

# CITY OF LINO LAKES MINNESOTA

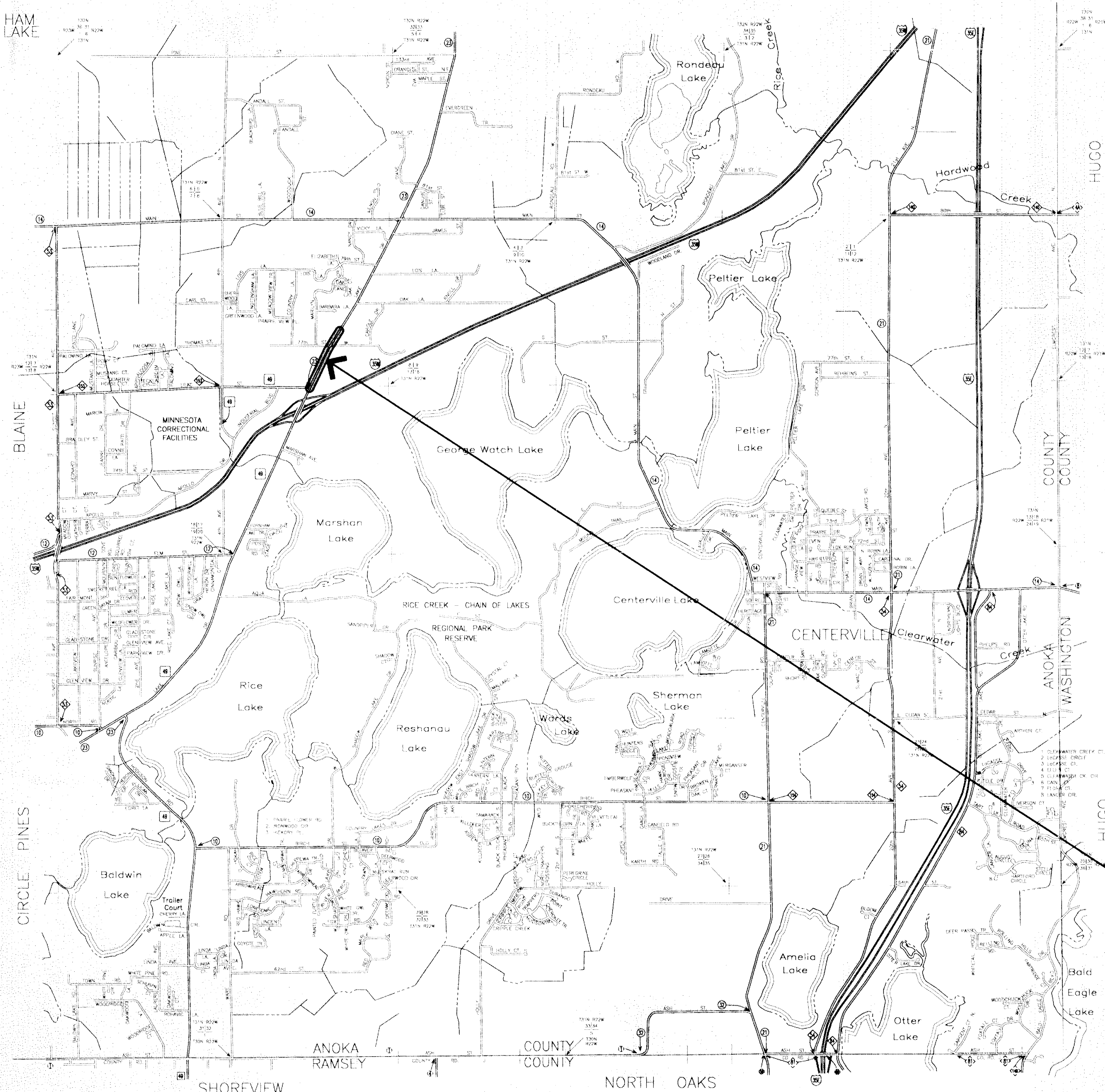
## LAKE DRIVE / APOLLO DRIVE IMPROVEMENTS

COMM. NO. 12426

### LIST OF DRAWINGS

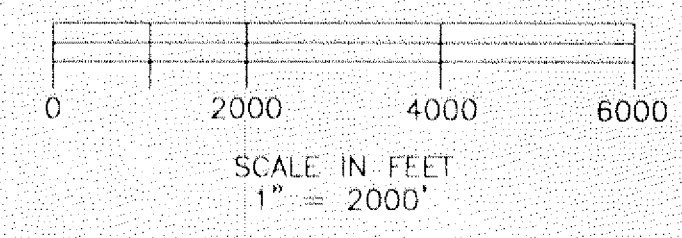
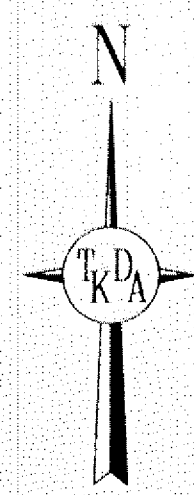
DWG. NO.	DESCRIPTION
1	TITLE SHEET
2-3	ESTIMATED QUANTITIES AND LEGEND
4	GEOMETRIC PLAN
5-8	CONSTRUCTION PHASING PLAN
9-13	TYPICAL SECTIONS
14-15	CONSTRUCTION DETAILS
16	EROSION CONTROL PLAN
17	EXISTING CONDITIONS
18	REMOVALS
19	STORM SEWER CONSTRUCTION CHART
20	SANITARY SEWER CONSTRUCTION CHART
21-23	PLAN AND PROFILE
24	SANITARY AND WATERMAIN
25	MISCELLANEOUS PROFILES
26-34	TRAFFIC SIGNAL PLANS
35-37A	SIGNING AND STRIPING PLANS
38-43	CROSS SECTIONS-LAKE DRIVE
44-45	CROSS SECTIONS-APOLLO DRIVE
46	CROSS SECTIONS-MARKETPLACE DRIVE

THIS PLAN CONTAINS 47 SHEETS.



PROJECT LOCATION

CITY OF LINO LAKES



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

*Paul Blum* JAN 28, 2002  
PAUL W. BLUM LIC. NO. 12779

APPROVED *[Signature]* ANOKA COUNTY ENGINEER  
APPROVED *[Signature]* JAMES C. STUBBS CITY OF LINO LAKES

ISSUED FOR CONSTRUCTION  
Date: 3-13-02 By: PWB

02-10-23

**TKDA**  
ENGINEERS • ARCHITECTS • PLANNERS

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



**LEGEND**

EXISTING CONDITIONS AND REMOVALS

	EXIST. RIGHT-OF-WAY
	EXIST. PROPERTY LINE
	EXIST. CONC. CURB AND GUTTER
	EXIST. CURB (TYPE AS NOTED)
	EXIST. EDGE OF BIT. SURFACE
	EXIST. EDGE OF GRAVEL
	EXIST. SIDEWALK (TYPE AS NOTED)
	EXIST. POWER POLE, GUY
	EXIST. LIGHT POLE, HAND HOLE
	EXIST. TREE
	EXIST. CHAIN LINK FENCE
	EXIST. WOOD FENCE
	EXIST. RETAINING WALL
	EXIST. BUILDING
	EXIST. SANITARY SEWER
	EXIST. STORM SEWER
	EXIST. MANHOLE
	EXIST. CATCHBASIN
	EXIST. WATERMAIN
	HYDRANT, GATE VALVE
	EXIST. GAS MAIN
	BURIED ELECTRIC
	ELECTRIC BOX
	BURIED TELEPHONE
	TELEPHONE PEDESTAL
	BURIED CABLE TELEVISION

**QUANTITIES**

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	SHEET 21	SHEET 22	SHEET 23	SHEET 24	TOTAL
1	2021.501	MOBILIZATION	LS					1
2	2101.501	CLEARING	ACRE					0.15
3	2101.502	CLEARING	TREE					74
4	2101.507	GRUBBING	ACRE					0.15
5	2101.507	GRUBBING	TREE					74
6	2103.501	REMOVE BUILDING, SLABS AND DEBRIS	LS					1
7	2104.501	REMOVE PIPE CULVERTS	LF					519
8	2104.501	REMOVE PIPE STORM SEWER	LF					904
9	2104.501	REMOVE CURB AND GUTTER	LF					148
10	2104.501	REMOVE FENCE	LF					309
11	2104.505	REMOVE CONCRETE DRIVEWAY PAVEMENT	SY					88
12	2104.505	REMOVE CONCRETE PAVEMENT	SY					7,200
13	2104.505	REMOVE BITUMINOUS PAVEMENT	SY					15,462
14	2104.509	REMOVE DRAINAGE STRUCTURE	EA					4
15	2104.511	SAWING CONC PAVEMENT (FULL DEPTH)	LF					200
16	2104.513	SAWING BIT PAVEMENT (FULL DEPTH)	LF					300
17	2104.523	SALVAGE SIGN TYPE C	EA					1
18	2104.523	SALVAGE SIGN TYPE D	EA					2
19	2104.523	SALVAGE LIGHTING UNIT	EA					1
20	2104.602	RELOCATE MAILBOX	EA					11
21	2105.501	COMMON EXCAVATION (P)	CY	9,426	5,813	8,768		24,007
22	2105.507	SUBGRADE EXCAVATION	CY	5,095	3,704	2,566		11,365
23	2105.525	TOPSOIL BORROW (LV)	CY					2,000
24	2130.501	WATER FOR DUST CONTROL	MGAL					500
25	2211.503	AGGREGATE BASE, CL 5 (P)	TON	4,884	3,885	2,331		11,100
26	2350.501	TYPE LV 3 WEARING COURSE MIXTURE (B)	TON	25	50			75
27	2350.501	TYPE HV 4 WEARING COURSE MIXTURE (C)	TON	1,479	783	638		2,900
28	2350.502	TYPE HV 3 NON-WEARING COURSE MIXTURE (C)	TON	1,428	756	616		2,800
29	2350.502	TYPE MV 3 NON-WEARING COURSE MIXTURE (B)	TON	4,080	2,295	2,125		8,500
30	2350.601	TEMPORARY PAVEMENT	SY	1,429	1,532			2,961
31	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL	2,736	1,392	672		4,800
32	2501.515	15" RC PIPE APRON WITH TRASH GUARD	EA					2
33	2501.515	18" RC PIPE APRON WITH TRASH GUARD	EA					7
34	2501.521	22" SPAN RC PIPE-ARCH CULVERT CLASS 5	LF					95
35	2501.525	22" SPAN RC PIPE-ARCH APRON W/TRASH GRD	EA					2
36	2503.511	12" RC PIPE SEWER CLASS 5	LF					326
37	2503.511	15" RC PIPE SEWER CLASS 5	LF	273	340	477		1,090
38	2503.511	18" RC PIPE SEWER CLASS 5	LF	674	442			1,116
39	2503.511	24" RC PIPE SEWER CLASS 3	LF	199		197		396
40	2503.511	8" PVC PIPE SEWER, SDR 26	LF					867
41	2503.603	TELEWISE SANITARY SEWER MAINS	LF					712
42	2504.602	CONNECT TO EXISTING WATERMAIN	EA					1
43	2504.602	WATERMAIN OFFSET	EA					1
44	2504.602	RELOCATE HYDRANT AND VALVE	EA	2	1			5
45	2504.602	HYDRANT	EA					1
46	2504.602	ADJUST EXISTING G.V. BOX	EA	1	4			6
47	2504.602	ADJUST EXISTING CURB BOX	EA	2	1			3
48	2504.602	6" GATE VALVE AND BOX	EA					1
49	2504.602	8" GATE VALVE AND BOX	EA					6
50	2504.603	6" WATERMAIN DUCTILE IRON CL 52	LF					18
51	2504.603	8" WATERMAIN DUCTILE IRON CL 52	LF					892
52	2504.604	2" INSULATION BOARD	SF	64	192			320
53	2504.608	DUCTILE IRON FITTINGS	LB					1,000
54	2506.502	CONST CATCH BASIN DESIGN H	EA					1
55	2506.502	CONST CB/MH DESIGN 402, 0-10' DP	EA	2				2
56	2506.502	CONST CB/MH DESIGN 406 - 48" DIA, 0-10' DP	EA	9	8	10		27
57	2506.502	CONST CB/MH DESIGN 406 - 60" DIA, 0-10' DP	EA	1		3		4
58	2506.502	CONST CB/MH DESIGN 406 - 66" DIA, 0-10' DP	EA			1		1
59	2506.502	CONST SAN SEWER MH DESIGN 301, 0-10' DP	EA					4
60	2506.511	RECONSTRUCT SANITARY MANHOLES	LF	6	11			17
61	2506.522	ADJUST FRAME AND RING CASTING	EA					1
62	2506.602	CONNECT TO EXIST STORM SEW MANHOLE	EA	1				1
63	2506.602	CONNECT TO EXIST SAN SEW MANHOLE	EA					1

XREF: BORDER.  
PLOT: 1 = 1  
CURRENT: 02/05/02  
DIR: 1242601.VAR.MISC.QUANT

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	NEW BID ITEM
2	2/26/02	LML	QUANTITY CHANGED

DESIGNED LML	DRAWN LML	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  LYNN M. LEIBFRIED LIC. NO. 40552
CHECKED LML	JAN 28, 2002	

**TKDA**  
ENGINEERS • ARCHITECTS • PLANNERS

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

**LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS**

LINO LAKES MINNESOTA

**QUANTITIES**

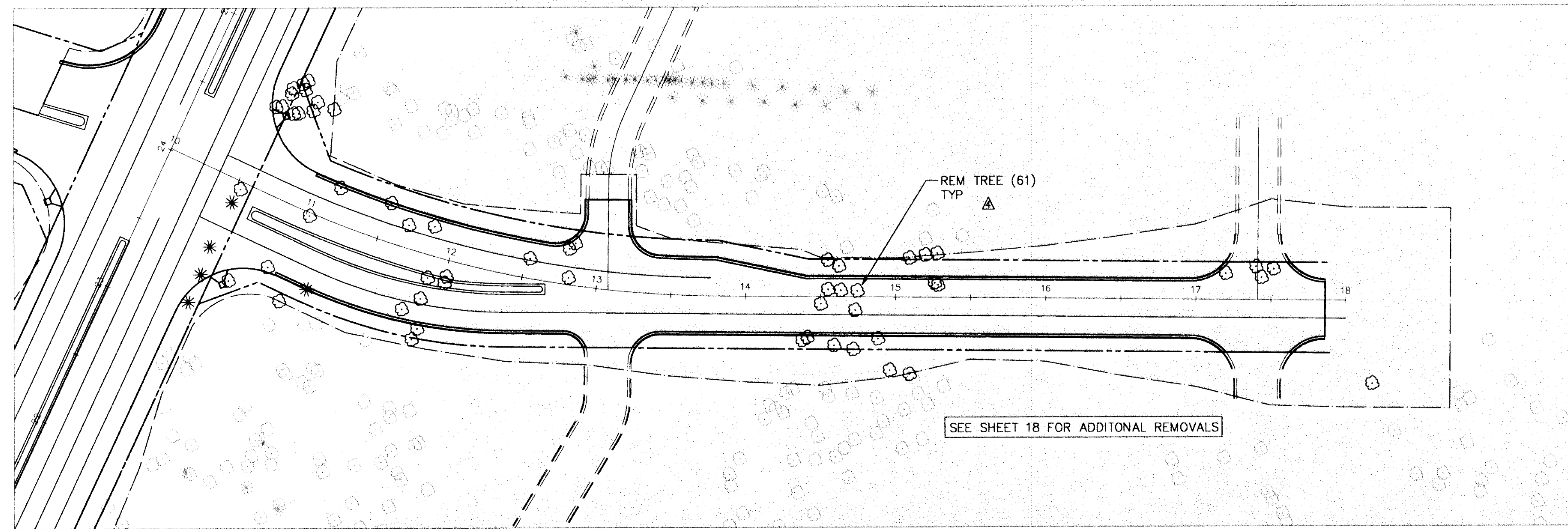
SHEET NO. 2 OF 46 SHEETS

COMMISSION NO.  
**12426-01**



QUANTITIES

ITEM NO.	SPEC. NO.	DESCRIPTION	UNIT	SHEET 21	SHEET 22	SHEET 23	SHEET 24	TOTAL
64	2506.602	OUTSIDE DROP FOR MANHOLE	EA				1	1
65	2506.603	EXTRA DEPTH OF 48" DIA MANHOLE	LF				44	44
66	2506.603	EXTRA DEPTH OF 60" DIA MANHOLE	LF	1				1
67	2521.501	4" CONCRETE WALK	SF	5,145	4,661	1,318		11,124
68	2531.501	CONCRETE CURB AND GUTTER DESIGN B418	LF	2,646	2,356			5,002
69	2531.501	CONCRETE CURB AND GUTTER DESIGN B618	LF	209	1,716	357		2,282
70	2531.507	6" CONCRETE DRIVEWAY PAVEMENT	SY		98			98
△ 71	2533.603	CONCRETE MEDIAN BARRIER DESIGN 8337	LF					1,000
△ 72	2533.603	RELOCATE CONCRETE MEDIAN BARRIER	LF					1,000
73	2545.602	INSTALL SALVAGED LIGHTING UNIT	EA					1
△ 74	2563.601	TRAFFIC CONTROL, PHASE 1	LS					1
△ 75	2563.601	TRAFFIC CONTROL, PHASE 2	LS					1
△ 76	2563.601	TRAFFIC CONTROL, PHASE 3	LS					1
△ 77	2564.531	SIGN PANELS TYPE C	SF					428.0
△ 78	2564.531	SIGN PANELS TYPE D	SF					42.3
△ 79	2564.537	INSTALL SIGN TYPE C	EA					1
△ 80	2564.537	INSTALL SIGN TYPE D	EA					2
81	2564.550	DELINEATOR TYPE CYLINDER STYLE	EA					2
82	2564.550	DELINEATOR TYPE (X4-2)	EA					8
△ 83	2564.602	PAVEMENT MESSAGE (LEFT ARROW) POLY PREFORM	EA					13
△ 84	2564.602	PAVEMENT MESSAGE (RIGHT ARROW) POLY PREFORM	EA					11
△ 85	2564.602	PAVT MESSAGE (RIGHT-THRU ARROW) POLY PREFORM	EA					2
86	2564.603	4" SOLID LINE WHITE-PAINT	LF					8,104
△ 87	2564.603	24" SOLID LINE WHITE-POLY PREFORMED	LF					377
88	2654.603	4" BROKEN LINE WHITE-PAINT	LF					710
89	2654.603	4" SOLID LINE YELLOW-PAINT	LF					6,316
90	2564.603	4" DOUBLE SOLID LINE YELLOW-PAINT	LF					455
△ 91	2564.603	8" BROKEN LINE WHITE-PAINT	LF					81
△ 92	2564.603	24" SOLID LINE YELLOW-POLY PREFORMED	LF					170
△ 93	2564.618	ZEBRA CROSSWALK WHITE-POLY PREFORMED	SF					1,062
94	2565.511	FULL T ACT T CONTROL SIGNAL SYSTEM A	SIG SYS					1
95	2565.511	FULL T ACT T CONTROL SIGNAL SYSTEM B	SIG SYS					1
96	2565.601	EMERGENCY VEHICLE PREEMPTION SYSTEM A	LS					1
97	2565.601	EMERGENCY VEHICLE PREEMPTION SYSTEM B	LS					1
98	2565.601	TRAFFIC CONTROL INTERCONNECTION	LS					1
99	2573.501	BALE CHECK AT CATCH BASIN	EA					50
100	2573.603	SILT FENCE, TYPE MACHINE SLICED	LF					3,000
101	2575.501	SEEDING, MIXTURE 60 B	ACRE					0.7
△ 102	2575.505	SODDING, TYPE SALT RESISTANT	SY					14,000



APOLLO DRIVE CLEARING AND GRUBBING

PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DNE: 1242601 VAR WISC QUANT

NO.	DATE	BY	DESCRIPTION OF REVISIONS
△	2/26/02	LML	APOLLO DRIVE CLEARING AND GRUBBING ADDED
△	2/26/02	LML	BID ITEM DESCRIPTION CHANGED
△	2/26/02	LML	NEW BID ITEM
△	2/26/02	LML	QUANTITY CHANGED

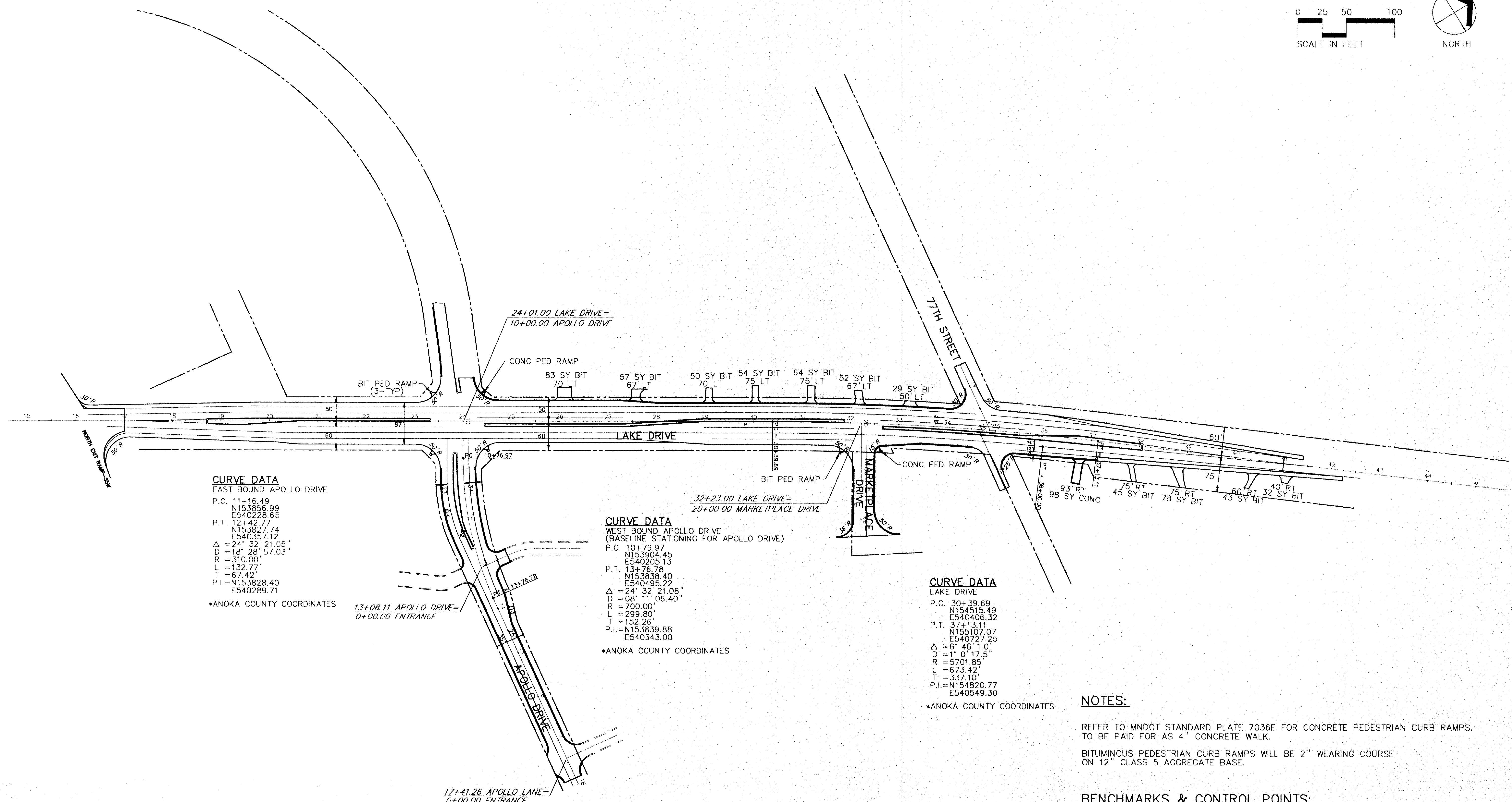
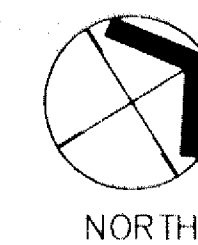
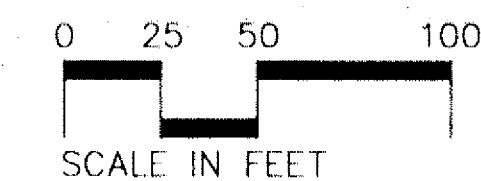
DESIGNED LML DRAWN LML  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Lynn M. Leibfried* JAN 28, 2002  
 LYNN M. LEIBFRIED LIC. NO. 40552

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES MINNESOTA

COMMISSION NO.  
 12426-01  
 QUANTITIES  
 SHEET NO. 3 OF 46 SHEETS





**CURVE DATA**  
 EAST BOUND APOLLO DRIVE  
 P.C. 11+16.49  
 N153856.99  
 E540228.65  
 P.T. 12+42.77  
 N153827.74  
 E540357.12  
 $\Delta = 24^\circ 32' 21.05''$   
 $D = 18' 28' 57.03''$   
 $R = 310.00'$   
 $L = 132.77'$   
 $T = 67.42'$   
 P.I. = N153828.40  
 E540289.71  
 \*ANOKA COUNTY COORDINATES

**CURVE DATA**  
 WEST BOUND APOLLO DRIVE  
 (BASELINE STATIONING FOR APOLLO DRIVE)  
 P.C. 10+76.97  
 N153904.45  
 E540205.13  
 P.T. 13+76.78  
 N153838.40  
 E540495.22  
 $\Delta = 24^\circ 32' 21.08''$   
 $D = 08' 11' 06.40''$   
 $R = 700.00'$   
 $L = 299.80'$   
 $T = 152.26'$   
 P.I. = N153839.88  
 E540343.00  
 \*ANOKA COUNTY COORDINATES

**CURVE DATA**  
 LAKE DRIVE  
 P.C. 30+39.69  
 N154515.49  
 E540406.32  
 P.T. 37+13.11  
 N155107.07  
 E540727.25  
 $\Delta = 6^\circ 46' 1.0''$   
 $D = 1^\circ 0' 17.5''$   
 $R = 5701.85'$   
 $L = 673.42'$   
 $T = 337.10'$   
 P.I. = N154820.77  
 E540549.30  
 \*ANOKA COUNTY COORDINATES

**NOTES:**

REFER TO MNDOT STANDARD PLATE 7036E FOR CONCRETE PEDESTRIAN CURB RAMPS. TO BE PAID FOR AS 4" CONCRETE WALK.  
 BITUMINOUS PEDESTRIAN CURB RAMPS WILL BE 2" WEARING COURSE ON 12" CLASS 5 AGGREGATE BASE.

**BENCHMARKS & CONTROL POINTS:**

- BM 54 916.05 CAST IRON MONUMENT ON LILAC STREET, NEAR CUL-DE-SAC AT GAS STATION. N153596.330, E539803.026
- BM 918.817 BRASS DISK SE CORNER TH 49 BRIDGE OVER I-35E.
- CP 55 CAST IRON MONUMENT ON LILAC STREET AND 4TH AVENUE. N153631.443, E537165.489

XREF: BORDER, GEOM  
 PLOT: 1 = 1  
 CURRENT: 02/02/02  
 DIR: 1242601.VAR.PROP\GEOM1

NO.	DATE	BY	DESCRIPTION OF REVISIONS

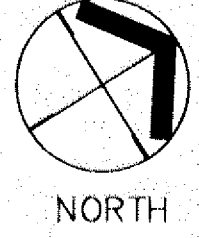
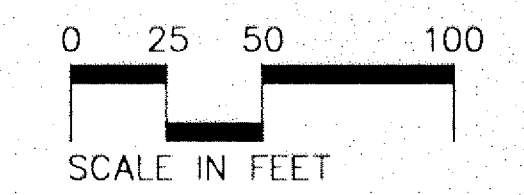
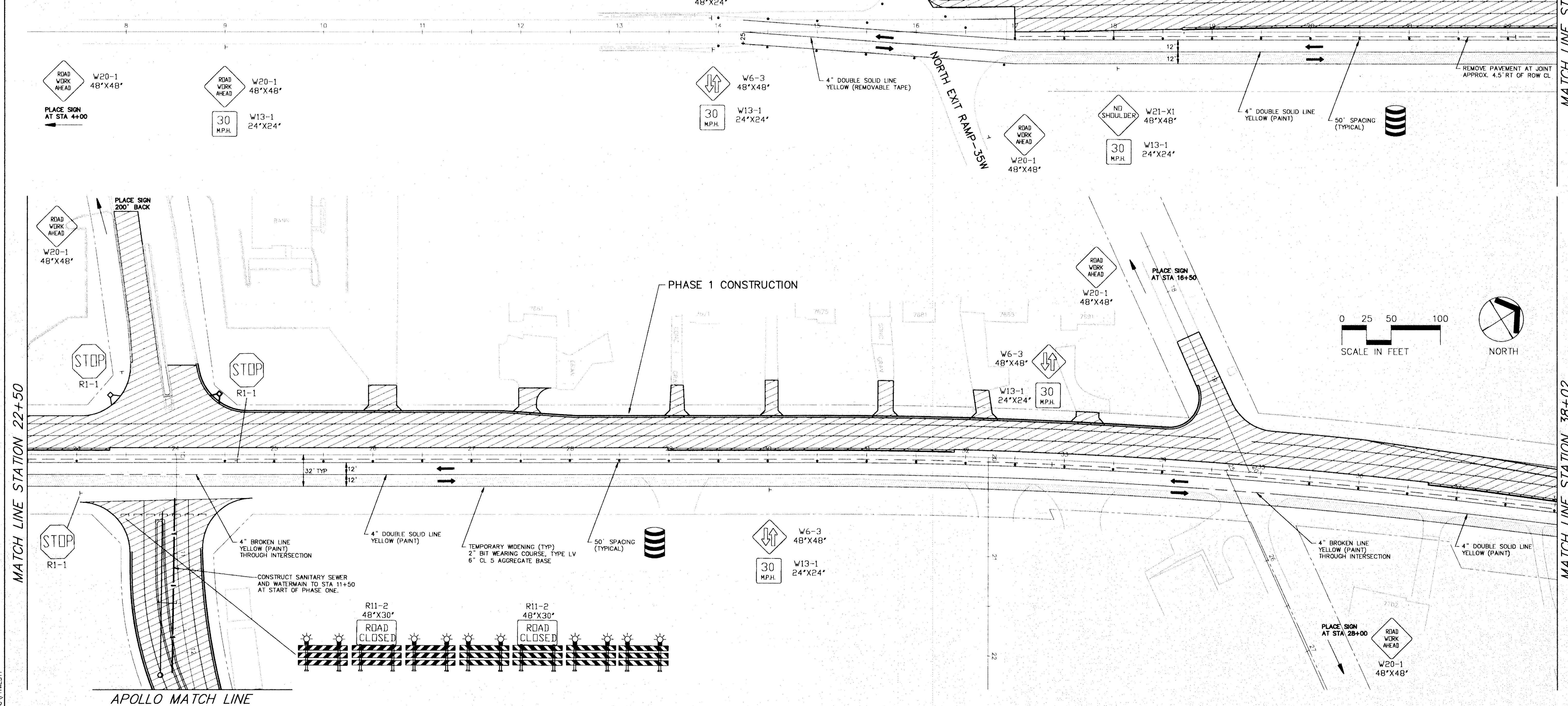
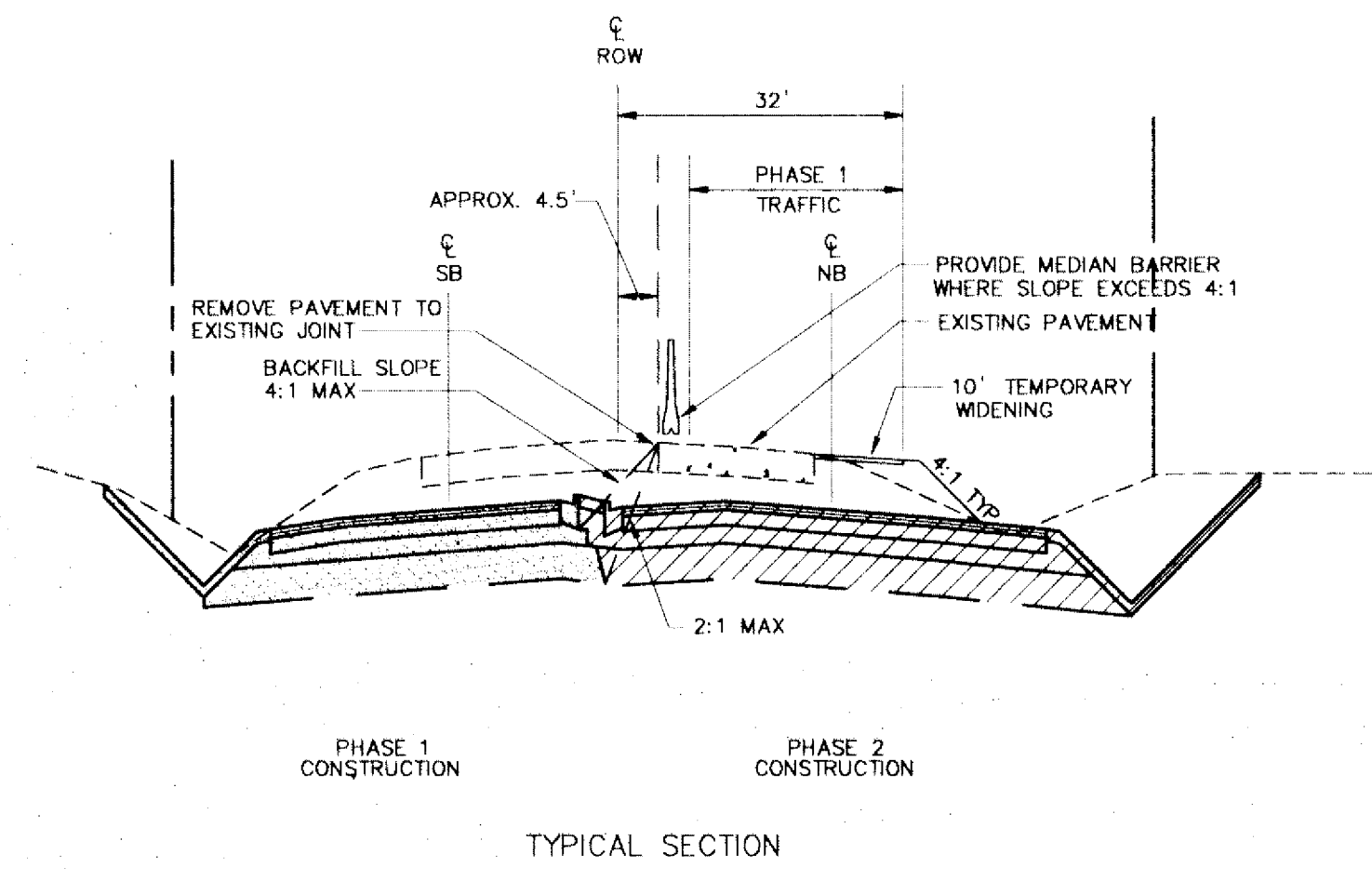
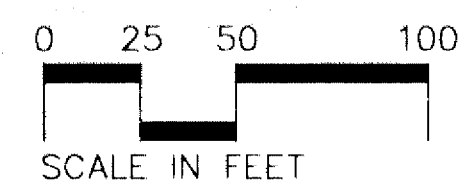
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 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA

COMMISSION NO.  
 12426-01  
 GEOMETRIC PLAN  
 SHEET NO. 4 OF 46 SHEETS





XREF: BORDER, HATWEST, PHWEST  
 PLOT: 1 - 1  
 CURRENT: 02/06/02  
 DIR: 1242601\_AIR\MISC\PHWEST

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ISSUED NEW PLAN SHEET

DESIGNED PWB  
 DRAWN LML  
 CHECKED PWB  
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TKDA

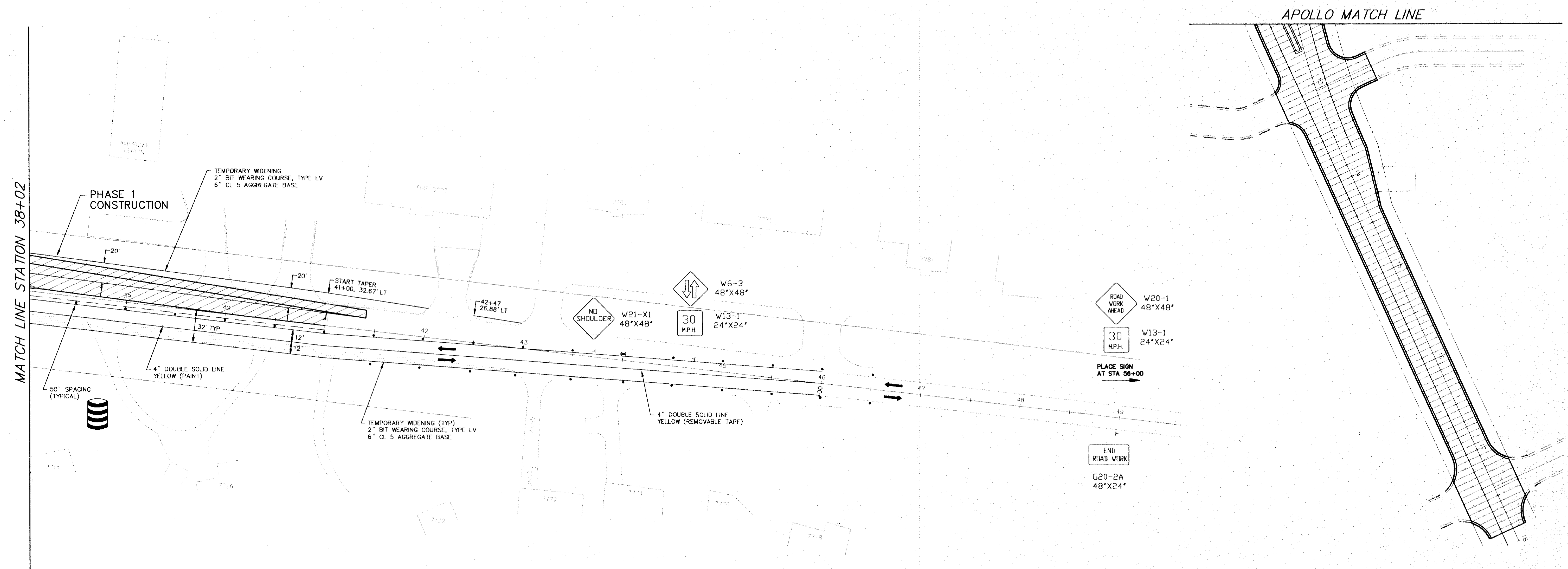
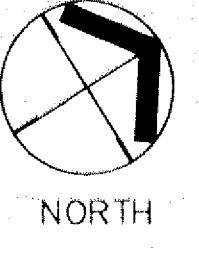
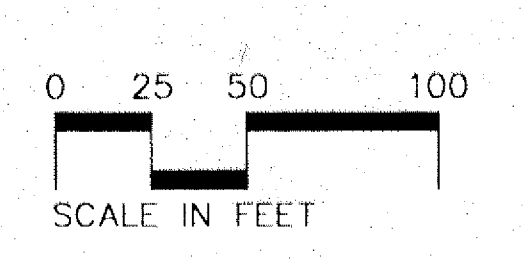
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 SAINT PAUL, MINNESOTA

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 LINO LAKES MINNESOTA

**PHASE 1  
 CONSTRUCTION**  
 SHEET NO. 5 OF 46 SHEETS

COMMISSION NO.  
**12426-01**





MATCH LINE STATION 38+02

APOLLO MATCH LINE

PLOT: 1 = 1  
 CURRENT: 02/06/02  
 DIR: 1242601\AIR\MISC\PHWEST2  
 XREF: BORDER, HATWEST, PHWEST

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ISSUED NEW PLAN SHEET

DESIGNED	DRAWN
PWB	LML
CHECKED	
PWB	

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LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

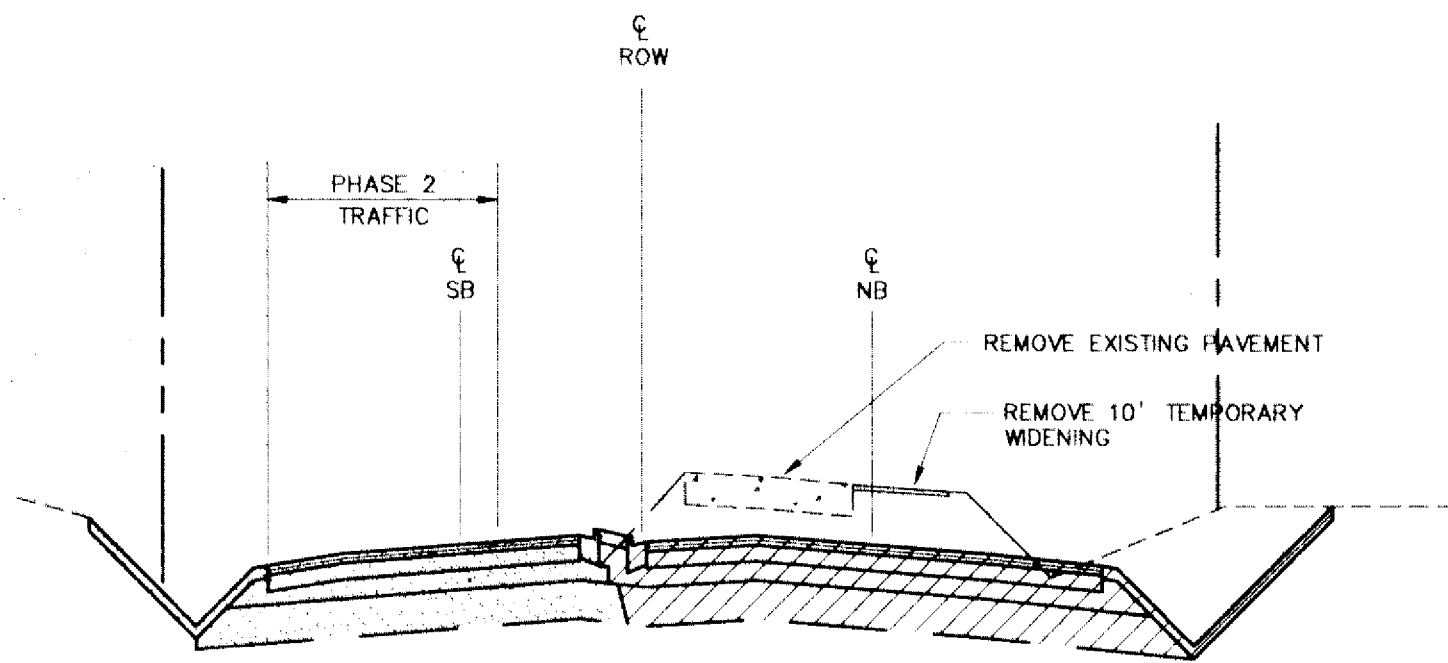
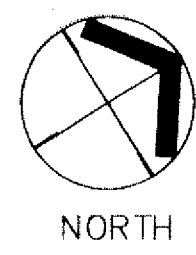
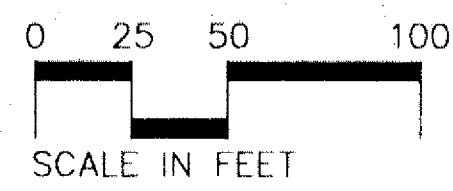
LINO LAKES MINNESOTA

PHASE 1  
 CONSTRUCTION

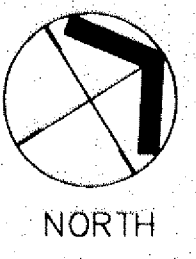
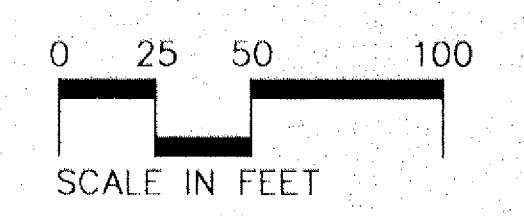
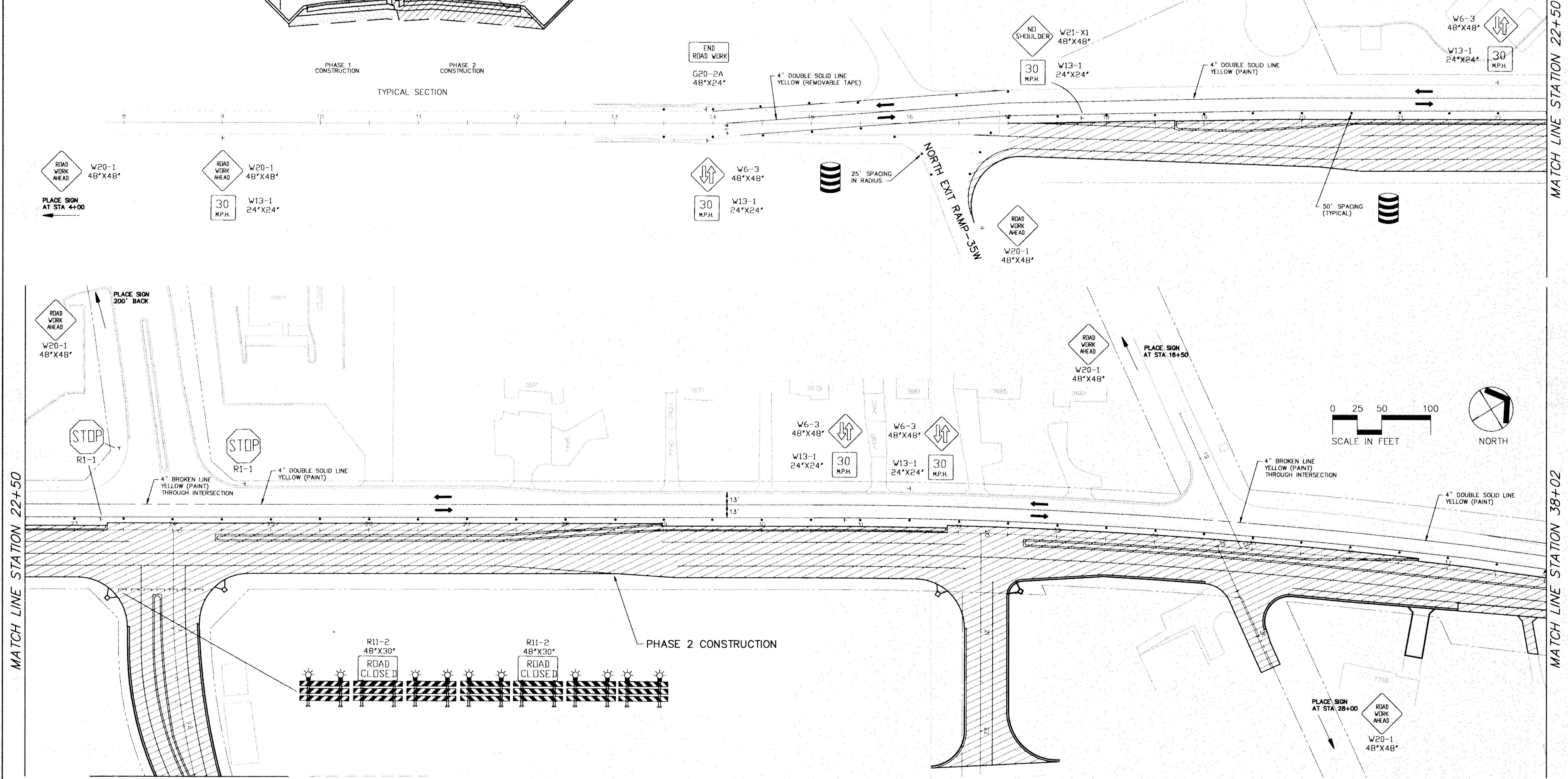
SHEET NO. 6 OF 46 SHEETS

COMMISSION NO.  
 12426-01





TYPICAL SECTION



XREF: BORDER, HATEAST, PHEAST

PLOT: 1 = 1  
CURRENT: 02/06/02  
DIR: 1242601.VAR WISC PHEAST1

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ISSUED NEW PLAN SHEET

DESIGNED PWB  
DRAWN LML  
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**TKDA**  
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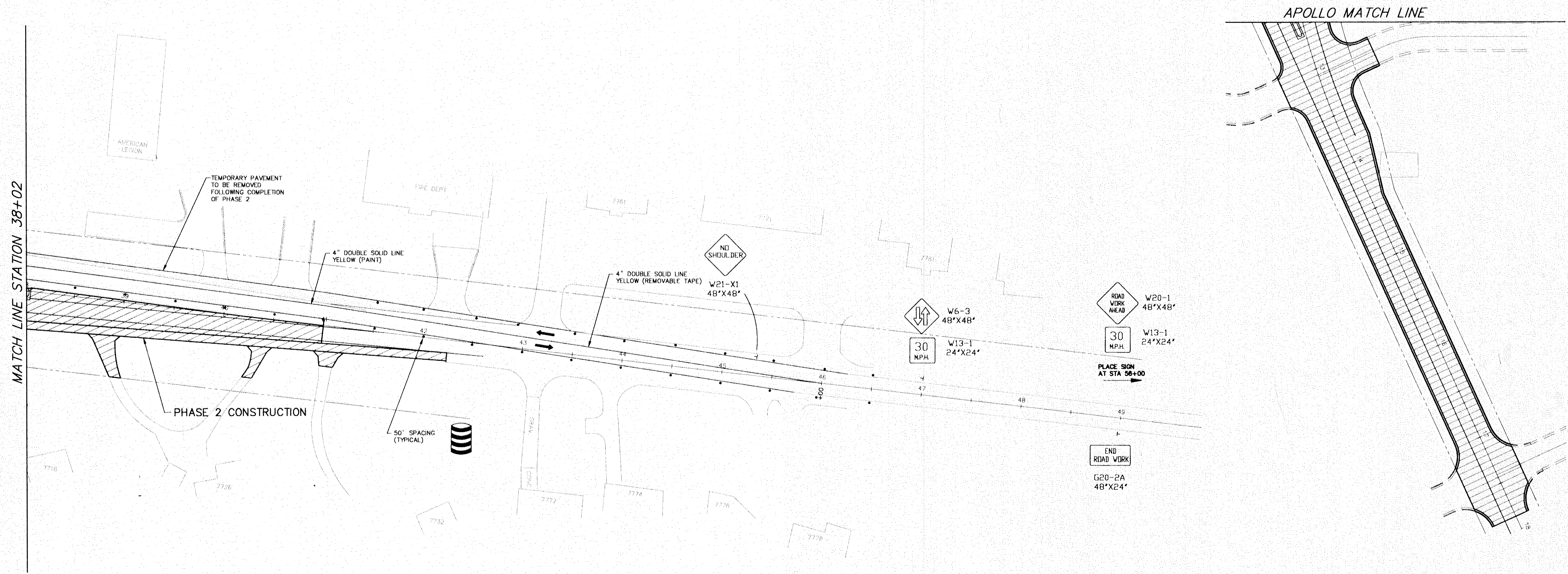
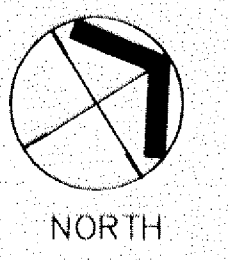
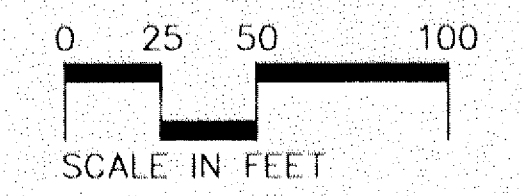
TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
SAINT PAUL, MINNESOTA

LAKE DRIVE  
APOLLO DRIVE IMPROVEMENTS  
MINNESOTA

PHASE 2 CONSTRUCTION  
SHEET NO. 7 OF 46 SHEETS

COMMISSION NO.  
12426-01





XREF: BORDER, HATEAST, PHEAST  
 PLOT: 11/1/06/02  
 DIR: 1242601\MINNASC\PH2AST2

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ISSUED NEW PLAN SHEET

DESIGNED	DRAWN
PWB	LML
CHECKED	
PWB	

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

TKDA

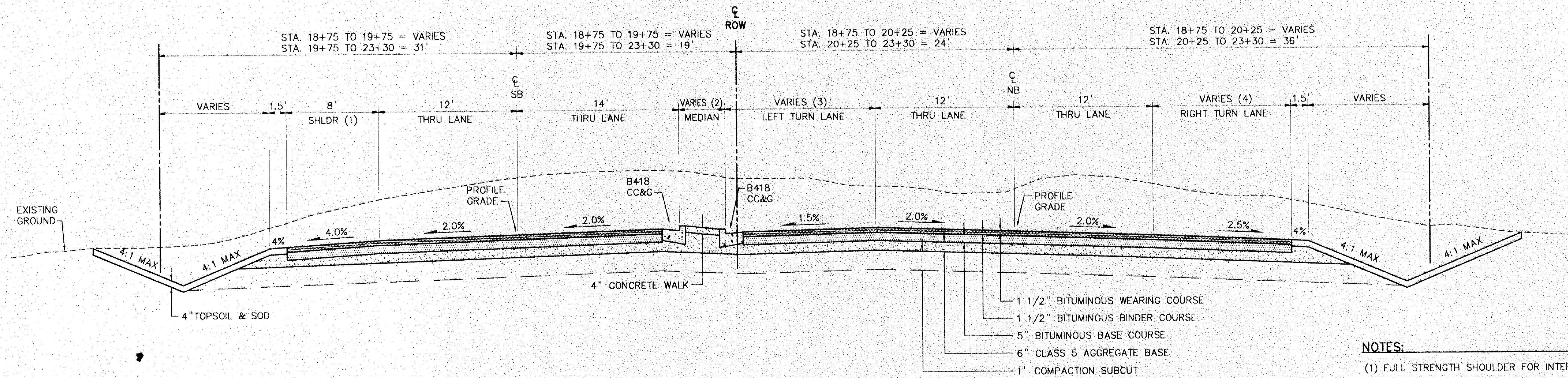
TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 ENGINEERS • ARCHITECTS • PLANNERS  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES MINNESOTA

PHASE 2  
 CONSTRUCTION  
 SHEET NO. 8 OF 46 SHEETS

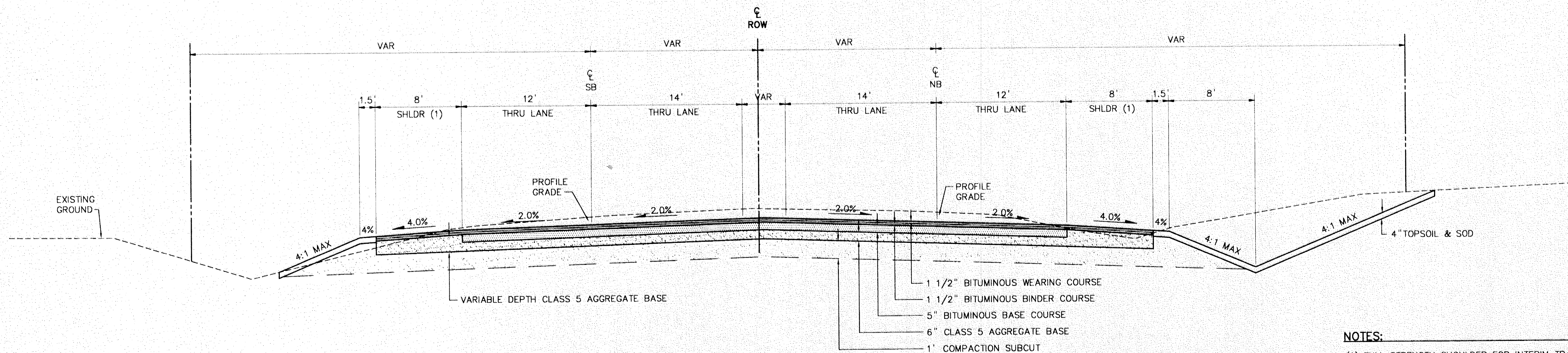
COMMISSION NO.  
 12426-01





TYPICAL SECTION  
STATION 18+75 TO 23+30

- NOTES:**
- (1) FULL STRENGTH SHOULDER FOR INTERIM TRAFFIC USE
  - (2) STA. 18+75 TO 20+60 = VARIES  
STA. 20+60 TO 23+30 = 4'
  - (3) STA. 19+38.33 TO 20+60 = VARIES  
STA. 20+60 TO 23+30 = 13'
  - (4) STA. 18+75 TO 20+25 = 8'  
STA. 20+25 TO 20+60 = VARIES  
STA. 20+60 TO 23+30 = 12'
  - (10) DITCH BOTTOMS SHALL BE ROUNDED IN ACCORDANCE WITH MNDOT ROAD DESIGN MANUAL



TYPICAL SECTION  
STATION 17+25 TO 18+75

- NOTES:**
- (1) FULL STRENGTH SHOULDER FOR INTERIM TRAFFIC USE

XREF: BORDER  
 PLOT: 1 = 1  
 CURRENT: 07/28/02  
 DIR: I:\Projects\1242601\car\Typ\Typsec0

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ADDED NOTE (10)

DESIGNED PWB DRAWN APO  
 CHECKED PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

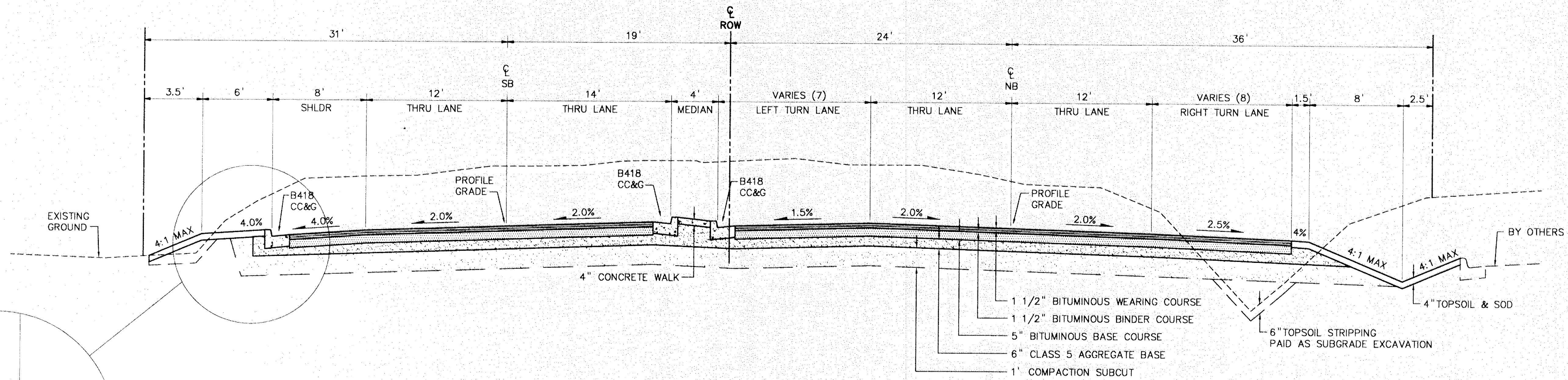
**TKDA**  
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 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES MINNESOTA

LAKE DRIVE  
 TYPICAL SECTIONS  
 SHEET NO. 9 OF 46 SHEETS

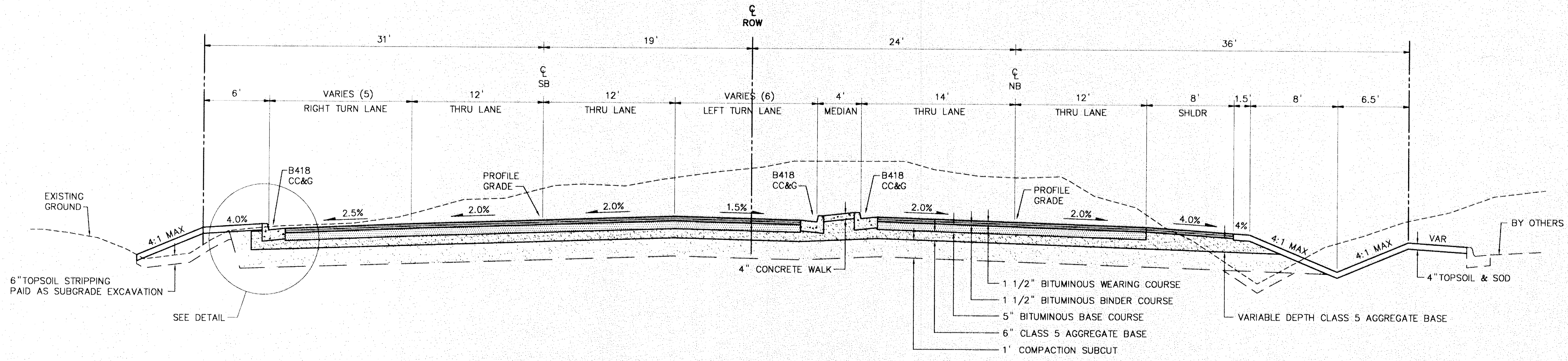
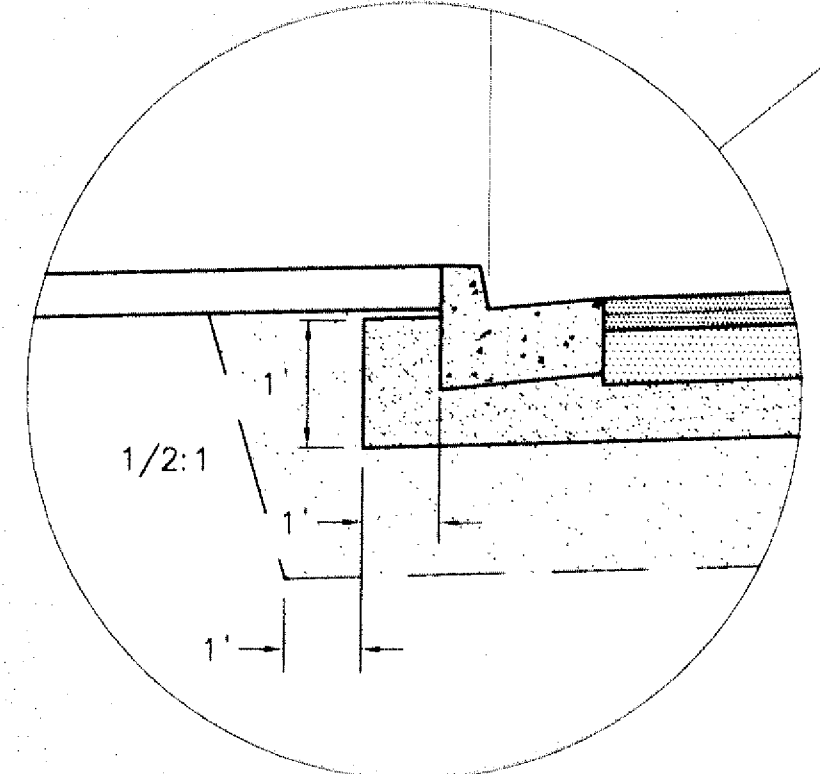
COMMISSION NO.  
 12426-01





**TYPICAL SECTION**  
 STATION 27+34 TO 31+85 RIGHT  
 STATION 28+99 TO 31+85 LEFT

- NOTES:**
- (7) STA. 27+34 TO 28+99 = VARIES  
 STA. 28+99 TO 31+85 = 13'
  - (8) STA. 27+34 TO 28+54 = 8'  
 STA. 28+54 TO 29+14 = VARIES  
 STA. 29+14 TO 31+85 = 12'
  - (10) DITCH BOTTOMS SHALL BE ROUNDED IN ACCORDANCE WITH MNDOT ROAD DESIGN MANUAL
  - (11) GRADING ON EAST SIDE OF LAKE DRIVE SHALL BE COORDINATED WITH CONSTRUCTION BY OTHERS



**TYPICAL SECTION**  
 STATION 24+47 TO 27+34 RIGHT  
 STATION 24+47 TO 28+99 LEFT

- NOTES:**
- (5) STA. 24+47 TO 27+30 = 13'  
 STA. 27+30 TO 28+05 = VARIES  
 STA. 28+05 TO 28+99 = 8'
  - (6) STA. 24+47 TO 27+34 = 13'  
 STA. 27+34 TO 28+99 = VARIES

XREF: BORDER  
 PLOT: 1 = 1  
 CURRENT: 01/28/02  
 DIR: in:\notes\1242601\air\typ\typsecb

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ADDED NOTES (10) AND (11)

DESIGNED PWB  
 DRAWN APO  
 CHECKED PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum*  
 JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

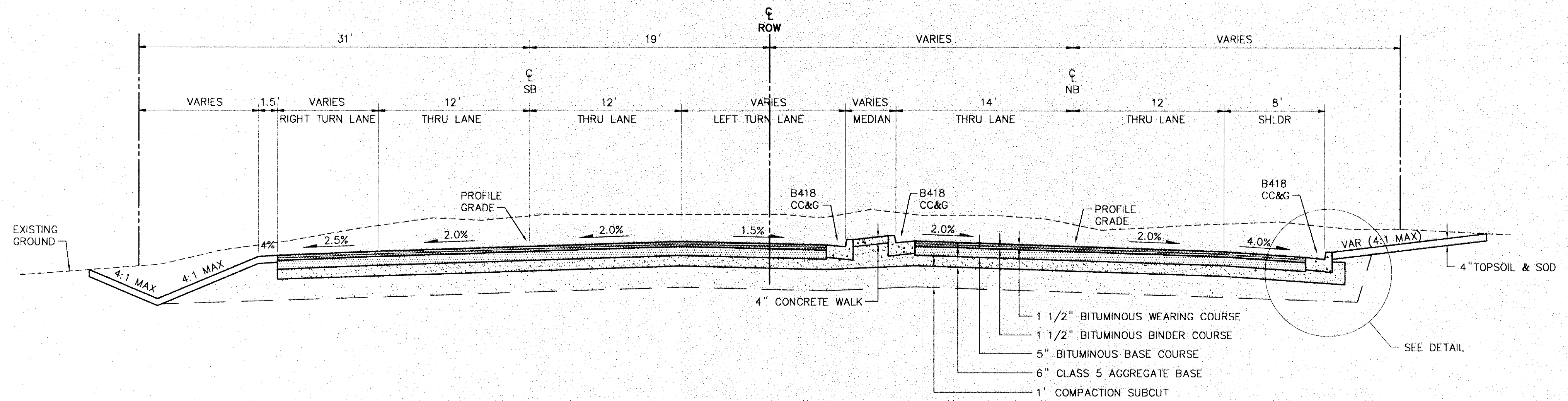
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES  
 MINNESOTA

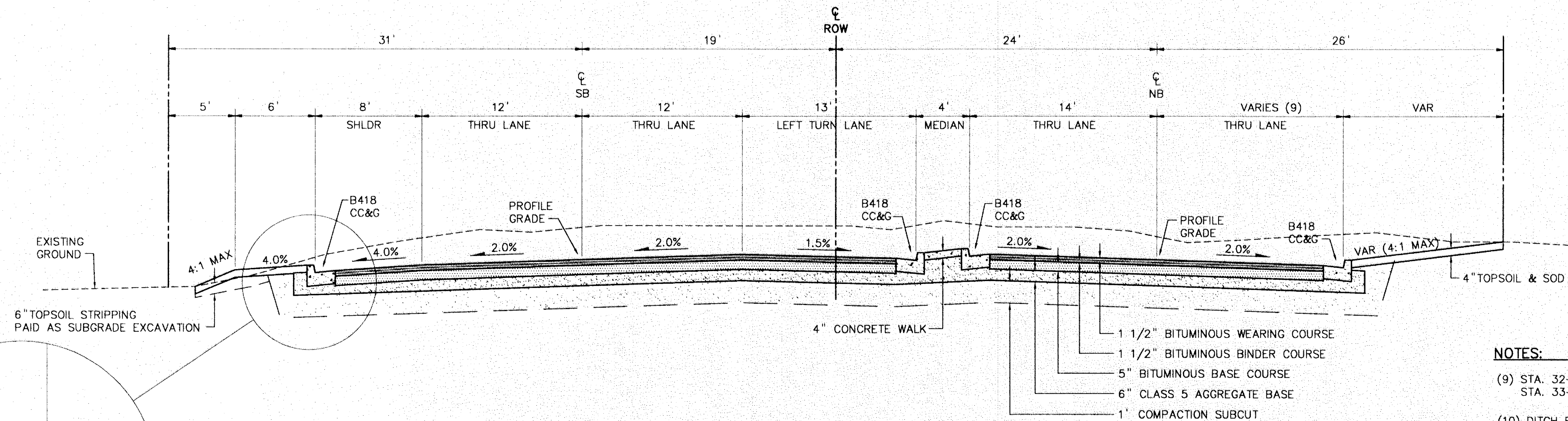
LAKE DRIVE  
 TYPICAL SECTIONS  
 SHEET NO. 10 OF 46 SHEETS

COMMISSION NO.  
 12426-01



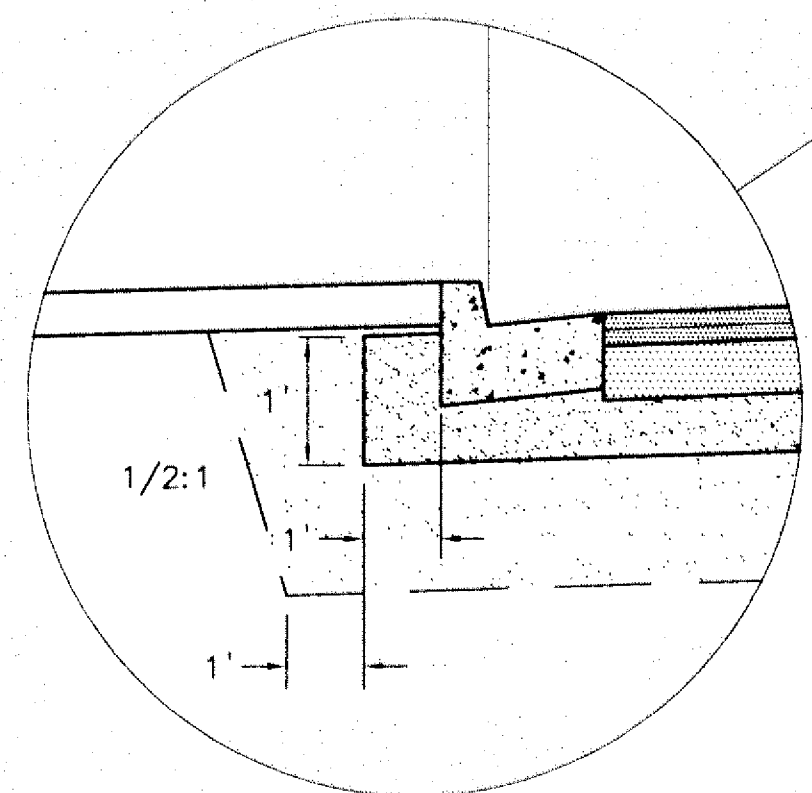


TYPICAL SECTION  
 STATION 35+50 TO 37+15 RIGHT  
 STATION 35+00 TO 37+20 LEFT



TYPICAL SECTION  
 STATION 32+70 TO 34+50 RIGHT  
 STATION 32+70 TO 34+00 LEFT

- NOTES:
- (9) STA. 32+70 TO 33+50 = VARIES  
 STA. 33+50 TO 34+50 = 14'
  - (10) DITCH BOTTOMS SHALL BE ROUNDED IN ACCORDANCE WITH MNDOT ROAD DESIGN MANUAL



PLOT: 1 = 1  
 CURRENT: 01/28/02  
 DIR: I:\projects\1242601\var\typ\typsect

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ADDED NOTE (10)

DESIGNED PWB  
 DRAWN APO  
 CHECKED PWB

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*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

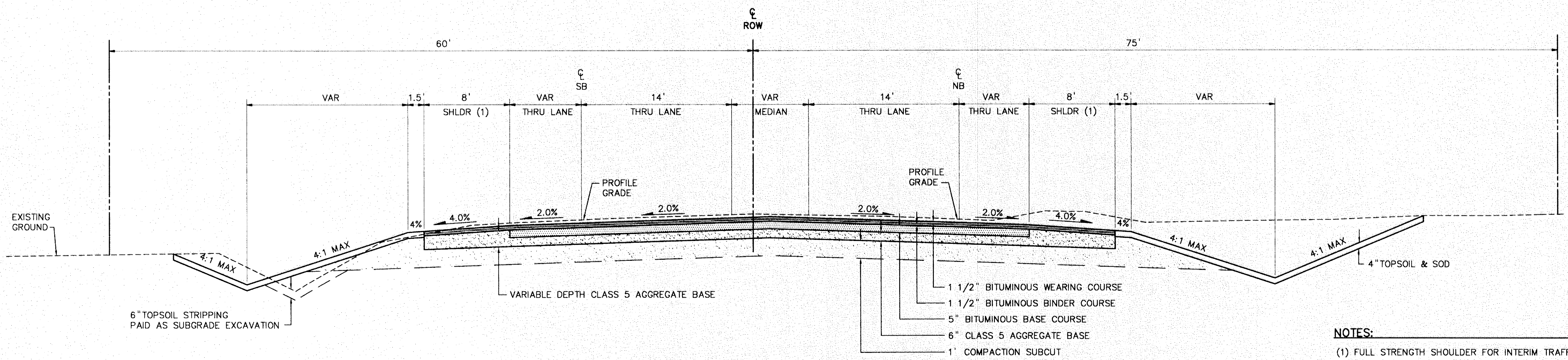
LINO LAKES MINNESOTA

LAKE DRIVE  
 TYPICAL SECTIONS

SHEET NO. 11 OF 46 SHEETS

COMMISSION NO.  
 12426-01





TYPICAL SECTION  
STATION 38+10 TO 41+40

- NOTES:**
- (1) FULL STRENGTH SHOULDER FOR INTERIM TRAFFIC USE
  - (10) DITCH BOTTOMS SHALL BE ROUNDED IN ACCORDANCE WITH MNDOT ROAD DESIGN MANUAL

XREF: BORDER  
 CUR: 01/28/02  
 DIR: Inroads\242601\air\typ\typsec.dwg

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	ADDED NOTE (10)

DESIGNED PWB  
DRAWN APO  
CHECKED PWB

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*Paul Blum* JAN 28, 2002  
PAUL W. BLUM LIC. No. 12779

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SAINT PAUL, MINNESOTA

LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS

LINO LAKES MINNESOTA

LAKE DRIVE  
TYPICAL SECTIONS

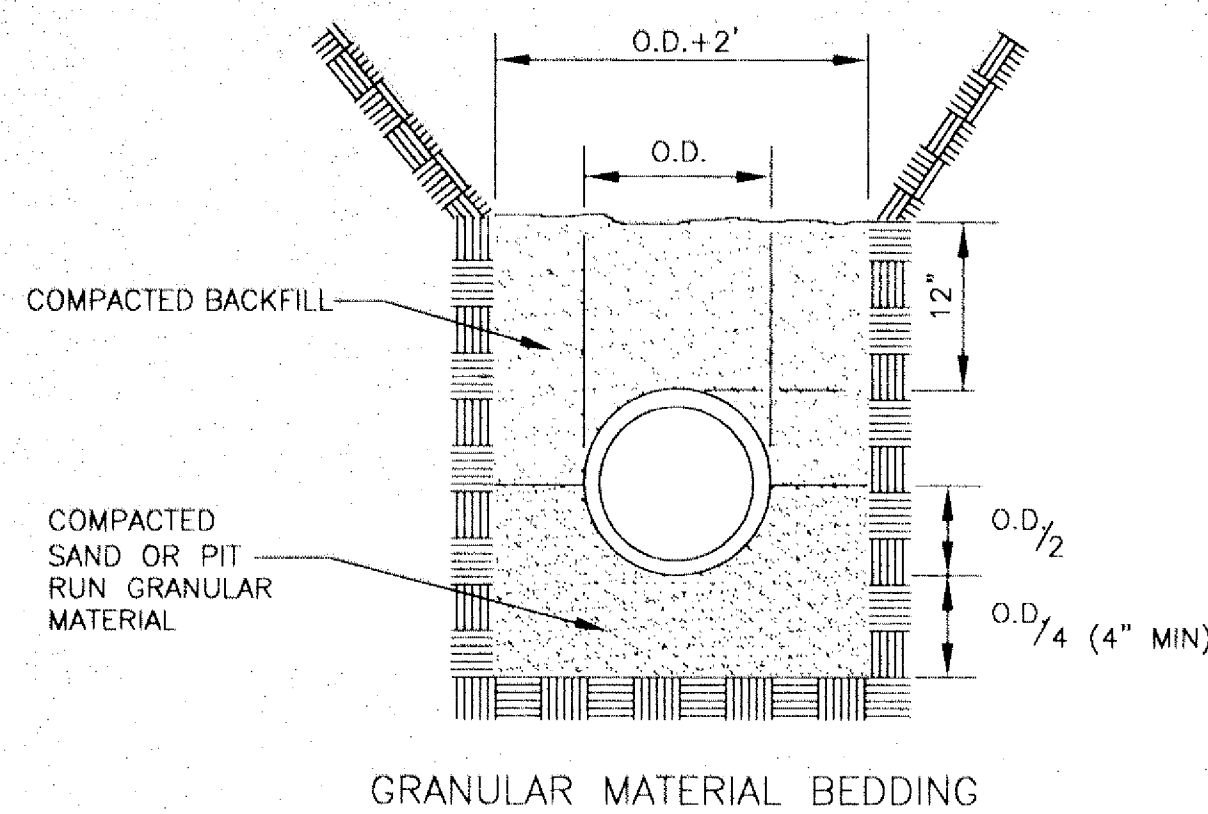
SHEET NO. 12 OF 46 SHEETS

COMMISSION, NO.  
12426-01

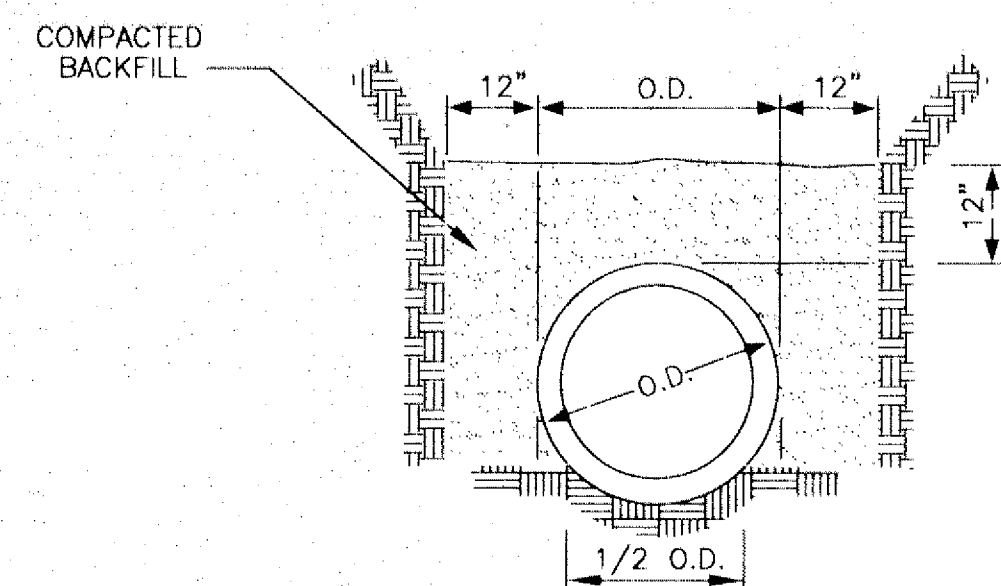






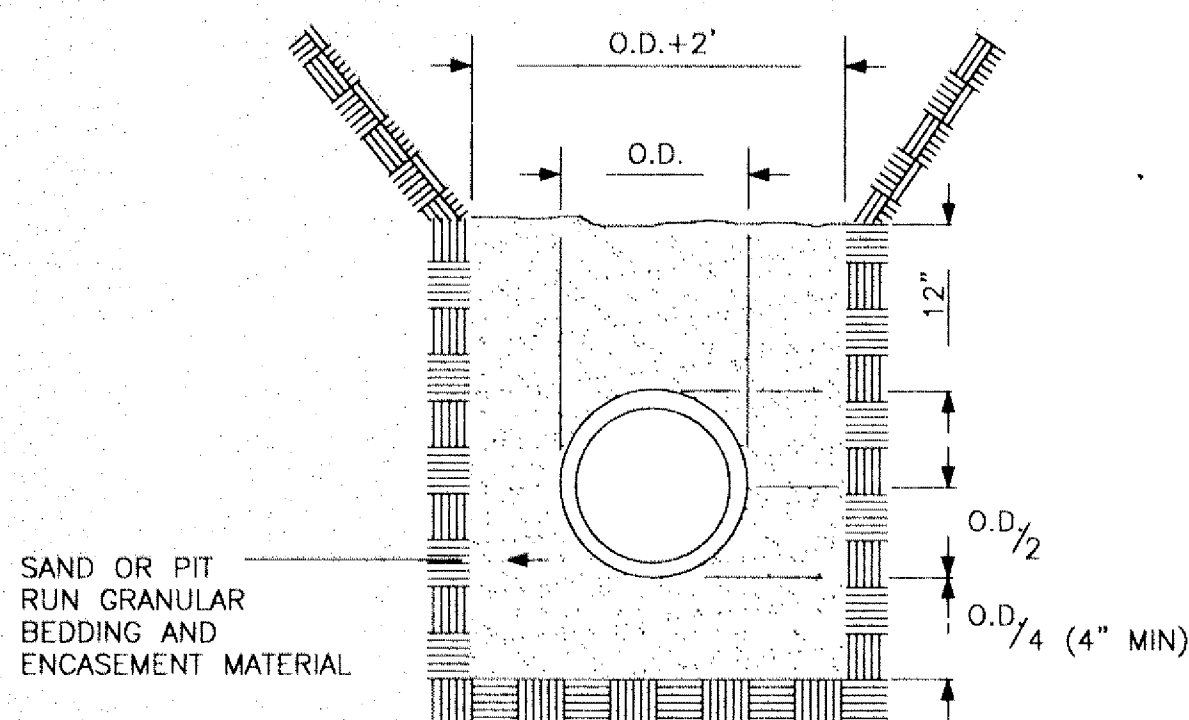


GRANULAR MATERIAL BEDDING



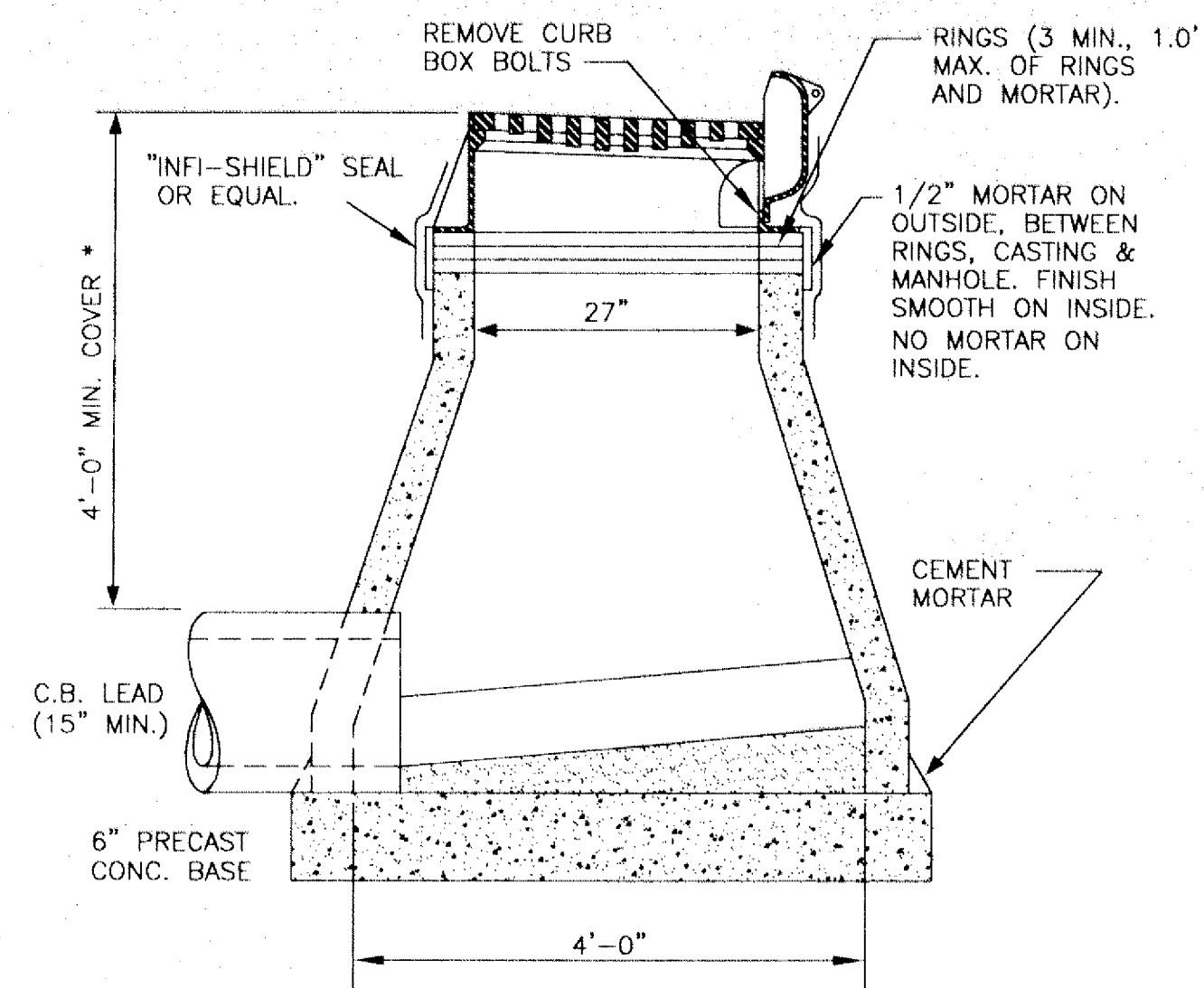
EARTH FOUNDATION

PIPE FOUNDATION DETAILS



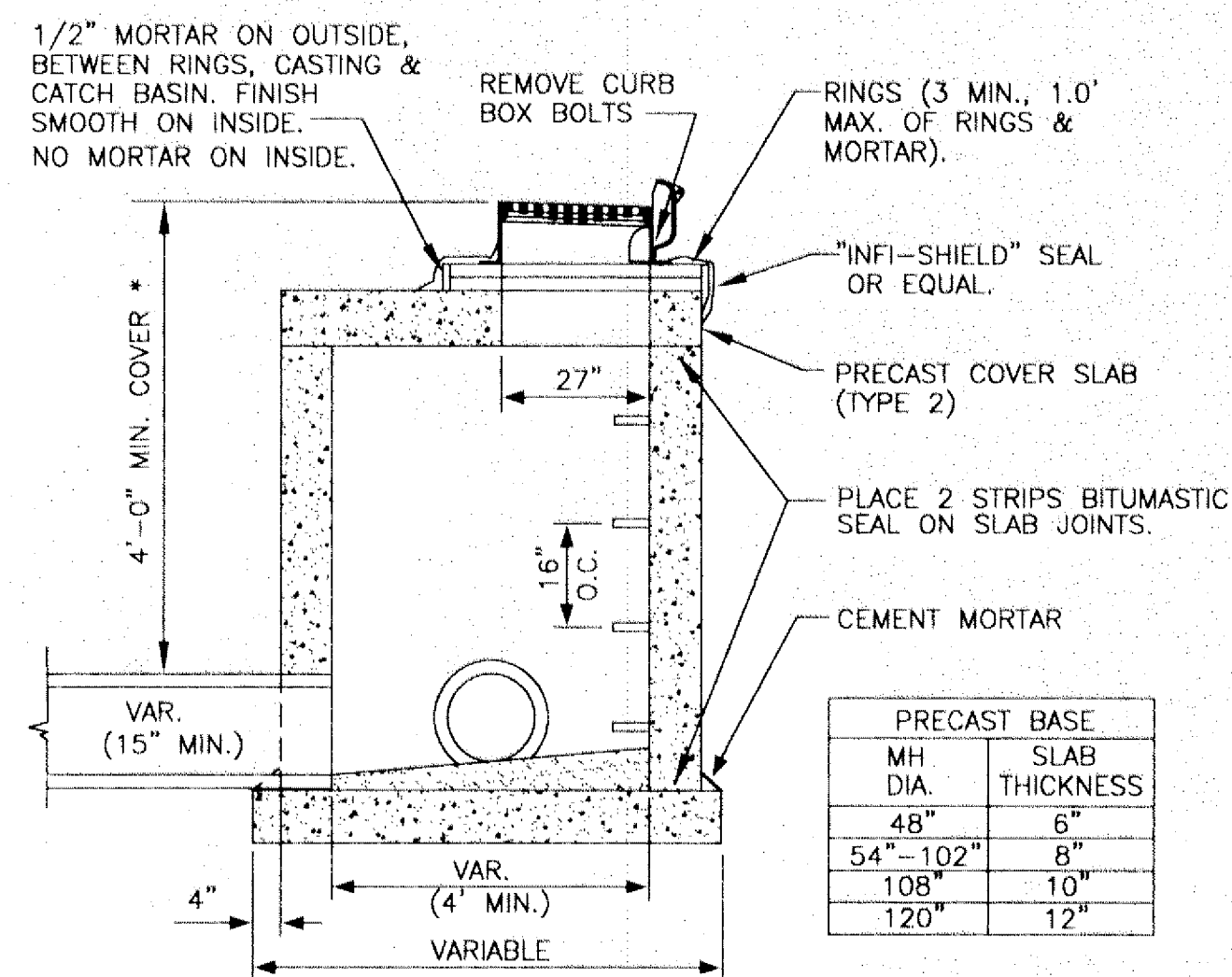
GRANULAR MATERIAL ENCASEMENT

PIPE BEDDING DETAILS



NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.  
 CAST IRON CATCH BASIN FRAME & COVER CASTINGS PER SPECIFICATIONS.  
 PRECAST REINFORCED CONCRETE CONE SECTION & PRECAST BASE PER ASTM C478.  
 FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR  
 INSIDE SURFACE SHALL BE FINISHED SMOOTH.  
 \* MINIMUM PIPE COVER CAN BE REDUCED FROM 4' TO 2'-6" WITH  
 INSTALLATION OF PERFORATED PIPE DRAIN PER "GRANULAR SUBCUT AND  
 PERFORATED PIPE DRAIN" DETAIL.

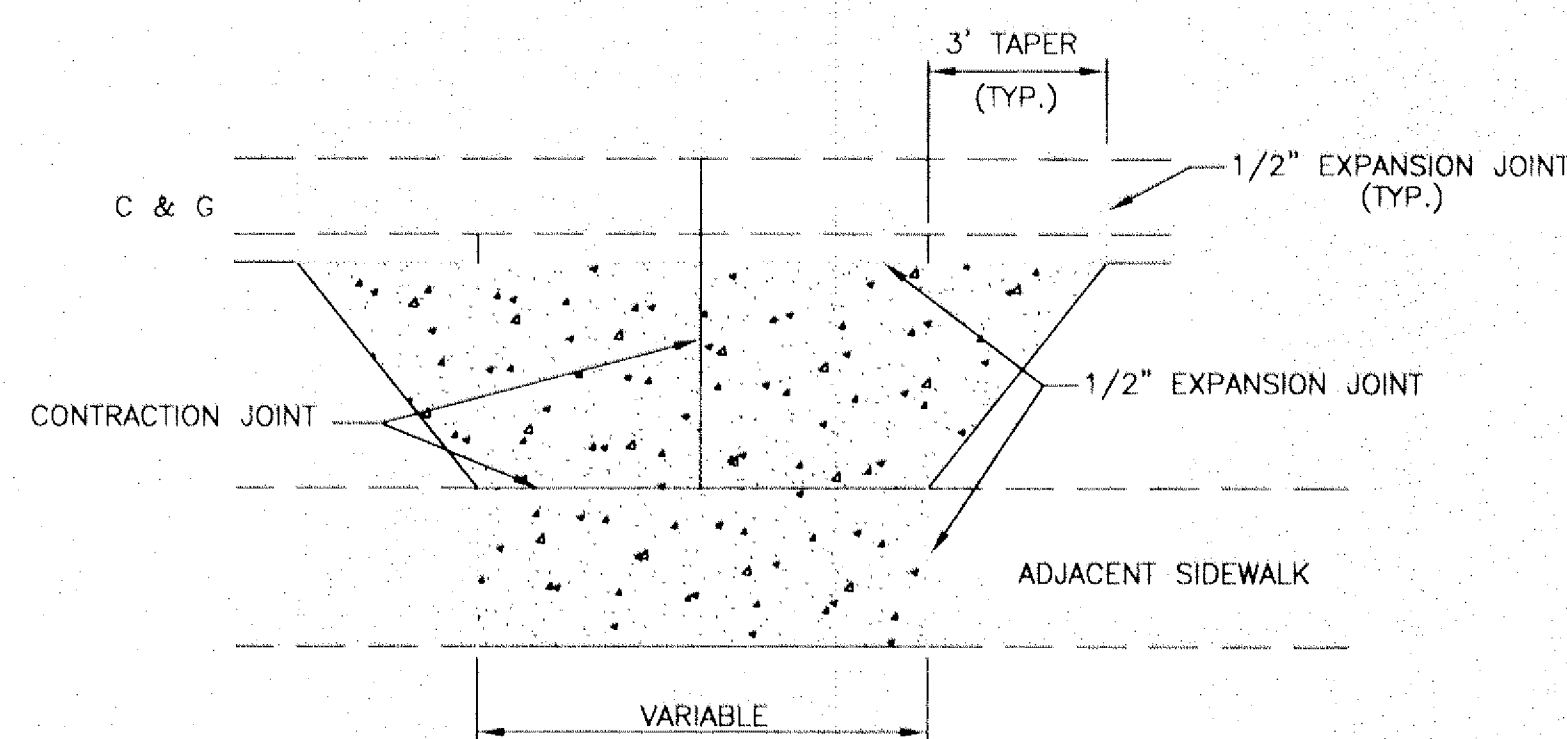
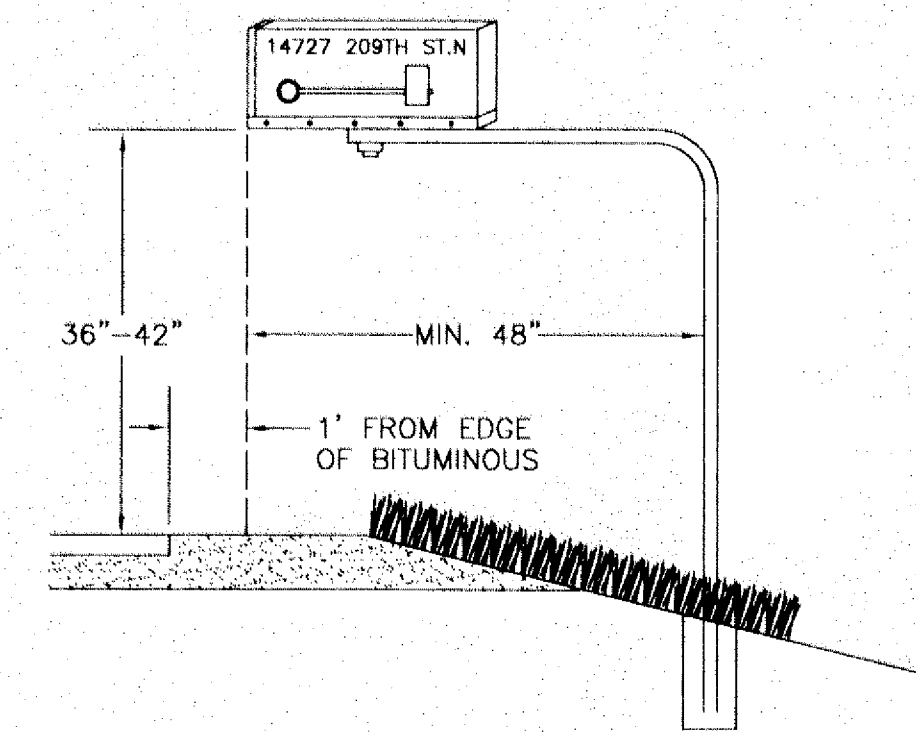
CATCH BASIN, TYPE 402



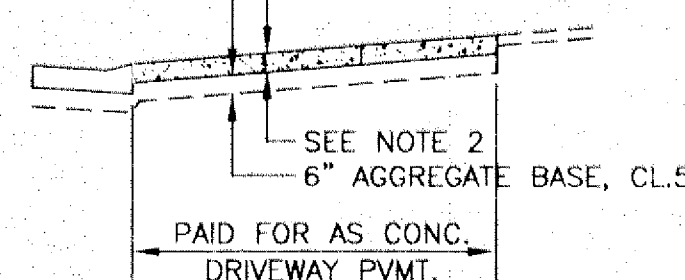
NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.  
 CAST IRON FRAME & GRATE CASTINGS PER SPECIFICATIONS.  
 MANHOLE STEPS SHALL BE CAST IRON, ALUMINUM OR STEEL REINFORCED PLASTIC PER  
 ASTM C478. LOCATION SHALL BE AS NOTED IN THE SPECIFICATIONS.  
 PRECAST REINFORCED CONCRETE BASE SLAB & COVER SLAB PER ASTM C478.  
 PRECAST REINFORCED CONCRETE MANHOLE SECTIONS PER ASTM C478,  
 OR 8" CONCRETE MANHOLE BLOCK WITH 1/2" MORTARED EXTERIOR.  
 FURNISH PRECAST CONCRETE MANHOLE SECTIONS WITH O-RING GASKETS &  
 LUBRICANT EXCEPT AS OTHERWISE SPECIFIED.  
 FILL OPENING BETWEEN PIPE AND MANHOLE WALL WITH CEMENT MORTAR.  
 INSIDE SURFACE SHALL BE FINISHED SMOOTH.  
 \* MINIMUM PIPE COVER CAN BE REDUCED FROM 4' TO 2'-6" WITH INSTALLATION OF  
 PERFORATED PIPE DRAIN PER "GRANULAR SUBCUT AND PERFORATED PIPE DRAIN" DETAIL.

CATCH BASIN/MANHOLE, TYPE 406

HAVE BOX EXTEND AS FAR IN FRONT OF SUPPORT POST AS  
 POSSIBLE. (THIS PREVENTS POSSIBLE SNOW PLOW DAMAGE.)  
 ADDRESS MUST BE ON SIDE OF BOX FROM WHICH CARRIER  
 APPROACHES IN LETTERS ABOUT ONE INCH HIGH. (OR ON  
 FRONT WHERE BOXES ARE GROUPED.)  
 BOX MUST BE LOCATED AS SHOWN.  
 NO MAILBOXES ON CIRCULAR PORTION OF CUL-DE-SAC.



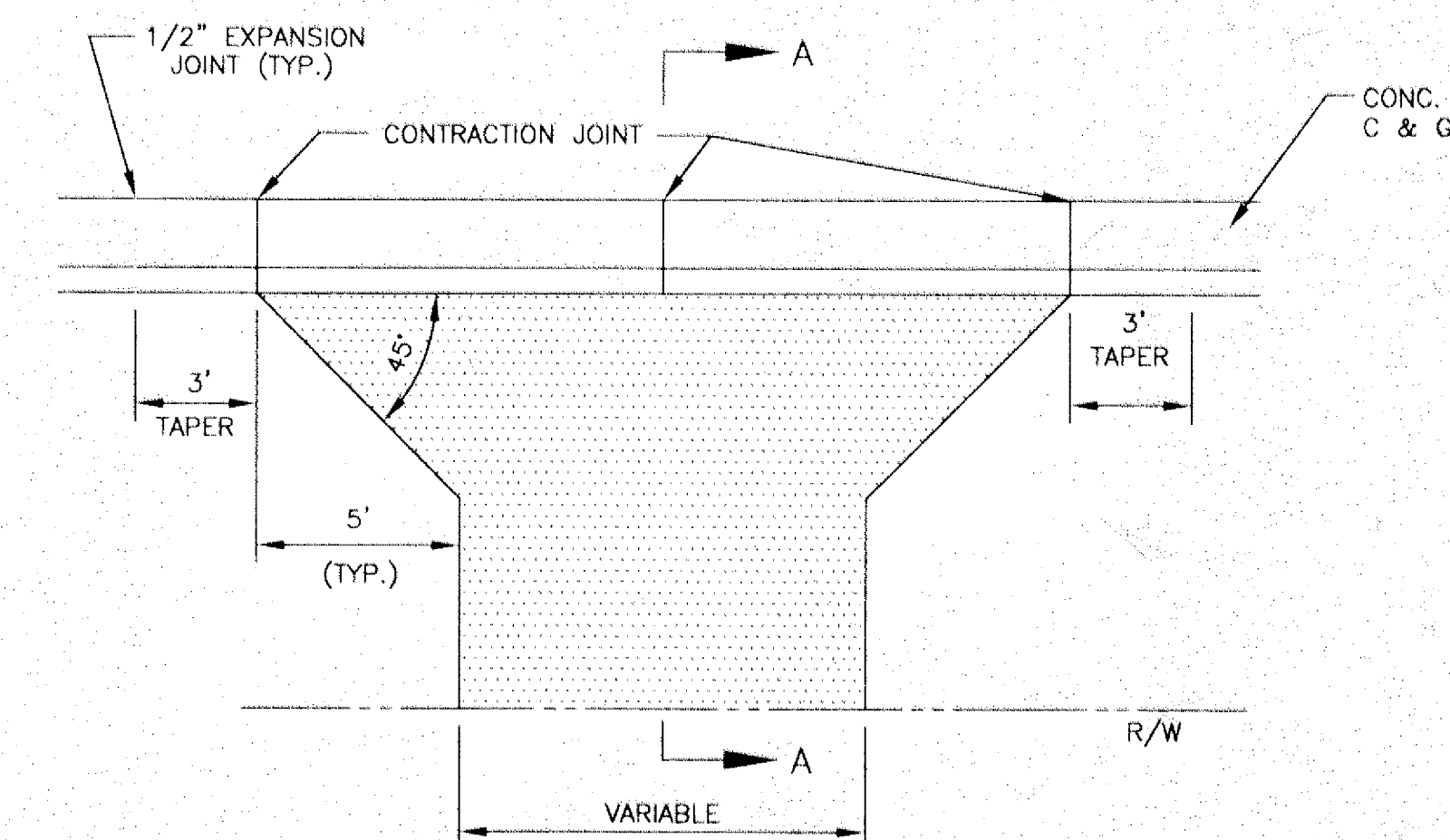
PLAN



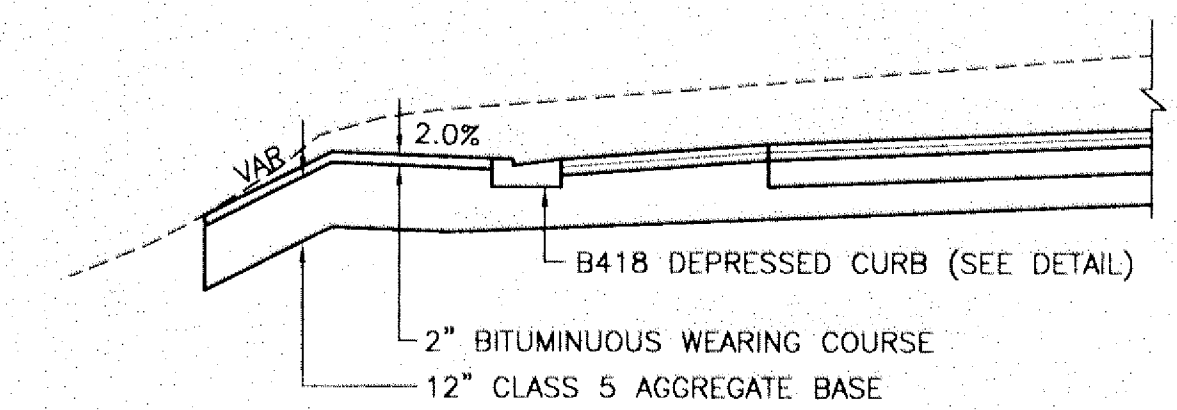
DRIVEWAY APPROACH CROSS SECTION

NOTES: 1) CONTRACTION JOINTS AS SHOWN FOR DRIVEWAY UP TO  
 22' WIDE. DRIVEWAYS 24' OR LARGER SHALL HAVE  
 HAVE PANELS CUT AT 12' MIN. JOINT SPACING.  
 2) 6" CONCRETE - SINGLE FAMILY  
 8" CONCRETE - MULTIPLE AND COMMERCIAL

CONCRETE DRIVEWAY



PLAN



SECTION A-A

BITUMINOUS DRIVEWAY DETAIL

PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242601 VAR WISC DETAIL

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED CPJ	DRAWN CPJ	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA <i>Paul Blum</i> JAN 28, 2002
CHECKED PWB	PAUL W. BLUM	

**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

LINO LAKES  
 MINNESOTA

CONSTRUCTION DETAILS

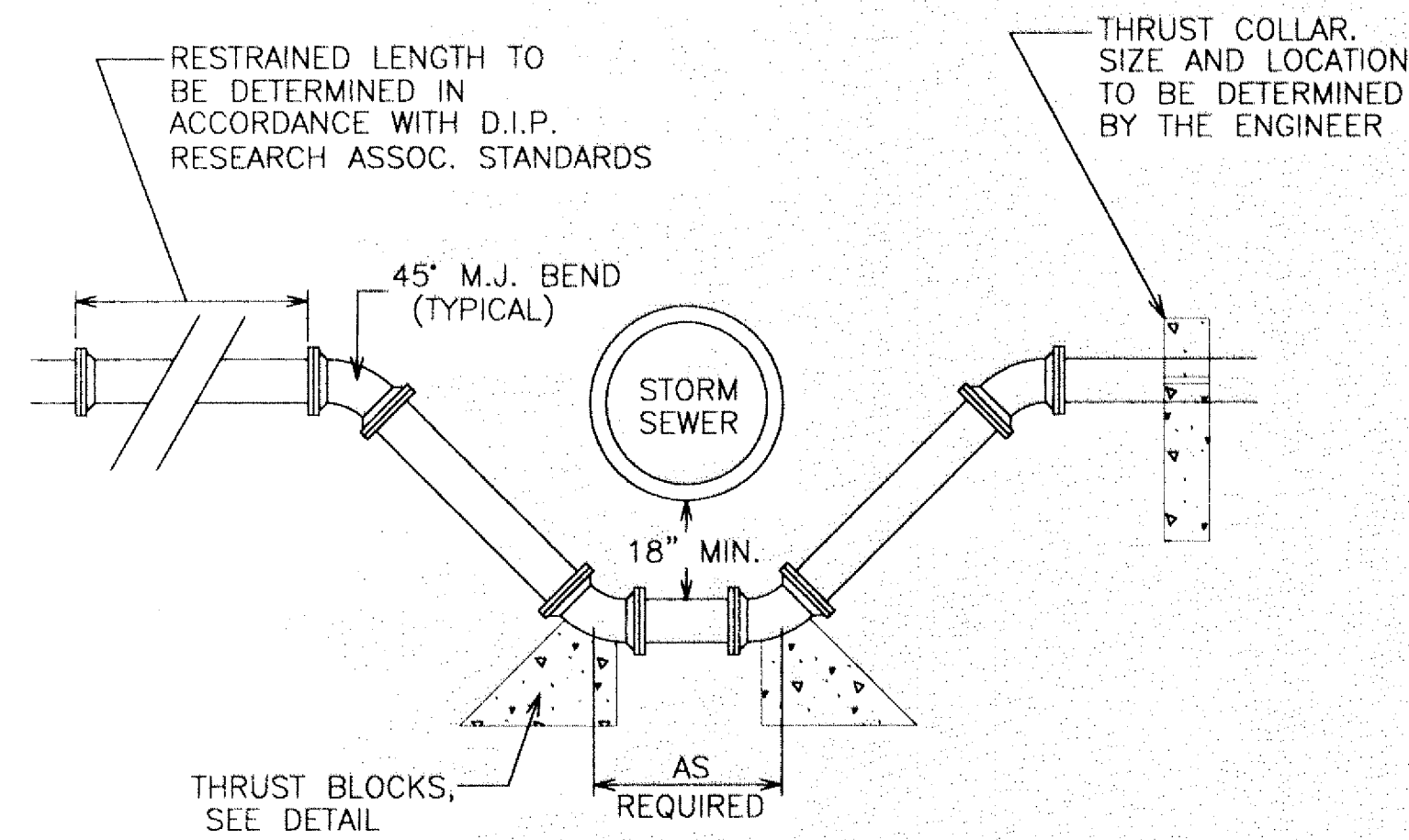
SHEET NO. 14 OF 46 SHEETS

COMMISSION NO.  
 12426-01



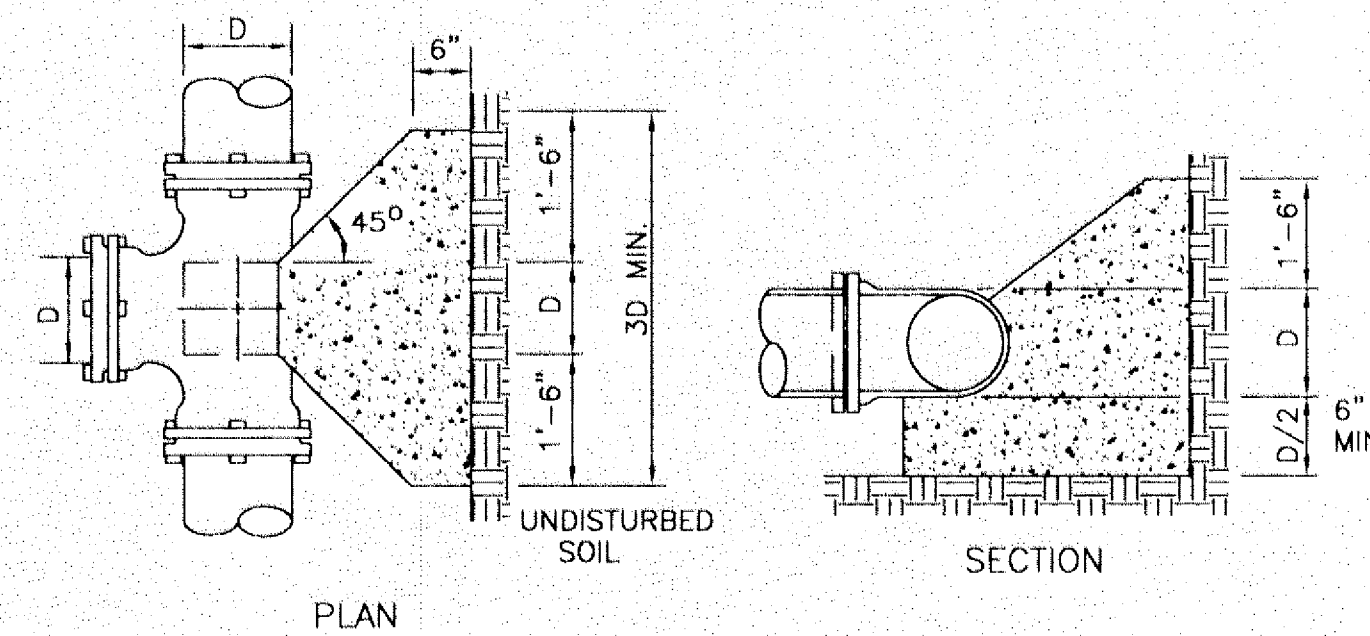
THE FOLLOWING STANDARD PLATES APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION SHALL APPLY ON THIS PROJECT.

STANDARD PLATES	
PLATE NO.	DESCRIPTION
3000L	REINFORCED CONCRETE PIPE
3006G	GASKET JOINT FOR R.C. PIPE
3014J	REINFORCED CONCRETE PIPE ARCH
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3110G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE-ARCH
3145E	CONCRETE PIPE TIES
4006L	MANHOLE OR CATCH BASIN
4010H	CONCRETE SHORT CONE AND ADJUSTING RING
4126F	CATCH BASIN FRAME CASTING
4143E	STOOL GRATE AND CONCRETE FRAME
4149C	GRATE CASTING FOR CATCH BASIN
4161F	CURB BOX CASTING FOR CATCH BASIN
7036E	PEDESTRIAN CURB RAMP
7100G	CONCRETE CURB AND GUTTER
7111J	INSTALLATION OF CATCH BASIN CASTINGS



NOTE: FITTINGS SHALL BE RESTRAINED WITH THE USE OF APPROVED MECHANICAL JOINT RESTRAINING GLANDS.

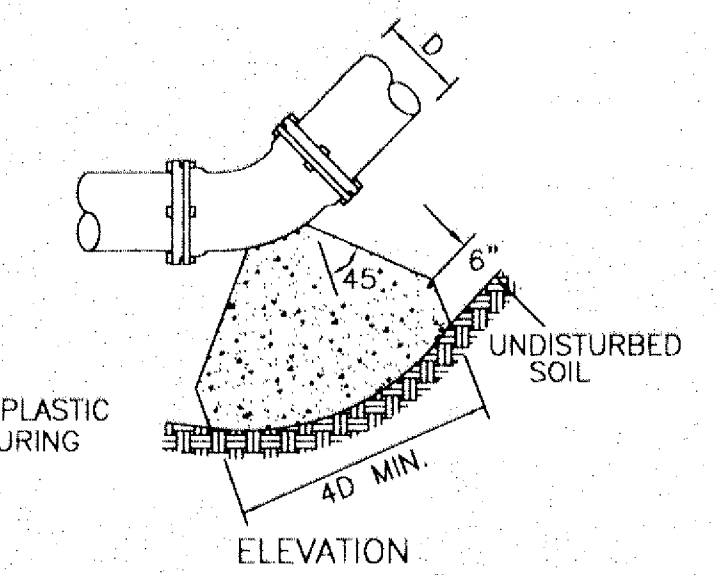
**WATERMAIN OFFSET**



NOTE: COVER FITTINGS WITH POLYETHYLENE (4MIL.) PRIOR TO POURING CONCRETE.

2500 P.S.I. CONCRETE 28 DAY STRENGTH

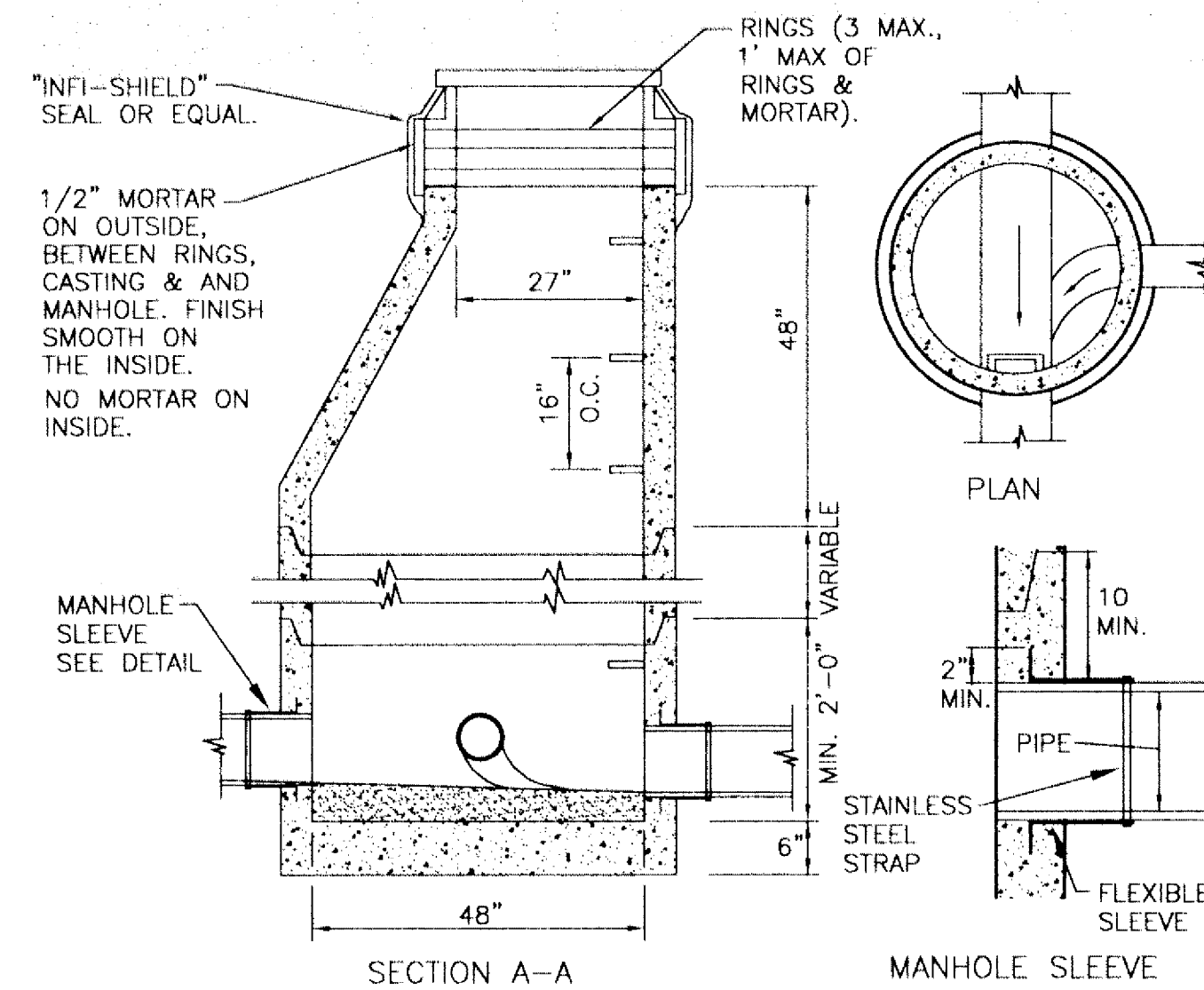
**CONCRETE REACTION BACKING (FOR TEES AND CROSSES)**



NOTE: COVER FITTINGS WITH PLASTIC (4 MIL) PRIOR TO POURING CONCRETE

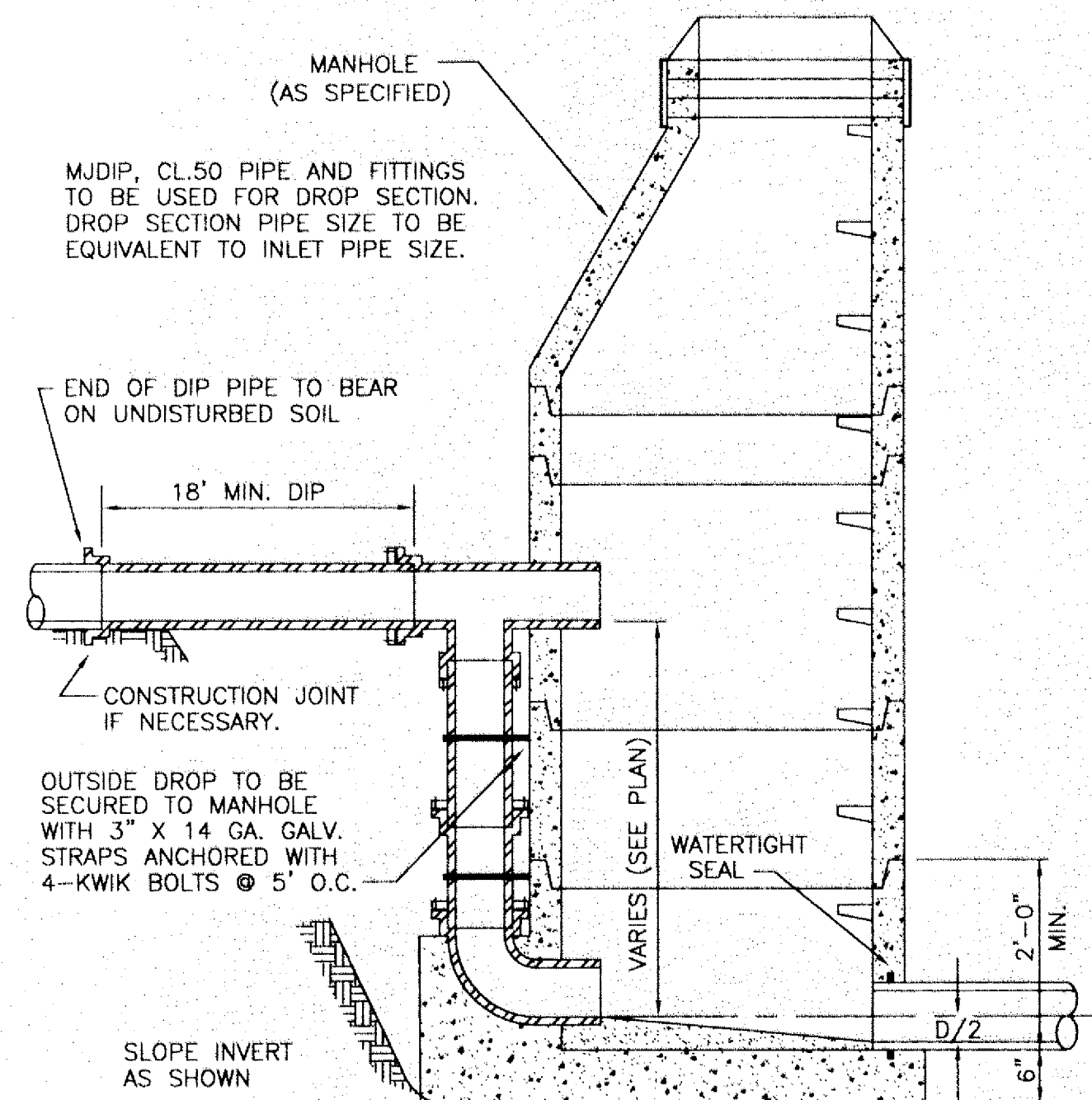
2500 PSI CONCRETE 28 DAY STRENGTH

**CONCRETE REACTION BACKING (FOR BENDS)**

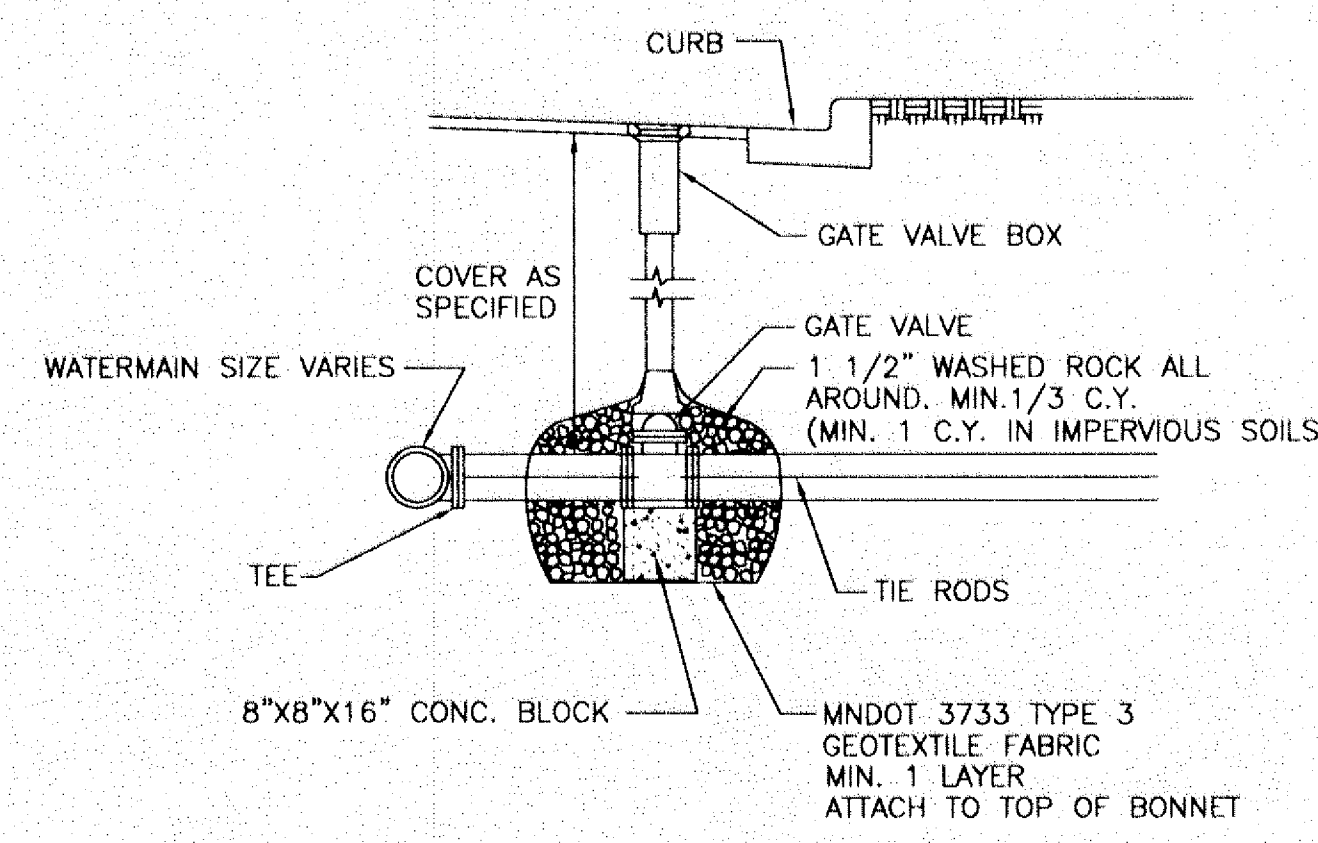


NO WOOD SHALL BE USED FOR ADJUSTING CASTING; CEMENT MORTAR ONLY.  
 CAST IRON MANHOLE FRAME & COVER AS PER SPECIFICATIONS.  
 MANHOLE STEPS SHALL BE CAST IRON, ALUMINUM OR STEEL REINFORCED PLASTIC, PER ASTM C478. STEP LOCATION SHALL BE AS NOTED IN THE SPECIFICATIONS.  
 MANHOLES 20\"/>

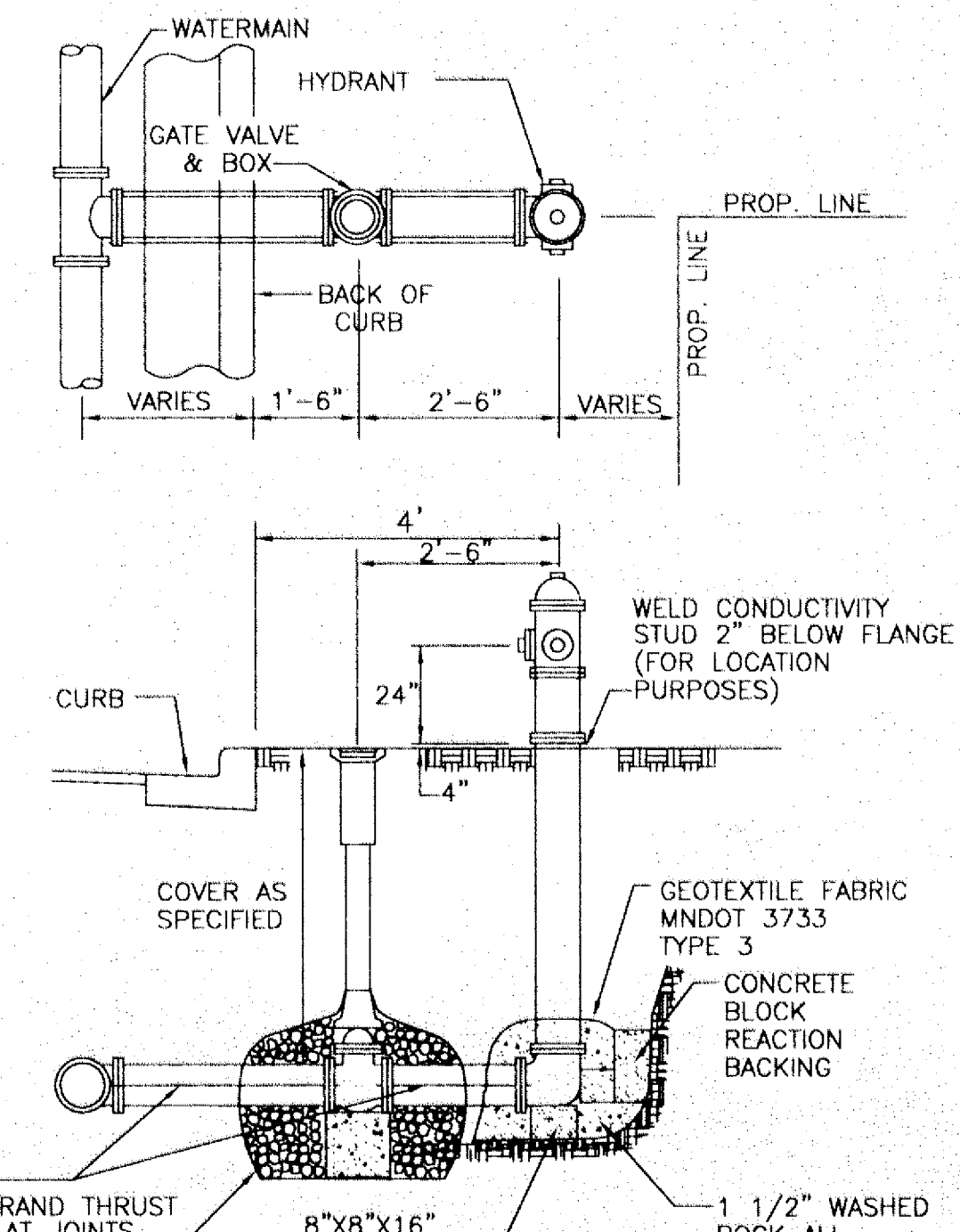
**SANITARY SEWER MANHOLE, TYPE 301 (PIPES 27\"/>**



**SANITARY SEWER OUTSIDE DROP**



**GATE VALVE INSTALLATION**



**TYPICAL HYDRANT LAYOUT (VALVE IN BOULEVARD)**

PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242601\_AIR/MISC/DETAIL2

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED	DRAWN
CPJ	CPJ
CHECKED	PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES  
 MINNESOTA

CONSTRUCTION DETAILS  
 SHEET NO. 15 OF 46 SHEETS

COMMISSION NO.  
 12426-01

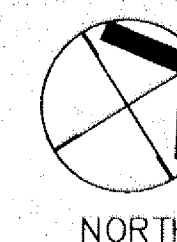
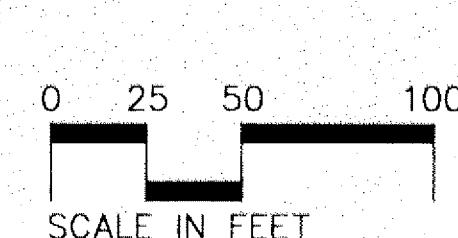


**LEGEND:**

- → → → PROPOSED DITCH
- ° PROPOSED/EXISTING INLET
- ▷ PROPOSED CULVERT APRON
- PROPOSED SILT FENCE
- STORM SEWER INLET PROTECTION
- ▭ BITUMINOUS SURFACE
- ▨ CONCRETE SURFACE
- ▩ 4" TOPSOIL AND SOD
- ▧ 4" TOPSOIL AND SEED

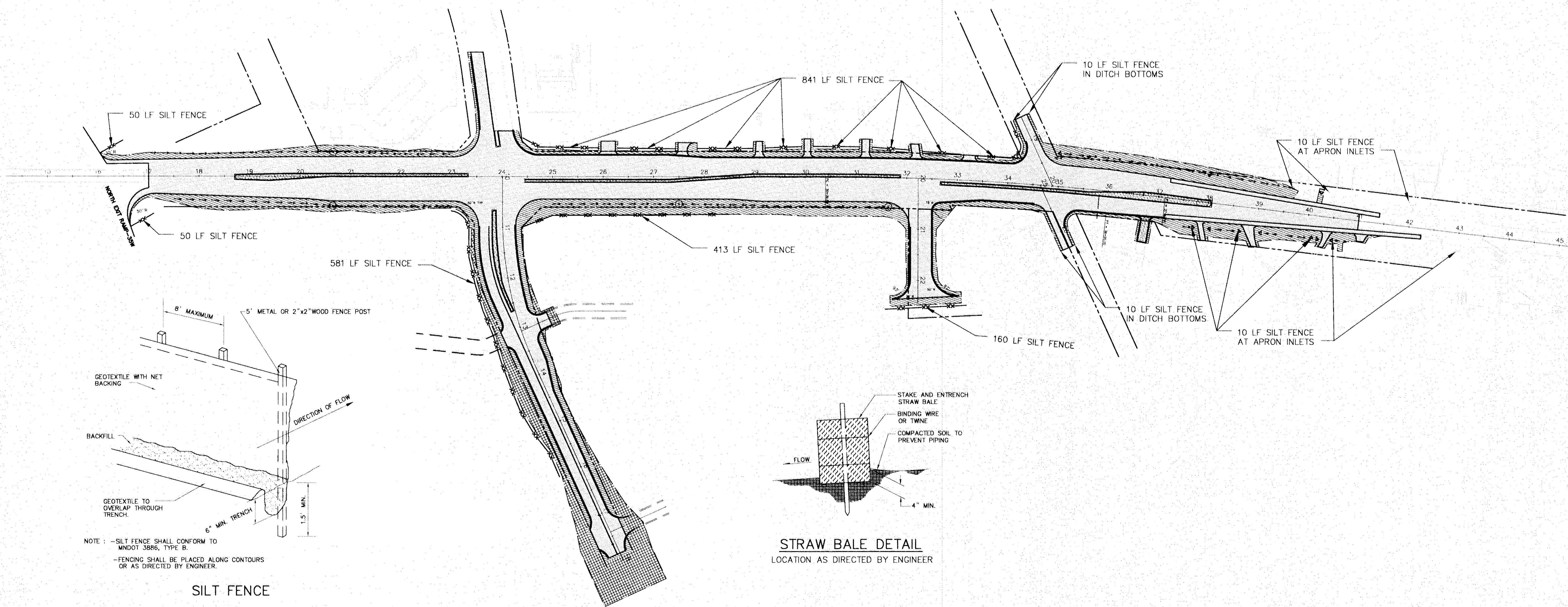
**NOTES:**

1. SCHEDULE AND CONDUCT OPERATIONS SO AS TO MINIMIZE ON SITE EROSION, PREVENT OFF SITE SEDIMENTATION, AND PREVENT SEDIMENT FROM ENTERING THE STORM SEWER SYSTEM.
2. ALL EXCAVATIONS AND EMBANKMENTS SHALL BE MAINTAINED IN A WELL DRAINED CONDITION AT ALL TIMES. THIS SHALL INCLUDE THE INSTALLATION OF PLANNED DRAINAGE FACILITIES CONCURRENTLY WITH THE EMBANKMENT CONSTRUCTION OR THE INSTALLATION OF TEMPORARY DRAINAGE FACILITIES AS APPROVED BY THE ENGINEER. NO MATERIAL SHALL BE STOCKPILED IN A MANNER THAT WILL RESTRICT SURFACE DRAINAGE.
3. EARTHWORK FINISHING AND TOPSOIL COVERING OPERATIONS SHALL BE CONDUCTED CONCURRENTLY WITH THE GRADING OPERATIONS SO AS TO PERMIT COMPLETION OF TURF ESTABLISHMENT AND OTHER EROSION CONTROL ITEMS AT THE EARLIEST PRACTICABLE TIME.
4. ALL AREAS DISTURBED WITHIN THE GRADING LIMITS SHALL BE RESTORED WITH TOPSOIL AND SEED, OR TOPSOIL AND SOD AS SHOWN ON THIS DRAWING.
5. CLEAN-UP OF THE CONSTRUCTION SITE AND HAUL ROUTES BOTH WITHIN AND OUTSIDE THE PROJECT AREA SHALL BE PERFORMED ON A CONTINUOUS BASIS WHENEVER CONSTRUCTION OPERATIONS ARE IN PROGRESS.
6. EXISTING AND PROPOSED STORM SEWER INLETS SHALL BE PROTECTED WITH SILT FENCE AND/OR STRAW BALES.
7. ALL SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RUNOFF EVENT. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. WHEN SEDIMENT DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE SILT FENCE, THE SEDIMENT SHALL BE REMOVED.



**SOD SCHEDULE**

LOCATION	TOTAL
ADJ. TO LAKE DRIVE	10,001 S.Y.
ADJ. TO APOLLO DRIVE	1,542 S.Y.
ADJ. TO MARKETPLACE DRIVE	449 S.Y.
ADJACENT TO 77TH STREET	127 S.Y.
AS DIRECTED BY ENGINEER	1,881 S.Y.
TOTAL	14,000 S.Y.



NOTE: -SILT FENCE SHALL CONFORM TO MNDOT 3886, TYPE B.  
-FENCING SHALL BE PLACED ALONG CONTOURS OR AS DIRECTED BY ENGINEER.

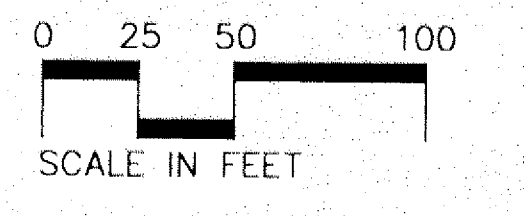
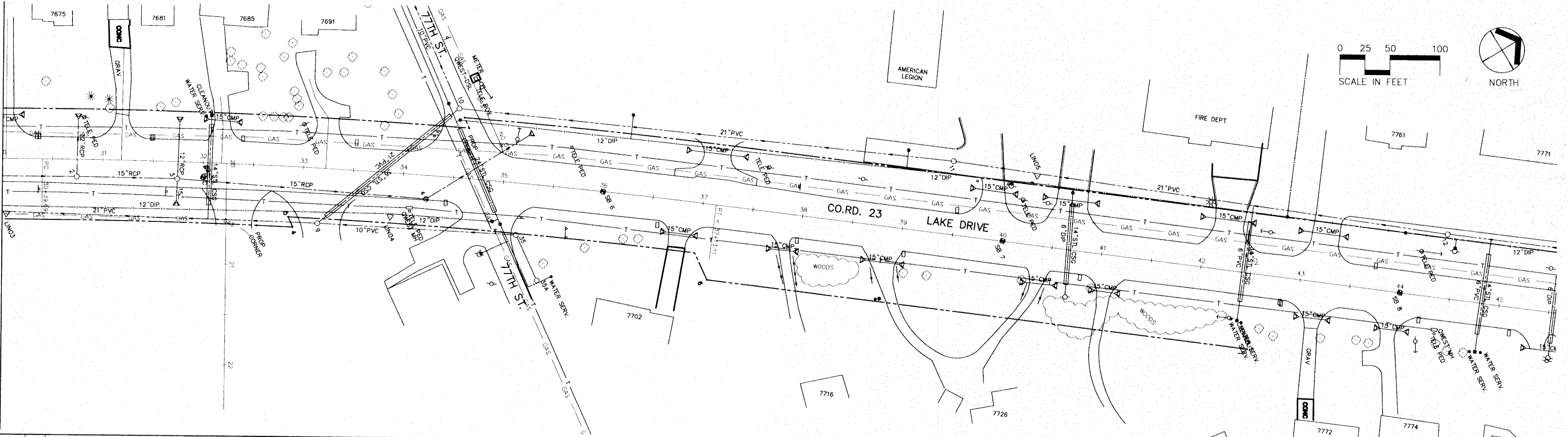
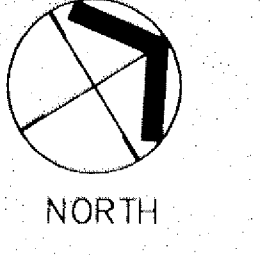
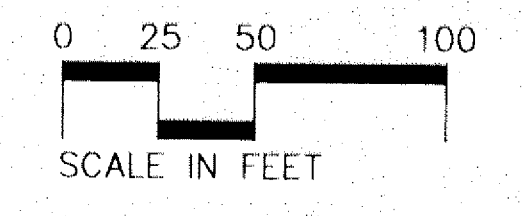
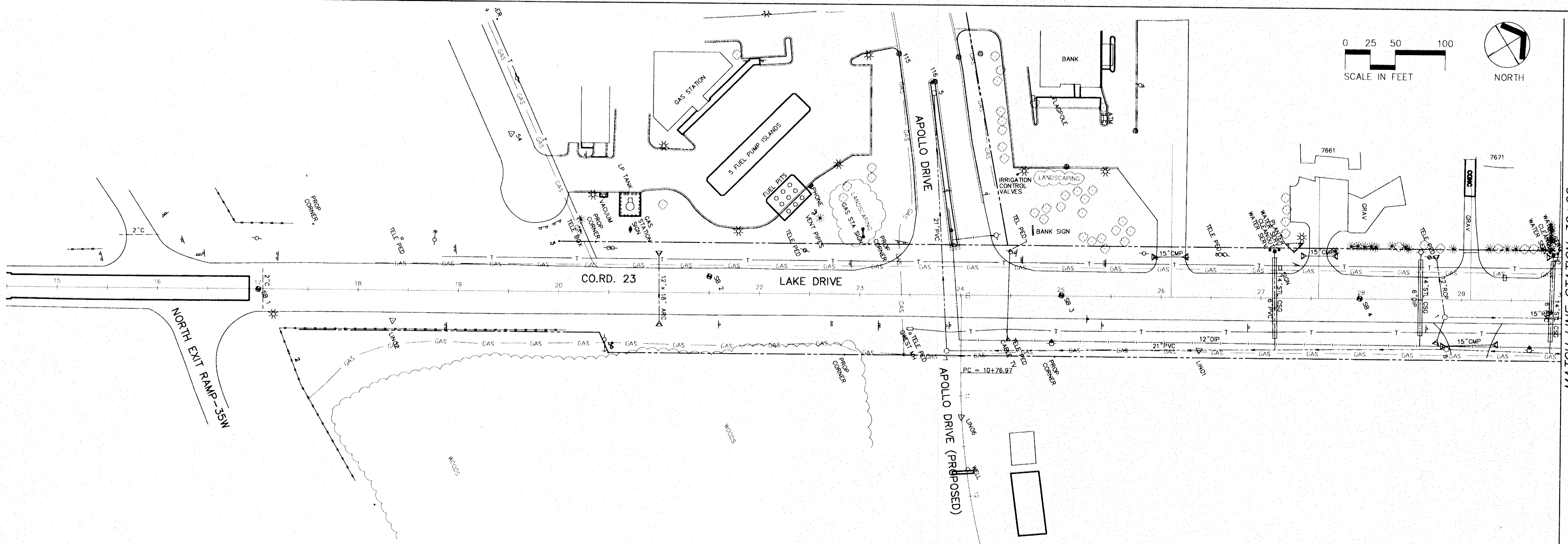
XREF: BORDER, EROBASE, GHATCH, GLIM  
 PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242801.AIR MISC EROSION

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED CPJ	DRAWN CPJ	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA <i>Paul Blum</i> JAN 28, 2002 PAUL W. BLUM LIC. NO. 12779
CHECKED PWB		

<b>TKDA</b> ENGINEERS • ARCHITECTS • PLANNERS	TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED SAINT PAUL, MINNESOTA	LAKE DRIVE APOLLO DRIVE IMPROVEMENTS	EROSION CONTROL PLAN	COMMISSION NO. 12426-01
		LINO LAKES MINNESOTA	SHEET NO. 16 OF 46 SHEETS	





PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242601 AIR/EX EXISTING  
 XREF: BORDER, EXBASE

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED LML	DRAWN APO	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA JAN 28, 2002 LYNN M. LEIBFRIED LIC. NO. 40552
CHECKED LML		

TKDA

ENGINEERS • ARCHITECTS • PLANNERS

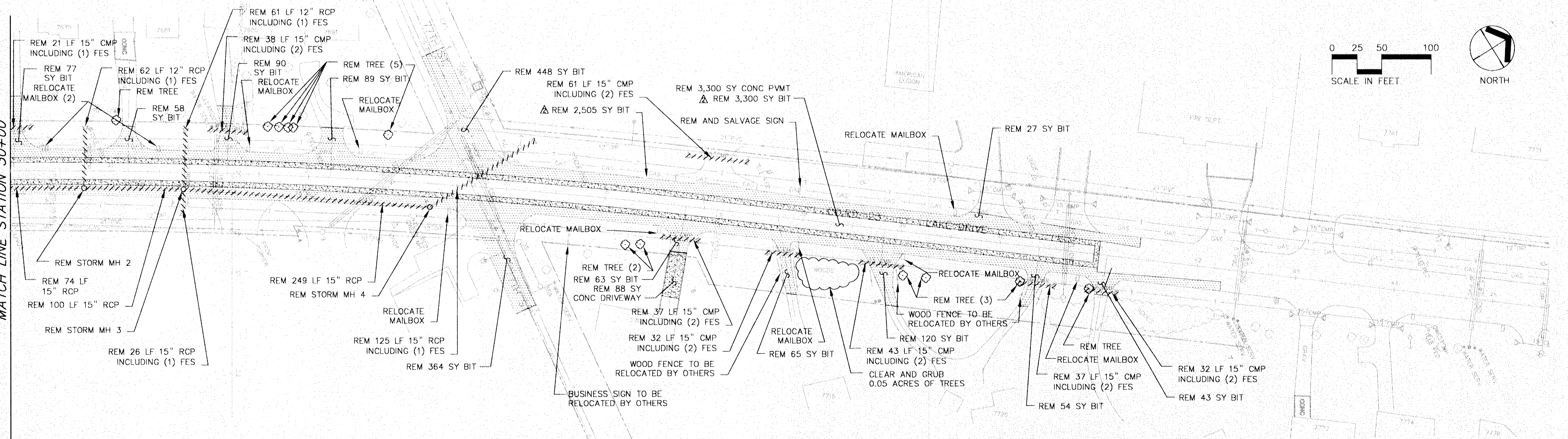
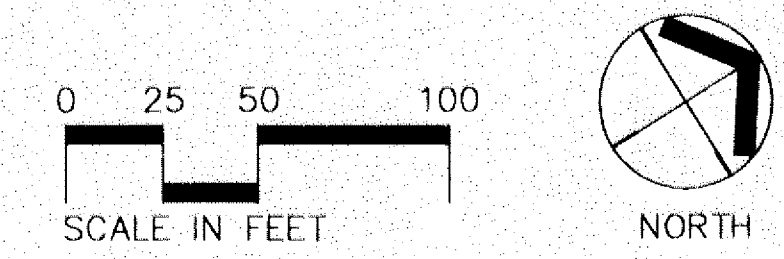
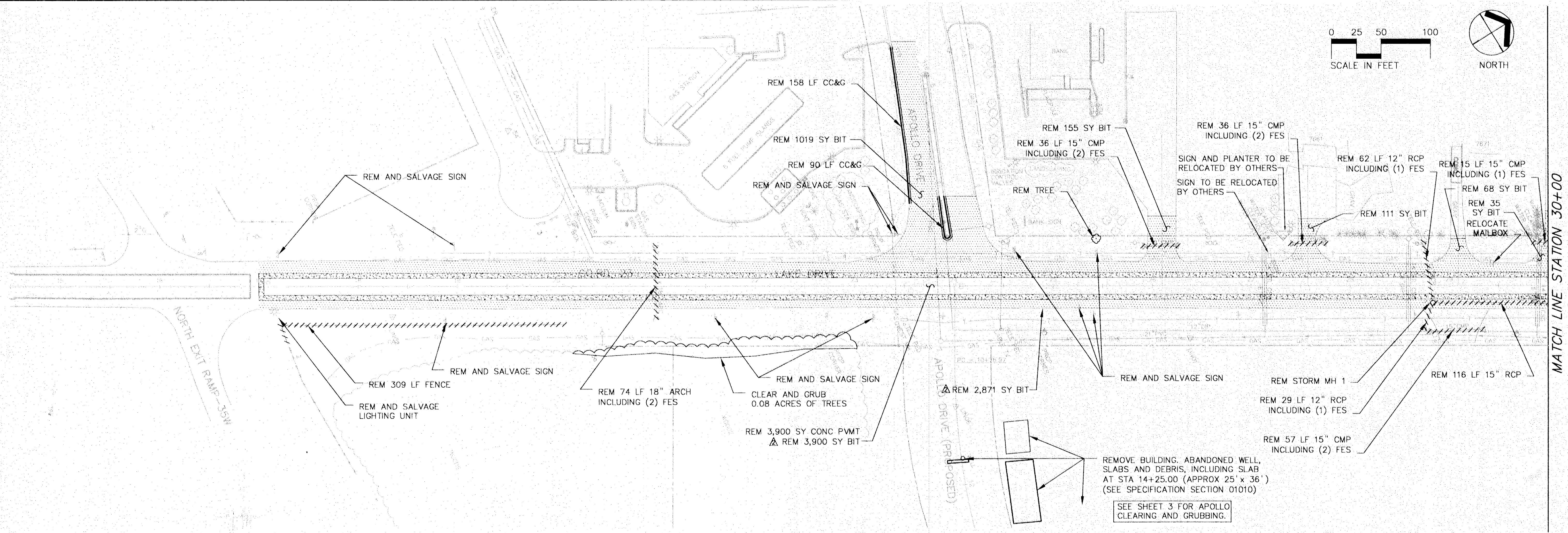
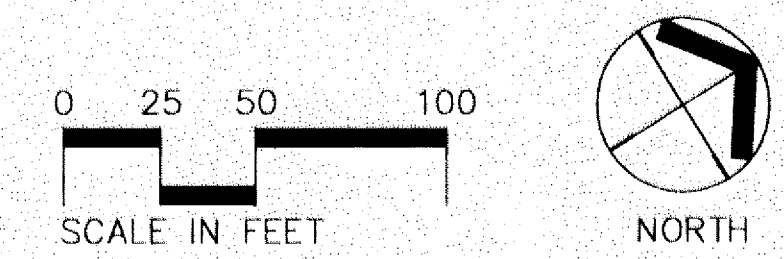
TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
SAINT PAUL, MINNESOTA

LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS

MINNESOTA

EXISTING CONDITIONS	COMMISSION NO.
SHEET NO. 17 OF 46 SHEETS	12426-01





PLOT: 1 - 1  
 CURRENT: 02/05/02  
 DIR: 1242601 AIR EX/REMOVALS  
 XREF: BORDER, EXBASE

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	CHANGED BIT AND CONC PVMT QUANTITIES
2	2/26/02	LML	NOTE FOR APOLLO DRIVE CLEARING AND GRUBBING ADDED

DESIGNED CPJ  
 DRAWN CPJ  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 Lynn M. Leibfried  
 JAN 28, 2002  
 LIC. NO. 40552

TKDA

ENGINEERS • ARCHITECTS • PLANNERS

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA

REMOVAL PLAN  
 SHEET NO. 18 OF 46 SHEETS

COMMISSION NO.  
 12426-01



### STORM SEWER CONSTRUCTION CHART

BASE LINE	LINE NO.	STRUCT NO.	LOCATION (1)		CONSTRUCTION				PIPE LENGTH (FEET)						LINE NO.	DRAINS TO			REMARKS	
			STATION	OFFSET	MH OR CB	DESIGN TYPE	CASTING TYPE (2)	RIM ELEV (3)	OUTLET ELEV	12" RCP CL.5	15" RCP CL.5	18" RCP CL.5	24" RCP CL.3	22" SPAN RCP ARCH CL.5		APRON EACH	STRUCT. NO.	SLOPE OF PIPE %		INVERT ELEV.
LAKE DRIVE	1	151	20+65.00	57.50' RT	CB	402	4342	911.67	906.67		57					1	152	0.28	906.51	
	2	152A	21+35.00	1.00' RT	CBMH	406	3250A-MOD	914.68	906.82		70					2	152	0.44	906.51	48" DIA.
	3	152	20+65.00	1.00' RT	CBMH	406	3250A-MOD	914.46	906.51		8					3	153	0.28	906.49	48" DIA.
	4	153	20+65.00	7.00' LT	CBMH	406	3250A-MOD	914.65	906.49		41					4	154	0.28	906.37	48" DIA.
	5	154	20+65.00	47.63' LT	CBMH	406	4342	911.65	906.17			300				5	155	0.24	905.45	48" DIA.
	6	156	27+50.00	53.50' RT	CB	402	4342	911.94	906.94		43					6	157	0.28	906.82	
	7	157	27+50.00	10.94' RT	CBMH	406	3250A-MOD	914.92	906.82		8					7	158	0.28	906.80	48" DIA.
	8	158	27+50.00	2.93' RT	CBMH	406	3250A-MOD	914.73	906.80		46					8	159	0.28	906.67	48" DIA.
	9	159	27+38.90	42.07' LT	CBMH	406	3250A-MOD	914.43	906.47				374			9	155	0.24	905.57	48" DIA.
	10	155	23+64.50	42.08' LT	MH	406	1642	915.55	904.82					199		10	115 Ex	0.16	904.50	60" DIA. 0.7' OVER 10'
	11	160	31+65.00	57.48' RT	MNDOT	H (4)	4342	909.87	906.82		58					11	161	0.28	906.66	27" DIA.
	12	161	31+80.00	1.00' RT	CBMH	406	3250A-MOD	912.58	906.66		8					12	162	0.28	906.64	48" DIA.
	13	162	31+80.00	7.00' LT	CBMH	406	3250A-MOD	912.77	906.64		30					13	163	0.28	906.56	48" DIA.
	14	163	31+80.00	37.00' LT	CBMH	406	3250A-MOD	912.02	906.36			221				14	164	0.24	905.83	48" DIA.
	15	164	34+00.00	37.00' LT	CBMH	406	3250A-MOD	910.92	905.83			105			1	15	FES	0.24	905.58	48" DIA., FES 35+00.00, 66.00' LT
	16	165	34+50.00	36.00' RT	CBMH	406	3250A-MOD	910.92	906.05		109					16	166	0.36	905.66	48" DIA.
	17	166	35+55.00	4.00' RT	CBMH	406	3250A-MOD	910.71	905.66		69				1	17	FES	0.28	905.47	48" DIA., FES 35+55.00, 65.23' LT
	18	167	37+95.00	9.26' RT	CBMH	406	3250A-MOD	909.70	905.27		15					18	168	0.68	905.17	48" DIA.
	19	168	37+95.00	5.75' LT	CBMH	406	3250A-MOD	909.70	905.17		51				1	19	FES	0.36	904.99	48" DIA., FES 37+95.00, 56.54' LT
	20	FES	37+72.00	52.30' RT					906.12			37			2	20	FES	0.46	905.95	38+09.00, 52.82' RT
	21	FES	28+65.00	48.59' RT					905.70			46			2	21	FES	0.44	905.6	39+10.99, 46.76' RT
	22	FES	40+20.00	48.68' LT					904.54				95		2	22	FES	0.44	904.79	40+10.00, 45.81' RT
	23	FES	40+53.00	44.10' RT					905.01			33			2	23	FES	0.50	904.84	40+20.00, 45.42' RT
APOLLO DRIVE	24	STUB	12+39.79	37.00' LT				907.14	24						24	60	0.50	907.02		
	25	60A	12+69.17	32.12' RT	CBMH	406	3250A	911.73	907.23		56				25	60	1.00	906.67	48" DIA.	
	26	60	12+60.13	23.00' LT	CBMH	406	3250A	911.81	905.56		28				26	61A	1.00	905.28	60" DIA.	
	27	62	13+16.65	51.04' LT	CBMH	406	3250A	910.97	906.39		25				27	61	1.00	906.14	48" DIA.	
	28	61	12+89.25	50.20' LT	CBMH	406	3250A	911.52	906.14		26				28	61A	1.00	905.88	48" DIA.	
	29	61A	12+89.28	24.10' LT	CBMH	406	3250A	911.46	904.78		151				29	59	1.00	903.27	48" DIA.	
	30	STUB	14+33.37	26.58' LT					903.24	18					30	59	0.50	903.15		
	31	59	14+41.89	10.75' LT	CBMH	406	3250A	908.88	902.49		121				31	58	0.50	901.88	66" DIA.	
	32	STUB	15+62.77	25.00' LT					900.03				14		32	58	0.65	899.94		
	33	58A	15+62.77	23.50' RT	CBMH	406	3250A	906.16	900.90		35				33	58	1.00	900.55	48" DIA.	
MKTPL	34	58	15+62.77	11.00' LT	CBMH	406	3250A	906.46	899.94			130		34	57	1.00	898.64	60" DIA.		
	35	57A	16+93.00	23.50' RT	CBMH	406	3250A	903.56	899.31		35			35	57	0.50	899.13	48" DIA.		
	36	57	16+93.00	11.00' LT	CBMH	406	3250A	903.86	898.64			53		36	STUB	1.00	898.11	60" DIA.		
	37	STUB	22+47.14	30.90' RT					907.49	14					37	24	1.00	907.35		
38	24	22+32.73	31.59' RT	CBMH	406	3250A	910.78	907.35		17				38	21	1.00	907.18	48" DIA.		
39	STUB	22+11.08	22.19' RT					907.26	10					39	21	1.00	907.18			
40	21	22+20.23	19.42' RT	CBMH	406	3250A	911.03	907.16		62				40	20	1.44	906.27	48" DIA.		
41	20A	20+70.00	26.00' LT	CBMH	406	3250A	911.60	907.31	148					41	20	0.70	906.27	48" DIA.		
42	20	22+17.53	42.12' LT	CBMH	406	3250A	910.67	906.27	33					42	STUB	1.50	905.78	48" DIA.		
			TOTAL						326	1090	1116	396	95	11						

**NOTES:**

(1) LOCATION DESIGNATES CENTER OF STRUCTURE. LOCATIONS ARE BASED ON STATIONING AS SHOWN.

(2) CASTING ASSEMBLIES:

- 3250A - NEENAH R-3250A FRAME, GRATE, AND CURB BOX OR APPROVED EQUAL.
- 3250A-MOD - NEENAH R-3250A FRAME, GRATE W/O CURB BOX OR APPROVED EQUAL.
- 1642 - NEENAH R-1642 WITH TYPE 'B' LID OR APPROVED EQUAL.
- 4342 - NEENAH R-4342 (MNDOT STD PLATE 4143E) STOOL GRATE AND CONCRETE FRAME OR APPROVED EQUAL.

(3) RIM ELEVATIONS:

- 3250A - 0.10' SUMP.
- 3250A-MOD - 0.10' SUMP.
- 1642 - 0.02' SUMP.
- 4342 - 0.25' SUMP.

(4) SEE MNDOT STD PLATE 4006L.

XREF: BORDER  
 DIR: 1242601.AIR\DDC\STORM\BL2  
 NO. DATE BY DESCRIPTION OF REVISIONS

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED CPJ	DRAWN CPJ	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. <i>Paul Blum</i> JAN 28, 2002 PAUL W. BLUM LIC. NO. 12779
CHECKED PWB		



ENGINEERS • ARCHITECTS • PLANNERS

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

LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS

LINO LAKES

MINNESOTA

STORM SEWER  
CONSTRUCTION CHART

SHEET NO. 19 OF 46 SHEETS

COMMISSION NO.  
12426-01



### SANITARY SEWER CONSTRUCTION CHART

BASE LINE	LINE NO.	STRUCT. NO.	LOCATION (1)		CONSTRUCTION						LINE NO.	DRAINS TO			REMARKS	
			STATION	OFFSET	MH OR CB	DESIGN TYPE	CASTING (2) TYPE	RIM (3) ELEV	OUTLET ELEV	DEPTH OVER 10'		8" PVC (FT)	STRUCT. NO.	SLOPE OF PIPE %		INVERT ELEV.
APOLLO DRIVE	1	STUB	17+56.00	35.29' RT				888.75		23	1	7D	0.40	888.66	48" DIA.	
	2	STUB	17+56.00	25.00' LT				888.81		37	2	7D	0.40	888.66		
	3	7D	17+56.00	12.00' RT	MH	301	1642	902.70	888.66	4.0	206	3	7C	0.40		887.84
	4	STUB	15+50.00	35.20' RT				887.93		23	4	7C	0.40	887.84		
	5	7C	15+50.00	12.00' RT	MH	301	1642	906.82	887.84	9.0	232	5	7B	0.40		886.91
	6	STUB	13+20.93	37.46' RT				887.00		23	6	7B	0.40	886.91		
	7	STUB	13+14.63	37.00' LT				900.20		49	7	7B	0.40	900.00		
	8	7B	13+19.12	14.42' RT	MH	301	1642	911.31	886.91	14.4	107	8	7A	0.40		886.48
	9	7A	12+17.00	30.96' RT	MH	301	1642	912.86	886.48	16.4	167	9	7 (Ex)	0.40		885.81
LAKE DRIVE	10	7 (Ex)	23+86.82	55.34' RT				915.64			10				ADJUST CSTG + 0.41'. EXISTING RIM ELEV 915.21 RECONSTRUCT MH 5.9'. EXISTING RIM ELEV 912.58 NO ADJUSTMENT REQUIRED RECONSTRUCT MH 5.4'. EXISTING RIM ELEV 911.01 NO ADJUSTMENT REQUIRED RECONSTRUCT MH 5.3'. EXISTING RIM ELEV 911.27 NO ADJUSTMENT REQUIRED	
	11	8 (Ex)	28+85.65	49.04' RT				913.52			11					
	12	9 (Ex)	33+16.73	54.80' RT							12					
	13	10 (Ex)	34+50.21	68.63' LT				910.46			13					
	14	11 (Ex)	39+41.98	72.85' LT							14					
	15	35 (Ex)	35+17.11	51.52' RT				910.61			15					
	16	35A (Ex)	35+42.36	94.57' RT				912.20			16					
			TOTAL							867						

**NOTES:**

- (1) LOCATION DESIGNATES CENTER OF STRUCTURE FOR NEW MH'S, CENTER OF CASTING FOR EXISTING MH'S. LOCATIONS ARE BASED ON STATIONING AS SHOWN.
- (2) CASTING ASSEMBLIES:  
1642 - NEENAH R-1642 WITH TYPE 'B' LID OR APPROVED EQUAL.

- (3) RIM ELEVATIONS:  
1642 - 0.00' IN TURF, 0.02' SUMP IN BITUMINOUS.

XREF: BORDER  
 DIR: 1242601.AIR.DOC SANITBL2  
 PLT: 1 = 1  
 CURRENT: 02/05/02

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED CPJ    DRAWN CPJ  
 CHECKED PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum*    JAN 28, 2002  
 PAUL W. BLUM    LIC. NO. 12779

## TKDA

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED

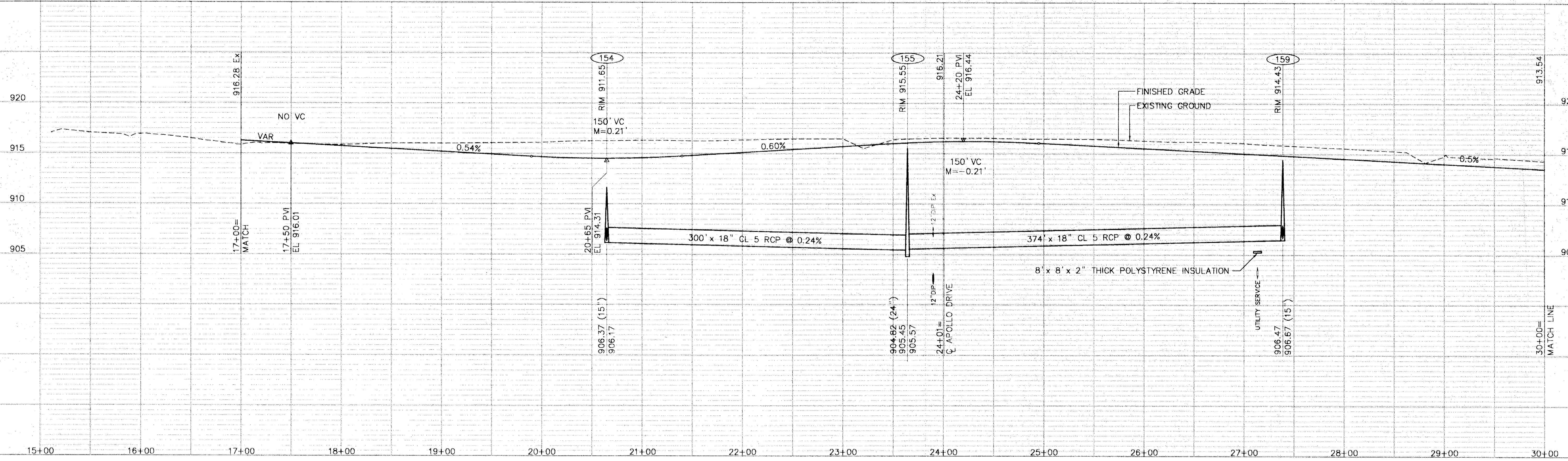
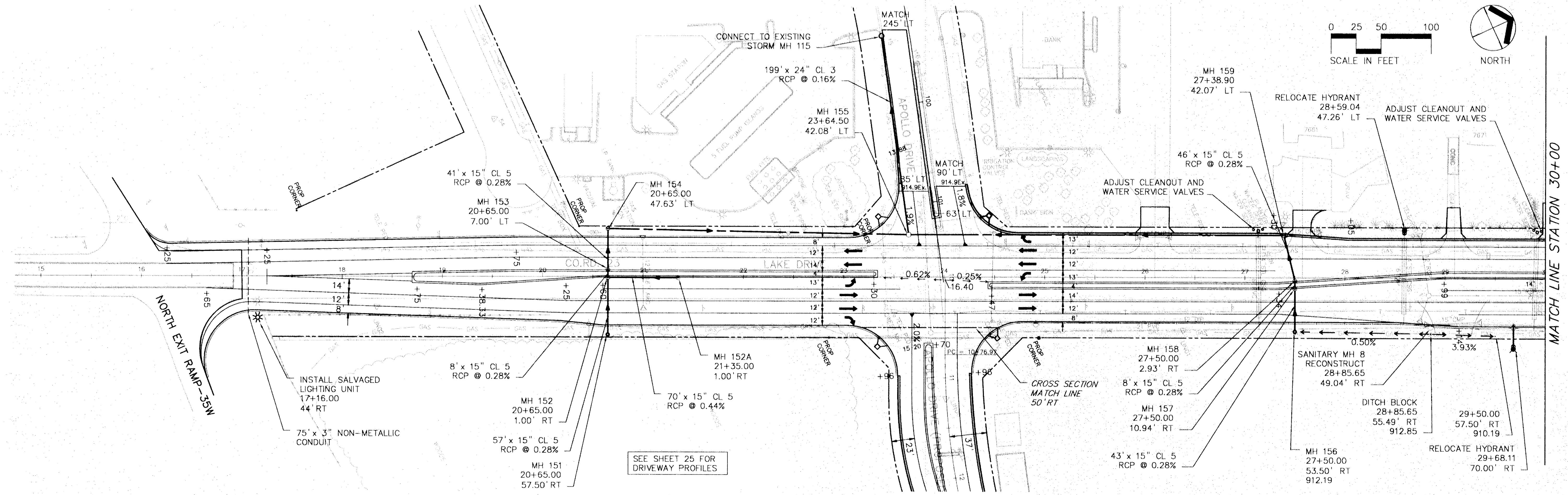
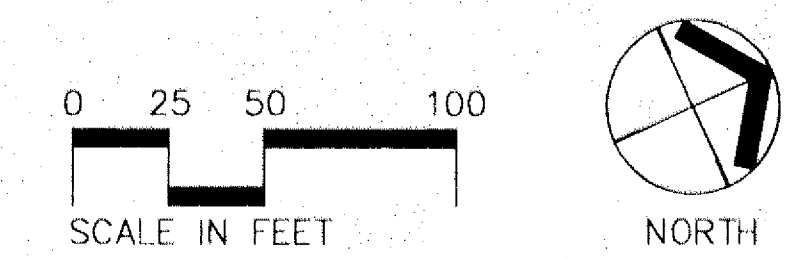
ENGINEERS • ARCHITECTS • PLANNERS    SAINT PAUL, MINNESOTA

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 LINO LAKES    MINNESOTA

**SANITARY SEWER  
 CONSTRUCTION CHART**  
 SHEET NO. 20 OF 46 SHEETS

COMMISSION NO.  
**12426-01**





XREF: BORPROP, PROFLAKE, SCRBASE, STREETE  
 PLOT: 1 OF 1  
 CURRENT: 07/05/02  
 DIR: 1242601.VAR PROF VPROF1

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED DRAWN LML/CPJ LML/CPJ  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
 JAN 28, 2002  
 LYNN M. LEIBFRIED LIC. NO. 40552

TKDA

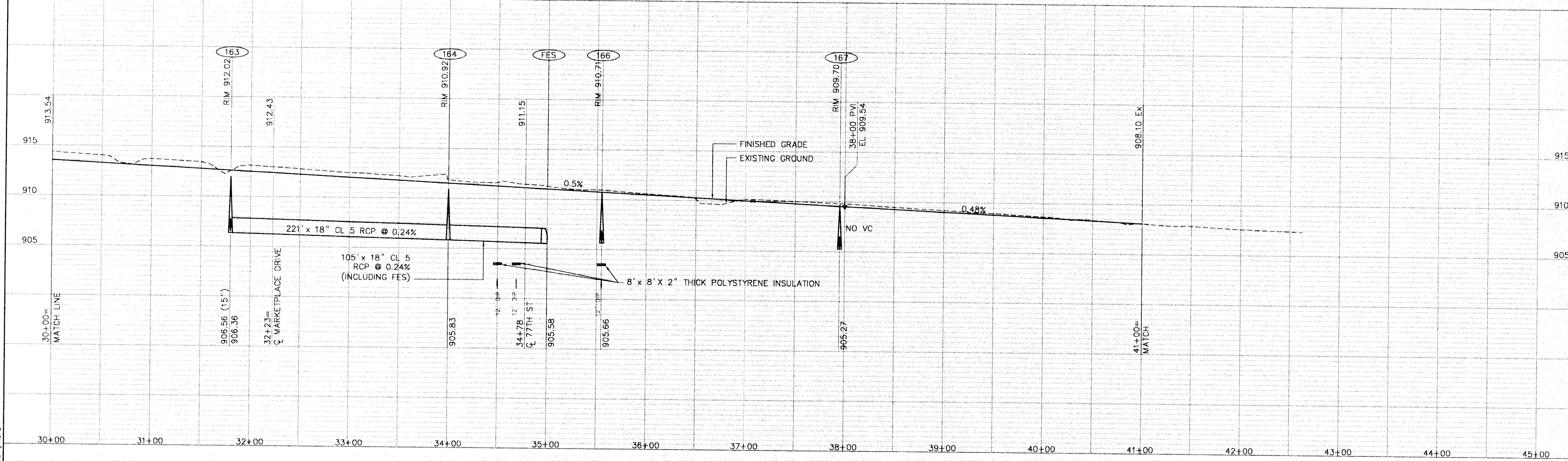
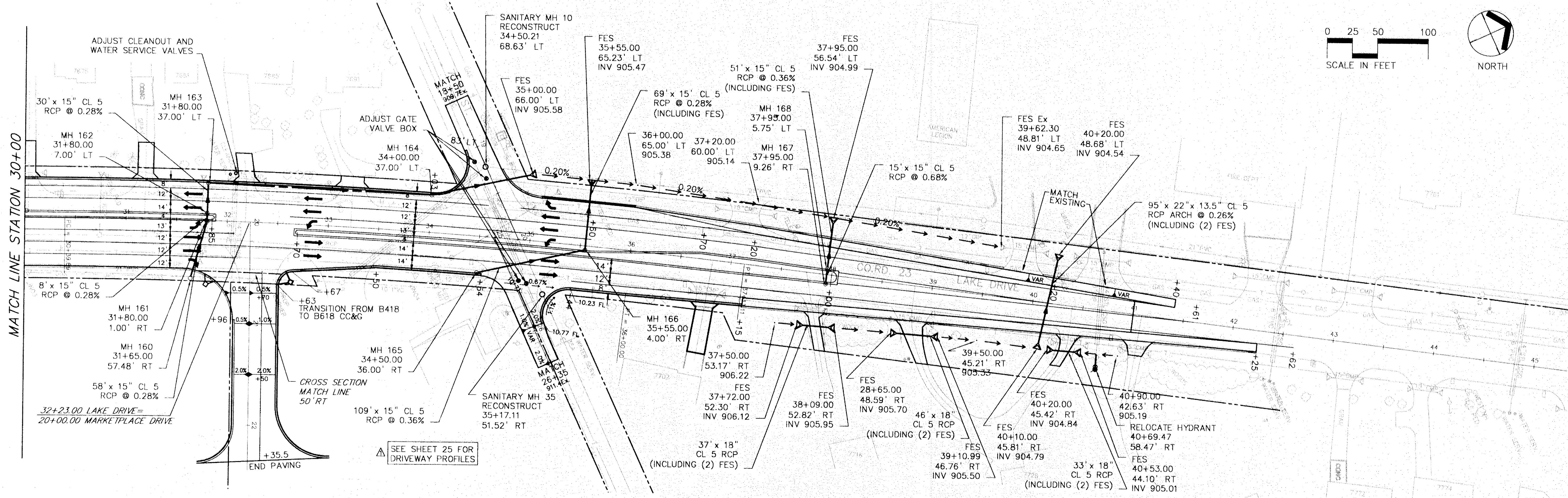
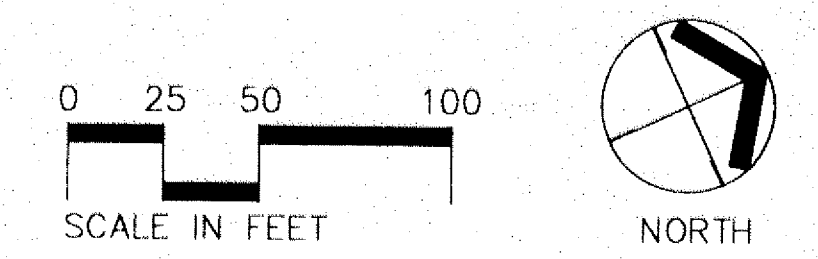
TOLTZ, KING, DUVALL, ANDERSON  
 AND ASSOCIATES INCORPORATED  
 ENGINEERS • ARCHITECTS • PLANNERS  
 SAINT PAUL, MINNESOTA

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 MINNESOTA  
 LINO LAKES

**LAKE DRIVE  
 PLAN AND PROFILE  
 STA. 15+00 TO 30+00**  
 SHEET NO. 21 OF 46 SHEETS

COMMISSION NO.  
 12426-01





XREF: BORPROP, PROJ.LAKE, SCRBASE, STREETE  
 PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242601.AIR.PROF.PROF2

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	CHANGED NOTE

DESIGNED LML/CPJ DRAWN LML/CPJ  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
 LYNN M. LEIBFRIED JAN 28, 2002  
 LIC. NO. 40552

TKDA

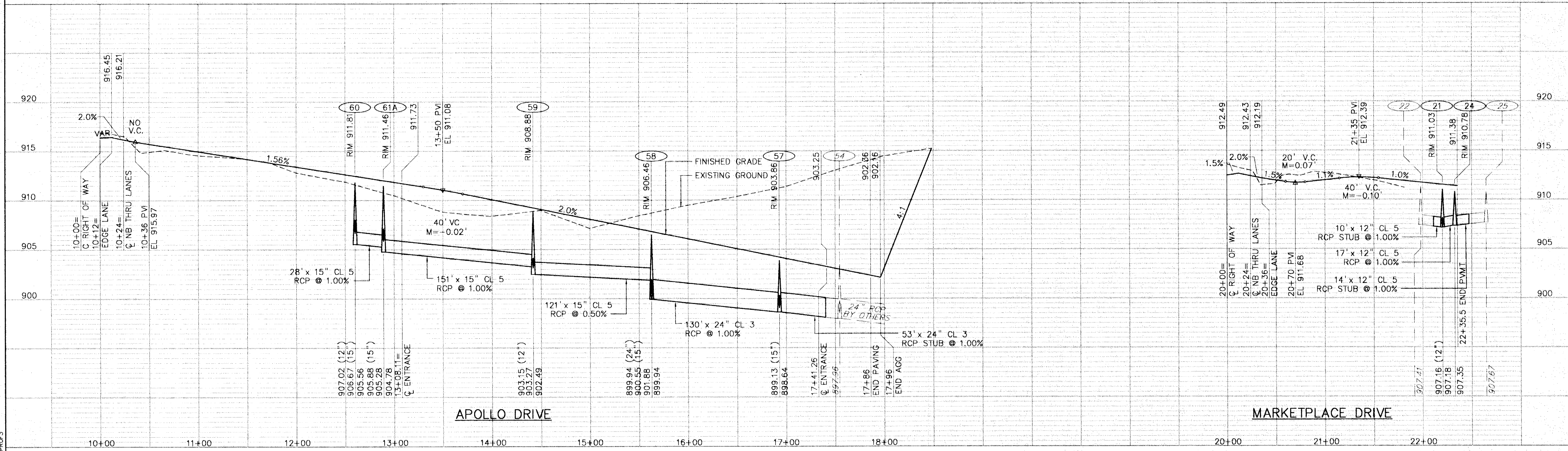
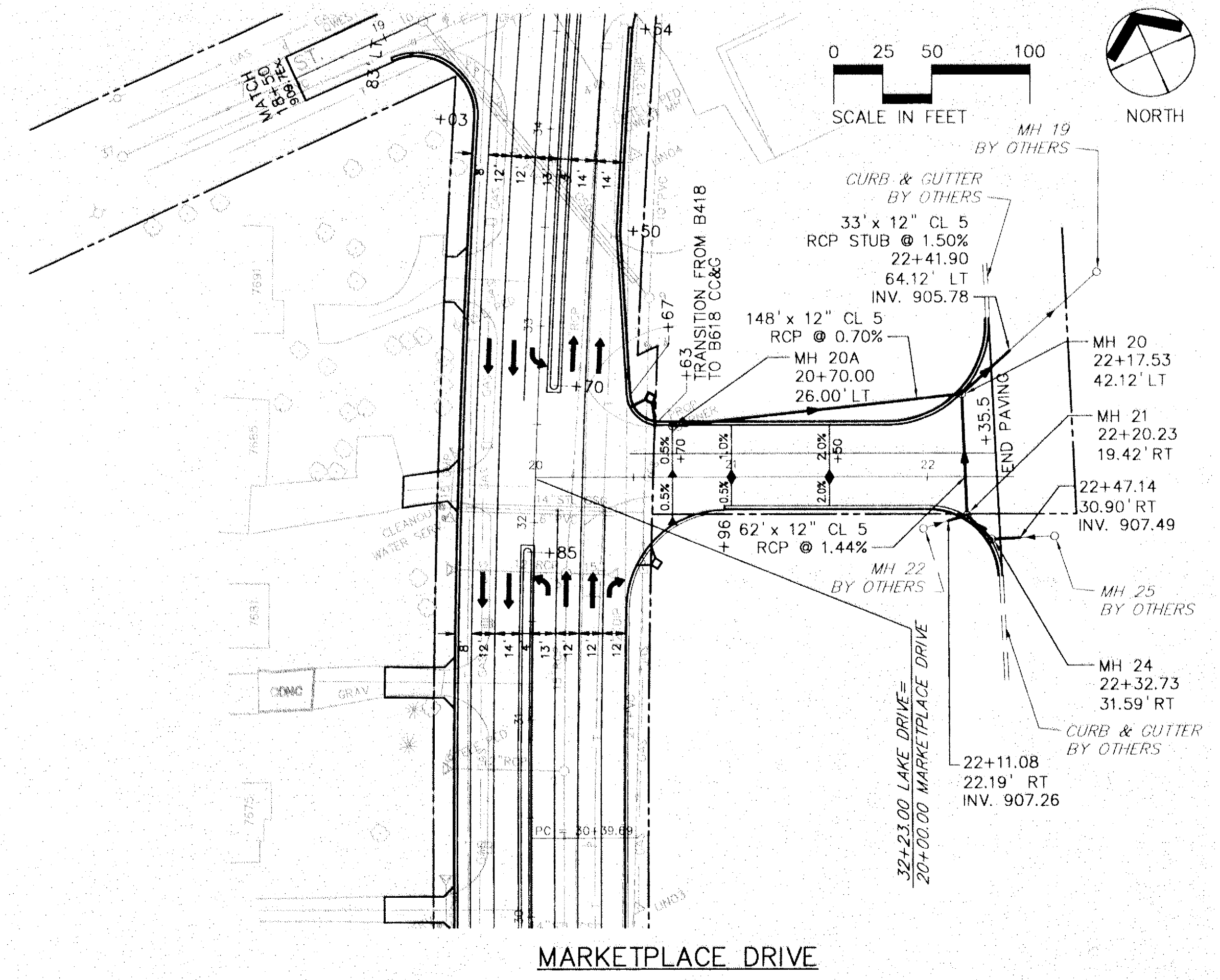
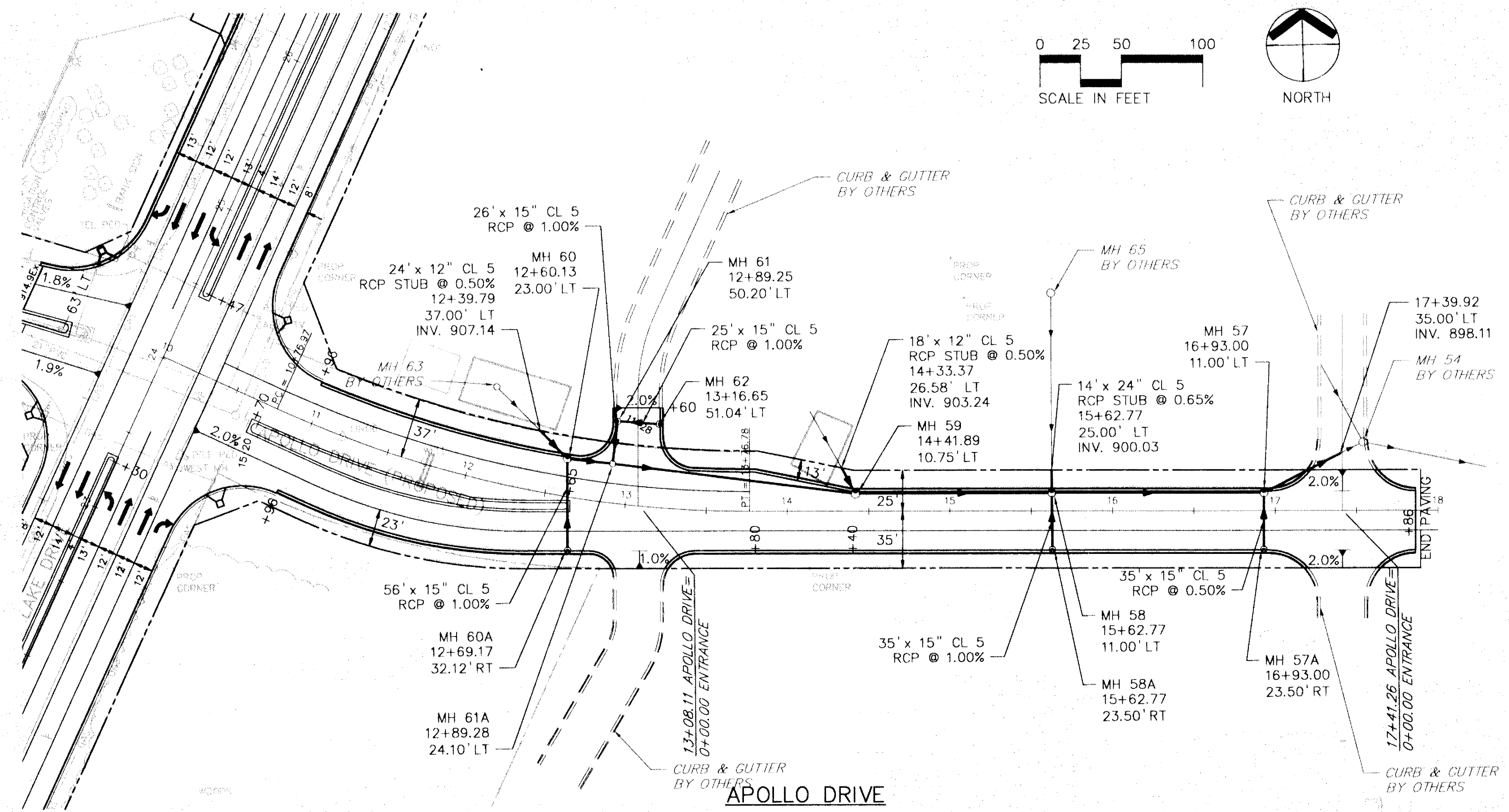
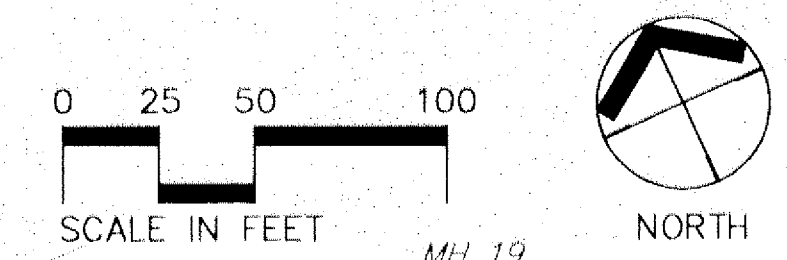
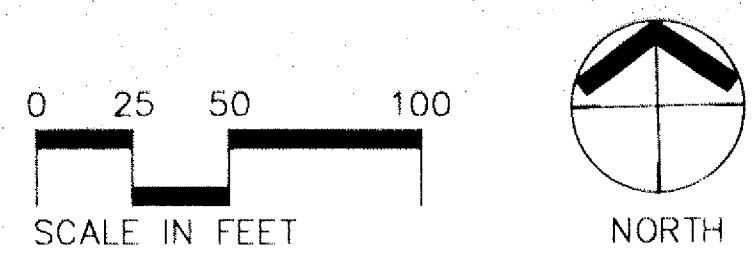
TOLTZ, KING, DUVALL, ANDERSON  
 AND ASSOCIATES INCORPORATED  
 ENGINEERS • ARCHITECTS • PLANNERS  
 SAINT PAUL, MINNESOTA

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 LINO LAKES MINNESOTA

**LAKE DRIVE  
 PLAN AND PROFILE  
 STA. 30+00 TO 45+00**  
 SHEET NO. 22 OF 46 SHEETS

COMMISSION NO.  
**12426-01**





XREF: BORPROP. PROFAPOL. PROFMKT. SCBASE. STREET  
 LOT: 1  
 CURRENT: 02/05/02  
 DIR: 1242601.AIR\PROF.PROF3

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED DRAWN LML/CPJ LML/CPJ  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
 LYNN M. LEIBFRIED JAN 28, 2002 LIC. NO. 40552

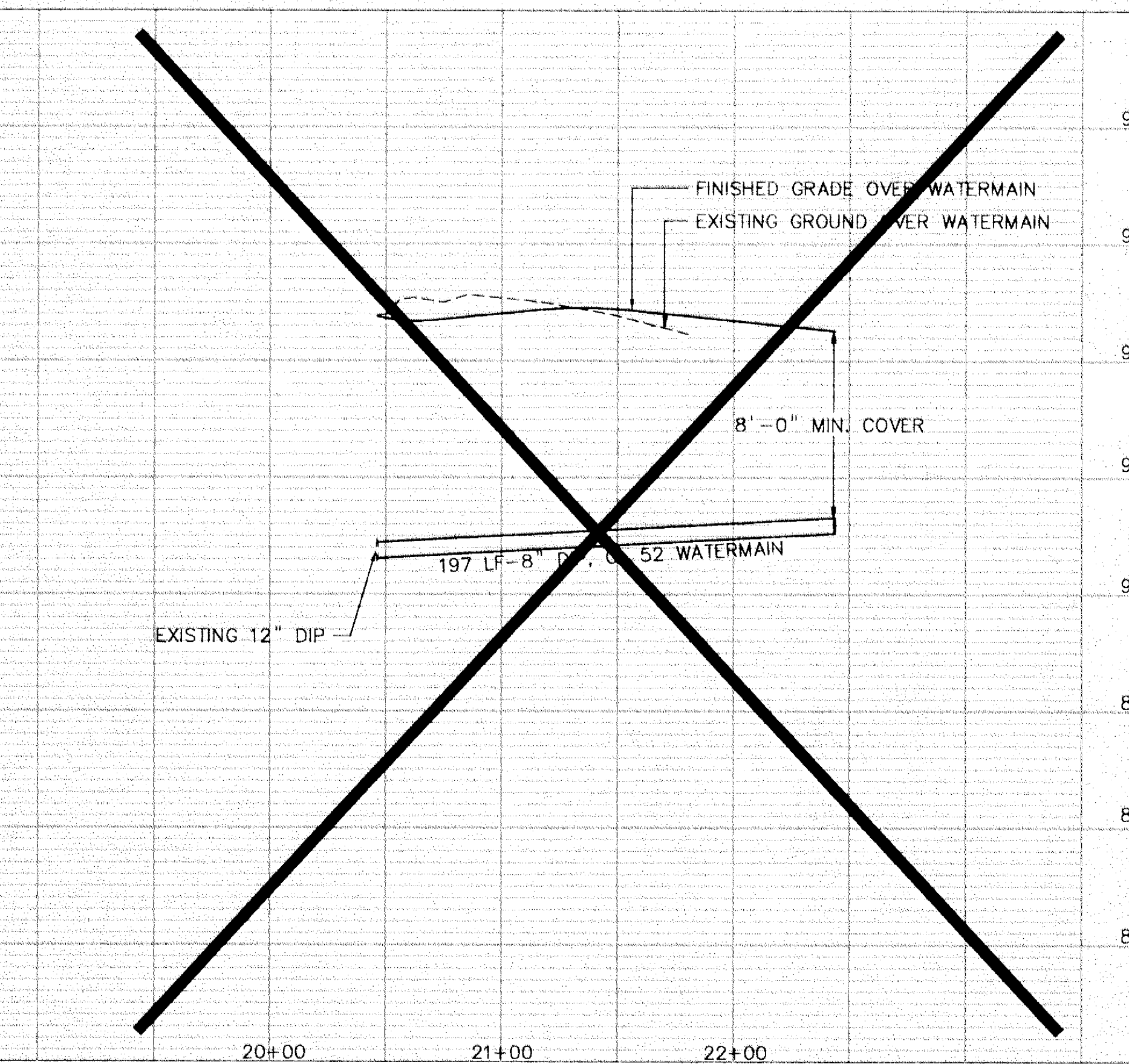
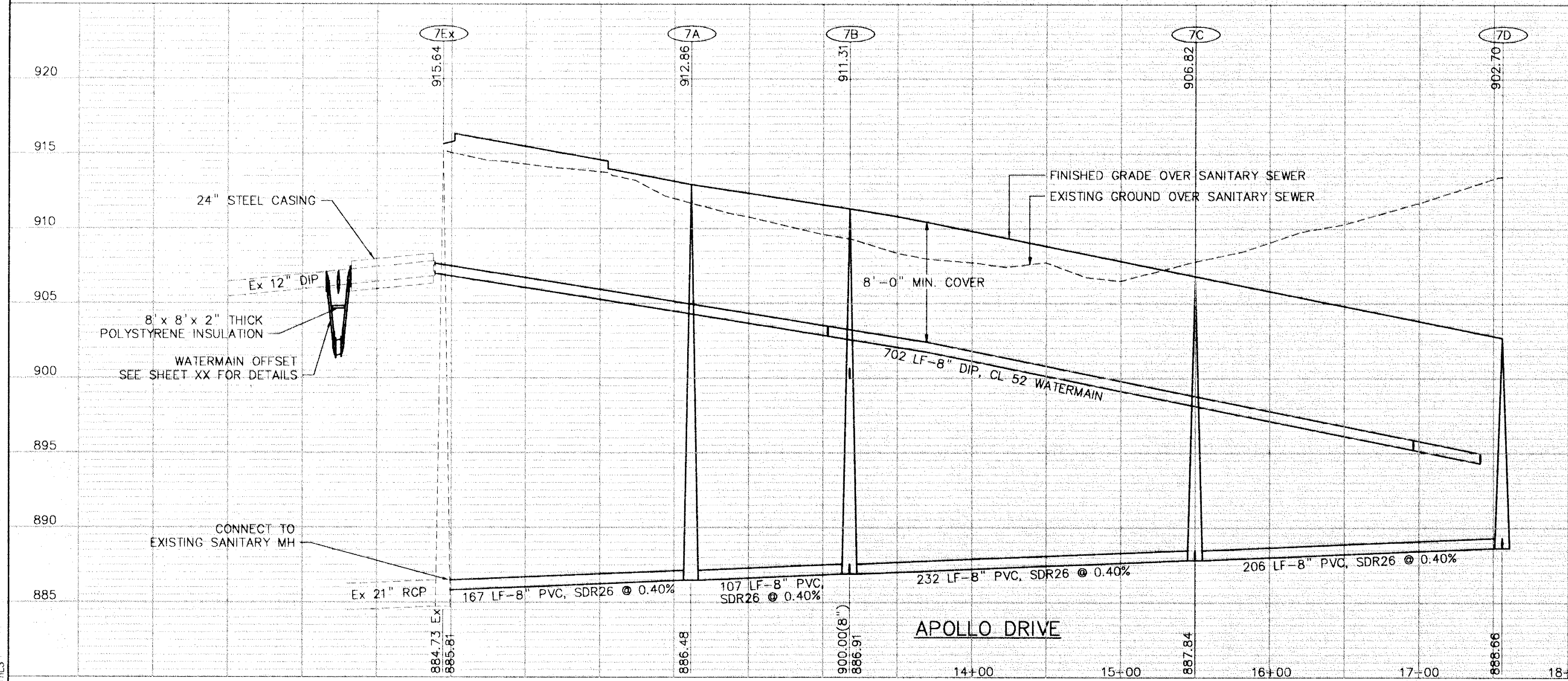
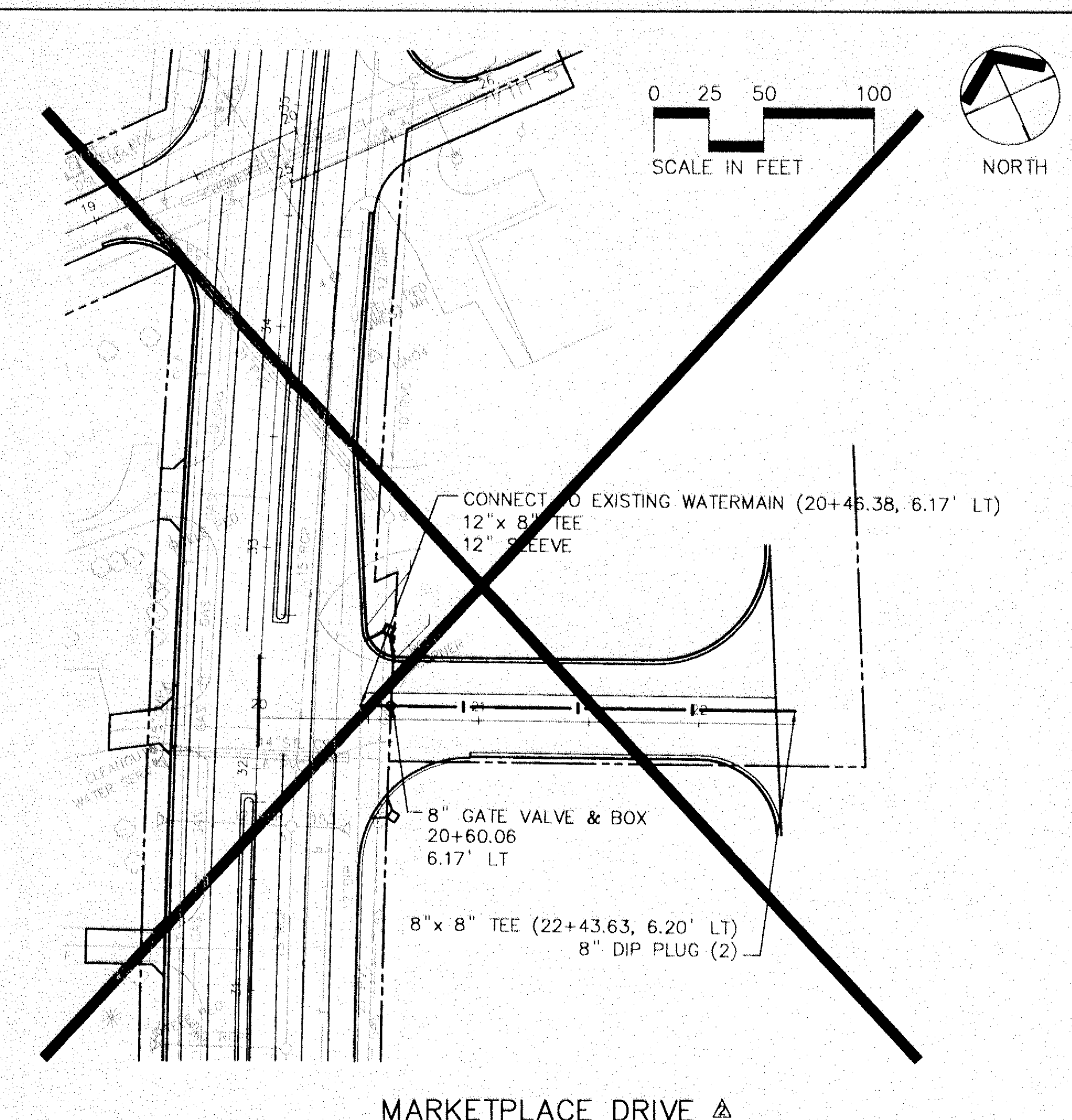
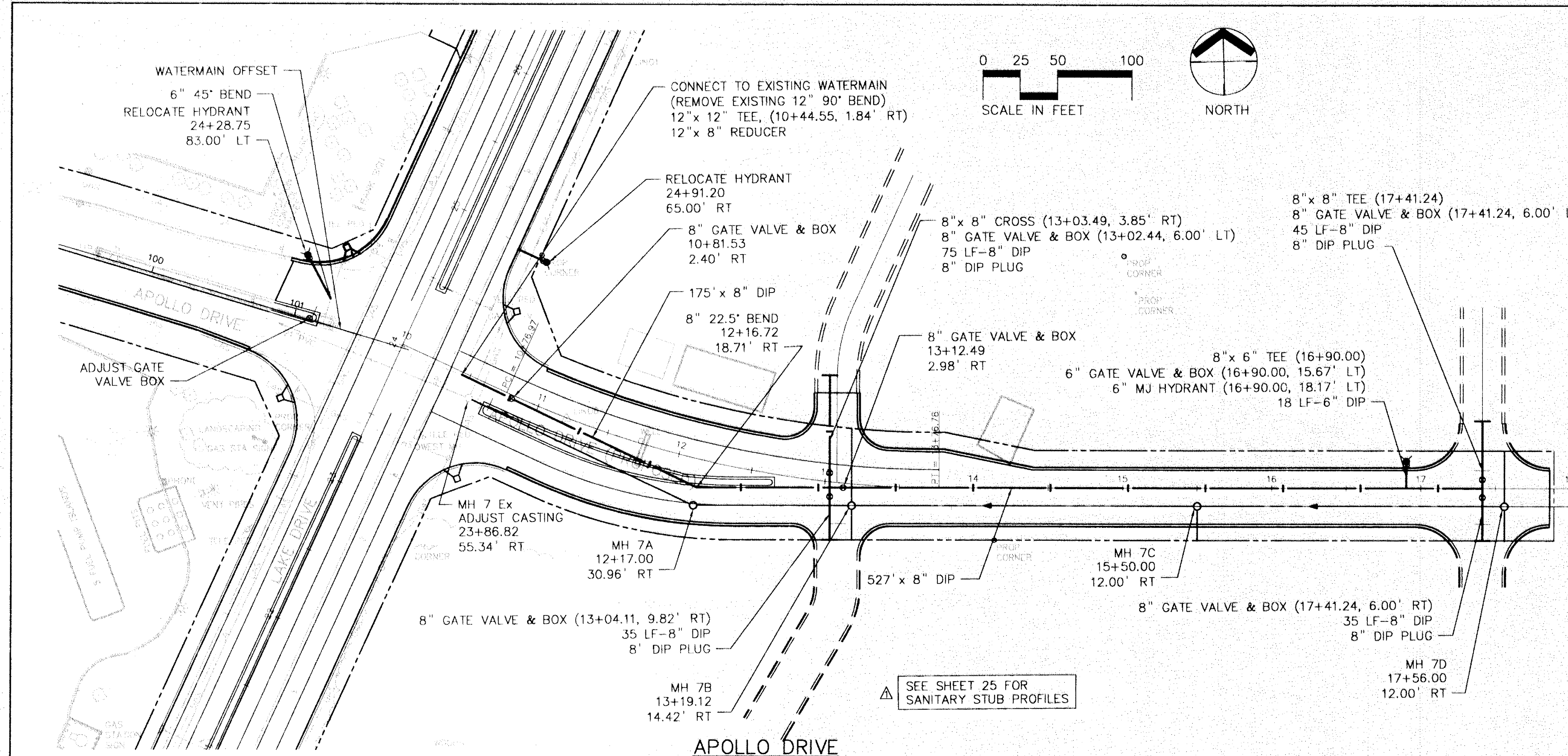
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA

APOLLO DRIVE AND  
 MARKETPLACE DRIVE  
 PLAN AND PROFILE  
 SHEET NO. 23 OF 46 SHEETS

COMMISSION NO.  
 12426-01





XREF: BORPROF, SORBASE, STREETE  
 PLOT: 1 = 1  
 CURRENT: 02/05/02  
 DIR: 1242601.ARW\UTIL3

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	LML	DELETE WATERMAIN FROM THIS PROJECT
2	2/26/02	LML	CHANGED NOTE

DESIGNED CPJ	DRAWN CPJ
CHECKED PWB	

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
**Paul Blum** JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

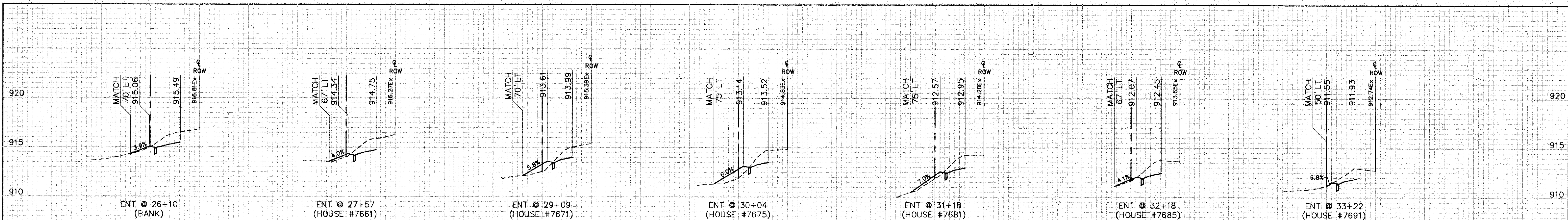
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA

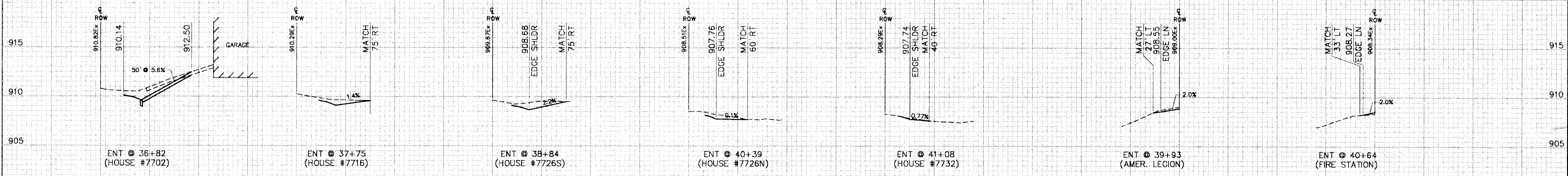
APOLLO DRIVE AND  
 MARKETPLACE DRIVE  
 SANITARY AND WATERMAIN  
 SHEET NO. 24 OF 46 SHEETS

COMMISSION NO.  
 12426-01

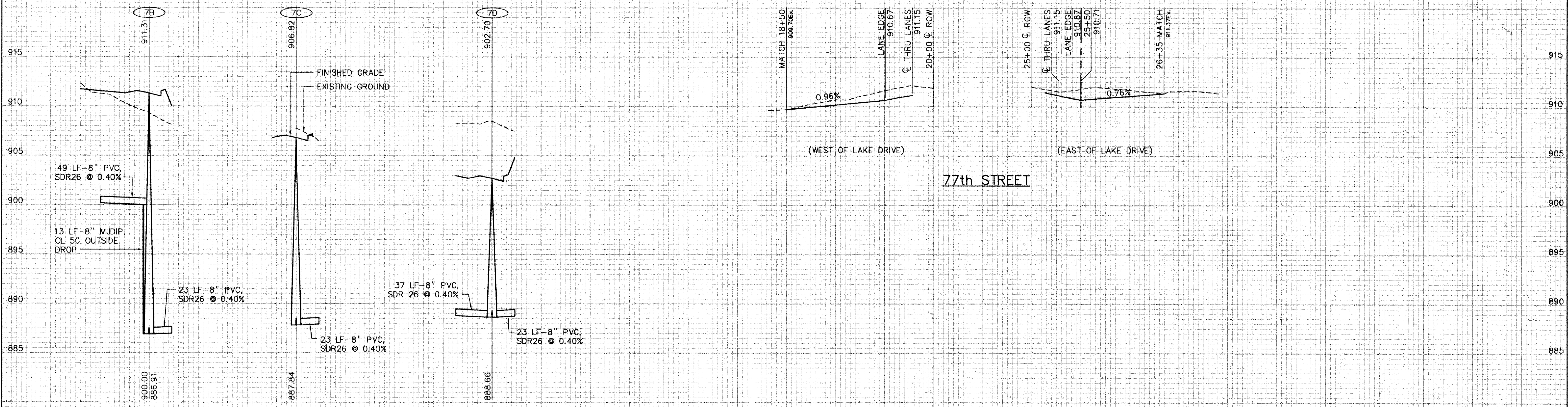




ENTRANCES



ENTRANCES



SANITARY SEWER STUBS

XREF: BORXSEC, DRIVEPROF, PROF77, SANPROF3  
 PLOT: 1 of 5  
 CURRENT: 02/05/02  
 DIR: 1242601\AR\UTIL\PROFMISC

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED LML  
 DRAWN APO  
 CHECKED LML  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
 LYNN M. LEIBFRIED JAN 28, 2002  
 LIC. NO. 40552

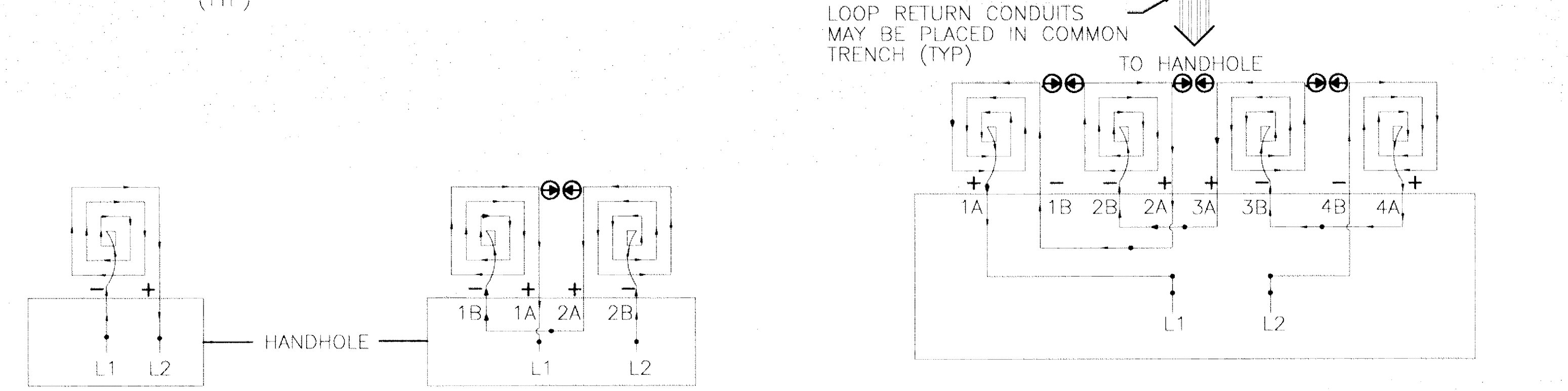
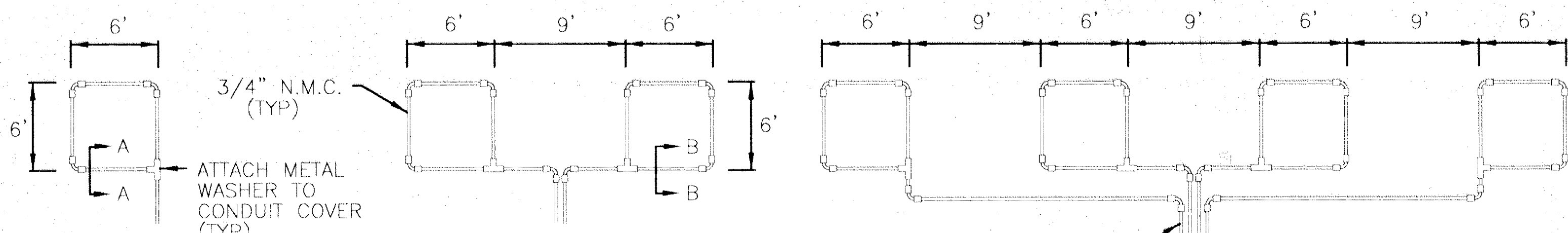
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE IMPROVEMENTS  
 LINO LAKES MINNESOTA

MISCELLANEOUS PROFILES  
 SHEET NO. 25 OF 46 SHEETS

COMMISSION NO.  
 12426-01





**LOOP DETECTOR DETAIL 'A'**  
(LOOP PHASING FOR SINGLE CONNECTION)

**LOOP DETECTOR DETAIL 'B'**  
(LOOP PHASING FOR SERIES CONNECTION)

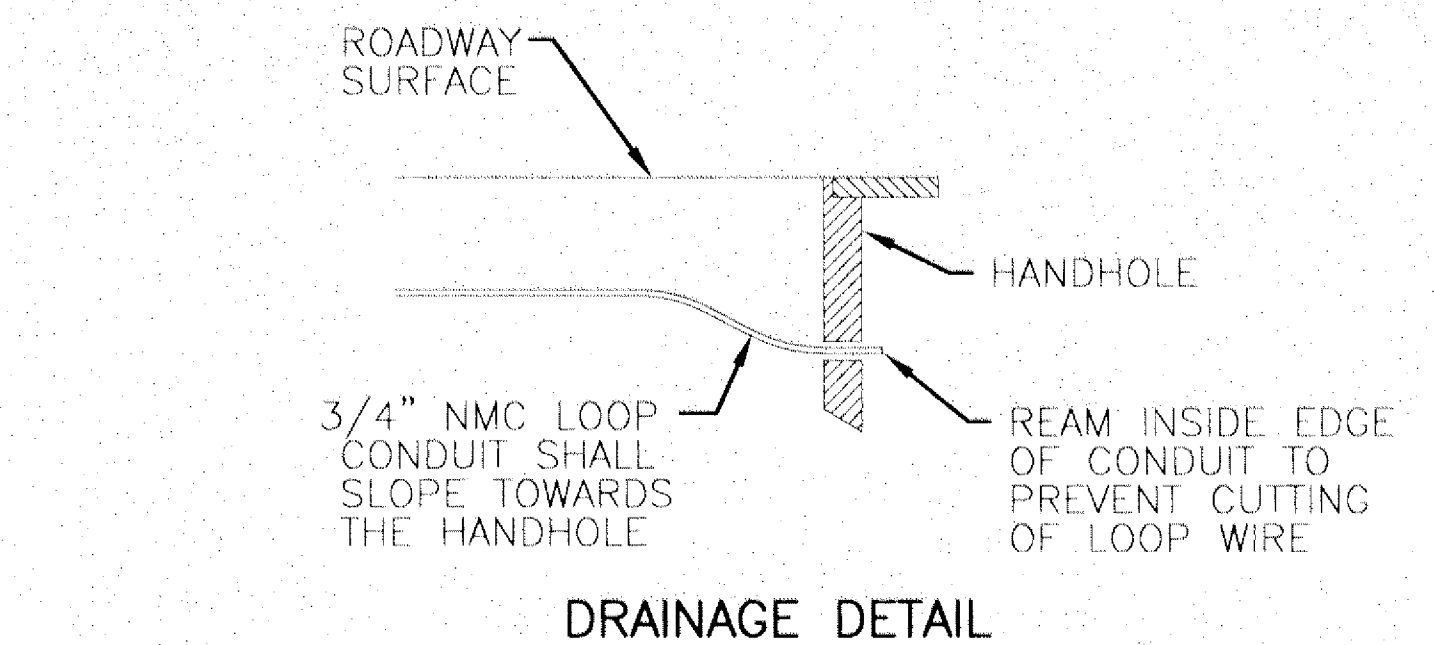
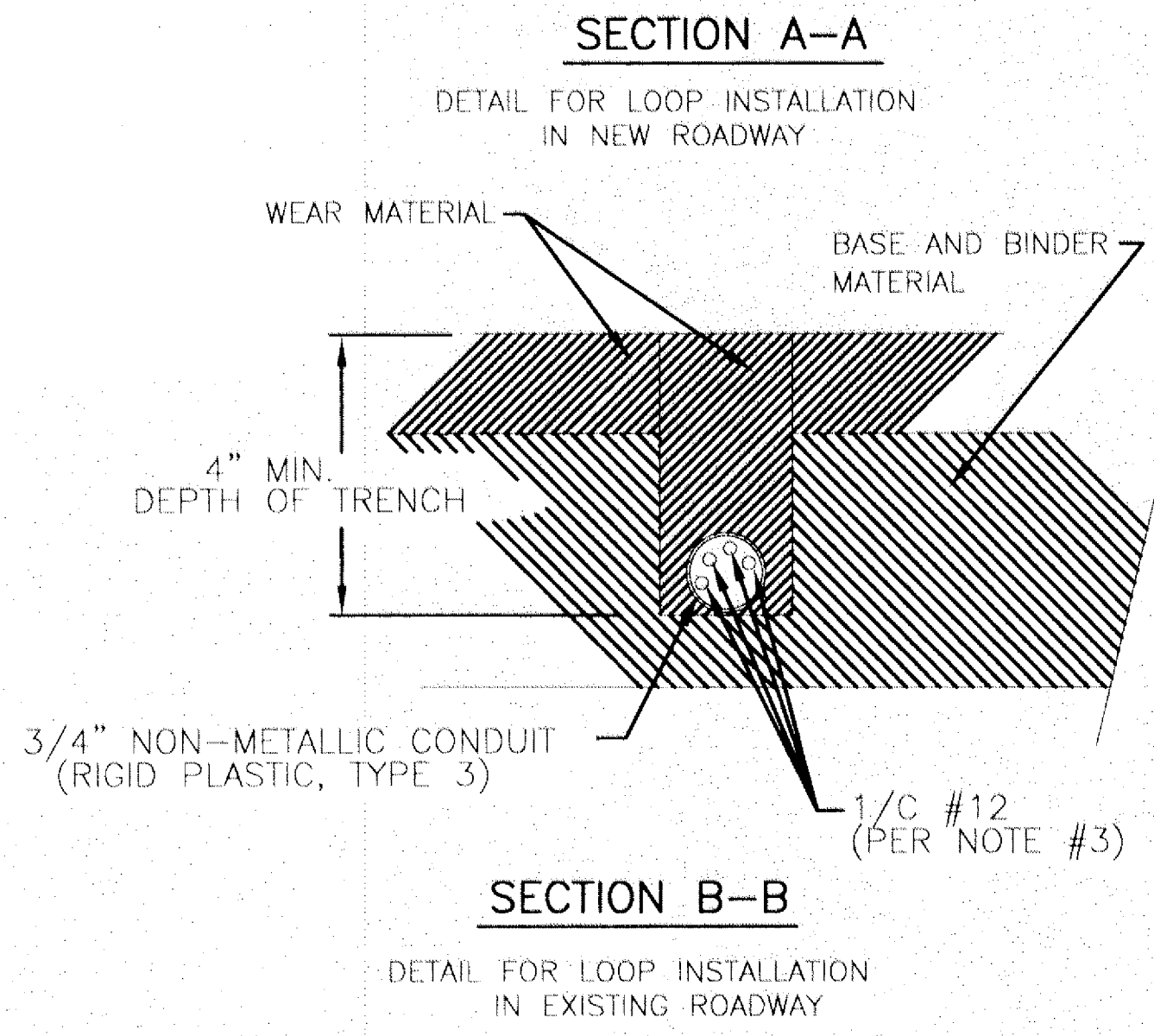
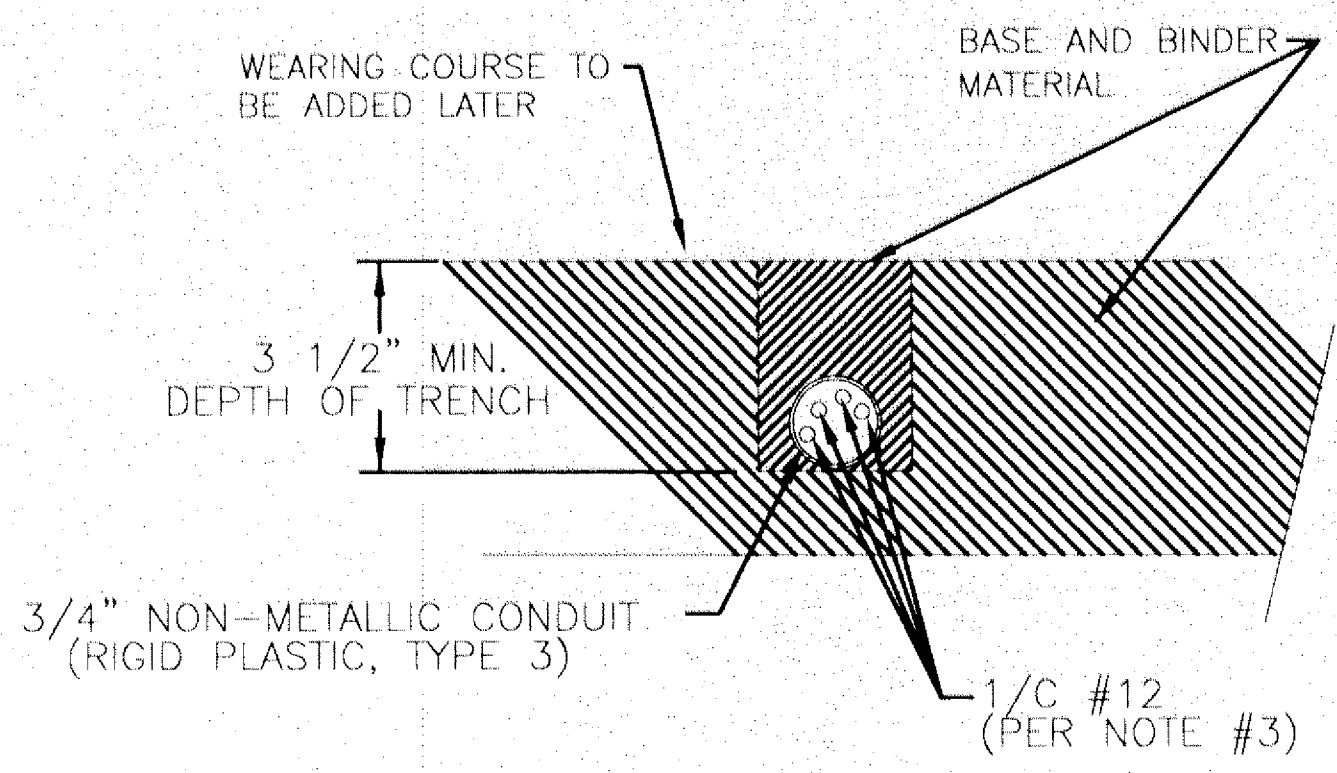
**LOOP DETECTOR DETAIL 'C'**  
(LOOP PHASING FOR SERIES CONNECTION)

LOOP CONNECTIONS SHALL BE LABELED AND SPLICED IN THE HANDHOLE AS FOLLOWS:

L1 TO 1A  
1B TO 2A  
2B TO L2

L1 TO 1A  
3B TO 4A  
1B TO 2A  
4B TO L2

SPLICE CONTROL CABLE TO L1 & L2 IN HANDHOLE. ALL CONDUCTORS SHALL BE TAGGED IN HANDHOLE (1A, 1B, ECT)



- LOOP DETECTOR WIRING**
- 1) ALL CORNERS SHALL BE 90° CONDUIT BENDS.
  - 2) CONNECT WIRES IN HANDHOLES USING SPLICE KIT METHOD DESCRIBED IN THE SPECIAL PROVISIONS.
  - 3) LOOP DETECTOR WIRES SHALL BE #12 AWG CROSSED LINKED POLYETHYLENE (XLP). SEE SPECIAL PROVISIONS.
  - 4) LOOP LEAD IN WIRES SHALL BE TWISTED A MIN. OF (5) TURNS PER FOOT THROUGH THE CONDUIT TO THE HANDHOLE.
  - 5) NMC DESIGNATES NON-METALLIC CONDUIT (SPEC. 3803)
  - 6) LOOPS 6' x 6' THRU 6' x 14' SHALL HAVE (4) TURNS.

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

STANDARD PLATES	
PLATE NO.	DESCRIPTION
8110D	TRAFFIC SIGNAL BRACKETING (POLE MOUNTED)
8114A	P.V.C. HANDHOLE/PULLBOX
8115D	PEDESTRIAN PUSH BUTTON INSTALLATION
8118C	SERVICE EQUIPMENT AND POLE-TRAFFIC CONTROL SIGNALS
8119C	GROUND MOUNTED CABINET FOUNDATION
8121D	TRANSFORMER BASE AND POLE BASE PLATE
8123D	POLE AND MAST ARM
8124E	MAST ARM SIGNAL HEAD MOUNTS
8126F	POLE FOUNDATION (PA90 AND PA100)

**LEGEND OF SYMBOLS**

CONTROLLER AND SERVICE EQUIP. NO's	(A)
SIGNAL BASE NO.	(1)
SIGNAL FACE NO.	(C)
LUMINAIRE NO.	(L)
CONTROLLER AND CABINET	(CAB)
CONTROLLER AND CABINET - IN PLACE	(CAB)
HANDHOLE	(H)
HANDHOLE - IN PLACE	(H)
RIGID STEEL CONDUIT (RSC)	(RSC)
RIGID STEEL CONDUIT (RSC) - IN PLACE	(RSC)
SIGNAL FACE WITH BACKGROUND SHIELD	(S)
SIGNAL FACE W/O BACKGROUND SHIELD	(S)
SIGNAL FACE - IN PLACE	(S)
PEDESTRIAN INDICATORS	(P)
PEDESTRIAN INDICATORS - IN PLACE	(P)
PEDESTRIAN PUSH BUTTONS ON PEDESTAL OR POLE	(P)
PEDESTRIAN PUSH BUTTON STATION	(P)
TRAFFIC SIGNAL PEDESTAL	(P)
TRAFFIC SIGNAL PEDESTAL - INPLACE	(P)
TRAFFIC SIGNAL POLE AND MAST ARM	(P)
TRAFFIC SIGNAL POLE AND MAST ARM - IN PLACE	(P)
STREET LIGHT POLE AND LUMINAIRE	(P)
STREET LIGHT POLE AND LUMINAIRE - IN PLACE	(P)
MAST ARM AND LUMINAIRE	(P)
MAST ARM AND LUMINAIRE - INPLACE	(P)
WOOD POLE	(P)
WOOD POLE - IN PLACE	(P)
SOURCE OF POWER	(P)
EMERGENCY VEHICLE PREEMPTION DETECTOR & LIGHT	(P)
RAILROAD SIGNAL - IN PLACE	(P)
RIGHT OF WAY LINE	(P)
CENTERLINE	(P)
EDGE OF ROADWAY	(P)
SHOULDERLINE	(P)
CURB LINE	(P)
STOP BAR	(P)

**ABBREVIATIONS**

3-1(EG) SIGNAL HEAD PHASE "3" - NO. "1"	P2-1(EG) PEDESTRIAN INDICATION PHASE "2" - NO. "1"
BR. GR. BARE GROUND	PB PUSH BUTTON
CH. SW. CHECK SWITCH	PB2-1(EG) PUSH BUTTON PHASE "2" - NO. "1"
CLR CLEAR	PEC PHOTOELECTRIC CELL
D2-1(EG) DETECTOR PHASE "2" - NO. "1"	PED PEDESTRIAN
DWK DON'T WALK	R RED
EQQ EQUIPMENT GROUND	R&S REMOVE AND SALVAGE
EVP EMERGENCY VEHICLE PRE-EMPTION	RLTA RED LEFT TURN ARROW
F&I FURNISH AND INSTALL	RRTA RED RIGHT TURN ARROW
FL FLASH/FLASHING	RSC RIGID STEEL CONDUIT
G GREEN	SOP SOURCE OF POWER
GLTA GREEN LEFT TURN ARROW	SPR SPARE
GRN GREEN	ST. LHT STREET LIGHT
GR. R GROUND ROD	STA STATION
GRTA GREEN RIGHT TURN ARROW	SW SWITCH
GTHA GREEN THRU ARROW	SWD SWITCHED
HH HANDHOLE	S&R SALVAGE AND REINSTALL
HPS HIGH PRESSURE SODIUM	TDW TELEPHONE DROP WIRE
JB JUNCTION BOX	WLK WALK
LUM LUMINAIRE	YEL YELLOW
NEU NEUTRAL	YLTA YELLOW LEFT TURN ARROW
NMC NONMETALLIC CONDUIT	YRTA YELLOW RIGHT TURN ARROW
	YTHA YELLOW THRU ARROW

**CONDUCTOR COLOR CODE**

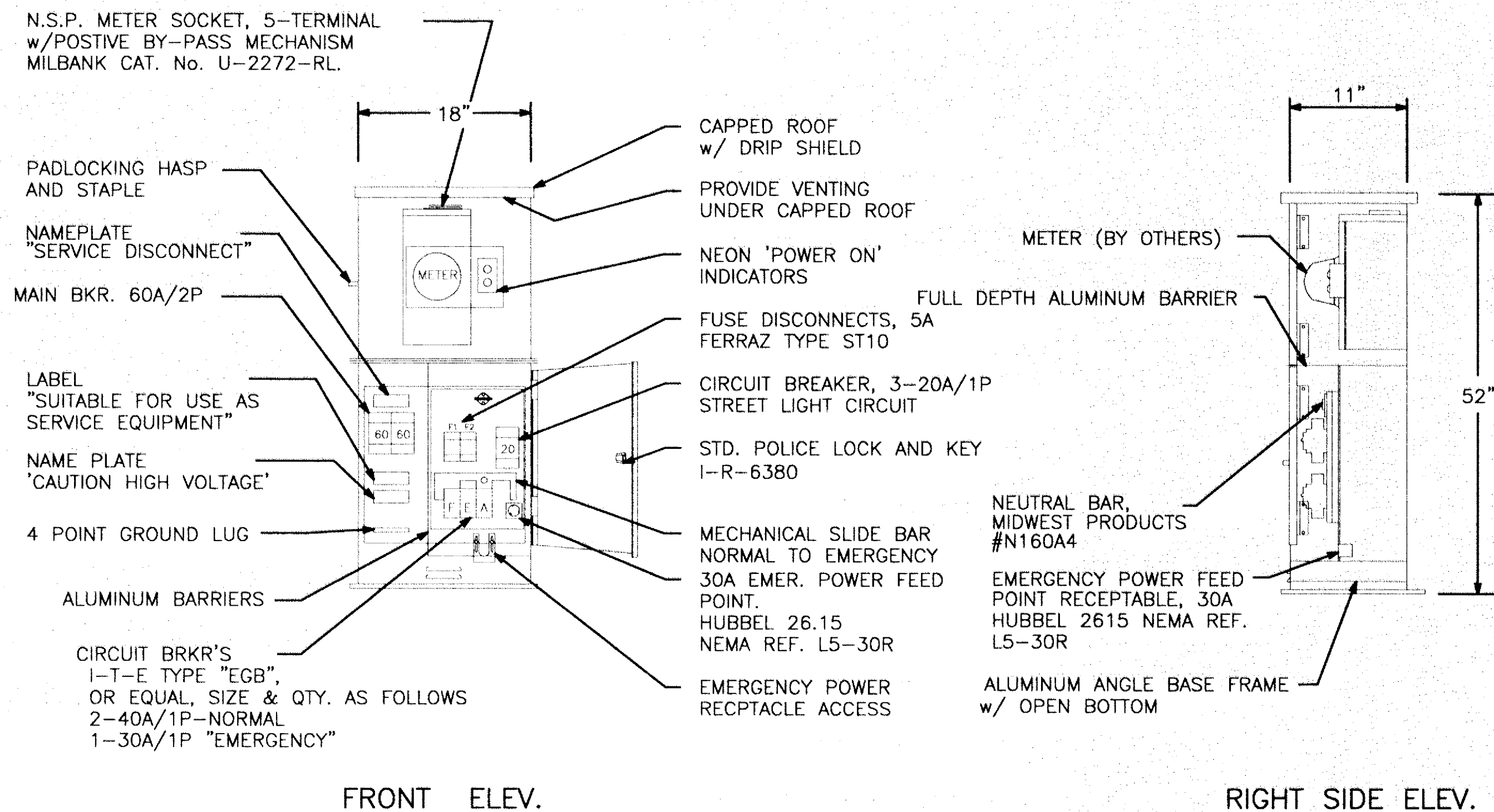
R	RED
O	ORANGE
BL	BLUE
WH	WHITE
R/BLK	RED WITH BLACK TRACER
O/BLK	ORANGE WITH BLACK TRACER
BL/BLK	BLUE WITH BLACK TRACER
WH/BLK	WHITE WITH BLACK TRACER
BLK	BLACK
BLK/WH	BLACK WITH WHITE TRACER
G/BLK	GREEN WITH BLACK TRACER
G	GREEN

DWG: K:\PROJECTS\G-M\INLAKES\1242601\AIR SIGNALS\DETAILS.DWG XREF: PLOT DATE: XXXX FIELD BOOK:

DESIGNED: JMG DRAWN: JMG CHECKED: BDP DATE: JAN 28, 2002		I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. <b>Brent D. Paulsen</b> BRENT D. PAULSEN LIC. NO. 26880		<b>TKDA</b> ENGINEERS • ARCHITECTS • PLANNERS TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED SAINT PAUL, MINNESOTA		LAKE DRIVE APOLLO DRIVE IMPROVEMENTS MINNESOTA		TRAFFIC CONTROL SIGNAL SYSTEM SIGNAL DETAILS SHEET NO. 26 OF 46 SHEETS		COMMISSION NO. 12426-01	
NO.	DATE	BY	DESCRIPTION OF REVISIONS								

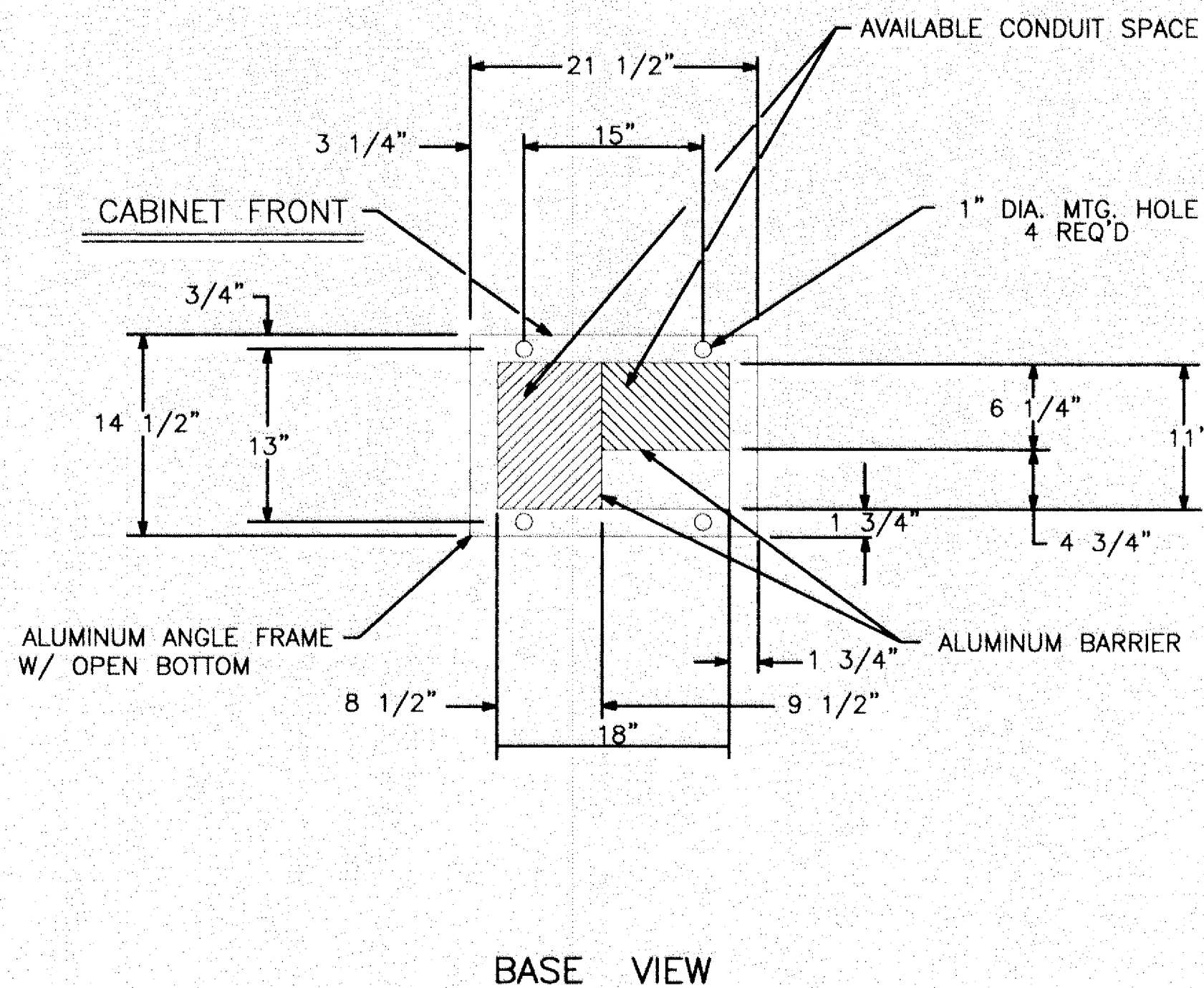


**SIGNAL SERVICE CABINET**



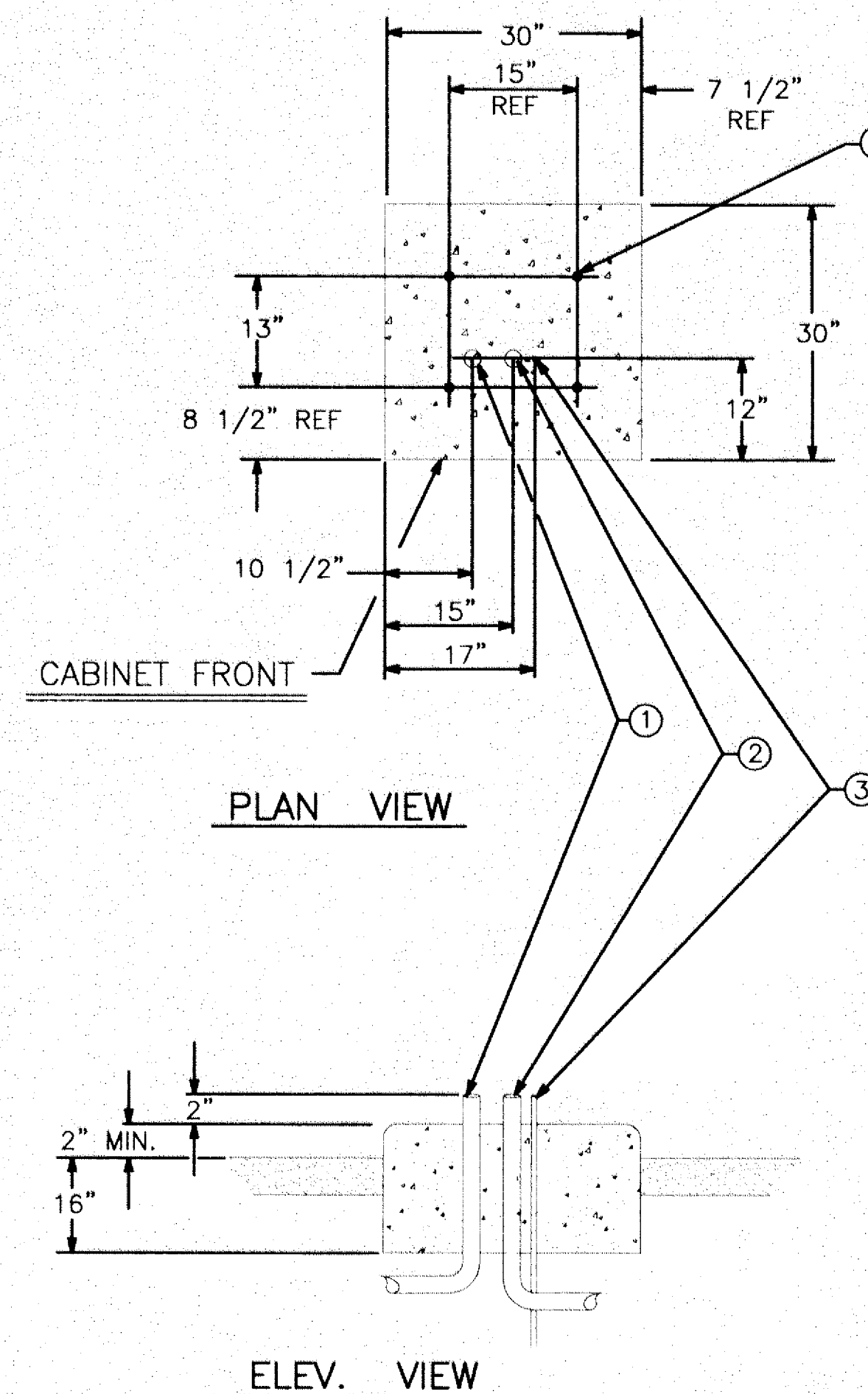
**CONSTRUCTION NOTES**

ENCLOSURE SHALL BE FABRICATED FROM 1/8" TYPE 5052 H32 ALUMINUM FOR OUTDOOR WEATHER PROOF SERVICES. DOORS AND BASE TO BE GASKETED, ALL HINGES, PINS AND LOCKS TO BE OF NON CORRODING CONSTRUCTION. CABINET TO BE ANNOZIZED CLEAR.  
 ENCLOSURE SHALL BE 'UL' APPROVED

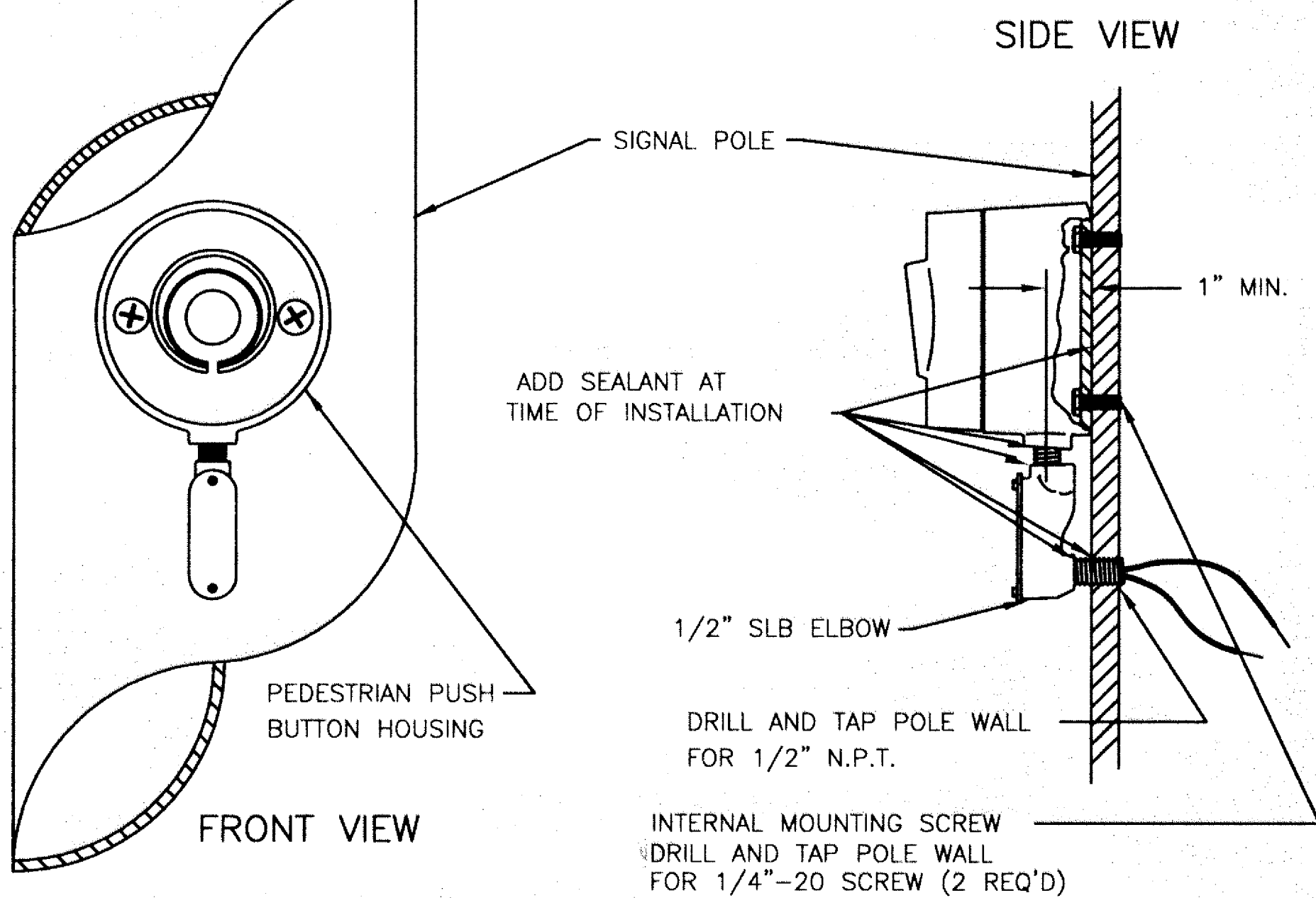


- ① 2" RSC TO HANDHOLE (FOR SOP)
- △ ② 2" RSC TO CONTROLLER CABINET
- ③ GROUNDING ROD
- △ ④ ANCHOR BOLT LOCATIONS (4 REQUIRED)

**△ SERVICE CABINET FOUNDATION**



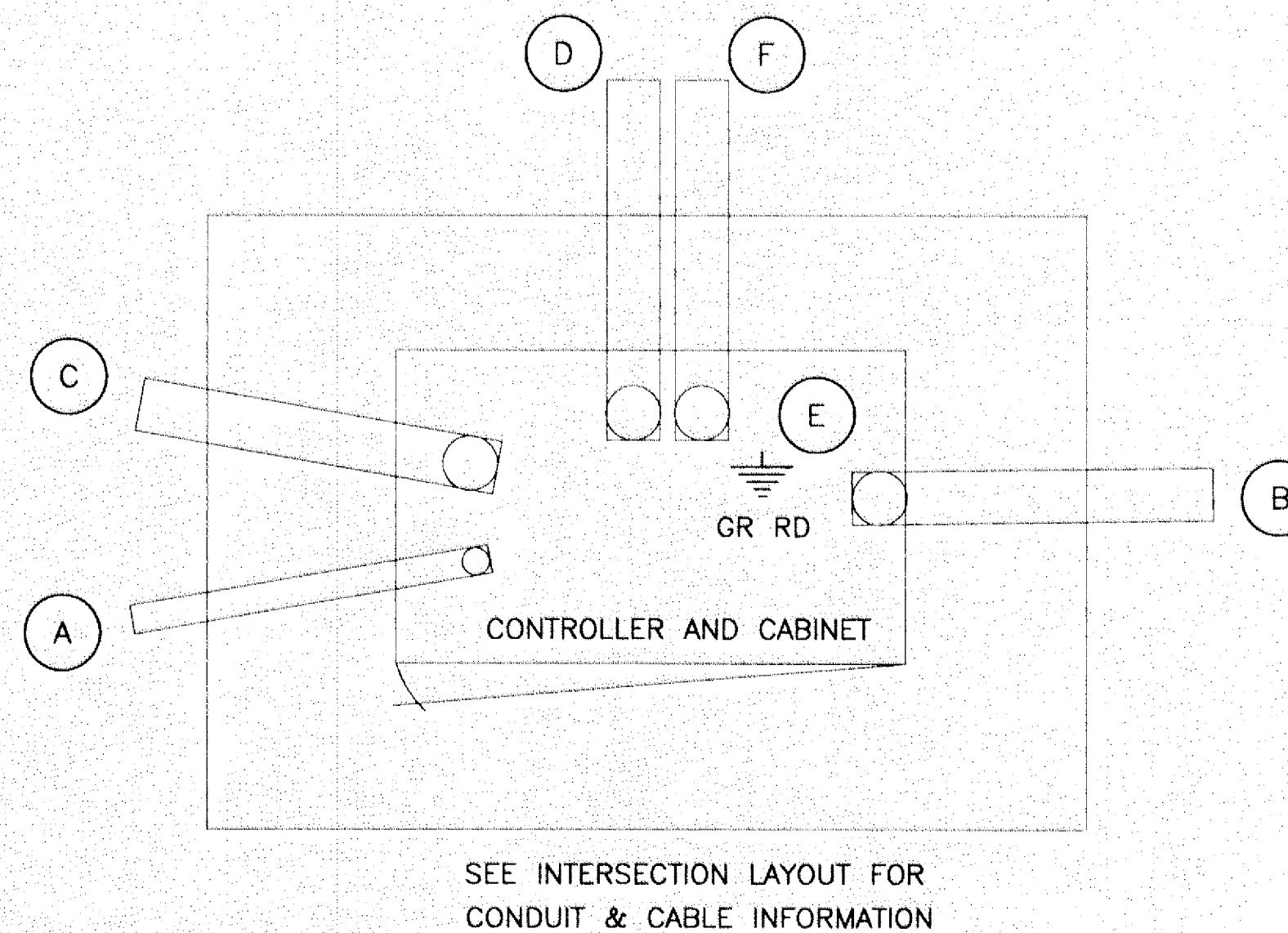
**MAST ARM POLE PEDESTRIAN PUSH BUTTON DETAIL**



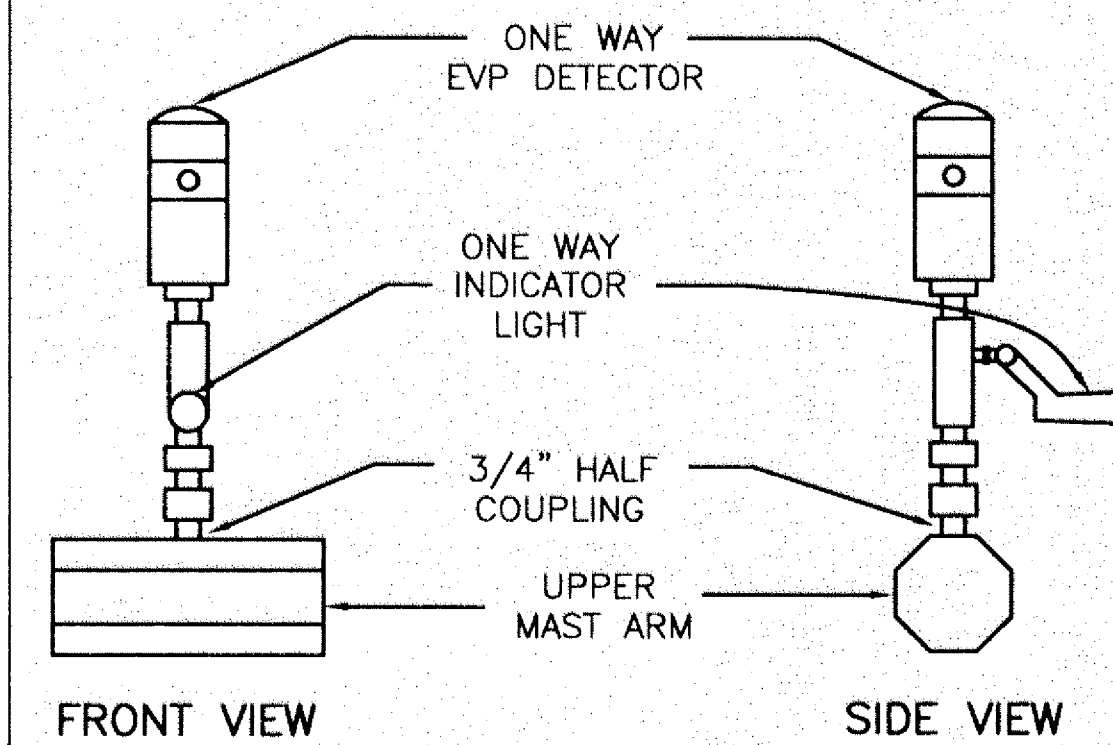
- △ (A) 2" R.S.C. FOR SERVICE CONNECTION (VIA HH)
- (B) 4" R.S.C. TO HH
- (C) 4" R.S.C. TO HH
- (D) 3" R.S.C. STUBOUT, THREAD & CAP BOTH ENDS (FOR FUTURE USE).
- (E) 5/8" DIA X 15' GROUND ROD
- (F) 3" R.S.C. STUBOUT, THREAD & CAP BOTH ENDS (FOR FUTURE USE).

CONCRETE FOUNDATION  
 SEE MN/DOT STANDARD PLATE NO. 8119C FOR DIMENSIONS.

**TYPICAL CONTROLLER CABINET PAD LAYOUT**  
 NO SCALE



**EVP DETECTOR AND LIGHT MOUNTING DETAIL ON MAST ARM**



DWG. K:\PROJECTS\G-M\LINOLAKES\01242601\_AIR\SIGNALS\DETAILS.DWG  
 XREF:  
 PLOT DATE: XXXX  
 FIELD BOOK:

△	2/26/02	BP	REVISE DETAIL
△	2/26/02	BP	REVISE 1 1/4" RSC TO 2" RSC
△	2/26/02	BP	REVISE NOTE
△	2/26/02	BP	REVISE 1 1/4" RSC TO 2" RSC
NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED: JMG  
 DRAWN: JMG  
 CHECKED: BDP  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
 Brent D. Paulsen  
 JAN 28, 2002  
 BRENT D. PAULSEN LIC. NO. 26880

**TKDA**

ENGINEERS • ARCHITECTS • PLANNERS

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

LINO LAKES

MINNESOTA

TRAFFIC CONTROL SIGNAL SYSTEM

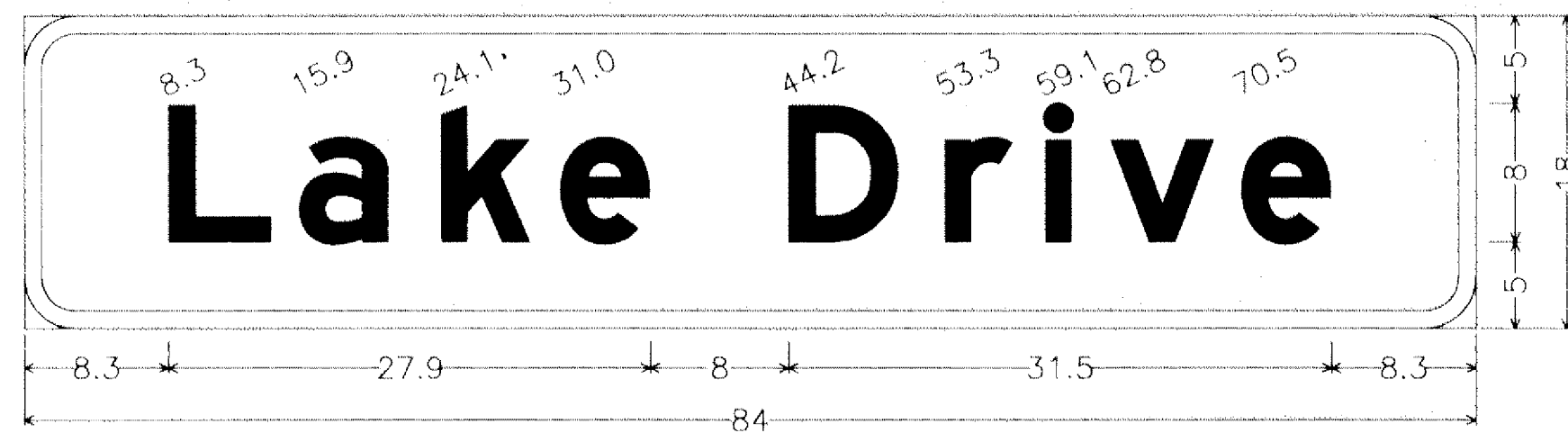
SIGNAL DETAILS

SHEET NO. 27 OF 46 SHEETS

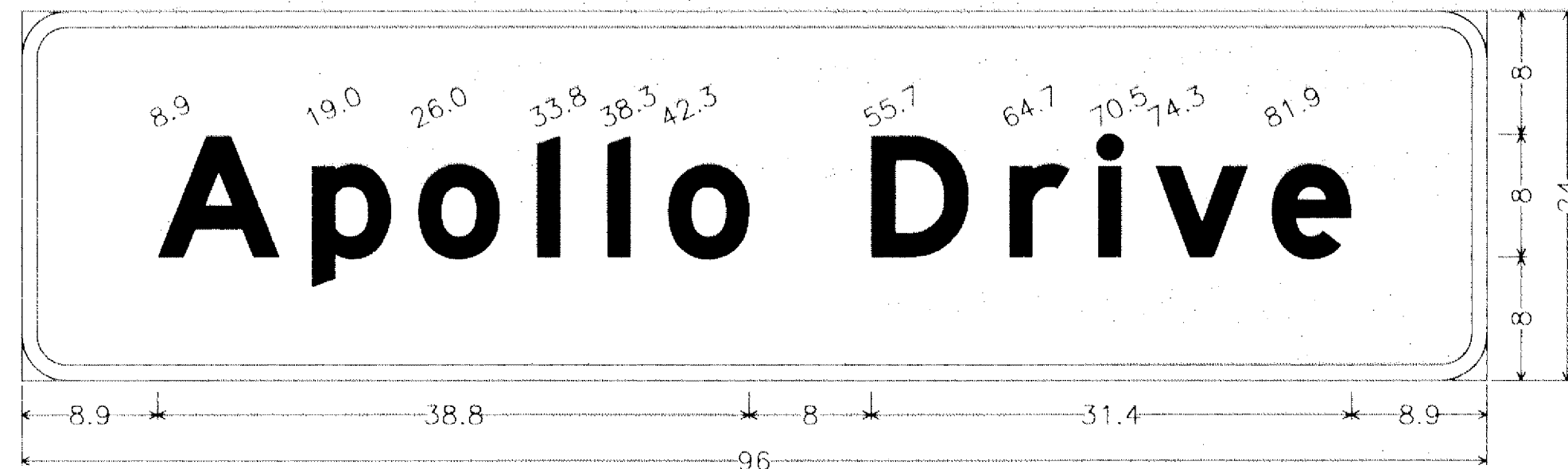
COMMISSION NO.

12426-01

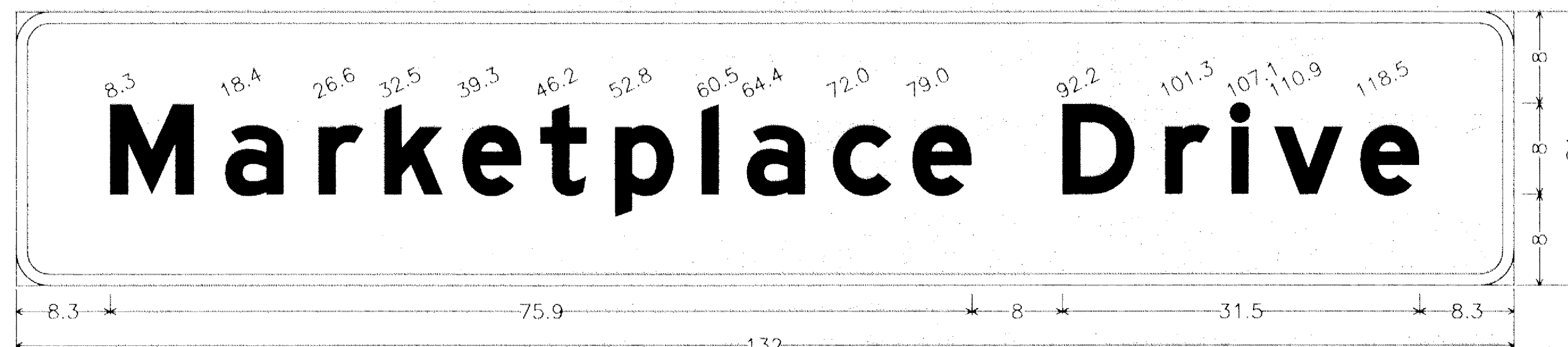




D-1; 3.0" Radius, 1.0" Border, White on Green;  
[Lake Drive] E Mod;



D-3; 3.0" Radius, 1.0" Border, White on Green;  
[Apollo Drive] E Mod;

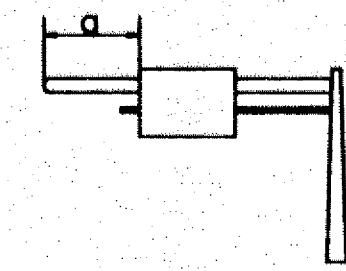


D-2; 3.0" Radius, 1.0" Border, White on Green;  
[Marketplace Drive] E Mod;

TYPE "D" SIGNS - F & I								
SIGNAL SYSTEM	SIGN PANEL	SIZE (inches)	NO. REQ.	NO. POSTS PER SIGN	POST SPACING (inches)	AREA (sq.ft.) PER SIGN	POLE NO.	a
A	D-1	84x18	1	2	54"	10.50	2	37'
A	D-1	84x18	1	2	54"	10.50	4	26'
A	D-2	96x24	1	2	54"	16.00	1	28'
A	D-2	96x24	1	2	54"	16.00	3	28'
B	D-1	84x18	1	2	54"	10.50	3	10'
B	D-3	132x24	1	3	45"	22.00	2	26'
B	D-3	132x24	1	3	45"	22.00	4	18'

TYPE "C" SIGNS - F & I								
SIGNAL SYSTEM	SIGN PANEL	SIZE (inches)	NO. REQ.	NO. POSTS PER SIGN	POST SPACING (inches)	AREA (sq.ft.) PER SIGN	POLE NO.	a
A	R6-1L	36x12	4	①	-	3.00	1,2,3,4	-
A	R6-1R	36x12	4	①	-	3.00	1,2,3,4	-
A	R9-3a	18x18	4	①	-	2.25	1,3,4	-
B	R6-1L	36x12	1	①	-	3.00	2	-
B	R6-1R	36x12	1	①	-	3.00	4	-
B	R9-3a	18x18	4	①	-	2.25	1,2,3,4	-

MAST ARM MOUNTED SIGNING



NOTES:

- 1) TYPE "D" SIGN COLOR-WHITE LEGEND AND BORDER ON GREEN BACKGROUND, FULLY REFLECTORIZED.
- 2) CORNERS EXTENDING BEYOND THE BORDER SHALL NOT BE TRIMMED.
- 3) FOR STRUCTURAL DETAILS, TYPE "C" AND "D" SIGNS, SEE DETAILS AND STANDARD SIGNS MANUAL.
- 4) FOR TYPE "D" STRINGER AND PANEL-JOINT DETAIL, SEE DETAILS AND STANDARD SIGNS MANUAL.
- 5) TYPE "C" AND "D" SIGN PANELS SHALL BE FURNISHED AND INSTALLED BY SIGNAL CONTRACTOR INCIDENTAL TO ITEM NO. 2565.511 FOR SIGNAL SYSTEM.
- 6) ① = MOUNT SIGN PANEL ON TRAFFIC SIGNAL MAST ARM POLE.

D:\PROJECTS\G-M\INDIANES\1242601\AIR SIGNALS\DETAIL3.DWG  
XREF  
PLOT DATE: XXXX  
FIELD BOOK

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED JMC  
DRAWN JMC  
CHECKED BDP

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Brent D. Paulsen* JAN 28, 2002  
BRENT D. PAULSEN LIC. NO. 26880

**TKDA**  
ENGINEERS • ARCHITECTS • PLANNERS  
10117 KING, DUVAL, ANDERSON AND ASSOCIATES INCORPORATED  
SAINT PAUL, MINNESOTA

LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS  
MINNESOTA

TRAFFIC CONTROL SIGNAL SYSTEM  
TRAFFIC SIGNAL SIGNING DETAILS  
SHEET NO. 28 OF 46 SHEETS

COMMISSION NO.  
12426-01



LOOP DETECTORS			
NUMBER	SIZE (FT.)	FUNCTION	LOCATION
D1-1	6x6	1	40
D1-2	6x6	1	10
D2-1	6x6	1	400
D2-2	6x6	1	400
D3-1	2-6x6	1	4 & 34
D3-2	2-6x6	1	-5 & 19
D4-1	6x6	3,8	180
D4-2	6x6,6x10	7	AS SHOWN
D5-1	6x6	1	40
D5-2	6x6	1	10
D6-1	6x6	1	400
D6-2	6x6	1	400
D7-1	2-6x6	1	4 & 34
D7-2	2-6x6	1	-5 & 19
D8-1	6x6	3,8	120
D8-2	6x6,6x10	7	AS SHOWN
D8-3	2-6x6	1	5

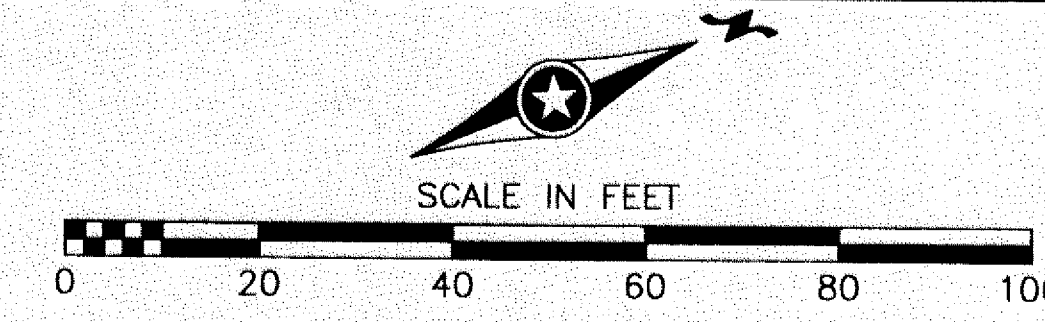
**LOOP DETECTOR FUNCTIONS**

- 1) CALL AND EXTEND
  - 3) EXTEND ONLY
  - 7) DELAY CALL/IMMEDIATE EXTEND
  - 8) CARRY OVER (STRETCH)
- LOCATION = DISTANCE FROM STOP LINE TO DETECTOR IN FEET

③

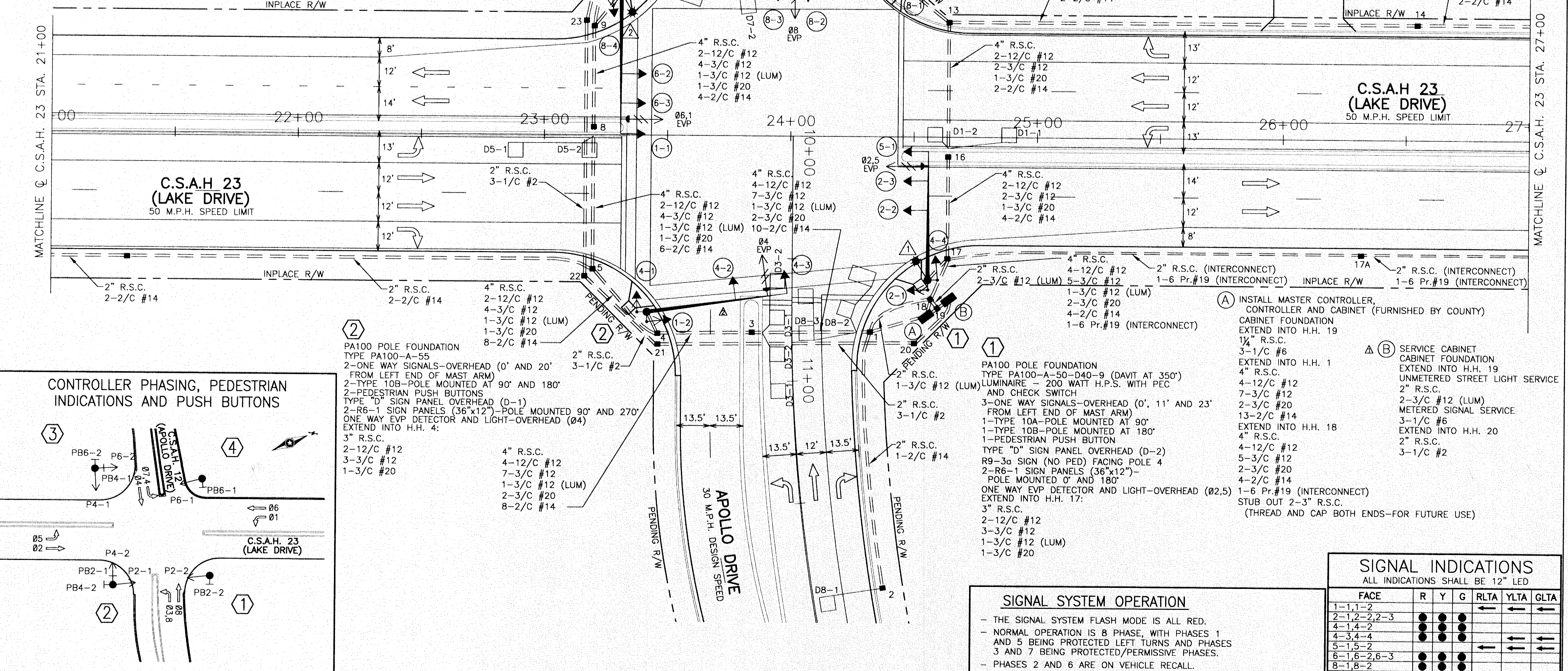
PA100 POLE FOUNDATION  
 TYPE PA100-A-55-D40-9 (DAVIT AT 350')  
 LUMINAIRE - 200 WATT H.P.S. WITH PEC AND CHECK SWITCH  
 3-ONE WAY SIGNALS OVERHEAD (0', 11' AND 23' FROM LEFT END OF MAST ARM)  
 2-TYPE 10B-POLE MOUNTED AT 90° AND 180°  
 2-PEDESTRIAN PUSH BUTTONS  
 TYPE "D" SIGN PANEL OVERHEAD (D-2)  
 2-R6-1 SIGN PANELS (36"x12")-POLE MOUNTED 0° AND 180°  
 ONE WAY EVP DETECTOR AND LIGHT-OVERHEAD (Ø6,1)  
 EXTEND INTO H.H. 9:  
 3" R.S.C.  
 2-12/C #12  
 4-3/C #12  
 1-3/C #12 (LUM)  
 1-3/C #12 (LUM)  
 1-3/C #20

SOP  
 INPLACE: POLE MOUNTED TRANSFORMER  
 F&I: 2" R.S.C. RISER WITH WEATHERHEAD  
 UP INPLACE UTILITY POLE  
 EXTEND INTO H.H. 23  
 2" R.S.C.  
 3-1/C #2

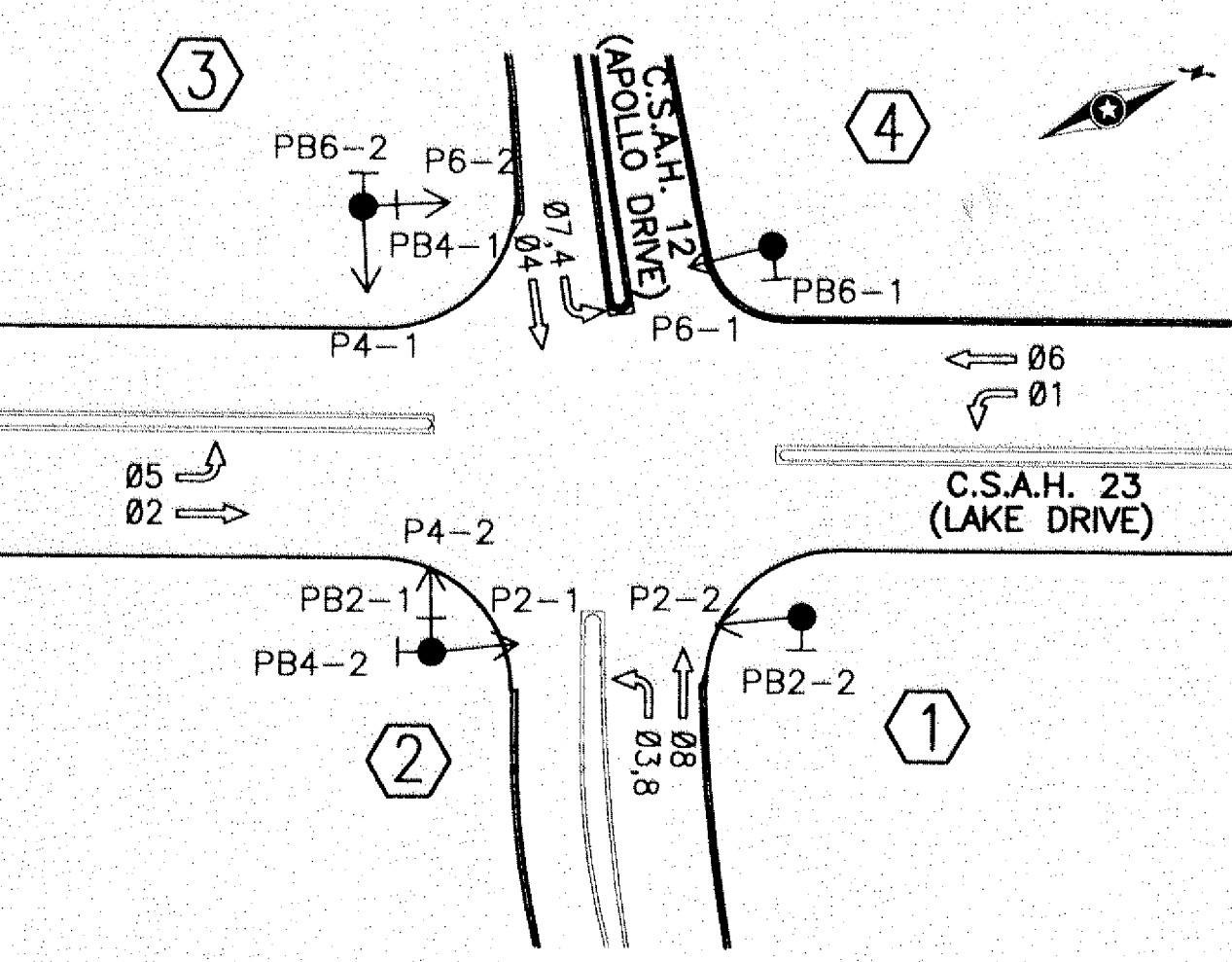


**NOTES:**

- 1) LOCATION OF POLES, FOUNDATIONS, LOOP DETECTORS AND HANDHOLES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
- 2) EACH SIGNAL FACE SHALL HAVE A BACKGROUND SHIELD.
- 3) ALL VEHICLE INDICATIONS AND ALL PEDESTRIAN SIGNAL INDICATIONS SHALL BE LED.
- 4) FOR SERVICE CABINET DETAILS SEE SHEET NO. 27
- 5) FOR NMC LOOP DETAILS SEE SHEET NO. 26
- 6) FOR SIGN DETAILS SEE SHEET NO. 28
- 7) (INTERCONNECT) DENOTES ITEMS TO BE MEASURED AND PAID FOR SEPARATELY UNDER FROM 2565.511.



**CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS**



- ① INSTALL MASTER CONTROLLER, CONTROLLER AND CABINET (FURNISHED BY COUNTY)  
 CABINET FOUNDATION  
 EXTEND INTO H.H. 19  
 1 1/4" R.S.C.  
 3-1/C #6  
 4" R.S.C.  
 4-12/C #12  
 7-3/C #12  
 2-3/C #20  
 13-2/C #14  
 EXTEND INTO H.H. 18  
 4" R.S.C.  
 4-12/C #12  
 5-3/C #12  
 2-3/C #20  
 4-2/C #14  
 1-6 Pr.#19 (INTERCONNECT)  
 STUB OUT 2-3" R.S.C.  
 (THREAD AND CAP BOTH ENDS-FOR FUTURE USE)
- ② SERVICE CABINET  
 CABINET FOUNDATION  
 EXTEND INTO H.H. 19  
 UNMETERED STREET LIGHT SERVICE  
 2" R.S.C.  
 2-3/C #12 (LUM)  
 METERED SIGNAL SERVICE  
 3-1/C #6  
 EXTEND INTO H.H. 20  
 2" R.S.C.  
 3-1/C #2

**SIGNAL SYSTEM OPERATION**

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 8 PHASE, WITH PHASES 1 AND 5 BEING PROTECTED LEFT TURNS AND PHASES 3 AND 7 BEING PROTECTED/PERMISSIVE PHASES.
- PHASES 2 AND 6 ARE ON VEHICLE RECALL.

SIGNAL INDICATIONS						
ALL INDICATIONS SHALL BE 12" LED						
FACE	R	Y	G	RLTA	YLTA	GLTA
1-1,1-2	●	●	●	←	←	←
2-1,2-2,2-3	●	●	●	←	←	←
4-1,4-2	●	●	●	←	←	←
4-3,4-4	●	●	●	←	←	←
5-1,5-2	●	●	●	←	←	←
6-1,6-2,6-3	●	●	●	←	←	←
8-1,8-2	●	●	●	←	←	←
8-3,8-4	●	●	●	←	←	←

DWG: K:\PROJECTS\G-4\UNILAKES\1242601\AIR SIGNALS\SHEET.DWG  
 XREF:  
 PLOT DATE: XXXX  
 FIELD BOOK:

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	REVISE NOTE
2	2/26/02	BP	REVISE ANGLE AT MAST ARM
3	2/26/02	BP	REVISE LOOP DETECTOR FUNCTION

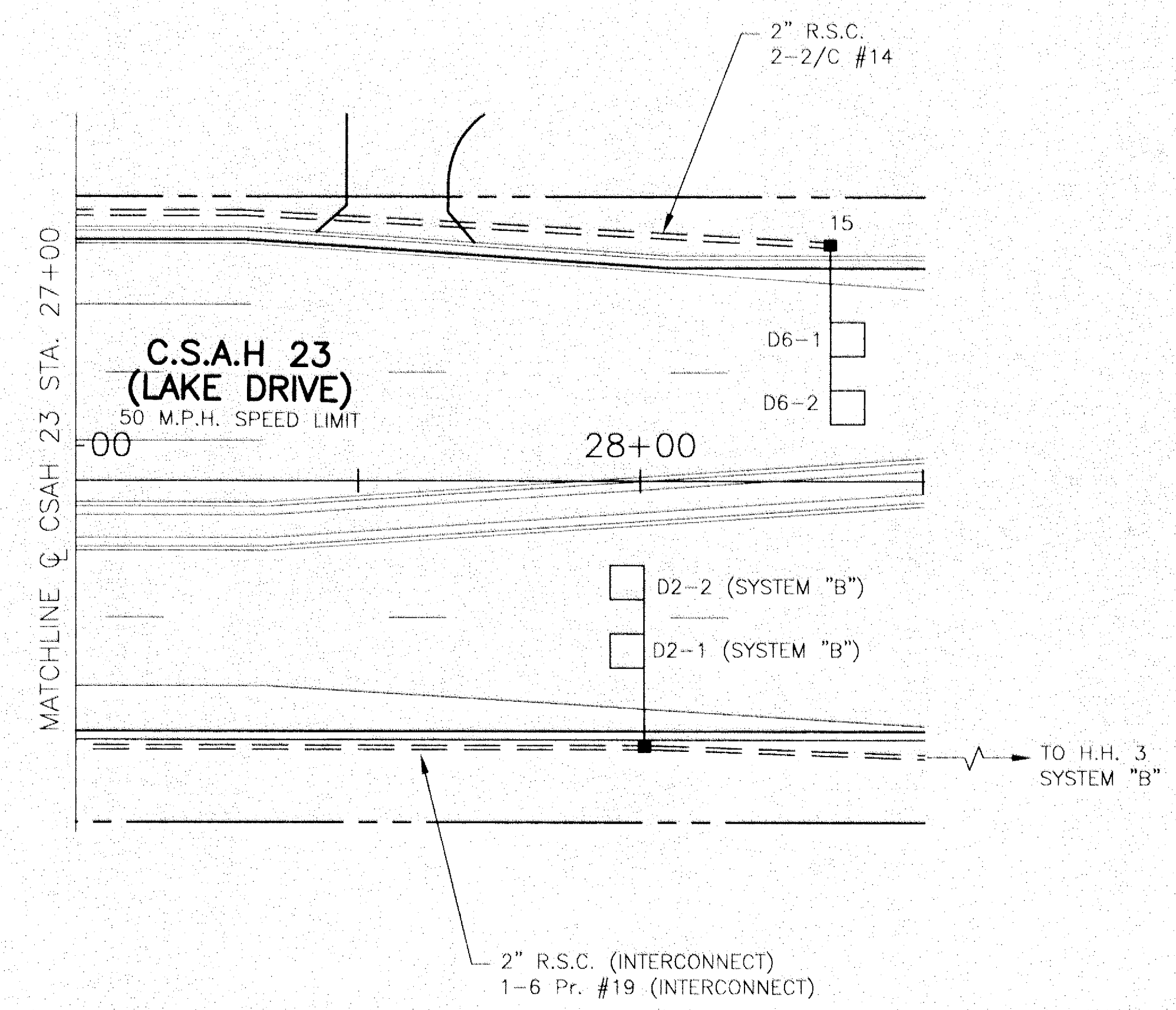
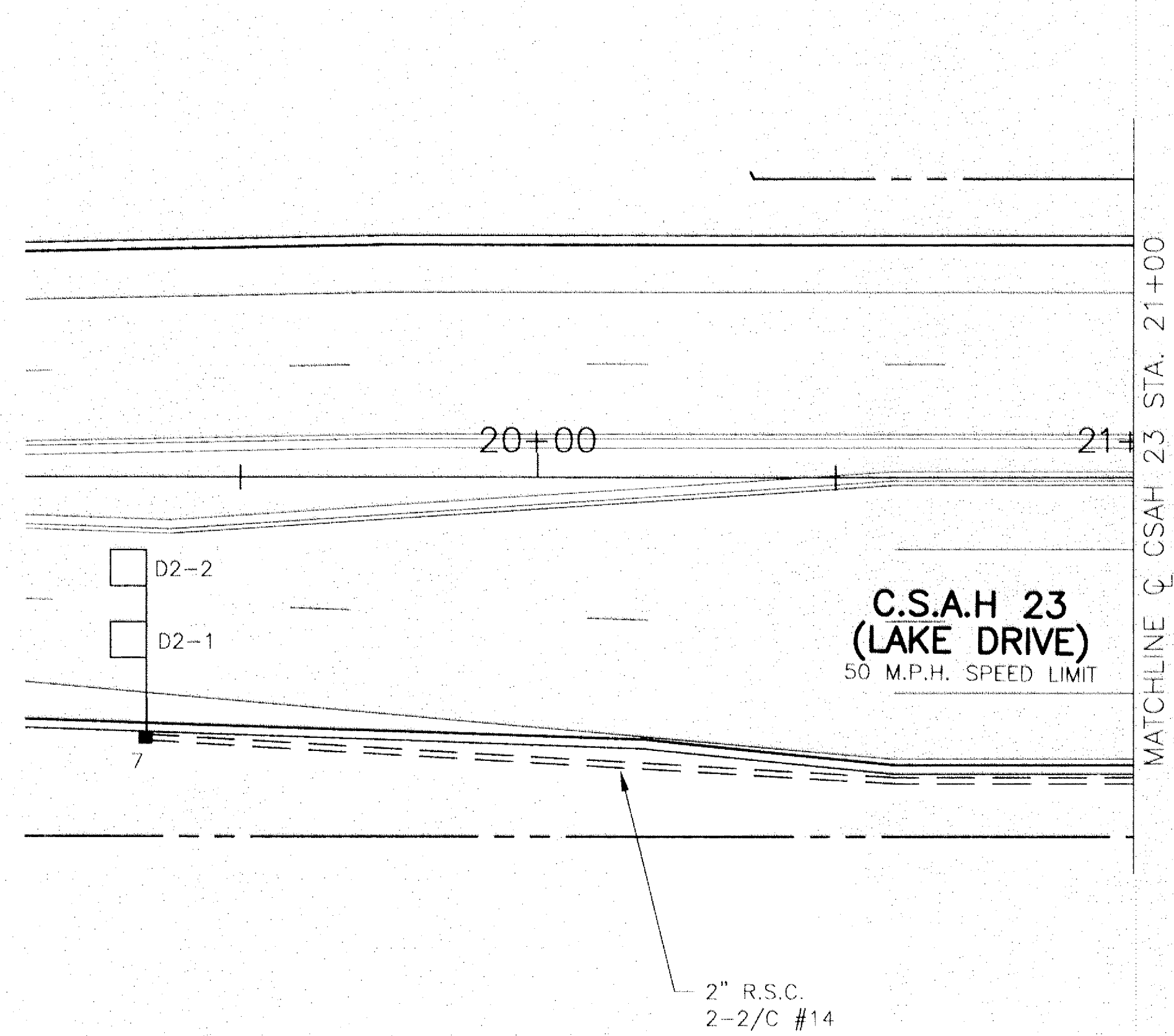
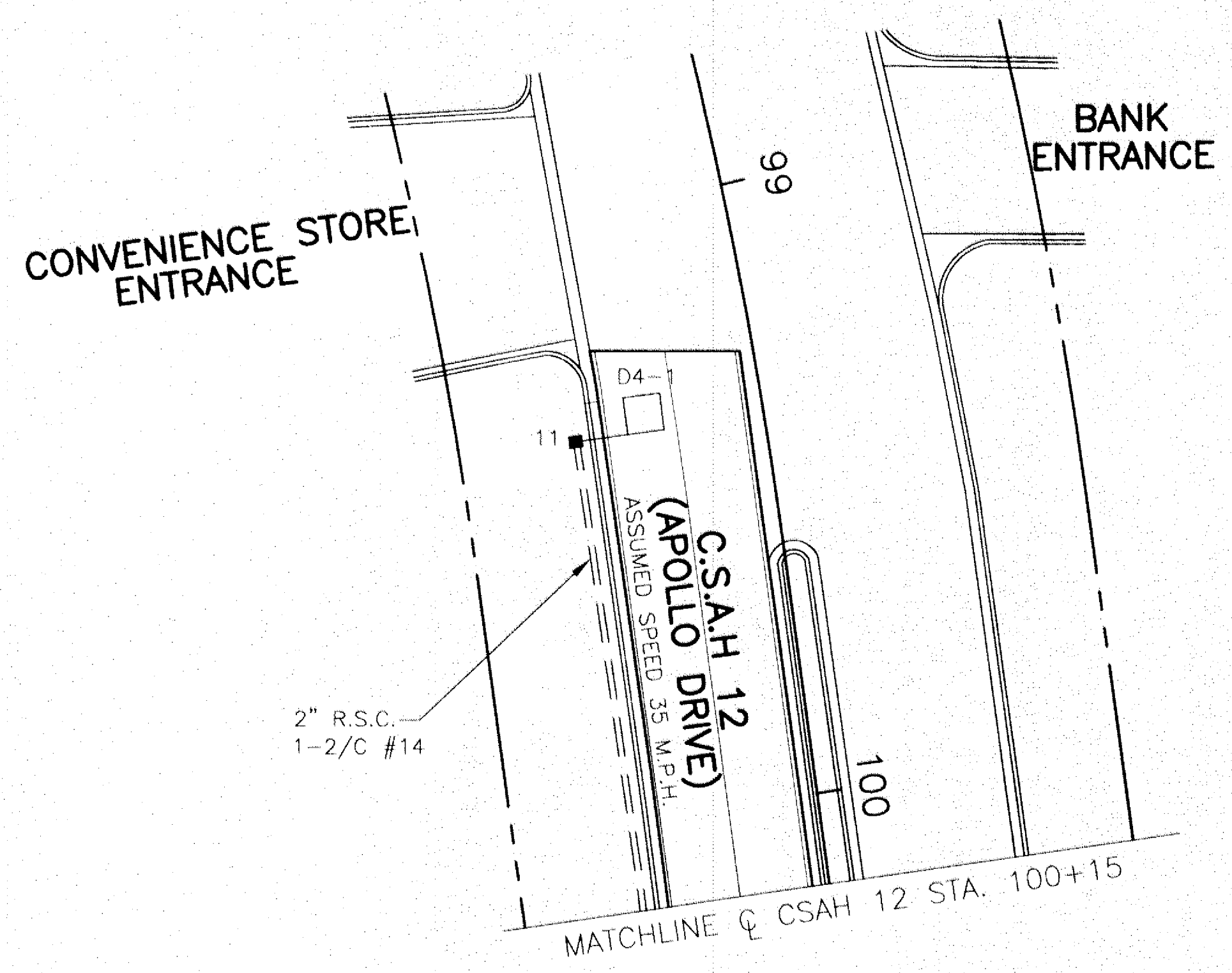
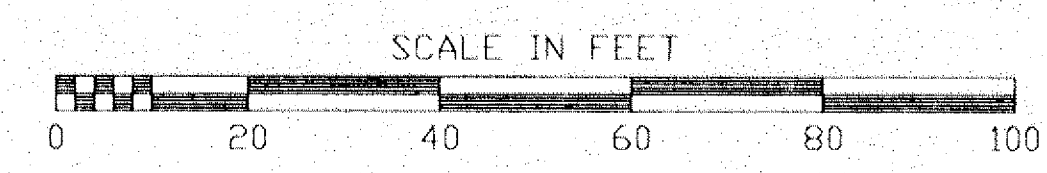
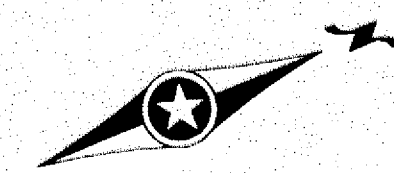
DESIGNED: JMG  
 DRAWN: JMG  
 CHECKED: BDP  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Brent D. Paulsen* JAN 28, 2002  
 BRENT D. PAULSEN LIC. NO. 26880

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

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 LINO LAKES MINNESOTA

**TRAFFIC CONTROL SIGNAL SYSTEM  
 INTERSECTION LAYOUT  
 SYSTEM "A"**  
 SHEET NO. 29 OF 46 SHEETS  
 COMMISSION NO. 12426-01





DWG: K:\PROJECTS\G-M\LINLAKES\01242601\AR SIGNALS\SHEET2.DWG  
 XREF:  
 PLOT DATE: XXXX  
 FIELD BOOK:

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED: JMC  
 DRAWN: JMC  
 CHECKED: BDP

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Brent D. Paulsen*  
 BRENT D. PAULSEN LIC. NO. 25880

**TKDA**  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
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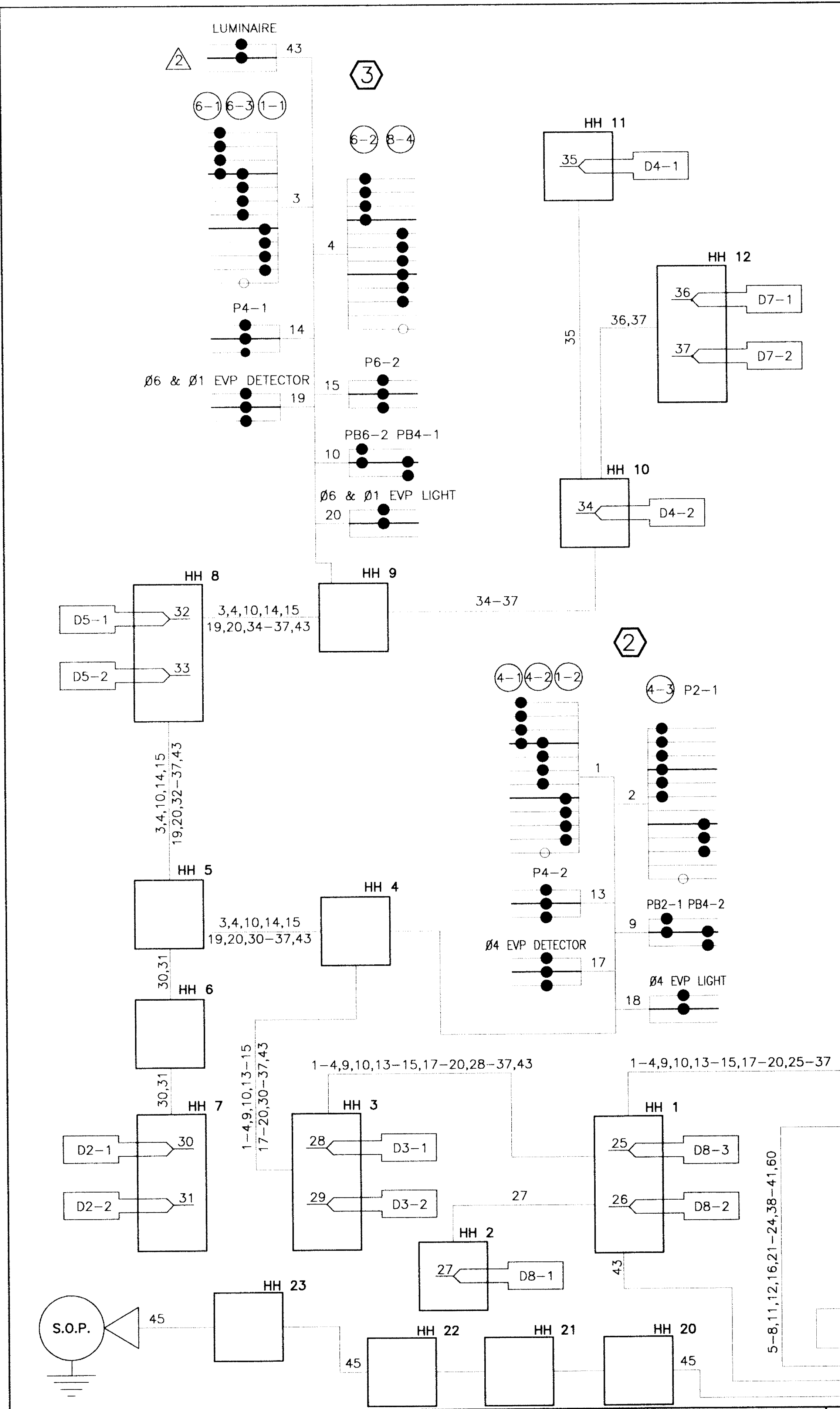
LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA

TRAFFIC CONTROL SIGNAL SYSTEM  
 MATCHLINES  
 SYSTEM "A"  
 SHEET NO. 30 OF 46 SHEETS

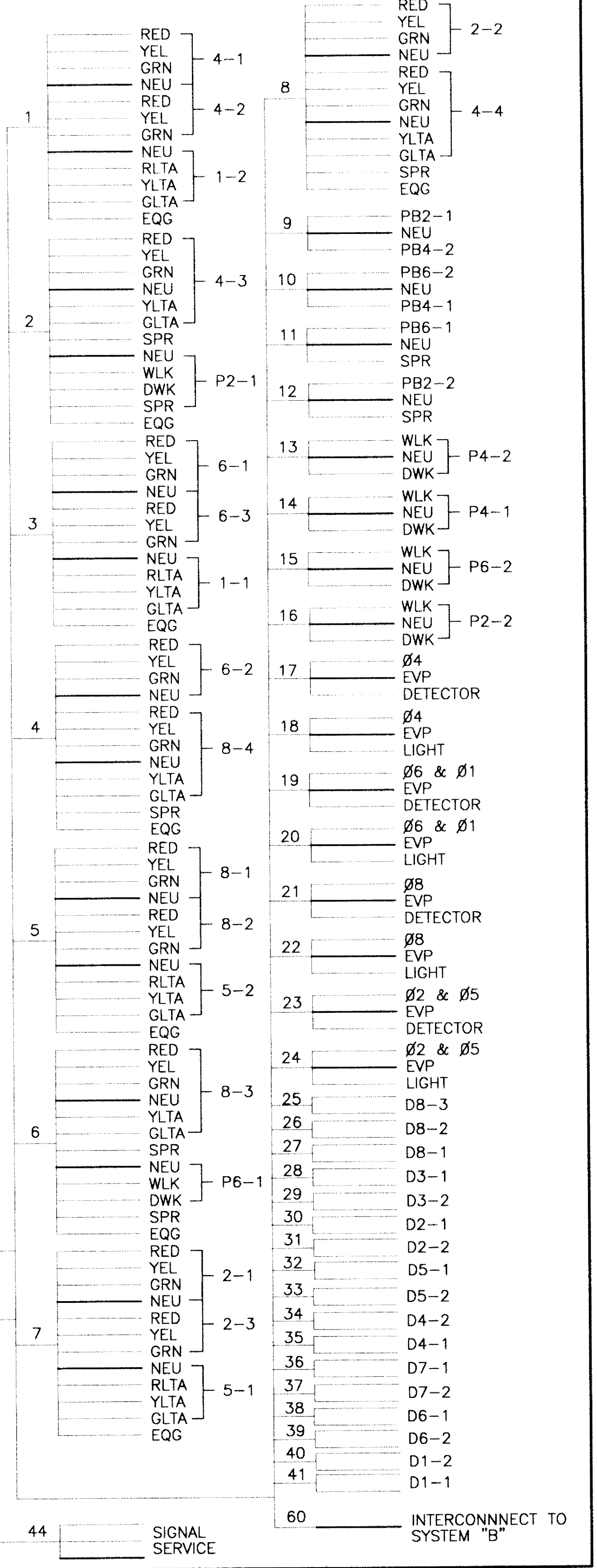
COMMISSION NO.  
 12426-01



DWG: K:\PROJECTS\G-M\LINO LAKES\C1242601\AIR SIGNALS\SHEET3.DWG  
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 PLOT DATE: XXXX  
 FIELD BOOK:



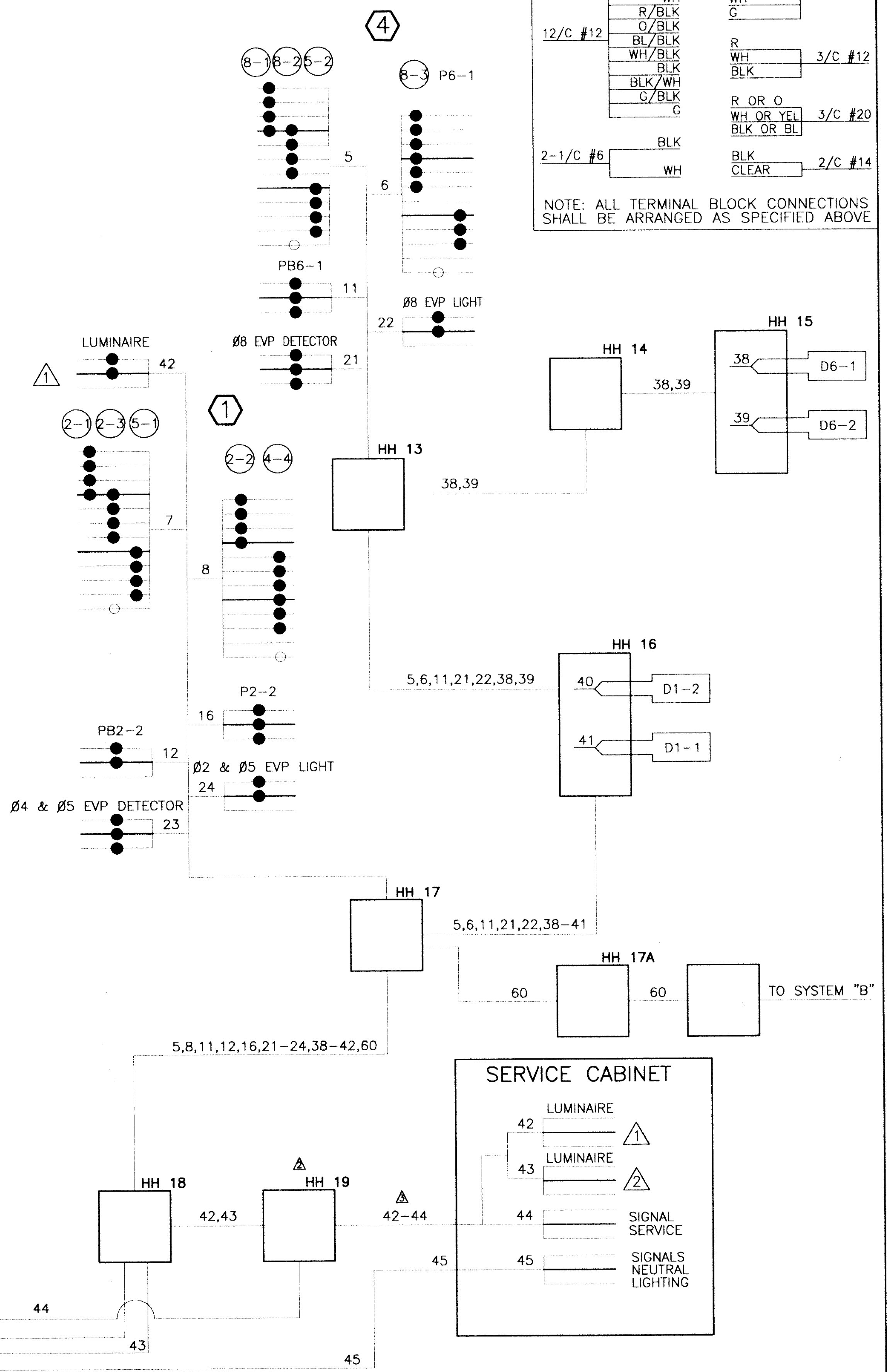
### CONTROLLER CABINET



### CONDUCTOR COLOR CODING

R	R
O	O
BL	BL
WH	WH
R/BLK	5/C #12
O/BLK	
BL/BLK	
WH/BLK	R
BLK	WH
BLK/WH	3/C #12
G/BLK	BLK
G	R OR O
	WH OR YEL
	3/C #20
	BLK OR BL
2-1/C #6	BLK
	WH
	2/C #14
	CLEAR

NOTE: ALL TERMINAL BLOCK CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE



NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	ADDED CHART
2	2/26/02	BP	ADDED HAND HOLE
3	2/26/02	BP	ADDED CONDUIT

DESIGNED: JMG  
 DRAWN: JMG  
 CHECKED: JEB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 JAMES E. BUDKE  
 JAN 28, 2002  
 LIC. NO. 2943

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

TRAFFIC CONTROL SIGNAL SYSTEM  
 WIRING DIAGRAM—SYSTEM "A"  
 SHEET NO. 31 OF 46 SHEETS  
 COMMISSION NO. 12426-01

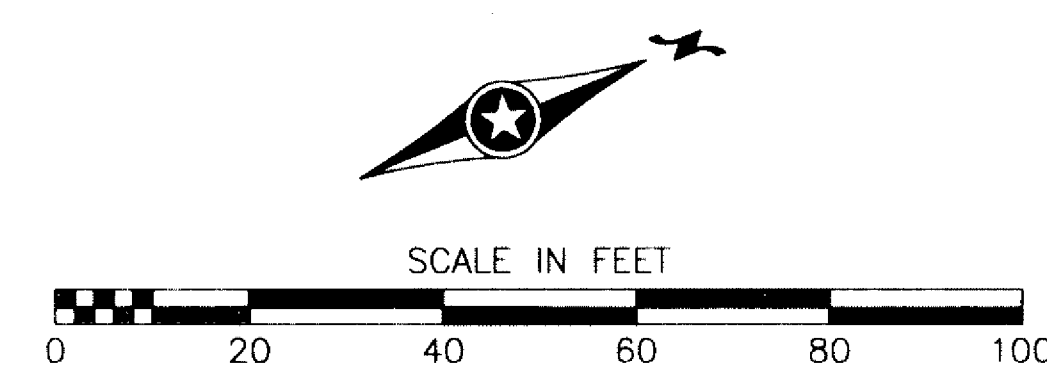


LOOP DETECTORS			
NUMBER	SIZE (FT.)	FUNCTION	LOCATION
D1-1	6x6	1	40
D1-2	6x6	1	10
D2-1	6x6	1	400
D2-2	6x6	1	400
D4-1	6x6	10	AS SHOWN
D4-2	6x6	10	AS SHOWN
D5-1	6x6	1	40
D5-2	6x6	1	10
D6-1	6x6	1	400
D6-2	6x6	1	400
D3-1	6x6	3,8	120
D3-2	2-6x6	1	4 & 34
D3-3	6x10,6x6	7	AS SHOWN
D3-4	2-6x6	1	-5 & 19

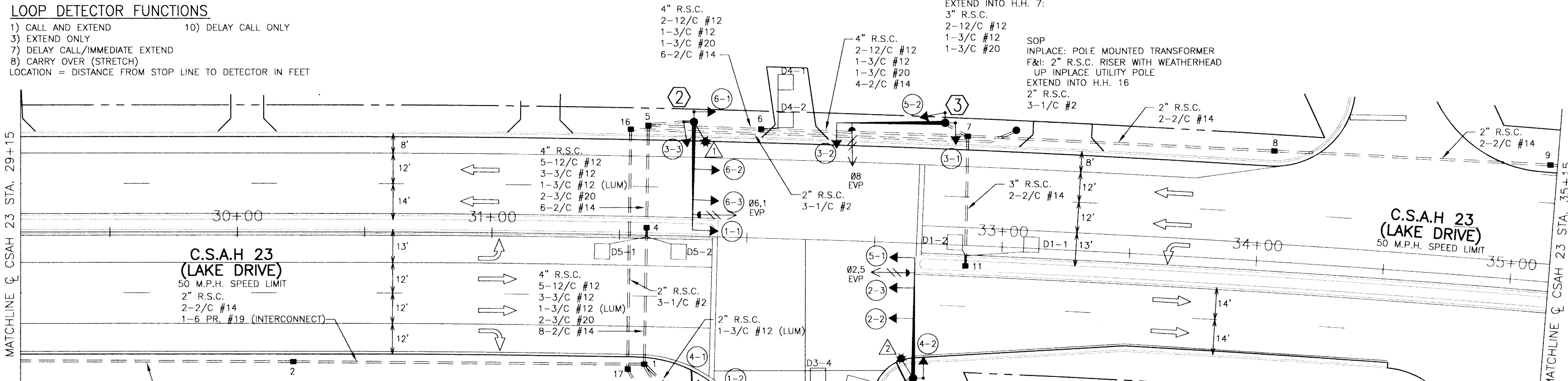
② PA90 POLE FOUNDATION  
 TYPE PA90-A-40-D40-9 (DAVIT @ 350')  
 LUMINAIRE-200 WATT H.P.S. WITH PEC AND CHECK SWITCH  
 3-ONE WAY SIGNALS-OVERHEAD (0', 11' AND 23' FROM LEFT END OF MAST ARM)  
 2-TYPE 10A-POLE MOUNTED 90° AND 180°  
 TYPE "D" SIGN PANEL OVERHEAD (D-3)  
 R6-1 SIGN PANEL (36"x12")-POLE MOUNTED 0°  
 R9-3a SIGN (NO PED) FACING POLE 1  
 ONE WAY EVP DETECTOR AND LIGHT-OVERHEAD (Ø6,1)  
 EXTEND INTO H.H. 5:  
 3" R.S.C.  
 3-12/C #12  
 2-3/C #12  
 1-3/C #12 (LUM)  
 1-3/C #20  
 1-3/C #20

**LOOP DETECTOR FUNCTIONS**

- 1) CALL AND EXTEND
  - 3) EXTEND ONLY
  - 7) DELAY CALL/IMMEDIATE EXTEND
  - 8) CARRY OVER (STRETCH)
  - 10) DELAY CALL ONLY
- LOCATION = DISTANCE FROM STOP LINE TO DETECTOR IN FEET



- NOTES:**
- 1) LOCATION OF POLES, FOUNDATIONS, LOOP DETECTORS AND HANDHOLES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
  - 2) EACH SIGNAL FACE SHALL HAVE A BACKGROUND SHIELD.
  - 3) ALL VEHICLE INDICATIONS AND ALL PEDESTRIAN SIGNAL INDICATIONS SHALL BE LED.
  - 4) FOR SERVICE CABINET DETAILS SEE SHEET NO. 27
  - 5) FOR NMC LOOP DETAILS SEE SHEET NO. 26
  - 6) FOR SIGN DETAILS SEE SHEET NO. 28
  - 7) (INTERCONNECT) DENOTES ITEMS TO BE MEASURED AND PAID FOR SEPERATELY FROM ITEM NO. 2565.511.

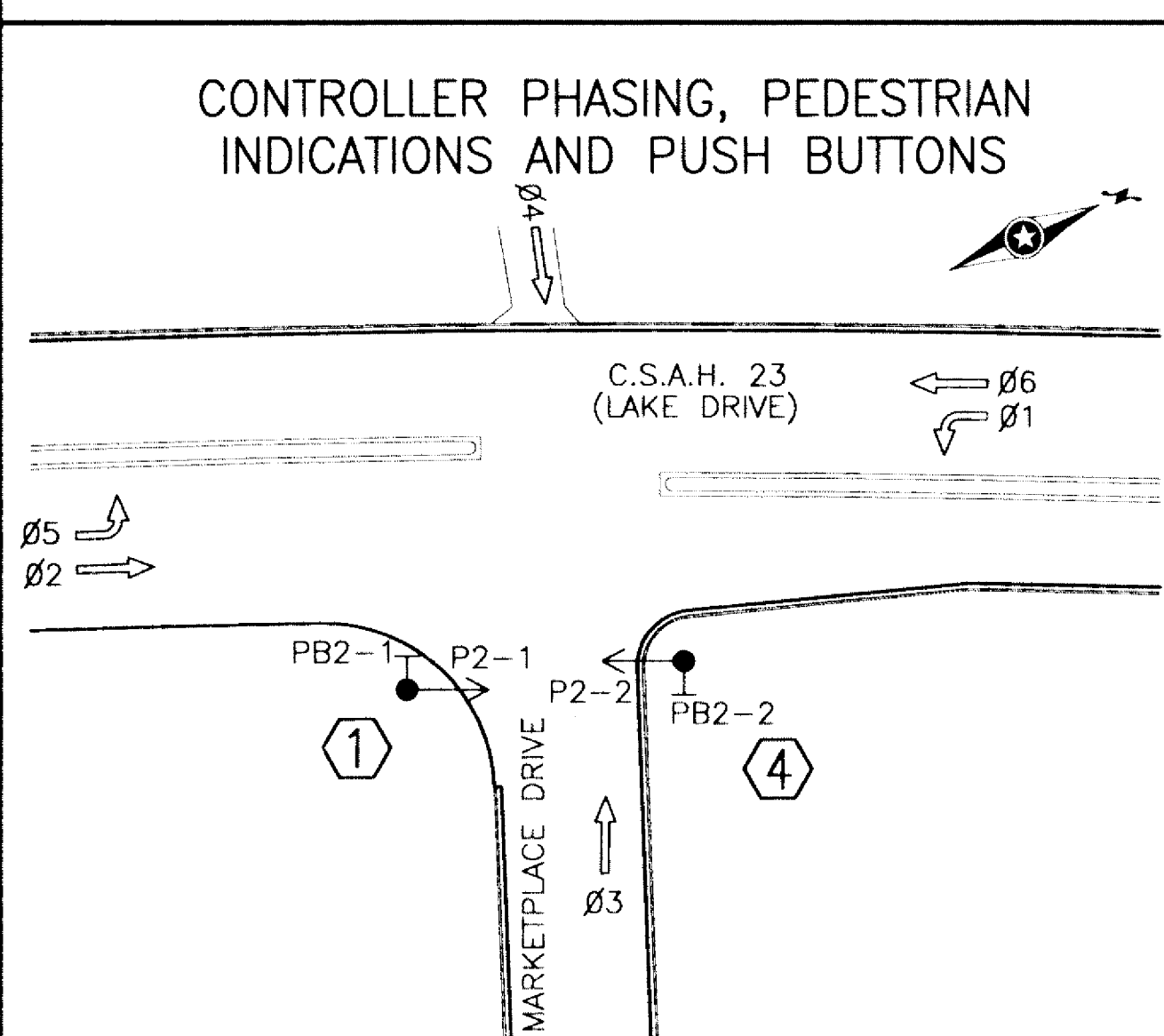


① PA100 POLE FOUNDATION  
 TYPE PA100 POLE  
 TYPE 10B-POLE MOUNTED AS SHOWN  
 TYPE 10A-POLE MOUNTED AS SHOWN  
 PED PUSH BUTTON  
 R9-3a SIGN (NO PED) FACING POLE 2  
 EXTEND INTO H.H. 14:  
 3" R.S.C.  
 1-12/C #12  
 4-3/C #12

④ PA100 POLE FOUNDATION  
 TYPE PA100-A-45-D40-9 (DAVIT @ 350')  
 LUMINAIRE-200 WATT H.P.S. WITH PEC AND CHECK SWITCH  
 3-ONE WAY SIGNALS-OVERHEAD (0', 11' AND 23' FROM LEFT END OF MAST ARM)  
 1-TYPE 10A-POLE MOUNTED 90°  
 1-TYPE 10B-POLE MOUNTED 180°  
 1-PEDESTRIAN PUSH BUTTON  
 TYPE "D" SIGN PANEL OVERHEAD (D-3)  
 R6-1 SIGN PANEL (36"x12")-POLE MOUNTED 180°  
 R9-3a SIGN (NO PED) FACING POLE 3  
 ONE WAY EVP DETECTOR AND LIGHT-OVERHEAD (Ø2,5)  
 EXTEND INTO H.H. 12:  
 3" R.S.C.  
 3-12/C #12  
 2-3/C #12  
 1-3/C #12 (LUM)  
 1-3/C #20

① INSTALL CONTROLLER AND CABINET (FURNISHED BY COUNTY)  
 CABINET AND FOUNDATION  
 EXTEND INTO H.H. 15:  
 METERED SIGNAL SERVICE  
 1 1/4" R.S.C.  
 3-1/C #6  
 EXTEND INTO H.H. 1:  
 4" R.S.C.  
 5-12/C #12  
 3-3/C #12  
 2-3/C #20  
 10-2/C #14  
 1-6 PR. #19 (INTERCONNECT)  
 EXTEND INTO H.H. 14:  
 4-12/C #12  
 6-3/C #12  
 1-3/C #20  
 4-2/C #14  
 STUB OUT 2-3" R.S.C.  
 (THREAD AND CAP BOTH ENDS-FOR FUTURE USE)

② SERVICE CABINET  
 CABINET FOUNDATION  
 EXTEND INTO H.H. 15:  
 2" R.S.C.  
 3-1/C #6 (METERED SIGNAL SERVICE)  
 2-3/C #12 (UNMETERED STREET LIGHT SERVICE)  
 EXTEND INTO H.H. 17:  
 2" R.S.C.  
 3-1/C #2



**SIGNAL SYSTEM OPERATION**

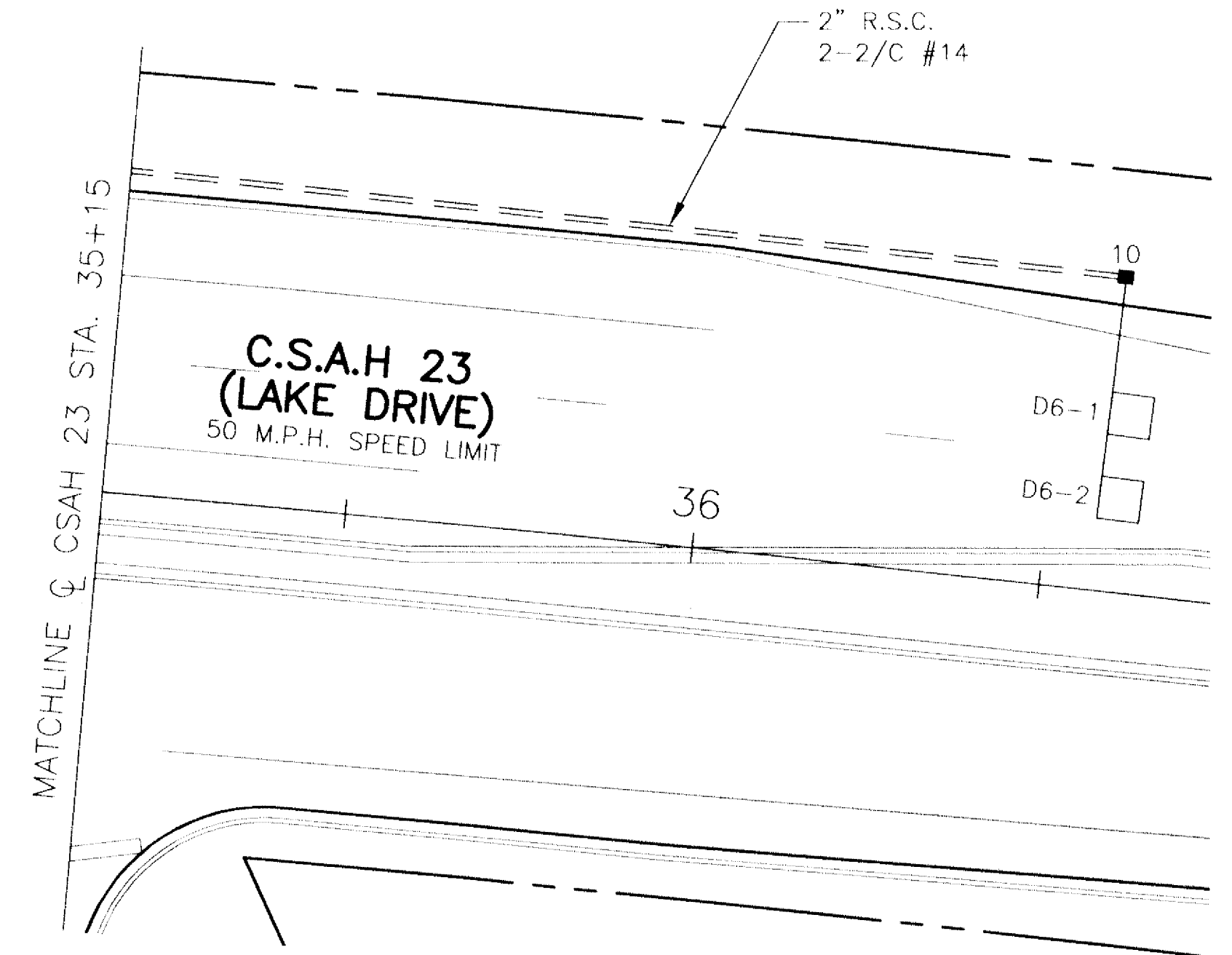
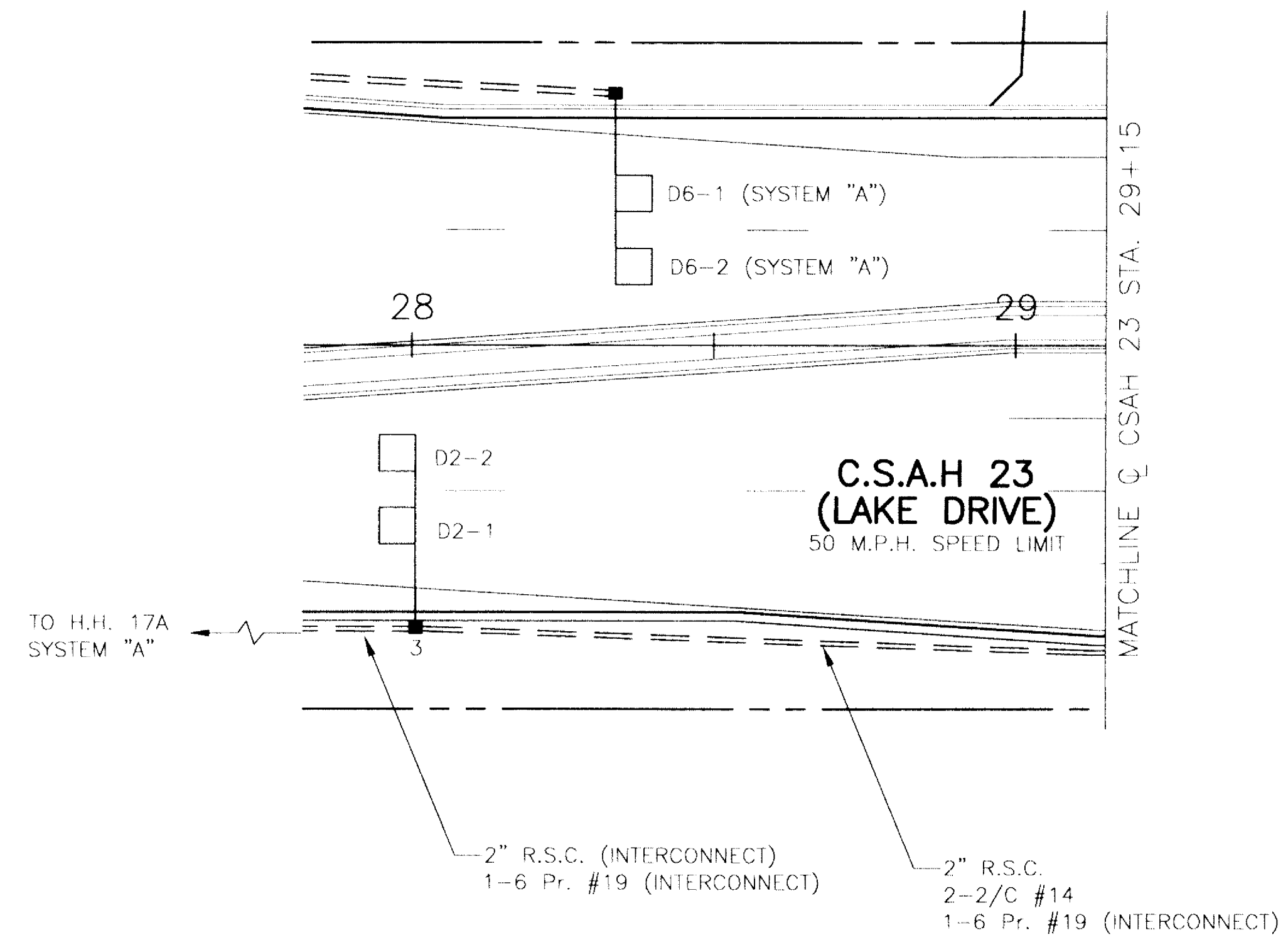
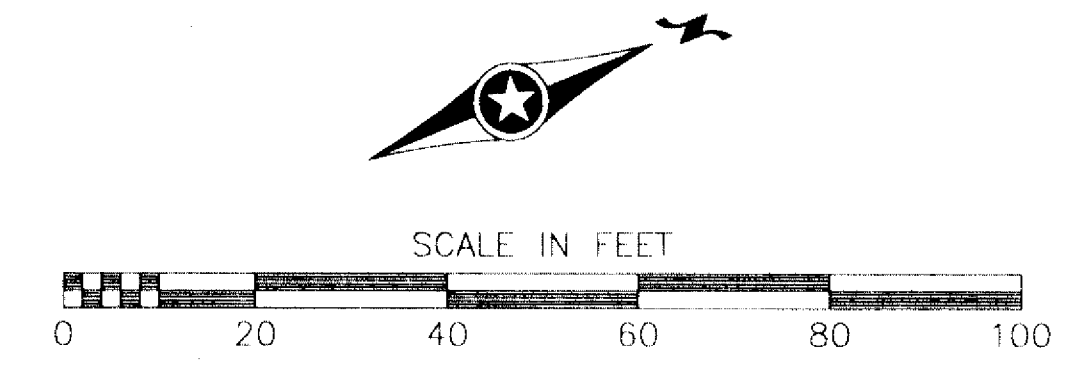
- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 6 PHASE, WITH PHASES 1 AND 5 BEING PROTECTED LEFT TURN PHASES.
- PHASES 2 AND 6 SHALL OPERATE ON VEHICLE RECALL.

SIGNAL INDICATIONS						
ALL INDICATIONS SHALL BE 12" LED						
FACE	R	Y	G	RLTA	YLTA	GLTA
1-1, 1-2	●	●	●	←	←	←
2-1, 2-2, 2-3	●	●	●			
4-1	●	●	●			
4-2	●	●	●			
5-1, 5-2	●	●	●	←	←	←
6-1, 6-2, 6-3	●	●	●			
3-1	●	●	●			
3-2, 3-3	●	●	●			

DWG: K:\PROJECTS\G-M\LINOLAKES\G242601\AIR SIGNALS\SHEET4.DWG  
 PLOT DATE: XXXX  
 FIELD BOOK:

NO. DATE BY DESCRIPTION OF REVISIONS 1 2/26/02 BP REISSUE PLAN SHEET	DESIGNED JMG DRAWN JMG CHECKED BDP	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA Brent D. Paulsen JAN 28, 2002 BRENT D. PAULSEN LIC. NO. 26880	<h1>TKDA</h1> ENGINEERS • ARCHITECTS • PLANNERS TO, LIZ, KING, DUVAL, ANDERSON AND ASSOCIATES INCORPORATED SAINT PAUL, MINNESOTA	<b>LAKE DRIVE          APOLLO DRIVE          IMPROVEMENTS</b> LINO LAKES MINNESOTA	<b>TRAFFIC CONTROL SIGNAL SYSTEM          INTERSECTION LAYOUT          SYSTEM "B"</b> SHEET NO. 32 OF 46 SHEETS	COMMISSION NO. 12426-01
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D:\K\PROJECTS\G-M\UNCLAKES\1242601\AR\IGNALS\SHEETS.DWG  
 PLOT DATE: XXXX  
 FIELD BOOK:

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED  
JMG

DRAWN  
JMG

CHECKED  
BDP

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

*Brent D. Paulsen* JAN 28, 2002

BRENT D. PAULSEN LIC. NO. 26880.

**TKDA**

ENGINEERS • ARCHITECTS • PLANNERS

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

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

MINNESOTA

TRAFFIC CONTROL SIGNAL SYSTEM  
 MATCHLINES  
 SYSTEM "B"

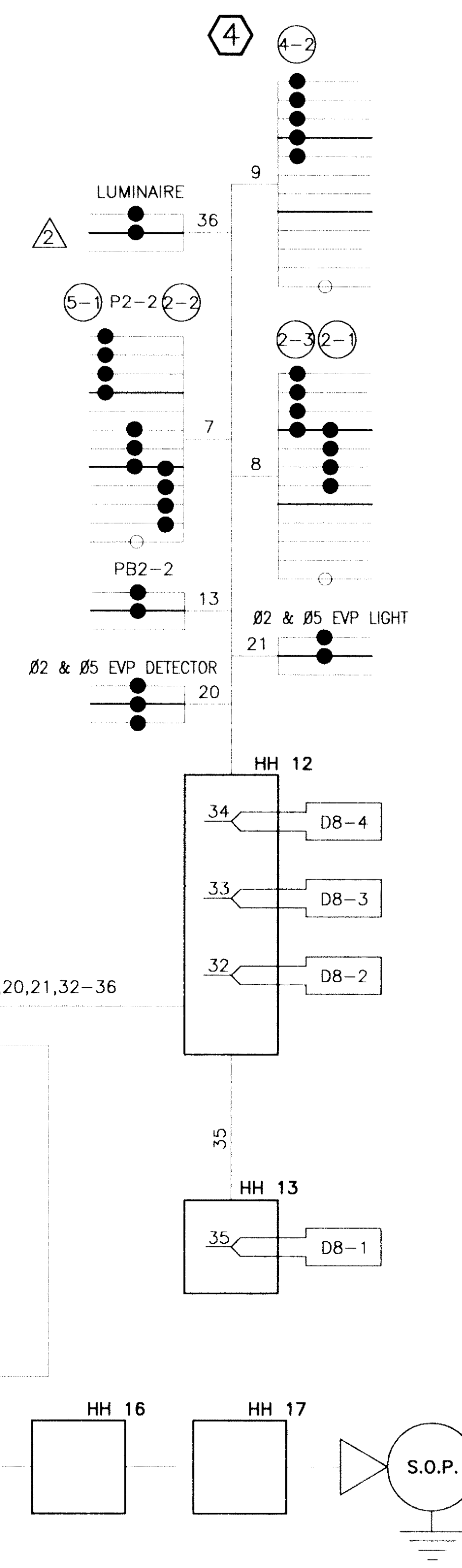
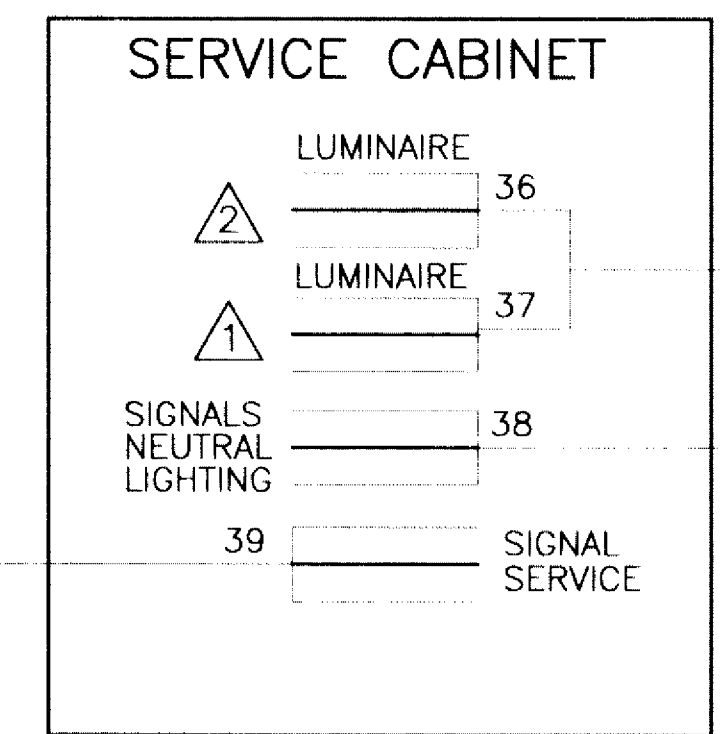
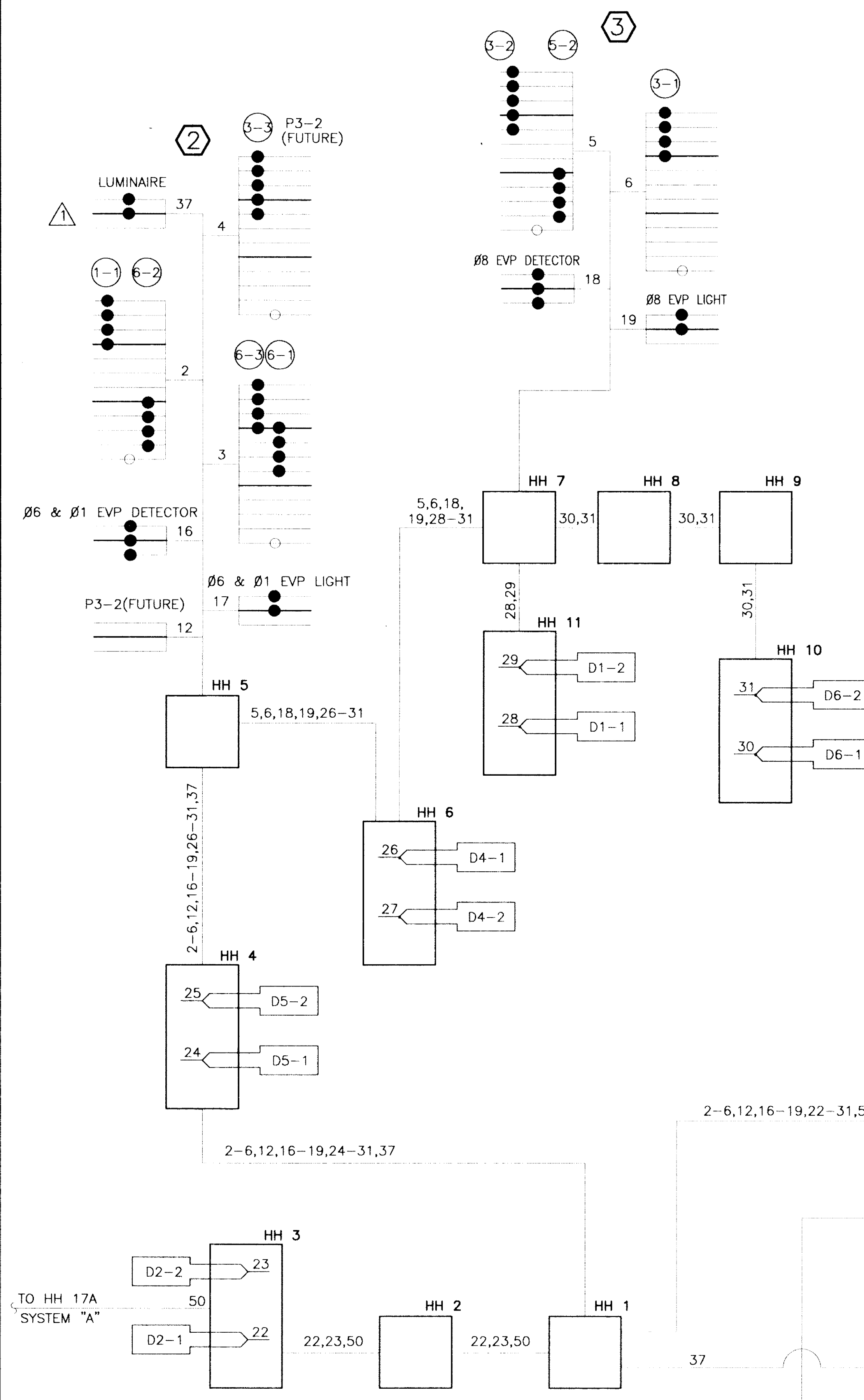
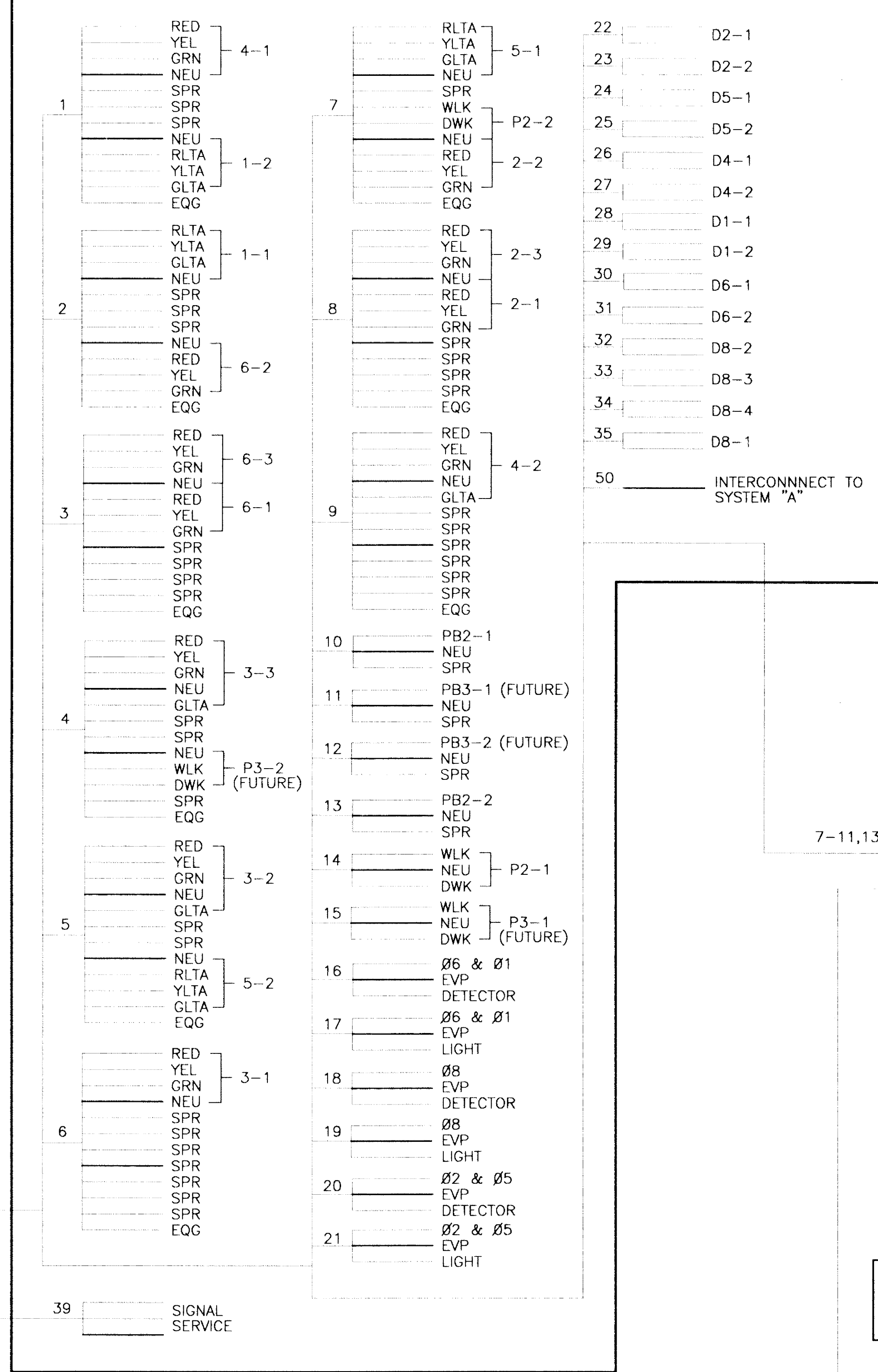
SHEET NO. 33 OF 46 SHEETS

COMMISSION NO.  
 12426-01



DWG: K:\PROJECTS\G-M\LINOLAKES\C1242601\VAR\SIGNALS\SHEET6.DWG  
 PLOT DATE: XXXX  
 FIELD BOOK XREF:

## CONTROLLER CABINET



NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	REISSUE PLAN SHEET

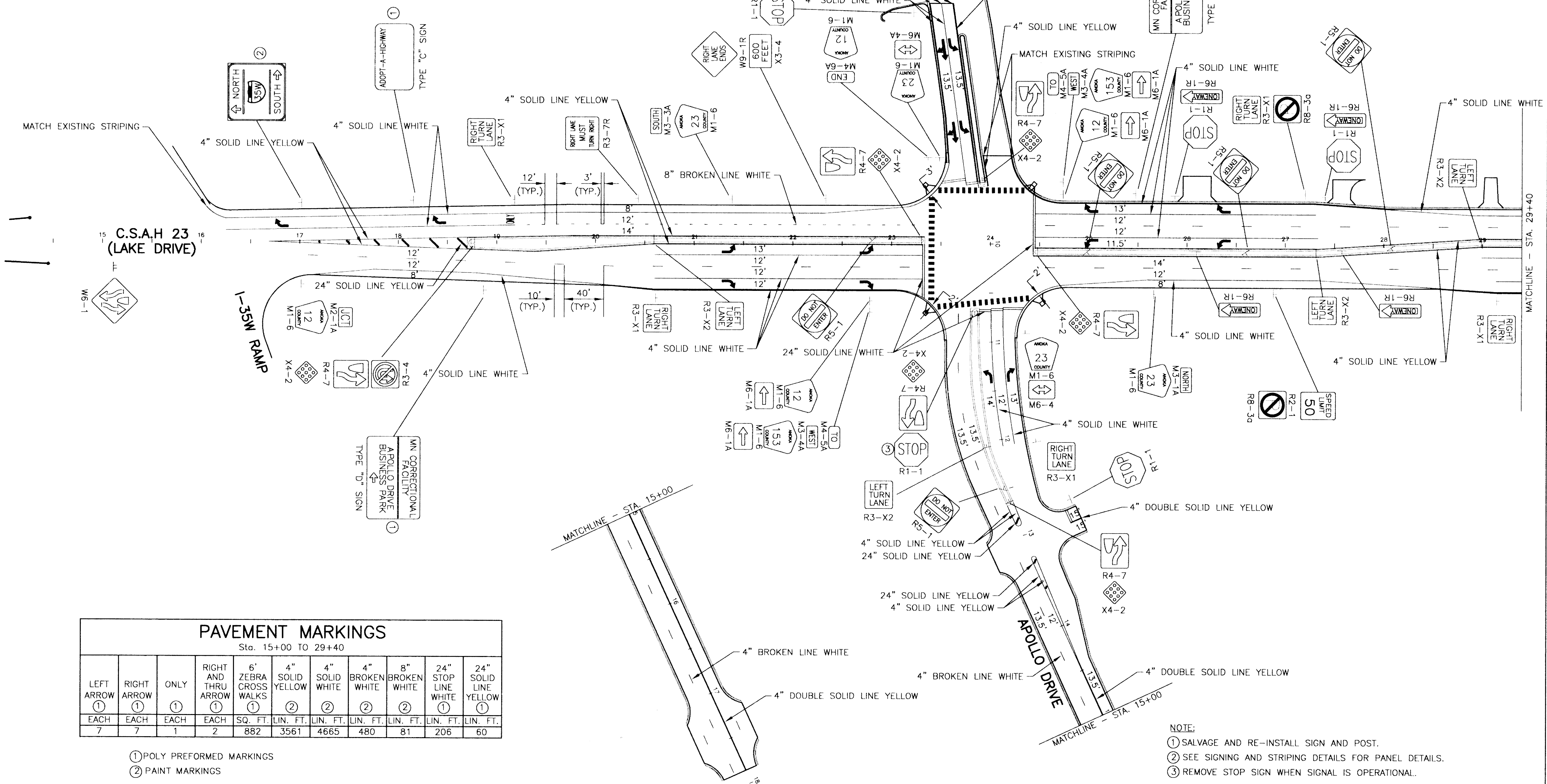
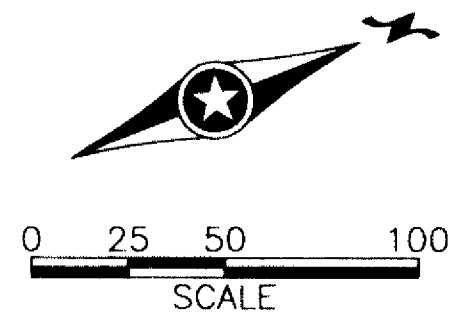
DESIGNED: JMG  
 DRAWN: JMG  
 CHECKED: JEB  
 HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 JAMES E. BUDKE JAN 28, 2002 LIC. NO. 29413

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

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 MINNESOTA

TRAFFIC CONTROL SIGNAL SYSTEM		COMMISSION NO.
<b>WIRING DIAGRAM—SYSTEM "B"</b>		12426-01
SHEET NO. 34 OF 46 SHEETS		





**PAVEMENT MARKINGS**  
Sta. 15+00 TO 29+40

LEFT ARROW	RIGHT ARROW	ONLY	RIGHT AND THRU ARROW	6' ZEBRA CROSS WALKS	4" SOLID YELLOW	4" SOLID WHITE	4" BROKEN WHITE	8" BROKEN WHITE	24" STOP LINE WHITE	24" SOLID LINE YELLOW
①	①	①	①	①	②	②	②	②	①	①
EACH	EACH	EACH	EACH	SQ. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.
7	7	1	2	882	3561	4665	480	81	206	60

- ① POLY PREFORMED MARKINGS
- ② PAINT MARKINGS

- NOTE:
- ① SALVAGE AND RE-INSTALL SIGN AND POST.
  - ② SEE SIGNING AND STRIPING DETAILS FOR PANEL DETAILS.
  - ③ REMOVE STOP SIGN WHEN SIGNAL IS OPERATIONAL.

DWG: K:\PROJECTS\G-M\LINLAKES\1242601\AIR\SIGNS\1\SHEET1.DWG  
 PLOT DATE: XXXX  
 FIELD BOOK:

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	REISSUE PLAN SHEET

DESIGNED: JMG  
 DRAWN: JMG  
 CHECKED: BDP  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 BRENT D. PAULSEN  
 JAN 28, 2002  
 LIC NO. 26880

**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLIZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

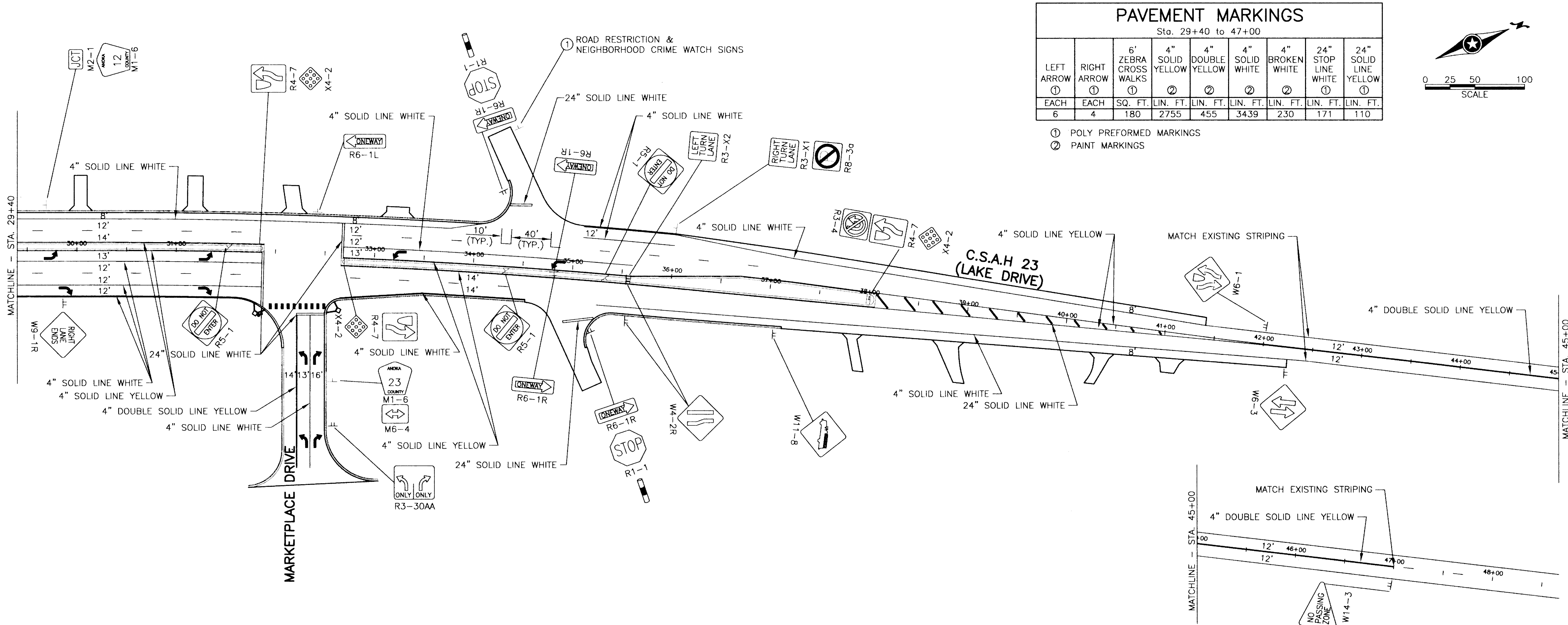
**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 LINO LAKES  
 MINNESOTA

**SIGNING AND STRIPING PLANS**  
 SHEET NO. 35 OF 46 SHEETS

COMMISSION NO.  
**12426-01**

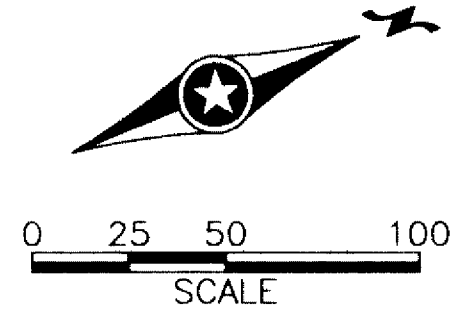


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 XREF:  
 PLOT DATE: XXXX  
 FIELD BOOK:



PAVEMENT MARKINGS								
Sta. 29+40 to 47+00								
LEFT ARROW	RIGHT ARROW	6' ZEBRA CROSS WALKS	4" SOLID YELLOW	4" DOUBLE YELLOW	4" SOLID WHITE	4" BROKEN WHITE	24" STOP LINE WHITE	24" SOLID LINE YELLOW
①	①	①	②	②	②	②	①	①
EACH	EACH	SQ. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.
6	4	180	2755	455	3439	230	171	110

- ① POLY PREFORMED MARKINGS
- ② PAINT MARKINGS



MATCHLINE - STA. 29+40

MATCHLINE - STA. 45+00

MATCHLINE - STA. 45+00

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	REISSUE PLAN SHEET

DESIGNED JMG  
 DRAWN JMG  
 CHECKED BDP  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Brent D. Paulsen* JAN 28, 2002  
 BRENT D. PAULSEN LIC. NO. 26880

**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVAL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA












LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES MINNESOTA

SIGNING AND STRIPING PLANS  
 SHEET NO. 36 OF 46 SHEETS



COMMISSION NO.  
 12426-01







TYPE "C" SIGNS

ITEM	SIGN NO.	QUANTITY	SIZE (IN.XIN.)	AREA (S.F.)	TOTAL AREA (S.F.)
	M1-6	12	24X24	4.00	48.00
	M2-1A	2	21X15	1.875	3.75
	M3-1A	1	24X12	2.00	2.00
	M3-3A	1	24X12	2.00	2.00
	M3-4A	2	24X12	2.00	4.00
	M4-5A	2	24X12	2.00	4.00
	M4-6A	1	24X12	2.00	2.00
	M6-1A	4	21X15	2.1875	8.75
	M6-4A	3	21X15	1.875	5.625
	R1-1	8	30X30	6.25	50.00
	R2-1	1	24X30	5.00	5.00


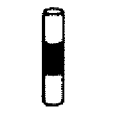
TYPE "C" SIGNS

ITEM	SIGN NO.	QUANTITY	SIZE (IN.XIN.)	AREA (S.F.)	TOTAL AREA (S.F.)
	R3-4	2	24X24	4.00	8.00
	R3-30AA	1	36X30	7.50	7.50
	R3-30AD	1	36X30	7.50	7.50
	R3-7R	1	30X30	6.25	6.25
	R3-X1	6	30X30	6.25	37.50
	R3-X2	5	30X30	6.25	31.25
	R4-7	9	24X30	5.00	45.00
	R5-1	8	30X30	6.25	50.00
	R6-1L	1	36X12	3.00	3.00
	R6-1R	8	36X12	3.00	18.00
	R8-3a	3	24X24	4.00	12.00

TYPE "C" SIGNS

ITEM	SIGN NO.	QUANTITY	SIZE (IN.XIN.)	AREA (S.F.)	TOTAL AREA (S.F.)
	W4-2R	1	36X36	9.00	9.00
	W6-1	2	36X36	9.00	18.00
	W6-3	1	36X36	9.00	9.00
	W9-1R	2	36X36	9.00	18.00
	W11-8	1	30X30	6.25	6.25
	W14-3	1	36X48X48	6.00	6.00
	X3-4	1	12X8	0.66	0.66
CUMULATIVE TOTAL (TYPE "C" SIGNS)					428.04

DELINEATORS

ITEM	SIGN NO.	QUANTITY	SIZE (IN.XIN.)	AREA (S.F.)	TOTAL (EACH)
	X4-2 YELLOW ON YELLOW	9	18X18	2.25	20.25
	DELINEATOR TYPE CYLINDER	2			2

PLOT DATE: 1/26/02 DWG: K:\PROJECTS\G-M\MINOLAKES\1242601\AR\SIGNS\SHEET3.DWG REF: XREF:

NO.	DATE	BY	DESCRIPTION OF REVISIONS
1	2/26/02	BP	REISSUE PLAN SHEET

DESIGNED: JMG DRAWN: JMG  
 CHECKED: BDP  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Brent D. Paulsen* JAN 28, 2002  
 BRENT D. PAULSEN LIC. NO. 26880

**TKDA**

ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVAL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LINO LAKES

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS

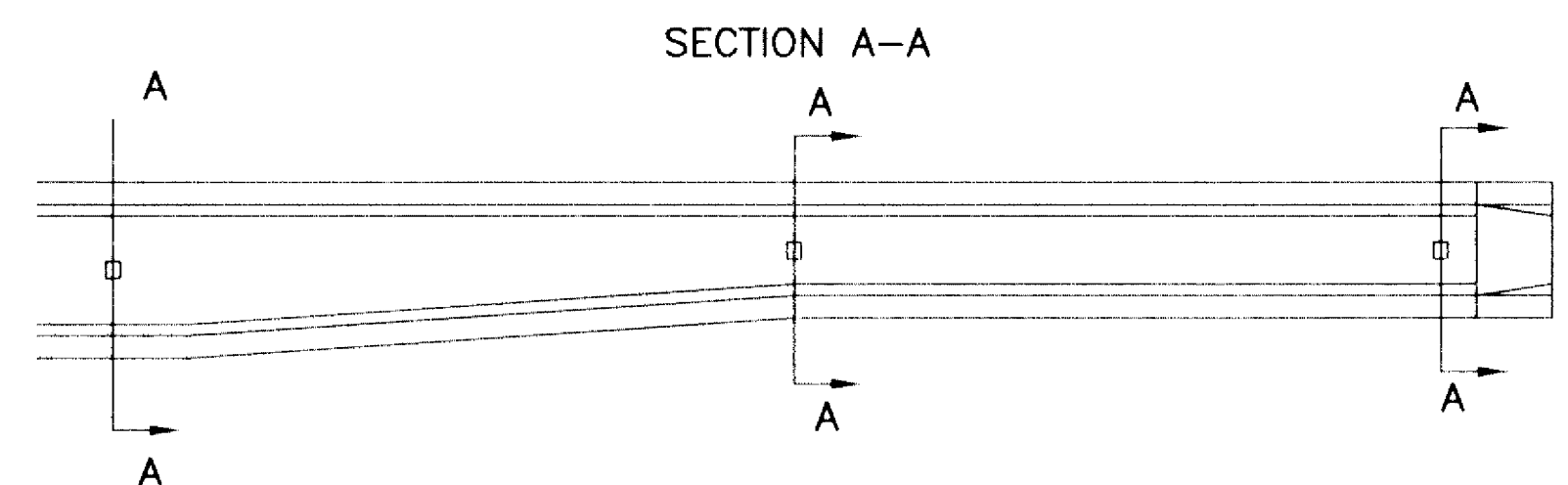
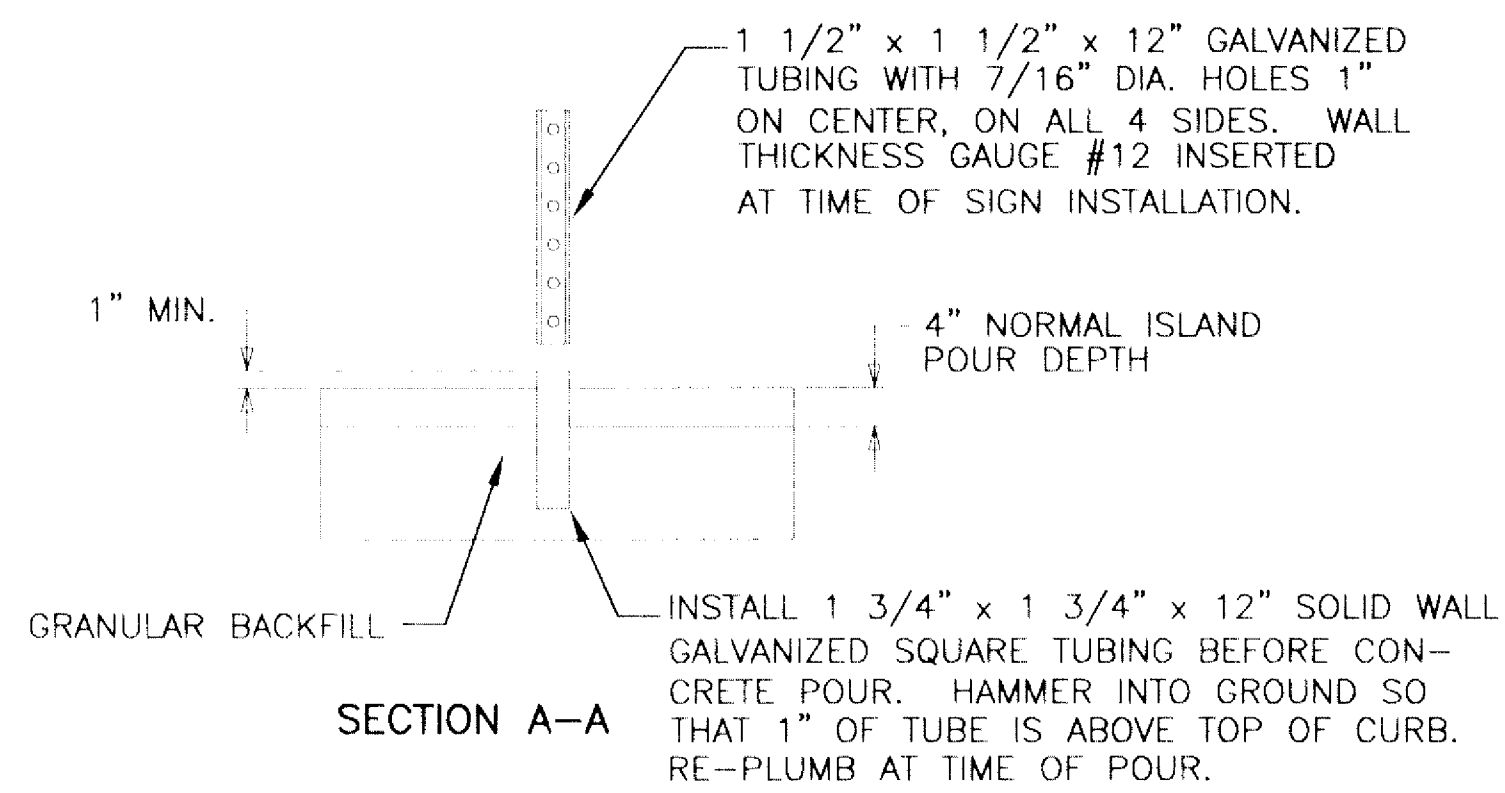
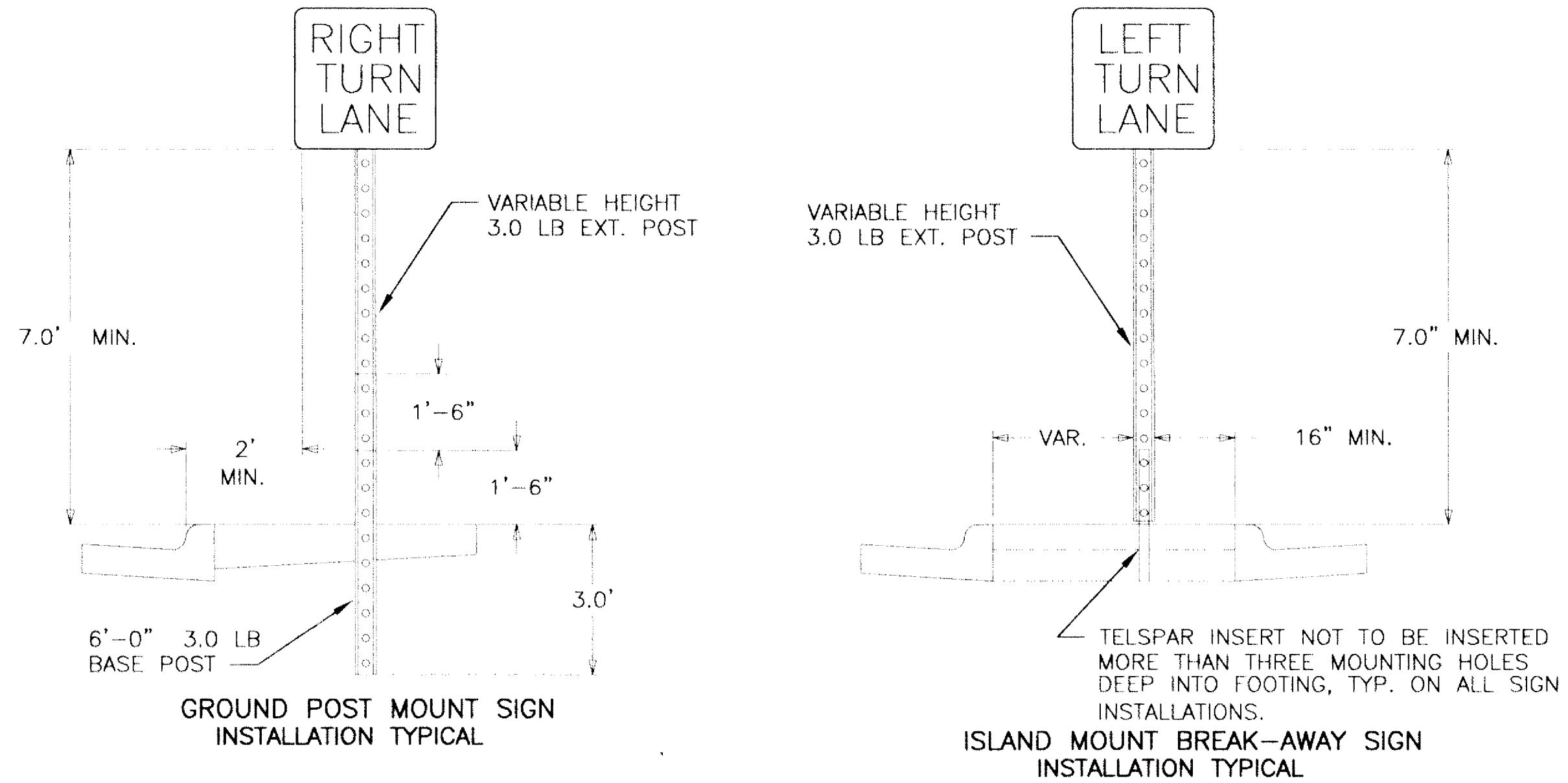
MINNESOTA

SIGNING AND STRIPING PLANS  
 SIGNING QUANTITIES  
 SHEET NO. 37 OF 46 SHEETS

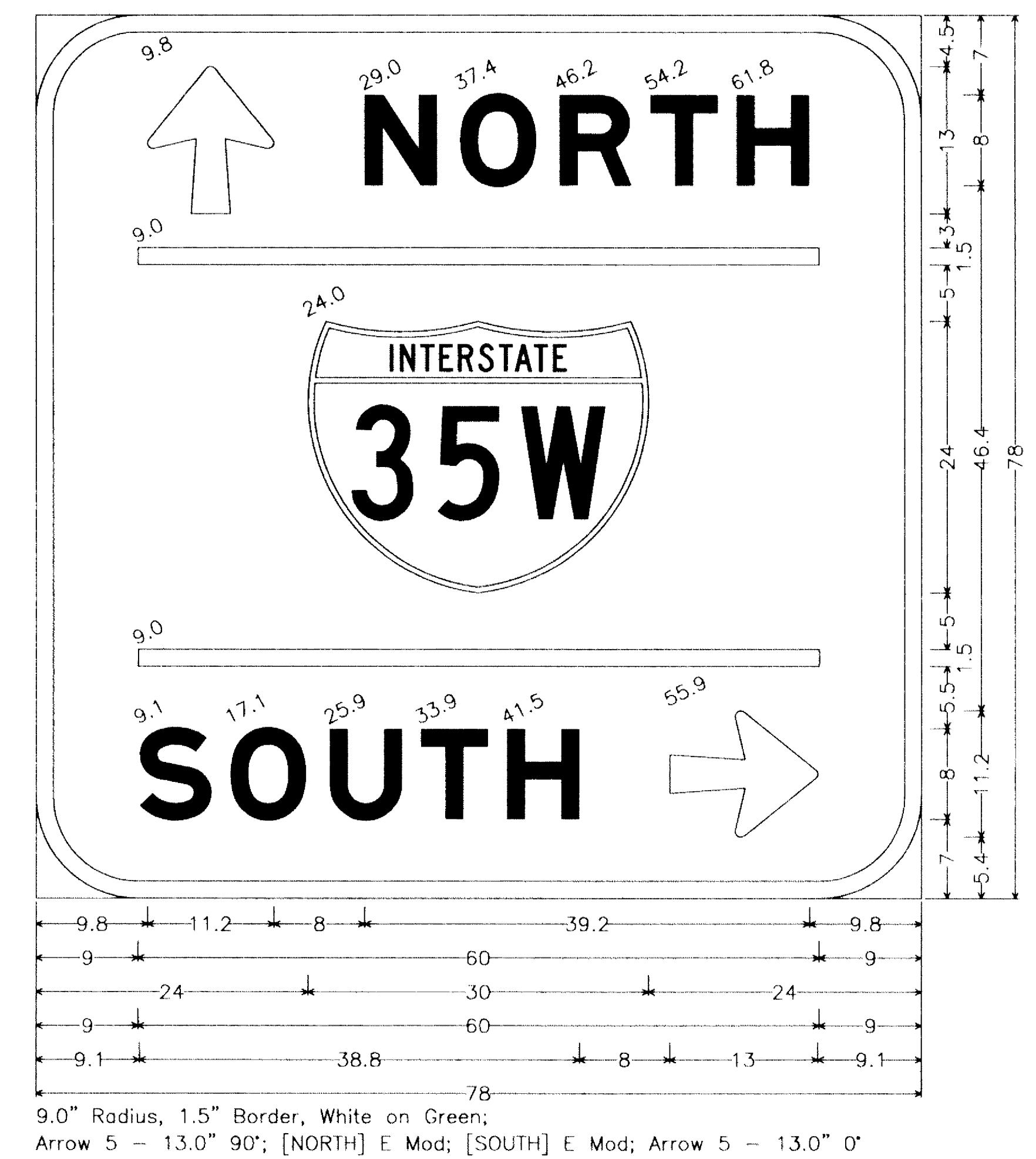
COMMISSION NO.  
 12426-01



SIGNING DETAILS

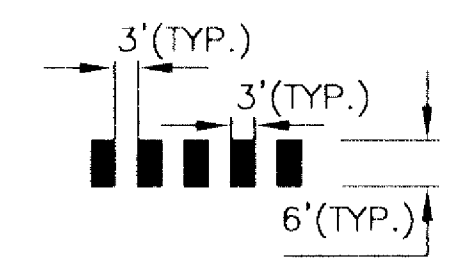


TYPE "D" SIGN PANEL DETAIL



STRIPING DETAILS

CROSSWALK DETAIL



PAINTED AREAS ARE TO BE CENTERED ON CENTER AND LANE LINES, EVEN IF INTERSECTION IS NOT ALIGNED.

LOCATION OF ZEBRA CROSSWALKS AND STOP BARS, SIGNAL LOOPS AND PED RAMPS ARE APPROXIMATE. FINAL LOCATIONS ARE TO BE DETERMINED AND FIELD VERIFIED DURING CONSTRUCTION BY THE FIELD ENGINEER.

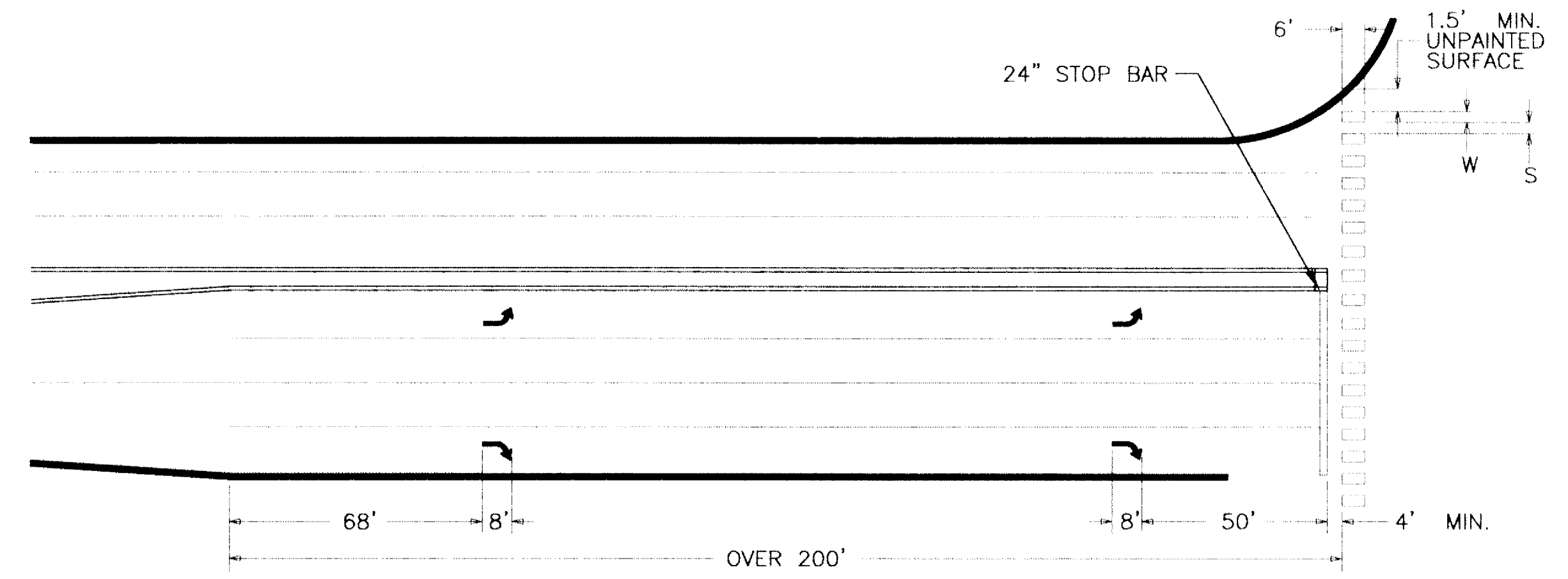
ZEBRA CROSSWALKS ARE TO BE PARALLEL TO THE DRIVING LANE OR LANES, EVEN IF THE STREET IS ON AN ANGLE TO THE INTERSECTION.

A MIN. OF 1'-6" CLEAR DISTANCE MUST BE LEFT ADJACENT TO THE CURB. IF LAST PAINTED AREA FALLS INTO THIS AREA, IT MUST BE OMITTED.

(L) WIDTH OF INSIDE LANE	(W) WIDTH OF TAPED AREA	(S) WIDTH OF SPACE
9'	2.0'	2.5'
10'	2.5'	2.5'
11'	2.5'	3.0'
12'	3.0'	3.0'
13'	3.0'	3.5'

NOTES:

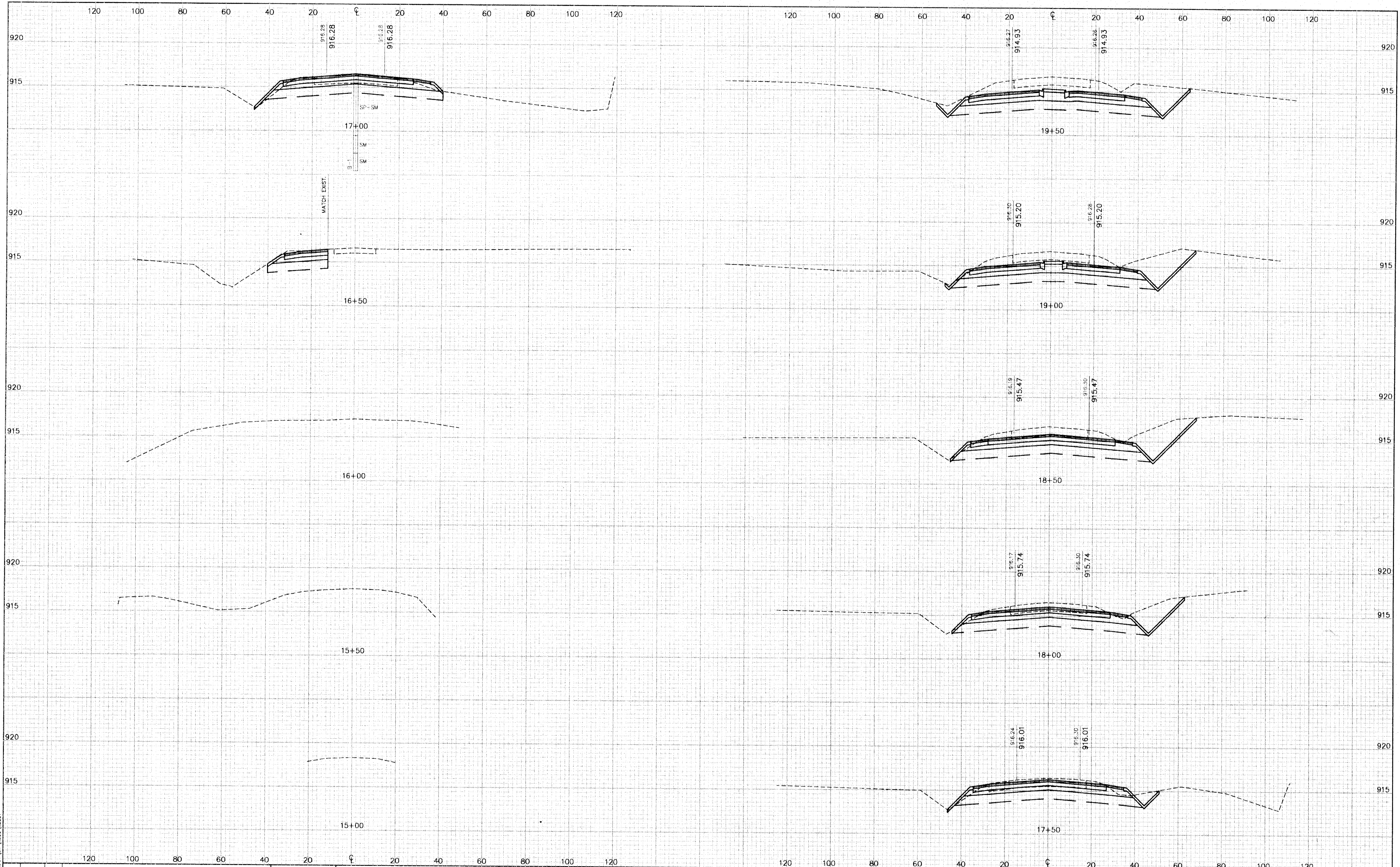
1. TAPED AREAS TO BE CENTERED ON CENTER LINE AND LANE LINES.
2. A MINIMUM OF 1.5 FT. CLEAR DISTANCE MUST BE LEFT ADJACENT TO CURB. IF LAST TAPED AREA FALLS INTO THIS DISTANCE IT MUST BE OMITTED.



PLOT DATE: 02/01/2002 DWG: K:\PROJECTS\G-M\LINOLAKES\1242601\AIR SIGNS\SHEET4.DWG XREF: FIELD BOOK:

NO.	DATE	BY	DESCRIPTION OF REVISIONS	DESIGNED JMG	DRAWN JMG	CHECKED BDP	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. <i>Brent D. Paulsen</i> JAN 28, 2002 BRENT D. PAULSEN P.E. (C. NO. 26880)	<b>TKDA</b> ENGINEERS • ARCHITECTS • PLANNERS 1017, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED SAINT PAUL, MINNESOTA	LAKE DRIVE APOLLO DRIVE IMPROVEMENTS MINNESOTA	SIGNING AND STRIPING PLANS SIGNING AND STRIPING DETAILS SHEET NO. 37A OF 46 SHEETS	COMMISSION NO. 12426-01
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XREF: BORDER.  
 PLOT: 15/28/02  
 PLOT: 15/28/02  
 DIR: \\linolakes\1242601\Var\smc\sssect

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB  
 DRAWN APO  
 CHECKED PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Gaul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

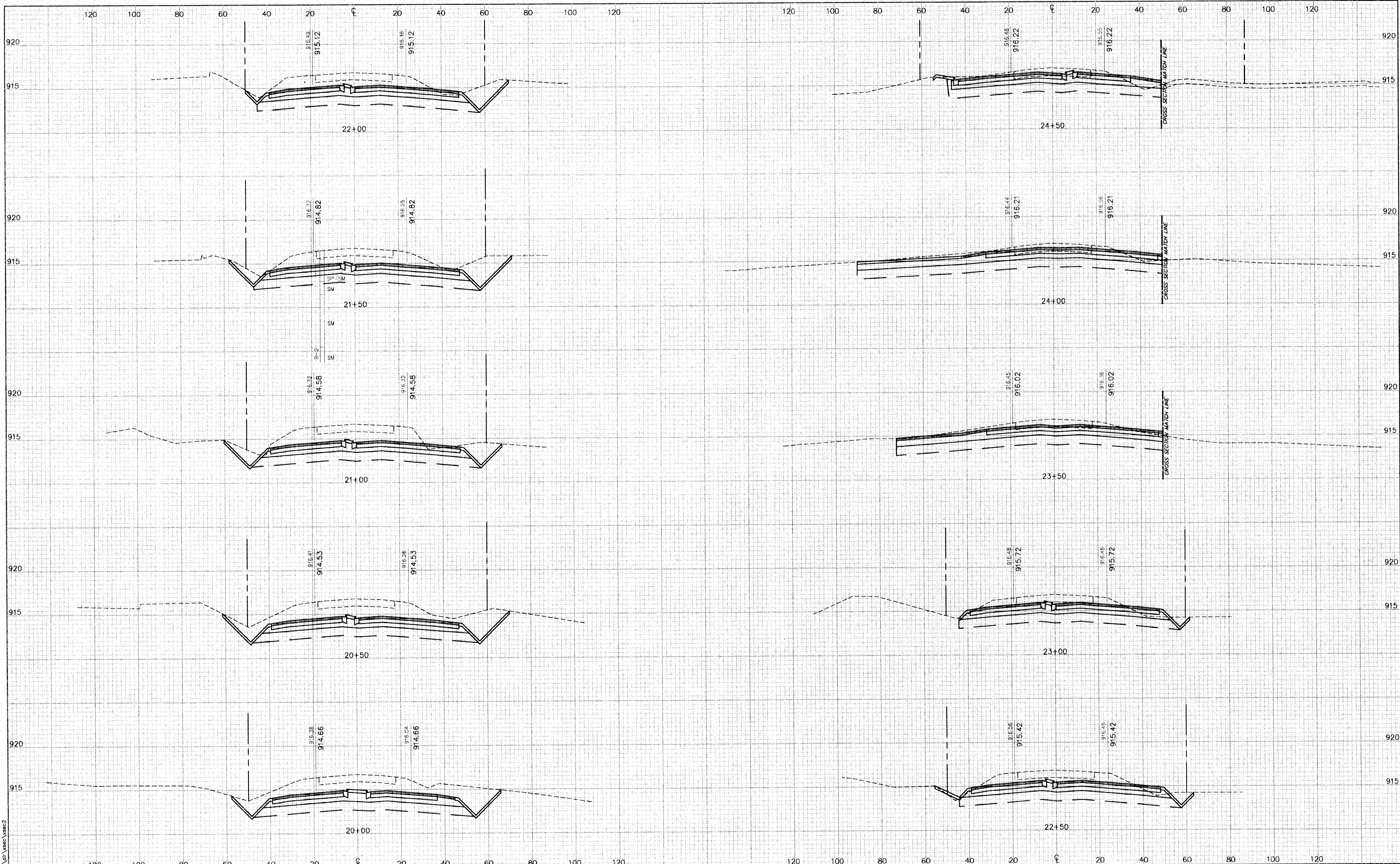
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

LAKE DRIVE  
 15+00 TO 19+50  
 CROSS SECTIONS  
 SHEET NO. 38 OF 46 SHEETS

COMMISSION NO.  
 12426-01





XREF: BORDER.  
 DIR: j:\inklines\1242601\dir\Xsec\Xsec2

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB DRAWN APO  
 CHECKED PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. No. 12779

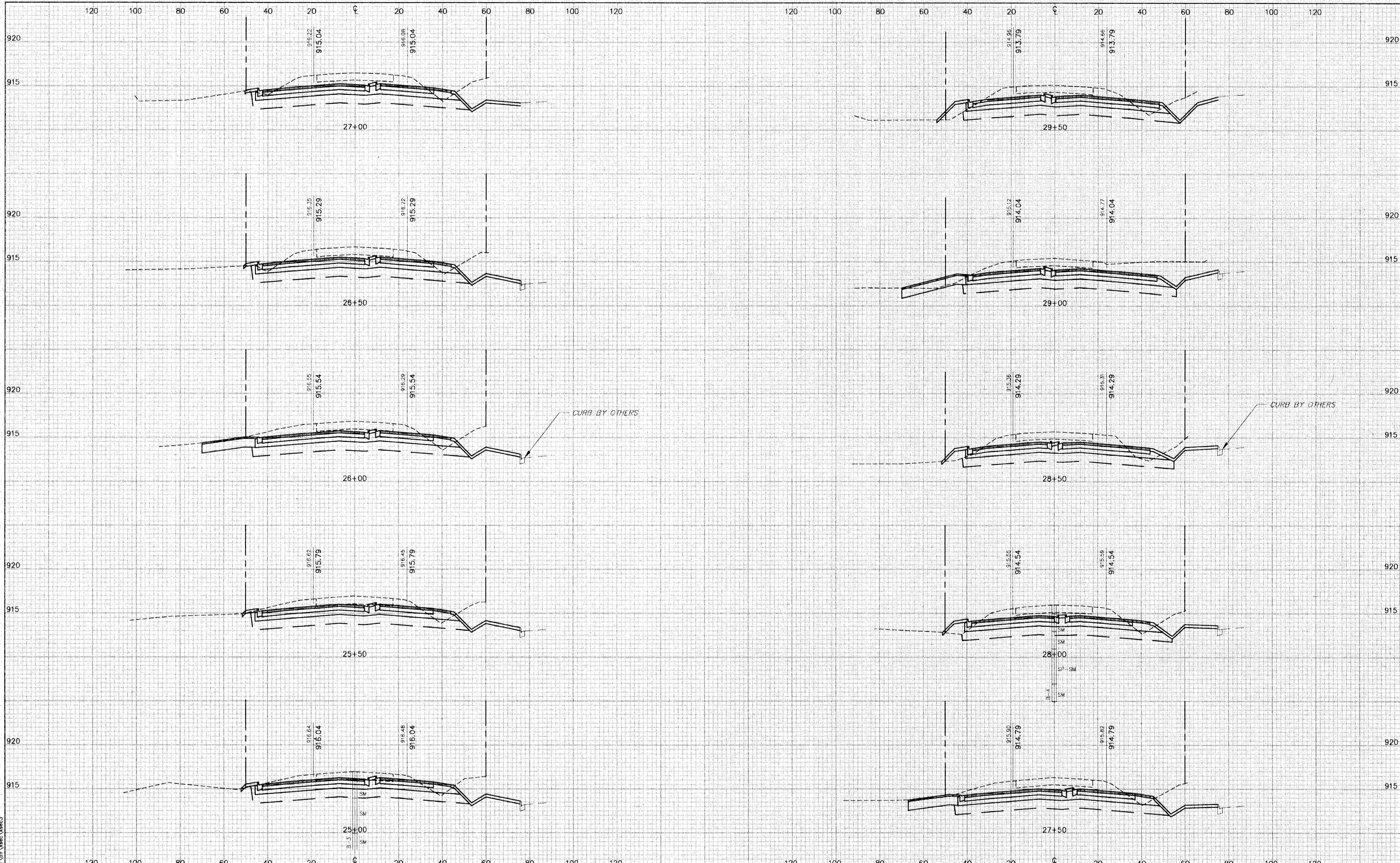
**TKDA**  
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 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

LAKE DRIVE  
 20+00 TO 24+50  
 CROSS SECTIONS  
 SHEET NO. 39 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1 of 5  
 CURRENT: 01/28/02  
 DIR: I:\oldwork\1242601\lrf\lsec\lsec3

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB  
 DRAWN APO  
 CHECKED PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS

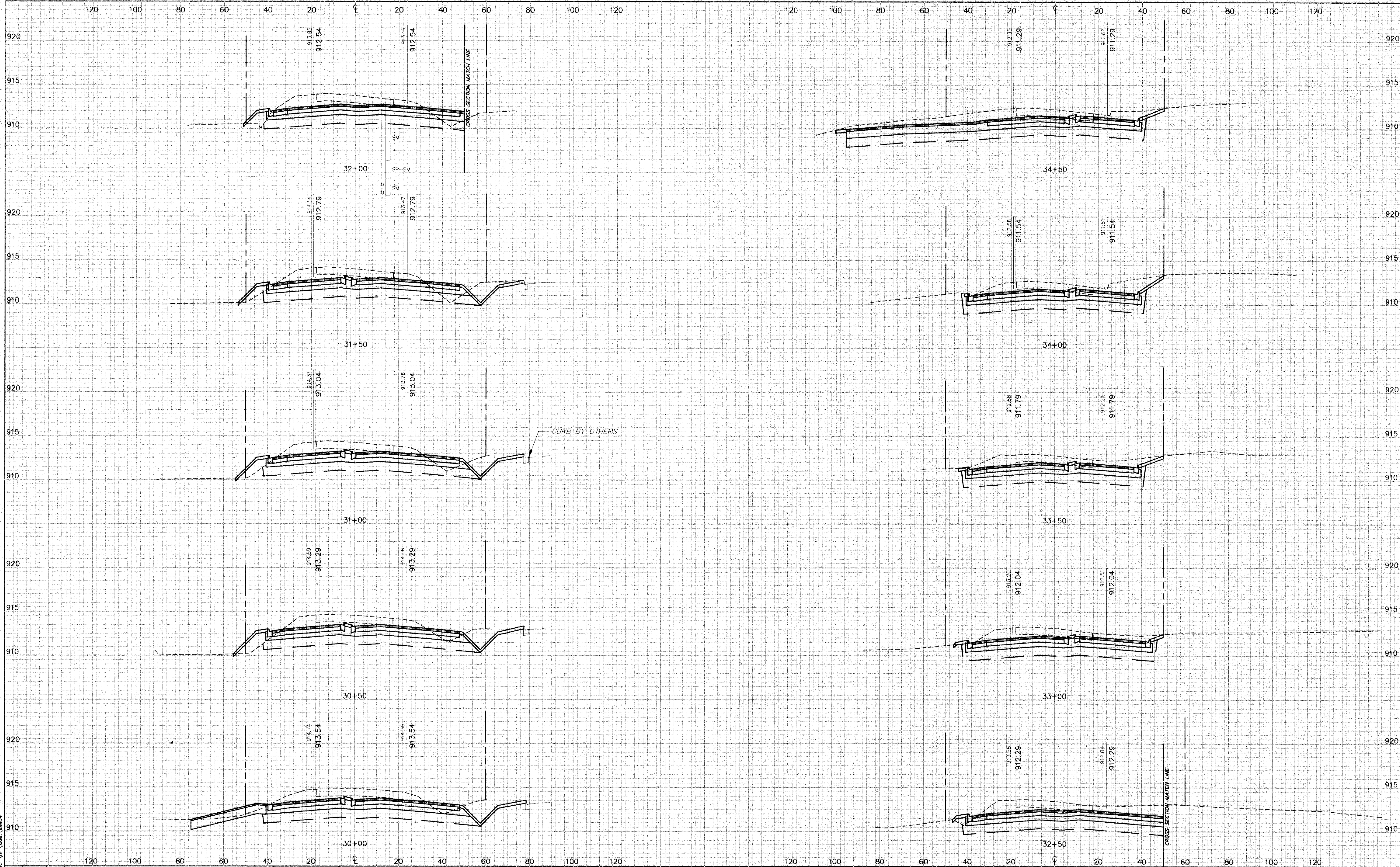
TOLTZ, KING, DUVALL, ANDERSON  
 AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

**LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS**  
 MINNESOTA

**LAKE DRIVE  
 25+00 TO 29+50  
 CROSS SECTIONS**  
 SHEET NO. 40 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1-5  
 CURRENT: 01/28/02  
 DIR: linokas\1242601\gr\_Vasec\_Vasec.dwg  
 XREF: BORDER

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED: PWB  
 DRAWN: APO  
 CHECKED: PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

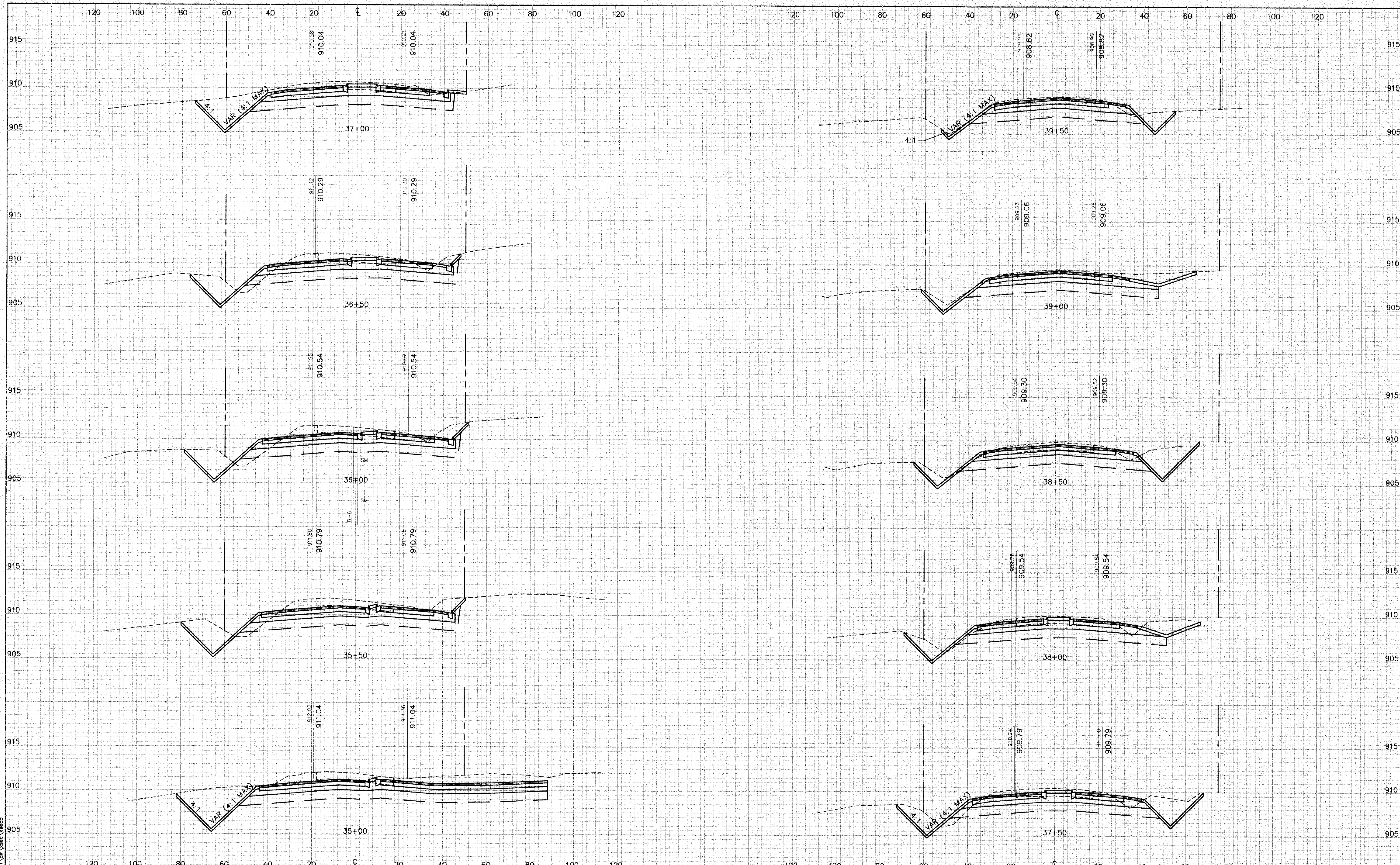
**TKDA**  
 ENGINEERS • ARCHITECTS • PLANNERS  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

LAKE DRIVE  
 30+00 TO 34+50  
 CROSS SECTIONS  
 SHEET NO. 41 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1 - 5  
 CURRENT: 01/28/02  
 DIR: in\olooka\1242601\gr\_xsec\_xsec5

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB DRAWN APO  
 CHECKED PWB  
 I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

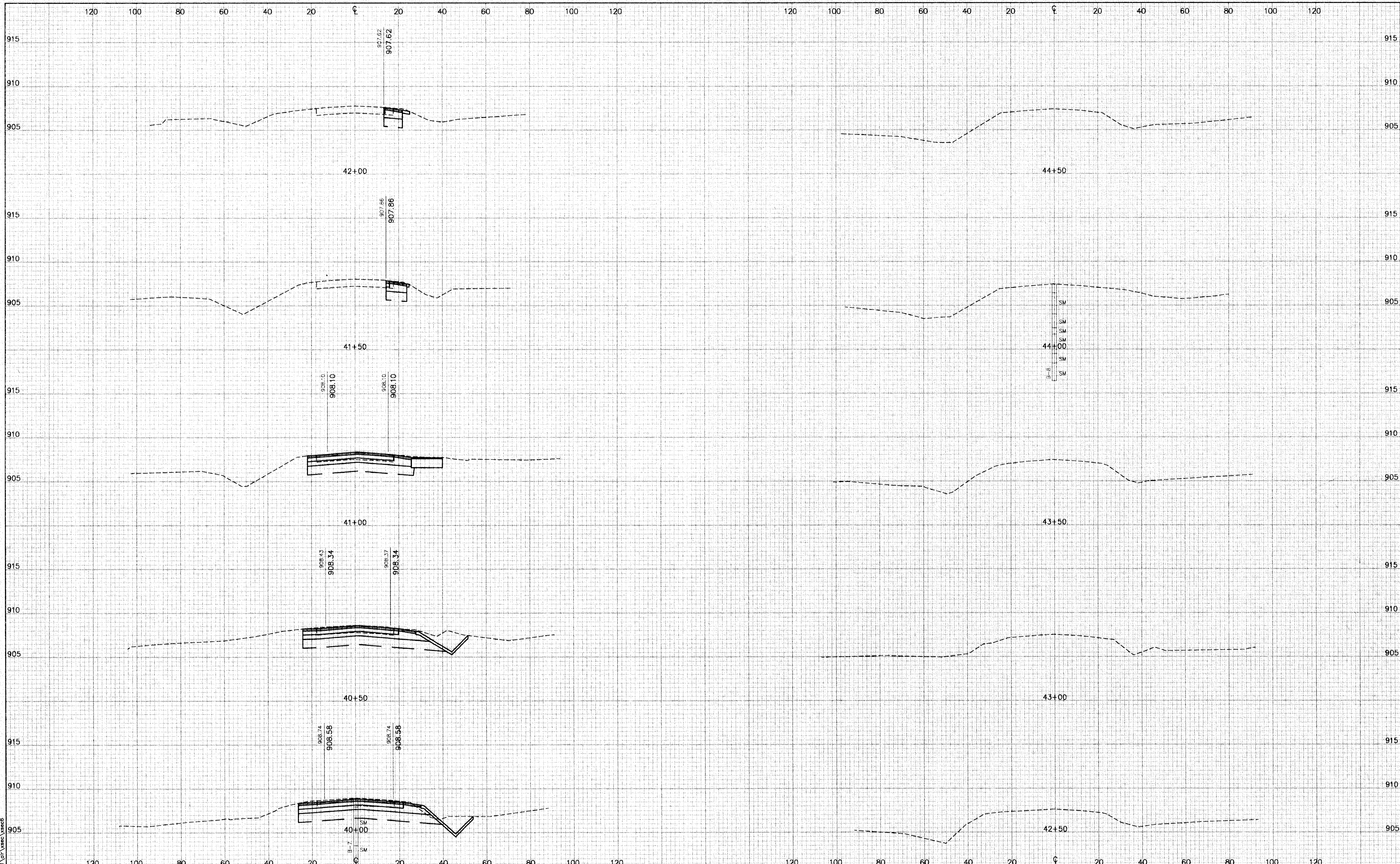
**TKDA**  
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 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES  
 MINNESOTA

LAKE DRIVE  
 35+00 TO 39+50  
 CROSS SECTIONS  
 SHEET NO. 42 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1\_5 / 78 / 02  
 DIR: I:\projects\1242601\p1\cross\cross6

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED: PWB  
 DRAWN: APO  
 CHECKED: PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

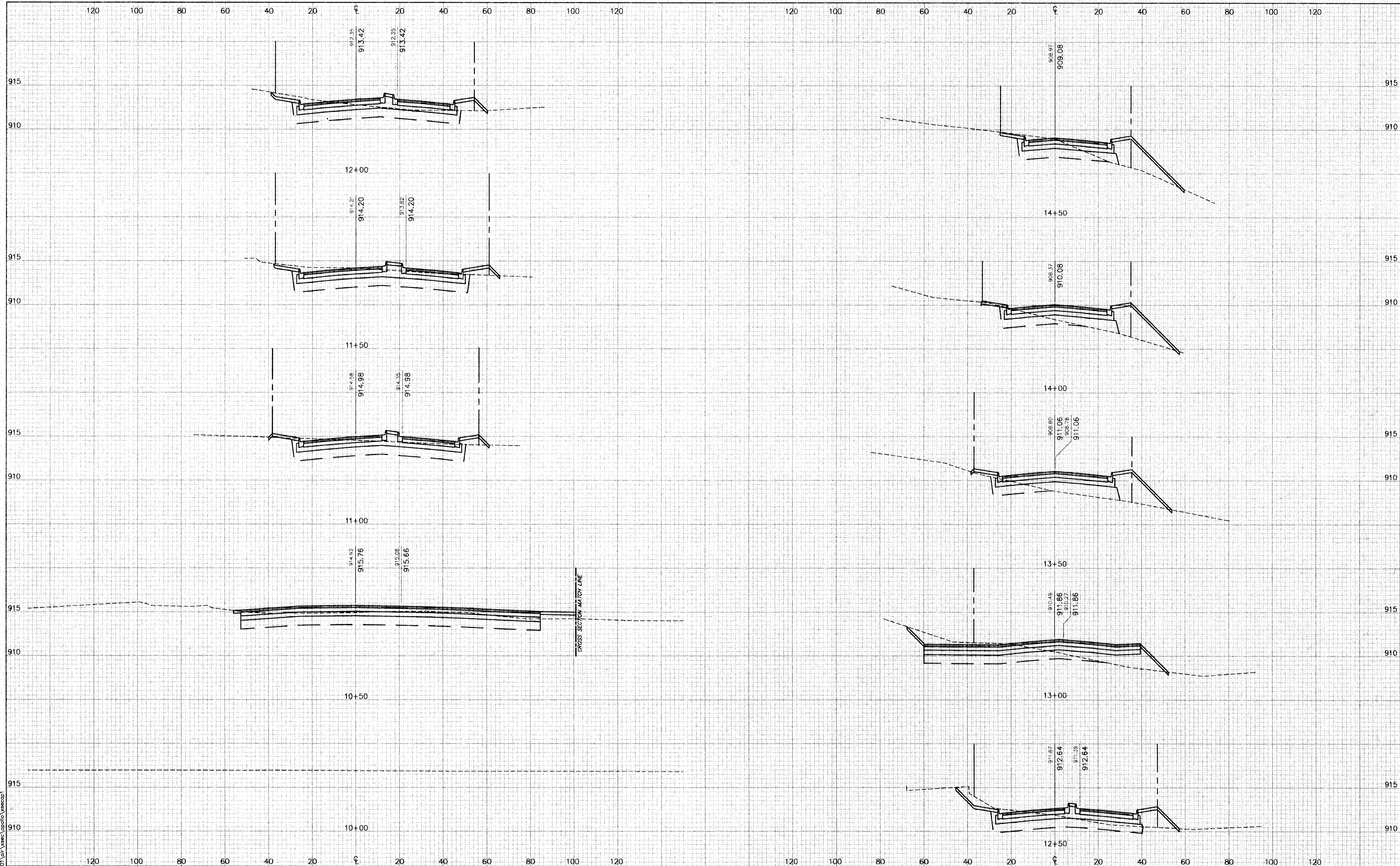
**TKDA**  
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 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

LAKE DRIVE  
 40+00 TO 44+50  
 CROSS SECTIONS  
 SHEET NO. 43 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1 = 5  
 CURRENT: 01/28/02  
 DIR: I:\lakes\122601\lrf\misc\apollo\yescap1

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB  
 DRAWN APO  
 CHECKED PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

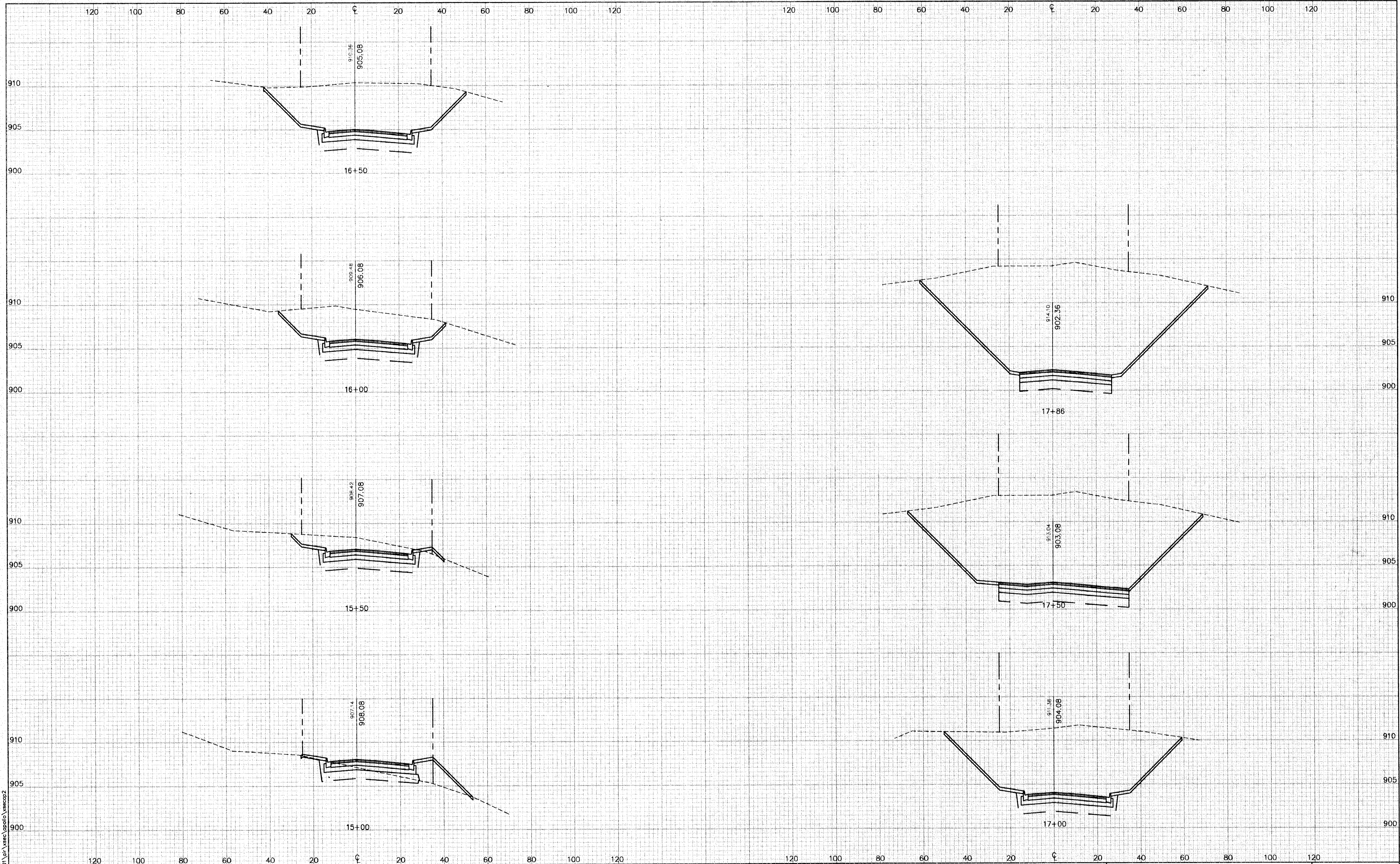
**TKDA**  
 TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED  
 ENGINEERS • ARCHITECTS • PLANNERS  
 SAINT PAUL, MINNESOTA

LAKE DRIVE APOLLO DRIVE IMPROVEMENTS  
 MINNESOTA  
 LINO LAKES

APOLLO DRIVE 10+00 TO 14+50 CROSS SECTIONS  
 SHEET NO. 44 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1\_1 = 5  
 CURRENT: 01/28/02  
 DIR: I:\projects\124260\lino\lake\apollo\apollo\_vascop2

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED  
 PWB  
 DRAWN  
 APO  
 CHECKED  
 PWB

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED  
 BY ME OR UNDER MY DIRECT SUPERVISION AND THAT  
 I AM A DULY LICENSED PROFESSIONAL ENGINEER  
 UNDER THE LAWS OF THE STATE OF MINNESOTA  
*Paul Blum* JAN 28, 2002  
 PAUL W. BLUM LIC. NO. 12779

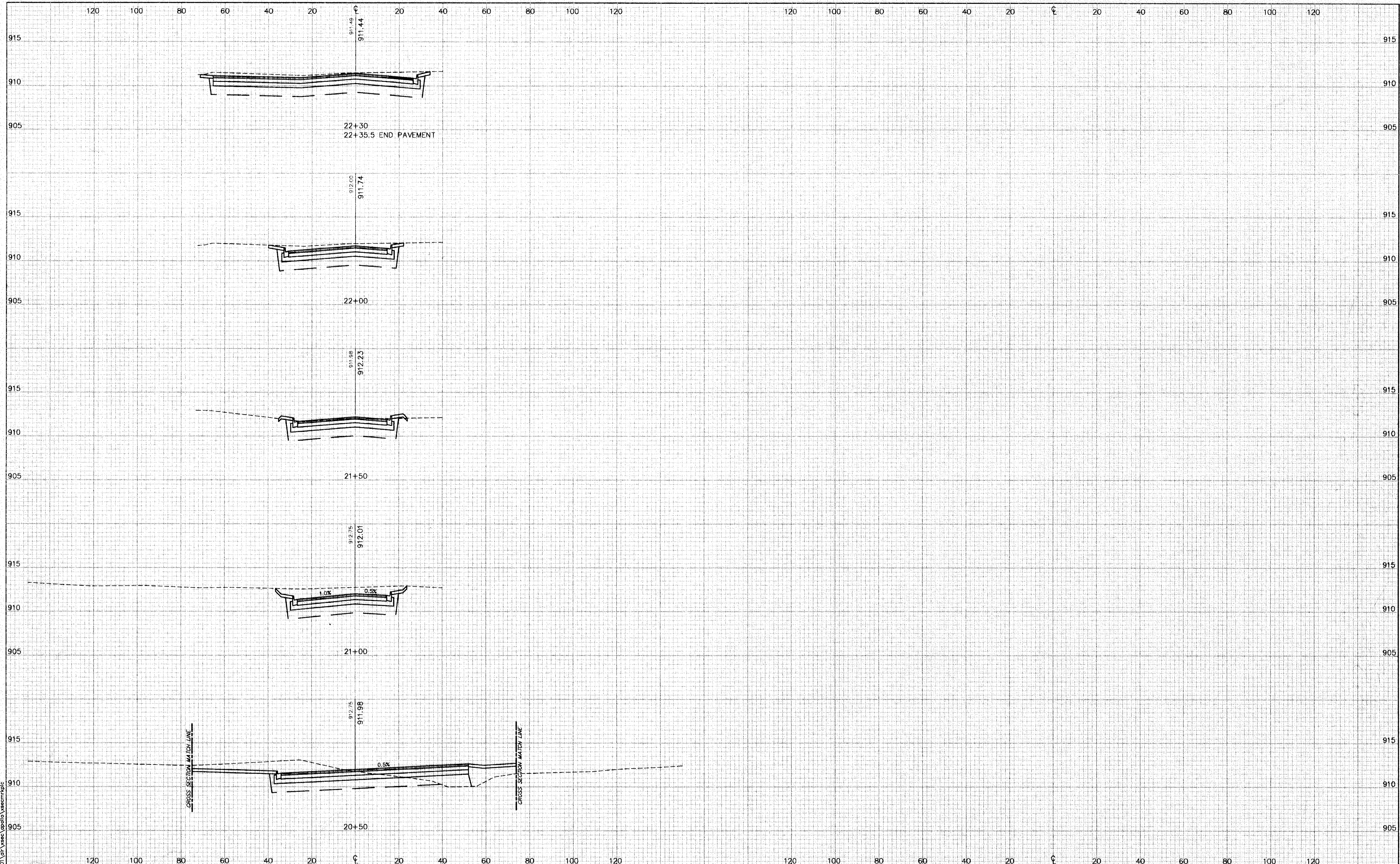
**TKDA**  
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 TOLTZ, KING, DUVALL, ANDERSON  
 AND ASSOCIATES INCORPORATED  
 SAINT PAUL, MINNESOTA

LAKE DRIVE  
 APOLLO DRIVE  
 IMPROVEMENTS  
 LINO LAKES  
 MINNESOTA

APOLLO DRIVE  
 15+00 TO 17+50  
 CROSS SECTIONS  
 SHEET NO. 45 OF 46 SHEETS

COMMISSION NO.  
 12426-01





PLOT: 1 = 5  
 CURRENT: 01/28/02  
 DIR: I:\projects\1242601\01r\ases\spallo\asem\pic

NO.	DATE	BY	DESCRIPTION OF REVISIONS

DESIGNED PWB	DRAWN APO	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA <i>Paul Blum</i> JAN 28, 2002 PAUL W. BLUM LIC. NO. 12779
CHECKED PWB		

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SAINT PAUL, MINNESOTA

LAKE DRIVE  
APOLLO DRIVE  
IMPROVEMENTS

MINNESOTA

MARKET PLACE  
20+50 TO 22+00  
CROSS SECTIONS

SHEET NO. 46 OF 46 SHEETS

COMMISSION NO.  
**12426-01**