MINNESOTA DEPARTMENT OF TRANSPORTATION

THE COUNTY OF OLMSTED

CONSTRUCTION PLAN FOR GRADING, AGGREGATE BASE, CONC. CURB & GUTTER P.M. BITUMINOUS SURFACE AND BR. NO. 3431 REPLACEMENT

LOCATED ON C.SAH. 12 **BETWEEN** TH 52 (APPROX. 300' E. OF W. LINE) **AND** CR 127 AT ORONOCO (APPROX. 491' W. OF E. LINE) **(GEOGRAPHIC DESCRIPTION)**

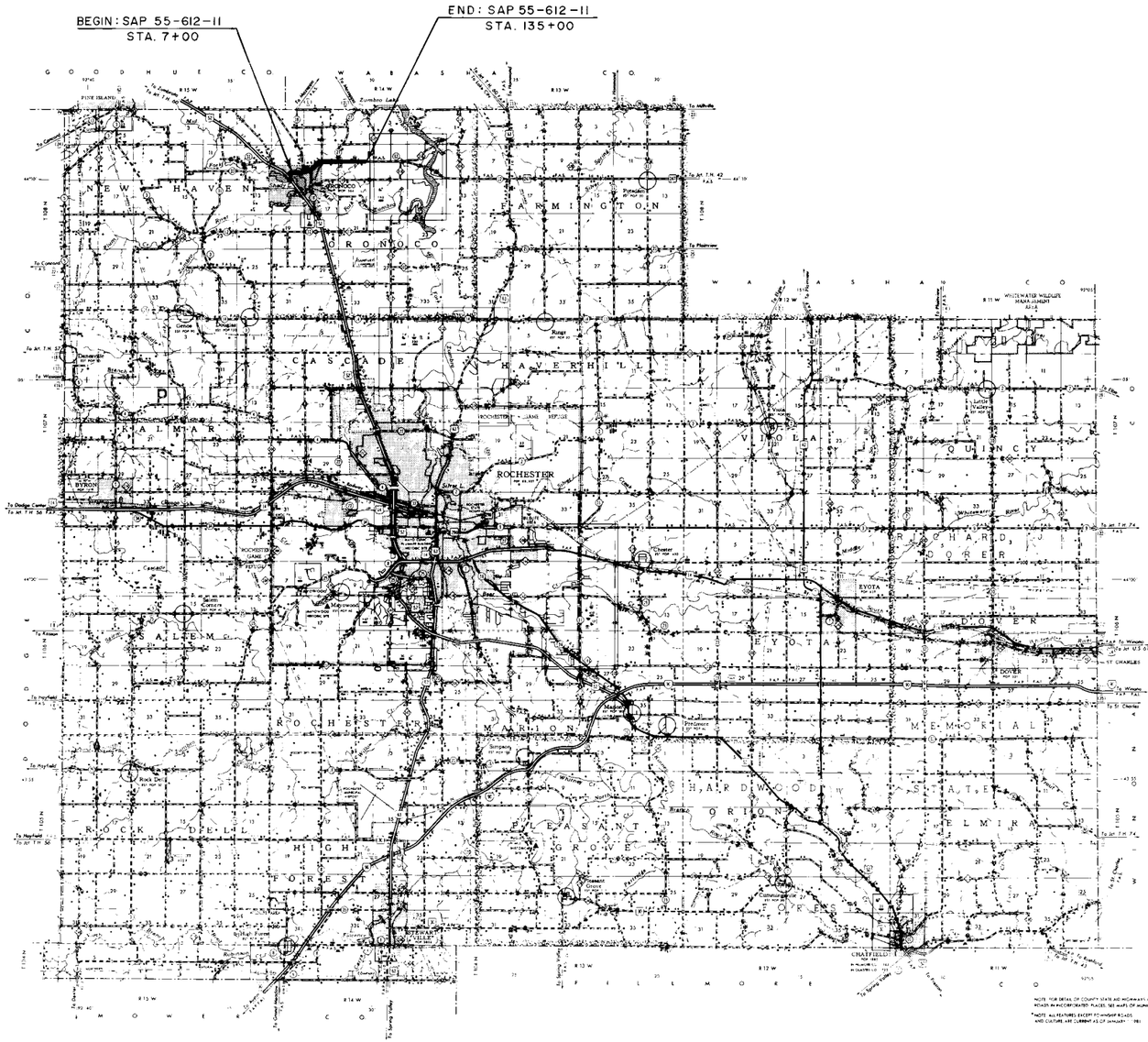
FROM OF SE 1/4 SEC.7 T108N-R14W **TO** SEC. 9 T108N-R14W **(LEGAL DESCRIPTION)**

STATE PROJ. NO. .....

GROSS LENGTH	FEET	MILES
BRIDGES-LENGTH	FEET	MILES
EXCEPTIONS-LENGTH	FEET	MILES
NET LENGTH	FEET	MILES

~~**STATE PROJ. NO.**~~ SAP 55-612-11

GROSS LENGTH	12,812.99	FEET	2.427 MILES
BRIDGES-LENGTH	—	FEET	— MILES
EXCEPTIONS-LENGTH	—	FEET	— MILES
NET LENGTH	12812.99	FEET	2.427 MILES



PLANS SYMBOLS

STATE LINE
COUNTY LINE
TOWNSHIP OR RANGE LINE
SECTION LINE
QUARTER LINE
SIXTEENTH LINE
RIGHT OF WAY LINE
PRESENT RIGHT OF WAY LINE
CONTROL OF ACCESS LINE
PROPERTY LINE (Except Land Lines)
VACATED PLATTED PROPERTY
CORPORATE OR CITY LIMITS
TRUNK HIGHWAY CENTER LINE
RETAINING WALL
RAILROAD
RAILROAD RIGHT OF WAY LINE
RIVER OR CREEK (NAME)
DRY RUN
DRAINAGE DITCH (SIZE)
DRAIN TILE
CULVERT
DROP INLET
GUARD RAIL
BARBED WIRE FENCE
WOVEN WIRE FENCE (W)
CHAIN LINK FENCE (C.L.)
RAILROAD SNOW FENCE
STONE WALL OR FENCE
HEDGE
RAILROAD CROSSING SIGN
RAILROAD CROSSING BELL
ELECTRIC WARNING SIGN
CROSSING GATE
MEANDER CORNER
SPRINGS
MARSH
TIMBER
ORCHARD
BRUSH (TIMBER)
NURSERY
CATCH BASIN C.B.
FIRE HYDRANT
CATTLE GUARD
OVERPASS (Highway Over)
UNDERPASS (Highway Under)
BRIDGE
BUILDING (One Story Frame) 15'x 25'
F FRAME C CONCRETE
S STONE T TILE
B BRICK ST STUCCO
IRON PIPE OR ROD
MONUMENT (STONE, CONCRETE, OR METAL)
WOODEN HUB
GRAVEL PIT (G)
SAND PIT (S)
BORROW PIT (B)
ROCK QUARRY (Q)
SLOPE EASEMENT SE

UTILITIES SYMBOLS

POWER POLE LINE
TELEPHONE OR TELEGRAPH POLE LINE
JOINT TELEPHONE AND POWER ON POWER POLES
ON TELEPHONE POLES
ANCHOR
STEEL TOWER
STREET LIGHT
PEDESTAL (TELEPHONE CABLE TERMINAL)
GAS MAIN — G — G —
WATER MAIN — I — I —
CONDUIT
TELEPHONE CABLE IN CONDUIT — T —
ELECTRIC CABLE IN CONDUIT — P —
TELEPHONE MANHOLE T
ELECTRIC MANHOLE P
BURIED TELEPHONE CABLE — T-BUR —
BURIED ELECTRIC CABLE — P-BUR —
AERIAL TELEPHONE CABLE — T-AE —
SEWER, (SANITARY OR STORM)
SEWER MANHOLE

SCALES

PLAN ..... 100'
PROFILE ..... 100' HOR. & 10' VER.
INDEX MAP 10,560
X SECTIONS
~~GENERAL LAYOUT~~ ..... 10'

STATE AID TITLE SHEET ALL UNDERLINED APPLIES TO SAP

MINN. PROJ. NO. .....

SPECIFICATIONS REFERENCE

The 1983 ~~1978~~ Edition of the Minnesota Department of Transportation "Standard Specifications For Construction" Shall Govern.

INDEX

SHEET NO. 1 TITLE SHEET & LAYOUT MAP
" " 2-3 ESTIMATE OF QUANTITES AND TYPICAL SECTIONS
" " 4-8 PLAN & PROFILE SHEETS
" " 9 LOCATION MAP OF AGGREGATE STOCKPILE & SAP 55-612-11
" " 10-31 CROSS SECTION SHEETS
" " 32-33 BRIDGE SHEETS FOR BRIDGE NO. 3431
" " 34-35 PRECAST BOX CULVERT DETAILS

NOTE: FOR THE DESIGNATION OF THE RIGHT OF WAY LINES AND TEMPORARY EASEMENTS ON S.A.P. 55-612-11 FROM STA. 75+00 TO STA. 135+00 SEE OLMSTED COUNTY RIGHT OF WAY PLATS NUMBER 30, 31, 32, 33, 34, AND 35.

DATE 1/31/85 .....
MAYOR OF ORONOCO

DESIGN DESIGNATION

R .....
ADT (Current Year) = 1549(1981)
ADT (Future Year) = 2788(2001)
DHV (Design Hr. Vol.) = ...
D (Directional Distr.) = ... %
T (Heavy Commercial) = 5.3 %
SOIL FACTOR 130
10 TON DESIGN

ΣN18(20) .....
Design Speed 50 MPH
Based on STOPPING Sight Distance
Height of eye 3.75' Height of object 0.5'
Design Speed not achieved at:

STA.	TO STA.	MPH
STA.	TO STA.	MPH
STA.	TO STA.	MPH

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE 1-23-85 REG. NO. 12219 ENGR. L Carlson
COUNTY Olmsted

Recommended for Approval ..... 19..
DISTRICT STATE AID ENGINEER

Recommended for Approval Delwert D. Ofstedal 2-22 1985
STATE AID PLANS AND SPECS ENGINEER

Approved ..... 19..
STATE AID ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

STATE AID PROJ. NO. 55-612-11
~~**STATE PROJ. NO.**~~ .....

SHEET NO. 1 OF 35 SHEETS

ESTIMATED QUANTITIES

	SPECIFICATION NO.	ITEM	UNIT	MUNICIPAL	RURAL	TOTAL ESTIMATED QUANTITIES	
	2101.501	CLEARING	ACRE	1.8		1.8	
	2101.502	CLEARING	TREE	36	52	88	
	2101.506	GRUBBING	ACRE	1.8		1.8	
	2101.507	GRUBBING	TREE	42	38	80	
	2104.501	REMOVE PIPE CULVERT	LIN. FT.	812	526	1338	
	2104.501	REMOVE SUBSURFACE DRAINS	LIN. FT.		36	36	
④	2104.501	REMOVE FENCE	LIN. FT.	1480	2020	3500	
	2104.509	REMOVE MANHOLE	EACH	1		1	
①	2104.509	REMOVE BOX CULVERT	EACH	2	2	4	
	2105.501	COMMON EXCAVATION	CU. YD.	37127	30312	67439	(P)
	2105.503	ROCK EXCAVATION	CU. YD.	2840	4191	7031	
	2105.507	SUBGRADE EXCAVATION	CU. YD.	7080	7438	14518	(P)
	2105.535	SALVAGED TOPSOIL (EV)	CU. YD.	3342	4278	7620	(P)
⑤	2130.501	WATER	M-GAL.	109	131	240	
②	2211.501	AGGREGATE BASE CL. 2 "DESIGNATED SOURCE"	TON	0	25000	25000	
	2221.501	AGGREGATE SHOULDER CL. 2	TON	2038	4366	6404	
	2331.504	BITUMINOUS MATERIAL FOR MIXTURE	TON	414	388	802	
③	2341.508	WEARING COURSE MIXTURE	TON	2338	1982	4320	
⑦	2331.510	BINDER COURSE MIXTURE	TON	1940	1770	3710	
	2331.514	BASE COURSE MIXTURE	TON	3332	3441	6773	
	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GALLON	2171	2252	4423	
	2501.511	18" C.S. PIPE CULVERT	LIN. FT.	292	734	1026	
	2501.511	24" C.S. PIPE CULVERT	LIN. FT.	60	32	92	
	2501.511	30" C.S. PIPE CULVERT	LIN. FT.		32	32	
	2501.511	24" R.C. PIPE CULVERT CL. II	LIN. FT.	84	80	164	
	2501.511	30" R.C. PIPE CULVERT CL. II	LIN. FT.		152	152	
	2501.511	30" R.C. PIPE CULVERT CL. III	LIN. FT.		108	108	
	2501.511	36" R.C. PIPE CULVERT CL. II	LIN. FT.		100	100	
	2501.515	18" G.S. PIPE APRON	EACH	18	24	42	
	2501.515	24" G.S. PIPE APRON	EACH	4	2	6	
	2501.515	30" G.S. PIPE APRON	EACH		2	2	
	2501.515	24" R.C. PIPE APRON	EACH	3	2	5	
	2501.515	30" R.C. PIPE APRON	EACH	1	6	7	
	2501.515	36" R.C. PIPE APRON	EACH	1	4	5	
	2501.521	21" SPAN C.S. PIPE-ARCH CULVERT	LIN. FT.	96		96	
	2501.521	58" SPAN R.C. PIPE-ARCH CULVERT CL. II A	LIN. FT.	82		82	
	2501.521	102" SPAN R.C. PIPE-ARCH CULVERT CL. II A	LIN. FT.		94	94	
	2501.521	122" SPAN R.C. PIPE-ARCH CULVERT CL. II A	LIN. FT.		56	56	
	2501.521	122" SPAN R.C. PIPE-ARCH CULVERT CL. III A	LIN. FT.		40	40	
	2501.525	21" SPAN G.S. PIPE-ARCH APRON	EACH	6		6	
	2501.525	58" SPAN R.C. PIPE-ARCH APRON	EACH	2		2	
	2501.525	102" SPAN R.C. PIPE-ARCH APRON	EACH		2	2	
	2501.525	122" SPAN R.C. PIPE-ARCH APRON	EACH		2	2	
	0501.605	108 P.C. CONC. BOX CULVERT (4' OVERFILL)	LIN. FT.	114		114	

(P) PLAN QUANTITY

① REMOVE CONC. BOX CULVERTS STA. 29+48 INPL. 4'x 2.5'x 22', STA. 30+02 INPL. 10'x 6'x 82', STA. 89+70 INPL. 8'x 6'x 54' AND STA. 114+29 INPL. 8'x 4'x 29'.
② INCLUDES 43,563 TONS MAINLINE CSAH 12, 1,643 TONS MAIN LINE CSAH 18, 927 TON FOR 6 PUBLIC ROAD APPROACHES, 1160 TONS FOR 29 RES. ENT. AND 480 TONS FOR 12 F. ENT.
③ INCLUDES 3353 TONS MAINLINE CSAH 12, 179 TONS MAINLINE CSAH 18, 478 TONS FOR 29 RES. ENT., 216 TONS FOR 6 PUBLIC ROAD APPROACHES AND 36 TONS FOR 12 F. ENT.
④ IN AREA'S DESIGNATED BY THE ENGINEER.

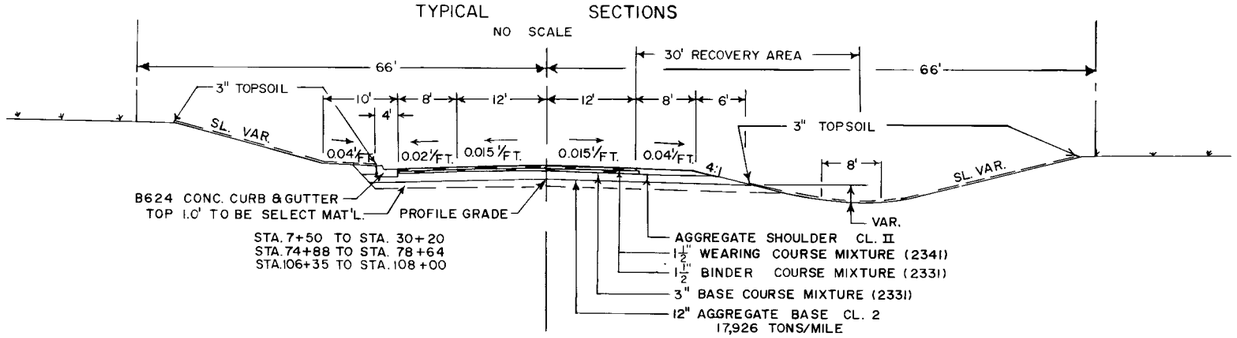
STANDARD PLATES

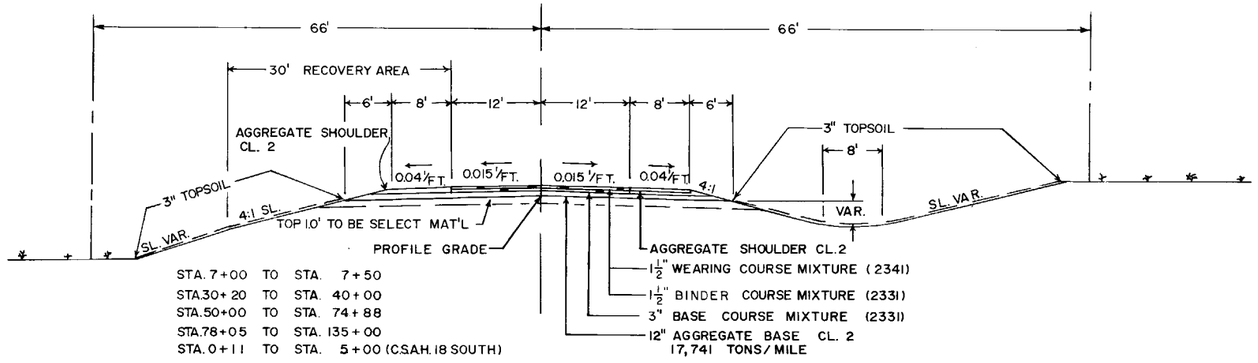
THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.

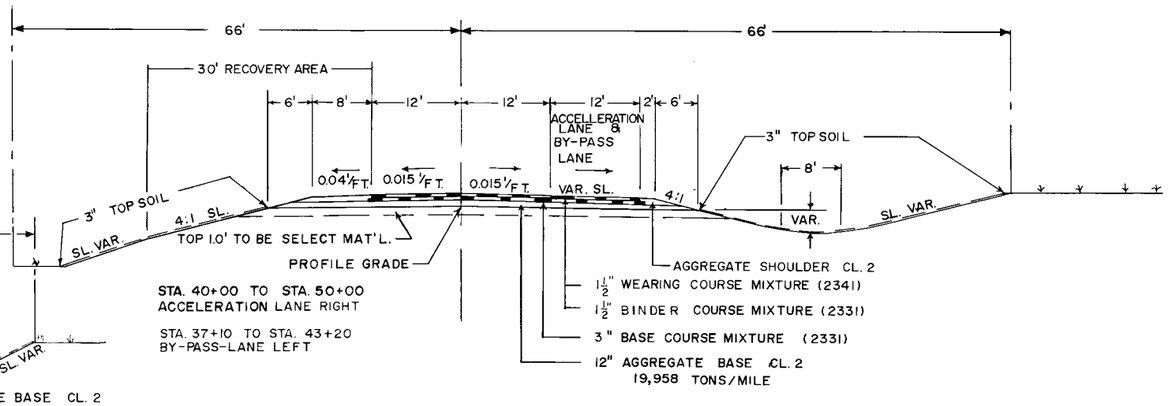
PLATE NO		DESCRIPTION
0004	A	SPECIFICATION REFERANCE TO STANDARD PLATES
3000	H	REINFORCED CONCRETE PIPE
3007	A	SHEAR REINFORCEMENT FOR PRECAST DRAINAGE STRUCTURES
3014	J	REINFORCED CONCRETE PIPE ARCH DETAIL
3040	F	CORRUGATED METAL PIPE CULVERT
3100	F	CONCRETE APRON FOR REIFORCED CONCRETE PIPE
3110	F	CONCRETE APRON FOR REINFORCED CONCRETE PIPE-ARCH
3114	G	SECTIONAL CONCRETE APRON FOR REINFORCED CONC. PIPE-ARCH
3122	I	METAL APRON FOR C.M. PIPE-ARCH CULVERT
3123	H	METAL APRON FOR C.M. PIPE
3124	B	METAL APRON CONNECTION
3133	A	RIP RAP AT RCP OUTLETS
3142	A	OUTLET SCREEN FOR C.M. AND S. C. PIPE
3143	C	INSPECTION TEES
3145	C	CONCRETE PIPE TIES
3221	C	CORRUGATED STEEL PIPE COUPLING BANDS
4000	I	MANHOLE OR CATCH BASIN
4002	E	MANHOLE OR CATCH BASIN
		CONTINUED ON PLAN SHEET NO. 3

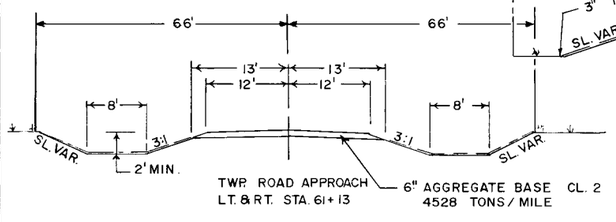
TYPICAL SECTIONS

NO SCALE









NOTE: ALL DIMENSIONS AND SLOPES SHOWN ON TYPICAL SECTION ARE APPROXIMATE.

S. A. P. 55-612-11 OLMSTED COUNTY C.S.A.H. 12

~~State Proj. No.~~

Sheet No. 2 of 35 Sheets

ALBINSON, INC. MINNEAPOLIS 55420

ESTIMATED QUANTITIES

	SPECIFICATION NO.	ITEM	UNIT	MUNICIPAL	RURAL	TOTAL ESTIMATED QUANTITIES	
	2503.511	12" R.C. PIPE SEWER CL. IV	LIN. FT.	8		8	
	2503.511	15" R.C. PIPE SEWER CL. IV	LIN. FT.	286		286	
	2503.511	18" R.C. PIPE SEWER CL. IV	LIN. FT.	124		124	
	2503.511	24" R.C. PIPE SEWER CL. IV	LIN. FT.	62		62	
	2503.511	30" R.C. PIPE SEWER CL. II	LIN. FT.	14		14	
	2503.511	36" R.C. PIPE SEWER CL. II	LIN. FT.	68		68	
	2506.508	CONSTRUCT MANHOLE DESIGN "A"	EACH	1		1	
	2506.508	CONSTRUCT MANHOLE DESIGN "C"	EACH	3		3	
	2506.509	CONSTRUCT CATCH BASIN DESIGN "C"	EACH	5		5	
	2511.501	RANDOM RIP RAP CL. III	CU. YD.	366	198	564	
	2511.501	GRANULAR FILTER	CU. YD.	59	89	148	
	2531.501	CONCRETE CURB & GUTTER DESIGN B624	LIN. FT.	2270	541	2811	
	2575.501	ROADSIDE SEEDING	ACRE	6.0	12.0	18.0	(P)
	2575.502	SEED MIXTURE 2	POUND	600	1200	1800	
	2575.502	SEED MIXTURE 5	POUND	300	600	900	
	2575.505	SODDING	SQ. YD.	17717	8804	26521	
	2575.511	MULCH MATERIAL TYPE 1	TON	12.0	24.0	36.0	
	2575.519	DISC ANCHORING	ACRE	2.6	10.4	13.0	(P)
	2575.531	COMMERCIAL FERTILIZER ANALYSIS 10-10-10	TON	0.6	1.2	1.8	(P)
	2451.509	AGGREGATE BEDDING CLASS "B" (CV)	CU. YD.	42.6	50.6	93.2	(P)
	0506.604	CONST. 108 P.C. CONC. BOX CULV. x 15" R.C. PIPE TEE (FIELD CONN)	EACH	1		1	
	2502.521	10" C.S. PIPE DRAIN	LIN. FT.		270	270	
	2502.551	10" C.S. INSPECTION TEES	LIN. FT.		11	11	
⑥	0501.606	108 P.C. CONC. BOX CULV. END SECTION INLET (MODIFIED)	EACH	1		1	
	0501.606	108 P.C. CONC. BOX CULV. END SECTION OUTLET	EACH	1		1	
	2502.521	8" C.S. PIPE DRAIN	LIN. FT.		132	132	
	2502.551	8" C.S. INSPECTION TEES	LIN. FT.		10	10	
②	2211.501	AGGREGATE BASE CLASS 2	TON	21788	985	22773	

(P) PLAN QUANTITY

⑤ WATER TO BE USED AS A DUST PREVENTATIVE AS DIRECTED BY THE ENGINEER.

⑥ SEE PLAN SHEET NO. 34 FOR DETAILS

⑦ INCLUDES 3364 TONS MAINLINE C.S.A.H. 12, 179 TONS MAINLINE C.S.A.H. 18, 120 TONS FOR 13 RIGHT TURN LANES AND 47 TONS FOR ONE BY-PASS LANE.

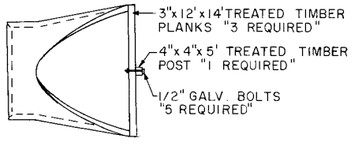
STANDARD PLATES

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.

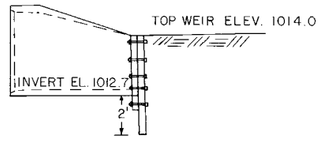
PLATE NO		DESCRIPTION
4010	F	CONC. SHORT CONE & ADJUSTING RING
4011	D	PRECAST CONCRETE BASE
4101	C	RING CASTING FOR MANHOLE OR CATCH BASIN
4110	D	COVER CASTING FOR MANHOLE
4129	F	CATCH BASIN FRAME CASTING
4151	B	GRATE CASTING FOR CATCH BASIN
4160	D	CURB BOX CASTING FOR CATCH BASIN
7035	J	CONCRETE WALK & CURB RETURNS AT ENTRANCES
7100	F	CONCRETE CURB & GUTTER
7110	E	CURB & GUTTER CONSTRUCTION AT CATCH BASIN
7111	G	INSTALLATION OF CATCH BASIN CASTINGS
8000	H	STANDARD BARRICADES
9000	B	APPROACHES AND ENTRANCES
9102	C	SODDING AT PIPE CULVERT ENDS

TIMBER WEIR CONSTRUCTION

TOP VIEW



SIDE VIEW



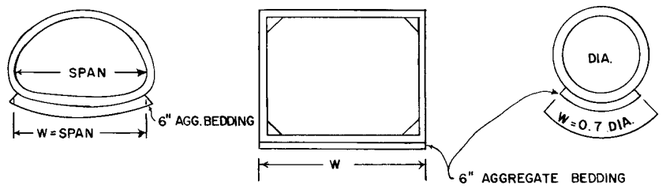
BASIS PLANNED QUANTITES

BITUMINOUS WEARING COURSE
BITUMINOUS MATERIAL – 6.0% OF MIXTURE BY WEIGHT
BITUMINOUS MIXTUE – 110 POUNDS/SQ. YD./INCH OF DEPTH

BITUMINOUS BINDER COURSE
BITUMINOUS MATERIAL – 5.5% OF MIXTURE BY WEIGHT
BITUMINOUS MIXTURE – 110 POUNDS/SQ. YD./INCH OF DEPTH

BITUMINOUS BASE COURSE
BITUMINOUS MATERIAL – 5.0% OF MIXTURE BY WEIGHT
BITUMINOUS MIXTURE – 110 POUNDS/SQ.YD./INCH OF DEPTH.

AGGREGATE BEDDING CLASS "B" (CV)
NO SCALE



LOCATION OF 8' WIDE BITUMINOUS SHOULDER	
LT.	RT.
STA. 7+00 TO STA. 32+30	STA. 7+00 TO STA. 40+00
STA. 74+88 TO STA. 78+05	①STA. 0+11 TO STA. 5+00
①STA. 0+11 TO STA. 5+00	

① C.S.A.H. 18 SOUTH STA. 39+60

LOCATIONS OF SEEDING & MULCHING	
LT.	RT.
STA. 33+00 TO STA. 43+00	STA. 39+00 TO STA. 52+00
STA. 59+00 TO STA. 75+00	STA. 59+00 TO STA. 71+00
STA. 78+00 TO STA. 105+80	STA. 74+00 TO STA. 88+00
STA. 108+80 TO STA. 111+90	STA. 91+00 TO STA. 120+00
STA. 113+74 TO STA. 135+00	STA. 124+10 TO STA. 135+00
①STA. 9+60 TO STA. 14+32	①STA. 18+00 TO STA. 21+00

① IN AREA WITH 2:1 SLOPES OR STEEPER

LOCATIONS OF SODDING		
LT.	RT.	℄ PIPE CULV. ENDS
③ STA. 7+00 TO STA. 33+00	③ STA. 7+00 TO STA. 33+00	STA. 34+88
① STA. 0+11 TO STA. 5+00	① STA. 0+11 TO STA. 5+00	STA. 43+90
② STA. 43+00 TO STA. 59+00	② STA. 52+00 TO STA. 59+00	STA. 52+10
STA. 75+00 TO STA. 78+00	STA. 71+00 TO STA. 74+00	STA. 68+53
STA. 105+80 TO STA. 108+80	STA. 88+00 TO STA. 91+00	STA. 106+06
STA. 111+90 TO STA. 113+74	STA. 120+00 TO STA. 124+10	STA. 110+45
		STA. 110+77
		STA. 120+18
		STA. 130+03

① C.S.A.H. 18 SOUTH STA. 39+60.

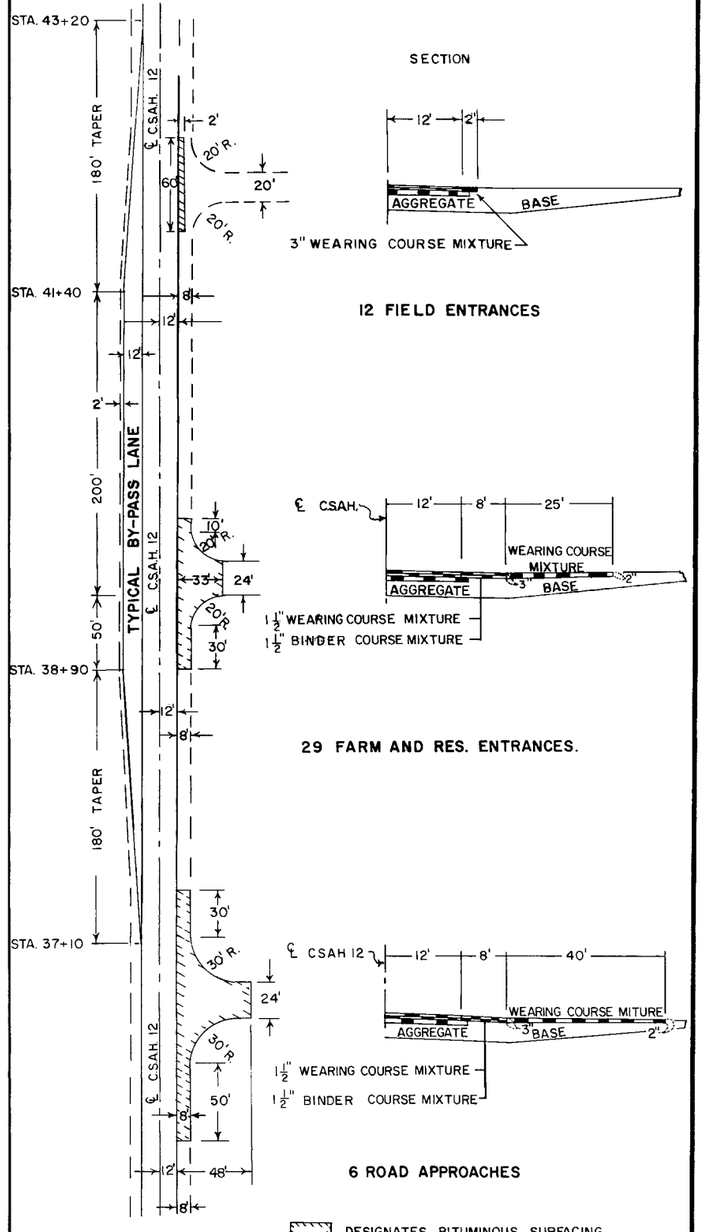
② DITCH LINER 12' WIDE.

③ IN AREA WITH 2:1 SLOPE OR STEEPER SEED AND MULCH.

APPROACHES AND ENTRANCES

NO SCALE

PLAN



SECTION

12 FIELD ENTRANCES

29 FARM AND RES. ENTRANCES.

6 ROAD APPROACHES

DESIGNATES BITUMINOUS SURFACING

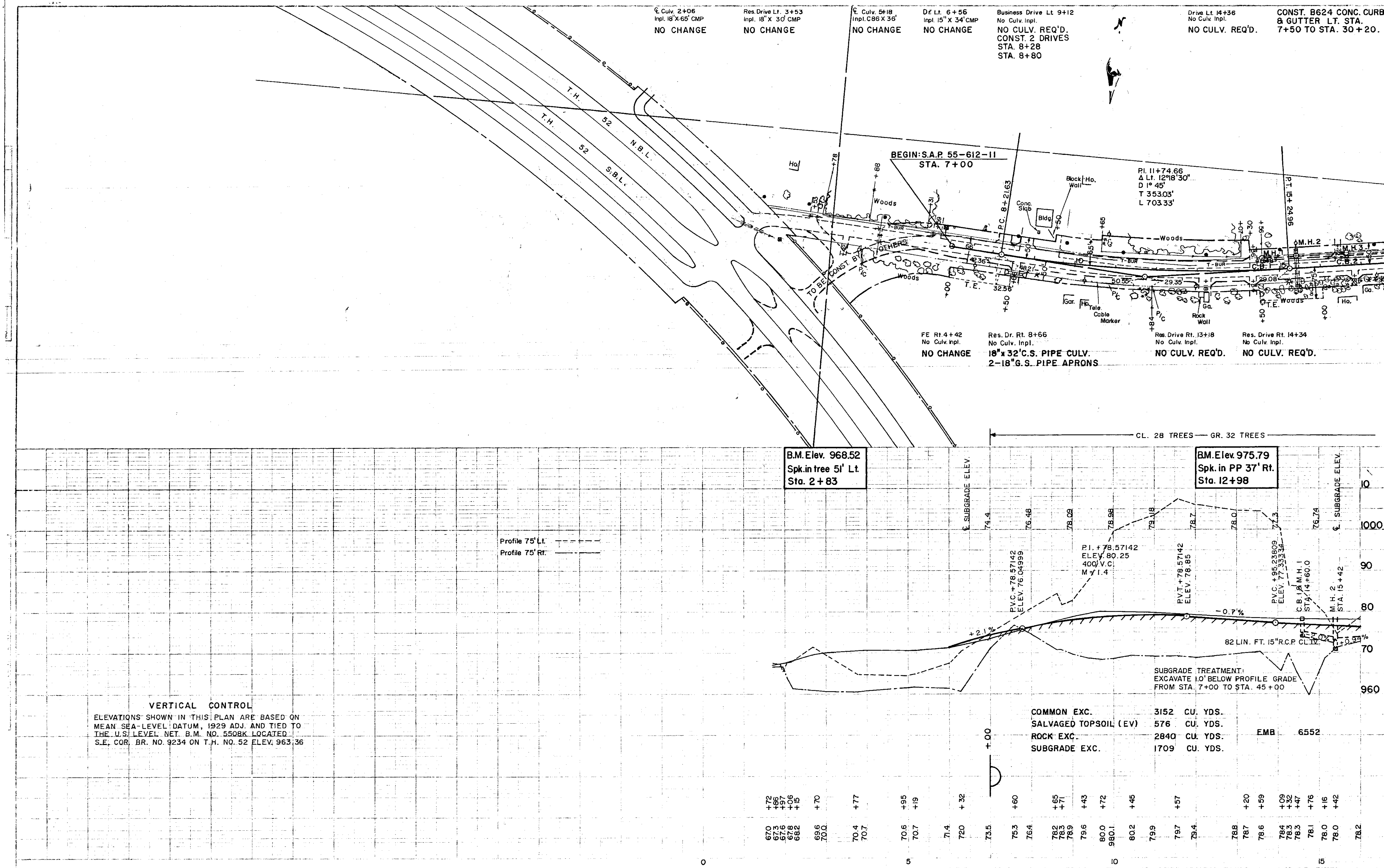
NOTE: ALL UTILITY POLES AND OTHER UNYIELDING OBJECTS WILL BE MOVED OUTSIDE THE 30' RECOVERY AREA.

S. A. P. 55-612-11

~~State Proj. No.~~

CSAH 12 OLMSTED COUNTY **Sheet No. 3 of 35 Sheets**

ALBINSON, INC. MINNEAPOLIS, MINN.


℄ Culv. 2+06
Inpl. 18"X 65' CMP
NO CHANGE
Res. Drive Lt. 3+53
Inpl. 18" X 30' CMP
NO CHANGE
℄ Culv. 5+18
Inpl. C86 X 36'
NO CHANGE
Dr. Lt. 6+56
Inpl. 15" X 34' CMP
NO CHANGE
Business Drive Lt. 9+12
No Culv. Inpl.
NO CULV. REQ'D.
CONST. 2 DRIVES
STA. 8+28
STA. 8+80
Drive Lt. 14+36
No Culv. Inpl.
NO CULV. REQ'D.
CONST. B624 CONC. CURB & GUTTER LT. STA. 7+50 TO STA. 30+20.
T.H. 52 N.B.L.
T.H. 52 S.B.L.
BEGIN: S.A.P. 55-612-11
STA. 7+00
TO BE CONST. BY OTHERS
Woods
P.C. 8+21.63
Conc. Slab
Bldg.
Block Wall
Ho.
P.I. 11+74.66
Δ Lt. 12°18'30"
D 1° 45'
T 353.03'
L 703.33'
P.T. 15+24.96
M.H. 1
M.H. 2
M.H. 3
C.B. 1
C.B. 2
T-BUR
T.E.
Gar.
Tele. Cable Marker
Rock Wall
Ga.
FE Rt. 4+42
No Culv. Inpl.
NO CHANGE
Res. Dr. Rt. 8+66
No Culv. Inpl.
18"x 32' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS
Res. Drive Rt. 13+18
No Culv. Inpl.
NO CULV. REQ'D.
Res. Drive Rt. 14+34
No Culv. Inpl.
NO CULV. REQ'D.
CL. 28 TREES — GR. 32 TREES
B.M. Elev. 968.52
Spk. in tree 51' Lt.
Sta. 2+83
B.M. Elev. 975.79
Spk. in PP 37' Rt.
Sta. 12+98
℄ SUBGRADE ELEV.
74.4 76.48 78.09 78.98 79.18 78.7 78.0 77.3 76.74
Profile 75' Lt.
Profile 75' Rt.
P.V.C. +78.57142
ELEV. 76.04999
P.I. +78.57142
ELEV. 80.25
400' V.C.
M = 1.4
P.V.T. +78.57142
ELEV. 78.85
P.V.C. +95.23809
ELEV. 77.33334
C.B. 1 & M.H. 1
STA. 14+60.0
M.H. 2
STA. 15+42
+2.1%
-0.7%
+0.94%
82 LIN. FT. 15" R.C.P. CL. IV.
SUBGRADE TREATMENT:
EXCAVATE 1.0' BELOW PROFILE GRADE
FROM STA. 7+00 TO STA. 45+00
10
1000
90
80
70
960
VERTICAL CONTROL
ELEVATIONS SHOWN IN THIS PLAN ARE BASED ON MEAN SEA-LEVEL DATUM, 1929 ADJ. AND TIED TO THE U.S. LEVEL NET B.M. NO. 5508K LOCATED S.E. COR. BR. NO. 9234 ON T.H. NO. 52 ELEV. 963.36
COMMON EXC. 3152 CU. YDS.
SALVAGED TOPSOIL (EV) 576 CU. YDS.
ROCK EXC. 2840 CU. YDS.
SUBGRADE EXC. 1709 CU. YDS.
EMB 6552
+00
+72 +86 +97 +06 +15 +70 +77 +95 +19 +32 +60 +65 +71 +43 +72 +45 +57 +20 +59 +09 +32 +47 +76 +16 +42
67.0 67.3 67.6 67.8 68.2 69.6 70.0 70.4 70.7 70.6 70.7 71.4 72.0 73.5 75.3 76.4 78.2 78.3 78.9 79.6 80.0 980.1 80.2 79.9 79.7 79.4 78.8 78.7 78.6 78.4 78.3 78.3 78.1 78.0 78.0 78.2
0
5
10
15

℄ Culv. 15+43
Inpl. 36"X 46' CMP
REMOVE

Drive Lt. 16+42
Inpl. 15"X 42'CMP
REMOVE

NO CULV. REQ'D.

℄ Culv. 25+45
Inpl. 42"X 32' CMP-A
REMOVE

Res. Drive Lt. 26+08
Inpl. 24"X 28' CMP
REMOVE

NO CULV. REQ'D.

CONST. DR. LT. 25+70

NO CULV. REQ'D.

Drive Lt. 29+86
Inpl. 18"X 30' CMP
REMOVE

NO CULV. REQ'D.

℄ Box Culv. 30+02
Inpl. 10'X 6'X 82'
REMOVE

SEE PLAN SHEETS NO. 32 THRU. 35 FOR BOX CULV. DETAIL.

C.S.A.H. 18 Lt. 33+29
No Culv. Inpl.
58" SPAN x 82' R.C.P. A.
A. CULV. CL. II A
2-58" SPAN R.C.P. A. APRONS.
F & I. CONC. PIPE JOINT TIES
PLACE CULV. ON "B" BEDDING 7.3 CU. YDS.

℄ Culv. 34+48
Inpl. 18"X 54' CMP
Skewed 10°
REMOVE

NO CULV. REQ'D.

FE Lt. 36+28
Inpl. 15"X 24' CMP
REMOVE
NO F.E. REQ'D.

℄ Culv. 43+90
Inpl. 24"X 100' CMP
REMOVE

NO CULV. REQ'D.

C.B. 1
CONST. CATCH BASIN DESIGN "C"
21' LT. STA. 14+60
GRATE ELEV. 77.83 OUTGOING
ELEV. N. 74.00
GRATE FRAME NO. 802 A
GRATE NO. 811
CURB BOX NO. 823 A
(8 LIN. FT. 15" R.C. SEWER CL. IV)

M.H. 1
CONST. MANHOLE DESIGN "C"
29' LT. STA. 14+60
RING ELEV. 78.71
OUTGOING ELEV. E. 73.76
INCOMING ELEV. SO. 73.96
RING CASTING NO. 700-9
COVER CASTING NO. 712
(82 LIN. FT. 15" R.C. SEWER CL. IV)
F & I. CONC. PIPE JOINT TIES

C.B. 2
CONST. CATCH BASIN DESIGN "C"
21' LT. STA. 16+66
GRATE ELEV. 77.45 OUTGOING ELEV. N. 73.56
GRATE FRAME NO. 802 A GRATE NO. 811
CURB BOX NO. 823 A
(8 LIN. FT. 12" R.C. SEWER CL. IV)

M.H. 3
CONST. MANHOLE DESIGN "C"
29' LT. STA. 16+66
RING ELEV. 78.23 OUTGOING ELEV. W. 73.08
INCOMING ELEV. SO. 73.50 INCOMING ELEV. E. 73.28
RING CASTING NO. 700-9 COVER CASTING NO. 712
(124 LIN. FT. 18" R.C. SEWER CL. IV)
F & I. CONC. PIPE JOINT TIES

C.B. 3
CONST. CATCH BASIN DESIGN "C"
21' LT. STA. 18+10
GRATE ELEV. 78.04 OUTGOING EL. N. 74.80
GRATE FRAME NO. 802 A GRATE NO. 811
CURB BOX NO. 823 A
(8 LIN. FT. 15" R.C. SEWER CL. IV)

M.H. 4
CONST. MANHOLE DESIGN "C"
29' LT. STA. 18+10
RING EL. 78.82 OUTGOING EL. W. 74.54
INCOMING EL. SO. 74.74
RING CASTING NO. 700-9
COVER CASTING NO. 712
(144 LIN. FT. 15" R.C. SEWER CL. IV)
F & I. CONC. PIPE JOINT TIES

CONST. BY-PASS LANE LEFT FROM STA. 37+10 TO 43+20
SEE PLAN SHEET NO. 3

RATE SUPERELEVATION 0.050'/FT.
240' RUNOFF

P.I. 41+66.30
Δ Lt. 42°06'30"
D 6°00'
T 367.61'
L 701.81'

P.T. 45+00.30

P.C. 37+98.69

P.I. 51+39+60.0

P.I. 1+28.65
Δ Rt. 16°06'53"
D 11°00'
T 73.74'
L 146.50'
R 519'

P.T. 2+01.41

P.C. 0+54.91

P.I. 30+60.90

P.C. 1+65.54

P.I. 3+02.51
Δ Rt. 19°00'
D 7°
T 136.97'
L 271.43'

P.C. 32+93.12
Δ Rt. 90°00'
TO P.I. 1+28.65

95°07'15"

P.T. 4+36.97

END CONSTRUCTION STA. 5+00

M.H. 42' LT. Sta. 0+95 (CSAH 18 So.)

REMOVE M.H.
REMOVE 60' LIN. FT. CULV.

F.E. Lt. 0+94 (CSAH 18 So.)
No Culv. Inpl.
MOVE F.E. TO STA. 1+50
18"x26" C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

Res. Dr. Lt. 2+56 (CSAH 18 So)
Inpl. 18"x 30' CMP
REMOVE
18"x 32' C.S. PIPE CULV.
2-18" G.S.P. ARCH APRONS

Res. Dr. Lt. 3+57 (CSAH 18 So.)
Inpl. 15"x 24' CMP
REMOVE
21" SPAN x 32' C.S.P.-ARCH CULV.
2-21" SPAN G.S.P. ARCH APRONS

Res. Dr. Lt. 4+17 (CSAH 18 So)
Inpl. 15"x 26' CMP
REMOVE
21" SPAN x 32' C.S.P.- ARCH CULV.
2-21" SPAN G.S.P. ARCH APRONS

Res. Dr. Rt. 2+15 (CSAH 18 So.) NO Culv. Inpl.

Res. Dr. Rt. 4+44 (CSAH 18 So.)
Inpl. 12"x 24' CMP
REMOVE
21" SPAN x 32' C.S.P.- ARCH CULV.
2-21" SPAN G.S.P. ARCH APRONS

Res. Dr. Rt. 16+22
Inpl. 15"x 32' CMP W/Aprons
REMOVE 36 LIN. FT.
18"x 32' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

Res. Drive Rt. 16+82
No Culv. Inpl.
18"x 32' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

PLACE RANDOM RIPRAP CL. III
24" DEPTH 78' TO 90' RT. STA. 18+10
TO STA. 20+50.
213 CU. YDS.

M.H. 2
CONST. MANHOLE DESIGN "A"
29' LT. STA. 15+42
RING ELEV. 78.38 OUTGOING ELEV. SO. 70.45
INCOMING ELEV. W. 72.20 INCOMING EL. E. 71.95
INCOMING ELEV. N. 70.95
RING CASTING NO. 700-9 COVER CASTING NO. 712
(14 LIN. FT. 30" R.C. SEWER CL. II & 1-30" R.C.P. APRON INLET) APRON INLET ELEV. 73.70
(68 LIN. FT. 36" R.C. SEWER CL. II & 1-36" R.C.P. APRON OUTLET) APRON OUTLET ELEV. 69.92
PLACE 36 R.C. SEWER ON "B" BEDDING 3.2 CU. YDS.
F & I. CONC. PIPE JOINT TIES.

C.B. 4
CONST. CATCH BASIN DESIGN "C" 21' LT. STA. 21+60
GRATE EL. 79.26 OUTGOING EL. SO. 72.79
GRATE FRAME NO. 802 A GRATE NO. 811 CURB BOX NO. 823 A
(62 LIN. FT. 24" R.C. SEWER CL. IV & 1-24" R.C.P. APRON OUTLET) APRON OUTLET ELEV. 72.00
PLACE PIPE ON "B" BEDDING 2 CU. YDS.
F & I. CONC. PIPE JOINT TIES.

℄ Box Culv. 29+48
4'x 2.5'x 22' Stone Arch.
REMOVE BOX CULV.

County Park Drive Rt. 30+09
No Culv. Inpl.
NO CULV. REQ'D.

Res. Drive Rt. 31+47
Inpl. 15" X 34' CMP
REMOVE
18"x 32' C.S.P. CULV.
2-18" G.S.P. APRONS

2 Ave. N.W. (Oronoco) Rt. 32+85
Inpl. 18"X 44' CMP
REMOVE
18"x 44' C.S.P. CULV.
2-18" G.S.P. APRONS

Res. Dr. 36+35 Rt.
No Culv. Inpl.
NO CULV. REQ'D.

C.S.A.H. 18 Rt.
No Culv. Inpl.
NO CULV. REQ'D.

C.B. 5
CONST. CATCH BASIN DESIGN "C" 21' LT. STA. 29+65
GRATE ELEV. 78.85 OUTGOING EL. SO. 73.10
GRATE FRAME NO. 802 A GRATE NO. 811 CURB BOX NO. 823 A
(44 LIN. FT. 15" R.C. SEWER CL. IV) OUTLET EL. 71.42
CONST. 1-48" P.C. CONC. BOX x 15" R.C.P. TEE FIELD CONNECTION
PLACE SEWER ON "B" BEDDING 0.9 CU. YDS.
F & I. CONC. PIPE JOINT TIES

CL. 0.6 ACRES — GR. 0.6 ACRES

CL. 8 TR. — GR. 10 TREES

B.M. Elev. 977.24
Top 3/4" Reinf. Bar in Wing
S.E. Cor. Bridge Sta. 30+60

B.M. Elev. 975.99
in Conc. water tank 100' Rt. 38+31

LAKE SHADY

Rock Wall

T.E.

Ho.

Ga.

Gar.

House

Shed

Hedge

Tele. Cable Marker

Woods

T-BUR

Marker

Profile 75' Lt. ——
Profile 75' Rt. ——

P.I. +95.23809
ELEV. 75.93334
400' V.C.
M = 0.525

P.V.T. +95.23809
ELEV. 76.63333

P.I. +00
ELEV. 79.1
400' V.C.
M = 0.35

P.V.C. +00 ELEV. 78.40

P.V.T. +00 ELEV. 78.4

P.V.C. +00 ELEV. 78.05

P.I. +00
ELEV. 77.35
400' V.C.
M = 0.425

P.V.T. +00 ELEV. 78.35

P.I. +47.72727
ELEV. 82.08864
500' V.C.
M = 4.125

P.V.C. +93.72727
ELEV. 80.83864

P.V.T. +97.72727
ELEV. 99.83862

+0.35%
-0.35%
+0.5%
+0.7%
+1.2%
+2.0%
+0.94%
+0.94%

82 LIN. FT. 15" R.C.P. CL. IV
124 LIN. FT. 18" R.C.P. CL. IV
144 LIN. FT. 15" R.C.P. CL. IV

SPECIAL DITCH LT.
SP. DITCH LT.

DROP INLET ELEV. 71.0
FLOWLINE ELEV. 66.0
INLET ELEV. 73.8
OUTLET ELEV. 73.1
OUTLET ELEV. 65.8

SUBGRADE TREATMENT
EXCAVATE 1.0' BELOW PROFILE GRADE
FROM STA. 2+00 TO STA. 5+00 CSAH 18 SO.

COMMON EXC.	27469	CU. YD.	
SALVAGED TOPSOIL (EV)	2469	CU. YD.	
SUBGRADE EXC.	5064	CU. YD.	EMB. 26127

SAP 55-612-11

C.S.A.H. 12 SHEET 5 OF 35 SHEETS

CONST. F.E. LT. 53 + 80
18"x 28' C.S. PIPE CULV.
2-18" C.S. PIPE APRONS

℄ Culv. 52+10
Inpl. 24" X 72' CMP SKEWED 30°
REMOVE
MOVE CULV. TO STA. 52+00 SKEW 15°
24"x 84' R.C. PIPE CL. II.
2-24" R.C. PIPE APRONS
F.& I. CONC. PIPE JOINT TIES.
PLACE CULV. ON "B" BEDDING, 3.4 CU.YDS.
PLACE 40 SQ.YDS. SOD AROUND CULV. APRONS
10 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH
5 CU YDS. GRANULAR FILTER 9" DEPTH
CONST. DITCH BLOCK AT INLET

Twp.Rd.Lt. 61+12
Inpl. 15" X 30' CMP
REMOVE
NO CULV. REQ'D.

FE Lt. 65+92
Inpl. 15" X 24' CMP
REMOVE
18"x28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

℄ Culv. 68+53
Inpl. 36"X 72' CMP
REMOVE
30"x 108' R.C. PIPE CULV. CL. III.
2-30" R.C. PIPE APRONS
F.& I. CONC. PIPE JOINT TIES
PLACE CULV. ON "B" BEDDING. 4.3 CU.YDS.
PLACE 40 SQ.YDS. SOD AROUND CULV. APRONS
10 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH
5 CU.YDS. GRANULAR FILTER 9" DEPTH

Res. Drive Lt. 74+99
Inpl. 15"X 24' CMP
REMOVE
OUTLET 43.79' LT. STA. 78+75.79
INLET 43.79' LT. STA. 74+76.21
FROM STA. 74+95 TO STA. 78+57.
CULV. IS LOCATED 25' LT. ℄
18"x 41'0" C.S. PIPE CULV.
2-18" G.S. PIPE APRONS
CULV. LENGTH INCLUDES 2-45° BENDS.
CONST. B624 CONC. CURB & GUTTER
LT. STA. 74+88 TO STA. 78+64

ORONOCO CORPORATE LIMITS
END CONSTRUCTION STA. 4+00
POST 61+07.16
Center Section No. 8 R. 14 W. T. 30 N.
Cast Iron Monument No. Lt. 61+07.16
1" SQ. CAP
82.82'
T-BUR
T.E.
T.S.
S.C.
C.S.
P.C. 50+55.55
P.T. 45+00.50
100'
(2) Brick Posts 3'X 3'
NO CHANGE
OFFICE REVISION
P.I. 55+93.35
Δ RT. 50° 17'
D = 5° 00'
T = 537.80'
L = 1005.67'
E = 119.93'
RATE SUPERELEVATION 0.056'/FT.
270' RUNOFF
~~P.I. 55+93.35~~
~~Δ RT. 51° 17'~~
~~D 4° 00'~~
~~T 473.39'~~
~~L 1057.00'~~
~~E 149.78'~~
P.C.T. 60+61.22
P.O.T. 60+43.71
Cemetery Drive Rt. 52+95
Inpl. 24" X 46' CMP
REMOVE
24"x 32' C.S. PIPE CULV.
2-24" G.S. PIPE APRONS
FE Rt. 53+80
Inpl. 18" X 30' CMP
REMOVE
24"x 28' C.S. PIPE CULV.
2-24" G.S. PIPE APRONS
Twp. Rd. Rt. 61+13
Inpl. 15" X 30' CMP
REMOVE
NO CULV. REQ'D
Pine Grove
Ho.
Silo
Res. Drive Rt. 70+95
Inpl. 18" X 28' CMP
REMOVE
18"x 32' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS
CONST. ACCELERATION LANE RT. STA. 40+00 TO STA. 50+00
Woods
END CONSTRUCTION STA. 5+00
CL. 1.2 ACRES — GR. 1.2 ACRES
TWP. ROAD APPROACH RT. STA. 61+13 CL. 29 GR. 20

B.M. Elev. 1107.02
Spk. in B P 29' Rt.
Sta. 61+58

℄ SUBGRADE ELEV.
Profile 75' Lt.
Profile 75' Rt.
+7.1%
P.V.C. +20.0 ELEV. 72.42
P.I. +50.0
ELEV. 24.25
1460' V.C.
M = 20.6225
SUBGRADE TREATMENT:
EXCAVATE 1.0' BELOW PROFILE GRADE
FROM STA. 53+70 TO STA. 65+25
INLET ELEV. 65.8
OUTLET ELEV. 64.0
P.T. 60+68.96
P.O.T. 60+55.97
EQUATION
+72
P.V.T. +67.01
ELEV. 93.58558
-4.2%
P.V.C. +00 ELEV. 75.4
P.I. +00
ELEV. 67.0
400' V.C.
M = 1.025
INLET ELEV. 77.6
OUTLET ELEV. 67.3
P.V.T. +00 ELEV. 62.7
-2.15%
-2.69%
INLET ELEV. 59.57
STA. 74+76.21

S.A.P. 55-612-11
C.S.A.H. 12
SHEET 6 OF 35 SHEETS

Res. Drive Lt. 77+89
Inpl. 15"X 30" CMP
REMOVE

Farm Drive Lt. 78+53
Inpl. 15" x 24' CMP
REMOVE
NO CULV. REQ'D.

C.S.A.H. 27 LT. STA. 87+40
INPL. 24"x 54' R.C. PIPE & 2-APRONS
CULV. IS 130' NORTH OF C.S.A.H. 12

NO CHANGE

℄ Box Culv. 89+70
Inpl. W 86 X 54'
REMOVE BOX CULV.

122" SPAN x 56' R.C.P.-ARCH CULV. CL. II A
122" SPAN x 40' R.C.P.-ARCH CULV. CL. III A
2-122" SPAN R.C.P. APRONS
F & I CONC. PIPE JOINT TIES
PLACE CULV. ON "B" BEDDING 18.1 CU. YD.
70 CU. YD. RANDOM RIPRAP CL. III 18" DEPTH
30 CU. YD. GRANULAR FILTER 9" DEPTH

CONST. 10" TILE CROSSING STA. 89+62
10"x 132' C.S. PIPE DRAIN
2-4 LIN. FT. C.S. INSPECTION TEES 65' LT. & 65' RT.

F.E. LT. STA. 94+00
NO CULV. INPL.
18" x 28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

N

Pine Grove
Ho.
T-BUR
Pl. 87+39.52
Δ = 10°-30'
R = 50'
C.S.A.H. 27
P.O.T. 94+20.12
TEMPORARY
EASEMENT
Shed
Dryer Complex
T.E.

CONST. F.E. RT. STA. 75+00
18"x 28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

F.E. Rt. 83+62
No Culv. Inpl.
18" x 28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

Res. Drive Rt. 87+52
Inpl. 15" X 24' CMP
REMOVE
18" x 32" C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

FE Rt. 91+08
No Culv. Inpl.
18"x 28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

FE Rt. 93+47
No Culv. Inpl.
NO CULV. REQ'D.

FE Rt. 100+89
Inpl. 15" X 24' CMP
REMOVE
18"x 28' C.S. PIPE CULV.
2-18" G.S. PIPE APRONS

CL. 3 — GR. 3

B.M. Elev. 1059.83
Spk. in PP 31' Lt.
Sta. 76+39

B.M. Elev. 1037.27
Spk. in TP 54' Rt.
Sta. 87+07

CL. 1 — GR. 1

B.M. Elev. 1024.04
Spk. in PP 33' Lt.
Sta. 101+07

℄ SUBGRADE ELEV.

INLET ELEV. 59.57
STA. 74+76.21

18" x 410' C.S. PIPE CULV.
2-45° BENDS INCLUDED
-2.15 %

P.V.T. +00
ELEV. 62.7

OUTLET ELEV. 59.75
STA. 78+75.79

Profile 75' Lt.
Profile 75' Rt.

P.V.C. +14.28571
ELEV. 45.19345

P.I. +14.28571
ELEV. 38.74287
600' V.C.
M = 1.8375

P.V.T. +14.28571
ELEV. 39.64286

+0.3 %

P.V.C. +01.61629
ELEV. 40.60483

P.I. +01.61290
ELEV. 41.70484
600' V.C.
M = 2.325

P.V.T. +01.61290
ELEV. 33.30484

-2.8 %

P.V.C. +50.0
ELEV. 26.35

P.I. +00
ELEV. 19.35
500' V.C.
M = 1.53125

SUBGRADE TREATMENT
EXCAVATE 1.0' BELOW PROFILE GRADE
FROM STA. 72+00 TO STA. 88+00 AND
FROM STA. 90+00 TO STA. 99+50

TILE INLET ELEV. 24.5
OUTLET ELEV. 24.0

INLET ELEV. 25.1
OUTLET ELEV. 24.5

COMMON EXC.	21889	CU. YDS.
SALVAGED TOPSOIL (EV)	2310	CU. YDS.
ROCK EXC.	37	CU. YDS.
SUBGRADE EXC.	3165	CU. YDS.
EMB.	20098	

COMMON EXC.	824 CU. YDS.
SALVAGED TOPSOIL (EV)	121 CU. YDS.
ROCK EXC.	150 CU. YDS.
SUBGRADE EXC.	274 CU. YDS.
EMB.	1026

Drive Lt. 105+68
No Culv. Inpl.

30"x32' C.S. PIPE CULV.
2-30"G.S. PIPE APRONS

℄ Culv. 106+04
Inpl. 24" X 36'

NO CULV. REQ'D

Drive Lt. 107+73
No Culv. Inpl.

REMOVE
30"x70'R.C.PIPE CULV. CL. II.
2-30"R.C. PIPE APRONS
F. & I. CONC. PIPE JOINT TIES.
PLACE CULV. ON "B" BEDDING. 2.8 CU.YDS.
PLACE 40 SQ.YDS. SOD AROUND CULV. APRONS.
10 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH.
5 CU.YDS. GRANULAR FILTER 9" DEPTH.
CONST. DITCH BLOCK LT. STA. 106+50

Farm Ent. 108+96
Inpl. 15" X 40' CMP

REMOVE
18"x32'C.S.P. CULV.
2-18"G.S.P. APRONS

Res. Drive 112+86
Inpl. 18" X 24' CMP.

REMOVE
18"x32'C.S. PIPE CULV.
2-18"G.S. PIPE APRONS

F.E. Lt. 113+86
No Culv. Inpl.

18"x28'C.S. PIPE CULV.
2-18"G.S. PIPE APRONS

℄ Culv. 120+18
Inpl. 30"X 47' CMP

REMOVE
30"x82' R.C. PIPE CULV. CL. II.
2-30"R.C. PIPE APRONS
F. & I. CONC. PIPE JOINT TIES
PLACE CULV. ON "B" BEDDING. 3.3 CU.YDS.
PLACE 40 SQ.YDS. SOD AROUND CULV. APRONS.
10 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH.
5 CU.YDS. GRANULAR FILTER 9" DEPTH.
CONST. DITCH BLOCK AT INLET.

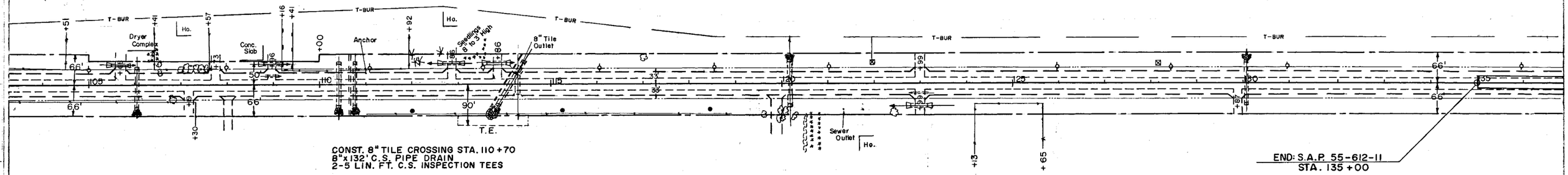
FE Lt. 122+99
No Culv. Inpl.

NO CULV. REQ'D.

℄ Culv. 130+03
Inpl. 24" X 39' CMP

REMOVE
24"x80' R.C. PIPE CULV. CL. II.
2-24"R.C. PIPE APRONS.
F. & I. CONC. PIPE JOINT TIES.
PLACE 29 SQ.YDS. SOD AROUND CULV. APRONS.
PLACE CULV. ON "B" BEDDING. 2.6 CU.YDS.
7 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH.
4 CU.YDS. GRANULAR FILTER 9" DEPTH

CONST. B624 CONC. CURB & GUTTER
LEFT STA. 106+35 TO STA. 108+00



CONST. 8" TILE CROSSING STA. 110+70
8"x132' C.S. PIPE DRAIN
2-5 LIN. FT. C.S. INSPECTION TEES

END: S.A.P. 55-612-11
STA. 135+00

CONST. F.E. RT. 108+00
NO. CULV. REQ'D.

F.E. Rt. 107+19
No Culv. Inpl.

NO CULV. REQ'D.

℄ Culv. 110+45
Inpl. 36"X 56' RCP

EXTEND
INLET 36"x14' R.C.P. CULV. CL. II.
OUTL. 36"x8' R.C.P. CULV. CL. II.
2-36"R.C.P. APRONS
F. & I. CONC. PIPE JOINT TIES.
PLACE CULV. ON "B" BEDDING.
1 CU.YD.
PLACE 50 SQ.YDS. SOD AROUND CULV. APRON
13 CU.YDS. RANDOM RIPRAP CL. III. 18"DEPTH.
7 CU.YDS. GRAN. FILTER 9"DEPTH.

℄ Culv. 110+77
Inpl. 36"X 40' CMP

REMOVE
36"x78'R.C.P. CULV. CL. II.
2-36"R.C.P. APRONS
F. & I. CONC. PIPE JOINT TIES.
PLACE CULV. ON "B" BEDDING.
3.7 CU.YDS.
PLACE 50 SQ.YDS. SOD AROUND CULV. APRON.
13 CU.YDS, RANDOM RIP-RAP CL. III. 18" DEPTH
7 CU.YDS. GRANULAR FILTER 9" DEPTH.

℄ Box Culv. 114+29
Inpl. C 84 X 29'

REMOVE BOX CULV.
MOVE CULV. TO STA. 114+15 SKEW 30°
102" SPAN x 94' R.C. PIPE-ARCH CULV. CL. IIA.
2-102" SPAN R.C. PIPE-ARCH APRONS.
F. & I. CONC. PIPE JOINT TIES.
PLACE CULV. ON "B" BEDDING. 14.8 CU.YDS.
65 CU.YDS. RANDOM RIP-RAP CL. III. 18" DEPTH.
26 CU.YDS. GRANULAR FILTER 9" DEPTH.
CONST. TIMBER WEIR AT INLET APRON.

CL. 19 — GR. 14

Res. Drive Rt. 122+99
Inpl. 24" X 20' CMP

8" TILE OUTLET 18' LT. STA. 114+25
REMOVE 36 LIN. FT. SUBSURFACE DRAIN
F. & I. 3 LIN. FT. C.S. INSP. TEE 60' LT.
STA. 114+28 ± SKEW 30°
F. & I. 10"x138' C.S. PIPE DRAIN.
OUTLET ELEV. 12.0
F. & I. OUTLET SCREEN FOR 10" C.M. PIPE.

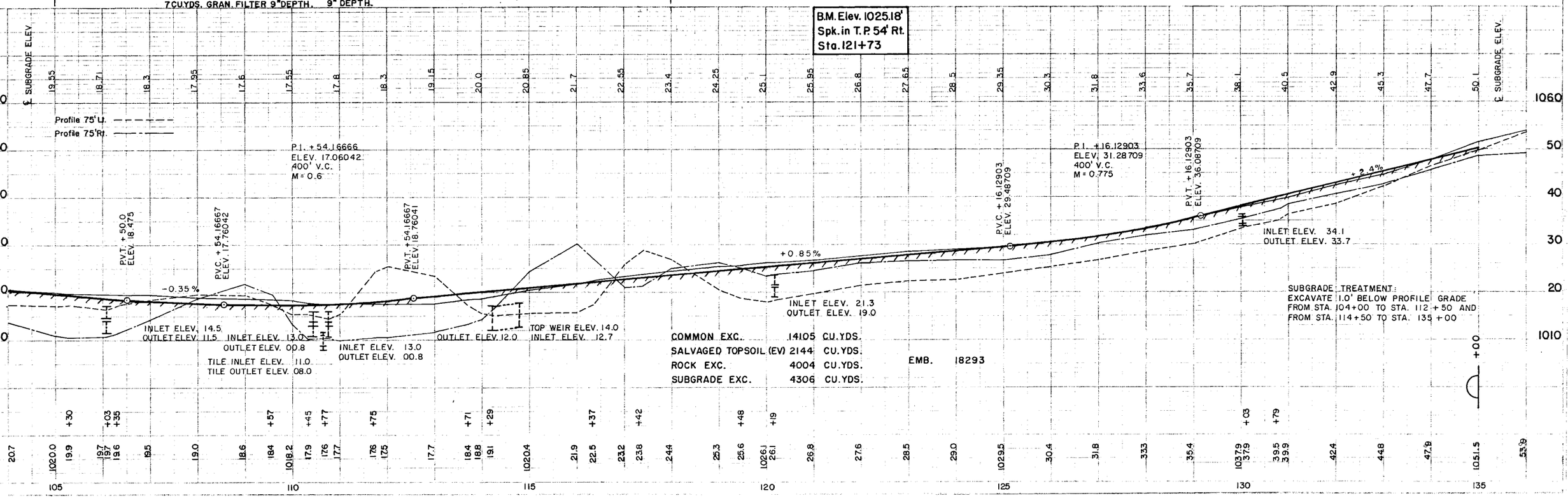
REMOVE
24"x32' C.S. PIPE CULV.
2-24"G.S. PIPE APRONS.

CONST. F.E. RT. STA. 119+90
NO CULV. REQ'D.

FE Rt. 129+87
No Culv. Inpl.

NO CULV. REQ'D.

B.M. Elev. 1025.18'
Spk. in T.P. 54' Rt.
Sta. 121+73



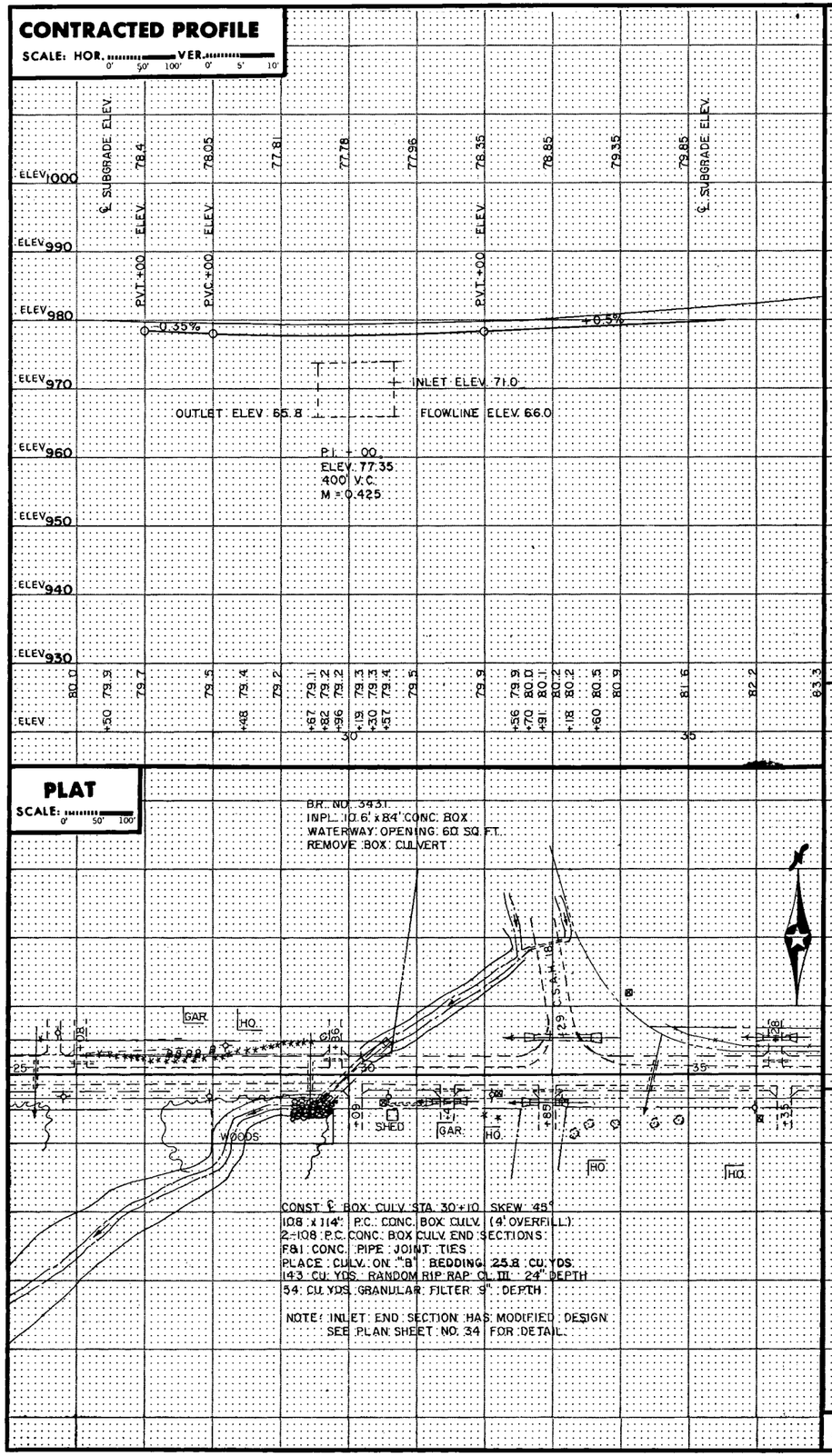
SUBGRADE TREATMENT:
EXCAVATE 1.0' BELOW PROFILE GRADE
FROM STA. 104+00 TO STA. 112+50 AND
FROM STA. 114+50 TO STA. 135+00

COMMON EXC.	14105	CU.YDS.
SALVAGED TOPSOIL (EV)	2144	CU.YDS.
ROCK EXC.	4004	CU.YDS.
SUBGRADE EXC.	4306	CU.YDS.

EMB. 18293

CONTRACTED PROFILE

SCALE: HOR. 0' 50' 100' VER. 0' 5' 10'



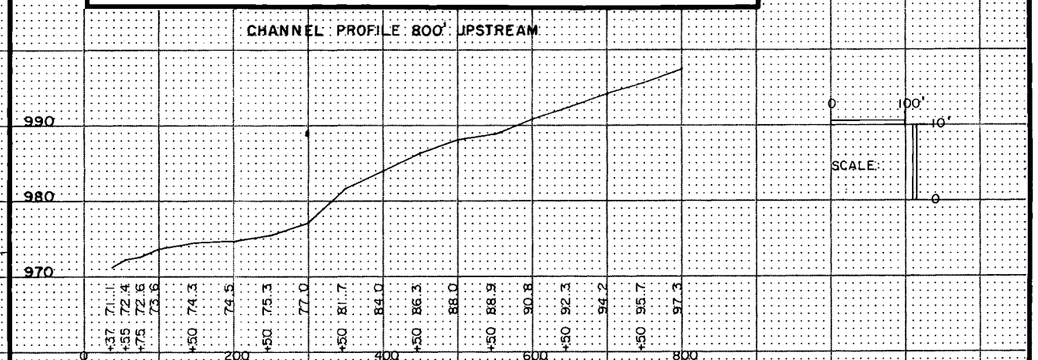
PLAT

SCALE: 0' 50' 100'

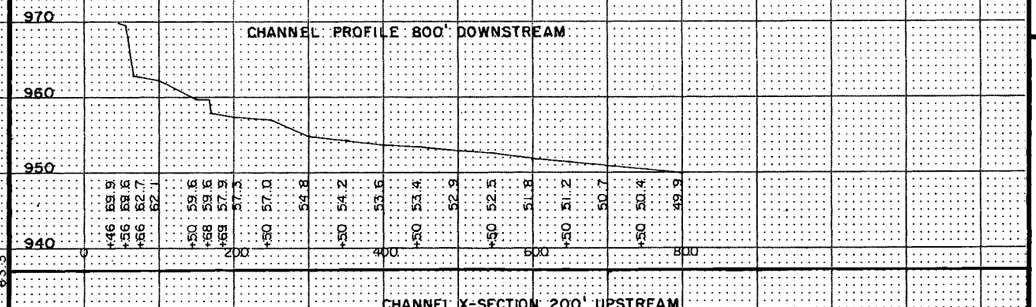
TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN

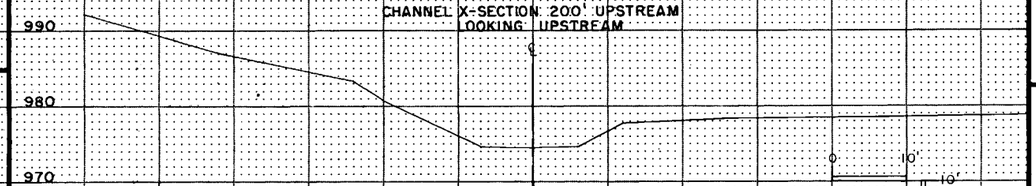
CHANNEL PROFILE 800' UPSTREAM



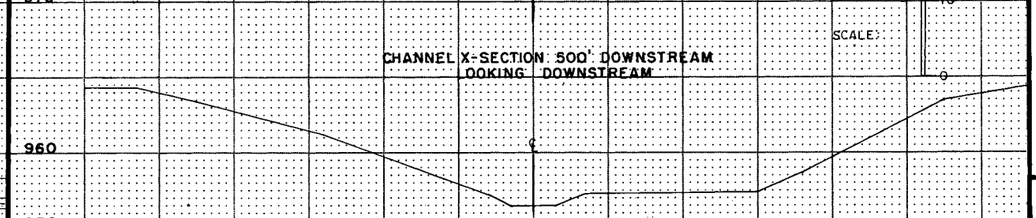
CHANNEL PROFILE 800' DOWNSTREAM



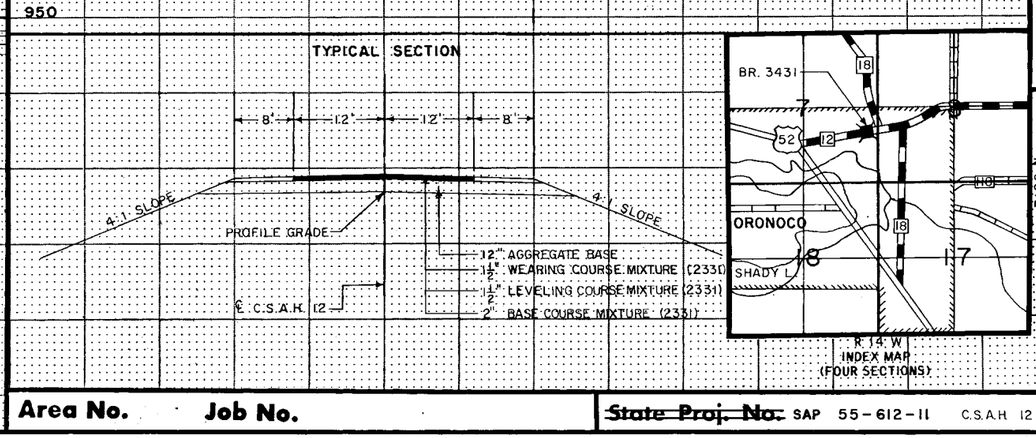
CHANNEL X-SECTION 200' UPSTREAM
LOOKING UPSTREAM



CHANNEL X-SECTION 500' DOWNSTREAM
LOOKING DOWNSTREAM



TYPICAL SECTION



Fed. Proj. No.

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.

2. Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway) :Given location, type, length, height above high water, cross-sectional area etc.

3. Apparent highwater elevation ..... Obtained from.....

4. Other data: Approx. velocity of water at time of survey.....

HYDRAULIC ENGINEERS RECOMMENDATION

DATE 3-14-84

Stream or ditch designation UNNAMED

Drainage area 142 ACRES

Max. flood on record ..... Design flood (100 yr. freq.) 370 C.F.S.

Max. observed highwater elevation 975± Design highwater elevation 974.9

Design mean velocity through structure 10.9 F.P.S.

Low superstructure at or above elevation 973.8

Flowline elevation 971.0 Skew angle 45°

Waterway area req'd. below elevation ..... = ... Sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is ..... C.F.S. at stage ..... and mean velocity of ..... F.P.S. with ..... Ft. swellhead. The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of Natural Resources.

FOUNDATION ENGINEERS RECOMMENDATION

DATE .....

Bridge survey sheets made from: BRIDGE SURVEY CONDUCTED BY OLMSTED COUNTY

Bench mark elevation 977.24 (M.S.L. 1929 Adj.)
Location 3/4" REINF. ROD SE. COR. BR. STA. 30+31

MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT MILE POINT 0.5 ON C.S.A.H. 12 (T.H., C.S.A.H., C.R. etc.)

PROPOSED BRIDGE LOCATED 0.5 MILES E OF JCT. T.H. 52 & C.S.A.H. 12

SEC. 7 TWP. T108N R. R14W,

TOWNSHIP ORONOCO COUNTY OLMSTED

BRIDGE NO. 3431

Area No. Job No.

~~State Proj. No.~~ SAP 55-612-11 C.S.A.H. 12

Sheet No. 32 of 35 Sheets

Fed. Proj. No.

0 10'

SCALE: 10' 0'

+00

50'

+20 END CURB & GUTTER

C.B. NO. 5

B624 CONC. CURB & GUTTER

8' BITUMINOUS SHOULDER

12'

54'

15" R.C. PIPE CL. IV

60°

45°

℄ OF LAYOUT
℄ C.S.A.H. 12

29 +00

30 +00

31 +00

12'

8' BITUMINOUS SHOULDER

54'

50'

PLAN

100

+00

ELEVATION

0' 10'

10'

0'

SCALE:

℄ PROFILE
PROFILE 20' LT.
PROFILE 20' RT.

24" DEPTH RANDOM RIP RAP CL. III
9" DEPTH GANULAR FILTER

1000
990
980
970
960

℄ SUBGRADE ELEV.

15" R.C. PIPE STORM SEWER OUTLET
ELEV. 71.42

DROP INLET ELEV. 71.0
FLOWLINE ELEV. 66.0
108 P.C. CONC. BOX CULV.

OUTLET ELEV. 65.8
108 P.C. CONC. BOX CULV.

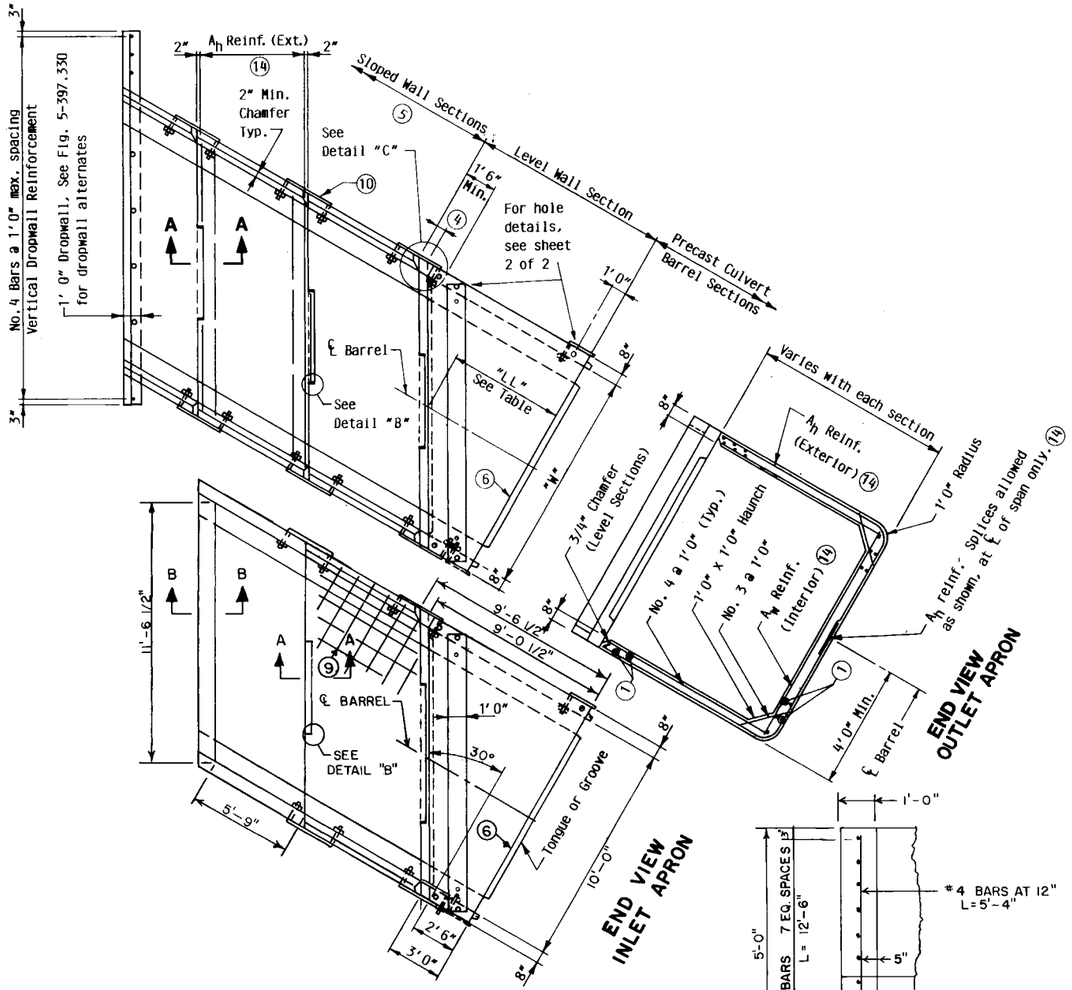
79.2 79.1 79.2 79.2 79.3 79.3 79.4 79.5

+67 +82 +96 +19 +30 +57 31

29 30

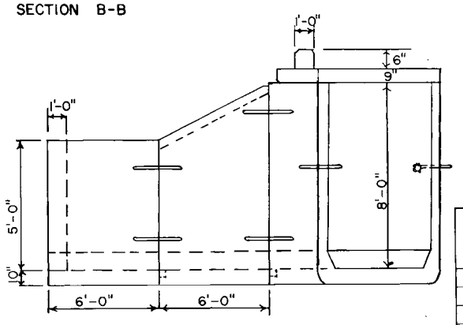
BORINGS SHOWN [ ] TAKEN WITH
STD 140 LB HAMMER
30 INCH DROP
2 INCH O.D. SAMPLER

BRIDGE SURVEY PLAN AND PROFILE	DES:	DR:	APPROVED:	Bridge No.
CSAH 12	CHK:	CHK:		
SAP 55-612-11	Sheet No. 33 of 35 Sheets			3431



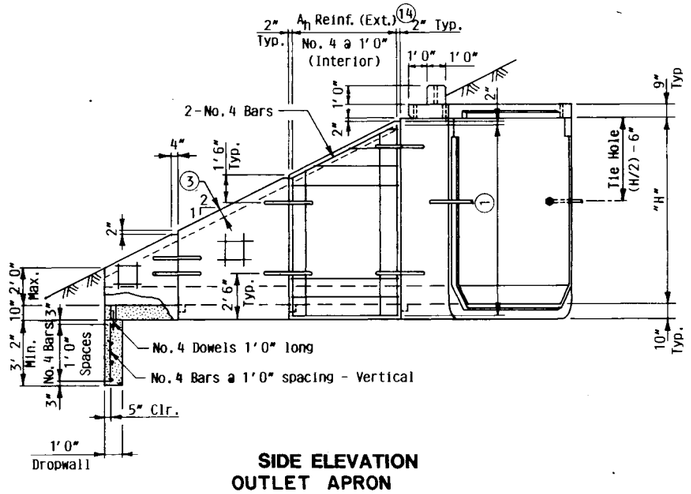
PLAN VIEW

SECTION B-B

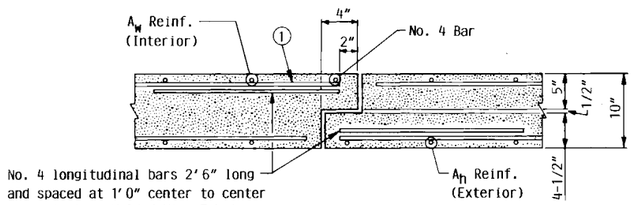


REINF SIZE AND DIMENSION SIMILAR TO OUTLET APRON.
DROPWALL NOT REQIRED ON INLET APRON.

SIDE ELEVATION INLET APRON

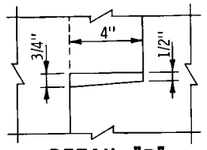


SIDE ELEVATION OUTLET APRON

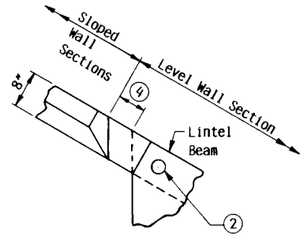


No. 4 longitudinal bars 2'-6" long and spaced at 1'-0" center to center or equivalent Welded Wire Fabric.

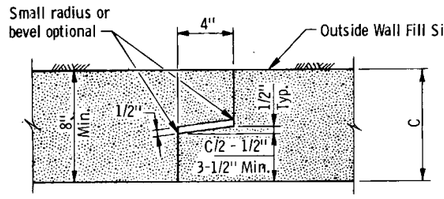
SECTION A-A



DETAIL "B"

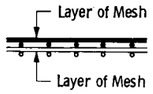


DETAIL "C"



TONGUE AND GROOVE JOINT

Make dimension of tongue or groove on adjacent precast barrel sections so inside walls are flush.



FABRIC LAYER DETAIL

When more than one layer of steel fabric is used to obtain the required reinforcement areas, the wire of the steel fabric shall be placed as shown in the Fabric Layer Detail.

"L" TABLE

CULVERT HEIGHT "H"	END SECTIONS "L"
4 ft.	4 ft.
5 ft.	6 ft.
6 ft.	8 ft.
7 ft.	10 ft.
8 ft.	12 ft.
9 ft.	14 ft.
10 ft.	16 ft.
12 ft.	20 ft.

"LL" TABLE

WIDTH "W"	SKEW ANGLE 15°	SKEW ANGLE 30°
8 ft.	3' 9"	5' 2"
10 ft.	4' 0"	5' 9"
12 ft.	4' 3"	6' 4"

NOTES:

The steel reinforcement shall conform to the applicable requirements of AASHTO M259. The reinforcement shall be Grade 60 or better.

The maximum size of reinforcing bars shall be No. 6. The maximum mesh size shall be 1/2" dia. (1 or 2 layers).

Finish all vertical edges of concrete with 3/4" chamfer or radius unless otherwise noted.

Dropwall shall be concrete Mix 1A43,3Y43 or 3W46.

Precast Concrete Sections shall be Mix 3W46 with no calcium chloride allowed.

Limits for excavation for dropwall to be approximately the same as dropwall dimensions.

1-1/2" minimum and 2" maximum concrete cover on all reinforcement (Typical for inside and outside walls).

Culverts to be constructed as per Spec., 2411 except as noted.

See "Precast Concrete Box Culvert" Standard Sheet 35 No. 5-397.701 for design and reinforcement requirements, except as noted.

One of the following combinations of steel reinforcement may be used:

(a) 1 or 2 layers of mesh or
(b) 1 layer of mesh and 1 layer of reinforcement bars or
(c) 1 layer of reinforcement bars.

If (b) or (c) are used, 1.5.37(B) of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges" shall be reviewed. The reinforcement shall be developed in accordance with applicable parts of 1.5.13.22 of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges".

(1) Longitudinal reinforcement parallel to side walls of end sections shall have a minimum of 0.06 sq. in. per ft. on all faces.

(2) 1" dia. x 1'-0" long steel dowel. 2" dia. hole in the top of the level wall section. Fill hole to top of lintel beam with an approved grout, see Note 11.

(3) See Embankment Protection for Box Culverts, sheet ____.

(4) Variable. 6" minimum to 2'-0" maximum.

(5) Number of sections varies with "H" dimensions.

(6) Check the location to determine whether a tongue or a groove is used.

(7) For a ℄ of culvert skew angle of 22-1/2° to 37-1/2°, use a 30° skew end section. For 7-1/2° to 22-1/2°, use a 15° skew end section.

(8) For spans of 10' to 14', use No. 9 bar. For spans under 10', use No. 8 bar.

(9) See Section A-A for additional reinforcement.

(10) Culvert ties are to be 1" dia. rods. See Standard Plate No. 3145 for connection details.

(11) Grout shall consist of 1 part cement and 2 parts sand. Use Type 1A air entrained Portland Cement. Grout mix shall have a maximum slump of 4".

(12) Two ties are required at angled wall joint connections. Bend ties to fit angle. No tongue or groove required.

(13) Apron widths up to 12 ft.=5' 0" tongue & 5' 1" groove. Apron widths over 12 ft.=8' 0" tongue & 8' 1" groove. Center tongue & groove on ℄ of each apron joint. Use same size tongue & groove in each apron assembly.

(14) See sheet 2 of 2 for A_h and A_w reinforcement tables.

MODIFIED

December 3, 1984

FIG. 5-397.710 (1 of 2)

PRECAST CONC. END SECTIONS - TYPE III SKEWED SINGLE OR MULTI-BARREL	DES:	DR:	APPROVED:	Bridge No.
	CHK:	CHK:		
	Sheet No. 34 of 35 Sheets			3431

S.A.P. 55-612-11

A_w REINFORCEMENT TABLE ②

HEIGHT OF EACH END SECT.	MAXIMUM APRON WIDTH OF EACH SECTION AT THE RESPECTIVE HEIGHT													
	8' 0" - 11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"	17' 0"	18' 0"	19' 0"	20' 0"	21' 0"	22' 0"	23' 0"	24' 0"
4' 0"	No. 4 @ 1' 0"	———	———	———	———	No. 4 @ 10"	No. 4 @ 8-1/2"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9-1/2"	No. 6 @ 8-1/2"
5' 0"	No. 4 @ 1' 0"	———	———	No. 4 @ 11"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"	No. 6 @ 9"	No. 6 @ 8"	No. 6 @ 7-1/2"
6' 0"	No. 4 @ 1' 0"	———	———	No. 4 @ 10-1/2"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9"	No. 6 @ 8"		
7' 0"	No. 4 @ 1' 0"	———	No. 4 @ 11-1/2"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 10-1/2"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 11"	No. 6 @ 10"	No. 6 @ 9"	No. 6 @ 8"		
8' 0"	No. 4 @ 1' 0"	———	No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10-1/2"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"				
10' 0"	No. 4 @ 1' 0"	———	No. 4 @ 10"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"						
12' 0"	No. 4 @ 1' 0"	No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 8-1/2"								

A_h REINFORCEMENT TABLE

HEIGHT "H"	"A_h"
8 ft. or less	No. 4 @ 1' 0"
10 ft.	No. 5 @ 8"
12 ft.	No. 6 @ 6"

NOTE: H is the highest vertical dimension of each section shown.

NOTES:

Curb is required and may be cast monolithically or cast separately.

① 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the level wall section. 3" dia. hole in the lintel beam. Fill the hole to the top of the lintel beam with an approved grout.

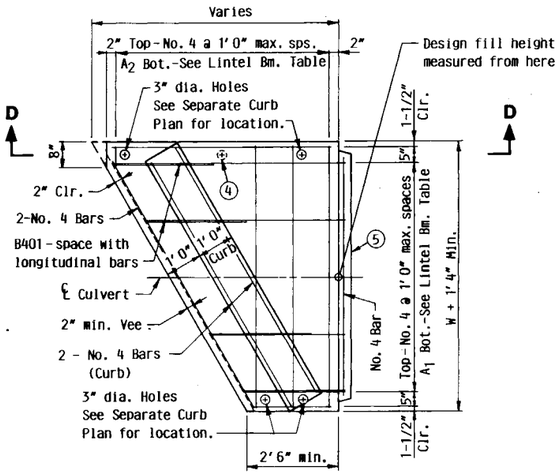
② Use the largest steel area from the table across each individual section.

③ 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the lintel beam. 3" dia. hole in the curb. Fill the hole to the top of the curb with an approved grout.

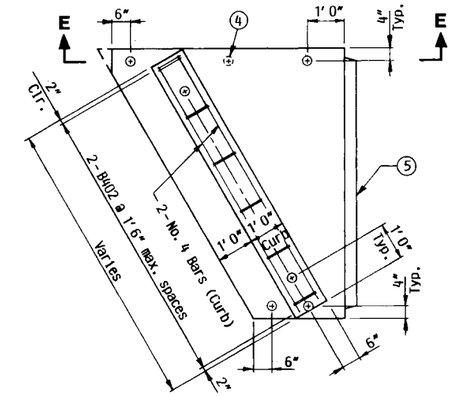
④ Cast an additional 3" hole at midpoint of beam when side of lintel beam is over 6 ft.

⑤ Check the location to determine whether a tongue or a groove is used.

⑥ For spans of 10' to 14', use No. 9 bar. For spans under 10', use No. 8 bar.

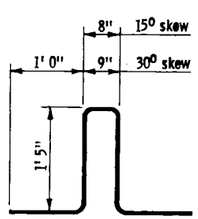


PLAN OF LINTEL BEAM

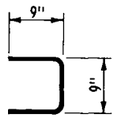


PLAN OF LINTEL BEAM

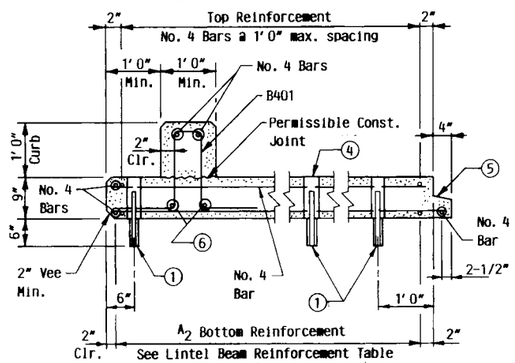
See Integral Curb Plan for lintel beam reinforcement



B401

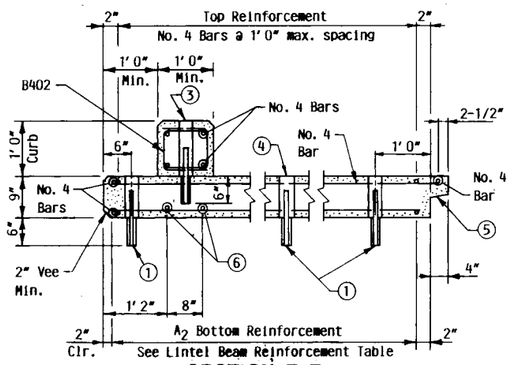


B402



SECTION D-D

(Integral Curb With Tongue)



SECTION E-E

(Separate Curb With Groove)

LINTEL BEAM REINFORCEMENT TABLE

W CULVERT WIDTH	4 FT. DESIGN FILL HEIGHT			2 FT. DESIGN FILL HEIGHT		
	SLAB THICK.	BOTTOM REINFORCEMENT		SLAB THICK.	BOTTOM REINFORCEMENT	
		A_1	A_2		A_1	A_2
Under 6'	9"	No. 4 @ 1' 2"	No. 4 @ 9-1/2"	9"	No. 4 @ 1' 6"	No. 4 @ 1' 4"
6'+ to 8'	9"	No. 4 @ 8"	No. 5 @ 8"	9"	No. 4 @ 1' 1"	No. 4 @ 9"
8'+ to 10'	9"	No. 5 @ 8"	No. 6 @ 7-1/2"	9"	No. 4 @ 9"	No. 4 @ 6"
10'+ to 12'	9"	No. 5 @ 6"	No. 6 @ 6"	9"	No. 5 @ 9"	No. 5 @ 6"

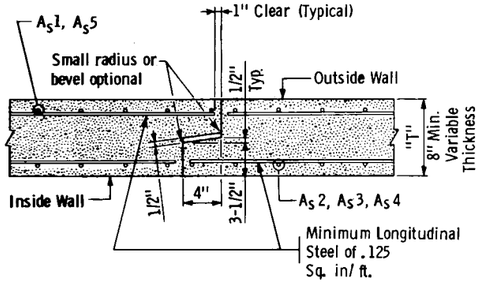
FIG. 5-397.710 (2 of 2)

December 3, 1984

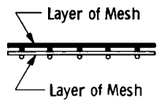
SAP 55-612-11

PRECAST CONC. END SECTIONS · TYPE III SKEWED SINGLE OR MULTI-BARREL	DES:	DR:	APPROVED:	Bridge No. 3431
	CHK.	CHK:		
	Sheet No. 34 A of 35 Sheets			

TELEPHONE POST TITLE 5/83 10PPS

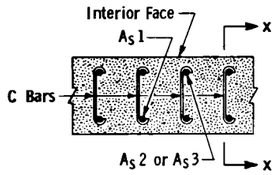


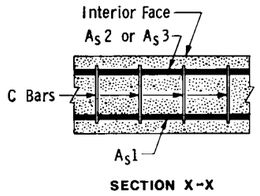
TONGUE AND GROOVE JOINT DETAIL



FABRIC LAYER DETAIL

When more than one layer of steel fabric is used to obtain the required reinforcement areas, the wires of the steel fabric shall be placed as shown in the Fabric Layer Detail.



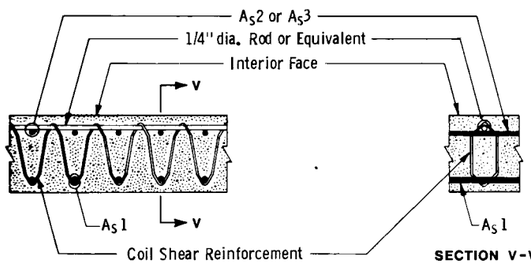


SECTION X-X

SHEAR REINFORCEMENT DETAIL

C BAR OPTION

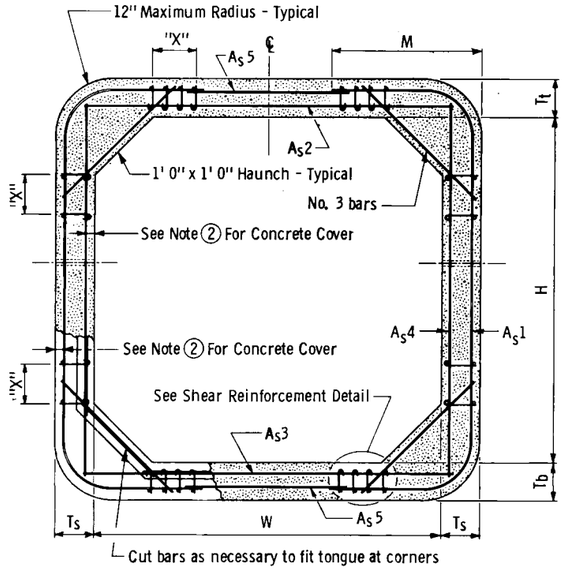
C Bars shall have 135° Min. and 180° Max. hooks



SECTION V-V

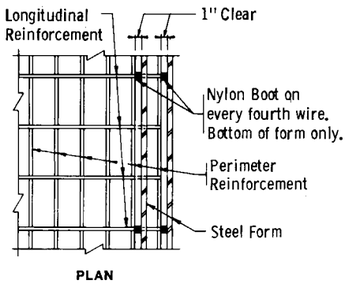
SHEAR REINFORCEMENT DETAIL

COIL OPTION

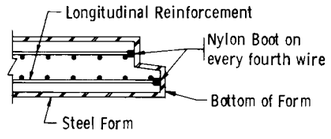


TRANSVERSE BARREL SECTION

(Bar Reinforcement Option Shown)

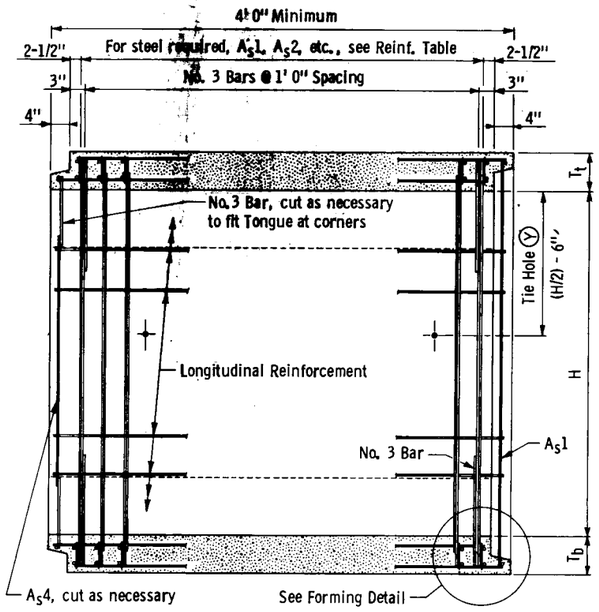


PLAN



SECTION

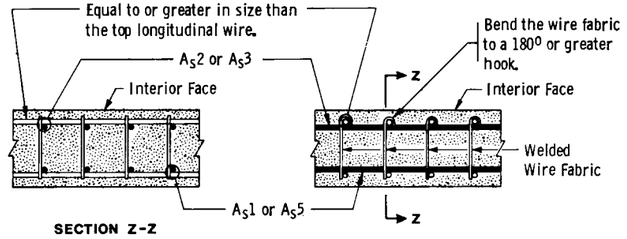
FORMING DETAIL



Ⓨ Culvert ties are to be 1" diameter rods. See Standard Plate No. 3145 for connection details.
All holes in the barrels are to be approved by the engineer.

LONGITUDINAL BARREL SECTION

(Bar Reinforcement Option Shown)



SECTION Z-Z

SHEAR REINFORCEMENT DETAIL

J BAR OPTION

DIMENSION TABLE

Dimensions	Height of Overfill Ⓕ				
	4'				
"W" (in Ft.)	10'				
"H" (in Ft.)	8'				
T_t (in inches)	9				
T_b (in inches)	10				
T_s (in inches)	8				
"M" (in inches)	29				
Weight (lbs./Ft.)	4470				

REINFORCEMENT TABLE

Reinforcement	Height of Overfill Ⓕ							
	4'						4'	
	*Area	Length	*Area	Length	*Area	Length	*Area	Length
A_s1	.362	13'-4"					.334	13'-4"
A_s2	.502	10'-3"					.464	10'-3"
A_s3	.569	10'-3"					.526	10'-3"
A_s4	.192	8'-3"					.192	8'-3"
A_s5	.192	8'-0"					.192	8'-0"
	①						②	

* Square inches per lineal foot of barrel

① fy = 60,000 PSI
② fy = 65,000 PSI

SHEAR REINFORCEMENT TABLE

Ⓕ Height of Overfill	NONE REQUIRED — Shear Reinforcement Requirements ☆								
	Top of Culvert			Bottom of Culvert			Side of Culvert		
	**Area	Maximum Spacing	"X" (in inches)	**Area	Maximum Spacing	"X" (in inches)	**Area	Maximum Spacing	"X" (in inches)

☆ When shear reinforcement requirements are minimal, a minimum of 0.06 sq. in. per sq. ft. of shear steel shall be used.
** Square inches per linear foot of barrel per line of shear reinforcement.
"X" = Distance from end of haunch.

NOTES:

REINFORCEMENT

1. The steel fabric, shear reinforcement and reinforcement bars used shall conform to the applicable requirements of AASHTO M 259. The reinforcing shall be Grade 60.
2. 1-1/2" min. and 2" max. concrete cover on all reinforcement, including the shear reinforcement, (Typical for inside and outside walls). Except for tongue & Groove detail.
3. One of the following combinations of steel reinforcement may be used:
   (a) 1 or 2 layers of mesh or
   (b) 1 layer of mesh and 1 layer of reinforcement bars or
   (c) 1 layer of reinforcement bars.
   If (b) or (c) are used 1.5.37 (B) of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges" shall be reviewed. The reinforcement shall be developed in accordance with applicable parts of 1.5.13-.22 of the 1977 & Interim AASHTO "Standard Specifications for Highway Bridges".
4. Longitudinal reinforcement parallel to the axis of the culvert shall have a min. of 0.06 square inches per peripheral foot on all faces of the barrel. Except in Tongue & Groove.
5. The anchorage of the shear reinforcement shall be in accordance with 1.5.21 of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges".
6. The max. shear reinforcement spacing in the longitudinal direction shall be 6 inches.
7. The transverse steel areas in each face shall be a minimum of 0.192 sq. in. per linear feet of barrel.
8. The steel fabric shall have a minimum lap of the spacing of the cross wires plus 2".
9. The max. size of reinforcement bars shall be No. 6. The max. mesh size shall be 1/2" dia. (1 or 2 layers).
10. The spacing center to center of the circumferential wires shall not be less than 2 inches nor more than 4 inches. The spacing center to center of the longitudinal wires shall not be more than 8 inches.
11. Welding will not be allowed on reinforcement bars or steel fabric, except that the original welding required to manufacture wire fabric is acceptable.
12. When reinf. bars are used, service stress must be checked according to AASHTO 1.5.39
13. When reinforcement bars are cut, additional reinforcement shall be added on both sides of the cut member to replace or exceed the steel area removed.

BASIS OF DESIGN

A. The design shall be in accordance with applicable 1977 & Interim AASHTO Specs. & the following criteria.
B. Ultimate strength design shall be according to 1977 & Interim AASHTO "Standard Specifications for Highway Bridges" using U=1.3 [B_DD+B_L (L+I) + $B_E E_V$ + $B_E E_L$] where B_D = 1.0, B_E = 1.0, B_L = 1.67, E_V = vertical earth load and E_L = lateral earth pressure. Lateral pressure coefficients shall range from. .16 to 1.0.
C. Live Load is based on HS20 or Military Loading with impact and distribution in accordance with 1977 & interim AASHTO "Standard Specifications for Highway Bridges".
D. Yield design strength of reinforcement is limited to 60,000 psi. Service stresses are checked according to 1.5.37 (B) of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges". — SEE REINFORCEMENT TABLE
E. Concrete shall be mix No. 3w46 with no calcium chloride allowed.
F. Minimum overfill shall be two (2) feet.

TOLERANCES

See AASHTO M 259, except for concrete cover over reinforcement.
Barrel sections which are cast with a draft in the forms shall be laid with the narrowest part of the section downstream.

Fed. Proj. No.

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNED.....

DATE..... REG. NO. .....

C.S. A.H. 12 HIGHWAY NO.
MINNESOTA
DEPARTMENT OF TRANSPORTATION

Bridge No. 3431

IDENTIFICATION NO. 113

PRECAST CONCRETE BOX CULVERT

SEC. 7 T108 N R.14 W
ORONOCO TOWNSHIP OLMSTED COUNTY

APPROVED .....

BRIDGE ENGINEER DIRECTOR, ENGINEERING SERVICES

DES.	DR.
CHK.	CHK.

FIG. 5-397.701
Approved: April 26, 1982

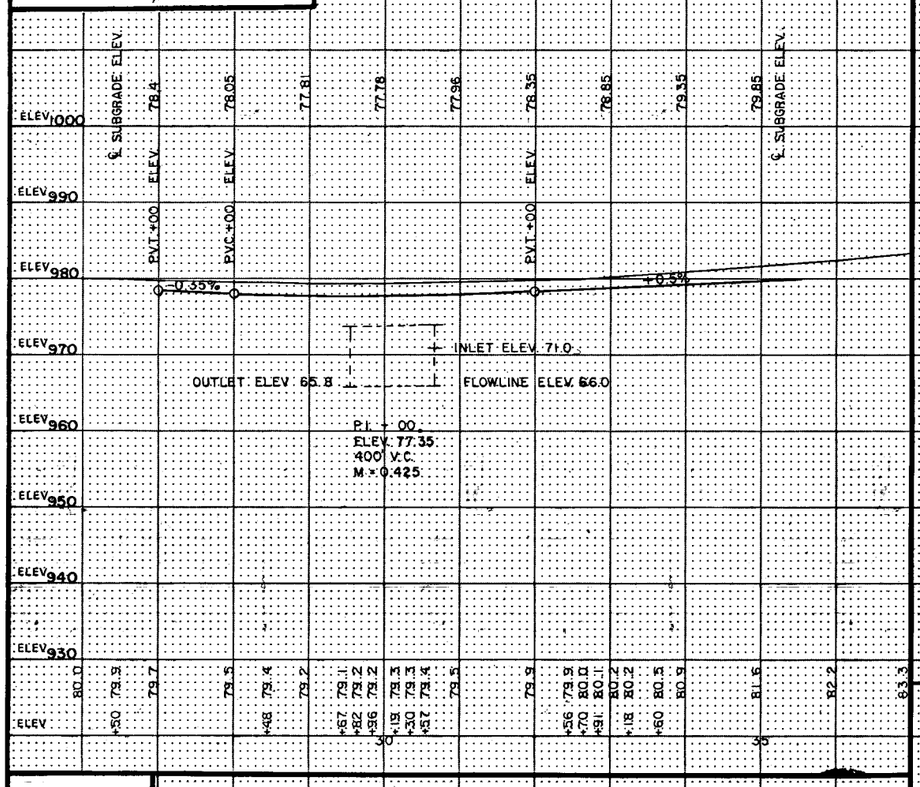
BARREL DETAILS

~~State Proj. No.~~ SAP 55-612-11 C.S.A.H. 12

Sheet No. 35 **of** 35 **Sheets**

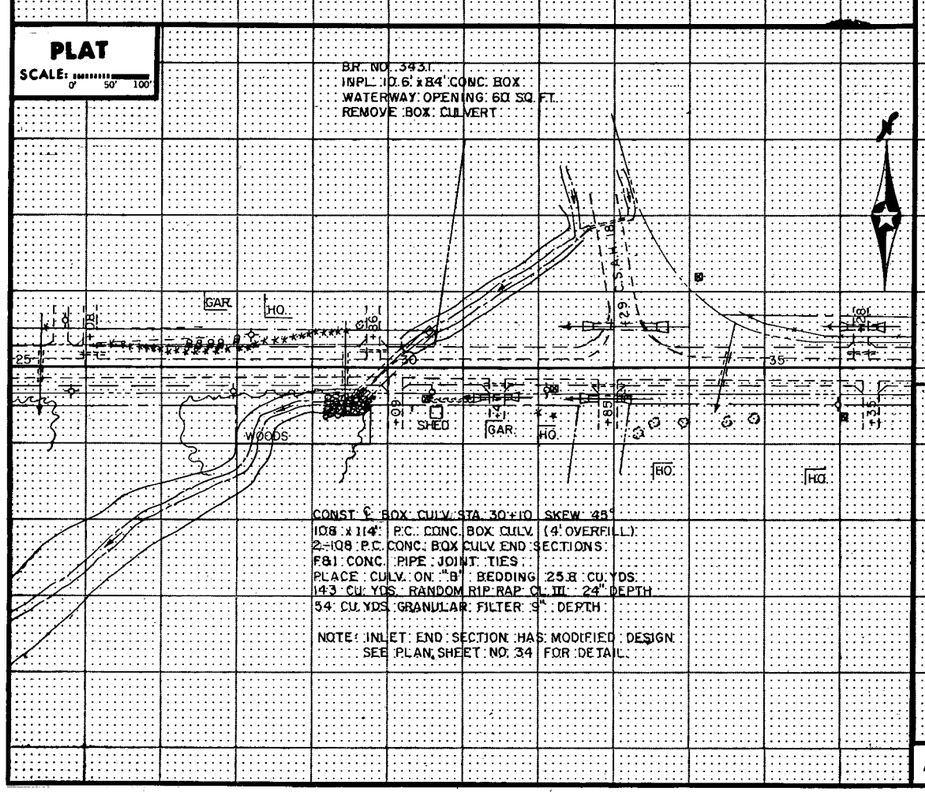
CONTRACTED PROFILE

SCALE: HOR. 0' 50' 100' VER. 0' 5' 10'



PLAT

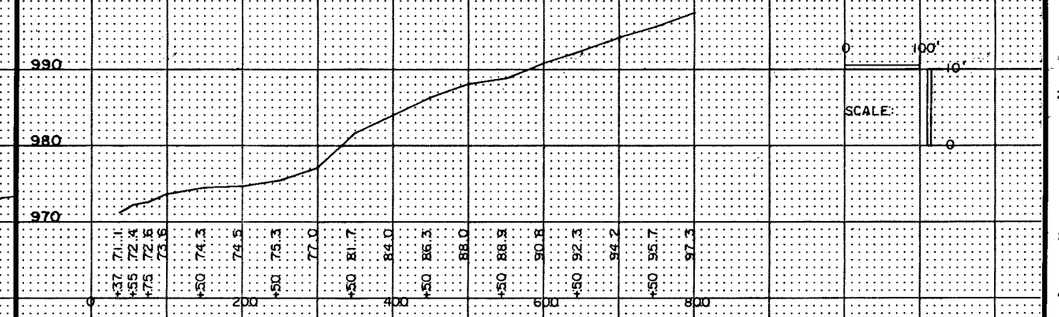
SCALE: 0' 50' 100'



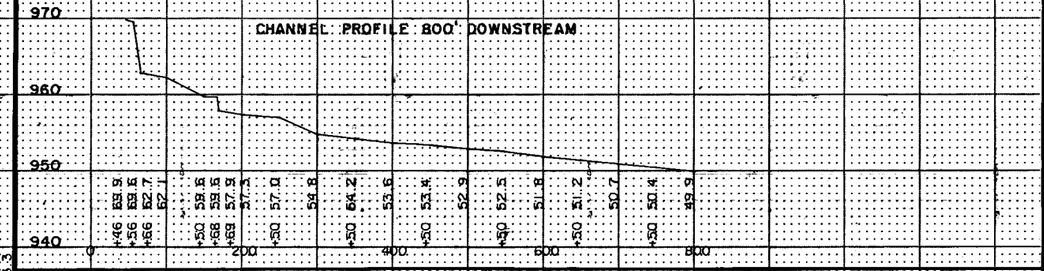
TYPICAL SECTIONS & PERTINENT DATA

SCALES AS SHOWN

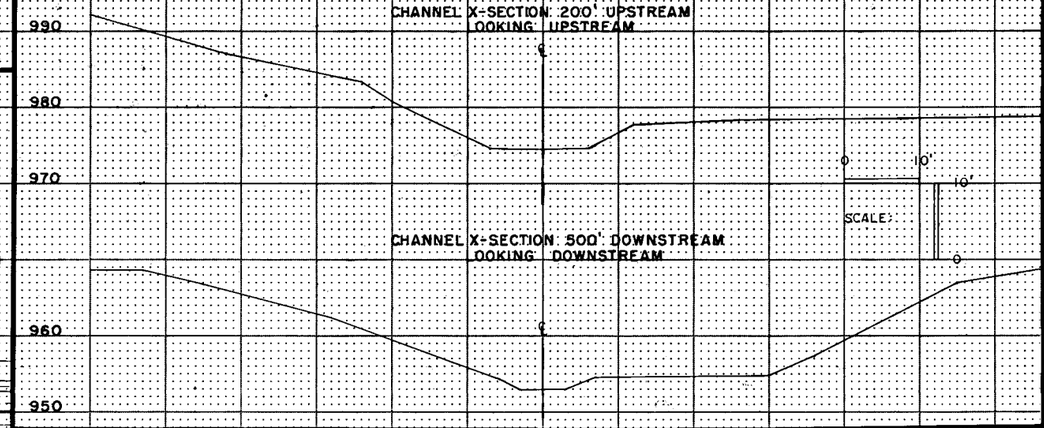
CHANNEL PROFILE 800' UPSTREAM



CHANNEL PROFILE 800' DOWNSTREAM

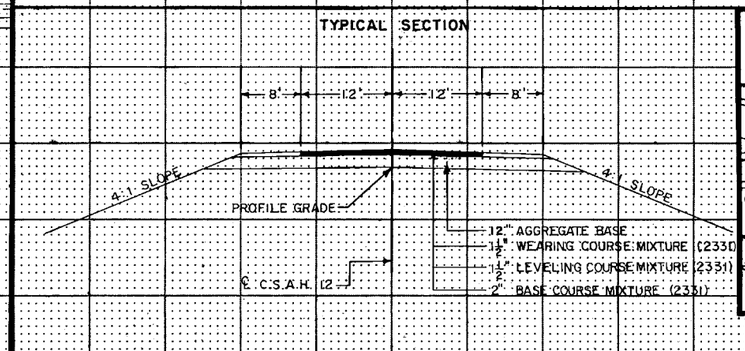


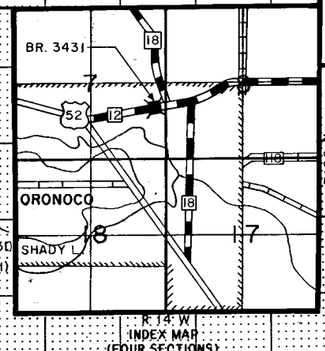
CHANNEL X-SECTION 200' UPSTREAM
LOOKING UPSTREAM



CHANNEL X-SECTION 500' DOWNSTREAM
LOOKING DOWNSTREAM

TYPICAL SECTION





Fed. Proj. No.

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

1. Special Features: Waterfalls, dams, floods, ice, debris, sliding banks, recreational boating.

2. Other bridges or culverts over the same stream (particularly structures which carry high water without overflow of roadway) :Given location, type, length, height above high water, cross-sectional area etc.

3. Apparent highwater elevation..... Obtained from.....

4. Other data: Approx. velocity of water at time of survey.....

HYDRAULIC ENGINEERS RECOMMENDATION

DATE 3-14-84

Stream or ditch designation UNNAMED

Drainage area 142 ACRES

Max. flood on record..... Design flood (100 yr. freq.) 370 C.F.S.

Max. observed highwater elevation 975 ± Design highwater elevation 974.9

Design mean velocity through structure 10.9 F.P.S.

Low superstructure at or above elevation 973.8

Flowline elevation 971.0 Skew angle 45°

Waterway area req'd. below elevation ..... = ... Sq. Ft. at Rt. angles to channel

In the interest of flood plain zoning the regional flood (100 yr. freq.) is ..... C.F.S. at stage ..... and mean velocity of ..... F.P.S. with ..... Ft. swellhead.

The above recommendation will provide a structure of adequate waterway to pass the regional flood within criteria established by the Dept. of Natural Resources.

FOUNDATION ENGINEERS RECOMMENDATION

DATE .....

Bridge survey sheets made from: BRIDGE SURVEY CONDUCTED BY OLMSTED COUNTY

Bench mark elevation 977.24 (M.S.L. 1929 Adj.)

Location 3/4" REINF ROD SE COR BR STA 30+31

MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

AT MILE POINT 0.5 ON C.S.A.H. 12 (T.H., C.S.A.H., C.R. etc.)

PROPOSED BRIDGE LOCATED 0.5 MILES E OF JCT. TH 52 & C.S.A.H. 12

SEC. 7 TWP T.108.N. R R.14.W.

TOWNSHIP ORONOCO COUNTY OLMSTED

BRIDGE NO. 3431

Area No. Job No.

~~State Proj. No.~~ SAP 55-612-11 C.S.A.H. 12

Sheet No. 32 of 35 Sheets

Fed. Proj. No.

PLAN

SCALE: 0' 10' — 10' 0'

+00

+20 END CURB & GUTTER

50'

C.B. NO. 5

B624 CONC. CURB & GUTTER

15" RC PIPE CL III

60°

45°

54'

54'

8' BITUMINOUS SHOULDER

12'

12'

8' BITUMINOUS SHOULDER

℄ OF LAYOUT
℄ C.S.A.H. 12

29 +00

30 +00

31 +00

50'

100'

+00

ELEVATION

SCALE: 0' 10' — 10' 0'

℄ PROFILE
PROFILE 20' LT.
PROFILE 20' RT.

24" DEPTH RANDOM RIP RAP CL III
9" DEPTH GANULAR FILTER

64'

9'

℄ SUBGRADE ELEV.

15" R.C. PIPE STORM SEWER OUTLET
ELEV. 71.42

OUTLET ELEV. 65.8
108 P.C. CONC. BOX CULV.

DROP INLET ELEV. 71.0

FLOWLINE ELEV. 66.0
108 P.C. CONC. BOX CULV.

1000
990
980
970
960

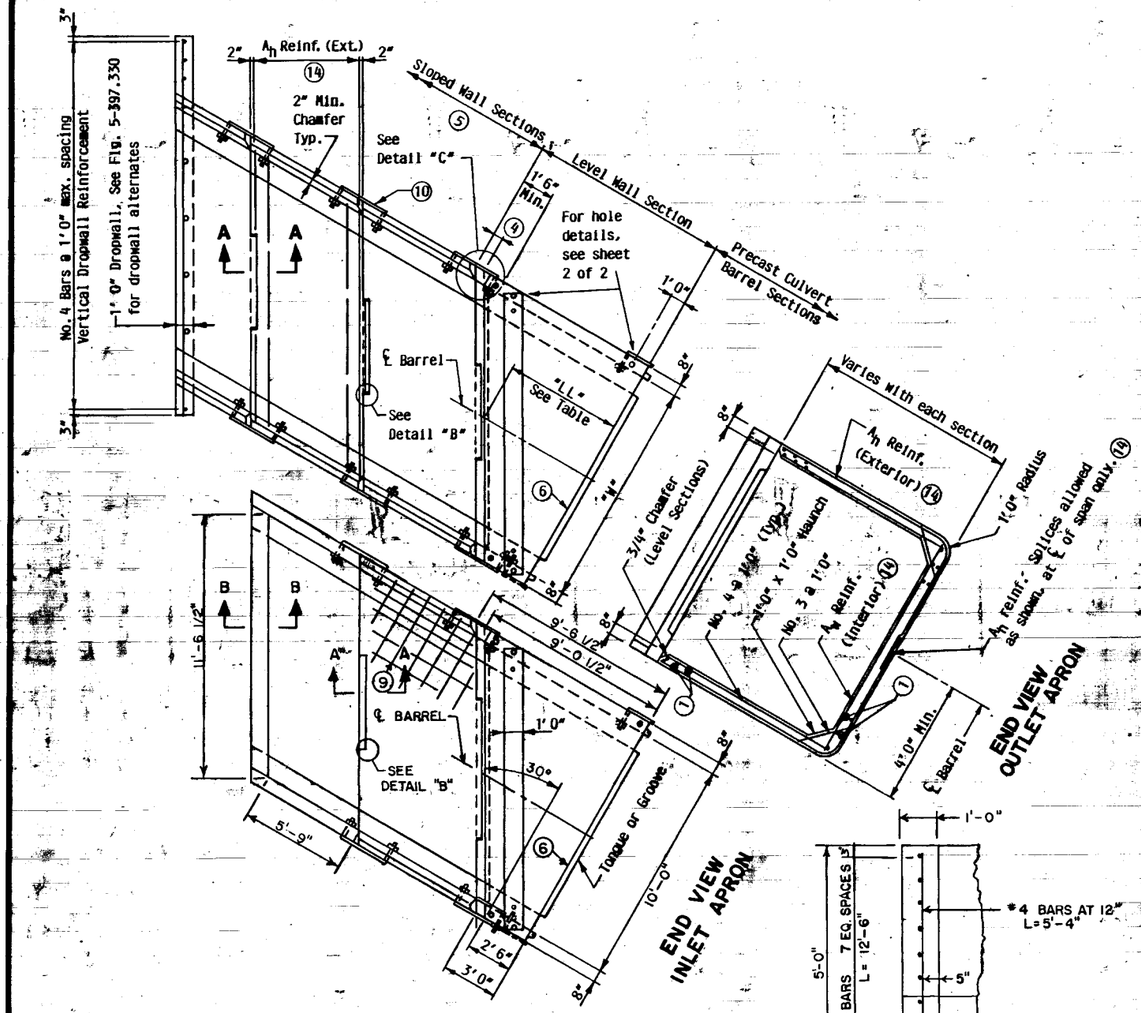
79.2 79.1 79.2 79.2 79.3 79.3 79.4 79.5

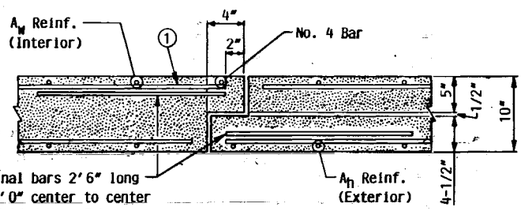
+67 +82 +96 +19 +30 +57

29 30 31

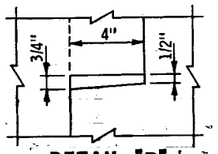
BORINGS SHOWN [ ] TAKEN WITH
STD 140 LB HAMMER
30 INCH DROP
2 INCH O.D. SAMPLER

BRIDGE SURVEY PLAN AND PROFILE	DES:	DR:	APPROVED:	Bridge No.
CSAH 12	CHK:	CHK:		
SAP 55-612-11	Sheet No. 33 of 35 Sheets			3431

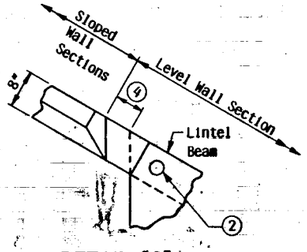




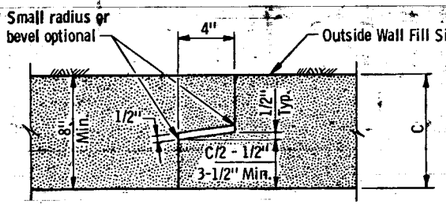
SECTION A-A



DETAIL "B"



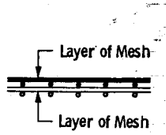
DETAIL "C"



TONGUE AND GROOVE JOINT

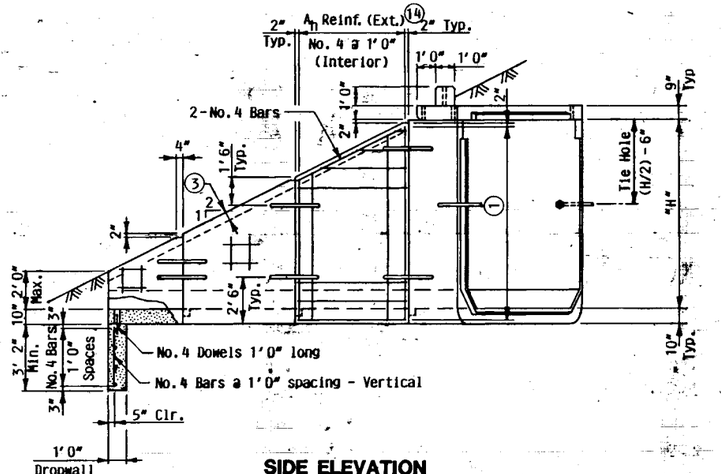
Make dimension of tongue or groove on adjacent precast barrel sections so inside walls are flush.

SECTION B-B

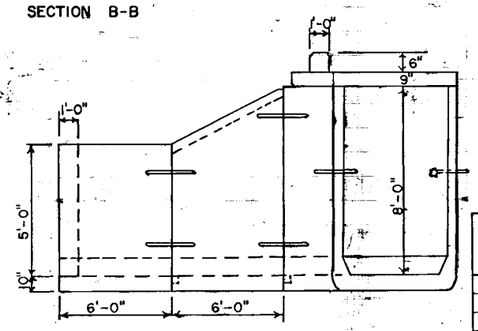


FABRIC LAYER DETAIL

When more than one layer of steel fabric is used to obtain the required reinforcement areas, the wire of the steel fabric shall be placed as shown in the Fabric Layer Detail.



SIDE ELEVATION OUTLET APRON



REINF SIZE AND DIMENSION SIMILAR TO OUTLET APRON. DROPWALL NOT REQIRED ON INLET APRON.

SIDE ELEVATION INLET APRON

"L" TABLE

CULVERT HEIGHT "H"	END SECTIONS "L"
4 ft.	4 ft.
5 ft.	6 ft.
6 ft.	8 ft.
7 ft.	10 ft.
8 ft.	12 ft.
9 ft.	14 ft.
10 ft.	16 ft.
12 ft.	20 ft.

"LL" TABLE

WIDTH "W"	SKEW ANGLE 15°	SKEW ANGLE 30°
8 ft.	3' 9"	5' 2"
10 ft.	4' 0"	5' 9"
12 ft.	4' 3"	6' 4"

NOTES:

The steel reinforcement shall conform to the applicable requirements of AASHTO M259. The reinforcement shall be Grade 60 or better.

The maximum size of reinforcing bars shall be No. 6. The maximum mesh size shall be 1/2" dia. (1 or 2 layers).

Finish all vertical edges of concrete with 3/4" chamfer or radius unless otherwise noted.

Dropwall shall be concrete Mix 1A43,3Y43 or 3W46.

Precast Concrete Sections shall be Mix 3W46 with no calcium chloride allowed.

Limits for excavation for dropwall to be approximately the same as dropwall dimensions.

1-1/2" minimum and 2" maximum concrete cover on all reinforcement (Typical for inside and outside walls).

Culverts to be constructed as per Spec., 2411 except as noted.

See "Precast Concrete Box Culvert" Standard Sheet 35, No. 5-397.701 for design and reinforcement requirements, except as noted.

One of the following combinations of steel reinforcement may be used:

(a) 1 or 2 layers of mesh or
(b) 1 layer of mesh and 1 layer of reinforcement bars or
(c) 1 layer of reinforcement bars.

If (b) or (c) are used, 1.5.37(B) of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges" shall be reviewed. The reinforcement shall be developed in accordance with applicable parts of 1.5.13.22 of the 1977 and Interim AASHTO "Standard Specifications for Highway Bridges".

① Longitudinal reinforcement parallel to side walls of end sections shall have a minimum of 0.06 sq. in. per ft. on all faces.

② 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the level wall section. Fill hole to top of lintel beam with an approved grout, see Note 11.

③ See Embankment Protection for Box Culverts, sheet ____.

④ Variable. 6" minimum to 2' 0" maximum.

⑤ Number of sections varies with "H" dimensions.

⑥ Check the location to determine whether a tongue or a groove is used.

⑦ For a ℄ of culvert skew angle of 22-1/2° to 37-1/2°, use a 30° skew end section. For 7-1/2° to 22-1/2°, use a 15° skew end section.

⑧ For spans of 10' to 14', use No. 9 bar. For spans under 10', use No. 8 bar.

⑨ See Section A-A for additional reinforcement.

⑩ Culvert ties are to be 1" dia. rods. See Standard Plate No. 3145 for connection details.

⑪ Grout shall consist of 1 part cement and 2 parts sand. Use Type 1A air entrained Portland Cement. Grout mix shall have a maximum slump of 4".

⑫ Two ties are required at angled wall joint connections. Bend ties to fit angle. No tongue or groove required.

⑬ Apron widths up to 12 ft.=5' 0" tongue & 5' 1" groove. Apron widths over 12 ft.=8' 0" tongue & 8' 1" groove. Center tongue & groove on ℄ of each apron joint. Use same size tongue & groove in each apron assembly.

⑭ See sheet 2 of 2 for A_h and A_w reinforcement tables.

MODIFIED

December 3, 1984

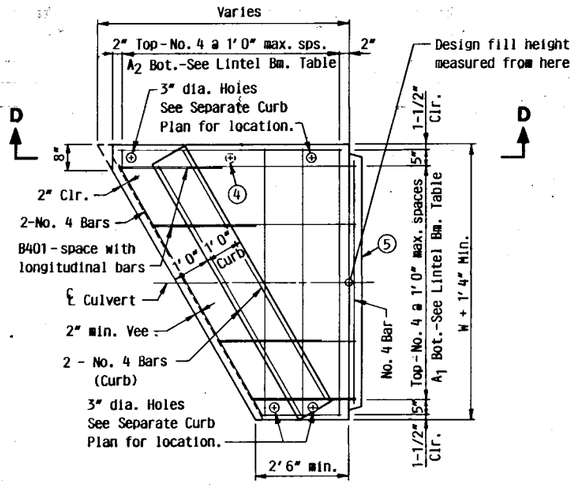
FIG. 5-397.710 (1 of 2)

PRECAST CONC. END SECTIONS - TYPE III SKEWED SINGLE OR MULTI-BARREL	DES:	DR:	APPROVED:	Bridge No.
	CHK:	CHK:		
	Sheet No. 34 of 35 Sheets			3431

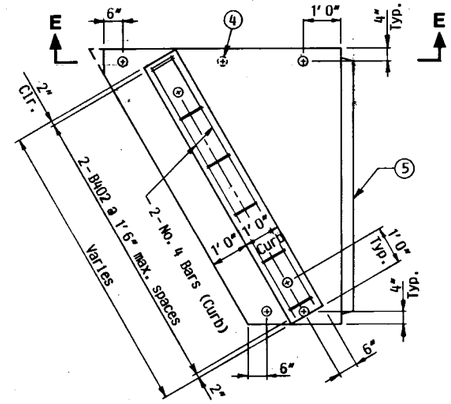
S.A.P. 55-612-11

A_w REINFORCEMENT TABLE ②

HEIGHT OF EACH END SECT.	MAXIMUM APRON WIDTH OF EACH SECTION AT THE RESPECTIVE HEIGHT													
	8' 0" - 11' 0"	12' 0"	13' 0"	14' 0"	15' 0"	16' 0"	17' 0"	18' 0"	19' 0"	20' 0"	21' 0"	22' 0"	23' 0"	24' 0"
4' 0"	No. 4 @ 1' 0"	→	→	→	→	No. 4 @ 10"	No. 4 @ 8-1/2"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9-1/2"	No. 6 @ 8-1/2"
5' 0"	No. 4 @ 1' 0"	→	→	No. 4 @ 11"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"	No. 6 @ 9"	No. 6 @ 8"	No. 6 @ 7-1/2"
6' 0"	No. 4 @ 1' 0"	→	→	No. 4 @ 10-1/2"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10"	No. 6 @ 9"	No. 6 @ 8"		
7' 0"	No. 4 @ 1' 0"	→	No. 4 @ 11-1/2"	No. 4 @ 9-1/2"	No. 4 @ 8"	No. 5 @ 10-1/2"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 11"	No. 6 @ 10"	No. 6 @ 9"	No. 6 @ 8"		
8' 0"	No. 4 @ 1' 0"	→	No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 1' 0"	No. 5 @ 10-1/2"	No. 5 @ 9"	No. 5 @ 8"	No. 6 @ 10-1/2"	No. 6 @ 9-1/2"				
10' 0"	No. 4 @ 1' 0"	→	No. 4 @ 10"	No. 4 @ 8"	No. 5 @ 11"	No. 5 @ 9-1/2"	No. 5 @ 8-1/2"	No. 6 @ 10-1/2"						
12' 0"	No. 4 @ 1' 0"	No. 4 @ 11"	No. 4 @ 9"	No. 5 @ 11-1/2"	No. 5 @ 10"	No. 5 @ 8-1/2"								

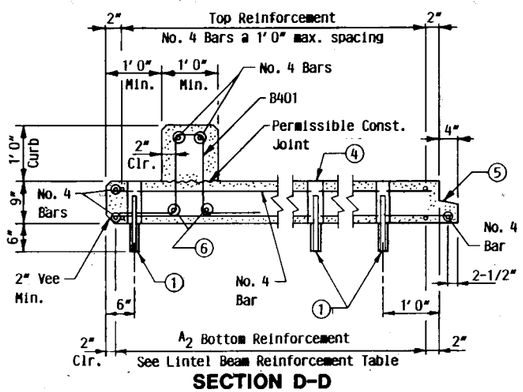


PLAN OF LINTEL BEAM



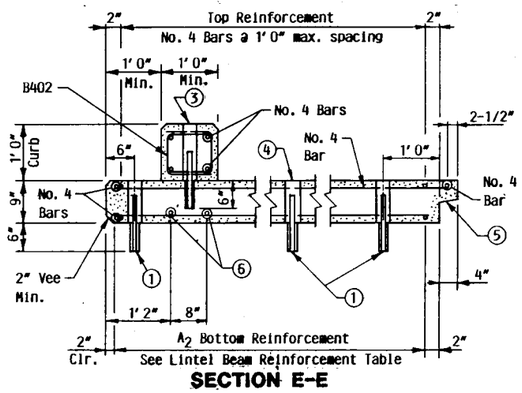
PLAN OF LINTEL BEAM

See Integral Curb Plan for lintel beam reinforcement



SECTION D-D

(Integral Curb With Tongue)



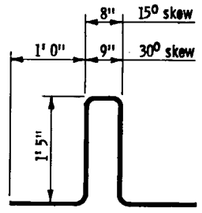
SECTION E-E

(Separate Curb With Groove)

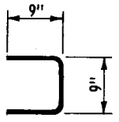
A_h REINFORCEMENT TABLE

HEIGHT "H"	"A_h"
8 ft. or less	No. 4 @ 1' 0"
10 ft.	No. 5 @ 8"
12 ft.	No. 6 @ 6"

NOTE: H is the highest vertical dimension of each section shown.



B401



B402

LINTEL BEAM REINFORCEMENT TABLE

W CULVERT WIDTH	4 FT. DESIGN FILL HEIGHT			2 FT. DESIGN FILL HEIGHT		
	SLAB THICK.	BOTTOM REINFORCEMENT		SLAB THICK.	BOTTOM REINFORCEMENT	
		A_1	A_2		A_1	A_2
Under 6'	9"	No. 4 @ 1' 2"	No. 4 @ 9-1/2"	9"	No. 4 @ 1' 6"	No. 4 @ 1' 4"
6'+ to 8'	9"	No. 4 @ 8"	No. 5 @ 8"	9"	No. 4 @ 1' 1"	No. 4 @ 9"
8'+ to 10'	9"	No. 5 @ 8"	No. 6 @ 7-1/2"	9"	No. 4 @ 9"	No. 4 @ 6"
10'+ to 12'	9"	No. 5 @ 6"	No. 6 @ 6"	9"	No. 5 @ 9"	No. 5 @ 6"

NOTES:

Curb is required and may be cast monolithically or cast separately.

① 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the level wall section, 3" dia. hole in the lintel beam. Fill the hole to the top of the lintel beam with an approved grout.

② Use the largest steel area from the table across each individual section.

③ 1" dia. x 1' 0" long steel dowel. 2" dia. hole in the top of the lintel beam. 3" dia. hole in the curb. Fill the hole to the top of the curb with an approved grout.

④ Cast an additional 3" hole at midpoint of beam when side of lintel beam is over 6 ft.

⑤ Check the location to determine whether a tongue or a groove is used.

⑥ For spans of 10' to 14', use No. 9 bar. For spans under 10', use No. 8 bar.

FIG. 5-397.710 (2 of 2)

December 3, 1984

SAP 55-612-II

PRECAST CONC. END SECTIONS - TYPE III SKEWED SINGLE OR MULTI-BARREL	DES:	DR:	APPROVED:	Bridge No. 3431
	CHK:	CHK:		
	Sheet No. 34A of 35 Sheets			