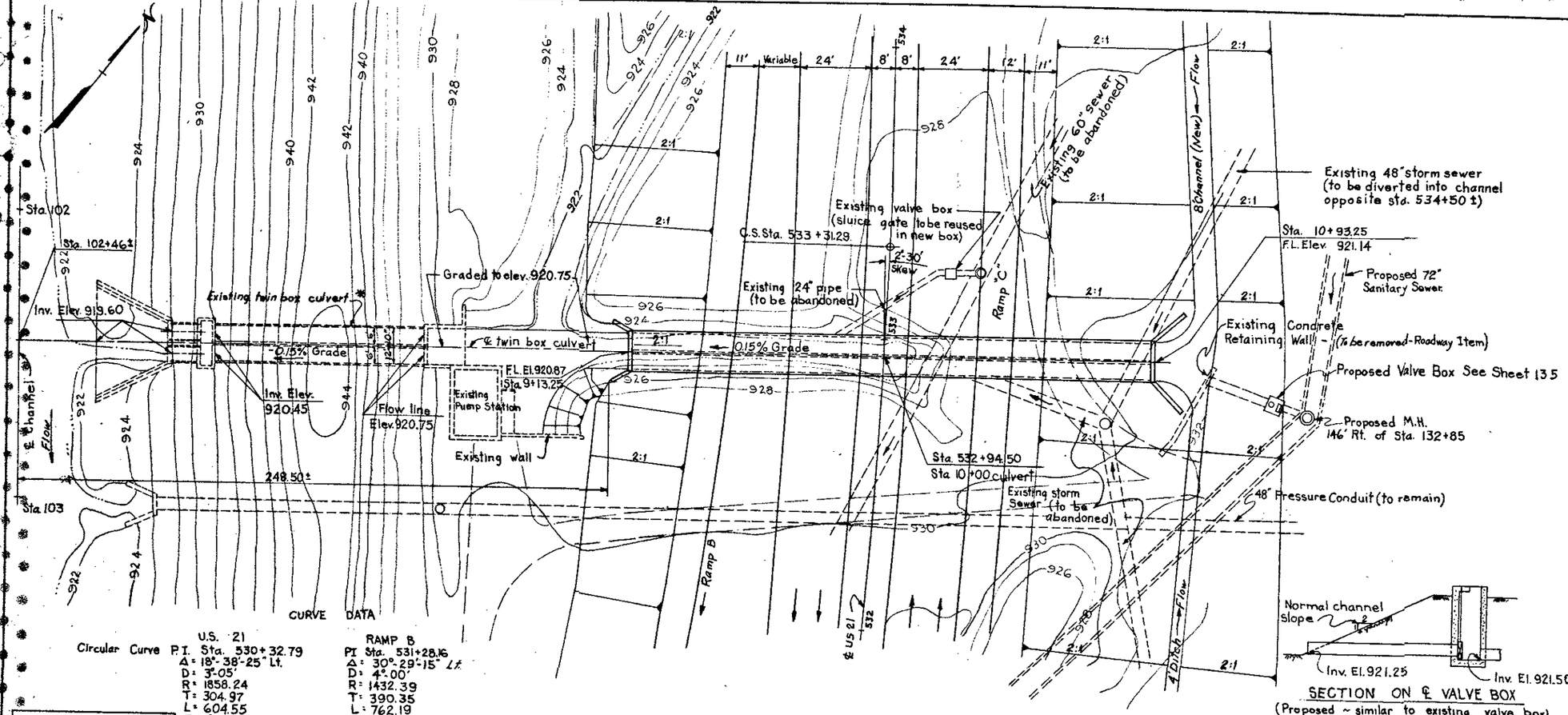
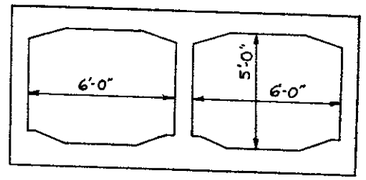
FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

200

STARK COUNTY
STA-21-8.40





TYPICAL SECTION
TWIN BOX CULVERT
(Proposed)

SECTION ON ℄ VALVE BOX
(Proposed ~ similar to existing valve box)

EXISTING STRUCTURE

LOCATION: Under levee; Approx. 145' downstream
TYPE: Twin Box Culvert
SPAN: 2 cells @ 6' span x 5' height x 68.75' long
SKEW: None
DESCRIPTION: Box Culvert operated by means of sluice gates at discharge well and by means of discharge pipes from the Arch. Avenue pump station.

PROPOSED STRUCTURE

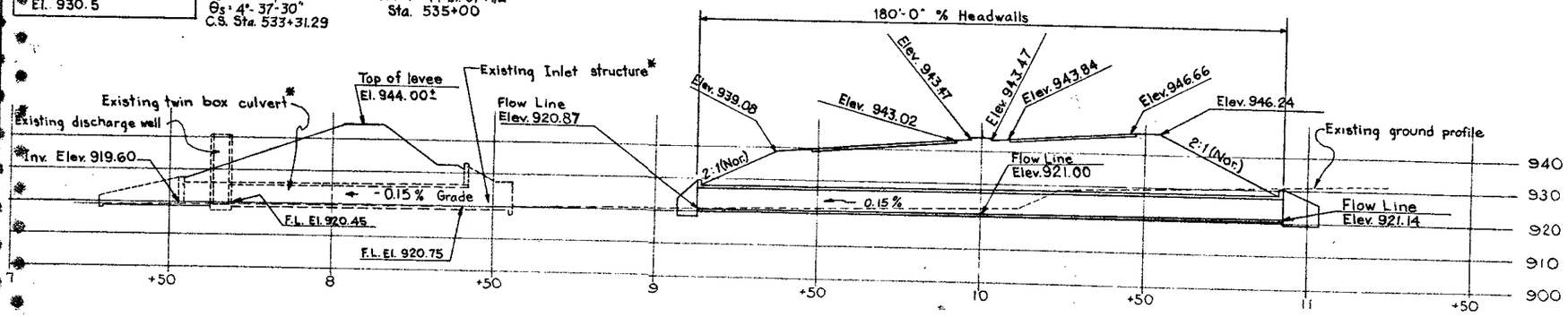
TYPE: Twin reinforced concrete box culvert
SIZE: 2 cells @ 6' span x 5' height x 180' long % headwalls
SKEW: 2°-30' Rt. Fwd.
ALIGNMENT: Tangent
LOADING: CF = 2000 (57)

CURVE DATA

U.S. 21
Circular Curve P.I. Sta. 530+32.79
Δ = 18°-38'-25" Lt.
D = 3°-05'
R = 1858.24
T = 304.97
L = 604.55
E = 24.85
L_s = 300'
θ_s = 4°-37'-30"
C.S. Sta. 533+31.29

RAMP B
PI Sta. 531+28.16
Δ = 30°-29'-15" Lt.
D = 4°-00'
R = 1432.39
T = 390.35
L = 762.19
E = 52.23
P.T. is 44' Lt. of M/L Sta. 535+00

High water = Jan. 1959
El. 930.5



PROFILE ON ℄ BOX CULVERT

M.L. U.S 21 GRADE DATA

+1.00 % Δ -1.29 %
P.I. Sta. 530+70
Elev. 946.45
V.C. = 400'

RAMP B

-3.00 % Δ -0.89 %
P.I. Sta. 529+50
Elev. 945.25
V.C. = 300'

* Details of existing facilities taken from construction drawings No. 027i-PM-51.2 and No. 027i-PM-51.4 of the Tuscarawas River Local Protection Project, Massillon, Ohio; Corps of Engineers, Huntington, W. Va.

MICHAEL BAKER JR., CONSULTING ENGINEERS
ROCHESTER, PENNSYLVANIA

SITE PLAN
TWIN 6'x5' BOX CULVERT
(MINOR STRUCTURE)
US 21 OVER INLET CHANNEL
TO ARCH AVENUE PUMP STATION
Sta 532+94.50

PRESENT TOPOGRAPHY		PROPOSED WORK			
SURVEYED	DRAWN	DESIGNED	DRAWN	CHECKED	REVIEWED
Aerial Survey	S.G.	BA	GW	GV	L.G.H. 9-5-61

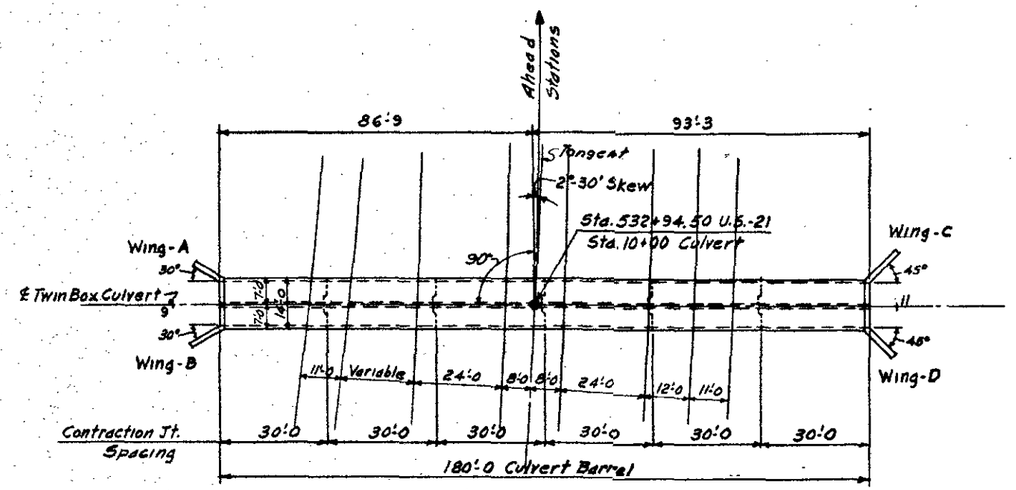
NORTH OF STA 21-1009

STA-21-1035

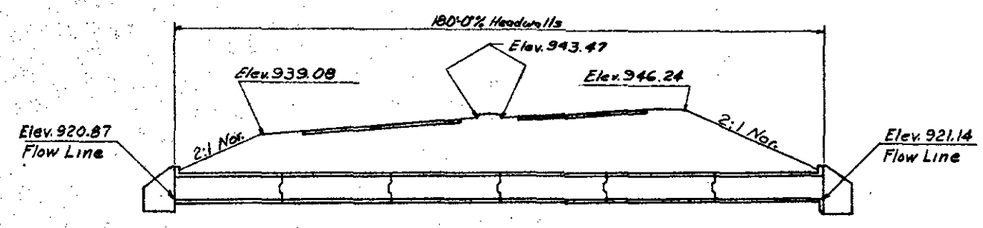
FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

201

STARK COUNTY
STA-21-8.40



PLAN



LONGITUDINAL SECTION

Estimated Quantities: Computed by D.N.D. 8-18-67
Checked by DWP 8-22-67

Quantities carried to Sh. No. 13

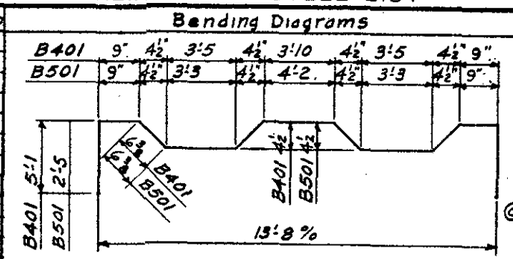
ESTIMATED QUANTITIES

Item	Total	Unit	Description	Box	Wings	Gen.
503	L.S.		Cofferdams, cribs, and sheeting			L.S.
503	660	Cu.Yds.	Unclassified excavation	562	98	
509	28401	Lbs.	Reinforcing Steel	27496	905	
511	226	Cu.Yds.	Class "C" Concrete	226		
511	25	Cu.Yds.	Class "E" Concrete		25	
512	38	Lin.Ft.	Premolded Sealing Strip		38	

REINFORCING STEEL LIST

Mark	No.	Length	Weight	Shp
B601	12	13'-6	243	S
B501	358	18'-11	7063	B
B502	40	5'-11	247	B
B503	20	6'-10	143	B
B504	11	13'-8	157	S
B505	26	5'-0	136	B
B506	40	3'-5	143	B
B507	20	4'-2	87	B
B508	13	2'-7	46	B
B509	422	8'-3"	3631	S
B401	358	24'-2	5779	B
B402	504	6'-6	2188	B
B403	359	29'-8	7114	S
B404	19	29'-4	372	S
B405	4	8'-0	21	S
B406	10	2'-11	19	B
B407	10	2'-3	15	B
B408	4	2'-6	7	B
B409	4	2'-5	6	B
B410	10	3'-7	24	B
B411	10	2'-3	15	B
B412	4	2'-10	8	B
B413	4	2'-5	6	B
B414	4	9'-10	26	S

Bending Diagrams

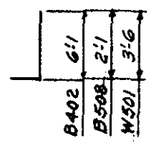


Mark	No.	Length	Weight	Shp
W501	18	4'-0	75	B
W502	18	3'-0	56	S
W503	18	2'-6	47	S
W504	5	6'-9	33	S
W505	6	6'-2	39	S
W506	2	4'-1	9	S
W507	8	8'-10	74	S
W508	8	7'-2	60	S
W509	25#3	4'-5⅝ 7'-8	38	S
W510	5	8'-9	43	S
W511	6	8'-2	51	S
W512	4	5'-6	23	S
W513	25#4	4'-8½ 7'-11	52	S
W514	2	8'-9	18	S
W515	6	9'-2	57	S
W516	2	6'-9	14	S
W517	25#4	5'-0½ 8'-0	54	S
W518	5	7'-3	38	S
W519	2	7'-8	16	S
W520	25#3	5'-0½ 7'-9	40	S
W521	5	9'-3	48	S
W522	2	9'-6	20	S

REPLACEMENT BARS

RE601	1	5'-11	—	S
RE501	1	5'-7	—	S
RE401	1	5'-3	—	S

ⓐ = Vary each bar by 1'-7½
ⓑ = " " " by 1'-1
ⓒ = " " " by 1'-0
ⓓ = " " " by 1'-4½



- FOUNDATION material of approximately uniform bearing capacity is contemplated. Spots of soft earth shall be removed and be replaced with throughly compacted granular material.
- EMBANKMENT shall be placed symmetrically on both sides of the culvert after the top slab is in place. Embankment over the barrel shall be placed in horizontal layers simultaneously with that on each side of culvert.

GENERAL NOTES

- DESIGN SPECIFICATIONS: This structure conforms to the requirements of "Design Specifications for Highway Structures" of the State of Ohio, Department of Highways, dated 9-1-57, together with current revisions thereof.
- BAR SIZE is indicated in the bar mark. The first digit where three digits are used indicates the bar size number. For example, BG01 is a number 6 size bar.
- 25 of 3 means 2 sets of 3 bars each.
- Concrete for box wall and slab shall be Class "C", for wings and footings, Class "E".
- DESIGN LOADING: C.F. = 2000 (57)
  Concrete, Class "C" - Basic unit stress, 1,333 p.s.i.
  Concrete, Class "E" - Basic unit stress, 1,133 p.s.i.
  Reinforcing Steel - A.S.T.M. A15, A16, A160, Deformed, Intermediate or hard grade. Basic unit stress 20,000 p.s.i.

MICHAEL BAKER JR., CONSULTING ENGINEERS
ROCHESTER, PENNSYLVANIA

GENERAL PLAN & ELEVATION - EST. QUANTITIES & STEEL LIST
TWIN 6 x 5 BOX CULVERT
UNDER US-21
Sta. 532+94.50

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
DWP	TP		GV	L.G.H. 9-5-67	

FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

202

STARK COUNTY
STA-21-8.40

WING - A

30'-0 Typical End Panel
(Panel-A 2-Panels Req.)
57-B401 @ 6"± Top Slab
57-B501 @ 6"± Bott. Slab

30'-0 Typical Interior Panel
(4-Panels Required)
61-B401 @ 6"± Top Slab
61-B501 @ 6"± Bott. Slab

30'-0
Panel-A
B414

6-B403
5-B403 Top & Bott. Slab
21-B402 @ 1'-6"±
21-B402 @ 1'-6"± (E.F.)
2-B502 Top & Bott. Slabs
4-B404 - Outlet panel
4-B403 - Inlet panel
5-B403 Top & Bott. Slab
21-B402 @ 1'-6"±

For Inlet Panel
5-B403 Top Slab
6-B403 Bott Slab

Flow

5-B404 Top Slab
6-B404 Bott. Slab
For Outlet Panel

3-B601 Top & Bott. Slab

2-B503 Top & Bott. Slabs
21-B402 @ 1'-6"± (E.F.)
4-B403
15-B403 Top Slab
16-B403 Bott. Slab
21-B402 @ 1'-6"±

5-B406 @ 1'-6"±
5-B407 @ 1'-6"±
2-B408 in Headwall
2-B409 in Headwall

3-B601 Top & Bott. Slab
13-B501 @ 12"±

℄ Culvert
Flow

WING - B

WING - C

WING - D

Keyed Contraction Jt.

15 of 4 - W517 (E.F.)
2-W522
2-W516
2-W501
2-W515
5-W503
2-W515
2-W521
3-W521
5-W502
5-W501 @ 2'-5½"± (F.F.)
El. 917.64

ELEVATION WING - C

PART PLAN

El. 928.53
15 of 3 - W509 (E.F.)
2-W508
2-W506
2-W507
2-W505
4-W503
2-W504
3-W504
4-W502
4-W501

Keyed Contraction Jt.

15 of 4 - W513 (E.F.)
2-W514
2-W512
2-W507
2-W511
5-W503
2-W511
2-W510
3-W510
5-W502
5-W501

Elev. 917.37

ELEVATION WING - A

ELEVATION WING - B

El. 928.80
15 of 3 - W520 (E.F.)
2-W519
2-W512
2-W507
2-W508
4-W503
2-W508
2-W518
3-W518
El. 917.64
4-W502
4-W501 @ 2'-5"± (F.F.)

Keyed Construction Jt.

ELEVATION WING - D

14'-0 % Box
8" 6'-0 Opening 8" 6'-0 Opening 8"
15-B403
Optional Constr. Jt.
B401 @ 6"±
B509 @ 12"
B402 @ 1'-6"±
B402 @ 1'-6"± (E.F.)
4-B403 (E.F.)
6-B403 (E.F.) (Typ. Both Sides)
3" ℄ Weepholes @ 8'-0" %
Construction Jt.
B501 @ 6"±
B402 @ 1'-6"±
16-B403

SECTION - AA

Exposed Face
1⅝" x 5⅝" Key Full Height
12" x ½" premolded Sealing Strip in 13" x ¾" Recess

CONTRACTION JOINT AT WINGS

2-B413
2-B412
in Headwall
5-B411 @ 1'-6"±
5-B410 @ 1'-6"±
B405

13-B505 @ 12"±
B504
B403 & B404
1'-0 Rad.
3-B601
B401 @ 6"±

HEADWALL DETAILS
Underside Curved at Entrance Only

B501 @ 6"±
3-B601
13-B508 @ 12"±
B504

CUT-OFF WALL DETAIL
At Entrance Only

W501
W503
W502
3" clear
Varies

SECTION B-B
TYPICAL WING SECTION

Contraction Jt.
2-B507
2" clear
2-B506

ELEVATION OF CULVERT BARREL

MICHAEL BAKER JR., CONSULTING ENGINEERS
ROCHESTER, PENNSYLVANIA

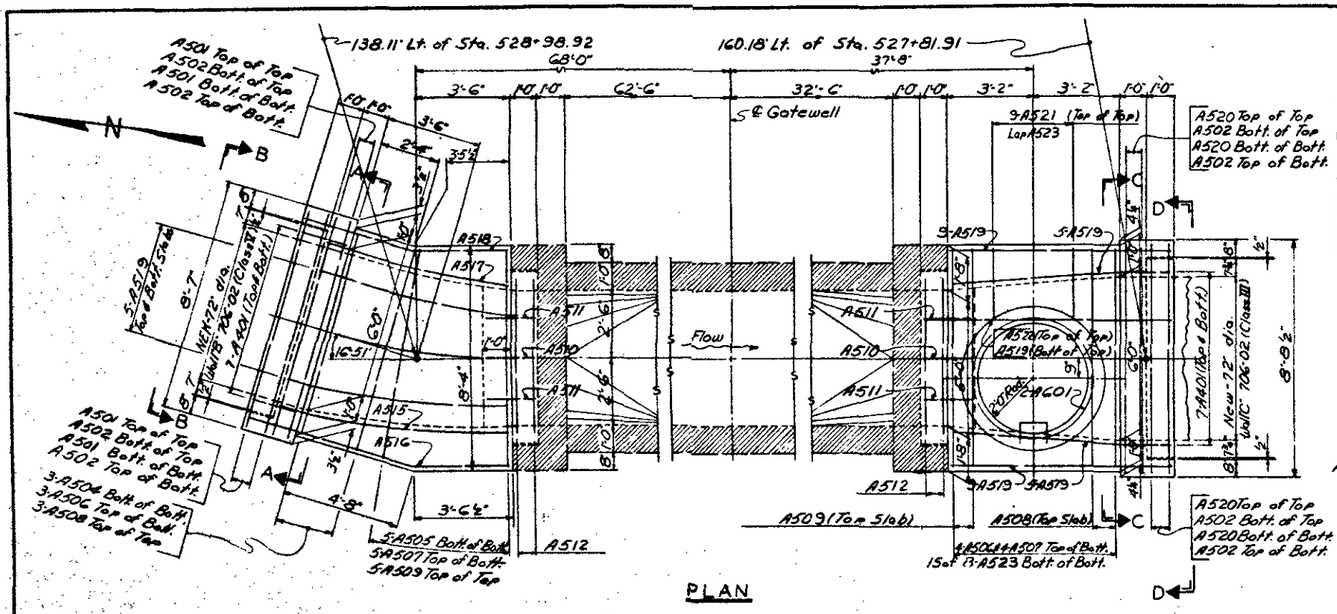
DETAILS
TWIN 6' x 5' BOX CULVERT
UNDER US-21 1027
Sta. 532+94.50

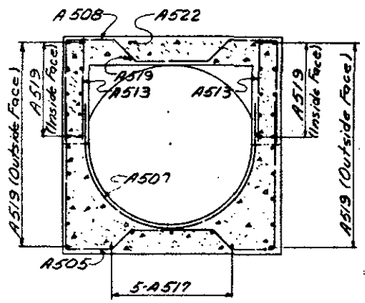
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
DWP	TP		GV	L.G.H. 9-5-67	

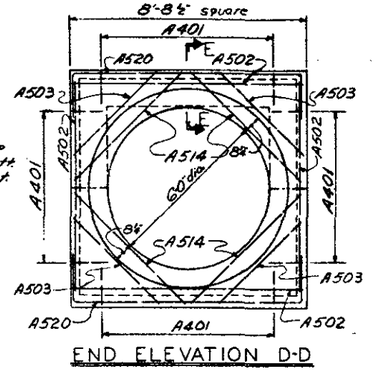
FED. RD. DIVISION	STATE	PROJECT	TYPE FUNDS
2	OHIO		

203

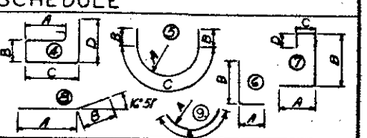
STARK COUNTY
STA.-21-8.40



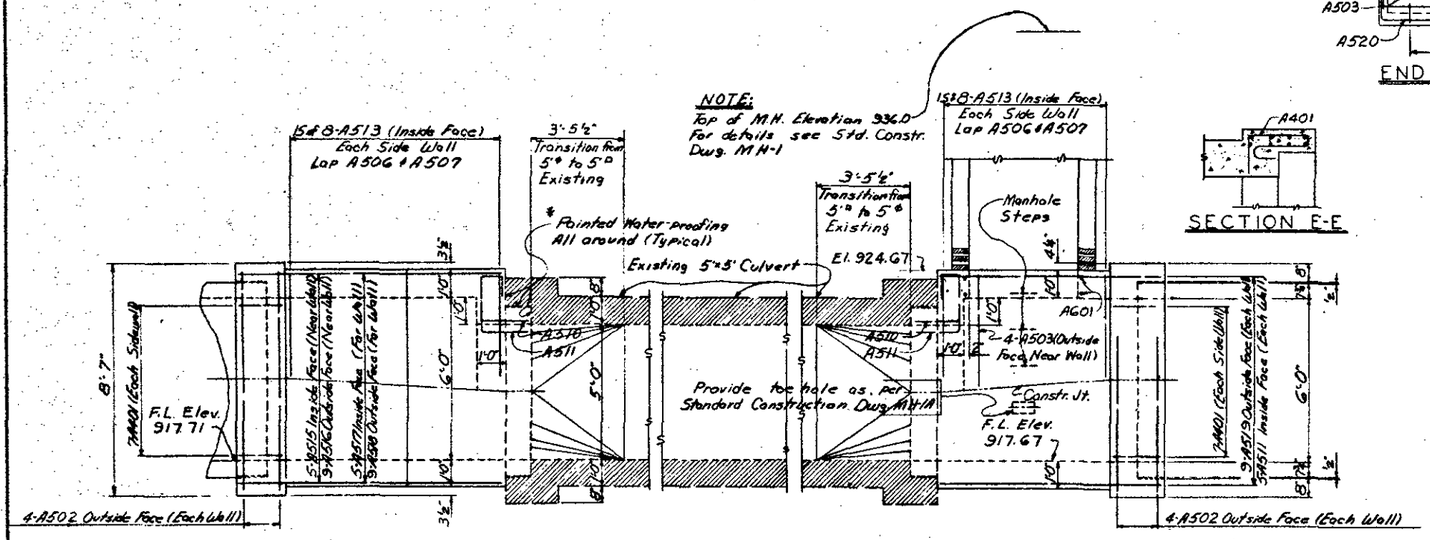




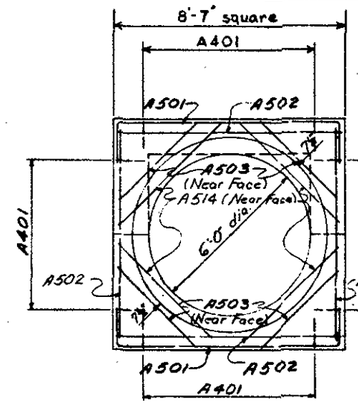
REINFORCING BAR SCHEDULE

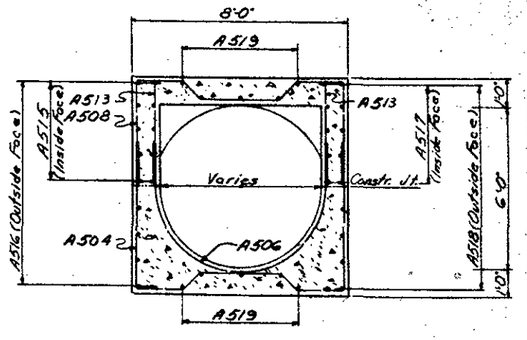


Mark	Number North	Number South	Number Total	Length	Weight North	Weight South	Shape	A	B	C	D	E	F	Remarks
A501	8	-	8	11'-2"	93	-	1	1'-7"	8'-3"					
A502	16	16	32	8'-3"	138	138	Str.							
A503	4	8	12	4'-0"	17	33	Str.							
A504	3	-	3	19'-11"	62	-	2	5'-5"	1'-8"	3'-0"	8"	11⅝"	7'-8"	
A505	5	-	5	20'-3"	106	-	2	5'-5"	1'-8"	3'-4"	8"	11⅝"	8'-0"	
A506	3	4	7	12'-8"	40	53	5	3'-0⅜	1'-7"	9'-6				
A507	5	4	9	12'-2"	63	51	5	2'-10⅝	1'-7"	9'-0"				
A508	3	2	5	15'-7"	49	33	2	3'-10"	1'-8"	3'-0"	8"	11⅝"	7'-8"	
A509	5	2	7	16'-3"	85	34	2	4'-0"	1'-8"	3'-4"	8"	11⅝"	8'-0"	
A510	1	1	2	4'-5"	5	5	7	1'-8"	1'-8"	8"	10"			
A511	2	2	4	4'-11"	10	10	7	1'-8"	2'-2"	8"	10"			
A512	2	2	4	18'-6"	39	39	3	2'-8⅝	16'-11"	1'-7"				
A513	25#8	25#8	45#8	3'-10"to 4'-4"	68	68	Str.							Vary each bar by ½"
A514	4	4	8	5'-5"	23	23	Str.							
A515	5	-	5	9'-0"	47	-	Str.							Bend in Field
A516	9	-	9	8'-4"	78	-	8	3'-4"	5'-0"					
A517	5	5	10	7'-3"	38	38	Str.							Bend in Field
A518	9	-	9	6'-4"	59	-	8	3'-4"	3'-0"					
A519	10	29	39	7'-0"	73	212	Str.							Bend in Field
A520	-	8	8	11'-4"	-	95	1	1'-7"	8'-4½					
A521	-	4	4	6'-4"	-	26	6	2'-6"	4'-0"					
A522	-	1	1	8'-0"	-	8	Str.							
A523	-	15#8	15#8	20'-3"to 19'-11"	-	168	2	5'-5"	1'-8"	3'-4"to 3'-0"	8"	11⅝"	8'-0"to 7'-8"	Vary each bar by 4"
A401	28	28	56	4'-7"	86	86	4	1'-6"	4"	1'-8"	11"			
A601	-	2	2	15'-9"	-	47	3	2'-2⅝	13'-0"	1'-11"				
RE 401				4'-7"			4	1'-6"	4"	1'-8"	11"			
RE 501				6'-7"			Str.							
RE 601				6'-11"			9	2'-2⅝	6'-11"					



NOTE:
Top of M.H. Elevation 936.0
For details see Std. Constr. Dwg. MH-1





*As specified for concrete sewer pipe, on Sheet 8-Project General Notes

ESTIMATED QUANTITIES

Item	Quantity	Unit	Description
503	Lump Sum	Lump Sum	Cofferdams, Cribs and Sheeting
503	71	Cu. Yds.	Unclassified Excavation
509	2346	Lbs.	Reinforcing Steel
511	24.1	Cu. Yds.	Class 'C' Concrete
512	128	Sq. Ft.	Waterproofing, painted *
604	1	Each	Standard No. 1 Manhole

GENERAL NOTES

- REFERENCE shall be made to Std. Construction Dwg's. MH-1 dated 6-1-65 and MH-1A dated 8-1-66
- DESIGN DATA:
  Concrete Class 'C' - basic unit stress 1,333 p.s.i.
  Reinforcing Steel - A.S.T.M. A15, A16, A160 Deformed, Intermediate or Hard Grade - basic unit stress 20,000 p.s.i.

MICHAEL BAKER JR., CONSULTING ENGINEERS
ROCHESTER, PENNSYLVANIA

JUNCTION CHAMBERS AT ENDS OF EXISTING 5×5 CULVERT (SANITARY SEWER)

Lt. of Sta. 527+81.91 to Sta. 528+98.92

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
DWP	R.J.P.		DWP	L.G.H. 9-5-67	