.	AREA Sq. Yds.	
S.R. 17					
12 + 03.13	12 + 23.13	20.0	98.0	217.78	
17 + 06.79	17 + 36.79	30.0	128.0	426.67	
TUXEDO AVENUE					
12 + 10.61	12 + 30.61	20.0	28.0	62.22	
8 + 03.59	8 + 33.59	30.0	Varies	139.00	
TOTAL				845.67	

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 6-26-69
CHECKED BY G.L. DATE 8-28-69

SCALE No Scale — HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE AHS DATE 7/9/70 — CONSULTING ENGINEERS
TRCD. HLO DATE 7/10/70 — KANSAS CITY CLEVELAND NEW YORK
CKD. GL DATE 7/14/70 M.B. 9-6-74

* See "QUANTITY ADJUSTMENTS" Note Above.

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ITEM 608 4½" CONCRETE WALK, AS PER PLAN

STATION FROM	STATION TO	SIDE	WIDTH Ft.	LENGTH Ft.	AREA Sq.Ft.	REMARKS
TUXEDO AVENUE						
4 + 00	7 + 10	Lt. & Rt.	5	620	3,100	
12 + 18	13 + 00	Rt.	5	110	550	
12 + 30	15 + 60	Lt.	5	215	1,075	
TOTAL					4,725	

ITEM 608 4" CONCRETE WALK

Station From	Station To	SIDE	WIDTH Ft.	LENGTH Ft.	AREA Sq.Ft.	REMARKS
PORTAL DRIVE						
4+53	4+73	Lt. & Rt.	5.5	20	110	See Detail Sheet
9+20	9+40	Lt. & Rt.	5.5	20	110	
Total					220	

ITEM 659 SEEDING AND MULCHING

Total Adjusted Right-of-way (Excluding pavement, paved shoulders, concrete medians, concrete curbs, bridges)		339,427 Sq.Yds.
Rip Rap	-	2860 Sq.Yds.
Rock Channel Protection Type A	-	506 Sq.Yds.
Rock Channel Protection Type B	-	554 Sq.Yds.
Sodding	-	8717 Sq.Yds.
Special Berm & Slope Protection	-	153 Sq.Yds.
Total		326,637 Sq.Yds.

ITEM 659 COMMERCIAL FERTILIZER

Seeded and Sodded Area	335,507 Sq.Yds.
335,507 x 9 x 20 ÷ 1000 x 2000	30.20 Tons

ITEM 659 AGRICULTURAL LIMING

Seeded and Sodded Area	335,507 Sq.Yds.
335,507 x 9 x 100 ÷ 1000 x 2000 =	150.98 Tons

ITEM SPECIAL DRAINAGE CONNECTION

STATION FROM	STATION TO	SIDE	LENGTH Lin.Ft.	END AREA Sq.Ft.	VOLUME Cu.Yds.	
SR-17						
19 + 30.50	22 + 05.72	Lt. & Rt.	277.22	2.6048	26.74	
22 + 05.72	28 + 20.29	Lt. & Rt.	614.57	2.6048	59.29	
TOTAL					86.03	

ITEM 609 CONCRETE CURB STANDARD

STATION FROM	STATION TO	SIDE	TYPE 2-A Lin.Ft.	TYPE 6 Lin.Ft.	TYPE 6 Modified	TYPE 7 Lin.Ft.	TYPE 8 Lin.Ft.	6x7" Integral Lin.Ft.	CURB TYPE SPEC.
I-80									
860 + 00	868 + 60	Lt. & Rt.		1,720					
868 + 60	869 + 50	Rt.		90					
LANE OBE-JN									
100 + 00	91 + 73.69	Lt.		826					
95 + 35	97 + 90	Rt.		265					
LANE JN-OBE									
63 + 25	66 + 75	Lt.		350					
58 + 80	69 + 40	Rt.		1,060					
WESTBOUND OUTER LANES									
895 + 50	911 + 16.84	Rt.		567					
WESTBOUND INNER LANES									
895 + 61.75	911 + 67.12	Lt.		605					
RAMP E-G									
Island at Granger			65	24					
TUXEDO AVENUE									
4 + 00	6 + 79.69	Rt.						280	
4 + 00	6 + 75.32	Lt.						275	
12 + 23	13 + 02.35	Lt. & Rt.						158	
13 + 02.35	13 + 59.63	Lt.						57	
13 + 59.63	15 + 86.78	Lt. & Rt.						454	
15 + 86.78	16 + 16.78	Lt. & Rt.			120				
SR-17									
5 + 45	6 + 05	Lt.	60						
6 + 05	9 + 27.06	Lt. & Rt.	644						
9 + 27.06	9 + 61.81	Lt.	35						
9 + 61.81	12 + 03.31	Lt. & Rt.	483						
16 + 97	6+79.69 Tuxedo	Lt.	194						
17 + 96	18 + 20	Rt.	26						
19 + 02	19 + 34	Rt.	34						
19 + 27	6+75.32 Tuxedo	Lt.	93						
31 + 95		℄	3						
32 + 45		℄	3						
RAMP G-E									
57 + 71.09	58 + 71.09	Rt.	100						
58 + 36.09	58 + 71.09	Lt.			35				
67 + 00	72 + 00	Lt.				240	260		
PORTAL DRIVE									
4 + 53	4 + 73	Lt. & Rt.							40
9 + 20	9 + 40	Lt. & Rt.							40
TOTAL			1740	5542	120	240	260	1338	80

ITEM 612 4" CONCRETE MEDIAN

STATION FROM	STATION TO	SIDE	LENGTH Lin.Ft.	WIDTH Ft.	AREA Sq.Yds.	REMARKS
I-80						
861 + 50	865 + 94.38	Lt.	444.38	(20+9) ÷ 2	715.94	Deduct for 10 Piers
865 + 94.38	868 + 60	Lt.	265.62	(9+5) ÷ 2	206.59	
860 + 00	866 + 75	Rt.	675.00	(25+9) ÷ 2	1256.14	Deduct for 9 Piers
866 + 75	869 + 50	Rt.	275.00	(9 +5) ÷ 2	213.89	
LANE OBE-JN						
95 + 35	97 + 90	Rt.	265.00	Varies	353.30	
RAMP E-G						
78 + 75	79 + 20	Rt.	Varies	Varies	40.00	
TOTAL					2785.86	

ITEM 612 CONCRETE MEDIAN

STATION FROM	STATION TO	SIDE	LENGTH Lin. Ft.	WIDTH Lin. Ft.	AREA Sq. Yds.
S.R. 17					
20+85	21+85	℄	100.00	10	111.11
21 + 85	24+18	℄	233.00	½(16 + 14)	388.33
24+18	27+16.76	℄	298.76	½(14 + 3)	282.16
27+16.76	28 + 20.29	℄	103.53	3	34.51
31+95		℄	1.00	2	0.22
32+45		℄	1.00	2	0.22
9+25	9+60	Rt.	35	Varies (0'-10')	26.36
SUB-TOTAL					842.91

ITEM 612 CONCRETE MEDIAN

STATION FROM	STATION TO	SIDE	LENGTH Lin.Ft.	WIDTH Lin.Ft.	AREA Sq.Yds.
I-80					
868 + 60	869 + 50	Lt.	90.00	6	60.00
869 + 50	890 + 01.63	Lt. & Rt.	2,051.63	12	2,735.51
890 + 01.63	891 + 29.56	Rt.	127.93	6	85.29
Deduct for Median Inlets		Lt. & Rt.	6 (8.00) + 2 (10.00)	6	-45.33
EASTBOUND OUTER LANES					
891 + 29.56	894 + 13.32	Lt.	283.76	6	189.17
894 + 13.32	902 + 88	Lt.	874.68 x (2895.54 ÷ 2864.79)	3.5	343.80
WESTBOUND OUTER LANES					
890 + 01.63	893 + 18	Rt.	316.37 x (3921.53 ÷ 3881.53)	6	213.09
911 + 16.84	912 + 16.84	Rt.	100.00	7	77.78
893 + 18	895 + 50	Rt.	232.00 x (3919.53 ÷ 3881.53)	8	208.24
S.R. 17					
6 + 05	12 + 23.13	℄	618.13	4	274.72
17 + 00	18 + 06	℄	½ (16) (4 + 4.8) + 4 (96)	Varies	47.82
19 + 02	20 + 85	℄	183.00	4	81.33
SUB-TOTAL					5,114.33
GRAND TOTAL					5957.24

Use 5957

SCALE No Scale
MADE AHS DATE 7/8/70
TRCD. HGD DATE 7/8/70
CKD. GL DATE 7/14/70
MB 9-6-74

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

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 8-27-69
CHECKED BY E.R.H. DATE 6-30-70

GENERAL SUMMARY

CODE TYPE 7223
OR AS SHOWN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. 80-15.81

SHEET NUMBER	TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
				ROADWAY
7: Lump; 3	Lump	Lump	201	Clearing and Grubbing
	3	Each	202	Septic Tank Removed
70: Lump; 101: Lump	Lump	Lump	202	Structures Removed
25: 17,376	17,376	Sq. Yds.	202	Pavement Removed
25: 10,990	10,990	Sq. Ft.	202	Sidewalk Removed
25: 3,424	3,424	Lin. Ft.	202	Curb Removed
25: 3,786	3,786	Lin. Ft.	202	Stone Curb Removed
35: 113; 36: 3,210; 37: 142	3,465	Lin. Ft.	202	Guard Rail Removed
25: 379	379	Sq. Yds.	202	Paved Median Removed
247A: 60	60	Each	202	Precast Traffic Dividers Removed
67: Lump	Lump	Lump	202	Portions of Structures Removed
67: 2; 70: 2	4	Each	202	Catch Basin Abandoned
70: 2	2	Each	202	Manhole Removed
67: 60; 70: 288	348	Lin. Ft.	202	Pipe Removed, 15" and under
67: 152; 70: 75	227	Lin. Ft.	202	Pipe Removed, over 15"
70: 3	3	Each	202	Catch Basin Removed
70: 2	2	Each	202	Manhole Abandoned
70: 127	127	Lin. Ft.	Special	Fill and Plug Existing 8'x6' Box Culvert
70: 700	700	Lin. Ft.	Special	Fill and Plug Existing 72" Diam. Culvert
67: 260	260	Lin. Ft.	Special	Fill and Plug Existing 84" Diam. Culvert
7: +3500; 25: 1,357,283; 35: 7; 42: 12; 64: 588; 101: 1,154; 102: 249; 103: 327	1,563,080	Cu. Yds.	203	Excavation not including Embankment Construction
7: -2500; 25: 1,192,137; 64: 7; 101: 1,557; 102: 791; 103: 627	1,192,619	Cu. Yds.	203	Embankment
25: 141,129	141,129	Sq. Yds.	203	Subgrade Compaction
25: 51	51	Hours	203	Proof Rolling
25: 3,216	3,216	Cu. Yds.	203	Embankment using granular material, as per plan
380: 5	5	Each	604	Centerline Reference Monument, Modified as per plan
380: 13	13	Each	604	Standard Monument Assembly
381: 5	5	Each	604	Centerline Reference Monuments
35: 1; 36: 10; 37: 1; 38: 5; 39: 10; 40: 3; 42: 2; 45: 1; 48: 1	33	Each	606	Anchor Assembly
36: 1	1	Each	606	Anchor Assembly, Barrier Design
36: 2; 39: 2	4	Each	606	Bridge Terminal Assembly, Type A
35: 525; 36: 3,661; 37: 1,075; 38: 2,000; 39: 1,450; 40: 1,000; 41: 325; 42: 225; 43: 50; 44: 365; 45: 410; 46: 417; 48: 100; 64: 261	11,864	Lin. Ft.	606	Guard Rail, Type 5
42: 1; 43: 1; 44: 2; 48: 2	6	Each	606	Bridge Terminal Assembly, As Per Plan
381: 16,910	16,910	Lin. Ft.	607	Fence, Type C L
36: 1	1	Each	Special	Impact Attenuator Assembly No. 1 (Hi-Dro Cushion)
37: 2	2	Each	Special	Impact Attenuator Assembly No. 2 (Fitch)
38: 220	220	Sq. Ft.	608	4" Concrete Walk
38: 4,725; 64: 80	4,805	Sq. Ft.	608	4½" Concrete Walk, as per plan
249: 1215; 250: 7564	8779	Sq. Yds.	615	Temporary Pavement, Class A
Lump	Lump	Lump	202	Parcel No 1564-WL, T, removal of one 1-story brick residence with attached garage
Lump	Lump	Lump	202	Parcel No 1565-WL, removal of one 1-story frame residence with attached garage
7: 200	200	Cu. Yds.	404	Asphalt Concrete or an Approved Bituminous Premixed Surface Course for Maintaining Traffic
7: 200	200	Cu. Yds.	410	Traffic Compacted Surface, Type A or B
7: 200	200	Cu. Yds.	410	Traffic Compacted Surface, Type C
7: 10	10	Tons	616	Calcium Chloride
7: 5,000	5,000	M Gals.	616	Water
				RETAINING WALL
247A: 539	539	Cu. Yds.	503	Unclassified Excavation
247A: 396	396	Cu. Yds.	503	Shale Excavation
247A: Lump	Lump	Lump	503	Cofferdams, Cribs and Sheeting
247A: 32,277	32,277	Pounds	509	Reinforcing Steel
247A: 432	432	Cu. Yds.	511	Class C Concrete, Wall Above Footings
247A: 223	223	Cu. Yds.	511	Class C Concrete, Footings
247A: 175	175	Lin. Ft.	512	Premolded Sealing Strips
247A: 190	190	Sq. Ft.	516	1" Preformed Expansion Joint Filler
247A: 198	198	Cu. Yds.	518	Porous Backfill

SCALE _____ DATE _____
MADE _____ DATE _____
TRCD. J.M.C. DATE 1-9-73
CKD. _____ DATE _____

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

QUANTITY CALCULATIONS
MADE BY M.G.B. DATE 8-30-74
CHECKED BY A.H.S. DATE 9-3-74

Rev. 10-16-74

GENERAL SUMMARY

CODE TYPE 7223

OR AS SHOWN

FED. RD. DIVISION	STATE	PROJECT		
2	OHIO			

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CUYAHOGA COUNTY
CUY. 80-15.81

SHEET NUMBER													TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
8	26	27	28	29	35	42	48	49	50	51	64	249				
																PAVEMENT
	21,974					52							22,026	Cu. Yds.	301	Bituminous Aggregate Base:702.01 (85-100 or AC-20);or 702.09,RT-11 or RT-12
		1419					10	16					1,445	Cu. Yds.	304	Aggregate Base
		4											4	Cu. Yds.	304	Aggregate Base or 703.10 Screenings
		25,881											25,881	Cu. Yds.	310	Subbase
		3,516											3,516	Cu. Yds.	310	Subbase, Grading A , as per plan
		126									113		239	Cu. Yds.	310	Subbase, 703.08 or 703.10
			11			10	1	5					27	Cu. Yds.	404	Asphalt Concrete (70-85 or AC-20) (Driveways)
			8				4	38					50	Gal.	408	Bituminous Prime Coat; 702.09,RT-2 or RT-3;702.02,MC-30 or MC-70 ; or 702.03, primer 20
			99,584										99,584	Sq. Yds.	451	10" Reinforced Portland Cement Concrete Pavement
			19,524						172	45			19,741	Sq. Yds.	451	9" Reinforced Portland Cement Concrete Pavement
			1,913								1,357		3,270	Sq. Yds.	451	9" Reinforced Portland Cement Concrete Pavement, as per plan
								24	62	113	86		285	Sq. Yds.	452	6" Plain Portland Cement Concrete Pavement
					432	77	72						581	Sq. Yds.	452	8" Plain Portland Cement Concrete Pavement
				1,740					70	38			1,848	Lin. Ft.	609	Concrete Curb, Standard Type 2-A
											1,087		1,087	Lin. Ft.	609	Concrete Curb, Standard Type 3-A
				5,542								740	6282	Lin. Ft.	609	Concrete Curb, Standard Type 6
				120									120	Lin. Ft.	609	Concrete Curb, Standard Type 6, Modified as per plan
				240									240	Lin. Ft.	609	Concrete Curb, Standard Type 7
				260									260	Lin. Ft.	609	Concrete Curb, Standard Type 8
				80									80	Lin. Ft.	609	Concrete Curb, as per plan
				1,338									1,338	Lin. Ft.	609	Concrete Curb, Inte gral 6"x7"
3,000													3,000	Lin. Ft.	609	Asphalt Concrete Curb, Standard Type 1 (70-85 or AC-20)
			116										116	Sq. Yds.	611	Reinforced Concrete Approach Slabs (T 12")
			846										846	Sq. Yds.	611	Reinforced Concrete Approach Slabs (T 13")
				5,957									5,957	Sq. Yds.	612	Concrete Median
				2,786									2,786	Sq. Yds.	612	4" Concrete Median
		2,773											2,773	Lin. Ft.	622	Concrete Barrier, Type B
		522											522	Lin. Ft.	622	Concrete Barrier, Type B, Modified As Per Plan
		40											40	Lin. Ft.	622	Concrete Barrier, Type D, Modified As Per Plan
				86									86	Cu. Yds.	Special	Drainage Connection using No. 8 Aggregate

SCALE ______ **HOWARD, NEEDLES, TAMMEN & BERGENDOFF**
MADE ______ DATE ______ CONSULTING ENGINEERS
TRCD. J.M.C. DATE 1-9-73
CKD. M.B. DATE 9-6-74 KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 6-26-69
CHECKED BY E.R.H. DATE 7-28-70

Rev. 10-16-74

GENERAL SUMMARY

CODE TYPE 7223

OR AS SHOWN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY. 80-15.81

SHEET NUMBER													TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
8	9	67	69	70	73	77	101	102	103	119	120	121				
																DRAINAGE
			0.21		.64	5.62			4.40	8.38			19.3	Cu. Yds.	602	Concrete Masonry
							10.88	6.69					17.6	Cu. Yds.	602	Concrete Masonry, as per plan
	300			56		94							450	Lin. Ft.	603	6" Conduit, Type B
	500	50		240	70	60							920	Lin. Ft.	603	6" Conduit, Type F
		77	484										561	Lin. Ft.	603	12" Conduit, Type B
		60											60	Lin. Ft.	603	12" Conduit, Type C, 706.01 CL.III, 706.08 E.S., 706.02 OR 707.13
			40										40	Lin. Ft.	603	12" Conduit, Type F
		65											65	Lin. Ft.	603	12" Conduit, Type F, 707.05
		7	1,001		965	434							2,407	Lin. Ft.	603	15" Conduit, Type B
		92											92	Lin. Ft.	603	15" Conduit, Type B, 706.02 Class V OR 707.13
		60											60	Lin. Ft.	603	15" Conduit, Type B, 707.13
		278	35			23							336	Lin. Ft.	603	15" Conduit, Type C
		90				142							232	Lin. Ft.	603	15" Conduit, Type C, 706.01 CL.III, 706.08 E.S., 706.02 or 707.13
						50							50	Lin. Ft.	603	15" Conduit, Type C, 706.02 Class IV OR 707.13
		125											125	Lin. Ft.	603	15" Conduit, Type C, 707.13
400						79							479	Lin. Ft.	603	15" Conduit, Type F
			128										128	Lin. Ft.	603	15" Conduit, Type F, 707.05
					403	449							852	Lin. Ft.	603	18" Conduit, Type B
					62								62	Lin. Ft.	603	18" Conduit, Type C, 706.02 Class V or 707.13
			192		81	470							743	Lin. Ft.	603	21" Conduit, Type B
					250								250	Lin. Ft.	603	21" Conduit, Type C, 706.02 Class III or 707.13
					248								248	Lin. Ft.	603	21" Conduit, Type C, 706.08 E.S., 706.02, 707.13 OR 706.01 CL.III
					84	57							141	Lin. Ft.	603	21" Conduit, Type F
		208				102							310	Lin. Ft.	603	24" Conduit, Type B
					15								15	Lin. Ft.	603	24" Conduit, Type C, 707.13
					327								327	Lin. Ft.	603	24" Conduit, Type C, 706.02 Class V or 707.13
					59								59	Lin. Ft.	603	24" Conduit, Type F, 707.05
			131										131	Lin. Ft.	603	27" Conduit, Type B
			187										187	Lin. Ft.	603	30" Conduit, Type B
						208							208	Lin. Ft.	603	30" Conduit, Type B, 706.02 Class III OR 707.13
			71										71	Lin. Ft.	603	30" Conduit, Type B, 706.02 Class V OR 707.13
			65										65	Lin. Ft.	603	42" Conduit, Type B
			53										53	Lin. Ft.	603	42" Conduit, Type F , 707.05
						1,407							1,407	Lin. Ft.	603	66" Conduit, Type C, 706.02 CL.V or 707.13 (0.109) Modified as per plan
						42							42	Lin. Ft.	603	66" Conduit, Type C, 706.02 CL.V or 707.13 (0.109) Modified as per plan, Radius Pipe
		282											282	Lin. Ft.	603	72" Conduit, Type B, 706.02 Class IV or 707.13 as per 707.02
		146											146	Lin. Ft.	603	72" Conduit, Type B, 706.03 Class V or 707.13 (0.109" as per 707.02)
		96											96	Lin. Ft.	603	72" Conduit, Type B, 706.03 Class V Radius Pipe or 707.13 (0.079" as per 707.02)
						16							16	Lin. Ft.	603	72" Conduit, Type C, 706.03 Class V or 707.13, as per plan
		185											185	Lin. Ft.	603	72" Conduit, Type C , 707.13 (0.168" as per 707.02)
		555											555	Lin. Ft.	603	78" Conduit, Type C, 707.07, (0.109" as per 707.02) ASB. Bonded, as per plan
					133								133	Lin. Ft.	603	84" Conduit, Type C, 707.03 (0.138"-0.168")
					24								24	Lin. Ft.	603	84" Conduit, Type C , 707.03 (0.138"-0.138")
						28							28	Lin. Ft.	603	84" Conduit, Type C, 706.03 Class V or 707.13, as per plan
						522							522	Lin. Ft.	603	96" Conduit, Type B, 707.03 (0.168"-0.249") as per plan
			1,185		430								1,615	Lin. Ft.	603	108" Conduit, Type C, 706.03 Class V or 707.13 (0.168" as per 707.02)
					565								565	Lin. Ft.	603	120" Conduit, Type B, 707.03 (0.249"-0.280")
											50	33	83	Cu. Yds.	503	Unclassified Excavation
											2,111	1,159	3270	Pounds	509	Reinforcing Steel
											30	14	44	Cu. Yds.	511	Class C Concrete
											22	24	46	Lin. Ft.	512	Premolded Sealing Strip
							3,044	1714					4758	Pounds	513	Structural Steel
											22	24	46	Sq. Ft.	516	1" Preformed Expansion Joint Filler

SCALE ______ **HOWARD, NEEDLES, TAMMEN & BERGENDOFF**
MADE ______ DATE ______ CONSULTING ENGINEERS
TRCD. J.M.C. DATE 1-10-73
CKD. ______ DATE ______ KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 8-29-74
CHECKED BY M.G.B. DATE 8-29-74

GENERAL SUMMARY

CODE TYPE 7223

OR AS SHOWN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY. 80-15.81

8	9	29	48	49	50	51	64	67	69	70	73	77	101	102	103	119	373	★ 100% STATE	TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
																						DRAINAGE
												1							1	Each	604	Std.No.2-2-A Catch Basin
									4										4	Each	604	Std.No.3 Catch Basin
									3		2								5	Each	604	Std.No.3-A Catch Basin
									5										5	Each	604	Cuyahoga County No.3-C Catch Basin
											1	6							7	Each	604	Std.No.4 Catch Basin
								2	3		5	6							16	Each	604	Std.No.5 Catch Basin
												4							4	Each	604	Std.No.5-A Catch Basin
								1											1	Each	604	Std.No.5-ACatch Basin, Modified as per plan
									1		4	1							6	Each	604	Std. No.6 Catch Basin, Modified as per plan
								1	3										4	Each	604	Std.No.2-A-6 Paved Shld. Inlet
									1										1	Each	604	Std.No.2-6 Median Inlet, Modified as per plan
									2		1	1							4	Each	604	Std.No.2-A-8 Paved Shld. Inlet
									2		4								6	Each	604	Std.No.2-8 Median Inlet, Modified as per plan
4								3											7	Each	604	Std.No.2-A-10 Paved Shld. Inlet
									2		2								4	Each	604	Std.No.2-10 Median Inlet, Modified as per plan
								3											3	Each	604	Std.No.2-A-12 Paved Shld. Inlet
								1											1	Each	604	Std.No.2-A-14 Paved Shld. Inlet
									2										2	Each	604	Std.No.2-14 Median Inlet
											1								1	Each	604	Std.No.2-A-16 Paved Shld. Inlet
												1							1	Each	604	Std.No.2-A-20 Paved Shld. Inlet
								1	1		3								5	Each	604	Std.No.I-3 B Median Inlet
								1	2										3	Each	604	Std.No.1 Manhole
								1	1										2	Each	604	Std.No.1-A Manhole
								1	4		3								8	Each	604	Std.No.2 Manhole
												1							1	Each	604	Std.No.2-A Manhole
									1										1	Each	604	Std.No.1 Manhole, Modified as per plan
									1										1	Each	604	Junction Chamber
	300							100		100									500	Lin.Ft.	605	6" Unclassified Pipe Underdrain, as per plan
100	3,000																		3,100	Lin.Ft.	605	6" Unclassified Pipe Underdrain, 707.01 Type III or 707.12, as per plan
								1,053		2,578									3,631	Lin.Ft.	605	6" Shallow Pipe Underdrain, as per plan
								225		3,508	4,226	3,154							11,113	Lin.Ft.	605	6" Deep Pipe Underdrain, as per plan
										510									510	Lin.Ft.	605	6" Pipe Underdrain 706.08 Perforated Bell and Spigot, as per plan
										357		225							582	Lin.Ft.	605	6" Pipe Underdrain 707.01 Type III or 707.12, as per plan
6																			6	Lin.Ft.	605	Aggregate Drains for Springs, as per plan
																						EROSION CONTROL - CODE TYPE Y005
	3																		3	Sq.Yds.	601	Crushed Aggregate Slope Protection, as per plan
											340								340	Cu.Yds.	601	Dumped Rock Fill, Type B
													356	1,137	5	244	1,118		2,860	Sq.Yds.	601	Riprap,using 6" Reinforced Concrete Slab, as per plan
															243	263			506	Cu.Yds.	601	Rock Channel Protection, Type A
	50									194	153	101				56			554	Cu.Yds.	601	Rock Channel Protection, Type B
		326,637																	326,637	Sq.Yds.	659	Seeding and Mulching
1.36		30.20																	31.56	Tons	659	Commercial Fertilizer (12-12-12)
		150.98																	150.98	Tons	659	Agricultural Liming, as per plan
										75	6	41							122	Sq.Yds.	660	Sodding for Special Berm and Slope Protection, as per plan
			462	217	109	591	507	100		771	1,428	4,304	30	88		110			8,717	Sq.Yds.	660	Sodding
65,910																			65,910	Sq.Yds.	207	Temporary Seeding and Mulching
15.8																			15 8	M.Gals.	207	Water
544																			544	Lin.Ft.	207	Temporary Slope Drains
1,191																			1,191	Cu.Yds.	207	Temporary Benches, Dikes, Dams and Sediment Basins
735																			735	M.Sq.Ft.	207	Mowing
16,480																			16,480	Sq.Yds.	659	Repair Seeding and Mulching
																						SANITARY - CODE TYPE Y060
								575		1,223									1,798	Lin.Ft.	603	8" Conduit, Type B, 706.08 E.S. with 706.12 Joints
												★795						795	795	Lin.Ft.	603	10" Conduit, Type B, 706.02 Class V Bituminous Coated with 706.11 Joints or ASA A-21.51 (A.W.W.A. 151) ASA Class 6 Mechanical Joint Ductile Iron Pipe, Cement Lined
										753									753	Lin.Ft.	603	18" Conduit, Type B, 706.08 E.S. with 706.12 Joints
										152									152	Lin.Ft.	603	30" Conduit, Type B, 706.02 Class V, 1/3 Lined or Fully Lined as per 706.05 and with 706.11 Joints
								5											5	Each	603	8" x 5" Y-Branch and Riser, Concrete Encased
								2		5		★ 1						1	8	Each	604	Std.No.1-A Manhole with 706.11 Joints, as per plan
										2									2	Each	604	Std.No.1-A Manhole with 706.11 Joints with Drop Pipe, as per plan
										1									1	Each	604	Std.No.1-A Manhole with 706.11 Joints with 2 Drop Pipes, as per plan
										2									2	Each	604	Manhole Reconstructed to Grade

SCALE ______ **HOWARD, NEEDLES, TAMMEN & BERGENDOFF**
MADE ______ DATE ______
CONSULTING ENGINEERS
TRCD J.M.C. DATE 1-10-73
KANSAS CITY CLEVELAND NEW YORK
CKD ______ DATE ______

QUANTITY CALCULATIONS
MADE BY M.G.B. DATE 8-30-74
CHECKED BY A.H.S. DATE 8-30-74

Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

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GENERAL SUMMARY

CODE TYPE 7223

OR AS SHOWN

CUYAHOGA COUNTY
CUY. 80-15.81

SHEET NUMBER		Normal Partic.						State 100% Partic.	Total Normal Partic.	Total 100% State Partic.	TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
7	222	233	234	236	237	238	239	237						
														WATERWORK- CODE TYPE Y060
						30			30		30	Lin.Ft.	Special	6" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined, All Lead Joints
				66					66		66	Lin.Ft.	Special	8" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined
				25					25		25	Lin.Ft.	Special	8" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined Boltless Restrained Push-On Joints
			78						78		78	Lin.Ft.	Special	8" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined, All Lead Joints
				67					67		67	Lin.Ft.	Special	12" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined
				50					50		50	Lin.Ft.	Special	12" Water Main ASA Class 25 Cast Iron Pipe and CI Fittings Class "D" Cement Lined Boltless Restrained Push-On Joints
				206	~~575~~			575	206	575	781	Lin.Ft.	Special	12" Water Main ASA Class 6 Ductile Iron Pipe and DI Fittings Class "D" Cement Lined
				275	~~320~~			320	275	320	595	Lin.Ft.	Special	12" Water Main ASA Class 6 Ductile Iron Pipe and DI Fittings Class "D" Cement Lined Boltless Restrained Push-On Joints
				2	1 ~~2~~			1	3	1	4	Each	Special	2" Air Cock Complete
				1					1		1	Each	Special	8"x8" Tapping Sleeve and 8" Tapping Valve, Complete
			1	1					2		2	Each	Special	8" Hub Valve
				2	~~1~~			1	2	1	3	Each	Special	12" Hub Valve
					1				1		1	Each	Special	12" Cutting-in Hub Valve Complete
		1							1		1	Each	Special	Furnish and Install Flush Pipe including Fittings and Valve
						1			1		1	Each	Special	4" Fire Hydrant Removed
						3			3		3	Each	Special	6" Fire Hydrant Relocated
						2	4		6		6	Each	Special	Adjust Valve Box to Grade
							19		19		19	Each	Special	Adjust Curb Cock Valve Box to Grade
					1				1		1	Each	Special	Remove Abandoned Valve Box (12")
					1	7	7		15		15	Each	Special	Remove Abandoned Curb Cock Valve Box
							2		2		2	Each	Special	Service Connection Extended
						7	7		14		14	Each	Special	Plugging Service Connection
						1			1		1	Each	Special	Plugging Water Mains and Branches (4")
				1					1		1	Each	Special	Temporary 8" CI Plug with Rods and Clamps
						3			3		3	Each	202	Manhole Abandoned (Meter Vault)
							1		1		1	Each	202	Manhole Removed (Meter Vault)
			358	1,314	478 ~~956~~			478	2150	478	2,628	Pounds	Special	Miscellaneous Metal Work
	2								2		2	MBM	Special	Sheeting Left in Place
			1						1		1	Each	Special	8" Cutting-In Valve, Complete
						1			1		1	Each	Special	Service Connection Relocated and Water Meter Relocated
Lump											Lump	Lump	619	Field Office
											Lump	Lump	623	Construction Layout Stakes
Lump											Lump	Lump	614	Maintaining Traffic
														Traffic Signal Quantities See Sheet 316
														Traffic Control Quantities See Sheet 255
														Lighting Quantities See Sheet 302
														Structures over 20' Span
														Bridge No. CUY-80-1585, For Estimated Quantities See Sheet 322
														Bridge No. CUY-80-1593, For Estimated Quantities See Sheet 345
														Bridge No. CUY-80-1594, For Estimated Quantities See Sheet 370
														Bridge No. CUY-80-1654, For Estimated Quantities See Sheet 373
														Bridge No. CUY-80-1685, For Estimated Quantities See Sheet 363

SCALE ________
MADE ______ DATE ______
TRCD J.M.C. DATE 1-11-73
CKD ______ DATE ______

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

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 8-29-74
CHECKED BY M.G.B. DATE 8-30-74

Rev. 12-6-74 A.W.G.
Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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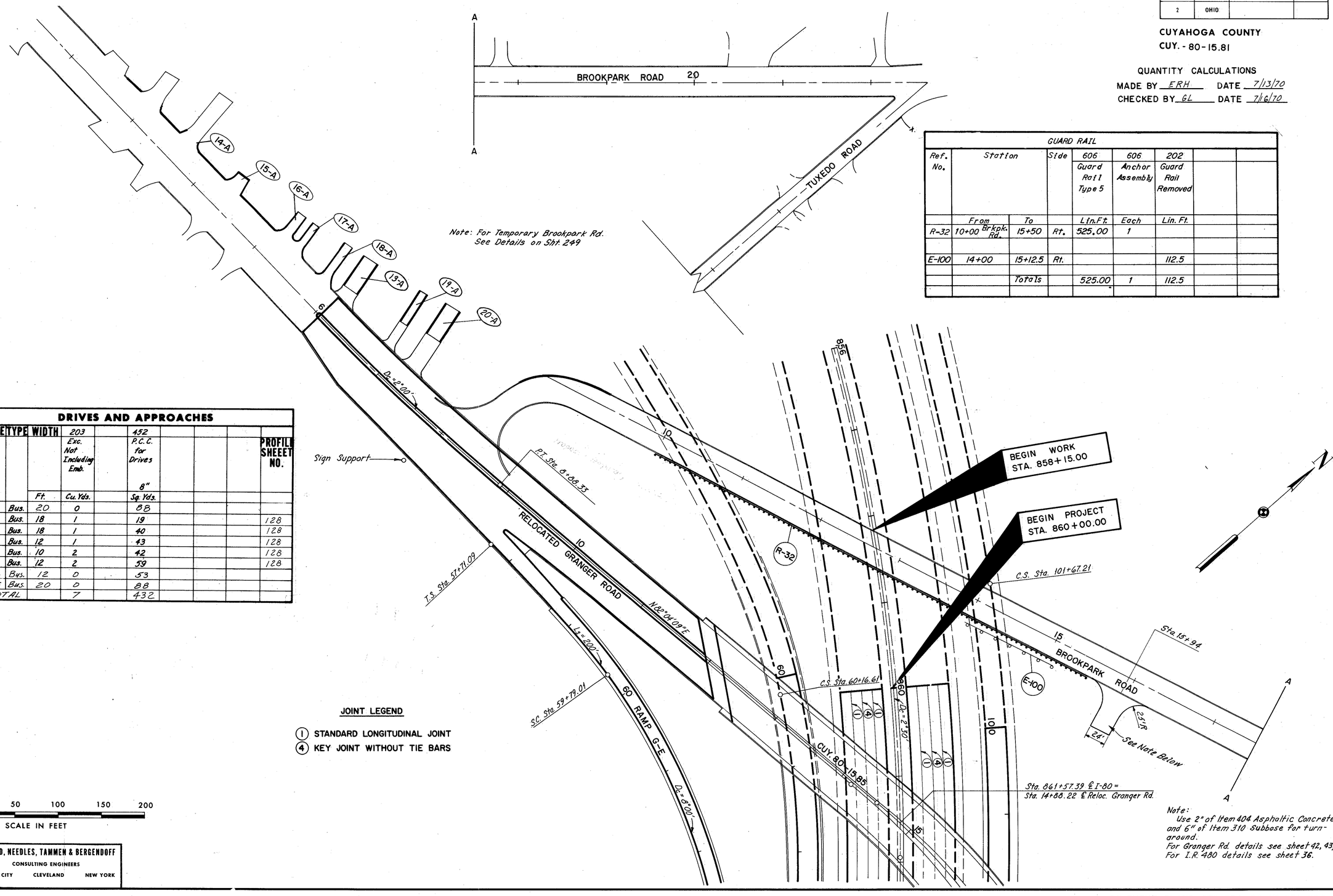
CUYAHOGA COUNTY
CUY. - 80 - 15.81

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70

GUARD RAIL								
Ref. No.	Station		Side	606 Guard Rail Type 5	606 Anchor Assembly	202 Guard Rail Removed		
	From	To		Lin. Ft.	Each	Lin. Ft.		
R-32	10+00 Brkpk. Rd.	15+50	Rt.	525.00	1			
E-100	14+00	15+12.5	Rt.			112.5		
		Totals		525.00	1	112.5		

DRIVES AND APPROACHES

REF. NO.	STATION	SIDE	TYPE	WIDTH	203 Exc. Not Including Emb.		452 P.C.C. for Drives 8"				PROFILE SHEEET NO.
				Ft.	Cu. Yds.		Sq. Yds.				
13-A	6+10	Lt.	Bus.	20	0		88				
14-A	3+61	Lt.	Bus.	18	1		19				128
15-A	4+34	Lt.	Bus.	18	1		40				128
16-A	5+15	Lt.	Bus.	12	1		43				128
17-A	5+36	Lt.	Bus.	10	2		42				128
18-A	5+82	Lt.	Bus.	12	2		59				128
19-A	6+85	Lt.	Bus.	12	0		53				
20-A	7+25	Lt.	Bus.	20	0		88				
		TOTAL			7		432				



JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT
(4) KEY JOINT WITHOUT TIE BARS

Note:
Use 2" of Item 404 Aspholtic Concrete and 6" of Item 310 Subbase for turn-around.
For Granger Rd. details see sheet 42, 43, 44.
For I.R. 480 details see sheet 36.

50 0 50 100 150 200
SCALE IN FEET

SCALE 1"=50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE TPM DATE
TRCD. TPM DATE CONSULTING ENGINEERS
CKD. ERH DATE 7/13/70 KANSAS CITY CLEVELAND NEW YORK

PAVEMENT PLANS STA. 856+00 TO STA. 860+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.– 80– 15.81

QUANTITY CALCULATIONS
MADE BY R.J.T. DATE 8-26-74
CHECKED BY R.B.H. DATE 8-28-74

PAVEMENT & PAVED BERMS NOT A PART OF THIS PROJECT. SEE NOTE ON SH.28.

GUARD RAIL

Ref. No.	Station From	Station To	Side	606 Guard Rail Type 5	606 Bridge Terminal Assembly	606 Anchor Assembly		606 Anchor Assembly Barrier Design	Special Impact Attenuator
				Lin.Ft.	Each	Each		Each	Each
R-1	93+85 OBE-JN	95+35	Rt.	125	1	1			
R-2	861+37.50	865+81.25	Lt.	887.5		2			
R-3	860+00	867+12.5	Rt.	687.5		1		1	
R-4	63+39	867+12.5	Lt.	348.5	1	1			
R-5	64+12.5 GE	67+75	Rt.	312.5		2			
R-29	60+00 JN-OBE	67+45	Rt.	725.0		1			
R-30	61+70 G-E	67+50	Lt.	575.0		2			
	865+81.25		Lt.						1
		Totals		3661.0	2	10		1	1

PROPOSED STRUCTURE CUY-80-1593

TYPE: Continuous steel rolled beam with reinforced concrete deck and substructure.
SPANS: 57'-0", 208'-0½", 69'-6", 49'-0", and 34'-6".
ROADWAY: 28'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 18°48'41" Left Forward
WEARING SURFACE: 1" Latex Modified Concrete
APPROACH SLABS: 30'-0" Rear & 20'-0" Forward, AS-1-72 Modified
ALIGNMENT: Tangent
SUPERELEVATION: Normal, 0.0156 ft. per ft. south of Pier 2, varies north of Pier 2.

PROPOSED STRUCTURE CUY-80-1594

TYPE: Continuous welded and seamless 24" O.D. x ⅜" thick steel pipe meeting the requirements of Section 707.11 with reinforced concrete substructure
SPANS: 151'-0", 351'-0", 711'-5½", 2 @ 87'-7⅜" and 3 @ 69'-2"
LOADING: Weight of full flow in 18" feeder pipe (80 lbs. per cu. ft.)
ALIGNMENT: Tangent

BEGIN LANE OBE–JN STA. 100+00.00
I-480-4(25)169
BEGIN PROJECT STA. 860+00.00
BEGIN LANE JN–OBE STA. 60+00.00
MATCH LINE STA 60+00 SEE SHEET 43
MATCH LINE STA. 875+00 SEE SHEET 37

℄ RELOC. TUXEDO AVE.
℄ RELOC. GRANGER RD.
GRANGER RD. (S.R.17)
℄ INTERSTATE ROUTE 80
℄ LANE OBE–JN
℄ LANE JN–OBE
℄ RAMP G-E
℄ WESTBOUND OUTER LANES
℄ Eastbound Outer Lanes
℄ TUXEDO CONNECTION
CUY.80-1593
CUY.-80-1594
E-1 E-2 E-3 E-4 E-5
R-1 R-2 R-3 R-4 R-5 R-29 R-30

T.S. Sta. 95+33.88 ℄ Lane OBE-JN
P.T. Sta 94+93.69 ℄ Lane OBE-JN
S.C. Sta. 97+83.88 ℄ Lane OBE-JN
Sta. 99+60
P.C. Sta. 91+73.69 ℄ Lane OBE-JN = Sta. 868+60.00 ℄ W.B.O.L.
Begin 4" Conc. Med. Sta. 861+30
Begin 4" Conc. Median Sta. 860+00
C.S. Sta. 861+94.38 ℄ I-80
S.T. Sta. 865+94.38 ℄ I-80
Begin 6'-0" Concrete Median Sta. 868+60 ℄ W.B.O.L.
Begin 6'-0" Concrete Median Sta. 869+50, ℄ I-80
Impact Attenuator No. 1 Reserve Area (22'x6')
See Detail A This Sheet
See Bridge Plans for detail of Scupper in barrier median
4" Concrete Median
Type 6 Curb
Type 7 Curb
Type 8 Curb
Retaining Wall
Concrete Barrier
6' Raised Median
P.C. Sta. 66+10.00 ℄ Lane JN-OBE
S.T. Sta. 64+16.61 ℄ Lane JN-OBE
C.S. Sta. 64+16.61 ℄ Lane JN-OBE
C.S. Sta. 63+23.68 ℄ Ramp G-E
S.T. Sta. 65+23.68 ℄ Ramp G-E
Sta. 61+00 End Type 7 Curb
Sta. 69+40 End Type 8 Curb
P.T. Sta. 69+50.00 ℄ Lane JN-OBE = Sta. 869+50.00-106 Rt. ℄ I-80
P.C. Sta. 69+84.01 ℄ Ramp G-E
P.T. Sta. 72+00 ℄ Ramp G-E Begin Taper
Nose Sta. 72+00.00-15' Lt. ℄ Ramp G-E = Sta. 872+00.00-116' Rt. ℄ I-80
Sta. 60+40
Sta. 64+40

Δ=8°00'00"
Δ=3°30'00"
D=8°00'00"
D=0°15'00"
D=0°30'00"
Ls=400'
Ls=200'
S43°23'05"E
S48°03'24"E
100' Pav't. Transition
100' Pav't. Transition
200' Shoulder Transition
40:1 Taper

Note: The section of concrete median for the 22'x6' reserve area (Impact Attenuator No. 1) shall be constructed without a crown.

DETAIL A Not to Scale
0'-6" face of Guard Rail to edge of backwall
30" ϕ
Attenuator Backwall
Install Type 5 G.R. with Std. Terminal as per Std. Dwg. G.R. 2-A 0'-6" inside attenuator backwall

For details of the Concrete Barrier at the Bridge Piers, Sta. 860+40 to Sta. 866+82 See Sheet 107 and Std. Drwg MC-9 Dated 1-1-74.

For contours and Pavement Detail see Cul-de-sac detail sheet 64.

PROPOSED STRUCTURE CUY-80-1585

TYPE: Continuous steel girders with reinforced concrete deck and substructure.
SPANS: 57'-0", 83'-0⅜", 120'-7½", 117'-2⅞", and 97'-2" (Measured along S.R. 17)
ROADWAY: Varies 60'-0" to 72'-0" Curb to Curb with raised median and two 5'-0" sidewalks.
LOADING: HS 20-44
SKEW: Varies (See Plan)
APPROACH SLABS: Southwest 20'-0", Northeast 30'-0" } AS-1-72 Mod.
ALIGNMENT: Tangent, 8°00'00" Right (Along ℄ S.R. 17)
SUPERELEVATION: Normal ±.0156 ft. per ft. to +.0156 ft. per ft.
Wearing Surface: 1" Latex Modified Concrete

JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT
(3) STANDARD CONTRACTION JOINT
(4) KEY JOINT WITHOUT TIE BARS

LANE JN-OBE
Shld. Slope -.042"/'
Shld. Slope -.0156"/'
Shld. Slope -.0156"/'
Shld. Slope -.0156"/'
69
73
125'
12.33 12.22 12.51 12.75 13.00 13.04 13.03
℄ RAMP G-E
NOSE DETAIL WITH SHOULDER ELEVATIONS

GUARD RAIL

Ref. No.	Station From	Station To	Side	202 Guard Rail Removed
				Lin. Ft.
E-1	18+12 SR 17	862+25	Rt.	455
E-2	11+05 SR 17	6+33	Lt.	890
E-3	6+33 Tux.	28+20 SR 17	Lt.	1100
E-4	93+75 OBE-JN	24+40 S.R. 17	Rt.	385
E-5	25+40	29+20	Rt.	380
		Total		3210

SCALE 1"=50'
MADE P.J.T. DATE 1-19-68
TRCD M.A.G. DATE 1-19-58
CKD. R.B.H. DATE 7/13/70 8-6-74

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

50 0 50 100
SCALE IN FEET

Rev. 10-16-74

PAVEMENT PLAN STA. 860+00 TO STA. 875+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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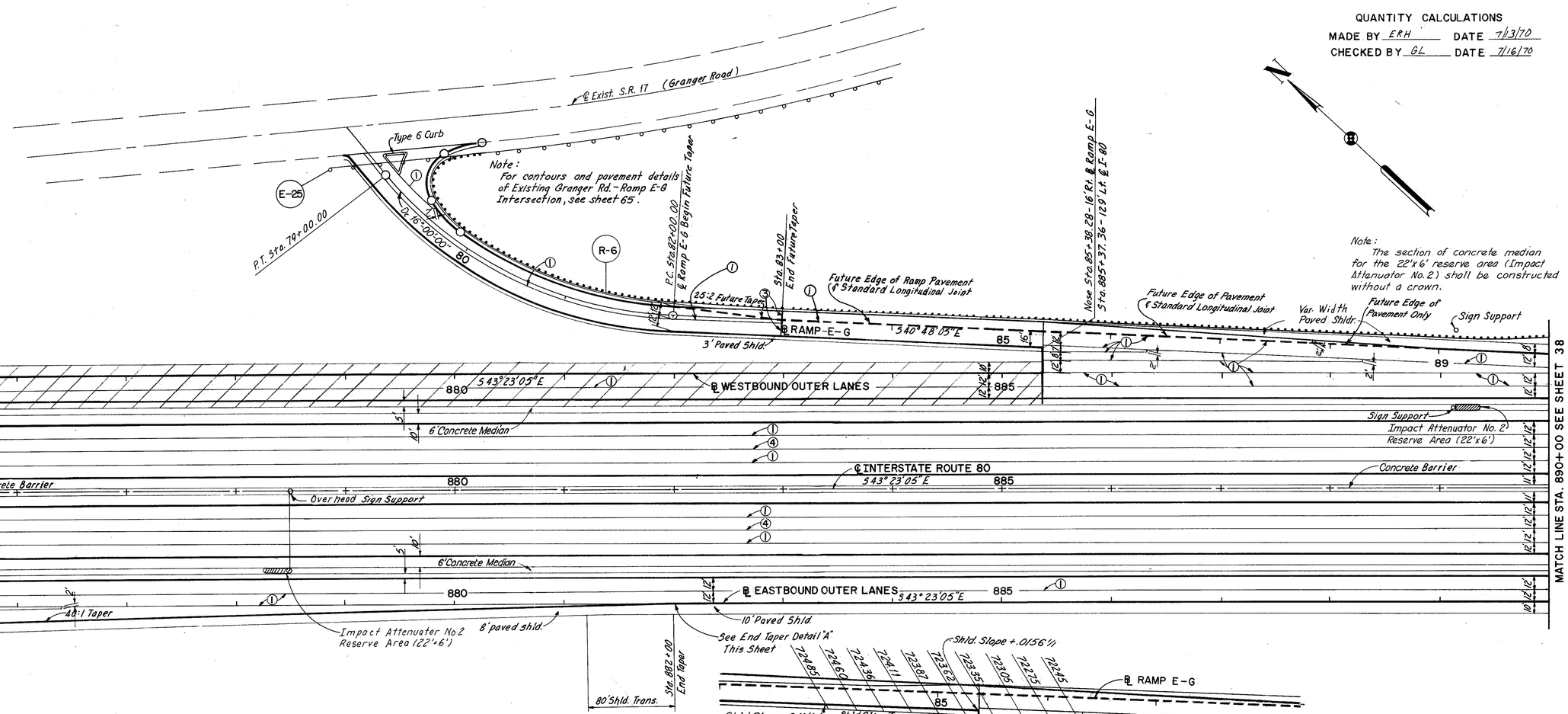
PAVEMENT & PAVED BERMS NOT A PART OF THIS PROJECT. SEE NOTE ON SH. 28.

CUYAHOGA COUNTY
CUY.– 80–15.81

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70



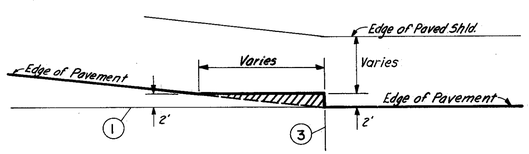
Note:
The section of concrete median for the 22'x6' reserve area (Impact Attenuator No. 2) shall be constructed without a crown.

JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT

(3) STANDARD CONTRACTION JOINT

(4) KEY JOINT WITHOUT TIE BARS



DETAIL "A"
Scale: 1" = 100'

NOSE DETAIL WITH SHOULDER ELEVATIONS

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

Ref. No.	Station From	Station To	Side	GUARD RAIL 202 Guard Rail Removed Lin. Ft.	GUARD RAIL 606 Guard Rail Type 5 Lin. Ft.	Special Impact Attenuator No. 2 Each
R-6	33+57 SR-17	90+00 E-G	Lt.		1075	
	889+10.00		Lt.			1
	878+50		Rt.			1
E-25	32+15 SR-17	33+57	Rt.	142		
	Totals			142	1075	2

50 0 50 100
SCALE IN FEET

SCALE 1"=50'
MADE RJT DATE 4-19-68
TRCD MAG DATE 4-23-68
CKD RBH DATE 7-14-70
NB 9-6-74

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

Rev. 10-16-74

PAVEMENT PLAN STA. 875+00 TO STA. 890+00

GUARD RAIL						
Ref. No.	Station		Side		606 Anchor Assembly	606 Guard Rail Type 5
	From	To			Each	Lin. Ft.
R-8	894+00 W.B.O.L.	904+25	Lt.		2	975
R-9	892+00 E.B.O.L.	902+50	Rt.		2	1000
R-36	890+00 W.B.O.L.	890+50	Rt.		1	25
		Totals			5	2000

CUY-80-1654

20'-0"x15'-0" Reinforced Concrete Arch Culvert with paved stream bed and stilling basin at outlet.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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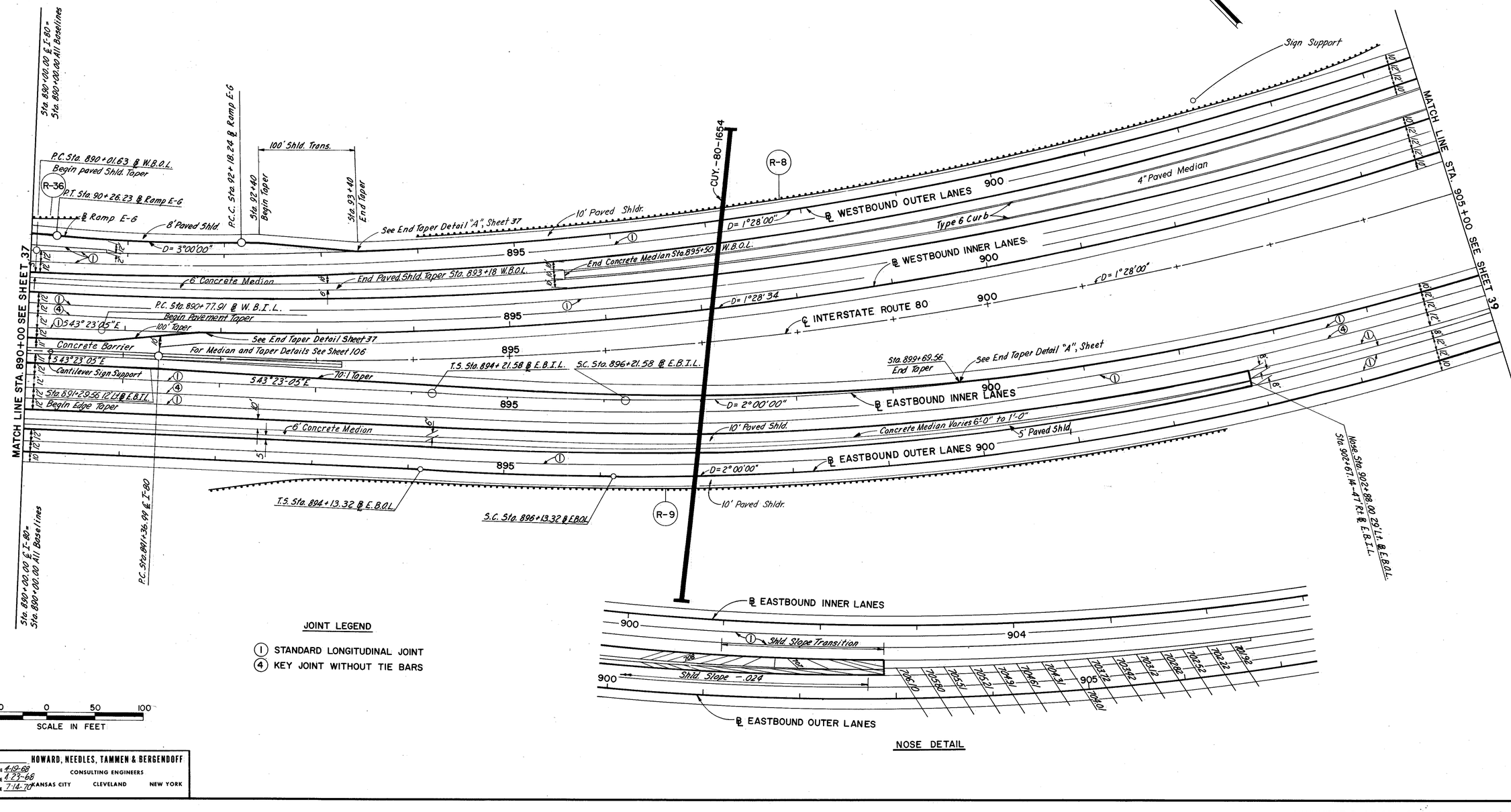
CUYAHOGA COUNTY
CUY.-80-15.81

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70



SCALE 1"=50'
MADE RJT DATE 4-19-68
TRCD. MPG DATE 4-23-68
CKD. RBH DATE 7-14-70

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

PAVEMENT PLAN STA. 890+00 TO STA. 905+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-80-15.81

PROPOSED STRUCTURE CUY-80-1685

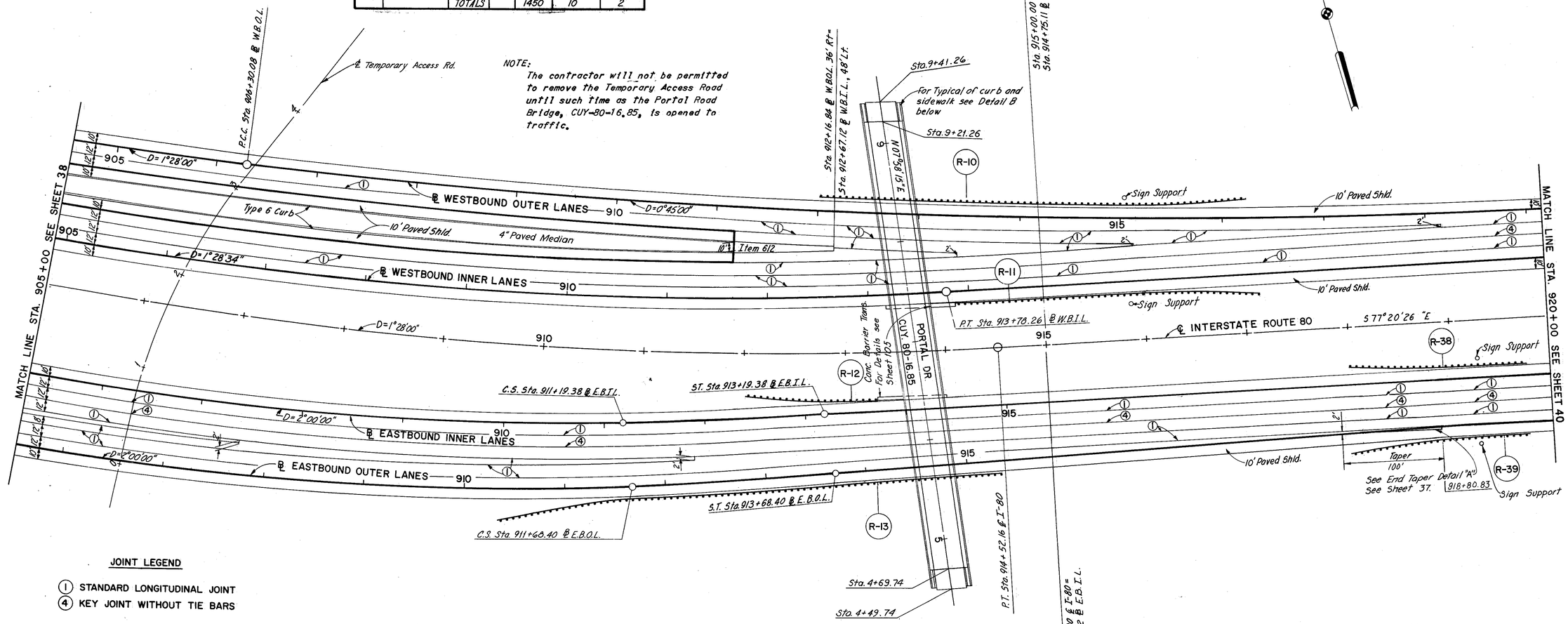
TYPE: Continuous welded steel girder with reinforced concrete deck and substructure
SPANS: 68'-6", 105'-0", 90'-9", 109'-5" and 73'-3"
ROADWAY: 26'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 5°56'29" Left Forward
WEARING SURFACE: 1" Latex Modified Concrete
APPROACH SLABS: AS-1-67 (20'-0" Long) (Modified)
ALIGNMENT: Tangent
SUPERELEVATION: Normal cross slope-$\frac{3}{16}$" per ft.

GUARD RAIL

Ref. No.	Station From	Station To	Side	606 Guard Rail Type 5	606 Anchor Assembly	606 Bridge Terminal Assembly Type A
				Lin.Ft.	Each	Each
R-10	912+05 WBOL	916+30	Lt.	375	2	
R-11	914+05 I-80	917+05	Lt.	275	1	1
R-12	912+04 I-80	913+2	Rt.	100	1	1
R-13	910+36 EBOL	915+32	Rt.	450	2	
R-38	918+00 I-80	919+75	Rt.	125	2	
R-39	918+00 I-80	919+75	Rt.	125	2	
		TOTALS		1450	10	2

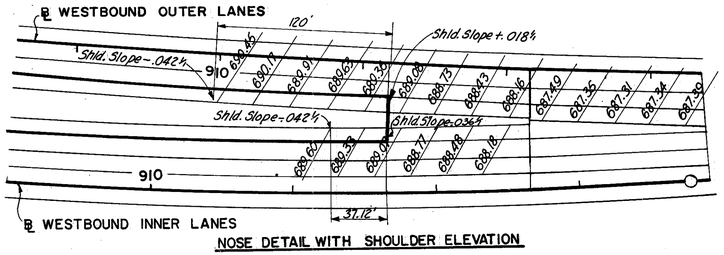
QUANTITY CALCULATIONS
MADE BY R.J.T. DATE 4-19-68
CHECKED BY R.B.H. DATE 7-14-70

NOTE:
The contractor will not be permitted to remove the Temporary Access Road until such time as the Portal Road Bridge, CUY-80-16.85, is opened to traffic.

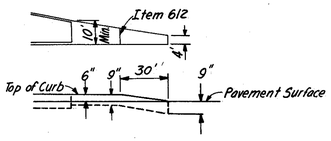


JOINT LEGEND

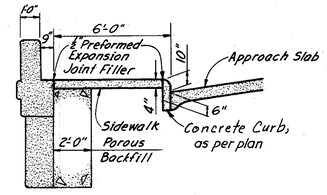
(1) STANDARD LONGITUDINAL JOINT
(4) KEY JOINT WITHOUT TIE BARS



NOSE DETAIL WITH SHOULDER ELEVATION



EXIT NOSE PROFILE



DETAIL - B

50 0 50 100
SCALE IN FEET

SCALE 1"=50'
MADE RJT DATE 4-19-68
TRCD. M.A.G DATE 4-23-68
CKD. RBH DATE 7-14-70

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

PAVEMENT PLAN STA. 905+00 TO STA. 920+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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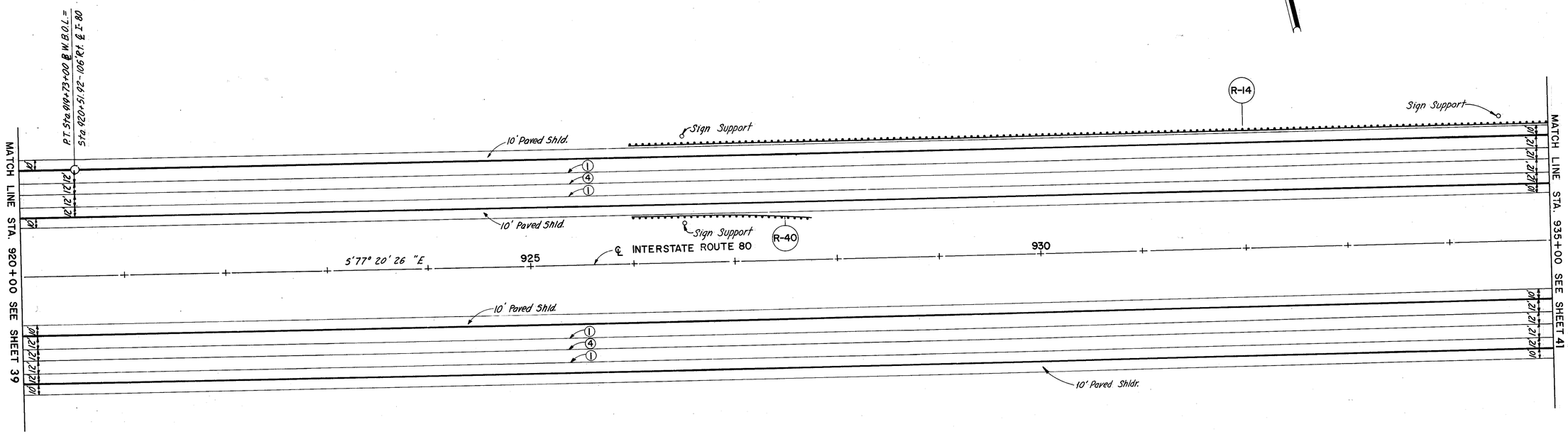
CUYAHOGA COUNTY
CUY.– 80– 15.81

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70

GUARD RAIL						
Ref. No.	Station		Side		606 Anchor Assembly	606 Guard Rail Type 5
	From	To			Each	Lin. Ft.
R-14	926+00	935+00	Lt.		1	875
R-40	926+00	927+75	Lt.		2	125
		Totals			3	1000



JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT
(4) KEY JOINT WITHOUT TIE BARS

50 0 50 100
SCALE IN FEET

SCALE 1"=50'
MADE RJT DATE 4-19-68
TRCD. MAG DATE 4-28-68
CKD. RBH DATE 7/13/70

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

PAVEMENT PLAN STA. 920+00 TO STA. 935+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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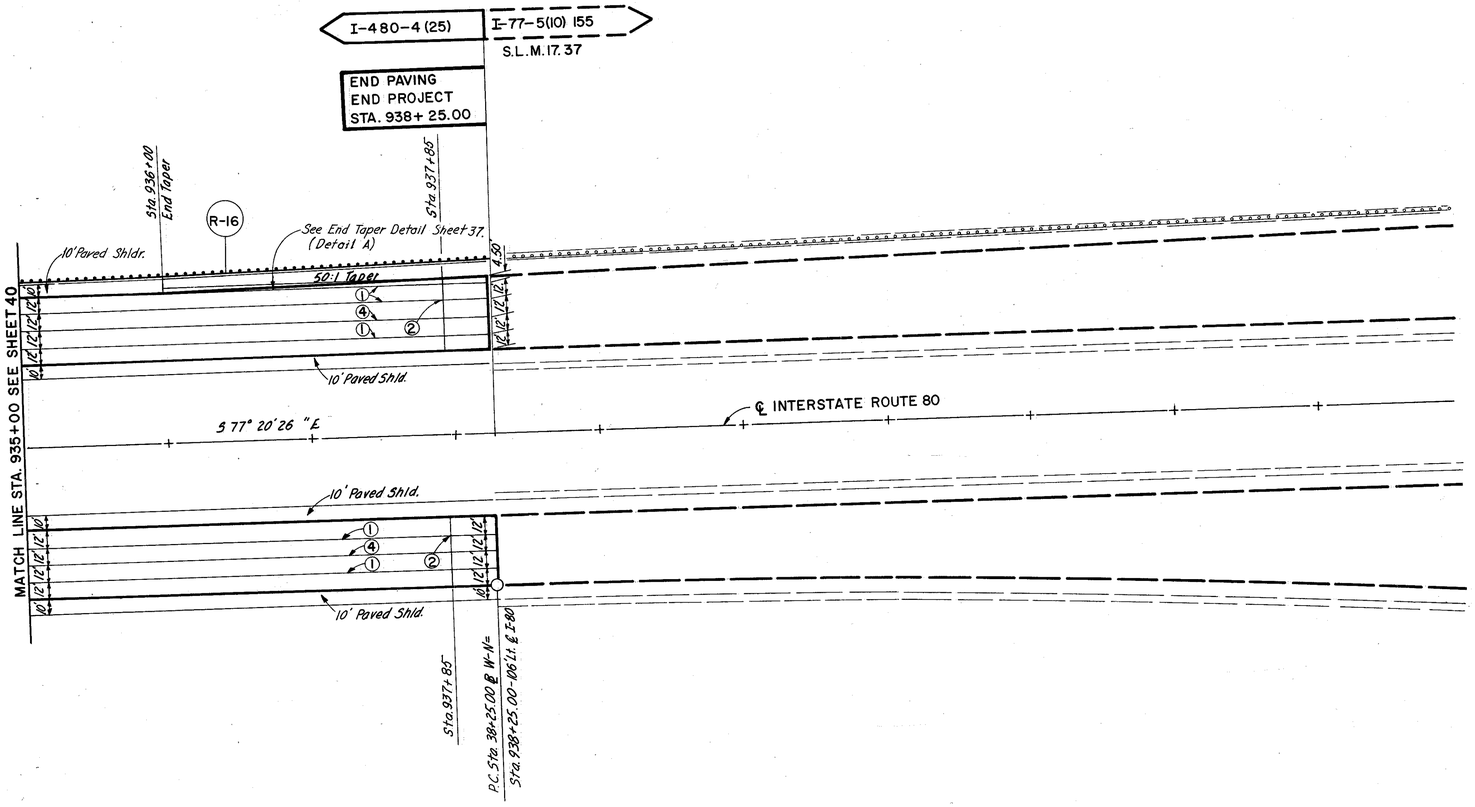
CUYAHOGA COUNTY
CUY.– 80–15.81

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70



N

GUARD RAIL					
Ref. No.	Station		Side	606 Guard Rail Type 5	
	From	To		Lin.Ft.	
R-16	935+00	938+25	Lt.	325	
		Totals		325	

JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT
(2) FLANGE BEAM JOINT
(4) KEY JOINT WITHOUT TIE BARS

50 0 50 100
SCALE IN FEET

SCALE 1"=50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE RLT DATE 4-19-69 CONSULTING ENGINEERS
TRCD. M.A.G. DATE 4-25-69 KANSAS CITY CLEVELAND NEW YORK
CKD. RBH DATE 7/19/70

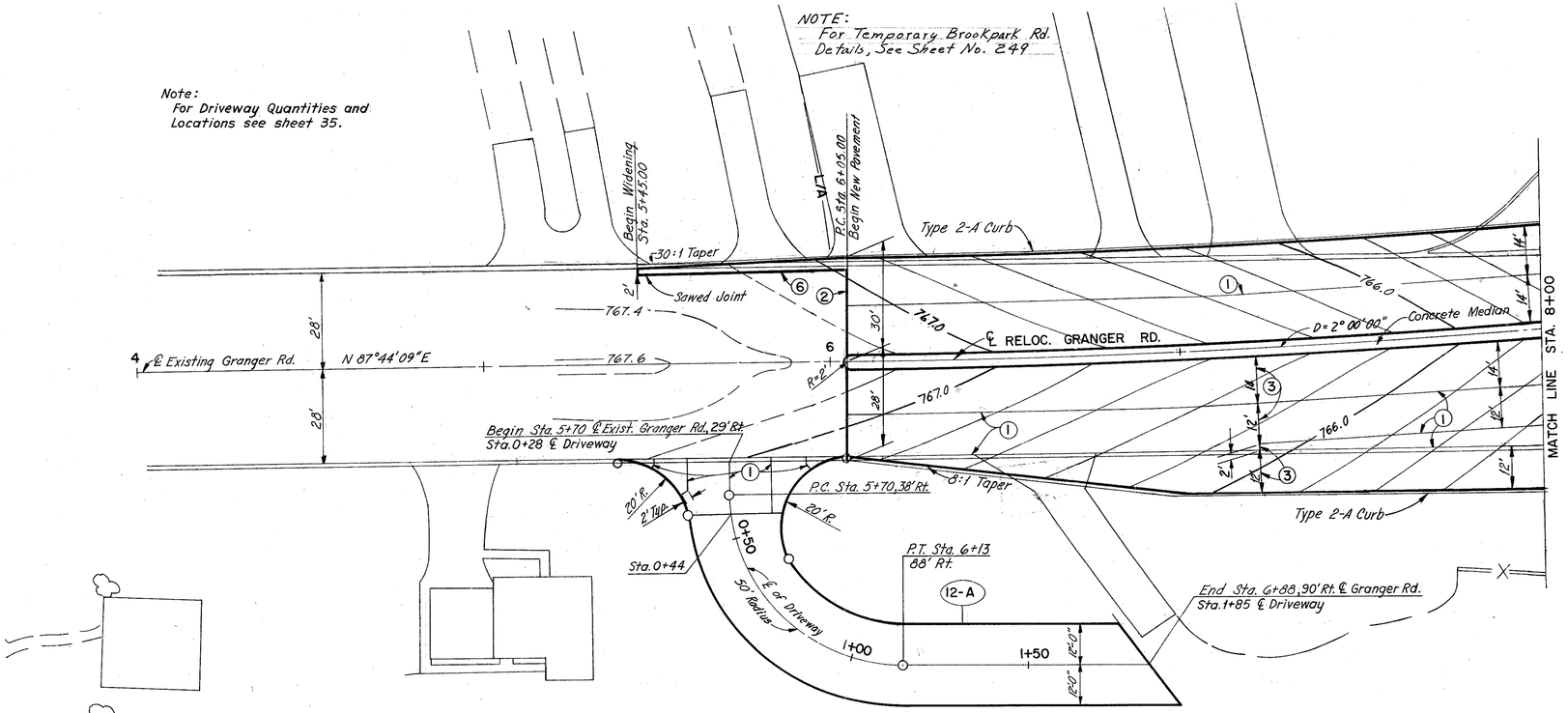
PAVEMENT PLAN STA. 935+00 TO STA. 938+25

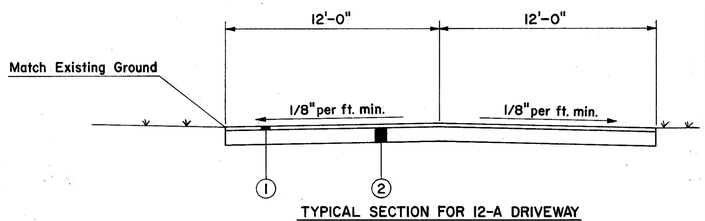
PLAN	
SURVEYED	
PLOTTED	TPM
ALIGNMENT CHECKED	RJT
GRADES CHECKED	
R. M.'s NOTED	
STRUCTURE NOTATIONS CHKD	
NOTE BOOK	
NO.	
DATE	6-6-68

PROFILE	
SURVEYED	
PLOTTED	TPM
GRADES CHECKED	RJT
R. M.'s NOTED	
STRUCTURE NOTATIONS CHKD	
NOTE BOOK	
NO.	
BY	TPM RJT
DATE	6-6-68 7-1-68

NOTE:
For Temporary Brookpark Rd.
Details, See Sheet No. 249

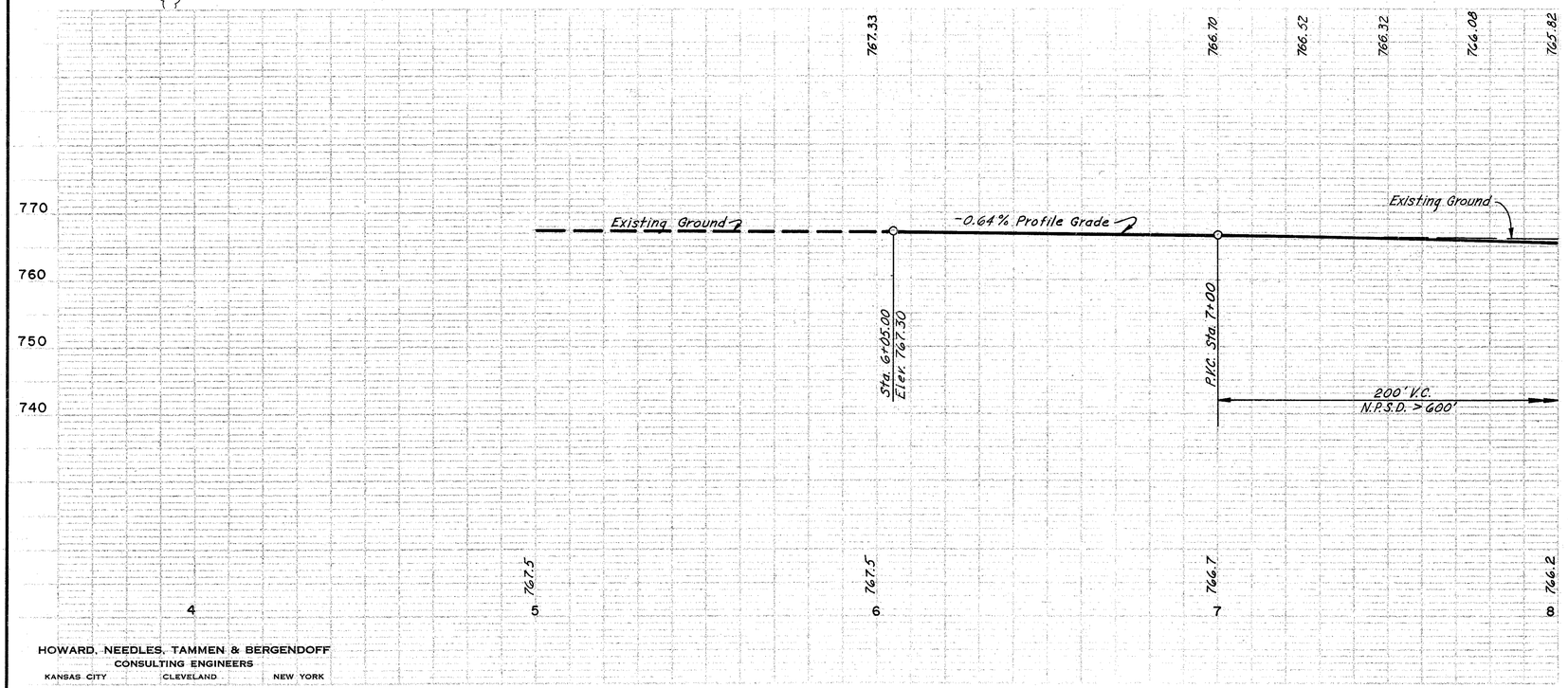
Note:
For Driveway Quantities and
Locations see sheet 35.





TYPICAL SECTION FOR 12-A DRIVEWAY
STA. 0+44.0 TO STA. 1+85.0

LEGEND
(1) ITEM 404 Asphalt Concrete (85-100 or AC-20)
(2) ITEM 301 Bituminous Aggregate Base



QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7/13/70
CHECKED BY D.L. DATE 7/16/70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY-80-15.81

DRIVES AND APPROACHES

Ref No.	Station	Side	Type	Width	203 Exc. Not Including Embankment	301 Bituminous Aggregate Base 5"	404 Asphalt Concrete 1"	452 P.C.C. for Drives 8"	Profile Sheet No.
				Ft.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Sq. Yds.	
12-A	5+70	Rt.	Bus.	24	11.5	52.2	10.4	76.6	127
		Total			11.5	52.2	10.4	76.6	

JOINT LEGEND
(1) Standard Longitudinal Joint
(2) Standard Expansion Joint
(3) Standard Contraction Joint
(6) Expansion Anchor Bolt Joint

20 0 20 40
Scale in Feet

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

RELOCATED GRANGER ROAD STA. 4+00 TO STA. 8+00

PLAN	DATE
SURVEYED	
PLOTTED	7-6-68
NOTE BOOK ALIGNMENT CHECKED.	TPM
RT OF WAY CHECKED.	
NO.	

PROFILE	BY	DATE
SURVEYED		
PLOTTED	TPM	6-6-68
NOTE BOOK GRADES CHECKED.	RVF	7-1-68
B. M. + NOTED		
STRUCTURE NOTATIONS CHKD		
NO.		

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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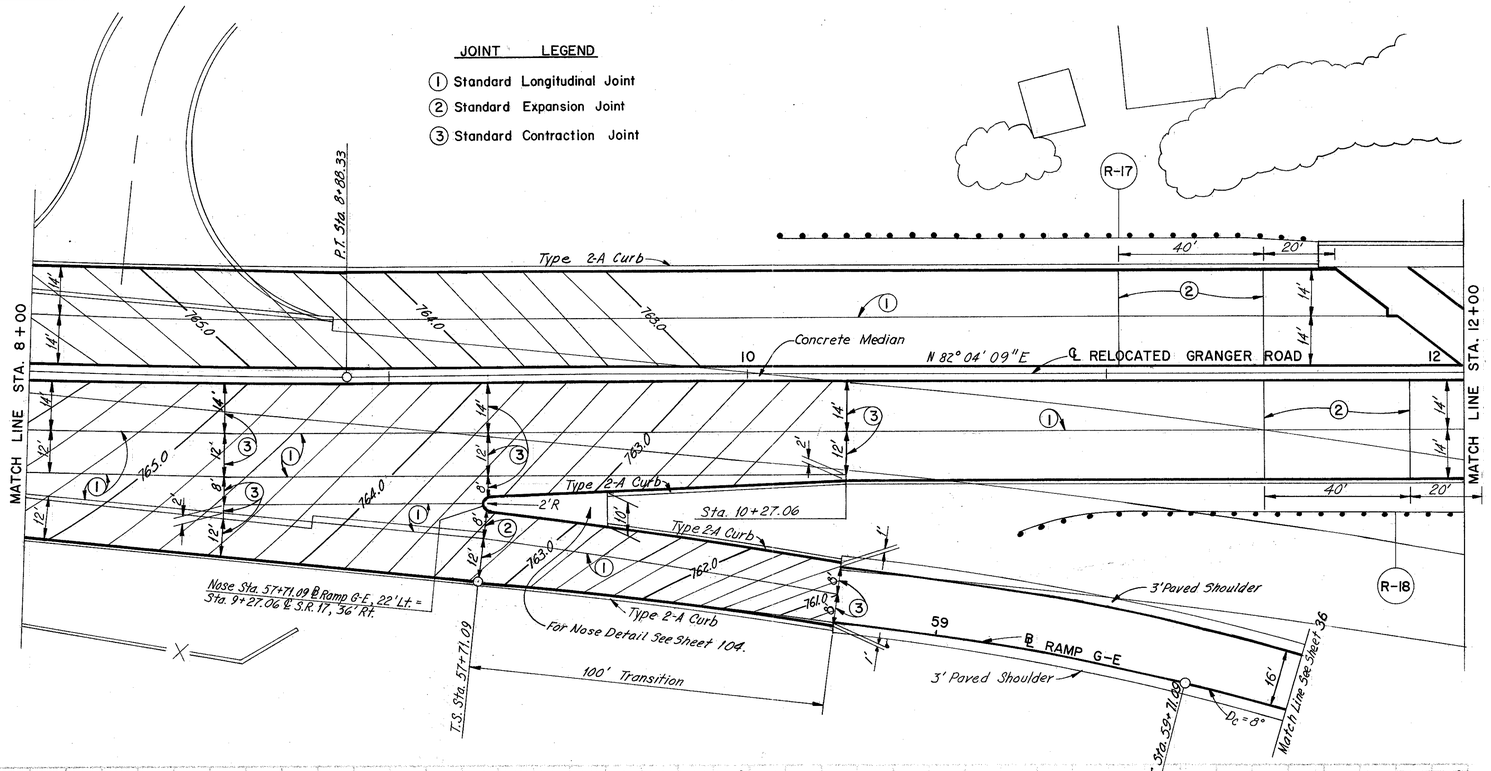
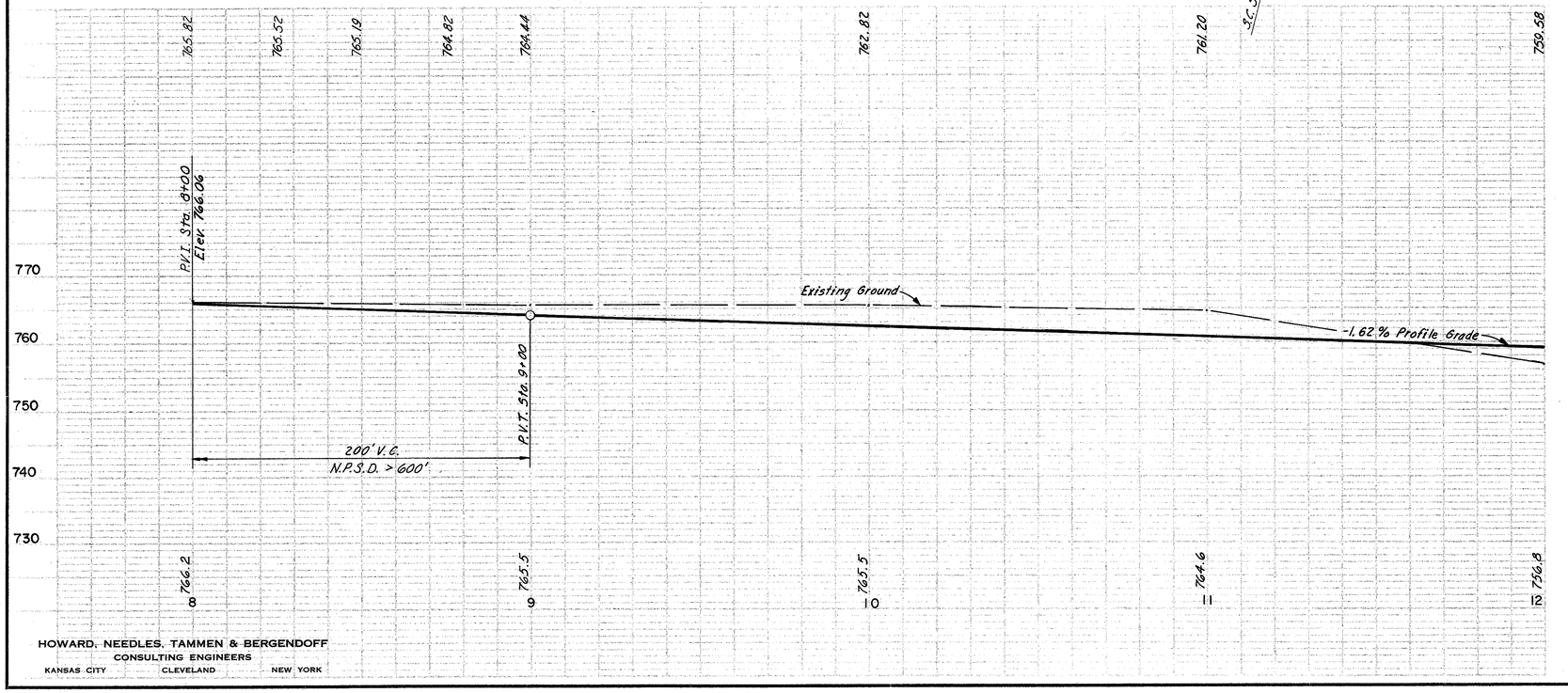
392

CUYAHOGA COUNTY
CUY-80-15.81

JOINT LEGEND
(1) Standard Longitudinal Joint
(2) Standard Expansion Joint
(3) Standard Contraction Joint





GUARD RAIL

Ref. No.	Station		Side	606 Guard Rail Type 5	606 Bridge Terminal Assembly, As Per Plan	606 Anchor Assembly
	From	To		Lin. Ft.	Each	Each
R-17	10+07	11+57	Lt.	125	1	1
R-18	10+75	12+00	Rt.	100		1
	Totals			225	1	2

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

20 0 20 40
Scale in Feet

RELOCATED GRANGER ROAD STA. 8+00 TO STA. 12+00

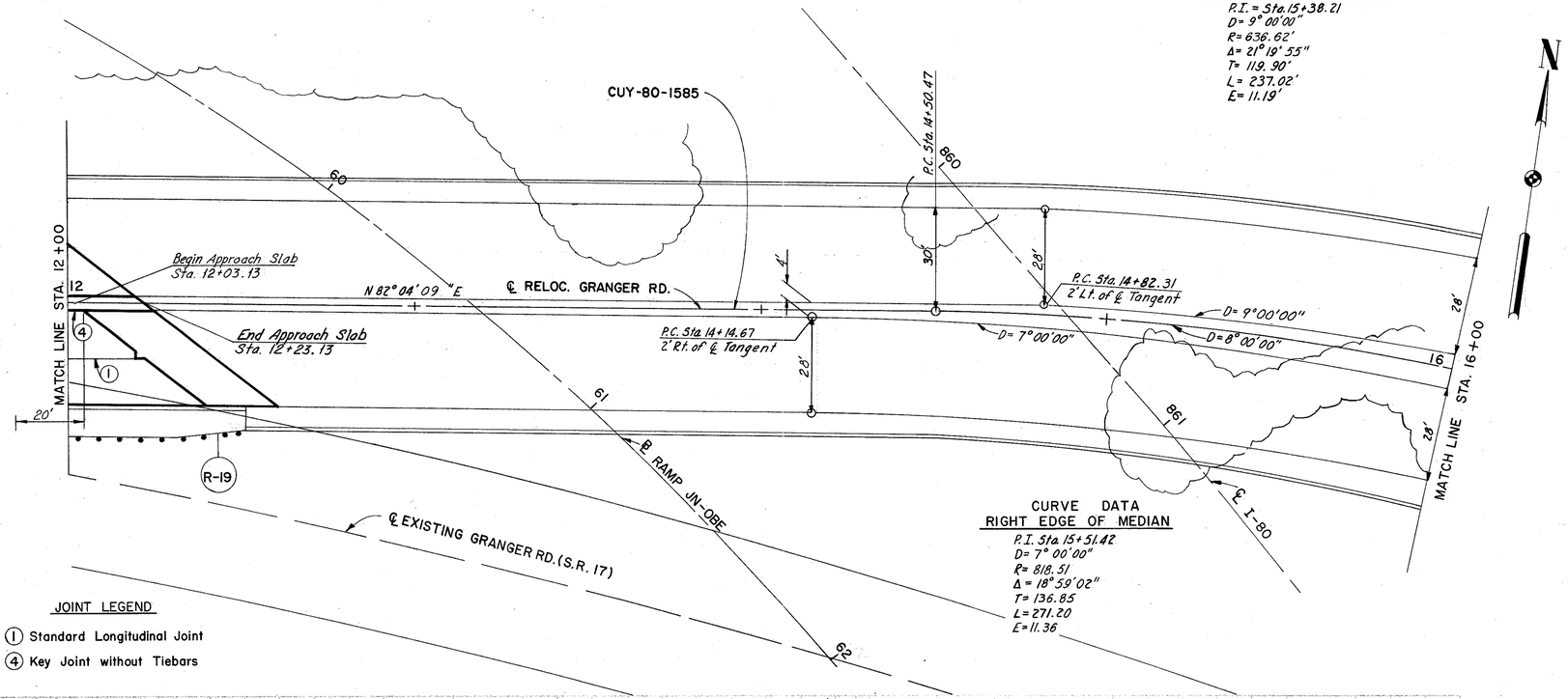
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

44
392

QUANTITY CALCULATIONS
MADE BY ERH DATE 7/13/70
CHECKED BY GL DATE 7/16/70

CUYAHOGA COUNTY
CUY-80-15.81

PLAN — SURVEYED — PLOTTED — NOTE BOOK — NO. — DRAWING CHECKED — ALIGNMENT CHECKED — PT. OF VAR. CHECKED — DATE 6-26-68 — BY TPM

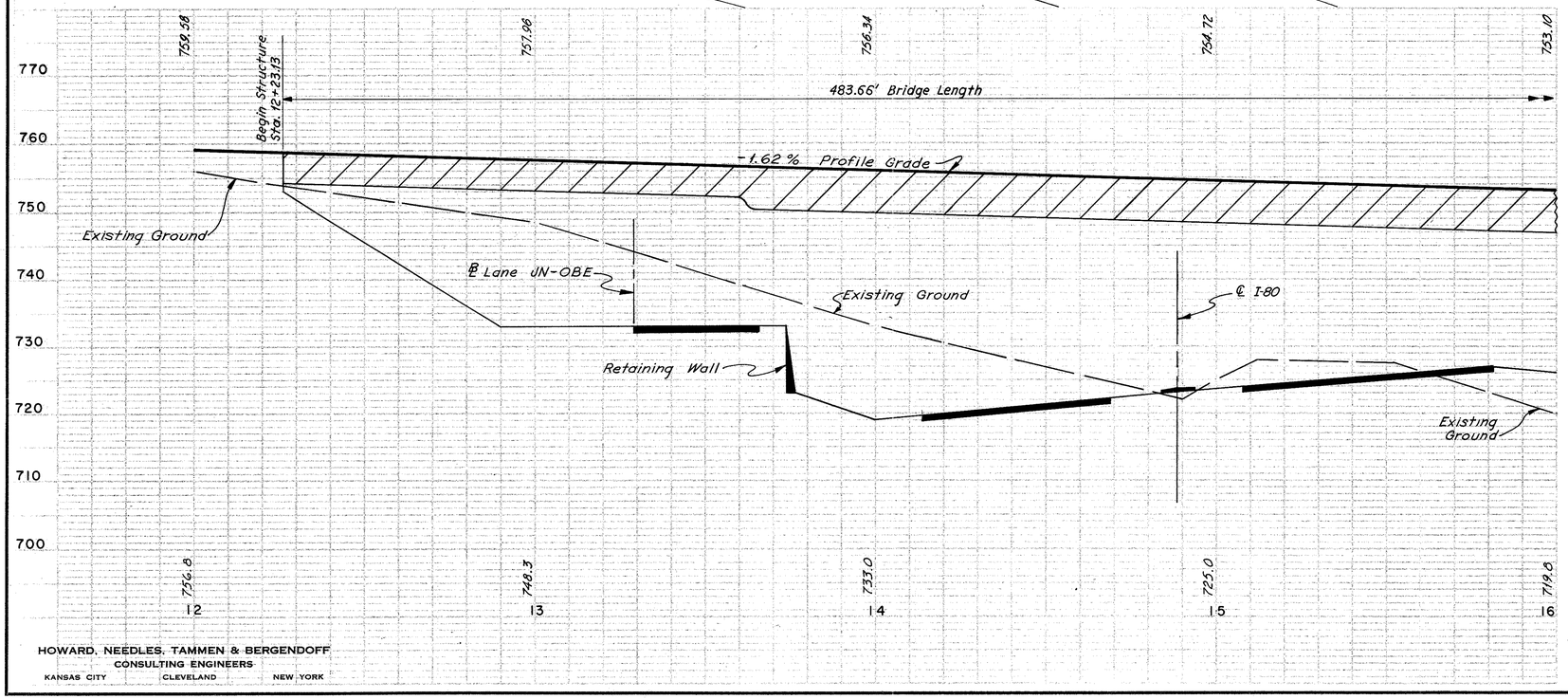


GUARD RAIL					
Ref. No.	Station		Side	606 Guard Rail Type 5	606 Bridge Terminal Assembly, As Per Plan
	From	To		Lin. Ft.	Each
R-19	12+00	12+50	Rt.	50	1
		Totals		50	1

PROPOSED STRUCTURE CUY-80-1585

TYPE: Continuous steel girders with reinforced concrete deck and substructure.
SPANS: 57'-0", 83'-0 15/16", 120'-7 1/8", 117'-2 3/8" and 97'-2" (Measured along S.R. 17)
ROADWAY: Varies 60'-0" to 72'-0" Curb to Curb with raised median and two 5'-0" sidewalks.
LOADING: HS 20-44
SKEW: Varies (See Plan)
APPROACH SLABS: Rear 20'-0", Forward 30'-0" } AS-1-72 Mod.
ALIGNMENT: Tangent, 8°00'00" Right (Along ℄ S.R. 17)
SUPERELEVATION: Normal ±.0156 ft. per ft. to ±.0156 ft. per ft.
WEARING SURFACE: 1" Latex Modified Concrete

PROFILE — SURVEYED — PLOTTED — NOTE BOOK — NO. — DRAWING CHECKED — BY M.K. NOTED. — STRUCTURE NOTATIONS CHECKED — BY TPM AGT — DATE 6-5-68 7-1-68



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

20 0 20 40
Scale in Feet

RELOCATED GRANGER ROAD STA. 12+00 TO STA. 16+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

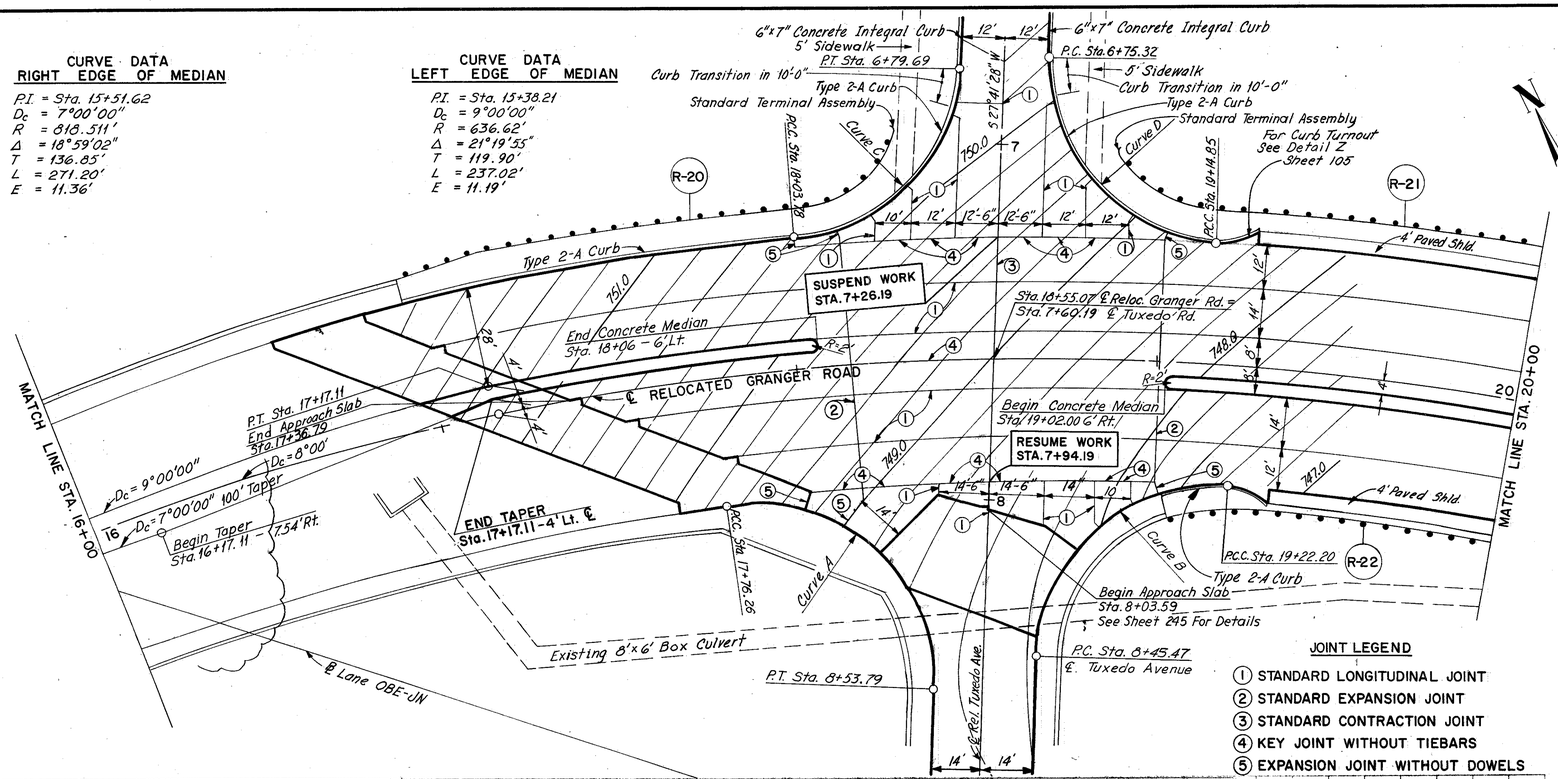
45
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7/13/70
CHECKED BY G.L. DATE 7/16/70

CURVE DATA RIGHT EDGE OF MEDIAN
P.I. = Sta. 15+51.62
D_c = 7°00'00"
R = 818.511'
Δ = 18°59'02"
T = 136.85'
L = 271.20'
E = 11.36'

CURVE DATA LEFT EDGE OF MEDIAN
P.I. = Sta. 15+38.21
D_c = 9°00'00"
R = 636.62'
Δ = 21°19'55"
T = 119.90'
L = 237.02'
E = 11.19'



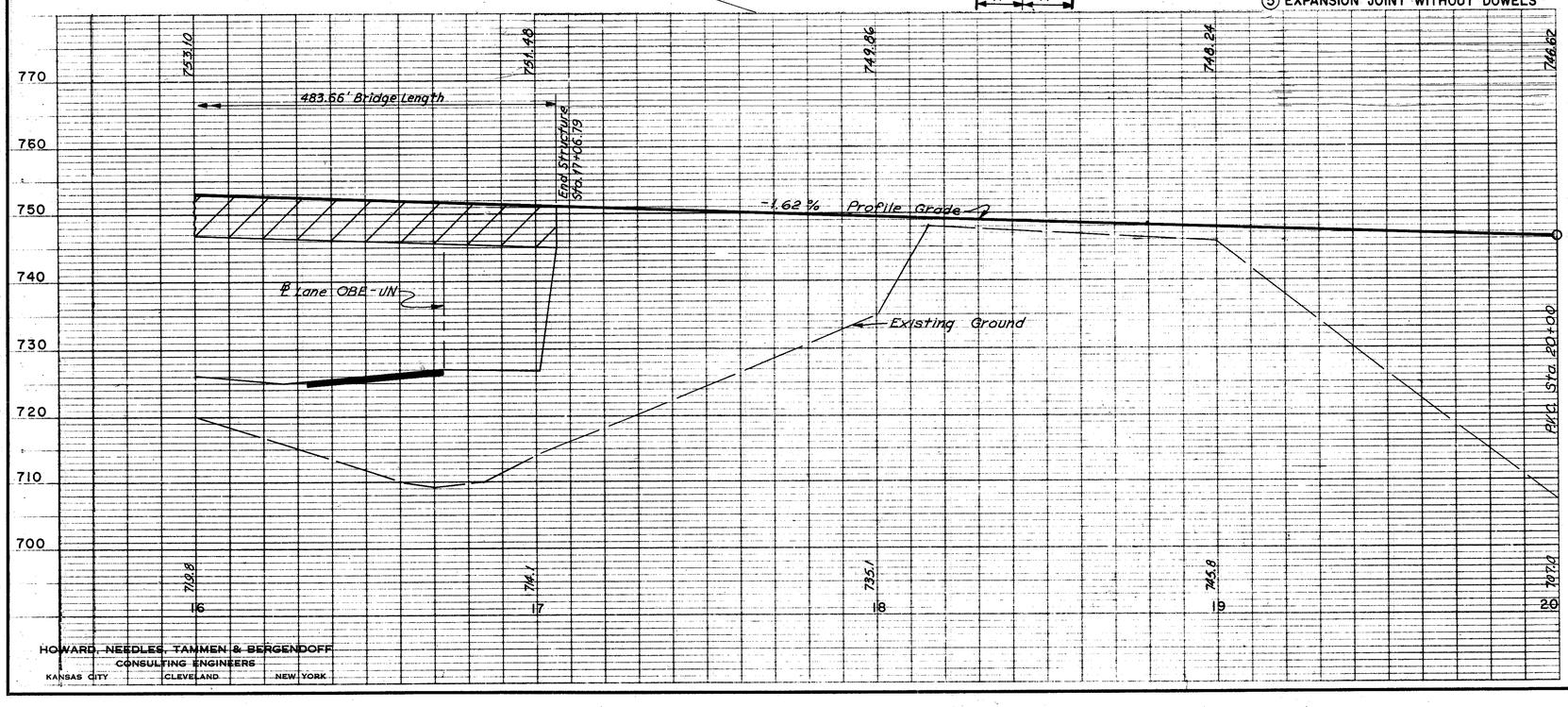
JOINT LEGEND
(1) STANDARD LONGITUDINAL JOINT
(2) STANDARD EXPANSION JOINT
(3) STANDARD CONTRACTION JOINT
(4) KEY JOINT WITHOUT TIEBARS
(5) EXPANSION JOINT WITHOUT DOWELS

FACE OF CURB — CURVE DATA

CURVE A	CURVE B	CURVE C	CURVE D
Δ= 82°43'05"	Δ= 88°28'14"	Δ= 99°33'29"	Δ= 92°07'03"
R= 50.00'	R= 50.00'	R= 50.00'	R= 50.00'
T= 44.02'	T= 48.68'	T= 59.12'	T= 51.88'
L= 72.18'	L= 77.20'	L= 86.88'	L= 80.39'
E= 16.62	E= 19.78'	E= 27.43'	E= 22.05

GUARD RAIL

Ref. No.	Station From	Station To	Side	606 Guard Rail Type 5 Lin. Ft.	606 Bridge Terminal Assembly As Per Plan
R-20	17+00	7+05 Tux.	Lt.	150	1
R-21	19+25	7+00 Tux.	Lt.	125	
R-22	19+00	20+00	Rt.	90	1
		Totals		365	2



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

20 0 20 40
Scale in Feet

RELOCATED GRANGER ROAD STA. 16+00 TO STA. 20+00

PLAN — SURVEYED: JOTTEL; DRAWN: JKED; NOTE BOOK: ALIGNMENT CHECKED; NO.: RT OF WAY CHECKED; B. M.'s NOTED; STRUCTURE NOTATIONS CHKD; BY: TJS; DATE: 6-6-68

PROFILE — SURVEYED: JOTTEL; DRAWN: JKED; NOTE BOOK: ALIGNMENT CHECKED; NO.: RT OF WAY CHECKED; B. M.'s NOTED; STRUCTURE NOTATIONS CHKD; BY: TJS, TJS, TJS; DATE: 6-6-68, 6-7-68, 7-7-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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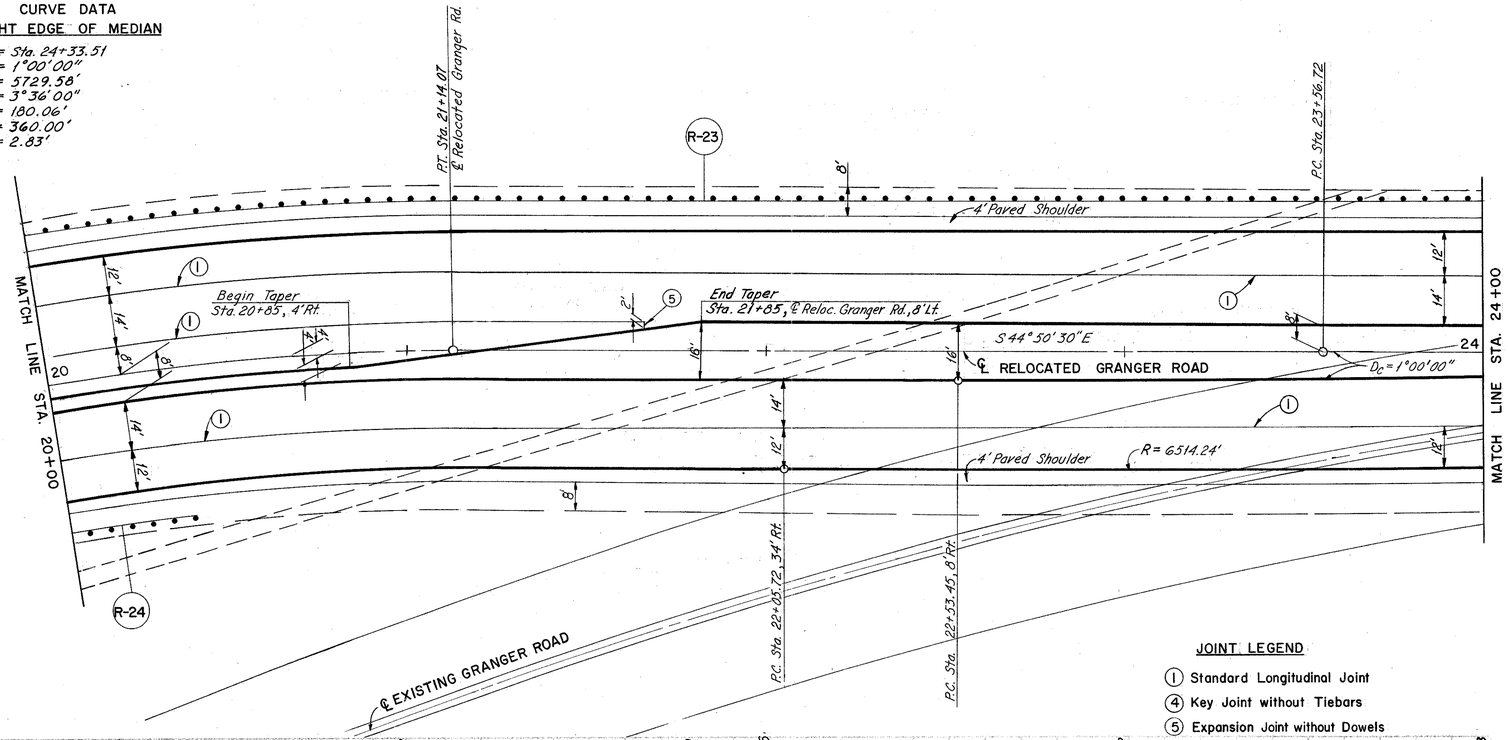
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7-13-70
CHECKED BY G.L. DATE 7-16-70

CURVE DATA
RIGHT EDGE OF MEDIAN

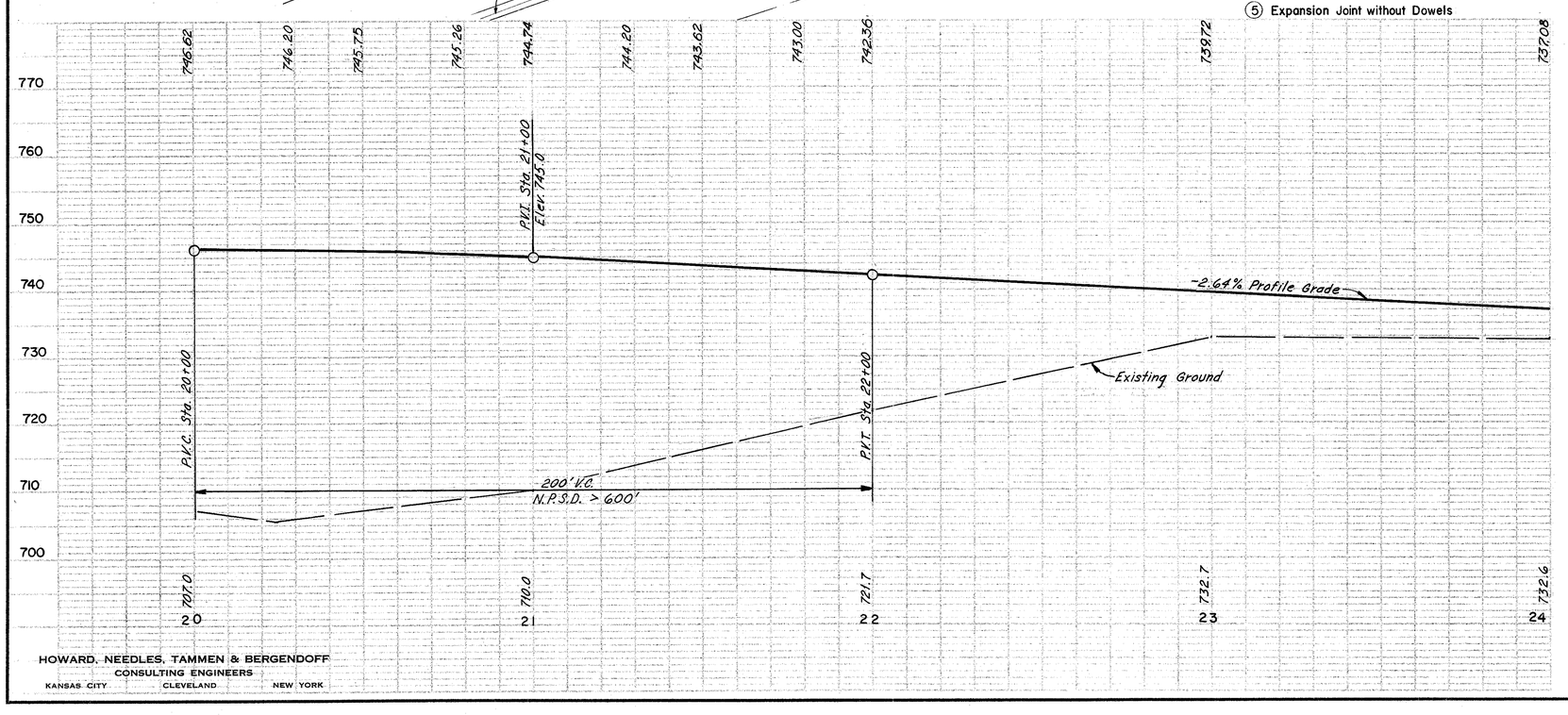
P.I. = Sta. 24+33.51
D = 1°00'00"
R = 5729.58'
Δ = 3°36'00"
T = 180.06'
L = 360.00'
E = 2.83'



JOINT LEGEND
(1) Standard Longitudinal Joint
(4) Key Joint without Tiebars
(5) Expansion Joint without Dowels

GUARD RAIL

Ref. No.	Station From	Station To	Side	606 Guard Rail Type 5 Lin.Ft.	606 Anchor Assembly Each
R-23	20 + 00	24 + 00	Lt.	400	
R-24	20 + 00	20 + 35	Rt.	10	1
	Totals			410	1



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

20 0 20 40
Scale in Feet

RELOCATED GRANGER ROAD STA. 20+00 TO STA. 24+00

PLAN
SURVEYED
PLOTTED
NOTE BOOK ALIGNMENT CHECKED
NO. RT OF WAY CHECKED
DATE

PROFILE
SURVEYED
PLOTTED
NOTE BOOK GRADES CHECKED
NO. B. M.'s NOTED
STRUCTURE NOTATIONS CHKD
DATE 6-6-68 7-1-69
BY TPM RVT

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7-13-70
CHECKED BY G.L. DATE 7-16-70

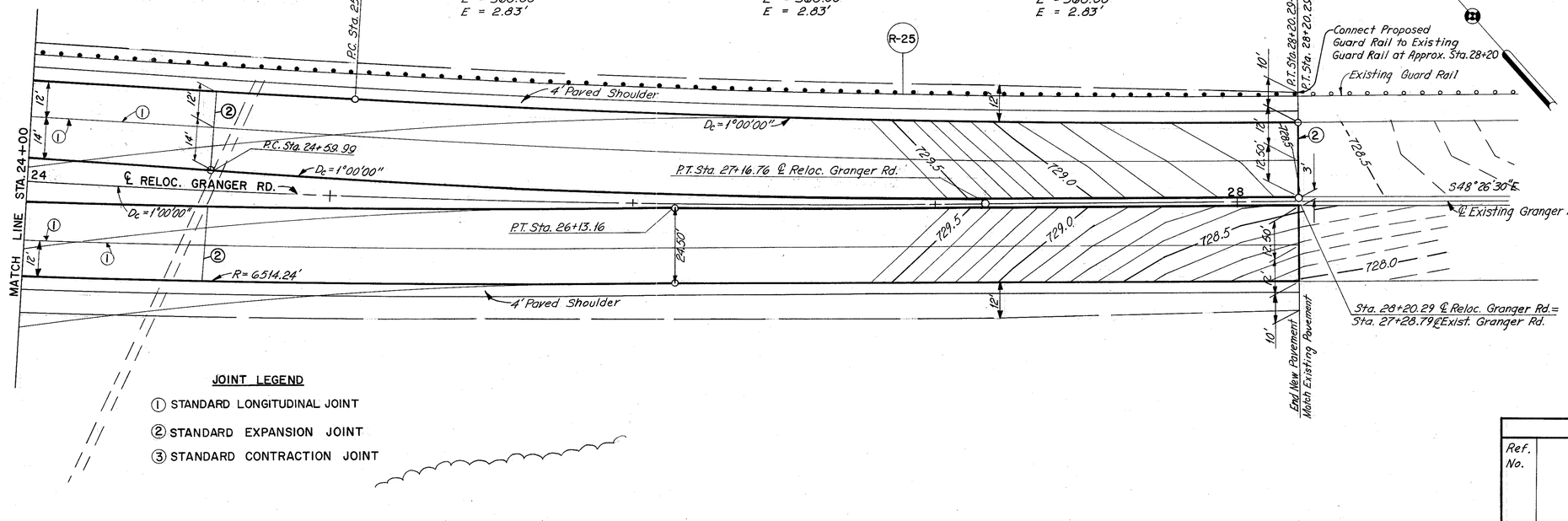
PLAN — SURVEYED: T.P.M. DATE: 6-6-68; PLOTTED: ; ALIGNMENT CHECKED: ; NOTE BOOK: ; RT OF WAY CHECKED: ; NO.:

PROFILE — SURVEYED: ; PLOTTED: ; GRADES CHECKED: ; B. M.'s NOTED: ; STRUCTURE NOTATNS CHKD: ; NO.: ; BY: ; DATE:

CURVE DATA
LEFT EDGE OF MEDIAN
P.I. = Sta. 26+40.65
D = 1°00'00"
R = 5729.58'
Δ = 3°36'00"
T = 180.06'
L = 360.00'
E = 2.83'

CURVE DATA
LEFT EDGE OF PAVEMENT
P.I. = Sta 26+37.78
D = 1°00'00"
R = 5729.58'
Δ = 3°36'00"
T = 180.06'
L = 360.00'
E = 2.83'

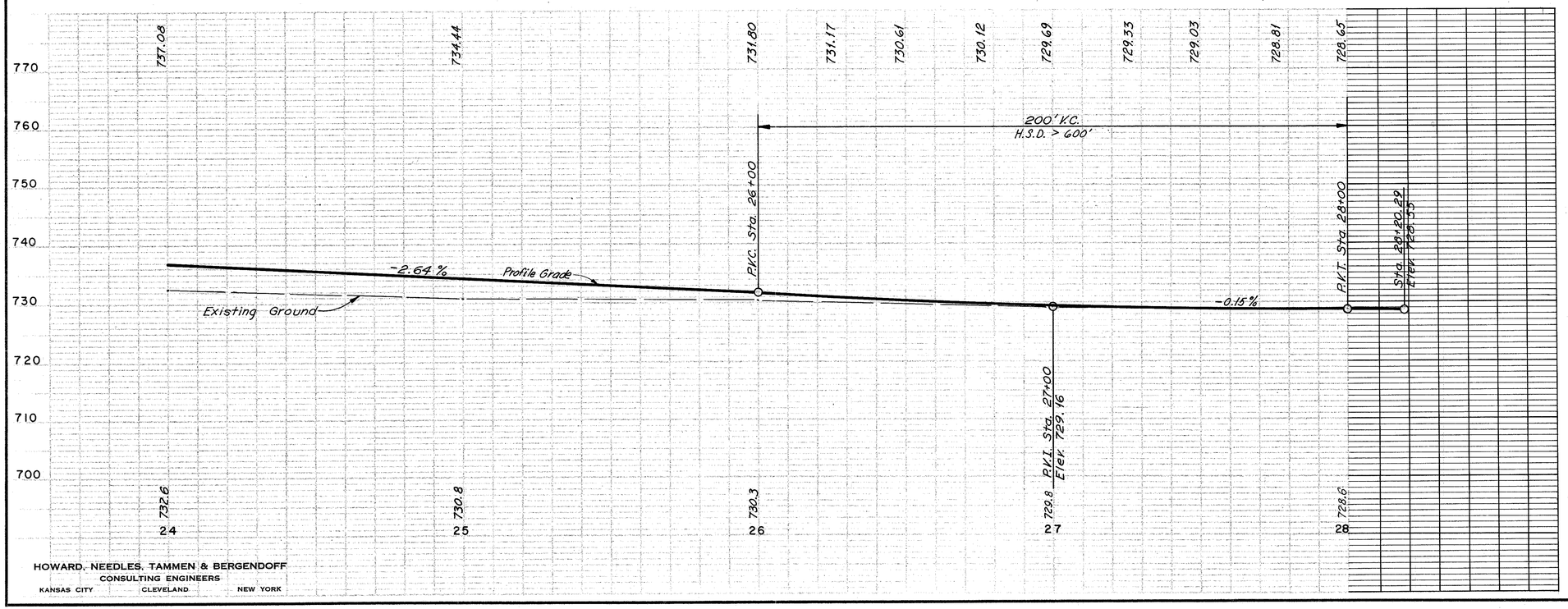
CURVE DATA
RIGHT EDGE OF MEDIAN
P.I. = Sta. 24+33.51
D = 1°00'00"
R = 5729.58'
Δ = 3°36'00"
T = 180.36'
L = 360.00'
E = 2.83'



JOINT LEGEND
① STANDARD LONGITUDINAL JOINT
② STANDARD EXPANSION JOINT
③ STANDARD CONTRACTION JOINT

GUARD RAIL

Ref. No.	Station From	Station To	Side	606 Guard Rail Type 5 Lin. Ft.
R-25	24 + 00	28 + 20	Lt.	417
		Totals		417



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

20 0 20 40
Scale in Feet

RELOCATED GRANGER ROAD STA. 24+00 TO STA. 28+20.29

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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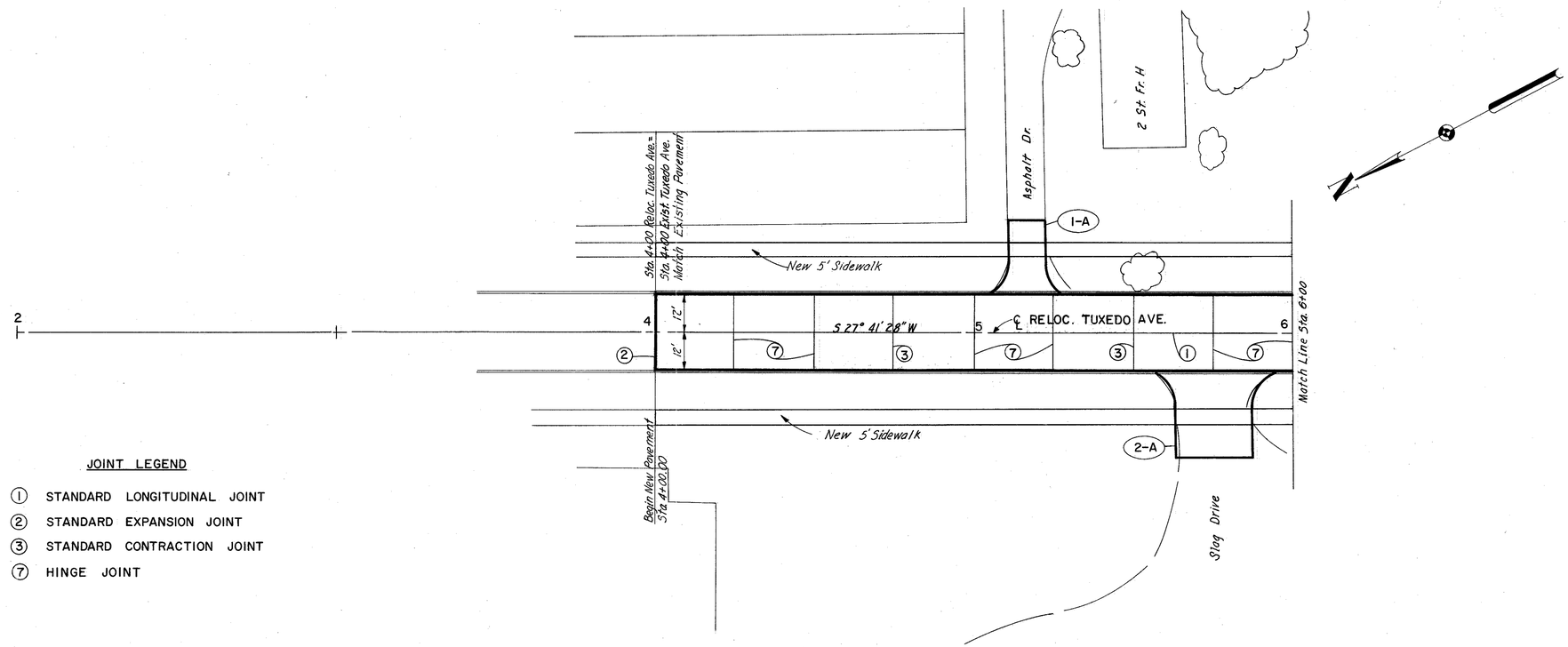
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7-13-70
CHECKED BY G.L. DATE 7-16-70

PLAN
SURVEYED
PLOTTED
NOTE BOOK ALIGNMENT CHECKED.
RT OF WAY CHECKED.
NO.
TPM 6-6-68

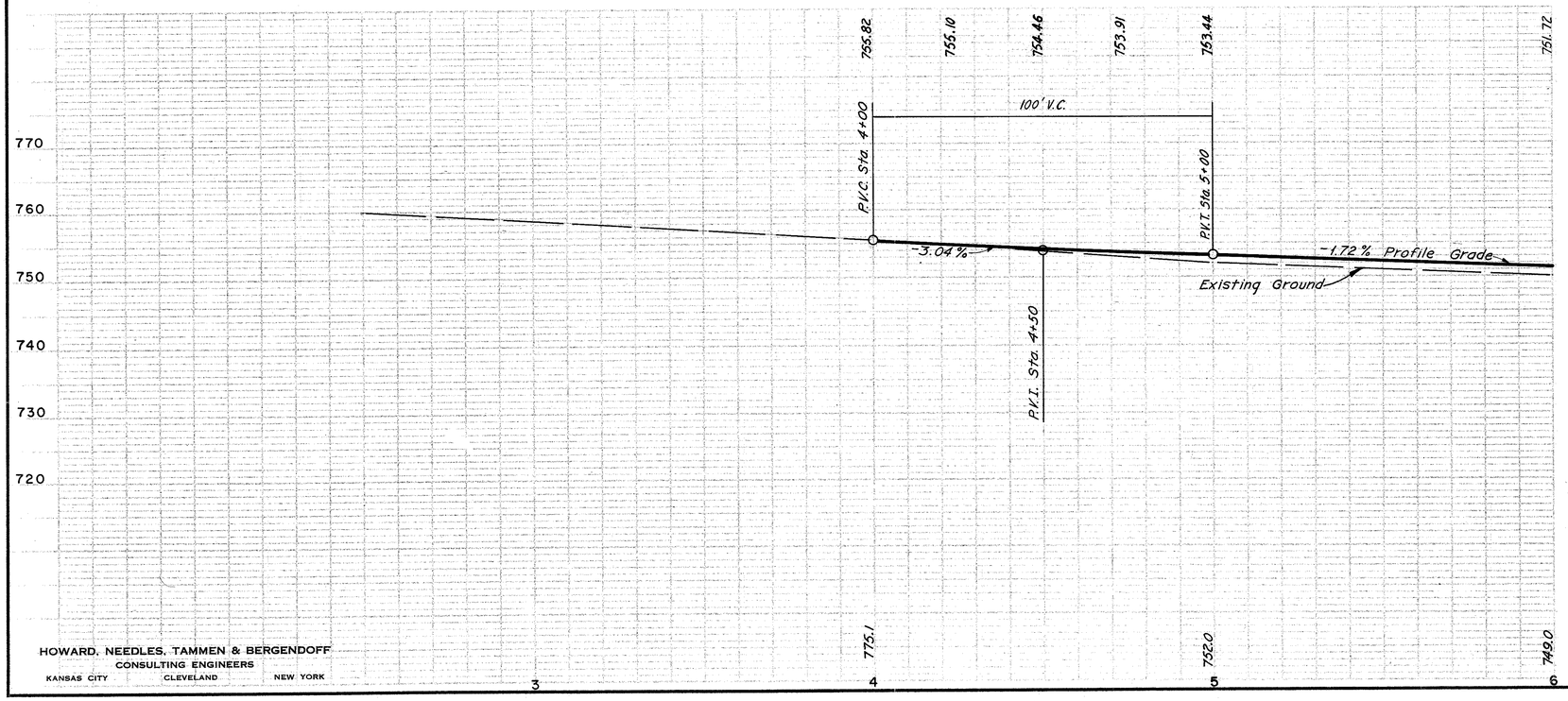


JOINT LEGEND

(1) STANDARD LONGITUDINAL JOINT
(2) STANDARD EXPANSION JOINT
(3) STANDARD CONTRACTION JOINT
(7) HINGE JOINT

PROFILE
SURVEYED
PLOTTED
NOTE BOOK GRADES CHECKED.
B. M. + NOTED
NO. STRUCTURE NOTATIONS CHKD

FPM 6-6-68
R.T. 6-25-68



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

DRIVE AND APPROACHES

Ref. No.	Station	Side	Type	Width		304 Aggregate Base		404 Asphalt Concrete 2½	408 Prime Coat	452 P.C.C. for Drives 8"	Profile Sheet No.
				Ft.		Cu. Yds.		Cu. Yds.	Gals.	Sq. Yds.	
1-A	5+12	Lt.	Bus.	12		1.93		0.60	3.5	26.51	125
2-A	5+71	Rt.	Bus.	24		7.78				45.40	125
		TOTAL				9.71		0.60	3.5	71.91	

ITEM 660 SODDING

Station From	Station To	Side	Length Ft.	Width Ft.	Area Sq. Yds.
4+00	6+00	Lt.	188	11.5	204.22
4+00	6+00	Rt.	179.5	11.5	221.69
TOTAL					461.91

20 0 20 40
Scale in Feet

RELOCATED TUXEDO AVENUE STA. 2+00 TO STA. 6+00

QUANTITY CALCULATIONS
MADE BY E.R.H. DATE 7-13-70
CHECKED BY G.L. DATE 7-15-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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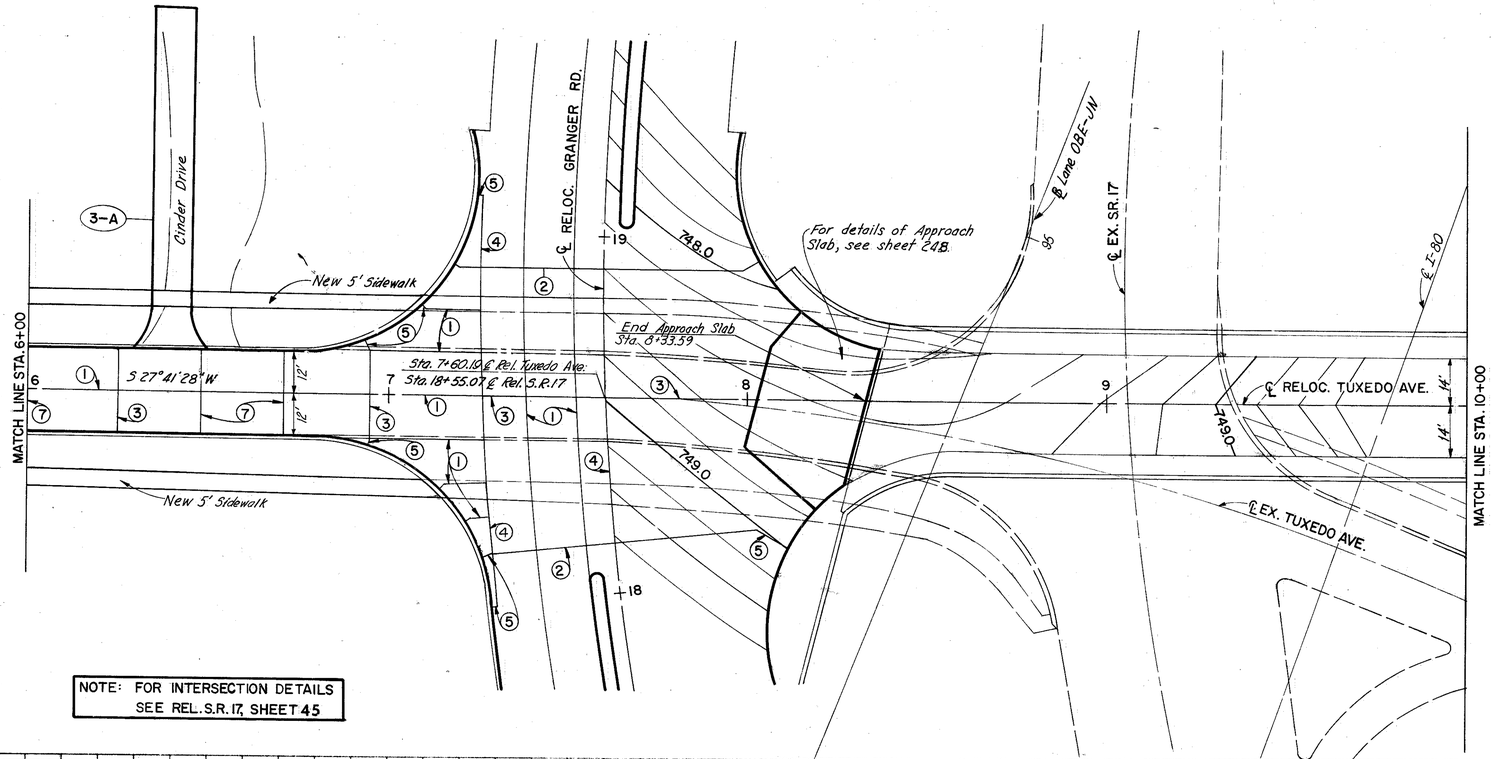
392

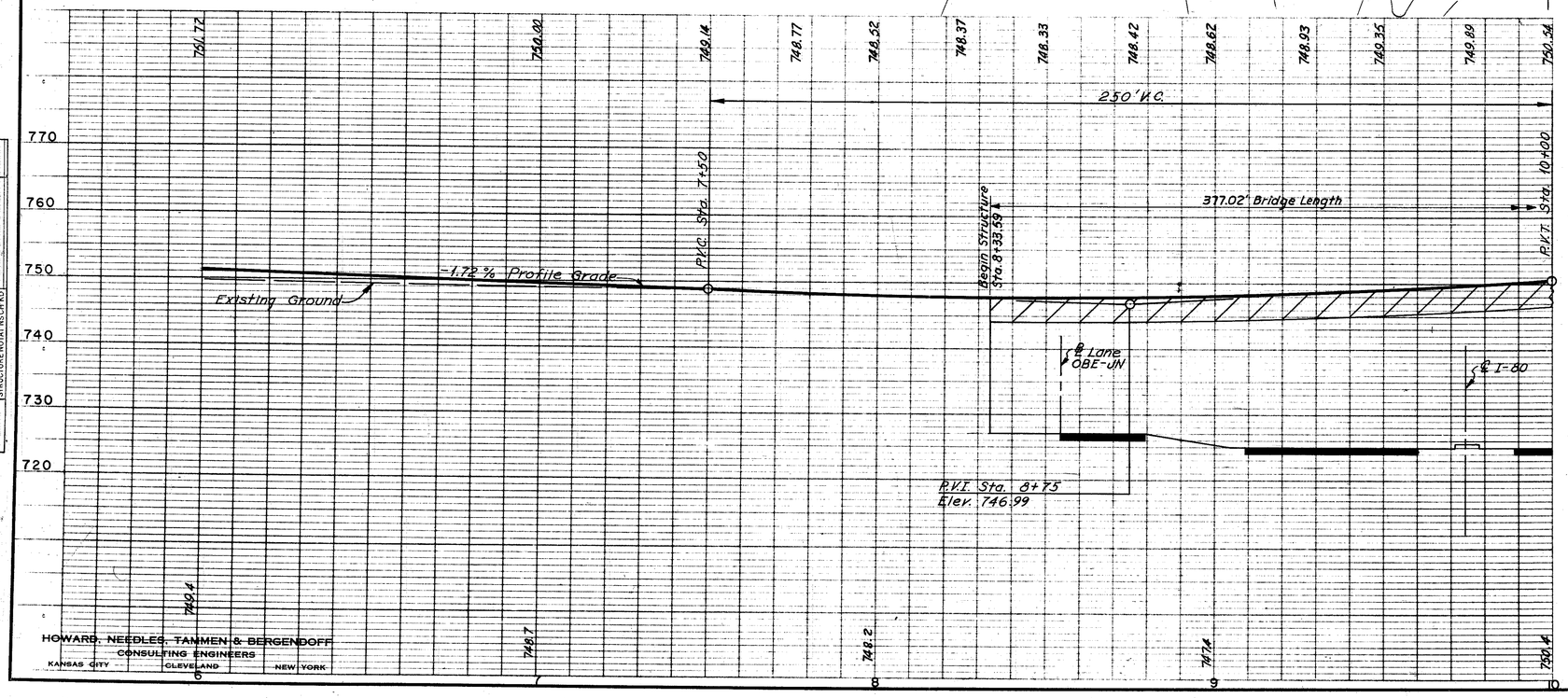
CUYAHOGA COUNTY
CUY-80-15.81



PLAN
SURVEYED
PLOTTED
NOTE BOOK ALIGNMENT CHECKED
NO. R/W CHECKED
DATE 6-6-68
BY TDJ

JOINT LEGEND

1. STANDARD LONGITUDINAL JOINT
2. STANDARD EXPANSION JOINT
3. STANDARD CONTRACTION JOINT
4. KEY JOINT WITHOUT TIEBARS
5. EXPANSION JOINT WITHOUT DOWELS
7. HINGE JOINT



PROFILE
SURVEYED
PLOTTED
NOTE BOOK BRIDGE NOS. B, M & N
NO. STRUCTURE NOTATIONS CHKD
DATE 6-6-68 6-28-68
BY TDJ R.H.T.

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

DRIVES AND APPROACHES

Ref. No.	Station	Side	Type	Width	304 Aggregate Base 6"	404 Asphalt Concrete 2"	408 Prime Coat	452 P.C.C. for Drives 6"	Profile Sheet No.
				Ft.	Cu. Yds.	Cu. Yds.	Gal.	Sq. Yds.	
3-A	6+39.5	Lt.	Res.	11	15.7	5.2	38.1	24.13	127
			TOTAL		15.7	5.2	38.1	24.13	

ITEM 660 SODDING

Station From	Station To	Side	Area Sq. Yds.	Remarks
6+00	7+05	Lt.	94.28	Planimeter
6+00	7+12	Rt.	122.40	Planimeter
TOTAL			216.68	

Driveway 3-A Profile on sheet 125.

20 0 20 40
Scale in Feet

RELOCATED TUXEDO AVENUE STA. 6+00 TO STA. 10+00

QUANTITY CALCULATIONS

MADE BY ERH DATE 7/13/70

CHECKED BY MGB DATE 7/6/74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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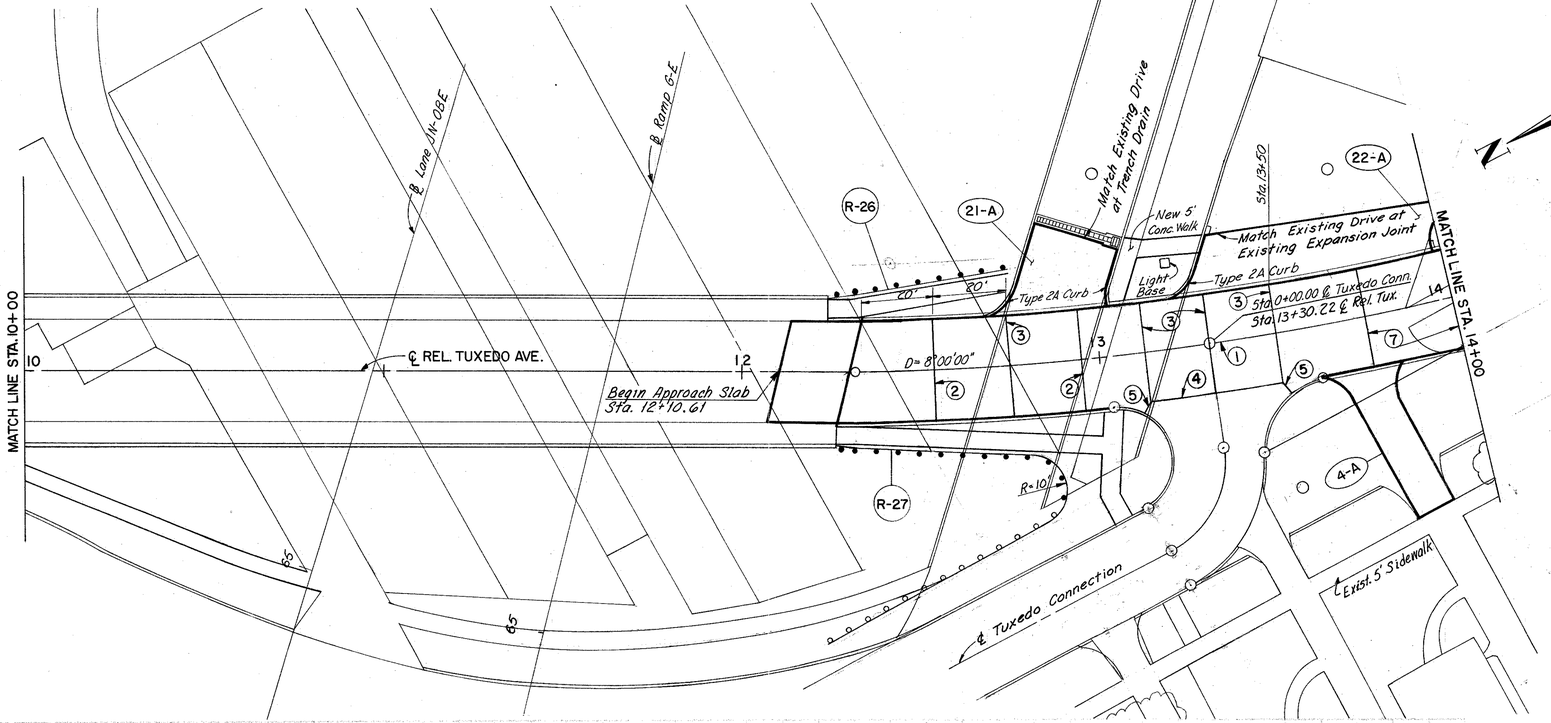
392

CUYAHOGA COUNTY

CUY-80-15.81

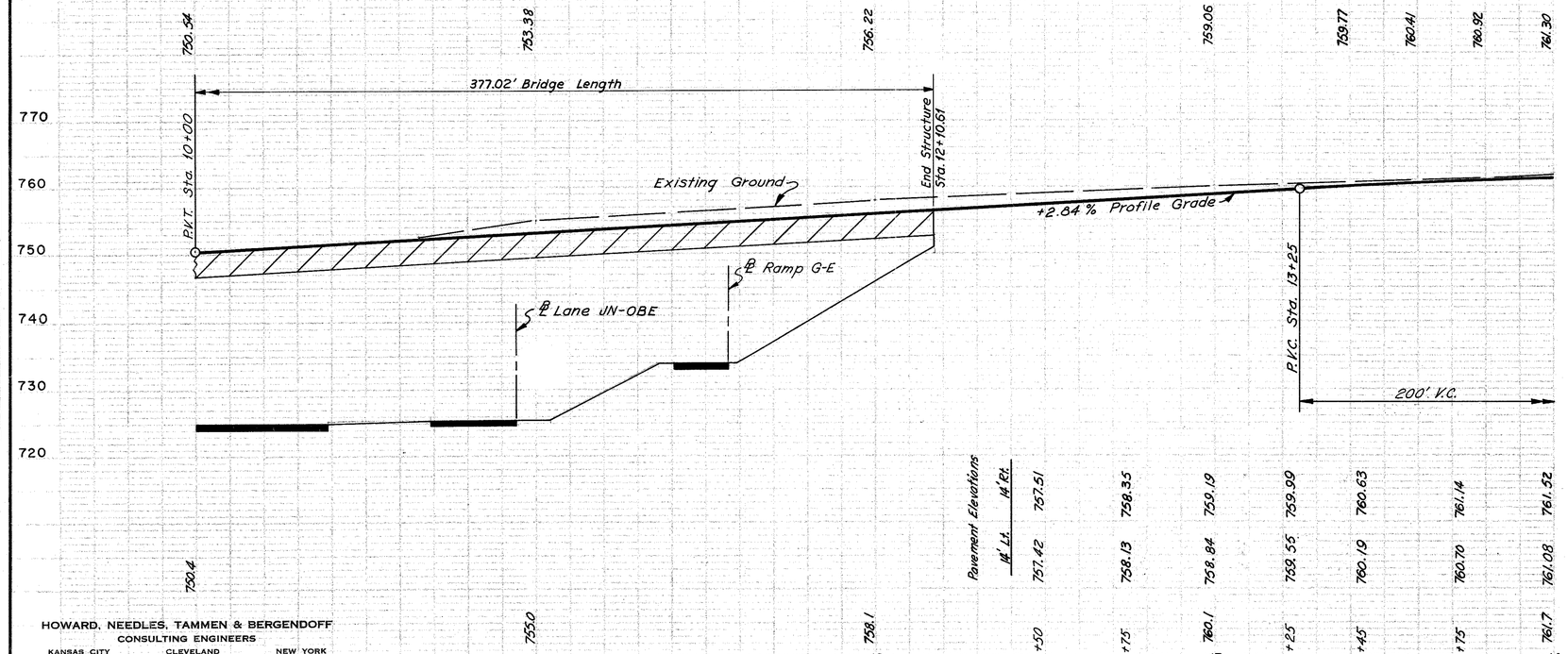


GUARD RAIL							
Ref. No.	Station		Side	606 Guard Rail Type 5	606 Bridge Terminal Assembly As Per Plan	606 Anchor Assembly
	From	To		Lin. Ft.	Each	Each
R-26	12+30	13+80	Lt.	25	1	1
R-27	12+18 Tux.	12+88	Rt.	75	1	
	Totals			100	2	1

ITEM 660 SODDING			
Station		Side	Area Sq. Yds.
From	To		
12+33	13+30	Lt.	32.27
13+80	14+00	Rt.	76.80
TOTAL			109.07

JOINT LEGEND

① STANDARD LONGITUDINAL JOINT
② STANDARD EXPANSION JOINT
③ STANDARD CONTRACTION JOINT
④ KEY JOINT WITHOUT TIEBARS
⑤ EXPANSION JOINT WITHOUT DOWELS
⑦ HINGE JOINT



DRIVES AND APPROACHES							
Ref. No.	Station	Side	Type	Width	451 9" R.P.C.C.	452 P.C.C. for Drives 6"	609 Type 2A Curb
				Ft.	Sq. Yds.	Sq. Yds.	Lin. Ft.
4-A	13+68	Rt.	Res.	11		61.60	
21-A	12+81	Lt.	Bus.	24	58.67		49.0
22-A	13+49	Lt.	Bus.	60	113.33		21.0
		TOTALS			172.00	61.60	70.0

Note: For T Connection and Intersection details see Sheet 64.
For Driveway Profiles see sheets 125 & 129.

20 0 20 40
Scale in Feet

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

RELOCATED TUXEDO AVENUE STA. 10+00 TO STA. 14+00

PLAN
SURVEYED
PLOTTED
NOTE BOOK ALIGNMENT CHECKED
NO. RT OF WAY CHECKED
DATE 6-6-68

PROFILE
SURVEYED TPM
PLOTTED PLF
NOTE BOOK GRADES CHECKED
NO. B. M.'s NOTED
STRUCTURE NOTATIONS CHK'KD
BY
DATE 6-6-68 6-25-68

QUANTITY CALCULATION
MADE BY ERH DATE 7/13/70
CHECKED M.G.B. DATE 9/6/74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-80-15.81

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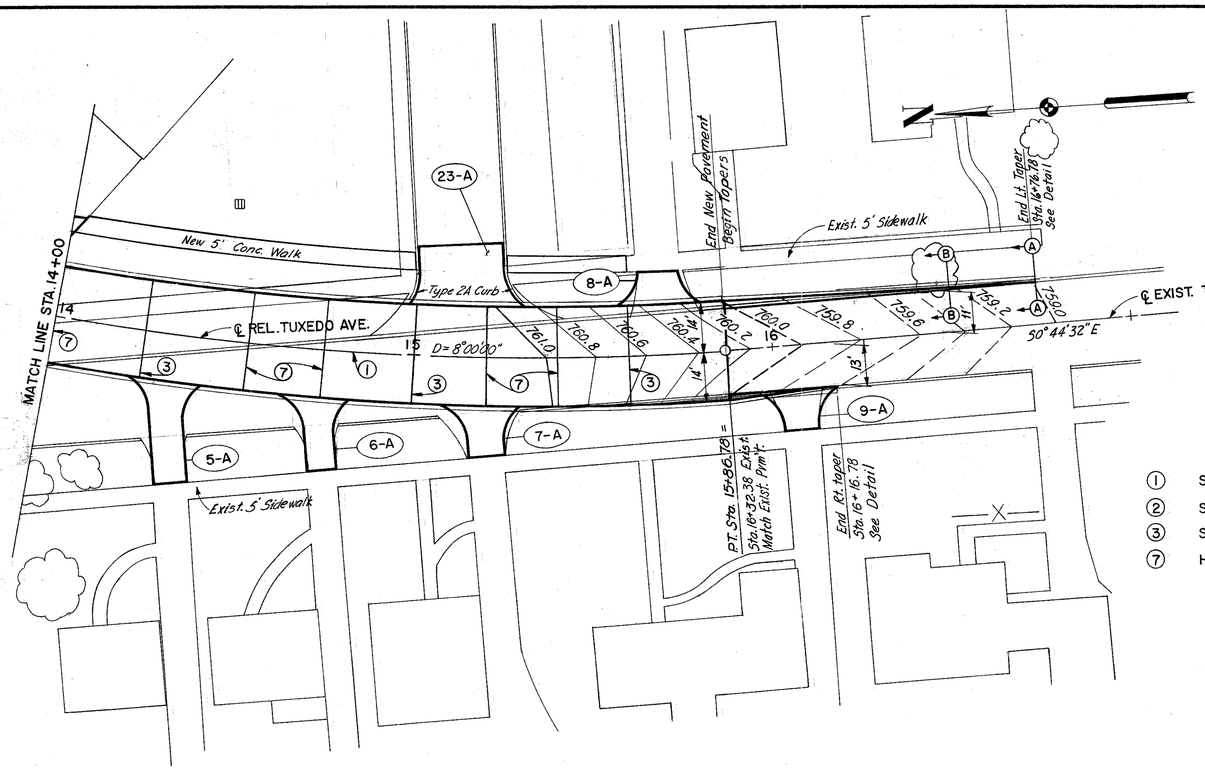
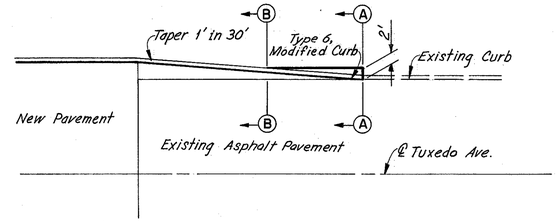


JOINT LEGEND

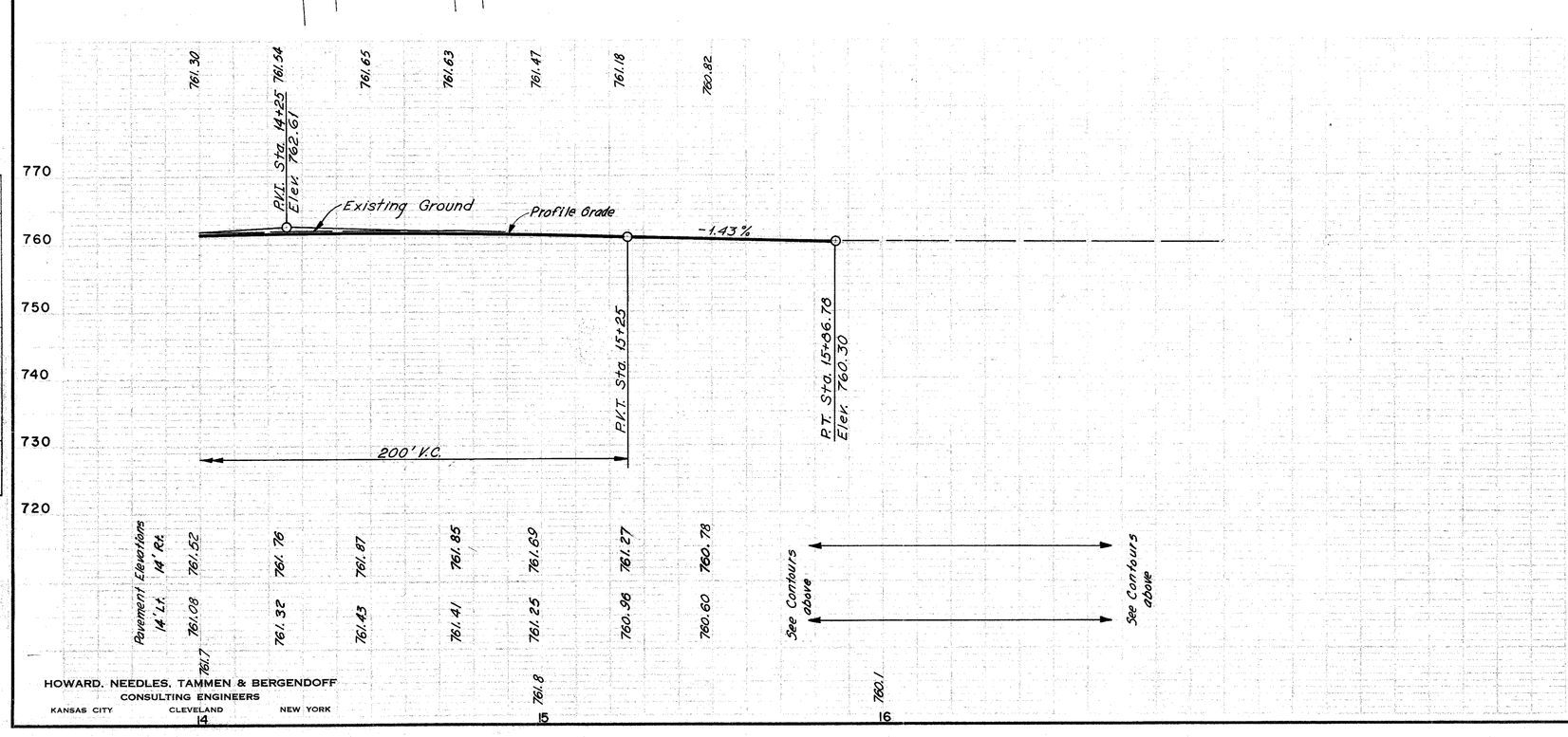
①	STANDARD LONGITUDINAL JOINT
②	STANDARD EXPANSION JOINT
③	STANDARD CONTRACTION JOINT
⑦	HINGE JOINT



TAPER DETAIL
No Scale

ITEM 660 SODDING			
Station From	Station To	Side	Area Sq. Yds.
13+96	16+77	Lt.	218.89
14+00	18+00	Rt.	372.30
TOTAL			591.19

DRIVES AND APPROACHES							
Ref. No.	Station	Side	Type	Width	451 9" R.P.C.C.	452 P.C.C. for Drives 6"	609 Type 2A Curb
				Ft.	Sq. Yds.	Sq. Yds.	Lin. Ft.
5-A	14+29	Rt.	Res.	9		34.11	
6-A	14+72	Rt.	Res.	8		22.47	
7-A	15+18	Rt.	Res.	10		27.08	
8-A	15+71	Lt.	Res.	10		13.36	
9-A	16+05	Rt.	Res.	10		15.58	
23-A	15+14	Lt.	Bus.	24	45.33		38.0
		TOTALS			45.33	112.60	38.0



Note: For Driveway Profiles see sheets 125, 126 & 128

20 0 20 40
Scale in Feet

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

PLAN
SURVEYED
PLOTTED
NOTE BOOK
NO.
ALIGNMENT CHECKED
RT OF WAY CHECKED
DATE 6-6-68
TPM

PROFILE
SURVEYED
PLOTTED
NOTE BOOK
NO.
GRADES CHECKED
B. M.'s NOTED
STRUCTURE NOTATIONS CHKD
BY TPM RLH
DATE 6/5/68 6/25/68

I-20

T-

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.–80–15.81

STA.	48' RIGHT	24' RIGHT	RIGHT EDGE	PROFILE GRADE	LEFT EDGE	24' LEFT	48' LEFT
	718.95	720.36		721.78	722.26	723.67	725.09
25	719.15	720.57		721.98	722.46	723.88	725.29
50	719.36	720.77		722.19	722.67	724.08	725.50
75	719.56	720.98		722.39	722.87	724.29	725.70
	719.77	721.18		722.60	723.08	724.49	725.91
25	719.97	721.39		722.80	723.28	724.70	726.11
50	720.18	721.59		723.01	723.49	724.90	726.32
75	720.38	721.80		723.21	723.69	725.11	726.32
	720.62	722.02		723.42	723.88	725.28	726.68
25	720.99	722.31		723.62	724.02	725.34	726.66
50	721.36	722.59		723.83	724.16	725.40	726.64
75	721.72	722.88		724.03	724.31	725.46	726.62
	722.09	723.16		724.24	724.45	725.52	726.60
25	722.46	723.45		724.44	724.59	725.58	726.58
50	722.82	723.74		724.65	724.76	725.67	726.58
75	723.19	724.02		724.85	724.93	725.76	726.59
	723.56	724.31		725.06	725.09	725.85	726.60
25	723.92	724.59		725.26		725.94	726.61
50	724.29	724.88		725.47		726.06	726.65
75	724.65	725.16		725.67		726.19	726.70
	725.02	725.45		725.88		726.31	726.74
25	725.37	725.75		726.08		726.46	726.80
50	725.70	726.08		726.29		726.66	726.88
75	726.03	726.40		726.49		726.87	726.96
	726.33	726.71		726.70		727.07	727.06
25	726.61	726.98		726.90		727.28	727.20
50	726.87	731.38		727.11		727.48	727.35
75	727.14	731.58		727.31		727.69	727.49
	727.41	731.79		727.52		727.89	727.63
	727.68	731.99		727.72		728.10	727.77
25	728.05	732.20		727.93			
50	728.30	732.40		728.13			
75	728.51	732.61		728.34			
	728.71	732.81					
25	728.92	733.02		728.54			
50	729.12	733.22		728.75			
75	729.33	733.43		728.95			
	729.53	733.63		729.16			
25	729.74	733.82		729.36			
50	729.94	733.98		729.57			
75	730.15	734.11		729.77			
	730.35	734.20		729.98			
25	730.56	734.26		730.18			
50	730.76	734.30		730.39			
75	730.97	734.26		730.59			
	731.17	734.20		730.80			
25	731.38	734.11		731.00			
50	731.58	733.98		731.21			
75	731.79	733.82		731.41			
	731.99	733.63		731.62			
25	732.20	733.41		731.82			
50	732.40	733.16		732.03			
75	732.61	732.87		732.23			
	732.81	732.57		732.44			
25	733.02	732.27		732.64			
50	733.22	731.97		732.85			
75	733.43	731.67		733.05			
	733.63	731.37		733.26			
25	733.82	731.07		733.45			
50	733.98	730.77		733.61			
75	734.11	730.47		733.73			
	734.20	730.17		733.83			
25	734.26	729.87		733.89			
50	734.30	729.57		733.92			
75	734.26	729.27		733.89			
	734.20	728.97		733.83			
25	734.11	728.67		733.73			
50	733.98	728.37		733.61			
75	733.82	728.07		733.45			
	733.63	727.77		733.26			
25	733.41	727.47		733.04			
50	733.16	727.17		732.78			
75	732.87	726.87		732.50			
	732.57	726.57		732.20			
25	732.27	726.27		731.90			
50	731.97	725.97		731.60			
75	731.67	725.67		731.30			
	731.37	725.37		731.00			
25	731.07	725.07		730.70			
50	730.77	724.77		730.40			
75	730.47	724.47		730.10			
	730.17	724.17		729.80			
25	729.87	723.87		729.50			
50	729.57	723.57		729.20			
75	729.27	723.27		728.90			
	728.97	722.97		728.60			
25	728.67	722.67		728.30			
50	728.37	722.37		728.00			
75	728.07	722.07		727.70			
	727.77	721.77		727.40			
25	727.47	721.47		727.10			
50	727.17	721.17		726.80			
75	726.87	720.87		726.50			
	726.57	720.57		726.20			
25	726.27	720.27		725.90			
50	725.97	719.97		725.60			
75	725.67	719.67		725.30			
	725.37	719.37		725.00			
25	725.07	719.07		724.70			
50	724.77	718.77		724.40			
75	724.47	718.47		724.10			

LEFT HALF SUPER ELEV.

Superelevation +.059 ft. per ft. | Superelevation Varies | Superelevation Varies (24' to 48' Lt.)

Superelevation -.0156 ft. per ft. (24' to 48' Lt.)

Superelevation +.0156 ft. per ft. (0' to 24' Lt.)

Same as Profile Grade Elevations

Same as 24' Right Elevations

Same as Profile Grade Elevations

Same as Profile Grade Elevations

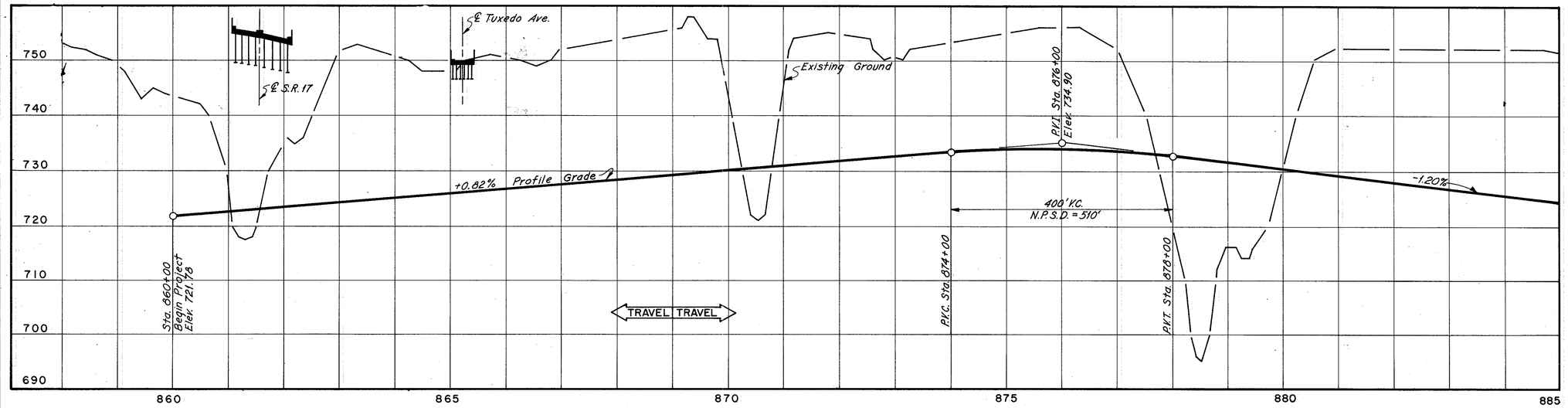
Same as Profile Grade Elevations

RIGHT HALF SUPER ELEV.

Superelevation -.059 ft. per ft. | Superelevation Varies | Superelevation Varies (0' to 24' Rt.)

Superelevation +.0156 ft. per ft. (0' to 24' Rt.)

Superelevation -.0156 ft. per ft. (24' to 48' Rt.)



SCALE Hor. 1"=100' Vert. 1"=10'
MADE R.J.T. DATE 6-12-63
TRCD. T.P.M. DATE 6-17-68
CKD. S.D.V. DATE 2-5-69

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

HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

PROFILE I-80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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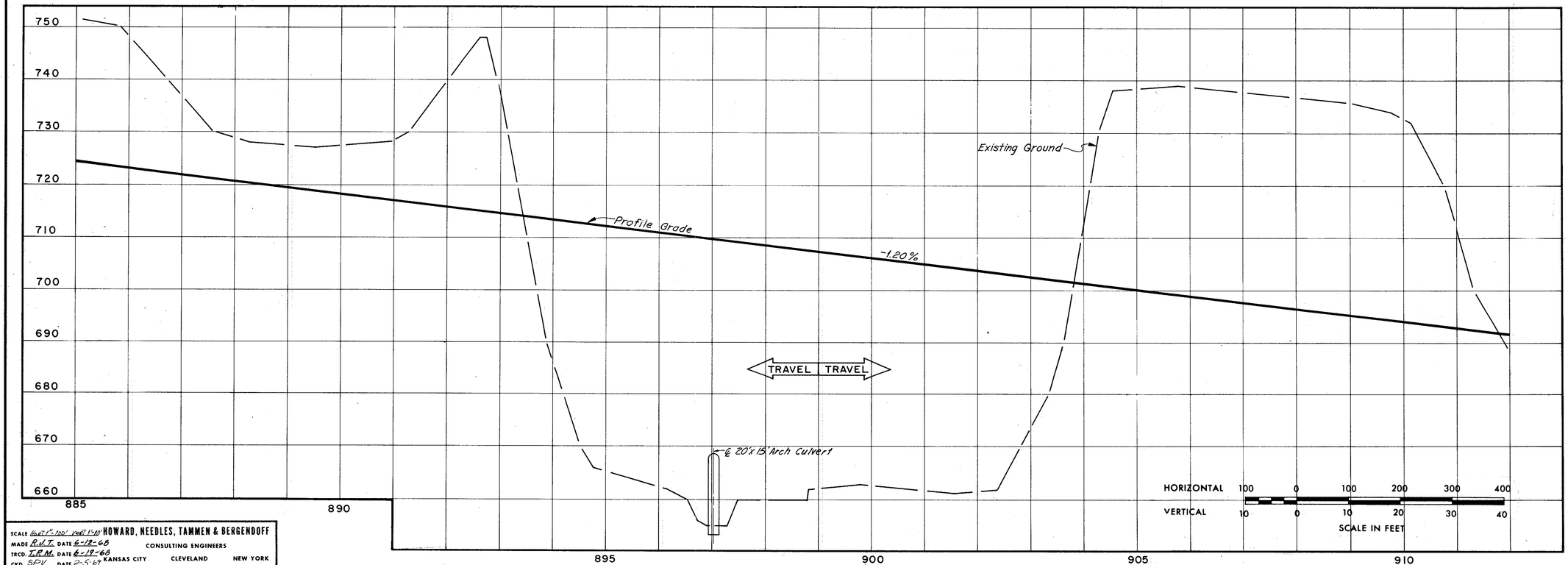
CUYAHOGA COUNTY
CUY.-80-15.81

STA.	PROFILE GRADE	LEFT EDGE	24' LEFT	48' LEFT	RIGHT EDGE	24' RIGHT	48' RIGHT
	LEFT HALF SUPER ELEV.	Superelevation -.0156 ft. per ft. (24' to 48' Lt.) Superelevation +.0156 ft. per ft. (0' to 24' Lt.)		S.E. Varies (0' to 24' Lt.)			
25	723.80	Same as Profile Grade Elevations	724.17	Same as Profile Grade Elevations	Same as Profile Grade Elevations	724.17	Same as Profile Grade Elevations
50	723.50		723.87			723.87	
75	723.20		723.57			723.57	
25	722.90		723.27			723.27	
50	722.60		722.97			722.97	
75	722.30		722.67			722.67	
25	722.00		722.37			722.37	
50	721.70		722.07			722.07	
75	721.40		721.77			721.77	
25	721.10		721.47			721.47	
50	720.80		721.17			721.17	
75	720.50		720.87			720.87	
25	720.20		720.57			720.57	
50	719.90		720.27			720.27	
75	719.60		719.97	719.29		719.97	719.32
25	719.30		719.66	718.93		719.68	719.08
50	719.00		719.30	718.56		719.38	718.85
75	718.70		718.94	718.20		719.09	718.62
25	718.40		718.57	717.84		718.79	718.39
50	718.10		718.21			718.50	
75	717.80	W. B. I. L.			E. B. I. L.		E. B. I. L.
25	717.50						
50	717.20						
75	716.90						
25	716.60						
50	716.30						
75	716.00						
25	715.70						
50	715.40						
75	715.10						
25	714.80						
50	714.50						
75	714.20						
25	713.90						
50	713.60						
75	713.30						
25	713.00						
50	712.70						
75	712.40						
25	712.10						
50	711.80						
75	711.50						
25	711.20						
50	710.90						
75	710.60						
25	710.30						
50	710.00						
75	709.70						
25	709.40						
50	709.10						
75	708.80						
25	708.50						
50	708.20						
75	707.90						
25	707.60						
50	707.30						
75	707.00						
25	706.70						
50	706.40						
75	706.10						
25	705.80						
50	705.50						
75	705.20						
25	704.90						
50	704.60						
75	704.30						
25	704.00						
50	703.70						
75	703.40						
25	703.10						
50	702.80						
75	702.50						
25	702.20						
50	701.90						
75	701.60						
25	701.30						
50	701.00						
75	700.70						
25	700.40						
50	700.10						
75	699.80						
25	699.50						
50	699.20						
75	698.90						
25	698.60						
50	698.30						
75	698.00						
25	697.70						
50	697.40						
75	697.10						
25	696.80						
50	696.50						
75	696.20						
25	695.90						
50	695.60						
75	695.30						
25	695.00						
50	694.70						
75	694.40						
25	694.10						
50	693.80						
75	693.50						
25	693.20						
50	692.90						
75	692.60						
25	692.30						
50	692.00						
75	691.70						
	RIGHT HALF SUPER ELEV.	Superelevation +.0156 ft. per ft. (0' to 24' Rt.) Superelevation -.0156 ft. per ft. (24' to 48' Rt.)		S.E. Varies (24' to 48' Rt.)			



SCALE Hor. 1"=100' Vert. 1"=10'
MADE R.W.T. DATE 6-12-68
TRCD. T.R.M. DATE 6-19-68
CKD. SPV DATE 2-5-69

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

PROFILE I-80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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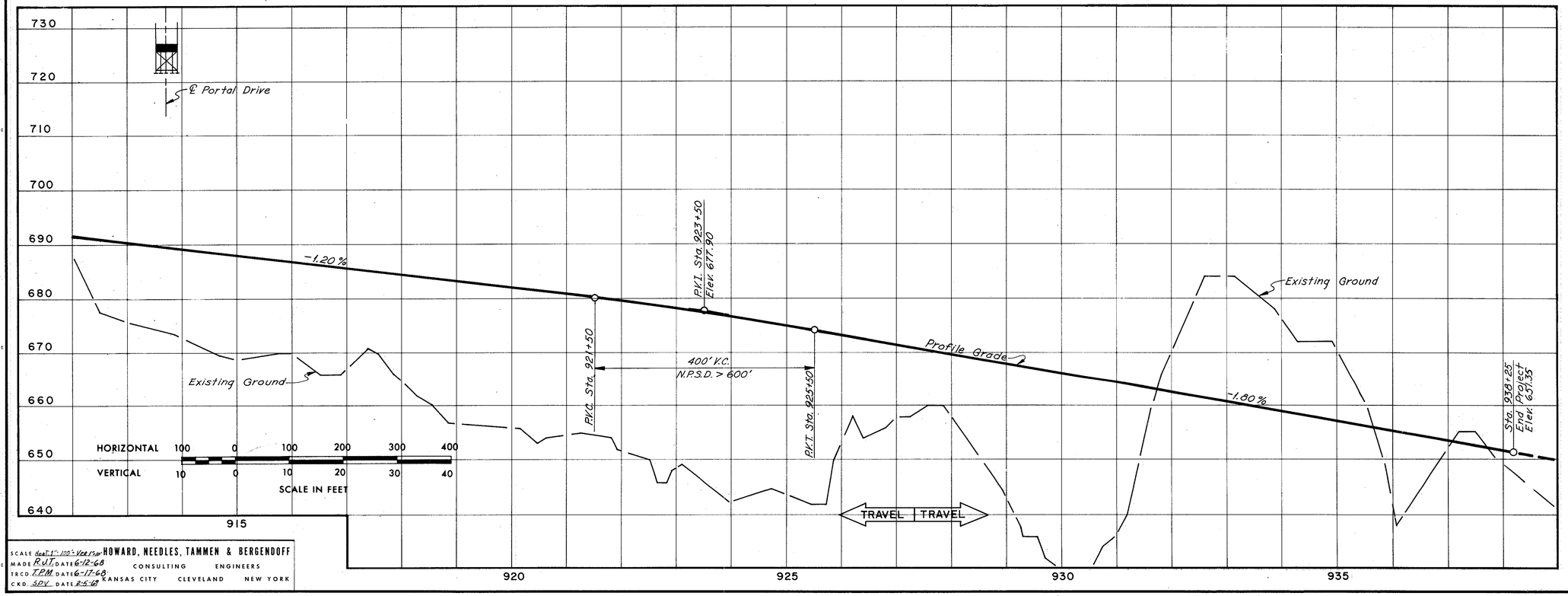
CUYAHOGA COUNTY
CUY.—80—15.81

STA.	PROFILE GRADE	58' LEFT	82' LEFT	106' LEFT	LEFT HALF SUPER ELEV.
					Superelevation −.0156 ft. per ft. (82' to 106' Lt.)
					S.E. Trans. (58' to 82' Lt.)
					Superelevation +.0156 ft. per ft. (58' to 82' Lt.)
25	688.40	687.91	687.93	W.B.I.L. — Lane W.B.O.L.	
50	688.10	687.73	687.82	Westbound Inner Lanes	
75		687.53	687.67		
25	687.80	687.33	687.50		
50	687.50	687.29	687.32		
75	687.20	687.05	687.15		
25	686.90	686.82	686.95		
50	686.60	686.58	686.71		
75	686.30	686.34	686.45		
25	686.00	686.07	686.15		
50	685.70	685.77	685.85		
75	685.40	685.47	685.55		
25	685.10	685.17	685.25		
50	684.80	684.87	684.95		
75	684.50	684.57	684.65		
25	684.20	684.27	684.35		
50	683.90	683.97	684.05		
75	683.60	683.67			
25	683.30	683.37	683.75		
50	683.00	683.07	683.45		
75	682.70	682.77	683.15		
25	682.40	682.47	682.85		
50	682.10	682.17	682.55		
75	681.80	681.87	682.25		
25	681.50	681.57	681.95		
50	681.20	681.27	681.65		
75	680.90	680.97	681.35		
25	680.60	680.67	681.05		
50	680.30	680.37	680.74		
75	680.00	680.07	680.43		
25	679.68	679.73	680.11		
50	679.36	679.40	679.77		
75	679.02	679.06	679.43		
25	678.68	678.71	679.08		
50	678.33	678.34	678.72	Same as 58' Left Elevations	
75	677.97	677.97	678.35		
25	677.60	677.59	677.97		
50	677.22	677.21	677.58		
75	676.83	676.81	677.18		
25	676.43	676.40	676.77		
50	676.02	675.98	676.36		
75	675.61	675.56	675.93		
25	675.18	675.12	675.49		
50	674.75	674.67	675.05		
75	674.30	674.22	674.60		
25	673.85	673.77	674.15		
50	673.40	673.32	673.70		
75	672.95	672.87	673.25		
25	672.50	672.42	672.80		
50	672.05	671.97	672.35		
75	671.60	671.52	671.90		
25	671.15	671.07	671.45		
50	670.70	670.62	671.00		
75	670.25	670.17	670.55		
25	669.80	669.72	670.10		
50	669.35	669.27	669.65		
75	668.90	668.82	669.20		
25	668.45	668.37	668.75		
50	668.00	667.92	668.30		
75	667.55	667.47	667.85		
25	667.10	667.02	667.4		
50	666.65	666.57	666.95		
75	666.20	666.12	666.50		
25	665.75	665.67	666.05		
50	665.30	665.22	665.60		
75	664.85	664.77	665.15		
25	664.40	664.32	664.70		
50	663.95	663.87	664.25		
75	663.50	663.42	663.80		
25	663.05	662.97	663.35		
50	662.60	662.52	662.90		
75	662.15	662.07	662.45		
25	661.70	661.62	662.00		
50	661.25	661.17	661.55		
75	660.80	660.72	661.10		
25	660.35	660.27	660.65		
50	659.90	659.82	660.20		
75	659.45	659.37	659.75		
25	659.00	658.92	659.30		
50	658.55	658.47	658.85		
75	658.10	658.02	658.40		
25	657.65	657.57	657.95		
50	657.20	657.12	657.50		
75	656.75	656.67	657.05		
25	656.30	656.22	656.60		
50	655.85	655.77	656.15		
75	655.40	655.32	655.70		
25	654.95	654.87	655.25		
50	654.50	654.42	654.80		
75	654.05	653.91	654.28		
25	653.60	653.40	653.77		
50	652.70	652.38	653.26		
75	652.25	652.38	652.75		
25	651.80	651.87	652.24		
					Superelevation +.0156 ft. per ft. (58' to 82' Rt.)
					Superelevation − 0156 ft. per ft. (82' to 106' Rt.)

STA.	58' RIGHT	82' RIGHT	106' RIGHT	RIGHT HALF SUPER ELEV.
25	688.47	688.85	Lanes E.B.I.L. or E.B.O.L.	
50	688.17	688.55	Eastbound Inner Lanes	
75	687.87	688.25		
25	687.57	687.95		
50	687.27	687.65		
75	686.97	687.35		
25	686.67	687.05		
50	686.37	686.75		
75	686.07	686.45		
25	685.77	686.15		
50	685.47	685.85		
75	685.17	685.55		
25	684.87	685.25		
50	684.57	684.95		
75	684.27	684.65		
25	683.97	684.35		
50	683.67	684.05		
75				
25	683.37	683.75		
50	683.07	683.45		
75	682.77	683.15		
25	682.47	682.85		
50	682.17	682.55		
75	681.87	682.25		
25	681.57	681.95		
50	681.27	681.65		
75	680.97	681.35		
25	680.67	681.05		
50	680.37	680.74		
75	680.07	680.43		
25	679.73	680.11		
50	679.40	679.77		
75	679.06	679.43		
25	678.71	679.08		
50	678.34	678.72	Same as 58' Right Elevations	
75	677.97	678.35		
25	677.59	677.97		
50	677.21	677.58		
75	676.81	677.18		
25	676.40	676.77		
50	675.98	676.36		
75	675.56	675.93		
25	675.12	675.49		
50	674.67	675.05		
75	674.22	674.60		
25	673.77	674.15		
50	673.32	673.70		
75	672.87	673.25		
25	672.42	672.80		
50	671.97	672.35		
75	671.52	671.90		
25	671.07	671.45		
50	670.62	671.00		
75	670.17	670.55		
25	669.72	670.10		
50	669.27	669.65		
75	668.82	669.20		
25	668.37	668.75		
50	667.92	668.30		
75	667.47	667.85		
25	667.02	667.4		
50	666.57	666.95		
75	666.12	666.50		
25	665.67	666.05		
50	665.22	665.60		
75	664.77	665.15		
25	664.32	664.70		
50	663.87	664.25		
75	663.42	663.80		
25	662.97	663.35		
50	662.52	662.90		
75	662.07	662.45		
25	661.62	662.00		
50	661.17	661.55		
75	660.72	661.10		
25	660.27	660.65		
50	659.82	660.20		
75	659.37	659.75		
25	658.92	659.30		
50	658.47	658.85		
75	658.02	658.40		
25	657.57	657.95		
50	657.12	657.50		
75	656.67	657.05		
25	656.22	656.60		
50	655.77	656.15		
75	655.32	655.70		
25	654.87	655.25		
50	654.42	654.80		
75	653.91	654.28		
25	653.40	653.77		
50	652.89	653.26		
75	652.38	652.75		
25	651.87	652.24		
50	651.35	651.72		



SCALE Hor. 1"=100' Vert. 1"=10'
MADE R.U.T. DATE 6-12-68
TRCD T.P.M. DATE 6-17-68
CKD. S.P.V. DATE 8-5-68

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

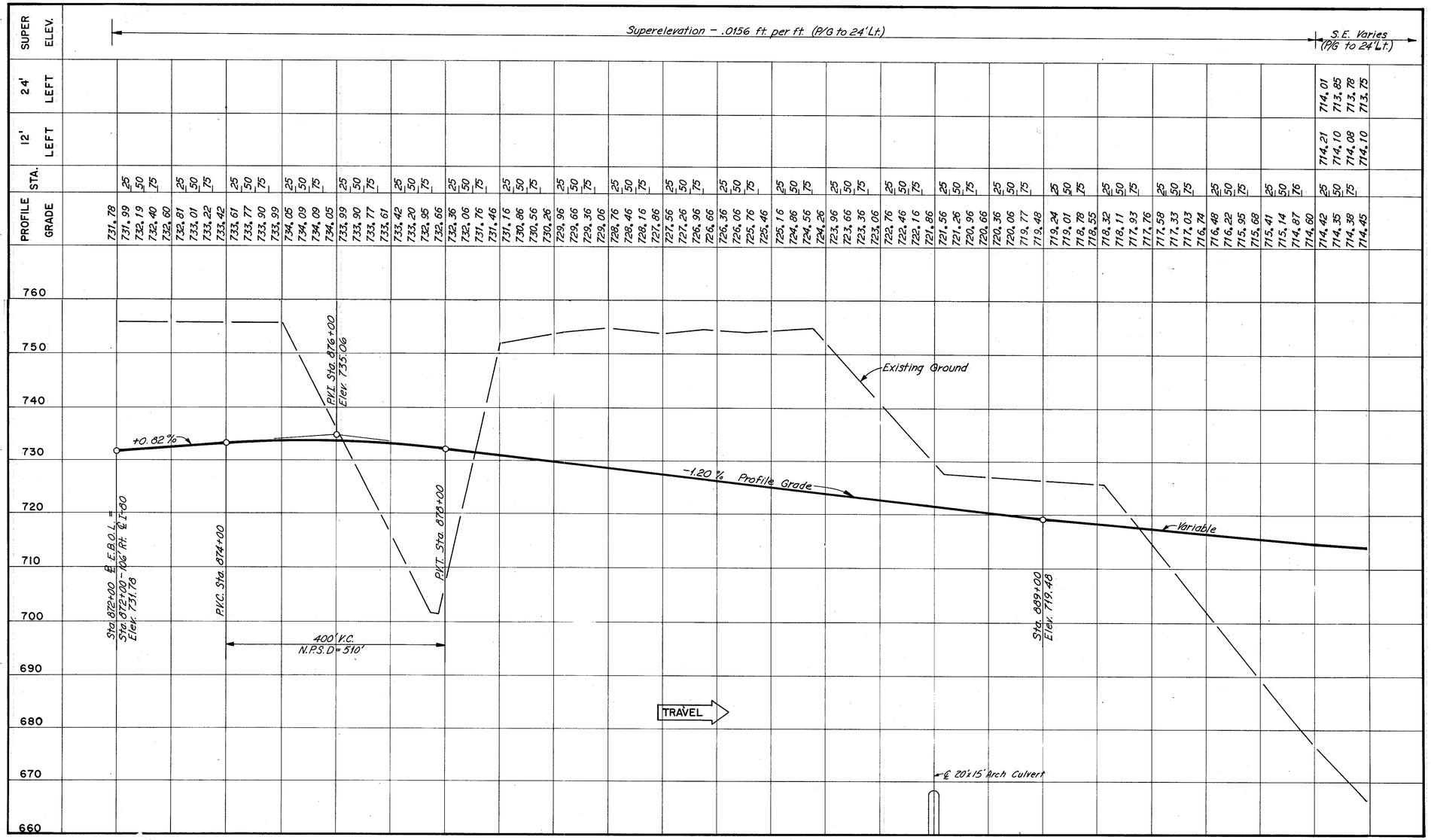
PROFILE I—80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

55
392

CUYAHOGA COUNTY
CUY.– 80–15.81

STA.	12' LEFT	24' LEFT	PROFILE GRADE
			731.78
25			731.99
50			732.19
75			732.40
			732.60
25			732.81
50			733.01
75			733.22
			733.42
25			733.61
50			733.77
75			733.90
			733.99
25			734.05
50			734.09
75			734.09
			734.05
25			733.99
50			733.90
75			733.77
			733.61
25			733.42
50			733.20
75			732.95
			732.66
25			732.36
50			732.06
75			731.76
			731.46
25			731.16
50			730.86
75			730.56
			730.26
25			729.96
50			729.66
75			729.36
			729.06
25			728.76
50			728.46
75			728.16
			727.86
25			727.56
50			727.26
75			726.96
			726.66
25			726.36
50			726.06
75			725.76
			725.46
25			725.16
50			724.86
75			724.56
			724.26
25			723.96
50			723.66
75			723.36
			723.06
25			722.76
50			722.46
75			722.16
			721.86
25			721.56
50			721.26
75			720.96
			720.66
25			720.36
50			720.06
75			719.77
			719.48
25			719.24
50			719.01
75			718.78
			718.55
25			718.32
50			718.11
75			717.93
			717.76
25			717.58
50			717.33
75			717.03
			716.74
25			716.48
50			716.22
75			715.95
			715.68
25			715.41
50			715.14
76			714.87
			714.60
25	714.21	714.01	714.42
50	714.10	713.85	714.35
75	714.08	713.78	714.38
	714.10	713.75	714.45



HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE 1"-10' Vert. & 1"-100' Hor. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE PJT DATE 9-16-68
TRCD. JJM DATE 1-13-69
CKD. SPV DATE 1-22-69
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PROFILE EAST BOUND OUTER LANES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY.-80-15.81

STA.	SUPER ELEV.	24' LEFT	12' LEFT	PROFILE GRADE
	S.E. Trans. (P/G to 24' Lt.)			
	Superelevation - .047 Ft. per ft. (P/G to 24' Lt.)			
	S.E. Trans. (P/G to 24' Lt.)			
		713.75	714.10	714.45
25		713.74	714.14	714.53
50		713.72	714.16	714.61
75		713.70	714.19	714.68
		713.69	714.23	714.77
25		713.64	714.20	714.77
50		713.52	714.08	714.65
75		713.37	713.93	714.50
		713.21	713.77	714.34
25		713.05	713.61	714.18
50		712.88	713.45	714.02
75		712.73	713.29	713.86
		712.49	713.05	713.62
25		712.13	712.69	713.26
50		711.67	712.23	712.80
75		711.20	711.76	712.33
		710.72	711.28	711.85
25		710.25	710.81	711.38
50		709.83	710.39	710.96
75		709.47	710.03	710.60
		709.15	709.71	710.28
25		708.87	709.43	710.00
50		708.58	709.14	709.71
75		708.30	708.86	709.43
		708.03	708.59	709.16
25		707.78	708.34	708.91
50		707.58	708.14	708.71
75		707.40	707.96	708.53
		707.22	707.78	708.35
25		707.03	707.59	708.16
50		706.86	707.42	707.99
75		706.68	707.24	707.81
		706.48	707.05	707.61
25		706.18	706.75	707.31
50		705.89	706.46	707.02
75		705.59	706.16	706.72
		705.29	705.86	706.42
25		704.99	705.56	706.12
50		704.69	705.26	705.82
75		704.39	704.96	705.52
		704.10	704.67	705.23
25		703.80	704.37	704.93
50		703.50	704.07	704.63
75		703.20	703.77	704.33
		702.90	703.47	704.03
25		702.60	703.17	703.73
50		702.30	702.87	703.43
75		702.00	702.57	703.13
		701.70	702.27	702.83
25		701.40	701.97	702.53
50		701.10	701.67	702.23
75		700.79	701.36	701.92
		700.49	701.06	701.62
25		700.19	700.76	701.32
50		699.89	700.46	701.02
75		699.57	700.14	700.70
		699.27	699.84	700.40
25		698.97	699.54	700.10
50		698.67	699.24	699.80
75		698.36	698.93	699.49
		698.06	698.63	699.19
25		697.75	698.32	698.88
50		697.45	698.02	698.58
75		697.14	697.71	698.27
		696.83	697.40	697.96
25		696.52	697.09	697.65
50		696.20	696.77	697.33
75		695.83	696.37	696.92
		695.37	695.88	696.39
25		694.91	695.39	695.86
50		See Sheet Lane E.B.I.L.	694.88	695.32
75			694.38	694.78
			693.87	694.24
25			693.38	693.71
50			692.97	693.27

760
750
740
730
720
710
700
690
680
670
660
650

895 900 905 910 915

Existing Ground
℄ Portal Drive
Variable
Profile Grade
TRAVEL
℄ E.B.O.L.
Sta. 913+68.40
Elev. 693.01

HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE 1"=10' Vert. & 1"=100' Hor. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE R.J.T. DATE 9-15-68
TRCD. T.P.M. DATE 1-6-69
CKD. S.D.V. DATE 1-22-69
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PROFILE EAST BOUND OUTER LANES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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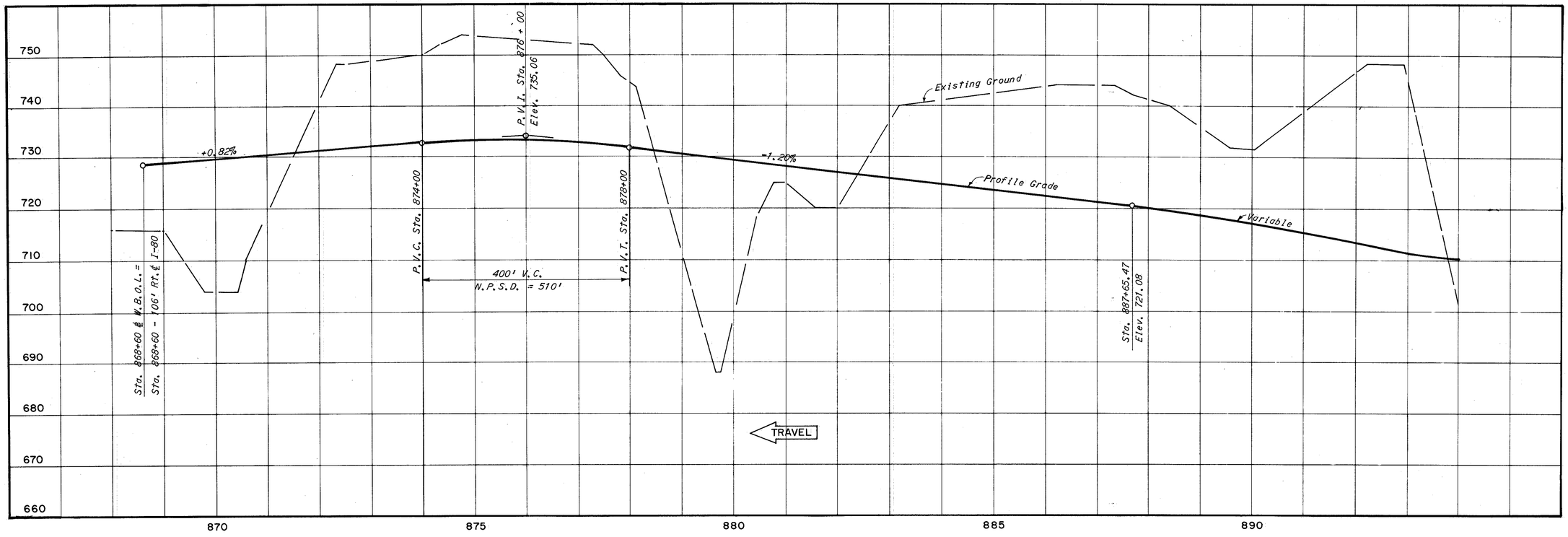
392

CUYAHOGA COUNTY
CUY. 80 - 15.81

	S.E. Transition (P/G to 24' Rt.)	Superelevation -.0156 ft. per ft. (P/G to 24' Rt.)	S.E. Transition (P/G to 24' Rt.)	Superelevation +.036 ft./ft. (P/G to 24' Rt.)

STA.	PROFILE GRADE	12' RIGHT	24' RIGHT
75	728.78	728.76	728.74
	729.05	729.00	728.95
25	729.31	729.23	729.15
50	729.59	729.47	729.36
75	729.85	729.70	729.56
	730.12	729.95	729.77
25	730.34		
50	730.55		
75	730.75		
	730.96		
25	731.16		
50	731.37		
75	731.57		
	731.78		
25	731.98		
50	732.19		
75	732.39		
	732.60		
25	732.80		
50	733.01		
75	733.21		
	733.42		
25	733.61		
50	733.77		
75	733.89		
	733.99		
25	734.05		
50	734.08		
75	734.08		
	734.05		
25	733.99		
50	733.89		
75	733.77		
	733.61		
25	733.42		
50	733.20		
75	732.94		
	732.66		
25	732.36		
50	732.06		
75	731.76		
	731.46		
25	731.16		
50	730.86		
75	730.56		
	730.26		
25	729.96		
50	729.66		
75	729.36		
	729.06		
25	728.76		
50	728.46		
75	728.16		
	727.86		
25	727.56		
50	727.26		
75	726.96		
	726.66		
25	726.36		
50	726.06		
75	725.76		
	725.46		
25	725.16		
50	724.86		
75	724.56		
	724.26		
25	723.96		
50	723.66		
75	723.36		
	723.06		
25	722.76		
50	722.46		
75	722.16		
	721.86		
25	721.56	720.59	720.59
50	721.26	720.77	720.29
75	720.94	720.43	719.99
	720.58		
25	720.21	720.10	719.69
50	719.85	719.77	719.39
75	719.49	719.44	719.08
	719.12	719.10	718.72
25	718.67	718.70	718.35
50	718.18	718.26	717.99
75	717.69	717.84	717.63
	717.21	717.42	717.27
25	716.70	716.99	716.88
50	716.19	716.54	716.43
75	715.70	716.07	716.00
	715.20	715.60	715.57
25	714.71	715.14	715.10
50	714.24	714.67	714.62
75	713.76	714.19	714.14
	713.28	713.71	713.65
25	712.79	713.22	713.19
50	712.33	712.76	712.72
75	711.96	712.39	712.25
	711.62	712.05	712.15
25	711.29	711.72	711.81
50	710.95	711.38	711.49
75	710.63	711.06	711.16
	710.30	710.73	



HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE Hor. 1"=100' Ver. 1"=10'
MADE R.V.T. DATE 9-17-68
TRCD. J.M.C. DATE 9-26-68
CKD. S.P.V. DATE 10-3-68

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

PROFILE WEST BOUND OUTER LANES

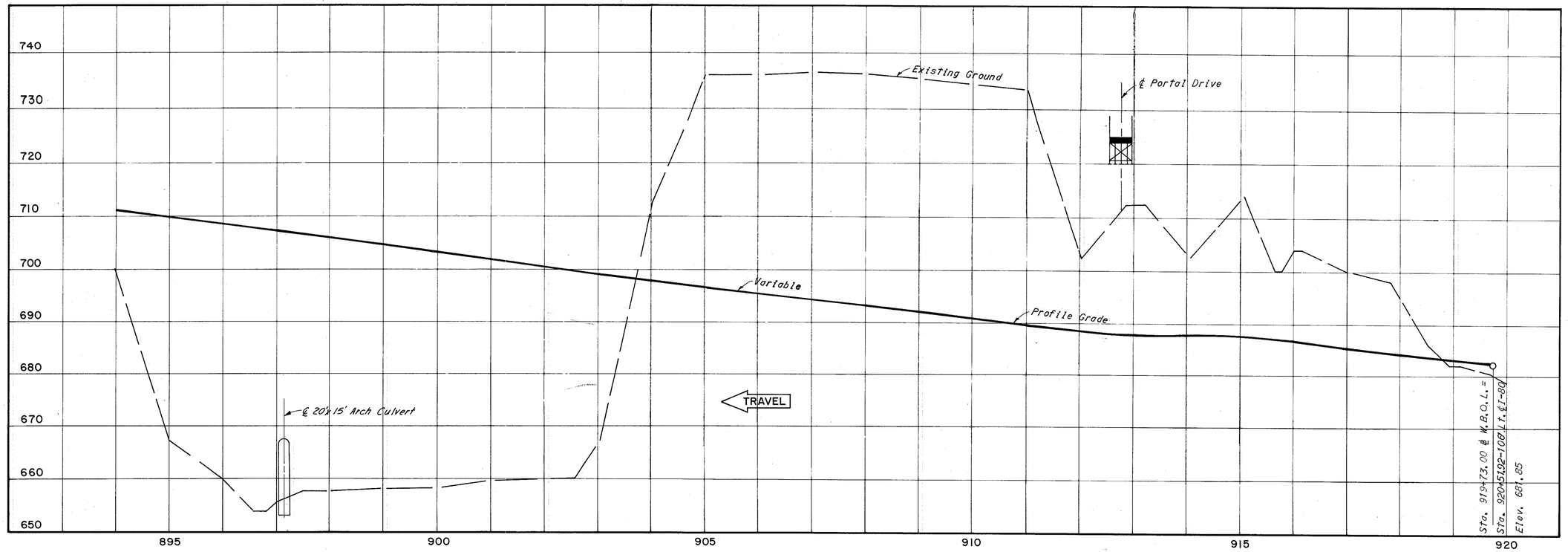
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

58
392

CUYAHOGA COUNTY
CUY. 80 - 15.81

Superelevation +.036 ft. per ft. (P/G to 24' Rt.) | S.E. Trans. P/G to 24' Rt. | Superelevation +.018 ft. per ft. (P/G to 24' Rt.) | S.E. Trans. (P/G to 24' Rt.) | S.E. +.0156 ft. per ft. (12 to 24' Rt.) | S.E. +.0156 ft. per ft. (P/G to 12' Rt.)

STA.	24' RIGHT	12' RIGHT	PROFILE GRADE
	711.16	710.73	710.30
25	710.84	710.41	709.98
50	710.52	710.09	709.66
75	710.20	709.77	709.34
	709.87	709.44	709.01
25	709.55	709.12	708.69
50	709.22	708.79	708.36
75	708.90	708.47	708.04
	708.57	708.14	707.71
25	708.25	707.82	707.39
50	707.93	707.50	707.07
75	707.60	707.17	706.74
	707.28	706.85	706.42
25	706.95	706.52	706.09
50	706.62	706.19	705.76
75	706.30	705.87	705.44
	705.97	705.54	705.11
25	705.64	705.21	704.78
50	705.31	704.88	704.45
75	704.98	704.55	704.12
	704.65	704.22	703.79
25	704.33	703.90	703.47
50	704.00	703.57	703.14
75	703.68	703.25	702.82
	703.35	702.92	702.49
25	703.03	702.60	702.17
50	702.70	702.27	701.84
75	702.37	701.94	701.51
	702.03	701.60	701.17
25	701.70	701.27	700.84
50	701.38	700.95	700.52
75	701.05	700.62	700.19
	700.73	700.30	699.87
25	700.40	699.97	699.54
50	700.07	699.64	699.21
75	699.74	699.31	698.88
	699.41	698.98	698.55
25	699.09	698.66	698.23
50	698.76	698.33	697.90
75	698.44	698.01	697.58
	698.11	697.68	697.25
25	697.79	697.36	696.93
50	697.46	697.03	696.60
75	697.13	696.70	696.27
	696.81	696.38	695.95
25	696.49	696.06	695.63
50	696.16	695.73	695.30
75	695.84	695.41	694.98
	695.52	695.11	694.71
25	695.21	694.87	694.54
50	694.91	694.65	694.39
75	694.62	694.40	694.19
	694.33	694.11	693.90
25	694.05	693.83	693.62
50	693.77	693.55	693.34
75	693.52	693.30	693.09
	693.28	693.06	692.85
25	693.04	692.82	692.61
50	692.77	692.55	692.34
75	692.48	692.26	692.05
	692.18	691.96	691.75
25	691.88	691.66	391.45
50	691.58	691.36	691.15
75	691.24	691.02	690.81
	690.85	690.63	690.42
25	690.45	690.23	690.02
50	690.06	689.84	689.63
75	689.66	689.44	689.23
	689.26	689.04	688.83
25	688.90	688.68	688.47
50	688.55	688.33	688.12
75	688.25	688.03	687.82
	687.98	687.76	687.55
25	687.69	687.49	687.30
50	687.54	687.35	687.17
75	687.50	687.31	687.13
	687.53	687.34	687.16
25	687.58	687.39	687.21
50	687.64	687.45	687.27
75	687.67	687.48	687.30
	687.67	687.48	687.30
25	687.63	687.44	687.26
50	687.56	687.37	687.19
75	687.45	687.26	687.08
	687.32	687.13	686.95
25	See W.B.I.L., Sheet	686.97	686.79
50		686.80	686.62
75		686.60	686.42
		686.36	686.18
25		686.10	685.92
50		685.83	685.65
75		685.55	685.37
		685.26	685.08
25		684.97	684.79
50		684.67	684.49
75		684.38	684.20
		See W.B.I.L., Sheet	683.90
25			683.60
50			683.30
75			683.00
			682.70
25			682.40
50			682.10



HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE Horiz. 1"=100' Vert 10'
MADE B.J.T. DATE 9-17-68
TRCD. J.M.G. DATE 9-27-68
CKD. SPV DATE 1-31-69

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

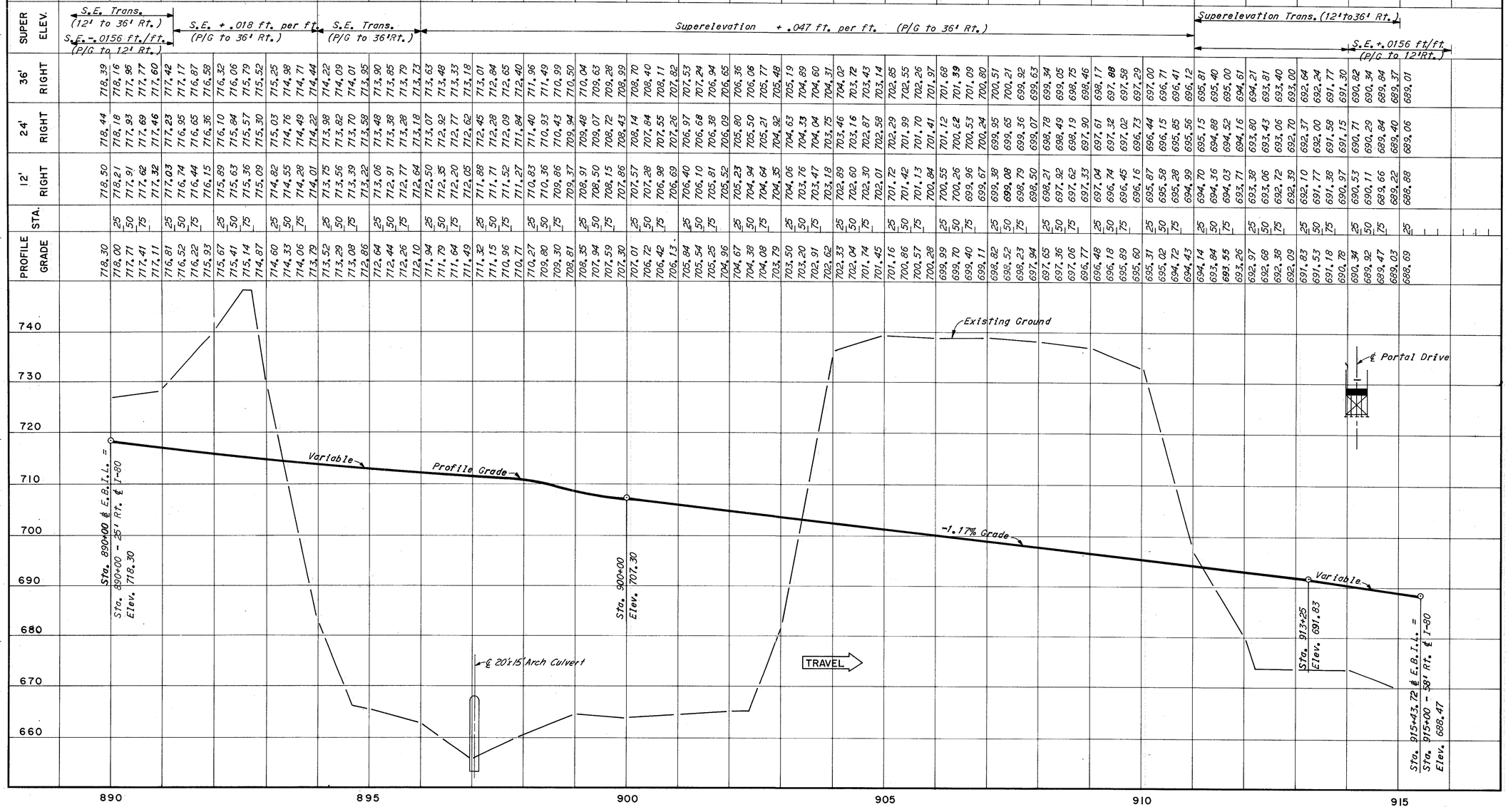
PROFILE WEST BOUND OUTER LANES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

59
392

CUYAHOGA COUNTY
CUY.-80-15.81

STA.	SUPER ELEV.	36' RIGHT	24' RIGHT	12' RIGHT	PROFILE GRADE
	S.E. Trans. (12' to 36' Rt.) S.E. -.0156 ft./ft. (P/G to 12' Rt.)				
25		718.39	718.44	718.50	718.30
50		718.18	718.21	718.21	718.00
75		717.96	717.93	717.91	717.71
25		717.77	717.69	717.62	717.41
50		717.60	717.46	717.32	717.11
75	S.E. + .018 ft. per ft. (P/G to 36' Rt.)	717.42	717.23	717.03	716.81
25		717.17	716.95	716.74	716.52
50		716.87	716.65	716.44	716.22
75		716.58	716.36	716.15	715.93
25		716.32	716.10	715.89	715.67
50		716.06	715.84	715.63	715.41
75		715.79	715.57	715.36	715.14
25		715.52	715.30	715.09	714.87
50		715.25	715.03	714.82	714.60
75		714.98	714.76	714.55	714.33
25		714.71	714.49	714.28	714.06
50		714.44	714.22	714.01	713.79
75	S.E. Trans. (P/G to 36' Rt.)	714.22	713.98	713.75	713.52
25		714.09	713.82	713.56	713.29
50		714.01	713.70	713.39	713.08
75		713.95	713.58	713.22	712.86
25		713.90	713.48	713.06	712.64
50		713.85	713.38	712.91	712.44
75		713.79	713.28	712.77	712.26
00		713.73	713.18	712.64	712.10
25	Superelevation + .047 ft. per ft. (P/G to 36' Rt.)	713.63	713.07	712.50	711.94
50		713.48	712.92	712.35	711.79
75		713.33	712.77	712.20	711.64
00		713.18	712.62	712.05	711.49
25		713.01	712.45	711.88	711.32
50		712.84	712.28	711.71	711.15
75		712.65	712.09	711.52	710.96
00		712.40	711.84	711.27	710.71
25		711.96	711.40	710.83	710.27
50		711.49	710.93	710.36	709.80
75		710.99	710.43	709.86	709.30
00		710.50	709.94	709.37	708.81
25		710.04	709.48	708.91	708.35
50		709.63	709.07	708.50	707.94
75		709.28	708.72	708.15	707.59
00		708.99	708.43	707.86	707.30
25		708.70	708.14	707.57	707.01
50		708.40	707.84	707.28	706.72
75		708.11	707.55	706.98	706.42
00		707.82	707.26	706.69	706.13
25		707.53	706.97	706.40	705.84
50		707.24	706.68	706.10	705.54
75		706.94	706.38	705.81	705.25
00		706.65	706.09	705.52	704.96
25		706.36	705.80	705.23	704.67
50		706.06	705.50	704.94	704.38
75		705.77	705.21	704.64	704.08
00		705.48	704.92	704.35	703.79
25		705.19	704.63	704.06	703.50
50		704.89	704.33	703.76	703.20
75		704.60	704.04	703.47	702.91
00		704.31	703.75	703.18	702.62
25		704.02	703.46	702.89	702.33
50		703.72	703.16	702.60	702.04
75		703.43	702.87	702.30	701.74
00		703.14	702.58	702.01	701.45
25		702.85	702.29	701.72	701.16
50		702.55	701.99	701.42	700.86
75		702.26	701.70	701.13	700.57
00		701.97	701.41	700.84	700.28
25		701.68	701.12	700.55	699.99
50		701.39	700.82	699.96	699.40
75		701.09	700.53	699.67	699.11
00		700.80	700.24	699.38	698.82
25	Superelevation Trans. (12' to 36' Rt.)	700.51	699.95	**699.08**	698.52
50		700.21	699.65	698.79	698.23
75	S.E. +.0156 ft/ft (P/G to 12' Rt.)	699.92	699.36	698.50	697.94
00		699.63	699.07	698.21	697.65
25		699.34	698.78	697.92	697.36
50		699.05	698.49	697.62	697.06
75		698.75	698.19	697.33	696.77
00		698.46	697.90	697.04	696.48
25		698.17	697.61	696.74	696.18
50		697.88	697.32	696.45	695.89
75		697.58	697.02	696.16	695.60
00		697.29	696.73	695.87	695.31
25		697.00	696.44	695.58	695.02
50		696.71	696.15	695.28	694.72
75		696.41	695.85	694.99	694.43
00		696.12	695.56	694.70	694.14
25		695.81	695.15	694.36	693.84
50		695.40	694.88	694.03	**693.55**
75		695.00	694.52	693.71	693.26
00		694.67	694.16	693.38	692.97
25		694.21	693.80	693.06	692.68
50		693.81	693.43	692.72	692.38
75		693.40	693.06	692.39	692.09
00		693.00	692.70	692.10	691.83
25		692.64	692.37	691.77	691.53
50		692.24	692.00	691.58	691.18
75		691.77	691.58	691.38	690.78
00		691.30	691.15	690.97	690.34
25		690.82	690.71	690.53	690.34
50		690.34	690.29	690.11	689.92
75		689.84	689.84	689.66	689.47
00		689.37	689.40	689.22	689.03
25		689.01	689.06	688.88	688.69



SCALE 1"=10' Vert 1"=100' Hor.
MADE RJT DATE 9-13-68
TRCD TPM DATE 1-15-69
CKD SPV DATE 1-22-69

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

HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

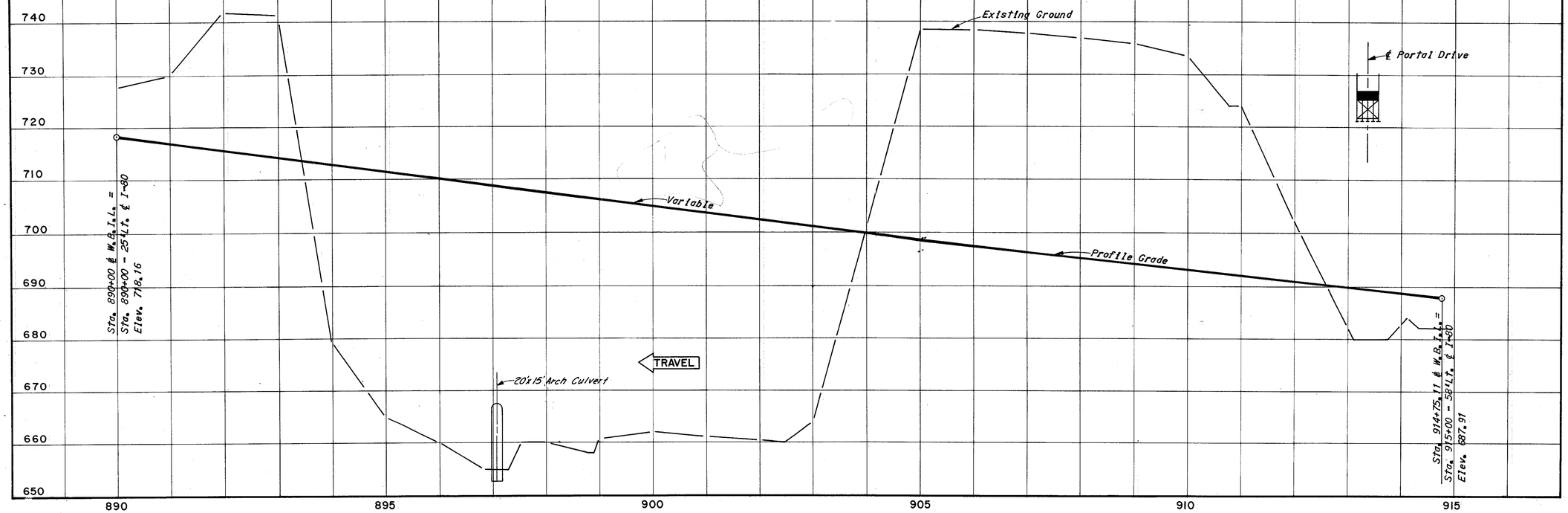
PROFILE EAST BOUND INNER LANES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

60
392

CUYAHOGA COUNTY
CUY.–80–15.81

STA.	SUPER ELEV.	36' LEFT	24' LEFT	12' LEFT	PROFILE GRADE
	S.E. -.0156 Ft/Ft. (12'Lt. to 36'Rt.) / S.E. Trans. (12'Lt. to 36'Rt.) / S.E. Trans. (P/G to 12'Lt.)				
890+00		717.84	718.02	718.21	718.16
25		717.82	717.66	717.82	717.82
50		717.48	717.28	717.47	717.49
75		717.09	716.86	717.05	717.12
891+00		716.67	716.43	716.62	716.75
25		716.24	716.00	716.20	716.40
50		715.81	715.56	715.80	716.04
75		715.33	715.12	715.40	715.68
892+00		714.84	714.68	715.01	715.33
25		714.36	714.24	714.62	714.99
50		713.87	713.81	714.22	714.63
75		713.39	713.43	713.86	714.29
893+00		712.99	713.09	713.52	713.95
25		712.65	712.75	713.18	713.61
50		712.31	712.43	712.86	713.29
75		711.99	712.10	712.53	712.96
894+00		711.66	711.79	712.22	712.65
25		711.35	711.53	711.96	712.39
50		711.09	711.15	711.58	712.01
75		710.77	710.84	711.27	711.70
895+00		710.40	710.63	711.06	711.49
25		710.19	710.21	710.64	711.07
50		709.77	709.90	710.33	710.76
75		709.46	709.58	710.01	710.44
896+00		709.14	709.16	709.59	710.02
25		708.72	708.94	709.37	709.80
50		708.50	708.57	709.00	709.43
75		708.13	708.31	708.74	709.17
897+00		707.87	708.00	708.43	708.86
25		707.56	707.68	708.11	708.54
50		707.24	707.36	707.79	708.22
75		706.92	707.04	707.47	707.90
898+00		706.60	706.72	707.15	707.58
25		706.28	706.40	706.83	707.26
50		705.96	706.09	706.52	706.95
75		705.65	705.77	706.20	706.63
899+00		705.33	705.45	705.88	706.31
25		705.01	705.12	705.55	705.98
50		704.68	704.81	705.24	705.67
75		704.37	704.48	704.91	705.34
900+00		704.04	704.17	704.60	705.03
25		703.73	703.84	704.27	704.70
50		703.40	703.53	703.96	704.39
75		703.09	703.21	703.64	704.07
901+00		702.77	702.89	703.32	703.75
25		702.45	702.56	702.99	703.42
50		702.12	702.24	702.67	703.10
75		701.80	701.92	702.35	702.78
902+00		701.48	701.60	702.03	702.46
25		701.16	701.29	701.72	702.15
50		700.85	700.98	701.41	701.84
75		700.54	700.66	701.09	701.52
903+00		700.22	700.33	700.76	701.19
25		699.89	700.02	700.45	700.88
50		699.58	699.69	700.12	700.55
75		699.25	699.38	699.81	700.24
904+00		698.94	699.06	699.49	699.22
25		698.62	698.74	699.17	699.60
50		698.30	698.42	698.85	699.28
75		697.98	698.11	698.54	698.97
905+00		697.67	697.79	698.22	698.65
25		697.35	697.47	697.90	698.33
50		697.03	697.16	697.59	698.02
75		696.72	696.84	697.27	697.70
906+00		696.40	696.52	696.95	697.38
25		696.08	696.20	696.63	697.06
50		695.76	695.88	696.31	696.74
75		695.44	695.57	696.00	696.43
907+00		695.13	695.25	695.68	696.11
25		694.81	694.93	695.36	695.79
50		694.49	694.60	695.03	695.46
75		694.16	694.33	694.76	695.19
908+00		693.89	694.11	694.54	694.97
25		693.67	693.92	694.35	694.78
50		693.48	693.72	694.15	694.58
75		693.28	693.43	693.86	694.29
909+00		692.99	693.13	693.56	693.99
25		692.69	692.83	693.26	693.69
50		692.39	692.54	692.97	693.40
75		692.10	692.24	692.67	693.10
910+00		691.80	691.94	692.37	692.80
25		691.50	691.65	692.08	692.51
50		691.21	691.35	691.78	692.21
75		690.91	691.05	691.48	691.91
911+00		690.61	690.75	691.18	691.61
25		690.31	690.46	690.89	691.32
50		690.02	690.16	690.59	691.02
75		689.72	689.87	690.30	690.73
912+00		689.43	689.57	690.00	690.43
25		689.13	689.28	689.71	690.14
50		688.84	688.98	689.41	689.84
75		688.54	688.69	689.12	689.55
913+00		688.25	688.47	688.88	689.29
25		688.05	688.32	688.67	689.02
50		687.97	688.23	688.52	688.80
75		687.94	688.13	688.36	688.59
914+00		687.90	688.07	688.24	688.41
25		687.88	688.03	688.13	688.24
50		687.84	688.00	688.05	688.09
75		687.81	687.93	687.92	687.91
915+00		687.74			
	S.E. Trans. (12'Lt. to 36'Lt.) / S.E. -.0156 Ft/Ft. (12'Lt. to 36'Lt.) / S.E. Trans. (P/G to 12'Lt.)				



HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE Horiz. 1"=100' Vert. 1"=10'
MADE RJT. DATE 9-13-68
TRCD. TPM. DATE 1-15-69
CKD. SPV DATE 2-3-69

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

PROFILE WEST BOUND INNER LANES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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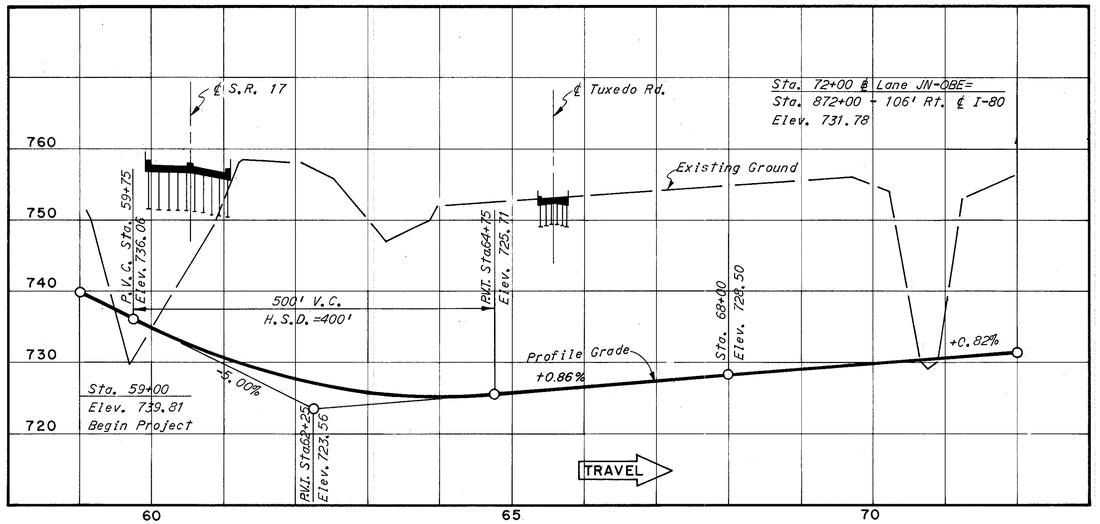
392

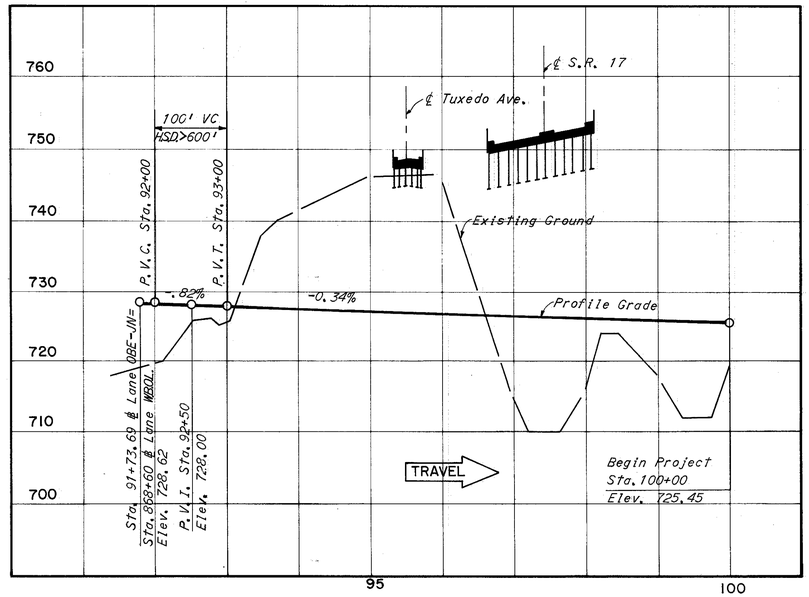
CUYAHOGA COUNTY
CUY. 80-15.81

		Superelevation Transition (P/G to 24' Lt.)			Superelevation -.0156 ft. per ft. (P/G to 24' Lt.)		
PROFILE GRADE	STA.	12' LEFT	24' LEFT		12' LEFT	24' LEFT	
739.81		740.59	741.37				
738.56	25	739.40	740.25				
737.31	50	738.22	739.12				
736.06	75	737.03	738.00				
734.85		735.85	736.85				
733.71	25	734.69	735.67				
732.64	50	733.56	734.47				
731.65	75	732.50	733.36				
730.73		731.52	732.31				
729.88	25	730.61	731.34				
729.10	50	729.77	730.43				
728.40	75	729.00	729.61				
727.77		728.31	728.85				
727.22	25	727.70	728.18				
726.74	50	727.16	727.57				
726.33	75	726.68	727.04				
725.99		726.28	726.57				
725.74	25	725.97	726.20				
725.56	50	725.73	725.89				
725.44	75	725.54	725.65				
725.39		725.43	725.47				
725.43	25	725.42	725.41				
725.54	50	725.50	725.46				
725.71	75	725.64	725.56				
725.92		725.82	725.71				
726.14	25	726.00	725.87				
726.36	50	726.19	726.03				
726.57	75						
726.78							
727.00	25						
727.22	50						
727.43	75						
727.64							
727.86	25						
728.08	50						
728.29	75						
728.50							
728.70	25						
728.91	50						
729.12	75						
729.32							
729.52	25						
729.73	50						
729.94	75						
730.14							
730.34	25						
730.55	50						
730.76	75						
730.96							
731.16	25						
731.37	50						
731.58	75						
731.78							



LANE JN-OBE

		S.E. Trans. P/G to 24'Lt.	S.E. +.0156 ft. /ft. P/G to 24'Lt.		S.E. Trans. P/G to 24'Lt.		Superelevation -.049 ft./ft. P/G to 24'Lt.	
PROFILE GRADE	STA.	12' LEFT		24' LEFT		12' LEFT		24' LEFT
728.41		728.61		728.54				
728.22	25	728.48		728.48				
728.06	50	728.35		728.43				
727.94	75	728.25		728.31				
727.83		728.13		728.20				
727.74	25	728.02		728.11				
727.66	50	727.93		728.03				
727.58	75	727.85		727.95				
727.49		727.77		727.86				
727.41	25	727.68		727.78				
727.32	50	727.60		727.69				
727.24	75	727.51		727.54				
727.15		727.39		727.32				
727.06	25	727.23		727.10				
726.98	50	727.08		726.89				
726.90	75	726.93		726.66				
726.81		726.78		726.42				
726.72	25	726.62		726.18				
726.64	50	726.45		725.96				
726.56	75	726.30		725.73				
726.47		726.14		725.49				
726.38	25	725.98		725.26				
726.30	50	725.82		725.12				
726.22	75	725.71		725.04				
726.13		725.63		724.95				
726.04	25	725.54		724.86				
725.96	50	725.45		724.78				
725.88	75	725.37		724.70				
725.79		725.29		724.61				
725.71	25	725.20		724.53				
725.62	50	725.12		724.44				
725.54	75	725.03		724.36				
725.45		724.95		724.27				



LANE OBE-JN

SCALE Hor. 1"=100' Ver. 1"=10'
MADE RJT DATE 9-18-68
TRCD. ____ DATE ____
CKD. SPV DATE 2-3-69

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

HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

PROFILE LANES JN-OBE & OBE-JN

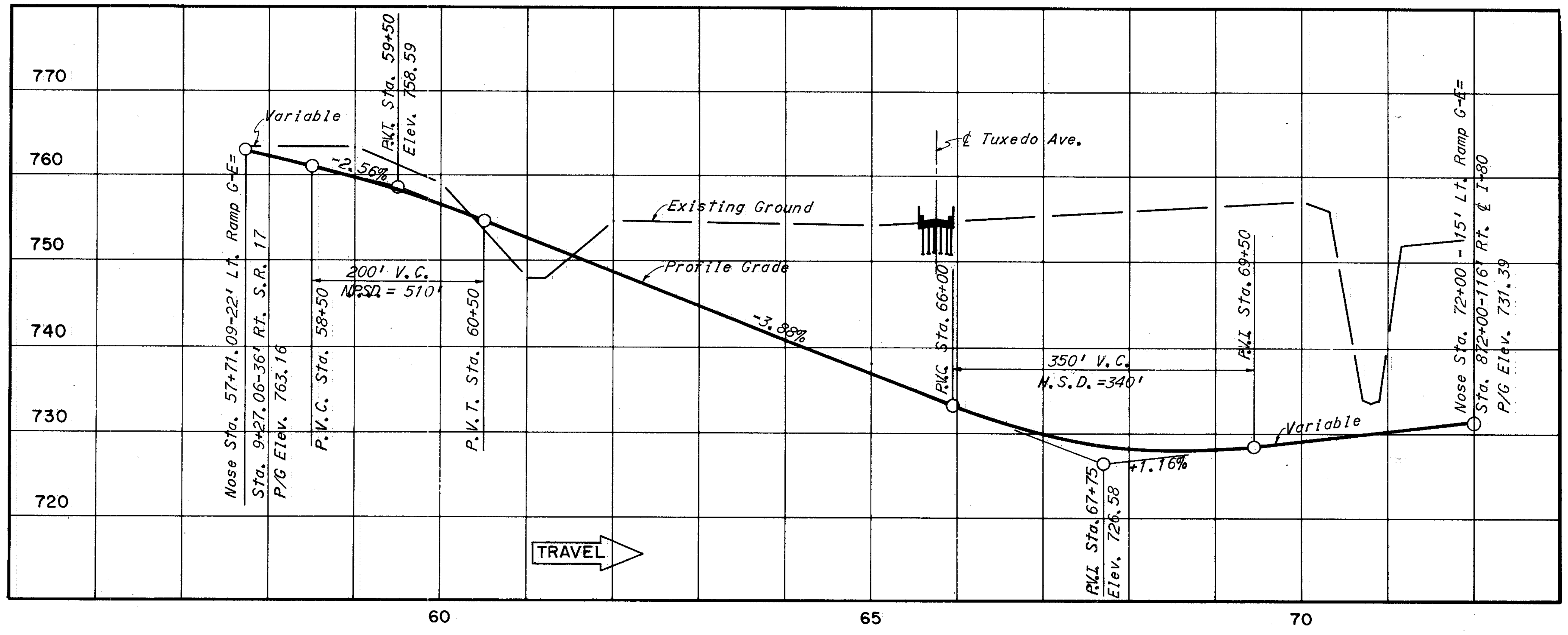
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

62
392

CUYAHOGA COUNTY

CUY.-80-15.81

	STA.	PROFILE GRADE	LEFT EDGE	PAV'T WIDTH
S.E. Transition	75	763.05	763.39	19.88
		762.42	762.91	19.13
	25	761.79	762.41	18.38
	50	761.15	761.90	17.63
	75	760.49	761.30	17.00
		759.79	760.24	16.00
	25	759.04	760.12	←
Superelevation +.083 ft./ft.	50	758.26	759.48	
	75	757.43	758.76	
		756.57	757.90	
	25	755.66	756.99	
	50	754.71	756.04	
	75	753.74	755.07	
		752.77	754.10	
	25	751.80	753.13	
	50	750.83	752.16	
	75	749.86	751.19	
		748.89	750.22	
	25	747.92	749.25	
	50	746.95	748.28	
	75	745.98	747.31	
S.E. Transition		745.01	746.34	
	25	744.04	745.36	
	50	743.07	744.25	
	75	742.10	743.15	
		741.13	742.04	
	25	740.16	740.94	
	50	739.19	739.83	
	75	738.22	738.73	
Superelevation +.0156 ft. per ft.		737.25	737.62	
	25	736.28	736.53	
	50	735.31	735.56	
	75	734.34	734.59	
		733.37	733.62	
	25	732.44	732.69	
	50	731.61	731.86	
	75	730.87	731.12	
		730.21	730.46	
	25	729.64	729.89	
	50	729.17	729.42	
	75	728.79	729.04	
		728.49	728.74	
	25	728.28	728.53	
	50	728.17	728.42	
	75	728.15	728.40	
		728.21	728.46	
	25	728.36	728.61	
	50	728.61	728.86	
	75	728.89	729.14	→
		729.18	729.43	16.00
	25	729.46	729.70	15.50
	50	729.73	729.96	15.00
	75	729.98	730.21	14.50
		730.28	730.53	16.00
	25	730.57	730.81	15.50
	50	730.86	731.09	15.00
	75	731.14	731.37	14.50
		731.39	731.61	14.00



HORIZONTAL 100 0 100 200 300 400

VERTICAL 10 0 10 20 30 40

SCALE IN FEET

SCALE Hor. 1"=100' Vert. 1"=10'
MADE IM DATE 2-1-68
TRCD. JEN DATE 2-2-68
CKD. SPV DATE 1-30-69

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

PROFILE RAMP G-E

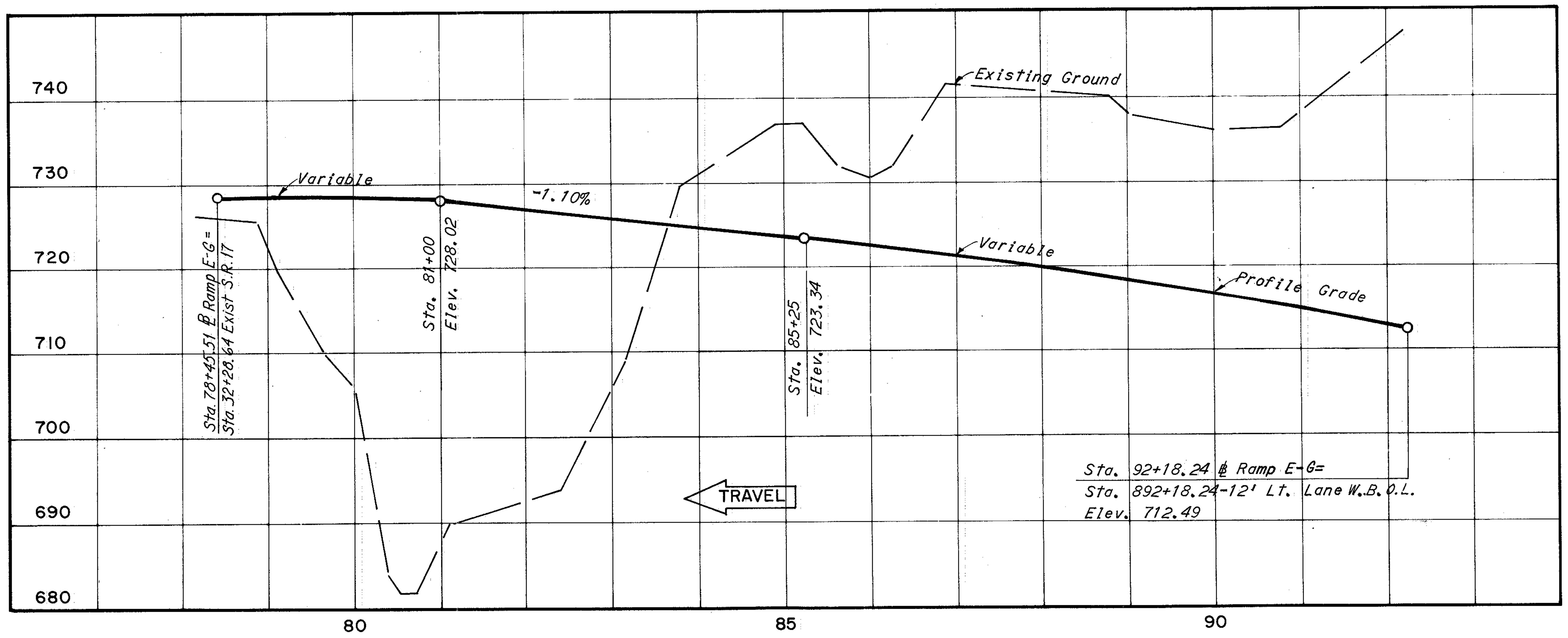
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

63
392

CUYAHOGA COUNTY
CUY. 80-15.81

S.E. Trans. P/G to 16'Rt. | S.E.+.047 ft/ft. P/G to 16' Rt. | SE Trans. PG to 16'Rt. | Superelevation +.0156 ft. per ft. (P/G to Rt. Edge) | S.E.Trans P/G to Rt. Edge
S.E. Trans. 8'Lt. to P/G | S.E.-.047 ft/ft. 8'Lt. to P/G | SE. Trans. LtEdge to PG

RIGHT PAV'T WIDTH		16.00'							16.00' 12.00'					12.00' 0.00'	0.00'		
RIGHT EDGE	See Intersection Detail Sheet 65		729.45	729.40 729.23 729.03 728.77	728.49 728.22 727.94 727.67	727.28 726.90 726.51 726.13	725.80 725.52 725.24 724.97	724.69 724.42 724.14 723.87	723.59 723.25 722.97 722.69	722.40 722.12 721.84 721.56	721.27 720.99 720.69 720.35	719.99 719.65 719.31 718.96	718.52 718.05 717.58 717.10	716.58 716.09 715.61			
STA.			25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75	25 50 75		
PROFILE GRADE	See Intersection Detail Sheet65	728.43	728.70 728.80 728.81 728.76	728.65 728.48 728.28 728.02	727.74 727.47 727.19 726.92	726.64 726.37 726.09 725.82	725.54 725.27 725.00 724.72	724.44 724.17 723.89 723.62	723.34 723.06 722.78 722.50	722.21 721.93 721.65 721.37	721.08 720.80 720.50 720.16	719.80 719.46 719.12 718.77	718.33 717.86 717.39 716.89	716.31 715.75 715.21 714.70	714.24 713.79 713.32 712.84		
LEFT EDGE	See Intersection Detail Sheet 65		728.41	728.27 728.10 727.90 727.64	727.36 727.08 726.81 726.54	726.40 726.24 726.05 725.82											
RIGHT PAV'T WIDTH		8.00'			8.00'	6.00' 4.00' 2.00' 0.00'											



HORIZONTAL 100 0 100 200 300 400
VERTICAL 10 0 10 20 30 40
SCALE IN FEET

SCALE 1"=10'Vert; 1"=100'Hor.
MADE R.J.T. DATE 9-19-68
TRCD. J.M.C. DATE 9-30-68
CKD. ______ DATE ______

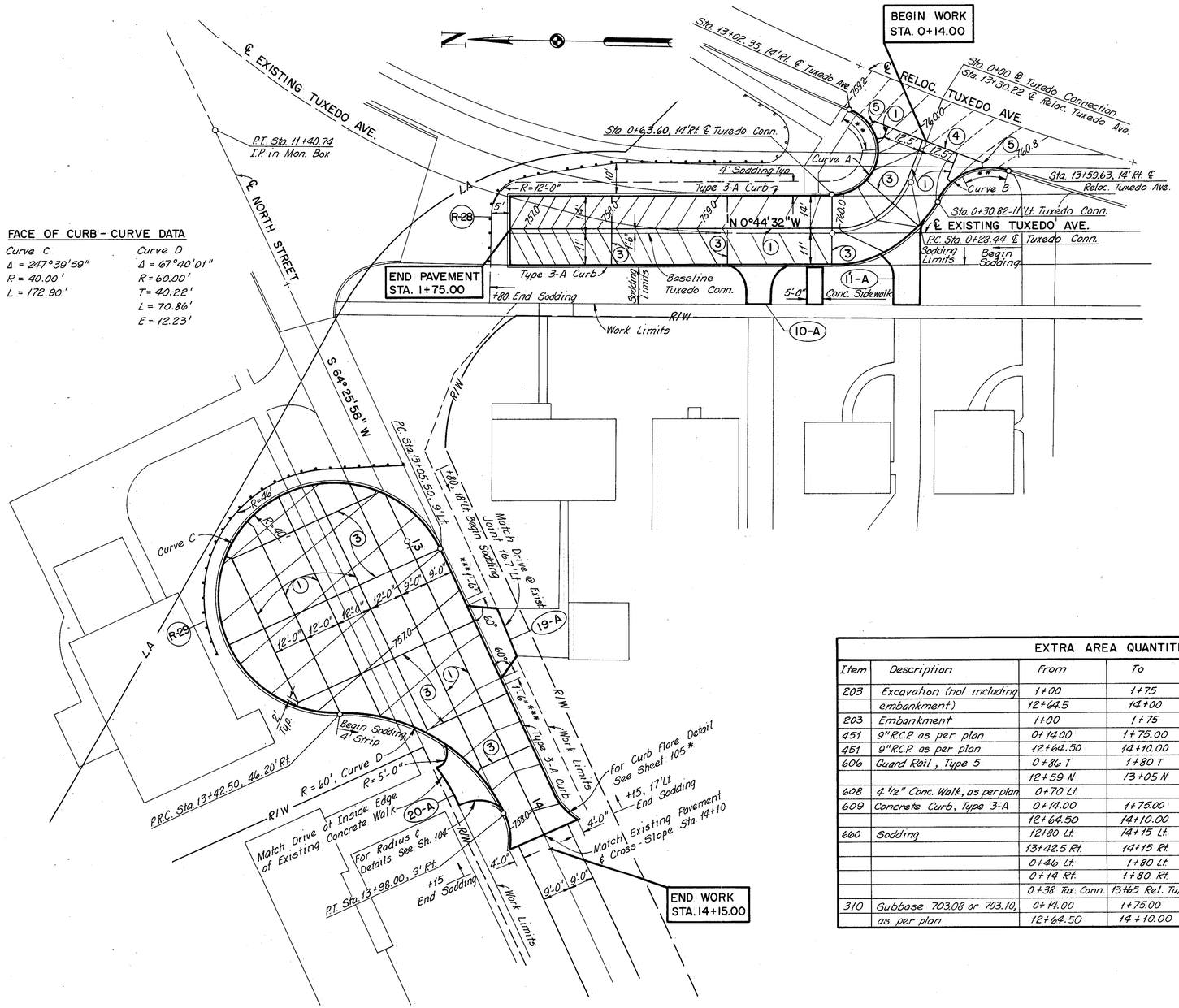
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

PROFILE RAMP E-G

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

64
392

CUYAHOGA COUNTY
CUY. 480-15.81



FACE OF CURB - CURVE DATA

Curve C	Curve D
Δ = 247°39'59"	Δ = 67°40'01"
R = 40.00'	R = 60.00'
L = 172.90'	T = 40.22'
	L = 70.86'
	E = 12.23'

FACE OF CURB - CURVE DATA

Curve A	Curve B
Δ = 157°14'42"	Δ = 82°55'55.6"
R = 15.00'	R = 20.00'
T = 74.54'	T = 17.67'
L = 41.17'	L = 28.95'
E = 61.04'	E = 6.69'

BASELINE TUXEDO CONNECTION

Δ = 69° 28' 32"
R = 29.00'
T = 20.11'
L = 35.16'
E = 6.29'

QUANTITY CALCULATIONS
MADE BY M.C.B. DATE 8-14-74
CHECKED BY T.D.V. DATE 8-28-74

LEGEND

(1) Standard Longitudinal Joint
(3) Standard Contraction Joint
(4) Key Joint without Tiebars
(5) Expansion Joint without Dowels

*Height of Curb shall transition form 4" to 0" in Curb Flair.
**15' Curb Transition from 6"x7" Integral Curb, as per plan, to Curb, Type 3-A, will be included in pay Item 609, Curb, Type 3-A.
***Transition Curb height from 4" to 2½" in 1'-6".

EXTRA AREA QUANTITIES

Item	Description	From	To	Quantity	Remarks
203	Excavation (not including	1+00	1+75	122.22 Cu. Yds.	Tuxedo Conn.
	embankment)	12+64.5	14+00	465.45 Cu. Yds.	North St.
203	Embankment	1+00	1+75	7.41 Cu. Yds.	Tuxedo Conn.
451	9" R.C.P. as per plan	0+14.00	1+75.00	504.10 Sq. Yds.	Tuxedo Conn.
451	9" R.C.P. as per plan	12+64.50	14+10.00	852.38 Sq. Yds.	North St. Cul-de-sac
606	Guard Rail, Type 5	0+86 T	1+80 T	136.5 Lin. Ft.	R-28
		12+59 N	13+05 N	125.0 Lin. Ft.	R-29
608	4 1/2" Conc. Walk, as per plan	0+70 Lt.		80.00 Sq. Ft.	Tuxedo Conn.
609	Concrete Curb, Type 3-A	0+14.00	1+75.00	724.83 Lin. Ft.	Tuxedo Conn.
		12+64.50	14+10.00	361.70 Lin. Ft.	North St.
660	Sodding	12+80 Lt.	14+15 Lt.	99.44 Sq. Yds.	North St.
		13+42.5 Rt.	14+15 Rt.	48.83 Sq. Yds.	North St.
		0+46 Lt.	1+80 Lt.	182.09 Sq. Yds.	Tuxedo Conn.
		0+14 Rt.	1+80 Rt.	72.18 Sq. Yds.	Tuxedo Conn.
		0+38 Tux. Conn.	13+65 Rel. Tux.	104.33 Sq. Yds.	Tuxedo Conn.
310	Subbase 703.08 or 703.10,	0+14.00	1+75.00	71.03 Cu. Yds.	North St.
	as per plan	12+64.50	14+10.00	42.01 Cu. Yds.	Tuxedo Conn.

DRIVES AND APPROACHES

Ref. No.	Station	Side	Type	Width	452 P.C.C. for Drives 6"	Profile Sheet No.
10-A	0+88.5	Lt.	Res.	9	15.61	127
11-A	0+43.5	Lt.	Res.	8	28.47	127
19-A	13+32.5	Lt.	Res.	16	20.11	129
20-A	13+78.3	Rt.	Res.	15	22.17	129
	TOTAL				86.36	

For Driveway Details See Sheet 104.

SCALE 1" = 20'
MADE M.C.B. DATE 8-22-74
TRCD. J.M.C. DATE 8-29-74
CKD. A.M.S. DATE 8-30-74

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

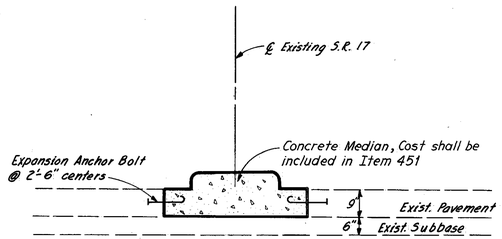
20 0 20 40 60 80
SCALE IN FEET

TUXEDO CONN. & NORTH ST. CUL-DE-SAC

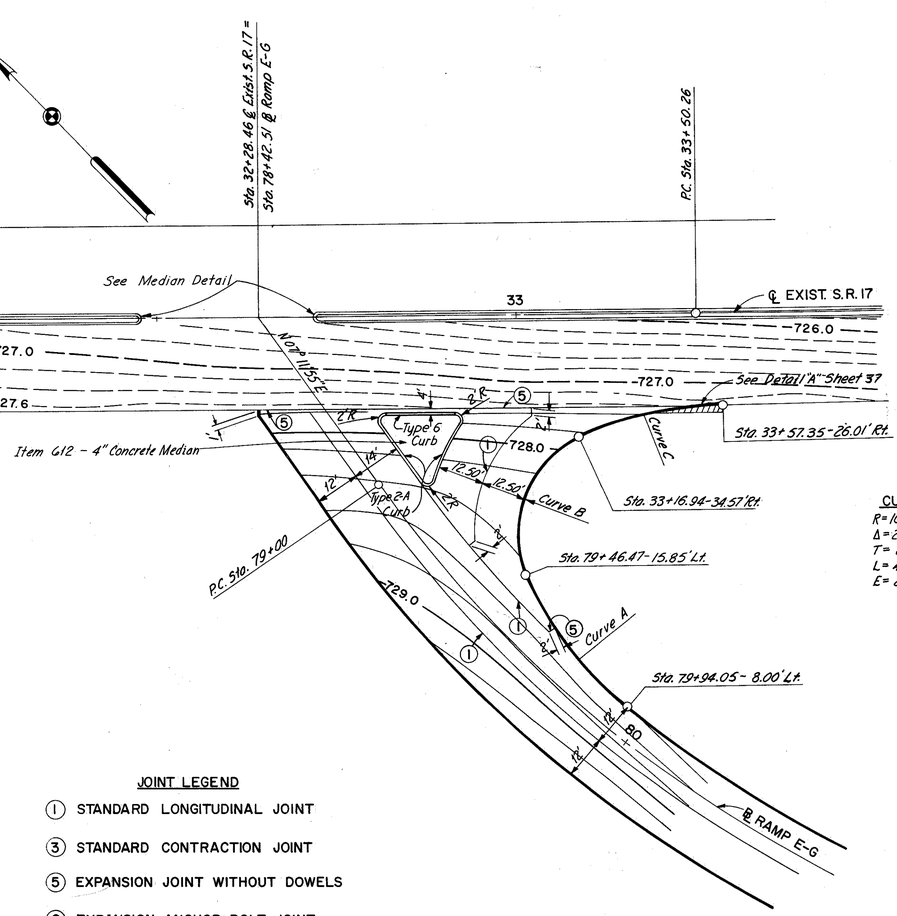
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

65
392

CUYAHOGA COUNTY
CUY.–80–15.81



SECTION A–A



CURVE A	CURVE B	CURVE C
R= 100.00'	R= 30.00'	R= 100.00'
Δ= 26°57'36"	Δ= 88°33'08"	Δ= 23°53'44"
T= 23.97'	T= 29.25'	T= 21.16'
L= 47.05'	L= 46.37'	L= 41.71'
E= 2.83'	E= 11.90'	E= 2.21'

JOINT LEGEND

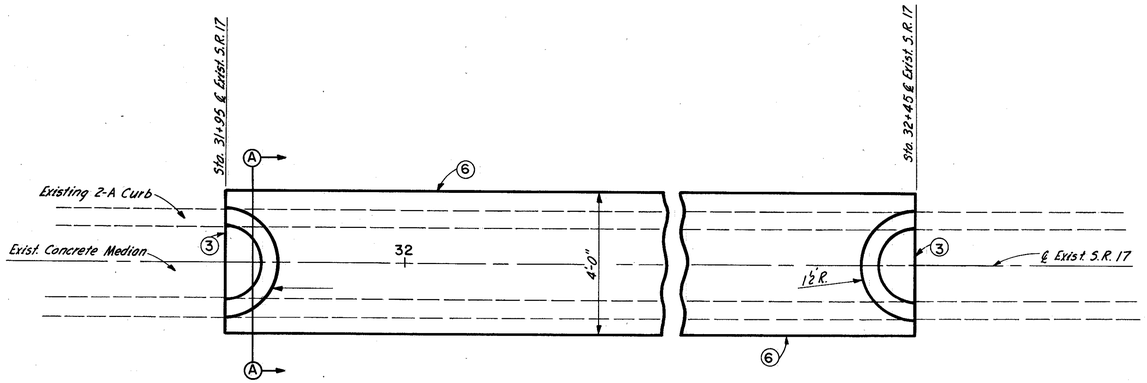
(1) STANDARD LONGITUDINAL JOINT

(3) STANDARD CONTRACTION JOINT

(5) EXPANSION JOINT WITHOUT DOWELS

(6) EXPANSION ANCHOR BOLT JOINT

20 0 20 40
Scale in Feet



MEDIAN DETAIL

2 0 2 4
Scale in Feet

SCALE
MADE RJT DATE 8-18-69
TRCD MAC DATE 8-18-69
CKD RBH DATE 7-16-70

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RAMP E–G INTERSECTION DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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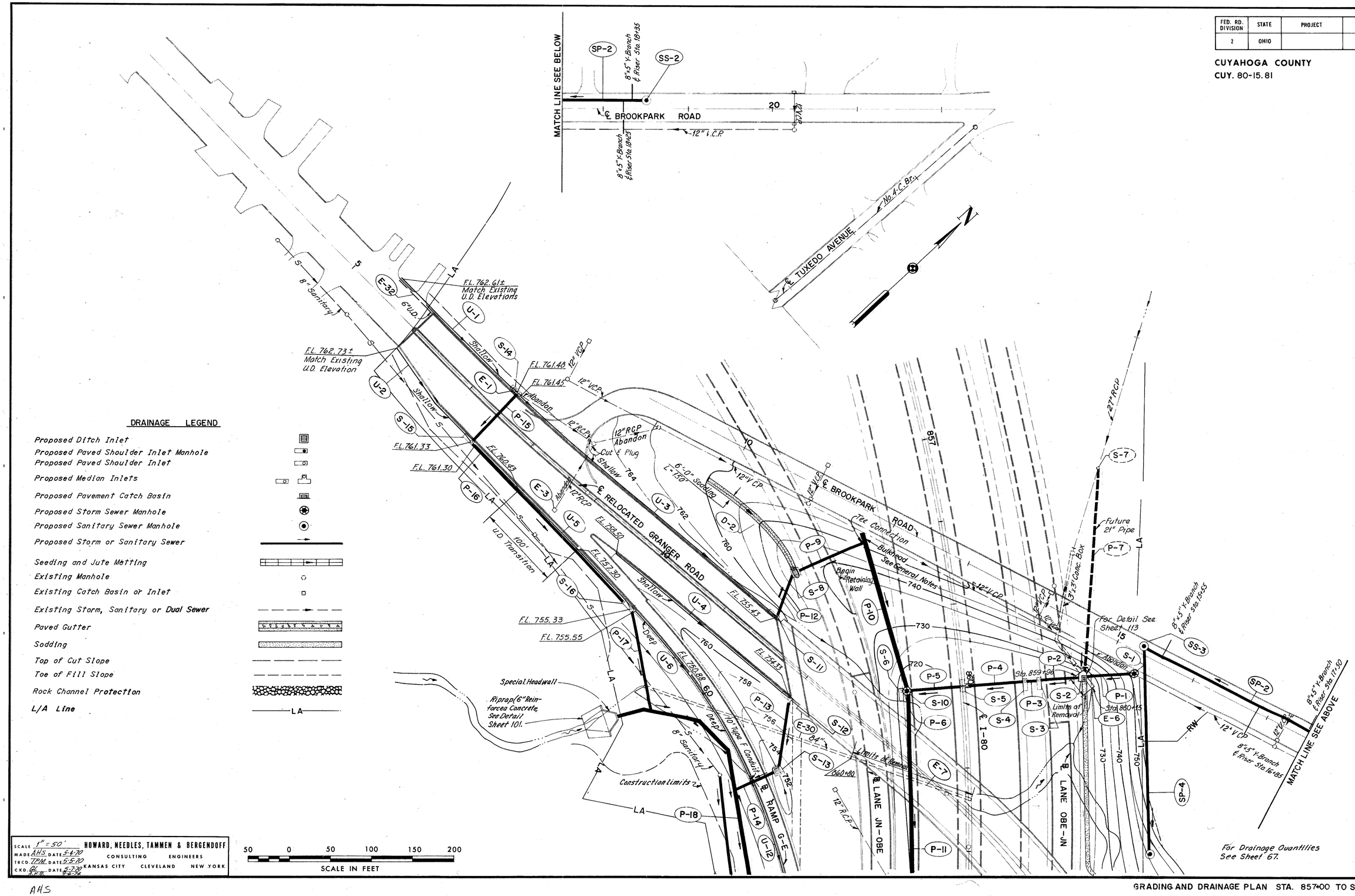
392

CUYAHOGA COUNTY
CUY. 80-15.81



DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Paved Shoulder Inlet
- Proposed Median Inlets
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Seeding and Jute Matting
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Dual Sewer
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope
- Rock Channel Protection
- L/A Line — LA —

SCALE 1" = 50'
MADE AHS DATE 5-4-70
TRCD. TPM DATE 5-5-70
CKD. GL DATE 5-7-70
A.H.S. DATE 6-6-74

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50 0 50 100 150 200
SCALE IN FEET

AHS

GRADING AND DRAINAGE PLAN STA. 857+00 TO STA. 860+00

QUANTITY CALCULATIONS

MADE BY A.H.S. DATE 9-21-70

CHECKED BY G.L. DATE 9-22-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY

CUY.-80-15.81

SANITARY SEWER

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B 706.08 ES. with 706.12 Joints 8"	604 Std. No. 1-A M.H. with 706.11 Joints	604 Y Branch & Riser 8"x5"
					Lin.Ft.	Each	Each
SP-2	18+50	15+30	Lt.	97	320		5
SP-4	15+30	862+00	Lt.	97	255		
SS-2	18+50		Rt.	97		1	
SS-3	15+30		Rt.	97		1	
		Total			575	2	5

UNDERDRAINS

Ref. No.	Station From	Station To	Side	605 Shallow U.D. 6"	605 Deep U.D. 6"	603 Type F Conduit 6"	605 Unclassified U.D. 6"
				Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.
U-1	5+45	7+45	Lt.	190		10	
U-2	6+05	7+45	Rt.	134		10	
U-3	7+49	11+52	Lt.	393		10	
U-4	9+60	12+30	Rt.	260		10	
U-5	7+49	58+60	Rt.	76	89	10	100
U-6	58+64	60+00	Rt.		136		
	Total			1053	225	50	100

DRAINAGE

Ref. No.	Station From	Station To	Side	202 C.B. Abandoned	202 Pipe Removed Over 15"	202 Portion of Existing Structures Removed	Special Fill and Plug Existing Culvert *84"	202 Pipe Removed 15" and under
				Each	Lin.Ft.	Lump	Lin.Ft.	Lin.Ft.
E-1	7+40		Lt.	1				
E-7	860+80	861+37	Rt.		152	Lump		
E-6	859+80	860+15	Lt.			Lump		
E-30	59+50	860+80	Rt.				260	
E-3	8+70		Rt.	1				
E-32	5+45	6+05						60
		Totals		2	152	Lump	260	60

* See General Note Sheet 9

DRAINAGE

Ref. No.	Station From	Station To	Side	660 Sodding
				Sq.Yds.
D-2	9+85	11+35	Lt.	100
	Total			100

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B 12"	603 Type B 15"	603 Type B 706.02 Class V 15"	603 Type B 707.13 15"	603 Type B 24"	603 Type B 706.02 Class IV 72"	603 Type B 706.02 Class V, Radius Pipe 72"	603 Type B 706.03 Class V 72"	603 Type C 706.01 ES, 706.08 ES or 706.02 12"	603 Type C 15"	603 Type C 707.13 15"	603 Type C 706.03 Class V, 8 Gage 3"x1" Corrugations 72"	603 Type C 706.01 ES, 706.08 ES, 706.02 or 707.13 15"	603 Type C 707.05 as per plan 78"	603 Type F 707.05 12"	604 Std. No. 1 M.H.	604 Std. No. 1-A M.H.	604 Std. No. 2 M.H.	604 Std. No. 2-A-6 Inlet	604 Std. No. 2-A-10 Inlet	604 Std. No. 2-A-12 Inlet	604 Std. No. 2-A-14 Inlet	604 Std. Medton I-3B Inlet	604 Std. No. 5 C.B.	603 Std. No. 5-A C.B. Mod.-as per plan	603 Bends and Branches 30° Bend 78"	603 Bends and Branches 35° Bend 78"
					Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Each	Each	Each	Each	Each	Each	Each	Each	Each	Each			
P-1	15+35	860+00	Lt.	78															65												
P-2	860+00	860+00	Lt.	78					52																						
P-3	100+55	860+00	Lt.	78					19																						
P-4	860+00	860+00	Lt.	78					72																						
P-5	860+00	860+00	Rt.	78					65																						
P-6	860+00	860+00	Rt.	78		7																									
P-9	58+60	858+10	Rt.	79			92																								
P-10	858+10	860+00	Rt.	79												185															
P-11	860+00	65+00	Rt.	80						282	96	146																			
P-12	11+50	58+60	Lt.	79									60																		
P-13	12+25	61+25	Rt.	81													90														
P-14	61+25	61+25	Rt.	81				60																							
P-15	7+50	7+50	Lt.	81	77																										
P-16	7+50	58+66	Rt.	81										278																	
P-17	58+66	59+80	Rt.	81											125																
P-18	59+63	65+00	Rt.	82														555												1	2
S-1	15+35		Rt.	78																1											
S-2	860+00		Lt.	78																										1	
S-3	100+55		Lt.	78																				1							
S-4	860+00		Lt.	78																			1								
S-5	860+00		℄	78																								1			
S-6	860+00		Rt.	78																					1						
S-7	857+70		Lt.	78																		1									
S-8	58+60		Rt.	79																									1		
S-10	860+00		Rt.	79																	1										
S-11	11+50		Lt.	79																							1				
S-12	12+25		Rt.	81																					1						
S-13	61+25		Lt.	81																									1		
S-14	7+50		Lt.	81																				1							
S-15	7+50		Rt.	81																				1							
S-16	58+66		Rt.	81																					1						
		Totals			77	7	92	60	208	282	96	146	60	278	125	185	90	555	65	1	1	1	1	3	3	1	1	2	1		

SCALE No Scale

MADE AHS DATE 9-21-70

TRCD. MAG DATE 9-22-70

CKD. GL DATE 9-22-70 AHS 9-6-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF

CONSULTING ENGINEERS

KANSAS CITY CLEVELAND NEW YORK

DRAINAGE QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY 80-15.81

SECTION A-A
Scale: 1"=10'

SECTION B-B
Scale: 1"=10'

Rock Channel Protection Type B

Construction Limits

Cut & Plug 12" Vit.

Top of Cut

Limits of Removal

Type B 7½' x 1'-6" Rock Channel Protection Type B L=290'

Type B 6' x 1'-6" Rock Channel Protection Type B L=145'

6'-0" Sodding L=80'

6'-0" Sodding L=330'

6'-0" Sodding L=300'

6'-0" Sodding L=150'

6'-0" Sodding L=150'

10' Type "F" Conduit

8" Sanitary

Connect pipe through

Abandon 12" R.C.P.

Abandon 10" R.C.P.

Abandon 24" R.C.P.

Abandon 15" R.C.P.

Abandon 12" R.C.P.

Abandon 12" R.C.P.

Abandon 24" R.C.P.

Abandon 15" R.C.P.

Abandon 15"

Plug

3' Sod Flume

24" Aerial Pipe

See Bridge Plans for detail of Scupper in Barrier Median.

See Sheet 123

Cut & Plug

Construction Limits

Deep

Shallow

Aerial

Limit of Removal

1.8'x6' Conc. Box

Type "C" Inlet

Type "D" Inlet

Type "E" Inlet

Type "F" Inlet

Type "G" Inlet

Type "H" Inlet

Type "J" Inlet

Type "K" Inlet

Type "L" Inlet

Type "M" Inlet

Type "N" Inlet

Type "P" Inlet

Type "Q" Inlet

Type "R" Inlet

Type "S" Inlet

Type "T" Inlet

Type "U" Inlet

Type "V" Inlet

Type "W" Inlet

Type "X" Inlet

Type "Y" Inlet

Type "Z" Inlet

Type "AA" Inlet

Type "BB" Inlet

Type "CC" Inlet

Type "DD" Inlet

Type "EE" Inlet

Type "FF" Inlet

Type "GG" Inlet

Type "HH" Inlet

Type "II" Inlet

Type "JJ" Inlet

Type "KK" Inlet

Type "LL" Inlet

Type "MM" Inlet

Type "NN" Inlet

Type "OO" Inlet

Type "PP" Inlet

Type "QQ" Inlet

Type "RR" Inlet

Type "SS" Inlet

Type "TT" Inlet

Type "UU" Inlet

Type "VV" Inlet

Type "WW" Inlet

Type "XX" Inlet

Type "YY" Inlet

Type "ZZ" Inlet

Type "AAA" Inlet

Type "BBB" Inlet

Type "CCC" Inlet

Type "DDD" Inlet

Type "EEE" Inlet

Type "FFF" Inlet

Type "GGG" Inlet

Type "HHH" Inlet

Type "III" Inlet

Type "JJJ" Inlet

Type "KKK" Inlet

Type "LLL" Inlet

Type "MMM" Inlet

Type "NNN" Inlet

Type "OOO" Inlet

Type "PPP" Inlet

Type "QQQ" Inlet

Type "RRR" Inlet

Type "SSS" Inlet

Type "TTT" Inlet

Type "UUU" Inlet

Type "VVV" Inlet

Type "WWW" Inlet

Type "XXX" Inlet

Type "YYY" Inlet

Type "ZZZ" Inlet

Type "AAAA" Inlet

Type "BBBB" Inlet

Type "CCCC" Inlet

Type "DDDD" Inlet

Type "EEEE" Inlet

Type "FFFF" Inlet

Type "GGGG" Inlet

Type "HHHH" Inlet

Type "IIII" Inlet

Type "JJJJ" Inlet

Type "KKKK" Inlet

Type "LLLL" Inlet

Type "MMMM" Inlet

Type "NNNN" Inlet

Type "OOOO" Inlet

Type "PPPP" Inlet

Type "QQQQ" Inlet

Type "RRRR" Inlet

Type "SSSS" Inlet

Type "TTTT" Inlet

Type "UUUU" Inlet

Type "VVVV" Inlet

Type "WWWW" Inlet

Type "XXXX" Inlet

Type "YYYY" Inlet

Type "ZZZZ" Inlet

Type "AAAAA" Inlet

Type "BBBBB" Inlet

Type "CCCCC" Inlet

Type "DDDDD" Inlet

Type "EEEEE" Inlet

Type "FFFFF" Inlet

Type "GGGGG" Inlet

Type "HHHHH" Inlet

Type "IIIII" Inlet

Type "JJJJJ" Inlet

Type "KKKKK" Inlet

Type "LLLLL" Inlet

Type "MMMMM" Inlet

Type "NNNNN" Inlet

Type "OOOOO" Inlet

Type "PPPPP" Inlet

Type "QQQQQ" Inlet

Type "RRRRR" Inlet

Type "SSSSS" Inlet

Type "TTTTT" Inlet

Type "UUUUU" Inlet

Type "VVVVV" Inlet

Type "WWWWW" Inlet

Type "XXXXX" Inlet

Type "YYYYY" Inlet

Type "ZZZZZ" Inlet

Type "AAAAAA" Inlet

Type "BBBBBB" Inlet

Type "CCCCCC" Inlet

Type "DDDDDD" Inlet

Type "EEEEEE" Inlet

Type "FFFFFF" Inlet

Type "GGGGGG" Inlet

Type "HHHHHH" Inlet

Type "IIIIII" Inlet

Type "JJJJJJ" Inlet

Type "KKKKKK" Inlet

Type "LLLLLL" Inlet

Type "MMMMMM" Inlet

Type "NNNNNN" Inlet

Type "OOOOOO" Inlet

Type "PPPPPP" Inlet

Type "QQQQQQ" Inlet

Type "RRRRRR" Inlet

Type "SSSSSS" Inlet

Type "TTTTTT" Inlet

Type "UUUUUU" Inlet

Type "VVVVVV" Inlet

Type "WWWWWW" Inlet

Type "XXXXXX" Inlet

Type "YYYYYY" Inlet

Type "ZZZZZZ" Inlet

Type "AAAAAAA" Inlet

Type "BBBBBBB" Inlet

Type "CCCCCCC" Inlet

Type "DDDDDDD" Inlet

Type "EEEEEEE" Inlet

Type "FFFFFFF" Inlet

Type "GGGGGGG" Inlet

Type "HHHHHHH" Inlet

Type "IIIIIII" Inlet

Type "JJJJJJJ" Inlet

Type "KKKKKKK" Inlet

Type "LLLLLLL" Inlet

Type "MMMMMMM" Inlet

Type "NNNNNNN" Inlet

Type "OOOOOOO" Inlet

Type "PPPPPPP" Inlet

Type "QQQQQQQ" Inlet

Type "RRRRRRR" Inlet

Type "SSSSSSS" Inlet

Type "TTTTTTT" Inlet

Type "UUUUUUU" Inlet

Type "VVVVVVV" Inlet

Type "WWWWWWW" Inlet

Type "XXXXXXX" Inlet

Type "YYYYYYY" Inlet

Type "ZZZZZZZ" Inlet

Type "AAAAAAAA" Inlet

Type "BBBBBBBB" Inlet

Type "CCCCCCCC" Inlet

Type "DDDDDDDD" Inlet

Type "EEEEEEEE" Inlet

Type "FFFFFFFF" Inlet

Type "GGGGGGGG" Inlet

Type "HHHHHHHH" Inlet

Type "IIIIIIII" Inlet

Type "JJJJJJJJ" Inlet

Type "KKKKKKKK" Inlet

Type "LLLLLLLL" Inlet

Type "MMMMMMMM" Inlet

Type "NNNNNNNN" Inlet

Type "OOOOOOOO" Inlet

Type "PPPPPPPP" Inlet

Type "QQQQQQQQ" Inlet

Type "RRRRRRRR" Inlet

Type "SSSSSSSS" Inlet

Type "TTTTTTTT" Inlet

Type "UUUUUUUU" Inlet

Type "VVVVVVVV" Inlet

Type "WWWWWWWW" Inlet

Type "XXXXXXXX" Inlet

Type "YYYYYYYY" Inlet

Type "ZZZZZZZZ" Inlet

Type "AAAAAAAAA" Inlet

Type "BBBBBBBBB" Inlet

Type "CCCCCCCCC" Inlet

Type "DDDDDDDDD" Inlet

Type "EEEEEEEEE" Inlet

Type "FFFFFFFFF" Inlet

Type "GGGGGGGGG" Inlet

Type "HHHHHHHHH" Inlet

Type "IIIIIIIII" Inlet

Type "JJJJJJJJJ" Inlet

Type "KKKKKKKKK" Inlet

Type "LLLLLLLLL" Inlet

Type "MMMMMMMMM" Inlet

Type "NNNNNNNNN" Inlet

Type "OOOOOOOOO" Inlet

Type "PPPPPPPPP" Inlet

Type "QQQQQQQQQ" Inlet

Type "RRRRRRRRR" Inlet

Type "SSSSSSSSS" Inlet

Type "TTTTTTTTT" Inlet

Type "UUUUUUUUU" Inlet

Type "VVVVVVVVV" Inlet

Type "WWWWWWWWW" Inlet

Type "XXXXXXXXX" Inlet

Type "YYYYYYYYY" Inlet

Type "ZZZZZZZZZ" Inlet

Type "AAAAAAAAAA" Inlet

Type "BBBBBBBBBB" Inlet

Type "CCCCCCCCCC" Inlet

Type "DDDDDDDDDD" Inlet

Type "EEEEEEEEEE" Inlet

Type "FFFFFFFFFF" Inlet

Type "GGGGGGGGGG" Inlet

Type "HHHHHHHHHH" Inlet

Type "IIIIIIIIII" Inlet

Type "JJJJJJJJJJ" Inlet

Type "KKKKKKKKKK" Inlet

Type "LLLLLLLLLL" Inlet

Type "MMMMMMMMMM" Inlet

Type "NNNNNNNNNN" Inlet

Type "OOOOOOOOOO" Inlet

Type "PPPPPPPPPP" Inlet

Type "QQQQQQQQQQ" Inlet

Type "RRRRRRRRRR" Inlet

Type "SSSSSSSSSS" Inlet

Type "TTTTTTTTTT" Inlet

Type "UUUUUUUUUU" Inlet

Type "VVVVVVVVVV" Inlet

Type "WWWWWWWWWW" Inlet

Type "XXXXXXXXXX" Inlet

Type "YYYYYYYYYY" Inlet

Type "ZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAA" Inlet

Type "BBBBBBBBBBB" Inlet

Type "CCCCCCCCCCC" Inlet

Type "DDDDDDDDDDD" Inlet

Type "EEEEEEEEEEE" Inlet

Type "FFFFFFFFFFF" Inlet

Type "GGGGGGGGGGG" Inlet

Type "HHHHHHHHHHH" Inlet

Type "IIIIIIIIIII" Inlet

Type "JJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKK" Inlet

Type "LLLLLLLLLLL" Inlet

Type "MMMMMMMMMMM" Inlet

Type "NNNNNNNNNNN" Inlet

Type "OOOOOOOOOOO" Inlet

Type "PPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRR" Inlet

Type "SSSSSSSSSSS" Inlet

Type "TTTTTTTTTTT" Inlet

Type "UUUUUUUUUUU" Inlet

Type "VVVVVVVVVVV" Inlet

Type "WWWWWWWWWWW" Inlet

Type "XXXXXXXXXXX" Inlet

Type "YYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFFFFFFFFF" Inlet

Type "GGGGGGGGGGGGGGGGGGGGGGGGGG" Inlet

Type "HHHHHHHHHHHHHHHHHHHHHHHHHH" Inlet

Type "IIIIIIIIIIIIIIIIIIIIIIIIII" Inlet

Type "JJJJJJJJJJJJJJJJJJJJJJJJJJ" Inlet

Type "KKKKKKKKKKKKKKKKKKKKKKKKKK" Inlet

Type "LLLLLLLLLLLLLLLLLLLLLLLLLL" Inlet

Type "MMMMMMMMMMMMMMMMMMMMMMMMMM" Inlet

Type "NNNNNNNNNNNNNNNNNNNNNNNNNN" Inlet

Type "OOOOOOOOOOOOOOOOOOOOOOOOOO" Inlet

Type "PPPPPPPPPPPPPPPPPPPPPPPPPP" Inlet

Type "QQQQQQQQQQQQQQQQQQQQQQQQQQ" Inlet

Type "RRRRRRRRRRRRRRRRRRRRRRRRRR" Inlet

Type "SSSSSSSSSSSSSSSSSSSSSSSSSS" Inlet

Type "TTTTTTTTTTTTTTTTTTTTTTTTTT" Inlet

Type "UUUUUUUUUUUUUUUUUUUUUUUUUU" Inlet

Type "VVVVVVVVVVVVVVVVVVVVVVVVVV" Inlet

Type "WWWWWWWWWWWWWWWWWWWWWWWWWW" Inlet

Type "XXXXXXXXXXXXXXXXXXXXXXXXXX" Inlet

Type "YYYYYYYYYYYYYYYYYYYYYYYYYY" Inlet

Type "ZZZZZZZZZZZZZZZZZZZZZZZZZZ" Inlet

Type "AAAAAAAAAAAAAAAAAAAAAAAAAAA" Inlet

Type "BBBBBBBBBBBBBBBBBBBBBBBBBBB" Inlet

Type "CCCCCCCCCCCCCCCCCCCCCCCCCCC" Inlet

Type "DDDDDDDDDDDDDDDDDDDDDDDDDDD" Inlet

Type "EEEEEEEEEEEEEEEEEEEEEEEEEEE" Inlet

Type "FFFFFFFFFFFFFFFFFFF

SCALE None
DESIGN AHS DATE 9-20-70
DRAWN MJD DATE 9-20-70
TRCD. GL DATE 9-24-70
CKD. AHS DATE 9-24-70

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

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B 12" Lin.Ft.	603 Type B 15" Lin.Ft.	603 Type B 21" Lin.Ft.	603 Type B 27" Lin.Ft.	603 Type B 30" Lin.Ft.	603 Type B 706.02 Class V 30" Lin.Ft.	603 Type B 42" Lin.Ft.	603 Type F 42" Lin.Ft.	603 Type C 15" Lin.Ft.	603 Type C 706.03 Class V 108" Lin.Ft.	603 Type F 12" Lin.Ft.	603 Type F 707.05 15" Lin.Ft.	603 Bends and Branches 25° Bend 12"	603 Bends and Branches 26° Bend 15"	602 Concrete Masonry Cu Yds.
P-19	5+00	Tuxedo	Lt to Rt	82	23														
P-20	5+00	Tuxedo	Lt.	82	5														
P-21	6+80	6+80	Rt. to Lt.	82	23														
P-22	6+80		Lt.	82	5														
P-23	6+80	19+30	Lt.	83			123												
P-25	18+00	17+85	Rt.	83	49	54													
P-26	17+85	19+30	Rt.	83		131													
P-27	19+30	20+00	Rt.	83			69												
P-28	20+85	20+00	Rt.	83	85														
P-29	20+00	20+00	Rt.	83	38														
P-30	20+00	94+35	Rt.	84												74			
P-31	94+35	866+00	Lt. to Rt.	84				58											
P-32	866+00	866+00	Lt. to ℄	84				73											
P-33	866+00	866+00	℄ to Rt.	84					73										
P-34	866+00	65+00	Rt.	84					114										
P-35	64+00	65+00	Rt.	84		100													
P-36	96+14	64+23	Lt. to Rt.	84		168													
P-37	64+23	65+00	Lt.	85		77													
P-38	65+00		Lt. to Rt.	85		47													
P-39	65+00	65+00	Rt.	85						71									
P-40	1+73	1+73	Rt. to Lt.	85	24														
P-41	1+73	64+71	Lt.	85	30														
P-42	12+79	64+10	Rt.	85	63														
P-43	64+10	64+74	Rt.	85							65								
P-44	64+74	65+00	Rt.	85								53							
P-45	12+50	1+85	Lt.	85	139														
P-46	68+58		Rt.	86		42													
P-47	68+58		Lt. to Rt.	86									10						
P-48	68+82	68+58	Rt.	86									25						
P-49	870+00	870+00	Lt. to Rt.	86		148													
P-50	870+00	870+00	Rt.	86		51										54		1	
P-56	65+00	68+58	Rt.	88										346					
P-57	68+58	877+00	Rt.	88										839					
P-100	23+31	23+42	Lt.	95											40		2		0.21
P-101	868+87	870+00	Lt.	95		113													
P-102	863+50	96+14	Lt.	96		74													
P-105	63+50	64+00	Rt.	84		50													
		Totals			484	1001	192	131	187	71	65	53	35	1185	40	128			0.21

DRAINAGE

Ref. No.	Station From	Station To.	Side	Sewer Profile Sheet No.	604 Std.No. 1 M.H. Each	604 Std.No. 1-A M.H. Each	604 Std.No. 1 M.H. Mod.Using No. 6 C.B. Grate Each	604 Std.No. 2 M.H. Each	604 Std.No. 2-A-6 Inlet Each	604 Std. No. 2-6 Median Inlet Mod. as per plan Each	604 Std.No. 2-A-8 Inlet Each	604 Std. No. 2-8 Median Inlet Mod. as per plan Each	604 Std.No. 2-10 Median Inlet Mod. as per plan Each	604 Std.No. 2-14 Median Inlet Each	604 Std.No. 3 C.B. Each	604 Std.No. 3-A C.B. Each	604 Std.No. I-3B Median Inlet Each	604 Std. No. 3-C C.B. as per plan Each	604 Std.No. 5 C.B. Each	604 Std.No. 6 C.B. Mod. as per plan Each	604 Junction Chamber Each
S-17	5+00		Rt.	82														1			
S-18	5+00		Lt.	82														1			
S-19	5+00		Lt.	82	1																
S-20	6+80		Rt.	82														1			
S-21	6+80		Lt.	82														1			
S-22	6+80		Lt.	82				1													
S-24	18+00		Lt.	83										1							
S-25	17+85		Rt.	83										1							
S-26	19+30		Rt.	83			1														
S-27	20+85		Rt.	83									1								
S-28	20+00		Rt.	83									1								
S-29	20+00		Rt.	83 & 84	1																
S-30	94+35		Rt.	84															1		
S-31	866+00		Lt.	84							1										
S-32	866+00		℄	84													1				
S-33	866+00		Rt.	84							1										
S-34	64+00		Rt.	84											1						
S-35	96+14		Lt.	84					1												
S-36	64+23		Lt.	84												1					
S-37	65+00		Lt.	85					1												
S-38	65+00		Rt.	84 & 85				1													
S-39	12+65		Lt.	85											1					1	
S-40	1+73		Rt.	85											1						
S-41	1+73		Lt.	85												1					
S-42	64+10		Rt.	85		1															
S-43	64+71		Rt.	85				1													
S-44	12+50		Lt.	85														1			
S-45	68+58		Lt.	86											1						
S-46	68+58		Rt.	86															1		
S-47	68+82		Rt.	86															1		
S-48	870+00		Lt.	86								1									
S-49	870+00		Rt.	86								1									
S-55	65+00		Rt.	85 & 88																	1
S-56	68+58		Rt.	86 & 88				1													
S-95	868+87		Lt.	95						1											
S-96	863+50		Lt.	96												1					
S-99	63+50		Rt.	84					1												
		Totals			2	1	1	4	3	1	2	2	2	2	4	3	1	5	3	1	1

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 9-20-70
CHECKED BY G.L. DATE 9-24-70

CUYAHOGA COUNTY
CUY - 80 - 15.81

FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

69
392

DRAINAGE QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

70
392

CUYAHOGA COUNTY
CUY.– 80–15.81

SANITARY SEWERS

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	603 Type B 706.08 ES. with 706.12 Joints 8" Lin.Ft.	603 Type B 706.08 ES. with 706.12 Joints 18" Lin.Ft.	603 Type B 706.02 Class V, as per 706.05 with 706.11 Joints 30" Lin Ft	604 Std. No. 1-A M. H. with 706.11 Joints Each	604 Std. No. 1-A M. H. with 706.11 Joints with Drop Pipe as per plan Each		604 Std. No. 1-A M.H. with 706.11 Joints with 2 Drop Pipes as per plan Each	604 M. H. Reconstructed to Grade Each	604 Existing Elev.	Proposed Elev.	
SP-5	862+00	6+67	Lt.	97	255										
SP-6	15+05	12+47	℄	98		258									
SP-7	12+47	67+56	Rt.	98		350									
SP-8	19+12	6+67	Rt.&Lt.	98		145									
SP-9	65+17	68+17	Rt.	99	300										
SP-10	68+17	70+84	Rt.	100	268										
SP-11	70+84	870+54	Both	100			152								
SP-14	60+93	63+21	Rt.	99	215										
SP-15	63+21	65+17	Rt.	99	185										
SS-5	862+00		Lt.	97				1							
SS-6	12+47		℄	98				1							
SS-7	67+56		Rt.	98				1							
SS-8	19+12		Rt.	98					1						
SS-9	65+17		Rt.	99					1						
SS-10	68+17		Rt.	99				1							
SS-11	70+84		Rt.	100							1				
SS-13	63+21		Rt.	99				1							
E-22	23+77		Rt.									1	732.5	734.2	
E-24	6+67		℄	97								1	749.38	750.57	
		Totals			1,223	753	152	5	2		1	2			

UNDERDRAINS

Ref. No.	Station From	Station To	Side	605 Shallow U.D. 6" Lin. Ft.	605 Deep U.D. 6" Lin. Ft.	603 Type F Conduit 6" Lin. Ft.	603 Type B Conduit 6" Lin. Ft.	660 Sodding for Spec. Berm & Slope Protection as per plan Sq. Yds.	Bends and Branches	605 707.01 Type III or 707.12 6" Lin. Ft.	605 Unclassified 6" Lin. Ft.	605 706.08 Perforated Bell & Spigot as per plan Lin. Ft.
U-7	100+40	94+37	Rt.		603	10			1			
U-9	860+00	865+98	Lt.		578	20						
U-11	60+00	64+25	Rt.		340	10						
U-12	60+00	64+88	Rt.		478	10			1			
U-13	4+00	5+00	Rt.			10			1			90
U-14	5+00	6+80	Rt.			20			1			160
U-15	17+00	6+80	Lt.	163		10						
U-16	4+00	5+00	Lt.			10			1			90
U-17	5+00	6+80	Lt.			10			1			170
U-18	18+75	28+20	Rt.	988		10		25	1			
U-19	18+90	19+20	Rt.	10		20						
U-20	19+28	28+20	Rt.	880		10	56		1			
U-21	94+25	91+00	Lt.		315	10			1			
U-22	867+73	869+98	Lt.		215	10			1			
U-23	866+00	875+00	Lt.		880	20						
U-24	64+25	64+96	℄Rt.	61		10			1			
U-25	65+00	69+96	℄Rt.	476		20			1			
U-27	870+00	875+00	Lt.		430	10			1			
U-29	68+60 GE	875+00			212	10			3	357	100	
	TOTALS			2578	3508	240	56	25		357	100	510

DRAINAGE

Ref. No.	Station From	Station To	Side	202 C.B. Removed Each	202 C.B. Abandoned Each	202 M.H. Removed Each	202 M.H. Abandoned Each	202 Pipe Removed 15" and Under Lin.Ft.	202 Pipe Removed Over 15" Lin.Ft.	Special Fill and Plug Existing Box Culvert 8'x6' * Lin.Ft.	202 Structures Removed Lump	Special Fill and Plug Existing Culvert 72" Lin. Ft.
E-8	6+00		Rt.	1								
E-9	6+00		Lt.	1								
E-10	94+75		Rt.				1					
E-11	97+25	96+15	Rt.							127		
E-12	95+25	26+00 SR17	Lt.									700
E-13	23+17		Rt.		1							
E-14	24+95		Lt.				1					
E-15	24+95		Lt.		1							
E-16	27+27		℄	1								
E-17	27+27		Lt.			1						
E-18	27+27		Rt.Lt.					30				
E-19	27+27		Rt.					98				
E-20	26+00	26+45	Lt.						45			
E-21	70+53		Lt.			1						
E-23	23+31	24+95	Lt.					160				
E-31	95+25	96+15	Rt.						30		Lump	
		Totals		3	2	2	2	288	75	127	Lump	700

* See General Note Sheet No. 9

DRAINAGE

Ref. No.	Station From	Station To	Side	660 Sodding Sq. Yds.	601 Rock Channel Protection Type B Cu. Yds.	660 Special Berm & Slope Protection Sq. Yds.
D-5	860+00	862+80	Lt.	218		
D-6	61+83	65+00	Rt.	200		
D-7	19+25	21+25	Lt.	53	65	
D-8	865+40		Lt.			50
D-9	866+00	867+50	Lt.	100		
D-10	67+08	68+58	Rt.	100		
D-11	68+88	69+38	Rt.	100		
D-12	23+43	26+41	Lt.		129	
TOTAL				771	194	50

SCALE NONE
MADE AHS DATE 9-1070
TRCD. MAG DATE 9-28-70
CKD. GL DATE 9-29-70

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

DRAINAGE QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. 80—15.81

For Drainage Quantities See Sheet 73.

DRAINAGE LEGEND

Proposed Ditch Inlet	▤
Proposed Paved Shoulder Inlet Manhole	▭●
Proposed Paved Shoulder Inlet	▭○
Proposed Median Inlets	▭○
Proposed Pavement Catch Basin	▤
Proposed Storm Sewer Manhole	⊛
Proposed Sanitary Sewer Manhole	◉
Proposed Storm or Sanitary Sewer	━━→
Seeding and Jute Matting	⊞
Existing Manhole	○
Existing Catch Basin or Inlet	□
Existing Storm, Sanitary or Dual Sewer	— — → — —
Paved Gutter	▨
Sodding	▨
Top of Cut Slope	—— —— ——
Toe of Fill Slope	— — — —
Rock Channel Protection	▩

50 0 50 100 150 200
SCALE IN FEET

SCALE 1" = 50'
MADE A.H.S. DATE 5-11-70
TRCD. TPM DATE 5-12-70
CKD. GL DATE 5-13-70

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

GRADING AND DRAINAGE PLAN STA. 875+00 TO STA. 890+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. 80-15.81

SECTION A-A
Scale: 1"=10'

SECTION B-B
Scale: 1"=10'

Rock Channel Protection Type B
1'-6" Ton 2
6" No. 357 Coarse Aggregate
1' 4' 1'
1.75' 4' 1.75'

8'x6'x1'-6" Rock Channel Protection Type B

MATCH LINE STA. 890+00 SEE SHEET 71

MATCH LINE STA. 905+00 SEE SHEET 74

CUY-80-1654

Construction Limits
Top of Cut
Toe of Fill
LA
Type B 6'x1'-6" Rock Channel Protection Type B L=325'
9'-0" Sodding L=300'
3' Sod Flume
20' Radius Ditch Deep
10' Type F Conduit Deep
20'x15' Arch Culvert For detail See Sheet 252
See Note

℄ WESTBOUND OUTER LANES 900
℄ WESTBOUND INNER LANES 895
℄ INTERSTATE I-80
℄ EASTBOUND INNER LANES
℄ EASTBOUND OUTER LANES 900
9'-0" Sodding L=845'

D-17 D-19 D-20
P-66 P-67 P-68 P-69 P-70 P-71 P-75 P-76 P-77 P-106 P-109
S-62 S-63 S-64 S-66 S-67 S-68 S-69 S-70 S-71 S-72 S-73 S-100 S-120
U-51 U-53 U-55
P-72 P-73 P-74

FL. 711.16
FL. 704.10
FL. 704.17
FL. 711.96
FL. 711.36
FL. 712.74
FL. 709.82
FL. 709.72
FL. 20' Radius Ditch

Note:
The Granular Material as shown on this sheet is only approximate. Location should be placed as specified in General Notes. See Sheet 7.

For Drainage Quantities Sheet 73.

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Paved Shoulder Inlet
- Proposed Median Inlets
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Seeding and Jute Matting
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Dual Sewer
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope
- Rock Channel Protection
- L/A Line — LA —
- Granular Material

50 0 50 100 150 200
SCALE IN FEET

SCALE 1"=50'
MADE AHS DATE 5-5-70
TRCD. TPM DATE 5-6-70
CKD. GL DATE 5-7-70

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

GRADING AND DRAINAGE PLAN STA. 890+00 TO STA. 905+00

UNDERDRAINS

Ref. No.	Station From	Station To	Side	605 Deep U.D. 6" Lin. Ft.	603 Type F Conduit 6" Lin. Ft.	Bends and Branches Each	660 Sodding for Ditch, Berm & Slope, Protection as per plan Sq. Yds.
U-31	875+00	875+63	Lt.	63			
U-32	875+00	875+63	Lt.	63			
U-34	875+00	875+63	Rt.	63			
U-37	875+63	881+50	Lt.	577	10		
U-39	875+63	881+31	Rt.	568	10	1	
U-43	881+55	888+00	Lt.	645	10		
U-45	881+33	888+00	Rt.	657	10	1	
U-46	85+52	90+00	Lt.	450			
U-48	888+05	890+00	Lt.	195			
U-50	888+05	890+00	Rt.	195			
U-51	890+00	849+25	Lt.	420	10	3	5.3
U-53	890+00	890+50	Lt.	45	10	1	
U-55	890+00	893+00	Rt.	285	10	1	
		TOTAL		4226	70		5.3

DRAINAGE

Ref. No.	Station From	Station To	Side	601 Rock Channel Protection Type B Cu. Yds.	601 Dump Rock Fill Type B Cu. Yds.	660 Sodding Sq. Yds.
D-14	880+00	881+50	Lt.			100
D-16	886+50	888+00	Rt.			100
D-17	891+00	894+00	Lt.	144.5		300
D-19	894+00	902+45	℄			845
D-20	902+40	902+46	Lt.	3.6		
D-48	80+00	81+60	Lt.	4.4		83
D-49					340	
		Totals		152.5	340	1428

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	604 Std. No. 2 M.H. Each	604 Std. No. 2-B Median Inlet Mod. as per plan Each	604 Std. No. 2-10 Median Inlet Mod. as per plan Each	604 Std. No. 2-A-8 Inlet Each	604 Std. No. 2-A-16 Inlet Each	604 Std. No. 3-A C.B. Each	604 Std. No. 1-3B Median Inlet Each	604 Std. No. 4 C.B. Each	604 Std. No. 5 C.B. Each	604 Std. No. 6 C.B. Mod., as per plan Each
S-50	877+00		Rt.	86									1	
S-51	881+50		Lt.	87									1	
S-52	881+50		Lt.	87		1								
S-53	881+50		℄	87							1			
S-54	881+50		Lt.	87		1								
S-57	877+00		Rt.	86 ℄ 88	1									
S-58	881+35		Rt.	86 ℄ 88	1									
S-59	888+00		Lt.	87		1								
S-60	888+00		℄	87							1			
S-61	888+00		Lt.	87		1								
S-62	890+50		℄	89							1			
S-63	893+00		Lt.	89			1							
S-64	893+00		Rt.	89			1							
S-65	888+00		Rt.	87 ℄ 89									1	
S-66	890+50		Rt.	89									1	
S-67	893+00		Rt.	89									1	
S-68	901+00		Rt.	90										1
S-69	902+60		Lt.	90										1
S-70	902+85		Lt.	90 ℄ 91										1
S-71	902+45		℄	91								1		
S-72	902+37		Lt.	91					1					
S-73	902+10		Rt.	91				1						
S-97	31+92	S.R. 17	Rt.	96						1				
S-98	78+84	E-G	Lt.	96						1				
S-100	902+25	E.B.I.L.	Rt.	90										1
S-120	896+30	E.B.O.L.	Rt.	90	1									
		Totals			3	4	2	1	1	2	3	1	5	4

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	602 Concrete Masonry Cu. Yds.	603 Type B 15" Lin. Ft.	603 Type B 18" Lin. Ft.	603 Type B 21" Lin. Ft.	603 Type C 706.02 Class V or 707.13 18" Lin. Ft.	603 Type C 706.02 Class III or 707.13 21" Lin. Ft.	603 Type C 706.08E3 706.02 or 707.13 21" Lin. Ft.	603 Type C 707.13 24" Lin. Ft.	603 Type C 706.02 Class V or 707.13 24" Lin. Ft.	603 Type C 707.03 Gage 10-8 84" Lin Ft.	603 Type C 707.03 Gage 10-10 84" Lin. Ft.	603 Type C 706.03 Class V 108" Lin. Ft.	603 Type B 707.03, Gage 3-1 120" Lin. Ft.	603 Type F 21" Lin. Ft.	603 Type F 707.05 24" Lin. Ft.	603 Bends and Branches 25° Bend 21"	603 Bends and Branches 25° Bend 24"	603 Bends and Branches 45° Bend 120"	603 Bends and Branches 30° Horiz. Bend 84"
P-51	877+00	877+00	Rt.	86					62														
P-52	881+50	881+50	Lt.	87			60																
P-53	881+50	881+50	Lt-℄	87			74																
P-54	881+50	881+50	℄-Rt	87			74																
P-55	881+50	881+35	Rt.	87			52																
P-58	877+00	881+35	Rt.	88												430						3	
P-59	881+50	885+33	Rt Lt	88													565						
P-60	884+86	884+90	Lt.	87								15											
P-61	884+82	885+17	Lt.	87											24								
P-62	881+97	883+27	Lt.	87										133									1
P-63	888+00	888+00	Lt.	87		74																	
P-64	888+00	888+00	Lt-℄	87		74																	
P-65	888+00	888+00	℄-Rt	87			53																
P-66	890+50	890+50	Rt.	89		125																	
P-67	893+00	893+00	Lt-Rt	89		153																	
P-68	893+00	893+00	Rt.	89		53																	
P-69	888+00	890+50	Rt.	89							248												
P-70	890+50	893+00	Rt.	89						250													
P-71	893+00	896+30	Rt.	90									327										
P-72	901+00	902+60	Lt.	90		118																	
P-73	902+60	902+85	Lt.	90		25																	
P-74	902+85	902+45	Rt Lt	91		140																	
P-75	902+45	902+37	Lt.	91			90																
P-76	902+37	902+10	Lt.	91				15															
P-77	902+10	902+10	Lt.	91	.39			66										84		2			
P-103	31+92 SR17	78+84EG	Rt.	96		72																	
P-104	78+84	79+84	Lt.	96	.25	106																	
P-106	901+00	901+25	Rt.	90		25																	
P-109	896+30	896+65	Rt.	90															59				
		Totals			.64	965	403	81	62	250	248	15	327	133	24	430	565	84	59				

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. – 80-15.81

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 9-21-70
CHECKED BY G.L. DATE 9-21-70

SCALE No Scale
MADE AHS DATE 9-21-70
TRCD. HLD DATE 9-21-70
CKD. GL DATE 9-22-70

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

DRAINAGE QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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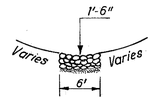
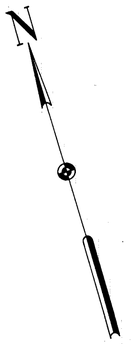
CUYAHOGA COUNTY
CUY. 80– 15.81

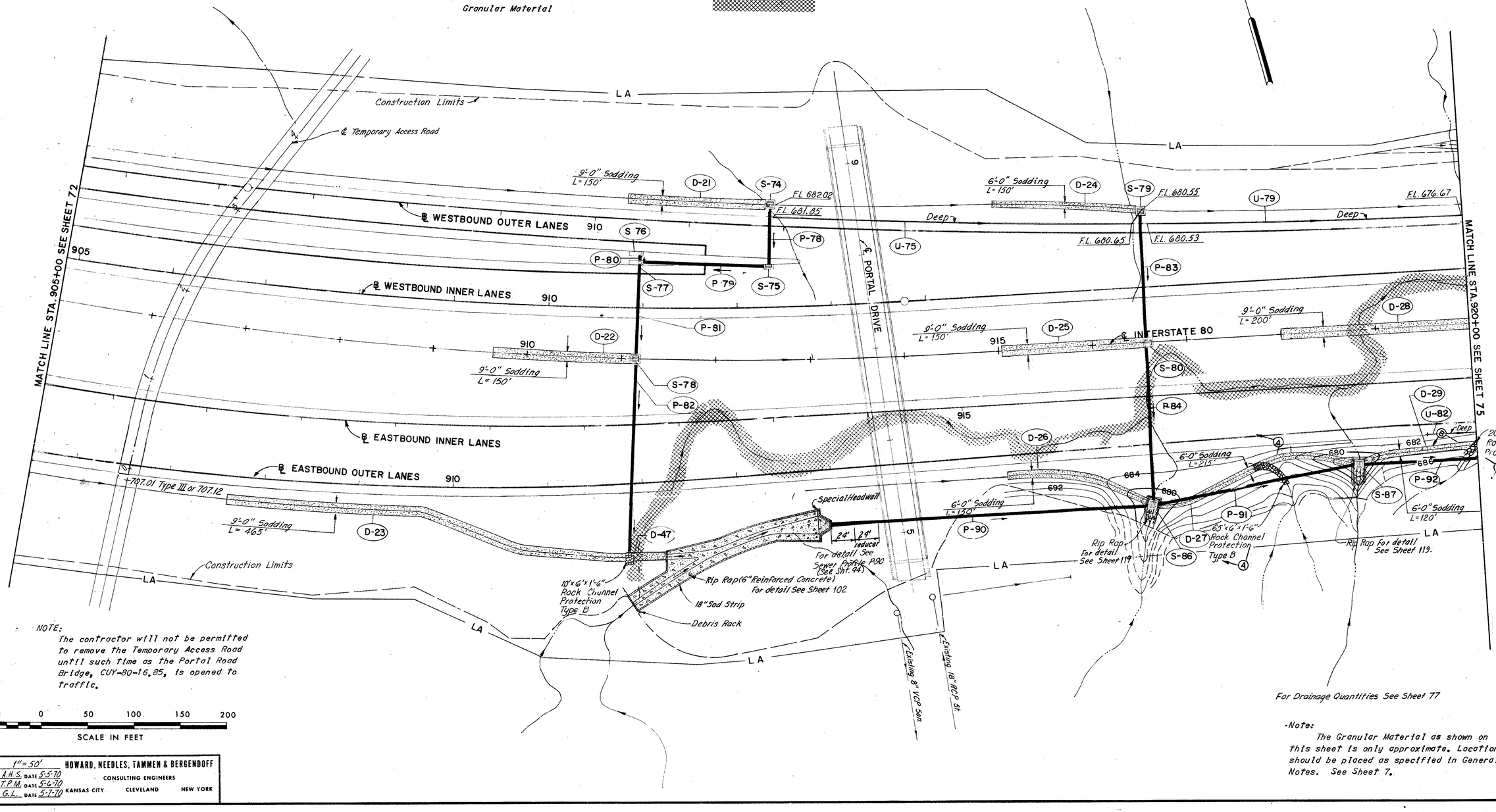
DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Paved Shoulder Inlet
- Proposed Median Inlets
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Seeding and Jute Matting
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Duel Sewer
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope
- Rock Channel Protection
- L/A Line
- Granular Material



SECTION A-A & B-B





NOTE:
The contractor will not be permitted to remove the Temporary Access Road until such time as the Portal Road Bridge, CUY-80-16.85, is opened to traffic.

50 0 50 100 150 200
SCALE IN FEET

For Drainage Quantities See Sheet 77

-Note:
The Granular Material as shown on this sheet is only approximate. Location should be placed as specified in General Notes. See Sheet 7.

SCALE 1"=50' MADE A.H.S. DATE 5-5-70 TRCD. T.P.M. DATE 5-6-70 CKD. G.L. DATE 5-7-70

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

GRADING AND DRAINAGE PLAN STA. 905+00 TO STA. 920+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY. 80-15.81

N

MATCH LINE STA 920+00 SEE SHEET 74

MATCH LINE STA. 935+00 SEE SHEET 76

6'-0" Sodding L = 150'
6'-0" Sodding L = 150'
6'-0" Sodding L = 150'
9'-0" Sodding L = 150'
6'-0" Sodding L = 150'
6'-0" Sodding L = 60'
9'-0" Sodding L = 450'
9'-0" Sodding L = 710'
6'-0" Sodding L = 170'
6'-0" Sodding L = 30'
6'-0" Sodding L = 30'
L = 140'
9'-0" Sodding L = 300'
9'-0" Sodding L = 290'
11'-0" Jute Matting L = 10'

LA
Construction Limits
Temporary Bulkhead
For Outlet Detail See Sheet 103
15" CMP
5'
2'
Std. No. 2 H.W.
Rock Channel Protection as per plan
Section A-A
6'x5'x1.5' Rock Channel Protection Type B
3' Sod Flume
F.L. 659.76
F.L. 660.76
F.L. 674.88
F.L. 674.86
F.L. 674.98
F.L. 676.67
F.L. 676.66
F.L. 670.59
924+50
F.L. 670.00
F.L. 662.56
F.L. 651.76
F.L. 690.00
F.L. 688.00
10' Type F Conduit
Deep
Rip Rap for detail See Sheet 119.
Rip Rap For detail See Sheet 120.
For location detail See Sheet 116
707.01 Type III, or 707.12
For Sod Flume See Sheet 113
Existing 15" RCP St.
Exist. Sanitary M.H.

WESTBOUND OUTER LANES
WESTBOUND INNER LANES
℄ INTERSTATE 80
EASTBOUND INNER LANES
EASTBOUND OUTER LANES

S-81 S-82 S-83 S-84 S-85 S-88 S-89 S-90 S-91
P-85 P-86 P-87 P-88 P-92 P-93 P-95 P-96 P-108
SP-12 SP-13
SS-12
U-83 U-86 U-87 U-91 U-100
D-30 D-31 D-32 D-33 D-34 D-35 D-37 D-38 D-39 D-40 D-41 D-48

620 630 640 650 660 662 664 666 670 680 682 686 690 925 930

50 0 50 100 150 200
SCALE IN FEET

Note:
Refer to Cross-Section sheets 187, 188, 192 and 194 for details of Granular Side Slopes.

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Paved Shoulder Inlet
- Proposed Median Inlets
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Seeding and Jute Matting
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Duel Sewer
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope
- Rock Channel Protection
- L/A Line
- Granular Material

For Drainage Quantities See Sheet 77

Note:
The Granular Material as shown on this sheet is only approximate. Location should be placed as specified in General Notes. See Sheet 7.

SCALE 1" = 50'
MADE B.H.S. DATE 5-5-70
TRCD T.P.M. DATE 5-6-70
CKD. G.L. DATE 5-7-70

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

GRADING AND DRAINAGE PLAN STA. 920+00 TO STA. 935+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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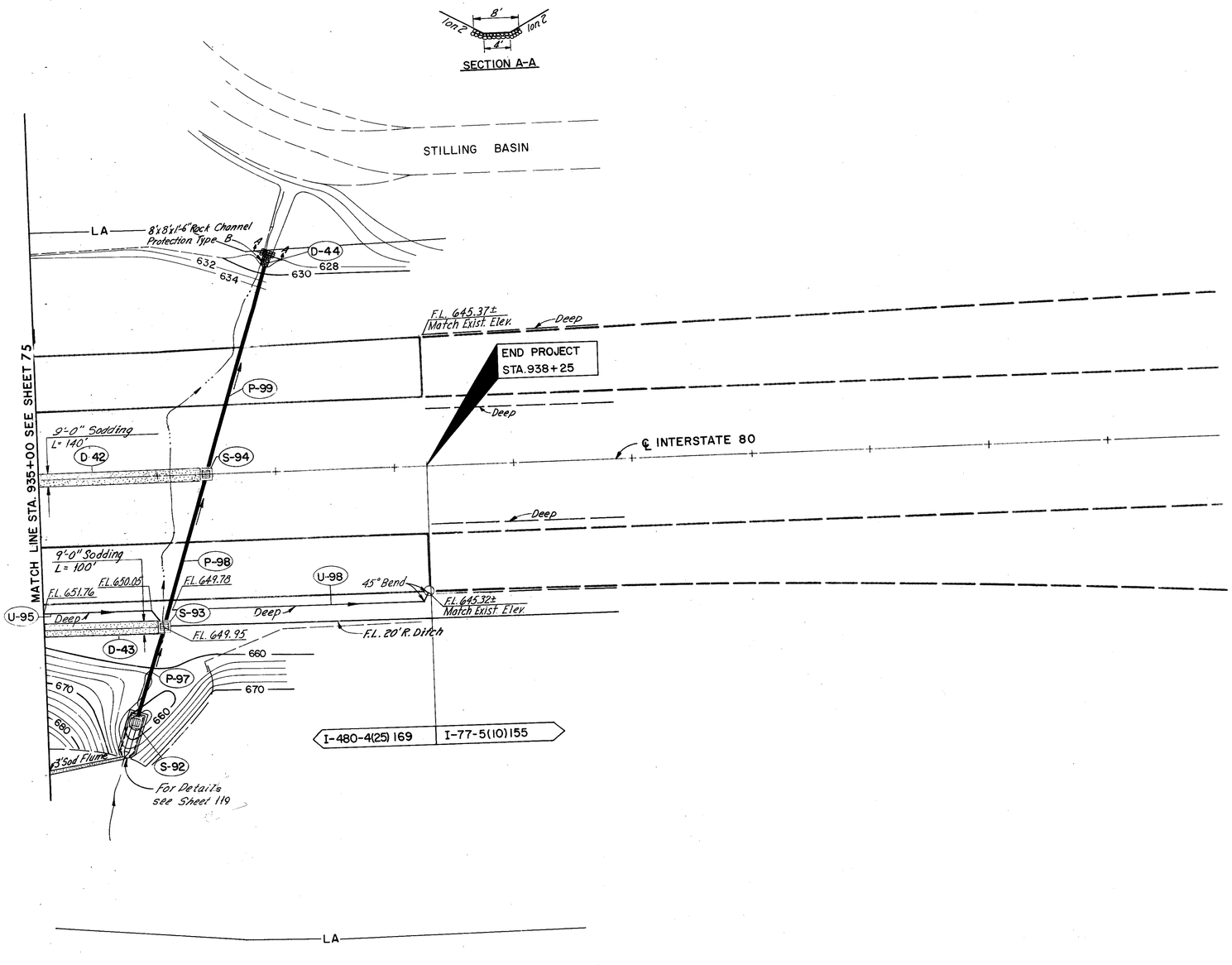
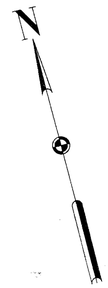
CUYAHOGA COUNTY
CUY. 80-15.81





For Drainage Quantities See Sheet 77.

DRAINAGE LEGEND

- Proposed Ditch Inlet
- Proposed Paved Shoulder Inlet Manhole
- Proposed Paved Shoulder Inlet
- Proposed Median Inlets
- Proposed Pavement Catch Basin
- Proposed Storm Sewer Manhole
- Proposed Sanitary Sewer Manhole
- Proposed Storm or Sanitary Sewer
- Seeding and Jute Matting
- Existing Manhole
- Existing Catch Basin or Inlet
- Existing Storm, Sanitary or Dual Sewer
- Paved Gutter
- Sodding
- Top of Cut Slope
- Toe of Fill Slope
- Rock Channel Protection
- L/A Line — LA —

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

GRADING AND DRAINAGE PLAN STA. 935+00 TO STA. 938+25

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-80-15.81

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 9-21-70
CHECKED BY G.L. DATE 9-23-70

UNDERDRAINS

Ref. No.	Station From	Station To	Side	605 Deep U.D. 6" Lin. Ft.	603 Type F Conduit 6" Lin. Ft.	608 Bends and Branches Each	660 Sodding for Slope, Berm & Slope Protection at Top Sq. Yds.	608 707.01 Type III at 707.12 6" Lin. Ft.
U-75	911+87	915+70	Lt.	386	10	1		
U-79	915+83	919+18	Lt.	335				
U-82	914+50	920+00	Rt.	90				
U-93	920+00	921+40	Lt.	143	10	1		
U-86	920+00	924+50	Rt.	455	20	1	14	
U-87	921+50	930+00	Lt.	870	10	1	7	
U-91	929+00	935+00	Rt.	600				
U-95	935+00	935+95	Rt.	95	10	1		
U-98	936+10	936+25	Rt.	220		2		
U100	932+65	934+90	Rt.				20	225
		TOTAL		3154	60		41	225

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	604 Std. No. 2-A Min. Inlet Each	604 Std. No. 2-A-B Min. Inlet Each	604 Std. No. 2-A-20 Inlet Each	604 Std. No. 2-2-A C.B. Each	604 Std. No. 4 C.B. Each	604 Std. No. 5 C.B. Each	604 Std. No. 5-A C.B. Each	604 Std. No. 6 C.B. Manh., as per plan Each
S-74	912+61		Lt.	91						1		1
S-75	912+35		Lt.	91								
S-76	910+50		Rt.	92		1						
S-77	910+95		Lt.	91			1					
S-78	911+15		℄	92					1			
S-79	916+58		Lt.	92						1		
S-80	916+58		℄	92		•		1	1			
S-81	921+45		Lt.	93						1		
S-82	921+45		℄	93					1			
S-83	921+45		℄	93					1			
S-84	928+00		℄	93						1		
S-85	928+00		Rt.	93								
S-86	916+58		Rt.	92						1		
S-87	918+75		Rt.	94						1		
S-88	921+45		Rt.	93						1		
S-89	924+38		Rt.	120						1		
S-90	928+00		Rt.	93	1			1				
S-91	935+00		Rt.	95					1			
S-92	935+76		Rt.	95						1		
S-93	936+00		Rt.	95					1			
S-94	936+40		℄	95								
		Totals			1	1	1	1	6	6	4	1

SANITARY

Ref. No.	Station From	Station To	Side	604 Std. No. 1-A M.H. 706.11 Jois per plan Each	603 Type B Conduit 706.02 Class II Bituminous Coated 706.11 Joints or A.S.A. Class 6 Mechanical Joint Ductile Iron Pipe Cement Lined 10" Lin. Ft.
SS-12	924+18	925+56	Lt. & Rt.	•	175
SS-12	925+56		Rt.		
SS-13	925+56	929+00			620
			Total	★ 1	★ 795

★ 100 % State

DRAINAGE

Ref. No.	Station From	Station To	Side	Sewer Profile Sheet No.	602 Masonry Cu. Yds.	603 Type B 15" Lin. Ft.	603 Type B 18" Lin. Ft.	603 Type B 21" Lin. Ft.	603 Type B 24" Lin. Ft.	603 Type B 30" Lin. Ft.	603 Type B 707.03 8-3 Gage * 96" Lin. Ft.	603 Type C 15" Lin. Ft.	603 Type C 706.01 E.S. 706.08 E.S. 706.02, or 707.13 15" Lin. Ft.	603 Type C 706.02 Class IV 15" Lin. Ft.	603 Type C 706.02 or 707.13 Mod. as per plan ⊗66" Lin. Ft.	603 Type C 706.02 or 707.13 Mod. as per plan Radius Pipe 66" Lin. Ft.	603 Type C 706.03 Class V 72" Lin. Ft.	603 Type C 706.03 Class V 84" Lin. Ft.	603 Type F 15" Lin. Ft.	603 Type F 21" Lin. Ft.	603 Bends and Branches 20° Bend 15"	603 Bends and Branches 25° Bend 15"	603 Bends and Branches 20° Bend 21"	603 Bends and Branches 30° Bend 21"
P-78	912+61	912+35	Lt.	91				66																
P-79	912+35	910+95	Lt.	91				137																
P-80	910+50	910+95	Rt.	92		8																		
P-81	910+95	911+15	Lt. & ℄	92					102															
P-82	911+15	911+80	℄ & Rt.	92	.56					208														
P-83	916+58	916+58	Lt. & ℄	92		142																		
P-84	916+58	916+58	℄ & Lt.	92			174																	
P-85	921+45	921+45	Lt.	93									59											
P-86	921+45	921+45	Lt. & ℄	93			129																	
P-87	921+45	921+45	℄ & Rt.	93			146																	
P-88	928+00	928+00	℄ & Rt.	93		157																		
P-89	928+00	928+00	Rt.	93								23												
P-90	913+06	916+58	Rt.	94											300		16	28						
P-91	916+58	918+75	Rt.	94											219									
P-92	918+75	921+45	Rt.	94											271									
P-93	921+45	924+65	Rt.	94											617	42								
P-95	928+00	931+70	Rt. & Lt.	94	4.4						522													
P-96	933+00	933+00	℄ & Rt.	95	.27	130													79		1	1		
P-97	935+76	936+00	Rt.	95									83											
P-98	936+00	936+40	Rt. & ℄	95				135																
P-99	936+40	936+96	℄ & Lt.	95	.39			132												57			1	1
P108	924+38		Rt.	96										50										
	TOTALS				5.52	434	449	470	102	208	522	23	142	50	1407	42	16	28	79	57				

DRAINAGE

Ref. No.	Station From	Station To	Side	601 Rock Channel Protection Type B Cu. Yds.	660 Sodding Sq. Yds.
D-21	911+00	912+60	Lt.		150
D-22	905+00	911+15	℄		150
D-23	907+00	911+15	Rt.		465
D-24	915+08	916+58	Lt.		100
D-25	915+08	916+58	℄		150
D-26	915+08	916+58	Rt.		100
D-27	916+58	918+75	Rt.	✓ 28.9	143
D-28	918+00	920+00	℄		200
D-29	918+75	920+00	Rt.	✓ 8.9	60
D-30	920+00	921+50	Lt.		100
D-31	920+00	921+50	℄		150
D-32	920+00	921+50	Rt.		100
D-33	920+00	921+50	Lt.		100
D-34	923+50	928+00	℄		450
D-35	921+50	923+00	Lt.		100
D-37	926+50	928+00	Rt.		133
D-38	928+00	929+55	Rt.		113
D-39	930+00	933+00	℄		300
D-40	931+50	935+00	Rt.	✓ 53.3	290
D-41	924+00	931+00	Lt.		710
D-42	935+00	936+40	℄		140
D-43	935+00	936+40	Rt.		100
D-44	937+00		Lt.	✓ 4.7	
D-47	911+83		Rt.	✓ 4.4	
D-48	924+05	924+25	Rt.		40
		Totals		100.5	4304.0

⊗ See General Note Sheet 9
✳ See General Note Sheet 9 for Alternate

SCALE No Scale
MADE A.H.S. DATE 9-21-70
TRCD M.A.G. DATE 9-22-70
CKD G.L. DATE 9-23-70

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

Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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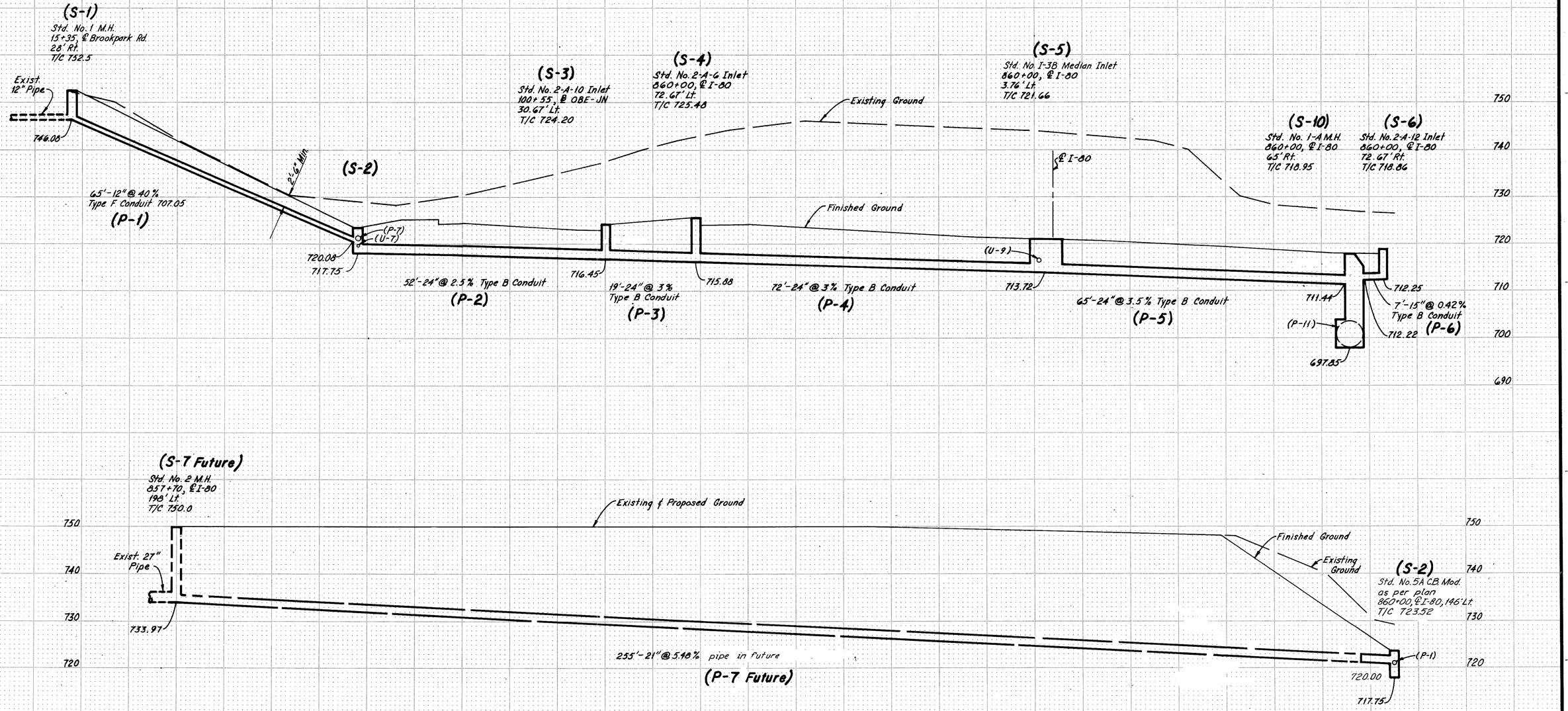
CUYAHOGA COUNTY
CUY.-80-15.81



6'-21" @ 5.48% Type B Conduit 706.02 Class V Bulkhead pipe, Payment included in Item 604 Std. No. 5-A C.B. Mod. as per plan

10 0 10 20
Scale in Feet

SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 6-8-10
TRCD. T.P.M. DATE 8-11-10
CKD. G.L. DATE 8-5-10 9-6-10 A.H.S

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

SEWER PROFILES P-1 TO P-6

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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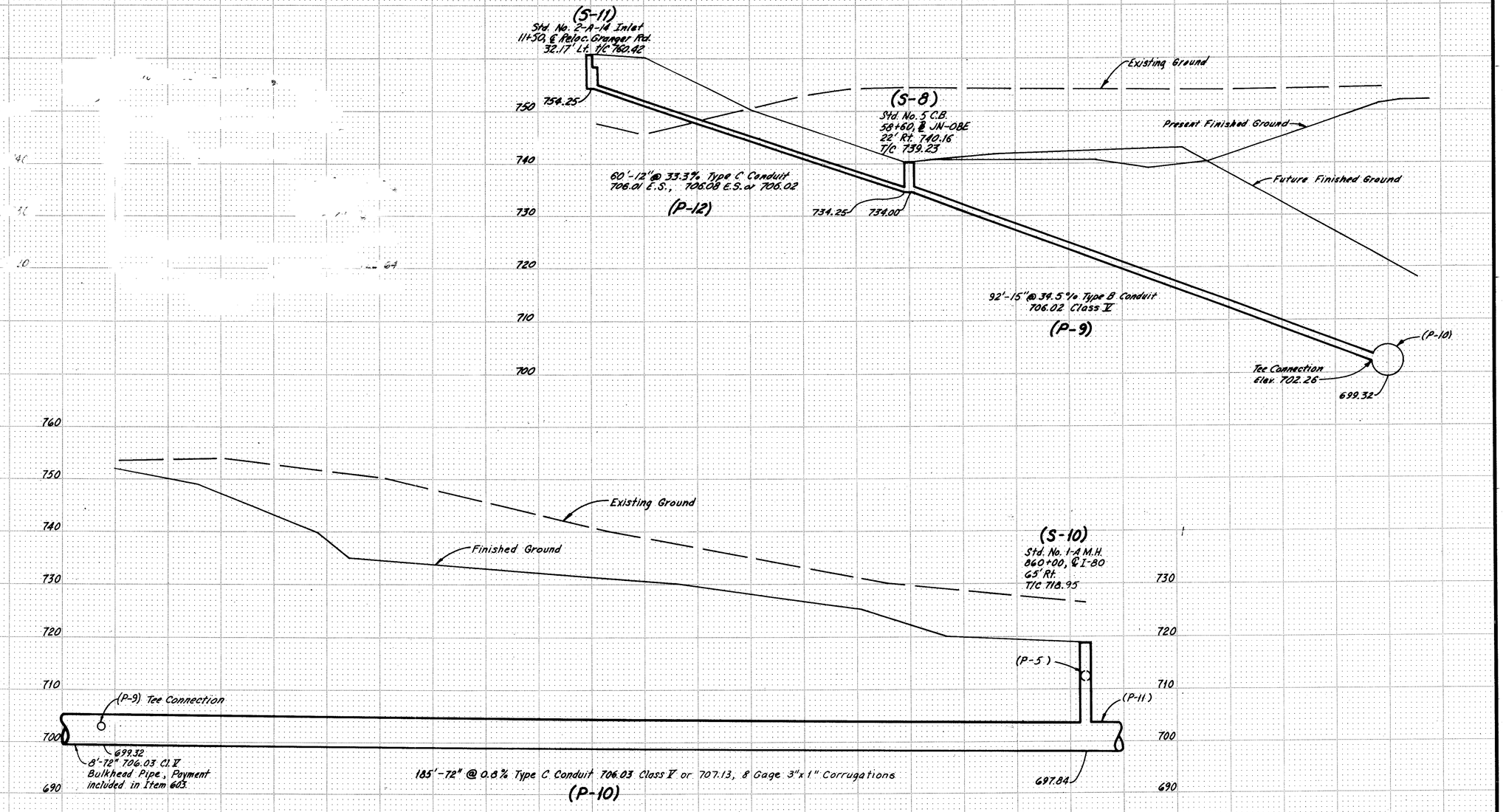
CUYAHOGA COUNTY
CUY.-80-15.81



SCALE 1"=10' Hor & Vert
MADE A.H.S. DATE 6-4-70
TRCD. T.P.M. DATE 8-17-70
CKD. G.L. DATE 9-5-70

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

SEWER PROFILES P-8 TO P-10, P-12

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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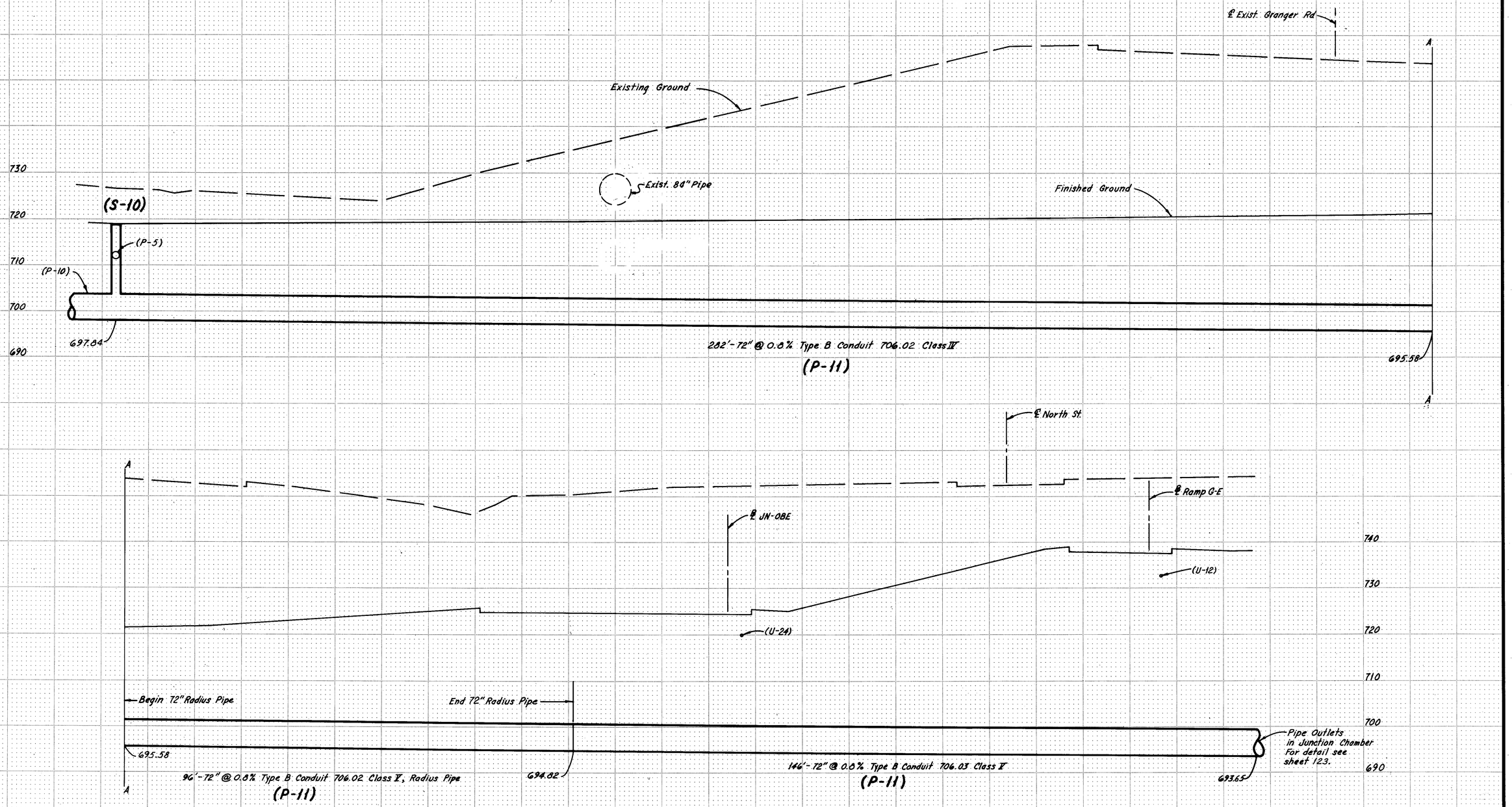
CUYAHOGA COUNTY
CUY.-80-15.81



SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 6-8-70
TRCD. T.P.M. DATE 7-17-70
CKD. G.L. DATE 8-5-70 KANSAS CITY CLEVELAND NEW YORK
CONSULTING ENGINEERS

10 0 10 20
Scale in Feet

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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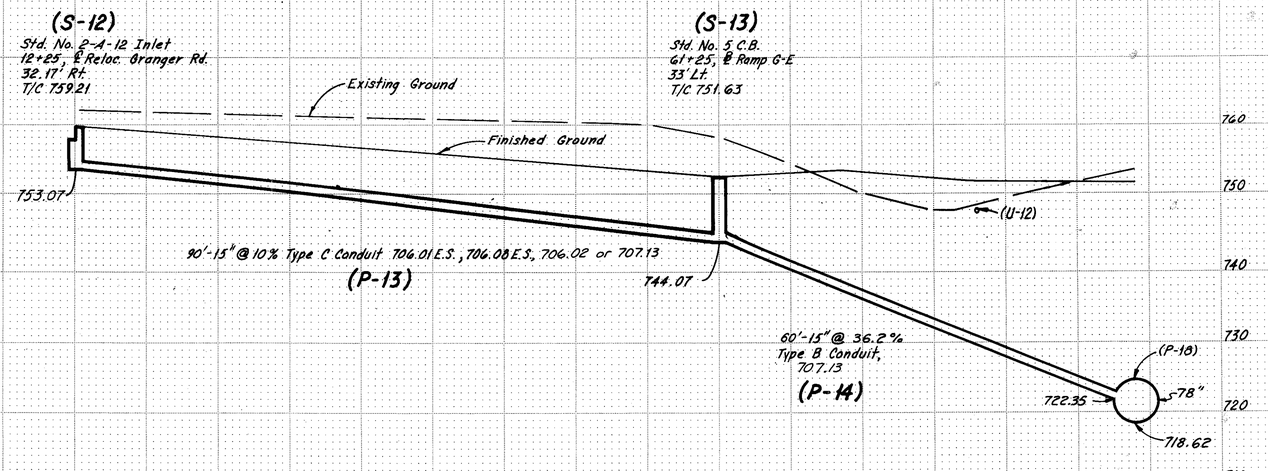
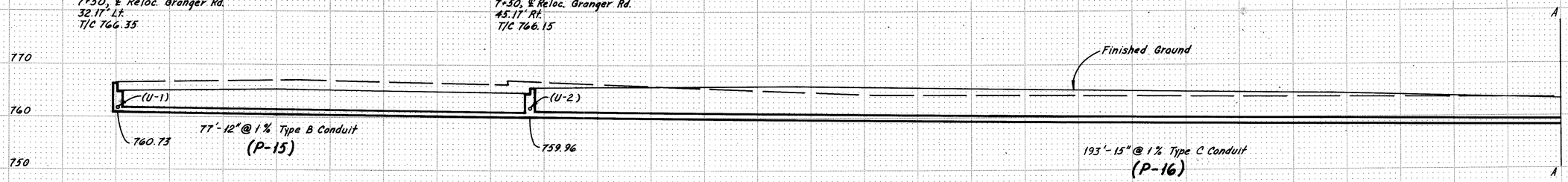
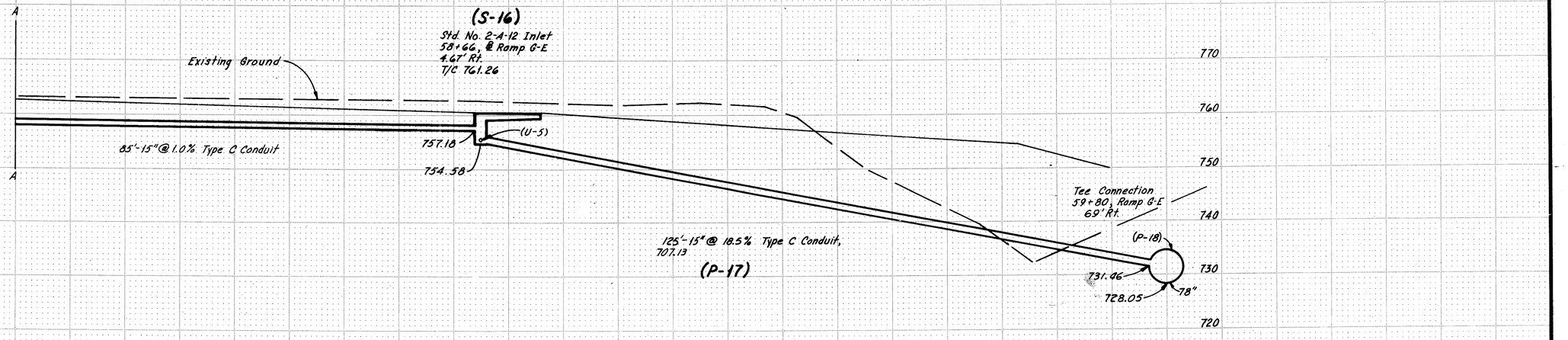
CUYAHOGA COUNTY
CUY.-80-15.81







SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 5-18-70
TRCD. T.P.M. DATE 6-17-70
CKD. G.L. DATE 7-5-70

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

10 0 10 20
Scale in Feet

SEWER PROFILES P-13 TO P-17

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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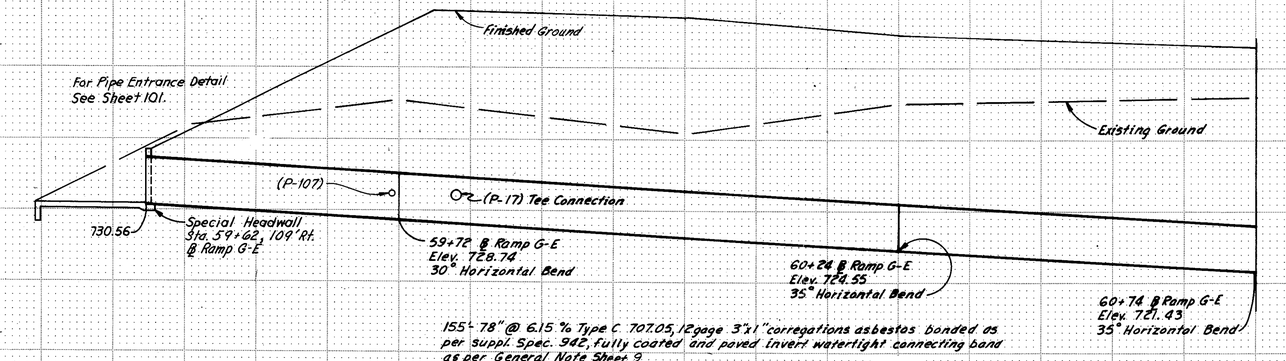
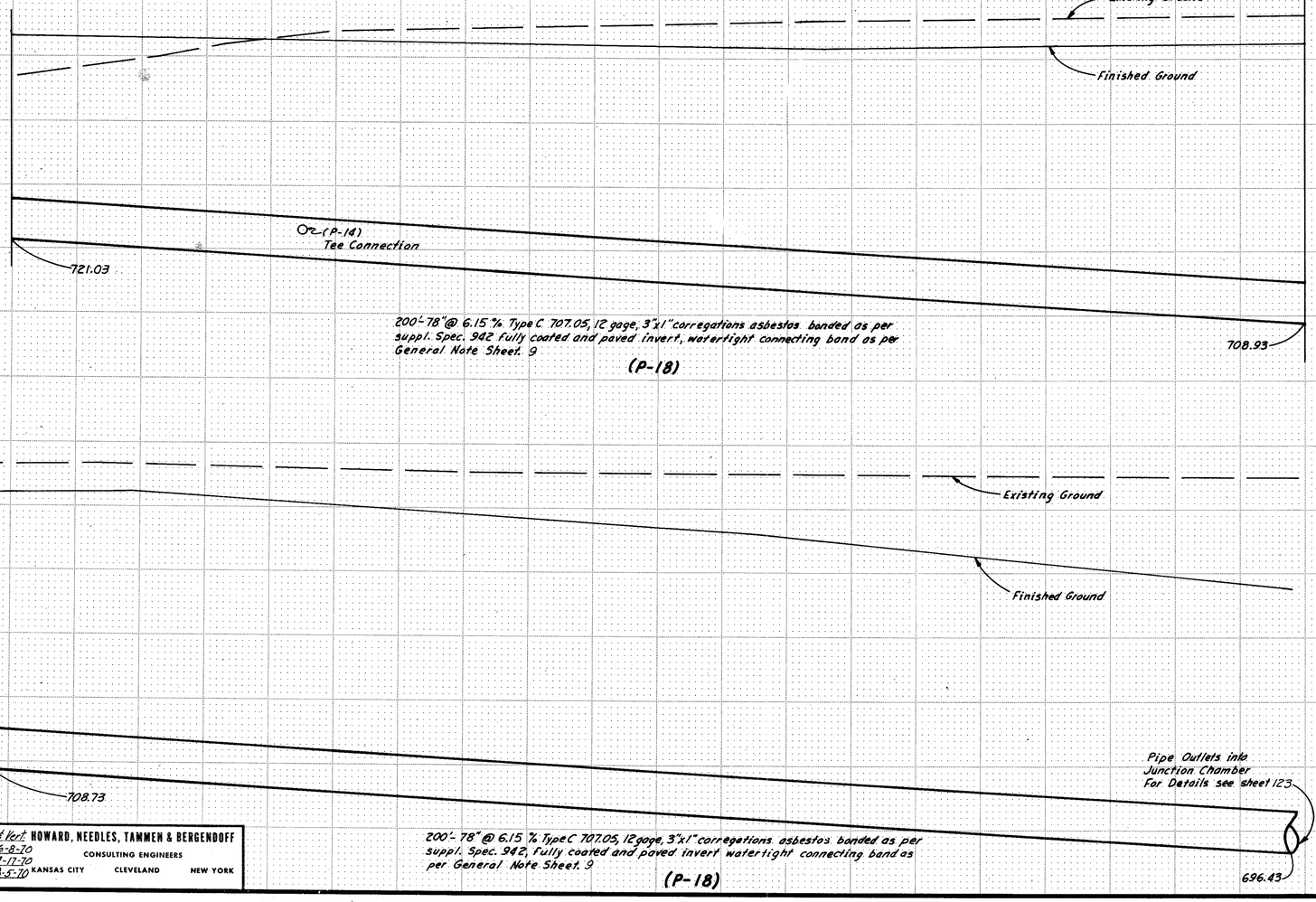
CUYAHOGA COUNTY
CUY.-80-15.81

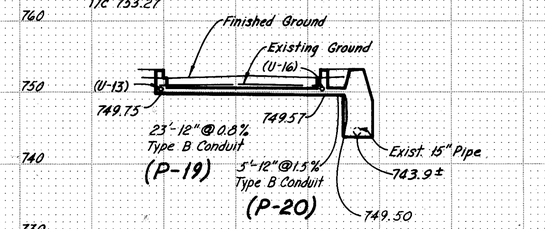




(S-17)
Special No. 3-C C.B., as per plan 5+00, ℄ Tuxedo Rd., 11.36' Rt. T/C 753.27

(S-18)
Special No. 3-C C.B., as per plan, 5+00 ℄ Tuxedo Rd. 11.36' Lt. T/C 753.27

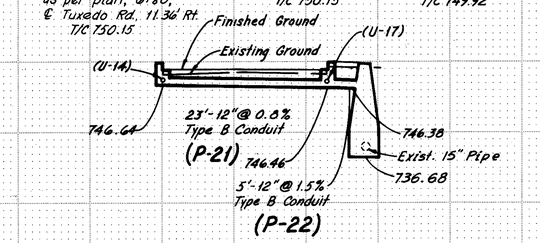
(S-19)
Std. No. 1 M.H. 5+00, ℄ Tuxedo Rd. 16.5' Lt. T/C 753.43

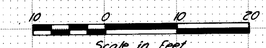


(S-20)
Special No. 3-C C.B., as per plan, 6+80, ℄ Tuxedo Rd., 11.36' Rt. T/C 750.15

(S-21)
Special No. 3-C C.B., as per plan, 6+80, ℄ Tuxedo Rd., 11.36' Lt. T/C 750.15

(S-22)
Std. No. 2 M.H. 6+80, ℄ Tuxedo Rd. 16.5' Lt. T/C 749.92





SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 6-8-70
TRCD. T.P.M. DATE 7-17-70
CKD. G.L. DATE 8-5-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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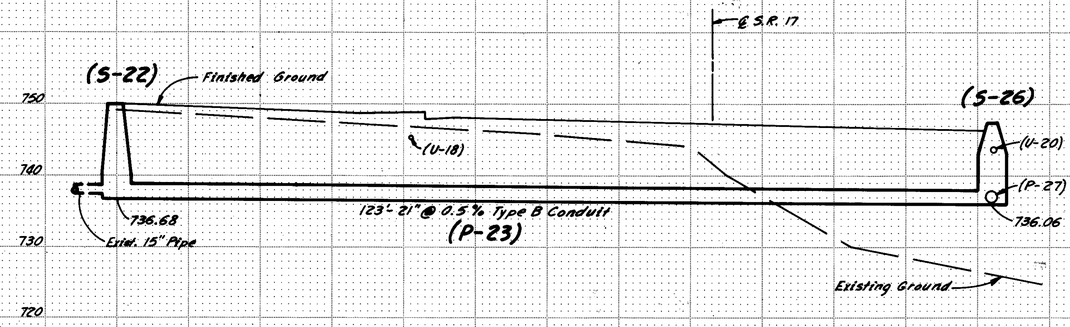
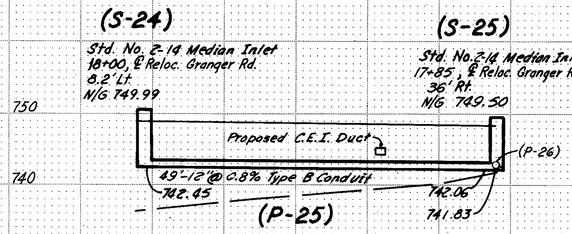
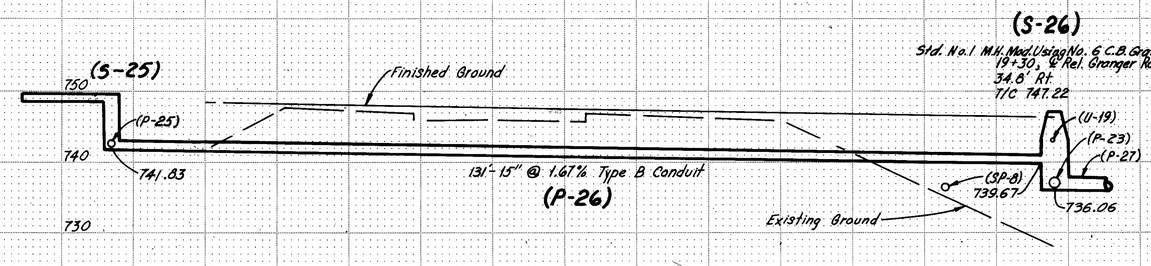
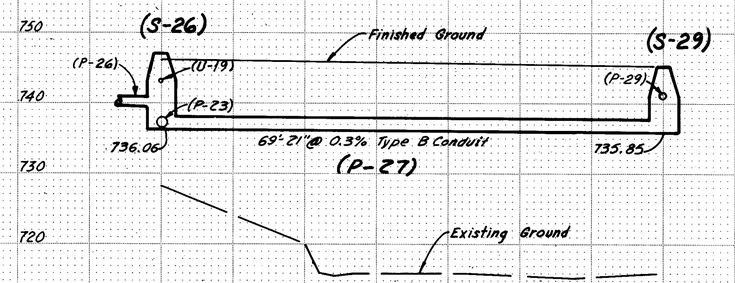
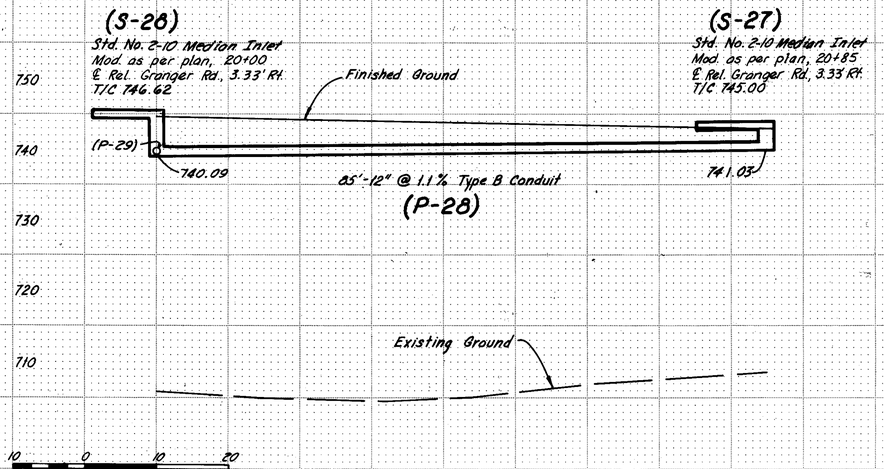
CUY.-80-15.81

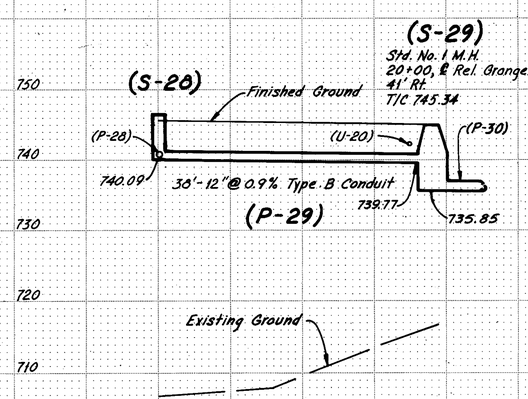












SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MAC. RBH DATE 7-24-70
TRCD. T.P.M. DATE 8-17-70
CKD. AHS DATE 9-5-70
CONSULTING ENGINEERS
KANSAS CITY · CLEVELAND NEW YORK

SEWER PROFILES P-23, P-25 TO P-29

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
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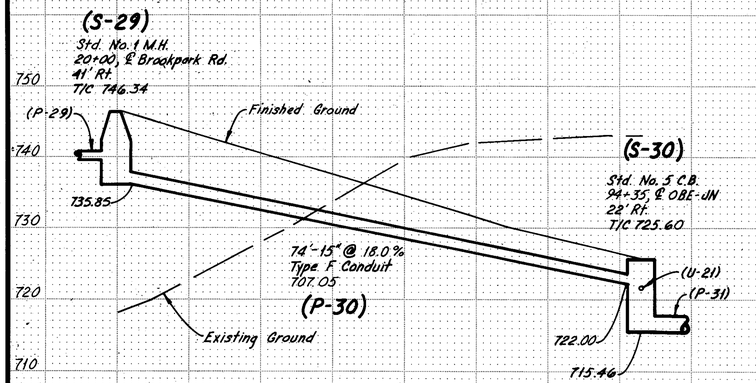

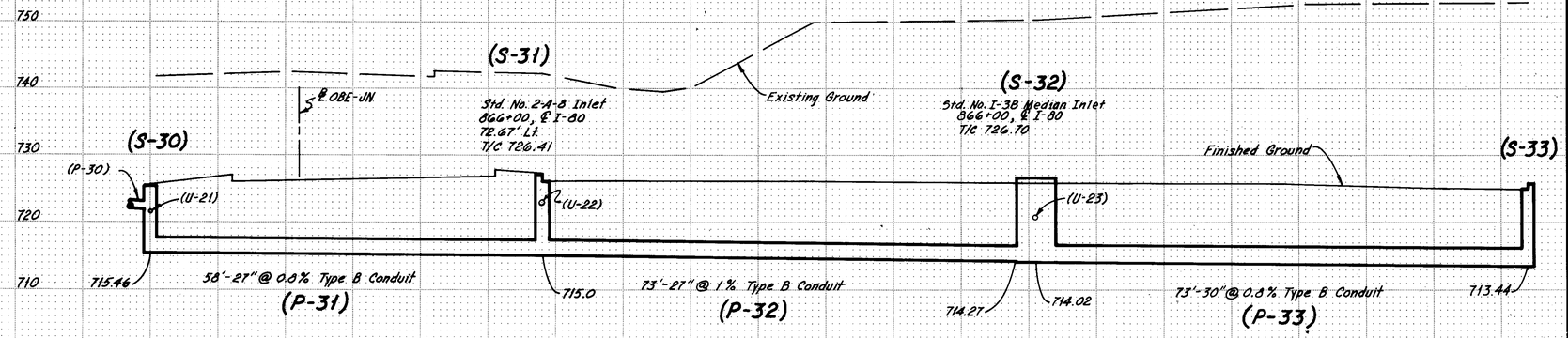

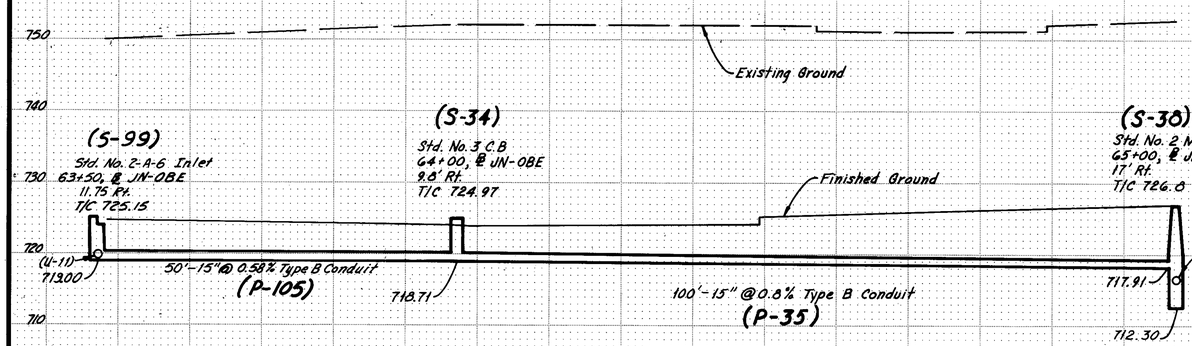

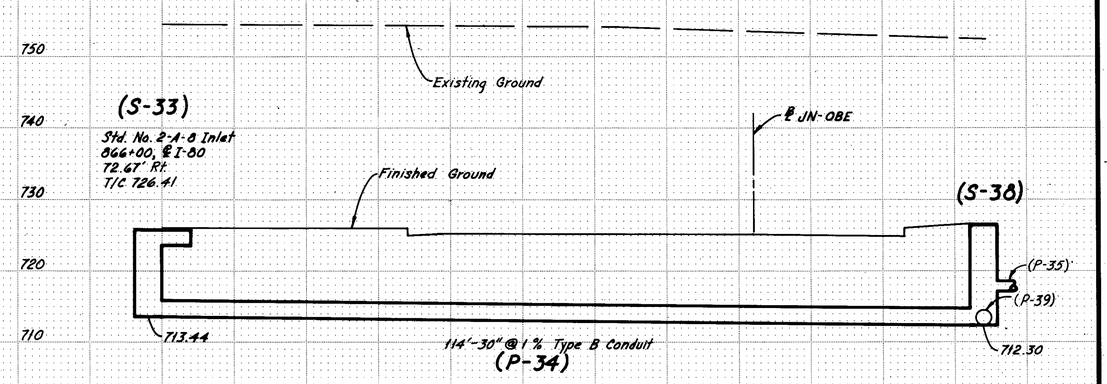

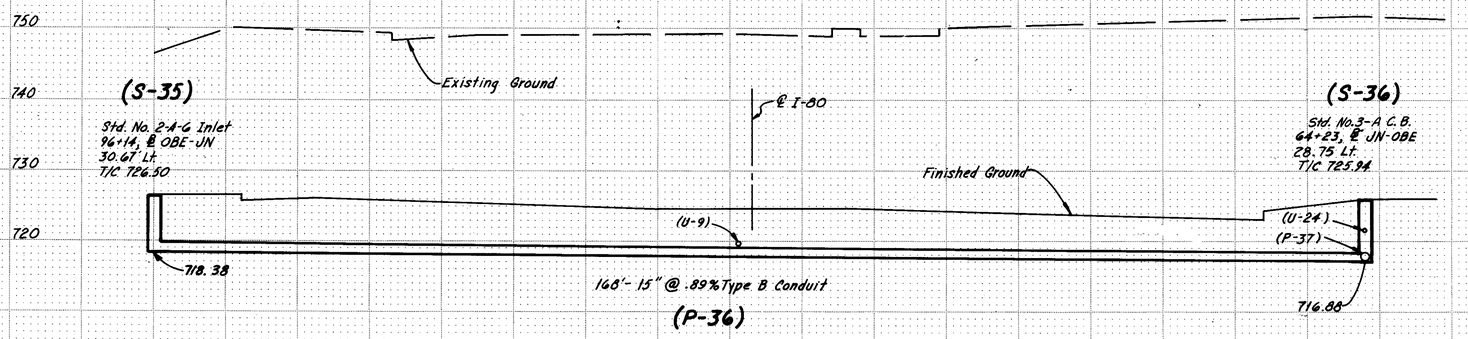

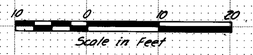

SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 7-29-10 CONSULTING ENGINEERS
TRCD. T.P.M. DATE 8-17-10 KANSAS CITY CLEVELAND NEW YORK
CKD G.L. DATE 9-15-10

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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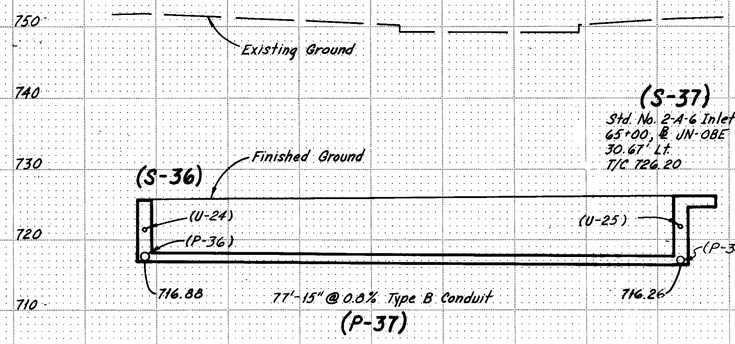
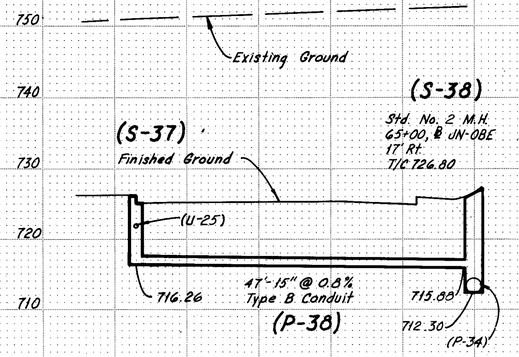
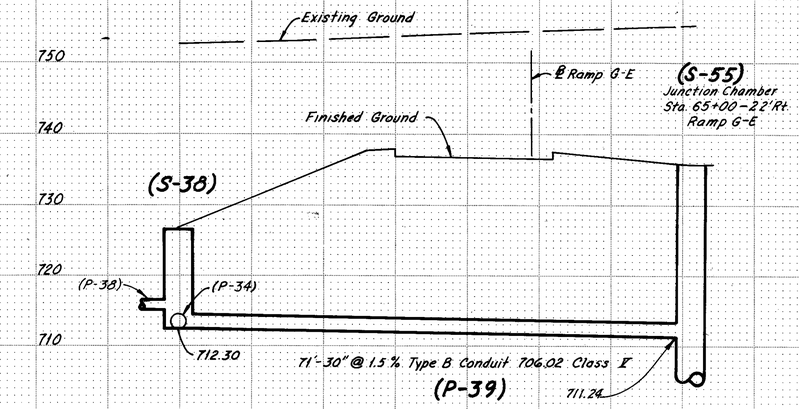
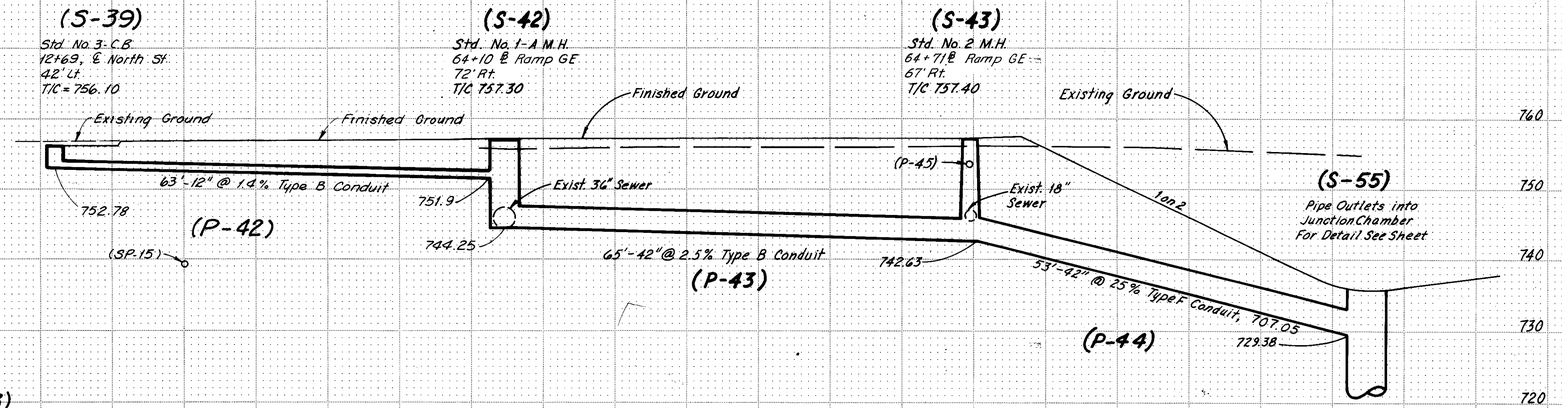
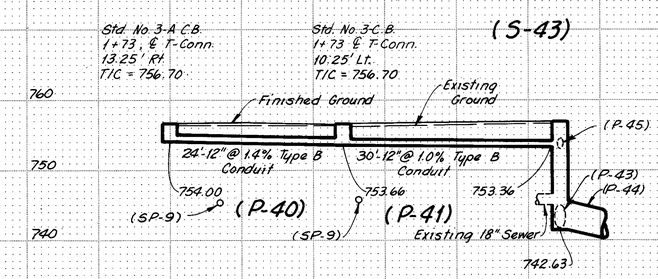
CUYAHOGA COUNTY
CUY. 80-15.81

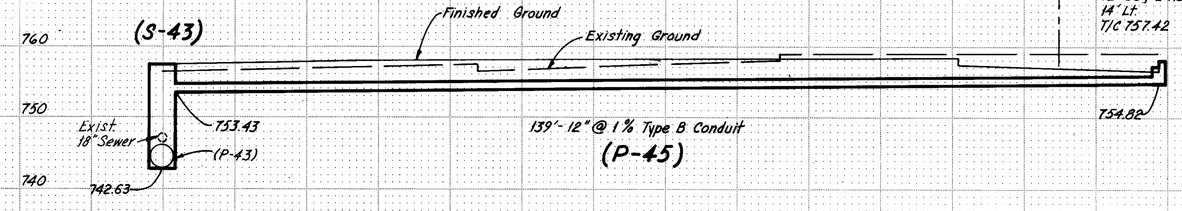












SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 6-2-70
TRCD. T.P.M. DATE 7-11-70
CKD. G.L. A.H.S. DATE 8-5-70 9-6-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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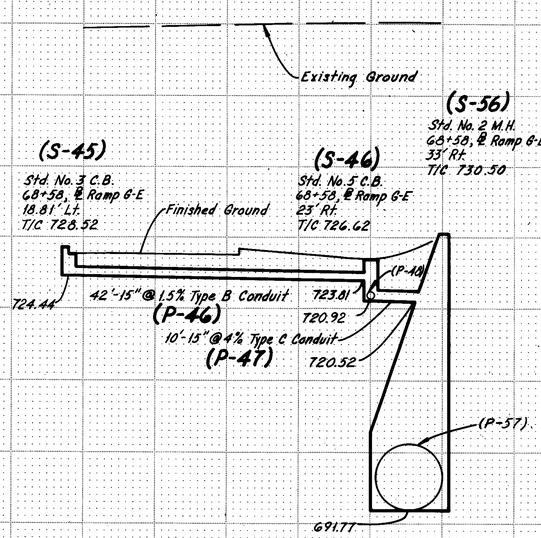
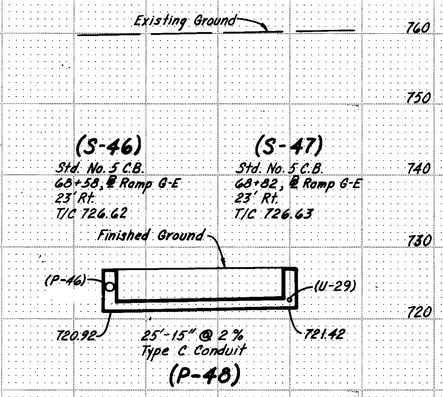
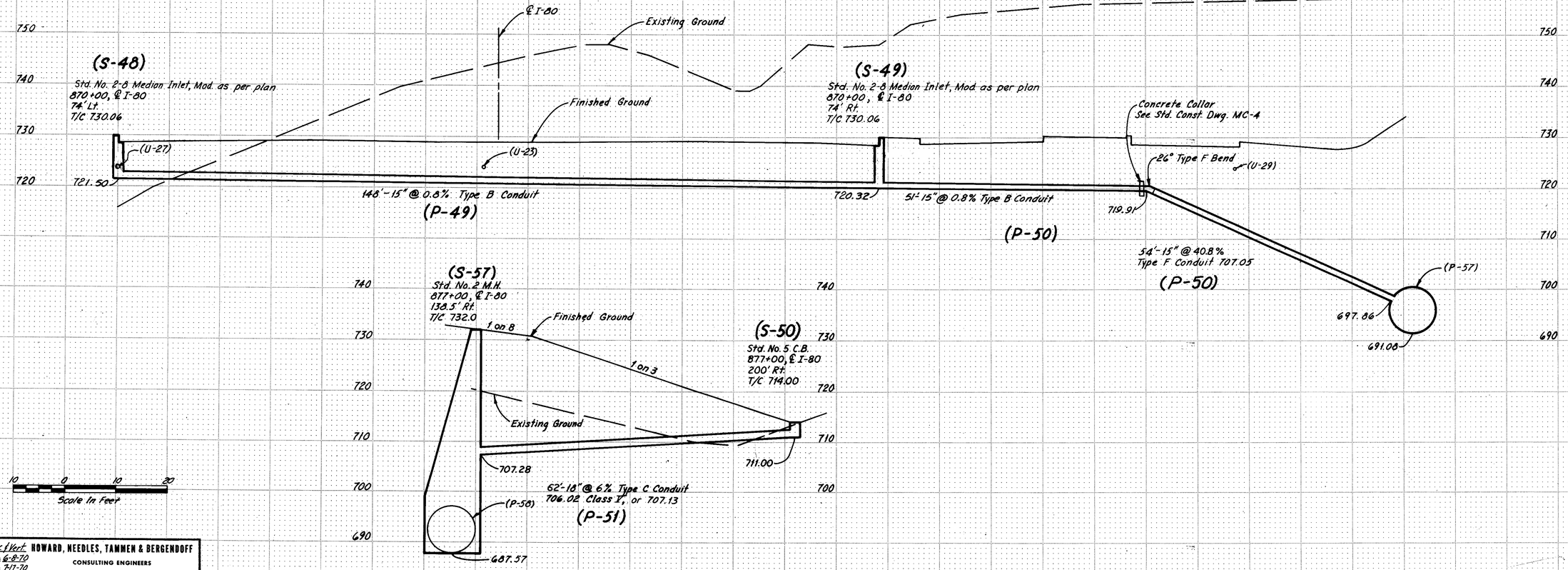
392

CUYAHOGA COUNTY
CUY.-80-15.81







SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 6-8-70
TRCD. T.P.M. DATE 7-11-70
CKD. G.L. DATE 8-5-70

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

SEWER PROFILES P-46 TO P-51

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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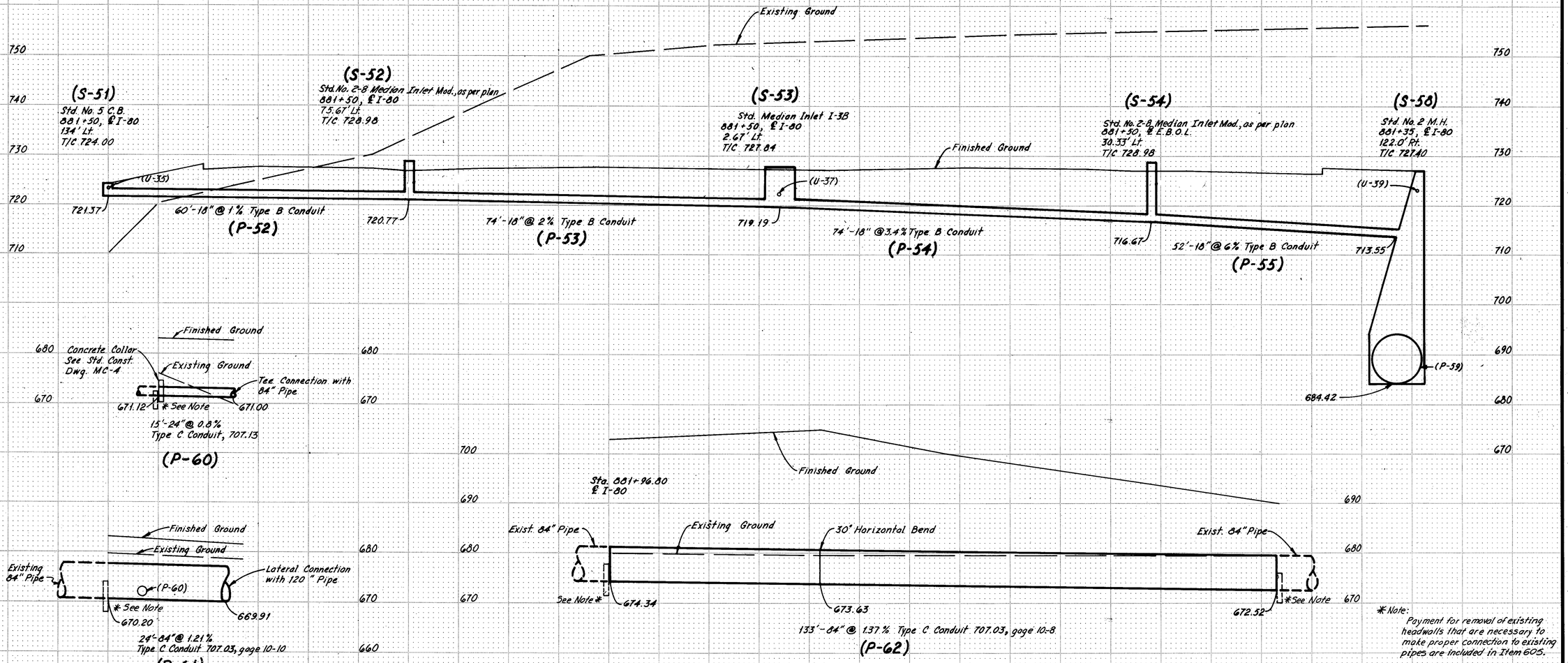
392

CUYAHOGA COUNTY
CUY.-80-15.81



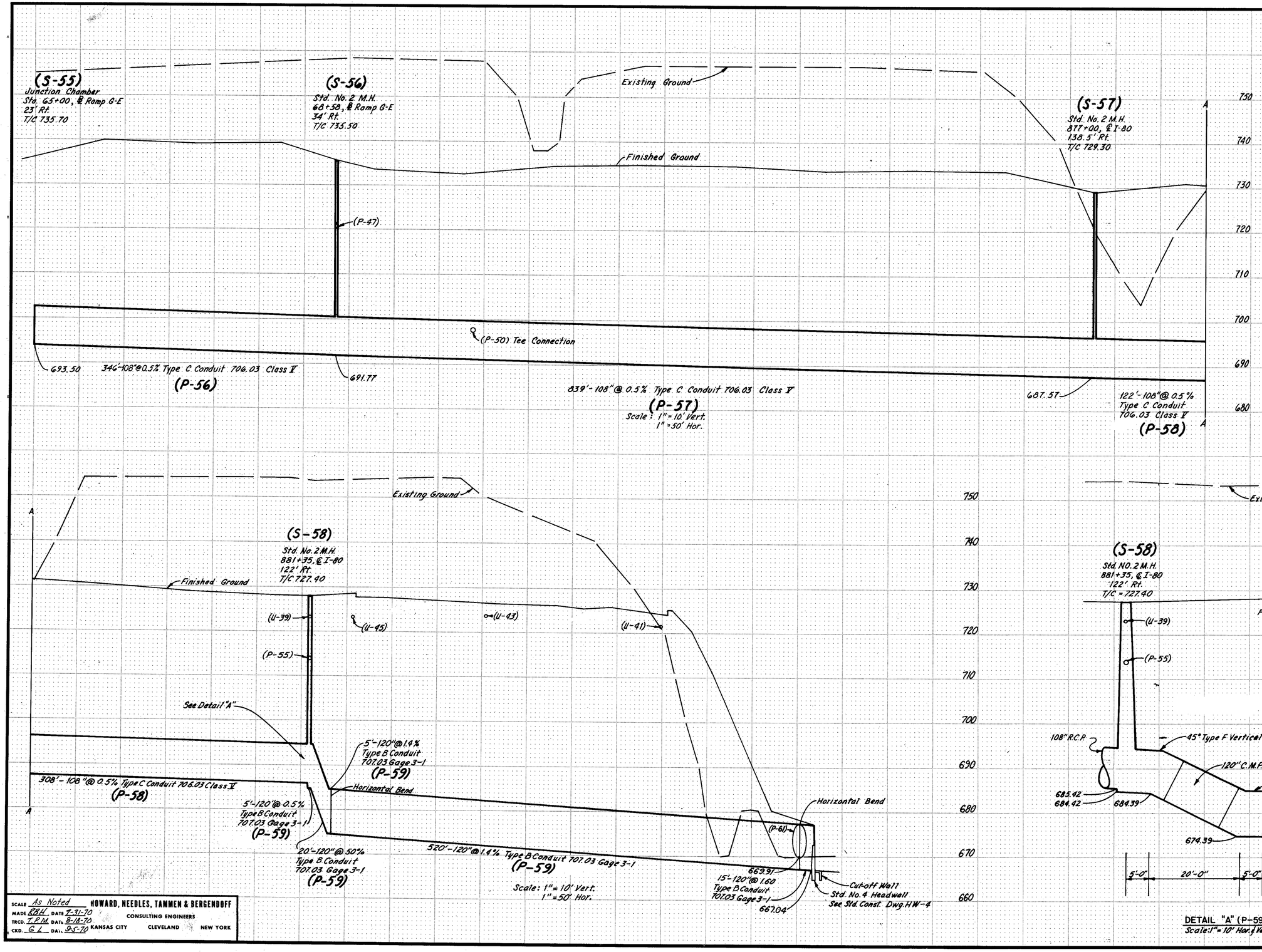
SCALE 1"=10' Hor & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 8-11-70
TRCD. I.P.M. DATE 9-18-70
CKD. G.L. DATE 10-13-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

SEWER PROFILES P-52 TO P-55, P-60 TO P-65

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

88
392

CUYAHOGA COUNTY
CUY.-80-15.81



SCALE As Noted
MADE RAH DATE 7-31-70
TRCD. T.P.M. DATE 8-18-70
CKD. G.L. DATE 9-5-70

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

SEWER PROFILES P-56 TO P-59

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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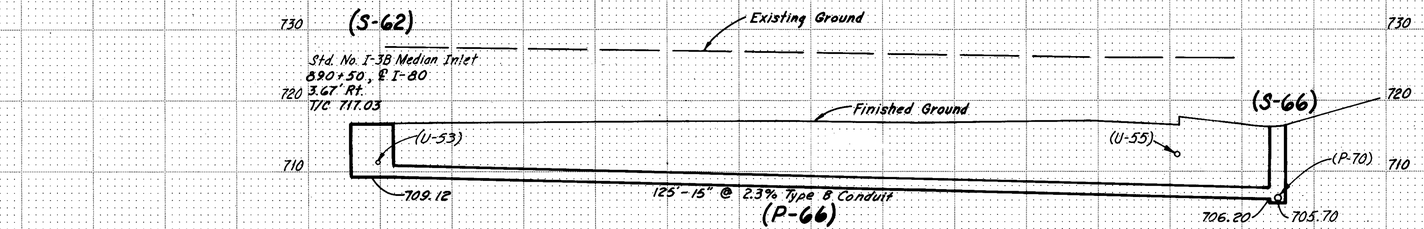
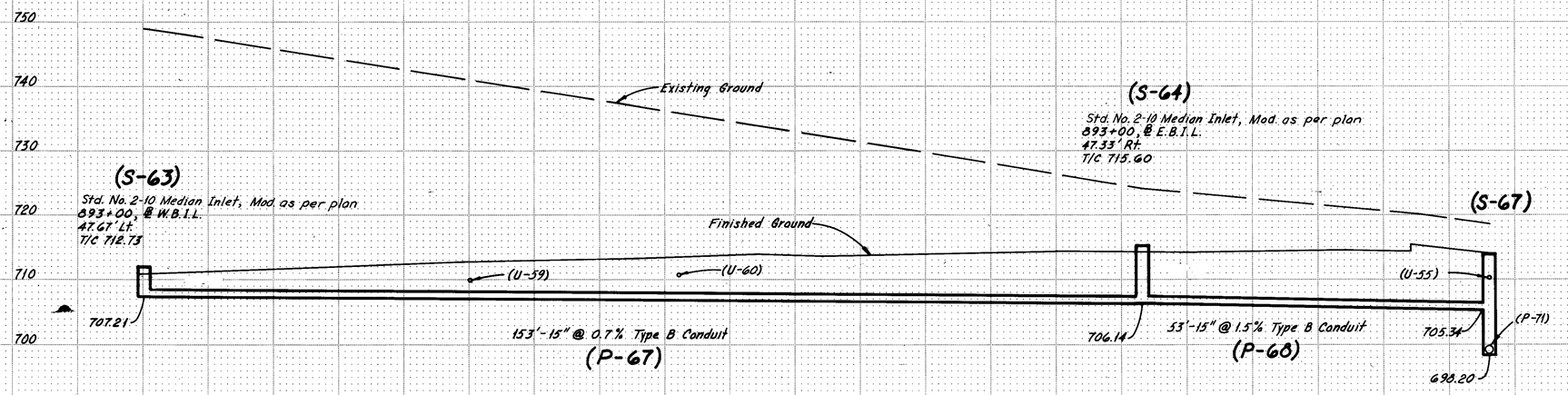
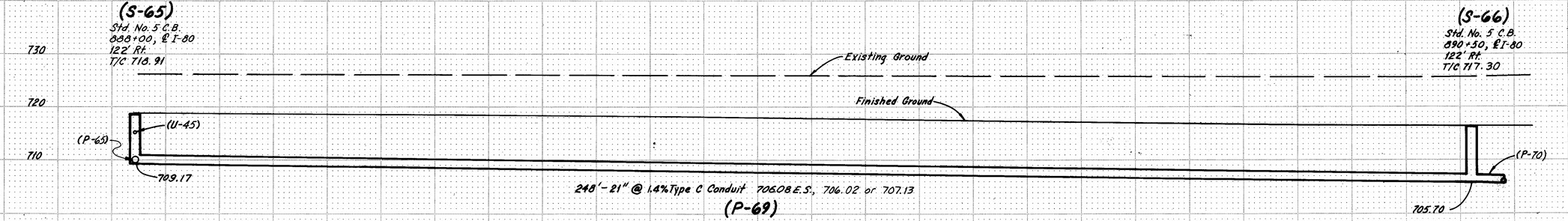
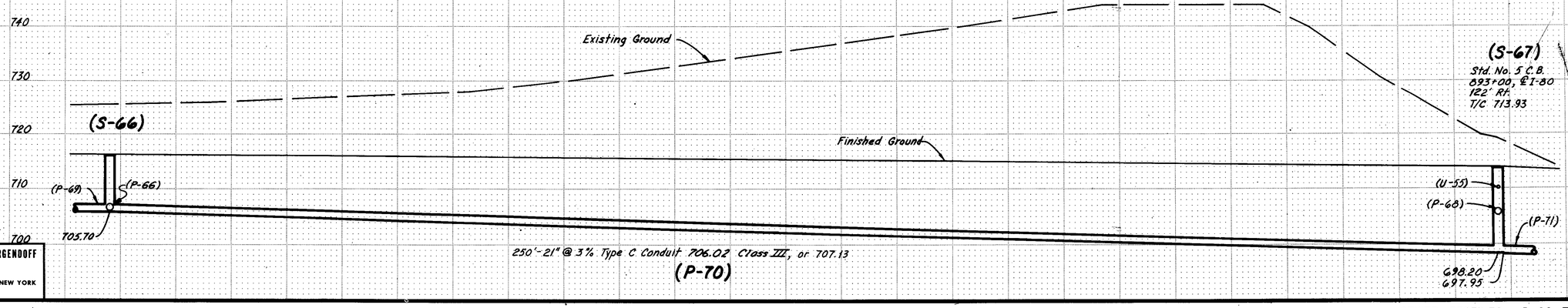
392

CUYAHOGA COUNTY
CUY.-80-15.81







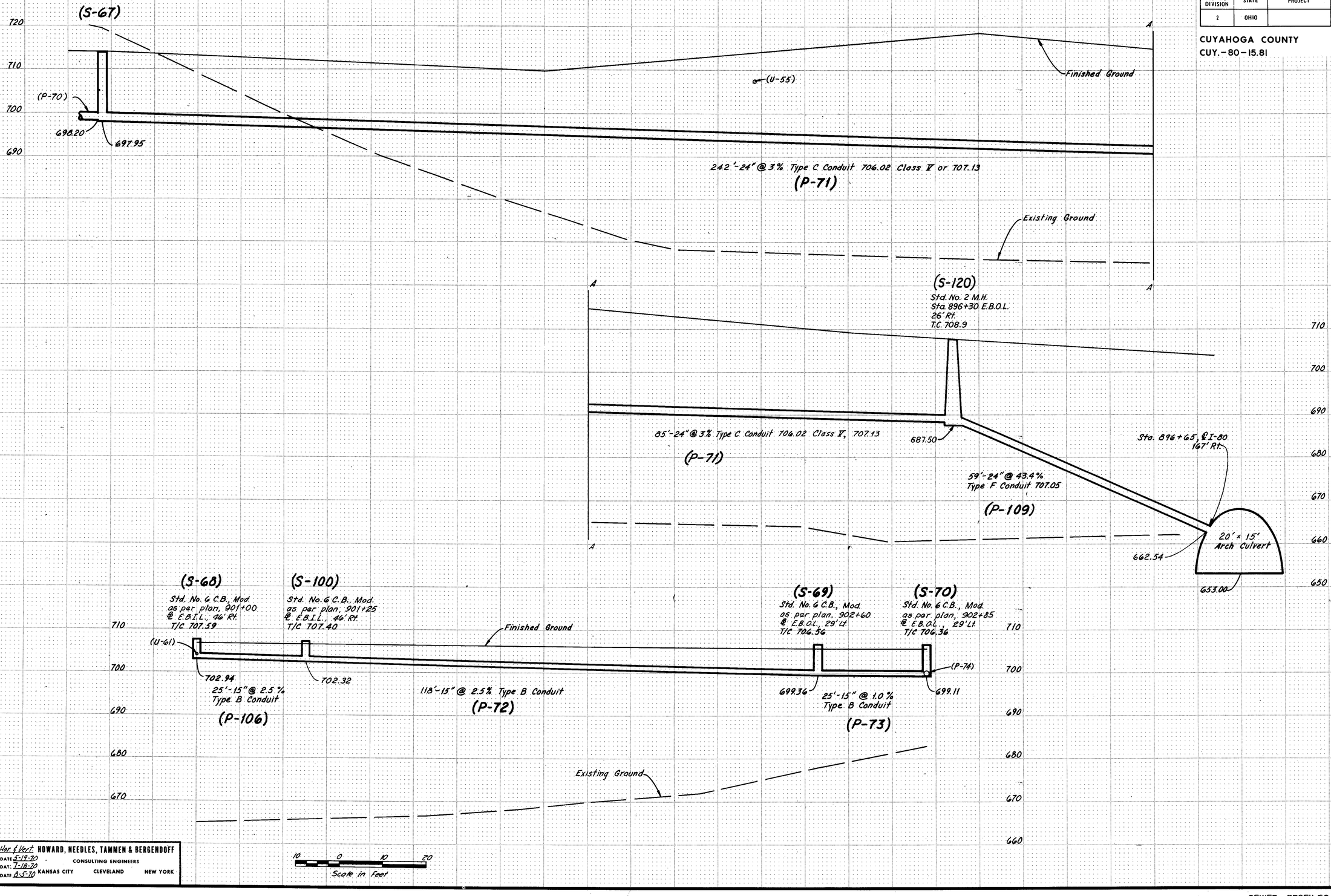


SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 5-7-70
TRCD. T.P.M. DATE 7-18-70
CKD. G.L. DATE 8-5-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

90
392

CUYAHOGA COUNTY
CUY.-80-15.81



SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 5-19-70 - CONSULTING ENGINEERS
TRCD. T.P.M. DAT: 7-18-70 KANSAS CITY CLEVELAND NEW YORK
CKD. G.L. DATE 8-5-70

SEWER PROFILES P-71 TO P-73 & P-106

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

91
392

CUYAHOGA COUNTY
CUY.-80-15.81

700
690
680
670
660
650

(S-73)
Std. No. 2-A-8 Inlet
902+10, ℄ W.B.O.L.
35.58' Rt.
T/C 700.79

(S-72)
Std. No. 2-A-16 Inlet
902+37, ℄ W.B.I.L.
47.58' Lt.
T/C 700.78

(S-71)
Std. No. 4 C.B.
902+45, ℄ I-80
T/C 700.78

Finished Ground
(U-66)
Existing Ground
Existing Ground
A
A

Concrete Collar
See Std. Const. Dwg. MC-4
25° Type F Bend
2'-6" Min.
1 on 2
25° Type F Bend
8'x6'x 1.5' Rock
Channel Protection
Type B
For detail see sheet 7C
Std. HW-4
Headwall
656.84
657.84
25'-21"@4% Type F Conduit
Sta. 902+10 ℄ W.B.O.L., 112' Rt.
59'-21" @ 50%
Type F Conduit
686.74
(P-77)
66'-21"@4% Type B Conduit
689.38
15'-21"@4%
Type B Conduit
(P-76)
690.23
689.98
90'-18"@3.5% Type B Conduit
(P-75)
693.38
693.63
25'-15"@4%
Type B Conduit
(P-74)

(S-70)
Std. No. 6 C.B. Mod.,
as per plan, 902+85
℄ E.B.O.L., 29' Lt.
T/C 706.36
(P-73)
699.11
115'-15"@4% Type B Conduit
(P-74)

710
700
690
680
730
720
710
700
690
680
670

(S-74)
Std. No. 5 C.B.
912+61, ℄ I-80
166' Lt.
T/C 685.43

(S-75)
Std. No. 6 C.B., Mod.
as per plan, 912+35
℄ W.B.I.L., 96' Lt.
T/C 688.36

(S-77)
Std. No. 2-A-20 Inlet
910+95, ℄ W.B.I.L.
47.58' Lt.
T/C 690.45

Existing Ground
Finished Ground
680.77
66'-21" @ 0.5% Type B Conduit
(P-78)
680.44
137'-21" @ 0.5% Type B Conduit
(P-79)
679.76
(P-81)
679.51

10 0 10 20
Scale in Feet

SCALE 1"=10' Hor. & Vert.
MADE A.W.S. DATE 6-20-70
TRCD. T.P.M. DATE 7-18-70
CKD. G.L. DATE 8-5-70

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

SEWER PROFILES P-74 TO P-79

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

92
392

CUYAHOGA COUNTY
CUY.-80-15.81

730
720
710
700
690
680
670

(S-76)
Std. No. 2-A-8 Inlet
910+50, ℄ W.B.O.L.
35.58' Rt.
T/C 690.41

(S-77)

685.03
684.96
8'-15" @ 0.9% Type B Conduit
(P-80)

(P.79)
679.51

(S-78)
Std. No. 4 C.B.
911+15, ℄ I-80
N.G. 688.85

102'-24" @ 0.7% Type B Conduit
(P-81)

678.80
678.30

Finished Ground
Existing Ground

150'-30" @ 0.63% Type B Conduit 706.02 Class III
(P-82)

A
A

710
700
690
680
670

℄ W.B.O.L.
℄ W.B.I.L.

(S-79)
Std. No. 5 C.B.
916+58, ℄ I-80
142' Lt.
T/C 683.68

1on 8
(U-75)
679.85

142'-15" @ 1.33% Type B Conduit
(P-83)

Finished Ground
1on 18
1on 18
℄ I-80

677.96
677.71

78'-18" @ 3.5% Type B Conduit
(P-84)

Existing Ground

℄ E.B.I.L.

(S-80)
Std. No. 4 C.B.
916+58, ℄ I-80
T/C 683.28

B
B

B
B

℄ E.B.O.L.

(S-86)
Std. No. 5-A C.B.
916+58, ℄ I-80
175' Rt.
T/C 674.6

1on 8
(U-82) 2.0
1on 4
1on 17

(P-84)
96'-18" @ 3.5% Type B Conduit

670.6
(P-91)
658.00

690
680
670
660

A
700
690
680
670
A

1on 2
10'x6'x1.5' Type B Rock Channel Protection
For Detail See Sheet 74.
676.99
1on 2

58'-30" @ 0.63% Type B Conduit
706.02 Class III
(P-82)

Std. HW-4 Headwall
911+80, ℄ E.B.O.L.
81' Rt.

10 0 10 20
Scale in Feet

SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 5-20-10
TRCD. T.P.M. DATE 7-18-10
CKD. G.L. DATE 8-23-10

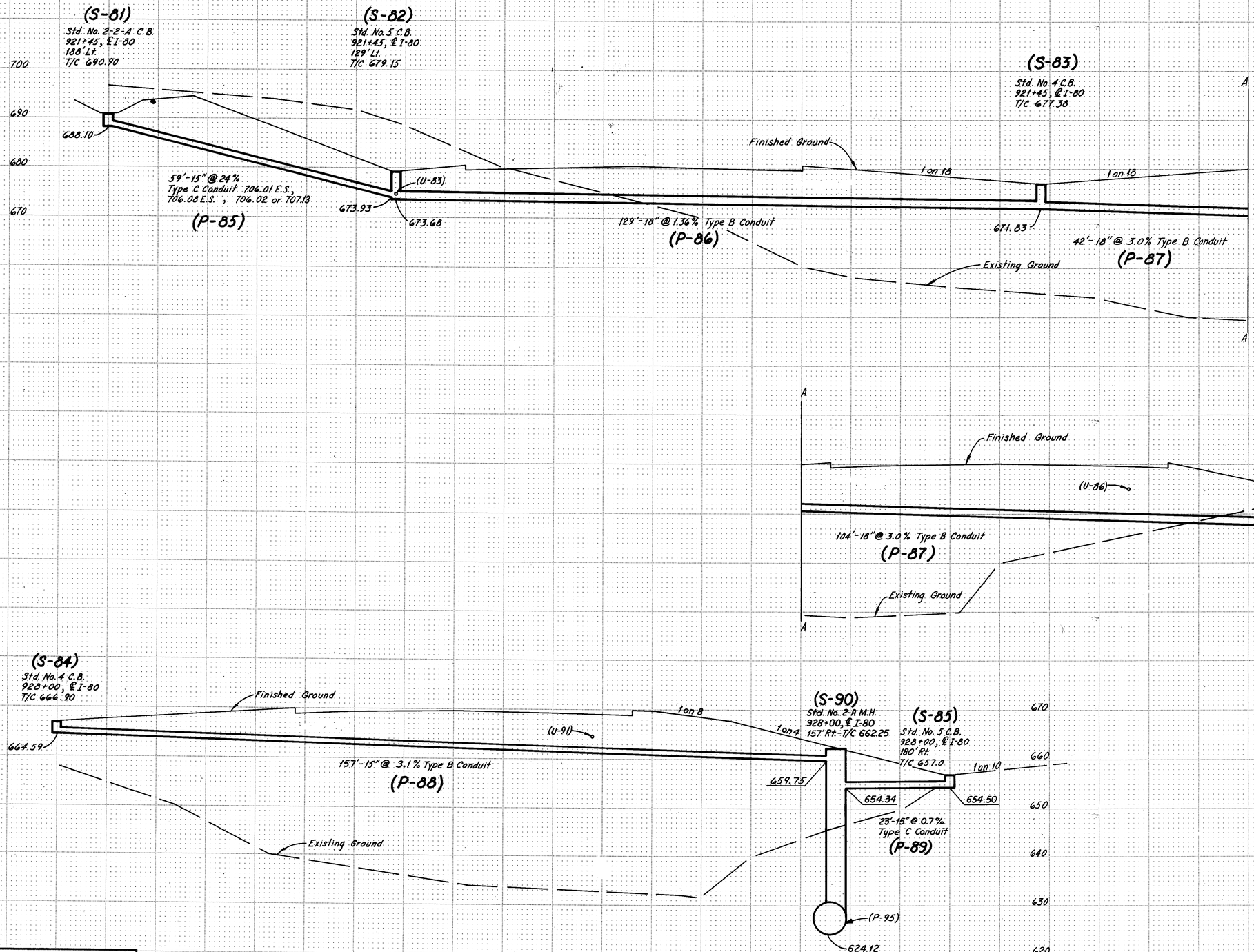
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

SEWER PROFILES P-80 TO P-84

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

93
392

CUYAHOGA COUNTY
CUY.- 80-15.81



SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 5-25-70
TRCD. T.P.M. DATE 6-18-70
CKD. G.L. DATE 6-20-70

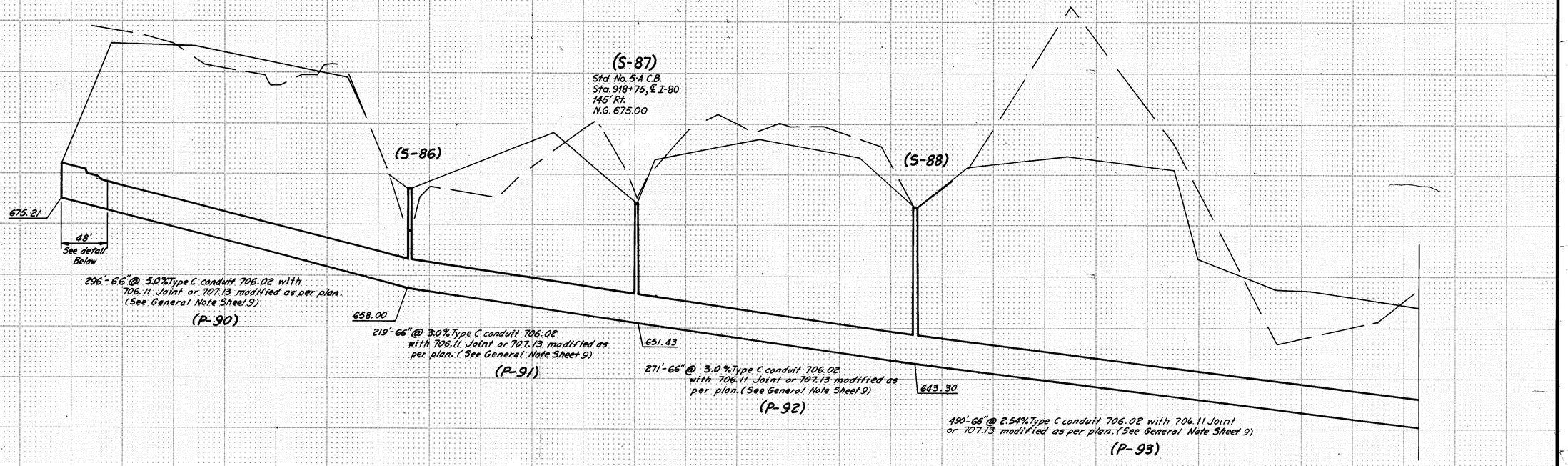
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

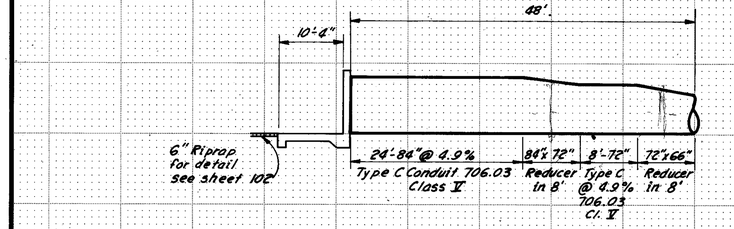
SEWER PROFILES P-85 TO P-89

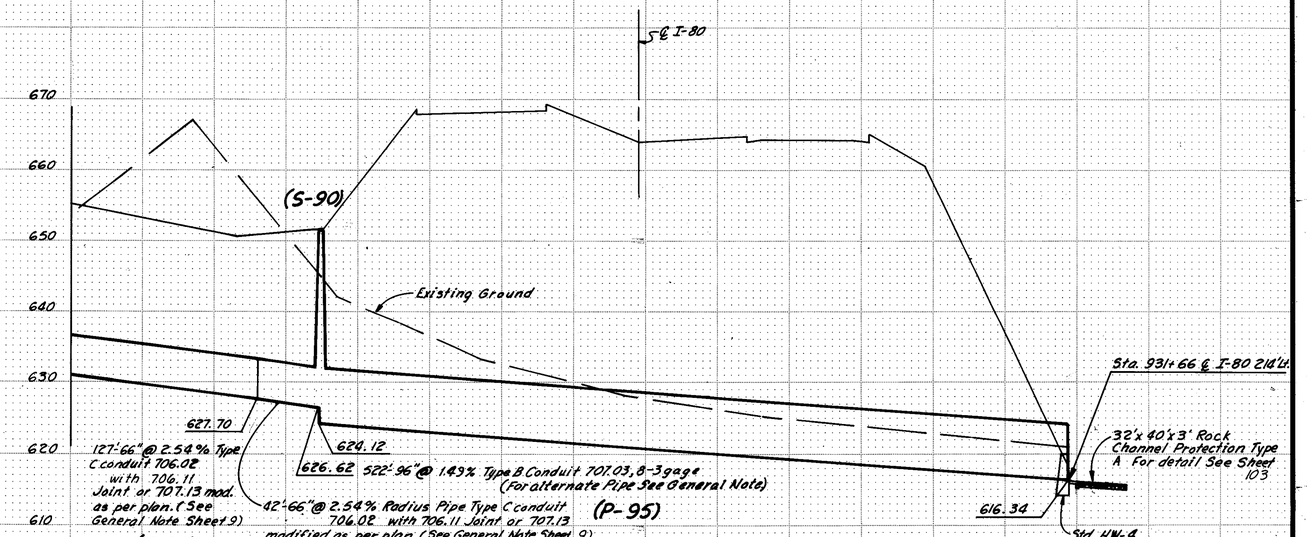
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

94
392

CUYAHOGA COUNTY
CUY.-80-15.81







SCALE 1"=10' Vert. 50' Hor.
MADE AHS DATE 9-28-70
TRCD. MAG DATE 9-29-70
CKD. GL DATE 9-29-70

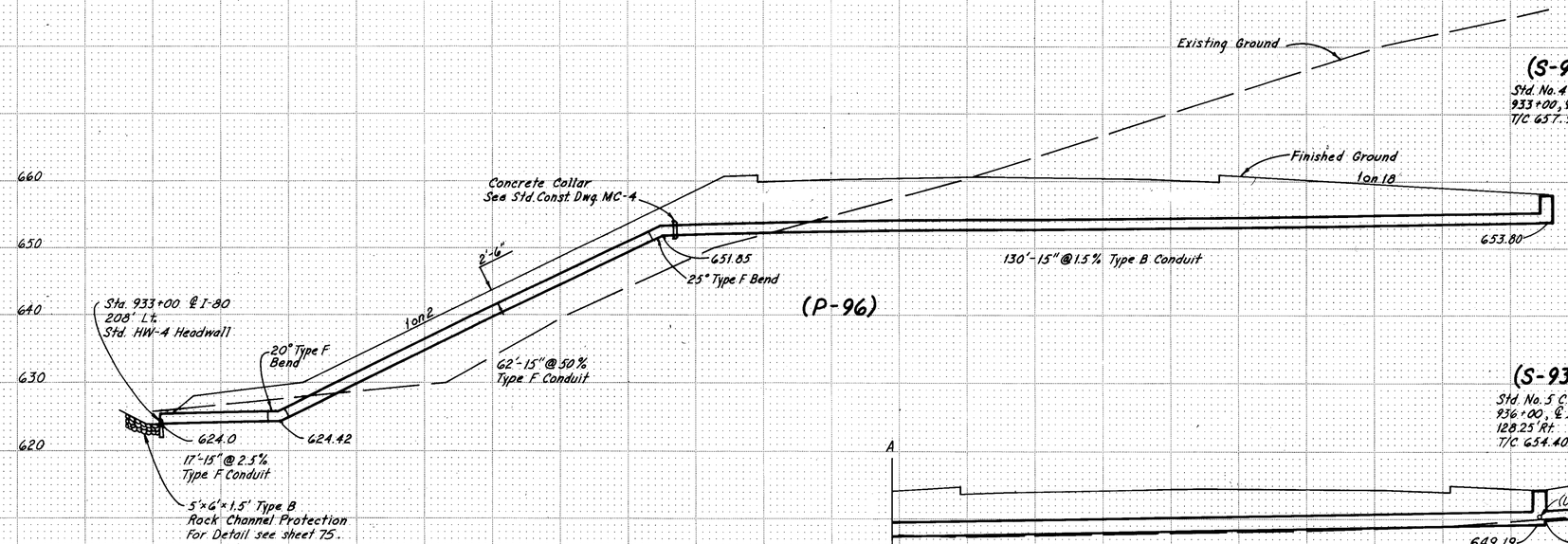
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

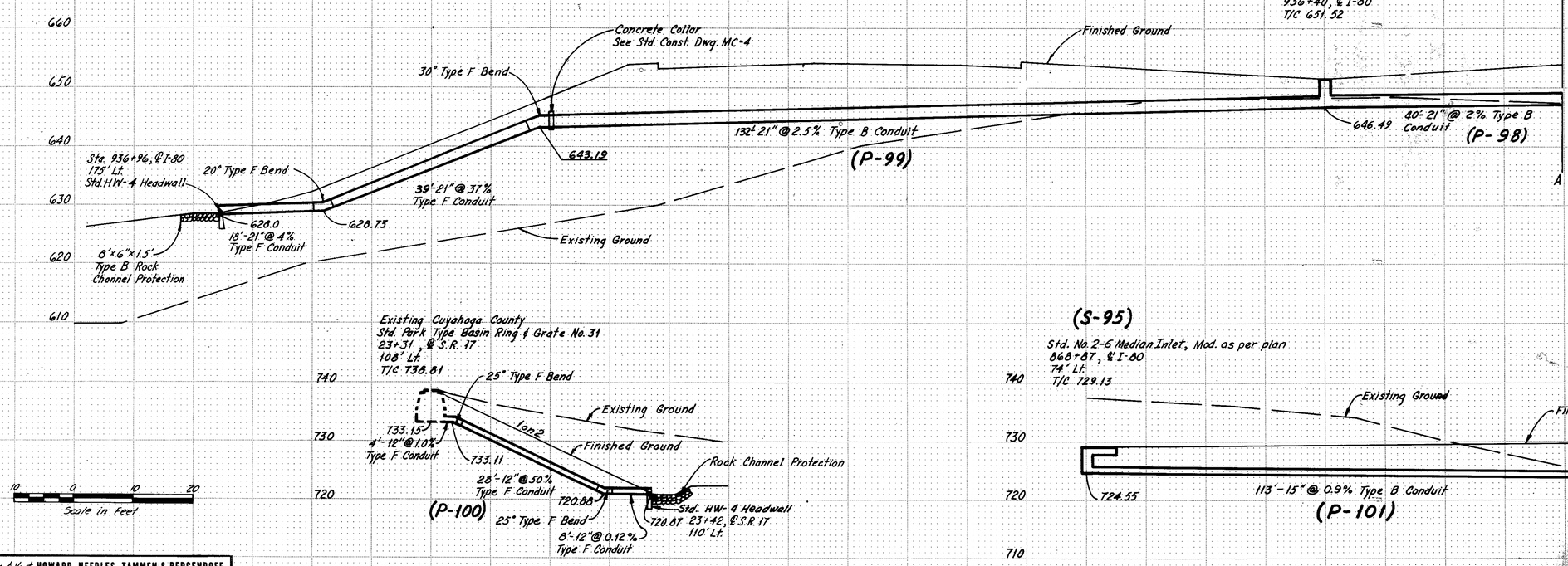
SEWER PROFILES P-90 TO P-95

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

95
392

CUYAHOGA COUNTY
CUY.–80–15.81





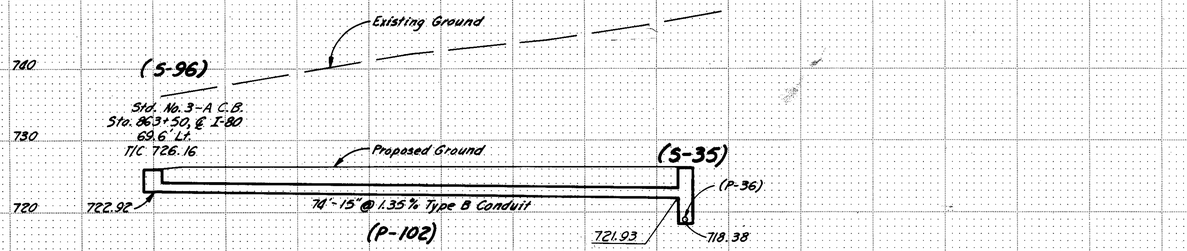
SCALE 1"=10' Hor. & Vert. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE A.H.S. DATE 6-8-70 CONSULTING ENGINEERS
TRCD. T.P.M. DATE 7-17-70
CKD. G.L. DATE 8-5-70 KANSAS CITY CLEVELAND NEW YORK

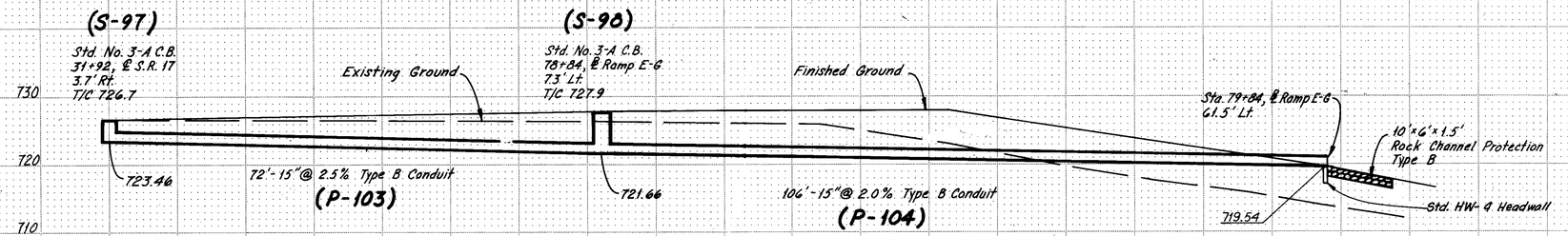
SEWER PROFILES P-96 TO P-101

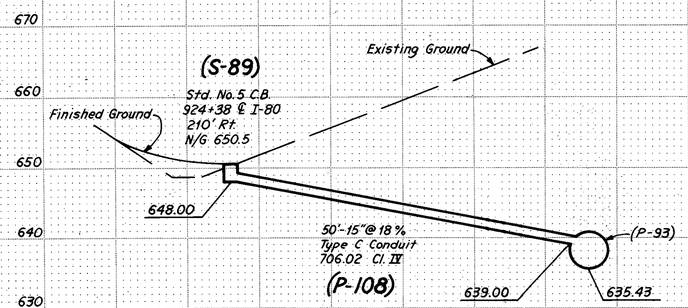
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

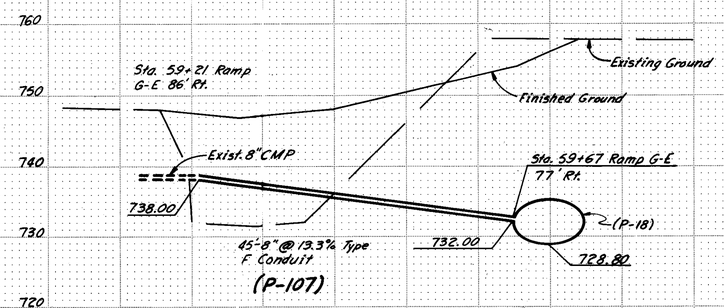
96
392

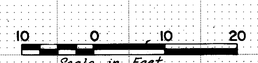
CUYAHOGA COUNTY
CUY. — 80–15.81











SCALE 1"=10' Hor. & Vert.
MADE A.H.S. DATE 9-28-70
TRCD. T.P.M. DATE 9-29-70
CKD. G.L. DATE 9-29-70

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

SEWER PROFILES P-102 TO P-104, P-107 & P-108

T-20

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-80-15.81

(SS-2)
Std. No.1-A M.H.
with 706.11 Joints, as per plan
18+50, ℄ Exist. Brookpark Rd.
10' Lt. T/C 762.00

749.60

Finished & Existing Ground

320'-8" @ 2.52% Type B Conduit 706.08 E.S. with 706.12 Joints
(SP-2)

(SS-3)
Std. No. 1-A M.H. with 706.11 Joints, as per plan
15+30 ℄ Exist. Brookpark Rd., 10' Lt.
T/C = 752.50

760
750
740

(SP-4)
741.53

760
750
740
730

(SS-3)

8" C.I. Water Pipe
12" Exist. St. Sewer
(SP-2)
741.53

Existing Ground
Finished Ground

255'-8" @ 0.4% Type B Conduit 706.08 E.S. with 706.12 Joints
(SP-4)

(SS-5)
Std. No. 1-A M.H.
with 706.11 Joints, as per plan
862+00, ℄ I-80
216' Lt.
T/C 745.5

(SP-5)
740.51

760
750
740
730

(E-24)
Existing M.H.
Reconstructed to Grade
with drop pipe
G+GT, E Tuxedo Ave.
T/C 750.6

760
750
740
730

(SS-5)

(SP-4)
740.51

Finished Ground
Existing Ground

255'-8" @ 0.4% Type B Conduit 706.08 E.S. with 706.12 Joints
(SP-5)

749.38
739.50
734.35
Exist. No. 2-C Br. San.

10 0 10 20
Scale in Feet

SCALE 1"=10' Hor. & Vert.
MADE G.L. DATE 5-15-70
TRCD. T.P.M. DATE 5-18-70
CKD. A.H.S. DATE 6-7-70

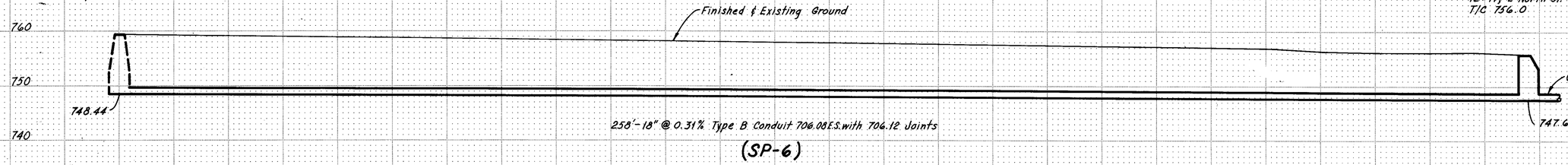
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

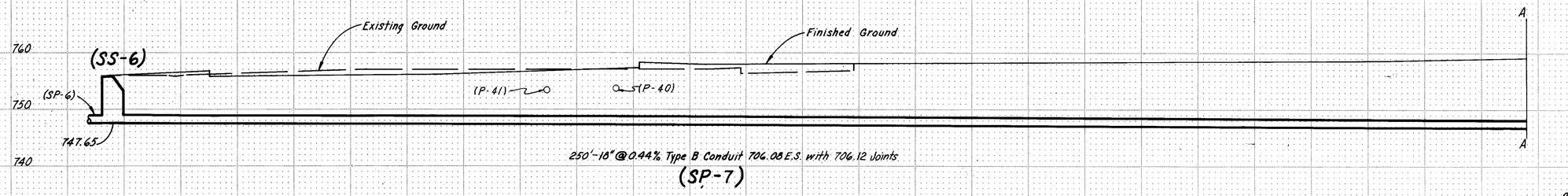
SANITARY SEWER PROFILES SP-2, SP-4 AND SP-5

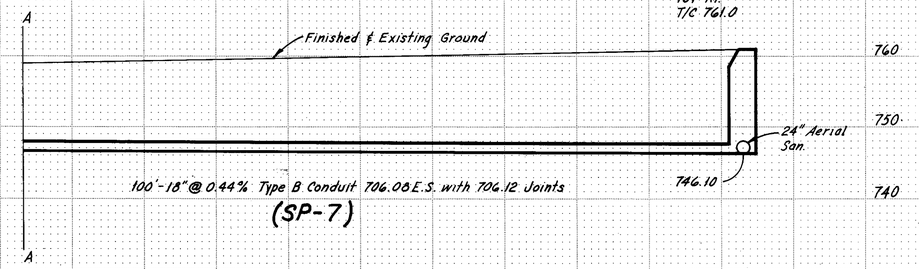
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

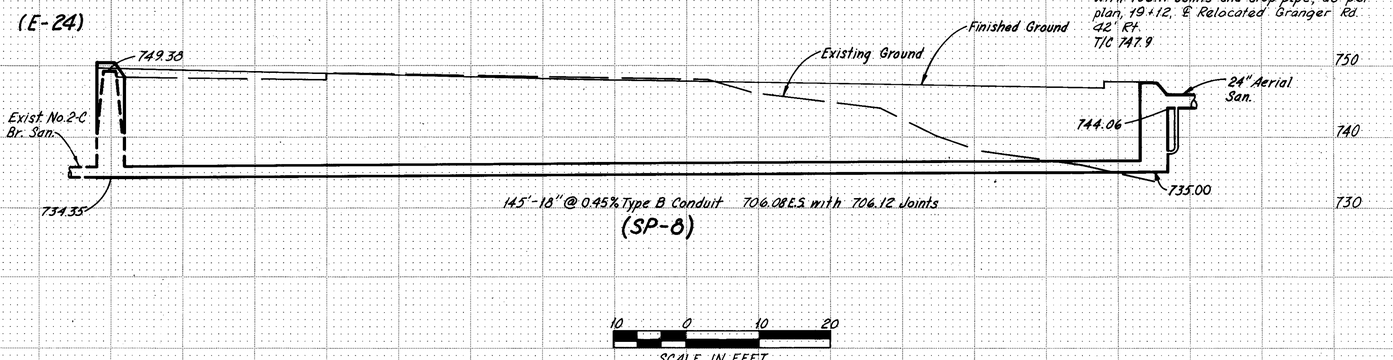
98
392

CUYAHOGA COUNTY
CUY.-80-15.81









SCALE 1" = 10' Hor & Vert
MADE G.L. DATE 5-15-70
TRCD. T.P.M. DATE 5-18-70
CKD. A.H.S. DATE 6-7-70

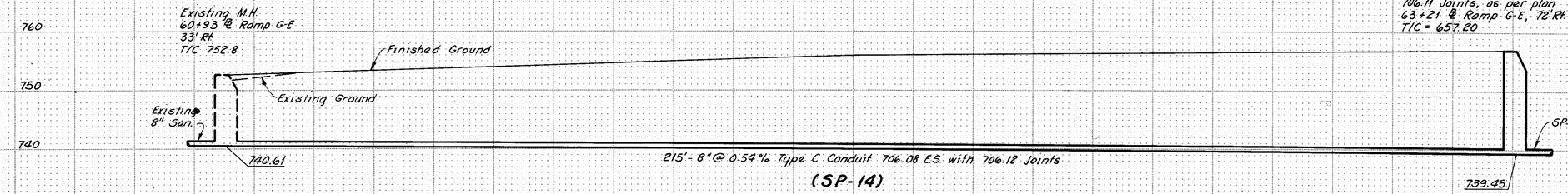
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

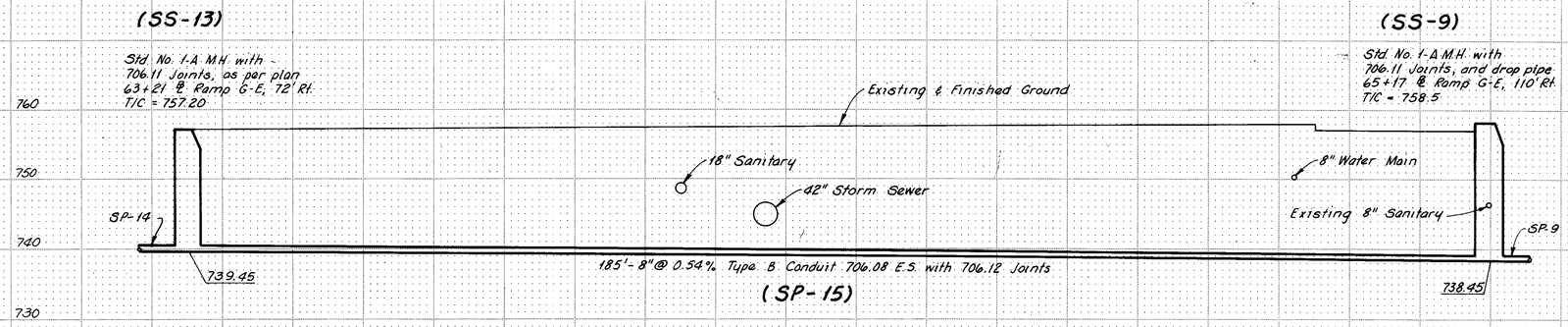
SANITARY SEWER PROFILES SP-6 TO SP-8

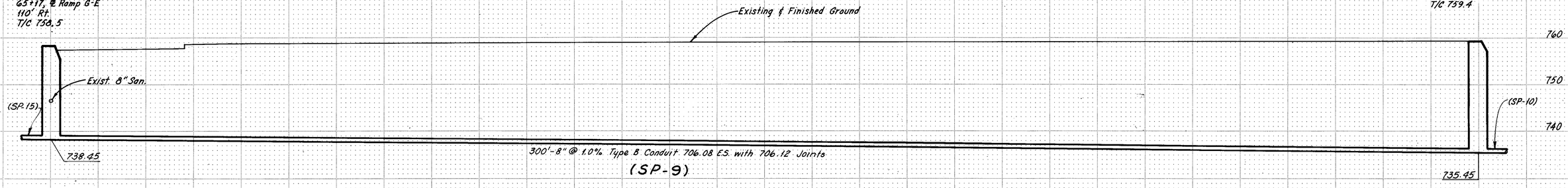
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

99
392

CUYAHOGA COUNTY
CUY.-80-15.81







10 0 10 20
Scale in Feet

SCALE 1"=10' Hor. & Vert.
MADE G.L. DATE 5-15-70
TRCD. T.P.M. DATE 9-18-70
CKD. A.H.S. DATE 9-18-70

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

SANITARY SEWER PROFILES SP-14, SP-15 AND SP-9

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

100
392

CUYAHOGA COUNTY
CUY.-80-15.81

(SS-10)

(SP-9)

735.45

Existing & Finished Ground

268'-8" @ 1.0% Type B Conduit 706.08 E.S. with 706.12 Joints
(SP-10)

(SS-11)
Std. No. 1-A M.H. with 706.11 Joints & 2 drop pipes, as per plan
70+84, ℄ Ramp G-E
105' Rt.
T/C 746.4

760
750
740
730
720
710

732.77

Exist. 30" San.

SP-11

717.88

(SS-11)
Std. No. 1-A M.H. with 706.11 Joints & 2 Drop Pipes as per plan
70+84, ℄ Ramp G-E
105' Rt.
T/C 746.4

740
730
720
710

SP-10

730.00

Existing Ground

℄ Ramp G-E

Finished Ground

Abandon Existing M.H. and connect pipe thru

Abandon Existing 30" Sanitary

717.91

152'-30" @ 0.6% Type B Conduit 706.02 Cl. V, as per 706.05 with 706.11 Joints 1/3 Lined or Fully Lined

717.0

(SP-11)

(SS-12)
Std. No. 1-A M.H. with 706.11 Joints
Eliminate 1" Cored Holes in Cover
Sta. 925+56, 119' Rt.
℄ I-80
T/C 673.90

680
670
660
650
640
630

Concrete Marker See Detail Sheet 115 Payment for Marker included in Item 604

℄ I-80

L/A

Existing M.H.

M.H. Cover buried 1'-0" below finished ground

Finished Ground

Existing Ground

Provide Temporary Bulkhead, Sta. 924+18, 226' Rt. Payment included with Item 603

Existing 10" Sanitary Sewer

Provide Temporary Bulkhead, Sta. 930+43, 260' Lt. Payment included with Item 603.

647.40

646.52

175'-10" @ 0.5%

620'-10" @ 0.5%

Type B Conduit 706.02 Cl. V Bituminous Coated with 706.11 Joints or A.S.A. Class 6 Mechanical Joint Ductile Iron Pipe Cement Lined.

Type B Conduit 706.02 Cl. V Bituminous Coated with 706.11 Joints or A.S.A. Class 6 Mechanical Joint Ductile Iron Pipe Cement Lined.

(SP-12)

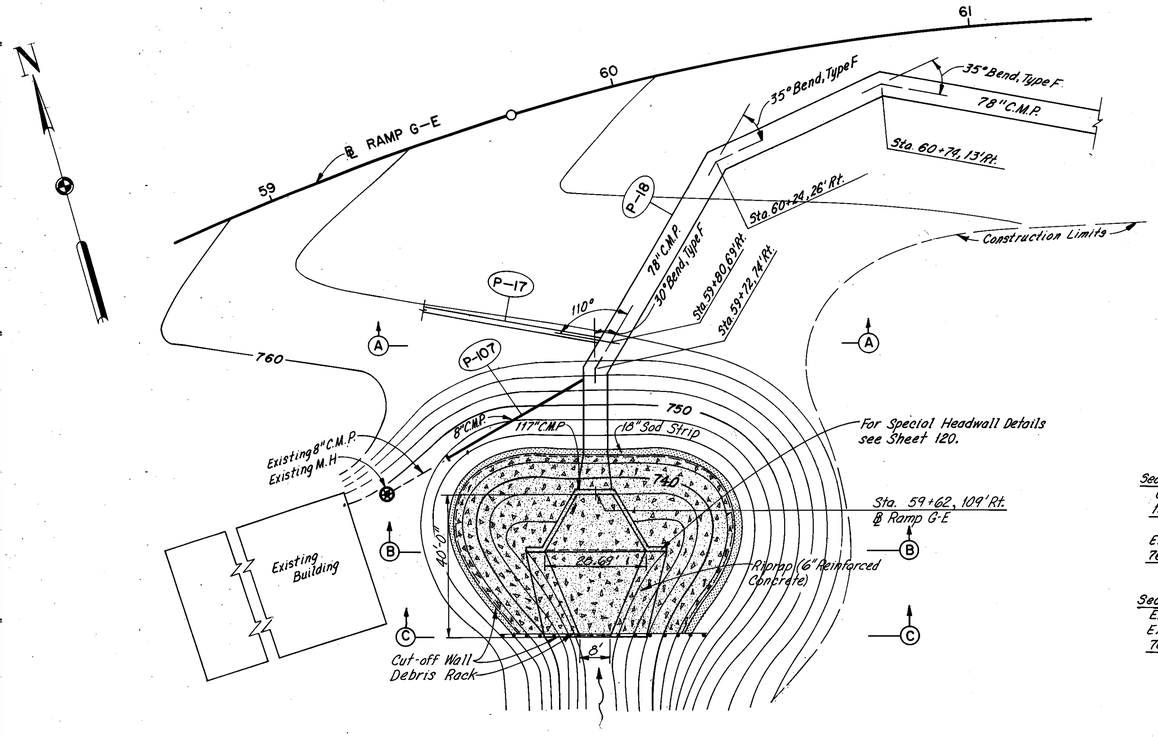
(SP-13)

0 100 200 300 400 500

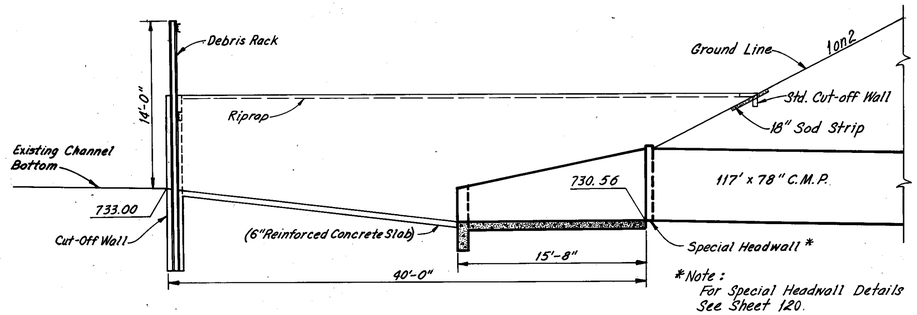
SCALE 1"=10' & 1"=50'
MADE G.L. DATE 5-15-10
TRCD. T.P.M. DATE 9-18-10
CKD. R.B.H. DATE 9-19-10

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

SANITARY SEWER PROFILES SP-10 TO SP-13



PLAN
Scale: 1" = 20'



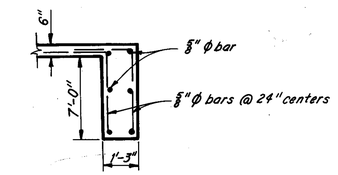
ELEVATION
Not to Scale

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	QUANTITY	UNIT
203	Excavation not including Embankment Construction	1154.06	Cu. Yds.
203	Embankment	1557.34	Cu. Yds.
513	Structural Steel (Debris Rack)	3044.0	lbs.
601	Riprap (6" Reinforced Concrete Slab), As Per Plan	356.0	Sq. Yds.
602	Concrete Masonry, as per plan	10.88	Cu. Yds.
660	Sodding	30.0	Sq. Yds.

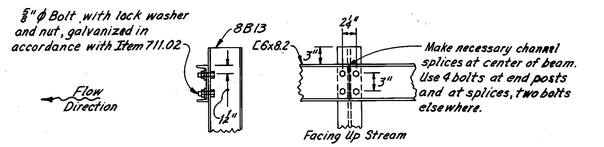
SCALE As Shown
MAD. RBH DATE 7-30-71
TRCD DCF DATE 8-3-71
CKD AHS DATE 8-5-71
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

Section A-A to B-B
Embankment:
$\frac{1380+70}{54} \times 58 = 1557.34$ Cu. Yds.
Excavation:
$\frac{760+0}{54} \times 58 = 816.29$ Cu. Yds.

Section B-B to C-C
Embankment: 0 Cu. Yds.
Excavation:
$\frac{760+0}{54} \times 24 = 337.77$ Cu. Yds.



CUT-OFF-WALL DETAIL AT DEBRIS RACK
Not To Scale



DEBRIS RACK CONNECTION DETAIL
Not To Scale

QUANTITY CALCULATIONS
MADE BY R.B.H. DATE 7-30-71
CHECKED BY A.H.S. DATE 8-5-71

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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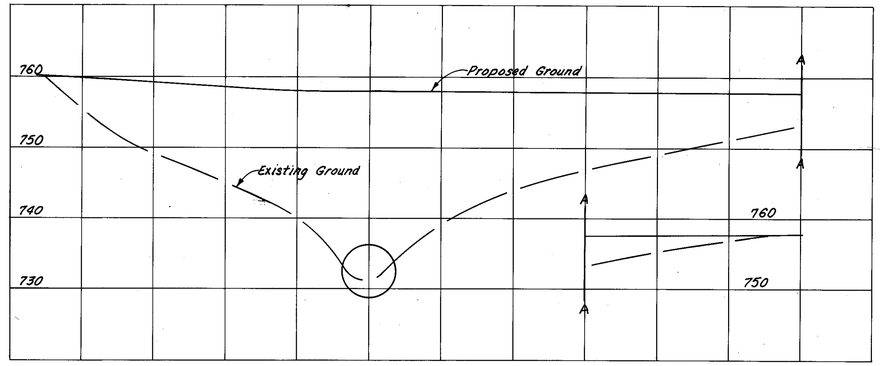
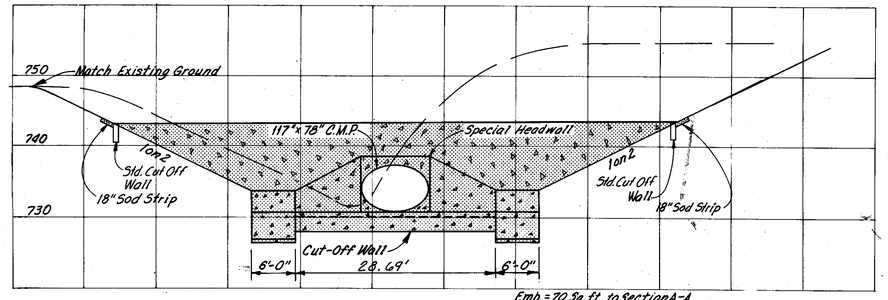
CUYAHOGA COUNTY
CUY.-80-15.81



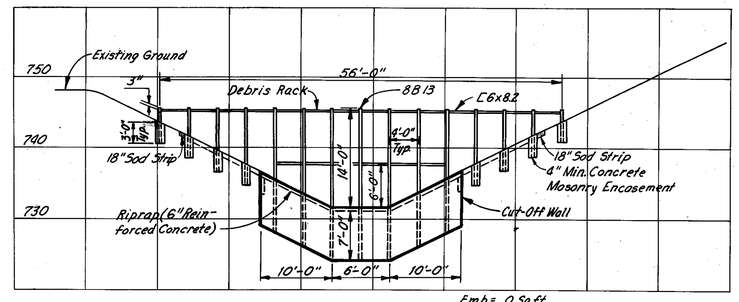
SECTION A-A
Scale: 1" = 10'

Emb. = 1,380 Sq. Ft.
Exc. = 0 Sq. Ft.



SECTION B-B
Scale: 1" = 10'

Emb. = 70 Sq. Ft. to Section A-A,
0 Sq. Ft. to Section C-C.
Exc. = 760 Sq. Ft.



SECTION C-C
Scale: 1" = 10'

Emb. = 0 Sq. Ft.
Exc. = 0 Sq. Ft.

D. A. = 266 Acres
Q 50 = 599 c.f.s.

STORM SEWER INLET DETAIL

QUANTITY CALCULATIONS
MADE BY RBH DATE 7-28-71
CHECKED BY AHS DATE 8-5-71

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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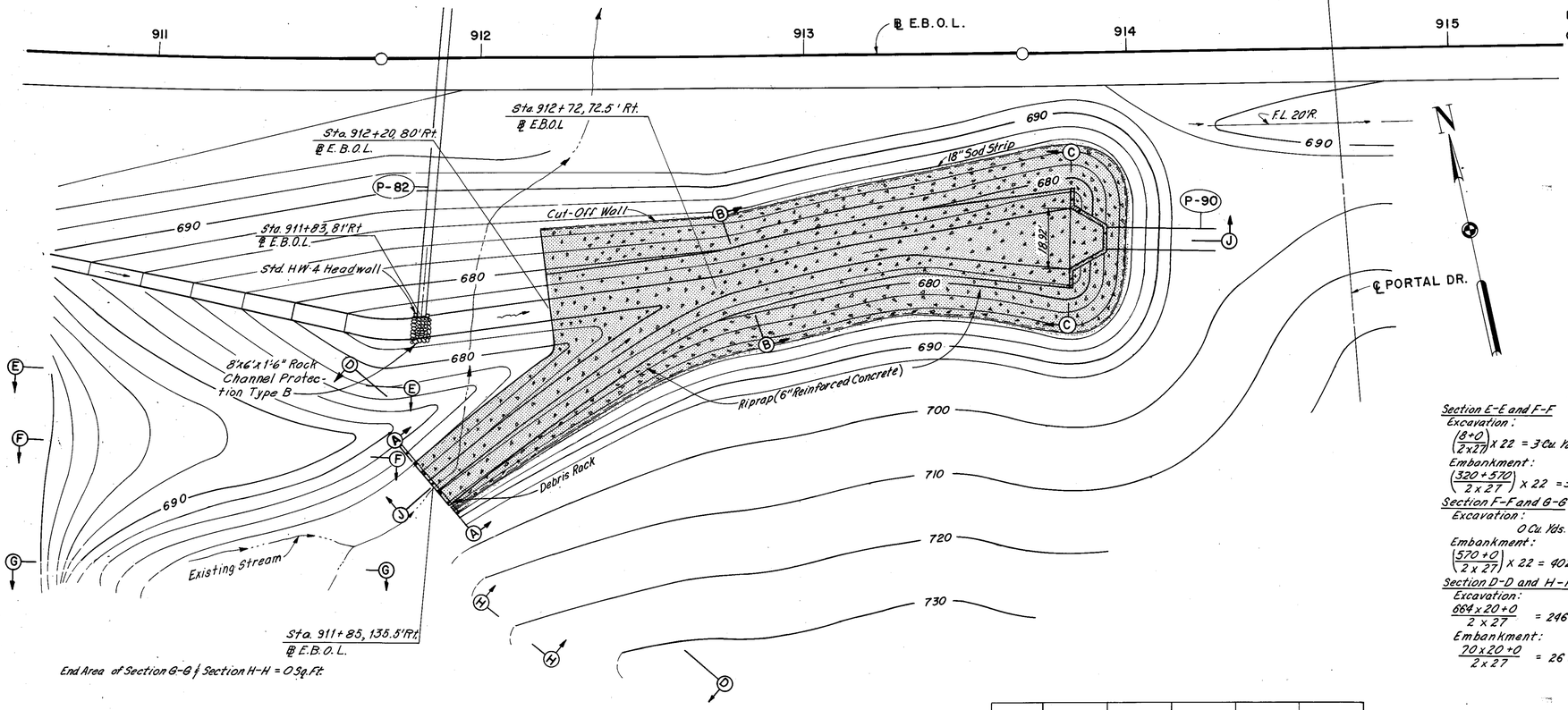
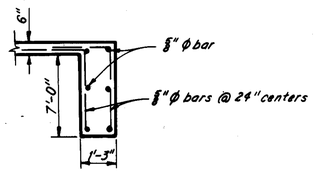
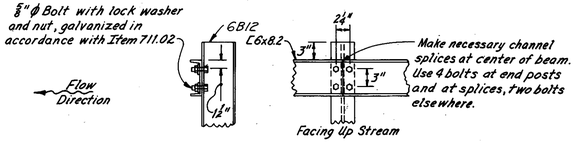
CUYAHOGA COUNTY
CUY.-80-15.81



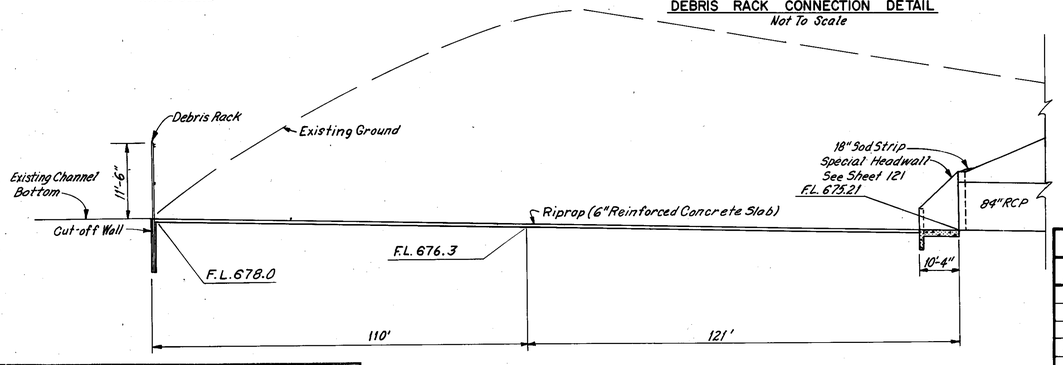
PLAN
Scale 1"=20'



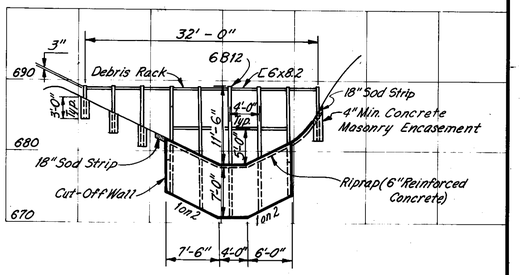
CUT-OFF-WALL DETAIL AT DEBRIS RACK
Not To Scale



DEBRIS RACK CONNECTION DETAIL
Not To Scale

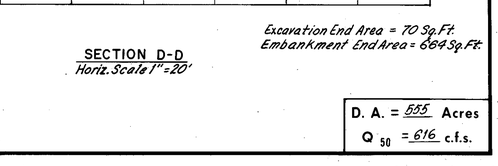


SECTION J-J
Horiz. Scale 1"=20'
Vert. Scale 1"=10'

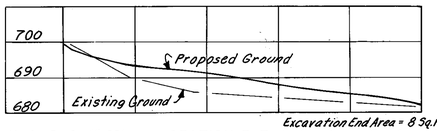


SECTION A-A
Scale: 1"=10'

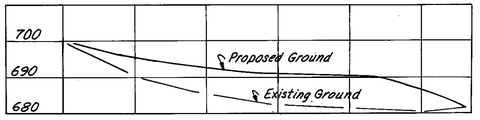
Section E-E and F-F
Excavation:
$\left(\frac{8+0}{2\times27}\right)\times 22 = 3$ Cu. Yds.
Embankment:
$\left(\frac{320+570}{2\times27}\right)\times 22 = 36.3$ Cu. Yds.
Section F-F and G-G
Excavation:
0 Cu. Yds.
Embankment:
$\left(\frac{570+0}{2\times27}\right)\times 22 = 402$ Cu. Yds.
Section D-D and H-H
Excavation:
$\frac{664\times20+0}{2\times27} = 246$ Cu. Yds.
Embankment:
$\frac{70\times20+0}{2\times27} = 26$ Cu. Yds.



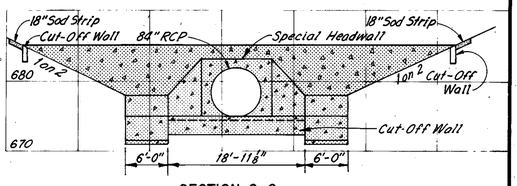
SECTION B-B
Scale: 1"=10'



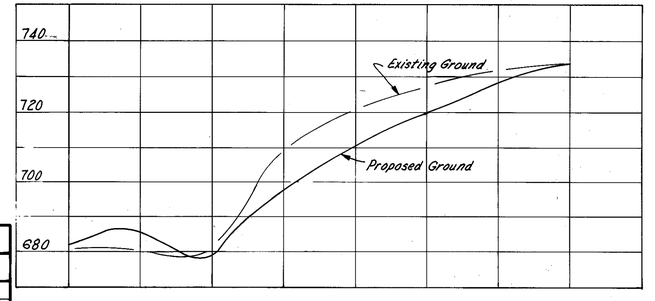
Horiz. Scale: 1"=20'
SECTION E-E
Excavation End Area = 8 Sq. Ft.
Embankment End Area = 320 Sq. Ft.



Horiz. Scale: 1"=20'
SECTION F-F
Excavation End Area = 0 Sq. Ft.
Embankment End Area = 750 Sq. Ft.



SECTION C-C
Scale: 1"=10'



Excavation End Area = 70 Sq. Ft.
Embankment End Area = 664 Sq. Ft.

SECTION D-D
Horiz. Scale 1"=20'

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT
203	Excavation not including Embankment Construction	249	Cu. Yds.
203	Embankment	791	Cu. Yds.
513	Structural Steel (Debris Rack)	1,714	lbs.
601	Riprap (6" Reinforced Concrete Slab), As Per Plan	1137	Sq. Yds.
602	Concrete Masonry, as per plan	6.69	Cu. Yds.
660	Sodding	88	Sq. Yds.

SCALE As Shown
MAD. RBH DATE 7-28-71
TRCD. D.C.F. DATE 8-4-71
CK. AHS DATE 8-5-71
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

D. A. = 555 Acres
Q_{50} = 616 c.f.s.

STORM SEWER INLET DETAIL (P-90)

QUANTITY CALCULATIONS
MADE BY AHS DATE 7-15-70
CHECKED BY GL DATE 8-17-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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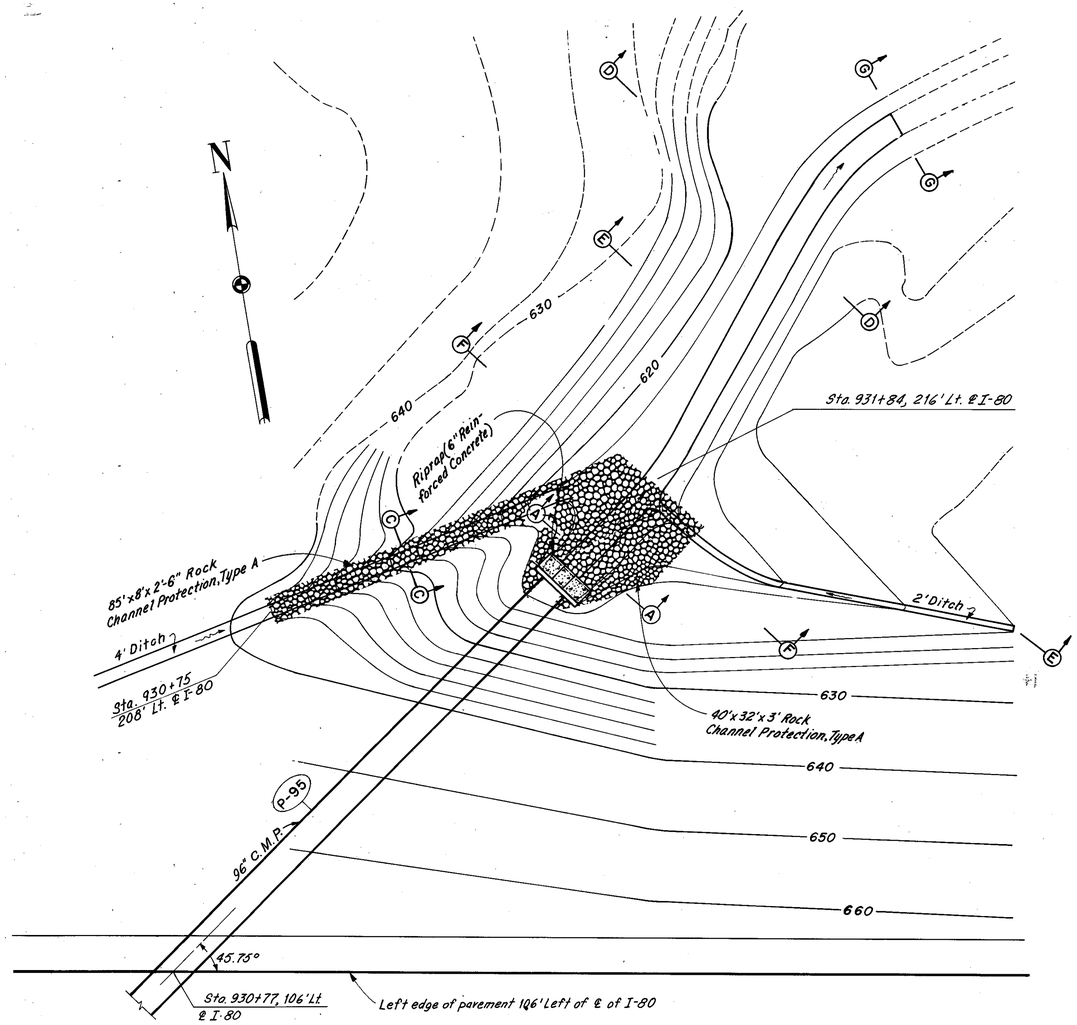
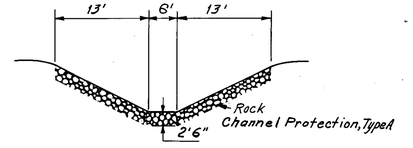
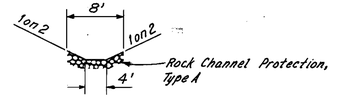
CUYAHOGA COUNTY
CUY.-80-15.81



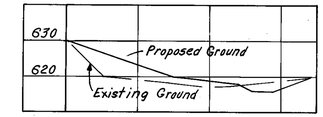
PLAN
Scale 1" = 20'



SECTION A-A

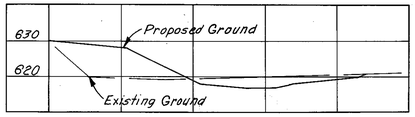


SECTION C-C



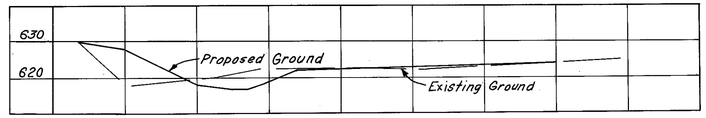
Excavation End Area 36 Sq. Ft.
Embankment End Area 130 Sq. Ft.

SECTION D-D
Horz. Scale 1" = 20'



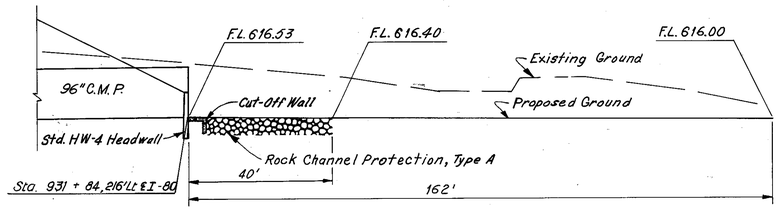
Excavation End Area 104 Sq. Ft.
Embankment End Area 210 Sq. Ft.

SECTION F-F
Horz. Scale 1" = 20'



Excavation End Area 80 Sq. Ft.
Embankment End Area 150 Sq. Ft.

SECTION E-E
Horz. Scale 1" = 20'



PROFILE
Horz. Scale 1" = 20'
Vert. Scale 1" = 10'

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	QUANTITY	UNIT
203	Excavation not including Embankment Construction	326.5	Cu. Yds.
203	Embankment	626.6	Cu. Yds.
601	Rock Channel Protection, Type A	243.0	Cu. Yds.
602	Concrete Masonry	4.4	Cu. Yds.
601	Riprap (6" Reinforced Concrete)	5.0	Sq. Yds.

Section G-G and D-D
Excavation
$\frac{36+0}{2} \times \frac{45}{27}$ = 30.0 Cu. Yds.
Embankment
$\frac{130+0}{2} \times \frac{45}{27}$ = 108.3 Cu. Yds.

Section D-D and E-E
Excavation
$\frac{36+80}{2} \times \frac{35}{27}$ = 75.2 Cu. Yds.
Embankment
$\frac{130+150}{2} \times \frac{35}{27}$ = 181.5 Cu. Yds.

Section E-E and F-F
Excavation
$\frac{80+104}{2} \times \frac{48}{27}$ = 163.6 Cu. Yds.
Embankment
$\frac{150+210}{2} \times \frac{48}{27}$ = 320.0 Cu. Yds.

Section F-F and Outlet
Excavation
$\frac{104+0}{2} \times \frac{30}{27}$ = 57.7 Cu. Yds.
Embankment
$\frac{210+0}{2} \times \frac{30}{27}$ = 116.8 Cu. Yds.

SCALE As Shown
MADE AHS DATE 7/15/70
TRCD. WLD DATE 8/17/70
CKD. GL DATE 8/17/70

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
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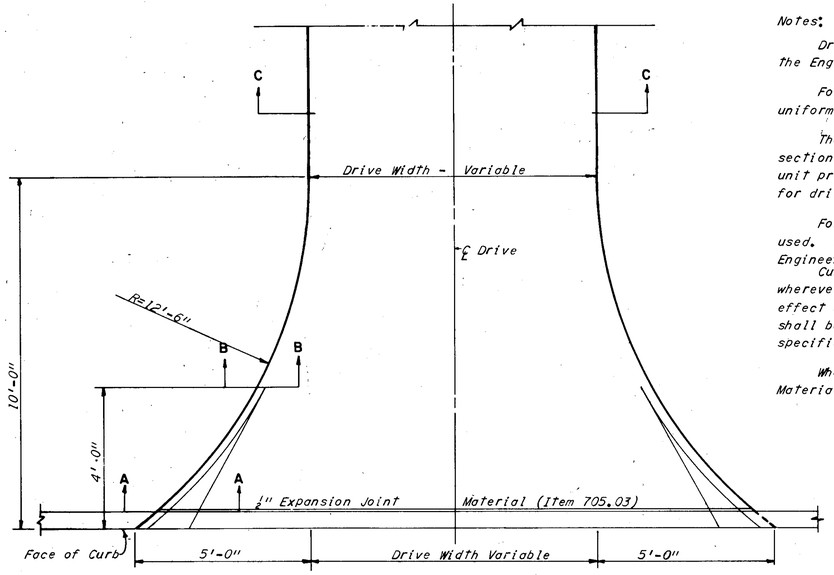
STORM SEWER OUTLET DETAIL (P-95)

MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

104
392

CUYAHOGA COUNTY
CUY.-80-15.81



CONCRETE APRON DETAIL

Notes:

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

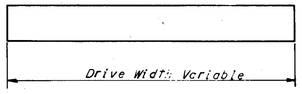
Form drive apron curb Sect. "A-A" behind curb line and taper out uniformly to no curb 4'-0" behind gutter line, as shown.

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

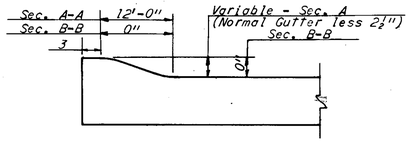
For Asphaltic Concrete and Slag drives, the plan view shown, shall be used. Shape drive section to provide for proper drainage as directed by the Engineer.

Curb shall be dropped to provide a 1¼" gutter at all driveways and wherever directed by the Engineer. The dressing of the Curb, necessary to effect a satisfactory transition from the normal curb height to a 1¼" height, shall be included in the contract unit price bid for the pertinent curb specified.

When drive abuts new or existing concrete sidewalk, ½" Expansion Joint Material (Item 705.03) shall be provided.



SECTION C-C

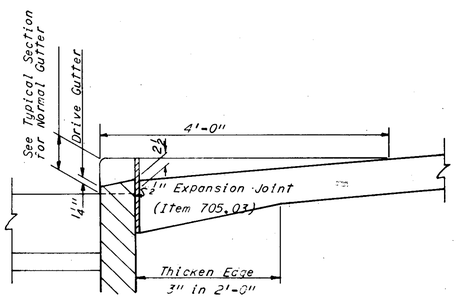


APRON CURB DETAIL
SECTION A-A & B-B

Notes:

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

The flared portion of residence drives for which earth shoulders only are specified, shall be paved with either 6" Plain Portland Cement Concrete (Item 452) or with two 1" courses of Asphaltic Concrete (Item 404) on 6" of Item 304 Aggregate.



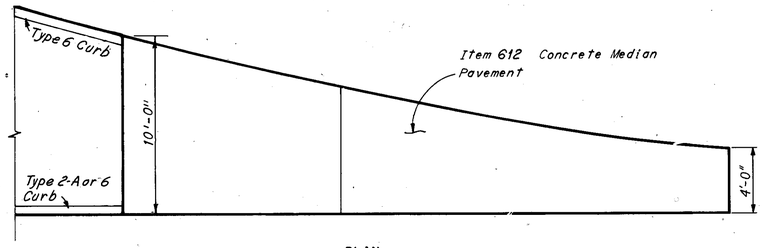
See Typical Section for Curb Specified
When drive abuts at pavement with no curb, the drive apron curb section shall be omitted.

APRON CURB TRANSITION

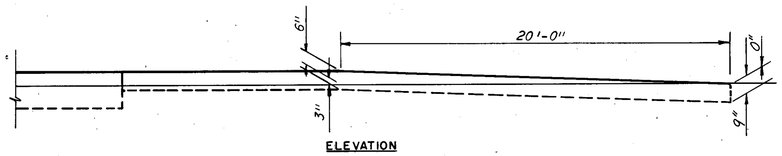
Notes:

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

(a) 6" Plain Portland Cement Concrete, Item 452
(b) 6" Item 304 surfaced with two 1" courses of Asphaltic Concrete, Item 404
(c) 8" Item 304 Aggregate, stabilized with calcium chloride

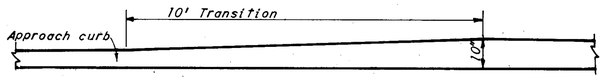


PLAN



ELEVATION

RAMP EXIT NOSE DETAIL



CURB HEIGHT TRANSITION AT BRIDGE WINGWALLS

SCALE As Shown
MADE JEN DATE 12-22-65
TRCD. ____ DATE ____
CKD. GL DATE 7/10/70

HOWARD NEEDLES, TAMMEN & BERGENDOFF
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KANSAS CITY CLEVELAND NEW YORK

MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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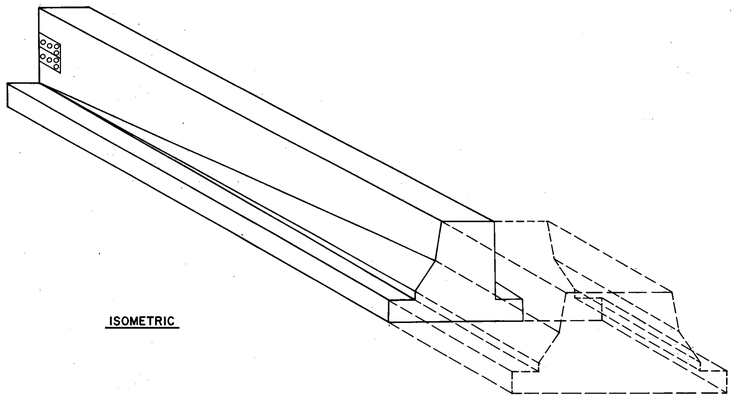
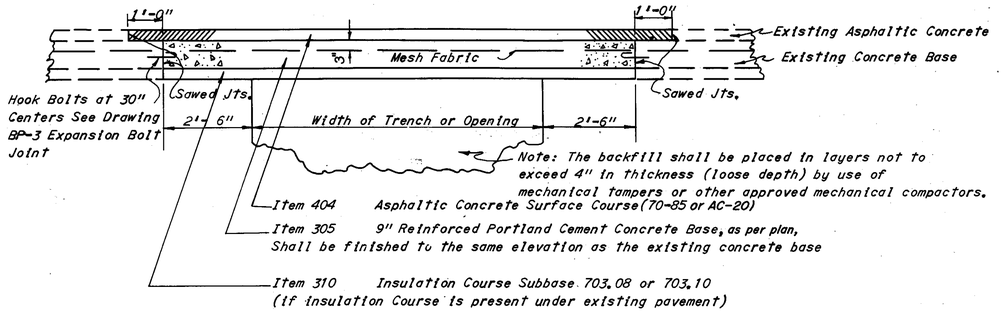
CUYAHOGA COUNTY
CUY.-80-15.81



ISOMETRIC

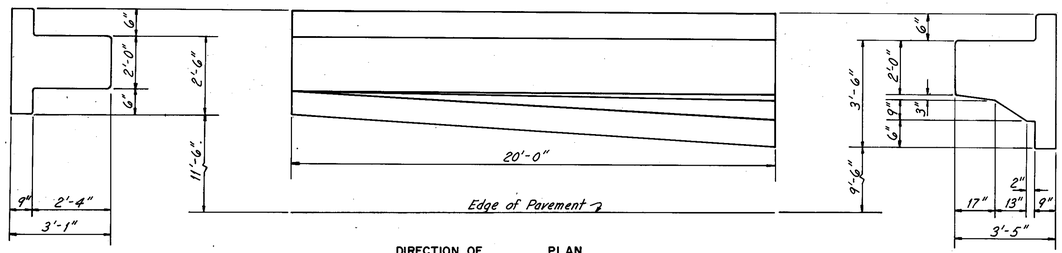


Note:
This Standard is applicable to existing concrete pavement or existing pavement with concrete base surfaced with asphalt.

Existing joints shall be preserved or restored

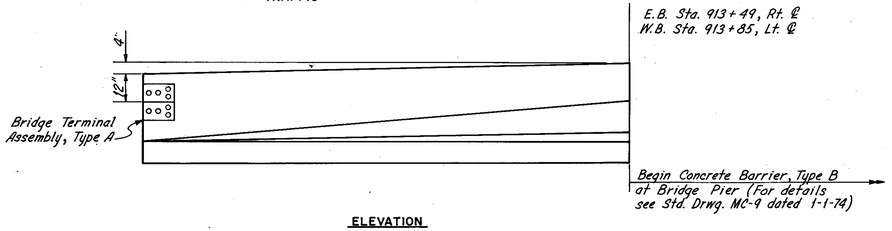
REPAIR OF RIGID PAVEMENT OPENINGS

This detail shall be used to restore existing pavement where required by new sewer work. Payment shall be included in the pertinent 603 Conduit item.



DIRECTION OF TRAFFIC

PLAN
No Scale

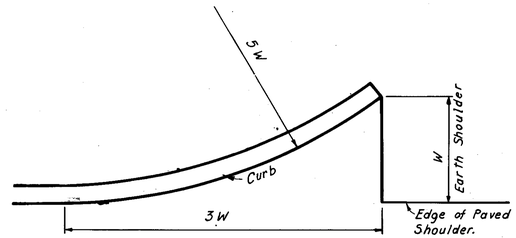


ELEVATION
No Scale

TRANSITION DETAIL

CONCRETE BARRIER TO GUARDRAIL CONNECTION

STA. 913+29 TO STA. 913+49 Rt. ℄ I-80
STA. 913+85 TO STA. 914+05 Lt ℄ I-80



DETAIL Z
CURB FLARE

3 0 3 6
SCALE IN FEET

SCALE As Noted
MADE G.L. DATE 9/1/69
TRCD. MAG DATE 9/8/69
CKD. MGB DATE 9/6/74

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

MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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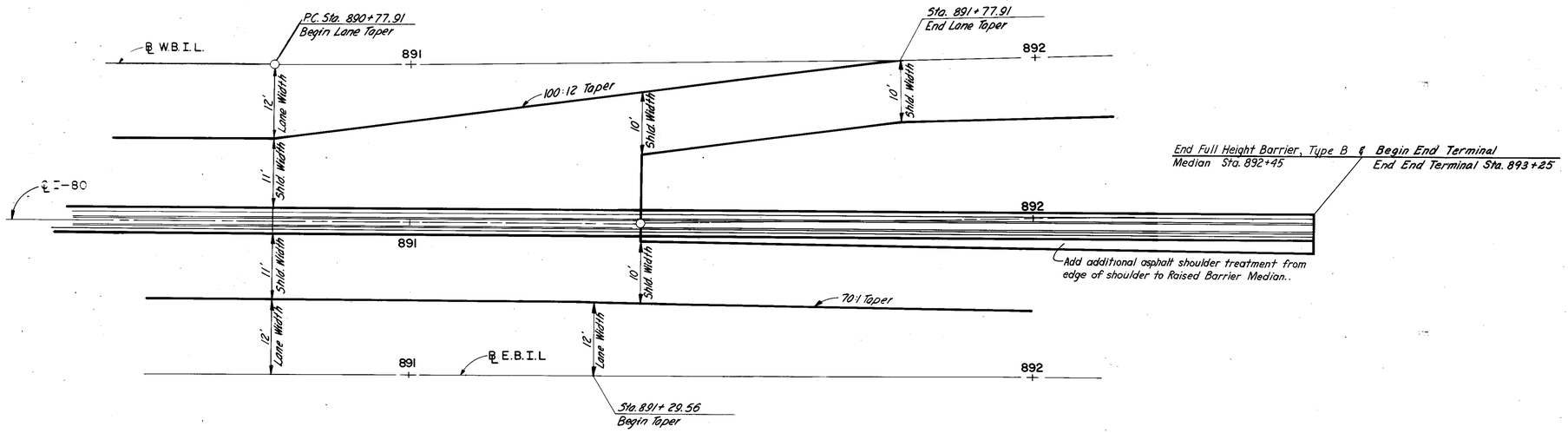
392

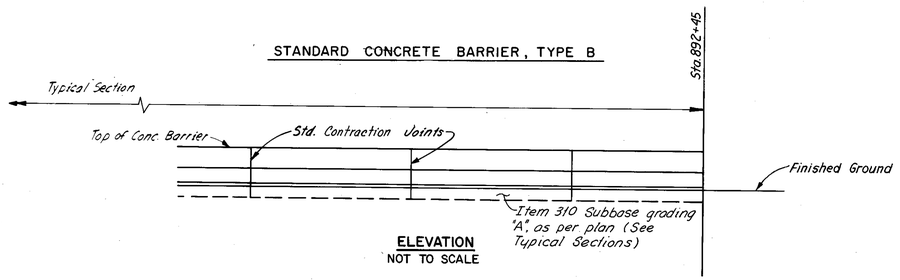
CUYAHOGA COUNTY
CUY.—80—15.81



PLAN

10 0 10 20 30 40
SCALE IN FEET

STANDARD CONCRETE BARRIER, TYPE B



ELEVATION
NOT TO SCALE

SCALE As Noted
MADE RJT DATE 9-15-69
TRCD MAG DATE 9-18-69
CKD. M.B. DATE 9-6-74

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CONCRETE BARRIER TERMINATION DETAIL

MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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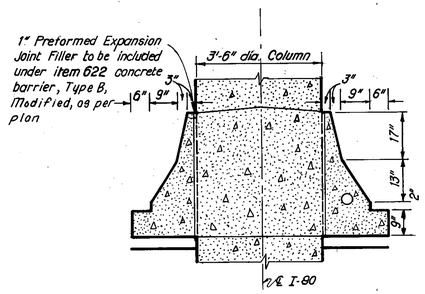
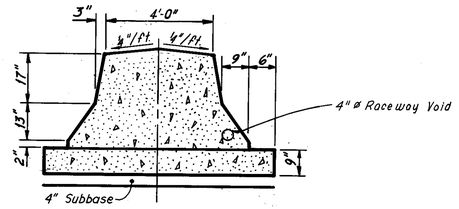
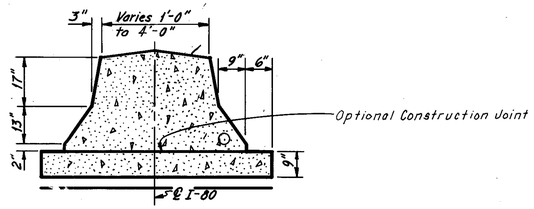
CUYAHOGA COUNTY
CUY.–80–15.81



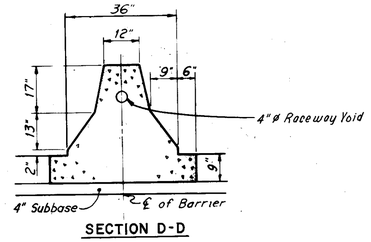
SECTION A-A



SECTION C-C

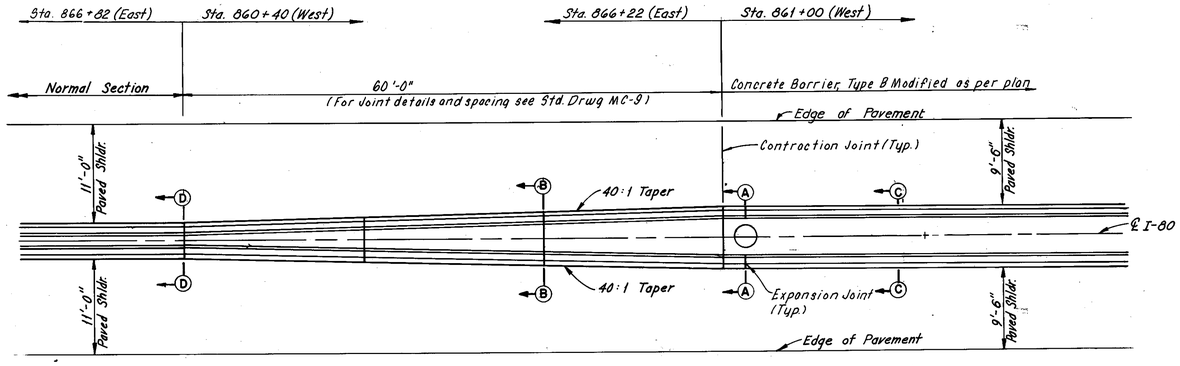


SECTION B-B



SECTION D-D

Note:
For details not shown see Standard Drawing MC-9 dated 1-1-74



CONCRETE BARRIER AT BRIDGE PIERS

SCALE None	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE RJT DATE 4-18-69	CONSULTING ENGINEERS	
TRCD. TPM DATE 8-21-69	KANSAS CITY CLEVELAND NEW YORK	
CKD. RAH DATE 11-12-71 M.E. 9-6-74		

DRAINAGE STRUCTURE LOCATION DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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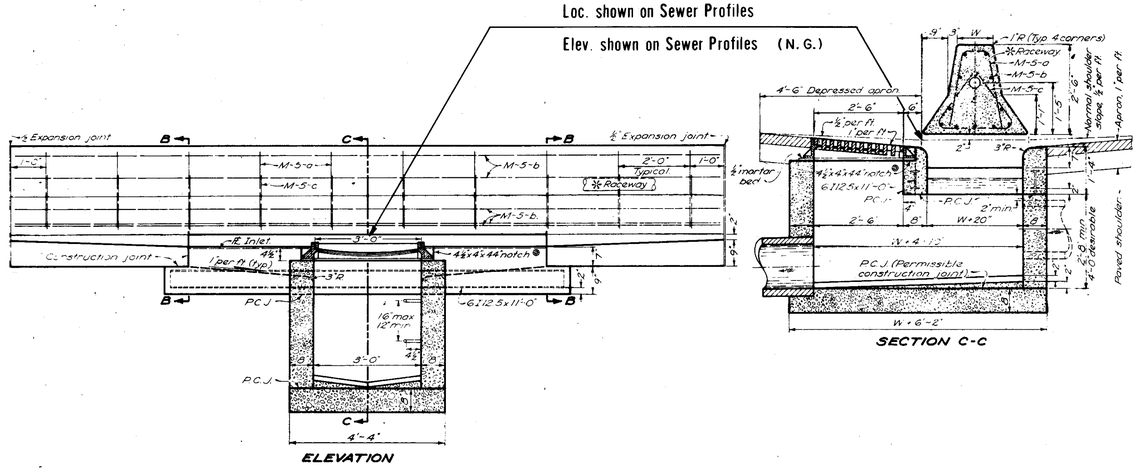
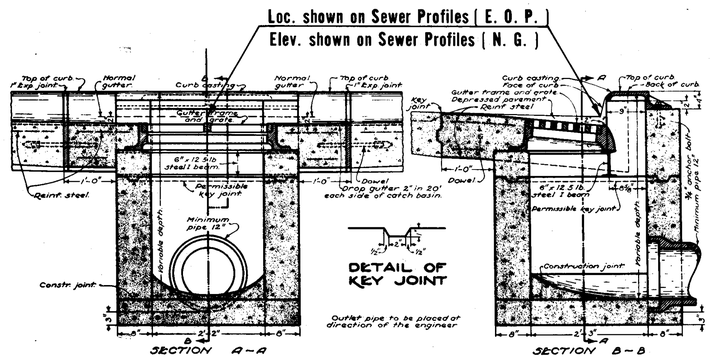
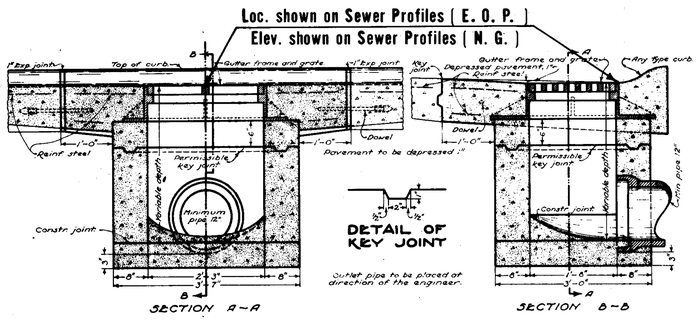
CUYAHOGA COUNTY
CUY.-80-15.81



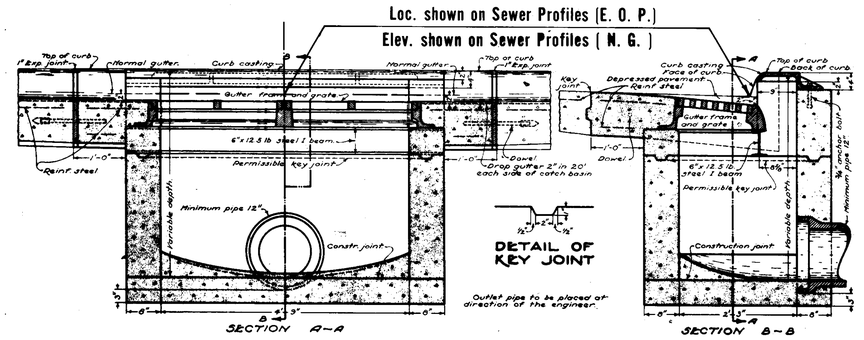
STANDARD NO. I - 3 MEDIAN INLET



STANDARD No. 3-A CATCH BASIN



STANDARD No. 6 CATCH BASIN



STANDARD No. 3 CATCH BASIN

Note:

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

SCALE As Shown
MADE RC DATE 7/11/70
TRCD. HLD DATE 7/15/70
CKD. RDH DATE 11-12-71

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DRAINAGE STRUCTURE LOCATION DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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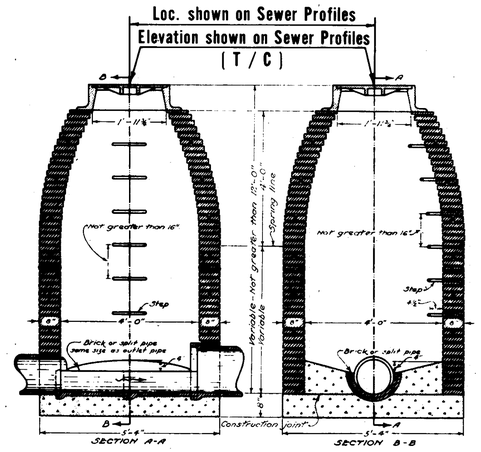
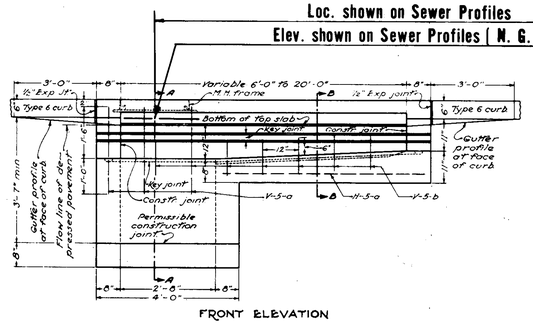
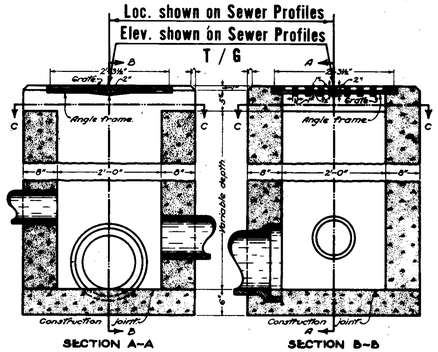
CUYAHOGA COUNTY
CUY.-80-15.81



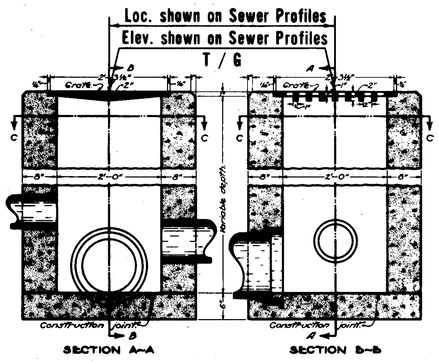
STANDARD MANHOLE



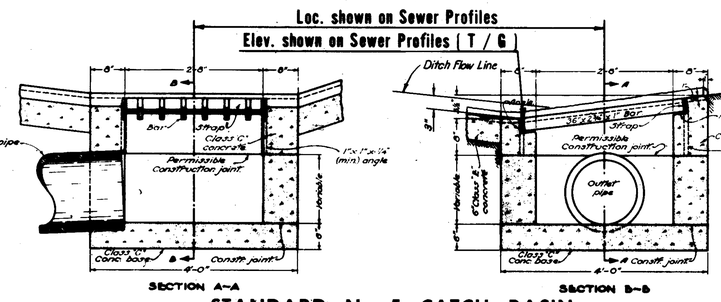
STANDARD No. 2-A PAVED SHOULDER INLETS



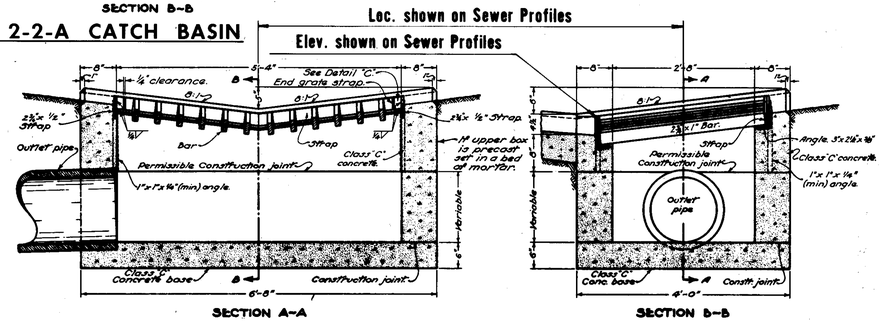
STANDARD No. 2-2-A CATCH BASIN



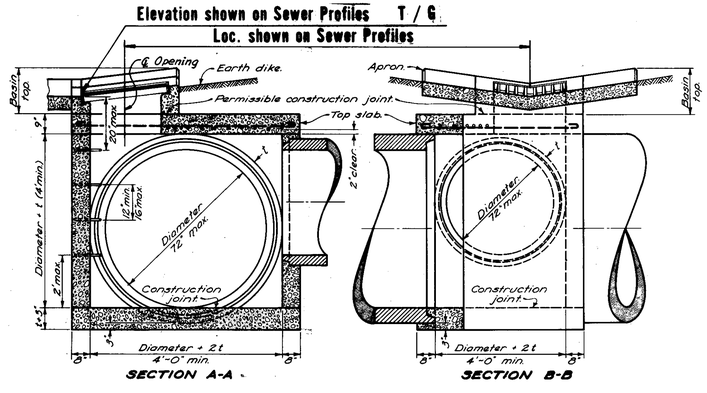
STANDARD No. 2-2-B CATCH BASIN



STANDARD No. 5 CATCH BASIN



STANDARD NO. 4 CATCH BASIN



STANDARD NO. 4A, NO. 5A AND NO. 8A CATCH BASINS

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

SCALE No scale
MADE D.D.S. DATE 10-19-69
TRCD. I.N. DATE 11-24-69
CKD. I.M. DATE 11-25-69

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FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
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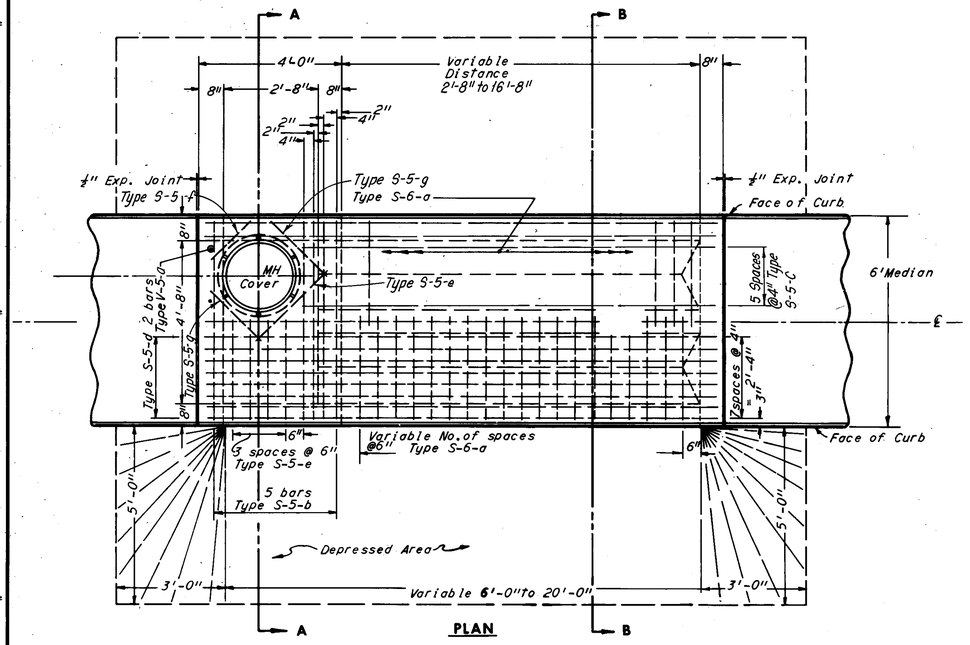
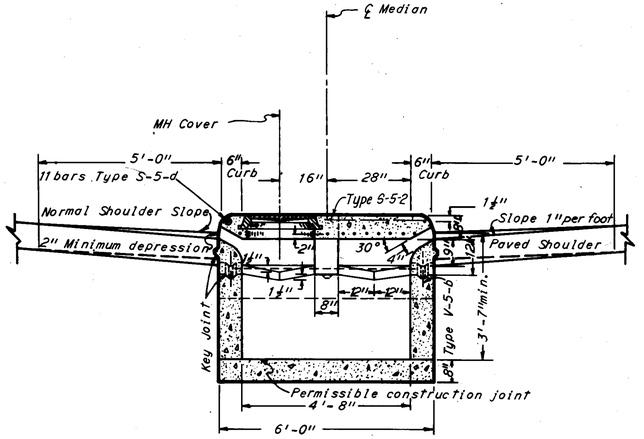


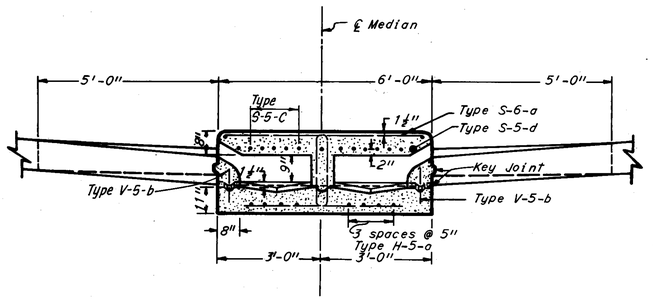
PLAN

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



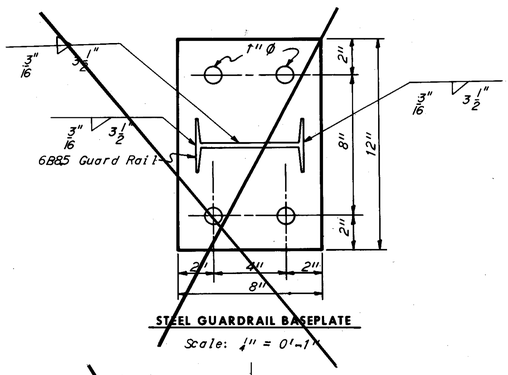
SECTION A-A

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



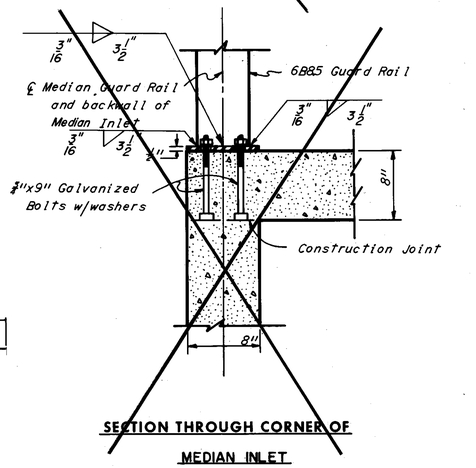
SECTION B-B

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



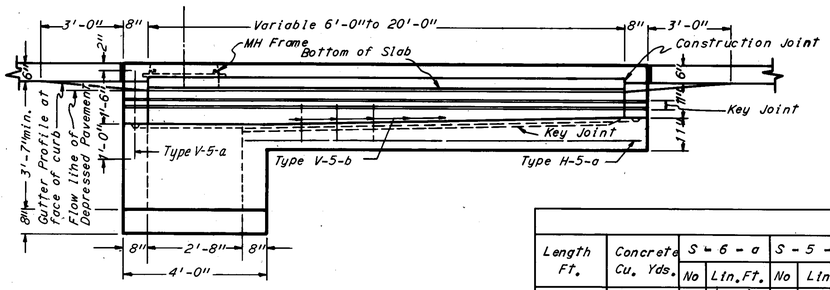
STEEL GUARDRAIL BASEPLATE

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



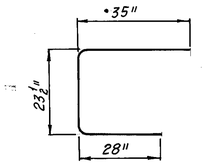
SECTION THROUGH CORNER OF MEDIAN INLET

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

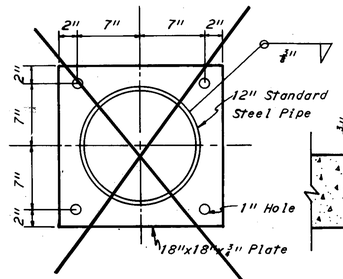


ELEVATION

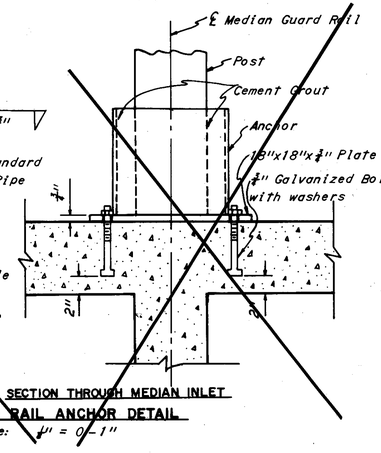
Scale: 1/2" = 1'-0"



S-6-A
3/4" Round Bar



PLAN



SECTION THROUGH MEDIAN INLET
WOOD GUARD RAIL ANCHOR DETAIL

Scale: 1" = 0'-1"

CONCRETE AND REINFORCING STEEL QUANTITIES																					
Length Ft.	Concrete Cu. Yds.	S-6-a		S-5-b		S-5-c		S-5-d		S-5-e		S-5-f		S-5-g		H-5-a		V-5-a		V-5-b		Weight in lbs.
		No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	No	Lin.Ft.	
6	7.0	10	7'-2 1/2"	5	5'-7"	6	4'-4"	11	7'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	3'-8"	2	2'-6"	10	1'-0"	312
8	8.3	18	7'-2 1/2"	5	5'-7"	6	6'-4"	11	9'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	5'-8"	2	2'-6"	14	1'-0"	455
10	9.6	26	7'-2 1/2"	5	5'-7"	6	8'-4"	11	11'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	7'-8"	2	2'-6"	18	1'-0"	598
12	10.9	34	7'-2 1/2"	5	5'-7"	6	10'-4"	11	13'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	9'-8"	2	2'-6"	22	1'-0"	741
14	12.2	42	7'-2 1/2"	5	5'-7"	6	12'-4"	11	15'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	11'-8"	2	2'-6"	26	1'-0"	884
16	13.5	50	7'-2 1/2"	5	5'-7"	6	14'-4"	11	17'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	13'-8"	2	2'-6"	30	1'-0"	1027
18	14.8	58	7'-2 1/2"	5	5'-7"	6	16'-4"	11	19'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	15'-8"	2	2'-6"	34	1'-0"	1170
20	16.1	66	7'-2 1/2"	5	5'-7"	6	18'-4"	11	21'-0"	5	2'-10"	1	1'-6"	2	2'-3"	8	17'-8"	2	2'-6"	38	1'-0"	1313

STANDARD I-2 MEDIAN INLET, MODIFIED, AS PER PLAN

Note:
All Details not shown on this drawing shall be as shown on Standard Construction Drawing I-2

Quantities shown are for estimating purposes only.

SCALE As Shown
MADE SMS DATE 6-27-72
TRCD DJT DATE 8-31-72
CKD DHS DATE 8-28-72

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KANSAS CITY CLEVELAND NEW YORK

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

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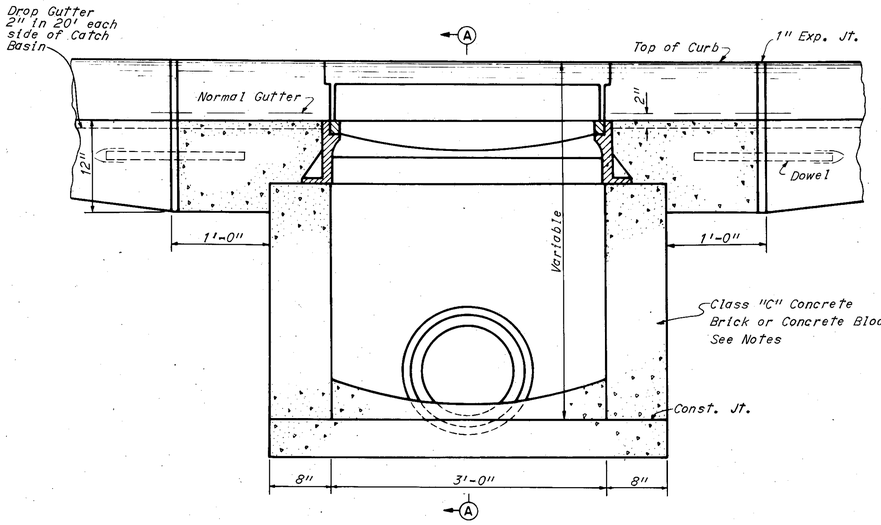
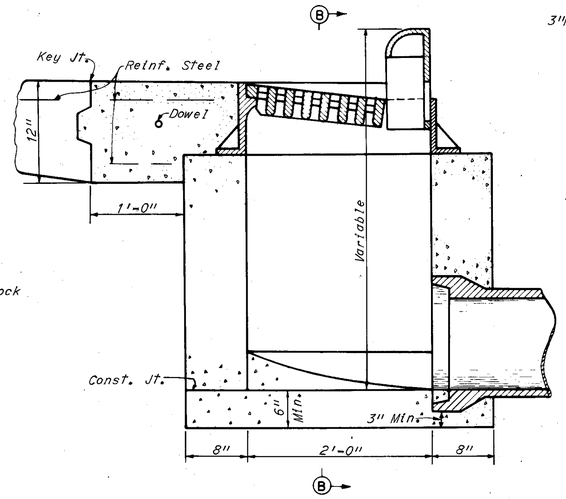
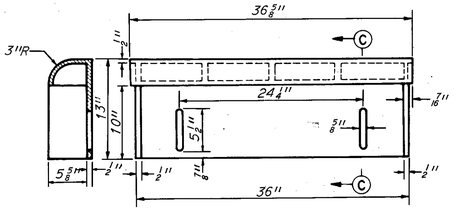
CUYAHOGA COUNTY
CUY.-480-15.81



SECTION B-B

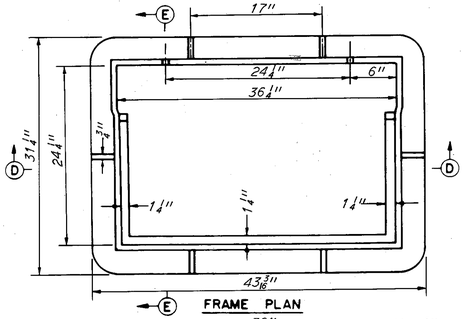


SECTION A-A

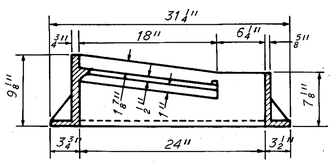


SECTION C-C

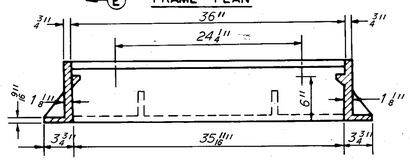
ELEVATION
RADIUS CURB BOX



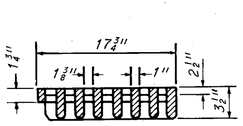
FRAME PLAN



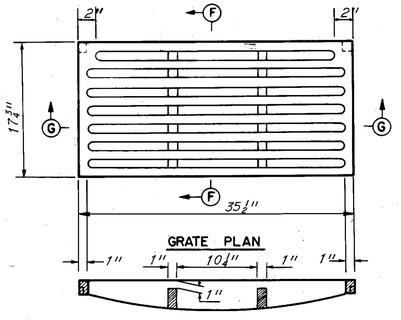
SECTION E-E



SECTION D-D

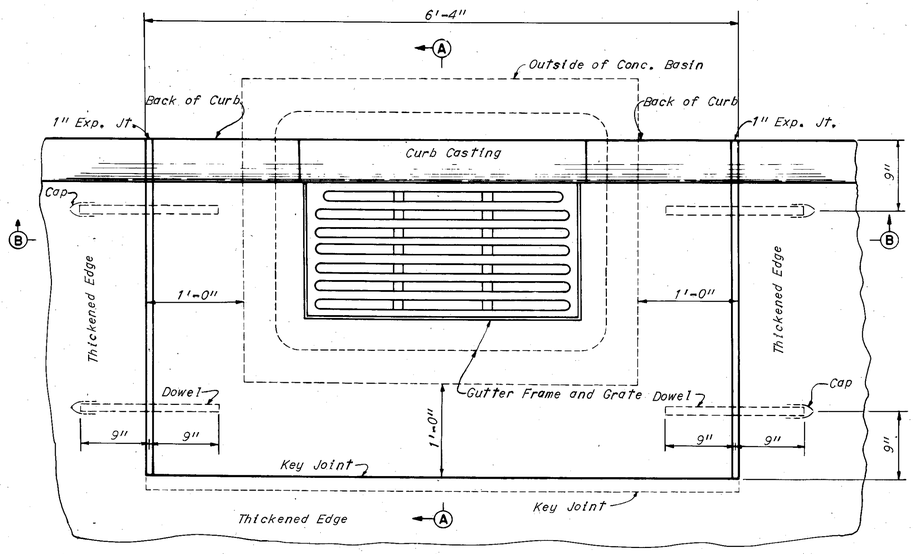


SECTION F-F



GRATE PLAN

SECTION G-G



PLAN OF CATCH BASIN &
PAVEMENT JOINTS

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

Weights, minimum

Curb casting	*100 pounds*
Gutter grate	*200 pounds*
Gutter frame	*300 pounds*

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

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

Concrete cast in place to be Class "C".

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

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

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

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

MADE R.J.K DATE 12-30-59 TRACED DATE
CHECKED R.J.H DATE 11-7-63 SCALE

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CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CUYAHOGA COUNTY NO. 3-C CATCH BASIN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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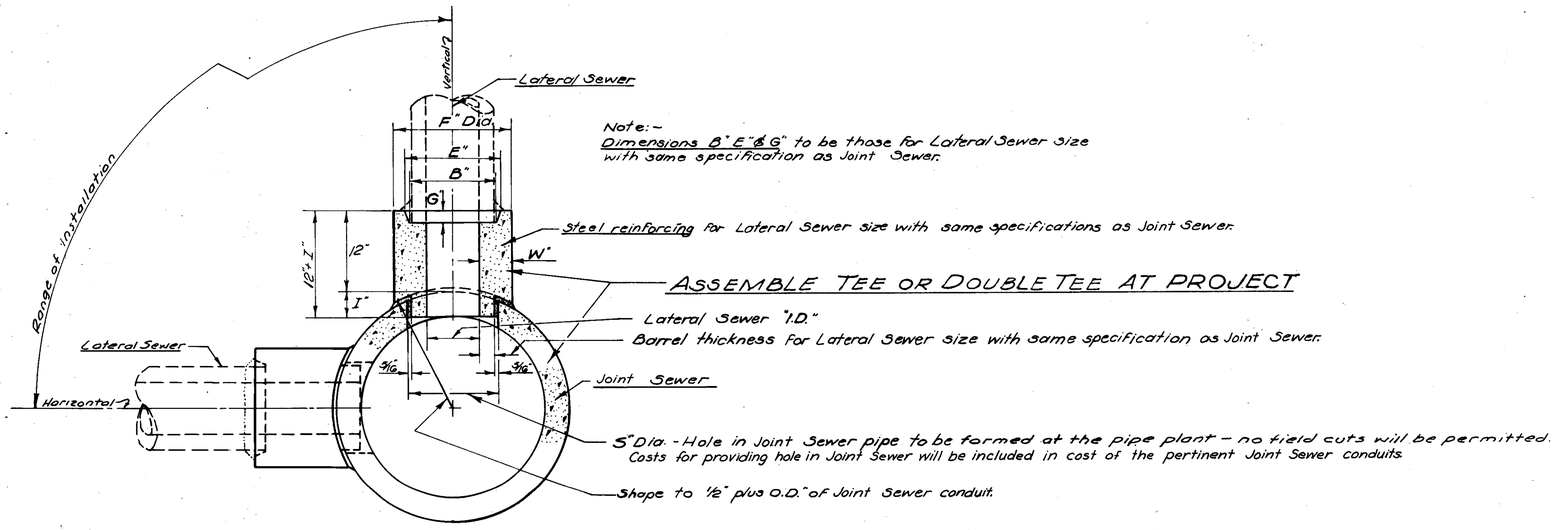
CUYAHOGA COUNTY
CUY.-80-15.81

603 - SADDLE TYPE CONDUIT CONNECTION

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)	F	I	S	W	Remarks
	6"	13½"	2¾"	10⅛"	3¾"	
21"			2¾"			
24"			3"			
27"			3"			
30"			3½"			
33"			3½"			
36"			4"			
39"			4"			
42"			4½"			
48"			5"			
54"			5½"			
60"			6"			
66"			6½"			
72"			7"			
78"			7½"			
84"			8"			
90"			8"			
96"			8½"			
108"			9"			
120"		13½"	10"	10⅛"	3¾"	
114"		"	10½"	"	"	
	8"	15½"	3"	12⅛"	3¾"	
21"			3"			
24"			3"			
27"			3"			
30"			3½"			
33"			3½"			
36"			4"			
39"			4"			
42"			4½"			
48"			5"			
54"			5½"			
60"			6"			
66"			6½"			
72"			7"			
78"			7½"			
84"			8"			
90"			8"			
96"			8½"			
108"			9"			
120"		15½"	10"	12⅛"	3¾"	
114"		"	10½"	"	"	
	10"	17½"	3	14½"	3¾"	
21"			3"			
24"			3"			
27"			3"			
30"		17½"	3½"	14½"	3¾"	
33"			3½"			
36"			4"			
39"			4"			
42"			4½"			
48"			5"			
54"			5½"			
60"			6"			
66"			6½"			
72"			7"			
78"			7½"			
84"			8"			
90"			8"			
96"			8½"			
108"			9"			
120"		17½"	10"	14½"	3¾"	
114"		"	10½"	"	"	
	12"	20"	3"	16⅝"	4"	
21"			3"			
24"			3"			
27"			3"			
30"			3½"			
33"			3½"			
36"			4"			
39"			4"			
42"			4½"			
48"			5"			
54"			5½"			
60"			6"			
66"			6½"			
72"			7"			
78"			7½"			
84"			8"			
90"			8"			
96"			8½"			
108"			9"			
120"		20"	10"	16⅝"	4"	
114"		"	10½"	"	"	
	15"	24½"	4"	20⅛"	4¾"	
21"			4"			
24"			4"			
27"			4"			
30"			4½"			
33"			4½"			
36"			5"			
39"			5"			
42"			5½"			
48"			6"			
54"			6"			
60"			6½"			
66"			7"			
72"			7½"			
78"			8"			
84"			8"			
90"			8½"			
96"			9"			
108"			9"			
120"		24½"	10"	20⅛"	4¾"	
114"		"	10½"	"	"	
	18"	28"	5"	23⅜"	5"	
21"			5"			
24"			5"			
27"			5"			
30"			5½"			
33"			5½"			
36"			6"			
39"			6"			
42"			6½"			
48"			7"			
54"			7½"			
60"			8"			
66"			8"			
72"			8"			
78"			8½"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		28"	10"	23⅜"	5"	
114"		"	10½"	"	"	
	21"	31½"	5½"	27⅛"	5¼"	
21"			5½"			
24"			5½"			
27"			5½"			
30"			6"			
33"			6"			
36"			6½"			
39"			6½"			
42"			7"			
48"			7½"			
54"			8"			
60"			8"			
66"			8"			
72"			8½"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		31½"	10"	27⅛"	5¼"	
114"		"	10½"	"	"	
	24"	36"	6"	30⅝"	6"	
21"			6"			
24"			6½"			
27"			7"			
30"			7½"			
33"			7½"			
36"			8"			
39"			8"			
42"			8"			
48"			8"			
54"			8½"			
60"			9"			
66"			9"			
72"			9"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		36"	10"	30⅝"	6"	
114"		"	10½"	"	"	
	27"	39½"	6½"	34⅛"	6¼"	
21"			6½"			
24"			6½"			
27"			7"			
30"		39½"	7"	34⅛"	6¼"	
33"			7½"			
36"			7½"			
39"			8"			
42"			8"			
48"		39½"	8"	34⅛"	6¼"	
54"			8½"			
60"			9"			
66"			9"			
72"			9"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		39½"	10"	34⅛"	6¼"	
114"		"	10½"	"	"	
	30"	43"	8"	37⅜"	6½"	
21"			8"			
24"			8"			
27"			8"			
30"			8½"			
33"			8½"			
36"			9"			
39"			9"			
42"			9"			
48"			9"			
54"			9"			
60"			9"			
66"			9"			
72"			9"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		43"	10"	37⅜"	6½"	
114"		"	10½"	"	"	
	33"	46½"	8"	41⅛"	6¾"	
21"			8"			
24"			8"			
27"			8"			
30"			8"			
33"			8½"			
36"			8½"			
39"			8½"			
42"			9"			
48"			9"			
54"			9"			
60"			9"			
66"			9"			
72"			9"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		46½"	10"	41⅛"	6¾"	
114"		"	10½"	"	"	
	36"	50"	8½"	44⅝"	7"	
21"			8½"			
24"			8½"			
27"			8½"			
30"			8½"			
33"			8½"			
36"			9"			
39"			9"			
42"			9"			
48"			9"			
54"			9"			
60"			9"			
66"			9"			
72"			9"			
78"			9"			
84"			9"			
90"			9"			
96"			9"			
108"			9"			
120"		50"	10"	44⅝"	7"	
114"		"	10½"	"	"	



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

ASSEMBLE TEE OR DOUBLE TEE AT PROJECT

Lateral Sewer "I.D."

Barrel thickness for Lateral Sewer size with same specification as Joint Sewer.

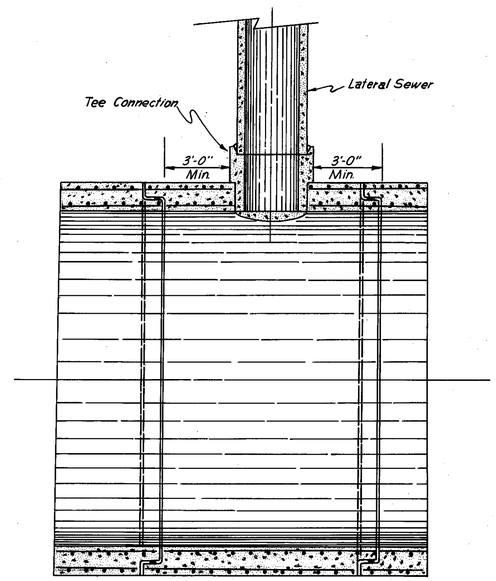
DETAIL

SHOWING

-"ON -"SADDLE TYPE TEE

-"ON -"SADDLE TYPE DOUBLE TEE

FOR CONCRETE PIPE ONLY



SECTION

MINIMUM JOINT CLEARANCE

SCALE NONE
MADE AHS DATE 9-21-10
TRCD MAG DATE 9-22-10
CKD RBH DATE 9-23-10

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KANSAS CITY CLEVELAND NEW YORK

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

MISCELLANEOUS DRAINAGE DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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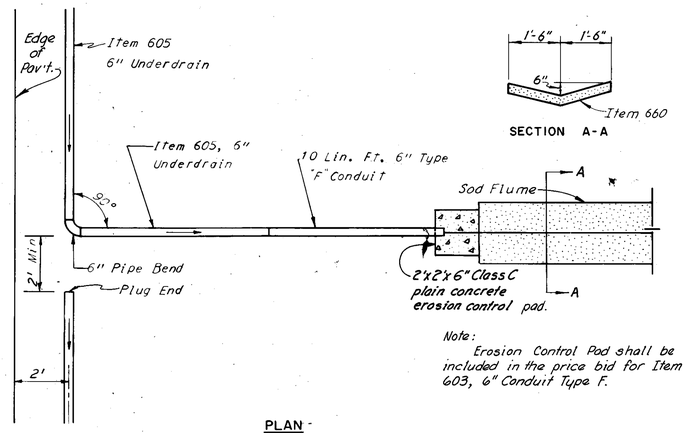
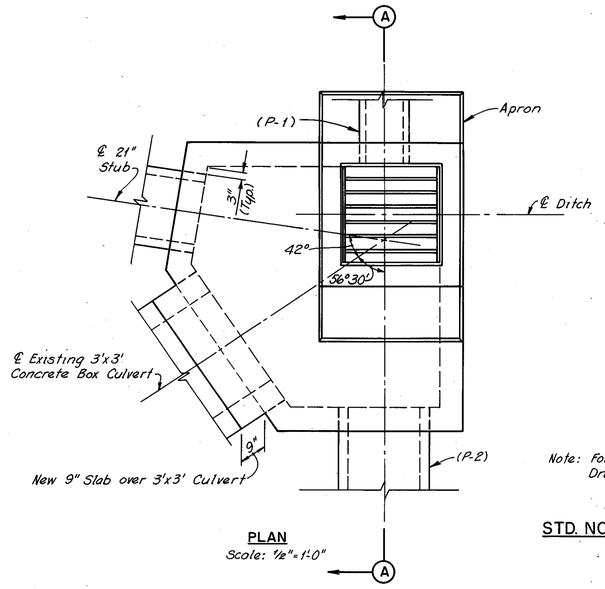
CUYAHOGA COUNTY
CUY. - 80-15.81

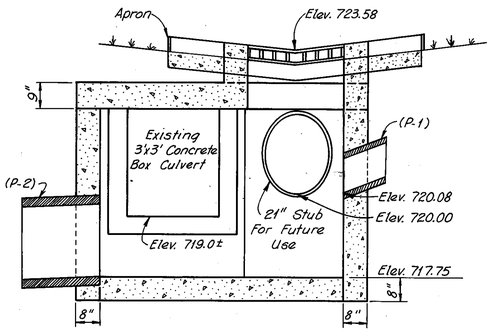


PLAN

UNDERDRAIN OUTLET IN FILL



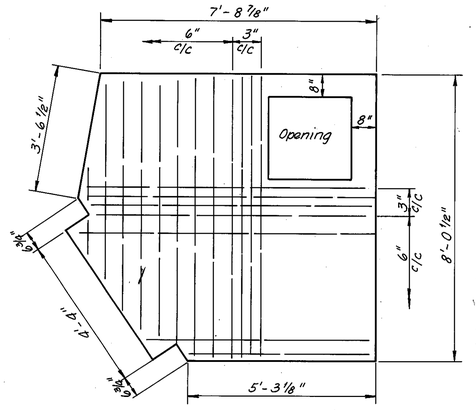
PLAN
Scale: 1/2"=1'-0"



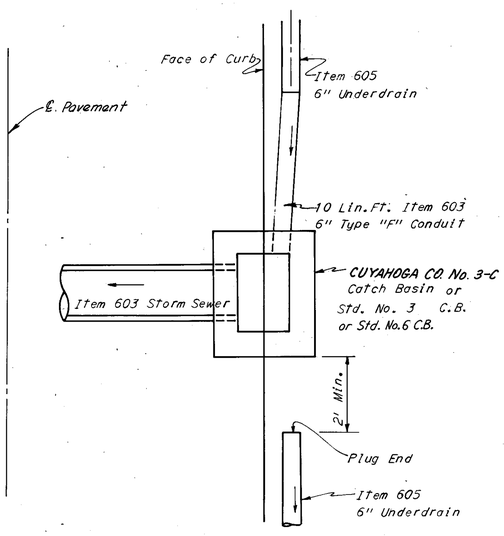
SECTION A-A
Scale: 1/2"=1'-0"

Note: for additional details see Standard Construction Drawing CB-458 A Dated 6-6-68.

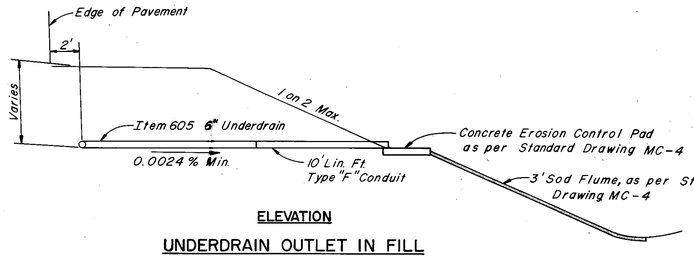
STD. NO. 5-A C.B. MODIFIED AS PER PLAN



TOP SLAB PLAN
Scale: 1/2"=1'-0"

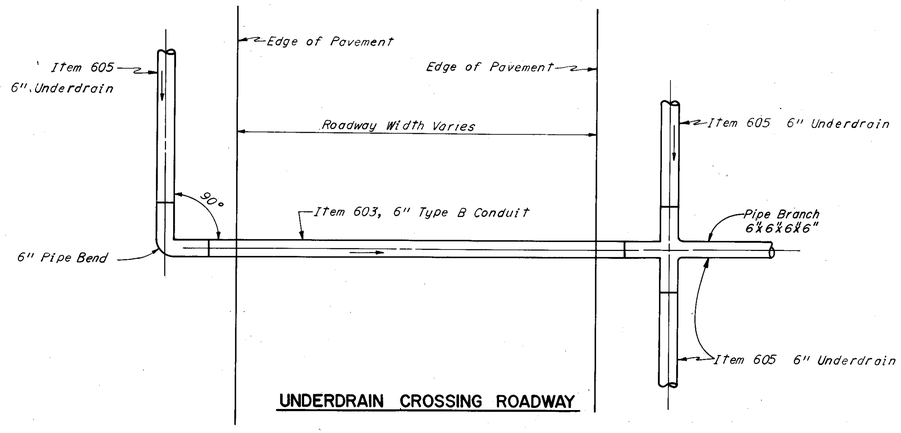


UNDERDRAIN TO CATCH BASIN AT CURB

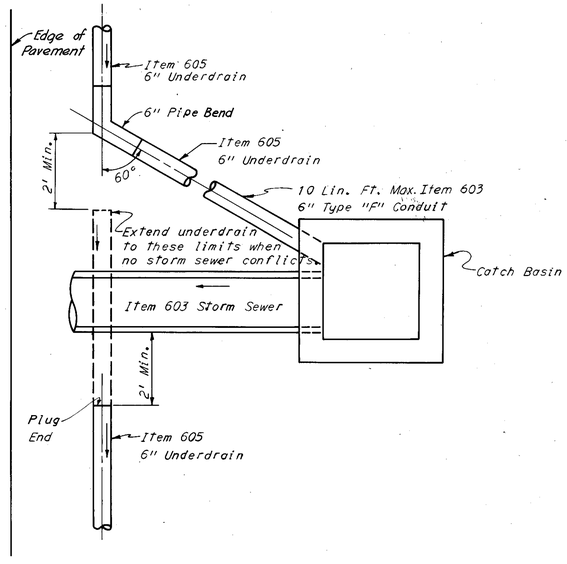


ELEVATION

UNDERDRAIN OUTLET IN FILL



UNDERDRAIN CROSSING ROADWAY



UNDERDRAIN TO DRAINAGE STRUCTURES

SCALE
MADE RBH DATE 11-11-71
TRCD. MAG DATE 11-12-71
CKD. AWB DATE 9-6-74

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MISCELLANEOUS DRAINAGE DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
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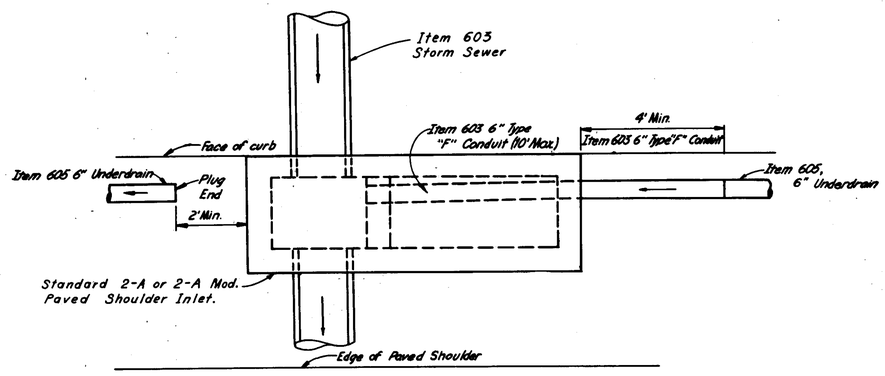
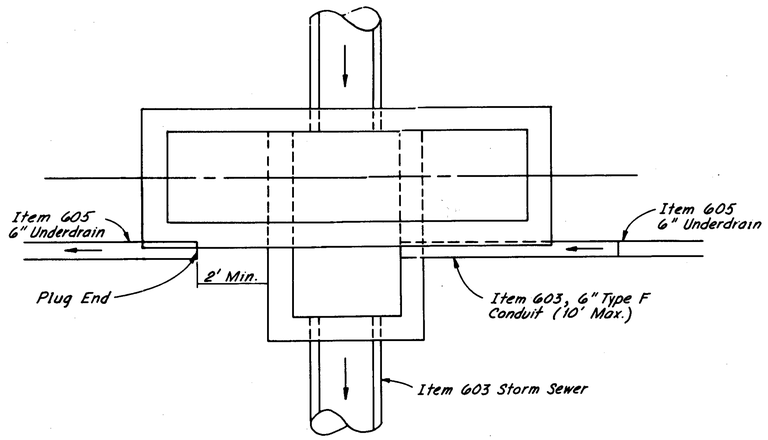
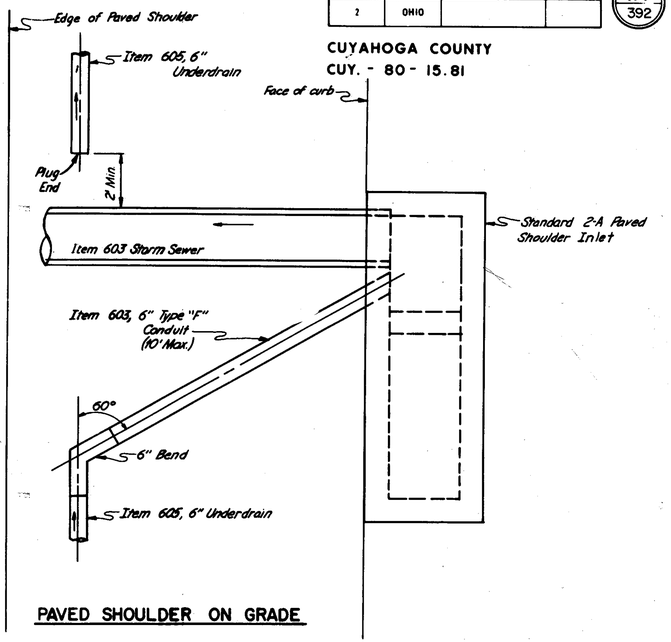


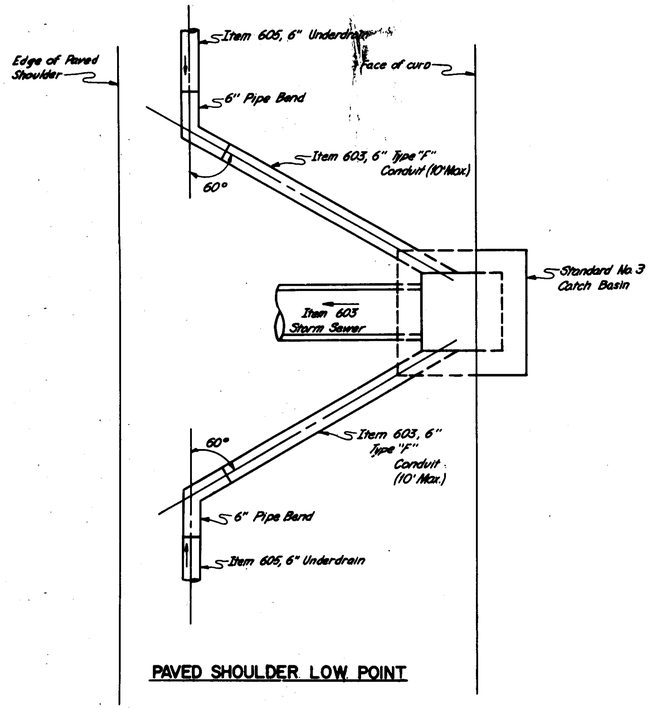
MEDIAN ON GRADE



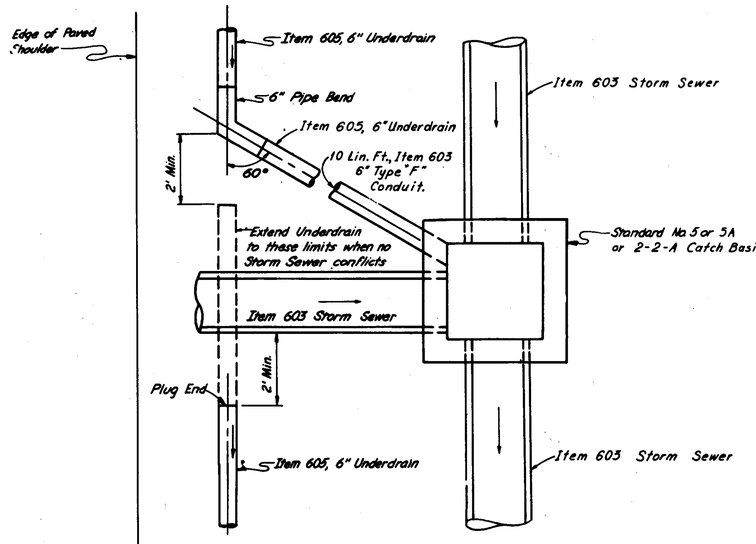
UNDERDRAIN DETAIL MEDIAN INLET I-3



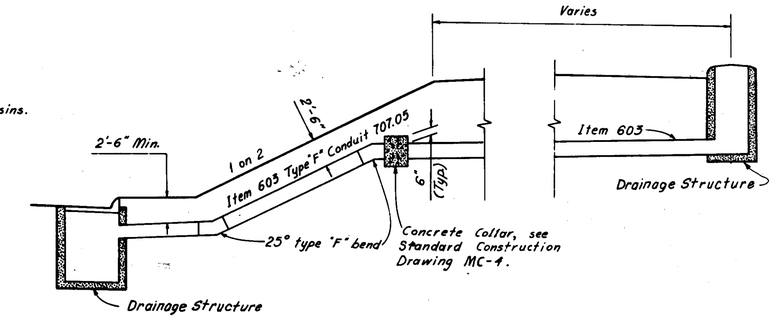
PAVED SHOULDER ON GRADE



PAVED SHOULDER LOW POINT



ROADWAY DITCH



STORM SEWER DETAIL CLOSED SYSTEM, FILL OUTLET
No Scale

TYPICAL UNDERDRAIN DETAILS

SCALE None
MADE G.L. DATE 6-20-70
TRCD. G.L. DATE 7-2-70
CKD. RBH DATE 11-12-71

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KANSAS CITY CLEVELAND NEW YORK

MISCELLANEOUS DRAINAGE DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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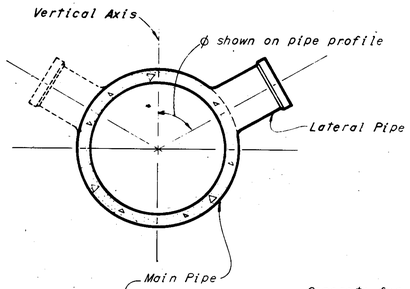
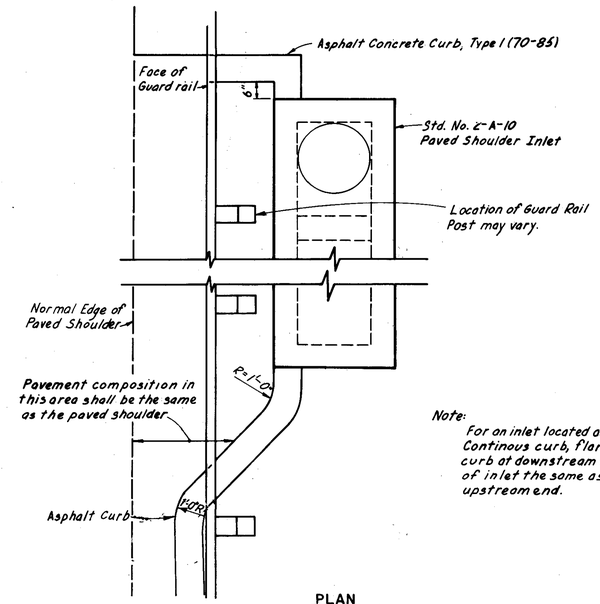
392

CUYAHOGA COUNTY
CUY.-80.-15.81

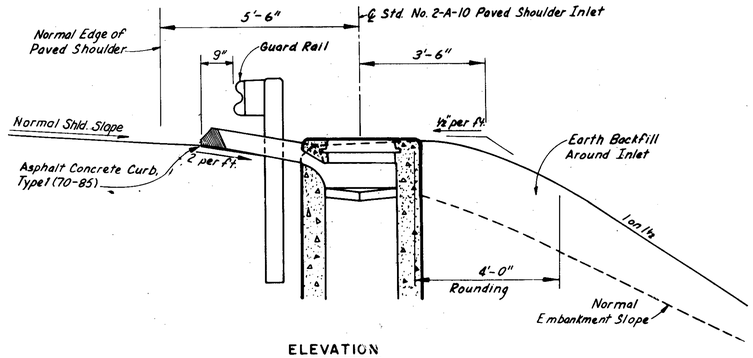


PRE-FABRICATED "T" CONNECTION



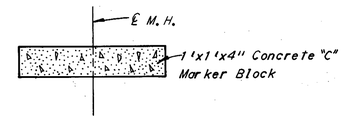
Note:
For an inlet located along Continous curb, flare the curb at downstream end of inlet the same as upstream end.

PLAN
Scale ½"=1'-0"



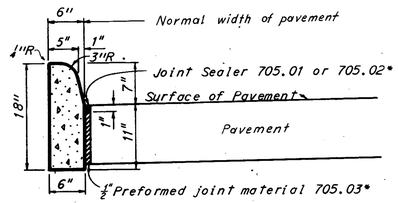
ELEVATION
Scale: ½"=1'-0"

CURB AND INLET FOR EROSION CONTROL
(See General Note Sheet 8)



CONCRETE MANHOLE MARKER FOR SS-12
No Scale, (See Sheet 75 for location)

Note:
Marker to be centered over manhole cover and flush with ground.
Price of concrete marker to be included in unit bid price for SS-12.



*Expansion joint material and joint sealer is not required when curb is adjacent to flexible type pavement.

CONCRETE CURB STANDARD TYPE 6 MOD.
Scale 1"=1'-0"

SCALE	As shown
MADE	RPR DATE 2-13-68
TRCD	MAG DATE 2-13-68
CKD.	RBH DATE 11-12-71

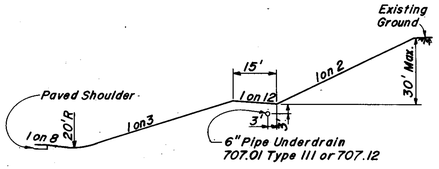
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

MISCELLANEOUS DRAINAGE DETAIL

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

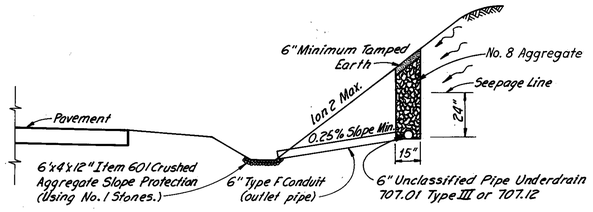
116
392

CUYAHOGA COUNTY
CUY. – 80–15.81

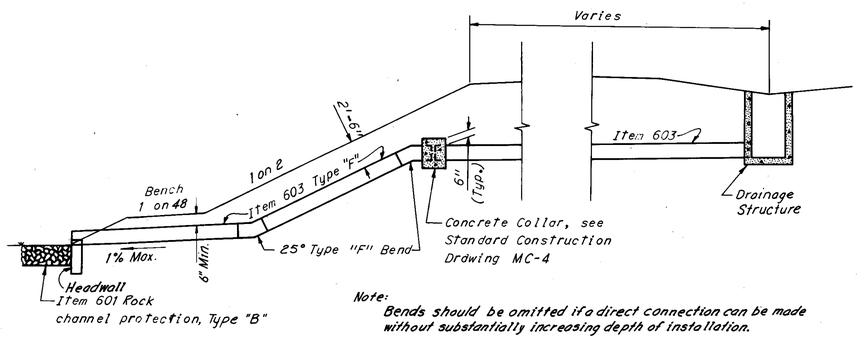


EARTH CUTS GREATER THAN 50' DEPTH
No Scale

RT. STA. 933+00± Sheet No. 75

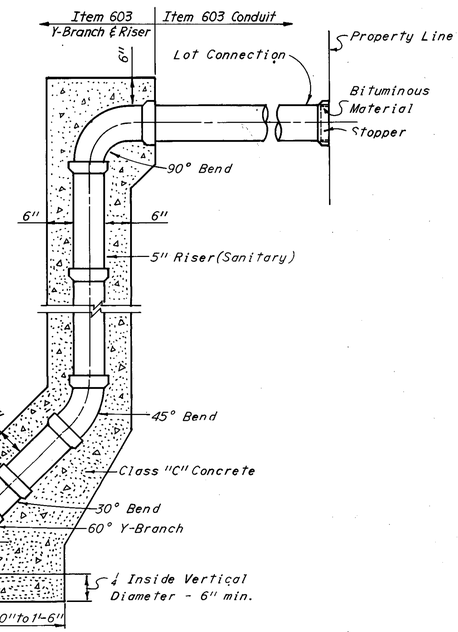


UNDERDRAIN INTERCEPTOR ON SLOPE
(See General Note Sheet 9)



Note:
Bends should be omitted if a direct connection can be made without substantially increasing depth of installation.

STORM SEWER OUTLET DETAIL IN HIGH FILL



TYPICAL Y-BRANCH AND RISER DETAIL

Scale: ¾" = 1'-0"

Note:
All materials necessary for the construction of the Y-Branch and Riser pipe will be paid for seperately as an each Item under Item 603 8" x 5" Y-Branch and Riser.

All other conduit and materials necessary for construction from riser pipe to property line will be paid for in Linear Feet under Item 603 Conduit.

SCALE As Shown
DMADE AHS DATE 1-10-71
TRCD. MAG DATE 1-11-71
CKD. G.L DATE 1-11-71

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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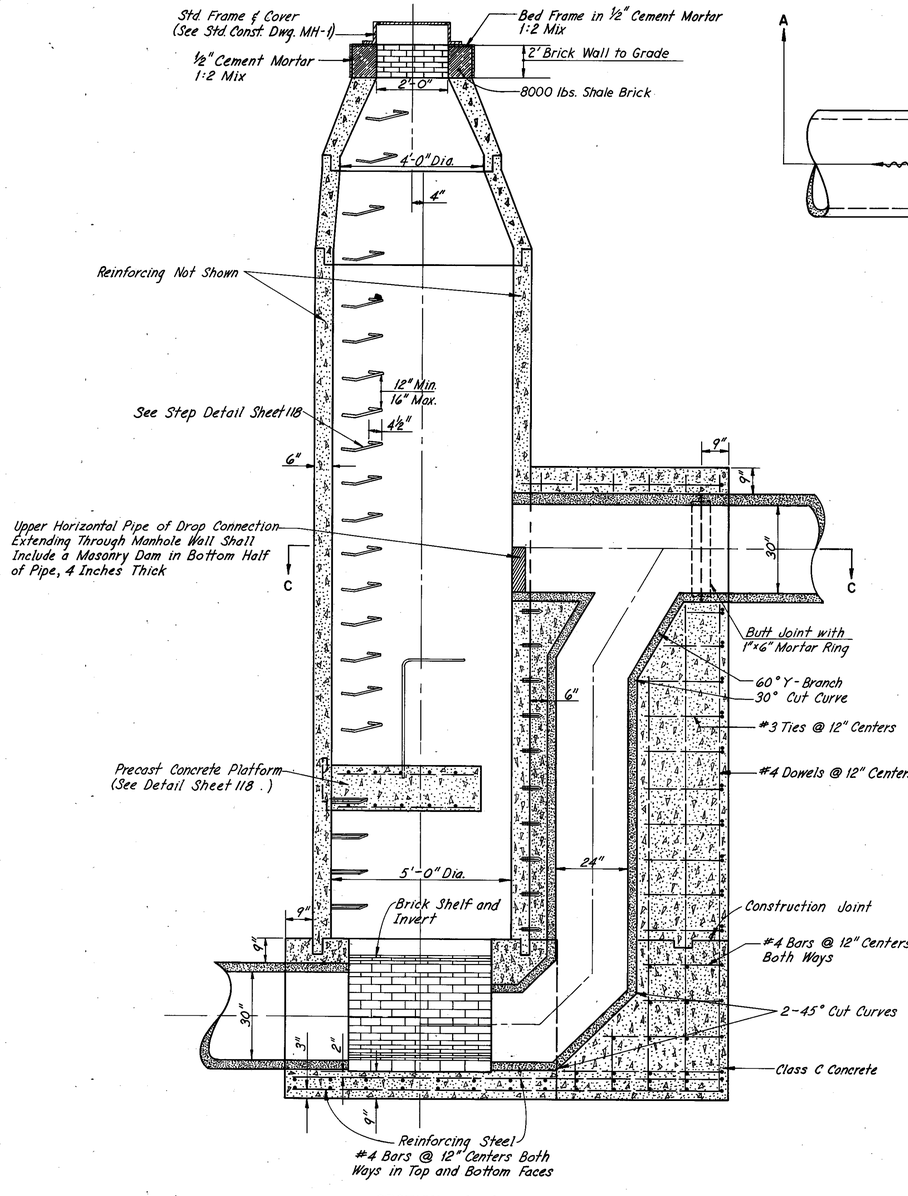
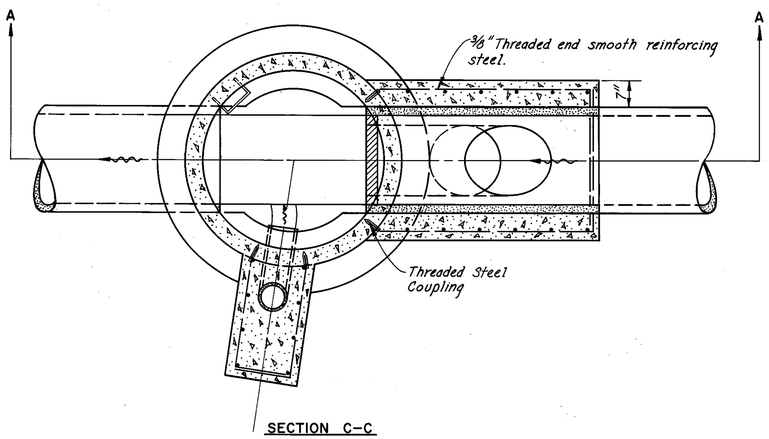
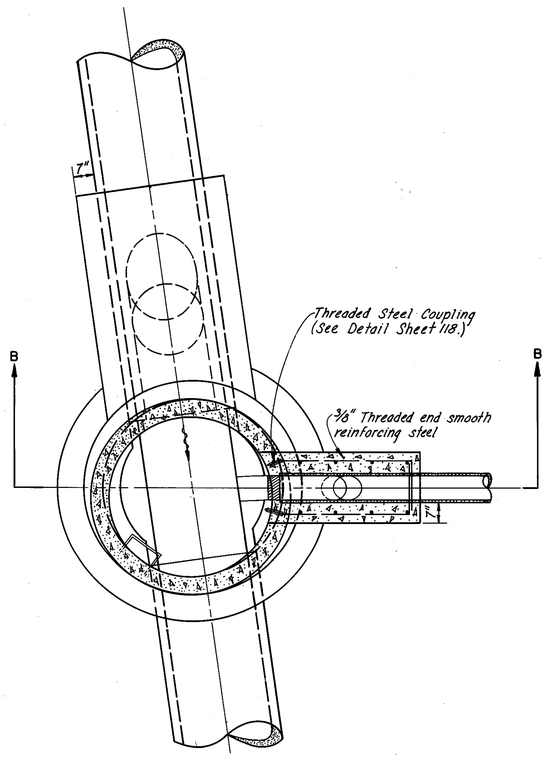
CUYAHOGA COUNTY
CUY.-80-15.81



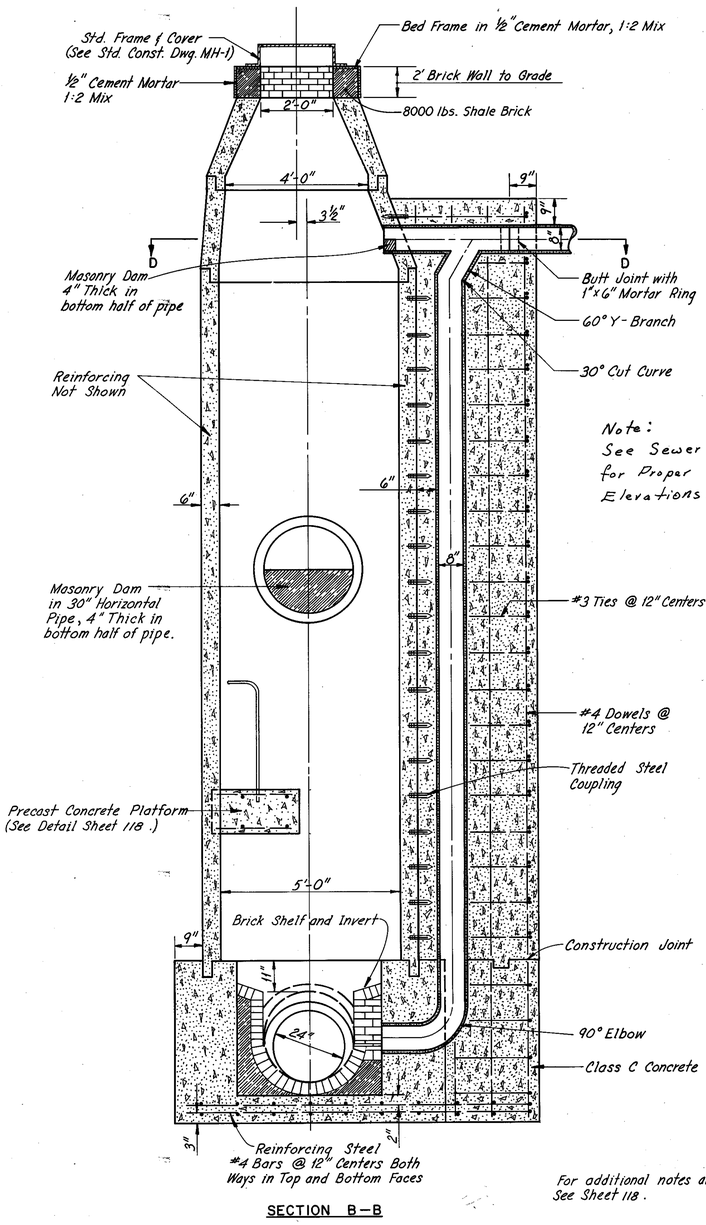
SECTION A-A



SECTION C-C



SECTION D-D



SECTION B-B

Note:
See Sewer Profiles for Proper Pipe Elevations.

For additional notes and details See Sheet 118.

SCALE ½" = 1'-0"
MADE E.R.H. DATE 1-8-71
TRCD. T.P.M. DATE 2-24-71
CKD. D.D.S. DATE 2-25-71

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

STD. No. 1-A SANITARY MANHOLE (SS-11) As Per Plan

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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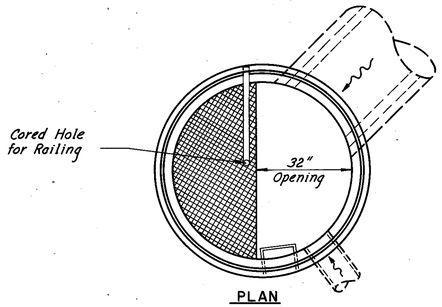
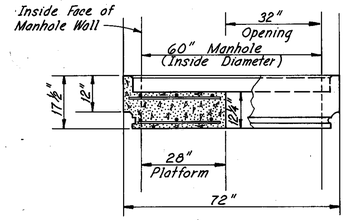
CUYAHOGA COUNTY
CUY.-80-15.81

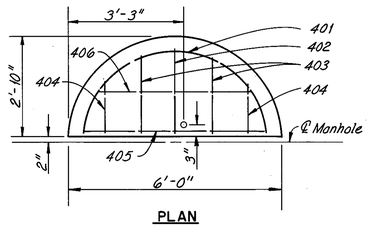


PLAN

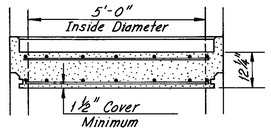


ELEVATION

PLATFORM DETAIL



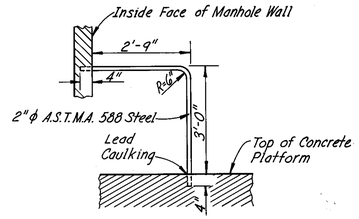
PLAN



ELEVATION

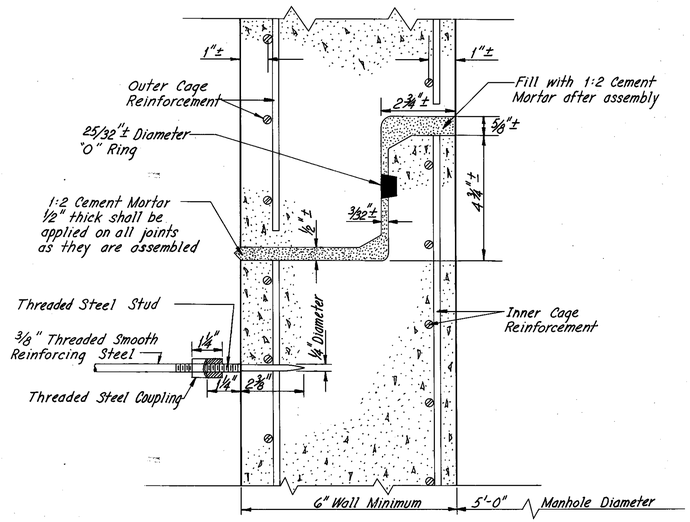
Note: Identical reinforcing steel top and bottom. All bars spaced 12" center to center.

REINFORCEMENT DETAIL



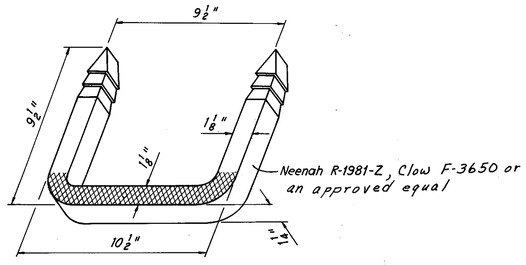
RAILING DETAIL

Reinforcing Bar Schedule			
Mark	No.	Length	Shape
401	2	7'-6"	121
402	2	2'-3"	Str.
403	4	2'-0"	Str.
404	4	1'-3"	Str.
405	2	5'-3"	Str.
406	2	4'-3"	Str.



TYPICAL DIMENSIONS OF JOINT DESIGN SECTION
Scale: ⅜" = 0'-1"

MANHOLE PLATFORM
Scale: ½" = 1'-0"



CAST IRON MANHOLE STEP
Scale 3"=1'-0"

NOTES:

Precast reinforced concrete manhole sections and domes shall comply with the requirements of 706.13.

1¼" holes for handling may be cast in sections and filled with 1:2 cement mortar after erection.

"O" Ring shall conform with 706.11.

All concrete shall be Class "C".

All brick shall be 2½"x4"x8½" 8000 Shale Sewer Brick and shall be in accord with 604.05 and 704.01

Castings shall be as specified on Standard Drawing MH-1.

Pipe holes in bottom sections shall be 2" larger than outside diameter of the pipe and the space between grouted with 1:2 cement mortar. All holes shall be circular. Maximum diameter to be 39".

Steel for couplings and studs shall be in accordance with 709.

SCALE As Shown
MADE E.R.H. DATE 1-8-71
TRCD. T.P.M. DATE 2-23-71
CKD. D.D.S. DATE 2-24-71

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

STD. No. 1-A SANITARY MANHOLE, AS PER PLAN

QUANTITY CALCULATIONS
MADE BY A.H.S. DATE 8-25-70
CHECKED BY R.B.H. DATE 8-27-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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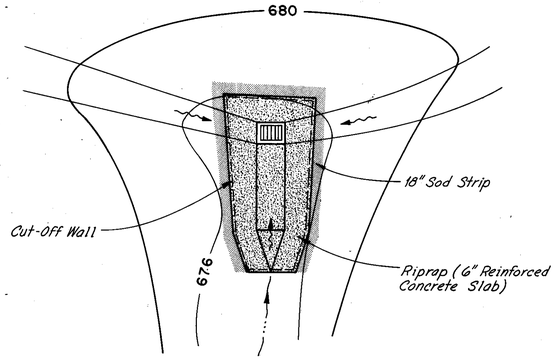
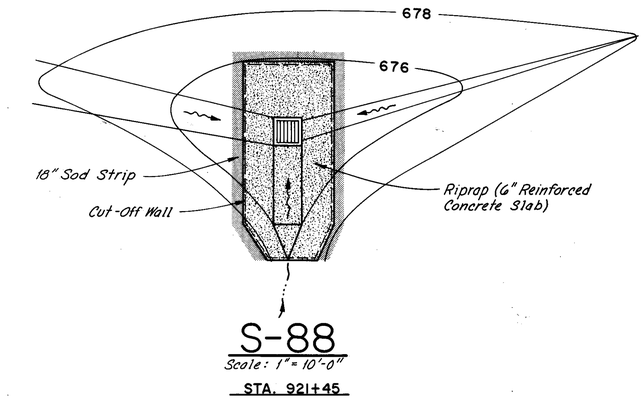
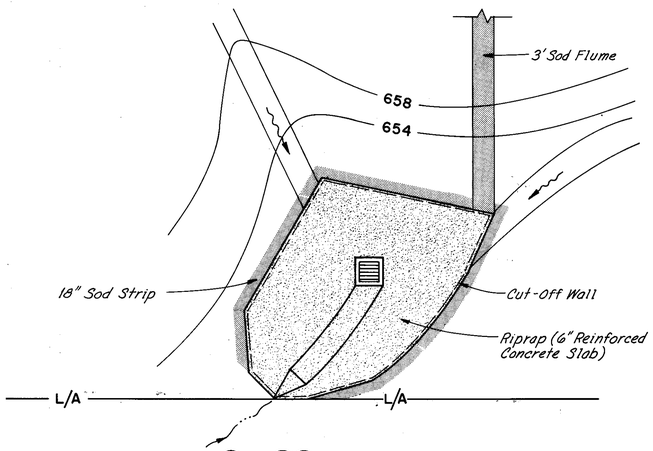
CUYAHOGA COUNTY
CUY.-80-15.81



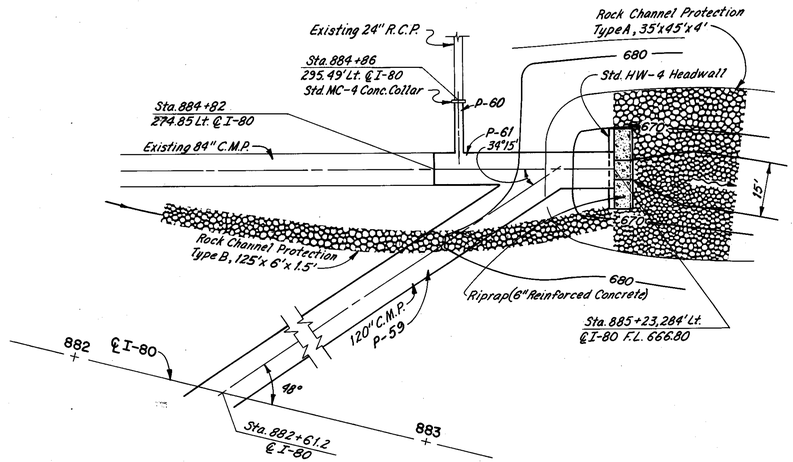
S-86
Scale: 1"=10'-0"
STA. 916+58

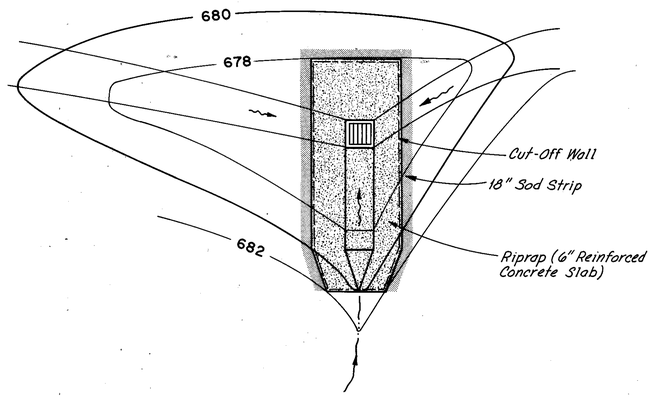


S-88
Scale: 1"=10'-0"
STA. 921+45

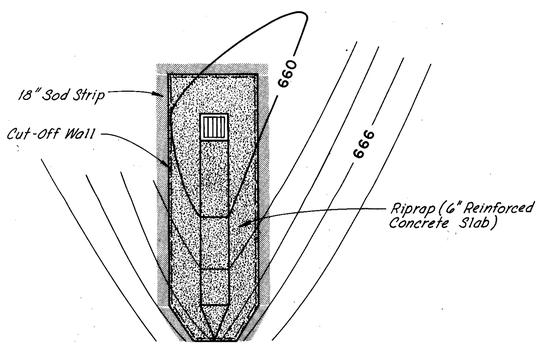


S-89
Scale: 1"=10'-0"
STA. 924+58





S-87
Scale: 1"=10'-0"
STA. 918+75



S-92
Scale: 1"=10'-0"
STA. 935+76

Item 601 - Riprap (6" Reinforced Concrete)
5.0'x .5'x 23.0' ÷9 = 6.38 Sq. Yds.

Item 601 - Rock Channel Protection
Type A - 35'x 45'x 4.5÷27 = 263 Cu. Yds.
Type B - 125'x 6'x 2 ÷27 = 56 Cu. Yds.

PLAN
Scale: 1"=20'

P-59, P-60, P-61 PIPE CONNECTION DETAIL
120" PIPE OUTLET DETAIL

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	QUANTITY	UNIT
601	Riprap (6" Reinforced Concrete Slab), As Per Plan	244.3	Sq. Yds.
601	Rock Channel Protection, Type A	263	Su. Yds.
601	Rock Channel Protection, Type B	56	Cu. Yds.
602	Concrete Masonry	8.38	Cu. Yds.
660	Sodding	110	Sq. Yds.

SCALE As Shown
MADE A.H.S. DATE 8-25-70
TRCD. T.P.M. DATE 8-26-70
CKD. R.B.H. DATE 8-27-70

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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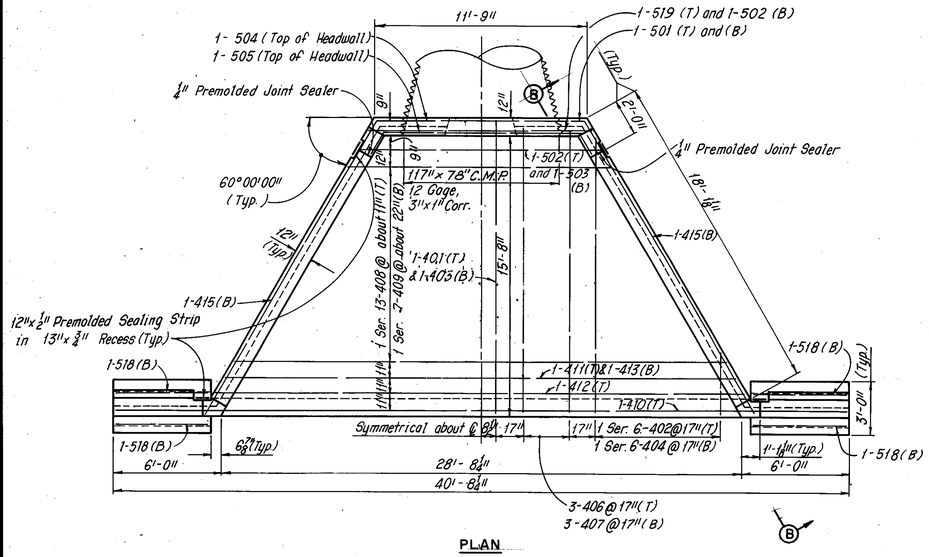
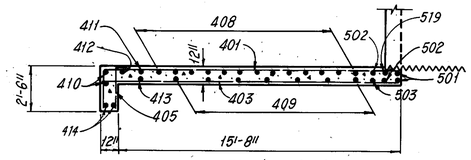
QUANTITY CALCULATIONS
MADE BY D.M.P. DATE 6-10-71
CHECKED BY J.T. DATE 8-13-71

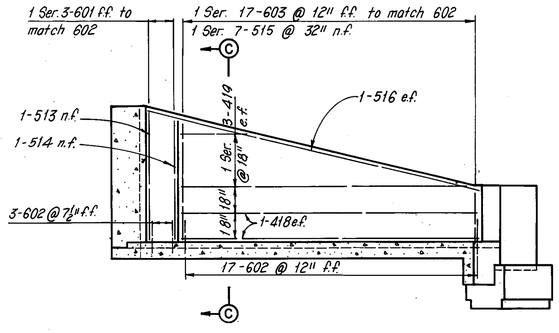
CUYAHOGA COUNTY
CUY.-80-15.81



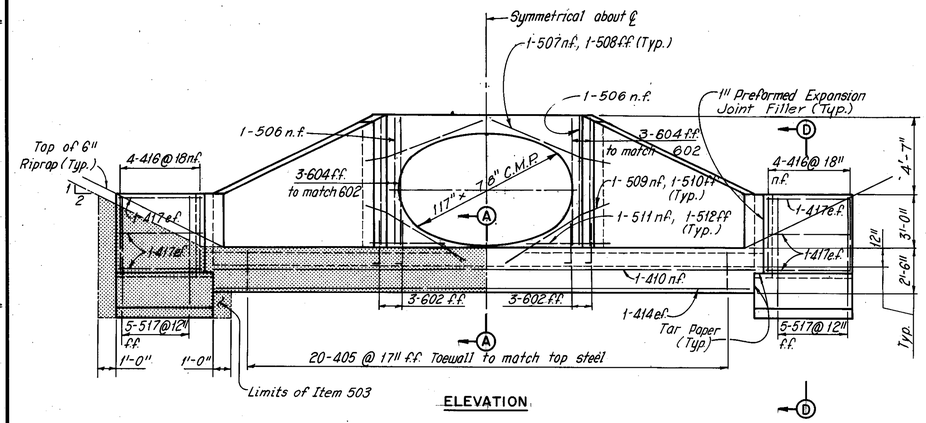
PLAN



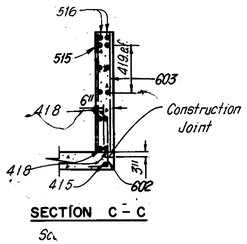
SECTION A – A



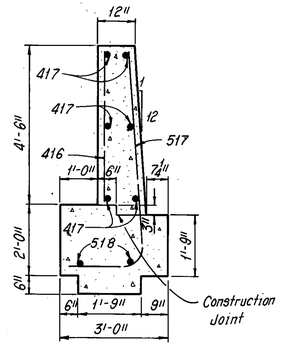
SECTION B – B



ELEVATION



SECTION C – C



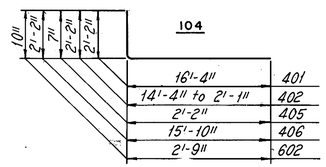
SECTION D – D

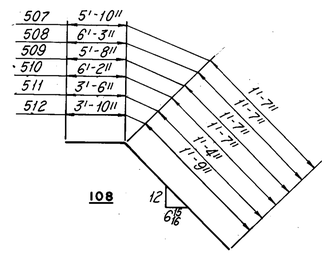
REINFORCEMENT SCHEDULE
(117"ϕ C.M.P.) HEADWALL

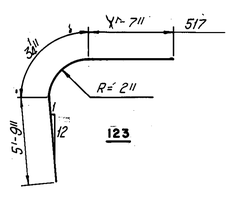
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
401	2	18'-5"	104		25
402	2 Ser. 6	~~16'-5"~~ 14'-2"	104	2'-5 8"	82
403	2	16'-3"	Str.		22
404	2 Ser. 6	~~15'-3"~~ 3'-0"	Str.	2'-5 8"	73
405	20	2'-8"	104		36
406	6	17'-11"	104		72
407	6	15'-10"	Str.		63
408	1 Ser. 13	~~13'-4"~~ 26'-0"	Str.	1'-0 1/2"	171
409	1 Ser. 7	~~14'-6"~~ 27'-2"	Str.	2'-1 7/8"	97
410	2	30'-6"	Str.		41
411	1	27'-0"	Str.		18
412	1	28'-0"	Str.		19
413	1	28'-2"	Str.		19
414	2	29'-6"	Str.		39
415	2	18'-10"	Str.		25
416	8	4'-2"	Str.		22
417	12	4'-7"	Str.		37
418	8	16'-4"	Str.		87
419	4 Ser. 3	~~15'-0"~~ 3'-0"	Str.	6'-0"	72
501	2	14'-7"	141		30
502	2	12'-4"	Str.		26
503	1	13'-4"	Str.		14

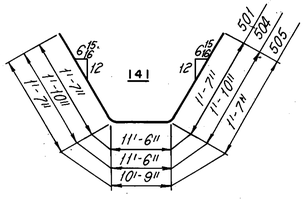
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
504	1	15'-1"	141		16
505	1	13'-10"	141		14
506	2	7'-3"	Str.		15
507	2	7'-4"	108		15
508	2	7'-9"	108		16
509	2	7'-2"	108		15
510	2	7'-8"	108		16
511	2	4'-9"	108		10
512	2	5'-6"	108		11
513	2	7'-3"	Str.		15
514	2	6'-9"	Str.		14
515	2 Ser. 7	~~6'-9"~~ 2'-9"	Str.	8"	69
516	4	17'-0"	Str.		71
517	10	7'-7"	123		79
518	4	5'-3"	Str.		22
519	1	11'-4"	Str.		12
601	2 Ser. 3	~~6'-11"~~ 7'-5"	Str.	3"	65
602	46	3'-5"	104		236
603	2 Ser. 17	~~6'-9"~~ 2'-9"	Str.	3"	243
604	6	7'-5"	Str.		67
	Total Weight				2111

BENDING DIAGRAMS









Note:
The following abbreviations are used:
(T) = Top
(B) = Bottom
nf = Near Face
ff = Far Face
ef = Each Face

Note:
Joint Sealer and Tar Paper is included with Item 511 for payment.

QUANTITIES			
Item	Total	Unit	Description
503	50	Cu. Yds.	Unclassified Excavation
509	2,111	Lbs.	Reinforcing Steel
511	30	Cu. Yds.	Class "C" Concrete
512	21,5	Lin. Ft.	Premolded Sealing Strip
516	21,5	Sq. Ft.	1" Preformed Expansion Joint Filler

Notes:
The clearance between reinforcing steel and face of concrete shall be 2 inches.

Foundation Material of approximately uniform bearing capacity is contemplated. Spots of soft earth shall be removed and be replaced with thoroughly suitable embankment material.

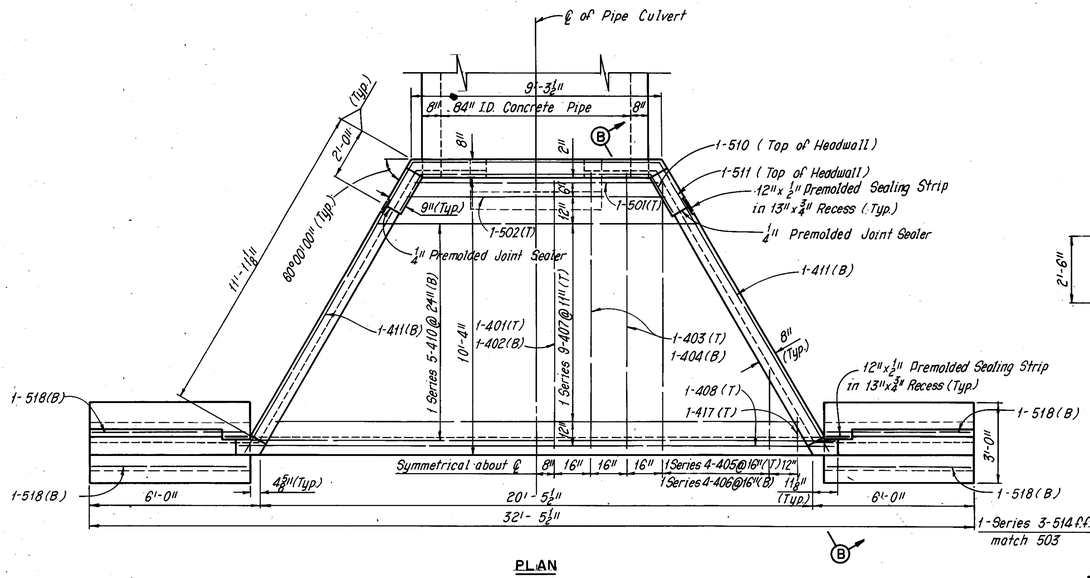
Payment shall be included in the unit cost for Item 503, Unclassified Excavation.

Quantities shown are for estimating purposes only.

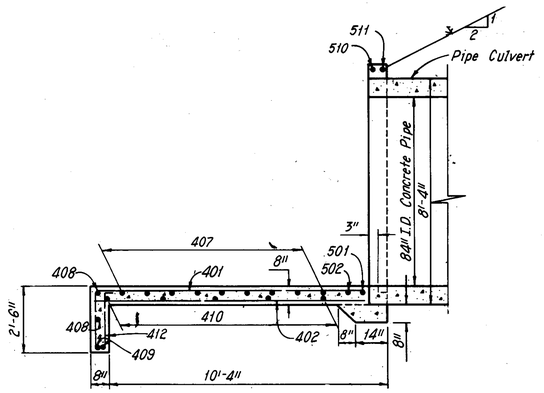
SCALE As Shown
MADE D.M.P. DATE 6-10-71
TRCD. A.J.T. DATE 6-11-71
CKD. J.T. DATE 6-21-71

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

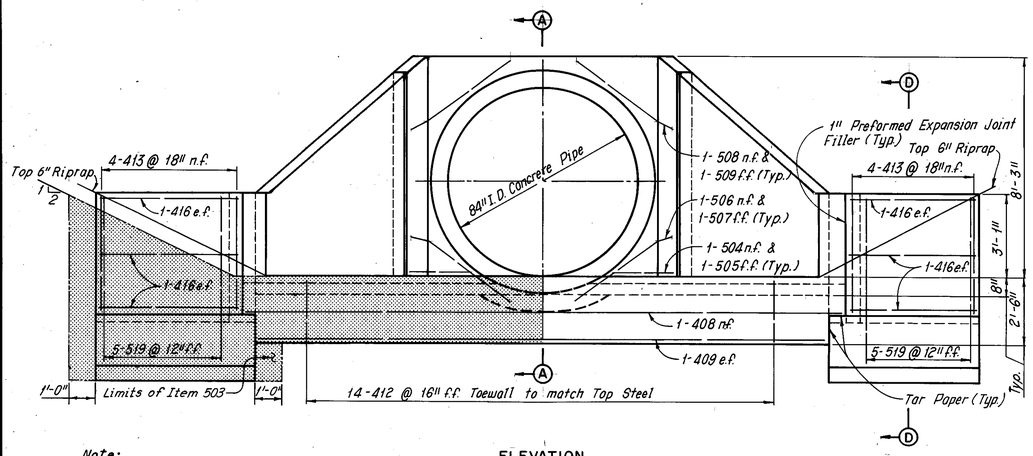
SPECIAL HEADWALL DETAILS FOR 117"ϕ PIPE



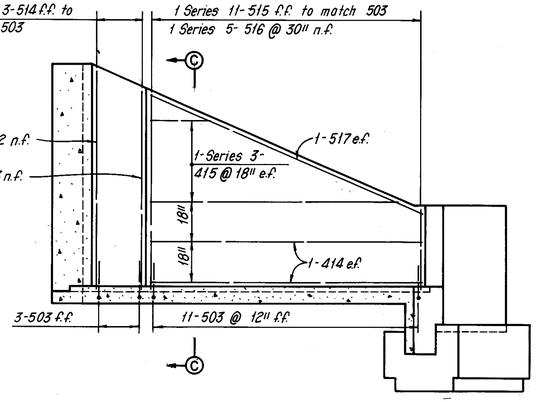
PLAN



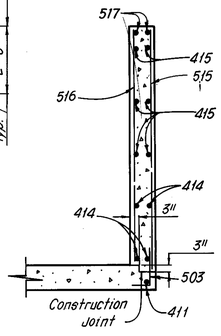
SECTION A-A



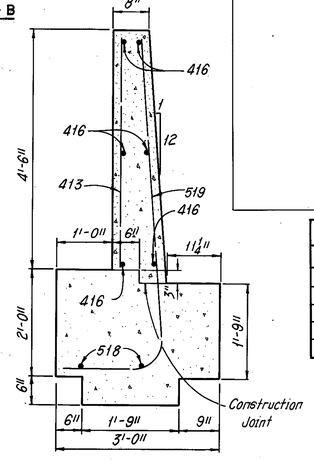
ELEVATION



SECTION B-B



SECTION C-C



SECTION D-D

Note:
The following abbreviations are used:
(T) = Top
(B) = Bottom
nf = Near Face
ff = Far Face
ef = Each Face

Note:
Joint Sealer and Tar Paper is included with Item 511 for payment.

QUANTITY CALCULATIONS
MADE BY D.M.P. DATE 6-11-71
CHECKED BY J.T. DATE 9-14-71

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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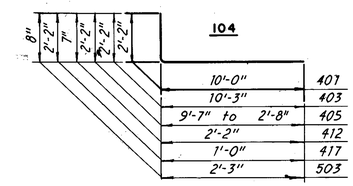
CUYAHOGA COUNTY
CUY.-80-15.81

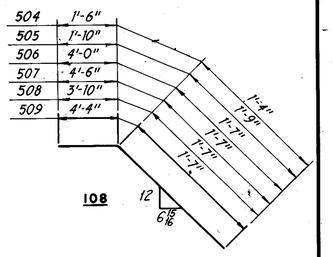
HEADWALL REINFORCEMENT SCHEDULE
(84" ϕ CONCRETE PIPE)

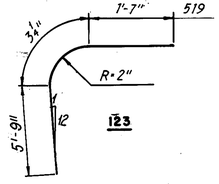
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
401	2	12'-1"	104		16
402	2	10'-0"	Str		13
403	4	12'-4"	104		33
404	4	10'-6"	Str.		28
405	2 Ser. 4	11'-8" 4'-9"	104	2'-3⅜"	44
406	2 Ser. 4	10'-6" 3'-6"	Str.	2'-4"	37
407	1 Ser. 9	10'-8" 19'-2"	Str.	1'-0¼"	90
408	2	22'-0"	Str.		29
409	2	20'-11"	Str.		28
410	1 Ser. 5	11'-7" 20'-6"	Str.	2'-2¾"	54
411	2	12'-3"	Str.		16
412	14	2'-8"	104		25
413	8	4'-2"	Str.		22
414	8	9'-11"	Str.		53
415	4 Ser. 3	9'-3" 2'-6"	Str.	3'-4¾"	47
416	12	4'-8"	Str.		37
417	2	3'-1"	104		4
501	1	8'-11"	Str.		9

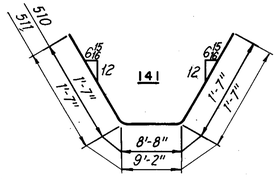
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
502	1	9'-6"	Str.		10
503	28	2'-10"	104		83
504	2	2'-9"	108		6
505	2	3'-6"	108		7
506	2	5'-6"	108		11
507	2	6'-0"	108		13
508	2	5'-4"	108		11
509	2	5'-10"	108		12
510	1	11'-9"	141		12
511	1	12'-3"	141		13
512	2	7'-10"	Str.		16
513	2	7'-3"	Str.		15
514	2 Ser. 3	8'-1" 1'-1"	Str.	3"	49
515	2 Ser. 11	7'-4" 2'-1"	Str.	5¼"	118
516	2 Ser. 5	7'-1" 2'-8"	Str.	1'-1¾"	51
517	4	10'-11"	Str.		46
518	4	5'-3"	Str.		22
519	10	7'-7"	123		79
Total Weight					1159

BENDING DIAGRAMS









QUANTITTIES			
Item	Total	Unit	Description
503	33	Cu. Yds.	Unclassified Excavation
509	1,159	Lbs.	Reinforcing Steel
511	14	Cu. Yds.	Class "C" Concrete
512	24	Lin. Ft.	Premolded Sealing Strip
516	24	Sq. Ft.	1" Preformed Expansion Joint Filler

Quantities shown are for estimating purposes only.

Notes:
The clearance between reinforcing steel and face of concrete shall be 2 inches.
Foundation Material of approximately uniform bearing capacity is contemplated. Spots of soft earth shall be removed and be replaced with thoroughly suitable embankment material.
Payment shall be included in the unit cost for Item 503 Unclassified Excavation.

SCALE As Shown
MADE D.M.P. DATE 6-11-71
TRCD. A.J.T. DATE 8-5-71
CKD. J.T. DATE 9-14-71

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

SPECIAL HEADWALL DETAILS FOR 84" ϕ PIPE

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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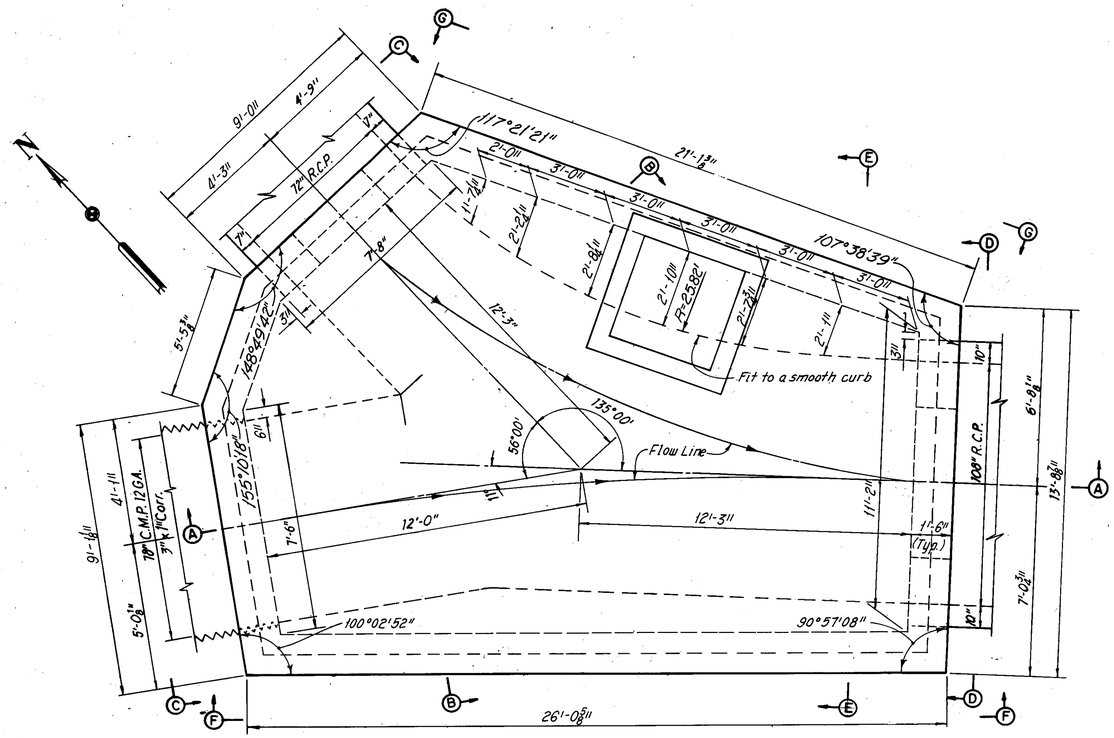
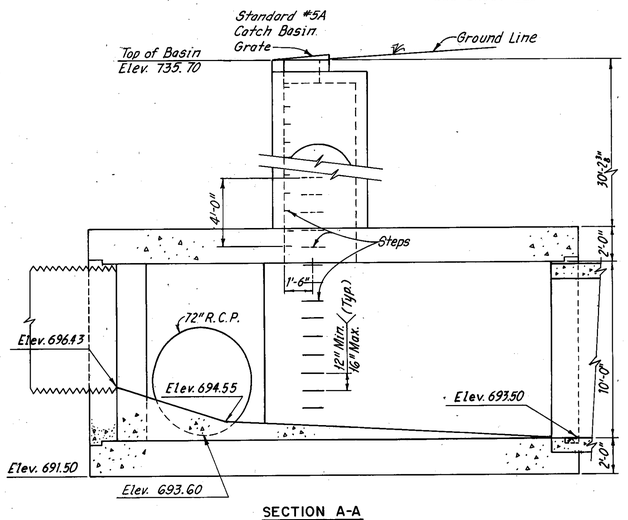
CUYAHOGA COUNTY
CUY.-80-15.81

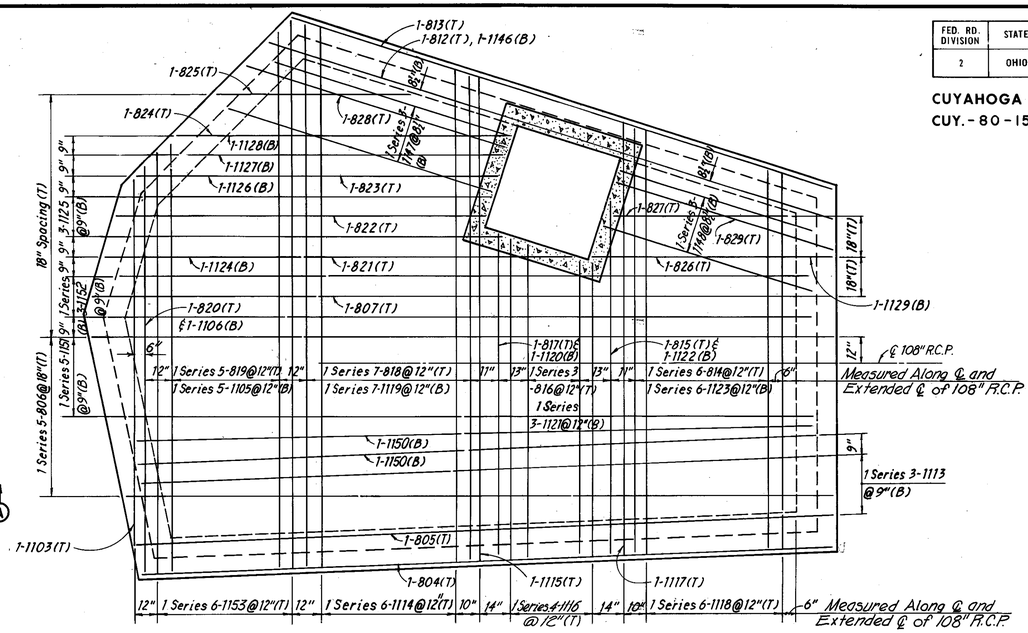


PLAN
Scale: 3/8" = 1'-0"

Note: For location of Junction Chamber see Sheet 68.

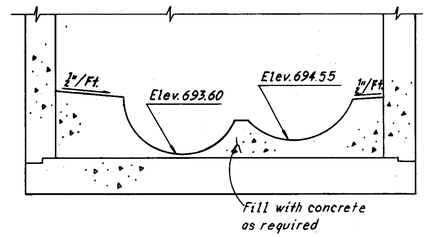


SECTION A-A
Scale: 1/4"-1'-0"
(Reinforcement not shown)

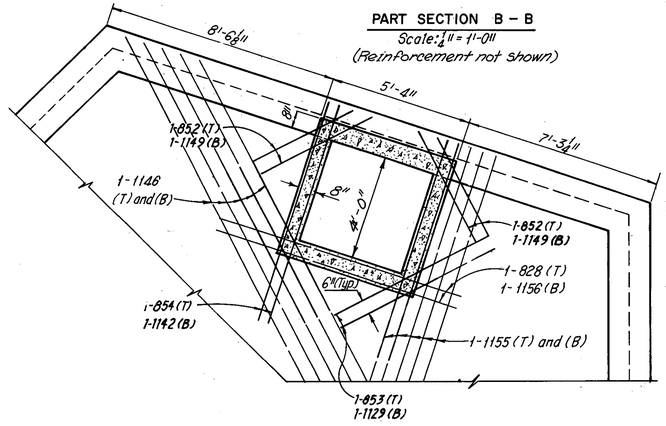


TOP SLAB PLAN
Scale: 3/8" = 1'-0"

Note:
For additional reinforcement around catch basin opening see part top slab plan.

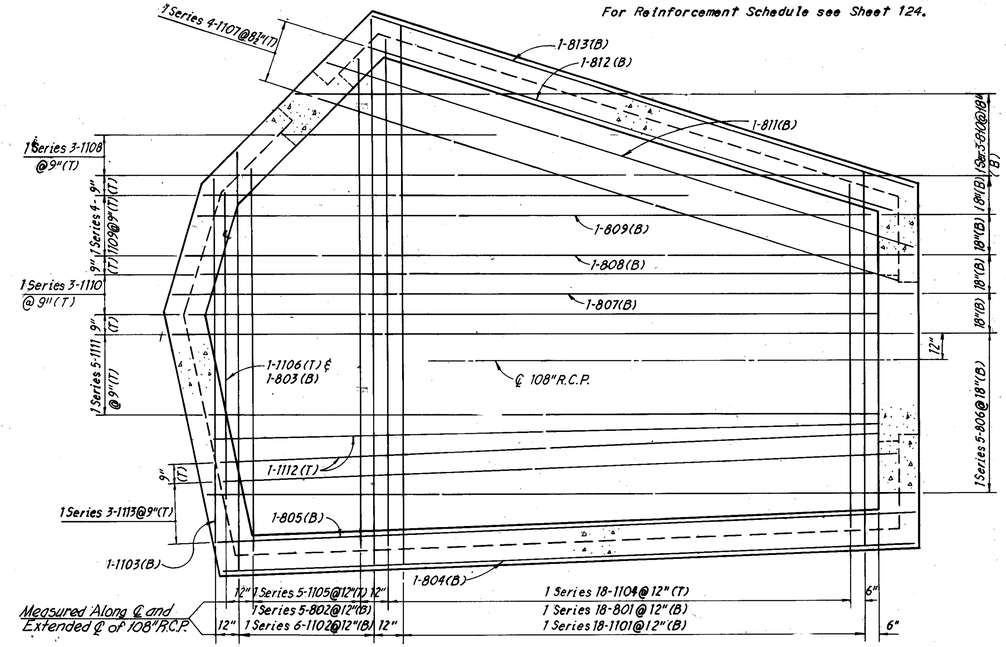


PART SECTION B - B
Scale: 1/4" = 1'-0"
(Reinforcement not shown)



PART TOP SLAB PLAN
Scale: 3/8" = 1'-0"

Notes:
Construct Junction Chamber in a neat excavation.
The clearance between reinforcing steel and face of concrete shall be 2 inches.
The following abbreviations are used:
(T) = Top (B) = Bottom
For Elevations C-C, D-D, F-F and G-G and for Section E-E see Sheet 123.
For Reinforcement Schedule see Sheet 124.



BOTTOM SLAB PLAN
Scale: 3/8" = 1'-0"

SCALE	As shown	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE	DMP	DATE 7-23-71	CONSULTING ENGINEERS
TRCD.	LDD	DATE 8-10-71	
CKD.	JT	DATE 9-16-71	KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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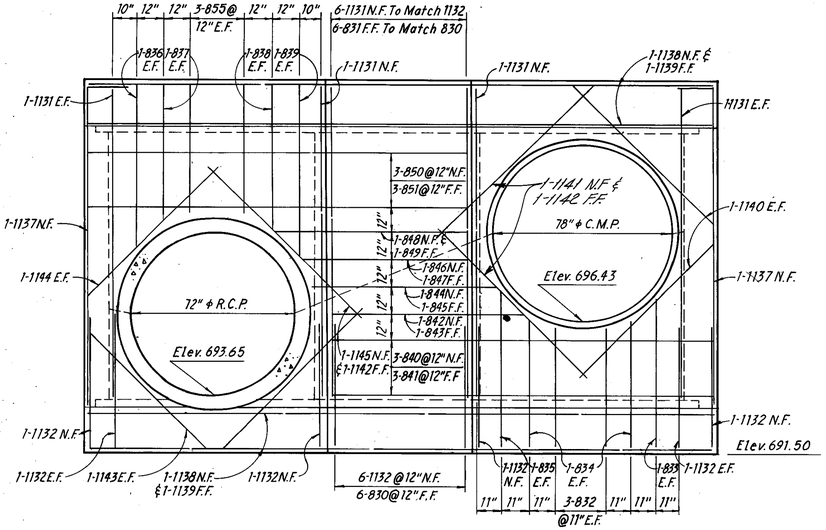
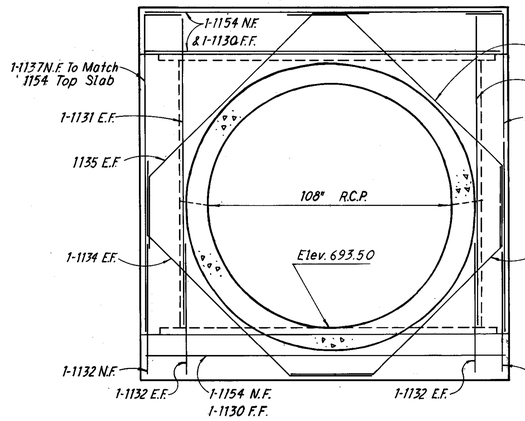
CUYAHOGA COUNTY
CUY. - 80 - 15.81

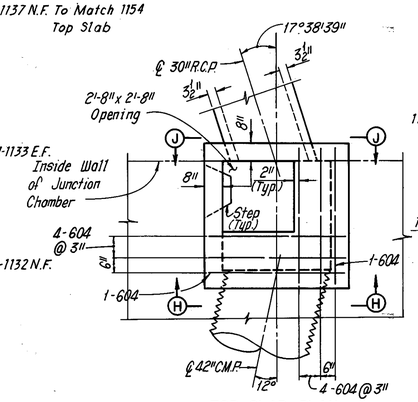


ELEVATION C-C
Scale: $\frac{3}{8}$"=1'-0"

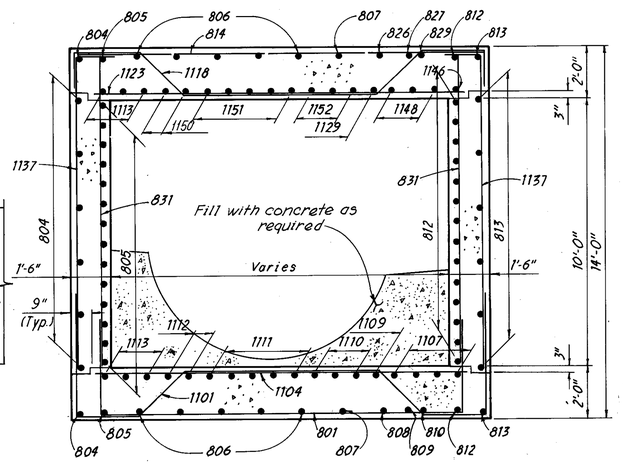


ELEVATION D-D
Scale: $\frac{3}{8}$"=1'-0"

Note: For Details of Grate, Steps and Top of Catch Basin, see Standard Construction Drawing CB-458A.



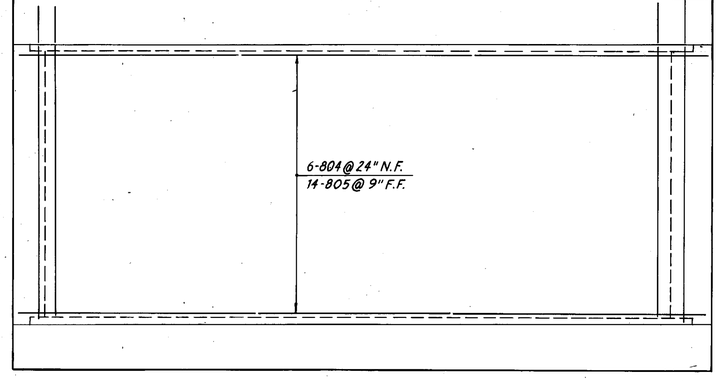
TOP SLAB PLAN
Scale: $\frac{3}{8}$"=1'-0" (Grate not shown)



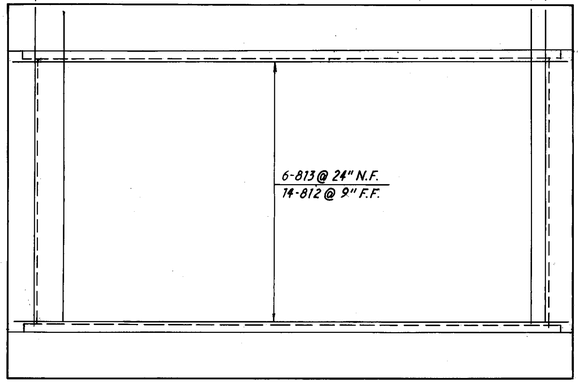
SECTION E-E
Scale: $\frac{3}{8}$"=1'-0"

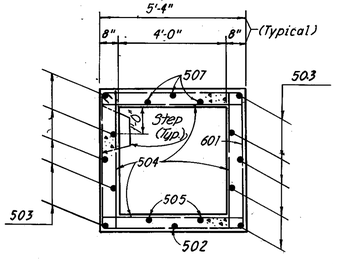
Note: For location of Catch Basin see Part Top Slab Plan on Sheet 123.

Note: The following abbreviations are used:
NF = Near Face
FF = Far Face
EF = Each Face



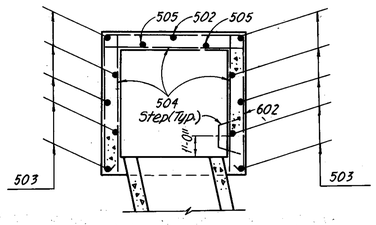
ELEVATION F-F
Scale: $\frac{3}{8}$"=1'-0"



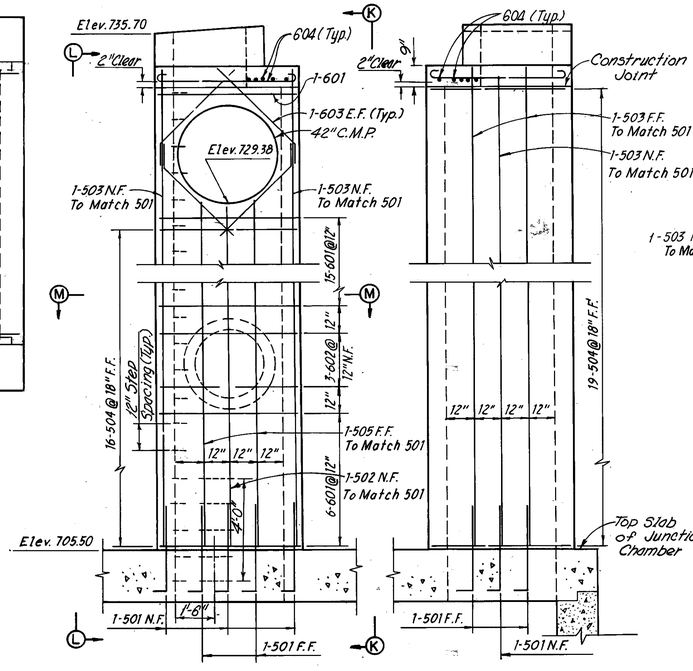


SECTION M-M
Section: $\frac{3}{8}$"=1'-0"

ELEVATION G-G
Scale: $\frac{3}{8}$"=1'-0"

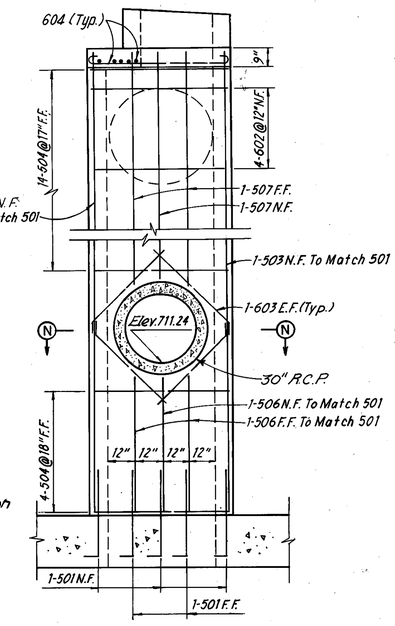


SECTION N-N
Section: $\frac{3}{8}$"=1'-0"



ELEVATION H-H
Scale: $\frac{3}{8}$"=1'-0"

ELEVATION K-K SHOWN
Scale: $\frac{3}{8}$"=1'-0" (Steps not shown)
ELEVATION L-L SIMILAR)



ELEVATION J-J
Scale: $\frac{3}{8}$"=1'-0" (Steps not shown)

Note: For location of Elevations C-C, D-D, F-F and G-G and Section E-E see Sheet 123.

SCALE	As Shown	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE	DMP	DATE 7-27-71	CONSULTING ENGINEERS
TRCD.	LDD	DATE 8-10-71	KANSAS CITY CLEVELAND NEW YORK
CKD.	JT	DATE 9-15-71	

JUNCTION CHAMBER-DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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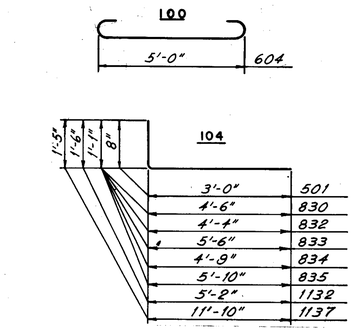
CUYAHOGA COUNTY
CUY.-80-15.81

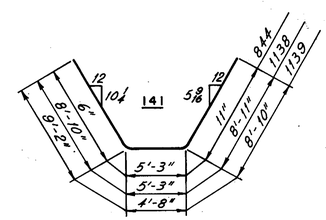
JUNCTION CHAMBER REINFORCEMENT SCHEDULE

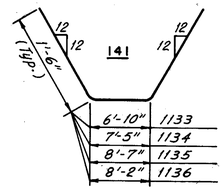
MARK	NO.	LENGTH	TYPE	SER. INCR.
501	16	3'-7"	104	
502	1	23'-3"	Str.	
503	10	28'-6"	Str.	
504	72	5'-0"	Str.	
505	2	23'-7"	Str.	
506	3	4'-10"	Str.	
507	3	19'-6"	Str.	
601	22	20'-9"	109	
602	7	15'-11"	110	
603	16	5'-4"	108	
604	10	6'-4"	100	
801	1 Ser.18	19'-8" to 25'-3"	105	3 15/16"
802	1 Ser.5	24'-7" to 20'-8"	105	11 5/8"
803	1	17'-2"	105	
804	8	25'-9"	Str.	
805	16	26'-0"	Str.	
806	2 Ser.5	26'-3" to 27'-3"	Str.	3"
807	2	27'-3"	Str.	
808	1	26'-9"	Str.	
809	1	24'-6"	Str.	
810	1 Ser.3	6'-3" to 19'-0"	Str.	6'-4 1/2"
811	1	22'-8"	Str.	
812	16	21'-9"	Str.	
813	8	20'-9"	Str.	
814	1 Ser.6	15'-9" to 14'-1"	Str.	4"
815	1	12'-9"	Str.	
816	1 Ser.3	10'-9" to 11'-4"	Str.	3 1/2"
817	1	11'-9"	Str.	
818	1 Ser.7	19'-8" to 17'-8"	Str.	4"
819	1 Ser.5	15'-4" to 19'-3"	Str.	11 3/4"
820	1	14'-4"	Str.	
821	1	16'-6"	Str.	
822	1	13'-6"	Str.	
823	1	13'-2"	Str.	
824	1	12'-2"	Str.	
825	1	6'-3"	Str.	
826	1	8'-9"	Str.	
827	1	6'-6"	Str.	
828	3	10'-0"	Str.	
829	1	8'-3"	Str.	
830	6	5'-5"	104	
831	47	11'-6"	Str.	
832	6	5'-3"	104	
833	2	6'-5"	104	
834	4	5'-8"	104	
835	2	6'-9"	104	
836	2	6'-1"	Str.	
837	2	5'-3"	Str.	
838	2	5'-5"	Str.	
839	2	6'-6"	Str.	
840	3	14'-1"	108	
841	3	13'-7"	108	
842	1	7'-0"	108	
843	1	6'-4"	108	
844	1	6'-6"	141	
845	1	5'-10"	108	
846	1	6'-0"	108	
847	1	5'-2"	108	
848	1	7'-0"	108	
849	1	6'-2"	108	
850	3	14'-0"	108	
851	3	13'-9"	108	
852	4	5'-0"	Str.	
853	2	6'-6"	Str.	

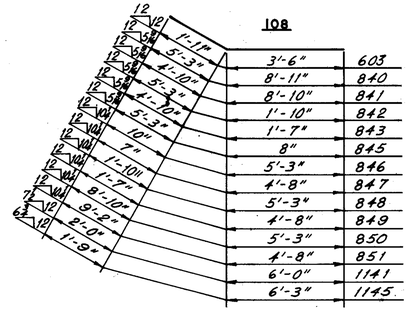
MARK	NO.	LENGTH	TYPE	SER. INCR.
854	2	8'-3"	Str.	
855	6	4'-9"	Str.	
1101	1 Ser.18	23'-5" to 29'-0"	157	3 15/16"
1102	1 Ser.6	29'-3" to 24'-4"	157	11 13/16"
1103	2	23'-0"	157	
1104	1 Ser.18	12'-9" to 18'-3"	Str.	3 7/8"
1105	2 Ser.5	17'-6" to 13'-9"	Str.	11 1/4"
1106	2	11'-9"	Str.	
1107	1 Ser.4	20'-0" to 22'-5"	Str.	8 11/16"
1108	1 Ser.3	6'-7" to 12'-11"	Str.	3'-2"
1109	1 Ser.4	16'-3" to 24'-0"	Str.	2'-7"
1110	1 Ser.3	24'-8" to 25'-2"	Str.	3"
1111	1 Ser.5	25'-2" to 24'-7"	Str.	1 3/4"
1112	2	24'-4"	Str.	
1113	2 Ser.3	24'-11" to 24'-6"	Str.	2 1/2"
1114	1 Ser.6	21'-1" to 22'-8"	157	3 15/16"
1115	1	20'-9"	157	
1116	1 Ser.4	13'-1" to 12'-2"	158	3 11/16"
1117	1	19'-0"	157	
1118	1 Ser.6	18'-9" to 17'-1"	157	4"
1119	1 Ser.7	18'-3" to 16'-3"	Str.	4"
1120	1	11'-0"	Str.	
1121	1 Ser.3	10'-8" to 10'-0"	Str.	4"
1122	1	12'-0"	Str.	
1123	1 Ser.6	12'-9" to 14'-4"	Str.	3 15/16"
1124	1	16'-6"	Str.	
1125	3	12'-9"	Str.	
1126	1	12'-1"	Str.	
1127	1	10'-10"	Str.	
1128	1	7'-8"	Str.	
1129	3	6'-9"	Str.	
1130	3	13'-9"	Str.	
1131	16	11'-6"	Str.	
1132	20	6'-3"	104	
1133	2	9'-7"	141	
1134	2	10'-2"	141	
1135	2	11'-4"	141	
1136	2	10'-11"	141	
1137	49	13'-0"	104	
1138	4	22'-9"	141	
1139	4	22'-5"	141	
1140	4	7'-6"	Str.	
1141	2	7'-10"	108	
1142	6	8'-0"	Str.	
1143	2	6'-0"	Str.	
1144	2	6'-9"	Str.	
1145	2	7'-10"	108	
1146	11	20'-0"	Str.	
1147	1 Ser.3	8'-8" to 10'-0"	Str.	8"
1148	1 Ser.3	8'-1" to 7'-4"	Str.	4 1/2"
1149	4	5'-0"	Str.	
1150	2	25'-0"	Str.	
1151	1 Ser.5	25'-9" to 25'-3"	Str.	1 5/8"
1152	1 Ser.3	25'-11" to 25'-5"	Str.	3"
1153	1 Ser.6	22'-11" to 18'-0"	157	11 15/16"
1154	3	13'-4"	Str.	
1155	10	14'-6"	Str.	
1156	2	10'-0"	Str.	

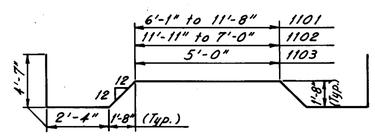
BAR BENDING DIAGRAMS

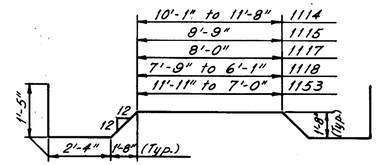


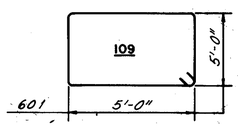


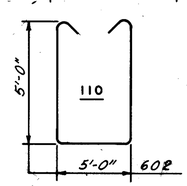


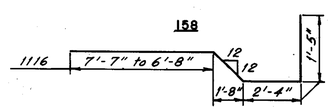












Quantities shown are for estimating purposes only.

SCALE None
MADE JSC DATE 9-15-71
TRCD. JSC DATE 9-15-71
CKD. DMP DATE 9-15-71

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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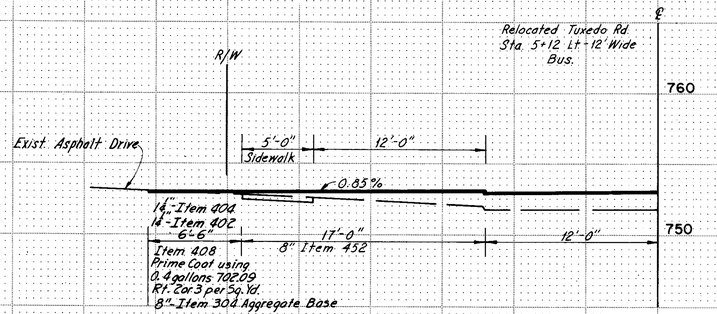
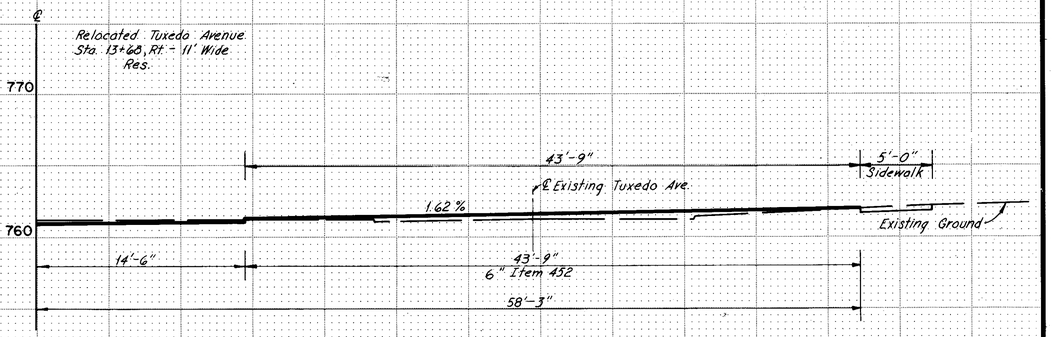
392

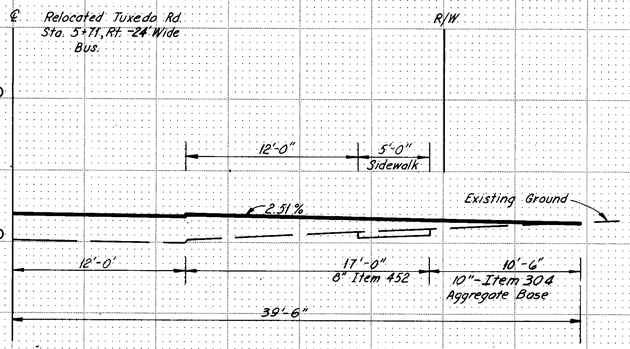
CUYAHOGA COUNTY
CUY.–80–15.81



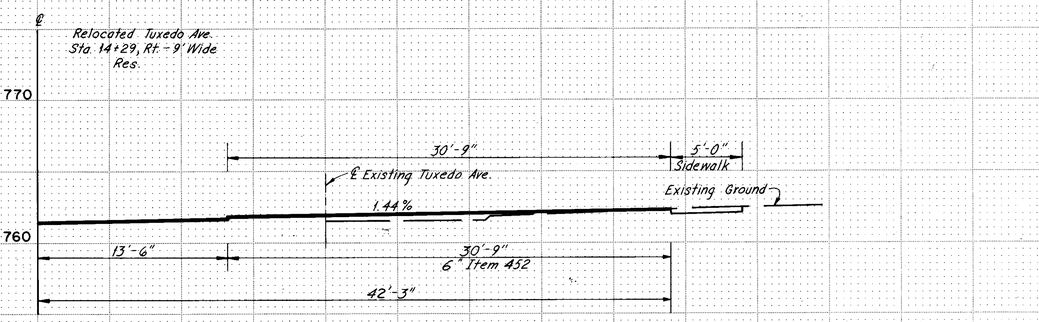
1-A



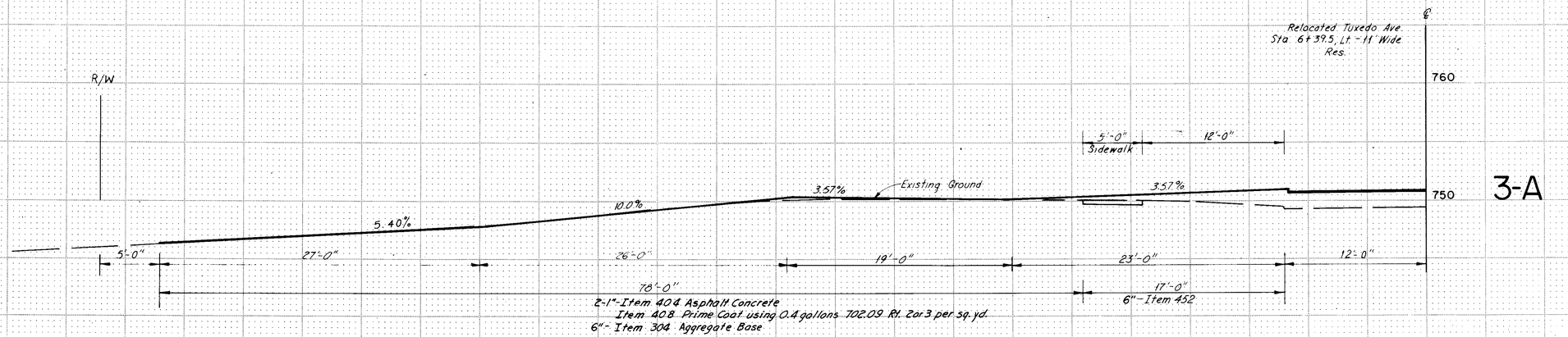
4-A



2-A



5-A



3-A

5 0 5 10 15 20
SCALE IN FEET

SCALE 1"=5'-0" Vert & Hor. HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE T.P.M. DATE 5-20-70
TRCD. T.P.M. DATE 5-26-70
CKD. R.R.H. DATE 5-27-70
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

DRIVEWAY PROFILES 1–A TO 5–A

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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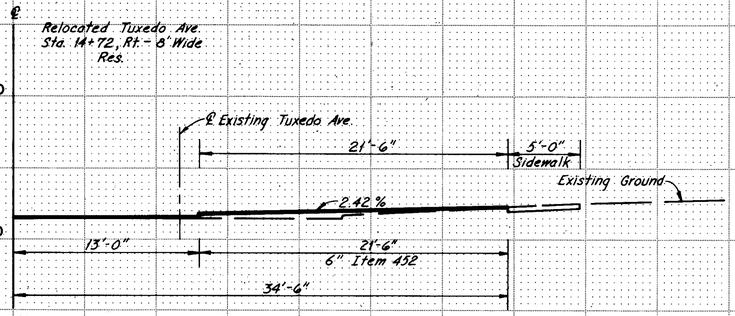
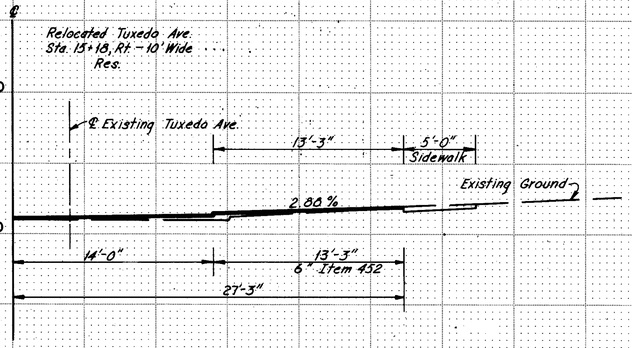
CUYAHOGA COUNTY
CUY.-80-15.81

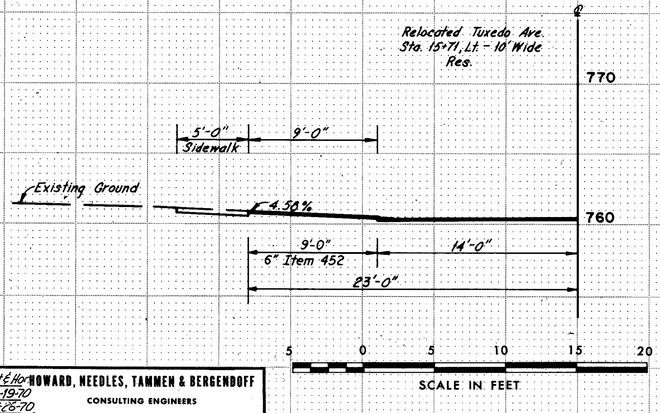
6-A



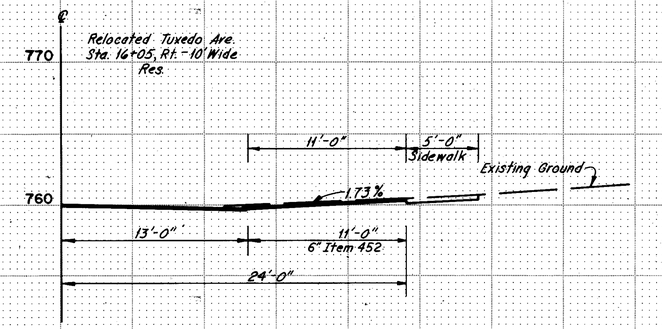
7-A



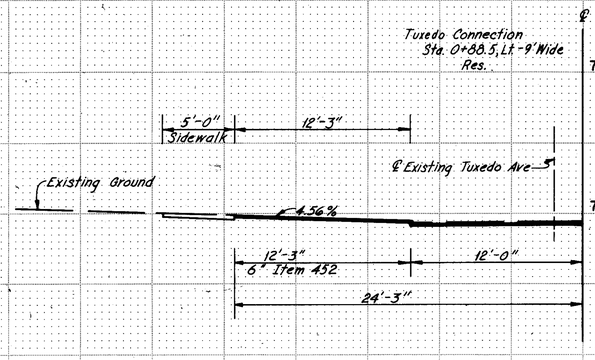
8-A



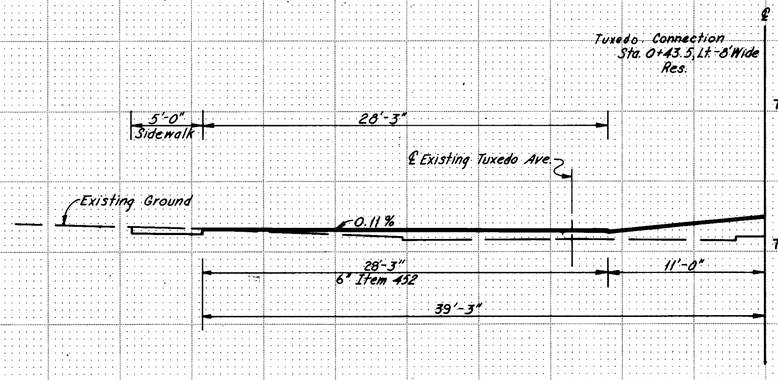
9-A



10-A



11-A



5 0 5 10 15 20
SCALE IN FEET

SCALE 1"=5'-0" Vert & Hor.
MADE TPM DATE 5-19-70
TRCD. TPM DATE 5-28-70
CKD. RBH DATE 5-28-70

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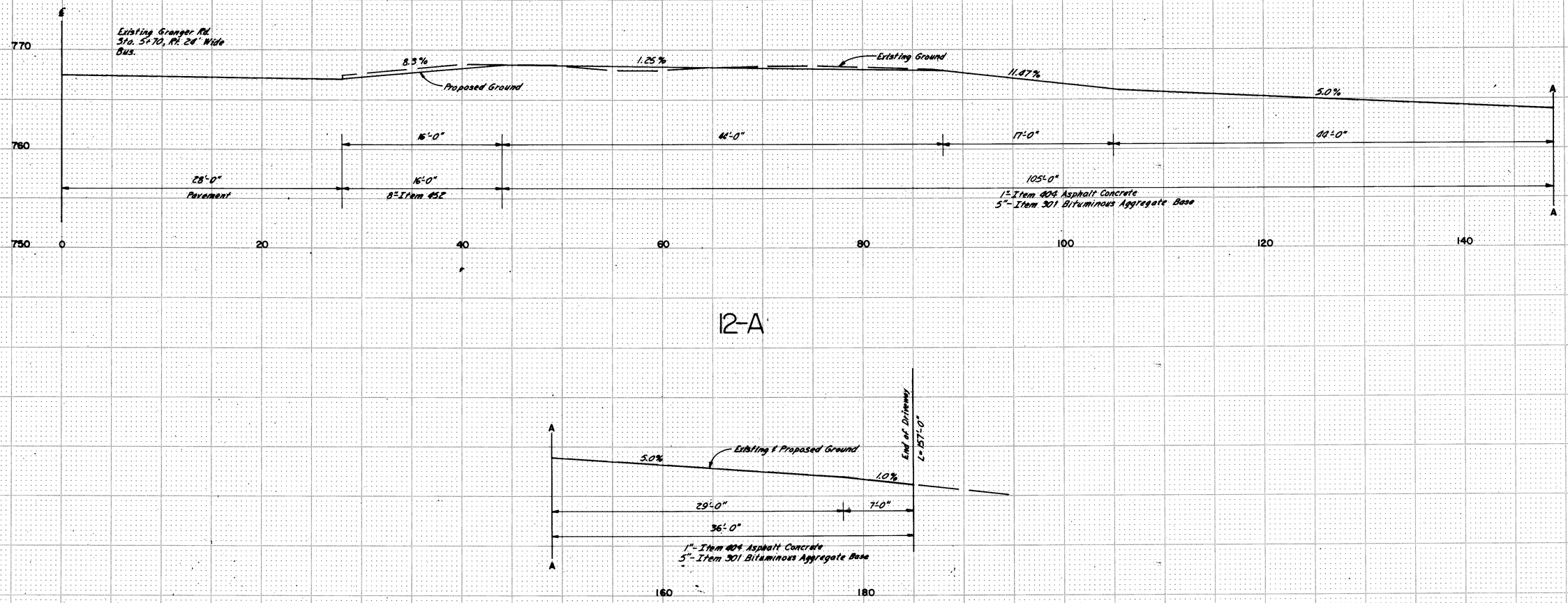
KANSAS CITY CLEVELAND NEW YORK

DRIVEWAY PROFILES 6-A TO 11-A

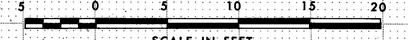
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

127
392

CUYAHOGA COUNTY
CUY.~80-15.81



12-A



SCALE 1"=5'
MADE GL DATE 9-18-70
TRCD. MAG DATE 9-21-70
CKD. AHS DATE 9-21-70

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

DRIVEWAY PROFILE 12-A

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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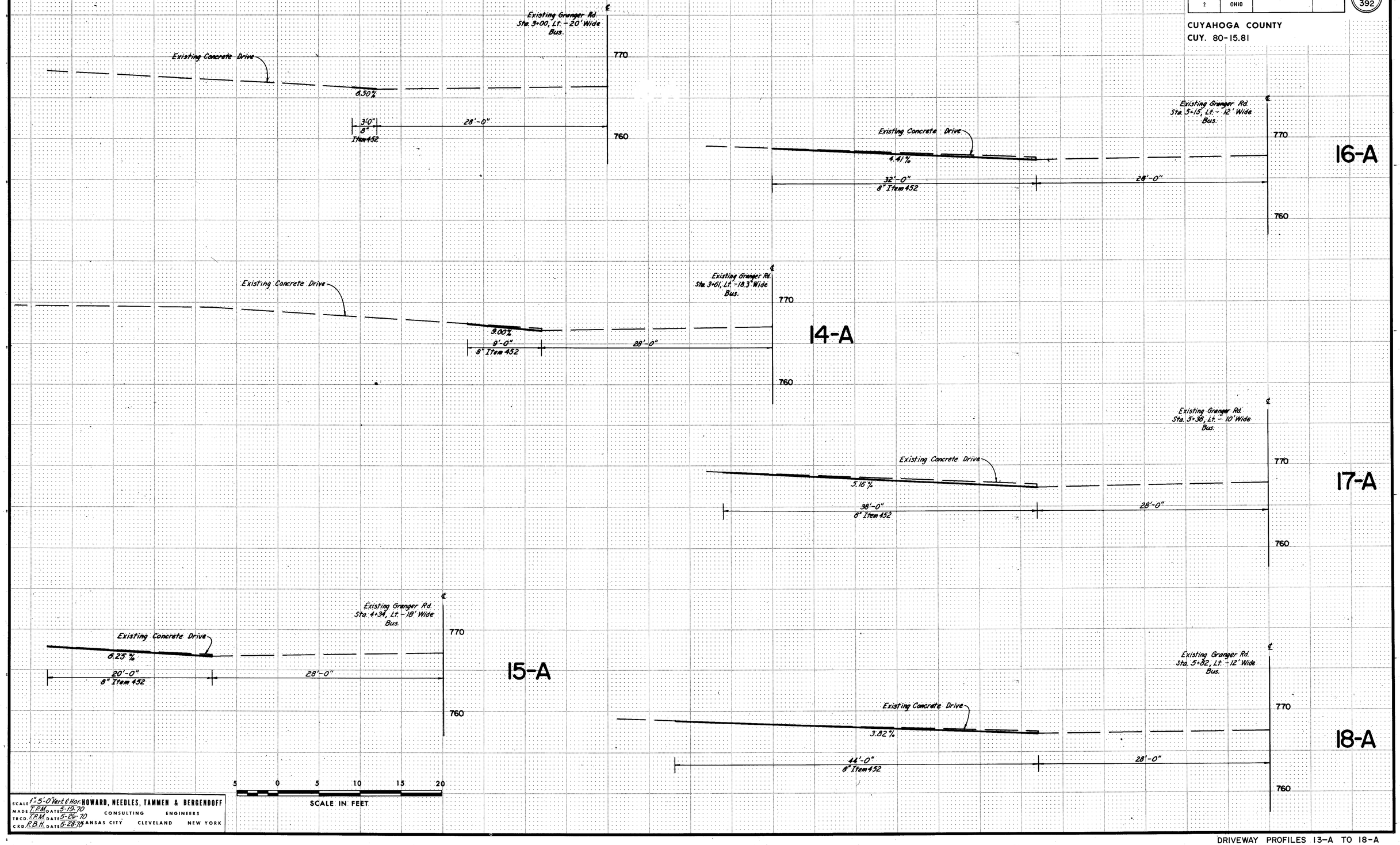
392

CUYAHOGA COUNTY
CUY. 80-15.81



SCALE 1"= 5'-0" Vert. & Hor.
MADE T.P.M. DATE 5-19-70
TRCD T.P.M. DATE 5-26-70
CKD R.B.H. DATE 5-28-70

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

DRIVEWAY PROFILES 13-A TO 18-A

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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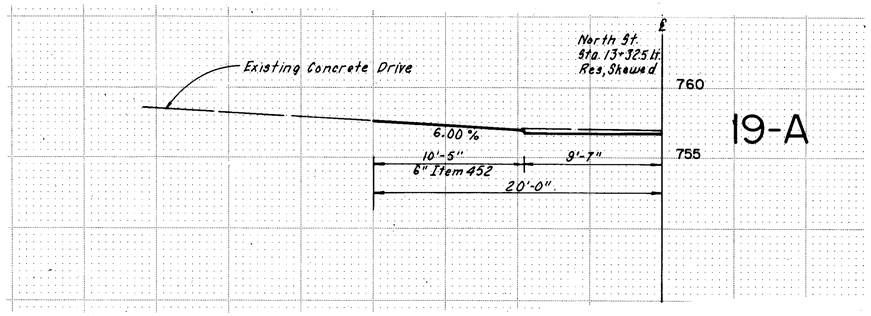
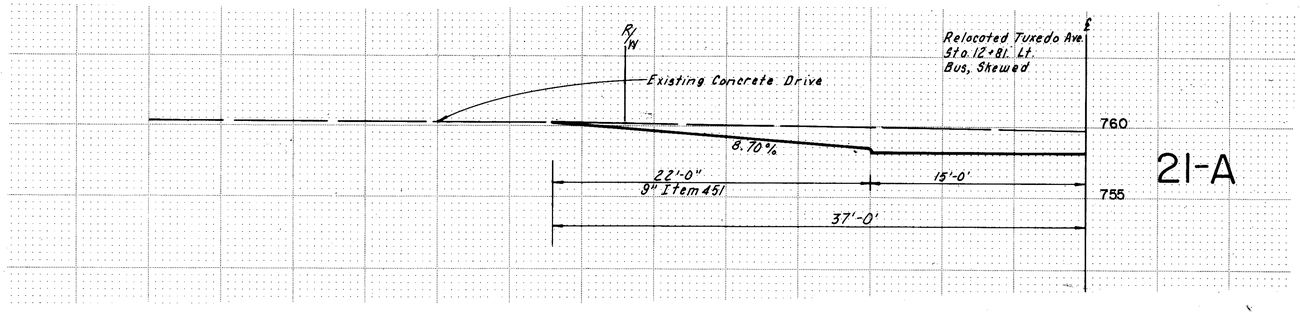
392

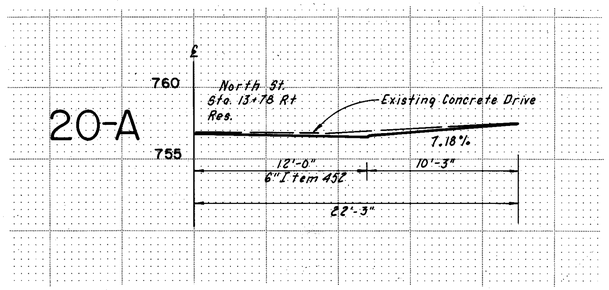
CUYAHOGA COUNTY
CUY.- 80 - 15.81



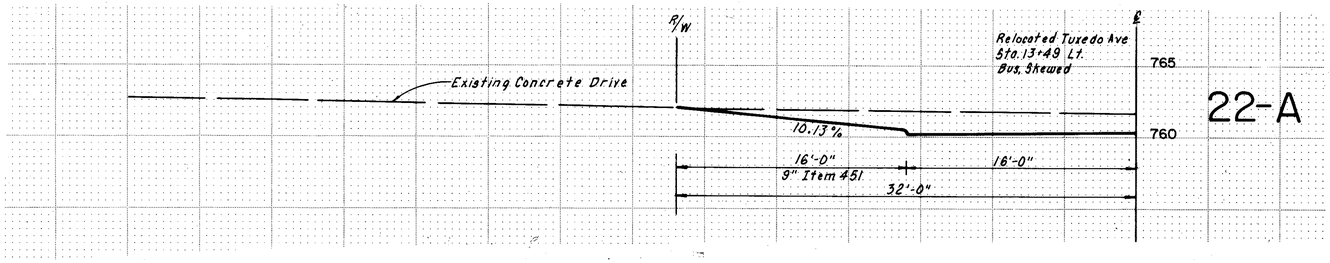
19-A



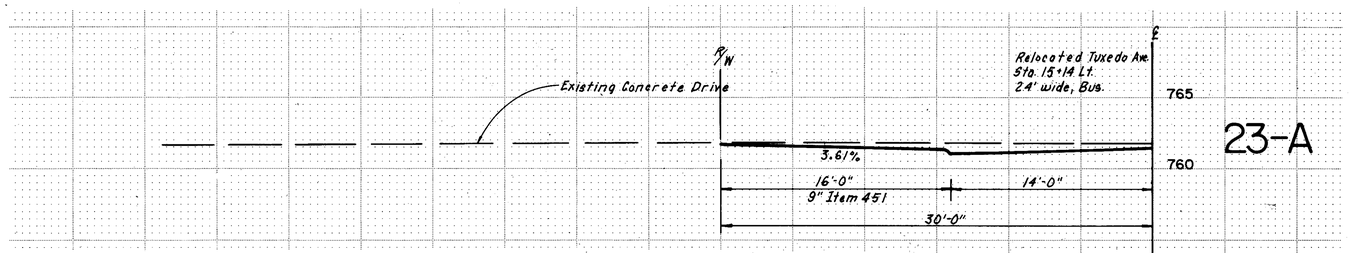
21-A



20-A



22-A



23-A

SCALE 1"=5'-0" Hor. & Ver.
MADE MGB DATE 8-27-74
TRCD. FCG DATE 8-30-74
CKD. AHS DATE 8-30-74

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

5 0 5 10 15 20
SCALE IN FEET

DRIVEWAY PROFILES 19-A TO 23-A

CROSS SECTION LAYOUT SHEET

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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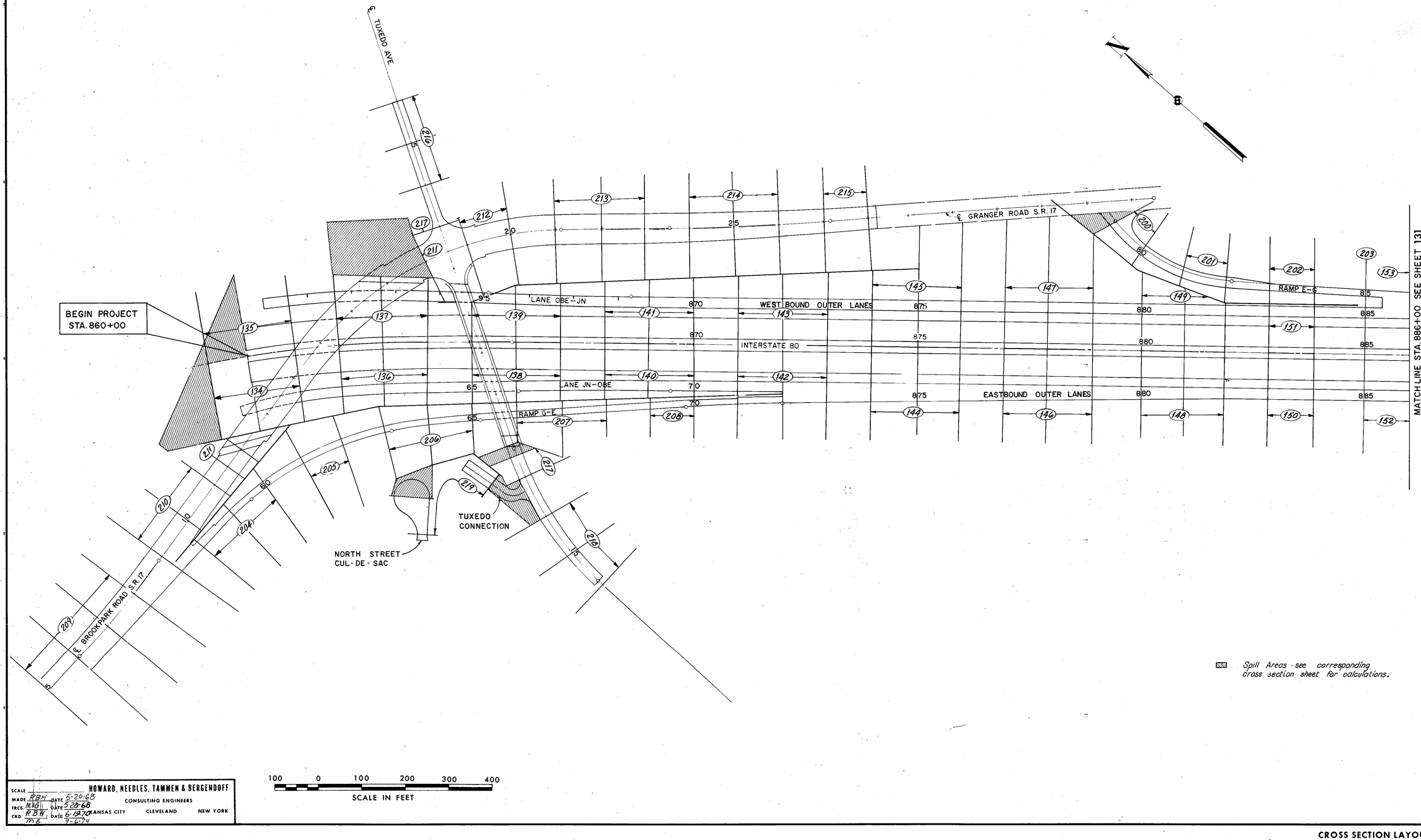
392

CUYAHOGA COUNTY
CUY.-80-15.81



Spill Areas - see corresponding cross section sheet for calculations.

100 0 100 200 300 400
SCALE IN FEET

SCALE
MADE RBH DATE 5-20-68
TRCD MAG DATE 5-28-68
CKD RBW DATE 6-19-70
M.B. 7-6-74

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

CROSS SECTION LAYOUT SHEET

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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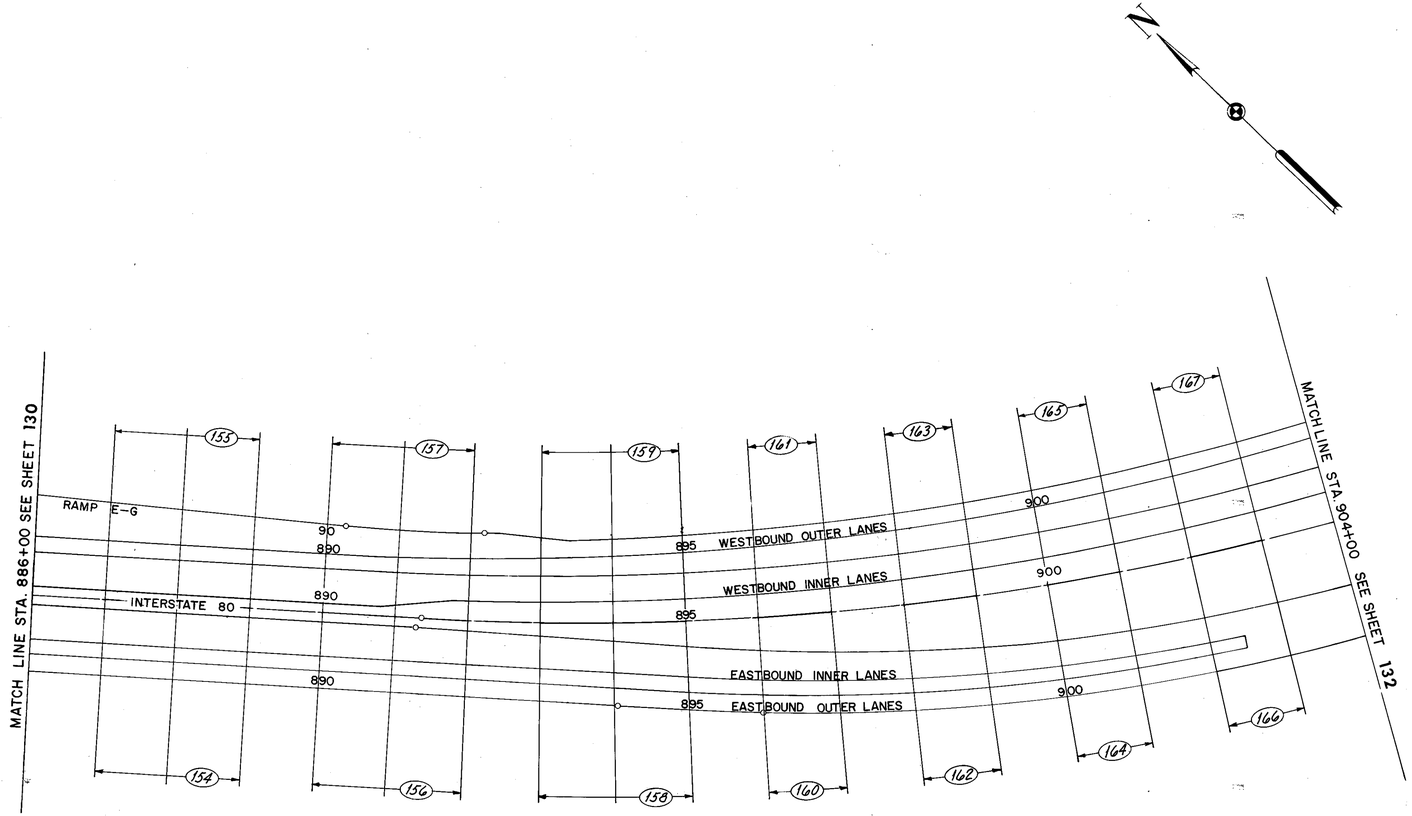
392

CUYAHOGA COUNTY
CUY.– 80–15.81



100 0 100 200 300 400
SCALE IN FEET

SCALE _____ DATE _____
MAD. MAG DATE 3-26-68
TRCD. DATE
CKD. R.B.H. DATE 6-19-70

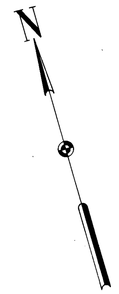
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

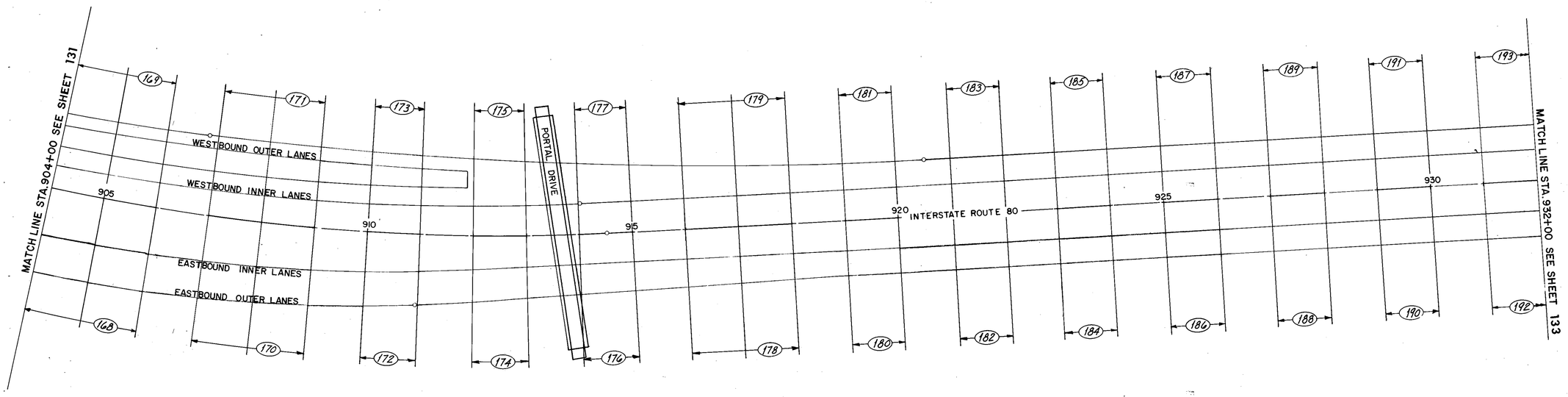
CROSS SECTION LAYOUT SHEET

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

132
392

CUYAHOGA COUNTY
CUY.– 80– 15.81





SCALE _____ DATE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE _____ DATE _____ CONSULTING ENGINEERS
TRCD. MAG DATE 5-3-68 KANSAS CITY CLEVELAND NEW YORK
CKD. R.B.H. DATE 7-14-70

100 0 100 200 300 400
SCALE IN FEET

CROSS SECTION LAYOUT SHEET

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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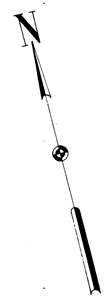
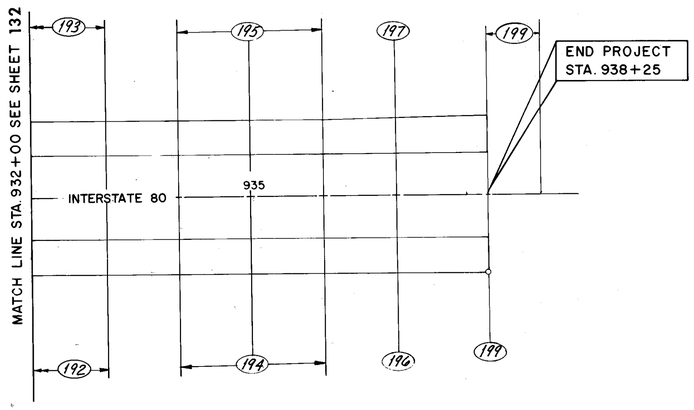
392

CUYAHOGA COUNTY
CUY.– 80–15.81





SCALE _____ DATE _____
MADE _____ DATE _____
TRCD. MAG DATE 6-3-68
CKD. R.B.H. DATE 7-14-70

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

100 0 100 200 300 400
SCALE IN FEET

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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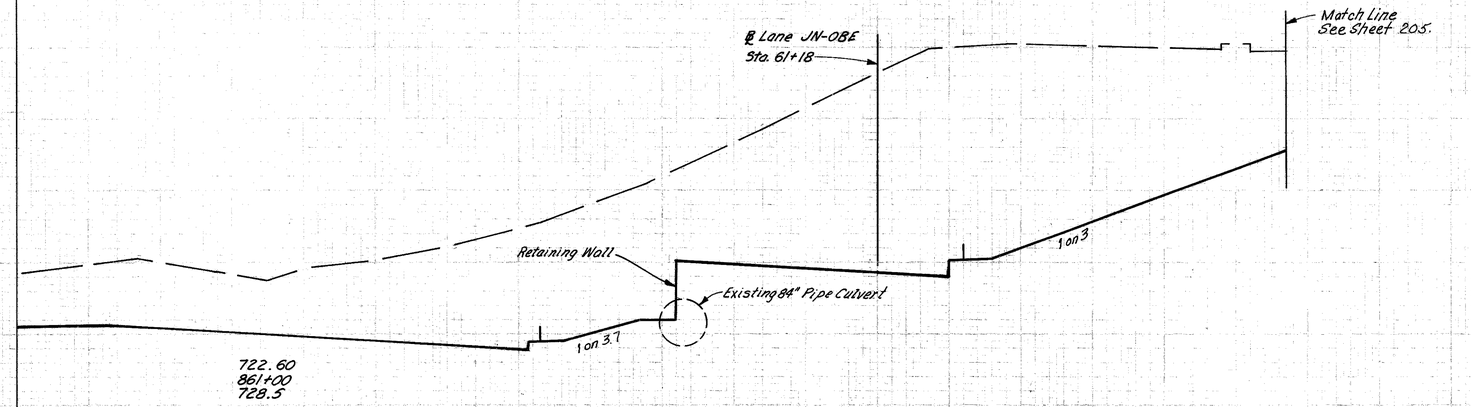
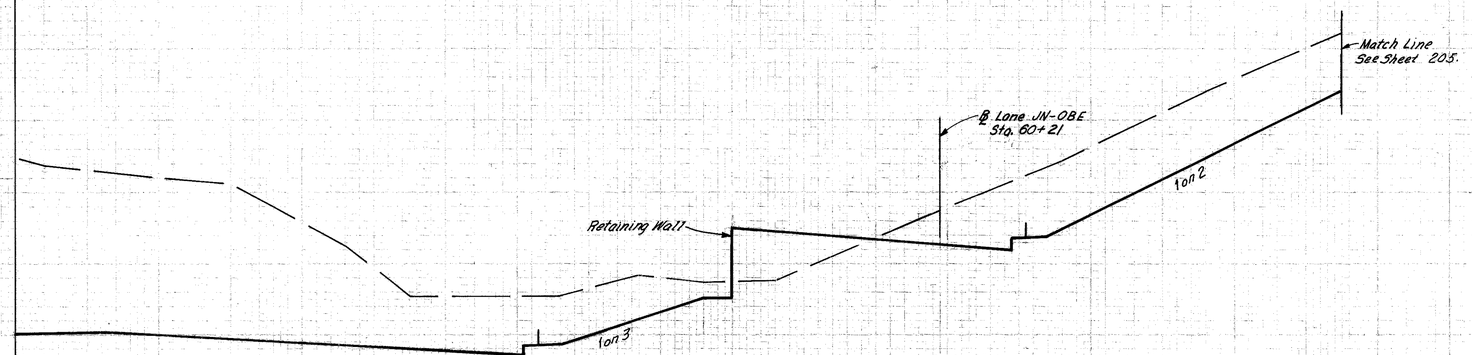
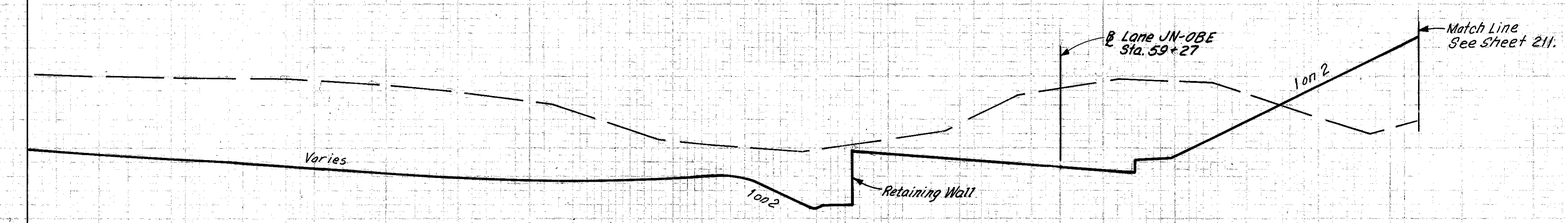
CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70







	EARTHWORK			
	AREA		VOLUME	
END	EXC.	EMB.	EXC.	EMB.
760				
740				
720				
	3094	0		
760				
740			9072	189
720				
	1805	102		
760				
			6144	431
740				
	1513	131		
720				

Note:
For the Spill Quantities see the Left Half at Sta. 860+00, I-80.
See Sheet 135.

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 STA. 859+00 RIGHT HALF TO STA. 861+00

04-6.97 0.7% 8-68 8-68 MW

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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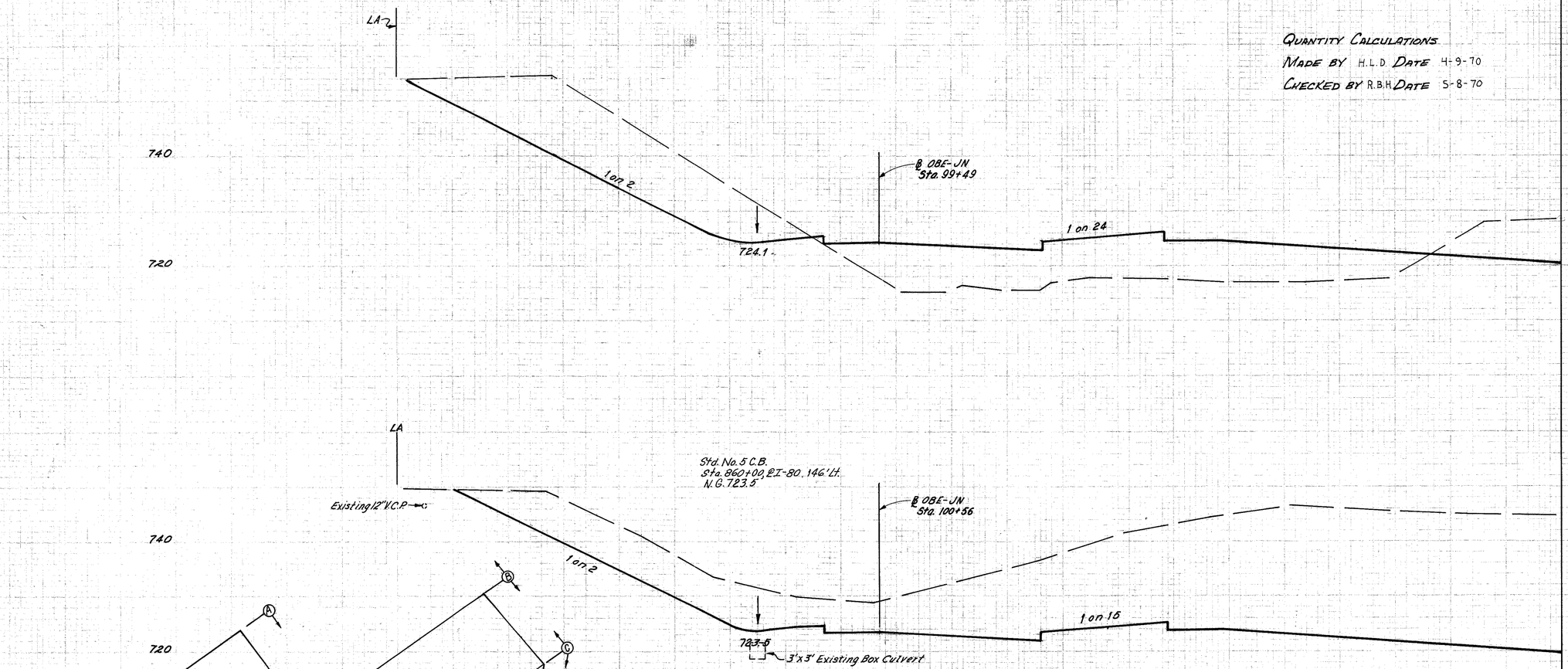
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D. DATE 4-9-70
CHECKED BY R.B.H. DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
722.06 861+00 728.5	825	710	
		6731	1315
721.78 860+00 744.8	2810	0	
Spill Quantity		10230	218

Embankment

Section A-A & B-B
$\frac{1}{2}$ x 1 x 15 = 8 cu. yds.

Section B-B & B'B' & C-C
$\left(\frac{81+131}{2} \times 82\right) \div 27$ = 210 cu. yds.

Total 218 cu. yds.

Excavation

Section A-A & B-B
$\left(\frac{2810+220}{2} \times 100\right) \div 27$ = 5600 cu. yds.

Section B-B & B'-B' & C-C
$\left(\frac{787+1783}{2} \times 82\right) \div 27$ = 3910 cu. yds.

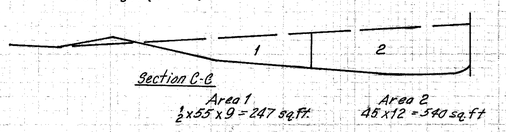
Section C-C & D-D
$\left(\frac{787+0}{2} \times 49.5\right) \div 27$ = 720 cu. yds.

Total 10230 cu. yds.

Note:
For location of Spill Area see Sheet 122.

Section B-B

Excavation
$\frac{1}{2}$ x 55 x 8 = 220 sq. ft.
1563 sq. ft.
1783 sq. ft. (Rt. Side)



Section C-C

Area 1
$\frac{1}{2}$ x 55 x 9 = 247 sq. ft.

Area 2
45 x 12 = 540 sq. ft.

Total 787 sq. ft.

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

LEFT HALF
INTERSTATE 80 STA. 860+00 TO STA. 861+00

MB-5-2.68 (N.B.-S.B.-I-80)
716+68 to 720+80

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70

℄ JN-OBE
Sta. 64+05

Match Line
See Sheet 206.

Existing 12" R.C.P.

Existing 12" R.C.P.

1 on 22

1 on 2.5

725.06
864+00
750.7

℄ JN-OBE
Sta. 63+07

Match Line
See Sheet 206.

Existing 12" R.C.P.

724.24
863+00
752.7

Retaining Wall

1 on 4

1 on 3

℄ JN-OBE
Sta. 62+12

Match Line
See Sheet 205.

Existing 12" R.C.P.

723.42
862+00
734.7

Retaining Wall

1 on 4

1 on 4

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1553	0		
		6222	0
1807	0		
		7154	0
2056	0		
		9537	0
Sta. 861+00 3094	0		

760
740
720
760
740
720
760
740
720

0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 STA. 862+00 RIGHT HALF TO STA. 864+00

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

M46 5-6-68
SN-14-5(68)
CUY 4-5.17 0

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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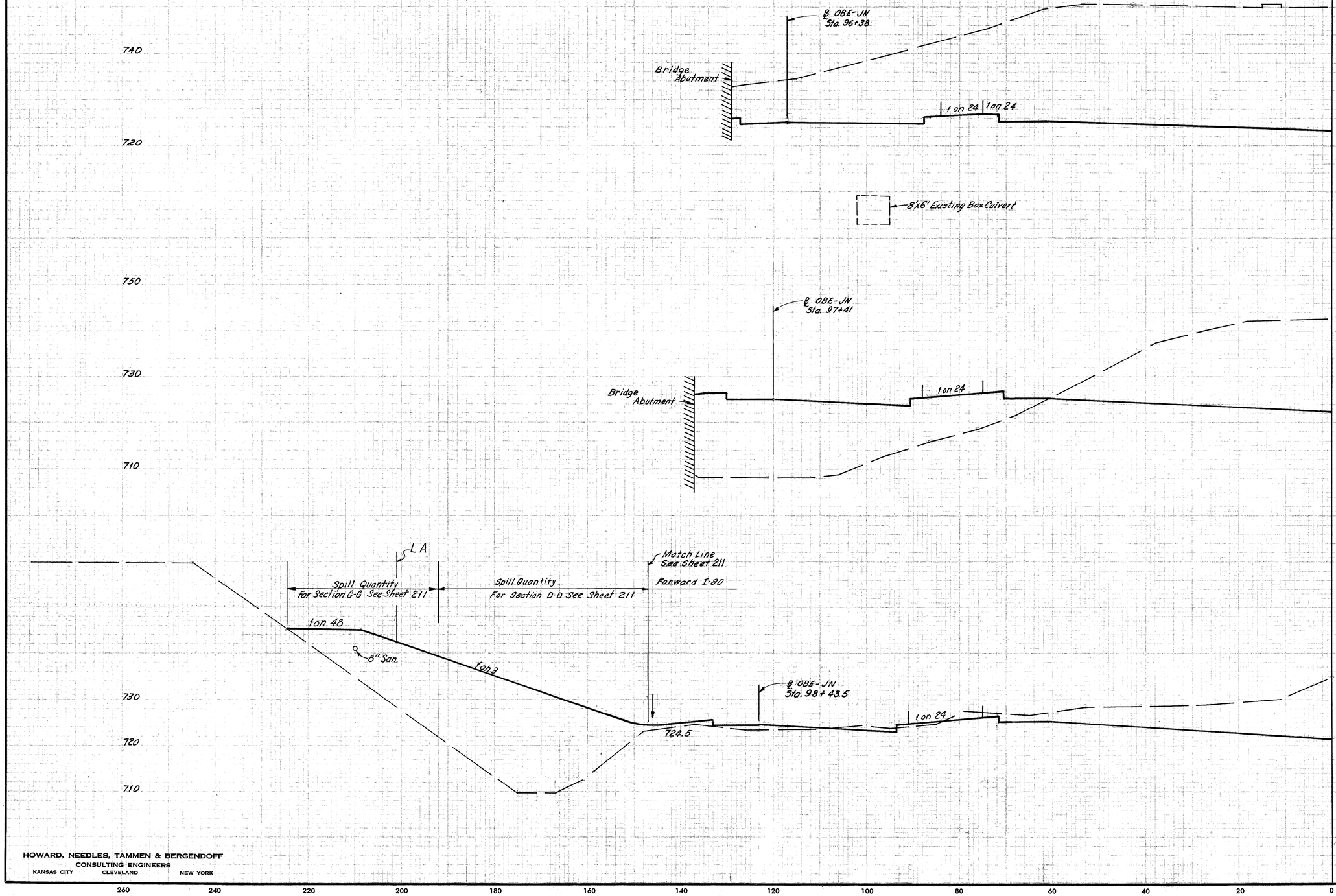
CUYAHOGA COUNTY
CUY-80-15.81



EARTHWORK

	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
725.06 864+00 750.1	2567	0		
			6281	1696
724.24 863+00 752.7	825	916		
			2283	1743
723.42 862+00 734.7	408	25		
			2283	1361
Sta. 861+00	825	710		

MAB 5-2-68 RWS 5-14-68 HLD 4-7-70

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

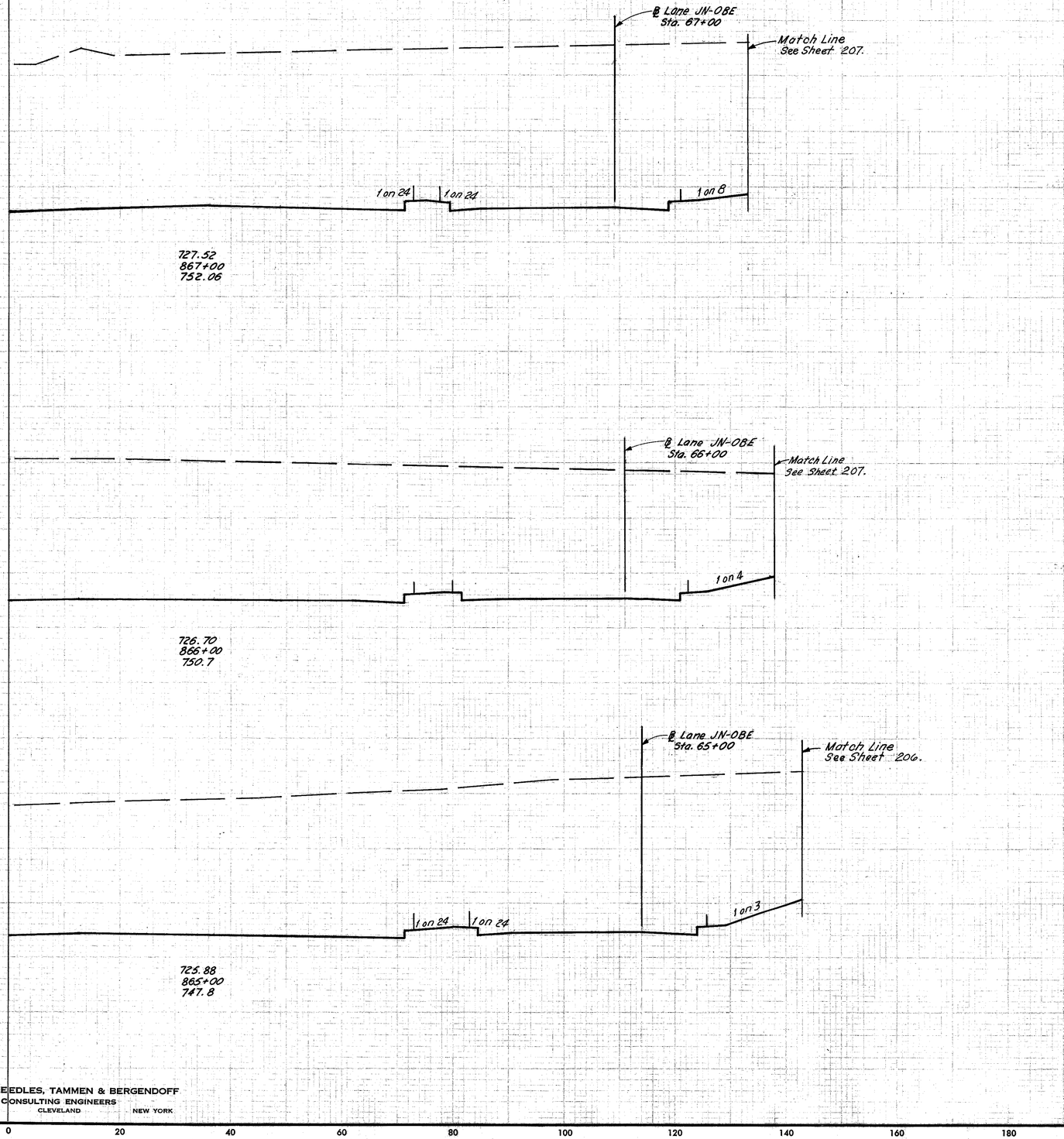
INTERSTATE 80 STA. 862+00 LEFT HALF TO STA. 864+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3735	0		
		13096	0
3337	0		
		13069	0
3720	0		
		9765	0
Sta. 864+00 1553	0		

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

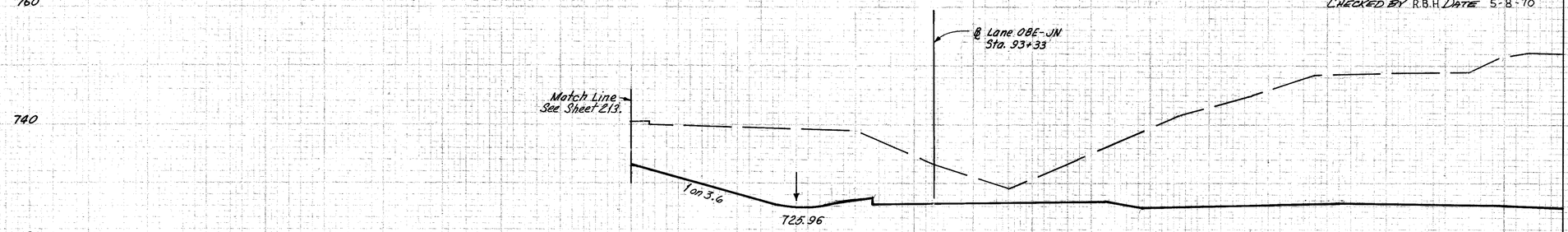
INTERSTATE 80 RIGHT HALF STA. 865+00 TO STA. 867+00

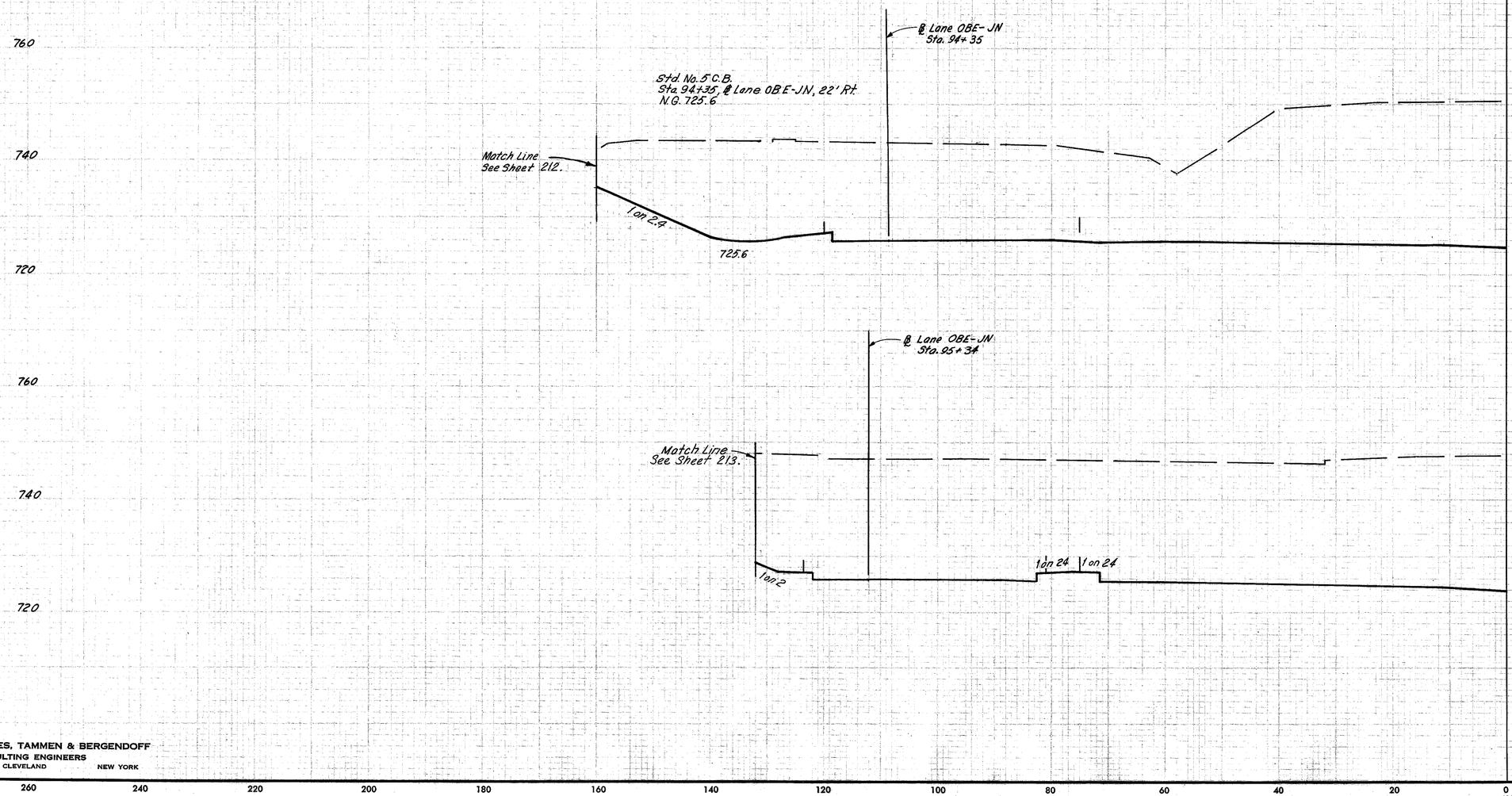
Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
727.52 867+00 752.00	2279	0	
		9618	0
726.70 866+00 750.70	2915	0	
		10561	0
725.88 865+00 747.8	2788	0	
		9917	0
Sta. 864+00	2567	0	

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

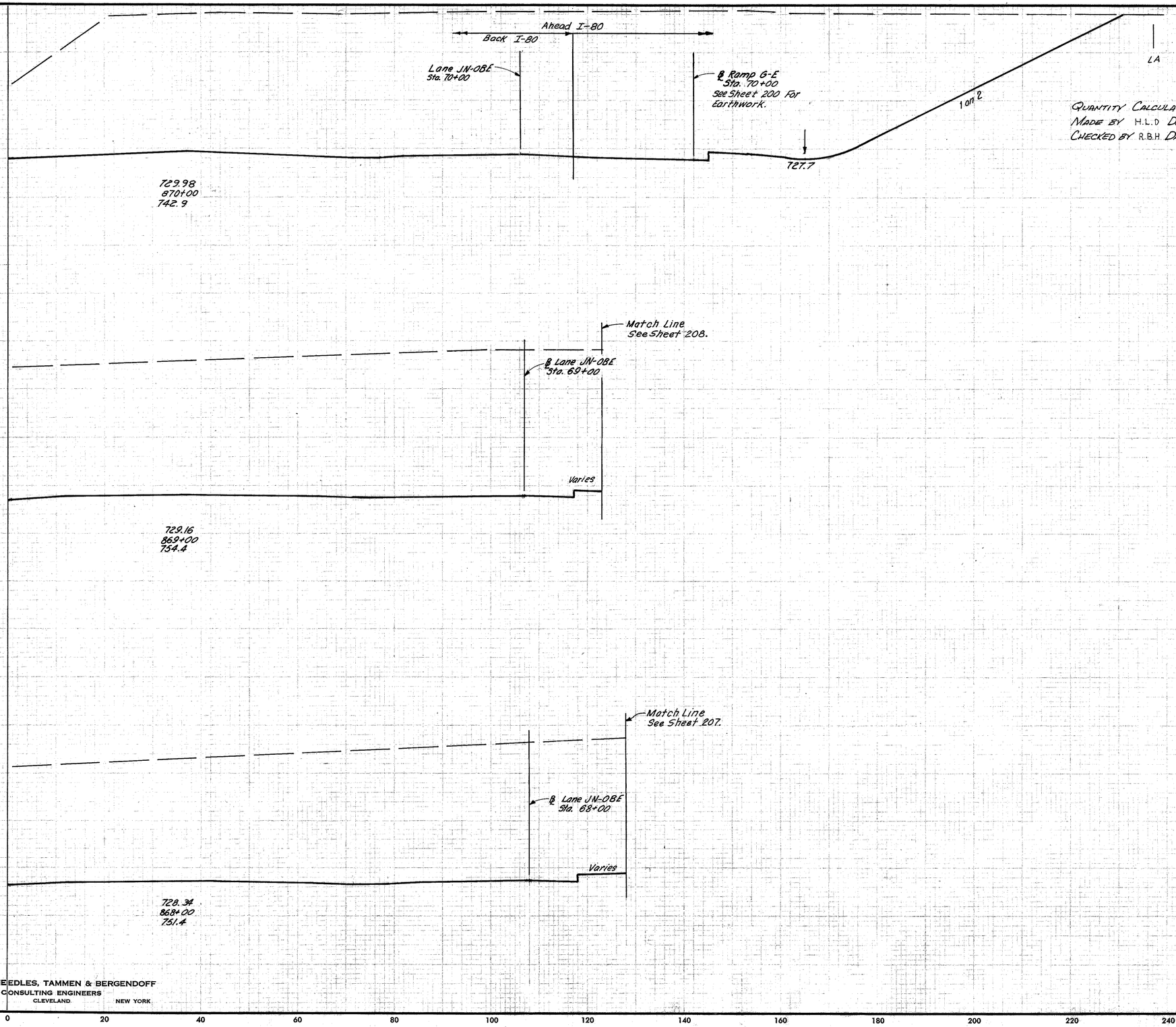
INTERSTATE 80 LEFT HALF STA. 865+00 TO STA. 867+00

HLD 4-9-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

40
392

CUYAHOGA COUNTY
CUY-80-15.81



Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70

		EARTHWORK			
		END AREA		VOLUME	
		EXC.	EMB.	EXC.	EMB.
Ahead I-80		5644	0		
Back I-80		3290	0		
				12648	0
		3540	0		
				13109	0
		3539	0		
				13470	0
Sta. 867+00		3735	0		

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

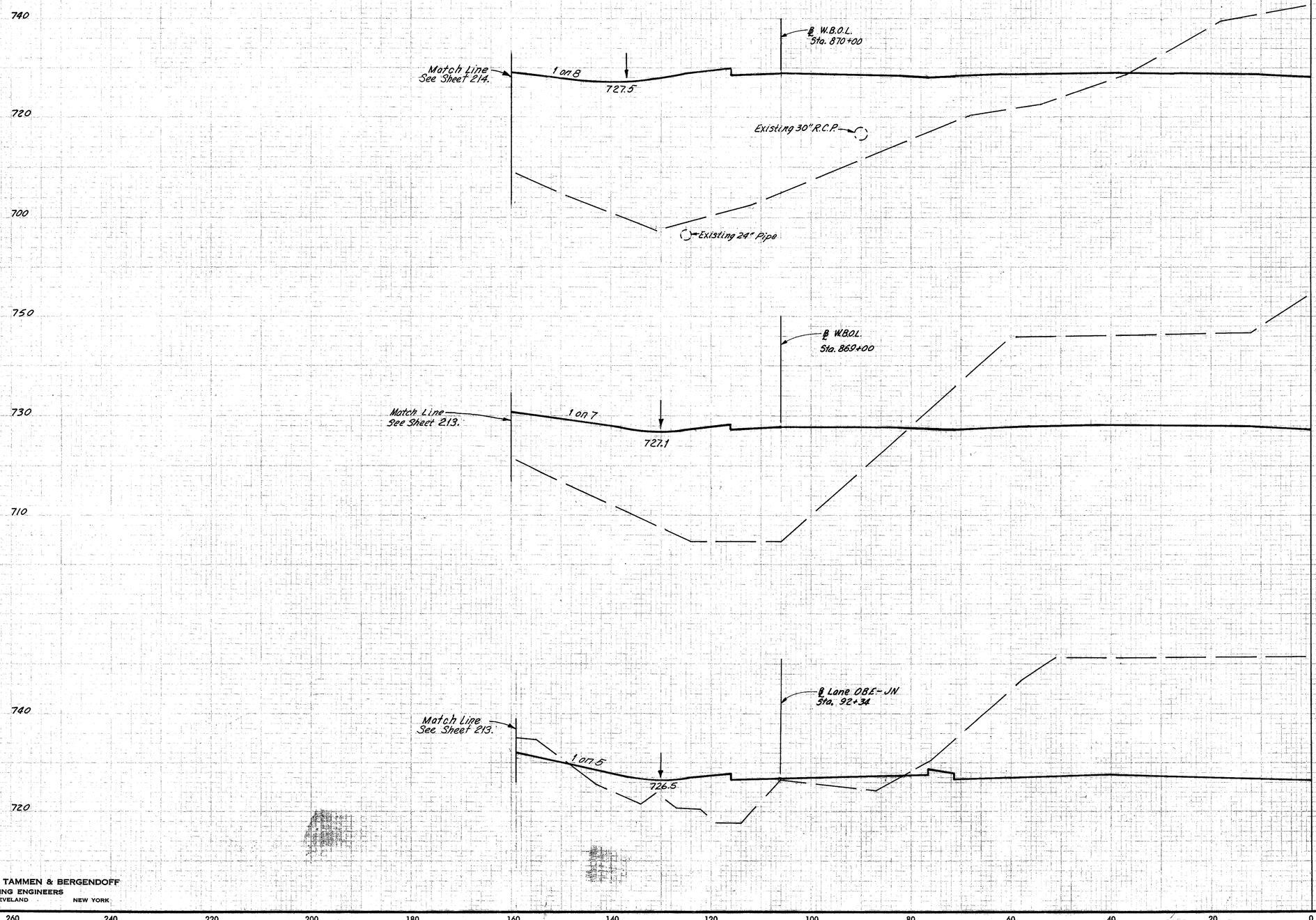
INTERSTATE 80 RIGHT HALF STA. 868+00 TO STA. 870+00

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

(4) 392

CUYAHOGA COUNTY
CUY-80-15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
729.98 870+00 742.9	321	2160	
		3065	6333
729.16 869+00 754.4	1334	1260	
		5506	2824
728.34 868+00 751.4	1639	265	
		7256	491
Sta. 867+00	2279	0	

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

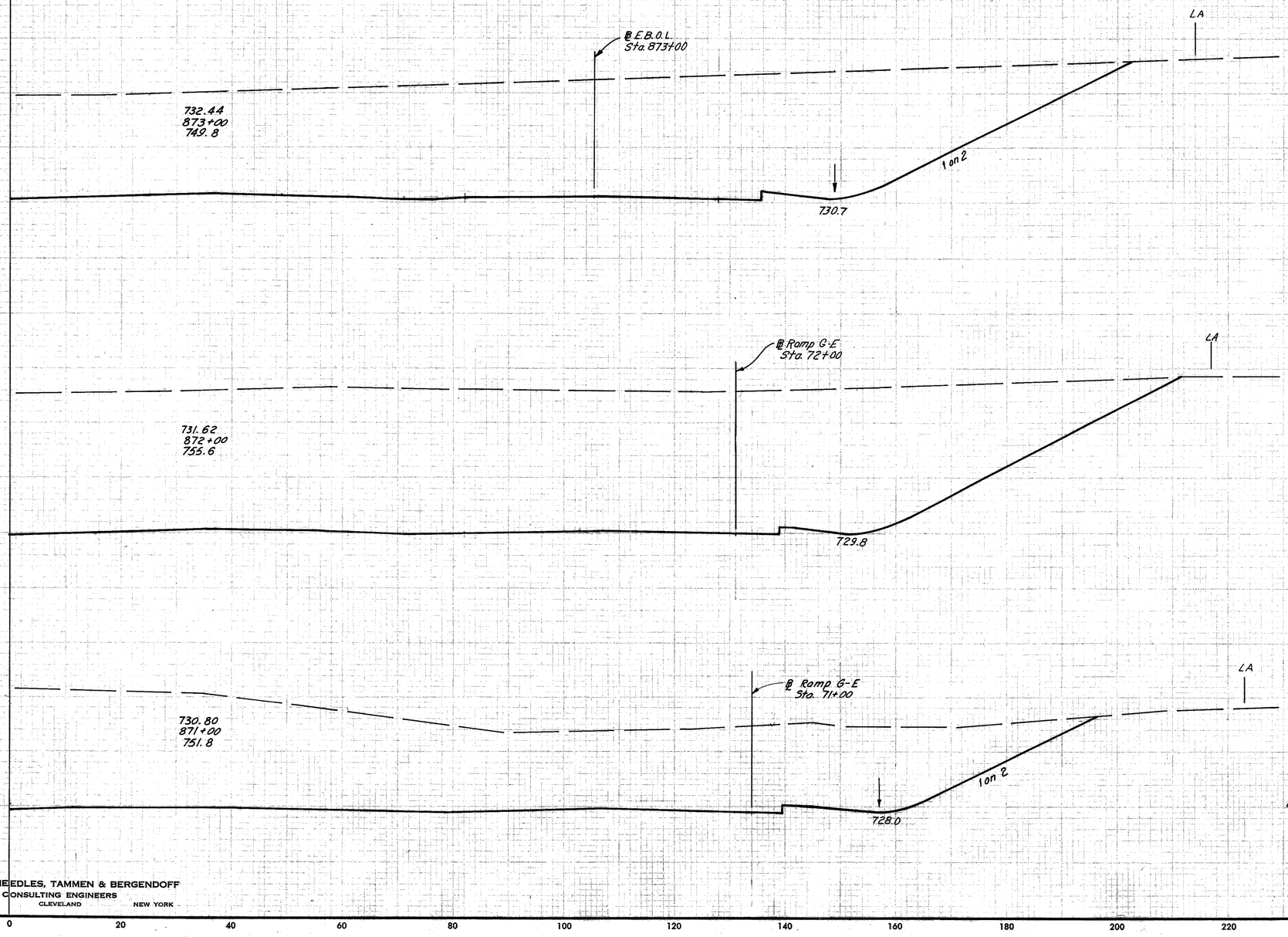
INTERSTATE 80 LEFT HALF STA. 868+00 TO STA. 870+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY—80—15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3730	0		
		15733	0
4766	0		
		14456	0
3040	0		
		16081	0
5644	0		

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

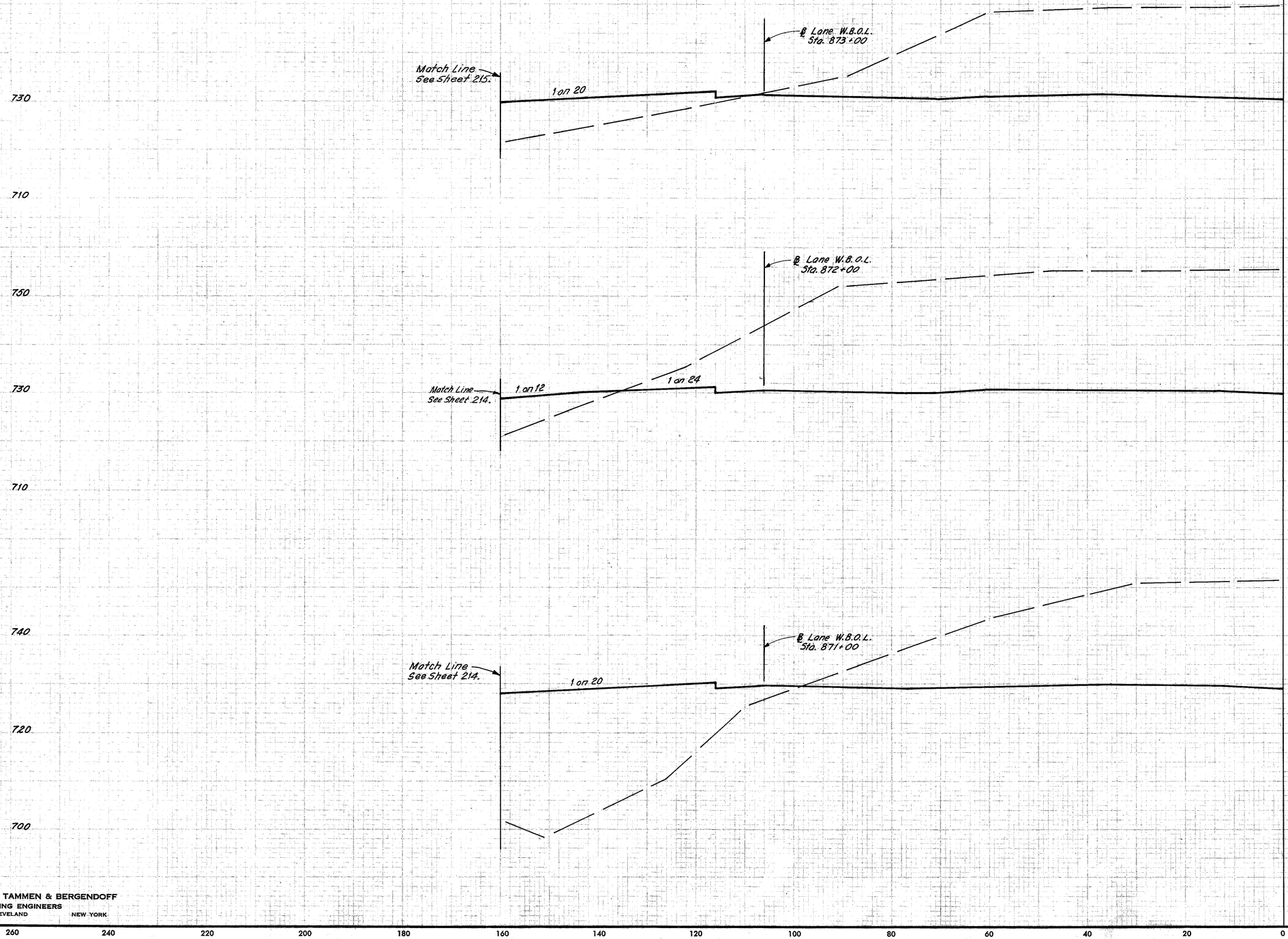
INTERSTATE 80 STA. 871+00 RIGHT HALF TO STA. 873+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

143
392

CUYAHOGA COUNTY
CUY-80-15.81

Quanity Calculations
Made By H.L.D Date 4-9-70
Checked By R.B.H Date 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
732.44 873+00 749.8	1441	244		
			7550	631
731.62 872+00 755.6	2636	97		
			7583	2178
730.80 871+00 751.8	1459	1079		
			3296	5998
Sta. 870+00	321	2160		

INTERSTATE 80 STA. 871+00 LEFT HALF TO STA. 873+00

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

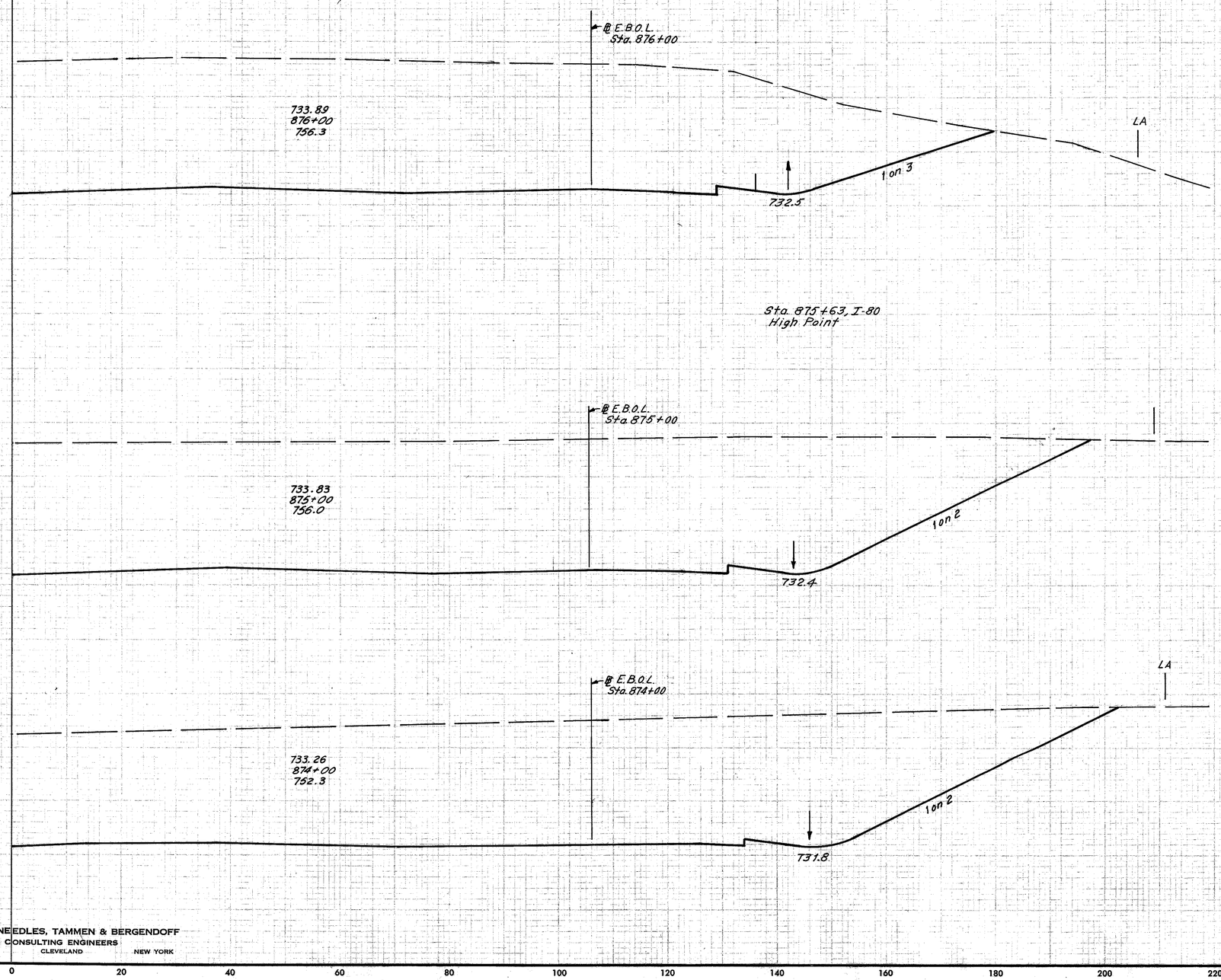
MAG 5268 (11) 80
SHEET 216
H.L.D 4-9-70

Quanity Calculations
Made By H.L.D Date 4-9-70
Checked By R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

44
392

CUYAHOGA COUNTY
CUY-80-15.81



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3699	0		
		14602	0
4186	0		
		15181	0
4012	0		
		14337	
Sta. 873+00 3730	0		

MAG. 5-6-68 DES. 11-15-68
SH. 11-54 REV. 4-9-70

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

RIGHT HALF
INTERSTATE 80 STA. 874+00 TO STA. 876+00

Quanity Calculations
Made By H.L.D Date 4-9-70
Checked By R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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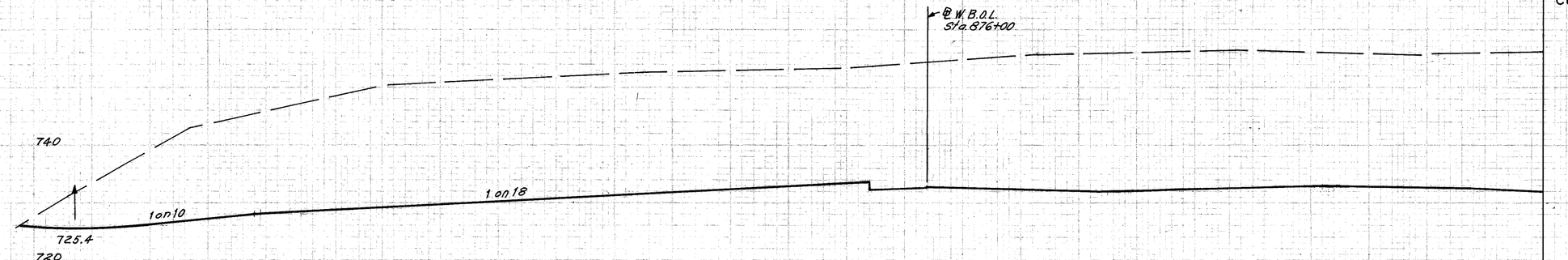
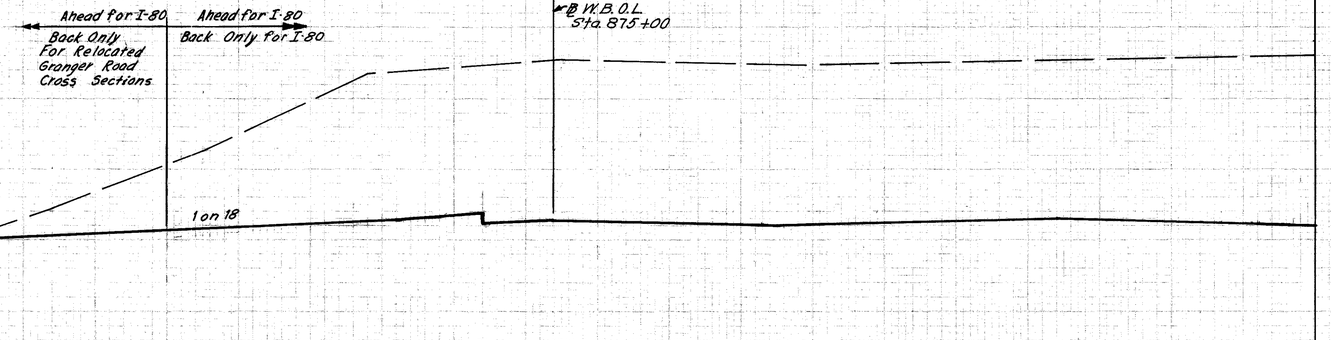
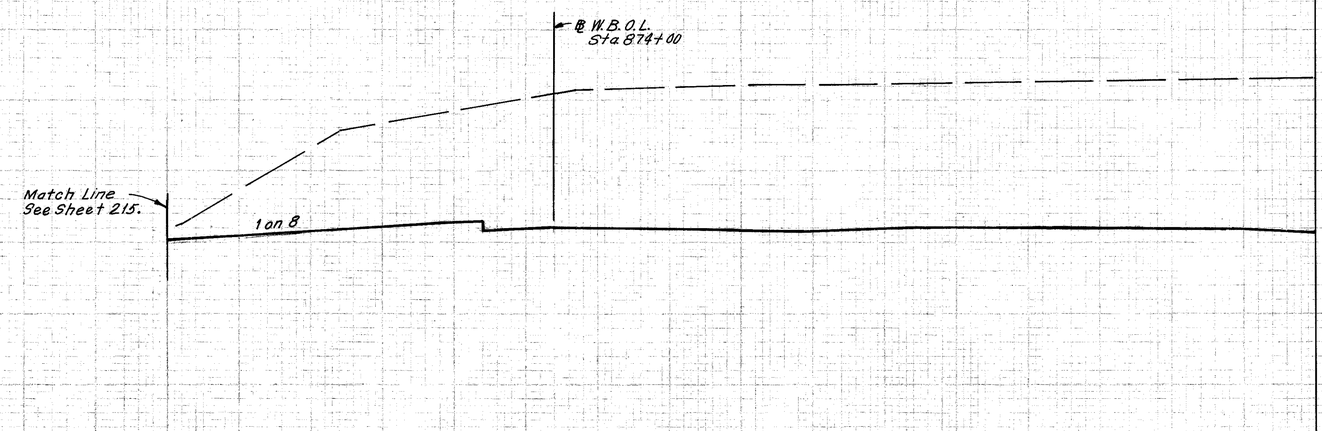
392

CUYAHOGA COUNTY
CUY-80-15.81







		EARTHWORK			
		END AREA		VOLUME	
		EXC.	EMB.	EXC.	EMB.
733.89 876+00 756.3		5325	0		
				16417	750
733.83 875+00 756.0	Ahead	3540	405		
	Back I-80	3408	0		
	Back Granger Rd.	132	405		
				11589	0
733.26 874+00 253.0		2850	0		
				7946	452
Sta. 873+00		1441	244		

260 240 220 200 180 160 140 120 100 80 60 40 20 0

LEFT HALF
INTERSTATE 80 STA. 874+00 TO STA. 876+00

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

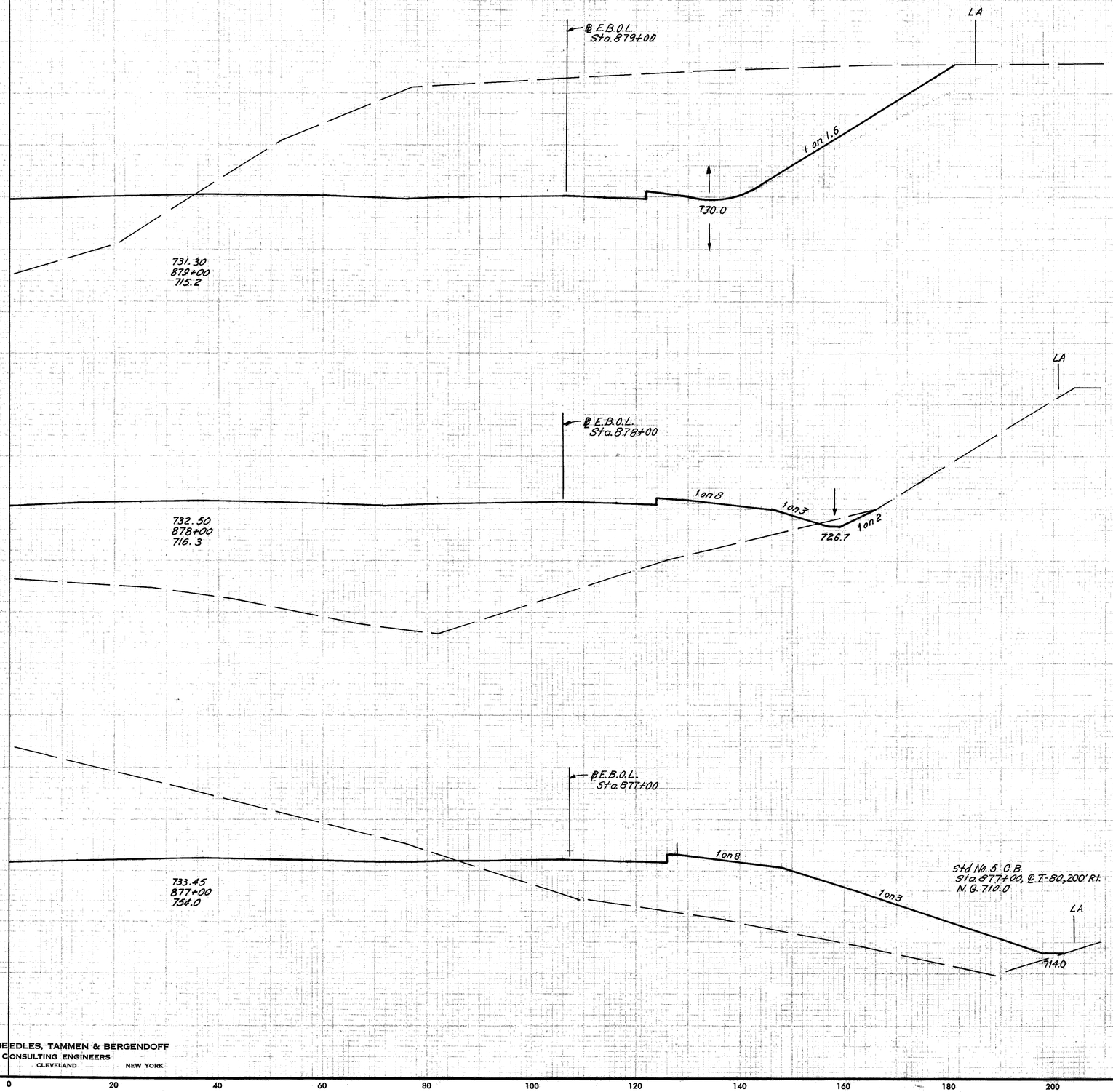
NAB-5-2-68 PRN-D-5-16-68 ST-11-10-4-7-70

QUANITY CALCULATIONS
Made By H.L.D DATE 4-9-70
Checked By R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

146
392

CUYAHOGA COUNTY
CUY—80—15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
2432	310		
		4524	5311
11	2358		
		1817	6488
970	946		
		8646	1751
Sta. 876+00	3699	0	

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

RIGHT HALF
INTERSTATE 80 STA. 877+00 TO STA. 879+

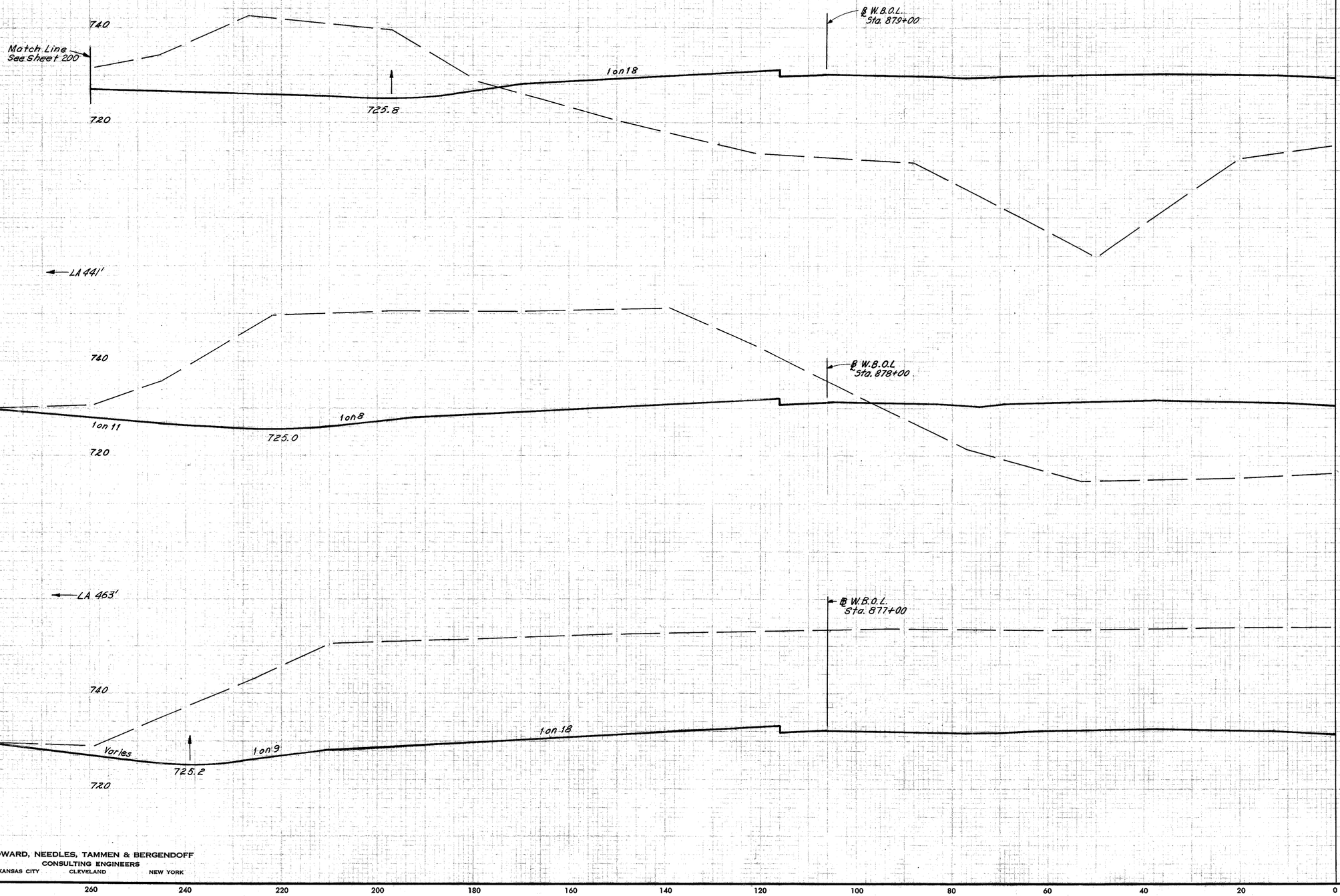
M46-5-68 Sht 15 of 88 Shts
Sht 15 of 88 Shts
Rev 4-8-70

QUANITY CALCULATIONS
Made By H.L.D DATE 4-9-70
Checked By R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY-80-15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
731.30 879+00 715.2	928	3299	
			6781 8424
732.50 878+00 716.3	2734	1250	
			14674 2315
733.45 877+00 754.0	5190	0	
			19472 0
Sta. 876+00	5325	0	

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 STA. 877+00 LEFT HALF TO STA. 879+00

QUANITY CALCULATIONS
Made By H.L.D Date 4-9-70
Checked By R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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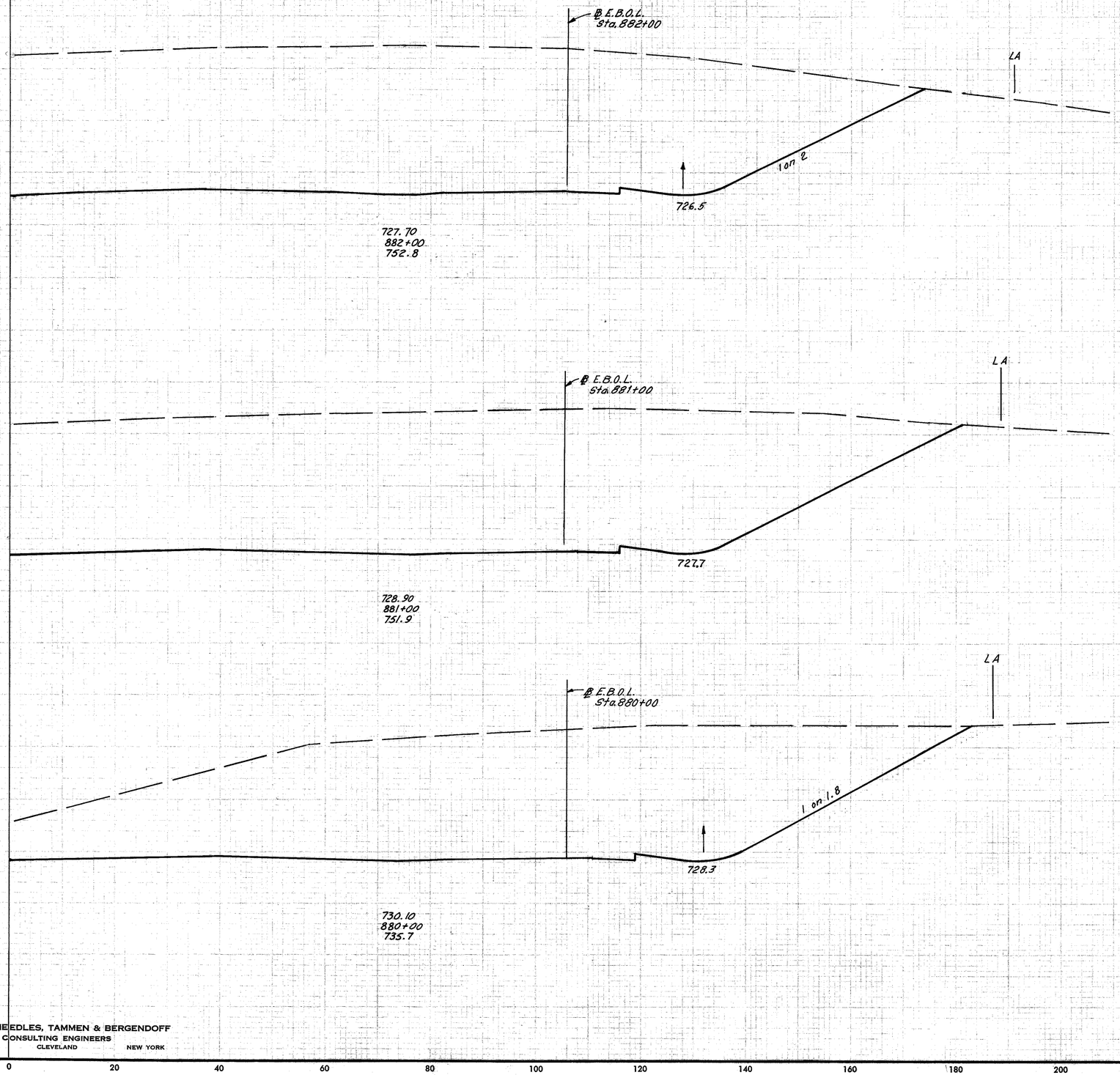
392

CUYAHOGA COUNTY
CUY-80-15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
4156	0		
		15400	0
4160	0		
		13844	0
3316	0		
		10644	574
Sta. 879+00 2432	310		

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

RIGHT HALF
INTERSTATE 80 STA. 880+00 TO STA. 882+00

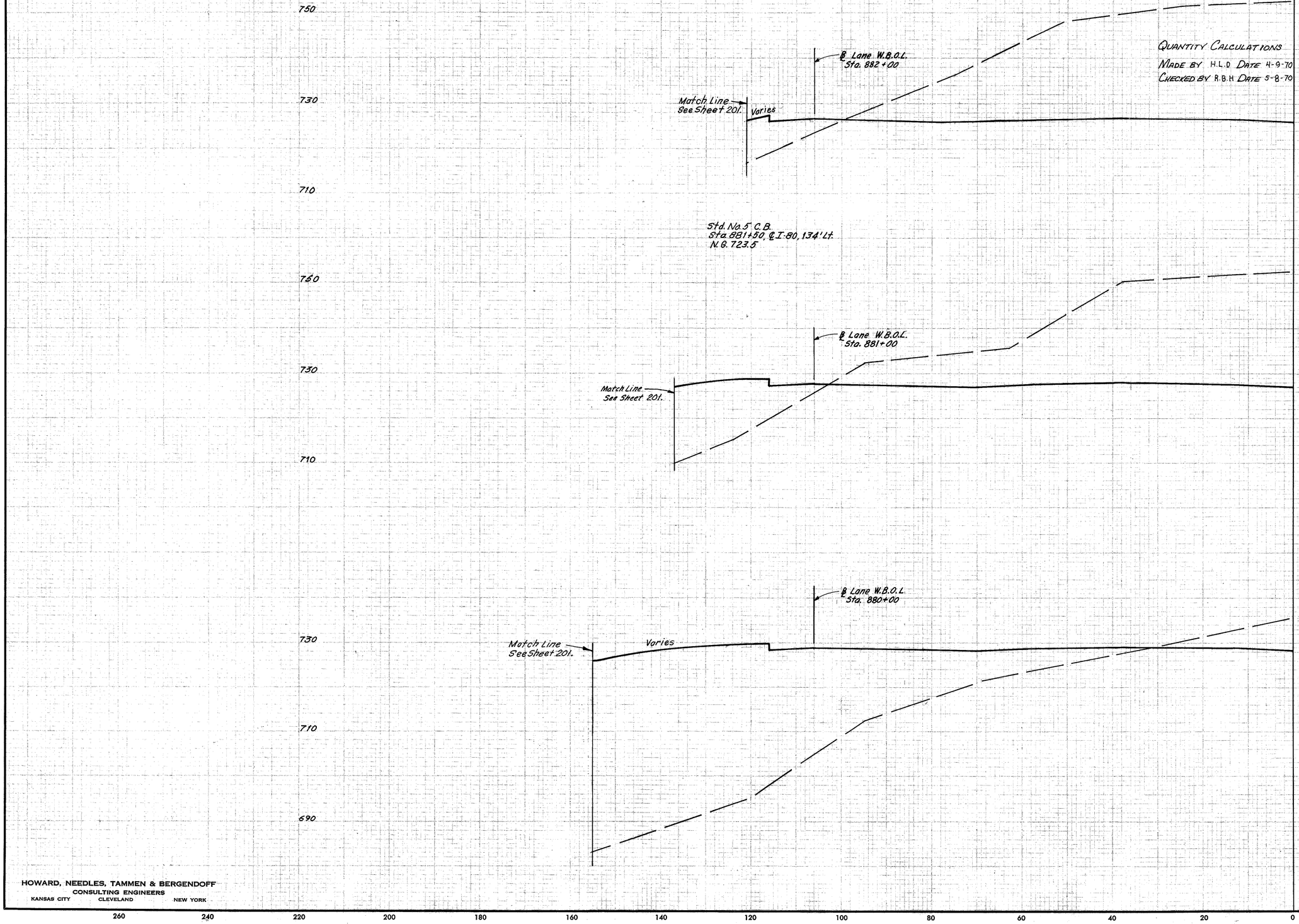
MAR 5-71 (R.H.) (H.O.) 4-9-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

142
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
727.70 882+00 752.8	1741	120		
			6039	843
728.90 881+00 751.9	1520	335		
			3026	5120
730.10 880+00 735.7	114	2430		
			1930	10609
Sta. 879+00	928	3299		

MAF-33-8(8) NH
SAF-33-8(8) NH
H.D. 4-8-70

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

INTERSTATE-80 STA. 880+00 LEFT HALF TO STA. 882+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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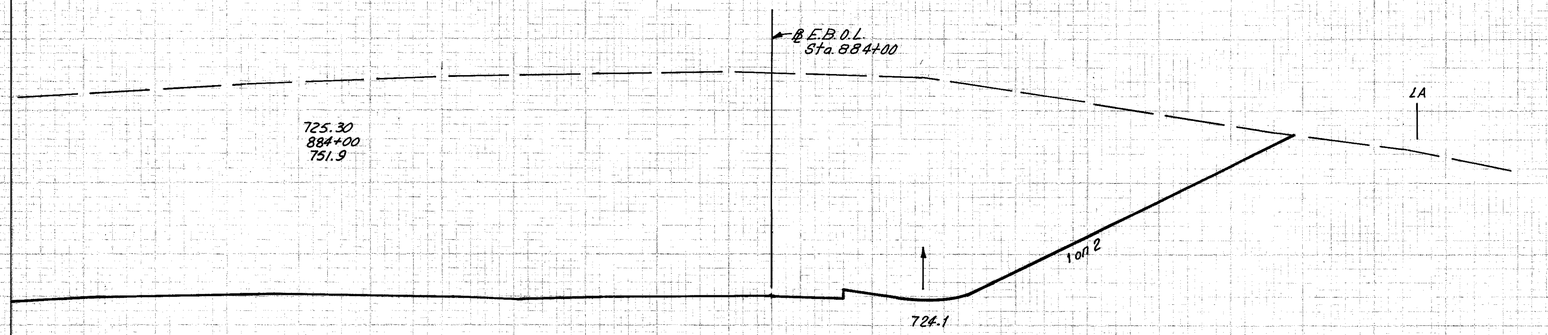
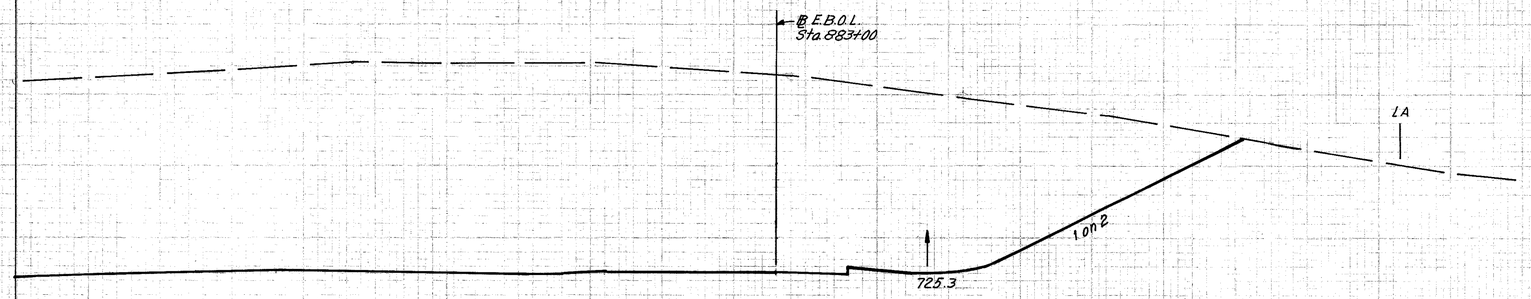
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
4690	0		
		16470	0
4204	0		
		15491	0
Sta. 882+00	4156	0	

750
730
750
730

0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 STA. 883+00 RIGHT HALF TO STA. 884+00

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

MAG. SYSTEM OF COORDINATES USED
SCALE: 1" = 20'
H.L.D 4-9-70

Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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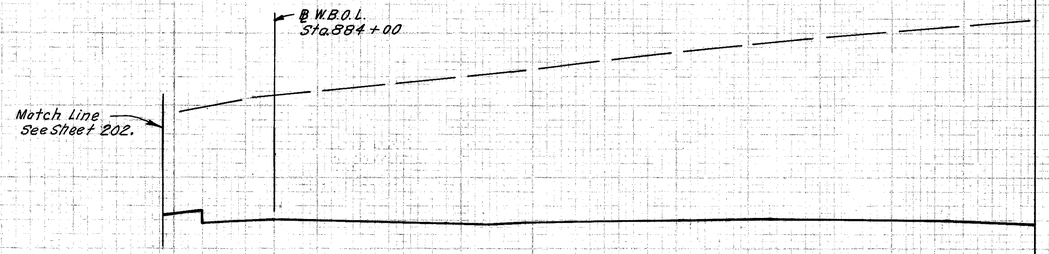
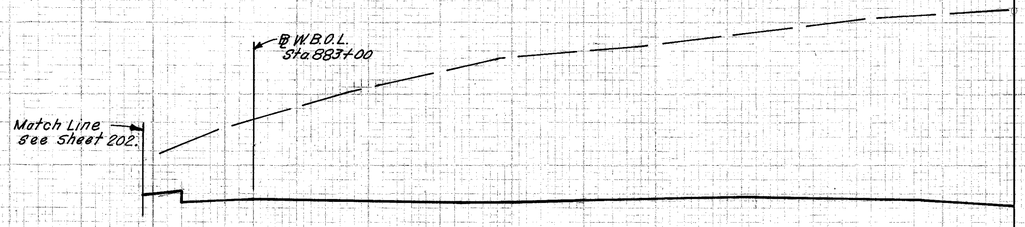
392

CUYAHOGA COUNTY
CUY-80-15.81





750
730
710
690
750
730
710

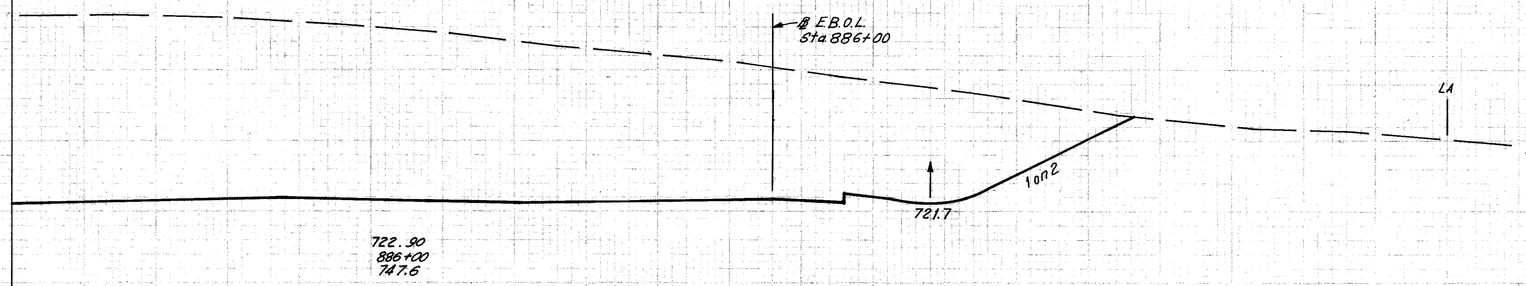
EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
725.30			
884+00	2680	0	
751.9			
		9315	0
726.50			
883+00	2350	0	
751.9			
		7576	222
Sta 882+00	1741	120	

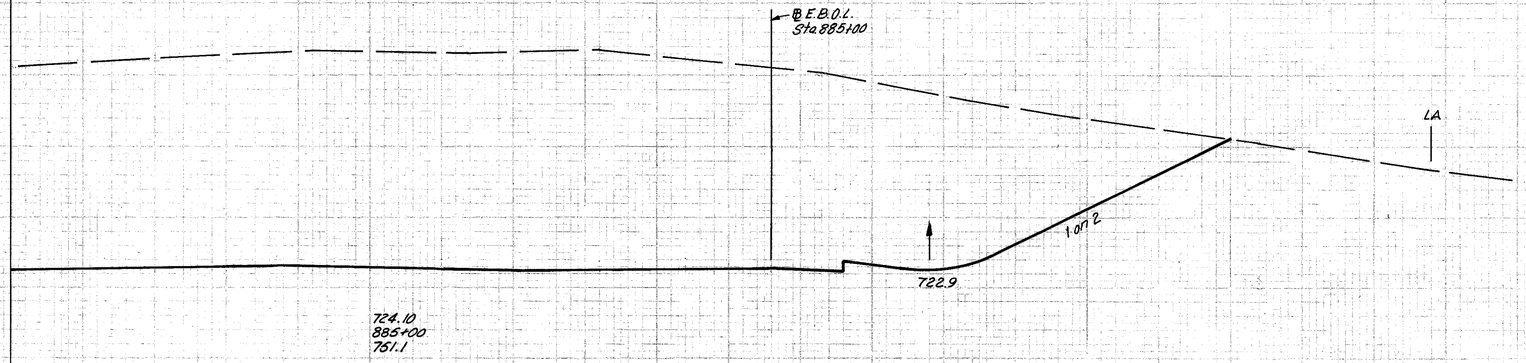
260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 STA. 883+00 LEFT HALF TO STA. 884+00

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

MAS 5-3-68 ~ 110.5-11.68
MAS 7-3-68 ~ 410.7-7.70





FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

152
392

CUYAHOGA COUNTY
CUY–80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70

MAG 5-7-68 ✓ HLD 5-17-68
RBH 11-13-68 ✓ RDT 11-19-68 ✓ SAV 12-3-68
HLD 4-9-70

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3142	0		
		13807	0
4314	0		
		16674	0
Sta. 884+00 4690	0		

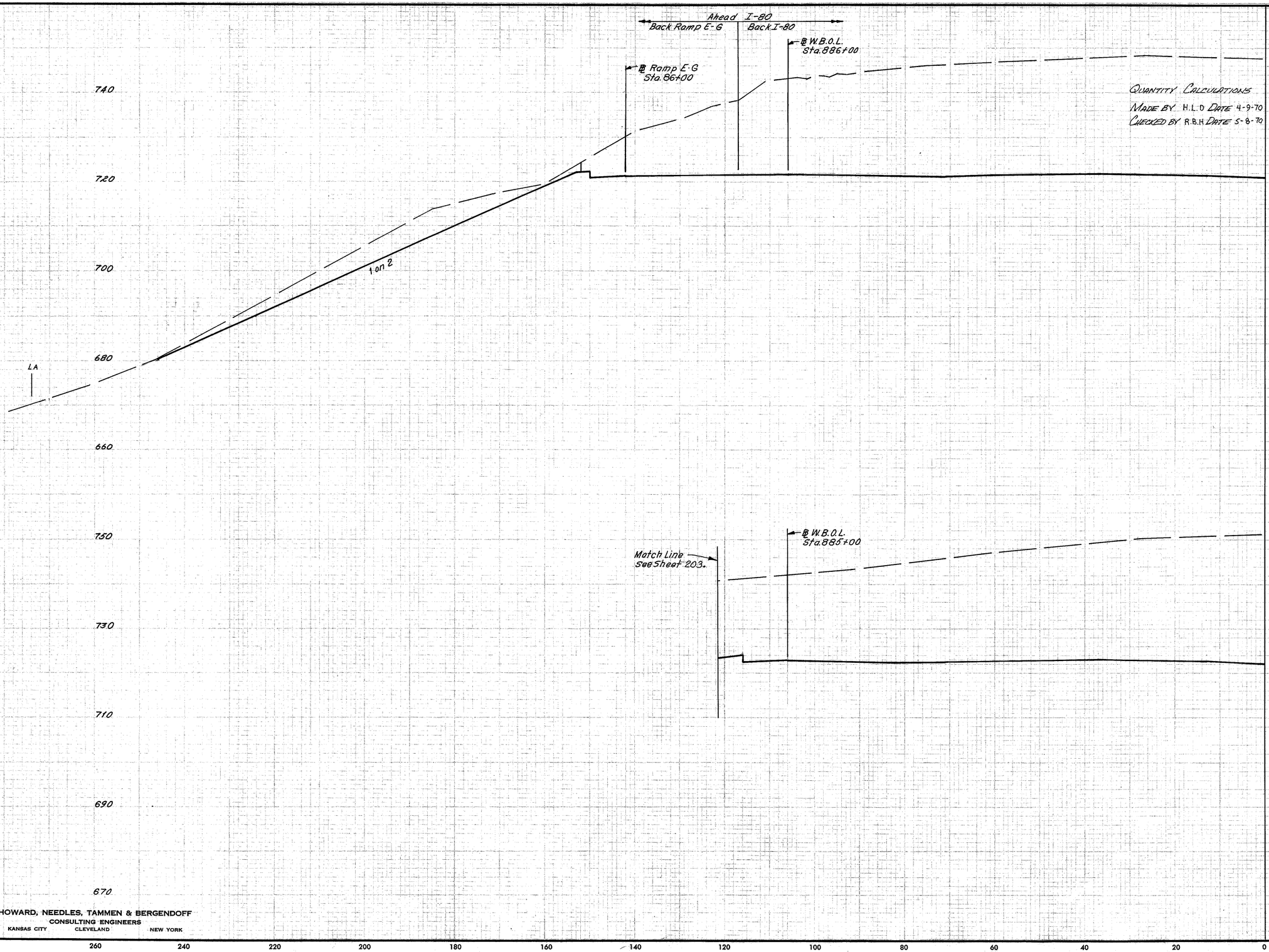
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

RIGHT HALF
INTERSTATE 80 STA. 885+00 TO STA. 886

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

153
392

CUYAHOGA COUNTY
CUY-80-15.81



Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
722.90 886+00 747.6				
Ahead I-80	3560	0		
Back Ramp E-G	665	0		
Back I-80	2895	0		
			10711	0
724.10 885+00 751.1	2889	0		
			10313	0
Sta. 884+00	2680	0		

MAS 5-P-68 (18) 114 WLD 5-17-68
HLD 4-7-70

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

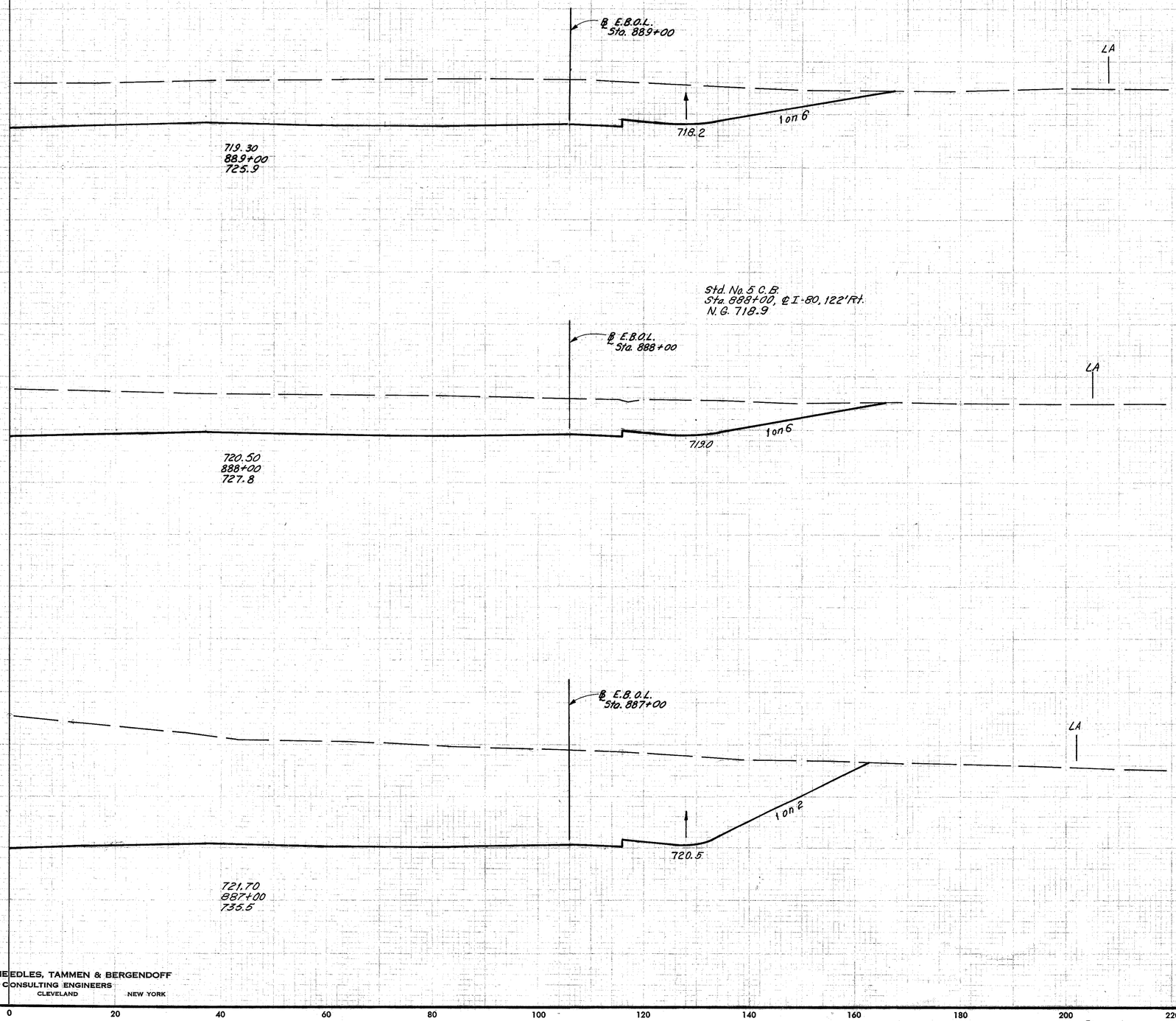
INTERSTATE 80 STA. 885+00 LEFT HALF TO STA. 886+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

154
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1220	0		
		4228	0
1063	0		
		7393	0
2329	0		
		11243	0
3142	0		

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

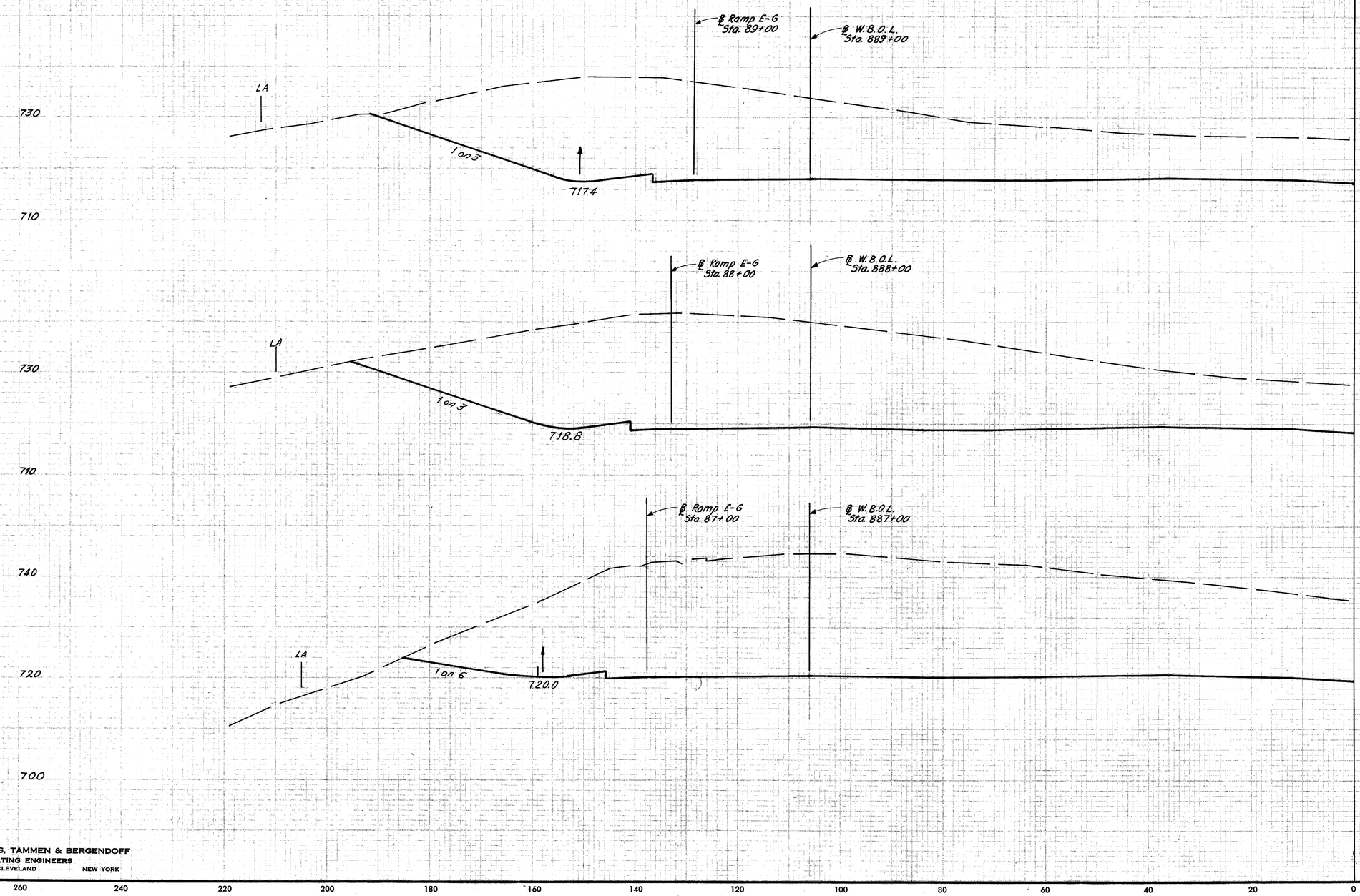
INTERSTATE 80 STA. 887+00 RIGHT HALF TO STA. 889+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

195
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
719.30 888+00 725.9	2377	0		
			9876	0
720.50 888+00 727.8	2956	0		
			12000	0
721.70 887+00 735.5	3524	0		
			13119	0
Sta. 886+00	3560	0		

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

INTERSTATE 80 STA. 887+00 LEFT HALF TO STA. 889+00

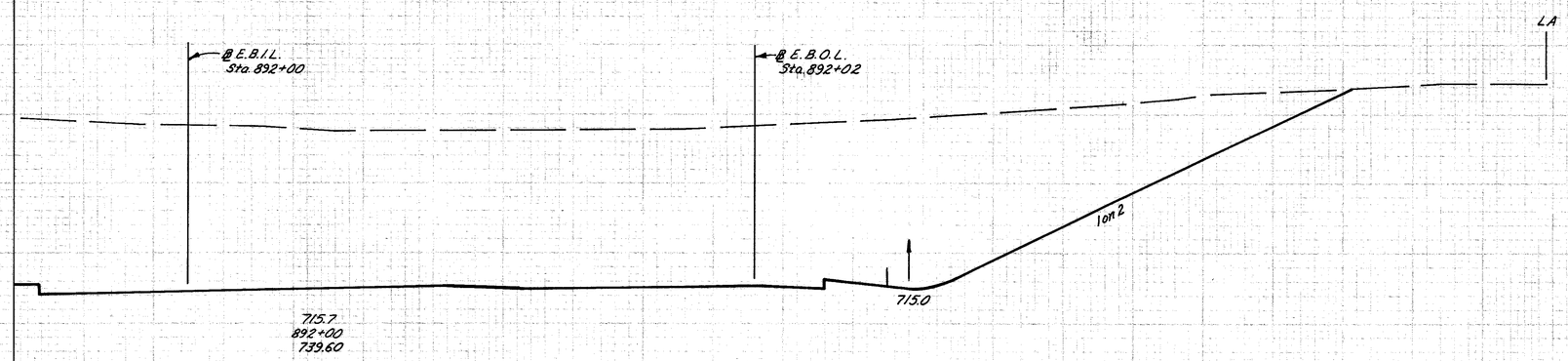
MAC-5-7768(4) 89.77
RBH 4-7-70
HLD 5-8-70

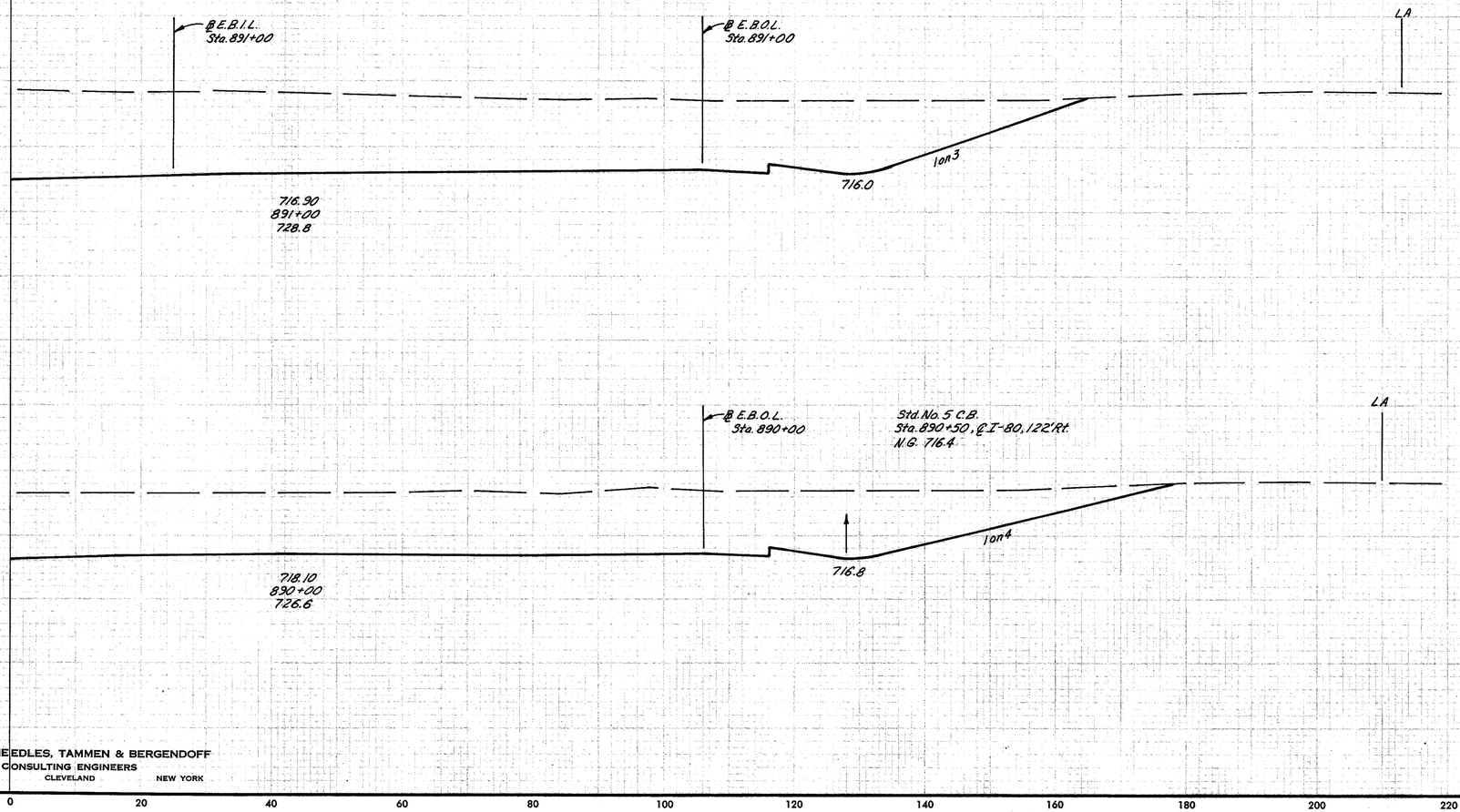
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

156
392

CUYAHOGA COUNTY
CUY.-80-15.81

Quantity Calculations
Made by H.L.D Date 4-10-70
Checked by R.B.H Date 5-8-70





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3787	0		
		10187	0
1714	0		
		5394	0
1523	0		
		5080	0
1220	0		

740
720
700
740
720
700
740
720
700
Sta. 889+00

0 20 40 60 80 100 120 140 160 180 200 220 240 260

RIGHT HALF
INTERSTATE 80 STA. 890+00 TO STA. 892+00

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

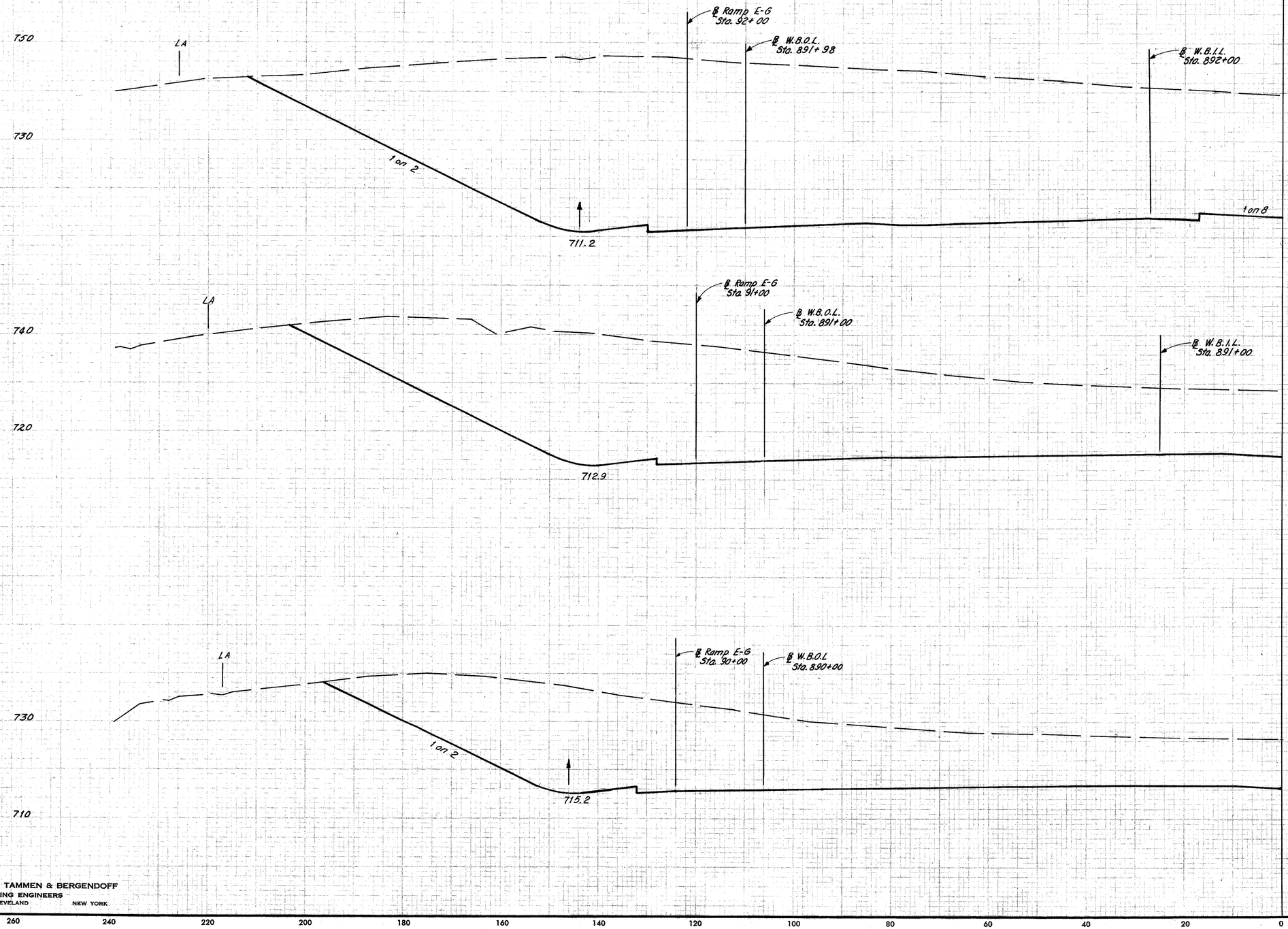
NAME 5-6-68 J HLD. 5-20-68
REV. 11-14-68 SRV 12-3-68
HLD 4-9-70
R.W. DCF-1-14-71

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

157
392

CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
715.70 892+00 732.6			
5746	0		
		17285	0
716.90 891+00 728.8			
3588	0		
		11491	0
718.10 890+00 726.6			
2617	0		
		9248	0
Sta. 889+00			
2377	0		

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 STA. 890+00 LEFT HALF TO STA. 892+00

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

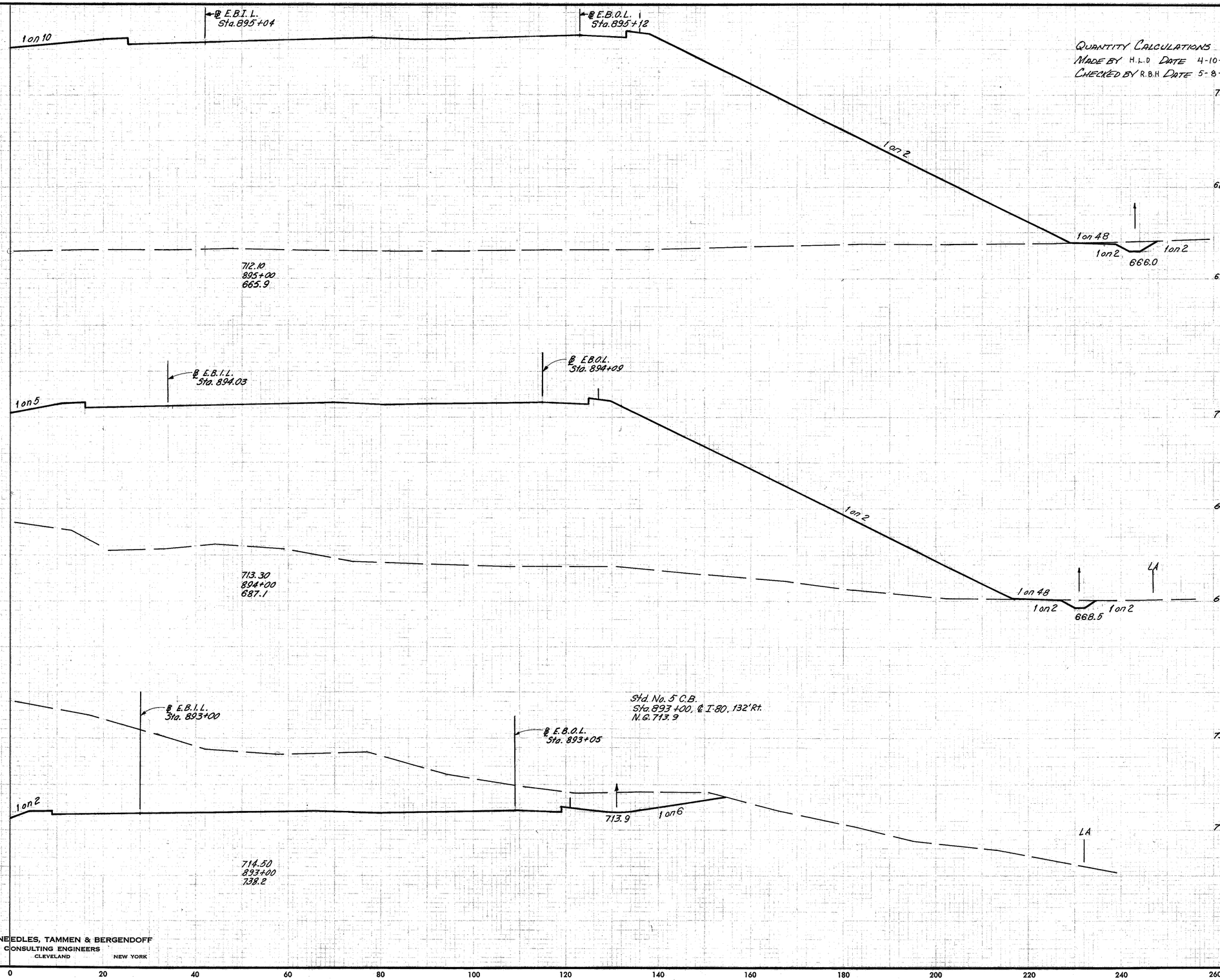
NO 4-7-72
IND 5-20-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

158
392

CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-10-70
Checked by R.B.H Date 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
20	8457		
		63	26407
14	5803		
		3211	10746
1720	0		
		10198	0
3787	0		

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

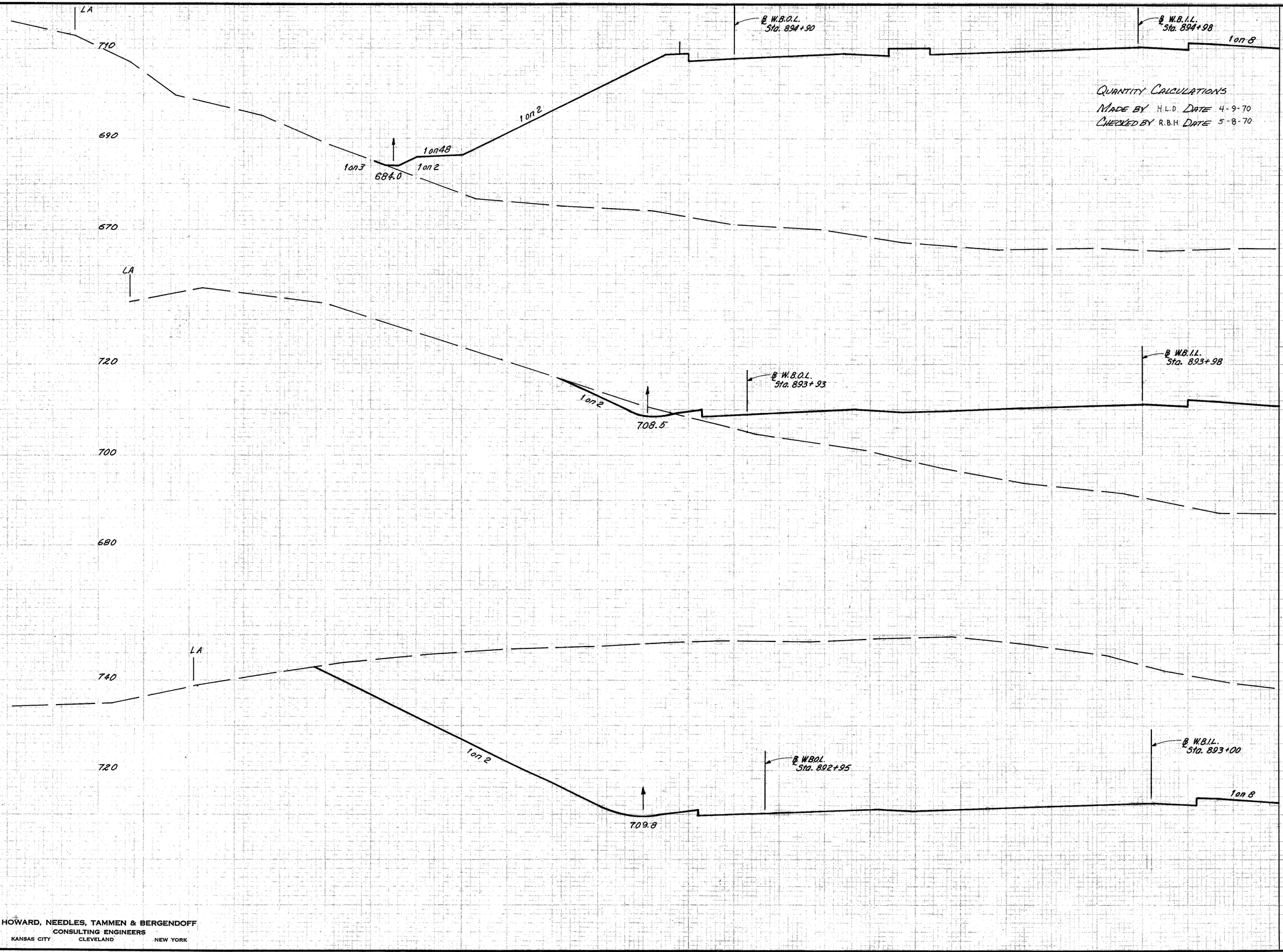
0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 STA. 893+00. RIGHT HALF TO STA. 895+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

158
392

CUYAHOGA COUNTY
CUY-80-15.81



Quantity Calculations
Made by H.L.D. Date 4-9-70
Checked by R.B.H. Date 5-8-70

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
712.10				
895+00	0	6685		
665.9				
			74	15707
713.30				
894+00	40	1797		
687.1				
				11927 3328
714+50				
893+00	6400	0		
738.2				
			22492	0
Sta. 892+00	5746	0		

MAG 5-5-68 → WLD 5-20-68
KBH 11-4-68
RLD 4-7-70

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

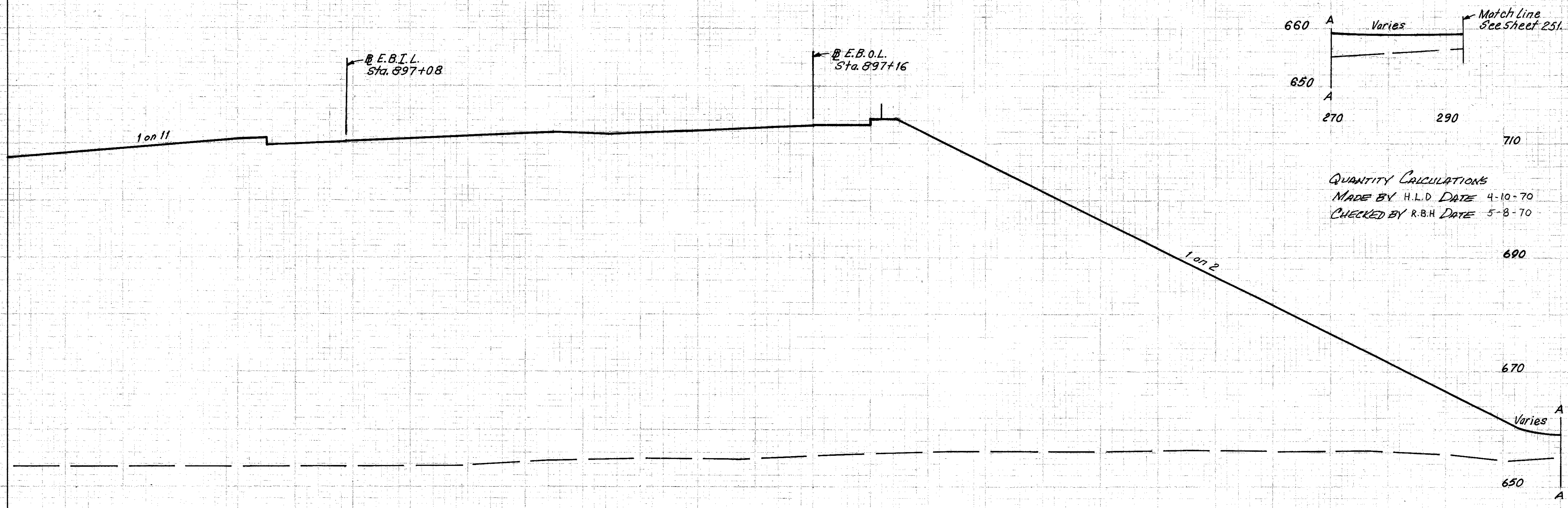
260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 STA. 893+00 LEFT HALF TO STA. 895+00

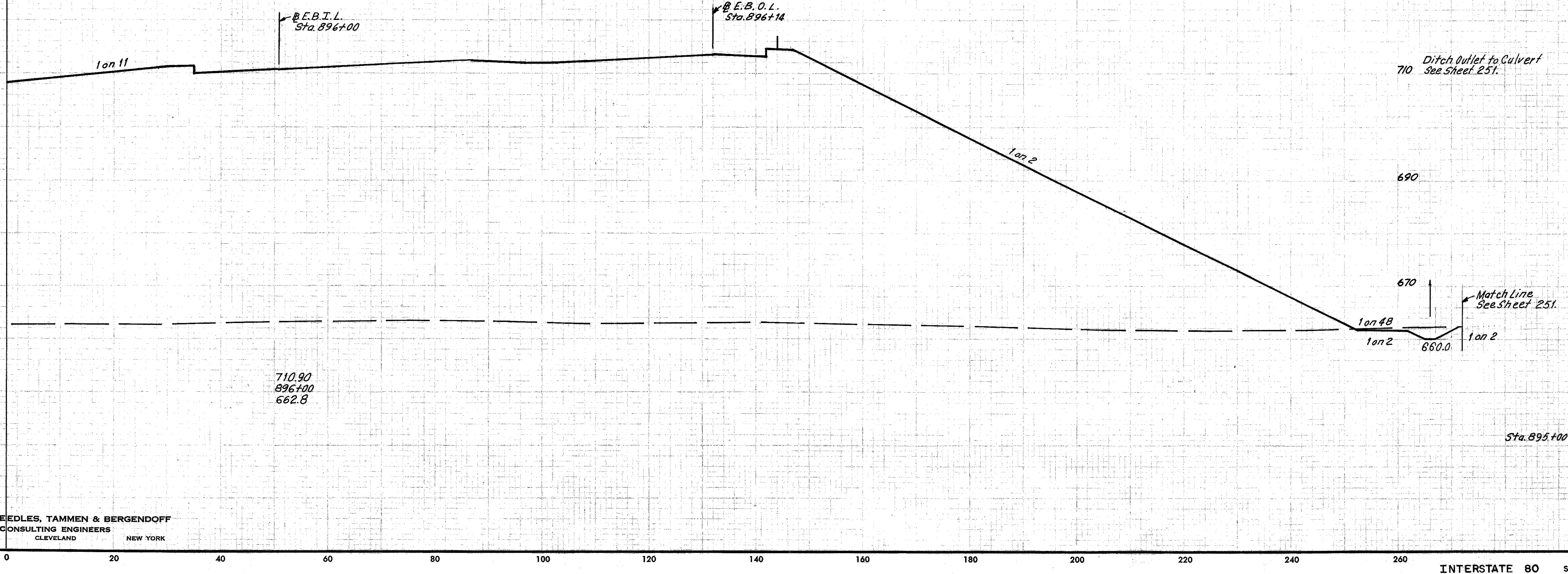
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

160
392

CUYAHOGA COUNTY
CUY-80-15.81



QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	0	12247		
			37	40919
	20	9850		
			74	33901
Sta. 895+00	20	8457		

MAG 5-7-68
RBH 11-15-68 JSN-12-3-68
HLD 4-9-70

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

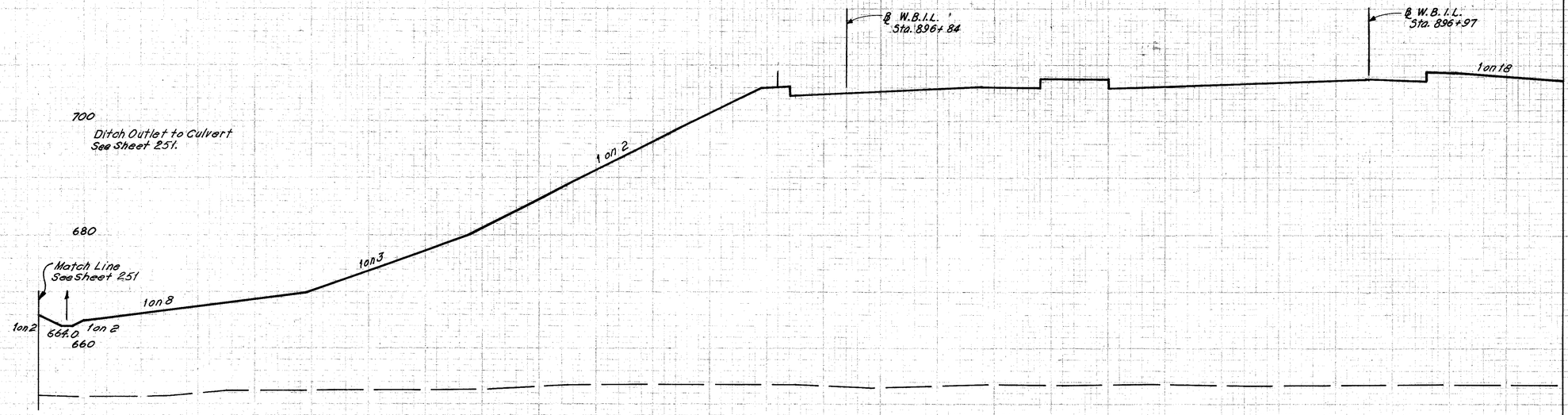
INTERSTATE 80 RIGHT HALF STA. 896+00 TO STA. 897+00

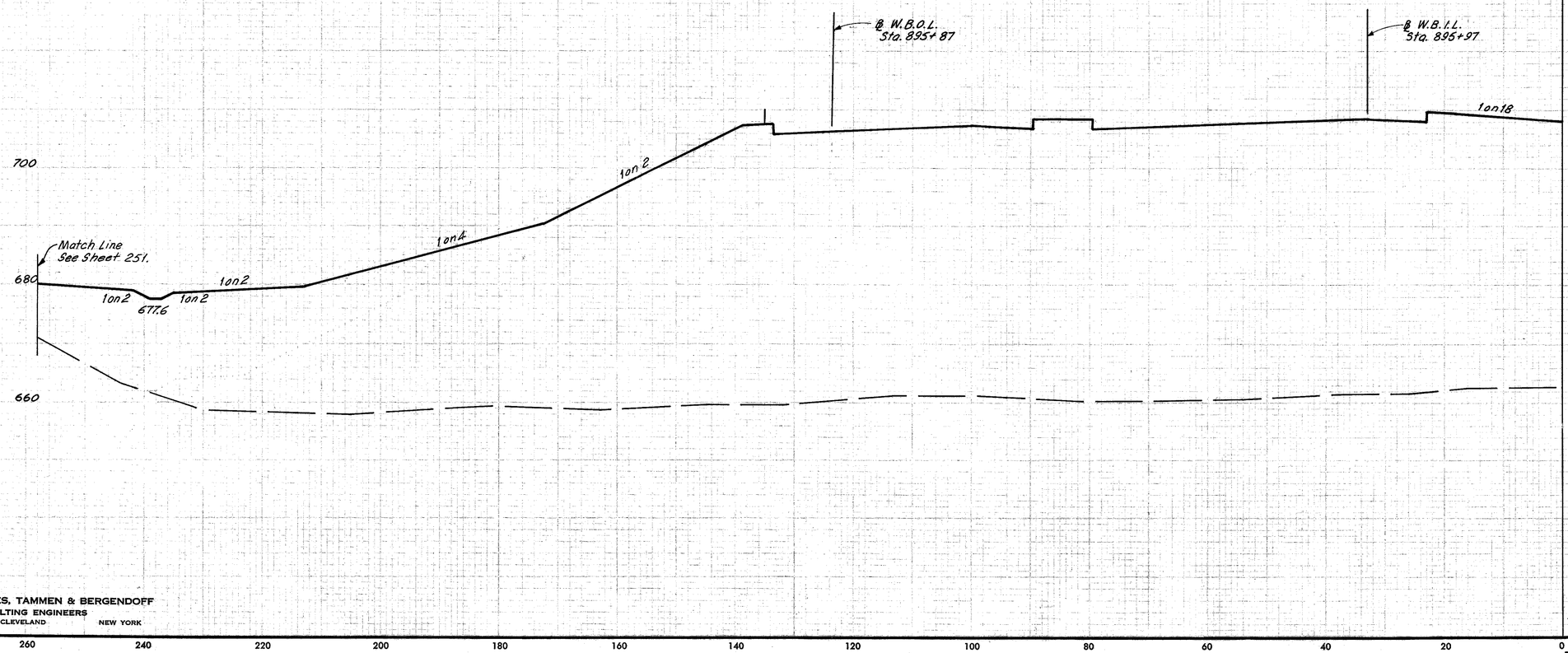
Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

16
392

CUYAHOGA COUNTY
CUY-80-15.81





	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
709.70				
897+00	0	10910		
653.5				
			0	38061
710.90				
896+00	0	9683		
662.8			0	30237
Sta. 895+00	0	6685		

MAG 5-6-68
RSH 11-1-68
WLO 4-7-70

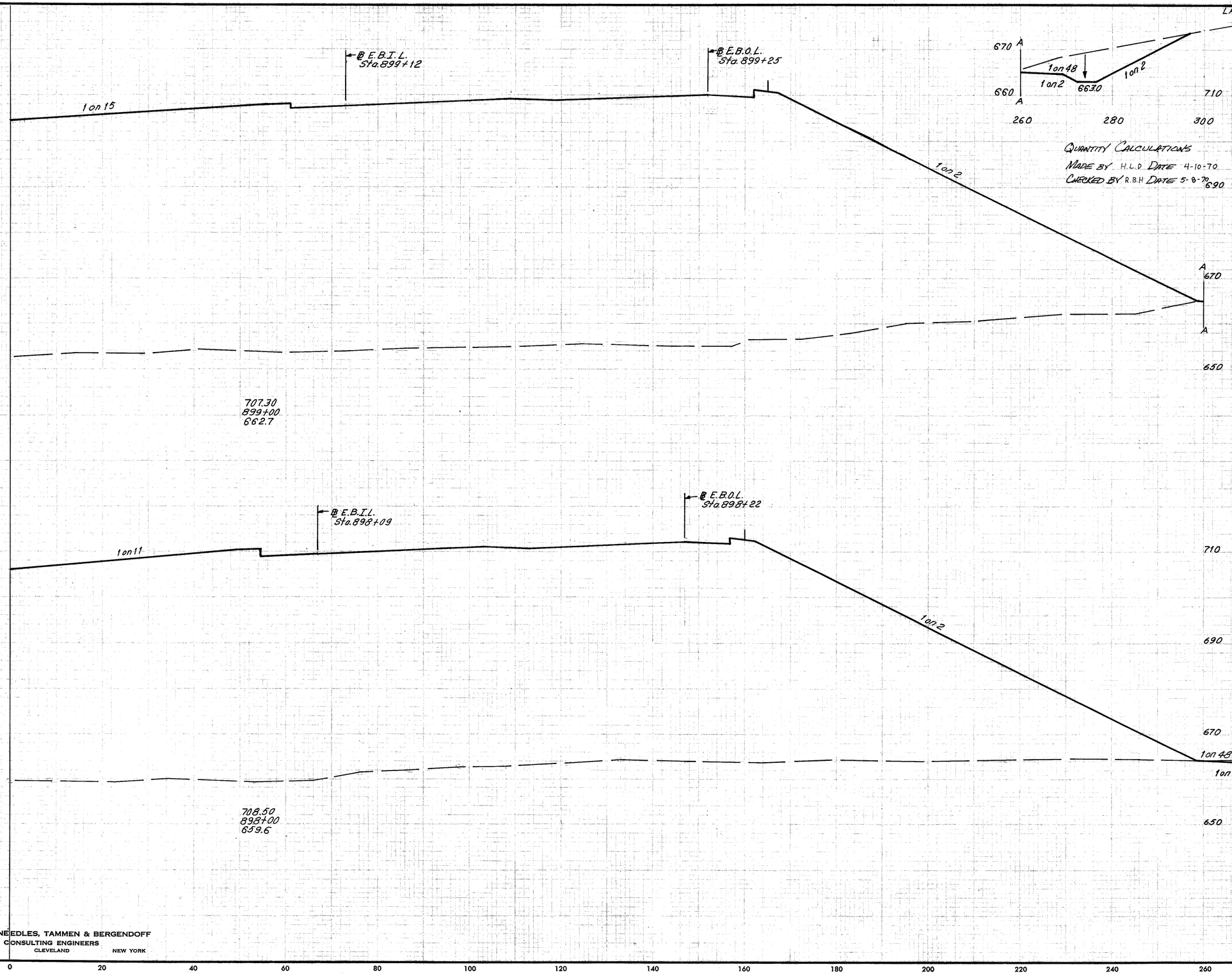
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 LEFT HALF STA. 896+00 TO STA. 897 +00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-80-15.81



Quantity Calculations
Made by H.L.D Date 4-10-70
Checked by R.B.H Date 5-8-70

EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
132	11470		
		276	40019
17	10141		
		31	41459
Sta. 897+00	0	12247	

MAG F.B. 68 pp 35-38
H&H F.B. 68 pp 49-50
H.L.D 4-9-70

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

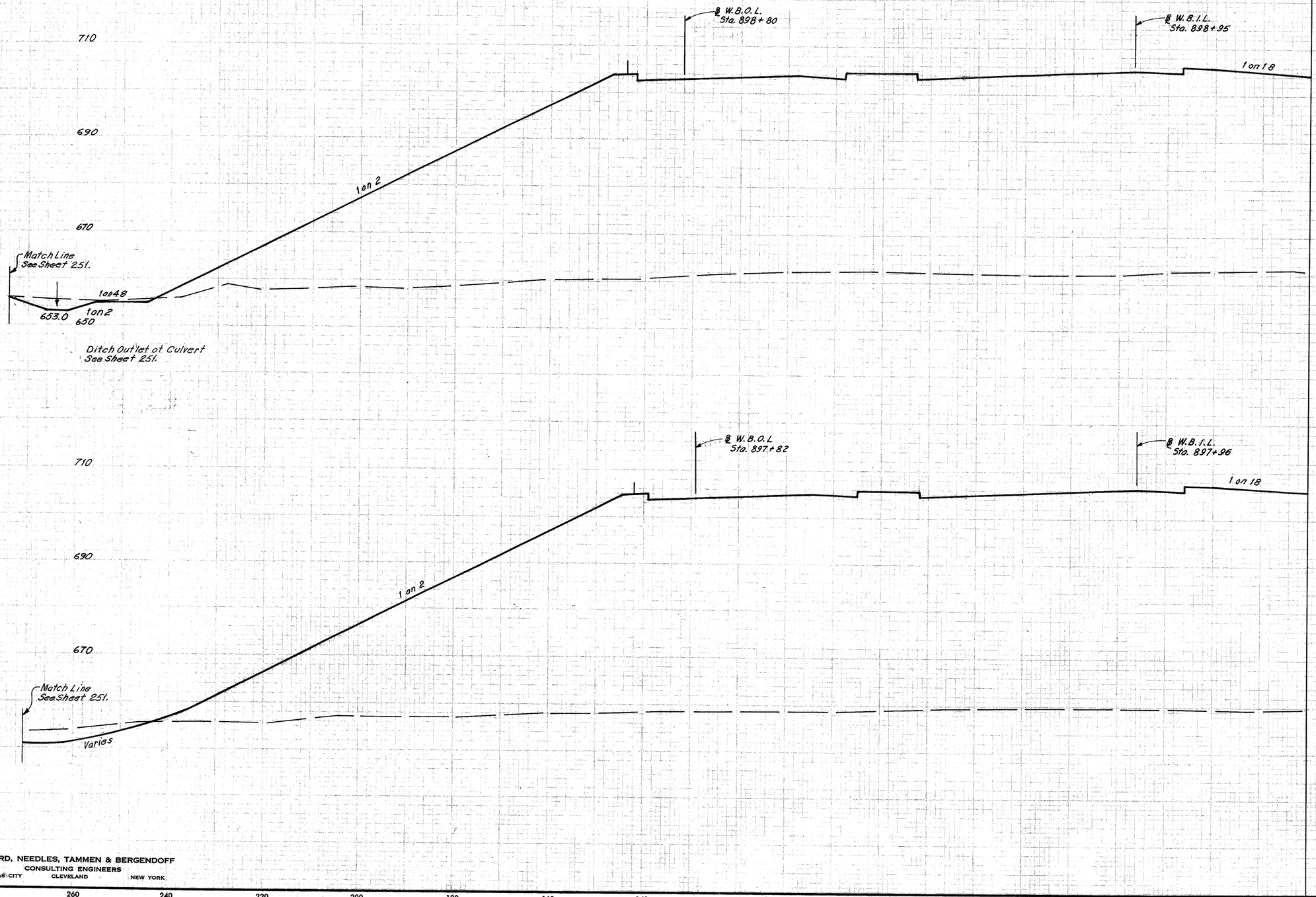
INTERSTATE 80 STA. 898+00 RIGHT HALF TO STA. 899+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

163
392

CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D *Date* 4-9-70
Checked by R.B.H *Date* 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
707.30 899+00 662.7	33	8305		
			172	31856
708.50 898+00 659.6	60	8897		
			111	36680
Sta. 897+00	0	10910		

MAG 5-6-68 ✓WLD 5-21-68
RBH 1-15-68
HLD 4-9-70

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

LEFT HALF
INTERSTATE 80 STA. 898+00 TO STA. 899+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

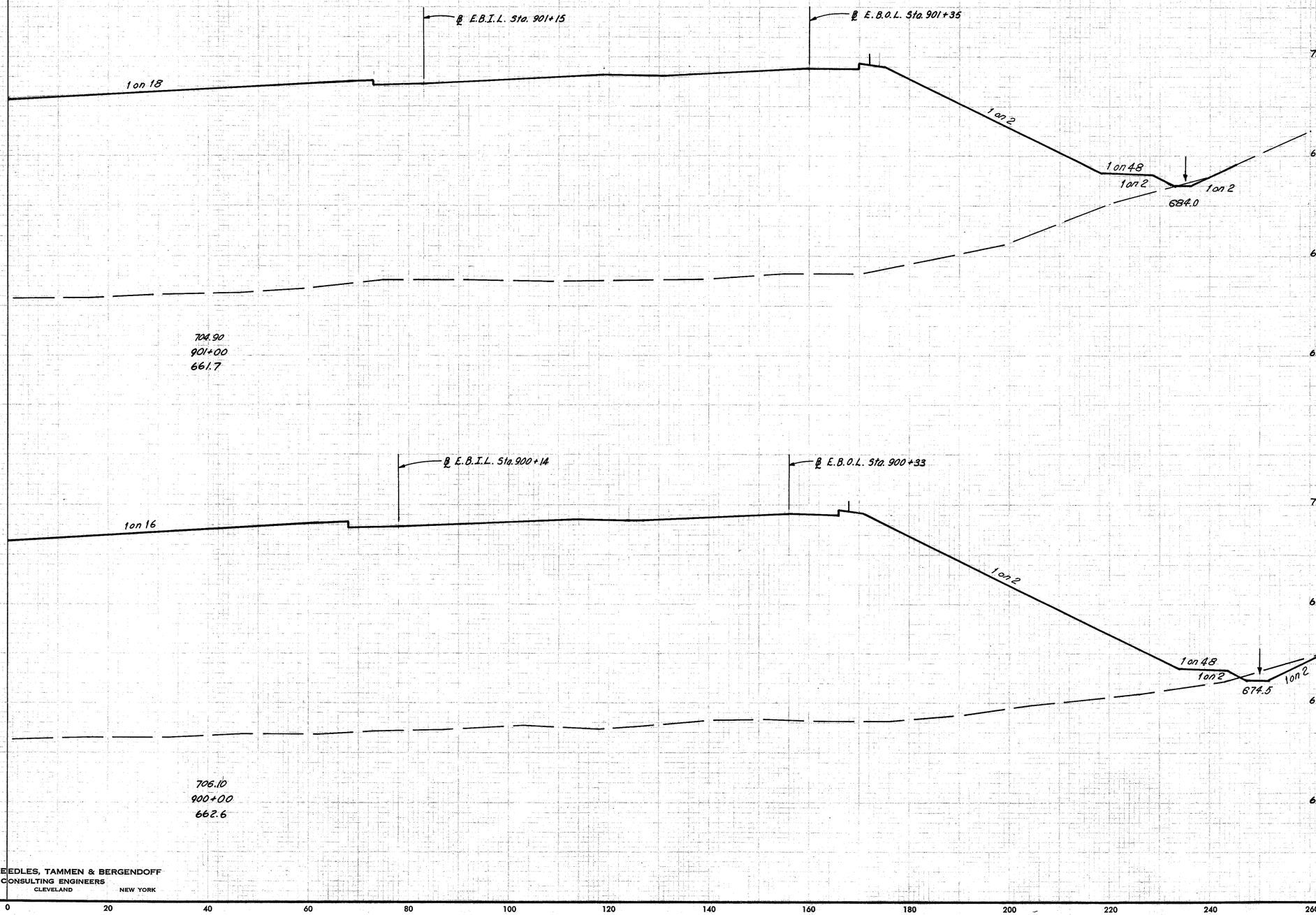
QUANTITY CALCULATIONS

MADE BY H.L.D DATE 4-10-70

CHECKED BY R.B.H DATE 5-8-70

CUYAHOGA COUNTY

CUY-80-15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1	8280		
		39	31240
20	8590		
		281	37147
132	11470		

MADE 5-8-68 R.B.H. 11-22-68 H.L.D 4-9-70

HOWARD, NEEDLES, TAMMEN & BERGENDOFF

CONSULTING ENGINEERS

KANSAS CITY CLEVELAND NEW YORK

RIGHT - HALF

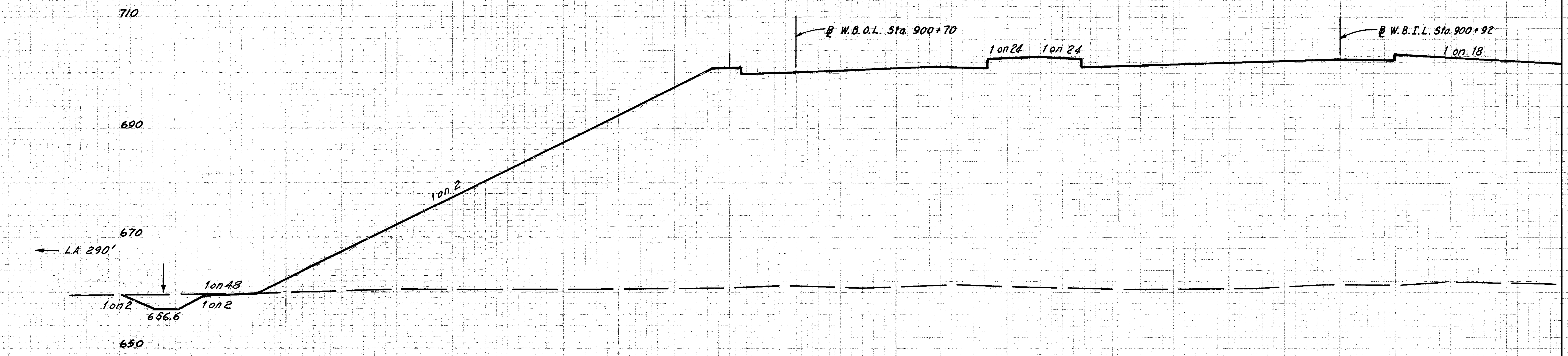
INTERSTATE 80 STA. 900+00 TO STA. 901+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

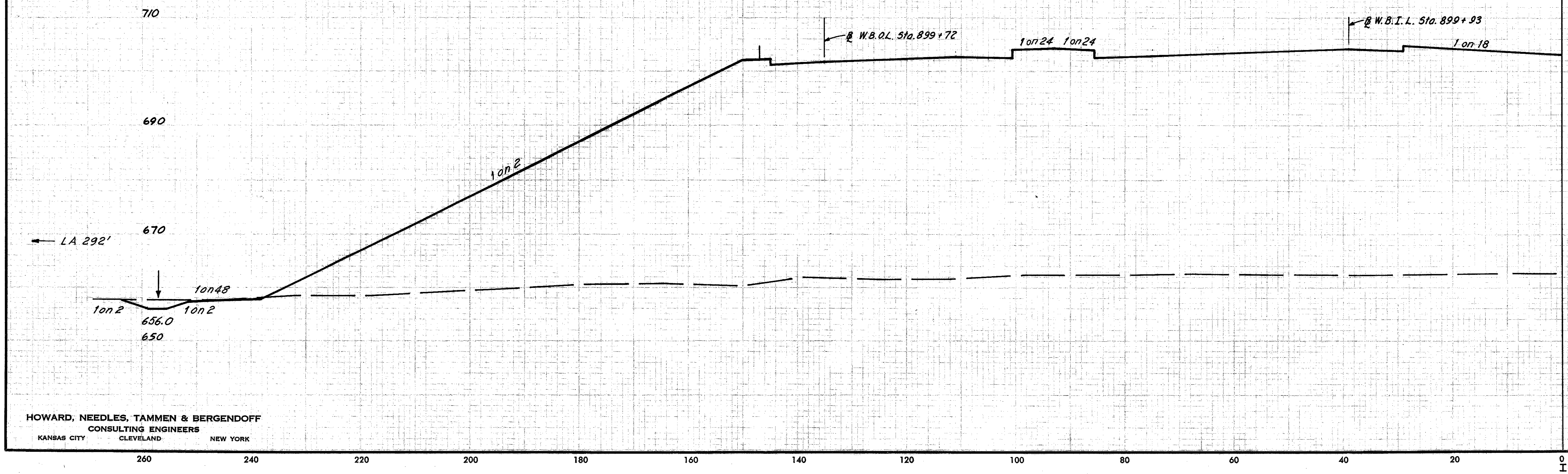
165
392

CUYAHOGA COUNTY
CUY 80 – 15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



704.90
901+00
661.7



706.10
900+00
662.6

Sta. 899+00

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
22	7850		
		66	29173
14	7904		
		87	30016
33	8305		

MAG 5-8-68 RBH 11-21-68
RJT 11-12-68 HLD 4-9-70

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

INTERSTATE 80 LFFT HALF STA. 900+00 TO STA. 901+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

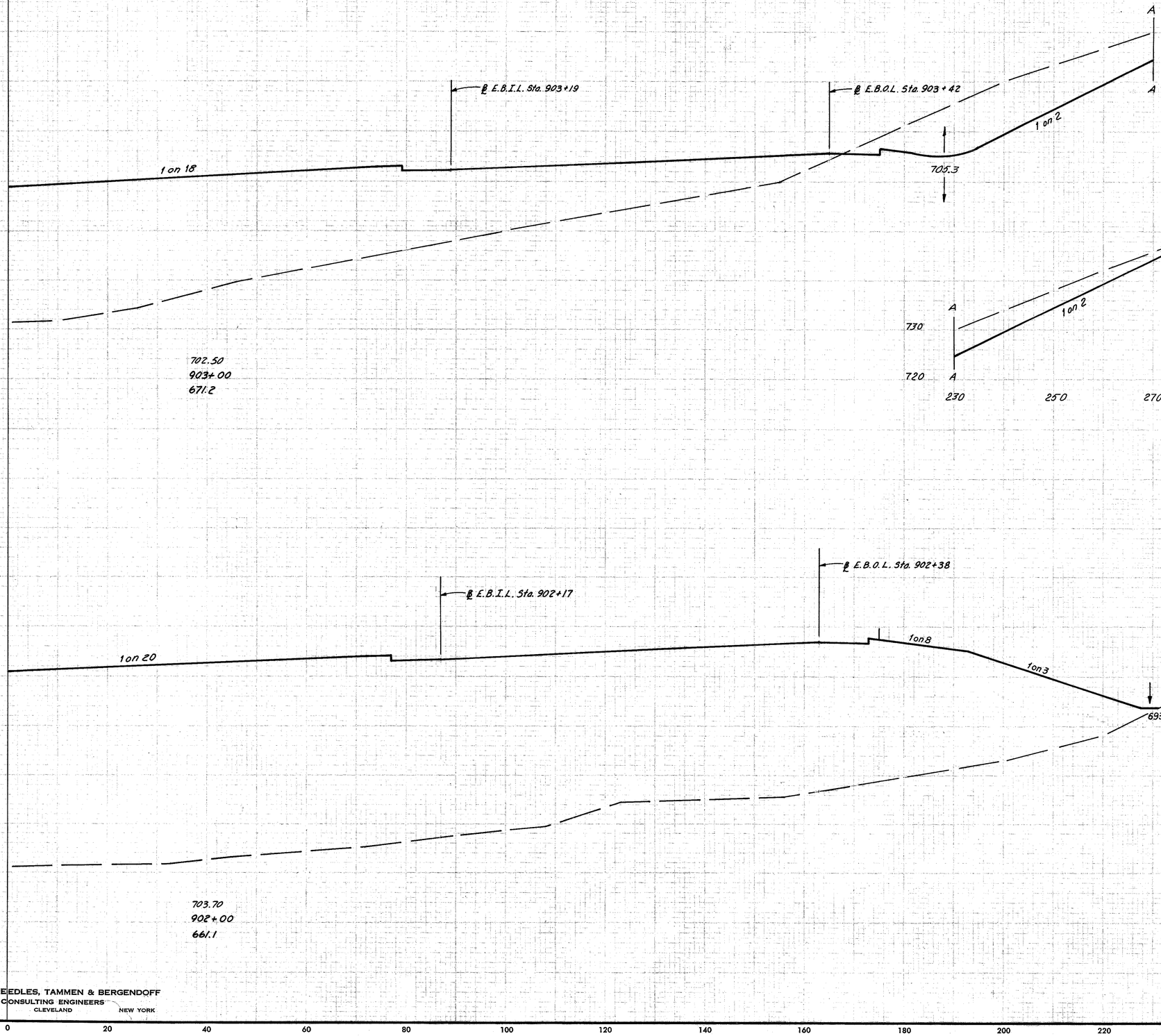
HDG. 392

QUANTITY CALCULATIONS

MADE BY H.L.D DATE 4-10-70

CHECKED BY R.B.H DATE 5-8-70

CUYAHOGA COUNTY
CUY 80-15.81



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
		824	2655
		1156	18222
		0	7185
		2	28639
		1	8280

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

INTERSTATE 80 STA. 902+00 RIGHT HALF TO STA. 903+01

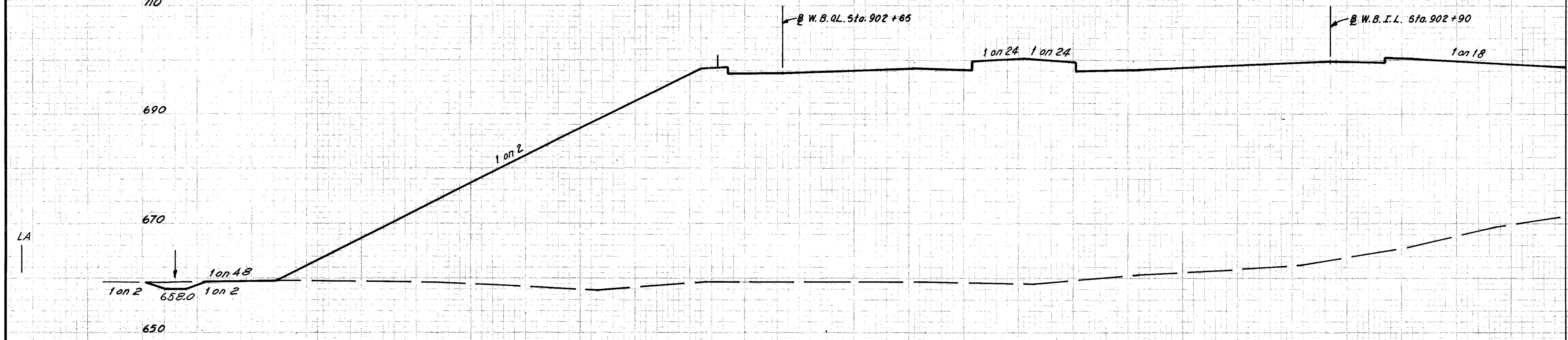
MAP 5-12-68 ROW 11-22-68 REVISED 4-9-70

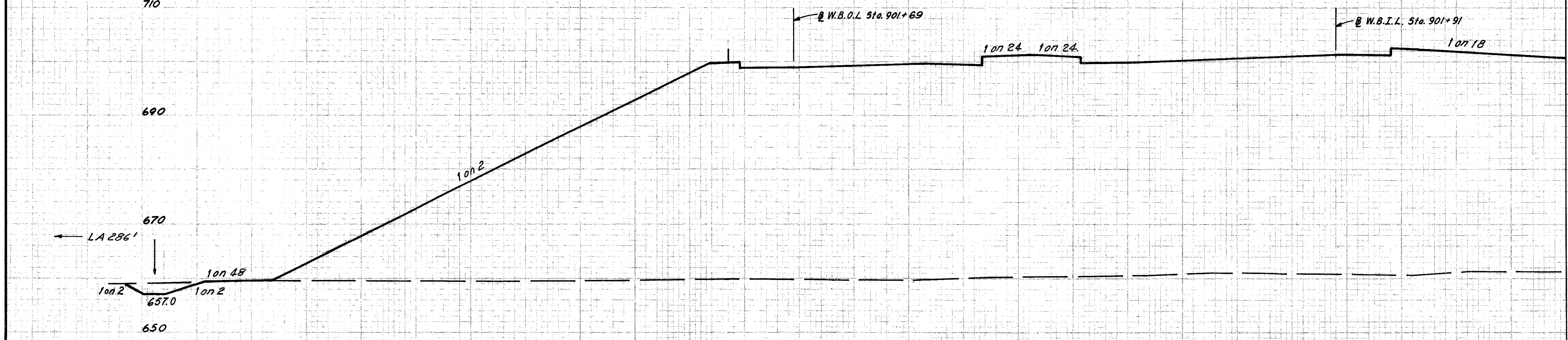
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

167
392

CUYAHOGA COUNTY
CUY 80-15.81

Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70





	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
702.50 903+00 671.2	11	7371		
			40	28144
703.70 902+00 661.1	11	7827		
			61	29031
Sta. 901+00	22	7850		

MAG 5-8-68 RBH 11-21-68
RJT 11-12-68
HLD 4-9-70

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 LEFT HALF STA. 902+00 TO STA. 903+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81

Quantity Calculations
Made By H.L.D Date 4-10-70
Checked By R.B.H Date 5-8-70

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
9075	0		
		33962	0
9865	0		
		31635	0
7818	0		
		19633	4917
Sta. 903+00	624	2655	

698.90
906+00
738.5

℄ E.B.I.L. Sta. 906+27

℄ E.B.O.L. Sta. 906+58

701.6

1 on 18

1 on 2

740

730

720

700

A

LA

250

270

700.10
905+00
738.3

℄ E.B.I.L. Sta. 905+24

℄ E.B.O.L. Sta. 905+52

702.9

740

720

700

730

710

690

1 on 18

1 on 2

701.30
904+00
710.2

℄ E.B.I.L. Sta. 904+22

℄ E.B.O.L. Sta. 904+48

704.1

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

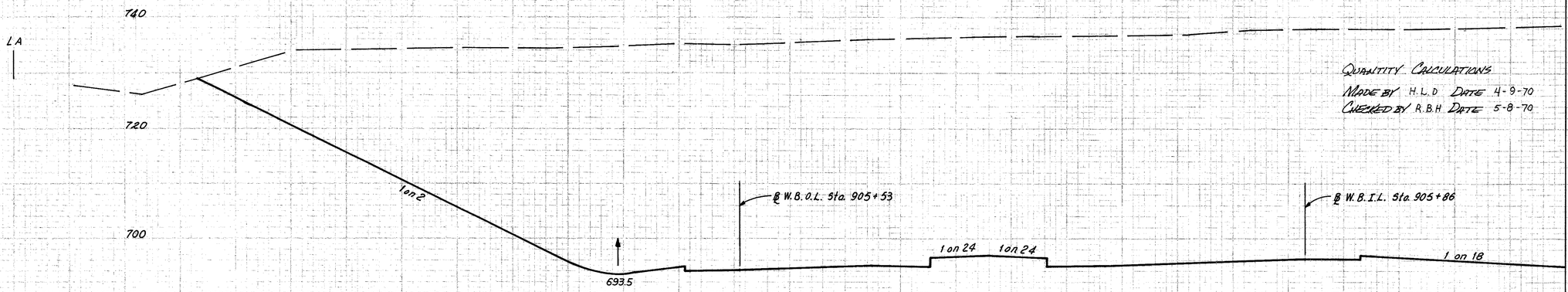
0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 RIGHT HALF STA. 904+00 TO STA. 906+00

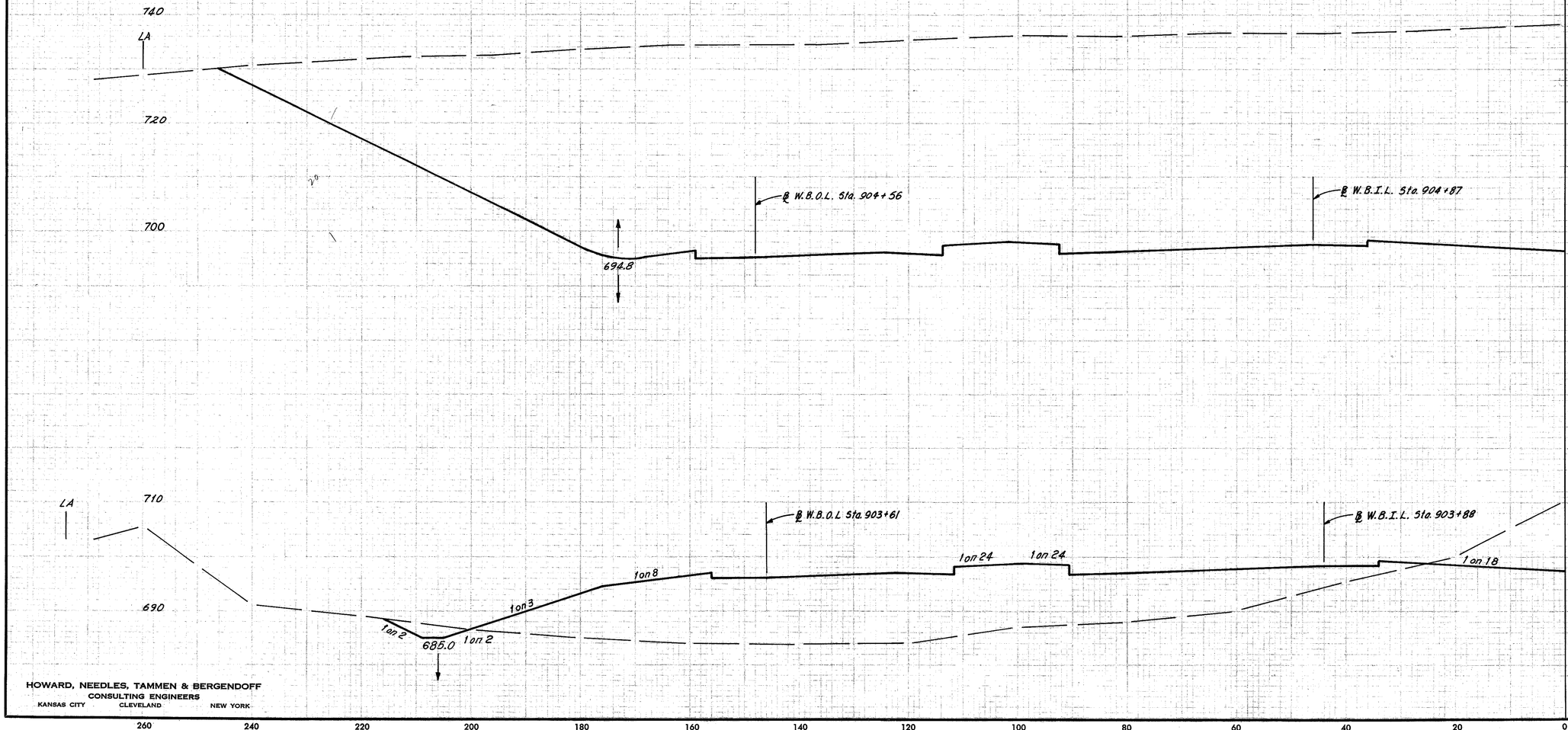
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81



Quantity Calculations
Made by H.L.D Date 4-9-70
Checked by R.B.H Date 5-8-70



EARTHWORK

END	AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
698.90				
906+00	8820	0		
739.8				
			31666	0
700.10				
905+00	8280	0		
738.3				
			15644	2878
701.30				
904+00	166	1554		
710.2			331	16528
Sta. 903+00	11	7371		

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 LEFT HALF
STA. 904+00 TO STA. 906+00

MAS 5-8-68
RDT 11-26-68
H&D 4-24-70
DWG 5-21-68
RDT 11-26-68
H&D 4-24-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY 80-15.81

695.30
909+00
736.4

℄ E.B.I.L. Sta. 909+34

℄ E.B.O.L. Sta. 909+68

697.8

1 on 18

1 on 2

LA

730

710

690

696.50
908+00
737.9

℄ E.B.I.L. Sta. 908+32

℄ E.B.O.L. Sta. 908+63

699.1

1 on 18

1 on 2

LA

730

710

690

697.70
907+00
738.5

℄ E.B.I.L. Sta. 907+30

℄ E.B.O.L. Sta. 907+60

700.4

1 on 18

1 on 2

LA

730

710

690

Quantity Calculations
Made By H.L.D Date 4-10-70
Checked By R.B.H Date 5-8-70

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
8930	0		
		34323	0
9605	0		
		35110	0
9355	0		
		34130	0
Sta. 906+00	9075	0	

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

INTERSTATE 80 RIGHT HALF STA. 907+00 TO STA. 909+00

Was Fig. 8 B.H. 11-13-68 + 8-22-69

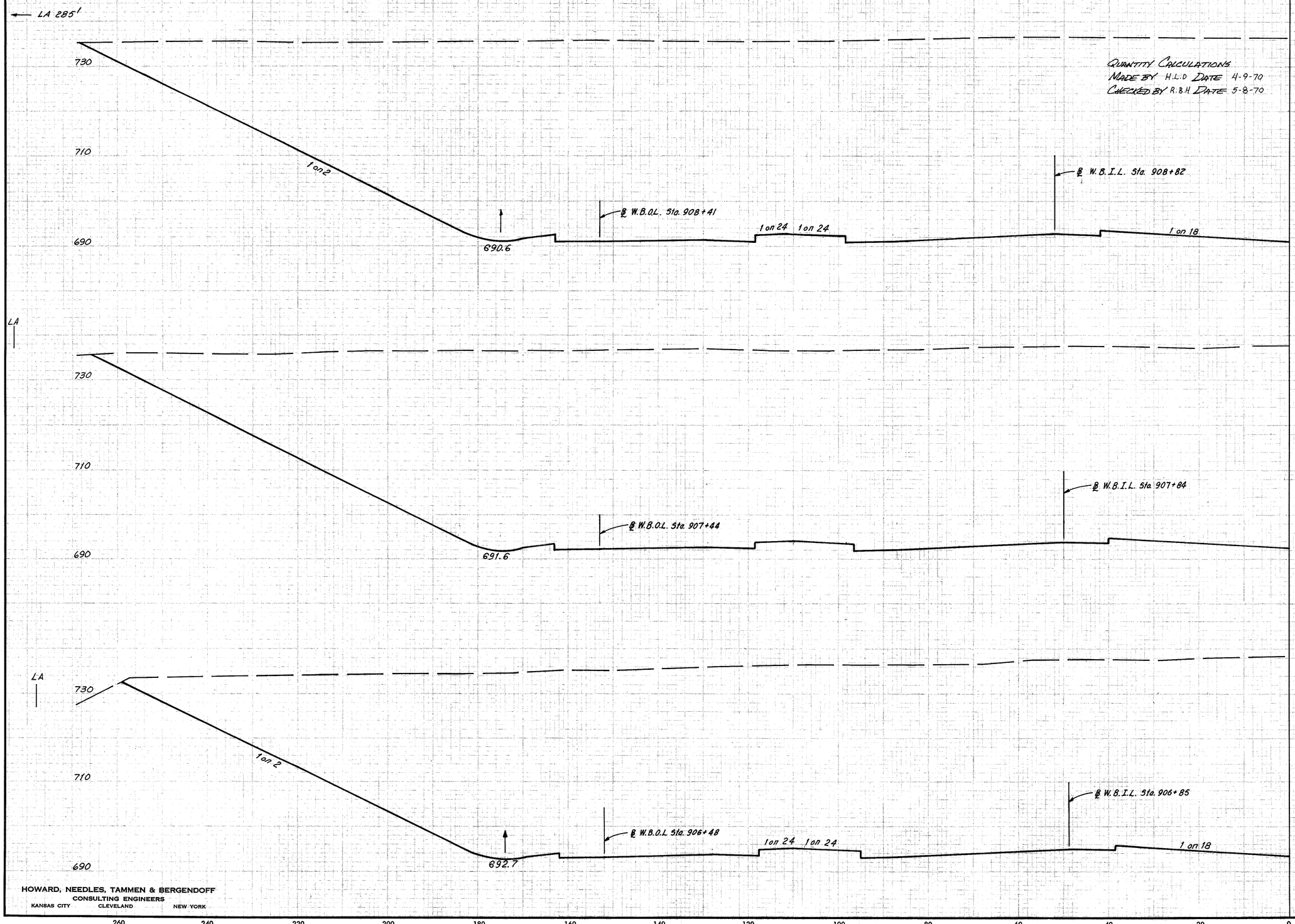
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70

MAG 5-8-68
REVISED RBH 11-22-68
H.L.D 4-24-70



EARTHWORK			
END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
695.30			
909+00			
736.4			
	9885	0	
			36388 0
696.50			
908+00	9765	0	
737.9			
			35324 0
697.70			
907+00	9310	0	
738.5			
			33574 0
Sta. 906+00	8820	0	

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 LEFT HALF
STA. 907+00 TO STA. 909+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

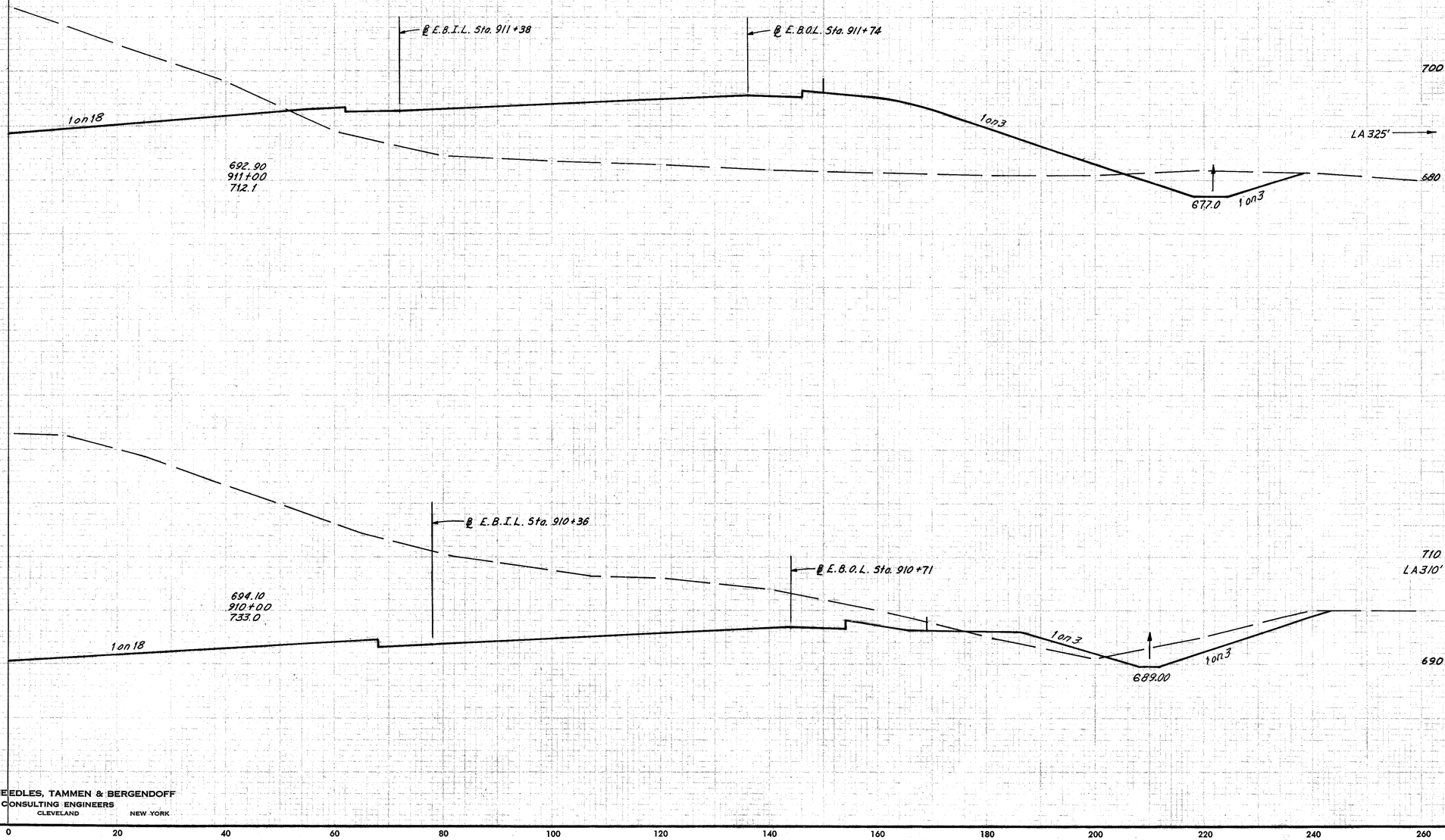
392

CUYAHOGA COUNTY
CUY 80–15.81

Quantity Calculations
Made By H.L.D Date 4-10-70
Checked By R.B.H Date 5-8-70

Std. No. S.C.B.
Sta. 911+15 @ I-80
N.G. 688.55

For detail of grading see sheet 102.



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
727	1440		
		7537	2731
3343	35		
		22728	65
8930	0		

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

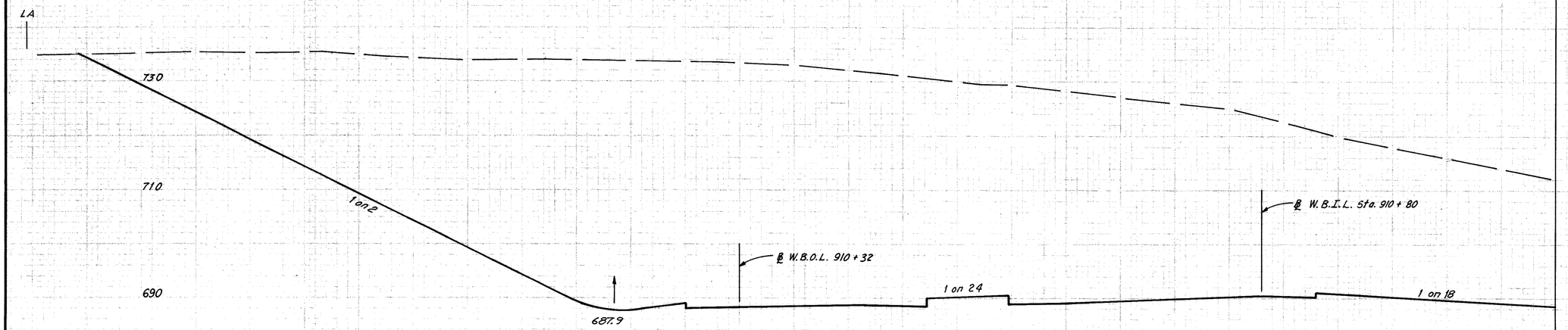
INTERSTATE 80 STA. 910 +00 RIGHT HALF TO STA. 911 +00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

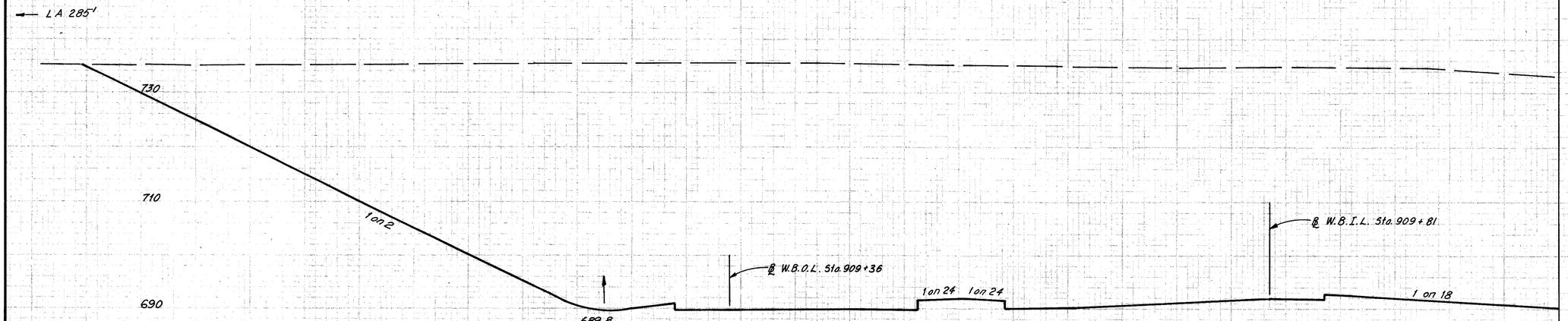
75 / 392

CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-9-70
CHECKED BY R.B.H DATE 5-8-70



692.90
911+00.0
712.1



694.10
910+00
733.0

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
692.90 911+00.0 712.1	8764	0		
			34635	0
694.10 910+00 733.0	9939	0		
			36711	0
Sta. 909+00	9885	0		

MNG 5-8-68 NHD 5-22-68
RDH 11-12-68
RJT 11-12-68 HLD 4-28-70

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

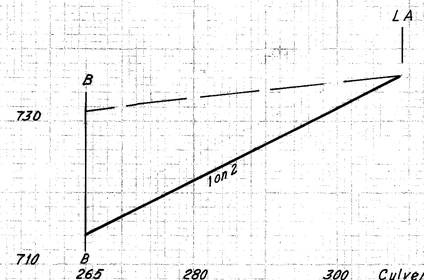
INTERSTATE 80 STA. 910 +00 LEFT HALF TO STA.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

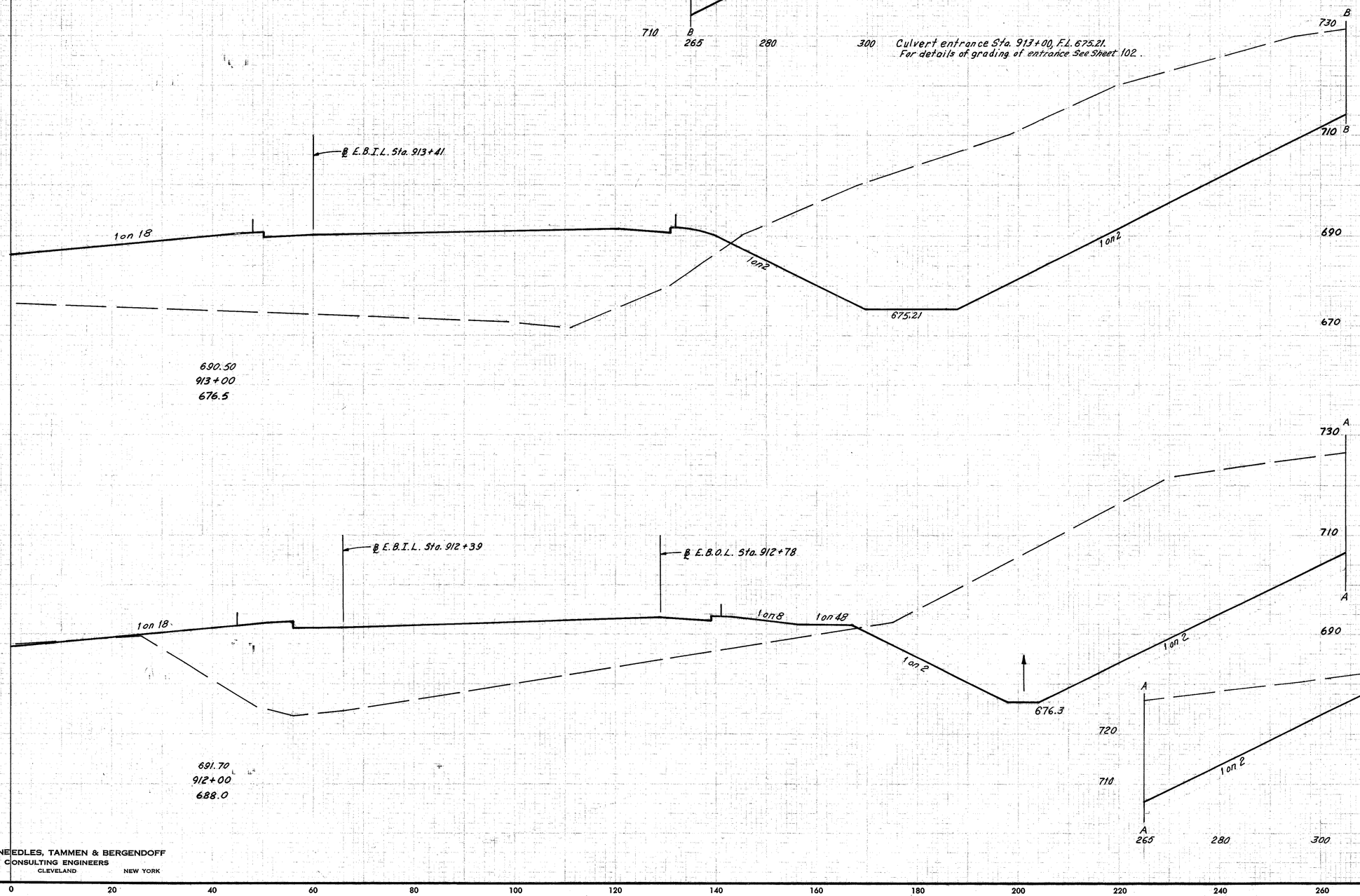
392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-16-70
CHECKED BY R.B.H DATE 5-8-70



Culvert entrance Sta. 913+00, F.L. 675.21.
For details of grading of entrance See Sheet 102.



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3247	2081		
		11346	6585
2880	1475		
		6680	5398
727	1940		

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

0 20 40 60 80 100 120 140 160 180 200 220 240 260

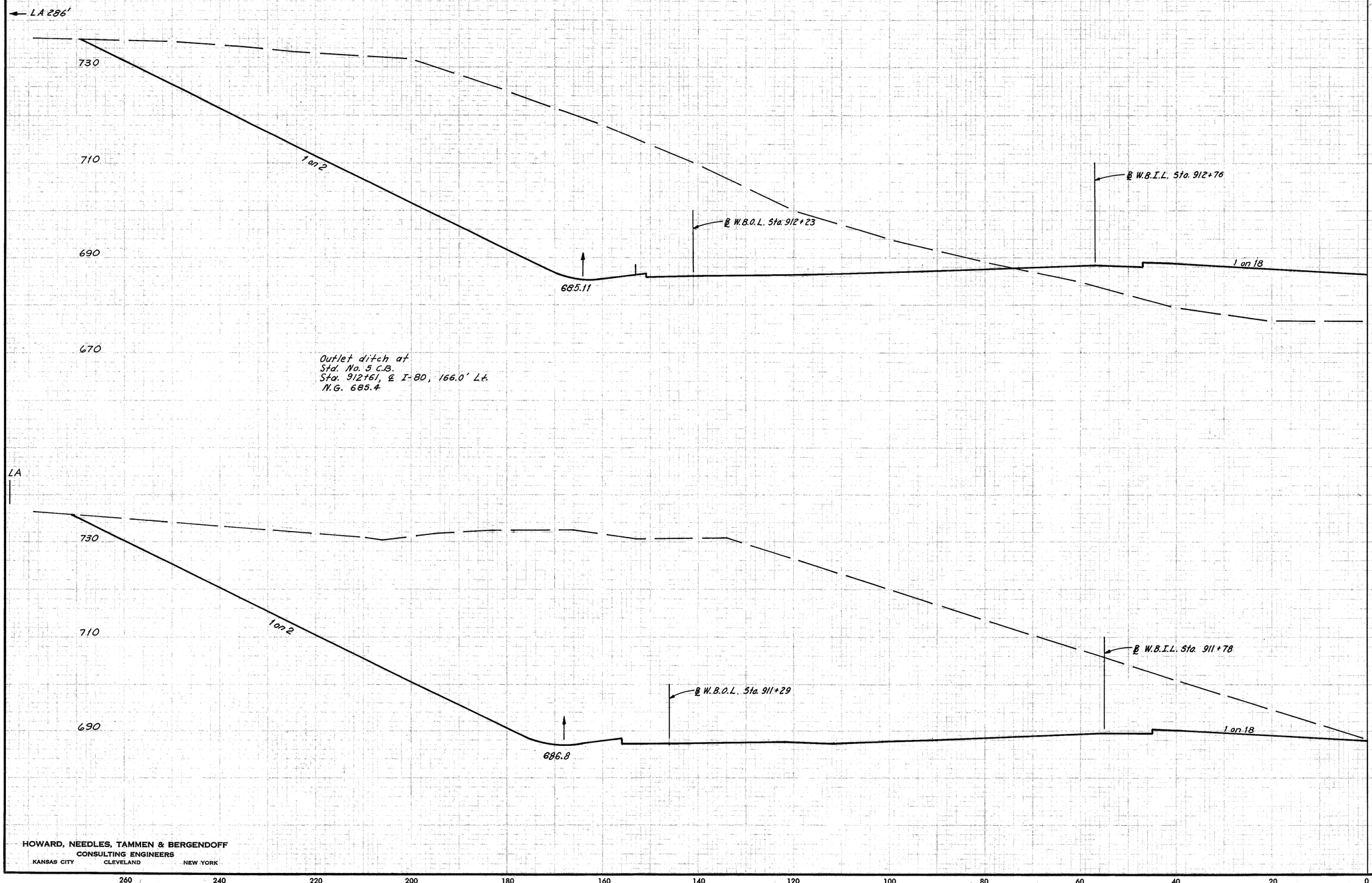
INTERSTATE 80 STA. 912+00 RIGHT HALF TO STA. 913+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

175
392

CUYAHOGA COUNTY
CUY 80-15.81

Quantity Calculations
Made By H.L.D Date 4-9-70
Checked By R.B.H Date 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
690.50				
913+00	568	3592		
676.5				
				13237 6652
691.70				
912+00	6580	0		
688.0				
				28815 0
Sta. 911+00	8764	0		

MIG 5-8-68 REV 11-22-68 REV 4-24-70

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

INTERSTATE 80 LEFT HALF STA. 912+00 TO STA. 913+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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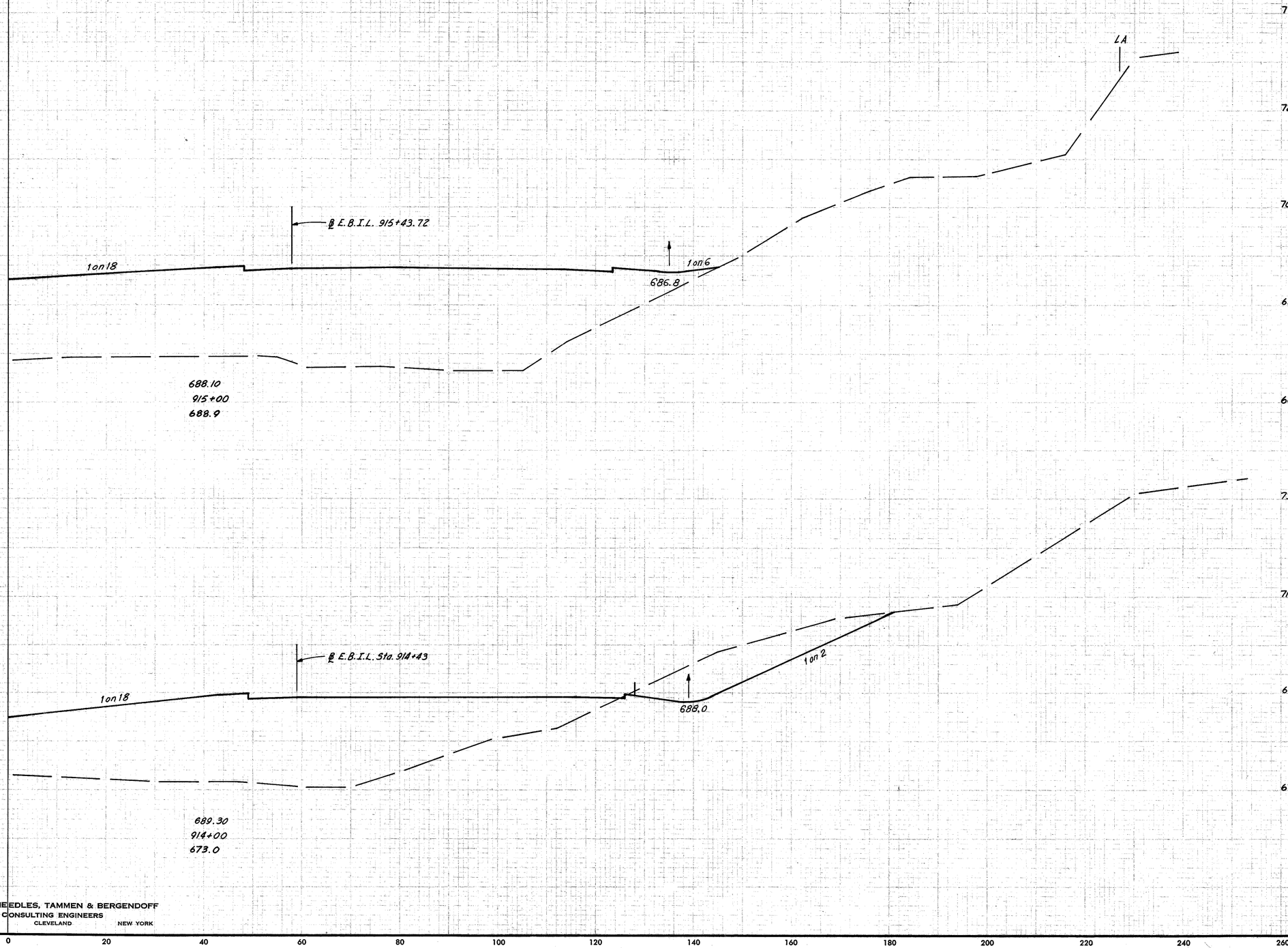
392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70

MAG 5-10-68
RJT 11-12-68 RBH 11-22-68 JSPV 12-8-68
HLD 4-24-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	0	2339		
			524	7443
	283	1680		
			5539	6965
Sta. 913+00	2708	2081		

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

INTERSTATE 80 STA. 914+00 RIGHT HALF TO STA. 915+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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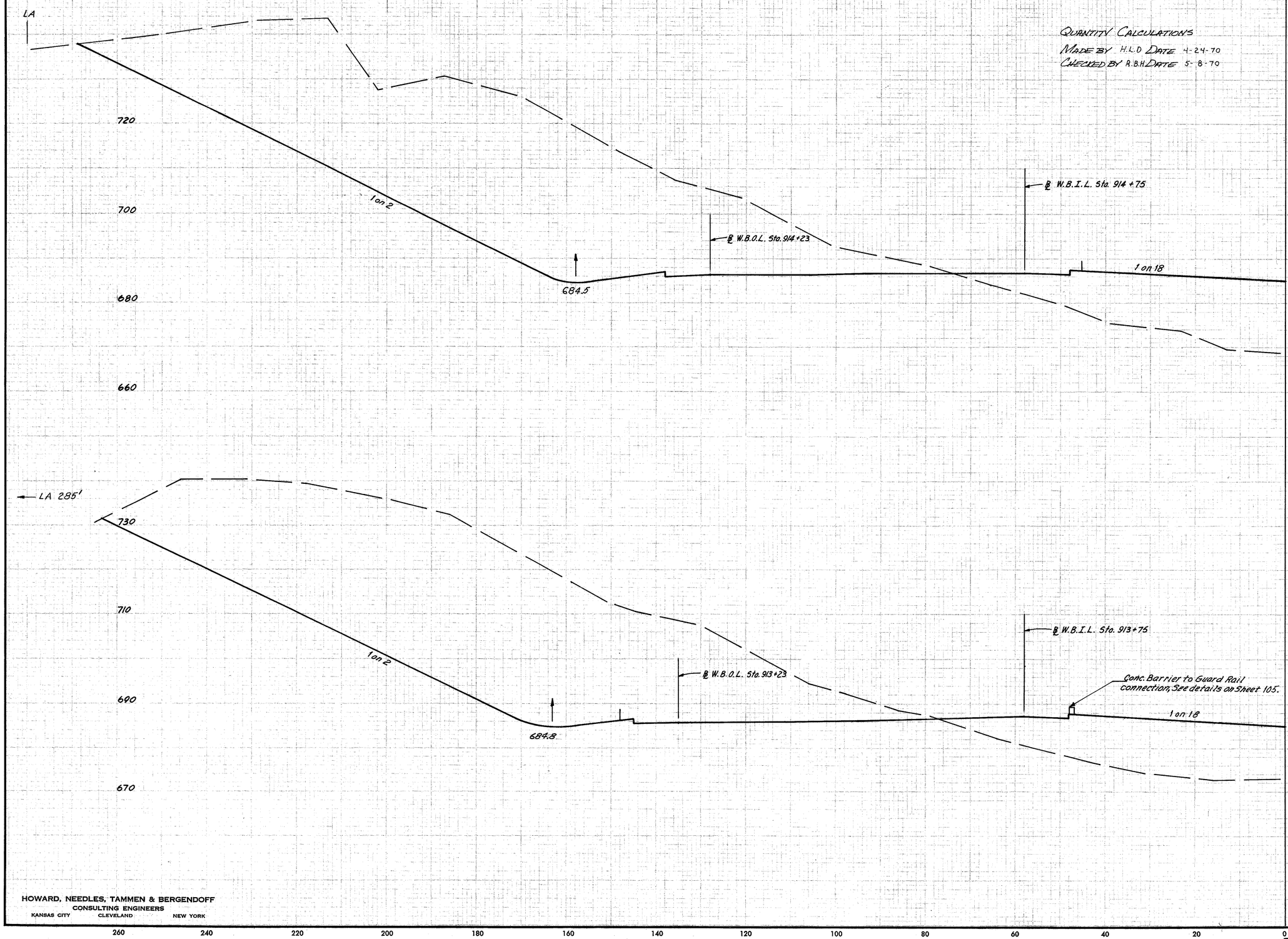
392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H. DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
688.10				
915+00	3940	737		
668.9				
			14913	2720
689.30				
914+00	4113	732		
673.0				
			8669	8007
Sta. 913+00	568	3592		

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

INTERSTATE 80 LEFT HALF
STA. 914+00 TO STA. 915+00

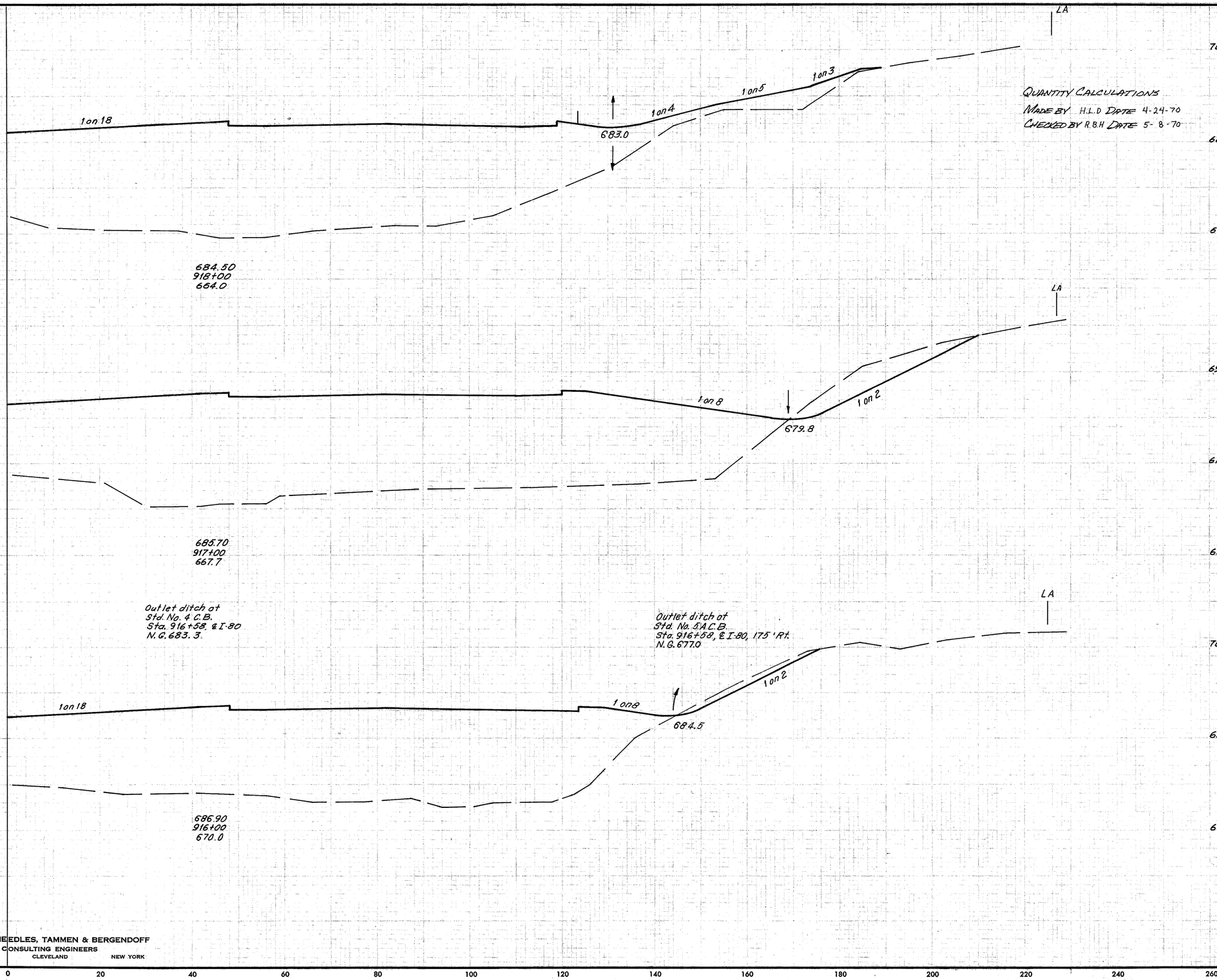
MAS 5-0-68
H.L.D. 2-4-70
EBH 11-22-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

678
392

CUYAHOGA COUNTY
CUY 80—15.81

Quantity Calculations
Made by H.L.D Date 4-24-70
Checked by R.B.H Date 5-8-70



EARTHWORK

END	AREA	VOLUME	
EXC.	EMB.	EXC.	EMB.
0	2910		
		274	11441
148	3268		
		344	10700
38	2510		
		70	8980
Sta. 915+00	0	2339	

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

INTERSTATE 80 RIGHT HALF STA. 916+00 TO STA. 918+0

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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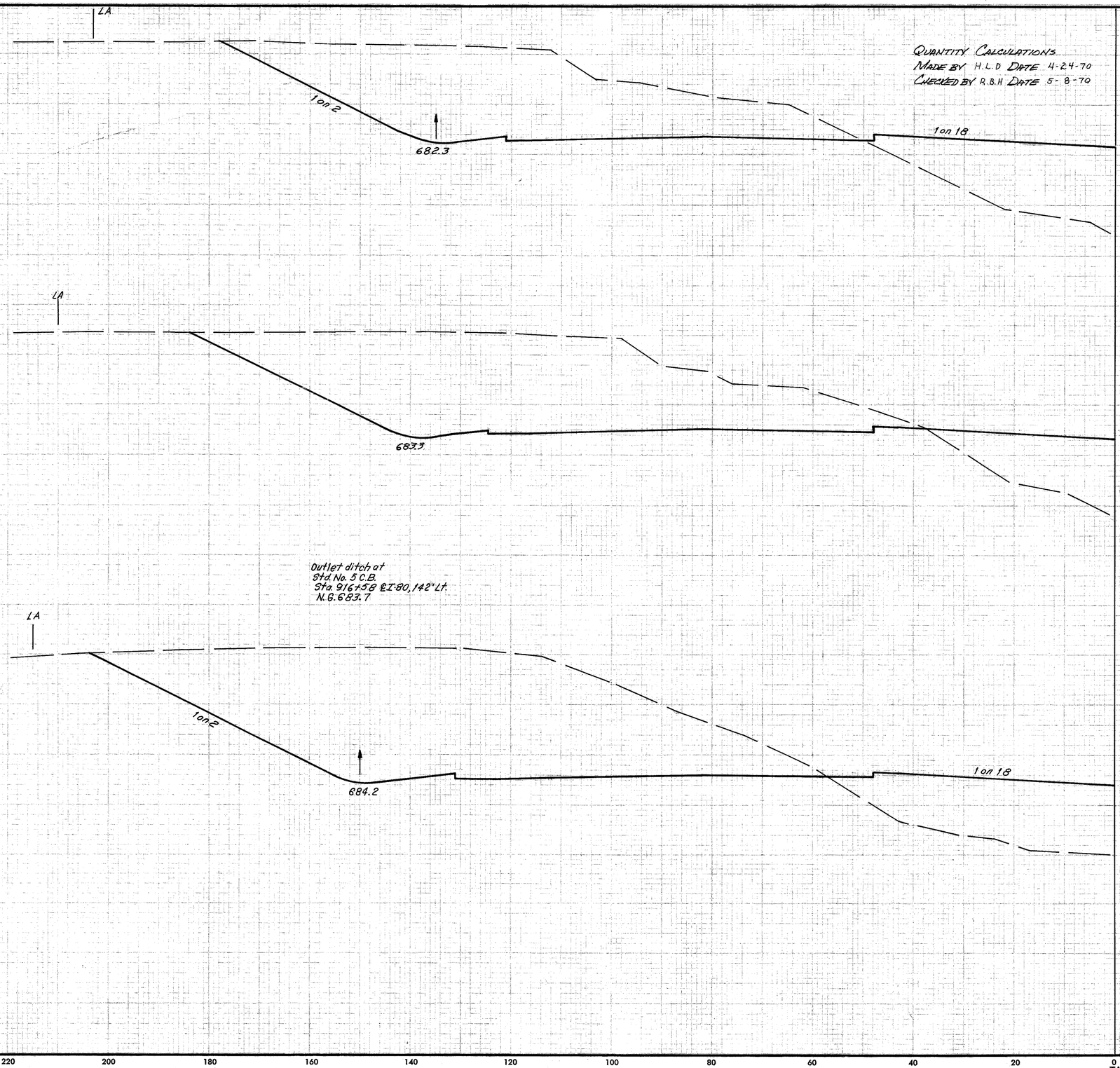
392

CUYAHOGA COUNTY
CUY 80—15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
684.50 918+00 664.0	1408	525		
			6006	1585
685.70 917+00 667.7	1835	331		
			7820	1737
686.90 916+00 670.0	2388	607		
			11719	2489
Sta. 915+00	3940	737		

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 LEFT HALF
STA. 916+00 TO STA. 918+0

MAR 5-27-68 NOS 5-28-68
MAR 5-27-68 MAINT 5-28-68
HLD 4-24-70

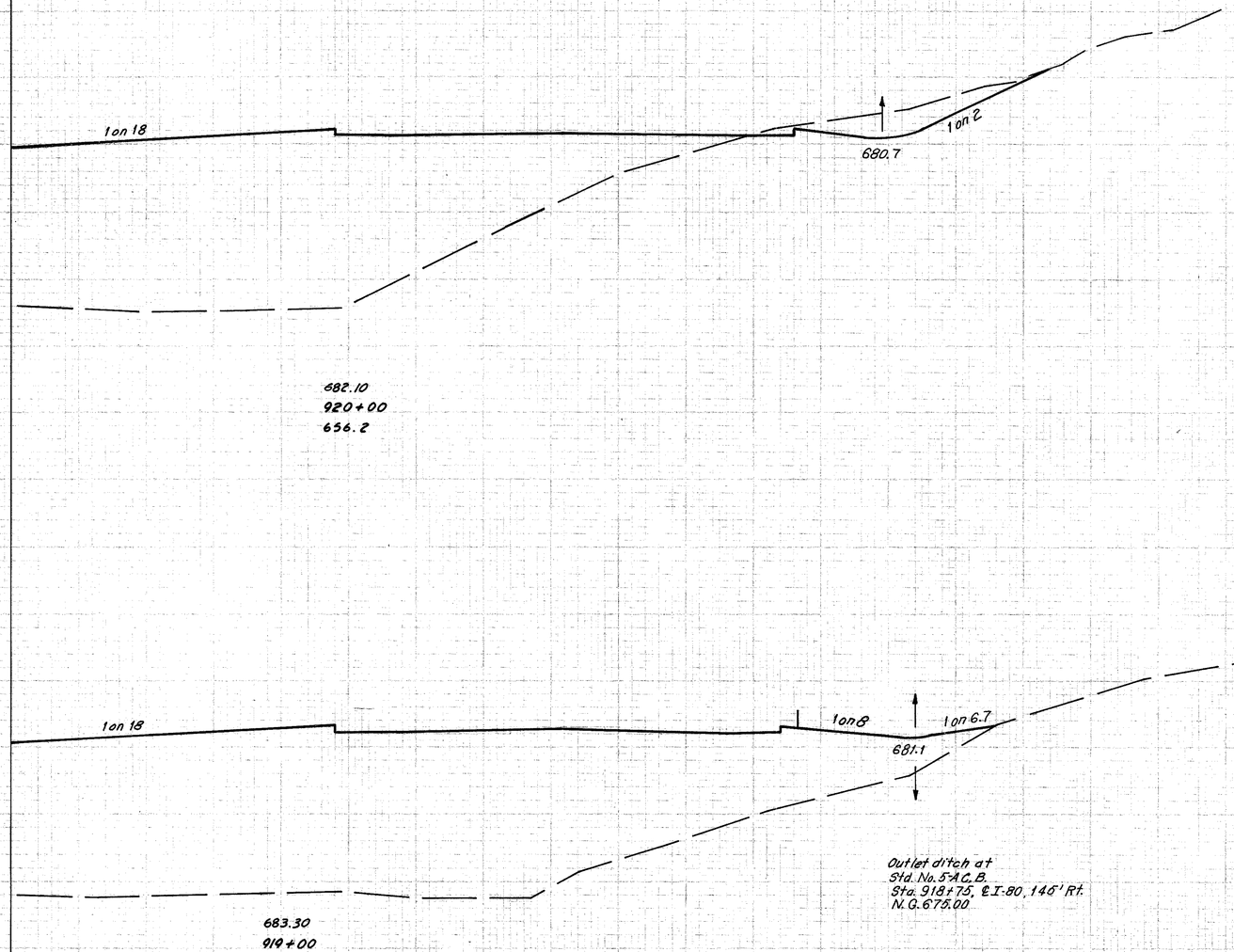
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

I-80
392

CUYAHOGA COUNTY
CUY 80—15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5- 8 -70

MAG 5-10-68 HLD 5-24-68
HLD 5-27-68 MAG 5-27-68
HLD 4-24-70



Outlet ditch at
Std. No. 5-A C.B.
Sta. 918+75, ℄ I-80, 145' Rt.
N.G. 675.00

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	92	1935		
			170	8617
	0	2718		
			0	10422
Sta. 918+00	0	2910		

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

INTERSTATE 80 RIGHT HALF STA. 919+00 TO STA. 920+0

Quantity Calculations.
Made by H.L.O Date 4-24-70
Checked by R.B.H Date 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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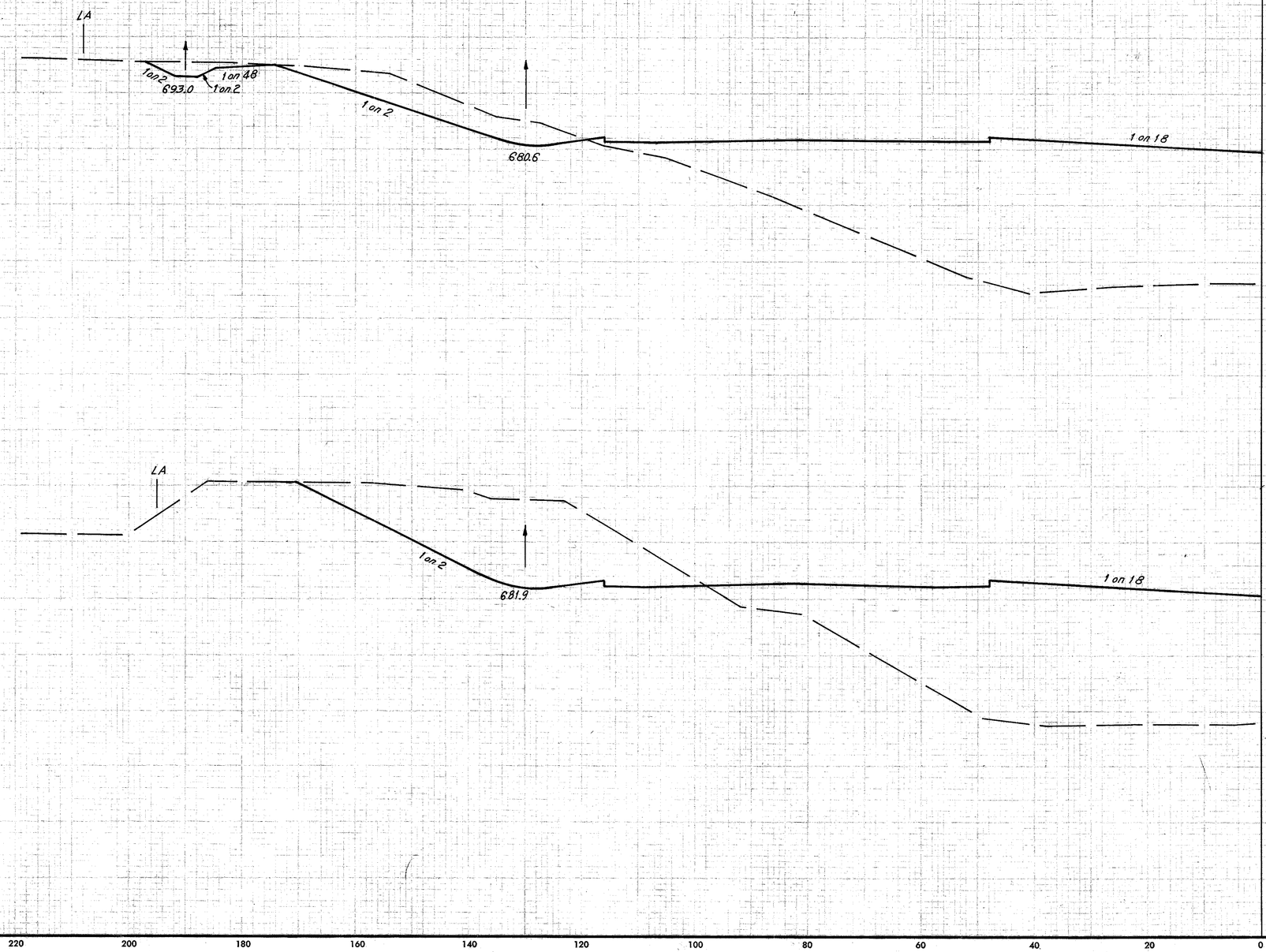
392

CUYAHOGA COUNTY
CUY 80—15.81



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
682.10			
920+00		225	2035
656.2			
			1657 6944
683.30			
919+00		670	1715
658+00			
			3848 4148
Sta. 918+00		1408	525

MAG 5-29-68 HLO 5-29-68
MAG 5-29-68 RBH 5-29-68
HLO 4-24-70

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

INTERSTATE 80 STA. 919+00 LEFT HALF TO STA. 920+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D. DATE 4-24-70
CHECKED BY R.B.H. DATE 5-8-70

EARTHWORK

END AREA EXC.	END AREA EMB.	VOLUME EXC.	VOLUME EMB.
30	2500		
		237	8859
98	2284		
		352	7813
92	1935		

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

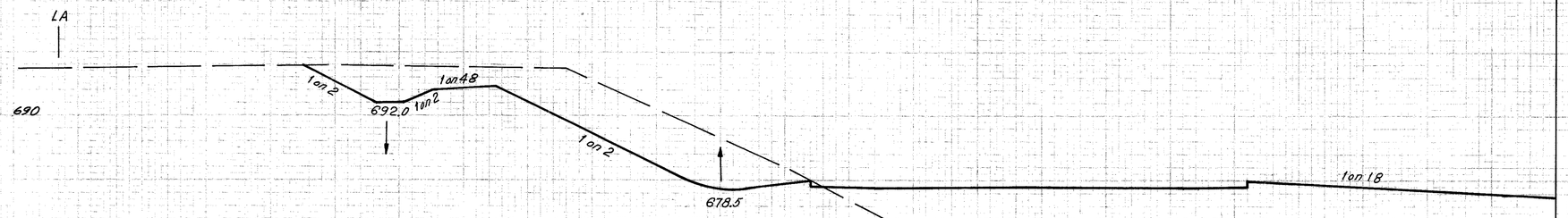
INTERSTATE 80 STA. 921+00 RIGHT HALF TO STA. 922+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

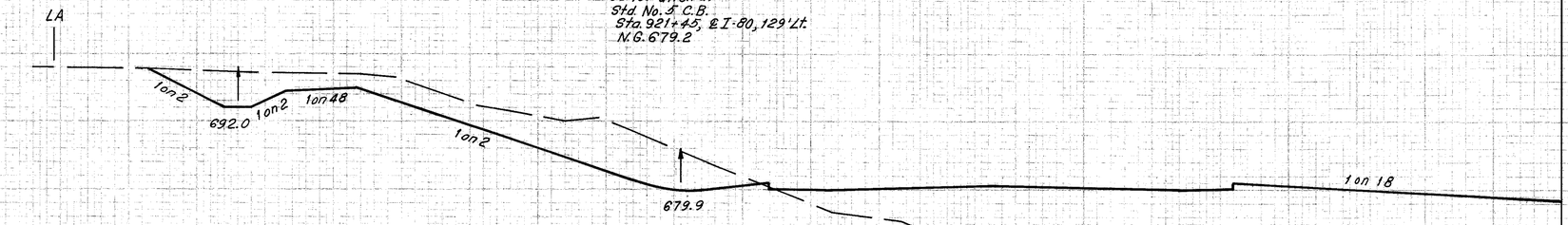
392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



Outlet ditch at
Std. No. 2-2A C.B.
Sta. 921+45, ℄ I-80, 188' Lt.
N.G. 691.0



Outlet ditch at
Std. No. 5 C.B.
Sta. 921+45, ℄ I-80, 129' Lt.
N.G. 679.2

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
679.68 922+00 651.0		430	1785
			1444 6848
680.30 921+00 656.1		350	1805
			1065 7111
Sta. 920+00		225	2035

MB 5568 NOV 5-11-68
MB 5274 PAGS 5-8-68
H.L.D 4-24-70

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0
INTERSTATE 80 LEFT HALF
STA. 921+00 TO STA. 922+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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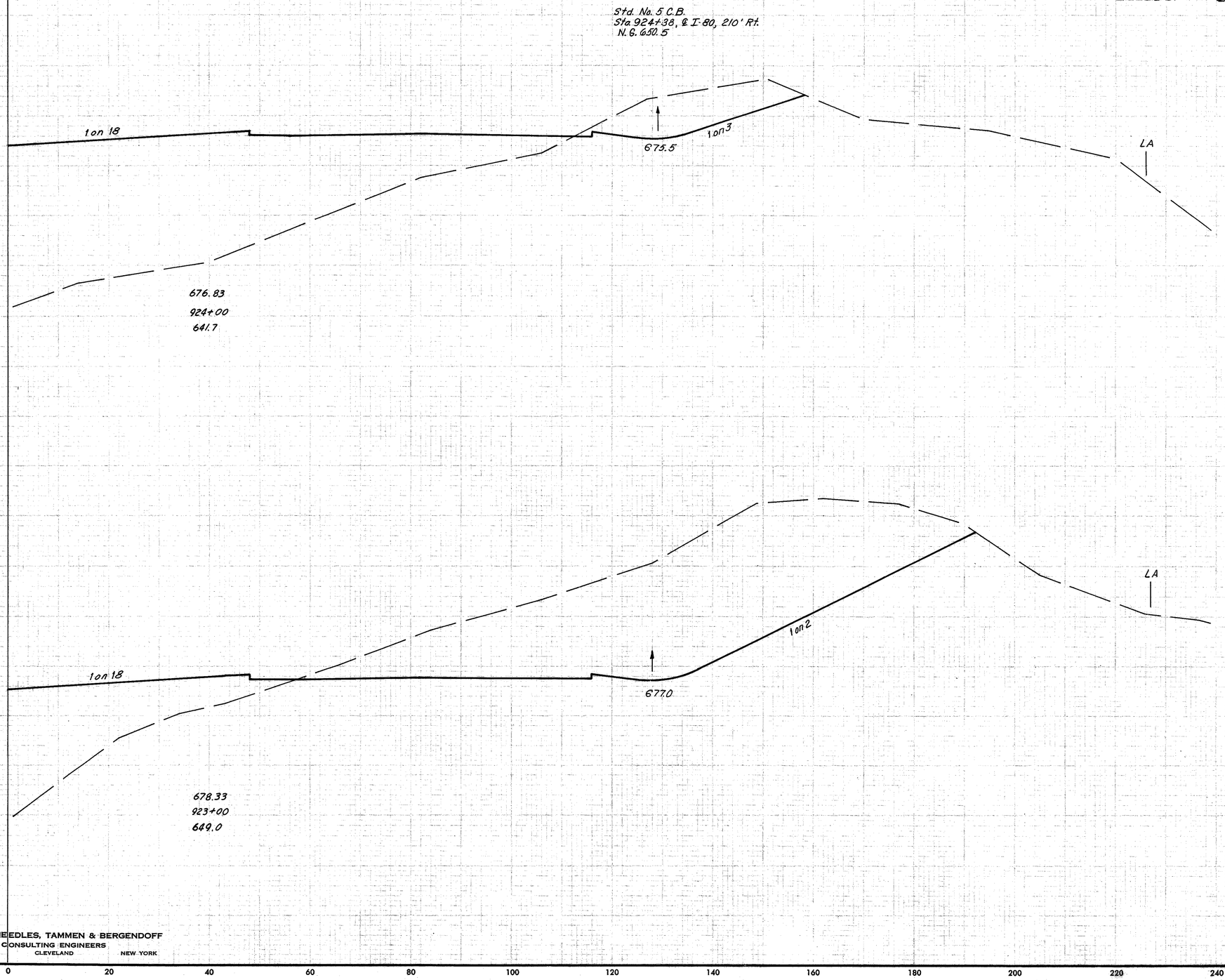
392

CUYAHOGA COUNTY
CUY 80-15.81

Quantity Calculations
Made by H.L.D *Date* 4-24-70
Checked by R.B.H *Date* 5-8-70



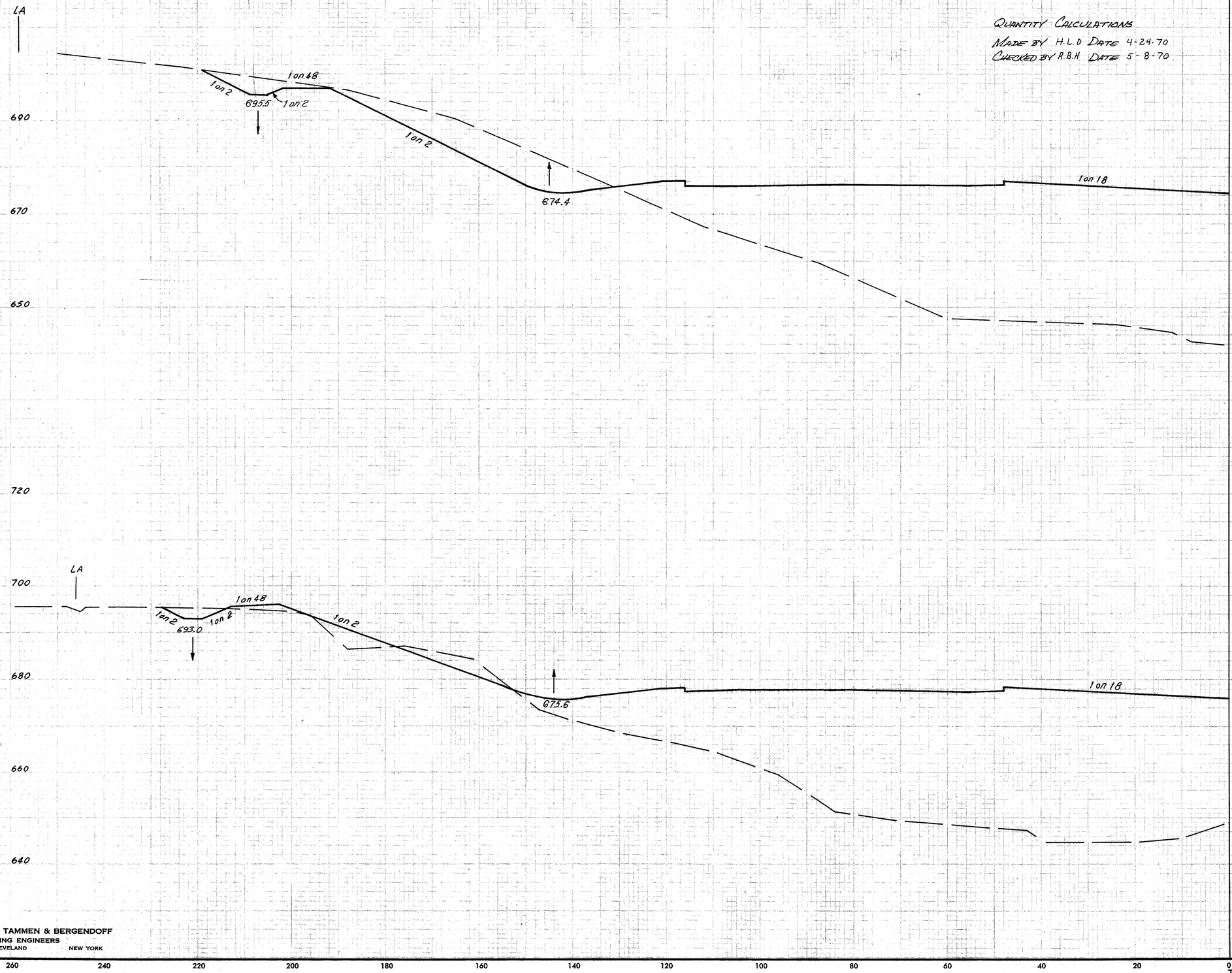
EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
255	2012		
		4270	4865
2051	615		
		3854	5769
30	2500		

Sta. 922+00

MAG 5-10-68 HLD 5-24-68
HLD 5-27-68 MAG 5-27-68
HLD 4-24-70

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

RIGHT HALF
INTERSTATE 80 STA. 923+00 TO STA. 924+00



QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H. DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY 80-15.81

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
676.83			
924+00	357	2822	
641.7			
		778	11504
678.33			
923+00	63	3390	
649.0			
		913	9584
Sta. 922+00	430	1785	

MG 5-1.88
MAS-224-(4)
4.20 4-24-70

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

INTERSTATE 80 LEFT HALF STA. 923+00 TO STA. 924+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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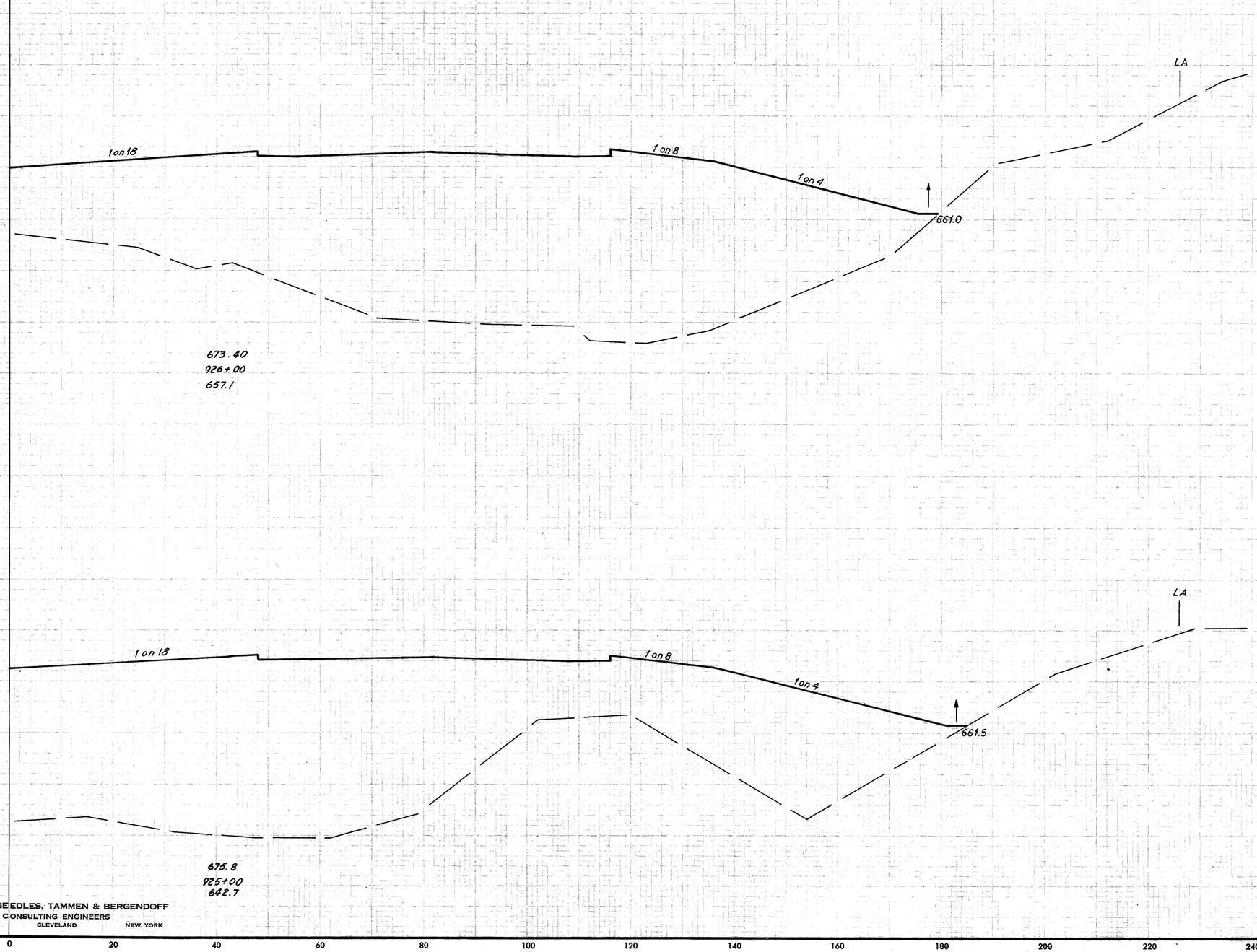
CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
0	4420		
		0	16093
0	4270		
		472	11633
Sta 924+00	255	2012	

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

INTERSTATE 80 STA. 925+00 RIGHT HALF TO STA. 926+00

MW 5-12-68
MW 5-13-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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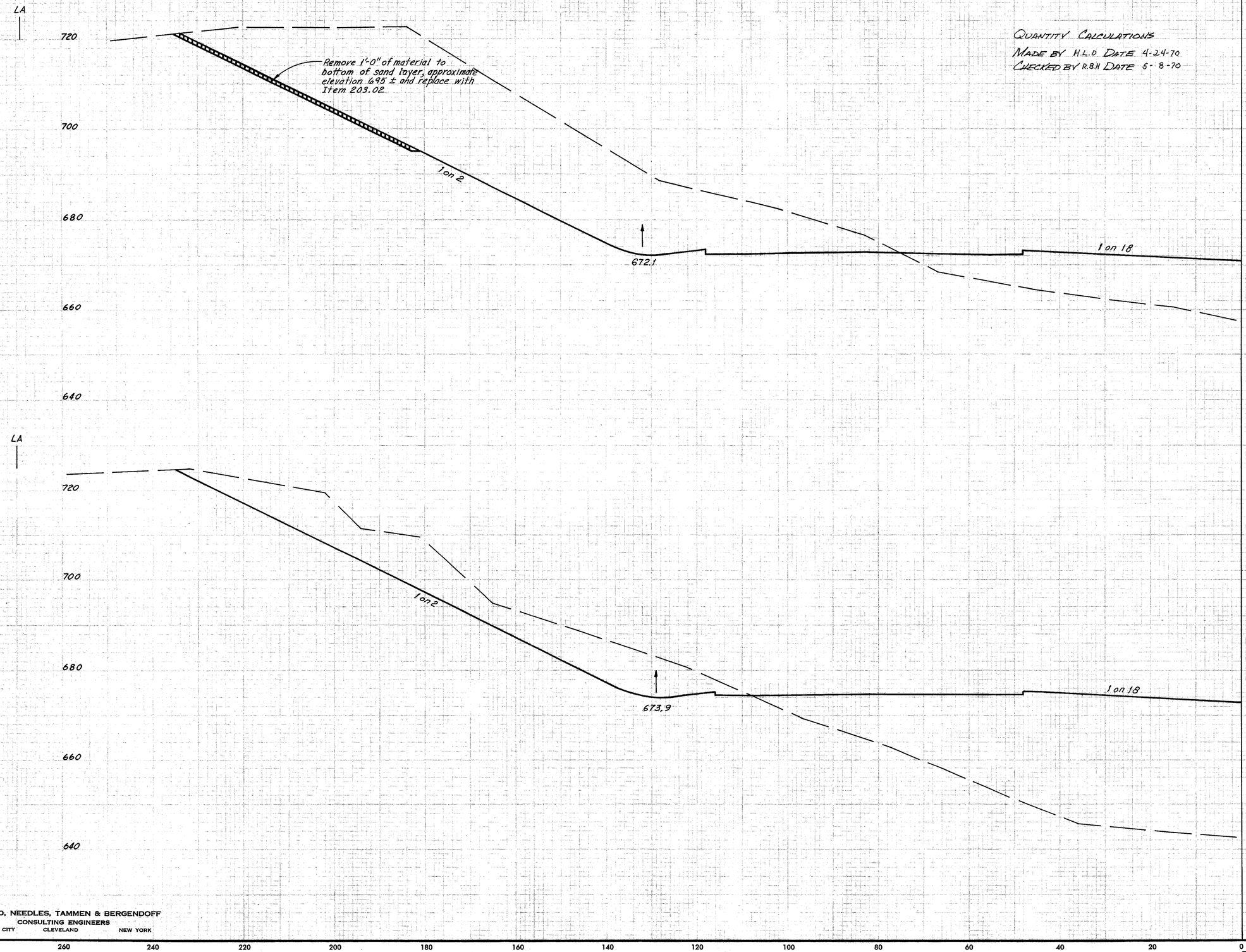
392

CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70

MAG 5-9-68 - H.L.D. 5-24-68
MAG 5-27-68 - HLD 5-28-68
HLO 4-24-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
673.40 926+00 657.1	2395	628		
			6091	5104
675.18 925+00 642.7	894	2128		
			2317	9167
Sta. 924+00	357	2822		

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

INTERSTATE 80 STA. 925+00 LEFT HALF TO STA. 926+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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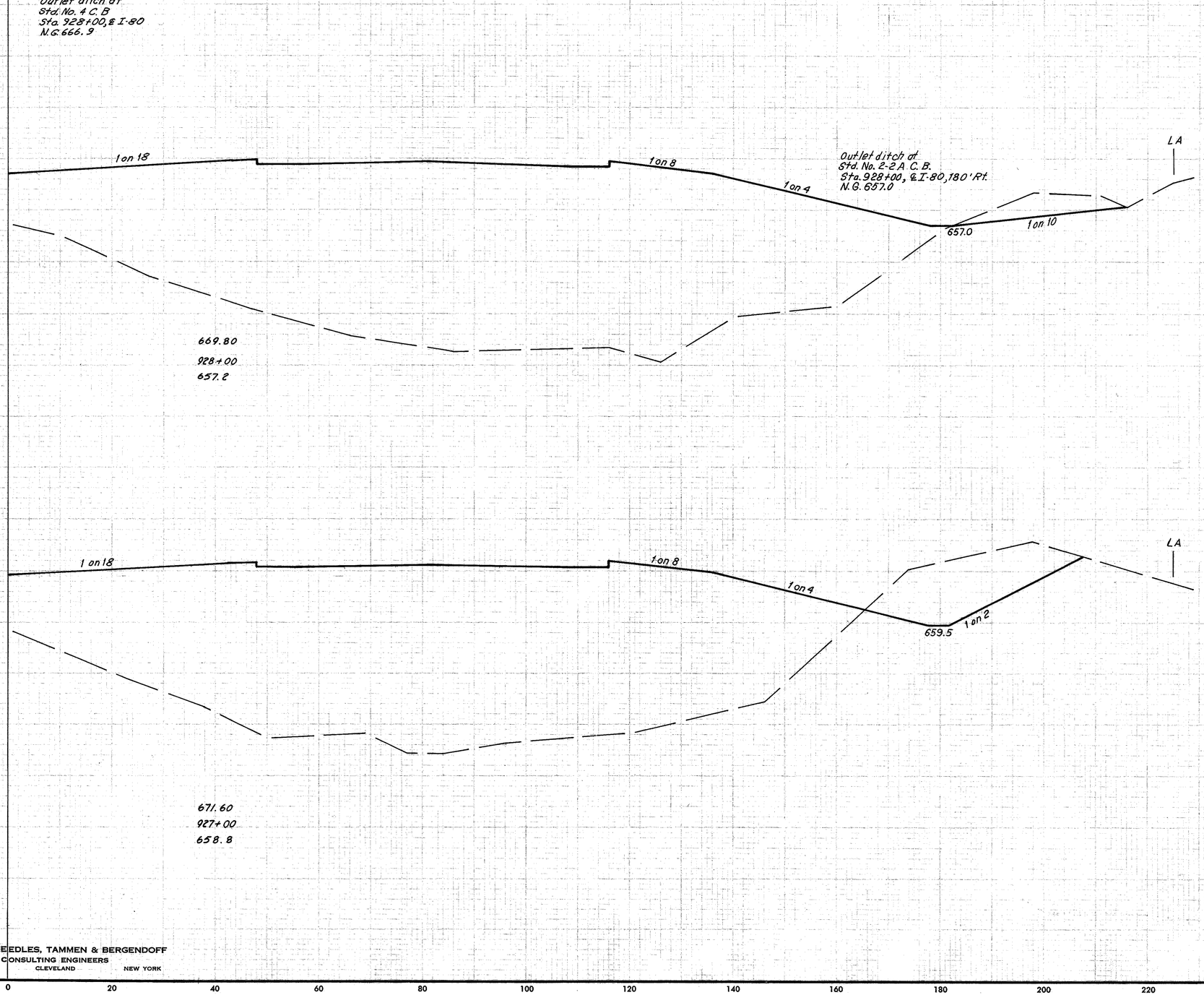
392

CUYAHOGA COUNTY
CUY 80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
90	4795		
		807	17204
346	4495		
		641	15842
Sta. 926+00	0	4060	

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

INTERSTATE 80 STA. 927+00 RIGHT HALF TO STA. 928+00

NAS 5-17-68 / HPD 5-17-68
HPD 5-17-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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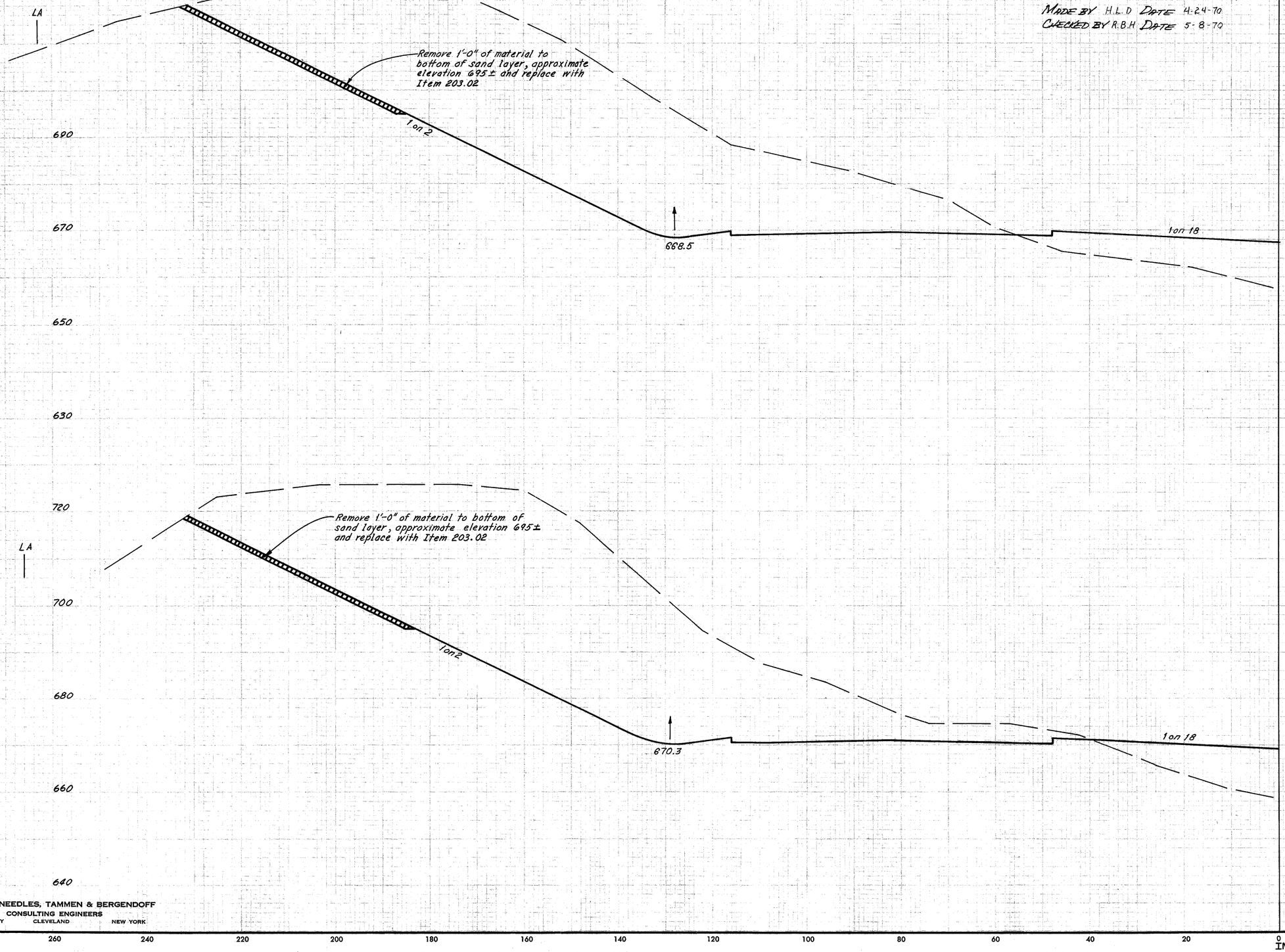
392

CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



MAG 5-9-68 ✓ HLD 5-24-68
MAG 5-27-68 ✓ HLD 5-28-68
HLD 4-24-70

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

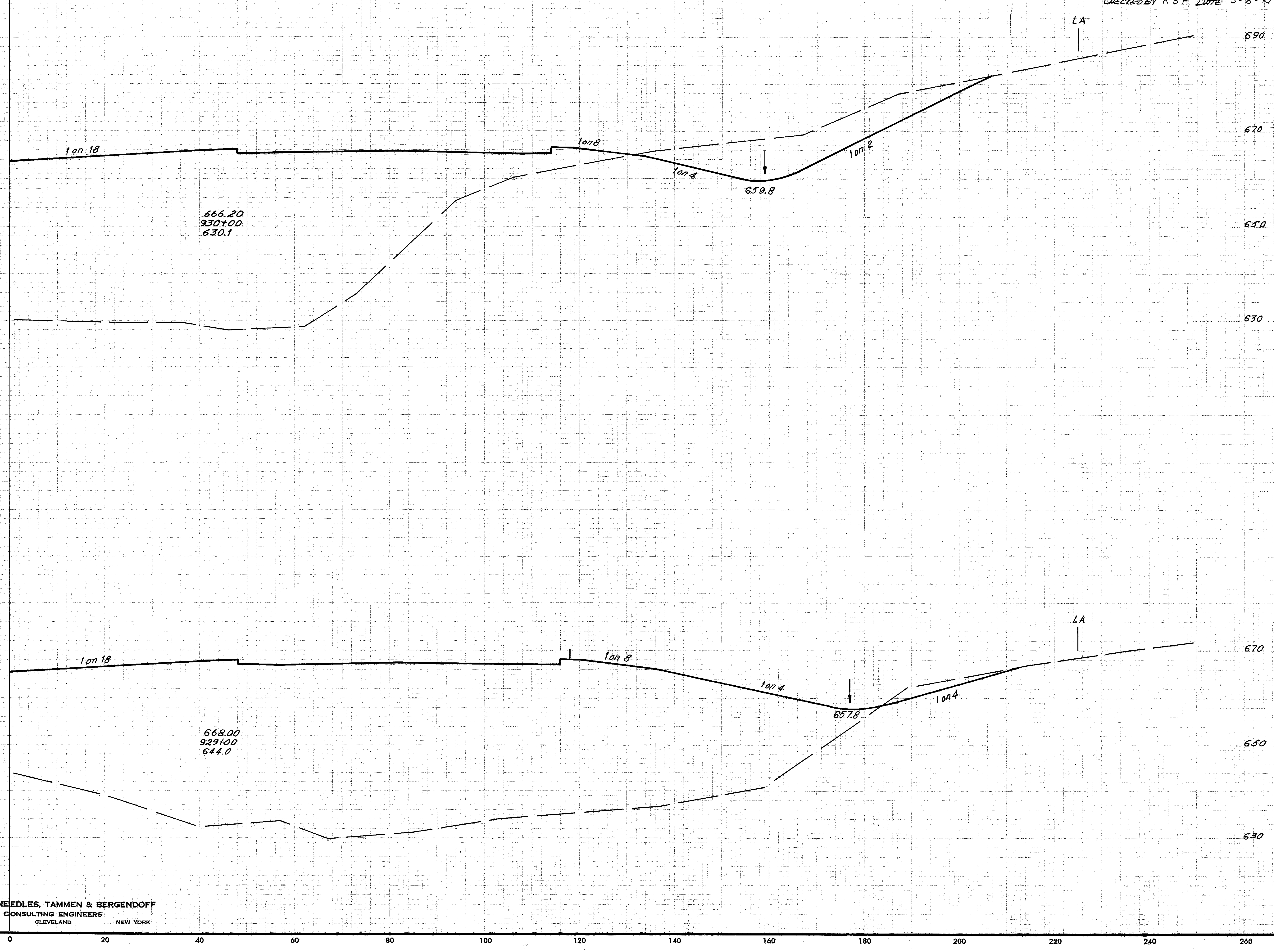
	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
669.80 928+00 657.2	3400	315		
			13257	1041
671.60 927+00 658.8	3759	247		
			11396	1620
Sta. 926+00	2395	628		

INTERSTATE 80 LEFT HALF STA. 927+00 TO STA. 928+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY 80–15. 81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	381	3175		
			780	15483
	40	5186		
			240	17720
Sta. 928+00	90	4383		

MAG 5-13-68 ✓HLD 5-28-68
HLD 5-27-68✓ MAG-5-27-68
HLD 4-24-70

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

RIGHT HALF
INTERSTATE 80 STA. 929+00 TO STA. 930+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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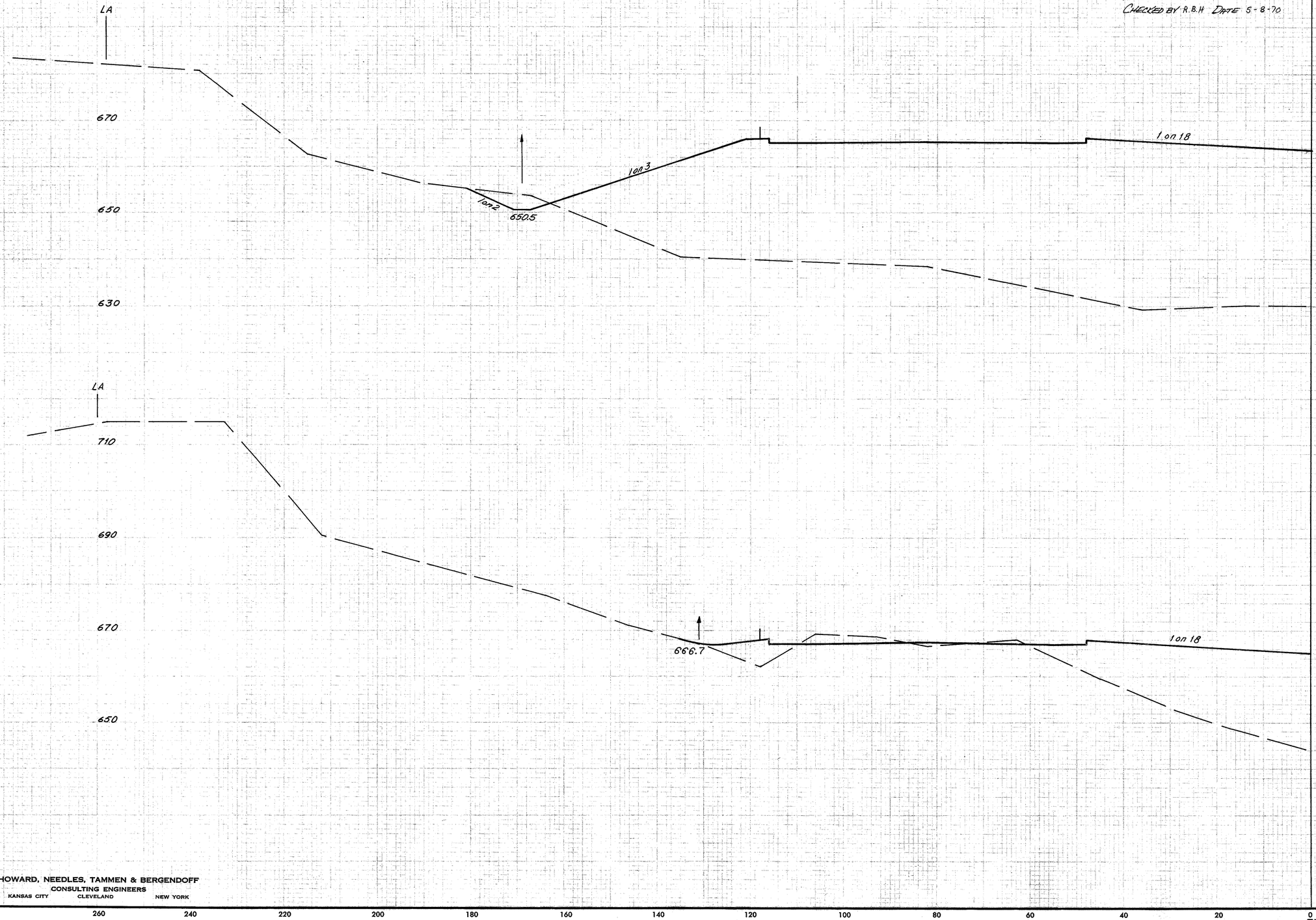
392

CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
666.20 930+00 630.1	30	4406		
			129	9678
668.00 929+00 644.0	40	820		
			6370	2102
Sta. 928+00	3400	315		

MAG 5-9-68 ✓HLD 5-24-68
MAG 5-27-68 ✓HLD 5-28-68
HLD 4-24-70

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

INTERSTATE 80 LEFT HALF STA. 929+00 TO STA. 930+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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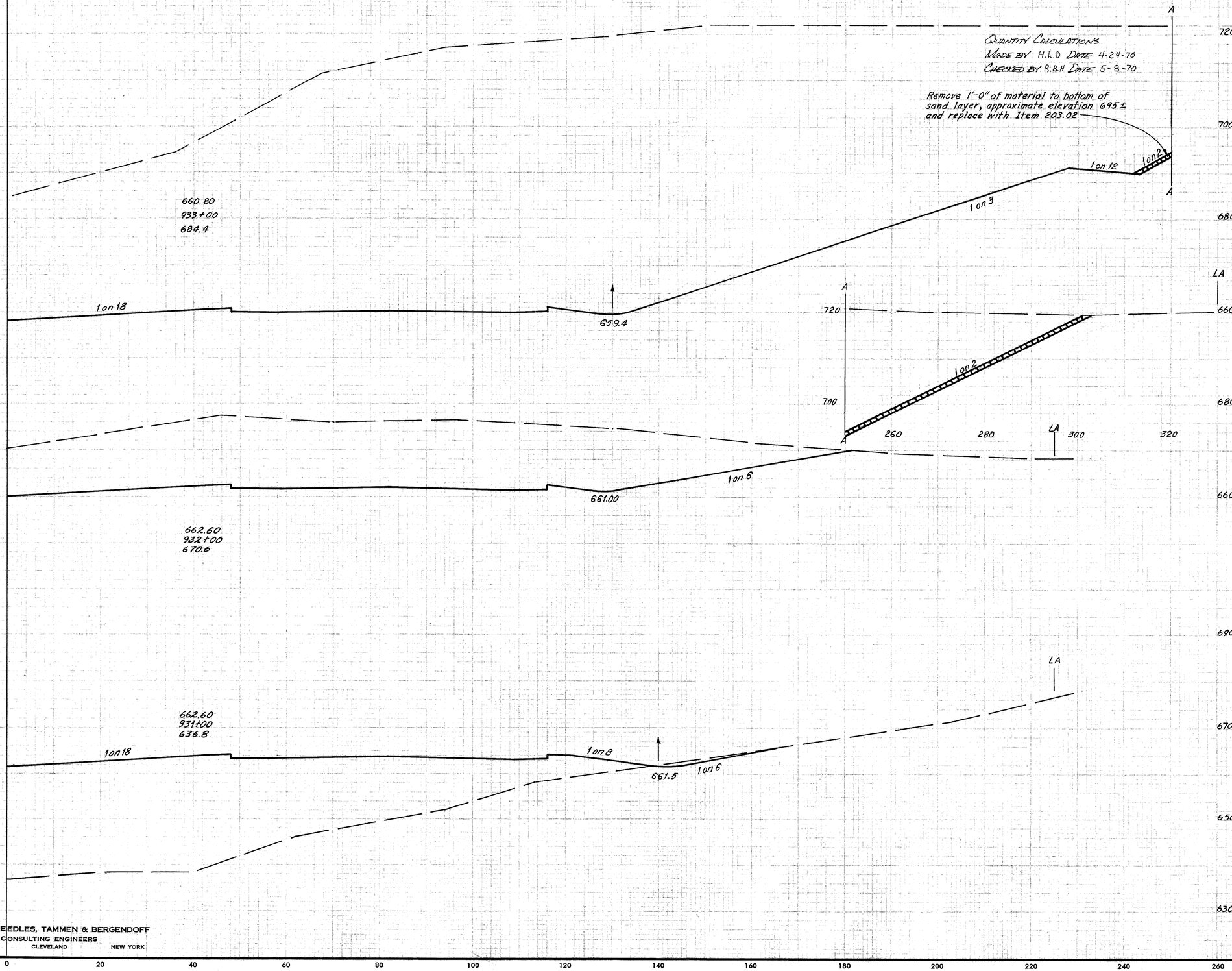
CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-24-70
Checked by R.B.H Date 5-8-70

Remove 1'-0" of material to bottom of sand layer, approximate elevation 695± and replace with Item 203.02



EARTHWORK

END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
11940	0		
		26027	0
2115	0		
		3944	4013
15	2167		
		733	9893
Sta. 930+00	381	3175	

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

INTERSTATE 80 STA. 931+00 RIGHT HALF TO STA. 933+00

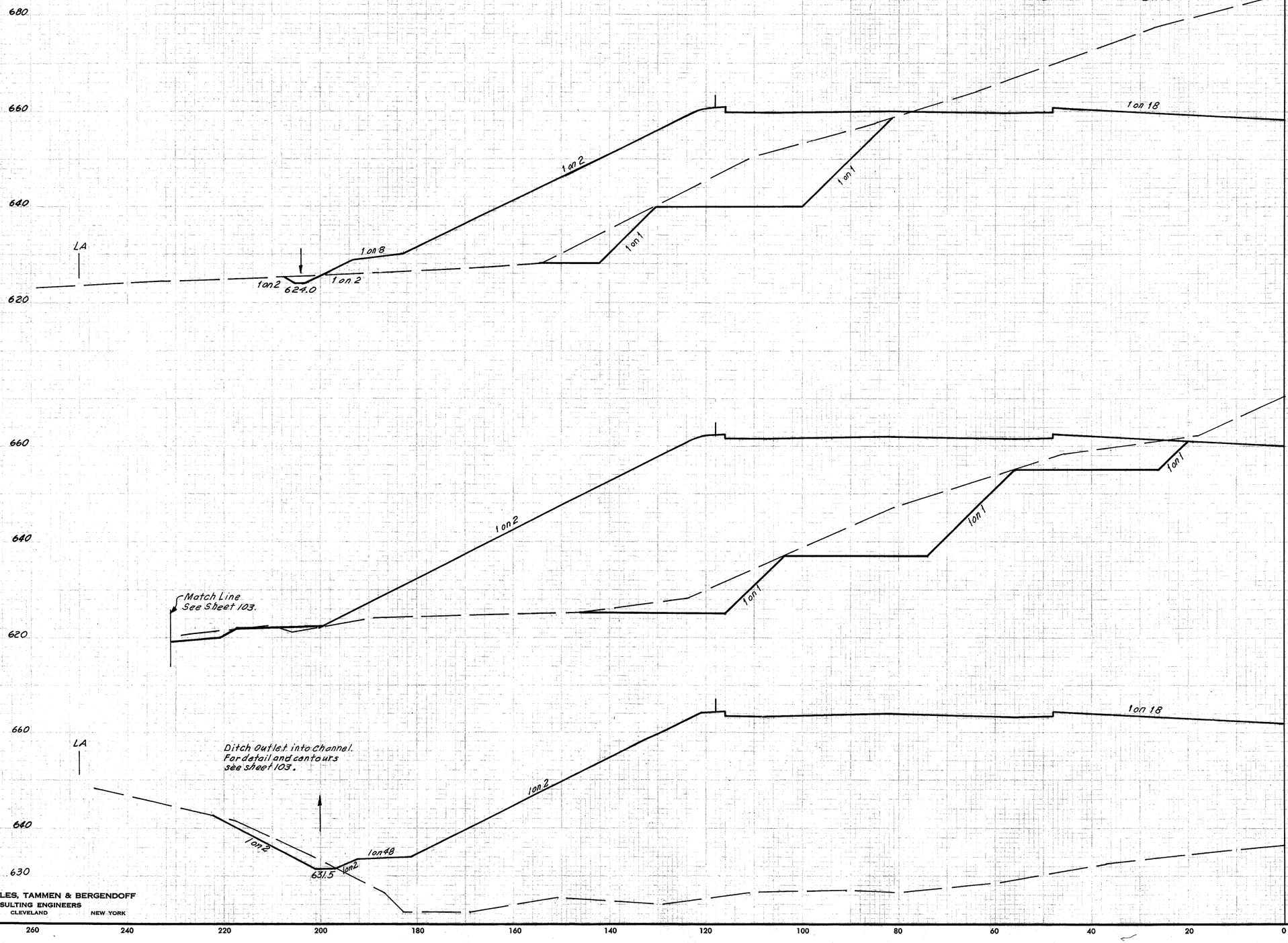
DWG # 17-68 V MAP # 20-68
ACC'S # 49 & 50 # 24-70-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-24-70
Checked by R.B.H Date 5-8-70



EARTHWORK				
END AREA		VOLUME		
	EXC.	EMB.	EXC.	EMB.
660.80				
933+00	1435	1604		
684.4				
			3702	8909
662.60				
932+00	584	3207		
684.4				
			1137	16839
664.40				
931+00	50	5670		
636.8				
			148	18659
Sta. 930+00	30	4406		

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

INTERSTATE 80 STA. 931+00 LEFT HALF TO STA. 933+00

DWG 5-14-68 / MOD 4-26-68
DWG 5-14-68 / MOD 4-26-68
H.L.D 4-24-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-80-15.81

Std. No. 5 C.B.
Sta. 836+00, ℄ I-80, 128' Rt.
N.G. 654.0

1 on 18 — 655.40, 936+00, 645.0 — 1 on 6 — 654.0 — 1 on 2 — LA

Quantity Calculations
Made by H.L.D. Date 4-24-70
Checked by R.B.H. Date 5-8-70

657.20, 935+00, 669.6 — 1 on 18 — 655.8 — 1 on 3 — LA

659.00, 934+00, 678.3 — 1 on 18 — 657.6 — 1 on 3 — 1 on 12 — 1 on 2 — A — LA

Remove 1'-0" of material to bottom of sand layer, approximate elevation 695± and replace with Item 203.02

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
108	765		
		7502	1417
3943	0		
		27120	0
10720	0		
		41963	0
Sta. 933+00	11940	0	

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

INTERSTATE 80 STA. 934+00 RIGHT HALF TO STA. 936+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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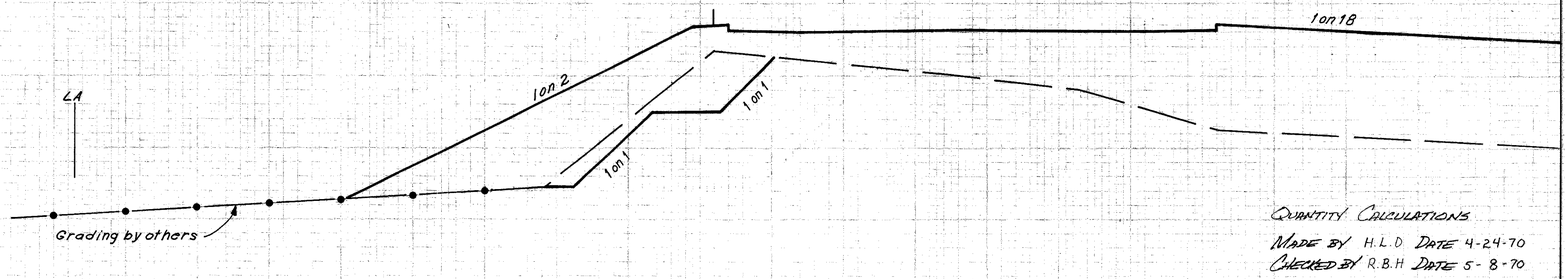
CUYAHOGA COUNTY
CUY- 80-15.81



QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
655.40 936+00 645.0	120	1668	
		1502	4907
657.20 935+00 669.6	691	982	
		3807	3650
659.00 934+00 678.3	1365	989	
		5185	4801
Sta. 933+00	1935	1604	

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

260 240 220 200 180 160 140 120 100 80 60 40 20 0

LEFT HALF
INTERSTATE 80 STA. 934+00 TO STA. 936+00

DWG. 4498 / MS. 4.28.68
CHKD. 4.27.70
H.L.D.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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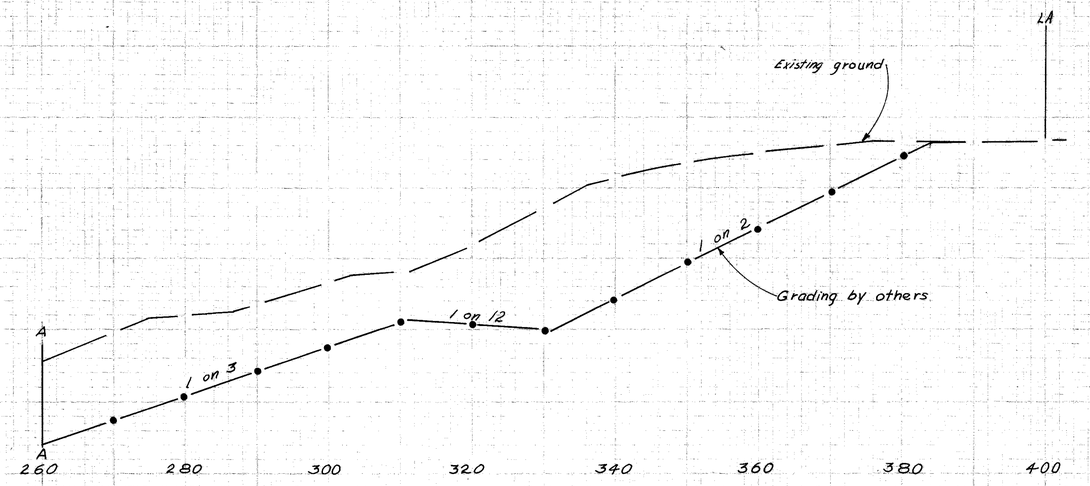
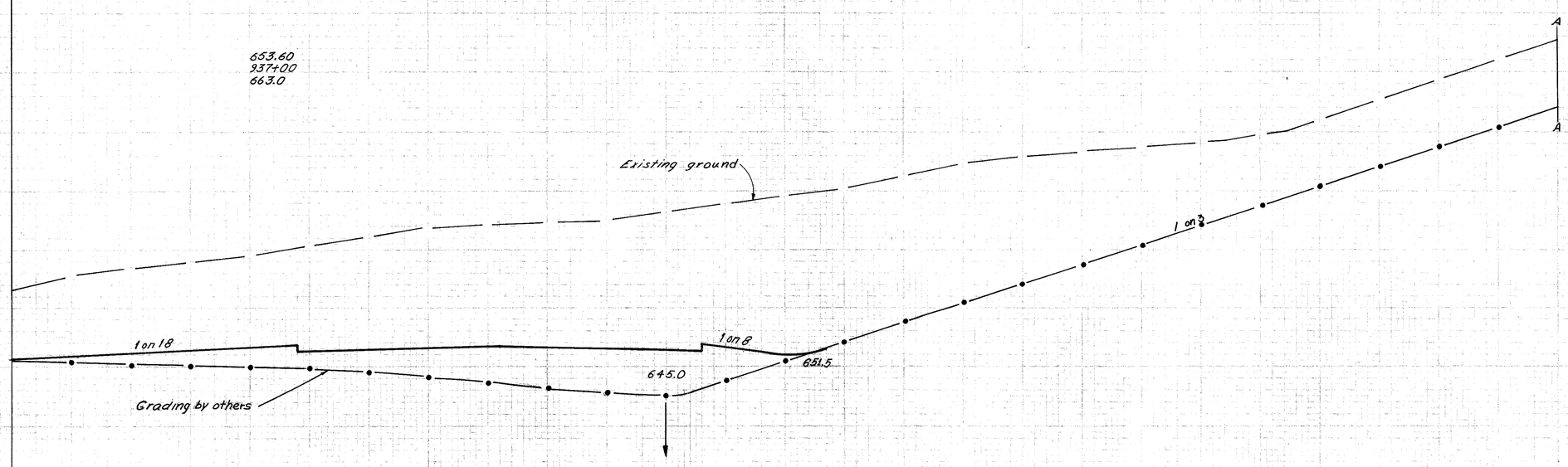
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
0	550		
		200	2435
108	765		

710
700
690
680
670
660
650
Sta. 936+00

RIGHT HALF
INTERSTATE 80 STA. 937+00

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

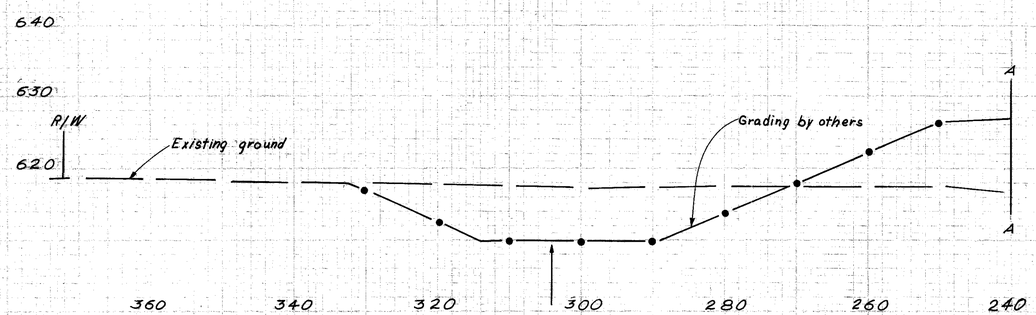
v APR 1-31-68
RBR 1-31-68
RBR 2-2-68

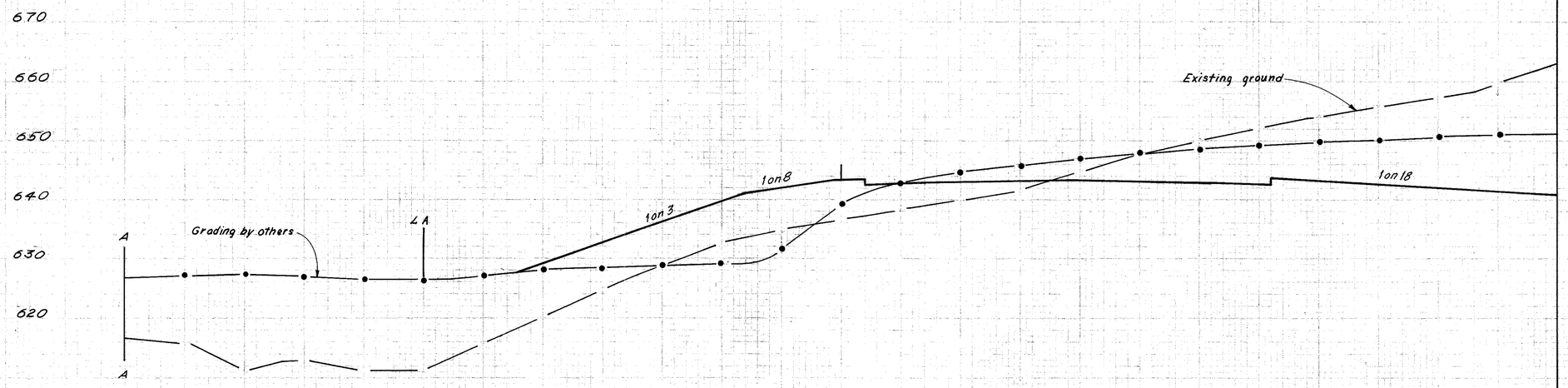
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

1971
392

CUYAHOGA COUNTY
CUY– 80– 15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70





	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
653.60 937+00 663.0	619	392		
			1369	3815
Sta. 936+00	120	1668		

✓ RPR
APR 1-31-68
MAG 2-1-68
RPR 2-1-68

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

LEFT HALF
INTERSTATE 80 STA. 937+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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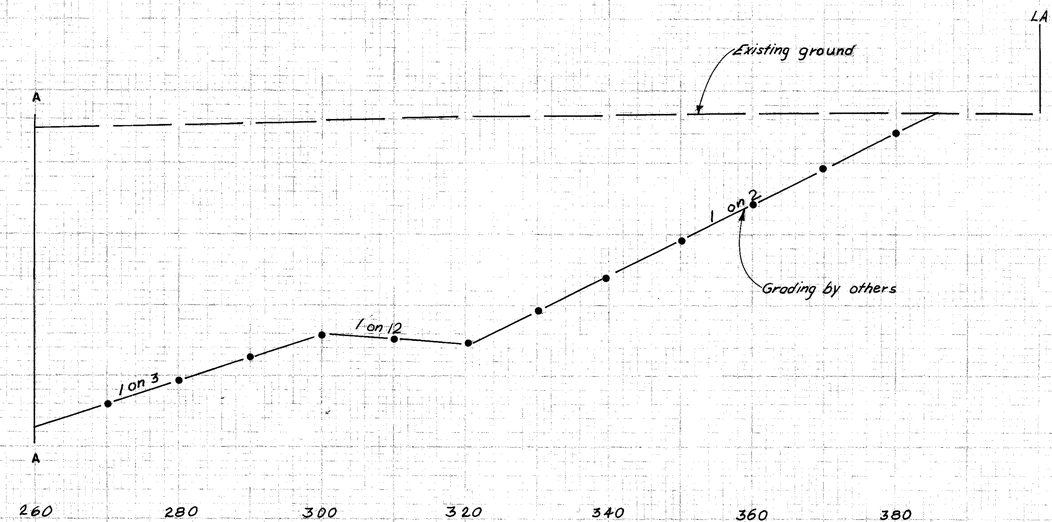
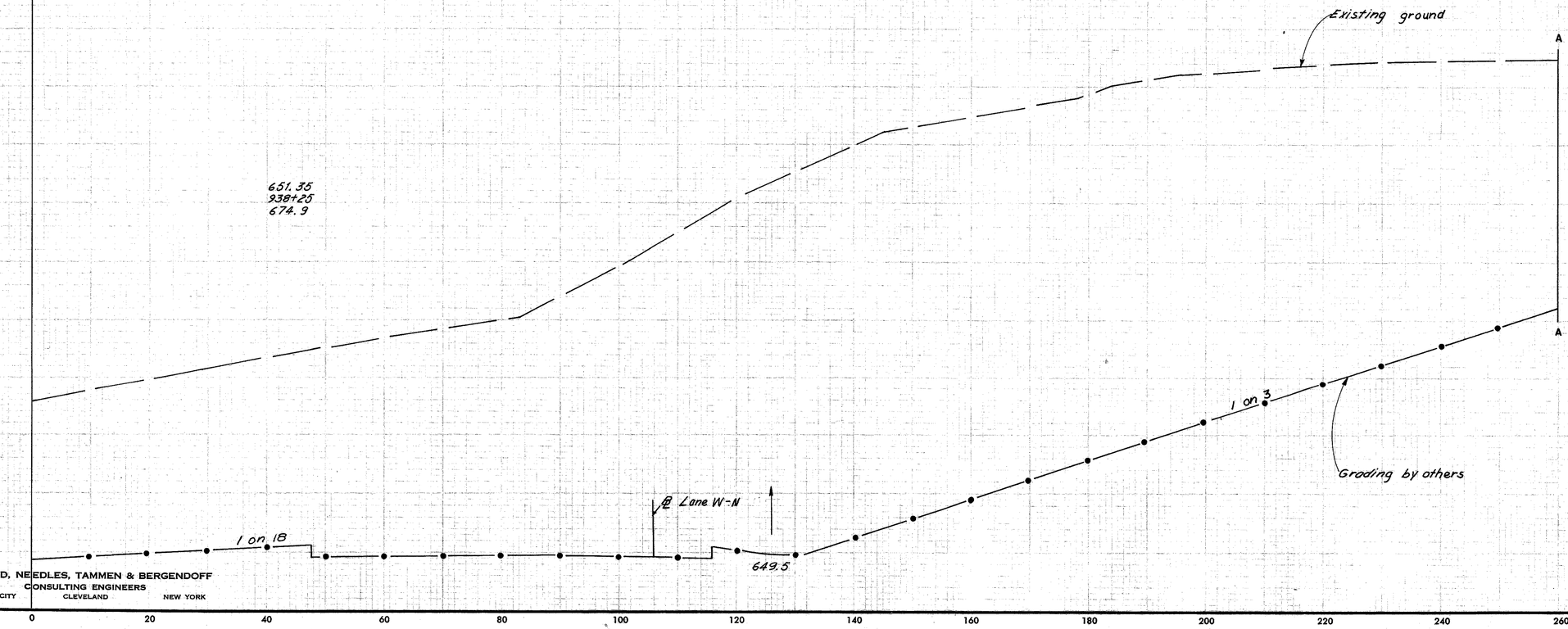
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS

MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70





EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
730			
720			
710	0	0	
700			
690		0	1019
680			
670			
937+00	0	550	
660			

L.F.L 12-8-66
JEN 2-2-67 ∨ L.F.L 2-9-67

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

RIGHT HALF
INTERSTATE 80 STA. 938+25

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-24-70
CHECKED BY R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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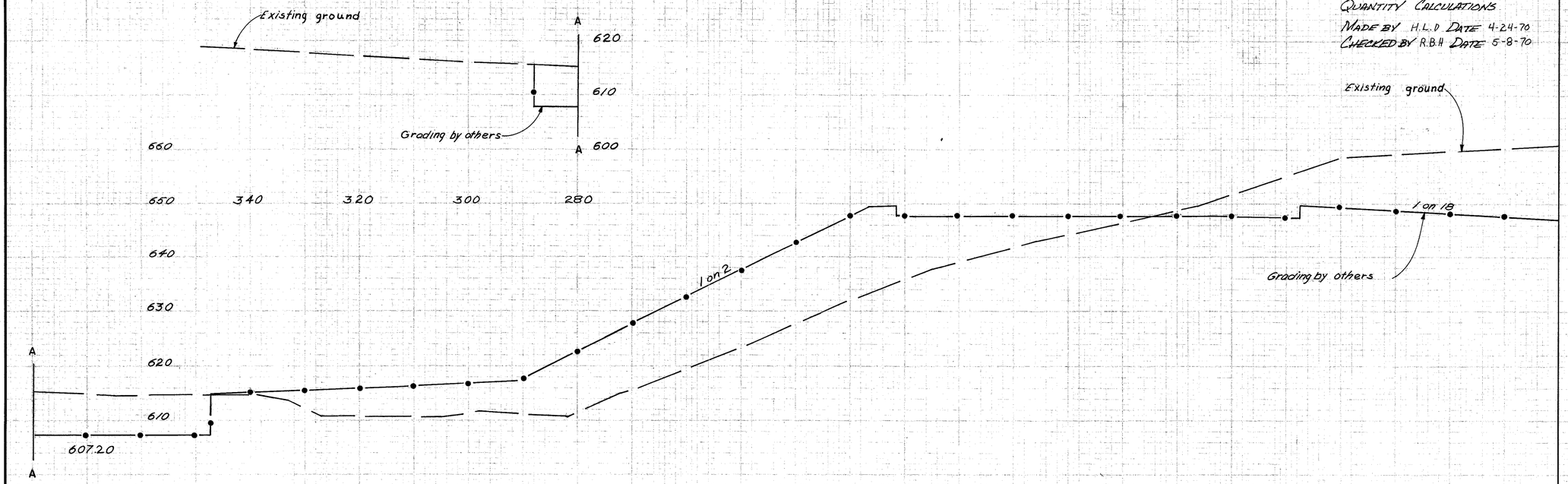
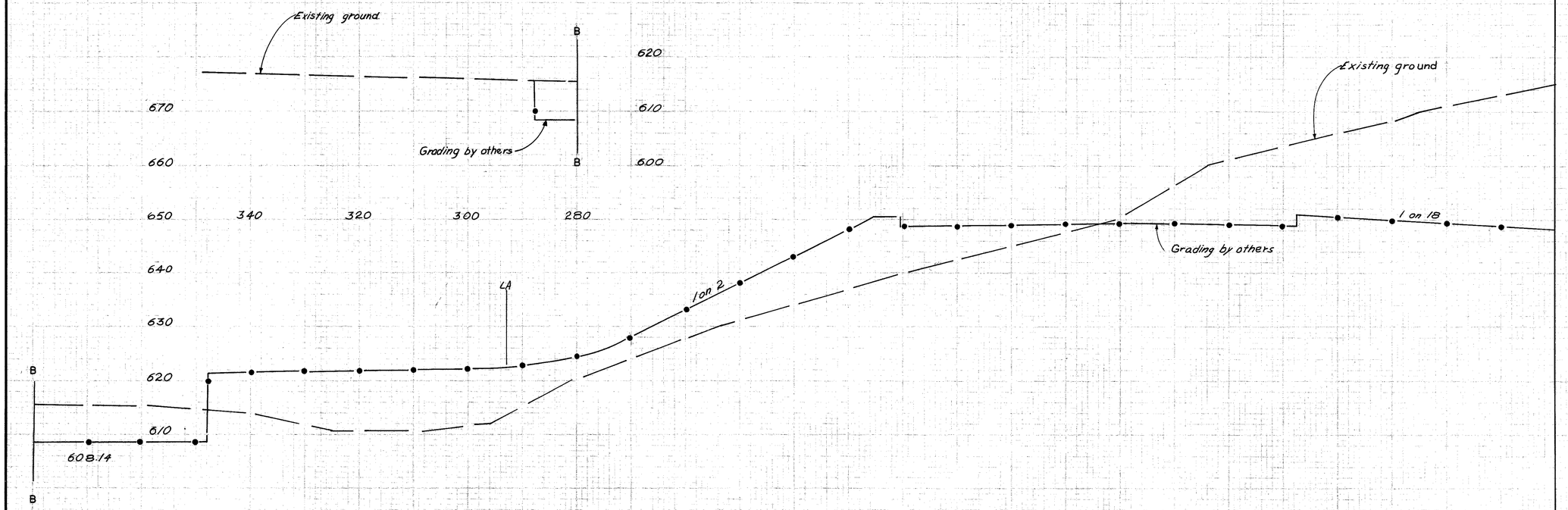
CUYAHOGA COUNTY
CUY-80-15.81





650.00
939+00
660.7

651.35
938+25
674.9

937+00

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
0	0		
		1146	726
619	392		

LEFT HALF
INTERSTATE 80 STA. 938+25 TO STA. 939+00

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

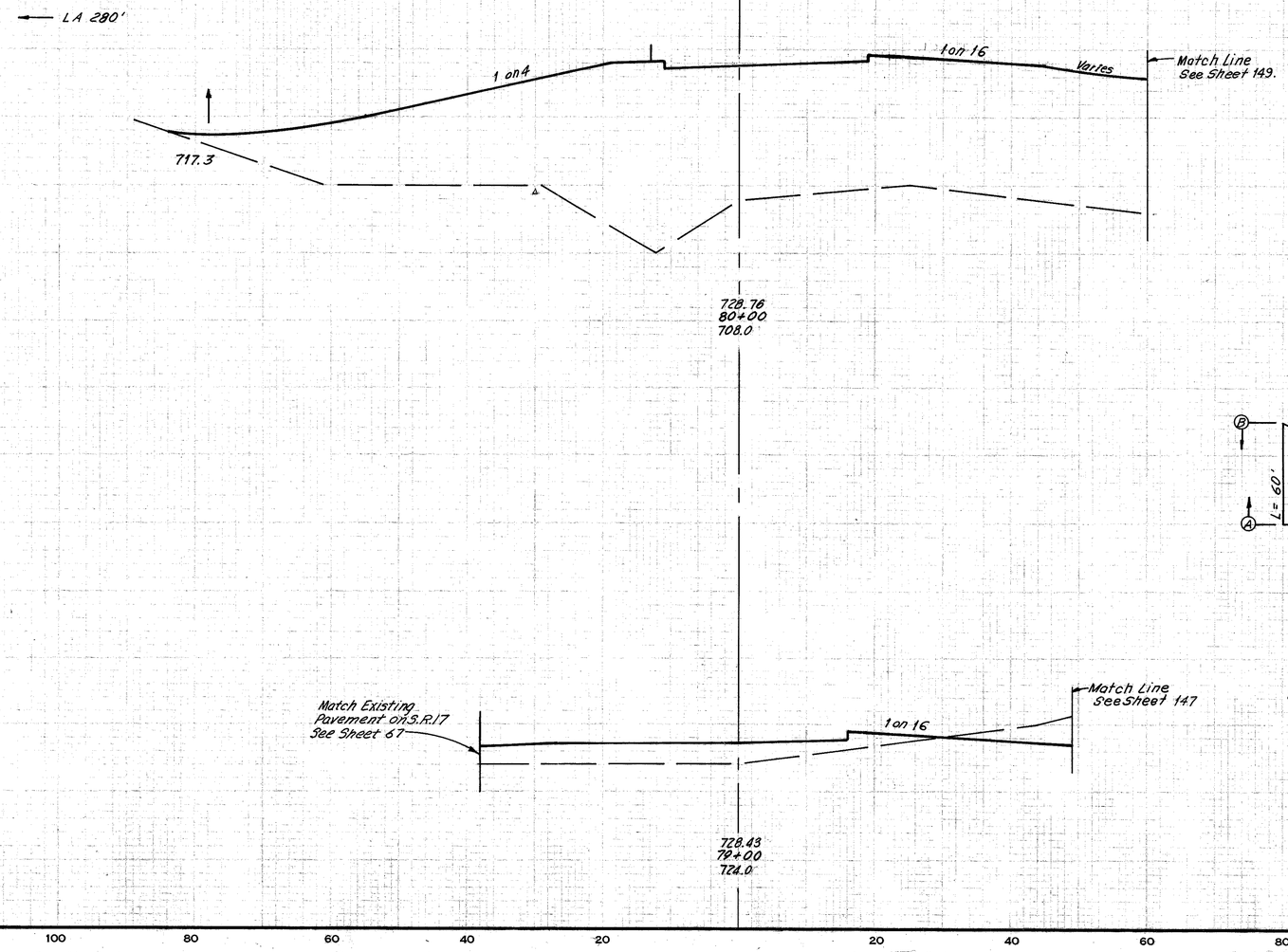
260 240 220 200 180 160 140 120 100 80 60 40 20 0

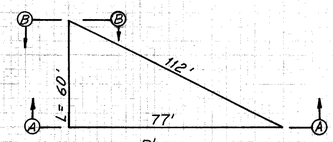
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

392

CUYAHOGA COUNTY
CUY 80-15.81

Quantity Calculations
Made By H.L.D Date 4-10-70
Checked By R.B.H Date 5-8-70





Plan
Section A-A & B-B

Embankment
$\left(\frac{173+0}{2} \times 60\right) \div 27 = 44.5$ cu.yds.

Excavation
$\left(\frac{41+0}{2} \times 60\right) \div 27 = 193$ cu.yds.

Note:
For Section A-A see cross section of Sta. 79+00, Ramp E-G
For location of Spill Area see sheet 130.

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
		0	2309
		76	4596
		41	173
Spill Quantity			193

720
710
700
740
730
720

RAMP E-G STA 79+00 STA 84+76

R.J.T. 11-12-68 RBH 11-22-68 CL 2-4-70

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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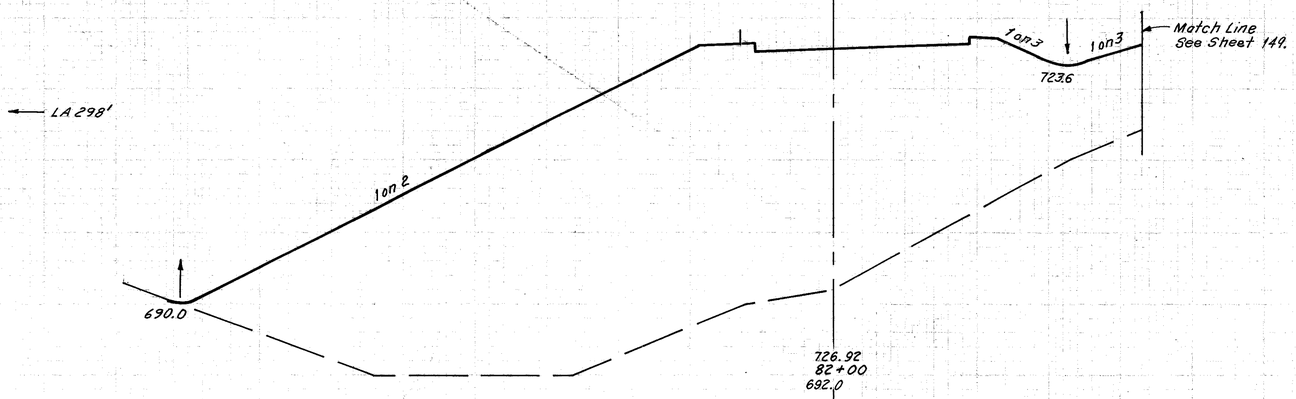
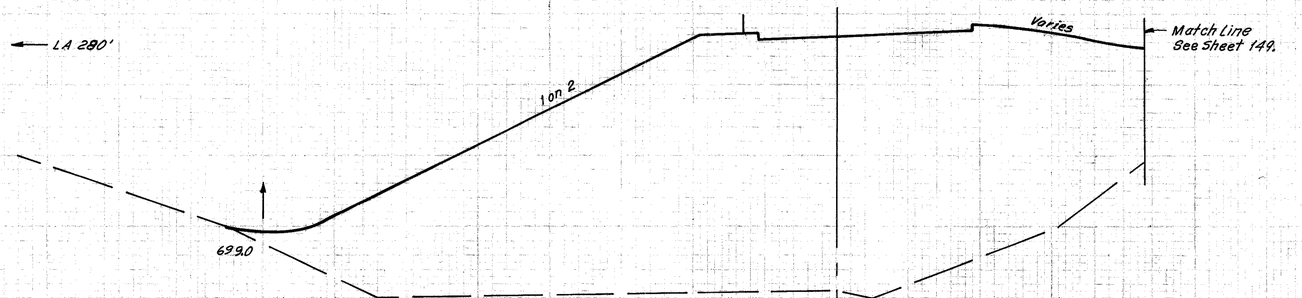
CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70





	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
740				
730				
720				
710				
700				
690				
680	0	3419		
			0	12313
730				
720				
710				
700				
690				
	0	3230		
			0	10257
Sta 80+00	0	2309		

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

RJT 11-12-68 PBH 11-22-68 HED 4-10-70

RAMP E–G STA. 81+00 TO STA. 82+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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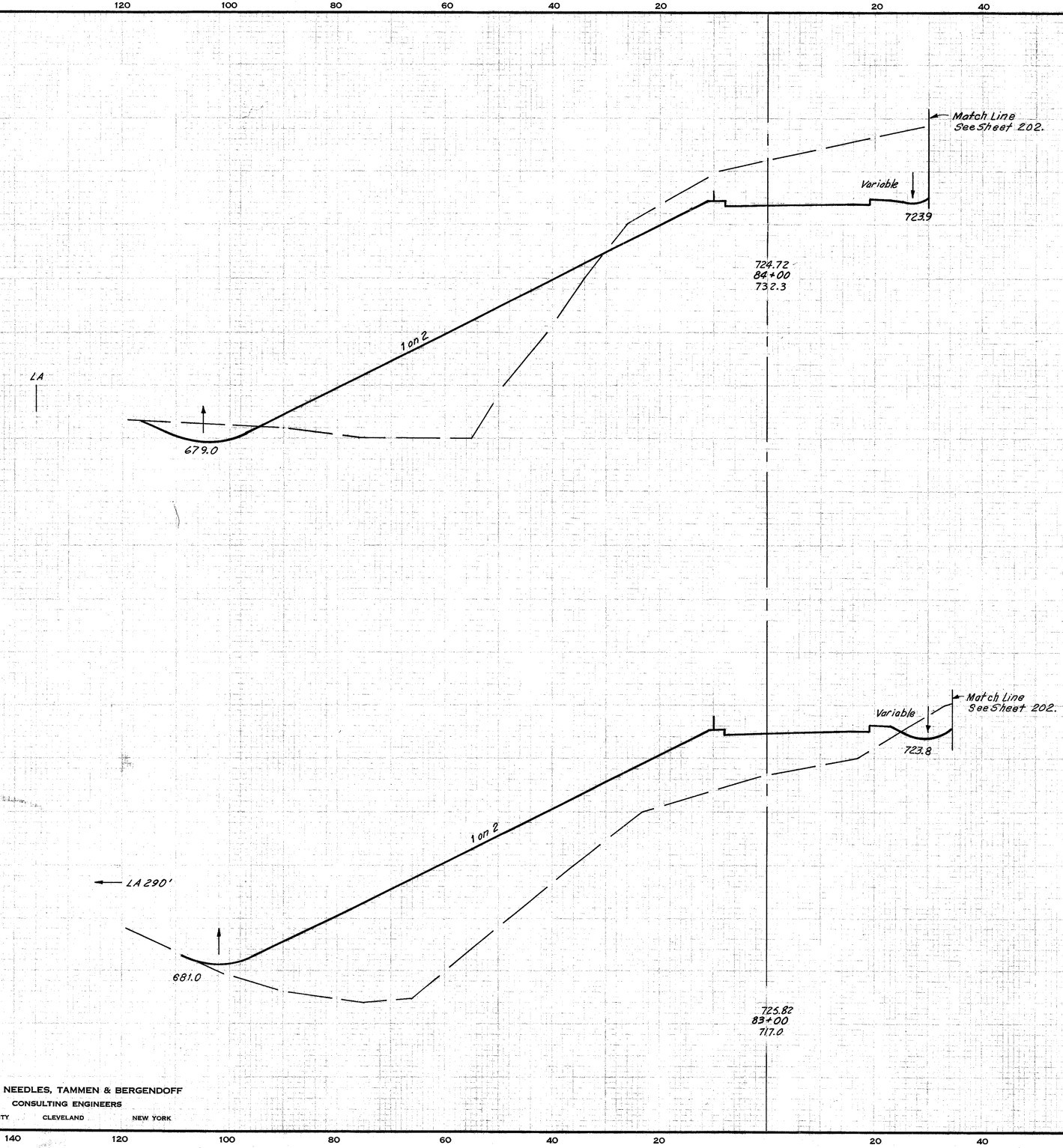
392

CUYAHOGA COUNTY
CUY 80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
537	730		
		1094	4115
54	1492		
		10	9034
0	3419		

740
730
720
710
700
690
680
670
740
730
720
710
700
690
680
Sta. 82+00

RAMP E-G STA. 83+00 TO STA. 84+00

RDY 11-12-68 RBH 11-22-68
HLD 4-10-70

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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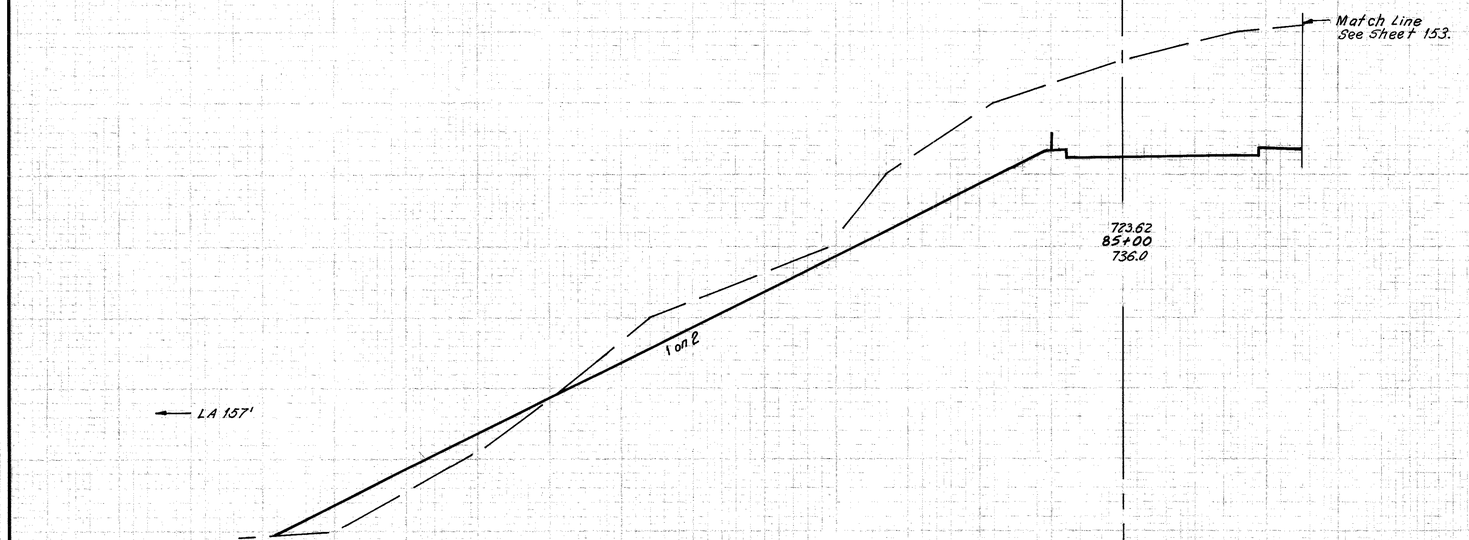
CUYAHOGA COUNTY
CUY 80—15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70

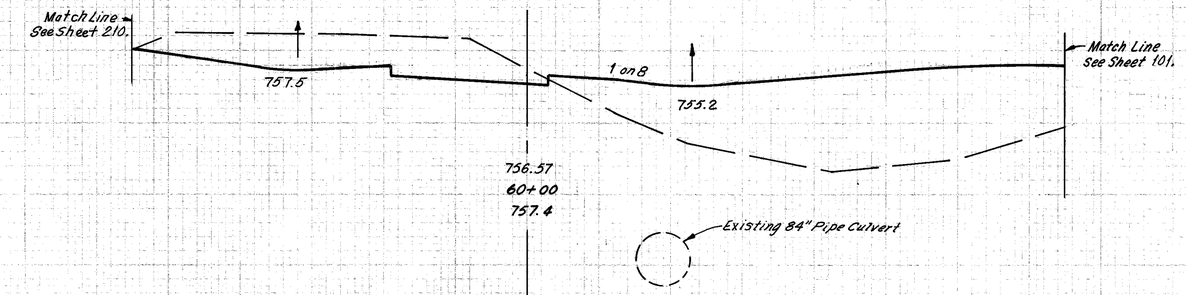


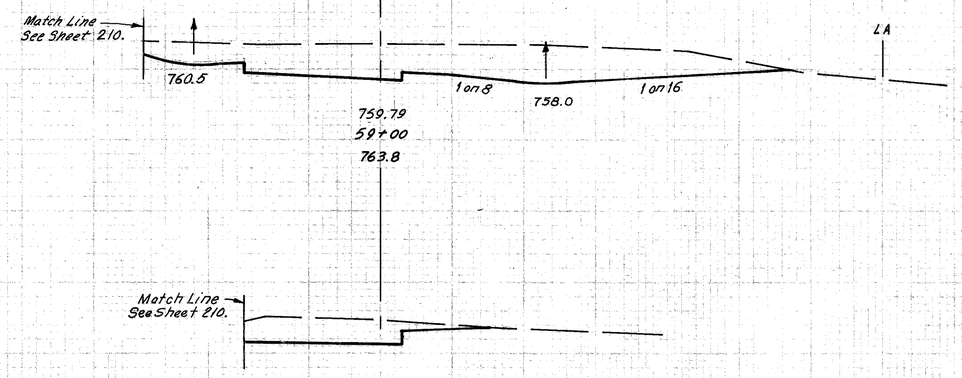
	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
Back Ramp E-G Sta. 86+00 See Sheet 153.	665	0		
			2870	167
740				
730				
720				
710	885	90		
700				
690				
680			2633	1519
Sta. 84+00	537	730		

RAMP E—G STA. 85+00 TO STA.

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

RJT 11-12-68 RBH 11-22-68 RJT 4-10-70





FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-22-70
CHECKED BY R.B.H DATE 5-8-70

CUYAHOGA COUNTY
CUY-80-15.81

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	243	697		
			1241	1291
	427	0		
			947	0
	85	0		
			132	62
Sta. 57+42	38	58		

DWC 5-6-68 ✓ MAG 5-16-68
SPV 11-1-68 ✓ RJT 11-12-68
HLD 4-13-70

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

RAMP G-E STA. 58+00 TO STA. 60+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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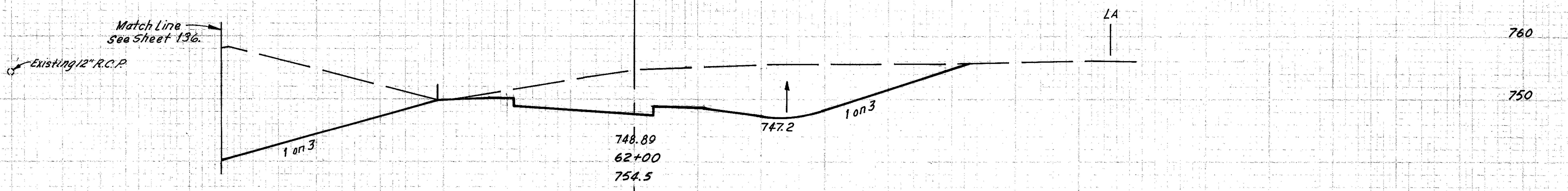
392

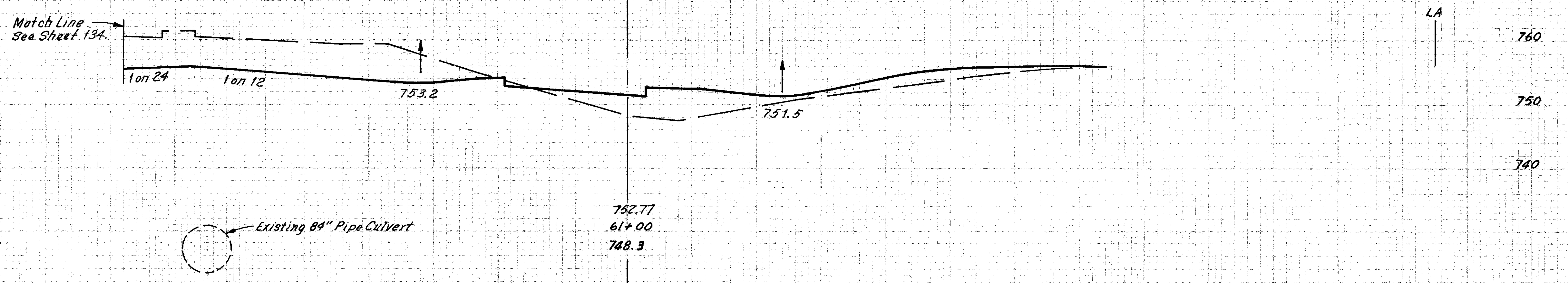
CUYAHOGA COUNTY
CUY–80–15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-22-70
CHECKED BY R.B.H DATE 5-8-70

DWC 5-5-68 ✓ MAG 5-16-68
SPV 11-1-68 ✓ RJT 11-12-68
HLD 4-13-70



Std. No. 5 C.B.
Sta. 61+25, ℄ Ramp G-E, 33' Lt.
N.G. 751.60



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	712	0		
			1819	300
	270	162		
			950	1591
Sta. 60+00	243	697		

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

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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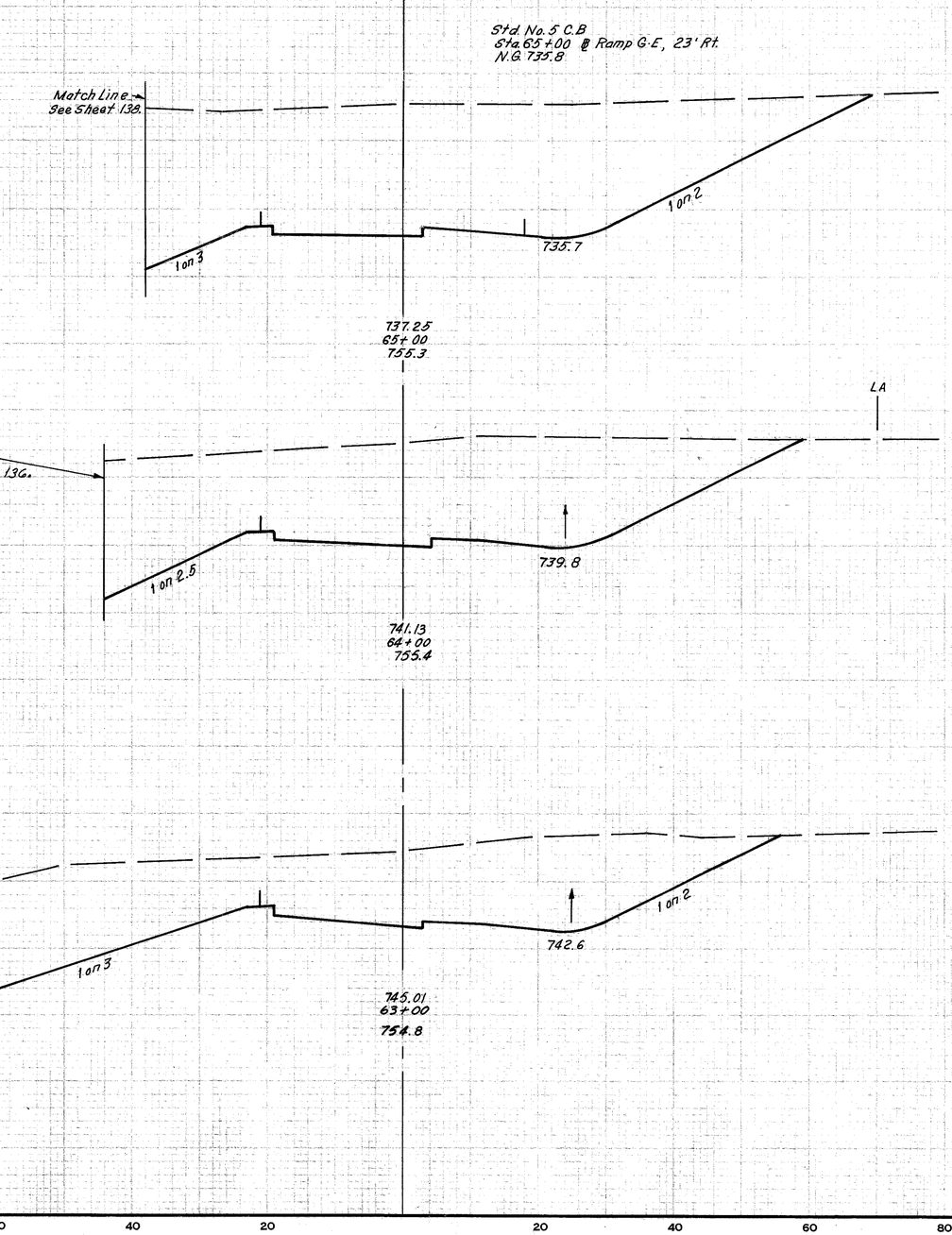
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-22-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
750			
730			
1654	0		
750		5520	0
730			
1327	0		
		4739	0
750			
730	1232	0	
		3600	0
Sta. 62+00	712	0	

DWGS 4-68 / MNS-5-15.48
SH 11-68
ADD 4-15-70

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

RAMP G-E STA. 63+00 TO STA. 65+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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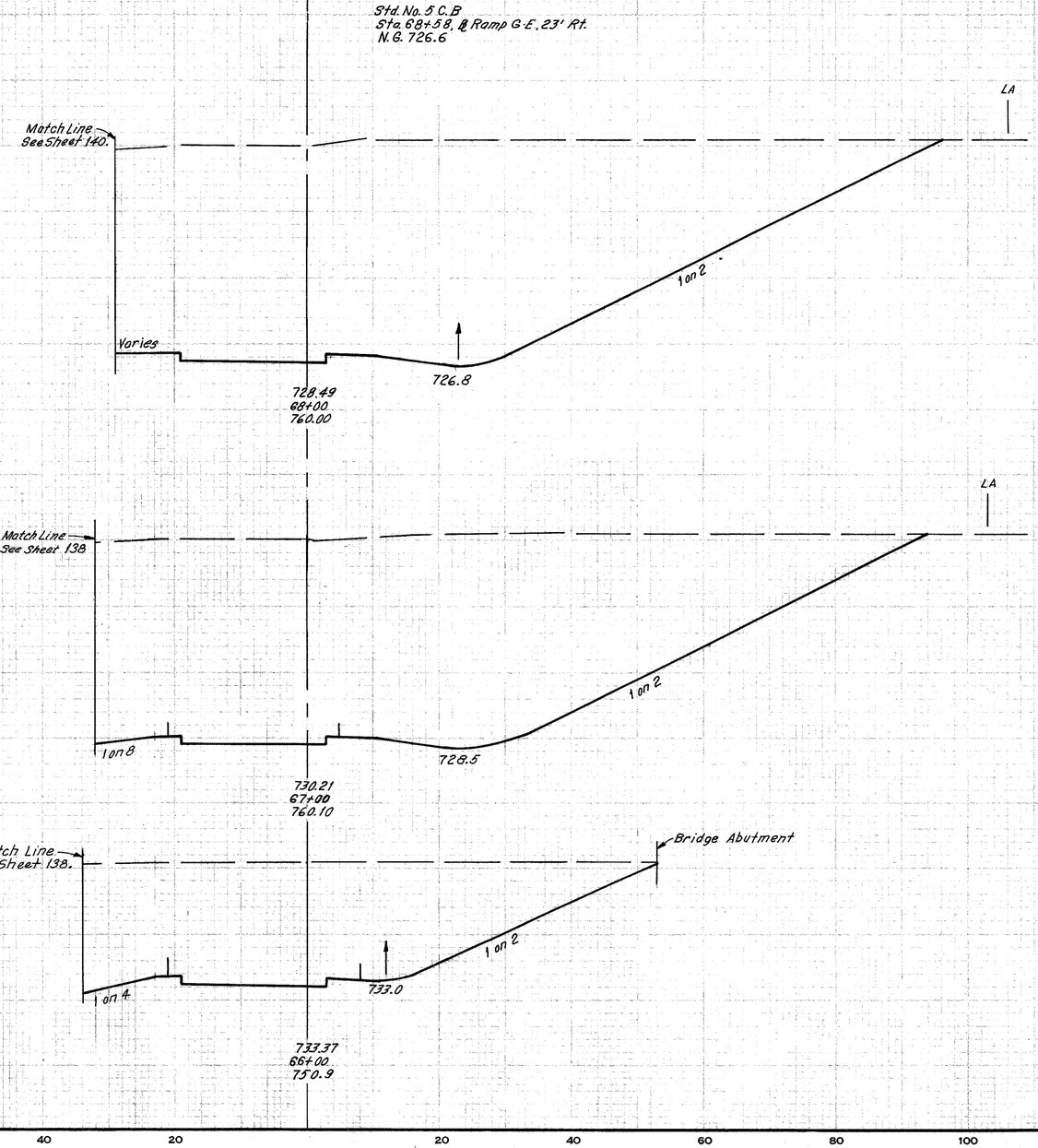
CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by H.L.D Date 4-22-70
Checked by R.B.H Date 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
3014	0		
		10994	0
2923	0		
		7693	0
1231	0		
		5343	0
Sta. 65+00	1654	0	

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

RAMP G-E STA. 66+00 TO STA. 68+00

DWG 5-68 / MAR. 5-72-68
SLO 4-6-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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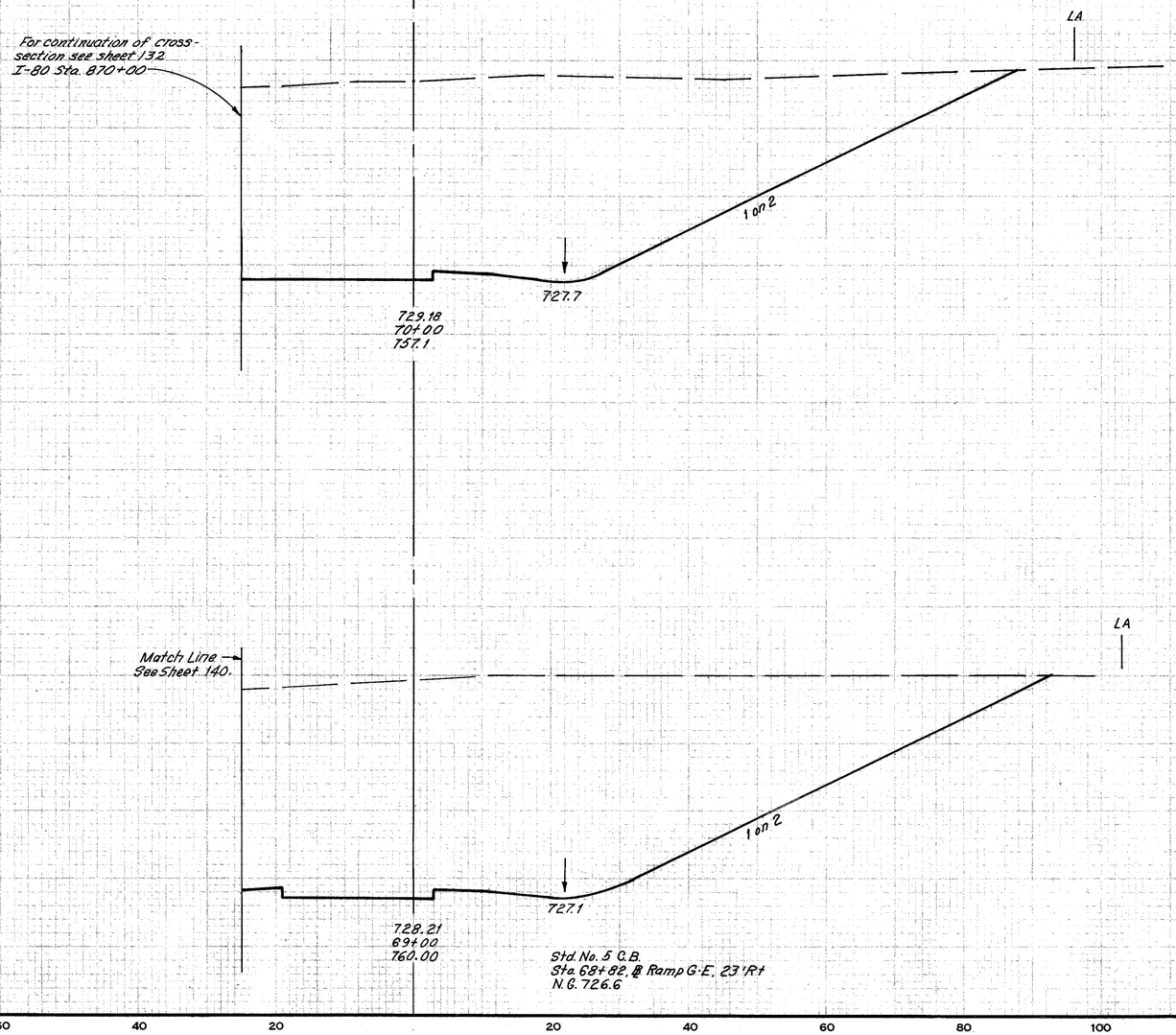
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-22-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
2354	0		
		9452	0
2750	0		
		10674	0
Sta. 68+00	3014	0	

RAMP G-E STA. 69+00 TO STA. 70+00

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

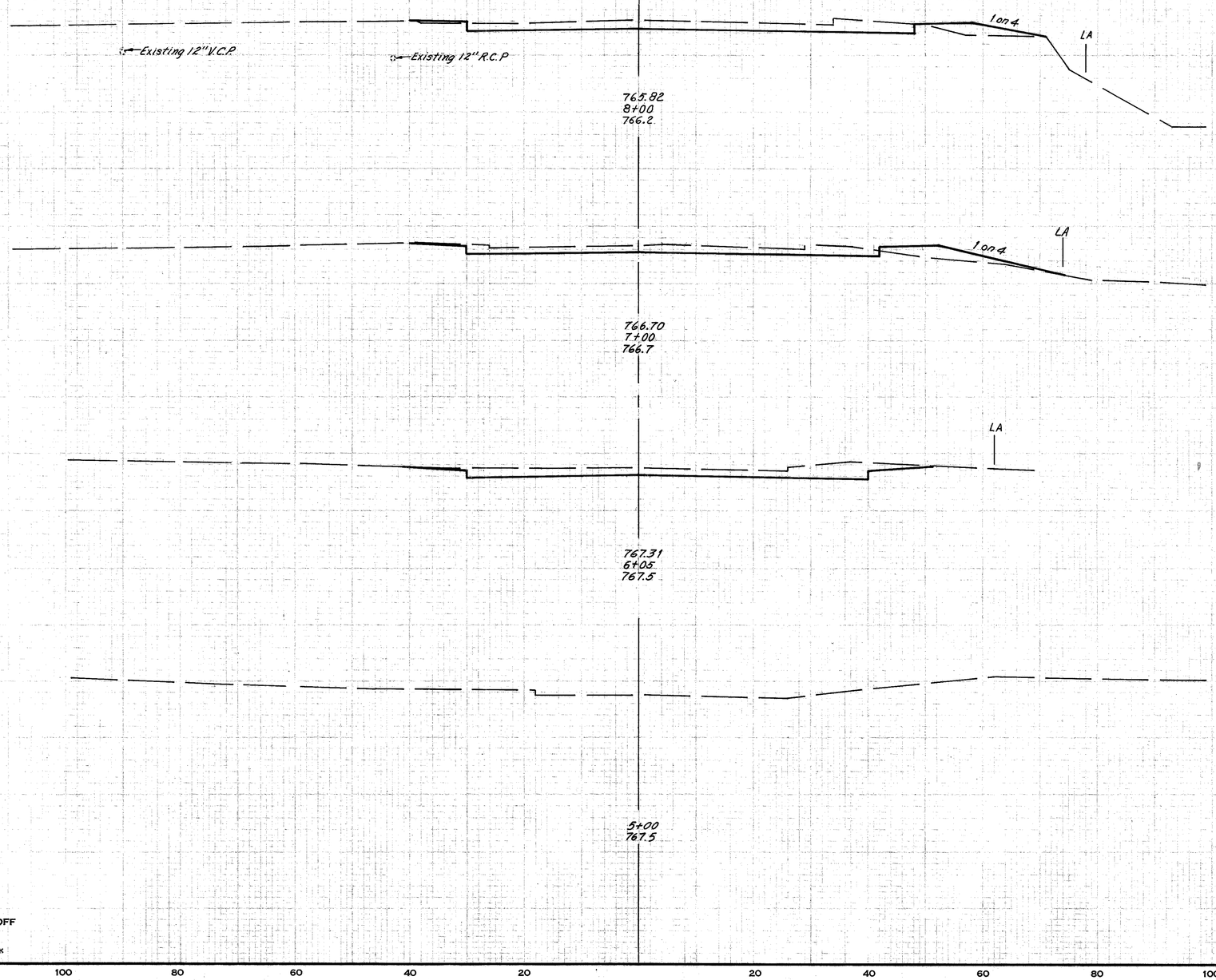
DWG. F-36-1, MAS. FEB 27, 1968
R.B.H. 4-22-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

209
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
	760		
	750	125	32
		402	107
	760		
	750	92	26
		359	48
	770		
	760		
		102	0
	770		
	760		

DWG. 5-B-68 V MAS 5-2-68
SPECIAL PROVISIONS

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

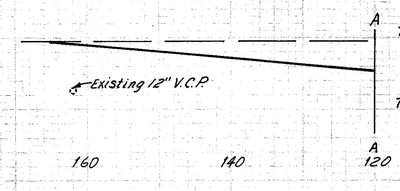
GRANGER ROAD STA. 5+00 TO STA. 8+00

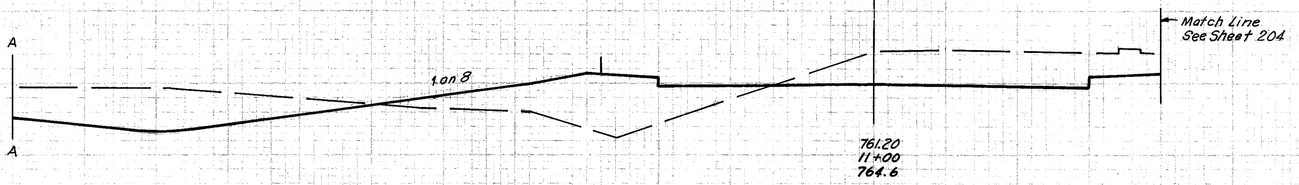
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

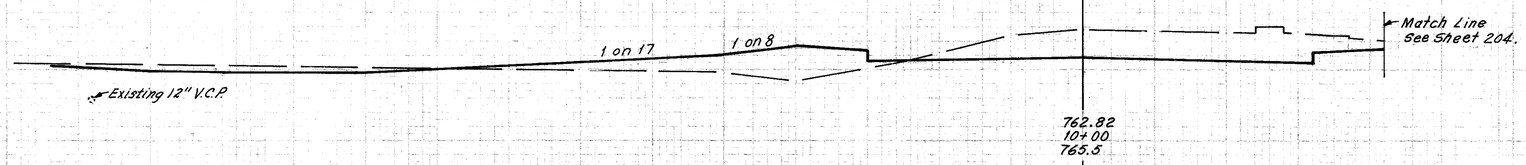
210
392

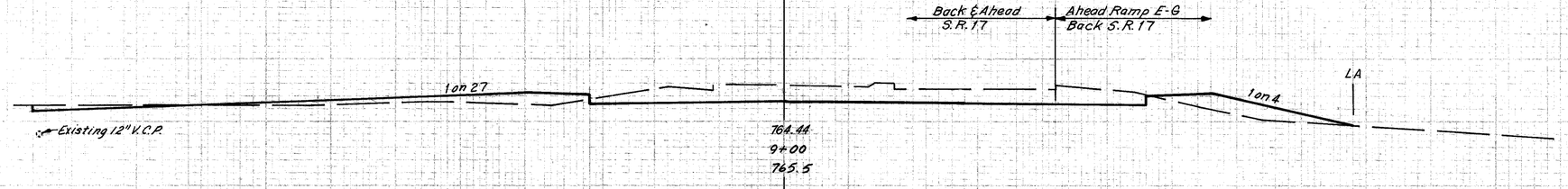
CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made By H.L.D. Date 4-7-70
Checked By R.B.H. Date 5-8-70









EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
760			
750	209	226	
		840	650
760			
750	245	125	
		806	330
760			
Ahead G-E	38	58	
Back S.R. 17	218	108	
Ahead Ramp S.R. 17	190	53	
750			
		636	260
Sta. 8+00	125	32	

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

GRANGER ROAD STA. 9+00 TO STA. 11+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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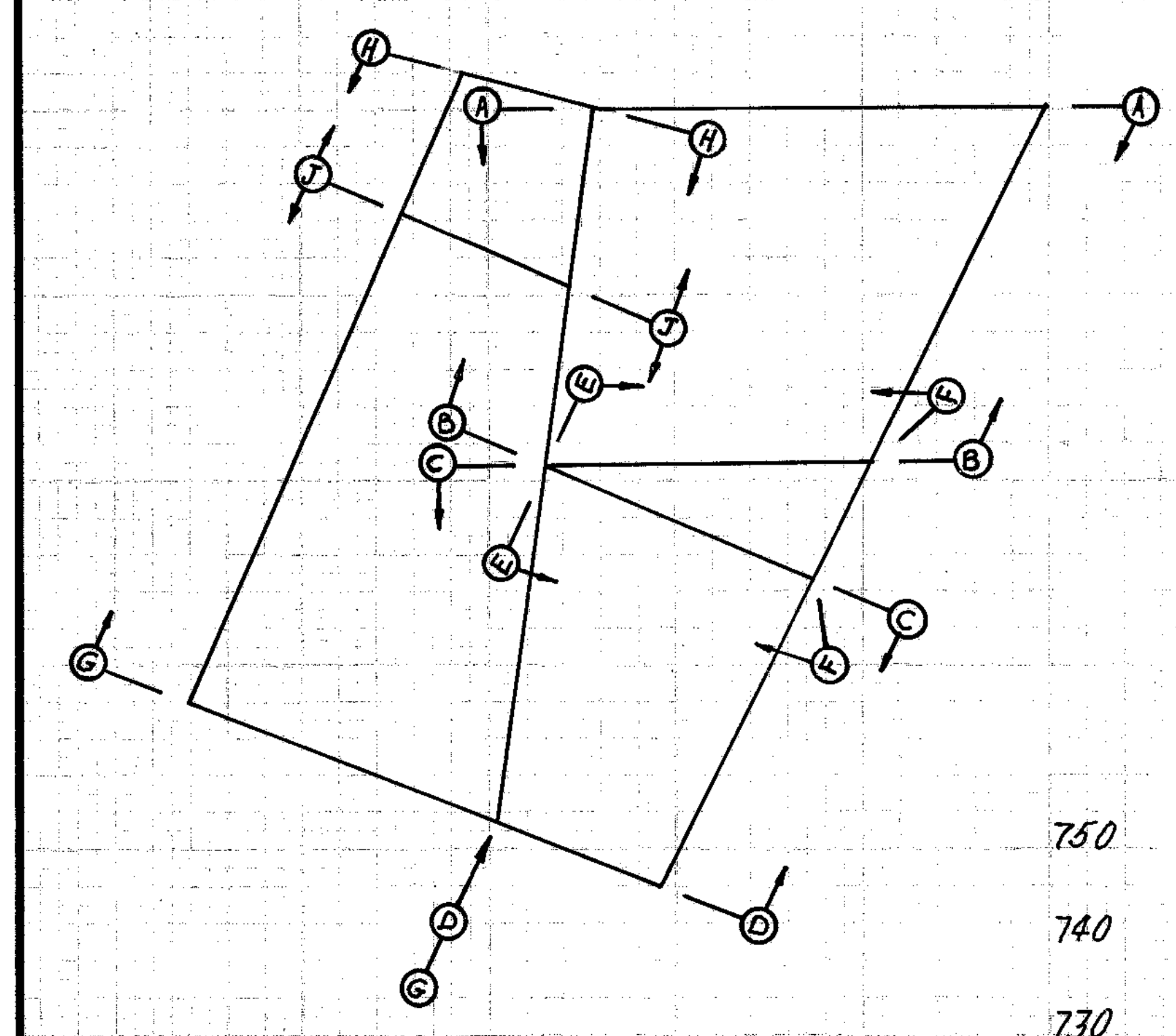
392

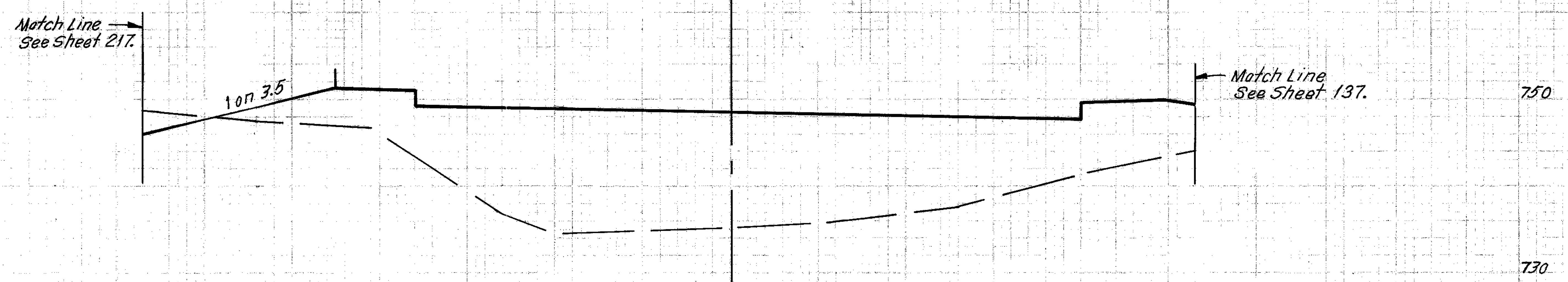
CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70

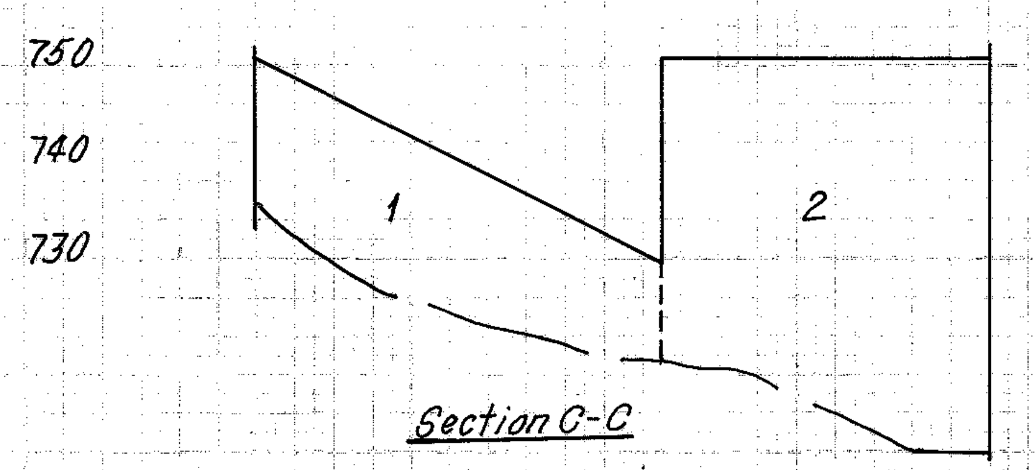


Plan

For section A-A see x-section sheet sta. 18+00, Granger Rd.



749.86
18+00
735.1



Section C-C

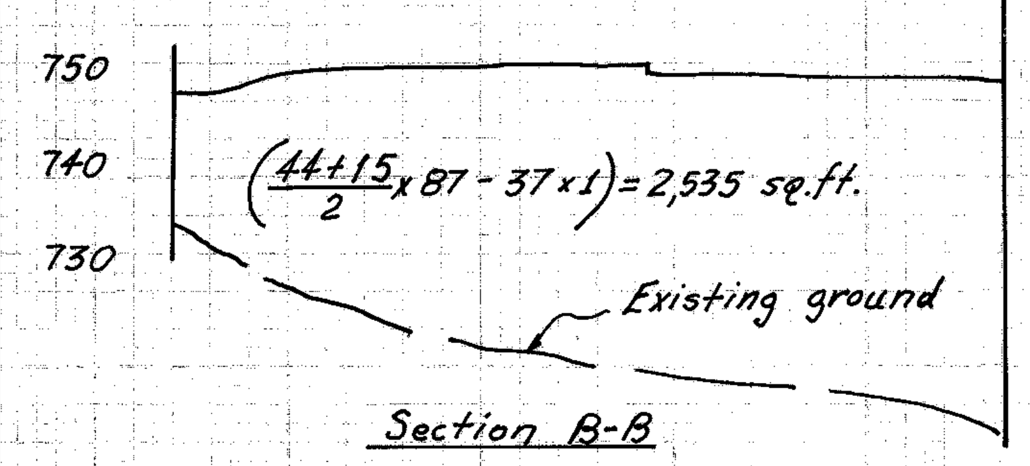
Area 1

$\frac{10+18.5}{2} \times 42.5 = 606$ sq. ft.

Area 2

$\frac{31+41}{2} \times 34.75 = 1250$ sq. ft.

Total 1856 sq. ft.



$\left(\frac{44+15}{2} \times 87 - 37 \times 1\right) = 2{,}535$ sq. ft.

Section B-B

Section A-A & B-B

Emb. $= \left(\frac{1045+2535}{2} \times 95\right) \div 27 = 6{,}300$ cu. yds.

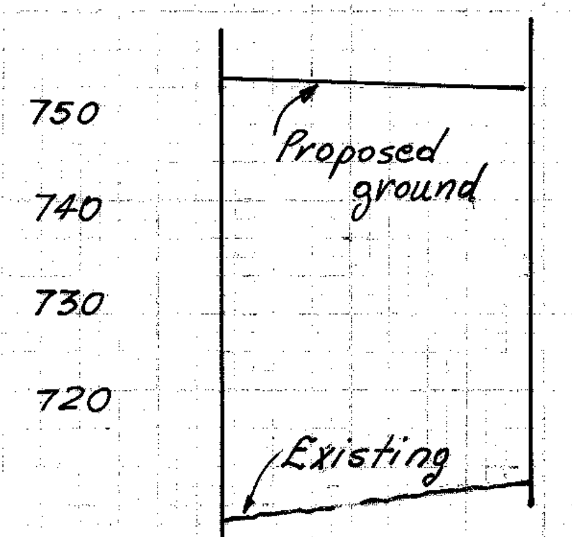
Exc. $= \left(\frac{10+10}{2} \times 95\right) \div 27 = 18$ cu. yds.

For section D-D see x-section sheet 129 sta. 862+00, I-80 Lt. side.

Emb. = 760 sq. ft.
Exc. = 0 sq. ft.

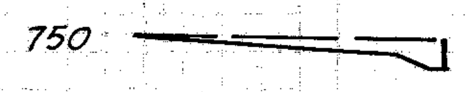
	Embankment	Excavation
Section A-A & B-B	= 6300 cu. yds.	18 cu. yds.
Section C-C & D-D	$\left(\frac{1856+760}{2} \times 95\right) \div 27 =$ 4602 cu. yds.	0 cu. yds
Section E-E & F-F	$\left(\frac{0+1392}{2} \times 78\right) \div 27 =$ 2010 cu. yds.	0 cu. yds.
Section G-G & J-J	$\left(\frac{340+52}{2} \times 143\right) \div 27 =$ 1020 cu. yds.	$\left(\frac{0+10}{2} \times 143\right) \div 27 = 27$ cu. yds.
Section H-H & J-J	$\left(\frac{0+52}{2} \times 45\right) \div 27 =$ 45 cu. yds.	$\left(\frac{20+10}{2} \times 41\right) \div 27 = 23$ cu. yds.
Total	13977 cu. yds.	Total 68 cu. yds.

For section G-G see x-section sheet 129 sta. 862+00, I-80 Lt. side.



Section F-F

Emb. $= \frac{41+46}{2} \times 32 = 1392$ sq. ft.

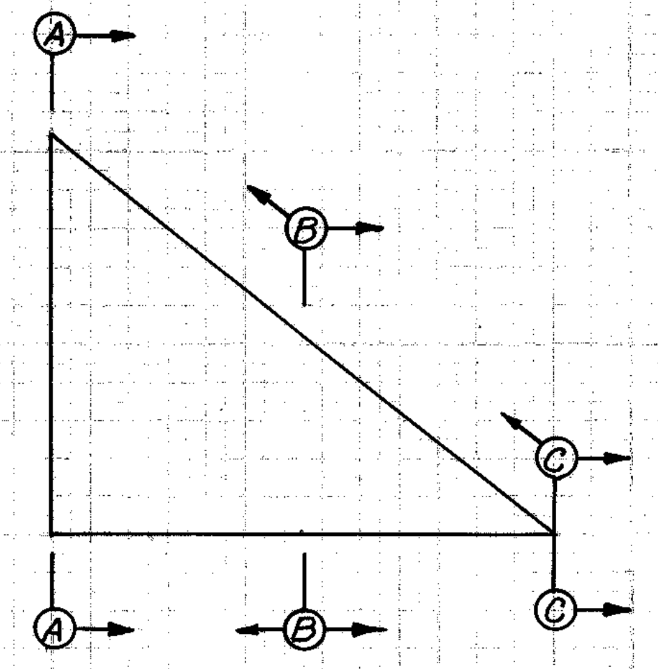


Section H-H

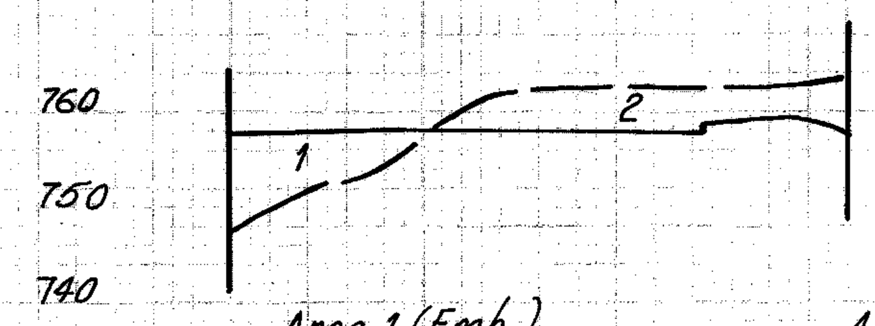
Exc. = 20 sq. ft. Emb. = 0 sq. ft.

Section J-J

Exc. = 10 sq. ft. Emb. = 52 sq. ft.



Plan



Area 1 (Emb.)

$\frac{1}{2} \times 20 \times 11.75 = 117.5$ sq. ft.

Section A-A & B-B (Emb.)

$\left(\frac{412+118}{2} \times 50\right) \div 27 = 490$ cu. yds.

Section B-B & C-C (Emb.)

$\frac{118+0}{2} \times 80 \div 27 = 175$ cu. yds.

Total Emb. = 665 cu. yds.

Area 2 (Exc.)

$\frac{1}{2} \times 9.5 \times 4 + 19 \times 4 + 10 \times 3 + 3 \times 4 =$ 137 sq. ft.

Section A-A & B-B (Exc.)

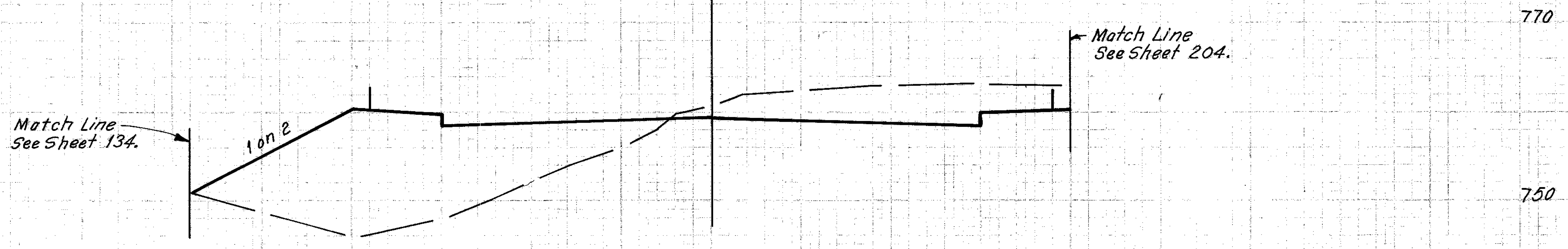
$\left(\frac{145+137}{2} \times 50\right) \div 27 = 262$ cu. yds.

Section B-B & C-C (Exc.)

$\frac{137+0}{2} \times 80 \div 27 = 203$ cu. yds.

Total Exc. = 465 cu. yds.

Note:
See sta. 11+50, Granger Rd. for section A-A.
For location of Spill Area see sheet 130.



11+50
761.0

	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	10	1045		
Spill Quantity			68	17435
Spill Quantity			465	665
	145	412		
			328	590
Sta. 11+00	209	226		

DWG 5-8-68 MAG 5-15-68
SPV 12-11-68 AHS 9-2-69
HLD 4-17-70

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

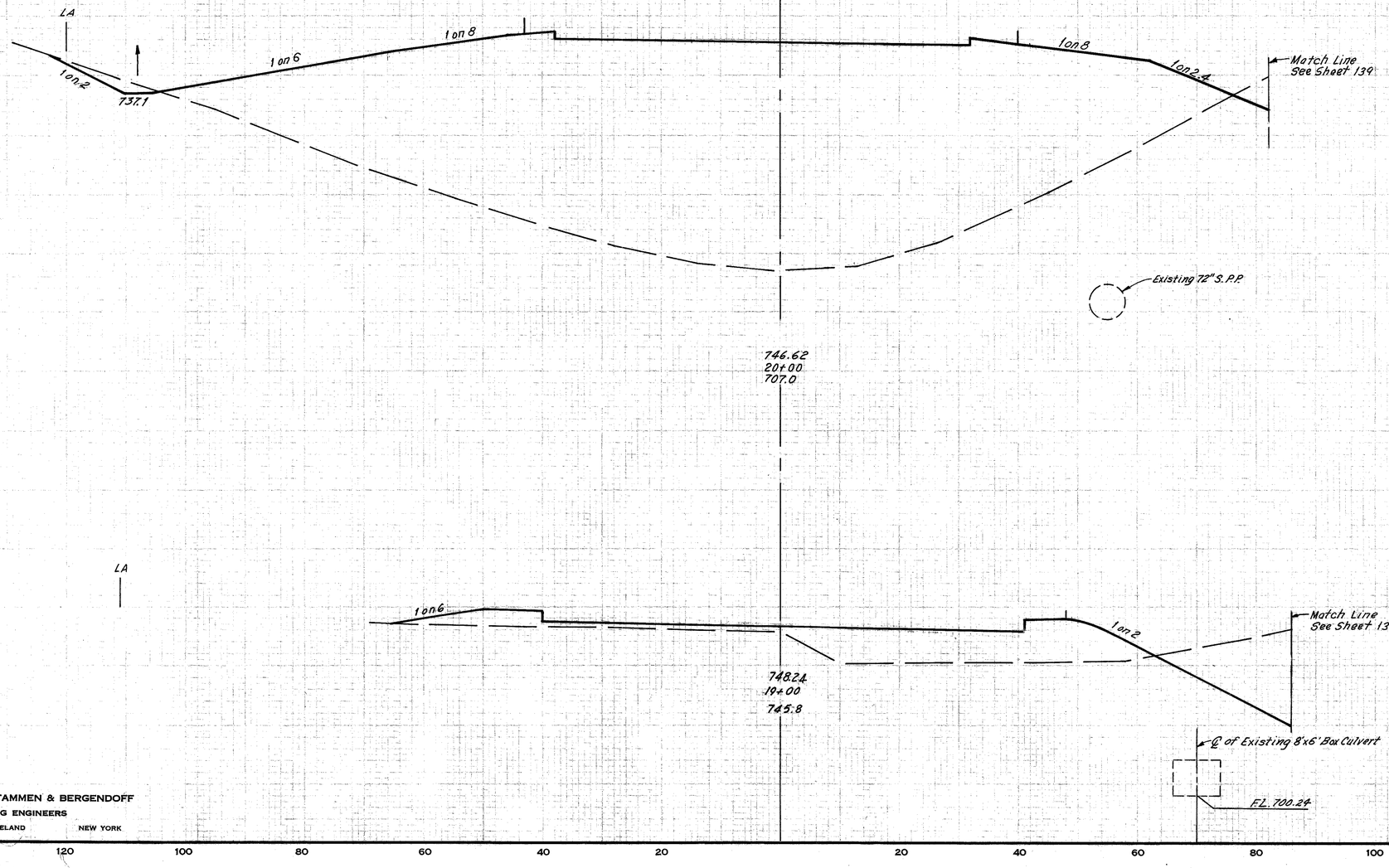
GRANGER ROAD STA. 11+50 TO STA. 18+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

212
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
740			
730			
720			
710			
40	4355		
		420	8843
750			
740			
190	420		
730			
		370	2713
Sta. 18+00	10	1045	

GRANGER ROAD STA. 19+00 TO STA. 20+00

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

DWG. R-748 V MAG 5-12-68
H.L.D. MAG 5-12-68

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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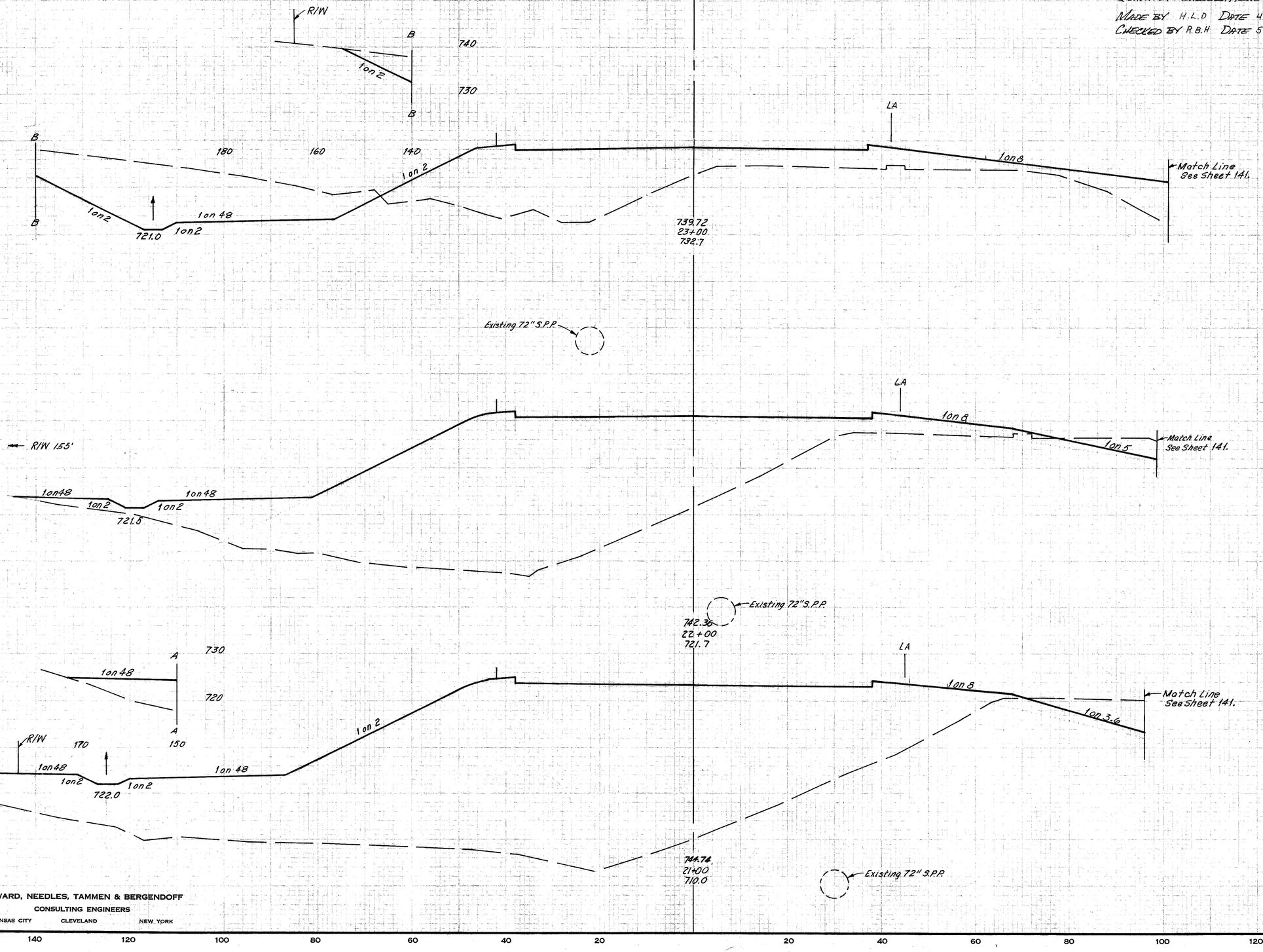
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70



EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
686	1100		
		1354	7574
45	2990		
		248	14393
89	4782		
		239	16920
Sta. 20+00	40	4355	

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

GRANGER ROAD STA. 21+00 TO STA. 23+00

DWG 5769 JMG 5-15-68
SPEC 4260 JMG 5-15-68

QUANTITY CALCULATIONS
MADE BY H.L.D DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY-80-15.81

Sta. 26+42, 113' Lt. S.R. 17
Existing Ditch

1 on 2
1 on 48
1 on 2
698.0
Existing 72" S.P.P.

731.80
26+00
730.3

LA

Varies
Varies
Match Line
See Sheet 143

1 on 12
Match Line
See Sheet 143

734.44
25+00
730.8

1 on 48
1 on 2
708.5
Existing 72" S.P.P.

R/W
1 on 2
Existing 12" V.t.
720.5
1 on 2
1 on 48
1 on 2
Existing 72" S.P.P.

737.08
24+00
732.6

LA
Existing 12" R.C.P.
1 on 10
Match Line
See Sheet 141

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
13	1692		
		89	6309
35	1715		
		157	5865
50	1452		
		1363	4126
Sta. 23+00		686	1100

730
720
710
700

DWG. 5.7.68 / MAS 5-16-68
SYM. 5.7.68 / MAS 5-16-68
FIELD CK. 5.7.68

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

GRANGER ROAD STA. 24+00 TO STA. 26+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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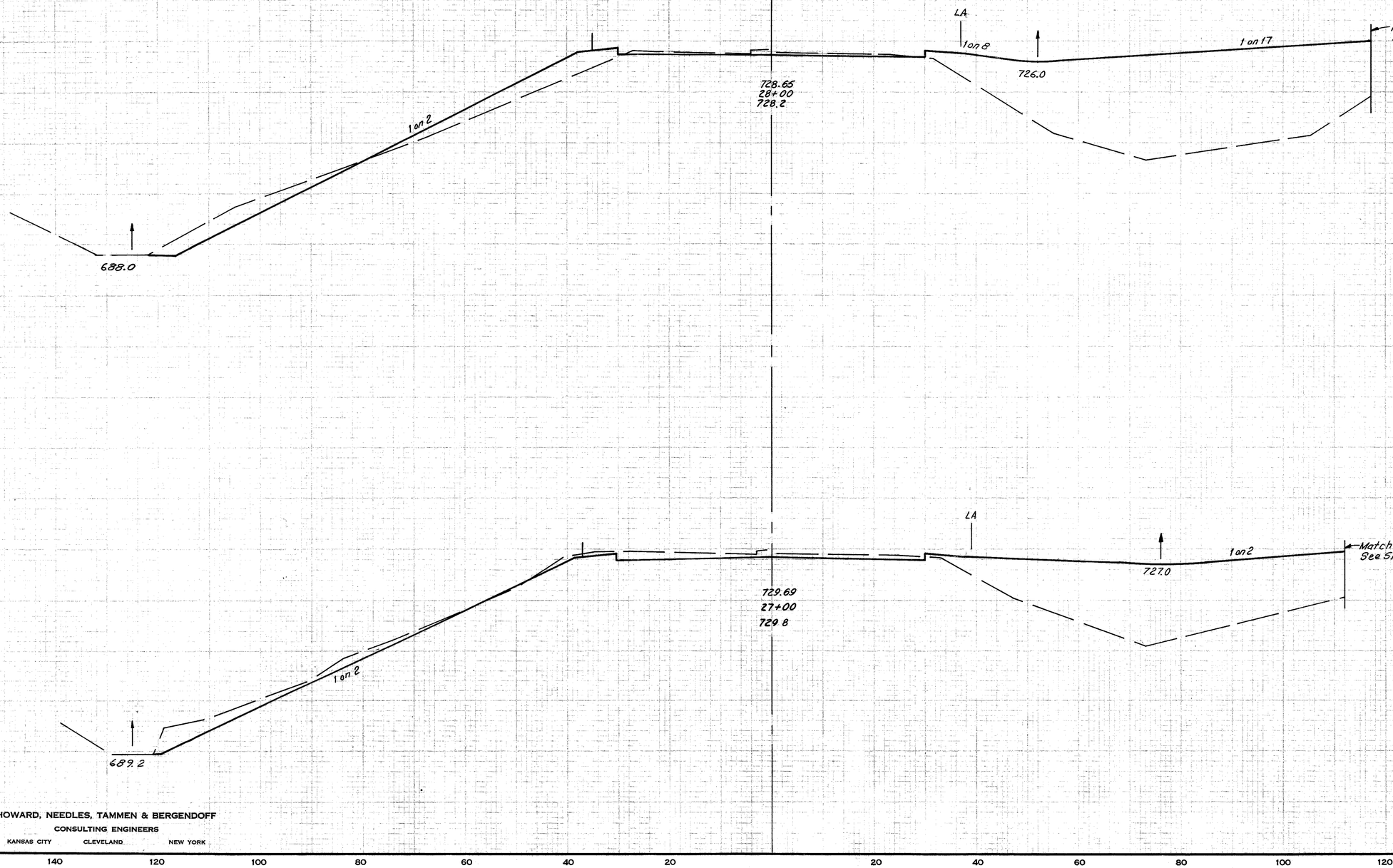
392

CUYAHOGA COUNTY
CUY-80-15.81

Proposed pavement meets existing pavement at Sta. 28+20.29.

QUANTITY CALCULATIONS
MADE BY H.L.D. DATE 4-7-70
CHECKED BY R.B.H DATE 5-8-70

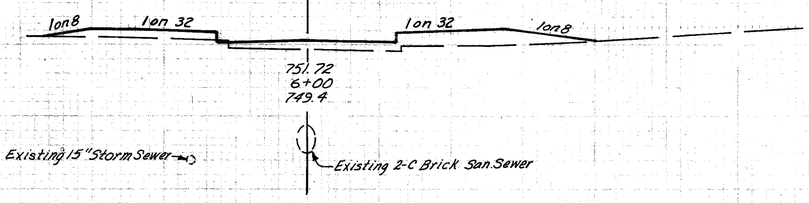


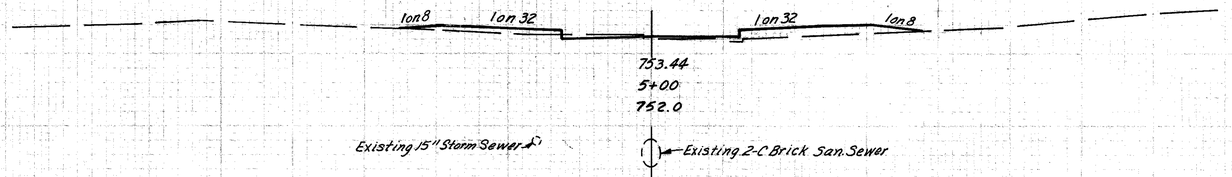
EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
Sta. 28+20.29	0	0		
730			48	523
720	130	1410		
710				
700				
690				
			576	4165
730				
720	181	839		
710				
700				
690			359	4687
Sta. 26+00	13	1692		

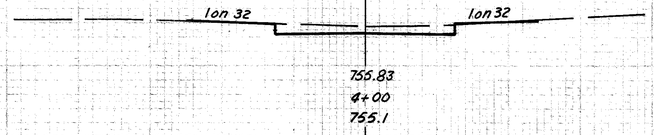
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GRANGER ROAD STA. 27+00 TO STA. 28+00

DWG. F.E.G. V.M.G. 5-16-68
SUBMITTED V.M.G. 5-20-68
REVISED 6-21-70







FED. RD. DIVISION	STATE	PROJECT	
2	OHIO	—	

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392

QUANTITY CALCULATIONS

MADE BY H.L.D DATE 4-10-70
CHECKED BY R.B.H DATE 5-8-70

CUYAHOGA COUNTY
CUY-80-15.81

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
1	65		
		6	185
3	35		
		67	65
33	0		

DWC 5668 ✓ MAG 5-16-68
SPV-12-9-68 ✓ AHS 9-3-69
HLD 4-10-70

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

TUXEDO AVE. STA. 4+00 TO STA. 6+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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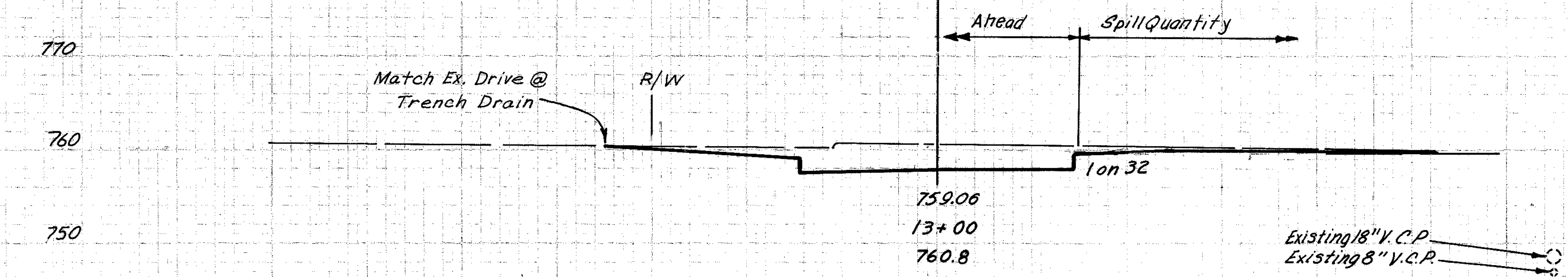
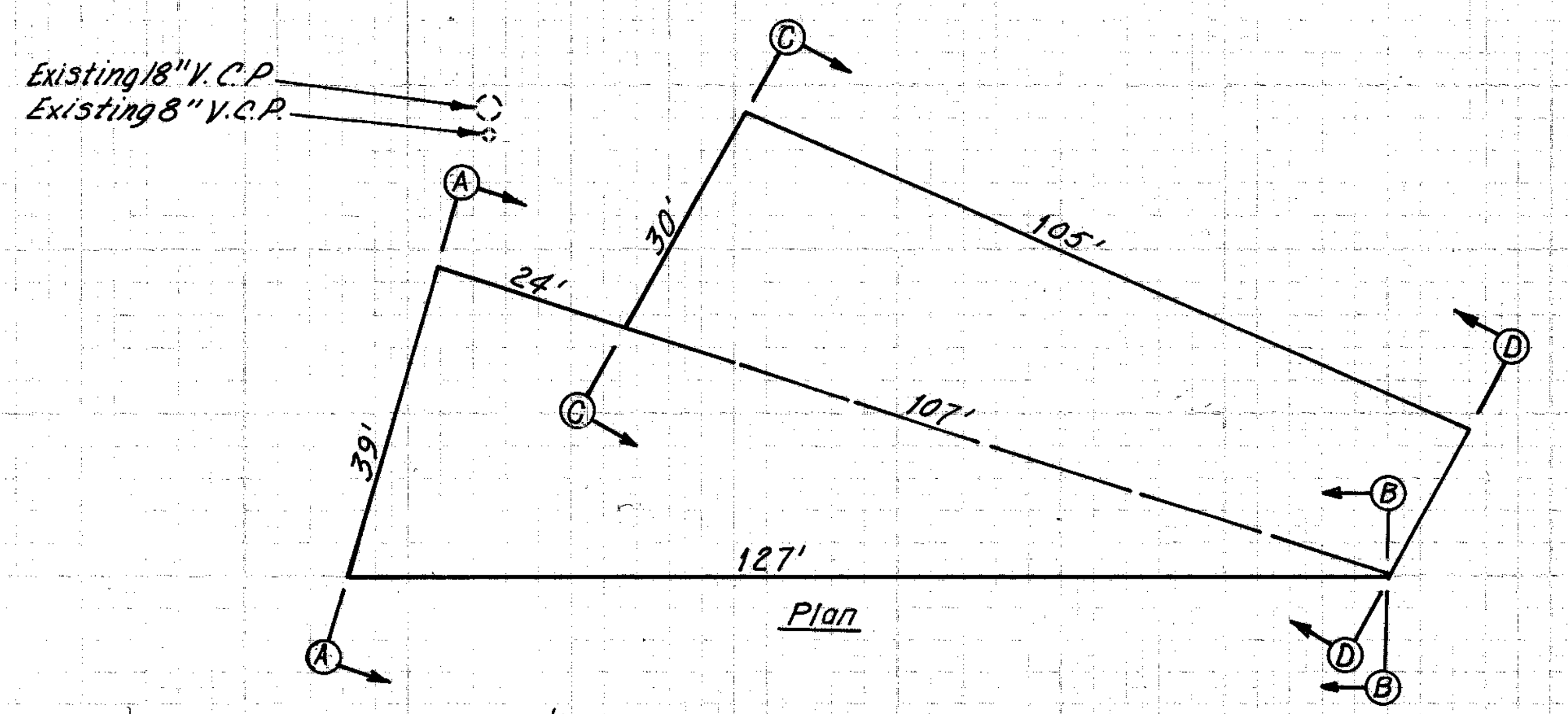
392

CUYAHOGA COUNTY
CUY-80-15.81

DWC 5-6-68 / MAG 5-20-68
SDV 12-9-68 AHS 9-4-69
HLD 4-10-70



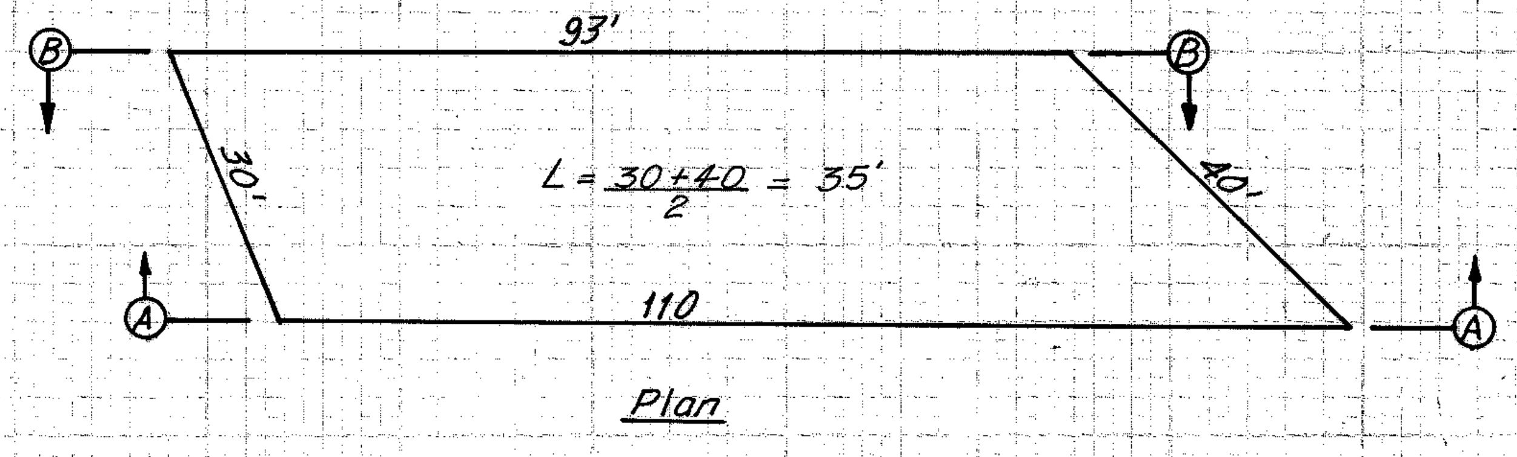


Plan

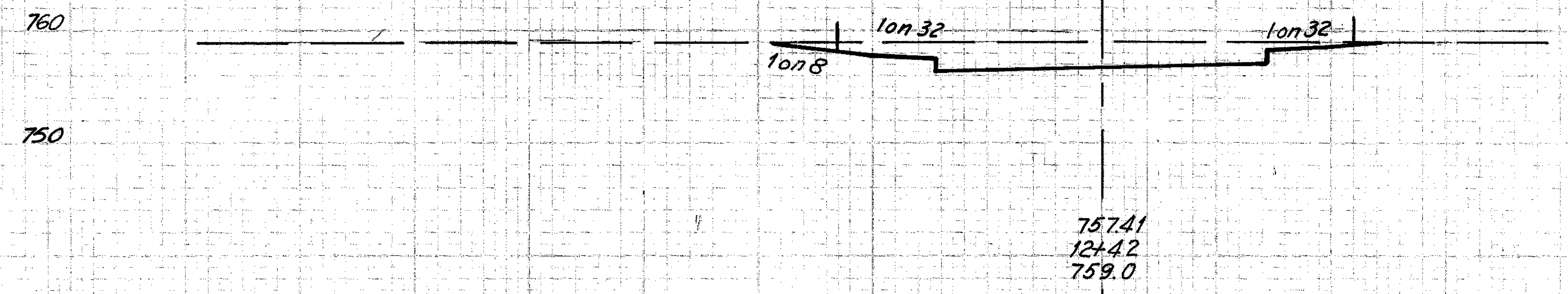
Excavation
Section A-A & B-B
$\left(\frac{24+0}{2} \times 117\right) \div 27 =$ 52 cu. yds.

Embankment
Section C-C & D-D
$\left(\frac{7+10}{2} \times 105\right) \div 27 =$ 33 cu. yds.

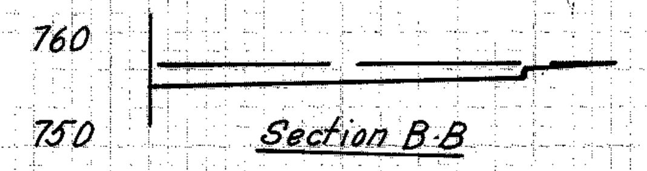
Note:
See Sta. 1+00, T-N Connection for Section A-A.
See Sta. 13+00 and Sta. 14+00 Spill Quantities for Section C-C and D-D respectirely.
For location of Spill Area see sheet 130.



Plan

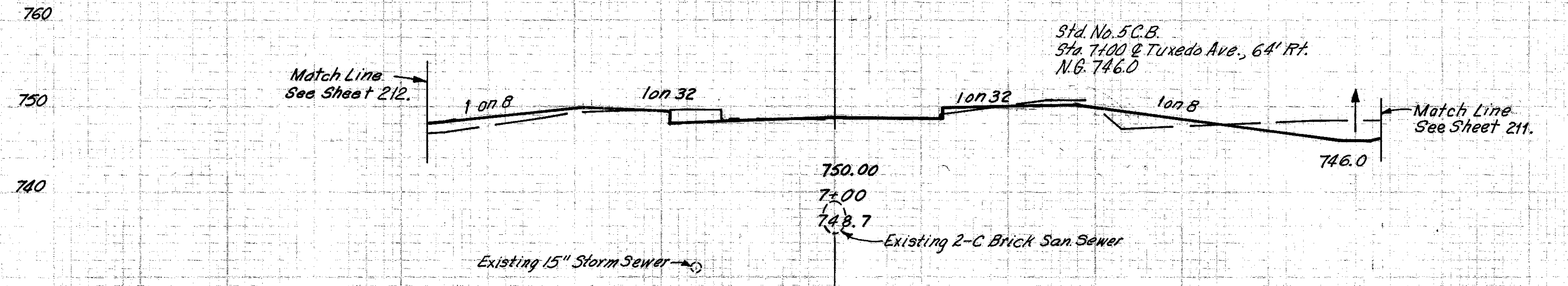


Note:
See Sta. 12+42, Tuxedo Ave. for section A-A.
For location of Spill Area see sheet 130.



Section B-B

Excavation
Section A-A & B-B
$\left(\frac{70+78}{2} \times 35\right) \div 27 =$ 96 cu. yds.



EARTHWORK

	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	80	0		
Spill Quantity			52	33
	70	0		
Spill Quantity			96	0
	30	40		
			56	195
Sta. 6+00	1	65		

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

TUXEDO AVE. STA. 7+00 TO STA. 13+00

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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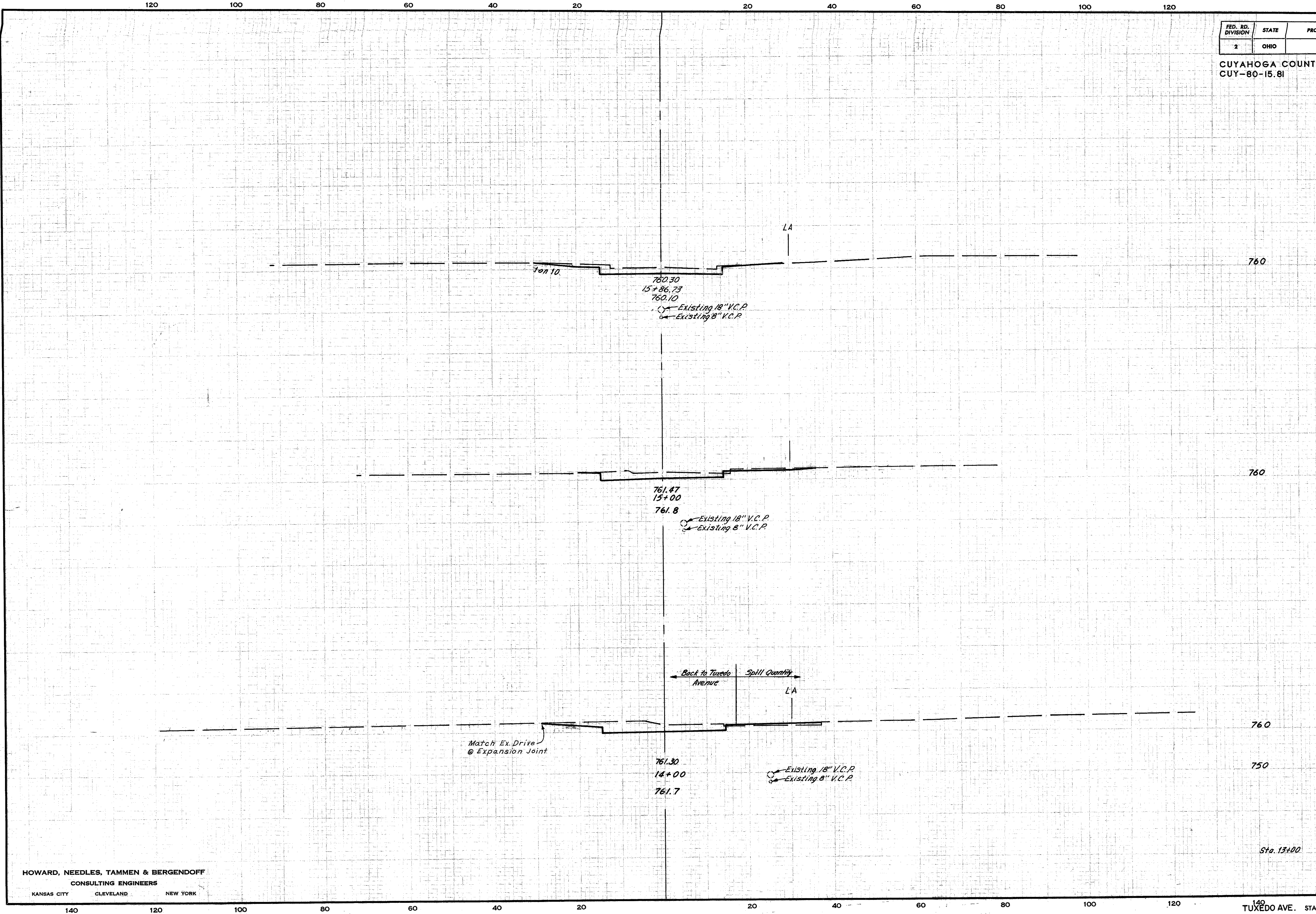
392

CUYAHOGA COUNTY
CUY-80-15.81



	EARTHWORK			
	END AREA		VOLUME	
	EXC.	EMB.	EXC.	EMB.
	75	0		
			201	5
	50	3		
			222	24
	70	10		
			278	19
Sta. 13+00	80	0		

VEYED
DWC 5-6-68 ✓ MAG 5-20-68
SPV- 12-9-68 ✓ AHS 9-3-69
HLO 4-10-70

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

TUXEDO AVE. STA.14+00 TO STA

K&E 17 0483 9-69 •

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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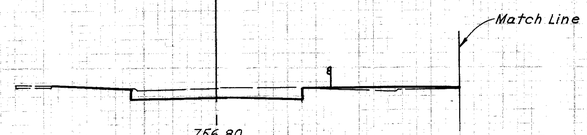
CUYAHOGA COUNTY
CUY-80-15.81

Quantity Calculations
Made by M.G.B Date 8-27-74
Checked by D.E.M Date 8-27-74

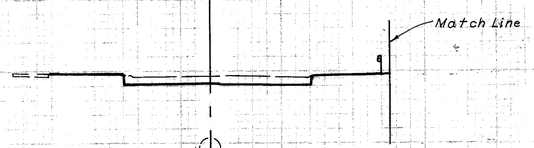
758.20
14+00
758.19

756.69
13+00 North St. Cul-de-Sac
756.98

Spill Area Quantity
Sta. 12+64.5 to Sta. 13+00 North St.
Avg. Depth = $\frac{137 \text{ sq ft}}{82 \text{ ft}}$ = 1.67 ft
Area = $\frac{1}{2}\pi(41)^2$ = 2640.51 sq. ft.
Excavation Vol. = $\frac{2640.51(1.67)}{27}$ = 163.32 cu. yds.



756.80
1+75
757.20



759.22
1+00 Tuxedo Conn.
759.34

EARTHWORK			
END AREA		VOLUME	
EXC.	EMB.	EXC.	EMB.
760	26	0	
750			
		301.85	0
760	137	0	
750			
			163.32
760	36	4	
750			
		12.22	7.41
760	30	0	
750			

8-1-74
8-26-74
9-24-74
9-25-74
8-27-74

R.W.
M.G.B.
M.G.B.
D.E.M.
D.E.M.

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

CUL-DE-SACS STA. 1+00 T TO STA. 1+13+00 N

I-77

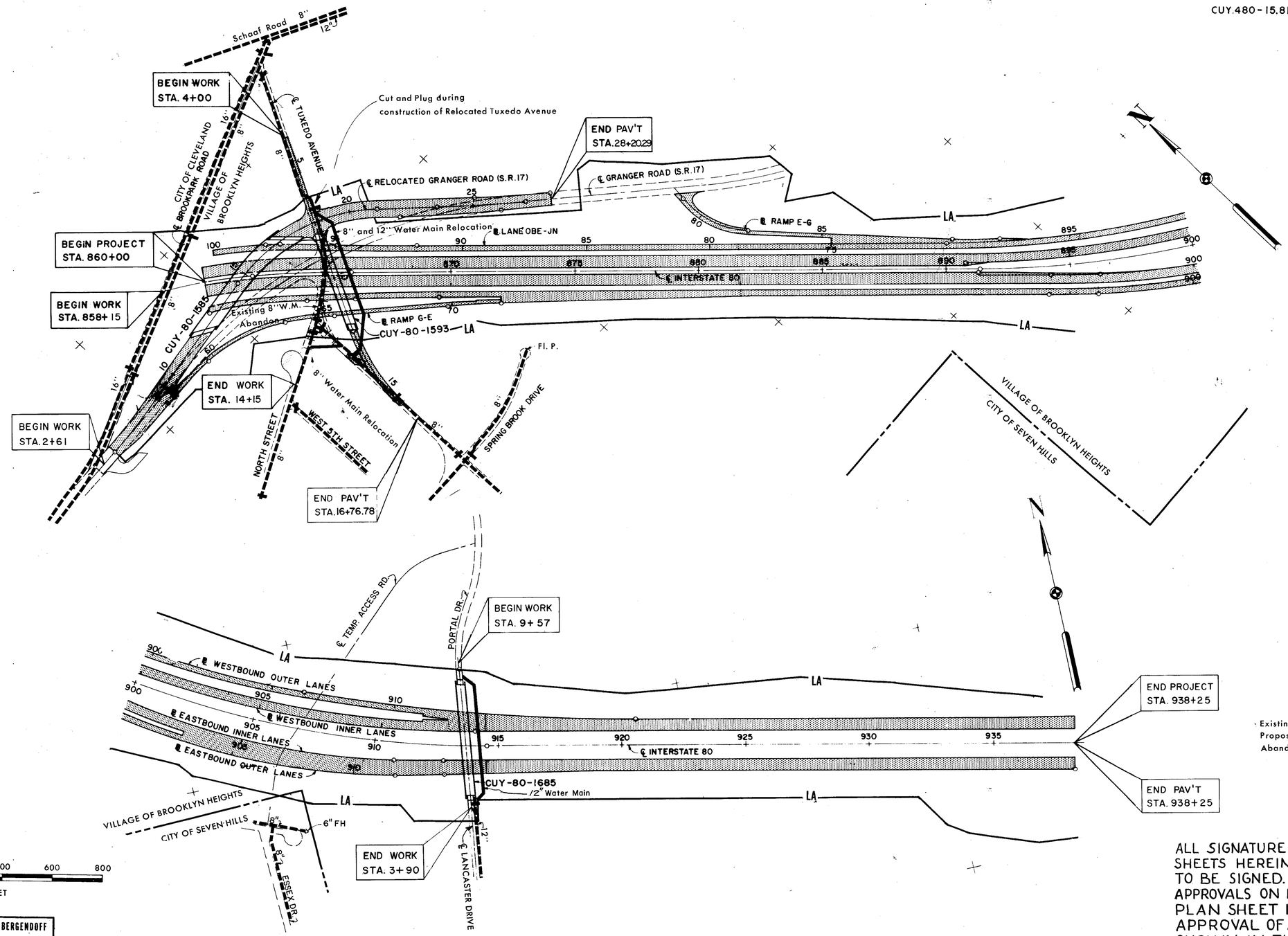
SCHEMATIC WATER WORK PLAN

FED. HWY. DIVISION	STATE	PROJECT	
2	OHIO		

220
392

CUYAHOGA COUNTY
CUY.480-15.81

1
25



SCALE 1" = 200'
MADE ERH DATE 9/22/70
TRCD. HLD DATE 9/29/70
CKD. ERH DATE 9/29/70

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

ALL SIGNATURE SPACES ON ALL SHEETS HEREIN ARE NOT REQUIRED TO BE SIGNED.
APPROVALS ON FIRST WATER WORK PLAN SHEET 15 CONSTITUTES APPROVAL OF ALL WATER WORK SHOWN IN THESE DOCUMENTS.

Rev. 10-16-74

WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
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GENERAL

SCOPE OF WORK

The work contemplated under this contract comprises the furnishing and installing, complete with valves and other appurtenances, the following water main relocations and performing other incidental work necessary to abandon existing water facilities.

1. 8" and 12" Cast Iron and Ductile Iron Water Main Relocation in Tuxedo Avenue under Proposed Interstate 480
2. 8" Cast Iron Water Main in T — Connection from existing Tuxedo Avenue to North Street.
3. 12" Cast Iron & Ductile Iron Water Main under Proposed Interstate 480 at Portal Drive.
4. Abandon existing Water Mains and Service Connections in Tuxedo Avenue, in North Street, and in Lancaster Drive (Portal Drive).
5. Abandon existing Service Connections in Brookpark Road.

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.

DEFINITIONS

Wherever in these specifications or in other contract documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

THE STATE

The State is the State of Ohio acting through its authorized representative.

ENGINEER

The Engineer is District Deputy Director or District Engineer, The District Construction Engineer or the District Maintenance Engineer or the Project Engineer assigned to administer the contract, or their duly designated deputies, agents, or representatives.

THE CITY

The City is the Director, Department of Public Utilities of the City of Cleveland or their duly designated deputies, agents or representatives.

STATUS OF CITY INSPECTOR

Inspectors as designated by the Director of Public Utilities are authorized to inspect all work done and materials furnished. Such inspection may extend to all or any part of the waterwork, and to the preparation or manufacture of the materials to be used in the waterwork. The city inspector as designated by the Director of Public Utilities will make work instructions through the Project Engineer.

ACCESS TO WORK AND PLACE OF MANUFACTURE

The Contractor shall notify the Engineer and Director of Public Utilities, at least seven (7) days previous to the commencement of the manufacture of any materials, of the time and place where the manufacture is to commence, in order that a representative of the Engineer and Director may be present to inspect the manufacture. The Contractor shall provide, without charge or expense to the State and City, all necessary assistance to the Engineer and Director when required for inspection or verification of work done.

DIMENSIONS, DETAILED DRAWINGS AND ELEVATIONS

Figured dimensions on drawings shall take precedence over measurements by scale, and detailed drawings are to take precedence over general drawings and shall be considered as explanatory of them and not as indicating extra work. If, however, any of the detailed drawings show more elaborate or expensive work than is normally specified and indicated by the contract drawings, notice thereof must be given to the Engineer by the Contractor within ten (10) days after receipt of such detailed drawings in order that the drawings may be amended or the additional expense on account of such work may be adjusted and authorized. If the Engineer does not receive such notice from the Contractor within ten (10) days after the detailed drawings have been received by him, it is hereby agreed that the Contractor accepts the drawings and will execute them without claim for extra compensation.

FLOODS AND FREEZING WEATHER

Proper facilities shall be provided for protecting the work from damage by flood, rain or frost, and work done in freezing weather shall be done in such manner as the Engineer may approve. Valves shall be protected from freezing until backfilled in the completed work.

ADDITIONAL WORK

(A) - Attention is called to the fact that the work of this contract includes certain performances as incidental to the itemized requirements hereof, though not exclusive as follows: To perform all excavation, backfilling, sheeting, shoring, temporary and final repaving and to test the installation. Sand backfill shall be placed under existing and proposed pavement. For the performances herein described and for other incidental performances of like nature, the State will make no specific or separate payment or allowance, but the cost thereof shall be included in the prices stipulated to be paid for the various items of the work to be done under this contract.

(B) - Preliminary flushing: Before being placed in service all dirt and foreign matter shall be removed from the new water main or extensions to existing mains by a thorough flushing through the hydrants or by other approved means. Each valved section of newly laid pipe shall be flushed independently. This shall be done after the pressure test and may be done before or after the trench shall have been 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. A charge will be assessed the Contractor for any material, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water. The Contractor shall furnish the necessary labor for excavation and backfilling which will be required for the installation of taps for injecting the chlorine solution, operating pumps and flushing mains.

(D) - Final flushing and test: Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremities until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proven equal to the water quality served the public from the existing water supply system.

(E) For the performances described in paragraphs (B), (C) and (D), the State will make no specific or separate payment or allowances, but the cost thereof shall be included in the prices stipulated to be paid for each linear foot of pipe furnished and installed.

MAINTENANCE OF SERVICE AND CONNECTING RELOCATED MAINS

When the new mains have been tested and chlorinated and are ready to be connected to the old main, the Contractor shall make such connections at a time designated by the City. Prior to shutting down the existing mains, the Contractor shall take suitable precautions to assure a minimum interruption to service, including the following:

(A) Perform all necessary excavation, including bell holes exposing the existing main sufficiently for the operation of the pipe saw by the City.

(B) Remove the cap or plug from the end of the new main.

(C) Swab the inside of all pipes, bends and sleeves to be used in connection thoroughly with a chlorine solution of at least 100 p.p.m.

(D) Make-up as much of the connection as possible outside the ditch to eliminate the need for caulking most of the necessary joints during the shutdown. By careful measurement all pipe cuts can be made by the Contractor prior to shutting down.

(E) Have sufficient manpower and equipment on the site to perform the operation in a minimum of time.

PAINTING

(A) - It is the intention of these specifications to provide that all metal work subject to corrosion shall be satisfactorily protected by a durable coating of paint or other approved material and that all metal surfaces not buried in earth, or in concrete shall be left clean and well painted at the completion of the contract. Unless otherwise specified, the protection shall be at least that given by three (3) coats of approved paint. The first coat is to be applied at the shop before the metal has rusted and after all grease, dirt and scale has been removed. Bolts and nuts shall not be shop coated, but shall receive three (3) coats of approved paint after installation.

(B) - All metal work which has not been coated before the arrival on the job shall be given a temporary protective coating of such a nature as to permit the ready adherence of future coatings. The temporary coating shall be a good grade asphaltic paint or other approved material. The temporary protection shall apply particularly to the valve boxes and covers, manhole rings and covers, ladders and ladder rungs and elsewhere when in the opinion of the Engineer, such protection is necessary.

(C) - All surfaces of metal which will be in contact after assembling shall be painted, at least one coat, before assembling. The final coat of paint on all exposed work shall be given shortly before the completion of the contract.

(D) - Where painting clauses appear hereinafter, they shall take precedence over this section, except that temporary protection herein described may be required.

(E) - All of this work shall be included in the price bid for the particular item requiring the painting.

TESTS, INSPECTION AND REPORTS

Notwithstanding the 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 Transp. "Construction and Material Specifications - January 1, 1973" shall govern.

HANDLING PIPE AND ACCESSORIES

(A) - Unloading: Cast iron pipe, fittings, valves, hydrants, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor. They shall at all times be handled with care to avoid damage. In loading and unloading they shall be lifted by hoists or slid, or rolled on skidways in such manner as to avoid shock. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

(B) - At site of work: In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

(C) - Protection of pipe coating: Pipe shall be handled in such manner that a minimum amount of damage to the coating will result. Any cast iron pipe or fitting, the coat of which has been damaged in shipping or handling, shall have the damaged portion well cleaned and covered with an asphalt paint, approved by the Engineer, before being placed in the work. The Contractor shall thoroughly coat all exposed parts of bolts and nuts with an approved asphalt paint, after all pipe has been laid and before backfilling has been placed. All field coating shall be furnished by the Contractor.

SCALE
MADE E.R.H. DATE 3/10/70
TRCD. H.L.D. DATE 3/10/70
CKD. E.R.H. DATE 8-11-74

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

APPROVED _____ DATE Aug. 30, 1974

ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
J. R. Molena, P.E.
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

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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

(A) - Whenever it becomes necessary in the opinion of the Engineer to change the locations of house connections between water main and curb cock, such changes will be done by the City. The Contractor will notify the City in ample time to permit the City to make such changes and avoid unnecessary delay in the completion of the work. The Contractor shall also cooperate with the City in making these house connections and all other changes required and shall do all excavating, backfilling and repaving as may be required. The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters.

(B) - Whenever 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 main and branch materials required to make the connection, and shall furnish and install complete, all the cast iron and ductile iron pipe, fittings and valves to make the connections indicated. The Contractor shall also furnish all labor, materials, tools and equipment and make the excavation, backfill and repaving for such connections. Payment for this will be included in the price bid under appropriate item for size of water main or connection to be installed. All pipes, valves, hydrants and appurtenances removed shall become the property of the Contractor.

WORK TO BE DONE BY THE CITY

(A) - The City will furnish the piping material for and make all changes required, including tapping, in the location of existing house service connections and meters, but the Contractor shall do all the necessary excavation, backfilling and repaving required therefore. No charge will be assessed the Contractor for any of the labor or materials furnished by the City.

(B) - In locations shown on the plans the Contractor will be required to sleeve-in to the existing mains. To speed up this operation, it is called to the Contractor's attention that the water department has on hand at Harvard Yards motor operated pipe cutters which are available for cutting pipe by City forces at the following rates. The prices include cost of labor, use of pipe cutting machine, and truck. The Contractor shall do all necessary excavation, backfilling and repaving and all air compressor equipment shall be furnished by the Contractor.

SIZE OF PIPE	COST PER CUT
8"	$30.00
12"	30.00

EXCAVATION

(A) The Contractor shall remove all existing structures, roadways, driveways and other similar materials and make all excavation necessary for the proper construction of the water main, pipe connections and appurtenant structures, including tunnel and shaft excavation. The excavation shall include the removal, handling, rehandling and disposal of materials encountered in the work and shall include all pumping, bailing, drainage, sheeting and bracing. Moreover, the Contractor must assume all responsibility for any added expense or other liability which may arise by means of quicksand, obstacles or conditions foreseen and unforeseen or encountered in the work of this contract.

(B) Trenches shall in every case be of sufficient width to permit solid packing of backfill under and around pipes, and satisfactory construction of all appurtenances and for such sheeting and shoring, pumping and draining as may be necessary.

(C) - The trench shall be dug to the alignment and depth required and only so far in advance of pipe laying as the Engineer shall permit. The trench shall be so braced and drained that workmen may work therein safely and efficiently. It is essential that the discharge from pumps be led to natural drainage channels, to drains, or to sewers.

(D) - The trench width may vary with and depend upon the depth of trench and the nature of the excavated material encountered; but in any case shall be of ample width to permit the pipe to be laid and jointed properly and of the backfill to be placed and compacted properly. The minimum width of 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 stop boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during the construction period.

(N) - The Contractor shall maintain all excavations in good order during the construction, so as not to hinder or injure the pipe laying, masonry or other work. He shall take all reasonable precautions to prevent movement of the sides of such excavation, and shall remove at his own expense any material sliding into the excavation.

SHEETING AND BRACING

(A) - The Contractor shall furnish and put in place such sheeting and bracing as may be required to support the sides of trenches or other excavation and shall remove such sheeting and bracing, as the trench or excavation is filled up, unless the Engineer shall order it left in place, in which case the Contractor shall cut the plank off at a height as ordered by the Engineer, or as called for on the contract drawings. That portion of the timber ordered to be left in place will be paid for at the unit price bid for Item Special, Sheeting Left-in-Place.

No payment will be made for wasted ends. A quantity of 2 M.B.M. has been provided in the General Summary for Item Special,-Sheeting Left in place.

(B) - Whenever the excavations for the work described herein are immediately adjacent to other subsurface structures, the Contractor shall furnish and place sheeting and bracing where noted on contract drawings and as may be necessary so as to reduce to a minimum the possibility of injury or damage the same, as per State of Ohio Construction I.C.-3-11 dated 1 Apr.68.

(C) - If the Engineer is of the opinion that at any point sufficient or proper supports, sheeting, or bracing have not been provided, he may order additional supports, sheeting or bracing, at the expense of the Contractor, and the compliance with such orders by the Contractor shall not relieve or release him from his responsibility for sufficiency of such supports.

REMOVAL OF EXCAVATED MATERIAL

(A) - All surplus material and such other material as the Engineer may deem unfit for use as backfill shall be disposed of by the Contractor so as to give a minimum of inconvenience to the public. In case of settlement after backfill, the Contractor shall supply sufficient material satisfactory to the Engineer to make up for the deficiency.

(B) - In the storing of excavated material, which is to be used as a backfill, the Contractor shall exercise care so as to avoid inconveniencing the public. If, in the opinion of the Engineer, it is necessary to remove this excavated material from the streets or lots, the Contractor shall be required to do so.

(C) - Any material which may spill or drip from vehicles by hauling in the streets, shall be removed and the streets cleaned by the Contractor, to the satisfaction of the Director of Public Service of the City of Cleveland or the proper officials of the municipality or township in which the work is being done.

(D) - When so directed by the Engineer, the Contractor shall immediately remove all excavated materials from the site.

LAYING PIPE

(A) - Proper implements, tools, and facilities, satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings, and valves shall be carefully lowered into the trench, piece by piece, by means of derrick, proper slings, and other suitable tools or equipment, in such manner as to prevent damage to pipe or coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench. If any defective piece is discovered while pipe is suspended or after being laid, a new piece shall be furnished and installed by the Contractor.

(B) - All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying.

(C) - At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe. No pipe shall be laid in water, or when the trench conditions or the weather is unsuitable for such work, except by permission of the Engineer.

(D) - Wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane to avoid obstructions, to plumb stems, or for other reasons, the degree of deflection shall be approved by the Engineer.

(E) - Before laying cast iron or ductile iron pipe, all lumps, blisters and excess coal tar coating shall be removed from the bell and spigot ends of each pipe, the pipe ends shall then be kept clean until joints are made.

SCALE
MADE E.R.H. DATE 3/10/70
TRCD. W.P. DATE 3/12/70
CKD. E.R.H. DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
J. R. Nelson P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

Rev. 10-16-74

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~~LAYING PIPE (CONTINUED)~~

~~(F) - Before laying concrete pipe, the pipe ends shall be made smooth with emery cloth, file or other approved means, wire brushed and wiped until clean and dry. Pipe ends shall be kept clean until joints are made. After cleaning and drying, all contact surfaces of the gaskets and steel joint rings shall be coated with an approved flax soap before entering the spigot end into the socket. Immediately after the joint is pulled together, the pipe shall be blocked with wood blocking. A surcingle shall be installed around the joint and the pipe shall be secured with earth or sand as required, carefully tamped under and on each side up to the spring line of the pipe, including the bell holes. All blocking shall be removed when backfill has reached the spring line of the pipe.~~

FLOATING

The Contractor shall take every precaution against the floating of the pipe due to water coming into the trench, or through caving in, flushing or puddling. In case of such floating the Contractor shall replace the pipe at his own expense, and make wholly good any injury or damage which may have resulted.

TESTING MAINS

(A) - All pipes, valves, fittings, etc., shall be laid in such a manner as to leave all joints watertight. After the pipe is laid, and before backfill is placed around the joints, such lengths of the water main as the Engineer may determine, shall be tested under a hydrostatic pressure of seventy-five (75) pounds per square inch above the static pressure, but nowhere less than 100 pounds per square inch.

(B) - The test shall be under the direction of the Engineer and Director of Public Utilities or his designate. The Contractor may obtain water for testing by observing the rules and regulations enforced in the municipalities or townships in which the work is being done. The City will furnish a pressure gage for measuring the pressure on the water main, but the Contractor shall furnish a suitable pump, pipes, test heads and all appliances, labor, fuel and other appurtenances necessary to make these tests.

(C) - The test pressure shall be maintained for a sufficient length of time to allow for a thorough examination of joints and elimination of leakage where necessary. The pipe lines shall be made absolutely tight under the test pressure.

(D) - After a section of the water main has been tested, the Contractor shall drain the main. In case the drains are connected to valve or drain vaults, then the Contractor, within a reasonable time after the test has been completed, shall pump all water out of the vaults.

(E) - In cold weather immediately after testing a section of the water main, the Contractor shall open all valves, air cocks, by-passes and drains and properly drain bonnets of all valves in the section of the water main, and take all other precautions necessary to prevent injury to the water main and appurtenances due to freezing.

(F) - As an alternate for testing concrete and steel mains other than by the preceding method, the Contractor may choose the following procedure:
The water main shall be tested under the same hydrostatic pressure as previously noted. The test pressure shall be maintained for a period of two (2) hours by pumping additional water into the main, if necessary. The quantity of water thus pumped into the main multiplied by twelve (12) shall be taken as the leakage per twenty-four (24) hours.

(G) - The permitted leakage shall not exceed a rate of seventy-five (75) gallons per twenty-four (24) hours per mile of pipe per inch of nominal diameter.

(H) - In calculating leakage, the Engineer will make allowance for any leakage at the valves, the 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 sufficient notice shall be given to the City, by the Contractor, so that the work may be done with a minimum of inconvenience to the public and delay to the Contractor.

PLUGGING DEAD ENDS

Standard plugs with clamps shall be inserted into the bells of all dead ends of pipes, tees, or crosses, and spigot ends capped and clamped by the Contractors, on all mains constructed by him and on existing water mains where indicated in the contract drawings. Concrete piers shall be placed when called for on the contract drawings, or ordered by the Engineer. The cost of furnishing and installing the plugs in new water mains shall be included in the per linear foot price bid for the various sizes of new water mains. The cost of furnishing and installing the plug in existing water main shall be included in the unit price bid for each "Item Special- Plugging Water Mains and Branches", classified as to size as shown elsewhere in these plans. (See Sheet 232)

BACKFILLING

(A) - This work includes all backfilling, together with ramming, puddling, and rolling, as required; the regrading of grounds; the replacing of surface and subsurface structures; the placing and maintaining of temporary sidewalks, and driveways; the furnishing of suitable material for backfill, reseeding lawns and replacing trees and shrubbery damaged by the Contractor; and all appurtenant work incidental thereto. Pavements, curbs, sidewalks and driveways within the limits of the work shall be temporarily surfaced, maintained and finally replaced or repaved as set forth under "Road Surfaces, Sidewalks, Driveways and Curbing."

(B) - Backfill, unless otherwise specified, may be made with material excavated from trenches, providing it is satisfactory to the Engineer. If, in the opinion of the Engineer, the material excavated is unsatisfactory, then the Contractor shall furnish at his own expense other material suitable for backfill. All backfill shall be free from slag, cinders, rubbish and other objectionable material.

(C) - Before laying the pipe, the bottom of the trench shall be brought to the grade of the bottom of the pipe, except at field joints. Wherever the bottom of the trench has been excavated below the bottom of the pipe, the Contractor shall place sand, or other material satisfactory to the Engineer to bring the bottom of the trench to the grade of the bottom of the pipe. This bed shall be thoroughly tamped before the pipe is laid.

(D) - Unless otherwise specified, the backfill under, around and to a depth of one (1) foot above the top of all pipe, shall be made with material satisfactory to the Engineer, which material shall be free from stone and other objectionable material noted above. The Contractor must use special care in placing this portion of the backfill, so as to avoid injuring, distorting or moving the pipe during compaction. Above this level the backfill shall be made with material satisfactory to the Engineer. However, where specified, sand shall be used for the entire portion of the backfill. See below.

(E) - Backfilling as noted in paragraph (D) shall be tamped in thin layers, simultaneously on each side of the pipe, and thoroughly compacted so as to provide a solid backing against the external surface of the pipe.

(F) - Only after the backfill previously mentioned has been satisfactorily compacted, may work proceed in placing the remaining backfill which must be carefully placed and compacted by tamping, puddling, or rolling. All precautions must be taken to eliminate future settlement. The number of men 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, where ordered by the Engineer.

(I) - All sand to be used for backfill shall be 703.05 State of Ohio, Dept of Transp. "Construction and Materials Specifications."

(J) - Special treatment of the trench will be required where cinder or active sulphur bearing shale or clays 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 the fine to coarse and free from slag, cinders, ashes, rubbish or other objectionable material. all limestone must be capable of being passed through a ¾ inch sieve. On top of this layer of crushed stone, hydrated lime shall be supplied in the amount of ⅜ 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 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 ¾ 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 Aug. 30, 1974

ENGINEER, VILLAGE OF BROOKLYN HEIGHTS L. R. Melena P.E.

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS

ENGINEER OF DESIGN REVIEW William J. Lawrence

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

SCALE _____
MADE E.R.H. DATE 3/10/70
TRCD H.L.D. DATE 3/11/70
CKD E.R.H. DATE 3-17-74

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

Rev. 10-16-74

WATERWORK NOTES

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GENERAL

ROAD SURFACES, SIDEWALKS, DRIVEWAYS, AND CURBING (CONTINUED)

(C) - All final paving of road surfaces, if so noted on the contract drawings shall be done by the contractor to the satisfaction of the Engineer and in conformity with the City of Cleveland "Standard Specifications for Construction of Pavements, Sidewalks and Sewers," dated November, 1969. The Contractor shall bear the entire cost of the work. At locations not specifically mentioned, the Contractor shall restore the same type of pavement as encountered. See Sheet 243 for Pavement Restoration Details.

(D) - All damaged or displaced curb shall be renewed or reset to the satisfaction of the Engineer. No faulty curb or curb less than 30" long will be permitted for reuse.

(E) - If prior to the expiration of this contract, any of the pavements or road surfaces within the lines of excavation or adjacent thereto, shall have been damaged or injured, due to undermining, or for any other cause which may be attributed to the work which is being done by the Contractor, then the Contractor shall remove such damaged or injured pavements or road surfaces, backfill with sand properly rammed and replace the final pavement or road surface.

(F) - If any sidewalks, driveways or curbs are removed or injured by the Contractor in the course of making excavation or handling materials, or for any other reason which may be attributed to work which has been done by the Contractor, then he shall relay same after all work, including backfilling, has been completed. If any stone sidewalks, driveways or curbs which have been removed or injured, are unfit to be relaid, then the Contractor shall furnish and relay new material. All concrete or cement sidewalks, driveways or curbs, which are removed or injured by the Contractor shall be broken up by him and he shall furnish all labor and materials and construct new sidewalks, driveways or curbs, to replace those removed or injured. At intersecting walks, drives, etc., additional concrete slabs beyond the excavation limits shall be removed and replaced with new material, in order to avoid having more joints than in the original work. All slabs replaced shall be of full width. The Contractor shall furnish, place and maintain, wherever the sidewalk has been removed or damaged by him, a temporary sidewalk so as to provide a safe and passable sidewalk until such time as the final sidewalk is completed.

(G) - All pavements, road surfaces, sidewalks, driveways, or curbs, which the Contractor is required to replace or to have replaced, shall, at the expiration of this contract, be in at least as good condition as at the time of awarding the contract.

(H) - All work which the Contractor may do in connection with the opening up or replacing of pavements, road surfaces, sidewalks, driveways, or curbs, as well as the final repaving, shall be done at his expense, in accordance with the rules and requirements of the Street or Sidewalk Departments of the City of Cleveland and in accordance with the additional requirements of these specifications. And the Contractor shall furnish evidence to the Engineer that the work has been completed to their satisfaction.

(I) - Tunneling will not be permitted without permission of the Engineer. In backfilling tunnels, sand shall be used as far as possible and balance of backfilling made with Class C concrete, rammed in place.

(J) - 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 as per 104.04 and 107.10, State of Ohio, Dept. of Transportation "Construction and Materials Specifications."

LIST AND INVOICES

The Contractor shall furnish the Engineer with a list, in duplicate, of pieces in each shipment of pipe and specials, giving the serial number and designation of each pipe and special sent at that time.

CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

WORK INCLUDED

The Contractor shall furnish, all the materials for and shall properly construct and connect in place, at the locations shown on the drawings or as directed, all cast iron or ductile iron pipe and fittings, including all excavation work, the cutting into and removal of existing pipe, backfilling, sand backfill, and repaving, all as required for the proper completion of the work included under this contract.

CAST IRON PIPE AND FITTINGS

(A) - All pit cast pipe shall be manufactured in all respects in accordance with, and shall meet the requirements of the latest "Standard Specifications for Cast Iron Pipe and Special Fittings" as adopted by the American Water Works Association which specifications except as herein modified are made a part of these specifications.

(B) - In lieu of pit cast pipe above the Contractor will be permitted to furnish either centrifugal or high strength cement lined pipe. The metal shall have a modulus of rupture of not less than 40,000 pounds and a tensile strength of not less than 18,000 pounds and shall be of class noted on the contract drawings. Pipe may be furnished in 12, 16, or 18 foot lengths. The centrifugally cast pipe shall conform to the American Standard Specification A21.6-1952 and all subsequent amendments thereto.

When noted on the contract drawings ductile iron pipe shall be supplied. All ductile iron pipe shall be manufactured in accordance with A.S.A. A21.51 or Federal Specification WWP-421B. All ductile iron fittings shall be manufactured in accordance with A.S.A. A21.10 or AWWA C 100-55. Ductile iron shall have a minimum of 60,000 psi ultimate tensile strength, 40,000 psi yield point and 10% elongation. The chemical analysis shall be as follows: Carbon 3% minimum, Phosphorus .08% maximum and Silicon 2.75% maximum. The thickness of the centrifugally cast ductile iron pipe and cast iron pipe shall conform to the following:

CAST IRON PIPE				DUCTILE IRON PIPE			
SIZE	WORKING PRESSURE	STANDARD THICKNESS	CLASS	SIZE	WORKING PRESSURE	STANDARD THICKNESS	CLASS
4"	250 psi	.44"	24				
6"	250 psi	.48"	25	6"	350 psi	.43"	6
8"	250 spi	.52"	25	8"	350 psi	.45"	6
10"	250 psi	.56"	25	10"	350 psi	.47"	6
12"	200 psi	.56"	24	12"	350 psi	.49"	6
12"	250 psi	.60"	25	16"	350 psi	.52"	6
16"	200 psi	.68"	25				
16"	250 spi	.73"	26				

All fittings, such as bends, tees, crosses, offsets, hydrant branches, etc., shall have bell and bell or bell and spigot ends with cast lead joints, pipe between offsets or bends and on hydrant branches, shall also be of bell and spigot type with lead joints.

(C) - All pipe shall have bell and spigot ends for cast lead joints or a slip-on type joint with compressed rubber ring inserts. All pipe and fittings shall be cement lined.

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

(E) - Where fittings are shown which are not covered by the above specifications, they shall conform to the dimensions and otherwise meet the specifications for the respective type which are carried in the latest revisions to the current edition of the "Handbook of Cast Iron Pipe" by the Cast Iron Pipe Research Association or which are otherwise shown on the contract drawings.

(F) - Wherever changes in line and grade of the main as shown on the drawings are not standard fitting deflections, the Contractor will be permitted to submit details using combinations of standard fittings and small deflections (not to exceed a maximum of one half (½) inch joint opening) in the adjoining lengths of pipe. Pipe to be installed with air cocks or drains shall be cast with bosses thereon, drilled and tapped for two (2) inch connections and plugged in the shop with cast iron threaded plugs before shipment.

(G) - Plugs for bell and spigot pipe and caps for lugged pipe shall be furnished with two (2) plugged two (2) inch taps for drain and air cock connections.

(H) - Closure pieces shall be accurately measured and cut in the field and installed using solid type pattern sleeves as shown or as required.

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

(J) - Bitumastic coating shall be applied on the exterior of all cast iron pipe and fittings in accordance with AWWA Specifications.

CEMENT LINING

All cast iron or ductile iron pipe and fittings shall be given a double 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.

SCALE
MADE E.R.H. DATE 3/10/70
TRCD. W.L.D. DATE 3/12/70
CKD. E.R.H. DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
F. R. Helena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS.

WATERWORK NOTES

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CUY.480-15.81

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CAST IRON AND DUCTILE IRON PIPE AND FITTINGS

LAYING (CONTINUED)

(D) - It is the intention of these specifications to secure first class workmanship in the placing of pipe and accessories. In such details as are not specifically mentioned herein or called for on the drawings, the Contractor will be required to conform with the applicable sections of the latest "Standard Specifications for Laying Cast Iron Pipe" as adopted by the American Water Works Association.

CUTTING PIPE

Whenever the pipes require cutting to fit into the lines, the work shall be done in a satisfactory manner so as to leave a smooth end at right angles to the axis of the pipe. In no event shall flame cutting be used. When a piece of pipe is cut to fit into the line, no payment will be made for the portion cut off and not used in the line.

LEAD JOINTS

In jointing all bell and spigot pipe and fittings having lead joints, the spigot of each pipe shall be properly seated in the bell of the next adjacent piece and adjusted so as to give a uniform annular space. The joint shall be made with twisted hard jute and soft pig lead. Before placing the jute, it shall be sterilized either by boiling or by dipping in a concentrated solution of "HTH". The jute shall be twisted and thoroughly driven into the bell, so that the lead, after having been caulked, shall have a depth of two and one-half (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.

PAINTING

After erection, all exposed or damaged coatings and all bolts for lugged joints shall be cleaned and painted with three (3) field coats of Inertol 50 or Bitumastic 50 or approved equal.

DRAWINGS

(A) - The Contractor shall submit to the Engineer for approval duplicate prints of all shop drawings for pit cast iron pipe and fittings and miscellaneous details which are not standard construction, and are not mentioned in the regular catalogue of the company furnishing the pipe. No work shall be done in the shop until after the drawings have been approved.

(B) - The approval of the drawings by the Engineer shall not relieve the Contractor of any of his obligations in connection with this contract.

MEASUREMENT

The number of linear feet of cast iron pipe and ductile iron pipe and connections to be paid for shall be the actual number of linear feet furnished and placed in accordance with these specifications as measured along the axis of the piping including fittings and valves connected up in place. For connections between new and existing mains, measurement shall be the distance from centerline to centerline of mains and the actual length of existing main ordered to be removed to make the connection.

PAYMENT

The footage measured as provided above shall be paid for at the contract price bid per linear foot for "Item Special - Water Main" Classified as to size and type, which price and payment shall constitute full compensation for excavating and for furnishing, hauling, placing, cutting into and connecting the pipe, pipe bends, plug and clamps at dead ends, concrete piers, sheeting and bracing, sand backfill, water used for compaction, incidental concrete, the removal of all surplus excavation and discarded material, repaving, and for all labor, equipment, tools, 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.

VALVES

WORK INCLUDED

The Contractor shall furnish all materials for and shall properly set in place and connect at the locations shown on the drawings or as directed, all air cocks, drain valves, gate, ~~and inserting valves~~ Valves of the various sizes and types specified or ordered, all as required for the proper completion of the work included under this contract. ~~Inserting valves shall be installed by the Inserting Valve Supplier. The Contractor shall pay all costsand charges for the insertion.~~ The work shall be under the supervision of The Divison of Water and Heat, and shall meet the requirements of Items "Testing Mains", "Lead Joints," and "Detailed Drawings" of these specifications.

AIR COCKS

All air cocks or air vent valves shall be 2-inch brass angle type globe valves. 2-inch air cocks shall be equal in all respects to the Farnan "Cleveland Standard" Brass Air Vent Valve No. W-4695 as manufactured by the Farnan Brass Works.

GATE VALVES ~~AND INSERTING VALVES~~

(A) - Type of Valves: The gate valves shall be manufactured in full compliance with the Standard Specifications for Gate Valves for Ordinary Water Works Service of the American Water Works Association AWWA C-500-61 or latest revision thereof and in addition shall comply with the following supplementary requirements:(1)All gate valves shall be of the non-revolving double disc parallel seat bottom wedge or side wedge type;(2)All gate valves 20 inches and over in size shall include by-pass valves attached thereto;(3) In opening or closing the valve, the gates shall be forced to 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;(4)In closing the valve, the discs when opposite the ports, shall be pressed firmly against the body seats by wedges or some other device equally suitable to the Engineer.

(B) - Valves with Stationary Stems: All gate valves, unless otherwise ordered, shall be made with single, non-rising stems.

(C) - Hub Ends: The dimensions of the bells on valves up to and including 24 inches in diameter shall conform to those for Class D pressure fittings, as required by AWWA C100. On valves 30 inches and larger in size, the bell dimensions shall be for the classes ordered.

(D) - Victaulic Ends: Victaulic ends shall conform to the dimensions given on the contract drawings.

(E) - Flange Ends: The end flanges of flanged end gate valves shall conform in dimensions and drilling to the "American 125 pound Cast Iron Flange Standard", unless otherwise ordered.

(F) - Screw Ends: All 2-inch gate valves and under shall be made with screw ends, unless otherwise specified.

(G) - Vertical and Horizontal Valves: All gate valves, 16 inches and under, shall be constructed to work vertically. Valves over 16 inches shall be constructed to work horizontally.

(H) - By-Passes: By-passes with gate valves shall be provided on valves 20 inches and larger. The by-passes shall be located on or below the horizontal centerline of the valves. By-pass valves shall be of the same size as the by-pass and shall conform to the requirement of these specifications for the specific valve used. The size requirements of by-passes shall be as follows: 20-inch valves shall be provided with 3-inch by-passes; valves 24-inches to 30-inches, inclusive, shall be provided with 4-inch by-passes; valves 36-inches to 42-inches, inclusive, shall be provided with 6-inch by-passes; 48-inch valves shall be provided with 8-inch by-passes.

(I) - Flanges: When flanged valves are required, the flanges shall be faced and drilled. Bolt holes shall be spot faced on the back when necessary to secure an even bearing. All bolt holes shall be of the size shown on the drawings to be submitted and approved, shall be accurately drilled from templates, spaced equal distances apart and shall straddle horizontal and vertical axis, all as shown on the drawings. The dimensions and drilling of all end flanges shall conform to the spacing indicated on the drawings which shall be the "American 125 pounds Cast Iron Flange Standard." Flanges shall be plain face with a smooth finish.

(J) - Marking: All gate valves 3 inches and over shall have the identity of maker, size and the year when made and also the letters "C. W. D." cast upon its body or dome in raised letters.

(K) - Stuffing Boxes: The stuffing box on each gate valve 3 inches or over, must be separate from the dome and fastened to it by bolts. For 2 inch valves and under, the stuffing boxes may be formed in the dome of the valve. When required by the Director, valves 16 inches and smaller, shall be furnished with "O" ring type seal plate. The seal plate shall be fitted with at least two (2) "O" rings, the lower "O" ring serving as the pressure seal and the upper "O" ring as a combined dirt and moisture seal. The "O" rings shall be Precision Rubber Corporation Quality Compound No. 122-70, or approved equal.

(L) - Seat and Gate Rings: Dimensions of the bronze seat and gate rings shall be proportioned to fit the test pressure required, and shall meet the approval of the Engineer. The rings shall be firmly secured in place by an approved device, which will prevent them from working loose, particularly when the valve is left partly open. Dimensions of the bronze seat and gate rings for gate valves shall be not less than that specified in the following tables. Body seat rings shall be made of Grade One Bronze. Gate seat rings shall be made of Grade Five Bronze.

BODY AND GATE RINGS
(DIMENSIONS IN INCHES)

BOTTOM WEDGE

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

APPROVED _____ DATE Aug. 30, 1974
F. R. Melena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Lucevec
ENGINEER OF DESIGN REVIEW

SCALE No Scale
MADE E.R.H. DATE 3/10/70
TRCD. H.E.D. DATE 3/11/70
CKD. E.R.H. DATE 3/27/74
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK NOTES

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2	OHIO		

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CUYAHOGA COUNTY
CUY.480-15.81

7/25

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	1.896	3
24	1.980	2
30	2.480	2

(N) - Wrench Caps: The wrench caps and retaining nuts on heads of valve stems and pinion shafts shall be of Grade Three Bronze. On valves 24 inches and over, wrench caps shall be 2 inches square and 2 inches deep. On valves 4 inches to 20 inches, inclusive, they shall be 1-3/4 inches square on top, 1-7/8 inches square at base, and 1-3/4 inches deep. On 3 inch valves and under: they shall be 1-1/4 inches square on top, 1-3/8 inches square at base and 1-1/2 inches deep. Machined wrench caps for valves 3 inches to 48 inches inclusive shall be fitted to a machined square stem or pinion shaft and held in place by a retaining nut. Wrench caps shall have a cut-away skirt to permit easy access to gland bolts.

(O) - Valves are to open clockwise except those 2 inches and under. All gate valves 3 inches and over including by-pass valves, shall be made to open by turning in a clockwise direction. All valves are to be so made that they can be easily operated.

(P) - Facing of Gates: All discs or gates and threads for seat rings in the body shall be machined true and a groove or grooves shall be machined in each disc or gate for the reception of the face ring. The disc and seat rings shall be securely and rigidly attached to the discs or body seats in a manner approved by the Engineer, and the rings are to be finished to a true surface.

(Q) - Rollers and Scrapers: In all valves 20 inches in diameter and larger designed to lie horizontally, each gate or disc shall be provided with two bronze rollers travelling on bronze-faced tracks and provided with suitable bronze scrapers or two stainless steel rollers travelling on stainless steel-faced tracks and provided with suitable stainless steel scrapers. The thickness of the facing of the tracks shall be not less than 1/4 inch. The bronze shall be Class 1 and the stainless steel shall be ASTM A 276-55, Type 302.

(R) - Valve Guides: All valves 20 inches in diameter and larger shall be provided with guides or tracks which shall be made straight and true, and all irregularities must be machined off. The guides or tracks of horizontal valves shall be substantially faced with a minimum of 1/4 inch of Grade One Bronze, or stainless steel ASTM A 276-55, Type 302, satisfactory to the Engineer, securely fastened and planed off smooth and true.

(S)-Gearing: All valves 20 inches in diameter and larger shall be equipped with enclosed cut tooth steel gears. Gears, shafts and bearings shall be such as to provide easy operation without bending or twisting.

(T)-Dowel Pins: All gear valves shall have two dowel pins set in the flanges connecting the dome and body. Size of the pins to be shown in plans.

(V)-Grease Cases: All valves 20 inches in diameter and larger shall have watertight grease cases installed. The grease cases shall be of the extended type and shall be made of cast iron conforming to ASTM specifications, serial designation A 126, Class B or any subsequent amendment thereto. Bearing surfaces for valve stem and pinion shaft shall be bronze bushed with Grade One Bronze. The grease cases shall be securely bolted to the valve bonnet through a heavy cast iron yoke. The yoke shall be of sufficient length to provide space for repacking valve and grease case stuffing boxes. All grease cases shall be provided with a removable cover securely bolted in place to allow easy access to the gears. There shall be also provided convenient filling and draining plugs and sufficient oil to fully submerge the pinion gear. The valves shall be delivered with the grease cases filled with the proper oil as recommended by the manufacturer.

(W)-Indicators: All valves 20 inches in diameter and over, shall be equipped with indicators denoting the positions of the gate. The moving part and bearings to be of bronze or bronze-lined.

(AA)-Bronze Parts: The stems, stem nuts, operating nuts, retaining nuts, disc and seat 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/ 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.

SCALE No Scale
MADE ERH DATE 3/10/70
TRCD. HLD DATE 3/11/70
CKD. ERH DATE 8.27.74

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

APPROVED _____ DATE Aug. 30, 1974

F. R. Melena Asst.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK NOTES

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VALVES

MATERIAL SPECIFICATIONS (CONTINUED)

(K) - Quality of Materials.
Grade One Cast bronze shall conform to the properties of A.S.T.M. B 62.

Grade Two cast bronze shall conform to the properties of A.S.T.M. B 132, Alloy A.

Grade Three cast bronze shall conform to the properties of A.S.T.M. B 132, Alloy B.

Grade Four rolled bronze shall conform to the properties of A.S.T.M. B 21, Alloy A (one-half hard).

Grade Five bronze shall be sufficiently malleable to conform to dove-tailed grooves when peened or rolled, and shall have a minimum compressive strength, without deformation, of 4,000 PSI, and shall have the following chemical composition:

Copper, per cent	91.0
Tin, per cent	0.0
Zinc, per cent	5.0
Lead, per cent	4.0

Silicon Bronze shall conform to A.S.T.M. Specifications B-98, Alloy A.

Stainless Steel shall conform to A.S.T.M. Specifications A-276, Type 302.

Cast Iron shall conform to A.S.T.M. Specifications A-126, Class B.

(L) - Other Materials: All other materials used in the manufacture of these valves and not specified in the specifications shall be of the best quality of their kinds, and subject to inspection, tests, and approval by the Engineer.

(M) - Chemical Analysis: Chemical analysis of the material used shall be furnished by the Contractor whenever required by the Engineer.

(N) - Cleaning of Castings: All iron castings shall be thoroughly cleaned on the outside and inside surfaces, and protected from rain or moisture until they are painted.

(O) - Hydrostatic Tests at Shop: All gate valves shall be tested in the shop by hydrostatic pressure, by closing the valve and applying the required test pressure in the body and dome of the valve as specified below.

3" and under	300 P.S.I. - No time requirement
4" through 12"	400 P.S.I. - No time requirement
14" through 20"	300 P.S.I. for 15 minutes, drop pressure to 150 P.S.I., then elevate again to 300 P.S.I. for 15 minutes - a total of 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.

(B) - After erection, all exposed metal surfaces of valves except brass or bronze shall be painted with (2) field coats of coal tar pitch paint using Inertol 66 or Koppers Bitumastic 50 or approved equal.

INSPECTION

The Engineer or his authorized designate will inspect the material and work done, as the interests of the City or State may require. He shall have unrestricted access to the Contractor's plant, and to all parts of the work, and other places at which the preparation of the material and the construction of the different parts of the work to be done under these specifications are carried on, and he shall receive all facilities and assistance to carry out his work of inspection and testing in a manner satisfactory to the Engineer. Such inspection shall not relieve the Contractor from any obligation to perform said work strictly in accordance with the specifications, or any modifications thereof as herein provided, and work not so constructed shall be removed and made good by the Contractor at his own expense.

DRAWINGS

(A) - Prior to the manufacture of any valves, the Contractor shall submit for the approval of the Engineer and Director of Public Utilities of the City of Cleveland complete working, detail, and dimension drawings showing thicknesses and kinds of material, and similar information.

(B) - Two prints 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 furnish to the Engineer three (3) sets of mylar or reproducible cloth, one of which shall be furnished to the Director of Public Utilities of the City of Cleveland and one set returned to the Contractor. No work shall be done in the shop until after the drawings have been finally approved.

PAYMENT

The Unit Price stipulated for each "Item Special - Valves" classified as to size and type, shall include the furnishing, placing, testing and painting of the air cock, drain, gate, check and inserting valves, including by-pass valves, operating nuts and other accessories and appurtenances and the furnishing of all materials labor, tools, and appliances necessary to complete the work as specified or as shown.

NOTE:

Air Cock is included for payment in "Item Special - 2" Air Cock Complete."
Drain Valve is included for payment in "Item Special - 2" Drain Complete."
~~Drain Valve is included for payment in "Item Special - 4" Drain Complete."~~

VALVE BOXES

VALVE BOXES

Materials and specifications shall conform to State of Ohio Dept. of Transportation Specification 604, "Miscellaneous Metal Work", specifications and details as shown in the plans, except that Cast Iron shall be A.S.T.M. A-48.

See also "(I) and (J) Material Specifications - Valves" Sheet 226.

Payment for valve boxes and covers shall be by unit bid price per pound for "Item Special - Miscellaneous Metal Work." See Sheet 228.

BRICK AND PLAIN CONCRETE MASONRY

WORK INCLUDED

Under these items the Contractor shall furnish all necessary labor, materials, tools and equipment for the construction, complete, of all miscellaneous masonry structures and including all water main drain and pitometer vaults, access and anchorage manholes, valve chambers, anchors, piers at pipe bends and under line valves, floors for drain and valve vaults, and other appurtenant work together with the hauling, mixing, placing, forming, scaffolding, sheeting and bracing, grouting, plastering, curing, etc., all as specified, required or shown on the contract drawings.

BRICK AND MASONRY MATERIAL

The material furnished by the Contractor for the various kinds of masonry construction to be constructed shall conform to the following specifications:

(B) - Portland cement shall conform to the requirements of 701.04 (ASTM C 150 Type 1), State of Ohio, Dept. of Transp. "Construction and Materials Specifications."

SCALE No Scale
MADE ERH DATE 3/10/70
TRCD HLO DATE 3/11/70
CKD. ERH DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
L. P. Melena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK NOTES

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BRICK AND PLAIN CONCRETE MASONRY

BRICK AND MASONRY MATERIAL (CONTINUED)

(D) - Fine Aggregate for Mortar or Grout shall conform to the requirements of 703.03 State of Ohio, Dept. of Transp. "Construction and Materials Specifications."

(E) - Aggregate for Portland Cement Concrete shall conform to the requirements of 703.02 State of Ohio, Dept. of Transp. "Construction and Materials Specifications."

(F) - All water shall be clean and accurately measured for each batch of concrete.

(G) - All plain concrete shall be State of Ohio, Dept. of Transp. "Construction and Materials Specification-499 Class C."

(H) - All cement mortar shall be mixed in the proportion of one (1) part of cement to three (3) parts of sand, except the mortar for brick catch basins and sewer manholes which shall be 1 to 2 mix.

MANHOLE CONSTRUCTION FOR VALVE CHAMBERS AND DRAIN VAULTS

(A) - All brick manholes, brick necks and extensions, and temporary extensions shall be built in accordance with the contract drawings.

(B) - The walls of manholes shall be built of No. 2 shale brick laid in 1:3 Portland Cement mortar, with brick arranged radially as headers, forming a wall nine (9) inches thick. In deep manholes, the wall shall be thirteen (13) inches thick below a point 12 feet from the surface. All of the brick composing said manholes shall be laid in full mortar beds and joints, with no mortar joints appearing on the inner surface of the manhole exceeding three-eights (⅜) inches thick.

(C) - The top of the walls of manholes shall be properly leveled off with mortar so as to form a flat surface upon which the cast iron manhole ring is to rest, and the manhole shall be built to proper height as indicated by the contract drawings.

(D) - The entire outer surface of all brick manholes shall be plastered with a smooth coating of 1:3 Portland cement mortar, at least one-half (½) inch thick.

MANHOLE CONSTRUCTION FOR ACCESS MANHOLES AND ANCHORAGES, METER AND PITOMETER VAULTS

(A) - All plain concrete masonry construction shall be built in accordance with the contract drawings.

~~(B) - Temporary brick masonry extension for Access Manhole and Anchorage Type "A" shall be built in accordance with the contract drawings.~~

PAYMENT

Payment shall be made at the contract unit price bid per each "Item Special" - "Meter Vault", "Drain Vault", ~~"Pitometer Vault", "Access and Anchorage Manhole Type A", "Access Manhole Type B", "Valve Chamber" and "Temporary Manhole Extension"~~ complete and accepted in place. Payment for brick or plain concrete masonry is to be included in the unit price bid for the item in which it is used.

Payment for concrete anchors and piers is to be included in the unit price bid for "Item Special - Water Main" or "Item Special - Plugging Water Mains and Branches".

MISCELLANEOUS METAL WORK

WORK INCLUDED

(A) - The Contractor, shall furnish and install all miscellaneous metal work which is required for the proper completion of the work included under this contract and is not specifically included under the other items of these specifications.

(B) - In general, the work shall include the furnishing and installing of manhole frames and covers, manhole steps, valve boxes, extension stems and brace, structural members, bronze bolts, and other similar items required for the proper completion of the work.

MATERIALS

All castings shall conform to the requirements of Item 604 of the State of Ohio, Department of Transp. Construction and Materials Specifications, except that the cast iron shall be ASTM A48 Class 30 B. All structural steel shall meet the requirements of the ASTM Specifications A 7-46. All bronze bolts and nuts shall conform to the U. S. Standard sizes, and shall be clean cut and have well fitted threads All bronze bolts and nuts shall be of Tobin or Manganese Bronze, or of similar approved materials.

for manhole frames and covers

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.

See also "(I) and (J) Materials Specifications - Valves" Sheet 226.

COATING

Each casting shall be sprayed or brushed inside and out with one coat of asphaltic compound varnish. The varnish shall be made of high grade asphalt fluxed and blended with properly treated drying oils and thinned to a proper consistency with a volatile solvent. The varnish shall be made to comply with Federal Specification 77-V-51a or Joint Army-Navy Specification JAN-P-450. Other methods of coating and types of coating material shall be subject to the approval of the Engineer, in addition to the shop coat the castings shall receive two (2) coats of approved paint.

INSPECTION

The Engineer or his authorized representative, shall have the right to inspect the material and work done, as the interests of the City or State may require. Such inspection shall not relieve the Contractor from any obligation to perform said work strictly in accordance with the specifications, or any modification thereof, as herein provided, and work not so constructed shall be removed and made good by the Contractor, at his own expense. All manhole rings and covers must be sound and shall conform to these specifications, and any defective castings which may have passed the inspector at the works, or elsewhere, shall be at all times liable to rejection when discovered, until the date of final payment under this contract.

STEPS AND LADDERS

Ductile iron steps and ladders of the size and shape shown on the contract drawings shall be built into the brick and concrete masonry of the manholes as indicated on the drawings.

RIMS AND COVERS

(A) - All cast iron manhole rims and covers of the forms, dimensions and details shown on the contract drawings shall be furnished and installed as directed.

(B) - The rims shall be properly set in place in a full bed of mortar or poured monolithic in the masonry, at such elevation as to make the top of the rim conform to the finished surfaces of the structures or the finished grade as established by the Engineer.

VALVE BOXES AND COVERS

The Contractor shall furnish and install, over each vertically set valve at the locations shown on the drawings, or as required, valve boxes and covers of the types and sizes indicated on the contract plans. These shall be carefully located over the valve nuts, and shall be set plumb and true, to elevation as required.

DETAILED DRAWINGS

Complete detailed drawings of miscellaneous metal work shall be submitted to the Engineer for approval, prior to the manufacture of any work to be furnished under this item, in accordance with these specifications.

PAINTING

All miscellaneous metal work not galvanized shall be thoroughly cleaned and given three (3) field coats of coal tar pitch, using Inertol 50 or Bitumastic 50, or approved equal.

MEASUREMENT

The weight of miscellaneous metal work to be paid for shall be the number of pounds of metal work actually furnished placed in accordance with these specifications and the detailed drawings approved by the Engineer. In computing the weights, if not determined by weighing, one (1) cubic foot of cast iron shall be assumed to weigh four hundred and fifty (450) pounds and one (1) cubic foot of steel shall be assumed to weigh four hundred and ninety (490) pounds.

PAYMENT

The unit price stipulated per pound for "Item Special - Miscellaneous Metal Work", shall include the furnishing, erecting, machining, fitting, adjusting, bolting, cleaning and painting of all miscellaneous metal work, and the furnishing of all labor, materials, tools and appliances necessary to complete the work as specified or as shown.

SCALE _____
MADE ERH DATE 3/10/70
TRCD. HLL DATE 3/12/70
CKD. ERH DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
F. R. Melena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

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WATERWORK NOTES

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FIRE HYDRANTS

ITEM SPECIAL - FURNISHING AND SETTING 6" FIRE HYDRANT

WORK INCLUDED

The Contractor shall furnish all hydrants, caulking material, labor, tools and equipment for and shall properly connect at the location shown on the Contract Drawings, 6" hydrants, complete, as required for the proper completion of the work included under this contract.

HYDRANTS

The 6" hydrant details shown in the plans is a City of Cleveland Standard and shall conform to the City's specifications on file at 1201 Lakeside Avenue, Cleveland, Ohio, 44114.

SETTING

(A) - General Location: The hydrant shall be located in a manner to provide complete accessibility, and in such manner that the possibility of damage from vehicles or injury to pedestrians will be minimized.

(B) - Location Regarding Curb Lines: When placed behind curb the hydrant barrel shall be set so that center of barrel will be no less than 3 feet from the gutter face of the curb except by consent of the Engineer.

(C) - Location Regarding Sidewalk: When set in the lawn space between the curb and the sidewalk, or between the sidewalk and the property line, no portion of the hydrant or nozzle cap shall be within 6 inches of the sidewalk.

(D) - Position of Nozzles: The hydrant shall stand plumb, with the nozzles pointing toward the road and at an angle of forty-five degrees therefrom. Where hydrant branch piping is parallel with, or not at right-angles to the curb, the Contractor shall release swivel head bolts and adjust the hydrant nozzles to face the road at the proper angle. A hydrant without swivel heads will be adjusted by the City where necessary to correct the angle on nozzles. The elevation shall conform to the established grade with tops of frost casing at least four (4) inches above grade.

(E) - Connection to Main: The hydrant shall be connected to the main pipe with a cast iron branch controlled by the independent gate valve of the same size as hydrant, except as otherwise directed.

(F) - Drainage at Hydrant: Drainage shall be provided at the base of the hydrant by filling around the elbow with coarse gravel or crushed stone to at least six (6) inches above the waste opening. Wherever a hydrant is set in rock, clay or other impervious soil, the trench shall be widened and deepened on each side of the hydrant base and the space shall be filled compactly with coarse gravel or broken stone mixed with coarse sand of sufficient quantity to absorb all water to be drained from the hydrant when the valve is closed.

(G) - Anchorage for Hydrant: The hydrant shall be set on a stone slab or a similar foundation and the base of the hydrant and the hydrant tee shall be well braced against unexcavated earth at the end of the trench with concrete backing, or it shall be tied to the pipe with suitable rods or clamps as directed by the Engineer.

(H) - Cleaning: The hydrant shall be thoroughly cleaned of dirt or foreign matter before setting.

PAYMENT

(A) - The unit price stipulated to be paid for each "Item Special - Furnishing and Setting 6" Fire Hydrant" shall include furnishing hydrant, setting, testing, painting, excavating, sheeting and shoring, backfilling, and the furnishing of all labor, material, tools and appliances necessary to complete the work as specified or as shown.

(B) - The cast iron pipe will be paid for under "Cast Iron Pipe and Fittings".

(C) - The valves will be paid for under "Valves".

(D) - The valve boxes will be paid for under "Miscellaneous Metal Work".

ITEM SPECIAL - FIRE HYDRANT RELOCATED

WORK INCLUDED

The Contractor shall remove the hydrant and property set in place and connect at the locations shown on the drawings or as directed by the Engineer. This shall included all excavating, furnishing and installing cast iron pipe and fittings, gate valve, and valve box, backfilling, testing, chlorinating, seeding and sodding, and repaving required for the proper completion of the work.

MATERIALS

All hydrants to be relocated must be in good condition. All other materials and appurtenances necessary for the proper completion of this Item shall be of the kind and grade called for in these notes for the particular kind of construction in which the materials are to be used.

CONSTRUCTION METHODS

The construction methods shall conform to the requirements of the "Item Special - Furnishing and Setting 6" Fire Hydrant" as set forth elsewhere in these notes.

PAYMENT

(A) - The unit price stipulated to be paid for each "Item Special - Fire Hydrant Relocated" shall include removing, setting, reconnecting, testing, painting, excavating, sheeting and shoring, backfilling, seeding and sodding and repaving, and furnishing of all labor, material, tools, and appliances necessary to complete the work as specified or as shown.

(B) - The cast iron pipe will be paid for under "Cast Iron Pipe and Fittings".

(C) - The Valves will be paid for under "Valves".

(D) - The Valve Boxes will be paid for under "Miscellaneous Metal Work".

FIRE HYDRANT ABANDONED

Where fire hydrants are indicated to be abandoned (not indicated for removal), no work is required, the hydrant becomes the property of the municipality. The cost of such disposal shall be included in the price for Item 203 Excavation not including Embankment Construction, as per plan.

ITEM SPECIAL - FIRE HYDRANT REMOVED

The work included in this item shall be paid for at the contract price bid for each "Item Special - Fire Hydrants Removed", which price and payment shall constitute full compensation for excavating, removing and disposing of fire hydrant and appurtenances, sheeting and bracing, backfill, repaving, seeding, sodding and for all labor, materials, equipment, tools and incidentals necessray to complete this item. The fire hydrant and appurtenances shall become the property of the Contractor.

REMOVED ITEMS

All materials consisting of pipe and fittings, valves, fire hydrants, valve boxes, and vault covers which are indicated for removal by the Contractor shall be come the property of the Contractor and be removed and disposed of by him.

SCALE
MADE E.R.H. DATE 3-11-70
TRCD H.L.D. DATE 3-12-70
CKD E.R.H. DATE 3-27-74

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

APPROVED _____ DATE Aug. 30, 1974
F. R. Molena, Dir.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

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William T. Sweeney
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1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK NOTES

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CUYAHOGA COUNTY
CUY. 480-15.81

13/25

MISCELLANEOUS ITEMS

ITEM SPECIAL - SERVICE CONNECTION EXTENDED

WORK INCLUDED

The City of Cleveland, Division of Water, will relocate curb boxes and extend connections at cost to the Contractor from existing curb box location to new curb box location. All other connection work and material shall be by the Contractor.

The Contractor shall do all the necessary excavation, backfilling, seeding, sodding and repaving required in making these service connections and alterations and costs thereof shall be included in the unit price bid for "Service Connection Extended". The curb boxes shall be relocated by the City and set to final grade by the Contractor. Water Meter Vaults for connections 1½" and over shall be constructed by the Contractor and paid for at contract unit price for each "Item Special - Meter Vault." (Brick and Concrete Masonry, See Sheets 227 and 228.)

MEASUREMENT

The service connection extended to be paid for shall be the actual number of each listed and estimated separately, completed and accepted.

BASIS OF PAYMENT

The unit price stipulated for each "Item Special - Service Connection Extended" under this item shall include the excavation, backfilling, seeding and sodding and repaving and the furnishing of all labor, materials, tools and appliances necessary to complete the work as specified or as shown.

ITEM SPECIAL - TEMPORARY SERVICE CONNECTION

WORK INCLUDED

The City shall disconnect the existing service connection from the water main that is to be taken temporarily out of service. A tap is to be made on a temporary by-pass or a water main that will remain in service, and the service connection shall be temporarily connected. After service is restored to the water main, the service connection shall be reconnected to the original or relocated main. The City will furnish the piping materials, and make all changes necessary to service connection box only. The Contractor shall do all excavation, backfilling, repaving and all other work.

PAYMENT

The actual number of each "Item Special - Temporary Service Connection", shall be paid at the contract unit price. This price and payment shall constitute full compensation for performing all of the requirements of this item, including furnishing all necessary materials, labor, tools, equipment supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at the expense of the Contractor.

ITEM SPECIAL - SERVICE CONNECTION RELOCATED AND WATER METER RELOCATED

WORK INCLUDED

The City will furnish the piping material for and make all changes required in the relocation of existing house connections and meters from the corporation cock to the curb cock only. The Contractor shall furnish the piping material and make all changes necessary to reconnect and do all the necessary excavation, backfilling, and repaving required and all other connections, labor and material.

Materials furnished by the City include piping, corporation cock, curb cock, and water meter vault. Water Meter Vault for connections 1½" and over shall be constructed by the Contractor and paid for at contract unit price for each, "Item Special - Meter Vault". (Brick and Concrete Masonry, See Sheets 227 and 228.)

PAYMENT

The actual number of each "Item Special - Service Connection Relocated" and each "Item Special - Water Meter Relocated" shall be paid for at the contract unit price bid and payment shall constitute full compensation for performing all the requirements of this item, including furnishing all necessary materials, labor, tools, equipment, supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at the expense of the Contractor.

ITEM SPECIAL - RELOCATE, RETAP AND RECONNECT SERVICE CONNECTION

WORK INCLUDED

The Contractor shall remove the existing service connection from the existing water main which is to be abandoned. A tap is to be made on the new water main and the existing service piping shall be connected to the new water main. The City will furnish the piping materials and make all changes necessary to reconnect, but the Contractor shall do all excavation, backfilling and repaving.

PAYMENT

The actual number of each "Item Special - Relocate, Retap and Reconnect Service Connection", shall be paid for at the contract unit price. This price and payment shall constitute full compensation for performing all of the requirements of this item, including furnishing all necessary materials, labor, tools, equipment, supplies and incidentals. The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at the expense of the Contractor.

ITEM SPECIAL - 2" AIR COCK COMPLETE

WORK INCLUDED

The Contractor shall furnish pipe with a 2" air cock connection and furnish and install the 2" air cock complete as shown in the "Water Work Details" at the locations shown in the plans.

PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - 2" Air Cock Complete" which price and payment shall constitute full payment for furnishing and installing all materials, labor, equipment, tools, and appliances necessary to complete this item. The valve box will be paid for separately under the item "Miscellaneous Metal Work".

ITEM SPECIAL - 2" DRAIN COMPLETE

WORK INCLUDED

The Contractor shall furnish pipe of the sizes shown with a 2" Tangent Outlet at the locations shown on the plans and shall furnish and install the 2" pipe, and valve as shown in the "Water Work Details".

PAYMENT

(A) - The work included in this item shall be paid for at the contract unit price bid for each "Item Special - 2" Drain Complete" which price and payment shall constitute full payment for furnishing and installing all materials, labor, equipment, tools and appliances necessary to complete this item.

(B) - The Drain Vault will be paid for under each "Item Special- Drain Vault".

(C) - The Valve Box will be paid for under "Item Special - Miscellaneous Metal Work".

ITEM SPECIAL - ADJUST CURB COCK VALVE BOX TO GRADE
ITEM SPECIAL - ADJUST VALVE BOX TO GRADE

WORK INCLUDED

The Contractor shall raise or lower the existing valve box to fit the revised grade by excavating under or tamping backfill under the valve box to insure that the box has a firm footing.

PAYMENT

The work included in this item shall be paid for at the contract unit price bid for each "Item Special - Adjust Valve Box to Grade", and "Item Special - Adjust Curb Cock Valve Box to Grade", which price and payment shall constitute full compensation for adjusting the valve box, excavation, tamping earth under valve box, backfill, seeding and for all labor, equipment, tools and incidentals necessary to complete this item.

ITEM SPECIAL - REMOVE ABANDONED VALVE BOX
ITEM SPECIAL - REMOVE ABANDONED CURB COCK VALVE BOX

WORK INCLUDED

The Contractor shall either remove or leave in place the abandoned curb cock, or gate valve. The valve box shall either be 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 Cock Valve Box" and "Item Special - Remove Abandoned Valve Box" which price and payment shall constitute full compensation for abandoning the valve and removing the valve box, backfilling, seeding, repaving, and for all labor, equipment, tools and incidentals necessary to complete this item.

SCALE
MADE ERH DATE 3/20/70
TRCD. HJD DATE 3/26/70
CKD. ERH DATE 8/7/74

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

APPROVED _____ DATE Aug 30, 1974

F. K. Mellena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS

William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK NOTES

MISCELLANEOUS ITEMS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY. 480-15.81

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2-INCH GALVANIZED BLACK IRON AND BRASS PIPE FOR FLUSHING CONNECTIONS, DRAINS AND AIR COCKS

WORK INCLUDED

The Contractor shall furnish all the materials for and shall properly connect in place at the locations shown on the drawings or as ordered, all 2-inch extra strong brass pipe and fittings, and all 2-inch extra strong galvanized black iron pipe and fittings respectively, which are necessary for the proper completion of the work included under this contract.

BRASS PIPE AND FITTINGS

All brass pipe and fittings shall be extra strong, 2-inch pipe size and the pipe shall conform to A.S.T.M. Specifications B 43-42. Fittings shall be extra strong weight and shall have sound, well fitting threads.

GALVANIZED BLACK IRON PIPE AND FITTINGS

All galvanized black iron pipe, nipples and couplings shall be extra strong black iron pipe A.S.T.M. Designation A 120. The fittings shall be beaded, of malleable iron, extra heavy weight. All pipe and fittings shall be hot dipped, zinc coated inside and outside, and shall have sound, well-fitting threads.

ERECTION

All pipe shall be carefully placed to the proper lines and grades, and shall be connected up, unless otherwise shown, with screw fittings. Screw joints shall be made tight with a graphite paste and screwed home. A liberal number of unions shall be used to permit the ready removal of any section.

PAYMENT

(A) - The work included in this item shall be paid for at the contract unit price bid for each "Item Special - Furnish and Install Flush Pipe including Fittings and Valve", whether temporary or left in place which price and payment shall constitute full compensation for excavating and for furnishing, hauling, and placing plugs, clamps, valves, roadway boxes, pressure backing and appurtenances, and for furnishing all labor, material, equipment, tools, and incidentals necessary to complete this item. See note A below.

(B) - Air Cocks shall be paid for at unit bid price for each "Item Special - 2" Air Cock Complete".

(C) - Drains shall be paid for at unit price for each "Item Special - Drain Complete", classified as to size.

INSERTING VALVE - SPECIAL NOTE

The Inserting Valve lead joints shall be of heated and poured lead, thoroughly caulked, as specified in the Water Work Notes for Item "Cast Iron and Ductile Iron Pipe and Fittings, Lead Joints." No "Lead Wool" jointing material will be accepted. The Inserting Valve work item shall be subject to: (1) Continuous installation, work method and inspection and (2) a watertightness test after installation.

(1) The installing work and method shall be approved by the City of Cleveland. Any work or method used that is not approved shall be cause for rejection. Such inspection shall not relieve the Contractor of any responsibility for a proper installation.

(2) After installation, each Inserting Valve shall be inspected for watertightness and shall meet the requirements specified in the Water Work Notes for Item "General, Testing Mains." Any leaks due to defects of materials and or workmanship shall be corrected and reinspected for watertightness. The work area around the Inserting Valve shall be maintained clear and accessible for a minimum period of two(2) days. The valve shall show no leaks.

Note A

A quantity of one (1) each "Item Special-Furnish and Install Flush Pipe including Fittings and Valve" has been provided in the General Summary for use as directed by the Engineer.

~~ITEM SPECIAL - INSERTING VALVE COMPLETE~~
ITEM SPECIAL - TAPPING SLEEVE AND VALVE COMPLETE

WORK INCLUDED

The Contractor shall furnish and install ~~the Inserting Valve or~~ the Tapping Sleeve and Valve at the location shown in these plans or as directed by the Engineer. The work shall include all excavating, backfilling, repaving and for furnishing and installing the Tapping sleeve and valve and all other work that is necessary for the proper completion of the work.

Where the Tapping Sleeve and Valve is to be installed and a tap is to be made in prestressed concrete cylinder pipe, the Contractor shall arrange for the work with the pipe fabricator or valve supplier.

Complete shop drawings and procedures to be followed shall be approved by the Division of Water and Heat before proceeding with the work.

QUALITY OF VALVES AND SLEEVES

The valves shall be A.P. Smith Manufacturing Co. or approved equal and shall comply with the requirements of the Item "Valves" of these specifications, insofar as they apply, including the provisions of sections (V) and (W).

The sleeves shall be of the class and size as shown and shall conform to the requirements of the Item "Cast Iron Pipe and Fittings" of these specifications, insofar as they apply.

PAYMENT

The work included in these items shall be paid for at contract unit price bid for ~~each "Item Special - Inserting Valve Complete" or~~ each "Item Special - Tapping Sleeve and Valve Complete"; classified as to size, which price and payment shall constitute full compensation for furnishing and installing the tapping sleeve and valve and performing, excavating, sheeting and shoring, backfilling and sand backfilling, seeding and sodding and repaving--if required, and for furnishing all labor, material, equipment, tools and incidentals necessary to complete the work as specified or as shown.

ITEM SPECIAL - CUTTING IN VALVE COMPLETE

WORK INCLUDED

The Division of Water will set the time of installation and the Contractor will do all pipe cutting and installing under the supervision of the Division of Water and Heat. The Contractor shall furnish and haul to the proper location the Hub Valve, Standard No. 38 Dresser Coupling or Smith Blair Coupling or approved equal, cast iron pipe and lead for the installation. The Contractor shall excavate, provide sheeting and bracing as necessary, backfill and repave as necessary.

PAYMENT

The work included in this item shall be paid for at the unit price bid for each "Item Special - Cutting in Valve Complete", classified as to size. The price and payment shall constitute full compensation for performing all excavation, sheeting, bracing, backfilling and repaving and furnishing and hauling to the proper location at the job site and the furnishing of all materials. The valve box shall be paid for under "Item Special - Miscellaneous Metal Work."

ITEM SPECIAL - PLUGGING WATER MAINS AND BRANCHES AND PLUGGING SERVICE CONNECTIONS

WORK INCLUDED

The work included under these items shall consist of the plugging of existing water mains and branches, and the plugging of service connections at the locations shown on the drawings or as ordered, including cast iron plugs or caps with clamps and concrete piers, all excavating, sheeting and bracing, concrete, sand backfill, backfill, temporary repaving and permanent repaving, all as required for the proper completion of the work.

(A) - Plugging Mains and Branches: When indicated on the plans or as ordered the Contractor shall make pipe cuts, remove pipe and fittings and shall plug or cap mains, tees or crosses, plug connections at mains or branches, shall do all the excavating, backfilling and repaving, all as required.

(B) - Plugging Service Connections: The Contractor shall do all necessary excavating, sheeting and bracing, sand backfilling, backfilling and repaving required for this item, but the Cleveland Water Department will plug the service connection. The Contractor shall arrange with the Cleveland Water Department for the necessary work under this item.

MEASUREMENT

The existing water mains and branches plugged or service connections plugged to be paid for shall be the actual number of each listed and estimated separately, completed and accepted.

PAYMENT

The unit price stipulated for each (A) "Item Special - Plugging Water Mains and Branches" classified as to size shall constitute full compensation for performing all the requirements of this item including furnishing all necessary materials, labor, tools, equipment and incidentals to make this a complete item of work.

The unit price stipulated for each (B) "Item Special - Plugging Service Connections" shall constitute full compensation for performing all the requirements of this item including furnishing all necessary materials, labor, tools, equipment and incidentals to make this a complete item of work.

The materials, labor, tools, equipment and incidentals furnished by the City of Cleveland, Division of Water, will be at the expense of the Contractor. The work performed by the City of Cleveland applies to (B) "Plugging Service Connections".

BOLTLESS RESTRAINED PUSH-ON TYPE JOINTS

~~Boltless Restrained Push-on Type Joints specified for the 12" ductile pipe shall be as manufactured by Clow Corporation "F-128 Super Lock", U.S. Pipe and Foundry "Tok-Tyton" or approved equal.~~

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE ERH DATE 3/19/70 CONSULTING ENGINEERS
TRCD. WLD DATE 3/26/70 KANSAS CITY CLEVELAND NEW YORK
CKD. E.R.H. DATE 5-12-72

APPROVED _____ DATE Aug. 30, 1974
E.R. Melena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

Rev. 10-16-74 WATERWORK NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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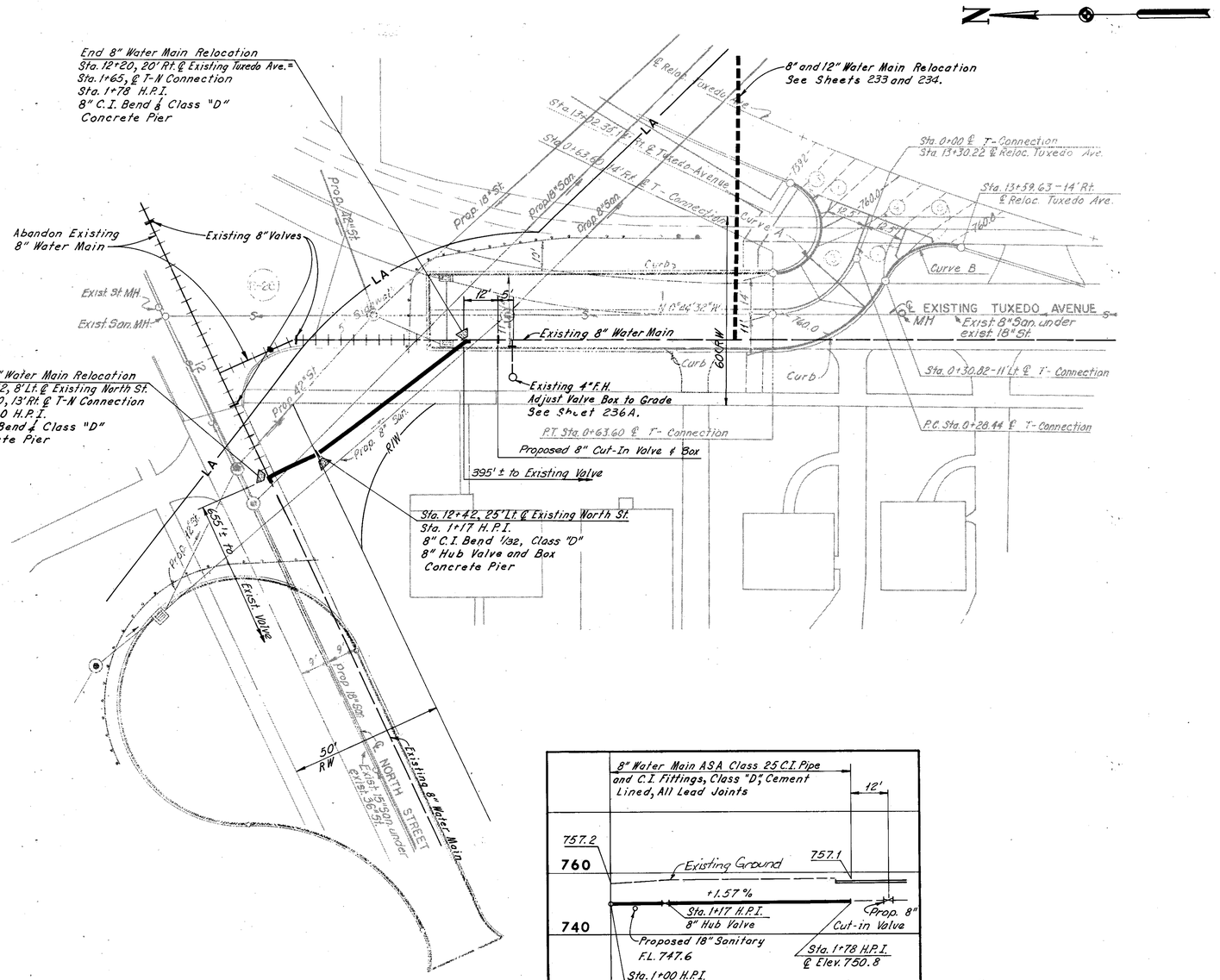
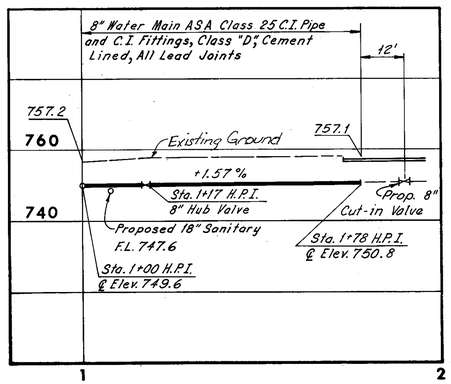
CUYAHOGA COUNTY
CUY.-480-15.81





ESTIMATED QUANTITIES CODE TYPE Y060

ITEM	DESCRIPTION	QUANTITY	UNIT
Special	8" Water Main ASA Class 25 C.I. Pipe and C.I. Fittings,		
	Class "D" Cement Lined All Lead Joints	78	Lin. Ft.
Special	8" Hub Valve (Misc. Metal 179 x 1 = 179 lbs.)	1	Each
Special	8" Cut-In Valve, Complete (" " " ")	1	Each
Special	Miscellaneous Metal Work	358	lbs.

Note:
1. This water work must be installed and in service before adjacent earthwork is begun.
2. The water pipe shall be installed and tested before connection, including proposed 8" Cut-In Valve.
3. Close existing valves and connect new water main. Abandon existing water main.
4. Water Department personnel will close and open all valves.
5. For removal Quantities See Sheet 239.

SCALE 1" = 20'
MADE ERH DATE 6-23-72
TRCD. JSC DATE 6-29-72
CKD. EDH DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
F. R. Melena V. Pres.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
T. E. Stallworth II
COMMISSIONER OF WATER AND HEAT
R. A. Rabas Jr.
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
David J. Hiller
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Wagner
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

8" WATER MAIN RELOCATION – NORTH ST. TO T-CONN.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-480-15.81

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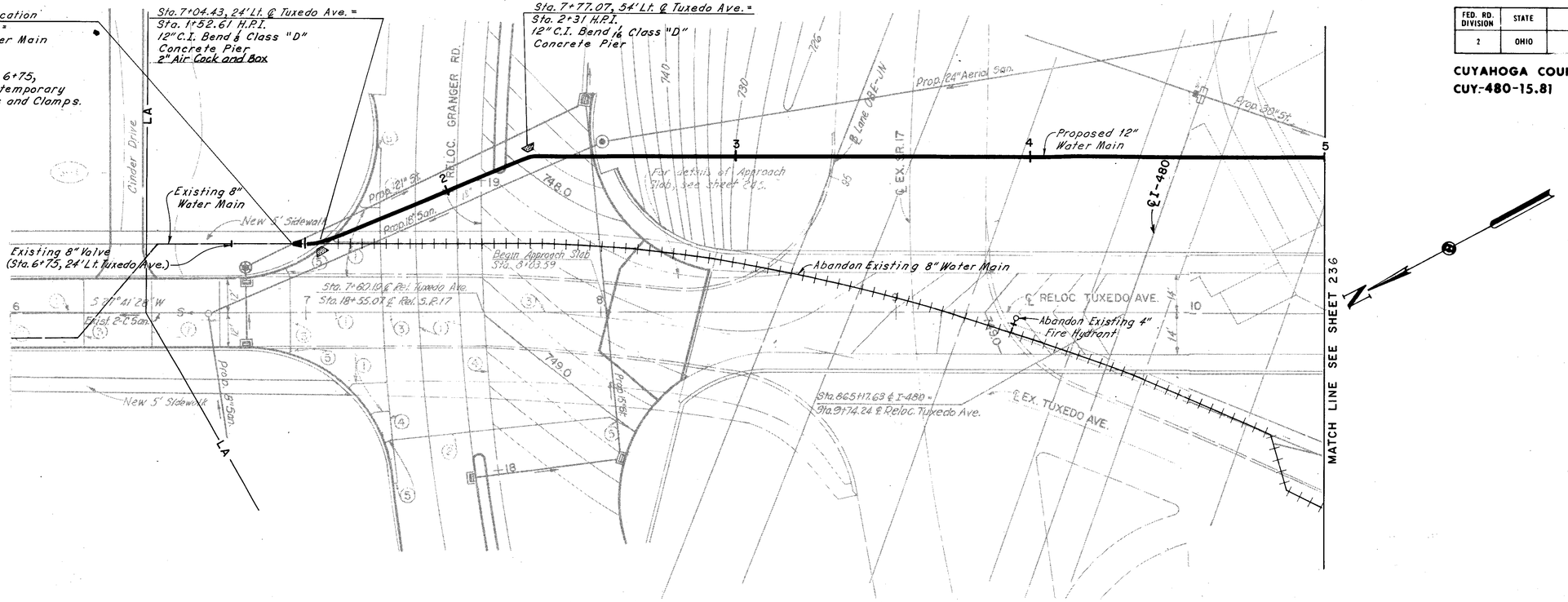
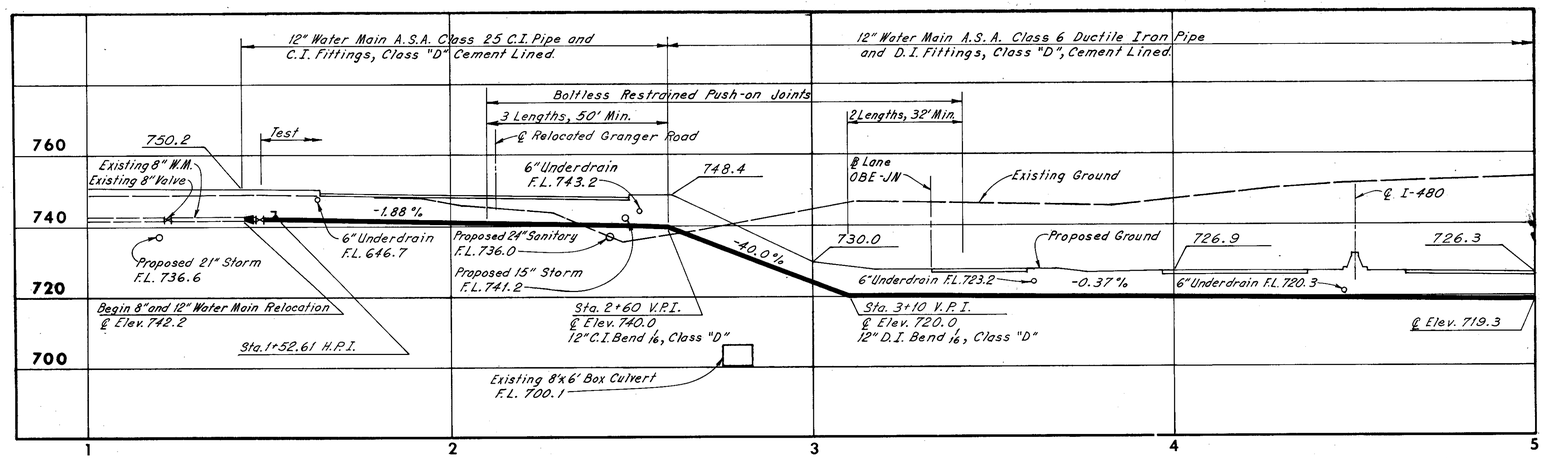
Begin 8" and 12" Water Main Relocation
Sta. 6+95, 24' Lt. ℄ Tuxedo Ave. =
Sta. 1+42.97 ℄ Existing 8" Water Main
12"x8" C.I. Reducer, Class "D"
12" Hub Valve and Box
Close existing 8" Valve at Sta. 6+75,
Cut existing water main and temporary
plug with 8" C.I. Plug and Rods and Clamps.

Sta. 7+04.43, 24' Lt. ℄ Tuxedo Ave. =
Sta. 1+52.61 H.P.I.
12" C.I. Bend ⅛ Class "D"
Concrete Pier
2" Air Cock and Box

Sta. 7+77.07, 54' Lt. ℄ Tuxedo Ave. =
Sta. 2+31 H.P.I.
12" C.I. Bend ⅛ Class "D"
Concrete Pier





Notes:
1. A minimum of 4' cover and a maximum of 10' cover must be in place before water pipe is installed.
2. Water work in T - Connection must be installed and in service before this work is begun. See Sheet 234.
3. Water work Quantities are on Sheet 236.
4. For removal Quantities see Sheet 239.

APPROVED _____ DATE Aug. 30, 1974
F. R. Melena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
ENGINEER OF DESIGN REVIEW

SCALE 1" = 20'
MADE ERH DATE 6-23-72
TRCD. J.S.C. DATE 6-30-72
CKD. ERH DATE 8-27-74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEER'S
KANSAS CITY CLEVELAND NEW YORK

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

8" AND 12" WATER MAIN RELOCATION - RELOCATED TUXEDO AVENUE Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

CUYAHOGA COUNTY
CUY.-480-15.81

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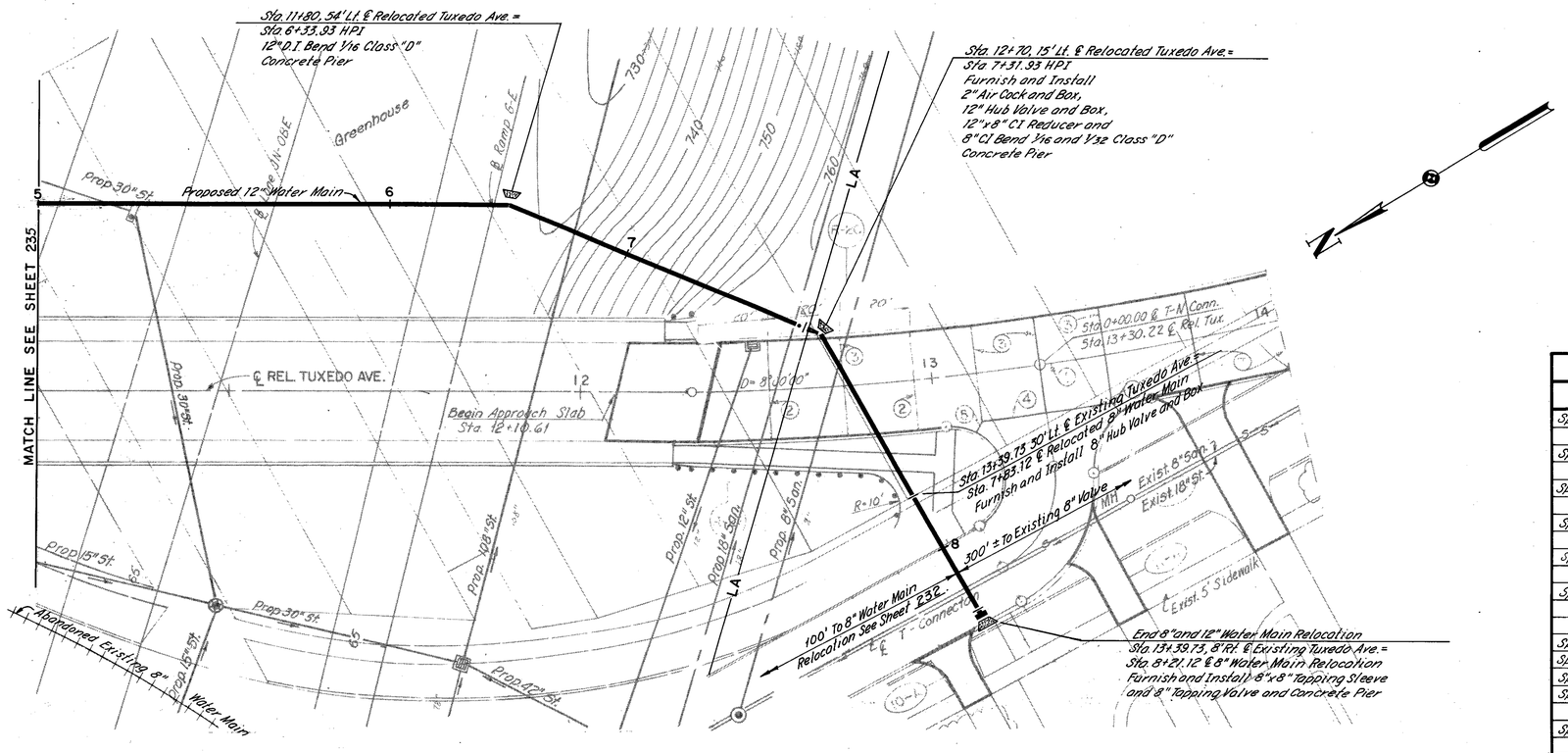

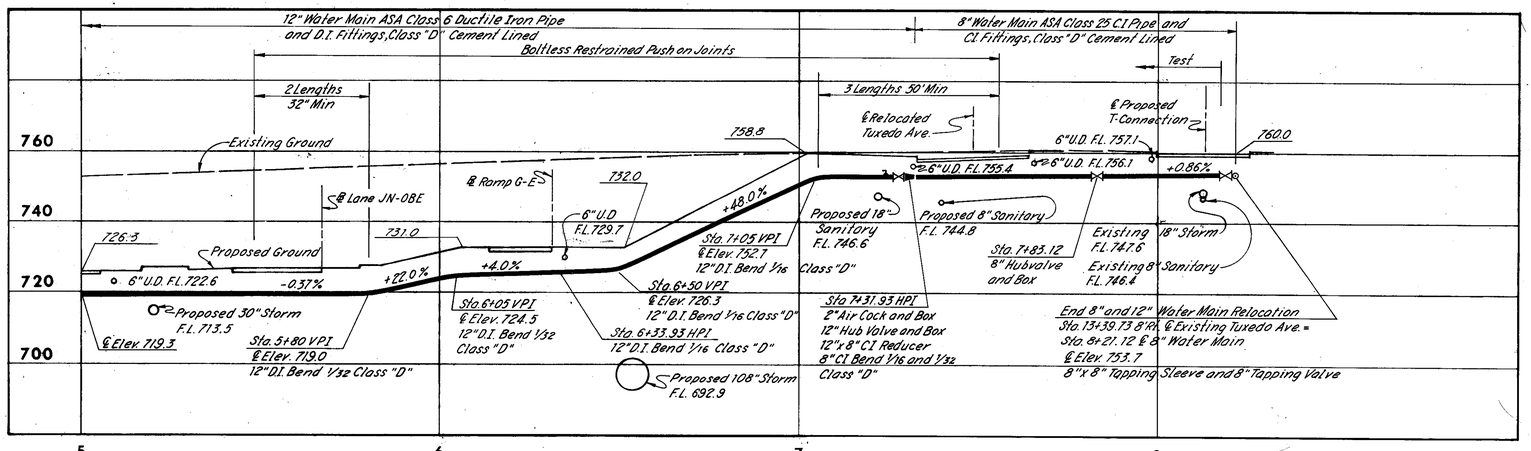

ESTIMATED QUANTITIES CODE TYPE Y060

ITEM	DESCRIPTION	QUANTITY	UNIT
Special	12" Water Main ASA Class 25 CI. Pipe and C.I. Fittings, Class "D",		
	Cement Lined.	67	Lin. Ft.
Special	12" Water Main ASA Class 25 C.I. Pipe and C.I. Fittings, Class "D",		
	Cement Lined, Boltless Restrained Push-on Joints.	50	Lin Ft.
Special	12" Water Main ASA Class 6 D.I Pipe and D.I. Fittings, Class "D",		
	Cement Lined.	206	Lin. Ft.
Special	12" Water Main ASA Class 6 D.I Pipe and D.I. Fittings, Class "D"		
	Cement Lined, Boltless Restrained Push-on Joints.	275	Lin. Ft.
Special	8" Water Main ASA Class 25 C.I. Pipe and C.I Fittings, Class "D",		
	Cement Lined.	66	Lin. Ft.
Special	8" Water Main ASA Class 25 C.I. Pipe and C.I. Fittings, Class "D",		
	Cement Lined, Boltless Restrained Push-on Joints.	25	Lin. Ft.
Special	2" Air Cock Complete (2 x 291 Lbs. = 582 - Misc. Metal)	2	Each
Special	12" Hub Valve (Misc. Metal = 374 lbs.)	2	Each
Special	8" Hub Valve (Misc. Metal = 179 lbs.)	1	Each
Special	8"x8" Tapping Sleeve and 8" Tapping Valve, Complete (Misc. Metal = 179 lbs.)	1	Each
Special	Temporary 8" C.I. Plug with Rods and Clamps	1	Each
Special	Miscellaneous Metal Work	1314	Lbs.

NOTE: 1. The 8" Water Main Relocation in T-Connection must be installed and in service before this work is begun. See Sheet 234.
2. The Existing 8" Water Main in Existing Tuxedo Ave. from Sta. 6+95 to Sta. 12+30 shall be closed during construction of Relocated Tuxedo Ave.
3. For Removal Quantities see Sheet 239.

SCALE 1"=20'
MADE ERH DATE 6-26-72
TRCD. TAF DATE 7-10-72
CKD. ERH DATE 8-27-74

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

APPROVED _____ DATE Aug. 30, 1974
F. P. Molena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William Schuerer
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: **WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS**

Rev. 10-16-74

8" AND 12" WATER MAIN RELOCATION — RELOCATED TUXEDO AVENUE

KAE-19-1253 10-71

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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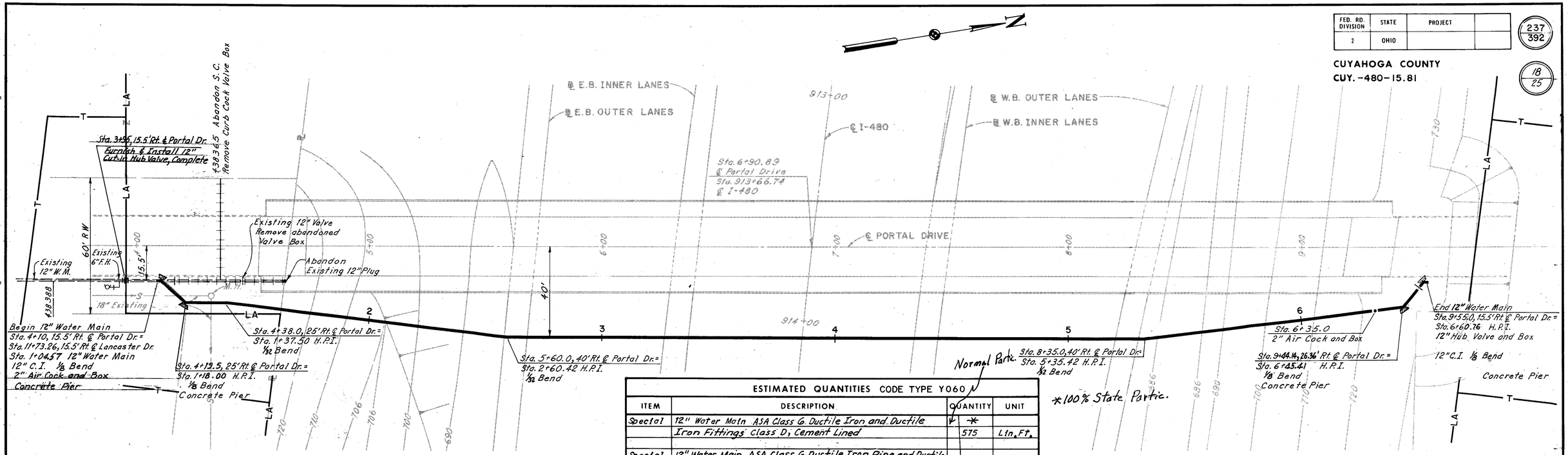
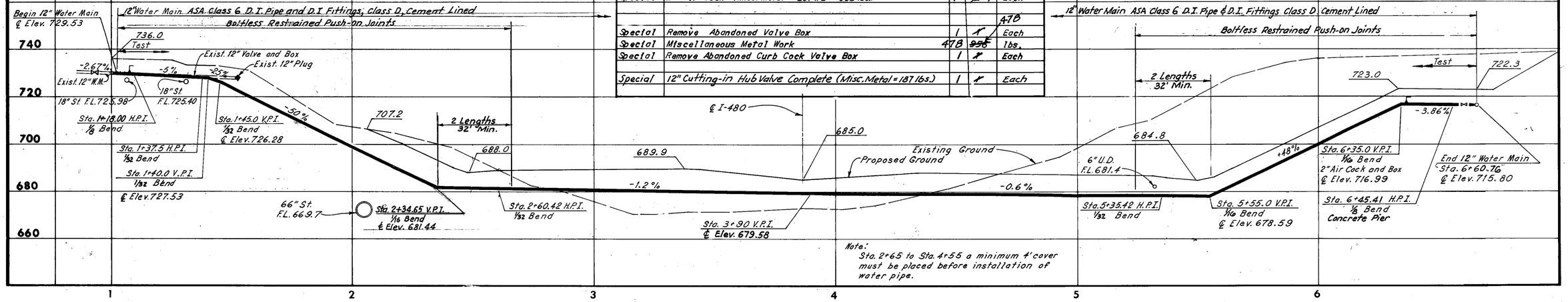
CUYAHOGA COUNTY
CUY.-480-15.81



ESTIMATED QUANTITIES CODE TYPE Y060

ITEM	DESCRIPTION	QUANTITY		UNIT
Special	12" Water Main ASA Class 6 Ductile Iron and Ductile Iron Fittings Class D, Cement Lined		575	Lin. Ft.
Special	12" Water Main ASA Class 6 Ductile Iron Pipe and Ductile Iron Fittings Class D, Cement Lined, Boltless Restrained Push-on Joints		320	Lin. Ft.
Special	12" Hub Valve (Misc. Metal = 187 lbs)		1	Each
Special	2" Air Cock (Misc. Metal = 291 x 2 = 582 lbs.)	1	1	Each
			478	
Special	Remove Abandoned Valve Box	1	1	Each
Special	Miscellaneous Metal Work	478	956	lbs.
Special	Remove Abandoned Curb Cock Valve Box	1	1	Each
Special	12" Cutting-in Hub Valve Complete (Misc. Metal = 187 lbs.)	1	1	Each



Note:
Sta. 2+65 to Sta. 4+55 a minimum 4' cover must be placed before installation of water pipe.

APPROVED J. P. Molena DATE Aug. 30, 1974
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

SCALE 1"=20' MADE EPH DATE 6-8-72 TRCD JSG DATE 7-18-72 CKD. ERH DATE 8-27-74
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

Rev. 12-6-74 A.W.G. Rev. 10-16-74

12" WATER MAIN UNDER I-480 AT PORTAL DRIVE

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

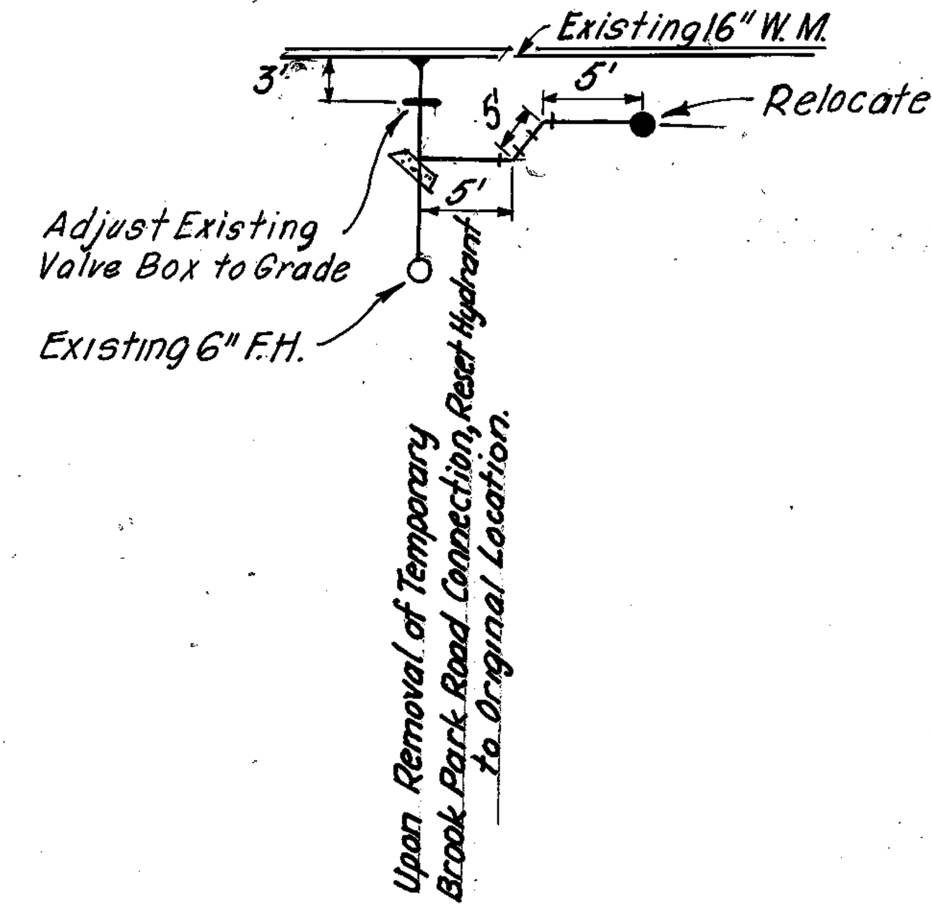
238
392

CUYAHOGA COUNTY
CUY.480 - 15.81

19
25

Relocate and Reset Existing 6" Fire Hydrant complete with 1 - 1/4 Bend, 2 - 1/8 Bends, 15 Lin. Ft. - 6" Class 25 C.I. Pipe, All Lead Joints, Class "D" Concrete Pier. Face of hydrant should be three (3) feet behind new pavement.

Clamp and tie existing valve before closing valve and relocating hydrant. Adjust valve box to grade.



ESTIMATED QUANTITIES CODE TYPE YO60			
ITEM	DESCRIPTION	QUANTITY	UNIT
Special	6" Water Main ASA Class 25 Cast Iron Pipe and C.I. Fittings		
	Class "D" All Joints Cement Lined	30	Lin. Ft.
Special	6" Fire Hydrant Relocated	3	Each
Special	4" Fire Hydrant Removed	1	Each
Special	Adjust Valve Box to Grade	2	Each
Special	Service Connection Relocated and Water Meter Relocated	1	Each
Special	Remove Abandoned Curb Cock Valve Box	7	Each
Special	Plugging Water Mains and Branches (4")	1	Each
Special	Plugging Service Connection at Main	7	Each
202	Manhole Abandoned (Meter Vault)	3	Each

SCALE 1" = 50'
MADE ERH DATE 5/26/70
TRCD. HLD DATE 5/26/70
CKD. ERH DATE 8-27-74

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

APPROVED F. R. Melena R.E.L. DATE Aug. 30, 1974
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

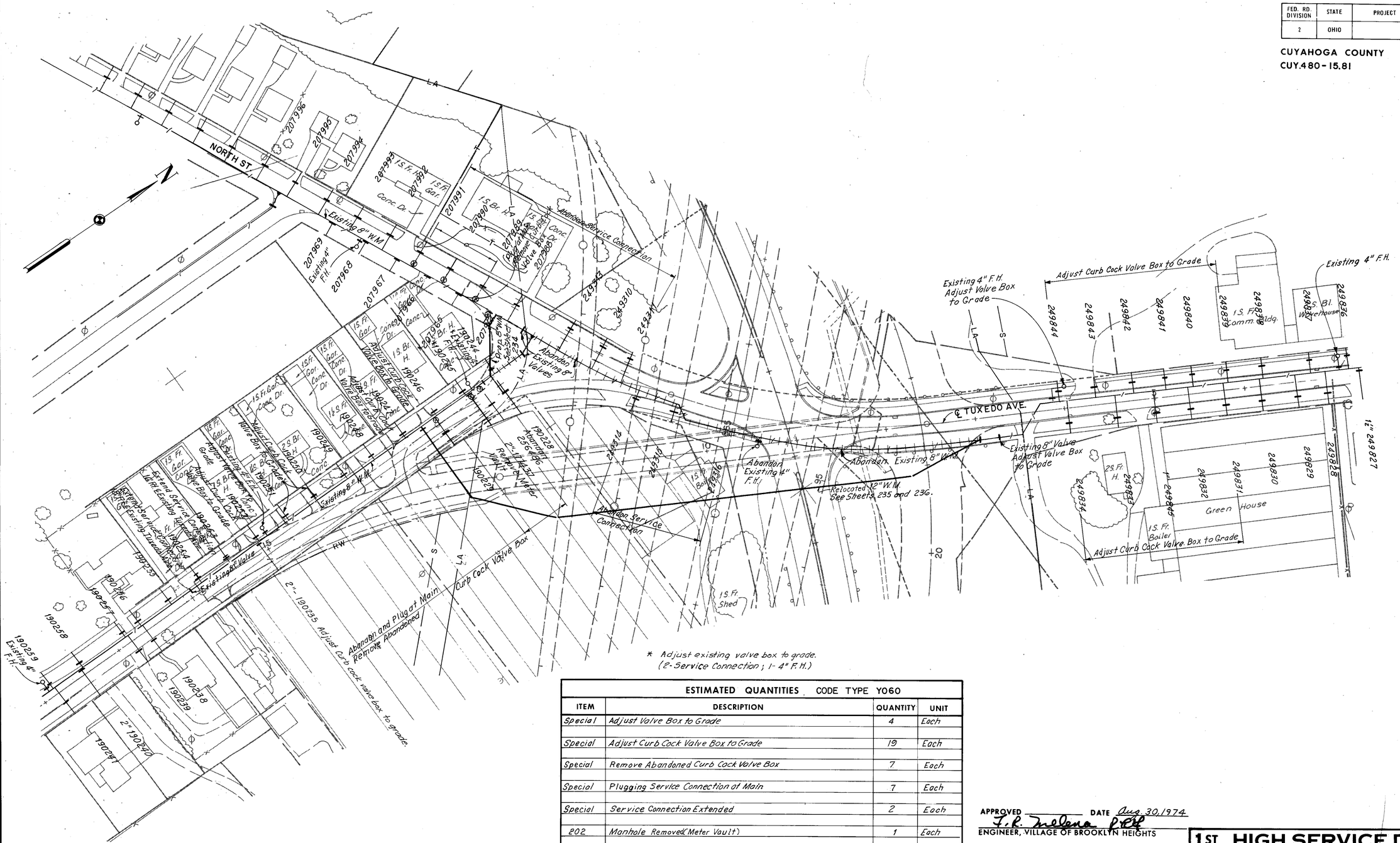
Rev. 10-16-74 WATERWORK PLAN - BROOKPARK RD. AND GRANGER RD.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

239
392

20
25

CUYAHOGA COUNTY
CUY.480-15.81



* Adjust existing valve box to grade.
(2-Service Connection; 1-4" F.H.)

ESTIMATED QUANTITIES CODE TYPE Y060

ITEM	DESCRIPTION	QUANTITY	UNIT
Special	Adjust Valve Box to Grade	4	Each
Special	Adjust Curb Cock Valve Box to Grade	19	Each
Special	Remove Abandoned Curb Cock Valve Box	7	Each
Special	Plugging Service Connection of Main	7	Each
Special	Service Connection Extended	2	Each
202	Manhole Removed (Meter Vault)	1	Each

SCALE 1"=50'
MADE ERH DATE 8/26/70
TRCD. HLD DATE 5/28/70
CKD. ERH DATE 8/27/74
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

APPROVED _____ DATE Aug. 30, 1974
F. R. Molena P.R.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
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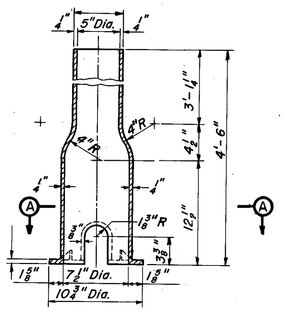
1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

WATERWORK PLAN - TUXEDO AVE. AND NORTH ST.

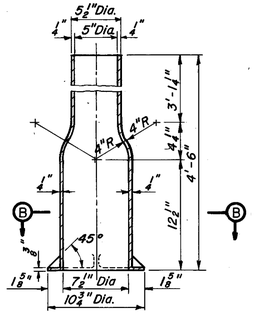


SECTION A-A

BASE NO. 1

For 1½" and 2" Valves

Estimated Weight 69 Lbs.

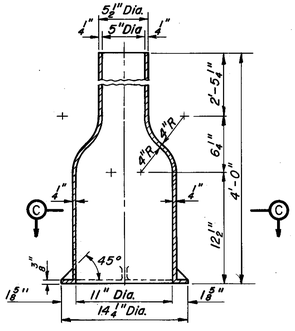


SECTION B-B

BASE NO. 2 AND NO. 3

For 3", 4", 6" and 8" Valves

Estimated Weight 71 Lbs.

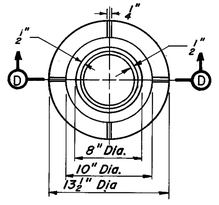


SECTION C-C

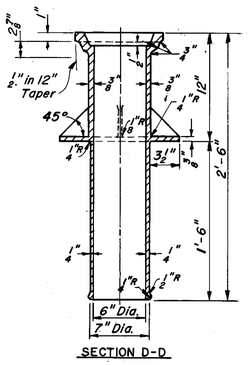
BASE NO. 4

For 10", 12" and 16" Valves

Estimated Weight 79 Lbs.



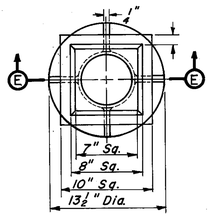
PLAN



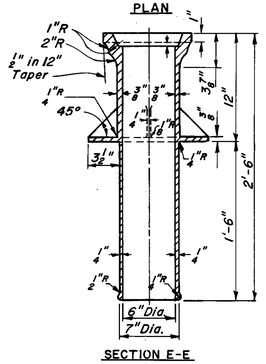
SECTION D-D

TOP WITH ROUND HEAD NO. 1 AND NO. 2

Estimated Weight 73 Lbs.



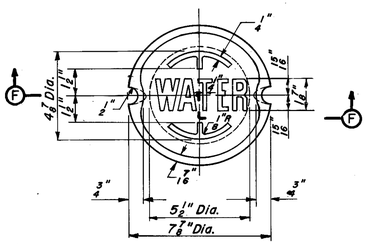
PLAN



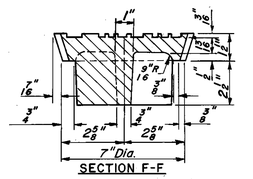
SECTION E-E

TOP WITH SQUARE HEAD NO. 3 AND NO. 4

Estimated Weight 85 Lbs.



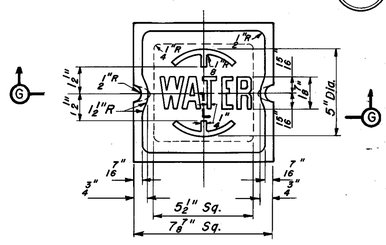
PLAN



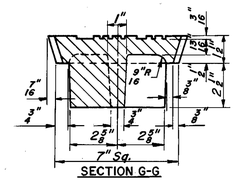
SECTION F-F

ROUND COVER FOR NO. 1 AND NO. 2 TOP

Estimated Weight 20 Lbs.



PLAN



SECTION G-G

SQUARE COVER FOR NO. 3 AND NO. 4 TOP

Estimated Weight 23 Lbs.

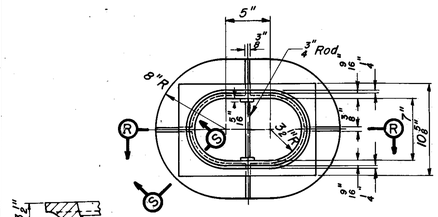
STANDARD DETAILS- VALVE BOXES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

240
392

21
25

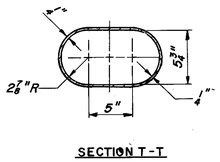
CUYAHOGA COUNTY
CUY. -480-15.81

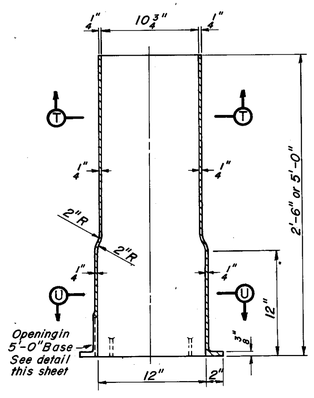


TOP

Estimated Weight 128 Lbs.

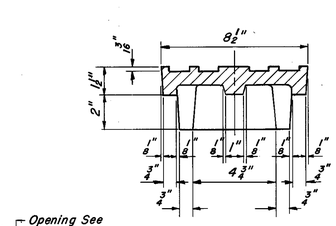
Air Cock Box No. 5 is Top and Cover
Air Cock Box No. 6 is Top Base 2'-6" Long and Cover
Flushing Box No. 7 is Top, Base 5'-0" Long and Cover

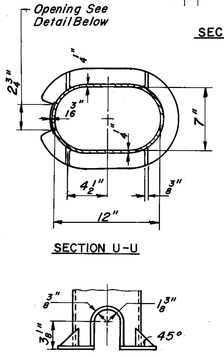




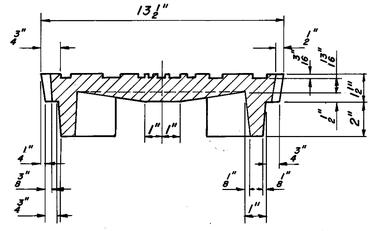
BASE

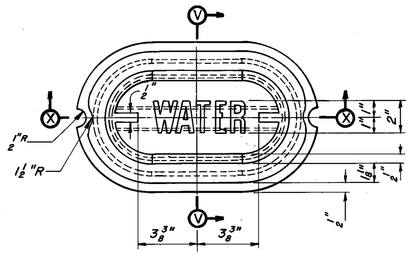
Estimated Weight 2'-6" Long = 70 Lbs.
Estimated Weight 5'-0" Long = 126 Lbs.



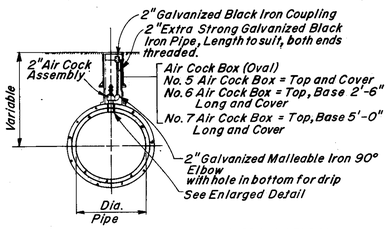


This opening to be in 5'-0" base only.

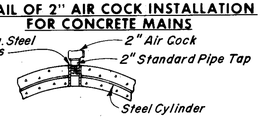




Estimated Weight 37 Lbs.

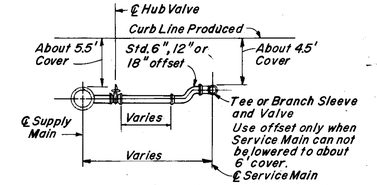


DETAIL OF 2" AIR COCK INSTALLATION FOR CONCRETE MAINS

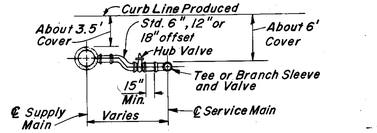


ENLARGED DETAIL SHOWING CONNECTION FOR AIR COCK OR PITOMETER

For cast iron and ductile iron pipe use sprinkler tee and tapped for 2" inside diameter standard thread.



Typical offset connection where supply main is lower than service main.



Typical offset connection where supply main is higher than service main.

TYPICAL OFFSET CONNECTIONS

STANDARD DETAILS- AIR COCK BOXES

STANDARD DETAILS- AIR COCK AND CONNECTIONS FOR VARIOUS PIPE

APPROVED F. R. Melena DATE Aug. 30, 1974

ENGINEER, VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS

William J. Lucerne

ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

SCALE No Scale MADE ERH DATE 3-19-71 TRCD. HLD DATE 3-10-71 CKD. ERH DATE 3-22-71

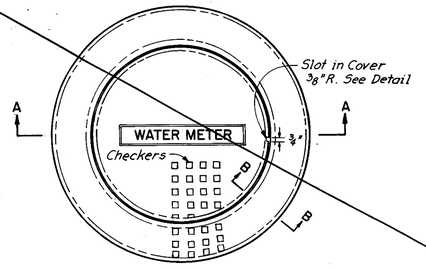
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

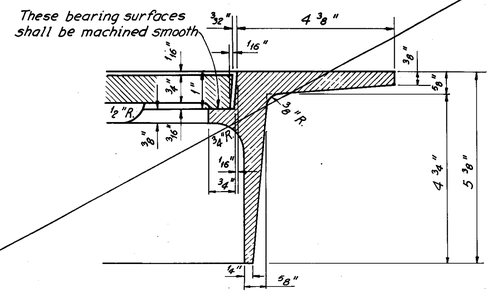
242
392

23
25

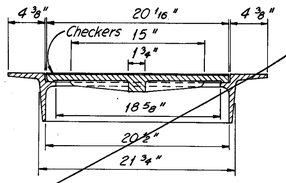
CUYAHOGA COUNTY
CUY. 480-15.81



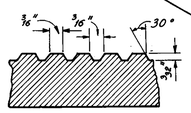
PLAN



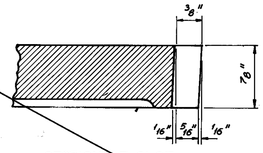
SECTION B-B



SECTION A-A

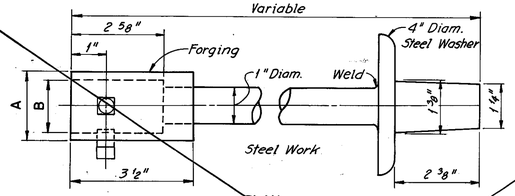


SECTION OF CHECKERS

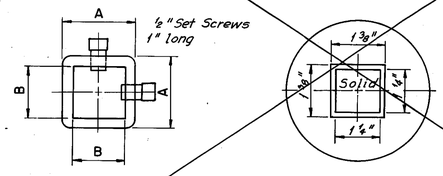


SECTION AT SLOT

MANHOLE FRAME AND COVER MARK NO. 2



PLAN

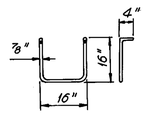


BOTTOM VIEW TOP VIEW

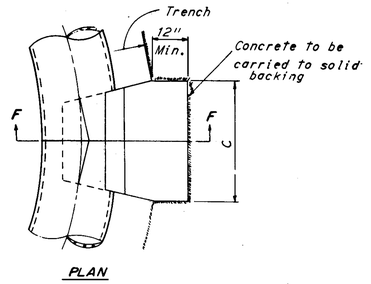
Note: Valve Nuts to be Countersunk 1/8" to receive Set Screws.

VALVE SIZE	A	B
2" and smaller	2"	1 1/2"
4" to 20"	2 1/2"	2"

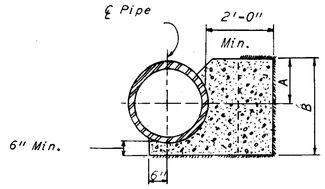
VALVE EXTENSION STEM



MANHOLE STEP



PLAN

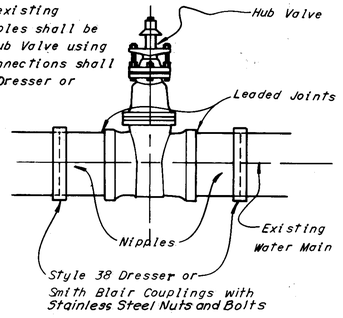


SECTION F-F

Size	Angle	A	B	C
6"℄8"		0'-4"	1'-6"	2'-0"
12"		1'-0"	2'-0"	2'-0"
16"	1/16	0'-10"	2'-0"	3'-0"
16"	Tee ℄ 1/8	1'-3"	3'-0"	4'-0"

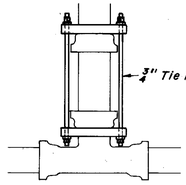
CONCRETE PIER FOR HORIZONTAL BENDS AND BRANCH TEES

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.



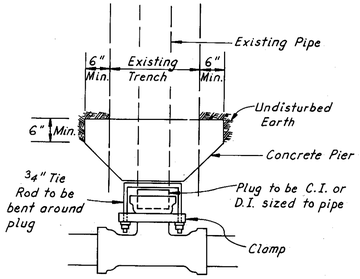
DETAIL OF CUTTING IN VALVE

NO SCALE



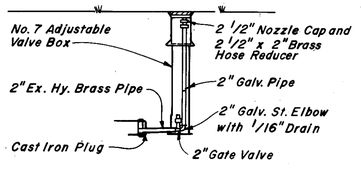
SOCKET CLAMPS WITH TIE RODS

No Scale



PLUGGING WATER MAINS AND BRANCHES

NO SCALE



FLUSHING PIPE

NO SCALE

APPROVED _____ DATE Aug 30, 1974
F. R. Milena P.E.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

SCALE No Scale
MADE ERH DATE 3-20-71
TRCD. HLD DATE 5-11-71
CKD. ERH DATE 5-27-74

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

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

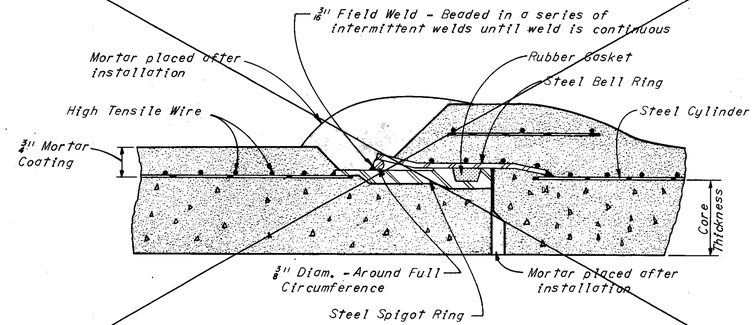
Rev. 10-16-74 MISCELLANEOUS WATERWORK DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

243
392

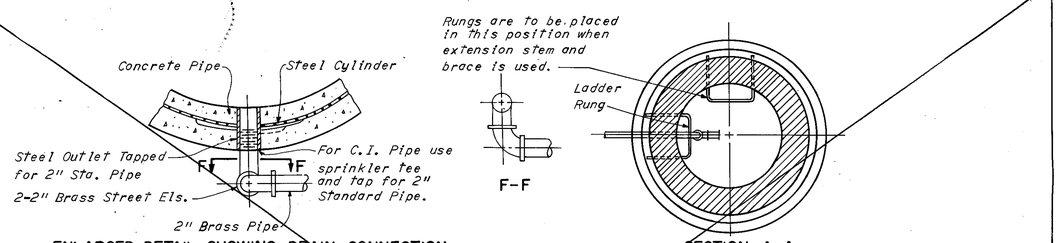
CUYAHOGA COUNTY
CUY. 480-15.81

24
25



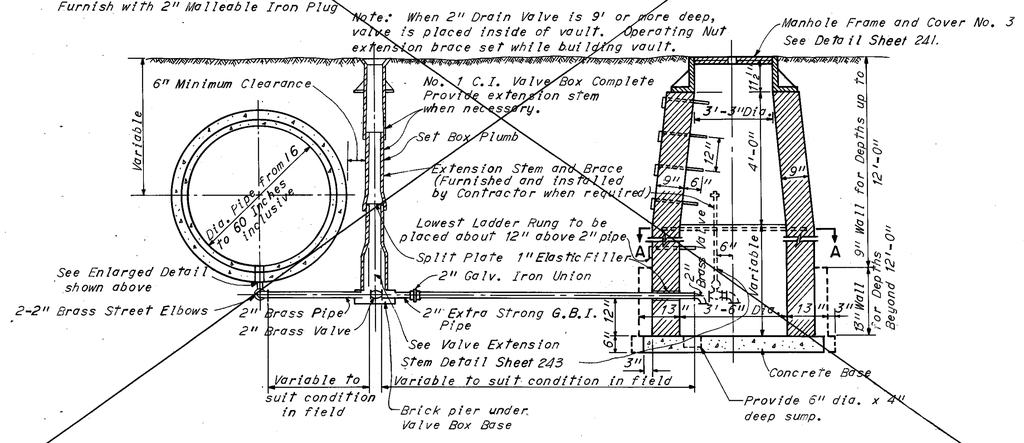
Prestressed Concrete Cylinder Pipe with rubber and steel joint showing welded type tied joint.
(Same type of weld for Reinforced Concrete Cylinder Pipe)

DETAIL "Y"



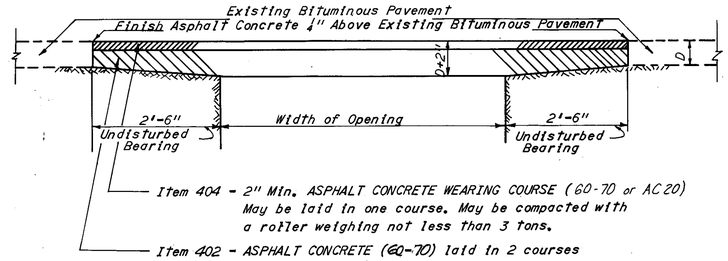
ENLARGED DETAIL SHOWING DRAIN CONNECTION
Furnish with 2" Malleable Iron Plug

SECTION A-A

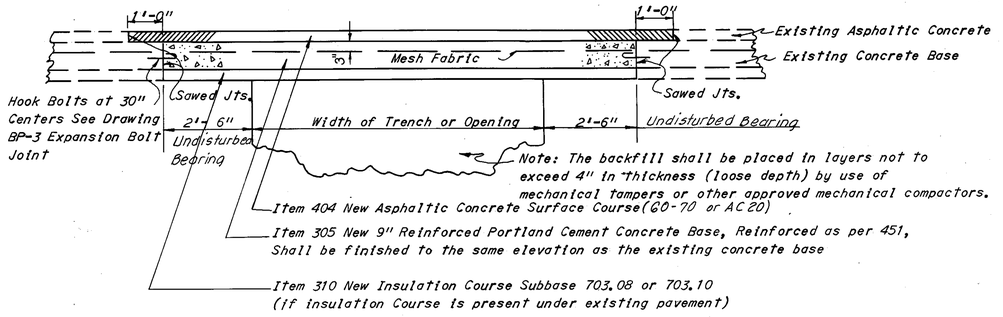


DETAIL OF 2" DRAIN AND DRAIN VAULT

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



REPAIR OF FLEXIBLE PAVEMENT OPENINGS



Note:
This Standard is applicable to existing concrete pavement or existing pavement with concrete base surfaced with asphalt.

Existing joints shall be preserved or restored

REPAIR OF RIGID PAVEMENT OPENINGS

PAVEMENT RESTORATION DETAILS

APPROVED _____ DATE Aug 30, 1974
F. R. Melena P.E.S.
ENGINEER, VILLAGE OF BROOKLYN HEIGHTS
DIRECTOR OF PUBLIC UTILITIES
COMMISSIONER OF WATER AND HEAT
COMMISSIONER DIVISION OF UTILITIES ENGINEERING
ENGINEER OF CONSTRUCTION AND SURVEYS
William J. Sweeney
ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT
DEPARTMENT OF PUBLIC UTILITES
DIVISION OF WATER AND HEAT
CLEVELAND, OHIO
Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

SCALE As Shown
MADE ERH DATE 7-5-72
TRCD. GT DATE 7-6-72
CKD. ERH DATE 8-27-72

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

Rev. 10-16-74

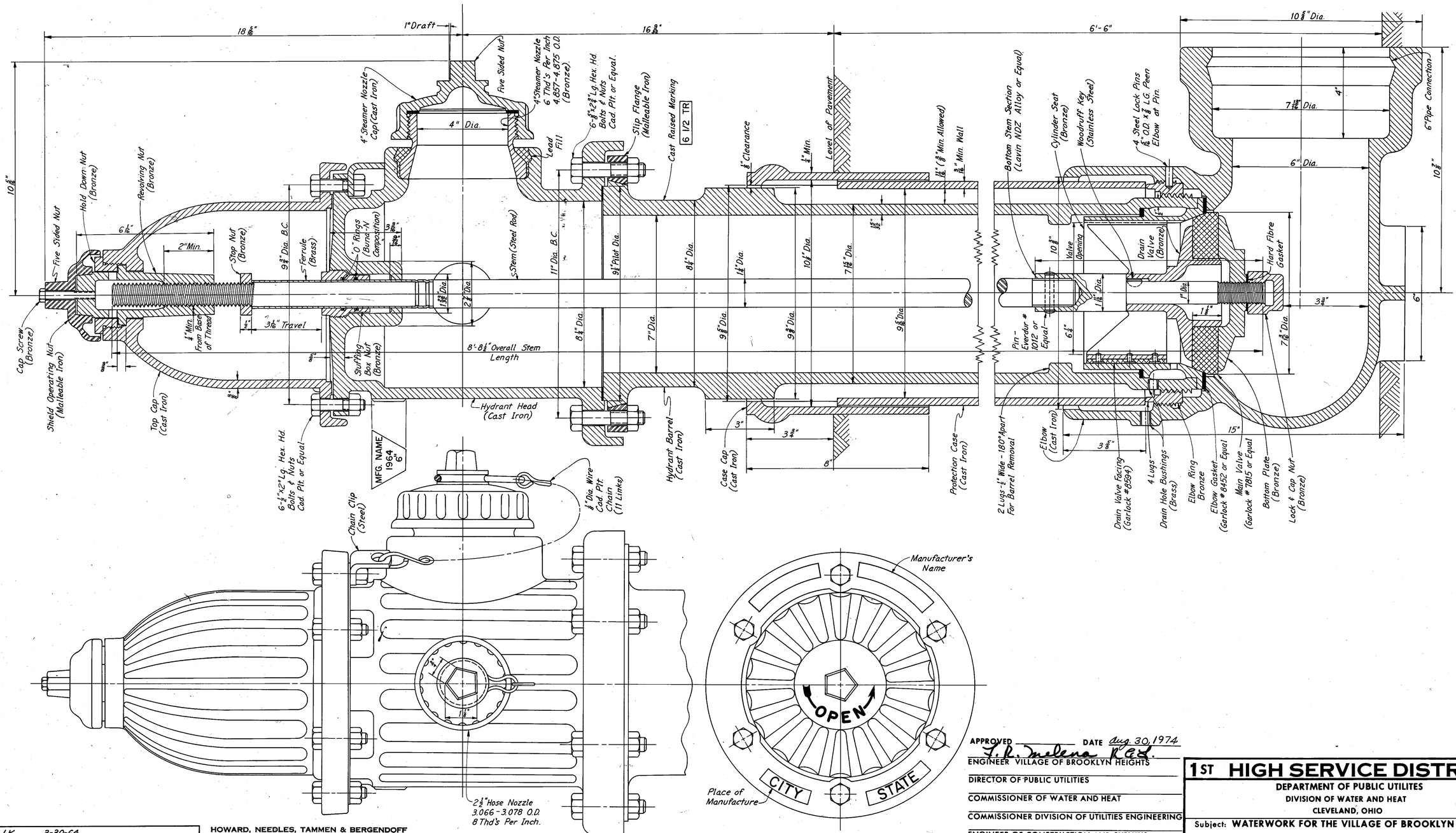
MISCELLANEOUS WATERWORK DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

244
392

25
25

CUYAHOGA COUNTY
CUY 480-15.81



APPROVED _____ DATE Aug. 30, 1974

ENGINEER VILLAGE OF BROOKLYN HEIGHTS

DIRECTOR OF PUBLIC UTILITIES

COMMISSIONER OF WATER AND HEAT

COMMISSIONER DIVISION OF UTILITIES ENGINEERING

ENGINEER OF CONSTRUCTION AND SURVEYS
William Lawrence

ENGINEER OF DESIGN REVIEW

1ST HIGH SERVICE DISTRICT

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

Subject: WATERWORK FOR THE VILLAGE OF BROOKLYN HEIGHTS

MADE R.J.K. DATE 3-30-64 TRACED _____ DATE _____
CHECKED EDH DATE 8-27-74 SCALE _____

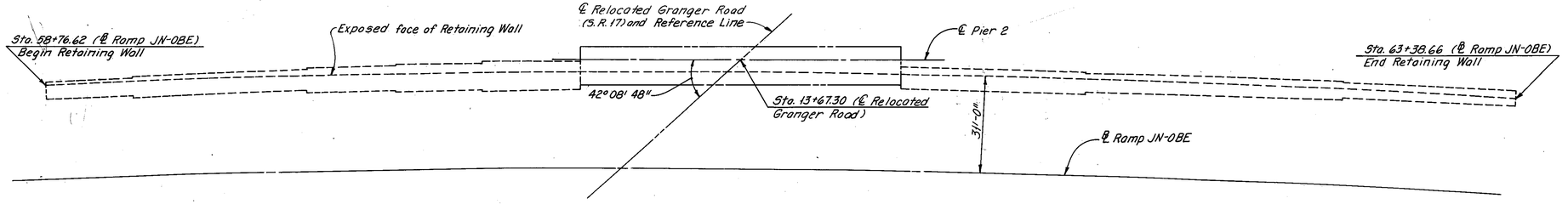
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

6" FIRE HYDRANT - WATERWORK DETAIL

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

245
392

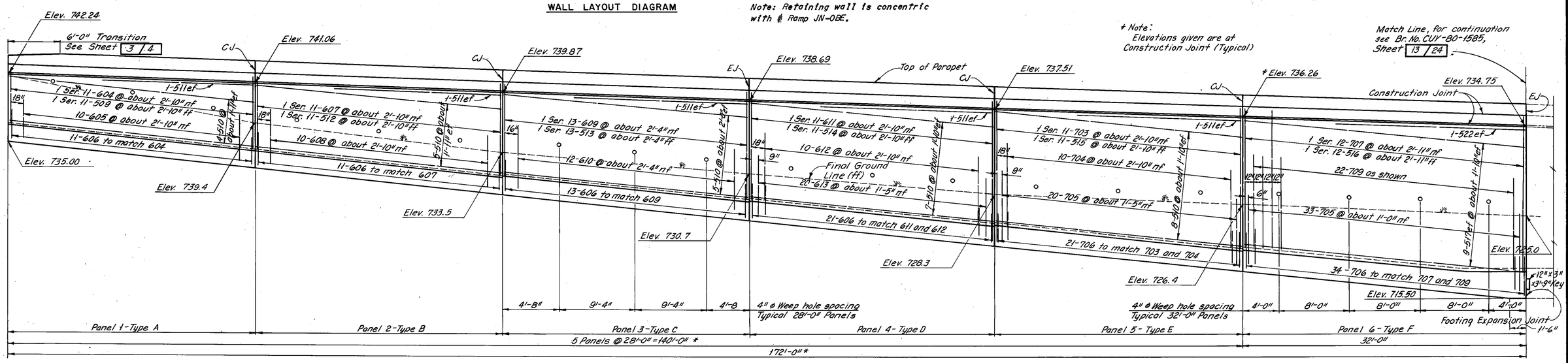
CUYAHOGA COUNTY
CUY-80-15.81



WALL LAYOUT DIAGRAM

Note: Retaining wall is concentric with ℄ Ramp JN-OBE.

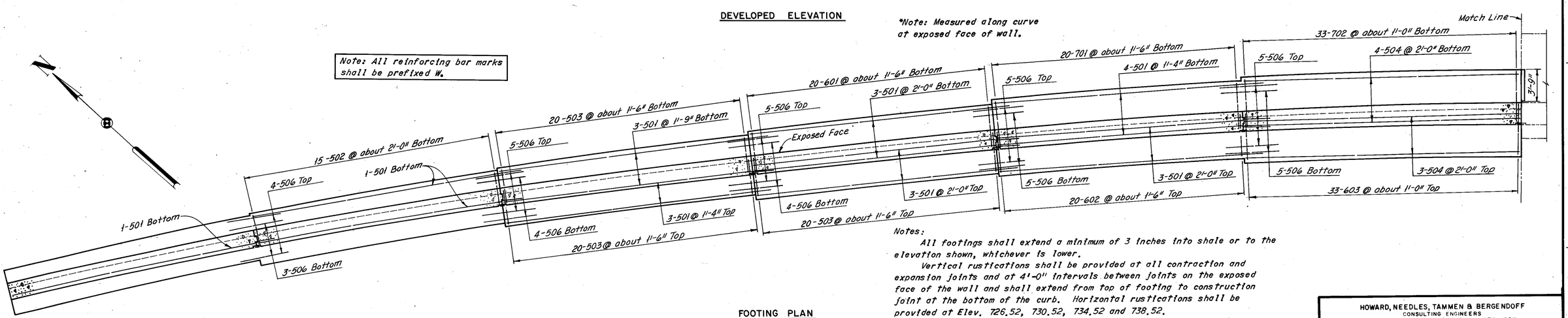
* Note: Elevations given are at Construction Joint (Typical)



DEVELOPED ELEVATION

*Note: Measured along curve at exposed face of wall.

Note: All reinforcing bar marks shall be prefixed W.



FOOTING PLAN

Notes:

All footings shall extend a minimum of 3 inches into shale or to the elevation shown, whichever is lower.

Vertical rustications shall be provided at all contraction and expansion joints and at 4'-0" intervals between joints on the exposed face of the wall and shall extend from top of footing to construction joint at the bottom of the curb. Horizontal rustications shall be provided at Elev. 726.52, 730.52, 734.52 and 738.52.

Location of construction joints in the footing are optional.

For Rustication and Striation Details see Sheet 10/24 Br. No. Cuy-80-1585.

For Joint Details see Sheet 2/4.

For wall sections, parapet reinforcement and parapet transition details see Sheet 3/4.

For reinforcement schedule see Sheet 4/4.

The following abbreviations are used:

CJ = Contraction Joint (Above footing)
EJ = Expansion Joint (Above footing)
nf = near face (South face)
ff = far face (North face)
ef = each face

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

RETAINING WALL NORTH OF RAMP JN-OBE

STA. 58+76.62 TO STA. 63+38.66

CUYAHOGA COUNTY OHIO

DRAWN LJW	TRACED WB	CHECKED JT	REVIEWED	REVISED
DATE 5-18-10	DATE 5-22-10	DATE 6-3-10	DATE	SHEET 1/4

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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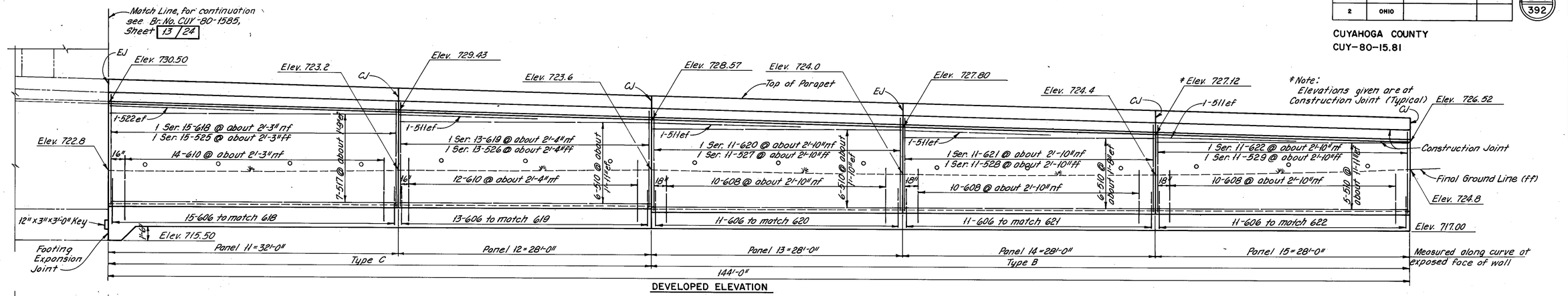
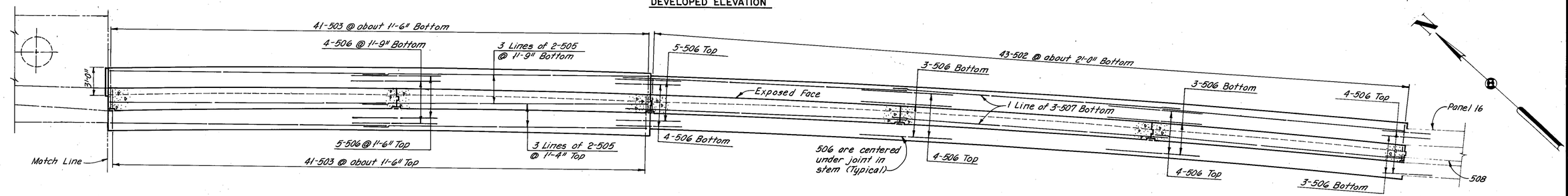
392

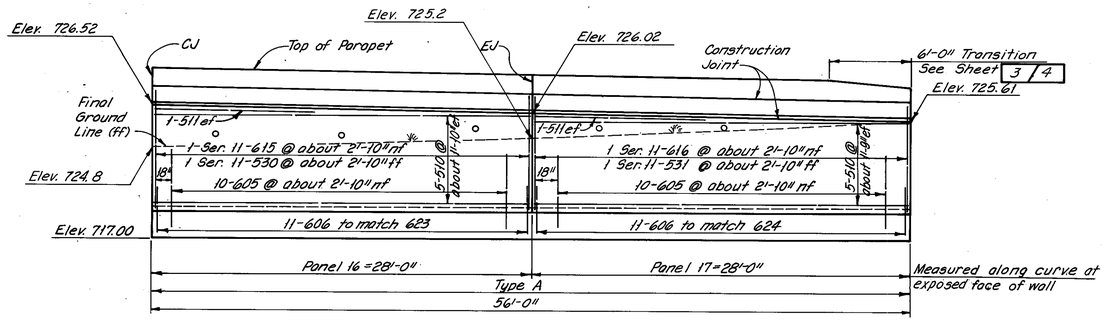
CUYAHOGA COUNTY
CUY-80-15.81



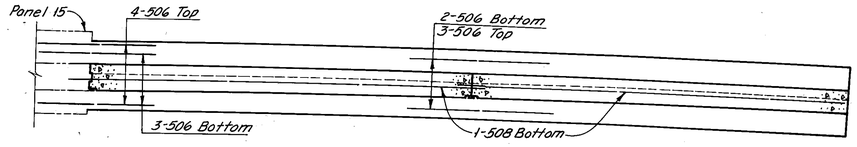
DEVELOPED ELEVATION



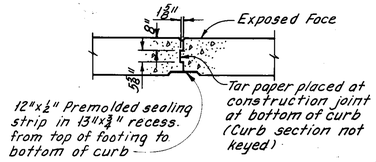
FOOTING PLAN



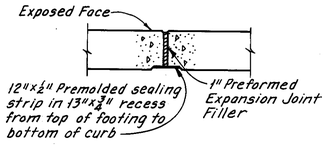
DEVELOPED ELEVATION



FOOTING PLAN



CONTRACTION JOINT DETAIL
(Reinforcement not shown)



EXPANSION JOINT DETAIL
(Reinforcement not shown)

Note: All reinforcing bar marks shall be prefixed W.

Notes:
For wall location see Layout Diagram, Sheet 1/4.
For wall sections, footing step detail, parapet reinforcement, and parapet transition details, see Sheet 3/4.
For additional notes, see Sheet 1/4.

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

RETAINING WALL
NORTH OF RAMP JN-OBE

STA. 58+76.62 TO
STA. 63+38.66

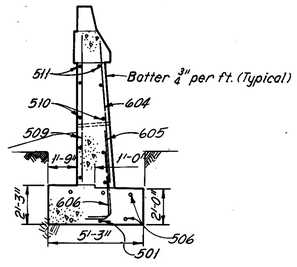
CUYAHOGA COUNTY OHIO

DRAWN L.J.W.	TRACED W.B.	CHECKED J.T.	REVIEWED	REVISED
DATE 5-18-70	DATE 5-26-70	DATE 6-3-70	DATE	SHEET 2/4

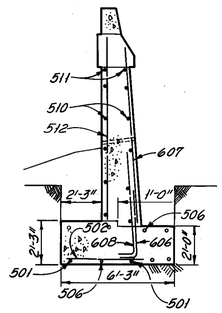
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

247
392

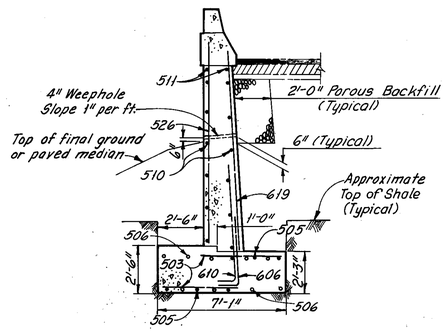
CUYAHOGA COUNTY
CUY-80-15.81



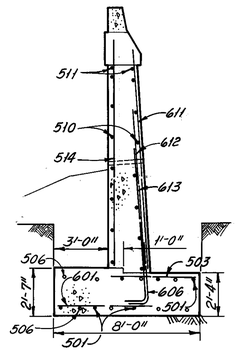
TYPE "A"
(Panel 1 Shown)



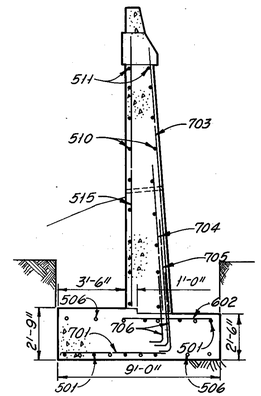
TYPE "B"
(Panel 2 Shown)



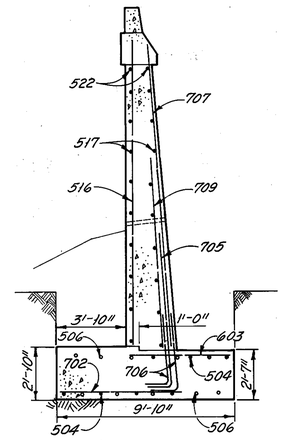
TYPE "C"
(Panel 12 Shown)



TYPE "D"
(Panel 4 Shown)

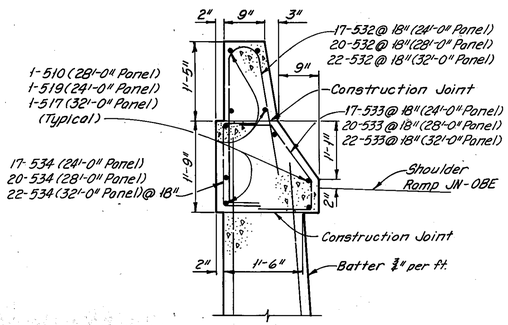


TYPE "E"
(Panel 5 Shown)

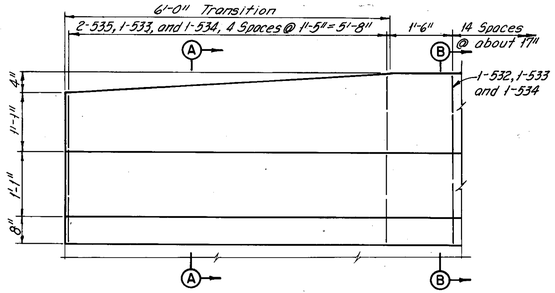


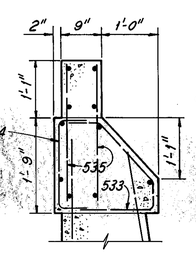
TYPE "F"
(Panel 6 Shown)

WALL SECTIONS

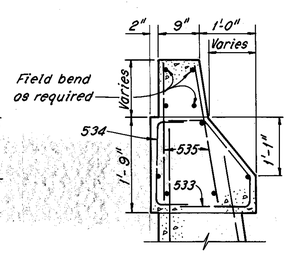


SECTION B-B
(Parapet reinforcement typical except in transitions)



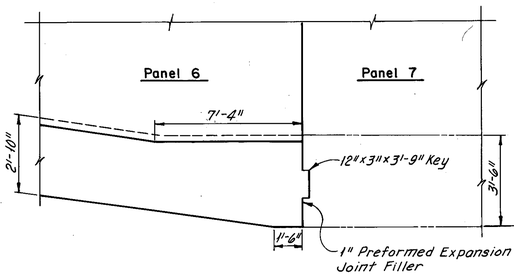


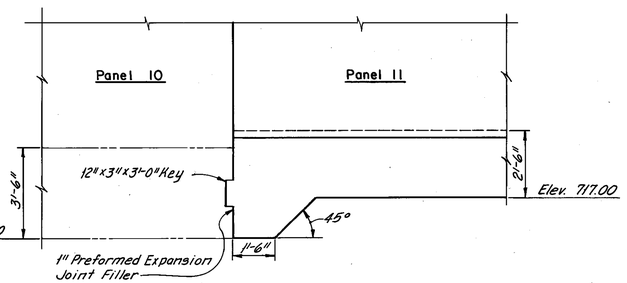
END VIEW

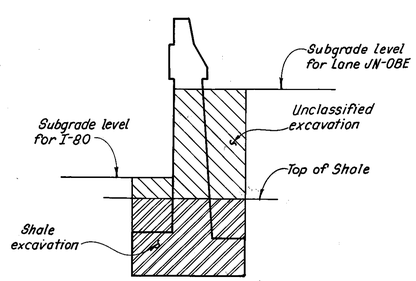


SECTION A-A

PARAPET TRANSITION DETAILS
(Typical at end of wall)







TYPICAL SECTION USED TO
DETERMINE EXCAVATION QUANTITIES

FOOTING STEP DETAILS

Notes:
Excavation for Panels 7 thru 10 is included with Pier 2 quantities, Br. No. CUY-80-1585 for payment.
For additional notes see Sheet 1/4.

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

RETAINING WALL
NORTH OF RAMP JN-OBE

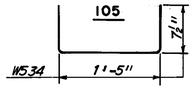
STA. 58+76.62 TO
STA. 63+38.66

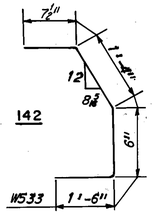
CUYAHOGA COUNTY OHIO

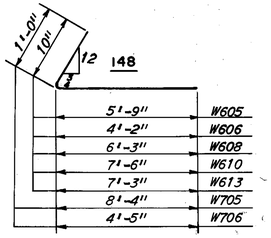
DRAWN JW	TRACED WB	CHECKED JT	REVIEWED	REVISED
DATE 5-18-70	DATE 5-28-70	DATE 6-3-70	DATE	SHEET 3/4

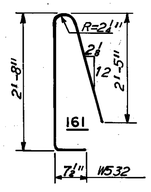
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)	MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
W501	22	30'-0"	Str.		688						
W502	58	4'-3"	Str.		257						
W503	142	4'-6"	Str.		666						
W504	7	31'-6"	Str.		230						
W505	12	30'-6"	Str.		382						
W506	89	10'-0"	Str.		928						
W507	6	29'-9"	Str.		186						
W508	2	29'-6"	Str.		62						
W509	1 Ser. 11	6'-6" 8'-6"	Str.	2 3/8"	86						
W510	286	27'-6"	Str.		8203						
W511	26	19'-0"	Str.		515						
W512	1 Ser. 11	8'-6" 10'-6"	Str.	2 3/8"	109						
W513	1 Ser. 13	10'-3" 12'-3"	Str.	2"	153						
W514	1 Ser. 11	12'-3" 14'-3"	Str.	2 3/8"	152						
W515	1 Ser. 11	14'-0" 15'-9"	Str.	2 3/8"	171						
W516	1 Ser. 12	15'-9" 18'-3"	Str.	2 3/8"	213						
W517	52	31'-9"	Str.		1722						
W518	1 Ser. 9	17'-3" 16'-0"	Str.	1 7/8"	156						
W519	52	23'-6"	Str.		1275						
W520	1 Ser. 11	16'-0" 13'-0"	Str.	1 3/8"	178						
W521	4	15'-0"	Str.		63						
W522	4	23'-0"	Str.		96						
W523	1 Ser. 11	15'-0" 13'-9"	Str.	1 1/2"	165						
W524	1 Ser. 9	13'-9" 13'-0"	Str.	1 1/2"	126						
W525	1 Ser. 15	12'-6" 11'-6"	Str.	7/8"	188						
W526	1 Ser. 13	11'-6" 10'-6"	Str.	1"	149						
W527	1 Ser. 11	10'-9" 10'-0"	Str.	7/8"	119						
W528	1 Ser. 11	10'-0" 9'-6"	Str.	3/4"	112						
W529	1 Ser. 11	9'-6" 8'-9"	Str.	7/8"	104						
W530	1 Ser. 11	8'-9" 8'-3"	Str.	3/4"	98						
W531	1 Ser. 11	8'-3" 8'-0"	Str.	3/8"	93						
W532	338	5'-7"	161		1968						
W533	338	3'-10"	142		1351						
W534	338	2'-5"	105		852						
W535	20	2'-3"	Str.		47						
W601	20	4'-9"	Str.		143						
W602	20	5'-6"	Str.		165						
W603	* 33	5'-9"	Str.		285						
W604	1 Ser. 11	6'-0" 8'-0"	Str.	2 3/8"	116						
W605	30	6'-5"	148		289						
W606	139	4'-10"	148		1009						
W607	1 Ser. 11	8'-0" 10'-0"	Str.	2 3/8"	149						
W608	40	6'-11"	148		416						
W609	1 Ser. 13	9'-9" 11'-9"	Str.	2"	210						
W610	38	8'-2"	148		466						
W611	1 Ser. 11	11'-9" 13'-9"	Str.	2 3/8"	211						
W612	28	7'-6"	Str.		315						
W613	20	7'-11"	148		238						
W614	1 Ser. 11	14'-6" 13'-3"	Str.	1 1/2"	229						
W615	1 Ser. 11	8'-3" 7'-9"	Str.	3/8"	132						
W616	1 Ser. 11	7'-9" 7'-6"	Str.	3/16"	126						
W617	1 Ser. 9	13'-3" 12'-6"	Str.	1 1/8"	174						
W618	1 Ser. 15	12'-0" 11'-0"	Str.	7/8"	259						
W619	1 Ser. 13	11'-0" 10'-0"	Str.	1"	205						
W620	1 Ser. 11	10'-3" 9'-6"	Str.	7/8"	163						
W621	1 Ser. 11	9'-6" 9'-0"	Str.	3/4"	153						
W622	1 Ser. 11	9'-0" 8'-3"	Str.	7/8"	143						
W701	20	5'-9"	Str.		235						
W702	33	6'-3"	Str.		422						
W703	1 Ser. 11	13'-6" 15'-3"	Str.	2 1/4"	323						
W704	20	9'-0"	Str.		368						
W705	53	9'-2"	148		993						
W706	55	5'-3"	148		590						
W707	1 Ser. 12	15'-3" 17'-3"	Str.	2 3/8"	399						
W708	1 Ser. 9	16'-9" 15'-6"	Str.	1 7/8"	297						
W709	38	11'-0"	Str.		854						
W710	1 Ser. 11	15'-6" 14'-6"	Str.	1 3/16"	337						
		TOTAL WEIGHT		=	32,277						

BENDING DIAGRAMS









Note:
For Replacement Bar Schedule see BR. NO. CUY-80-1585, Sheet 24/24 .

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

247A
392

CUYAHOGA COUNTY
CUY-80-15.81

QUANTITY CALCULATIONS
MADE BY L.M.C. DATE 9-8-70
CHECKED BY J.H. DATE 9-10-70

ESTIMATED QUANTITIES RETAINING WALL ALONG LANE JN-OBE

ITEM	DESCRIPTION	UNIT	QUANTITY
503	Unclassified Excavation	Cu. Yds.	539
503	Shale Excavation	Cu. Yds.	396
503	Cofferdams, Cribs, and Sheeting	Lump Sum	Lump Sum
509	Reinforcing Steel	Pounds	32,277
511	Class "C" Concrete, Wall Above Footings	Cu. Yds.	432
511	Class "C" Concrete, Footings	Cu. Yds.	223
512	Premolded Sealing Strip	Lin.Ft.	175
516	1" Preformed Expansion Joint Filler	Sq. Ft.	190
518	Porous Backfill	Cu. Yds.	198

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

REINFORCEMENT SCHEDULE AND ESTIMATED QUANTITIES RETAINING WALL NORTH OF RAMP JN-OBE

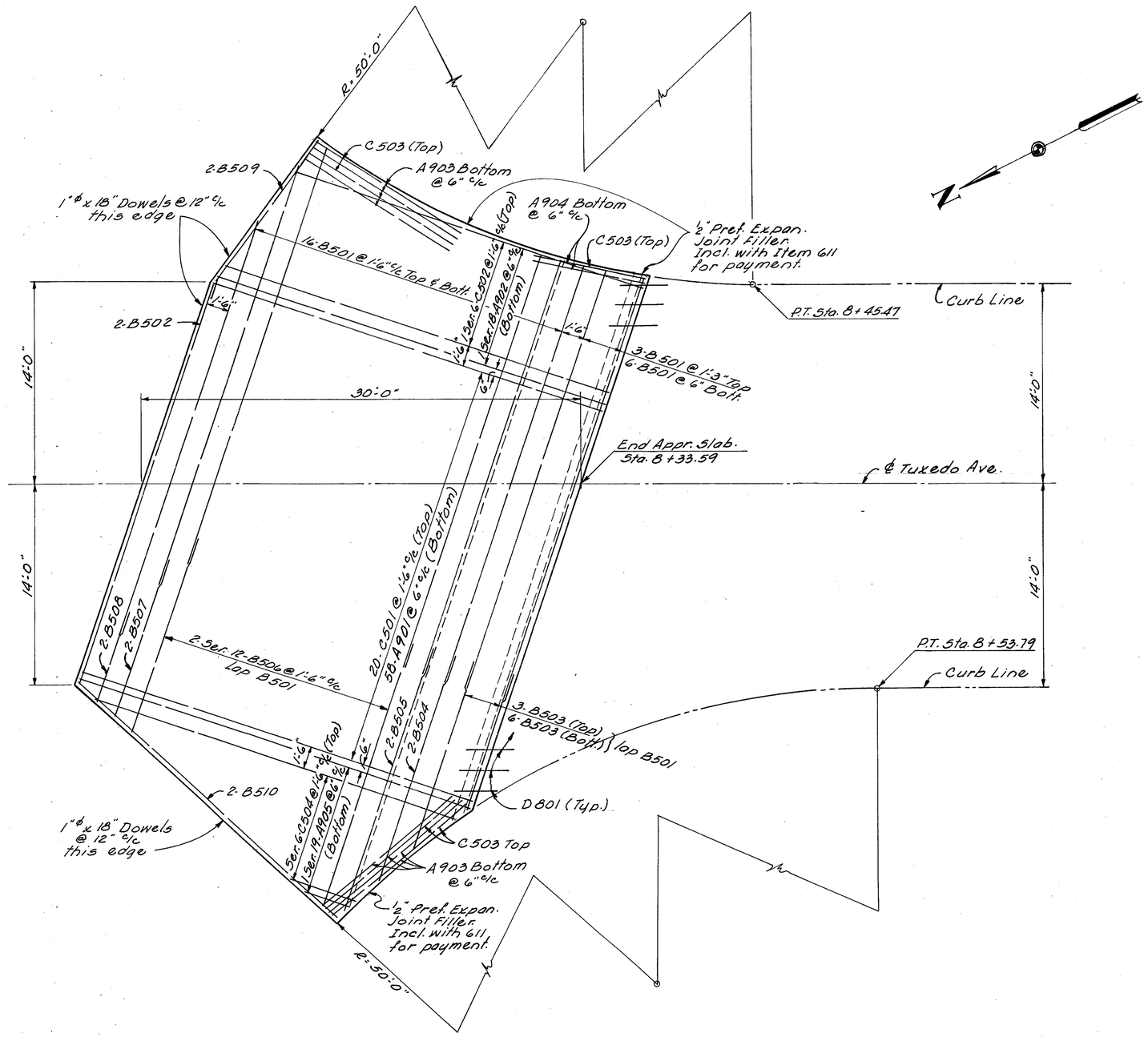
STA. 58+76.62 TO STA. 63+38.66

OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 9-8-70	DATE 9-8-70	DATE 9-10-70	DATE	SHEET 4/4

FHWA REGION	STATE	PROJECT	
5	OHIO		

CUYAHOGA COUNTY
CUY — 80 — 15.81

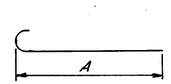


PLAN

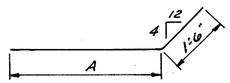
NORTHEAST APPROACH SLAB (REAR)

REINFORCEMENT SCHEDULE

Mark	Number Reqd.	Dimension A	Length	Type	Series inc.
A901	58	28'-0"	29'-3"	101	
A902	1 Ser. 18	25'-3" 28'-0"	26'-6" 29'-3"	101	1⅝"
A903	8		12'-0"	Str.	
A904	2	8'-0"	9'-3"	101	
A905	1 Ser. 19	3'-0" 27'-9"	4'-3" 29'-0"	101	16½"
B501	41		30'-0"	Str.	
B502	2		29'-6"	Str.	
B503	9		13'-4"	Str.	
B504	2		16'-0"	Str.	
B505	2		19'-0"	Str.	
B506	2 Ser. 12		14'-0" 19'-0"	Str.	5½"
B507	2		11'-6"	Str.	
B508	2		6'-6"	Str.	
B509	2	12'-0"	13'-6"	108	
B510	2		24'-0"	Str.	
C501	20		28'-0"	Str.	
C502	1 Ser. 6		25'-3" 27'-0"	Str.	5 3/16"
C503	5		12'-0"	Str.	
C504	1 Ser. 6		4'-4½" 25'-0"	Str.	4'-1½"



TYPE 101



TYPE 108

NOTE: For pavement jacking hole details, typical sections and notes, see Ohio Standard Drawing AS-1-72. The clearance over the top rebars shall be 3" instead of the 2" shown.

FHWA REGION	STATE	PROJECT	
5	OHIO		

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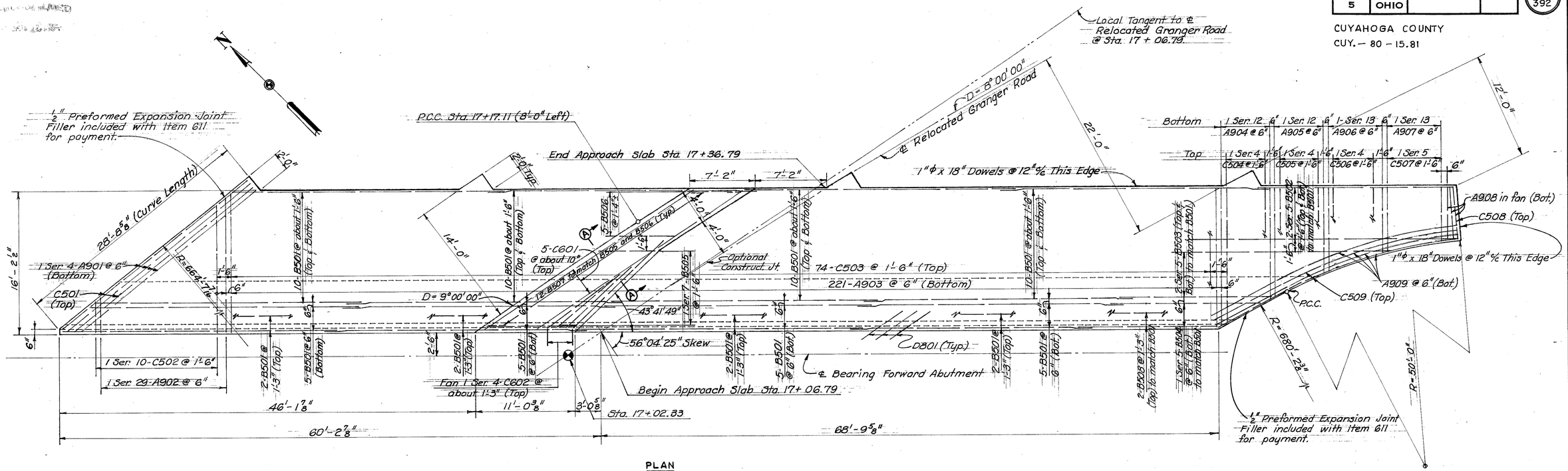
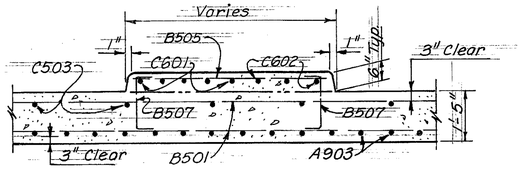
CUY.– 80 – 15.81



PLAN

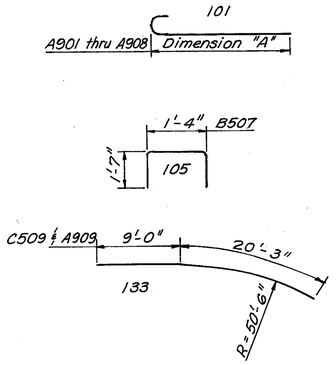
FORWARD APPROACH SLAB



SECTION A-A

REINFORCEMENT SCHEDULE					
MARK	NO.	DIMENSION "A"	LENGTH	TYPE	SER. INCR.
A901	1 Ser. 4	26'-0" 28'-0"	27'-3" 29'-3"	101	8"
A902	1 Ser. 29	3'-8" 15'-4"	4'-11" 16'-7"	101	5"
A903	221	15'-10"	17'-1"	101	
A904	1 Ser. 12	12'-6" 15'-6"	13'-9" 16'-9"	101	3 1/4"
A905	1 Ser. 12	9'-6" 12'-3"	10'-9" 13'-6"	101	3"
A906	1 Ser. 13	7'-4" 9'-4"	8'-7" 10'-7"	101	2"
A907	1 Ser. 13	6'-2" 7'-2"	7'-5" 8'-5"	101	1"
A908	3	6'-0"	7'-3"	101	
A909	4		29'-3"	133	
B501	108		30'-0"	Str.	
B502	2 Ser. 5		22'-6" 30'-3"	Str.	1'-11 1/4"
B503	2 Ser. 5		17'-0" 23'-3"	Str.	1'-6 3/4"
B504	1 Ser. 5		15'-6" 16'-9"	Str.	3 3/4"
B505	1 Ser. 7		6'-6" 10'-6"	Str.	8"
B506	5		6'-6"	Str.	
B507	24		4'-3"	105	
B508	2		16'-0"	Str.	
C601	5		28'-3"	Str.	
C602	1 Ser. 4		9'-0" 14'-6"	Str.	1'-10"
C501	2		26'-8"	Str.	
C502	1 Ser. 10		3'-3" 14'-6"	Str.	1'-3"
C503	74		15'-10"	Str.	
C504	1 Ser. 4		12'-9" 15'-2"	Str.	9 3/4"
C505	1 Ser. 4		9'-9" 12'-0"	Str.	9"
C506	1 Ser. 4		7'-8" 9'-2"	Str.	6"
C507	1 Ser. 5		6'-2" 7'-2"	Str.	3"
C508	1		6'-0"	Str.	
C509	2		29'-3"	133	

BENDING DIAGRAMS



NOTE: For pavement jacking hole details, typical sections and notes, see Ohio Standard Drawing AS-1-72. The clearance over the top rebars shall be 3" as shown in SECTION A-A instead of the 2" shown on the std. drwg.

TEMPORARY BROOKPARK ROAD AND TEMPORARY GRANGER ROAD

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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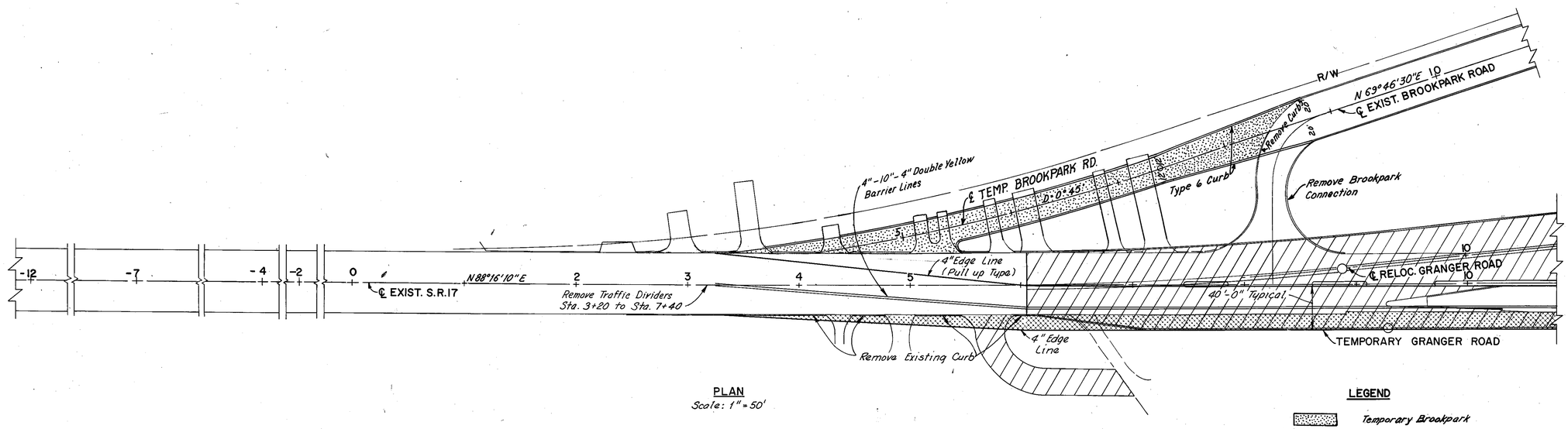
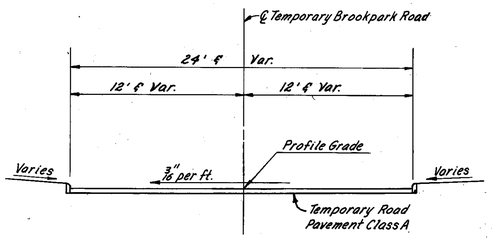
CUY.-480-15.81



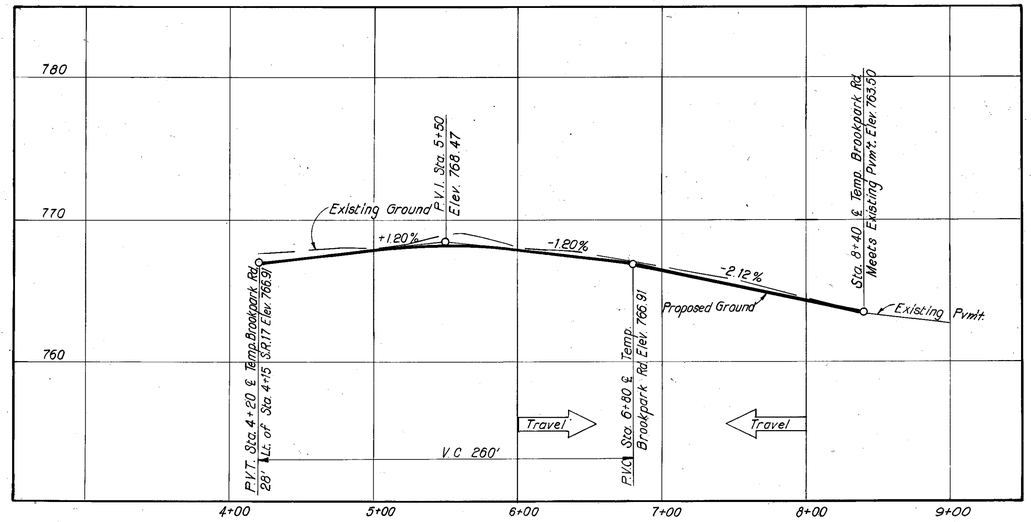
PLAN
Scale: 1" = 50'

LEGEND

- Temporary Brookpark
- Relocated Granger Road
- Existing Sections
- Temporary Granger Road Widening (For Details and Quantities See Sheet 250)



TYPICAL SECTION
No Scale



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

QUANTITY CALCULATIONS
MADE BY D.C.F. DATE 2-5-71
CHECKED BY J.E.N. DATE 8-18-71

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
202	Precast Traffic Dividers Removed	Each	60
609	Concrete Curb, Std. Type 6	Lin. Ft.	740
615	Temporary Pavement, Class A	Sq. Yd.	1215

SCALE As Noted
MADE D.C.F. DATE 2-5-71
TRCD. M.M.D DATE 8-8-71
CKD. J.E.N. DATE 8-18-71
M.B. 6-6-72

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

TEMPORARY GRANGER ROAD

QUANTITY CALCULATIONS
MADE BY M.G.B. DATE 8-14-74
CHECKED BY A.H.S. DATE 8-20-74

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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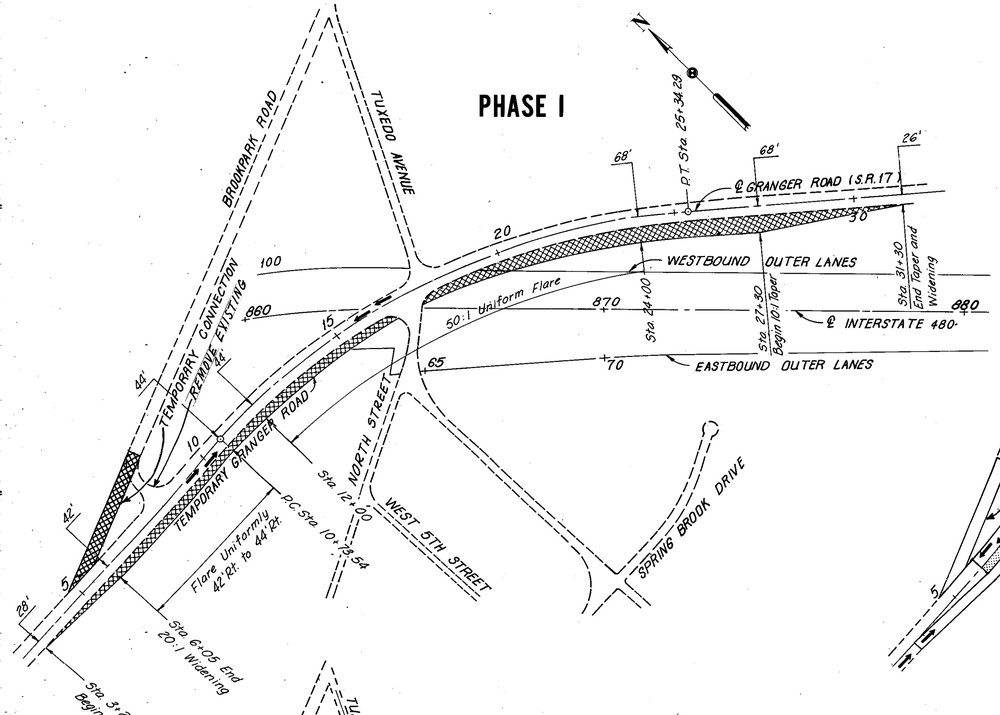
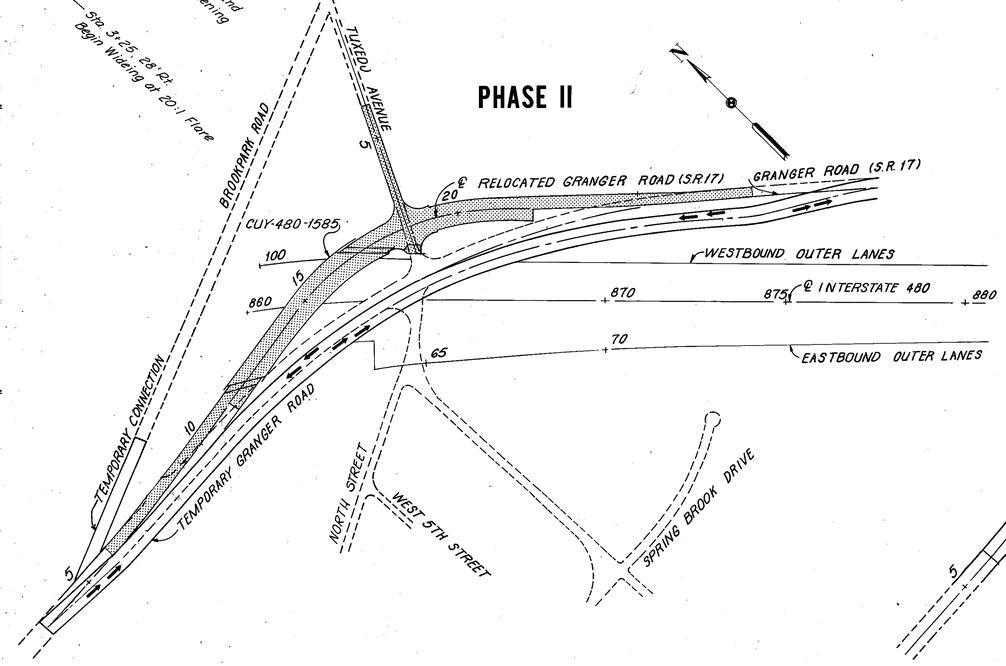
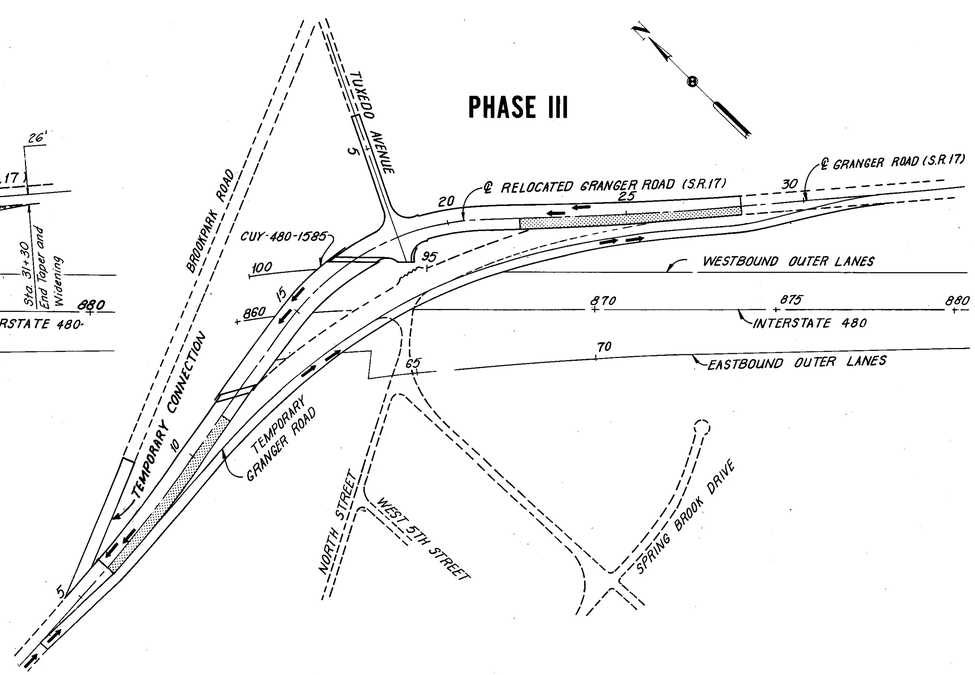
PHASE I



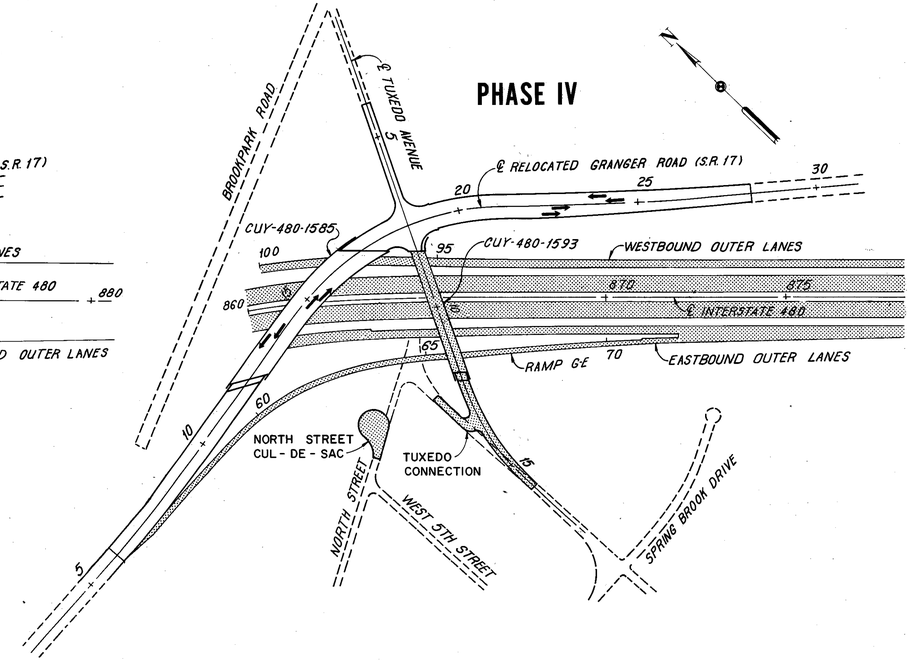
PHASE II



PHASE III



PHASE IV



SUGGESTED CONSTRUCTION SEQUENCE

PHASE I: Construct Temporary Granger Road and the Temporary Brookpark Rd. Conn. and Remove Existing Conn. to Granger Rd.
Maintain normal traffic flow on Existing Granger Road.

PHASE II: Construct Structure CUY-480-1585 (Relocated Granger Road over I-480), the North Abutment of Structure CUY-480-1593 (Relocated Tuxedo Avenue of I-480) and Relocated Tuxedo Avenue north of Structure CUY-480-1593. Construct the Westbound lanes and a portion of the Eastbound lanes of Relocated Granger Road.
Maintain traffic on Temporary Granger Road (two ten-foot wide lanes each direction).

PHASE III: Complete the Eastbound lanes of Relocated Granger Road.
Maintain Westbound traffic on the Westbound lanes of Relocated Granger Road. Maintain Eastbound traffic on Temporary Granger Road.

PHASE IV: Route both East-and Westbound traffic onto Relocated Granger Road.*
Construct Structure CUY-480-1593, Relocated Tuxedo Avenue, the North Street Cul-de-Sac, and complete the remaining construction.

* Remove the Temporary Brookpark Rd. Connection and Reconstruct the Drives with Quantities as Shown on Sht. No. 35.

ITEM 615 CLASS A TEMPORARY PAVEMENT

STATION	WIDTH Ft.	LENGTH Ft.	AREA Sq. Yds.
3+25	0.0		
6+05	14.0	280.00	217.78
10+73.54	16.0	468.54	780.90
12+00	16.0	126.46	224.82
24+00	42.0	1200.00	3866.67
27+30	42.0	330.00	1540.00
31+30	0.0	400.00	933.33
Total			7563.50

LEGEND
▨ — TEMPORARY CONSTRUCTION
▤ — PERMANENT CONSTRUCTION
---- — EXISTING CONDITIONS

SCALE 1"=200'
MADE RJT DATE 5-1-68
TRCD MET DATE 1-23-74
CKD MGB DATE 1-24-74 *
2-4-74
2-5-74

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CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

SIGNING NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.480-15.81

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816 STRUCTURAL SUPPORTS, STEEL BEAM (TYPE)

The Structural Steel Beam Supports including 8 and 6 pound beams, 4 pound drive post and hardware shall be galvanized in accordance with ASTM A-123 and A-153 respectively. All fabrication shall be complete prior to galvanizing.

Quantities for Item 816 "Structural Supports, Steel Beam (Type)", appearing in the quantity tables are approximate. The Contractor shall be responsible for determining exact support lengths prior to fabrication and galvanizing of supports. Payment shall be at the contract unit price bid per lin. ft. which price and payment shall include all costs in connection with the embedment of the supports.

The cost of the concrete used for embedment will be a separate pay item.

816 OVERHEAD SIGN SUPPORT, BY TYPE

All component parts of the Overhead Sign Supports shall be steel, except for the truss and components for the Number 7 series which shall be aluminum. For specific details and materials, see sheet numbers 21 and 22.

Cost of furnishing and installing the sign brackets and the fixture support arm, length "G", with mounting holes and hardware shall be included in the contract unit price bid for Overhead Sign Supports.

Modifying Supplemental Specification 816 Switch Enclosure Mounting Brackets including mounting bolts and drilled holes shall be furnished and installed under payment for 816 Overhead Sign Support Structures at the contract price per Overhead Sign Support, by Type.

Payment for this item shall be made at the contract unit price bid for each Overhead Sign Support, by Type, installed in place and accepted, which price shall be full compensation for furnishing all anchor bolts 2" and $\frac{3}{4}$" EMT conduit ells (for installation under 816 Concrete for Overhead Sign Support Foundations), and for furnishing and installing each Overhead Sign Support Structure shown on sheets 19 through 20 including fixture support arms, switch enclosure mounting bracket, sign brackets and all component parts necessary to make a complete workable installation ready for sign erection, installation of disconnect switch and enclosure, ground rod and wire connections and sign wiring.

Erection of these supports shall be accomplished in a manner meeting the requirements of Supplemental Specification 816.

816 CONCRETE FOUNDATIONS, FOR SIGN SUPPORTS

Payment for this item shall be based on plan dimensions (or dimensions as modified by the Engineer in lieu of plan quantities) as required in Supplemental Specification 816.

Payment for reinforcing steel and installation of 2" conduit ells shall be included in the cost of Concrete Foundations for Overhead Sign Supports. Concrete shall be Class "C".

Basis of payment shall be as follows:

1. Concrete Foundations for Overhead Sign Supports, per cubic yard.
2. Concrete Foundations for Ground Mounted Sign Supports, per cubic yard.

815 SIGN ERECTION, BY TYPE

The Contractor shall erect sign panels as indicated on the Traffic Control Plan Sheet Numbers 9 through 14. The panels will be furnished by others and shall be mounted on the brackets or beam supports provided in the Plans.

All sign material and accessories will be furnished and transported by others to a delivery point designated by the Contractor on or near the subject project. The Contractor shall be responsible for the handling, protection and storage of the sign panels and accessories from the time of unloading by others at the delivery point.

Large guide signs (over 8 feet in height) may be delivered in two pieces. Work shall also consist of assembly of these panels including attachment of demountable sign legend and erection of signs in conformance with the schematic sign plan.

The Contractor shall submit, in three copies, a schedule for sign erection to the Engineer at least 120 calendar days prior to the start of any scheduled erection work. The schedule shall include proposed dates, sign numbers and delivery point. The Engineer will furnish copies of the schedule to the Division Traffic Engineer and to the Engineer of Design Services, 25 South Front Street, Columbus, Ohio, 43215.

The price bid per square foot for "Item 815, Sign Erection, By Type" shall include payment for all necessary equipment, labor and tools to store, assemble and erect the signs as specified.

ELECTRICAL - GENERAL

This item shall consist of furnishing all necessary material, labor and facilities required to complete the electrical installation in accordance with the designs, dimensions and details shown in the plans and described in the Specifications.

All material, workmanship and construction methods, except as modified herein, shall conform to the general requirements of the State of Ohio, Department of Highways, Construction and Materials Specifications, January 1, 1971

625 SIGN SERVICE

This item shall consist of the completion of the electrical system and components connecting the connectors in the pull box (included within the roadway lighting quantities) with the primary side of the disconnecting switch.

Work will include the furnishing and installing (including trenching and backfilling) of the 2 inch galvanized steel conduit and couplings from the pull box to the conduit ell in the sign support foundation.

This item will also include the furnishing and installing of the 1/C 600 volt service wire from the connectors to the disconnect switch.

Basis of payment for this item shall be at contract unit price per each, which shall include all labor, material, and equipment required to complete this item of work.

625 WIRE AND CABLE

Wire and cable installation shall conform to Section 625.14 of the Construction and Materials Specifications and shall be of the sizes and types shown on the plans.

Wire or cable installed in conduit on or with sign structures shall be No. 10 RHH, 600 volt standard copper wire (pole and bracket cable).

Cable installed underground leading from the pullbox to the disconnect switch shall be No. 4 or 6 single conductor circuit cable.

625 INSPECTION AND TESTING OF SIGN LIGHTING

Electrical tests of sign lighting circuits shall conform to the requirements of Section 625.22 with the following additions:

1. A voltage and amperage measurement shall be made at the sign support switch.
2. Where a low voltage tap transformer is used, the voltage shall be measured to determine the applicable tap.
3. During the performance test period, adjustments to fixture aiming angles shall be made to obtain maximum uniformity as directed by the engineer.

The above measurements and voltage tap selection notations shall be included in the test reports furnished to the engineer.

GROUNDING

Each sign support or structure shall be grounded with a #4 insulated conductor. The grounding conductor shall be connected to the switch then to the compression connector in the sign support then to a 1"x10' ground rod. Ground conductor shall be exothermically welded to ground rod and then taped with plastic electrical tape at each exposed portion of conductor. The welded connection and taped portion shall be painted 2 coats of insulating enamel.

816 - SPAN WIRE SIGN ATTACHMENT

This item of work shall consist of the furnishing and installation of a span wire mounting bracket, hanger, and hardware as detailed on sheet 17.

Basis of payment shall be at the contract bid price per Span Wire Sign Attachment which price shall include all labor, material, equipment and incidentals to perform the required item of work.

VIBRATION DAMPERS

The erection of signs on existing overhead sign supports may require the removal of vibration damper. (A 4'x8' panel attached to a support with no signs in place). All vibration dampers shall be removed when the permanent sign is installed.

All span sign supports erected without signs must have a vibration damper attached within eight (8) hours of erection.

Any vibration damper removed and not re-erected on new span type supports will be stored for removal by state forces.

The cost of removal, re-erection and storage of the vibration dampers will be incidental to the various Traffic Control items in the plan.

CERTIFICATION AND APPROVAL OF SIGN SUPPORT AND SIGN LIGHTING ITEMS

The Contractor shall submit through proper channels the drawings, information and samples as required below:

A. 8 copies of shop drawings and material lists for approval:
   1. Overhead sign supports
   2. Breakaway sign supports
   3. Sign lighting layout plan and details for wiring, conduit size and placement from sign disconnect switch to fixture.
B. 8 copies of catalog cuts descriptions of samples of fabricators standard items as shown in the plans or their equals for approval of their use.
C. Certifications and/or samples for all material which have been approved above under "A" and "B".
D. Approval of items under "A" and "B" shall be in the hand of the Contractor prior to any purchase or installation.
E. Certifications of samples under "C" must be in hand and approved prior to contract completion.

SCALE
MADE JEN DATE 2-4-10
TRCD DATE
CKD RJK DATE 2-5-10

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CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

REVISED 9-12-74 RSE

SIGNING NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
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816 INTERIM STEEL DRIVE POSTS, 4 LBS. PER FOOT, AS PER PLAN

This work shall consist of furnishing and installing 4 pound per linear foot steel posts as specified for interim lane width transitions.

This item shall include 4 pounds per foot steel posts 11'-0" long bolted to the inside of interim barrels furnished under 606 using a minimum of three $\frac{5}{8}$" steel bolts spaced on 12" centers.

Post flanges shall be 90 degrees to interim edge lines facing approaching traffic. Steel bearing plates 3" x 2" shall be used at each bolt outside the barrel to prevent pull through. Mounting of signs on the drive posts with the bottom of the signs 7' above the pavement shall be included in Item 815.

The quantity furnished and installed will be paid for at the price bid per lin. ft. which price shall be full compensation for furnishing and installing drive posts including necessary hardware, labor and equipment.

606 - TEMPORARY BEAM RAIL, AS PER PLAN

Modifying 606 all drums for temporary beam rail will meet the following specifications:

1. The exterior of each barrel shall be painted orange and provided with a 4" band of white reflectorized sheeting, Type E, around the circumference above and below the rail element. Reflectorization and application of the sheeting shall be in accordance with supplemental specification 815.
2. The interior of the barrels shall be painted and half-filled with 1/2" or larger slag-type material.
3. For drainage of steel drums, 4 one-half (1/2") diameter holes shall be provided on the circular surface at the bottom of each drum.

606 INTERIM BARRELS, AS PER PLAN

This work shall consist of furnishing and placement of 55 gallon barrels as specified on Plan Sheets.

The barrels shall be painted orange and half filled with granular material. In addition to painting requirements, an 8" band of white reflectorized sheeting, Type E, shall be provided around the circumference of each barrel at the top. Reflectorization and application of the sheeting shall be in accordance with supplemental specification 815.

For drainage of steel drums, 4 each one-half inch (1/2") diameter holes shall be provided on the circular surface near the bottom of each drum.

The quantity furnished and installed will be paid for at the price bid per each which price shall be full compensation for furnishing and installing barrels including painting, reflectorized sheeting, granular material and necessary labor and equipment.

620 - INTERIM DELINEATORS, AS PER PLAN

This work shall consist of furnishing and installing interim delineators as specified on plan sheets.

This item shall include 2 pounds per foot steel drive posts 4'-0" long bolted to inside of interim barrels furnished under 606 using a minimum of three 5/16" steel bolts spaced on 12" centers. Post flanges shall be 90 degrees to interim edge lines facing approaching traffic. Type D delineators shall be mounted on the drive post flanges with the top of the delineator 4' above the pavement.

The quantity furnished and installed will be paid for at the price bid per each which price shall be full compensation for furnishing and installing drive posts and delineators including necessary hardware, labor and equipment.

614 TEMPORARY SIGNS AND SUPPORTS FOR MAINTAINING TRAFFIC

The following requirements shall be adhered to regarding materials and placement of signs to be furnished, installed, maintained and subsequently removed by the Contractor in accordance with the plans.

Signs shall be aluminum sheet or plywood type with reflective sheeting in accordance with Supplemental Specification 815. Sign material shall conform with the following schedule:

Individual Sign Area	Material
less than 10 sq. ft.	0.060 Alum. Sheet
10 - 16 sq. ft.	0.080 Alum. Sheet
16 - 20 sq. ft.	0.100 Alum. Sheet
over 20 sq. ft.	$\frac{3}{4}$ inch Plywood

The Contractor shall have the option of furnishing extrusheet aluminum panels as a substitute for plywood.

All supports for ground mounted signs not erected on drums or overpass mounted shall be steel channel type, driven to a minimum depth of 5 feet. Signs shall have 1, 2 or 3 separate supports in accordance with the following schedule:

Total Sign Assembly Area (Sq. Ft.)	Support Type Sign Length (Horiz.)		
	4 Ft. or Less	4-10 Ft.	11 Ft. or More
10 or less	1-4 lb. Post	2-3 lb. Post	-
10 - 20	1-6 lb. Beam	2-4 lb. Post	-
21 - 75	-	2-6 lb. Beam	3- 6lb. Beam
	-	-	

Supports for ground mounted signs greater than 75 sq. ft. in area shall be as directed by the Engineer.

Mounting height and lateral placement of temporary signs shall be in accordance with Figures 5-2 and 5-3 (pages 2-9 and 2-10) of the Ohio Manual of Uniform Traffic Control Devices.

Standards and sign layouts for temporary signs are available from the Bureau of Design Services, 25 South Front Street, Columbus, Ohio.

The Contractor shall be responsible for removal of all temporary signs and supports when no longer needed, and he shall restore each sign site to its original condition.

All signs and supports furnished, erected, maintained and removed by the Contractor shall become the property of the Contractor.

Basis of payment for the above described work shall be in the Lump Sum Item of Work for Item 614, Maintaining Traffic.

816 BREAKAWAY SIGN SUPPORT CONNECTION

This item consists of cutting and drilling the structural support; furnishing and attaching the fuse plate; and furnishing and attaching the base plates for each Structural Sign Support as indicated on the Plans.

All materials, labor and equipment required to fabricate and install this item for each sign support (exclusive of the structural sign support) will be measured and paid for at the unit price bid per each for Item 816 Breakaway Sign Support Connection.

614 MAINTENANCE OF TRAFFIC

Modifying Specification 104.04 this item of work shall consist of maintenance of traffic on existing roadways and ramps in accordance with traffic control details shown on sheet 6 & 12 in addition to requirements of this standard specification.

816 ERECTION OF OVERHEAD SPAN TYPE SIGN SUPPORTS (7 SERIES)

In all cases, span type overhead sign supports and signs shall be erected concurrently. At no time shall the box trusses be erected without the sign being in place within eight (8) hours.

COVER BASES

Cover bases shall be provided for all overhead sign and signal support foundations that are located in sidewalks, tree lawns or in traffic islands used as walks. Payment for cover bases and all tools, materials and labor necessary to erect the cover bases shall be included in the price bid for Item 816, Overhead Sign Supports, or for Item 816 Signal Support.

MATERIALS - GENERAL

Materials to be furnished may be specified in the Plans by a given manufacturer's catalog number or type. This is for descriptive purposes only and the Contractor may assume that approved equal materials may be furnished.

816 STRUCTURAL SUPPORTS DRIVEN TYPE

Driven type structural supports will be driven to a depth of five feet (5'-0") minimum below ground line in such a manner that no deformation within the length of the support, or damage to the support, will occur.

Prior to installation each support shall be significantly marked with paint at a location on the support 5'-6" from the embedded end, and approved by the Engineer.

"Structural Support 6lb Beam, Driven and 6lb Beam, as per plan, Driven" will include the 10" x 12" x 1/2" soil plate detailed in the plans.

Payment for installation of sign supports by the above method shall be included in the cost of the various support types specified including all labor, equipment and materials required.

MILE MARKER LOCATION

The Bureau of Transportation Technical Services will locate the longitudinal position of mile markers by a paint blotch on the completed pavement edge.

On divided highways only one pavement edge will be marked. Markers for the opposite direction will be placed "across" from those on the marked edge.

The contractor will notify the Project Engineer who shall notify the Bureau of Transportation Technical Services thirty (30) days in advance of the planed marker installation.

815 REMOVE AND RE-ERECT EXISTING GROUND MOUNTED SIGNS ON NEW SUPPORTS

This work shall consist of the carefull removal of existing ground mounted signs and their re-erection on new structural supports at a location specified in the plans in a manner satisfactory to the Engineer.

This work shall be paid at the unit price bid per each for "REMOVE AND RE-ERECT EXISTING GROUND MOUNTED SIGNS ON NEW SUPPORTS" and shall include all labor, equipment and materials required.

SCALE
MADE JEN DATE 5-6-71
TRCD. DATE
CKD. DDS DATE 5-12-71

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

REVISED 9-12-74 RSE

SIGNING NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

253
392

3
31

CUYAHOGA COUNTY
CUY.480-15.81

815 INTERIM COVERING FOR SIGNS

This item shall consist of furnishing and installing an interim cover and attachment materials for signs so indicated in the Plans or as directed by the Engineer. This item shall also include the subsequent removal of covers when directed by the Engineer.

Material for covering shall be plastic coated burlap blankets in conformance with 705.06.

The Engineer shall approve the method proposed for attaching interim covers to signs prior to installation of covers.

Work shall include all necessary material, hardware, labor, and equipment required to perform the required item of work.

Basis of payment shall be INTERIM COVERING FOR SIGNS, per square foot.

In addition to the 50 sq. ft. referred to in the Plans, an additional quantity of 100 sq. ft. for Item 815, Interim Covering for Signs, have been included to cover signs as directed by the Engineer.

816 ALTERNATE DESIGNS FOR OVERHEAD SIGN SUPPORTS

If the Contractor desires to furnish an alternate design for overhead sign supports, the alternate designs must be submitted to the State at least 21 days prior to opening of bids. The bidder will be notified as to acceptance or rejection of alternate design at least 7 days before bids are to be opened. Alternate designs must utilize tubular structural members. Submissions shall be made to Ohio Department of Transportation, Bureau of Design Services, 25 South Front Street, Columbus, Ohio, 43215.

816 STRUCTURAL SUPPORTS, 6 LB. BEAM, AS PER PLAN DRIVEN

This item shall consist of the furnishing, assembly, and installation of two (2) 3 lb. per foot drive posts (6 lb. beam) in combination with a square seamless tubular post extension spliced to the top of the 6 lb. beam. Details are shown on Sheet 26A.

Square seamless tubular post material shall conform to ASTM A 570 Grade B, after fabrication.

Work shall include all labor, materials, equipment, tools, and hardware necessary to perform the required item of work.

Basis of payment shall be for Structural Supports, 6 Lb. Beam, as per Plan per linear foot measured by total length of combination beam from end to end.

GALVANIZED SUPPORTS

The structural steel beam supports including the 6 pound beams and the 4 pound post shall be galvanized, after punching, in accordance with ASTM A-153 except where aluminum or stainless steel is specified.

816 ROCK EXCAVATION

Where solid rock is encountered in excavation for sign support foundations, the depth to be excavated below rock surface may be decreased as directed by the Engineer to a maximum of thirty-five (35) percent of depth specified in the Plans.

625 GROUND RODS FOR CONCRETE BARRIER MEDIAN MOUNTED CANTILEVER SIGN SUPPORTS

This item of work shall consist of furnishing and installing ground rod and cable as detailed and specified on Standard Drawing HL-17A, for roadway lighting poles.

Basis of payment for this item shall be at Contract Unit Price per each, which shall include all labor, materials and equipment required to complete this item of work.

EXISTING SIGNS

Existing signs located within the roadwork areas which are necessary for interim or permanent traffic control shall be removed and re-erected in locations indicated by the plans or as approved by the engineer. Stop signs will be maintained at all times while traffic is maintained. The cost of removal, re-erection and subsequent removal if required shall be considered a subsidiary work item, the cost of which shall be included in the price bid for the roadway work items. The signs which are to be re-erected on the berms shall be located with the center line of support on the P.I. of the shoulder.

INTERIM PAVEMENT MARKING, BY TYPE

This work shall consist of the furnishing and installation of interim removable markings as specified herein and shown on the Plans.

1. MATERIAL

Material shall consist of a backing coated with a pressure-sensitive adhesive and a weather and traffic resistant reflective white or yellow colored surface and additional requirements as follows:

A. REFLECTION - The white and yellow striping material shall be reflex-reflective, reflecting white or yellow respectively and shall be readily visible when viewed with automobile headlights at night.

B. ADHESIVE - The striping material shall have a precoated pressure-sensitive adhesive which shall not require a liner for protection from contamination, preadhesion or blocking within the roll as delivered.

C. CONFORMABILITY - The striping material shall be thin, flexible, formable and following application, shall remain conformed to the texture of the pavement surface.

D. REMOVABILITY - The striping material backing shall permit removal without requiring sandblast, solvent or grinding methods.

E. DURABILITY - The striping material applied in accordance with recommended procedures shall be weather resistant and show no appreciable fading, lifting or shrinkage, prior to completion of this project.

F. GENERAL - The striping material as supplied shall be of good appearance, free from cracks, and edges shall be true, straight and unbroken. The striping material shall be supplied in rolls and there shall be no more than 3 splices per 60 yards of length.

The striping material shall be prepared for delivery in standard commercial containers so constructed as to insure acceptance by the carrier and prevent damage during proper shipment and storage.

The Contractor shall store the material in a cool, dry location where temperature will not exceed 100 degrees F. prior to application of marking on roadway surfaces.

2. ROAD SURFACE PREPARATION

The road surface must be clean and dry, free of oils and grease, dust or dirt. All surfaces must be primed.

Concrete pavement shall be surface treated in accordance with Section 621.04. Surface shall then be generously flushed with clean water and allowed to dry thoroughly prior to application of primer and interim markings.

3. PRIMING

Method of priming shall be as approved by the Engineer. The Contractor shall submit a proposal for type of priming to be used. Cost for priming surfaces shall be incidental to the cost of various items included in Item 615, Temporary Roads, as per plan.

4. APPLICATION

Interim lines shall be applied to the road surface with a roller type applicator and rolled immediately afterwards by rubber-tired roller with approximate single wheel load between one thousand (1000) and two thousand (2000) pounds.

5. SPECIAL PLAN DETAILS

Details for location of interim markings are shown on sign location plan sheets.

6. BASIS OF PAYMENT

Cost of furnishing and installation of interim pavement marking shall be included at the contract unit price per linear foot.

CAPPING OF CONDUIT

All conduit in foundations which will not have wire or cable pulled into it during construction shall have the ends closed with capped bushings or otherwise sealed in an approved manner to completely keep all moisture and foreign matter out of the conduit.

SIGN LOCATIONS

All signs shall be placed normal to the roadway on which they are stationed unless otherwise noted on the Plans.

620 DELINEATORS, AS PER PLAN

The Contractor shall have the option of driving or concrete embedding the delineator post in accordance with details of sheet 30.

Posts may be trimmed on the embedded ends to adjust for grade and required delineator mounting height. Concrete shall be Class "C".

In either case, the Contractor shall be responsible for damage to underground utilities or cable during performance of this item of work.

The quantity furnished and installed shall be paid for at the price bid per each which price shall be full compensation for either type of installation.

DISCONNECT SWITCH ENCLOSURE MOUNTING BRACKETS

This item shall include the fabricating, furnishing and installation of Disconnect Switch Enclosure Mounting Brackets when enclosures are mounted on existing overhead sign supports (not part of this project) or attached to concrete bridge columns or abutments.

Work shall consist of field drilling, attachment and hardware as detailed on standard drawing 20.002.

Basis of payment shall be at the bid price per each mounting bracket which price shall be full compensation for furnishing, fabrication, and installation including all labor, material, and incidentals necessary to complete this item of work.

CONSTRUCTION LAYOUT STAKES FOR SIGNS AND TRAFFIC SIGNALS

The Contractor shall stake out all sign and traffic signal supports in accordance with Supplemental Specification 816 prior to installation of any foundations or supports.

After stakeout the Contractor shall notify the Engineer a minimum of seven (7) days in advance of scheduled work. Support locations for each support will be field checked and approved by the Engineer and Division Traffic Engineer and / or City Traffic Engineer prior to proceeding with construction work required.

If both major and minor type supports are included within the project it will be permissible to perform the construction stakeout and field inspection in two (2) stages, one for major supports and one for minor supports.

Cost for this item of work will be included in Item 623 for payment.

816 SIGN SUPPORT IDENTIFICATION DECALS

Each sign support installation shall be identified by a combination of letters and numbers which will indicate the County, Route, and Straight Line Mileage (Samples: LAK-2-0.02, CUY-90-17.58).

Identifying numbers shall be as indicated on sheet 29 in these plans or as specified by the maintaining agency.

Identification shall be by adhesive type decals with silver white reflective characters on a reflective interstate green background in accordance with Military Specifications Mil-R-13689A.

The top legend of the decal shall be located approximately 8 feet above the ground line, on the quadrant of the surface of the sign support that faces oncoming traffic.

Two identification decals shall be furnished for sign support installation spanning opposing directions of traffic.

The cost of furnishing and attaching the sign support decals shall be an incidental item to the various sign support items.

816 OVERHEAD SIGN AND TRAFFIC SIGNAL SUPPORT FABRICATION

In lieu of Plan details the following are fabrication requirements for supports in this project:

All handholes fabricated for supports shall be 4" X 8" in size with face flush with pole exterior at the required locations described in Plans.

The electrical service entry through each vertical sign support pole shall be provided by means of a two inch (2") half-coupling centered at a height of 5'-0" above the bottom of the base plate.

The disconnect switch enclosure shall be mounted in such a manner that the bottom of the enclosure will be 4'-9½" (±¼") above bottom of base plate.

Payment for the fabrication requirement specified above shall be incidental to the cost of each support structure.

SCALE
MADE JEN DATE 5-19-69
TRCD DATE
CKD ADS DATE 11-11-69

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

Revised 9-12-74 RSE

625 MERCUURY VAPOR SIGN LIGHTING LUMINAIRE, WITH BALLAST AND LAMP, BY RATING

This item of work shall consist of furnishing mercury vapor sign lighting luminaires with lamp and integral ballast as specified below.

The luminaire shall be no more than 8½" high overall by 16" wide by 18¼" deep including the ballast enclosure. These measurements shall be checked when the luminaire is resting on a horizontal table top with the lens up.

The outer housing of the luminaire, the frame for the lens, and the ballast housing shall be of cast aluminum with a finish of gray baked acrylic base enamel.

The lamp housing body shall bave 3-5/16" diameter holes drilled according to the mounting plate design shown on Sheet 28. The centerline of two of the boltholes shall be 1 3/8" away from and parallel with the projection of the lamp centerline on the base of the lamp housing.

The reflector shall be made of a single piece of aluminum, die formed to shape and processed to distribute the light evenly over the sign area. A heavy duty mogul base lampholder shall be securely fastened to the reflector and the reflector shall be securely fastened to the lamp housing.

The luminaire shall have a borosilicate glass lens capable of withstanding thermal shock and impact of freezing rain and hail. The lens shall be either clear or have a mild diffusion pattern molded into its inner surface. A permanent, flexible, waterproof sealer shall be used to seal the lens into its frame. A continuous water proof gasket shall be provided to seal the lens and frame unit to the lamp housing. This gasket shall be so designed to stay in the proper position for at least 10 years regardless of the number of times the lens unit is opened for service or adjustment.

The lens unit shall be hinged on one edge and fastened on the other edge with spring loaded latches that require no tools to open. The hinges, latches and all other external fasteners shall be of stainless steel.

The luminaire shall be provided with an integral ballast of at least 90% power factor, and of the constant wattage autotransformer type to provide plus or minus 5% lamp watt variation for a plus or minus 10% line voltage variation. Primary supply voltage shall be 60 hertz and 120, 208, 240, 277 or 480 volts as specified in the plans. The luminaire shall operate satifactorily over any expected outdoor temperatures down to -20 degrees F. Self-ballasted mercury vapor lamp type luminaires are not acceptable.

Basis of payment for this item shall be at contract unit price per each "625 Mercury Vapor Sign Lighting Luminaire With Ballast and Lamp, By Rating" furnished to the job for installation under item 625 Mercury Vapor Lighted Sign Wired Complete.

625 MERCURY **VAPOR** LIGHTED SIGN, WIRED COMPLETE:

This item shall consist of the installation of the mercury vapor luminaires furnished under "625 Mercury Vapor Sign Lighting Luminaire, with Lamp By Rating". It will also include furnishing and installation of the electrical components and hardware from the disconnect switch to the luminaire including furnishing and installing the 2.16#/ft. aluminum channel and fixture mounting plate with "J" bolts. These items will be mounted on the "G" Support arm which is included with Item 816 Overhead Sign Support By Type.

Luminaires shall be mounted as shown on Sheet 28. Wiring shall be not less than #12 THW in 3/4" dia. conduit. The wires should be continuous from a junction box on the top chord of the sign support or on structure mounted conduit to the first fixture, and then continuous to the second, third and fourth fixtures on a single sign. On multiple sign installations each sign shall have a separate junction box so that, if maintenance is needed, the sign and all electrical devices attached to it can be disconnected as a unit from the support by disconnecting only two wires and the U bolts attaching it to the support.

Conduit for the mercury vapor sign lighting shall be as follows:

1. A screw-on-cover, 1¼" double hub junction box shall be fastened to a 1¼" coupling welded to the top truss chord of the sign support arm with a short 1¼" nipple. On structure mounted signs the junction box shall be attached to the conduit mounted on structure.

2. A length of 3/4" P.V.C. covered flexible waterproof conduit shall connect the junction box through a 1¼"x3/4" bushing to a 3/4" LR or LL condulet on the sign bracket nearest tha pole on which the switch enclosure is mounted.

3. 3/4" rigid conduit shall connect the LR or LL condulet to a 3/4" LB condulet so arranged to line up the short end with the 1 1/8" dia. holes in the sign bracket and fixture support arm. This rigid conduit shall be fastened to the sign bracket with not less than 2 conduit clamps placed within 3" of the condulet fittings and not more than 24" c/c.

4. 3/4" rigid conduit shall connect the above LB condulet to the short end of another LB condulet fitting at the other end of the fixture support arm. This conduit shall be run through both 1 1/8" dia. holes in the fixture support arm, be jogged out of the way of the fasteners on the diagonal bracing rods, when required, be fastened near each end an at not less than 24" c/c, and be made to a length that, when screwed into both condulet fittings, the rear condulet shall be approximately centered on the sign bracket web and the front condulet shall fit snugly against the outer plate of the fixture support arm. The long end of the front condulet shall be angled downward approximately 30 degrees, when viewed from the front of the sign, to allow the next piece of conduit to be jogged easily to lay along the centerline and approxmiately 3/8" in front of flange of the channel that supports the lighting fixtures.

5. A 3/4" type "T" condulet fitting shall be located within approximately 18" of the near edge of each fixture on the sign. 3/4" rigid conduit shall be connected from the LB condulet fitting described above to the first "T" condulet. Straight lengths of conduit shall connect as many "T" condulets as are required for the number of luminaires specified for the sign. A threaded plug shall be used to close the opening in the last "T" condulet used on each sign installation. Suitable conduit clamps shall be used on 24" centers to hold the entire run of conduit on the centerline of the channel flange as listed under Item 4 above. The Type "T" condulets shall be so oriented that the third tapped opening shall be perpendicular to the face of the sign.

6. A length of 2/4" P.V.C. covered waterproof flexible conduit shall connect each fixture to each corresponding "T" condulet. The length of this conduit shall be so arranged to make a neat and gradual curve into the fixture without either sharp bends or drooping appearance. Wiring for mercury vapor sign lighting shall be sized and installed according to the National Electrical Code but shall be not less than No. 12 THW and shall be spliced only in junction boxes or in the wiring enclosure of the luminaire. All wiring shall be in conduit, inside structural chords and poles, or in electrical boxes and fixtures. Solderless connectors, of the proper size and type, may be used where splices and junctions are allowed above ground level. However, when used, they shall be securely taped with water resistant electrical tape to form a waterproof joint. When solderless connectors are not used, all splices and junctions above ground shall be soldered and double taped to make a waterproof electrical joint.

Payment for this item shall be at the contract unit price bid for the following:

1. 625 Mercury Vapor Lighted Sign, Wired Complete.

2. 625 Mercury Vapor Lighted Sign, Wired Complete (Structure Mounted).

Payment shall include all labor and materials to connect all luminaires on one sign into the disconnect switch enclosure, including conuit on structure for structure mounted signs. When more than one sign is mounted on an installation, each sign shall be considered as a separate pay item.

DISCONNECT SWITCH WITH ENCLOSURE

This item shall include furnishing of a 30 amp. 600 volt fused disconnect switch in a NEMA 4 stainless steel enclosure attached to each sign support by means of mounting brackets.

The disconnect switch shall be a 3 pole, solid neutral type meeting the requirements of 713.19, 10.

The enclosure shall meet the requirements of 713.20 with the following exceptions.

1) The stenciled legend or plate shall read "sign lighting".

2) A chase nipple shall be furnished and installed in the back of the enclosure.

3) Factory installed hubs shall not be provided on the top.

4) A screened ventilation opening shall not be provided.

5) Mounting poles, slots and chase nipple location shall match those provided on the switch enclosure bracket and sign support.

Each switch enclosure shall be furnished with one padlock. Padlocks shall have a brass body and wrought iron shackle equal to Russwin No. 2882 KA or Master No. KA or approved equal. Padlocks shall be all keyed alike with Master Key 3476.

Basis of payment for this item shall be per each at contract unit price, which shall include all labor, material, and equipment to complete this item of work.

SHEET ADDED 9-12-74 RSE

SUMMARY OF ESTIMATED QUANTITIES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

255/392

5/31

CUYAHOGA COUNTY
CUY. 480-15.81

SHEET 3	SHEET 6	SHEET 7	SHEET 8	SHEET 8A	SHEET 15	GRAND TOTAL	UNIT	ITEM	DESCRIPTION
									TYPE CODE 7221
									TRAFFIC CONTROL
									TYPE CODE 7223
			1			1	Each	625	Mercury Vapor Sign Lighting Luminaire with 100 Watt Lamp and Ballast
			17	38		55	Each	625	Mercury Vapor Sign Lighting Luminaire with 175 Watt Lamp and Ballast
			6	18		24	Each	625	Mercury Vapor Sign Lighting Luminaire with 250 Watt Lamp and Ballast
			11	27		38	Each	625	Mercury Vapor Sign Wired Complete
			9			9	Each	625	Mercury Vapor Sign Service
			9			9	Each	625	Disconnect Switch with Enclosure
			8			8	Each	625	Ground Rod
			1			1	Each	625	Ground Rod for Concrete Barrier Median Mounted Cantilever Sign Support
100			50			150	Sq. Ft.	815	Interim Covering for Signs
		119.0	2084.5	5009.5		7213	Sq. Ft.	815	Sign Erection Extru. Sheet Type
		741.0				741	Sq. Ft.	815	Sign Erection Flat Sheet Type
			80.0			80.0	Cu. Yds.	816	Concrete for Overhead Sign Support Foundations
		2.5				2.5	Cu. Yds.	816	Concrete for Ground Mounted Sign Support Foundations
			1			1	Each	816	Overhead Sign Support No. 7.5, Design 1 Mod., 63'-0" Span
			1			1	Each	816	Overhead Sign Support No. 7.5, Design 2 Mod., 78'-0" Span
			1			1	Each	816	Overhead Sign Support No. 7.6, Design 3 Mod., 78'-0" Span
			1			1	Each	816	Overhead Sign Support No. 7.6, Design 4 Mod., 93'-0" Span
			1			1	Each	816	Overhead Sign Support No. 12.30, Design 1 Mod.,
			1			1	Each	816	Overhead Sign Support No. 12.30, Design 6 Mod., 22'-0" Arms
			1			1	Each	816	Overhead Sign Support No. 12.30, Design 8 Mod., 24'-0" Arms
			1			1	Each	816	Overhead Sign Support No. 12.30, Design 10 Mod.,
		42				42	Lin. Ft.	816	Structural Support, Steel Beam, 10 WF 21
			1			1	Each	816	Overhead Sign Support No. 7.5 Design 2 Mod. 74'-0" Span
		188				188	Lin. Ft.	816	Structural Support, 6 Lb. Beam, Driven
		31				31	Lin. Ft.	816	Structural Support, 6 Lb. Beam, as per plan, Driven
		457				457	Lin. Ft.	816	Structural Support, 4 Lb. Post, Driven
		2				2	Each	816	Remove and Re-erect Existing Ground Mounted Sign
		1				1	Each	816	Bridge Connection for Regulatory Sign
		2				2	Each	816	Span Wire Sign Attachment
57						57	Each	620	Delineators, Type D, Post Mounted
25						25	Each	620	Interim Delineators, Type D, Mounted on Barrels, as per plan
83						83	Each	606	Interim Barrels, as per plan
10.84						10.84	Miles	621	Edge Lines
1.07						1.07	Miles	621	4" Lane Lines
10.14						10.14	Miles	621	6" Lane Lines
3						3	Each	621	Word on Pavement
3458						3458	Lin. Ft.	621	8" Channelizing Lines
0.44						0.44	Miles	621	4" Center Line
260						260	Lin. Ft.	621	24" Stop Line
1404						1404	Sq. Ft.	621	Island Markings
7						7	Each	621	Lane Arrows
716						716	Lin. Ft.	621	Curb Markings
890						690	Lin. Ft.	621	Crosswalk Lines
1856						1856	Lin. Ft.	621	24" Broad Transverse Lines
0.61						0.61	Miles	621	Interim 4" Edge Line
					24	24	Each	202	Existing Signs Removed for Storage

SCALE
MADE DCF DATE 8-16-71
TRCD. DATE
CKD. JEN DATE 8-18-71

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

Revised 9-12-74 RSE

COMPUTATIONS AND SUB-SUMMARIES

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

256/392

CUYAHOGA COUNTY
CUY.480-15.81

8/31

ITEM 621 6" LANE LINE

Station From	Station To	Side	Calculation	Lin.Ft.
I-480 EASTBOUND				
860 + 00	891 + 30	Rt.	3 x 3130	9390
915 + 00	938 + 25	Rt.	3 x 2325	6975
I-80 WESTBOUND				
860 + 00	890 + 78	Lt.	3 x 3078	9234
915 + 00	938 + 25	Lt.	3 x 2325	6975
LANE OBE-JN				
91 + 74	100 + 00	Lt.	1 x 826	826
LANE JN-OBE				
60 + 00	72 + 00	Rt.	1 x 1200	1200
EASTBOUND OUTER LANES				
910 + 08	913 + 68	Rt.	1 x 360	360
872 + 00	913 + 68	Rt.	1 x 4168	4168
WESTBOUND OUTER LANES				
868 + 60	914 + 18	Lt.	1 x 4558	4558
EASTBOUND INNER LANES				
891 + 30	913 + 25	Rt.	2 x 2195	4390
913 + 25	915 + 44	Rt.	3 x 219	657
WESTBOUND INNER LANES				
890 + 78	914 + 75	Lt.	2 x 2397	4794
TOTAL			10.14 Miles	53,527

ITEM 621 4" LANE LINE

Station From	Station To	Side	Calculation	Lin.Ft.
RELOCATED GRANGER ROAD EASTBOUND				
6 + 05	18 + 21	Rt.	1 x 1216	1216
18 + 88	28 + 20	Rt.	1 x 932	932
7 + 50	7 + 90	Rt.	1 x 40	40
RELOCATED GRANGER ROAD WESTBOUND				
6 + 05	18 + 21	Lt.	1 x 1216	1216
18 + 88	28 + 20	Lt.	1 x 932	932
LANE JN-OBE				
874 + 00	876 + 40	Rt.	1 x 240	240
RAMP E-G				
78 + 85	90+00	Rt.	1 x 1115	1115
WESTBOUND OUTER LANE				
890 + 35	891 + 15		1 x 80	80
TOTAL			1.07 Miles	5671

ITEM 621 24" BROAD TRANSVERSE

Station From	Station To	Side	Calculations	Lin.Ft.
WESTBOUND OUTER LANE				
885 + 37	890 + 35	Lt.	1 x 1050	1050
912 + 17	915 + 45	Lt.	1 x 665	665
RELOCATED GRANGER ROAD				
7 + 90	9 + 27	Rt.	1 x 141	141
TOTAL				1856

606 INTERIM BARRELS, AS PER PLAN

Station From	Station To	Side	Dist.	Calculation	Each
℄ I-480					
886 + 00	896 + 00	Lt.	50'	1 x 21	21
912 + 00	927 + 00	Lt.	50'	1 x 31	31
932+00	947+00	Rt.	50'	1 x 31	31
TOTALS					83

4" LANE LINE (DELETED)

Station From	Station To	Side	Calculation	Lin.Ft.
WESTBOUND OUTER LANE				
890+35	891+15	Lt.	1 x 80 x 15 ÷ 40	30
TOTAL				0.06 Miles

ITEM 621 4" EDGE LINE

Station From	Station To	Side	Calculation	Lin.Ft.
I-480 EASTBOUND				
860 + 00	891 + 30	Rt. & Lt.*	2 x 3130	6260
915 + 00	938 + 25	Rt. & Lt.*	2 x 2325	4650
I-480 WESTBOUND				
860 + 00	890 + 78	Rt. & Lt.*	2 x 3078	6156
920 + 52	938 + 25	Rt. & Lt.*	2 x 1773	3546
EASTBOUND OUTER LANES				
872 + 00	902 + 88	Lt.*	1 x 3088	3088
872 + 00	876 + 40	Rt.	1 x 440	440
872 + 00	913 + 68	Rt.	1 x 4168	4168
WESTBOUND OUTER LANES				
868 + 60	919 + 73	Lt.*	1 x 5113	5113
868 + 60	911 + 17	Rt.	1 x 4257	4257
914 + 18	919 + 73	Rt.	1 x 555	555
EASTBOUND INNER LANES				
891 + 30	913 + 25	Lt.* & Rt.	2 x 2195	4390
913 + 25	915 + 44	Rt. & Lt.*	2 x 219	438
WESTBOUND INNER LANES				
890 + 78	911 + 66	Lt.*	1 x 2088	2088
890 + 78	914 + 75	Rt.	1 x 2397	2397
LANE OBE-JN				
91 + 74	100 + 00	Lt.* & Rt.	2 x 826	1652
LANE JN-OBE				
60 + 00	72 + 00	Lt.* & Rt.	2 x 1200	2400
RAMP G-E				
58 + 71	71 + 00	Lt.* & Rt.	2 x 1229	2458
71 + 00	72 + 00	Lt.*	1 x 100	100
RAMP E-G				
78 + 85	85 + 38	Lt.* & Rt.	2 x 653	1306
RELOCATED GRANGER ROAD				
19 + 27	28 + 20	Lt.*	1 x 893	893
19 + 33	28 + 20	Rt.	1 x 887	887
TOTAL * YELLOW			10.84 Miles	57,242

6" LANE LINE (DELETED)

Station From	Station To	Side	Calculation	Lin.Ft.
I-480 WESTBOUND				
916+00	922+00	Lt.	2 x 600 x 15 ÷ 40	450
922+00	928+00	Lt.	1 x 600 x 15 ÷ 40	225
WESTBOUND OUTER LANES				
890+00	896+00	Lt.	1 x 600 x 15 ÷ 40	225
TOTAL				0.17 Miles

ITEM 621 24" STOP LINE

Station From	Station To	Side	Calculation	Lin.Ft.
GRANGER ROAD				
18 + 21		Rt.	1 x 55	55
18 + 88		Lt.	1 x 50	50
RELOCATED TUXEDO AVENUE				
8 + 98		Rt.	1 x 15	15
8 + 38		Lt.	1 x 15	15
T-N CONNECTOR				
0 + 25		Lt.	1 x 13	13
RAMP E-G				
78 + 85		Rt. & Lt.	1 x 60	60
EXISTING S.R. 17				
31 + 90		Rt.	1 x 26	26
32 + 68		Lt.	1 x 26	26
TEMPORARY BROOKPARK ROAD				
TOTAL				260

ITEM 621 8" CHANNELIZING LINE

Station From	Station To	Side	Calculation	Lin.Ft.
WESTBOUND OUTER LANE				
985 + 37	890 + 35	Lt.	2 x 498	396
911 + 17	915 + 45	Lt.	2 x 428	856
EASTBOUND OUTER LANE				
872 + 00	874 + 00	Rt.	1 x 200	200
902 + 88	909 + 70	Rt.	1 x 682	682
GRANGER ROAD				
7 + 90	10 + 27	Rt.	2 x 237	474
17 + 21	18 + 21	Rt.	1 x 100	100
18 + 88	20 + 38	Lt.	1 x 150	150
TOTAL				3458

ITEM 621 CURB MARKING

Station From	Station To	Side	Calculation	Lin.Ft.
RAMP G-E				
58 + 05	58 + 71	Rt.	1 x 66	66
67 + 00	72 + 00	Rt.	1 x 500	500
RELOCATED GRANGER ROAD				
9 + 61	10 + 27	Rt.	1 x 66	66
RAMP E-G at S.R. 17				
78 + 81	79 + 10	Lt.	28 + 28 + 28	84
TOTAL				716

ITEM 621 LANE ARROWS

STATION FROM	STATION TO	SIDE	TYPE	EACH
RELOCATED GRANGER RD				
17+07	17+96	RT.	TURN ARROW	1
19+13	20+77	LT.	TURN ARROW	2
RAMP E-G				
79+35	84+35	RT.	TURN & COMBINATION ARROWS	4
TOTAL				7

ITEM 621 WORD ON PAVEMENT

STATION	SIDE	WORD	EACH
RELOCATED GRANGER RD			
17+31	RT	"ONLY"	1
19+37	LT	"ONLY"	1
RAMP E-G			
79+59	RT	"ONLY"	1
TOTAL			3

ITEM 621 6" CROSSWALK LINES

Station From	Station To	Side	Calculation	Lin.Ft.
TUXEDO AVENUE				
7 + 02	7 + 08	℄	37 + 45	82
8 + 28	8 + 34	℄	41 + 36	77
13 + 02	13 + 08	℄	28 + 29	57
T-N CONNECTOR				
0 + 68	0 + 74	℄	25 + 25	50
RELOCATED GRANGER ROAD				
18 + 25	18 + 31	℄	100 + 116	216
18 + 78	18 + 84	℄	98 + 110	208
TOTAL				690

INTERIM 4" EDGE LINE

Station From	Station To	Side	Calculation	Lin.Ft.
I-480 WESTBOUND				
916+40	928+00	Lt.	1 x 1160	1160
WESTBOUND OUTER LANE				
890+35	896+00	Lt.	1 x 565	565
EASTBOUND LANES				
932+00	947+00	Rt.	1 x 1500	1500
TOTAL			0.61 MILES	3225

ITEM 621 ISLAND MARKING

Station From	Station To	Side	Calculation	Sq.Ft.
RAMP E-G				
78 + 81	79 + 10	Lt.	2 x 5 x 14 x √(28)² - (14)²	339
WESTBOUND OUTER LANE				
911 + 17	912 + 17	Lt.	(4 + 10) ÷ 2 x 100	700
RELOCATED GRANGER ROAD				
6 + 05	6+15	℄ *	4 x 10	40
9+26	9+61	Rt.	(4+10) ÷ 2 x 35	245
17+96	18+06	℄ *	4 x 10	40
19+02	19+12	℄ *	4 x 10	40
TOTAL * Yellow				1404

ITEM 621 4" CENTER LINE (DOUBLE YELLOW)

Station From	Station To	Side	Calculation	Lin.Ft.
TUXEDO AVENUE				
5 + 52	7 + 02	℄	1 x 150	150
8 + 34	9 + 84	℄	1 x 150	150
11 + 52	13 + 02	℄	1 x 150	150
13 + 50	15 + 00	℄	1 x 150	150
RELOCATED GRANGER ROAD				
18 + 06	18 + 25	℄	1 x 19	19
18 + 84	19 + 02	℄	1 x 18	18
TEMPORARY BROOKPARK ROAD				
5 + 00	9 + 00	℄	1 x 400	400
TUXEDO AVENUE				
4 + 00	7 + 02	℄	1 x 302	302
8 + 34	13 + 02	℄	1 x 468	468
13 + 50	15 + 87	℄	1 x 237	237
T-N CONNECTOR				
0 + 25	2 + 92	℄	1 x 267	267
TOTAL			.44 MILES	2311

DELINEATOR LOCATIONS AND ESTIMATED QUANTITIES

Location From	Location To	Side	Space	Type 'D' Post Mounted
Relocated Granger Road				
6+00	9+00	Rt.	100	4
Ramp G-E				
58+40	-	Rt. & Lt.	-	2
59+20	63+70	Lt.	50	10
64+50	-	Rt. & Lt.	-	2
65+50	71+50	Rt.	100	7
Eastbound Outer Lane				
872+50	882+50	Rt.	100	11
Ramp E-G				
78+90	81+30	Rt.	40	7
81+70	-	Rt. & Lt.	-	2
82+40	93+40	Lt.	100	12
TOTAL				57

620 INTERIM DELINEATORS, AS PER PLAN

Station From	Station To	Side	Space	Type 'D' Delineators Mounted on Barrels
℄ I-480				
886 + 00	892 + 00	Lt.	200	4
893 + 50	895 + 50	Lt.	100	3
913 + 00	923 + 00	Lt.	200	6
924 + 50	926 + 50	Lt.	100	3
932 + 50	934 + 50	Rt.	100	3
936+00	946 +00	Rt.	200	6
TOTAL				25

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE JEN DATE 9-6-71
TRCD. _____ DATE _____ CONSULTING ENGINEERS
CKD. AHH DATE 9-6-71 KANSAS CITY CLEVELAND NEW YORK

CHECKED 9-12-74 AHH
REVISED 9-12-74 RSE

SUB SUMMARY

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

257 / 392

7 / 31

	LANE	STATION	SIGN ERECTION FLAT SHEET TYPE SQ. FT.	SIGN ERECTION EXTRUSHEET TYPE SQ. FT.	CONCRETE CU. YD.	STRUCTURAL SUPPORT 4LB POST DRIVEN LIN. FT.	STRUCTURAL SUPPORT GLB BEAM DRIVEN LIN. FT.	STRUCTURAL SUPPORT GLB BEAM A.P.P. DRIVEN LIN. FT.	STRUCTURAL SUPPORT 10 WF 21 LIN. FT.	REMOVE & RE-ERECT EXISTING GROUND MOUNTED SIGN EACH	BRIDGE COMN. FOR REGULATORY SIGNS EACH	SPAN WIRE SIGN ATTACHMENT EACH	
W-49R-48 & WP-49-24	JN	68+00	19.00				16.0						
R-158-30	GE	58+00	6.25			14.5							
R-41B-36 & R-43C-36 & R-43R-36	EG	78+65	15.00					15.50					
R-41B-36 & R-43C-36 & R-43R-36	EG	78+95	15.00					15.50					
DUAL R-41A-36 & R-31SP-36	EG	81+35	27.00				30.00						
D-3-24G & D-4-2	EG	82+40		65.0	2.5				42.00				
M-Z-24 & M-8-24 & M-24-20	EG	82+40	8.10			14.0							
W-47-48 & WP-47-24	EG	86+00	19.00				16.0						
R-38R-24 & RP-38R-24	GRN.	6+10	8.00				16.0						
X-1-18	GRN.	9+75	2.25			12.0							
SPECIAL	GRN	12+00					15.0			1			
R-31C-48	GRN	16+75	10.00								1		
M-Z-24 & M-8-24 & M-26-20	GRN	17+25	8.10				16.0						
R-31C-48	GRN	19+50	10.00				16.0						
R-31C-48	GRN	21+15	10.00				16.0						
SPECIAL	GRN	25+00					15.0			1			
M-Z-24 & M-8-24 & M-26-20	GRN	31+00	8.10				16.0						
** R-37R-24	GRN	18+05	5.00			15.0							
** R-26A-30	GRN	18+35	7.50									1	
** R-26A-30	GRN	18+75	7.50									1	
** R-37R-24	GRN	19+05	5.00			15.0							
** R-37R-24	GRN	31+95	5.00			15.0							
** R-37R-24	GRN	32+45	5.00			15.0							
* R-Z-48	EG	79+00	6.93				16.0						
W-138-30	WBOL	887+00	6.25			11.0							
W-138-30	WBOL	889+00	6.25			11.0							
W-138-30	WBOL	891+00	6.25			11.0							
W-138-30	WBOL	893+00	6.25			11.0							
W-138-30	WBOL	894+00	6.25			11.0							
W-138-30	WBOL	895+00	6.25			11.0							
W-138-30	WBOL	896+00	6.25			11.0							
W-138-30	480	912+00	6.25			11.0							
W-138-30	480	914+00	6.25			11.0							
W-138-30	480	916+00	6.25			11.0							
W-138-30	480	918+00	6.25			11.0							
W-138-30	480	920+00	6.25			11.0							
W-138-30	480	922+00	6.25			11.0							
W-138-30	480	924+00	6.25			11.0							
W-138-30	480	925+00	6.25			11.0							
W-138-30	480	926+00	6.25			11.0							
W-138-30	480	927+00	6.25			11.0							
R-1-30	OLD TUX.	0+25	6.25			15.0							
N-41-12	480	861+36	3.00			11.0							
N-41-12	480	861+36	3.00			11.0							
N-41-12	480	914+16	3.00			11.0							
N-41-12	480	914+16	3.00			11.0							
W-138-30	480	932+00	6.25			11.0							
W-138-30	480	933+00	6.25			11.0							
W-138-30	480	934+00	6.25			11.0							
W-138-30	480	935+00	6.25			11.0							
W-138-30	480	937+00	6.25			11.0							
W-138-30	480	939+00	6.25			11.0							
W-138-30	480	941+00	6.25			11.0							
W-138-30	480	943+00	6.25			11.0							
W-138-30	480	945+00	6.25			11.0							
W-138-30	480	947.00	6.25			11.0							
SUB-TOTAL			394.73	65.0	2.5	456.5	188.0	31.00	42.00	2	1	2	

	LANE	STATION	SIGN ERECTION FLAT SHEET TYPE SQ. FT.	SIGN ERECTION EXTRUSHEET TYPE SQ. FT.	CONCRETE CU. YD.	STRUCTURAL SUPPORT 4LB POST DRIVEN LIN. FT.	STRUCTURAL SUPPORT GLB BEAM DRIVEN LIN. FT.	STRUCTURAL SUPPORT GLB BEAM APP DRIVEN LIN. FT.	STRUCTURAL SUPPORT 10 WF 21 LIN. FT.	REMOVE & RE-ERECT EXISTING GROUND MOUNTED SIGN EACH	BRIDGE COMN. FOR REGULATORY SIGNS EACH	SPAN WIRE SIGN ATTACHMENT EACH	
X-1-18	TT	453+80	2.25										
W-49R-48 & WP-49-24	SW	58+25	19.00										
X-1-18	SW	74+10	2.25										
W-Z-36 & W-143-24	SW	79+00	13.00										
W-49R-48 & WP-49-24	SW	91+00	19.00										
W-49L-48 & WP-49-24	SE	84+00	19.00										
X-1-18	F-3	58+83	2.25										
X-1-18	NE	55+70	2.25										
W-Z-36 & W-143-24	NE	60+00	13.00										
W-49R-48 & WP-49-24	NE	75+00	19.00										
W-49L-48 & WP-49-24	NW	64+00	19.00										
W-49R-48 & WP-49-24	TT	454+00	19.00										
W-98-48	480	942+25	20.00										
X-1-18	480	946+80	2.25										
X-1-18	WS	54+00	2.25										
W-49L-48 & WP-49-24	WS	66+00	19.00										
W-49R-48 & WP-49-24	WN	81+00	19.00										
GK	480	953+00 EB		27.0									
W-49R-48 & WP-49-24	480	986+75	19.00										
W-98-48	480	993+00	20.00										
X-1-18	480	988+40	2.25										
X-1-18	ES	82+30	2.25										
W-49R-48 & WP-49-24	ES	59+00	19.00										
W-97-48	F-5	37+42	20.00										
X-1-18	F-5	37+08	2.25										
W-49R-36 & WP49-24	F-5	35+00	12.00										
W-49L-48 & WP-49-24	EN	81+00	19.00										
W-49R-48 & WP-49-24	480	955+00	19.00										
GK	480	953+00 WB		27.00									
SUB-TOTAL			346.25	54.0									
SUB-TOTAL COLUMN 1			394.73	65.0	2.5	456.5	188.0	31.0	42.0	2	1	2	
TOTAL TO SHEET 5/31			740.98	119.0	2.5	456.5	188.0	31.0	42.0	2	1	2	

* SIGNS SHOWN ON SIGNAL PLAN

CHECKED 9-12-74 AHH
SHEET ADDED 9-12-74 RSE

SUB SUMMARY

ITEM	SIGN NUMBER															ITEM	QUANT.	UNIT	DESCRIPTION
	10	11A	11B	12	13A	13B	14	15A	15B	16A	16B	16C	17A	17B	18				
	1															625	1	EACH	MERCURY VAPOR SIGN LIGHTING LUMINAIRE WITH 100 WATT LAMP AND BALLAST
						3	2	3		2	2	2	3			625	17	EACH	MERCURY VAPOR SIGN LIGHTING LUMINAIRE WITH 175 WATT LAMP AND BALLAST
									2					2	2	625	6	EACH	MERCURY VAPOR SIGN LIGHTING LUMINAIRE WITH 250 WATT LAMP AND BALLAST
	1					1	1	1	1	1	1	1	1	1	1	625	11	EACH	MERCURY VAPOR SIGN WIRED COMPLETE
	1	1		1	1		1	1			1		1		1	625	9	EACH	MERCURY VAPOR SIGN SERVICE
	1	1		1	1		1	1			1		1		1	625	9	EACH	DISCONNECT SWITCH WITH ENCLOSURE
	1	1			1		1	1			1		1		1	625	8	EACH	GROUND ROD
				1												625	1	EACH	GROUND ROD FOR CONCRETE BARRIER MEDIAN MOUNTED CANTILEVER SIGN SUPPORT
	50					168	189	262.5	226.5	178.5	152.5	142	262.5	226.5	226.5	815	2084.50	SQ.FT.	SIGN ERECTION, EXTRUSHEET TYPE
	2.5	15.0		9.75	15.0		4.5	9.4			9.4		9.4		5.0	816	79.95	CU.YD.	CONCRETE FOR OVERHEAD SIGN SUPPORT FOUNDATIONS
					1											816	1	EACH	OVERHEAD SIGN SUPPORT NO. 7.5 DES. 1 MOD. 63' SPAN
		1														816	1	EACH	OVERHEAD SIGN SUPPORT NO. 7.5 DES. 2 MOD. 74' SPAN
											1					816	1	EACH	OVERHEAD SIGN SUPPORT NO. 7.5 DES. 2 MOD. 78' SPAN
													1			816	1	EACH	OVERHEAD SIGN SUPPORT NO. 7.6 DES. 3 MOD. 78' SPAN
								1								816	1	EACH	OVERHEAD SIGN SUPPORT NO. 7.6 DES. 4 MOD. 93' SPAN
	1															816	1	EACH	OVERHEAD SIGN SUPPORT NO. 12.30 DES. 1 MOD.
				1												816	1	EACH	OVERHEAD SIGN SUPPORT NO. 12.30 DES. 6 MOD. 22' ARMS
							1									816	1	EACH	OVERHEAD SIGN SUPPORT NO. 12.30 DES. 8 24' ARMS
															1	816	1	EACH	OVERHEAD SIGN SUPPORT NO. 12.30 DES. 10 MOD
	50															815	50	SQ.FT.	INTERIM COVERING FOR SIGNS

SHEET ADDED 9-12-74 RSE CHECKED 9-12-74 AHH

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

258A / 392

8A / 31

SUB SUMMARY

ITEM	54+15 NE A	54+15 NE B	943+25 I-480 A	943+25 I-480 B	943+25 I-480 C	51+50 WS A	51+50 WS B	61+15 WS	958+25 480	367+50 77	449+14 77	57+90 F-3	72+30 SW A	85+75 77	31+25 77	963+00 480	64+00 ES	992+00 480 A	992+00 480 B	992+00 480 C	84+50 ES A	84+50 ES B	49+00 ES A	49+00 ES B	40+11 ES A	40+11 ES B	72+30 SW B
	2	1	3	2	2	2	2	2					2					3	2	2	2	2	2		2	3	2
									2	2	2	2		2	2	2	2	-	-	-				2			
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	178.5	115.5	262.5	152.5	142.0	136.5	178.5	195.5	239	203.5	241.0	187.5	178.5	216	216	209.5	195.5	262.5	142	152.5	126	178.5	178.5	195.5	178.5	190	157.5

ITEM	QUANT.	UNIT	DESCRIPTION
625	38	EACH	MERCURY VAPORSIGN LIGHTING LUMINAIRE WITH 175 WATT LAMP AND BALLAST
625	18	EACH	MERCURY VAPOR SIGN LIGHTING LUMINAIRE WITH 250 WATT LAMP AND BALLAST
625	27	EACH	MERCURY VAPOR SIGN WIRED COMPLETE
815	5009.5	SQ.FT.	SIGN ERECTION, EXTRUSHEET TYPE

SHEET ADDED 9-12-74 RSE CHECKED 9-12-74 AHH

LD0304 12-29-67

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

259
392

9
31

CUYAHOGA COUNTY
CUY.-480-15.81

PROPOSED SIGNALIZED INTERSECTION

TUXEDO AVE.

4" Center Line (Double Yellow)

8" Channelizing Line (White) Lane Arrows - For details see below

24" Stop Line

8" Channelizing Line

Island Painted Yellow Crosswalk

Island Painted Yellow

Granger Road

679 (69) 59
1318 (153) 93
11,230 (1295) 789
345 (40) 30
335 (45) 22
1072 (144) 72
179 (24) 12
53 (4) 7
2337 (161) 290
345 (30) 40
335 (22) 45
7583 (532) 876
8263 (584) 961

M-26-20
M-2-24
M-8-24
TO 176
17-25

(1517) 941
(560) 895
(1205) 327
(327) 205

25+00 TUXEDO AVE. BOARDMAN

4" Edge Line (Yellow)
4" Lane Line
4" Edge Line (White)
℄ RELOCATED GRANGER RD.
℄ EXISTING GRANGER ROAD S.R. 17

PROPOSED SIGNALIZED INTERSECTION

TO 176 (A-24-20) 31+00

78+65
78+45

24" Stop Line

(895) 560

R-418-36
DO NOT ENTER
ONE WAY
R-431-36
R-43R-36

M-8-24
M-2-24
M-24-20
TO 176

D-3-24G 10'-0" x 2'-6"
D-4-2 10'-0" x 4'-0"
WEST 17 EAST
Brookpark Rd.
Granger Rd.

STA. 82+40

(560) 895
Island Painted White
24" Stop Line
82+40
4" Lane Line
80
RAMP E-G
(622) 381
4" Edge Line (Yellow)
85

WRONG WAY
R-418-36
ONLY
R-8R-36
4" Edge Line (White)

100+00
LANE OBE-JN
870
℄ W.B.O.L
(5621) 3445
(1710) 1048
875
880
885
4" Center Line (Double Yellow)
6" Lane Line
4" Edge Line (White)
4" Edge Line (Yellow)
860+00
INTERSTATE 480
B135 dual
LANE JN-OBE
70
(1048) 1710
60+00
RAMP G-E
65
4" Edge Line (White)
Paint top and face of curb solid yellow
8" Channelizing Line
4" Edge Line (White)
4" Lane Line
℄ E.B.O.L.
(3445) 5621
(1429) 2332
MATCH LINE STA. 886+00 SEE SHEET 260

N-41-17 CUYAHOGA BRIDGE
TUXEDO AVE 12+00
X-1-18 9+15
4" Edge Line (Yellow)
(381) 622
4" Center Line (Double Yellow)
Crossweik
24" Stop Line
68+00
North Street Cul-de-sac
Old Tuxedo Ave. Cul-de-sac
MERGE W-4-9-48 WP-4-9-24
(213) 106
(252) 394
0+25
4" Center Line (Double Yellow)
STOP R-1-30
4" Lane Line (Yellow)
4" Edge Line (White)
Island Painted White
8" Channelizing Line (see Detail "A" this sheet)
10
(1380) 841
Island Painted Yellow
58+00
PEDESTRIANS AND BICYCLES PROHIBITED R-15B-30
for detail of striping see this sheet.
(965) 1683
4" Lane Line
KEEP RIGHT R-3BR-24
RP-3BR-24
6+70

OVERHEAD SIGN NO. 10
STA. 7+90 E.B. S.R. 17
INTERSTATE 480 EAST
Youngstown
10'-0" x 4'-0"

OVERHEAD SIGN NO. 11
STA. 878+50 E.B. I-480
(FUTURE SIGNS, FURNISH AND ERECT SUPPORT ONLY)

LEFT LANE ENDS ¼ MILE
14'-0" x 8'-0"

(77) Cleveland Akron 1½ MILES
EXITS 20A,B
N-12C-132
13'-0" x 11'6"

Granger Road

100 0 100 200 300 400
SCALE IN FEET

SCALE 1"= 100' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE TPM DATE 5-25-68
TRCD. MAG DATE 5-28-68
CKD. JEN DATE 8-17-71
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

REVISED 9-12-74 FISE

8" Channelizing Line
8' Spacing
24 Broad Transverse Lines
45°

DETAIL "A"
Not to Scale

25' 30' 100'
Stop Line
4" WIDE
℄ of Lane

TYPICAL LOCATION OF LANE ARROWS

Notes:

All signs for this project will be furnished by others.

Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.

DESIGN YEAR : 1991
DESIGN SPEED : 60 MPH
DIRECTIONAL DESIGN HOURLY VOLUME (DDHV) : (000) = A.M. PEAK
000 = P.M. PEAK

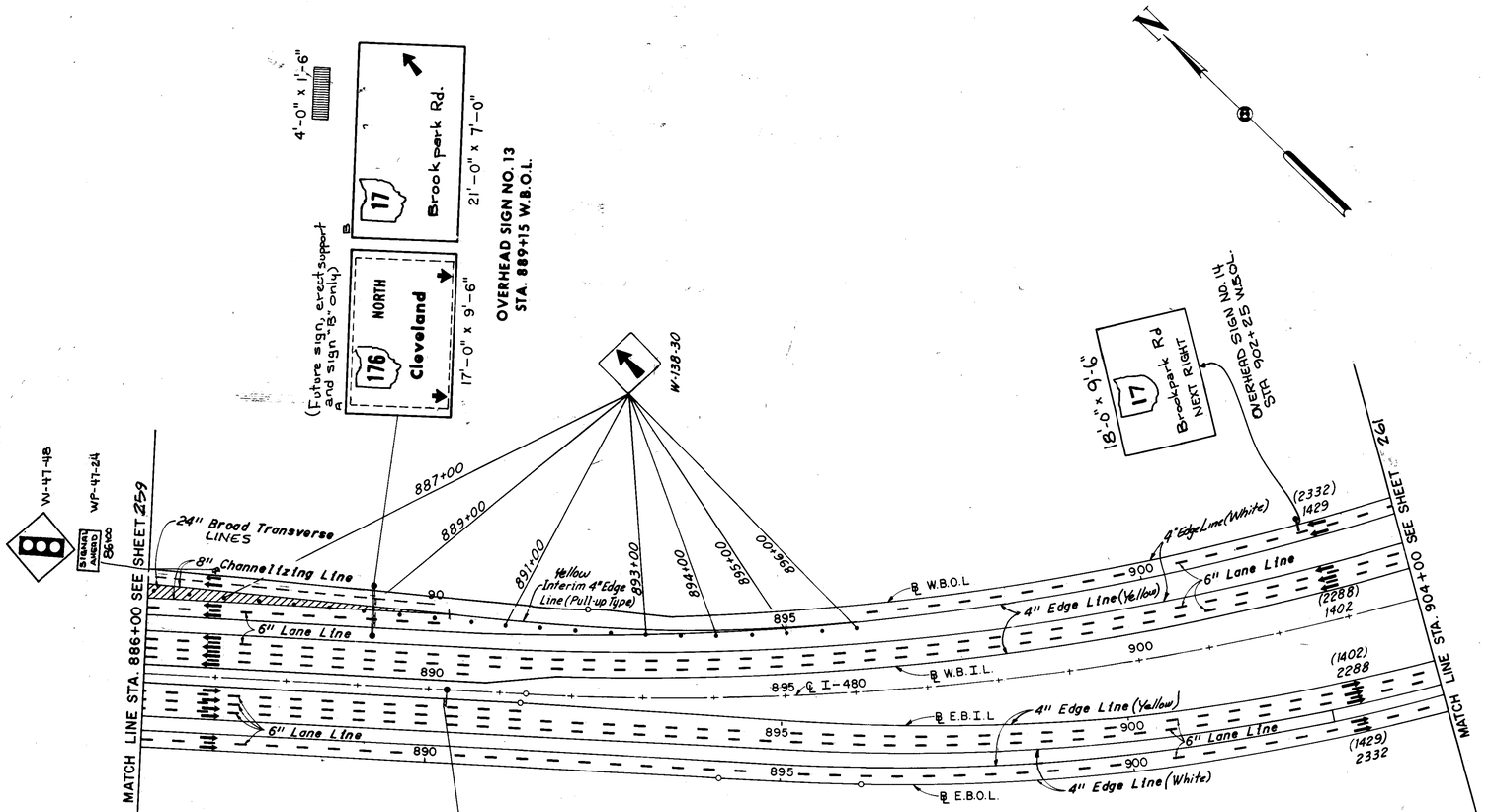
TRAFFIC CONTROL PLAN

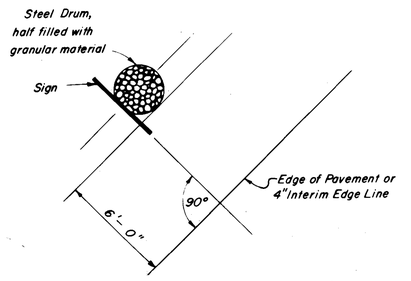
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

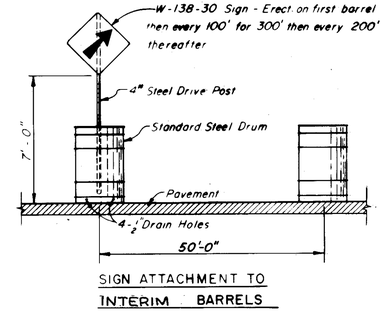
260/392

10/31

CUYAHOGA COUNTY
CUY.– 480–15.81







SIGN ATTACHMENT TO INTERIM BARRELS

Notes:

All signs for this project will be furnished by others.

Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.

This area indicates sign with black letters on yellow background.

This area indicates permanent sign to be erected with blank green interim overlay.

Signs indicated as interim are to be erected under this contract and the messages are to be revised in the future by others.

100 0 100 200 300 400
SCALE IN FEET

SCALE 1"=100'
MAD. TPM DATE 5-25-68
TRCD. MAG DATE 5-26-68
CKD. JEN DATE 8-18-71

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

REVISED 9-12-74 RSE

DESIGN YEAR : 1991
DESIGN SPEED : 60 MPH
DIRECTIONAL DESIGN HOURLY VOLUME (DDHV) : (000) = A.M. PEAK
000 = P.M. PEAK

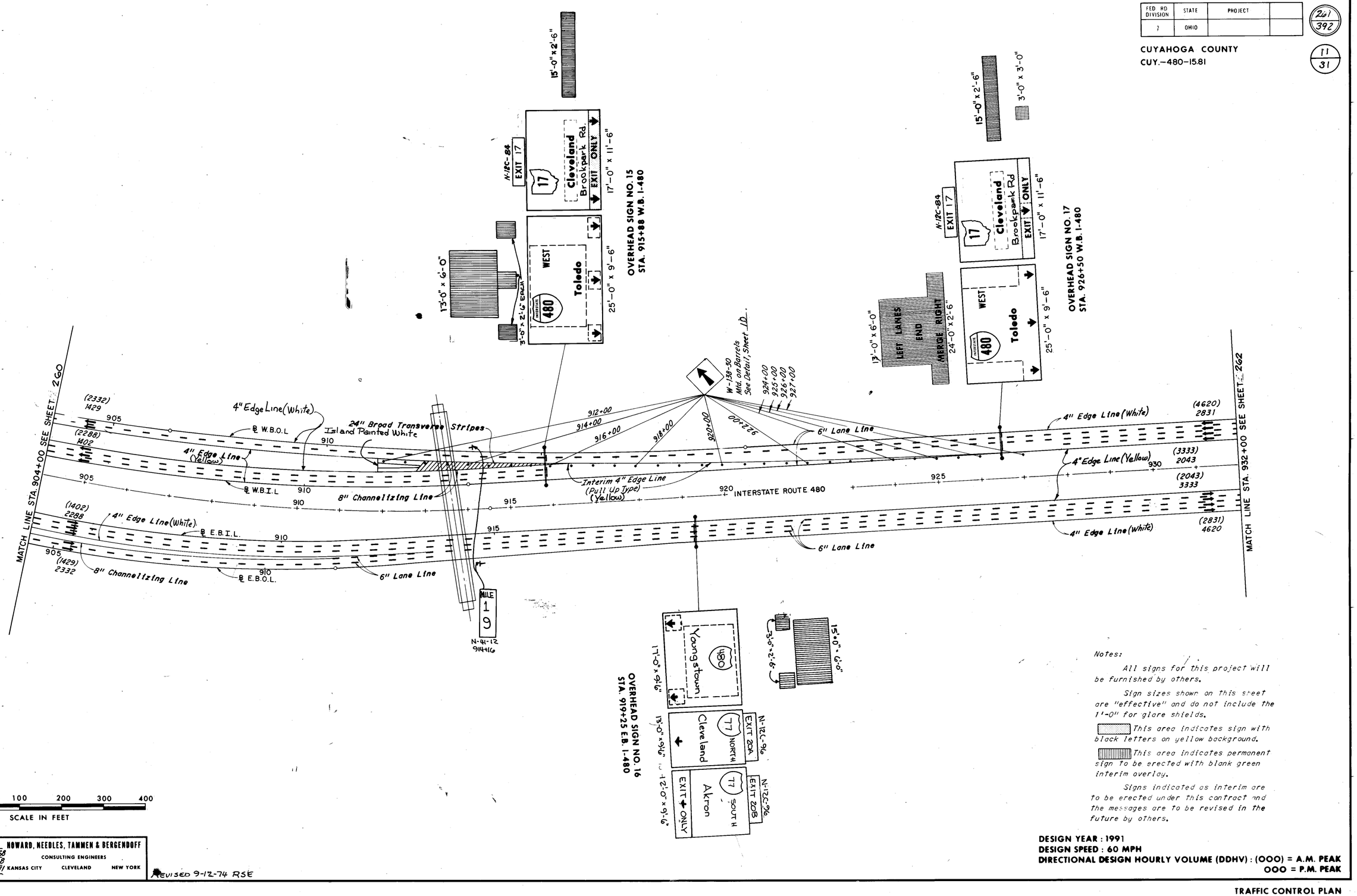
TRAFFIC CONTROL PLAN

FED. RD. DIVISION	STATE	PROJECT	
7	OHIO		

2a1 / 392

11 / 31

CUYAHOGA COUNTY
CUY.–480–15.81



100 0 100 200 300 400
SCALE IN FEET

SCALE	1"=100'	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE	TPM	DATE 6-2-68	CONSULTING ENGINEERS
TRCD.	MAG	DATE 6-3-68	KANSAS CITY CLEVELAND NEW YORK
CKD.	JEN	DATE 9-18-71	

REVISED 9-12-74 RSE

Notes:

All signs for this project will be furnished by others.

Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.

This area indicates sign with black letters on yellow background.

This area indicates permanent sign to be erected with blank green interim overlay.

Signs indicated as interim are to be erected under this contract and the messages are to be revised in the future by others.

DESIGN YEAR : 1991
DESIGN SPEED : 60 MPH
DIRECTIONAL DESIGN HOURLY VOLUME (DDHV) : (000) = A.M. PEAK
000 = P.M. PEAK

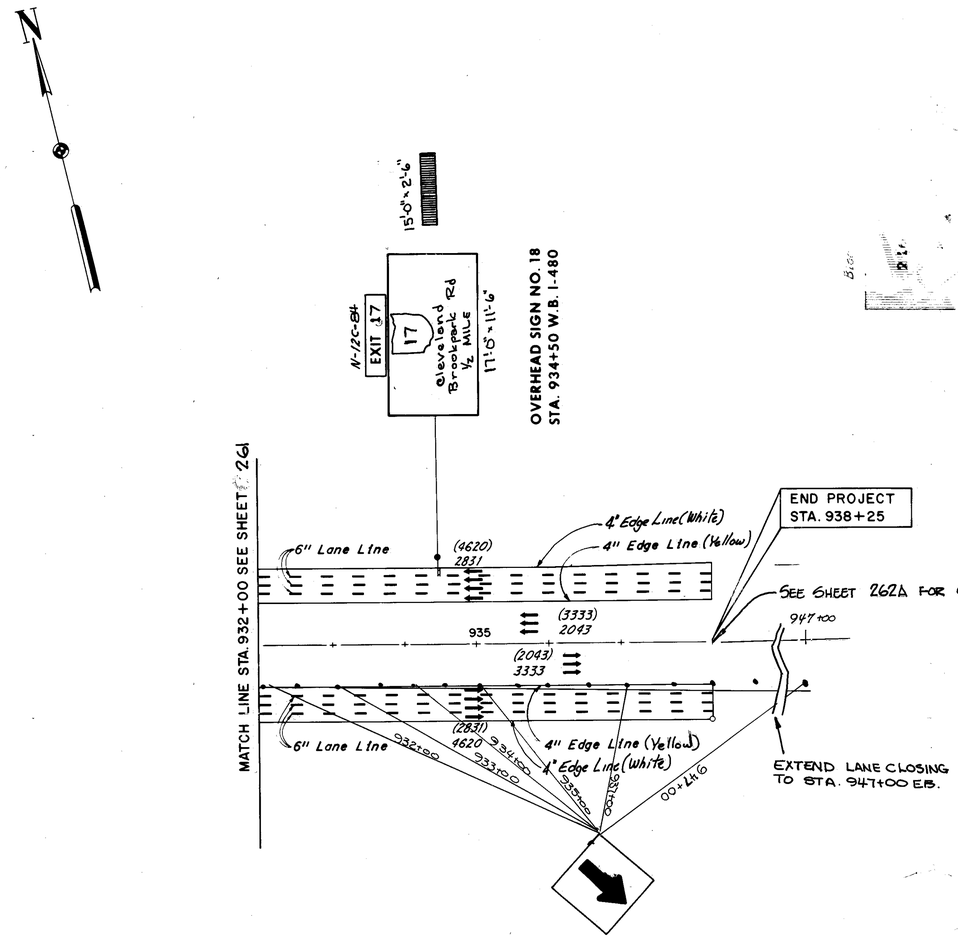
TRAFFIC CONTROL PLAN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

262
392

12
31

CUYAHOGA COUNTY
CUY.-480-15.81



Notes:

All signs for this project will be furnished by others.

Sign sizes shown on this sheet are "effective" and do not include the 1'-0" for glare shields.

▨ This area indicates permanent sign to be erected with blank green interim overlay.

Signs indicated as interim are to be erected under this contract and the messages are to be revised in the future by others.

100 0 100 200 300 400
SCALE IN FEET

SCALE	1"= 100'	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE	TPM	DATE 6-3-68	CONSULTING ENGINEERS
TRCD.	MAG	DATE 6-3-68	
CKD.	JEN	DATE 8-18-71	KANSAS CITY CLEVELAND NEW YORK

REVISED 9-12-74 RSE

DESIGN YEAR : 1991
DESIGN SPEED : 60 MPH
DIRECTIONAL DESIGN HOURLY VOLUME (DDHV) : (000) = A.M. PEAK
000 = P.M. PEAK

TRAFFIC CONTROL PLAN

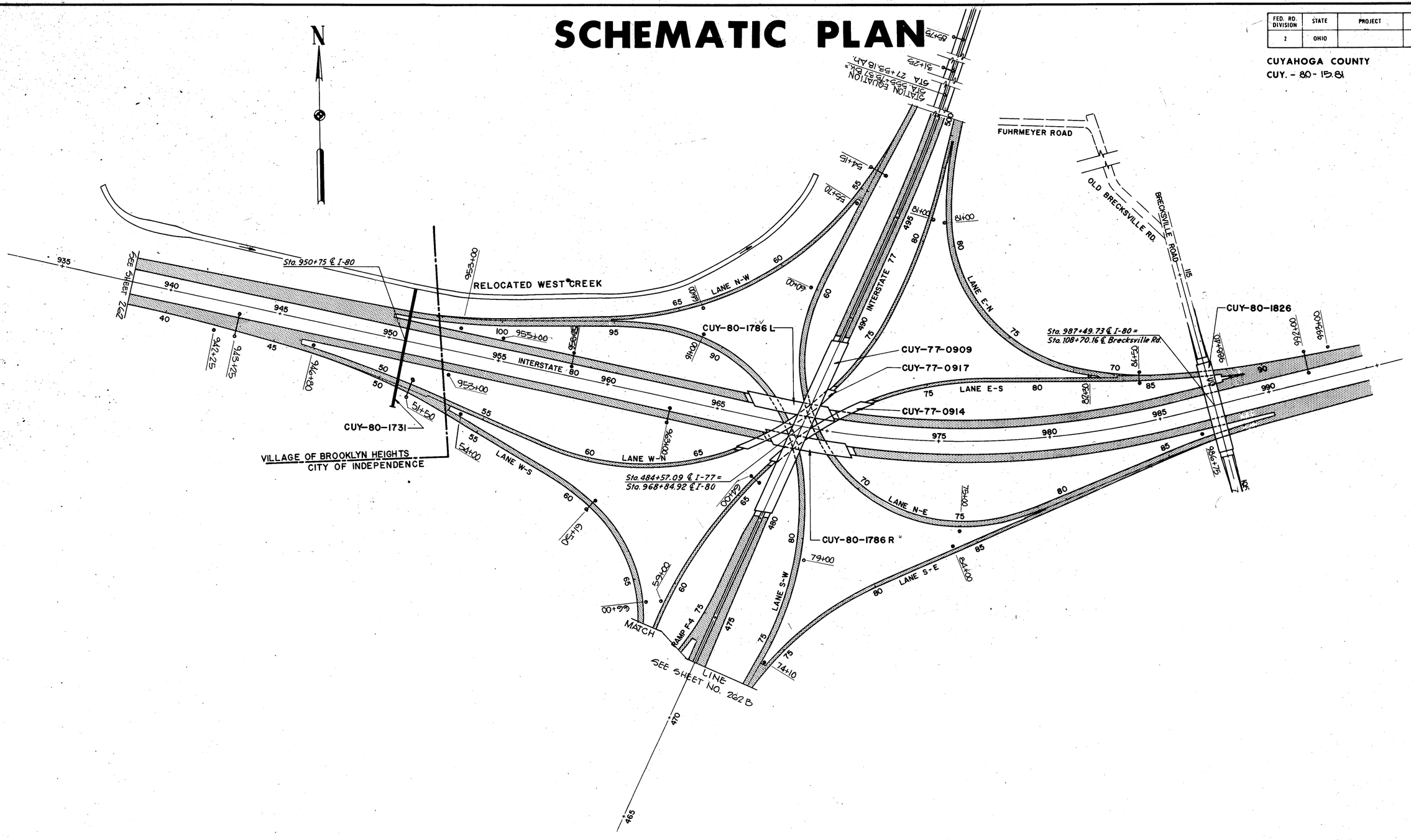
Broadview Rd.

SCHEMATIC PLAN

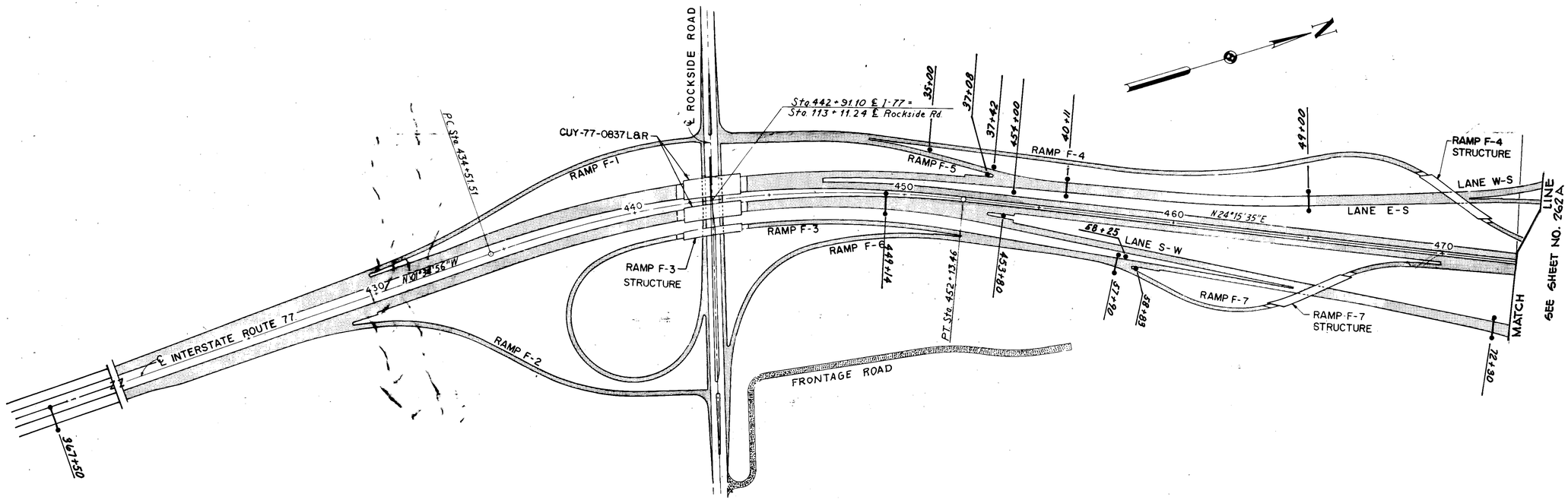
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

262A
392

CUYAHOGA COUNTY
CUY. - 80 - 15.81

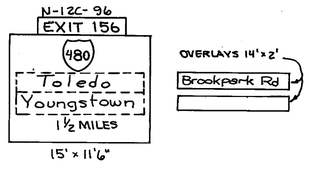


CUYAHOGA COUNTY
CUY- 80-18.81

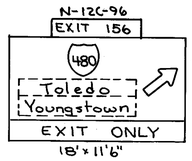


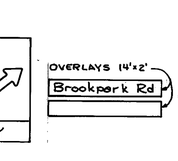
CUYAHOGA COUNTY
CUY.480-15.81

Sta. 367+50 N.B. 77



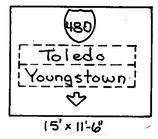
Sta. 449+14 N.B. 77



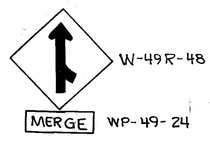


Sta. 37+08 Ramp F-5
Sta 54+00 Lane W-S
Sta 55+10 Lane N-E
Sta. 74+10 Lane SW
Sta. 453+80 N.B. 77
Sta. 58+83 Ramp F-3
Sta 946+80 EB. 480
Sta. 988+40 WB 480
Sta. 82+30 Lane E-S

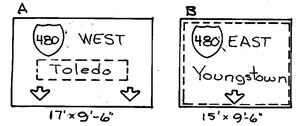
Sta. 57+90 Ramp F-3

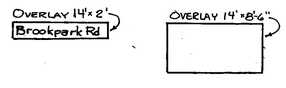


Sta. 955+00 W.B. 480
Sta. 59+00 Lane E-S
Sta. 81+00 Lane W-N
Sta. 91+00 Lane S-W
Sta. 58+25 Lane S-W
Sta. 75+00 Lane N-E
Sta 454+00 SB 77
Sta. 986+75 EB 480
Sta. 35+00 Ramp F-5

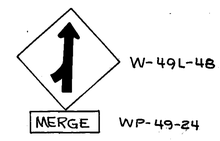


Sta. 72+30 Lane S-W





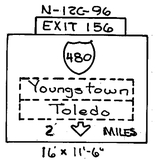
Sta. 66+00 Lane W-S
Sta. 84+00 Lane S-E
Sta. 64+00 Lane N-W
Sta. 81+00 Lane E-N

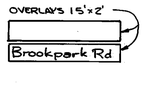


SHEET ADDED 9-12-74 RSE

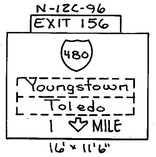
Sta 79+00 Lane S-W
Sta 60+00 Lane N-E

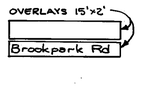
Sta 85+75 SB 77



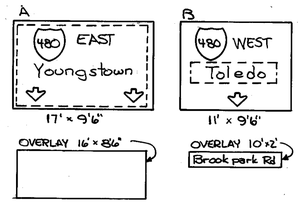


Sta. 31+25 SB. 77

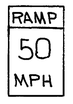




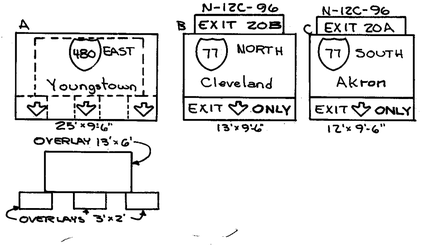
Sta. 54+15 Lane N-E



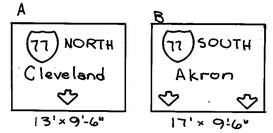
Sta. 942+25 EB. 480
Sta. 993+00 WB. 480



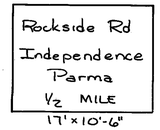
Sta. 943+25 E.B. 480



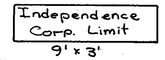
Sta. 51+50 Lane W-S



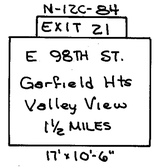
Sta 61+15 Lane W-S



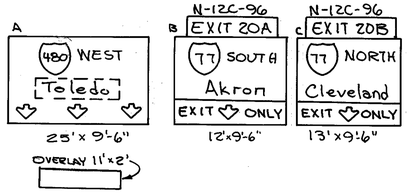
Sta. 953+80 EB 480



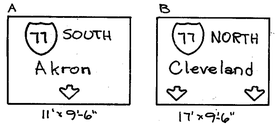
Sta. 963+00 E.B. 480



Sta. 992+00 W.B. 480



Sta. 84+50 Lane E-S



CUYAHOGA COUNTY
CUY. 480-15.81

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392

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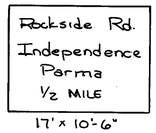
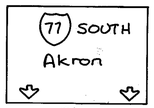
Sta. 64+00 LANE E-S



17' x 10'-6"

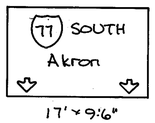
Sta. 49+00 LANE E-S



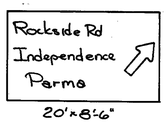
17' x 9'-6"

17' x 10'-6"

Sta. 40+11 LANE E-S

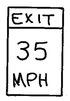


17' x 9'-6"



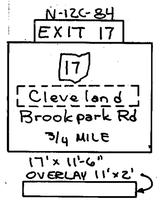
20' x 8'-6"

Sta 37+42 RAMP F-5



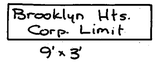
W-97-48

Sta. 958+25 WB 480



17' x 11'-6"
OVERLAY 11' x 2'

Sta. 953+00 WB 480



9' x 3'

SHEET ADDED 9-12-74 RSE

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

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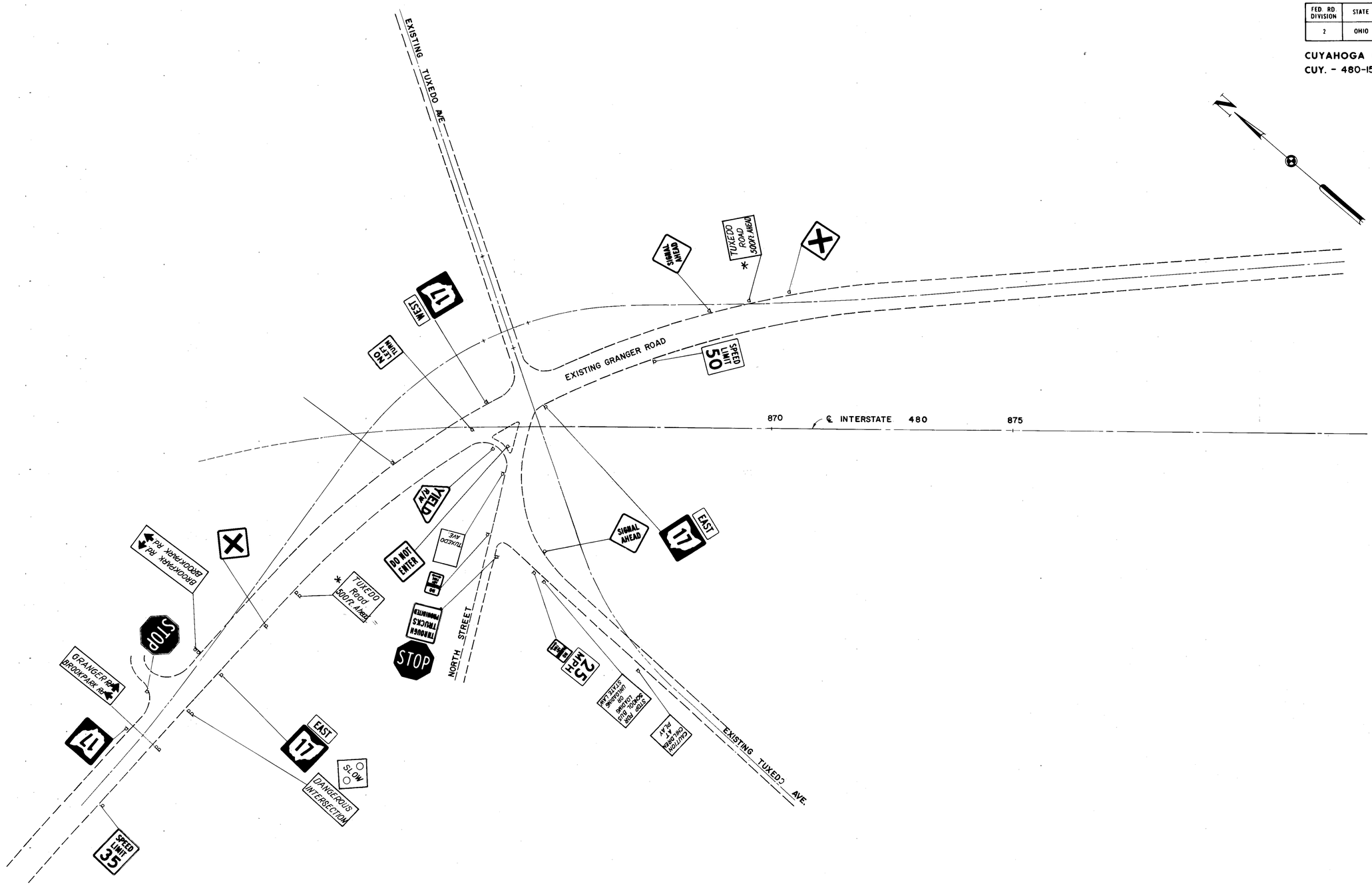
15/31

CUYAHOGA COUNTY
CUY. - 480-15.81



SCALE 1" = 100'
MADE JEN DATE 2-2-71
TRCD. JMD DATE 02-12-71
CKD. JEN DATE 8-5-71

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

REVISED 9-12-74 RSE

Note
The signs on this sheet are to be removed for storage, except as noted.

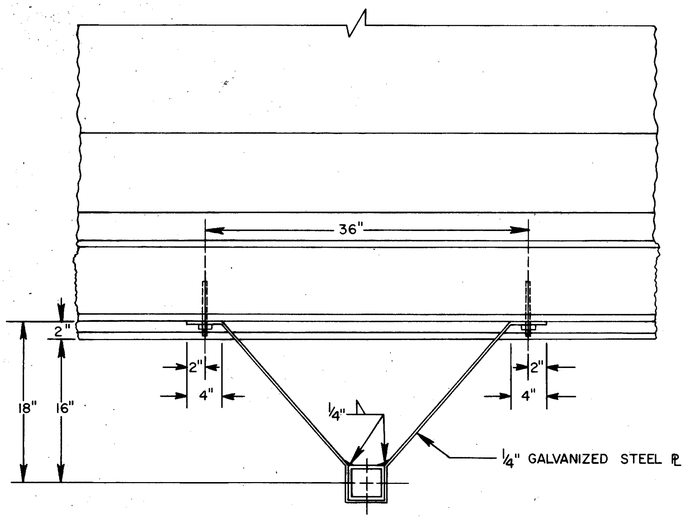
* Remove and re-erect on new supports

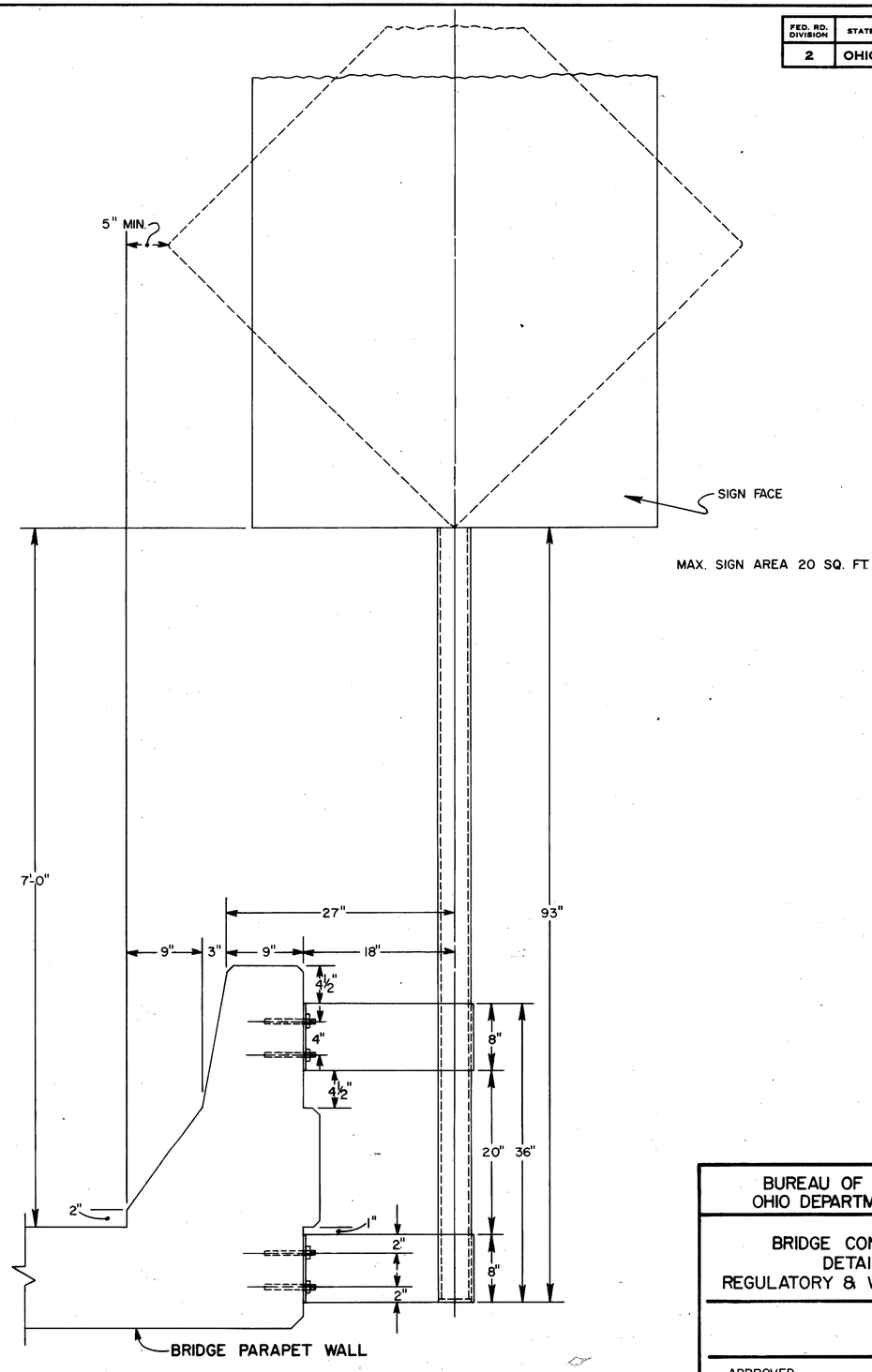
EXISTING SIGNS

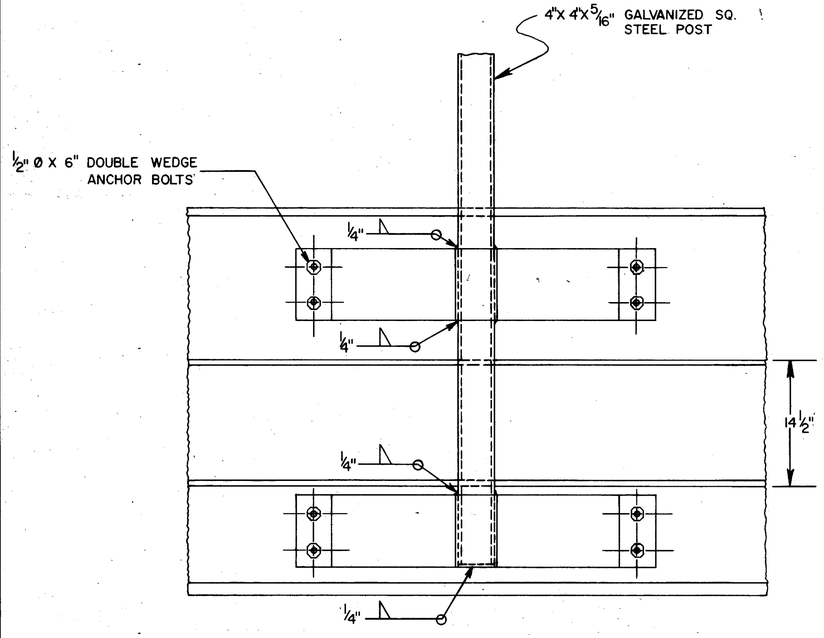
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

266/392

16/31







SHEET ADDED 9-12-74 RSE

BUREAU OF DESIGN SERVICES
OHIO DEPARTMENT OF HIGHWAYS

BRIDGE CONNECTION DETAILS
REGULATORY & WARNING SIGNS

DATE 5/5/72

APPROVED _____
ENGINEER OF DESIGN SERVICES

MISCELLANEOUS DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

267
392

CUYAHOGA COUNTY
CUY.-480-15.81

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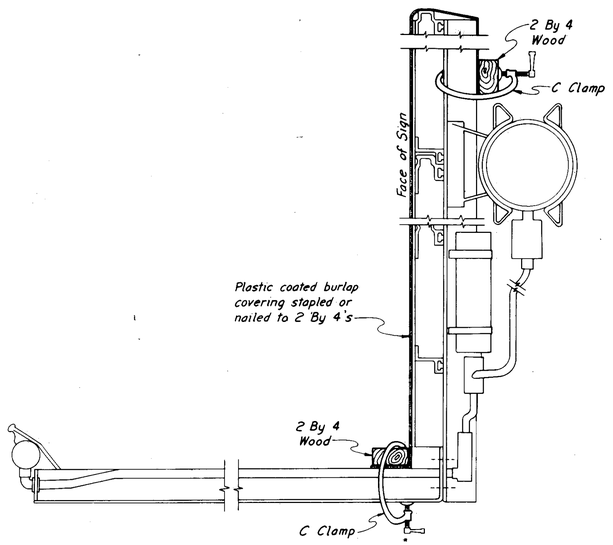
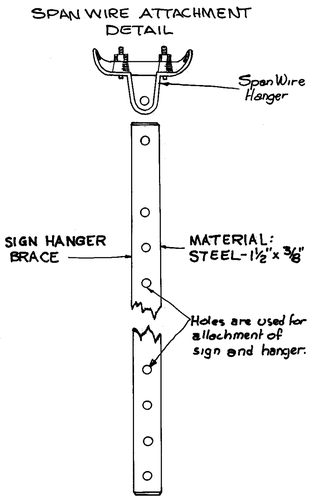
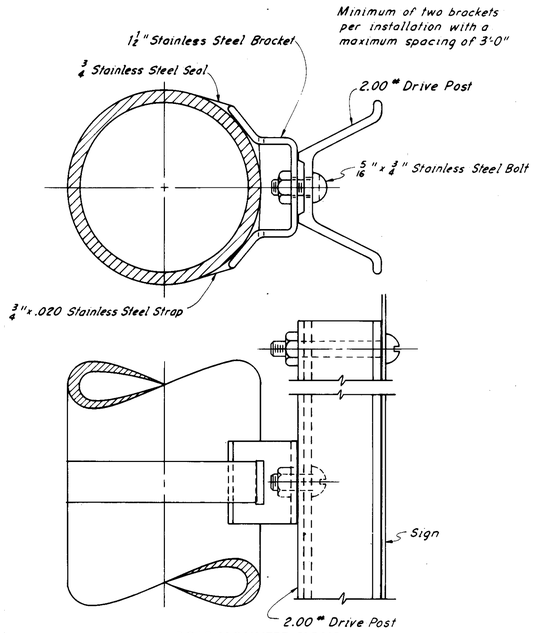
31

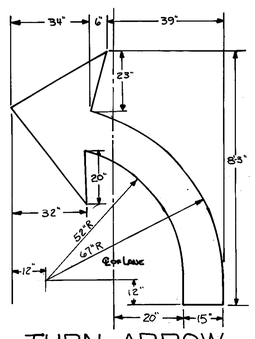


ATTACHMENT OF INTERIM COVERING DETAIL

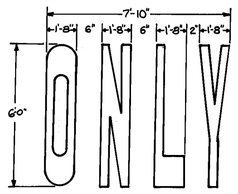




POLE MOUNTED SIGNS



TURN ARROW



WORD "ONLY"

SCALE No Scale
MADE JEN DATE 8-7-69
TRCD. RJK DATE 2-17-71
CKD. DDS DATE 2-25-71

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

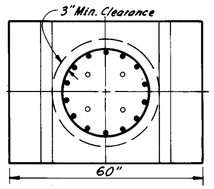
REVISED 9-12-74 RSE

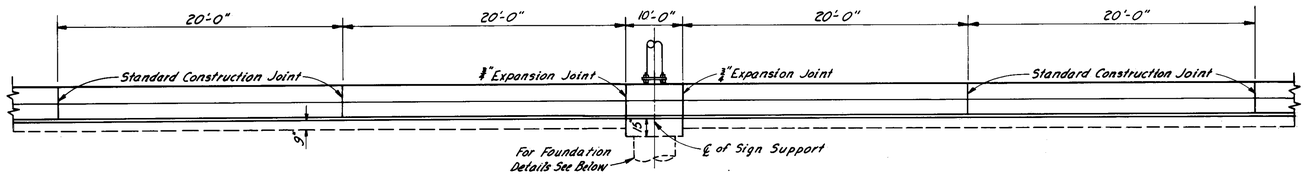
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

268
392

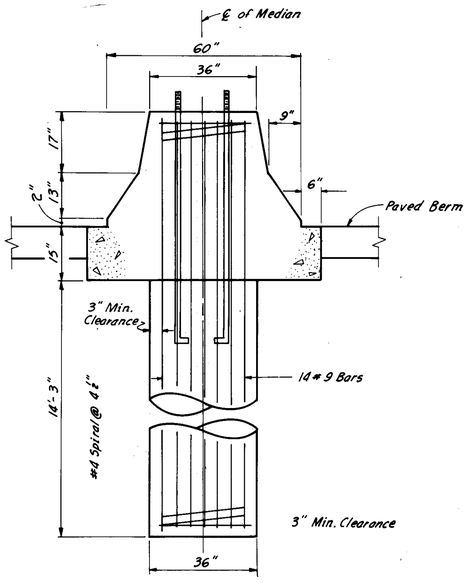
18
31

CUYAHOGA COUNTY
CUY.–480–15.81



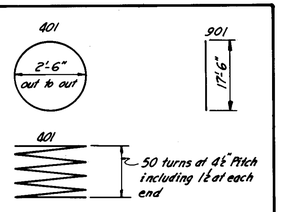


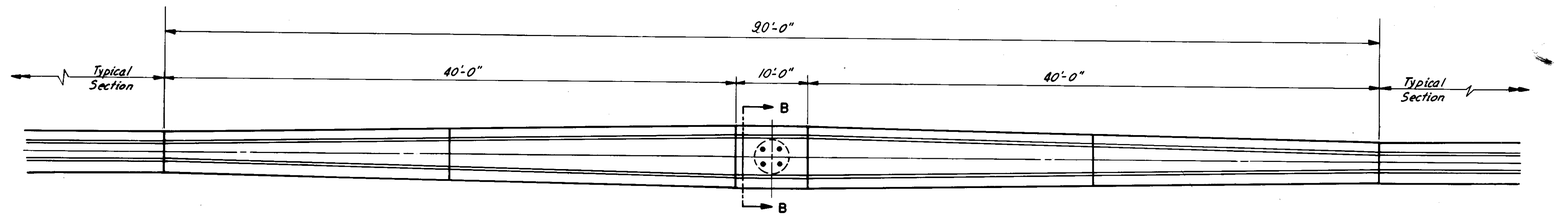
CONSTRUCTION JOINT LOCATIONS



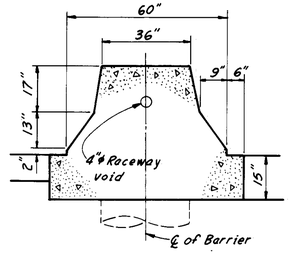
SIGN SUPPORT
FOUNDATION DETAILS
FOR
CONCRETE MEDIAN BARRIER

REINFORCEMENT SCHEDULE			
MARK	NO.	LENGTH	TYPE
901	14	17'-6"	Straight
401	1	17'-6"	Spiral





STANDARD MEDIAN BARRIER FLARE
(Flare shall be 40:1 Taper)



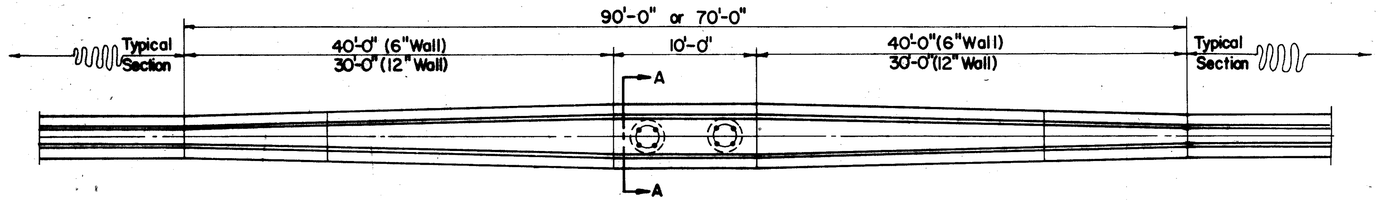
SECTION B-B

SCALE No Scale
MADE JEN DATE 2-3-70
TRCD. RJK DATE 2-5-70
CKD. DDS DATE 2-21-70

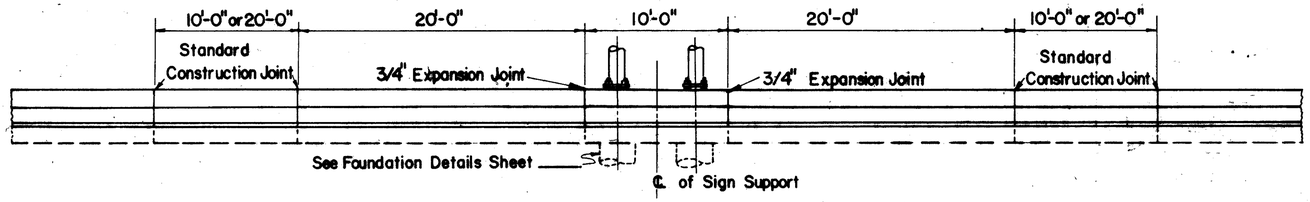
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

REVISED 9-12-74 RSE

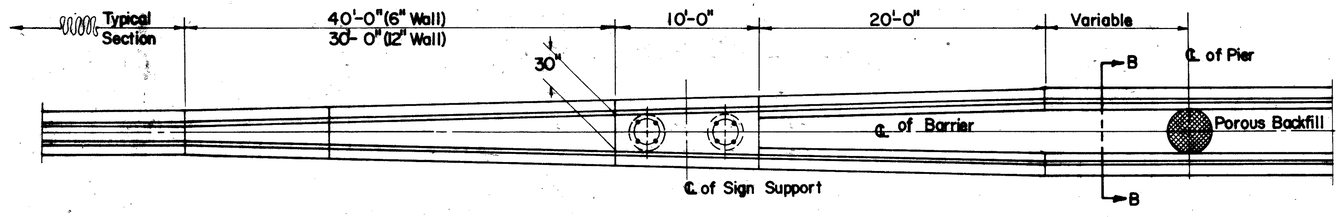
BARRIER MEDIAN AND FOUNDATION DETAILS FOR CANTILEVER SIGN



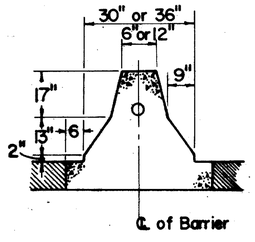
STANDARD BARRIER MEDIAN FLARE
(Flare shall be 40:1 taper)



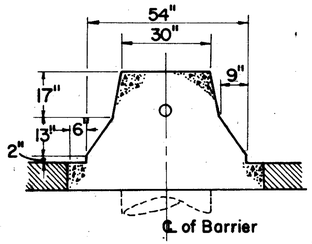
CONSTRUCTION JOINT LOCATIONS



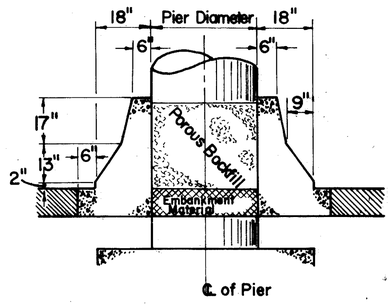
BRIDGE PIER APPROACH FLARE
(Flare shall be 40:1 Taper)



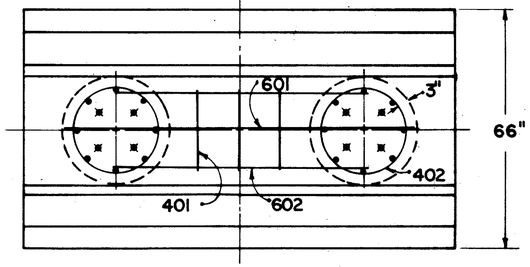
TYPICAL SECTION

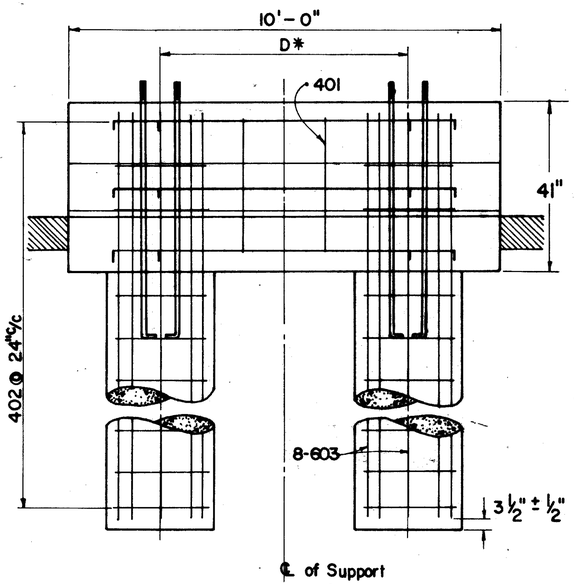


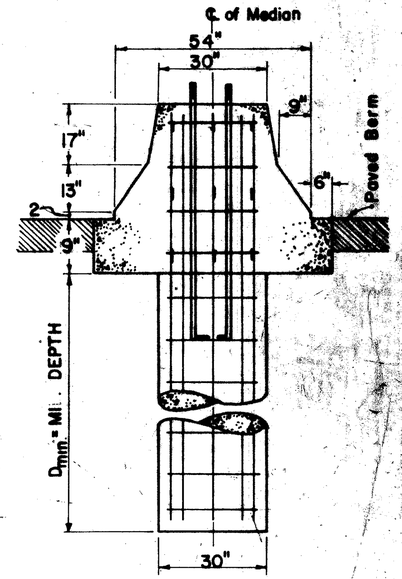
SECTION A-A



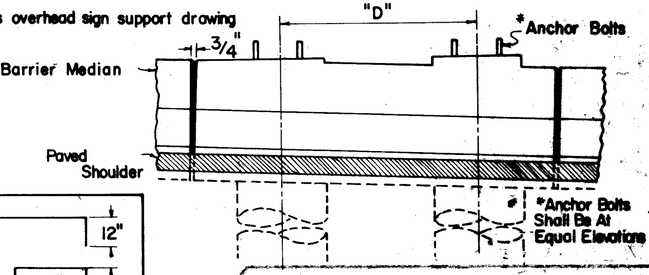
SECTION B-B



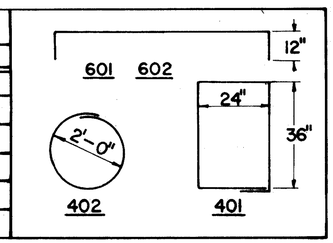




* For dimension "D" see 7 series overhead sign support drawing



REINFORCEMENT SCHEDULE			
MARK	NO.	LENGTH	TYPE
401	12" ℄	10'-6"	401
402	24" ℄	7'-6"	402
601	3	D+48"	601
602	6	D+24"	602
603	16	D_{min}+38"	Str.



BUREAU OF DESIGN SERVICES
OHIO DEPARTMENT OF HIGHWAYS

MEDIAN BARRIER WALL
SIGN SUPPORT FOUNDATIONS

DATE 5/1/72

STANDARD CONSTRUCTION DRAWING

APPROVED _____
ENGINEER OF DESIGN SERVICES

SHEET ADDED 9-12-74 RSE

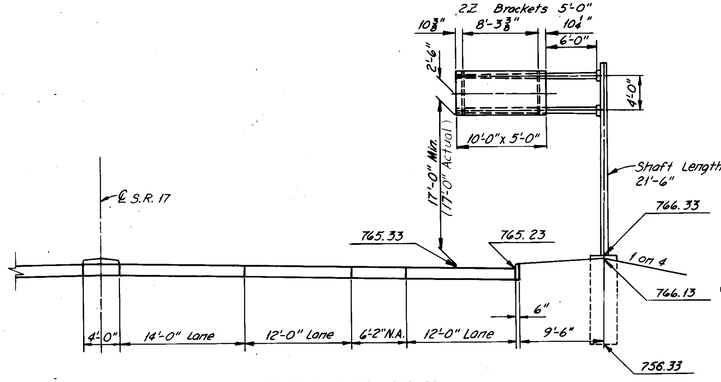
SIGN SUPPORT DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

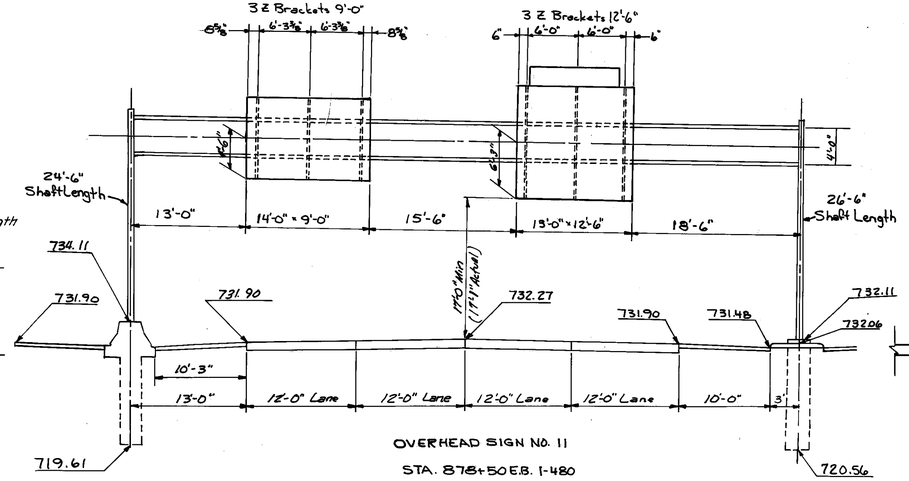
CUYAHOGA COUNTY
CUY. 480-15.81

264
392

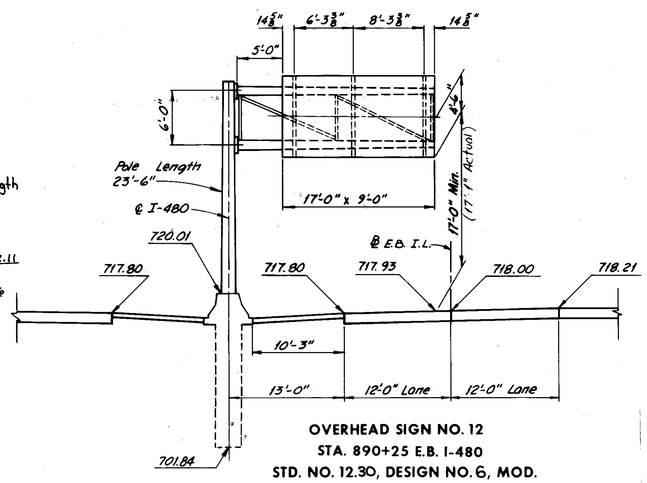
19
31



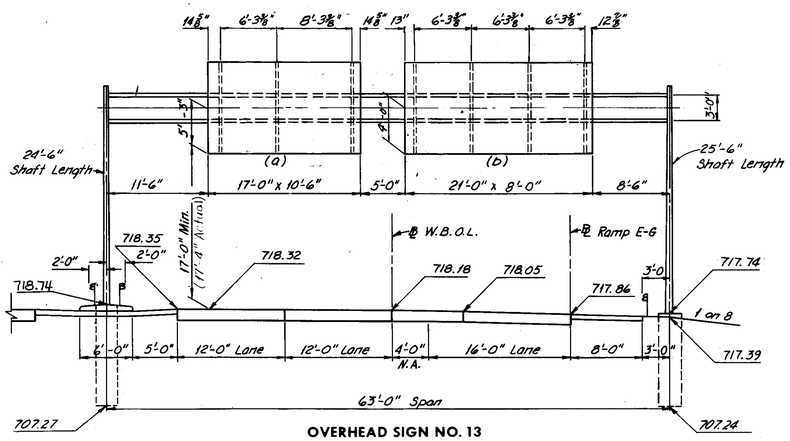
OVERHEAD SIGN NO. 10
STA. 7+90 S.R. 17 AND RAMP G-E
STD. NO. 12.30, DESIGN NO. 1, MOD.



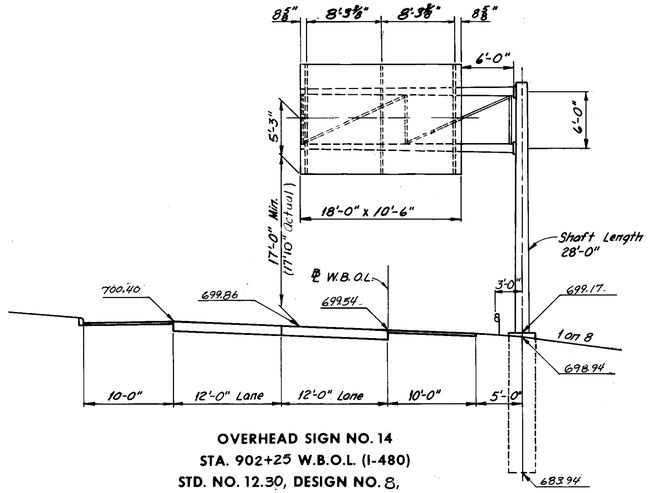
OVERHEAD SIGN NO. 11
STA. 878+50 E.B. I-480
STD. NO. 7.5, DESIGN NO. 2, MOD.
74'-0" SPAN



OVERHEAD SIGN NO. 12
STA. 890+25 E.B. I-480
STD. NO. 12.30, DESIGN NO. 6, MOD.
22'-0" ARMS



OVERHEAD SIGN NO. 13
STA. 889+50 W.B.O.L. (I-480)
STD. NO. 7.5, DESIGN NO. 1, MOD.
63'-0" SPAN



OVERHEAD SIGN NO. 14
STA. 902+25 W.B.O.L. (I-480)
STD. NO. 12.30, DESIGN NO. 8,
24'-0" ARMS

SCALE 1" = 1'-0"
MADE D.C.F. DATE 5-24-71
TRCD. K.A.N. DATE 5-1-71
CK'D. J.E.N. DATE 5-3-71

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

REVISED 9-12-74 RSE

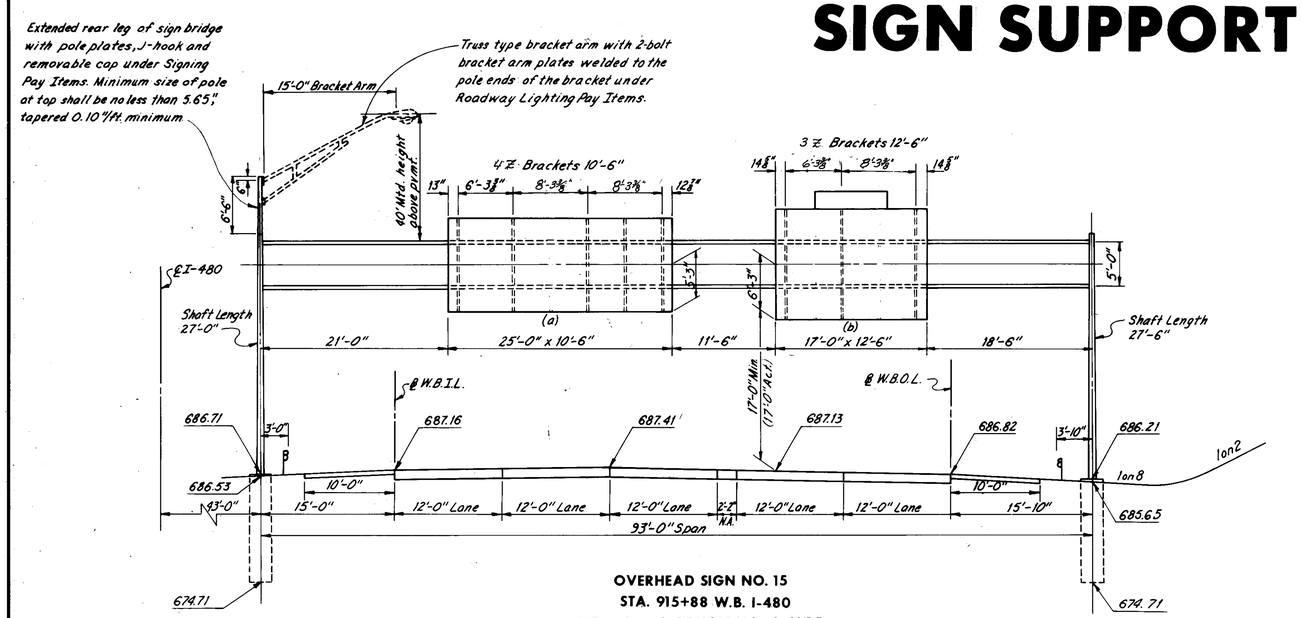
SIGN SUPPORT DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

270 / 392

CUYAHOGA COUNTY
CUY. 480–15.81

20 / 31



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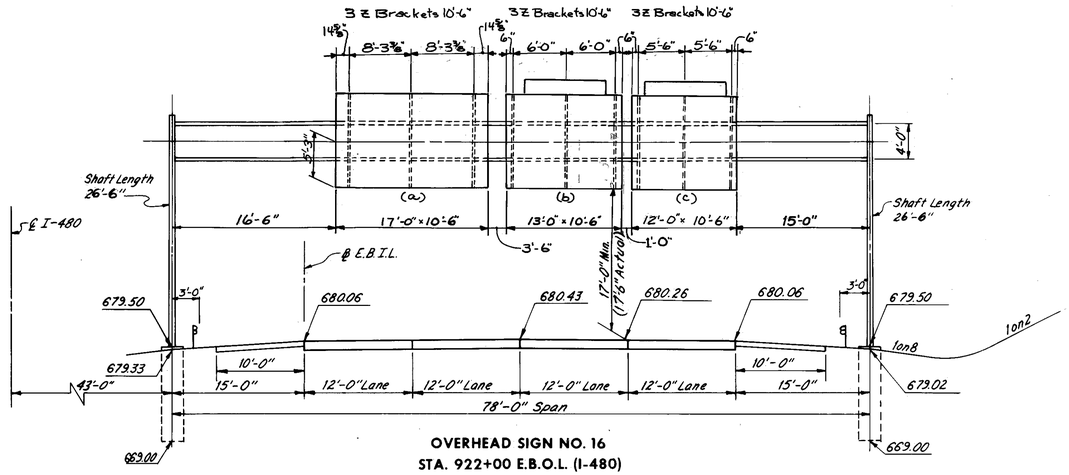
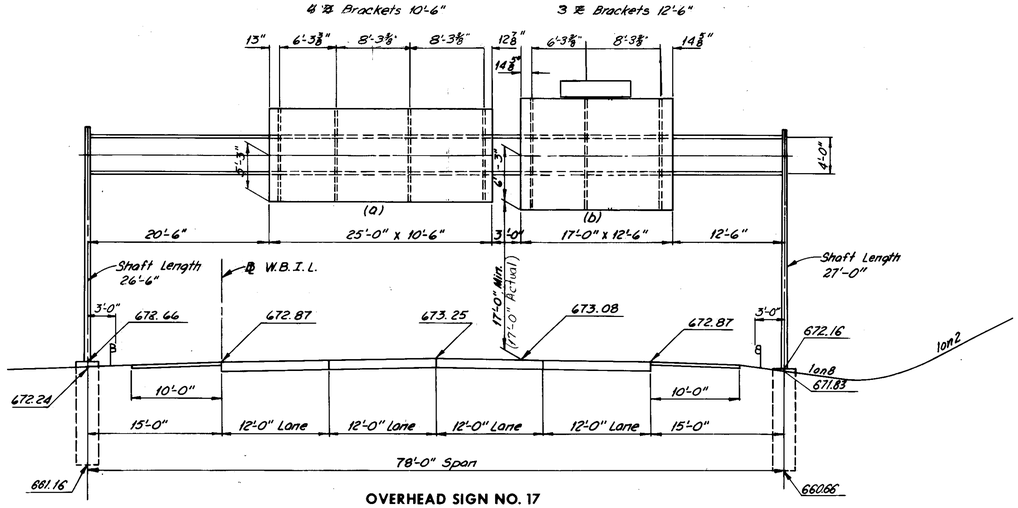
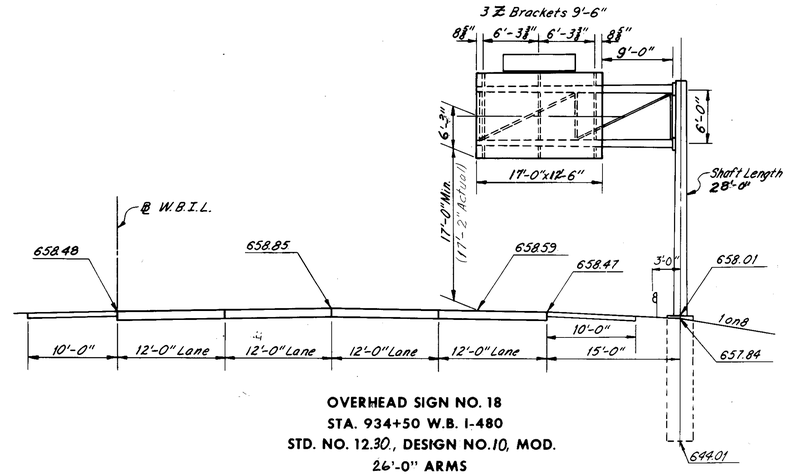
STA. 915+88 W.B. I-480
STD. NO. 7.6, DESIGN NO. 4, MOD.
93'-0" SPAN



OVERHEAD SIGN NO. 16
STA. 922+00 E.B.O.L. (I-480)
STD. NO. 7.5, DESIGN NO. 2, MOD.
78'-0" SPAN



OVERHEAD SIGN NO. 17
STA. 926+50 W.B.I.L. (I-480)
STD. NO. 7.6, DESIGN NO. 3, MOD.
78'-0" SPAN



OVERHEAD SIGN NO. 18
STA. 934+50 W.B. I-480
STD. NO. 12.30., DESIGN NO. 10, MOD.
26'-0" ARMS

SCALE 3/8" = 1'-0" | HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE D.C.F. DATE 5-29-71 | CONSULTING ENGINEERS
TRCD K.A.N. DATE 6-1-71
CKD J.E.N. DATE 6-3-71 | KANSAS CITY CLEVELAND NEW YORK

REVISED 9-12-74 RSE

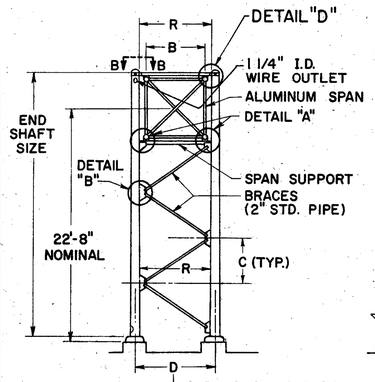
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

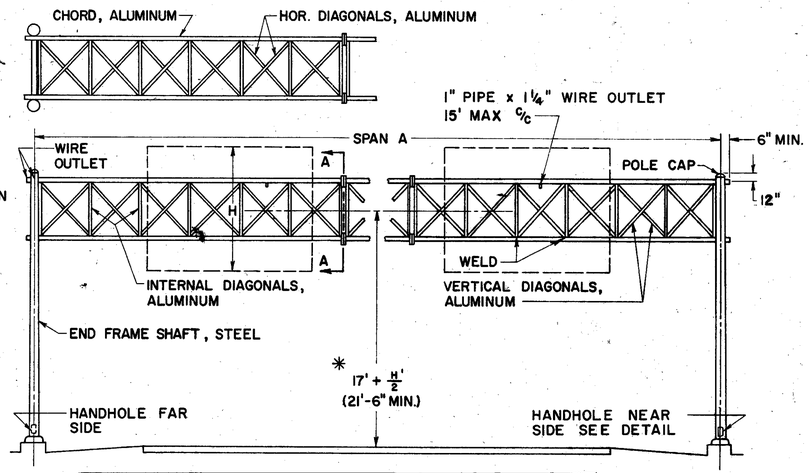
271
392

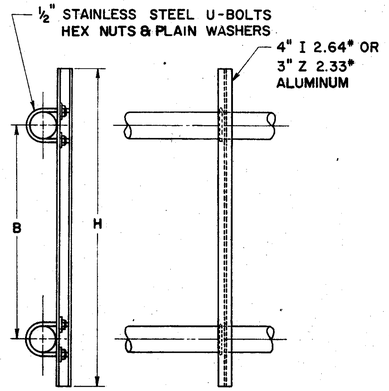
21
31

CUYAHOGA COUNTY
CUY. 480-15.81

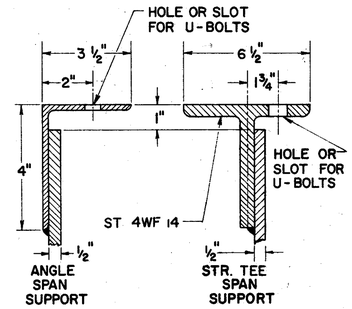
DIRECTION OF TRAFFIC







SIGN BRACKET



SECTION D-D

NOTES

MATERIALS

THE OVERHEAD SPAN TRUSS SHALL BE ALUMINUM AND THE END FRAMES SHALL BE STEEL.

SPAN TRUSS AND END FRAMES, INCLUDING HARDWARE, SHALL BE IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 816 UNLESS OTHERWISE NOTED.

STEEL POLE BASES AND GUSSETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A-373.

AFTER FABRICATION THE TAPERED POLES SHALL HAVE A MINIMUM YIELD STRENGTH OF 48,000 PSI.

FABRICATION

THE ENTIRE STEEL END FRAME SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SEC. 711.02

MAXIMUM LENGTH OF SPAN SECTIONS IS 30 FT.

ERECTION

USE A MINIMUM OF 1" CAMBER IN SPAN TRUSS MEMBER FOR A 50' SPAN; ADD 1/4" OF CAMBER FOR EACH 5' OF INCREASE IN SPAN OVER 50'.

PAYMENT

PAYMENT FOR THE GALVANIZED CONDUIT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS.

SOILS

THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY, OR STIFF CLAY).

FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

REINFORCING STEEL

COST OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 816 CONCRETE FOR SIGN SUPPORT FOUNDATIONS.

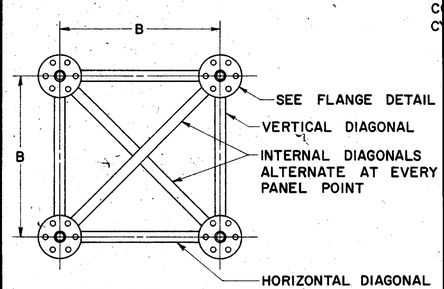
BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST DIGIT WHERE THREE DIGITS ARE USED AND THE FIRST TWO DIGITS WHERE FOUR ARE USED, INDICATE THE BAR SIZE NUMBER.

*FOUNDATION ELEVATION

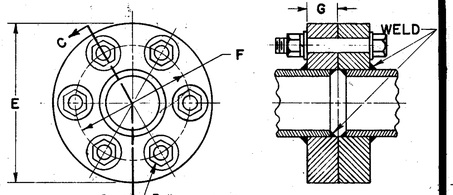
ELEVATION OF TOPS OF FOUNDATIONS SHALL BE BUILT UP SO THAT 17' CLEARANCE IS MAINTAINED OVER THE ENTIRE WIDTH OF PAVEMENT AND SHOULDERS.

DESIGN

THE DESIGN OF OVERHEAD SUPPORTS IS IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 12, 1961.

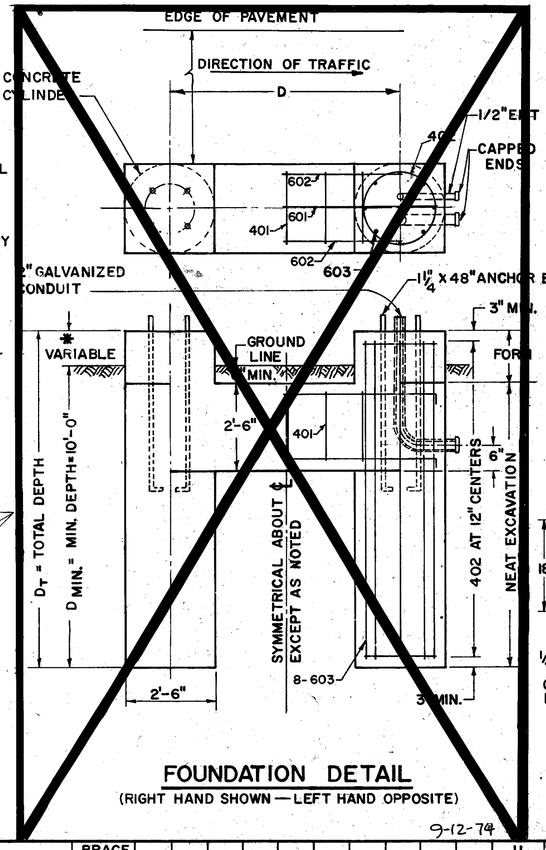


SECTION A-A



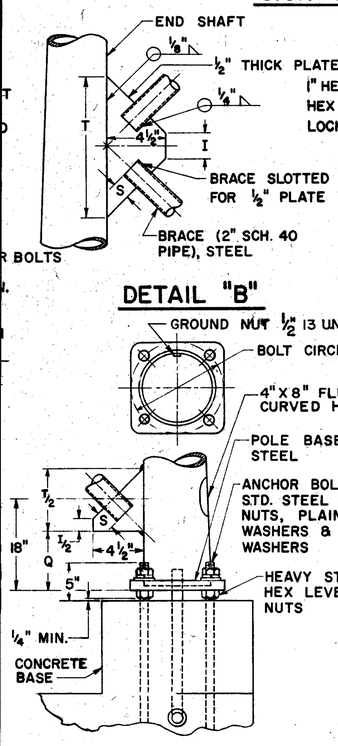
CAST FLANGE, B-26 ALLOY SG 70A-T7 (356-T7)

FLANGE DETAIL



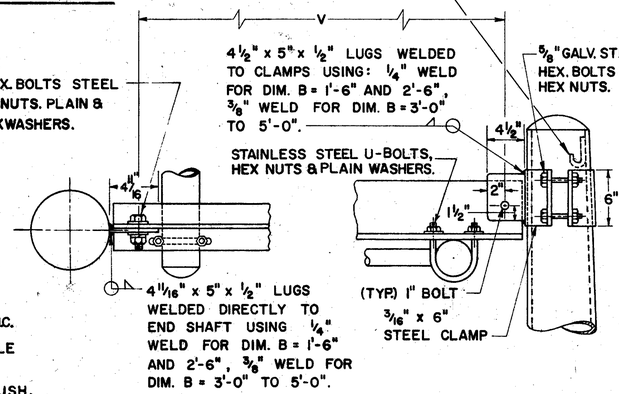
FOUNDATION DETAIL

(RIGHT HAND SHOWN — LEFT HAND OPPOSITE)



DETAIL "B"

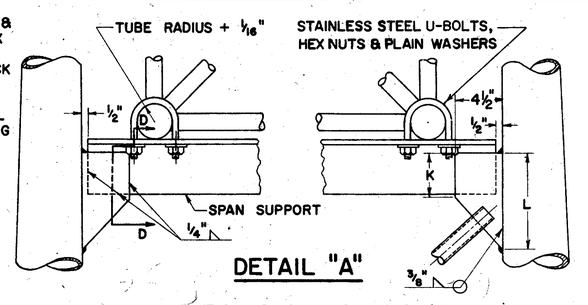
POLE BASE DETAIL



VIEW B-B

DETAIL "D"

UPPER SPAN SUPPORT (ALTERNATE METHODS)



DETAIL "A"

LOWER SPAN SUPPORT

DESIGN NO.	SPAN A	B	C	D	E	END SHAFT	BRACE LENGTH	F	G	I	K	L	P	Q	R	S	T	U BOLTS	V	BOLT CIRCLE	SPAN SUPPORT SECTION D-D	CHORDS	HORIZONTAL AND INTERNAL DIAGONAL	VERTICAL DIAGONAL
1	50' THRU 70'	3'-0"	4'-1 3/4"	4'-5"	9 1/4"	8"X4.5"X25'-0", 3GA	5'-10 3/16"	7 7/16"	1 3/8"	3 1/2"	4 3/4"	8"	12"	6 5/8"	3'-9"	1 1/2"	10"	5/8"	3'-3 5/8"	11"	SPLIT TEE 3'—8"	4 3/4"X.188"	1.900"X.145"	1.660"X.140"
2	71' THRU 80'	4'-0"	4'-10 1/4"	5'-7"	9 1/4"	8"X6.22"X25'-6", 3GA	6'-7 1/8"	7 7/16"	1 3/8"	5/8"	4 3/8"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5/8"	4'-5 5/8"	11"	SPLIT TEE 4'—10"	4 3/4"X.188"	2" X .188"	1.900"X.145"
3	81' THRU 86'	4'-0"	4'-10 1/4"	5'-7"	11"	8"X6.22"X25'-6", 3GA	6'-7 1/8"	8 1/2"	1 1/2"	5/8"	4 3/8"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5/8"	4'-5 5/8"	11"	SPLIT TEE 4'—10"	5 1/2"X.250"	2" X .188"	1.900"X.145"
4	86' THRU 110'	5'-0"	4'-8 1/2"	6'-7"	11"	8"X6.18"X26'-0", 3GA	7'-3 1/4"	8 1/2"	1 1/2"	—	3 1/2"	7 3/4"	12"	7 1/4"	5'-11"	1 3/4"	11 1/4"	3/4"	5'-5 5/8"	11"	SPLIT TEE 5'—10"	5 1/2"X.250"	2 1/2"X.188"	2 1/2"X.188"

9-12-74

REINFORCEMENT SCHEDULE				
MARK	NO.	LENGTH	TYPE	
401	12"C/C	1'-6"	101	
402	12"C/C	7'-6"	103	
601	4	D+4'-0"	101	
602	8	D+2'-0"	101	
603	32	D+-6"	STR.	

9-12-74

BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		
OVERHEAD SIGN SUPPORTS	816 No. 7.5	DATE 5-2-62, 7-25-62, 4-20-64, 6-20-66
APPROVED Robert E. Comer ENGINEER OF TRAFFIC		

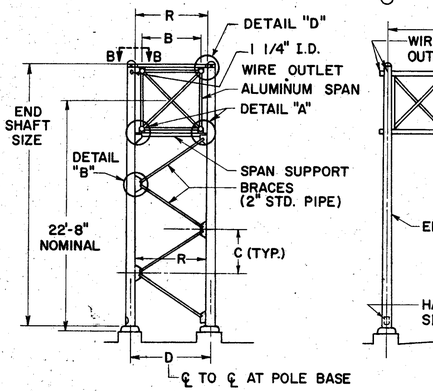
500 SQ. FT. SIGN AREA OVERHEAD SIGN SUPPORT, 816 NO. 7.5

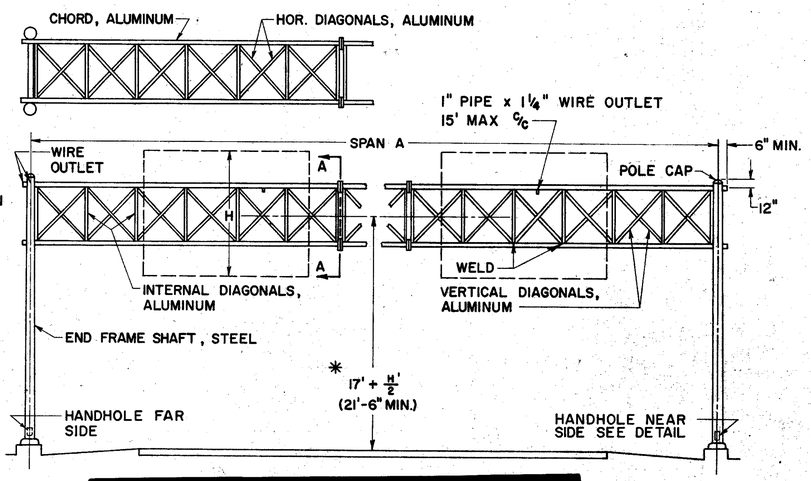
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

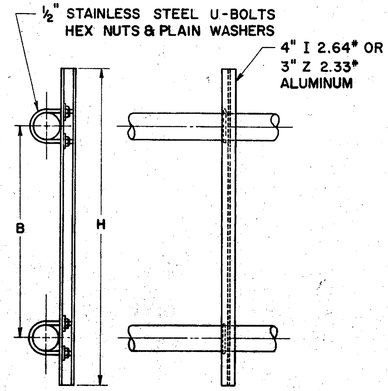
272
392

22
31

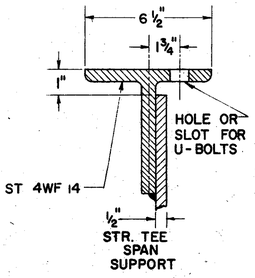
CUYAHOGA COUNTY
CUY. 480-15.81







SIGN BRACKET



SECTION D-D

NOTES

MATERIALS

THE OVERHEAD SPAN TRUSS SHALL BE ALUMINUM AND THE END FRAMES SHALL BE STEEL.

SPAN TRUSS AND END FRAMES, INCLUDING HARDWARE, SHALL BE IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 816 UNLESS OTHERWISE NOTED.

STEEL POLE BASES AND GUSSETS SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A-373.

AFTER FABRICATION THE TAPERED POLES SHALL HAVE A MINIMUM YIELD STRENGTH OF 48,000 PSI.

FABRICATION

THE ENTIRE STEEL END FRAME SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SEC. 711.02.

MAXIMUM LENGTH OF SPAN SECTIONS IS 30 FT.

ERECTION

USE A MINIMUM OF 1" CAMBER IN SPAN TRUSS MEMBER FOR A 50' SPAN; ADD 1/4" OF CAMBER FOR EACH 5' OF INCREASE IN SPAN OVER 50'.

PAYMENT

PAYMENT FOR THE GALVANIZED CONDUIT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR OVERHEAD SIGN SUPPORTS.

SOILS

THE FOUNDATION DETAILS SHOWN ARE FOR AVERAGE SOIL CONDITIONS (MEDIUM CLAY, CEMENTED SAND AND GRAVEL, SANDY CLAY, OR STIFF CLAY).

FOR POOR SOIL CONDITIONS, INCREASE "D" MIN. BY: 50% IN DRY OR WET SAND, 60% IN SILTY CLAY, 100% IN SOFT CLAY, AND FROM 75% TO 150% IN WET SILT, DEPENDING ON QUICKSAND ACTION.

REINFORCING STEEL

COST OF REINFORCING STEEL SHALL BE INCLUDED IN THE UNIT PRICE FOR ITEM 816 CONCRETE FOR SIGN SUPPORT FOUNDATIONS.

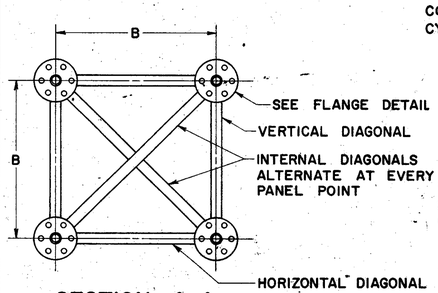
BAR SIZE IS INDICATED IN THE BAR MARK. THE FIRST DIGIT WHERE THREE DIGITS ARE USED AND THE FIRST TWO DIGITS WHERE FOUR DIGITS ARE USED, INDICATE THE BAR SIZE NUMBER.

*FOUNDATION ELEVATION

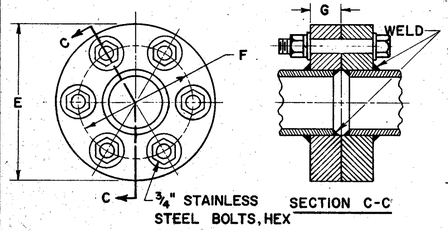
ELEVATION OF TOPS OF FOUNDATIONS SHALL BE BUILT UP SO THAT 17' CLEARANCE IS MAINTAINED OVER THE ENTIRE WIDTH OF THE PAVEMENT AND SHOULDERS.

DESIGN

THE DESIGN OF OVERHEAD SUPPORTS IS IN ACCORDANCE WITH A.A.S.H.O. SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, ADOPTED JUNE 12, 1961.

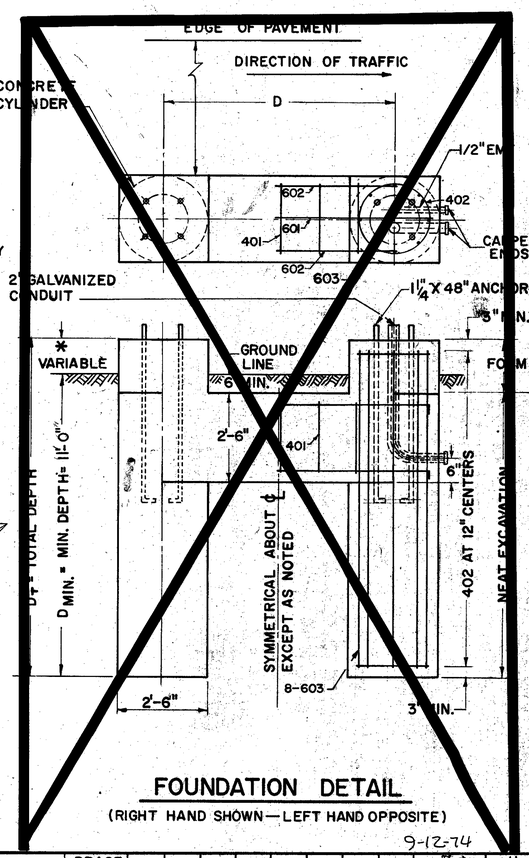


SECTION A-A



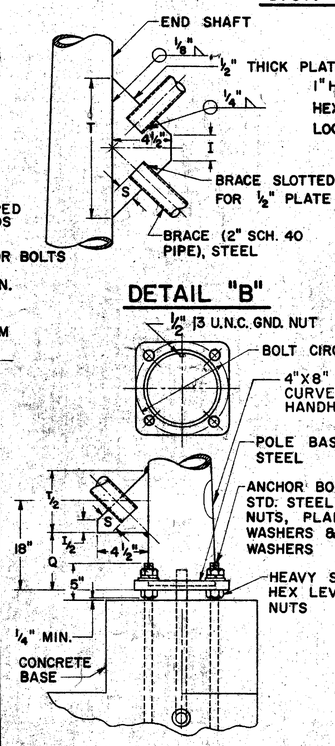
CAST FLANGE, B-26 ALLOY SG 70A-T7 (356-T7)

FLANGE DETAIL



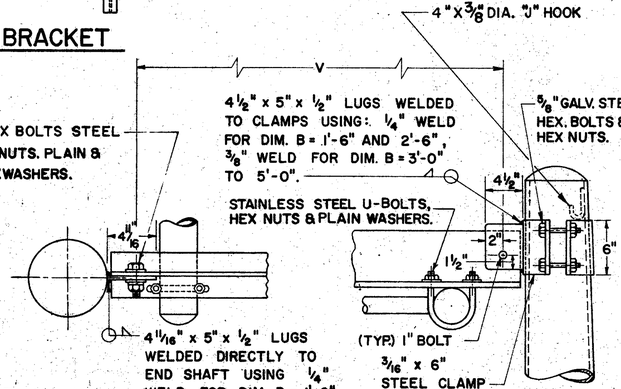
FOUNDATION DETAIL

(RIGHT HAND SHOWN — LEFT HAND OPPOSITE)



DETAIL "B"

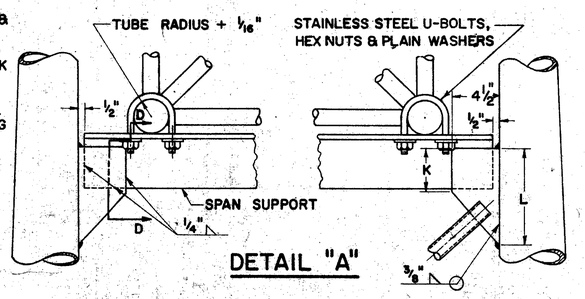
POLE BASE DETAIL



VIEW B-B

DETAIL "D"

UPPER SPAN SUPPORT (ALTERNATE METHODS)



DETAIL "A"

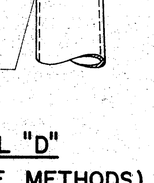
LOWER SPAN SUPPORT

DESIGN NO.	SPAN A	B	C	D	E	END SHAFT	BRACE LENGTH	F	G	I	K	L	P	Q	R	S	T	U BOLTS	V	BOLT CIRCLE	SPAN SUPPORT SECTION D-D	CHORDS	HORIZONTAL AND INTERNAL DIAGONAL	VERTICAL DIAGONAL
1.	50' thru 65'	3'-0"	4'-11 3/4"	4'-5"	9 1/4"	8"X4.5 X25'-0",3GA	5'-10 13/16"	7 7/16"	1 3/8"	3 1/2"	4 3/4"	8"	12"	6 5/8"	3'-9"	1 1/2"	10"	5/8"	3'-3 5/8"	11"	Split Tee 3'-8"	4 3/4" X .188"	2" X .188"	1.660" X .140"
2.	70' thru 75'	4'-0"	4'-10 1/4"	5'-7"	9 1/4"	8"X6.22X25'-6",3GA	6'-7 1/8"	7 7/16"	1 7/8"	5/8"	4 3/4"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5/8"	4'-5 5/8"	11"	Split Tee 4'-10"	4 3/4" X .188"	2' X .188"	1.900" X .145"
3.	76' thru 80'	4'-0"	4'-10 1/4"	5'-7"	11"	8"X6.22X25'-6",3GA	6'-7 1/8"	8 1/2"	1 1/2"	5/8"	4 3/4"	7 3/4"	12"	6 1/4"	4'-11"	1 1/2"	9 1/2"	5/8"	4'-5 5/8"	11"	Split Tee 4'-10"	5 1/2" X .250	2 1/2" X .188"	1.900" X .145"
4.	81' thru 110'	5'-0"	4'-8 1/2"	6'-7"	11"	8"X6.18 X26'-0",3GA	7'-3 1/4"	8 1/2"	1 1/2"	—	3 1/2"	7 3/4"	12"	7 1/4"	5'-11"	1 3/4"	11 1/4"	3/4"	5'-5 5/8"	11"	Split Tee 5'-10"	5 1/2" X .250	2 1/2" X .188	2 1/2" X .188

9-12-74

REINFORCEMENT SCHEDULE				
MARK	NO.	LENGTH	TYPE	
401	12" C/C	6"	101	
402	12" C/C	7'-6"	103	
601	4	D+4'-0"	101	
602	8	D+2'-0"	101	
603	32	D+ — 6"	STR.	

9-12-74



BUREAU OF TRAFFIC OHIO DEPARTMENT OF HIGHWAYS		
OVERHEAD SIGN SUPPORTS	816 No.7.6	DATE 5-6-64 5-5-64 6-20-60
APPROVED ENGINEER OF TRAFFIC		

600.90 FT. SIGN AREA

OVERHEAD SIGN SUPPORT, 816 NO.7.6

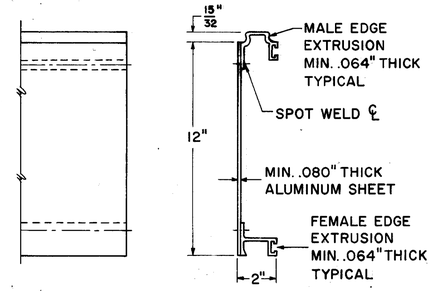
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

273/392

CUYAHOGA COUNTY
CUY. 480-15.81

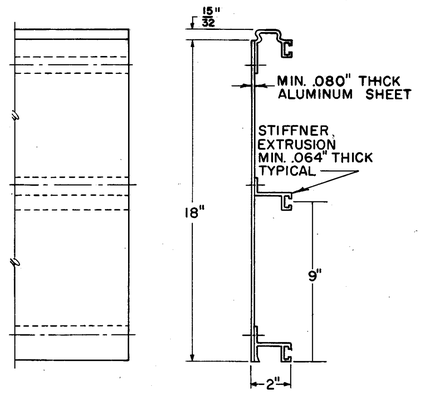
23/31

12" EXTRUSHEET PANEL



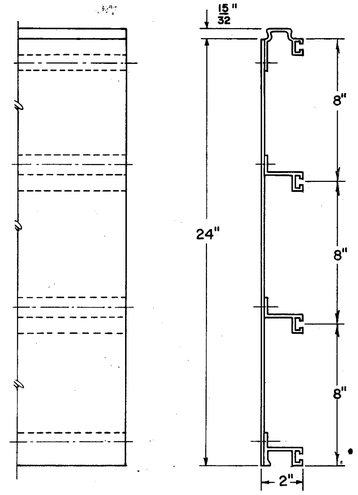
FRONT VIEW SIDE VIEW

18" EXTRUSHEET PANEL



FRONT VIEW SIDE VIEW

24" EXTRUSHEET PANEL



FRONT VIEW SIDE VIEW

NOTES:

EXTRUSHEET PANELS SHALL BE ALUMINUM; SPOT WELDING AND ALL MATERIALS SHALL CONFORM WITH SUPPLEMENTAL SPECIFICATION 815.

COMBINATIONS OF 12", 18", AND 24" PANELS ARE USED TO ATTAIN REQUIRED SIGN HEIGHT.

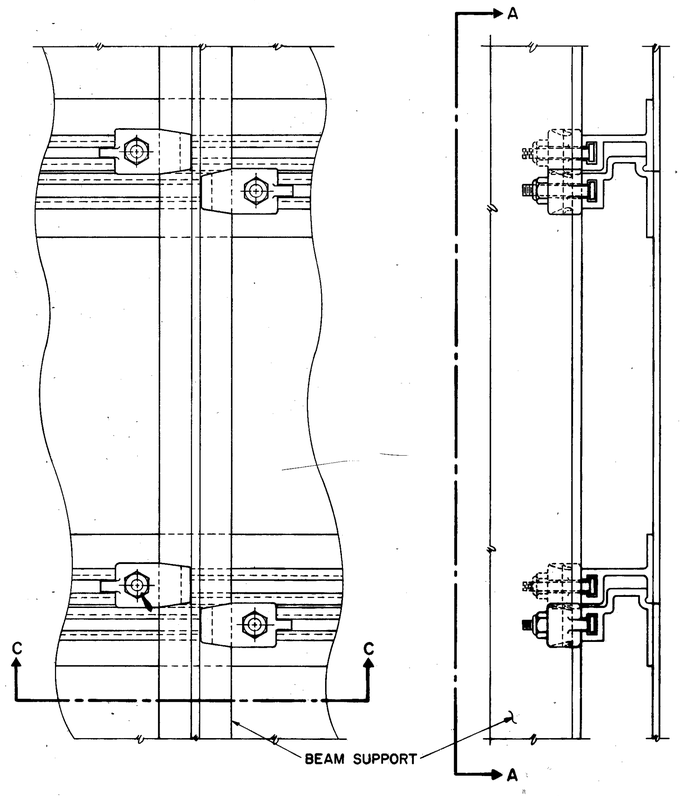
INDIVIDUAL PANELS SHALL BE THE SAME LENGTH AS THE HORIZONTAL LENGTH OF SIGN WITH NO SPLICES.

PANELS SHALL BE INTERLOCKED AND ERECTED WITH THE MALE EXTRUSION LOCATED AT THE TOP EDGE OF THE SIGN.

EXTRUSHEET PANELS SHALL BE FASTENED TO EACH VERTICAL SUPPORT MEMBER WITH MOUNTING CLIPS; ALTERNATELY AT EACH HORIZONTAL EXTRUSION; BOTH SIDES AT EACH JOINT, AND ON BOTH SIDES AT TOP AND BOTTOM EDGE OF SIGN.

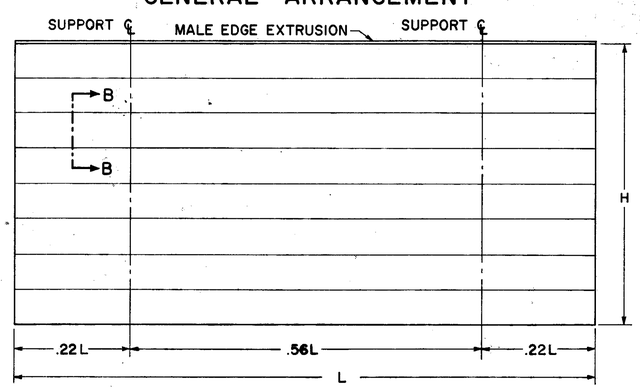
THE PANELS SHALL BE DESIGNED TO WITHSTAND A WIND LOAD OF 35 POUNDS PER SQUARE FOOT, IN ACCORDANCE WITH THE A.A.S.H.O. SPECIFICATION FOR DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS.

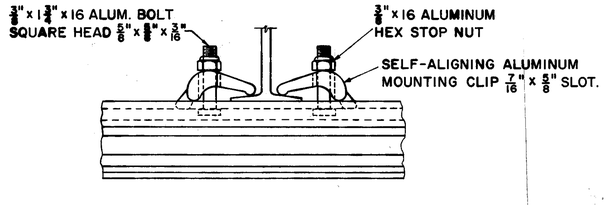
THE MAXIMUM SIGN LENGTH FOR TWO SUPPORTS IS 19'-0".
THE MAXIMUM SIGN LENGTH FOR THREE SUPPORTS IS 29'-0".



SECTION A-A SECTION B-B

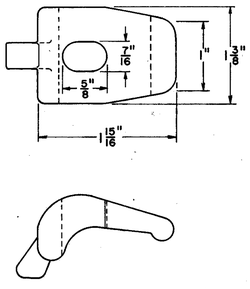
GENERAL ARRANGEMENT





SECTION C-C

CLIP DETAIL



SPOT WELDS

PANEL SIZE	MAXIMUM SPOT WELD SPACING	
	CENTER TO CENTER	BETWN ROWS
12 INCH	4 INCH	10 INCH
18 & 24 INCH	4 INCH	8 INCH

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

ALUMINUM EXTRUSHEET PANEL SIGN

ECD 1

DATE
9-25-63
5-19-64
10-21-65
5-24-67

APPROVED Fred C. Gerber
ENGINEER OF TRAFFIC

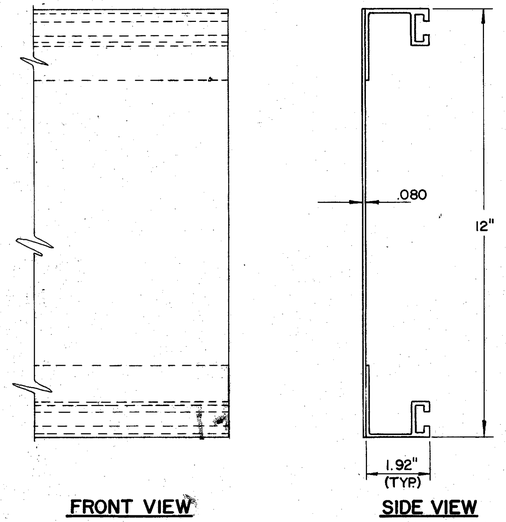
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

274
392

CUYAHOGA COUNTY
CUY. 480-15.81

24
31.

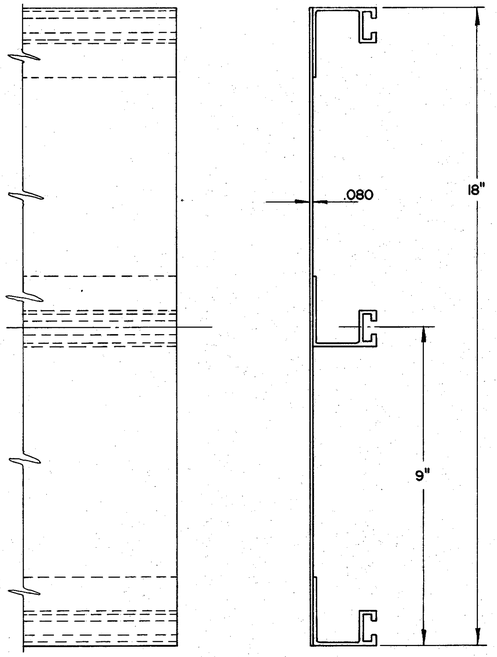
12" BOLTED-EXTRUSHEET PANEL



FRONT VIEW

SIDE VIEW

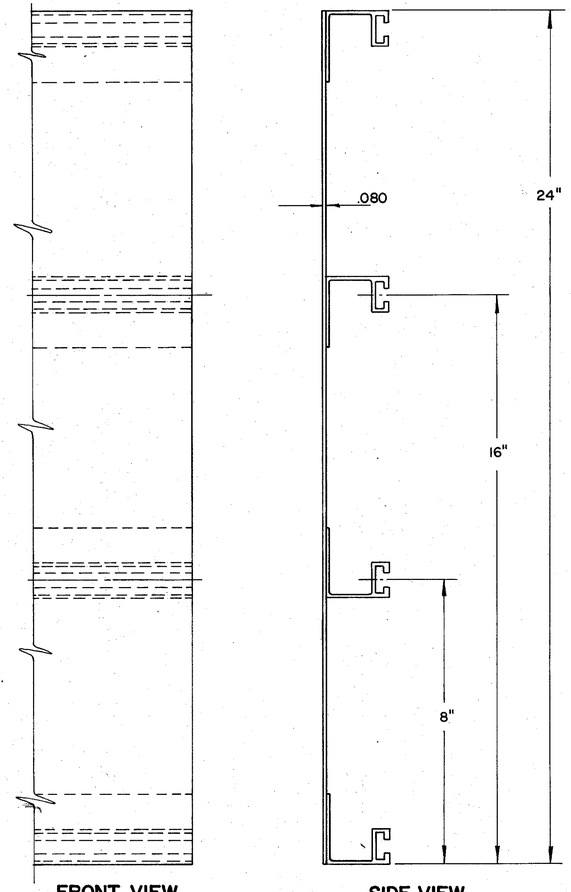
18" BOLTED-EXTRUSHEET PANEL



FRONT VIEW

SIDE VIEW

24" BOLTED-EXTRUSHEET PANEL



FRONT VIEW

SIDE VIEW

NOTES

EXTRU-SHEET PANELS SHALL BE ALUMINUM; SPOT WELDING, MATERIALS AND HARDWARE SHALL CONFORM WITH SPECIFICATION NO. 815.

COMBINATIONS OF 12", 18" AND 24" PANELS ARE TO BE USED TO ATTAIN REQUIRED SIGN HEIGHT.

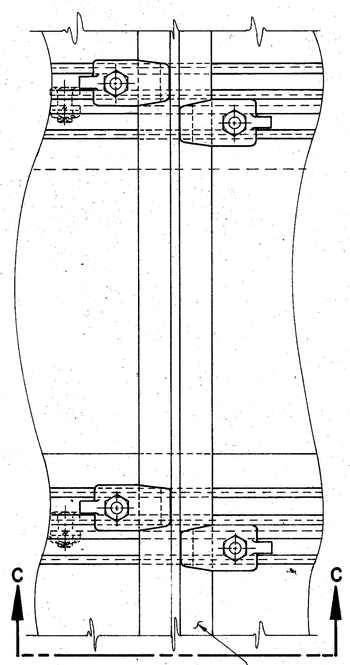
INDIVIDUAL PANELS SHALL BE THE SAME LENGTH AS THE HORIZONTAL LENGTH OF SIGN, WITH NO SPLICES.

THE PANELS SHALL BE ERECTED HORIZONTALLY AND BOLTED ON 24" CENTERS.

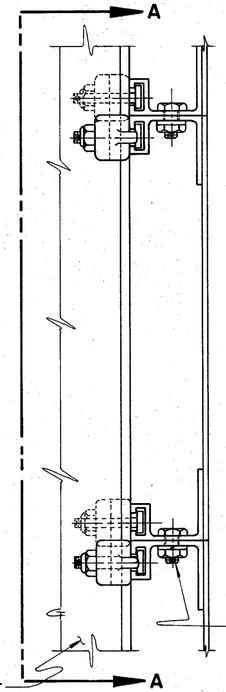
THE PANELS SHALL BE FASTENED TO EACH VERTICAL SUPPORT MEMBER WITH MOUNTING CLIPS; ALTERNATELY AT EACH HORIZONTAL EXTRUSION; BOTH SIDES AT EACH JOINT, AND BOTH SIDES AT TOP AND BOTTOM EDGES OF SIGN.

THE PANELS SHALL BE DESIGNED IN ACCORDANCE WITH THE A.A.S.H.O SPECIFICATION FOR THE DESIGN AND CONSTRUCTION OF STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, BASE ON A WIND LOAD OF 35#/SQ.FT.

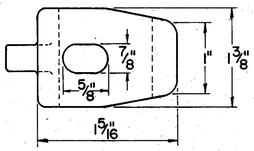
THE MAXIMUM SIGN LENGTH FOR TWO SUPPORTS IS 19'-0".
THE MAXIMUM SIGN LENGTH FOR THREE SUPPORTS IS 29'-0".

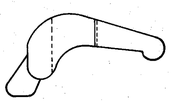


SECTION A-A



SECTION B-B





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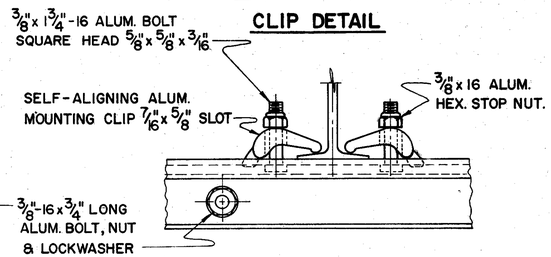
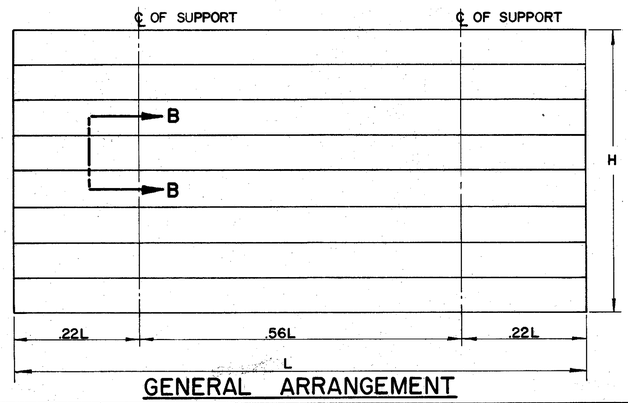


SECTION C-C



GENERAL ARRANGEMENT

SPOT WELDS

PANEL SIZE	MAXIMUM SPOT WELD SPACING	
	CENTER TO CENTER	BETWN ROWS
12 INCH	4 INCH	10 INCH
18 & 24 INCH	4 INCH	8 INCH

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

ALUMINUM BOLTED EXTRUSHEET PANEL SIGN

ECD 2

DATE 10-14-65

APPROVED Fred C. Talbot
ENGINEER OF TRAFFIC

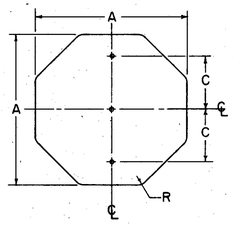
ALUMINUM BOLTED-EXTRUSHEET PANEL SIGN

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

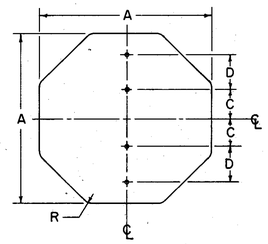
275/392

25/31

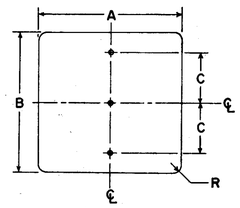
CUYAHOGA COUNTY
CUY. 480-15.81



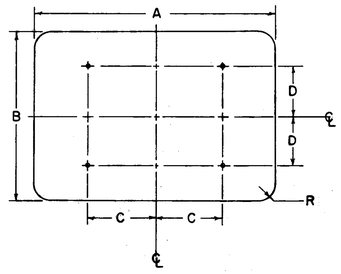
A	C	R	GAUGE
30	8	1 1/2	.080
36	8	1 1/2	.080



A	C	D	R	GAUGE
48	8	10	1 1/2	.100

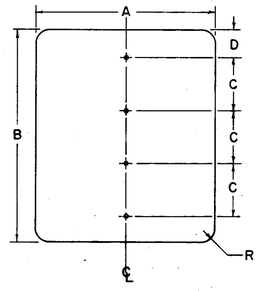


A	B	C	R	GAUGE
24	30	8	1 1/2	.063
24	48	15	1 1/2	.100
30	36	11	1 1/2	.080
30	42	12	1 1/2	.080
36	36	11	1 1/2	.080
36	42	15	1 1/2	.080
36	48	15	1 1/2	.080
48	24	10	3	.100
48	36	13	3	.100

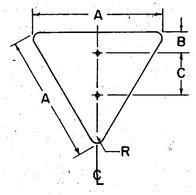


A	B	C	D	R	GAUGE
48	48	22	16	3	.100
48	60	22	22	3	.100

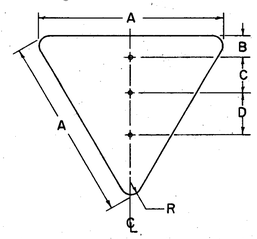
SPEED LIMIT SIGNS ON TWO [redacted]



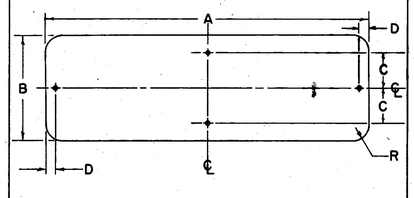
A	B	C	D	R	GAUGE
48	48	12	6	3	.100
48	60	15	7 1/2	3	.100



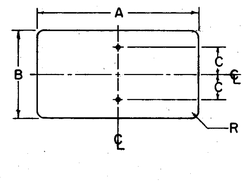
A	B	C	R	GAUGE
36	3	16	2 1/2	.080



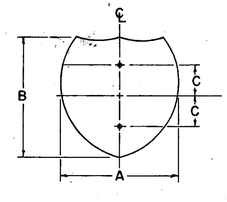
A	B	C	D	R	GAUGE
48	4	10	15	3	.100
60	5	10	15	4	.100



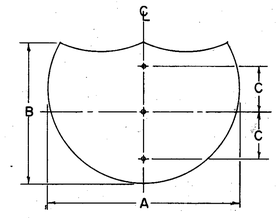
A	B	C	D	R	GAUGE
36	12	4	1	1 1/2	.080
72	12	—	16	1 1/2	.100
60	[redacted]	—	13	1 1/2	.100



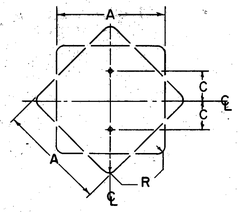
A	B	C	R	GAUGE
12	6	1 1/2	1 1/2	.063
20	15	6	1 1/2	.063
24	12	4 1/2	1 1/2	.063
24	18	7 1/2	1 1/2	.063
8	26	8	1	.063
36	18	7 1/2	1 1/2	.080



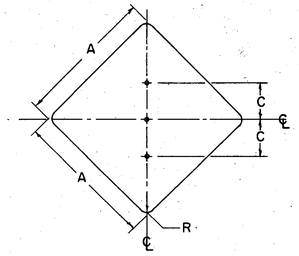
A	B	C	GAUGE
24	24	8	.063
30	24	8	.080



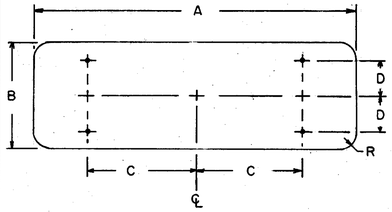
A	B	C	GAUGE
36	36	11	.080
48	36	11	.100



A	C	R	GAUGE
18	7 1/2	1 1/2	.063
24	8	1 1/2	.063
30	8	1 1/2	.080

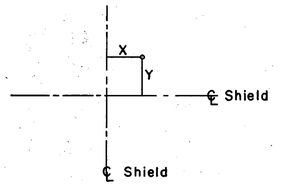


A	C	R	GAUGE
36	12	1 1/2	.080
48	14	3	.100



A	B	C	D	R	GAUGE
72	18	20	6	1 1/2	.100
72	24	20	8	1 1/2	.100
60	30	17	10	1 1/2	.100
96	18	27	6	1 1/2	.100

Location of holes on "Demountable Shields" (attached to guide signs)



SIZE	NO. HOLES	X	Y
(26) 24X24	4	7	7
30X24	4	8	8
(39) 36X36	4	10	10
		0	10
48X36	6	15	10

For notes on fastening see drawing for miscellaneous "Signing Items" sheet.

NOTES:

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SHOWN.

MATERIAL

FLAT SIGN BLANKS SHALL BE FURNISHED IN ALUMINUM ALLOY 6061-T6, (ASTM-B209, GSIIA-T6) WITH MILL FINISH.

BOLT HOLES

THE BOLT HOLES SHALL BE 3/8" IN DIAMETER, AND MAY BE DRILLED, BLANKED OR PUNCHED TO FINISHED SIZE.

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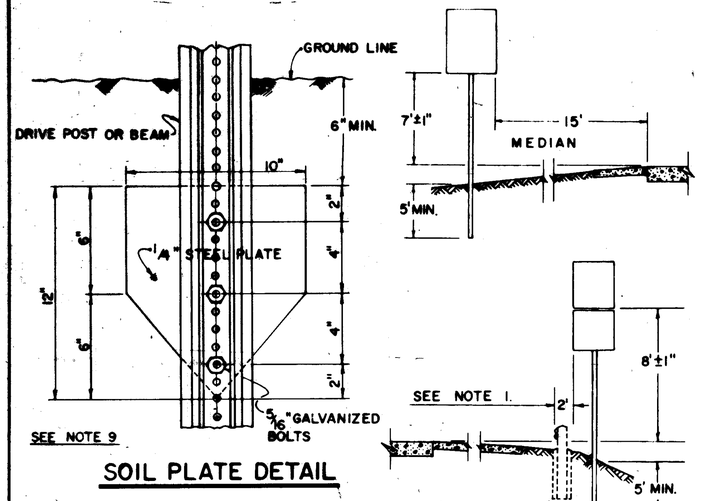
OHIO DEPARTMENT OF HIGHWAYS

SIGN BLANK DETAILS

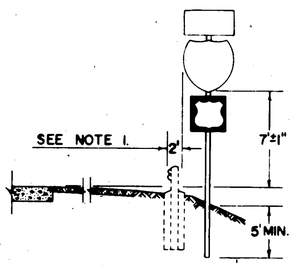
SBD

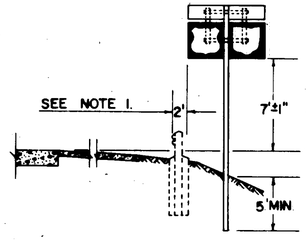
DATE
4-14-67
5-10-68
10-1-68
5-27-69
6-18-69

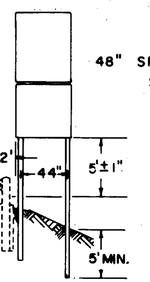
APPROVED_____
ENGINEER OF TRAFFIC

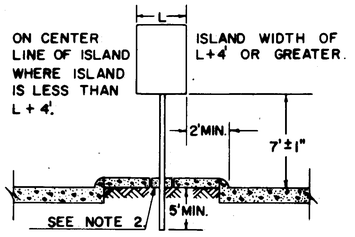


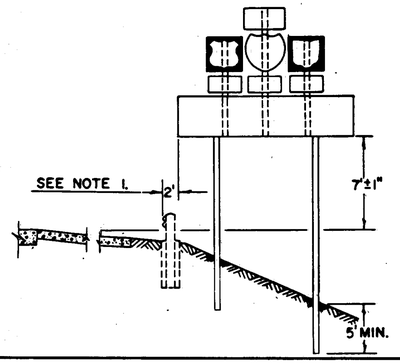
SOIL PLATE DETAIL

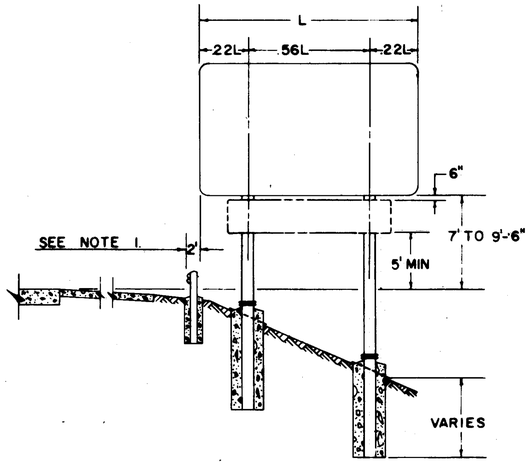


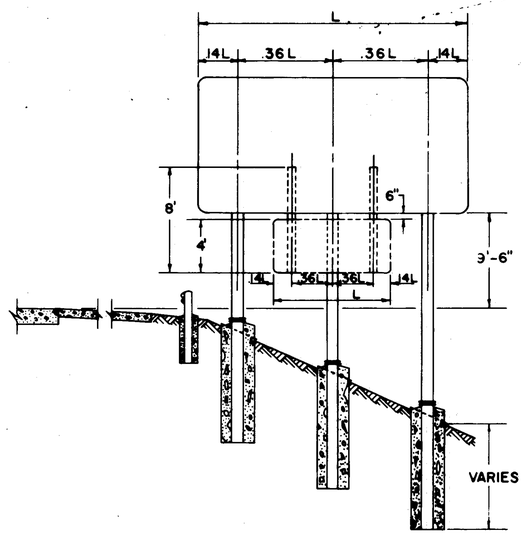


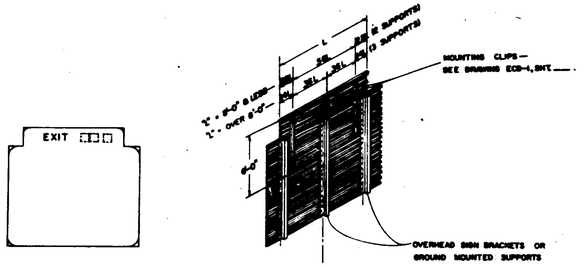




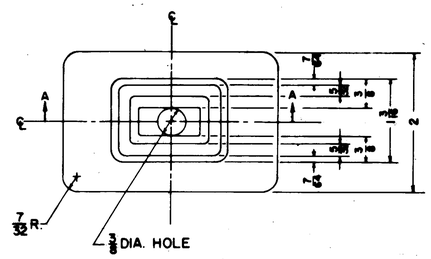






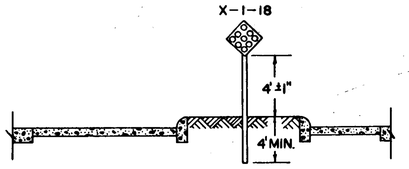


"EXIT" SIGN ATTACHMENT DETAIL



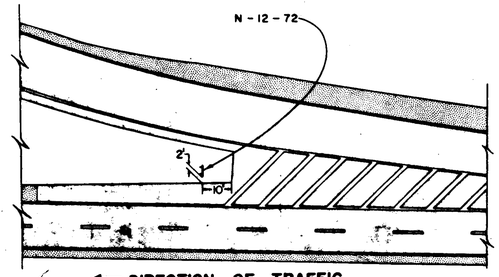
NOTE:
THE PLATE IS SYMMETRICAL ABOUT EITHER CENTERLINE.
METAL SHALL BE 16 GAUGE STEEL.
ALL DIMENSIONS ARE IN INCHES.

BEARING PLATE DETAIL



SIGN SUPPORT SPACING

L=FT	2 SUPPORTS .22	2 SUPPORTS .56	3 SUPPORTS .14	3 SUPPORTS .36	L=FT	2 SUPPORTS .22	2 SUPPORTS .56	3 SUPPORTS .14	3 SUPPORTS .36
5.0	1.10	2.80	0.70	1.80	17.0	3.74	9.52	2.38	6.12
6.0	1.32	3.36	0.84	2.16	18.0	3.96	10.08	2.52	6.48
7.0	1.54	3.92	0.98	2.52	19.0	4.18	10.64	2.66	6.84
8.0	1.76	4.48	1.12	2.88	20.0			2.80	7.20
9.0	1.98	5.04	1.26	3.24	21.0			2.94	7.56
10.0	2.20	5.60	1.40	3.60	22.0			3.08	7.92
11.0	2.42	6.16	1.54	3.96	23.0			3.22	8.28
12.0	2.64	6.72	1.68	4.32	24.0			3.36	8.64
13.0	2.86	7.28	1.82	4.68	25.0			3.50	9.00
14.0	3.08	7.84	1.96	5.04	26.0			3.64	9.36
15.0	3.30	8.40	2.10	5.40	27.0			3.78	9.72
16.0	3.52	8.96	2.24	5.76	28.0			3.92	10.08



FED. RD. DIVISION	STATE	PROJ.	#
2	OHIO		

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392

26
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NOTES

1. THE NEAR EDGE OF ALL MAIN LINE SIGNS, EXCEPT GORE INSTALLATIONS, SHALL BE LOCATED TWO FEET (2') BACK OF GUARD RAIL FACE. THIS DIMENSION SHALL BE DETERMINED BY ROADWAY TYPICAL SECTION & USED WHETHER OR NOT GUARD RAIL IS PRESENT.

ON RAMPS THE NEAR EDGE OF SIGNS SHALL BE LOCATED TWO FEET (2') BACK OF GUARD RAIL FACE. THIS DIMENSION WILL BE DETERMINED AND USED AS FOR MAIN LINE ABOVE.

ON APPROACHES THE NEAR EDGE OF SIGNS SHALL BE

(A) TWO FOOT (2') BEHIND EXISTING GUARD RAIL

(B) TWO FEET (2') FROM THE EDGE OF PAVED OR TRAVELED SHOULDER WITH A MINIMUM OF 6' FROM EDGE OF ROADWAY PAVEMENT.

2. POSTS PLACED IN CONCRETE MEDIANS SHALL BE INSTALLED BY DRIVING THROUGH A 6" SLEEVE OR CORE DRILLED HOLE. THE HOLE SHALL BE FILLED WITH ASPHALTIC CONCRETE AFTER THE POST IS IN THE PROPER POSITION.

3. HORIZONTAL BACK BRACING SHALL ALWAYS BE MOUNTED ON THE FRONT FLANGE OF THE SUPPORT EXCEPT WHERE SIGNS ARE MOUNTED BACK TO BACK. BACK BRACING SHALL NEVER EXTEND ABOVE TOP EDGE OF UPPERMOST SIGN PLATE AND SHALL BE ATTACHED TO SUPPORTS USING 5/16" GALVANIZED STEEL BOLTS.

4. SCREWS, NUTS, AND WASHERS FOR SIGN ERECTION SHALL BE ALUMINUM EXCEPT AS NOTED ABOVE. 5/16" TRUSS HEAD SLOTTED MACHINE SCREWS WITH HEX. NUTS PLAIN AND LOCKWASHERS SHALL BE USED. PLAIN WASHERS SHALL BE 5/16" "WIDE", USED ON SIGN FACE ONLY.

5. SIGN INSTALLATIONS SHALL BE PLACED SO THAT SUPPORTS ARE NOT PLACED IN DRAINAGE DITCHES.

6. HORIZONTAL CLEARANCES SHOWN PERTAIN TO NON-CURBED SECTIONS. SECTIONS WITH UNMOUNTABLE CURB SHALL HAVE A HORIZONTAL CLEARANCE OF 2'-0" MINIMUM FROM THE CURB FACE TO THE SIGN EDGE.

7. VERTICAL AND HORIZONTAL CLEARANCE BETWEEN SIGNS ON ONE ASSEMBLY SHALL BE A MAXIMUM OF 2" AND A MINIMUM OF 1".

8. GALVANIZED STEEL BEARING PLATES SHALL BE INCLUDED BETWEEN ALL SHEET ALUMINUM SIGNS ATTACHED TO VERTICAL SUPPORTS AT EACH SIGN BOLT LOCATION.

9. SOIL PLATES SHALL BE ATTACHED TO ALL 6 LB. BEAMS BETWEEN POSTS AS DETAILED ON THIS SHEET, EXCEPT WHERE BEAMS ARE PLACED IN CONCRETE MEDIANS AS COVERED IN NOTE 2.

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OHIO DEPARTMENT OF HIGHWAYS

TYPICAL PLACEMENT OF SIGNS

TPS-1

DATE
9-27-67
7-12-68
5-13-69
3-5-71
12-21-71
3-7-72

APPROVED _____
ENGINEER OF TRAFFIC

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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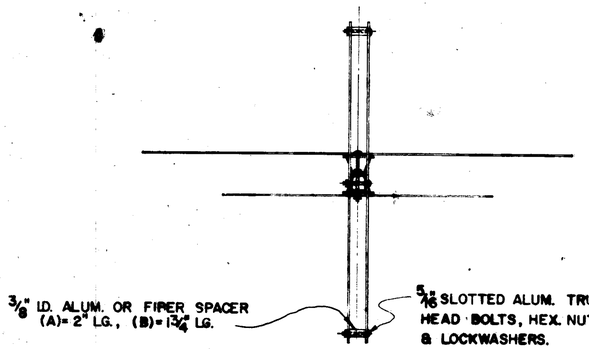
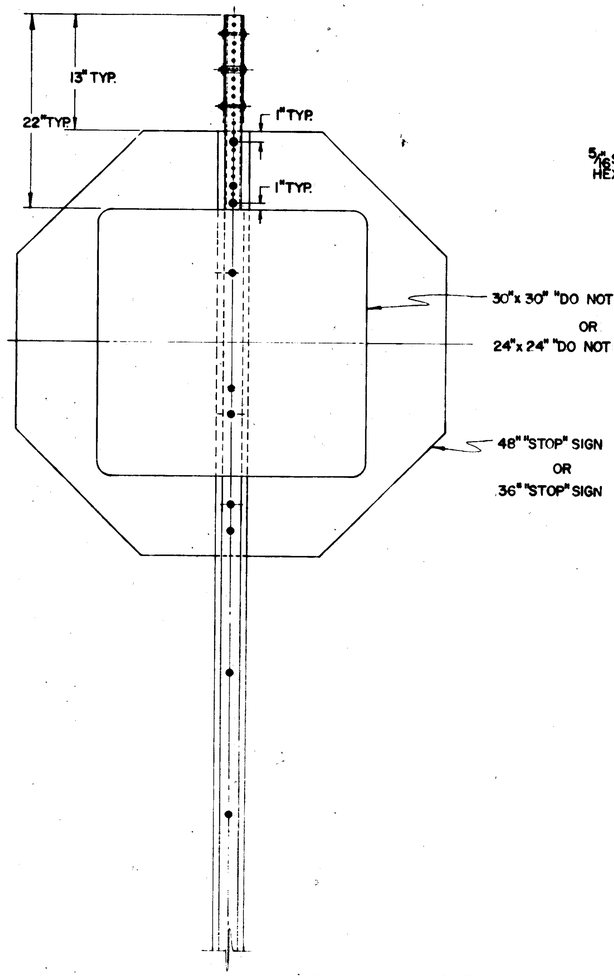
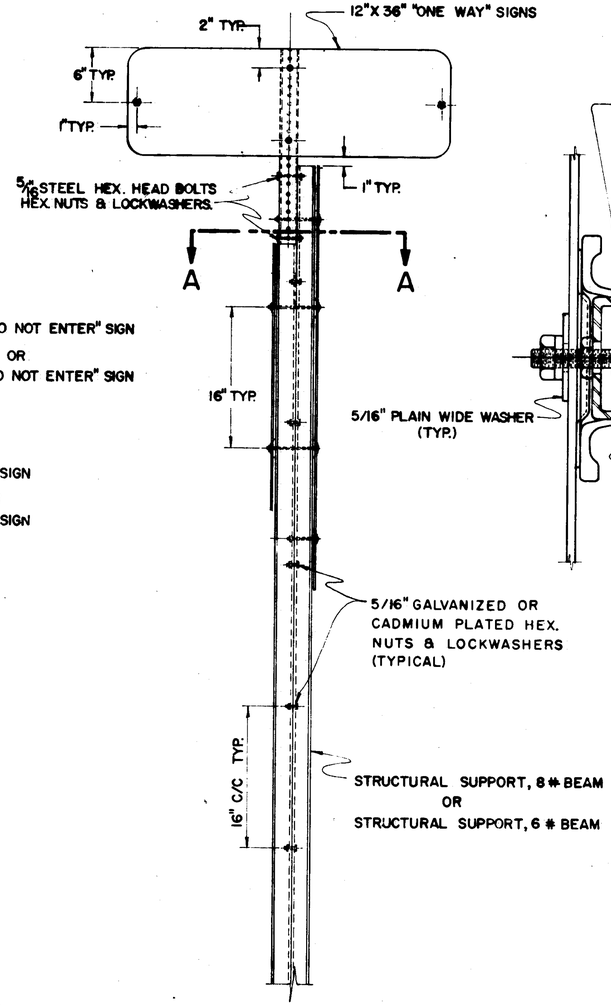
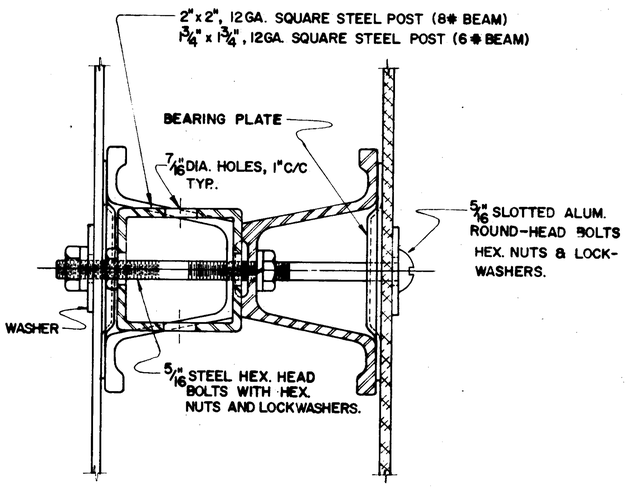
26A 3.1





"ONE WAY", "STOP", "DO NOT ENTER", SIGN INSTALLATION





SECTION A-A

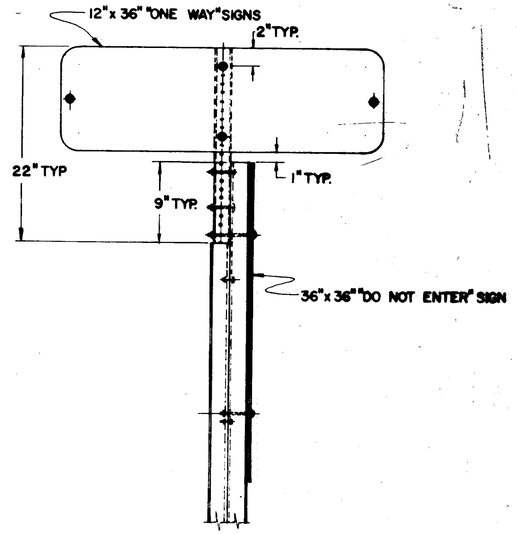
NOTES

MATERIALS

ALL SIGN MATERIALS SHALL BE IN ACCORDANCE WITH SUPPLEMENT SPECIFICATION 815.

ALL STRUCTURAL MATERIALS SHALL BE IN ACCORDANCE WITH SUPPLEMENT SPECIFICATION 816.

FOR SPECIFICATIONS FOR THE 2" & 1 3/4" SQUARE STEEL POST SEE GENERAL NOTES, SHEET NO.____.



"ONE WAY", "DO NOT ENTER" SIGN INSTALLATION

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

SPECIAL "ONE WAY" SIGN SUPPORT DETAILS	SOW	DATE 2-7-66 4-18-67
APPROVED ENGINEER OF TRAFFIC		

SPECIAL "ONE WAY" SIGN SUPPORT DETAILS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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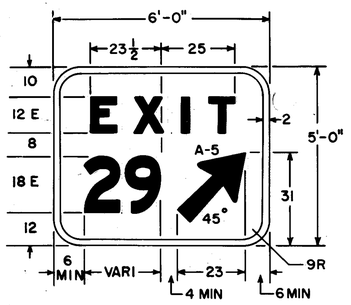
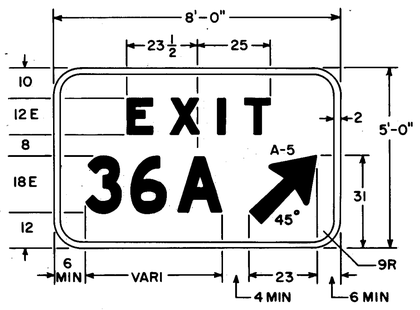
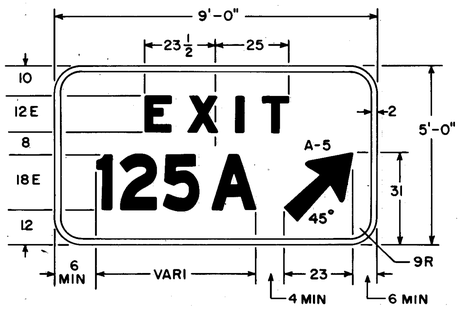
N-12A-72

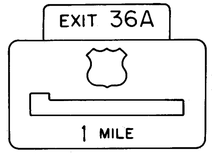


N-12A-96



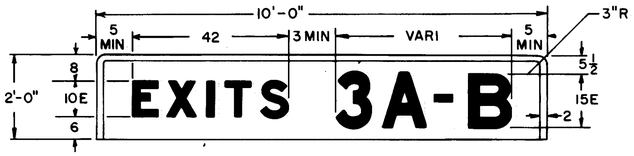
N-12A-108



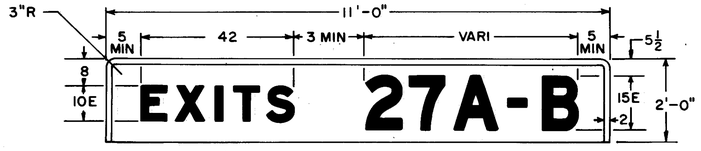


TYPICAL SIGN

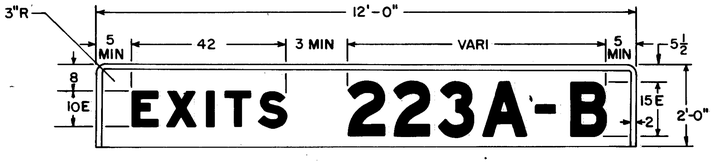
N-12C-120



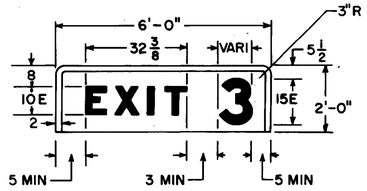
N-12C-132



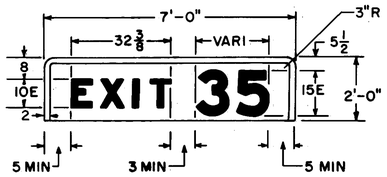
N-12C-144



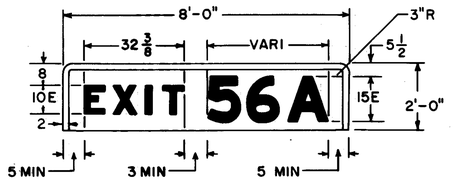
N-12C-72



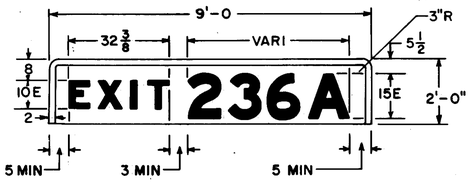
N-12C-84



N-12C-96



N-12C-108



	E		X		I		T		S	TOTAL
10"E	6.75	2.50	7.62	3.37	2.12	3.25	6.75	2.25	7.37	42
			E		X		I		T	TOTAL
12"E	8.37	5.62	9.12	7.62	2.50	6.87	8.37			48½

	E		X		I		T	TOTAL
10"E	6.75	2.50	7.62	3.37	2.12	3.25	6.75	32⅜

NOTE

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SHOWN.

THE LEGEND AND OUTLINE ARE WHITE. THE BACKGROUND IS GREEN.

CODE NUMBER	DIGIT AND/OR LETTER COMBINATION
N-12A-72	ONE OR TWO DIGITS, ONE DIGIT AND ONE LETTER
N-12A-96	THREE DIGITS, TWO DIGITS AND ONE LETTER
N-12A-108	THREE DIGITS AND ONE LETTER
N-12C-72	ONE DIGIT
N-12C-84	TWO DIGITS, OR ONE DIGIT AND ONE LETTER
N-12C-96	THREE DIGITS, OR TWO DIGITS AND ONE LETTER
N-12C-108	THREE DIGITS AND ONE LETTER
N-12C-120	ONE DIGIT AND TWO LETTERS
N-12C-132	TWO DIGITS AND TWO LETTERS
N-12C-144	THREE DIGITS AND TWO LETTERS

BRUNING 44.560 10943

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

EXPRESSWAY GUIDE SERIES

N-12A, N-12C

DATE 4-13-71 4-24-72

DRAWN BY: C.R.

APP. BY: R.D. McMillen Jr.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

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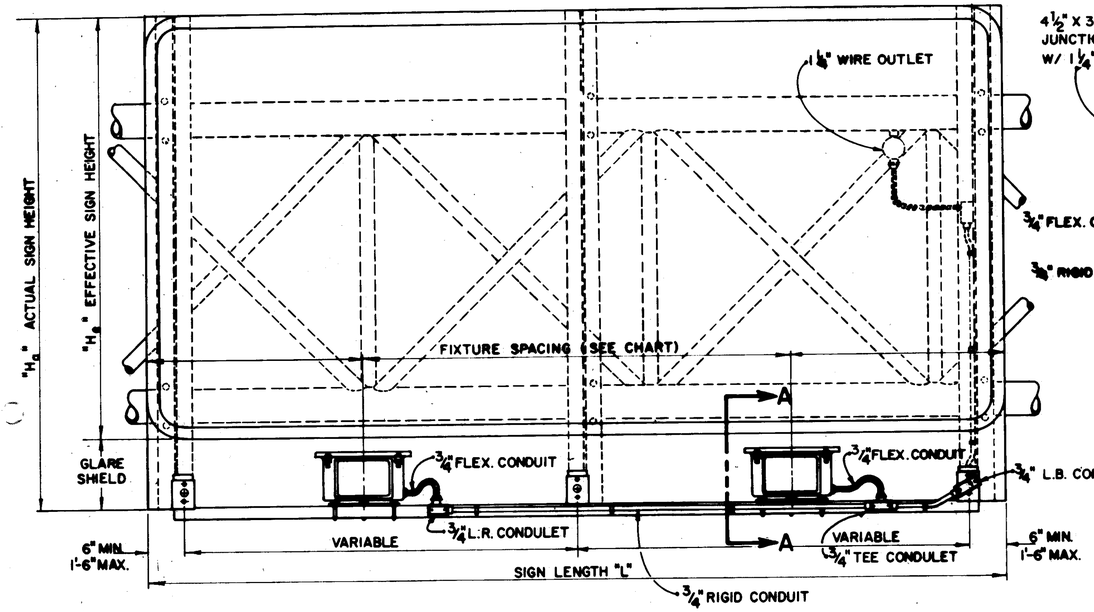
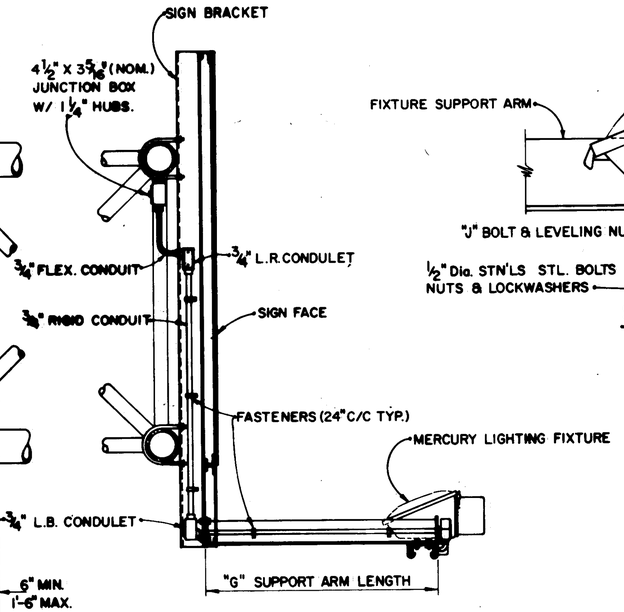
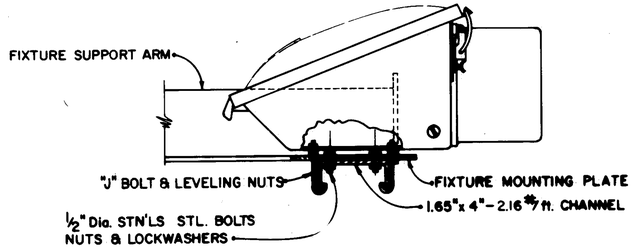
31





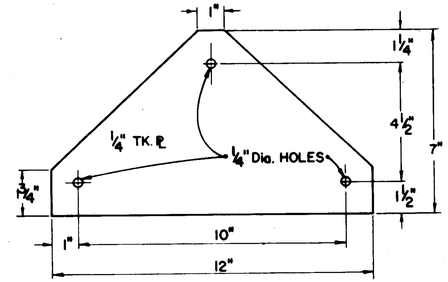


SECTION A-A

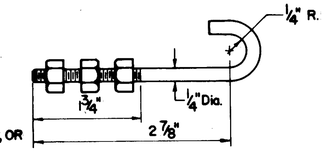
SIGN LENGTH "L"	NO. OF FIXTURES	LIGHT FIXTURE SPACING						SUPPORT ARM SPACING					NO. OF SIGN BRACKETS
4'-0"	1	2'-0"	2'-0"					6"	36"	6"			2
5'-0"	1	2'-6"	2'-6"					6"	48"	6"			2
6'-0"	1	3'-0"	3'-0"					6"	60"	6"			2
7'-0"	1	3'-6"	3'-6"					6"	72"	6"			2
8'-0"	1	4'-0"	4'-0"					10⅜"	75⅜"	10¼"			2
9'-0"	1	4'-6"	4'-6"					16⅜"	75⅜"	16¼"			2
10'-0"	1	5'-0"	5'-0"					10⅜"	99⅜"	10¼"			2
11'-0"	1	5'-6"	5'-6"					16⅜"	99⅜"	16¼"			2
12'-0"	2	3'-0"	6'-0"	3'-0"				6"	66"	66"	6"		3
13'-0"	2	3'-6"	6'-0"	3'-6"				6"	72"	72"	6"		3
14'-0"	2	4'-0"	6'-0"	4'-0"				8⅝"	75⅜"	75⅜"	8⅝"		3
15'-0"	2	4'-6"	6'-0"	4'-6"				14⅝"	75⅜"	75⅜"	14⅝"		3
16'-0"	2	4'-0"	8'-0"	4'-0"				8⅝"	75⅜"	99⅜"	8⅝"		3
17'-0"	2	4'-6"	8'-0"	4'-6"				14⅝"	75⅜"	99⅜"	14⅝"		3
18'-0"	2	4'-0"	10'-0"	4'-0"				8⅝"	99⅜"	99⅜"	8⅝"		3
19'-0"	2	4'-6"	10'-0"	4'-6"				14⅝"	99⅜"	99⅜"	14⅝"		3
20'-0"	3	4'-0"	6'-0"	6'-0"	4'-0"			7"	75⅜"	75⅜"	75⅜"	6⅞"	4
21'-0"	3	4'-6"	6'-0"	6'-0"	4'-6"			13"	75⅜"	75⅜"	75⅜"	12⅞"	4
22'-0"	3	4'-0"	7'-0"	7'-0"	4'-0"			7"	75⅜"	75⅜"	99⅜"	6⅞"	4
23'-0"	3	4'-6"	7'-0"	7'-0"	4'-6"			13"	75⅜"	75⅜"	99⅜"	12⅞"	4
24'-0"	3	4'-0	8'-0"	8'-0	4'-0"			7"	75⅜"	99⅜"	99⅜"	6⅞"	4
25'-0"	3	4'-6"	8'-0"	8'-0"	4'-6			13"	75⅜"	99⅜"	99⅜"	12⅞"	4
26'-0"	4	4'-0"	6'-0"	6'-0"	6'-0"	4'-0"		7"	99⅜"	99⅜"	99⅜"	6⅞"	4
27'-0"	4	4'-6"	6'-0"	6'-0"	6'-0"	4'-6"		13"	99⅜"	99⅜"	99⅜"	12⅞"	4

EFFECTIVE SIGN HEIGHT "H"	SUPPORT ARM LENGTH "G"	APPROX. AIMING ANGLE	LAMP WATTS	ANSI LAMP CODE	BALLAST TYPE
3'-0" to 5'-0"	2'-9"	0°	100	H38-4HT	CMRI-100-(a)
5'-1" to 6'-6"	3"-3"	0°	175	H39-22KB	CMRI-175-(a)
6'-7" to 10'-0"	4'-3"	2°	175	H39-22KB	CMRI-175-(a)
10'-1" to 13'-0"	5'-9"	8°	250	H37-5KB	CMRI-250-(a)
13'-1" to 15'-0"	7'-3"	8°	250	H37-5KB	CMRI-250-(a)

(a) = OPERATING VOLTAGE (120V., 208V., 240V., 277V., OR 480V.)



FIXTURE MOUNTING PLATE
(ALUMINUM)



"J" BOLT
(STAINLESS STEEL BOLT, NUTS & LOCKWASHERS)

BUREAU OF DESIGN SERVICES
OHIO DEPARTMENT OF HIGHWAYS

MERCURY VAPOR SIGN LIGHTING DETAILS

STANDARD CONSTRUCTION DRAWING

APPROVED _____ ENGINEER OF DESIGN SERVICES

DATE 4-13-72

DRAWING 44-560 (1943)

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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392

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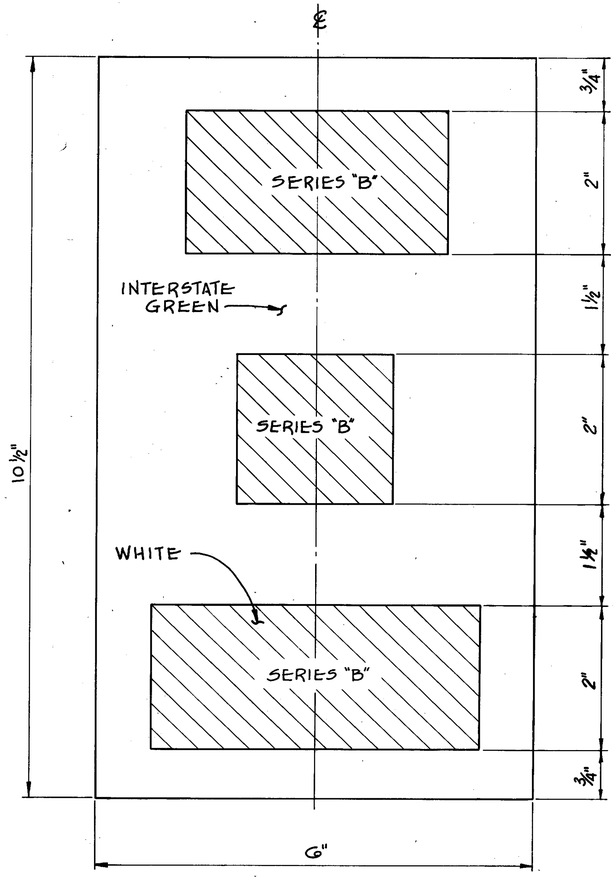


LEGEND VARIES, SEE TABLE

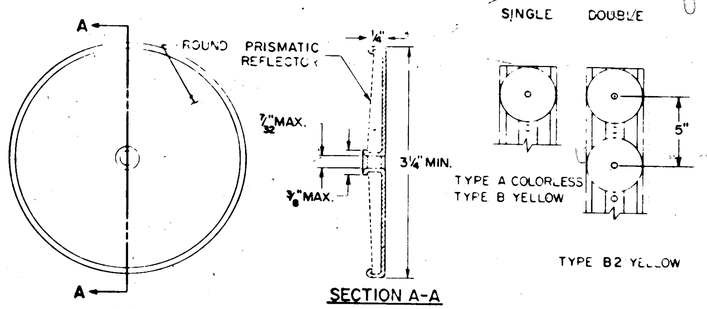
CUY
90
0.04

EXAMPLE

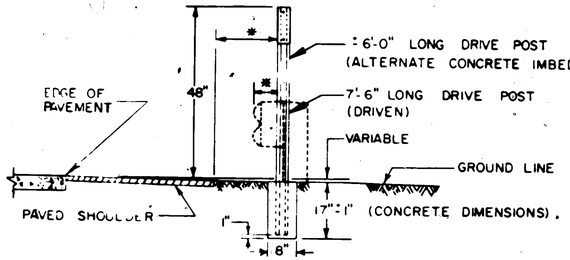
SUPPORT NO.	STATION	LOCATION	DIRECTION	DECAL LEGENDS		
				COUNTY	RT	MILEAGE
11	878+50	I-480	EB	CUY	480	16.16
12	890+25	I-480	EB	CUY	480	16.38
13	889+15	I-480	WB	CUY	480	16.36
14	902+25	I-480	WB	CUY	480	16.61
15	915+88	I-480	WB	CUY	480	16.87
16	919+25	I-480	EB	CUY	480	16.94
17	926+50	I-480	WB	CUY	480	17.08
18	934+50	I-480	WB	CUY	480	17.23

SIGN SUPPORT INDENTIFICATION DECALS

ROUND DELINEATORS



RECTANGULAR SHEET DELINEATORS



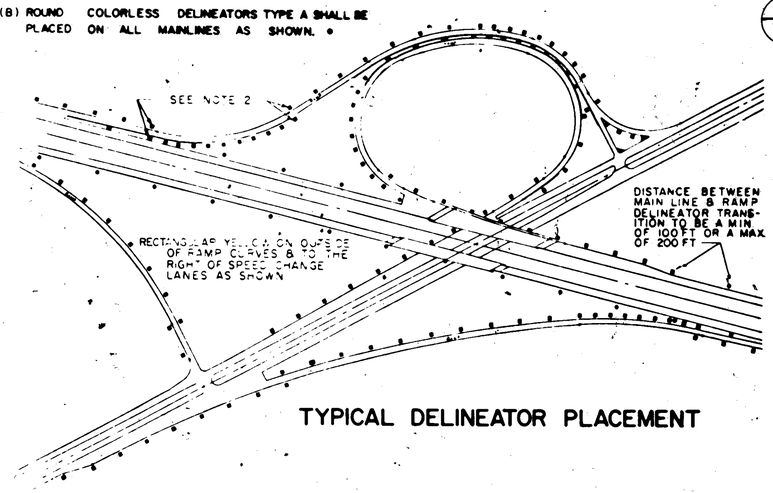
LATERAL PLACEMENT OF DELINEATORS

* DELINEATORS SHALL BE 6" BEHIND FACE OF TYPICAL GUARDRAIL LOCATION BUT WITH A MINIMUM DISTANCE OF 2'6" FROM EDGE OF PAVED SHOULDER WHERE GUARDRAIL IS NOT PRESENT.

NOTE:

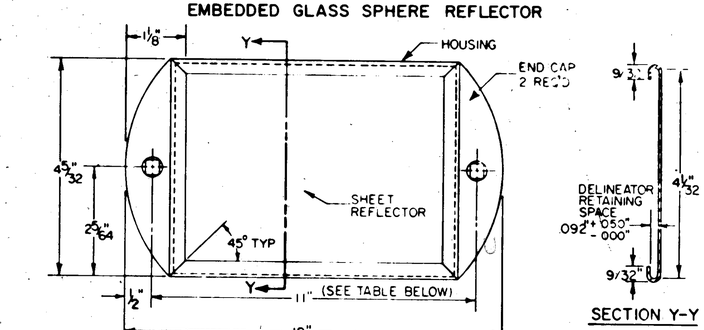
(A) RECTANGULAR YELLOW DELINEATORS TYPE D SHALL BE PLACED ON ALL RAMPS AS SHOWN. *

(B) ROUND COLORLESS DELINEATORS TYPE A SHALL BE PLACED ON ALL MAINLINES AS SHOWN. *



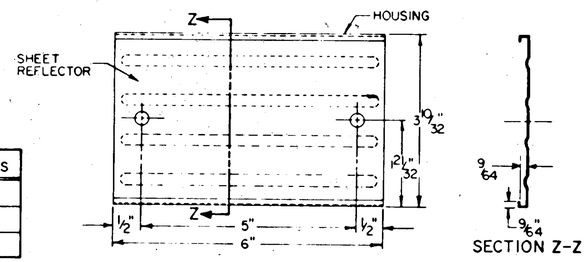
TYPICAL DELINEATOR PLACEMENT

EMBEDDED GLASS SPHERE REFLECTOR

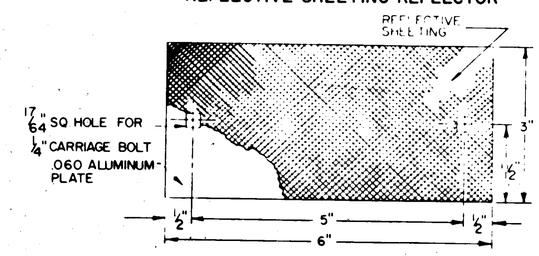


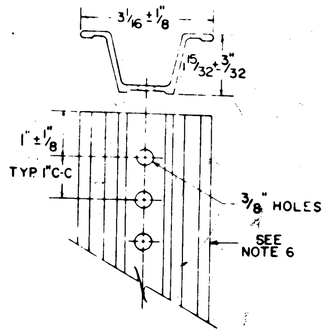
ACRYLIC PLASTIC PRISMATIC REFLECTOR

RECTANGULAR TYPES
C - COLORLESS
D - YELLOW
E - RED



REFLECTIVE SHEETING REFLECTOR

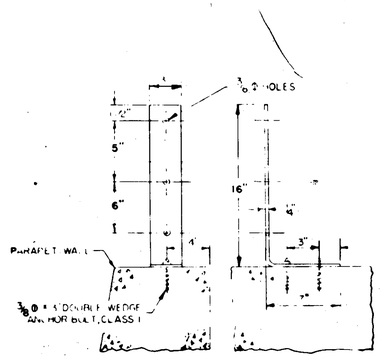




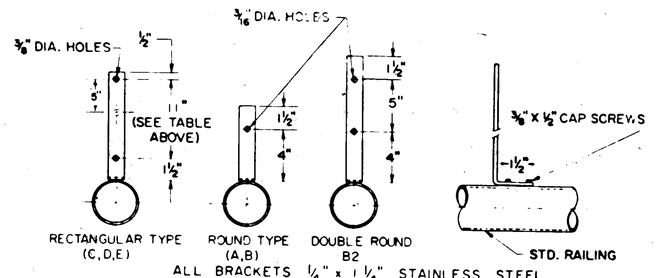
2 LB./FT. DELINEATOR DRIVE POST

TAMPER RESISTANT FASTENERS SHALL BE USED TO FASTEN DELINEATORS TO POST AS/OR SIMILAR TO ONE SHOWN ABOVE.

TAMPER RESISTANT FASTNERS



BRIDGE PARAPET BRACKET



ALL BRACKETS ¼" x 1¼" STAINLESS STEEL

BRIDGE RAIL BRACKET

DELINEATOR SPACING ON RAMP HORIZONTAL CURVES

RADII, FT. FROM	RADII, FT. TO	SPACING ON CURVE	* TRANSITION SPACING		
TANGENT	1,801	100'	100'		100'
1,800	1,401	80'	100'		100'
1,400	1,001	70'	100'		100'
1,000	751	60'	100'		100'
750	551	50'	80'		100'
550	326	40'	70'		100'
325	——	30'	60'		100'

* SUCH AS 40' TO 70' TO 100' OR 100' TO 80' TO 50' OR ANY OTHER COMBINATION SHOWN ABOVE.

NOTES

1. TYPE A DELINEATORS ON THE RIGHT OF THE THROUGH ROADWAY ARE TO BE SPACED AT 200 FT. INTERVALS THROUGHOUT, REGARDLESS OF CURVES.

2. WHEN CROSSING FROM LEFT TO RIGHT OR FROM RIGHT TO LEFT ON THE RAMPS THE DELINEATORS AT THE POINT OF CROSSOVER ARE TO BE AT THE SAME STATION ON EACH SIDE.

3. NO DELINEATORS ARE TO BE PLACED IN PAVED BERM

4. WHEN RADII OF CURVE ON RAMPS REQUIRE 100' SPACING THE DELINEATORS SHALL BE PLACED ON THE RIGHT IN RELATION TO THE FLOW OF TRAFFIC.

5. IN ADDITION TO MATERIALS LISTED IN 620.02, RECTANGULAR SHEET REFLECTORS MAY CONSIST OF REFLECTIVE SHEETING COMPOSED OF GLASS SPHERES IMBEDDED IN A WEATHER PROOF SYNTHETIC RESIN SHEET, THE REFLECTIVE FACE OF WHICH SHALL BE PLACED BEHIND AND SEALED TO A WEATHERPROOF RIGID PLASTIC FACE OF METHYL METHACRYLATE OF 0.060 INCHES MINIMUM THICKNESS.

6. SUPPLEMENTING THE DRIVE POST DETAILS SHOWN, ALTERNATE POST SECTIONS MAY BE FURNISHED. ANY ALTERNATE SECTION FURNISHED SHALL MEET ALL THE MATERIAL REQUIREMENTS OF 620, HAVE A SHAPE APPROXIMATELY AS DETAILED, AND HAVE A MOMENT OF INERTIA EQUAL TO OR GREATER THAN THE SECTION DETAILED. THE REQUIREMENTS OF 712.20 REALTIVE TO MAXIMUM WEIGHT TOLERANCE ARE HEREBY WAIVED. NO ALTERNATE SECTION FURNISHED SHALL EXCEED THE WEIGHT OF THE CORRESPONDING SECTION BY MORE THAN 10 PERCENT.

BUREAU OF DESIGN SERVICES
DIVISION OF HIGHWAYS
OHIO DEPARTMENT OF TRANSPORTATION

DELINEATOR DETAILS

DATE 1/1/73 3/12/73

APPROVED _____
ENGINEER OF DESIGN SERVICES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

281
392

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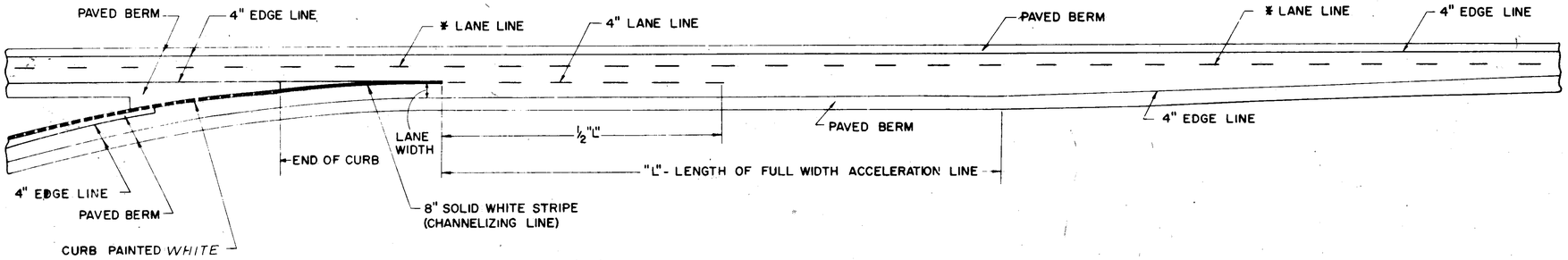
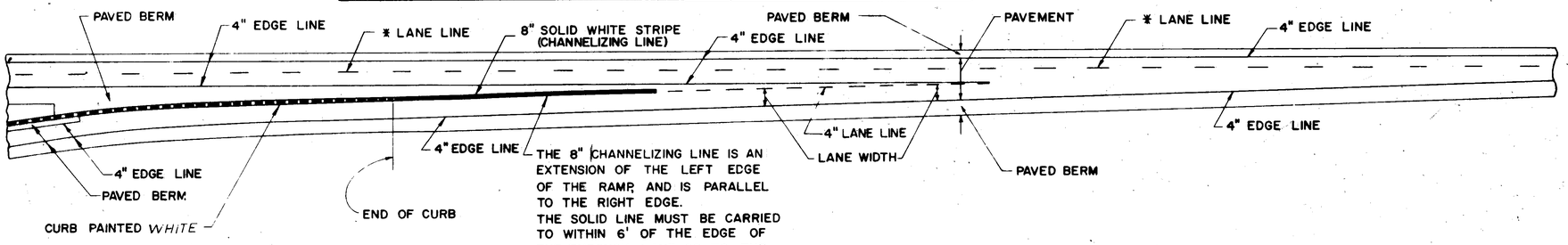
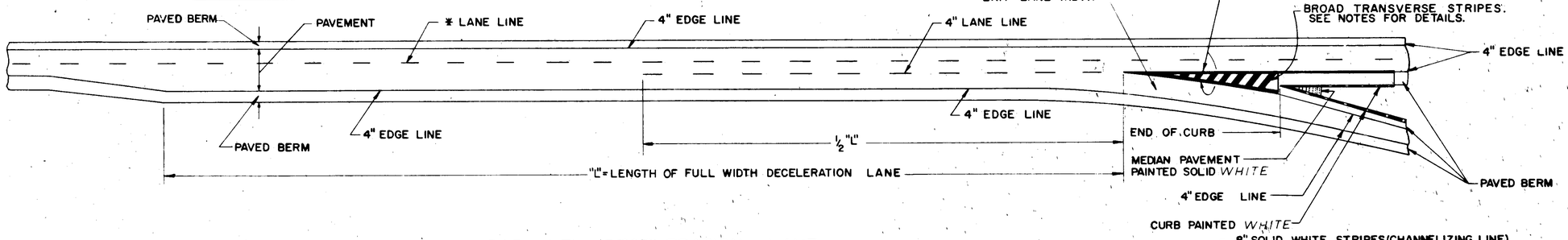
ENTRANCE TERMINAL - PARALLEL ACCELERATION LANE



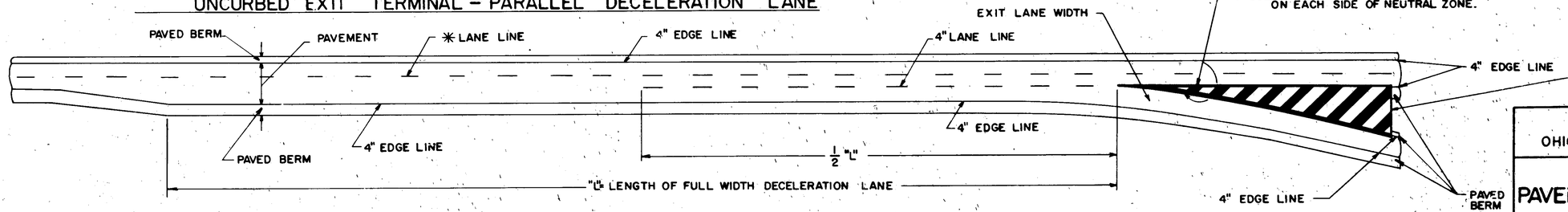
ENTRANCE TERMINAL - TAPERED ACCELERATION LANE



CURBED EXIT TERMINAL - PARALLEL DECELERATION LANE



UNCURBED EXIT TERMINAL - PARALLEL DECELERATION LANE



NOTES

DIAGONAL STRIPES AT EXIT RAMPS SHALL BE 24" BROAD TRANSVERSE STRIPES, 621.11, WITH A 6' SPACE BETWEEN STRIPES.

* 6" LANE LINE ON INTERSTATE HIGHWAYS ONLY.
4" LANE LINE ON ALL OTHER HIGHWAYS.

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

PAVEMENT MARKING | 621

DATE
7-17-61
4-6-62
5-24-65
9-[illegible]-67
4-17-68
1-11-72

APPROVED Robert E. Lower
ENGINEER OF TRAFFIC

1-17

LIGHTING PLANS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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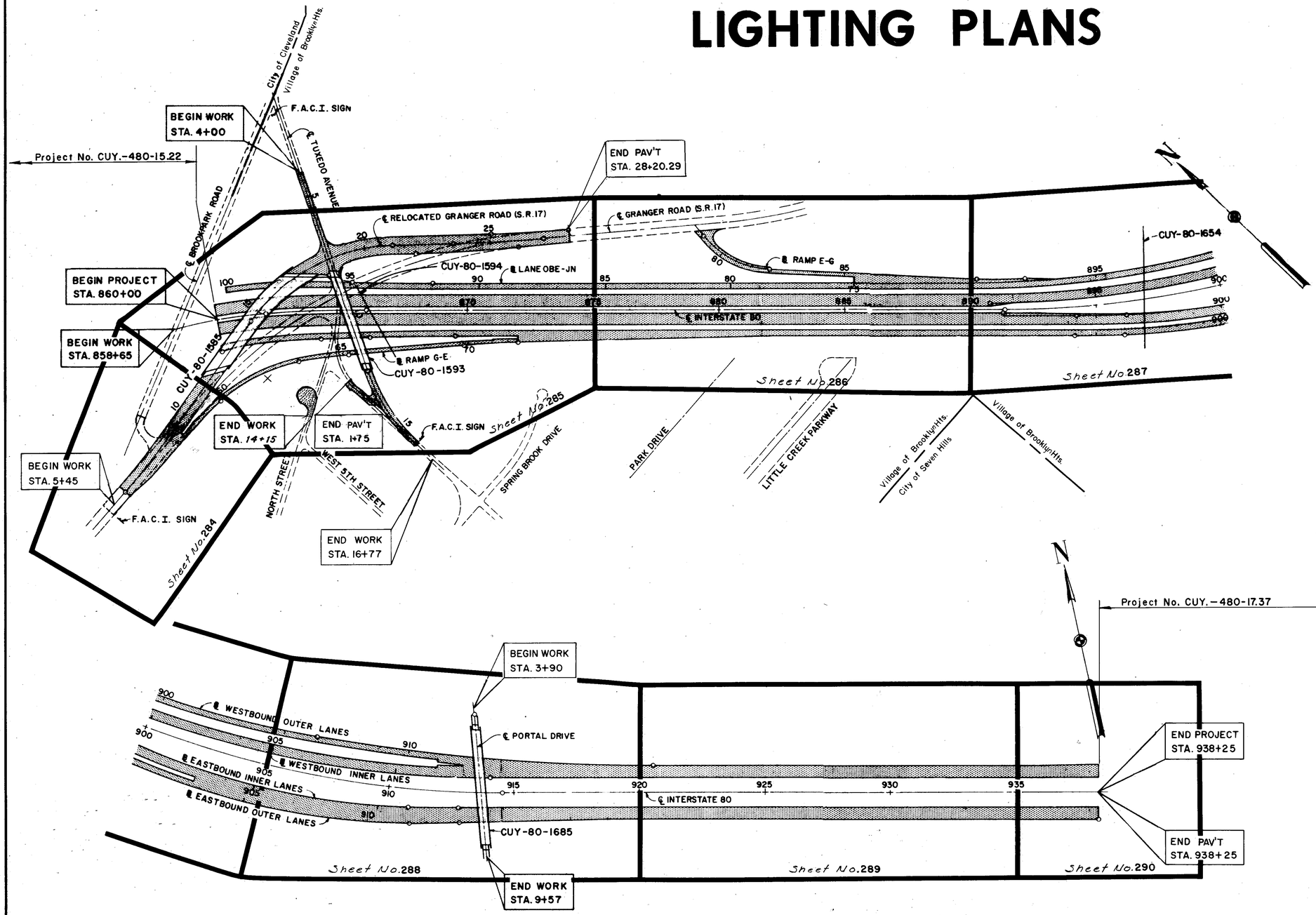
CUYAHOGA COUNTY
CUY.-480-15.81



SCALE 1"=200' MADE J.R.K. DATE 11-9-70
TRCD ____ DATE ____
CKD L.W.L. DATE 7-8-74

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

COMPOSITE PROJECT PLAN LAYOUT

LIGHTING NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-480-15.81

STANDARD CONSTRUCTION DRAWING HL-3.

POLE BASE DETAILS SHOWN ON THIS DRAWING ARE ESSENTIALLY FOR GALVANIZED STEEL POLES. FOR ALUMINUM DESIGNS, OR OTHER PERMITTED STEEL MATERIAL DESIGNS, VARIATIONS FROM THESE DETAILS WILL BE ACCEPTABLE, AS APPROVED BY THE ENGINEER.

STANDARD CONSTRUCTION DRAWING HL-15.

WEEPHOLE DIAMETERS OF 1/8 INCH SHOWN ON THIS DRAWING SHALL BE INCREASED TO 1/4 INCH.

SPECIFICATIONS

These notes are supplemental to Items 625 and 713 of the State of Ohio Department of Highways Construction and Materials Specifications.

Reference shall be made to Standard Construction Drawings HL-1, HL-2, HL-3, HL-4, HL-5, HL-6, HL-7, HL-8, HL-9, HL-10, HL-11, HL-12, HL-16, HL-17A, and HL-17B.

625.03 - GENERAL

The power supplying agency for this project is:

Cleveland Electric Illuminating Company
Illuminating Building
Public Square
Cleveland, Ohio
Whose mailing address is:
Post Office Box 5000
Cleveland, Ohio, 44101

The project has been designed on the basis of 5% voltage drop permissible on branch circuits. The project will receive 480-volt, two-wire, secondary service with one side grounded from C.E.I.Co.

The project has been designed on the basis of full lighting with 1.2 foot-candle average initial with a maximum uniformity ratio of 4.0 to 1.

LIGHT POLE DATA

REFERENCE LETTER	DESIGN NUMBER	FOUNDATION ANCHOR BOLTS SIZE DIAM. X LENGTH	FOUNDATION ANCHOR BOLTS BOLT CIRCLE DIAMETER	TRANSFORMER BASE STYLE
A	A15BB39 D	1 1/4"x42"	8"x 18"	
B	AT25B41.7	1"x 40"	17 1/4"	AT-C (Al.)
C	AT15B41.7	1"x 40"	17 1/4"	AT-C (Al.)
D	T15B41.7	1"x 40"	17 1/4"	AT-C OR STEEL
E	AT10B34.2	1"x 40"	15"	AT-C (Al.)
F	ST10B40.0	1"X 40"	15"	STEEL
G	ST10B31·7	1"x 40"	15"	STEEL
H	AT20BB41.7	1"x 40"	17 1/4"	AT-C (Al.)

ESTIMATED QUANTITIES:

AN ESTIMATED QUANTITY OF "150 LIN. FT. OF 605, 4 INCH SHALLOW PIPE UNDERDRAINS" IS PROVIDED IN THE LIGHTING GENERAL SUMMARY FOR USE AS DIRECTED BY THE ENGINEER IN PROVIDING POSITIVE DRAINAGE FOR PULL BOXES IN FILL AREAS. IT IS INTENDED THAT ALL PULL BOXES IN THESE AREAS BE PROVIDED WITH DRAINAGE, PROVIDED THE LENGTH OF UNDERDRAIN NECESSARY TO OBTAIN A SATISFACTORY OUT FALL DOES NOT EXCEED 20 FEET APPROXIMATELY. A PERFORATED PVC PIPE OR CONDUIT MATERIAL APPROVED BY THE ENGINEER MAY BE USED IN THE CONSTRUCTION OF THIS ITEM.

625.07 and 713.11-LUMINAIRES

400 watt luminaires shall have dual rated 240/480 volt, integral, regulator ballasts, and shall be General Electric M400, Westinghouse OV-25, McGraw-Edison "Unistyle", or equal approved by the Engineer. 700 watt luminaires shall have single rated 480-volt, 700 watt, integral regulator ballasts, and shall be General Electric M-1000, Westinghouse OV-50, McGraw-Edison "Unistyle" or equal approved by the Engineer.
Luminaires predominately illuminating a main line roadway shall be positioned perpendicularly thereto.

625.07 - 713.13 UNDERPASS LUMINAIRES

250-watt underpass luminaires shall be Holophone "Underpass Wallpack", or equal Westinghouse, or McGRAW-EDISON underpass unit approved by the Engineer, and shall be furnished with an integral fuse holder and 10-ampere fuse. The integral ballast shall be of a regulator type rated for 480 volts.

625.08 - 713.14 LAMPS

Mercury lamps shall be General Electric "Bonus Line", Westinghouse "Lifeguard", Sylvania "Rough Service", or equal approved by the Engineer.

CONDUIT ON STRUCTURES

Expansion fittings for conduit on structures shall be OZ Type AX, Crouse-Hinds Type XJ-4, Appleton Type XJ-4 or equal approved by the Engineer, for Bridges Nos. CUY-480-1585, CUY-480-1593, and CUY-480-1685. Each Expansion fitting shall have a copper external bonding jumper.

625.19 and 713.20 - CONTROL CENTERS

The contractor shall furnish and install control centers, located as per plans, to serve roadway lighting and sign circuits. The control centers shall include the control equipment, mounted as shown on detailed plan sheets, and as specified. The secondary distribution panels are to be mounted in a pedestal mounted enclosure. The contractor shall provide all incidentals required for the 480-volt, secondary, branch circuits for roadway and sign lighting at the site locations as indicated.
In addition to furnishing the secondary switches, fuses, conduits for feeders and branches to underground, cables, concrete foundation, concrete step, pedestal, enclosure, anchor bolts and all incidentals required for a complete control center, the contractor shall furnish and install, complete with wire and conduit, a 20-ampere, by-pass, switch rated at 240 volts. Cleveland Electric Illuminating Co. will make final connection to the switch for manual by-pass control of their lighting controller.
Cost of the switch is to be included in the price bid for "Control Center", as per plan.
See details on sheet 232.

LIGHT POLE ANCHOR BOLTS FOR BRIDGES

Anchor bolts for mounting light poles on bridges and retaining walls shall conform to the requirements of 713.01 and details shown on the plans and standard drawings, or the approved shop drawings, for the respective poles to be placed thereon.
Payment shall be made at the unit price bid for each set of the size required and necessary to install one pole, and this payment shall constitute full compensation for furnishing and placing the bolts.

HIGH VOLTAGE DIRECT CURRENT TEST

A high voltage direct current test, as described in Supplemental Specification 839, shall be performed on all distribution cable, and duct cable systems installed on this project. The test shall not be performed until after all new construction, such as guard rail, fence, delineator posts, sign supports, etc., in the immediate vicinity of the location of the cable run being tested, has been completed.

PULL BOXES IN MEDIAN BARRIER

Pull boxes shall be provided in the Median Barrier for termination of conduit under-crossings from either side of the roadway where indicated on the lighting layout sheets. Boxes shall be assembled as per the details shown on HL-17A and HL-17B.

CONNECTOR KITS:

AT THE OPTION OF THE CONTRACTOR, TYPE IX CABLE CONNECTIONS MAY BE SUBSTITUTED WHERE TYPE II OR III CABLE CONNECTIONS ARE SPECIFIED IN HAND HOLES OR TRANSFORMER BASES OF LIGHT POLES.

TYPE I THROUGH TYPE VII CABLE CONNECTIONS IN PULL BOXES, JUNCTION BOXES, AND OTHER ENCLOSURES BELOW GROUND MAY BE ACCOMPLISHED BY THE USE OF EITHER OF THE FOLLOWING:

1. A SLEEVE OR TEE CABLE CONNECTOR CONFORMING TO THE GENERAL REQUIREMENTS OF STYLE "S" OR "H", OR OTHER CONNECTING DEVICE APPROVED BY THE ENGINEER. THE CONNECTOR SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS AND CONNECTION SHALL BE SEALED AND WATER-PROOFED WITH A HI-DIELECTRIC COMPOUND SUCH AS "AQUA SEAL" AS MANUFACTURED BY KEARNEY, OR EQUAL APPROVED BY THE ENGINEER. THE SEALING MATERIAL SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS TO MAKE A WATER-TIGHT CONNECTION. CONNECTIONS NOT ACCOMPLISHED IN-LINE OR IN TEE FORM SHALL BE ADDITIONALLY PROTECTED BY USE OF A HI-DIELECTRIC PVC, OR OTHER APPROVED MATERIAL, BOOT WITH AN APPROVED FASTENING DEVICE.

2. A PREASSEMBLED KIT, AS MANUFACTURED BY JOY OR BUSSMAN, OR APPROVED EQUAL, WITH A WATERPROOF OR WATER-TIGHT RATING ACCEPTABLE TO THE ENGINEER.

ITEM 625 - SERVICE TO UNDERPASS LIGHTING, AS PER PLAN

This item shall consist of providing complete electrical service, except for luminaires, lamps, and structure grounding, for an underpass lighting system on Bridge No. CUY - 480-1595, relocated Granger Road over I-480. The installation work shall include conduits, conduit grounding, mountings, fittings, junction boxes, cables, and all incidentals necessary to complete, ready for use, the service as detailed on Sheet 236.
The lump sum price bid for "Item 625 - Service to Underpass Lighting, as per plan" shall include payment for all equipment, labor, and materials necessary to complete the work as specified. Component parts not specifically mentioned but required for satisfactory operation of this item shall be furnished and considered paid for as part of the item.

ELECTRICAL SERVICE FOR ILLUMINATED SIGNS

The pay items in the Lighting General Summary include the pull box or junction box adjacent to each lighted sign and the electrical service connections leading into the box, including connector kits in the pull box or junction box. Quantities for electrical service from the connector kits in the pull box or junction box to the sign are included in the Traffic Control General Summary.

Quantities for electrical service from the connector kits to luminaires mounted on combination-type sign or signal supports, including distribution cable, pole and bracket cable, luminaire support arm, luminaire, lamp, etc. exclusively required to service the roadway lighting unit, are included in the Lighting General Summary.

ITEM 625 - TEMPORARY LIGHTING, AS PER PLAN

This item shall consist of maintaining existing lighting or providing lighting for temporary roadways as further described below:
(Existing lighting on all existing roadways remaining open to traffic through the project area shall be maintained. Should the Contractor require the removal of lighting from an existing roadway, the Contractor shall then be responsible for adequate temporary lighting of that portion of the existing roadway affected by the removal of the existing lighting).

On temporary roadway between Stations 5+17 Existing Granger Road and 9+25 Existing Brookpark Rd., around Bridge No. CUY - 480 - 1585 Temporary lighting providing an average initial intensity of 1.2 footcandles shall be installed before opening of the temporary pavements to traffic.

Wood poles with overhead wiring may be used. All materials necessary to complete the Temporary lighting shall be furnished by the Contractor and the Temporary lighting installations shall be removed and disposed of by the Contractor when no longer needed.

Reconditioned or approved used materials may be furnished for temporary lighting. Temporary overhead construction shall not be less than Grade A for strength requirement as defined by the National Electric Safety Code. Mounting height for temporary luminaires shall not be less than 27 feet and minimum overhead conductor clearance shall be 20 feet.

The lump sum bid price for "Item 625 - Temporary Lighting, as per plan" shall include payment for all labor, equipment, materials, and incidentals necessary to provide the temporary lighting as specified, including the electrical energy, installation, removal, and maintenance of temporary lighting.

713.07 Polyvinyl Chloride Plastic Conduit. 1. Scope.
This specification covers polyvinyl chloride conduit for either direct burial in earth or for encasement in concrete and shall be of the size and type specified.

2. Detail Requirements. Conduit furnished under this specification shall comply with one of the following:

(a) Conduit conforming to NEMA Standards Publication No. TC1 with the exceptions that conduit and conduit fittings composed of styrene polymers or copolymers shall not be acceptable

(b) Conduit conforming to NEMA Standards Publication No. TC6 with the exception that conduit and conduit fittings composed of acrylonitrile-butadiene-styrene (ABS) shall not be acceptable.

(c) Conduit conforming to the requirements of (a), above, with the additional exceptions that where 4 inch nominal size conduit is to be encased in concrete it shall be permissible to use conduit having a minimum wall thickness of 0.075 inches and an outside diameter not less than 4.202 inches nor more than 4.360 inches instead of those dimensions specified in NEMA Standards Publication No. TC1.

For any given installation the mixed use of the conduits described in (a) and (b) shall be prohibited.

When the conduit described in (c) is used in a given installation all such conduit shall be the product of a single manufacturer.

PULL BOX - 713·09

THE AIR BELL AS DETAILED ON STANDARD CONSTRUCTION DRAWING HL-10 SHALL BE DELETED, AND THE COVER DETAIL REFERENCE CHANGED FROM "713·08" TO "S 713·09".

PLAN SPECIFICATION REFERENCES:

REFERENCES TO ITEM 625 AND 713 IN THESE PLANS SHALL BE CONSIDERED TO READ AS RESPECTIVE REFERENCES TO ITEMS S625 AND S713.

SCALE None
MADE J.R.K. DATE 6-1-74
TRCD. DATE
CKD L.W.L. DATE 7-8-74

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

FED. RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY

LIGHTING KEY CUY.-480-15.81

- -Typical Concrete Pole Base; with pole and with frangible base.
- -Typical Pole Base on Structure; with pole
- -Typical Pole Base in Safety Median; with pole and without frangible base. Junction box included with 14-ft. barrier section.
- -Typical Lighting Unit; with clear, mercury vapor lamp, 700 watt size, ANSI-IES Type III, M-C, with bracket arm of length shown and on pole of type shown.
- -Typical Lighting Unit; with clear, mercury vapor lamp, 400 watt size, ANSI-IES Type II, M-C, with bracket arm of length shown and on pole of type shown.
- -Typical Lighting Unit; with clear, mercury vapor lamp, 400 watt size, ANSI-IES Type III, M-C, with bracket arm of length shown and on pole of type shown.
- -Typical Existing Lighting Unit.
- A -Typical Light Pole Reference Letter, for type see Lighting Notes.
- -Duct Cable, directly buried, 24-inches deep.
- -Circuit Cables in 2-inch diam; 7.13.04, conduit directly buried in the ground.
- -Circuit Cables in 2-inch diam., 7.13.04 conduit in structures, or directly buried from end of structure to pull box or to nearest light pole base.
- -Circuit Cables in 1¼-inch diam., 7.13.04, conduit in structures for under pass lights.
- -Circuit Cables in 3-inch diam., 7.13.04 Conduit under paved areas.
- -Circuit Cables in 4-inch diam., raceway void in the Safety Median.
- -Pull Box, 18-inch diameter.
- -Junction Box in structure, 18"x8"x6".
- -Pull Box in Safety Median.
- -Glare Shield.
- -Control Center
- -Typical Underpass Lighting Unit; 250 watt, clear, mercury vapor lamp, mounted between girders.
- E -Expansion Joint in Structures.
- -Bridge Ground
- -Pull Box, 24"x18"x12", Sidewalk box.

Station III-700-15-2TA9 -Typical Light Pole Identification; III is the ANSI-IES Type; 700 is the lamp wattage; 15 is the bracket length; 2 is the Circuit Number, TA is the Control Center, and 9 is the pole number in the circuit.

Existing

Begin Temporary Connection Sta 5+17 Ex. Granger Rd. 30 Lt.

PROPOSED TEMPORARY CONNECTION

End Temporary Connection Sta 91+25 Ex. Brookpark Rd.

Sta. 5+42 ℄ Rel. Granger Rd. III-700-15-2TA13

Sta. 7+15 ℄ Rel. Granger Rd. III-700-15-2TA6

Sta. 7+90 ℄ Granger Rd. O.H. Sign No. 10, 700 watt & Sta. 8+06 ℄ Granger Rd. & Pull Box. 12 Type VIII B Conn. Kits.)

Sta. 8+82 ℄ Rel. Granger Rd. III-700-15(4.8)-2TA12

2 - Type VIII A Conn. Kits.

T.S. Sta. 57+79.19

Sta. 58+40 ℄ Ramp G-E & Pull Boxes and Conduit Crossunder (4 - Type VIII B Conn. Kits.)

Sta. 59+16 ℄ Ramp G-E II-400-10(34.2)-2TA11

C.S. Sta. 57+79.01

P.T. Sta. 6+86.43

Sta. 9+62 ℄ Rel. Granger Rd. III-700-15(4.8)-2TA10

Sta. 10+71 ℄ Rel. Granger & Pull Box 12 Type VIII A Conn. Kits.)

Sta. 11+41 ℄ Rel. Granger III-700-15(4.8)-2TA5

RELOCATED GRANGER ROAD

N 82° 04' 09" E

MATCH LINE STA. 11+59 REL. GRANGER ROAD

VILLAGE OF BROOKLYN HEIGHTS

CITY OF CLEVELAND

BROOKPARK ROAD

C.S. Sta 60+16.61

Sta. 13+94

Sta. 361+57.39 ℄ I-80 = Sta. 14+88.22 ℄ Reloc. Granger Rd.

- SEE SHEET NO. 285

RAMP G-E

Note: The bridge grounds and expansion joints shown on the lighting layout sheets are not to be considered complete in number or better than approximate in location.

LIGHTING LAYOUT
Rev. 10-16-74

SCALE 1" = 50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE J.R.K. DATE 11-10-70 CONSULTING ENGINEERS
TRCD. ____ DATE ____
CKD. L.W.L. DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

FED. RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY
CUY.-480-15.81

Project No. CUY. 480-15.22 | **Begin Project** CUY.480 - 15.81

BEGIN LANE OBE — JN STA. 100+00.00

BEGIN PROJECT STA. 860+00.00

BEGIN LANE JN — OBE STA. 60+00.00

MATCH LINE STA. 11+50 REL. GRANGER ROAD - SEE SHEET NO. 284

MATCH LINE STA. 875+00 - SEE SHEET NO. 286

I-480-4(25)

CUY-480-15.81

GRANGER RD. (S.R. 17)

℄ RELOC S.R. 17 (GRANGER ROAD)

℄ INTERSTATE ROUTE 80

℄ LANE OBE — JN

℄ LANE JN — OBE

℄ WESTBOUND OUTER LANES

℄ Eastbound Outer Lanes

℄ RAMP G-E

℄ Relocated Granger Road

Exist. Granger Rd.

Sta. 28+20.29 ℄ Rel. Granger Rd. = Sta. 27+28.79 ℄ Existing Granger Rd.

Sta. 27+50 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA6

Sta. 28+40 ℄ Exist. Granger Rd. III-700-15(41'-8") 1TA15

Sta. 26+59 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA14

Sta. 25+69 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA5

Sta. 24+77 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA13

Sta. 23+85 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA4

Sta. 22+95 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA12

Sta. 22+04 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA3

Sta. 21+13 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA11

Sta. 20+22 ℄ Rel. Granger Rd. III-700-15(41'-8") 1TA2

Sta. 19+30 ℄ Rel. Granger Rd. & Pull Boxes and Conduit Crossunder. (2-Type VIIB) III-700-15(40'-0") 1TA10

Sta. 18+39 ℄ Rel. Granger Rd. & Pull Boxes and Conduit Crossunder. (2-Type VIIB each box) III-700-15(40'-0") 1TA1

Sta. 18+05 ℄ Relocated Granger Rd. III-700-15(40'-0") 2TA1 Proposed Signalized Intersection Control, Sta. Connected 55 ft. Tuxedo Ave. Load = 25.7 Kva

Sta. 16+09 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA2

Sta. 13+85 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA3

Sta. 11+96 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA8

Sta. 98+80 ℄ Lane OBE-JN III-700-25(41'-8") 1TN17

Sta. 97+80 ℄ Lane OBE-JN, Pull Box (2-Type VIIA) Sta. 97+83.00 ℄ Lane OBE-JN

Sta. 96+35 ℄ Lane OBE-JN III-700-15(41'-8") 1TN16

Sta. 17+25 ℄ Rel. Granger Rd. & Pull Box (2-Type VIIA) Sta. 17+14 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA7

Sta. 14+60 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA9

Sta. 860+30 ℄ I-80 (Duplex) III-700-15(41'-8") 1TN15

Sta. 864+10 ℄ I-80 (2-Type VIIB)

Sta. 865+00 ℄ I-80 (Duplex) III-700-15(41'-8") 1TN14

Sta. 866+75 ℄ I-80 (Begin Concrete Median)

Sta. 864+36 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN13

Sta. 866+78 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN4

Sta. 868+35 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN15

Sta. 871+92 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN6

Sta. 874+49 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN7

Sta. 870+84 ℄ W.B.O.L. III-700-25(41'-8") 2TN11

Sta. 873+38 ℄ W.B.O.L. III-700-25(41'-8") 2TN12

Begin Concrete Median Sta. 868+60 ℄ W.B.O.L.

Sta. 868+60.00 ℄ W.B.O.L.

P.C. Sta. 91+73.69 ℄ Lane OBE-JN = Sta. 868+60.00 ℄ W.B.O.L.

P.T. Sta. 91+73.69 ℄ Lane OBE-JN

P.C. Sta. 97+83.00 ℄ Lane OBE-JN

Sta. 97+60

Sta. 92+06 ℄ Lane OBE-JN III-700-25(41'-8") 2TN10

Sta. 87+04 ℄ Tuxedo Ave (2-Type VIIA) I.S. Sta. 95+73.88 ℄ Lane OBE-JN

Sidewalk Pull Box - See Sheet 285 (2-Type VIIB)

Sta. 66+10.00 ℄ Lane JN-OBE

P.C. Sta. 66+10.00 ℄ Lane JN-OBE

Sta. 64+16.61 ℄ Lane JN-OBE

Sta. 60+31 Lane JN-OBE ℄ Pull Box (2-Type VIIB) Conn. Kits

Sta. 64+15 ℄ Ramp G-E (2-Type VIIC)

Sta. 66+92 ℄ Ramp G-E II-400-10(34'-2") 1TN14

Sta. 66+41 ℄ Lane JN-OBE III-700-15(41'-8") 2TN1

Sta. 12+45 ℄ Rel. Tuxedo Ave. ℄ Pull Box (2-Type I in each box)

Sta. 13+20 ℄ Del. Tuxedo Ave III-400-10(34'-2") 2TA19

Village of Brooklyn Heights
Village Hall & Fire Station

Sta. 14+45 ℄ Del. Tuxedo Ave. II-400-10(34'-2") 2TA20 ℄ Pull Box & Conduit Crossunder. (2-Type VIIA)

Sta. 68+98 ℄ Lane JN-OBE III-700-15(41'-8") 2TN16

Sta. 69+10 ℄ Ramp G-E II-400-10(34'-2") 1TN5

Sta. 71+28 ℄ Ramp G-E III-700-25(41'-8") 1TN8

Sta. 73+46 ℄ EBOL III-700-25(41'-8") 1TN7

Sta. 10+20 ℄ Rel. Tuxedo Ave II-400-10(35'-3") 2TA18

Sta. 11+80 ℄ Del. Tuxedo Ave. II-400-10(34'-2") 1TN3

Sta. 63+80 ℄ Ramp G-E Connected Load = 3.00 Kva

Control Center TN, 90 ft. Rt. Sta. 63+80 ℄ Ramp G-E Connected Load = 3.00 Kva

CONNECTION

TUXEDO AVE

NORTH STREET

CE/Lp. pole head for Control Center TN.

Sta. 0+46 ℄ T-U Connection III-400-10(34'-2") 2TN6

Sta. 63+02 ℄ Ramp G-E II-400-10(34'-2") 1TN2

Sta. 63+03 ℄ Lane JN-OBE III-700-25(41'-8") 1TN13

Sta. 62+88 ℄ Ramp G-E II-400-10(34'-2") 1TN1

Sta. 62+82 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA5

Sta. 62+28 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA4

Sta. 12+18 ℄ Rel. Granger Rd. ℄ Pull Box (2-Type I Conn. Kits)

Sta. 11+70 ℄ Rel. Granger Rd. III-700-10(41'-8") 2TA4

Spring Brook Drive

Sta. 72+00.00-15' Lt. ℄ Ramp G-E to Sta. 72+00.00-116' Rt. ℄ I-80

P.T. Sta. 72+00 ℄ Ramp G-E Begin Taper

Sta. 69+84.01 ℄ Ramp G-E

P.C. Sta. 69+84.01 ℄ Ramp G-E

P.T. Sta. 69+50.00 ℄ Lane JN-OBE = Sta. 869+50.00 ℄ Ramp G-E

P.T. Sta. 69+50.00 ℄ Lane JN-OBE = Sta. 869+50.00 105' Rt. ℄ I-80

Sta. 872+00.00-116' Rt. ℄ I-80

Type 6 Curb

Type 8 Curb

End Type 8 Curb

4" Concrete Median

6" Concrete Median

Concrete Barrier

Retaining Wall 2

4ft. gate

Sidewalk

Begin Taper

Shoulder Transition

Full Transition

Partial Transition

40:1 Taper

S 43° 23' 05" E

S 46° 03' 24"

D = 0° 30' 00"

D = 1° 00' 00"

SCALE 1"=50' | MADE JRL DATE 11-5-70 | TRCD. ____ DATE ____ | CKD. LWL DATE 7-8-74

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

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY
CUY.-480-15.81

Village of Brooklyn Heights

Sta. 28+41 ℄ Exist. Granger Rd. III-700-15(41'-8")1TA17
Sta. 29+32 ℄ Exist. Granger Rd. III-700-15(41'-8") 1TA16
Sta. 30+23 ℄ Exist. Granger Rd. III-700-15(41'-8") 1TA18
Sta. 31+14 ℄ Exist. Granger Rd. III-700-15(41'-8") 1TA17
Sta. 32+05 ℄ Exist. Granger Rd. III-700-15(41'-8") 1TA15
Proposed Signalized Intersection
Sta. 33+50 ℄ Exist. Granger Rd. III-700-15(41'-8") 2LC12
℄ Exist. S.R. 17 (GRANGER ROAD)
Type 6 Curb
Sta. 79+47.84 Ramp E-G II-400-10(34'-2") 2LC11
P.T. Sta. 80+00.00
D 78°-8'
Sta. 881+15 ℄ WBOL III-700-25 (41'-8") 2TN15
Sta. 881+53 ℄ Ramp E-G II-400-10(34'-2") 2LC10
P.C. Sta. 882+00.00 ℄ Ramp E-G & Begin Taper
Sta. 883+05 ℄ WBOL III-700-15(41'-8") 2TN16
Sta. 883+60 ℄ Ramp E-G II-400-10(34'-2") 2LC9
Sta. 884+00 ℄ EBOL Pull Box (A-Type III)
Sta. 885+78 ℄ WBOL III-700-15(41'-8") 2LC15
Sta. 885+38.28-16'℄ Ramp E-G
Sta. 885+37.36-12.9'℄ EB80
Sta. 888+02 ℄ WBOL III-700-25 (41'-8") 2LC14
2-Type VIIBconnector kits
Sta. 889+15 ℄ WBOL O.H. Sign No. 13, 875 watts.
Sta. 875+92 ℄ WBOL III-700-25 (41'8") 2TN13
Sta. 878+47 ℄ WBOL III-700-25 (41'-8") 2TN14
3' Paved Shld.
℄ RAMP-E-G
S 40°48'05" E
100' Shld. Trans.
25:2 Taper
Sta. 83+00 End Taper
8' Paved Shld.
S 43°23'05" E
880
885
℄ WESTBOUND OUTER LANES
℄ INTERSTATE ROUTE 80
6' Concrete Median
Concrete Barrier
Sta. 877+06 ℄ I-80 (Duplex) III-700-15(41'-8") 2TN18
Sta. 878+30 ℄ I-80 O.H. Sign No. 11, Circ. No. 2TN 850 watts. (2-VII B)
Sta. 879+63 ℄ I-80 (Duplex) III-700-15(41'-8") 1LC3
Sta. 882+20 ℄ I-80 (Duplex) III-700-15(41'-8") 1LC2 & 3
Sta. 884+77 ℄ I-80 (Duplex) III-700-15(41'-8") 1LC1
Sta. 886+77 ℄ I-80 (Duplex) III-700-15(41'-8") 1LC4
Sta. 889+27 ℄ I-80 (Duplex) III-700-15(41'-8") 1LC5
2-Type VIIA and 2-VII-B connector kits
2-Type VIIB connector kits
℄ EASTBOUND OUTER LANES
10' Paved Shld.
6' paved shld.
40:1 Taper
80' Shld. Trans.
Sta. 882+00 End Taper
4ft. gate in fence.
Sta. 875+71 ℄ EBOL III-700-25 (41'-8") 1TN18
Sta. 878+22.8 ℄ EBOL III-700-25 (41'-8") 1TN9
Sta. 880+84 ℄ EBOL III-700-25 (41'-8") 1TN10
Sta. 883+46 ℄ EBOL III-700-25 (41'-8") 1TN11
Sta. 885+71 ℄ EBOL III-700-25 (41'-8") 2LC1
Sta. 888+06 ℄ EBOL III-700-25 (41'-8") 2LC2
Control Center "LC" 195ft. ℄ Sta. 885+00 ℄ I-80 Connected Load = 32.57 Kva. Feed from CEI Co. Pole No. 627-712.
℄ Park Drive
℄ Little Creek Parkway

MATCH LINE STA. 875+00 SEE SHEET NO. 285

MATCH LINE STA. 890+00 - SEE SHEET NO. 287

SCALE 1"=50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE J.P.K. DATE 11-10-70 CONSULTING ENGINEERS
TRCD. — DATE —
CKD. LWL DATE 1-8-74 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY
CUY.-480-15.81

Village of Brooklyn Heights

MATCH LINE STA. 890+00 - SEE SHEET NO.286

MATCH LINE STA. 905+00 - SEE SHEET NO.288

E. Marginal Drive

Sta. 890+52 ℄ WBOL
III-700-25(41'-8") 2LC5

Sta. 893+02 ℄ WBOL
III-700-25(41'-8") 2LC6

Sta. 894+13 ℄ WBIL
III-700-15(41'-8") 1LC11

Sta. 895+29 ℄ WBOL
III-700-15(41'-8") 2LC11

Sta. 896+60 ℄ WBIL
III-700-25(41'-8") 1LC12

Sta. 897+80 ℄ WBOL
III-700-15(41'-8") 2LC8

Sta. 899+20 ℄ WBIL
III-700-25(41'-8") 1LC13

Sta. 900+36 ℄ WBOL
III-700-15(41'-8") 2LC9

Sta. 901+80 ℄ WBIL
III-700-25(41'-8") 1LC14

Sta. 902+94 ℄ WBOL
III-700-15(41'-8") 2LC10

Sta. 890+00.63 ℄ WBOL
Begin paved Shld. Taper

PT Sta. 90+26.23 ℄ Ramp E-6

Sta. 92+18 ℄ Ramp E-6

Sta. 93+40 End Taper

100 Shld. Trans.

2 Paved Shld.

D = 3°00'00"

6" Concrete Median

End Paved Shld. Taper Sta. 893+18 WBOL

End Concrete Median Sta. 895+50 WBOL

P.C. Sta. 897+71.91 ℄ W.B.I.L.
Begin Pavement Taper
100' Taper

See End Taper Detail Sheet

Route Barrier

S43°23'05"E

70:1 Taper

Begin Edge Taper

℄ WESTBOUND OUTER LANES 900

Type 6 Curb

℄ WESTBOUND INNER LANES 900

D = 1°28'00"

D = 1°28'39"

895

900

Sta. 904+25 ℄ WBIL
III-700-25(41'-8") 3PD8

Sta. 904+33 ℄ EBIL
III-700-25(41'-8") 3PD12

2 Type III B Conn. Kits

Sta. 902+25 ℄ WBOL
O.H. Sign No. 14 500 watts

+℄ Sta. 904+71.58 ℄ E.B.I.L.

End Taper

10' Paved Shld.

Concrete Median Varies from 1'-0" to 6'-0"

5' Paved Shld.

℄ EASTBOUND INNER LANES 900

D = 2°00'00"

℄ EASTBOUND OUTER LANES 900

10' Paved Shlder

T.S. Sta. 896+13.32 ℄ EBOL

S.C. Sta. 896+13.32 ℄ EBOL

Sta. 890+40 ℄ EBOL
III-700-25(41'-8") 2LC3

Sta. 890+25 E I-80
O.H. Sign No. 12, (2-VIII B)
350 watts
OH. ILC

Sta. 891+25 E I-80
Median Pull Box with 2 Type III B connector kits

Sta. 891+77 (Duplex) E I-80
III-700-20(41'-8") ILC8
(Offset 6'-3" Left of Center-line of I-480)

Sta. 893+13 ℄ EBOL
III-700-25(41'-8") 2LC4

Sta. 893+85 E I-80
℄ Pull Box. (2) Type VIIBConn. Kits

Sta. 894+19 ℄ EBIL
III-700-15(41'-8") 1LC7

Sta. 895+43 ℄ EBOL
III-700-15(41'-8") 2LC5

Sta. 896+67 ℄ EBIL
III-700-25(41'-8") 1LC8

Sta. 898+00 ℄ EBOL
III-700-15(41'-8") 2LC6

Sta. 899+17 ℄ EBIL
III-700-25(41'-8") 1LC9

Sta. 900+74 ℄ EBOL
III-700-15(41'-8") 2LC7

Sta. 901+92 ℄ EBIL
III-700-25(41'-8") 1LC10

Sta. 903+48 ℄ EBOL
III-700-25(41'-8") 2LC8

Village of Brooklyn Heights
City of Seven Hills

SCALE 1"= 50'
MADE J.R.K. DATE 11-12-70
TRCD. DATE
CKD. LWC DATE 7-8-71

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

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY
CUY.-480-15.81

Village of Brooklyn Heights

MATCH LINE STA. 905+00 - SEE SHEET NO. 287

MATCH LINE STA. 920+00 - SEE SHEET NO. 289

℄ Kent Circle

℄ South Ridge Road

℄ Marengo Drive

℄ Belmont Drive

℄ Lancaster Drive

℄ INTERSTATE ROUTE 80

℄ WESTBOUND OUTER LANES

℄ WESTBOUND INNER LANES

℄ EASTBOUND INNER LANES

℄ EASTBOUND OUTER LANES

PORTAL DR
CUY.-480-1685

Sta. 905+52 ℄ WBOL
III-700-25(4I-B)-3PD3

Sta. 906+18 ℄ WBIL
III-700-25(4I-B)-3PD7

Sta. 908+30 ℄ WBIL
III-700-25(4I-B)-3PD6

Sta. 908+10 ℄ WBOL
III-700-2.5-(4I-B)-3PD2

Sta. 910+35 ℄ WBIL
III-700-2.5(4I-B)-3PD5

Sta. 910+68 ℄ WBOL
III-700-25(4I-B)-3PD1

Sta. 912+41 ℄ WBIL
III-700-25(4D)-3PD4

Sta. 912+15 ℄ WBOL ℄ Pull box
(2-Type VIIIBkits)

Sta. 912+16.82 ℄ WBIL

Sta. 912+46 ℄ WBOL

Sta. 913+52 ℄ WBOL
III-700-25(4I-B)-1PD1

Sta. 915+78 ℄ I-80
℄ Pull box (2-Type III B)

Sta. 915+88 ℄ I-80
O.H. Sign No. 15
1025 watts

Sta. 916+00 ℄ I-80
III-700-25(4I-B)-1PD2

Sta. 917+54 ℄ I-80
III-700-25(4I-B)-1PD3

Sta. 919+36 ℄ I-80
III-700-25(4I-B)-1PD4

Sta. 912+65 ℄ WBIL
℄ Pull box (2-Type VIIIBkits)

Sta. 913+35 ℄ EBIL
℄ Pull box. (4-Type VIIIBkits)

Sta. 913+68.40 ℄ EBOL

Sta. 911+68.40 ℄ EBOL

Sta. 913+25 ℄ EBIL
III-700-25(4I-B)-3PD9

Sta. 913+75 ℄ EBOL
℄ Pull Box (4-Type VIIIA kits)

Sta. 913+36 ℄ EBOL
III-700-25(4I-B)-2PD1

Sta. 909+32 ℄ EBOL
III-700-25(4I-B)-3PD14

Sta. 910+34 ℄ EBIL
III-700-25(4I-B)-3PD10

Sta. 912+20 ℄ EBOL
III-700-15(4I-B)-3PD13

Sta. 907+41 ℄ EBIL
III-700-25(4I-B)-3PD11

Sta. 904+50 ℄ EBOL
III-700-25(4I-B)-3PD15

Sta. 7+92 ℄ Portal Dr.
II-400-10-3PD19
Install transformer base with floodlight for illumination of diverging lanes nose. (3PD16)

Sta. 6+03 ℄ Portal Dr.
II-400-10-3PD18

Sta. 916+28 ℄ I-80
III-700-25(4I-B)-2PD2
℄ Pull box and conduit crossunder. (2-Type VIIB)

Sta. 918+16 ℄ I-80
III-700-25(4I-B)-2PD3

Sta. 919+25 ℄ I-80
O.H. Sign No. 16
1050 watts

2-Type VIIB

Begin Approach Slab
Sta 9+21.26

End Approach Slab
Sta 6+77.78

PT Sta 913+18.26 ℄ WBIL

PT Sta 913+10.38 ℄ EBIL

PT Sta 913+10.38 ℄ EBOL

Sta 915+00.00 ℄ I-80=
Sta 914+75.11 ℄ WBIL
Sta 914+93.73 ℄ WBEL

Sta 915+00.00 ℄ I-80=
Sta 915+06.27 ℄ EBIL=
Sta 915+43.72 ℄ EBOL

Type 6 curb

10' Paved Shld.

Item 612

Extend conduit 2-ft. beyond end of wingwall, 2-ft. below grade, into pull box. Typical both ends.

Village of Brooklyn Heights
City of Seven Hills

SCALE 1"=50'
MADE J.R.K. DATE 11-12-70
TRCD. ____ DATE ____
CKD. L.W.L. DATE 7-5-74

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

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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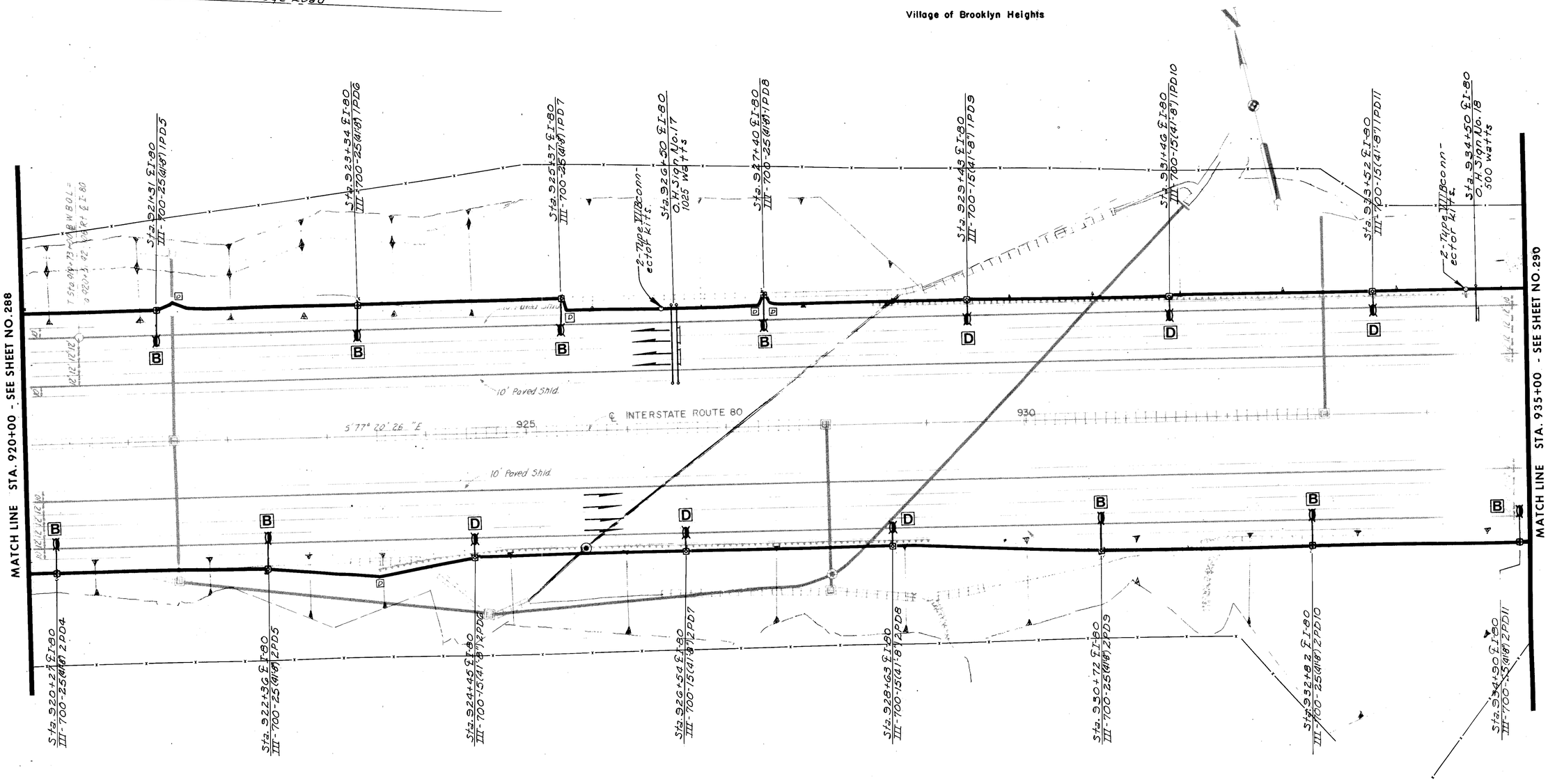
392

CUYAHOGA COUNTY
CUY.-480-15.81



SCALE 1"=50'
MADE J.R.L DATE 11-12-70
TRCD. DATE
CKD. LWC DATE 7-9-74

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

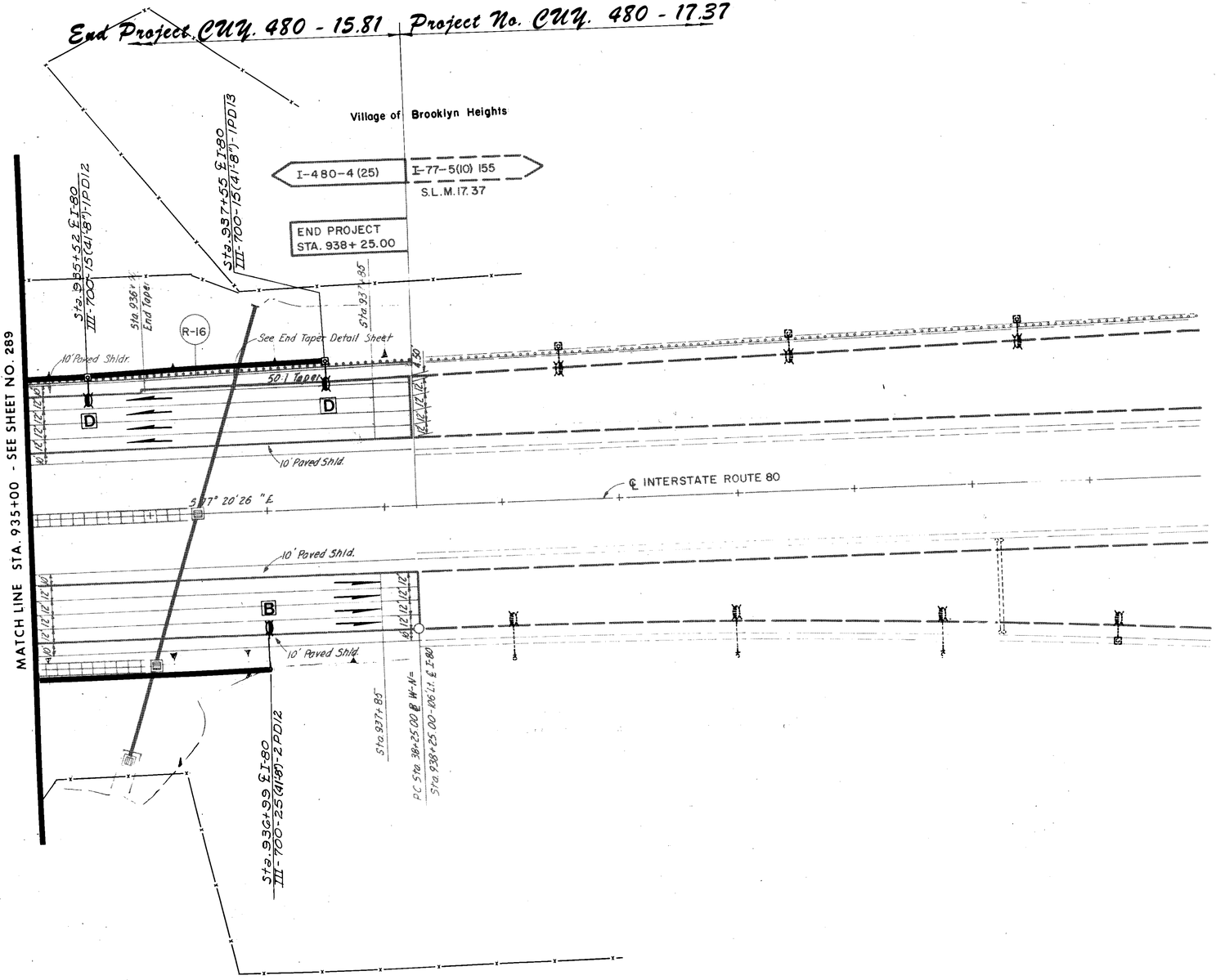
LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

290
392

CUYAHOGA COUNTY
CUY.-480-15.81

End Project CUY. 480 - 15.81 Project No. CUY. 480 - 17.37



SCALE 1"=50' HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE J.D.K. DATE 11-12-70 CONSULTING ENGINEERS
TRCD ____ DATE ____
CKD. L.W.L. DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

LIGHTING LAYOUT

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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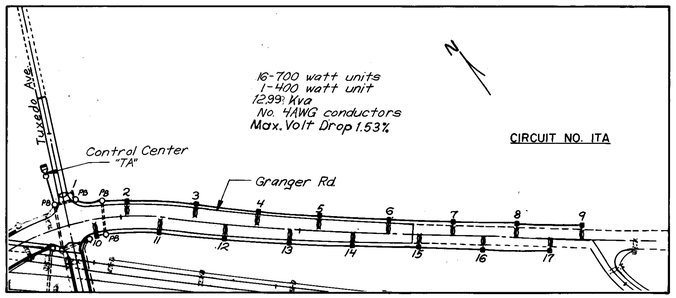
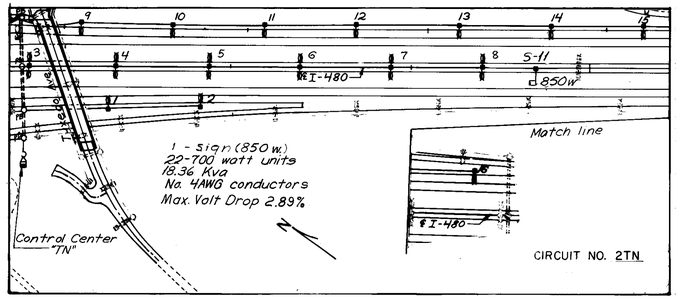
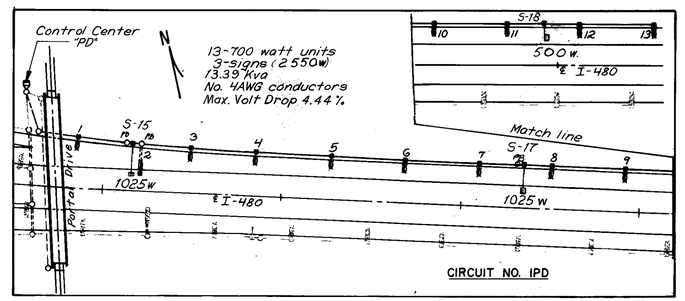
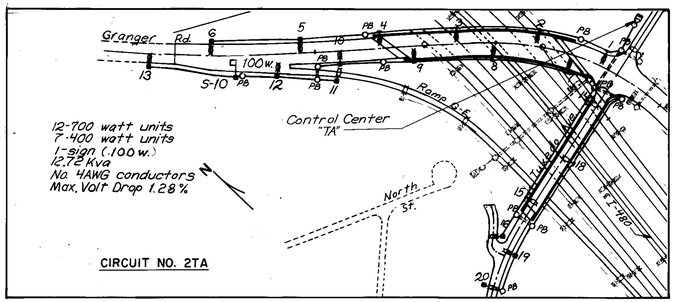
392

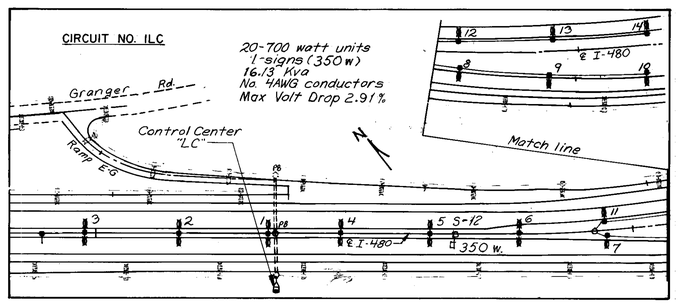
CUYAHOGA COUNTY
CUY.-480-15.81

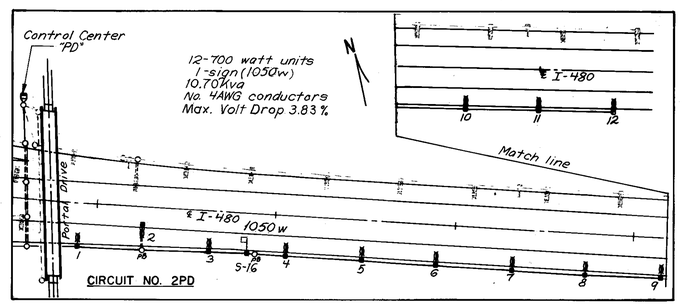


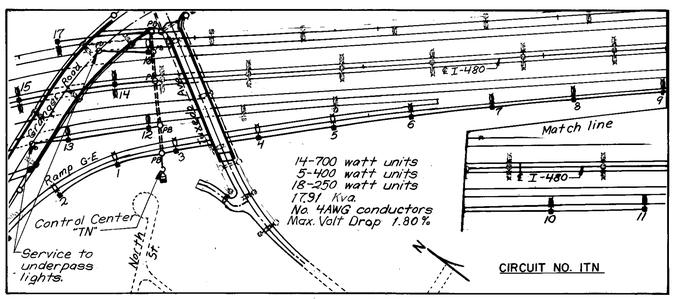


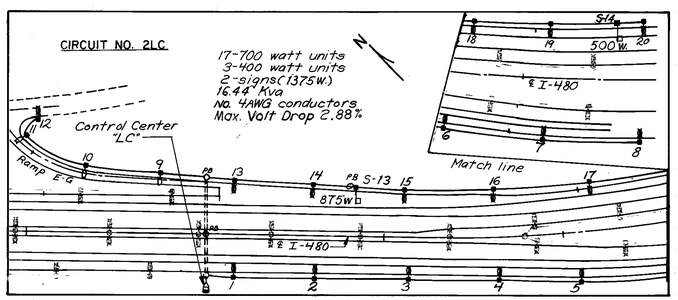


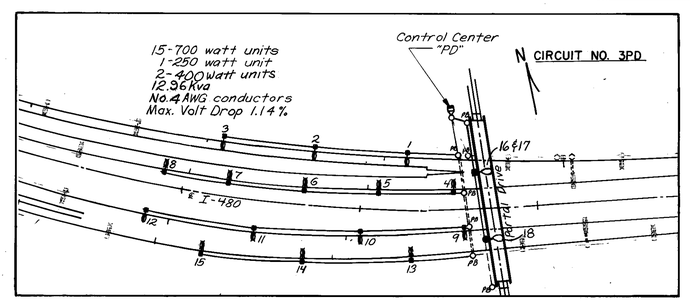












SCALE 1"-200'
MADE KR DATE 6-25-74
TRCD. DATE
CKD. LWC DATE 7-8-74

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

CIRCUIT LAYOUT MAPS

FED. ROAD DIV. NO.	STATE	FEDERAL AID PROJECT NO.	TYPE FUNDS
2	OHIO		

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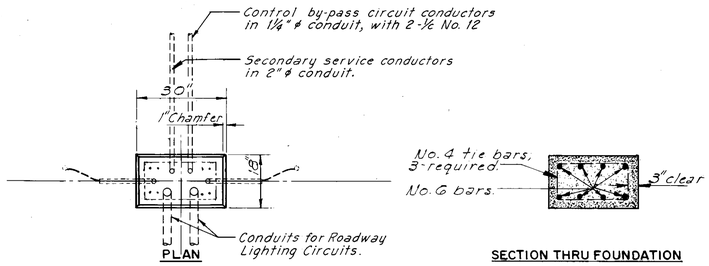
CUYAHOGA COUNTY
CUY.- 480-15.81

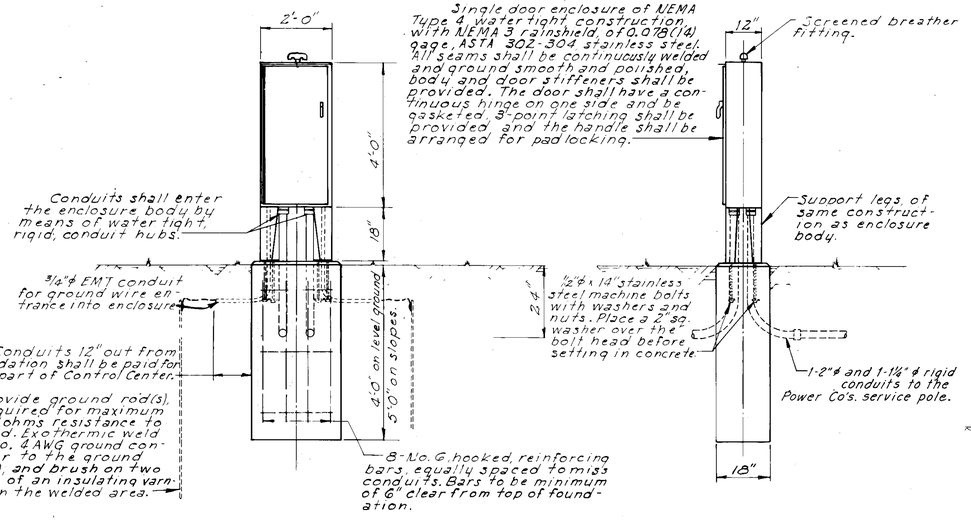
CONTROL CENTER DATA

CONTROL CENTER	LOCATION STA.	LOCATION SIDE	CONNECTED LOAD KVA	SECONDARY SERVICE CONDUCTOR	SAFETY SWITCH SIZE	CIRCUIT NO.	FIXTURE 700 WATTS	FIXTURE 400 WATTS	FIXTURE 250 WATTS	FIXTURE SIGN WATTS	CIRCUIT CONDUCTORS	CIRCUIT FUSES
TN	64+25 Ramp G-E	66Ft. Rt.	37.00	No. 2AWG	60Amp 600VAC.	1	14	5	18	—	No. 4AWG	50Amp
						2	22	—	—	850	No. 4AWG	50Amp
						3	—	—	—	—	Spare	50Amp
TA	6+75 Rel. Tuxedo	35Ft. Rt.	25.71	No. 2 AWG	60Amp 600VAC.	1	16	1	—	—	No. 4AWG	35Amp
						2	12	7	—	100	No. 4AWG	35Amp
						3	—	—	—	—	Spare	35Amp
LC	885+00 & I-80	195Ft. Rt.	32.57	No. 2AWG	60Amp 600VAC.	1	20	—	—	350	No. 4AWG	45Amp
						2	17	3	—	1375	No. 4AWG	45Amp
						3	—	—	—	—	Spare	45Amp
PD	913+00 & I-80	295Ft. Lt.	37.05	No. 2AWG	60Amp 600VAC.	1	13	—	—	2550	No. 4AWG	35Amp
						2	12	—	—	1050	No. 4AWG	35Amp
						3	15	—	1	—	No. 4AWG	35Amp



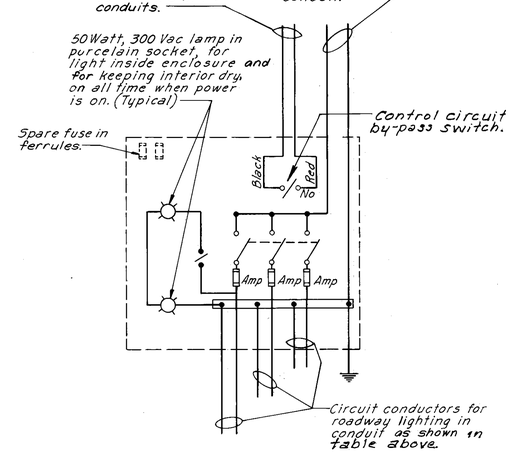
SECTION THRU FOUNDATION

Notes:
See "Lighting Layout" sheets for direction and placement of conduits out of foundation.
Spacing and placement of anchor bolts in foundation is dependent upon the enclosure manufacturers dimensions.
Enclosure dimensions are inside measurements.



CONTROL CENTER DETAILS
Scale: 1/2"-1'-0"

ELECTRICAL SERVICE POLE



TYPICAL WIRING DIAGRAM FOR CONTROL CENTER IN ENCLOSURE

SCALE — HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE TRK DATE 6-20-74
TRCD R.R DATE 6-20-74
CKD LWL DATE 7-8-74
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

CONTROL CENTER
Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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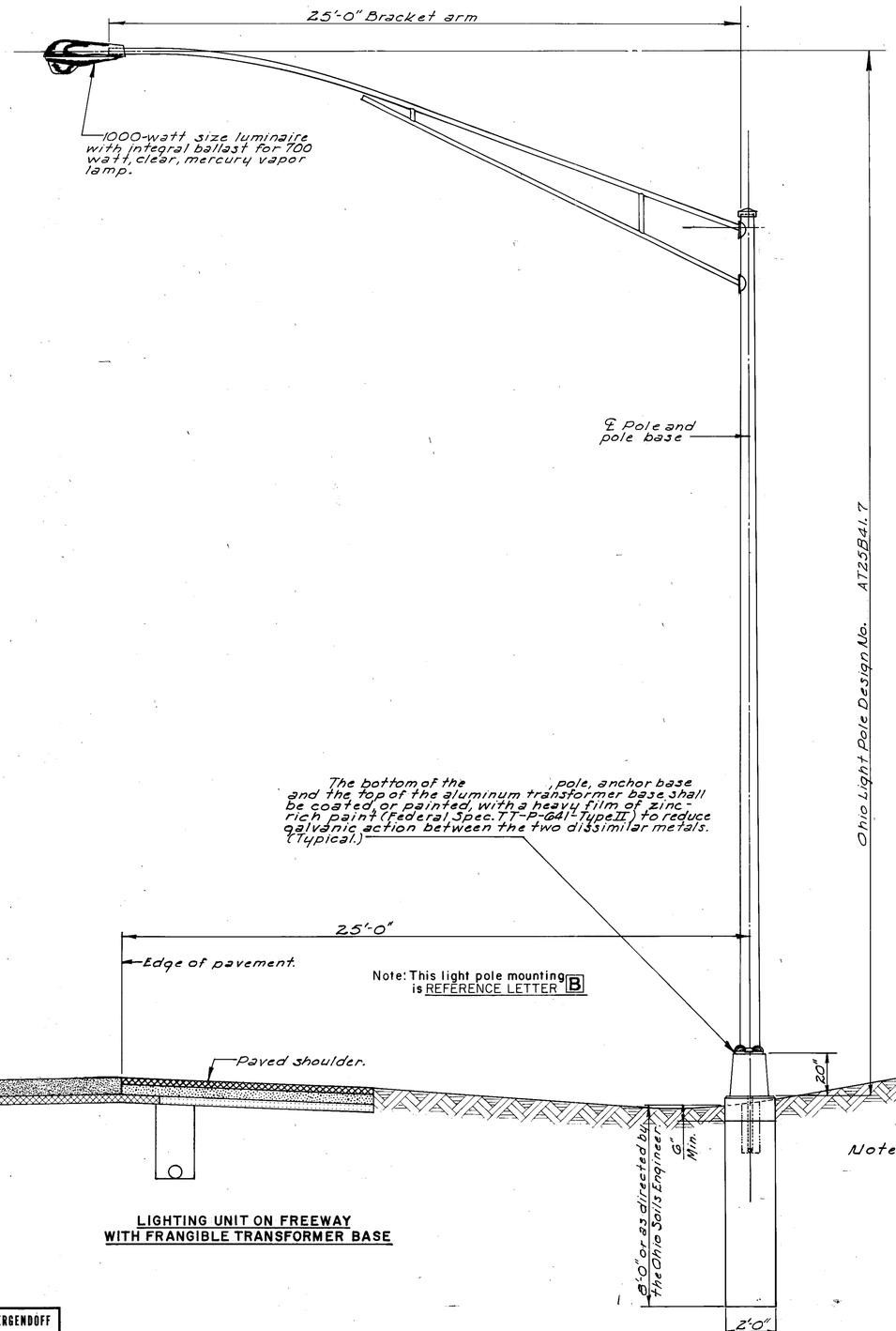
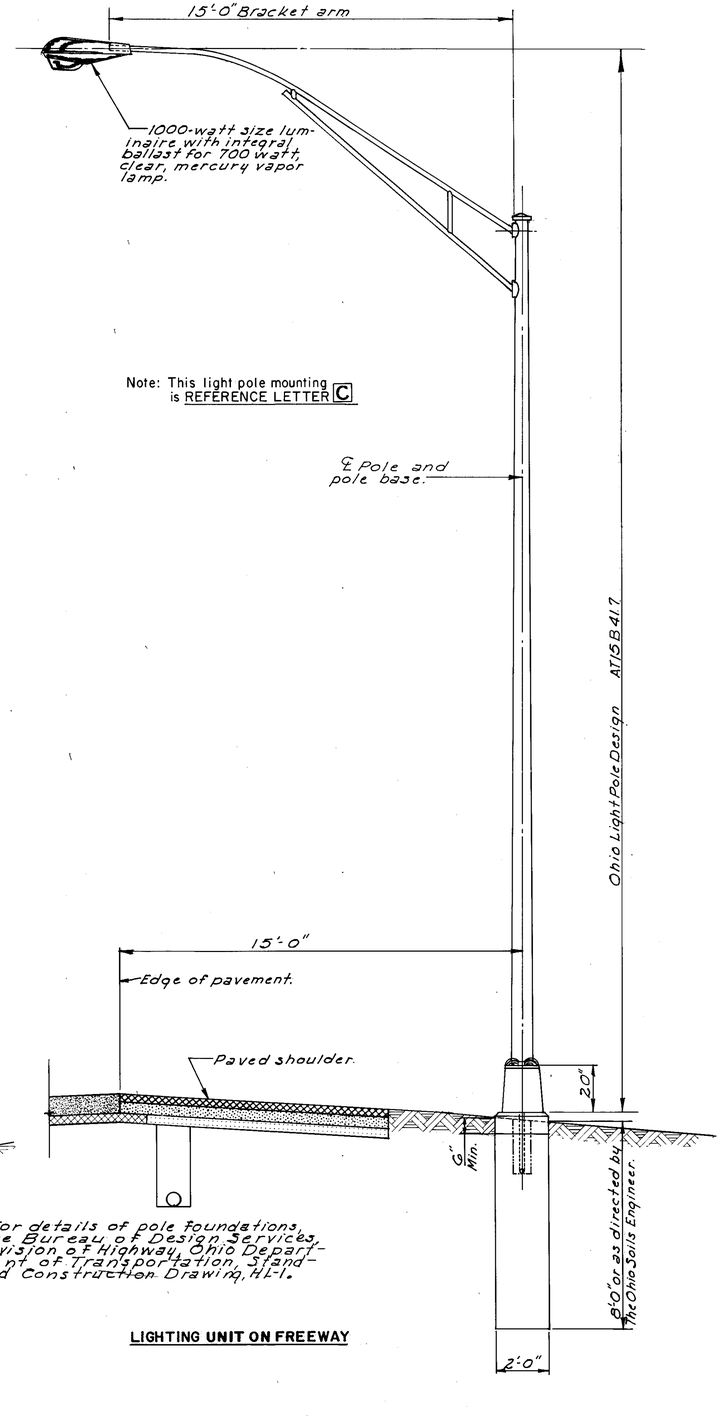
CUYAHOGA COUNTY
CUY.-480-15.81



LIGHTING UNIT ON FREEWAY WITH FRANGIBLE TRANSFORMER BASE



Note: For details of pole foundations, see Bureau of Design Services, Division of Highway, Ohio Department of Transportation, Standard Construction Drawing, HL-1.

LIGHTING UNIT ON FREEWAY

SCALE As Noted
MADE J.R.K. DATE 11-16-70
TRCD. ____ DATE ____
CKD. LWC DATE 2-8-71

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

GROUND MOUNT LIGHTING DETAILS

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

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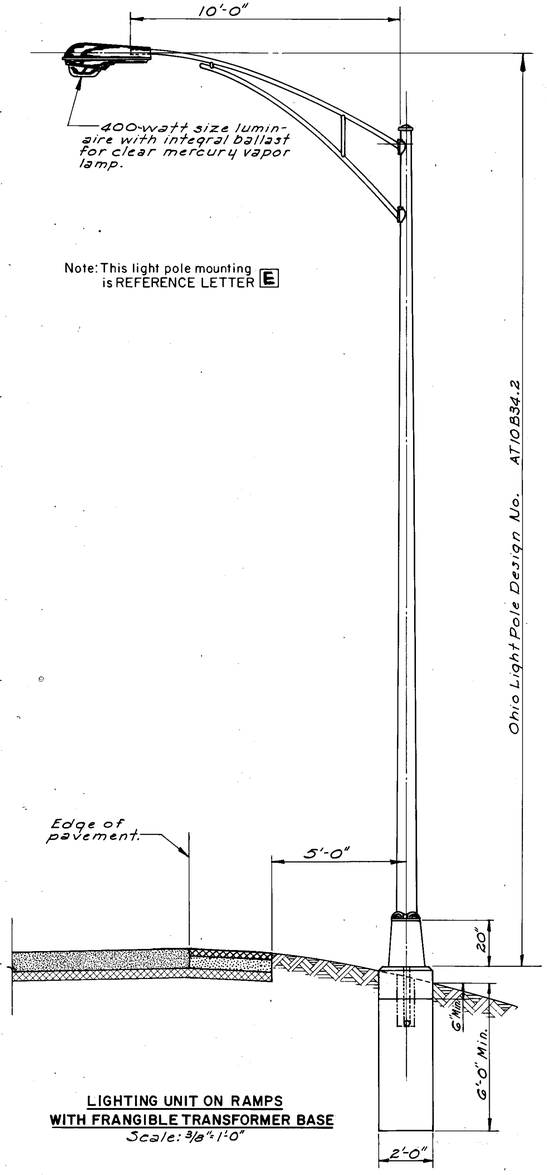
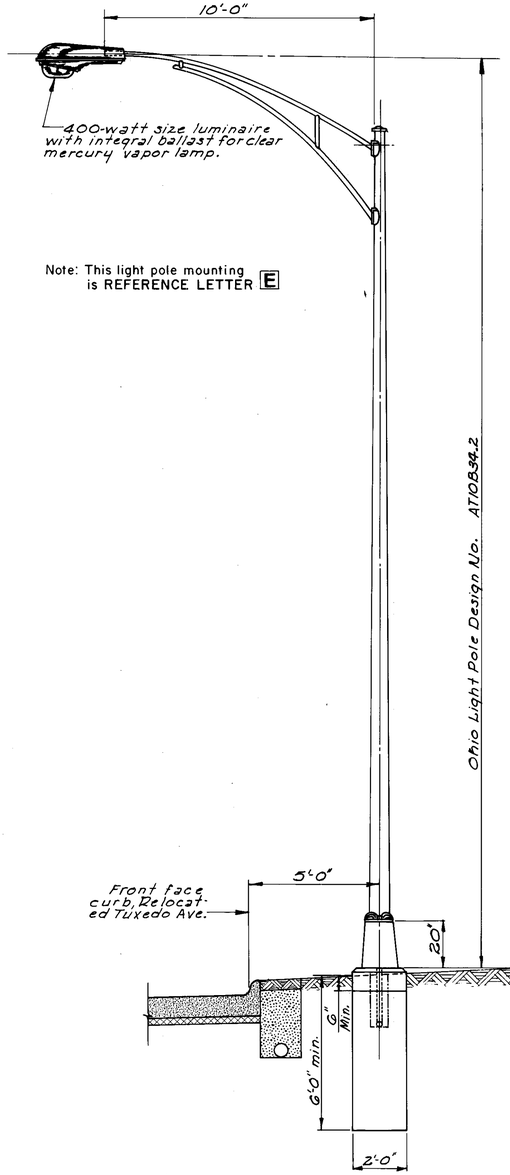
CUYAHOGA COUNTY
CUY.-480-15.81



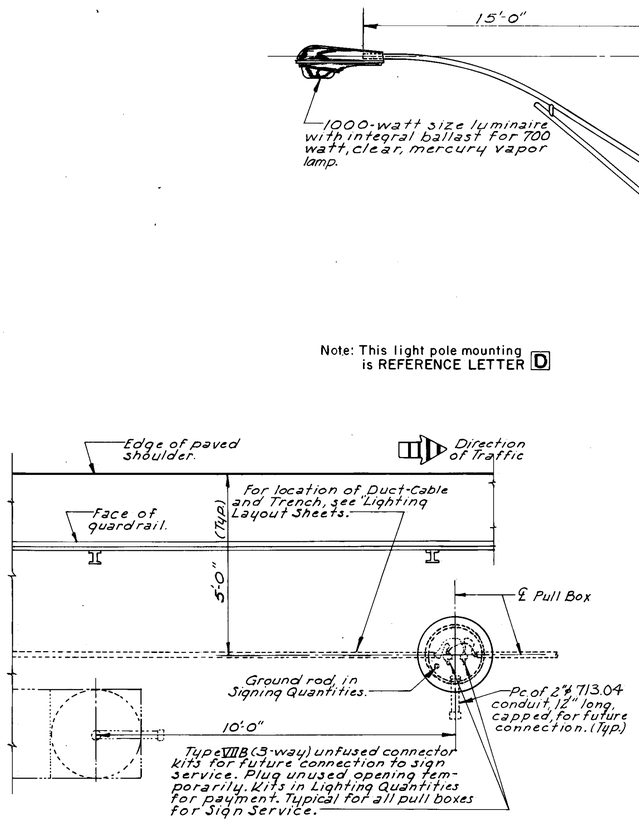
Note: This light pole mounting is REFERENCE LETTER E

LIGHTING UNIT ON RAMPS WITH FRANGIBLE TRANSFORMER BASE
Scale: 3/8"=1'-0"

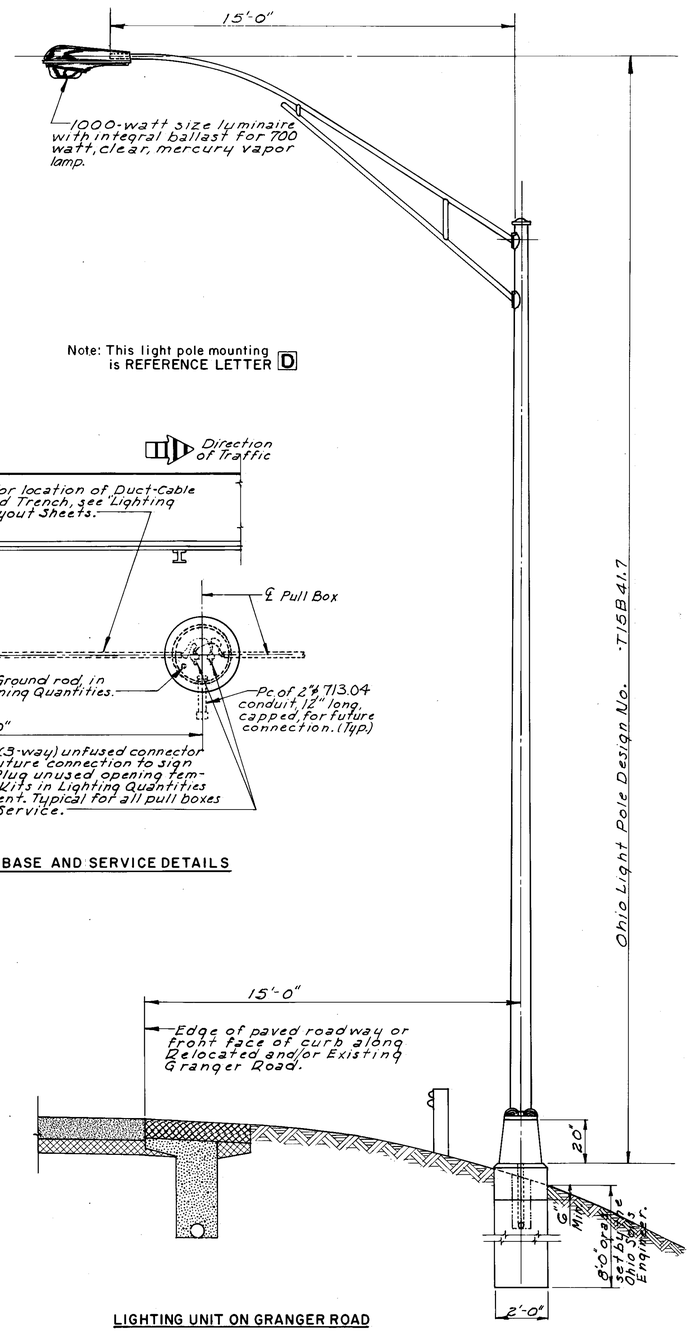


Note: This light pole mounting is REFERENCE LETTER E

LIGHTING UNIT ON RELOCATED TUXEDO AVE. WITH FRANGIBLE TRANSFORMER BASE
Scale: 3/8"=1'-0"



TYPICAL GROUND MOUNTED SIGN BASE AND SERVICE DETAILS
Scale: 1/2"



Note: This light pole mounting is REFERENCE LETTER D

LIGHTING UNIT ON GRANGER ROAD WITH FRANGIBLE TRANSFORMER BASE
Scale: 3/8"=1'-0"

GROUND MOUNT LIGHTING DETAILS

SCALE As Noted	HOWARD, NEEDLES, TAMMEN & BERGENDOFF		
MADE J.R.K. DATE 11-18-70	CONSULTING ENGINEERS		
TRCD. DATE	KANSAS CITY	CLEVELAND	NEW YORK
CKD. J.R.K. DATE 7-8-74			

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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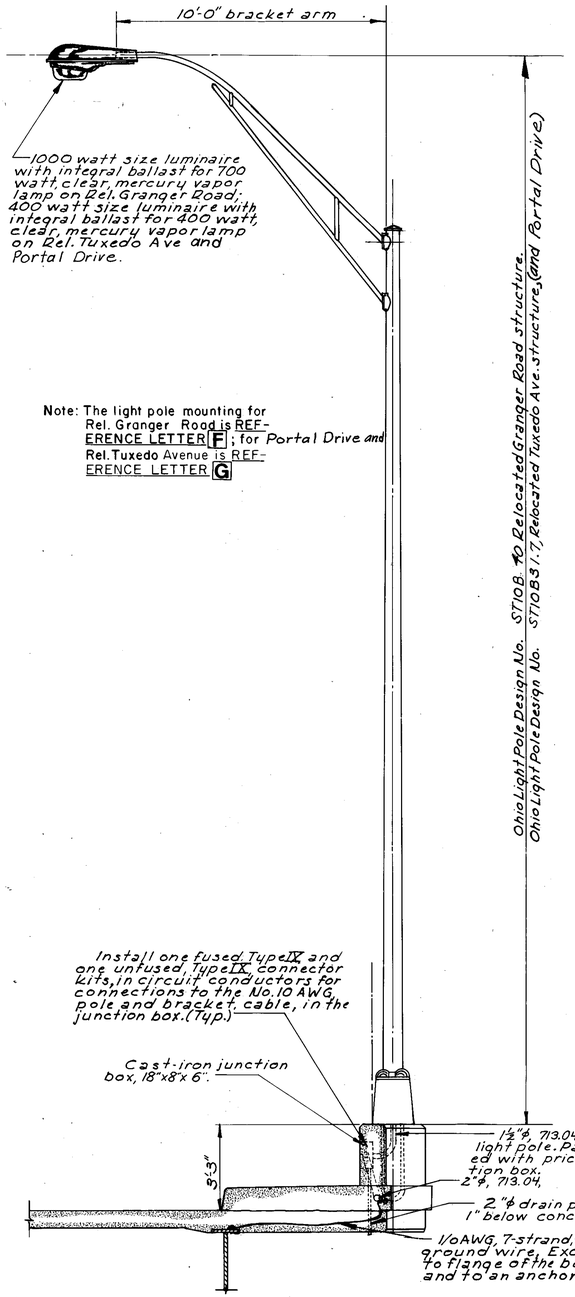
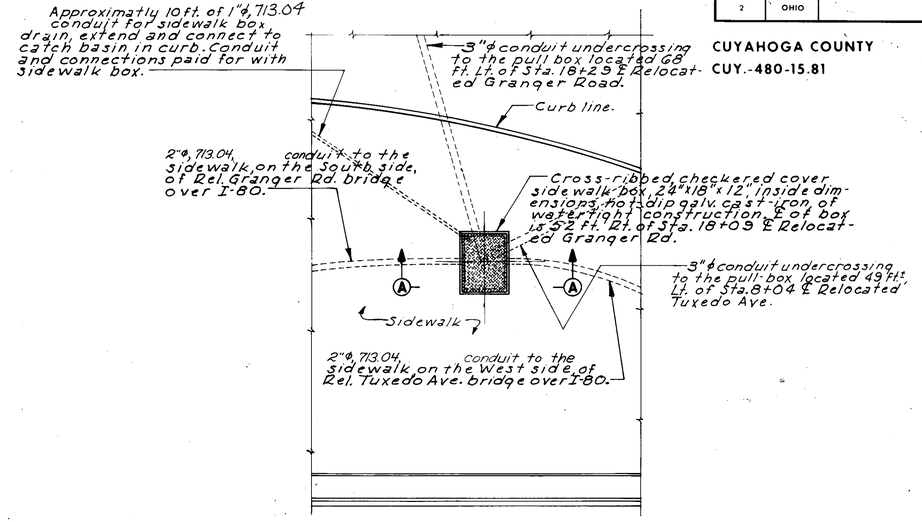
CUYAHOGA COUNTY
CUY.-480-15.81

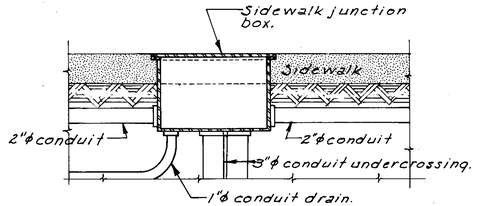


Note: The light pole mounting for Rel. Granger Road is REFERENCE LETTER F; for Portal Drive and Rel. Tuxedo Avenue is REFERENCE LETTER G

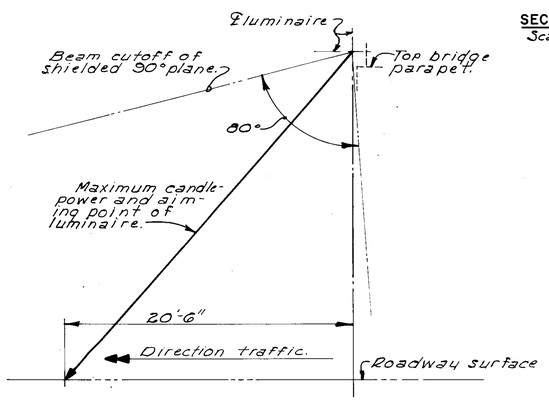
LIGHTING UNIT ON STRUCTURES
Scale: 3/8"=1'-0"



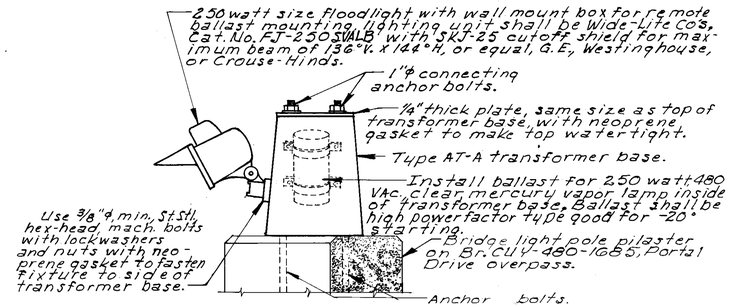
SIDEWALK JUNCTION BOX
Scale: 3/8"=1'0"



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



GORE FLOODLIGHT AIMING DIAGRAM



GORE FLOODLIGHT
DIVERGING LANES NOSE-W.B. OUTER AND INNER LANES

SCALE As Noted
MADE I.R.K. DATE 11-18-70
TRCD ____ DATE ____
CKD. L.W.L. DATE 7-8-74

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

BRIDGE LIGHTING DETAILS
Rev. 10-16-74

FED. RD DIVISION	STATE	PROJECT	
2	OHIO		

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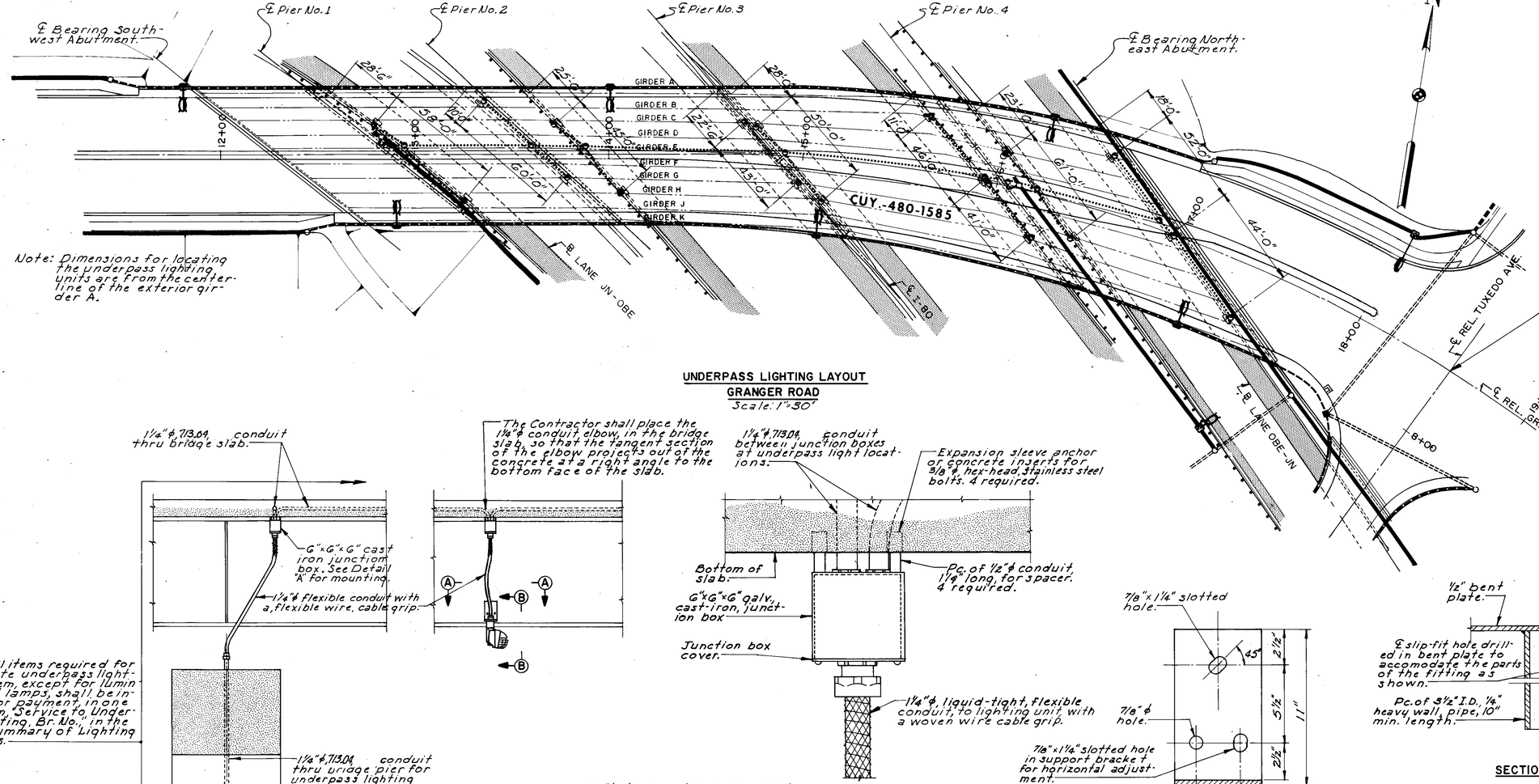
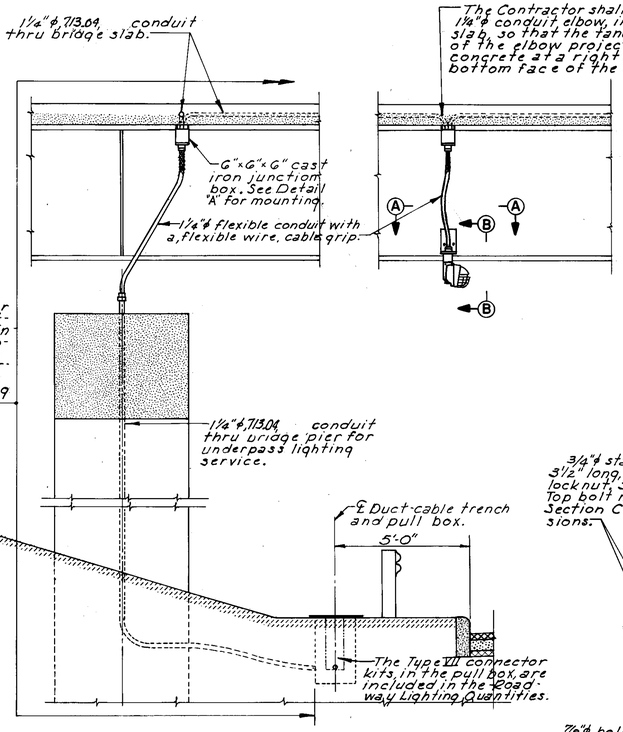
CUYAHOGA COUNTY
CUY.-480-15.81



Note: Dimensions for locating the underpass lighting units are from the center-line of the exterior girder A.

Sta.7+60.19 ℄ Tuxedo Ave. =
Sta.18+55.07 ℄ Rel. Granger Rd.
Proposed Signalized Intersection

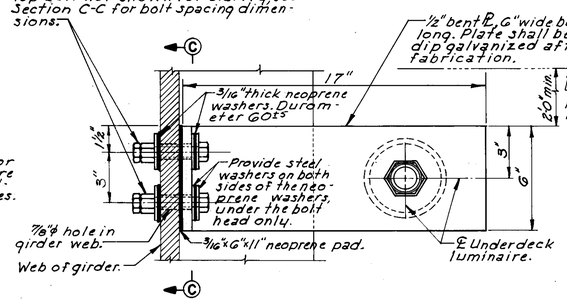
UNDERPASS LIGHTING LAYOUT
GRANGER ROAD
Scale: 1"=30'



Note: All items required for a complete underpass lighting system, except for luminaires and lamps, shall be included, for payment, in one lump sum "Service to Underpass Lighting, Br. No.," in the General Summary of Lighting Quantities.

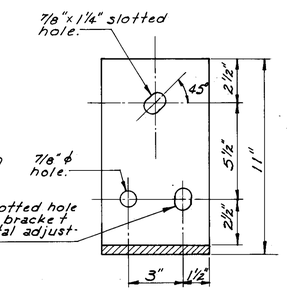
UNDERPASS LIGHTING UNIT TYPE "B" MOUNTING
Scale: 3/16"=1'-0"

DETAIL "A"
Scale: 3"=1'-0"

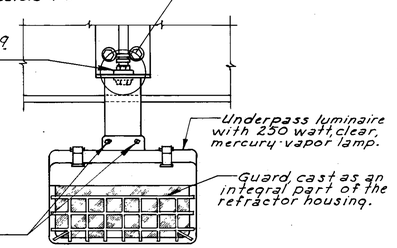


SECTION A-A
Scale: 3"=1'-0"

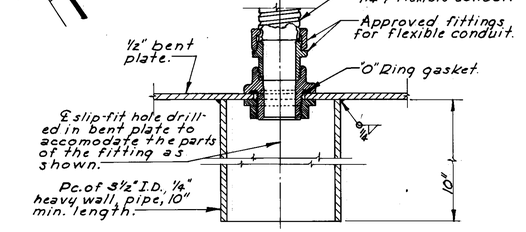
Rotate the fixture until the refractor is parallel to the curb line below. Use fixture as template for drilling 9/32" holes in pipe support. Discard fixture set screws and use 9/16 cap screws, with same threads as set screws, and lockwashers to attach fixture to pipe support. See Detail 'C'.



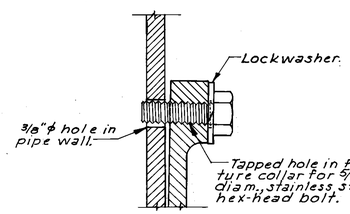
SECTION C-C
Scale: 3"=1'-0"



SECTION B-B
Scale: 1½"=1'-0"



SECTION THRU DETAIL "B"
No Scale



DETAIL "C"
Full Scale

SCALE As Noted	HOWARD, NEEDLES, TAMMEN & BERGENDOFF	
MADE J.P.K. DATE 11-24-70	CONSULTING ENGINEERS	
TRCD. ____ DATE ____	KANSAS CITY CLEVELAND NEW YORK	
CKD. LWL DATE 7-8-71		

UNDERPASS LIGHTING LAYOUT AND UNDERPASS LIGHTING DETAILS

Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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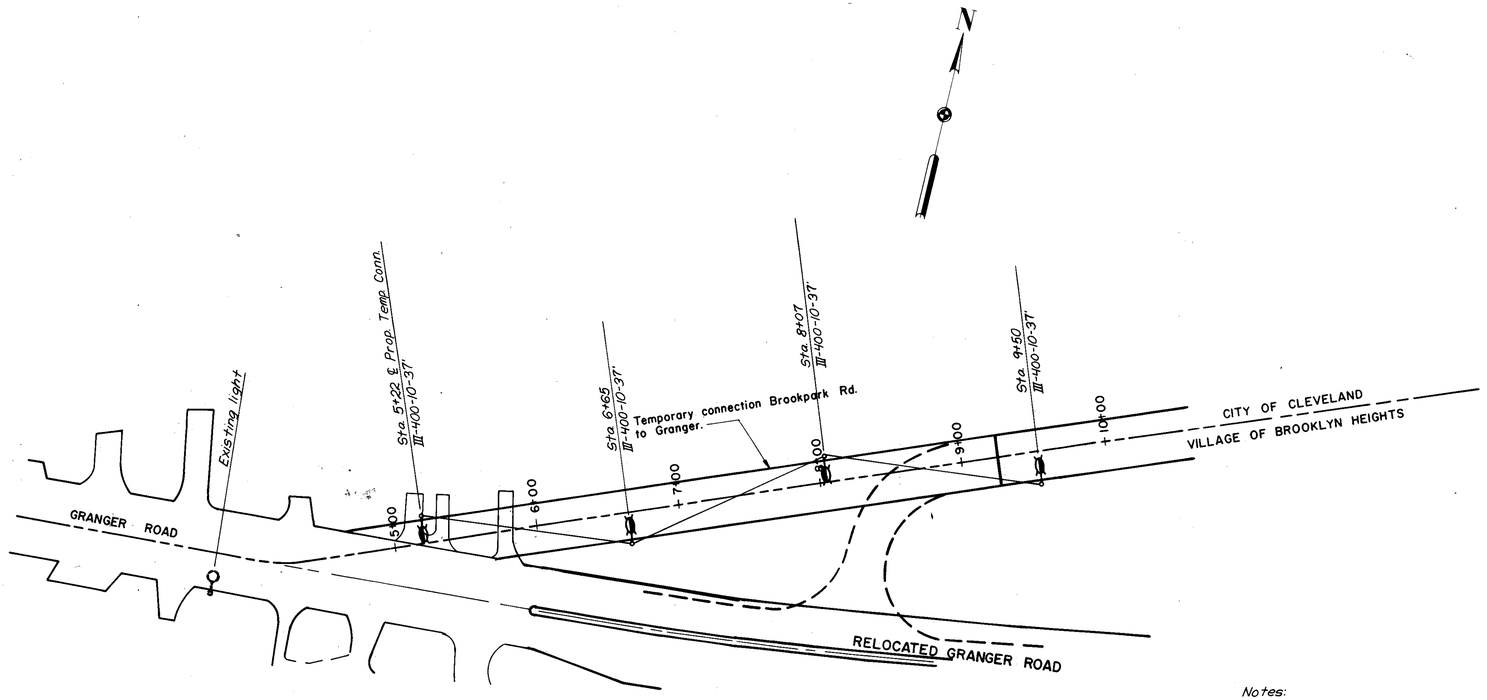
CUYAHOGA COUNTY
CUY.-480-15.81

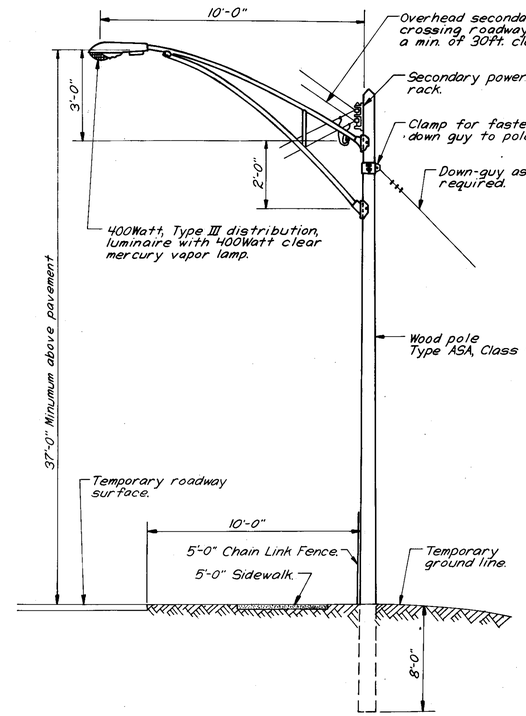


TEMPORARY LIGHTING LAYOUT

Notes:

All temporary lighting units shall be Type III, 400Watt Clear Mercury, w/10'-0" bracket arms, at a 37-foot mounting height above the roadway.

The Contractor may employ the C.E.I. Company to furnish, install and maintain the temporary runaround lighting but the layout used shall be approved by the Director.



DETAIL OF TEMPORARY ROADWAY LIGHTING UNIT

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE K.R. DATE 6-6-74
TRCD. _____ DATE _____ CONSULTING ENGINEERS
CKD. L.W.L. DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

TEMPORARY ROADWAY LIGHTING

LIGHTING QUANTITIES SUB-SUMMARY

CUYAHOGA COUNTY
CUY.-480-15.81

REFERENCE NO.	SIDE	STATION	STATION	A LIGHT POLE DESIGN NO. A15BB39	B LIGHT POLE DESIGN NO. AT25B41.7	C LIGHT POLE DESIGN NO. AT15B41.7	D LIGHT POLE DESIGN NO. T15B41.7	E LIGHT POLE DESIGN NO. AT10B34.2	F LIGHT POLE DESIGN NO. ST10B40.0 BRIDGE MOUNTED	G LIGHT POLE DESIGN NO. ST10B31.7 BRIDGE MOUNTED	H LIGHT POLE DESIGN NO. AT20BB41.7	SPECIAL 14-FT. CONC. BARRIER SECT. FOR LIGHT POLE FOUND.	LIGHT POLE FOUNDATION 24"x24"x8'-0"	LIGHT POLE FOUNDATION 24"x24"x6'-0"	LUMINAIRE, TYPE III, 700WATT, 713.11	LUMINAIRE, TYPE III, 400WATT, 713.11	LUMINAIRE, TYPE II, 400WATT, 713.11	LUMINAIRE, UNDERPASS, 250 WATT, 713.11	LAMP, 700WATT, 713.14, MERCURY	LAMP, 400WATT, 713.14 MERCURY	LAMP, 250WATT, 713.14 MERCURY	GLARE SHIELD, 700WATT, 713.11	GLARE SHIELD, 400WATT, 713.11	GROUND ROD	PULL BOX, 18-INCH CIRCULAR, 713.09	PULL BOX, 24"x18"x12", SIDEWALK BOX	TRENCH, 24-INCH DEEP	CONDUIT, 4-INCH, 713.06, TYPE I	CONDUIT, 3-INCH, 713.04,	CONDUIT, 2-INCH, 713.04,	CONDUIT, 2-INCH, 713.04, CONCRETE-ENCASED	DISTRIBUTION CIRCUIT CABLE, 1-NO. 4AWG, 600VOLT CABLE	1½" DUCT CABLE, 2-NO.4AWG 600VOLT CABLES	POLE AND BRACKET CABLE, 1-NO. 10 AWG, 600 VOLT	CONNECTOR KIT, TYPE VII A	CONNECTOR KIT, TYPE VII B	CONNECTOR KIT, TYPE VII C		CONNECTOR KIT, TYPE VIII	CONNECTOR KIT, TYPE IX	CONTROL CENTER "TN"	CONTROL CENTER "TA"	CONTROL CENTER "LC"	CONTROL CENTER "PD"	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1585	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1593	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1685	JUNCTION BOX, 18"x8"x6"	LIGHT POLE ANCHOR BOLTS, 713.01	SPECIAL BARRIER MEDIAN PULL BOX, AS PER PLAN	SERVICE TO UNDERPASS LIGHTING, BR. CUY-80-1585	HIGH VOLTAGE TEST	CABLE MARKER
				EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	EA	EA	EA	EA	EA	EA	LU	LU	LU	LU	EA	EA	EA	EA	Sets	EA	LU	LU	EA.
		Roadway Lighting	Sheet No. 284																																																		
1	Lt.	7+13 Rel. Granger.				1							1		1				1					1										100						2													
2	Lt.	7+13	9+2			1							1		1				1					1			245		55				255	100						2													
3	Lt.	9+2	11+50 Rel. Gran.																						1		190			10		30	190		2																		
4	Rt.	5+42 Rel. Granger				1							1		1				1					1										100						2													
5	Rt.	5+42	8+84			1							1		1				1					1	1		350		35				360	100		2				2													
6	Rt.	8+84	58+40 G-E																						1		110						120			2																	
7	Rt.	58+40 G-E	59+16 G-E					1						1			1			1				1			75						85	80						2													
8	Rt.	58+40 G-E	11+50 Granger			1							1		1				1					1	1		190		35			90	180	100	2					2													
Highway Total			Sheet No.	284		5		1					5	1	5		1		5	1				6	4		1160		125	10		120	1190	580	4	4				12													
		Highway Lighting	Sheet No. 285																																																		
9	Lt.	98+80 OBE-JN			1								1		1				1			1		1										120						2													
10	Lt.	98+80	94+60		1								1		1				1			1		1	1		450						480	120	8					2													1
11	Lt.	94+60	92+06		1								1		1				1					1			255						265	120						2													
12	Lt.	92+06 OBE-JN	870+84 WBCL		1								1		1				1					1			255						265	120						2													
13	Lt.	870+84	875+00		1								1		1				1					1			420						440	120						2													
14	Rt.	97+80 OBE-JN	96+28 OBE-JN				1						1		1			10	1		10	1		1	2		160			20			190	100	2					2											1		
15	℄	860+00	860+30	1								1			2				2			2		1				30						165					2														
16	℄	860+30	863+00	1								1			2				2			2		1				270				560		165						2													
17	℄	863+00	864+36	1								1			2				2			2		1				140				300		166						2											1			
18	℄	864+36	866+78	1								1			2				2					1				245				510		165						2													
19	℄	866+78	869+35	1								1			2				2					1				255				530		165						2													
20	℄	869+35	871+92	1								1			2				2					1				255				530		165						2													
21	℄	871+92	875+00	1								1			2				2					1				310				640		165						2													
22	Rt.	66+31 JN-OBE	61+65		1								1		1			8	1		8	1		1	1		150			20			160	120	2					2											1		2
23	Rt.	61+65	63+90		1								1		1				1					1			225						235	120						2													
24	Rt.	63+90	66+41			1							1		1				1					1	1		250						280	120		4				2													1
25	Rt.	66+41	68+98 JN-OBE			1							1		1				1					1			260						270	120						2													
26	Rt.	61+02 G-E						1						1			1			1				1										80						2													
27	Rt.	61+02	62+88					1						1			1			1				1			185						195	80						2													
28	Rt.	62+88	64+61					1						1			1			1				1	1		175						185	80			2			2													
29	Rt.	64+61	66+92					1						1			1			1				1			230						240	80						2													
30	Rt.	66+92	69+10					1						1			1			1				1			220						230	80						2													
31	Rt.	69+10	71+28		1								1		1				1					1			240						250	120						2													1
32	Rt.	71+28	75+15 E.B.CL		1								1		1				1					1			390						400	120						2													
33	Rt.	96+28 OBE-JN	64+15 G-E																								330		330			1560																					
34	Rt.	64+15	Control Cent.																								90				90	400									1												
35	Rt.	11+50 Rel. Granger	12+48																						1		100			30		160	70		2																		
36	Rt.	17+05 Rel. Granger	18+05			1							1		1				1					1	1		100							100	2					2													
37	Rt.	18+05	6+95 Tuxedo Ave.																						1		40					50				2																	
38		6+95	6+75																								20				20	120										1											
39		6+95 Rt.	6+95 Lt																						1		55		55			130				2																	
40		6+65	6+95					1						1			1			1				1			30						40	80					2														
41		6+95	19+50 Rel. Granger																						1		85						95			2																	
42	Lt	19+50	20+22				1						1		1				1					1			85						85	100						2													
43	Lt.	20+22	22+04				1						1		1				1					1			190						200	100						2													
44	Lt.	22+04	23+85				1						1		1				1					1			185						195	100						2													
45	Lt.	23+85	25+68				1						1		1				1					1			185						195	100						2													
46	Lt.	25+68 Rel. Gr.	28+20 Exist.				1						1		1				1					1			345						365	100						2													
47		19+50 Lt.	19+50 Rt.																						1		80		80			180				2																	
48	Rt.	19+31					1						1		1				1					1										100					2														
49	Rt.	19+31	21+13			1							1		1				1					1			180						190	100						2													
50	Rt.	21+13	22+95			1							1		1				1					1			185						195	100						2													
51	Rt.	22+95	24+77			1							1		1				1					1			185						195	100						2													
52	Rt.	24+77	26+59			1							1		1				1					1			185						195	100						2													
53	Rt.	26+59	28+20			1							1		1				1					1			250						270	100						2													
Sub-Total			Sheet No. 285	7	9	8	7	6				7	24	6	38		6	18	38	6	18	10		37	12		6575	1505	465	70	110	5670	6375	4255	16	12	2		6	68	1	1								1	2		5

SCALE ____
MADE JRK DATE 6-8-74
TRCD. ____ DATE ____
CKD. LWL DATE 7-8-74

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

QUANTITY CALCULATIONS
MADE BY J.R.K. DATE 6-8-74
CHECKED BY LWL DATE 7-8-74

LIGHTING QUANTITIES SUB-SUMMARY
Rev. 10-16-74

FED RD DIVISION	STATE	PROJECT
2	OHIO	

299
392

CUYAHOGA COUNTY
CUY.-480-15.81

LIGHTING QUANTITIES SUB-SUMMARY

REFERENCE NO.	SIDE	STATION	STATION	A LIGHT POLE DESIGN NO. A15BB39	B LIGHT POLE DESIGN NO. AT25B41.7	C LIGHT POLE DESIGN NO. AT15B41.7	D LIGHT POLE DESIGN NO. T15B41.7	E LIGHT POLE DESIGN NO. AT10B34.2	F LIGHT POLE DESIGN NO. ST10B40.0 BRIDGE MOUNTED	G LIGHT POLE DESIGN NO. ST10B31.7 BRIDGE MOUNTED	H LIGHT POLE DESIGN NO. AT20BB41.7	SPECIAL 14-FT. CONC. BARRIER SECT. FOR LIGHT POLE FOUND.	LIGHT POLE FOUNDATION 24"x24"x8'-0"	LIGHT POLE FOUNDATION 24"x24"x6'-0"	LUMINAIRE, TYPE III, 700WATT, 713.11	LUMINAIRE, TYPE III, 400WATT, 713.11	LUMINAIRE, TYPE II, 400WATT, 713.11	LUMINAIRE, UNDERPASS, 250 WATT, 713.11	LAMP, 700WATT, 713.14, MERCURY	LAMP, 400WATT, 713.14 MERCURY	LAMP, 250WATT, 713.14 MERCURY	GLARE SHIELD, 700WATT, 713.11	GLARE SHIELD, 400WATT, 713.11	GROUND ROD	PULL BOX, 18-INCH CIRCULAR, 713.09	PULL BOX, 24"x18"x12", SIDEWALK BOX	TRENCH, 24-INCH DEEP	CONDUIT, 4-INCH, 713.06, TYPE I	CONDUIT, 3-INCH, 713.04,	CONDUIT, 2-INCH, 713.04,	CONDUIT, 2-INCH, 713.04, CONCRETE-ENCASED	DISTRIBUTION CIRCUIT CABLE, 1-NO. 4AWG, 600VOLT CABLE	1½" DUCT CABLE, 2-NO.4AWG 600 VOLT CABLES	POLE AND BRACKET CABLE, 1-NO. 10 AWG, 600 VOLT	CONNECTOR KIT, TYPE VII A	CONNECTOR KIT, TYPE VII B	CONNECTOR KIT, TYPE VII C		CONNECTOR KIT, TYPE VIII	CONNECTOR KIT, TYPE IX	CONTROL CENTER "TN"	CONTROL CENTER "TA"	CONTROL CENTER "LC"	CONTROL CENTER "PD"	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1585	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1593	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1685	JUNCTION BOX, 18"x8"x6"	LIGHT POLE ANCHOR BOLTS, 713.01	SPECIAL BARRIER MEDIAN PULL BOX, AS PER PLAN	SERVICE TO UNDERPASS LIGHTING, BR. CUY-80-1585	HIGH VOLTAGE TEST	CABLE MARKER
				EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	EA	EA	EA	EA	EA	EA	LU	LU	LU	LU	EA	EA	EA	EA	Sets	EA	LU	LU	EA
Highway Sub-Totals			Sht. No. 285	7	9	8	7	6				7	24	6	38		6	18	38	6	18	10		37	12		6575	1506	465	70	110	5670	6375	4255	16	12	2		6	68	1	1								1	2		5
54	Rt.	8+04 Tuxedo Ave.																								1	175		120	55		400					2																
55		8+04 Rt.	8+04 Lt.																						1		90		90			200			2																		
56	Lt.	8+40																									40			40		80																					
57	Lt.	12+25	13+20 Tuxedo					1						1		1				1				1	1		95			20		50	75	80	2					2													
58	Lt.	13+20	14+45					1						1			1			1				1	1		165		35			80	135	80	2				2														
59	Rt.	12+25 Tuxedo	0+65 T-N-					1						1		1				1				1	1		95						165	80	2					2													
60																																																					
Total Highway Sheet No. 285				7	9	8	7	9				7	24	9	38	2	7	18	38	9	18	10		40	16	1	7235	1505	710	185	110	6480	6690	4495	26	12	4		8	72	1	1								1	2		5
Structure Lighting Sheet No. 285																																																					
61	Lt.	11+50 Rel. Grange	11+76						1						1				1											25		60		90						2								1	1				
62	Lt.	11+76	13+91						1						1				1											215		450		90						2								1	1				
63	Lt.	13+91	16+05						1						1				1											215		450		90						2					1			1	1				
64	Lt.	16+05	16+90																											85		170																					
65	Rt.	12+45	12+83						1						1				1											40		90		90						2								1	1				
66	Rt.	12+83	14+98						1						1				1											220		460		90						2								1	1				
67	Rt.	14+98	17+45						1						1				1											250		520		90						2								1	1				
68	Lt.	8+54 Tuxedo	10+26							1							1			1										175		370		80						2								1	1				
69	Lt.	10+26	12+25																											200		400														1							
70	Rt.	8+54 Tuxedo	8+74							1							1			1										20		60		80						2								1	1				
71	Rt.	8+74	12+25							1							1			1										350		720		80						2								1	1				
Total Structures Sheet No. 285									6	3					6		3		6	3										1795		3750		780						18					1	1		9	9				
Highway Lighting-Sheet No. 286																																																					
72	Lt.	28+20	28+41 Rel. Grange				1						1		1				1					1			20						30	100						2													
73	Lt.	28+41	30+23				1						1		1				1					1			185						195	100						2													
74	Lt.	30+23	32+05				1								1				1					1			185						195	100					2														
75	Rt.	28+20	29+32			1							1		1				1					1			110						120	100						2													
76	Rt.	29+32	31+14			1							1		1				1					1			180						190	100					2														
77	Rt.	875+00 WB℄	875+92		1								1		1				1					1			90						100	120						2													
78	Rt.	875+92	878+47		1								1		1				1					1			255						265	120						2													
79	Rt.	878+47	881+01		1								1		1				1					1			255						265	120						2													
80	Rt.	881+01	883+56 WB℄			1							1		1				1					1			265						275	100					2														1
81	Rt.	33+50 Exist. Grange Rd.				1							1		1				1					1										100					2														
82		33+50	79+47 E-G					1						1			1			1				1			70						80	80						2													
83		79+47	81+53					1						1			1			1				1			205						215	80						2													
84	Lt.	81+53	83+60					1						1			1			1				1			210						220	80						2													
85	Lt.	83+60 E-G	885+78 WB℄				1						1		1				1					1	1		220						230	100		2				2													
86	Lt.	885+78	888+02		1								1		1				1					1			225						235	120						2													
87	Lt.	888+02	890+00																						1		200						210			2																	1
88	℄	875+00	877+06	1								1			2				2					1				210				440		165						2													
89	℄	877+06	879+63	1								1			2				2					1				255				535		165		2				2										1			
90	℄	879+63	882+20	1								1			2				2					1				260				540		165						2													
91	℄	882+20	884+77	1								1			2				2					1				260				540		165						2													
92	℄	884+77	886+77	1								1			2				2					1				200				420		165	2	2				2										1			
93	℄	886+77	890+00	1								1			2				2					1				325				670		165						2													
94	Rt.	875+00 EB℄	875+71		1								1		1				1					1			70						80	120						2													
95	Rt.	875+71	878+22		1								1		1				1					1			250						260	120						2													
96	Rt.	878+22	880+84		1								1		1				1					1			260						270	120						2													
97	Rt.	880+84	883+46		1								1		1				1					1			260						270	120					2														
98	Rt.	885+00	885+71 EB℄		1								1		1				1					1	1		70						80	120		2				2													1
99	Rt.	885+71	890+00		1								1		1				1					1			430						440	120						2													
100		885+00 Lt.	885+00 Rt.																										285			880																					
101		885+00 Rt.	Control Center																								75				75	340											1										
		Totals Sheet No. 286		6	10	4	4	3				6	18	3	30		3		30	3				27	3		4090	1510	285		75	4365	4225	3230	2	10			10	44			1							2			3

SCALE	
MADE J.R.K.	DATE 6-1-74
TRCD.	DATE
CKD. LWL	DATE 7-8-74

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

QUANTITY CALCULATIONS
MADE BY J.R.K. DATE 6-1-74
CHECKED BY LWL DATE 7-8-74

LIGHTING QUANTITIES SUB-SUMMARY
Rev. 10-16-74

LIGHTING QUANTITIES SUB-SUMMARY

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

300
392

CUYAHOGA COUNTY
CUY.-480-15.81

A B C D E F G H

REFERENCE NO.	SIDE	STATION	STATION	LIGHT POLE DESIGN NO. AI6B839	LIGHT POLE DESIGN NO. AP25641.7	LIGHT POLE DESIGN NO. AT15B41.7	LIGHT POLE DESIGN NO. T15B41.7	LIGHT POLE DESIGN NO. AT10B342	LIGHT POLE DESIGN NO. STOUB+20 BRIDGE MOUNTED	LIGHT POLE DESIGN NO. STOUB3.1.7 BRIDGE MOUNTED	LIGHT POLE DESIGN NO. AT20B841.7	SPECIAL 14 FT. CONC. BARRIER SECT. FOR LIGHT POLE FOUND.	LIGHT POLE FOUNDATION 24"x24"x8'-0"	LIGHT POLE FOUNDATION 24"x24"x6'-0"	LUMINAIRE, TYPE III, 700 WATT, 713.11	LUMINAIRE, TYPE III, 400 WATT, 713.11	LUMINAIRE, TYPE II, 400 WATT, 713.11	LUMINAIRE, UNDERPASS, 250 WATT, 713.11	LAMP, 700 WATT, 713.14, MERCURY	LAMP, 400 WATT, 713.14 MERCURY	LAMP, 250 WATT, 713.14 MERCURY	GLARE SHIELD, 700 WATT, 713.11	GLARE SHIELD, 400 WATT, 713.11	GROUND ROD	PULL BOX, 18-INCH CIRCULAR 713.09	PULL BOX 24"x18"x12" SIDEWALK BOX	TRENCH, 24-INCH DEEP	CONDUIT, 4-INCH, 713.06, TYPE I	CONDUIT, 3-INCH, 713.04,	CONDUIT, 2-INCH, 713.04,	CONDUIT, 2-INCH, 713.04, CONCRETE-ENCASED	DISTRIBUTION CIRCUIT CABLE, I-NO. 4AWG, 600 VOLT CABLE	1½" DUCT CABLE, 2-NO. 4 AWG 600 VOLT CABLES	POLE AND BRACKET CABLE, I-NO. 10 AWG, 600 VOLT	CONNECTOR KIT, TYPE VIII A	CONNECTOR KIT, TYPE VIII B	CONNECTOR KIT, TYPE VIII C	CONNECTOR KIT, TYPE VIII	CONNECTOR KIT, TYPE IX	CONTROL CENTER "TN"	CONTROL CENTER "TA"	CONTROL CENTER "LC"	CONTROL CENTER "PO"	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1585	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1533	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1685	JUNCTION BOX, 18"x 8"x 6"	LIGHT POLE ANCHOR BOLTS, 713.01	SPECIAL BARRIER MEDIAN PULL BOX, AS PER PLAN	SERVICE TO UNDERPASS LIGHTING, BR. CUY-80-1585	BRACKET ARM, 15-FT.	BRACKET ARM, 10-FT.	HIGH VOLTAGE TEST	CABLE MARKER
				EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	EA	EA	EA	EA	EA	LU	LU	LU	LU	EA	EA	EA	EA	EA	Sets	EA	LU	EA	EA	LU	EA
Highway Lighting Sheet No. 287																																																							
102	LT.	890+00 WBL	890+52		1								1		1									1				65						75	120				2													1	
103	LT.	890+52	893+07		1								1		1									1				250						260	120				2														
104	LT.	893+02	895+29				1						1		1									1				225						235	100				2													1	
105	LT.	895+29	897+80 WBL				1						1		1									1				250						260	100				2														
106	LT.	897+80	900+36				1						1		1									1				255						265	100				2														
107	LT.	900+36	902+94				1						1		1									1		1		260						270	100		2		2													
108	LT.																																																					
109	℄	890+00	891+77								1		1		2				2					1				55	130			55	430		160	2	2		2									2					
110	℄	891+77	893+85																						1			210						220			2																
111	Rt.	893+85 ℄	894+19 WBL			1							1		1									1				45						55	100				2													1	
112	Rt.	894+19	896+60 WBL	1									1		1									1				255						265	120				2														
113	Rt.	896+60	899+20	1									1		1									1				265						275	120				2														
114	Rt.	899+20	901+80	1									1		1									1				265						275	120					2													
115	Rt.	901+25	901+96 WBL	1									1		1									1				70						80	120					2													
116		893+85 ℄	894+19 EBL			1							1		1									1				40						50	100				2													1	
117	LT.	894+19	896+67 EBL	1									1		1									1				260						270	120				2														
118	LT.	896+67	899+17	1									1		1									1				250						260	120				2														
119	LT.	899+17	901+92 EBL	1									1		1									1				275						285	120					2													
120	LT.	904+83 EBL	905+23	1									1		1									1				90						100	120					2													
121	Rt.	890+00 EBL	890+66 EBL	1									1		1									1				90						100	120				2														
122	Rt.	890+60	893+13	1									1		1									1				250						260	120				2														
123	Rt.	893+13	895+43			1							1		1									1				230						240	100				2														
124	Rt.	895+43	898+00			1							1		1									1				260						270	100				2														
125	Rt.	898+00	900+74			1							1		1									1				280						290	100				2														
126	Rt.	900+74	903+48			1							1		1									1				275						285	100					2													
Totals - Sheet No. 287				12	2	8				1			23		24				24					23	2		4765	130			55	430	4945	2600	2	6		12	34						2							4	
Highway Lighting Sheet No. 288																																																					
127	LT.	904+50 WBL	905+52	1									1		1				1					1											120				2													
128	LT.	905+52	908+10 WBL	1									1		1				1					1				255						265	120				2														
129	LT.	908+10	910+68	1									1		1				1					1				260						270	120				2														
130	LT.	910+68	912+15																						1			150						160			2													1	
131		912+15	Control Center																						1			125				125	590											1							
132		Control Center	912+17																						1			125				125	270			2														
133	LT.	912+17	913+52 WBL	1									1		1				1					1				135						145	120				2													1	
134	LT.	913+52	916+00																						2			180						190			4													3	
135		916+00 Rt.	916+00 LT.	1									1		1				1					1				100		100			220		120				2													
136	LT.	916+00	917+54 LT. ℄	1									1		1				1					1				155						165	120				2													1	
137	LT.	917+54	920+00 ℄	1									1		1				1					1				250						260	120				2														
138	Rt.	905+25 WBL	906+18 WBL	1									1		1				1					1				135						145	120				2														
139	Rt.	906+18	908+30	1									1		1				1					1				210						220	120				2														
140	Rt.	908+30	910+35	1									1		1				1					1				210						220	120				2														
141	Rt.	910+35	912+65 WBL	1									1		1				1					1	1			290						260	120		2		2													
142		912+65 Rt.	912+15 WBL																									120		120			520																	
143	LT.	905+25 EBL	907+41 EBL	1									1		1				1					1				215						225	120				2														
144	LT.	907+41	910+34	1									1		1				1					1				290						300	120				2														
145	LT.	910+34	913+35 EBL	1									1		1				1					1	1			310						330	120		4		2													
146		913+35 EBL	912+65 WBL																									85		85				380																	
147	Rt.	906+30 EBL		1									1		1				1					1											120				2													
148	Rt.	906+30	909+32 EBL	1									1		1				1					1				300						310	120				2														
149	Rt.	909+32	912+20			1							1		1				1					1				330						340	100				2													3	
150	Rt.	912+20	913+75																						1			160						170		4														
151		913+75 EBL	913+35 EBL																									95		95				420																	
152	LT.	913+75 EBL	915+36 EBL	1									1		1				1					1				160						170	120				2													1	
153	Rt.	915+36 EBL	916+28 ℄																						1			190						200			2													1	
154		916+28 LT.	916+28 Rt.	1									1		1				1					1				95						210	120				2														
Sub-Total Sheet No. 288				18	1								19		19				19					19	9		4880		495		250	1550	5355	2260	6	19		6	32				1							11	

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE JRK DATE 6-1-74 CONSULTING ENGINEERS
TRCD _____ DATE _____
CKD LWL DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY JRK DATE 6-1-74
CHECKED BY LWL DATE 7-8-74

LIGHTING QUANTITIES SUB-SUMMARY
Rev. 10-16-74

LIGHTING QUANTITIES SUB-SUMMARY

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-480-15.81

REFERENCE NO.	SIDE	STATION	STATION	A LIGHT POLE DESIGN NO. A15BB39	B LIGHT POLE DESIGN NO. AT25B41.7	C LIGHT POLE DESIGN NO. AT15B41.7	D LIGHT POLE DESIGN NO. T15B41.7	E LIGHT POLE DESIGN NO. AT10B34.2	F LIGHT POLE DESIGN NO. ST10B40.0 BRIDGE MOUNTED	G LIGHT POLE DESIGN NO. ST10B31.7 BRIDGE MOUNTED	H LIGHT POLE DESIGN NO. AT20B41.7	SPECIAL 14-FT. CONC. BARRIER SECT. FOR LIGHT POLE FOUND.	LIGHT POLE FOUNDATION 24"x24"x8'-0"	LIGHT POLE FOUNDATION 24"x24"x6'-0"
				EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
Sub-total Sheet No. 288					18		1						19	
155	Rt.	916+28	918+18 L		1								1	
156	Rt.	918+18	920+00 ℄											
157		Control Center	9+53 Portal Drive											
158		4+54 Portal	Drive											
Totals Highway Sheet No. 288					19		1						20	
Bridge Lighting - Sheet No. 288														
159	Lt.	4+54	9+55							2				
Highway Lighting Sheet No. 289														
160	Lt.	920+00	921+31 ℄		1								1	
161	Lt.	921+31	923+34		1								1	
162	Lt.	923+34	925+37		1								1	
163	Lt.	925+37	927+40		1								1	
164	Lt.	927+40	929+43				1						1	
165	Lt.	929+43	931+46				1						1	
166	Lt.	931+46	933+52				1						1	
167	Lt.	933+52	935+00											
168	Rt.	920+00	920+27		1								1	
169	Rt.	920+27	922+36		1								1	
170	Rt.	922+36	924+45				1						1	
171	Rt.	924+45	926+54				1						1	
172	Rt.	926+54	928+63				1						1	
173	Rt.	928+63	930+72		1								1	
174	Rt.	930+72	932+82		1								1	
175	Rt.	932+82	935+00		1								1	
Totals Sheet No. 289					9		6						15	
Highway Lighting Sheet No. 290														
176	Lt.	935+00	935+52				1						1	
177	Lt.	932+52	937+55				1						1	
178	Rt.	935+00	936+99		1								1	
Totals Sheet No. 290					1		2						3	

REFERENCE NO.	SIDE	STATION	STATION	LUMINAIRE, TYPE III, 700WATT, 713.11	LUMINAIRE, TYPE III, 400WATT, 713.11	LUMINAIRE, TYPE II, 400WATT, 713.11	LUMINAIRE, UNDERPASS, 250 WATT, 713.11	LAMP, 700WATT, 713.14, MERCURY	LAMP, 400WATT, 713.14 MERCURY	LAMP, 250WATT, 713.14 MERCURY	GLARE SHIELD, 700WATT, 713.11	GLARE SHIELD, 400WATT, 713.11	GROUND ROD	PULL BOX, 18-INCH CIRCULAR, 713.09	PULL BOX, 24"x18"x12", SIDEWALK BOX	TRENCH, 24-INCH DEEP
				EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	Lin. Ft.
Sub-total Sheet No. 288				19				19					19	9		4880
155	Rt.	916+28	918+18 L	1				1					1			190
156	Rt.	918+18	920+00 ℄											1		180
157		Control Center	9+53 Portal Drive											1		30
158		4+54 Portal	Drive											1		5
Totals Highway Sheet No. 288				20				20					20	12		5285
Bridge Lighting - Sheet No. 288																
159	Lt.	4+54	9+55													
Highway Lighting Sheet No. 289																
160	Lt.	920+00	921+31 ℄	1				1					1			130
161	Lt.	921+31	923+34	1				1					1			205
162	Lt.	923+34	925+37	1				1					1			205
163	Lt.	925+37	927+40	1				1					1	1		205
164	Lt.	927+40	929+43	1				1					1			205
165	Lt.	929+43	931+46	1				1					1			205
166	Lt.	931+46	933+52	1				1					1			205
167	Lt.	933+52	935+00											1		150
168	Rt.	920+00	920+27	1				1					1			30
169	Rt.	920+27	922+36	1				1					1			210
170	Rt.	922+36	924+45	1				1					1			215
171	Rt.	924+45	926+54	1				1					1			210
172	Rt.	926+54	928+63	1				1					1			210
173	Rt.	928+63	930+72	1				1					1			210
174	Rt.	930+72	932+82	1				1					1			210
175	Rt.	932+82	935+00	1				1					1			220
Totals Sheet No. 289				15				15					15	2		3025
Highway Lighting Sheet No. 290																
176	Lt.	935+00	935+52	1				1					1			55
177	Lt.	932+52	937+55	1				1					1			205
178	Rt.	935+00	936+99	1				1					1			200
Totals Sheet No. 290				3				3					3			460

REFERENCE NO.	SIDE	STATION	STATION	CONDUIT, 4-INCH, 713.06, TYPE I	CONDUIT, 3-INCH, 713.04,	CONDUIT, 2-INCH, 713.04,	CONDUIT, 2-INCH, 713.04, CONCRETE-ENCASED	DISTRIBUTION CIRCUIT CABLE, 1-NO. 4AWG, 600VOLT CABLE	1½" DUCT CABLE, 2-NO.4AWG 600 VOLT CABLES	POLE AND BRACKET CABLE, 1-NO. 10 AWG, 600 VOLT	CONNECTOR KIT, TYPE VII A	CONNECTOR KIT, TYPE VII B	CONNECTOR KIT, TYPE VII C		CONNECTOR KIT, TYPE VIII	CONNECTOR KIT, TYPE IX
				Lin. Ft.	Lin.Ft.	Lin.Ft.	Lin. Ft.	Lin. Ft.	Lin.Ft.	Lin. Ft.	EA	EA	EA	EA	EA	EA
Sub-total Sheet No. 288					495		250	1550	5355	2260	6	14			6	32
155	Rt.	916+28	918+18 L						200	120						2
156	Rt.	918+18	920+00 ℄						190			2				
157		Control Center	9+53 Portal Drive			30		80			2					
158		4+54 Portal	Drive			5					8					
Totals Highway Sheet No. 288					495	35	250	1630	5745	2380	16	16			6	34
Bridge Lighting - Sheet No. 288																
159	Lt.	4+54	9+55			490		1100		160			2			4
Highway Lighting Sheet No. 289																
160	Lt.	920+00	921+31 ℄						140	120						2
161	Lt.	921+31	923+34						215	120						2
162	Lt.	923+34	925+37						215	120						2
163	Lt.	925+37	927+40						225	120		2				2
164	Lt.	927+40	929+43						215	100						2
165	Lt.	929+43	931+46						215	100						2
166	Lt.	931+46	933+52						215	100						2
167	Lt.	933+52	935+00						160			2				
168	Rt.	920+00	920+27						40	120						2
169	Rt.	920+27	922+36						220	120						2
170	Rt.	922+36	924+45						225	100						2
171	Rt.	924+45	926+54						220	100						2
172	Rt.	926+54	928+63						220	100						2
173	Rt.	928+63	930+72						220	120						2
174	Rt.	930+72	932+82						220	120						2
175	Rt.	932+82	935+00						230	120						2
Totals Sheet No. 289									3195	1680		4				30
Highway Lighting Sheet No. 290																
176	Lt.	935+00	935+52						65	100						2
177	Lt.	932+52	937+55						215	100					2	
178	Rt.	935+00	936+99						210	120					2	
Totals Sheet No. 290									490	320					4	2

REFERENCE NO.	SIDE	STATION	STATION	CONTROL CENTER "TN"	CONTROL CENTER "TA"	CONTROL CENTER "LC"	CONTROL CENTER "PD"	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1585	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-15.93	STRUCTURE GROUNDING SYSTEM, BR. NO. CUY-80-1685	JUNCTION BOX, 18"x8"x6"	LIGHT POLE ANCHOR BOLTS, 713.01	SPECIAL BARRIER MEDIAN PULL BOX, AS PER PLAN	SERVICE TO UNDERPASS LIGHTING, BR. CUY-80-1585	BRACKET ARM, 15-FT.	BRACKET ARM, 10-FT.	HIGH VOLTAGE TEST	GORE FLOODLIGHT		CABLE MARKER
				LU	LU	LU	LU	EA	EA	EA	EA	Sets	EA	LU	EA	EA	LU	LU	LU.	EA
Sub-total Sheet No. 288							1													11
155	Rt.	916+28	918+18 L																	1
156	Rt.	918+18	920+00 ℄																	1
157		Control Center	9+53 Portal Drive																	
158		4+54 Portal	Drive																	
Totals Highway Sheet No. 288							1													13
Bridge Lighting - Sheet No. 288																				
159	Lt.	4+54	9+55							1	2	2						1		
Highway Lighting Sheet No. 289																				
160	Lt.	920+00	921+31 ℄																	
161	Lt.	921+31	923+34																	1
162	Lt.	923+34	925+37																	
163	Lt.	925+37	927+40																	2
164	Lt.	927+40	929+43																	1
165	Lt.	929+43	931+46																	
166	Lt.	931+46	933+52																	
167	Lt.	933+52	935+00																	
168	Rt.	920+00	920+27																	
169	Rt.	920+27	922+36																	
170	Rt.	922+36	924+45																	1
171	Rt.	924+45	926+54																	
172	Rt.	926+54	928+63																	
173	Rt.	928+63	930+72																	
174	Rt.	930+72	932+82																	
175	Rt.	932+82	935+00																	
Totals Sheet No. 289																				5
Highway Lighting Sheet No. 290																				
176	Lt.	935+00	935+52																	
177	Lt.	932+52	937+55																	
178	Rt.	935+00	936+99																	
Totals Sheet No. 290																				

SCALE ________ **HOWARD, NEEDLES, TAMMEN & BERGENDOFF**
MADE JRK DATE 6-1-74 CONSULTING ENGINEERS
TRCD. ______ DATE ______
CKD. LWL DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY J.R.K. DATE 6-1-74
CHECKED BY LWL DATE 7-8-74

LIGHTING QUANTITIES SUB-SUMMARY
Rev. 10-16-74

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY.-480-15.81

GENERAL SUMMARY LIGHTING QUANTITIES

CUY.-480-15.81

LINE NO.	STRUCTURES CUY.-480-1685	STRUCTURES CUY.-480-1593	STRUCTURES CUY.-480-1585	ROADWAY							GRAND TOTAL	ITEM	UNIT	DESCRIPTION	REFERENCE LETTER	LINE NO.
	288	285	285	290	289	288	287	286	285	284	SHEET NO.					
														ROADWAY LIGHTING TYPE CODE 7223		
1								6	7		13	625	Each	Light Pole, Design No. A158B39D	A	1
2				1	9	19	12	10	9		60	625	Each	Light Pole, Design No. AT25B41.7	B	2
3							2	4	8	5	19	625	Each	Light Pole, Design No. AT15B41.7	C	3
4				2	6	1	8	4	7		28	625	Each	Light Pole, Design No. T15B41.7	D	4
5								3	9	1	13	625	Each	Light Pole, Design No. AT10B34.2	E	5
6			6								6	625	Each	Light Pole, Design No. ST10BA0-0, Bridge Mounted	F	6
7	2	3									5	625	Each	Light Pole, Design No. ST10B31-1, Bridge Mounted	G	7
8							1				1	625	Each	Light Pole, Design No. AT20BB41.7	H	8
9								6	7		13	625	Each	Special 14-Ft. Concrete Barrier Section For Light Pole Foundation		9
10				3	15	20	2	18	24	5	87	625	Each	Light Pole Foundation, 24"x 24"x8'-0"		10
11								3	9	1	13	625	Each	Light Pole Foundation, 24"x 24"x 6'-0"		11
12			6	3	15	20	24	30	38	5	141	625	Each	Luminaire, Type III, 700 Watt, 713.11		12
13									2		2	625	Each	Luminaire, Type III, 400 Watt, 713.11		13
14		3						3	7	1	14	625	Each	Luminaire, Type II, 400 watt, 713.11		14
15									18		18	625	Each	Luminaire, Underpass, 250 Watt, 713.13		15
16			6	3	15	20	24	30	38	5	141	625	Each	Lamp, 700 Watt, 713.14, Mercury		16
17		3						3	9	1	16	625	Each	Lamp, 400 Watt, 713.14, Mercury		17
18									18		18	625	Each	Lamp, 250 Watt, 713.14, Mercury		18
19									10		10	625	Each	Glare Shield, 713.11, 700 Watt		19
20																20
21				3	15	20	23	27	40	6	134	625	Each	Ground Rod		21
22					2	12	2	3	16	4	39	625	Each	Pull-Box, 18-inch Circular, 713.09		22
23									1		1	625	Each	Pull-Box, 24"x 18"x 12", Sidewalk Box		23
24				460	3025	5285	4765	4090	7235	1160	26020	625	Lin. Ft.	Trench, 24-inch Deep		24
25							130	1510	1505		3145	625	Lin. Ft.	Conduit, 4-inch, 713.06, Type I		25
26						495		285	710	125	1615	625	Lin. Ft.	Conduit, 3½ inch, 713.04		26
27	490	745	1050			35			185	10	2515	625	Lin. Ft.	Conduit, 2-inch, 713.04		27
28						250	55	75	110		490	625	Lin. Ft.	Conduit, 2-inch, 713.04, Concrete-encased		28
29	1100	1550	2200			1630	430	4365	6480	120	17875	625	Lin. Ft.	Distribution Cable, 1-No. 4 AWG, 600 Volt Cable		29
30				490	3195	5745	4945	4225	6690	1190	26480	625	Lin. Ft.	1 1/2" Duct Cable, 2-No. 4 AWG, 600 Volt Cables		30
31	160	240	540	320	1680	2380	2600	3230	4495	580	16225	625	Lin. FT.	Pole and Bracket Cable, 1-No. 10 AWG, 600 Volt		31
32						16	2	2	26	4	50	625	Each	Connector Kit, Type VII-A, AS PER PLAN		32
33					4	16	6	10	12	4	52	625	Each	Connector Kit, Type VII-B, AS PER PLAN		33
34	2								4		6	625	Each	Connector Kit, Type VII-C, AS PER PLAN		34
35																35
36				4		6	12	10	8		40	625	Each	Connector Kit, Type VIII, AS PER PLAN		36
37	4	6	12	2	30	34	34	44	72	12	250	625	Each	Connector Kit, Type IX, AS PER PLAN		37
38									LS		Lump	625	Lump	Control Center "TN"		38
39									LS		Lump	625	Lump	Control Center "TA"		39
40								LS			Lump	625	Lump	Control Center "LC"		40
41						LS					Lump	625	Lump	Control Center "PD"		41
42			1								1	625	Each	Structure Grounding System, Br. No. CUY.-80-1585		42
43		1									1	625	Each	Structure Grounding System, Br. No. CUY.-80-1593		43
44	1										1	625	Each	Structure Grounding System, Br. No. CUY.-80-1685		44
45	2	3	6								11 **	625	Each	Junction Box, 18"x 8"x 6"		45
46	2	3	6								11	625	Sets	Light Pole Anchor Bolts, 713.01		46
47							2	2	1		5	625	Each	Special Barrier Median Pull-Box; As Per Plan.		47
48									LS		Lump	625	Lump	Service To Underpass Lighting, Br. No. CUY.-80-1585		48
49																49
50																50
51										* LS	Lump	839	Lump	High Voltage Test		51
52	LS										Lump	625	Lump	Gore Floodlight		52
53																53
54					3	13	4	3	5		28	625	Each	Cable Marker		54
55										*150	150	605	LIN. FT.	4-INCH SHALLOW PIPE UNDERDRAINS		55
56																56
57																57

** 100% STATE

* GENERAL NOTES

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE J.R.K. DATE 6-1-74 CONSULTING ENGINEERS
TRCD. _____ DATE _____
CKD. L.W.L. DATE 7-8-74 KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY J.R.K. DATE 6-1-74
CHECKED BY L.W.L. DATE 7-8-74

GENERAL TRAFFIC SIGNAL NOTES

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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SCOPE

The Contractor shall install traffic signals at the intersections of Granger Road - Tuxedo Avenue and Granger Road - Ramp E-G as shown in the plans. The Contractor shall furnish all labor, materials, and equipment necessary so that the traffic signals installation will be complete, tested, accepted and ready for service prior to opening of intersections for vehicular traffic.

GENERAL

Any items of labor, materials, and equipment required, but not shown as a separate pay item in the proposal shall be furnished and installed as incidental to the contract.

The reference to any name, make and model number is intended to be descriptive and not restrictive and is to indicate to bidders the design that will be acceptable. Bids on other names, makes and numbers will be considered. Before any equipment is ordered or installation of a traffic signal system is begun, a complete schedule of materials and equipment shall be submitted to and approved by the Engineer. The schedule shall include eleven (11) sets (3 sets to be sent to the Mayor's office, Village of Brooklyn Heights) of catalog cuts, diagrams, brochures, data sheets, drawings, manufacturer s certificates of compliance or other descriptive data as may be required and shall include complete descriptive data on the signals, wiring diagrams, complete cable descriptions, test data, make and capacity of all apparatus. The Contractor shall identify the item on each sheet and shall mark all prints "RECORD DRAWING". One copy will be returned marked "APPROVED", if found satisfactory. In the event any items of material of equipment contained in the schedule fail to comply with the specification requirements, such items will be rejected.

All materials and equipment furnished under these specifications shall be new, first quality, of the latest design, and free from defects and poor workmanship. The Contractor shall be responsible not to scratch or damage the paint or galvanized finish of any material or equipment being installed. Minor scratches shall be touched up with two coats of the final paint color. Deep scratches on galvanized finish on poles or other equipment will not be acceptable.

All major items of equipment such as controllers, signals, detectors, poles, specific types of cables, etc., shall be of the same manufacture and same type in order to assure uniformity, interchangeability of components, single responsibility and most satisfactory service.

INSTALLATION

The Contractor shall conform to all applicable requirements of the National Electric Code, the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways, 1963 edition with latest revisions, and the State of Ohio's Construction and Material Specifications dated January 1, 1973, the Institute of Traffic Engineers, and the Standards of EEI-NEMA and the Underwriter's Laboratories in performing contract work and in the equipment furnished. He shall observe the regulations of utilities in the area of their equipment and exercise due caution in construction work near their facilities.

2. Prior to beginning construction, the Contractor shall contact all utilities having installations in the area to secure and affirm data on utility locations. These agencies and utilities shall be notified at least 24 hours prior to any excavation in areas containing their installations.

3. The Contractor shall install the power to the controller cabinet and provide 120/240 volts, 30 amp service as required. The Contractor shall be responsible for arranging and providing the power in the manner shown in the plans through the Cleveland Electric Illuminating Company. The cost of obtaining the power shall be included in the bid price for "Power Service".

4. Traffic signal cable shall enter the controller cabinets and run continuously from signal head to signal head without splices. Pressure type connectors will be used to make connections inside the controller cabinet. Cable entrances shall be protected by a suitable weather head and drip loop when entering traffic fixtures.

5. All wires in the controller cabinet shall be labeled, neatly lashed and fastened to the cabinet with clamps. This shall include wires to signal heads, and all miscellaneous equipment.

6. All current carrying wires shall be copper unless otherwise specified.

7. No splices shall be permitted in any electrical conductor, except in pull boxes and handhole in base of poles. No splice shall be permitted along the run of loop lead-in cable between the loop wire interface pull box and the detector amplifier in the control center.

8. All splices in pull boxes shall be of the weather-proof poured type.

MARKING OF CABLE

All cables shall be marked or tagged at all pull boxes, signal supports, and controllers with tag, so as to be individually identified.

The tag shall be not less than 0.031" thick copper, brass or plastic, and shall be embossed or engraved with letters or numbers of not less than ¼" high. It shall be securely attached with an AWG 14 copper wire. Markings shall consist of the following or variations thereof: Ground, Grd.; Phase A.; OA; Common, Com; Power, ac+ or ac-; etc.

Payment for this work shall be incidental to the installation of the various cables.

EQUIPMENT

All equipment shall be furnished with two wiring diagrams, service manual and instructions on installation and maintenance. To facilitate later maintenance, the Contractor shall provide the Village of Brooklyn Heights with a complete list of the replacement parts for all equipment installed.

TESTING OF TRAFFIC SIGNALS

The Contractor shall furnish all personnel, equipment and appliances required to successfully test the completed installations.

The Contractor shall test and demonstrate to the satisfaction of the Engineer or his authorized representative, that the circuits are properly connected, continuous and free from short circuits, crosses and unspecified grounds, and, that they are connected in accordance with the wiring instructions and that each circuit is operating correctly and independently of any other circuit.

The Contractor shall test each ungrounded circuit and spare wires terminating at the traffic controller cabinet for resistance to ground. This resistance to ground shall be not less than ten (10) megohms. The Contractor shall furnish a complete report of all megohms readings of each circuit and spare conductors in cable appearing at the controller base. The ground rod at the traffic controller shall have a resistance of not more than 15 OHMS to ground.

The Contractor shall have the responsibility of correcting malfunctions of the installation. Power for the test will be furnished from the service installed as a part of this contract. The cost of the power to conduct the test will be borne by the Contractor. Cost of conducting tests by the Contractor shall be included in the bid price for the item tested.

614 MAINTAINING TRAFFIC

The existing traffic signals shall be kept in operation until directed by the Engineer. At this time, the existing signal may be turned off. When not in operation, signal heads shall be bagged. When no signal is in operation, at the location traffic shall be maintained through the use of stop signs or law enforcement personnel

Signal control of the intersection shall not be interrupted during the hours of 7:00 A.M. to 9:00 A.M. and 3:30 P.M. to 6:30 P.M. on weekdays. Signals shall be inoperative no longer than six hours.

Payment will be included in the lump sum price bid for "Item 614, Maintaining Traffic."

202-REMOVAL OF EXISTING SIGNAL INSTALLATION

In accordance with standard specification 202, this item shall include the removal of the signal heads, controller, illuminated signs, cables, messenger wires, and all other portions of the existing traffic signal which are not to be reused in the new installation. Signal support poles are the property of CEI/OBT and are not included in this item.

Removal of the installation shall be coordinated with the cognizant Utility Company.

The signal heads, illuminated NLT sign, control equipment, cabinets, and other items designated by the owner, shall be carefully removed and delivered to Village of Brooklyn Heights Service Dept. at 225 Tuxedo Ave., Brooklyn Heights. All other items removed shall become the property of the Contractor and shall be removed and disposed of by the Contractor.

Payment for "Item 202, Removal of Existing Signal Installation" will be made at the unit price bid per each intersection wherein existing signal equipment is to be removed.

625 - POWER SERVICE

This item shall consist of installing on the C.E.I. power service pole a fused disconnect switch, weatherhead and conduit riser, conduit fittings and ells, stainless steel mounting straps, associated hardware and wire and other incidentals of installation required to provide power service to the traffic signal system.

The fused disconnect switch shall be of the type shown in the plans and housed in the plans and housed in a lockable, stainless steel , NEMA-4 watertight enclosure mounted on the service pole in the manner described in the plans.

The fuses shall be 30 Amp. dual element, UL Class K-5, equivalent to Buss FRS-30 or approved equal.

Contractor shall provide the locks and four (4) sets of keys; two (2) sets to the Village of Brooklyn Heights, one (1) set to the State, and one (1) to C.E.I.

The weatherhead shall be cast aluminum or galvanized cast ferrous metal of watertight construction to prevent the entry of water into the conduit.

Conduit shall be 2" Ø, Type III as specified in 713.04.

Stainless steel straps shall be ¾-inch wide by .020-inch thick and space at minimum intervals of six (6) feet to support the conduit riser.

The Contractor shall coordinate the installation of material and attachment of power service with the Cleveland Electric Illuminating Company and the Engineer.

Payment for "Item 625 - Power Service" will be made at the contract unit price for the installation, including all labor, materials, equipment, and incidentals necessary to perform the required item of work, installed and wired in place, complete, tested, and accepted, and including all costs incurred in obtaining installation coordination, approval, and arrangement for power service with C.E.I.

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE EFJ DATE 5-15-73 CONSULTING ENGINEERS
TRCD. MEE DATE 8-6-73 KANSAS CITY CLEVELAND NEW YORK
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FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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GENERAL TRAFFIC SIGNAL NOTES

625-SEMI-ACTUATED, TWO PHASE SIGNAL CONTROLLER, SOLID-STATE TYPE WITH INTERCONNECT AND CABINET

The Contractor shall furnish and install a semi-actuated, two phase, solid-state traffic signal controller. It shall be capable of providing the basic signal sequence in accordance with signal operation drawings.

The controller shall be one ET-460 Traffic Signal Controller with TF-451 Solid State Load Switching Unit contained in one completely wired type EL-643 cabinet as manufactured by Eagle Signal Company, a division of E.W. Bliss Company, Davenport, Iowa, or one Traf-O-Matic Multi-phase Traffic Signal Controller with Solid State Load Switching contained in one completely wired G-cabinet as manufactured by Automatic Signal Company, a Division of Laboratories for Electronics, Inc., Norwalk, Connecticut, or an approved equal. Controller cabinets shall be as specified above and shall be manufactured by the controller supplier. The cabinet shall be of size to contain the dector amplifiers, coordination control, fire pre-emption control and shall be prewired at the factory for these functions. The cabinets shall contain a separate jack-mounted, solid state flashing unit and jack-mounted, solid state load switches, radio interference filter, duplex service outlet conforming to NEC (1971) Art. 210-22(d) and a 20A. breaker switch. The cabinets shall be installed with necessary equipment to insure that conflicting green indications cannot occur and to provide for the mutual coordination shown in the plans. The controller cabinet for the Tuxedo and Granger Rd. intersection shall also be large enough to house a time-clock. The controllers shall operate in conformance with Proposed NEMA Standard TS-P2-1972. All indicators shall be solid state LED'S.

The large cabinet door shall be fitted with a smaller door which shall contain a main on-off switch and an automatic flash switch. The lock on the large cabinet door shall be keyed to the city maintenance master. The lock on the small door shall be keyed to the city police master. Two keys shall be furnished with each lock. All equipment required for a satisfactory operation shall be furnished completely installed.

Two coats of federal yellow paint shall be applied to the traffic signal controller cabinet. Cabinets shall be painted after installation. Twenty-four hours shall elapse before the second coat of paint is applied to any equipment. Payment for painting shall be included in the contract unit bid price. The Contractor shall exercise due caution to protect vehicles during application of paint and shall erect and remove "fresh paint" signs on equipment as required.

Payment for Item 625 " Semi-Actuated, Two Phase, Signal Controller, Solid-State Type with Interconnect and Cabinet.", will be made at the contract price for each controller by type, complete, and in place, including prewired cabinet, all connections and testing.

625 TRAFFIC SIGNAL HEADS, BY TYPE

This work shall consist of furnishing and installing vehicular traffic signal heads of the type and size shown on the plans and installing them as shown on the detail sheets and as herein specified.

All traffic signals shall meet the latest ITE (Institute of Traffic Engineers) standards for "Adjustable Face Traffic Control Signal Head Standards". The traffic signals shall also meet the following requirements:

1. Twelve (12") traffic signal sections shall be installed with a combination tunnel type hood twelve (12") long, with an open slot at the bottom of the hood.

2. Reflectors shall be highly polished silvered glass.

3. All traffic signals shall be arranged for span wire mounting.

4. Glass lenses, number and size, shall be as indicated on the intersection drawings. These lenses shall meet the latest ITE standards for lenses. Lenses displaying the Green Arrow shall conform to the Ohio Manual of Uniform Traffic Control Devices.

5. All Signal optical units shall produce standard (ITE definition) light distributions.

6. All traffic signals and signal service entrance fixtures shall be painted according with the following:

   A. Finish on body of signal, outside of hood, doors and service entrance fixture- Federal Yellow, Standard 595 Color 13655 - two coats.

   Finish on inside of Hood - Flat Black.

   B. Paint requirements:

   1st coat (all surfaces) - Epon oxide baking primer, Federal Spec. TT-P-636
   2nd coat (all surfaces) - Medium gray alkyd urea exterior baking enamel, Federal Spec. TT-E-489B
   3rd coat (yellow surfaces) - Federal Yellow alkyd urea exterior baking enamel, Federal Spec. TT-E-489B, Color 13538
   3rd coat (flat black surfaces) - Alkyd urea black synthetic, heat-resisting glyceryl phthalate, Type 4, Instrument Black, Military Spec. E-5557.

7. Stainless steel latching devices and span wire hangers shall not be painted.

8. Balance adjustors shall be installed to maintain the traffic signals in a vertical position.

9.(A) Traffic Signal Head, 3 Section, 12" Lens, One Way - A complete one way, Three - section signal assembly shall consist of the following component parts for span wire mounting:

   A. Galvanized span wire hanger for $\frac{3}{8}$" messenger.
   B. Balance adjustor.
   C. 1-$\frac{1}{2}$" service entrance head with galvanized nipple.
   D. 1-$\frac{1}{2}$" galvanized lock nuts.
   E. Pinnacle assembly.
   F. One, twelve inch three-section traffic signal including red, yellow, and green lenses with all required components to lock the signals in place and provide a water and dust tight installation.
   G. All other incidentals necessary to make the assembly complete.

9.(B) Traffic Signal Head, 3 Section 12" Lense, Two-Way w/Arrow. A completed two-way three-section traffic signal assembly shall consist of the following component parts for span wire mounting:

   A. Galvanized span wire hanger for $\frac{3}{8}$" messenger wire.
   B. Balance adjustor.
   C. 1-$\frac{1}{2}$" service entrance head with galvanized nipple.
   D. 1-$\frac{1}{2}$" galvanized lock nuts.
   E. 1-$\frac{1}{2}$" diameter top bracket assembly.
   F. Bottom bracket assembly.
   G. Two, twelve inch, three-section traffic signal including red, yellow, green and green-arrow lenses in the configuration as shown on the detail sheets, with all required components to lock the signals in place and provide a water and dust tight installation
   H. All other incidentals necessary to make the assembly complete.

10. The Contractor shall furnish and install a traffic signal lamp in each traffic signal section. Signal lamps shall conform to the requirements of "A Standard for Traffic Signal Lamps" as approved by the Institute of Traffic Engineers (ITE) Board of Direction on December 26, 1967, with the following exceptions and qualifications:

   A. Brass screw bases shall be required.
   B. Lamp sizes shall be as follows:

	watts	rated life hours	light center length
(1) 12" Diameter red, green, green arrow	150	6000	3"
(2) 12" Diameter yellow	69	6000	3"

Lamps shall be installed with the open portion of the filament in the upward position.

Cost of furnishing and installing lamps shall be included in the bid price of each item requiring lamps.

11. Signals shall be installed such that all signals are at the same elevation with respect to the signal with the minimum clearance above the pavement surface as shown in the plans.

Payment for Item 625 "Traffic Signals" will be made at the contract unit price for each assembly (by type) mounted in place, tested and accepted.

625 COVERING OF TRAFFIC SIGNAL HEADS

All traffic signal heads, erected at locations where traffic will be maintained prior to energizing of the signal, shall be covered.

The covering shall be plastic coated burlap blankets as per Item 705.06. They shall be firmly attached and completely cover the signal head without damage to the head. The covering shall be maintained in place at all times while traffic is using the area and the signal is not in operation.

Payment shall be at the unit price bid per each for Item 625 "Covering of Traffic Signal Heads" which shall be full compensation for all labor, materials and equipment required to erect, maintain and remove the covering.

625 - LOOP DETECTOR AMPLIFIER

The loop detector amplifier is an electronic device that will detect the presence or motion of a vehicle. This detection is accomplished by the passage of a car over a wire loop imbedded in the roadway.

The amplifier shall conform to the following:

1. The detector shall operate satifactory at any temperature between -30°F. and +165°F.
2. The operating voltage shall be 115 volt, 60 cycle.
3. The internal circuitry shall be incorporated into printed circuit board assemblies.
4. The detector design shall include a fixed frequency crystal which will generate a sine wave form of signal.
5. No external equipment shall be necessary for installation tuning or sensitivity adjustments.
6. Various types of outputs shall be available including pulse and presence. These outputs shall be available by switching from one to the other without changing any internal parts.
7. All transitors, crystals, and relays shall be of the plug type to facilitate replacement.
8. The amplifier and power supply shall be capable of driving several loops from the one source. The amplifier shall be capable of detecting vehicles in a total area of up to 400 sq.ft. and shall properly function with lead-in lengths totaling up to 750 feet.

Payment for Item 625 "Loop Detector Amplifier" will be made at the contract unit price for each detector amplifier, completely wired and installed in controller cabinet.

625- GUARANTEES AND WARRANTIES

The contractor shall warrant or guarantee satisfactory operation of electrical traffic control equipment for a period of 6 months following acceptance of the equipment by the State. The contractor's responsibility shall be limited to necessary repairs, replacement of defective parts with parts equal to or better than those originally specified and remedying faulty installation in an approved manner; including all labor, material and equipment costs related thereto. The following items shall be provided with the specified 6 month guarantee:

1) Traffic signal controllers and associated control equipment
2) Loop Detector Amplifiers
3) Fire Preempter

In addition, the manufacturer's normal warranties for the above equipment and other manufacturer's equipment for which guarantees are normally provided shall be assigned and delivered to the State.

The contractor shall install and handle items in accordance with the manufacturer's recommended procedures, provided such procedures are not in conflict with the plans and specifications.

Costs for provision and performance of guarantees and warranties herein described shall be incidental to and included in the unit price(s) bid for the various traffic control items.

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE EFJ DATE 5-15-73 CONSULTING ENGINEERS
TRCD. MEE DATE 9-25-73 KANSAS CITY CLEVELAND NEW YORK
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FED. RD. DIVISION	STATE	PROJECT	
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GENERAL TRAFFIC SIGNAL NOTES

625 PEDESTRIAN PUSHBUTTON WITH SIGN

Pushbuttons shall be of two piece construction, consisting of a housing and a removable cover plate assembly. The cover plate and housing consist of a cast aluminum alloy material. All cast metal parts shall have a tensile strength of not less than 17,000 pounds per square inch. The alloy used shall be S-5A or CS-72A of ASTM Specification B-26-60T. The housing and cover plate shall be painted with (2) coats of dark green enamel. The cover plate assembly shall attach to the housing with stainless steel machine screws.

The cover plate assembly shall consist of one set of normally open contracts and all the necessary mechanical and electrical components required for the operation of the pedestrain pushbutton. The pushbutton shall be waterproof and designed for rugged operation. Only metal components will be permitted on the outside of the push-button.

Pedestrian pushbuttons installed on steel signal poles shall be serviced by cables inside the poles. The Contractor shall drill the proper size holes in the steel poles in back of the pushbutton, install an insulated bushing, cast pushbutton saddle and route the cable through to the pushbutton in such a manner that the cable will not appear on the outside of the poles. All pushbuttons shall be installed with the center of the pushbutton a height of 4'-0" above the ground.

An 9" x 12" sign with black legend on a white background shall be furnished and installed at a point on the pole 6" clear distance above the top of the pushbutton. The sign shall be fabricated from .010 aluminum of enameled steel and shall bear the legend shown on detail sheet No.

Signs and pushbuttons shall be located on the side of poles and oriented to face the crosswalk to which they apply as noted on the plans or as directed by the Engineer.

Payment for Item 625, "Pedestrian Pushbutton with Sign", will be made at the contract unit price each, completely assembled and mounted in place, including sign tested, and accepted.

625 METHOD OF MEASUREMENT

Supplementing Item 625.24, linear measurements for payment of various traffic signal bid items shall be made as follows:

1. Signal cable, Power cable, Interconnect cable, Loop detector lead-in cable, Service cable.
   The length measured horizontally from center to center of pullboxes, poles, foundations, or signal heads, plus the following:

   A. Five feet per each pullbox, pole, or termination at controller or signal head to allow for slack and splicing of leads.

   B. The length measured vertically from trench bottom to pole outlet or mast arm attachment on vertical runs.

   Multipliers as contained in 625.24 paragraph (C) and (E) shall not be used for multi conductor cables covered in this note.

2. Loop Detector Wire
   Measured horizontally from center line of pullbox to pavement edge, to loop through loop sawslots for the number of turns required and thence returning to the pullbox, plus five feet at each end to allow for slack and splices.

3. Loop Detector Pavement Cutting
   Measured along the sawcut from outside edge of pavement or curb, to loop and around the loop, using rectangular perimiter dimensions shown on the plans or directed by the Engineer but not including chamfer cuts at loop corners.

4. Messenger Wire With Accessories
   Measured horizontally from center to center of pole to pole: or bullring (aerial corner) to pole, or bullring to bullring: but not including any additional messenger required for attachment of messenger to poles, bullrings or strain insulators by wrapping or bending.

625 - LOOP DETECTOR WIRE AND LEAD-IN CABLE

Loop detector wire shall consist of single conductor, insulated, No. 14 AWG RHW Type stranded copper wire, and be installed in accordance with the typical loop detector detail. Each wire loop shall consist of the number of turns as shown on the plans or as required by the manufacturer of the loop detector amplifier. The loop wire shall run continuously to the adjacent pull box where it shall be spliced to the loop detector lead-in cable. The lead-in cable shall be a continuous run with no splices from the loop wire splice to the loop detector amplifier input connector.

Payment for Item 625 "Loop Detector Wire" will be made at the contract unit price per linear foot in place for No.14 detector wire and shall include detector wire, installation, jacket, conduit from roadway edge to pullbox splice and all incidentals necessary to complete the installation. The estimated quantities of loop detector wire shown on the plans is based on the Engineers estimate of the required number of turns. Payment will be based on the actual linear feet required as determined by the detector amplifier manufacturers specification for proper operation.

Payment for Item 625 "Loop Detector Lead-in Cable" will be made at the contract unit price per linear foot in place for No. 14 AWG, 2 cond., polyethylene insulated, twisted pair, shielded and jacketed cable, including soldered, waterproof, poured splice.

625 - LOOP DETECTOR PAVEMENT CUTTING

Loop detector pavement cutting shall consist of a saw cut size as detailed in the plans and in accordance with typical loop detector installation detail. The saw cut shall be filled with a joint sealer after the wire has been installed. The joint sealer shall be as specified in the plans. Note, special details are required for the loop in the Tuxedo Rd. bridge. See traffic control plan sheets 314 & 313 and bridge plan sheet 355

Payment for Item 625 "Loop Detector Pavement Cutting" will be made at the contract unit price per linear foot for saw cutting and treatment including joint sealer.

625 CABLE SUPPORT ASSEMBLY

A cable support assembly shall be installed for each group of cables passing through each wire outlet near the top of pole, it shall be attached to the "J" hook as shown in the plans and shall consist of the following major items:

1. One bronze or stainless steel cable grip with single "U" eye bale.
2. All other miscellaneous items that may be necessary to make the assembly complete.

The messenger shall be 0.164 inches in diameter consisting of three strands of 0.075 inch copper-covered steel wires twisted in the form of a cable. Guy thimbles shall be grooved to fit the guy strand and bent to the proper radius to prevent the strand from being sharply bent. The cable grip shall have a single "U" eye bale. The grips shall be of the proper size to fit the cable. The grip shall be either the "closed", or "split with rod" type, and shall have a minimum rated breaking strength of 250 lbs.

Payment for Item 625 Cable Support Assembly will be made at the contract unit price each, completely assembled in place and accepted.

625 SIGNAL CABLE 1-5/c NO. 14 AWG, 600V.

Traffic signal cable shall be weatherproof and shall consist of 5 conductors and be AWG No. 14. Cables shall be insulated, jacketed, rated 600 volts for use in underground conduit or as aerial cable supported by a messenger. It shall be color coded and in every respect follow the International Municipal Signal Association Specification No. 19-1-67. Wires may be solid or stranded.

Payment for Item 625 "Traffic Signal Cable 1-5/c No. 14 AWG 600V." will be made at the contract unit price per linear foot by type, in place, completed and accepted, including wiring, terminals, connections, testing, and all incidentals necessary. Cable lengths shown in the plans are Engineers estimate; the Contractor shall determine the exact length required.

625 INTERCONNECT CABLE 1-5/c NO. 12 AWG, 600V., STRANDED

Interconnect cable shall be weatherproof and shall consist of 5 conductors as specified on the plans. All conductors shall be AWG No. 12. Cables shall be insulated, jacketed, rated at 600 volts for use in underground conduit or as aerial cable supported by a messenger. It shall be color coded and in every respect follow the International Municipal Signal Association Specification No. 19-1-67. Conductors may be solid or stranded.

Payment for Item 625 "Interconnect cable 1-5/c No. 12 AWG, 600V." will be made at the lineal price bid per linear foot, in place, completed, and accepted including wiring, terminals, connections, splicing, testing and all incidentals necessary. Cable lengths shown in the plans are Engineers estimate; the Contractor shall determine the exact length required.

625 - POWER CABLE, 1-3/c NO. 4 AWG, 600V - RHW (OR RHW TYPE) STRANDED

Power cable shall be weatherproof and shall be 3 conductor AWG No. 4 RHW (or RHW Type) stranded copper as shown on the plans. Power cable shall be installed from the controller cabinet through underground conduit, to the power pole, where it shall be attached to the disconnect switch. (three single conductor No. 4 RHW wires may be substituted; however payment will be based upon the equivalent length of 3 conductor cable.)

Payment for Item 625 "Power Cable 1-3/c No. 4, 600V RHW Stranded" will be made at the contract unit price per linear foot, in place, complete and accepted, including wiring, terminals, connections, testing, and all incidentals necessary and shall also include any cost incurred to arrange the service installation with the Cleveland Electric Illuminating Company in conformance with the plans. Cable lengths shown in the plans are the Engineers estimate; the Contractor shall determine the exact length required.

625 - POWER CABLE, 1-3/c NO. 8 AWG, 600V - RHW (OR RHW TYPE) STRANDED

Power cable shall be weatherproof and shall be 3 conductor AWG No. 8 RHW (or RHW Type) stranded copper as shown on the plans. Power cable shall be installed from the the controller cabinet through the appropriate conduit to the power pole, to the disconnect switch. Three single conductor No. 8 RHW wires may be substituted; however payment will be based upon the equivalent length of 3 conductor cable.

Payment for Item 625 "Power Cable 1-3c No. 8, 600V RHW Stranded", will be made at the contract unit price per linear foot, in place, complete and accepted, including wiring, terminals, connections, testing, and all incidentals necessary and shall also include any cost incurred to arrange the service installation with the Cleveland Electric Illuminating Company in conformance with the plans. Cable lengths shown in the plans are the Engineers estimate; the Contractor shall determine the exact length required.

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE EFJ DATE 5-15-73
TRCD. MEE DATE 9-25-73
CKD. EFJ DATE 9-27-73
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

GENERAL TRAFFIC SIGNAL NOTES

FED. RD DIVISION	STATE	PROJECT	
5	OHIO		

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625 PULL BOX, CONCRETE, AS PER PLAN

The Contractor shall furnish and install concrete pull boxes of the type shown and detailed in the plans on Sheet 310

Pull boxes shall be cast, reinforced concrete, 29" x 29" x 34". Maximum spacing between pull boxes not stationed on the plans shall be 200 feet or as directed by the Engineer. No. 6 or 6A Aggregate shall be used to form a 9" gravel drain. The top coner of the pull box shall be flush with the final grade and the backfill around the box shall be compacted with material from the contiguous areas.

The Pull Box Corner shall have the words "TRAFFIC CONTROL" placed on the top surface in the manner described in Specification 713.08.

Basis of payment shall be at the Contract bid price, per each, Item 625 "Pull Box, Concrete, As per Plan," complete, installed, in place, measured, and accepted.

625 - STRUCTURE JUNCTION BOX, (16"x12"x6")

This item shall consist of providing and installing watertight, flush mounted, cast-iron junction boxes in the bridge parapet as indicated and detailed in the plans for running the Loop Detector Lead-in Cable.

The junction boxes shall be galvanized cast-iron measuring 16"Wx12"W x 6"D, inside dimensions and not less than ¼-inch thickness, the boxes shall have an outside flange designed for flush mounting in concrete walls and bosses, drilled and tapped.

The boxes shall be of watertight (NEMA 4) construction complete with recessed plain cover, neoprene gasket, flush stainless steel screws, and anti-loss cover chain.

Junction boxes shall be OZ-YR161206 or approved equal.

Each box shall be installed complete with a steel conduit drain pipe extending from the box to a point outside the parapet in the manner described in the plans. A 1/0 AWG 7 - Strand bare copper ground wire shall be exothermically welded to flange of beam and connected to the junction box in the manner described in the plans.

Each junction box shall be provided with grounding type insulated bushing, conduit entrance holes and all conduits indicated in the plans attached to the box.

Payment for "Item 625 - Structure Junction Box" will be made at the contract unit price for the installation, including all labor materials, and incidentals required to perform the item of work, complete, and accepted.

816 CONSTRUCTION LAYOUT STAKES FOR TRAFFIC SIGNALS

The Contractor shall stake out all traffic signal supports in accordance with supplemental specification 816 prior to installation of any foundations or supports.

After stakeout theContractor shall notify the Engineer a minimum of seven (7) days in advance of scheduled work. Support locations for each support will be field checked and approved by the Engineer who shall coordinate with the Division Traffic Engineer prior to proceeding with construction work required.

Cost for this item of work will be incidental to the various 816 items of work contained in the project.

816 CONCRETE FOR SIGNAL SUPPORT FOUNDATIONS

Traffic signal pole foundations shall be constructed as shown in the plans. The Contractor shall stake the longitudinal and lateral location and the elevation of the top of each foundation subject to the approval of the Engineer. The Contractor shall be responsible for the proper elevation, offset and level of each foundation. Excavations shall be made to the dimensions shown on the plans and shall be performed by means of an earth auger of the specified diameter unless otherwise directed by the Engineer. Where sub-surface obstructions are encountered, the Engineer may require the Contractor to remove the obstruct-or to replace the excavated material and relocate the foundation. If caving of the foundation occurs, the Contractor shall excavate to the specified depth, maintaining the sidewalls as nearly vertical as possible. No payment shall be made for any excavation, concrete or rein-forcing steel used in excess of the planned quantities.

Portland cement concrete shall be used and shall conform with class "C" of the 1973 Construction and Material Specifications by the Department of Transportation of the State of Ohio.

The concrete shall be placed against undisturbed soil or compacted embankment. The foundation shall have anchor bolts and conduit accurately held in position with a templet when concrete is poured. Forms shall be used for the upper portion of all foundations and no backfilling shall be permitted from the bottom to within 6 inches below ground level. No grouting of concrete shall be permitted between the foundation and the steel pole.

Payment for Item 816 "Concrete for Signal Support Foundations" shall be made per cubic yard for each foundation constructed in accordance with the typical foundation details and shall include concrete, reinforcing steel, excavation and backfill.

816 - CAPPING OF CONDUIT

All conduit in foundations which will not have wire or cable pulled into it during construction shall have the ends closed with capped blushings of otherwise sealed in an approved manner to completely keep all moisture and foreign matter out of the conduit.

816 MESSENGER WIRE 7 - STRAND By 3/8" WITH ACCESSORIES

Messenger wire shall be utility grade galvanized steel as per ASTM A 122 and 218 Class "B". It shall consist of seven strand (⅜" nominal diameter with a breaking load of 11,500 lbs.) Galvanized steel lashing rods shall be used to suspend the signal cable from the messenger wire, tightly secured. Wet-porcelain strain insulatiors (600 volt), guy clamps, and Galvanized performed guy grip dead ends, thimbles, and bull rings (when required) with a rated loading strength equal to or greater than the breaking load of the messenger wire shall be installed as shown on the plans and or specified by the Engineer. The messenger wire shall be installed so that the entire load of the signal equipment will not cause sag to exceed a maximum of 5% or a minimum of 3% of the span.

Payment for Item 816 "Messenger Wire By 3/8" - 7 Strand with Accessories" will be made at the contract unit price per lineal foot (measured to center of pole or areial corners) completely assembled in accordance with the typical signal installation details and shall include messenger wire, lashing rods, strain insulators, performed guy grips, thimbles, guy clamps, and aerial corner bull rings, as described above and shown on the details on sheet.

816 SIGNAL STRAIN POLE

This item of work shall consist of furnishing and erection of poles by size and height as shown and specified in the plans.

Shafts shall be tapered tubes.

Each pole shall be galvanized and include the furnishing of anchor bolts, Type III rigid ferrous metal 3" conduit ell and 3" electrical metallic tubing ell for grounding lead for installation in foundations plus handhole with cover, "J" hook, pole clamp, and cable service entrance with blind half-coupling for each pole in accordance with details as shown in the plans.

The poles shall be installed and adjusted to the proper rake so that the weight of the signal installation will not cause the poles to be off vertical alignment by more than 1%.

ANCHOR BOLTS

Four high grade steel anchor bolts fitted with hex nuts shall be furnished for each pole. Each anchor bolt shall be threaded at the top and bottom ends. The bolt shall be fabricated from high strength steel having a minimum yield strength of 55,000 psi and a minimum ultimate strength of 90,000 psi. Each bolt shall have the top threaded end galvanized for a minimum length of five (5) times the diameter of the bolt. Each bolt shall be provided with one regular hex nut and one heavy square nut. All nuts shall be hot-dip galvanized and meet the physical and chemical requirements of ASTM A307.

COVER BASES

Cover bases shall be provided for all overhead signal support which do not have cast anchor bases with leaf bolt covers and are located in sidewalks, tree lawns or in traffic islands used as walks. Payment for cover bases and all tools, materials, and labor necessary to erect the cover bases shall be included in the price bid for "Item 816-Signal Strain Pole."

Basis of payment shall be at the contract bid price per each, "816 Signal Strain Pole, (guage, by size)" including all labor, materials, equipment and incidentals related to this item of work, complete, installed, and accepted.

625 FIRE PRE-EMPTOR

This item of work shall consist of providing and installing the necessary equipment to provide a fire pre-emption interval of the type and display indicated herein for the intersection of Granger Rd. and Tuxedo Ave. The equipment shall be installed in the controller cabinet at the intersection except for a push button actuator which shall be installed in the fire house in a location and manner specified by the Engineer.

The equipment shall be such as to provide a pre-timed pre-emption interval whenever the system is actuated, the signals shall display a normal clearance interval before changing to any more restrictive indication called for by the pre-emption. However the signals which become less restrictive during pre-emption may change without clearance intervals. At no time shall any signal head display a non-standard indication, as defined by the OMUTCD, nor shall the signals give right-of-way to any conflicting approaches. Following clearance the pre-em emption device shall cause green ball indications to be displayed on the Northbound Tuxedo Ave approach and Red ball on all other approaches for a pre-timed pre-emption period of 10 sec. to 120 sec. as set on the timer in the equipment. Following the pre-emption, pre-timed yellow clearance shall be displayed to the fire lane and the signal returned to Granger Rd green with a call placed on Tuxedo Ave.

Payment will be made at the contract bid price for each Item 625 " Fire Pre-emptor" installed and tested complete including all equipment in the controller cabinet, fire station, labor, equipment and incidentals. Cable, conduit, trench, pull boxes and junction boxes needed to run the cable from the controller cabinet to the push button in the fire station will be paid seperatly.

SCALE
MADE EFJ DATE 5-15-73
TRCD MEE DATE 9-6-73
CKD EFJ DATE 9-21-73

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KANSAS CITY CLEVELAND NEW YORK

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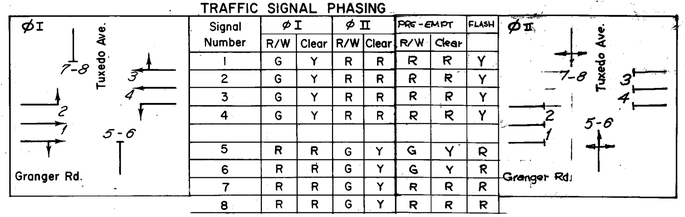
CUY. - 480 - 15 81

Note:
Existing underground Utilities are not shown. See Utility Plans. The Contractor is responsible for determining the type and location of underground utilities as may be necessary to avoid damage thereto.

TRAFFIC SIGNAL PHASING

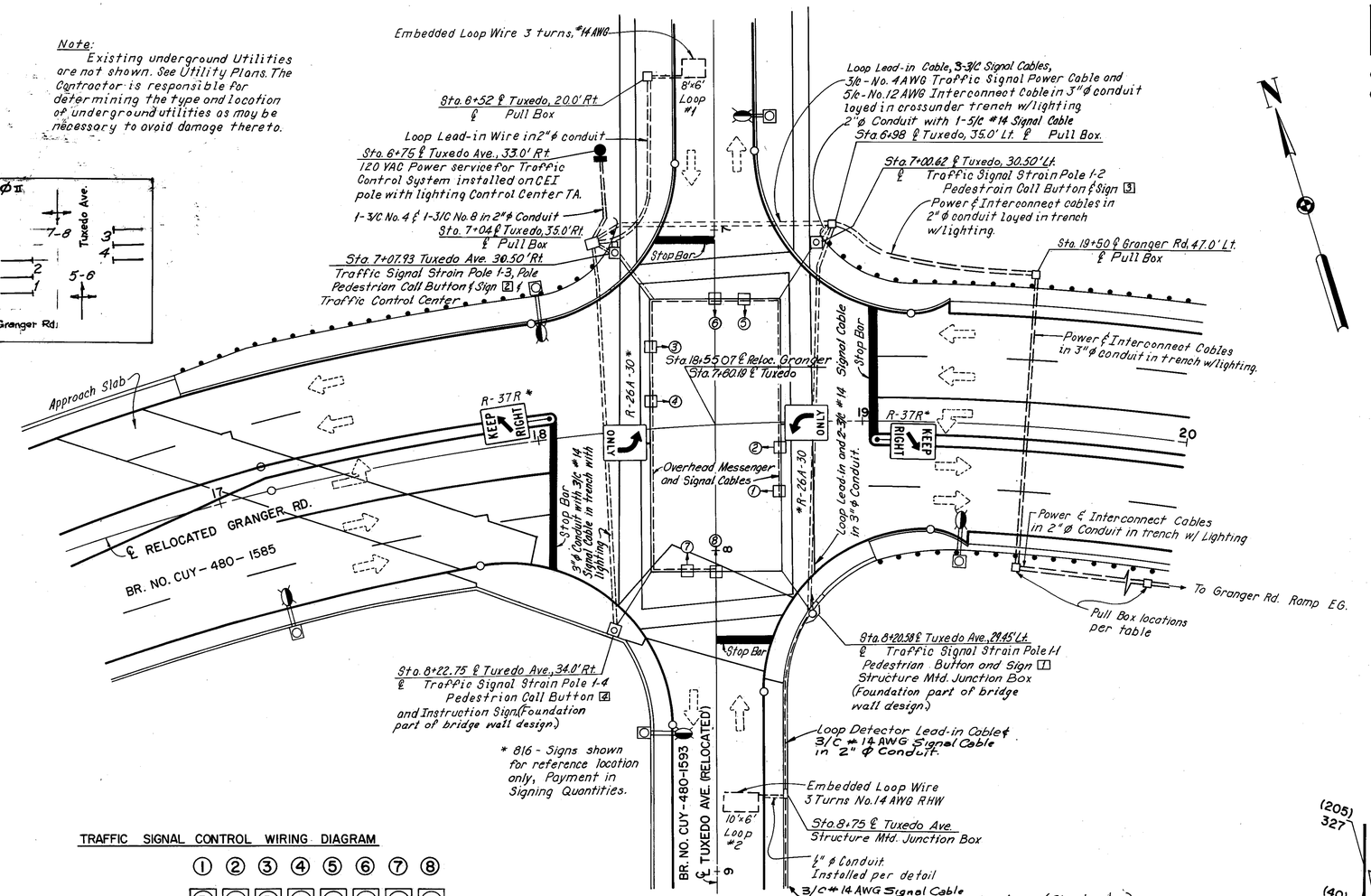


Signal Number	ϕ I R/W	ϕ I Clear	ϕ II R/W	ϕ II Clear	PRE-EMPT R/W	PRE-EMPT Clear	FLASH
1	G	Y	R	R	R	R	Y
2	G	Y	R	R	R	R	Y
3	G	Y	R	R	R	R	Y
4	G	Y	R	R	R	R	Y
5	R	R	G	Y	G	Y	R
6	R	R	G	Y	G	Y	R
7	R	R	G	Y	R	R	R
8	R	R	G	Y	R	R	R

TRAFFIC SIGNAL TIMING CHART

Phase	I	II
Minimum	45	
Initial		5
Vehicle		3
Maximum		14
Ped. Green		7
Ped. Clear		25
Yel. Clear	3	4
Red Clear	2	2

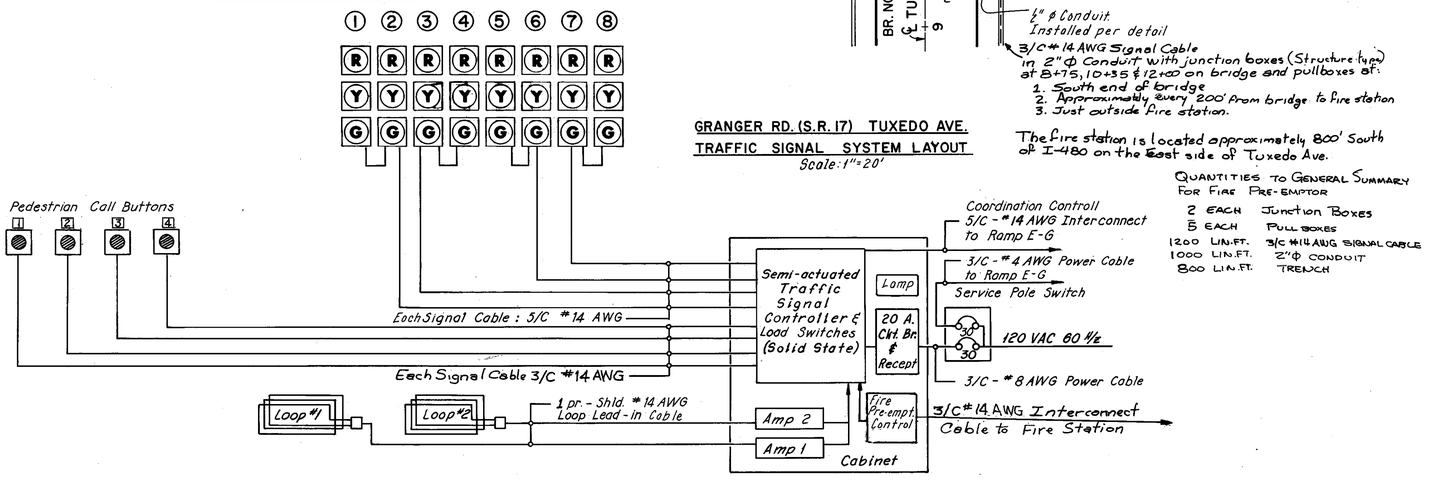
Note:
(1) Dwell in ϕI in absence of Pedestrain or Vehicle Call.
(2) Coordination with Granger-Ramp E-G signals
(3) Time intervals shown are estimates only and may be changed as directed by the Engineer



Pull Box Located at following stations along ℄ Granger Rd.:

STATION	OFFSET
18+50	44.0' Rt.
21+45	44.0' Rt.
23+41	44.0' Rt.
25+36	44.0' Rt.
28+23	44.0' Rt.
30+19	44.0' Rt.
32+15	44.0' Rt.

TRAFFIC SIGNAL CONTROL WIRING DIAGRAM

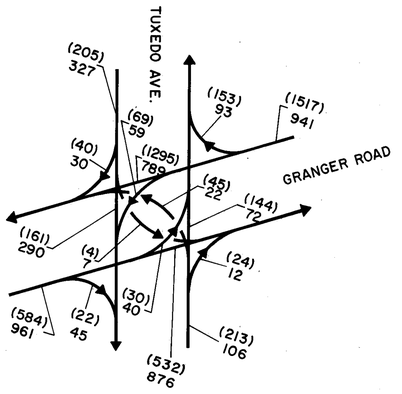


GRANGER RD. (S.R. 17) TUXEDO AVE. TRAFFIC SIGNAL SYSTEM LAYOUT

Scale: 1"=20'

QUANTITIES TO GENERAL SUMMARY FOR FIRE PRE-EMPTOR

2 EACH	Junction Boxes
5 EACH	Pull Boxes
1200 LIN.FT.	3/c #14 AWG SIGNAL CABLE
1000 LIN.FT.	2" ϕ CONDUIT
800 LIN.FT.	TRENCH



DESIGN YEAR: 1990
DDHV: (000) A.M. PEAK
000 P.M. PEAK

SCALE 1" = 20'
MADE E.F.J. DATE 7-7-73
TRCD. M.E.F. DATE 9-22-73
CKD. E.F.J. DATE 8-24-74

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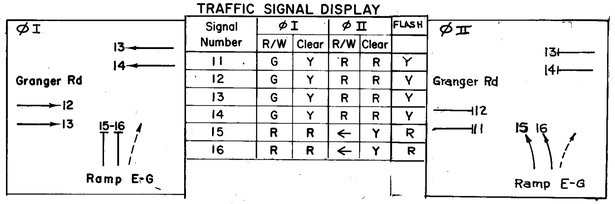
TRAFFIC SIGNAL DISPLAY

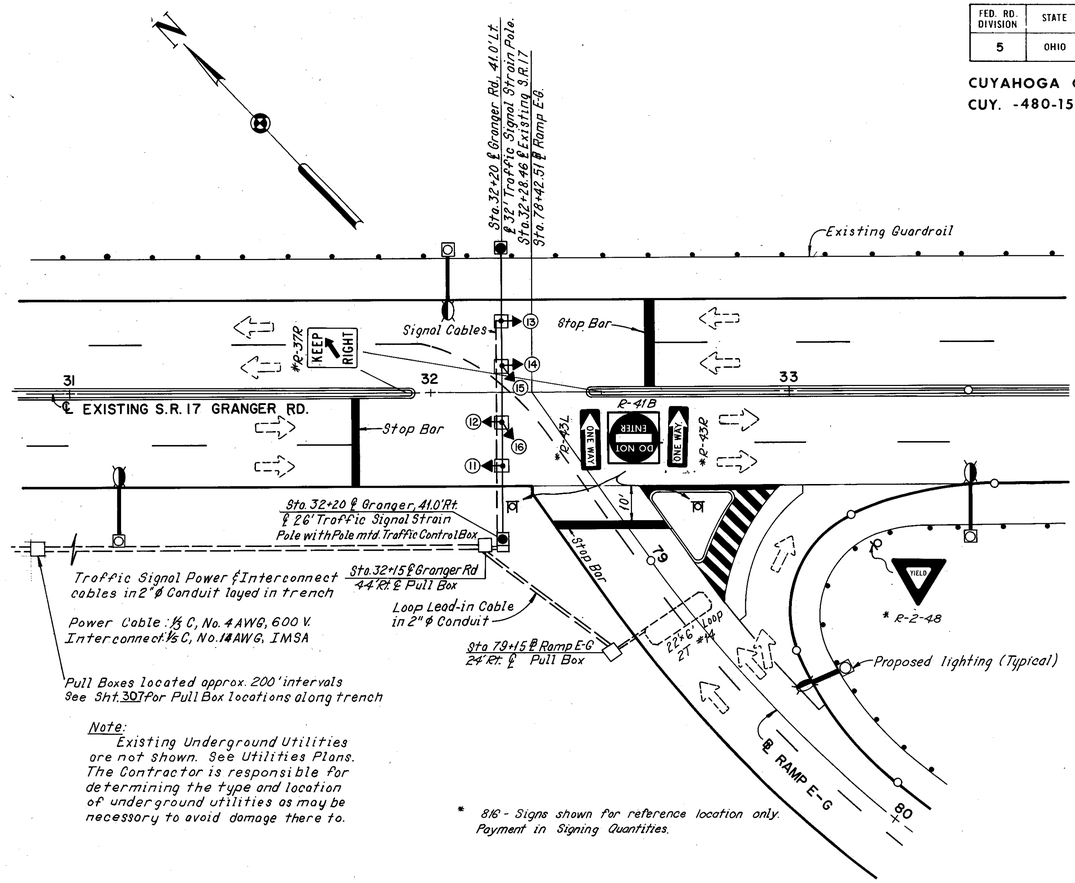


Signal Number	ØI R/W	ØI Clear	ØII R/W	ØII Clear	FLASH
11	G	Y	R	R	Y
12	G	Y	R	R	Y
13	G	Y	R	R	Y
14	G	Y	R	R	Y
15	R	R	←	Y	R
16	R	R	←	Y	R

TRAFFIC SIGNAL TIMING CHART

Phase	I	II
Minimum	45	
Initial		5
Vehicle		3
Maximum		20
Yel. Clear	3	3
Red Clear	1	1

(1) Time in seconds
(2) Dwell in ØI in absence of call.
(3) Coordination with Granger - Tuxedo Signals.
Time intervals shown are estimates only and may be changed as directed by Engineer.

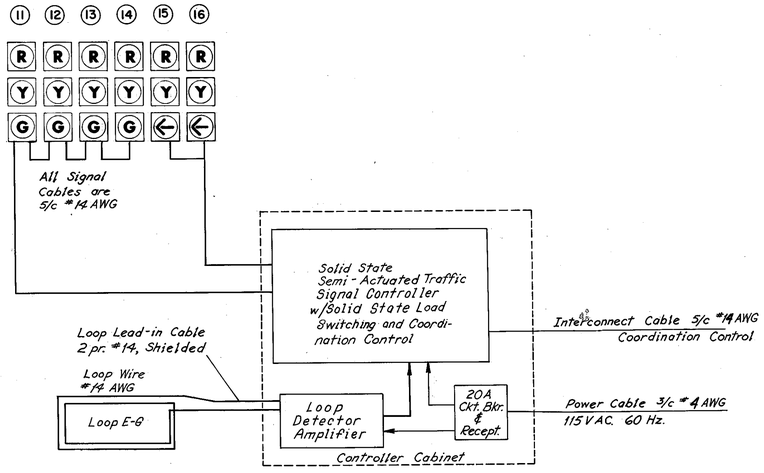


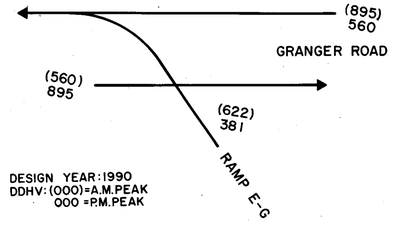
Note:
Existing Underground Utilities are not shown. See Utilities Plans. The Contractor is responsible for determining the type and location of underground utilities as may be necessary to avoid damage there to.

* 8'6" - Signs shown for reference location only. Payment in Signing Quantities.

GRANGER RD. – RAMP E-G
TRAFFIC SIGNAL SYSTEM LAYOUT
Scale 1" = 20'

TRAFFIC SIGNAL CONTROL & WIRING DIAGRAM





DESIGN YEAR: 1990
DDHV: (000) = A.M. PEAK
000 = P.M. PEAK

SCALE 1" = 20'
MADE EFJ DATE 9-7-73
TRCD. MEE DATE 9-27-73
CKD. MEE DATE 9-27-73

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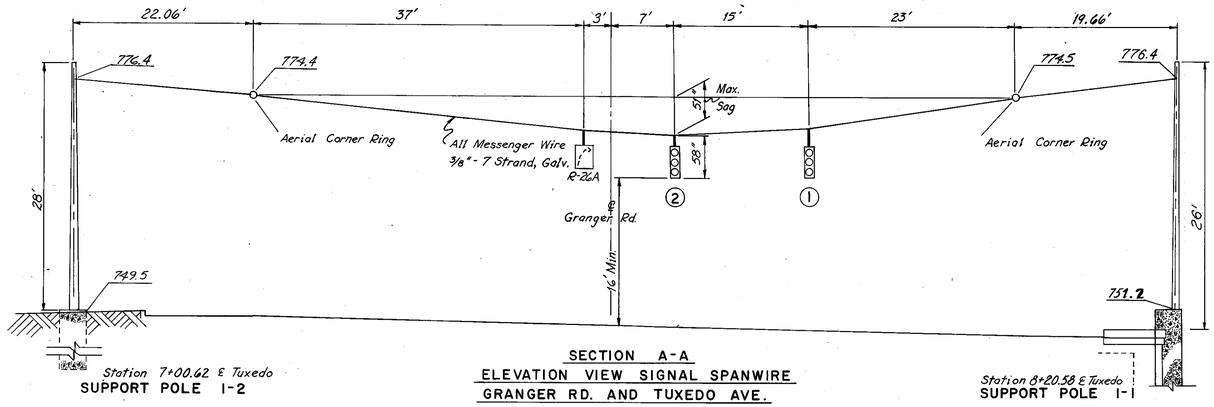
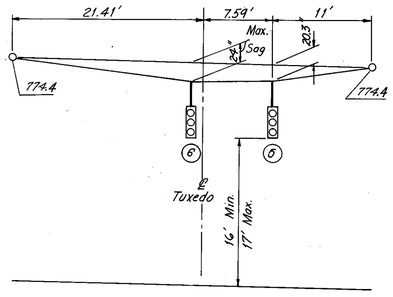
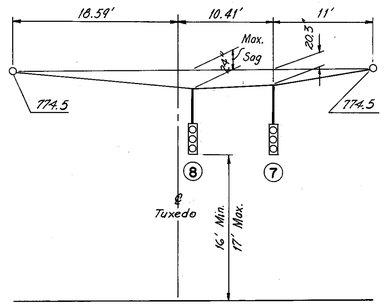


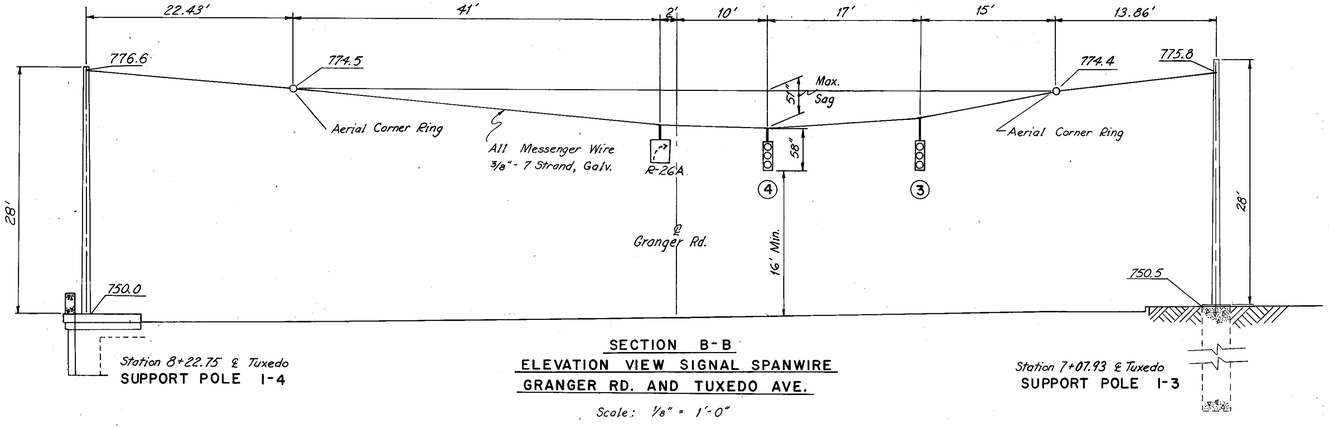
SECTION A-A
ELEVATION VIEW SIGNAL SPANWIRE
GRANGER RD. AND TUXEDO AVE.
Scale: 1/8" = 1'-0"



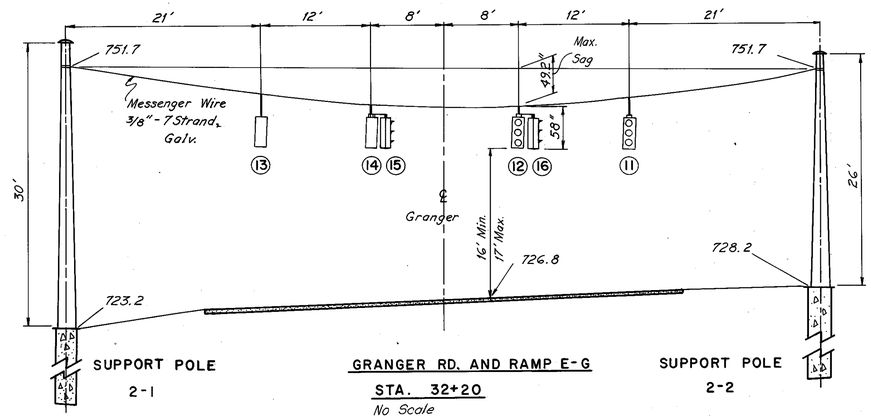
SECTION C-C
TUXEDO AVE.



SECTION D-D
TUXEDO AVE.



SECTION B-B
ELEVATION VIEW SIGNAL SPANWIRE
GRANGER RD. AND TUXEDO AVE.
Scale: 1/8" = 1'-0"



SCALE As Shown
MADE MEE DATE 3-25-73
TRCD. MEE DATE 3-25-73
CKD. E.F.U. DATE 3-27-73

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

MISCELLANEOUS SIGNAL DETAILS

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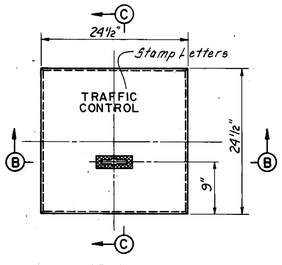
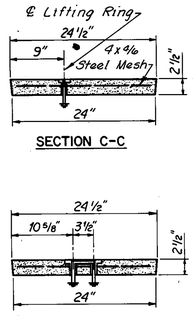


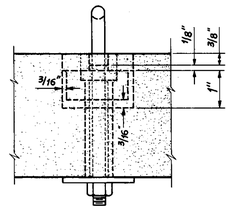
PLAN

COVER DETAIL
Scale 1"=1'-0"

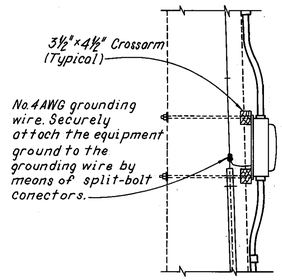


SECTION C-C

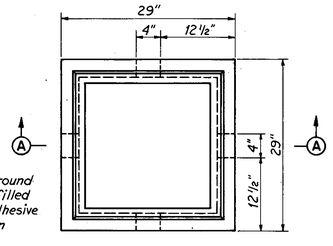
SECTION B-B



SECTION E-E

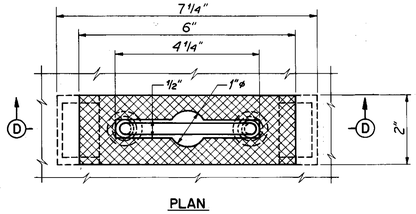


SECTION A-A

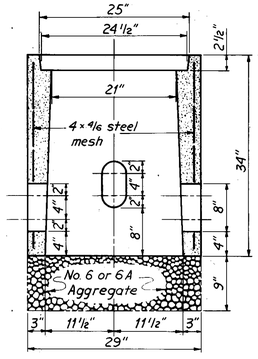


Note:
The ¼" opening around the cover shall be filled with a lubricant adhesive filler as specified in Item 705.11.

PLAN



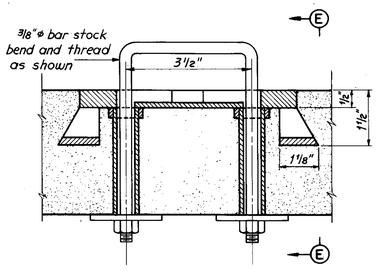
PLAN



SECTION A-A

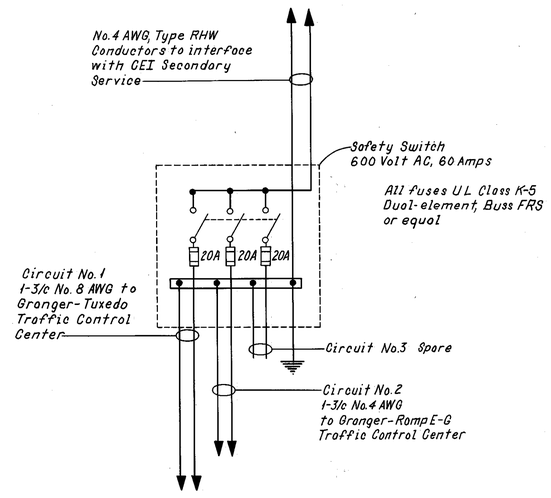
Note:
4x4⅛ steel mesh reinforcing to be used in box and cover. All reinforcing to be covered by a minimum of 1" of concrete.
All conduit entrance holes shall be oval shaped.

TRAFFIC SIGNAL PULL BOX DETAIL
Scale 1"=1'-0"

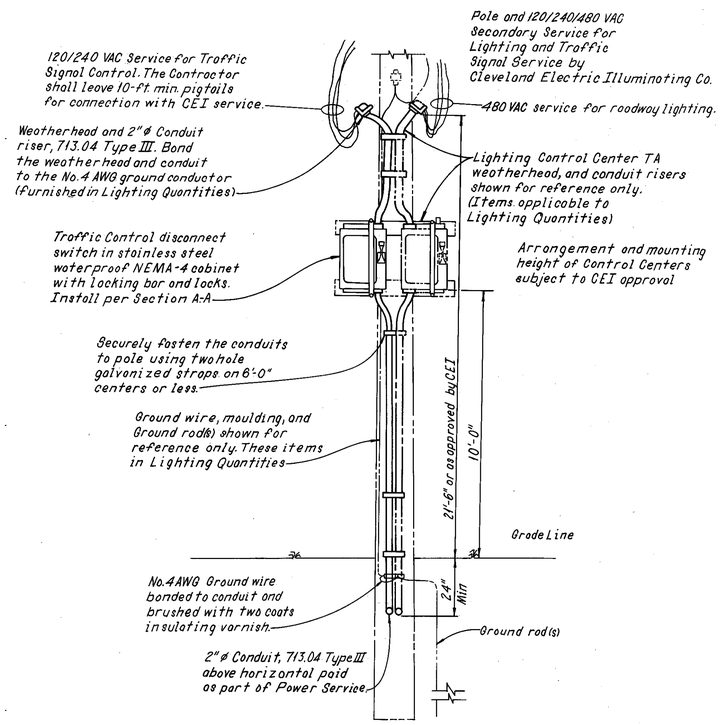


SECTION D-D

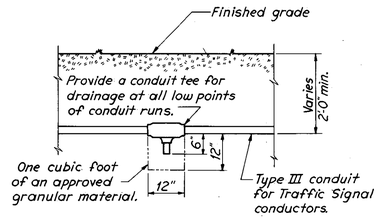
PULL BOX COVER
LIFTING RING DETAIL
Scale: 1/2"=1'-0"



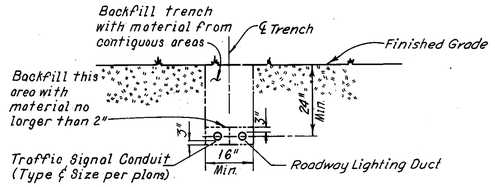
WIRING DIAGRAM
TRAFFIC CONTROL POWER SERVICE CENTER



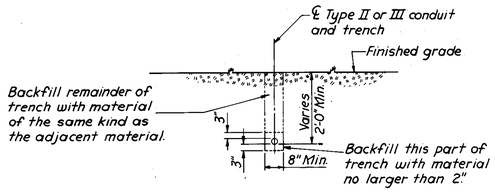
COMBINATION SERVICE
TRAFFIC SIGNAL POWER SERVICE
120/240 VAC WITH 480 VAC ROADWAY LIGHTING SERVICE
Scale: 3/8"=1'-0"



CONDUIT DRAIN
FOR TRAFFIC SIGNAL CONDUIT
No scale



COMBINATION TRAFFIC SIGNAL
AND ROADWAY LIGHTING TRENCH
(Use common trench where feasible to minimize duct runs.)
Scale: 1/2"=1'-0"



LOOP LEAD-IN CABLE CONDUIT TRENCH
Scale: 3/8"=1'-0"

SCALE	As Shown
MADE	E.F.J. DATE 4-20-73
TRCD.	F.G. DATE 4-25-73
CKD.	E.F.J. DATE 9-25-73

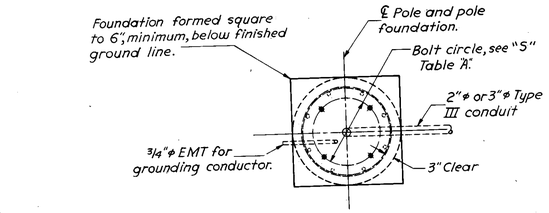
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

FHWA REGION	STATE	PROJECT	
5	OHIO		

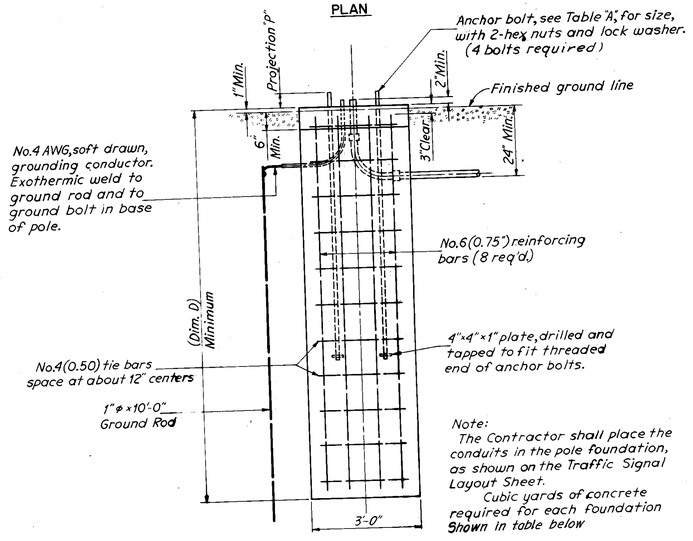
311
392

CUYAHOGA COUNTY

CUY - 480 - 15.81



PLAN



Note:
The Contractor shall place the conduits in the pole foundation, as shown on the Traffic Signal Layout Sheet.
Cubic yards of concrete required for each foundation shown in table below

ELEVATION

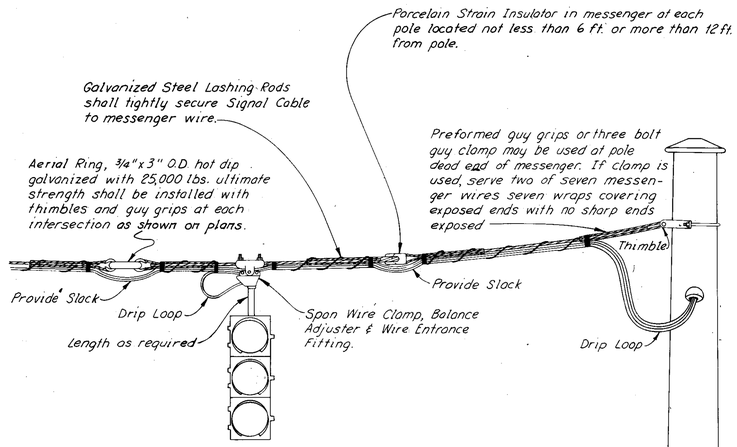
POLE FOUNDATION

No Scale

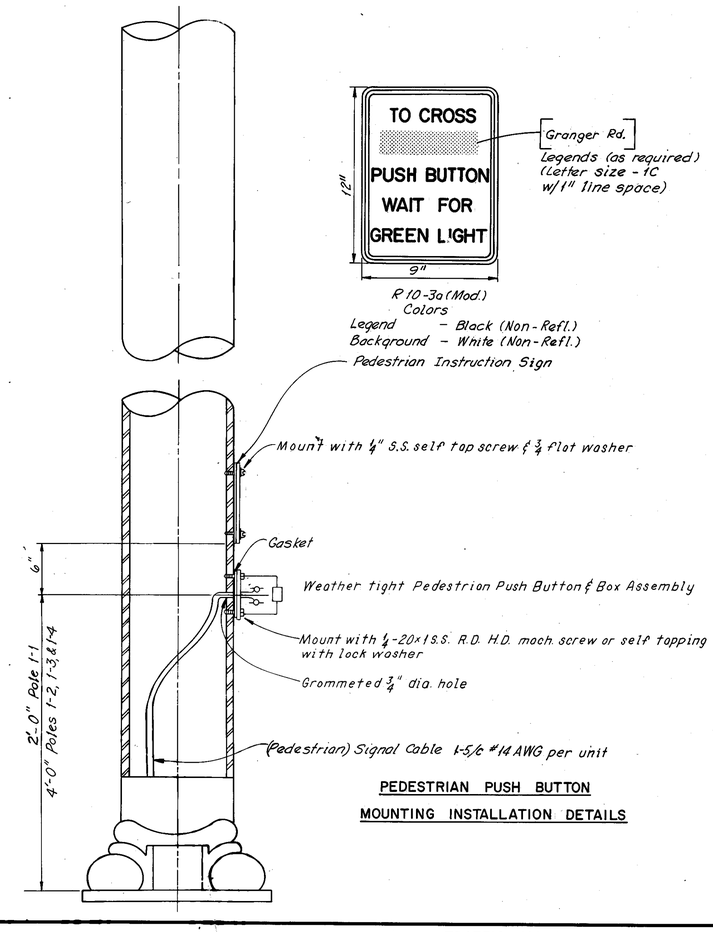
SUPP. NO.	STATION LOCATION	SPAN WIRE	LEFT HAND STRAIN POLE			RIGHT HAND STRAIN POLE			BOLT CIRCLE	"D" MIN.	"P"	"S"	ANCHOR BOLT	CONCRETE (CU. YD.)
			DIA.	GA.	HEIGHT	DIA.	GA.	HEIGHT						
1-1	Tuxedo 8+20.58	3/8"-7 Std.				9"	3-3	26'	15"	**	7"	15 5/8"	2"x 96"	*
1-2	Tuxedo 7+00.62	331.5'	9.5"	3-3	28'				16"	18'-0"	7"	17"	1 3/4"x 90"	3.93
1-3	Tuxedo 7+07.93		9.5"	3-3	28'				16"	16'-0"	7"	17"	1 3/4"x 90"	3.93
1-4	Tuxedo 8+22.75					9.5"	3-3	28'	16"	*	7"	17"	1 3/4"x 90"	*
2-1	Granger 32+20	3/8"-7 Std.	11"	3-3	30'				20"	16'-0"	8"	20 1/2"	2"x 96"	4.19
2-2	Granger 32+20	82'				10"	3-3	26'	18"	15'-0"	7 1/2"	18 1/2"	2"x 96"	3.93

* Foundation included in Bridge Plans Sheet 349A
** Foundation included in Bridge Plans Sheet 347

For supplemental strain pole details, see Sheet 312



TYPICAL MESSENGER WIRE DETAILS



PEDESTRIAN PUSH BUTTON

MOUNTING INSTALLATION DETAILS

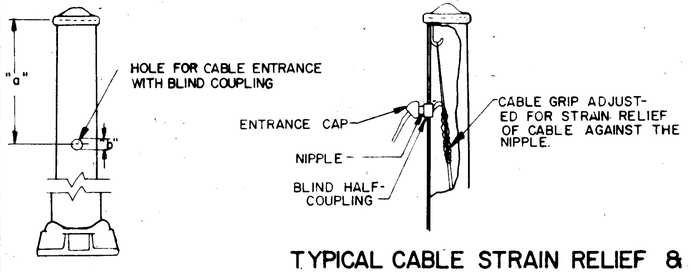
SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE M.E.E. DATE 9-25-73
TRCD. M.E.E. DATE 9-25-73
CKD. E.F.J. DATE 8-27-74
CONSULTING ENGINEERS
KANSAS CITY CLEVELAND NEW YORK

QUANTITY CALCULATIONS
MADE BY M.E.E. DATE 9-25-73
CHECKED BY E.F.J. DATE 8-27-74

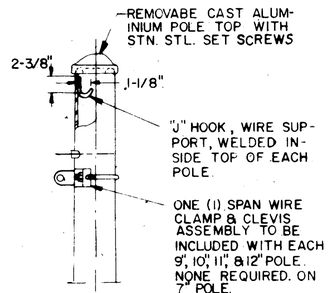
TRAFFIC SIGNAL STRAIN POLE DETAILS

FED RD DIVISION	STATE	PROJECT	
5	OHIO		

312
392



TYPICAL CABLE STRAIN RELIEF & ENTRANCE CAP DETAILS



POLE TOP DETAILS

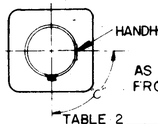
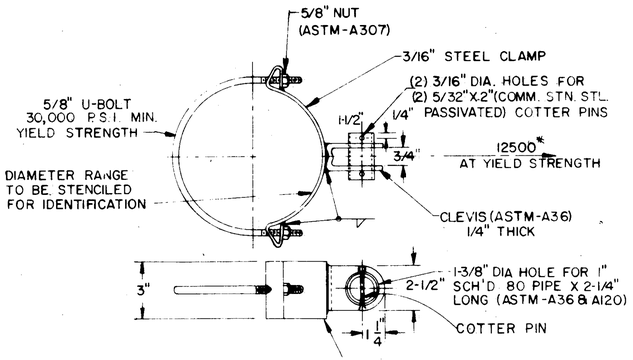


TABLE 2

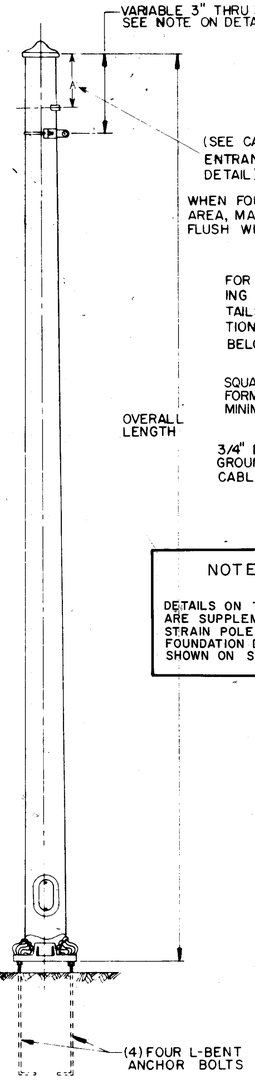
CONFIG.	"a"	"b"	"c"
A	30"	2"	90°
B	30"	2"	180°
C	30"	2"	270°
D	48"	2"	90°
E	48"	2"	180°
F	48"	2"	270°
G	NO HOLE REQUIRED		

CABLE ENTRANCE LOCATION DETAIL

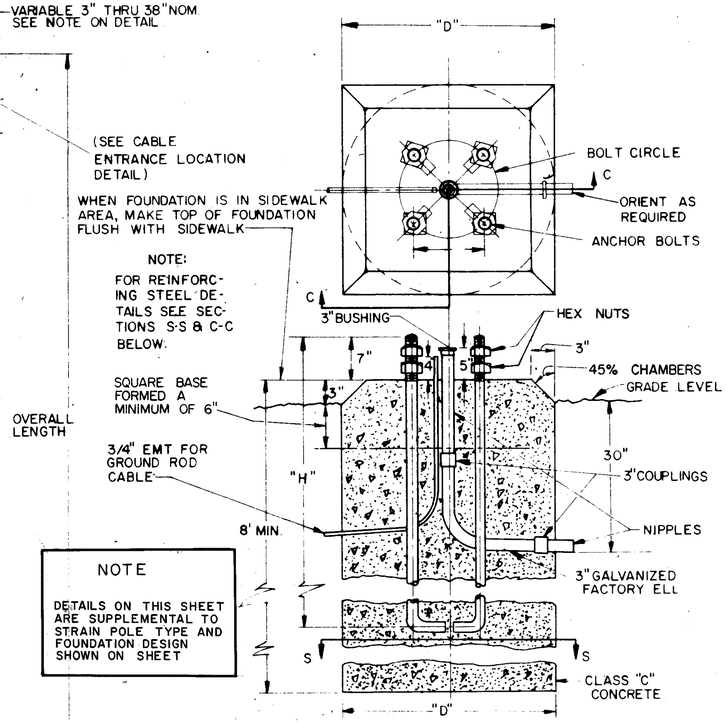


TYPE	CLAMP RANGE MIN.	MAX.
I	3.1"	3.6"
II	3.6"	4.4"
III	4.4"	5.2"
IV	5.2"	5.8"
V	5.8"	6.8"
VI	6.8"	7.9"
VII	7.9"	9.0"
VIII	9.0"	10.1"
IX	10.1"	11.3"
X	11.3"	12.1"
XI	12.1"	13.4"
XII	13.4"	14.5"
XIII	14.5"	15.5"
XIV	15.5"	16.5"

SPAN WIRE CLAMP DETAILS



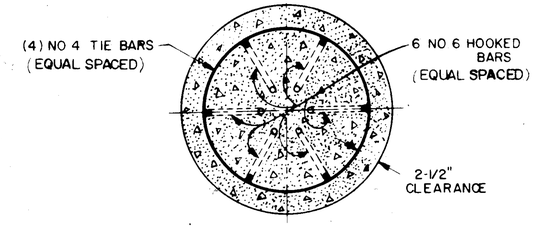
STEEL STRAIN POLE



TYPICAL STRAIN POLE FOUNDATION

NOTE

DETAILS ON THIS SHEET ARE SUPPLEMENTAL TO STRAIN POLE TYPE AND FOUNDATION DESIGN SHOWN ON SHEET



SECTION - S-S

NOTES:

MATERIAL SPECIFICATIONS

1. TAPERED TUBES (S.A.E.-1020 STEEL PROCESSED TO MINIMUM YIELD STRESS OF 55,000 P.S.I.
2. CAST ANCHOR BASE & HANDHOLE FRAME - ASTM-A27-GRADE 65-35.
3. HANDHOLE COVER PLATE - 11GA. STEEL SAE-1015
4. CAST ALUMINUM POLE TOP - ALUMINUM ALLOY 43
5. SPAN WIRE CLAMP - LOW ALLOY, HIGH STRENGTH STEEL ASTM-A242 - OR 375, LOAD PRODUCING DISTORTION 12,500 LBS. DIRECT TENSION
6. ALL BOLTS & NUTS LESS THAN 5/8" DIA. PASSIVATED STAINLESS STEEL AISI-300 SERIES - COMMERCIAL GRADE.
7. ALL OTHER NUTS & BOLTS 5/8" DIA. & OVER - ASTM-A307 AND GALVANIZED IN ACCORDANCE WITH ASTM-A153
8. ANCHOR BASE & U-BOLTS - HIGH STRENGTH STEEL - MINIMUM YIELD STRESS 55,000 LBS. SQ. IN. - MIN. ULTIMATE 90,000 P.S.I.
9. WELDING ROD - ASTM-A233 - CLASS E60XX OR 70XX.
10. GALVANIZING - WHEN SPECIFIED ASTM-A123.

TRAFFIC SIGNAL POLE FOUNDATIONS

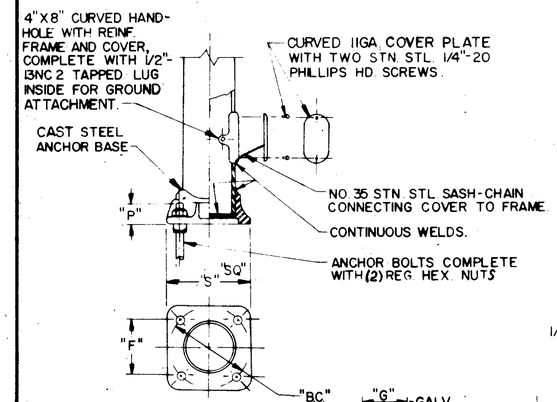
THE CONTRACTOR SHALL STAKE THE LONGITUDINAL AND LATERAL LOCATION, AND THE ELEVATION OF THE TOP OF EACH FOUNDATION SUBJECT TO THE APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER ELEVATION, OFFSET, AND LEVEL OF EACH FOUNDATION. THE FOUNDATION LOCATIONS MAY BE CHANGED AS DIRECTED BY THE ENGINEER, IN CASE OF SLOPE OR SUBSURFACE DIFFICULTIES.
EXCAVATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 503. EXCAVATION SHALL BE TO THE DIMENSIONS SHOWN ON THE PLANS, AND SHALL BE PERFORMED BY MEANS OF AN EARTH AUGER OF THE SPECIFIED DIA. UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
WHERE SUBSURFACE OBSTRUCTIONS ARE ENCOUNTERED, THE ENGINEER MAY REQUIRE THE CONTRACTOR TO REMOVE THE OBSTRUCTION OR TO REPLACE THE EXCAVATED MATERIAL AND RELOCATE THE FOUNDATION.
IF CAVING OF THE EXCAVATION OCCURS, THE CONTRACTOR SHALL EXCAVATE THE SPECIFIED DEPTH MAINTAINING THE THE SIDES AS NEARLY VERTICAL AS POSSIBLE. NO PAYMENT SHALL BE MADE FOR ANY EXCAVTION, CONCRETE, OR REINFORCING STEEL USED IN EXCESS OF THE PLAN QUANTITIES.
CONCRETE, CLASS C, SHALL BE PLACED IN ACCORDANCE WITH THE REQUIREMENTS OF ITEM 511, AND SHALL BE PLACED AGAINST UNDISTURBED SOIL OR COMPACTED EMBANKMENT. STEEL REINFORCEMENT BARS, WHERE REQUIRED, SHALL BE POSITIONED AS SHOWN ON THE PLANS AND PLACED IN ACCORDANCE WITH ITEM 509.
CYLINDRICAL ANCHOR BASE TYPE FOUNDATIONS FOR TRAFFIC SIGNAL POLES SHALL HAVE ANCHOR BOLTS AND CONDUIT ACCURATELY HELD IN POSITION WITH A TEMPLET WHILE CONCRETE IS PLACED. FORMS SHALL BE USED FOR THE UPPER PORTIONS OF ALL FOUNDATIONS AND NO BACKFILLING SHALL BE PERMITTED FROM THE BOTTOM TO SIX INCHES BELOW THE GRADE LEVEL. NO GROUTING OF CONCRETE SHALL BE PERMITTED BETWEEN THE FOUNDATION TOP AND THE POLE BASE.

TRAFFIC SIGNAL POLE

WHERE A WIRE ENTRANCE IS REQUIRED, THE SERVICE ENTRANCE HEAD SHALL BE LOCATED APPROXIMATELY 12" BELOW SPAN WIRE CLAMP.

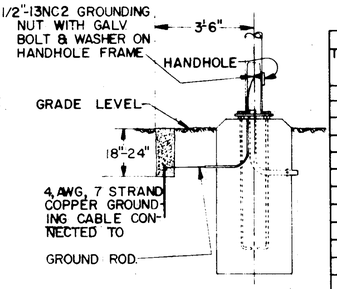
GROUND ROD

GROUND ROD SHALL BE IN ACCORDANCE WITH TYPICAL GROUND ROD DETAIL AND TESTED IN ACCORDANCE WITH 625.22 "CONSTRUCTION AND MATERIAL SPECIFICATIONS."



ANCHOR BASE DATA					ANCHOR BOLT DATA SIZE	"L"	"T"	"G"
POLE DIA.	"BC"	"F"	"S"	"P"				
7"	10"	7 1/16	10 1/2"	2 1/4"	1/4" X 48"	42"	8"	10"
9"	12-1/2"	8-7/8"	12-3/4"	3"	1/2" X 60"	54"	9"	11"
10"	13-1/2"	9-9/16"	14-1/8"	3-3/8"	1-1/2" X 60"	54"	9"	11"
11"	15"	10-5/8"	15-5/8"	3-5/8"	1-3/4" X 90"	84"	9"	11"
12"	16"	11-5/16"	17"	4"	1-3/4" X 90"	84"	9"	11"

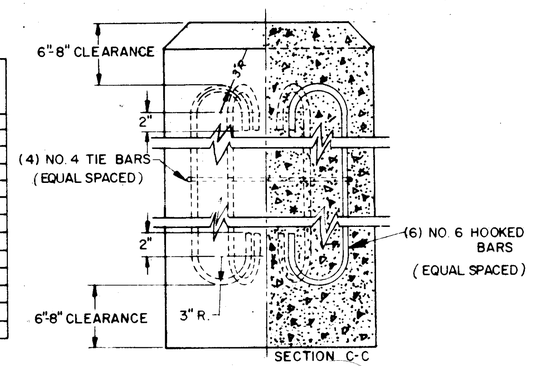
TYPICAL HANDHOLE, ANCHOR BASE & ANCHOR BOLT DETAILS



TYPICAL GROUND ROD DETAIL

TYPE	BASE DIA.	TOP DIA.	OVERALL LENGTH	WALL THICKNESS	DESIGN DATA FOR TRANSVERSE LOAD AT 18" DOWN FROM TOP ELAST. DEFL. RATE	YIELD STRENGTH	"H"	"D"
1	7.0"	4.20	20.0'	(3 GA.) .250"	.59"/100#	2135#	42"	24"
2	9.0"	5.36"	26.0'		.64"/100#	2730#	54"	24"
3	10.0"	6.36"			.44"/100#	3400#	54"	24"
4	11.0"	7.36"			.32"/100#	4140#	84"	30"
5	12.0"	8.36"			.24"/100#	4960#	84"	36"
6	9.0"	5.08"	28.0'		.84"/100#	2520#	54"	24"
7	10.0"	6.08"			.54"/100#	3140#	54"	24"
8	11.0"	7.08"			.41"/100#	3850#	84"	30"
9	12.0"	8.08"			.31"/100#	4590#	84"	36"
10	9.0"	4.80"	30.0'		.110"/100#	2350#	54"	24"
11	10.0	5.80"			.74"/100#	2920#	54"	24"
12	11.0"	6.80"			.53"/100#	3560#	84"	30"
13	12.0"	7.80"			.39"/100#	4260#	84"	36"

STRAIN POLE TYPES



SECTION C-C

TYPICAL REINFORCING STEEL SECTIONS

BUREAU OF TRAFFIC

OHIO DEPARTMENT OF HIGHWAYS

STEEL STRAIN POLE & FOUNDATION DETAILS

APPROVED _____

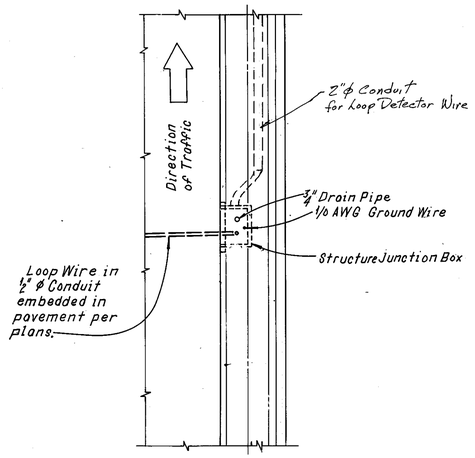
ENGINEER OF TRAFFIC

MISCELLANEOUS SIGNAL DETAILS

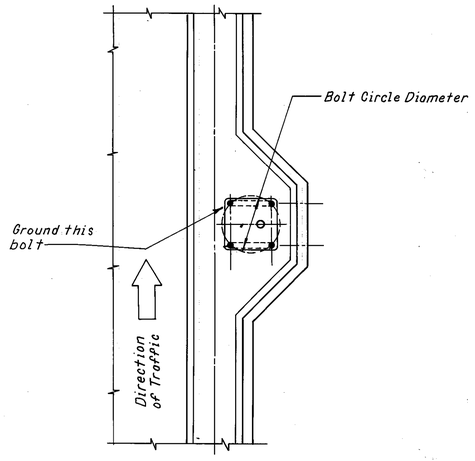
FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

313/392

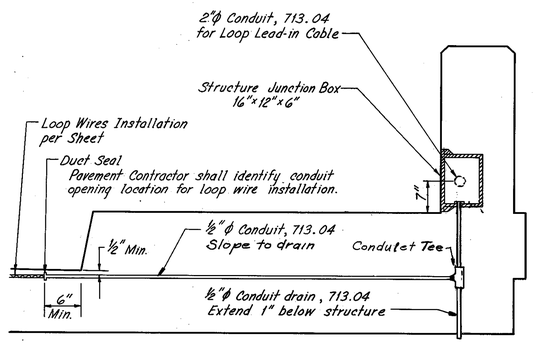
CUYAHOGA COUNTY
CUY. 480-15.81



STRUCTURE JUNCTION BOX
STA. 8+75 ℄ TUXEDO AVE.
Scale: ¾"=1'0"

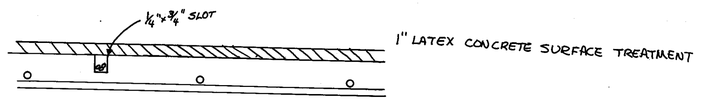


STRUCTURE SUPPORT
TRAFFIC SIGNAL STRAIN POLE



STRUCTURE JUNCTION BOX
LOOP WIRE LEAD-IN CONDUIT
INSTALLATION
Station 8+75 ℄ Tuxedo Avenue

Scale: 1"=1'-0"



¼" x ¾" SLOT MUST BE SAWED AND SEALED PRIOR TO PLACING LATEX CONCRETE SURFACE TREATMENT

SCALE
MADE FG DATE 9-28-73
TRCD. DATE
CKD. EFJ DATE 8-24-74

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

FED RD DIVISION	STATE	PROJECT	
5	OHIO		

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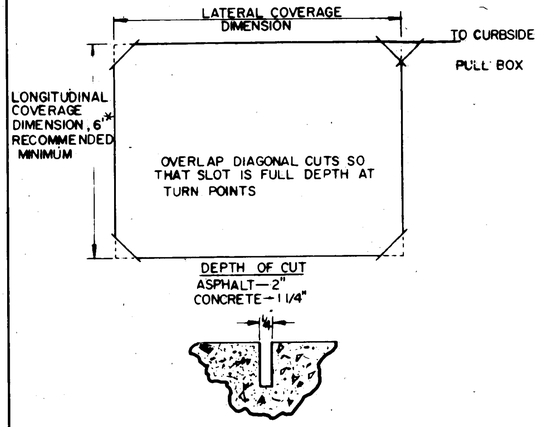

SOLID LINES SHOW SAW CUTS USED TO ACCOMODATE ROADWAY WIRE LOOP. DOTTED LINES SHOW UNUSED SAW CUTS.

FIGURE 1
TYPICAL LOOP SLOT CONSTRUCTION

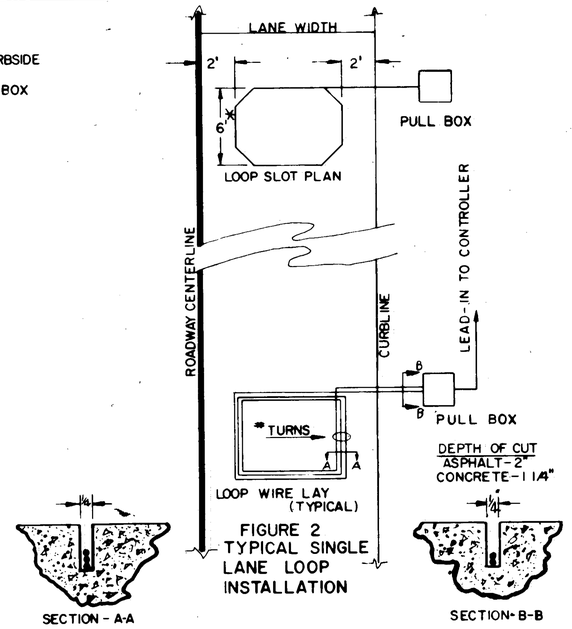

FIGURE 2
TYPICAL SINGLE LANE LOOP INSTALLATION

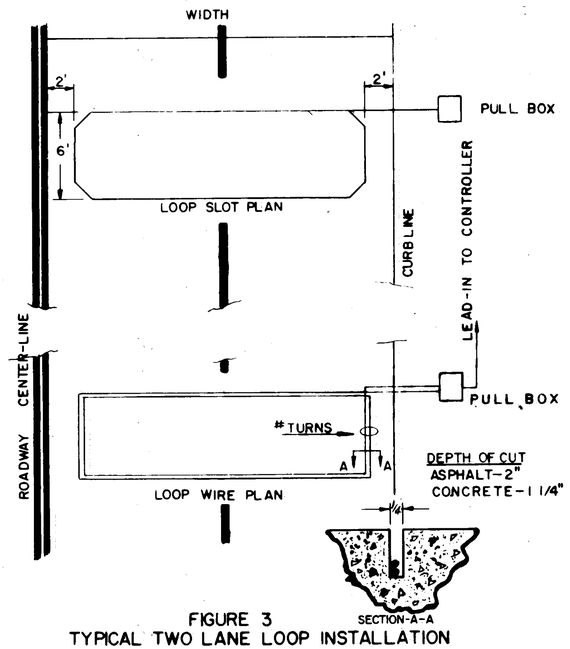

FIGURE 3
TYPICAL TWO LANE LOOP INSTALLATION

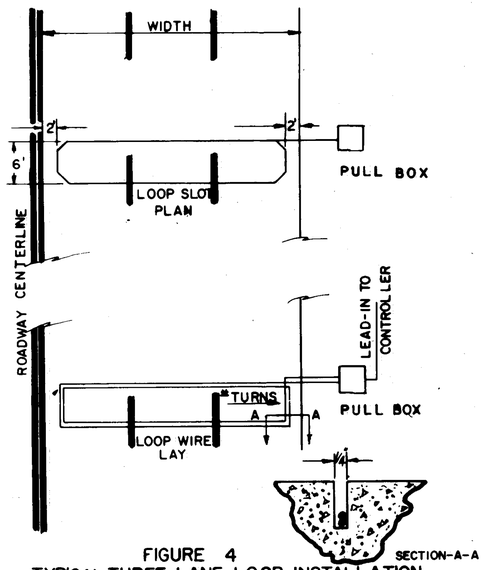

FIGURE 4
TYPICAL THREE LANE LOOP INSTALLATION

TABLE-1 ROADWAY LOOP CONSTRUCTION

LOOP PERIMETER	NO. OF TURNS
UP TO 40 FEET	3
40 TO 160 FEET	2
160 AND UP	1

MAINTAIN 6' MINIMUM DIMENSION IN DIRECTION OF TRAVEL.

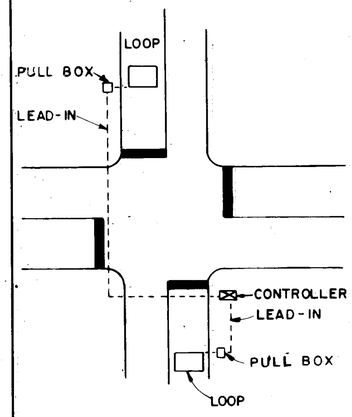

FIGURE 5
TYPICAL LEAD-IN DETAIL

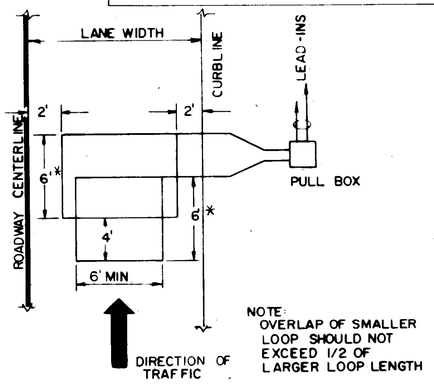

FIGURE 6
TYPICAL DIRECTIONAL DETECTION LOOP INSTALLATION (OVERLAPPED)

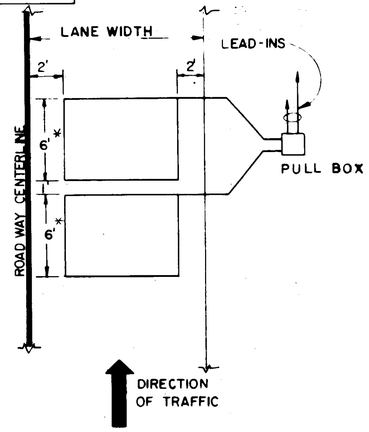

FIGURE 7
TYPICAL DIRECTIONAL DETECTION LOOP INSTALLATION (ADJACENT)

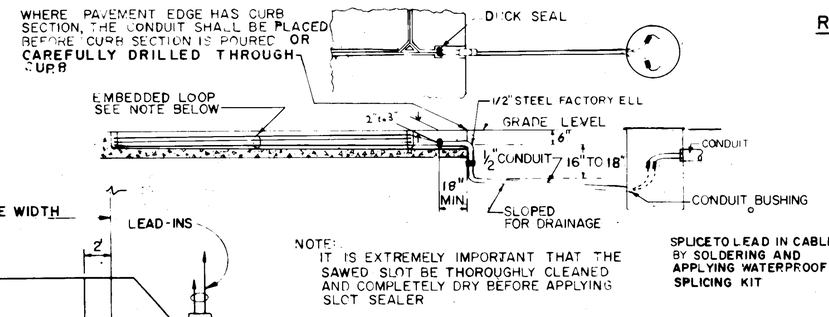

FIGURE 8
INTERFACE BETWEEN EMBEDDED LOOP AND ROAD SIDE PULL BOX

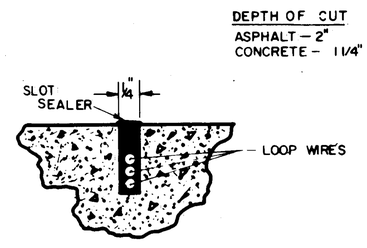

FIGURE 9
TYPICAL SLOT SEALING DETAIL

ROADWAY LOOP INSTALLATION

THE ROADWAY WIRE LOOP IS POSITIONED IN THE PAVEMENT IN A SAWED SLOT THAT OUTLINES THE REQUIRED DETECTION AREA. THE SLOT **SHALL** BE 1/4" WIDE AND FROM 1 1/4" **OR** 2" DEEP. RIGHT ANGLE TURNS **SHALL** BE CHAMFERED TO PREVENT SHARP BENDS OF WIRE (SEE FIG. 1). THE SLOT MUST BE BRUSHED AND BLOWN CLEAN OF ALL LOOSE MATERIAL. THE LOOP WIRE MUST BE CAREFULLY PUSHED INTO THE SLOT WITH A BLUNT STICK TO AVOID DAMAGING ITS INSULATION. RESISTANCE OF THE WIRE LOOP TO GROUND SHOULD BE CHECKED AFTER THE WIRE IS PLACED IN THE SLOT, BOTH BEFORE AND AFTER THE SLOT IS SEALED. THIS IS ESPECIALLY IMPORTANT IF THE ROADWAY WIRE LOOP IS SPLICED TO LEAD-IN CABLE AT CURBSIDE JUNCTION BOX. A RESISTANCE OF LESS THAN 10 MEGOHMS INDICATES A FAULTY SPLICE OR WIRE INSTALLATION WHICH MUST BE CORRECTED BEFORE THE ROADWAY LOOP IS SEALED IN PLACE.

INSTALLATIONS IN NEW ASPHALT PAVEMENT SHALL BE MADE IN THE SUBBASE PRIOR TO PLACING THE TOP COURSE.

SEALING

A FLEXIBLE EMBEDDING SEALANT NO. 491-H.P. MANUFACTURED BY EUCLID CHEMICAL CO. OF CLEVELAND, OHIO OR E-707 MANUFACTURED BY THE BONDO CORP OF NORTHFORD, CONNECTICUT OR EQUIVALENT. SHALL BE MIXED ACCORDING TO DIRECTIONS, POURED INTO THE SAW SLOTS AND LEFT UNDISTURBED UNTIL CURED INTO A SOLID MASS.

* DIMENSIONS
IN CASES WHERE THE LATERAL DIMENSION WOULD BE LESS THAN EIGHT (8) FEET, THE LONGITUDINAL DIMENSION SHALL BE INCREASED TO OBTAIN A MINIMUM AREA OF 48 S.F.

BUREAU OF TRAFFIC
OHIO DEPARTMENT OF HIGHWAYS

EMBEDDED VEHICLE DETECTOR LOOP DETAILS

Rev 11-3-67
Rev 6-1-71
Rev 2-3-72

APPROVED _____
ENGINEER OF TRAFFIC

FED. RD. DIVISION	STATE	PROJECT	
5	OHIO		

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CUYAHOGA COUNTY
CUY.- 480- 15.81

TRAFFIC SIGNAL SUB SUMMARY

STATION	STATION	SIDE	202		625	625	625		625	625	625	625	625	625	625	625	625	625	625	625	625	625	625	816	816	816	816	816	816	625
			Removal of Existing Installation		Covering of Traffic Signal Heads	Traffic Signal Heads 3 Section, 12" Lens Oneway	Traffic Signal Heads 3 Section, 12" Lens Twoway, w/Arrow		Pedestrian Pushbutton with Sign	Signal Controller 2-Ø, Semi-Actuated, Solid State w/Cabinet	Loop Detector Amplifier	Signal Cable, 7-3/c No. 14 AWG, 600V IMSA 19-1-67	Signal Cable, 1-5/c No. 14 AWG, 600V. IMSA 19-1-67	Interconnect Cable, 1-5/c No. 12 AWG, 600V. IMSA 19-1-67	Power Cable, 1-3/c No. 4 AWG, Standard, RHW or RHW Type	Power Cable, 1-3/c No. 8 AWG, Standard, RHW or RHW Type	Loop Detector Wire 1/c No. 14 AWG, RHW or RHW Type	Loop Detector Lead-in Cable 2/c No. 14 AWG, Twisted Pair Shielded	Loop Detector Pavement Cutting	Cable Support Assembly	Pull Box, Concrete, 24" As Per Plan	Structure Junction Box, Cast Iron, 16" X 12" X 6"	Trench	Conduit 3", 713.09	Conduit 2", 713.04	Ground Rod	Power Service	Signal Strain Pole 2 Ply 3Ga., 9.0"x5.36"x 26'	Signal Strain Pole 2 Ply 3Ga., 9.5"x5.58"x 28'	Signal Strain Pole 2 Ply 3Ga., 10.0"x6.36"x26'	Signal Strian Pole 2 Ply 3Ga., 11.0"x6.8"x30'	Messenger Wire 7-Stranded (3/8") with Accessories	Concrete for Signal Strain Pole Foundation	Fire Pre-emptor
			LUMP		Each	Each	Each		Each	Each	Each	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Each	Lin.Ft.	Each	Each	Each	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Each	Each	Each	Each	Each	Lin.Ft.	Cu.Yd.	EACH
GRANGER RD. & TUXEDO AVE.																																	
18+19 E Granger			1		8	8			4	1	2	400	730								1											350		1
18+19 E Granger	6+98 E Tuxedo	Rt&Lt.												40		50					1		125	130	5	2			2			3.93	
6+98 E Tuxedo	6+52 E Tuxedo	Rt.													40			125	80	30	1		55	80	55		1						
6+98 E Tuxedo	19+50 E Granger	Rt&Lt.												250	250			175	320	40	3	2	370	90	70			1	1			3.93	
TOTAL	SHEET 307		1		8	8			4	1	2	400	730	290	290	50	300	400	70	1	5	2	550	300	130	2	1	1	3			350	7.86	1
GRANGER RD. & RAMP E-G																																	
19+50 E Granger	32+15 E Granger	Rt.												1300	1300						1	6	1265		1270	1							
32+15 E Granger	79+15 E Ramp E-G	Rt&Lt.			4	2	2			1	1		230	10	10		150	75	60		1		60		50	1				1	1	85	8.12	
TOTAL	SHEET 308				4	2	2			1	1		230	1310	1310		150	75	60	1	7		1325		1320	2				1	1	85	8.12	
GRAND	TOTAL		1		12	10	2		4	2	3	400	960	1600	1600	50	450	475	130	2	12	2	1875	300	1450	4	1	1	3	1	1	435	15.98	1

SCALE _____ HOWARD, NEEDLES, TAMMEN & BERGENDOFF
MADE MEE DATE 8-31-73 CONSULTING ENGINEERS
TRCD MEE DATE 9-20-73 KANSAS CITY CLEVELAND NEW YORK
CKD. E.F.J. DATE 8-28-74

QUANTITY CALCULATIONS
MADE BY MEE DATE 8-31-73
CHECKED BY E F J DATE 8-28-74

GENERAL SUMMARY — TRAFFIC SIGNAL QUANTITIES

FED. RD DIVISION	STATE	PROJECT	
5	OHIO		

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CUYAHOGA COUNTY
CUY.-480-15.81

SHEET NUMBER				TOTAL QUANT.	UNIT	ITEM	DESCRIPTION
307	315	307	308				
							TRAFFIC SIGNALS
							TYPE CODE 7223
	1			1	Each	202	Removal of Existing Installation
	12			12	Each	625	Covering of Traffic Signal Heads
	10			10	Each	625	Traffic Signal Heads, 3 Section, 12" Lens, Oneway
	2			2	Each	625	Traffic Signal Heads, 3 Section, 12" Lens, Twoway, w/Arrow
	1			1	Each	625	Fire Pre-emptor
	4			4	Each	625	Pedestrian Pushbutton with Sign
	2			2	Each	625	Signal Controller 2-0, Semi-Actuated, Solid State w/Cabinet
	3			3	Each	625	Loop Detector Amplifier
1200	400			1600	Lin. Ft.	625	Signal Cable, 1-3/c, No. 14AWG, 600V. IMSA 19-1-67
	960			960	Lin. Ft.	625	Signal Cable, 1-5/c, No. 14 AWG, 600V. IMSA 19-1-67
	1600			1600	Lin. Ft.	625	Interconnect Cable, 1-7/c, No. 12 AWG, 600V. IMSA 19-1-67
	1600			1600	Lin. Ft.	625	Power Cable, 1-3/c, No. 4 AWG, Standard, RHW or RHW Type
	50			50	Lin. Ft.	625	Power Cable, 1-3/c, No. 8 AWG, Standard, RHW or RHW Type
	450			450	Lin. Ft.	625	Loop Detector Wire, 1/c No. 14 AWG, Stranded, RHW Type
	475			475	Lin. Ft.	625	Loop Detector Lead-in Cable, Twisted Pair 2/c No. 14 AWG, Shielded
	2			2	Each	625	Cable Support Assembly
	130			130	Lin. Ft.	625	Loop Detector Pavement Cutting
	4			4	Each	625	Ground Rod
5	12			17	Each	625	Pull Box, Concrete, 24" x 24", As Per Plan
2	2			4	Each	625	Structure Junction Box, Cast Iron, 16" x 12" x 6"
	1875			1875	Lin. Ft.	625	Trench
800	300			1100	Lin. Ft.	625	Conduit 3", 713.09
1000	1450			2450	Lin. Ft.	625	Conduit 2", 713.04
	1			1	Each	625	Power Service
	1			1	Each	816	Signal Strain Pole, 2 Ply 3 Ga., 9.0"x5.36"x26'
	1			1	Each	816	Signal Strain Pole, 2 Ply 3 Ga., 10.0"x6.36"x26'
	3			3	Each	816	Signal Strain Pole, 2 Ply 3 Ga., 9.5"x5.58"x28'
	1			1	Each	816	Signal Strain Pole, 2 Ply 3 Ga., 11.0" x 6.8" x 30'
	435			435	Lin. Ft.	816	Messenger Wire 7-Stranded (3/8") with Accessories
	16.0			16.0	Cu. Yd.	816	Concrete for Signal Strain Pole Foundation

SCALE _____
MADE MEE DATE 9-27-73
TRCD MEE DATE 9-20-73
CKD. E.F.J. DATE 8-28-74

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

QUANTITY CALCULATIONS
MADE BY MEE DATE 9-27-73
CHECKED BY EFJ DATE 8-28-74

FED.RD. DIVISION	STATE	PROJECT	
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CUYAHOGA COUNTY
CUY-80-15.81

1. DESIGN SPECIFICATIONS

These structures conform to "Standard Specifications for Highway Bridges" adopted by the American Association of State Highway Officials, 1969, including the 1970 Interim Specifications and the Ohio "Supplement" to these specifications. The design loading is HS 20-44 and the Interstate Alternate Loading.

The class of concrete and the grades of structural steel and reinforcing steel, together with the working stresses for each are as follows:

Concrete, Class C - Superstructure - basic unit stress 1,200 p.s.i.
Concrete, Class C - Abutments, Piers, Footings and the Arch Culvert - basic unit stress 1,333 p.s.i.
Structural Steel - ASTM A36 - basic unit stress 20,000 p.s.i.
Reinforcing Steel - ASTM A615, A616 or A617 - unit stress of 20,000 p.s.i. Spiral reinforcement may be plain bars ASTM A82, A306, A499 or A615.

2. SUPPLEMENTAL SPECIFICATIONS

Reference shall be made to Supplemental Specifications No. 808, Chemical Admixture for Concrete, Type A, B or D, dated 1-1-71, and to No. 836, Concrete Curing and Protective Membrane, dated 1-1-71.

3. REFERENCE DRAWINGS

Reference shall be made to Standard Drawings RB-1-55 revised 2-2-59; SD-1-69 dated 6-12-69 (Sheets 1, 2, 3 and 4 of 4); and to AS-1-72, dated 6-30-72.

4. DIMENSIONS

Dimensions given are measured horizontally and at 60° F. unless otherwise noted.

5. UTILITIES

Any existing privately owned utility facilities encountered at the site of the work which will interfere with portions of the finished roadways or structures shall be removed or relocated by the Owner unless otherwise noted on the plans. All expenses incurred in so doing shall be be borne by the Owner. The Contractor and Owners are requested to cooperate by arranging their work in such a manner that inconvenience to either would be held to a minimum.

6. SPREAD TYPE FOOTINGS

All spread footings at the piers are designed for a maximum bearing pressure of 6 tons per square foot.

The spread footings at the Arch Culvert are designed for a maximum bearing pressure of 10 tons per square foot.

7. STEEL BEARING PILES

Piles shall be driven to refusal on bedrock or to 20 blows per inch for the last few inches of penetration. The design load is 35 tons per pile for the HP10x42 piles, 45 tons per pile for the HP12x53 abutment piles and 40 tons per pile for the HP12x53 pier piles.

8. CHARPY TESTS

Where a shape or plate is labeled "CVN", the material shall have a minimum longitudinal Charpy V-notch energy absorption value (CVN) of 15 ft. lb. at 40°F. Sampling and testing procedures shall be in accordance with ASTM A673. The (H) frequency of heat testing shall be used, and the test data shall be recorded on the Test Reports required by 501.07 of the Constr. & Mat. Specs. The Fabricator shall submit to the Director a procedure designed for positive identification of material through all phases of fabrication. No material shall be fabricated until the Director has approved the procedure.

9. BEARING ANCHORS

At the option of the Contractor, bearing anchors (or formed holes), located and supported by templates, may be cast in place.

10. STEEL ERECTION

During the erection of end dams and crossframes care shall be taken to insure that stringers, bearing parts and bridge seats remain in bearing contact.

11. BACKWALL CONCRETE

In addition to the provisions of 511.08, backwall concrete shall not be placed until after the deck concrete in the span adjacent to the backwall has been placed.

12. DRILLED SHAFTS

(a) General

Drilled shafts for Bridge No. CUY-80-1594 shall be 36 inches minimum diameter or, if the excavations are made by hand, the shafts may be square with side dimensions of not less than 36 inches, nor more than 42 inches.

(b) Excavation

The shafts shall be drilled by mechanical methods, using equipment of adequate power and stability to insure good progress and uniform holes, with the drilling supplemented by manual excavation as necessary to complete the excavation to the required elevation, or the entire excavation may be made manually.

Casings will be required for shaft excavations where such provision is necessary to prevent caving of the material, or when necessary to shut off seepage water. Casings shall be of metal and of ample strength to withstand handling stresses, the pressure of concrete and of the surrounding earth or backfill materials and any surcharge loads, and shall be watertight. The inside diameter of casings shall be not less than 36 inches; otherwise, the size of the casing and the size of drilled excavation in which the casing is to be placed will be left to the discretion of the Contractor with approval of the Engineer. No extra compensation will be allowed for the concrete required to fill an oversize casing or oversize excavation. The plans designate a penetration depth for shafts into the design foundation material. The portion of the shaft within the foundation material shall not be cased, except to such depth as is necessary to effect a seal against water entering the excavation. The shaft shall be drilled or hand excavated into the foundation material to a depth below the bottom of casing, as set, equal to the specified penetration. Where casings are used, they shall be left in place.

Any excavation for the shafts beyond the lines required by the plan dimensions, where casings are not required, shall be backfilled with Class "C" concrete at the Contractor's expense. Where casings are used, the Contractor will be permitted to backfill outside the casings with granular material or other materials acceptable to the Engineer.

(c) Tolerances

The center of each drilled shaft at its top shall not vary from the design position of the shaft by more than two (2) inches. The center of the shafts at any horizontal plane, other than the top, shall not be out of their design position with respect to the center of the shaft at the top by more than one-sixtieth (1/60) of the distance from the point in question to the top of shaft, or by more than one-twentieth (1/20) of the diameter of the shaft, whichever is less.

When any foundation shaft exceeds the tolerances herein specified, its deviation from such tolerances shall be compensated for as directed by the Engineer by placing additional reinforcing steel in the shaft or by other approved construction at the expense of the Contractor.

(d) Reinforcing Steel

The reinforcing steel units for the shafts shall be completely assembled by tying and placed into position as a rigid unit. Tack welding will not be permitted. Suitable precast concrete or steel spacer blocks shall be used at intervals along the side of the unit to insure accurate centering of the reinforcing steel along the length of the shaft. Except at Pier 1, reinforcing shall extend from top limits shown on the plans to a minimum of 5' below top of shale.

(e) Inspection

The condition of the bottom and the vertical and axial deviation shall be inspected and approved by the Engineer before any concrete is placed.

(f) Concrete

Concrete for the drilled shafts shall be Class "C". The concrete shall be placed immediately after all excavation and inspection are complete and reinforcing steel is placed. Concrete placing shall be as continuous as practicable. Concrete shall be placed through a suitable tremie tube to prevent segregation of concrete material and unnecessary splashing on the reinforcing steel cage. The tremie shall be made in sections to permit the discharge end to be raised as the placement progresses. The maximum free fall of concrete from the tremie shall not exceed 5 ft. The Contractor shall consolidate the concrete by means of a vibrator as it is placed. After a placement is completed, the top surface shall be cured.

If an artesian water condition is encountered during the installation of any shaft the Contractor shall be responsible for any special procedures necessary to accomplish the installation, to the satisfaction of the Director. There shall be no water in the hole when the concrete is placed, except under certain conditions when artesian water is encountered.

(g) Method of Measurement

The number of linear feet of drilled shafts to be paid for shall be the linear feet of drilled shafts in place, complete and acceptable, measured from the actual bottom of shaft to the top of shaft as shown on the plans.

(h) Basis of Payment

The number of linear feet of drilled shafts determined as above provided, shall be paid for at the contract price per linear foot for "Item Special, Drilled Shafts". Payment for drilled shafts shall include the cost of all labor, equipment and materials to construct the shafts including all drilling and excavating and furnishing and placing steel casing, concrete and reinforcing steel.

13. CONCRETE DECK

(a) The steel beams and girders shall be fabricated with camber, as specified on the plans, to compensate for the deflections due to weight of concrete and steel and for vertical curve and superelevation of the roadway. The theoretical deflections are tabulated on the plans.

(b) The final surface of the roadway shall conform to the elevations shown on the plans. To compensate for deflections due to dead load of the concrete, the screeds used to strike off the surface of the concrete to the final desired grade line shall be adjusted by amounts equal to deflections shown for this dead load. Screeds may require further adjustments due to irregularities in the fabricated steel. The theoretical top of portland cement concrete slab elevations at the gutter lines before the deflections from the concrete have occurred are tabulated on the plans.

(c) The depth of concrete over each beam or girder (top of portland cement concrete to top of flange or top of web) is given on the plans. The concrete slab shall be of uniform thickness between girders with adjustments obtained by varying the thickness of the haunches over the girders.

(d) The aforementioned depth of concrete over each girder is the nominal dimension. The quantity of deck concrete to be paid for shall be based on this dimension even though deviation from it may be necessary because the top flange may not have the exact camber or conformation required to place it parallel to the finished grade. Deduction shall be made for the volume of encased steel plates in accordance with 511.18.

(e) Omit Supl. Spec. 836 concrete curing & protective membrane on the top surface of deck; see sh. GN-2 for curing requirements.

14. REINFORCING STEEL

(a) All bars are designated on the plans by bar numbers. The bar size is indicated by the first digit of three-digit numbers and by the first two digits of four-digit numbers.

All bar dimensions are given out to out.

All bars of a series shall vary in length by a constant increment.

(b) The clear distance between reinforcing steel and face of concrete shall be 3" in footings, 2½" at bar mats under shoes and 2" elsewhere unless otherwise shown on the plans.

15. ITEMS NOT INCLUDED IN BRIDGE PLANS

The following items are not included in the bridge plans. See Roadway Plans for details.

(1) Grading and approach pavements and slabs.
(2) Relocation or removal of existing utilities and pavements.
(3) Lighting
(4) Signing

16. ELECTRICAL CONDUITS carried through the structures shall be 1" clear from construction joints and 2" clear between conduits minimum.

H.N.T.B. BR. NO.	STATE BR. NO.	DESCRIPTION
35	CUY-80-1585	I-80, Lane OBE-JN and Lane JN-OBE Under Relocated Granger Road (S.R. 17)
36	CUY-80-1593	I-80, Lane OBE-JN and Lane JN-OBE Under Relocated Tuxedo Avenue
36A	CUY-80-1594	I-80, Lane OBE-JN and Lane JN-OBE Under 24" Sanitary Sewer
37	CUY-80-1685	I-80 Under Portal Drive
37A	CUY-80-1654	I-80 Over West Creek

H.N.T.B. BR. NO. 35, 36, 36A, 37 & 37A

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

GENERAL NOTES

CUYAHOGA COUNTY OHIO

DRAWN J.E.H.	TRACED	CHECKED W.F.	REVIEWED	REVISED
DATE 6-24-70	DATE 9-14-70	DATE 10-6-70	DATE	SHEET GN 1

T-17

FHWA REGION	STATE	PROJECT	
5	OHIO		

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CUYAHOGA COUNTY
CUY-480-15.81

LATEX MODIFIED CONCRETE WEARING COURSE

LATEX MODIFIED PORTLAND CEMENT CONCRETE

1. Description. This work shall consist of constructing a wearing course of Latex Modified Portland Cement concrete on the prepared surface of the Portland Cement concrete bridge deck. The work shall be done in accordance with these specifications and in reasonably close conformity with grades, thickness and cross-sections shown on the plans or established by the Engineer.

2. First Course Curing and Surface Preparation.

The surface shallhave a uniformly gritty texture. The surface of the portland cement concrete first course shall be cured by the use of burlap mats, waterproof paper, polyethylene sheeting or waterproof curing blankets. The entire surface of the top and sides of the newly placed concrete shall be covered. The surface shall have cured sufficiently, 14 days or when 650 p.s.i. average beam test is obtained, but not less than 7 days, prior to placement of Latex Modified Portland Cement Concrete. All laitance or any foreign material shall be removed from the surface by sandblasting within 24 hours of placing overlayment. Immediately before placement of the wearing course begins, the surface shall be cleaned by air blast or pressure water flushing. Thorough soaking of the surface with clean water for not less than one hour prior to placement, will be required.

3. Materials

A. Portland cement shall be Type I, 701.04 or, if required by weather conditions, Type III, 701.05, at the direction of the latex manufacturer.

B. Sand shall be fine aggregate conforming to 703.02 of the CMS.

C. Coarse aggregate shall size No. 8 limestone meeting the requirements of section 703.02 of the CMS.

D. The latex modifier shall conform to the requirements of Dow Chemical Company, Modifier A, or approved equal.

E. Water shall conform to the requirements of section 499.02 of the CMS and the storage and handling of all materials shall be in accordance with the CMS and the latex manufacturer's requirements. The latex modified concrete shall be designed by the Engineer, using the following as a guide.

Material or Property	Latex Modified Concrete
Average Thickness	1" and greater
Cement content, sacks/cu.yd.	7.0
Latex Emulsion Admixture, gal./sack	3.5
** Water, gal. per sack	2.5
Air content, % of plastic mix	5 ± 2
* Slump, inches	4-6
Percent Fine Aggregate as percent of Total agg., by weight	50-55
*** Weight ratio of cement: sand: coarse aggregate dry basis agg. specific gravity = 2.65	1:2.5:2.0

Note: * The slump shall be measured 4 to 5 minutes after discharge from the mixer. During this waiting period, it shall be deposited on the deck and not be disturbed.

** The net water added shall be adjusted to control the slump within the prescribed limits and should produce net water cement ratios of 0.35-0.40, by weight.

*** The dry weight ratios are approximate and should produce good workability but due to gradation changes may be adjusted within limits by the Engineer. The sand ratio may be increased by as much as 0.2 if the coarse aggregate is reduced by an equivalent volume.

4. Equipment: Sandblasting equipment must be of such size and capacity to blast clean the deck area in allotted time.

Proportioning and mixing equipment shall be self-contained, mobile, continuous mixing subject to the following:

A. The mixer shall be self-propelled and be capable of carrying sufficient unmixed dry, bulk cement, sand, coarse aggregate, latex modifier, and water to produce on the site not less than 6 cubic yards of concrete.

B. The mixer shall be capable of positive measurement of cement introduced into the mix. A recording meter visible at all times and equipped with a ticket printout shall indicate this quantity.

C. Mixers shall be calibrated to accurately proportion the specified mix. Certification of the calibration by approved testing authority will be accepted as evidence of this accuracy if the yield is shown to be true within a tolerance of 1.0 percent according to the following test:
With the cement meter set on zero and all controls set for the desired mix activate the mixer discharging mixed material into a one quarter cubic yard container- 36"x 36"x 9". When the container is level-struck full, making provisions for settling the material into all corners, the cement meter must show a discharge of 1 3/4 bags of cement for latex modified concrete, (7 bags/cu.yd.).

D. The mixer shall provide positive control of the flow of water and latex emulsion into the mixing chamber. Water flow shall be indicated by flow meter and be readily adjustable to provide for minor variations in aggregate moisture.

E. The mixer shall be capable of being calibrated to automatically proportion and blend all components of indicated composition on a continuous or intermittent basis as required by the finishing operation, and shall discharge mixed material through a conventional chute directly in front of the finishing machine.

F. The mixer shall be capable of spraying water over the entire placement width as it moves ahead to insure that the surface to be overlaid is wetted to receive the modified material.

Placing and Finishing Equipment shall include hand tools for placement and brushing-in freshly mixed modified concrete and for distributing it to approximately the correct level for striking-off with the screed. Approved hand operated vibrators and screeds may be used to place and finish small areas of work.

An approved finishing machine complying with the following requirements shall be used for finishing all large areas of work:
The finishing machine shall be self-propelled and capable of forward and reverse movement under positive control. Provisions shall be made for raising all screeds to clear the screeded surface for traveling in reverse.
The machine shall be equipped with vibrating screeds designed to consolidate the modified composition by vibration. Vibration frequency shall be variable with positive control between 3000 and 11,000 vpm. The bottom face of the screeds shall be not less than 4" wide and be metal covered. The screeds shall be provided with positive control of the vertical position.
A Gomaco C450 or equivalent self-propelled screed with one or more rollers, augers, and 1500 to 2500 vpm vibratory pans may be used.
Any modifications shall be subject to approval by the Engineer. A suitable portable lightweight or wheeled work bridge shall be required and used behind the finishing operation.
Supporting rails upon which the finishing machine travels will be required and shall be sufficiently rigid that they do not deflect under the weight of the machine. They shall be so attached to the old surface that they may be removed without damage to the edge of the new overlayment.

5. Proportioning, Mixing, Placing, Finishing and Curing of Modified Compositions.

The operations of proportioning and mixing modified materials shall comply with the following requirements: Mixers shall be clean and the ingredients accurately proportioned.
Modified mortar or concrete materials shall be mixed at the site in accordance with the specified requirements for the equipment used. The modified mortar or concrete as discharged from the mixer shall be uniform in composition and consistency. Mixing capability shall be such that finishing operations can proceed at a steady pace with final finishing completed before the formation of the plastic surface film. If required by the Engineer, uniformity tests shall be run according to ASTM C685 and shall meet the requirements of Table A1, therein.

Screed rails shall be placed and fastened in position to insure finishing the new surface to the required profile. Anchorage for supporting rails shall provide horizontal and vertical stability. Screed rails shall not be treated with parting compound to facilitate their removal.
All surfaces shall be completely cleaned as approved by the Engineer prior to placing mixtures.
The mixture shall be brushed onto the wetted, prepared surface. Care shall be exercised to insure that all vertical as well as horizontal surfaces receive a thorough, even coating and the rate of progress is limited so that the brushed material does not become dry before it is covered with additional material as required for the final grade. Material used for brushing which has had the concrete used up, shall be disposed of.

5. (Continued)

The mixture shall be placed and struck-off to approximately 1/4" above final grade, it shall then be consolidated and finished at final grade with the vibrating screeds. Hand finishing with a wood float may be required along the edge of the pour or on small areas of repair.

When a tight, uniform surface has been achieved it shall be texturized by broom or burlap drag before the plastic film forms on the surface.
Screed rails and/or construction bulkheads shall be separated from the newly placed material by passing a pointing trowel along their inside face. Metal expansion dams shall not be separated from the overlayment. Care shall be exercised to insure that this trowel cut is made for the entire depth and length of rails or dams after the mixture has stiffened sufficiently.
The surface shall be promptly covered with a single layer of clean, wet burlap as soon as the surface will support it without deformation.
Within one hour of covering with wet burlap, a layer of 4 mil, polyethylene film shall be placed on the wet burlap and the surface cured for 24 hours. The curing material shall then be removed for an additional 72 hour air cure before traffic use.
Wet burlap-polyethylene sheets may be substituted for the polyethylene film with the approval of the Engineer but shall not replace the initial wet burlap.

A representative of the manufacturer shall be present during the proportioning, mixing, placing and finishing of the concrete. Operations and procedures which are considered by this representative as being detrimental to the integrity and durability of the concrete will not be permitted. Surface smoothness shall conform to the requirements of 451.12.

6. Limitation of Operations

No vehicular traffic shall be permitted on the latex cement surface until 96 hours after placement. At temperatures below 55 degrees F the Engineer may require a longer curing period.
No latex modified mixtures shall be placed at temperatures lower than 45 degrees F. They may be placed at 45 degrees F when rising temperature is predicted and then only if and until the prediction indicates 8 hours over 45 degrees F for the curing period. At temperatures above 85 degrees F the Engineer may require placements to be made at night or early morning hours if in his opinion a sotisfactory surface finish is not being achieved.
A construction dam or bulkhead shall be installed in case of major delay in the placement operation exceeding one hour in duration. During minor delays one hour or less the end of the placement may be protected from drying with several layers of wet burlap.
Adequate precautions shall be taken to protect freshly placed modified material from sudden or unexpected rain. All placing operations shall stop when it starts to rain. The Engineer may order removal of any material damaged by rainfall.

7. Method of Measurement.

A. Surface preparation will be computed in Sq. Yds. from measurements of areas so prepared and accepted.

B. Latex modified portland cement material shall be computed in Cu. Yds. of materials mixed and placed. Meter ticket printout of continuous mixers so equipped and properly calibrated will be accepted for this calculation. No deduction will be made for coarse aggregate thrown out due to brushing operations.

C. Finishing and curing will be computed in Sq. Yds. from measurements of the areas so finished and cured.

The quantities of various other pay items which contribute to the completed and accepted work will be measured for payment according to the plans and specifications for the several items.

8. Basis of Payment.

The quantities measured as provided above will be paid for at the contract unit price for the pay items, which price shall be full compensation for furnishing, hauling and placing of all materials and for all labor, equipment, tools and incidentals.

STATE OF OHIO
DEPARTMENT OF HIGHWAYS
DIVISION OF DESIGN AND CONSTRUCTION
BUREAU OF BRIDGES

LATEX MODIFIED CONCRETE WEARING COURSE
BR. NO. CUY-480-1585
BR. NO. CUY-480-1593
BR. NO. CUY-480-1685

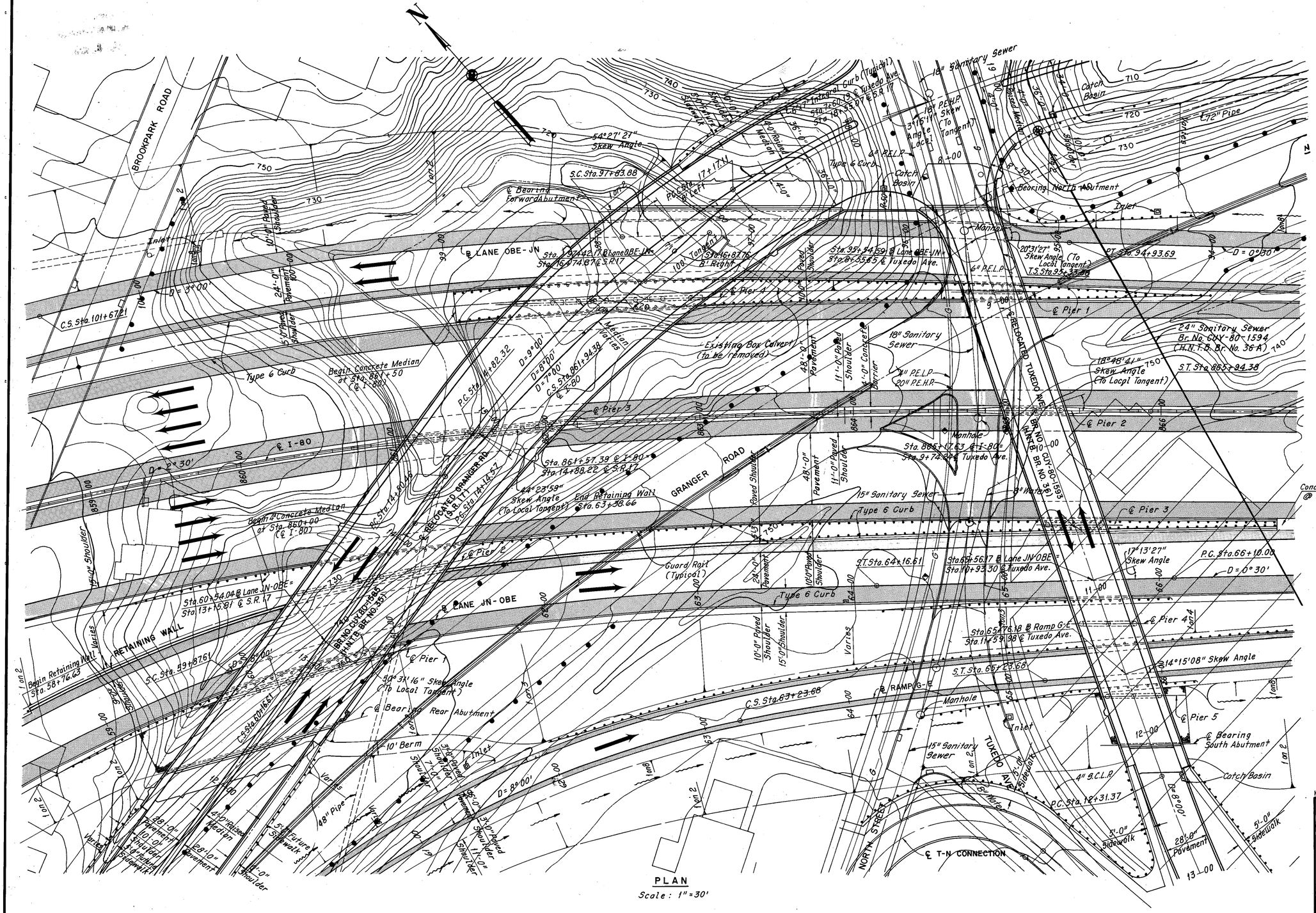
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
DLM	GFJ			WJJ	10-23-73	

SHEET GN2

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

319
392

CUYAHOGA COUNTY
CUY-80-15.81



PLAN
Scale: 1"=30'

Note:
Earthwork limits shown are schematic. Actual slopes shall conform to plan cross-sections.

H.N.T.B. BR. NO. 35 AND 36

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

GENERAL SITE PLAN

I-80 UNDER RELOCATED GRANGER ROAD (S.R.17) AND RELOCATED TUXEDO AVENUE
BR. NO. CUY-80-15 85
BR. NO. CUY-80-15 93

CUYAHOGA COUNTY OHIO

DRAWN CKB	TRACED CP	CHECKED JEH	REVIEWED	REVISED
DATE 4-8-68	DATE 4-22-68	DATE 5-27-70	DATE	SHEET GP.1

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

320
392

CUYAHOGA COUNTY
CUY - 80 - 15.81

CURVE DATA - ℄ RELOCATED S.R. 17

P. I. Sta. 18+08.24
△ = 53°05'21"
D_c = 8°00'00" Right
R = 716.20'
T = 357.78'
L = 663.61'
E = 84.39'

CURVE DATA - LEFT EDGE OF MEDIAN RELOCATED S. R. 17

△ = 21°19'55"
D = 9°00'00" Right
R = 636.62'
T = 119.90'
L = 237.02'
E = 11.19'

CURVE DATA - RIGHT EDGE OF MEDIAN RELOCATED S. R. 17

△ = 18°59'02"
D = 7°00'00" Right
R = 818.51'
T = 136.85'
L = 271.20'
E = 11.36'

CURVE DATA - ℄ I-80

P. I. Sta. 854+15.02
△ = 40°46'55"
D_c = 2°30'00" Right
R = 2,291.83
T = 851.91'
L = 1,631.28'
E = 153.21'

C. S. Sta. 861+94.38
S. T. Sta. 865+94.38
θ_s = 5°00'00"
LT = 266.77'
L_s = 400.00'
ST = 133.43'
P = 2.91'

CURVE DATA - ℄ RAMP G-E

P. I. Sta. 61+51.03
△ = 28°12'27"
D_c = 8°00'00" Right
R = 716.20'
T = 179.95'
L = 352.60'
E = 22.26'

C. S. Sta. 63+23.68
S. T. Sta. 65+23.68
θ_s = 8°00'00"
LT = 133.47'
L_s = 200.00'
ST = 66.79'
P = 2.33'

CURVE DATA - ℄ RELOCATED TUXEDO AVE.

P. I. Sta. 14+12.81
△ = 28°26'00"
D_c = 8°00'00" Left
R = 716.20'
T = 181.45'
L = 355.42'
E = 22.63'

CURVE DATA - ℄ LANE JN-OBE

S. S. Sta. 55+87.61
S. C. Sta. 59+87.61
θ_s = 16°00'00"
LT = 267.76'
L_s = 400.00'
P = 9.28'

P. I. Sta. 60+02.11
△ = 2°19'13"
D_c = 8°00'00" Right
R = 716.20'
T = 14.50'
L = 29.00'
E = 0.15'

C. S. Sta. 60+16.61
S. T. Sta. 64+16.61
θ_s = 16°00'00"
LT = 267.76'
L_s = 400.00'
P = 9.28'

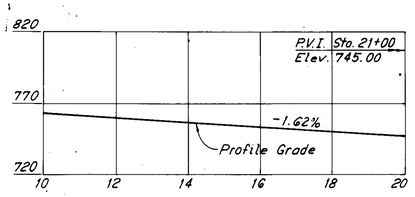
P. I. Sta. 67+80.01
△ = 1°42'00"
D_c = 0°30'00" Right
R = 11,459.16'
T = 170.01'
L = 340.00'
E = 1.26'

CURVE DATA - ℄ OBE - JN

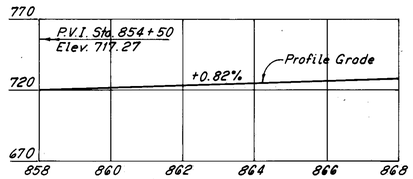
P. I. Sta. 93+33.70
△ = 1°36'00"
D_c = 0°30'00" Right
R = 11,459.16'
T = 160.01'
L = 320.00'
E = 1.12'

T. S. Sta. 95+33.88
S. C. Sta. 97+83.88
θ_s = 3°45'00"
LT = 166.70'
L_s = 250.00'
P = 1.36'

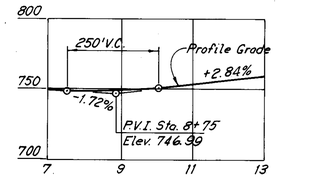
P. I. Sta. 99+76.19
△ = 11°30'00"
D_c = 3°00'00" Left
R = 1,909.86'
T = 192.31'
L = 383.33'
E = 9.66'



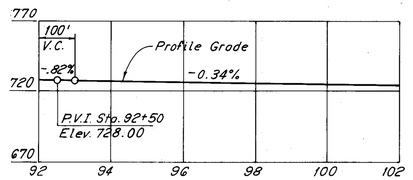
PROFILE - RELOCATED S.R. 17
Scale: Horiz. 1"=200'
Vert. 1"=50'



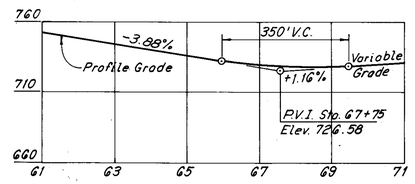
PROFILE I-80
Scale: Horiz. 1"=200'
Vert. 1"=50'



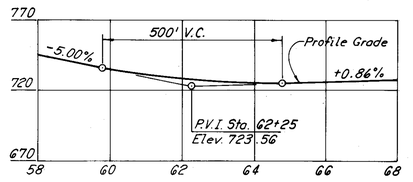
PROFILE - RELOCATED TUXEDO AVENUE
Scale: Horiz. 1"=200'
Vert. 1"=50'



PROFILE - LANE OBE-JN
Scale: Horiz. 1"=200'
Vert. 1"=50'



PROFILE RAMP G-E
Scale: Horiz. 1"=200'
Vert. 1"=50'



PROFILE - LANE JN-OBE
Scale: Horiz. 1"=200'
Vert. 1"=50'

H.N.T.B. BR. NO. 35 AND 36

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

PROFILES AND CURVE DATA

BR. NO. CUY-80-15 85
BR. NO. CUY-80-15 93

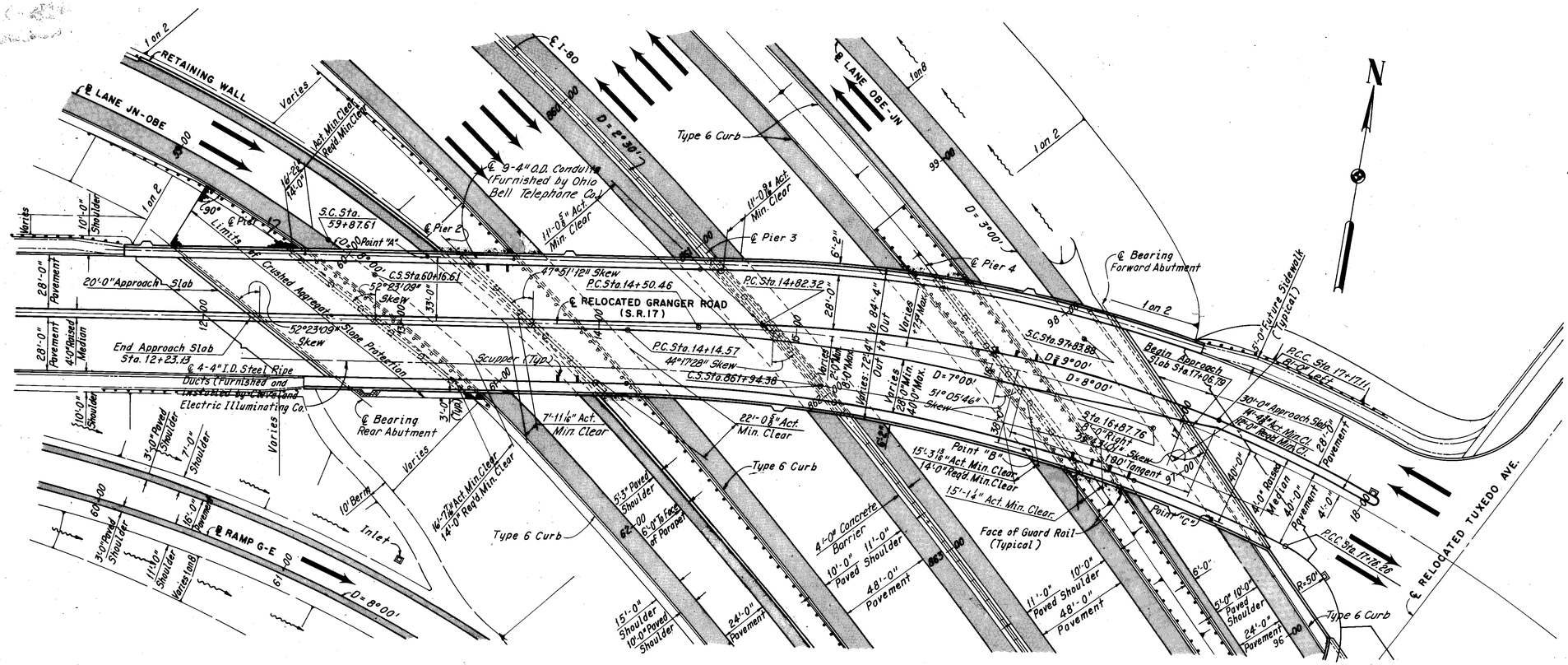
CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 3-11-68 CKB	DATE	DATE 6-11-70 MCB	DATE	SHEET G.P.2

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

321
392

CUYAHOGA COUNTY
CUY - 80 - 15.81



PLAN
Scale: 1" = 30'

PROPOSED STRUCTURE

TYPE: Continuous steel girders with reinforced concrete deck and substructure.
SPANS: 57'-0", 83'-0⅝", 120'-7½", 117'-2⅝", and 97'-2" (Measured along ℄ S.R. 17)
ROADWAY: Varies 60'-0" to 72'-0" Curb to Curb with raised median and two 5'-0" sidewalks.
LOADING: HS 20-44
SKEW: Varies (See Plan)
APPROACH SLABS: Rear 20'-0" / Forward 30'-0" } AS-1-72 (Modified)
ALIGNMENT: Tangent, 8°00'00" Right (Along ℄ S.R. 17)
SUPERELEVATION: Normal ±.0156 ft. per ft. to ±.0156 ft. per ft.
WEARING SURFACE - 1" Latex Modified Concrete

TRAFFIC DATA: (1991)
Relocated Granger Road (S.R. 17)
Vehicular:
25,585 A.D.T.
1,583 D.D.H.V.
Pedestrian:
80 (Light industry and commercial)
80 (Residential)
160 Total

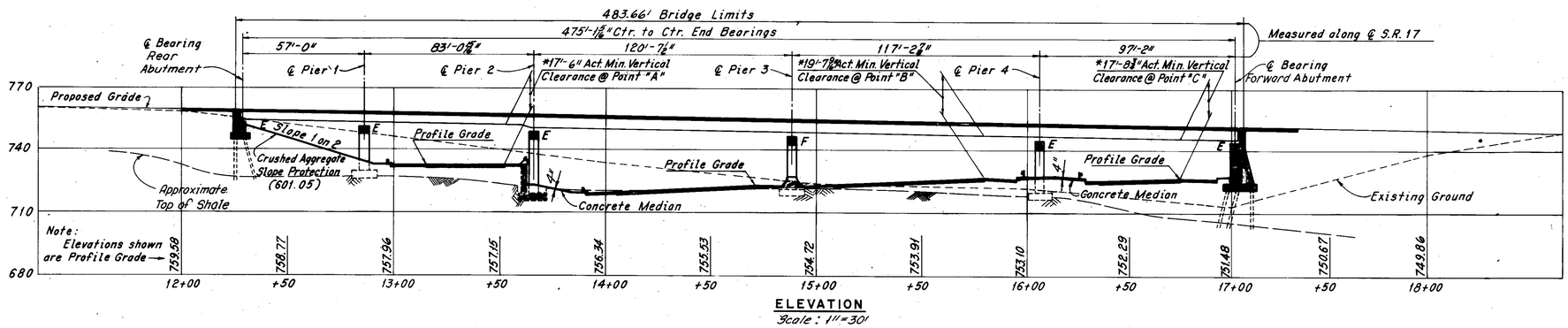
FOUNDATION DATA:

All piers are founded on spread footings.
Piles at Rear Abutment are HP10x42 with an estimated average pay length of 20'-0"
Piles at Forward Abutment are HP12x53 with an estimated average pay length of 21'-0"

EXCAVATION AND BACKFILL

Excavation in cut sections shall be completed and embankment shall be placed and compacted to the level of the subgrade and to the finished spill-thru slopes, or to the limits shown on Sheet 7/24 at the forward abutment, before excavation or any construction work is started at the abutments or piers.
The excavation quantity includes the removal of embankment material required for the construction of the abutments.

*Note:
16'-4" Required minimum vertical clearance over I-80.
15'-0" Required minimum vertical clearance over Lane OBE-JN and Lane JN-OBE.



ELEVATION
Scale: 1" = 30'

Notes:
For roadway intersection stations and angles see Sheet GP1.
For details of concrete barrier at Pier 3 see Roadway Plans.
Modify Std. Drwg. AS-1-72 by providing 3" clear over the top rebars instead of the 2" shown on the Std. Drwg.

H.N.T.B. BR. NO. 35

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

SITE PLAN

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN CAB	TRACED CP	CHECKED JEA	REVIEWED	REVISED
DATE 4-1-68	DATE 4-25-68	DATE 5-27-70	DATE	SHEET 1 / 24

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-15.81

ESTIMATED QUANTITIES

CUY-80-1585 H.N.T.B. BRIDGE NO. 35

ITEM	TOTAL	UNIT	DESCRIPTION	ABUT-MENTS	PIERS	SUPER-STRUCTURE	GENERAL		
503	1,787	Cu. Yd.	Unclassified Excavation	1,133	654				
503	383	Cu. Yd.	Shale Excavation		383				
505	Lump Sum	Lump Sum	Test Pile				Lump Sum		
507	660	Lin. Ft.	Steel Piles, HP10x42	660					
507	3,530	Lin. Ft.	Steel Piles, HP12x53	3,530					
503	Lump Sum	Lump Sum	Cofferdams, Cribs and Sheeting				Lump Sum		
509	629,843	Pounds	Reinforcing Steel	125,612	131,750	372,481			
511	1142	Cu. Yd.	Class "C" Concrete, Superstructure			1142			
511	805	Cu. Yd.	Class "C" Concrete, Abutments Above Footings	805					
511	420	Cu. Yd.	Class "C" Concrete, Piers Above Footings		420				
511	739	Cu. Yd.	Class "C" Concrete, Footings	422	317				
512	180	Lin. Ft.	Premolded Sealing Strip	180					
513	*1,121,200	Pounds	Structural Steel			1,121,200			
514	1,121,200	Pounds	Field Painting of Structural Steel			1,121,200			
516	190	Sq. Ft.	1" Preformed Expansion Joint Filler	190					
517	1,094	Lin. Ft.	Bridge Railing (Concrete with Aluminum Chain Link	Fence Sec. 710.04)			1,094		
518	410	Cu. Yd.	Porous Backfill	410					
518	84	Lin. Ft.	6" ϕ Non-Perforated Helical C.M.P. Including Specials, 707.01	84					
518	94	Lin. Ft.	6" ϕ Perforated Helical C.M.P., 707.01	94					
518	48	Lin. Ft.	8" ϕ Perforated C.M.P. Including Specials, 707.01	48					
518	12	Each	Scuppers Including Supports			12			
518	88	Lin. Ft.	8" ϕ Pipe, Horizontal Conductors Including Supports			88			
518	96	Lin. Ft.	8" ϕ Pipe, Downspouts Including Supports		96				
601	742	Sq. Yd.	Crushed Aggregate Slope Protection	742					
601	572	Sq. Yd.	Concrete Slope Protection (4" Thick)		572				
625			See Sheet for Lighting Summary						
808	1142	Units	Chemical Admixture for Concrete Type A, B or D			1142			
Special	3034	Sq Yd.	Surface preparation			3034			
Special	85	Cu. Yd.	Latex modified portland cement concrete			85			
Special	3034	Sq. Yd.	Finishing and curing			3034			

* Includes 3,406 pounds to be paid for by the Cleveland Electric Illuminating Company.

H.N.T.B. BR. NO. 35

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

ESTIMATED QUANTITIES

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN WB	TRACED MC	CHECKED JEH	REVIEWED	REVISED 10-3-74
DATE 6-5-70	DATE 8-3-70	DATE 8-4-70	DATE	SHEET 2 /24

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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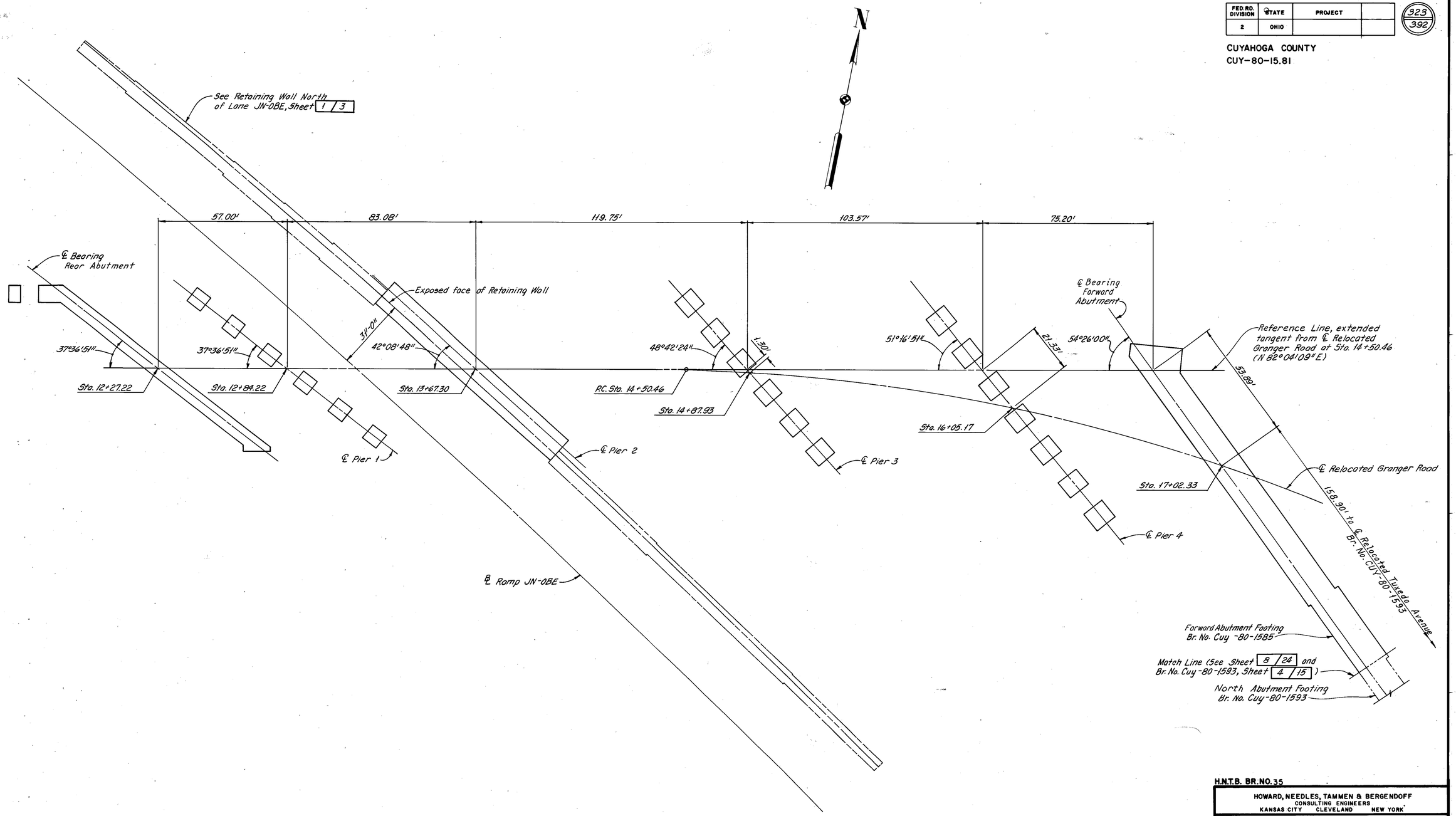
392

CUYAHOGA COUNTY
CUY-80-15.81



LAYOUT DIAGRAM

H.N.T.B. BR.NO. 35

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

LAYOUT DIAGRAM

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN LJW	TRACED WB	CHECKED JEA	REVIEWED	REVISED
DATE 5-25-70	DATE 6-1-70	DATE 6-2-70	DATE	SHEET 3/24.

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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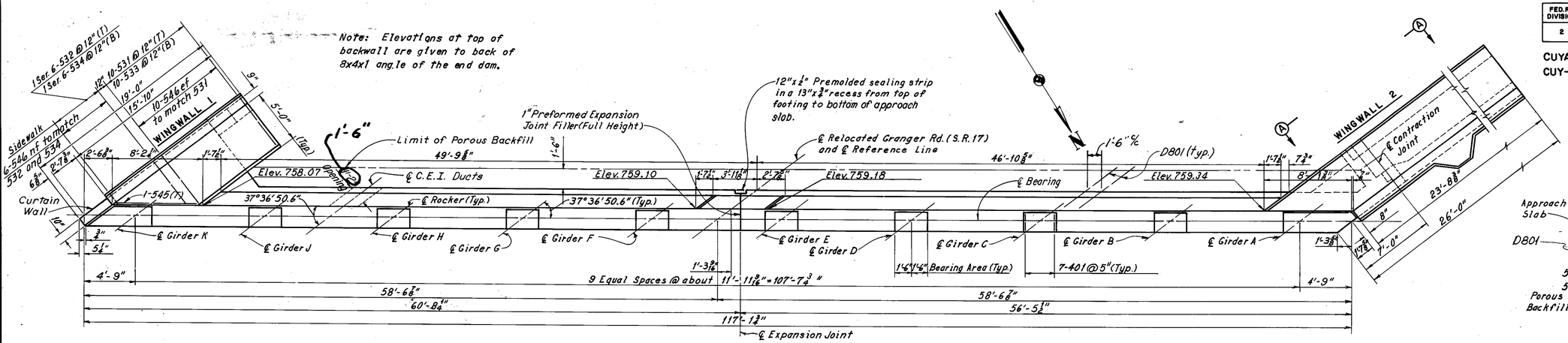
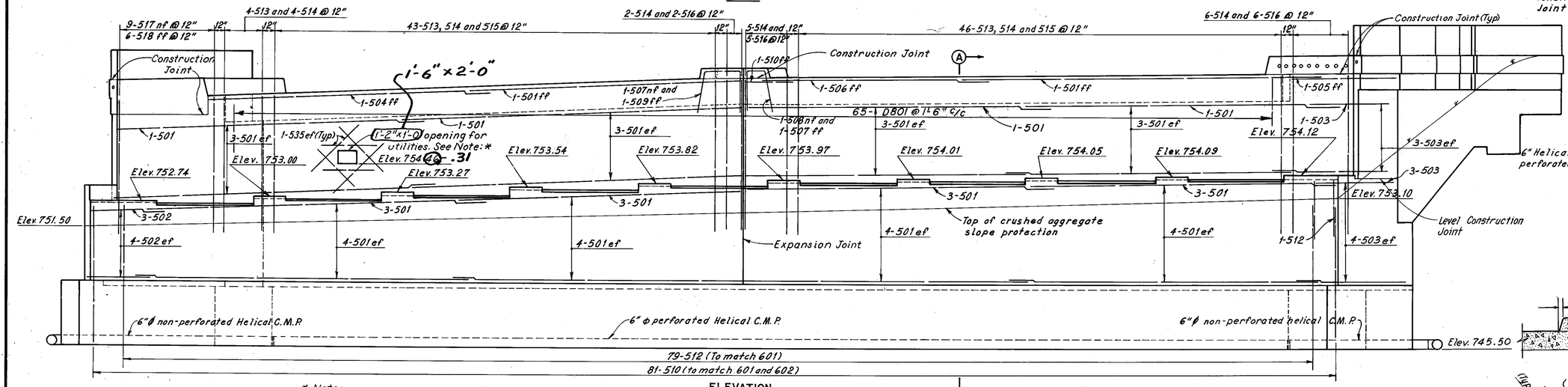
CUYAHOGA COUNTY
CUY-80-15.81

Note: Elevations at top of backwall are given to back of 8x4x1 angle of the end dam.

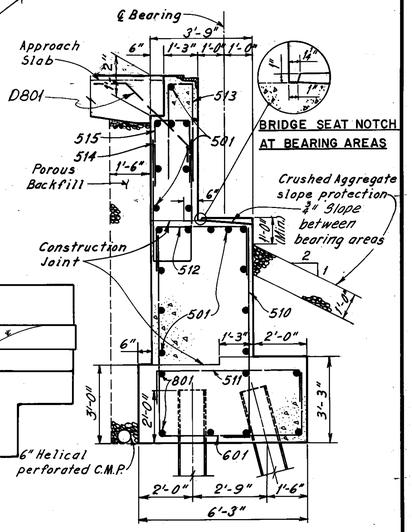


PLAN



* Note:
Field cut reinforcement as required.

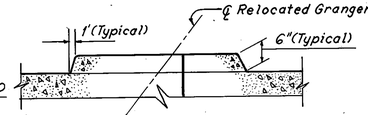
ELEVATION
(Piles not shown)



BRIDGE SEAT NOTCH AT BEARING AREAS

Crushed Aggregate slope protection
3/4" Slope between bearing areas

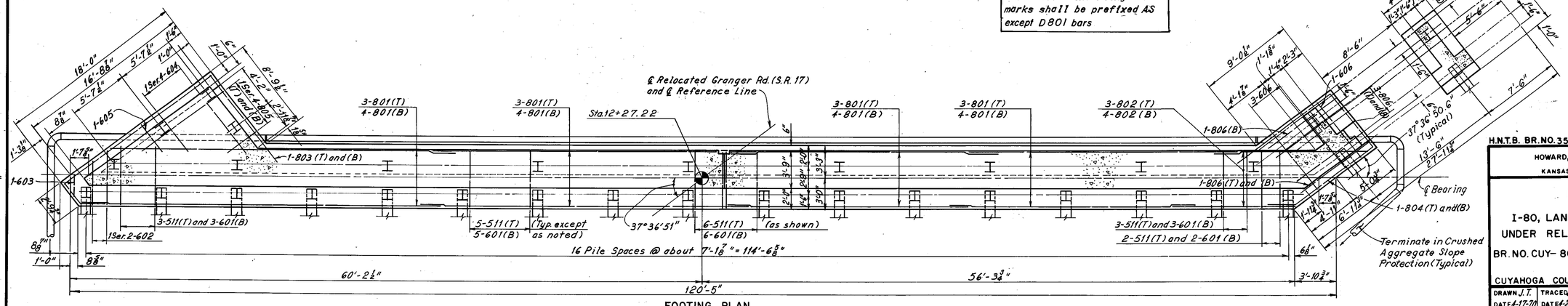
SECTION A-A



MEDIAN DETAIL
(Reinforcement not shown)

Note: All reinforcing bar marks shall be prefixed AS except D801 bars

Note: For View A-A and notes see Sheet 5 | 24 .



FOOTING PLAN

H.N.T.B. BR. NO. 35

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

REAR ABUTMENT

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN J.T.	TRACED J.C.	CHECKED DM	REVIEWED	REVISED 2-7-75
DATE 4-17-70	DATE 4-24-70	DATE 4-27-70	DATE	SHEET 4	24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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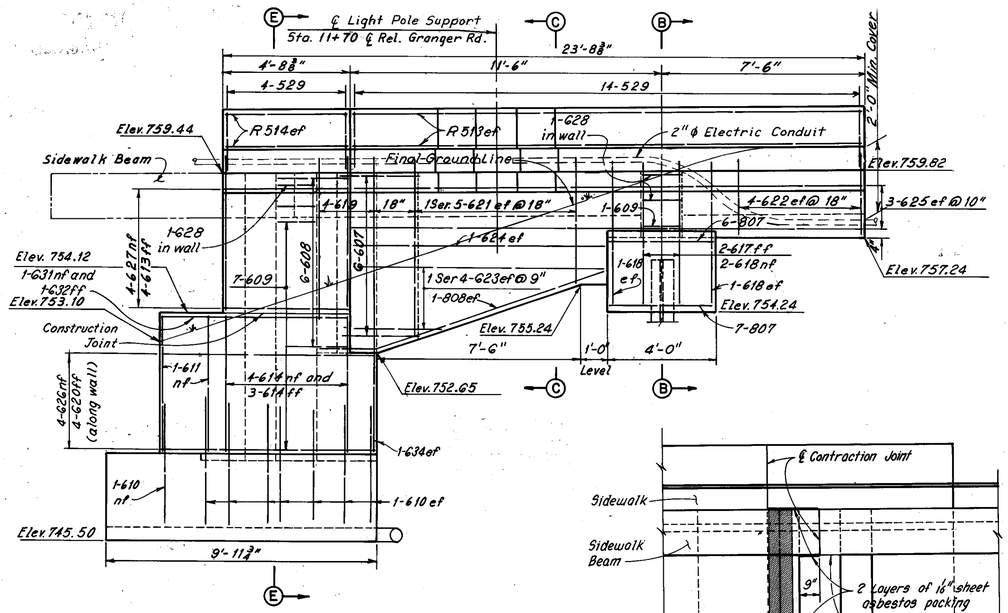
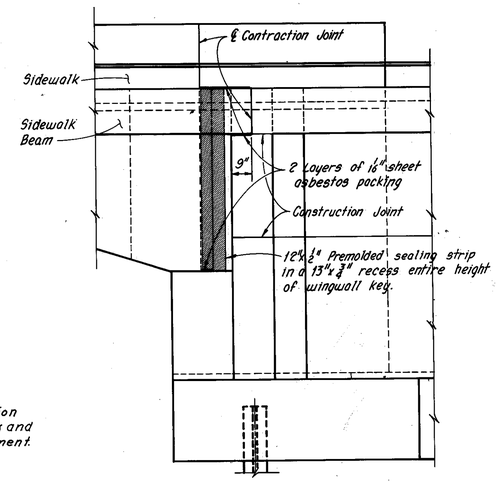
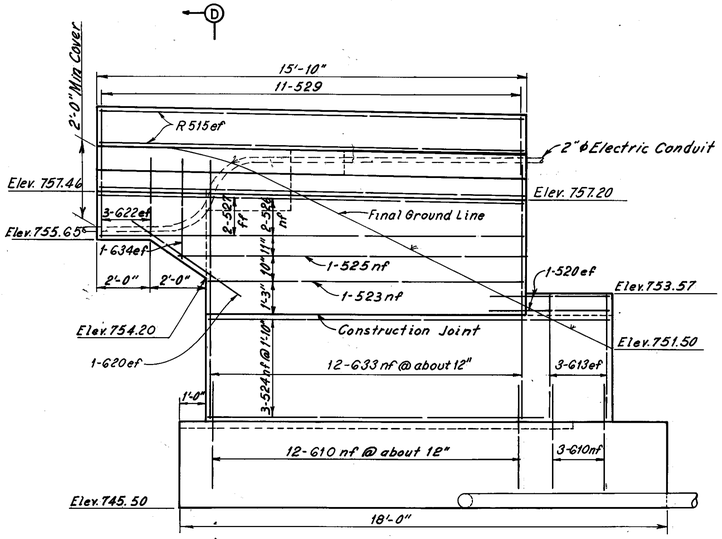
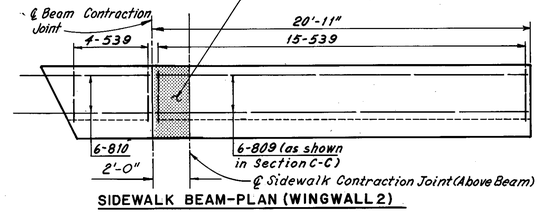
CUYAHOGA COUNTY
CUY-80-15.81



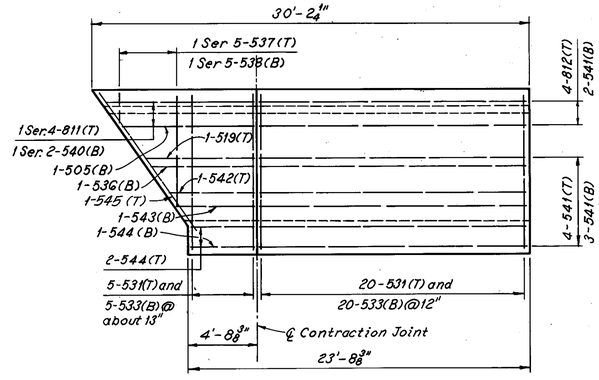


VIEW A-A
For location see Sheet 4 | 24 .



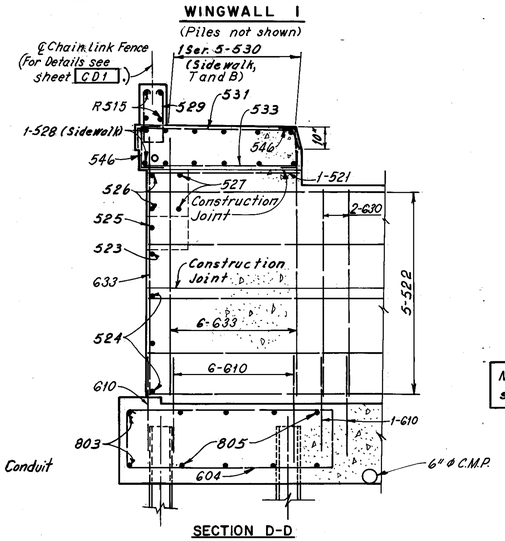


SIDEWALK BEAM-PLAN (WINGWALL 2)



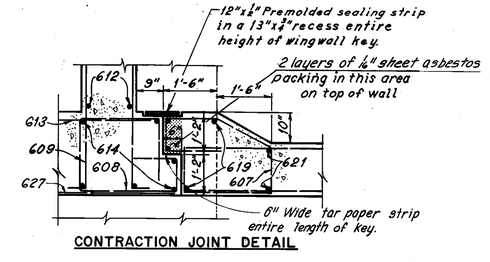
SIDEWALK-PLAN (WINGWALL 2)

WINGWALL 1
(Piles not shown)



SECTION D-D

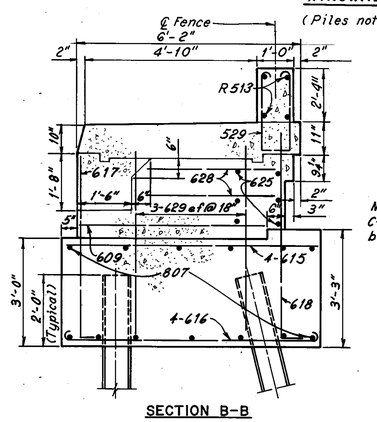
Note: All reinforcing bar marks shall be prefixed AS.



CONTRACTION JOINT DETAIL

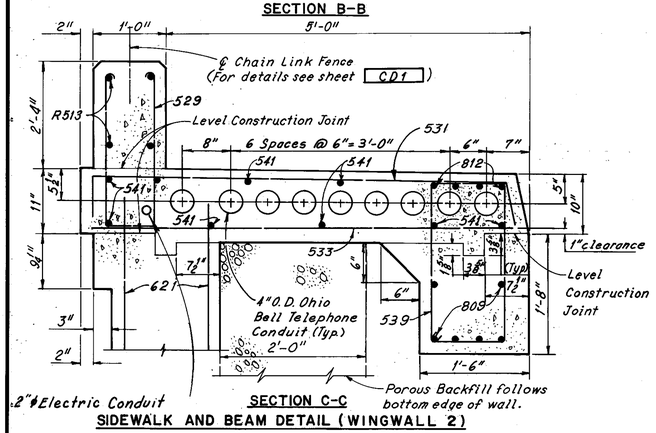
Note:
Sheet asbestos packing, Item 711.22 and tar paper to be included with Item 511 for payment.

WINGWALL 2
(Piles not shown)



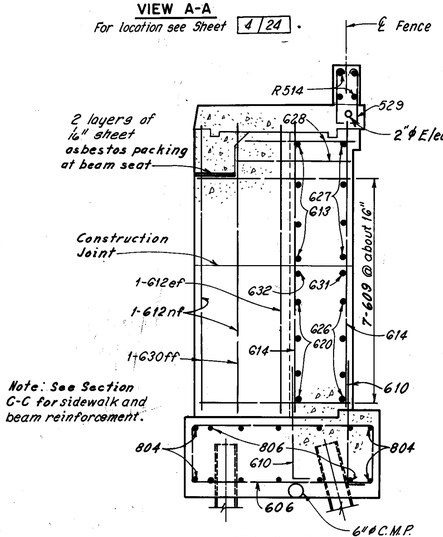
SECTION B-B

Note: See Section C-C for sidewalk and beam reinforcement.



SECTION C-C

SIDEWALK AND BEAM DETAIL (WINGWALL 2)



SECTION E-E

Notes:
Backfill under the sidewalk areas shall be placed prior to the placement of the sidewalk.
All piles are HP 10x42. All battered piles shall be inclined 3 in 12 in the direction shown.
The following abbreviations are used:
nf = near face
ff = far face
ef = each face
T = Top
B = Bottom
For Reinforcement Schedule and Bending Diagrams see Sheet 23 | 24 .
For Light Pole Support Details see Sheet CD 2 .

H.N.T.B. BR. NO. 35

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

REAR ABUTMENT
WINGWALLS
I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

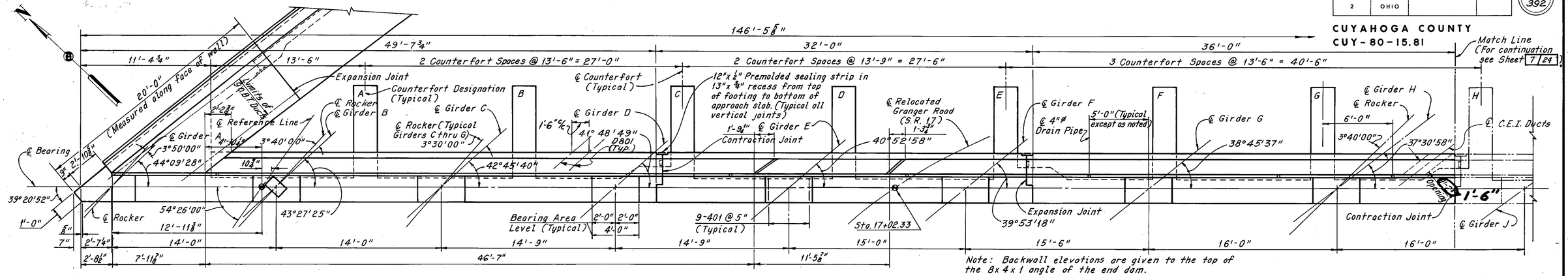
CUYAHOGA COUNTY OHIO

DRAWN J.T.	TRACED J.S.C.	CHECKED D.W.F.	REVIEWED	REVISED
DATE 4-20-70	DATE 4-29-70	DATE 5-4-70	DATE	SHEET 5/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

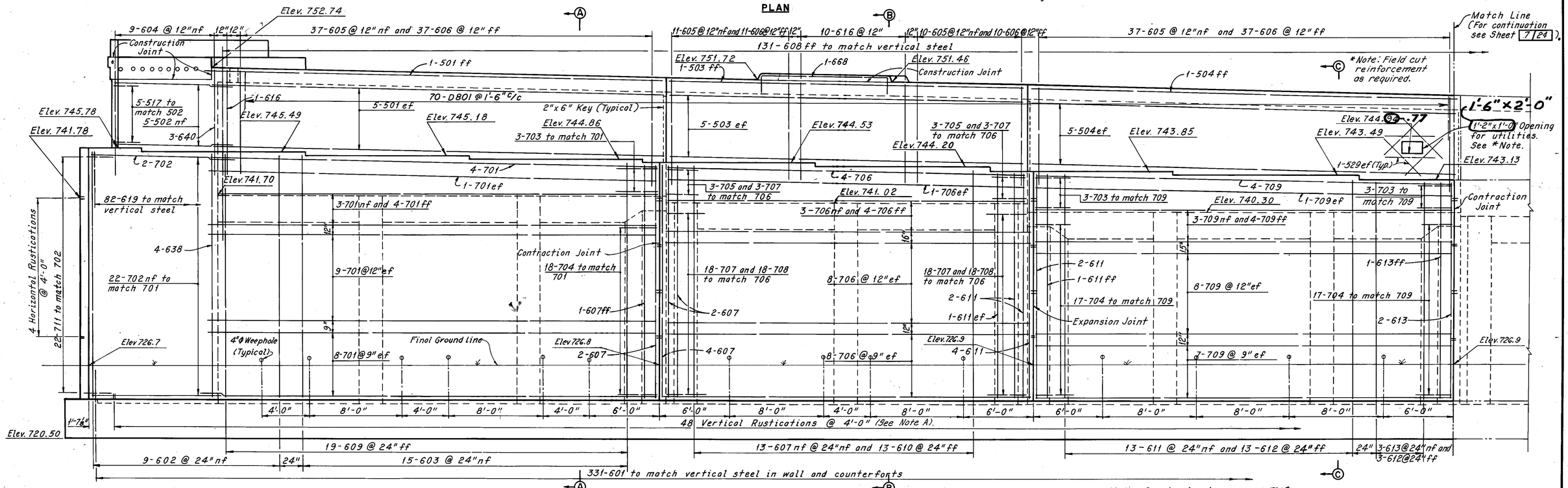
326
392

CUYAHOGA COUNTY
CUY-80-15.81

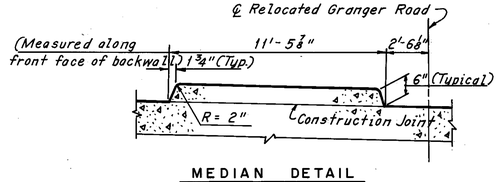


Note: Backwall elevations are given to the top of the 8x4x1 angle of the end dam.

PLAN



Note: All reinforcing bar marks shall be prefixed A N . except D801 bars



MEDIAN DETAIL
(Reinforcement not shown)

ELEVATION
(Piles not shown)

Note A:
The vertical rusticotions shall extend from top of bridge seat to a minimum of 6" below the final ground line except as noted.
Between vertical rusticotions the walls shall have a textured finish as produced by striated forms.

Notes: Backfill in front of abutment shall be placed prior to or concurrent with placing backfill behind the abutment.
Backfill under the sidewalk areas shall be placed prior to placement of sidewalk.
For Typical Joint Detail see Sheet 9/24.
For Rusticotion and Striation Detail see Sheet 10/24.
For Section A-A, Section B-B and Section C-C see Sheet 9/24.
For roadway end dam details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4. The main angle shall be 8x4x1. For special details see Sheet 19/24.
For longitudinal reinforcement in the parapets, fence post spacing and end post details see Sheet CD1.
For Reinforcement Schedule and Bending Diagrams see Sheet 23/24.
For additional notes see Sheet 8/24.
The following abbreviations are used:
nf = near face ef = each face ff = far face

H.N.T.B. BR. NO. 35

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

FORWARD ABUTMENT

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

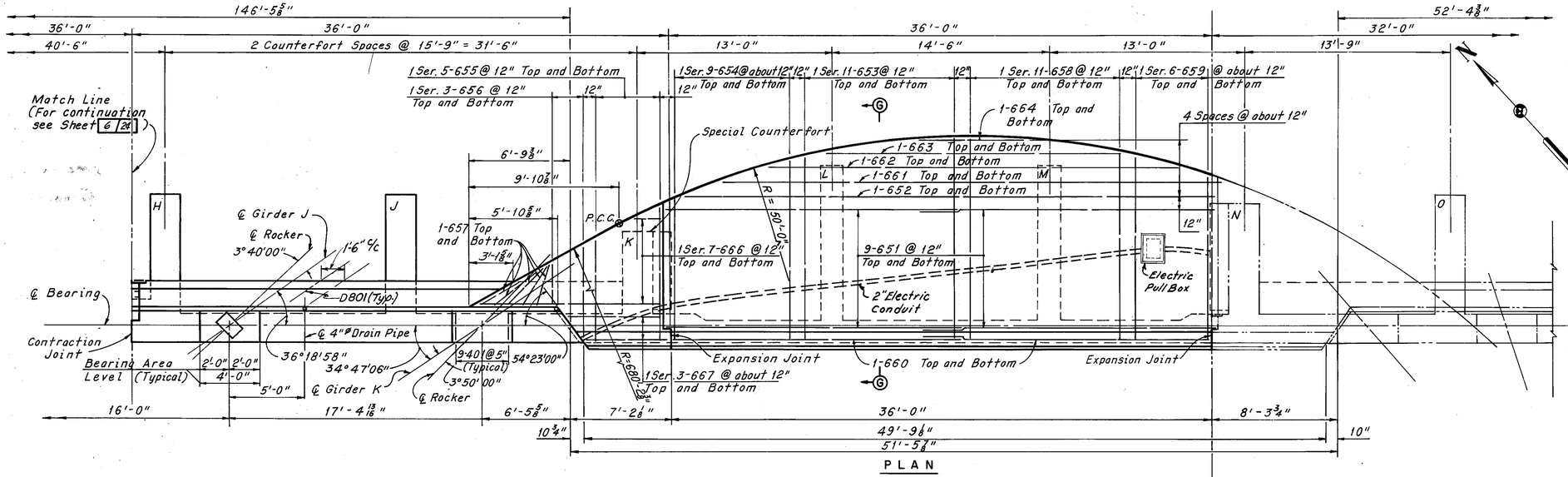
CUYAHOGA COUNTY OHIO

DRAWN H.S.	TRACED C.P.	CHECKED J.W.V.	REVIEWED	REVISED 2-7-75
DATE 7-9-69	DATE 7-13-69	DATE 7-28-69	DATE	SHEET 6/24

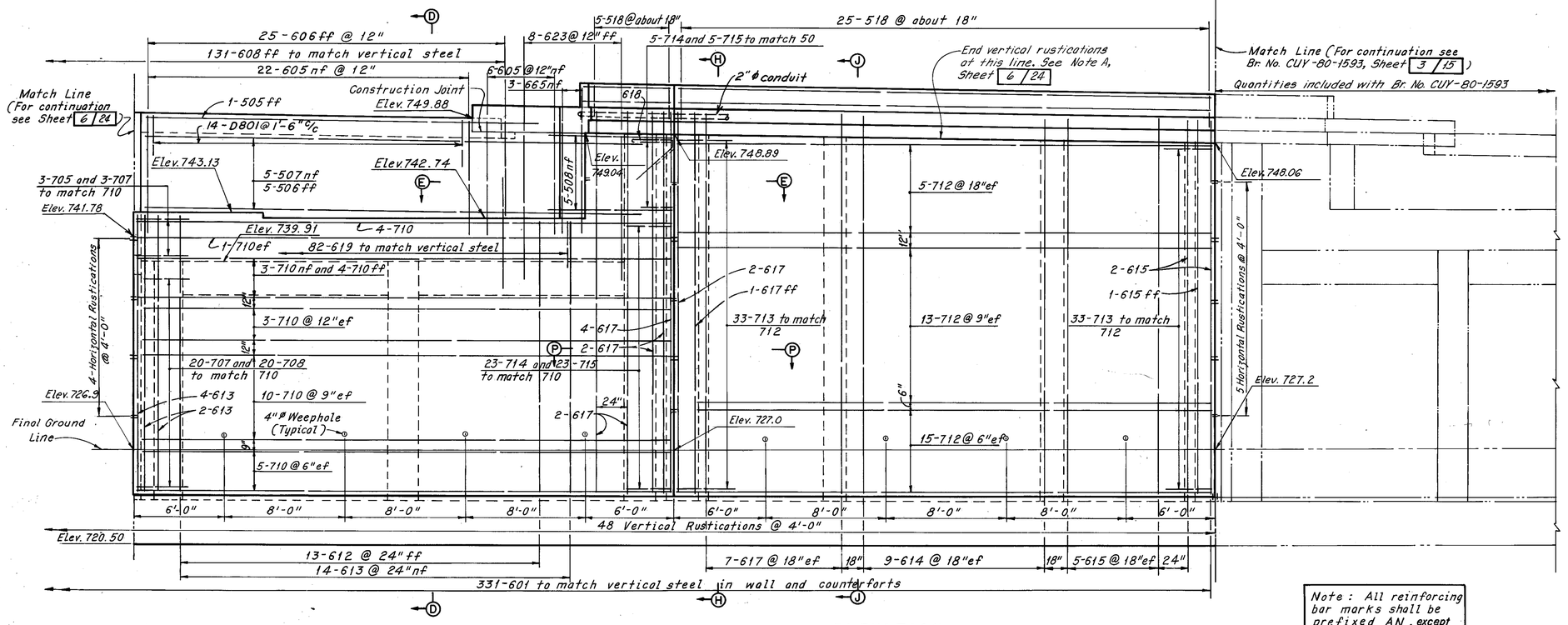
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

327
392

CUYAHOGA COUNTY
CUY-80-15.81

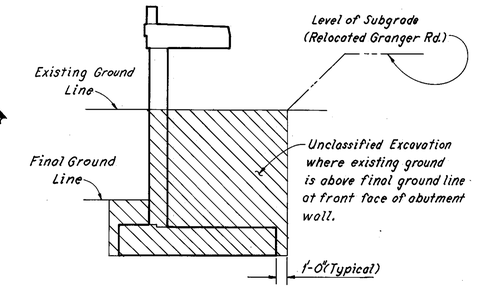


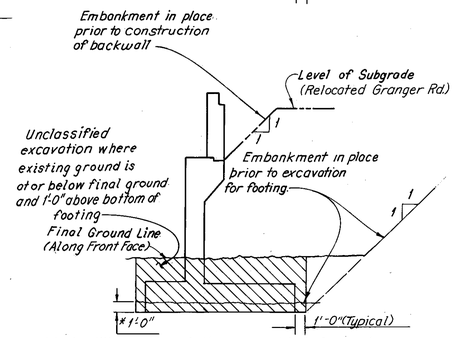
PLAN



ELEVATION
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AN. except D 801.





* Note: Where the existing ground is below a plane one foot above the bottom of footing, embankment will be placed one foot above the bottom of footing before excavating for the footing.

TYPICAL SECTIONS USED TO DETERMINE UNCLASSIFIED EXCAVATION

Notes:
For Sections D-D and P-P see Sheet 9/24.
For Sections E-E, G-G, H-H and J-J see Sheet 10/24.
The following abbreviations are used:
P.C.C. = Point of compound curve
nf = near face
ff = far face
ef = each face
For Reinforcement Schedule and Bending Diagrams see Sheet 23/24.
For additional notes see Sheet 6/24.
For Electric Pull Box and embedded 2" ⌀ conduit see Lighting Plans.

H.N.T.B. BR. NO. 35

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

FORWARD ABUTMENT

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

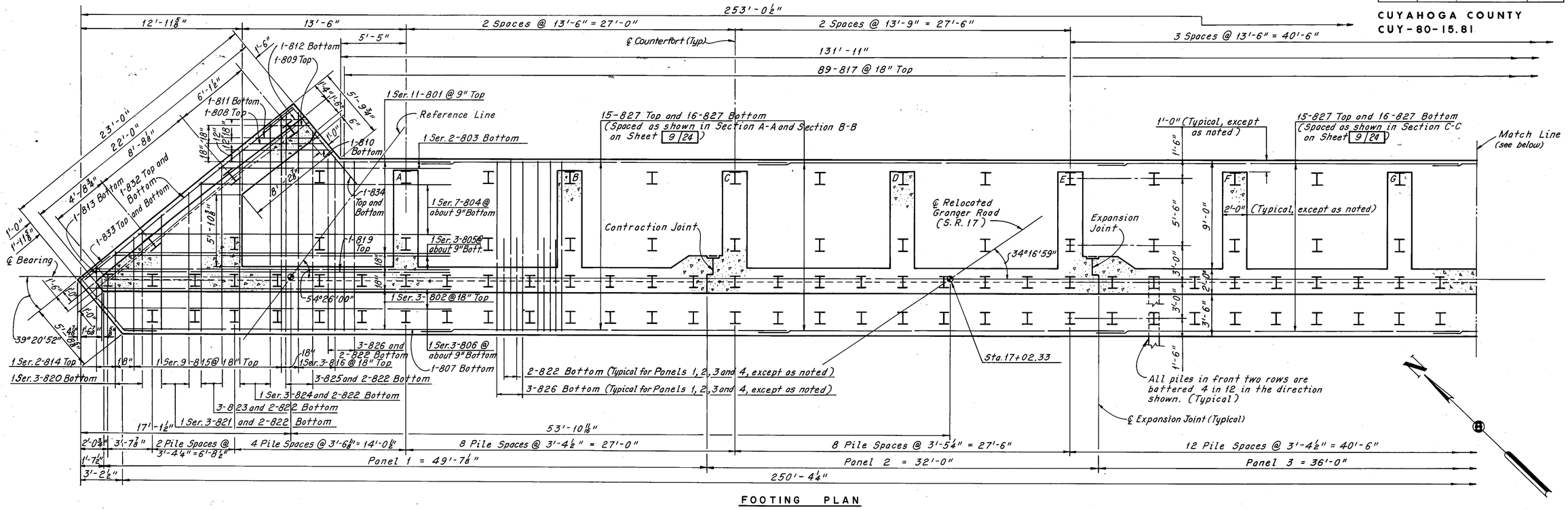
CUYAHOGA COUNTY OHIO

DRAWN D.H.S	TRACED C.P.	CHECKED T.W.Y.	REVIEWED	REVISED
DATE 7-8-69	DATE 7-18-69	DATE 7-30-69	DATE	SHEET 7/24

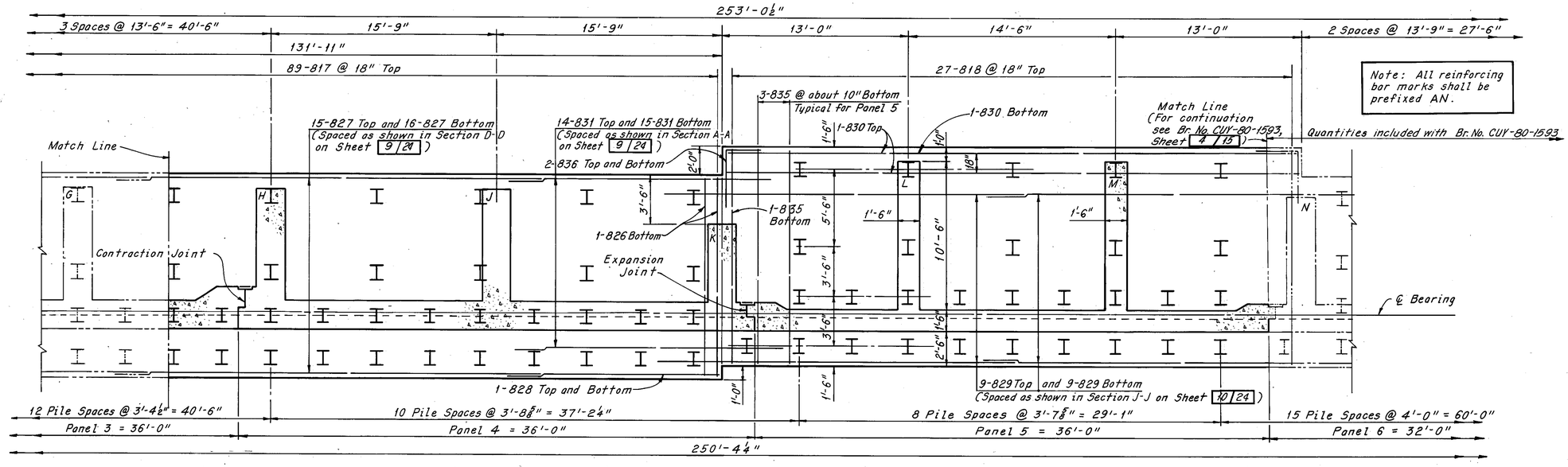
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

328
392

CUYAHOGA COUNTY
CUY-80-15.81



FOOTING PLAN



FOOTING PLAN

Notes:
All piles are HP12x53.
All battered piles shall be inclined 4 in 12 in the direction shown except as noted.
Pile spacings are measured along bottom of footing.
For Bending Diagrams and Reinforcement Schedule see Sheet 23/24.
For additional notes see Sheet 6/24.

H.N.T.B. BR. NO. 35

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

FORWARD ABUTMENT FOOTING

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

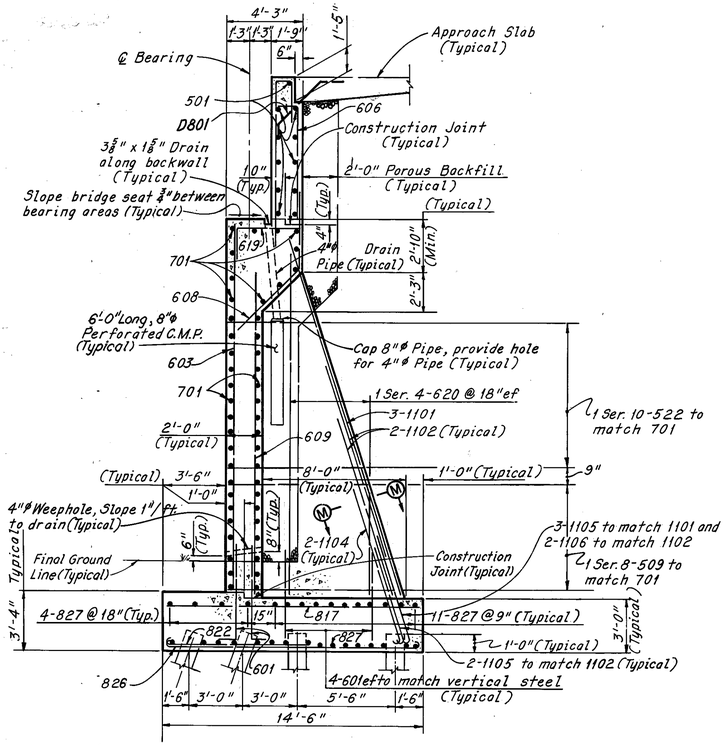
CUYAHOGA COUNTY OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED T.W.Y.	REVIEWED	REVISED
DATE 6-1969	DATE 7-1969	DATE 8-7-69	DATE	SHEET 8/24

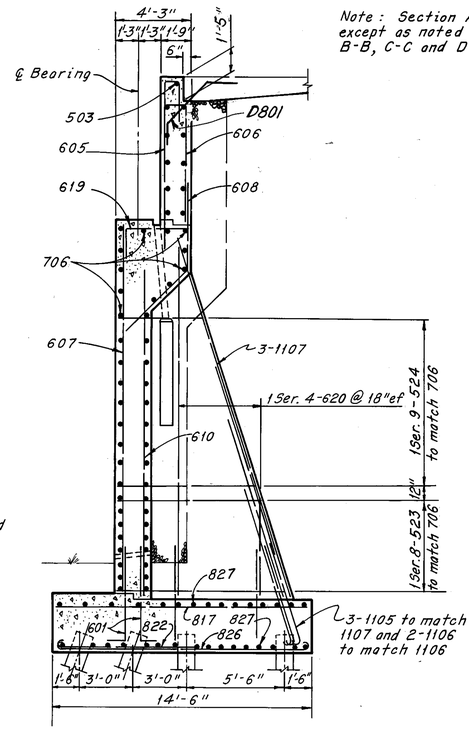
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

329
392

CUYAHOGA COUNTY
CUY-80-15.81

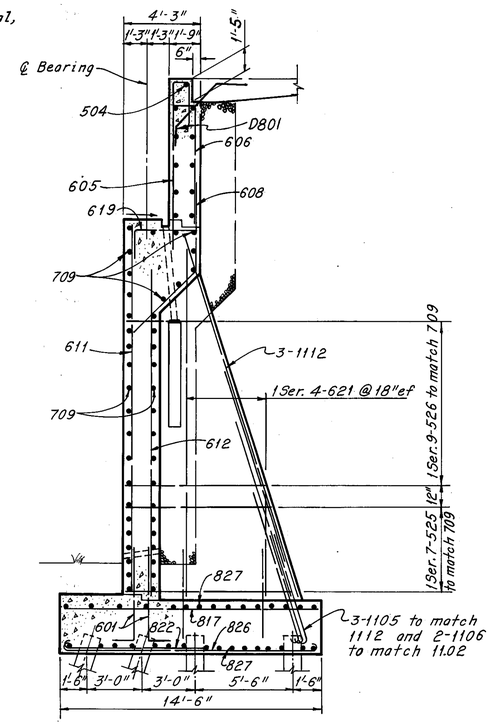


SECTION A-A
(Counterforts A and B, See Sheet 8/24)

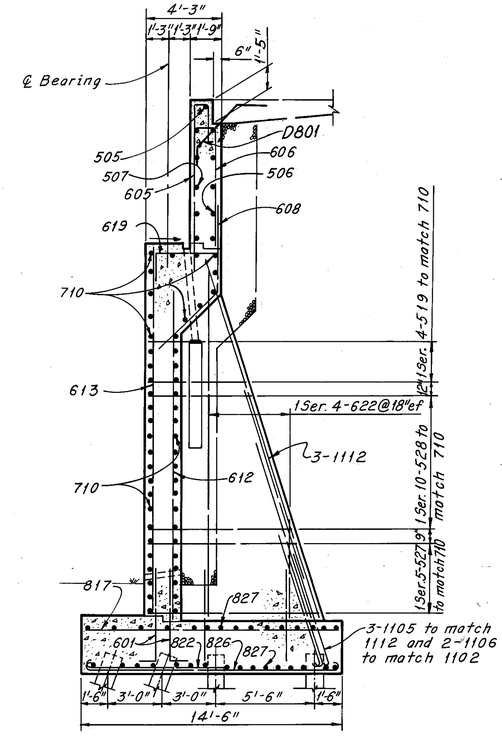


SECTION B-B
(Counterforts C, D and E, See Sheet 8/24)

Note: Section A-A is typical, except as noted in Sections B-B, C-C and D-D.

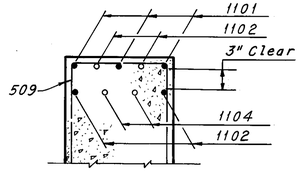


SECTION C-C
(Counterforts F and G, See Sheet 8/24)



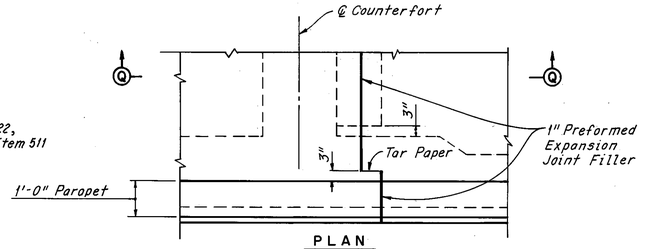
SECTION D-D
(Counterforts H and J, See Sheet 8/24)

Note: All reinforcing bar marks shall be prefixed A N. except D801 bars.



SECTION M-M

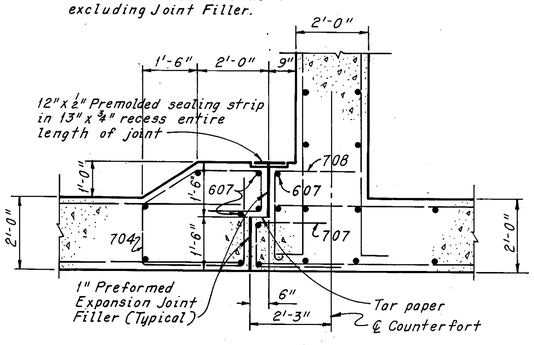
Note: Sheet asbestos packing, 711.22, and tar paper to be included with Item 511 for payment.



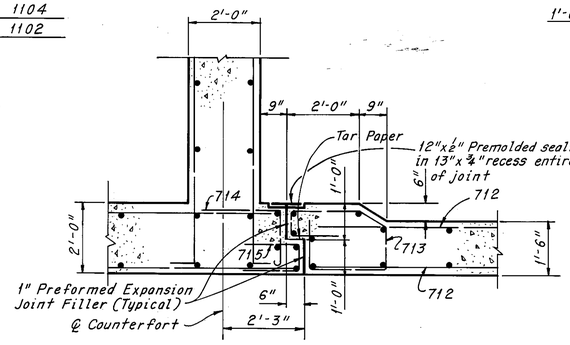
PLAN
SIDEWALK EXPANSION JOINT
(Special Counterfort K)

Notes:
The 4" ϕ drain pipes thru the bridge seat shall be galvanized steel pipe. Galvanizing shall be done in accordance with 707.11. The pipes are included with Item 511 for payment.
For additional notes see Sheet 6/24 and Sheet 8/24.

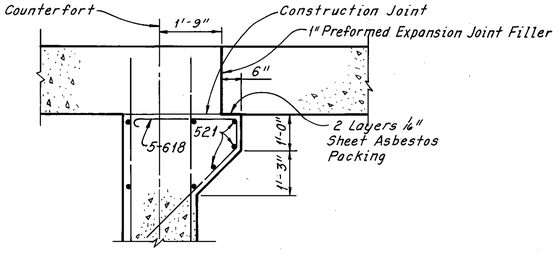
Note: Contraction Joint similar excluding Joint Filler.



TYPICAL JOINT DETAIL
(Expansion Joint Shown)



SECTION P-P
EXPANSION JOINT DETAIL



SECTION Q-Q

H.N.T.B. BR. NO. 35

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

FORWARD ABUTMENT SECTIONS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED T.W.Y.	REVIEWED	REVISED
DATE 7-25-69	DATE 7-30-69	DATE 8-7-69	DATE	SHEET 9/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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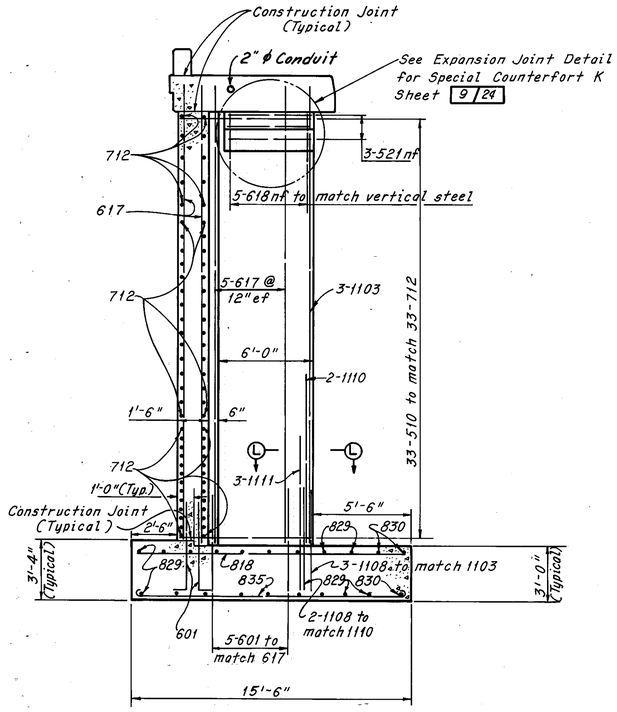
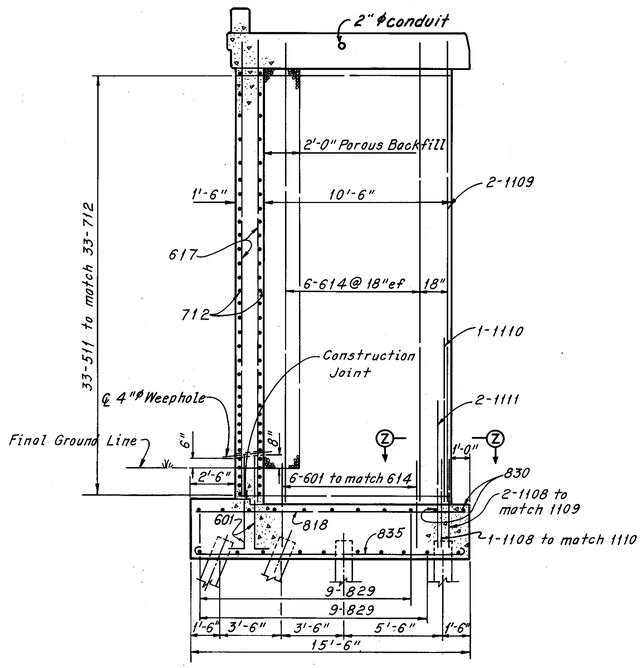
392

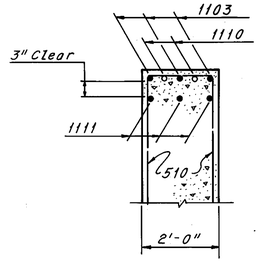
CUYAHOGA COUNTY
CUY-80-15.81



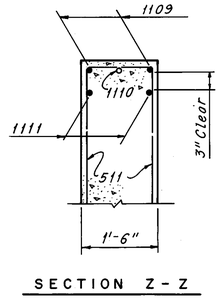
SECTION H-H
(Special Counterfort K, See Sheet 7/24)



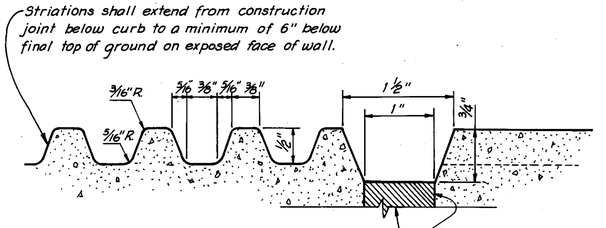
SECTION J-J
(Counterforts L and M, See Sheet 7/24)



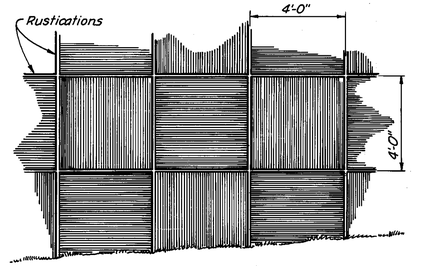
SECTION L-L



SECTION Z-Z



RUSTICATION & STRIATION DETAIL
Scale : Full Size

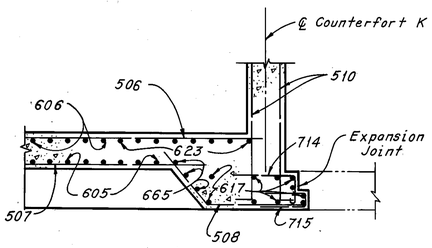


Note:
Special care shall be taken to properly match and finish striations at construction joints.

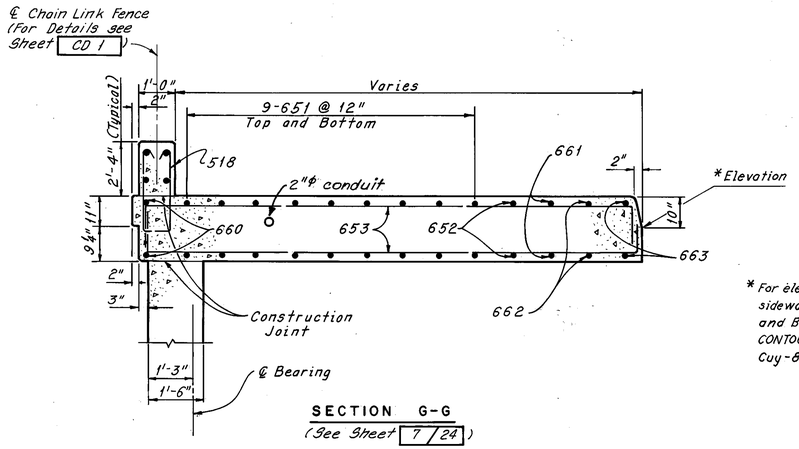
Direction of striations shall be alternated as indicated in the developed elevation view.

DEVELOPED ELEVATION
SHOWING SURFACE TREATMENT

Note: All reinforcing bar marks shall be prefixed AN.



SECTION E-E
(See Sheet 7/24)



SECTION G-G
(See Sheet 7/24)

* For elevation at gutter line of sidewalk between Br. No. Cuy.80-1585 and Br. No. Cuy.80-1593, see PART CONTOUR PLAN Sheet 12/15 Br. No. Cuy-80-1593.

Note:
For notes see Sheet 6/24 and Sheet 8/24.

H.N.T.B. BR.NO.35

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

FORWARD ABUTMENT SECTIONS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-15 85 STA.12+23.13 TO STA.17+06.79

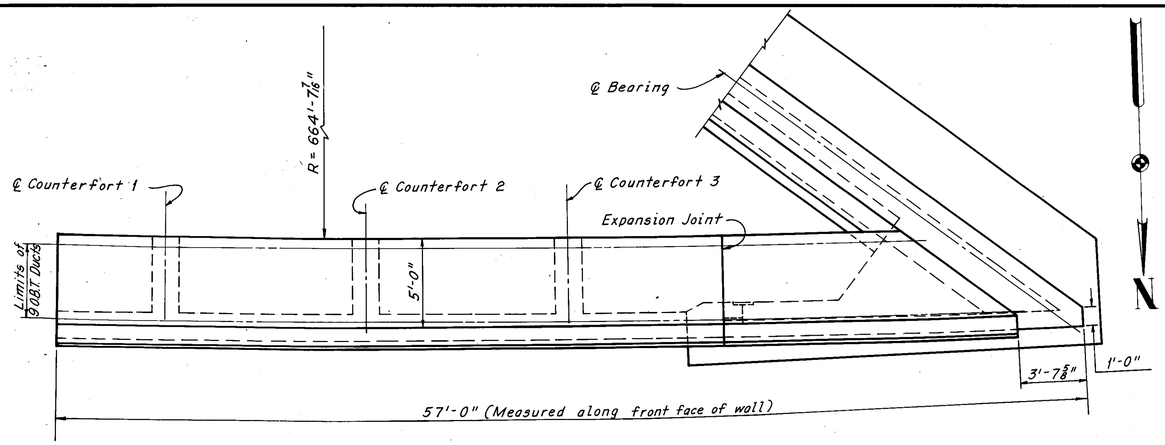
CUYAHOGA COUNTY OHIO

DRAWN D.H.S.	TRACED C.P.	CHECKED J.W.Y.	REVIEWED	REVISED
DATE 7-28-69	DATE 8-8-69	DATE 8-14-69	DATE	SHEET 10/24

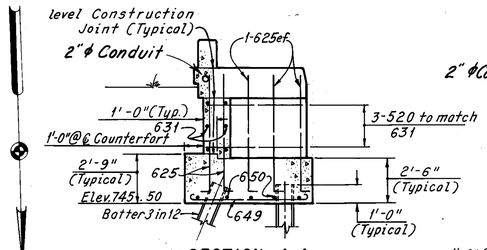
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

331
392

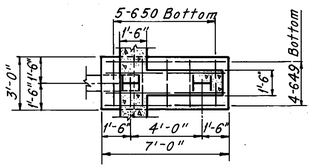
CUYAHOGA COUNTY
CUY-80-15.81



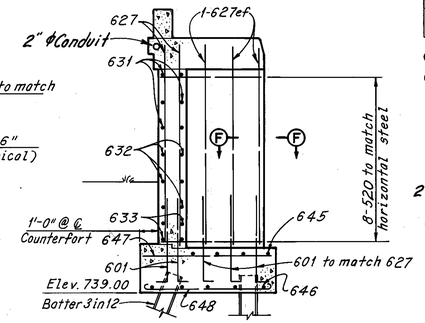
WINGWALL PLAN



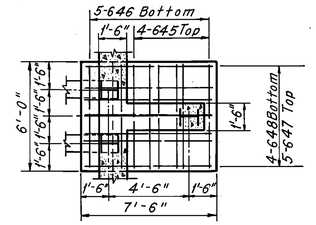
SECTION A-A



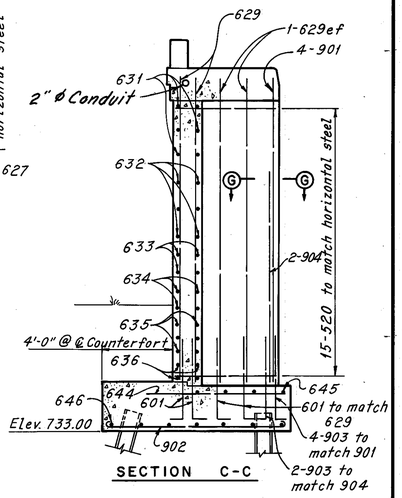
FOOTING PLAN
(Counterfort 1)



SECTION B-B

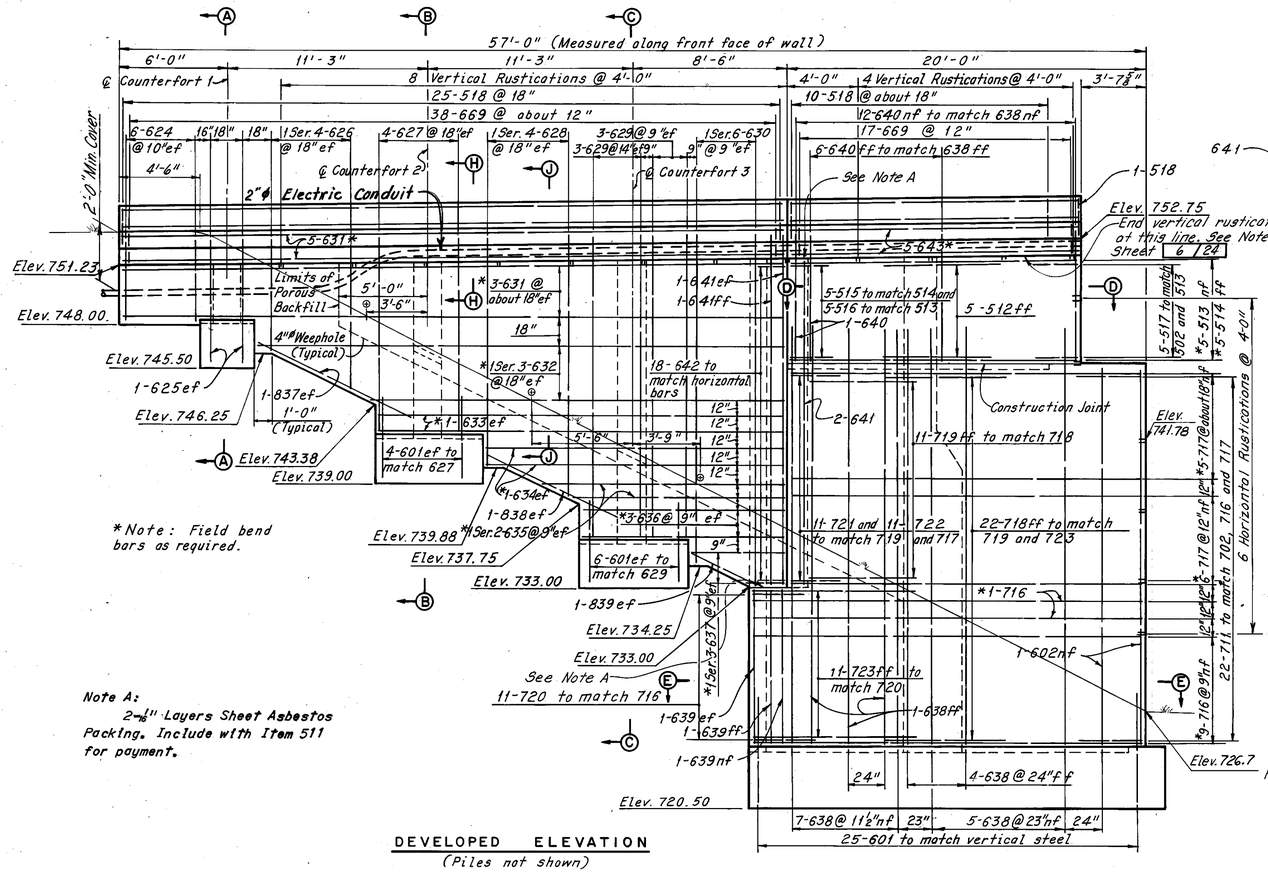


FOOTING PLAN
(Counterfort 2)



SECTION C-C

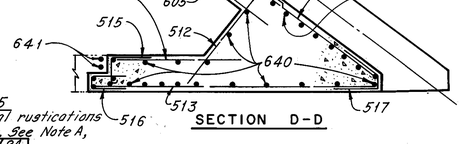
Note: All reinforcing bar marks shall be prefixed AN.



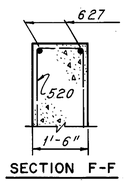
*Note: Field bend bars as required.

DEVELOPED ELEVATION
(Piles not shown)

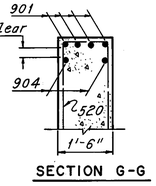
Note A:
2-⅛" Layers Sheet Asbestos Packing. Include with Item 511 for payment.



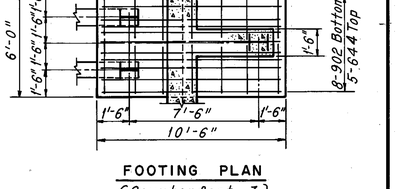
SECTION D-D



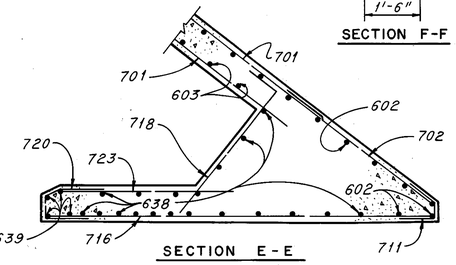
SECTION F-F



SECTION G-G



FOOTING PLAN
(Counterfort 3)



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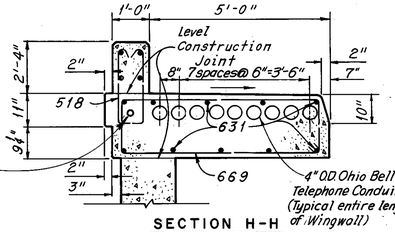
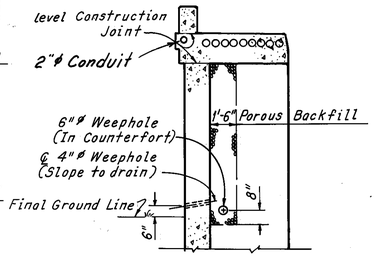


SECTION H-H



SECTION J-J
(Typical for Wingwall)

Notes:
The following abbreviations are used:
nf = near face
ff = far face
ef = each face
For additional notes see Sheet 6 24 and Sheet 8 24.

H.N.T.B. BR. NO. 35

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

FORWARD ABUTMENT
WINGWALL
I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN D.H.S	TRACED C.P.	CHECKED I.W.Y.	REVIEWED	REVISED
DATE 7-18-69	DATE 8-5-69	DATE 8-13-69	DATE	SHEET 11 24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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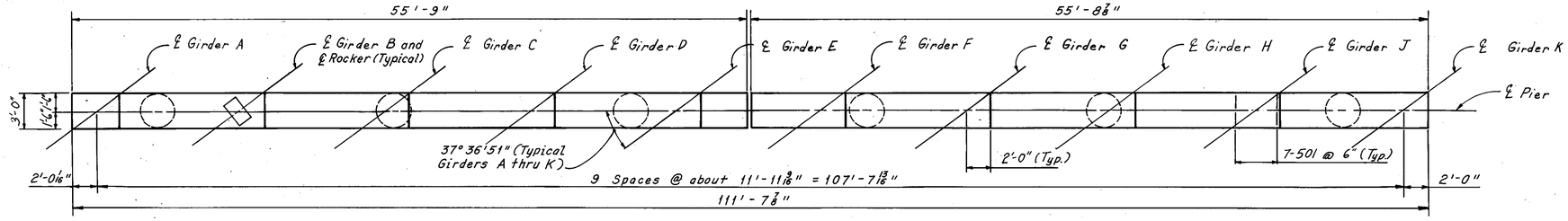
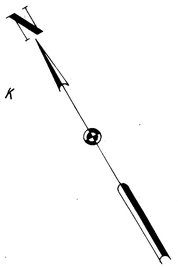
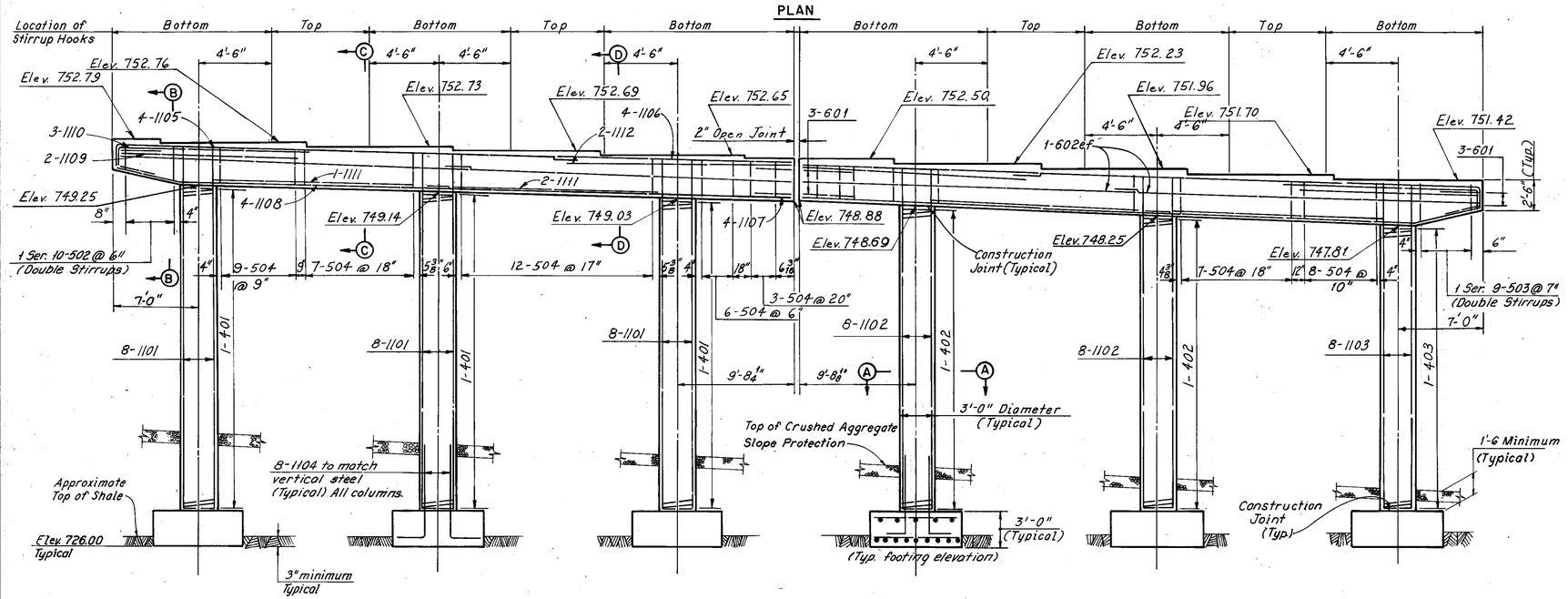
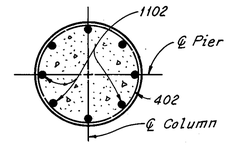
392

CUYAHOGA COUNTY
CUY-80-15.81

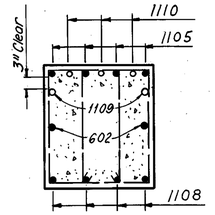




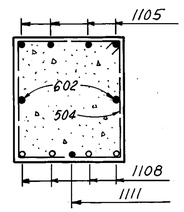




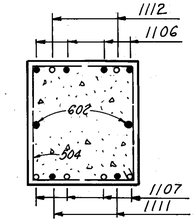
SECTION A-A



SECTION B-B

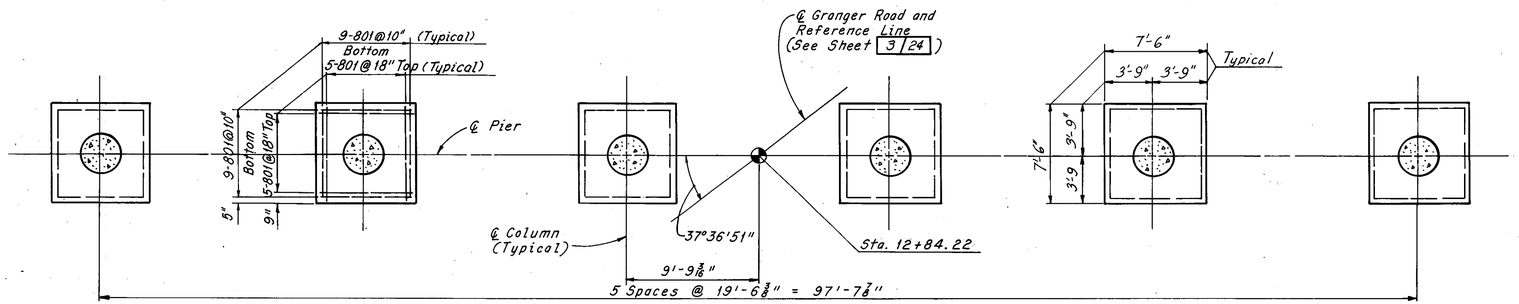


SECTION C-C



SECTION D-D

Note: Reinforcing steel is symmetrical about open joint except as noted.



FOOTING PLAN

Note:
All reinforcing bar marks shall be prefixed PA

Notes:
Footings shall extend a minimum of 3" into firm shale or to the elevation shown, whichever is lower.
The following abbreviation is used:
ef = each face

H.N.T.B. BR. NO. 35

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

PIER 1

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN M-RS	TRACED WB	CHECKED AG	REVIEWED	REVISED
DATE 6/1969	DATE 7/1/69	DATE 7/1969	DATE	SHEET 12/24

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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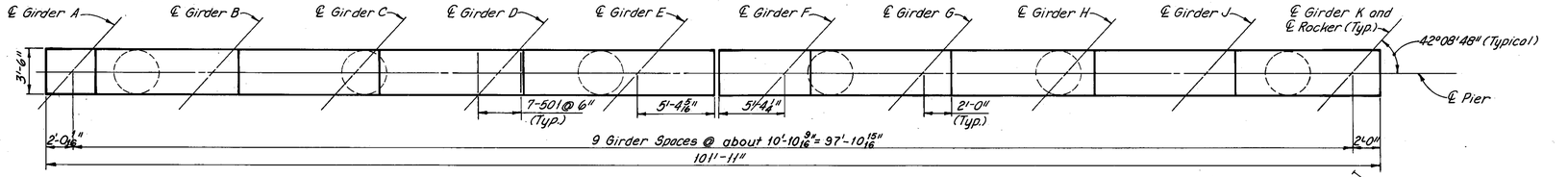
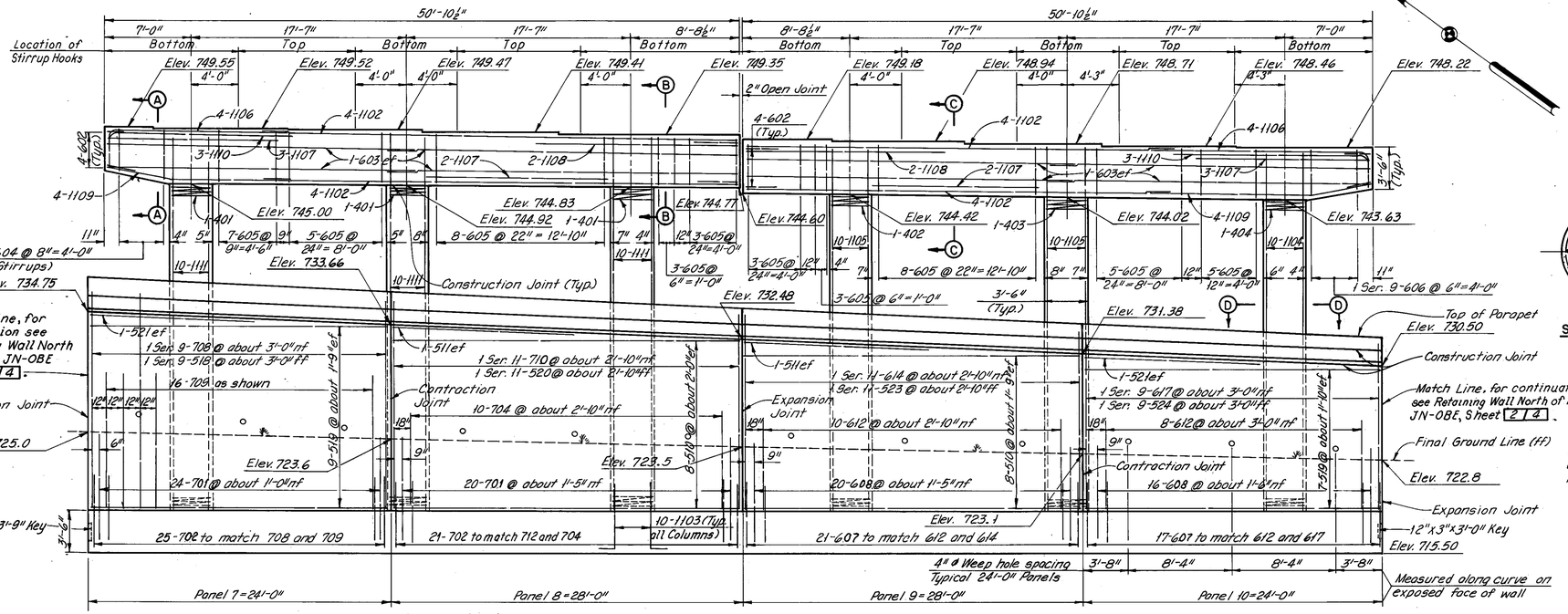
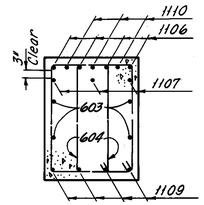
392

CUYAHOGA COUNTY
CUY-80-15.81

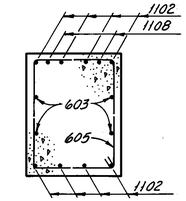


CAP PLAN

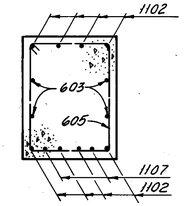




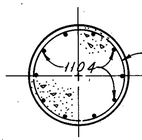
SECTION A-A



SECTION B-B



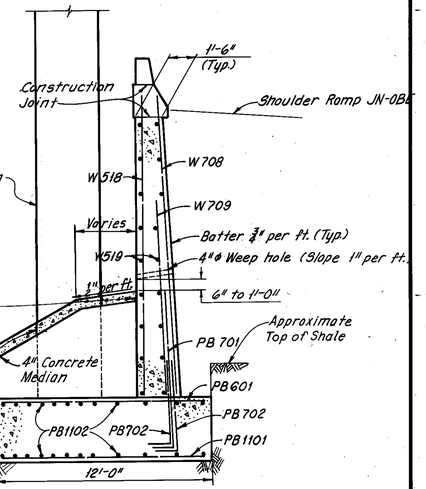
SECTION C-C



SECTION D-D

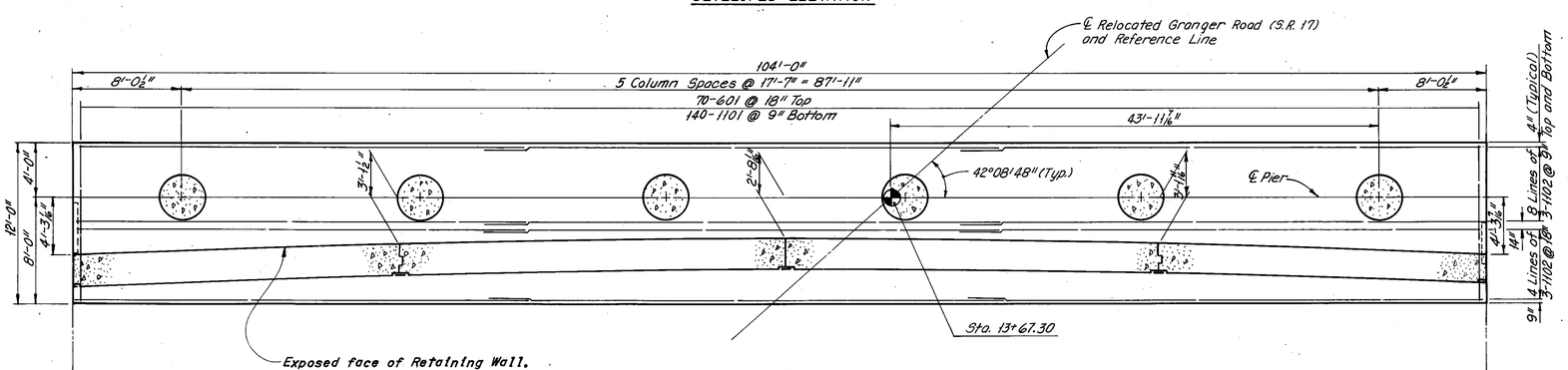
1" Preformed Expansion Joint Filler (Include with 4" Concrete Median for payment)

1" Preformed Expansion Joint Filler around Pier Columns (Include with 4" Concrete Median for payment)



WALL SECTION
(Section thru Panel 7 shown)

DEVELOPED ELEVATION



FOOTING PLAN

Notes:

All footings shall extend a minimum of 3 inches into shale or to the elevation shown, whichever is lower.

Vertical rusticattions shall be provided at all contraction and expansion joints and at 4'-0" intervals between joints on the exposed face of the wall and shall extend from top of footing to construction joint at the bottom of curb. Horizontal rusticattions shall be provided at Elev. 726.52, 730.52, 734.52 and 738.52.

For Rusticattion and striation details see Sheet 10/24.

For additional retaining wall plans and details see Retaining Wall North of Ramp JN-OBE, Sheets 1 thru 4 of 4. The excavation quantity for Pier 2 is determined the same as shown for the retaining wall.

The concrete in the wall above the footing and all reinforcement which does not extend into the footing (Prefixed W) are included with the Retaining Wall Quantities.

The following abbreviations are used:

nf = near face
ff = far face
ef = each face

For pier notes see Sheet 12/24.

Note: All pier reinforcing bar marks shall be prefixed PB. All wall reinforcing bar marks shall be prefixed W. (Footing bar prefixed PB)

H.N.T.B. BR.NO.35

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

PIER 2 AND RETAINING WALL

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-15 85 STA.12+23.13 TO STA.17+06.79

CUYAHOGA COUNTY OHIO

DRAWN JW	TRACED WB	CHECKED JT	REVIEWED	REVISED
DATE 5-1-72	DATE 5-20-72	DATE 6-3-70	DATE	SHEET 13/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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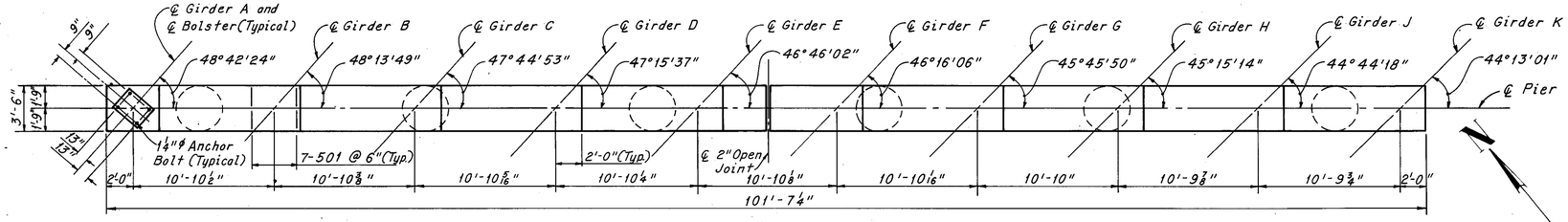
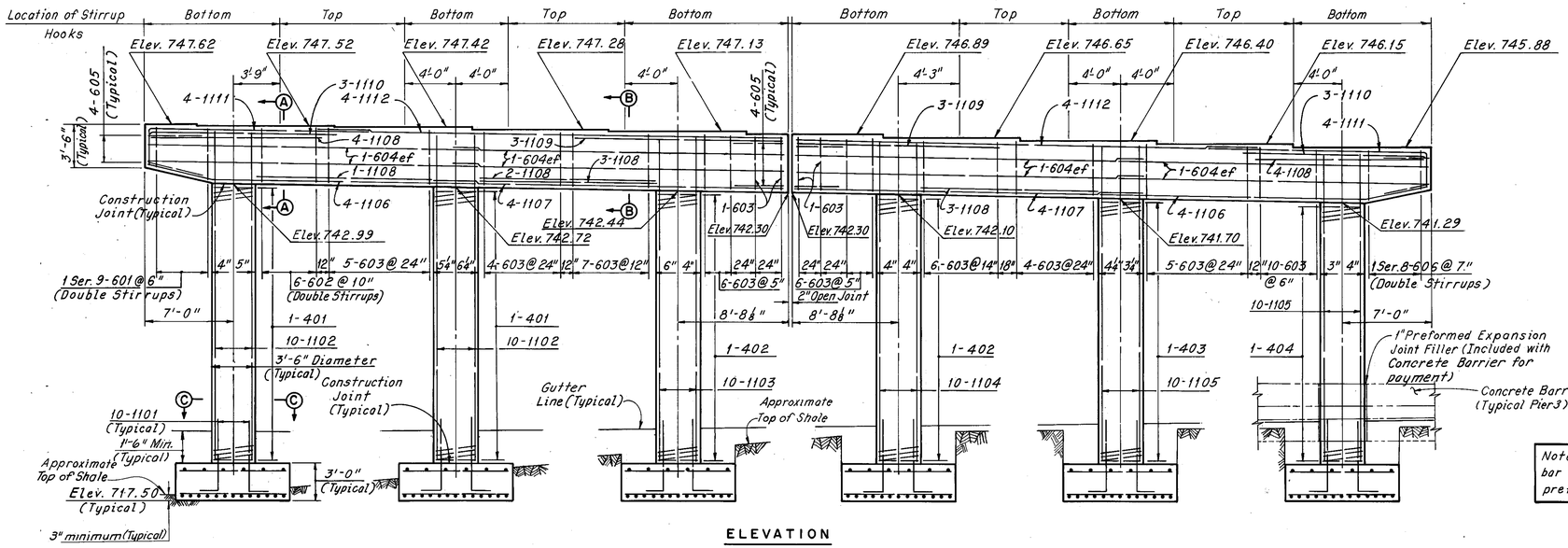
392

CUYAHOGA COUNTY
CUY-80-15.81



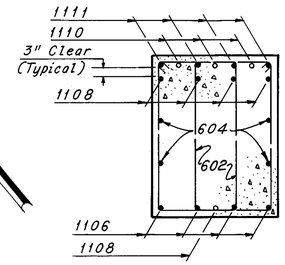
PLAN

Note:
Special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes.

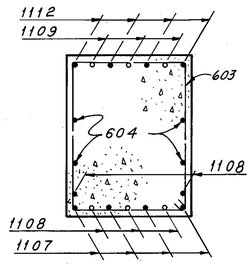


ELEVATION

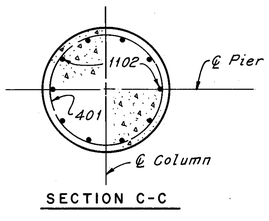
Note: All reinforcing bar marks shall be prefixed PC.



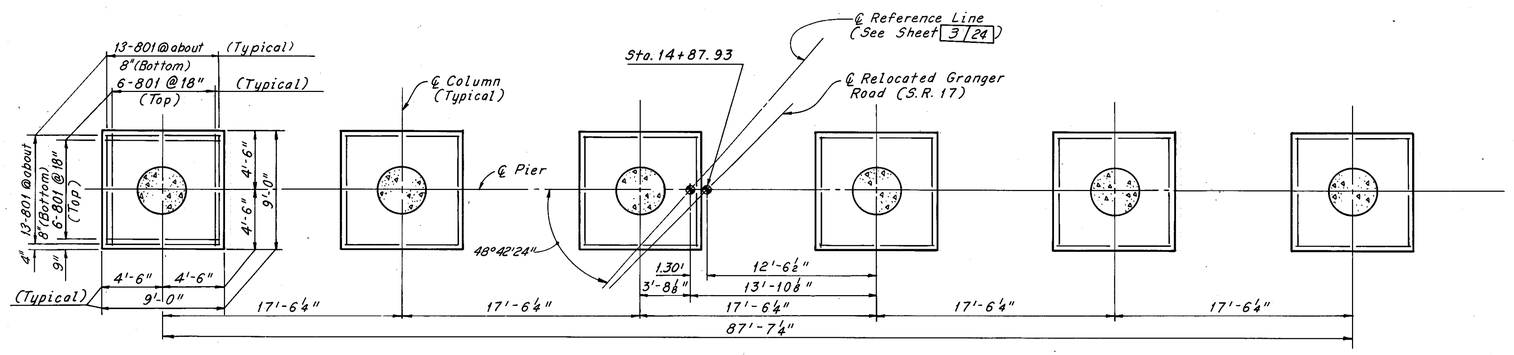
SECTION A-A



SECTION B-B



SECTION C-C



FOOTING PLAN

Notes:
Footing shall extend a minimum of 3" into firm shale or to the elevation shown, whichever is lower.
For anchor bolt details see Ohio Standard Drawing RB-1-55, revised 2-2-59, and Sh. GN 1
The following abbreviation is used:
ef = each face
For additional notes see Sheet 12/24.

H.N.T.B. BR. NO. 35

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

PIER 3

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN C.P.	TRACED C.P.	CHECKED RCG	REVIEWED	REVISED
DATE 6-2069	DATE 7-2-69	DATE 7/24/69	DATE	SHEET 14/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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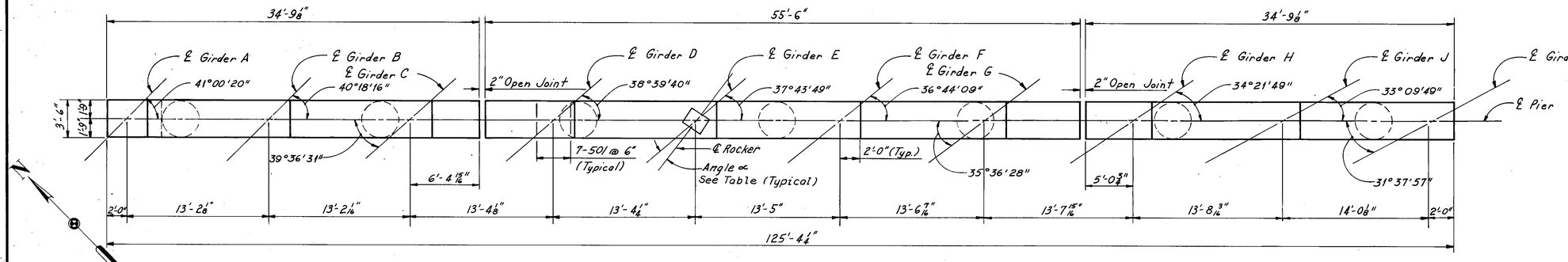
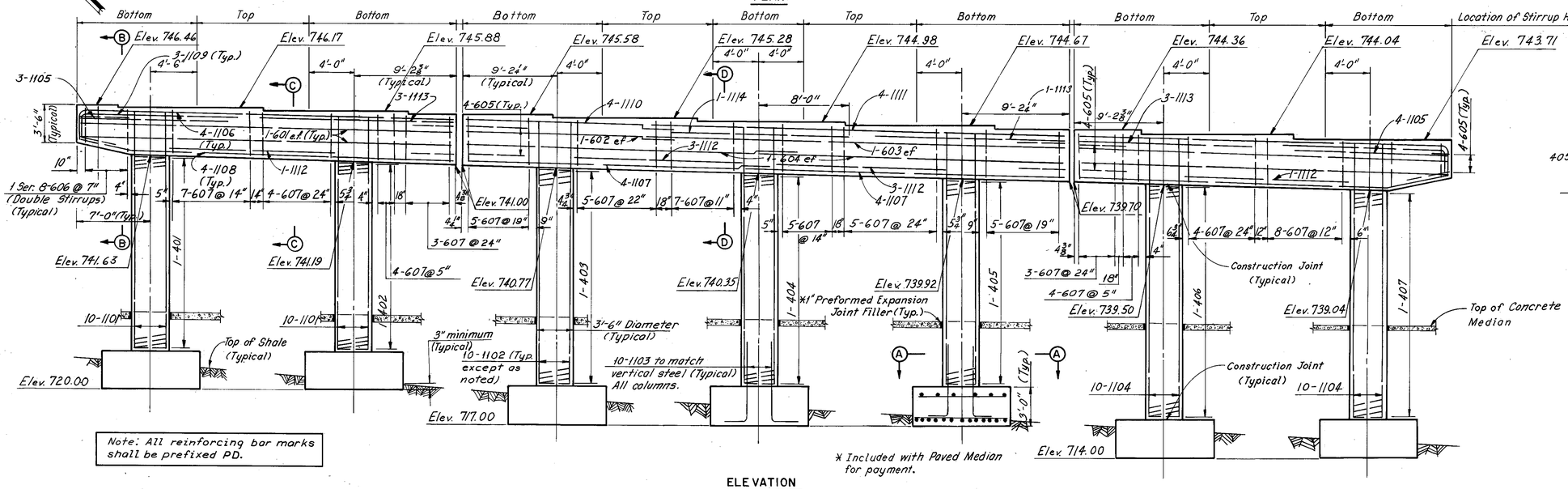
CUYAHOGA COUNTY
CUY.- 80-15.81

ROCKER ANGLES	
Girder	∝ Angle
A	7°10'00"
B	6°40'00"
C	6°30'00"
D	6°20'00"
E	6°10'00"
F	6°10'00"
G	6°10'00"
H	6°20'00"
J	6°30'00"
K	7°00'00"



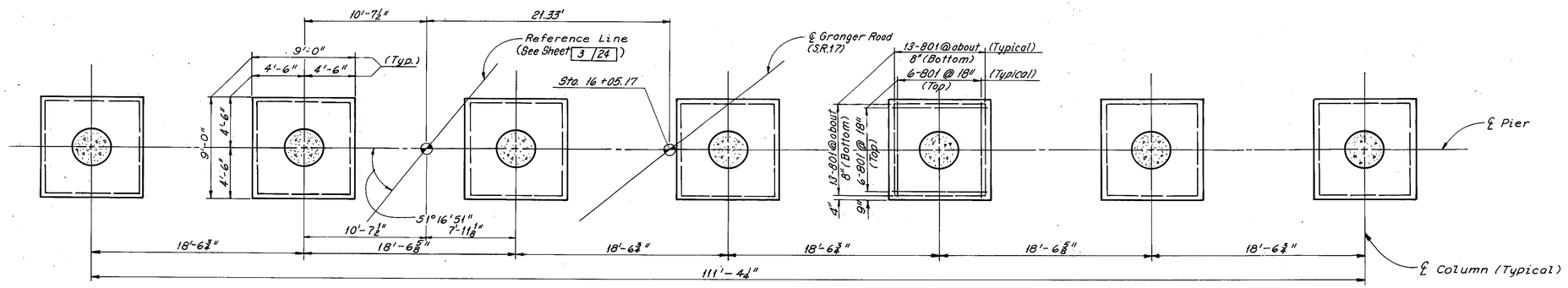
PLAN



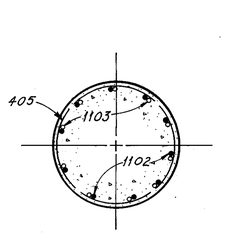
Note: All reinforcing bar marks shall be prefixed PD.

* Included with Paved Median for payment.

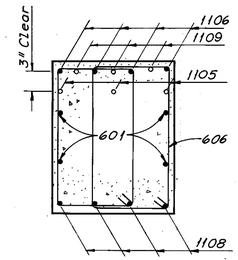
ELEVATION



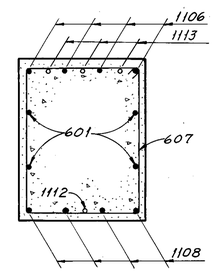
FOOTING PLAN



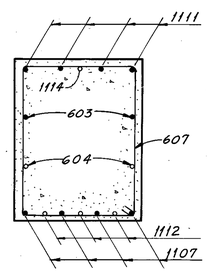
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

Notes:
Footings shall extend a minimum of 3" into firm shale or to the elevation shown, whichever is lower.
The following abbreviation is used:
ef = each face
(Typ.) = Typical
For additional notes see Sheet 12/24.

H.N.T.B. BR. NO. 35

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

PIER 4

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY- 80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN KRS	TRACED WB	CHECKED DWS	REVIEWED	REVISED
DATE 7-8-69	DATE 7-15-69	DATE 8-18-69	DATE	SHEET 15/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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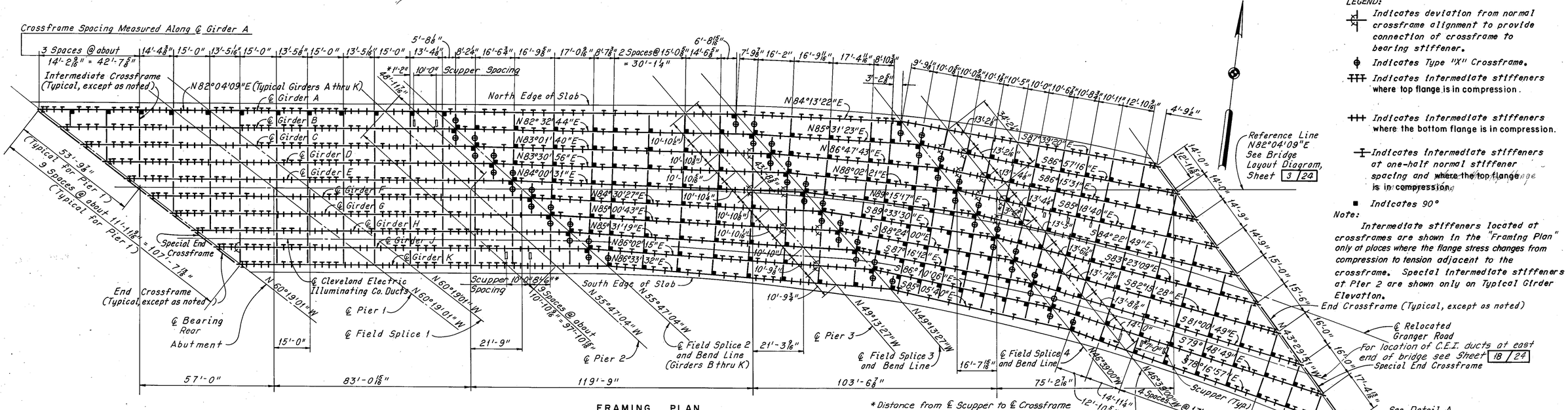
CUYAHOGA COUNTY

CUY-80-15.81

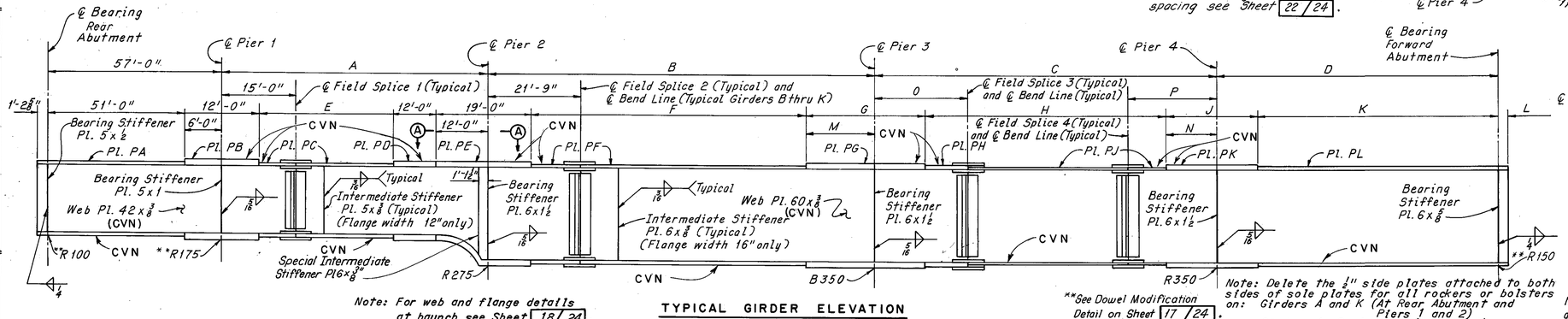
HORIZONTAL OFFSETS TO EDGE OF SLAB																				
Location	℄ Bearing S. Abut.	1/4	1/2	3/4	℄ Field Splice 1	1/4	1/2	3/4	℄ Field Splice 2	1/4	1/2	3/4	℄ Field Splice 3	1/4	1/2	3/4	℄ Field Splice 4	1/4	1/2	3/4	℄ Bearing N. Abut.
℄ Girder A to North Edge of Slab	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-7 3/4"	3'-8 1/4"	3'-3 1/4"	2'-4 5/8"	3'-11 5/8"	4'-5"	3'-8 3/4"	1'-10 7/16"
℄ Girder K to South Edge of Slab	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-1 3/4"	3'-2 5/8"	1'-10 1/4"	1'-7 5/8"	2'-6 7/8"	4'-8"	3'-9 1/4"	3'-4 1/2"	3'-5 5/8"	4'-0 5/8"	2'-3 1/4"	1'-8 5/8"	2'-6 1/4"	4'-9 3/8"

Note: The 1/4, 1/2 and 3/4 points are measured between the ℄ of Abutment Bearing and Field Splice or between Field Splices. Horizontal offsets are given perpendicular to ℄ Girder. Offsets at Field Splices are to be measured perpendicular to Girder left of Field Splice.



FRAMING PLAN

* Distance from ℄ Scupper to ℄ Crossframe measured along curb line. For Scupper spacing see Sheet 22/24.

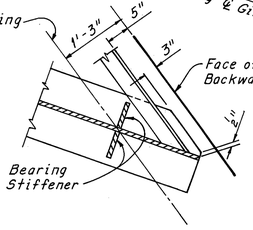


Note: For web and flange details at haunch see Sheet 18/24.

TYPICAL GIRDER ELEVATION

**See Dowel Modification Detail on Sheet 17/24.

Note: Delete the 1" side plates attached to both sides of sole plates for all rockers or bolsters on: Girders A and K (At Rear Abutment and Piers 1 and 2)
Girders A, B, J and K (At Pier 3)
Girders A, B, C, H, J, and K (At Pier 4 and Forward Abutment)



DETAIL A

Note: Similar flange cuts shall be made at both abutments for all girders.

INTERMEDIATE STIFFENERS shall have a tight fit with the tension flange and may have either a tight fit or be welded to the compression flange with a 1/4" fillet weld.

LEGEND:

- Indicates deviation from normal crossframe alignment to provide connection of crossframe to bearing stiffener.
- Indicates Type "X" Crossframe.
- Indicates intermediate stiffeners where top flange is in compression.
- Indicates intermediate stiffeners where the bottom flange is in compression.
- Indicates intermediate stiffeners at one-half normal stiffener spacing and where the top flange is in compression.
- Indicates 90°

Note:

Intermediate stiffeners located at crossframes are shown in the "Framing Plan" only at places where the flange stress changes from compression to tension adjacent to the crossframe. Special intermediate stiffeners at Pier 2 are shown only on Typical Girder Elevation.

Notes:

For details of Rockers and Bolsters see Ohio Standard Drawing RB-1.55, revised 2-2-59, and Sheet 17/24.
For View A-A see Sheet 17/24.
For Crossframe Details see Sheet 18/24.
For End Dam Details see Sheet 18/24 and Sheet 19/24.
For additional notes see Sheet 17/24. and Sheet GN 1

CVN - See Sh. GN 1

TABLE OF GIRDER DIMENSIONS																
Girder	Dimensions															
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	
A	89'-5"	127'-2 5/16"	111'-4 15/16"	90'-6 1/8"	59'-5"	109'-2 5/8"	19'-0"	91'-4 15/16"	19'-0"	83'-6 1/8"	1'-4 1/2"	11'-0"	12'-0"	21'-3 9/16"	19'-9 3/16"	
B	88'-0 1/8"	126'-3 11/16"	112'-7 1/4"	90'-7 1/8"	58'-0 1/2"	108'-3 11/16"	19'-0"	92'-7 1/4"	21'-0"	81'-7 1/8"	1'-4 3/4"	11'-0"	12'-0"	21'-5 7/16"	20'-1 3/16"	
C	86'-7 7/8"	125'-5 1/16"	113'-10 3/4"	90'-8 5/16"	56'-7 5/8"	107'-5 1/16"	19'-0"	93'-10 3/16"	21'-0"	81'-9 5/16"	1'-4 15/16"	11'-0"	12'-0"	21'-7 3/16"	20'-4 11/16"	
D	85'-2 5/8"	124'-6 1/16"	115'-1 3/4"	91'-3 5/8"	55'-2 5/8"	106'-6 1/16"	19'-0"	95'-3 5/8"	21'-0"	82'-3 5/8"	1'-4 15/16"	11'-0"	12'-0"	21'-9 1/16"	20'-9 1/16"	
E	83'-9 3/8"	123'-7 5/16"	116'-8 3/16"	91'-10 1/16"	53'-9 3/8"	105'-7 5/16"	18'-0"	97'-8 3/16"	21'-0"	82'-10 5/8"	1'-5 1/8"	11'-0"	12'-0"	21'-11 1/8"	21'-2 5/16"	
F	82'-4 1/2"	122'-9 7/16"	118'-3 1/16"	92'-1 7/16"	52'-4 1/2"	104'-9 7/16"	18'-0"	99'-3 1/16"	21'-0"	83'-7 1/16"	1'-5 3/8"	11'-0"	12'-0"	22'-1 11/16"	21'-8 13/16"	
G	80'-11 13/16"	121'-11"	119'-11 5/8"	93'-8 1/4"	50'-11 3/8"	101'-11"	20'-0"	99'-11 5/16"	22'-0"	84'-8 1/16"	1'-6 1/16"	13'-0"	13'-0"	22'-4"	22'-3 5/16"	
H	79'-6 11/16"	121'-0 3/16"	121'-10 3/4"	95'-1"	49'-6 1/8"	101'-0 9/16"	20'-0"	101'-10 3/16"	22'-0"	86'-1"	1'-6 13/16"	13'-0"	13'-0"	22'-6 5/16"	23'-0 9/16"	
J	78'-1 3/4"	120'-2 1/16"	123'-9 1/4"	96'-6"	48'-1 3/4"	100'-2 1/16"	26'-0"	97'-9 1/4"	22'-0"	87'-6"	1'-7 1/16"	13'-0"	13'-0"	22'-8 3/16"	23'-9 3/16"	
K	76'-8 7/16"	119'-3 3/4"	126'-0 1/8"	98'-9 15/16"	46'-8 7/16"	98'-3 3/4"	27'-0"	100'-0 1/8"	24'-0"	87'-9 15/16"	1'-8 1/16"	14'-0"	13'-0"	22'-11 13/16"	24'-9 7/16"	

TABLE OF FLANGE PLATES											
Girder	Plate Size										
	PA	PB	PC	PD	PE	PF	PG	PH	PJ	PK	PL
A	12x3/8	12x1 1/4	12x1	12x1 3/8	16x1 3/8	16x1 5/8	16x2 1/4	16x1 3/8	16x5/8	16x1 3/8	16x1 1/4
B	12x3/8	12x1 1/8	12x3/4	12x1 5/8	16x1 5/8	16x1 1/4	16x2 1/4	16x1 3/8	16x3/4	16x1 3/8	16x1 1/8
C	12x3/8	12x1 1/8	12x3/8	12x1 5/8	16x1 5/8	16x1 1/4	16x2	16x1 1/2	16x7/8	16x1 3/8	16x1 1/8
D	12x3/8	12x1 1/8	12x3/8	12x1 5/8	16x1 5/8	16x1 1/4	16x2	16x1 1/2	16x5/8	16x1 1/4	16x1 1/8
E	12x3/8	12x1 1/8	12x3/8	12x1 1/2	16x1 1/2	16x1 1/4	16x2	16x1 1/2	16x5/8	16x1 3/8	16x1 1/8
F	12x3/8	12x1	12x3/8	12x1 1/2	16x1 1/2	16x1 1/8	16x2	16x1 1/2	16x7/8	16x1 3/8	16x1 1/8
G	12x5/8	12x1	12x3/4	12x1 1/2	16x1 1/2	16x1 1/8	16x2	16x1 1/2	16x7/8	16x1 7/8	16x1 1/4
H	12x5/8	12x1	12x3/4	12x1 3/8	16x1 3/8	16x1 1/8	16x2	16x1 1/2	16x5/8	16x1 1/4	16x1 1/4
J	12x5/8	12x1	12x3/4	12x1 3/8	16x1 3/8	16x1	16x2	16x1	16x1	16x1 3/4	16x1 1/4
K	12x5/8	12x1 1/8	12x3/4	12x1 3/8	16x1 3/8	16x1 1/8	16x2 1/4	16x1 1/8	16x1 1/8	16x2	16x1 1/4

WELD SIZE WEB TO FLANGE	
Flange Plate Thickness	Fillet Weld Size
3/4" thru 1 1/2"	5/16"
1 5/8" thru 2 1/4"	3/8"

H.N.T.B. BR.NO.35

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

FRAMING PLAN

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

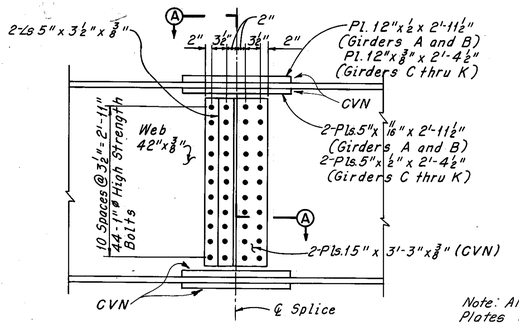
CUYAHOGA COUNTY OHIO

DRAWN J.E.H.	TRACED C.P.	CHECKED MCG	REVIEWED	REVISED
DATE 6-4-69	DATE 6-16-69	DATE 7-7-69	DATE	SHEET 16/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

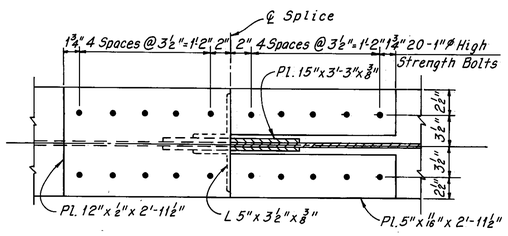
337
392

CUYAHOGA COUNTY
CUY - 80-15.81

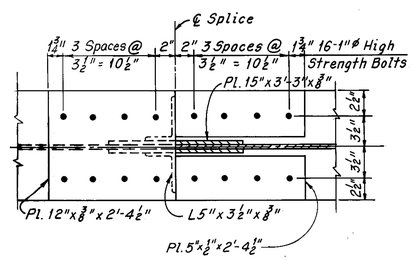


FIELD SPLICE 1

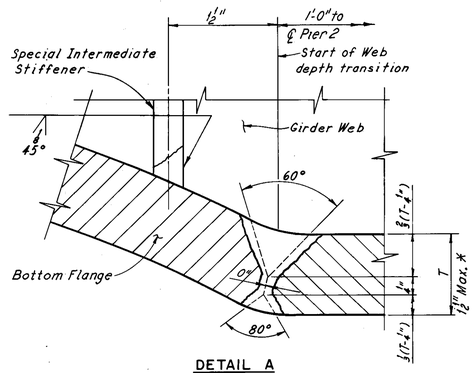
Note: All Flange Splice Plates are Typical, top and bottom of web.



SECTION A-A
(Girders A and B)

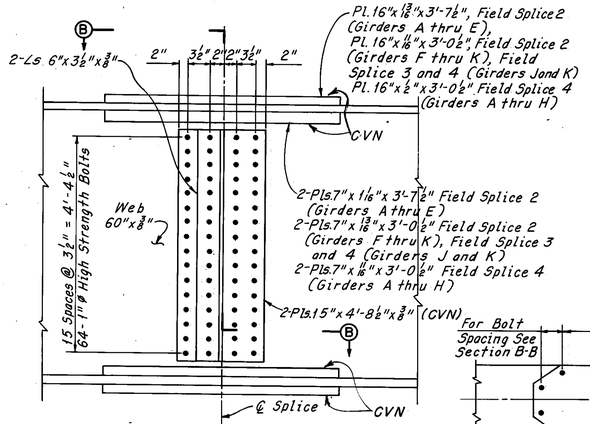


SECTION A-A
(Girder C thru K)

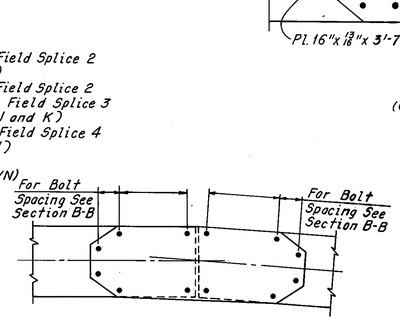


DETAIL A

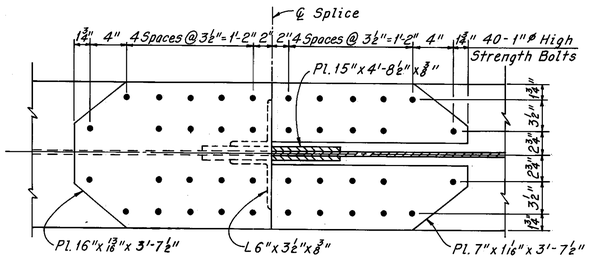
Note: The above full penetration weld shall be back-gouged and welded after welding far side. The weld shall be ground flush, the finish grinding being parallel to the direction of stress.
*For plate thickness over 1½", use joint preparation conforming to B-U3a-S or B-U7-S, Figure 216, A.W.S. Specifications.



FIELD SPLICE 2, 3 & 4
(Typical except for Girders A thru H, Field Splice 3)



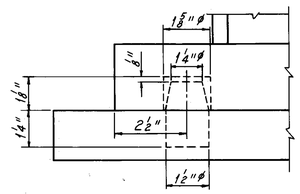
COVER PLATE DETAIL AT GIRDER BEND POINT



SECTION B-B
(Girder A thru E, Field Splice 2 only).

ABUTMENT ROCKER AND BOLSTER DIMENSIONS (Inches)															
NUMBER	NO. REQ'D.	A	B	C	D	F	G	H	K	L	M	R	T	Y	WEIGHT
R350, B350	20	3½	22	4	3¼	⅞	12	20⅞	15	30	25	13¼	3½	1 11/16	24,440

Note: For dimension locations and details see Ohio Standard Drawing RB-1-55, revised 2-2-59. Rocker details, except for anchor bolt holes in base plate, shall be the same as given on Ohio Standard Drawing RB-1-55, but with dimensions as shown here.



DETAIL OF DOWEL MODIFICATION FOR R100, R150 AND R175

GIRDER NOTES:

The girders shall be fabricated to compensate for the effects of dead load, vertical curvature and superelevation. In all spans except Span 2, the top of the girder shall parallel the profile of the roadway surface directly over the center-line of the girder. In Span 2 allowance shall be made for the variation in haunch depth between Pier 1 and Pier 2.

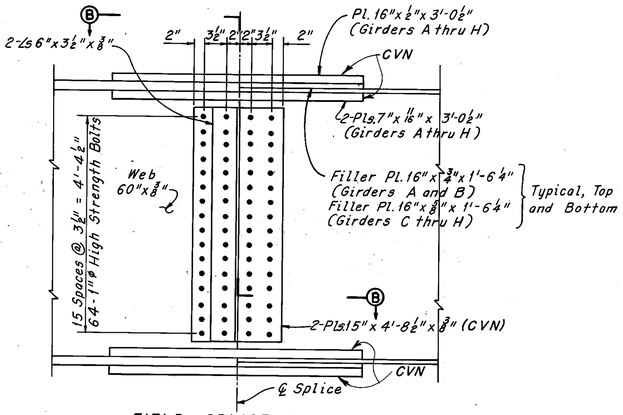
Top and bottom flange plates are to be the same and shall be spliced at points shown on the framing plan. The web plates may be shop spliced as required by available plate lengths. The locations of shop web splices and the locations and details of any additional shop flange splices shall be submitted to the Director for approval prior to ordering of materials.

Intermediate stiffeners shall be placed as shown on the framing plan equally spaced between crossframes, or crossframes and bearing stiffeners, or crossframes and field splices. Additional stiffeners shall be placed 1'-1½" west of ℄ Pier 2 (see Detail A). Stiffeners shall be placed in pairs.

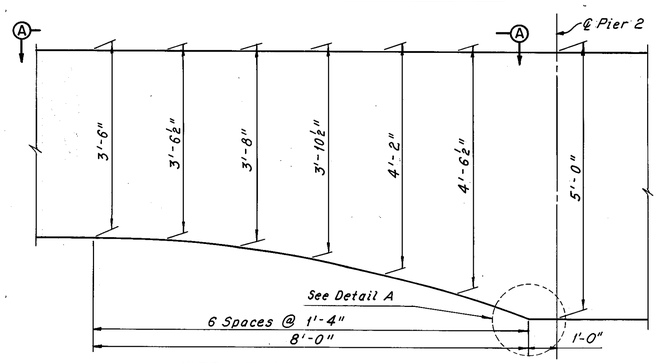
Bearing stiffeners at piers and abutments shall be placed in pairs. Bearing stiffeners at the piers and all intermediate stiffeners shall be normal to the top flange. Bearing stiffeners at abutments shall be vertical.

All girder field splices shall be made with 1" diameter high strength steel bolts. The bolts shall be placed with their heads on the outside face of exterior girders and on the bottom of all flange plates.

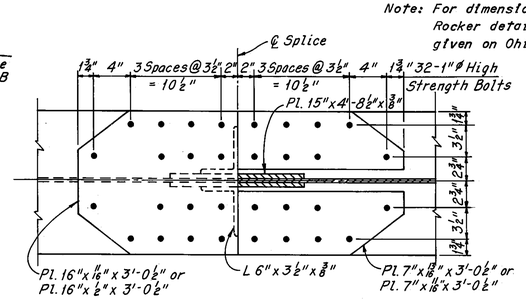
The Contractor shall submit to the Director for approval three prints showing his proposed erection procedure.



FIELD SPLICE 3
(Girders A thru H)



WEB TRANSITION DETAIL



VIEW A-A
(See Framing Plan for location)

H.N.T.B. BR. NO. 35

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GIRDER DETAILS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 6-30-69	DATE 7-7-69	DATE 8/1/69	DATE	SHEET 17/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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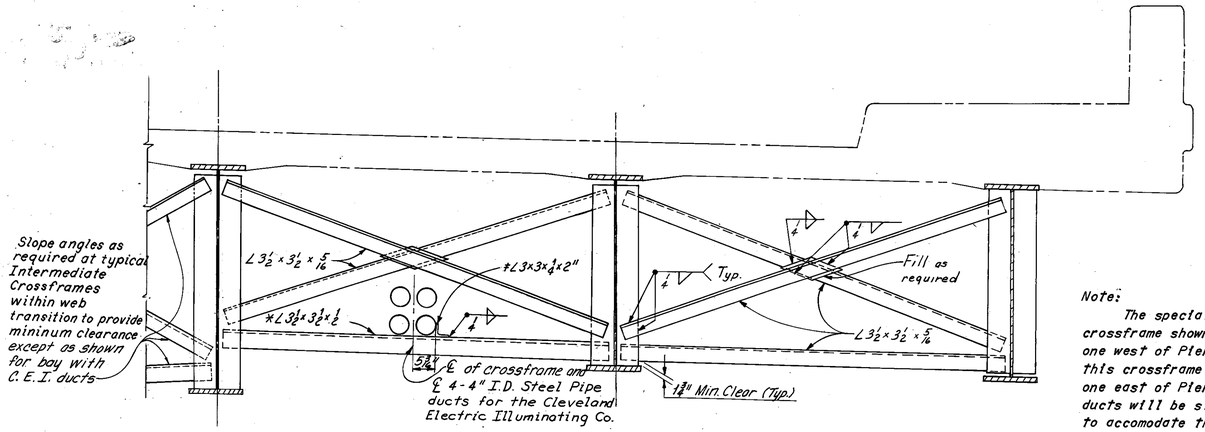
392

CUYAHOGA COUNTY
CUY. – 80 – 15.81

ROADWAY END DAMS: A 3" x ¼" bar shall be welded to the main angle, at the rear abutment only and regardless of grade, as shown for beveled bar on SD-1-69, Sh. 1 of 4, in detail labeled LONGITUDINAL SECTION, BRIDGE ON GRADE.

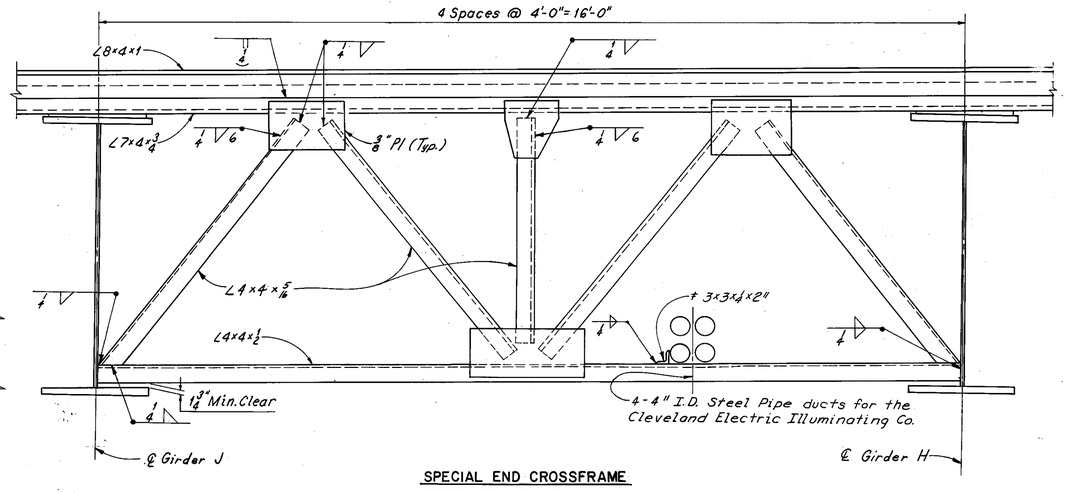


SPECIAL INTERMEDIATE (Between Girder H and Girder J)

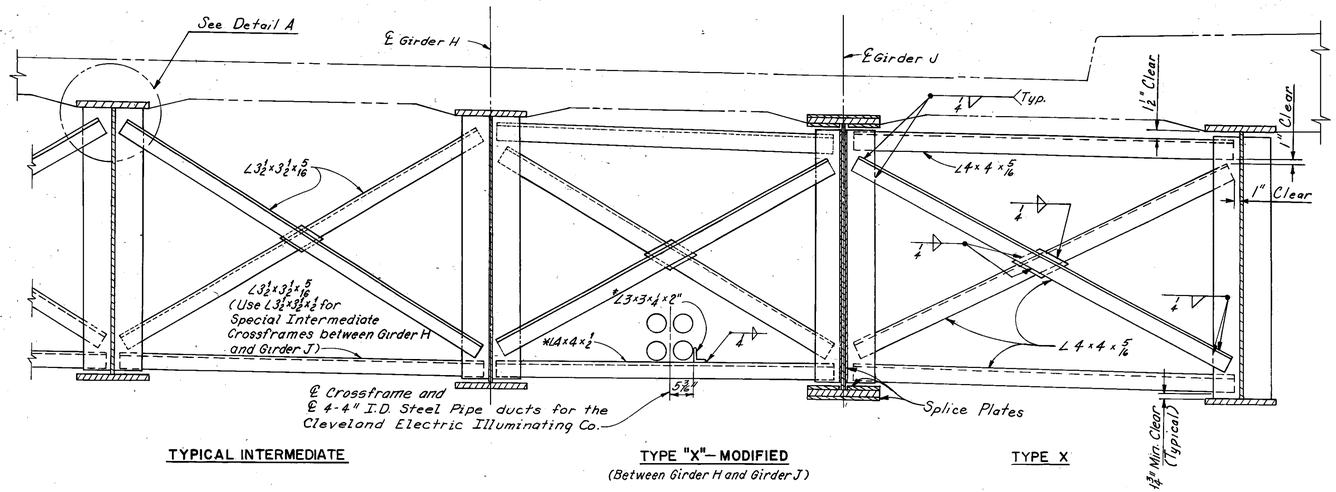
TYPICAL INTERMEDIATE

TYPICAL CROSSFRAMES FOR 42 INCH WEB

Note:
The special intermediate crossframe shown is the first one west of Pier 2. Between this crossframe and the first one east of Pier 2, the pipe ducts will be slightly curved to accomodate the change in girder depth.



SPECIAL END CROSSFRAME
FORWARD ABUTMENT

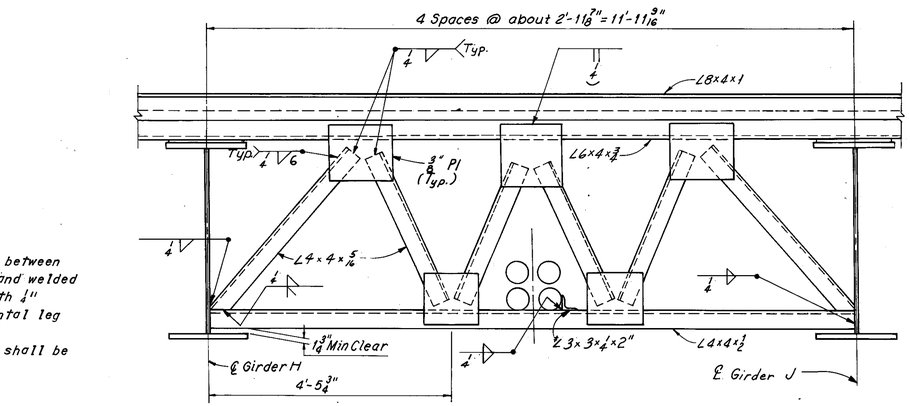


TYPICAL INTERMEDIATE

TYPE "X"–MODIFIED
(Between Girder H and Girder J)

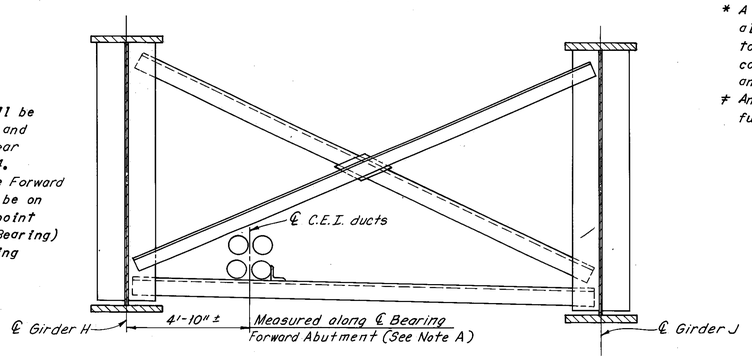
TYPE X

TYPICAL CROSSFRAMES FOR 60 INCH WEB



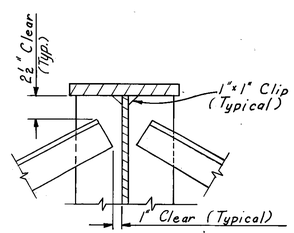
SPECIAL END CROSSFRAME
REAR ABUTMENT

Note A:
The C.E.I. ducts shall be centered between Girder H and Girder J from ℄ Bearing Rear Abutment to Field Splice 4. From Field Splice 4 to the Forward Abutment, the ducts shall be on a tangent passing thru a point 4'-10" (measured along ℄ Bearing) from ℄ Girder H at ℄ Bearing Forward Abutment.



SPECIAL INTERMEDIATE CROSSFRAME
(Shows location of C.E.I. ducts at east end of bridge)

* A support L 3½ x 3½ x ½ should be placed midway between all crossframes greater than 12'-6" apart and welded to a stiffener plate or to a girder web with ¼" continuous fillet weld along top of horizontal leg and both sides of vertical leg.
‡ Angle pipe stop, pipe racks and pipe ducts shall be furnished and installed by the C.E.I. Co.



DETAIL A

Notes:
For details of typical end crossframes and roadway end dam, see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4. The supporting angle shown in Section A-A shall be decreased from 7x4x¾ to 6x4x¾ at the Rear Abutment. The main angle shall be 8x4x1 at both abutments.
See STEEL ERECTION note Sh. GN 1
See also note above.

H.N.T.B. BR. NO. 35

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CROSSFRAME DETAILS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R. 17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

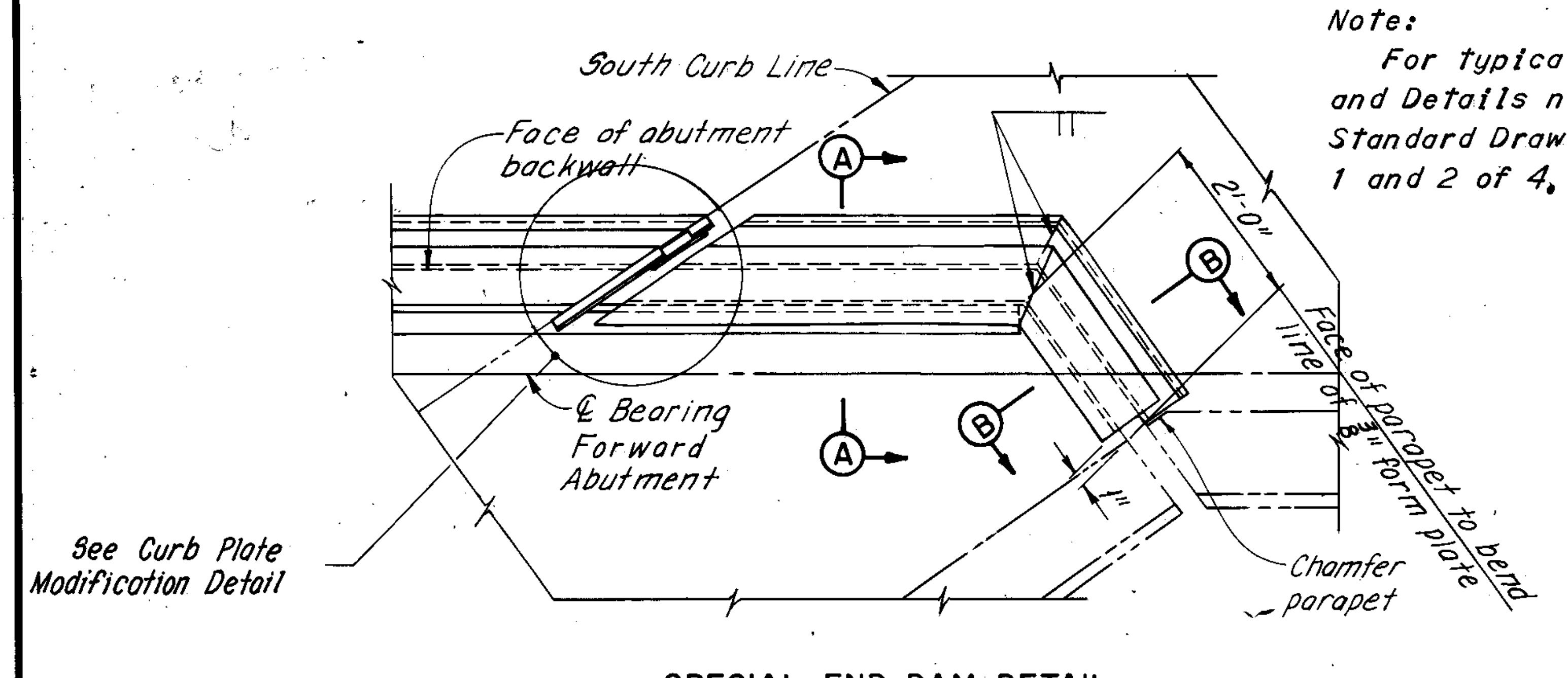
CUYAHOGA COUNTY OHIO

DRAWN JEH	TRACED WB	CHECKED WB	REVIEWED	REVISED
DATE 7-7-69	DATE 7-10-69	DATE 7-17-69	DATE	SHEET 18/24

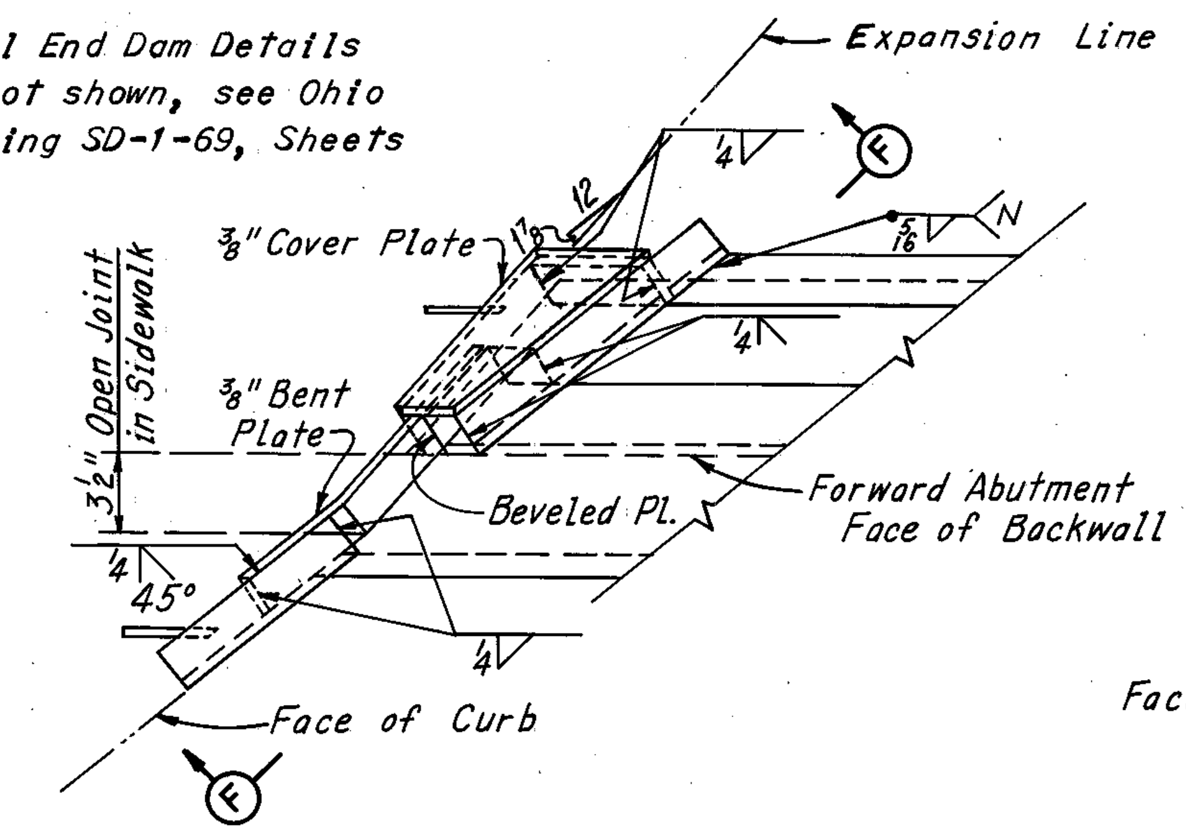
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-80-15.81

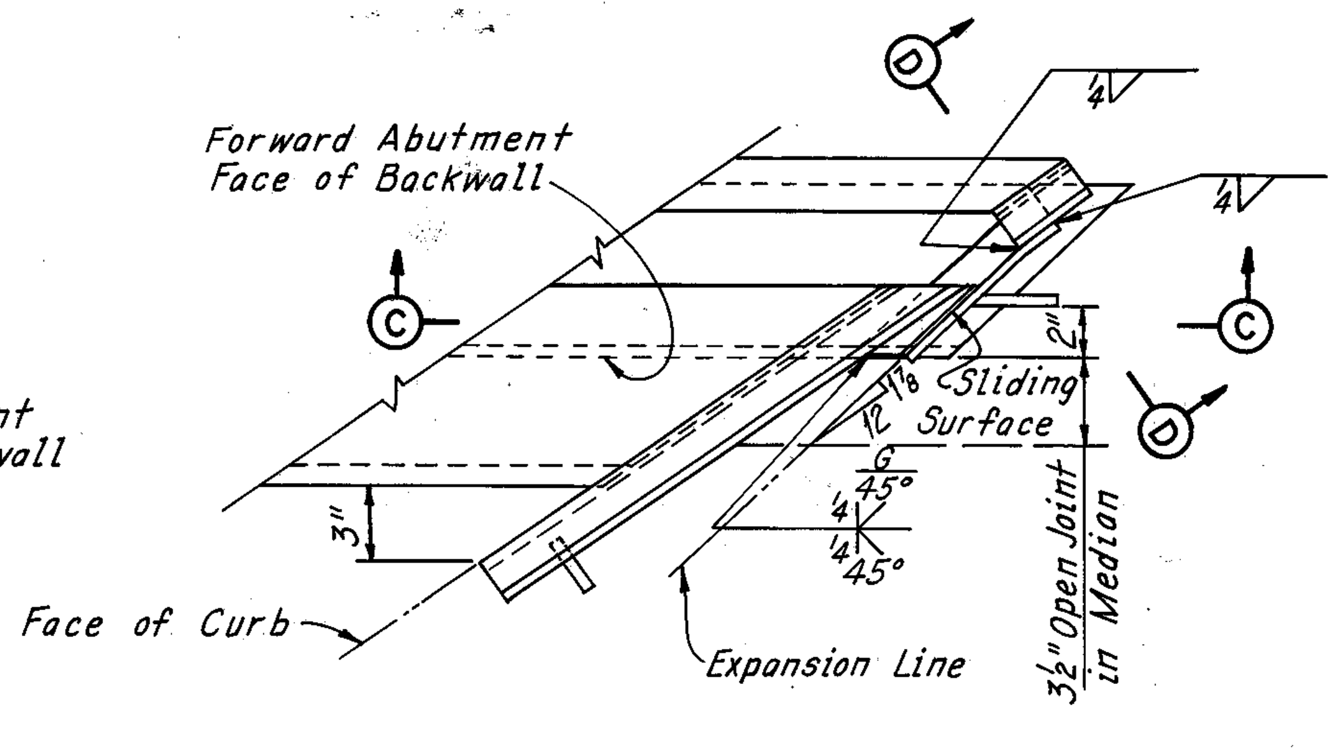
Note:
For typical End Dam Details and Details not shown, see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4.



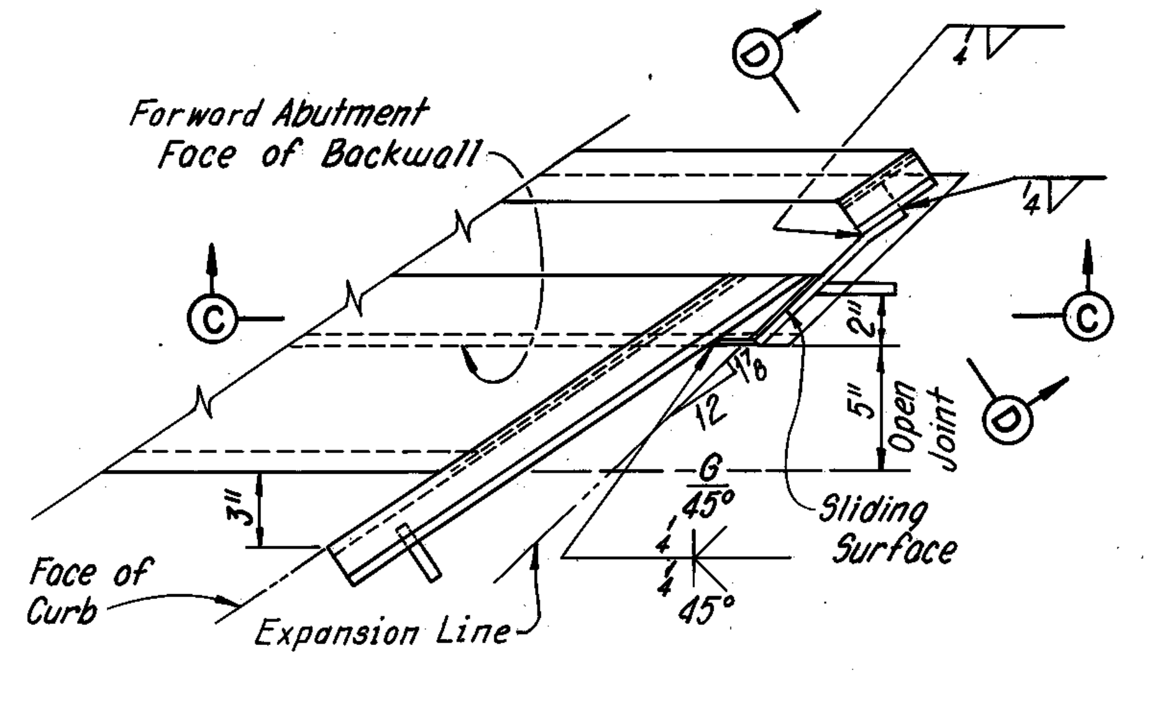
SPECIAL END DAM DETAIL NORTHEAST SIDEWALK



NORTHWEST CURB



NORTH MEDIAN CURB



NORTHEAST CURB

CURB PLATE MODIFICATION DETAILS

VERTICAL OFFSETS AT BEARING POINTS

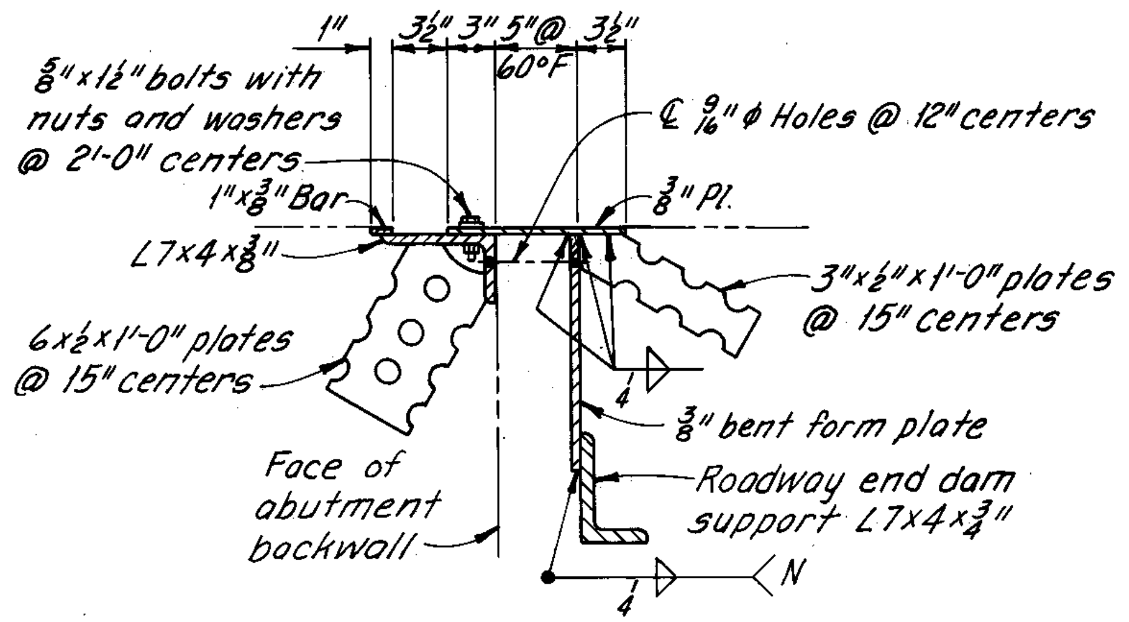
Girder	℄ Pier 1	℄ Pier 2	℄ Pier 3	℄ Pier 4
A	-1 5/8"	-3 15/16"	-3"	+1"
B	-1 3/16"	-3 1/8"	-2 3/16"	+9/16"
C	-3/4"	-2 1/2"	-1 5/8"	+1/16"
D	-1/4"	-2"	-1 1/4"	-3/8"
E	+1/16"	-1 9/16"	-1 1/8"	-13/16"
F	+5/16"	-1 5/16"	-1 5/16"	-1"
G	+3/8"	-1 1/16"	-1 1/16"	-15/16"
H	+1/2"	-13/16"	-13/16"	-3/4"
J	+9/16"	-5/8"	-9/16"	-11/16"
K	-11/16"	-5/16"	-1/4"	-9/16"

Note: Negative values indicate offsets below the base line.

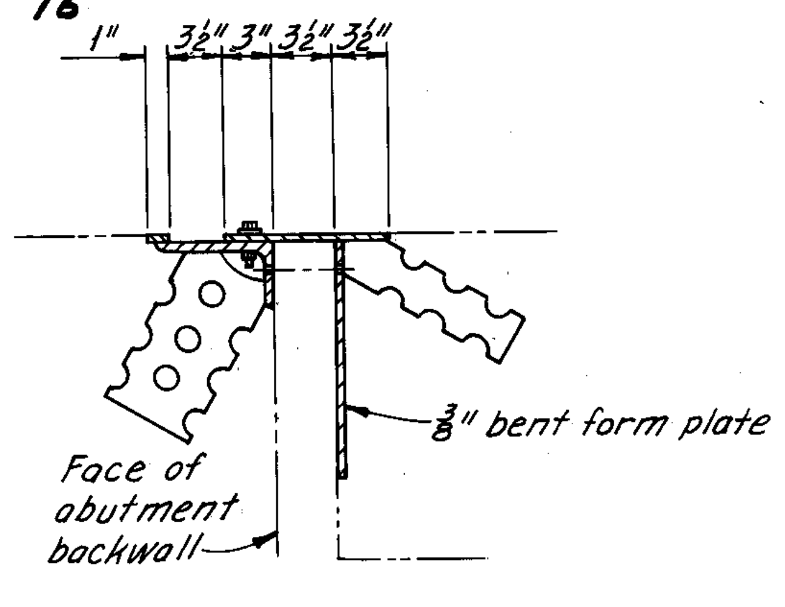
+11/16"

TOP OF LATEX MODIFIED CONCRETE ELEVATIONS

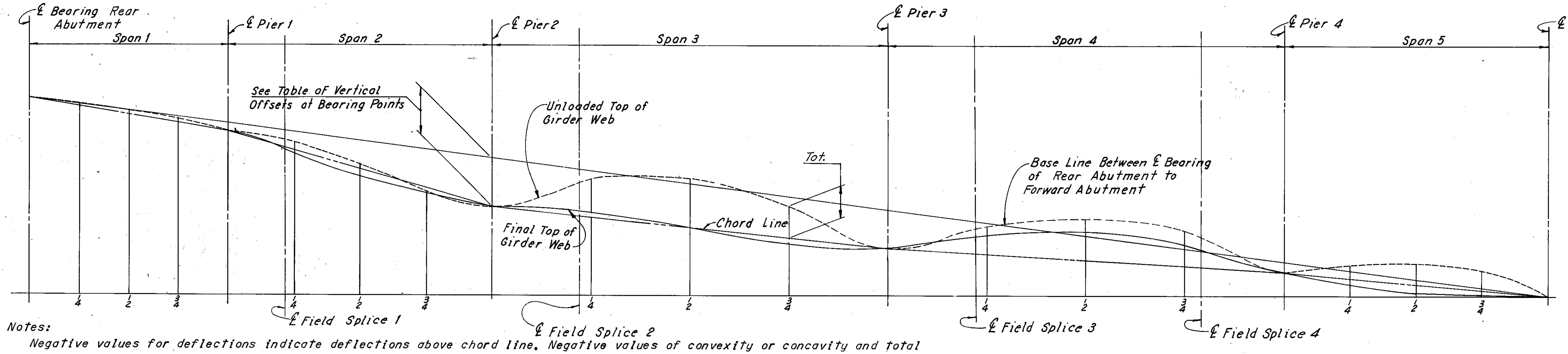
Girder	Span 1					Span 2				Span 3				Span 4				Span 5				Girder
	℄ Bearing Rear Abut.	1/4	1/2	3/4	℄ Pier 1	1/4	1/2	3/4	℄ Pier 2	1/4	1/2	3/4	℄ Pier 3	1/4	1/2	3/4	℄ Pier 4	1/4	1/2	3/4	℄ Bearing Forward Abut.	
A	759.32	759.09	758.86	758.63	758.39	758.05	757.73	757.43	757.13	756.70	756.28	755.85	755.45	755.16	754.89	754.62	754.25	753.90	753.56	753.23	752.91	A
B	759.28	759.05	758.82	758.59	758.36	758.02	757.71	757.40	757.09	756.65	756.20	755.76	755.35	755.02	754.70	754.37	753.96	753.60	753.26	752.93	752.61	B
C	759.24	759.01	758.78	758.55	758.32	757.99	757.68	757.36	757.04	756.58	756.12	755.66	755.23	754.87	754.50	754.11	753.67	753.31	752.96	752.62	752.30	C
D	759.20	758.97	758.74	758.51	758.28	757.96	757.63	757.30	756.98	756.50	756.03	755.56	755.10	754.68	754.26	753.83	753.37	753.00	752.65	752.31	751.97	D
E	759.16	758.93	758.70	758.47	758.24	757.91	757.57	757.24	756.91	756.42	755.93	755.44	754.94	754.48	754.01	753.55	753.07	752.70	752.34	751.99	751.65	E
F	769.01	758.77	758.54	758.31	758.08	757.75	757.42	757.08	756.75	756.24	755.73	755.21	754.71	754.23	753.74	753.26	752.77	752.39	752.02	751.66	751.32	F
G	758.74	758.51	758.28	758.05	757.82	757.49	757.16	756.83	756.50	756.00	755.49	754.97	754.46	753.97	753.46	752.97	752.47	752.07	751.69	751.33	750.97	G
H	758.47	758.24	758.01	757.78	757.55	757.23	756.90	756.58	756.26	755.76	755.24	754.72	754.21	753.71	753.19	753.68	752.16	751.75	751.36	750.98	750.61	H
J	758.20	757.97	757.74	757.51	757.28	756.96	756.65	756.33	756.01	755.52	755.00	754.47	753.97	753.45	752.91	752.39	751.84	751.43	751.02	750.63	750.26	J
K	757.94	757.71	757.47	757.24	757.01	756.70	756.39	756.08	755.77	755.28	754.75	754.22	753.72	753.19	752.62	752.09	751.52	751.09	750.66	750.26	749.86	K



SECTION A-A

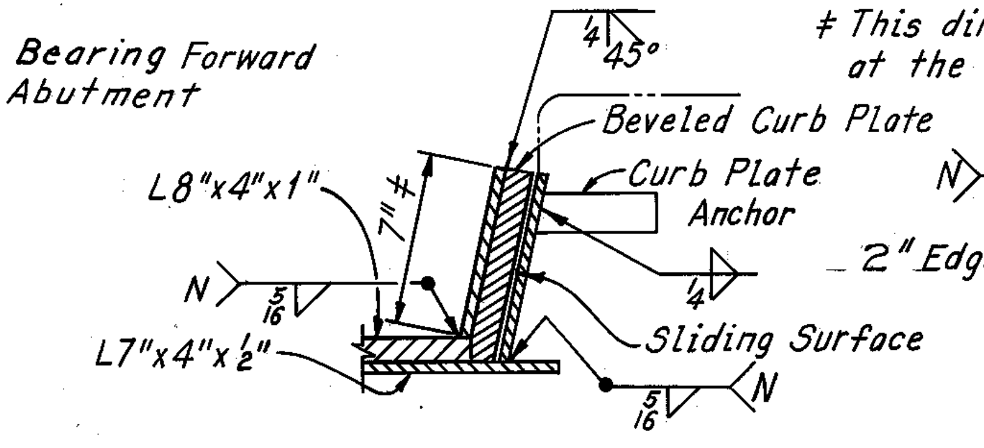


SECTION B-B

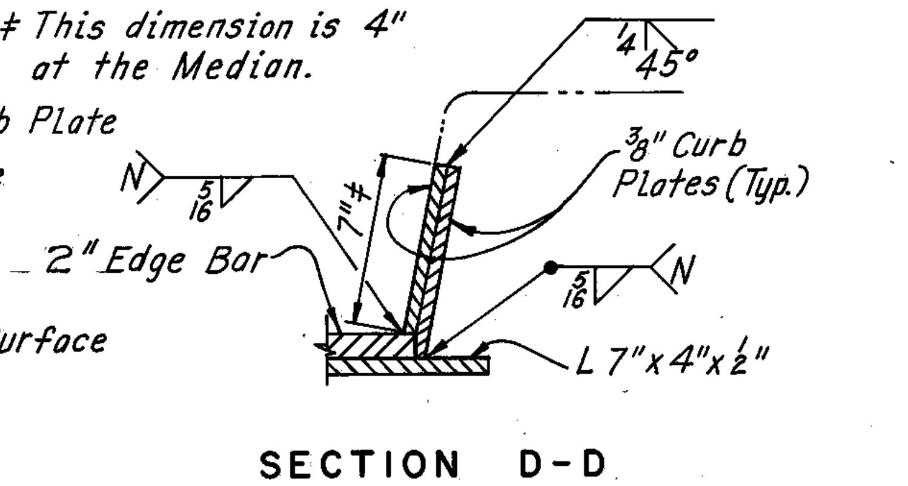


CAMBER DIAGRAM

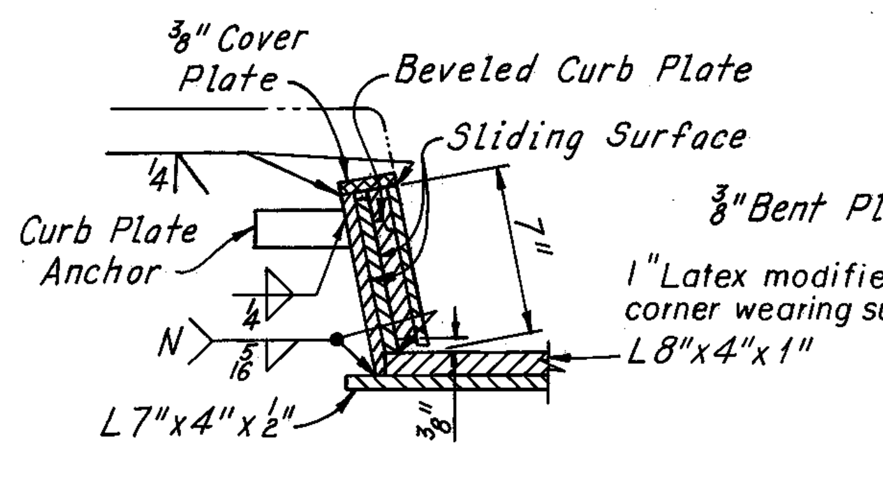
Notes:
Negative values for deflections indicate deflections above chord line. Negative values of convexity or concavity and total required camber indicate values below the chord line. Deflections and Convexities or Concavities are given to the nearest 1/16 inch. The two inch change in haunch depth in Span 2 is accounted for in the Camber Diagram and accompanying tables.



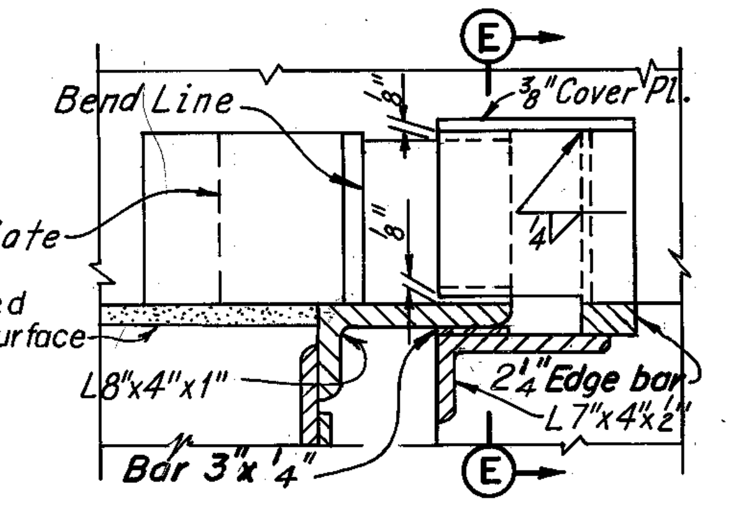
SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

DEAD LOAD DEFLECTION AND CAMBER

Girder	Span 1 1/4 Stl.	Span 1 1/4 Rem. D.L.	Span 1 1/4 Con.	Span 1 1/4 Tot.	Span 1 1/2 Stl.	Span 1 1/2 Rem. D.L.	Span 1 1/2 Con.	Span 1 1/2 Tot.	Span 1 3/4 Stl.	Span 1 3/4 Rem. D.L.	Span 1 3/4 Con.	Span 1 3/4 Tot.	Span 2 Field Splice 1 Stl.	Span 2 Field Splice 1 Rem. D.L.	Span 2 Field Splice 1 Con.	Span 2 Field Splice 1 Tot.	Span 2 1/4 Stl.	Span 2 1/4 Rem. D.L.	Span 2 1/4 Con.	Span 2 1/4 Tot.	Span 2 1/2 Stl.	Span 2 1/2 Rem. D.L.	Span 2 1/2 Con.	Span 2 1/2 Tot.	Span 2 3/4 Stl.	Span 2 3/4 Rem. D.L.	Span 2 3/4 Con.	Span 2 3/4 Tot.
A	1/16	3/16	0	1/4	1/16	3/16	0	1/4	0	1/8	0	1/8	0	3/16	-1/4	-1/16	1/16	1/4	-5/16	0	1/16	5/16	-5/16	1/16	0	0	-3/16	-3/16
B	1/16	3/16	0	1/4	1/16	3/16	0	1/4	0	1/8	-1/16	1/16	0	1/8	-1/8	0	1/16	3/16	-3/16	1/16	1/16	1/4	-3/16	1/8	0	0	-1/8	-1/8
C	1/16	3/16	0	1/4	1/16	1/4	-1/16	1/4	0	1/8	-1/16	1/16	0	1/8	-1/16	1/16	0	3/16	-1/8	1/16	1/16	3/16	-1/16	3/16	0	-1/16	-1/16	-1/8
D	1/16	3/16	0	1/4	1/16	1/4	-1/16	1/4	0	1/8	-1/16	1/16	0	1/8	0	1/8	0	3/16	0	3/16	0	3/16	0	3/16	0	-1/16	0	-1/16
E	1/16	3/16	0	1/4	1/16	1/4	0	5/16	0	1/8	0	1/8	0	1/8	0	1/8	0	1/8	0	1/8	0	3/16	0	3/16	0	-1/16	0	-1/16
F	1/16	3/16	0	1/4	1/16	1/4	0	5/16	0	3/16	0	3/16	0	1/16	0	1/16	0	1/8	0	1/8	0	1/8	0	1/8	0	-1/16	0	-1/16
G	1/16	3/16	0	1/4	1/16	3/16	0	1/4	0	1/8	0	1/8	0	1/16	0	1/16	0	1/8	0	1/8	0	1/8	0	1/8	0	-1/16	0	-1/16
H	1/16	3/16	0	1/4	1/16	1/4	0	5/16	0	1/8	0	1/8	0	1/16	0	1/16	0	1/16	0	1/16	0	1/8	0	1/8	0	-1/16	0	-1/16
J	1/16	3/16	0	1/4	1/16	1/4	0	5/16	0	1/8	0	1/8	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	-1/16	0	-1/16
K	1/16	3/16	0	1/4	1/16	1/4	0	5/16	0	3/16	0	3/16	0	1/16	0	1/16	0	1/8	0	1/8	0	1/8	0	1/8	0	0	0	0

Girder	Span 3 Field Splice 2 Stl.	Span 3 Field Splice 2 Rem. D.L.	Span 3 Field Splice 2 Con.	Span 3 Field Splice 2 Tot.	Span 3 1/4 Stl.	Span 3 1/4 Rem. D.L.	Span 3 1/4 Con.	Span 3 1/4 Tot.	Span 3 1/2 Stl.	Span 3 1/2 Rem. D.L.	Span 3 1/2 Con.	Span 3 1/2 Tot.	Span 3 3/4 Stl.	Span 3 3/4 Rem. D.L.	Span 3 3/4 Con.	Span 3 3/4 Tot.	Span 4 Field Splice 3 Stl.	Span 4 Field Splice 3 Rem. D.L.	Span 4 Field Splice 3 Con.	Span 4 Field Splice 3 Tot.
A	1/8	9/16	-1/16	5/8	3/16	7/8	-1/8	15/16	5/16	1 5/16	-3/16	1 7/16	3/16	3/4	-5/16	5/8	0	1/16	1/16	1/8
B	1/8	9/16	-1/16	5/8	3/16	13/16	-1/8	7/8	5/16	1 1/8	-3/16	1 1/4	3/16	5/8	-5/16	1/2	0	1/8	3/16	3/16
C	1/8	1/2	-1/16	9/16	3/16	3/4	-1/8	13/16	5/16	1 1/16	-3/16	1 3/16	3/16	9/16	-1/4	1/2	0	1/8	1/4	3/8
D	1/8	1/2	-1/16	9/16	3/16	11/16	-1/16	13/16	1/4	1 1/16	-1/8	1 3/16	1/8	9/16	-1/8	9/16	0	1/8	3/16	5/16
E	1/8	1/2	0	5/8	3/16	3/4	0	15/16	1/4	1 1/8	+1/16	1 7/16	1/8	5/8	+1/16	13/16	0	1/8	1/16	3/16
F	1/8	1/2	1/8	3/4	1/8	13/16	1/16	1	1/4	1 1/16	0	1 5/16	1/8	5/8	-1/16	11/16	0	1/8	1/8	1/4
G	1/8	7/16	1/8	11/16	3/16	11/16	1/8	1	1/4	15/16	1/16	1 1/4	1/8	1/2	-1/16	9/16	1/16	3/16	3/16	7/16
H	1/8	1/2	3/16	13/16	3/16	5/8	3/16	1	1/4	15/16	1/16	1 1/4	1/8	1/2	-1/16	9/16	1/16	3/16	1/4	1/2
J	1/8	7/16	3/16	3/4	3/16	5/8	3/16	1	1/4	7/8	1/16	1 3/16	1/8	7/16	-1/16	1/2	1/16	3/16	1/4	1/2
K	1/8	3/8	1/4	3/4	1/8	9/16	1/4	15/16	3/16	3/4	1/16	1	1/16	3/8	-1/16	3/8	1/16	5/16	3/16	11/16

Girder	Span 4 1/4 Stl.	Span 4 1/4 Rem. D.L.	Span 4 1/4 Con.	Span 4 1/4 Tot.	Span 4 1/2 Stl.	Span 4 1/2 Rem. D.L.	Span 4 1/2 Con.	Span 4 1/2 Tot.	Span 4 3/4 Stl.	Span 4 3/4 Rem. D.L.	Span 4 3/4 Con.	Span 4 3/4 Tot.	Span 5 Field Splice 4 Stl.	Span 5 Field Splice 4 Rem. D.L.	Span 5 Field Splice 4 Con.	Span 5 Field Splice 4 Tot.	Span 5 1/4 Stl.	Span 5 1/4 Rem. D.L.	Span 5 1/4 Con.	Span 5 1/4 Tot.	Span 5 1/2 Stl.	Span 5 1/2 Rem. D.L.	Span 5 1/2 Con.	Span 5 1/2 Tot.	Span 5 3/4 Stl.	Span 5 3/4 Rem. D.L.	Span 5 3/4 Con.	Span 5 3/4 Tot.	Girder
A	0	1/8	1/8	1/4	1/16	3/8	7/16	7/8	1/16	3/16	13/16	1 1/16	0	1/8	13/16	15/16	1/16	5/16	-3/16	3/16	1/8	9/16	-1/4	7/16	1/16	1/2	-3/16	3/8	A
B	0	3/16	1/4	7/16	1/16	1/2	5/8	1 3/16	1/16	1/4	13/16	1 1/8	0	3/16	3/4	15/16	1/16	1/4	-3/16	1/8	1/8	9/16	-1/4	7/16	1/8	7/16	-3/16	3/8	B
C	0	3/16	5/16	1/2	1/16	1/2	9/16	1 1/8	1/16	1/4	5/8	15/16	0	1/8	5/8	3/4	1/16	1/4	-3/16	1/8	1/8	9/16	-5/16	3/8	1/8	7/16	-3/16	3/8	C
D	1/16	3/16	3/16	7/16	1/8	1/2	5/16	15/16	1/16	1/4	3/8	11/16	0	3/16	3/8	9/16	1/16	1/4	-3/16	1/8	1/8	9/16	-5/16	3/8	1/16	1/2	-3/16	3/8	D
E	1/16	3/16	+1/16	5/16	1/8	9/16	0	11/16	1/16	1/4	1/8	7/16	0	3/16	3/16	3/8	1/16	5/16	-3/16	3/16	1/8	5/8	-5/16	7/16	1/8	1/2	-1/4	3/8	E
F	1/16	3/16	1/16	5/16	1/8	1/2	0	5/8	1/16	1/4	1/16	3/8	1/16	1/8	1/8	5/16	1/16	5/16	-1/4	1/8	1/8	5/8	-5/16	7/16	1/8	1/2	-1/4	3/8	F
G	1/16	5/16	1/8	1/2	1/8	5/8	0	3/4	1/16	3/8	1/8	9/16	1/16	3/16	3/16	7/16	1/16	1/4	-1/4	1/16	1/8	9/16	-5/16	3/8	1/8	7/16	-1/4	5/16	G
H	1/16	3/8	1/8	9/16	1/8	11/16	0	13/16	1/16	3/8	1/8	9/16	1/16	3/16	3/16	7/16	1/16	5/16	-1/4	1/8	1/8	5/8	-5/16	7/16	1/8	1/2	-1/4	3/8	H
J	1/16	5/16	3/16	9/16	1/8	11/16	0	13/16	1/16	3/8	1/8	9/16	1/16	3/16	3/16	7/16	1/16	5/16	-1/4	1/8	1/8	11/16	-5/16	1/2	1/8	9/16	-1/4	7/16	J
K	1/8	1/2	3/16	13/16	3/16	15/16	1/16	1 3/16	1/8	1/2	3/16	13/16	1/16	3/8	3/16	5/8	1/16	1/4	-1/4	1/16	1/8	5/8	-3/8	3/8	1/8	1/2	-1/4	3/8	K

Note:
The following abbreviations are used:
Stl. = Dead load deflection due to the weight of the structural steel.
Rem. D.L. = Remaining dead load deflections.
Con. = Convexity or Concavity
Tot. = Total required camber.

H.N.T.B. BR.NO.35

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

SUPERSTRUCTURE DETAILS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR.NO.CUY-80-15 85
STA.12+23.13 TO
STA.17+06.79

CUYAHOGA COUNTY OHIO

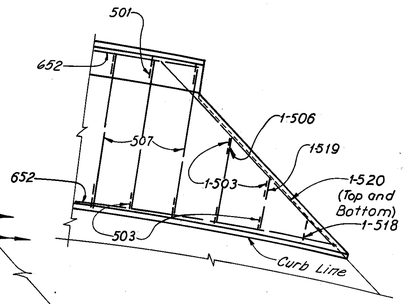
DRAWN WLM	TRACED GEM	CHECKED MCB	REVIEWED	REVISED 9-26-75
DATE 7-15-69	DATE 7-22-69	DATE 7-25-69	DATE	SHEET 19/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

340
392

CUYAHOGA COUNTY
CUY:80-15.81

+Fan 12-601@ 7½"(Top)
+Fan 12-602@ 7½" (Bottom)
1 Ser. 70-603 @ 7½" (Top)
1 Ser. 70-604 @ 7½" (Bottom)
7½"
5-674 (sidewalk)
See Detail "A"
42-625
1 Ser. 16-653 (Top)
1 Ser. 21-654 (Bottom)
℄ Bearing Rear Abutment
+ Note: Measure Spaces Along North Edge of Slab.
96-502@ 18"
63-605@7½" (Top)
63-606@ 7½" (Bottom)
71-625
1 Ser. 11-650 (Top)
1 Ser. 18-651 (Bottom)
1 Ser. 14-648 (Top)
1 Ser. 19-649 (Bottom)
91-605@ 7½" (Top)
91-609@ 7½" (Bottom)
113 lines of 2-625
91-605 @ 7½" (Top)
91-610 @ 7½" (Bottom)
89-502 @ 18"
See Detail "B"
1 Ser. 63-607 @ 7½" (Top)
1 Ser. 63-608 @ 7½" (Bottom)
℄ Light Pole Support Sta. 12+82
321-509 @ 18"
348-507 to match 501, 502, and 503
204-501 @ 18"
℄ Field Splice 3 and match line
℄ Light Pole Support Sta. 13+85
105-503 @ 18"
173-605 @ 6½" (Top)
173-611 @ 6½" (Bottom)
℄ Pier 2
167 Lines of 11-625
314-508 to match 510 thru 516 (North Edge of Median)
317-508 to match 510 thru 516 (South Edge of Median)
173-605 @ 6½" (Top)
173-609 @ 6½" (Bottom)
86-503@18"
173-501 @ 18"
344-507 to match 501, 502, and 503
318 -509 @ 18"
℄ Light Pole Support Sta. 14+96
63-612@ 6½" (Top)
63-613 @ 6½" (Bottom)
63-614 @6½" (Top)
63-615 @6½" (Bottom)
39-616 @ 6½" (Top)
39-617@ 6½" (Bottom)
39-614@ 6½" (Top)
39-618@ 6½" (Bottom)
18" 31-501 @12"
31-503@ 12"
*62-619 (Top)
*62-620 (Bottom)
*62-621 (Top and Bottom) to match 619 and 620 (Typical)
*62-622 (Top)
*62-623 (Bottom)
to match 621 (Typical)
Face of Parapet
Curb Line

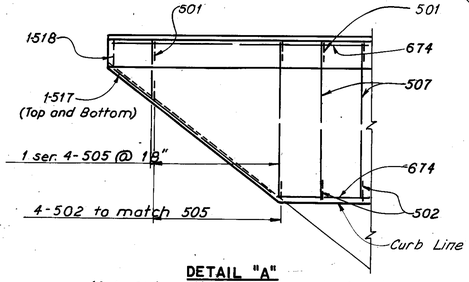


DETAIL "C"
(Only sidewalk reinforcement shown)

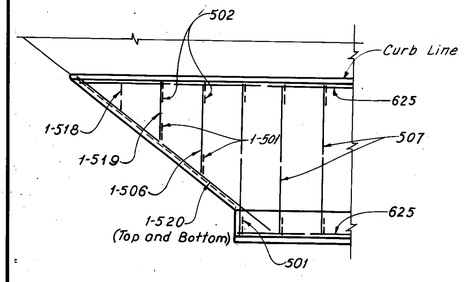
509 @ 18" (see above)
507 (see above)
501 @ 18"
18"
501 @ 12"
18" 31-501 @ 18"
503 @ 12"
31-503@ 18"
* 619 (Top)
*620 (Bottom)
* 73-624 (Top)
* 73-625 (Bottom)
18"
67-501 @ 12"
* 80-630 (Top)
* 80-631 (Bottom)
℄ Light Pole Support Sta. 16+09
19-501 @ 18"
see Detail "C"
67-503@ 12"
*126-633 (Top)
*126-634 (Bottom)
1 Ser. 29-638 @ 6½" (Top)
1 Ser. 29-639 @ 6½" (Bottom)
1 Ser. 19-655 (Top)
1 Ser. 30-650 (Bottom)
167-652
℄ Bearing Forward Abutment
21-503@ 18"
1 Ser. 65-640 @ 6½" (Top)
1 Ser. 65-641 @ 6½" (Bottom)
*621 (Top and Bottom)
*73-626 (Top)
*73-627 (Bottom)
* 80-626 (Top and Bottom)
*126-635 (Top)
*126-636 (Bottom)
29-625@ 6½" (Top and Bottom)
1 Ser. 18-657 (Top) and 1 Ser. 30-638 (Bottom)
1 Ser. 65-642 @ 6½" (Top)
1 Ser. 65-643 @ 6½" (Bottom)
*622 (Top)
*623 (Bottom)
*73-628 (Top)
*73-629 (Bottom)
*80-632 (Top)
*80-626 (Bottom)
*126-637 (Top)
*126-636 Bottom)
503 @ 18"
41-503 @12"
24-503 @18"
27-503@12"
29-648@ 6½" (Top)
29-636@6½" (Bottom)
107-625
65-647 (Top)
65-615 (Bottom)
67-503@ 18"
1 Ser. 21-659 (Top)
53-660 (Bottom)
59-625
501 @ 18"
41-501 @12"
24-501@18"
27-501@12"
67-501@18"
12-503@12"
see Detail "D"
509 (see above)
307 (see above)
℄ Field splice 3 and match line
℄ Light Pole Support Sta. 17+14
5-673 to match 625 (Sidewalk)
*Fan 44-644@ 6½" (Top)
*Fan 44-645@6½" (Bottom)
Face of Parapet
Curb Line

*Fan bars perpendicular to North Edge of slab.
Bar spacing 6½" measured along North Edge of Slab.

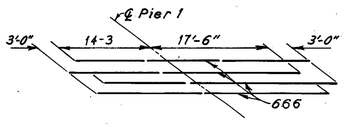
Note:
All reinforcing bar marks shall be prefixed S.

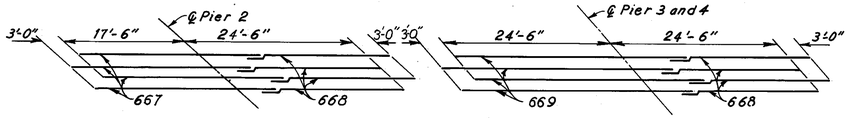


DETAIL "A"
(Only sidewalk reinforcement shown)



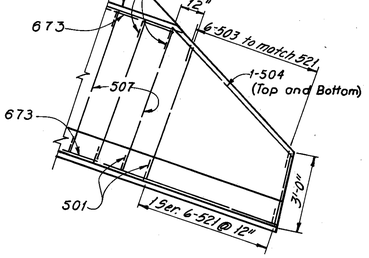
DETAIL "B"
(Only sidewalk reinforcement shown)





ADDITIONAL REINFORCEMENT OVER PIERS

SLAB PLAN



DETAIL "D"
(Only sidewalk reinforcement shown)

* Note: Measure Spaces along South Edge of Slab.

Notes:
For Median Details and Typical Cross Sections See Sheet 21/24.
For Parapet Details See Sheet 21/24.
For Light Pole Support Details see Sheet CD2.

H.N.T.B. BR.NO.35

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

SLAB PLAN

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY- 80-15 85 STA.12+23.13 TO STA.17+06.79

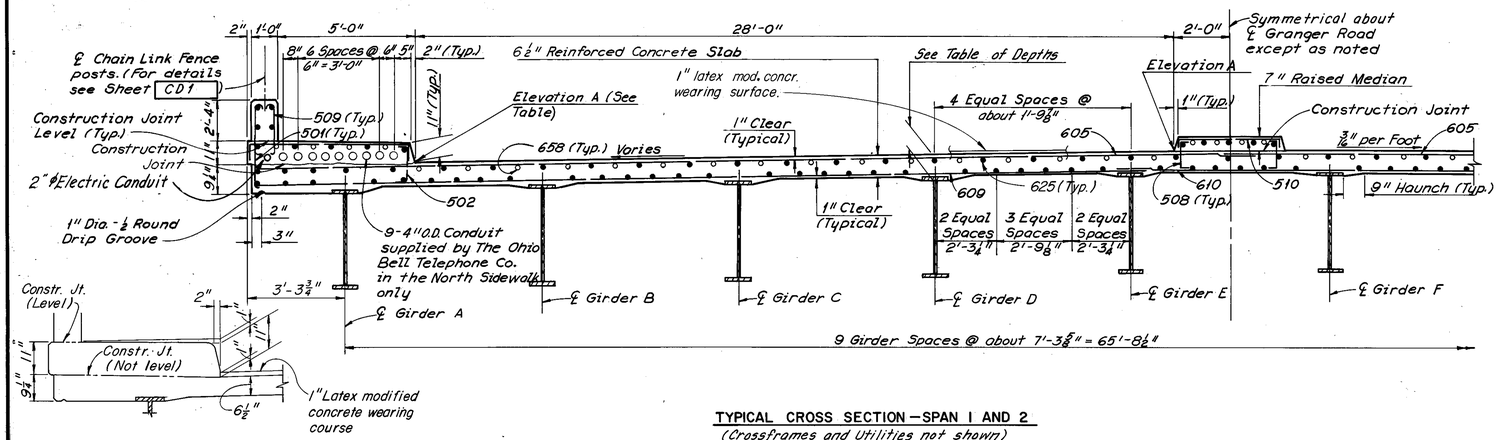
CUYAHOGA COUNTY OHIO

DRAWN NCB	TRACED JSC	CHECKED EA	REVIEWED	REVISED
DATE 6-1969	DATE 7-1469	DATE 8-2569	DATE	SHEET 20/24

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

341
392

CUYAHOGA COUNTY
CUY-80-15.81



TYPICAL CROSS SECTION — SPAN 1 AND 2
(Crossframes and Utilities not shown)

ELEVATION A (TOP OF PORTLAND CEMENT CONCRETE SLAB)

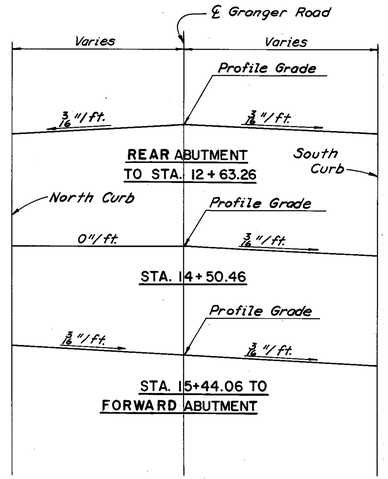
Location	Rear Abut.	1/4	1/2	3/4	Pier 1	1/4	1/2	3/4	Pier 2	1/5	2/5	3/5	4/5	Pier 3	1/5	2/5	3/5	4/5	Pier 4	1/4	1/2	3/4	Forward Abutment
North Curb Line	759.22	759.01	758.78	758.54	758.30	757.98	757.67	757.34	757.04	756.75	756.45	756.10	755.70	755.34	755.10	754.90	754.68	754.40	754.09	753.77	753.44	753.08	752.69
North Edge Median Curb	759.07	758.86	758.63	758.39	758.15	757.83	757.49	757.14	756.81	756.48	756.13	755.74	755.31	754.90	754.57	754.26	753.92	753.54	753.17	752.82	752.47	752.09	751.67
South Edge Median Curb	758.99	758.77	758.55	758.31	758.06	757.74	757.40	757.05	756.72	756.37	756.01	755.60	755.15	754.70	754.30	753.92	753.52	753.08	752.67	752.36	752.06	751.74	751.41
South Curb Line	757.96	757.75	757.52	757.28	757.04	756.73	756.42	756.10	755.78	755.43	755.06	754.64	754.18	753.74	753.34	752.94	752.51	752.04	751.58	751.17	750.76	750.32	749.84

Note: Elevation A, at the face of curbs, are those which are required before the concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of concrete.

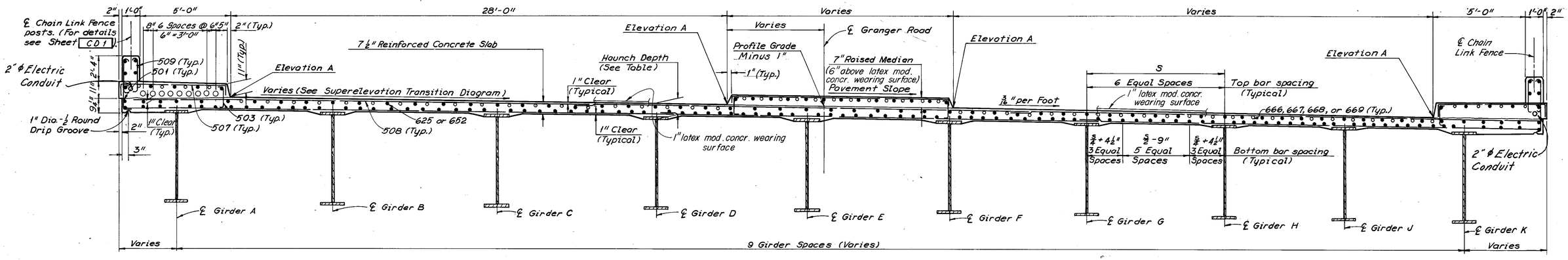
Note: A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch width less than 9" in width.

TABLE OF DEPTHS	
Rear Abutment	7 3/4"
Pier 1	7 3/4"
Piers 2 thru 4	9 3/4"
Forward Abutment	9 3/4"

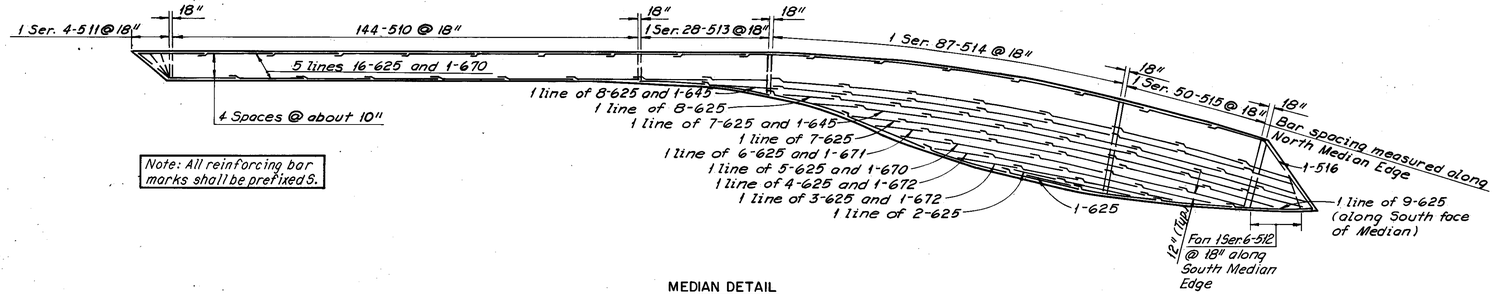
The above dimensions are measured from top of portland cement concrete slab to top of web at ℄ Bearing of Piers and Abutments. These dimensions are measured from extended top of portland cement concrete slab for exterior girders and interior girders where they are below median.



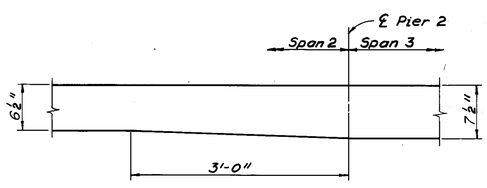
SUPERELEVATION TRANSITION DIAGRAM



TYPICAL CROSS SECTION — SPAN 3,4, AND 5
(Crossframes and Utilities not shown)



MEDIAN DETAIL



SLAB THICKNESS TRANSITION

Note: The top of portland cement concrete slab to top of girder web dimension shall be transitioned between Pier 1 and Pier 2.

Note: For Slab Plan see Sheet 20/24.

H.N.T.B. BR. NO. 35

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

TYPICAL SECTIONS

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-15 85 STA. 12+23.13 TO STA. 17+06.79

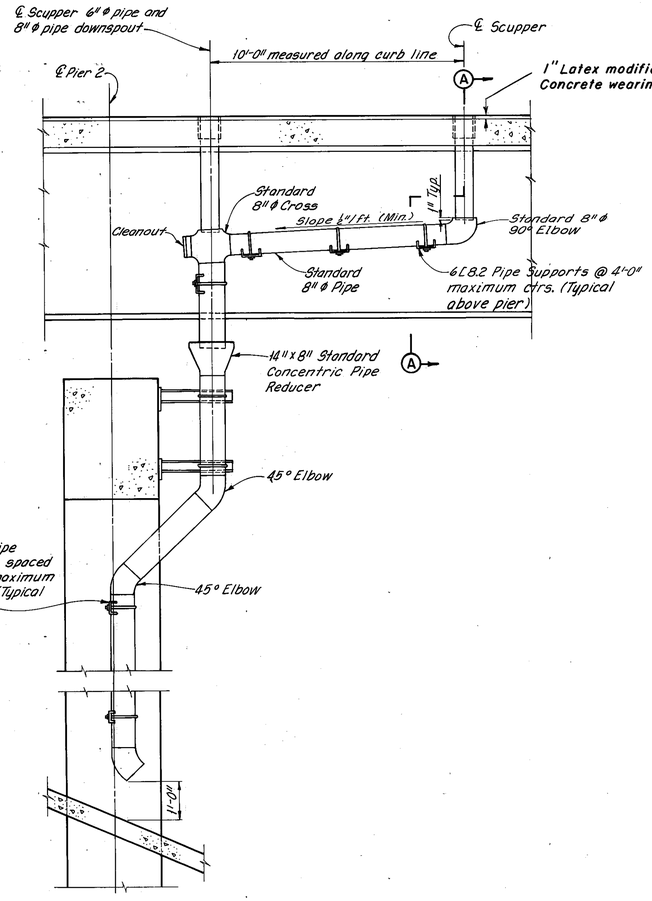
CUYAHOGA COUNTY OHIO

DRAWN WCB	TRACED WB	CHECKED WH	REVIEWED	REVISED
DATE 6-20-68	DATE 6-27-68	DATE 8-25-68	DATE	SHEET 21/24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

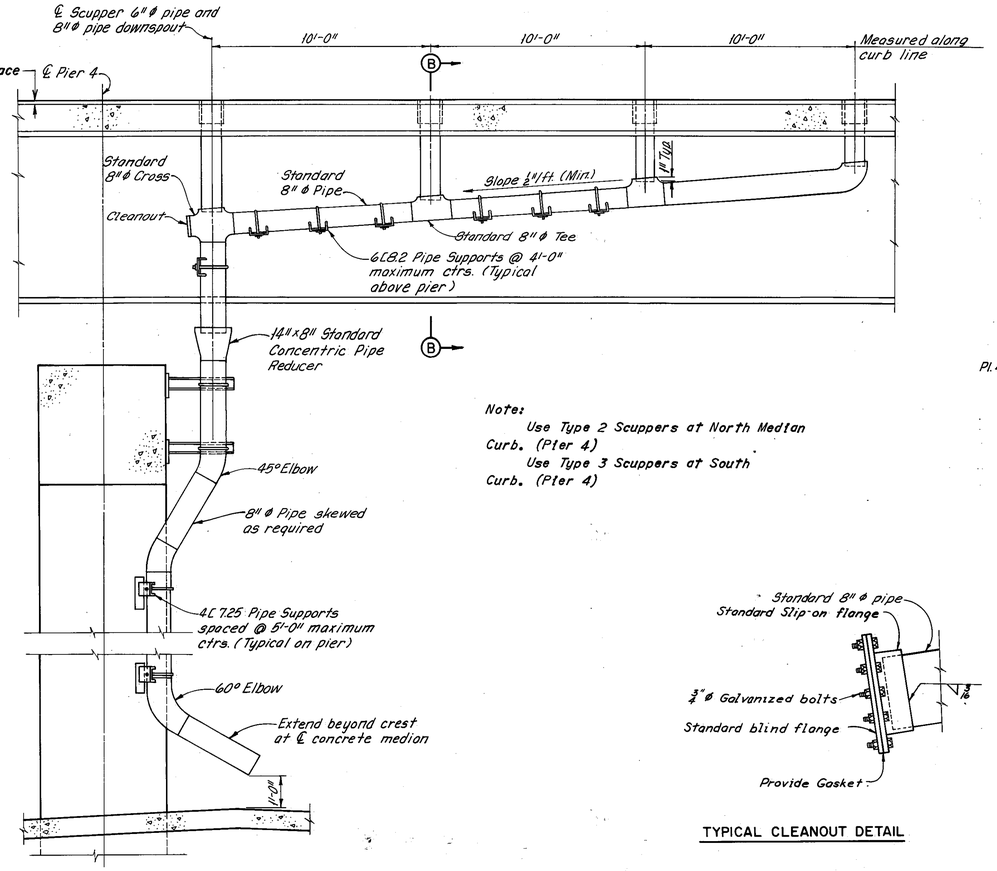
342
392

CUYAHOGA COUNTY
CUY.-80-15.81



COLLECTOR SYSTEMS AT PIER 2

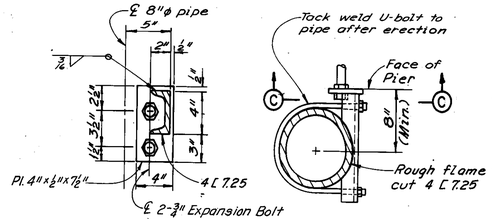
System under North curb shown looking North along ℄ Bearing.
System under South curb similar except scuppers are on opposite side of pier.



COLLECTOR SYSTEMS AT PIER 4

System under North median curb shown looking North along ℄ Bearing.
System under South curb similar except as noted.

Note:
Use Type 2 Scuppers at North Median Curb. (Pier 4)
Use Type 3 Scuppers at South Curb. (Pier 4)



SECTION C-C PLAN

PIPE SUPPORT DETAIL ON PIERS

TYPICAL CLEANOUT DETAIL

Notes:

The 6"ϕ and 8"ϕ pipes shall be alloy steel pipe, 707.11, or hot-dip galvanized steel pipe. Joints shall be made by welding or by the use of a clamp-type coupling with a ring gasket. All welding shall be done before galvanizing. Support material for attaching pipes shall be the same material as the pipe. The bolts shall be galvanized as specified in ASTM A-153.

The 8"ϕ pipe attached to the superstructure, including fittings, supports and accessories, shall be paid for at the contract unit price for "Item 518, 8"ϕ Pipe, Horizontal Conductors Including Supports".

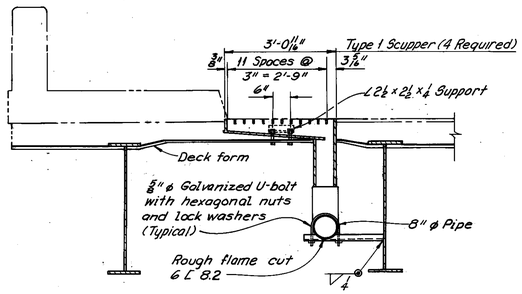
The 8"ϕ pipe attached to substructure, including fittings, supports and accessories shall be paid for at the contract unit price for "Item 518, 8"ϕ Pipe, Downspouts Including Supports".

Standard 14" x 8"ϕ reducers and 8"ϕ elbows, tees, crosses and laterals shall be used in all cases.

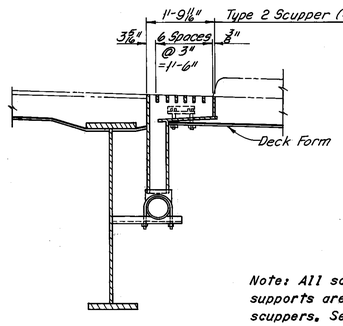
Support Ls 2½x2½x¼ and attached 6"ϕ pipe are included with "Item 518, Scuppers Including Supports" for payment.

For Scupper Details not shown, see Ohio Standard Drawing SD-1-69, Sheet 3 of 4, except that scupper pipes shall extend 8" below the bottom of the girders instead of 2".

For scupper locations see Framing Plan.

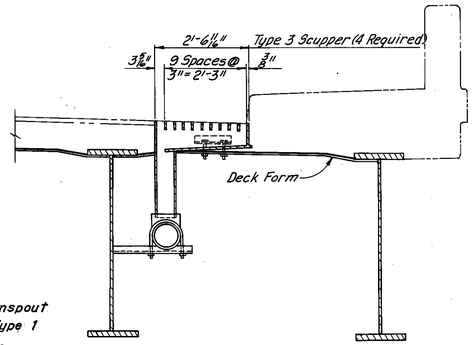


SECTION A-A



SECTION B-B AT NORTH MEDIAN CURB

Note: All scupper and downspout supports are similar to Type 1 scuppers. See Section A-A.



SECTION B-B AT SOUTH CURB

H.N.T.B. BR.NO.35

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

DRAINAGE DETAILS

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R.17)

BR.NO. CUY-80-1585 STA.12+23.13 TO STA.17+06.79

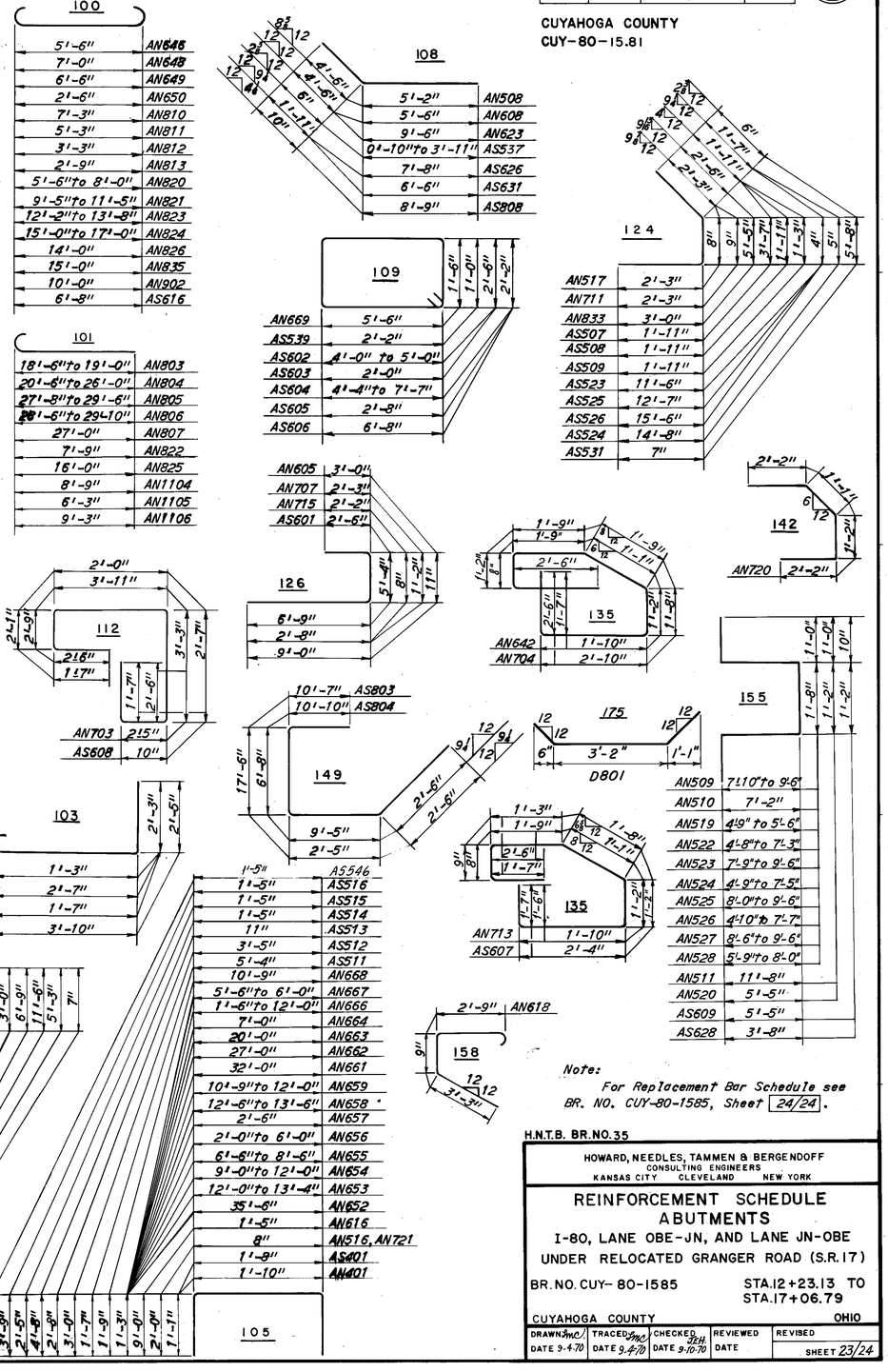
CUYAHOGA COUNTY OHIO

DRAWN LJW	TRACED WB	CHECKED EA	REVIEWED	REVISED
DATE 9-22-69	DATE 9-26-69	DATE 6-5-70	DATE	SHEET 22/24

MARK	NO	LENGTH	TYPE	SER INCR	WEIGHT (LBS)
FORWARD ABUTMENT					
AN401	90	3'-9"	105		225
AN501	11	40'-0"	Str.		459
AN502	5	8'-9"	Str.		46
AN503	11	30'-6"	Str.		350
AN504	11	36'-6"	Str.		419
AN505	1	26'-6"	Str.		28
AN506	5	33'-0"	Str.		172
AN507	5	29'-6"	Str.		154
AN508	5	9'-8"	108		50
AN509	2 Ser. 8	18'-10" 22'-2"	155	5 3/4"	342
AN510	33	17'-6"	155		602
AN511	66	26'-0"	155		1790
AN512	5	7'-4"	104		38
AN513	5	16'-0"	Str.		83
AN514	5	7'-0"	Str.		37
AN515	5	4'-0"	103		21
AN516	5	4'-5"	105		23
AN517	5	4'-11"	124		26
AN518	66	6'-11"	110		476
AN519	2 Ser. 4	12'-8" 14'-2"	155	6"	112
AN520	26	13'-6"	155		366
AN521	3	4'-3"	Str.		13
AN522	2 Ser. 10	12'-6" 17'-8"	155	6 7/8"	315
AN523	3 Ser. 8	18'-8" 22'-2"	155	6"	511
AN524	3 Ser. 9	12'-8" 18'-0"	155	8"	432
AN525	2 Ser. 7	19'-2" 22'-2"	155	6"	302
AN526	2 Ser. 9	12'-10" 18'-4"	155	8 1/4"	293
AN527	2 Ser. 5	20'-2" 22'-2"	155	6"	221
AN528	2 Ser. 10	14'-8" 19'-2"	155	6"	353
AN529	12	3'-0"	Str.		38
AN601	338	5'-8"	104		2877
AN602	11	21'-3"	Str.		351
AN603	15	20'-3"	Str.		456
AN604	9	9'-0"	Str.		122
AN605	123	12'-7"	126		2325
AN606	120	7'-2"	104		1292
AN607	24	20'-0"	Str.		721
AN608	131	9'-11"	108		1951
AN609	19	17'-6"	Str.		499
AN610	13	17'-0"	Str.		332
AN611	26	19'-3"	Str.		752
AN612	29	16'-0"	Str.		697
AN613	28	18'-6"	Str.		778
AN614	42	25'-9"	Str.		1624
AN615	15	25'-0"	Str.		563
AN616	11	19'-1"	105		315
AN617	39	26'-3"	Str.		1538
AN618	5	7'-2"	158		54
AN619	82	5'-9"	104		708
AN620	10 Ser. 4	5'-3" 19'-6"	Str.	4 1/8"	743
AN621	4 Ser. 4	5'-0" 18'-6"	Str.	4 1/16"	282
AN622	4 Ser. 4	5'-0" 17'-9"	Str.	4 1/3"	273
AN623	8	13'-4"	108		160
AN624	12	4'-0"	Str.		72
AN625	10	7'-7"	104		114
AN626	2 Ser. 4	5'-9" 8'-0"	Str.	9"	83
AN627	14	10'-3"	Str.		216
AN628	2 Ser. 4	12'-0" 14'-3"	Str.	9"	158
AN629	18	16'-6"	Str.		446
AN630	2 Ser. 6	17'-9" 19'-3"	Str.	3 5/8"	333
AN631	16	36'-6"	Str.		877
AN632	2 Ser. 3	23'-0" 25'-0"	Str.	3 1/16"	234
AN633	4	22'-3"	Str.		134
AN634	4	16'-3"	Str.		98
AN635	2 Ser. 2	12'-0" 13'-6"	Str.	11.6"	77
AN636	6	11'-0"	Str.		99
AN637	2 Ser. 3	2'-0" 5'-0"	Str.	11.6"	32
AN638	19	24'-0"	Str.		685
AN639	4	8'-9"	Str.		53
AN640	17	6'-9"	Str.		172
AN641	5	19'-3"	Str.		145
AN642	18	9'-10"	135		266
AN643	10	15'-9"	Str.		237
AN644	5	8'-0"	Str.		60
AN645	8	5'-6"	Str.		66
AN646	12	6'-10"	100		123
AN647	5	7'-0"	Str.		53
AN648	4	8'-4"	100		50
AN649	4	7'-10"	100		44
AN650	5	3'-10"	100		29
AN651	36	20'-7"	104		1113
AN652	2	37'-8"	105		113
AN653	2 Ser. 11	14'-2" 15'-6"	105	1 1/8"	490
AN654	2 Ser. 9	11'-8" 14'-2"	105	4 1/4"	345
AN655	2 Ser. 5	8'-8" 10'-3"	105	6"	145
AN656	2 Ser. 3	4'-2" 8'-2"	105	2'-0"	56
AN657	10	4'-8"	105		70
AN658	2 Ser. 11	14'-8" 15'-6"	105	1 1/4"	501
AN659	2 Ser. 6	12'-11" 14'-2"	105	5 1/4"	244
AN660	4	20'-1"	104		121
AN661	2	34'-2"	105		103
AN662	2	29'-2"	105		88
AN663	2	22'-2"	105		67
AN664	2	9'-2"	105		28
AN665	3	7'-0"	Str.		32
AN666	2 Ser. 7	3'-8" 14'-2"	105	1'-9"	188
AN667	2 Ser. 3	7'-8" 8'-2"	105	3"	71
AN668	2	13'-8"	105		41
AN669	55	14'-9"	109		1218
AN701	47	40'-0"	Str.		3843
AN702	24	11'-6"	Str.		564
AN703	9	16'-6"	112		304
AN704	52	13'-4"	135		1417
AN705	9	6'-11"	103		127
AN706	45	30'-6"	Str.		2805
AN707	65	5'-9"	126		764
AN708	56	4'-6"	103		630
AN709	43	35'-6"	Str.		3120
AN710	49	34'-6"	Str.		3455
AN711	22	5'-0"	124		225
AN712	66	35'-0"	Str.		4722
AN713	66	9'-8"	135		1304
AN714	29	4'-6"	103		267
AN715	29	5'-2"	126		307
AN716	11	21'-6"	Str.		483
AN717	11	19'-6"	Str.		438
AN718	22	10'-1"	104		453
AN719	11	7'-0"	Str.		157
AN720	11	6'-3"	142		141
AN721	11	4'-4"	105		97
AN722	11	4'-2"	103		94
AN723	11	9'-0"	Str.	11 9/16	202
D801	84	5'-4"	175		1196
AN801	1 Ser. 11	19'-0" 28'-0"	Str.	10 3/8"	690
AN802	1 Ser. 3	27'-0" 28'-6"	Str.	11.3"	226
AN803	1 Ser. 2	19'-7" 20'-1"	101	6"	106
AN804	1 Ser. 7	21'-7" 27'-1"	101	11"	455
AN805	1 Ser. 3	28'-9" 30'-7"	101	11"	238
AN806	1 Ser. 3	29'-7" 30'-11"	101	8"	242
AN807	1	28'-1"	101		75
AN808	1	6'-3"	Str.		17
AN809	1	3'-3"	Str.		9
AN810	1	9'-5"	100		25
AN811	1	7'-5"	100		20
AN812	1	5'-5"	100		14
AN813	1	4'-11"	100		13
AN814	1 Ser. 2	2'-9" 5'-6"	Str.	2 1/8"	22
AN815	1 Ser. 9	7'-9" 17'-9"	Str.	11.3"	306
AN816	1 Ser. 3	14'-6" 18'-0"	Str.	11.9"	130
AN817	89	14'-0"	Str.		3327
AN818	27	15'-0"	Str.		1081
AN819	1	29'-6"	Str.		79
AN820	1 Ser. 3	7'-8" 10'-2"	100	11.3"	71
AN821	1 Ser. 3	11'-7" 13'-7"	100	11.0"	101
AN822	84	8'-10"	101		1981
AN823	1 Ser. 3	14'-4" 16'-10"	100	9"	121
AN824	1 Ser. 3	17'-2" 19'-2"	100	11.0"	146
AN825	3	17'-11"	101		137
AN826	116	16'-2"	100		5007
AN827	124	30'-0"	Str.		9932
AN828	2	15'-0"	Str.		80
AN829	36	24'-9"	Str.		2379
AN830	3	40'-0"	Str.		320
AN831	29	19'-0"	Str.		1471
AN832	2	22'-6"	Str.		120
AN833	2	10'-7"	124		57
AN834	2	11'-4"	104		61
AN835	31	17'-2"	100		1421
AN836	2	6'-10"	104		36
AN837	2	9'-6"	Str.		51
AN838	2	8'-0"	Str.		43
AN839	2	4'-0"	Str.		21
AN901	4	16'-6"	Str.		224
AN902	8	12'-6"	100		340
AN903	6	6'-7"	104		134
AN904	2	9'-0"	Str.		61
AN1101	15	20'-6"	Str.		1634
AN1102	36	10'-0"	Str.		1913
AN1103	3	26'-3"	Str.		418
AN1104	18	10'-4"	101		988
AN1105	45	7'-10"	101		1873
AN1106	18	10'-10"	101		1036
AN1107	6	19'-0"	Str.		606
AN1108	11	7'-5"	104		433
AN1109	4	25'-9"	Str.		547
AN1110	4	9'-6"	Str.		207
AN1111	7	9'-11"	104		369
AN1112	12	19'-3"	Str.		1227
TOTAL WEIGHT	=	107,456			
REAR ABUTMENT					
AS401	70	3'-7"	105		168
AS501	74	30'-0"	Str.		2315
AS502	11	3'-6"	Str.		40
AS503	18	2'-3"	Str.		42
AS504	1	19'-9"	Str.		21
AS505	2	9'-0"	Str.		19
AS506	1	19'-0"	Str.		20
AS507	2	7'-2"	124		15
AS508	1	5'-6"	124		6
AS509	1	4'-10"	124		5
AS510	82	7'-3"	104		620
AS511	79	8'-3"	105		680
AS512	80	9'-2"	105		765
AS513	93	6'-0"	105		582
AS514	106	10'-6"	105		1161
AS515	89	6'-0"	105		557
AS516	13	8'-8"	105		118
AS517	9	6'-9"	Str.		63
AS518	6	12'-0"	104		75
AS519	1	7'-6"	Str.		8
AS520	4	4'-6"	Str.		19
AS521	1	9'-5"	104		10
AS522	5	8'-9"	Str.		46
AS523	1	13'-3"	124		14
AS524	3	16'-6"	124		52
AS525	1	14'-4"	124		15
AS526	2	17'-3"	124		36
AS527	2	5'-3"	Str.		11
AS528	2	15'-6"	Str.		32
AS529	29	5'-7"	110		169
AS530	2 Ser. 5	9'-3" 15'-3"	Str.	11.6"	128
AS531	35	6'-6"	124		237
AS532	1 Ser. 6	1'-8" 5'-5"	104	9"	22
AS533	35	5'-8"	Str.		207
AS534	1 Ser. 6	1'-3" 5'-0"	Str.	9"	20
AS535	12	3'-0"	Str.		38
AS536	1	7'-3"	Str.		8
AS537	1 Ser. 5	1'-3" 4'-4"	108	9 1/4"	15
AS538	1 Ser. 5	1'-0" 5'-0"	Str.	9"	13
AS539	19	6'-9"	109		135
AS540	1 Ser. 2	10'-0" 9'-0"	Str.	11.0"	20
AS541	9	18'-9"	Str.		176
AS542	1	6'-0"	Str.		6
AS543	1	5'-3"	Str.		5
AS544	3	4'-3"	Str.		13
AS545	2	8'-0"	Str.		17
A5546	26	21'-6"	105		68
AS601	79	14'-3"	126		1691
AS602	1 Ser. 2	13'-9" 15'-9"	109	2 1/0"	44
AS603	1	9'-9"	109		15
AS604	1 Ser. 4	13'-9" 20'-3"	109	2 1/2"	102
AS605	1	10'-5"	109		16
AS606	4	18'-5"	109		111
AS607	6	9'-6"	135		86
AS608	6	9'-10"	112		89
AS609	8	13'-0"	155		156
AS610	38	5'-3"	104		300
AS611	2	5'-0"	Str.		15
AS612	4	10'-6"	Str.		63
AS613	10	4'-6"	Str.		68
AS614	7	11'-0"	Str.		116
AS615	4	6'-9"	Str.		41
AS616	4	8'-0"	100		48
AS617	2	5'-8"	104		17
AS618	6	6'-3"	Str.		104
AS619	4	7'-3"	Str.		44
AS620	6	6'-3"	Str.		56
AS621	2 Ser. 5	4'-6" 6'-6"	Str.	6"	83
AS622	14	3'-0"	Str.		63
AS623	2 Ser. 4	3'-0" 8'-3"	Str.	2 1/1"	74
AS624	2	9'-3"	Str.		28
AS625	6	18'-6"	Str.		167
AS626	4	9'-6"	108		57
AS627	4	5'-2"	104		31
AS628	4	9'-6"	155		57
AS629	6	5'-3"	Str.		47
AS630	4	8'-0"	Str.		48
AS631	1	8'-4"	108		13
AS632	1	4'-9"	Str.		7
AS633	18	9'-6"	Str.		257
AS634	4	3'-6"	Str.		21
D801	65	5'-4"	175		926
AS801	28	30'-0"	Str.		2243
AS802	7	10'-0"	Str.		187
AS803	2	32'-7"	149		174
AS804	2	28'-11"	149		154
AS805	2 Ser. 4	3'-0" 9'-6"	Str.	2 1/2"	134
AS806	9	9'-0"	Str.		216
AS807	13	3'-6"	Str.		121
AS808	2	9'-5"	108		50
AS809	6	20'-6"	Str.		328
AS810	6	8'-3"	Str.		132
AS811	1 Ser. 4	10'-0" 9'-0"	Str.	4"	101
AS812	4	18'-9"	Str.		200
1 Light Pole Support					291
TOTAL WEIGHT		=	18,156		

Note: For Light Pole Support Reinforcement Schedule see Sheet CD2

BENDING DIAGRAMS



Note: For Replacement Bar Schedule see BR. NO. CUY-80-1585, Sheet 24/24.

H.N.T.B. BR. NO. 35

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-80-15.81

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

REINFORCEMENT SCHEDULE ABUTMENTS

I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-1585 STA. 12+23.13 TO STA. 17+06.79

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DMC DATE 9-4-70	DMC DATE 9-4-70	JEH DATE 9-10-70	DATE	SHEET 23/24

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 1					
PA401	3	20'-3"	150		41
PA402	2	19'-9"	150		26
PA403	1	18'-10"	150		13
PA501	70	5'-1"	105		371
PA502	2 Ser.10	8'-5" 101.5"	109	2 1/16"	196
PA503	2 Ser. 9	8'-5" 101.5"	109	3"	177
PA504	73	12'-2"	109		926
PA601	12	6'-2"	105		111
PA602	8	28'-9"	Str.		345
PA801	168	7'-0"	Str.		3140
PA1101	24	22'-9"	Str.		2901
PA1102	16	22'-3"	Str.		1891
PA1103	8	21'-6"	Str.		914
PA1104	48	7'-5"	104		1891
PA1105	8	39'-9"	104		1690
PA1106	8	21'-0"	Str.		893
PA1107	8	30'-9"	Str.		1307
PA1108	8	28'-2"	108		1197
PA1109	4	14'-9"	Str.		313
PA1110	6	17'-9"	104		566
PA1111	6	16'-6"	Str.		526
PA1112	4	18'-6"	Str.		393
		TOTAL WEIGHT	=		19,828
PIER 2					
PB401	3	25'-10"	150		1665
PB402	1	25'-5"	150		547
PB403	1	25'-0"	150		540
PB404	1	24'-7"	150		531
PB501	70	5'-7"	105		408
PB601	70	11'-6"	Str.		1209
PB602	16	41'-9"	105		114
PB603	16	26'-3"	Str.		631
PB604	2 Ser. 7	12'-1" 13'-7"	109	3"	270
PB605	50	15'-5"	109		1158
PB606	1 Ser. 9	13'-9" 15'-3"	109	2 1/4"	196
PB607	38	6'-3"	148		357
PB608	36	8'-11"	148		482
PB701	44	10'-1"	148		907
PB702	46	6'-2"	148		580
PB1101	140	11'-6"	Str.		8554
PB1102	88	37'-0"	Str.		17,299
PB1103	60	8'-2"	104		2603
PB1104	10	28'-9"	Str.		1527
PB1105	20	29'-3"	Str.		3108
PB1106	8	19'-8"	104		836
PB1107	10	14'-0"	Str.		744
PB1108	4	16'-6"	Str.		351
PB1109	8	16'-11"	108		719
PB1110	6	17'-7"	104		561
PB1111	30	30'-0"	Str.		4782
		TOTAL WEIGHT	=		50,679
PIER 3					
PC401	2	22'-6"	150		970
PC402	2	21'-11"	150		941
PC403	1	21'-2"	150		455
PC404	1	20'-9"	150		447
PC501	70	6'-1"	105		444
PC601	2 Ser. 9	11'-9" 13'-3"	109	2 1/4"	338
PC602	12	13'-5"	109		242
PC603	57	15'-5"	109		1320
PC604	16	26'-3"	Str.		631
PC605	16	6'-8"	105		160
PC606	2 Ser. 8	11'-9" 13'-3"	109	2 3/16"	300

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PC801	228	8'-8"	Str.		5327
PC1101	60	7'-5"	104		2364
PC1102	20	26'-6"	Str.		2816
PC1103	10	26'-0"	Str.		1381
PC1104	10	25'-6"	Str.		1355
PC1105	20	25'-0"	Str.		2657
PC1106	8	26'-5"	108		1123
PC1107	8	27'-9"	Str.		1179
PC1108	17	13'-9"	Str.		1242
PC1109	6	16'-6"	Str.		526
PC1110	6	17'-9"	104		566
PC1111	8	20'-7"	104		875
PC1112	8	36'-9"	Str.		1562
		TOTAL WEIGHT	=		29,221
PIER 4					
PD401	1	18'-7"	150		352
PD402	1	18'-2"	150		339
PD403	1	20'-9"	150		386
PD404	1	20'-4"	150		379
PD405	1	19'-11"	150		373
PD406	1	22'-6"	150		419
PD407	1	22'-0"	150		412
PD501	70	5'-7"	105		408
PD601	8	34'-3"	Str.		412
PD602	2	19'-3"	Str.		58
PD603	2	37'-9"	Str.		113
PD604	4	28'-6"	Str.		171
PD605	24	6'-8"	105		240
PD606	4 Ser. 8	11'-5" 13'-5"	109	3/16"	597
PD607	69	15'-5"	109		1598
PD801	266	8'-6"	Str.		6037
PD1101	20	22'-3"	Str.		2364
PD1102	30	24'-3"	Str.		3865
PD1103	70	7'-5"	104		2758
PD1104	20	26'-0"	Str.		2763
PD1105	7	13'-9"	Str.		514
PD1106	8	37'-4"	104		1587
PD1107	8	29'-3"	Str.		1243
PD1108	8	34'-4"	108		1459
PD1109	6	17'-9"	104		566
PD1110	4	20'-6"	Str.		436
PD1111	4	38'-6"	Str.		818
PD1112	8	15'-0"	Str.		638
PD1113	7	17'-0"	Str.		632
PD1114	1	16'-0"	Str.		85
		TOTAL WEIGHT	=		32,022
SUPERSTRUCTURE					
S501	702	21'-4"	105		1708
S502	189	21'-2"	105		427
S503	522	21'-3"	105		1225
S504	2	7'-2"	108		15
S505	1 Ser. 4	3'-0" 6'-8"	105	1 2 1/16"	20
S506	2	41'-4"	105		9
S507	692	6'-8"	105		4812
S508	631	1'-10"	105		1207
S509	639	6'-9"	110		4499
S510	144	31'-10"	105		576
S511	1 Ser. 4	3'-10" 31'-10"	105	8"	20
S512	1 Ser. 6	4'-4" 7'-10"	105	8 3/8"	38
S513	1 Ser. 28	4'-4" 7'-0"	105	1 1/8"	165
S514	1 Ser. 87	7'-1" 14'-4"	105	1"	972
S515	1 Ser. 50	14'-4" 21'-4"	105	1 1/2"	591
S516	1	11'-4"	105		12
S517	2	8'-8"	108		18
S518	4	4'-6"	109		19
S519	2	21'-8"	105		6
S520	4	9'-3"	Str.		39
S521	1 Ser. 6	3'-2" 5'-8"	105	6 "	28

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
S601	12	6'-11"	101		125
S602	12	6'-3"	Str.		113
S603	1 Ser.70	7'-5" 40'-9"	101	5 3/16"	2528
S604	1 Ser.70	6'-9" 40'-0"	Str.	5 3/16"	2458
S605	591	37'-6"	101		33,288
S606	63	33'-0"	Str.		3123
S607	1 Ser.63	6'-3" 36'-0"	101	5 3/16"	1999
S608	1 Ser. 63	9'-6" 39'-3"	Str.	5 3/16"	2307
S609	264	40'-3"	Str.		15,960
S610	91	33'-6"	Str.		4579
S611	173	34'-0"	Str.		8835
S612	63	39'-2"	101		3706
S613	63	35'-0"	Str.		3312
S614	102	36'-11"	101		5656
S615	128	39'-9"	Str.		7642
S616	39	40'-8"	101		2382
S617	39	36'-0"	Str.		2109
S618	39	40'-0"	Str.		2343
S619	62	26'-2"	101		2437
S620	62	29'-0"	Str.		2701
S621	124	26'-0"	Str.		4842
S622	62	29'-8"	101		2763
S623	62	25'-6"	Str.		2375
S624	73	26'-8"	101		2924
S625	2613	30'-0"	Str.		117,742
S626	313	27'-0"	Str.		12,693
S627	73	26'-6"	Str.		2906
S628	73	30'-8"	101		3362
S629	73	26'-9"	Str.		2933
S630	80	27'-8"	101		3324
S631	80	31'-0"	Str.		3725
S632	80	31'-8"	101		3805
S633	126	28'-2"	101		5331
S634	126	32'-0"	Str.		6056
S635	126	28'-0"	Str.		5299
S636	281	27'-6"	Str.		11,607
S637	126	32'-2"	101		6088
S638	1 Ser. 29	12'-0" 28'-0"	Str.	5 5/8"	806
S639	1 Ser. 29	16'-6" 30'-0"	Str.	5 5/8"	1013
S640	1 Ser. 65	10'-6" 39'-0"	Str.	5 5/8"	2416
S641	1 Ser. 65	5'-9" 34'-9"	Str.	5 5/8"	1977
S642	1 Ser. 65	19'-2" 43'-2"	101	4 1/2"	3043
S643	1 Ser. 65	18'-6" 42'-6"	Str.	4 1/2"	2978
S644	44	18'-8"	101		1234
S645	46	18'-0"	Str.		1244
S646	29	32'-8"	101		1423
S647	65	35'-2"	101		3433
S648	1 Ser. 14	3'-3" 33'-3"	Str.	2'-3 3/16"	384
S649	1 Ser. 19	3'-3" 33'-3"	Str.	11.8"	521
S650	1 Ser. 11	6'-6" 32'-0"	Str.	2'-6 3/4"	318
S651	1 Ser. 18	6'-6" 32'-0"	Str.	11.6"	520
S652	167	23'-6"	Str.		5895
S653	1 Ser. 16	5'-3" 37'-6"	Str.	2'-1 3/16"	514
S654	1 Ser. 21	5'-3" 37'-6"	Str.	1'-7 3/4"	674
S655	1 Ser. 19	3'-6" 30'-0"	Str.	1'-5 15/16"	478
S656	1 Ser. 30	3'-6" 30'-0"	Str.	10 13/16"	755
S657	1 Ser. 18	2'-6" 30'-0"	Str.	1'-7 7/16"	439
S658	1 Ser. 30	2'-6" 30'-0"	Str.	11 3/8"	732
S659	1 Ser. 21	3'-6" 41'-0"	Str.	1'-10 1/2"	702
S660	1 Ser. 33	3'-6" 41'-0"	Str.	1'-2 1/16"	1103
S666	44	34'-9"	Str.		2297
S667	60	27'-0"	Str.		2433
S668	176	20'-0"	Str.		5287
S669	116	34'-0"	Str.		5924
S670	6	21'-6"	Str.		194
S671	1	10'-0"	Str.		15
S672	2	25'-0"	Str.		75
S673	5	41'-0"	Str.		308
S674	5	37'-6"	Str.		282
5 Light Pole Supports					1,280
		TOTAL WEIGHT	=		372,481

BENDING DIAGRAMS

101

6'-3"	S601
6'-9" to 40'-0"	S603
36'-10"	S605
5'-7" to 35'-4"	S607
38'-6"	S612
36'-3"	S614
40'-0"	S616
25'-6"	S619
29'-0"	S622
26'-0"	S624
30'-0"	S628
27'-0"	S630
31'-0"	S632
27'-6"	S633
31'-6"	S637
18'-6" to 42'-6"	S642
18'-0"	S644
32'-0"	S646
34'-6"	S647

104

PA1104, PC1101, PD1103	6'-3"
PB1103	7'-0"
PA1105	37'-11"
PA1110	15'-10"
PB1106	16'-11"
PB1110	14'-10"
PC1110, PD1109	14'-10"
PC1111	17'-8"
PD1106	34'-5"

108

22'-9"	PA1108
21'-0"	PC1106
11'-11"	PB1109
29'-4"	PD1108
6'-3"	S504
7'-9"	S517

109

PA502, PA503	2'-2" to 3'-2"
PA504	3'-2"
PB604	3'-4" to 4'-1"
PB605, PC603, PD607	4'-2"
PB606	3'-4" to 4'-1"
PC601, PC606	3'-4" to 4'-1"
PC602	4'-2"
PD606	3'-2" to 4'-2"
S518	1'-4"

110

21'-9"	
8"	S509

2'-9" to 5'-3"	S521
2'-3"	S519
11'-0"	S516
14'-0" to 8'-0"	S515
6'-9" to 14'-0"	S514
4'-0" to 6'-8"	S513
4'-0" to 7'-6"	S512
3'-6" to 5'-6"	S511
3'-6"	S510
10"	S508
5'-8"	S507
3'-4"	S506
2'-0" to 5'-8"	S505
1'-3"	S503
1'-2"	S502
1'-4"	S501
3'-8"	PC501
3'-2"	PB602, PC605, PD605
2'-8"	PA601
3'-2"	PB501, PD501
2'-8"	PA501

148

5'-7"	PB607
8'-3"	PB608
9'-3"	PB701
5'-4"	PB702

105

2'-8" Out to Out (Pier 1)
3'-2" Out to Out (Piers 2, 3 and 4)

150

PA401	*57
PA402	*56
PA403	*53
PB401	**72
PB402	**71
PB403	**70
PB404	**69
PC401, PD406	**63
PC402	**61
PC403	**59
PC404, PD403	**58
PD401	**53
PD402	**51
PD404	**57
PD405	**56
PD407	**62

* Number of turns at 3½" pitch including 1½ turns at each end.
** Number of turns at 4½" pitch including 1½ turns at each end.

REPLACEMENT BAR SCHEDULE			
Size	No.	Length	Type
4	4	6'-3"	Str.
5	10	6'-9"	Str.
6	37	7'-0"	Str.
7	2	7'-3"	Str.
8	6	7'-6"	Str.
9	1	8'-0"	Str.
10	1	8'-3"	Str.
11	9	8'-6"	Str.

Note: Replacement bars are listed for Bridges 35, 36, 36A, 37 and the Arch Culvert.

SPIRAL REINFORCEMENT NOTE

The "Length" shown in the reinforcement schedule for the spiral bars is the distance from the top of the footing to the bottom of the Pier cap.

Four steel channels, tee or angle spacers, weighing approximately 0.80 lbs. per ft. of spacer shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers based on 0.80 lbs. per ft. will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

Note:
For Light Pole Support Reinforcement Schedule see Sheet CD2

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-80-15.81

H.N.T.B. BR.NO.35

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

PIERS AND SUPERSTRUCTURE REINFORCEMENT SCHEDULE
I-80, LANE OBE-JN, AND LANE JN-OBE
UNDER RELOCATED GRANGER ROAD (S.R.17)

BR. NO. CUY-80-15 85 STA.12+23.13 TO STA.17+06.79

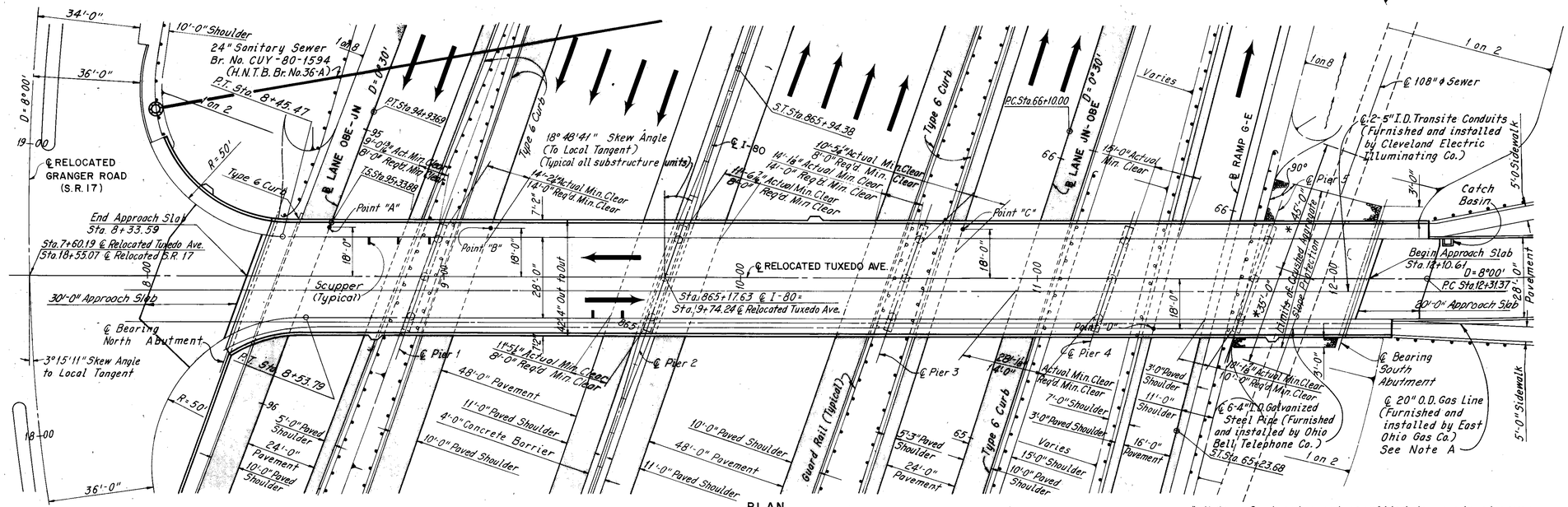
CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
DATE 9-11-70	DATE 9-14-70	DATE 9-14-70	DATE	SHEET 24 / 24

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

345/392

CUYAHOGA COUNTY
CUY-80-15.81



PLAN
Scale: 1" = 20'

* Note: Contractor not permitted to construct sewer with open trench within these limits. See Note on Sheet 9/ concerning construction of sewer under bridge.

PROPOSED STRUCTURE

TYPE: Continuous steel rolled beam with reinforced concrete deck and substructure.
SPANS: 57'-0", 2@81'-0", 69'-6", 49'-0", and 34'-6".
ROADWAY: 28'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 18°48'41" Left Forward
WEARING SURFACE: 1" Latex Modified Concrete
APPROACH SLABS: 30'-0" Rear & 20'-0" Forward, A3-1-72 (Modified)
ALIGNMENT: Tangent
SUPERELEVATION: Normal, 0.0156 ft. per ft. south of Pier 2, varies north of Pier 2.

Modify Std. Drwg. A3-1-72 by providing 3" clear over the top rebars instead of the 2" shown on the Std. Drwg.

TRAFFIC DATA: (1991)

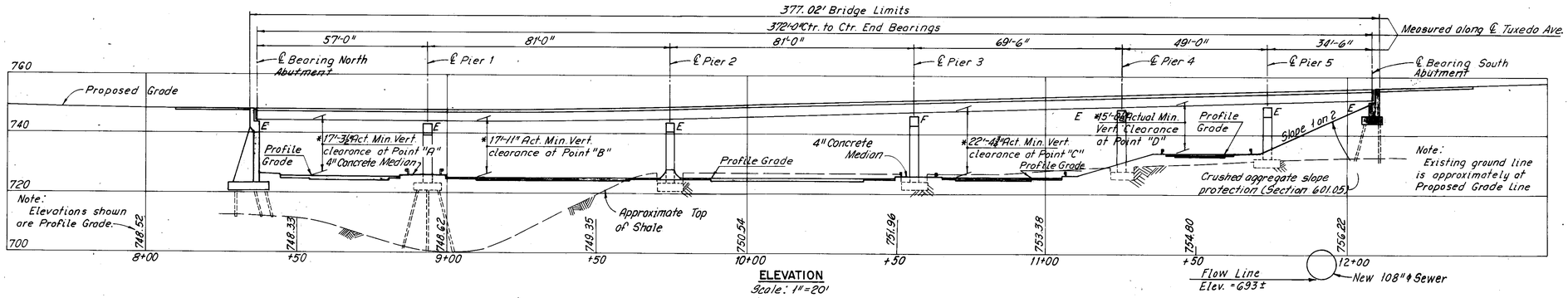
Tuxedo Avenue 4,937 A.D.T.
394 D.D.H.V.

FOUNDATION DATA:

Piers 2 thru 5 are founded on spread footings.
Piles at Pier 1 are HP12x53 with an estimated average pay length of 24'-0".
Piles at North Abutment are HP12x53 with an estimated average pay length of 13'-0".
Piles at South Abutment are HP10x42 with an estimated average pay length of 14'-0".

Note A:

58' (34' at the north end and 24' at the south end) of 24" O.D., Grade B, uncoated pipe sleeve weighing 79.06 pounds per foot with 0.312" wall thickness to be furnished and installed by the Bridge Contractor; paid for by The East Ohio Gas Company.



ELEVATION
Scale: 1"=20'

*Note:
16'-4" Required minimum vertical clearance over I-80. 15'-0" Required minimum vertical clearance over Lane OBE-JN, Lane JN-OBE and Ramp G-E.

EXCAVATION AND BACKFILL

Excavation in cut sections shall be completed to the level of the subgrade and to the finished spill-thru slopes, or to the limits shown on Sheets 3/15 and 5/15 at the North Abutment, before excavation or any construction work is started at the abutments or piers.

Notes:
For roadway intersection stations and angles see Sheet GP1.
For details of concrete barrier at Pier 2 see Roadway Plans.

H.N.T.B. BR. NO. 36

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

SITE PLAN

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

CUYAHOGA COUNTY OHIO

DRAWN CKB	TRACED CP	CHECKED WH	REVIEWED	REVISED
DATE 3-72	DATE 3-26-72	DATE 5-27-72	DATE	SHEET 1/15

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-15.81

ESTIMATED QUANTITIES

CUY-80-1593 H.N.T.B. BRIDGE NO. 36

ITEM	TOTAL	UNIT	DESCRIPTION	ABUT-MENTS	PIERS	SUPER-STRUCTURE	GENERAL		
503	1157	Cu. Yd.	Unclassified Excavation	1088	69				
503	110	Cu. Yd.	Shale Excavation		110				
505	Lump Sum	Lump Sum	Test Pile				Lump Sum		
507	270	Lin. Ft.	Steel Piles, HP10 x 42	270					
507	1210	Lin. Ft.	Steel Piles, HP12 x 53	700	510				
503	Lump Sum	Lump Sum	Cofferdams, Cribs and Sheeting				Lump Sum		
509	244,580	Pounds	Reinforcing Steel	45,940	45,542	153,098			
511	568	Cu. Yd.	Class "C" Concrete, Superstructure			568			
511	301	Cu. Yd.	Class "C" Concrete Abutments Above Footings	301					
511	148	Cu. Yd.	Class "C" Concrete, Piers Above Footings		148				
511	255	Cu. Yd.	Class "C" Concrete, Footings	162	93				
512	66	Lin. Ft.	Premolded Sealing Strip	66					
513	*461,700	Pounds	Structural Steel			461,700			
514	*461,700	Pounds	Field Painting of Structural Steel			461,700			
516	123	Sq. Ft.	1" Preformed Expansion Joint Filler	123					
517	837	Lin. Ft.	Bridge Railing (Concrete with Aluminum Chain Link Fence	Sec. 710.04)			837		
518	120	Cu. Yd.	Porous Backfill	120					
518	58	Lin. Ft.	6" ϕ Non-Perforated Helical C.M.P., Including Specials, 707.01	58					
518	28	Lin. Ft.	6" ϕ Perforated Helical C.M.P., 707.01	28					
518	12	Lin. Ft.	8" ϕ Perforated C.M.P. Including Specials, 707.01	12					
518	5	Each	Scuppers Including Supports			5			
518	44	Lin. Ft.	8" ϕ Pipe, Horizontal Conductors Including Supports			44			
518	36	Lin. Ft.	8" ϕ Pipe, Downspouts Including Supports		36				
601	233	Sq. Yd.	Crushed Aggregate Slope Protection	233					
Special	1176	Sq. Yd.	Surface preparation			1176			
Special	33	Cu. Yd.	Latex modified portland cement concrete			33			
Special	1176	Sq. Yd.	Finishing and curing			1176			
808	568	Units	Chemical Admixture for Concrete, Type A, B or D			568			
625			See Sheet ___ for Lighting Summary						

* Includes 7296 pounds required for installation of 20" O.D. gas line to be paid for by the East Ohio Gas Company (includes additional crossframe material and pipe sleeves at abutments) and 3724 pounds required for installation of two 5" ducts to be paid for by the Cleveland Electric Illuminating Company.

H.N.T.B. BR. NO. 36

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

ESTIMATED QUANTITIES

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

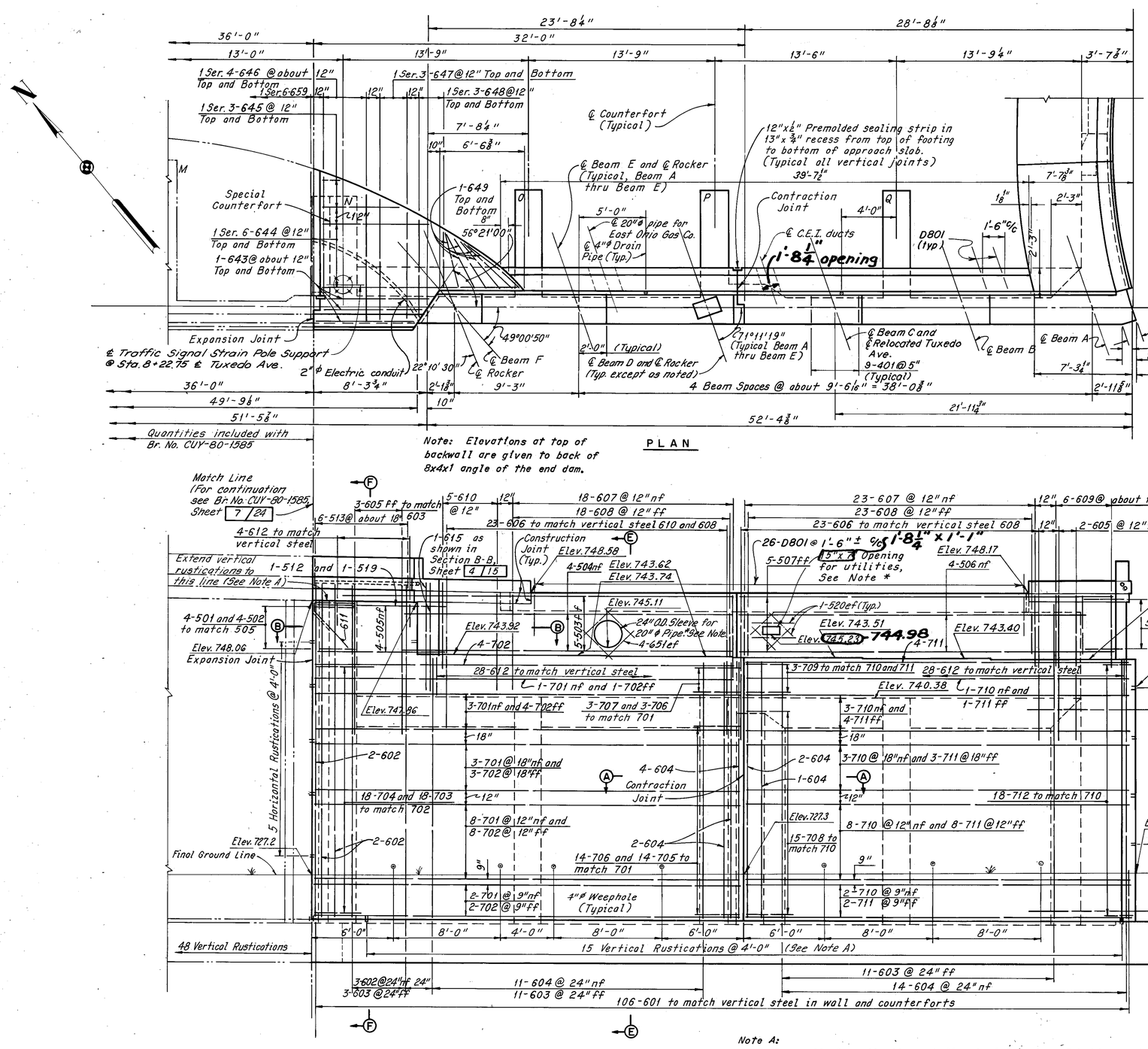
CUYAHOGA COUNTY OHIO

DRAWN WB	TRACED LMC	CHECKED WB	REVIEWED	REVISED
DATE 6-4-70	DATE 6-8-70	DATE 6-10-70	DATE	SHEET 2 /15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

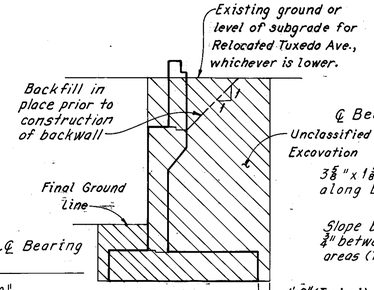
347
392

CUYAHOGA COUNTY
CUY-80-15.81



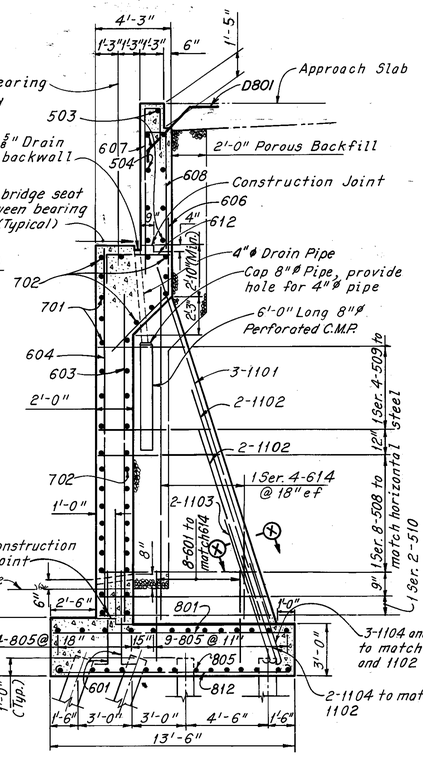
PLAN

Note: Elevations at top of backwall are given to back of 8x4x1 angle of the end dam.

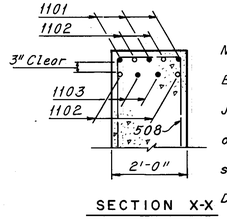


TYPICAL SECTION USED TO DETERMINE UNCLASSIFIED EXCAVATION

Note: All reinforcing bars shall be prefixed AN except D801 bars.



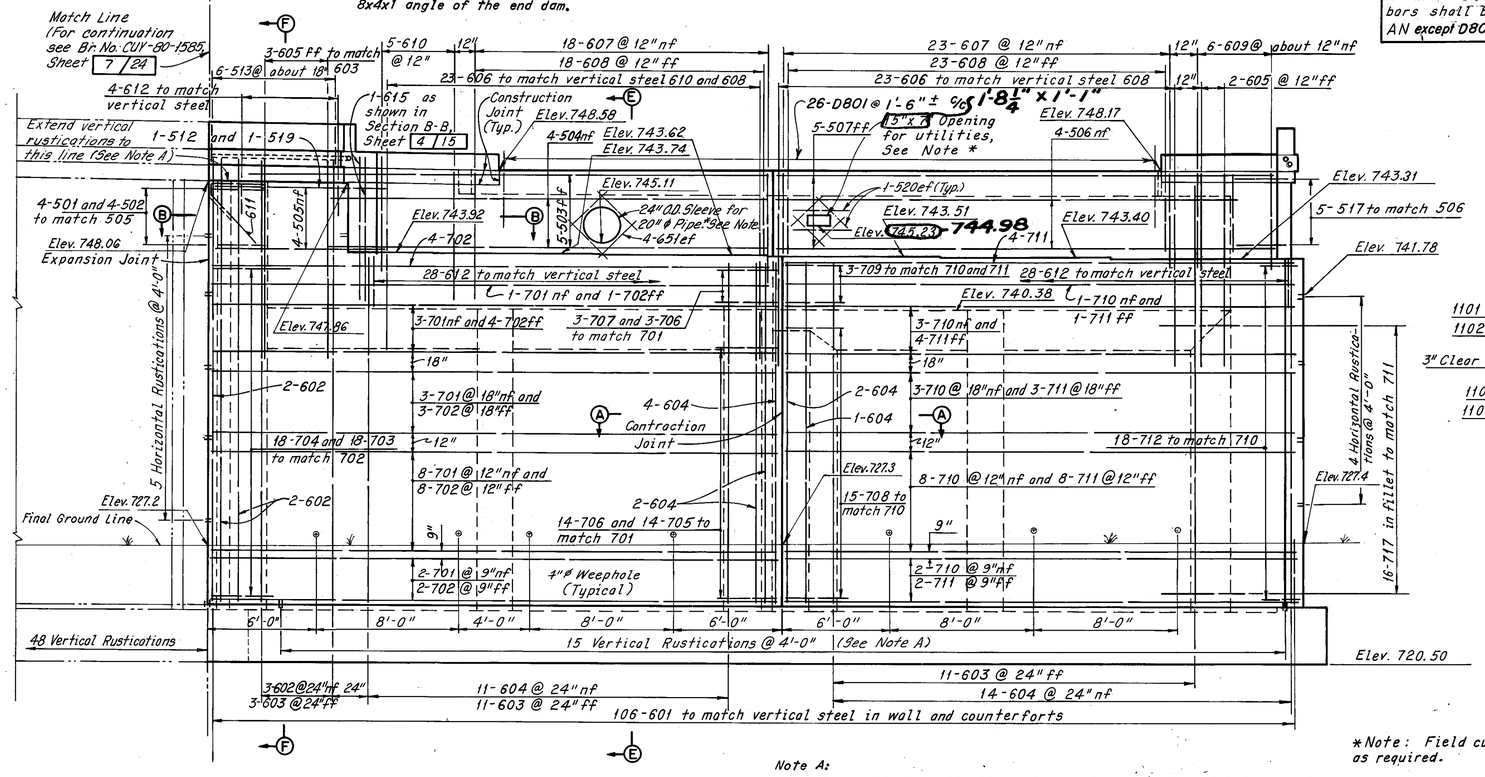
SECTION E-E
(Counterforts O, P and Q)



SECTION X-X

Notes:
For Rustication and Striation Details see Sheet 10/24, Br. No. Cuy-80-1585.
For Section A-A, Section B-B, Section F-F and Expansion Joint Details see Sheet 4/15.
Backfill shall be placed and compacted prior to construction of sidewalk.
For longitudinal reinforcement in the parapets, railing post spacing and end post details see Sheet CD1.
For roadway and sidewalk and dam details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4. The main angle shall be 8x4x1.
For special end dam details see Sheet 12/15.
The following abbreviations are used:
nf = near face ef = each face ff = far face
For Reinforcement Schedule and Bending Diagrams see Sheet 14/15.
For Traffic Signal Strain Pole Support details see Sheet 4/15

H.N.T.B. BR. NO. 36



ELEVATION
(Piles not shown)

*Note: Field cut reinforcement as required.

Note A:
The vertical rustications shall extend from top of bridge seat to a minimum of 6" below the final ground line except as noted.
Between vertical rustications the walls shall have a textured finish as produced by striated forms.

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

NORTH ABUTMENT

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15.93 STA. 8+33.59 TO STA. 12+10.61

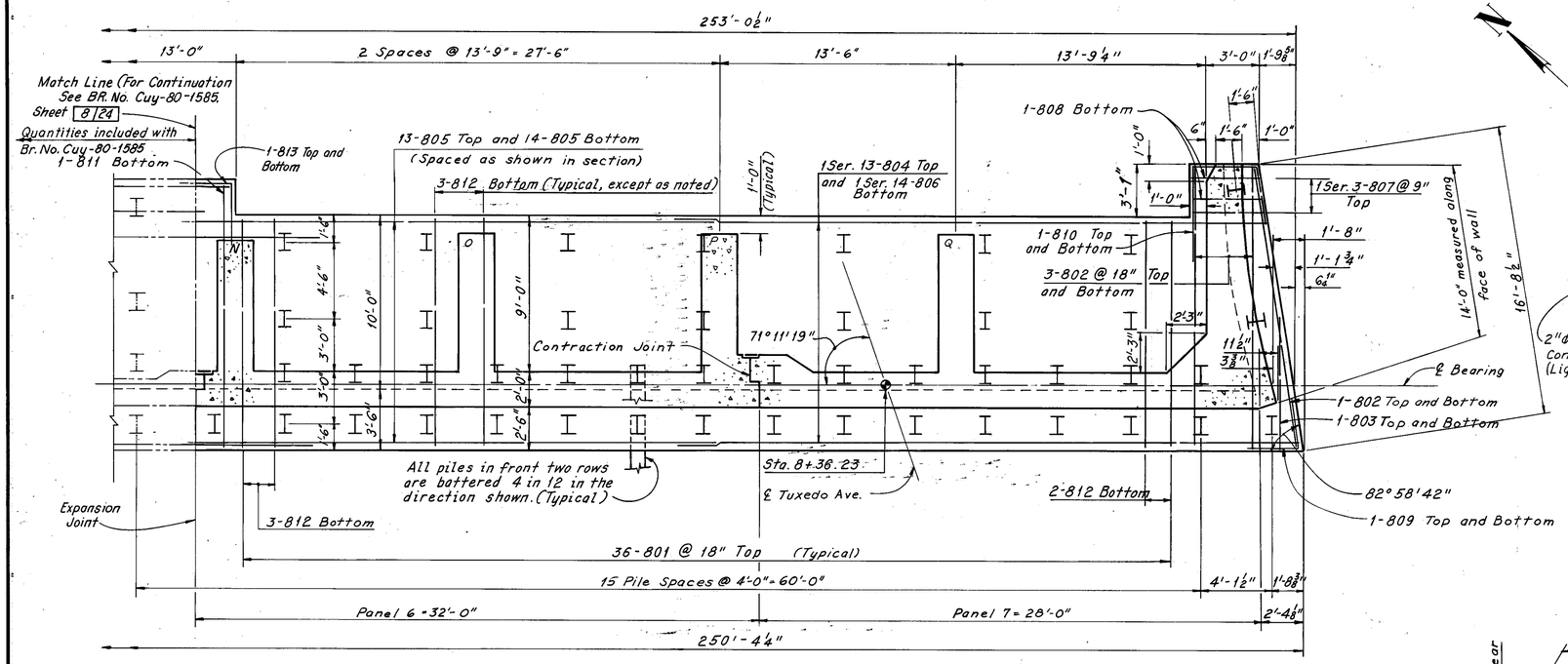
CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED 2-7-75
DATE 7-1469	DATE 7-2269	DATE 8-2969	DATE	SHEET 3/15

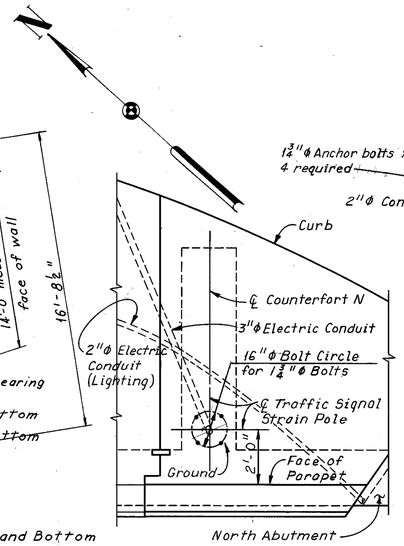
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

348/392

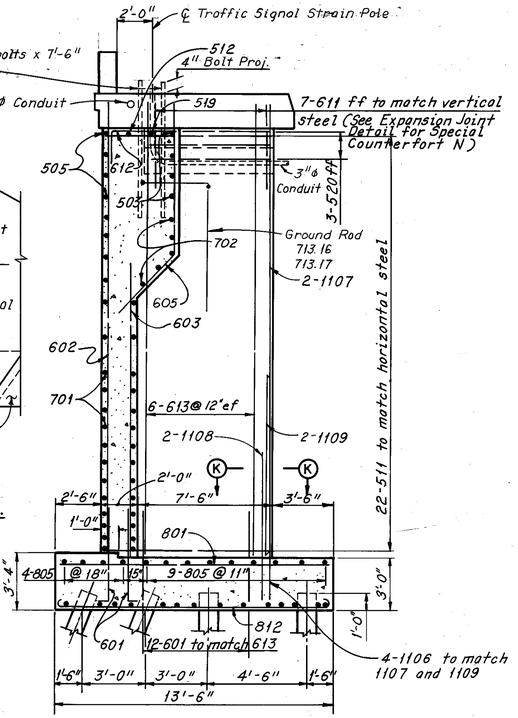
CUYAHOGA COUNTY
CUY - 80-15.81



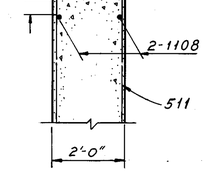
FOOTING PLAN



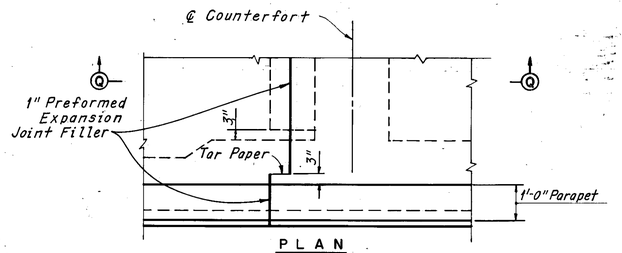
PLAN OF SUPPORT FOR TRAFFIC SIGNAL STRAIN POLE AT STA. 8+22.75 ℄ RELOC. TUXEDO AVE., 34.00' RT.



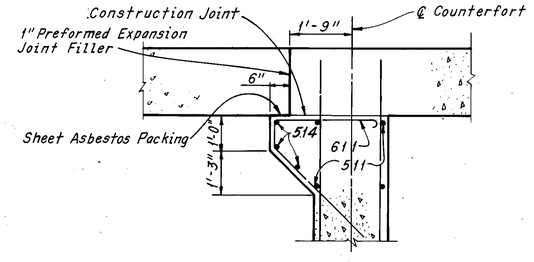
SECTION F-F
(Special Counterfort N See Sheet 3/15)



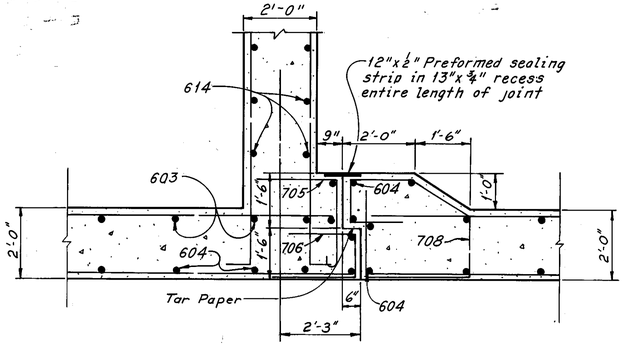
SECTION K-K



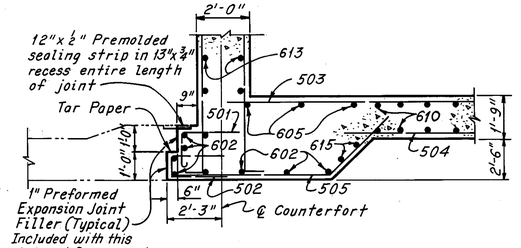
PLAN
EXPANSION JOINT
(Special Counterfort N)



SECTION Q-Q



SECTION A-A
(See Sheet 3/15)



SECTION B-B
(See Sheet 3/15)

Notes:
All piles are HP12x53.
All battered piles shall be inclined 4 in 12 in the direction shown except as noted.
Backfill in front of abutment shall be placed prior to or concurrent with placing backfill behind the abutment.
For additional notes see Sheet 3/15.
Tar paper and Sheet Asbestos packing are included for payment with Item 511.
For Traffic Signal Strain Pole details see Traffic Signal Plans.

H.N.T.B. BR. NO. 36

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

NORTH ABUTMENT FOOTING

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

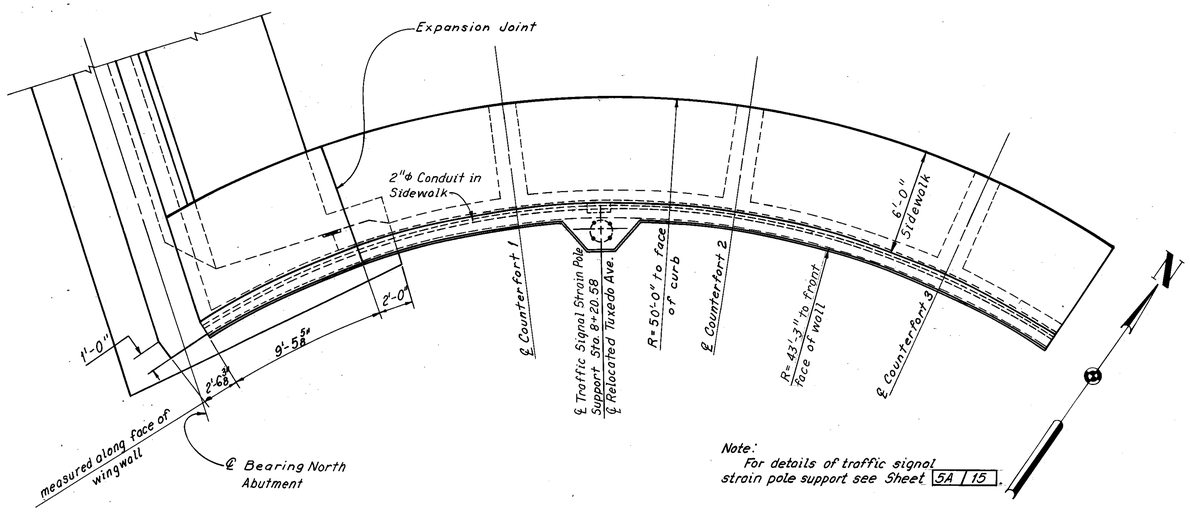
CUYAHOGA COUNTY OHIO

DRAWN DHS	TRACED WB	CHECKED TW	REVIEWED	REVISED
DATE 7-3-69	DATE 7-23-69	DATE 9-3-69	DATE	SHEET 4/15

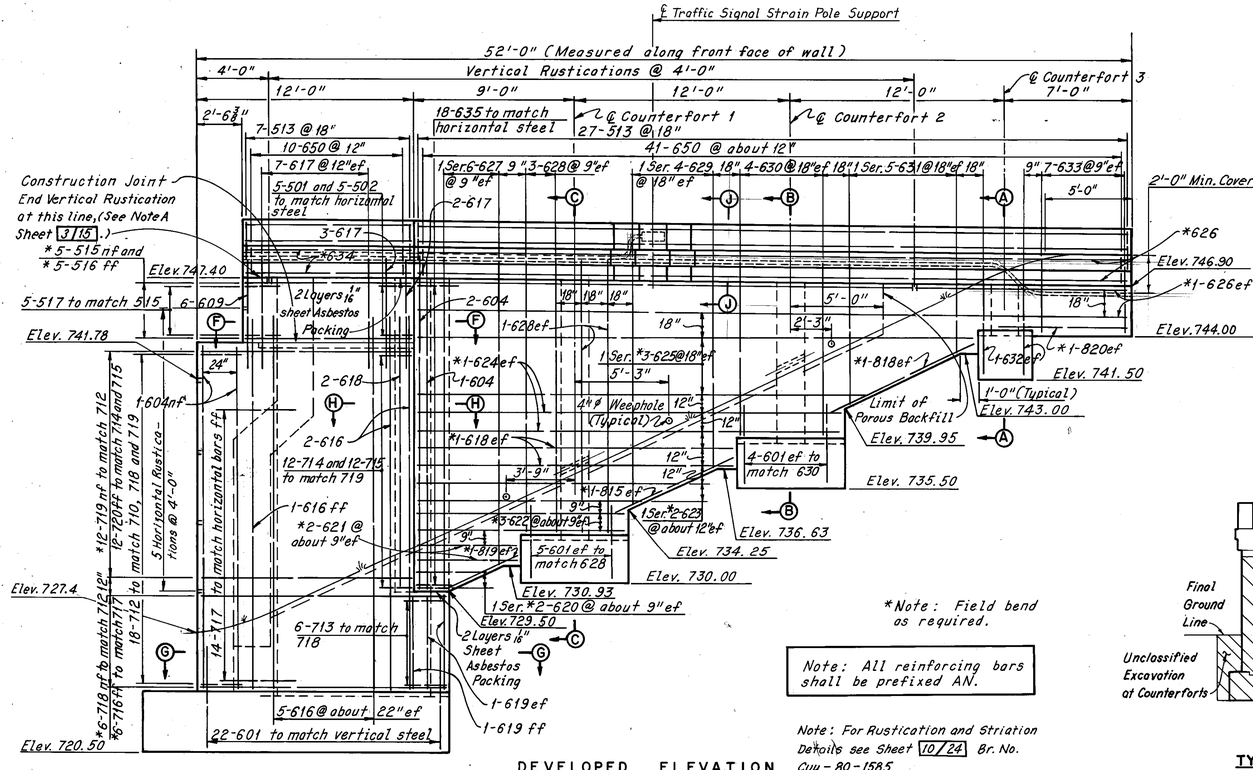
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

349
392

CUYAHOGA COUNTY
CUY-80-15.81

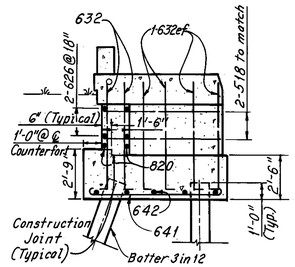


NORTHEAST WINGWALL PLAN

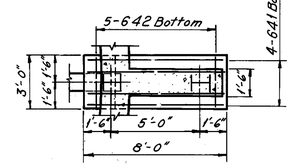


*Note: Field bend as required.

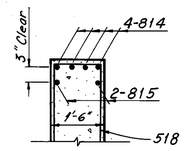
DEVELOPED ELEVATION
(Piles not shown)



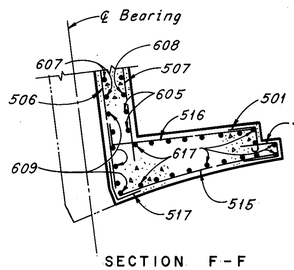
SECTION A-A
(Counterfort 3)



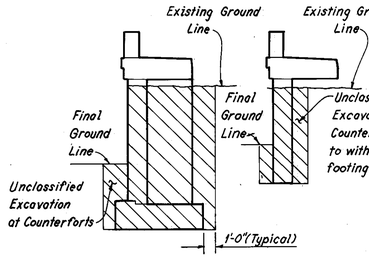
FOOTING PLAN



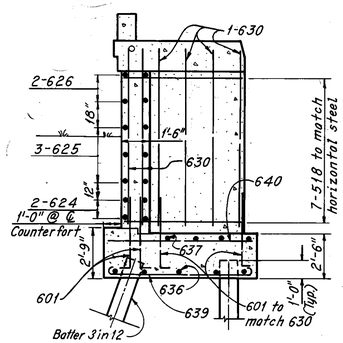
SECTION D-D



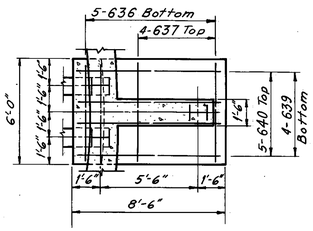
SECTION F-F



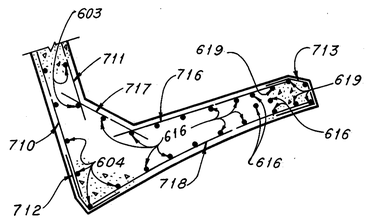
TYPICAL SECTIONS USED TO DETERMINE UNCLASSIFIED EXCAVATION



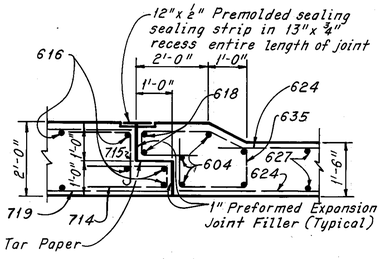
SECTION B-B
(Counterfort 2)



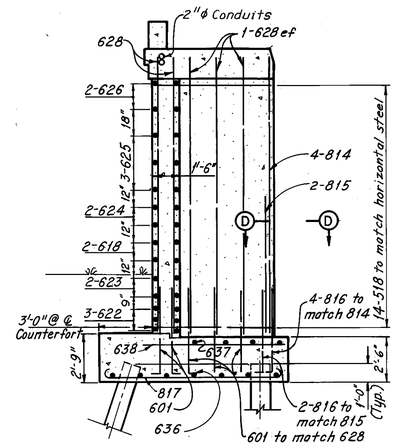
FOOTING PLAN



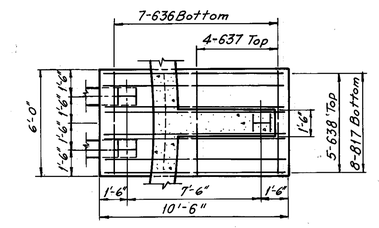
SECTION G-G



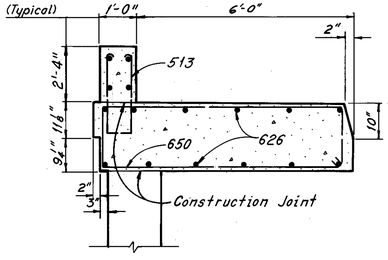
SECTION H-H
(Joint Detail)



SECTION C-C
(Counterfort 1)



FOOTING PLAN



SECTION J-J
(Traffic signal strain pole support not shown)

H.N.T.B. BR. NO. 36

Note: For notes see Sheets 3 | 15 and 4 | 15 .

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
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NORTH ABUTMENT WINGWALL

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

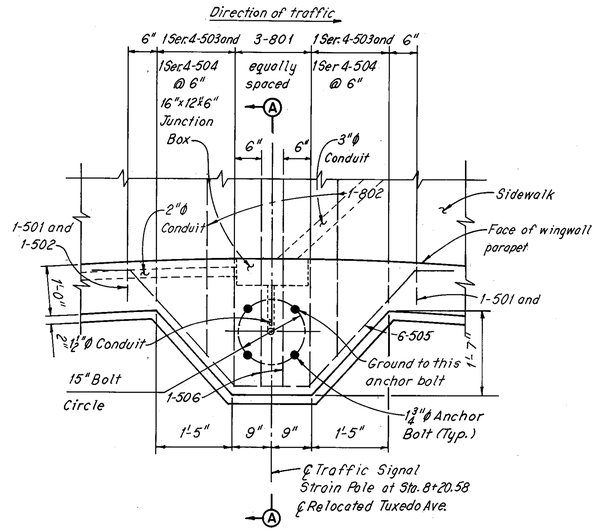
CUYAHOGA COUNTY OHIO

DRAWN DHS	TRACED WB	CHECKED SM	REVIEWED	REVISED
DATE 7-11-68	DATE 7-31-68	DATE 8-29-68	DATE	SHEET 5/15

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

349A / 392

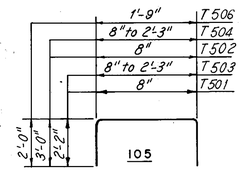
CUYAHOGA COUNTY
CUY-80-15.81

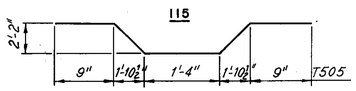


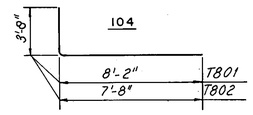
PLAN

REINFORCEMENT SCHEDULE					
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
T501	2	4'-9"	105		10
T502	2	6'-5"	105		13
T503	2 Ser. 4	4'-9" / 6'-4"	105	6 3/8"	46
T504	2 Ser. 4	6'-5" / 8'-0"	105	6 3/8"	60
T505	6	8'-1"	115		51
T506	2	5'-6"	105		11
T801	3	11'-8"	104		93
T802	2	11'-2"	104		60
For one Traffic Signal Strain Pole (on North Abutment Wingwall)		TOTAL WEIGHT=			344

BENDING DIAGRAMS







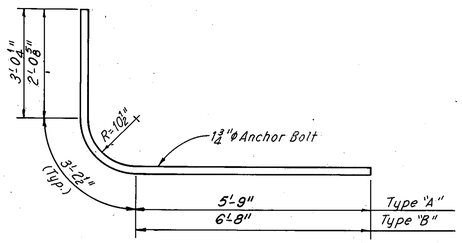
Notes:

For Traffic Signal Strain Pole locations on Bridge No. 36 see Sheets 4 15 and 5 15 .

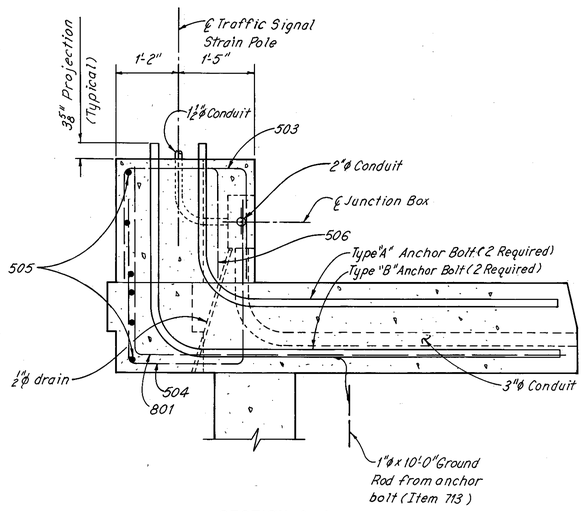
For locations of conduit in the structure, additional details and quantities see Traffic Signal Plans.

Traffic Signal Strain Pole Support reinforcement is included for payment with slab reinforcement; see Reinforcement Schedule for weight summary.

Concrete for Traffic Signal Strain Pole Support above the parapet joint is included for payment with "Item 517, Bridge Railing (Concrete Parapet with Aluminum Chain Link Fence, Sec. 710.04)".



ANCHOR BOLT DETAIL



SECTION A-A

(Normal sidewalk and parapet reinforcement not shown)

H.N.T.B. BR.NO. 36

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

TRAFFIC SIGNAL STRAIN POLE SUPPORT DETAILS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

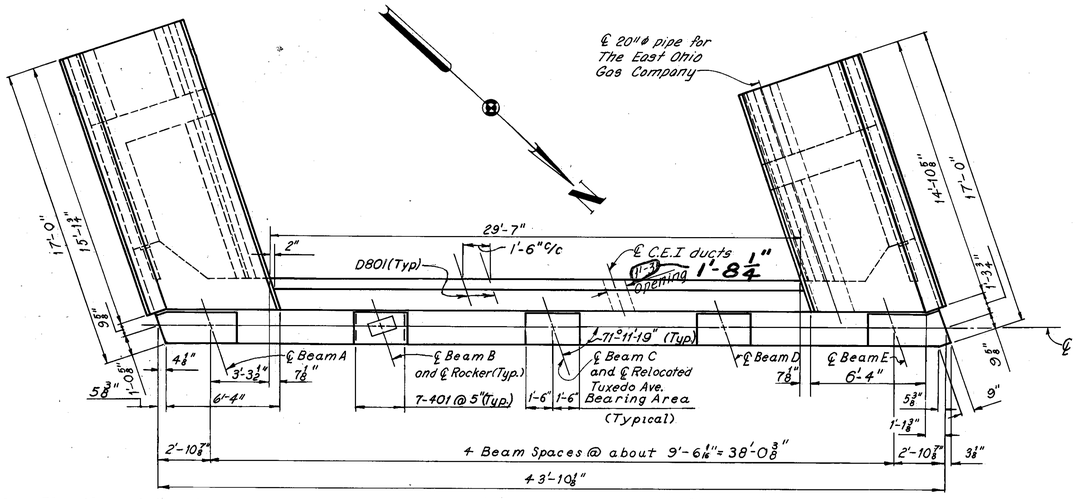
CUYAHOGA COUNTY OHIO

DRAWN RCK	TRACED RCK	CHECKED LEE	REVIEWED	REVISED
DATE 8-21-74	DATE 8-23-74	DATE 8-30-74	DATE	SHEET 5A 15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

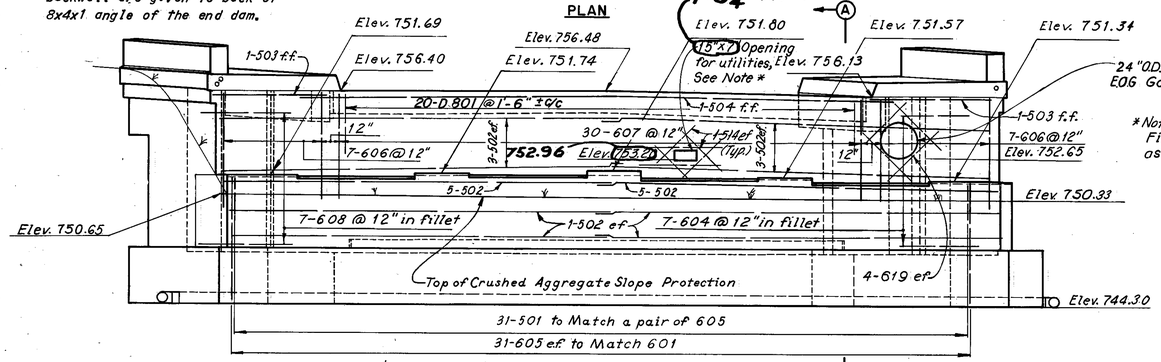
350
392

CUYAHOGA COUNTY
CUY.-80-15.81



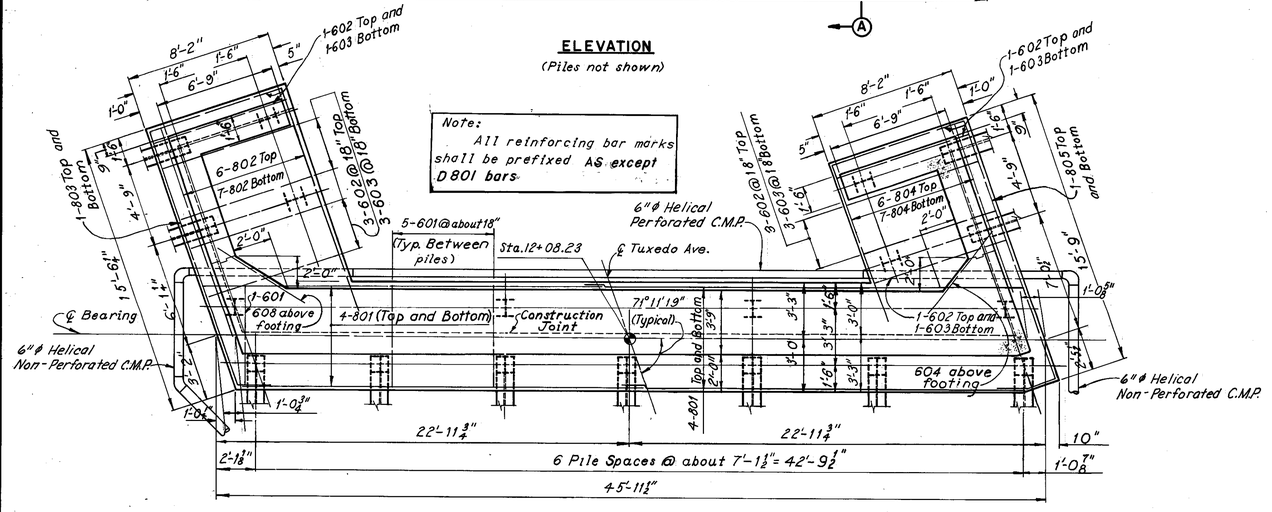
Note: Elevations at top of backwall are given to back of 8x4x1 angle of the end dam.

PLAN

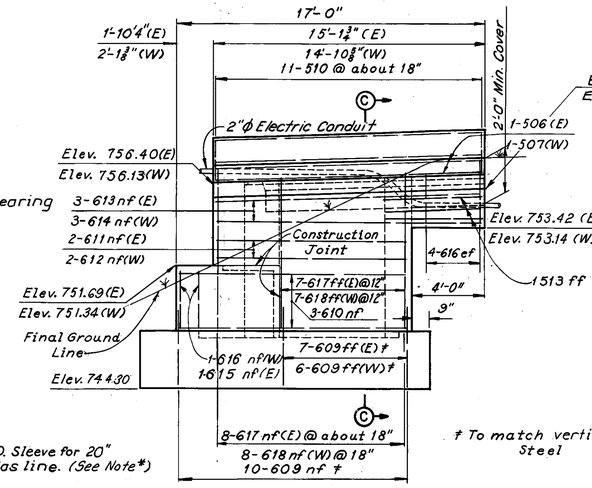


ELEVATION
(Piles not shown)

Note: All reinforcing bar marks shall be prefixed AS except D801 bars.



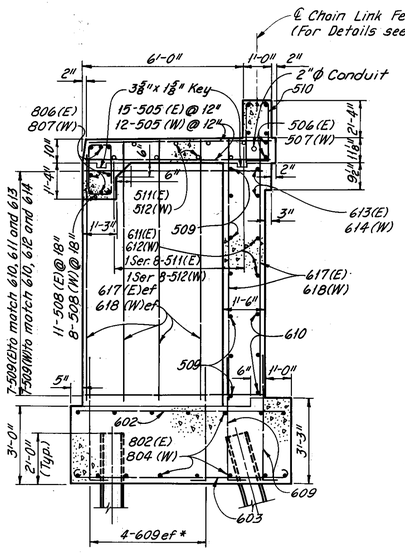
FOOTING PLAN



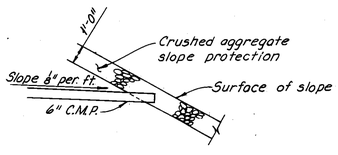
* Note: Field cut reinforcement as required.

† To match vertical Steel

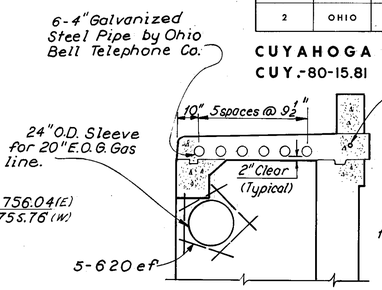
WINGWALL ELEVATION
(East and West)



SECTION C-C

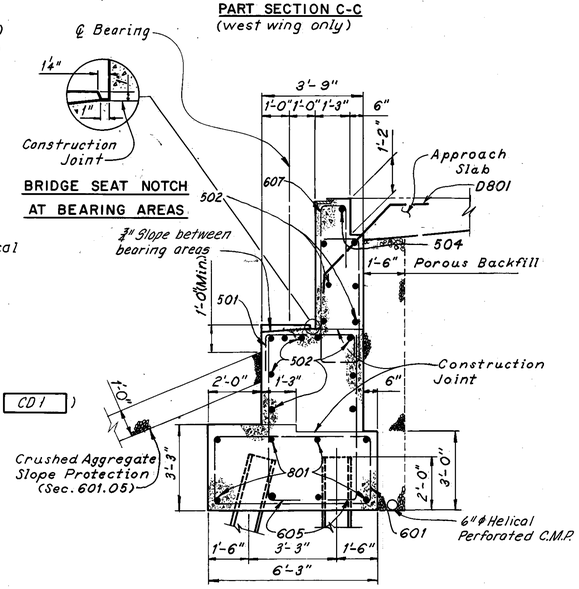


TERMINATION OF 6"ϕ C.M.P. AT THE FRONT SLOPE



Note: For sidewalk and counterfort dimensions and reinforcing steel see Section C-C this sheet. Field cut counterfort reinforcement as required for gas line only.

PART SECTION C-C
(west wing only)



BRIDGE SEAT NOTCH AT BEARING AREAS

SECTION A-A

Notes:
All piles are HP10x42.
All battered piles shall be inclined 3 in 12 in the direction shown.
For roadway and sidewalk end dam and curb plate details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4. The main angle shall be 8x4x1.
The following abbreviations are used:
nf = near face
ff = far face
ef = each face
E = East Wingwall
W = West Wingwall

H.N.T.B. BR. NO. 36

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

SOUTH ABUTMENT

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

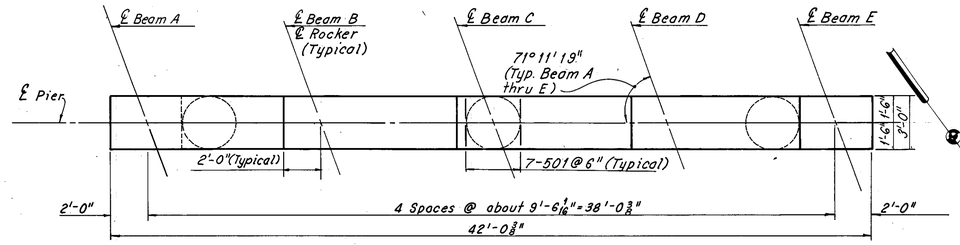
CUYAHOGA COUNTY OHIO

DRAWN M.B.	TRACED R.C.K	CHECKED W.J.	REVIEWED	REVISED 2-7-75
DATE 6-5-69	DATE 6-17-69	DATE 7-15-69	DATE	SHEET 6/15

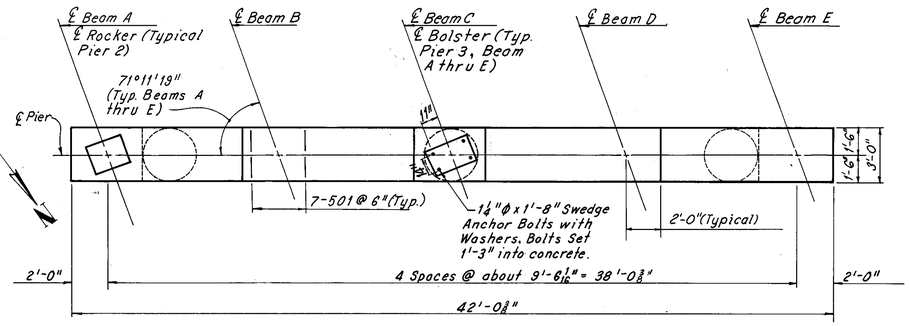
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

351
392

CUYAHOGA COUNTY
CUY-80-15.81



PLAN



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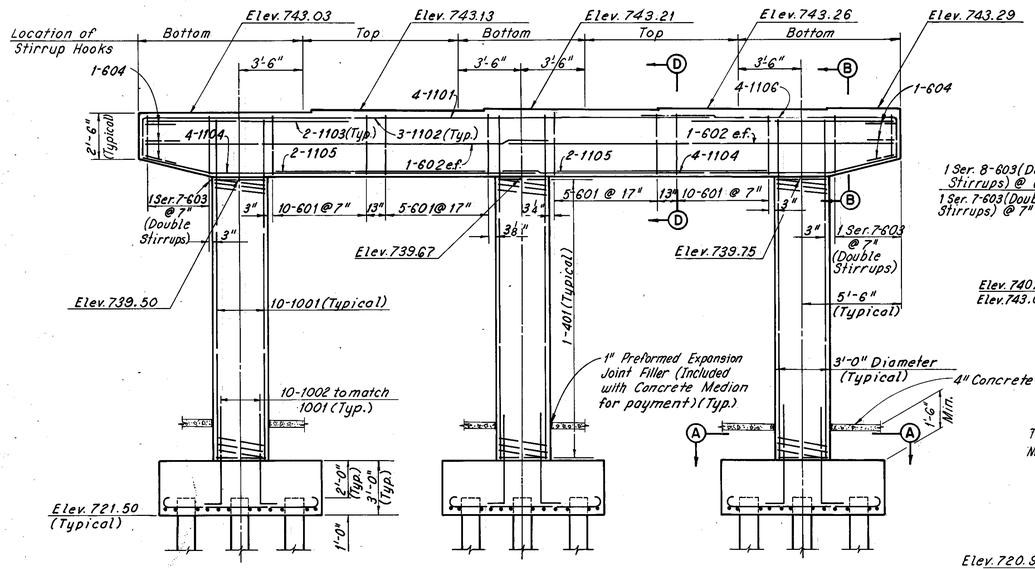
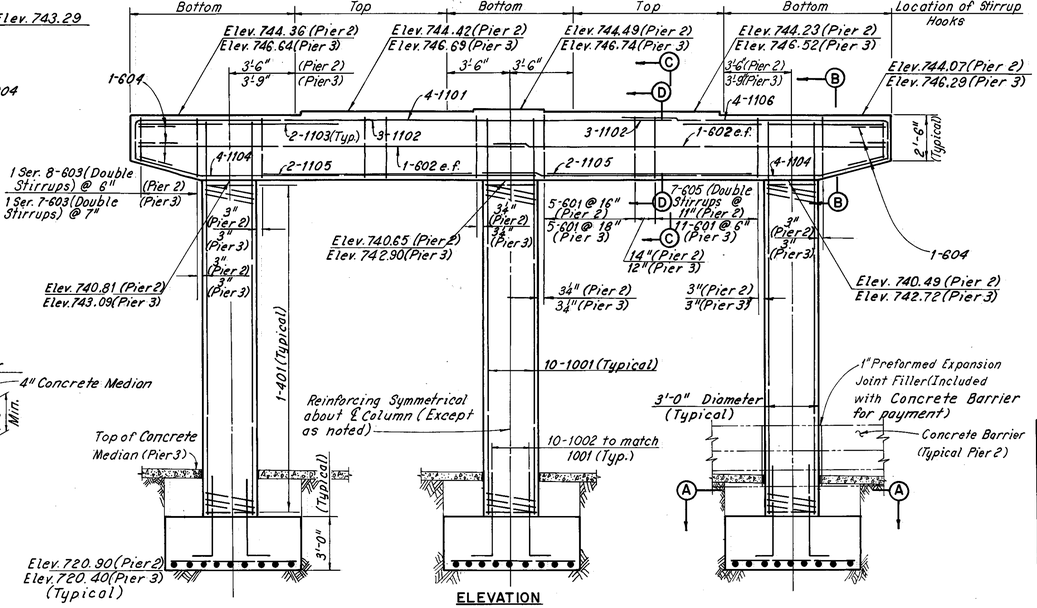
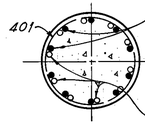


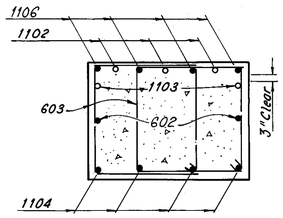
ELEVATION



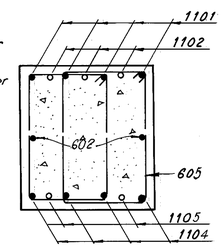
ELEVATION



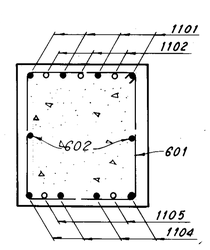
SECTION A-A (TYPICAL)



SECTION B-B (TYPICAL)

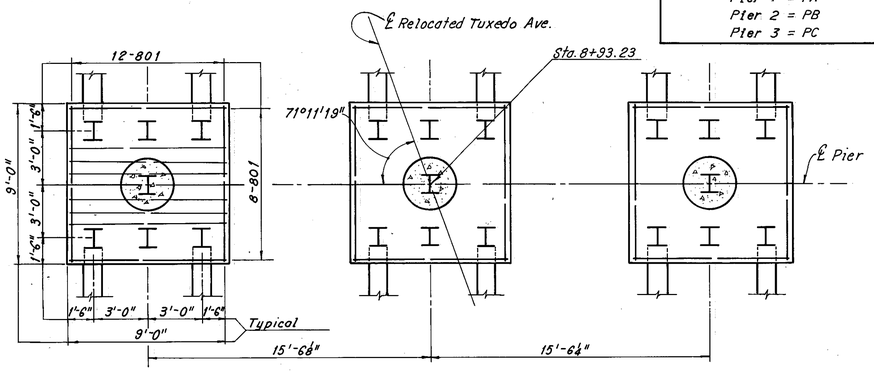


SECTION C-C (PIER 2)

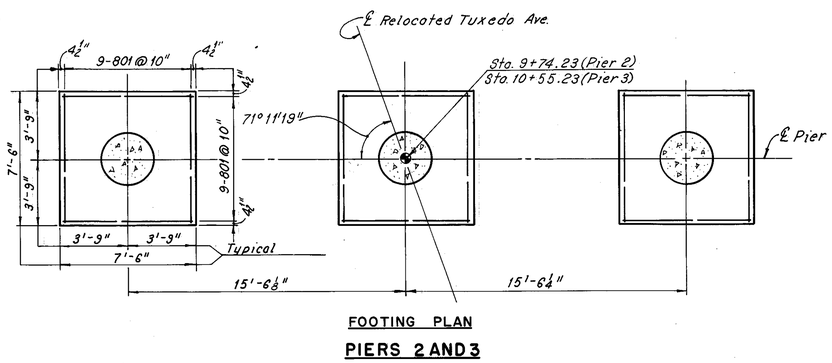


SECTION D-D (PIER 1 & 3)

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 1 = PA
Pier 2 = PB
Pier 3 = PC



FOOTING PLAN
PIER 1



FOOTING PLAN
PIERS 2 AND 3

Note: At Pier 3 special care shall be taken in placing reinforcing steel in the vicinity of the bridge seats so as to avoid interference with the drilling of anchor bolt holes. See Sh. GN 1 for note.

Footings of Pier 2 and Pier 3 shall extend 3" minimum into shale or to the elevation shown, whichever is lower.

Piles at Pier 1 are HP12X53.

All battered piles shall be inclined 3 in 12 in the direction shown.

Pile spacings are measured along the bottoms of footings.

The following abbreviations are used: ef = each face (Typ.) = Typical

H.N.T.B. BR. NO. 36

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

PIERS 1, 2 AND 3

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

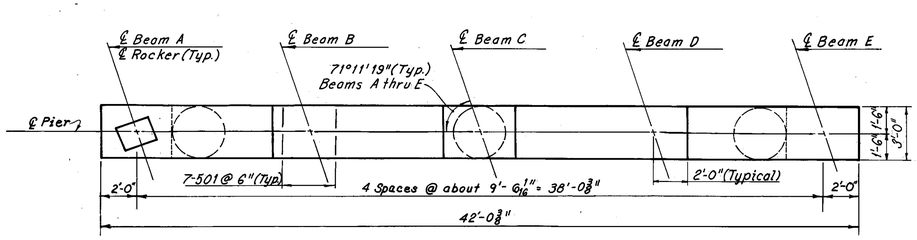
CUYAHOGA COUNTY OHIO

DRAWN DHS	TRACED GEA	CHECKED RCG	REVIEWED	REVISED
DATE 6-2-69	DATE 6-9-69	DATE 6-23-69	DATE	SHEET 7/15

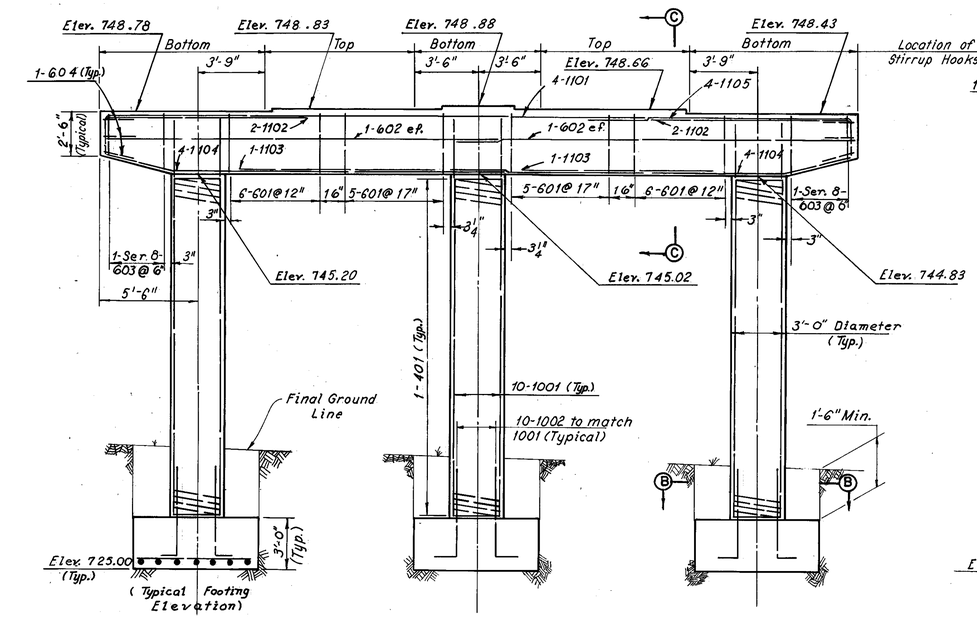
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

352
392

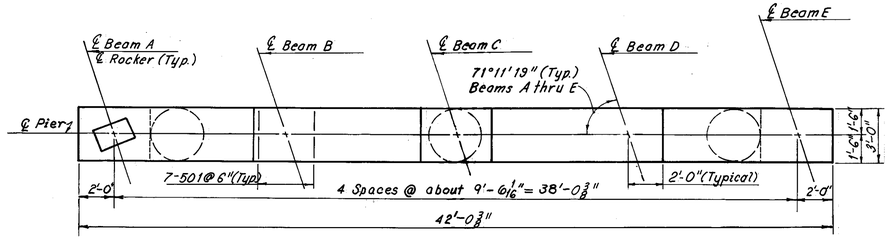
CUYAHOGA COUNTY
CUY-80-15.81



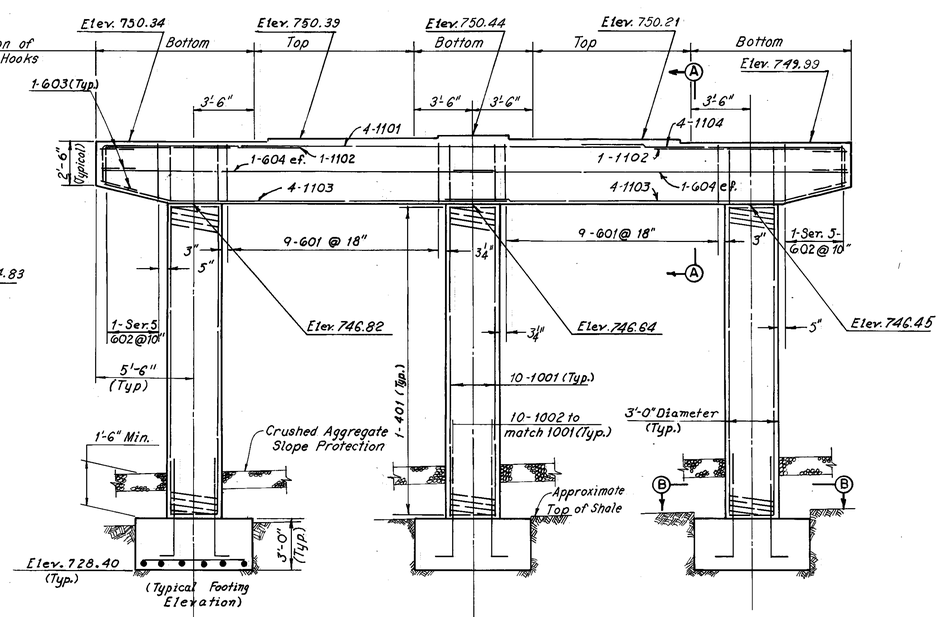
PLAN



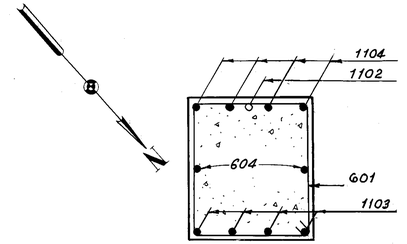
ELEVATION



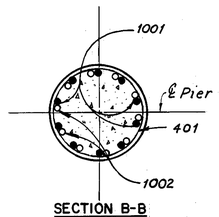
PLAN



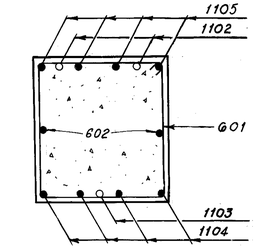
ELEVATION



SECTION A-A

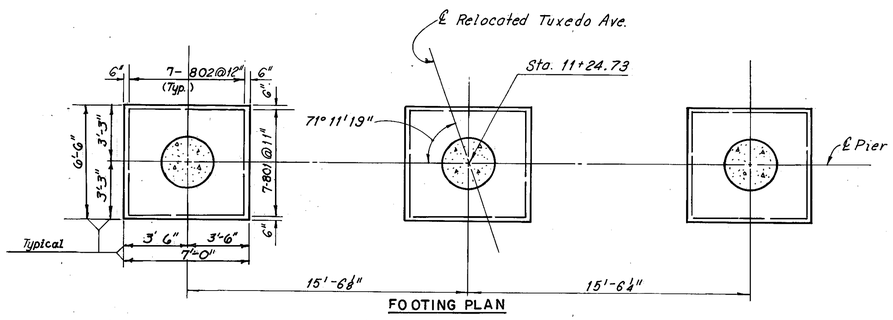


SECTION B-B



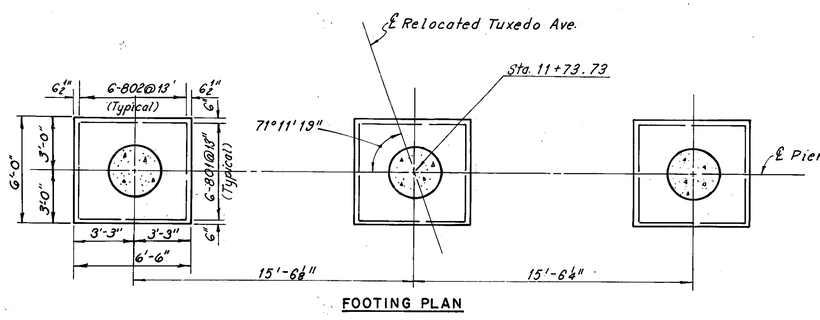
SECTION C-C

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 4 = PD
Pier 5 = PE



FOOTING PLAN

PIER 4



FOOTING PLAN

PIER 5

Notes:
Footings shall extend 3" minimum into shale or to the elevation shown, whichever is lower.
The following abbreviations are used:
ef = each face
(Typ.) = Typical
For additional notes see Sheet 7/15.

H.N.T.B. BR.NO.36

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

PIERS 4 AND 5

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

CUYAHOGA COUNTY OHIO

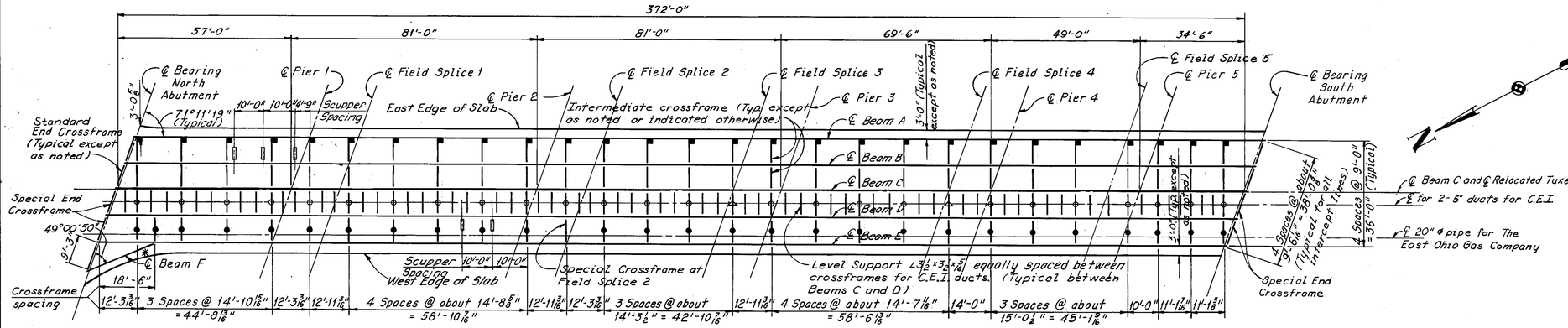
DRAWN DHS	TRACED AJT	CHECKED MCB	REVIEWED	REVISED
DATE 6-3-69	DATE 6-14-69	DATE 8-27-69	DATE	SHEET 8/15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

353
392

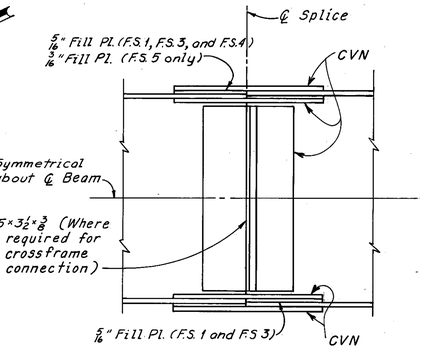
CUYAHOGA COUNTY
CUY-80-15.81

LEGEND:
- ■ Indicates 90°.
- □ Indicates Scuppers.
- Special Intermediate Crossframe for O.B.I. gas main.
- Special Intermediate Crossframe for C.E.I. ducts.
- Special Crossframe @ Field Splice for C.E.I. ducts.



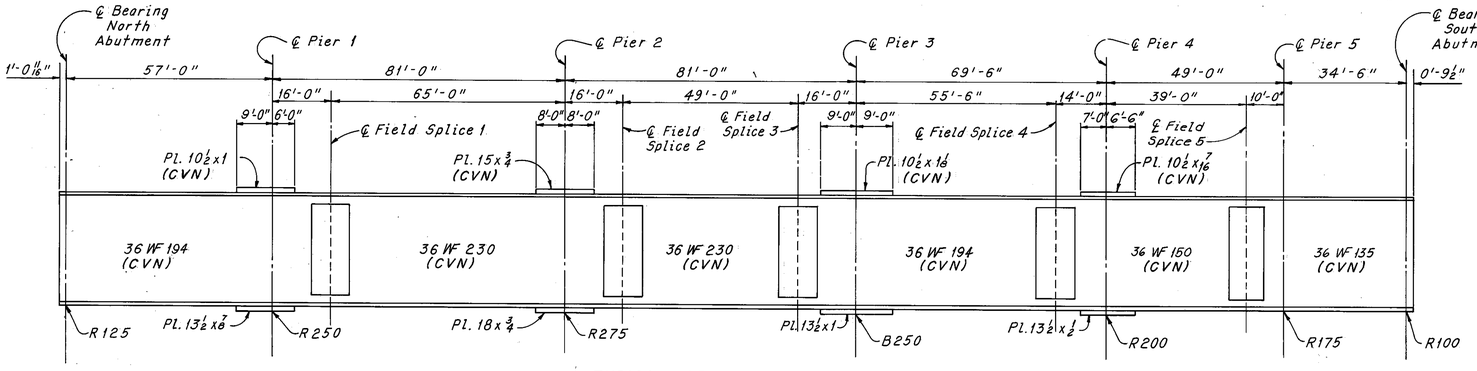
* Horizontal offset along ℄ Beam F varies. See Detail A.

FRAMING PLAN



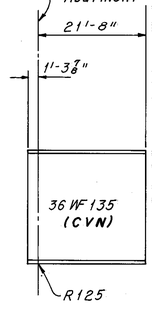
BEAM SPLICE DETAIL

(For additional details see Ohio Standard Drawing SD-1-69, Sheet 4 of 4)

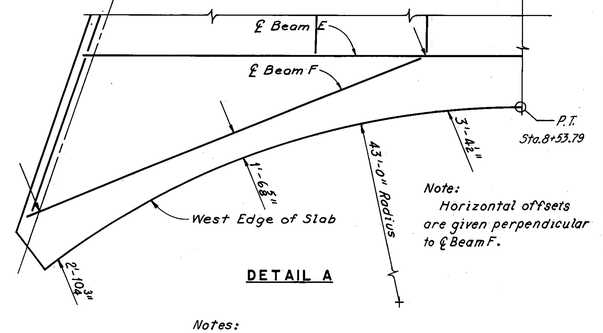


TYPICAL BEAM ELEVATION A THRU E

CVN - See Sh GN1

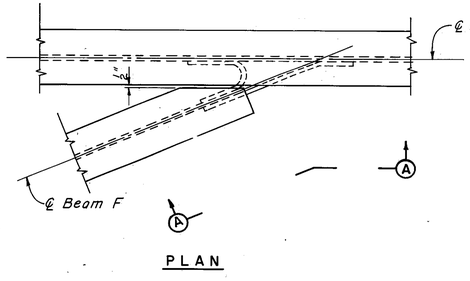


BEAM F

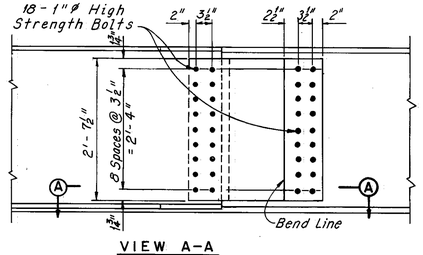


Note: Horizontal offsets are given perpendicular to ℄ Beam F.

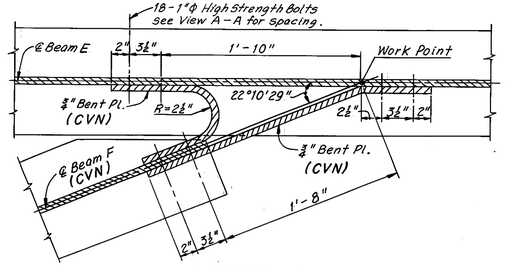
DETAIL A



PLAN

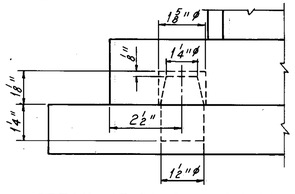


VIEW A-A



SECTION A-A

SPECIAL BEAM F CONNECTION DETAILS



DETAIL OF DOWEL MODIFICATION FOR R100 AND R125

Notes:
For details of Rockers and Bolsters see Ohio Standard Drawing RB-1-55.
For details of standard end crossframes and roadway end dam, see Ohio Standard Drawing SD-1-69, Shs. 1 & 2 of 4 & Sh GN1. For special end dam and curb plate details see Sheet 12/15.
For Intermediate Crossframes and special End Crossframes, see Sheet 10/15.
For moment plate welding details see Ohio Standard Drawing SD-1-69, Sheet 3 of 4.

H.N.T.B. BR. NO. 36

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

FRAMING PLAN AND BEAM SPLICE DETAILS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

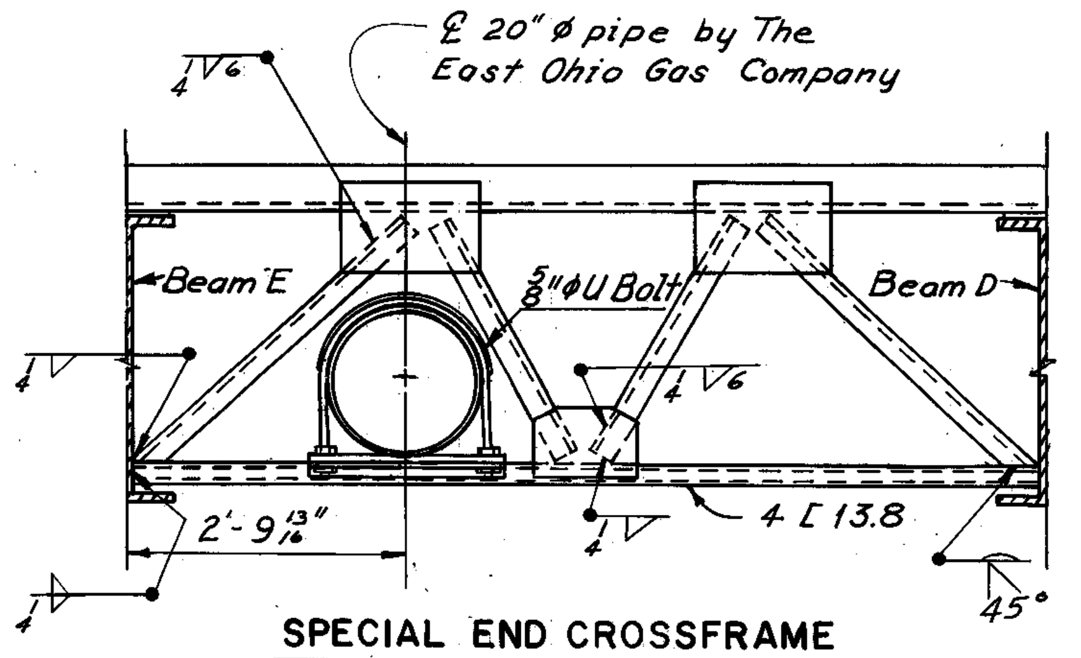
CUYAHOGA COUNTY OHIO

DRAWN M.C.B	TRACED C.P.	CHECKED	REVIEWED	REVISED
DATE 6-4-69	DATE 6-18-69	DATE 6-25-69	DATE	SHEET 9/15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

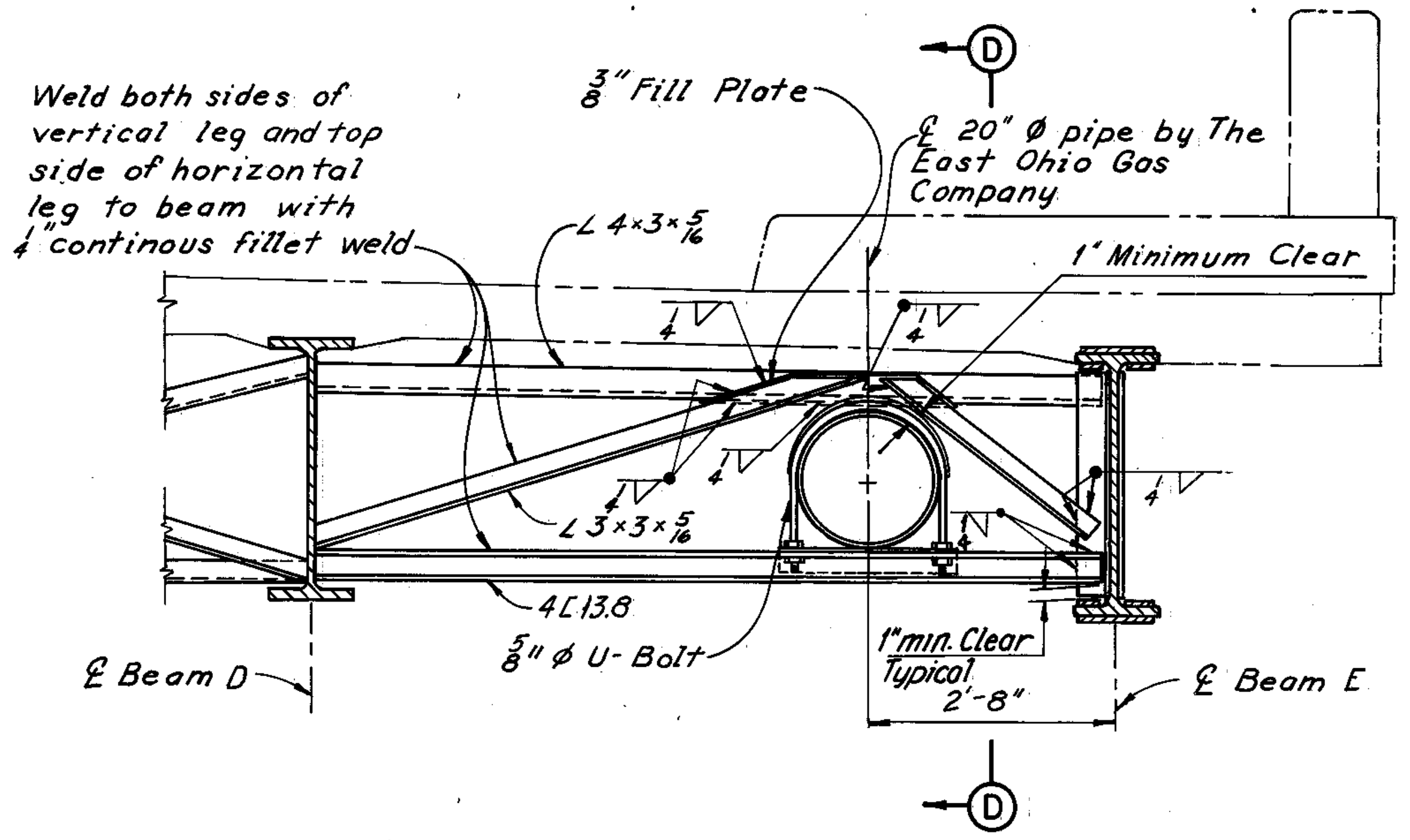
354/392

CUYAHOGA COUNTY
CUY.-80-15.81

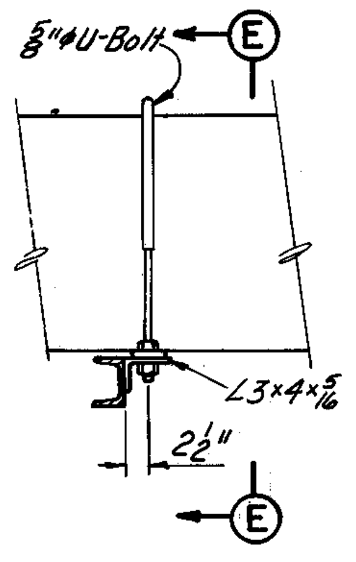


SPECIAL END CROSSFRAME
(2 Required)

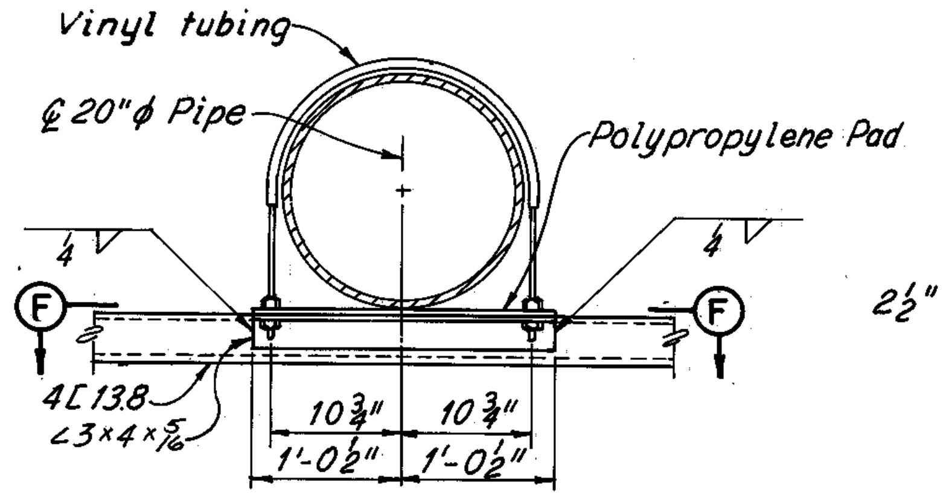
Note:
20" Gas Pipe, 5/8"ø U-bolt, washers, nuts, vinyl tubing and polypropylene pad to be furnished and installed by The East Ohio Gas Company.



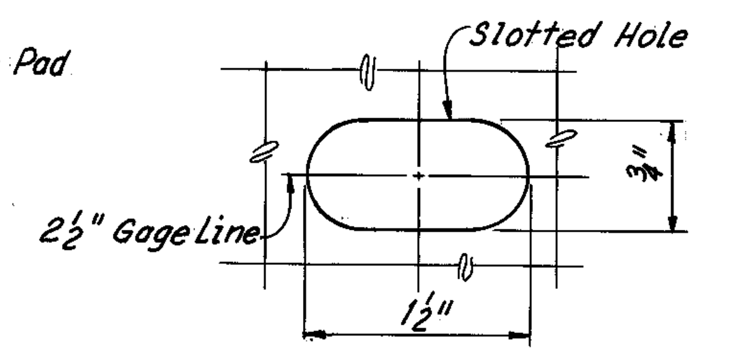
SPECIAL CROSSFRAME AT FIELD SPLICE 2
(1 Required)



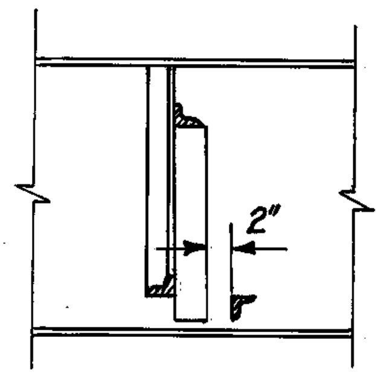
SECTION D-D.



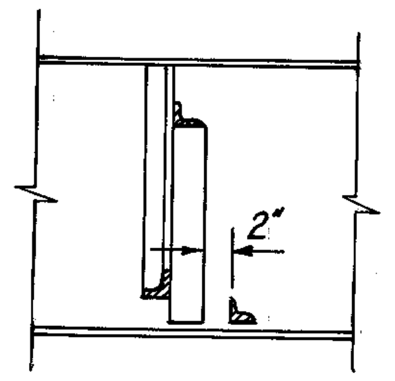
SECTION E-E



PART SECTION F-F



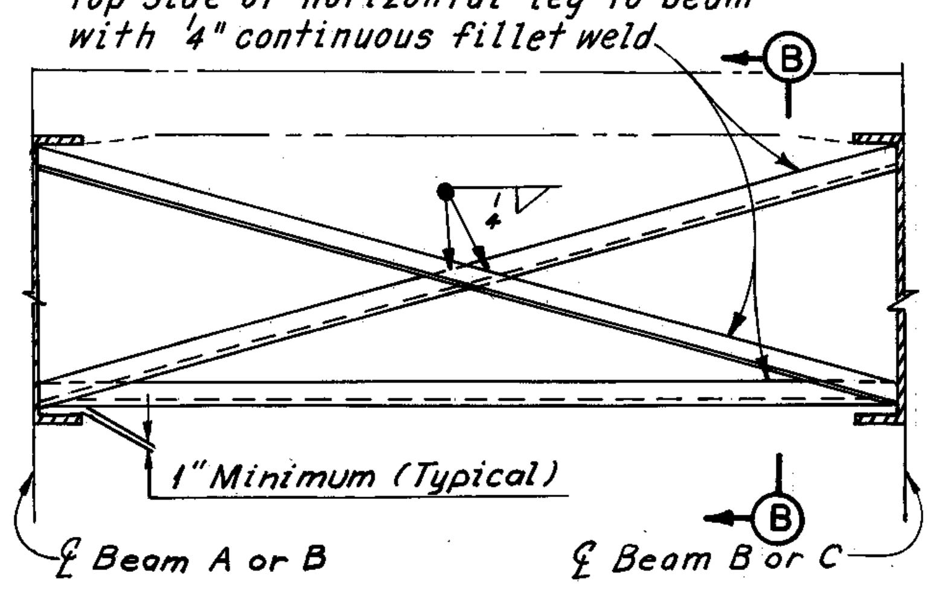
SECTION C-C



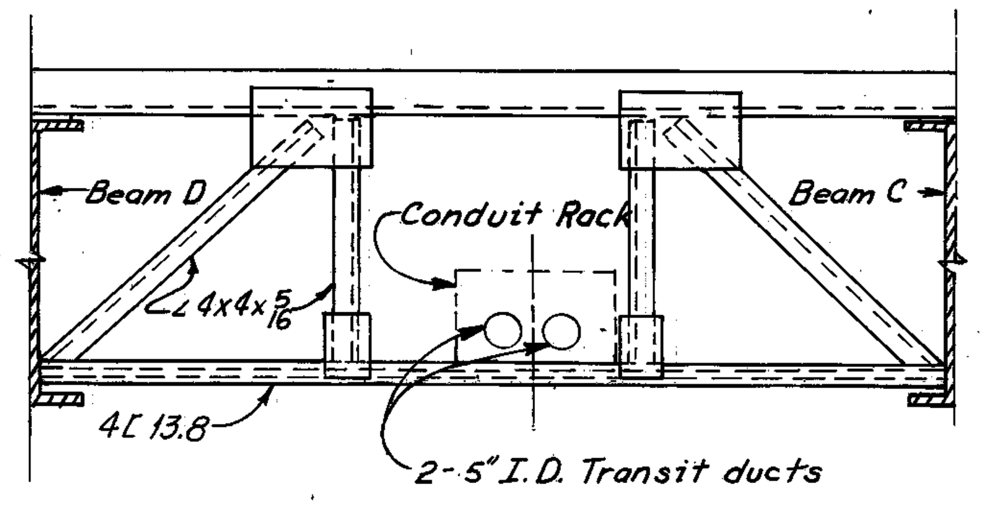
SECTION B-B

Note:
For standard end crossframes and additional details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4 and Sh GN 1.

Intermediate Crossframe Ls, 3x3x5/16. Weld both sides of vertical leg and top side of horizontal leg to beam with 1/4" continuous fillet weld.

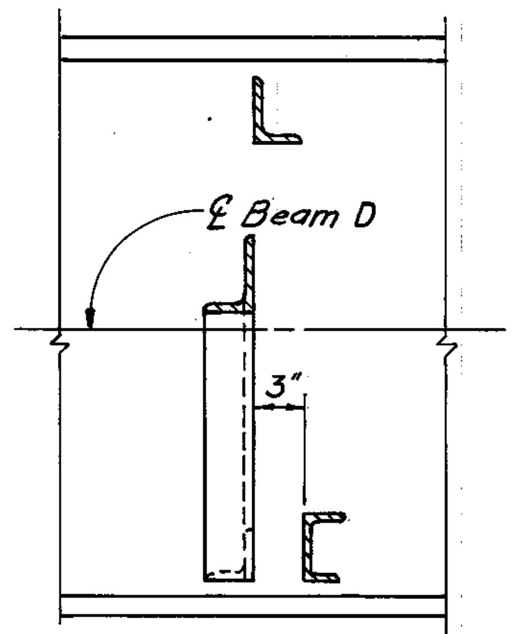


TYPICAL INTERMEDIATE CROSSFRAME
(48 Required)

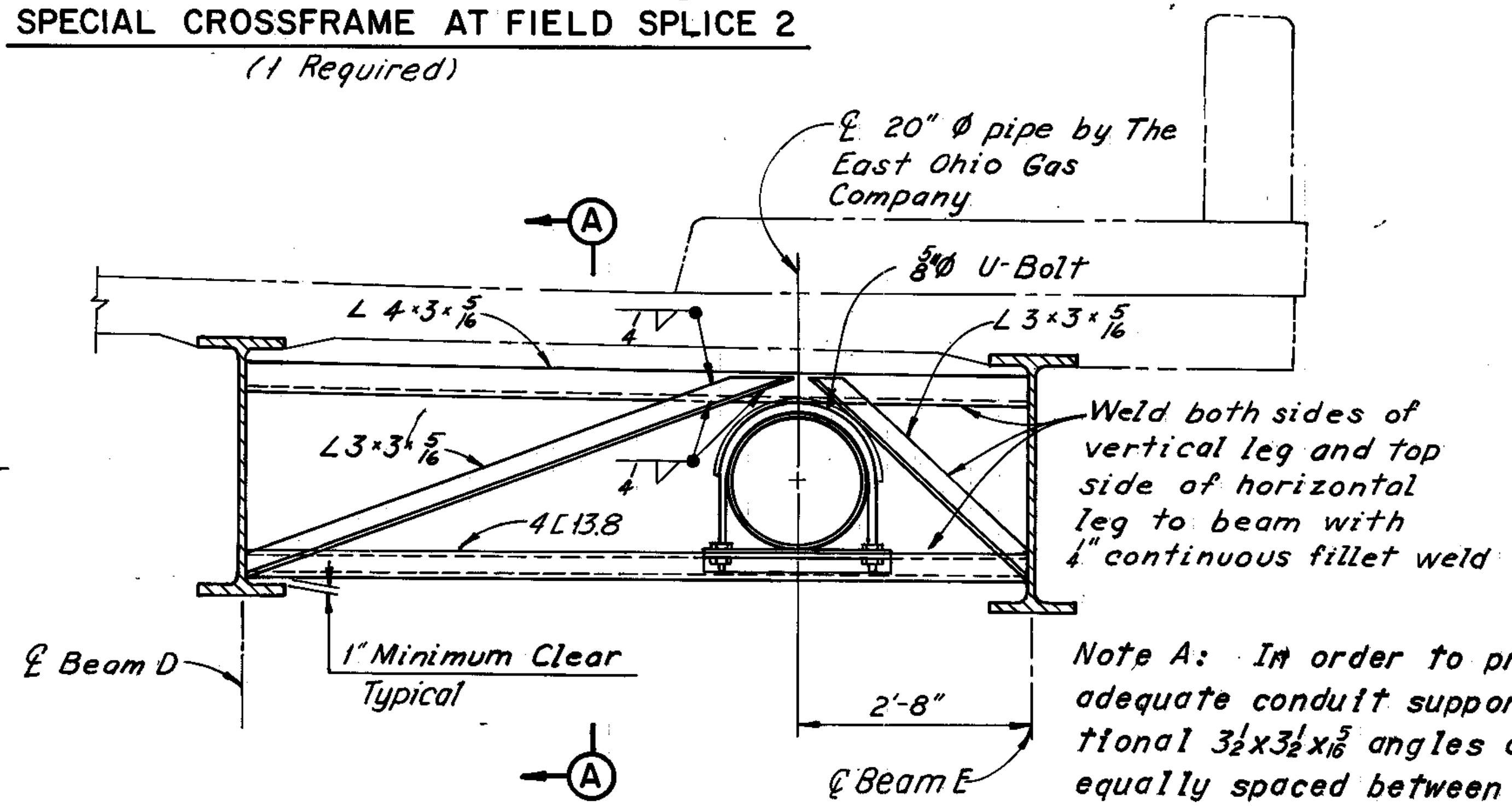


SPECIAL END CROSSFRAME
(2 Required)

Note: C.E.I. will furnish transite ducts and conduit rack.



SECTION A-A

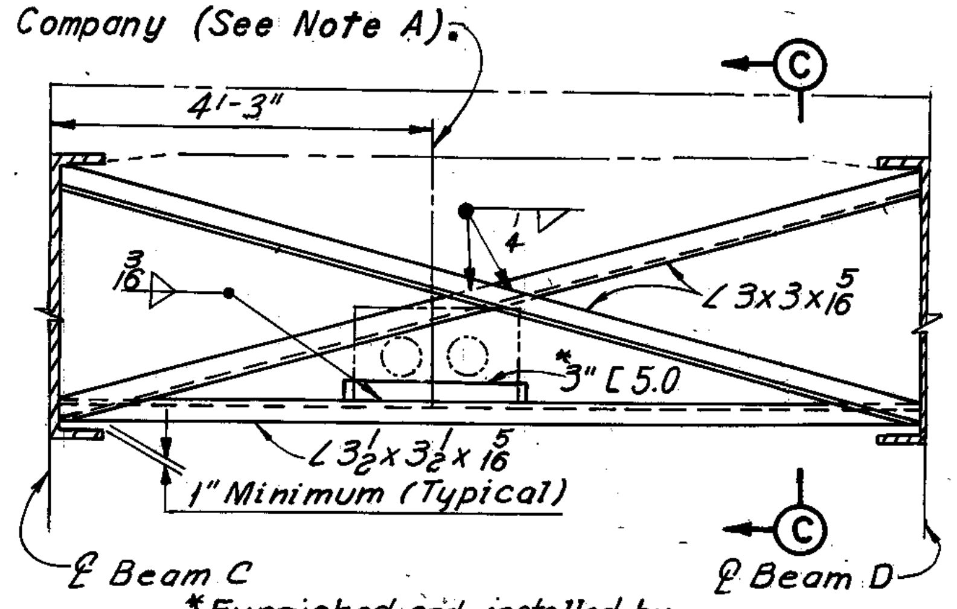


Weld both sides of vertical leg and top side of horizontal leg to beam with 1/4" continuous fillet weld

SPECIAL INTERMEDIATE CROSSFRAME
BETWEEN BEAMS D AND E
(27 Required)

Note A: In order to provide adequate conduit support additional 3 1/2x3 1/2x5/16 angles are equally spaced between crossframes as shown on Framing Plan. Weld to beam web with 1/4" continuous fillet weld along top of horizontal leg and both sides of vertical leg.

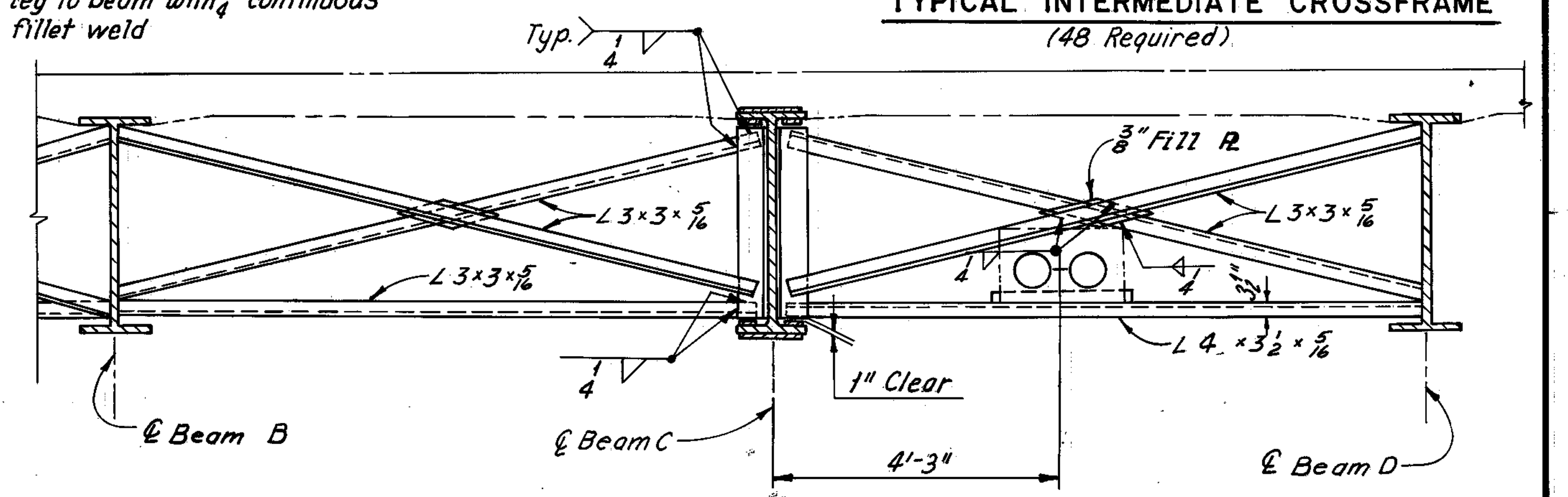
¢ 2 - 5" I.D. Transite Conduits for the Cleveland Electric Illuminating Company (See Note A).



*Furnished and installed by the C.E.I. CO.

SPECIAL INTERMEDIATE CROSSFRAME
BETWEEN BEAMS C AND D

Note: Where no angle stiffener is provided, weld both sides of vertical leg and Top side of horizontal leg to beam with 1/4" continuous fillet weld



TYPICAL INTERMEDIATE CROSSFRAME AT FIELD SPLICE
(6 Required)

SPECIAL CROSSFRAME AT FIELD SPLICE
(2 Required)

DEAD LOAD DEFLECTION AND CAMBER BR. NO. 36

Beam	Span 1											
	1/4				1/2				3/4			
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	1/16	3/16	-9/16	-5/16	1/16	3/16	-3/4	-1/2	0	1/16	-9/16	-1/2
B	1/16	3/16	-3/4	-1/2	1/16	3/16	-1	-3/4	0	1/16	-9/16	-1/2
C	1/16	3/16	-3/4	-1/2	1/16	3/16	-15/16	-11/16	0	1/16	-11/16	-5/8
D	1/16	3/16	-3/4	-1/2	1/16	3/16	-1	-3/4	0	1/16	-11/16	-5/8
E	1/16	3/16	-1 5/16	-1 1/16	1/16	3/16	-1 1/16	-13/16	0	1/16	-1/4	-3/16

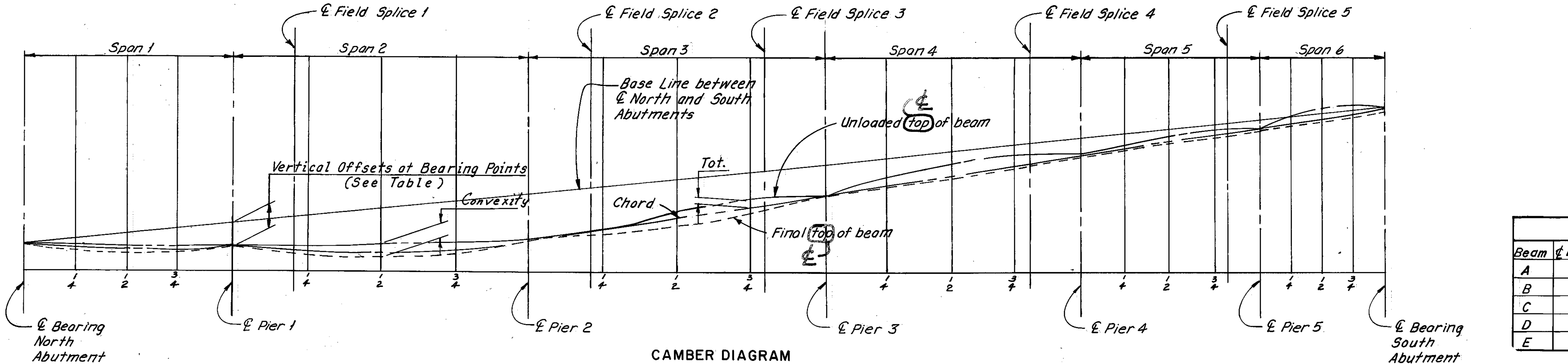
Beam	Span 2															
	Field Splice 1				1/4				1/2				3/4			
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	1/16	3/16	-1 7/16	-1 3/16	1/16	5/16	-1 13/16	-1 7/16	1/8	1/2	-2 1/8	-1 1/2	1/16	1/4	-1 1/2	-1 3/16
B	1/16	3/16	-1 7/16	-1 3/16	1/16	5/16	-1 9/16	-1 3/16	1/8	1/2	-1 13/16	-1 3/16	1/16	1/4	-1 1/2	-1 3/16
C	1/16	3/16	-1 1/16	-13/16	1/16	5/16	-1 5/16	-15/16	1/8	1/2	-1 7/8	-1 1/4	1/16	1/4	-1 3/8	-1 1/16
D	1/16	3/16	-15/16	-11/16	1/16	5/16	-1 1/4	-7/8	1/8	1/2	-1 15/16	-1 5/16	1/16	1/4	-1 7/8	-1 9/16
E	1/16	3/16	-11/16	-7/16	1/16	5/16	-7/8	-1/2	1/8	1/2	-1 1/2	-7/8	1/16	1/4	-1 1/2	-1 3/16

Beam	Span 3																			
	Field Splice 2				1/4				1/2				3/4				Field Splice 3			
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	1/16	3/16	-5/16	-1/16	1/16	5/16	-5/16	1/16	1/8	1/2	-3/16	7/16	1/16	3/8	-1/8	5/16	1/16	1/4	-1/16	1/4
B	1/16	3/16	-7/16	-3/16	1/16	5/16	-7/16	-1/16	1/8	1/2	-5/16	5/16	1/16	3/8	-1/8	5/16	1/16	1/4	-1/8	3/16
C	1/16	3/16	-1/2	-1/4	1/16	5/16	-1/2	-1/8	1/8	1/2	-3/8	1/4	1/16	3/8	-3/16	1/4	1/16	1/4	-1/8	3/16
D	1/16	3/16	-9/16	-5/16	1/16	5/16	-5/8	-1/4	1/8	1/2	-7/16	3/16	1/16	3/8	-1/4	3/16	1/16	1/4	-3/16	1/8
E	1/16	3/16	-5/8	-3/8	1/16	5/16	-11/16	-5/16	1/8	1/2	-9/16	1/16	1/16	3/8	-1/4	3/16	1/16	1/4	-1/4	1/16

Beam	Span 4															
	1/4				1/2				3/4				Field Splice 4			
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	1/16	3/16	0	1/4	1/16	3/8	0	7/16	1/16	1/4	0	5/16	1/16	3/16	0	1/4
B	1/16	3/16	0	1/4	1/16	3/8	0	7/16	1/16	1/4	0	5/16	1/16	3/16	0	1/4
C	1/16	3/16	0	1/4	1/16	3/8	0	7/16	1/16	1/4	0	5/16	1/16	3/16	0	1/4
D	1/16	3/16	0	1/4	1/16	3/8	0	7/16	1/16	1/4	0	5/16	1/16	3/16	0	1/4
E	1/16	3/16	0	1/4	1/16	3/8	0	7/16	1/16	1/4	0	5/16	1/16	3/16	0	1/4

Beam	Span 5															
	1/4				1/2				3/4				Field Splice 5			
	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.
A	0	0	0	0	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16
B	0	0	0	0	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16
C	0	0	0	0	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16
D	0	0	0	0	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16
E	0	0	0	0	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16

Span 6												Beam
1/4				1/2				3/4				
Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	Stl.	Rem. D.L.	Con.	Tot.	
0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	A
0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	B
0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	C
0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	D
0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	0	1/16	E



CAMBER DIAGRAM

Notes:

Negative values for deflections indicate deflections above chord line. Negative values of convexity or concavity and total required camber indicate values below the chord line. Deflections and convexities or concavities are given to the nearest 1/16 inch.

The following abbreviations are used:

Stl. = Dead load deflection due to the weight of the steel.
Rem. D. L. = Remaining dead load deflection.
Con. = Convexity or concavity.
Tot. = Total required camber.

VERTICAL OFFSETS AT BEARING POINTS

Beam	¢ N. Abut.	¢ Pier 1	¢ Pier 2	¢ Pier 3	¢ Pier 4	¢ Pier 5	¢ S. Abut.
A	0	-1'-0"	-1'-5 1/4"	-0'-11 9/16"	-0'-6 5/16"	-0'-2 5/8"	0
B	0	-1'-0"	-1'-5 1/2"	-0'-11 13/16"	-0'-6 7/16"	-0'-2 5/8"	0
C	0	-1'-0 1/4"	-1'-5 3/4"	-1'-0 1/16"	-0'-6 5/8"	-0'-2 3/4"	0
D	0	-1'-3 1/16"	-1'-8 1/16"	-1'-1 11/16"	-0'-7 1/2"	-0'-3 1/8"	0
E	0	-1'-0 3/4"	-1'-10 7/16"	-1'-3 1/2"	-0'-8 3/8"	-0'-3 1/2"	0

Note: Negative values indicate offsets below the base line.

1'-0 1/4"

H.N.T.B. BR. NO. 36

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

CROSSFRAMES & CAMBER DIAGRAM
I-80, LANE OBE-JN, LANE JN-OBE AND RAMP
G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15.93
STA. 8+33.59 TO
STA 12+10.61

CUYAHOGA COUNTY OHIO

DRAWN MCB	TRACED WB	CHECKED LJW	REVIEWED	REVISED 8-8-75
DATE 5-28-69	DATE 6-24-69	DATE 6-2-70	DATE	SHEET 10/15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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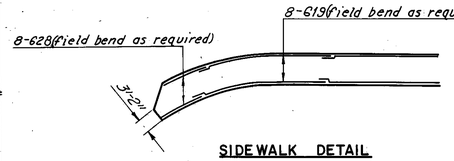
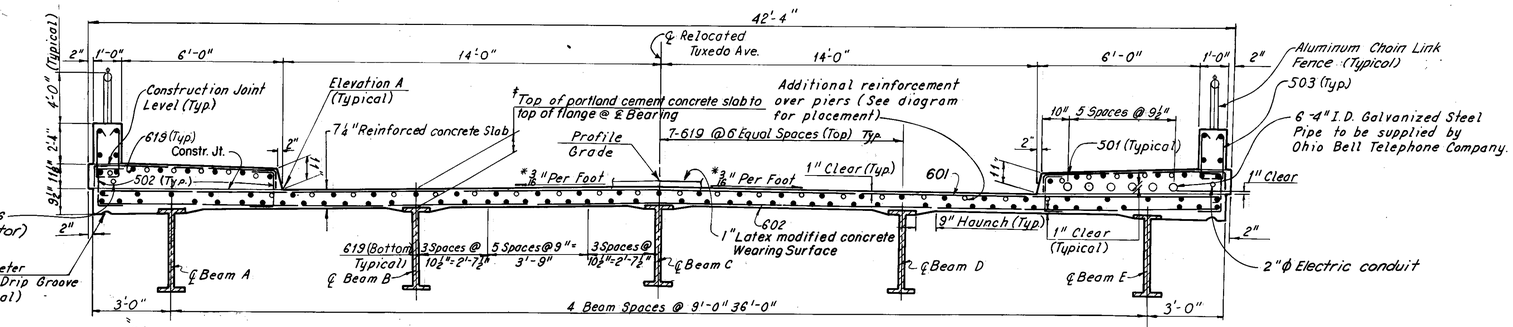
392

CUYAHOGA COUNTY
CUY.80-15.81



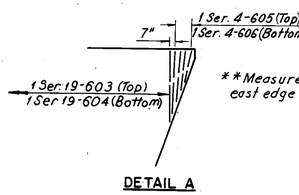
SIDEWALK DETAIL



TYPICAL CROSS SECTION
(Except as shown at North end on Framing Plan, Sheet 9/15)

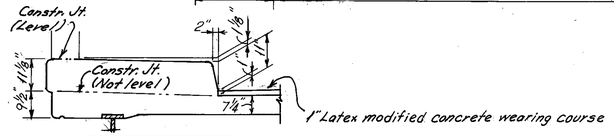
* This dimension is $8\frac{7}{16}$" for 36WF230; $8\frac{1}{8}$" for 36WF194; $8\frac{7}{16}$" for 36WF150; $8\frac{3}{8}$" for 36WF135. These dimensions are measured to the extended top of portland cement concrete slab elevation when Beams A, E and F are under the sidewalk.

* Cross slope varies at North End of Bridge. See Contour Plan, Sheet 12/15.



**Measured along east edge of slab.

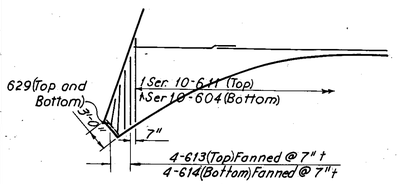
DETAIL A



ELEVATION A (TOP OF PORTLAND CEMENT CONCRETE SLAB)

Elevation A	Span 1				Span 2				Span 3				Span 4				Span 5				Span 6				
	℄ Brg. N. Abut.	¼	½	¾	℄ Pier 1	¼	½	¾	℄ Pier 2	¼	½	¾	℄ Pier 3	¼	½	¾	℄ Pier 4	¼	½	¾	℄ Pier 5	¼	½	¾	℄ Brg. S. Abut.
East Curb	748.09	748.12	748.16	748.25	748.35	748.57	748.90	749.25	749.69	750.25	750.84	751.40	751.95	752.46	752.96	753.45	753.92	754.27	754.62	754.97	755.31	755.56	755.81	756.05	756.29
West Curb	748.51	748.41	748.41	748.48	748.55	748.72	748.91	749.12	749.48	749.98	750.57	751.13	751.68	752.18	752.69	753.18	753.65	754.00	754.35	754.70	755.04	755.29	755.54	755.78	756.02

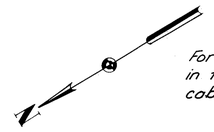
Note: The elevations shown at the face of curbs are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete.



†Measured along west edge of slab.

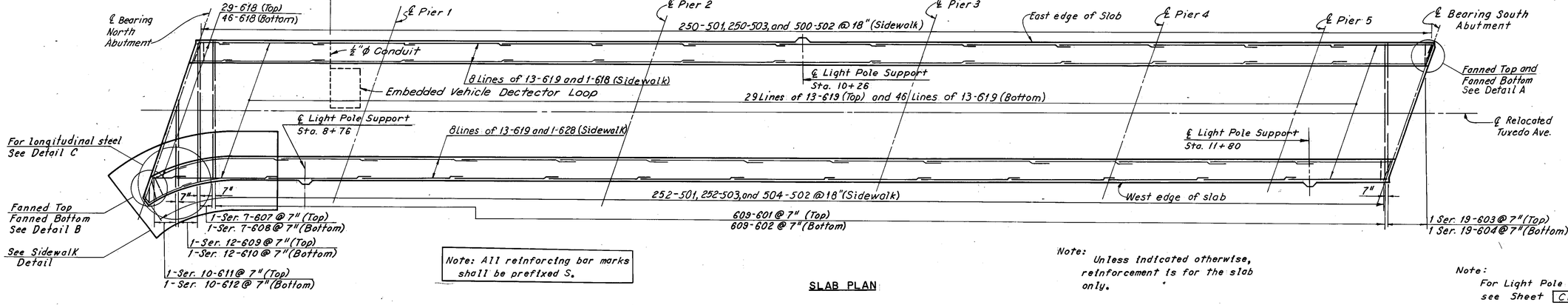
DETAIL B
For Special End Dam Detail see Sheet 12/15.

The detector loop shall be embedded in the Portland cement deck slab before the 1" Latex modified concrete wearing surface is poured. The maximum depth of the sawcut shall be ¾".



For location of three junction boxes in the parapet for interconnect cable see sheet 307/392

Note:
A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided that the slope shall be not more than 1:4 for a haunch less than 9" in width.
For Chain Link Fence and Parapet Details see Sheet CD1.



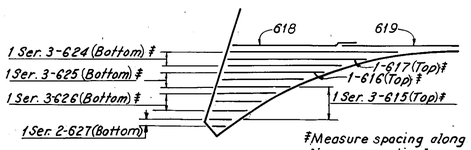
Note: All reinforcing bar marks shall be prefixed S.

SLAB PLAN

Note: Unless indicated otherwise, reinforcement is for the slab only.

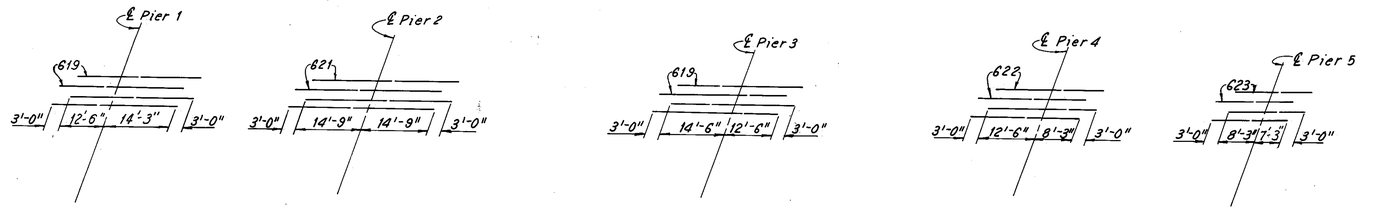
Note:
For Light Pole Support Details see Sheet CD2.

For Embedded Vehicle Detector Loop details see Signal Plans.



‡Measure spacing along a line perpendicular to the Centerline Relocated Tuxedo with top bars spaced @ 18" and bottom bars spaced @ 9".

DETAIL C



ADDITIONAL REINFORCEMENT OVER PIERS

H.N.T.B. BR.NO.36

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

SLAB PLAN AND TYPICAL CROSS SECTION

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

CUYAHOGA COUNTY, OHIO

DRAWN MC &	TRACED Gem	CHECKED JT	REVIEWED	REVISED
DATE 5-23-67	DATE 5-27-69	DATE 8-13-69	DATE	SHEET 11/15

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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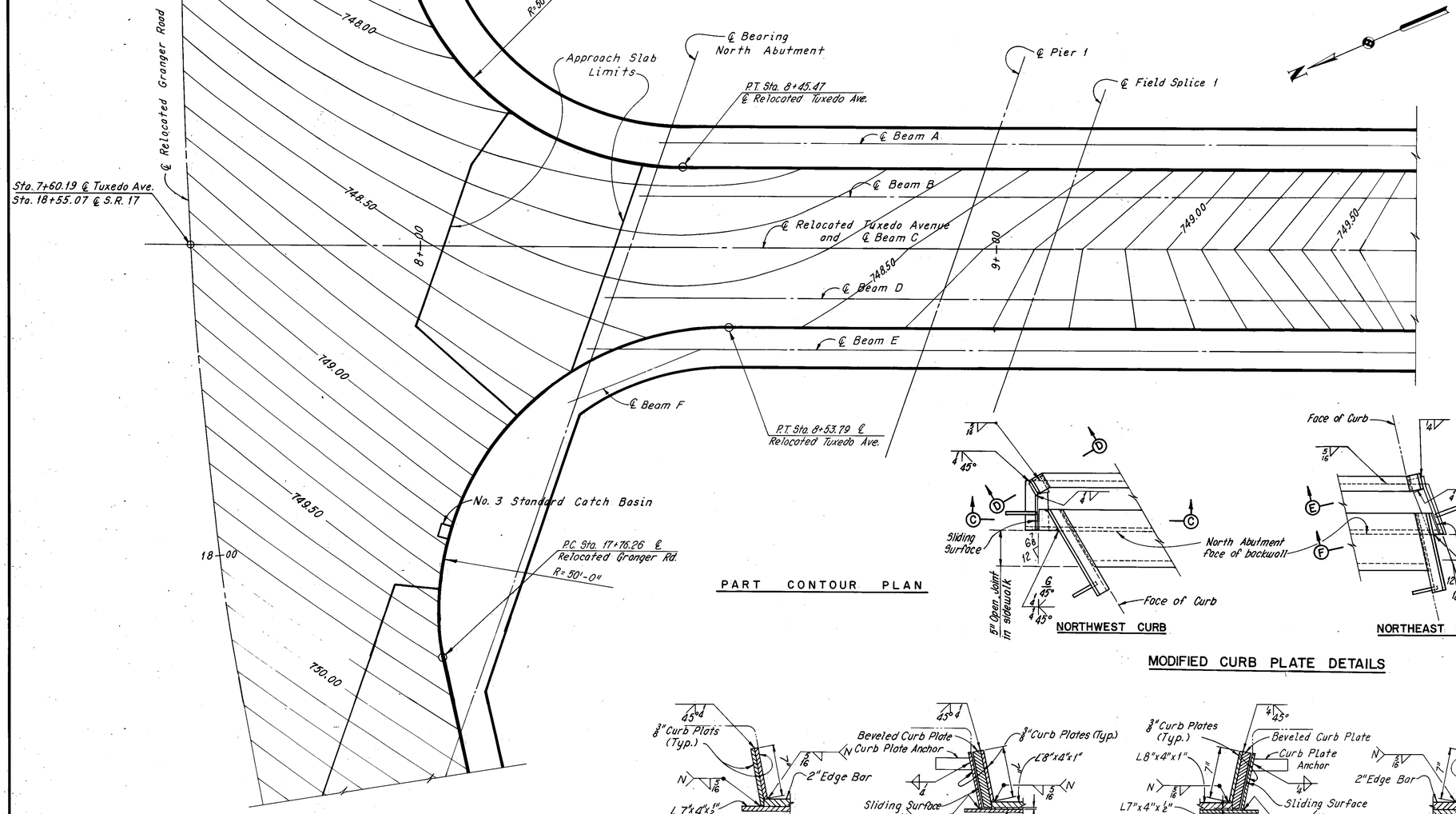
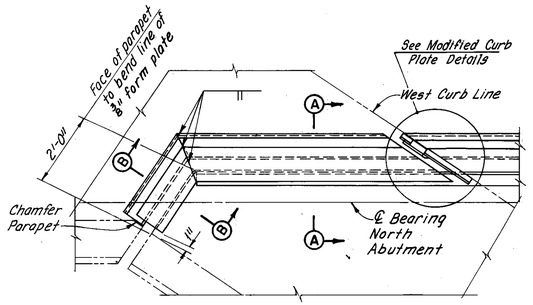
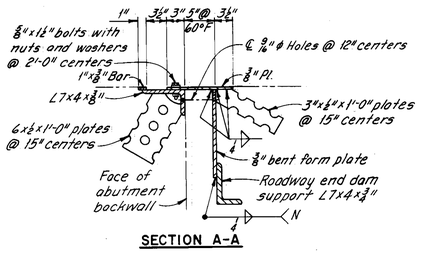
CUYAHOGA COUNTY
CUY-80-15.81



PART CONTOUR PLAN

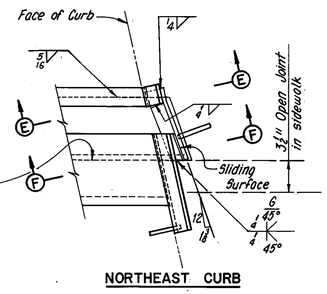


SPECIAL END DAM DETAIL
NORTHWEST SIDEWALK



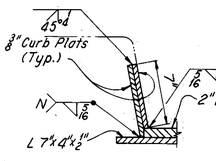
SECTION A-A

NORTHWEST CURB

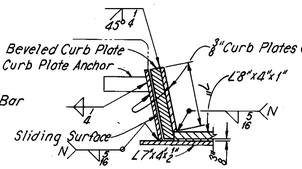


NORTHEAST CURB

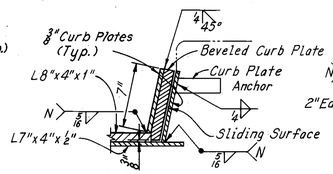
MODIFIED CURB PLATE DETAILS



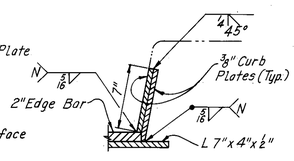
SECTION D-D



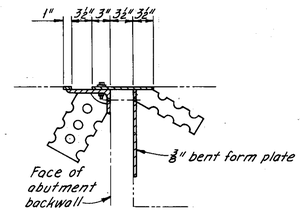
SECTION C-C



SECTION F-F



SECTION E-E



SECTION B-B

Note:
For typical End Dam Details and details not shown, see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4.

TOP OF LATEX MODIFIED CONCRETE ELEVATIONS

Beam	Span 1				Span 2				Span 3				Span 4				Span 5				Span 6					Beam
	North Abutment	¼	½	¾	Pier 1	¼	½	¾	Pier 2	¼	½	¾	Pier 3	¼	½	¾	Pier 4	¼	½	¾	Pier 5	¼	½	¾	South Abutment	
A	748.13	748.14	748.19	748.27	748.38	748.57	748.88	749.27	749.74	750.28	750.85	751.43	752.00	752.50	752.99	753.48	753.98	754.32	754.67	755.02	755.37	755.61	755.86	756.10	756.35	A
B	748.22	748.23	748.27	748.37	748.48	748.68	748.99	749.35	749.80	750.33	750.91	751.48	752.06	752.55	753.04	753.54	754.03	754.38	754.73	755.07	755.42	755.67	755.91	756.16	756.40	B
C	748.33	748.33	748.37	748.45	748.56	748.78	749.06	749.43	749.87	750.39	750.96	751.53	752.11	753.60	753.10	753.59	754.08	754.43	754.78	755.13	755.47	755.72	755.96	756.21	756.45	C
D	748.44	748.42	748.44	748.51	748.61	748.77	748.97	749.24	749.66	750.16	750.73	751.31	751.88	752.38	752.87	753.36	753.86	754.20	754.55	754.90	755.25	755.49	755.74	755.98	756.23	D
E	748.56	748.51	748.51	748.56	748.64	748.77	748.92	749.12	749.45	749.94	750.50	751.08	751.65	752.15	752.64	753.13	753.63	753.98	754.32	754.67	755.02	755.26	755.51	755.75	756.00	E

Note: All elevations on Beams A and E that fall below the sidewalk are measured to the extended top of latex modified concrete.

H.N.T.B. BR.NO. 36

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

SPECIAL END DAM DETAILS AND TOP OF PAVEMENT ELEVATIONS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

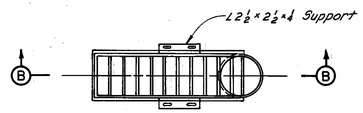
CUYAHOGA COUNTY OHIO

DRAWN M.C.B.	TRACED C.P.	CHECKED J.T.	REVIEWED	REVISED
DATE 5-13-70	DATE 5-15-70	DATE 5-25-70	DATE	SHEET 12/15

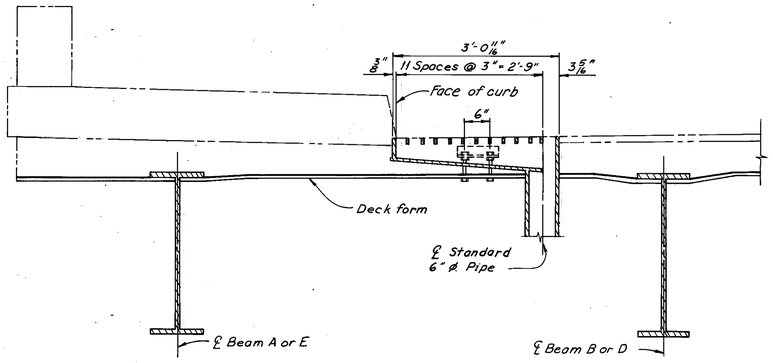
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO	—	

357
392

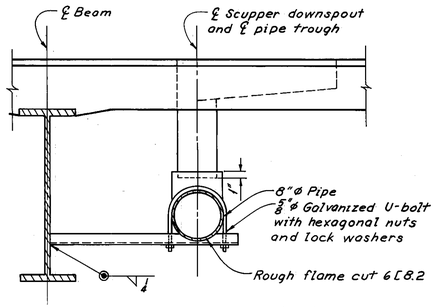
CUYAHOGA COUNTY
CUY-80-15.81



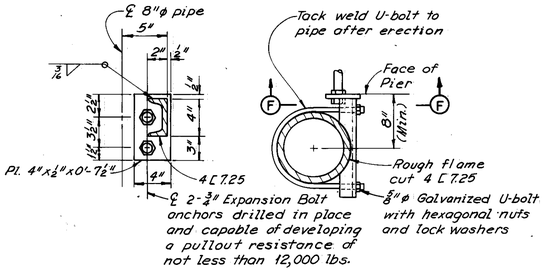
PLAN



SECTION B-B
(Typical at Both Curbs)

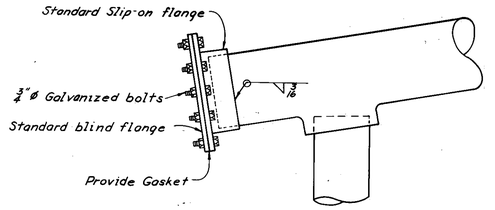


SECTION E-E



SECTION F-F PLAN

PIPE SUPPORT DETAIL
ON ABUTMENTS



TYPICAL CLEANOUT DETAIL

Notes:

The 6"ø and 8"ø pipes shall be alloy steel pipe, 707.11, or hot-dip galvanized steel pipe. Joints shall be made by welding or by the use of a clamp-type coupling with a ring gasket. All welding shall be done before galvanizing. Support materials for attaching pipes shall be the same material as the pipe. The bolts shall be galvanized as specified in ASTM A-153.

The 8"ø pipe attached to superstructure, including fittings, supports and accessories, shall be paid for at the contract unit price for "Item 518, 8"ø Pipe, Horizontal Conductors Including Supports".

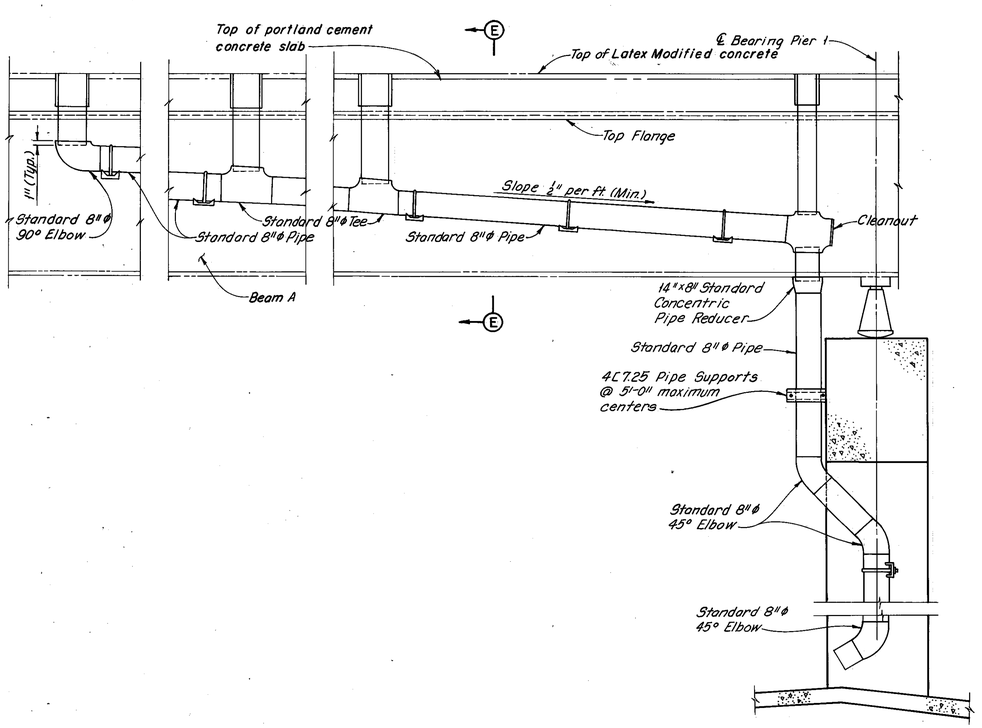
The 8"ø pipe attached to substructure, including fittings, supports and accessories shall be paid for at the contract unit price for "Item 518, 8"ø Pipe, Downspouts Including Supports".

Standard 14"x8"ø reducers and 8"ø elbows, tees, crosses and laterals shall be used in all cases.

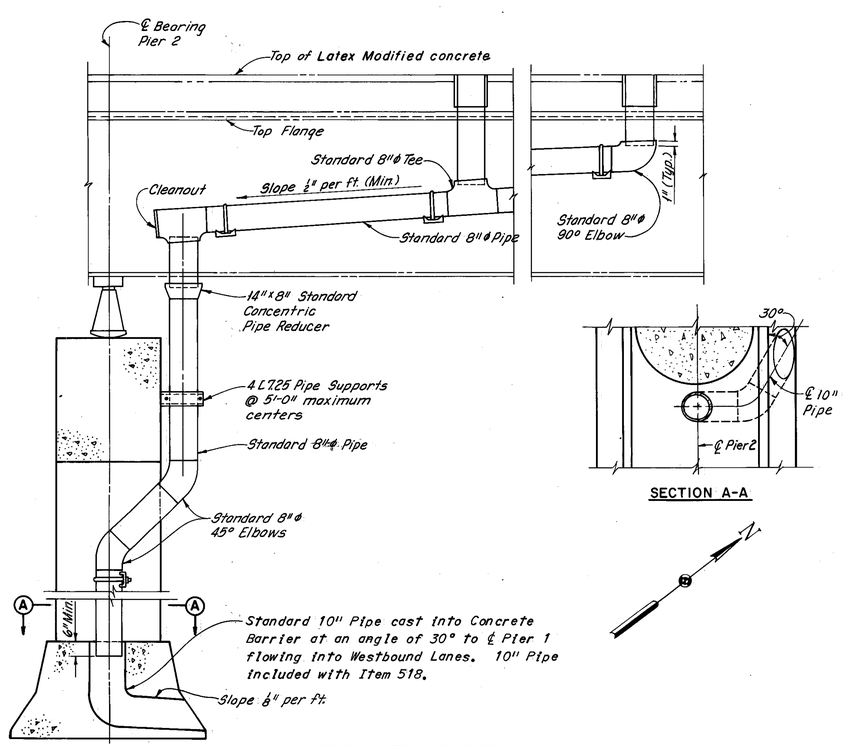
Support Ls 2½x2½x¼ and attached 6"ø pipe are included with "Item 518, Scuppers Including Supports" for payment.

For Scupper Details not shown, see Ohio Standard Drawing SD-1-69, Sheet 3 of 4, except that scupper pipes shall extend 8" below the bottom of the beams instead of 2".

For scupper locations see Framing Plan.



COLLECTOR SYSTEM AT PIER 1
(System under East curb shown looking East along ℄ Bearing.)



COLLECTOR SYSTEM AT PIER 2
(System under West curb shown looking West along ℄ Bearing.)

SECTION A-A

H.N.T.B. BR.NO.36

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

DRAINAGE DETAILS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

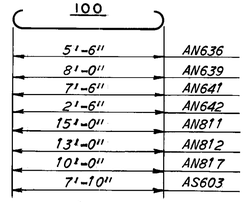
BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

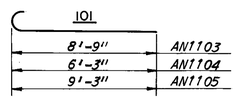
CUYAHOGA COUNTY OHIO

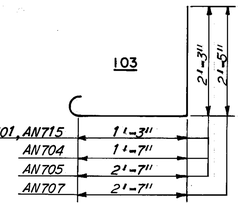
DRAWN MCB	TRACED WB	CHECKED JEA	REVIEWED	REVISED
DATE 8-7-69	DATE 8-11-69	DATE 6-9-70	DATE	SHEET 13/15

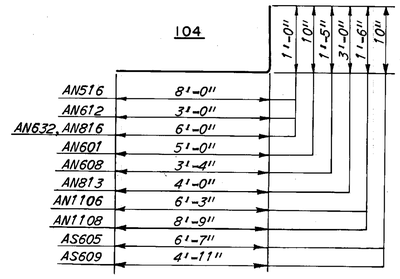
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
NORTH ABUTMENT					
AN401	54	3'-9"	105		135
AN501	9	4'-0"	103		38
AN502	9	4'-5"	105		41
AN503	5	30'-6"	Str.		159
AN504	4	24'-0"	Str.		100
AN505	4	10'-10"	108		45
AN506	4	27'-6"	Str.		115
AN507	5	25'-3"	Str.		132
AN508	3 Ser.8	14'-3" / 26'-10"	155	8"	463
AN509	3 Ser.4	12'-6" / 15'-10"	155	1 1/2"	177
AN510	3 Ser.2	21'-4" / 21'-10"	155	6"	135
AN511	22	21'-6"	155		493
AN512	1	7'-6"	Str.		8
AN513	36	6'-11"	110		260
AN514	3	6'-9"	Str.		21
AN515	5	9'-0"	Str.		47
AN516	5	8'-11"	104		47
AN517	5	5'-0"	124		26
AN518	23	15'-6"	155		372
AN519	1	7'-9"	Str.		8
AN520	12	3'-0"	Str.		38
AN601	160	5'-8"	104		1,362
AN602	9	26'-3"	Str.		355
AN603	25	16'-0"	Str.		601
AN604	41	18'-6"	Str.		1,139
AN605	5	12'-8"	108		95
AN606	46	9'-11"	108		685
AN607	41	9'-7"	126		590
AN608	41	4'-7"	104		282
AN609	6	6'-0"	Str.		54
AN610	5	11'-10"	126		89
AN611	7	7'-2"	158		75
AN612	32	4'-10"	104		232
AN613	12	25'-0"	Str.		451
AN614	6 Ser.4	4'-6" / 18'-0"	Str.	4 1/2"	406
AN615	2	7'-0"	Str.		21
AN616	15	21'-0"	Str.		473
AN617	19	5'-9"	Str.		164
AN618	6	17'-0"	Str.		153
AN619	5	5'-3"	Str.		39
AN620	2 Ser.2	11'-6" / 3'-3"	Str.	1 1/2"	14
AN621	4	5'-0"	Str.		30
AN622	6	11'-0"	Str.		99
AN623	2 Ser.2	12'-0" / 14'-6"	Str.	2 1/2"	80
AN624	4	23'-0"	Str.		138
AN625	2 Ser.3	24'-6" / 30'-6"	Str.	3 1/2"	248
AN626	16	39'-6"	Str.		949
AN627	2 Ser.6	17'-0" / 18'-6"	Str.	3 5/8"	320
AN628	16	15'-0"	Str.		360
AN629	2 Ser.4	11'-3" / 13'-3"	Str.	7"	147
AN630	16	9'-6"	Str.		228
AN631	2 Ser.5	5'-0" / 7'-6"	Str.	7 1/2"	94
AN632	12	6'-10"	104		123
AN633	14	3'-6"	Str.		74
AN634	12	9'-0"	Str.		162
AN635	18	8'-5"	135		228
AN636	12	6'-10"	100		123
AN637	8	5'-6"	Str.		66
AN638	5	7'-6"	Str.		56
AN639	4	9'-4"	100		56
AN640	5	8'-0"	Str.		60
AN641	4	8'-8"	100		52
AN642	5	3'-8"	100		28
AN643	6	9'-4"	105		84
AN644	2 Ser.6	9'-7" / 16'-8"	105	1 1/2"	237
AN645	2 Ser.3	3'-5" / 9'-8"	105	2 1/2"	50
AN646	2 Ser.4	11'-5" / 12'-8"	105	5"	145
AN647	2 Ser.3	10'-3" / 10'-11"	105	4 1/2"	95
AN648	2 Ser.3	6'-8" / 9'-2"	105	1 1/2"	71
AN649	12	5'-11"	105		107
AN650	51	16'-3"	109		1,245
AN651	8	4'-6"	Str.		54
AN701	17	31'-6"	Str.		1,095
AN702	22	30'-6"	Str.		1,372
AN703	18	5'-2"	126		190
AN704	18	4'-6"	103		166
AN705	14	5'-6"	103		157
AN706	17	5'-9"	126		200
AN707	3	5'-8"	103		35
AN708	15	13'-4"	135		409
AN709	3	16'-3"	112		100
AN710	17	27'-9"	Str.		964
AN711	22	26'-9"	Str.		1,203
AN712	18	5'-0"	124		184
AN713	6	6'-3"	142		77
AN714	12	4'-4"	105		106
AN715	12	4'-2"	103		102
AN716	6	10'-9"	Str.		132
AN717	14	6'-0"	Str.		172
AN718	6	13'-6"	Str.		166
AN719	12	11'-6"	Str.		282
AN720	12	10'-6"	Str.		258
D801	26	5'-4"	175		370
AN801	36	13'-0"	Str.		1,250
AN802	8	16'-0"	Str.		342
AN803	2	9'-0"	Str.		48
AN804	1 Ser.13	34'-0" / 36'-0"	Str.	2"	1,215
AN805	27	30'-0"	Str.		2,163
AN806	1 Ser.14	34'-0" / 36'-3"	Str.	2"	1,313
AN807	1 Ser.3	3'-7" / 3'-9"	Str.	1"	29
AN808	2	3'-9"	Str.		20
AN809	2	5'-10"	148		31
AN810	2	11'-8"	124		62
AN811	1	17'-2"	100		46
AN812	41	15'-2"	100		1,660
AN813	2	6'-10"	104		36
AN814	4	15'-0"	Str.		160
AN815	4	8'-0"	Str.		86
AN816	6	6'-10"	104		109
AN817	8	12'-2"	100		260
AN818	2	10'-0"	Str.		53
AN819	2	4'-0"	Str.		21
AN820	2	7'-0"	Str.		37
AN1101	9	19'-0"	Str.		909
AN1102	12	10'-0"	Str.		638
AN1103	6	10'-4"	101		329
AN1104	15	7'-10"	101		624
AN1105	6	10'-10"	101		345
AN1106	4	7'-5"	104		158
AN1107	2	25'-0"	Str.		266
AN1108	2	10'-0"	104		106
AN1109	2	10'-6"	Str.		112
		TOTAL WEIGHT	=		36,117
SOUTH ABUTMENT					
AS401	35	3'-5"	105		80
AS501	31	6'-6"	105		210
AS502	30	22'-6"	Str.		704
AS503	2	6'-9"	Str.		14
AS504	1	32'-6"	Str.		34
AS505	54	6'-9"	Str.		380
AS506	2	14'-9"	Str.		31
AS507	2	14'-6"	Str.		30
AS508	19	5'-10"	109		116
AS509	14	21'-2"	157		300
AS510	22	7'-1"	110		163
AS511	1 Ser.8	14'-3" / 16'-0"	Str.	3"	126
AS512	1 Ser.8	12'-9" / 14'-6"	Str.	3"	114
AS513	6	5'-6"	Str.		34
AS514	12	3'-0"	Str.		38
AS601	31	17'-9"	109		826
AS602	14	7'-9"	Str.		163
AS603	14	9'-2"	100		193
AS604	7	5'-6"	Str.		58
AS605	62	7'-3"	104		675
AS606	14	15'-11"	109		335
AS607	30	15'-8"	112		706
AS608	7	6'-6"	Str.		68
AS609	49	5'-7"	104		411
AS610	6	12'-6"	Str.		113
AS611	2	10'-9"	Str.		32
AS612	2	10'-6"	Str.		32
AS613	3	14'-9"	Str.		67
AS614	3	14'-6"	Str.		65
AS615	2	3'-9"	Str.		11
AS617	23	9'-3"	Str.		320
AS618	22	9'-6"	Str.		314
AS619	8	4'-6"	Str.		54
AS620	10	3'-9"	Str.		56
D801	20	5'-4"	175		285
AS801	16	24'-0"	Str.		1,025
AS802	13	12'-6"	Str.		434
AS803	2	17'-7"	108		94
AS804	13	10'-0"	Str.		347
AS805	2	19'-5"	124		104
AS806	8	15'-0"	Str.		320
AS807	8	11'-6"	Str.		246
TOTAL WEIGHT			=		9,823

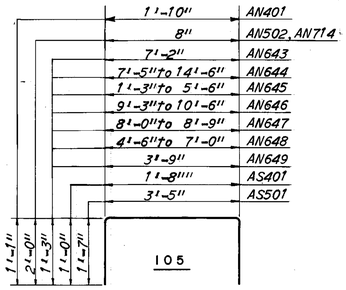
BENDING DIAGRAMS

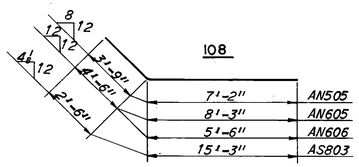


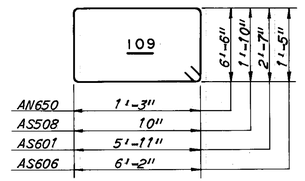


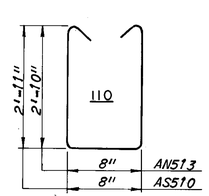


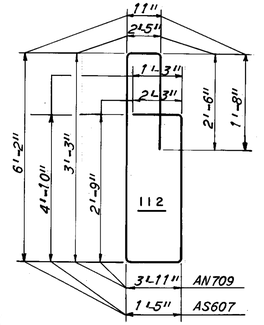


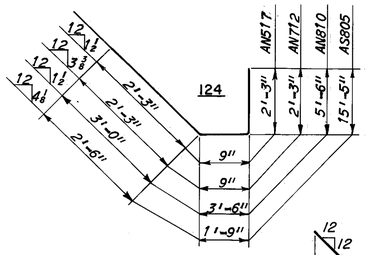


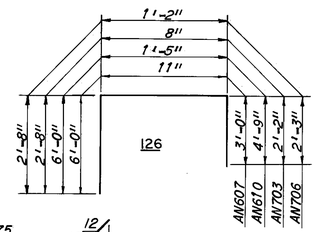


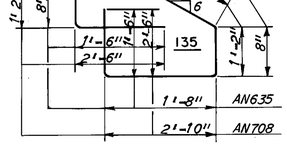


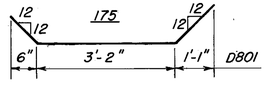


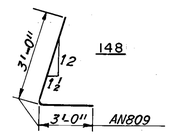


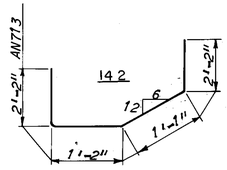


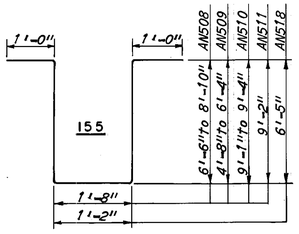


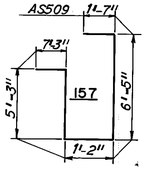


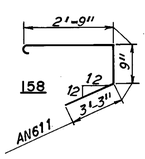












Note:
For Replacement Bar Schedule see BR. NO. CUY-80-1585, Sheet 24/24.

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO	---	

358
392

CUYAHOGA COUNTY
CUY-80-15.81

H.N.T.B. BR. NO. 36

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

REINFORCEMENT SCHEDULE

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

CUYAHOGA COUNTY OHIO

DRAWN JJT	TRACED MC	CHECKED JMS	REVIEWED	REVISED
DATE 6-17-70	DATE 6-24-70	DATE 7-28-70	DATE	SHEET 14/15

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 1					
PA401	3	14'-9"	150		836
PA501	35	3'-9"	105		137
PA601	30	12'-5"	109		559
PA602	4	21'-9"	Str.		131
PA603	4 Ser. 7	10'-5" to 12'-5"	109	4"	480
PA604	6	6'-2"	105		56
PA801	60	10'-10"	100		1,736
PA1001	30	17'-6"	Str.		2,260
PA1002	30	7'-0"	104		904
PA1101	4	31'-10"	104		677
PA1102	6	15'-2"	104		483
PA1103	4	11'-3"	Str.		239
PA1104	8	22'-0"	108		935
PA1105	4	11'-6"	Str.		244
PA1106	4	16'-10"	104		358
		TOTAL WEIGHT	=		10,035
PIER 2					
PB401	3	16'-9"	150		955
PB501	35	3'-9"	105		137
PB601	10	12'-5"	109		186
PB602	4	21'-9"	Str.		131
PB603	4 Ser. 8	8'-9" to 10'-9"	109	3⅜"	468
PB604	6	6'-2"	105		56
PB605	14	10'-9"	109		226
PB801	54	7'-3"	Str.		1,045
PB1001	30	16'-9"	Str.		2,162
PB1002	30	7'-0"	104		904
PB1101	4	31'-10"	104		677
PB1102	6	15'-2"	104		483
PB1103	4	11'-3"	Str.		239
PB1104	8	22'-0"	108		935
PB1105	4	11'-6"	Str.		244
PB1106	4	16'-10"	104		358
		TOTAL WEIGHT	=		9,206
PIER 3					
PC401	3	19'-6"	150		1,097
PC501	35	3'-9"	105		137
PC601	32	12'-5"	109		597
PC602	4	21'-9"	Str.		131
PC603	4 Ser. 7	8'-9" to 10'-9"	109	4"	410
PC604	6	6'-2"	105		56
PC801	54	7'-3"	Str.		1,045
PC1001	30	22'-0"	Str.		2,840
PC1002	30	7'-0"	104		904
PC1101	4	31'-10"	104		677
PC1102	6	15'-2"	104		483
PC1103	4	11'-3"	Str.		239
PC1104	8	22'-0"	108		935
PC1105	4	11'-6"	Str.		244
PC1106	4	16'-10"	104		358
		TOTAL WEIGHT	=		10,153

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 4					
PD401	3	17'-2"	150		975
PD501	35	3'-9"	105		137
PD601	22	12'-5"	109		410
PD602	4	21'-9"	Str.		131
PD603	2 Ser. 8	10'-5" to 12'-5"	109	3⅜"	274
PD604	6	6'-2"	105		56
PD801	21	6'-9"	Str.		378
PD802	21	6'-3"	Str.		350
PD1001	30	19'-9"	Str.		2,549
PD1002	30	7'-0"	104		904
PD1101	4	31'-10"	104		676
PD1102	4	13'-2"	104		280
PD1103	2	12'-6"	Str.		133
PD1104	8	22'-0"	108		935
PD1105	4	16'-10"	104		358
		TOTAL WEIGHT	=		8,546
PIER 5					
PE401	3	15'-2"	150		858
PE501	35	3'-9"	105		137
PE601	18	12'-5"	109		336
PE602	2 Ser. 5	10'-5" to 12'-5"	109	6"	171
PE603	6	6'-2"	105		56
PE604	4	21'-9"	Str.		131
PE801	18	6'-3"	Str.		300
PE802	18	5'-9"	Str.		276
PE1001	30	18'-0"	Str.		2,324
PE1002	30	7'-0"	104		904
PE1101	4	31'-10"	104		676
PE1102	2	13'-2"	104		140
PE1103	8	22'-0"	108		935
PE1104	4	16'-10"	104		358
		TOTAL WEIGHT	=		7,602

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
SUPERSTRUCTURE & SIDEWALK					
S501	502	7'-9"	105		4,058
S502	1004	2'-4"	105		2,443
S503	502	6'-3"	110		3,272
S601	609	42'-10"	100		39,180
S602	609	41'-6"	Str.		37,961
S603	1 Ser. 19	9'-4" to 41'-4"	100	1 9/16"	723
S604	1 Ser. 19	8'-0" to 40'-0"	Str.	1 9/16"	685
S605	1 Ser. 4	4'-8" to 7'-8"	101	1'-0"	37
S606	1 Ser. 4	4'-0" to 7'-0"	Str.	1'-0"	33
S607	1 Ser. 7	43'-8" to 44'-6"	100	1 11/16"	464
S608	1 Ser. 7	42'-3" to 43'-3"	Str.	2"	449
S609	1 Ser. 12	26'-6" to 44'-2"	100	1 7/16"	637
S610	1 Ser. 12	25'-3" to 42'-9"	Str.	1 7/16"	613
S611	1 Ser. 10	12'-7" to 25'-1"	100	1 1/8"	283
S612	1 Ser. 10	11'-3" to 23'-9"	Str.	1 1/8"	263
S613	4	10'-5"	101		63
S614	4	9'-9"	Str.		59
S615	1 Ser. 3	3'-3" to 8'-0"	Str.	2 1/4"	25
S616	1	11'-0"	Str.		17
S617	1	15'-3"	Str.		23
S618	83	8'-3"	Str.		1,028
S619	1243	30'-0"	Str.		56,010
S621	30	32'-6"	Str.		1,464
S622	30	23'-9"	Str.		1,070
S623	30	18'-6"	Str.		834
S624	1 Ser. 3	12'-6" to 18'-6"	Str.	3'-0"	70
S625	1 Ser. 3	8'-0" to 11'-0"	Str.	1'-6"	43
S626	1 Ser. 3	4'-9" to 6'-9"	Str.	1'-0"	26
S627	1 Ser. 2	1'-9" to 3'-9"	Str.	1'-6"	8
S628	8	11'-6"	Str.		138
S629	2	2'-3"	Str.		7
3 Light Pole Supports					768
1 Traffic Signal Strain Pole Support					344
		TOTAL WEIGHT	=		153,098

BENDING DIAGRAMS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-80-15.81

100

8'-8"	PA801
41'-6"	S601
8'-0" to 40'-0"	S603
42'-4" to 43'-2"	S607
25'-2" to 42'-10"	S609
11'-3" to 23'-9"	S611

101

4'-0" to 7'-0"	S605
9'-9"	S613

104

PA1002, PB1002, PC1002	5'-10"
PD1002, PE1002	5'-11"
PA1101, PB1101, PC1101 PD1101, PE1101	30'-0"
PA1102, PB1102, PC1102	13'-4"
PD1102, PE1102	11'-4"
PA1106, PB1106, PC1106 PD1105, PE1104	15'-0"

1'-5" 2'-2"

105

2'-8"	PA501, PB501, PC501 PD501, PE501
6'-8"	S501
1'-3"	S502
2'-8"	PA604, PB604, PC604 PD604, PE603

8" 1'-11"

108

3 12 4'-0" 18'-0" PA1104, PB1104 PC1104, PD1104, PE1103

109

PA601, PB601, PC601 PD601, PE601	3'-2"
PA603, PD603, PE602	2'-2" to 3'-2"
PB603, PC603	2'-2" to 3'-2"
PB605	3'-2"

2'-8" 1'-10"

110

2'-6" 8" S503

2'-8" Out to Out
*Number of turns at 4½" pitch includes 1½ turns at each end.

150

PA401	PB401	PC401	PD401	PE401
*42	*48	*55	*49	*43

SPIRAL REINFORCEMENT NOTE:
The "Length" shown in the reinforcement schedule for the spiral bars is the distance from the top of the footing to within 2" ± of the top of pedestal.
Four steel channels, tee or angle spacers, weighing approximately 0.80 lbs. per linear foot of spacer, shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers, based on 0.80 lbs. per linear foot will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

Note:
For Replacement Bar Schedule see BR. NO. CUY-80-1585, Sheet 24/24.
For Light Pole Support Reinforcement Schedule see Sheet CD2
For Traffic Signal Strain Pole Support Reinforcement Schedule see Sheet SA/15

H.N.T.B. BR.NO.36

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

REINFORCEMENT SCHEDULE

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 93 STA. 8+33.59 TO STA. 12+10.61

CUYAHOGA COUNTY OHIO

DRAWN JTT	TRACED JNC	CHECKED TJS	REVIEWED	REVISED
DATE 6-17-70	DATE 6-24-70	DATE 7-28-70	DATE	SHEET 15/15

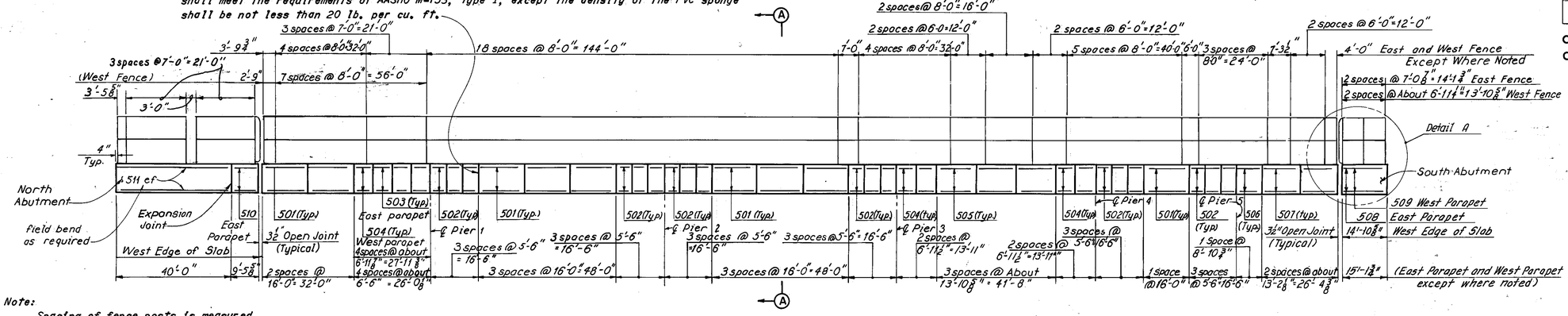
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

(360 392)

CUYAHOGA COUNTY

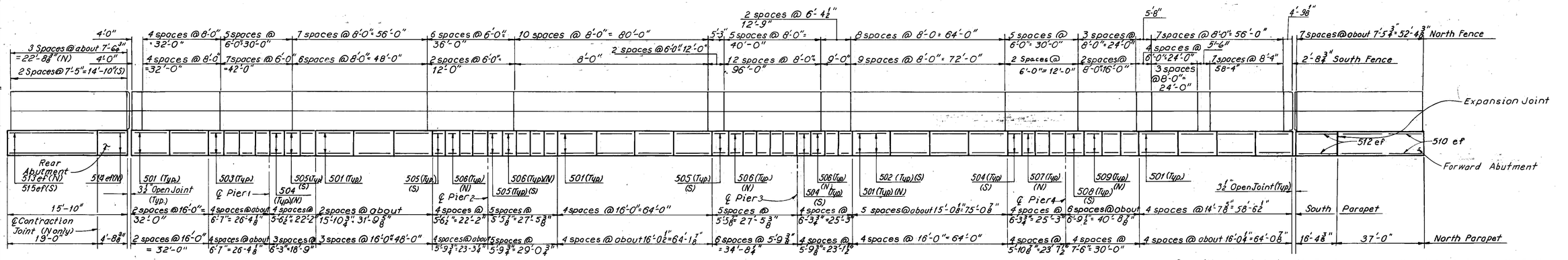
CUY.80-15.81

Preformed Expansion Joint Filler in the fencing parapet deflection joints may be either ½" gray sponge rubber or ¼" gray cellular polyvinyl chloride (PVC) sponge. Either material shall meet the requirements of AASHO M-153, Type I, except the density of the PVC sponge shall be not less than 20 lb. per cu. ft.



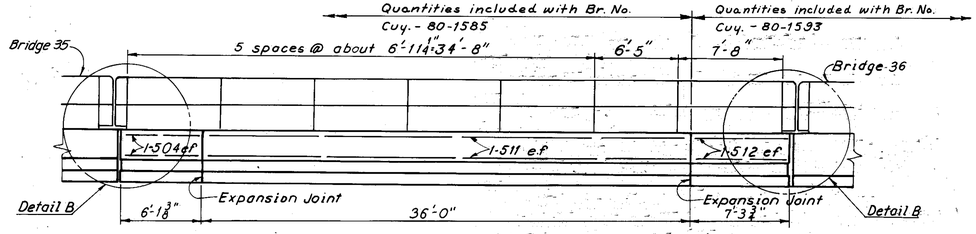
Note:
Spacing of fence posts is measured along edge of slab.

BRIDGE 36 EAST AND WEST PARAPET AND FENCE DETAILS



Note:
For reinforcing steel
N- North parapet
S- South parapet

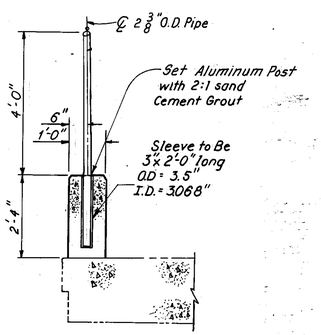
BRIDGE 35 NORTH AND SOUTH PARAPET AND FENCE DETAILS



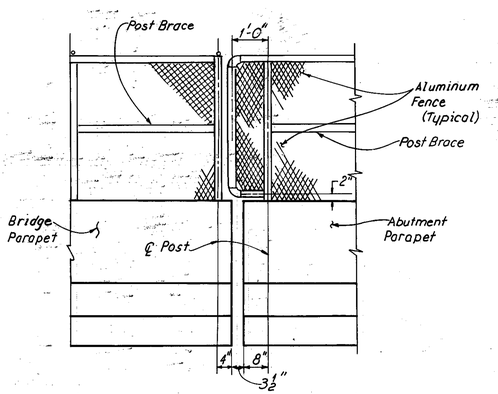
NORTH ABUTMENT BETWEEN BRIDGE 35 & 36

For Sections thru parapet see North Abutment Bridge 35 Section G-G, Br. No. Cuy-80-1585 Sheet 8129.

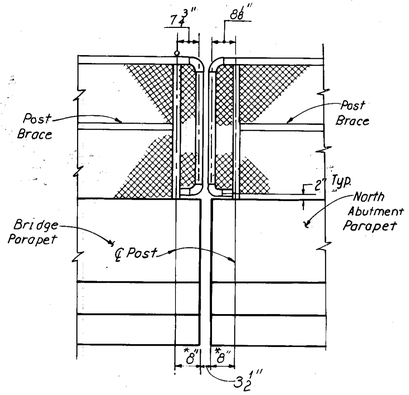
Note:
Spacing of deflection joints is measured along edge of slab except as noted.



SECTION A-A
(Typical)



DETAIL A
(Typical except where noted)



DETAIL B
**Measured along Centerline of Parapets*

REINFORCEMENT SCHEDULE

Mark	Bridge No. 35 No.	Bridge No. 35 Length	Bridge No. 36 No.	Bridge No. 36 Length	Mark	Bridge No. 35 No.	Bridge No. 35 Length	Bridge No. 36 No.	Bridge No. 36 Length
R501	116	15'-6"	72	15'-6"	R508	24	6'-3"	4	14'-9"
R502	20	14'-6"	144	5'-0"	R509	16	7'-0"	4	14'-6"
R503	32	6'-0"	16	6'-0"	R510	4	36'-6"	4	9'-0"
R504	48	5'-9"	48	6'-6"	R511	4	35'-6"	4	39'-6"
R505	72	5'-0"	24	13'-6"	R512	4	16'-0"	4	7'-0"
R506	76	5'-3"	8	8'-6"	R513	4	18'-6"		
R507	16	5'-6"	16	12'-9"	R514	4	4'-3"		
					R515	4	15'-6"		

H.N.T.B. BR. NO. 35 & 36

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

PARAPET AND FENCE DETAILS

I-80, LANE OBE-JN, AND LANE JN-OBE UNDER RELOCATED GRANGER ROAD (S.R.17) AND UNDER RELOCATED TUXEDO AVENUE

BR. NO. CUY-80-15 85
AND CUY-80-1593

CUYAHOGA COUNTY OHIO

DRAWN KRS	TRACED HCH	CHECKED WKA	REVIEWED	REVISED
DATE 8-1963	DATE 10-64	DATE 9-1-65	DATE	SHEET CD1

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-80-15.81

ESTIMATED QUANTITIES

CUY-80-1685 H.N.T.B. BRIDGE NO. 37

ITEM	TOTAL	UNIT	DESCRIPTION	ABUTMENTS	PIERS	SUPERSTRUCTURE	GENERAL		
503	567	Cu. Yd.	Unclassified Excavation	280	287				
503	76	Cu. Yd.	Shale Excavation		76				
505	Lump Sum	Lump Sum	Test Pile				Lump Sum		
507	770	Lin. Ft.	Steel Piles, HP10x42	770					
507	1,340	Lin. Ft.	Steel Piles, HP12x53		1,340				
⊙ 233,507 → 509	~~233,090~~	Pounds	Reinforcing Steel	15,986	~~55,646~~	161,398			
511	683	Cu. Yd.	Class "C" Concrete, Superstructure		56,123	683			
511	119	Cu. Yd.	Class "C" Concrete, Abutments above Footings	119					
⊙ 216 → 511	~~213~~	Cu. Yd.	Class "C" Concrete, Piers above Footings		~~213~~ → 216				
511	225	Cu. Yd.	Class "C" Concrete, Footings	76	149				
513	*598,200	Pounds	Structural Steel			598,200			
514	*598,200	Pounds	Field Painting of Structural Steel			598,200			
517	973	Lin. Ft.	Bridge Railing (Concrete with Aluminum Chain Link Fence Sec. 710.00)				973		
518	80	Cu. Yd.	Porous Backfill	80					
518	96	Lin. Ft.	6" ϕ Non-Perforated Helical C.M.P.						
			Including Specials, 707.01	96					
518	68	Lin. Ft.	6" ϕ Perforated Helical C.M.P., 707.01	68					
518	12	Each	Scuppers, Including Supports			12			
601	1061	Sq. Yd.	Crushed Aggregate Slope Protection	1,061					
808	683	Units	Chemical Admixture for Concrete, Type A, B or D			683			
625			See sheet ___ for Lighting Summary						
Special	1295	Sq. Yd.	Surface preparation			1295			
Special	36	Cu. Yd.	Latex Modified Portland Cement Concrete			36			
Special	1295	Sq. Yd.	Finishing and Curing			1295			

* Includes: 1706 pounds to be paid for by the East Ohio Gas Company (Gas line supports and pipe sleeves)
3907 pounds to be paid for by the Cleveland Electric Illuminating Company (Conduit supports)

⊙ Includes the following additional quantities incurred by raising the bridge grade:

477 pounds of reinforcing steel
3 Cu. Yd. of class "C" concrete.

REV. 7-18-75

H.N.T.B. BR.NO. 37

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

ESTIMATED QUANTITIES

I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

CUYAHOGA COUNTY OHIO

DRAWN JMS	TRACED JMS	CHECKED DH	REVIEWED	REVISED
DATE 9-3-70	DATE 9-16-70	DATE 9-17-70	DATE	SHEET 2 / 8

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

CUYAHOGA COUNTY
CUY-80-15.81

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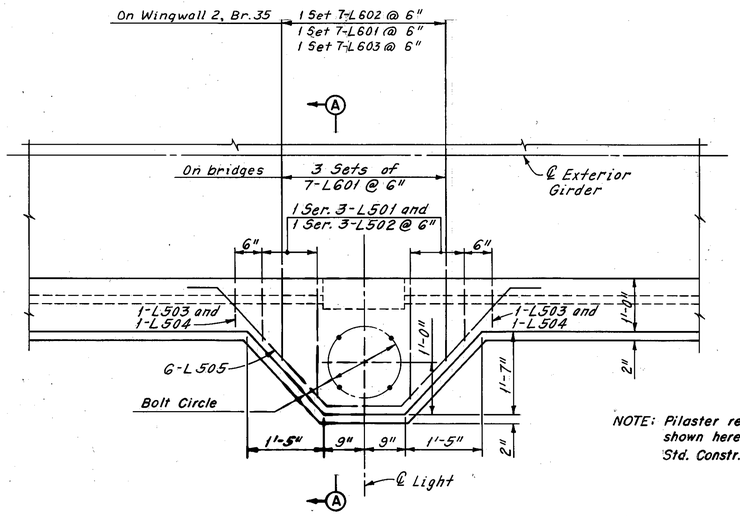
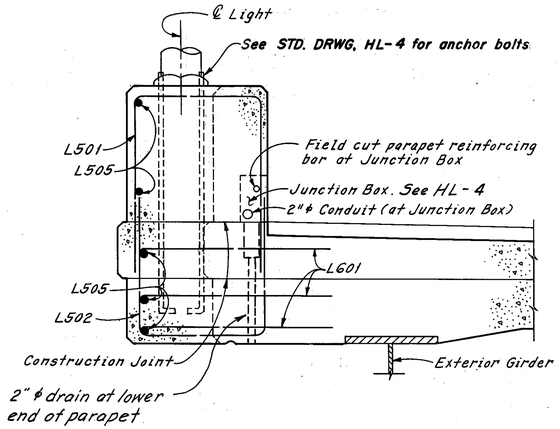


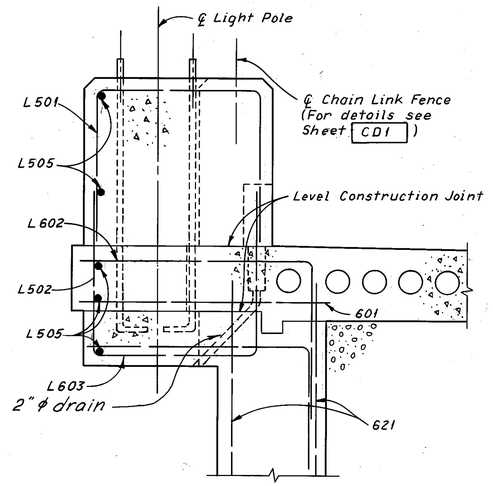
PLAN

NOTE: Pilaster reinforcing steel shall be as shown hereon rather than as shown on Std. Constr. Drwg. HL-4.



SECTION A-A ON BRIDGES

Note:
Normal sidewalk, parapet and slab reinforcement not shown; normal longitudinal reinforcement is continuous through light support unless indicated otherwise.

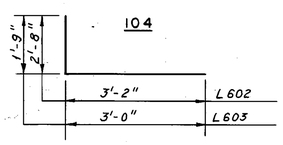


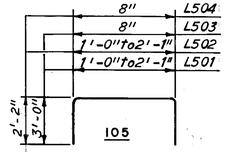
SECTION A-A ON REAR ABUTMENT WINGWALL 2, BR. 35

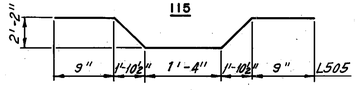
REINFORCEMENT SCHEDULE

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
L501	2 Ser. 3	6'-9" / 1'-10"	105	6½"	45
L502	2 Ser. 3	5'-1" / 6'-2"	105	6½"	36
L503	2	6'-5"	105		13
L504	2	4'-9"	105		10
L505	5	8'-1"	115		42
L601	21	3'-6"	Str.		110
For One Light Pole Support (on Bridge)					
		Total Weight	=		256
L501	2 Ser. 3	6'-9" / 1'-10"	105	6½"	45
L502	2 Ser. 3	5'-3" / 6'-4"	105	6½"	36
L503	2	6'-5"	105		13
L504	2	4'-11"	105		10
L505	5	8'-1"	115		42
L601	7	3'-6"	Str.		37
L602	7	5'-8"	104		60
L603	7	4'-7"	104		48
For One Light Pole Support					
(on Rear Abutment Wingwall 2)					
		Total Weight	=		291

BENDING DIAGRAMS







Notes:

For Light Pole Locations on Bridge No. 35 see Slab Plans and Sheet 5 24 .

For Light Pole Locations on Bridge No. 36 see Slab Plans.

For Light Pole Locations on Bridge No. 37 see Site Plan.

For location of conduit in the structure, additional lighting details and lighting quantities see Lighting Plans and Lighting Standard Drawings.

Light Pole Support reinforcement is included for payment with slab reinforcement; see Reinforcement Schedule for weight summary.

Concrete for Light Pole Supports above the parapet joint is included for payment with "Item 517, Bridge Railing (Concrete Parapet with Aluminum Chain Link Fence, Sec. 710.04)".

Refer to Standard Construction Drawings HL-3, dated 7-27-73 and HL-4, HL-5, and HL-7 all dated 9-6-73.

H.N.T.B. NO. 35, 36 & 37

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

LIGHT POLE SUPPORT DETAILS

BR. NO. CUY-80-1585
BR. NO. CUY-80-1593
BR. NO. CUY-80-1685

CUYAHOGA COUNTY OHIO

DRAWN GAL.	TRACED LKW	CHECKED DHS	REVIEWED	REVISED
DATE 7-12-74	DATE 7-14-74	DATE 7-15-74	DATE	SHEET CD2

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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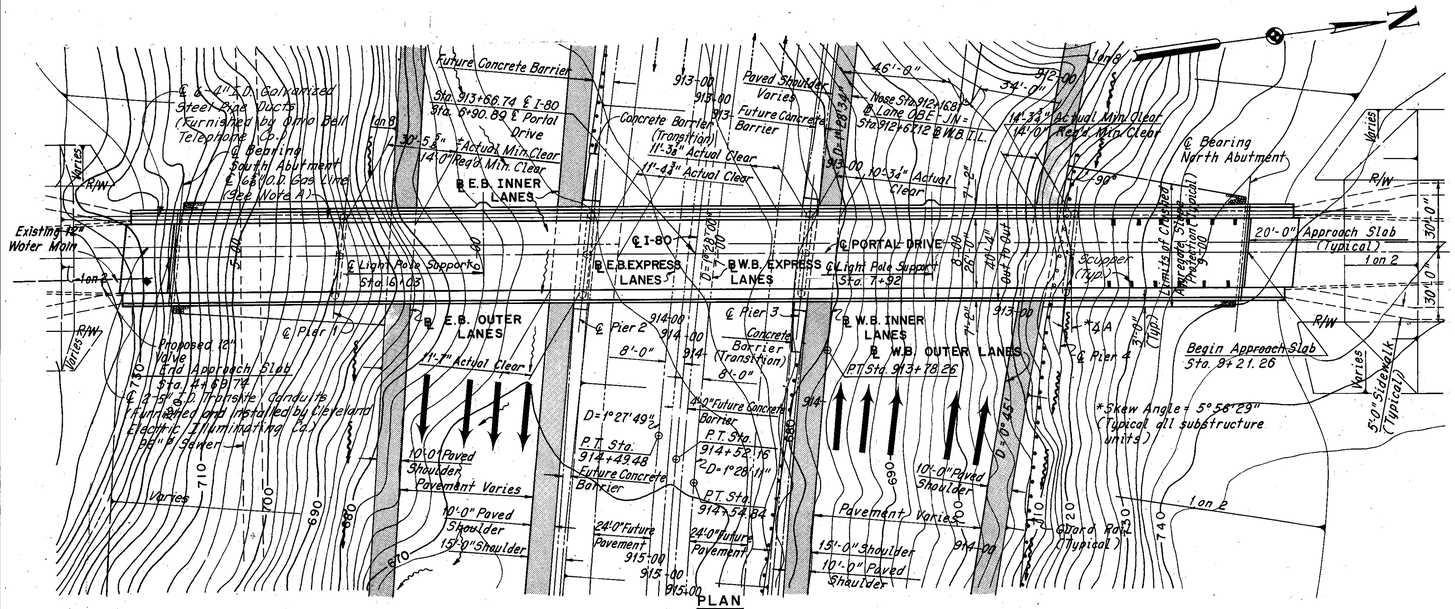
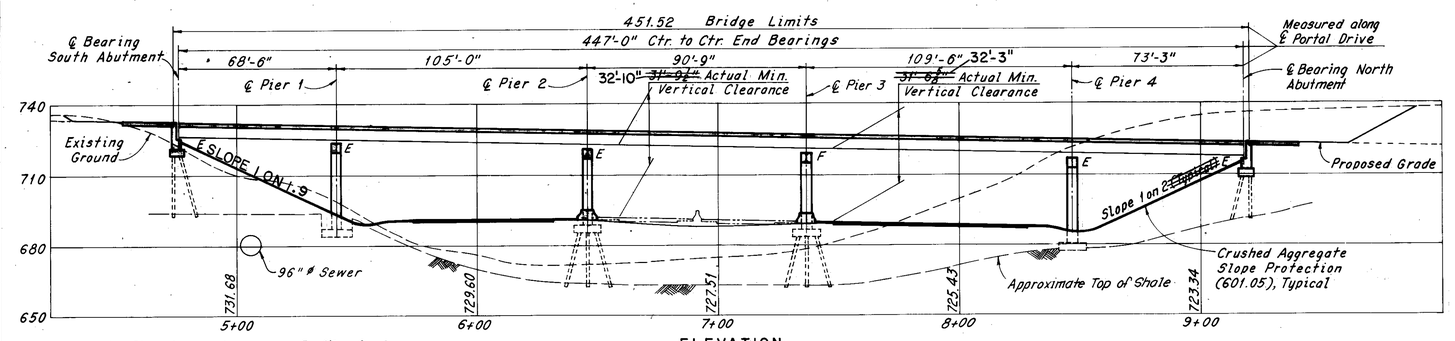
CUYAHOGA COUNTY
CUY-80-15.81

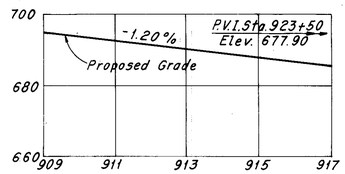


PLAN
Scale: 1" = 30'

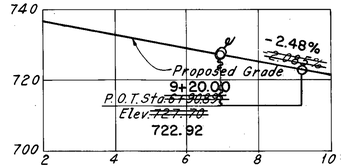


ELEVATION
Scale: Horiz. = 1" = 30'
Vert. = 1" = 30'

Note: Elevations shown are Profile Grade.



PROFILE I-80
Scale: Horiz. 1"=200'
Vert. 1"= 20'



PROFILE PORTAL DRIVE
Scale: Horiz. 1"=200'
Vert. 1"= 20'

PROPOSED STRUCTURE

TYPE: Continuous welded steel girder with reinforced concrete deck and substructure
SPANS: 68'-6", 105'-0", 90'-9", 109'-6" and 73'-3"
ROADWAY: 26'-0" Curb to curb with two 6'-0" sidewalks.
LOADING: HS 20-44
SKEW: 5°56'29" Left Forward
WEARING SURFACE: 1" Latex Modified concrete
APPROACH SLABS: AS-1-72 (20'-0" Long) (Modified)
ALIGNMENT: Tangent
SUPERELEVATION: Normal cross slope-⅝" per ft.

Modify Std. Drwg. AS-1-72 by providing 3" clear over the top rebars instead of the 2" shown on the Std. Drwg.

TRAFFIC DATA: (1991)

Portal Drive - 1,000 A.D.T.
91 D.D.H.V.

Notes:

Roadway excavation shall be completed and embankments shall be placed and compacted to the finish spill-thru slopes and to the level of the subgrades before excavating and driving piles for the abutments and piers.

Piles at the abutments are HP10x42 and shall be driven to a minimum bearing capacity of 35 tons per pile. Piles at Piers 2 and 3 are HP12x53 and shall be driven to a minimum bearing capacity of 40 tons per pile.

Piers 1 and 4 are founded on spread footings designed for a maximum bearing pressure of 6 tons per square foot.

The estimated average pay length of the piles are as follows:

North Abutment - 17 feet
Pier 2 - 23 feet
Pier 3 - 23 feet
South Abutment - 26 feet

See Roadway Plans for Concrete Barrier at Piers 2 and 3.

Note A:

21' of 10¾" O.D. Grade B, uncoated, pipe sleeve, weighing 31.20 pounds per foot at each abutment. Pipe Sleeves to be furnished and installed by the Bridge Contractor; paid for by The East Ohio Gas Company.

Note:

For Light Pole Support Details see Sheet CD2 .

Note:

16'-4" Required minimum vertical clearance. Minimum vertical clearance occurs at Westbound Inner Lane and the outside edge of the west exterior girder.

CURVE DATA
℄ EASTBOUND EXPRESS LANES

P.I. Sta. 903+24.71
Δ = 33°57'21"
Dc = 1°27'49" Left
R = 3,914.53'
T = 1,195.14'
L = 2,319.91'
E = 178.38'

CURVE DATA
℄ I-80

P.I. Sta. 903+29.69
Δ = 33°57'21"
Dc = 1°28'00" Left
R = 3,906.53'
T = 1,192.70'
L = 2,315.17'
E = 178.02'

CURVE DATA
℄ WESTBOUND INNER LANES

P.I. Sta. 902+62.98
Δ = 33°57'21"
Dc = 1°28'34" Left
R = 3,881.53'
T = 1,185.07'
L = 2,300.36'
E = 176.88'

CURVE DATA
℄ WESTBOUND EXPRESS LANES

P.I. Sta. 903+34.67
Δ = 33°57'21"
Dc = 1°28'11" Left
R = 3,898.53'
T = 1,190.26'
L = 2,310.43'
E = 177.65'

CURVE DATA
℄ WESTBOUND OUTER LANES

P.I. Sta. 913+03.28
Δ = 10°04'19"
Dc = 0°45'00" Left
R = 7,639.44'
T = 673.19'
L = 1,342.92'
E = 29.60'

REV. 7-18-75

H.N.T.B. BR. NO. 37

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

SITE PLAN

I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

CUYAHOGA COUNTY OHIO

DRAWN CKB	TRACED C.P.	CHECKED DMP	REVIEWED	REVISED
DATE 5-19-68	DATE 6-1-68	DATE 8-3-70	DATE	SHEET 1/8

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

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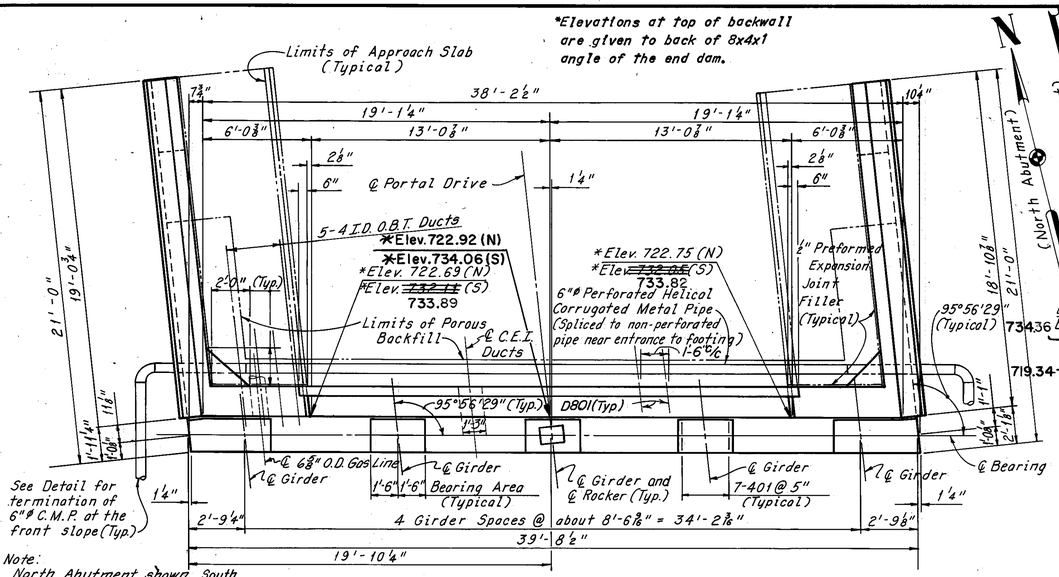
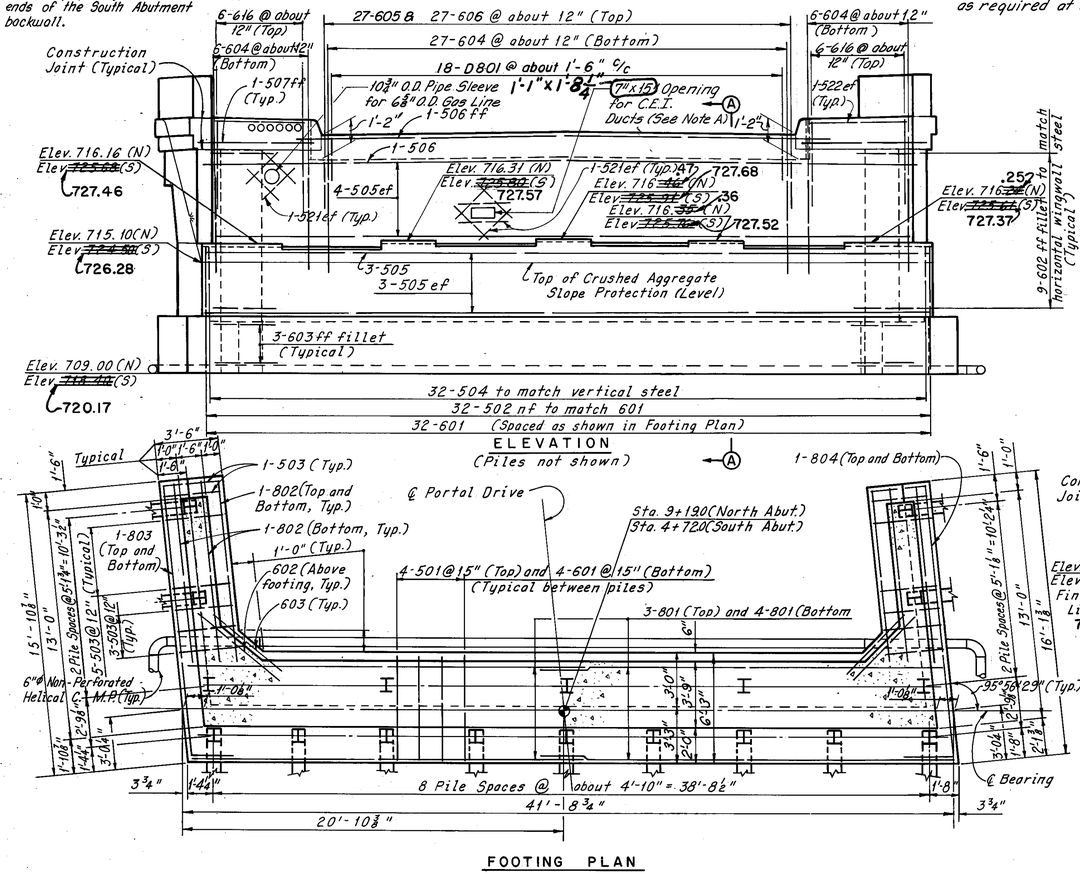
CUYAHOGA COUNTY
CUY-80-15.81

*Elevations at top of backwall are given to back of 8x4x1 angle of the end dam.



PLAN

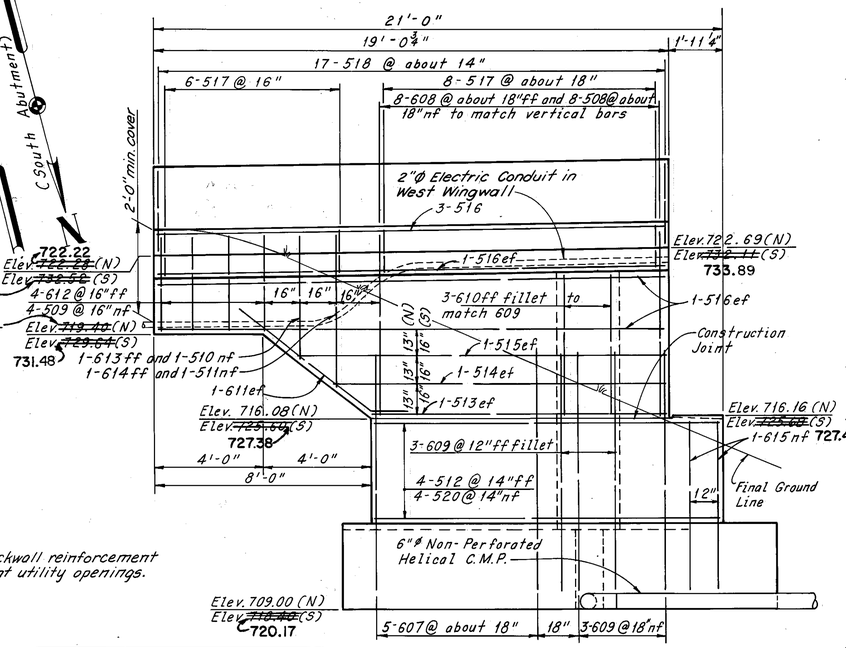
Note:
North Abutment shown, South Abutment similar by rotation except for utility openings which are on opposite ends of the South Abutment backwall.



ELEVATION
(Piles not shown)

FOOTING PLAN

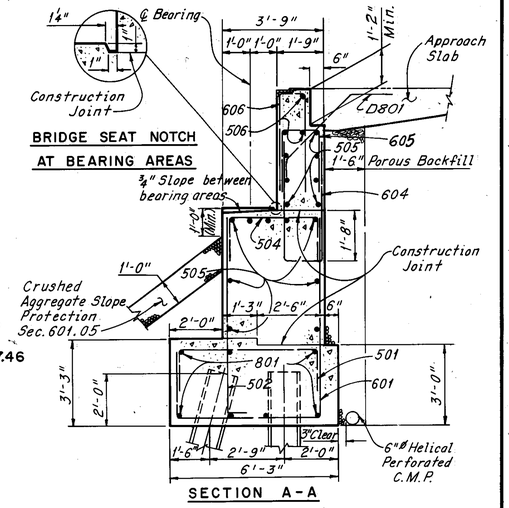
Note A:
Field cut backwall reinforcement as required at utility openings.



WEST WINGWALL (North Abutment, Shown)
EAST WINGWALL (South Abutment)
(Piles not shown)

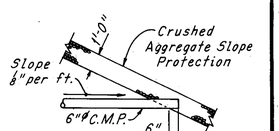
Note: All reinforcing bar marks except D801 shall be prefixed as follows:

AN = North Abutment
AS = South Abutment

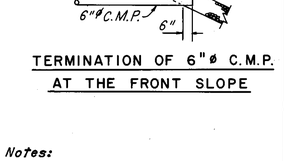


BRIDGE SEAT NOTCH AT BEARING AREAS

SECTION A-A

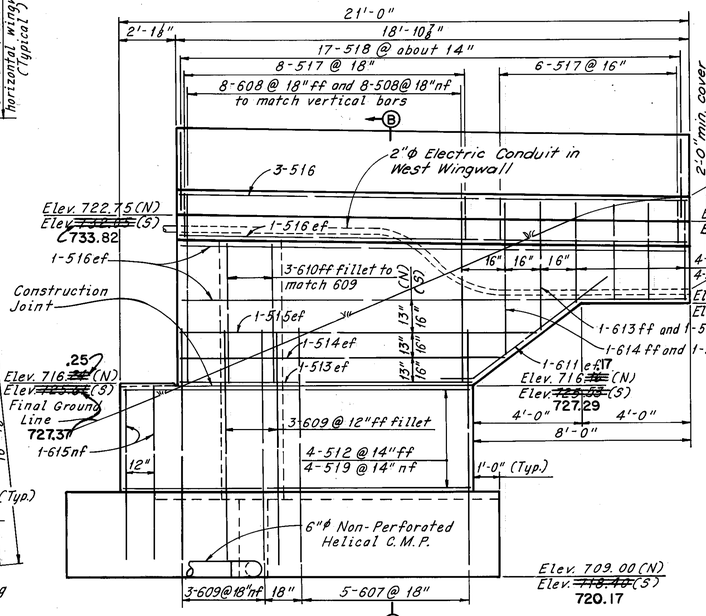


SECTION B-B



TERMINATION OF 6"ø C.M.P. AT THE FRONT SLOPE

Notes:
All piles are HP10x42.
All battered piles shall be inclined 3 in 12 in the direction shown.
For longitudinal reinforcement in the parapets and fence details see Sheet 7/8.
For roadway end dam and sidewalk end dam details see Ohio Standard Drawing SD-1-69, sheets 1 and 2 of 4 and Sh. GN1.
The following abbreviations are used:
nf = near face
ff = far face
ef = each face
(N) = North Abutment
(S) = South Abutment



EAST WINGWALL (North Abutment, Shown)
WEST WINGWALL (South Abutment)
(Piles not shown)

REV. 7-18-75

H.N.T.B. BR. NO. 37

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

NORTH AND SOUTH ABUTMENTS
I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-16.85 STA. 4+69.74 TO STA. 9+21.26

CLEVELAND CUYAHOGA COUNTY OHIO

DRAWN C.P.	TRACED C.P.	CHECKED J.M.S.	REVIEWED	REVISED 1-24-75
DATE 5-8-70	DATE 5-11-70	DATE 6-4-70	DATE	SHEET 3/8

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

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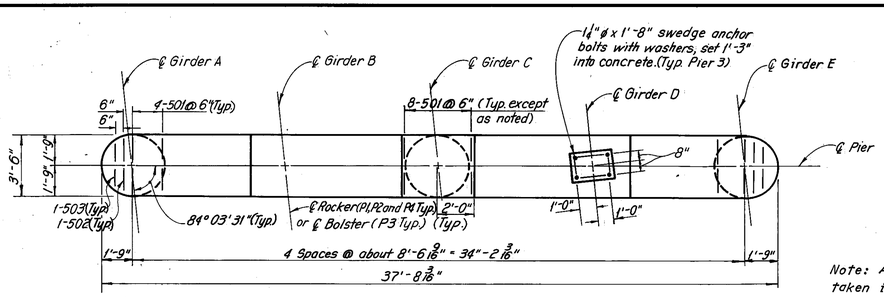
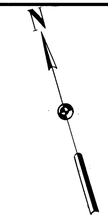
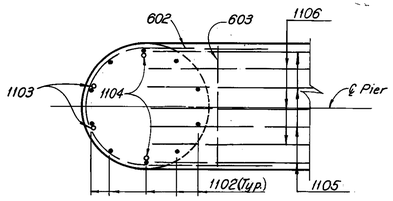
392

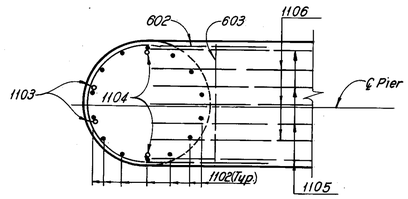
CUYAHOGA COUNTY
CUY-15.81



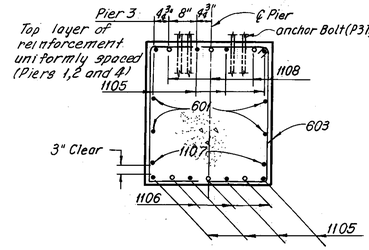




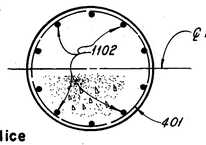
SECTION B-B
(Piers 1,2 and 4)



SECTION B-B
(Pier 3)



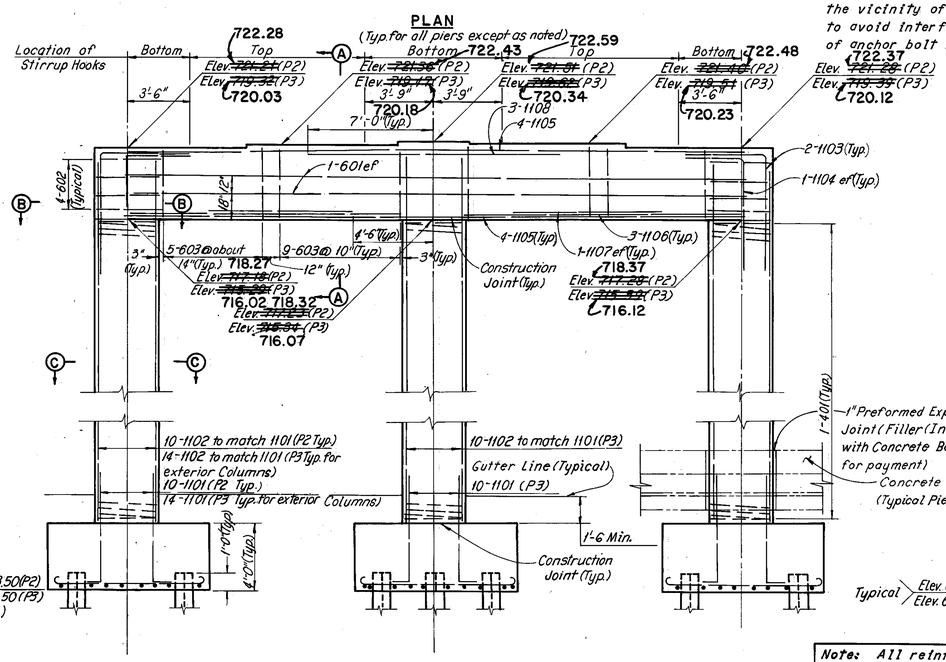
SECTION A-A
(Typical for all piers except as noted)



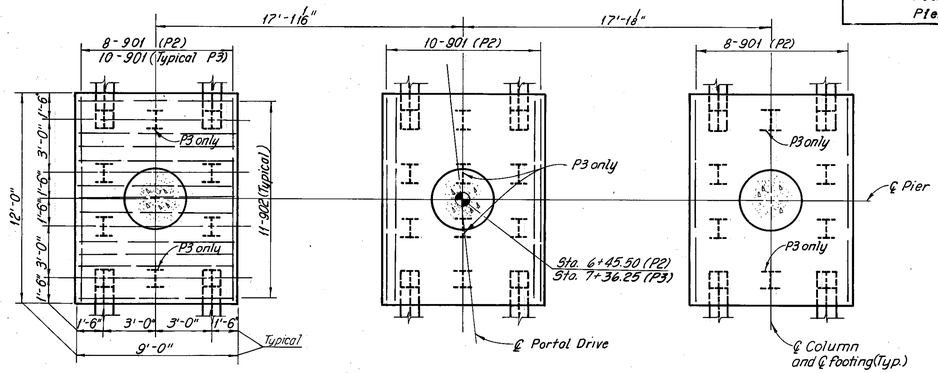
SECTION C-C
(Piers 1, 2 and 4)

Note: At Pier 3 special care shall be taken in placing reinforcing steel in the vicinity of the bridge seat so as to avoid interference with the drilling of anchor bolt holes.(See note on Sh. GN 1)

PLAN
(Typ.for all piers except as noted)

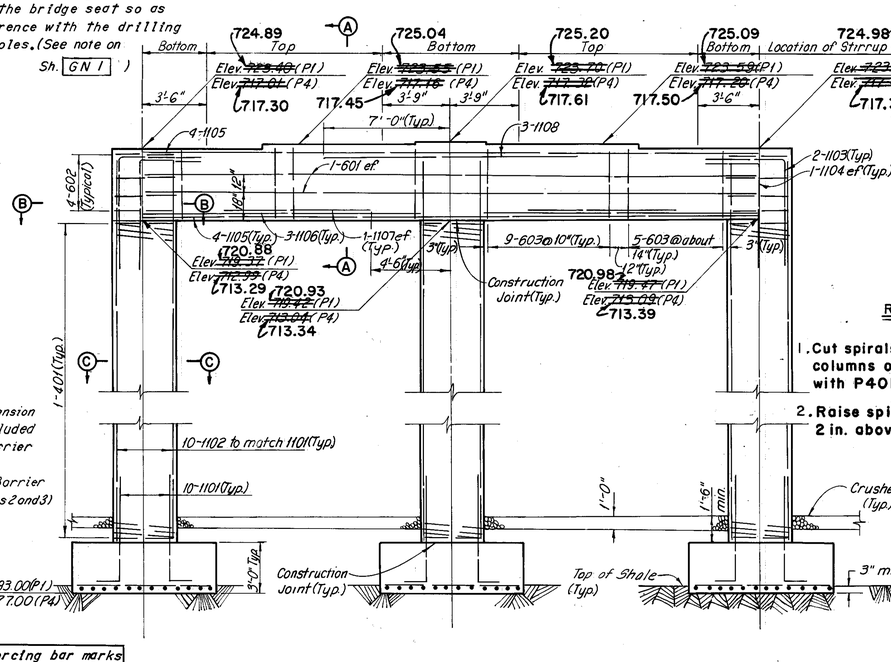


ELEVATION
(Pier 2 shown, Pier 3 similar except as noted)

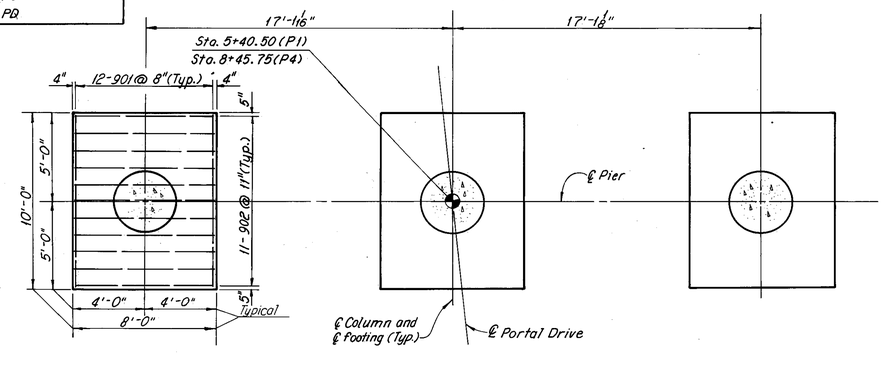


FOOTING PLAN
(Pier 2 shown, Pier 3 similar except as noted)

PIERS 2 AND 3



ELEVATION
(Pier 1 Shown, Pier 4 Similar except as noted)



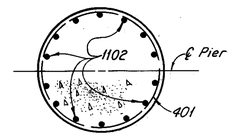
FOOTING PLAN
(Pier 1 Shown, Pier 4 Similar except as noted)

PIERS 1 AND 4

Note: All reinforcing bar marks shall be prefixed as follows:
Pier 1 = PA
Pier 2 = PB
Pier 3 = PC
Pier 4 = PD

RE-BAR NOTES

1. Cut spirals at mid height for all columns of Piers 1, 2 & 3 and splice with P401. Lap 1½ turns min.
2. Raise spirals for all Pier 4 columns 2 in. above tops of footings.



SECTION C-C
(Pier 3)

Notes:
All piles shall be 12BP53 steel piles.
All battered piles shall be inclined 3 in 12 in the direction shown.
Pile layout dimensions are measured along bottom of footing.
The following abbreviations are used:
P1 = Pier 1
P2 = Pier 2
P3 = Pier 3
P4 = Pier 4
ef = each face

H.N.T.B. BR. NO. 37

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KANSAS CITY CLEVELAND NEW YORK

PIERS

I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

CUYAHOGA COUNTY OHIO

DRAWN MCB	TRACED HCH	CHECKED MS	REVIEWED	REVISED
DATE 7-7-70	DATE 7-21-70	DATE 7-24-70	DATE	SHEET 4/8

REV. 7-18-75

FED. RD. DIVISION	STATE	PROJECT	
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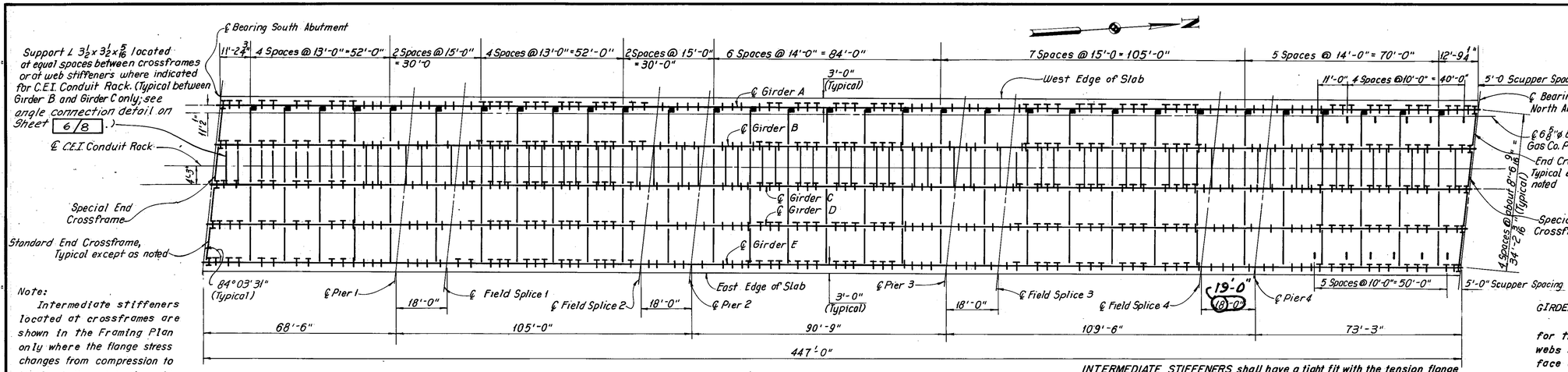
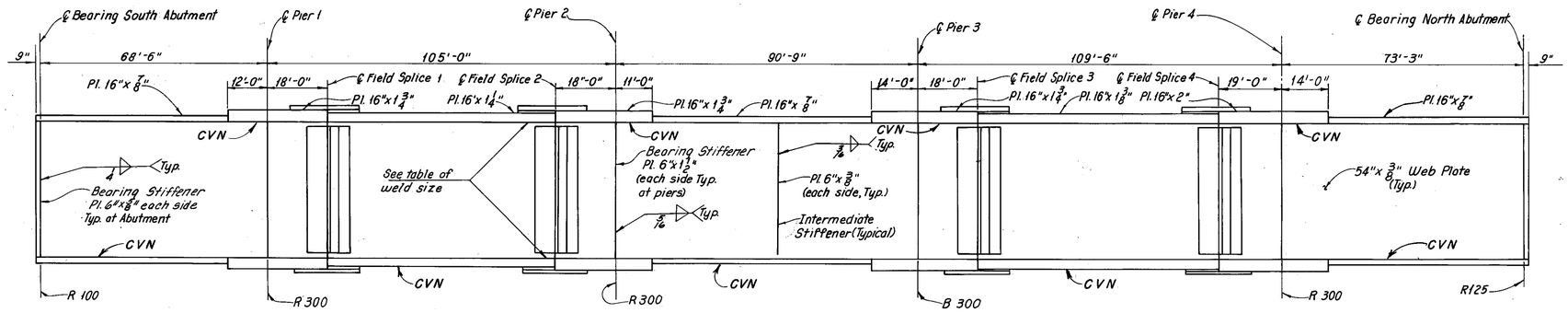
Support L $3\frac{1}{2}\times3\frac{1}{2}\times\frac{5}{16}$ located at equal spaces between crossframes or at web stiffeners where indicated for C.E.I. Conduit Rack. (Typical between Girder B and Girder C only; see angle connection detail on Sheet 6/8.)



FRAMING PLAN

Note:
Intermediate stiffeners located at crossframes are shown in the Framing Plan only where the flange stress changes from compression to tension adjacent to the crossframe.

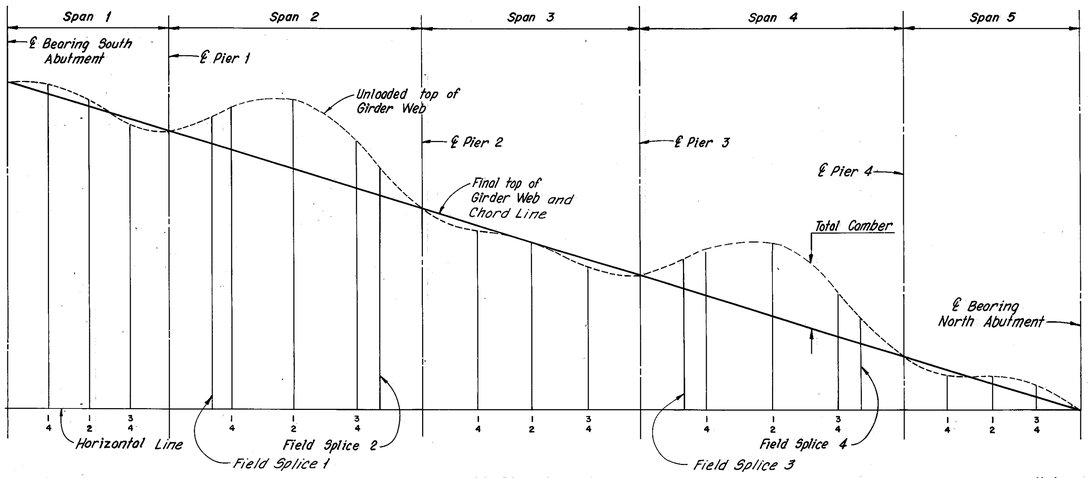
INTERMEDIATE STIFFENERS shall have a tight fit with the tension flange and may have either a tight fit or be welded to the compression flange with a 1/4" fillet weld.



FLANGE TO WEB WELD SIZE TABLE	
Flange Pl. thickness	Weld Size
⅞" to 1⅜"	½
1¼" to 2"	⅝

TYPICAL GIRDER ELEVATION

CVN - See Sh. GN 1



CAMBER DIAGRAM

Notes:
Negative values for deflections indicate deflections above the chord line.
Negative values for total required camber indicate values below the chord line.
Deflections are given to the nearest 1/16 inch.
The following abbreviations are used:
Stl. = Dead load deflection due to the weight of steel
Rem. D.L. = Remaining dead load deflection
Tot. = Total required camber

DEAD LOAD DEFLECTION AND CAMBER

	Span 1									Field Splice 1			Span 2									Field Splice 2			Span 3								
	¼			½			¾						¼			½			¾						¼			½			¾		
Girder	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.
A	0	⅛	⅛	0	⅛	⅛	0	-1/16	-1/16	1/16	5/16	⅜	1/16	9/16	⅝	⅛	⅞	1	1/16	9/16	⅝	1/16	3/16	7/16	0	-1/16	-1/16	0	0	0	0	-1/16	-1/16
B	0	⅛	⅛	0	⅛	⅛	0	-1/16	-1/16	1/16	5/16	⅜	1/16	9/16	⅝	⅛	⅞	1	1/16	9/16	⅝	1/16	3/16	7/16	0	-1/16	-1/16	0	0	0	0	-1/16	-1/16
C	0	⅛	⅛	0	⅛	⅛	0	-1/16	-1/16	1/16	5/16	⅜	1/16	9/16	⅝	⅛	⅞	1	1/16	9/16	⅝	1/16	3/16	7/16	0	-1/16	-1/16	0	0	0	0	-1/16	-1/16
D	0	⅛	⅛	0	⅛	⅛	0	-1/16	-1/16	1/16	5/16	⅜	1/16	9/16	⅝	⅛	⅞	1	1/16	9/16	⅝	1/16	3/16	7/16	0	-1/16	-1/16	0	0	0	0	-1/16	-1/16
E	0	⅛	⅛	0	⅛	⅛	0	-1/16	-1/16	1/16	5/16	⅜	1/16	9/16	⅝	⅛	⅞	1	1/16	9/16	⅝	1/16	3/16	7/16	0	-1/16	-1/16	0	0	0	0	-1/16	-1/16

DEAD LOAD DEFLECTION AND CAMBER

	Span 4									Field Splice 4			Span 5								
	¼			½			¾						¼			½			¾		
Field Splice 3	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.	Stl.	Rem. D.L.	Tot.
1/16	⅜	7/16	⅛	11/16	¾	1/16	15/16	1	5/16	1/16	⅜	7/16	0	-1/16	-1/16	0	⅛	⅛	0	⅜	⅜
1/16	⅜	7/16	⅛	11/16	¾	1/16	15/16	1	5/16	1/16	⅜	7/16	0	-1/16	-1/16	0	⅛	⅛	0	⅜	⅜
1/16	⅜	7/16	⅛	11/16	¾	1/16	15/16	1	5/16	1/16	⅜	7/16	0	-1/16	-1/16	0	⅛	⅛	0	⅜	⅜
1/16	⅜	7/16	⅛	11/16	¾	1/16	15/16	1	5/16	1/16	⅜	7/16	0	-1/16	-1/16	0	⅛	⅛	0	⅜	⅜
1/16	⅜	7/16	⅛	11/16	¾	1/16	15/16	1	5/16	1/16	⅜	7/16	0	-1/16	-1/16	0	⅛	⅛	0	⅜	⅜

Notes:
1. For standard end crossframe and roadway and sidewalk end dam details see Ohio Standard Drawing SD-1-69, Sheets 1 and 2 of 4, and Sh. GN 1.
2. For scupper details see Ohio Standard Drawing SD-1-69, Sheet 3 of 4, except that scupper pipes shall extend 8" below the bottom of the girders instead of 2".

LEGEND:
+ Indicates intermediate stiffeners where the bottom flange is in compression.
∓ Indicates intermediate stiffeners where the top flange is in compression
∓ Indicates intermediate stiffeners at one-half normal stiffener spacing and where the top flange is in compression.
■ Indicates 90° angle.
See Note for treatment of stiffeners at the compression and tension flanges.

GIRDER NOTES:

The girders shall be fabricated to compensate for the effects of dead load. The top of the girder webs shall parallel the profile of the roadway surface directly over the center line of girder.

Top and bottom flange plates are to be the same and shall be spliced at points shown on the girder elevation. The web plates may be shop spliced as required by available plate lengths. The locations of shop web splices and the locations and details of any additional shop flange splices shall be submitted to the Director for approval prior to ordering of materials.

Intermediate stiffeners shall be placed as shown on the framing plan equally spaced between crossframes, or crossframes and bearing stiffeners, or crossframes and field splices, except the first two stiffener spaces from the abutments shall be one-half of this spacing. Stiffeners shall be placed in pairs.

Bearing stiffeners at piers and abutments shall be placed in pairs on all girders. Intermediate stiffeners and bearing stiffeners at the piers shall be normal to girder flange. Bearing stiffeners at abutments shall be vertical.

All girder field splices shall be made with 1" diameter high strength steel bolts. The bolts shall be placed with their heads on the outside face of the exterior girders and on the bottom of all flange plates.

The Contractor shall submit to the Director for approval three prints showing his proposed erection procedure.

For details of Rockers and Bolsters see Ohio Standard Drawing RB-1-55.

H.N.T.B. BR.NO.37

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

FRAMING PLAN & CAMBER DIAGRAM

I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

CUYAHOGA COUNTY OHIO

DRAWN JT	TRACED HCH	CHECKED JM	REVIEWED	REVISED 4-30-75
DATE 5-1-70	DATE 5-8-70	DATE 7-15-70	DATE	SHEET 5/8

FED RD DIVISION	STATE	PROJECT	
2	OHIO		

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CUYAHOGA COUNTY
CUY-15.81

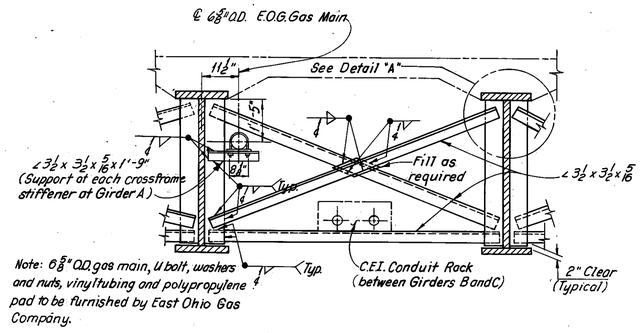
TOP OF LATEX MODIFIED CONCRETE ELEVATIONS

Girder	℄ Brg. South Abut.	1/4	1/2	3/4	℄ Brg. Pier 1	.20	.40	.60	.80	℄ Brg. Pier 2	1/4	1/2	3/4	℄ Brg. Pier 3	.20	.40	.60	.80	℄ Brg. Pier 4	1/4	1/2	3/4	℄ Brg. North Abut.
A	731.96	731.61	731.25	730.89	730.53	730.10	729.86	729.22	728.78	728.34	727.87	727.40	726.93	726.45	726.00	725.54	725.08	724.63	724.17	723.79	723.41	723.02	722.64
B	732.11	731.76	731.40	731.04	730.69	730.25	729.81	729.37	728.93	728.50	728.02	727.55	727.08	726.60	726.15	725.69	725.23	724.78	724.32	723.94	723.56	723.17	722.79
C	732.26	731.91	731.55	731.19	730.84	730.40	729.96	729.52	729.08	728.65	728.17	727.70	727.23	726.75	726.30	725.84	725.38	724.93	724.48	724.09	723.71	723.33	722.94
D	732.15	731.79	731.44	731.08	730.72	730.28	729.85	729.41	728.97	728.53	728.06	727.59	727.11	726.64	726.18	725.73	725.27	724.81	724.36	723.98	723.59	723.21	722.83
E	732.04	731.68	731.32	730.97	730.61	730.17	729.73	729.29	728.86	728.42	727.95	727.48	727.00	726.53	726.07	725.61	725.18	724.70	724.24	723.86	723.48	723.10	722.72
ELEVATION A (TOP OF PORTLAND CEMENT CONCRETE)																							
E. Curb	732.01	731.66	731.30	730.94	730.58	730.18	729.77	729.34	728.87	728.39	727.91	727.45	726.97	726.50	726.08	725.66	725.20	724.71	724.22	723.83	723.46	723.08	722.69
W. Curb	731.95	731.61	731.25	730.88	730.53	730.12	729.72	729.28	728.81	728.34	727.86	727.39	726.91	726.44	726.02	725.60	725.14	724.65	724.16	723.77	723.41	723.03	722.63

See Revised Table below

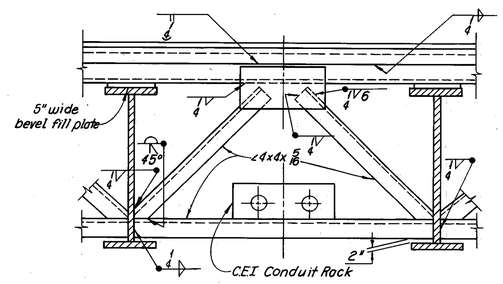
* The elevations shown at the face of curbs are those which are required before concrete is placed. Proper allowance has been made for the dead load deflections caused by the weight of the concrete.

⊙ The elevations over Girders A&E are on the deck slope extended.

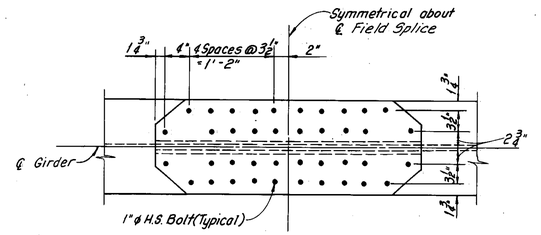


Note: 6⅝" O.D. gas main, U bolt, washers and nuts, vinyl tubing and polypropylene pad to be furnished by East Ohio Gas Company.

INTERMEDIATE CROSSFRAME



SPECIAL END CROSSFRAME
For typical end crossframe details see Ohio Standard Drawing SD-1-69, Sheet 1 of 4.
See Steel Erection note Sh. GN1



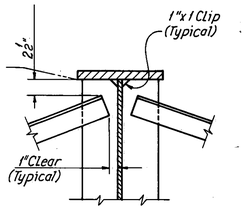
TYPICAL FLANGE SPLICE DETAIL

TOP OF LATEX MODIFIED CONCRETE ELEVATIONS

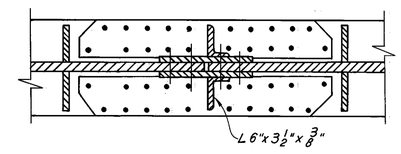
Girder	℄ Brg. South Abut.	1/4	1/2	3/4	℄ Brg. Pier 1	.20	.40	.60	.80	℄ Brg. Pier 2	1/4	1/2	3/4	℄ Brg. Pier 3
⊙ A	733.72	733.30	732.87	732.45	732.02	731.50	730.98	730.46	729.94	729.42	728.86	728.29	727.73	727.17
B	733.87	733.45	733.02	732.60	732.17	731.65	731.13	730.61	730.09	729.57	729.01	728.44	727.88	727.32
C	734.03	733.61	733.18	732.76	732.33	731.81	731.29	730.77	730.25	729.73	729.17	728.60	728.04	727.48
D	733.92	733.50	733.07	732.65	732.22	731.70	731.18	730.66	730.14	729.62	729.06	728.49	727.93	727.37
⊙ E	733.81	733.39	732.96	732.54	732.11	731.59	731.07	730.55	730.03	729.51	728.95	728.38	727.82	727.26
ELEVATION A (TOP OF PORTLAND CEMENT CONCRETE)														
E. Curb	733.78	733.36	732.93	732.51	732.08	731.60	731.08	730.58	730.00	729.48	728.92	728.35	727.79	727.23
W. Curb	733.71	733.30	732.87	732.44	732.00	731.53	731.01	730.51	729.97	729.41	728.85	728.28	727.72	727.16

TOP OF LATEX MODIFIED CONCRETE ELEVATIONS (CONTINUED)

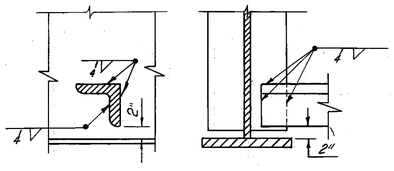
Girder	℄ Brg. Pier 3	.20	.40	.60	.80	℄ Brg. Pier 4	1/4	1/2	3/4	℄ Brg. NORTH ABUTMENT
⊙ A	727.17	726.63	726.08	725.54	725.00	724.45	724.00	723.54	723.09	722.64
B	727.32	726.78	726.23	725.69	725.15	724.60	724.15	723.69	723.24	722.79
C	727.48	726.94	726.39	725.85	725.31	724.76	724.31	723.85	723.40	722.95
D	727.37	726.83	726.28	725.74	725.20	724.65	724.20	723.74	723.29	722.84
⊙ E	727.26	726.72	726.17	725.63	725.09	724.54	724.09	723.63	723.18	722.73
ELEVATION A (TOP OF PORTLAND CEMENT CONCRETE (CONT.)										
E. Curb	727.23	726.73	726.20	725.66	725.10	724.54	724.06	723.60	723.15	722.70
W. Curb	727.16	726.66	726.13	725.59	725.03	724.44	723.99	723.53	723.09	722.63



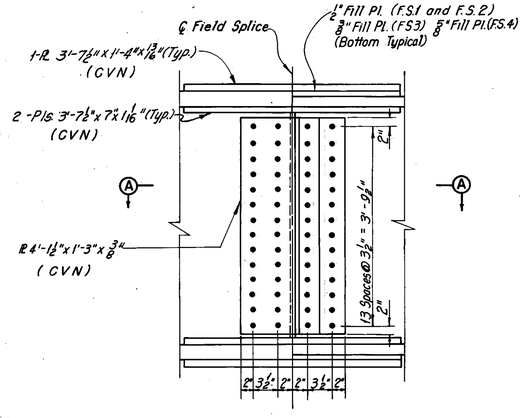
DETAIL "A"



SECTION A-A



CEI SUPPORT ANGLE CONNECTION DETAIL



TYPICAL GIRDER SPLICE DETAIL

REV-7-18-75

H.N.T.B. BR. NO. 37

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

GIRDER DETAILS AND TOP OF PAVEMENT ELEVATIONS
I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

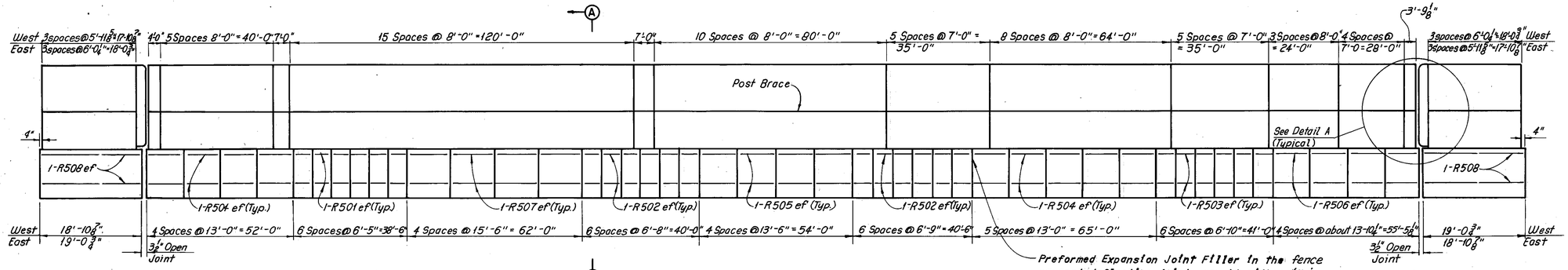
CUYAHOGA COUNTY OHIO

DRAWN JT	TRACED HCM	CHECKED JM	REVIEWED	REVISED
DATE 5-1-70	DATE 5-6-70	DATE 7-15-70	DATE	SHEET 6/8

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

368
392

CUYAHOGA COUNTY
CUY-15.81



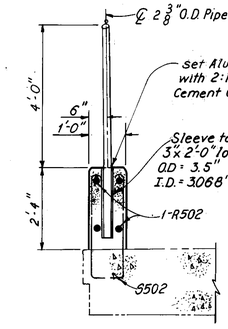
SOUTH ABUTMENT PARAPET

EAST AND WEST PARAPET AND FENCE DETAIL

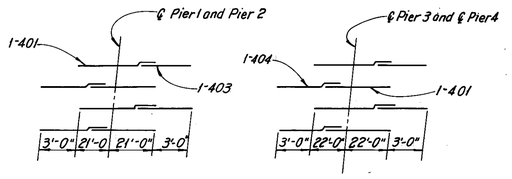
NORTH ABUTMENT PARAPET

Preformed Expansion Joint Filler in the fence parapet deflection joints may be either ½" gray sponge rubber or ¼" gray cellular polyvinyl chloride (PVC) sponge. Either material shall meet the requirements of AASHO M-153, Type I, except the density of the PVC sponge shall be not less than 20 lbs. per cu. ft.

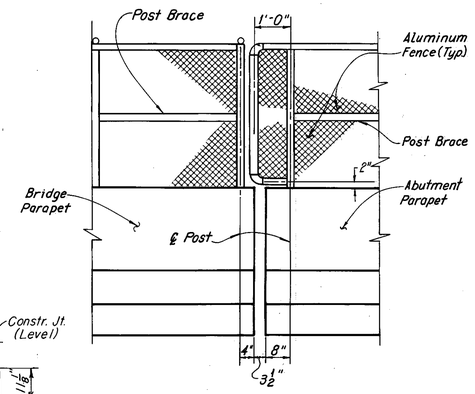
Note:
Payment for parapet and fence shall be made at the contract unit price for "Item 517", Bridge Railing, Concrete with Aluminum Chain Link Fence Sec. 710.04, including Specials and Parapet. Payment length shall be the overall length of the parapets. Sleeves, parapet expansion joint material and longitudinal reinforcing steel in the parapets shall be included with "Item 517" for payment. All other reinforcing steel in the parapets is included with "Item 509".



SECTION A-A

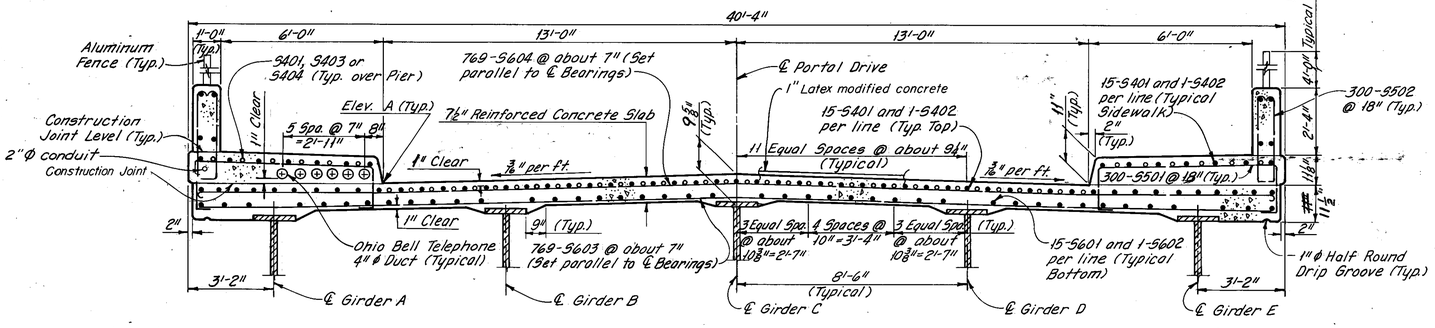


ADDITIONAL REINFORCEMENT OVER PIERS



DETAIL A

PARAPET REINFORCEMENT SCHEDULE				
MARK	NO.	LENGTH	SHAPE	WEIGHT
R501	48	6'-0"	Str.	300
R502	96	6'-3"	Str.	626
R503	48	6'-6"	Str.	325
R504	72	12'-6"	Str.	939
R505	32	13'-0"	Str.	434
R506	32	13'-6"	Str.	451
R507	32	15'-0"	Str.	500
R508	16	18'-6"	Str.	309
			Total =	3884



TYPICAL CROSS SECTION

Note:
A typical haunch width of 9" shall be used for computing quantity of concrete. However, the haunch width may vary between 6" and 12" provided the slope shall be not more than 1:4 for a haunch less than 9" in width.

Note:
For slab reinforcing bar schedule and bending diagrams, see Sheet 8/8.

H.N.T.B. BR.NO.37

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

TYPICAL CROSS SECTION
AND PARAPET DETAILS
I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

CUYAHOGA COUNTY OHIO

DRAWN JT	TRACED HCH	CHECKED JH	REVIEWED	REVISED
DATE 5-1-70	DATE 5-6-70	DATE 7-15-70	DATE	SHEET 7/8

REVISED 7-18-75

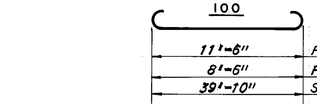
FED.RD. DIVISION	STATE	PROJECT		369 / 392
2	OHIO			

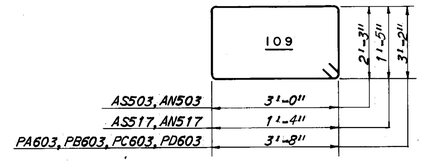
CUYAHOGA COUNTY
CUY-80-15.81

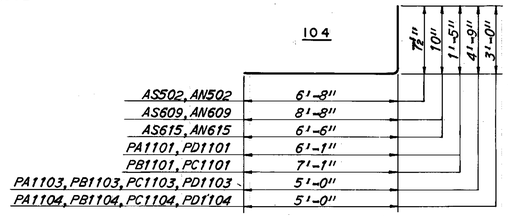
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
SOUTH ABUTMENT					
AS401	35	3'-7"	105		84
AS501	32	8'-3"	105		275
AS502	32	7'-2"	104		239
AS503	20	10'-11"	109		228
AS504	32	6'-4"	105		211
AS505	17	39'-3"	Str.		696
AS506	2	28'-9"	Str.		60
AS507	2	5'-9"	Str.		12
AS508	16	7'-3"	Str.		121
AS509	8	3'-6"	Str.		29
AS510	2	4'-9"	Str.		10
AS511	2	6'-0"	Str.		13
AS512	8	8'-3"	Str.		69
AS513	4	10'-9"	Str.		45
AS514	4	12'-0"	Str.		50
AS515	4	13'-6"	Str.		56
AS516	18	18'-6"	Str.		347
AS517	28	5'-11"	109		173
AS518	34	7'-3"	110		257
AS519	4	14'-1"	148		59
AS520	4	14'-1"	108		59
AS521	20	2'-6"	Str.		52
AS522	4	5'-6"	Str.		23
AS601	32	14'-4"	126		689
AS602	18	5'-9"	Str.		155
AS603	6	4'-6"	Str.		41
AS604	39	10'-11"	105		639
AS605	27	8'-1"	105		328
AS606	27	10'-5"	105		422
AS607	10	18'-2"	105		273
AS608	16	7'-0"	Str.		174
AS609	12	9'-4"	104		168
AS610	6	5'-3"	Str.		47
AS611	4	8'-11"	108		54
AS612	8	3'-6"	Str.		42
AS613	2	4'-9"	Str.		14
AS614	2	6'-0"	Str.		18
AS615	4	7'-2"	104		43
AS616	12	12'-9"	105		230
D801	18	5'-4"	175		256
AS801	14	22'-0"	Str.		822
AS802	8	10'-6"	Str.		224
AS803	2	18'-3"	108		97
AS804	2	18'-5"	148		98
		TOTAL WEIGHT	=		8002
NORTH ABUTMENT					
AN401	35	3'-7"	105		84
AN501	32	8'-3"	105		275
AN502	32	7'-2"	104		239
AN503	20	10'-11"	109		228
AN504	32	6'-4"	105		211
AN505	17	39'-3"	Str.		696
AN506	2	28'-9"	Str.		60
AN507	2	5'-9"	Str.		12
AN508	16	7'-0"	Str.		117
AN509	8	3'-6"	Str.		29
AN510	2	4'-6"	Str.		9
AN511	2	5'-6"	Str.		11
AN512	8	12'-6"	Str.		69
AN513	4	10'-9"	Str.		45
AN514	4	12'-0"	Str.		50
AN515	4	13'-6"	Str.		56
AN516	18	18'-6"	Str.		347
AN517	28	5'-11"	109		173
AN518	34	7'-3"	110		257
AN519	4	14'-1"	148		59
AN520	4	14'-1"	108		59
AN521	20	2'-6"	Str.		52
AN522	4	5'-6"	Str.		23
AN601	32	14'-4"	126		689
AN602	18	5'-9"	Str.		155
AN603	6	4'-6"	Str.		41
AN604	39	10'-11"	105		639
AN605	27	8'-1"	105		328
AN606	27	10'-5"	105		422
AN607	10	18'-2"	105		273
AN608	16	7'-0"	Str.		168
AN609	12	9'-4"	104		168
AN610	6	5'-3"	Str.		47
AN611	4	8'-5"	108		51
AN612	8	3'-6"	Str.		42
AN613	2	4'-6"	Str.		14
AN614	2	5'-6"	Str.		16
AN615	4	7'-2"	104		43
AN616	12	12'-9"	105		230
D801	18	5'-4"	175		256
AN801	14	22'-0"	Str.		822
AN802	8	10'-6"	Str.		224
AN803	2	18'-3"	108		97
AN804	2	18'-5"	148		98
		TOTAL WEIGHT	=		7984
PIER 1					
PA401	3	33'-4"	150		711
P401	3	2'-7½"	150		159
PA501	32	5'-7"	105		186
PA502	2	5'-4"	105		11
PA503	2	41'-10"	105		10
PA601	4	34'-3"	Str.		206
PA602	8	8'-10"	144		106
PA603	28	14'-5"	109		606
PA901	36	9'-6"	Str.		1163
PA902	33	7'-6"	Str.		842
PA1101	30	7'-3"	104		1156
PA1102	30	36'-6"	Str.		5818
PA1103	4	9'-6"	104		202
PA1104	4	7'-9"	104		165
PA1105	8	34'-3"	Str.		1456
PA1106	6	15'-3"	Str.		486
PA1107	4	8'-0"	Str.		170
PA1108	3	14'-0"	Str.		223
		TOTAL WEIGHT	=		13,517
PIER 2					
PB401	3	29'-9"	150		633
P401	3	2'-7½"	150		159
PB501	32	5'-7"	105		186
PB502	2	5'-4"	105		11
PB503	2	4'-10"	105		10
PB601	4	34'-3"	Str.		206
PB602	8	8'-10"	144		106
PB603	28	14'-5"	109		606
PB901	26	14'-0"	100		1238
PB902	33	11'-0"	100		1234
PB1101	30	8'-3"	104		1315
PB1102	30	32'-9"	Str.		5220
PB1103	4	9'-6"	104		202
PB1104	4	7'-9"	104		165
PB1105	8	34'-3"	Str.		1456
PB1106	6	15'-3"	Str.		486
PB1107	4	8'-0"	Str.		170
PB1108	3	14'-0"	Str.		223
		TOTAL WEIGHT	=		13,467
PIER 3					
PC401	3	28'-10½"	150		617
P403	3	2'-7½"	150		159
PC501	32	5'-7"	105		186
PC502	2	5'-4"	105		11
PC503	2	4'-10"	105		10
PD401	3	33'-0"	150		703
PD501	32	5'-7"	105		186
PD502	2	5'-4"	105		11
PD503	2	4'-10"	105		10
PD601	4	34'-3"	Str.		206
PD602	8	8'-10"	144		106
PD603	28	14'-5"	109		606
PD901	36	9'-6"	Str.		1163
PD902	33	7'-6"	Str.		842
PD1101	30	7'-3"	104		1156
PD1102	30	36'-0"	Str.		5738
PD1103	4	9'-6"	104		202
PD1104	4	7'-9"	104		165
PD1105	8	34'-3"	Str.		1456
PD1106	6	15'-3"	Str.		486
PD1107	4	8'-0"	Str.		170
PD1108	3	14'-0"	Str.		223
		TOTAL WEIGHT	=		13,676
SUPERSTRUCTURE					
S401	1189	30'-0"	Str.		23,828
S402	67	17'-0"	Str.		761
S403	92	16'-3"	Str.		999
S404	92	18'-3"	Str.		1122
S501	600	9'-11"	157		6206
S502	600	7'-1"	110		4433
S601	630	30'-0"	Str.		28,388
S602	42	26'-9"	Str.		1687
S603	769	39'-9"	Str.		45,913
S604	769	41'-2"	100		47,549
2 Light Pole Supports					512
		TOTAL WEIGHT	=		161,398

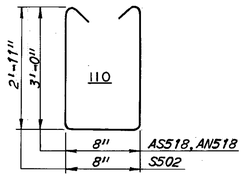
15,392

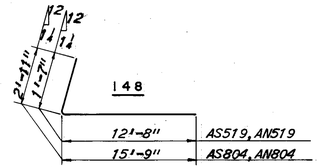
BENDING DIAGRAMS

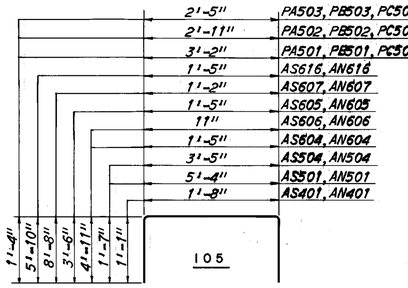


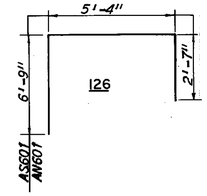


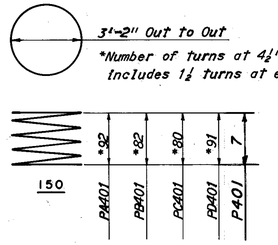




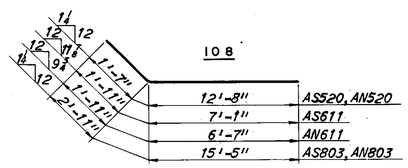


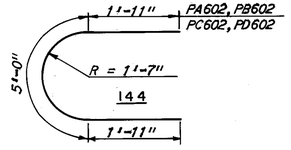


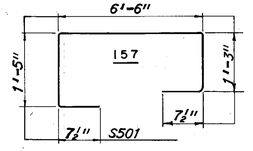


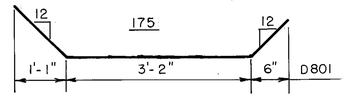


3'-2" Out to Out
*Number of turns at 4½" pitch includes 1½ turns at each end.









Note:
For Replacement Bar Schedule see BR. NO. CUY-80-1585, Sheet 24/24.
For Light Pole Reinforcement Schedule see Sheet CD2

SPIRAL REINFORCEMENT NOTE

The "Length" shown in the reinforcement schedule for the spiral bars is the distance from the top of the footing to the bottom of the Pier cap.

Four steel channels, tee or angle spacers, weighing approximately 0.80 lbs. per ft. of spacer shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers based on 0.80 lbs. per ft. will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

REV. 7-18-75

H.N.T.B. BR. NO. 37

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

REINFORCEMENT SCHEDULE

I-80 UNDER PORTAL DRIVE

BR. NO. CUY-80-1685 STA. 4+69.74 TO STA. 9+21.26

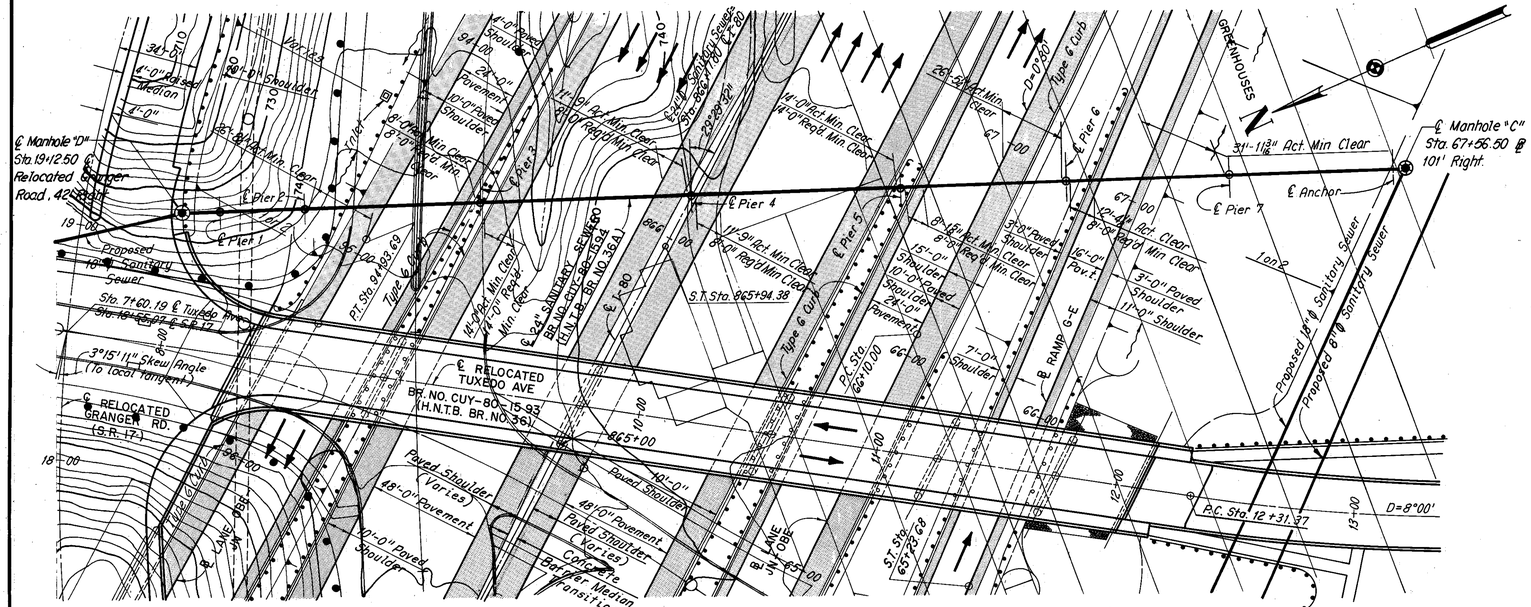
CUYAHOGA COUNTY OHIO

DRAWN WB	TRACED WB	CHECKED DHS	REVIEWED	REVISED
DATE 9-10-70	DATE 9-16-70	DATE 9-17-70	DATE	SHEET 8/8

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

370
392

CUYAHOGA COUNTY
CUY - 80-15.81



PLAN
Scale: 1"=30'

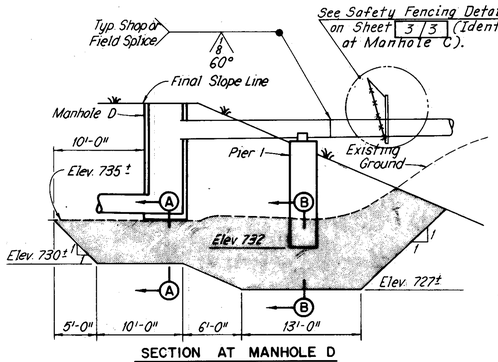
ELEVATION

Note:
Roadway excavation shall be completed to the finished spill-thru slopes before bridge construction is started.

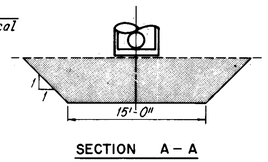
CONSTRUCTION PROCEDURE AT MANHOLE D AND PIER 1

1. Excavate shaded area to limits shown.
2. Backfill and compact to bottom of Manhole D.
3. Construct Manhole D.
4. Fill and compact to final slope line.
5. Excavate for and construct Pier 1.

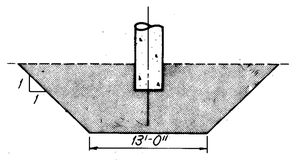
Excavation and backfill is included with Item 503 for payment.



SECTION AT MANHOLE D



SECTION A - A



SECTION B - B

PIPE NOTES:

The pipe shall be 24" O.D. with .500" walls, alloy steel meeting the requirements of Section 707.11, except as noted at Manhole "D".

Cambering the pipe is not required but any curved pipe shall be placed with the convex side up.

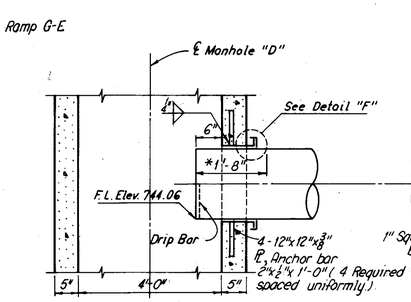
The interior walls of the pipe shall receive a primer and a $^{9}/_{32}$"$\pm^{1}/_{32}$" shop coating of coal tar enamel applied in one or two coats as recommended by the manufacturer.

The exterior walls of the underground portion of pipe shall receive a primer and a $^{3}/_{32}$"$\pm^{1}/_{32}$" shop coating of coal tar enamel, except as noted at Manhole "D". Coal tar enamel and primer shall meet the requirements, be tested and applied in accordance with American Waterworks Association Specification C-203. The coated pipe shall be handled and erected in accordance with this same AWWA specification. The shop coated pipe completely fabricated and erected shall be paid for at the unit price bid per pound for Item 513, Structural Steel.

The exterior walls of the exposed portion of the pipe shall be painted in accordance with Section 514.

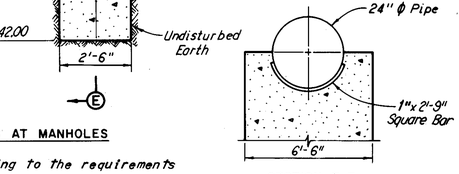
The pipe may be shop spliced as required by available pipe lengths. The location of shop splices shall be submitted to the Director for approval prior to ordering of materials.

All butt welds shall be tested by radiographic inspection.



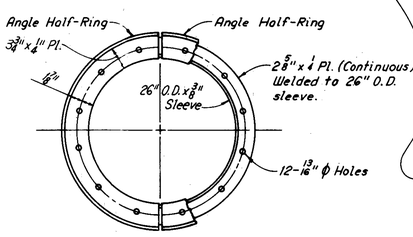
Note: Manholes, including packing ring assembly, are included with roadway quantities for payment.

SECTIONS AT MANHOLES

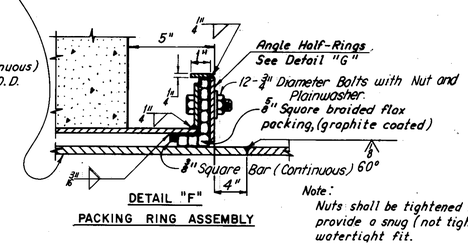


SECTION E-E

* Stainless steel pipe conforming to the requirements of ASTM A312, Grade TP347. The exterior wall of this segment shall not be painted.



DETAIL "G"



DETAIL "F"
PACKING RING ASSEMBLY

Note: Nuts shall be tightened to provide a snug (not tight) watertight fit.

DETAILS AT MANHOLES

ESTIMATED QUANTITIES

ITEM	TOTAL	UNIT	DESCRIPTION		
503	360	Cu. Yd.	Unclassified Excavation		
507	120	Lin. Ft.	Steel Piles, HP10x42		
509	7,709	Pounds	Reinforcing Steel		
511	19	Cu. Yd.	Class C Concrete, Columns		
511	10	Cu. Yd.	Class C Concrete, Footing and Anchor		
513	49,350	Pounds	Structural Steel		
Special	69	Lin. Ft.	Drilled Shafts		

Notes:
The piles at Pier 2 are HP10x42 with an estimated average pay length of 30 feet.
Trench excavation between manholes "C" and "D" is included with Item 503 for payment.

PROPOSED STRUCTURE

TYPE:	Continuous welded and seamless 24" O.D.x $^{1}/_{4}$" thick steel pipe with reinforced concrete substructure.
SPANS:	15'-0", 35'-0", 71'-5 1/4", 2 @ 87'-7 3/16" and 3 @ 69'-2"
LOADING:	Weight of full flow in 18" feeder pipe (80 lbs. per cu. ft.)
ALIGNMENT:	Tangent

H.N.T.B. BR. NO. 36A

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

SITE PLAN, QUANTITIES AND MANHOLE DETAILS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER 24" SANITARY SEWER

BR. NO. CUY-80-1594

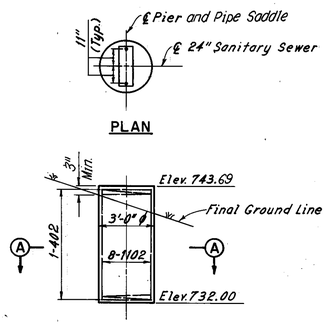
CUYAHOGA COUNTY OHIO

DRAWN CKB	TRACED DLA	CHECKED WV	REVIEWED	REVISED
DATE 3-27-69	DATE 4-1-69	DATE 5-7-70	DATE	SHEET 1 / 3

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

371/392

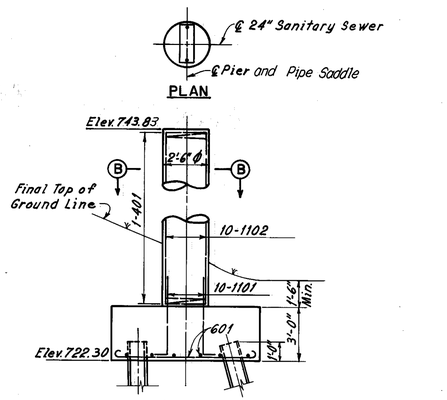
CUYAHOGA COUNTY
CUY-80-15.81



PLAN

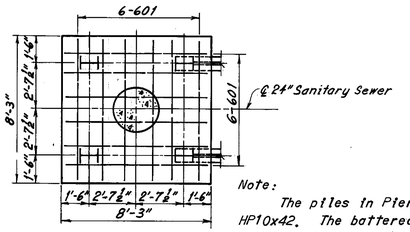
PIER 1 ELEVATION
(Pipe Saddle not shown)

Note: All of Pier 1 is included for payment with "Item Special, Drilled Shafts."



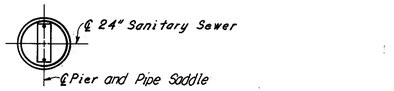
PLAN

ELEVATION
(Pipe Saddle not shown)

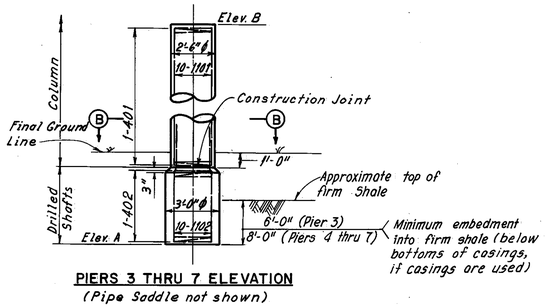


FOOTING PLAN
PIER 2

Note:
The piles in Pier 2 are HP10x42. The battered piles shall be inclined 3 in 12 in the direction shown.



PLAN



PIERS 3 THRU 7 ELEVATION
(Pipe Saddle not shown)

Note:
Reinforcing bar marks shall be prefixed as shown in the Reinforcement Schedule.

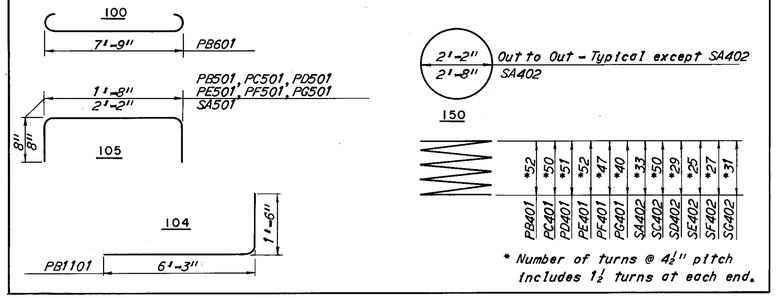
REINFORCEMENT SCHEDULE

MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
PIER 2					
PB401	1	18'-4"	150		291
PB501	4	2'-9"	105		11
PB601	12	9'-1"	100		164
PB1101	10	71'-6"	104.		398
PB1102	10	18'-3"	Str.		970
PIER 3					
PC401	1	17'-9"	150		280
PC501	4	2'-9"	105		11
PC1101	10	17'-9"	Str.		943
PIER 4					
PD401	1	18'-0"	150		286
PD501	4	2'-9"	105		11
PD1101	10	18'-0"	Str.		956
PIER 5					
PE401	1	18'-5"	150		291
PE501	4	2'-9"	105		11
PE1101	10	18'-3"	Str.		970
PIER 6					
PF401	1	16'-8"	150		263
PF501	4	2'-9"	105		11
PF1101	10	16'-6"	Str.		877
PIER 7					
PG401	1	13'-11"	150		223
PG501	4	2'-9"	105		11
PG1101	10	13'-9"	Str.		731
TOTAL WEIGHT =					7,709

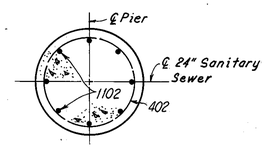
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
DRILLED SHAFTS					
PIER 1					
SA402	1	11'-3"	150		218
SA501	4	3'-3"	105		14
SA1102	8	111'-3"	Str.		478
PIER 3					
SC402	1	17'-9"	150		280
SC1102	10	211'-3"	Str.		1,129
PIER 4					
SD402	1	9'-10"	150		161
SD1102	10	131'-6"	Str.		717
PIER 5					
SE402	1	8'-4"	150		138
SE1102	10	121'-0"	Str.		638
PIER 6					
SF402	1	8'-10"	150		149
SF1102	10	121'-6"	Str.		664
PIER 7					
SG402	1	10'-4"	150		172
SG1102	10	141'-0"	Str.		744

The reinforcement in the Drilled Shafts is included for payment with "Item Special, Drilled Shafts".

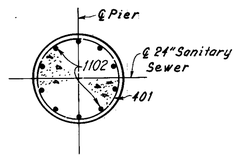
BENDING DIAGRAMS



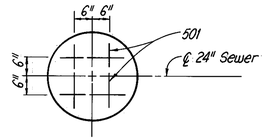
* Number of turns @ 4½" pitch includes 1½ turns at each end.



SECTION A-A



SECTION B-B
Bar marks shown for Pier 2
Others Piers similar.



TYPICAL BAR MAT AT TOP OF COLUMNS

PIER ELEVATIONS		
Pier	Elev. A	Elev. B
3	708.20	744.12
4	716.00	744.47
5	717.50	744.82
6	719.00	745.09
7	720.50	745.37

Note:
For Pipe Saddle Details see Sheet 3/3.

SPIRAL REINFORCEMENT NOTE:
The "Length" shown in the reinforcement schedule for the spiral bars is the length of the Coil.
Four steel channels, tees or angle spacers, weighing approximately 0.80 lbs. per linear foot of spacer, shall be provided for each spiral unit. They shall be equally spaced along the periphery of the coil. The number of pounds of these spacers, based on 0.80 lbs. per linear foot will be paid for as reinforcing steel and is included in the tabulated quantity of spiral bars.

H.N.T.B. BR.NO. 36A

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

PIER, DRILLED SHAFT DETAILS & REINFORCEMENT SCHEDULE

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER 24" SANITARY SEWER
BR.NO. CUY-80-1594

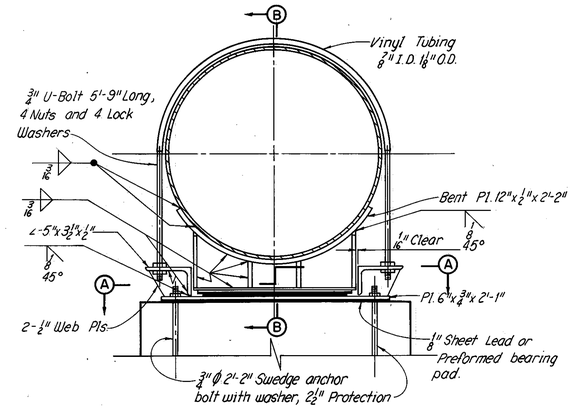
CUYAHOGA COUNTY OHIO

DRAWN M.C.B.	TRACED J.S.C.	CHECKED W.F.	REVIEWED	REVISED
DATE 1-28-70	DATE 5-6-70	DATE 5-7-70	DATE	SHEET 2/3

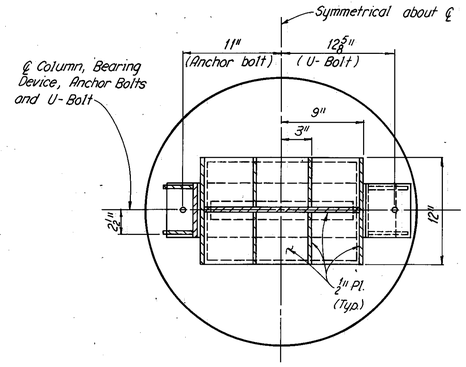
FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

372
392

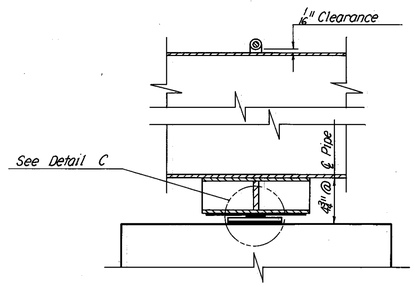
CUYAHOGA COUNTY
CUY- 80 - 15.81



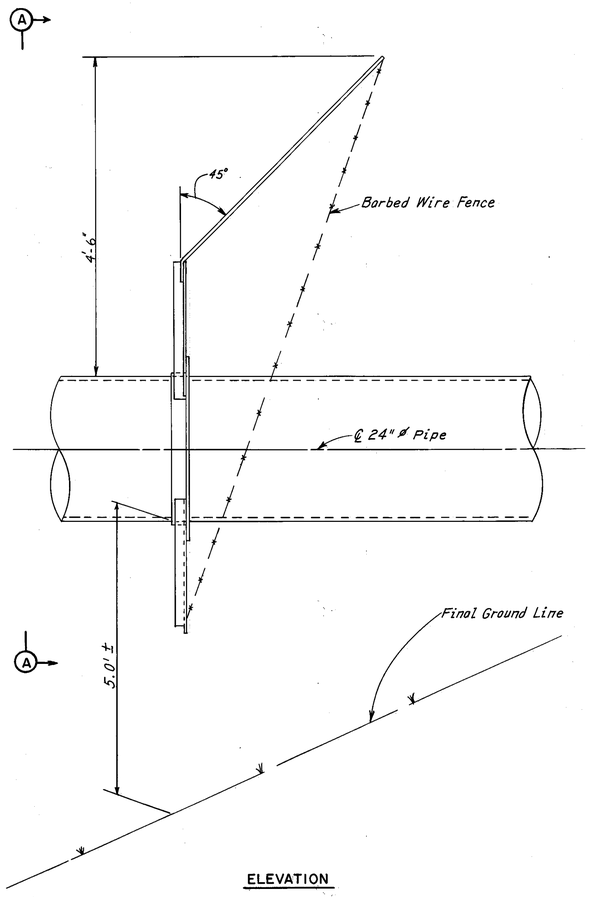
PIPE SADDLE DETAIL



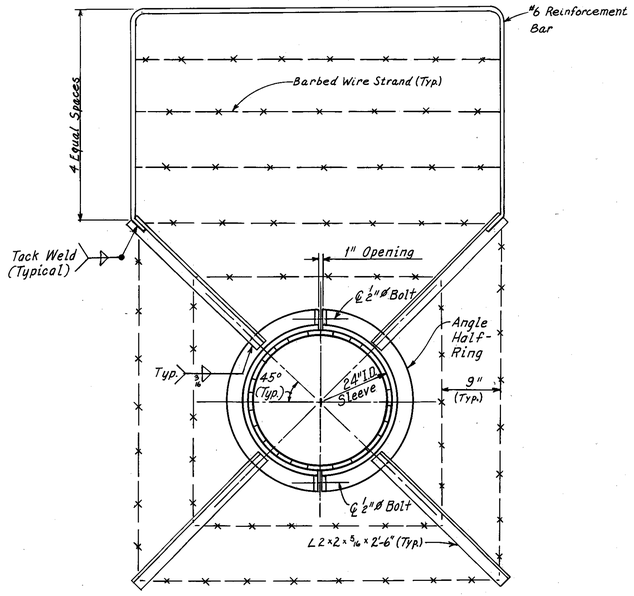
SECTION A-A



SECTION B-B

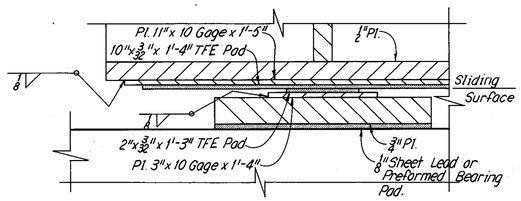


ELEVATION



SECTION A-A

Note: Barbed wire shall be field tack welded to frame as required.

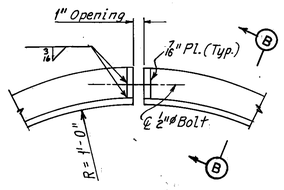


DETAIL C

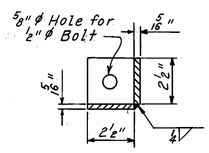
Note:
The sliding bearing pads shall be TFE (Tetrafluoroethylene) resin reinforced with 15% to 25% by weight of pulverized glass fibers. The following are physical property requirements:

Property	VALUE	ASTM Test
Tensile Strength @ 73°F.	1500 p.s.i. to 3000 p.s.i.	D-638-61T
Compressive Strength 1% Strain @ 73°F.	1190 p.s.i.	D-695
Hardness (Durometer Shore D)	55-65	D-1700-61

The TFE pads shall be shop bonded to the 10 Gage Pl. (ASTM-A588 Steel) with an adhesive suitable for temperature variations from -30°F. to 220°F. The surfaces to be bonded shall be prepared in accordance with the adhesive manufacturer's recommendation.



PIPE SLEEVE DETAIL



SECTION B-B

SAFETY FENCING

(Fencing Materials Shall Be Included with Item 513 for Payment)

H.N.T.B. BR. NO. 36A

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

PIPE SADDLE AND SAFETY FENCING DETAILS

I-80, LANE OBE-JN, LANE JN-OBE AND RAMP G-E UNDER 24" SANITARY SEWER

BR.NO.CUY-80-1594

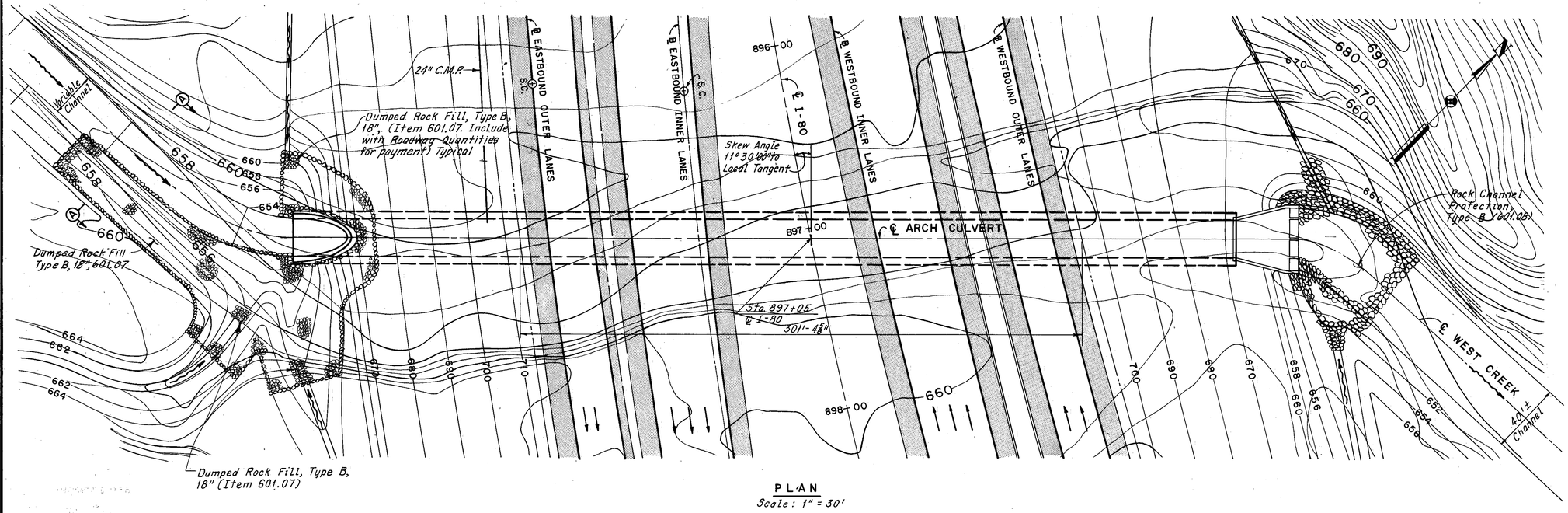
CUYAHOGA COUNTY OHIO

DRAWN CKB	TRACED JW	CHECKED DHS	REVIEWED	REVISED
DATE 4-24-72	DATE 5-1-72	DATE 5-5-72	DATE	SHEET 3 / 3

FED.RD. DIVISION	STATE	PROJECT	
2	OHIO		

373
392

CUYAHOGA COUNTY
CUY- 80-15.81



PLAN
Scale: 1" = 30'

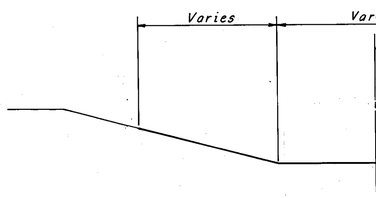
PROPOSED STRUCTURE

20'-0"x15'-0" Reinforced Concrete Arch Culvert with paved stream bed and stilling basin at outlet.

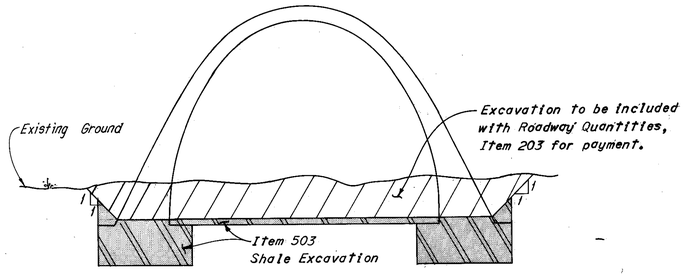
Drainage Area = 8.65 sq. mi.
Quantity (50 yrs.) = 4,120 c.f.s.
Headwater Elevation = 672.6

FOUNDATION NOTE

Arch culvert is founded in shale with an allowable bearing capacity of 10 tons per sq. ft.

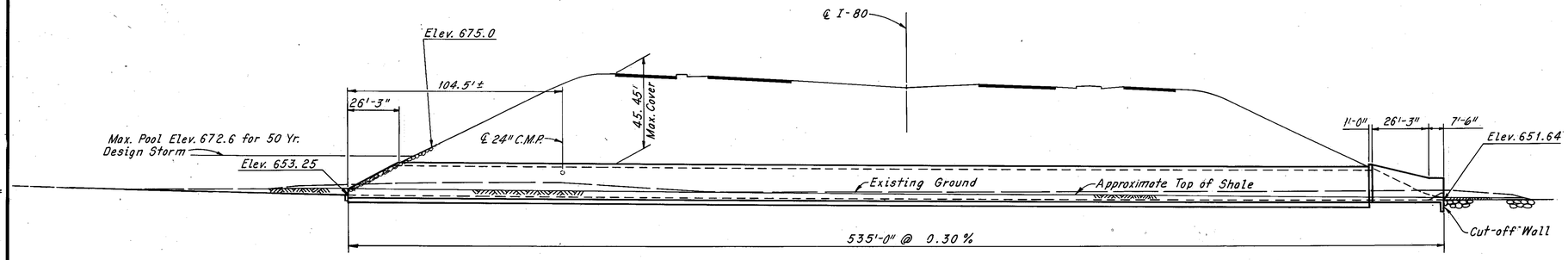


SECTION A-A



TYPICAL SECTION USED TO DETERMINE CULVERT EXCAVATION

ESTIMATED QUANTITIES			
ITEM	TOTAL	UNIT	DESCRIPTION
503	1160	Cu. Yd.	Shale Excavation
518	4500	Cu. Yd.	Granular Backfill
509	139,743	Pounds	Reinforcing Steel
511	1438	Cu. Yd.	Class "C" Concrete, Above Footings
511	828	Cu. Yd.	Class "C" Concrete, Footings
512	540	Sq. Yd.	Type "B" Waterproofing
601	1118	Sq. Yd.	6" Reinforced Concrete Slab, As Per Plan



ELEVATION
Scale: 1" = 30'-0"

H.N.T.B. 37A

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

SITE PLAN

I-80 OVER WEST CREEK

BR. NO. CUY- 80-1654 STA. 896+90.64 TO STA. 897+19.36

OHIO

DRAWN G.A.L.	TRACED C.P.	CHECKED W.H.S.	REVIEWED	REVISED
DATE 7-30-70	DATE 8-5-70	DATE 11-4-70	DATE	SHEET 1/6

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

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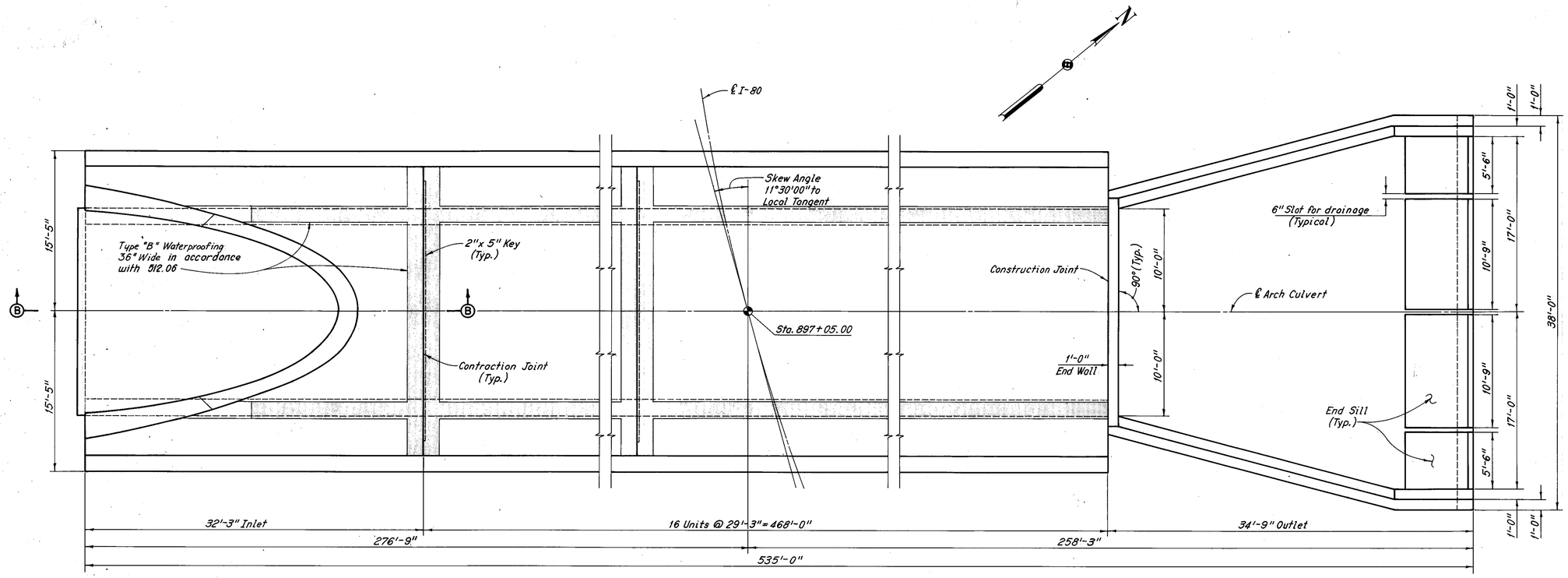
CUYAHOGA COUNTY
CUY-80-15.81

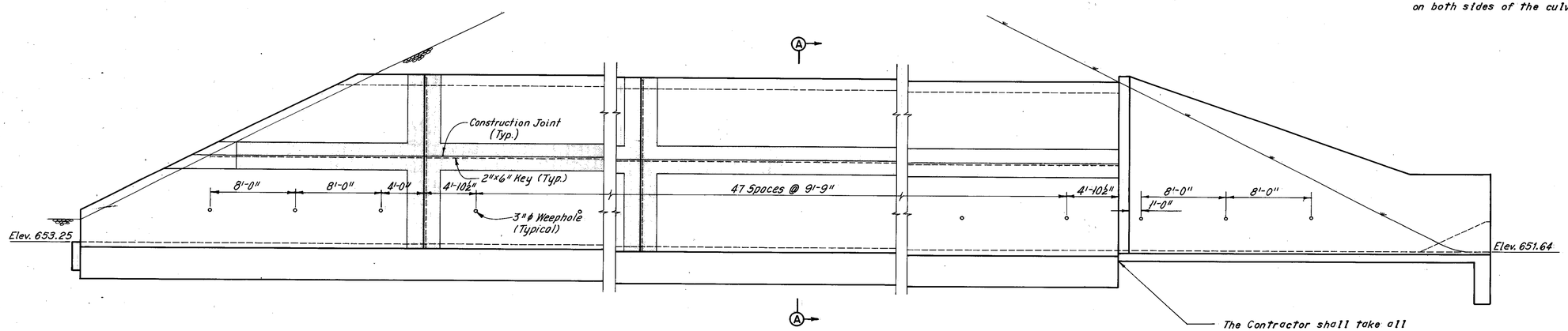


PLAN

Notes:

For Section A-A, see Sheet 3/6.
For Section B-B, see Sheet 4/6.

Backfill and embankment shall be placed simultaneously on both sides of the barrel. Backfill and embankment over the top of culvert shall be placed in horizontal layers symmetrically on both sides of the culvert.



ELEVATION

The Contractor shall take all necessary precautions to insure full bearing for outlet footing.

H.N.T.B. BR. NO. 37 A

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

PLAN AND ELEVATION

I-80 OVER WEST CREEK

BR. NO. CUY-80-1654 STA. 896+90.64
STA. 897+19.36

CUYAHOGA COUNTY OHIO

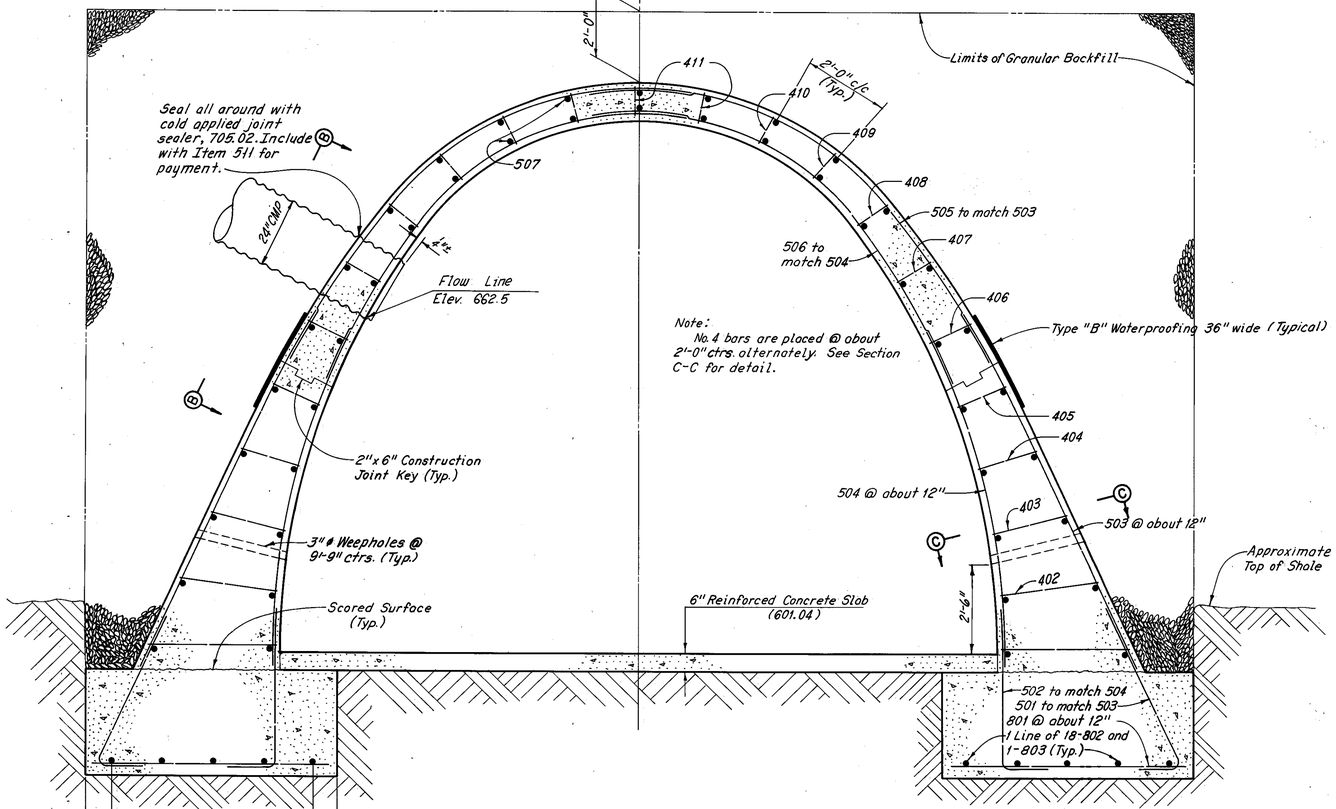
DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S.	D.L.R.	K.Y.H.		
DATE 10-29-70	DATE 10-30-70	DATE 11-10-70	DATE	SHEET 2/6

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

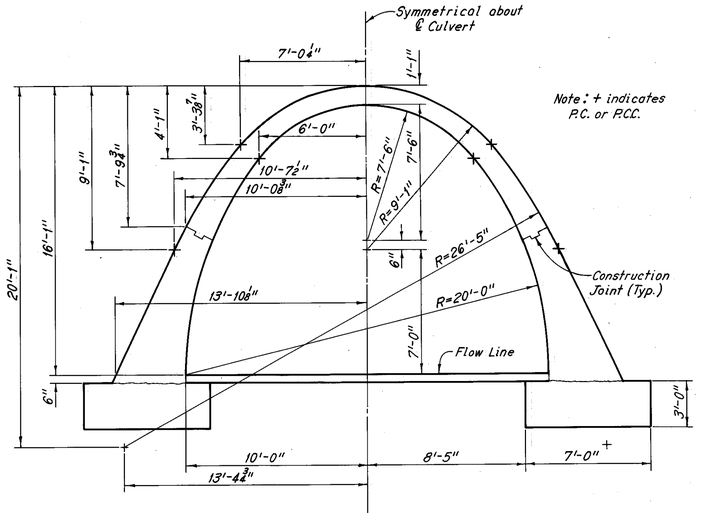
375
392

CUYAHOGA COUNTY
CUY-80-15.81

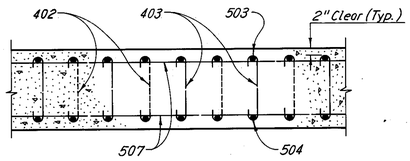
Note:
For Location of 24" CMP
See Site Plan, Sheet 1 6



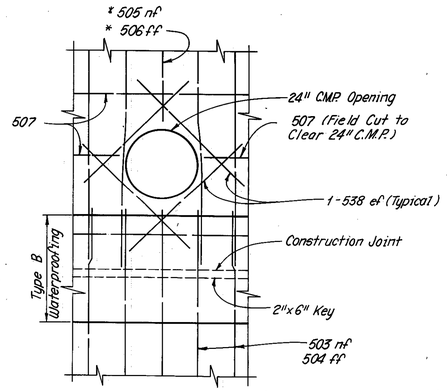
SECTION A-A



CULVERT GEOMETRY



SECTION C-C



VIEW B-B

Reinforcement required for one typical unit
(No. 8 bars in the Footings not included)

30-401	30-407	60-502
30-402	30-408	60-503
30-403	30-409	60-504
30-404	30-410	60-505
30-405	45-411	60-506
30-406	60-501	46-507

Note:
All reinforcing bar marks shall be prefixed A.

Notes:
For location of Section A-A see Sheet 2 6.

H.N.T.B. BR. NO. 37 A

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

TYPICAL SECTION

I-80 OVER WEST CREEK

BR. NO. CUY-80-1654 STA. 896+90.64
STA. 897+19.36

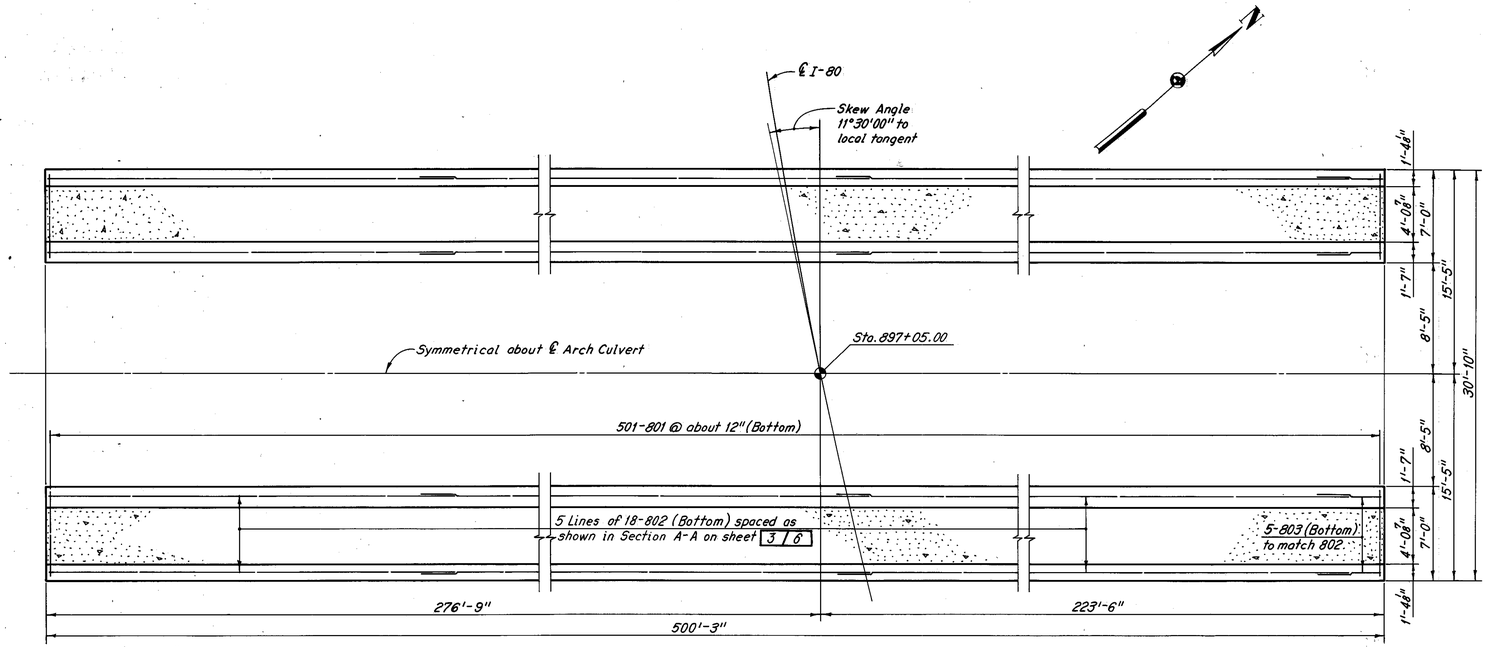
CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S.	D.L.R.	K.V.H.		
DATE 10-30-70	DATE 11-2-70	DATE 11-10-70	DATE	SHEET 3 6

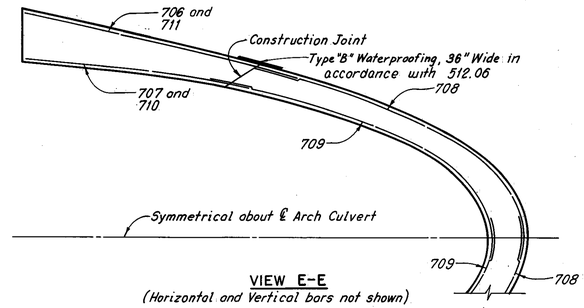
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO	"	

376
392

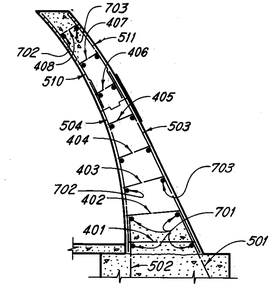
CUYAHOGA COUNTY
CUY-80-15.81



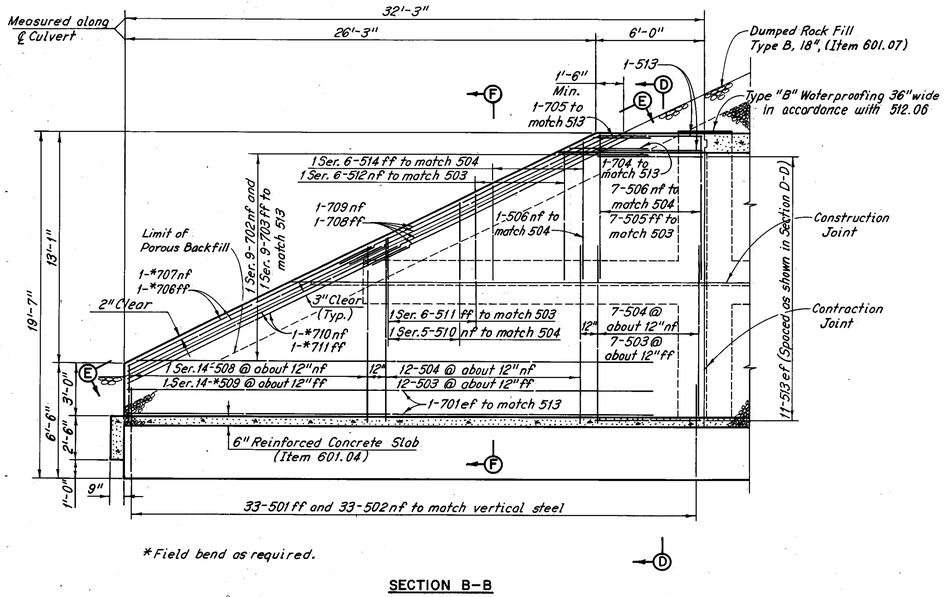
FOOTING PLAN
(Reinforced Concrete slab not shown)



VIEW E-E
(Horizontal and Vertical bars not shown)



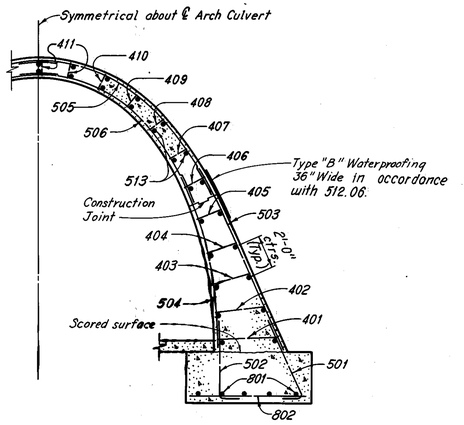
SECTION F-F



*Field bend as required.

SECTION B-B
(No. 4 tie bars and footing reinforcement not shown)

Note:
All reinforcing bar marks shall be prefixed A.



SECTION D-D

Notes: For location of Section B-B, see Sheet 2 / 6 .
The following abbreviations are used:
nf = near face
ff = far face
ef = each face

H.N.T.B. BR. NO. 37 A

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

FOOTING PLAN AND INLET DETAILS

I-80 OVER WEST CREEK

BR. NO. CUY-80-1654 STA. 896+90.64
STA. 897+19.36

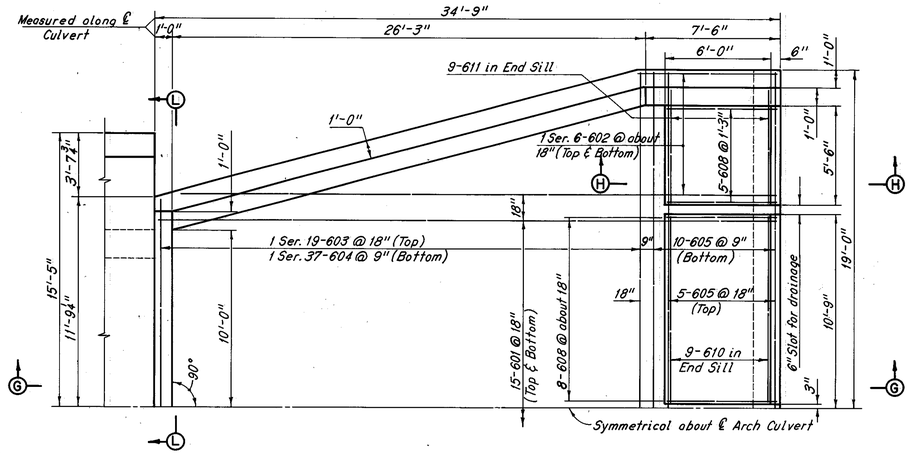
CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S.	D.L.A.	K.Y.H.		
DATE 11-2-70	DATE 11-4-70	DATE 11-10-70	DATE	SHEET 4 / 6

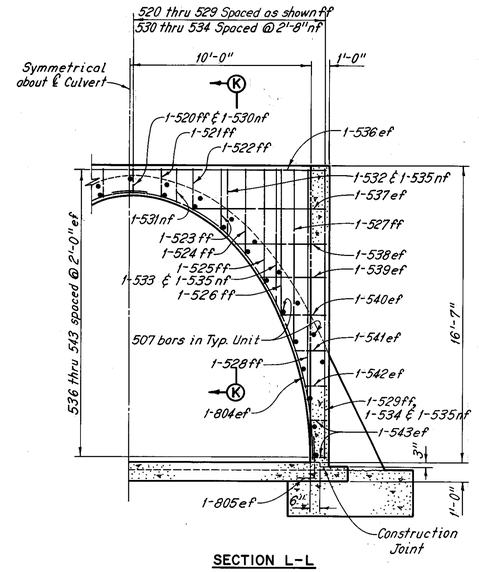
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

377
392

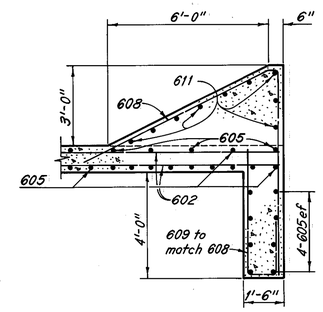
CUYAHOGA COUNTY
CUY-80-15.81



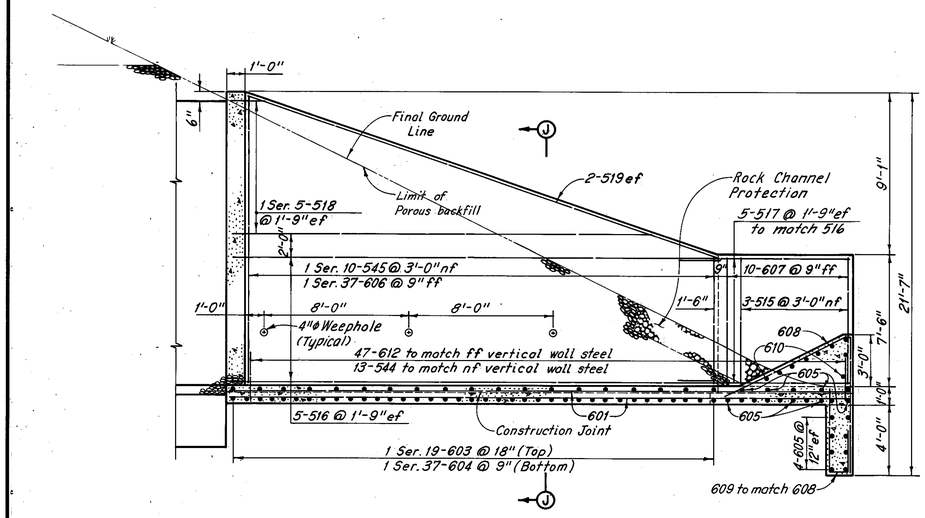
PART OUTLET PLAN



SECTION L-L

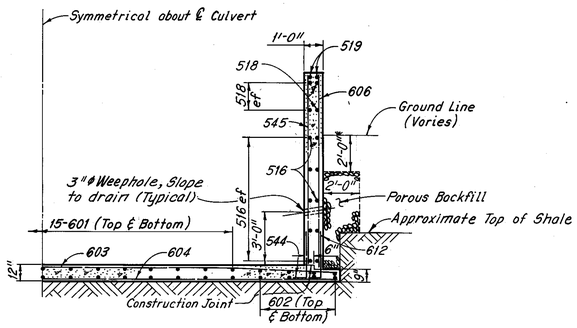


SECTION H-H

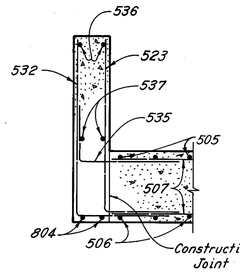


SECTION G-G

Note:
All reinforcing bar marks shall be prefixed A.



SECTION J-J



SECTION K-K

Note:
The following abbreviations are used:
nf = near face
ff = far face
ef = each face

H.N.T.B. BR. NO. 37 A

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

OUTLET DETAILS

I-80 OVER WEST CREEK

BR. NO. CUY-80-1654 STA. 896+90.64
STA. 897+19.36

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
D.H.S.	D.L.R.	K.Y.H.		
DATE 11-3-70	DATE 11-6-70	DATE 11-12-70	DATE	SHEET 5/6

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

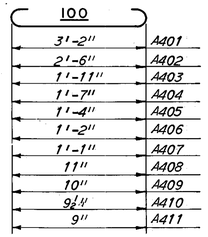
(378) (392)

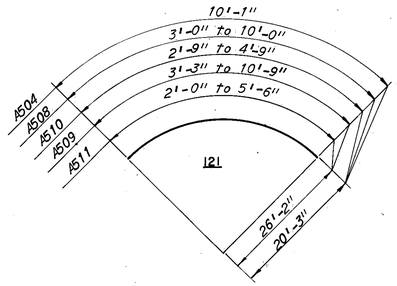
CUYAHOGA COUNTY
CUY-80-15.81

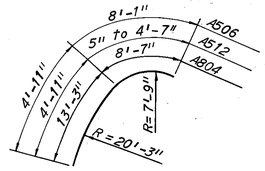
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
16 TYPICAL UNITS					
A401	480	4'-2"	100		1336
A402	480	3'-6"	100		1122
A403	480	2'-11"	100		935
A404	480	2'-7"	100		828
A405	480	2'-4"	100		748
A406	480	2'-2"	100		695
A407	480	2'-1"	100		668
A408	480	1'-11"	100		615
A409	480	1'-10"	100		588
A410	480	1'-9½"	100		575
A411	720	1'-9"	100		842
A501	960	5'-4"	148		5340
A502	960	5'-1"	157		5090
A503	960	11'-4"	133		11,348
A504	960	10'-1"	121		10,096
A505	960	14'-0"	139		14,018
A506	960	13'-0"	139		13,017
A507	736	28'-9"	Str.		22,070
INLET UNIT					
A401	34	4'-2"	100		95
A402	32	3'-6"	100		75
A403	32	2'-11"	100		62
A404	28	2'-7"	100		45
A405	24	2'-4"	100		37
A406	20	2'-2"	100		29
A407	18	2'-1"	100		25
A408	12	1'-11"	100		18
A409	12	1'-10"	100		15
A410	8	1'-9½"	100		10
A411	11	1'-9"	100		13
A501	66	5'-4"	148		367
A502	66	5'-1"	157		350
A503	38	11'-4"	133		449
A504	38	10'-1"	121		400
A505	14	14'-0"	139		204
A506	16	13'-0"	139		217
A508	2 Ser. 14	3'-0" 10'-0"	121	6¼"	190
A509	2 Ser. 14	3'-3" 10'-9"	121	6⅝"	204
A510	2 Ser. 5	2'-9" 11'-9"	121	6"	39
A511	2 Ser. 6	2'-0" 5'-6"	121	8⅜"	47
A512	2 Ser. 6	5'-4" 9'-6"	139	10"	93
A513	46	5'-0"	Str.		240
A514	2 Ser. 6	5'-6" 10'-2"	139	11¾"	98
A701	8	29'-0"	Str.		474
A702	2 Ser. 9	5'-0" 27'-9"	Str.	2'-10⅝"	602
A703	2 Ser. 9	3'-6" 27'-6"	Str.	3'-0"	570
A704	1	4'-3"	Str.		9
A705	1	3'-0"	Str.		6
A706	4	15'-3"	Str.		125
A707	4	14'-0"	Str.		114
A708	8	22'-0"	158		360
A709	8	22'-3"	158		364
A710	4	15'-6"	Str.		127
A711	4	16'-9"	Str.		137

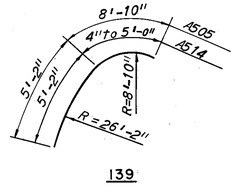
MARK	NO.	LENGTH	TYPE	SER. INCR.	WEIGHT (LBS.)
OUTLET UNIT					
A515	6	1'-0"	Str.		44
A516	20	27'-6"	Str.		574
A517	20	9'-0"	108		188
A518	4 Ser. 5	2'-0" 23'-6"	Str.	5'-4½"	266
A519	4	28'-6"	Str.		119
A520	1	3'-4"	104		3
A521	2	3'-6"	104		7
A522	2	4'-1"	104		8
A523	2	5'-1"	104		11
A524	2	6'-7"	104		14
A525	2	8'-1"	104		17
A526	2	9'-10"	104		20
A527	2	11'-7"	104		24
A528	2	15'-1"	104		31
A529	2	18'-7"	104		39
A530	1	4'-4"	104		5
A531	2	4'-9"	104		10
A532	2	6'-4"	104		13
A533	2	10'-5"	104		22
A534	2	19'-7"	104		41
A535	6	4'-3"	104		27
A536	2	21'-6"	Str.		45
A537	4	7'-3"	Str.		30
A538	12	4'-9"	Str.		60
A539	4	3'-6"	Str.		15
A540	4	2'-6"	Str.		10
A541	4	1'-6"	Str.		6
A542	4	1'-0"	Str.		4
A543	8	9"	Str.		6
A544	26	3'-0"	104		81
A545	2 Ser. 10	7'-0" 16'-0"	Str.	1'-0"	240
A601	30	34'-3"	Str.		1543
A602	4 Ser. 6	7'-3" 33'-0"	Str.	5'-1¾"	725
A603	1 Ser. 19	23'-0" 37'-6"	Str.	9⅜"	863
A604	1 Ser. 37	23'-0" 37'-6"	Str.	4⅜"	1681
A605	23	37'-6"	Str.		1295
A606	2 Ser. 37	7'-0" 16'-0"	Str.	3"	1278
A607	20	7'-0"	Str.		210
A608	26	15'-3"	124		595
A609	26	7'-5"	126		290
A610	18	10'-0"	Str.		270
A611	18	6'-0"	Str.		162
A612	94	3'-6"	104		494
A804	4	21'-10"	139		233
A805	4	4'-6"	159		48
FOOTING					
A801	1002	6'-6"	Str.		17,390
A802	180	30'-0"	Str.		14,418
A803	10	4'-9"	Str.		127
ARCH CULVERT		TOTAL WEIGHT	=		139,743

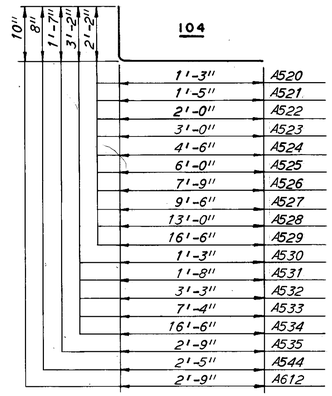
BENDING DIAGRAMS

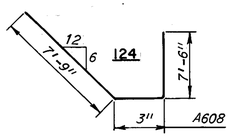


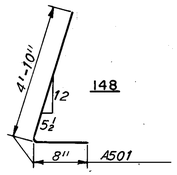


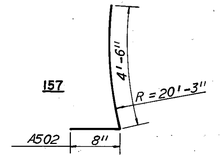


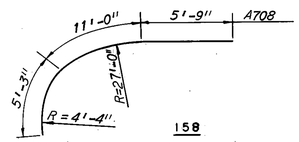


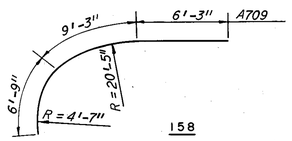


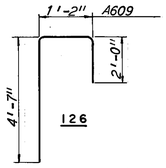


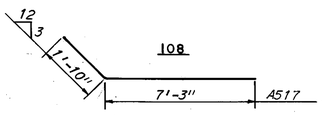


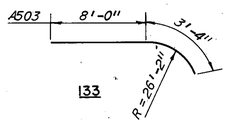


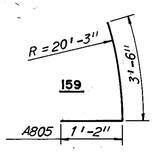












Note:
For Replacement Bar Schedule see Br. No. CUY-80-1585, Sheet 24/24.

H.N.T.B. BR. NO. 37 A

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

REINFORCEMENT SCHEDULE
ARCH CULVERT
I-80 OVER WEST CREEK

BR. NO. CUY-80-1654
STA. 896+90.64
STA. 897+19.36

CUYAHOGA COUNTY OHIO

DRAWN	TRACED	CHECKED	REVIEWED	REVISED
Y.H.	A.C.	DHS		
DATE 11-25-70	DATE 11-30-70	DATE 11-30-70	DATE	SHEET 6/6