



Intersection Safety Technologies Guidebook Appendix D

Intersection Conflict Warning Systems & LED STOP Signs

May 2016

2016RIC10B

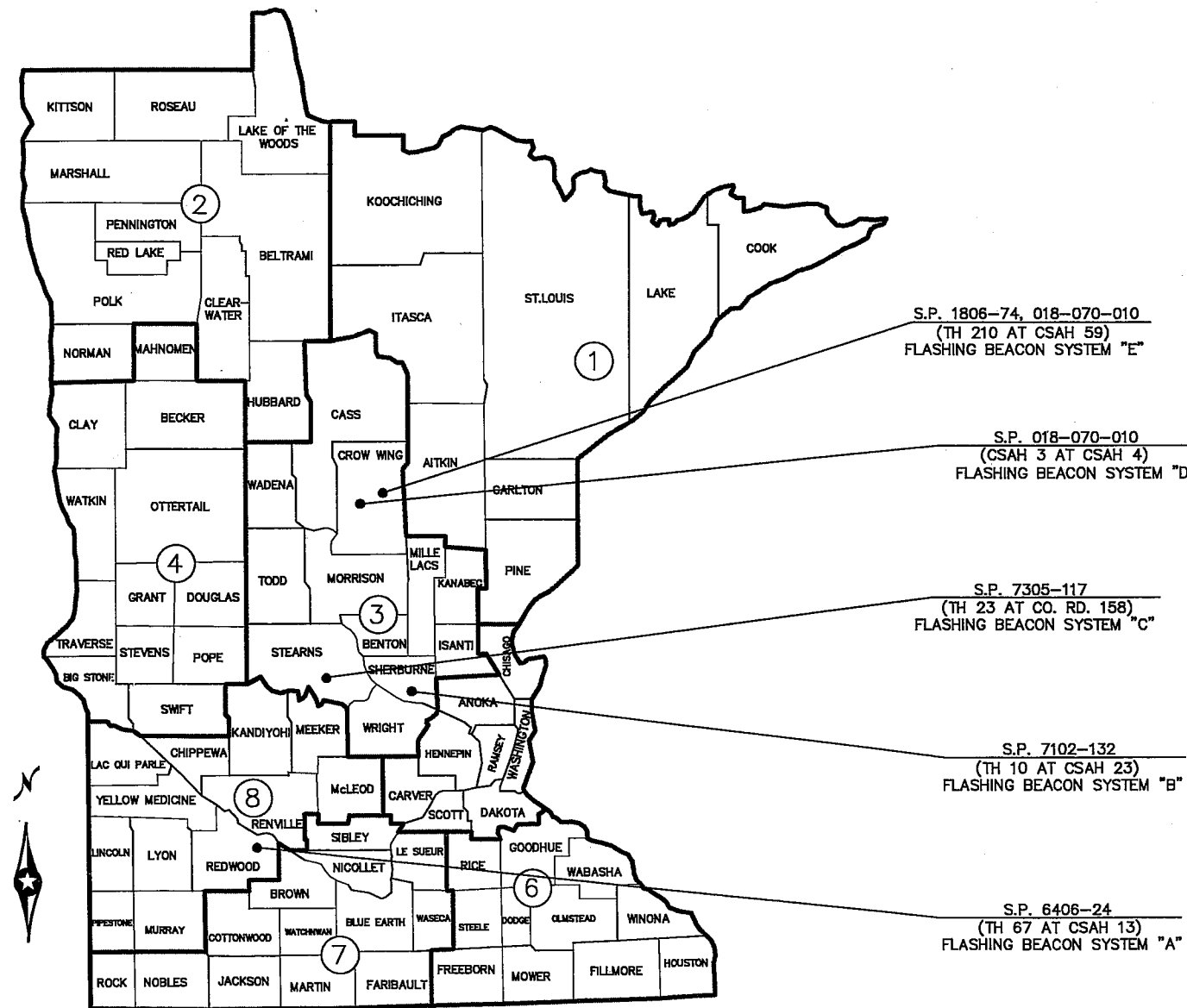


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MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR RURAL INTERSECTION CONFLICT WARNING SYSTEMS - PHASE II
STATE PROJECT NO. 8816-2274

- (SYSTEM "A") LOCATED ON TH 67 AT CSAH 13 NEAR MORGAN, MN. (REDWOOD COUNTY) - S.P. 6406-24
- (SYSTEM "B") LOCATED ON TH 10 AT CSAH 23 IN BECKER, MN. (SHERBURNE COUNTY) - S.P. 7102-132
- (SYSTEM "C") LOCATED ON TH 23 AT CO. RD. 158 NEAR COLD SPRING, MN. (STEARNS COUNTY) - S.P. 7305-117
- (SYSTEM "D") LOCATED ON CSAH 3 AT CSAH 4 NEAR MERRIFIELD, MN. (CROW WING COUNTY) - S.P. 018-070-010
- (SYSTEM "E") LOCATED ON TH 210 AT CSAH 59 NEAR IRONTON, MN. (CROW WING COUNTY) - S.P. 1806-74, S.P. 018-070-010



S.P. 1806-74, 018-070-010
(TH 210 AT CSAH 59)
FLASHING BEACON SYSTEM "E"

S.P. 018-070-010
(CSAH 3 AT CSAH 4)
FLASHING BEACON SYSTEM "D"

S.P. 7305-117
(TH 23 AT CO. RD. 158)
FLASHING BEACON SYSTEM "C"

S.P. 7102-132
(TH 10 AT CSAH 23)
FLASHING BEACON SYSTEM "B"

S.P. 6406-24
(TH 67 AT CSAH 13)
FLASHING BEACON SYSTEM "A"

MnDOT DISTRICT	COUNTY	STATE PROJECT NO.	CHARGE IDENTIFIER
3	CROW WING	018-070-010	
3	CROW WING	1806-74, 018-070-010	
3	SHERBURNE	7102-132	
3	STEARNS	7305-117	
8	REDWOOD	6406-24	

PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY

STATE PROJ. NO. 8816-2274 (SUPPORTING STATE PROJ. NOS.
1806-74 (TH 210=002), 6406-24 (TH 67=093), 7102-132 (TH 10=003), 7305-117 (TH 23=023), AND 018-070-010

MINN. PROJECT NO. _____ HSIP 8815(260)

GOVERNING SPECIFICATIONS

THE 2014 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE 2014 EDITION OF THE "MATERIALS LAB SUPPLEMENTAL SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MN MUTCD, INCLUDING FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

INDEX

- 1 TITLE SHEET
- 2-3 GENERAL LOCATIONS
- 4-7 ESTIMATED QUANTITIES, GENERAL NOTES, AND FLASHER DETAILS
- 8-11 FLASHING BEACON SYSTEM "A"
- 12-14 FLASHING BEACON SYSTEM "B"
- 15-18 FLASHING BEACON SYSTEM "C"
- 19-22 FLASHING BEACON SYSTEM "D"
- 23-26 FLASHING BEACON SYSTEM "E"
- 27-41 SIGNING AND STRIPING PLANS/DETAILS

THIS PLAN CONTAINS 41 SHEETS

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.

John M. Gray, Jr. LIC. NO. 22457 DATE: 3-3-15
JOHN M. GRAY, JR.
DESIGN SQUAD _____ JMG, TAS, CJ, MW, MT, BY _____

RECOMMENDED FOR APPROVAL *John M. Gray, Jr.* DATE: 3-4-15
DISTRICT 3 ENGINEER

Kelvin Hammonds DATE: 3-4-15
DISTRICT 3 STATE AID ENGINEER: REVIEWED FOR COMPLIANCE WITH STATE AID RULES/POLICY

RECOMMENDED FOR APPROVAL *Eric Kar* DATE: 3-9-15
FOR DISTRICT 8 ENGINEER

RECOMMENDED FOR APPROVAL *Susan M. Witt* DATE: 3-10-15
STATE TRAFFIC ENGINEER

Kelvin Hammonds DATE: 3-4-15
APPROVED FOR STATE AID FUNDING: STATE AID ENGINEER

RECOMMENDED FOR APPROVAL *Theresa K. Hanson* DATE: 4/27/15
725 STATE PRE-LETTING ENGINEER

OFFICE OF LAND MANAGEMENT APPROVAL *John P. ...* DATE: 4/28/15
DIRECTOR, LAND MANAGEMENT

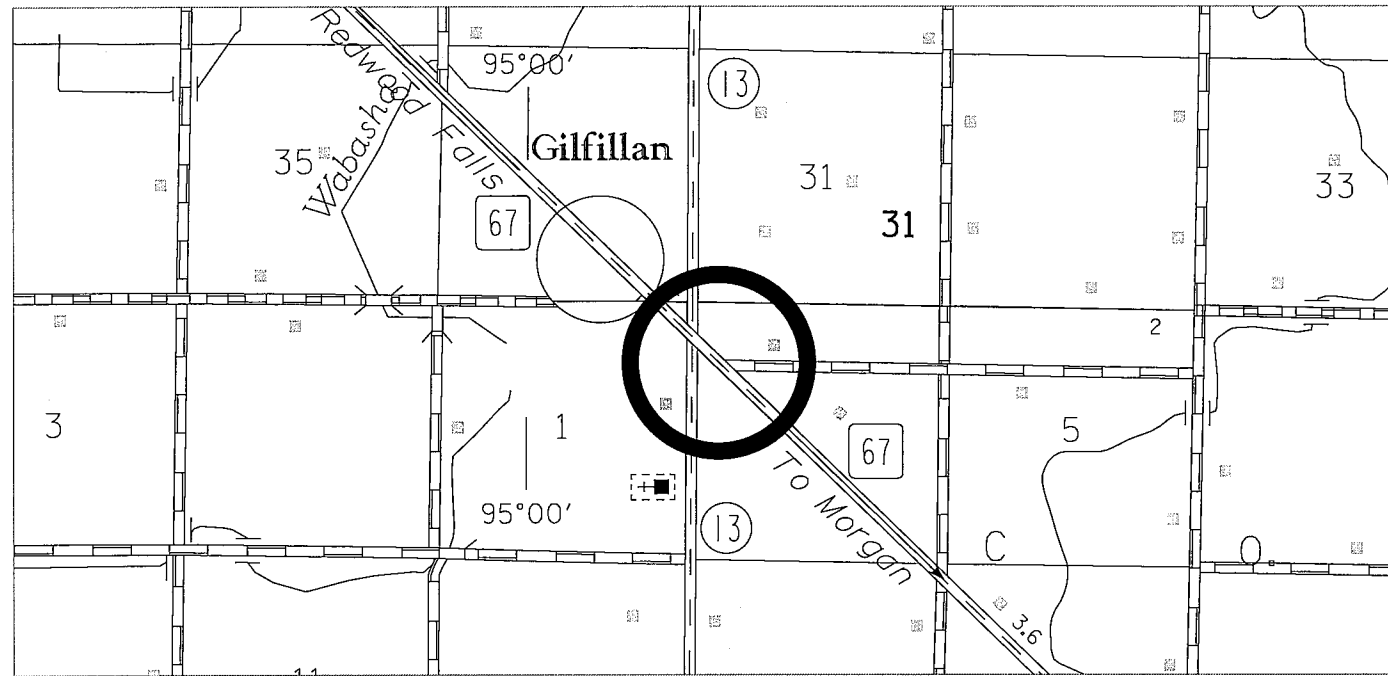
APPROVED *Christopher ...* DATE: 4-30-15
STATE DESIGN ENGINEER

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 LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME: _____ LIC. NO. _____ DATE: _____

SHEET NO. 1 OF 41 SHEETS

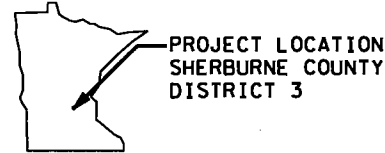
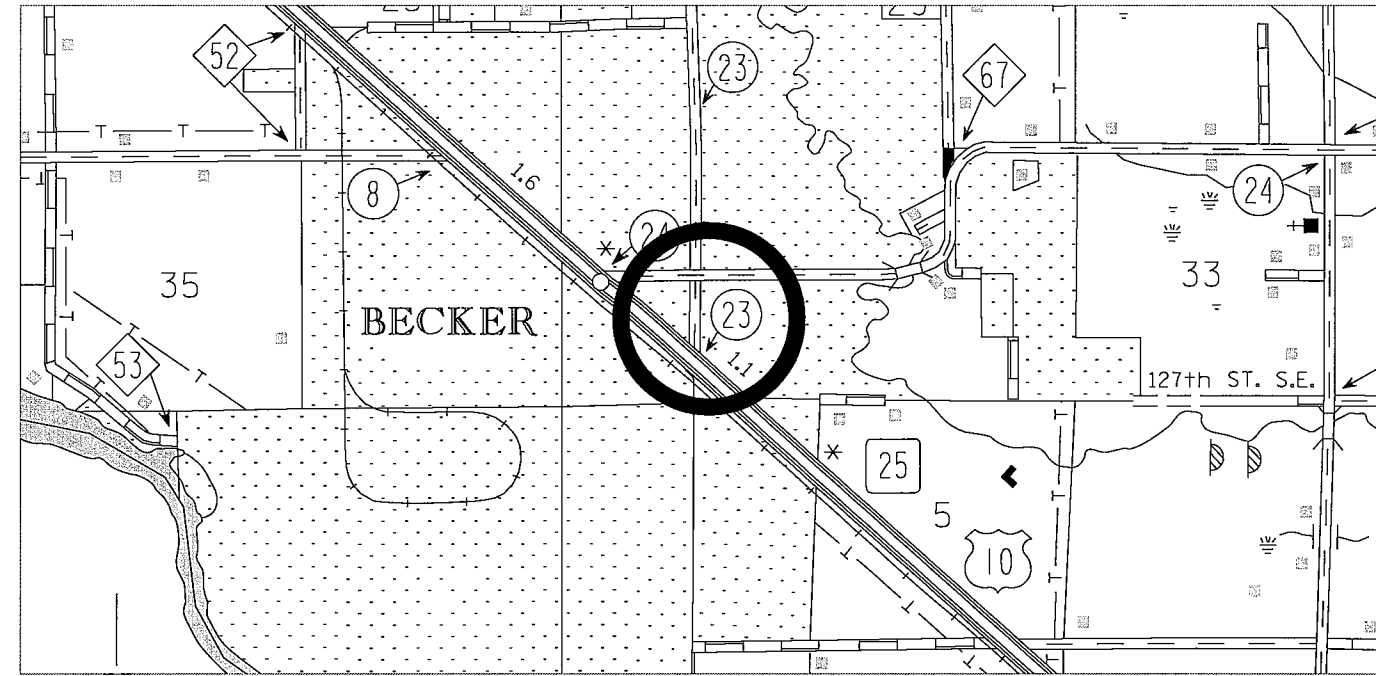
FLASHING BEACON SYSTEM "A" - LOCATED ON TH 67 AT CSAH 13 NEAR MORGAN, MN. (REDWOOD COUNTY) - S.P. 6406-24



PROJECT LOCATION
REDWOOD COUNTY
DISTRICT 8

INDEX MAP  400
SCALE IN FEET

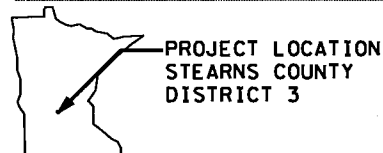
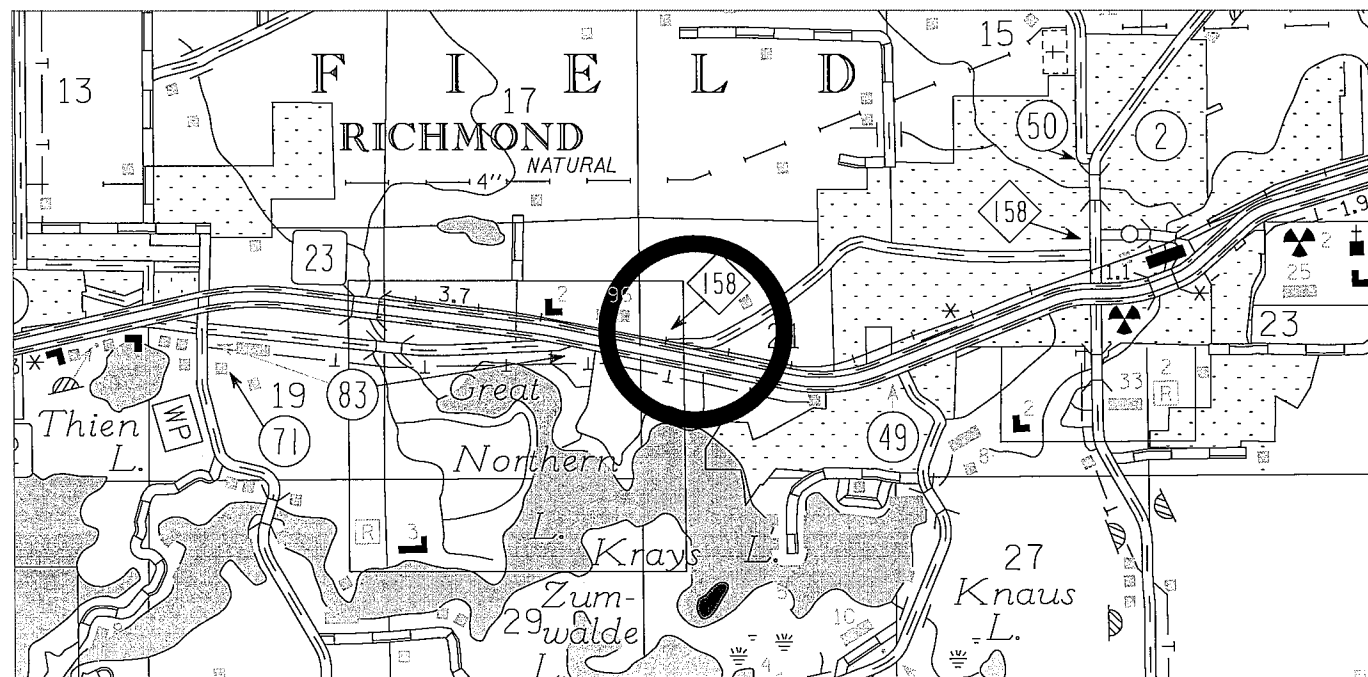
FLASHING BEACON SYSTEM "B" - LOCATED ON TH 10 AT CO. RD. 23 IN BECKER, MN. (SHERBURNE COUNTY) - S.P. 7102-132



PROJECT LOCATION
SHERBURNE COUNTY
DISTRICT 3

INDEX MAP  400
SCALE IN FEET

FLASHING BEACON SYSTEM "C" - LOCATED ON TH 23 AT CO. RD. 158 NEAR COLD SPRING, MN. (STEARNS COUNTY) - S.P. 7305-117



PROJECT LOCATION
STEARNS COUNTY
DISTRICT 3

INDEX MAP  400
SCALE IN FEET

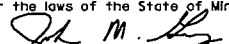
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3/6/2015

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DESIGN TEAM				
DRAWN BY: <u>CMJ</u>				
DESIGNER: <u>JMG</u>				
CHECKED BY: <u>JMG</u>				
	NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By:  Lic. No. 22457
Printed Name: JOHN M. GRAY Date: 03/12/2015

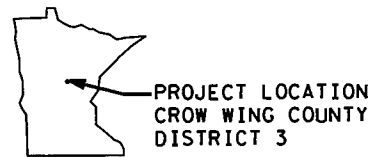
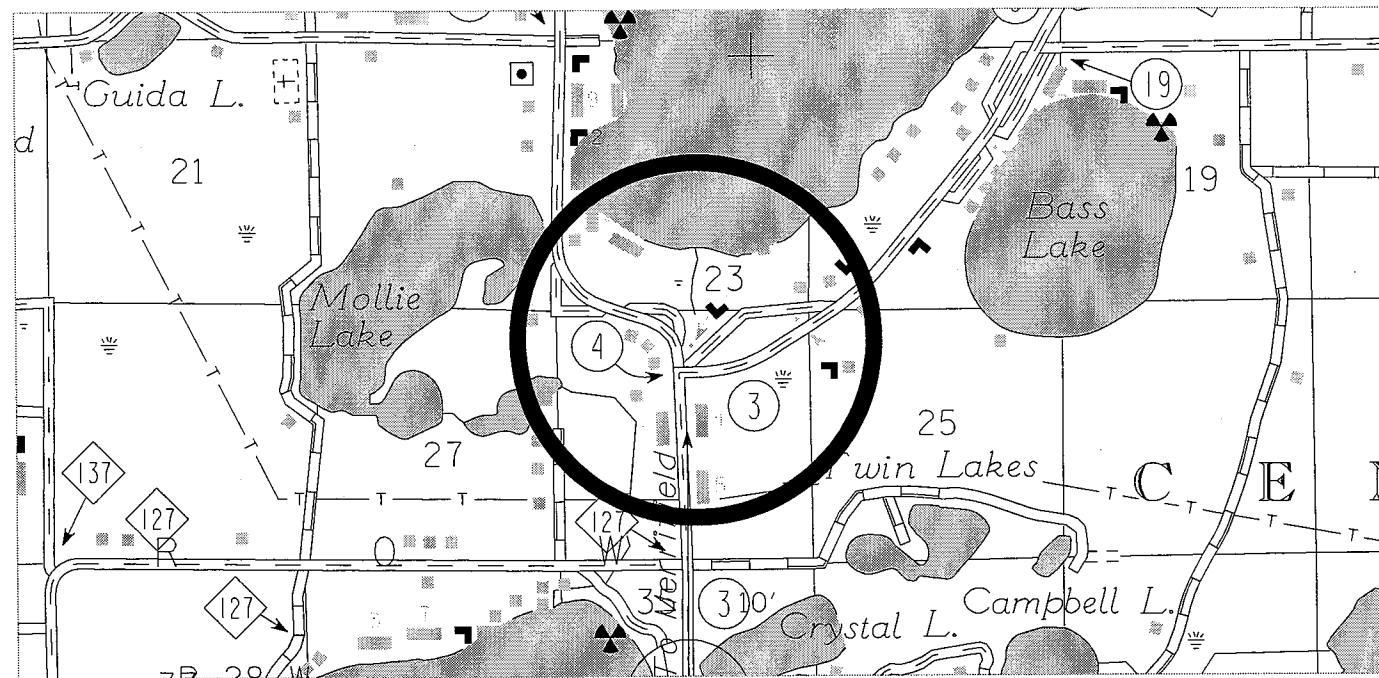
 PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110


MINNESOTA DEPARTMENT OF TRANSPORTATION
**RURAL INTERSECTION CONFLICT
WARNING SYSTEM - PHASE II**
S.P. 8816-2274, 1806-74, 6406-24, 7102-132,
S.P. 7305-117, 018-070-010

**FLASHING BEACON SYSTEMS "A-C"
LOCATION MAPS**

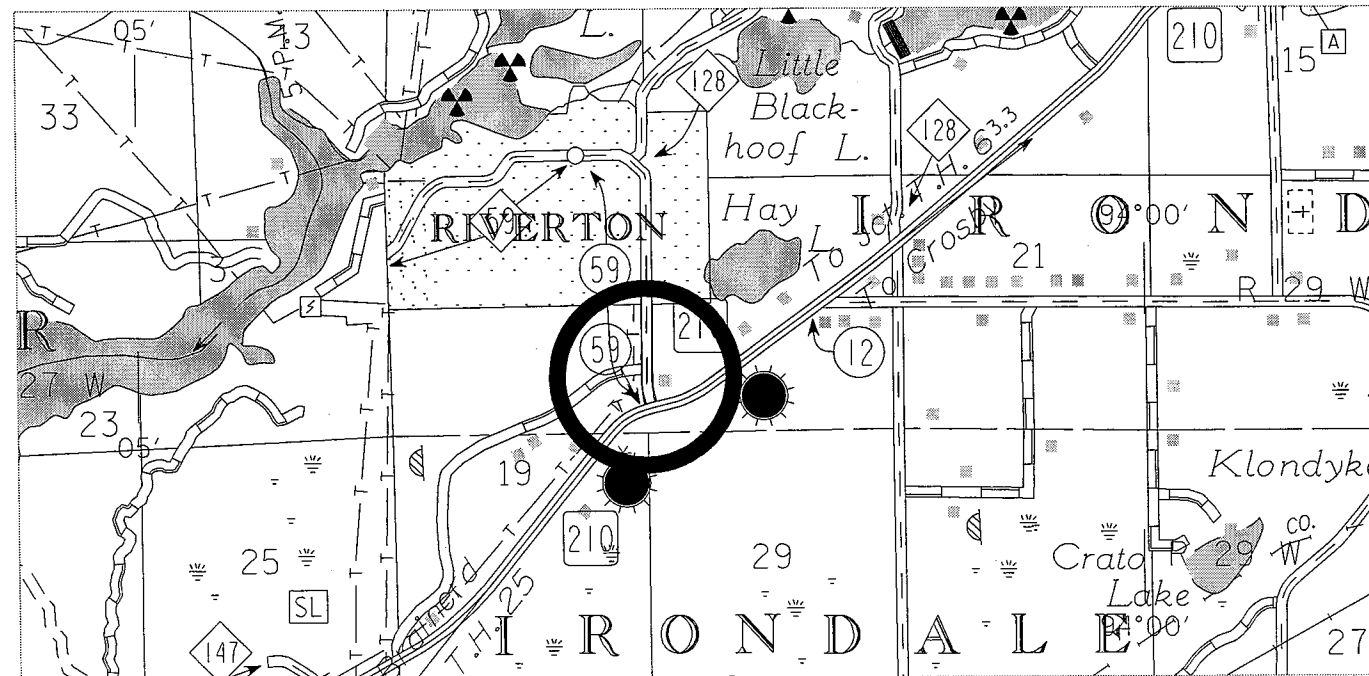
FILE NO. 2
MNTMD31077
41

FLASHING BEACON SYSTEM "D" - LOCATED ON CSAH 3 AT CSAH 4 NEAR MERRIFIELD, MN. (CROW WING COUNTY) - S.P. 018-070-010



INDEX MAP  400
SCALE IN FEET

FLASHING BEACON SYSTEM "E" - LOCATED ON TH 210 AT CSAH 59 NEAR IRONTON, MN. (CROW WING COUNTY) - S.P. 1806-74, S.P. 018-070-010

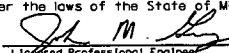



INDEX MAP  400
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DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Certified By:  Lic. No. 22457
Printed Name: JOHN M. GRAY Date: 03/12/2015

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MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT
WARNING SYSTEM - PHASE II
S.P. 8816-2274, 1806-74, 6406-24, 7102-132
S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEMS "D" & "E"
LOCATION MAPS

FILE NO. 3
MNTMD131077 41

ABBREVIATIONS

APS	ACCESSIBLE PEDESTRIAN SIGNAL
AWF	ADVANCE WARNING FLASHER
C.D.	COUNT DOWN
D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
DEG	DEGREES
DWK	DON'T WALK INDICATION
EQ.G	EQUIPMENT GROUND
EVP	EMERGENCY VEHICLE PRE-EMPTION
F&I	FURNISH AND INSTALL
FL	FLASH/FLASHING
FYA	FLASHING YELLOW ARROW
FYLA	FLASHING YELLOW LEFT ARROW
GLA	GREEN LEFT ARROW
GRN	GREEN INDICATION
GR. RD.	GROUND ROD
GRA	GREEN RIGHT ARROW
GTA	GREEN THRU ARROW
HH	HANDHOLE
HPS	HIGH PRESSURE SODIUM
IND	INDICATION
IMC	INTERMEDIATE METAL CONDUIT
INP	INPLACE
INS. GR.	INSULATED GROUND
JB	JUNCTION BOX
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
NEU	NEUTRAL
NMC	NONMETALLIC CONDUIT
P1-1 (e.g.)	PEDESTRIAN HEAD (PHASE 1, NO. 1)
PB	PUSH BUTTON
PB2-1 (e.g.)	PUSH BUTTON (PHASE 2, NO. 1)
PEC	PHOTOELECTRIC CELL
PED	PEDESTRIAN
PVC	POLYVINYL CHLORIDE (CONDUIT)
RED	RED INDICATION
R&S	REMOVE AND SALVAGE
RLA	RED LEFT ARROW
RSC	RIGID STEEL CONDUIT
S&I	SALVAGE AND INSTALL
SOP	SOURCE OF POWER
SPR	SPARE
STA	STATION
WLK	WALK INDICATION
YEL	YELLOW INDICATION
YLA	YELLOW LEFT ARROW
YRA	YELLOW RIGHT ARROW

SYMBOLS

■	HANDHOLE
⊖	EQ.G CONNECTION
←	EVP CONFIRMATORY LIGHT
↔	EVP DETECTOR
↔←	EVP DETECTOR AND CONFIRMATORY LIGHT
Ⓢ	FIBER OPTIC VAULT
△	LUMINAIRE NO.
②	SIGNAL BASE NO.
②-1	SIGNAL HEAD NO./FLASHER HEAD NO.
Ⓢ	BARREL MOUNT BASE NO.
Ⓢ	WOOD POLE NO.
●	SPLICE
—V—	VIDEO DETECTION
—M—	MICROWAVE DETECTION
—S—	SONIC DETECTION

FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

STATEMENT OF ESTIMATED QUANTITIES

SHEET ID	ITEM NO	ITEM	UNIT	TOTAL ESTIMATED QUANTITY	SP 8816-2274				
					(A)(B) SP 1806-74 SP 018-070-010	(A) SP 6406-24	(A) SP 7102-132	(C) SP 7305-117	(A)(B) SP 018-070-010
-	2011.601	AS BUILT	LUMP SUM	1	0.11	0.22	0.22	0.22	0.23
-	2021.501	MOBILIZATION	LUMP SUM	1	0.11	0.22	0.22	0.22	0.23
27	2104.509	REMOVE SIGN TYPE C	EACH	5		2	1	2	
27	2104.523	SALVAGE SIGN TYPE C	EACH	16	4	4	4	2	2
27	2104.523	SALVAGE SIGN TYPE D	EACH	11	4	1	2	2	2
-	2563.601	TRAFFIC CONTROL	LUMP SUM	1	0.11	0.22	0.22	0.22	0.23
27	2564.531	SIGN PANELS TYPE C	SQ. FT.	18		18			
27	2564.537	INSTALL SIGN TYPE C	EACH	16	4	4	4	2	2
27	2564.537	INSTALL SIGN TYPE D	EACH	11	4	1	2	2	2
8-11	2565.616	FLASHING BEACON SYSTEM A	SYSTEM	1		1			
12-14	2565.616	FLASHING BEACON SYSTEM B	SYSTEM	1			1		
15-18	2565.616	FLASHING BEACON SYSTEM C	SYSTEM	1				1	
19-22	2565.616	FLASHING BEACON SYSTEM D	SYSTEM	1					1
23-26	2565.616	FLASHING BEACON SYSTEM E	SYSTEM	1	1				
-	2575.555	TURF ESTABLISHMENT	LUMP SUM	1	0.11	0.22	0.22	0.22	0.23
28, 32, 36	2582.502	24" SOLID LINE WHITE-EPOXY	LIN. FT.	110	20	30		60	

FUNDING NOTES:

- (A) = 90% FEDERAL / 10% STATE.
- (B) = SEE LUMP SUM AGREEMENT NO. 1000027 WITH CROW WING COUNTY.
- (C) = 100% STATE.

GENERAL NOTES:

1. NO UTILITIES ARE ANTICIPATED TO BE AFFECTED BY THIS PROJECT.
2. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 3802, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."
3. THE FOLLOWING LIST SHOWS THE UTILITY COMPANIES WITHIN THE PROJECT LIMITS OF THE ENTIRE PROJECT:
ARVIG COMMUNICATIONS SYSTEMS, CENTERPOINT ENERGY MINNESOTA GAS, CENTURYLINK, CHARTER COMMUNICATIONS, CITY OF BECKER, CONSOLIDATED TELEPHONE COMPANY, CROW WING COOPERATIVE POWER & LIGHT COMPANY, ENVENTIS TELECOM INCORPORATED, MIDCONTINENT COMMUNICATIONS, MINNESOTA DEPARTMENT OF TRANSPORTATION, MINNESOTA POWER, REDWOOD ELECTRIC COOPERATIVE, STEARNS COOPERATIVE ELECTRIC ASSOCIATION, TDS METROCOM, WINDSTREAM COMMUNICATIONS, XCEL ENERGY
4. TURF ESTABLISHMENT SHALL BE APPLIED TO ALL DISTURBED AREAS IN ACCORDANCE WITH MnDOT 2575 AND MnDOT 3878 AND AS FOLLOWS:
A. EXISTING VEGETATION SHALL BE REPLACED IN-KIND USING MnDOT SEED MIX 25-121, 25-131 OR 35-241 IF SEEDED PRIOR TO SEPTEMBER 20TH.
B. EXISTING VEGETATION SHALL BE REPLACED IN-KIND USING MnDOT SEED MIX 35-241 IF AFTER SEPTEMBER 20TH AND PRIOR TO OCTOBER 20TH.
C. SEED MIX 25-131 SHALL BE USED IN MOWED OR LAWN AREAS.
D. SEED MIXES SHALL BE APPLIED AT THE RATES NOTED IN MnDOT 2575 AND MnDOT 3878.
5. THIS PROJECT DOES NOT MEET THE CRITERIA FOR A NPDES CONSTRUCTION GENERAL PERMIT INCLUDING SWPPP DEVELOPMENT. HOWEVER, THE CONTRACTOR SHALL USE ENVIRONMENTALLY FRIENDLY CONSTRUCTION TECHNIQUES WHILE PERFORMING THE WORK. THESE TECHNIQUES CAN INCLUDE BUT ARE NOT LIMITED TO: DO NOT DISTURB AREAS, PERIMETER CONTROL, INLET PROTECTION, DUST CONTROL, PROPER DEWATERING TECHNIQUES, TEMPORARY SOIL STABILIZATION, AND PERMANENT SOIL STABILIZATION.
6. THE CONTRACTOR SHALL STABILIZE ALL EXPOSED SOIL AREAS WITHIN 14 DAYS OF INACTIVITY. ALL AREAS THAT HAVE A POTENTIAL TO DISCHARGE TO AN ENVIRONMENTALLY SENSITIVE AREA MUST BE STABILIZED WITHIN 24 HOURS AS DIRECTED BY THE ENGINEER WITH CHANGING FIELD CONDITIONS.
7. ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM AND BE FURNISHED AND INSTALLED IN ACCORDANCE WITH THE "MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MnMUTCD), AND PART IV "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" (CURRENT EDITION).
8. THE CONTRACTOR IS REQUIRED TO PROVIDE TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO COMMENCING ANY FIELD WORK A WRITTEN PLAN ON HOW THE CONTRACTOR INTENDS TO MEET THE CONTRACT REQUIREMENTS FOR MAINTENANCE OF TRAFFIC AND TRAFFIC CONTROL INCLUDING BUT NOT LIMITED TO PROVIDING TO THE ENGINEER A COMPLETE PLAN FOR WHAT MnMUTCD "FIELD MANUAL" LAYOUTS ARE PLANNED TO BE USED FOR EACH FIELD OPERATION. LAYOUTS MUST SHOW ALL DEVICES THE CONTRACTOR PROPOSES TO INSTALL AND MAINTAIN FOR EACH FIELD OPERATION.
9. THE CONTRACTOR SHALL NOT USE THE MOBILE AND SHORT DURATION TEMPORARY TRAFFIC CONTROL LAYOUTS FROM THE MnMUTCD "FIELD MANUAL" (WORK ON THIS PROJECT IS RESTRICTED TO USING SHORT TERM STATIONARY TEMPORARY TRAFFIC CONTROL LAYOUTS, UNLESS OTHERWISE APPROVED BY THE ENGINEER).
10. CONTRACTOR MUST HAVE ALL REQUIRED TRAFFIC CONTROL SIGNS AND DEVICES ON SITE AND FURNISHED AND INSTALLED IN ACCORDANCE WITH THE APPROVED TRAFFIC CONTROL PLAN AND THE MnMUTCD "FIELD MANUAL" PRIOR TO COMMENCING ANY FIELD OPERATIONS. THE ENGINEER (OR HIS DESIGNATED REPRESENTATIVE) WILL STOP ALL FIELD OPERATIONS AND NOT ALLOW WORK TO COMMENCE UNTIL ALL REQUIRED TRAFFIC CONTROL DEVICES ARE FURNISHED, INSTALLED AND MAINTAINED BY THE CONTRACTOR DURING CONSTRUCTION.

STANDARD PLATES - FLASHER SYSTEMS

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

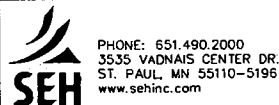
PLATE NO.	DESCRIPTION
▶ 8000 I	STANDARD BARRICADES
▶ 8111 E	TRAFFIC SIGNAL BRACKETING (PEDESTAL MOUNTED) (3 SHEETS)
▶ 8117 G	PRECAST CONCRETE HANDHOLE WITH VEHICLE LOAD
▶ 8119 C	GROUND MOUNTED CABINET FOUNDATION
▶ 8127 D	LIGHT FOUNDATION - DESIGN E 40' POLE OR LESS (2 SHEETS)
▶ 8132 B	PREFORMED RIGID PVC CONDUIT LOOP DETECTORS (3 SHEETS)

▶ STANDARD PLATES APPLICABLE TO THIS PROJECT

DRAWN BY: JMG
DESIGNER: JMG
CHECKED BY: TAS

NO.	BY	DATE	REVISIONS

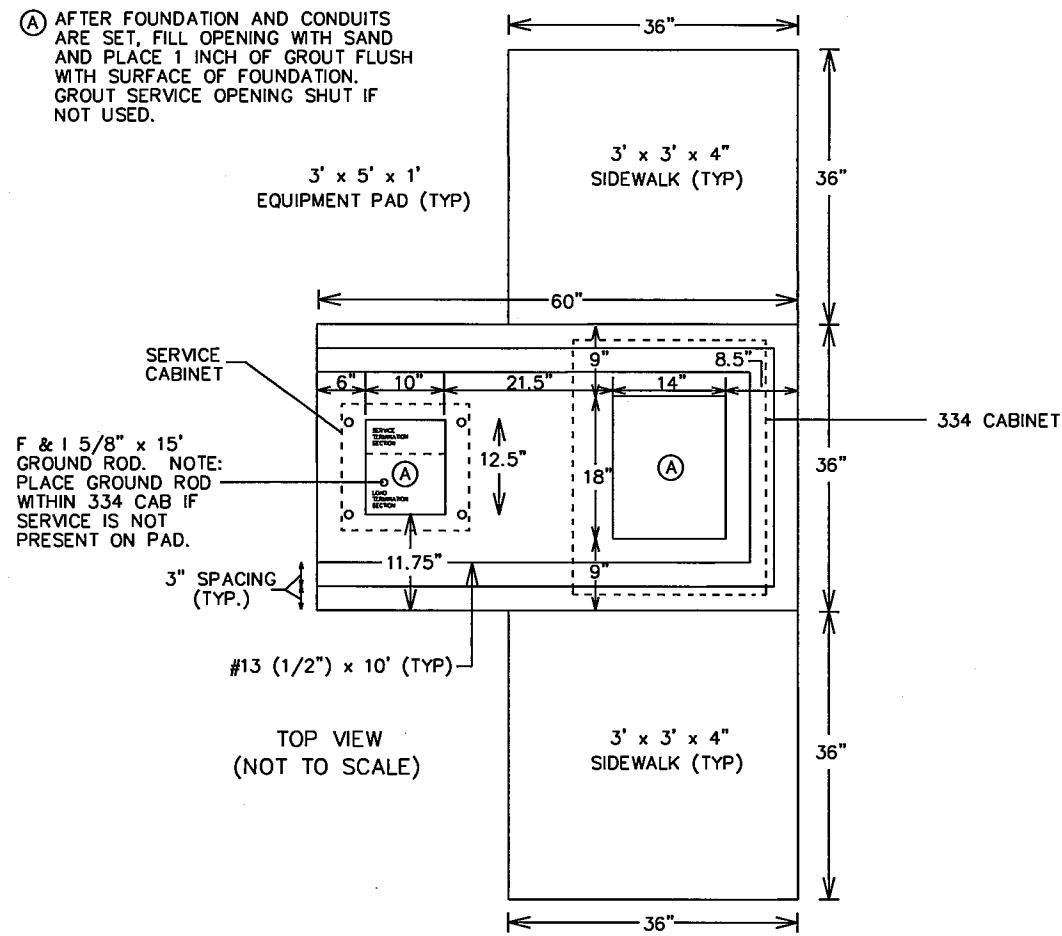
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
Certified By: *John M. Gray* Lic. No. 22457
Printed Name: John M. Gray, PE Date: 3/12/2015



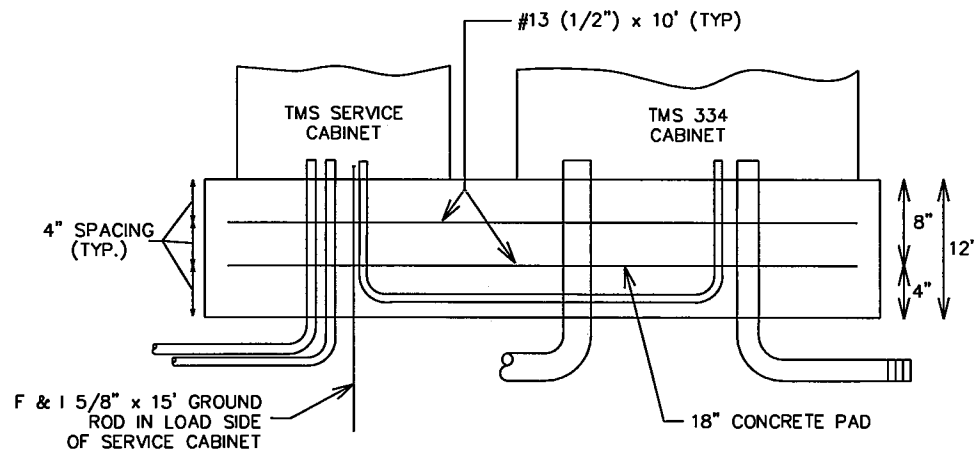
MINNESOTA DEPARTMENT OF TRANSPORTATION
**RURAL INTERSECTION CONFLICT
WARNING SYSTEMS - PHASE II**
S.P. 8816-2274, 1806-74, 6406-24, 7102-132,
S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEMS "A-E"
STATEMENT OF ESTIMATED QUANTITIES,
STANDARD PLATES AND GENERAL NOTES

FILE NO.
MNTMD 131077

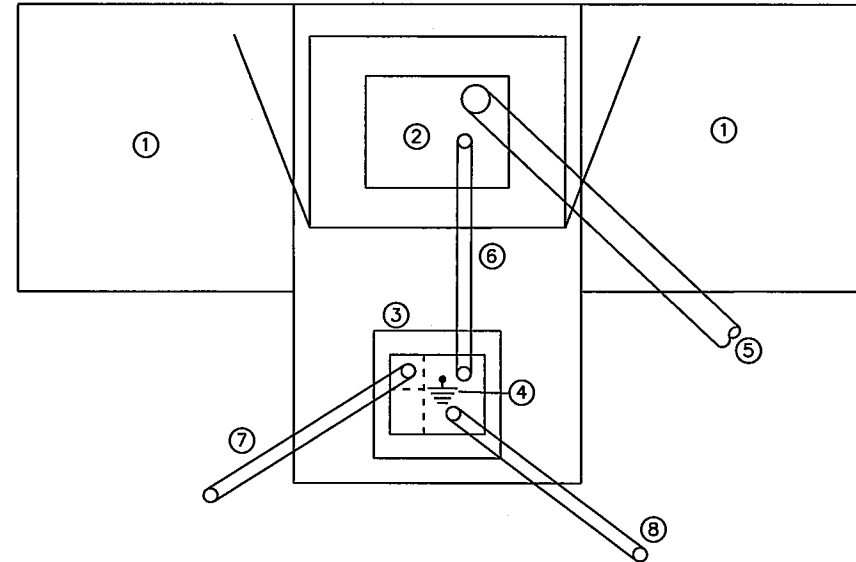


FRONT VIEW (NOT TO SCALE)



TYPICAL 334 SERIES + DMS FOUNDATION WITH SERVICE CABINET
FLASHING BEACON SYSTEMS "A-E"

TYPICAL CABINET INTERSECTION LAYOUT



- ① 3' x 3' x 4" SIDEWALK (SEE DETAIL)
- ② 334Z STYLE RICWS CABINET LOCATION
- ③ RURAL LIGHTING/FLASHER SERVICE CABINET
- ④ GROUND ROD
- ⑤ 4" CONDUIT TO HANDHOLE 1 (WITH RICWS FLASHER/DETECTOR CABLES)
- ⑥ 2" CONDUIT BETWEEN SERVICE CABINET AND RICWS CABINET (WITH SERVICE CABLES)
- ⑦ 2" CONDUIT FROM SERVICE CABINET TO SOURCE OF POWER (WITH 3-1/c#2 CABLE)
- ⑧ 2" CONDUIT FROM SERVICE CABINET TO HANDHOLE 1 (WITH STREET LIGHTING CABLES)

NOTES:

1. THE ANCHOR RODS, NUTS AND WASHERS FOR THE STATE FURNISHED RICWS CABINET AND CONTROLLER SHALL BE FURNISHED BY THE STATE AND INSTALLED BY CONTRACTOR.
2. THE ANCHOR RODS, NUTS AND WASHERS FOR THE CONTRACTOR FURNISHED SERVICE CABINETS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
3. THE OUTER EDGE OF THE ENTIRE EQUIPMENT PAD AND CONCRETE WALK SHALL BE BEVELLED OR CHAMFERED IN A NEAT MANNER AS DIRECTED BY THE ENGINEER.
4. THE TOP OF THE CONDUITS SHALL BE THREADED AND CAPPED AFTER INSTALLATION (UNTIL CABLES ARE PULLED IN).
5. CONDUIT SHALL PROJECT A MINIMUM OF 2" ABOVE THE CONCRETE AND SHALL BE LOCATED INSIDE THE CABINET WHERE DIRECTED BY THE ENGINEER, BUT SHALL NOT INTERFERE WITH THE CABINET FUNCTIONS (SUPPORTING MEMBERS, ETC.).
6. CONCRETE MIX 3A32 OR EQUAL SHALL BE USED FOR EQUIPMENT PAD AND SIDEWALK.
7. CONDUITS WITH BOTH ENDS TERMINATING WITHIN THE PAD SHALL NOT BE PLACED BELOW THE CONCRETE.
8. THE EXACT LOCATION OF CONDUITS WITHIN THE PAD SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
9. ANCHOR RODS SHALL PROJECT A MINIMUM OF 3" ABOVE THE CONCRETE BUT SHALL NOT INTERFERE WITH THE CABINET FUNCTIONS (SUPPORTING MEMBERS, ETC.).
10. CABINETS TO BE CENTERED (LEFT & RIGHT) ON THE PAD.
11. BRUSH ON ANTI-SEIZE LUBRICANT MUST BE APPLIED TO ALL ANCHOR ROD THREADS PROTRUDING ABOVE THE CONCRETE PAD BEFORE THE CABINETS ARE SET.

DRAWN BY:	MW			
DESIGNER:	JMG			
CHECKED BY:	TAS			
DESIGN TEAM	NO.	BY	DATE	REVISIONS

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.

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 Printed Name: John M. Gray, PE Date: 3/12/2015

PHONE: 651.490.2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110-5196
 www.sehinc.com

MINNESOTA DEPARTMENT OF TRANSPORTATION
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 WARNING SYSTEMS - PHASE II**
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132,
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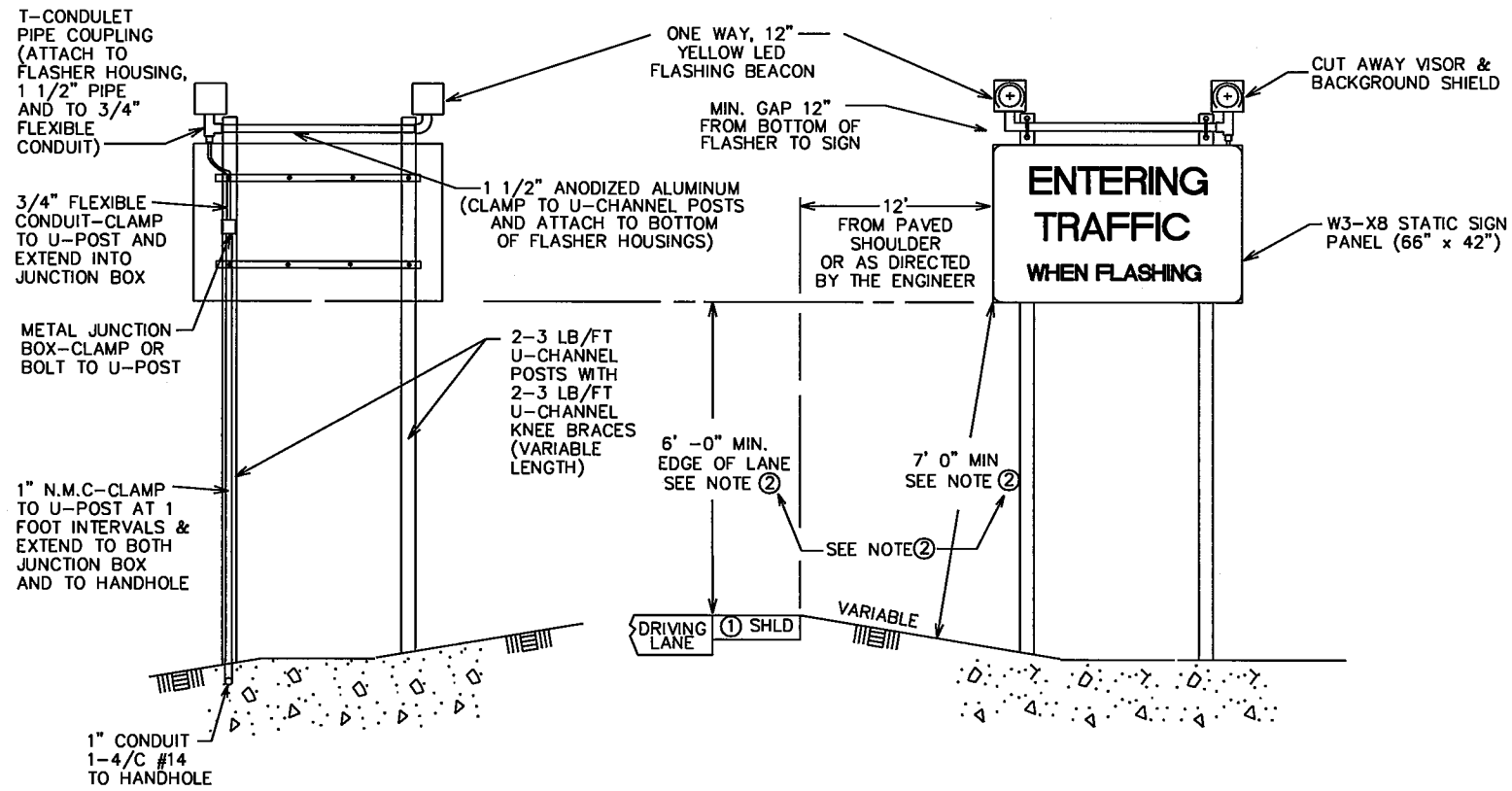
FLASHING BEACON SYSTEMS "A-E"
 CABINET PAD LAYOUT

FILE NO.
 MNTMD 131077

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 41

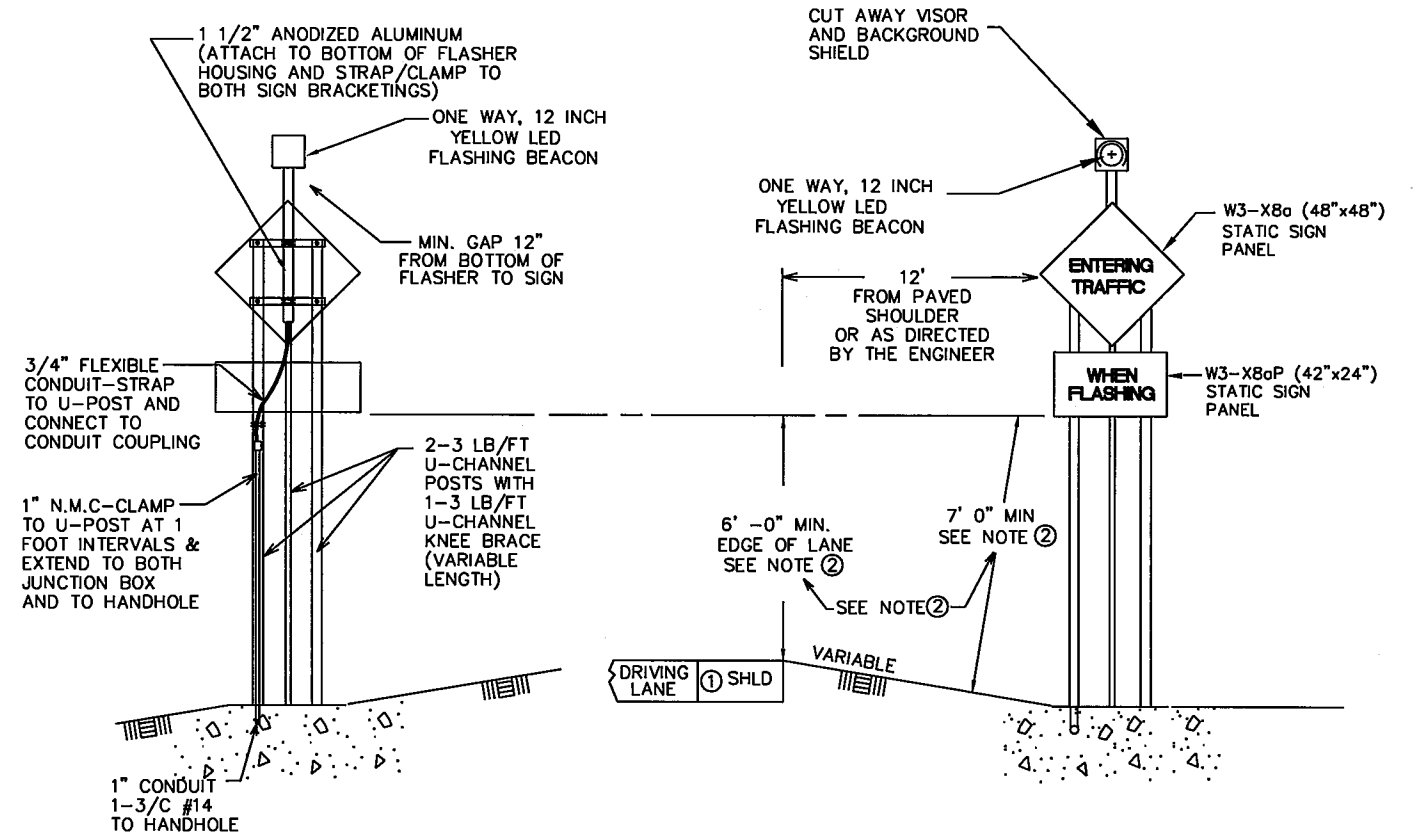
BACK VIEW

FRONT VIEW



BACK VIEW

FRONT VIEW

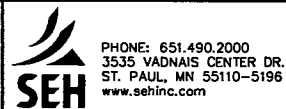


- NOTES: ① WITHOUT PAVED SHOULDER, EDGE OF SIGN SHALL BE 12' - 0" FROM EDGE OF DRIVING LANE.
- ② CONTRACTOR SHALL MEET BOTH MINIMUM REQUIRED MOUNTING HEIGHTS WITH THE SHORTEST U-CHANNEL POSTS POSSIBLE OR AS DIRECTED BY THE ENGINEER.

DRAWN BY: MW			
DESIGNER: JMG			
CHECKED BY: TAS			
DESIGN TEAM	NO.	BY	DATE
			REVISIONS

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.

Certified By: *John M. Gray* Lic. No. 22457
 Licensed Professional Engineer
 Printed Name: John M. Gray, PE Date: 3/12/2015



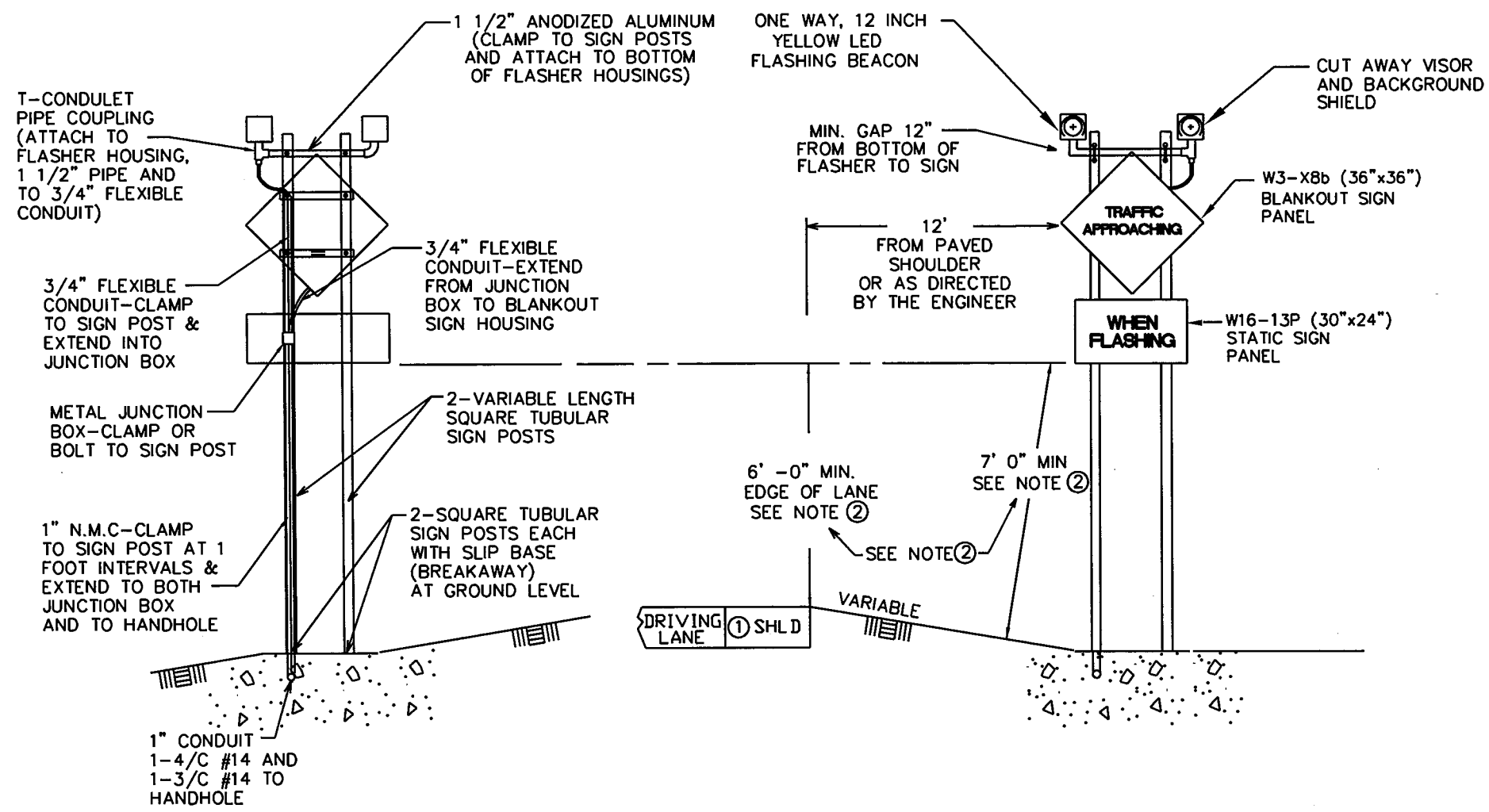
MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEMS - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132, S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEMS "A-E"
 ADVANCE SIGN INSTALLATION DETAILS

FILE NO. MNTMD 131077

BACK VIEW

FRONT VIEW



- NOTES: ① WITHOUT PAVED SHOULDER, EDGE OF SIGN SHALL BE 12' - 0" FROM EDGE OF DRIVING LANE.
- ② CONTRACTOR SHALL MEET BOTH MINIMUM REQUIRED MOUNTING HEIGHTS WITH THE SHORTEST SQUARE TUBE POSTS POSSIBLE OR AS DIRECTED BY THE ENGINEER.

DRAWN BY:	MW			
DESIGNER:	JMG			
CHECKED BY:	TAS			
DESIGN TEAM	NO.	BY	DATE	REVISIONS

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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: John M. Gray, PE Date: 3/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEMS - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEMS "A", "D", "E"
 INTERSECTION SIGN INSTALLATION DETAILS

F & I ROADWAY DETECTORS			
NUMBER	SIZE	LOCATION	TYPE
D2-1	702-3	934'	CANOGA
D2-2	702-3	916'	CANOGA
D4-1	6' x 6'	610'	PVC
D4-2	2-6' x 6'	-5' & 5'	PVC
D6-1	702-3	934'	CANOGA
D6-2	702-3	916'	CANOGA
D6-3	702-3	376'	CANOGA
D8-1	6' x 6'	610'	PVC
D8-2	2-6' x 6'	-5' & 5'	PVC

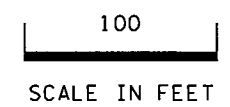
LOCATION = DISTANCE FROM STOP BAR TO FRONT OF ROADWAY DETECTOR.

(B) INPLACE - WOOD POLE (S.O.P.-XCEL ENERGY)
 F & I 2" CONDUIT RISER AND WEATHERHEAD
 3-1/c#2
 EXTEND INTO SERVICE CABINET:
 2" CONDUIT
 3-1/c#2

(A) F & I EQUIPMENT PAD FOUNDATION (SEE DETAIL)
 RICWS/LIGHTING SERVICE CABINET
 SERVICE CABINET TO SOURCE OF POWER:
 2" CONDUIT (SEE B NOTES)
 SERVICE CABINET TO RICWS CABINET:
 2" CONDUIT
 3-1/c#6
 SERVICE CABINET TO H.H.1:
 2" CONDUIT
 2-3/c#14 (LUM)
 RICWS CABINET TO H.H.1:
 4" CONDUIT
 2-4/c#14 (FLASHERS)
 2-3/c#14 (FLASHERS)
 2-3/c#14 (BLANKOUT SIGNS)
 9-2/c#14 (DETECTORS)

(1) F & I 2-SQUARE TUBULAR POSTS AT 30" SPACING (SEE DETAIL)
 W16-13P ("WHEN FLASHING") STATIC SIGN (30" x 24")
 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS,
 AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE
 EDGE OF "TRAFFIC APPROACHING" SIGN ON STANDARD
 SIGNAL BRACKETING (F-1, F-1A)
 EXTEND INTO H.H.1:
 1" CONDUIT
 1-4/c#14 (FLASHERS)
 1-3/c#14 (BLANKOUT SIGN)

INSTALL 334Z CABINET AND CONTROLLER (FURNISHED BY STATE)
 INSTALL "TRAFFIC APPROACHING" (36" x 36") BLANK OUT SIGN (FURNISHED BY STATE)



- NOTES:**
- THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MNDOT DISTRICT TRAFFIC PERSONNEL.
 - SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
 - COORDINATE SERVICE CONNECTION WITH XCEL ENERGY (AND WITH ENGINEER). CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
 - SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
 - THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
 - CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.
 - DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
 - SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MNDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
 - NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MNDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
 - ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
 - ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

MATCHLINE "A" (SEE SHEET 10)

MATCHLINE "B" (SEE SHEET 10)

ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

LEGEND OF SYMBOLS

FLASHER SIGN NO.	(1)
FLASHER AND SIGN POST	(2)
SINGLE BEACON (ADVANCE INSTALLATION)	(3)
DOUBLE BEACON (INTERSECTION INSTALLATION)	(4)
HANDHOLE	(5)
F & I CONDUIT (SIZE AS NOTED)	(6)
PVC LOOP DETECTOR (SIZE AS NOTED)	(7)
CANOGA 702 (3-CANOGA DETECTORS)	(8)
CABINET, CONTROLLER, AND SERVICE CABINET	(A)
SOURCE OF POWER-INPLACE	(B)
STREET LIGHT AND POLE	(C)
FLASHER FACE NO.	(F-2)

1) LOCATION OF UTILITIES SHOWN ARE APPROXIMATE.
 2) CONTRACTOR SHALL VERIFY ALL LOCATIONS PRIOR TO BEGINNING ANY CONSTRUCTION.
 3) DAMAGE TO EXISTING UTILITIES DUE TO FLASHER SYSTEM CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR AT NO EXPENSE TO THE STATE OR THE COUNTY.

PUBLIC UTILITIES AT/NEAR INTERSECTION	
UTILITY COMPANY	
ARVIG COMMUNICATIONS SYSTEMS	
REDWOOD ELECTRIC COOPERATIVE	
XCEL ENERGY	

(3) F & I 2-SQUARE TUBULAR POSTS AT 30" SPACING (SEE DETAIL)
 W16-13P ("WHEN FLASHING") STATIC SIGN (30" x 24")
 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS,
 AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE
 EDGE OF "TRAFFIC APPROACHING" SIGN ON STANDARD
 SIGNAL BRACKETING (F-3, F-3A)
 EXTEND INTO H.H.9:
 1" CONDUIT
 1-4/c#14 (FLASHERS)
 1-3/c#14 (BLANKOUT SIGN)
 INSTALL "TRAFFIC APPROACHING" (36" x 36") BLANK OUT SIGN (FURNISHED BY STATE)

(1) F & I STREET LIGHT POLE FOUNDATION-DESIGN E
 TYPE D40-9 STREET LIGHT POLE
 LUMINAIRE-LED
 EXTEND INTO H.H. 6:
 2" CONDUIT
 1-3/c#14 (LUM)

(2) F & I STREET LIGHT POLE FOUNDATION-DESIGN E
 TYPE D40-9 STREET LIGHT POLE
 LUMINAIRE-LED
 EXTEND INTO H.H.14:
 2" CONDUIT
 1-3/c#14 (LUM)

H.H. 9 TO H.H. 14:
 2" CONDUIT (DIR. BORE)
 1-4/c#14
 2-3/c#14
 2-2/c#14

H.H. 1 TO H.H. 14:
 2" CONDUIT (DIR. BORE)
 1-4/c#14
 2-3/c#14
 4-2/c#14
 1-3/c#14 (LUM)

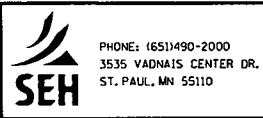
H.H. 1 TO H.H. 6:
 2" CONDUIT (DIR. BORE)
 2-2/c#14
 1-3/c#14 (LUM)

H.H. 1 TO H.H. 2:
 2" CONDUIT
 1-3/c#14
 3-2/c#14

H.H. 2 TO H.H. 3:
 2" CONDUIT
 1-3/c#14
 2-2/c#14

H.H. 6 TO H.H. 7:
 H.H. 7 TO H.H. 8:
 2" CONDUIT
 1-2/c#14

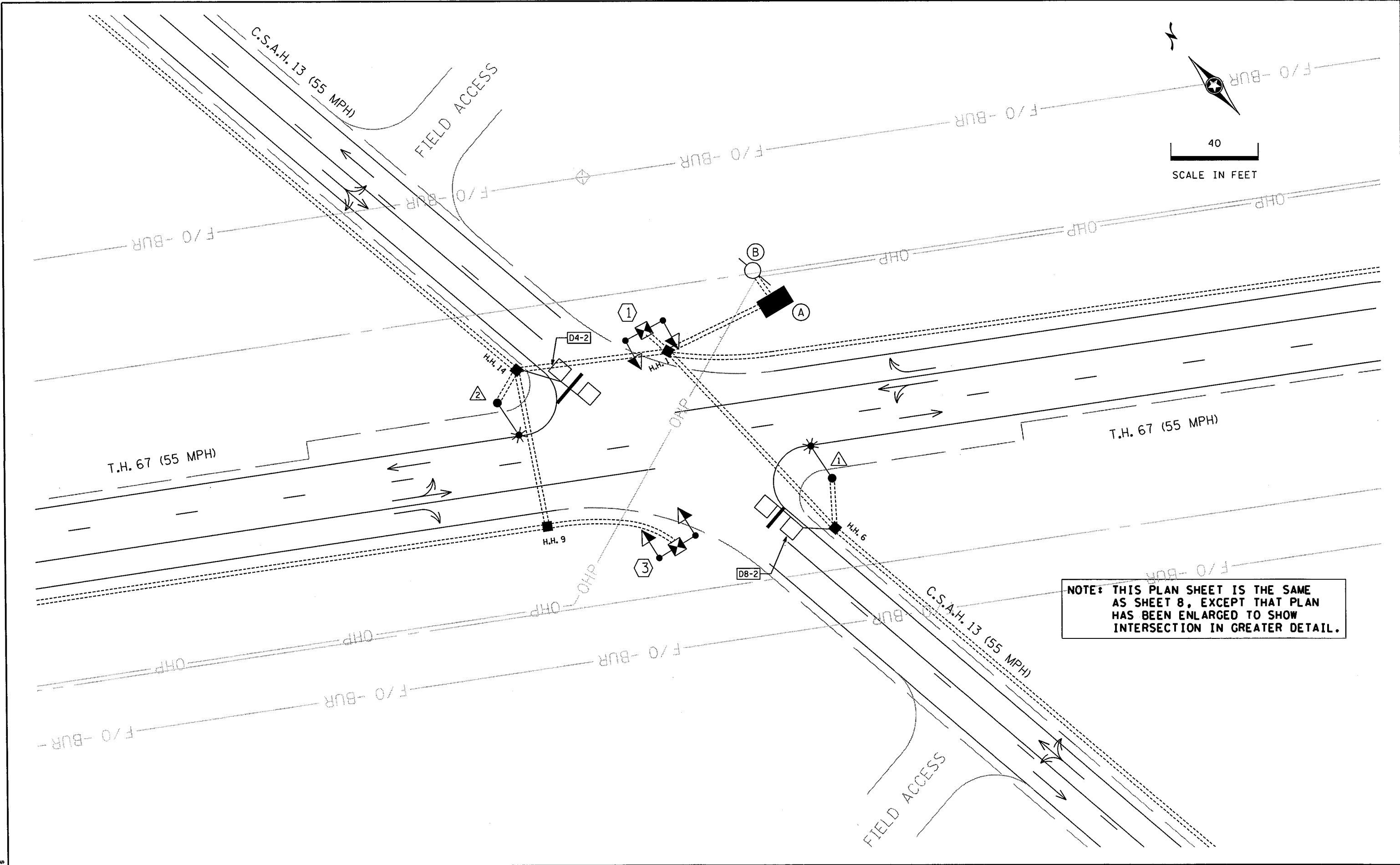
I hereby certify that this sheet was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "A" INTERSECTION LAYOUT
TRUNK HIGHWAY 67 AT CSAH 13
 MORGAN, MINNESOTA - REDWOOD COUNTY

FILE NO. **8**
 MNTMD31077
41



NOTE: THIS PLAN SHEET IS THE SAME AS SHEET 8, EXCEPT THAT PLAN HAS BEEN ENLARGED TO SHOW INTERSECTION IN GREATER DETAIL.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "A" INTERSECTION LAYOUT
TRUNK HIGHWAY 67 AT CSAH 13
 MORGAN, MINNESOTA - REDWOOD COUNTY

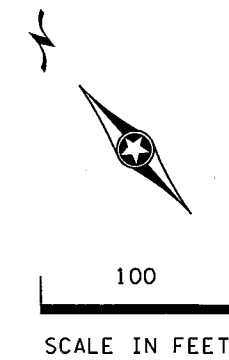
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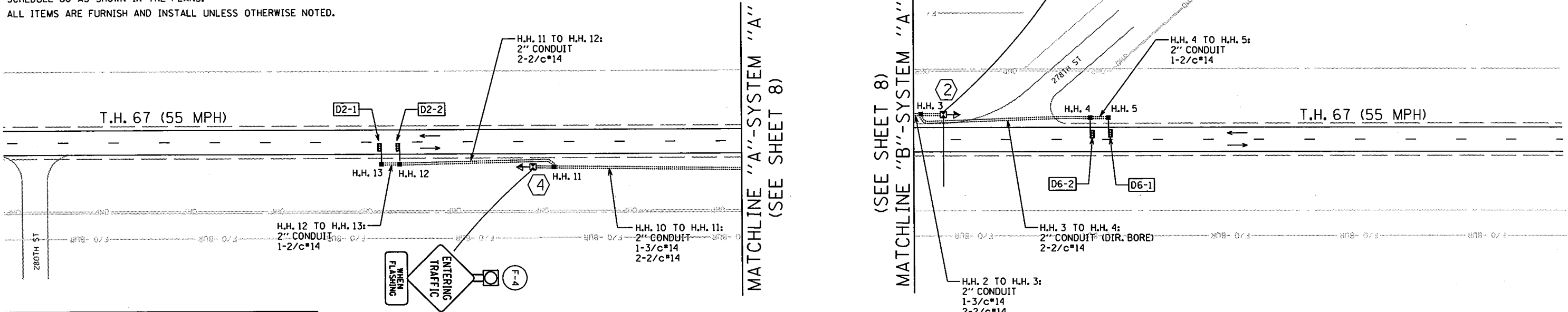
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NOTES:

- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MnDOT DISTRICT TRAFFIC PERSONNEL.
- 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
- 3) COORDINATE SERVICE CONNECTION WITH XCEL ENERGY (AND WITH ENGINEER). CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
- 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
- 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
- 6) CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MnDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MnDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.



④ F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE W3-X8a ("ENTERING TRAFFIC") (48" x 48") AND W3-X8aP ("WHEN FLASHING") (42" x 24") STATIC SIGNS (800' FROM INTERSECTION) 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-4) EXTEND INTO H.H. 11: 1" CONDUIT 1-3/c*14 (FLASHER)



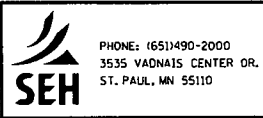
LEGEND OF SYMBOLS	
FLASHER SIGN NO.	①
FLASHER AND SIGN POST	⊠
SINGLE BEACON (ADVANCE INSTALLATION)	→
DOUBLE BEACON (INTERSECTION INSTALLATION)	↔
HANDHOLE	■
F & I CONDUIT (SIZE AS NOTED)	⋯
PVC LOOP DETECTOR (SIZE AS NOTED)	□
CANOGA 702 (3-CANOGA DETECTORS)	⊞
CABINET, CONTROLLER, AND SERVICE CABINET	■ (A)
SOURCE OF POWER-INPLACE	⊙ (B)
FLASHER FACE NO.	(F-2)

ABBREVIATIONS	
D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

② F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE W3-X8a ("ENTERING TRAFFIC") (48" x 48") AND W3-X8aP ("WHEN FLASHING") (42" x 24") STATIC SIGNS (775' FROM INTERSECTION) 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-2) EXTEND INTO H.H.3: 1" CONDUIT 1-3/c*14 (FLASHER)

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMC		
CHECKED BY:	JMC		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "A" INTERSECTION LAYOUT
TRUNK HIGHWAY 67 AT CSAH 13
 MORGAN, MINNESOTA - REDWOOD COUNTY

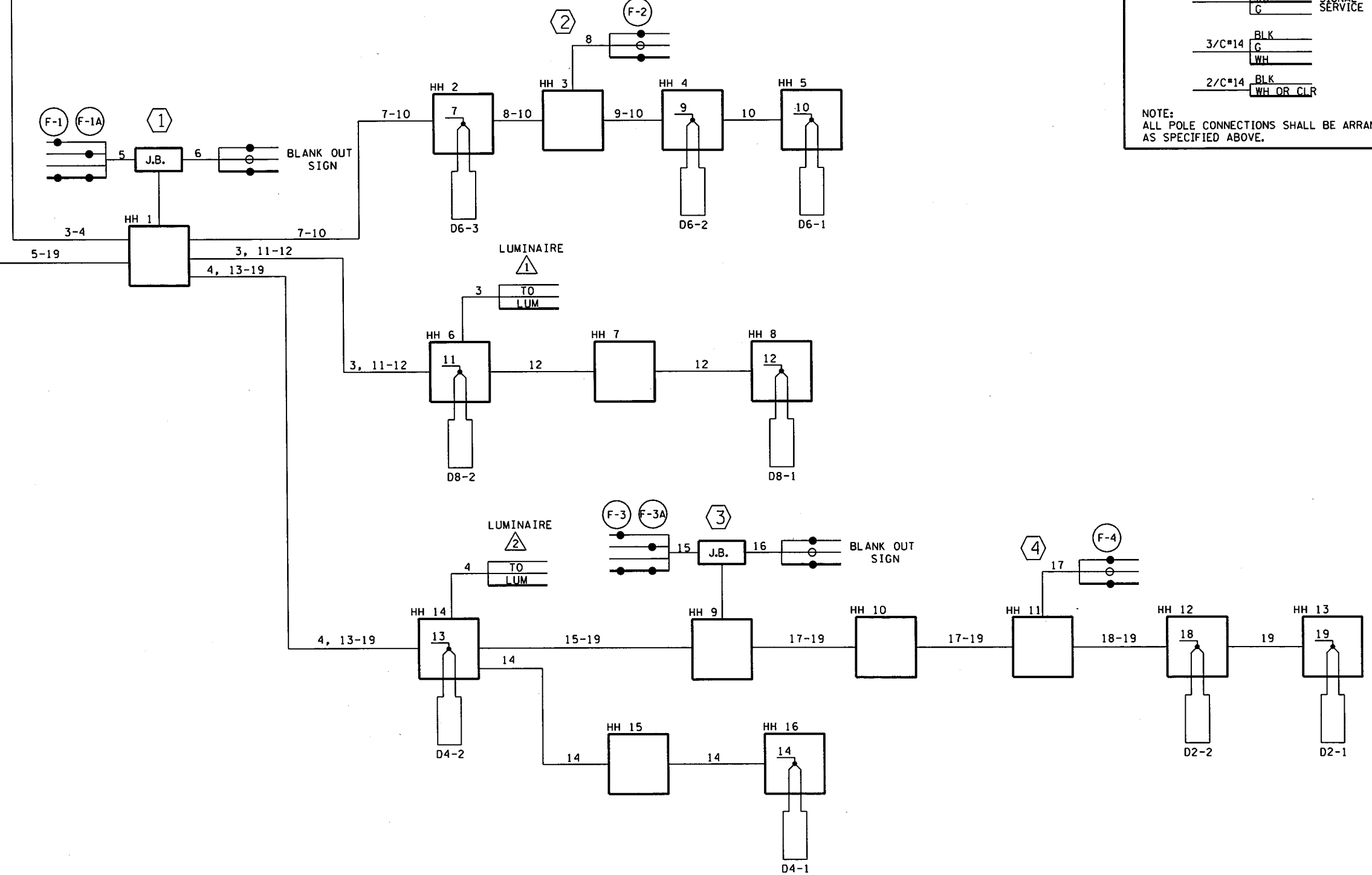
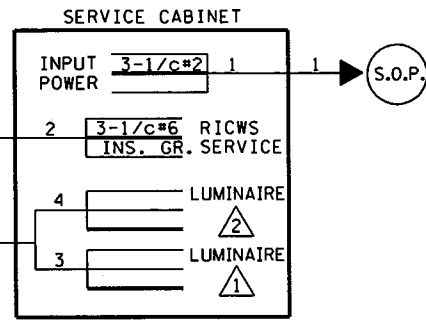
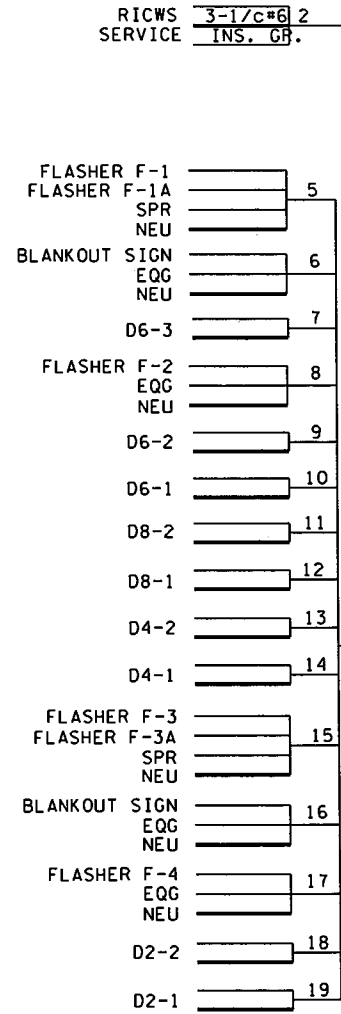
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RICWS CABINET



NOTES:

1) FLASHER SYSTEM AND LUMINAIRES SHALL BE METERED POWER.

CONDUCTOR COLOR CODE (14 GAUGE)

TO RICWS CABINET/DEVICE

1/C#6	G	
3-1/C#2	R	INPUT POWER
	WH	
	BLK	
4/C#14	R	SIGNAL SERVICE
	BLK/R	
	BLK	
	WH	
3-1/C#6	BLK	SIGNAL SERVICE
	WH	
	G	
3/C#14	BLK	
	G	
	WH	
2/C#14	BLK	
	WH OR CLR	

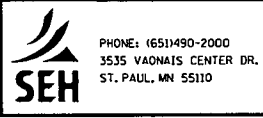
NOTE: ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457

Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION

RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II

S.P. 8816-2274, 1806-74, 6406-24, 7102-132
S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "A"
FIELD WIRING DIAGRAM
TRUNK HIGHWAY 67 AT CSAH 13
MORGAN, MINNESOTA - REDWOOD COUNTY

FILE NO. 11
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SCALE IN FEET

F & I ROADWAY DETECTORS			
NUMBER	SIZE	LOCATION	TYPE
D2-1	6' x 6'	346'	PVC
D2-2	2-6' x 6'	5' & 20'	PVC
D2-3	6' x 15'	0'	PVC
D4-1	6' x 6'	189'	PVC
D4-2	6' x 6'	189'	PVC
D4-3	2-6' x 6'	5' & 20'	PVC
D4-4	2-6' x 6'	5' & 20'	PVC
D4-5	6' x 15'	0'	PVC

LOCATION = DISTANCE FROM STOP BAR TO FRONT OF ROADWAY DETECTOR.

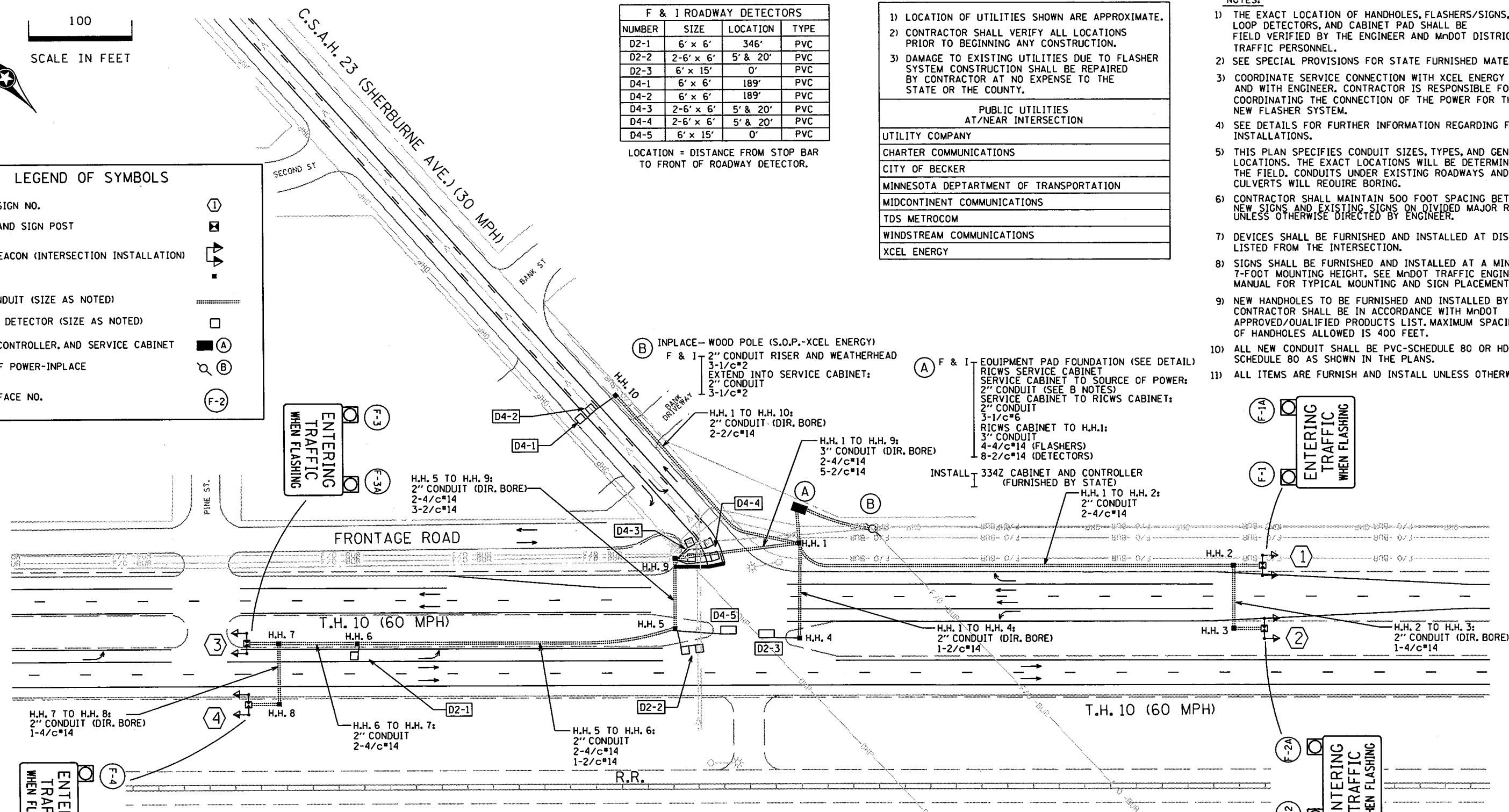
- 1) LOCATION OF UTILITIES SHOWN ARE APPROXIMATE.
- 2) CONTRACTOR SHALL VERIFY ALL LOCATIONS PRIOR TO BEGINNING ANY CONSTRUCTION.
- 3) DAMAGE TO EXISTING UTILITIES DUE TO FLASHER SYSTEM CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR AT NO EXPENSE TO THE STATE OR THE COUNTY.

PUBLIC UTILITIES AT/NEAR INTERSECTION	
UTILITY COMPANY	
CHARTER COMMUNICATIONS	
CITY OF BECKER	
MINNESOTA DEPARTMENT OF TRANSPORTATION	
MIDCONTINENT COMMUNICATIONS	
TDS METROCOM	
WINDSTREAM COMMUNICATIONS	
XCEL ENERGY	

- NOTES:**
- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MNDOT DISTRICT TRAFFIC PERSONNEL.
 - 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
 - 3) COORDINATE SERVICE CONNECTION WITH XCEL ENERGY AND WITH ENGINEER. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
 - 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
 - 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
 - 6) CONTRACTOR SHALL MAINTAIN 500 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON DIVIDED MAJOR ROADWAY UNLESS OTHERWISE DIRECTED BY ENGINEER.
 - 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
 - 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MNDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
 - 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MNDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
 - 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
 - 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

LEGEND OF SYMBOLS

- FLASHER SIGN NO. (1)
- FLASHER AND SIGN POST (2)
- DOUBLE BEACON (INTERSECTION INSTALLATION) (3)
- HANDHOLE (4)
- F & I CONDUIT (SIZE AS NOTED) (5)
- PVC LOOP DETECTOR (SIZE AS NOTED) (6)
- CABINET, CONTROLLER, AND SERVICE CABINET (A)
- SOURCE OF POWER-INPLACE (B)
- FLASHER FACE NO. (F-1, F-2)



ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

1 F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (450' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-1, F-1A) EXTEND INTO H.H. 2: 1" CONDUIT 1-4/c*14 (FLASHERS)

2 F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (450' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-2, F-2A) EXTEND INTO H.H. 3: 1" CONDUIT 1-4/c*14 (FLASHERS)

3 F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (450' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-3, F-3A) EXTEND INTO H.H. 7: 1" CONDUIT 1-4/c*14 (FLASHERS)

4 F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (450' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-4, F-4A) EXTEND INTO H.H. 8: 1" CONDUIT 1-4/c*14 (FLASHERS)

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

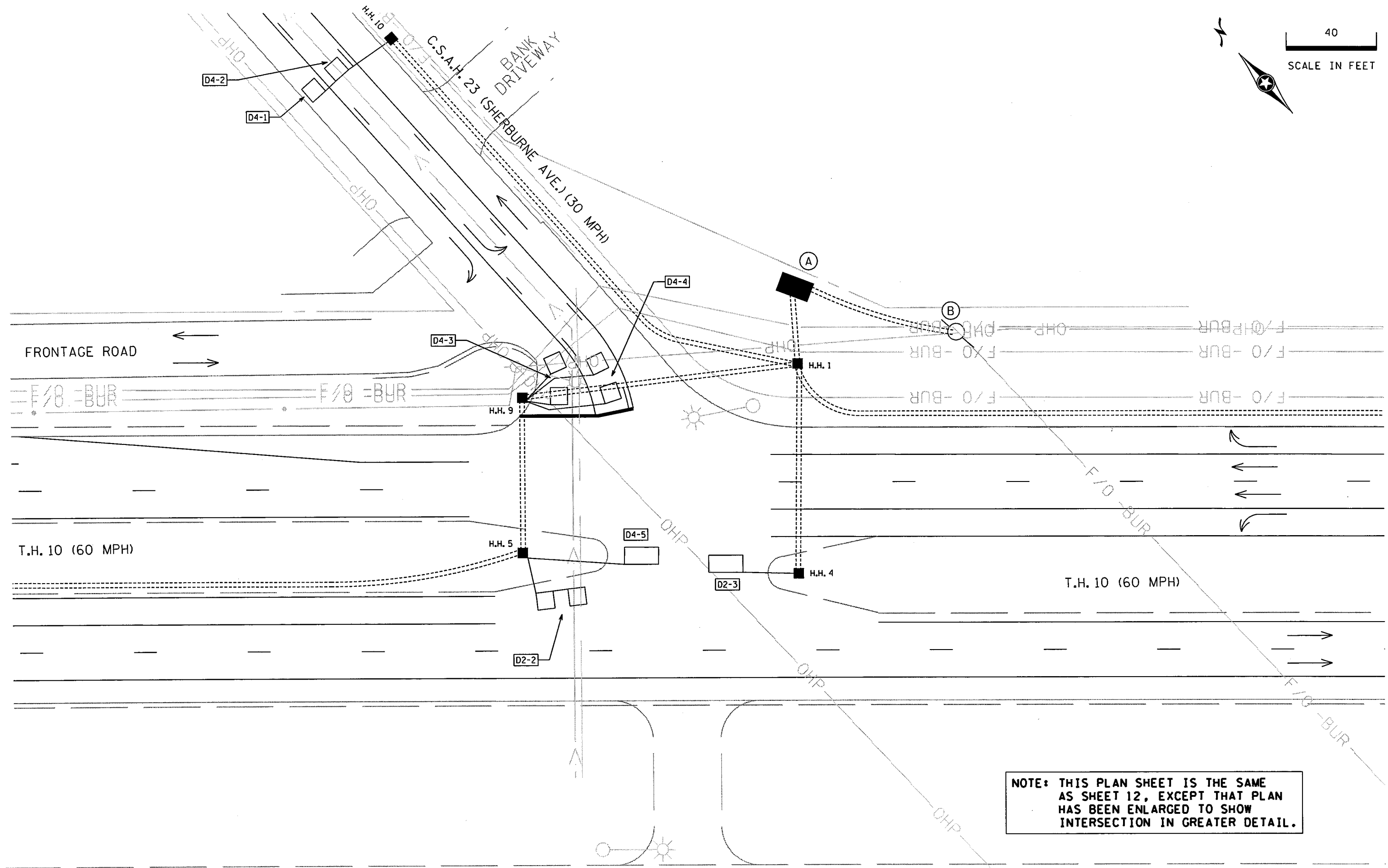
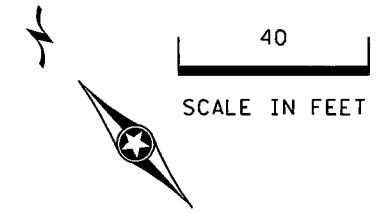
FLASHING BEACON SYSTEM "B" INTERSECTION LAYOUT
TRUNK HIGHWAY 10 AT CR 23
 BECKER, MINNESOTA - SHERBURNE COUNTY

FILE NO.	12
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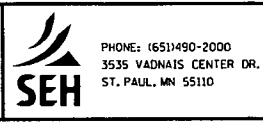


NOTE: THIS PLAN SHEET IS THE SAME AS SHEET 12, EXCEPT THAT PLAN HAS BEEN ENLARGED TO SHOW INTERSECTION IN GREATER DETAIL.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "B" INTERSECTION LAYOUT
TRUNK HIGHWAY 10 AT CR 23
 BECKER, MINNESOTA - SHERBURNE COUNTY

FILE NO. **13**
 MNTMD131077
41

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RICWS CABINET

SERVICE CABINET

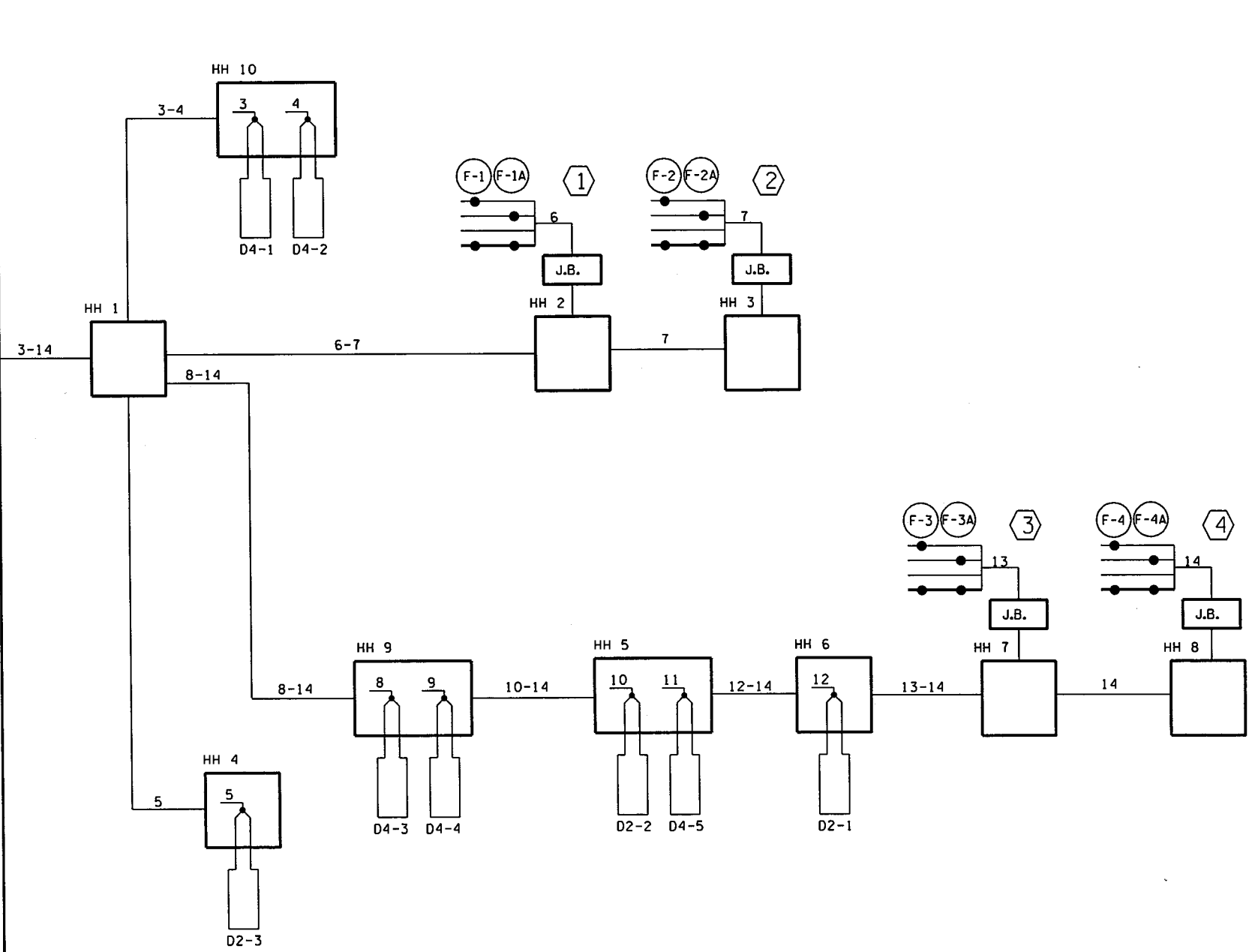
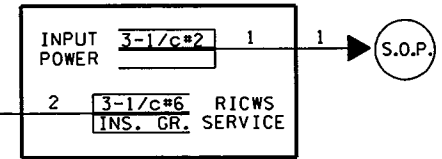
NOTES:
 1) FLASHER SYSTEM AND LUMINAIRES SHALL BE METERED POWER.

CONDUCTOR COLOR CODE (14 GAUGE)

TO RICWS CABINET/DEVICE	
1/C*6	G
3-1/C*2	R
	WH
	BLK
4/C*14	R
	BLK/R
	BLK
3-1/C*6	BLK
	WH
	G
3/C*14	BLK
	G
	WH
2/C*14	BLK
	WH OR CLR

NOTE:
 ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.

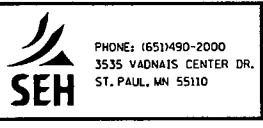
- RICWS SERVICE 3-1/C*6 2 INS. GR.
- D4-1 3
- D4-2 4
- D2-3 5
- FLASHER F-1 6
- FLASHER F-1A 6
- SPR 6
- NEU 6
- FLASHER F-2 7
- FLASHER F-2A 7
- SPR 7
- NEU 7
- D4-3 8
- D4-4 9
- D2-2 10
- D4-5 11
- D2-1 12
- FLASHER F-3 13
- FLASHER F-3A 13
- SPR 13
- NEU 13
- FLASHER F-4 14
- FLASHER F-4A 14
- SPR 14
- NEU 14



DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
 RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "B"
 INTERSECTION LAYOUT
 TRUNK HIGHWAY 10 AT CR 23
 BECKER, MINNESOTA - SHERBURNE COUNTY

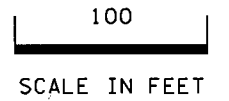
FILE NO. 14
 MNTMD131077 41

NOTES:

- THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MnDOT DISTRICT TRAFFIC PERSONNEL.
- SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
- COORDINATE SERVICE CONNECTION WITH XCEL ENERGY AND WITH ENGINEER. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
- SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
- THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
- CONTRACTOR SHALL MAINTAIN 500 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON DIVIDED MAJOR ROADWAY UNLESS OTHERWISE DIRECTED BY ENGINEER.
- DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MnDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MnDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

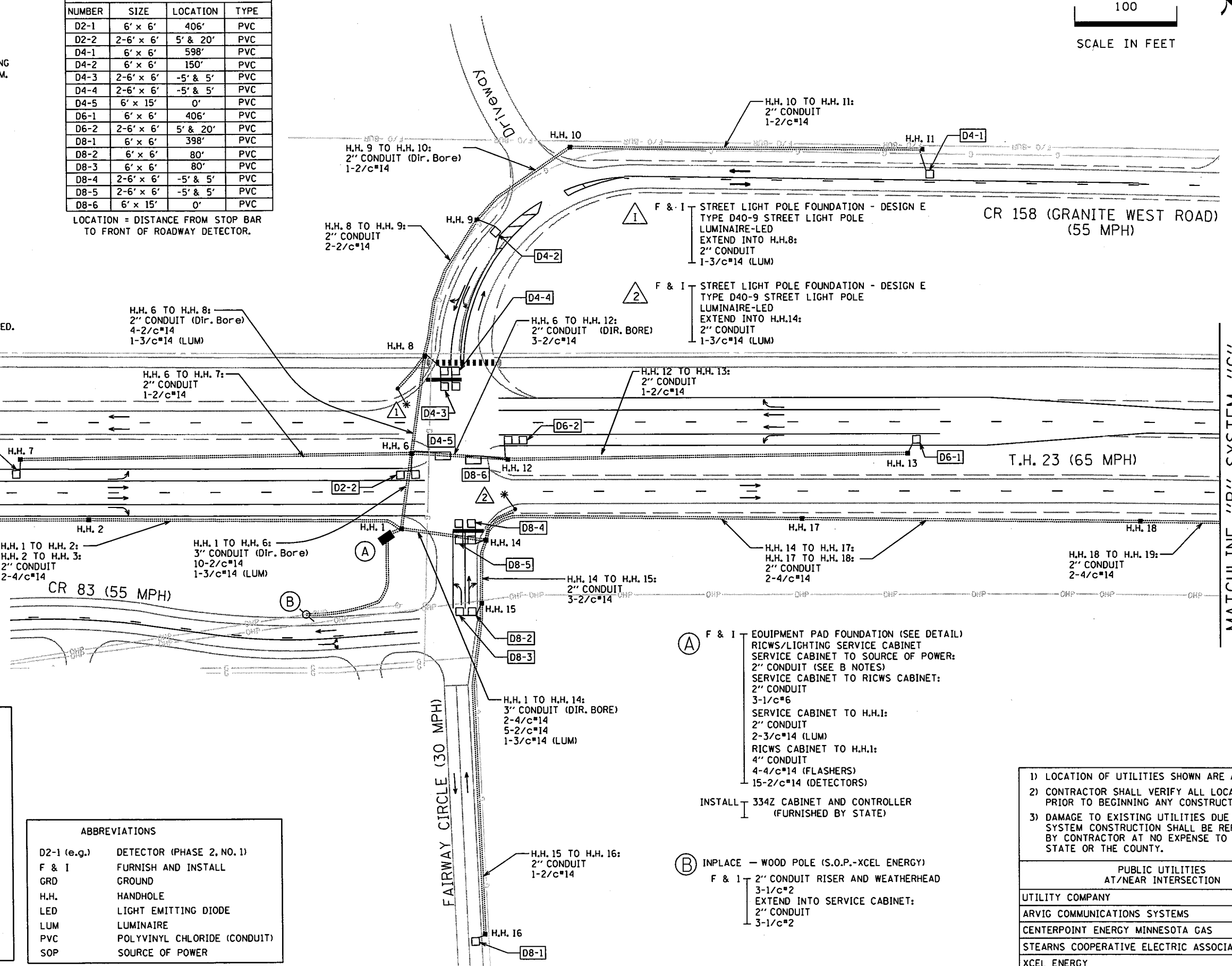
F & I ROADWAY DETECTORS			
NUMBER	SIZE	LOCATION	TYPE
D2-1	6' x 6'	406'	PVC
D2-2	2-6' x 6'	5' & 20'	PVC
D4-1	6' x 6'	598'	PVC
D4-2	6' x 6'	150'	PVC
D4-3	2-6' x 6'	-5' & 5'	PVC
D4-4	2-6' x 6'	-5' & 5'	PVC
D4-5	6' x 15'	0'	PVC
D6-1	6' x 6'	406'	PVC
D6-2	2-6' x 6'	5' & 20'	PVC
D8-1	6' x 6'	398'	PVC
D8-2	6' x 6'	80'	PVC
D8-3	6' x 6'	80'	PVC
D8-4	2-6' x 6'	-5' & 5'	PVC
D8-5	2-6' x 6'	-5' & 5'	PVC
D8-6	6' x 15'	0'	PVC

LOCATION = DISTANCE FROM STOP BAR TO FRONT OF ROADWAY DETECTOR.



MATCHLINE "A"-SYSTEM "C" (SEE SHEET 17)

MATCHLINE "B"-SYSTEM "C" (SEE SHEET 17)



LEGEND OF SYMBOLS	
FLASHER SIGN NO.	①
FLASHER AND SIGN POST	⊠
DOUBLE BEACON (INTERSECTION INSTALLATION)	⊠
HANDHOLE	■
F & I CONDUIT (SIZE AS NOTED)	----
PVC LOOP DETECTOR (SIZE AS NOTED)	□
CABINET, CONTROLLER, AND SERVICE CABINET	■ (A)
SOURCE OF POWER-INPLACE	⊙ (B)
FLASHER FACE NO.	⊙ (F-2)

ABBREVIATIONS	
D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

(A) F & I EQUIPMENT PAD FOUNDATION (SEE DETAIL) RICWS/LIGHTING SERVICE CABINET SERVICE CABINET TO SOURCE OF POWER: 2" CONDUIT (SEE B NOTES) SERVICE CABINET TO RICWS CABINET: 2" CONDUIT 3-1/c*6 SERVICE CABINET TO H.H.1: 2" CONDUIT 2-3/c*14 (LUM) RICWS CABINET TO H.H.1: 4" CONDUIT 4-4/c*14 (FLASHERS) 15-2/c*14 (DETECTORS) INSTALL 334Z CABINET AND CONTROLLER (FURNISHED BY STATE)

(B) INPLACE - WOOD POLE (S.O.P.-XCEL ENERGY) F & I 2" CONDUIT RISER AND WEATHERHEAD 3-1/c*2 EXTEND INTO SERVICE CABINET: 2" CONDUIT 3-1/c*2

- LOCATION OF UTILITIES SHOWN ARE APPROXIMATE.
- CONTRACTOR SHALL VERIFY ALL LOCATIONS PRIOR TO BEGINNING ANY CONSTRUCTION.
- DAMAGE TO EXISTING UTILITIES DUE TO FLASHER SYSTEM CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR AT NO EXPENSE TO THE STATE OR THE COUNTY.

PUBLIC UTILITIES AT/NEAR INTERSECTION	
UTILITY COMPANY	
ARVIG COMMUNICATIONS SYSTEMS	
CENTERPOINT ENERGY MINNESOTA GAS	
STEARNS COOPERATIVE ELECTRIC ASSOCIATION	
XCEL ENERGY	

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DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

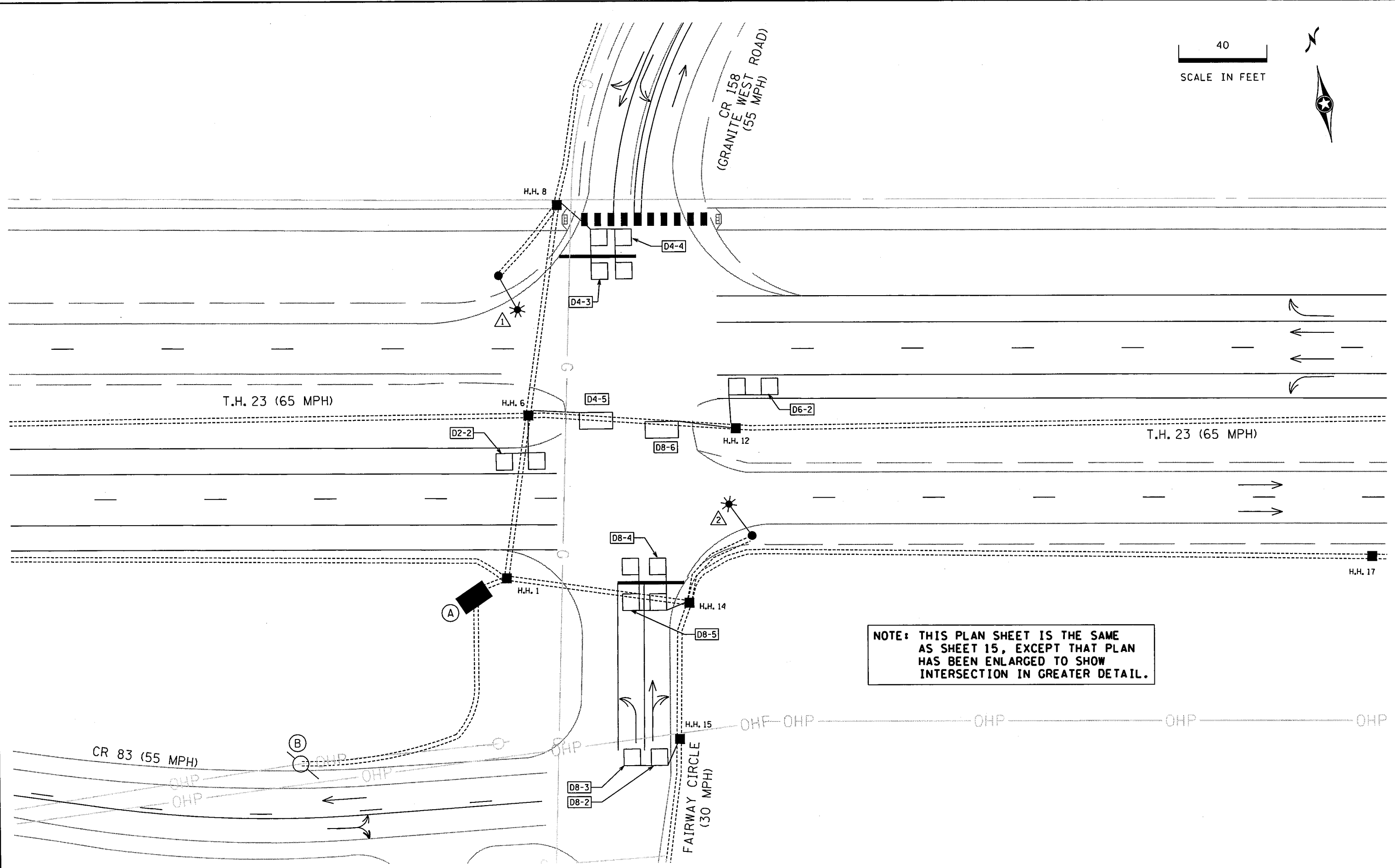
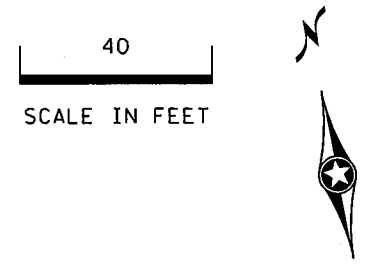


MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "C" INTERSECTION LAYOUT
TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

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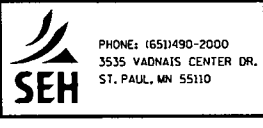


NOTE: THIS PLAN SHEET IS THE SAME AS SHEET 15, EXCEPT THAT PLAN HAS BEEN ENLARGED TO SHOW INTERSECTION IN GREATER DETAIL.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "C" INTERSECTION LAYOUT
TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

FILE NO. **16**
 MNTMD131077
41

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4/23/2015

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NOTES:

- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MNDOT DISTRICT TRAFFIC PERSONNEL.
- 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
- 3) COORDINATE SERVICE CONNECTION WITH XCEL ENERGY AND WITH ENGINEER. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
- 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
- 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
- 6) CONTRACTOR SHALL MAINTAIN 500 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON DIVIDED MAJOR ROADWAY UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MNDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MNDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

① F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (950' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-1, F-1A) EXTEND INTO H.H. 4: 1" CONDUIT 1-4/c*14 (FLASHERS)

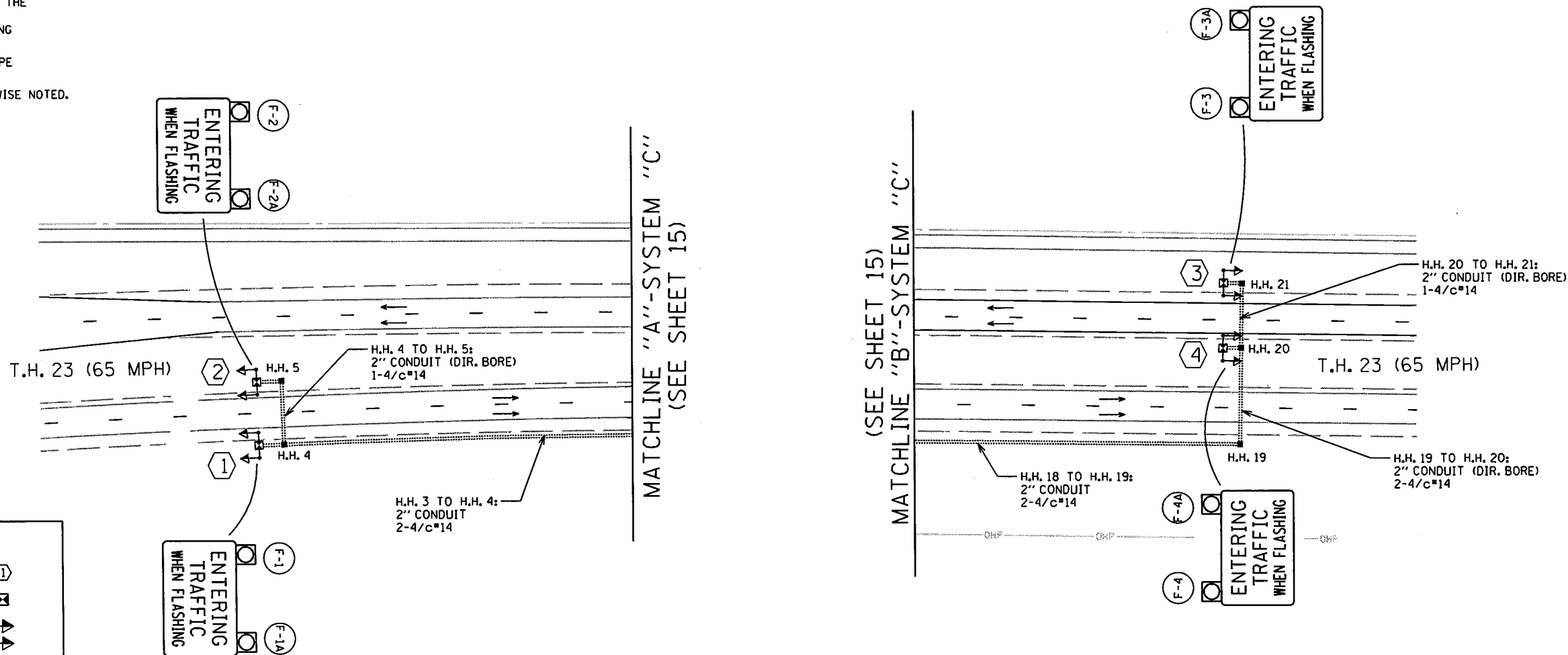
② F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (950' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-2, F-2A) EXTEND INTO H.H. 5: 1" CONDUIT 1-4/c*14 (FLASHERS)

③ F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (950' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-3, F-3A) EXTEND INTO H.H. 21: 1" CONDUIT 1-4/c*14 (FLASHERS)

④ F & I 2-3 LB/FT U-CHANNEL POSTS AT 42" SPACING WITH 2-3 LB/FT U-CHANNEL KNEE BRACES W3-X8 ("ENTERING TRAFFIC WHEN FLASHING") (66" x 42") STATIC SIGN (950' FROM INTERSECTION) 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-4, F-4A) EXTEND INTO H.H. 20: 1" CONDUIT 1-4/c*14 (FLASHERS)



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SCALE IN FEET

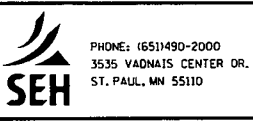


LEGEND OF SYMBOLS	
FLASHER SIGN NO.	①
FLASHER AND SIGN POST	⊠
DOUBLE BEACON (INTERSECTION INSTALLATION)	⊠
HANDHOLE	■
F & I CONDUIT (SIZE AS NOTED)	⋯
PVC LOOP DETECTOR (SIZE AS NOTED)	□
CABINET, CONTROLLER, AND SERVICE CABINET	■ (A)
SOURCE OF POWER-INPLACE	⊗ (B)
FLASHER FACE NO.	F-2

ABBREVIATIONS	
D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

DESIGN TEAM			
DRAWN BY:			
DESIGNER:			
CHECKED BY:			
NO.	BY	DATE	REVISIONS

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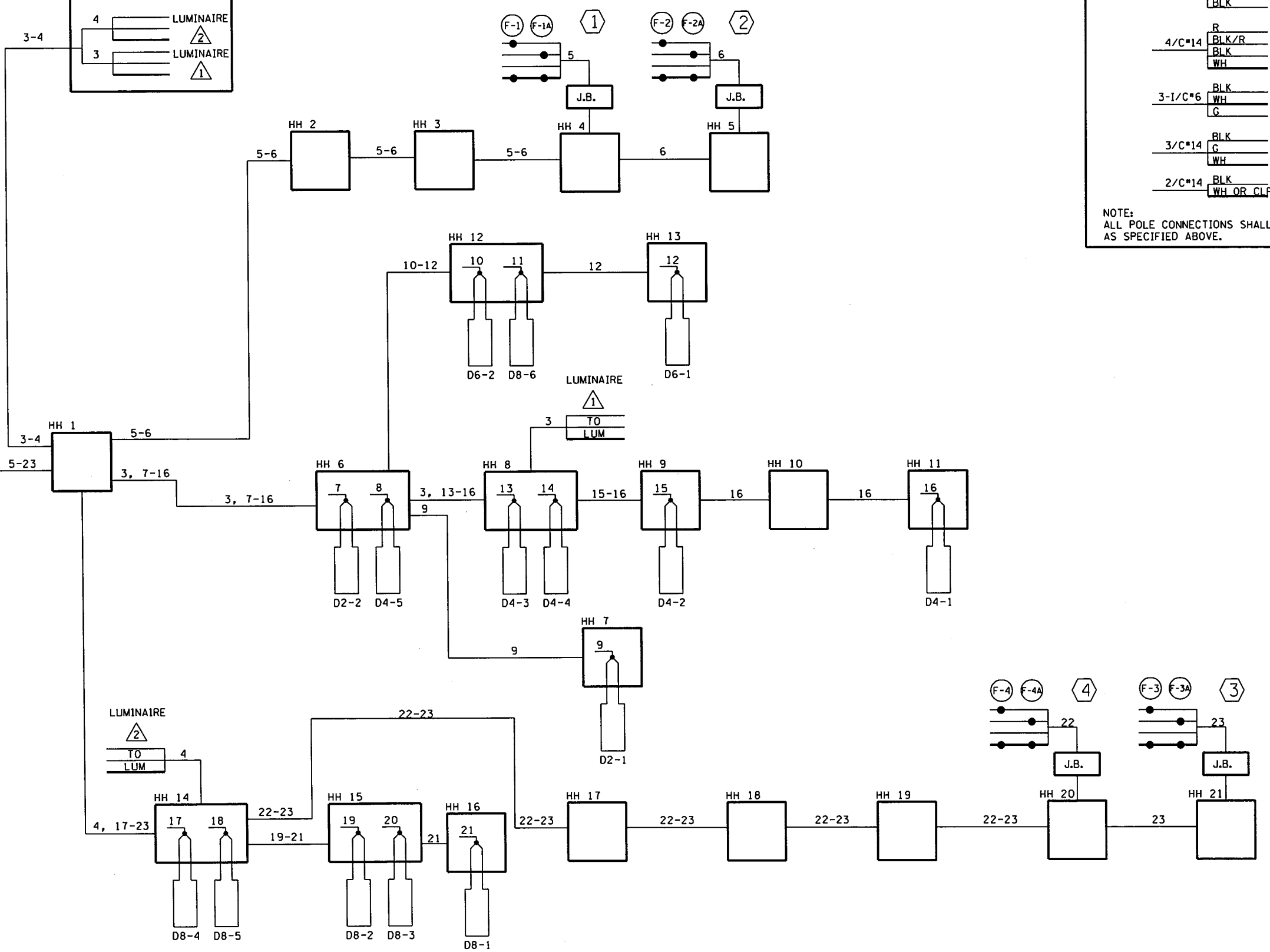
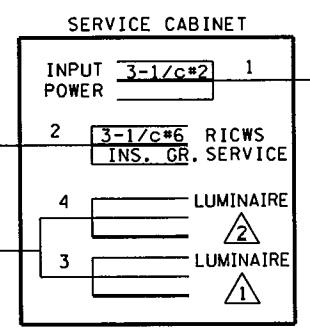
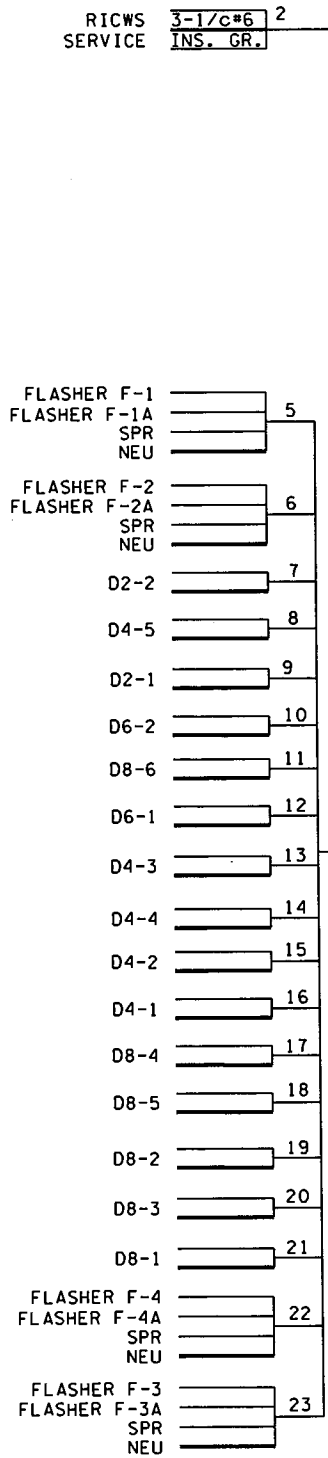
MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "C" INTERSECTION LAYOUT
TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

FILE NO. **17**
 MNTMD131077
41

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RICWS CABINET



NOTES:
 1) FLASHER SYSTEM AND LUMINAIRES SHALL BE METERED POWER.

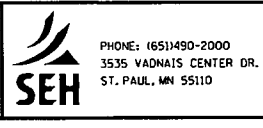
CONDUCTOR COLOR CODE (14 GAUGE)

TO RICWS CABINET/DEVICE	
1/C#6	G
3-1/C#2	R WH BLK
4/C#14	R BLK/R BLK WH
3-1/C#6	BLK WH G
3/C#14	BLK G WH
2/C#14	BLK WH OR CLR

NOTE:
 ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMC		
CHECKED BY:	JMC		
NO.	BY	DATE	REVISIONS

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MINNESOTA DEPARTMENT OF TRANSPORTATION
 RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "C"
 FIELD WIRING DIAGRAM
 TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

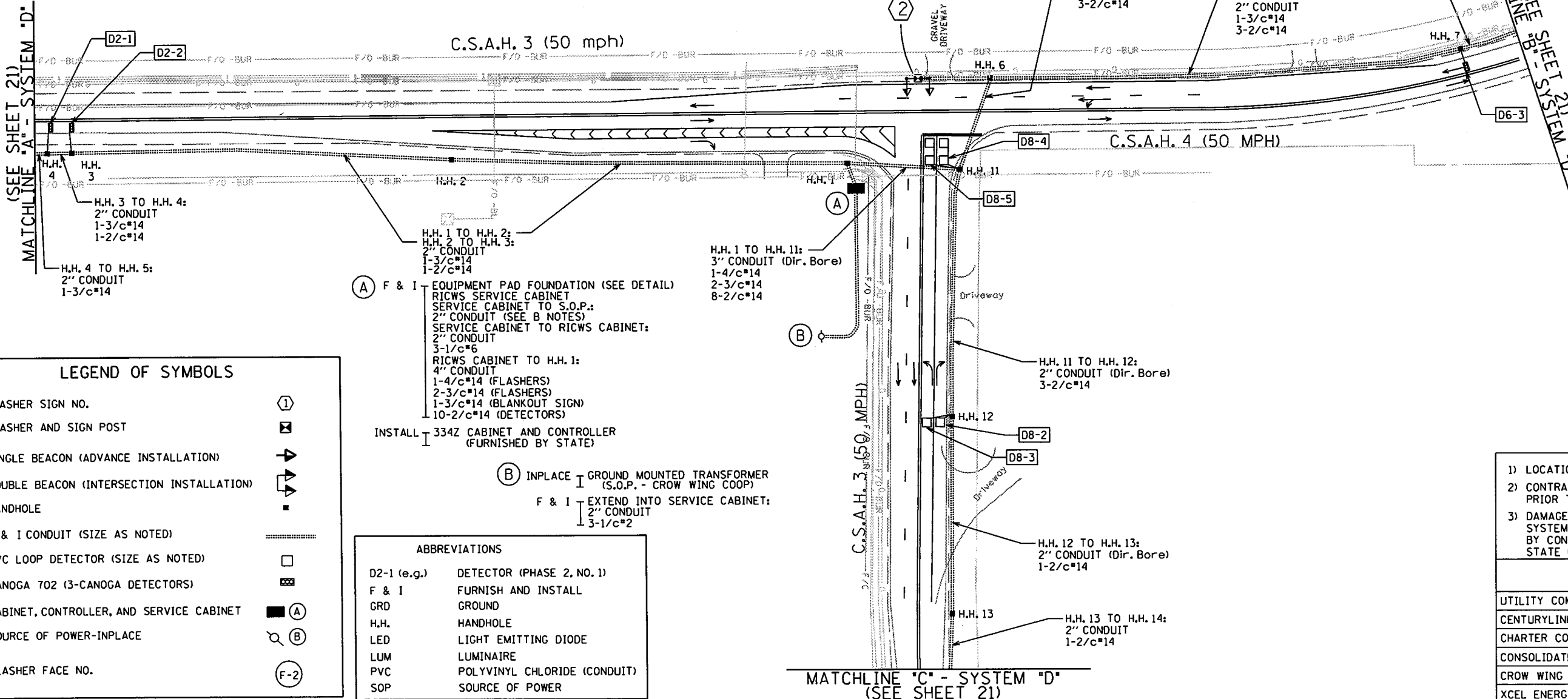
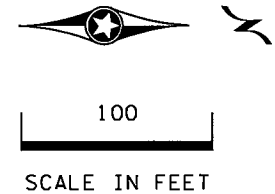
NOTES:

- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MNDOT DISTRICT TRAFFIC PERSONNEL.
- 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
- 3) COORDINATE SERVICE CONNECTION WITH CROW WING COOP POWER AND LIGHT COMPANY AND WITH ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
- 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
- 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
- 6) CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.
- 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MNDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MNDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

F & I ROADWAY DETECTORS			
NUMBER	SIZE	LOCATION	TYPE
D2-1	702-3	682'	CANOGA
D2-2	702-3	664'	CANOGA
D6-1	702-3	682'	CANOGA
D6-2	702-3	664'	CANOGA
D6-3	702-3	385'	CANOGA
D8-1	6' x 6'	710'	PVC
D8-2	6' x 6'	240'	PVC
D8-3	6' x 6'	240'	PVC
D8-4	2-6' x 6'	5' & 20'	PVC
D8-5	2-6' x 6'	5' & 20'	PVC

LOCATION = DISTANCE FROM STOP BAR TO FRONT OF ROADWAY DETECTOR.

② F & I 2-SQUARE TUBULAR POSTS AT 30" SPACING (SEE DETAIL) (INSTALL BEHIND INPLACE GUARD RAIL)
 W16-13P ("WHEN FLASHING") STATIC SIGN (30" x 24")
 2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "TRAFFIC APPROACHING" SIGN ON STANDARD SIGNAL BRACKETING (F-2, F-2A)
 EXTEND INTO H.H. 6:
 1" CONDUIT
 1-4/c*14 (FLASHERS)
 1-3/c*14 (BLANKOUT SIGN)
 INSTALL "TRAFFIC APPROACHING" (36" x 36") BLANK OUT SIGN (FURNISHED BY STATE)



LEGEND OF SYMBOLS

- FLASHER SIGN NO. (F-2)
- FLASHER AND SIGN POST (Symbol with F-2)
- SINGLE BEACON (ADVANCE INSTALLATION) (Symbol with arrow)
- DOUBLE BEACON (INTERSECTION INSTALLATION) (Symbol with two arrows)
- HANDHOLE (Symbol with square)
- F & I CONDUIT (SIZE AS NOTED) (Symbol with dashed line)
- PVC LOOP DETECTOR (SIZE AS NOTED) (Symbol with square)
- CANOGA 702 (3-CANOGA DETECTORS) (Symbol with square)
- CABINET, CONTROLLER, AND SERVICE CABINET (Symbol with square and A)
- SOURCE OF POWER-INPLACE (Symbol with square and B)
- FLASHER FACE NO. (Symbol with F-2)

① F & I EQUIPMENT PAD FOUNDATION (SEE DETAIL)
 RICWS SERVICE CABINET
 SERVICE CABINET TO S.O.P.:
 2" CONDUIT (SEE B NOTES)
 SERVICE CABINET TO RICWS CABINET:
 2" CONDUIT
 3-1/c*6
 RICWS CABINET TO H.H. 1:
 4" CONDUIT
 1-4/c*14 (FLASHERS)
 2-3/c*14 (FLASHERS)
 1-3/c*14 (BLANKOUT SIGN)
 10-2/c*14 (DETECTORS)
 INSTALL 334Z CABINET AND CONTROLLER (FURNISHED BY STATE)

② INPLACE GROUND MOUNTED TRANSFORMER (S.O.P. - CROW WING COOP)
 F & I EXTEND INTO SERVICE CABINET:
 2" CONDUIT
 3-1/c*2

ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

- 1) LOCATION OF UTILITIES SHOWN ARE APPROXIMATE.
- 2) CONTRACTOR SHALL VERIFY ALL LOCATIONS PRIOR TO BEGINNING ANY CONSTRUCTION.
- 3) DAMAGE TO EXISTING UTILITIES DUE TO FLASHER SYSTEM CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR AT NO EXPENSE TO THE STATE OR THE COUNTY.

PUBLIC UTILITIES AT/NEAR INTERSECTION	
UTILITY COMPANY	CENTURYLINK
UTILITY COMPANY	CHARTER COMMUNICATIONS
UTILITY COMPANY	CONSOLIDATED TELEPHONE COMPANY
UTILITY COMPANY	CROW WING COOPERATIVE POWER AND LIGHT COMPANY
UTILITY COMPANY	XCEL ENERGY (GAS)

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "D" INTERSECTION LAYOUT CSAH 3 AT CSAH 4
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

FILE NO. MNTMD31077

19
41

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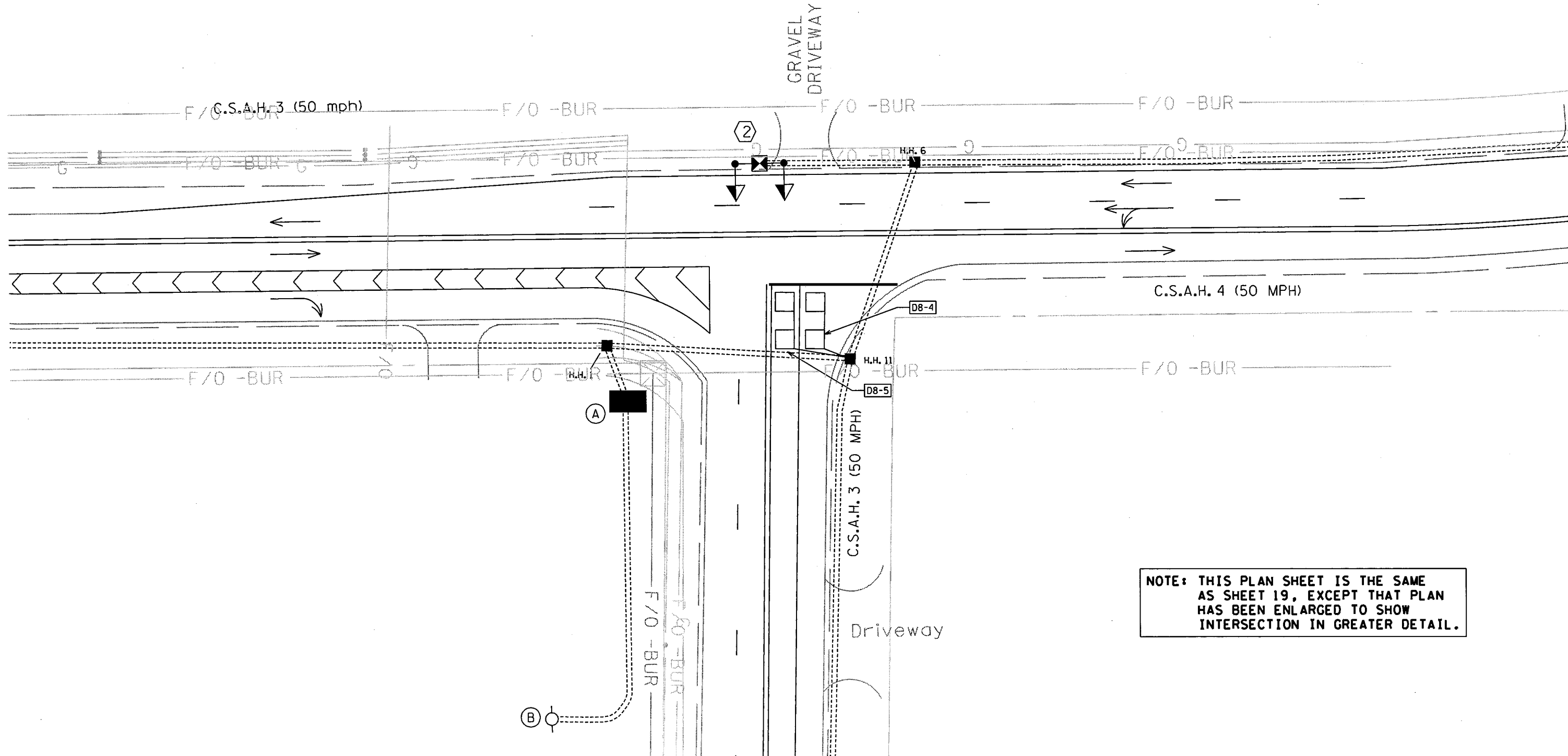
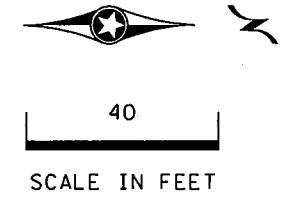
4/23/2015

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4/23/2015

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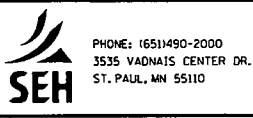


NOTE: THIS PLAN SHEET IS THE SAME AS SHEET 19, EXCEPT THAT PLAN HAS BEEN ENLARGED TO SHOW INTERSECTION IN GREATER DETAIL.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



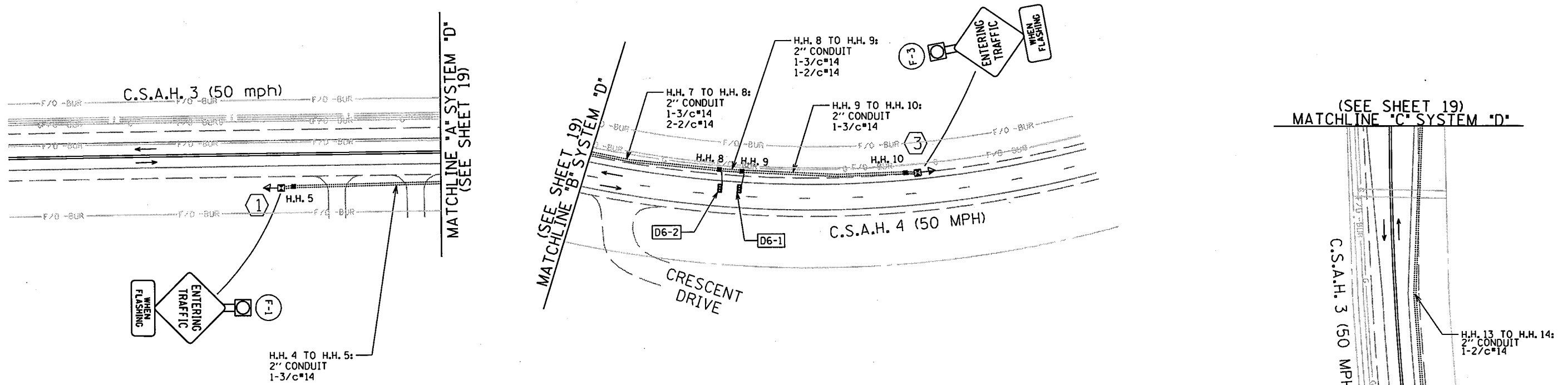
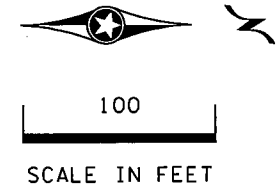
MINNESOTA DEPARTMENT OF TRANSPORTATION
 RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "D"
 INTERSECTION LAYOUT
 CSAH 3 AT CSAH 4
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

FILE NO. 20
 MNTMD131077 41

① F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE
 W3-X80 ("ENTERING TRAFFIC") (48" x 48") AND W3-X80P ("WHEN FLASHING") (42" x 24") STATIC SIGNS (850' FROM INTERSECTION)
 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-1)
 EXTEND INTO H.H.5:
 1" CONDUIT
 1-3/c*14 (FLASHER)

③ F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE
 W3-X80 ("ENTERING TRAFFIC") (48" x 48") AND W3-X80P ("WHEN FLASHING") (42" x 24") STATIC SIGNS (850' FROM INTERSECTION)
 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-3)
 EXTEND INTO H.H.10:
 1" CONDUIT
 1-3/c*14 (FLASHER)



- NOTES:**
- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MnDOT DISTRICT TRAFFIC PERSONNEL.
 - 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
 - 3) COORDINATE SERVICE CONNECTION WITH CROW WING COOP POWER AND LIGHT COMPANY AND WITH ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
 - 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
 - 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
 - 6) CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.

- 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MnDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MnDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

LEGEND OF SYMBOLS

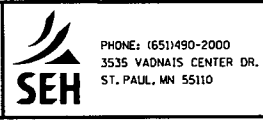
FLASHER SIGN NO.	①
FLASHER AND SIGN POST	⊠
SINGLE BEACON (ADVANCE INSTALLATION)	➔
DOUBLE BEACON (INTERSECTION INSTALLATION)	➔➔
HANDHOLE	■
F & I CONDUIT (SIZE AS NOTED)	-----
PVC LOOP DETECTOR (SIZE AS NOTED)	□
CANOGA 702 (3-CANOGA DETECTORS)	⊞
CABINET, CONTROLLER, AND SERVICE CABINET	■ (A)
SOURCE OF POWER-INPLACE	⊙ (B)
FLASHER FACE NO.	(F-2)

ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

DESIGN TEAM				
DRAWN BY:	CMJ			
DESIGNER:	JMG			
CHECKED BY:	JMG			
	NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



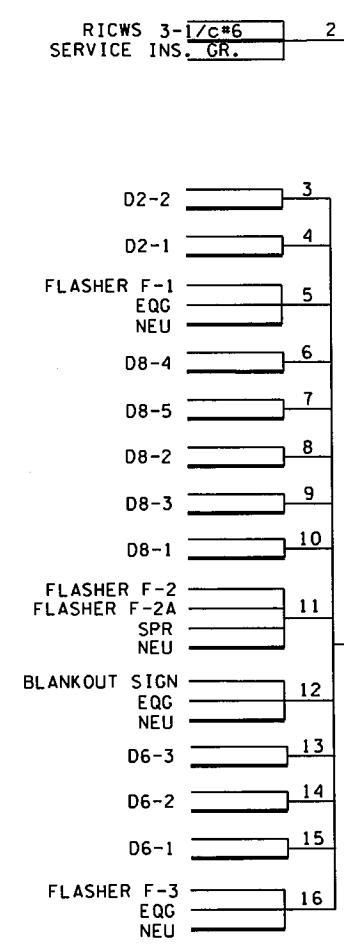
MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "D" INTERSECTION LAYOUT CSAH 3 AT CSAH 4
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

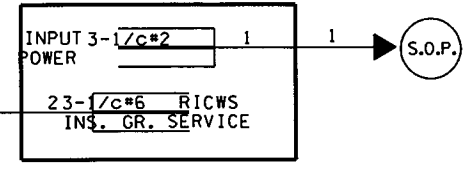
FILE NO. **21**
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41

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 SHODEL.S

RICWS CABINET



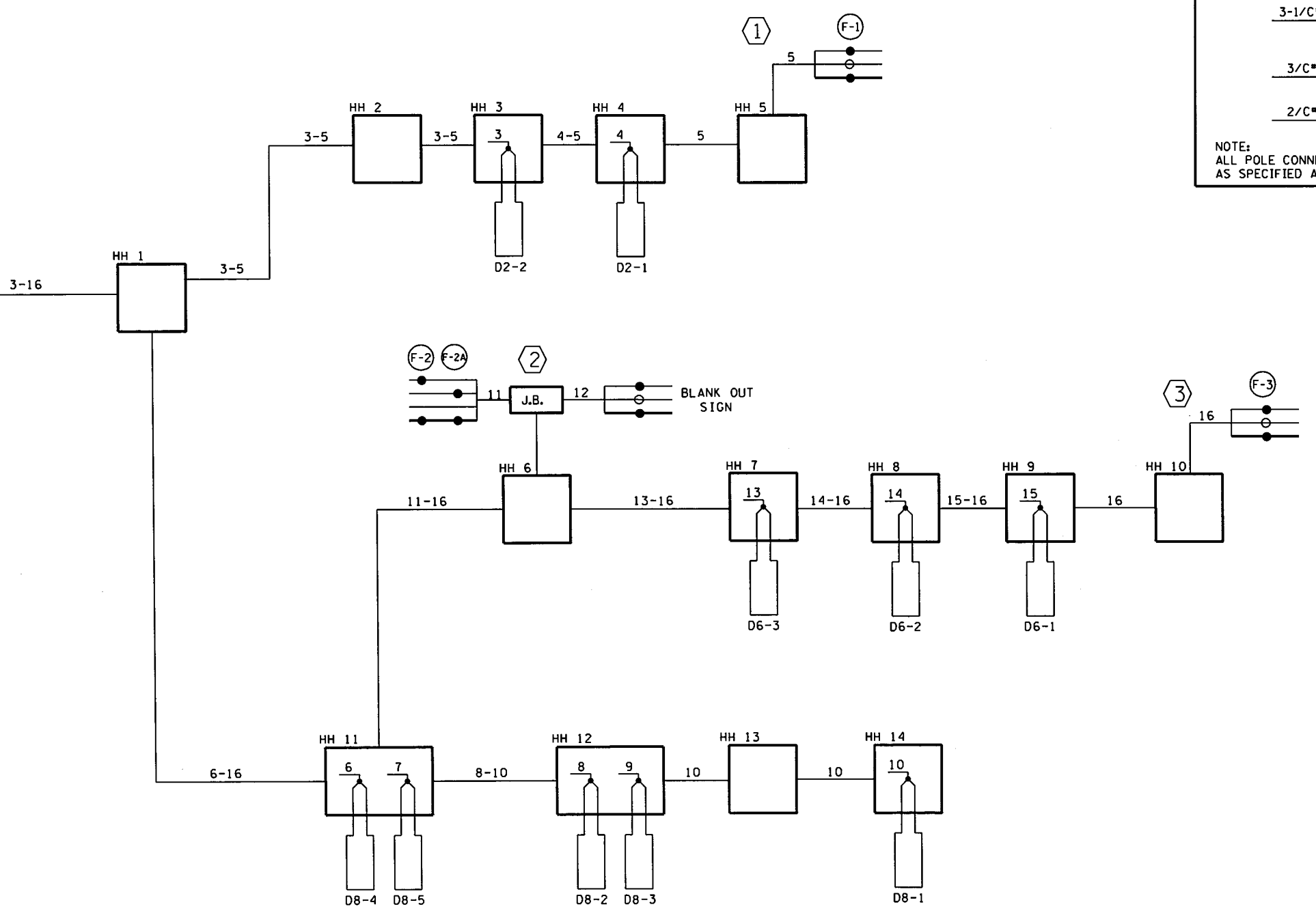
SERVICE CABINET



NOTES:
 1) FLASHER SYSTEM AND LUMINAIRES SHALL BE METERED POWER.

CONDUCTOR COLOR CODE (14 GAUGE)	
TO RICWS CABINET/DEVICE	
1/C*6	G
3-1/C*2	R WH BLK
	INPUT POWER
4/C*14	R BLK/R BLK WH
3-1/C*6	BLK WH G
	SIGNAL SERVICE
3/C*14	BLK G WH
2/C*14	BLK WH OR CLR

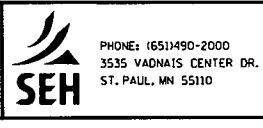
NOTE:
 ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.



DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "D"
FIELD WIRING DIAGRAM
CSAH 3 AT CSAH 4
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

FILE NO.	22
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4/23/2015

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NOTES:

- THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MnDOT DISTRICT TRAFFIC PERSONNEL.
- SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
- COORDINATE SERVICE CONNECTION WITH MINNESOTA POWER AND WITH ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
- SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
- THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
- CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.
- DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
- SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MnDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
- NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MnDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
- ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
- ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

F & I ROADWAY DETECTORS

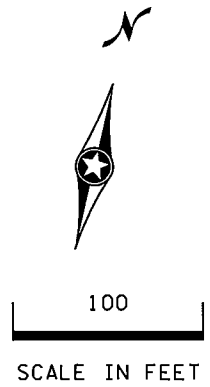
NUMBER	SIZE	LOCATION	TYPE
D2-1	702-3	737'	CANOGA
D2-2	702-3	719'	CANOGA
D4-1	6' x 6'	610'	PVC
D4-2	2-6' x 6'	-5' & 5'	PVC
D6-1	702-3	737'	CANOGA
D6-2	702-3	719'	CANOGA

LOCATION = DISTANCE FROM STOP BAR TO FRONT OF ROADWAY DETECTOR.

- LOCATION OF UTILITIES SHOWN ARE APPROXIMATE.
- CONTRACTOR SHALL VERIFY ALL LOCATIONS PRIOR TO BEGINNING ANY CONSTRUCTION.
- DAMAGE TO EXISTING UTILITIES DUE TO FLASHER SYSTEM CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR AT NO EXPENSE TO THE STATE OR THE COUNTY.

PUBLIC UTILITIES AT/NEAR INTERSECTION

UTILITY COMPANY
CHARTER COMMUNICATIONS
CROW WING COOPERATIVE POWER AND LIGHT COMPANY
ENVENTIS TELECOM, INCORPORATED
MINNESOTA POWER



LEGEND OF SYMBOLS

FLASHER SIGN NO.	(1)
FLASHER AND SIGN POST	⊠
SINGLE BEACON (ADVANCE INSTALLATION)	→
DOUBLE BEACON (INTERSECTION INSTALLATION)	↔
HANDHOLE	■
F & I CONDUIT (SIZE AS NOTED)	-----
PVC LOOP DETECTOR (SIZE AS NOTED)	□
CANOGA 702 (3-CANOGA DETECTORS)	⊞
CABINET, CONTROLLER, AND SERVICE CABINET	⊙ (A)
SOURCE OF POWER-INPLACE	⊙ (B)
FLASHER FACE NO.	(F-2)

H.H. 1 TO H.H. 2:
H.H. 2 TO H.H. 3:
2" CONDUIT
1-2/c*14

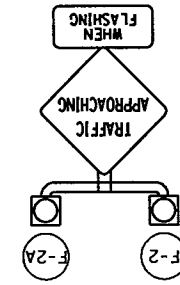
(2) F & I 2-SQUARE TUBULAR POSTS AT 30" SPACING (SEE DETAIL)
W16-13P ("WHEN FLASHING") STATIC SIGN (30" x 24")
2-12" LED YELLOW FLASHERS (WITH HOUSINGS, VISORS, AND BACKGROUND SHIELDS)-MOUNT 6" ABOVE EDGE OF "TRAFFIC APPROACHING" SIGN ON STANDARD SIGNAL BRACKETING (F-2, F-2A)
EXTEND INTO H.H. 8:
1" CONDUIT
1-4/c*14 (FLASHERS)
1-3/c*14 (BLANKOUT SIGN)
INSTALL "TRAFFIC APPROACHING" (36" x 36") BLANK OUT SIGN (FURNISHED BY STATE)

H.H. 1 TO H.H. 4:
2" CONDUIT (DIR. BORE)
1-3/c*14
2-2/c*14

H.H. 4 TO H.H. 5:
H.H. 5 TO H.H. 6:
2" CONDUIT
1-3/c*14
2-2/c*14

H.H. 1 TO H.H. 8:
2" CONDUIT (DIR. BORE)
1-4/c*14
2-3/c*14
2-2/c*14

H.H. 8 TO H.H. 9:
H.H. 9 TO H.H. 10:
2" CONDUIT
1-3/c*14
2-2/c*14



(A) F & I EQUIPMENT PAD FOUNDATION (SEE DETAIL)
RICWS SERVICE CABINET
SERVICE CABINET TO S.O.P.:
2" CONDUIT (SEE B NOTES)
SERVICE CABINET TO RICWS CABINET:
2" CONDUIT
3-1/c*6
RICWS CABINET TO H.H. 1:
4" CONDUIT
1-4/c*14 (FLASHERS)
2-3/c*14 (FLASHERS)
1-3/c*14 (BLANKOUT SIGN)
6-2/c*14 (DETECTORS)
INSTALL 334Z CABINET AND CONTROLLER (FURNISHED BY STATE)

(B) INPLACE- WOOD POLE (S.O.P.)-MINN POWER
F & I 2" CONDUIT RISER AND WEATHERHEAD
3-1/c*2
EXTEND INTO SERVICE CABINET:
2" CONDUIT
3-1/c*2

(SEE SHEET 25)
MATCHLINE "A"-SYSTEM "E"

MATCHLINE "B"-SYSTEM "E"
(SEE SHEET 25)

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CMJ				
DESIGNER: JMG				
CHECKED BY: JMG				

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT
WARNING SYSTEM - PHASE II
S.P. 8816-2274, 1806-74, 6406-24, 7102-132
S.P. 7305-117, 018-070-010

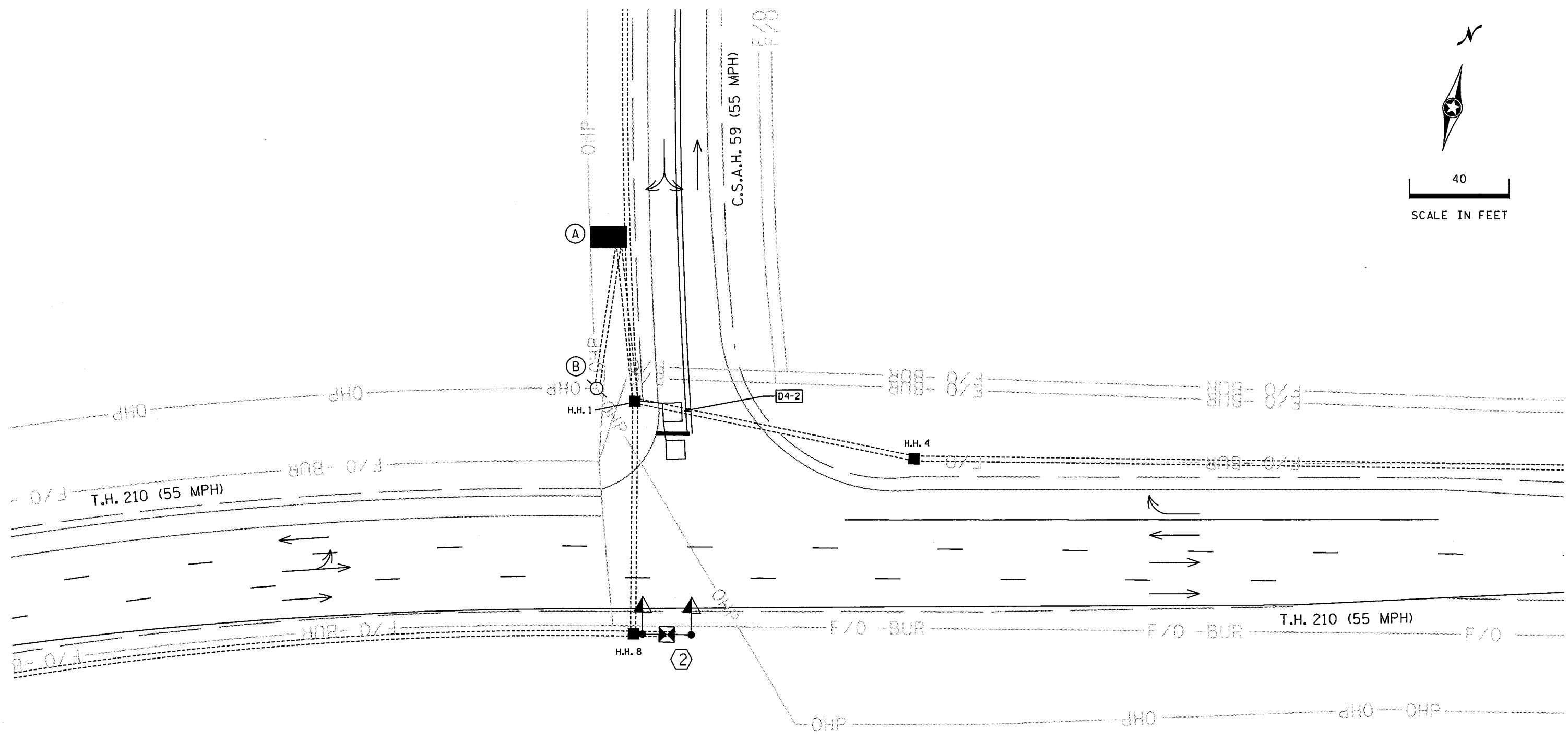
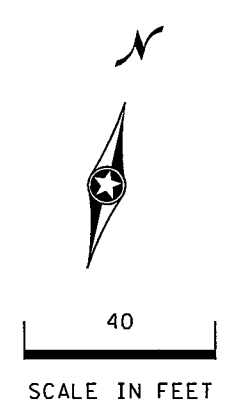
FLASHING BEACON SYSTEM "E"
INTERSECTION LAYOUT
TRUNK HIGHWAY 210 AT CSAH 59
IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO.	23
MNTMD131077	41

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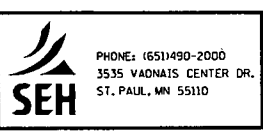


NOTE: THIS PLAN SHEET IS THE SAME AS SHEET 23, EXCEPT THAT PLAN HAS BEEN ENLARGED TO SHOW INTERSECTION IN GREATER DETAIL.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *[Signature]* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
 RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "E"
 INTERSECTION LAYOUT
 TRUNK HIGHWAY 210 AT CSAH 59
 IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO. 24
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4/23/2015

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LEGEND OF SYMBOLS

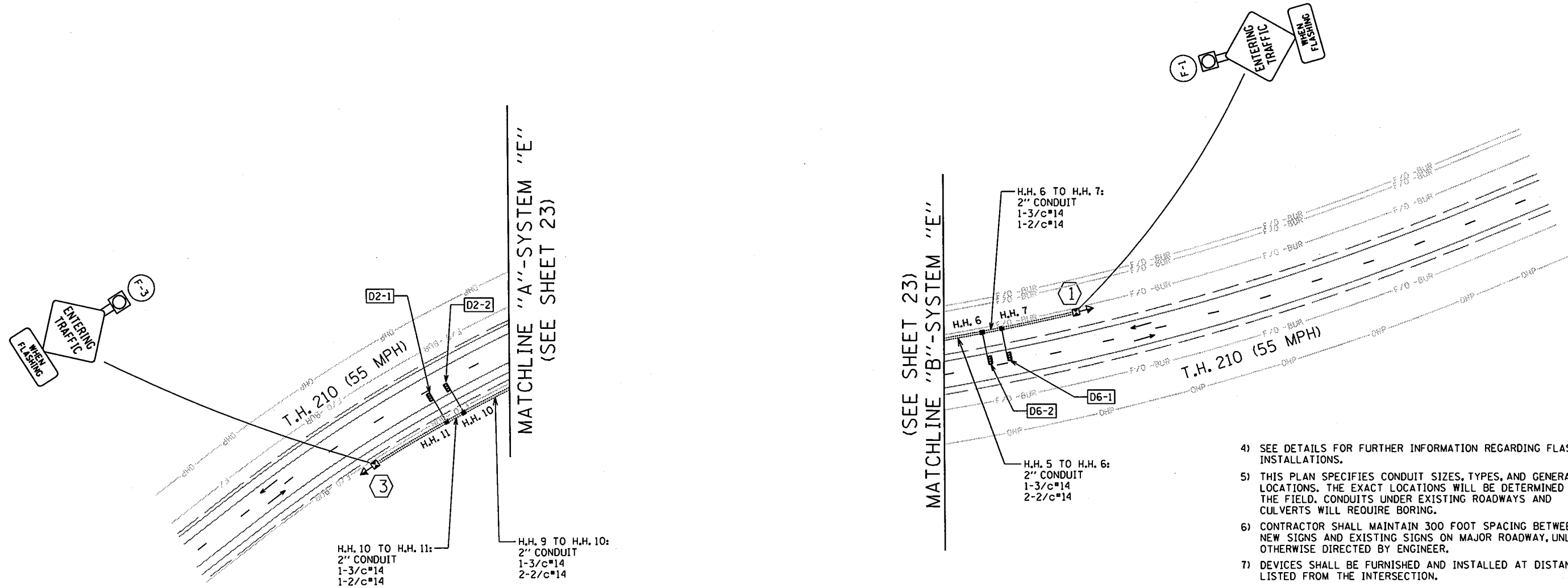
FLASHER SIGN NO.	(1)
FLASHER AND SIGN POST	[Symbol]
SINGLE BEACON (ADVANCE INSTALLATION)	[Symbol]
DOUBLE BEACON (INTERSECTION INSTALLATION)	[Symbol]
HANDHOLE	[Symbol]
F & I CONDUIT (SIZE AS NOTED)	[Symbol]
PVC LOOP DETECTOR (SIZE AS NOTED)	[Symbol]
CANOGA 702 (3-CANOGA DETECTORS)	[Symbol]
CABINET, CONTROLLER, AND SERVICE CABINET	(A)
SOURCE OF POWER-INPLACE	(B)
FLASHER FACE NO.	(F-2)

ABBREVIATIONS

D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
F & I	FURNISH AND INSTALL
GRD	GROUND
H.H.	HANDHOLE
LED	LIGHT EMITTING DIODE
LUM	LUMINAIRE
PVC	POLYVINYL CHLORIDE (CONDUIT)
SOP	SOURCE OF POWER

(1) F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE
 W3-X8c ("ENTERING TRAFFIC") (48" x 48") AND W3-X8cP ("WHEN FLASHING") (42" x 24") STATIC SIGNS (800' FROM INTERSECTION)
 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-1)
 EXTEND INTO H.H. 7:
 1" CONDUIT
 1-3/c*14 (FLASHER)

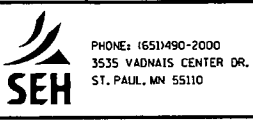
(3) F & I 2-3 LB/FT U-CHANNEL POSTS AT 30" SPACING WITH 1-3 LB/FT U-CHANNEL KNEE BRACE
 W3-X8c ("ENTERING TRAFFIC") (48" x 48") AND W3-X8cP ("WHEN FLASHING") (42" x 24") STATIC SIGNS (800' FROM INTERSECTION)
 1-12" LED YELLOW FLASHER (WITH HOUSING, VISOR, AND BACKGROUND SHIELD)-MOUNT 6" ABOVE EDGE OF "ENTERING TRAFFIC" SIGN ON STANDARD SIGNAL BRACKETING (F-3)
 EXTEND INTO H.H. 11:
 1" CONDUIT
 1-3/c*14 (FLASHER)



- NOTES:**
- 1) THE EXACT LOCATION OF HANDHOLES, FLASHERS/SIGNS, LOOP/CANOGA DETECTORS, AND CABINET PAD SHALL BE FIELD VERIFIED BY THE ENGINEER AND MNDOT DISTRICT TRAFFIC PERSONNEL.
 - 2) SEE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS.
 - 3) COORDINATE SERVICE CONNECTION WITH MINNESOTA POWER AND WITH ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE NEW FLASHER SYSTEM.
 - 4) SEE DETAILS FOR FURTHER INFORMATION REGARDING FLASHER INSTALLATIONS.
 - 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS AND CULVERTS WILL REQUIRE BORING.
 - 6) CONTRACTOR SHALL MAINTAIN 300 FOOT SPACING BETWEEN NEW SIGNS AND EXISTING SIGNS ON MAJOR ROADWAY, UNLESS OTHERWISE DIRECTED BY ENGINEER.
 - 7) DEVICES SHALL BE FURNISHED AND INSTALLED AT DISTANCES LISTED FROM THE INTERSECTION.
 - 8) SIGNS SHALL BE FURNISHED AND INSTALLED AT A MINIMUM 7-FOOT MOUNTING HEIGHT. SEE MNDOT TRAFFIC ENGINEERING MANUAL FOR TYPICAL MOUNTING AND SIGN PLACEMENT.
 - 9) NEW HANDHOLES TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH MNDOT APPROVED/QUALIFIED PRODUCTS LIST. MAXIMUM SPACING OF HANDHOLES ALLOWED IS 400 FEET.
 - 10) ALL NEW CONDUIT SHALL BE PVC-SCHEDULE 80 OR HDPE SCHEDULE 80 AS SHOWN IN THE PLANS.
 - 11) ALL ITEMS ARE FURNISH AND INSTALL UNLESS OTHERWISE NOTED.

DESIGN TEAM				
DRAWN BY: CMJ				
DESIGNER: JMG				
CHECKED BY: JMG				
NO.	BY	DATE	REVISIONS	

I hereby certify that this sheet 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.
 Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "E" INTERSECTION LAYOUT
TRUNK HIGHWAY 210 AT CSAH 59
 IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO. **25**
 MNTMDI3077
41

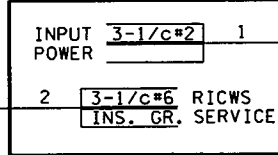
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4/23/2015

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RICWS CABINET

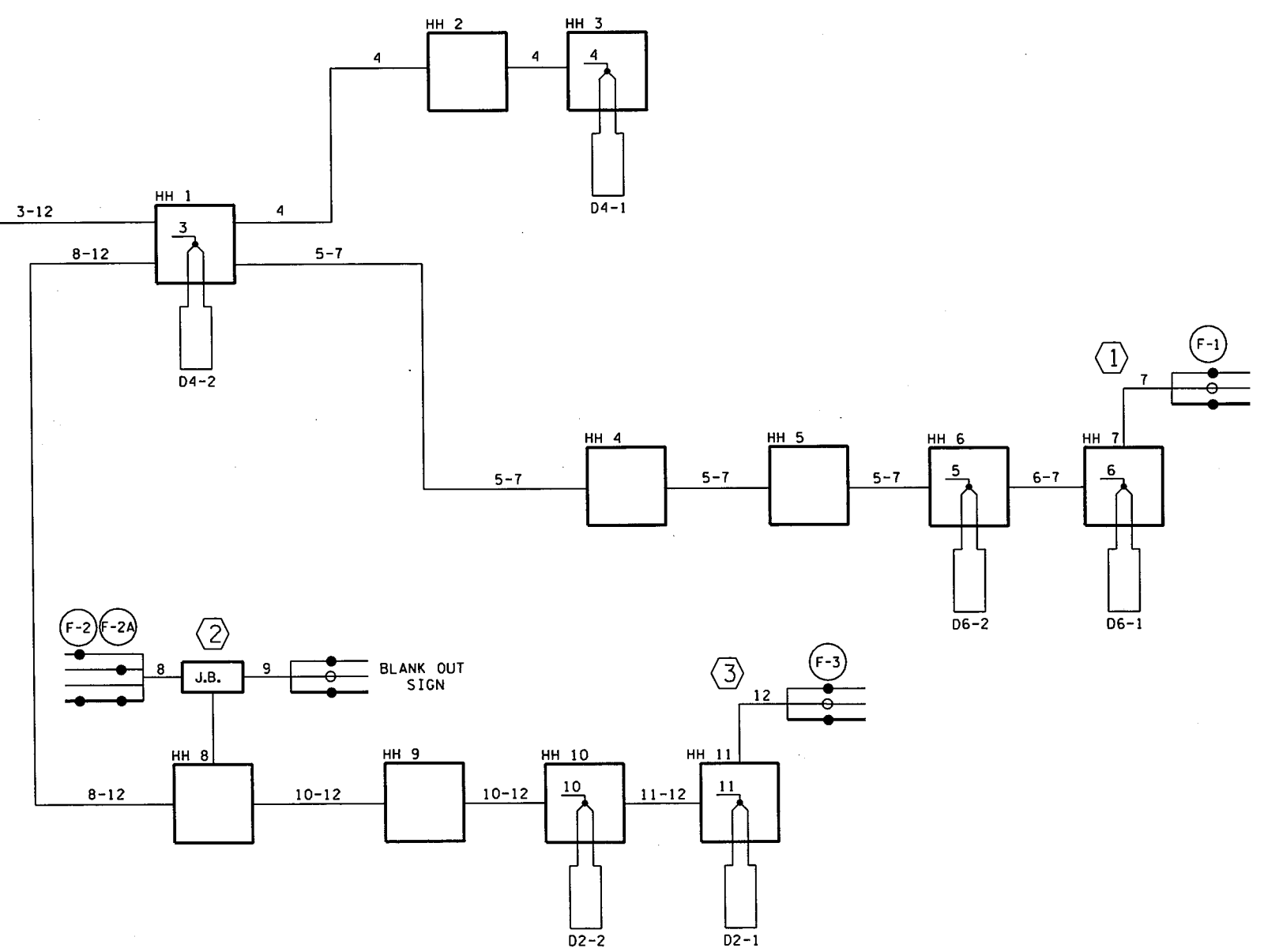
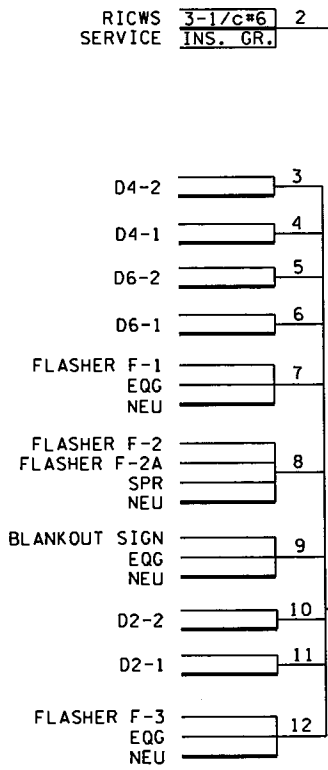
SERVICE CABINET



NOTES:
1) FLASHER SYSTEM AND LUMINAIRES SHALL BE METERED POWER.

CONDUCTOR COLOR CODE (14 GAUGE)	
TO RICWS CABINET/DEVICE	
1/C#6	G
3-1/C#2	R
	WH
	BLK
INPUT POWER	
4/C#14	R
	BLK/R
	BLK
WH	
3-1/C#6	BLK
	WH
	G
SIGNAL SERVICE	
3/C#14	BLK
	G
WH	
2/C#14	BLK
	WH OR CLR

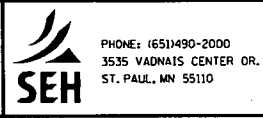
NOTE:
ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.



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DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Certified By: *John M. Gray* Lic. No. 22457
Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT
WARNING SYSTEM - PHASE II
S.P. 8816-2274, 1806-74, 6406-24, 7102-132
S.P. 7305-117, 018-070-010

FLASHING BEACON SYSTEM "E"
FIELD WIRING DIAGRAM
TRUNK HIGHWAY 210 AT CSAH 59
IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO. 26
MNTMOI31077 41

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4/23/2015

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SIGN PANELS TYPE C										
SIGN NO.	TOTAL QUANTITY	POSTS			MTG. HT. (FT) (1)	PANEL SIZE (IN.)	AREA (SQ FT)	LOCATION	CODE NO.	PANEL LEGEND
		NO. & TYPE	KNEE BRACES QUANT.	LENGTH (FT)						
(7) C-1	2	2-U	1	16	7	36 x 36	9.00	SYSTEM "A"	R1-1	STOP
TOTAL	2						18.00			

GENERAL FURNISH & INSTALL SIGN TYPE C NOTES:
 1. POST LENGTHS ARE APPROXIMATE AND INCLUDE EMBEDMENT, BUT DO NOT INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE.
 2. SEE SHEETS 38-40 FOR STRUCTURAL DETAILS.
 3. SEE STANDARD SIGNS MANUAL FOR PUNCHING CODE AND DETAILED DRAWINGS OF TYPE C SIGN PANELS.

SPECIFIC FURNISH & INSTALL SIGN TYPE C NOTES:
 (1) MOUNTING HEIGHT IS MINIMUM (WITH A +6 INCH TOLERANCE) SEE SHEET NO. 41 FOR TYPICAL MOUNTING.

SALVAGE SIGN TYPE C INSTALL SIGN TYPE C										
SIGN NO.	TOTAL QUANTITY	POSTS			MTG. HT. (FT) (1)	PANEL SIZE (IN.)	LOCATION	CODE NO.	PANEL LEGEND	
		NO. & TYPE	KNEE BRACES QUANT.	LENGTH (FT)						
(7) C-201	2	2-U		15	7	24 x 24	SYSTEM "A"	M1-6	REDWOOD COUNTY 13	
(7) C-202	2	2-U		16	7	21 x 15	SYSTEM "A"	M2-1A	JCT (BLUE)	
						24 x 24		M1-6	REDWOOD COUNTY 13	
(8) C-203	1					24 x 24	SYSTEM "B"	I-8	LIBRARY	(4)
						21 x 15		M6-1L	ARROW LEFT (GREEN)	(4)
(8) C-204	1	2-U	1	16	7	36 x 36	SYSTEM "B"	R3-7L	LEFT LANE MUST TURN LEFT	
(8) C-205	1	2-U	1	16	7	36 x 36	SYSTEM "B"	R3-7R	RIGHT LANE MUST TURN RIGHT	
(8) C-206	1					24 x 24	SYSTEM "B"	M1-X4	SHERBURNE 23 COUNTY	(2)
						21 x 15		M6-1R	ARROW RIGHT (WHITE)	(2)
						24 x 24		I-8	LIBRARY	(3)
						21 x 15		M6-1R	ARRDW RIGHT (GREEN)	(3)
(9) C-207	2	2-U		16	7	21 x 15	SYSTEM "C"	M2-1	JCT (WHITE)	
						24 x 24		M1-X4	STEARNS 158 COUNTY	
(10) C-208	1	2-U	1	15	7	48 x 24	SYSTEM "D"	W1-7	DOUBLE ARROW	
(10) C-209	1	2-U	1	18	7	21 x 15	SYSTEM "D"	M2-1	JCT (WHITE)	
						24 x 24		M1-X4	CROW WING COUNTY 4	
						24 x 24		M1-X4	INTER COUNTY C	
						24 x 24		M1-X4	CROW WING COUNTY 3	
						21 x 15		M5-1R	ADVANCE TURN ARROW RIGHT (WHITE)	
(11) C-210	1	2-U	1	15	7	48 x 24	SYSTEM "E"	W1-7	DOUBLE ARROW	
(11) C-211	1	2-U		15	7	30 x 30	SYSTEM "E"	R4-X8	BYPASS LANE	
(11) C-212	1	2-U		16	7	24 x 24	SYSTEM "E"	M1-X4	CROW WING COUNTY 59	
						21 x 15		M6-1R	ARROW LEFT (WHITE)	
(11) C-213	1	2-U		16	7	21 x 15	SYSTEM "E"	M2-1	JCT (WHITE)	
						24 x 24		M1-X4	CROW WING COUNTY 59	
TOTAL	16									

GENERAL SALVAGE & INSTALL SIGN TYPE C NOTES:
 4. FOR ALL SALVAGE AND INSTALLED SIGN PANELS, PROVIDE NEW POSTS AND MOUNTING HARDWARE (REMOVE AND DISPOSE OF OLD POSTS AND MOUNTING HARDWARE).
 SPECIFIC SALVAGE & INSTALL SIGN TYPE C NOTES:
 (1) MOUNTING HEIGHT IS MINIMUM (WITH A +6 INCH TOLERANCE). SEE SHEET NO. 41 FOR TYPICAL MOUNTING.
 (2) MOUNT UNDER D-203. SEE SIGNING PLANS.
 (3) MOUNT ABOVE D-203. SEE SIGNING PLANS.
 (4) MOUNT UNDER INPLACE "LEFT LANE MUST TURN LEFT" SIGN. SEE SIGNING PLANS.

REMOVE SIGN TYPE C						
SIGN NO.	TOTAL QUANTITY	POSTS NO. & TYPE	PANEL SIZE (IN.)	LOCATION	CODE NO.	PANEL LEGEND
(7) C-101	2	1-U	30 x 30	SYSTEM "A"	R1-1	STOP
(8) C-102	1	1-U	36 x 12	SYSTEM "B"	R6-1L	ONE WAY LEFT
(9) C-103	2	2-U	48 x 48	SYSTEM "C"	W11-X3	TRUCKS ENTERING
TOTAL	5					

SALVAGE SIGN TYPE D INSTALL SIGN TYPE D										
SIGN NO.	TOTAL QUANTITY (EACH)	POSTS				MTG. HT. (FT) (1)	LOCATION	PANEL SIZE (IN.) (5)	PANEL LEGEND	
		NO. & TYPE	KNEE BRACES QUANT.	SPACING (IN.)	LENGTH (FT)					
(7) D-201	1	2-U	2	54	19	7	SYSTEM "A"	78 x 54	UNDEPT JUNCTION CASINO HOTEL 5 MILES	
								48 x 24	GOLF CLUB 8 MILES	
(8) D-202	1	2-U	2	42	18	7	SYSTEM "B"	72 x 36	Pebble Creek Golf Club	
								54 x 24	Becker Community Center 1 mi	
(6)(8) D-203	1	2-U	1	30	15	7	SYSTEM "B"	54 x 24	Sherburne Ave	
(9) D-204	1	2-U	1	30	15	7	SYSTEM "C"	54 x 24	Fairway Cir	
(9) D-205	1	2-U	1	30	15	7	SYSTEM "C"	54 x 24	Fairway Cir	
(10) D-206	1	2-U	2	66	18	7	SYSTEM "D"	114 x 60	Brainerd Merrifield Crosslake	
(10) D-207	1	2-U	2	66	18	7	SYSTEM "D"	114 x 60	Breezy Point Nisswa Crosslake	
(11) D-208	1	2-U	2	30	15	7	SYSTEM "E"	54 x 24	Riverton	
(11) D-209	1	2-U	2	42	16	7	SYSTEM "E"	66 x 36	Cuyuna County State Rec Area Sagamore Unit	
(11) D-210	1	2-U	2	42	16	7	SYSTEM "E"	66 x 36	Riverton	
(11) D-211	1	2-U	2	30	15	7	SYSTEM "E"	54 x 24	Cuyuna County State Rec Area Sagamore Unit	
TOTAL	11									

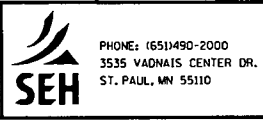
GENERAL SALVAGE & INSTALL SIGN TYPE D NOTES:
 1. POST LENGTHS ARE APPROXIMATE AND INCLUDE EMBEDMENT, BUT DO NOT INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE.
 2. SEE SHEETS 38-40 FOR STRUCTURAL DETAILS.
 3. SEE STANDARD SIGNS MANUAL FOR TYPE D STRINGER AND PANEL JOINT DETAILS.
 4. FOR ALL SALVAGE AND INSTALLED SIGN PANELS, PROVIDE NEW POSTS AND MOUNTING HARDWARE (REMOVE AND DISPOSE OF OLD POSTS AND MOUNTING HARDWARE).

SPECIFIC SALVAGE & INSTALL SIGN TYPE D NOTES:
 (1) MOUNTING HEIGHT IS MINIMUM (WITH A 6 INCH TOLERANCE). SEE SHEET NO. 41 FOR TYPICAL MOUNTING.
 (5) SIZES AND SPACING ARE APPROXIMATE.
 (6) MOUNT ON SAME SIGN POST AS SIGN C-206.

SPECIFIC NOTES FOR ALL CHARTS:
 (7) QUANTITY INCLUDED UNDER S.P. 6406-24 (SYSTEM "A").
 (8) QUANTITY INCLUDED UNDER S.P. 7102-132 (SYSTEM "B").
 (9) QUANTITY INCLUDED UNDER S.P. 7305-117 (SYSTEM "C").
 (10) QUANTITY INCLUDED UNDER S.P. 018-070-010 (SYSTEM "D").
 (11) QUANTITY INCLUDED UNDER S.P. 1806-74 (2/3) AND S.P. 018-070-010 (1/3) (SYSTEM "E").

DESIGN TEAM						
DRAWN BY: <u>CMJ</u>						
DESIGNER: <u>JMG</u>						
CHECKED BY: <u>JMG</u>						
NO.	BY	DATE	REVISIONS			

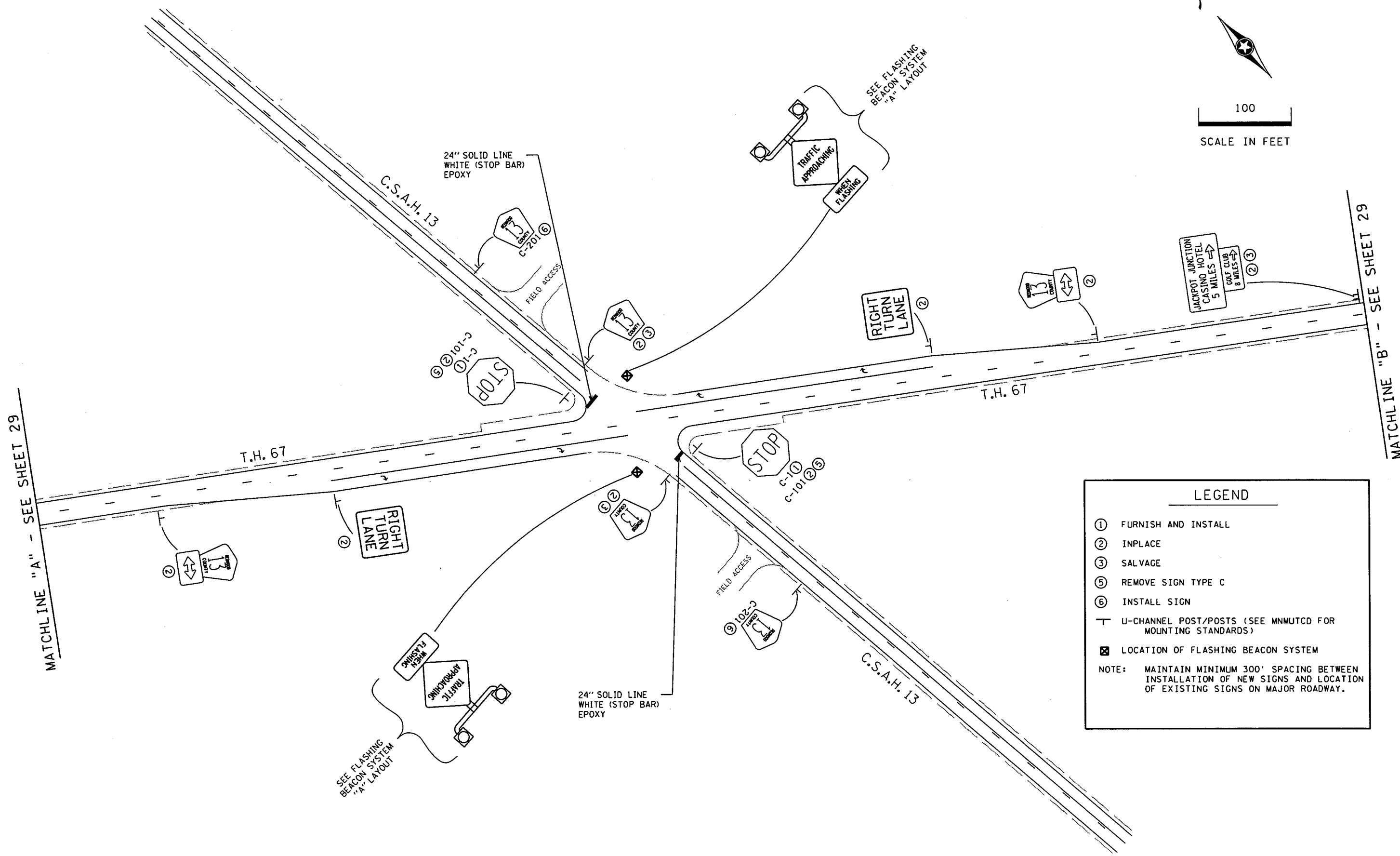
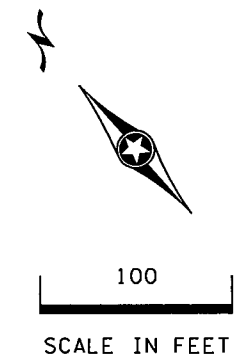
I hereby certify that this sheet was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: John M. Gray Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING TABULATIONS

FILE NO. **27**
 MNTMD31077
41



LEGEND


- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- └ U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

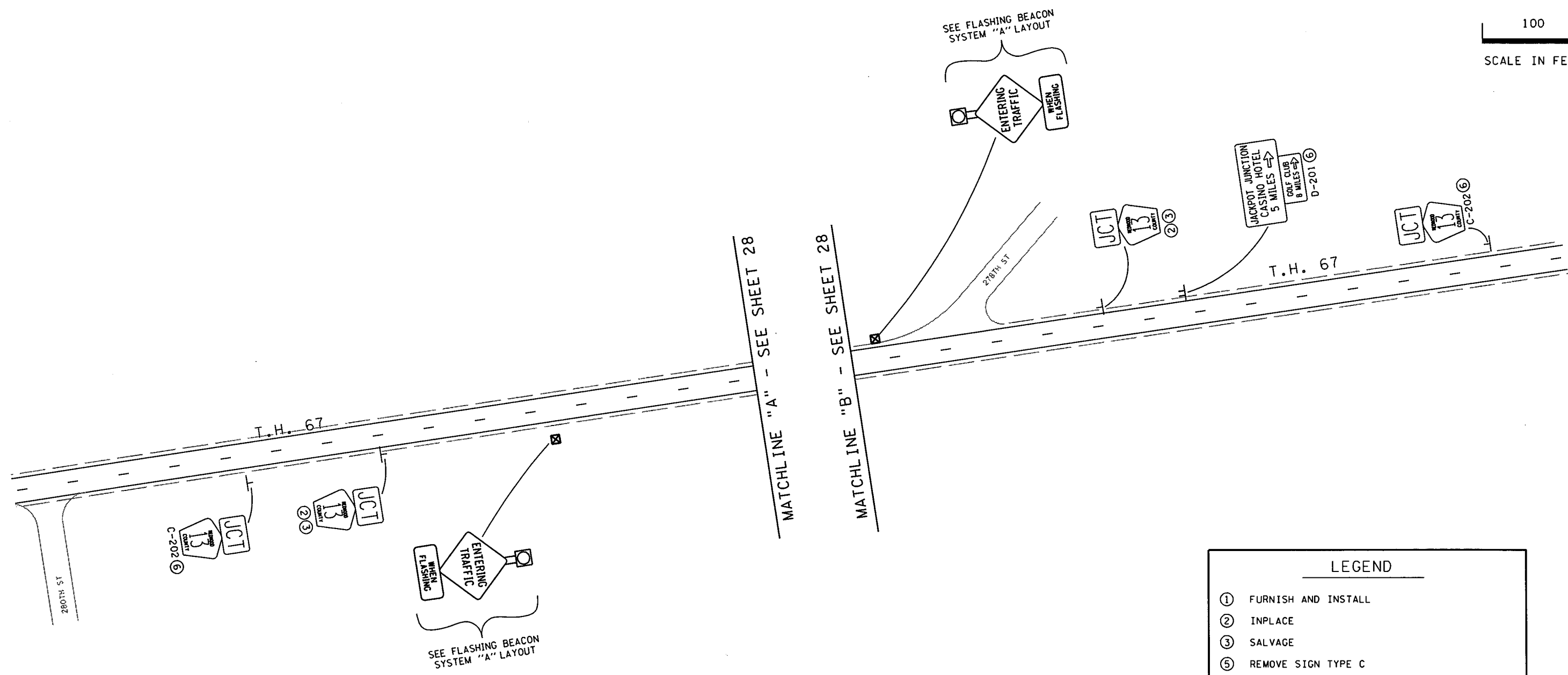
MINNESOTA DEPARTMENT OF TRANSPORTATION
**RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II**
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

**SIGNING & STRIPING PLAN
 TRUNK HIGHWAY 67 AT CSAH 13**

MORGAN, MINNESOTA - REDWOOD COUNTY



100
SCALE IN FEET



LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- ┴ U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.

DESIGN TEAM				REVISIONS			
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DESIGNER:	JMG						
CHECKED BY:	JMG						
NO.	BY	DATE					

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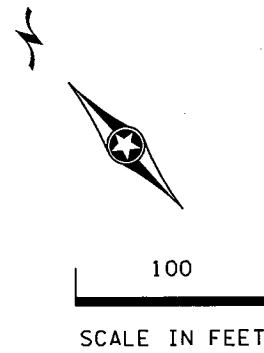
SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN
TRUNK HIGHWAY 67 AT CSAH 13
 MORGAN, MINNESOTA - REDWOOD COUNTY

FILE NO.
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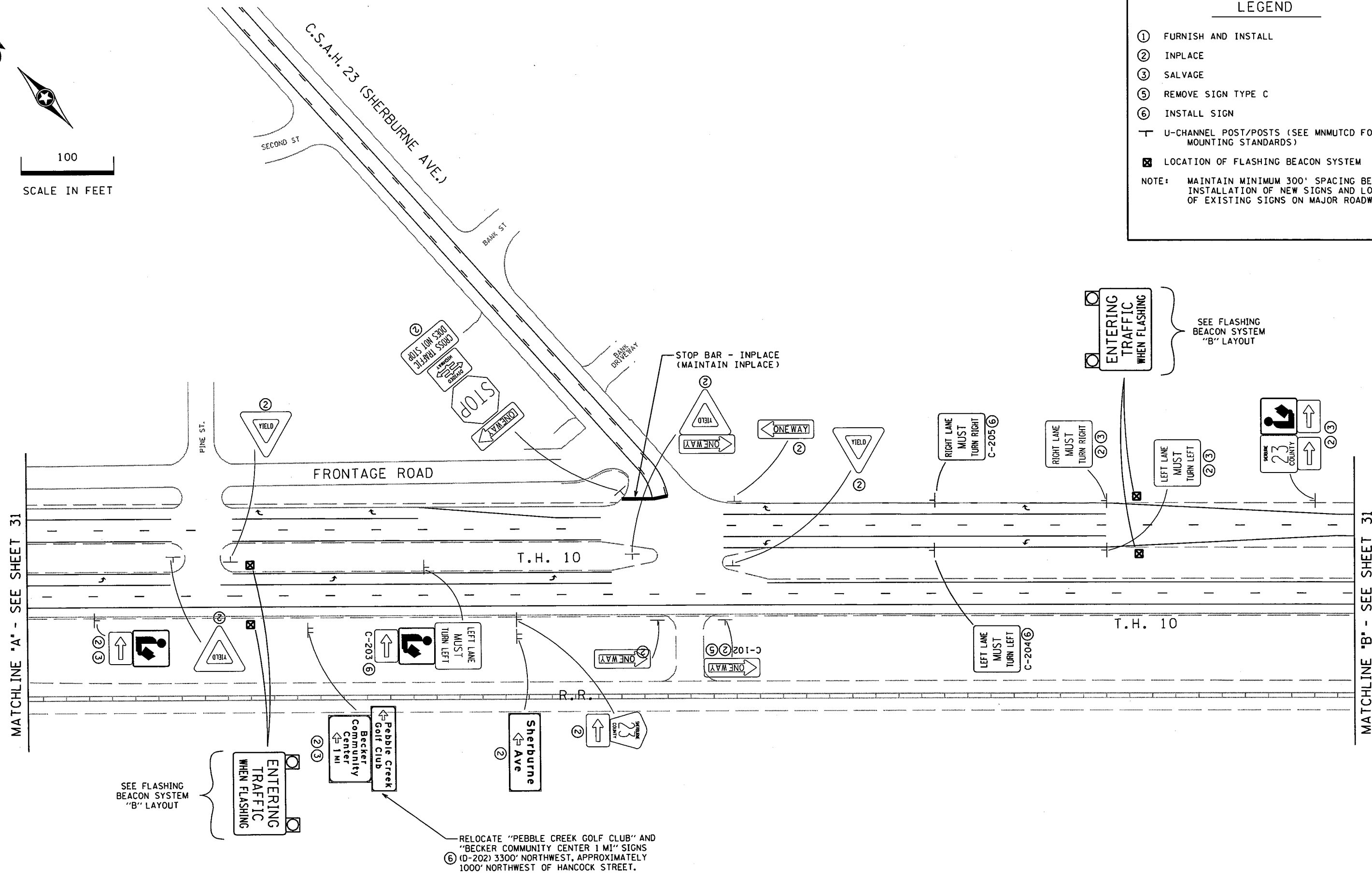
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LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.



MATCHLINE 'A' - SEE SHEET 31

MATCHLINE 'B' - SEE SHEET 31

DESIGN TEAM			
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DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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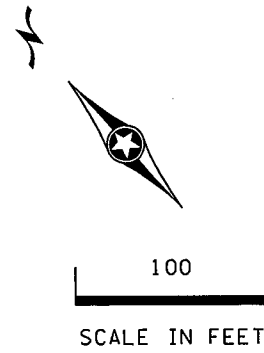
Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015



MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN
TRUNK HIGHWAY 10 AT CSAH 23
 BECKER, MINNESOTA - SHERBURNE COUNTY

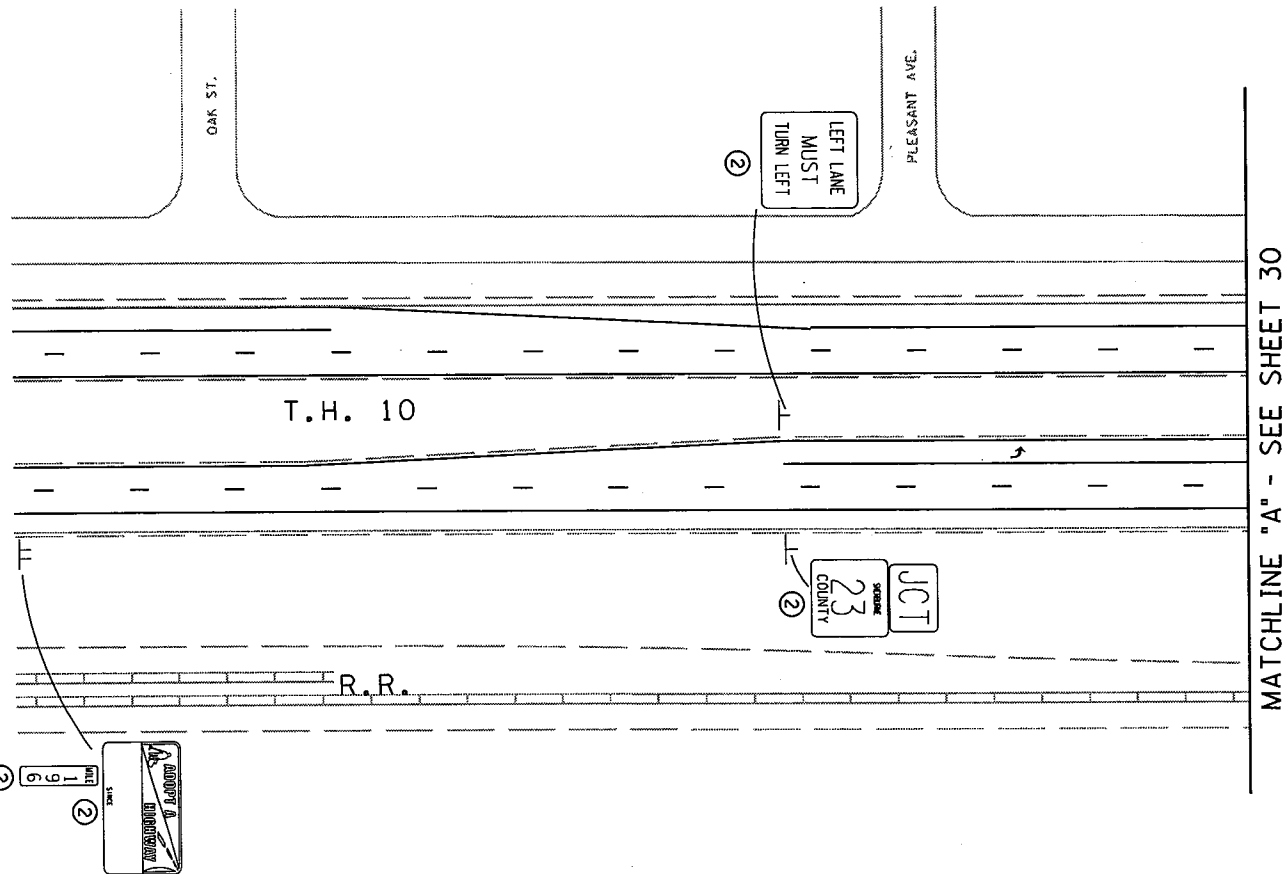
FILE NO. **30**
 MNTMD31077
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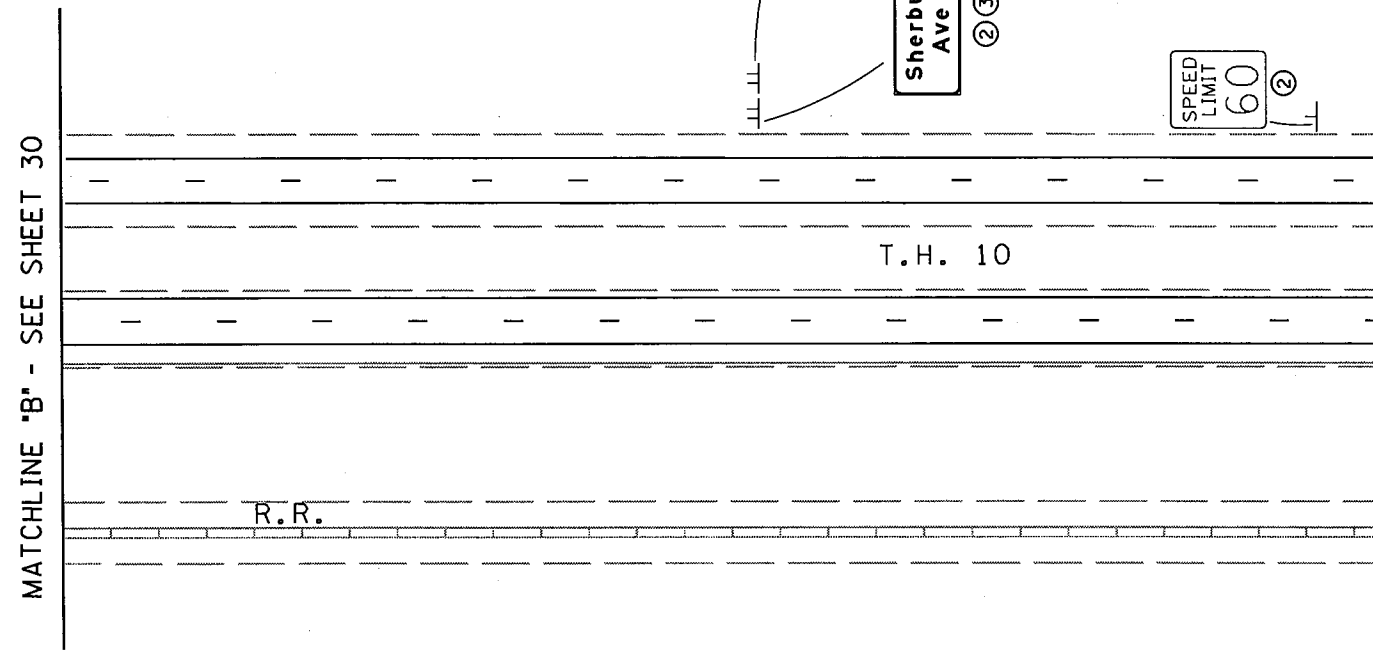
LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.



MATCHLINE "A" - SEE SHEET 30



MATCHLINE "B" - SEE SHEET 30

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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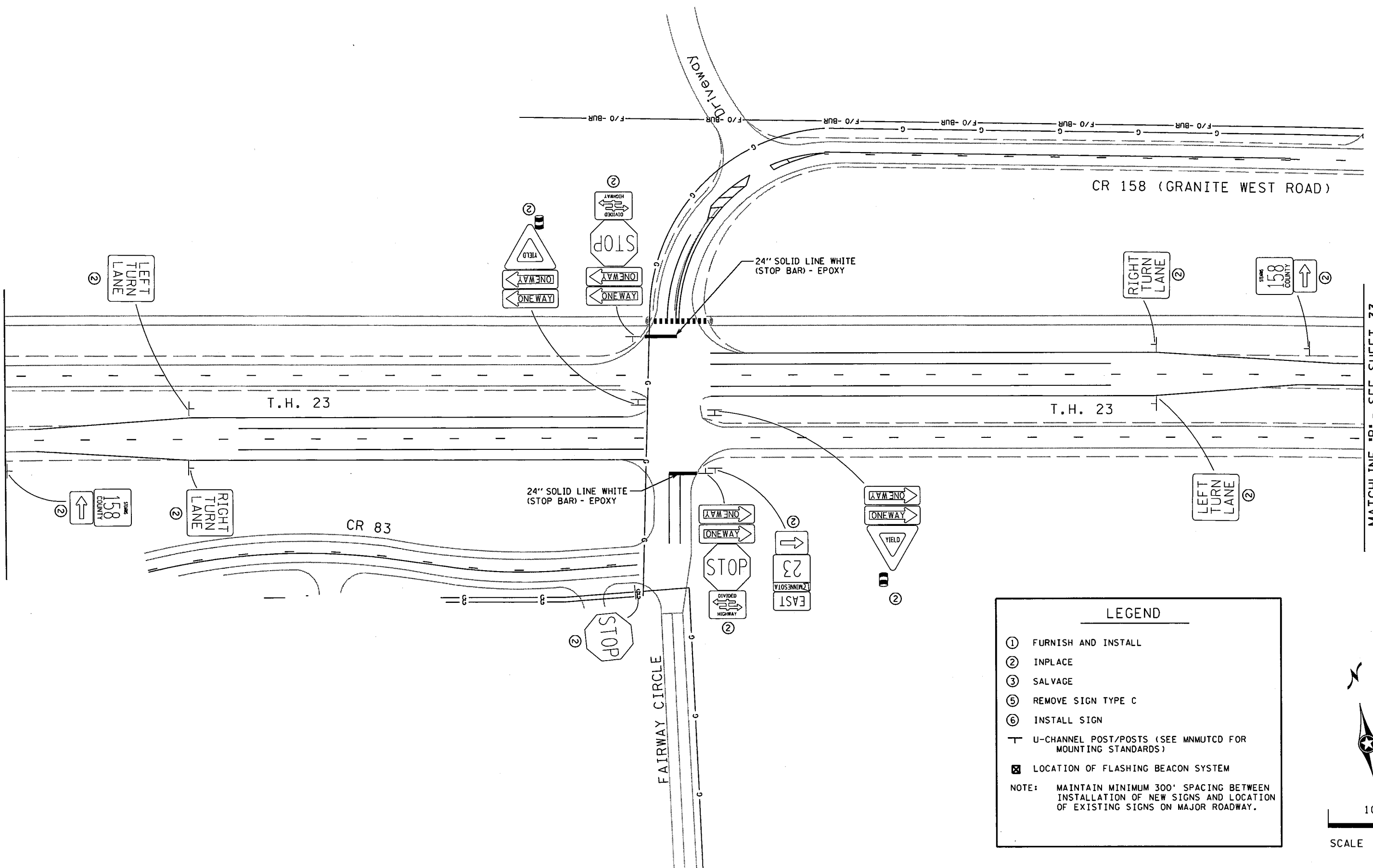
MINNESOTA DEPARTMENT OF TRANSPORTATION
**RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II**
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

**SIGNING AND STRIPING PLAN
 TRUNK HIGHWAY 10 AT CSAH 23**
 BECKER, MINNESOTA - SHERBURNE COUNTY

FILE NO. **31**
 MNTMD131077 **41**

MATCHLINE "A" - SEE SHEET 33

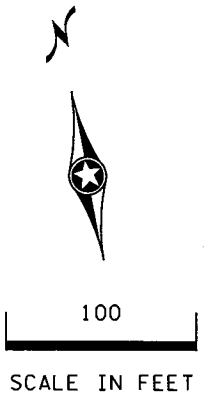
MATCHLINE "B" - SEE SHEET 33



LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.



DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this sheet 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.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

FILE NO. **32**
 MNTMD131077
41

11:41:30 AM

4/23/2015

S:\XO\MM\m1md\131077\5-final-dsgn\50-final-dsgn\10-civil\plan\131077_SN_23-158.dgn

LEGEND

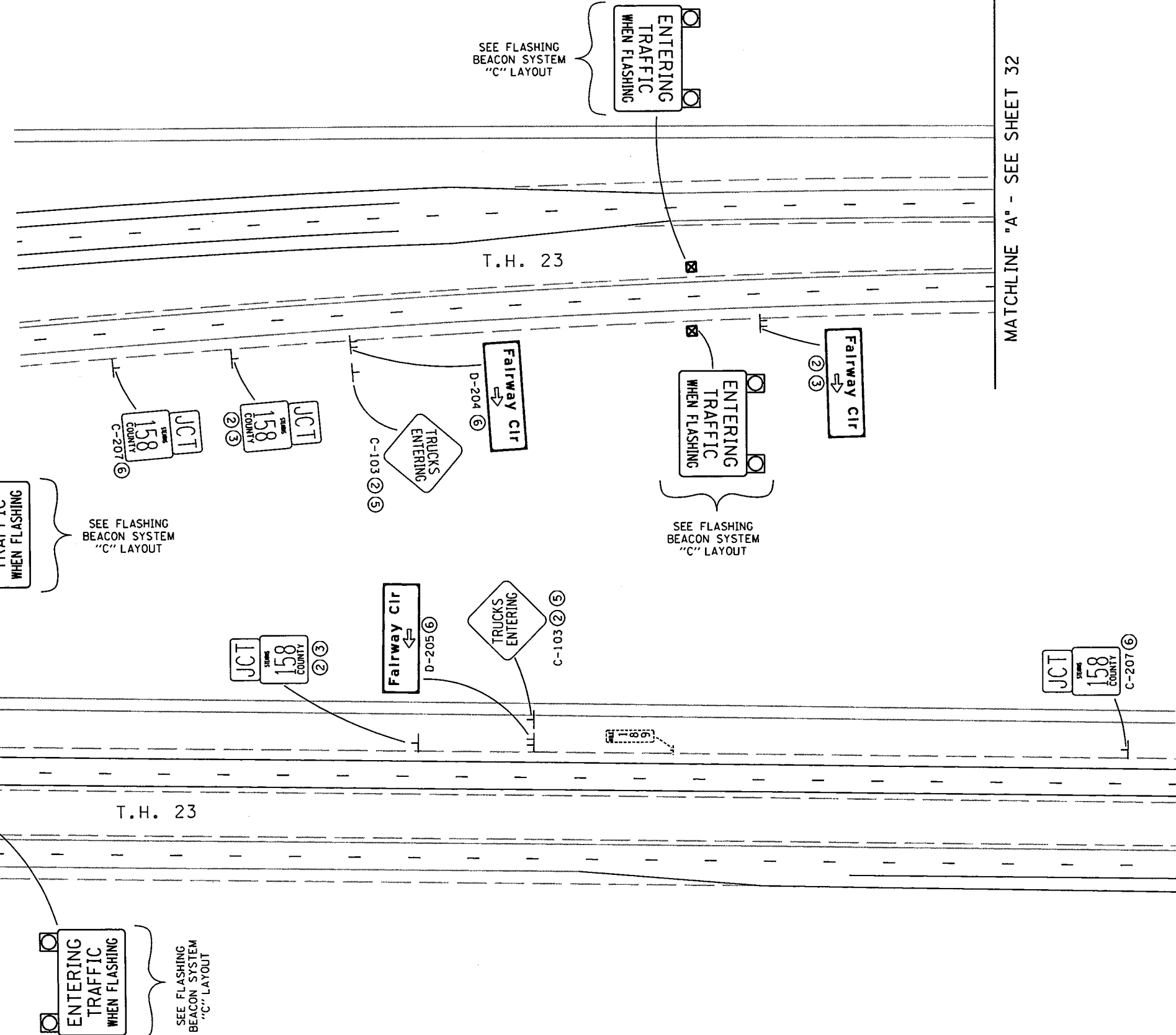
- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.



MATCHLINE "B" - SEE SHEET 32

MATCHLINE "A" - SEE SHEET 32



DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

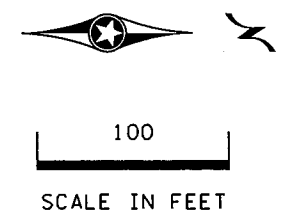
I hereby certify that this sheet was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN
TRUNK HIGHWAY 23 AT CR 158
 COLD SPRING, MINNESOTA - STEARNS COUNTY

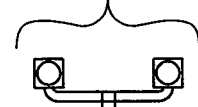
FILE NO. **33**
 MNTMD131077
41



MATCHLINE 'A' - SEE SHEET 35

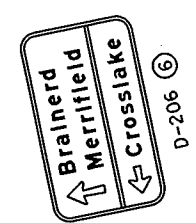
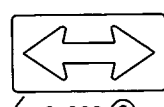
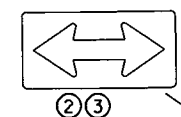
MATCHLINE 'B' - SEE SHEET 35

SEE FLASHING BEACON SYSTEM "D" LAYOUT



TRAFFIC APPROACHING

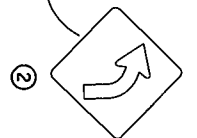
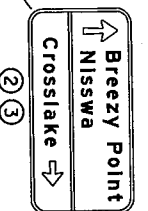
WHEN FLASHING



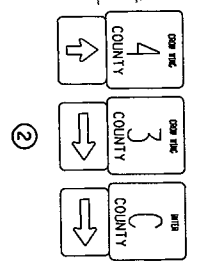
C.S.A.H. 3

C.S.A.H. 4

C.S.A.H. 3



RIGHT TURN LANE



INPLACE STOP BAR - MAINTAIN INPLACE



Driveway

Driveway

LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- ┌ U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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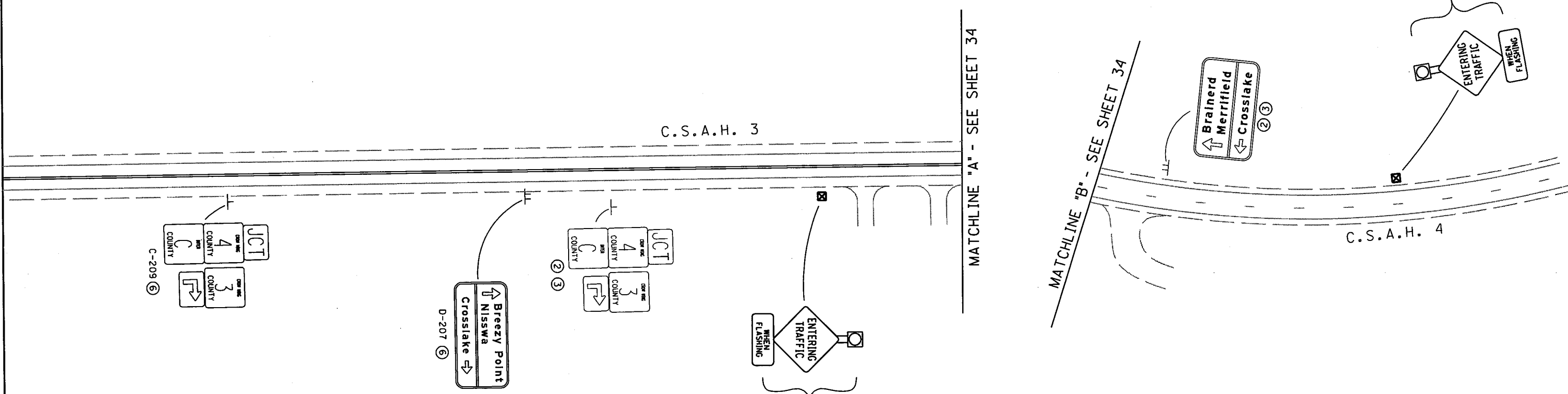
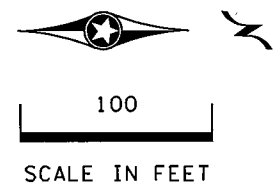
SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN
CSAH 3 AT CSAH 4
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

FILE NO. **34**
 MNTMD131077 **41**

11:41:31 AM
 4/23/2015
 S:\KOV\MM\mtd\131077\5-final-dsgn\50-final-dsgn\10-CIVIL\Plansheets\131077_SN_3-4.dgn
 MODEL \$



LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- T U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Certified By: *John M. Gray* Lic. No. 22457
 Printed Name: JOHN M. GRAY Date: 03/12/2015

MINNESOTA DEPARTMENT OF TRANSPORTATION
**RURAL INTERSECTION CONFLICT
 WARNING SYSTEM - PHASE II**
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

**SIGNING AND STRIPING PLAN
 CSAH 3 AT CSAH 4**
 MERRIFIELD, MINNESOTA - CROW WING COUNTY

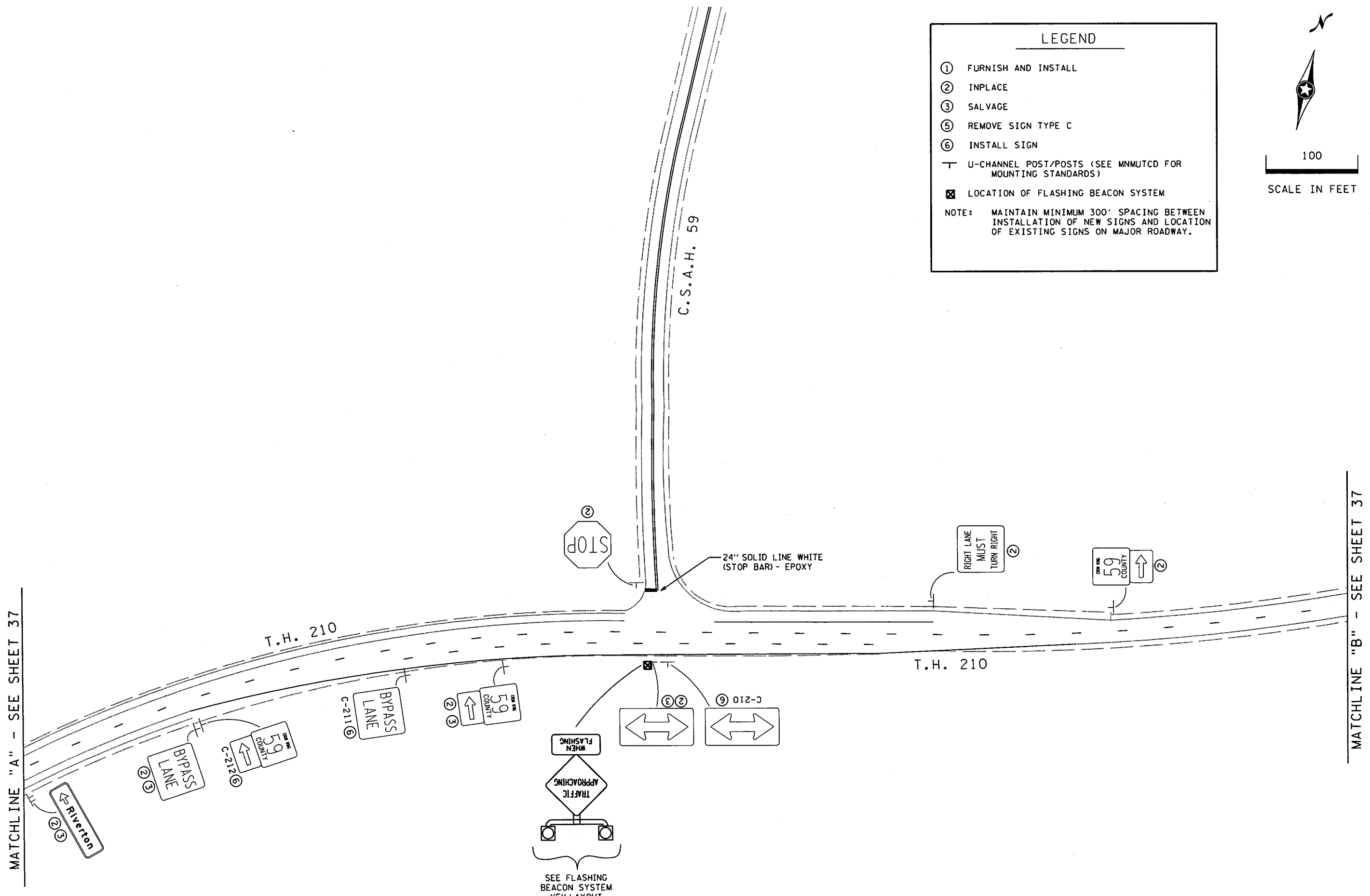
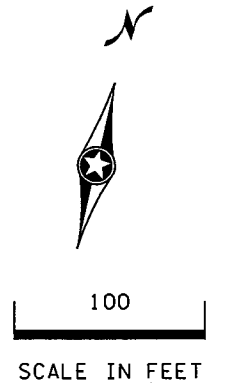
FILE NO. **35**
 MNTMD131077
41

11:41:32 AM
4/23/2015
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MODEL \$

LEGEND

- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- ┴ U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.



MATCHLINE "A" - SEE SHEET 37

MATCHLINE "B" - SEE SHEET 37

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Printed Name: JOHN M. GRAY Date: 03/12/2015

PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

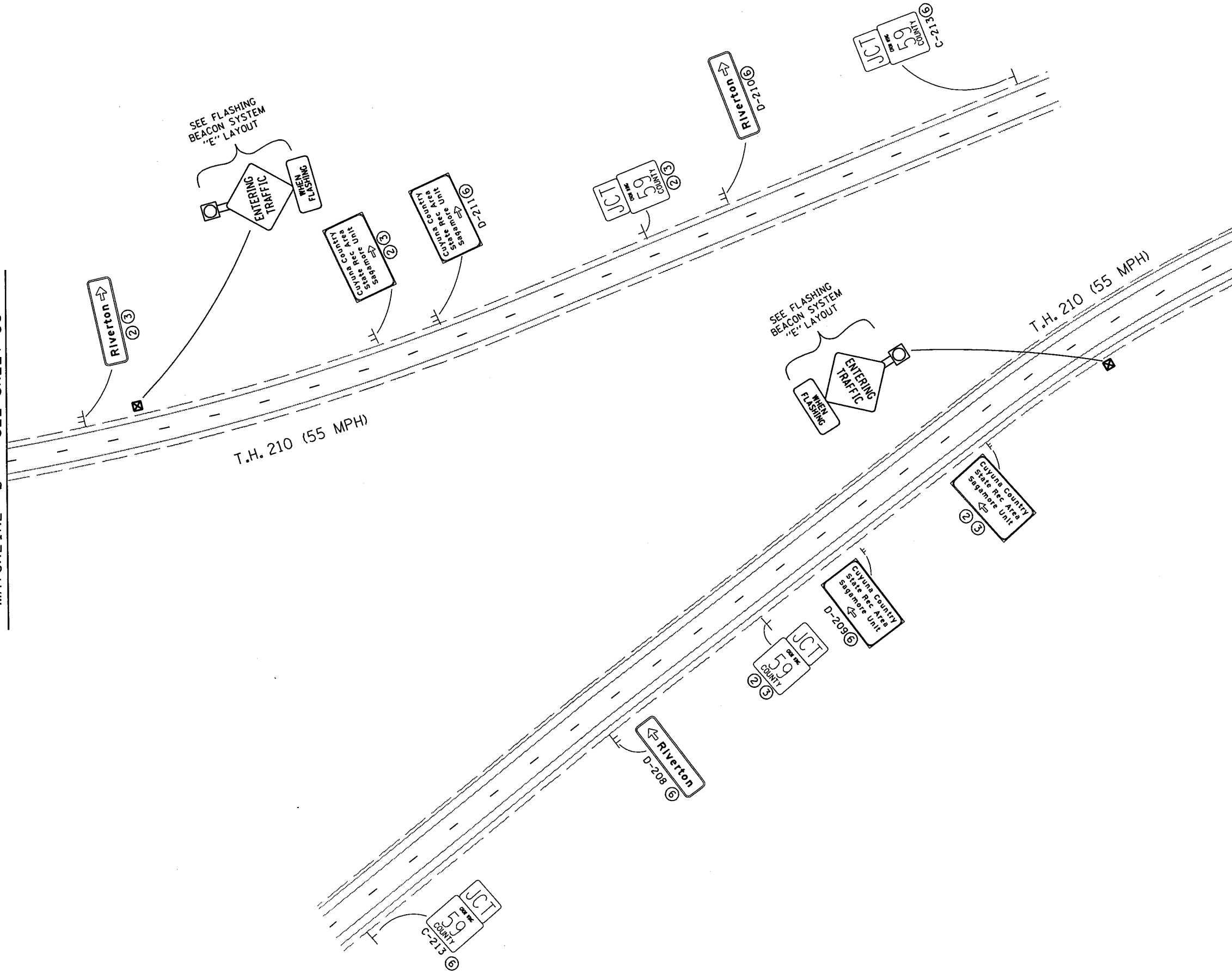
MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
S.P. 8816-2274, 1806-74, 6406-24, 7102-132
S.P. 7305-117, 018-070-010

SIGNING AND STRIPING PLAN
TRUNK HIGHWAY 210 AT CSAH 59
IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO. **36**
MNTMD131077
41

MATCHLINE "B" - SEE SHEET 36

MATCHLINE "A" - SEE SHEET 36

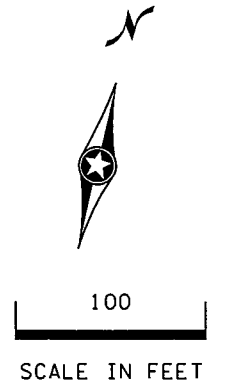


SEE FLASHING BEACON SYSTEM "E" LAYOUT

SEE FLASHING BEACON SYSTEM "E" LAYOUT

T.H. 210 (55 MPH)

T.H. 210 (55 MPH)



LEGEND

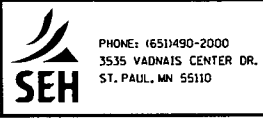
- ① FURNISH AND INSTALL
- ② INPLACE
- ③ SALVAGE
- ⑤ REMOVE SIGN TYPE C
- ⑥ INSTALL SIGN
- U-CHANNEL POST/POSTS (SEE MNMUTCD FOR MOUNTING STANDARDS)
- ☒ LOCATION OF FLASHING BEACON SYSTEM

NOTE: MAINTAIN MINIMUM 300' SPACING BETWEEN INSTALLATION OF NEW SIGNS AND LOCATION OF EXISTING SIGNS ON MAJOR ROADWAY.

DESIGN TEAM			
DRAWN BY:	CMJ		
DESIGNER:	JMG		
CHECKED BY:	JMG		
NO.	BY	DATE	REVISIONS

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Certified By: *John M. Gray* Lic. No. 22457
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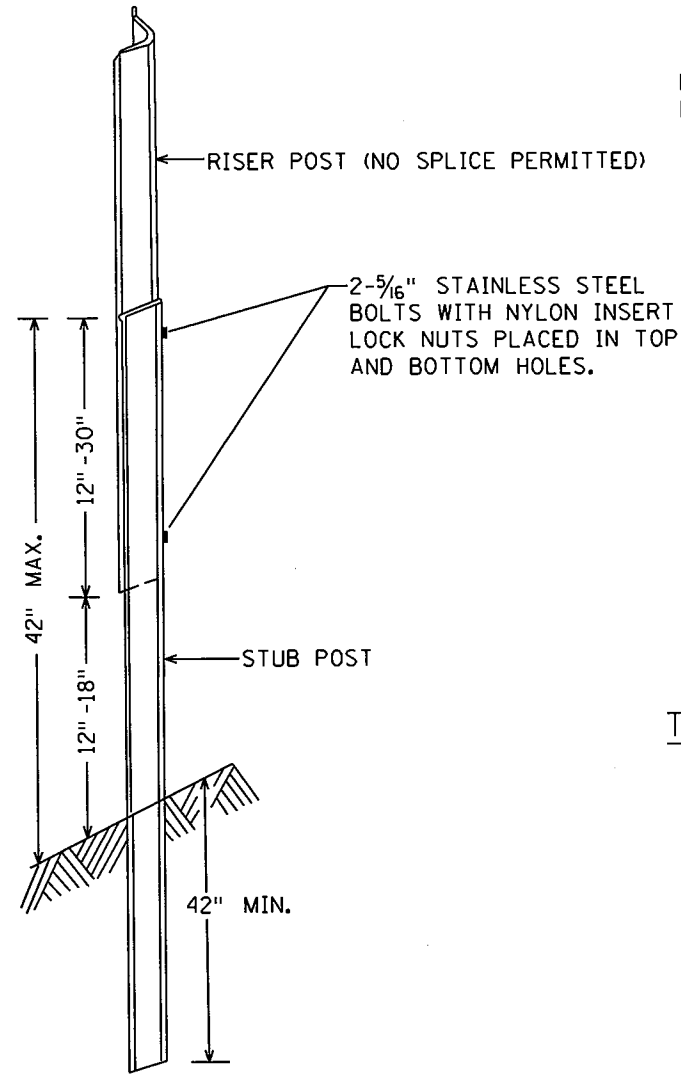


MINNESOTA DEPARTMENT OF TRANSPORTATION
RURAL INTERSECTION CONFLICT WARNING SYSTEM - PHASE II
 S.P. 8816-2274, 1806-74, 6406-24, 7102-132
 S.P. 7305-117, 018-070-010

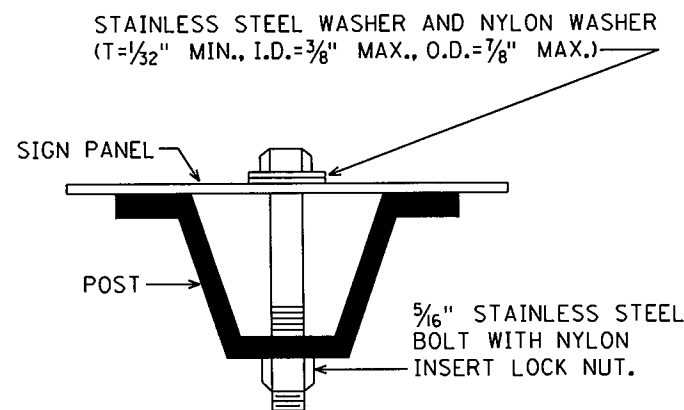
SIGNING AND STRIPING PLAN
TRUNK HIGHWAY 210 AT CSAH 59
 IRONTON, MINNESOTA - CROW WING COUNTY

FILE NO. **37**
 MNTMD131077
41

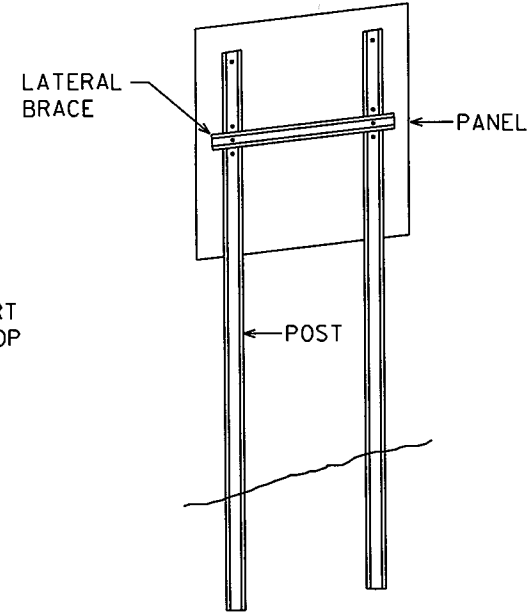
TYPE C & D POST



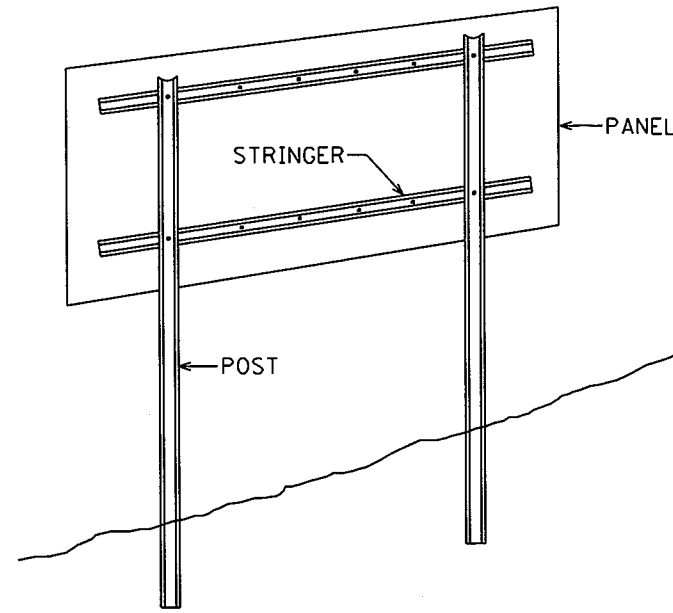
U POST BREAKAWAY SPLICE



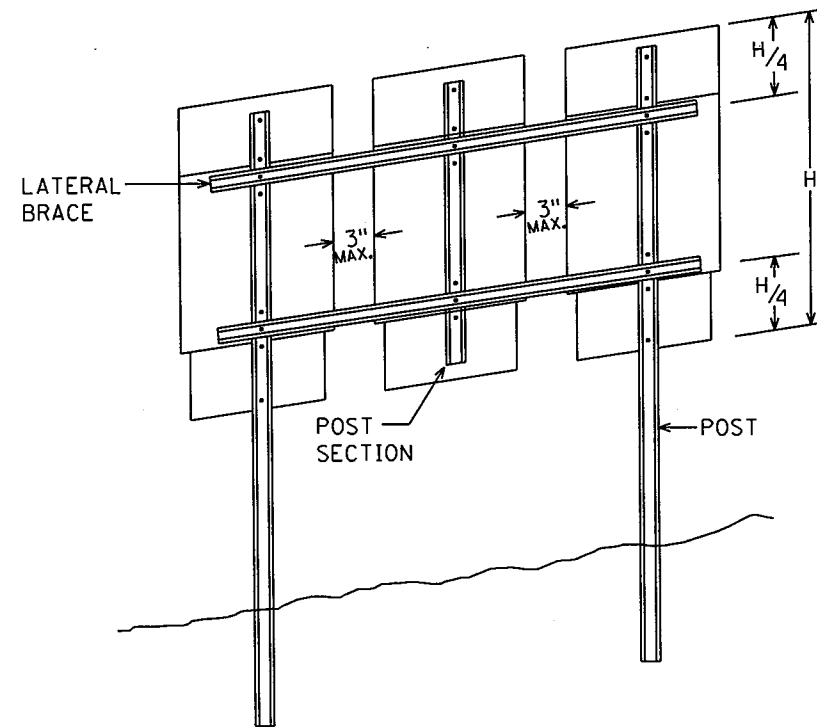
U POST MOUNTING
TYPE C SIGNS



TYPICAL TYPE C INSTALLATION



TYPICAL TYPE D INSTALLATION



MODIFIED TYPE C INSTALLATION

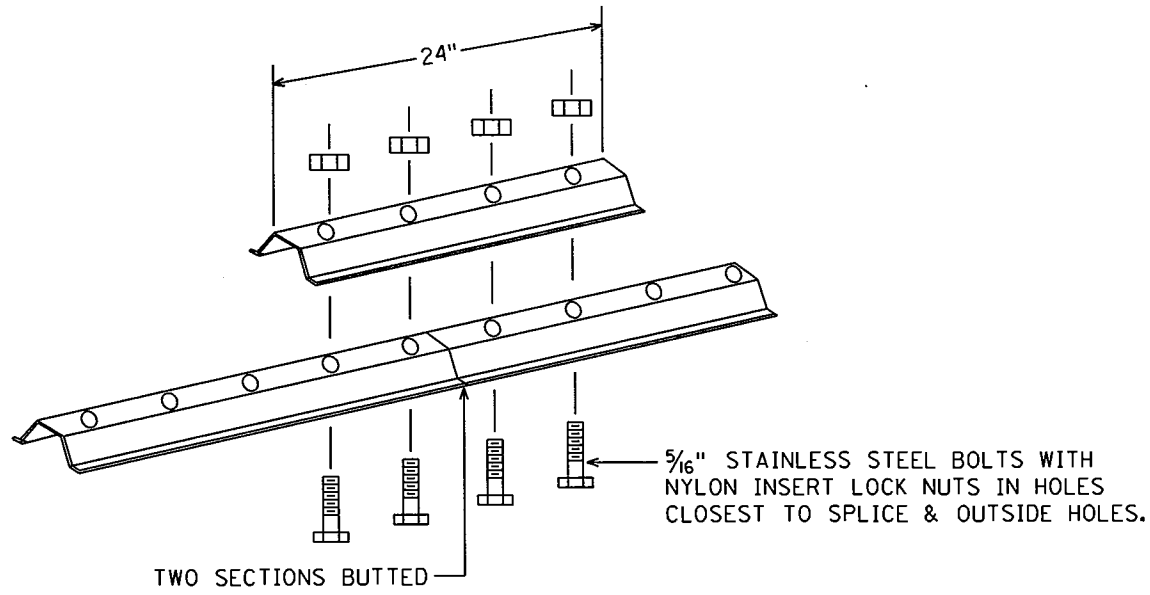
NOTES:

1. USE 3 LB/FT STUB POSTS. SHALL CONFORM TO MNDOT 3401.
2. USE 2.5 LB/FT RISER POSTS, STRINGERS, KNEE BRACES AND LATERAL BRACES. ALL SHALL CONFORM TO MNDOT 3401.
3. SEE SIGN DATA SHEETS FOR NUMBER OF POSTS, KNEE BRACES, POST LENGTHS AND SPACINGS, AS DETERMINED FROM TEM CHARTS 6.3 AND 6.4.
4. IF MORE THAN TWO POSTS ARE NEEDED, THE MINIMUM SPACING SHALL BE 45" BETWEEN POSTS.
5. TYPE D SIGN PANELS SHALL BE BOLTED TO STRINGERS AT 24" MAXIMUM INTERVALS IN ACCORDANCE WITH THE TYPE D STRINGER AND PANEL-JOINT DETAIL (SEE STANDARD SIGNS MANUAL).
6. MOUNTING (PUNCH CODE) FOR TYPE C SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
7. ALL RISER (VERTICAL) U POSTS SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
8. USE STAINLESS STEEL 5/16" BOLTS, WASHERS AND NYLON INSERT LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
9. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
10. BRACING STUBS SHALL BE NO MORE THAN 4" ABOVE GROUND AND EMBEDDED AT LEAST 42".
11. A-FRAME BRACKET SHALL BE STEEL CONFORMING TO MNDOT 3306 AND GALVANIZED IN ACCORDANCE WITH MNDOT 3394.
12. COLLARS SHALL BE USED TO SHIM OVERLAYS AND LEGEND COMPONENTS AWAY FROM PANEL WHERE INTERFERENCE WITH BOLT HEADS IS ENCOUNTERED. MNDOT 3352.2A6.
13. 2 POST TYPE C SIGNS SHALL BE REINFORCED WITH AT LEAST ONE LATERAL BRACE. INSTALLATIONS WHERE THE TOTAL PANEL HEIGHT IS 60" OR MORE SHALL HAVE TWO LATERAL BRACES LOCATED APPROXIMATELY AT THE QUARTER POINTS.
14. WHERE 2 SINGLE POST TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND LOCATED APPROXIMATELY AT THE QUARTER POINTS.
15. WHERE 3 OR MORE TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND POST SECTION AND LOCATED APPROXIMATELY AT THE QUARTER POINTS AS SHOWN IN MODIFIED TYPE C INSTALLATION.

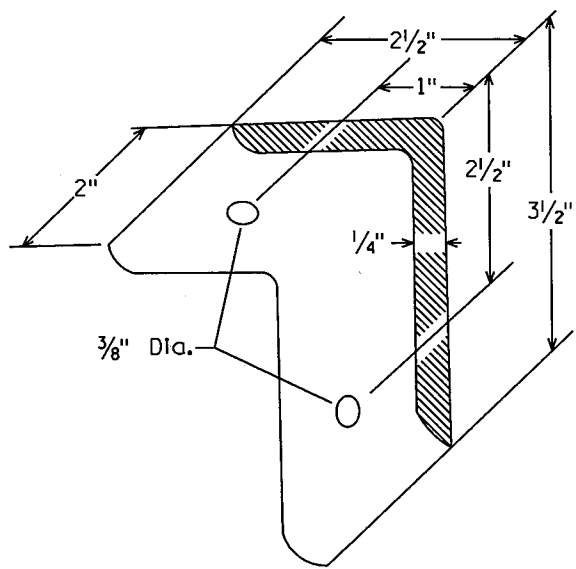
TYPE C & D SIGN
STRUCTURAL DETAILS

PLOTTED/REVISED: \$\$\$DATE\$\$\$

DISTRICT #: \$\$\$DISTRICT\$\$\$
PLOT NAME: \$\$\$PLOTNAME\$\$\$
PATH & FILENAME: \$\$\$PATHFILENAME\$\$\$

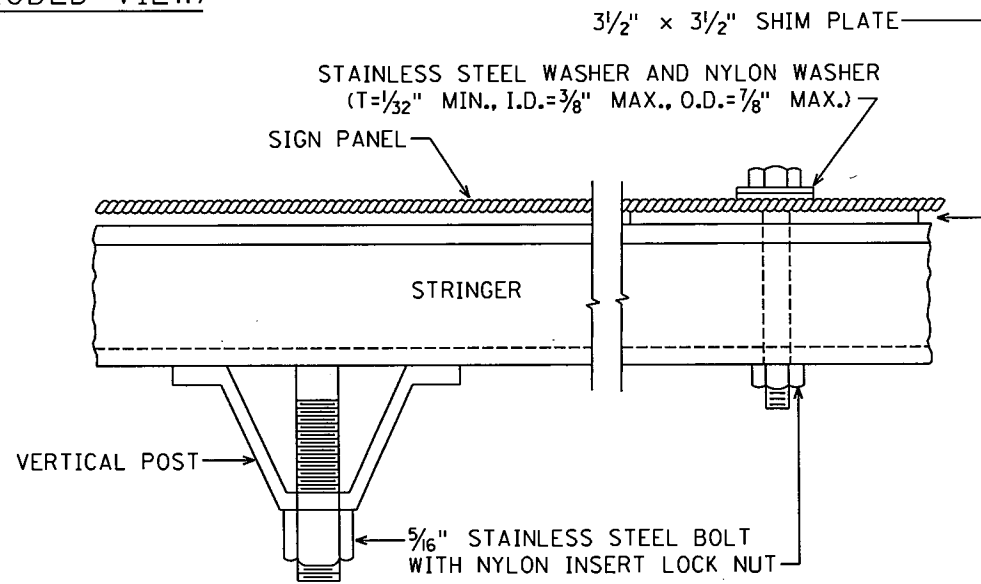


LATERAL BRACE OR STRINGER
SPlice DETAIL (EXPLODED VIEW)

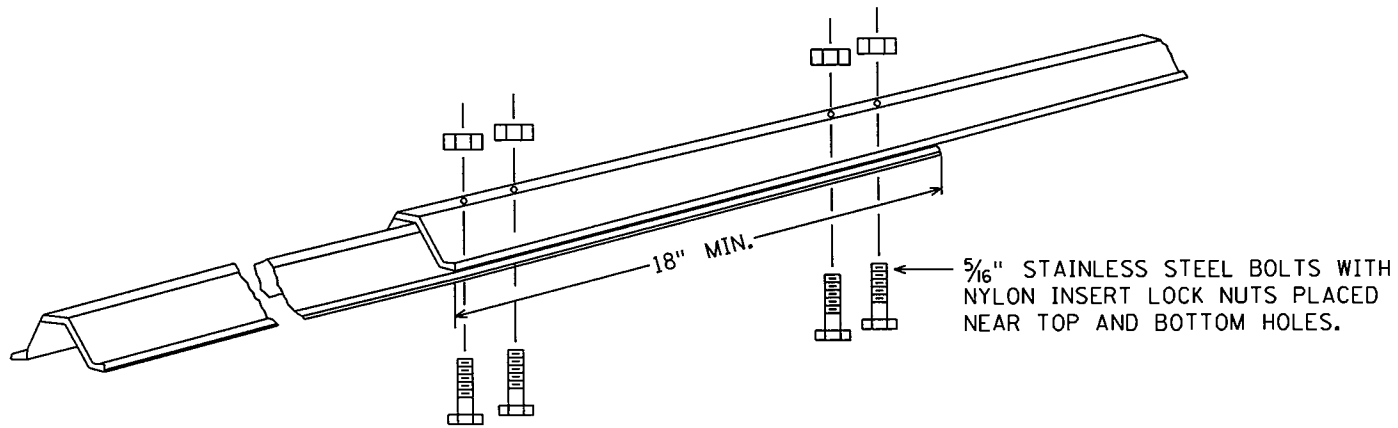


A-FRAME BRACKET

(STEEL MNDOT 3306 GALVANIZED PER MNDOT 3394)

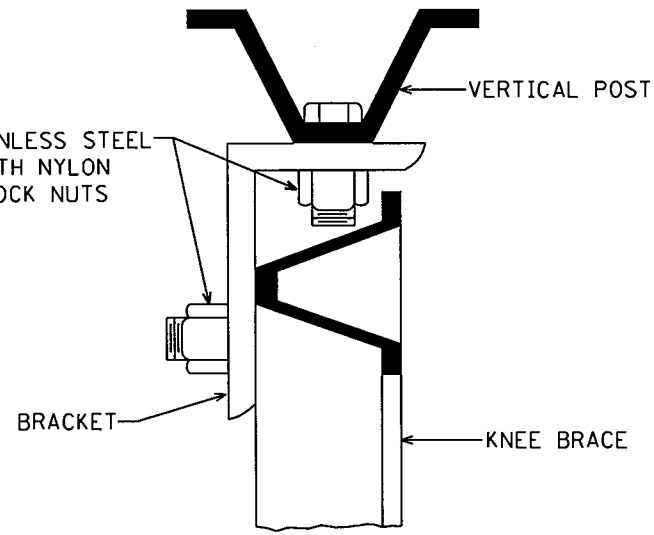


SECTION B-B

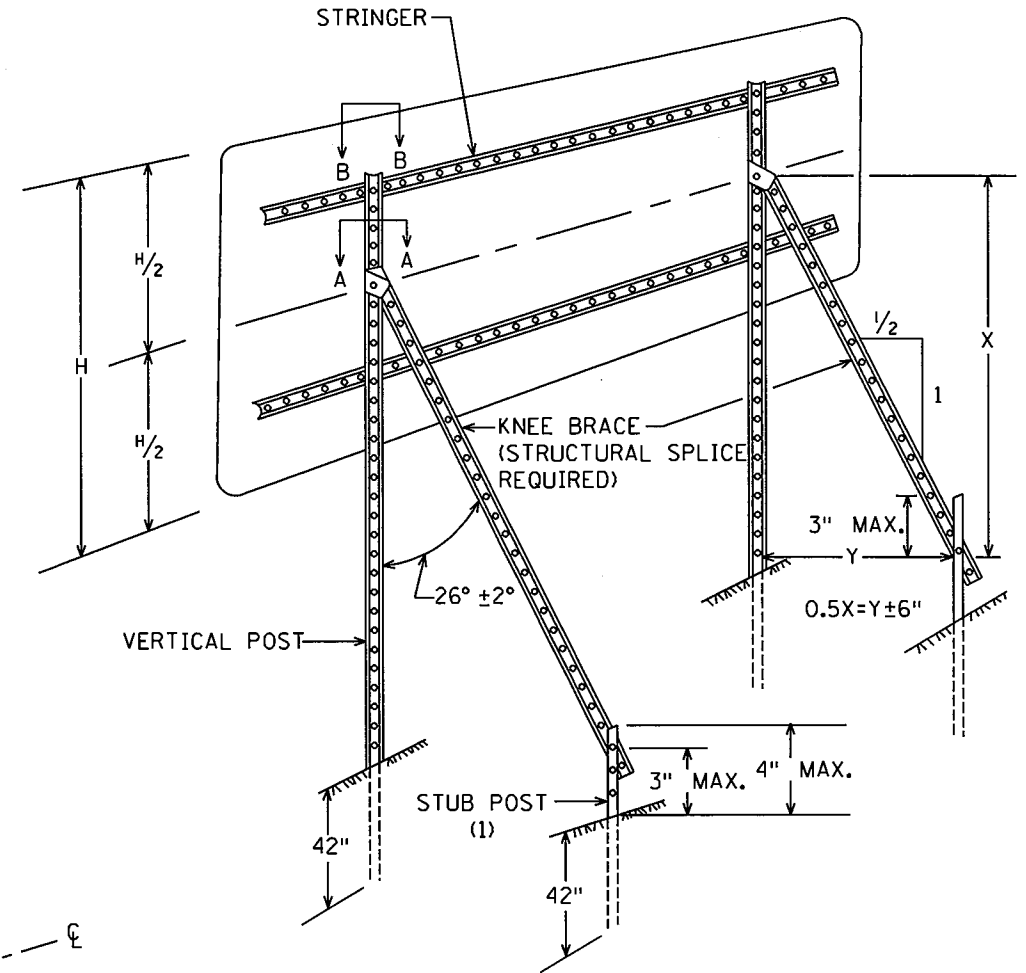


STRUCTURAL SPLICE

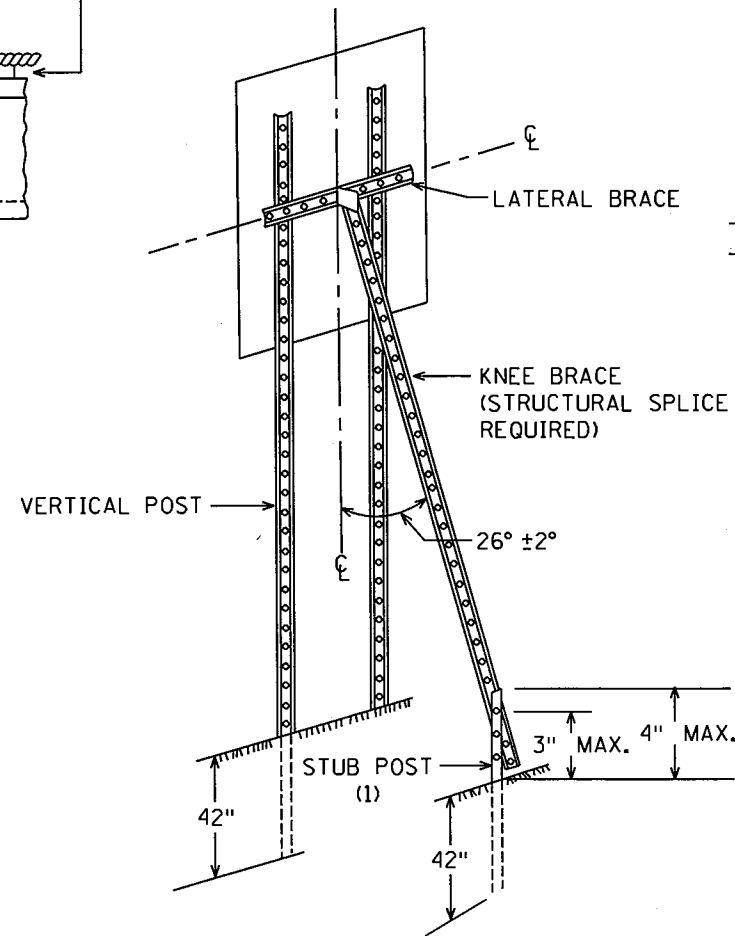
(USE WHEN IT IS NECESSARY TO FABRICATE THE CORRECT LENGTH OF POST FROM TWO PIECES)



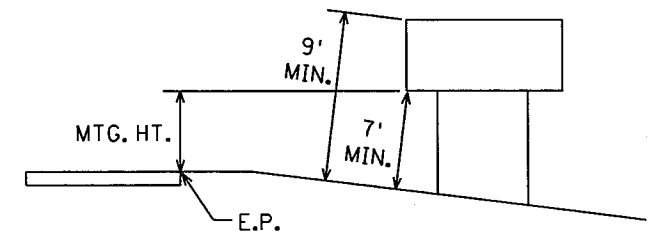
SECTION A-A



TYPICAL "A-FRAME" INSTALLATION
TYPE "D" SIGNS



TYPICAL "A-FRAME" INSTALLATION
TYPE "C" SIGNS

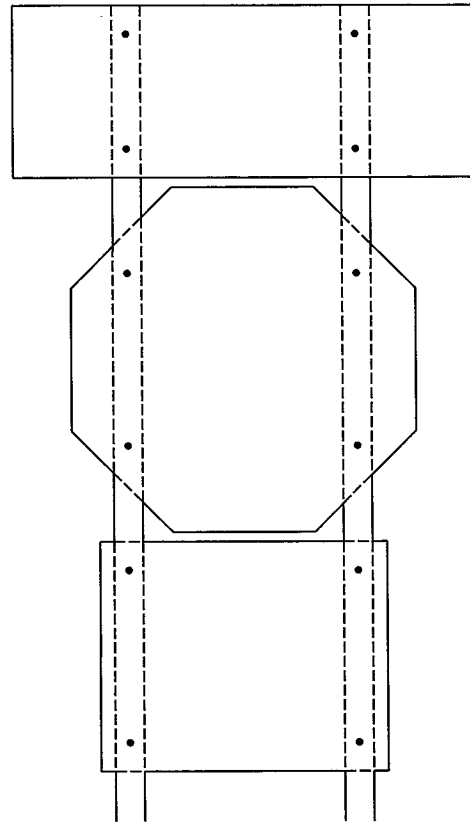


TYPICAL MOUNTING

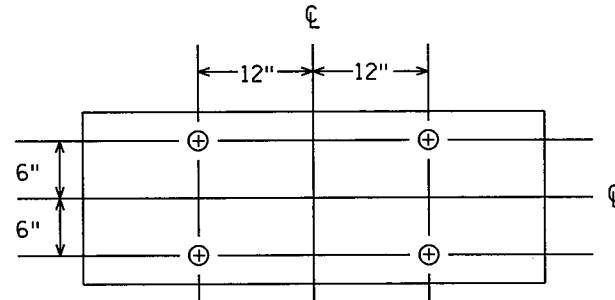
(1) OFFSET STUB POST 1' TOWARD ROADWAY
RELATIVE TO VERTICAL POST. ATTACH STUB
POST AND KNEE BRACE BACK TO BACK.

TYPE C & D SIGN
STRUCTURAL DETAILS

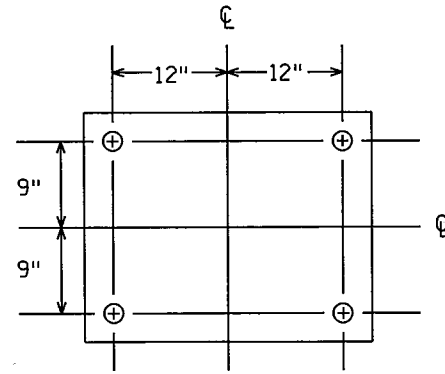
Sheet 2 of 3



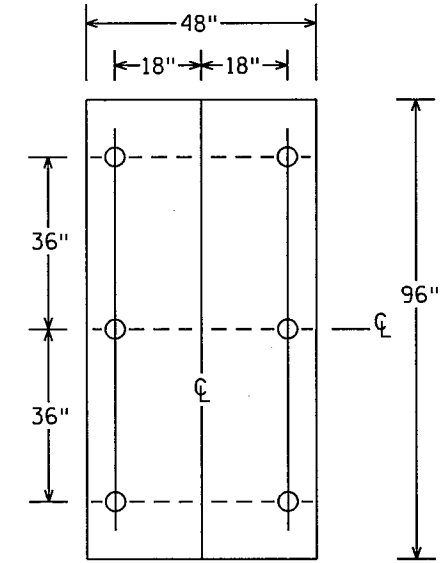
R6-1, R1-1 & (R6-3 OR R6-3a)
MOUNTING



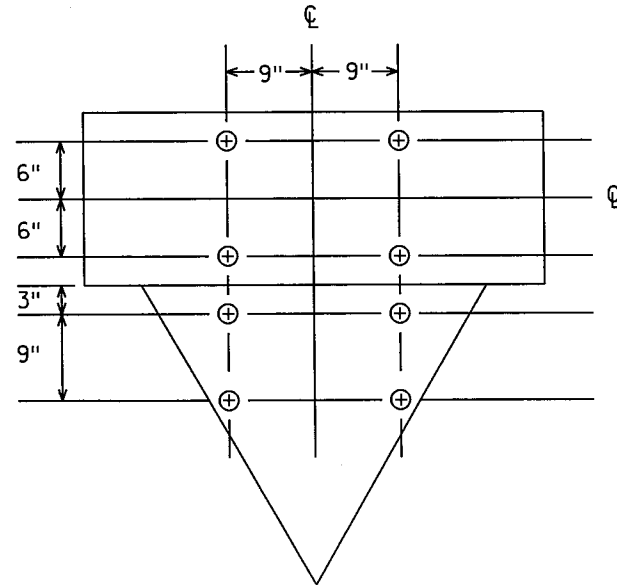
PUNCHING FOR R6-1(54" x 18")



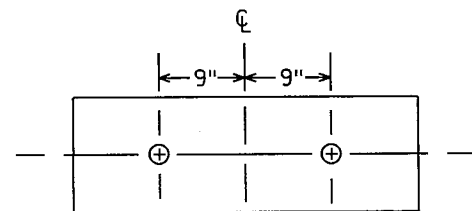
PUNCHING FOR R6-3 OR R6-3a(30" x 24")



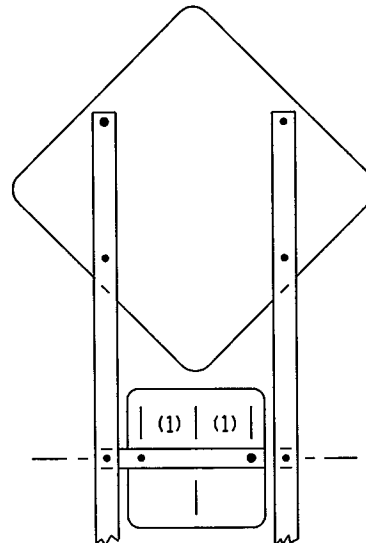
PUNCHING FOR R2-4b
SPEED LIMIT



PUNCHING FOR R6-1(54" x 18")
& R1-2(36" x 36" x 36")



PUNCHING FOR R6-1(36" x 12")



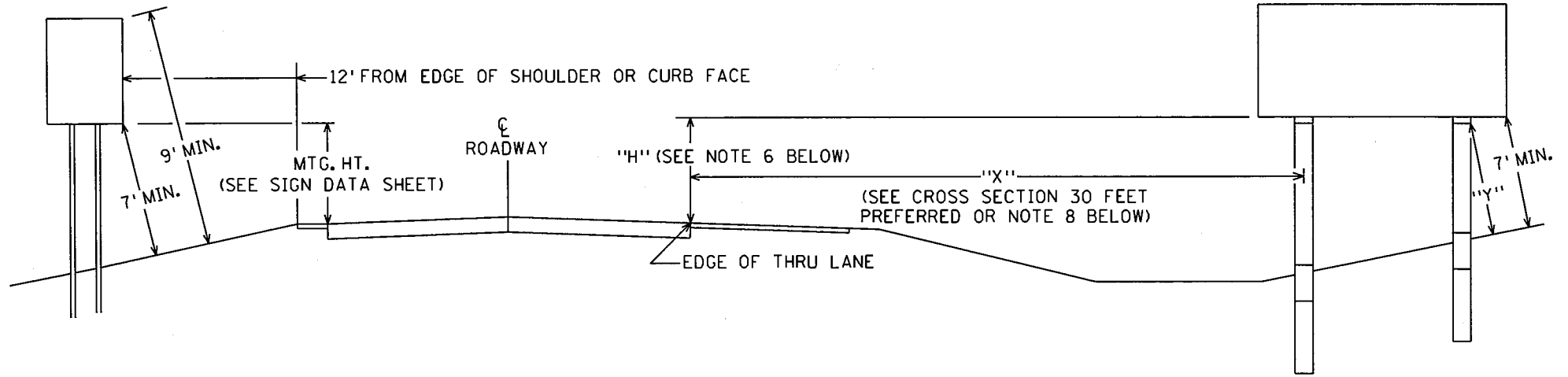
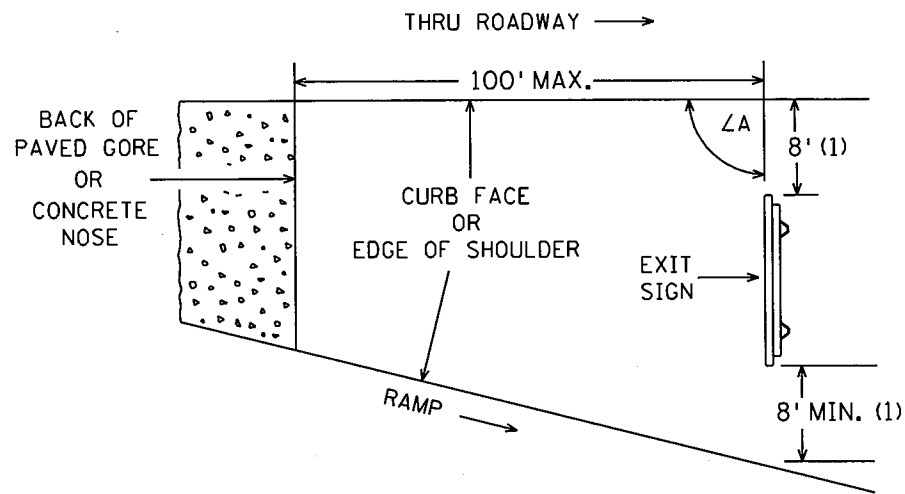
WARNING SIGN [30" x 30 OR 48" x 48"] AND
WARNING PLAQUE [18" x 18" OR 30" x 30"]
PUNCHING AND MOUNTING

- (1) 6" FOR WARNING PLAQUE (18" x 18")
- 12" FOR WARNING PLAQUE (30" x 30")

TYPE C & D SIGN
STRUCTURAL DETAILS

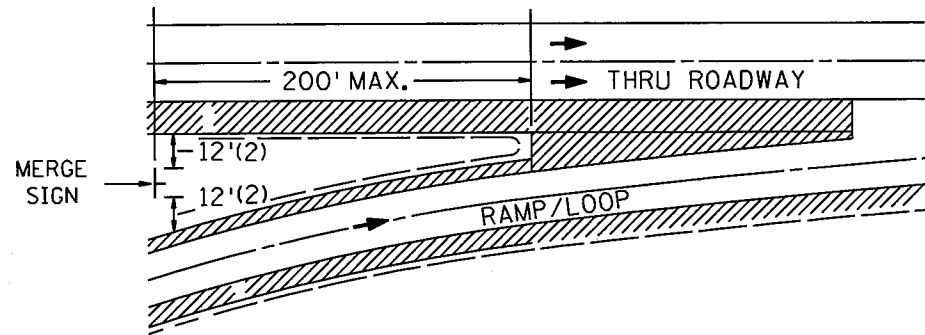
GORE PLACEMENT

ROADSIDE PLACEMENT



ROUTE MARKER, REGULATORY & WARNING SIGNS - TYPE C
GUIDE SIGNS - TYPE D

GUIDE SIGN - TYPE A



SPECIFIC NOTES:

(1) EXIT SIGNS

IF THESE OFFSETS CANNOT BE ATTAINED WITHIN 100 FEET OF THE PAVED GORE, A 4 FOOT OFFSET IS ACCEPTABLE. IF THE 4 FOOT OFFSETS CANNOT BE ATTAINED WITHIN 100 FEET OF THE PAVED GORE, CONTACT THE PROJECT ENGINEER WHO WILL CONSULT WITH THE STATE SIGNING ENGINEER.

(2) MERGE SIGNS

IF THESE OFFSETS CANNOT BE ATTAINED WITHIN 200 FEET OF THE PAVED GORE, A 4 FOOT OFFSET IS ACCEPTABLE. IF THE 4 FOOT OFFSETS CANNOT BE ATTAINED WITHIN 200 FEET OF THE PAVED GORE, CONTACT THE PROJECT ENGINEER WHO WILL CONSULT WITH THE STATE SIGNING ENGINEER.











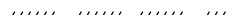




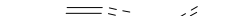
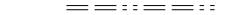
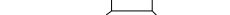

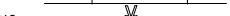





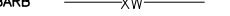






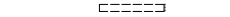

















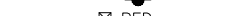
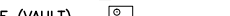

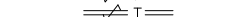
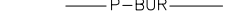


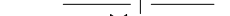














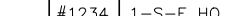







NOTES:

1. ALL ROUTE MARKERS, WARNING & REGULATORY SIGNS SHALL BE AT LEAST 7' ABOVE EDGE OF THRU LANE.
2. SIGN FACES SHALL BE VERTICAL.
3. OVERHEAD SIGNS SHALL BE POSITIONED AT RIGHT ANGLES TO THE THRU ROADWAY UNLESS OTHERWISE NOTED.
4. TO AVOID SPECULAR GLARE, ΔA SHALL BE APPROXIMATELY 93° FOR SIGNS LOCATED LESS THAN 30' FROM THE EDGE OF THRU LANE AND APPROXIMATELY 92° FOR SIGNS LOCATED 30' OR MORE FROM EDGE OF THRU LANE. THIS APPLIES TO SIGNS TYPE A, C, & D AND INCLUDES SIGNS IN THE GORE.
5. "Y" IS THE PERPENDICULAR DISTANCE FROM THE GROUND LINE TO THE FRICTION FUSE ON THE POST. THIS DISTANCE SHALL BE AT LEAST 7'.
6. WHERE "X" IS LESS THAN 30', "H" SHALL BE $7' \pm 6"$. WHERE "X" IS 30' OR GREATER, MINIMUM AND PREFERRED "H" IS 5'.
7. LATERAL CLEARANCES GIVEN APPLY TO RIGHT AND OR LEFT SIDE INSTALLATION.
8. WHEN A TYPE A SIGN IS INSTALLED DIRECTLY BEHIND TRAFFIC BARRIER, THE LEFT EDGE OF THE SIGN PANEL SHALL BE LOCATED A MINIMUM OF 8 FEET BEHIND THE FACE OF THE TRAFFIC BARRIER.

SIGN PLACEMENT

DISTRICT #: \$DISTRICT\$
 PLOT NAME: \$PLOTNAME\$
 PATH & FILENAME: \$PATHFILENAME\$
 PLOTTED/REVISED: \$DATE\$

PLAN SYMBOLS

- COUNTY LINE 
- TOWNSHIP OR RANGE LINE 
- SECTION LINE 
- QUARTER LINE 
- SIXTEENTH LINE 
- EXISTING R/W 
- NEW R/W 
- TEMP EASE 
- RAILROAD R/W 
- UNSURFACED RD. OR SHLD. 
- EDGE OF LAKE 
- SWAMP BOUNDARY 
- MISCELLANEOUS BOUNDARY 
- CORPORATE OR CITY LIMITS 
- ALIGNMENT STATIONS 
- ALIGNMENT POINTS 
- PROPERTY LINES 
- VACATED PLATTED PROPERTY 
- RIVER OR CREEK 
- DRAINAGE DITCH 
- BRIDGE 
- RECREATIONAL TRAIL 
- RAILROAD (SINGLE TRACK) 
- RR CROSSING PAVEMENT MARKING 
- RR CROSSING SIGNAL AND GATE 
- RR CROSSBUCK SIGN 
- RR CROSSBUCK SIGN W/LIGHTS 
- RR SWITCH 
- BARBED WIRE FENCE 
- CHAIN LINK FENCE 
- WOVEN WIRE, OR WOVEN AND BARB 
- WOOD FENCE 
- BILLBOARD 
- GUARD POST 
- RETAINING WALL 
- GUARDRAIL (CABLE) 
- GUARDRAIL (PLATE BEAM) 
- DRAIN TILE 
- FLUME 
- CULVERT APRON 
- CULVERT 
- WOODS OR BRUSH, NURSERY 
- DECIDUOUS TREES 
- CONIFER (EVERGREEN) TREES 
- HEDGE 
- BUSH OR SHRUB 
- STUMP 
- SWAMP OR MARSH 
- CONCRETE OR STONE MONUMENT 
- IRON PIPE 
- CAST IRON OR CAPPED PIPE MONUMENT 
- HUB 
- NAIL OR SPIKE OR PK NAIL 
- IRON PIN OR REBAR 
- IRON PIN WITH BRASS DISK 
- VERTICAL CONTROL 
- HORIZONTAL CONTROL 
- POWER POLE 
- LIGHT POLE 
- LIGHT AND TELEPHONE POLE 
- LIGHT, TELEPHONE AND POWER POLE 
- GUY POLE 
- POLE ANCHOR 
- TELEPHONE POLE 
- TELEPHONE AND POWER POLE 
- UNDERGROUND CABLE PEDESTAL 
- TELEPHONE OR POWER MANHOLE (VAULT) 
- ELECTRIC CABLE IN CONDUIT 
- TELEPHONE CABLE IN CONDUIT 
- BURIED ELECTRIC CABLE 
- BURIED TELEPHONE CABLE 
- GAS LINE 
- GAS METER 
- WATER LINE 
- VALVE 
- FIRE HYDRANT 
- WATER MANHOLE 
- WELL 
- LAWN SPRINKLER HEAD 
- STORM SEWER MANHOLE 
- SEPTIC TANK
- SANITARY SEWER MANHOLE
- CATCH BASIN
- FORCE MAIN LIFT STA.
- SEWER LINE
- BARRICADE
- SIGN
- TRAFFIC SIGNAL W/MAST ARM
- PED. PUSH BUTTON STA.
- HAND HOLE
- YARD LIGHT
- ENTRANCE
- BUILDING
- SATELLITE DISH
- STEEL TOWER
- FLAG POLE

AGREEMENT NO. 1000499
 ST. LOUIS COUNTY
 SP 8821-270
 HSIP
 DISTRICT 1 (DULUTH)

MINNESOTA DEPARTMENT OF TRANSPORTATION

SAINT LOUIS COUNTY

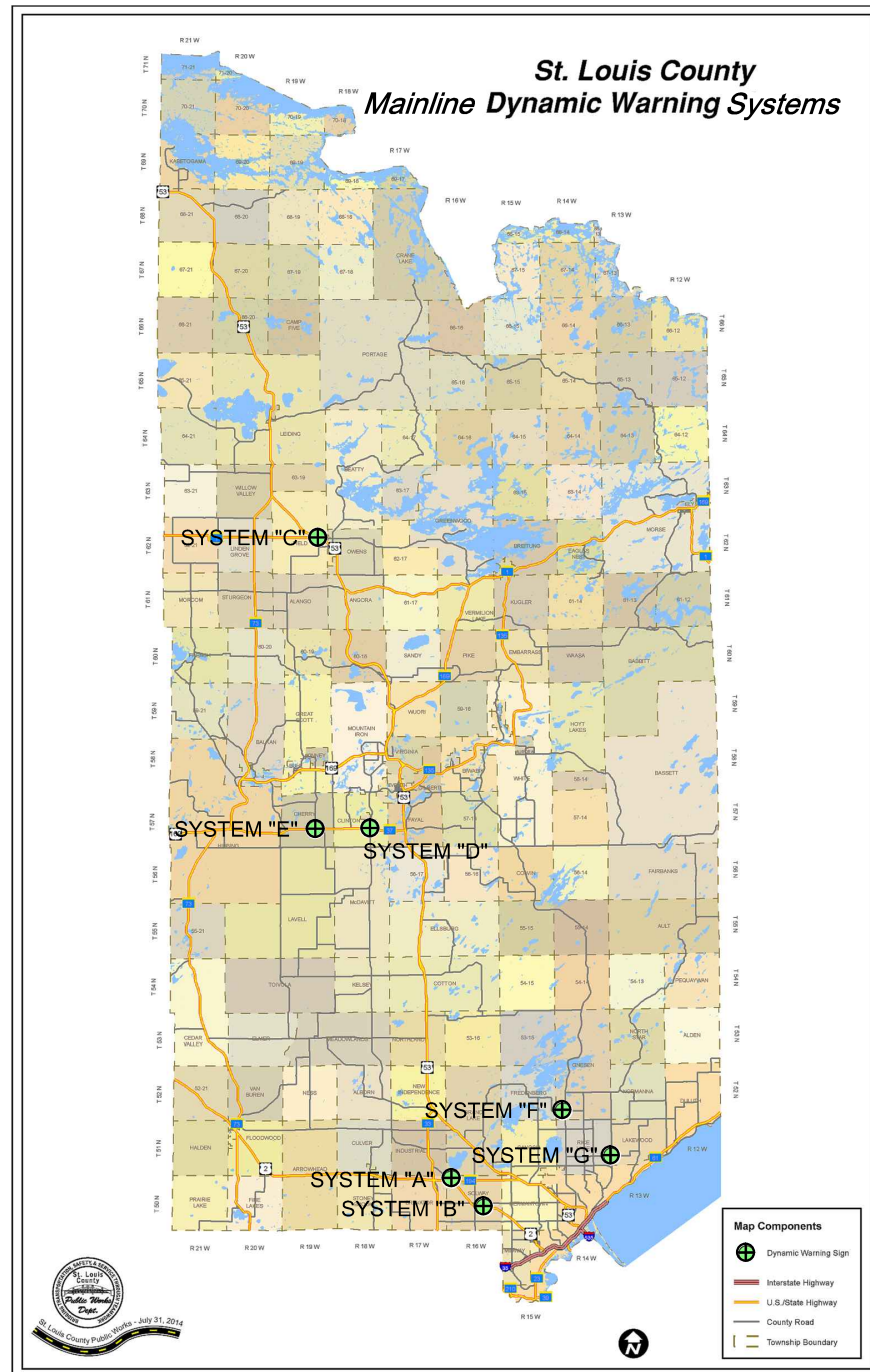
CONSTRUCTION PLAN FOR: MAINLINE DYNAMIC WARNING SYSTEMS

LOCATED ON SEVEN RURAL INTERSECTIONS IN ST. LOUIS COUNTY

STATE PROJ. NO. 069-070-017

COUNTY PROJ. NO. 0000-187068

STATE PROJ. NO. 8821-270



MINN. PROJ. NO. HSIP

SPECIFICATIONS

THE 2014 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE 2014 EDITION OF THE "MATERIALS LAB SUPPLEMENTAL SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

INDEX

SHEET NO.	SHEET NAME
1	TITLE
2	STATEMENT OF ESTIMATED QUANTITIES
3	WARNING SIGN ASSEMBLY DETAILS
4	VEHICLE DETECTOR POLE DETAILS
5	SIGN MOUNTING BRACKET DETAILS
6-12	PLAN SHEETS
13-16	TRAFFIC CONTROL

THIS PLAN CONTAINS 16 SHEETS

DESIGN SQUAD VL, CL, RP

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.

Print Name: Victor K. Lund

Signature: _____

Date: _____ LIC. NO. 48160

Approved: St. Louis County Highway Engineer Date: _____

Recommended for Approval: District 1 Traffic Engineer Date: _____

Approved: District 1 Engineer Date: _____

District State Aid Engineer: Reviewed for Compliance with State-Aid Rules/Policy Date: _____

Approved for State Aid Funding and Federal Aid Funding: State Aid Engineer Date: _____

Recommended for Approval: State Pre-Letting Engineer Date: _____

Office of Land Management Approval: Director, Land Management Date: _____

Approved: State Design Engineer Date: _____

PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

S.P. 069-070-017

S.P. 8821-270

SHEET NO. 1 OF 16 SHEETS

STATEMENT OF ESTIMATED QUANTITIES						
ITEM NO.	ITEM DESCRIPTION	UNIT OF MEASURE	TOTAL ESTIMATED QUANTITY	MN/DOT (SP 8821-270) (90% FEDERAL/10% STATE FUNDS)	ST. LOUIS COUNTY (SP 069-070-017) (CP 0000-187068) (90% FEDERAL/10% STATE AID FUNDS)	ST. LOUIS COUNTY (SP 069-070-017) (CP 0223-233633) (90% FEDERAL/10% LOCAL FUNDS)
				ESTIMATED QUANTITY	ESTIMATED QUANTITY	ESTIMATED QUANTITY
2021.501	MOBILIZATION	LUMP SUM	1.00	0.33	0.57	0.10
2563.601	TRAFFIC CONTROL	LUMP SUM	1.00	0.33	0.57	0.10
2565.616	FLASHING BEACON SYSTEM A	SYSTEM	1.00	0.29	0.71	
2565.616	FLASHING BEACON SYSTEM B	SYSTEM	1.00	0.29		0.71
2565.616	FLASHING BEACON SYSTEM C	SYSTEM	1.00	0.29	0.71	
2565.616	FLASHING BEACON SYSTEM D	SYSTEM	1.00	0.29	0.71	
2565.616	FLASHING BEACON SYSTEM E	SYSTEM	1.00	0.29	0.71	
2565.616	FLASHING BEACON SYSTEM F	SYSTEM	1.00		1.00	
2565.616	FLASHING BEACON SYSTEM G	SYSTEM	1.00		1.00	
2575.555	TURF ESTABLISHMENT	LUMP SUM	1.00	0.33	0.57	0.10

WARNING
 LOCATION OF UNDERGROUND UTILITIES
 TO BE VERIFIED BY THE CONTRACTOR.
 CALL BEFORE DIGGING
1-800-252-1166
 REQUIRED BY LAW.

UNDERGROUND UTILITIES WILL NOT
 BE AFFECTED BY THIS PROJECT

ALL POWERLINES ARE DISTRIBUTION ONLY.

STANDARD PLATES	
THE FOLLOWING STANDARD PLATES, APPROVED BY FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.	
PLATE NO.	DESCRIPTION
8000I	STANDARD BARRICADES
8112H	PEDESTAL FOUNDATION (TRAFFIC CONTROL SIGNALS)
8118D	SERVICE EQUIPMENT & POLE TRAFFIC CONTROL SIGNALS
8122F	PEDESTAL & PEDESTAL BASE (FOR TRAFFIC CONTROL SIGNALS SUPPORT)
8127D	LIGHT FOUNDATION - DESIGN E CAST IN-PLACE 40' POLE OR LESS
8129A	SHIM AND WASHER (TRAFFIC CONTROL SIGNALS AND ROADWAY LIGHTING)

INTERSECTION DESCRIPTION CHART					
FLASHING BEACON SYSTEM	MAJOR ROAD NO.	MAJOR ROAD NAME	MINOR ROAD NO.	MINOR ROAD NAME	QUANTITY (SYS)
A	US-2	Highway 2	CSAH 46	Saginaw Road	1
B	US-2	Highway 2	CR 223	Munger Shaw Road	1
C	US-53	Highway 53	CSAH 115	Ashawa Road	1
D	MNTH-37	Highway 37	CSAH 7	Highway 7	1
E	MNTH-37	Highway 37	CSAH 25 (West)	Highway 25	1
F	CSAH 4	Rice Lake Road	CSAH 43	Emerson Road	1
G	CSAH 37	Jean Duluth Road	CSAH 2	West Tischer Road	1

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL COORDINATE THE STAGING OF ALL WORK IN THIS PROJECT WITH THE ENGINEER.
2. THIS PROJECT DOES NOT MEET THE CRITERIA FOR THE NPDES CONSTRUCTION GENERAL PERMIT INCLUDING THE SWPPP DEVELOPMENT. HOWEVER, THE CONTRACTOR WILL USE ENVIRONMENTALLY FRIENDLY CONSTRUCTION TECHNIQUES WHILE PERFORMING WORK. THESE TECHNIQUES CAN INCLUDE BUT ARE NOT LIMITED TO: DO NOT DISTURB AREAS, PERIMETER CONTROL, INLET PROTECTION, DUST CONTROL, PROPER DEWATERING TECHNIQUES, TEMPORARY SOIL STABILIZATION AND PERMANENT SOIL STABILIZATION. THESE TECHNIQUES SHALL BE INCIDENTAL TO 2565.616.

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

 SIGNATURE

Victor K. Lund
 TYPED NAME

DATE
 48160
 LIC. NO.

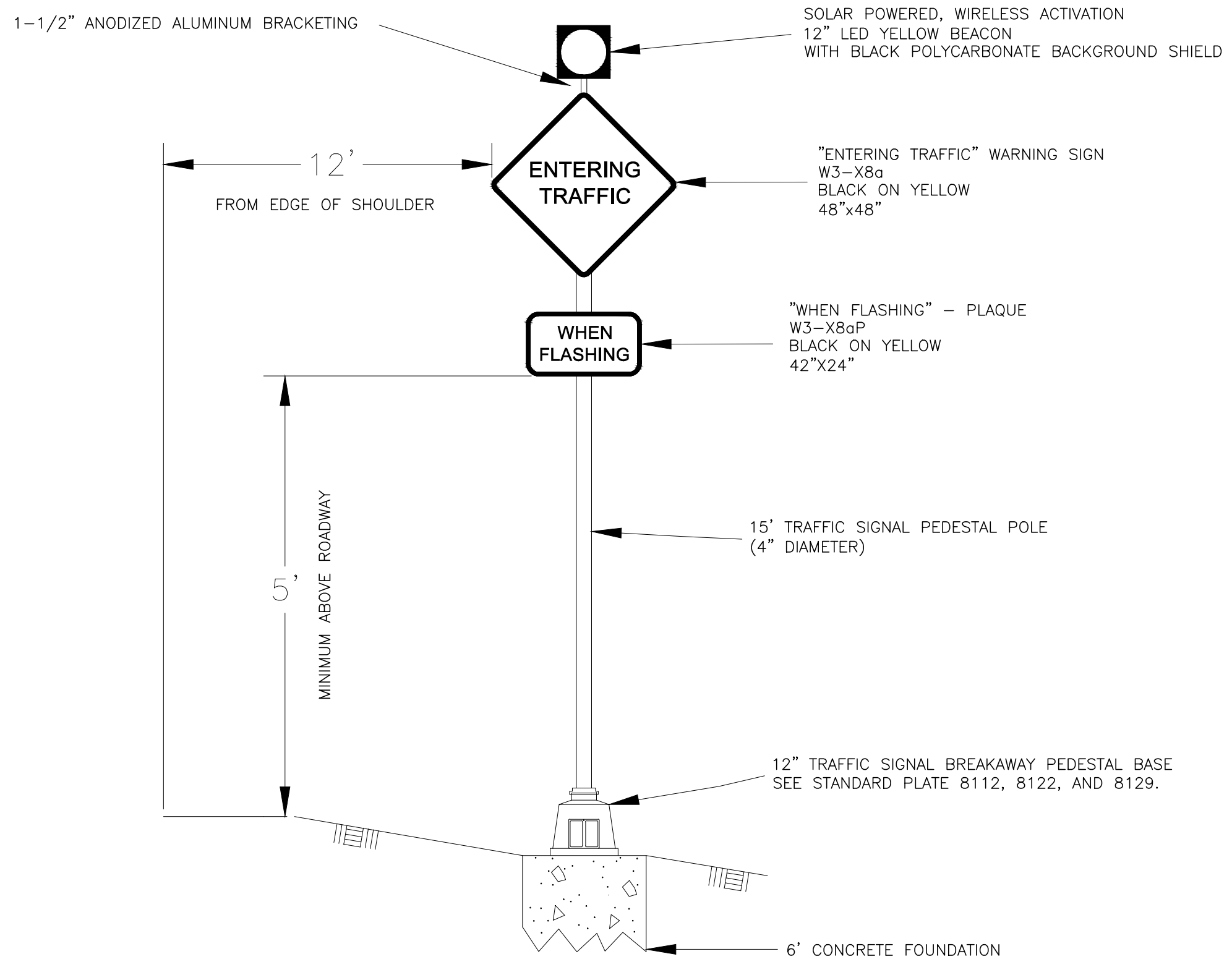
REVISIONS

S.P. 069-070-017

STATEMENT OF ESTIMATED QUANTITIES

S.P. 8821-270 SHEET 2 OF 16 SHEETS

WARNING SIGN ASSEMBLY



NOTES:

1. MOUNTING BOLTS SHALL BE STAINLESS STEEL. APPLY BRUSH-ON ANTI-SEIZE COMPOUND PRIOR TO ASSEMBLY.
2. ANTI-SEIZE COMPOUND MUST BE USED ON THE MOUNTING BOLTS ON ALL SIGNS.
3. THE CONTRACTOR SHALL INCLUDE RIGID PVC CONDUIT IN PEDESTAL FOUNDATION PER STANDARD PLATE 8112, AND SHALL APPROPRIATELY CAP THE CONDUIT FOR POTENTIAL FUTURE USE.
4. THE DISTANCE BETWEEN THE EDGE OF THE BEACON BACKGROUND SHIELD AND THE EDGE OF THE "ENTERING TRAFFIC" SIGN SHALL BE 12".
5. THE DISTANCE BETWEEN THE EDGE OF THE "ENTERING TRAFFIC" SIGN AND EDGE OF THE "WHEN FLASHING" PLAQUE SHALL BE ≤ 3 ".
6. THE PEDESTAL AND PEDESTAL BASE, SHOWN IN 8122, SHALL BE MADE OF ALUMINUM.

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

Victor K. Lund
TYPED NAME

SIGNATURE

DATE
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LIC. NO.

REVISIONS

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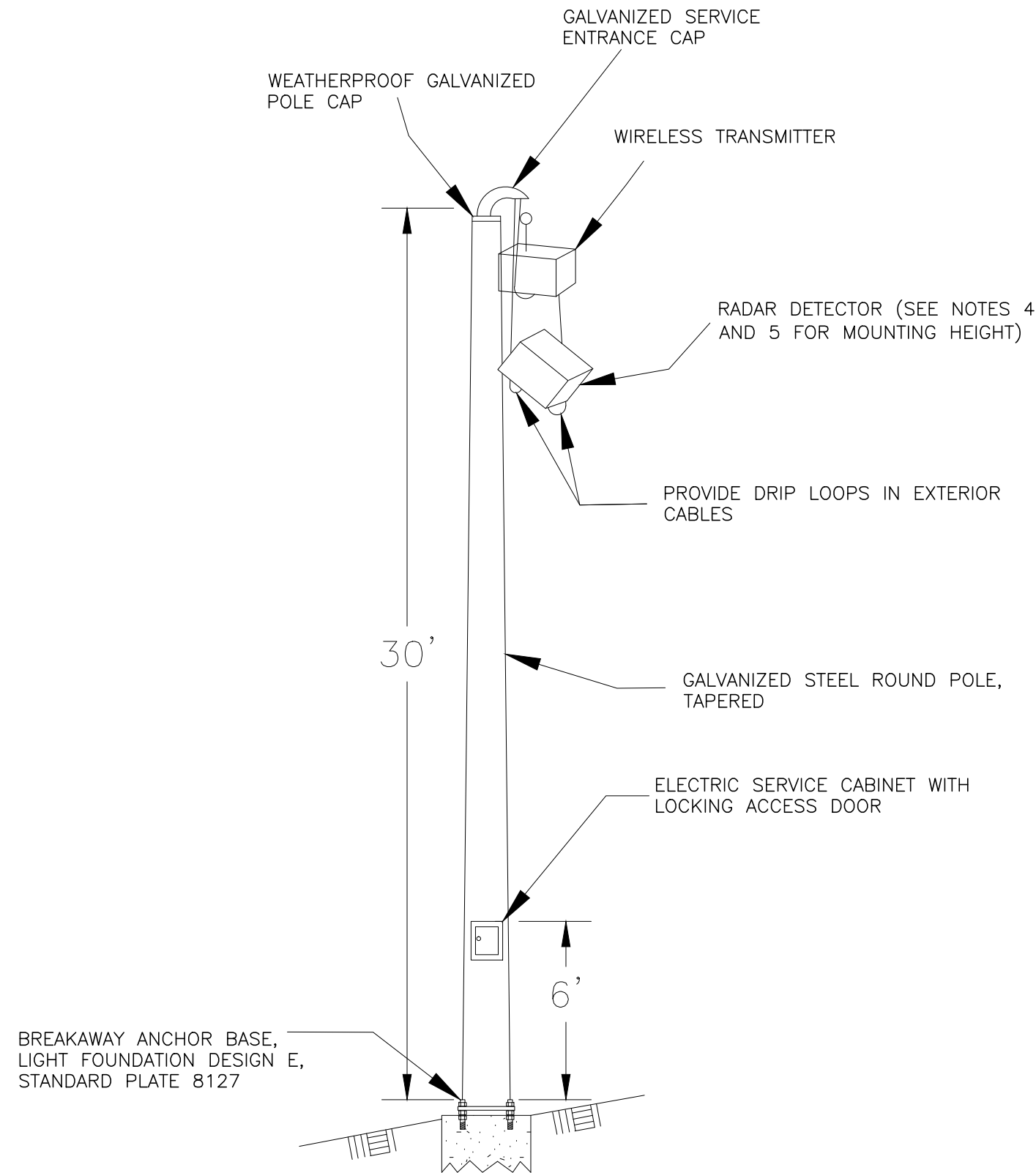
WARNING SIGN ASSEMBLY DETAILS

S.P. 8821-270 SHEET 3 OF 16 SHEETS

VEHICLE DETECTOR POLE

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND SECURE ELECTRIC SERVICE WITH THE POWER COMPANY.
2. THE STEEL POLE SHALL BE GALVANIZED BY THE MANUFACTURER.
3. THE ANCHOR BASE SHALL BE A BREAKAWAY DESIGN.
4. THE MINIMUM MOUNTING HEIGHT OF THE RADAR DETECTOR SHALL BE 15' ABOVE THE DETECTION AREA.
5. THE WIRELESS TRANSMITTER AND RADAR DETECTOR SHOULD BE MOUNTED WITHIN 3'-5' OF THE TOP OF THE POLE.
6. ELECTRICAL WIRING SHALL BE RUN INSIDE OF THE POLE.
7. THE RADAR DETECTOR SHALL WIRELESSLY COMMUNICATE WITH THE 12" LED BEACONS MOUNTED ON THE WARNING SIGN ASSEMBLIES.
8. THE VEHICLE DETECTION AREA IN ADVANCE OF THE STOP SIGN WILL BE DETERMINED BY THE PLACEMENT OF THE WARNING SIGNS ON THE MAJOR ROAD, AND NOT LESS THAN 10' DOWNSTREAM OF THE STOP SIGN. THE ENGINEER WILL COORDINATE WITH THE CONTRACTOR ON THE ADVANCE DETECTION DISTANCE.
9. THERE ARE TWO VEHICLE DETECTOR POLES PER SYSTEM. ONLY ONE POLE PER SYSTEM HAS AN ELECTRICAL SERVICE CABINET. SEE EACH SYSTEM PLAN SHEET FOR WHICH POLE HAS THE ELECTRICAL SERVICE CABINET.
10. THE BEACONS SHALL FLASH CONTINUOUSLY IF THE COMMUNICATION FAILS BETWEEN THE WIRELESS TRANSMITTER AND BEACONS. IF COMMUNICATIONS ARE RESTORED FOLLOWING AN INTERRUPTION, THE BEACONS SHALL RESUME NORMAL FUNCTION.
11. A DATA LOGGER SHALL BE INSTALLED IN A WATERPROOF ENCLOSURE TO ELECTRONICALLY RECORD OPERATIONS OF THE RADAR DETECTOR AND WIRELESS TRANSMITTER. IF A USB INTERFACE CABLE IS USED TO TRANSFER DOWNLOADABLE DATA, THE CABLE(S) SHALL BE RUN INSIDE THE POLE AND TERMINATED INSIDE THE ELECTRICAL SERVICE CABINET. IF MULTIPLE USB INTERFACE CABLES ARE USED, THE TERMINATIONS SHALL BE LABELED INSIDE THE ELECTRICAL SERVICE CABINET TO IDENTIFY WHICH DATA LOGGER AND DEVICE THE CABLES ARE CONNECTED TO.
12. SECURE WIRES BETWEEN SERVICE ENTRANCE CAP AND EXTERNAL DEVICES TO THE POLE AS DIRECTED BY THE ENGINEER.
13. WIRES SHALL BE TERMINATED AT THE ELECTRIC SERVICE CABINET AND DEVICES ONLY.
14. THE ELECTRIC SERVICE CABINET SHALL HAVE ONE (1) 30 AMP, 2-POLE MAIN CIRCUIT BREAKER, AND FOUR (4) 15 AMP BRANCH BREAKERS. EACH DEVICE ON THE VEHICLE DETECTOR POLES WILL BE SERVICED BY ITS OWN BRANCH BREAKER.
15. TWO (2) 1.5" DIAMETER HUBS, WITH A RUBBER GROMMET TO PROTECT THE WIRES, SHALL BE DRILLED AND WELDED ONTO THE POLE BEHIND THE ELECTRIC SERVICE CABINET. THE CONNECTION OF THE ELECTRIC SERVICE CABINET TO THE HUBS SHALL BE MADE BY A THREADED NIPPLE AND BE SEALED TO PROTECT FROM WATER PENETRATION.
16. THE ELECTRIC SERVICE CABINET SHALL BE FASTENED TO THE POLE WITH THREE (3) STAINLESS STEEL BANDS.
17. THE WIRES FROM THE SOURCE OF POWER SHALL BE RUN INSIDE A CONDUIT WHICH IS RUN BETWEEN THE POLE FOUNDATION AND ONE OF THE HUBS. THE INTENT IS TO PROTECT THE CONDUCTORS FROM CONTACTING THE POLE.



NOTE : DRAWING NOT TO SCALE

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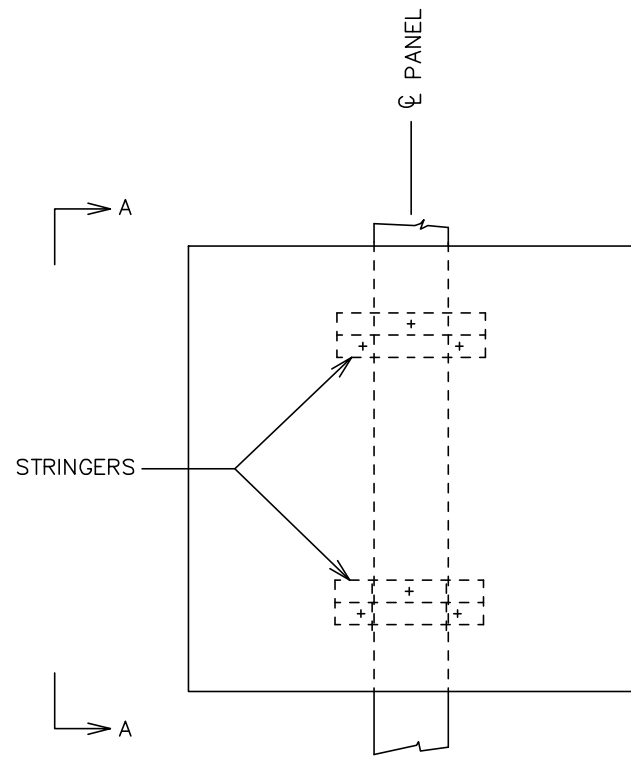
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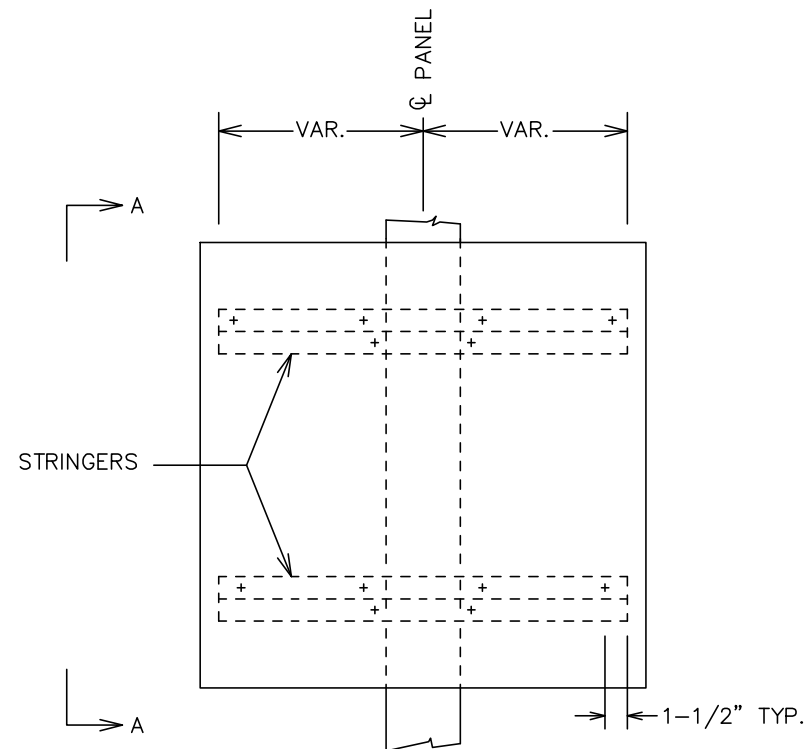
VEHICLE DETECTOR POLE DETAILS

S.P. 8821-270 SHEET 4 OF 16 SHEETS

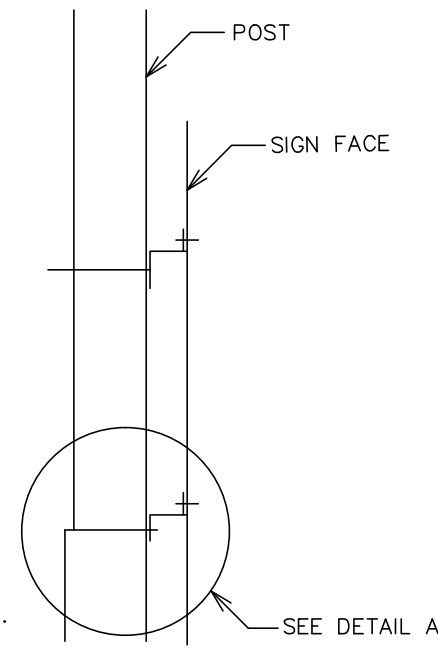
SIGN MOUNTING BRACKET



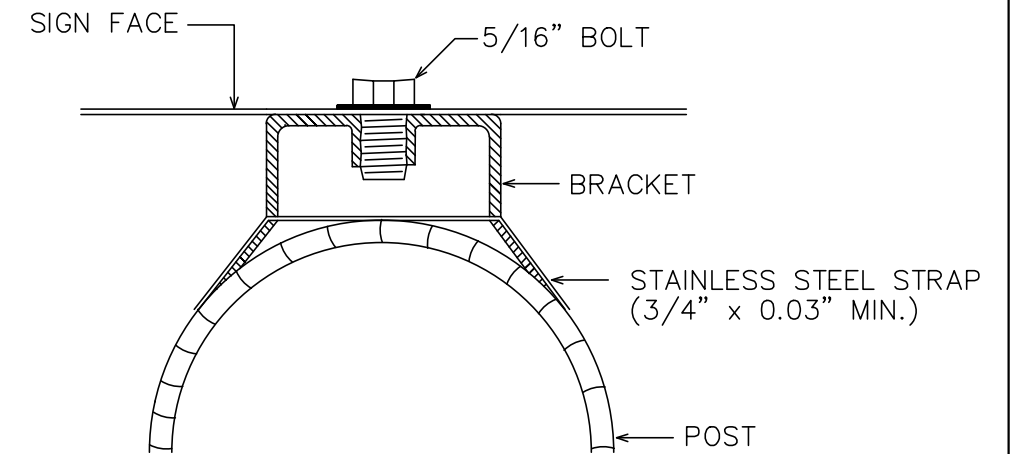
SINGLE POST PUNCHING
ELEVATION



2-POST PUNCHING
ELEVATION

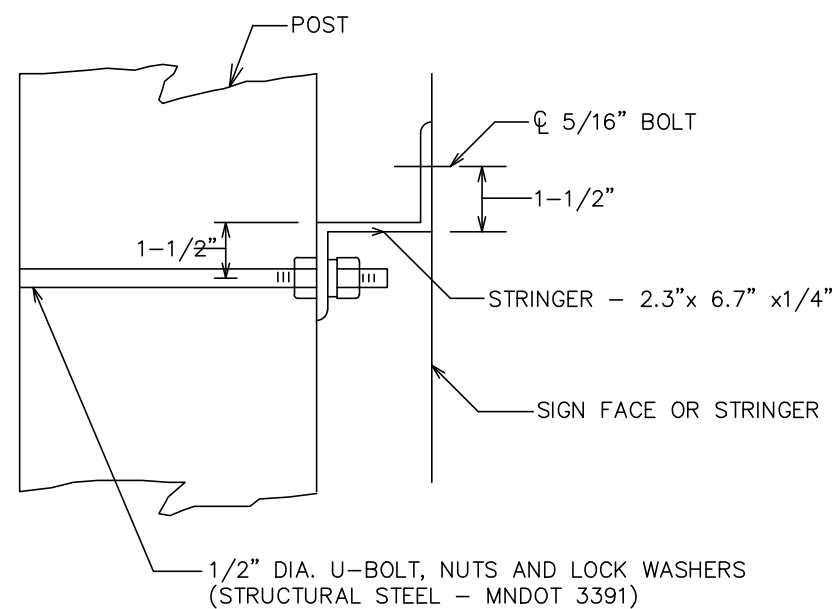


VIEW A-A

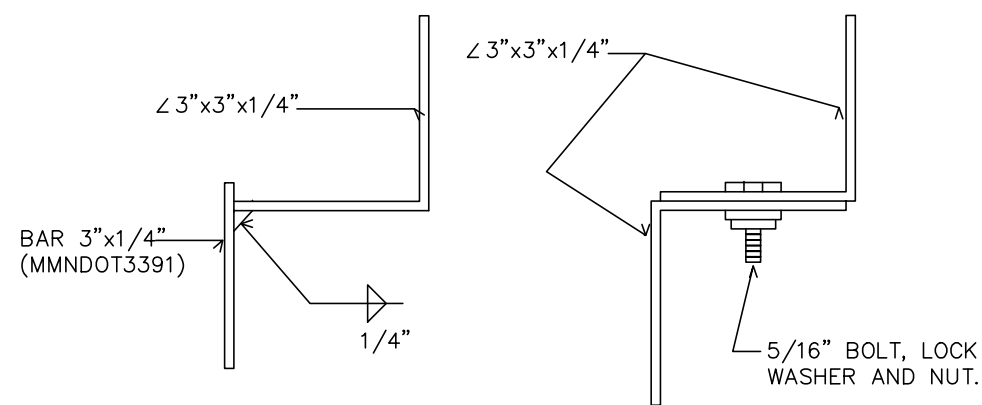


GALVANIZED OR STAINLESS
STEEL BRACKET, BOLT AND
WASHER.

STRAP MOUNTING DETAIL FOR
OVERHEAD IDENTIFICATION AND
LIGHTING SYSTEM IDENTIFICATION PLATES



DETAIL A



DETAIL A STRINGER ALTERNATES

NOTES:

1. FOR DETAILS AND NOTES NOT SHOWN SEE "C" & "D" SIGN DETAILS.
2. FOR BACK TO BACK MOUNTINGS, ROTATE STRINGERS FOR ONE PANEL 180° FROM WHAT IS SHOWN SUCH THAT PANELS CAN BE MOUNTED AT SAME ELEVATION.
3. DETAIL A STRINGER MAY BE ONE OF THE THREE DESIGNS DETAILED OR AN APPROVED EQUAL. STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH MNDOT 3306 AND GALVANIZED IN ACCORDANCE WITH MNDOT 3394. FASTENERS SHALL BE IN ACCORDANCE WITH MNDOT 3391.2B AND SHALL BE GALVANIZED EITHER BY THE HOT-DIP PROCESS IN ACCORDANCE WITH ASTM A153, OR BY THE MECHANICAL PROCESS IN ACCORDANCE WITH ASTM B695, CLASS 50 OR GREATER.

SIGN TYPE C AND D STRUCTURAL
STEEL MOUNTING SYSTEM
FOR ROUND SUPPORTS

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

SIGNATURE

Victor K. Lund
TYPED NAME

DATE
48160
LIC. NO.

REVISIONS

S.P. 069-070-017

S.P. 8821-270

SHEET 5 OF 16 SHEETS

SIGN MOUNTING BRACKET DETAILS

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

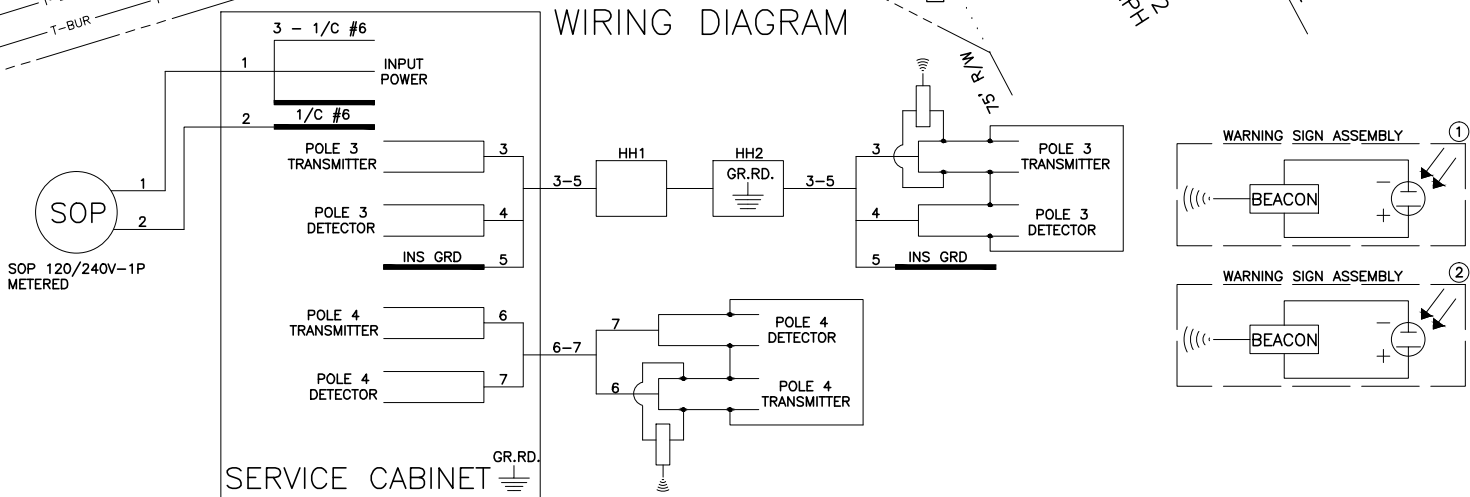
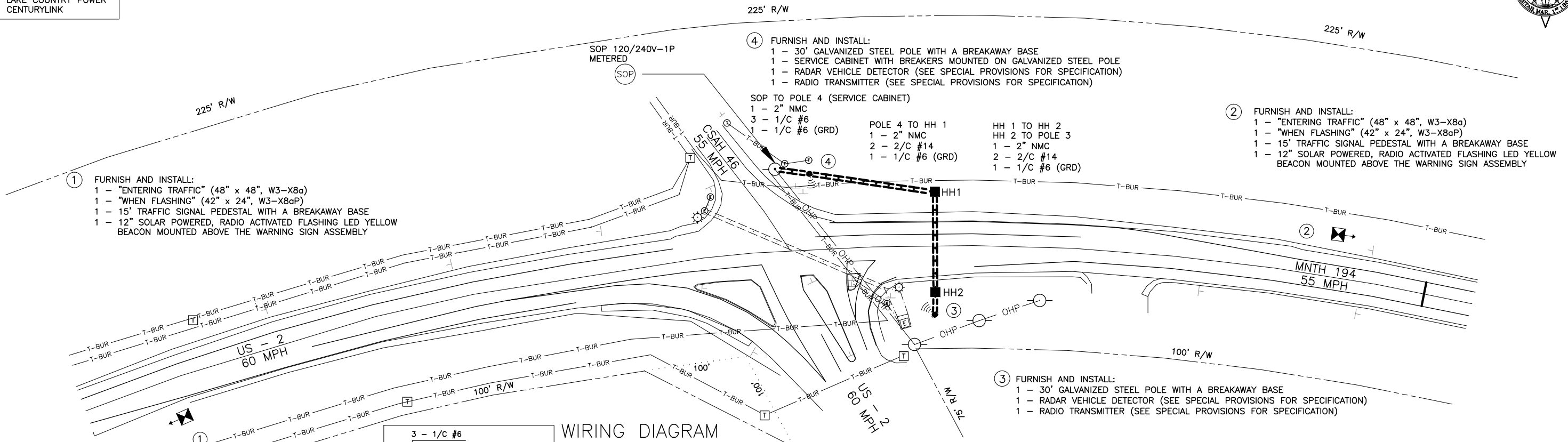
FLASHING BEACON SYSTEM A

INTERSECTION OF US-2 AND CSAH 46 (SAGINAW ROAD)



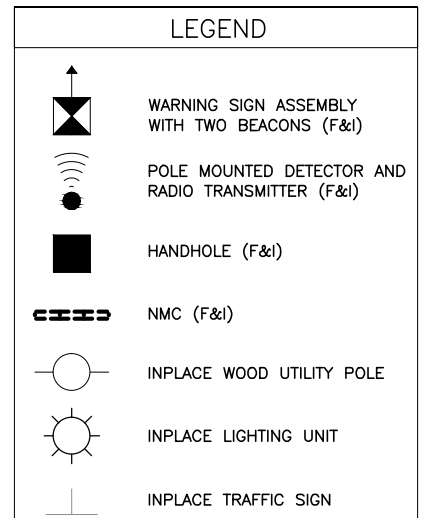
UTILITY COMPANIES

1. LAKE COUNTRY POWER
2. CENTURYLINK



NOTES:

1. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH LAKE COUNTRY POWER. THE SERVICE ADDRESS IS 7000 SAGINAW ROAD, SAGINAW, MN 55779.
2. THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
3. THE EXACT LOCATION OF THE TRAFFIC SIGNAL PEDESTALS, GALVANIZED STEEL POLES, AND HANDHOLE SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. MNDOT AND ST. LOUIS COUNTY WILL RELOCATE EXISTING TRAFFIC SIGNS AS NECESSARY. THE CONTRACTOR SHALL COORDINATE WITH AVAILABILITY OF THE SIGN CREWS.
5. THE CONTRACTOR SHALL DIRECTIONAL DRILL THE CONDUIT UNDER THE ROADWAY.
6. ALL CONDUIT SHALL BE NMC - SCHEDULE 80 OR HDPE SCHEDULE 80. SEE THE SPECIAL PROVISIONS.
7. SEE SHEET 3 FOR THE DETAIL OF THE WARNING SIGN ASSEMBLY.
8. SEE SHEET 4 FOR A DETAIL OF THE VEHICLE DETECTOR POLE.
9. THE CONTROL LOGIC OF THE MAINLINE DYNAMIC WARNING SYSTEM SHALL MEET THE FOLLOWING REQUIREMENTS:
 - 9.1. A VEHICLE IS DETECTED ON A MINOR APPROACH (THE DETECTED VEHICLE MAY BE APPROACHING A STOP LINE, STOPPED AT A STOP LINE, OR BEGINNING TO ENTER THE INTERSECTION). → SIMULTANEOUSLY AND IMMEDIATELY ACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL FLASH CONTINUOUSLY AS LONG AS A VEHICLE IS DETECTED ON A MINOR APPROACH).
 - 9.2. NO VEHICLE IS DETECTED ON A MINOR APPROACH. → DEACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL NOT FLASH AS LONG AS NO VEHICLE IS DETECTED ON A MINOR APPROACH).



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Victor K. Lund
TYPED NAME

DATE
48160
REG. NO.

REVISIONS

S.P. 069-070-017

PLAN SHEETS

S.P. 8821-270

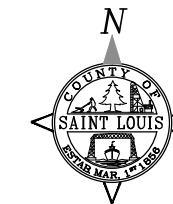
SHEET 6 OF 16 SHEETS

SIGNATURE

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

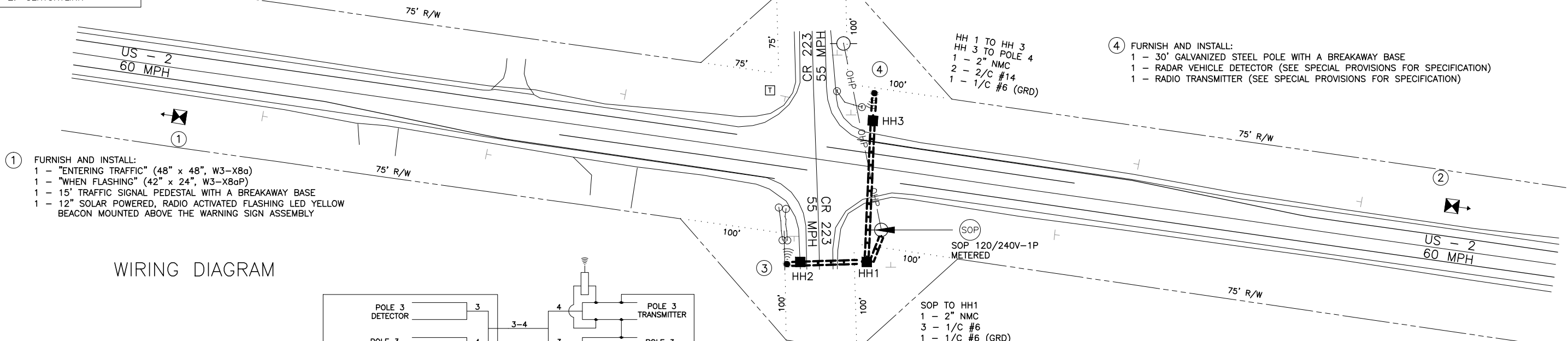
FLASHING BEACON SYSTEM B

INTERSECTION OF US-2 AND CR 223 (MUNGER SHAW ROAD)



UTILITY COMPANIES

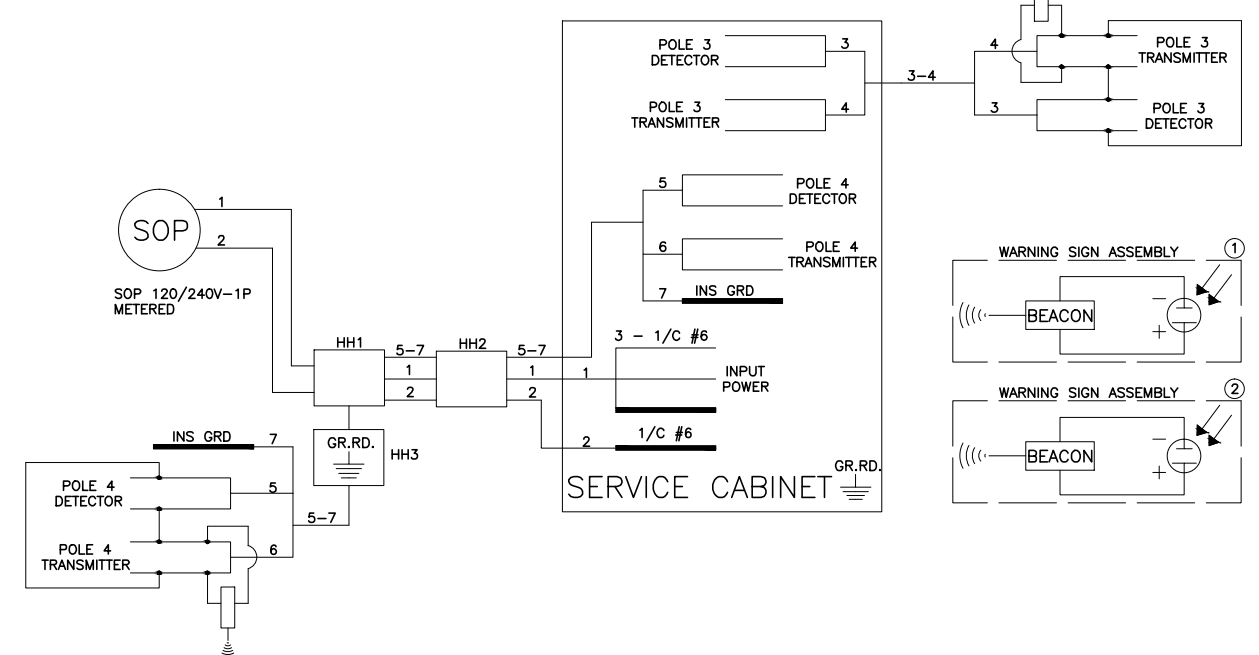
1. MINNESOTA POWER
2. CENTURYLINK



- ① FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

- ④ FURNISH AND INSTALL:
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

WIRING DIAGRAM



- HH 1 TO HH 2
HH 2 TO POLE 3 (SERVICE CABINET)
- 2 - 2" NMC
 - RSC-A
 - 3 - 1/C #6
 - 1 - 1/C #6 (GRD)
 - NMC - B
 - 2 - 2/C #14
 - 1 - 1/C #6 (GRD)

- ③ FURNISH AND INSTALL:
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- ② FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY



LEGEND	
	WARNING SIGN ASSEMBLY WITH TWO BEACONS (F&I)
	POLE MOUNTED DETECTOR AND RADIO TRANSMITTER (F&I)
	HANDHOLE (F&I)
	NMC (F&I)
	INPLACE WOOD UTILITY POLE
	INPLACE LIGHTING UNIT
	INPLACE TRAFFIC SIGN

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH MINNESOTA POWER. THE SERVICE ADDRESS IS 6300 HWY 2, CLOQUET, MN 55720.
2. THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
3. THE EXACT LOCATION OF THE TRAFFIC SIGNAL PEDESTALS, GALVANIZED STEEL POLES, AND HANDHOLE SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. MNDOT AND ST. LOUIS COUNTY WILL RELOCATE EXISTING TRAFFIC SIGNS AS NECESSARY. THE CONTRACTOR SHALL COORDINATE WITH AVAILABILITY OF THE SIGN CREWS.
5. THE CONTRACTOR SHALL DIRECTIONAL DRILL THE CONDUIT UNDER THE ROADWAY.
6. ALL CONDUIT SHALL BE NMC - SCHEDULE 80 OR HDPE SCHEDULE 80. SEE THE SPECIAL PROVISIONS.
7. SEE SHEET 3 FOR THE DETAIL OF THE WARNING SIGN ASSEMBLY.
8. SEE SHEET 4 FOR A DETAIL OF THE VEHICLE DETECTOR POLE.
9. THE CONTROL LOGIC OF THE MAINLINE DYNAMIC WARNING SYSTEM SHALL MEET THE FOLLOWING REQUIREMENTS:
 - 9.1. A VEHICLE IS DETECTED ON A MINOR APPROACH (THE DETECTED VEHICLE MAY BE APPROACHING A STOP LINE, STOPPED AT A STOP LINE, OR BEGINNING TO ENTER THE INTERSECTION). → SIMULTANEOUSLY AND IMMEDIATELY ACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL FLASH CONTINUOUSLY AS LONG AS A VEHICLE IS DETECTED ON A MINOR APPROACH).
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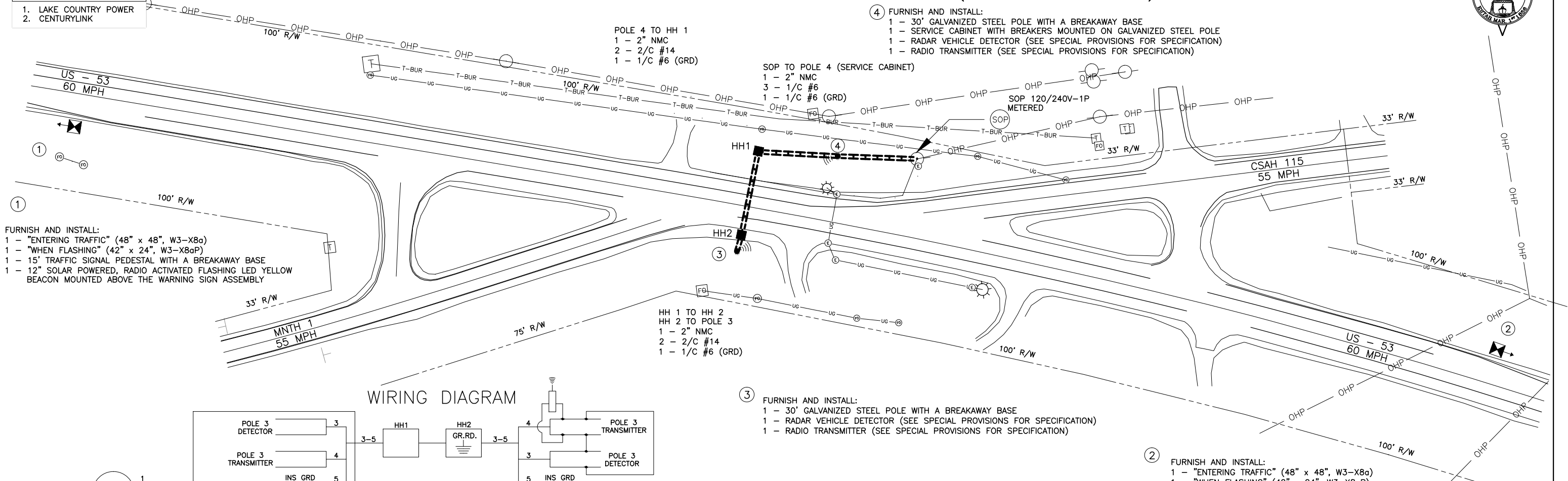
FLASHING BEACON SYSTEM C

INTERSECTION OF US-53 AND CSAH 115 (ASHAWA ROAD)



UTILITY COMPANIES

- LAKE COUNTRY POWER
- CENTURYLINK



- FURNISH AND INSTALL:**
- "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

- POLE 4 TO HH 1**
- 2" NMC
 - 2/C #14
 - 1/C #6 (GRD)

- SOP TO POLE 4 (SERVICE CABINET)**
- 2" NMC
 - 1/C #6
 - 1/C #6 (GRD)

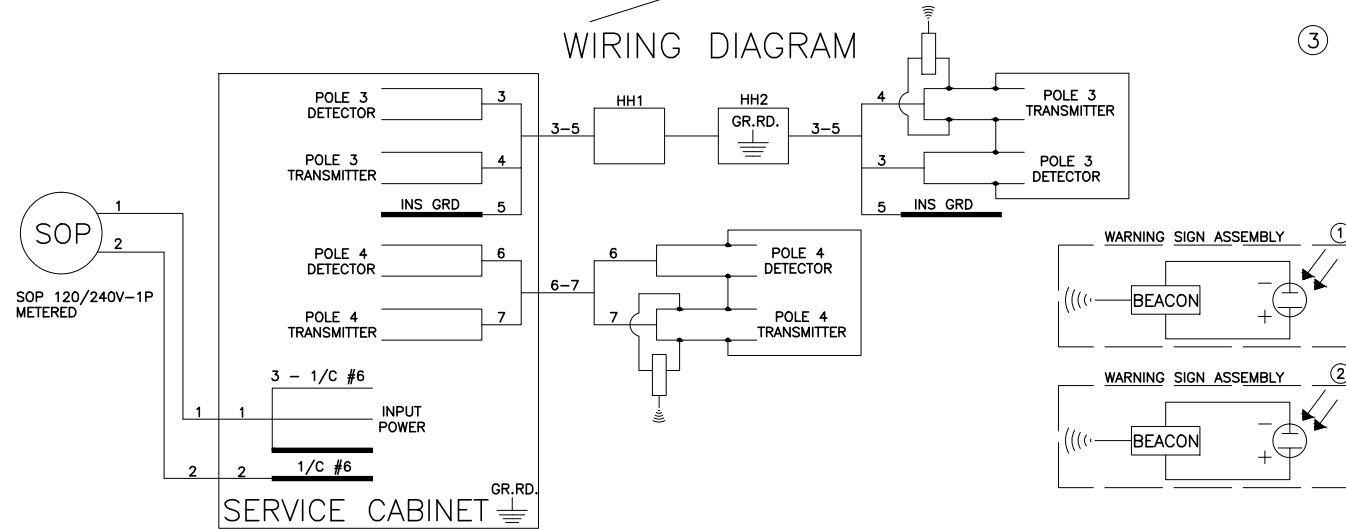
- FURNISH AND INSTALL:**
- 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- HH 1 TO HH 2**
- HH 2 TO POLE 3**
- 2" NMC
 - 2/C #14
 - 1/C #6 (GRD)

- FURNISH AND INSTALL:**
- 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- FURNISH AND INSTALL:**
- "ENTERING TRAFFIC" (48" x 48", W3-X8a)
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 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

WIRING DIAGRAM



NOTES:

- THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH LAKE COUNTRY POWER. THE SERVICE ADDRESS IS 1900 HWY 53, COOK, MN 55723.
- THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
- THE EXACT LOCATION OF THE TRAFFIC SIGNAL PEDESTALS, GALVANIZED STEEL POLES, AND HANDHOLE SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
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- THE CONTRACTOR SHALL DIRECTIONAL DRILL THE CONDUIT UNDER THE ROADWAY.
- ALL CONDUIT SHALL BE NMC - SCHEDULE 80 OR HDPE SCHEDULE 80. SEE THE SPECIAL PROVISIONS.
- SEE SHEET 3 FOR THE DETAIL OF THE WARNING SIGN ASSEMBLY.
- SEE SHEET 4 FOR A DETAIL OF THE VEHICLE DETECTOR POLE.
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LEGEND	
	WARNING SIGN ASSEMBLY WITH TWO BEACONS (F&I)
	POLE MOUNTED DETECTOR AND RADIO TRANSMITTER (F&I)
	HANDHOLE (F&I)
	NMC (F&I)
	INPLACE WOOD UTILITY POLE
	INPLACE LIGHTING UNIT
	INPLACE TRAFFIC SIGN

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

SIGNATURE

Victor K. Lund
TYPED NAME

DATE
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REG. NO.

REVISIONS

S.P. 069-070-017

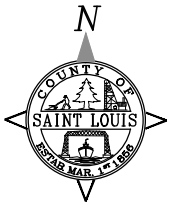
PLAN SHEETS

S.P. 8821-270 SHEET 8 OF 16 SHEETS

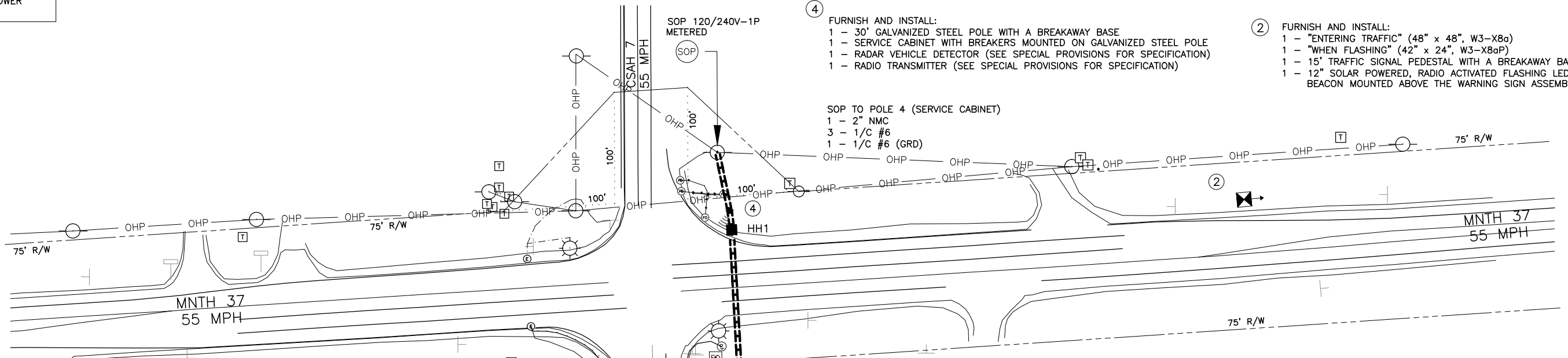
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FLASHING BEACON SYSTEM D

INTERSECTION OF MNTH-37 AND CSAH 7 (HIGHWAY 7)



- UTILITY COMPANIES**
- MINNESOTA POWER
 - CENTURYLINK



- ① FURNISH AND INSTALL:**
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

- ③ FURNISH AND INSTALL:**
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- ④ FURNISH AND INSTALL:**
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

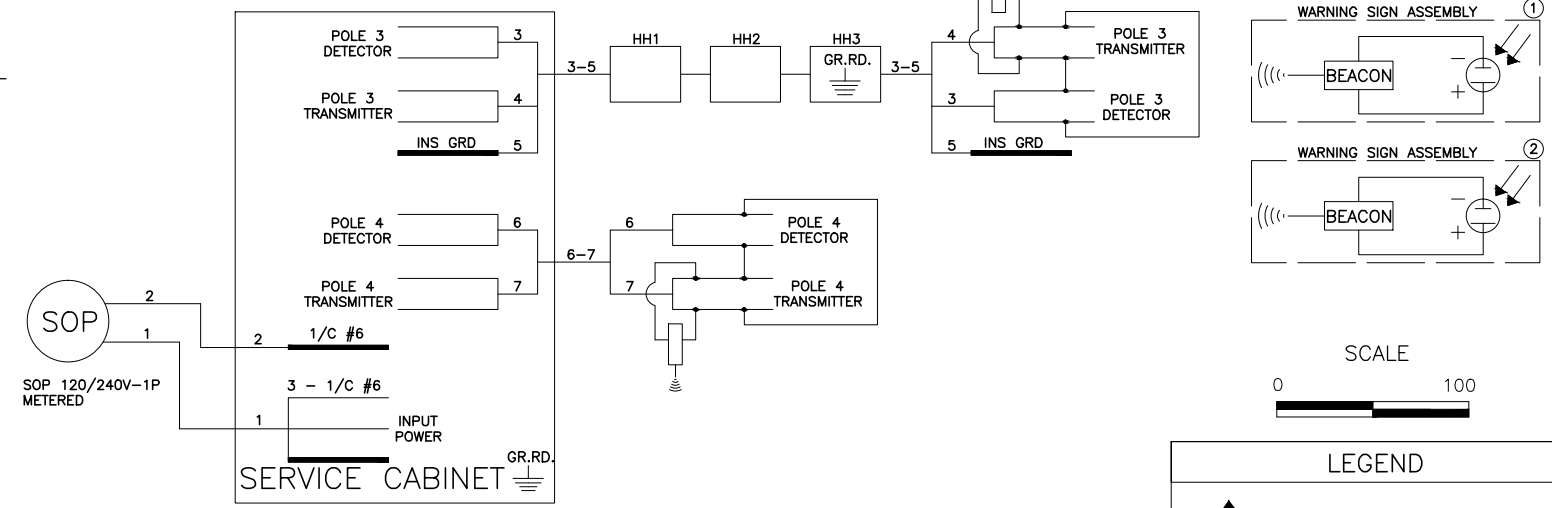
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 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

- SOP TO POLE 4 (SERVICE CABINET)**
- 1 - 2" NMC
 - 3 - 1/C #6
 - 1 - 1/C #6 (GRD)

- HH 2 TO HH 3
HH 3 TO POLE 3**
- 1 - 2" NMC
 - 2 - 2/C #14
 - 1 - 1/C #6 (GRD)

- POLE 4 TO HH 1
HH 1 TO HH 2**
- 1 - 2" NMC
 - 2 - 2/C #14
 - 1 - 1/C #6 (GRD)

WIRING DIAGRAM



LEGEND	
	WARNING SIGN ASSEMBLY WITH TWO BEACONS (F&I)
	POLE MOUNTED DETECTOR AND RADIO TRANSMITTER (F&I)
	HANDHOLE (F&I)
	NMC (F&I)
	INPLACE WOOD UTILITY POLE
	INPLACE LIGHTING UNIT
	INPLACE TRAFFIC SIGN

- NOTES:**
- THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH MINNESOTA POWER. THE SERVICE ADDRESS IS 8700 HWY 37, IRON, MN 55751.
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SIGNATURE: Victor K. Lund
TYPED NAME: Victor K. Lund

DATE: 48160
REG. NO.: 48160

REVISIONS

S.P. 069-070-017

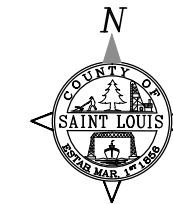
PLAN SHEETS

S.P. 8821-270 SHEET 9 OF 16 SHEETS

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FLASHING BEACON SYSTEM E

INTERSECTION OF MNTH-37 AND CSAH 25 (HIGHWAY 25 WEST)



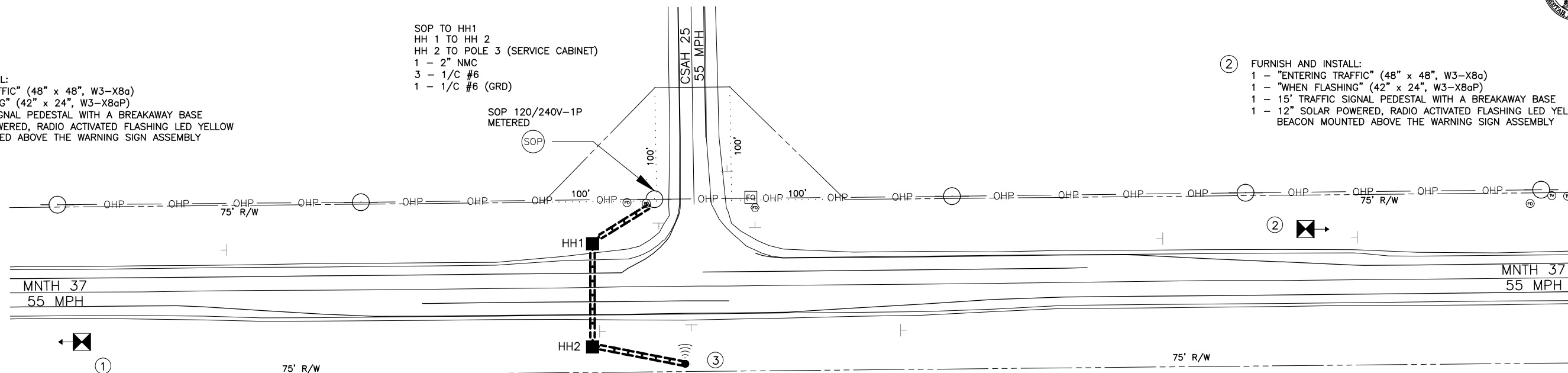
UTILITY COMPANIES

1. LAKE COUNTRY POWER
2. CENTURYLINK

- ① FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

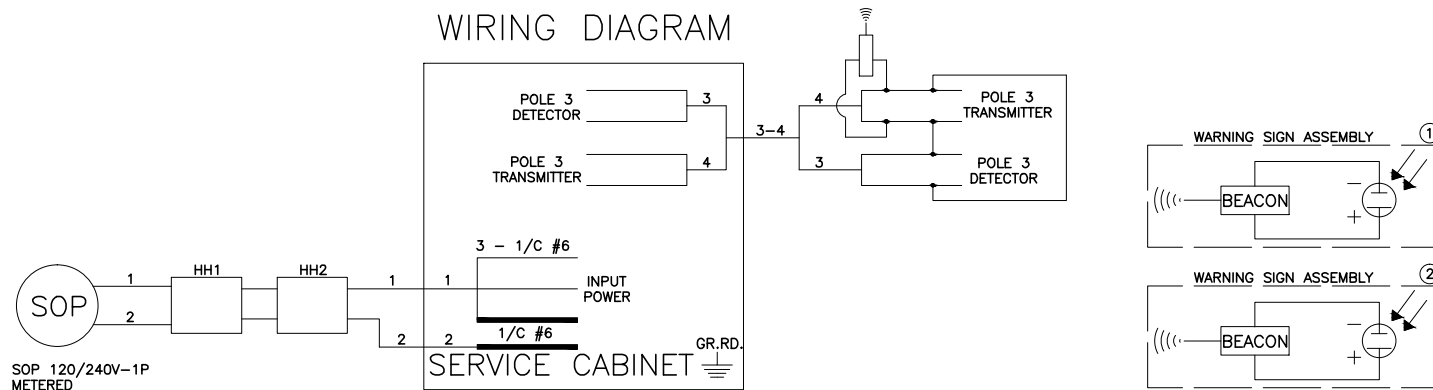
- SOP TO HH1
 HH 1 TO HH 2
 HH 2 TO POLE 3 (SERVICE CABINET)
- 1 - 2" NMC
 - 3 - 1/C #6
 - 1 - 1/C #6 (GRD)

- ② FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
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- ③ FURNISH AND INSTALL:
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

WIRING DIAGRAM



LEGEND

- WARNING SIGN ASSEMBLY WITH TWO BEACONS (F&I)
- POLE MOUNTED DETECTOR AND RADIO TRANSMITTER (F&I)
- HANDHOLE (F&I)
- NMC (F&I)
- INPLACE WOOD UTILITY POLE
- INPLACE LIGHTING UNIT
- INPLACE TRAFFIC SIGN

NOTES:

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Victor K. Lund
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 REG. NO.

REVISIONS

S.P. 069-070-017

PLAN SHEETS

S.P. 8821-270

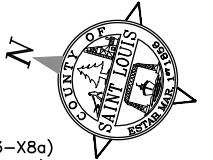
SHEET 10 OF 16 SHEETS

SIGNATURE

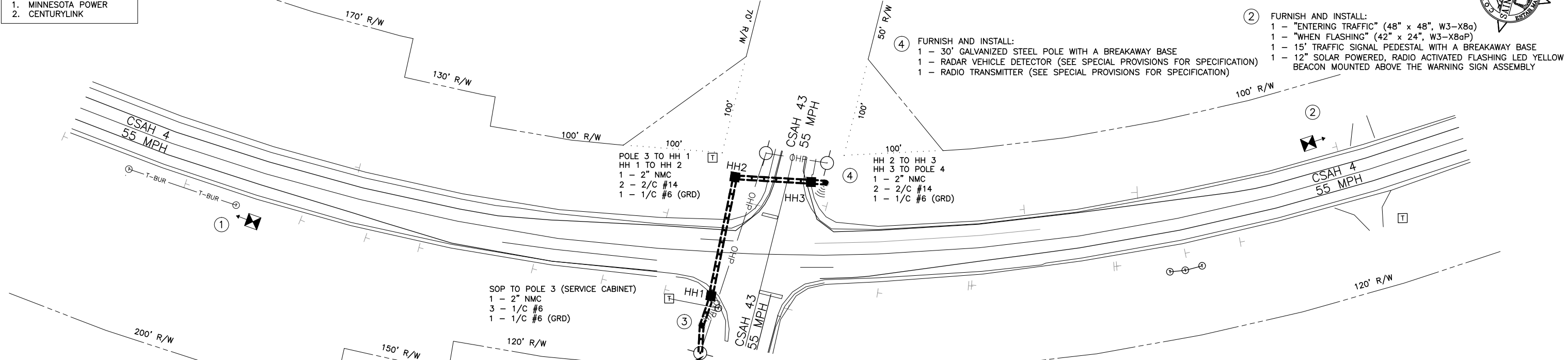
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FLASHING BEACON SYSTEM F

INTERSECTION OF CSAH 4 (RICE LAKE ROAD) AND CSAH 43 (EMERSON ROAD)



- UTILITY COMPANIES**
- MINNESOTA POWER
 - CENTURYLINK



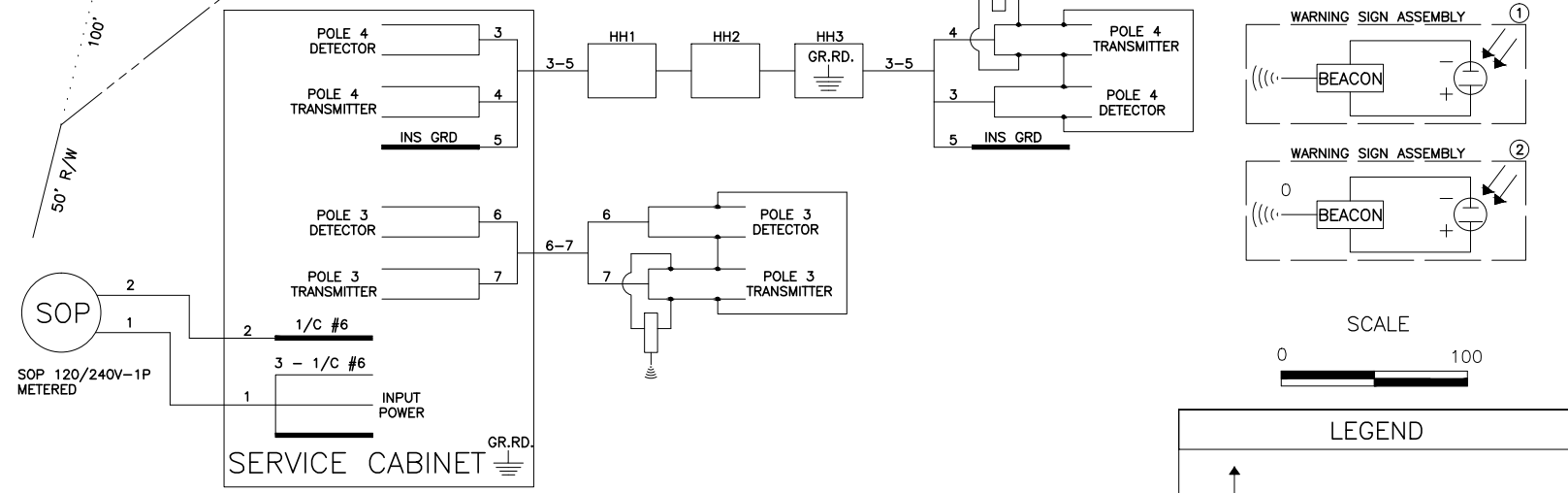
- ① FURNISH AND INSTALL:**
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 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

- ③ FURNISH AND INSTALL:**
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- ④ FURNISH AND INSTALL:**
- 1 - 30' GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
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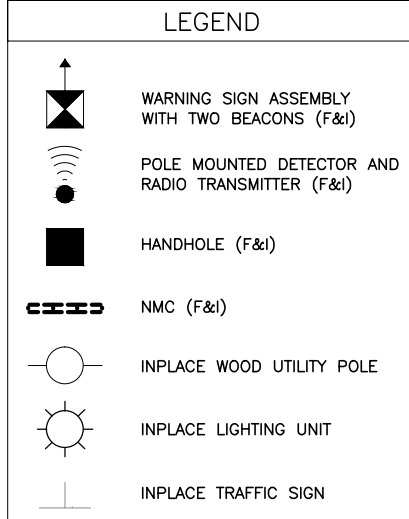
- ② FURNISH AND INSTALL:**
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WIRING DIAGRAM



NOTES:

- THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH MINNESOTA POWER. THE SERVICE ADDRESS IS 6100 RICE LAKE ROAD, DULUTH, MN 55803.
- THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
- THE EXACT LOCATION OF THE TRAFFIC SIGNAL PEDESTALS, GALVANIZED STEEL POLES, AND HANDHOLE SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
- MNDOT AND ST. LOUIS COUNTY WILL RELOCATE EXISTING TRAFFIC SIGNS AS NECESSARY. THE CONTRACTOR SHALL COORDINATE WITH AVAILABILITY OF THE SIGN CREWS.
- THE CONTRACTOR SHALL DIRECTIONAL DRILL THE CONDUIT UNDER THE ROADWAY.
- ALL CONDUIT SHALL BE NMC - SCHEDULE 80 OR HDPE SCHEDULE 80. SEE THE SPECIAL PROVISIONS.
- SEE SHEET 3 FOR THE DETAIL OF THE WARNING SIGN ASSEMBLY.
- SEE SHEET 4 FOR A DETAIL OF THE VEHICLE DETECTOR POLE.
- THE CONTROL LOGIC OF THE MAINLINE DYNAMIC WARNING SYSTEM SHALL MEET THE FOLLOWING REQUIREMENTS:
 - A VEHICLE IS DETECTED ON A MINOR APPROACH (THE DETECTED VEHICLE MAY BE APPROACHING A STOP LINE, STOPPED AT A STOP LINE, OR BEGINNING TO ENTER THE INTERSECTION). → SIMULTANEOUSLY AND IMMEDIATELY ACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL FLASH CONTINUOUSLY AS LONG AS A VEHICLE IS DETECTED ON A MINOR APPROACH).
 - NO VEHICLE IS DETECTED ON A MINOR APPROACH. → DEACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL NOT FLASH AS LONG AS NO VEHICLE IS DETECTED ON A MINOR APPROACH).



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

SIGNATURE

Victor K. Lund
TYPED NAME

DATE
48160

REG. NO.
REG. NO.

REVISIONS

S.P. 069-070-017

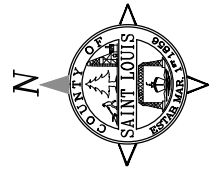
PLAN SHEETS

S.P. 8821-270 SHEET 11 OF 16 SHEETS

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINE FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

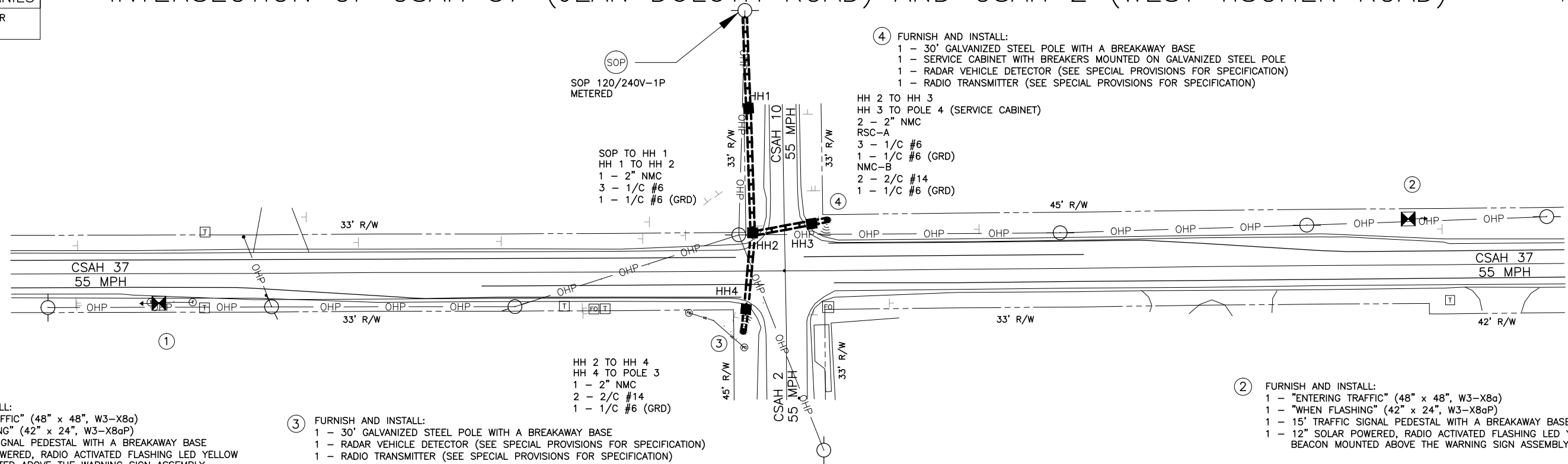
FLASHING BEACON SYSTEM G

INTERSECTION OF CSAH 37 (JEAN DULUTH ROAD) AND CSAH 2 (WEST TISCHER ROAD)



UTILITY COMPANIES

1. MINNESOTA POWER
2. CENTURYLINK

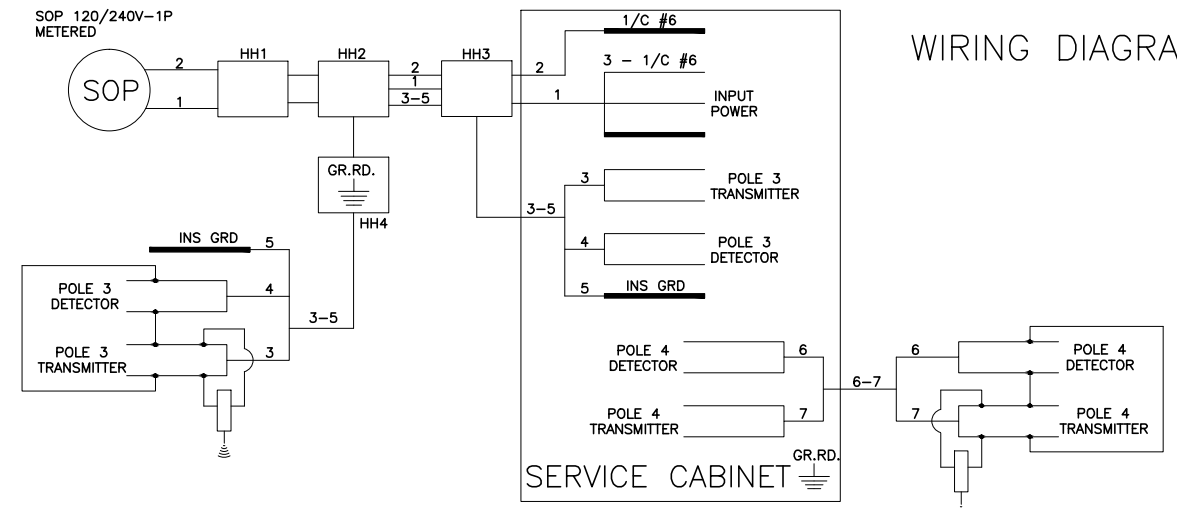


- ① FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY

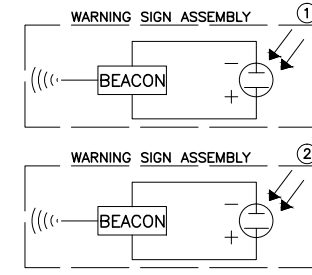
- ③ FURNISH AND INSTALL:
- 1 - 30" GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- ④ FURNISH AND INSTALL:
- 1 - 30" GALVANIZED STEEL POLE WITH A BREAKAWAY BASE
 - 1 - SERVICE CABINET WITH BREAKERS MOUNTED ON GALVANIZED STEEL POLE
 - 1 - RADAR VEHICLE DETECTOR (SEE SPECIAL PROVISIONS FOR SPECIFICATION)
 - 1 - RADIO TRANSMITTER (SEE SPECIAL PROVISIONS FOR SPECIFICATION)

- ② FURNISH AND INSTALL:
- 1 - "ENTERING TRAFFIC" (48" x 48", W3-X8a)
 - 1 - "WHEN FLASHING" (42" x 24", W3-X8aP)
 - 1 - 15' TRAFFIC SIGNAL PEDESTAL WITH A BREAKAWAY BASE
 - 1 - 12" SOLAR POWERED, RADIO ACTIVATED FLASHING LED YELLOW BEACON MOUNTED ABOVE THE WARNING SIGN ASSEMBLY



WIRING DIAGRAM



LEGEND	
	WARNING SIGN ASSEMBLY WITH TWO BEACONS (F&I)
	POLE MOUNTED DETECTOR AND RADIO TRANSMITTER (F&I)
	HANDHOLE (F&I)
	NMC (F&I)
	INPLACE WOOD UTILITY POLE
	INPLACE LIGHTING UNIT
	INPLACE TRAFFIC SIGN

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE AND COMPLETE THE POWER CONNECTIONS WITH MINNESOTA POWER. THE SERVICE ADDRESS IS 5100 JEAN DULUTH ROAD, DULUTH, MN 55803.
2. THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
3. THE EXACT LOCATION OF THE TRAFFIC SIGNAL PEDESTALS, GALVANIZED STEEL POLES, AND HANDHOLE SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
4. MNDOT AND ST. LOUIS COUNTY WILL RELOCATE EXISTING TRAFFIC SIGNS AS NECESSARY. THE CONTRACTOR SHALL COORDINATE WITH AVAILABILITY OF THE SIGN CREWS.
5. THE CONTRACTOR SHALL DIRECTIONAL DRILL THE CONDUIT UNDER THE ROADWAY.
6. ALL CONDUIT SHALL BE NMC - SCHEDULE 80 OR HDPE SCHEDULE 80. SEE THE SPECIAL PROVISIONS.
7. SEE SHEET 3 FOR THE DETAIL OF THE WARNING SIGN ASSEMBLY.
8. SEE SHEET 4 FOR A DETAIL OF THE VEHICLE DETECTOR POLE.
9. THE CONTROL LOGIC OF THE MAINLINE DYNAMIC WARNING SYSTEM SHALL MEET THE FOLLOWING REQUIREMENTS:
 - 9.1. A VEHICLE IS DETECTED ON A MINOR APPROACH (THE DETECTED VEHICLE MAY BE APPROACHING A STOP LINE, STOPPED AT A STOP LINE, OR BEGINNING TO ENTER THE INTERSECTION). → SIMULTANEOUSLY AND IMMEDIATELY ACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL FLASH CONTINUOUSLY AS LONG AS A VEHICLE IS DETECTED ON A MINOR APPROACH).
 - 9.2. NO VEHICLE IS DETECTED ON A MINOR APPROACH. → DEACTIVATE THE BEACONS ON BOTH MAINLINE DYNAMIC WARNING SIGN ASSEMBLIES (THE BEACONS SHALL NOT FLASH AS LONG AS NO VEHICLE IS DETECTED ON A MINOR APPROACH).

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

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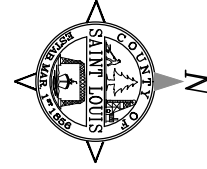
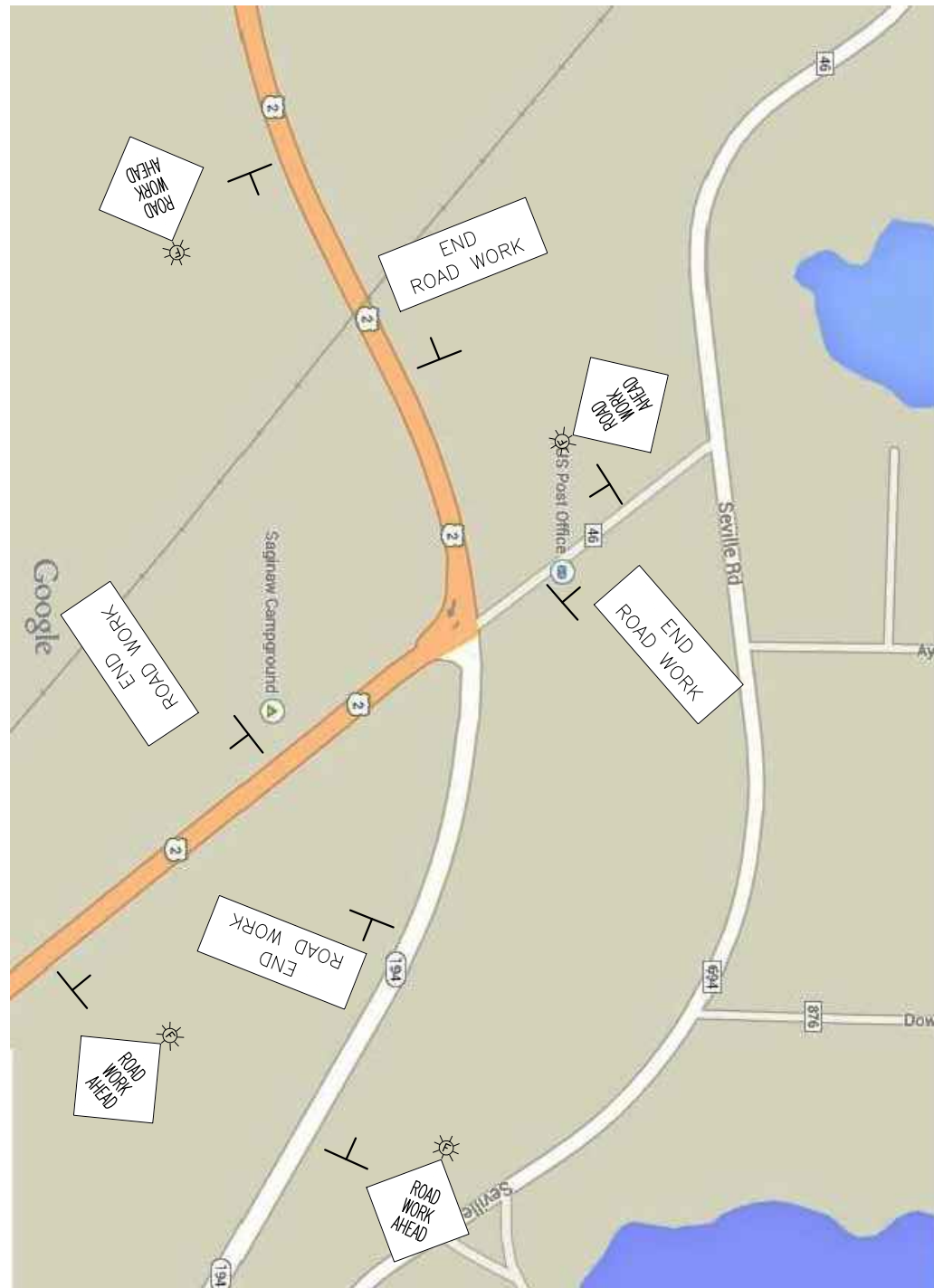
REVISIONS

S.P. 069-070-017

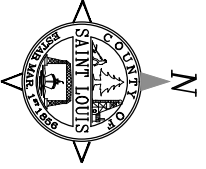
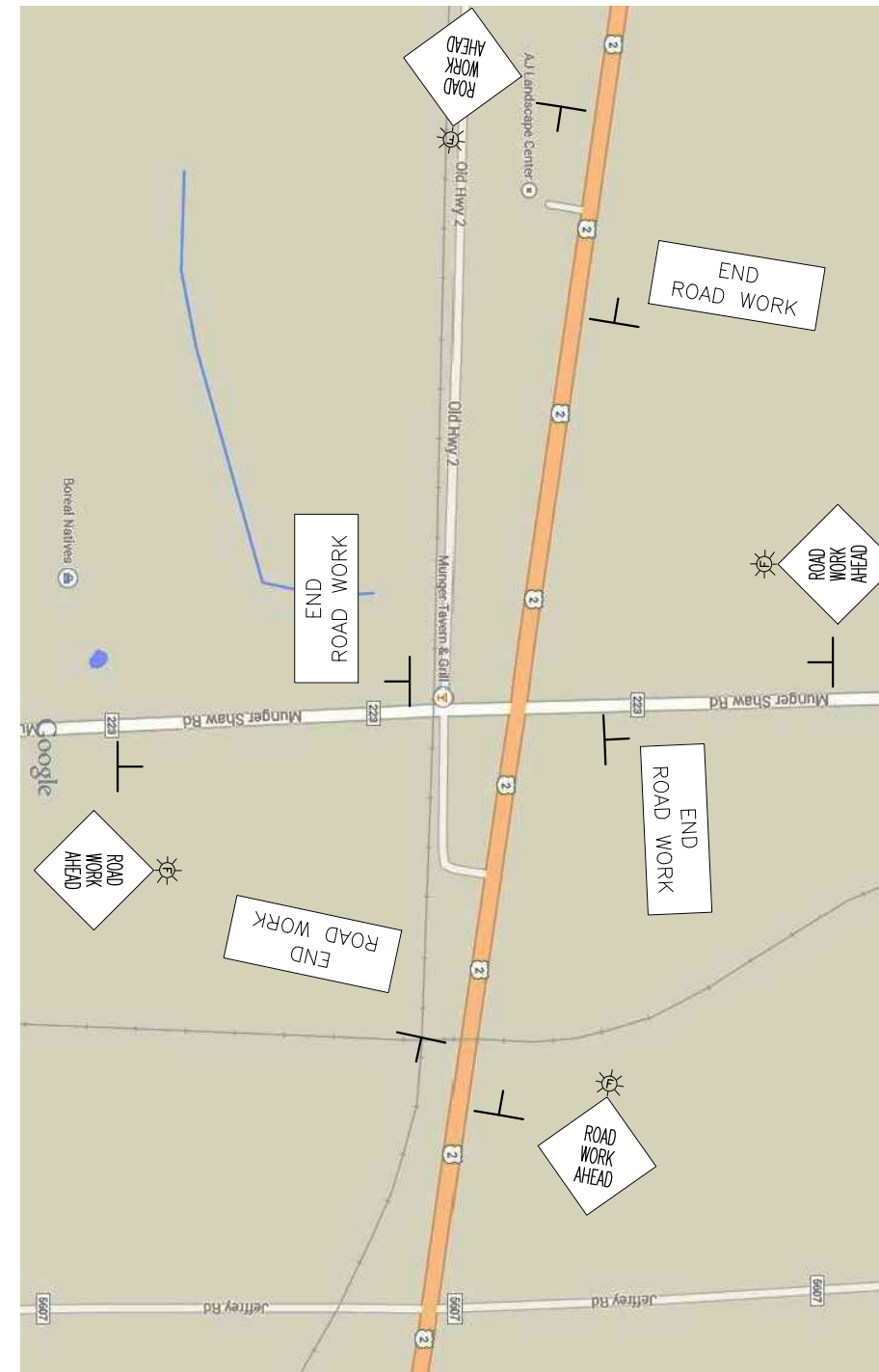
PLAN SHEETS

S.P. 8821-270 SHEET 12 OF 16 SHEETS

INTERSECTION OF US-2 AND CSAH 46



INTERSECTION OF US-2 AND CR 223



NOTE: ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MOST RECENT EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

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

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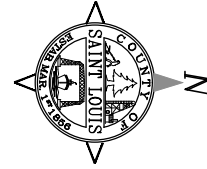
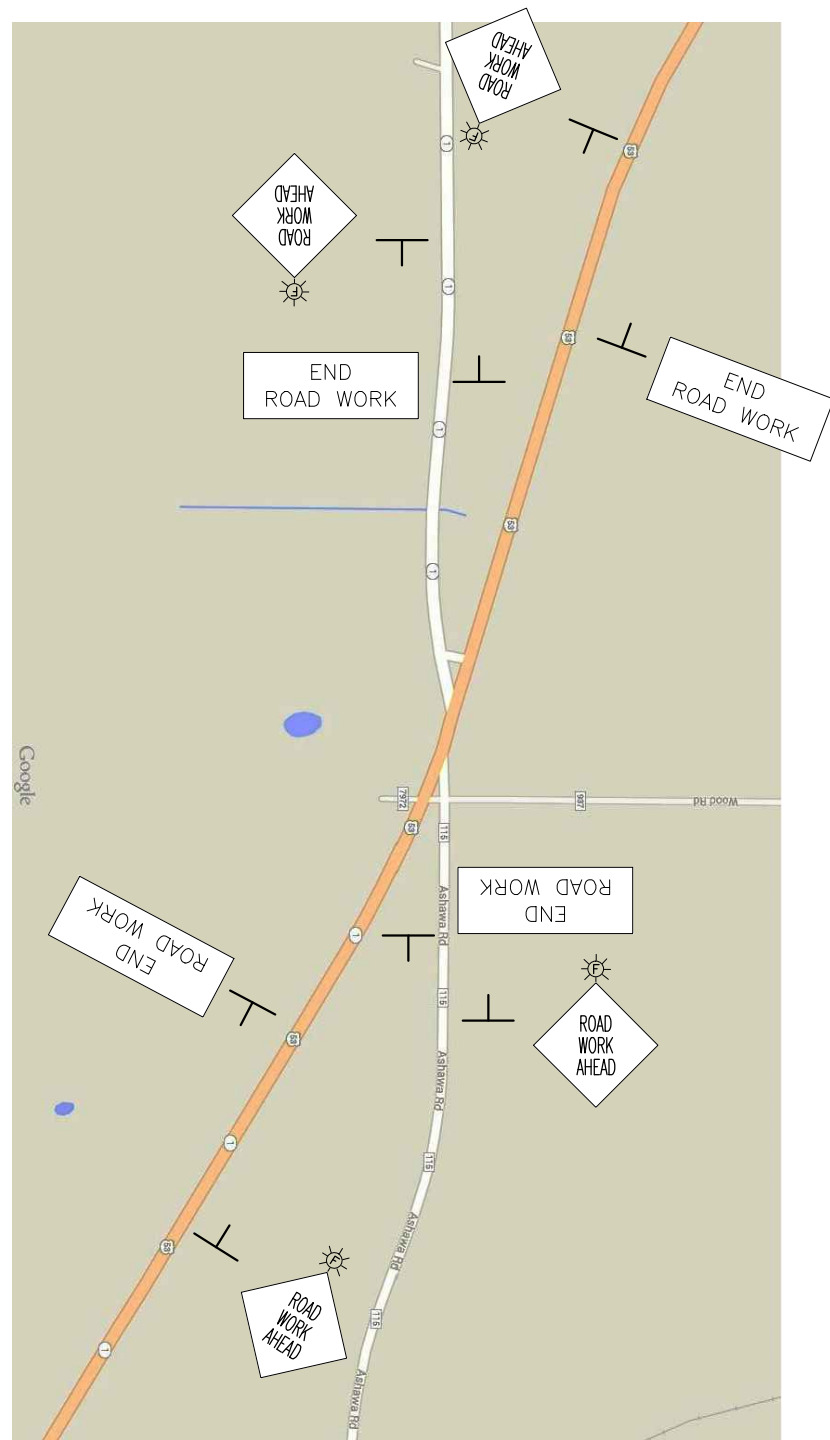
TRAFFIC CONTROL

S.P. 8821-270

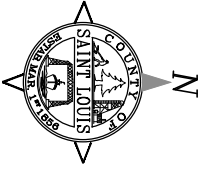
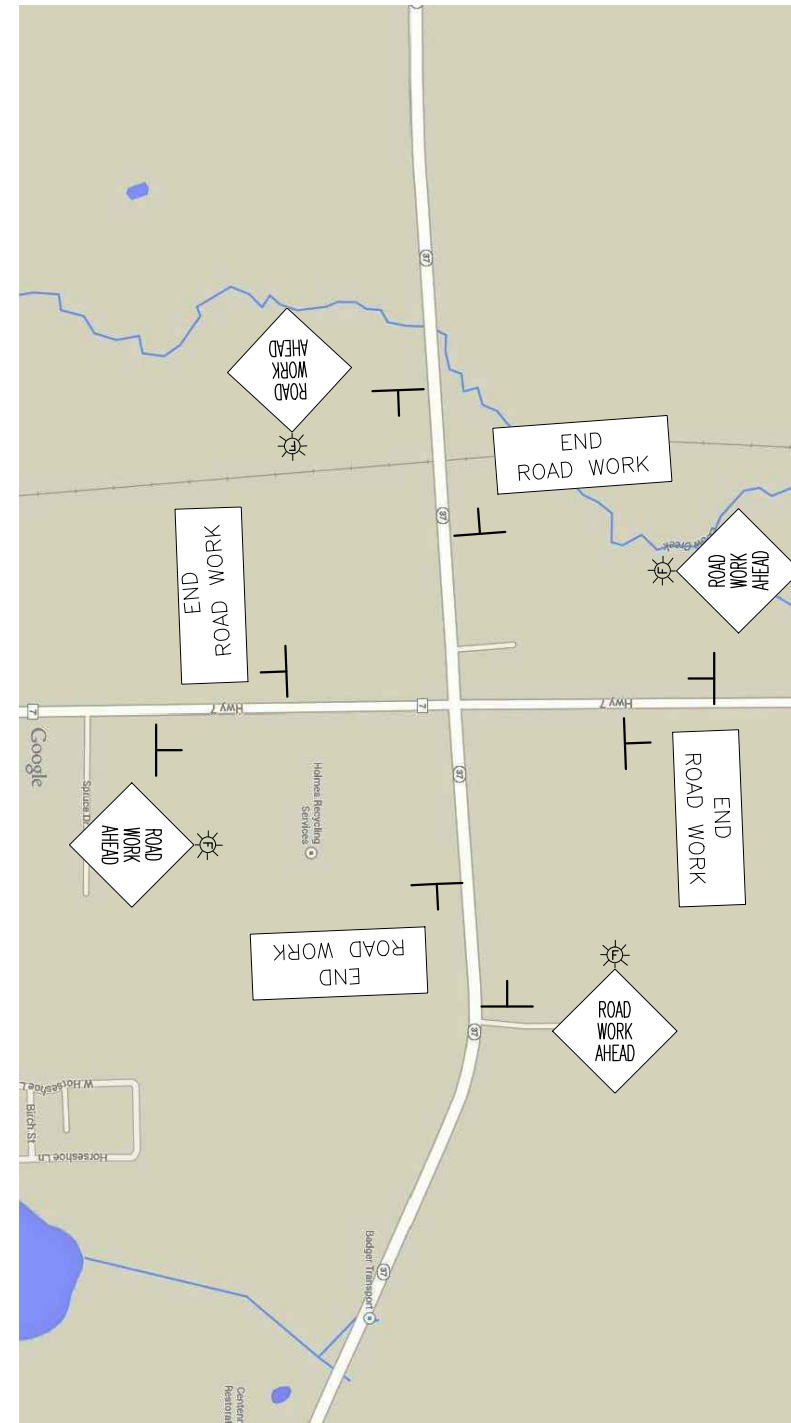
SHEET 13 OF 16 SHEETS

SIGNATURE

INTERSECTION OF US-53 AND CSAH 115



INTERSECTION OF MNTH-37 AND CSAH 7



NOTE: ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MOST RECENT EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

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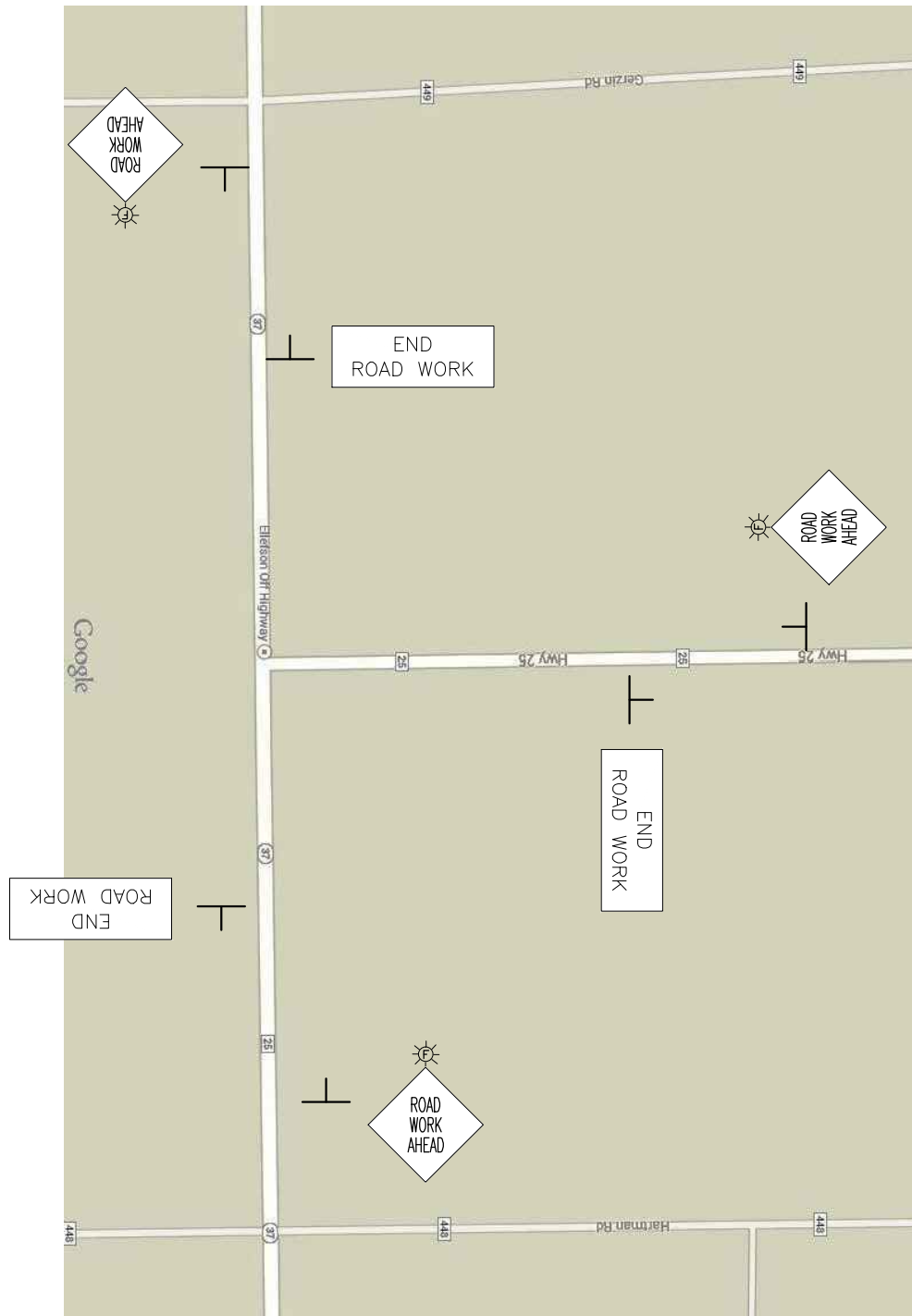
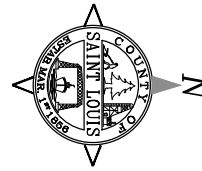
SIGNATURE Victor K. Lund
TYPED NAME

DATE
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REG. NO.

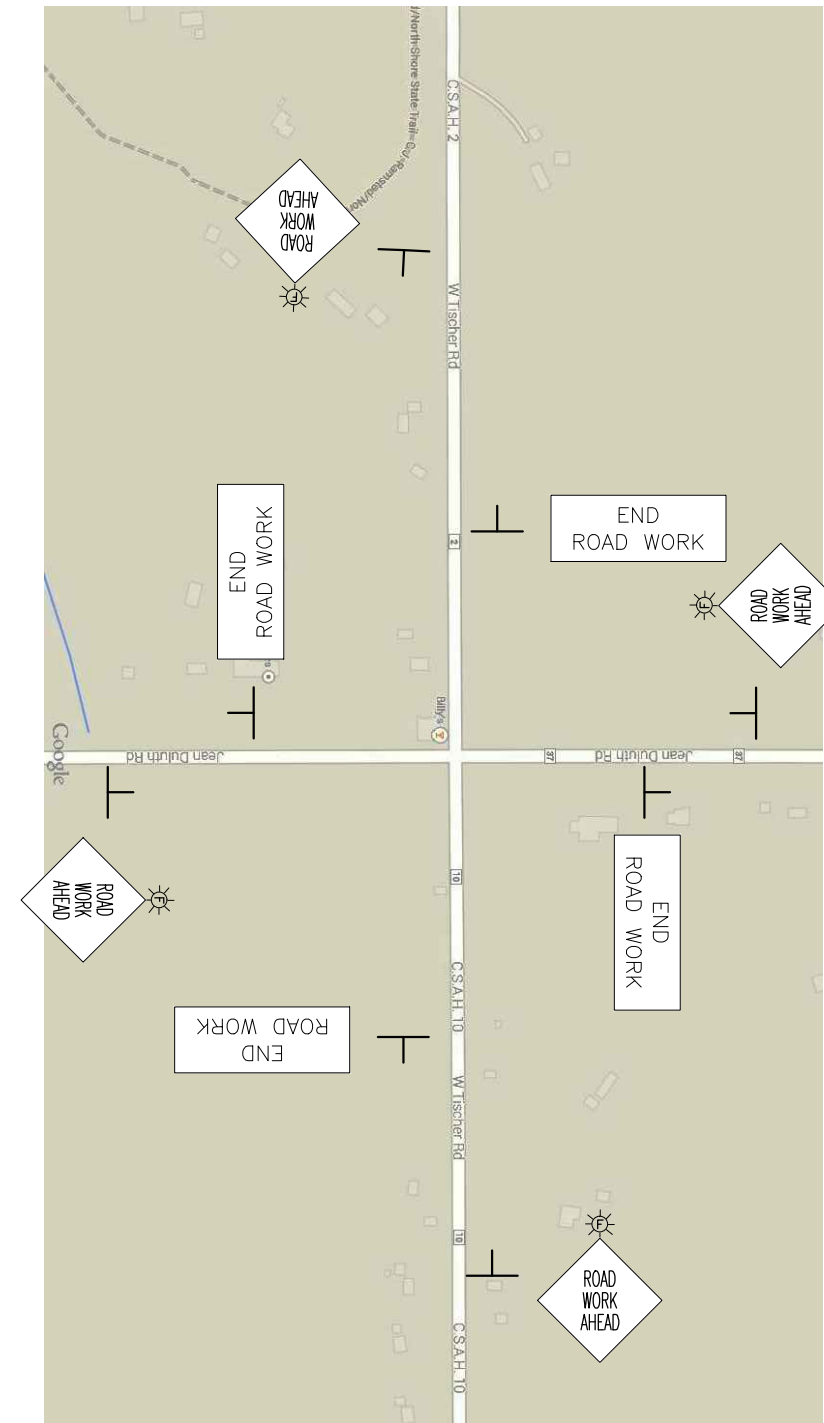
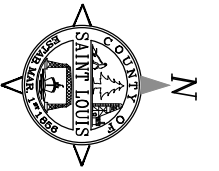
REVISIONS
S.P. 069-070-017

TRAFFIC CONTROL
S.P. 8821-270 SHEET 14 OF 16 SHEETS

INTERSECTION OF MNTH-37 AND CSAH 25 (WEST)



INTERSECTION OF CSAH 37 AND CSAH 2



NOTE: ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MOST RECENT EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

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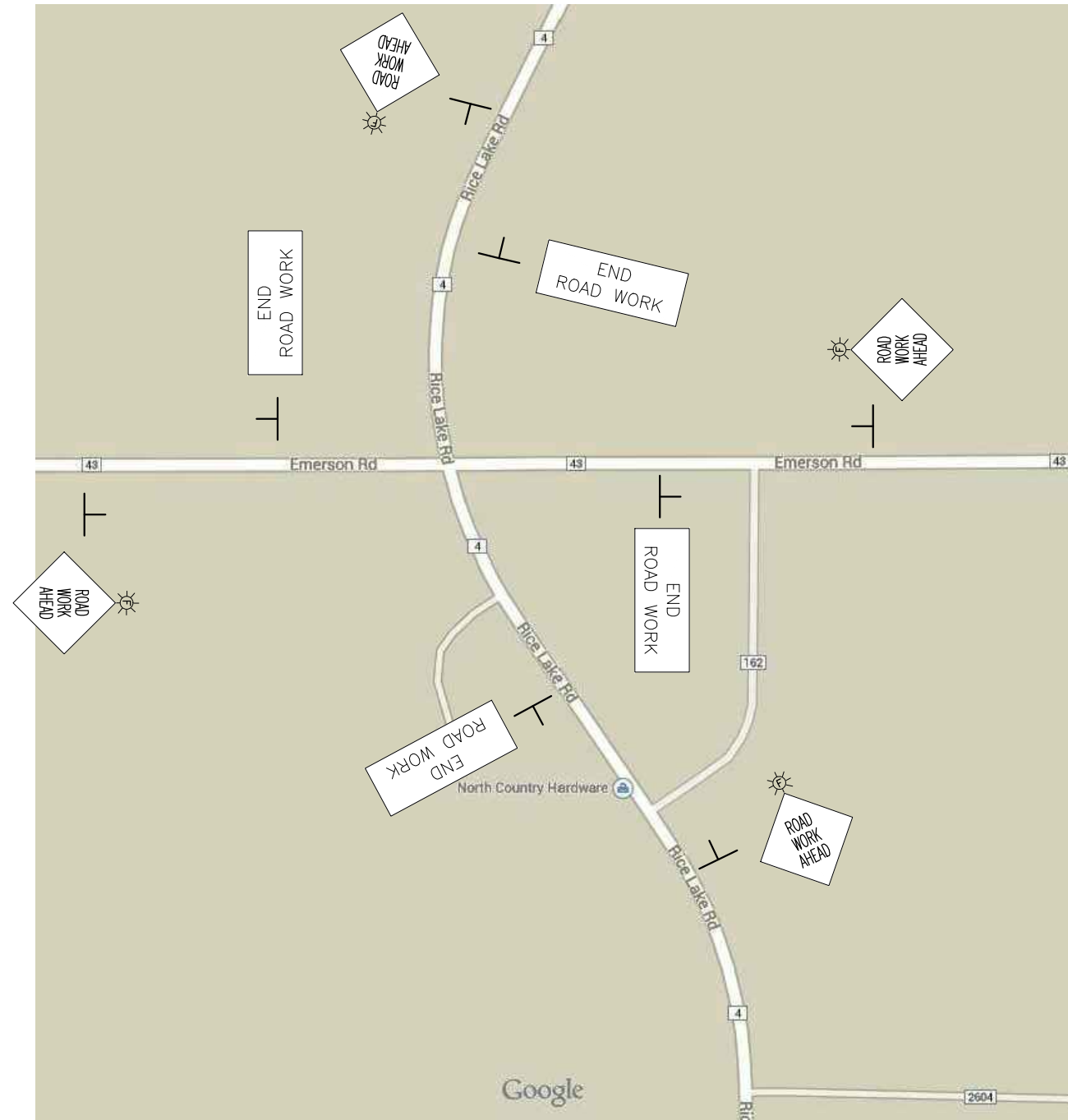
SIGNATURE Victor K. Lund
TYPED NAME

DATE
48160
REG. NO.

REVISIONS
S.P. 069-070-017

TRAFFIC CONTROL
S.P. 8821-270 SHEET 15 OF 16 SHEETS

INTERSECTION OF CSAH 4 AND CSAH 43



LEGEND:

- FLASHER
- SIGN
- BARRICADE
- WORK ZONE

NO SCALE

POSTED SPEED LIMIT PRIOR TO STARTING (mph)	SPACING OF ADVANCE WARNING SIGNS (feet) (A)
0 - 30	250
35 - 40	325
45 - 50	600
55	750
60 - 55	1,000

TRAFFIC CONTROL DEVICES			
ITEM	DESIGN	QTY.	REMARKS
ROAD WORK AHEAD	W20-1	27	48" x 48" DOUBLE POST MOUNTED WITH FLASHER
END ROAD WORK	G20-2	27	36" x 18" DOUBLE POST MOUNTED
PLASTIC BARRELS			PLACE AS REQUIRED BY CONTRACTOR'S OPERATIONS
FLASHER, TYPE A	LOW INTENSITY	27	SEE PLAN FOR PLACEMENT

NOTE: ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MOST RECENT EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL, DEVICES INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

I HEREBY CERTIFY THAT THIS PLAN SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. _____ SIGNATURE	Victor K. Lund TYPED NAME	DATE 48160 REG. NO.	REVISIONS S.P. 069-070-017	TRAFFIC CONTROL S.P. 8821-270	SHEET 16 OF 16 SHEETS
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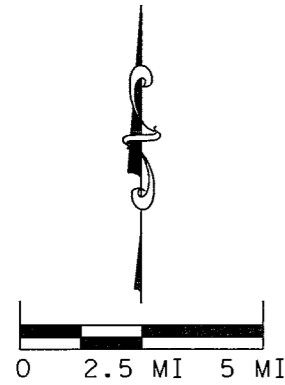
MINNESOTA DEPARTMENT OF TRANSPORTATION MCLEOD COUNTY

CONSTRUCTION PLAN FOR: INTERSECTION LIGHTING, AND ITS ACTIVE WARNING SYSTEMS

PROJECT LOCATION: VARIOUS COUNTY INTERSECTIONS

CSAH 1 & CR 56	A	CSAH 115 & CSAH 25 (JEFFERSON)	N
CSAH 1 & CSAH 3	B	CSAH 115 & CSAH 25 (ADAMS)	O
CSAH 1 & CSAH 10	C	CSAH 9 & CSAH 3	P
CSAH 2 & CSAH 22	D	CSAH 12 & CSAH 19	Q
CSAH 2 & CSAH 10	E	CSAH 13 & CSAH 17	R
CSAH 2 & CSAH 3 (IWS 1)	F*	CSAH 25 & CR 62	S
CSAH 4 & CR 79	G	CSAH 25 & CSAH 26	T
CSAH 4 & CSAH 11	H	CSAH 115 & CSAH 14	U
CSAH 4 & CR 62	I	CSAH 15 & CSAH 3 (IWS 3)	V*
CSAH 5 & CSAH 31	J	CSAH 18 & CSAH 7	W
CSAH 5 & CSAH 2	K		
CSAH 7 & CR 79	L		
CSAH 7 & CSAH 115 (IWS 2)	M*		

*ITS ACTIVE WARNING SYSTEM



HSIP 4311(272)

GOVERNING SPECIFICATIONS

THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING THE FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

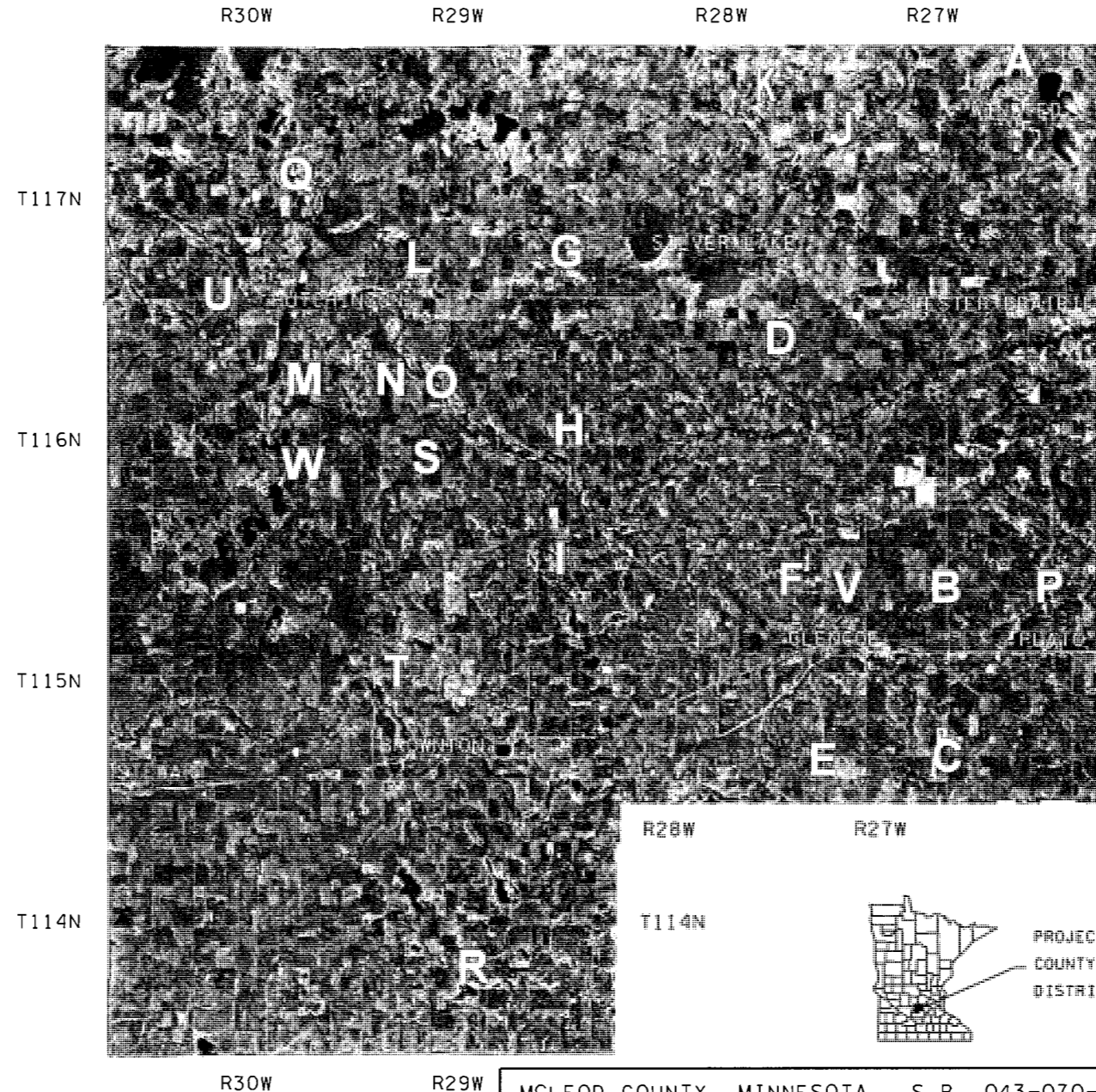
INDEX OF SHEETS

SHEET	DESCRIPTION
1	TITLE SHEET
2	ESTIMATED QUANTITIES
3 - 4	LIGHTING DETAILS
5 - 7	ITS DETAILS
8 - 11	SIGN DETAILS
12 - 34	LOCATION DETAILS

THIS PLAN SET CONTAINS 34 SHEETS

PLAN SYMBOLS

	2" NON-METALLIC CONDUIT (DIRECTIONAL BORE)
	2" NON-METALLIC CONDUIT
	R/W RIGHT OF WAY
	OHP OVER HEAD POWER
	TV-BUR BURRIED TV CABLE
	F/O -BUR BURRIED FIBER OPTIC
	EXISTING POWER POLE
	F & I 12-40 LIGHTING UNIT, 250 WATT HPS WITH DESIGN E (CONCRETE) LIGHT BASE
	F & I 30' STUB POST WITH CABINET AND METER



T117N

T116N

T115N

T114N

MCLEOD COUNTY HIGHWAY DEPARTMENT
1400 ADAMS STREET HUTCHINSON, MN 55350
320-484-4321

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.

CHAD HAUSMANN, MCLEOD COUNTY ASSISTANT ENGINEER

DATE: 5/26/2011 LICENSE NO: 40890

For
MCLEOD COUNTY ENGINEER: RECOMMENDED FOR APPROVAL DATE: 5/26/11

DISTRICT STATE AID ENGINEER: REVIEWED FOR COMPLIANCE WITH STATE AID RULES/POLICY DATE: 6/22/11

STATE AID ENGINEER: APPROVED FOR STATE AID AND FEDERAL AID FUNDING DATE: 6/22/11

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

JOHN T. BRUNKHORST, MCLEOD COUNTY ENGINEER
DATE: _____ LICENSE NO: 26890

ITEM NOTES	ITEM NO.	CONTRACT ITEM	UNIT	COUNTY-WIDE SP 043-070-004 TOTAL
B	2545.501	ELECTRIC LIGHT SYSTEM "A"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "B"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "C"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "D"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "E"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "F"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "G"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "H"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "I"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "J"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "K"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "L"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "M"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "N"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "O"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "P"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "Q"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "R"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "S"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "T"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "U"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "V"	LS	1
B	2545.501	ELECTRIC LIGHT SYSTEM "W"	LS	1
A,B	2565.616	INTERSECTION WARNING SYSTEM "1"	SYS	1
A,B	2565.616	INTERSECTION WARNING SYSTEM "2"	SYS	1
A,B	2565.616	INTERSECTION WARNING SYSTEM "3"	SYS	1

UTILITY CONTACTS

CENTER POINT ENERGY	608-223-2014/800-722-9326
CITY OF HUTCHINSON/HUC	320-587-4745
CITY OF WINSTED	763-559-5185
EMBARQ	800-762-0592
FRONTIER COMMUNICATION	763-682-3514
GLENCOE UTILITIES	320-864-5184
KOCH PIPELINE CO, LP	800-688-7594
MCLEOD COOP POWER	763-682-3514
MEDIACOM	320-583-3824
NORTHERN NATURAL GAS	320-894-5800
NU TELECOM	763-682-3514
WINSTED TELEPHONE	763-682-3514
WRIGHT HENNEPIN COOP	763-682-3514
XCEL ENERGY	612-630-4366

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-2, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING UTILITY DATA."

SPECIFIC ITEM NOTES

- A ALL ITEMS NECESSARY TO ACCOMPLISH THE INTENDED FUNCTION OF THE INTERSECTION WARNING SYSTEM INCLUDING, BUT NOT LIMITED TO: SIGNS, POSTS, SOLAR PANELS, BATTERIES, CABINETS, RADAR DETECTORS, WIRING, AND MISCELLANEOUS HARDWARE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR "SYSTEM".
- B SEE "LOCATION DETAILS" FOR INDIVIDUAL SYSTEM QUANTITIES

GENERAL CONSTRUCTION NOTES:

- 1 TRAFFIC CONTROL IS INCIDENTAL. ALL CONSTRUCTION ZONE SIGNING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL TRAFFIC CONTROL LAYOUTS AND DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD), INCLUDING THE LATEST EDITION OF THE FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS. THE CONTRACTOR WILL FURNISH, INSTALL, AND MAINTAIN ALL REQUIRED TRAFFIC CONTROL SIGNS AND DEVICES TO THE SATISFACTION OF THE ENGINEER. AT MINIMUM, THE CONTRACTOR SHALL USE LAYOUT 2, PAGE 6K-2 OF THE FIELD MANUAL, FOR INSTALLATION OF THE STREET LIGHT SYSTEMS. FOR ALL OTHER WORK ZONE SITUATIONS THAT THE CONTRACTOR MAY ENCOUNTER, THE CONTRACTOR SHALL INSTALL THE PROPER TRAFFIC CONTROL DEVICES PER THE FIELD MANUAL OR AS DIRECTED BY THE ENGINEER.
- 2 TURF ESTABLISHMENT IS INCIDENTAL. ALL AREAS DISTURBED BY THE CONTRACTORS OPERATIONS SHALL BE LEVELED SUITABLE TO THE ENGINEER IN THE FIELD AND COVERED WITH MNDOT SEED MIX 250 AT A NOMINAL RATE OF 130 LBS/ACRE. EXPOSED AREAS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR UNTIL A MINIMUM OF 70% VEGITATIVE COVER HAS BEEN ESTABLISHED. THE CONTRACTOR MAY, AT THEIR OWN COST, USE EROSION CONTROL BLANKET CONFORMING TO MNDOT SPEC. 3885 OR OTHER APPROVED BY THE ENGINEER FOR SITE STABILIZATION.

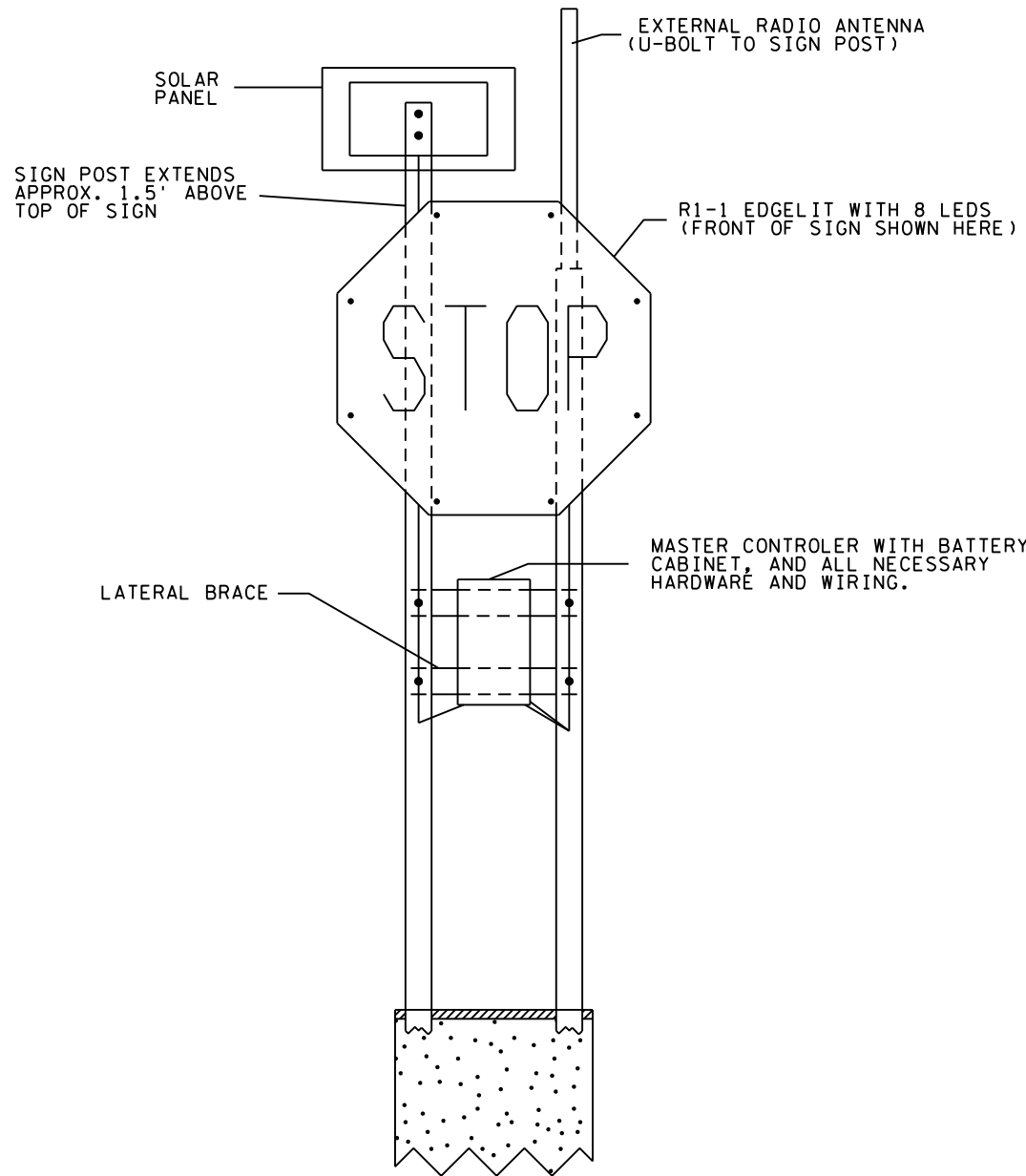
STANDARD PLATES

THE FOLLOWING STANDARD PLATES, APPROVED BY FHWA SHALL APPLY TO THIS PROJECT.

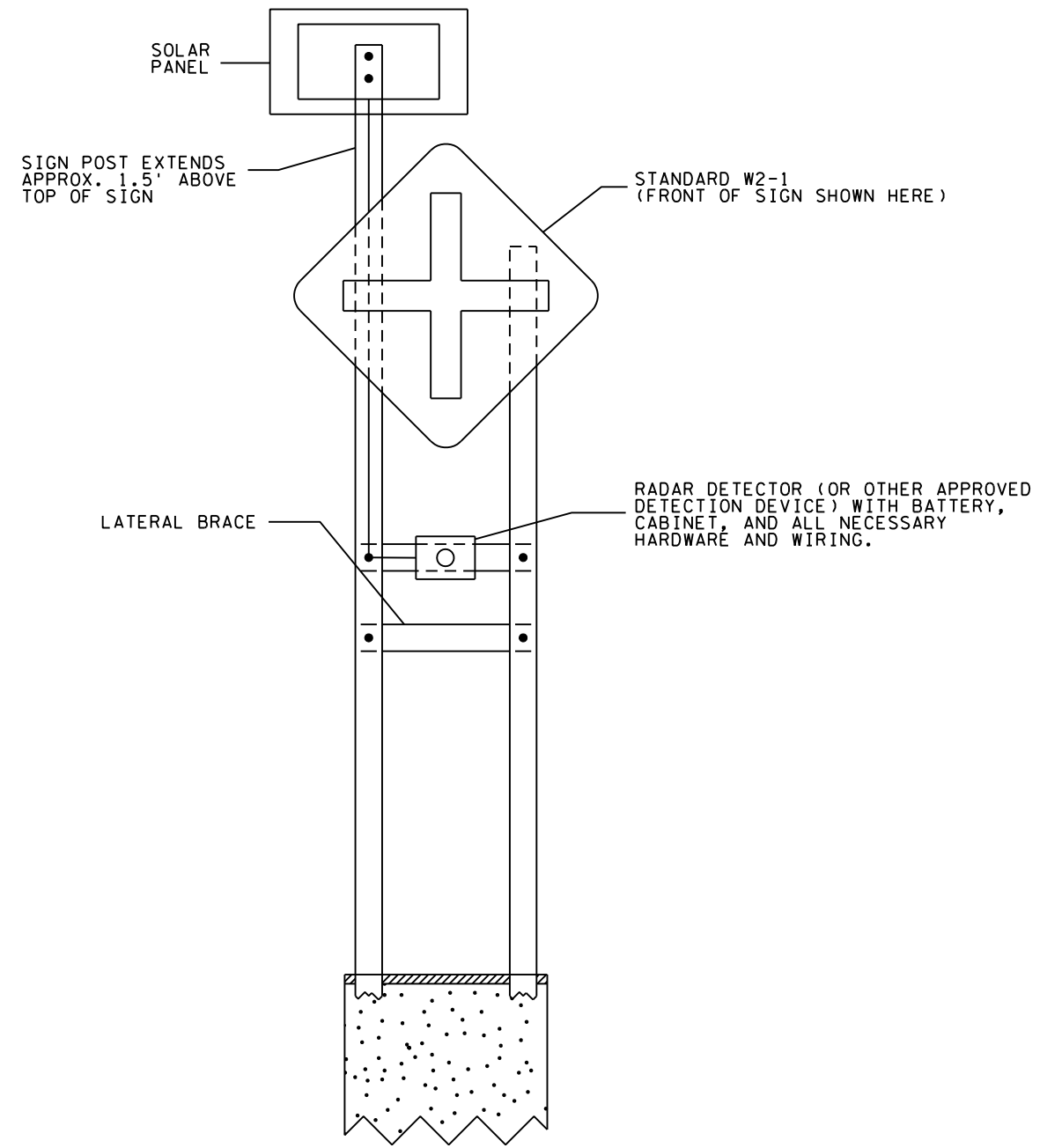
- 8000 I STANDARD BARRICADES
- 8114 A P.V.C. HANDHOLE/PULLBOX
- * 8127 B LIGHT BASE - DESIGN E

* PRECAST OR Poured CONCRETE BASE REQUIRED (STD. PLT. 8127B)

					I hereby certify that this plan, specification or report 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		 <p>McLEOD COUNTY HIGHWAY DEPARTMENT</p>	S.P. 043-070-004 C.P. S.A.P.	INTERSECTION LIGHTING	SHEET 2 OF 34
					Date <u>5/26/2011</u> Reg. No. <u>40890</u>				ESTIMATED QUANTITIES	
NO	DATE	BY	CKD	APPR	REVISION					



TYPICAL MASTER CONTROLLER INSTALLATION
CSAH 3 APPROACH



TYPICAL RADAR DETECTION INSTALLATION
CSAH 2 APPROACH

NOTES:

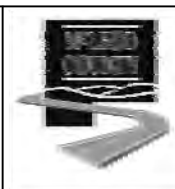
- 1 ALTERNATIVE INSTALLATION CONFIGURATIONS MAY BE APPROVED BY THE ENGINEER PROVIDED THEY PERFORM THE FUNCTIONS INTENDED OF THE INTERSECTION WARNING SYSTEM.
- 2 SHOP DRAWINGS MUST BE SUBMITTED AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- 3 ALL SIGNS SHALL BE 36" IN SIZE AND SHEETING SHALL BE DG3 OR APPROVED EQUAL.
- 4 CONTRACTOR SHALL ENSURE THAT ALL L.E.D. SIGN PANELS AND RADAR UNITS ARE ALIGNED PROPERLY TO FUNCTION IN ACCORDANCE WITH THE APPROACHING TRAFFIC. ANY MISALIGNMENT SHALL BE CORRECTED TO THE ENGINEER'S SATISFACTION.
- 5 ALL SIGN STRUCTURES SHALL BY TYPE 2U-1A WITH KNEE BRACE.
- 6 EXACT SIGN LOCATIONS TO BE STAKED BY THE ENGINEER IN THE FIELD

NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification or report 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

Chad Hagan

Date 5/26/2011 Reg. No. 40890



**McLEOD COUNTY
HIGHWAY DEPARTMENT**

S.P. 043-070-004
C.P.
S.A.P.

INTERSECTION LIGHTING
IWS DETAIL SYSTEM 1
CSAH 2 & CSAH 3

SHEET
5
OF
34

7:59:47 AM 5/26/2011

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(APPROX.) LIGHT STANDARD LOCATIONS			
NO.	TYPE	NORTHING	EASTING
*	IF	12-40	222050 621305

(APPROX.) SYSTEM "F" QUANTITY TAB		
ITEM	UNIT	QTY.
LIGHT UNIT TYPE 12-40	EA	1 *
30' STUB POLE	EA	0 *
2" NON-METALLIC CONDUIT	LF	40 **
2" NON-METALLIC CONDUIT (DIRECTIONAL BORE)	LF	0 **
SERVICE CABINET SECONDARY TYPE B	EA	1
1 CONDUCTOR NO. 8 WIRE	LF	150 **

NOTES

- * POLE, UNDERGROUND WIRE, AND IWS SIGN LOCATIONS SHALL BE STAKED BY THE ENGINEER IN THE FIELD.
 - ** FOR INFORMATIONAL PURPOSES ONLY. ACTUAL QUANTITIES MAY VARY.
- POWER SHALL BE PROVIDED BY **MCLEOD COOP** AT THIS LOCATION

METER SOCKET ADDRESS FOR LOCATION "F"
8723 120TH ST. GLENCOE MN, 55336

- 2" NON METALLIC CONDUIT
- F & I 12-40 LIGHTING UNIT, 250 WATT HPS WITH DESIGN E (CONCRETE) LIGHT BASE
- EXISTING POWER POLE

PUBLIC UTILITIES PRESENT
GLENCOE UTILITIES, MCLEOD COOP POWER, CENTER POINT ENERGY, EMBARQ

GOPHER STATE ONE CALL
CALL 1-800-252-1166
FROM YOUR SMARTPHONE
[HTTP://MNTICKETENTRY.KORTERRAWEB.COM](http://mnticketentry.korterraweb.com)
OR ON THE WEB [GOPHERSTATEONECALL.ORG](http://gopherstateonecall.org)

NO	DATE	BY	CKD	APPR	REVISION

I hereby certify that this plan, specification or report 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

Bill Hayes

Date 5/26/2011 Reg. No. 40890

**McLEOD COUNTY
HIGHWAY DEPARTMENT**

S.P. 043-070-004
C.P.
S.A.P.

INTERSECTION LIGHTING
SYSTEM F
CSAH 2 & CSAH 3

SHEET
17
OF
34

S-1 INTERSECTION WARNING SYSTEM (IWS)

The contractor shall be responsible for providing all time and materials necessary for proper installation and function of each IWS as stated in the plan. All components of the IWS system shall be installed to conform to the recommendations of the manufacturer unless otherwise approved by the engineer. The proposed IWS shall be installed using guidance from the plan as well as what is stated below:

S-1.1 With Approval of the Engineer, the Contractor may submit alternate design configurations provided they perform the functions intended of the intersection warning systems.

S-1.2 Sign/Radar Placement

All sign locations shall be approved by the Engineer prior to installation.

The Major and Minor roadway radars need to be placed at the detection distance recommended by the manufacturer and approved by the Engineer.

The contractor shall ensure proper alignment of radar units to allow for proper function of the IWS system.

S-1.3 Solar Panel and Battery Backup

The contractor shall be responsible for determining the size of solar panel required based on sunlight intensity in the area of the IWS and daily power consumption of the IWS electrical loads. The battery backup shall have enough storage to power the IWS node for at least 10 consecutive days without any solar panel draw.

S-1.4 Sign Posts

Posts must be of breakaway type with breakaway bases that meet the crashworthy requirements of NCHRP 350, Category II, Test Level 3. Flanged Channel Type Sign Posts shall be used in sign structure type 2U-1A. Post weight must be sufficient for support of IWS elements. Structure installations must be approved by the Engineer prior to installation of IWS elements.

S-1.5 Solar Panels



(Photo provided is for information only and does not depict exact structure details)

The contractor shall follow the following guidelines when installing solar panels, unless recommended otherwise by manufacturer:

- Solar panels are installed facing south in order to optimize sunlight exposure.
- Panels shall be installed at a 45-degree angle to the sign post.
- Per FHWA guidance, the panel shall be securely mounted and shall not compromise the crashworthiness of the structure.
- The post that the solar panel is mounted to should extend 1.5-feet above the top of the sign to ensure that the solar panel clears the top of the sign.

S-1.6 Major and Minor Roadway Radar



(Photo provided is for information only and does not depict exact structure details)

The contractor shall follow the following guidelines when installing the Major and Minor Roadway Radar:

- Radar is screwed into a fiberglass enclosure that has a front fastening cover and conduit fitting attached.
- Radar enclosure shall be bolted to the sign post, with the radar positioned to detect vehicles approaching the radar.
- The radar should be aimed at an angle towards the roadway and away from the sign post towards the adjacent lane of traffic, in order to detect traffic at a point approximately 100-feet downstream of the radar.
- Radar cable should be run from the radar enclosure to the controller cabinet. Enclose the cables in a ½ inch N.M.C. flex conduit and tie/wrap the conduit to the sign post.

S-1.7 Intersection Ahead Sign with edge lit LED Lights



- Intersection Ahead signs with edge lit LED Lights shall be installed on CSAH 115 in conjunction with the radar sensors located on the stop ahead signs on CSAH 7.

S-1.8 Stop Sign with edge lit LED Lights



- Stop signs with edge lit LED Lights shall be installed on CSAH 3 in conjunction with the radar sensors located on the Intersection Ahead signs on CSAH 15 and CSAH 2.

S-1.9 Controller Cabinet



(Photo provided is for information only and does not depict exact structure details)

- Install a water tight fiberglass Controller Cabinet on two lateral braces.
- Install weather tight conduit/cable fittings to receive flex conduit and cables from the different IWS components and run the necessary wires/cables into the controller cabinet.
- The controller cabinet should be installed approximately 5 feet above the ground so the cabinet is at eye-level.

S-1.10 Fault Notification System

The contractor shall furnish and install a fault notification and failsafe system which will notify personnel of a system malfunction. The parameters and configuration of the fault notification system must be approved by the Engineer prior to installation.

S-1.11 Miscellaneous Items

In addition to the previously listed items, all other items necessary to complete the IWS to the satisfaction of the contract; including, but not limited to wireless radios and solar charge controllers shall be supplied/installed by the Contractor. Specific details for these miscellaneous items shall be obtained from manufacturers or other knowledgeable individuals. The completed IWS will only be accepted per the approval of the Engineer.

Shop drawings of the IWS for each intersection indicated shall be required from the contractor prior to IWS installation. Shop drawings must be approved by the Engineer prior to construction of the IWS.

S-1.12 Warranty and Users Manual

The Contractor shall provide an Intersection Warning System warranty for a period of two (2) years from the date of acceptance. The system warranty shall guarantee that the installed IWS is free of defects in materials and workmanship for the above specified time period. Warranty details must be reviewed and approved by the Engineer prior to the final acceptance of the IWS.

The Contractor shall provide McLeod County with a user manual for the IWS. The user manual must define maintenance, trouble shooting, and repair procedures for the care of the IWS. The user manual shall include manufacturer information (website, names and contact numbers), all pertinent information required for proper care and replacement of parts and materials associated with the IWS. The contractor shall submit a DRAFT of their proposed user manual for review and comment by the Engineer prior to final IWS acceptance. The final user manual shall meet the satisfaction of the Engineer prior to final IWS acceptance and subsequent payment.