

CITY OF LINO LAKES

1993 MSA

APOLLO DRIVE IMPROVEMENTS

PHASE 2

MSAP 210-115-01 & MSAP 210-113-01

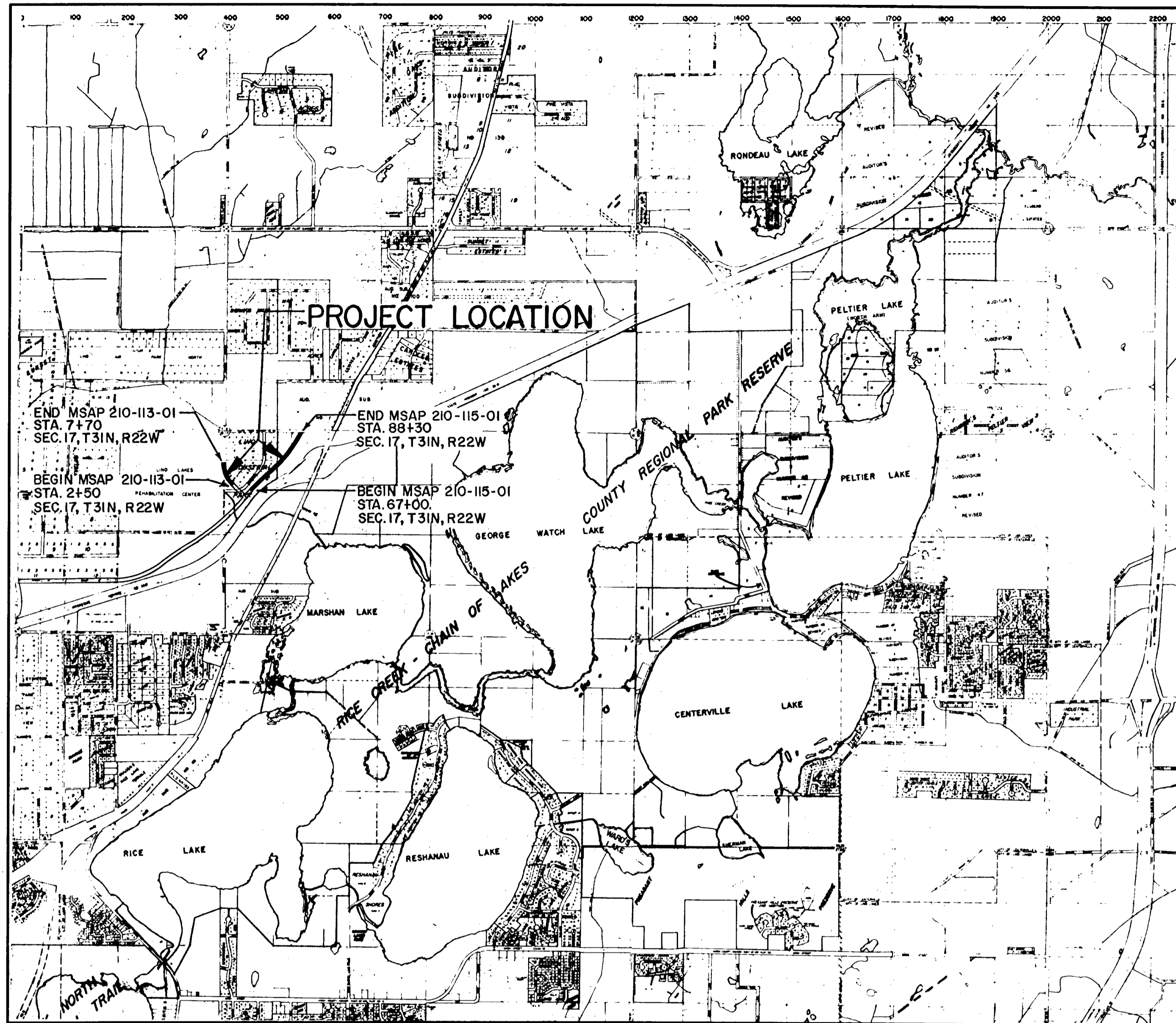
COMM. NO. 10300

PLANS FOR:

RIGHT OF WAY, EROSION CONTROL, GRADING, AGGREGATE BASE, SANITARY SEWER, CONCRETE CURB AND GUTTER, STORM SEWER, WATERMAIN, BITUMINOUS SURFACING, AND RESTORATION.

LIST OF DRAWINGS

DRAWING NO.	DESCRIPTION
1	TITLE SHEET
2	SITE PLAN & TYPICAL SECTIONS
3	STATEMENT OF ESTIMATED QUANTITIES
4	SUPERELEVATION TABULATION
5	UTILITIES, STATION 67+00 TO STATION 80+00
6	UTILITIES, STATION 80+00 TO LILAC STREET
7	STREET IMPROVEMENTS, STATION 67+50 TO STATION 80+00
8	STREET IMPROVEMENTS, STATION 80+00 TO LILAC STREET
9	FOURTH AVE. - STREET & UTILITIES
10	CROSS SECTIONS, STATION 67+50 TO STATION 78+50
11	CROSS SECTIONS, STATION 79+00 TO LILAC STREET
12	CROSS SECTIONS, 4TH AVENUE
13	VOLUME TABULATIONS



DESIGN DESIGNATION

LOCATION: APOLLO DRIVE (MSAP 210-115-01)

FROM: APOLLO DRIVE - PHASE 1
TO: LILAC STREET - S.T. HWY 49

PRESENT ADT(1992) NA
PROJECTED ADT(2012) 600

MSAP 210-113-01

MSAP 210-115-01

NA
600

NA
3000

LOCATION: FOURTH AVENUE (MSAP 210-113-01)

FROM: APOLLO DRIVE - PHASE 1
TO: FOURTH AVE. - S.T. HWY 49

DESIGN LOADING 10 TON
FUNCTIONAL CLASS. LOW DENSITY COLLECTOR

NUMBER OF TRAFFIC LANES 2
NUMBER OF PARKING LANES 2
R VALUE R=50
SIGMA N-18 FACTOR 117,157
DESIGN SPEED (MPH) 30

STOPPING SIGHT DISTANCE
HEIGHT OF EYE 3.5'
HEIGHT OF OBJECT 0.5'

GROSS LENGTH 520' 0.10 MI
NET LENGTH 520' 0.10 MI

SPECIFICATIONS

THE 1988 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AS AMENDED BY THE JANUARY 2, 1991 SUPPLEMENTAL SPECIFICATIONS SHALL GOVERN.

10 TON
HIGH DENSITY COLLECTOR

4
0
R=50
607,295
50

2130' 0.40 MI
2130' 0.40 MI

APPROVED _____ DATE _____
LINO LAKES CITY ENGINEER

APPROVED _____ DATE _____
ANOKA COUNTY ENGINEER

RECOMMENDED FOR APPROVAL _____ DATE _____
METRO DIVISION STATE AID ENGINEER

RECOMMENDED FOR APPROVAL _____ DATE _____
STATE AID PLANS AND SPECIFICATIONS ENGINEER

APPROVED _____ DATE _____
DIRECTOR: OFFICE OF STATE AID

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.

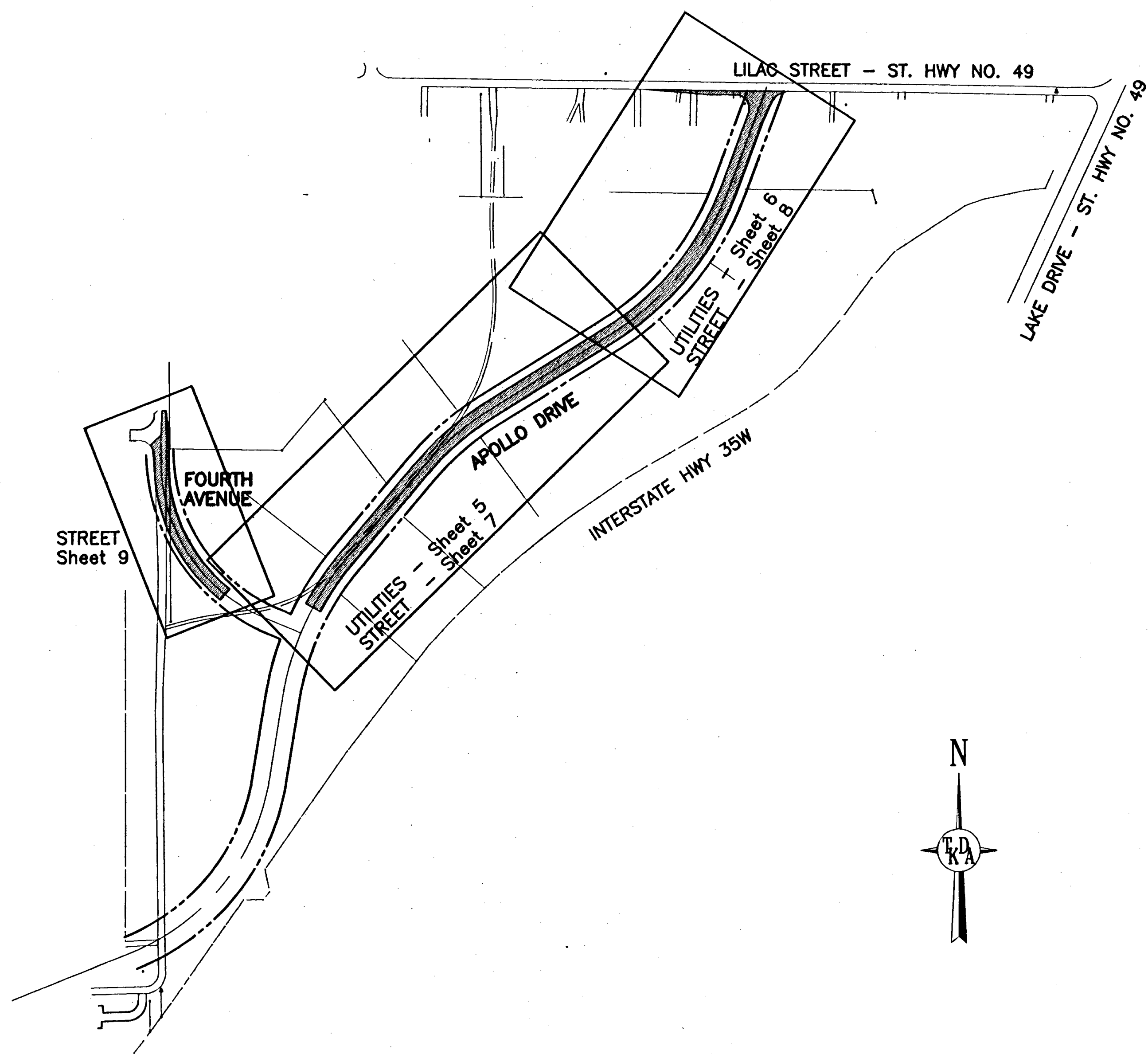
John M. Paddell DATE 6.28.93 REG. NO. 20624

TKDA

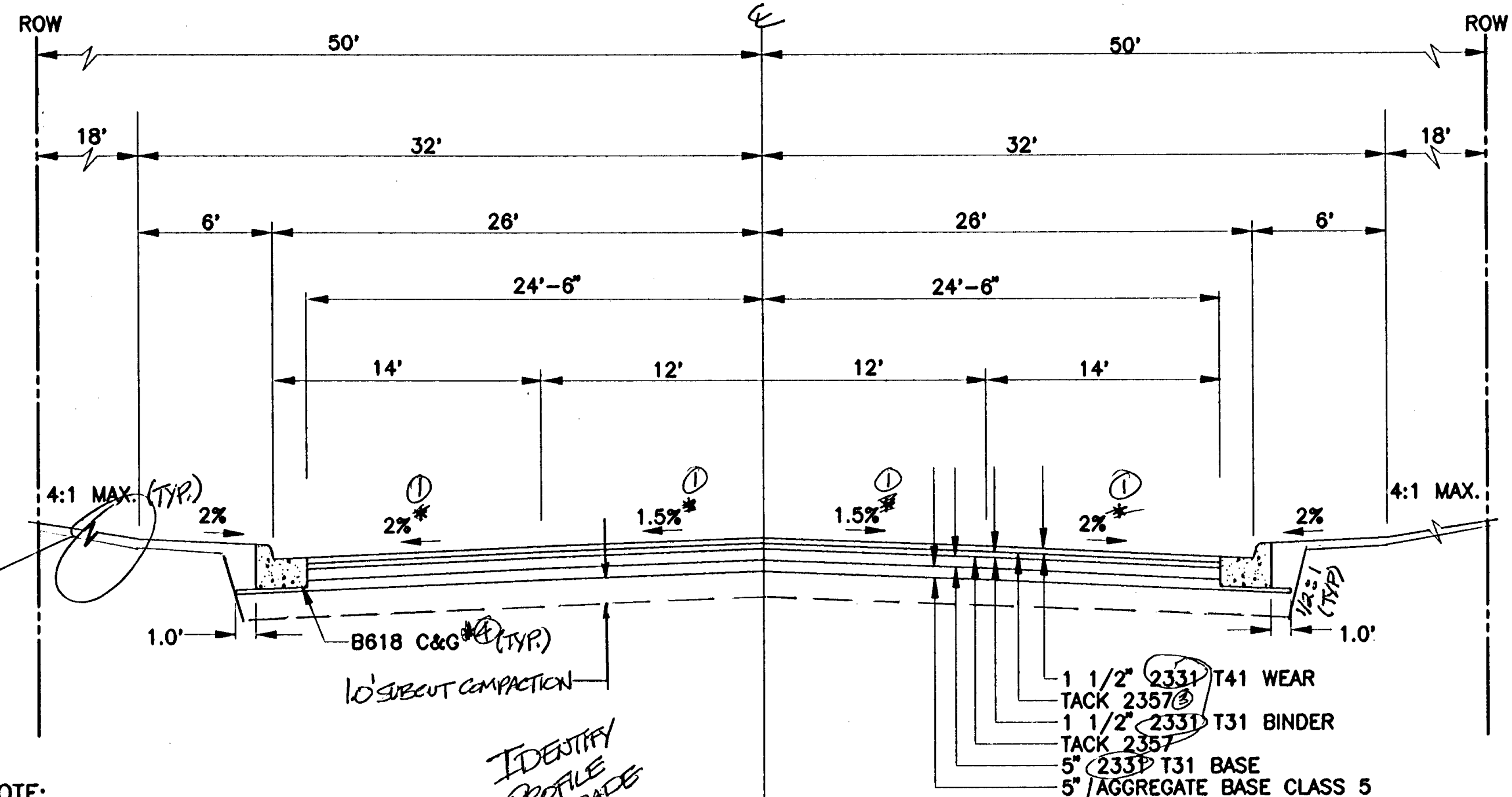
ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON
AND ASSOCIATES INCORPORATED

SAINT PAUL, MINNESOTA



SITE PLAN
NOT TO SCALE



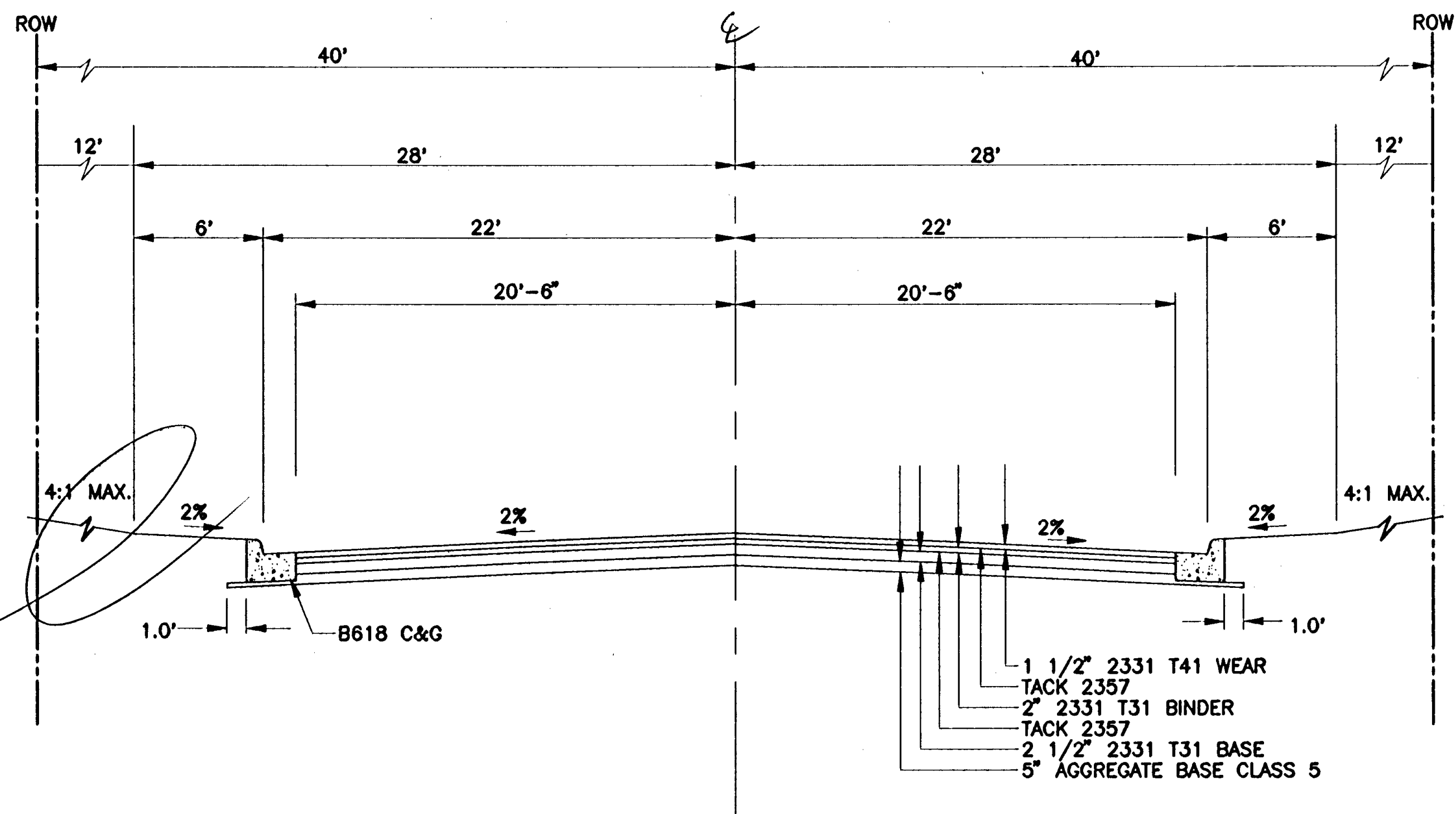
NOTE:

- ② * TURN LANE ON LILAC ST. USE SAME PAVEMENT SECTION AS APOLLO DR.
- ③ * TACK QUANTITY BASED ON AN APPLICATION RATE OF .05 GA./SY.
- ④ * 10' OBSTACLE FREE CLEAR ZONE REQUIRED FROM FACE OF CURB ON APOLLO DRIVE.

APOLLO DRIVE, MSAP 210-115-01

NOT TO SCALE

STA. 67+50 TO 88+30.12



4TH AVENUE, MSAP 210-113-01

NOT TO SCALE

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED TAC DRAWN IMB
 CHECKED JMP
 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 JUNE 28, 1993 REG. NO. 20834

TKDA

ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
 SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS
PHASE 2

LINO LAKES

MINNESOTA

TYPICAL SECTIONS
& SITE PLAN

SHEET NO. 2 OF 13 SHEETS

MSAP 210-113-01 & 210-115-01

COMMISSION NO.

10300

STATEMENT OF ESTIMATED QUANTITIES

NO.	ITEM	DESCRIPTION	UNIT	NON-ELIGIBLE				ELIGIBLE				TOTAL	
				5	6	7	8	SUB TOTAL	7	8	9		SUB TOTAL
01-	CONN TO EXIST SANITARY SEWER	EA	1 00					1 00				0 00	1 00
02-	21" PVC SDR 35 SS 16-18'	LF	449 00					449 00				0 00	449 00
03-	21" PVC SDR 35 SS 18-20'	LF	654 00					654 00				0 00	654 00
04-	21" PVC SDR 35 SS 20-22'	LF	32 00	210 00				242 00				0 00	242 00
05-	21" PVC SDR 35 SS 22-24'	LF	119 00	582 00				701 00				0 00	701 00
06-	21" PVC SDR 35 SS THRU CASING	LF		100 00				100 00				0 00	100 00
07-	CONST STD 4' DIA MANHOLE	EA	4 00	4 00				8 00				0 00	8 00
08-	EXTRA DEPTH OF 4' DIA MANHOLE	LF	37 70	55 40				93 10				0 00	93 10
09-	4" ON 21" PVC SDR 35 WYE BRAN	EA		3 00				3 00				0 00	3 00
10-	6" ON 21" PVC SDR 35 WYE BRAN	EA	10 00	3 00				13 00				0 00	13 00
11-	4" PVC SDR 26 SERVICE PIPE	LF		190 00				190 00				0 00	190 00
12-	6" PVC SDR 26 SERVICE PIPE	LF	620 00	200 00				820 00				0 00	820 00
13-	30" DIA CASING PIPE FOR SAN	LF		100 00				100 00				0 00	100 00
14-	TELEVISION SAN SEWER MAINS	LF	1254 00	892 00				2146 00				0 00	2146 00
15-	DEWATERING	LS	1 00					1 00				0 00	1 00
01-	CONN TO EXISTING WATERMAIN	EA	1 00					1 00				0 00	1 00
02-	6" DIP CLASS 50 WATERMAIN	LF	645 00	220 00				865 00				0 00	865 00
03-	12" DIP CLASS 50 WATERMAIN	LF	1273 00	809 00				2082 00				0 00	2082 00
04-	12" DIP CL 50 WM THRU CASING	LF		65 00				65 00				0 00	65 00
05-	6" MJ RES SEAT GATE VALVE	EA	14 00	5 00				19 00				0 00	19 00
06-	12" MJ RES SEAT BUTTERFLY VLV	EA	2 00	1 00				3 00				0 00	3 00
07-	6" MJ HUB HYDRANT 9'-0" BURY	EA	4 00	2 00				6 00				0 00	6 00
08-	12" HYDRANT EXTENSION	EA	2 00	1 00				3 00				0 00	3 00
09-	1" TYPE K COPPER TAP SERVICE	LF		170 00				170 00				0 00	170 00
10-	1" CORPORATION STOP	EA		3 00				3 00				0 00	3 00
11-	1" CURB STOP WITH CURB BOX	EA		3 00				3 00				0 00	3 00
12-	MJ DIP FITTINGS	LB	2132 00	925 00				3057 00				0 00	3057 00
13-	24" DIA CASING PIPE FOR WM	LF		65 00				65 00				0 00	65 00
01-2104 501	REM/DISP EX CB/18" STORM PIPE	LS						0 00		1 00		1 00	1 00
02-2104 501	REM/DISP EX 15" STORM PIPE	LF						0 00		1 00		1 00	1 00
03-2503 541	12" RCP CLASS 5 STORM SEWER	LF						0 00	56 00			56 00	56 00
04-2503 541	15" RCP CLASS 5 STORM SEWER	LF				26 00		26 00			62 00	62 00	88 00
05-2503 541	18" RCP CLASS 5 STORM SEWER	LF			26 00			26 00		134 00		134 00	160 00
06-2503 541	21" RCP CLASS 4 STORM SEWER	LF				26 00		26 00				0 00	26 00
07-2503 541	24" RCP CLASS 4 STORM SEWER	LF						0 00		473 00		473 00	473 00
08-2503 541	27" RCP CLASS 4 STORM SEWER	LF			74 00			74 00	534 00	90 00		624 00	698 00
09-2503 541	30" RCP CLASS 4 STORM SEWER	LF						0 00	295 00			295 00	295 00
10-2503 541	36" RCP CLASS 4 STORM SEWER	LF						0 00	477 00			477 00	477 00
11-2503 541	15" CMP CULVERT	LF						0 00		58 00		58 00	58 00
12-2503 541	66" CMP CULVERT	LF						0 00		80 00		80 00	80 00
13-2503 573	15" RC FLARED END SECTION	EA						0 00		1 00		1 00	1 00
14-2503 573	18" RC FLARED END SECTION	EA						0 00		2 00		2 00	2 00
15-2503 573	66" CMP APRON	EA						0 00		1 00		1 00	1 00
16-0503 602	CONN TO EXISTING STORM SEWER	EA						0 00	1 00			1 00	1 00
17-2506 508	CONST STD 4' DIA CATCH BASIN	EA						0 00	4 00	3 00	2 00	9 00	9 00
18-2506 508	CONST STD 5' DIA CATCH BASIN	EA						0 00	1 00	1 00		2 00	2 00
19-2506 508	CONST STD 6' DIA CATCH BASIN	EA						0 00	1 00			1 00	1 00
20-2506 508	CONST STD 6 5' DIA CATCH BASIN	EA						0 00	1 00			1 00	1 00
21-2511 501	CLASS II HAND PL GR RIP RAP	CY						0 00		1 60		1 60	1 60
22-2573 502	SILT FENCE	LF						0 00	2600 00	1540 00	1040 00	5180 00	5180 00
01-2021 501	MOBILIZATION	LS						0 00	1 00			1 00	1 00
02-2031 501	FIELD OFFICE	LS						0 00	1 00			1 00	1 00
03-2101 502	CLEARING	AC						0 00	0 20	0 05		0 25	0 25
04-2101 507	GRUBBING	AC						0 00	0 20	0 05		0 25	0 25
05-2104 505	REM/DISP EXIST BIT PAVEMENT	SY						0 00		55 00	670 00	725 00	725 00
06-2105 501	COMMON EXCAVATION	CY						0 00	3895 00	2210 00	2420 00	8525 00	8525 00
07-2105 507	SUBGRADE PREPARATION	RS						0 00	12 60	8 10	5 20	25 90	25 90
08-2105 521	GRANULAR BORROW (LV)	CY						0 00	3075 00	420 00	925 00	4420 00	4420 00
09-2105 525	TOPSOIL BORROW (LV)	CY						0 00		285 00	90 00	375 00	375 00
10-2211 501	AGGREGATE BASE CLASS 5	TN						0 00	2570 00	1775 00	905 00	5250 00	5250 00
11-2331 508	BIT WEAR COURSE MIX 2331 T41	TN						0 00	630 00	435 00	220 00	1285 00	1285 00
12-2331 510	BIT BINDER COURSE MIX 2331 T31	TN						0 00	630 00	450 00	290 00	1370 00	1370 00
13-2331 514	BIT BASE COURSE MIX 2331 T31	TN						0 00	2100 00	1405 00	365 00	3870 00	3870 00
14-2357 505	CRS-1 BIT MATERIAL FOR TACK	GA						0 00	685 00	485 00	240 00	1410 00	1410 00
15-2531 501	B618 CONCRETE CURB & GUTTER	LF						0 00	2520 00	1400 00	990 00	4910 00	4910 00
16-2575 501	ROADSIDE SEEDING COMPLETE	AC						0 00	1 50	0 90	1 20	3 60	3 60
17-2575 505	SODDING	SY						0 00		2560 00	780 00	3340 00	3340 00
18-SPECIAL	PAVEMENT MARKINGS, STRIPING	LS						0 00	1 00			1 00	1 00
19-SPECIAL	TRAFFIC CONTROL	LS						0 00	1 00			1 00	1 00
2506 516	CASTING ASSEMBLY	EA											

BASIS OF QUANTITIES ?

IE: BITUMINOUS TACK SEEDING FERTILIZER

CONSTRUCTION NOTES BASIS/CRITERIA OF ESTIMATE COMPUTATIONS etc.

*Storm drain
Use: frame No. 801
grate No. 810
curb box No. 821-E } inlets
frame No. 700-7 } solid (no inlets)
cover No. 716 }*

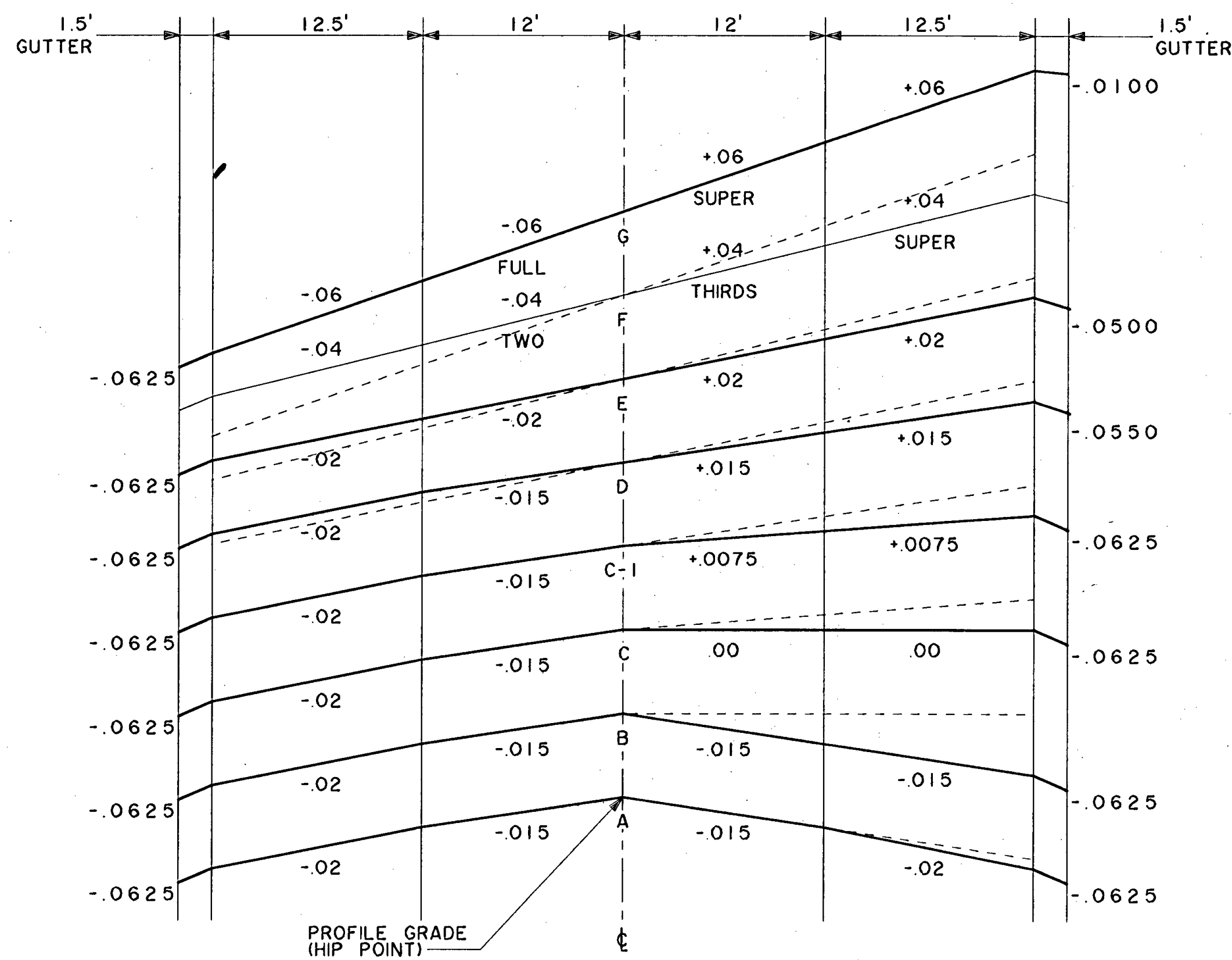
LEGEND

EXISTING	PROPOSED
	TREE - DECIDUOUS
	TREE - EVERGREEN
	STUMP
	CURB
	CONC. WALK (SIZE NOTED)
	SAN. SEWER
	STORM SEWER
	CATCH BASIN
	UTILITY MANHOLE
	LIGHTING CONDUIT
	TELEPHONE CONDUIT
	ELECTRIC CONDUIT
	GAS MAIN
	GAS VALVE
	POWER POLE W/ GUY WIRE
	LIGHT POLE
	SANITARY SEWER
	STORM SEWER
	WATERMAIN
	WATER VALVE
	WATER VALVE MANHOLE
	HYDRANT
	PROPERTY IRON
	SOIL BORING
	CONTOURS
	SEWER AND WATER SERVICE
	CULVERT W/FLARED END
	RIGHT-OF-WAY
	CENTERLINE
	CONST. ESMT. LINE
	EDGE OF WOODS

STANDARD DETAIL PLATES

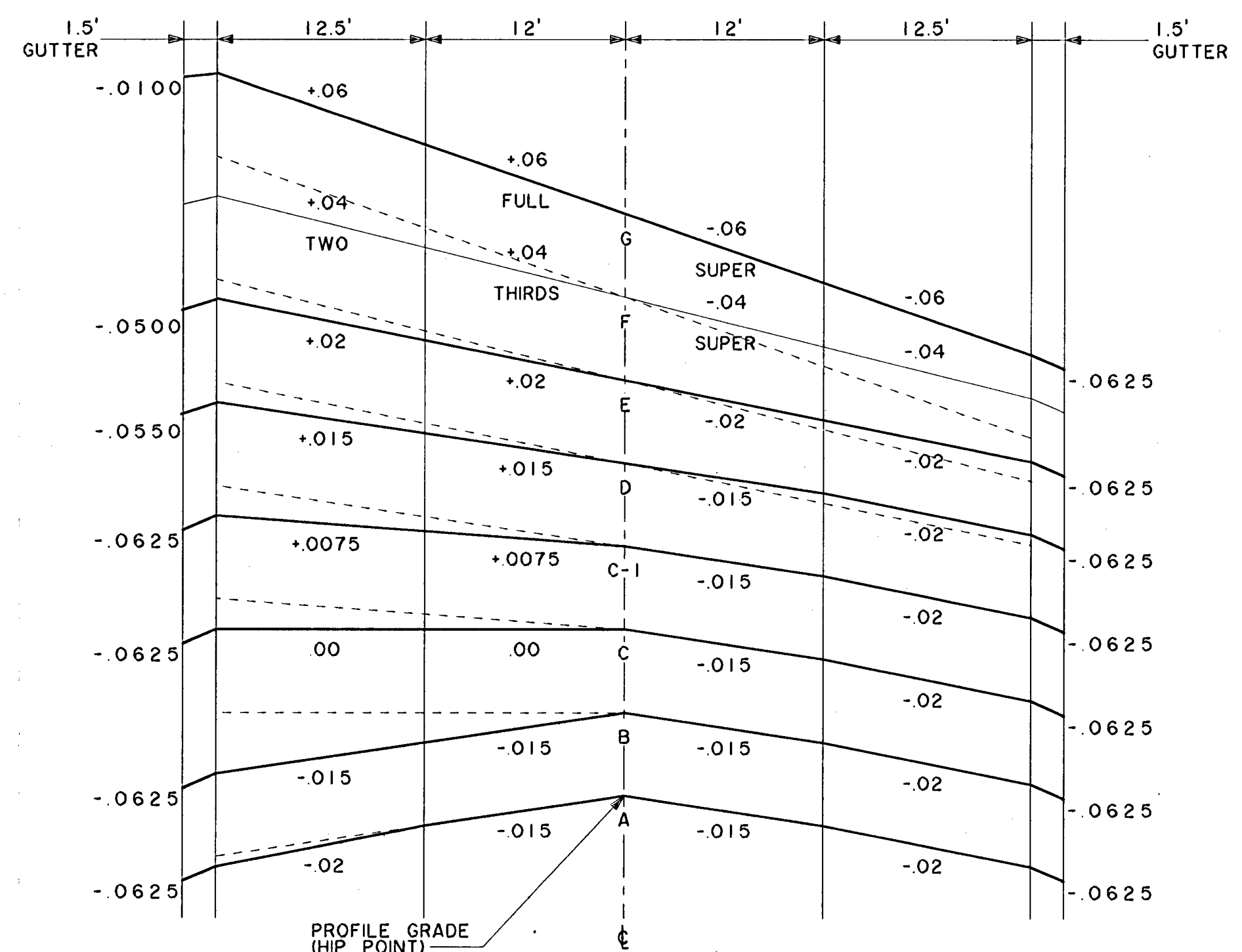
MNDOT* PLATE NO.	LINO LAKES PLATE NO.	TKDA PLATE NO.	STANDARD DETAIL
0005A			SPECIFICATION REFERENCE TO STANDARD PLATES
3000L			REINFORCED CONCRETE PIPE
3006F			GASKET JOINT FOR RCP
3100G			CONCRETE APRON FOR RCP
3133B			RIPRAP AT RCP OUTLETS
3145E			CONCRETE PIPE TIES
4010G			CONCRETE ADJUSTING RING
4180H			MANHOLE OR CATCH BASIN STEP
7100F			CONCRETE CURB AND GUTTERS
7110E			CURB & GUTTER CONSTRUCTION AT CATCH BASIN
7111G			INST. & REINF. OF CATCH BASIN CASTINGS
101			PIPE FOUNDATION DETAILS
102			PIPE BEDDING DETAILS
103			GRANULAR MATERIAL BEDDING METHOD
105			SPECIAL FOUNDATION DETAIL
201			TYPICAL HYDRANT LAYOUT
203			GATE VALVE INSTALLATION
205			CONCRETE REACTION BACKING
206			CONCRETE REACTION BACKING
207			WATER SERVICE DETAIL
301			STANDARD SANITARY SEWER MANHOLE.
313			SANITARY SEWER SERVICE DETAIL
402			CONE TYPE CATCH BASIN
407			STANDARD STORM SEWER MANHOLE
409			SHALLOW STORM SEWER MANHOLE
602			SILT FENCE DETAIL
			MANHOLE COVER PICKHOLE

* THE FOLLOWING STANDARD PLATES AS APPROVED BY THE FHWA SHALL APPLY.



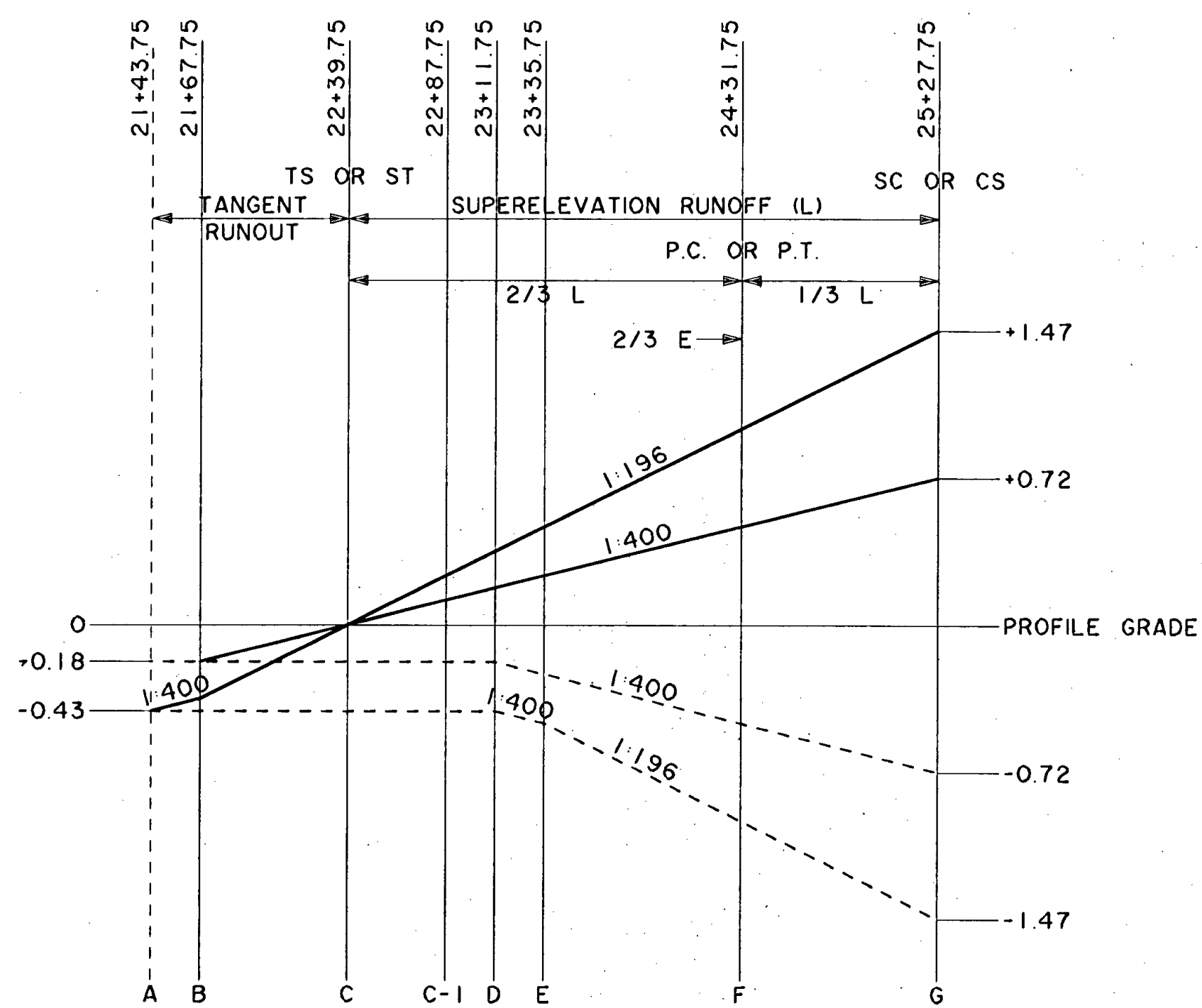
SUPERELEVATION - LEFT CURVE
NO SCALE

CURVE NUMBER	REF. POINT	TRANSITION POINT STA.
8	A	76+63.71
	B	76+87.88
	C	77+60.38
	C-1	77+96.63
	D	78+32.88
	E	78+57.05
	F	79+53.71
G	80+50.38	
G		84+59.06
F		85+09.06
E		85+59.06
C-1		85+90.31
C		86+09.06



SUPERELEVATION - RIGHT CURVE
NO SCALE

CURVE NUMBER	REF. POINT	TRANSITION POINT STA.
6	G	68+30.09
	F	69+26.76
	E	70+23.43
7	E	71+67.93
	F	72+64.59
	G	73+61.26
	G	74+32.41
	F	75+29.08
	E	76+25.75
	D	76+49.92
C-1	76+86.17	
C	77+22.41	
B	77+94.91	
A	78+19.08	
9	C	86+09.06
	C-1	86+27.81
	E	86+59.06
	F	87+09.06
	C-2	87+87.44



SUPERELEVATION RUNOFF
NO SCALE

How can curve no. 7 be @ normal crown 78+19.08 while curve no. 6 is transitioning into super 78+32.88?

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED - DRAWN TAC JBR	CHECKED JMP
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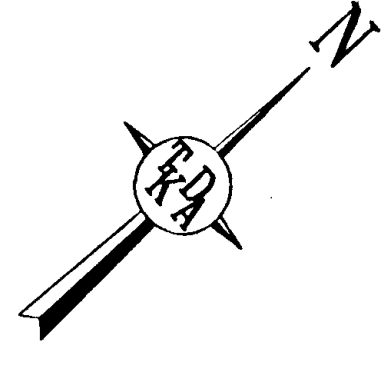
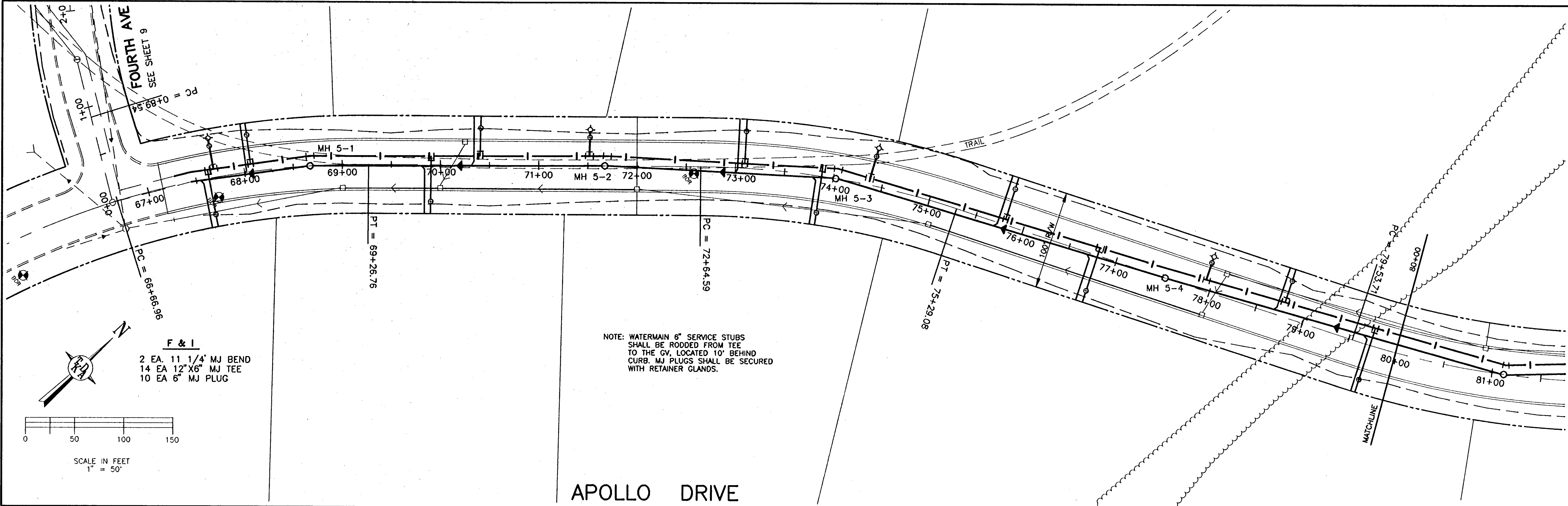
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
John M. Powell
DATE JUNE 28, 1993 REG. NO. 20834

TKDA
ENGINEERS ARCHITECTS PLANNERS
TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
SAINT PAUL, MINNESOTA

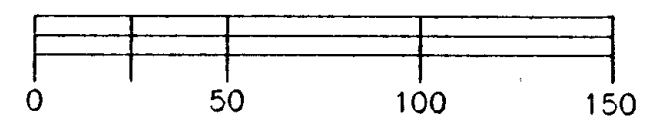
APOLLO DRIVE IMPROVEMENTS
PHASE 2
MINNESOTA
LINO LAKES

SUPERELEVATION
TABULATION
SHEET NO. 4 OF 13 SHEETS

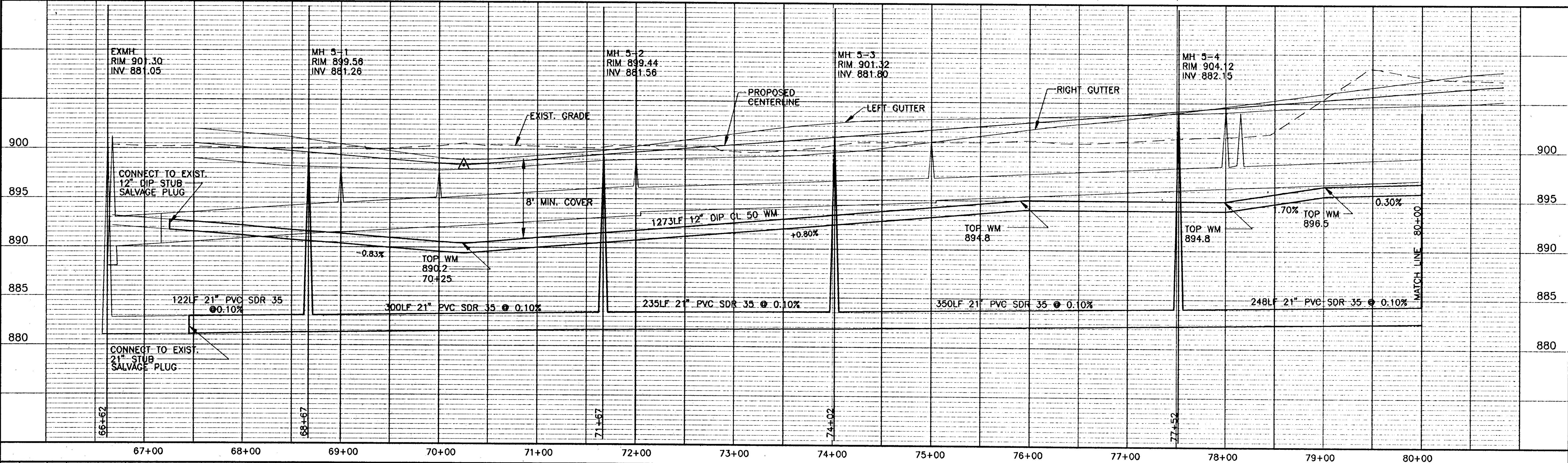
COMMISSION NO.
10300



F & I
2 EA. 11 1/4" MJ BEND
14 EA 12"X6" MJ TEE
10 EA 6" MJ PLUG



SCALE IN FEET
1" = 50'



NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED DRAWN
JMP, JES IMB

CHECKED
JMP

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John M. Powell

DATE JUNE 28, 1993 REG. NO. 20834

TKDA
ENGINEERS ARCHITECTS PLANNERS

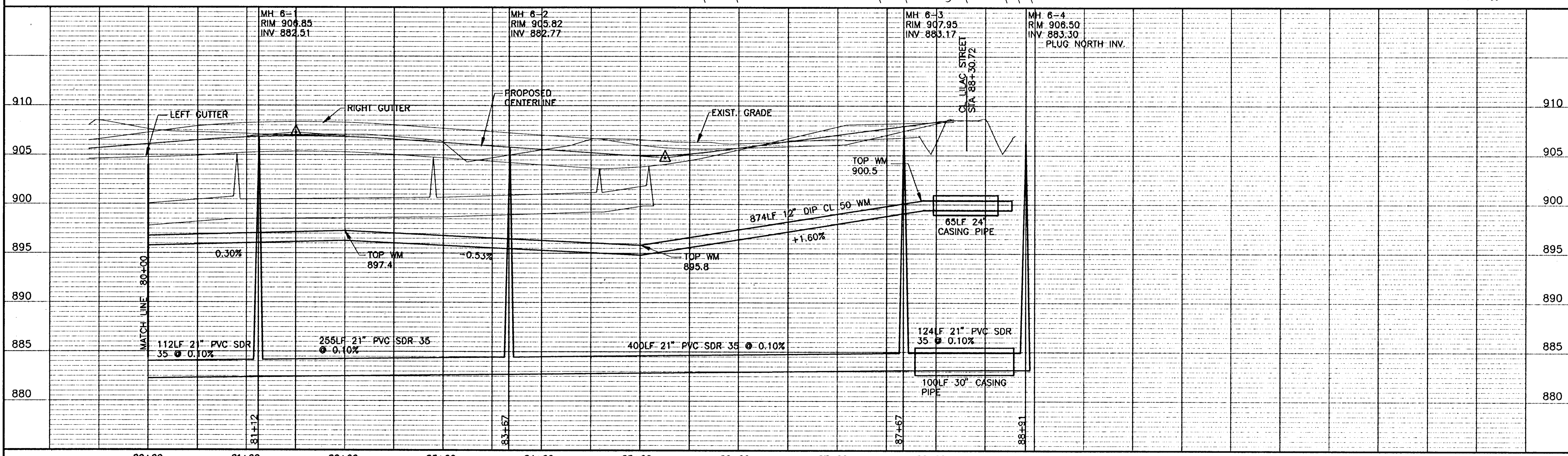
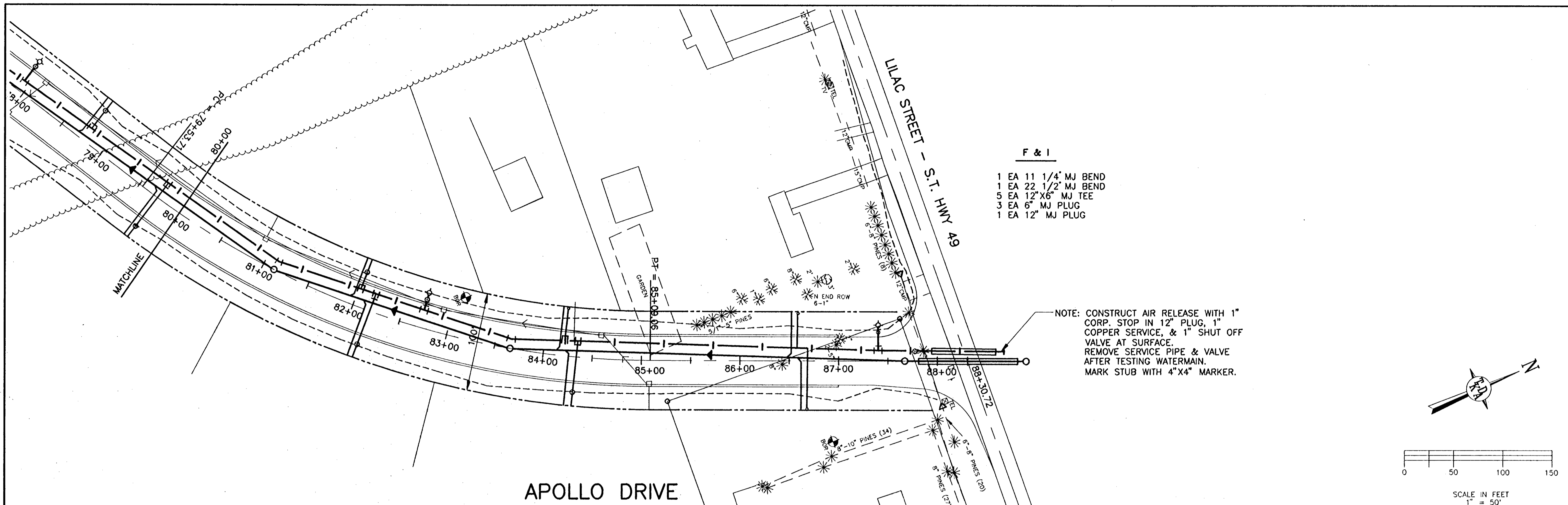
TOLTZ, KING, DUVALL, ANDERSON
AND ASSOCIATES INCORPORATED
SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS
PHASE 2
LINO LAKES
MINNESOTA

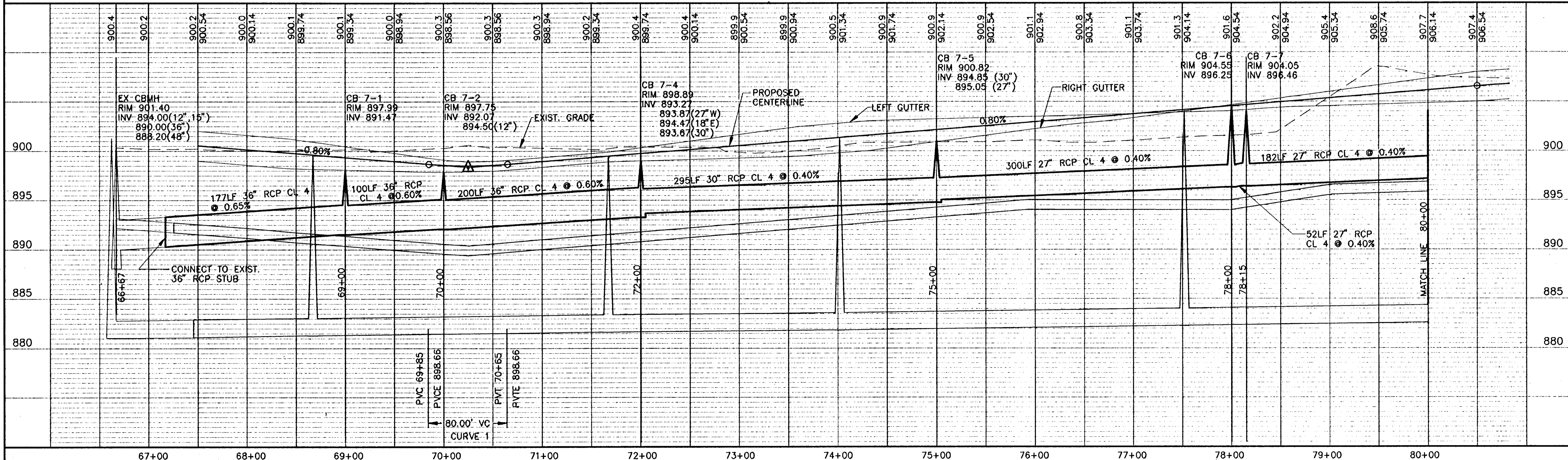
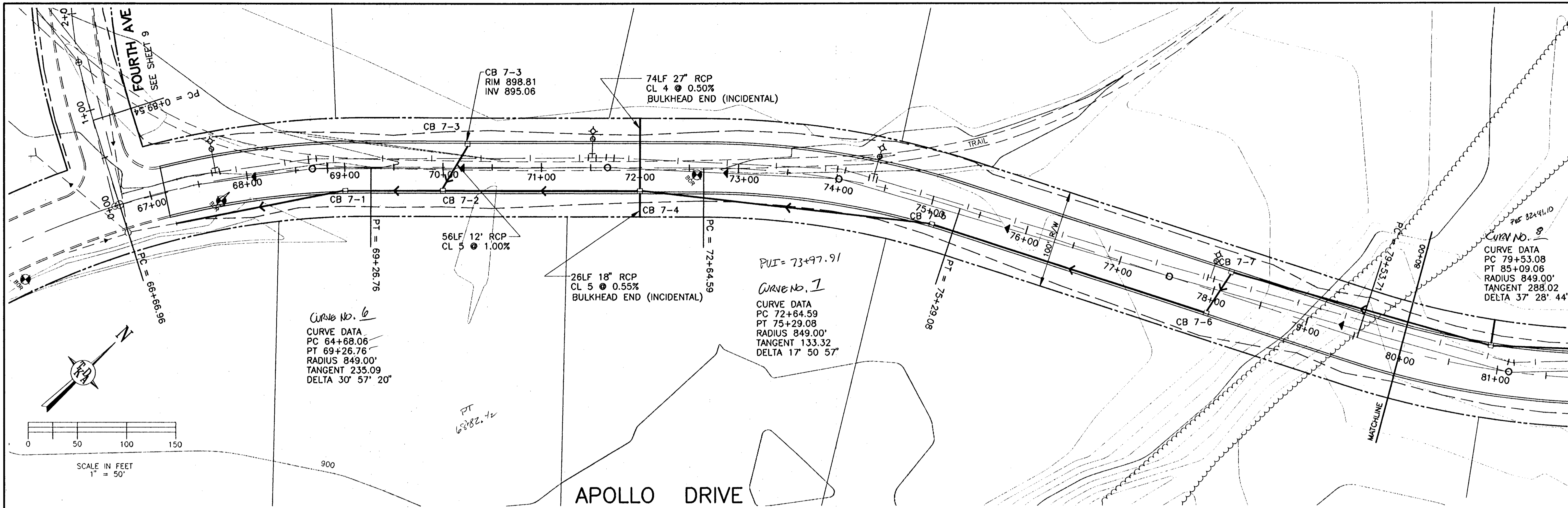
UTILITIES
STA. 67+50 TO STA. 80+00

SHEET NO. 5 OF 13 SHEETS
MSAP 210-115-01

COMMISSION NO.
10300



DESIGNED JMP, JES	DRAWN IMB	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 <i>W. M. Powell</i> DATE <u>JUNE 28, 1993</u> REG. NO. <u>20834</u>	TKDA ENGINEERS ARCHITECTS PLANNERS SAINT PAUL, MINNESOTA	APOLLO DRIVE IMPROVEMENTS PHASE 2 LINO LAKES MINNESOTA	UTILITIES STA. 80+00 TO LILAC STREET SHEET NO. 6 OF 13 SHEETS MSAP 210-115-01	COMMISSION NO. 10300
CHECKED JMP	DATE					



NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED TAC
 DRAWN IMB
 CHECKED JMP

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.

John M. Powell
 DATE: JUNE 26, 1993 REG. NO. 20834

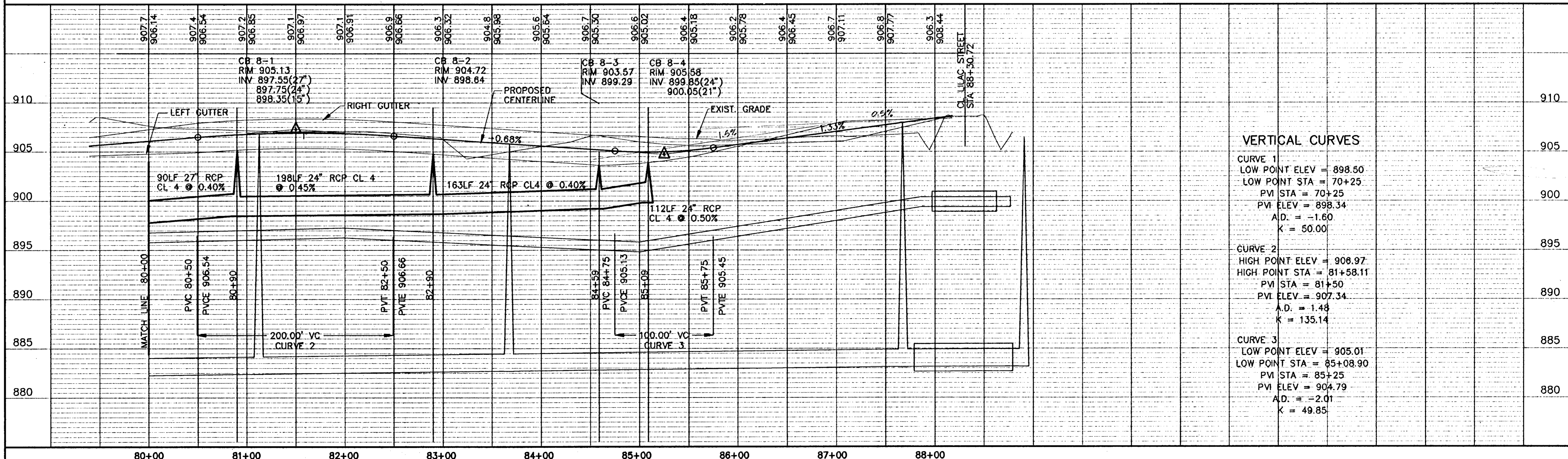
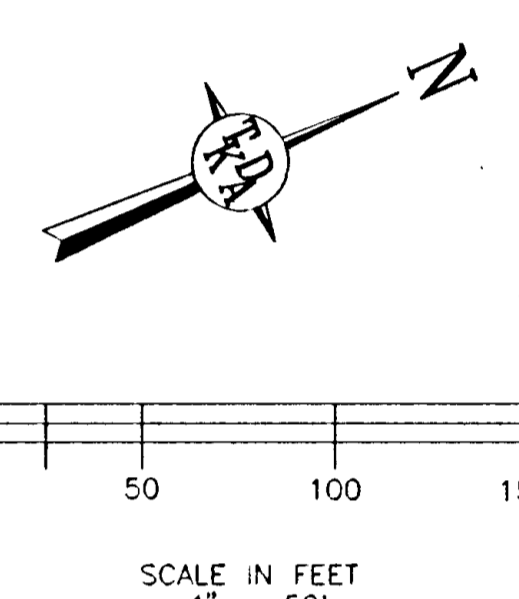
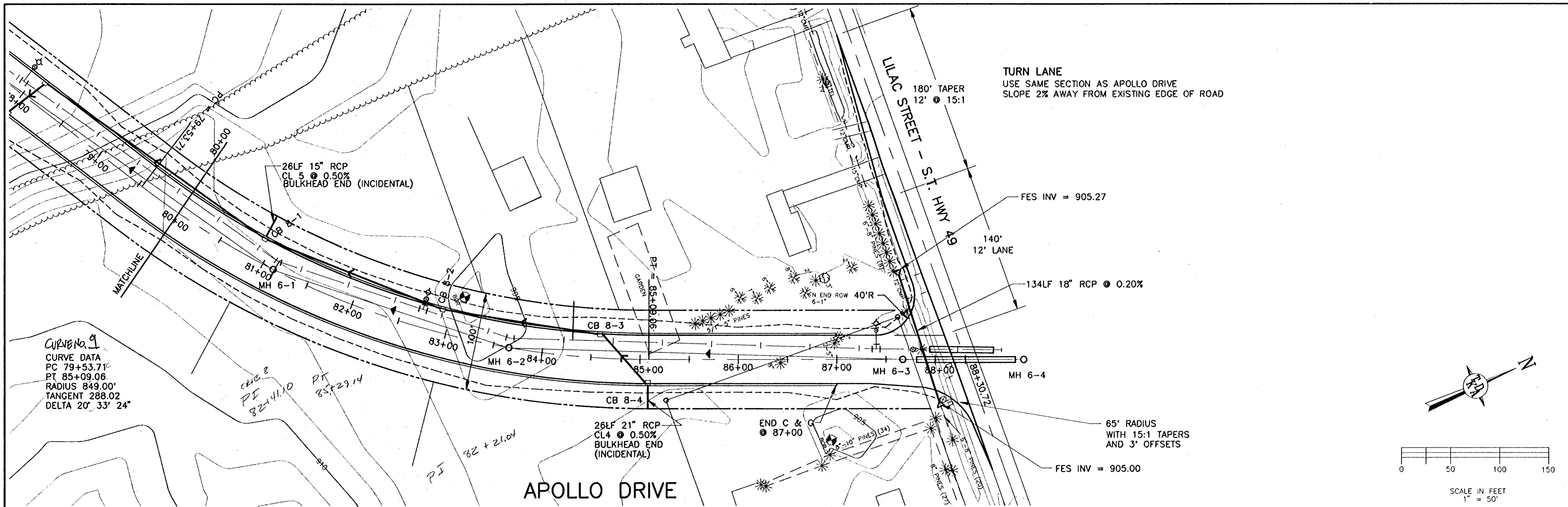
TKDA
 ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
 SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS PHASE 2
 LINO LAKES MINNESOTA

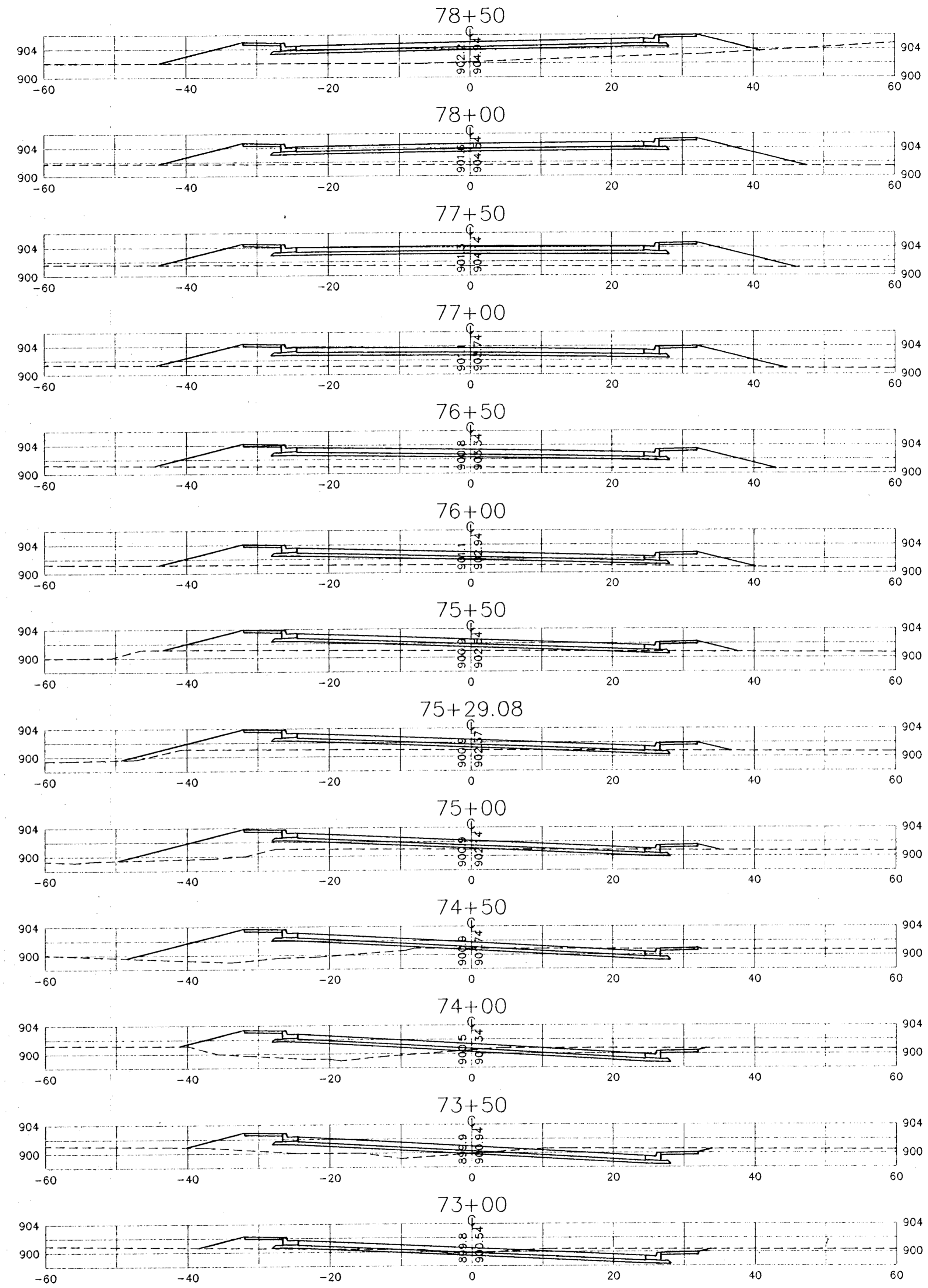
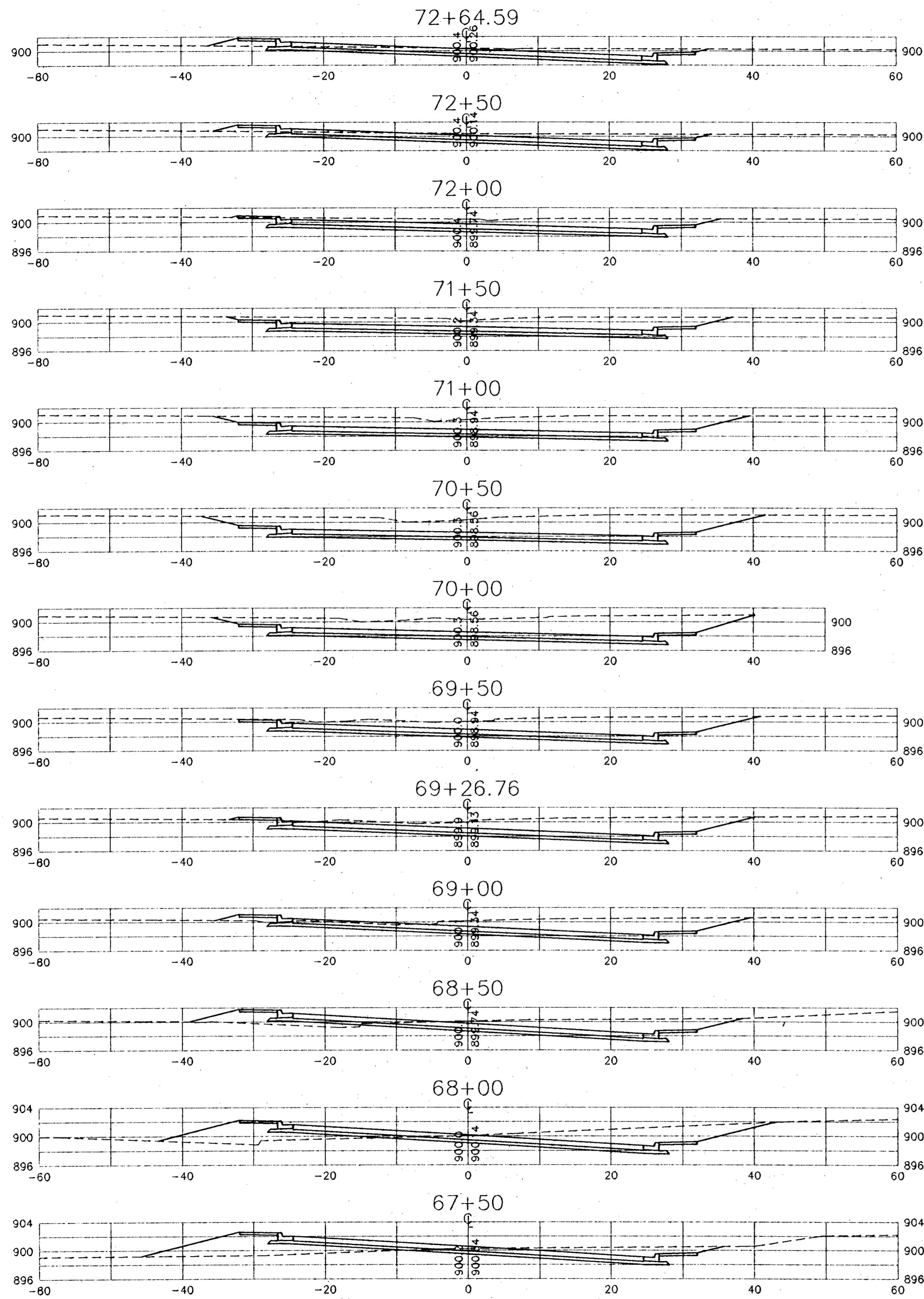
STREET IMPROVEMENTS STA. 67+50 TO STA. 80+00
 SHEET NO. 7 OF 13 SHEETS

COMMISSION NO. 10300



DESIGNED TAC	DRAWN IMB	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: JUNE 28, 1993 REG. NO. 20834	TKDA TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED SAINT PAUL, MINNESOTA	APOLLO DRIVE IMPROVEMENTS PHASE 2		STREET IMPROVEMENTS STA. 80+00 TO LILAC STREET		COMMISSION NO.
CHECKED JMP				LINO LAKES MINNESOTA	MINNESOTA		SHEET NO. 8 OF 13 SHEETS	

NO.	DATE	BY	DESCRIPTION OF REVISIONS
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NO.	DATE	BY	DESCRIPTION OF REVISIONS

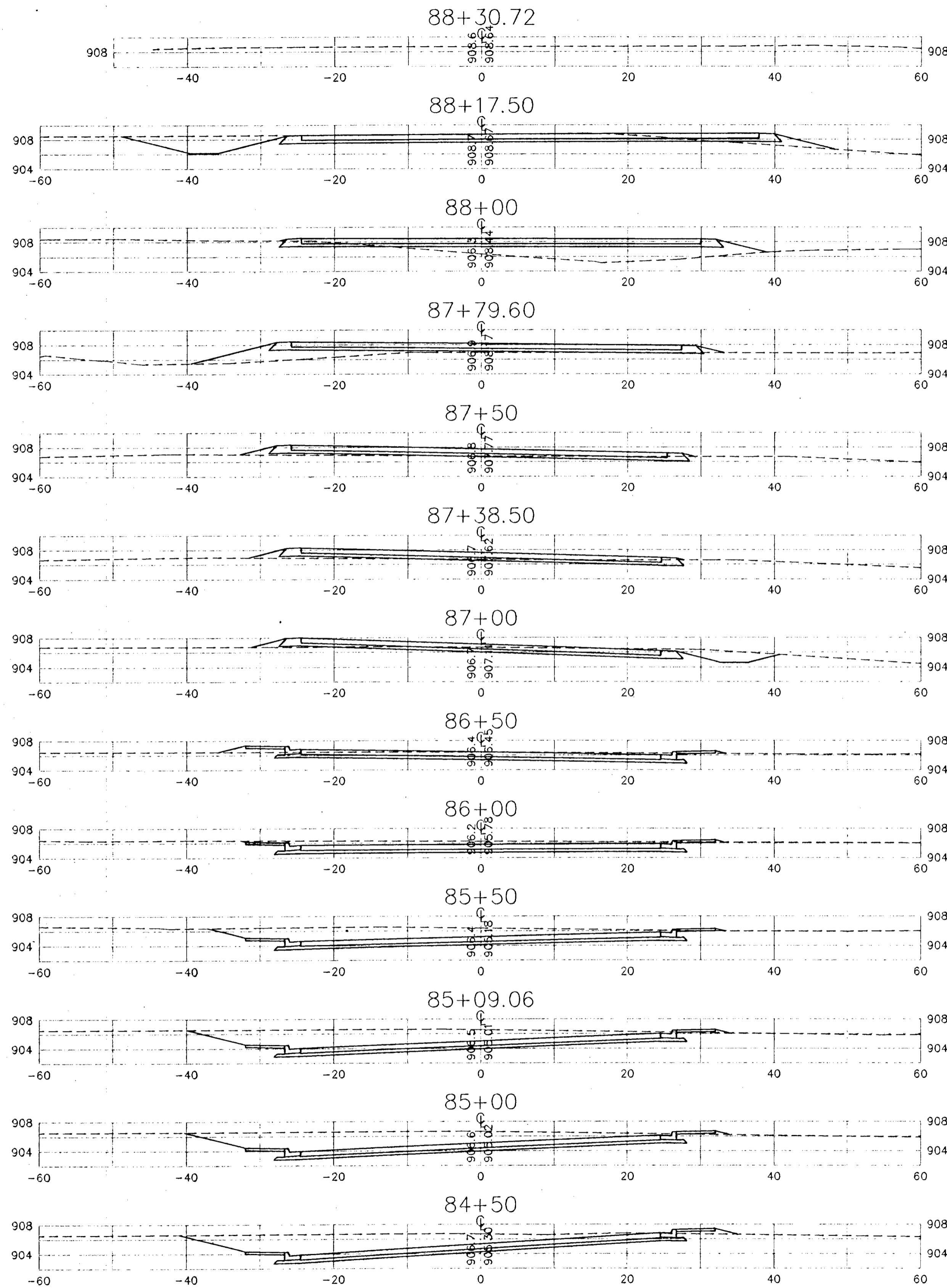
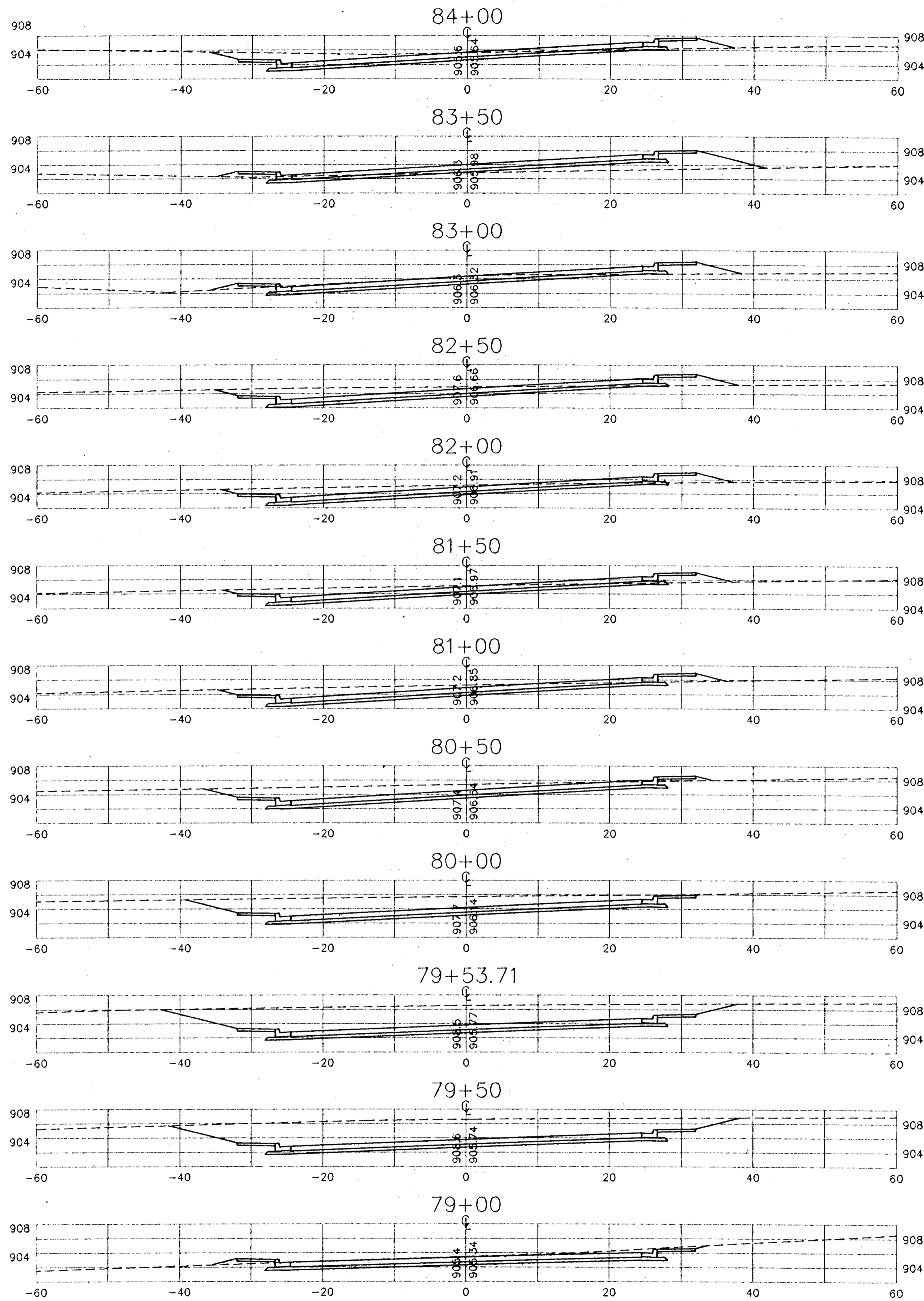
DESIGNED TAC
DRAWN IMB
CHECKED JMP
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
DATE JUNE 28, 1993 REG. NO. 20834

TKDA
ENGINEERS ARCHITECTS PLANNERS
TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS
PHASE 2
LINO LAKES
MINNESOTA

CROSS-SECTIONS
STA. 67+50 TO STA. 78+50
SHEET NO. 10 OF 13 SHEETS

COMMISSION NO.
10300



NO.	DATE	BY	DESCRIPTION OF REVISIONS

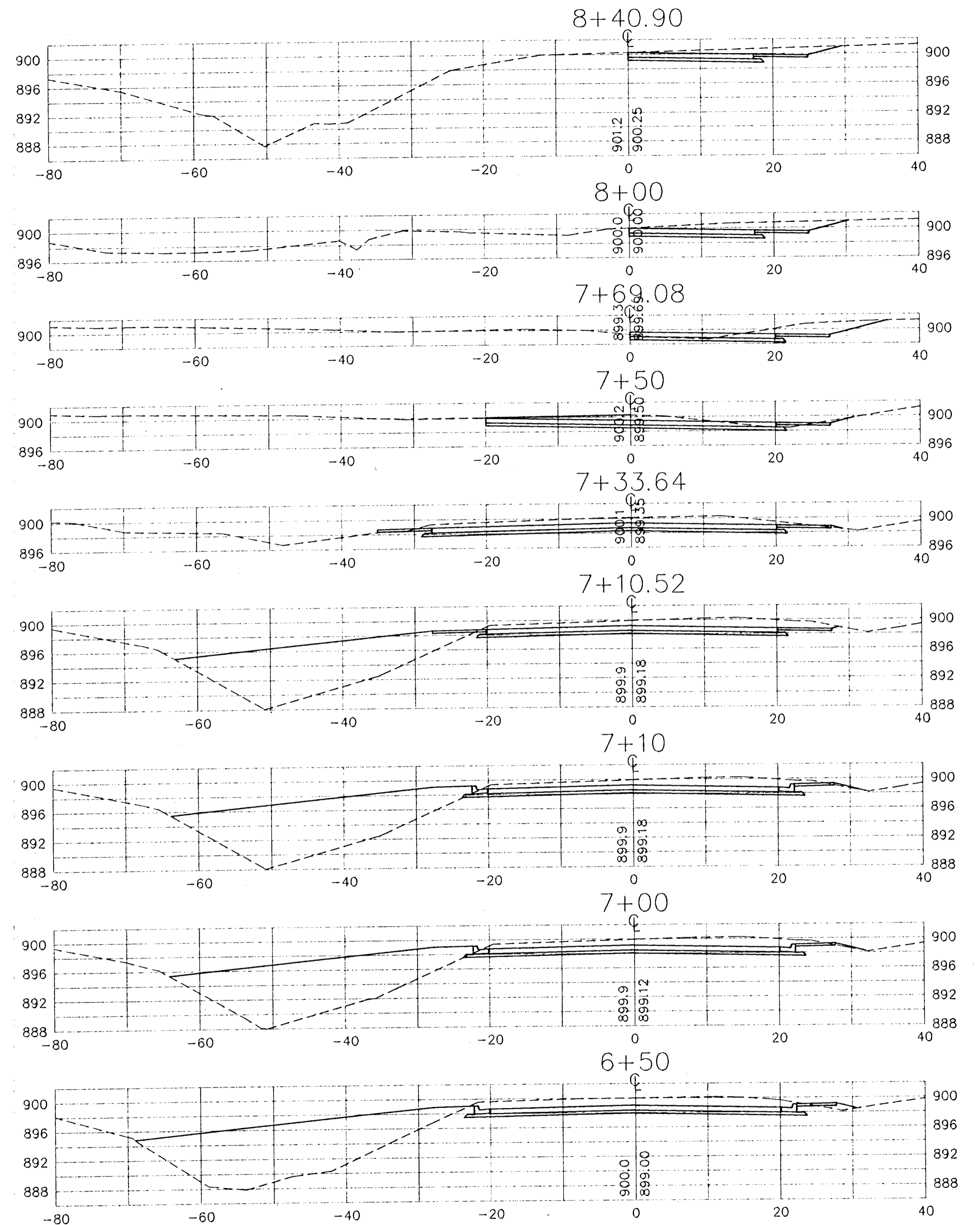
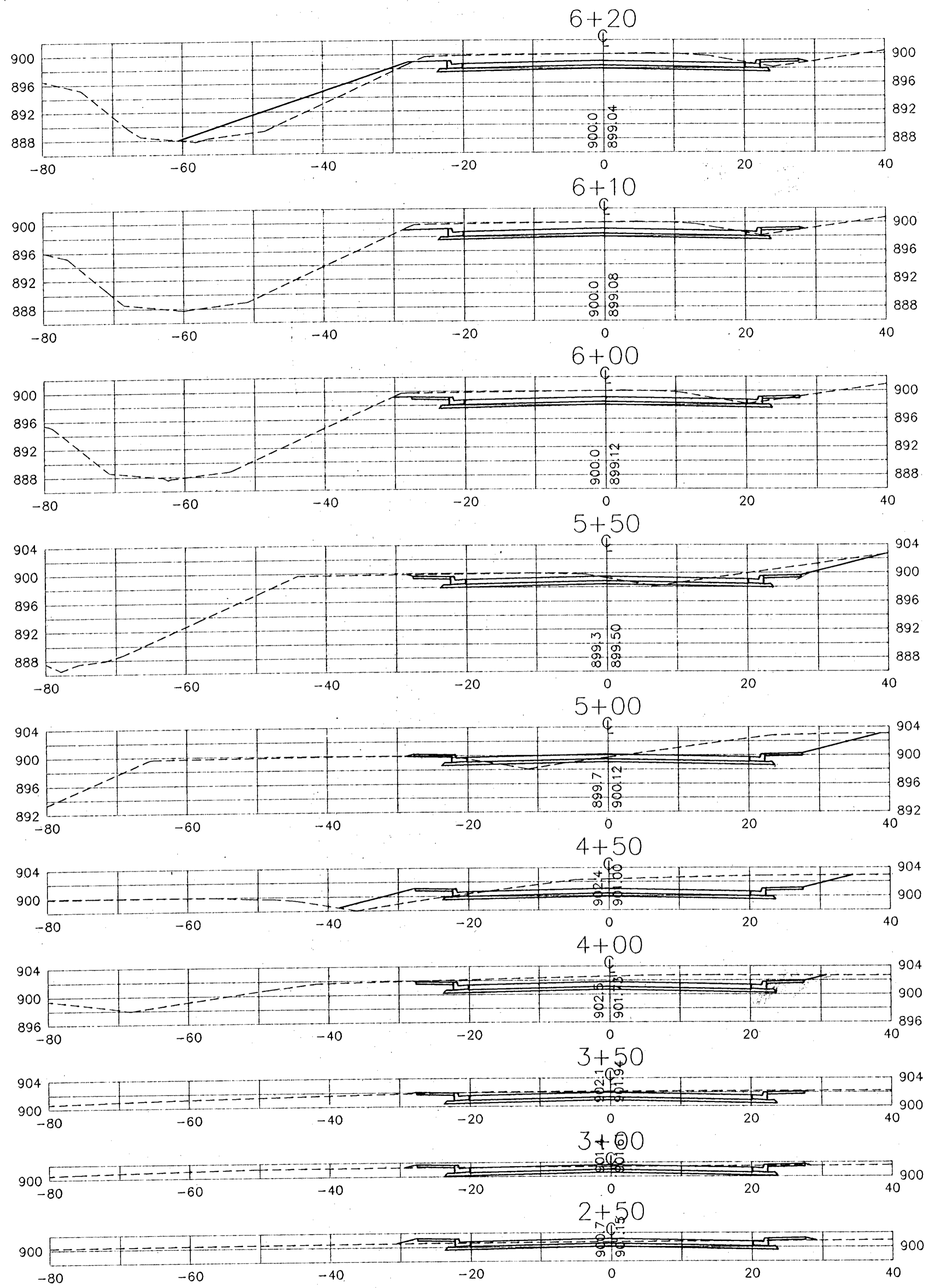
DESIGNED TAC DRAWN IMB
 CHECKED JMP
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
 DATE JUNE 28, 1993 REG. NO. 20834

TKDA
 ENGINEERS ARCHITECTS PLANNERS
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
 SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS
 PHASE 2
 LINO LAKES MINNESOTA

CROSS-SECTIONS
 STA. 79+00 TO LILAC STREET
 SHEET NO. 11 OF 13 SHEETS

COMMISSION NO.
 10300



NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED: TAC
 DRAWN: IMB
 CHECKED: JMP

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.
W. M. Paul
 DATE, JUNE 29, 1993 REG. NO. 20834

TKDA
 ENGINEERS ARCHITECTS PLANNERS
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED
 SAINT PAUL, MINNESOTA

APOLLO DRIVE IMPROVEMENTS
 PHASE 2
 LINO LAKES MINNESOTA

CROSS-SECTIONS
 FOURTH AVENUE
 SHEET NO. 12 OF 13 SHEETS

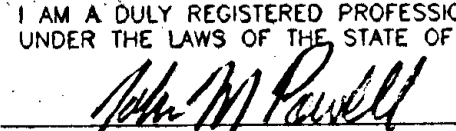
COMMISSION NO.
 10300

APOLLO DRIVE

STATION	AREAS		VOLUMES		CUMULATIVE VOLUMES	
	Square Feet		Cubic Yards		Cubic Yards	
	CUT	FILL	CUT	FILL	CUT	FILL
67+50	57.34	53.08				
68+00	94.88	41.17	136.53	117.16	136.53	117.16
68+50	90.86	20.47	167.06	76.33	303.59	193.50
69+00	120.13	4.44	191.86	30.88	495.45	224.38
69+26.76	138.97	0.31	126.64	3.17	622.09	227.55
69+50	157.71	0.00	127.69	0.17	749.78	227.72
70+00	195.75	0.00	327.28	0.00	1077.05	227.72
70+50	208.80	0.00	374.58	0.00	1451.64	227.72
71+00	175.77	0.00	356.09	0.00	1807.72	227.72
71+50	141.01	0.00	293.31	0.00	2101.03	227.72
72+00	108.15	0.10	230.70	0.12	2331.74	227.84
72+50	83.18	4.46	177.16	5.49	2508.89	233.32
72+64.59	76.06	6.14	43.04	3.72	2551.93	237.05
73+00	54.55	12.16	84.65	16.11	2636.58	253.16
73+50	42.53	37.46	88.08	61.45	2724.66	314.61
74+00	38.04	66.99	72.80	129.10	2797.46	443.70
74+50	26.24	83.91	58.11	186.76	2855.56	630.47
75+00	11.05	67.67	33.66	186.94	2889.23	817.41
75+29.08	4.82	59.02	8.30	90.00	2897.53	907.41
75+50	1.54	64.15	2.47	62.04	2899.99	969.44
76+00	0.00	84.46	1.43	178.88	2901.42	1148.32
76+50	0.00	134.03	0.00	263.00	2901.42	1411.32
77+00	0.00	146.17	0.00	337.28	2901.42	1748.61
77+50	0.00	158.36	0.00	366.57	2901.42	2115.18
78+00	0.00	176.79	0.00	403.42	2901.42	2518.60
78+50	0.00	139.12	0.00	380.26	2901.42	2898.86
79+00	69.02	2.75	63.91	170.77	2965.32	3069.62
79+50	248.96	0.00	294.43	3.31	3259.75	3072.94
79+53.71	247.76	0.00	34.12	0.00	3293.87	3072.94
80+00	161.11	0.00	349.25	0.00	3643.12	3072.94
80+50	112.30	2.36	251.67	2.89	3894.79	3075.83
81+00	83.09	6.40	179.89	10.90	4074.68	3086.73
81+50	69.67	8.71	140.74	18.80	4215.42	3105.53
82+00	75.08	8.81	133.18	21.81	4348.60	3127.34
82+50	77.96	10.30	140.78	23.79	4489.38	3151.13
83+00	43.16	14.25	111.98	30.33	4601.36	3181.45
83+50	9.10	44.54	48.24	71.54	4649.60	3252.99
84+00	65.73	9.35	68.46	66.06	4718.06	3319.05
84+50	152.41	2.85	199.37	15.20	4917.43	3334.25
85+00	159.02	0.70	285.20	4.43	5202.63	3338.68
85+09.06	155.77	0.62	52.27	0.30	5254.90	3338.98
85+50	133.86	0.23	219.57	0.84	5474.47	3339.82
86+00	86.08	0.15	203.65	0.46	5678.13	3340.28
86+50	56.37	4.76	131.90	5.91	5810.03	3346.18
87+00	48.45	2.99	97.06	9.33	5907.09	3355.51
87+38.50	13.80	5.88	44.38	8.22	5951.47	3363.73
87+50	9.57	6.67	4.98	3.47	5956.44	3367.20
87+79.60	0.57	35.05	5.56	29.73	5962.00	3396.93
88+00	7.02	67.99	2.87	50.60	5964.87	3447.53
88+17.50	56.98	7.93	20.74	31.98	5985.61	3479.52
			13.95	2.52	5999.56	3482.04

FOURTH AVENUE

STATION	AREAS		VOLUMES		CUMULATIVE VOLUMES	
	Square Feet		Cubic Yards		Cubic Yards	
	CUT	FILL	CUT	FILL	CUT	FILL
2+50	39.00	3.32	82.70	5.03	82.70	5.03
3+00	50.74	0.71	112.06	1.00	194.76	6.03
3+50	70.69	0.08	160.46	0.10	355.22	6.14
4+00	103.55	0.00	205.48	23.31	560.70	29.45
4+50	121.64	18.86	190.40	28.52	751.10	57.97
5+00	91.25	3.96	147.13	5.01	898.23	62.98
5+50	75.96	0.18	149.03	0.95	1047.26	63.93
6+00	88.74	0.62	33.68	0.55	1080.94	64.48
6+10	92.18	1.74	34.91	12.91	1115.85	77.39
6+20	95.65	54.51	109.22	228.09	1225.07	305.48
6+50	99.78	240.07	36.88	122.02	1261.94	427.50
7+00	92.50	221.51	33.41	112.85	1438.44	1008.55
7+10	89.28	218.84	1.72	5.59	1440.16	1014.13
7+10.52	89.70	197.13	76.07	109.80	1516.23	1123.93
7+33.64	87.99	0.17	34.72	0.43	1550.95	1124.37
7+50	26.62	0.92	21.67	0.42	1572.62	1124.79
7+69.08	34.72	0.00	45.00	0.00	1617.62	1124.79
8+00	43.88	0.00	62.02	0.00	1679.64	1124.79
8+40.90	38.00	0.00	0.06	0.00	1679.70	1124.79

NO. DATE BY		DESCRIPTION OF REVISIONS		DESIGNED TAC	DRAWN IMB	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: JUNE 28, 1993 REG. NO. 20834	TKDA ENGINEERS ARCHITECTS PLANNERS SAINT PAUL, MINNESOTA	APOLLO DRIVE IMPROVEMENTS PHASE 2		VOLUME TABULATIONS SHEET NO. 13 OF 13 SHEETS		COMMISSION NO. 10300
				CHECKED JMP				LINO LAKES MINNESOTA		MSAP 210-113-01 & 210-115-01		