

MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR TRAFFIC CONTROL SIGNAL SYSTEMS

LOCATED AT:

C.S.A.H.9 (ROUND LAKE BOULEVARD) AT 140th AVENUE N.W. IN ANDOVER, SYSTEM "A", S.A.P. 02-609-07
 COUNTY ROAD 78 (HANSON BOULEVARD) AT 121st AVENUE N.W. IN COON RAPIDS, SYSTEM "B", S.A.P. 114-102-08, C.P. 88-04-78
 COUNTY ROAD 51 (UNIVERSITY AVENUE) AT 117th AVENUE N.E. IN COON RAPIDS AND BLAINE, SYSTEM "C", S.A.P. 106-109-04, C.P. 88-06-51
 C.S.A.H. 23 (LAKE DRIVE) AT FIREBARN ROAD IN CIRCLE PINES, SYSTEM "D", S.A.P. 02-623-06

FED. PROJ. NO. _____

GOVERNING SPECIFICATIONS

THE 1983 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION 'STANDARD SPECIFICATION FOR CONSTRUCTION' AND SUPPLEMENTAL SPECIFICATIONS, DATED MAY 19, 1987, SHALL GOVERN

INDEX

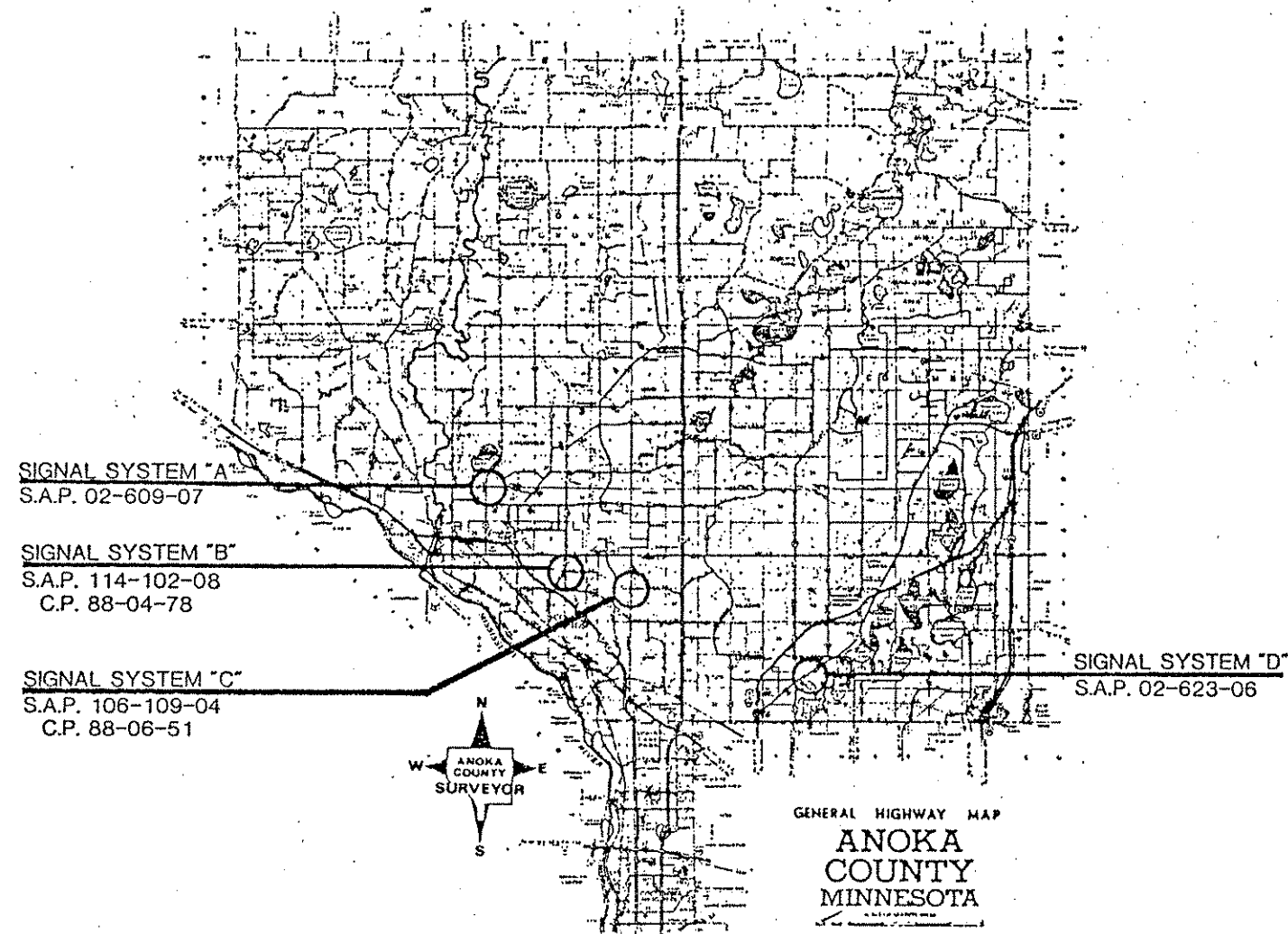
- 1 TITLE SHEET
- 2-9 INTERSECTION LAYOUTS AND FIELD WIRING DIAGRAMS
- 10 DETAILS
- 11-14 UTILITIES

THIS PLAN CONTAINS 14 SHEETS

PROJECT LOCATIONS

SCALE

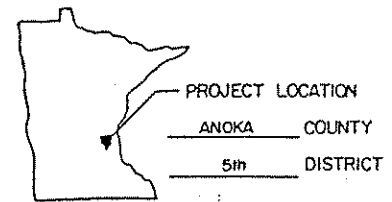
INDEX MAP	2.88 MI
PLAN & PROFILE	HORIZ. NA
	VERT. NA
CROSS SECTIONS	NA
SIGNAL	30 FEET



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

DATE 7/5/88 REG. NO. 9089 ENGR. Allen Van Wormer
 DESIGN SQUAD M. KREBSBACH

- Right of Way Approval _____ 19__
- Recommended for Approval Paul K. Kind 7/15/1988
ANOKA COUNTY ENGINEER
- Recommended for Approval Jerry B. Peterson 7/20 1988
CITY OF BLAINE
- Recommended for Approval William R. Ottum 7/20 1988
CITY OF COON RAPIDS
- Recommended for Approval C.E. Weichselbaum 7/17/1988
DISTRICT STATE AID ENGINEER
- Recommended for Approval Julia Skallman 7/1 1988
STATE AID PLAN REVIEW ENGINEER
- Approved 8/2 1988 Shelly M. Jay
STATE AID ENGINEER



FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

STATE PROJ. NO.	AREA	JOB
_____	_____	_____
_____	_____	_____
_____	_____	_____

DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 APPROVED _____
 DIVISION ADMINISTRATOR DATE

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, OF THIS PLAN WERE MADE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ REG. NO. _____

ESTIMATED QUANTITIES

PROJECT NO.	ITEM NO.	ITEM	UNIT	TOTAL ESTIMATED QUANTITIES	MINNEAPOLIS DISTRICT					
					02-609-07 ANOKA COUNTY	88-04-78 ANOKA COUNTY	114-102-08 COON RAPIDS	88-06-51 ANOKA COUNTY COON RAPIDS	106-109-04 BLAINE	02-623-06 ANOKA COUNTY
	2104.501	REMOVE CURB AND GUTTER	LIN.FT.	100		25	75			
	2104.505	REMOVE CONCRETE SIDEWALK	SO.FT.	300		75	225			
	2105.503	COMMON BORROW (LV)	CUBIC YARD	32	16			5.33	2.67	8
	2501.511	15" C.M. PIPE CULVERT	LIN FT.	16	16					
	2521.501	4" CONCRETE WALK	SO.FT.	240		60	180			
	2531.501	CONCRETE CURB AND GUTTER (8618)	LIN FT.	100		25	75			
	2531.602	PEDESTRIAN CURB RAMP	EA.	3		0.75	2.25			
	2565.511	FULL-TRAFFIC-ACTUATED TRAFFIC CONTROL SIGNAL SYSTEM "A"	SIGNAL SYSTEM	1	1					
	2565.511	FULL-TRAFFIC-ACTUATED TRAFFIC CONTROL SIGNAL SYSTEM "B"	SIGNAL SYSTEM	1		0.25	0.75			
	2565.511	FULL-TRAFFIC-ACTUATED TRAFFIC CONTROL SIGNAL SYSTEM "C"	SIGNAL SYSTEM	1			0.333	0.167	0.50	
	2565.511	FULL-TRAFFIC-ACTUATED TRAFFIC CONTROL SIGNAL SYSTEM "D"	SIGNAL SYSTEM	1						1
	2575.501	ROADSIDE SEEDING	SQ.YD.	120	60		20	10	30	

STATE AID PROJ. NO. _____ COUNTY PROJ. NO. _____
 STATE PROJ. NO. _____ SHEET NO. 1 OF 14 SHEETS

NOTES:

- 1) SEE SPECIAL PROVISIONS FOR CONTRACTORS RESPONSIBILITY FOR LOCATION OF UTILITIES.
- 2) ALL SIGNAL FACES SHALL HAVE BACKGROUND SHIELDS.
- 3) LUMINAIRE Δ WITH P.E.C. AND CHECK SWITCH.
- 4) SEE SPECIAL PROVISIONS FOR ANOKA COUNTY SERVICE CABINET DETAILS.
- 5) DIRECTIONAL SIGNS TO BE FURNISHED AND INSTALLED ON MAST ARMS AT ① ② ③ AND ④. SEE SPECIAL PROVISIONS.
- 6) HANDHOLES SHALL BE CONCRETE OR P.V.C. WITH CONCRETE COVERS.
- 7) LOOP DETECTOR WIRES SHALL BE CROSS LINKED POLYETHYLENE (XLP) IN 1" N.M.C. SEE SPECIAL PROVISIONS.
- 8) ALL PEDESTRIAN INDICATIONS SHALL BE 9" x 9".
- 9) HUBS FOR POLE MOUNTED SIGNAL INDICATIONS SHALL BE PROVIDED ON 4 SIDES OF MAST ARM POLES.

① TYPE P90-A-25-D40-9 (DAVIT AT 350°)
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10B-POLE MOUNTED 90°
 TYPE 10B-POLE MOUNTED 270°
 LUMINAIRE-200 WATT H.P.S.
 2-PEDESTRIAN PUSH BUTTONS AND SIGNS
 EXTEND INTO H.H.6:
 3" R.S.C.
 2-12/c #12
 1-3/c #12
 2-1/c #10

④ TYPE P90-A-25
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10B-POLE MOUNTED 90°
 TYPE 10B-POLE MOUNTED 270°
 2-PEDESTRIAN PUSH BUTTONS AND SIGNS
 EXTEND INTO H.H.3:
 3" R.S.C.
 2-12/c #12
 1-3/c #12

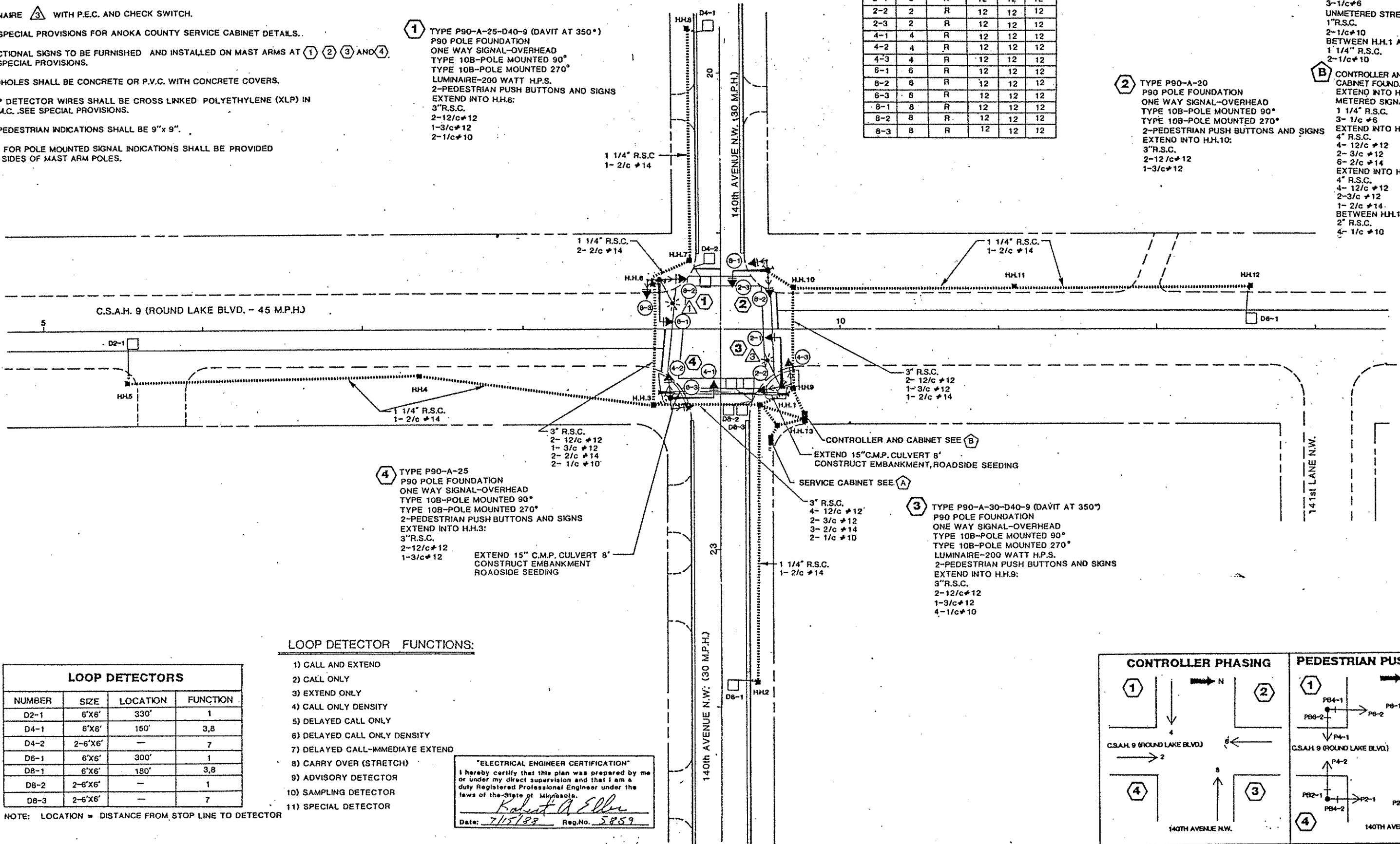
③ TYPE P90-A-30-D40-9 (DAVIT AT 350°)
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10B-POLE MOUNTED 90°
 TYPE 10B-POLE MOUNTED 270°
 LUMINAIRE-200 WATT H.P.S.
 2-PEDESTRIAN PUSH BUTTONS AND SIGNS
 EXTEND INTO H.H.9:
 3" R.S.C.
 2-12/c #12
 1-3/c #12
 4-1/c #10

SIGNAL INDICATIONS					
FACE	PHASE	FLASH	R	Y	G
2-1	2	R	12	12	12
2-2	2	R	12	12	12
2-3	2	R	12	12	12
4-1	4	R	12	12	12
4-2	4	R	12	12	12
4-3	4	R	12	12	12
6-1	6	R	12	12	12
6-2	6	R	12	12	12
6-3	6	R	12	12	12
8-1	8	R	12	12	12
8-2	8	R	12	12	12
8-3	8	R	12	12	12



- Ⓐ SERVICE CABINET
 CABINET FOUNDATION
 STUB OUT 2" R.S.C.
 (FOR SERVICE BY OTHERS)
 EXTEND INTO H.H.13:
 METERED SIGNAL SERVICE
 1 1/4" R.S.C.
 3-1/c #6
 UNMETERED STREET LIGHT SERVICE
 1" R.S.C.
 2-1/c #10
 BETWEEN H.H.1 AND H.H.13
 1 1/4" R.S.C.
 2-1/c #10
- Ⓑ CONTROLLER AND CABINET
 CABINET FOUNDATION
 EXTEND INTO H.H.13:
 METERED SIGNAL SERVICE
 1 1/4" R.S.C.
 3-1/c #6
 EXTEND INTO H.H.1:
 4" R.S.C.
 4-12/c #12
 2-3/c #12
 6-2/c #14
 EXTEND INTO H.H.9:
 4" R.S.C.
 4-12/c #12
 2-3/c #12
 1-2/c #14
 BETWEEN H.H.1 AND H.H.9
 2" R.S.C.
 4-1/c #10

② TYPE P90-A-20
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10B-POLE MOUNTED 90°
 TYPE 10B-POLE MOUNTED 270°
 2-PEDESTRIAN PUSH BUTTONS AND SIGNS
 EXTEND INTO H.H.10:
 3" R.S.C.
 2-12/c #12
 1-3/c #12



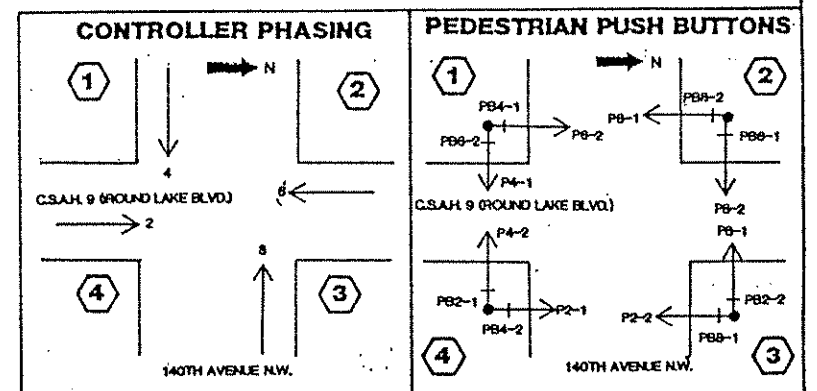
LOOP DETECTOR FUNCTIONS:

- 1) CALL AND EXTEND
- 2) CALL ONLY
- 3) EXTEND ONLY
- 4) CALL ONLY DENSITY
- 5) DELAYED CALL ONLY
- 6) DELAYED CALL ONLY DENSITY
- 7) DELAYED CALL-IMMEDIATE EXTEND
- 8) CARRY OVER (STRETCH)
- 9) ADVISORY DETECTOR
- 10) SAMPLING DETECTOR
- 11) SPECIAL DETECTOR

LOOP DETECTORS			
NUMBER	SIZE	LOCATION	FUNCTION
D2-1	6'X6'	330'	1
D4-1	6'X6'	150'	3,8
D4-2	2-6'X6'	-	7
D6-1	6'X6'	300'	1
D8-1	6'X6'	180'	3,8
D8-2	2-6'X6'	-	1
D8-3	2-6'X6'	-	7

NOTE: LOCATION = DISTANCE FROM STOP LINE TO DETECTOR

"ELECTRICAL ENGINEER CERTIFICATION"
 I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Robert A. Ellen
 Date: 7/15/89 Reg. No. 5859



NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
John Van Wagoner
 Date: 7/19/89 Reg. No. 9089

ENGINEERS ARCHITECTS & PLANNERS

SIGNAL SYSTEM "A"
 INTERSECTION LAYOUT
 140th AVE N.W. AT C.S.A.H.9 (ROUND LAKE BLVD.)

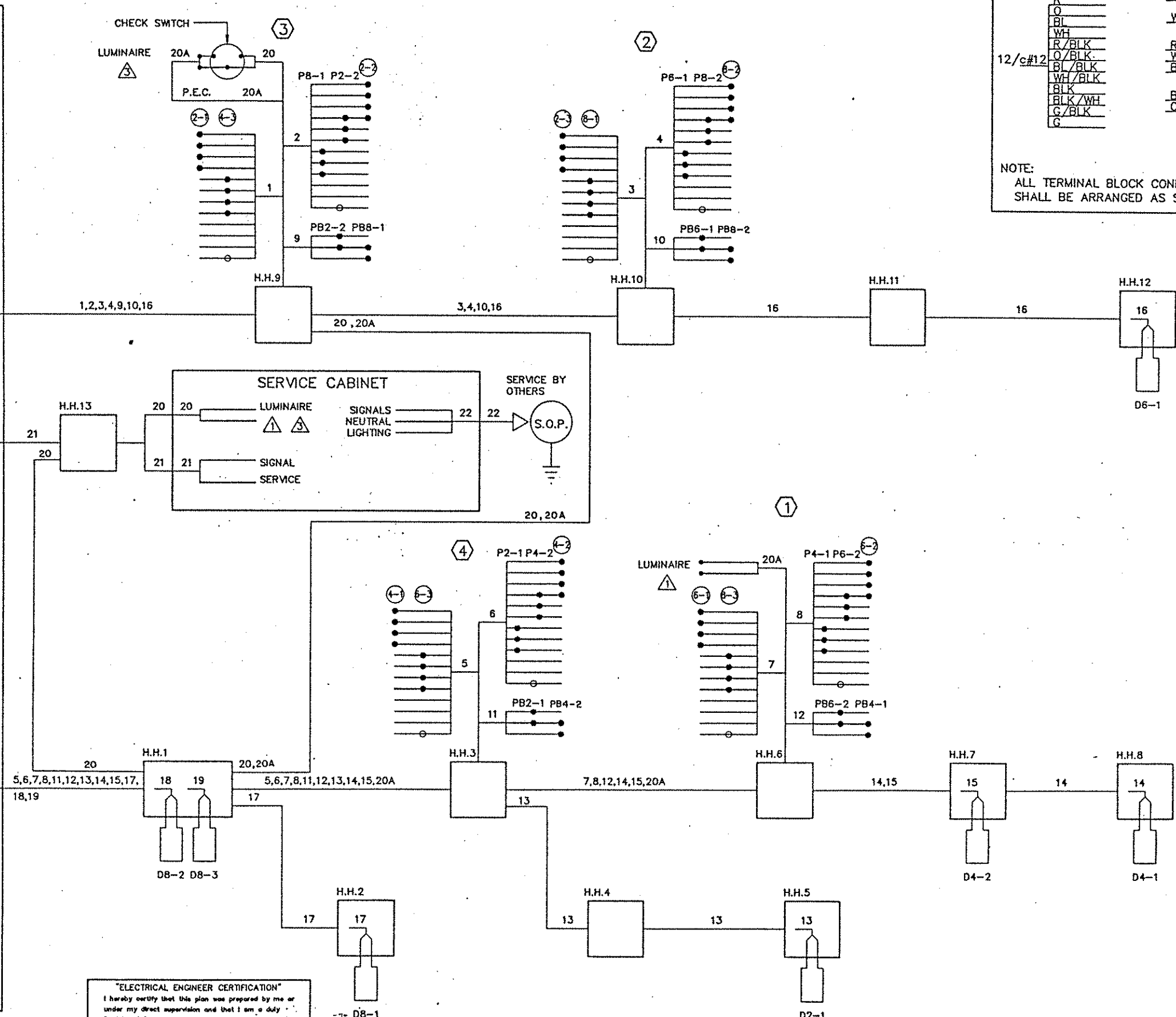
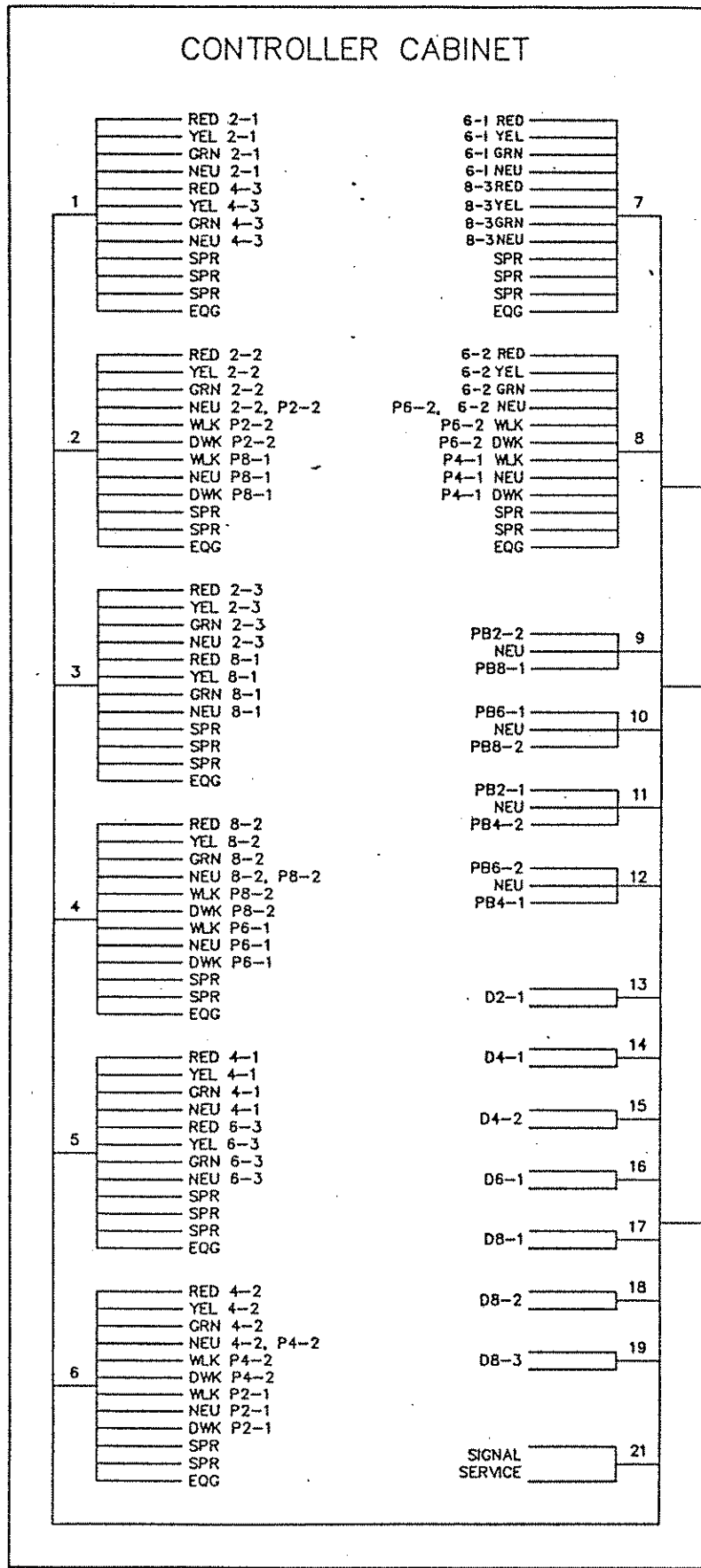
S.A.P. 02-609-07

FILE NO.	88148.03	2
DATE	7/5/88	14

CONDUCTOR COLOR CODING

R	BLK	2-1/c#2
O	WH	2-1/c#6
BL	WH	2-1/c#10
WH	R	
R/BLK	WH	3/c#12
O/BLK	BLK	
BL/BLK	BLK	
WH/BLK	BLK	
BLK	BLK	
BLK/WH	BLK	2/c#14
G/BLK	CLEAR	
G		

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



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Robert A. Sllon
Date: 7/15/89 Reg. No. 5859

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SIGNAL SYSTEM "A"
FIELD WIRING DIAGRAM

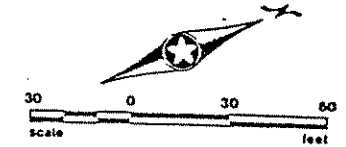
S.A.P. 02-609-07

FILE NO. 88146.03
DATE
3

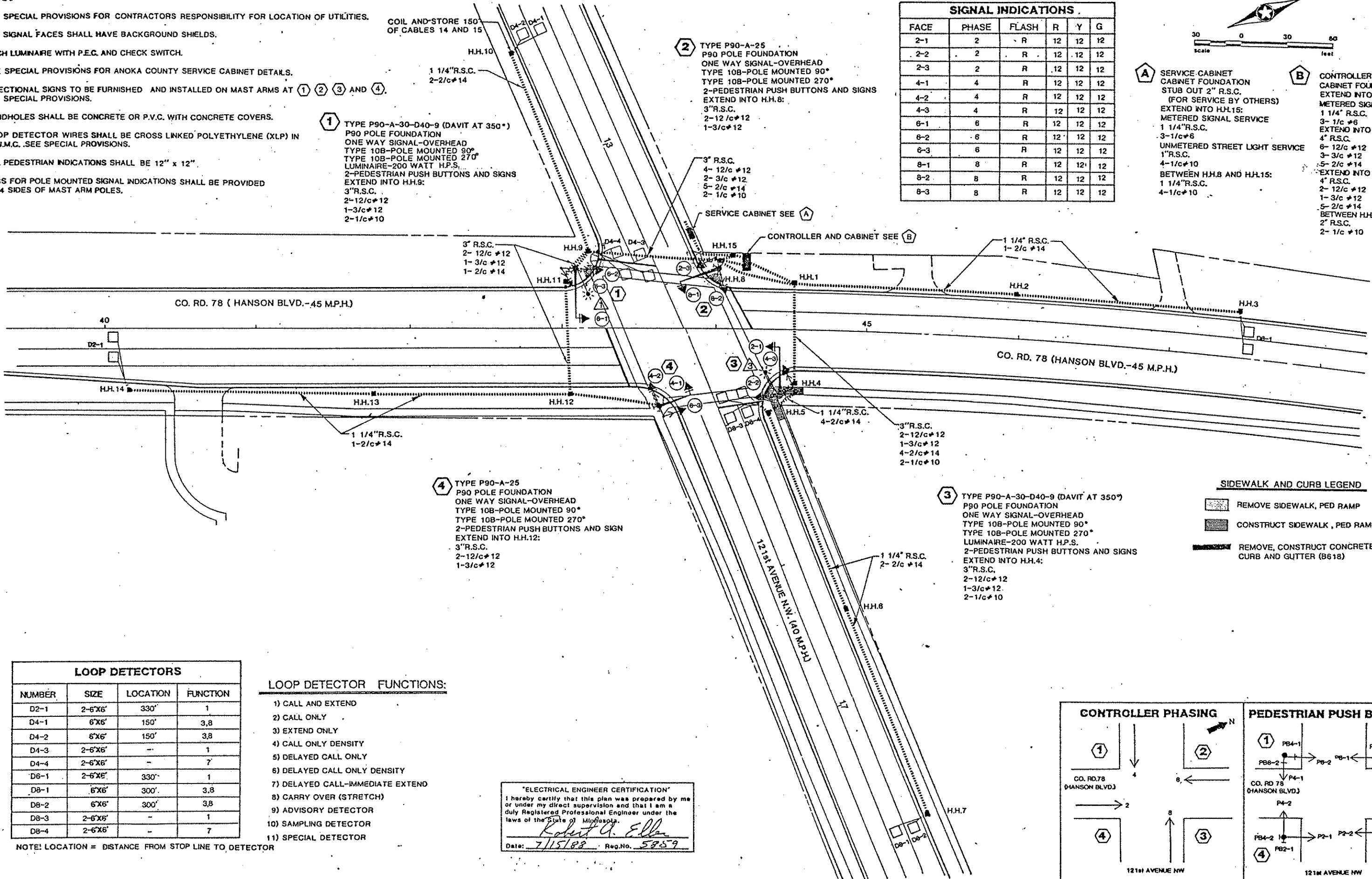
NOTES:

- 1) SEE SPECIAL PROVISIONS FOR CONTRACTORS RESPONSIBILITY FOR LOCATION OF UTILITIES.
- 2) ALL SIGNAL FACES SHALL HAVE BACKGROUND SHIELDS.
- 3) EACH LUMNAIRE WITH P.E.C. AND CHECK SWITCH.
- 4) SEE SPECIAL PROVISIONS FOR ANOKA COUNTY SERVICE CABINET DETAILS.
- 5) DIRECTIONAL SIGNS TO BE FURNISHED AND INSTALLED ON MAST ARMS AT ① ② ③ AND ④. SEE SPECIAL PROVISIONS.
- 6) HANDHOLES SHALL BE CONCRETE OR P.V.C. WITH CONCRETE COVERS.
- 7) LOOP DETECTOR WIRES SHALL BE CROSS LINKED POLYETHYLENE (XLP) IN 1" N.M.C. .SEE SPECIAL PROVISIONS.
- 8) ALL PEDESTRIAN INDICATIONS SHALL BE 12" x 12".
- 9) HUBS FOR POLE MOUNTED SIGNAL INDICATIONS SHALL BE PROVIDED ON 4 SIDES OF MAST ARM POLES.

SIGNAL INDICATIONS					
FACE	PHASE	FLASH	R	Y	G
2-1	2	R	12	12	12
2-2	2	R	12	12	12
2-3	2	R	12	12	12
4-1	4	R	12	12	12
4-2	4	R	12	12	12
4-3	4	R	12	12	12
6-1	6	R	12	12	12
6-2	6	R	12	12	12
6-3	6	R	12	12	12
8-1	8	R	12	12	12
8-2	8	R	12	12	12
8-3	8	R	12	12	12



- A** SERVICE CABINET
CABINET FOUNDATION
STUB OUT 2" R.S.C.
(FOR SERVICE BY OTHERS)
EXTEND INTO H.H.15:
METERED SIGNAL SERVICE
1 1/4" R.S.C.
EXTEND INTO H.H.8:
1 1/4" R.S.C.
UNMETERED STREET LIGHT SERVICE
1" R.S.C.
4-1/c #10
- B** CONTROLLER AND CABINET
CABINET FOUNDATION
EXTEND INTO H.H.15:
METERED SIGNAL SERVICE
1 1/4" R.S.C.
EXTEND INTO H.H.8:
4" R.S.C.
6-12/c #12
3-3/c #12
5-2/c #14
EXTEND INTO H.H.1:
4" R.S.C.
2-12/c #12
1-3/c #12
5-2/c #14
BETWEEN H.H. 8 AND H.H.1:
2" R.S.C.
2-1/c #10



① TYPE P90-A-30-D40-9 (DAVIT AT 350°)
P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10B-POLE MOUNTED 90°
TYPE 10B-POLE MOUNTED 270°
LUMINAIRE-200 WATT H.P.S.
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
EXTEND INTO H.H.9:
3" R.S.C.
2-12/c #12
1-3/c #12
2-1/c #10

② TYPE P90-A-25
P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10B-POLE MOUNTED 90°
TYPE 10B-POLE MOUNTED 270°
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
EXTEND INTO H.H.8:
3" R.S.C.
2-12/c #12
1-3/c #12

④ TYPE P90-A-25
P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10B-POLE MOUNTED 90°
TYPE 10B-POLE MOUNTED 270°
2-PEDESTRIAN PUSH BUTTONS AND SIGN
EXTEND INTO H.H.12:
3" R.S.C.
2-12/c #12
1-3/c #12

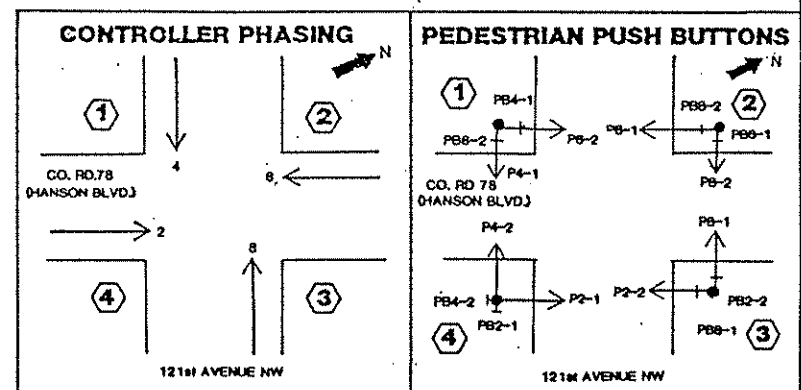
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P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10B-POLE MOUNTED 90°
TYPE 10B-POLE MOUNTED 270°
LUMINAIRE-200 WATT H.P.S.
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
EXTEND INTO H.H.4:
3" R.S.C.
2-12/c #12
1-3/c #12
2-1/c #10

- SIDEWALK AND CURB LEGEND**
- REMOVE SIDEWALK, PED RAMP
 - CONSTRUCT SIDEWALK, PED RAMP
 - REMOVE, CONSTRUCT CONCRETE CURB AND GUTTER (8618)

LOOP DETECTORS			
NUMBER	SIZE	LOCATION	FUNCTION
D2-1	2-6'X6'	330'	1
D4-1	6'X6'	150'	3,8
D4-2	6'X6'	150'	3,8
D4-3	2-6'X6'	-	1
D4-4	2-6'X6'	-	7
D6-1	2-6'X6'	330'	1
DB-1	6'X6'	300'	3,8
DB-2	6'X6'	300'	3,8
DB-3	2-6'X6'	-	1
DB-4	2-6'X6'	-	7

- LOOP DETECTOR FUNCTIONS:**
- 1) CALL AND EXTEND
 - 2) CALL ONLY
 - 3) EXTEND ONLY
 - 4) CALL ONLY DENSITY
 - 5) DELAYED CALL ONLY
 - 6) DELAYED CALL ONLY DENSITY
 - 7) DELAYED CALL-IMMEDIATE EXTEND
 - 8) CARRY OVER (STRETCH)
 - 9) ADVISORY DETECTOR
 - 10) SAMPLING DETECTOR
 - 11) SPECIAL DETECTOR

"ELECTRICAL ENGINEER CERTIFICATION"
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Robert A. Ellen
Date: 7/15/88 Reg.No. 5859





- NOTES:**
- 1) SEE SPECIAL PROVISIONS FOR CONTRACTORS RESPONSIBILITY FOR LOCATION OF UTILITIES.
 - 2) ALL SIGNAL FACES SHALL HAVE BACKGROUND SHIELDS.
 - 3) LUMINAIRE Δ 3 WITH P.E.C. AND CHECK SWITCH.
 - 4) SEE SPECIAL PROVISIONS FOR ANOKA COUNTY SERVICE CABINET DETAILS.
 - 5) DIRECTIONAL SIGNS TO BE FURNISHED AND INSTALLED ON MAST ARMS AT 1 AND 3. SEE SPECIAL PROVISIONS.
 - 6) HANDHOLES SHALL BE CONCRETE OR P.V.C. WITH CONCRETE COVERS.
 - 7) LOOP DETECTOR WIRES SHALL BE CROSS LINKED POLYETHYLENE (XLP) IN 1" N.M.C. SEE SPECIAL PROVISIONS.
 - 8) ALL PEDESTRIAN INDICATIONS SHALL BE 9" x 9".
 - 9) HUBS FOR POLE MOUNTED SIGNAL INDICATIONS SHALL BE PROVIDED ON 4 SIDES OF MAST ARM POLES.
 - 10) AN EXTRA 30' OF EACH CABLE TO ADJACENT PEDESTALS SHALL BE COILED AND STORED IN HANDHOLES 4 AND 10.

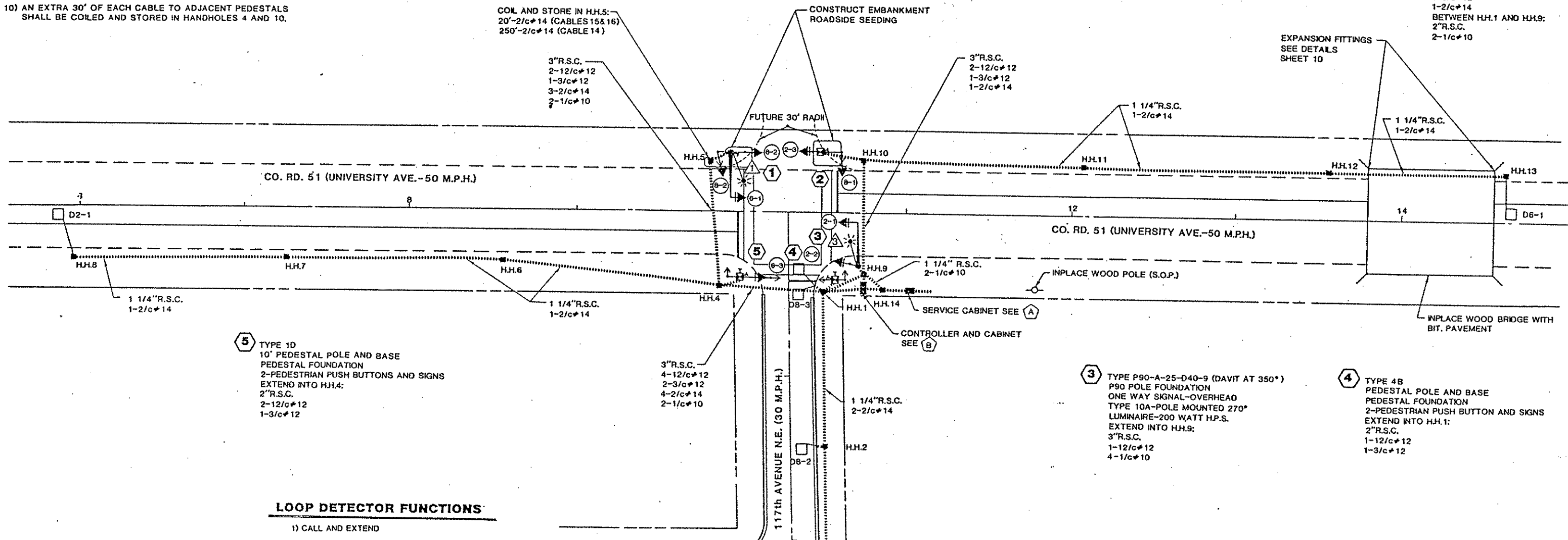
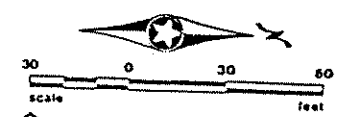
1 TYPE P90-A-25-D40-9 (DAVIT AT 350*)
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10A-POLE MOUNTED 270°
 TYPE 10B-POLE MOUNTED 90°
 LUMINAIRE-200 WATT H.P.S.
 ONE-PEDESTRIAN PUSH BUTTON AND SIGN
 EXTEND INTO H.H.10:
 2" R.S.C.
 2-12/c#12
 1-3/c#12
 2-1/c#10

2 TYPE 2B
 10' PEDESTAL POLE AND BASE
 PEDESTAL FOUNDATION
 ONE-PEDESTRIAN PUSH BUTTON AND SIGN
 EXTEND INTO H.H.10:
 2" R.S.C.
 2-12/c#12
 1-3/c#12

SIGNAL INDICATIONS					
FACE	PHASE	FLASH	R	Y	G
2-1	2	R	12	12	12
2-2	2	R	12	12	12
2-3	2	R	12	12	12
6-1	6	R	12	12	12
6-2	6	R	12	12	12
6-3	6	R	12	12	12
8-1	8	R	12	12	12
8-2	8	R	12	12	12

A SERVICE CABINET
 CABINET FOUNDATION
 STUB OUT 2" R.S.C.
 (FOR SERVICE BY OTHERS)
 EXTEND INTO H.H.14:
 METERED SIGNAL SERVICE
 1 1/4" R.S.C.
 3-1/c#6
 UNMETERED STREET LIGHT SERVICE
 1" R.S.C.
 2-1/c#10

B CONTROLLER AND CABINET
 CABINET FOUNDATION
 EXTEND INTO H.H.14:
 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
 7-2/c#14
 EXTEND INTO H.H.9:
 4" R.S.C.
 3-12/c#12
 1-3/c#12
 1-2/c#14
 BETWEEN H.H.1 AND H.H.9:
 2" R.S.C.
 2-1/c#10



5 TYPE 1D
 10' PEDESTAL POLE AND BASE
 PEDESTAL FOUNDATION
 2-PEDESTRIAN PUSH BUTTONS AND SIGNS
 EXTEND INTO H.H.4:
 2" R.S.C.
 2-12/c#12
 1-3/c#12

3 TYPE P90-A-25-D40-9 (DAVIT AT 350*)
 P90 POLE FOUNDATION
 ONE WAY SIGNAL-OVERHEAD
 TYPE 10A-POLE MOUNTED 270°
 LUMINAIRE-200 WATT H.P.S.
 EXTEND INTO H.H.9:
 3" R.S.C.
 1-12/c#12
 4-1/c#10

4 TYPE 4B
 PEDESTAL POLE AND BASE
 PEDESTAL FOUNDATION
 2-PEDESTRIAN PUSH BUTTON AND SIGNS
 EXTEND INTO H.H.1:
 2" R.S.C.
 1-12/c#12
 1-3/c#12

LOOP DETECTOR FUNCTIONS

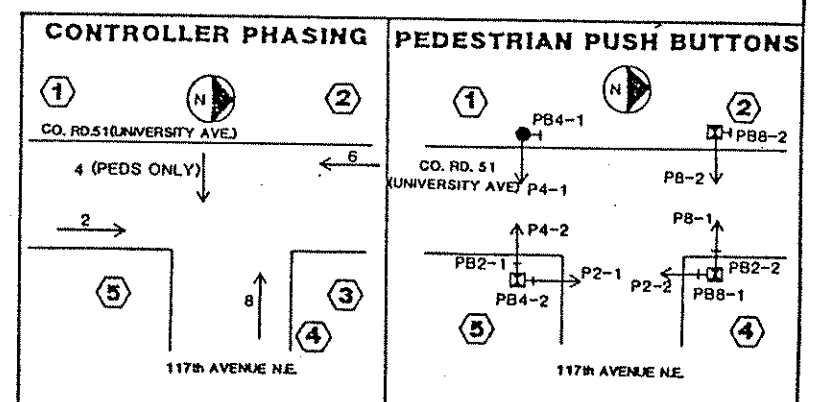
- 1) CALL AND EXTEND
- 2) CALL ONLY
- 3) EXTEND ONLY
- 4) CALL ONLY DENSITY
- 5) DELAYED CALL ONLY
- 6) DELAYED CALL ONLY DENSITY
- 7) DELAYED CALL-IMMEDIATE EXTEND
- 8) CARRY OVER (STRETCH)
- 9) ADVISORY DETECTOR
- 10) SAMPLING DETECTOR
- 11) SPECIAL DETECTOR

LOOP DETECTORS			
NUMBER	SIZE	LOCATION	FUNCTION
D2-1	6'x6'	410'	1
D6-1	6'x6'	410'	1
D8-1	6'x6'	220'	3
D8-2	6'x6'	100'	3
D8-3	2-6'x6'	-	7

NOTE: LOCATION=DISTANCE FROM STOP LINE TO DETECTOR.

"ELECTRICAL ENGINEER CERTIFICATION"
 I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Robert A. Elder
 Date: 7/15/88 Reg. No. 5859

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Clinton W. Warner
 Date: 7/14/88 Reg. No. 9089



NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

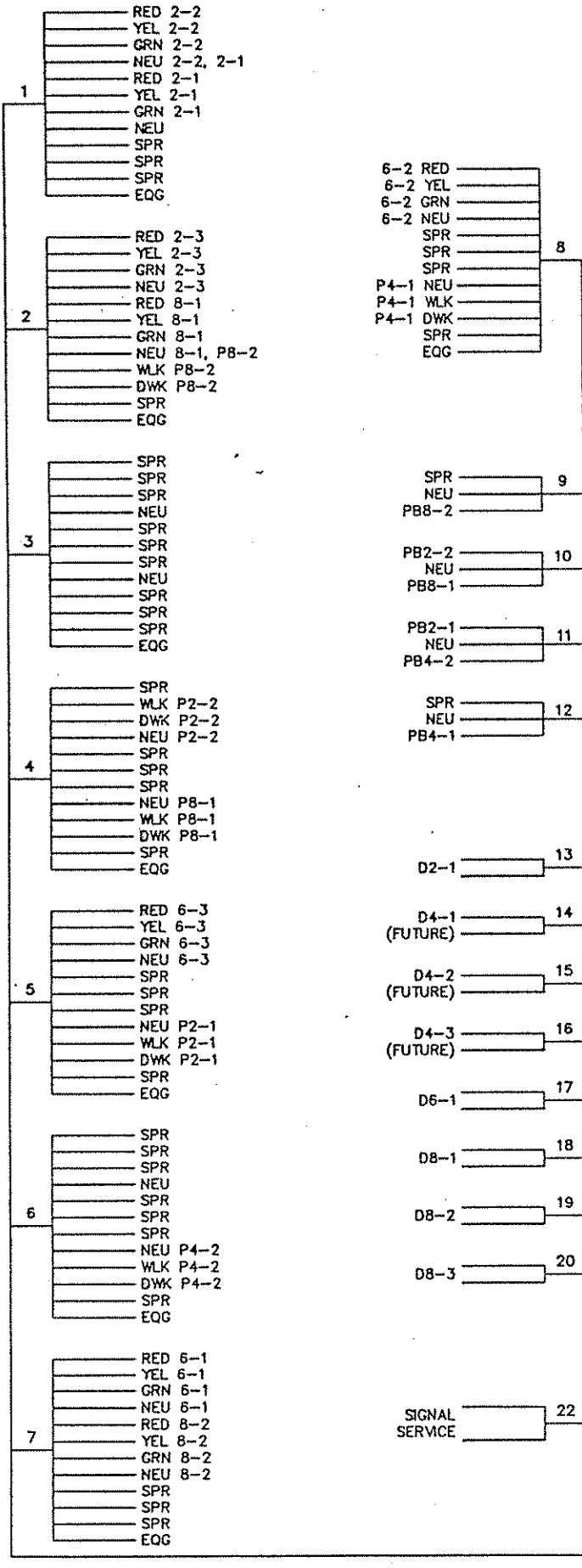


SIGNAL SYSTEM "C"
 INTERSECTION LAYOUT
 117th AVE N.E. AT CO. RD 51 (UNIVERSITY AVE)

S.A.P. 106-109-04
 C.P. 88-06-51

FILE NO. 88146.01	6
DATE 7/5/88	14

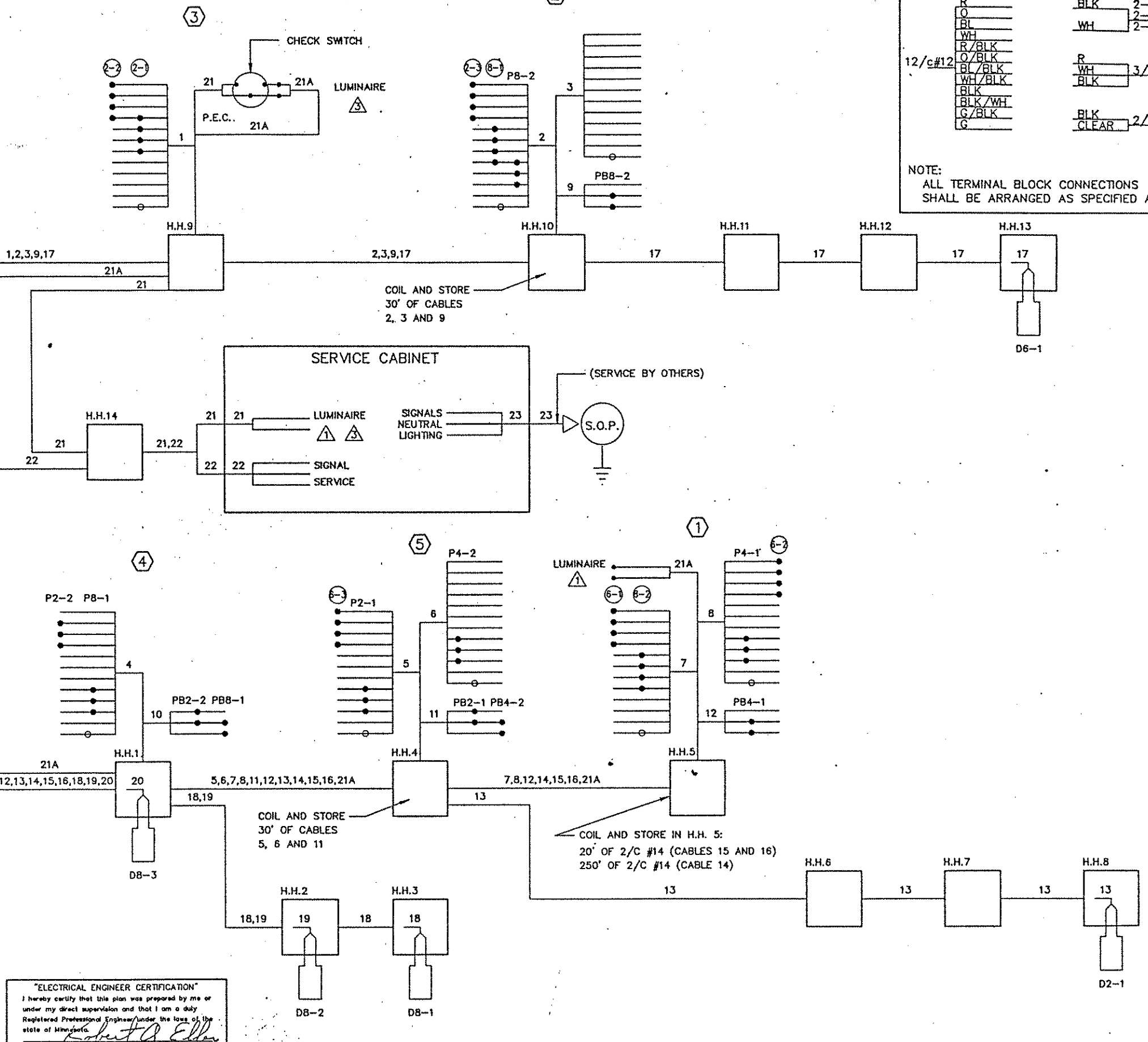
CONTROLLER CABINET



CONDUCTOR COLOR CODING

R	BLK	2-1/c#2
O	WH	2-1/c#5
BL	WH	2-1/c#10
WH		
R/BLK		
O/BLK		
BL/BLK		
WH/BLK		
BLK/WH		
G/BLK		
G		
	BLK	3/c#12
	BLK	2/c#14
	CLEAR	2/c#14

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



"ELECTRICAL ENGINEER CERTIFICATION"
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
Robert A. Ellen
Date: 7/15/88 Reg. No. 5259

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
William W. Brown
Date: 7/14/88 Reg. No. 9089



SIGNAL SYSTEM "C"
FIELD WIRING DIAGRAM
117th AVE. N.E. AT C.R. 51 (UNIVERSITY AVE.)

S.A.P. 106-109-04
C.P. 88-06-51

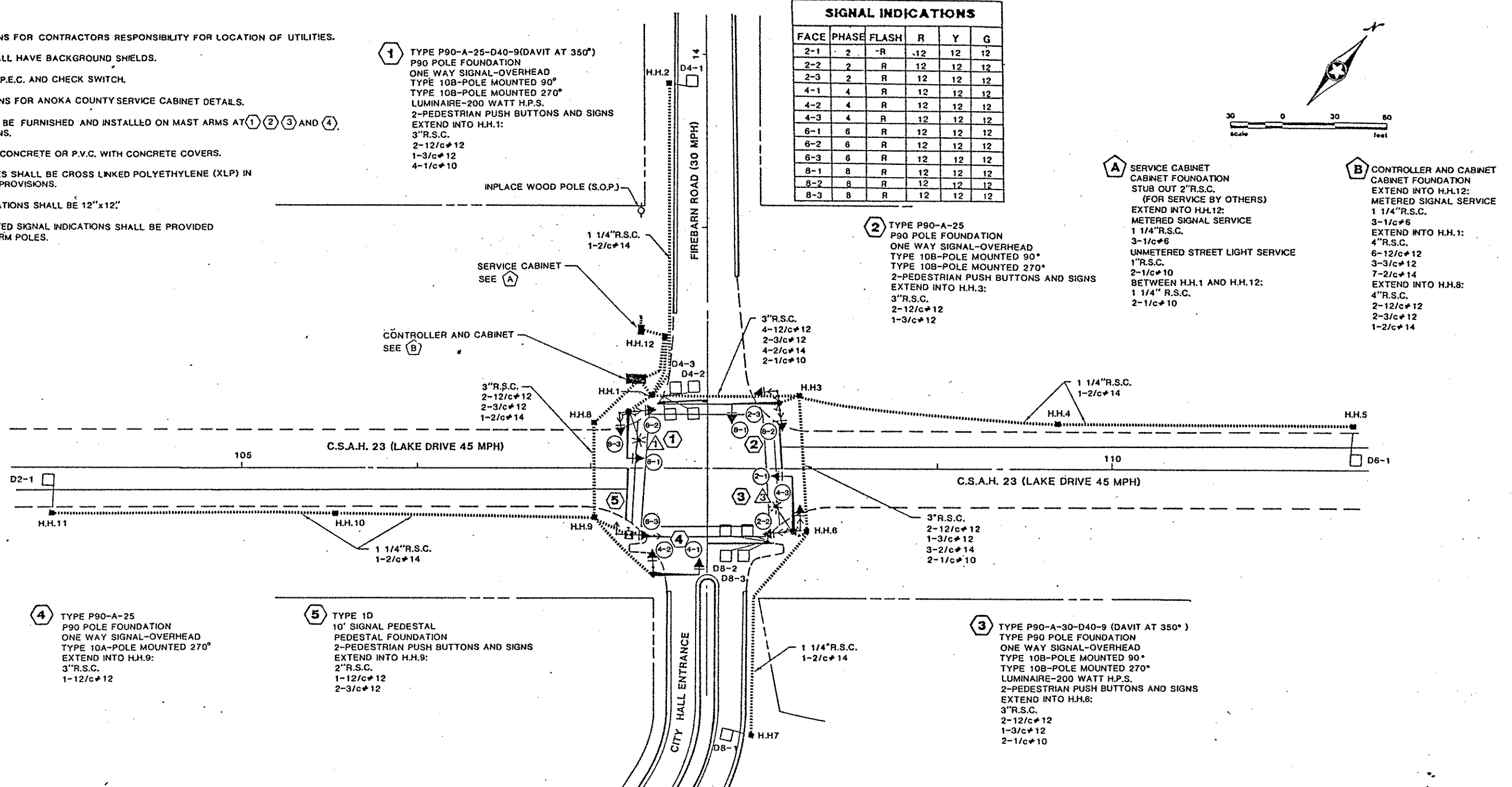
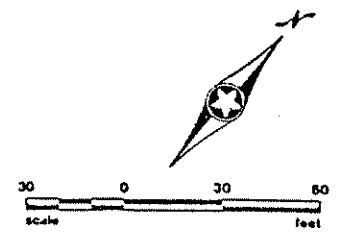
FILE NO.	7
88146.01	
DATE	7/5/88
	14

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

NOTES:

- 1) SEE SPECIAL PROVISIONS FOR CONTRACTORS RESPONSIBILITY FOR LOCATION OF UTILITIES.
- 2) ALL SIGNAL FACES SHALL HAVE BACKGROUND SHIELDS.
- 3) LUMINAIRE Δ WITH P.E.C. AND CHECK SWITCH.
- 4) SEE SPECIAL PROVISIONS FOR ANOKA COUNTY SERVICE CABINET DETAILS.
- 5) DIRECTIONAL SIGNS TO BE FURNISHED AND INSTALLED ON MAST ARMS AT ① ② ③ AND ④. SEE SPECIAL PROVISIONS.
- 6) HANDHOLES SHALL BE CONCRETE OR P.V.C. WITH CONCRETE COVERS.
- 7) LOOP DETECTOR WIRES SHALL BE CROSS LINKED POLYETHYLENE (XLP) IN 1" N.M.C. SEE SPECIAL PROVISIONS.
- 8) ALL PEDESTRIAN INDICATIONS SHALL BE 12"x12".
- 9) HUBS FOR POLE MOUNTED SIGNAL INDICATIONS SHALL BE PROVIDED ON 4 SIDES OF MAST ARM POLES.

SIGNAL INDICATIONS					
FACE	PHASE	FLASH	R	Y	G
2-1	2	-R	.12	12	12
2-2	2	R	12	12	12
2-3	2	R	12	12	12
4-1	4	R	12	12	12
4-2	4	R	12	12	12
4-3	4	R	12	12	12
6-1	6	R	12	12	12
6-2	6	R	12	12	12
6-3	6	R	12	12	12
8-1	8	R	12	12	12
8-2	8	R	12	12	12
8-3	8	R	12	12	12



④ TYPE P90-A-25
P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10A-POLE MOUNTED 270°
EXTEND INTO H.H.9:
3" R.S.C.
1-12/c#12

⑤ TYPE 1D
10' SIGNAL PEDESTAL
PEDESTAL FOUNDATION
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
EXTEND INTO H.H.9:
2" R.S.C.
1-12/c#12
2-3/c#12

③ TYPE P90-A-30-D40-9 (DAVIT AT 350°)
TYPE P90 POLE FOUNDATION
ONE WAY SIGNAL-OVERHEAD
TYPE 10B-POLE MOUNTED 90°
TYPE 10B-POLE MOUNTED 270°
LUMINAIRE-200 WATT H.P.S.
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
EXTEND INTO H.H.6:
3" R.S.C.
2-12/c#12
1-3/c#12
2-1/c#10

LOOP DETECTOR FUNCTIONS:

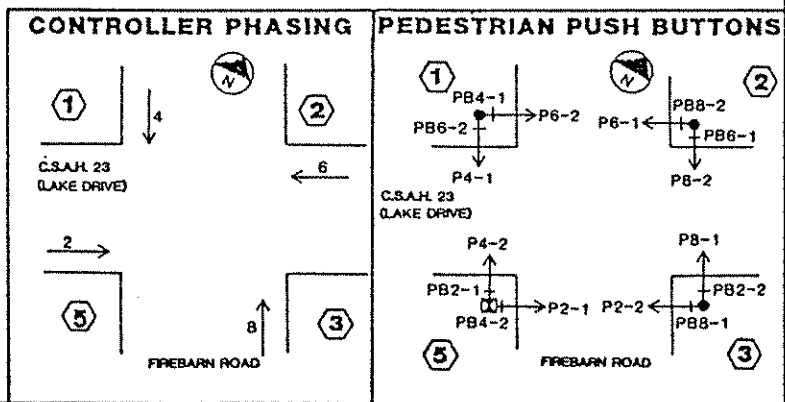
- 1) CALL AND EXTEND
- 2) CALL ONLY
- 3) EXTEND ONLY
- 4) CALL ONLY DENSITY
- 5) DELAYED CALL ONLY
- 6) DELAYED CALL ONLY DENSITY
- 7) DELAYED CALL-IMMEDIATE EXTEND
- 8) CARRY OVER (STRETCH)
- 9) ADVISORY DETECTOR
- 10) SAMPLING DETECTOR
- 11) SPECIAL DETECTOR

LOOP DETECTORS			
NUMBER	SIZE	LOCATION	FUNCTION
D2-1	6'x6'	330'	1
D4-1	6'x6'	180'	3,8
D4-2	2-6'x6'	-	1
D4-3	2-6'x6'	-	7
D6-1	6'x6'	330'	1
D8-1	6'x6'	110'	3,8
D8-2	2-6'x6'	-	1
D8-3	2-6'x6'	-	7

NOTE: LOCATION = DISTANCE FROM STOP LINE TO DETECTOR.

"ELECTRICAL ENGINEER CERTIFICATION"
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Robert A. Ellen
Date: 7/15/82 Reg. No. 5859

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
Alan Van Wormer
Date: 7/14/82 Reg. No. 9099



NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED



**SIGNAL SYSTEM "D"
INTERSECTION LAYOUT
FIREBARN ROAD AT C.S.A.H.23 (LAKE DRIVE)**

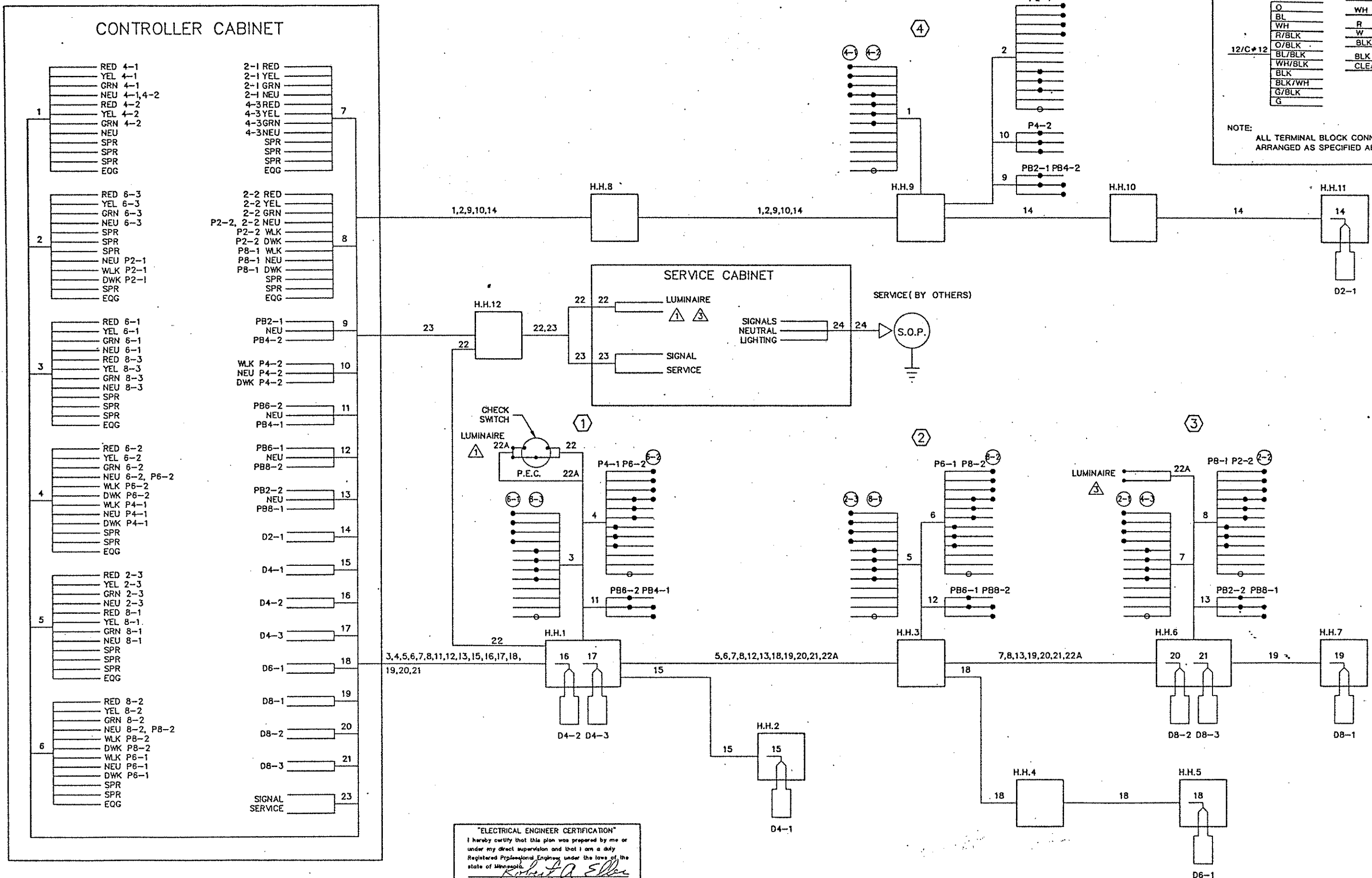
S.A.P. 02-623-06

FILE NO. 88148.00	8
DATE 7/5/88	14

CONDUCTOR COLOR CODING

R	BLK	2-1/C#8
O	WH	2-1/C#10
BL	R	3/C#12
WH	W	3/C#12
R/BLK	BLK	
O/BLK	BLK	
BL/BLK	BLK	
WH/BLK	CLEAR	2/C#14
BLK		
BLK/WH		
G/BLK		
G		

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



"ELECTRICAL ENGINEER CERTIFICATION"
 I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
Robert A. Elmer
 Date: 7/15/88 Reg. No. 5853

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
William W. Wimmer
 Date: 7/14/88 Reg. No. 9089

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED



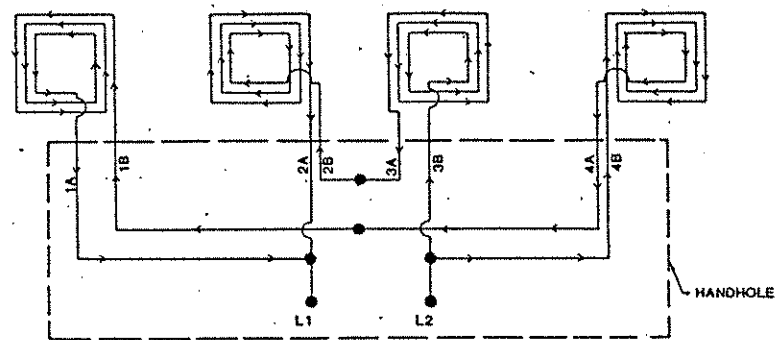
SIGNAL SYSTEM "D"
 FIELD WIRING DIAGRAM
 FIREBARN ROAD AT C.S.A.H. 23 (LAKE DRIVE)

S.A.P. 02-623-06

FILE NO.	88146.00	9
DATE	7/5/88	14

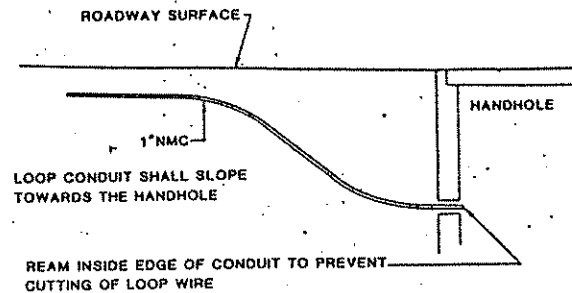
LOOP DETECTOR DETAIL "C"

PLAN VIEW
(NOT TO SCALE)

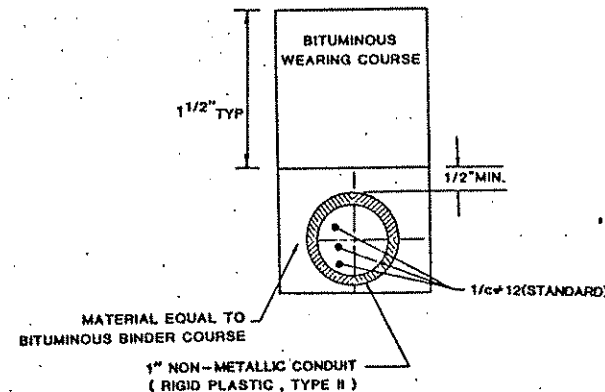


LOOP CONNECTIONS SHALL BE SPLICED IN THE HANDHOLE AS FOLLOWS:
1B TO 4A 2B TO 3A: 1A AND 2A TO L1: 3B AND 4B TO L2.
SPLICE CONTROL CABLE TO L1 AND L2 IN HANDHOLE.
ALL CONDUCTORS SHALL BE TAGGED IN HANDHOLE (1A, 1B, ect.).

DRAINAGE DETAILS



CROSS SECTION A-A



ABBREVIATIONS

EQUIPMENT AND INDICATIONS

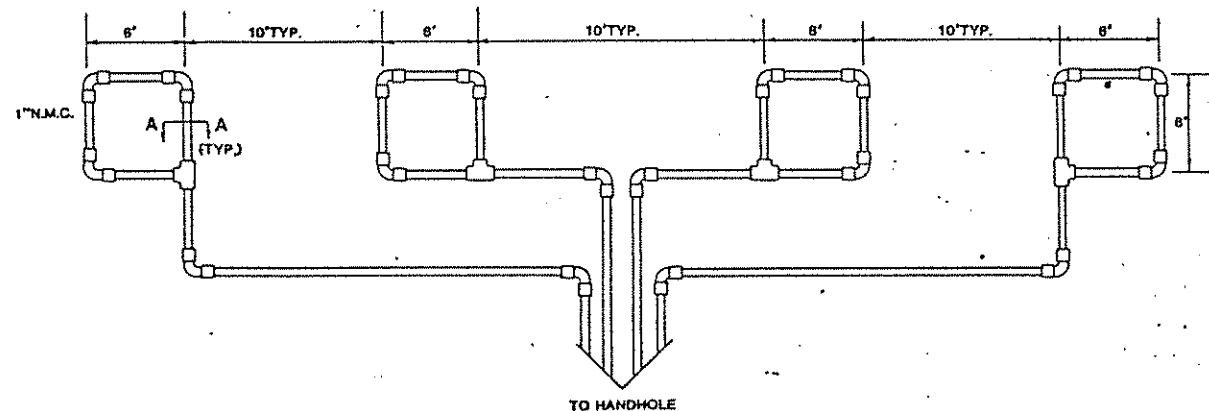
- R, RED - RED
- Y, YEL - YELLOW
- G, GRN - GREEN
- WLK - WALK
- NEU - NEUTRAL
- DWK - DON'T WALK
- LUM - LUMINAIRE
- DNL - DOWNLIGHT
- H.H. - HANDHOLE
- EQG - EQUIPMENT GROUND
- R.S.C. - RIGID STEEL CONDUIT
- GLTA - GREEN LEFT TURN ARROW
- YRTA - YELLOW RIGHT TURN ARROW
- D2-1(eg) - DETECTOR-PHASE "2"
- GR.R - GROUND ROD
- SER. - SERVICE
- P2-2 PEDESTRIAN INDICATIONS-PHASE "2"
- 2-1(eg) - SIGNAL HEADS-PHASE "2"
- SPR. - SPARE CONDUCTORS
- N.M.C. - NON METALLIC CONDUIT
- E.V.P. - EMERGENCY VEHICLE PRE-EMPTION
- J.B. - JUNCTION BOX
- W.P. - WOOD POLE
- P.E.C. - PHOTOELECTRIC CELL
- B. Gr. - BARE GROUND

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
- W/BLK-WHITE WITH BLACK TRACER
- BLK-BLACK
- BLK/WH-BLACK WITH WHITE TRACER
- G/BLK-GREEN WITH BLACK TRACER
- G-GREEN

LEGEND OF SYMBOLS

- CONTROLLER AND SERVICE EOPT. NO'S. --- (Symbol)
- SIGNAL BASE NO. --- (Symbol)
- SIGNAL FACE NO. --- (Symbol)
- LUMINAIRE NO. --- (Symbol)
- CONTROLLER AND CABINET --- (Symbol)
- CONTROLLER AND CABINET-IN PLACE --- (Symbol)
- HANDHOLE --- (Symbol)
- HANDHOLE-IN PLACE --- (Symbol)
- RIGID STEEL CONDUIT (R.S.C.) --- (Symbol)
- RIGID STEEL CONDUIT (R.S.C.)-IN PLACE --- (Symbol)
- SIGNAL FACE WITH BACKGROUND SHIELD --- (Symbol)
- SIGNAL FACE W/O BACKGROUND SHIELD --- (Symbol)
- SIGNAL FACE-IN PLACE --- (Symbol)
- PEDESTRIAN INDICATIONS --- (Symbol)
- PEDESTRIAN INDICATIONS-IN PLACE --- (Symbol)
- PEDESTRIAN PUSH BUTTON ON PEDESTAL OR POLE --- (Symbol)
- PEDESTRIAN PUSH BUTTON STATION --- (Symbol)
- TRAFFIC SIGNAL PEDESTAL --- (Symbol)
- TRAFFIC SIGNAL PEDESTAL-IN PLACE --- (Symbol)
- TRAFFIC SIGNAL POLE AND MAST ARM --- (Symbol)
- TRAFFIC SIGNAL POLE AND MAST ARM-IN PLACE --- (Symbol)
- STREET LIGHT POLE AND LUMINAIRE --- (Symbol)
- STREET LIGHT POLE AND LUMINAIRE-IN PLACE --- (Symbol)
- MAST ARM AND LUMINAIRE --- (Symbol)
- MAST ARM AND LUMINAIRE-IN PLACE --- (Symbol)
- WOOD POLE --- (Symbol)
- WOOD POLE-IN PLACE --- (Symbol)
- SOURCE OF POWER --- (Symbol)
- RAILROAD SIGNAL-IN PLACE --- (Symbol)
- RIGHT OF WAY LINE --- (Symbol)
- CENTER LINE --- (Symbol)
- EDGE OF ROADWAY --- (Symbol)
- SHOULDER LINE --- (Symbol)
- CURB LINE --- (Symbol)
- STOP BAR --- (Symbol)
- CROSSWALK --- (Symbol)



CONDUIT INSTALLATION DETAIL FOR LOOP DETECTORS

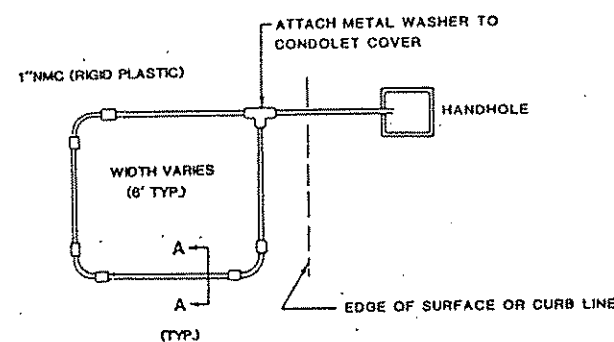
LOOP DETECTOR CONDUITS ARE TO BE INSTALLED IN 3" CUT TRENCHES AS SHOWN ON PLANS. INSTALL EACH COMPLETE DETECTOR ASSEMBLY WITH THE DETECTOR WIRE PULLED THROUGH THE COMPLETE ASSEMBLY TO HANDHOLE. WHERE APPROPRIATE, PLACE DETECTOR CONDUIT IN BITUMINOUS BINDER COURSE PRIOR TO PLACEMENT OF THE WEARING COURSE. THE DEPTH OF THE TRENCH AND THE RESULTANT PLACEMENT OF THE DETECTOR CONDUIT SHALL BE SUCH THAT THE ENTIRE DETECTOR ASSEMBLY DRAINS INTO THE HANDHOLE. BACKFILL AND COMPACT THE TRENCHES WITH MATERIAL EQUIVALENT TO THE MATERIAL REMOVED.

NOTES:

- 1) ALL CORNERS SHALL BE STANDARD 90° CONDUIT BENDS.
- 2) CONNECT WIRES IN HANDHOLES USING WESTERN UNION SPLICE, SOLDERED, TAPED & AND WATERPROOFED.
- 3) LOOP DETECTOR WIRES SHALL BE CROSS LINKED POLYETHYLENE(XPL) SEE SPECIAL PROVISIONS.
- 4) LOOP WIRES SHALL BE TWISTED A MINIMUM OF 1 TURN PER 3 FEET FROM THE LOOP TO THE CONDUIT AND 3 TURNS PER FOOT THROUGH THE CONDUIT TO THE HANDHOLE.
- 5) N.M.C. DESIGNATES NON-METALLIC CONDUIT (SPEC 3803).

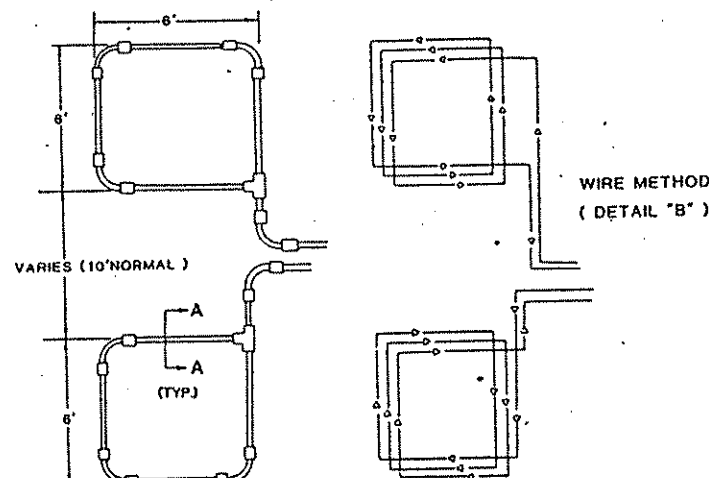
LOOP DETECTOR DETAIL "A"

PLAN VIEW
(NOT TO SCALE)



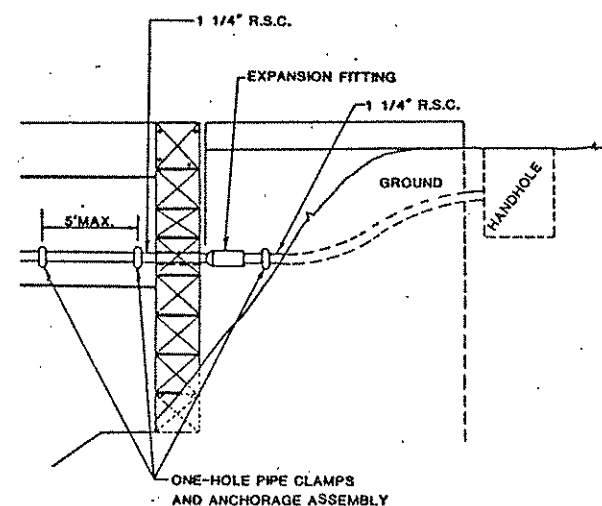
LOOP DETECTOR DETAIL "B"

PLAN VIEW
(NOT TO SCALE)
(TYPICAL)



CONDUITS MAY BE PLACED IN COMMON TRENCH.

BRIDGE MOUNTED CONDUIT EXPANSION FITTING



"ELECTRICAL ENGINEER CERTIFICATION"
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Robert A. Ellor
Date: 7/15/88 Reg. No. 5859

STANDARD PLATES	
PLATE NO.	DESCRIPTION
* 8110 C	TRAFFIC SIGNAL BRACKETING - POLE MOUNTED
* 8111 B	TRAFFIC SIGNAL BRACKETING - PEDESTAL MOUNTED
* 8112 C	PEDESTAL FOUNDATION
* 8113 C	MAGNETIC VEHICLE DETECTOR INSTALLATION
* 8115 C	PEDESTRIAN PUSH BUTTON INSTALLATION
* 8117 F	PRECAST CONCRETE HANDHOLE
8118 C	SERVICE EQUIPMENT AND POLE
* 8119 C	GROUND MOUNTED CABINET FOUNDATION
* 8120 H	P-80 AND P-90 POLE FOUNDATION
* 8121 B	TRANSFORMER BASE WITH POLE BASE PLATE
* 8122 C	PEDESTAL AND PEDESTAL BASE
* 8123 B	POLE AND MAST ARM
* 8124 D	SIGNAL HEAD MOUNTS
8126 C	P-100 POLE FOUNDATION
8130 D	SAW CUT LOOP DETECTORS
* 3124 B	METAL APRON CONNECTION
* 3221 C	CORRUGATED STEEL PIPE COUPLING BAND

* THESE STANDARD PLATES APPLY TO THIS PLAN

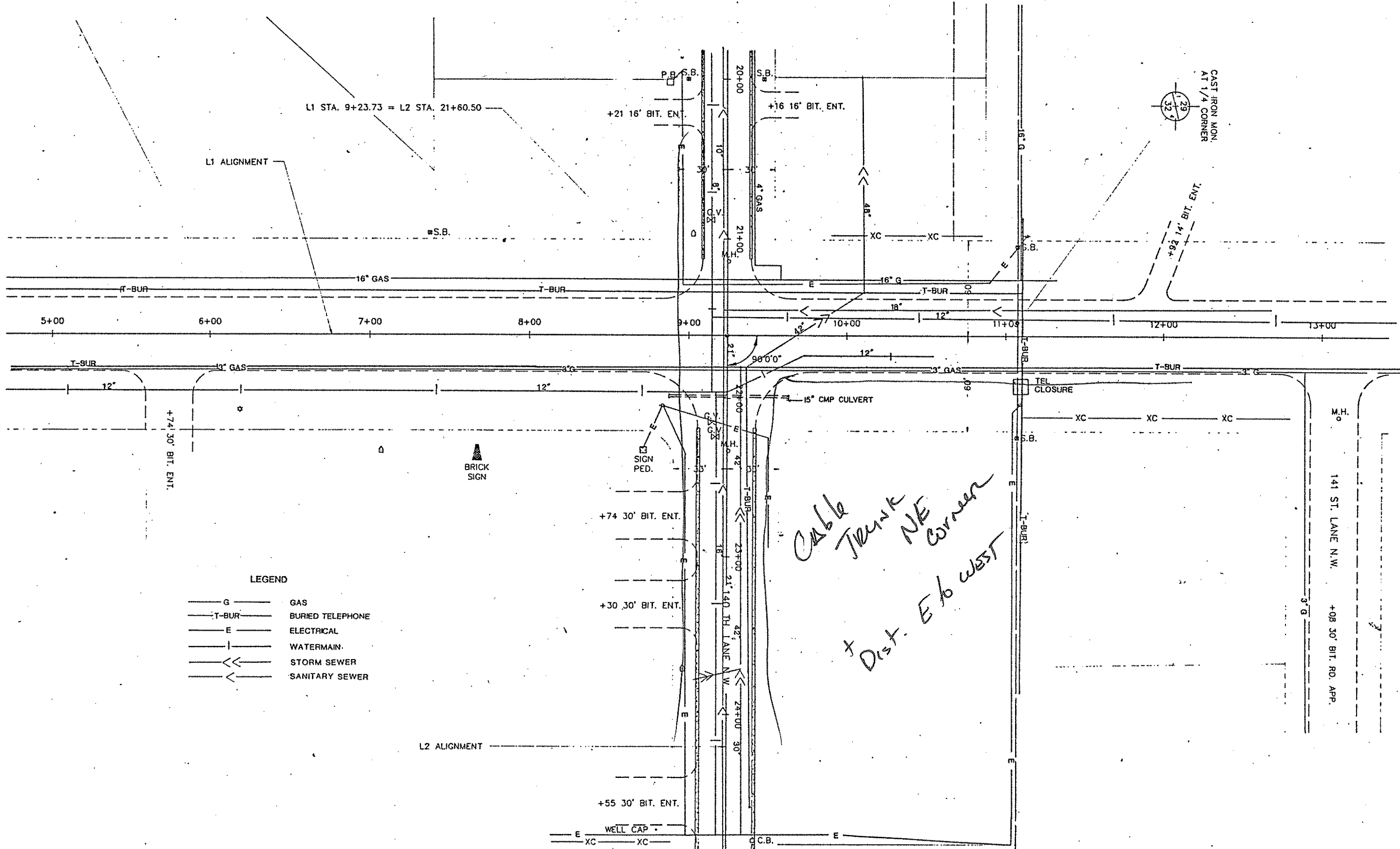
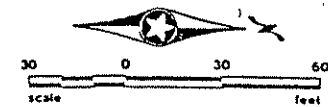
NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.
Allen Van Wazer
Date: 7/15/88 Reg. No. 9089



SIGNAL SYSTEMS
"A", "B", "C", AND "D"
DETAILS

FILE NO. 88148	10
DATE 7/5/88	14



- LEGEND**
- G — GAS
 - T-BUR — BURIED TELEPHONE
 - E — ELECTRICAL
 - | — WATERMAIN
 - << — STORM SEWER
 - < — SANITARY SEWER

*Cable Trunk NE corner
Dist. E to west*

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

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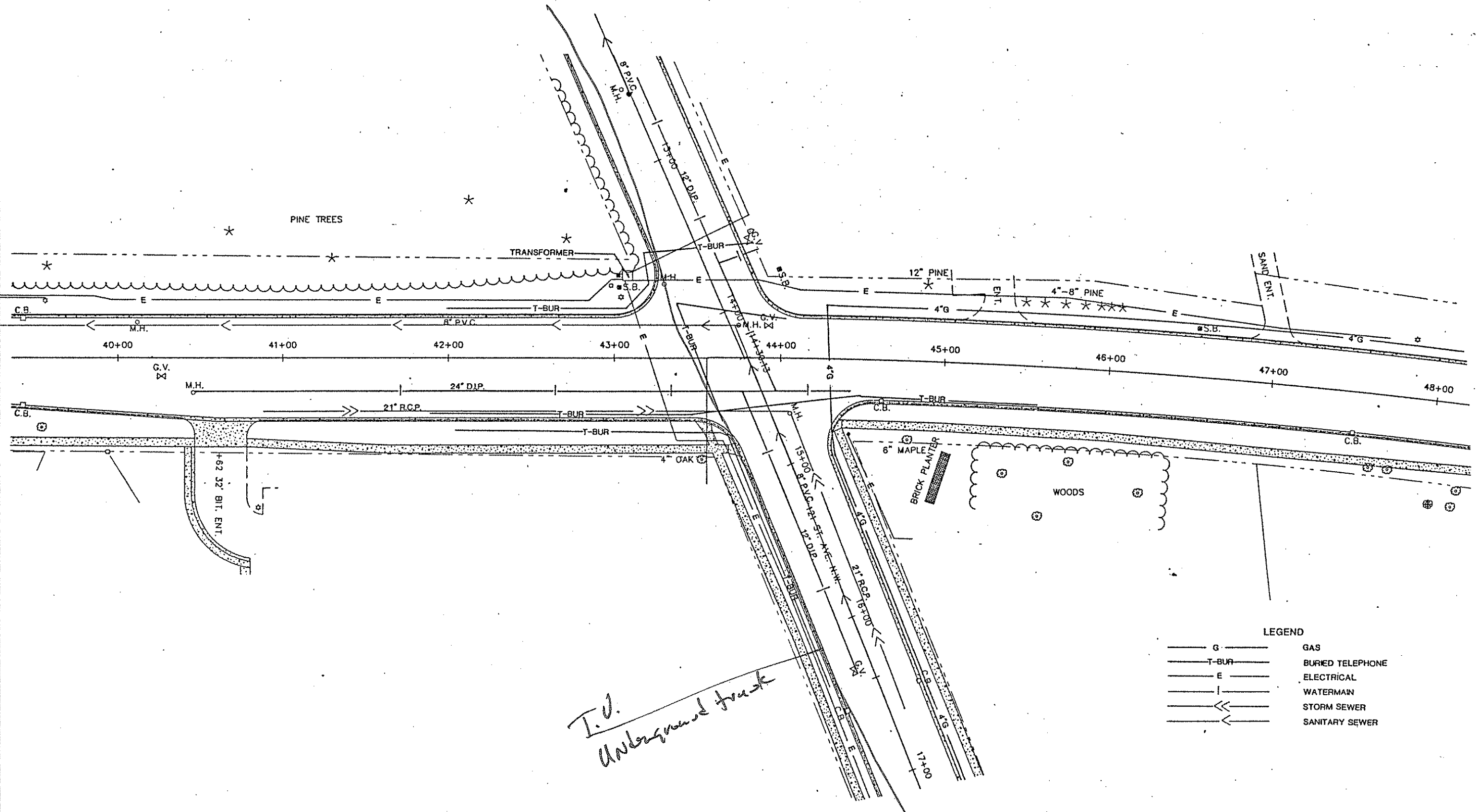
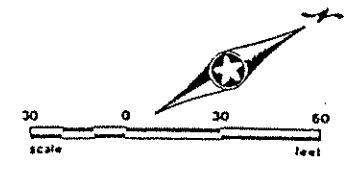
Shelvan Wormer
Date 7.11.88 Reg. No. 9089



SIGNAL SYSTEM "A"
UTILITIES
140th AVE N.W. AT C.S.A.H.9 (ROUND LAKE BLVD.)

S.A.P. 02-609-07

FILE NO. 88146.03
DATE 7/3/88
11
.14



*T.V.
Underground truck*

LEGEND

— G —	GAS
— T-BUR —	BURIED TELEPHONE
— E —	ELECTRICAL
— I —	WATERMAIN
— << —	STORM SEWER
— >> —	SANITARY SEWER

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.

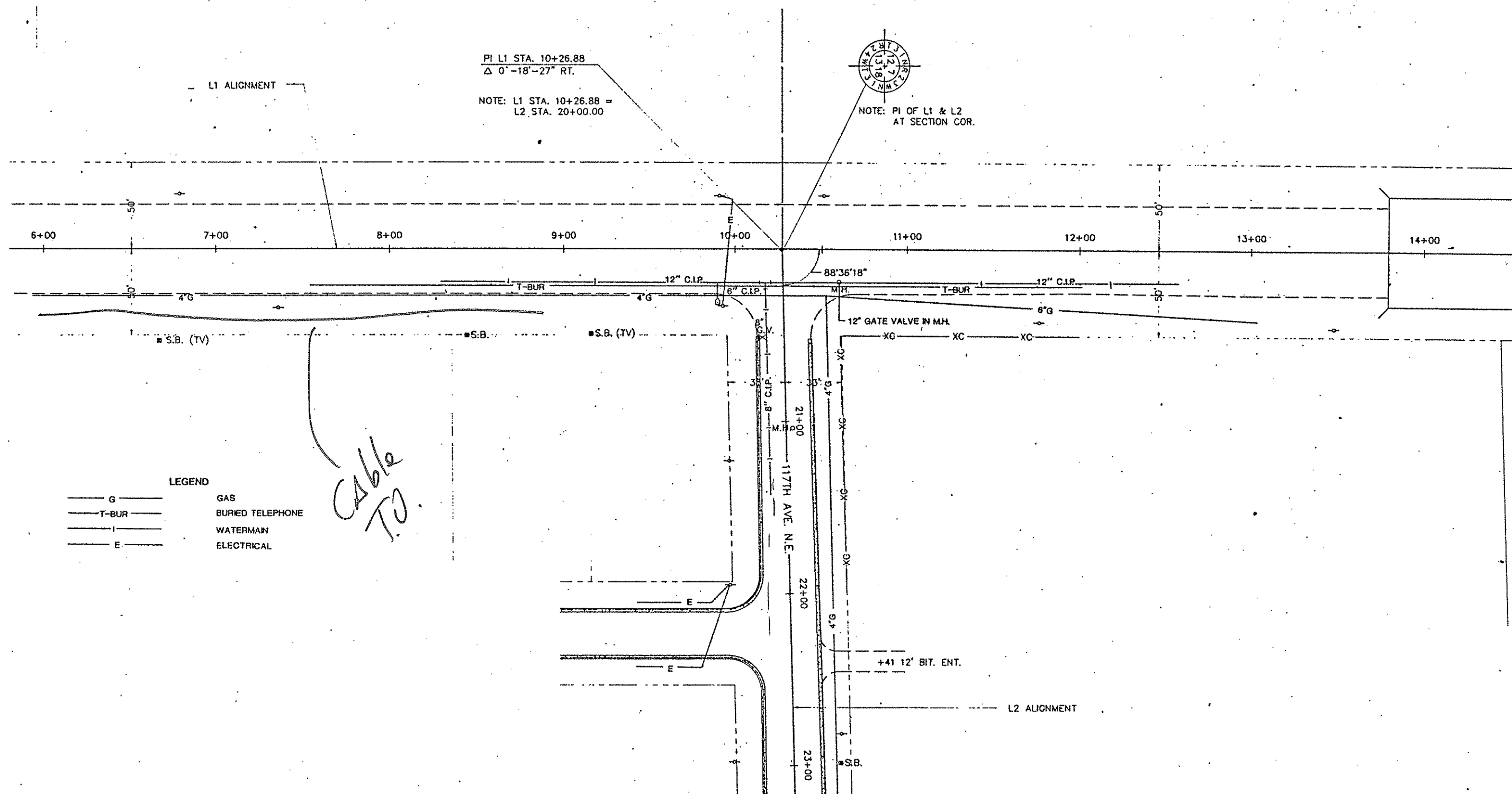
Edwin W. Wimmer
Date *7/5/88* Reg. No. *9089*



SIGNAL SYSTEM "B"
UTILITIES
121st AVE N.W. AT CO. RD 78 (HANSON BLVD.)

S.A.P. 114-102-08
C.P. 88-04-78

FILE NO.	88146.02	12
DATE	7/5/88	.14



PI L1 STA. 10+26.88
 $\Delta 0^\circ - 18' - 27''$ RT.
 NOTE: L1 STA. 10+26.88 =
 L2 STA. 20+00.00

NOTE: PI OF L1 & L2
 AT SECTION COR.

LEGEND

— G —	GAS
— T-BUR —	BURIED TELEPHONE
— I —	WATERMAN
— E —	ELECTRICAL

Cable TO

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

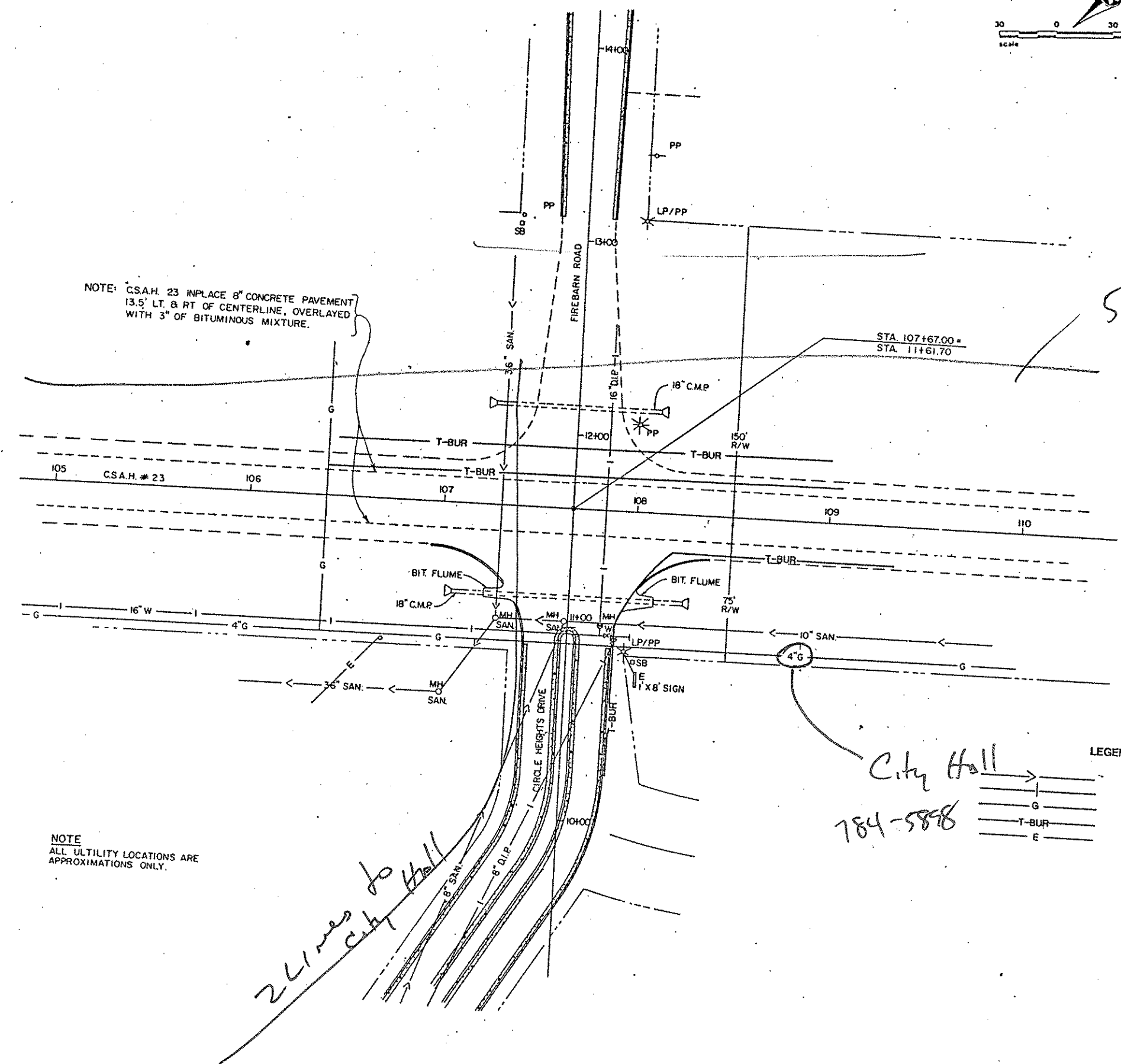
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
John Van Worman
 Date 7.1.88 Reg. No. 9089



SIGNAL SYSTEM "C"
 UTILITIES
 117th AVE N.E. AT CO.RD 51 (UNIVERSITY AVE.)

S.A.P. 106-109-04
 C.P. 88-06-51

FILE NO. 88148.01	13
DATE 7/5/88	14



NOTE: C.S.A.H. 23 INPLACE 8" CONCRETE PAVEMENT
13.5' LT. & RT. OF CENTERLINE, OVERLAYED
WITH 3" OF BITUMINOUS MIXTURE.

NOTE
ALL UTILITY LOCATIONS ARE
APPROXIMATIONS ONLY.

5 cable TV
Trunk

24 lines to
City Hall

City Hall
784-5898

LEGEND

—	SANITARY SEWER
G	WATERMAIN
—	GAS
T-BUR	BURIED TELEPHONE
E	ELECTRICAL

NO.	BY	DATE	REVISIONS	ITEM	DESIGN	CHECKED

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the state of Minnesota.

Blair Van Arman
Date 7/19/88 Reg No. 9089



SIGNAL SYSTEM "D"
UTILITIES
FIREBARN ROAD AT C.S.A.H.23 (LAKE DRIVE)

S.A.P. 02-623-06

FILE NO. 88146.00	14
DATE 7/5/88	14