

# MINNESOTA DEPARTMENT OF TRANSPORTATION HENNEPIN COUNTY

CONSTRUCTION PLAN FOR WILDLIFE DETECTION AND WARNING SYSTEM

FED. PROJ. NO. ....

### GOVERNING SPECIFICATIONS

THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM AND BE INSTALLED IN ACCORDANCE TO THE "MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MN MUTCD) AND PART VI, "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

### INDEX

SHEET NO.	SHEET DESCRIPTION
1	TITLE SHEET
2	TABULATION SHEET
3-4	PLAN LAYOUTS
5-20	DETAIL SHEETS

THIS PLAN CONTAINS ...20... SHEETS

### STANDARD PLATES

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

PLATE NO.	DESCRIPTION
8132 A	PREFORMED RIGID PVD CONDUIT LOOP DETECTOR

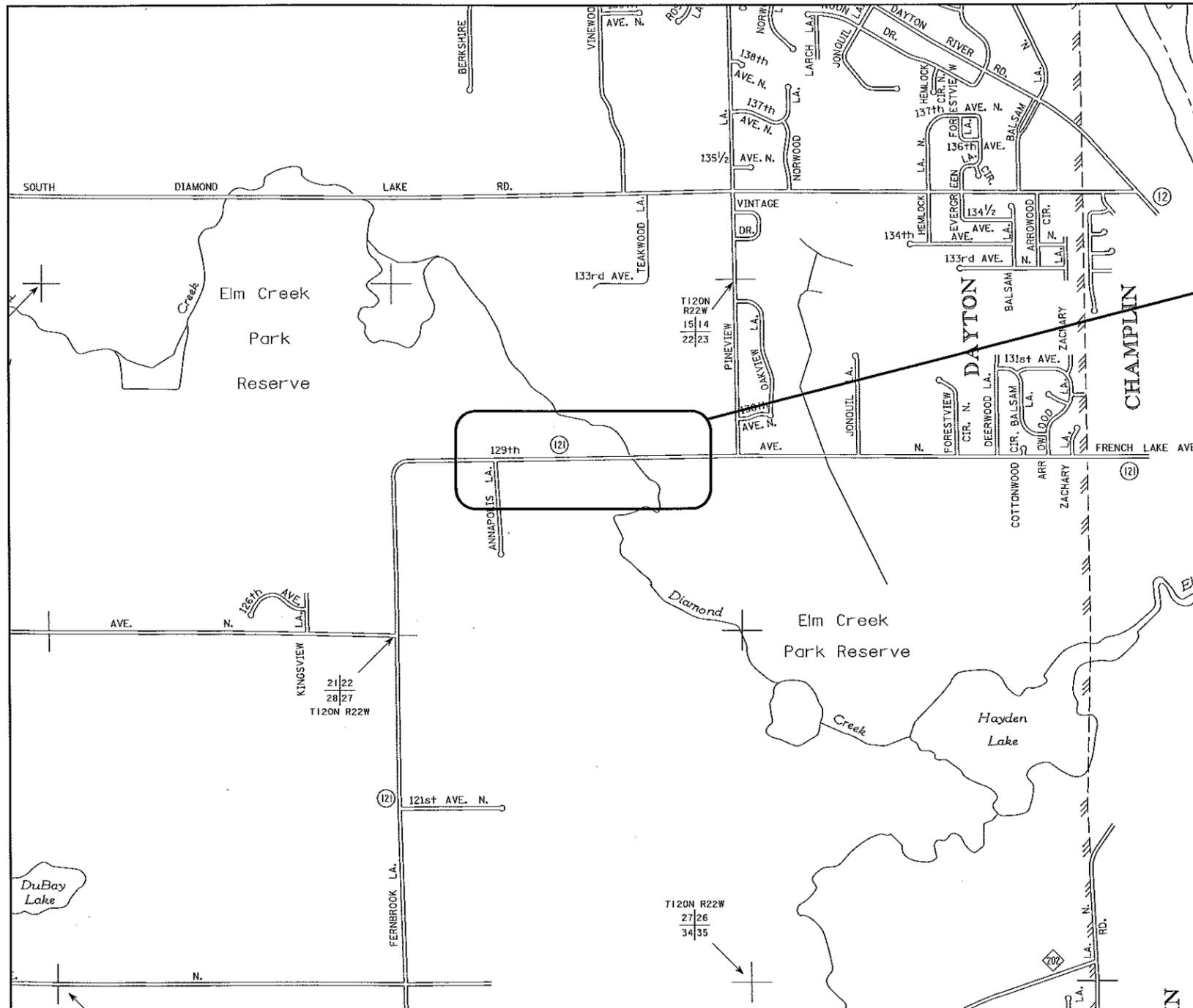
UTILITY	NOTE
City of Dayton	LEAVE AS IS
Center Point Energy	LEAVE AS IS
Charter Communications	LEAVE AS IS
Connexus Energy	LEAVE AS IS
Qwest	LEAVE AS IS

**NOTE:**  
 UTILITIES SHOWN ARE A COMPILATION OF INFORMATION PROVIDED BY THE UTILITY COMPANIES AND PREVIOUS PROJECTS WITHIN THE AREA THE UTILITIES WERE NOT FIELD LOCATED.  
 NO UTILITIES WILL BE AFFECTED BY THIS PROJECT.  
 THE CONTRACTOR SHALL CALL GOPHER STATE ONE CALL FOR UTILITY LOCATES PRIOR TO BEGINNING ANY CONSTRUCTION.  
 GOPHER ONE STATE CALL IS MINNESOTA UNDERGROUND FACILITY NOTIFICATION CENTER (1-800-252-1166 OR 651-454-0021). IT SHOULD BE NOTED THAT IN ACCORDANCE WITH MINNESOTA STATUTE 2160, IT IS REQUIRED THAT ALL CONSTRUCTION PROJECTS INVOLVING MAINTENANCE ACTIVITY REQUIRES THE PARTY DOING THE EXCAVATION TO CALL GOPHER STATE ONE. CALL 48 HOURS PRIOR TO EXCAVATION.  
 THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUB SURFACE UTILITY DATA"



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.

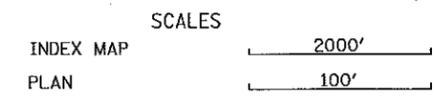
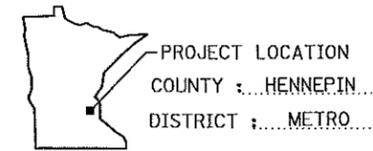
SIGNATURE Eric D. Minge  
 DATE 06/13/11 LIC. NO. 24156 PRINT NAME ERIK D. MINGE



PROJECT LOCATION



PLAN REVISIONS		
DATE	SHEET NO.	APPROVED BY



FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

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THIS PLAN AND/OR SPECIFICATION WAS PREPARED SPECIFICALLY FOR THIS PROJECT, AND ANY RE-USE OF DETAILS OR SPECIFICATIONS ON OTHER PROJECTS IS NOT INTENDED OR AUTHORIZED BY THE DESIGNER. LIABILITY FOR ANY RE-USE ON OTHER PROJECTS IS THE RESPONSIBILITY OF THE PERSON, AGENCY, OR CORPORATION USING PLAN OR SPECIFICATION DATA FROM THIS PROJECT.

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

S.A.P. STATE PROJ. NO. .... SHEET NO. 1 OF 20 SHEETS

SIGN PANELS TYPE C											
SIGN NO	QTY	POSTS			MTG HT (1)	PANEL			CODE NO	PANEL LEGEND	NOTES
		NO & TYPE	KNEE BRACES QTY	LEN FEET		SIZE INCH	AREA SQ FT	TOTAL AREA SQ FT			
C-1	2	2-U	0	15	7	48 x 48	16.00	32.00	W11-3	DEER CROSSING SYMBOL	(2)
<b>TOTAL</b>								<b>32.00</b>			

**SPECIFIC NOTES:**  
 (1) MOUNTING HEIGHT IS MINIMUM, SEE SHEET 17 FOR TYPICAL MOUNTING.  
 (2) MOUNT IN CONCRETE. SEE SHEET 10 FOR DETAIL.

**GENERAL NOTES:**  
 1. POST LENGTHS ARE APPROXIMATE AND INCLUDE EMBEDMENT BUT DO NOT INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE.  
 2. SEE STANDARD SIGNS MANUAL FOR PUNCHING CODE, AND DETAILED DRAWINGS OF TYPE C SIGN PANELS.  
 3. FURNISH AND INSTALL ON 2.75LB/FT POST (MN/DOT 3401).  
 4. FOR PUNCHING AND MOUNTING DETAILS, SEE SHEET 8 .

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 6/13/2011  
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NO	DATE	BY	CHK	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 Licensed Landscape Architect under the laws of the State of Minnesota.

Print Name: **ERIK D. MINGE**

*Erik D. Minge*

Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
 STATE PROJECT NO. X  
 COUNTY PROJECT NO. X  
 CITY PROJECT NO. X

DRAWN BY  
 B. BETTS  
 DESIGNED BY  
 M. GALLAGHER  
 CHECKED BY  
 M. GALLAGHER

COMM. NO. 0117332

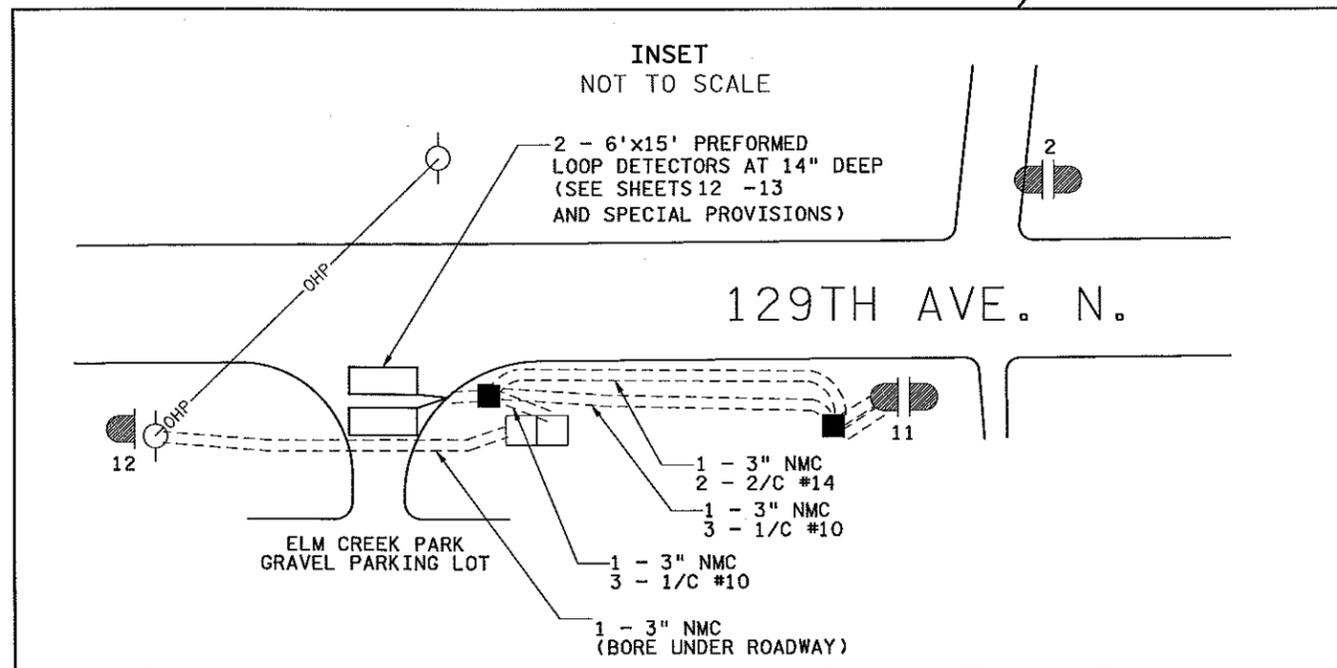
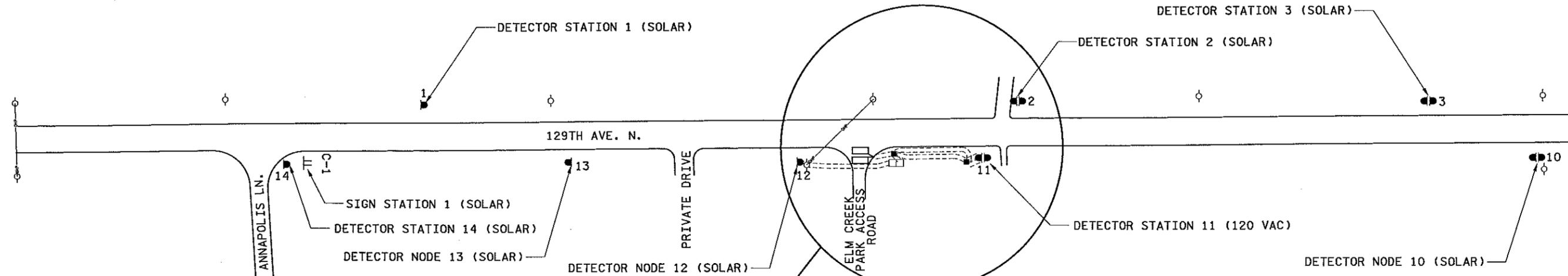
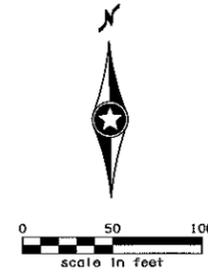


**ENGINEERS  
 PLANNERS  
 DESIGNERS**

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 SIGNING TABULATIONS  
 WILDLIFE DETECTION AND WARNING SYSTEM

SHEET  
 2  
 OF  
 20

DETECTOR NUMBER	OFFSET FROM EDGE OF PAVEMENT (FEET)
1	17
2	16
3	14
4,5	16
6	14
7,8	15
9	12
10	14
11	11
12,13	13
14	11



LEGEND:	
	DETECTOR - SINGLE UNIT
	DETECTOR - TWO UNITS
	ACTIVE DEER WARNING SIGN
	HANDHOLE
	MANAGEMENT STATION AND ELECTRICAL SERVICE DISCONNECT WITH BREAKERS
	POWER POLE
	6'x15' PRE-FORMED LOOP DETECTOR

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NO	DATE	BY	CHKD	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 Licensed Professional Engineer under the laws of the State of Minnesota.

Print Name: **ERIK D. MINGE**

*Erik D. Minge*

Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X

STATE PROJECT NO. X

COUNTY PROJECT NO. X

CITY PROJECT NO. X

DRAWN BY M. BRESSLER

DESIGNED BY M. GALLAGHER

CHECKED BY M. GALLAGHER

COMM. NO. 0117332

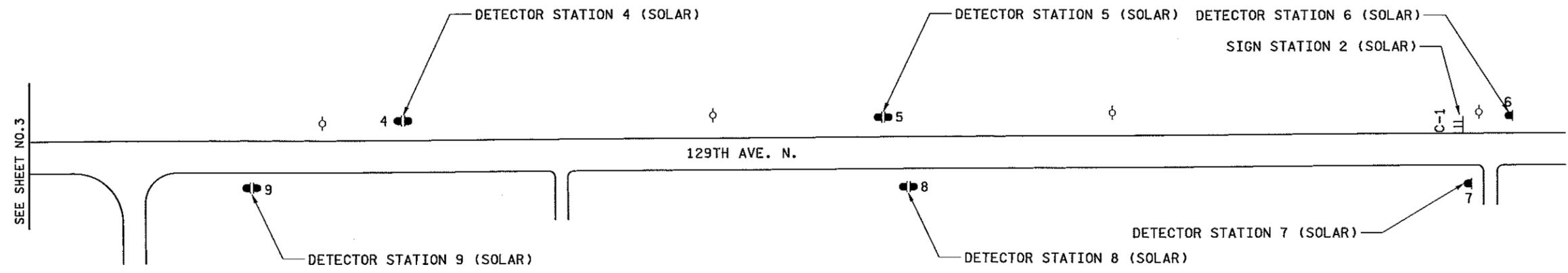
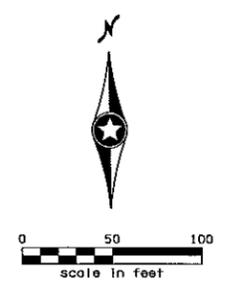


ENGINEERS  
PLANNERS  
DESIGNERS

MINNESOTA DEPARTMENT OF TRANSPORTATION  
PLAN LAYOUT  
WILDLIFE DETECTION AND WARNING SYSTEM

SHEET  
3  
OF  
20

DETECTOR NUMBER	OFFSET FROM EDGE OF PAVEMENT (FEET)
1	17
2	16
3	14
4,5	16
6	14
7,8	15
9	12
10	14
11	11
12,13	13
14	11



LEGEND:	
	DETECTOR - SINGLE UNIT
	DETECTOR - TWO UNITS
	ACTIVE DEER WARNING SIGN
	POWER POLE

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NO	DATE	BY	CHKD	APPR	REVISION

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 Print Name: **ERIK D. MINGE**  
  
 Date: 6/13/11 License # 24156

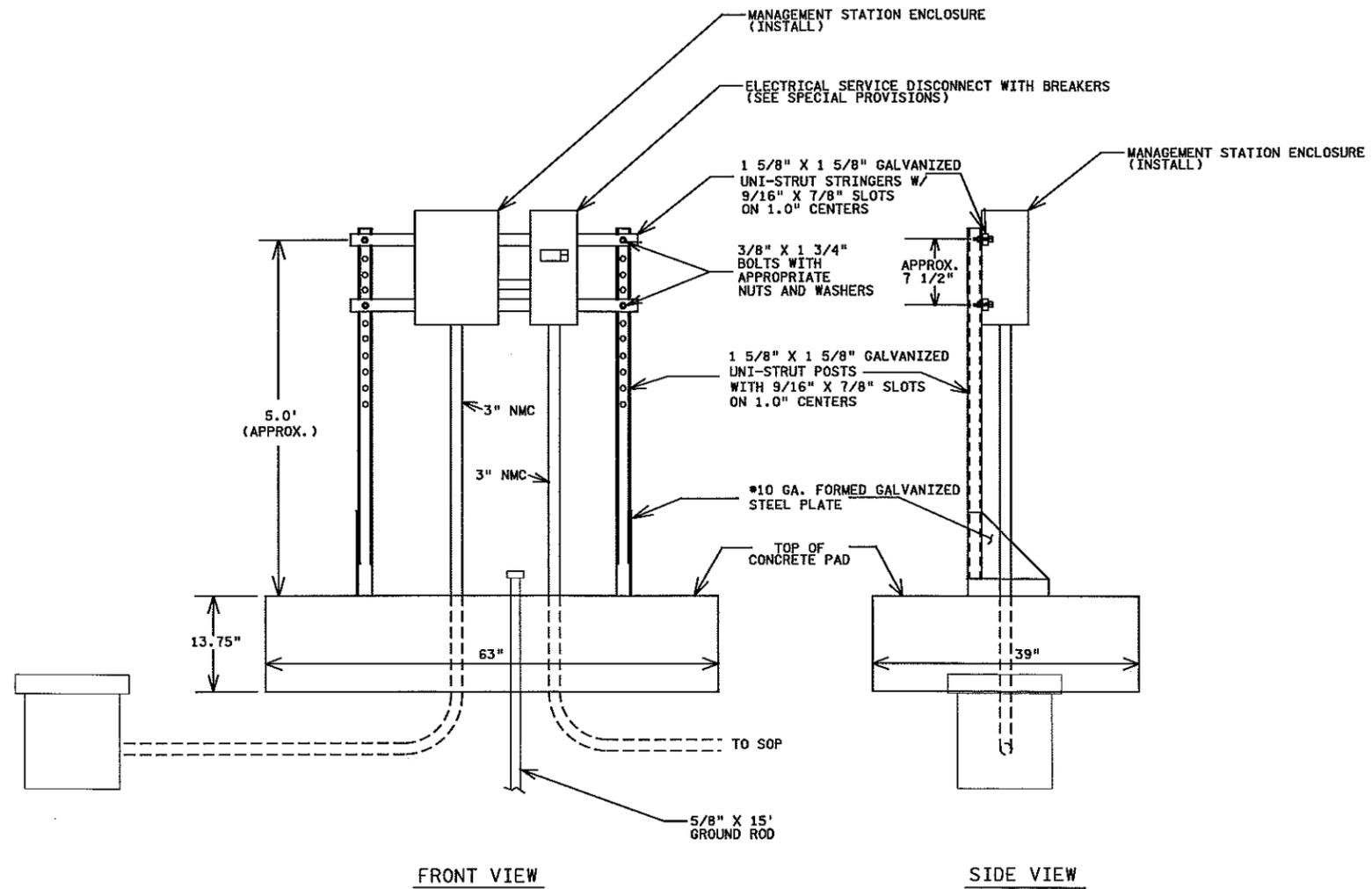
STATE AID PROJECT NO. X	DRAWN BY M. BRESSLER
STATE PROJECT NO. X	DESIGNED BY M. GALLAGHER
COUNTY PROJECT NO. X	CHECKED BY M. GALLAGHER
CITY PROJECT NO. X	COMM. NO. 0117332



**ENGINEERS  
 PLANNERS  
 DESIGNERS**

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 PLAN LAYOUT  
 WILDLIFE DETECTION AND WARNING SYSTEM

SHEET  
 4  
 OF  
 20



MANAGEMENT STATION FRAME DETAIL

NOTES:

ALL ITEMS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE.

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6/13/2011  
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NO	DATE	BY	CHKD	APPR	REVISION

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 Print Name: **ERIK D. MINGE**  
*Erik D. Minge*  
 Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
 STATE PROJECT NO. X  
 COUNTY PROJECT NO. X  
 CITY PROJECT NO. X

DRAWN BY M. BRESSLER  
 DESIGNED BY M. GALLAGHER  
 CHECKED BY M. GALLAGHER  
 COMM. NO. 0117332



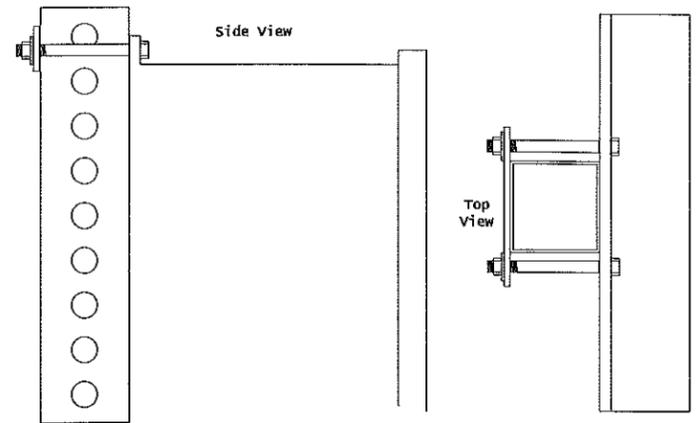
ENGINEERS  
 PLANNERS  
 DESIGNERS

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 MANAGEMENT STATION DETAILS  
 WILDLIFE DETECTION AND WARNING SYSTEM

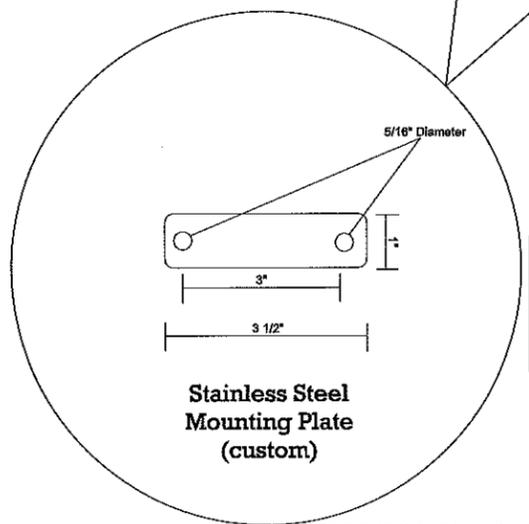
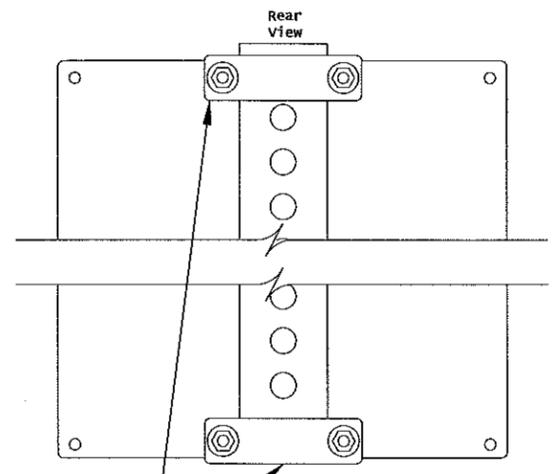
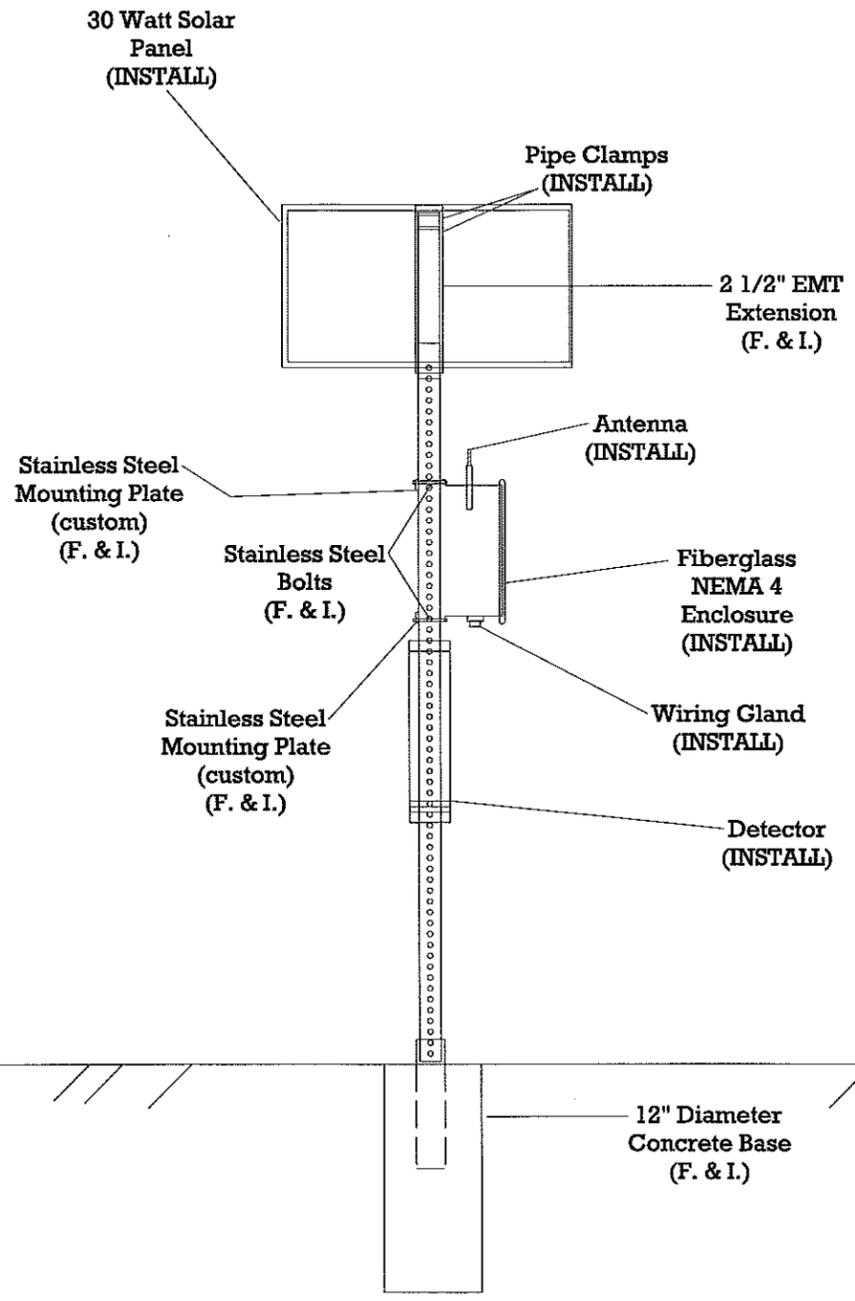
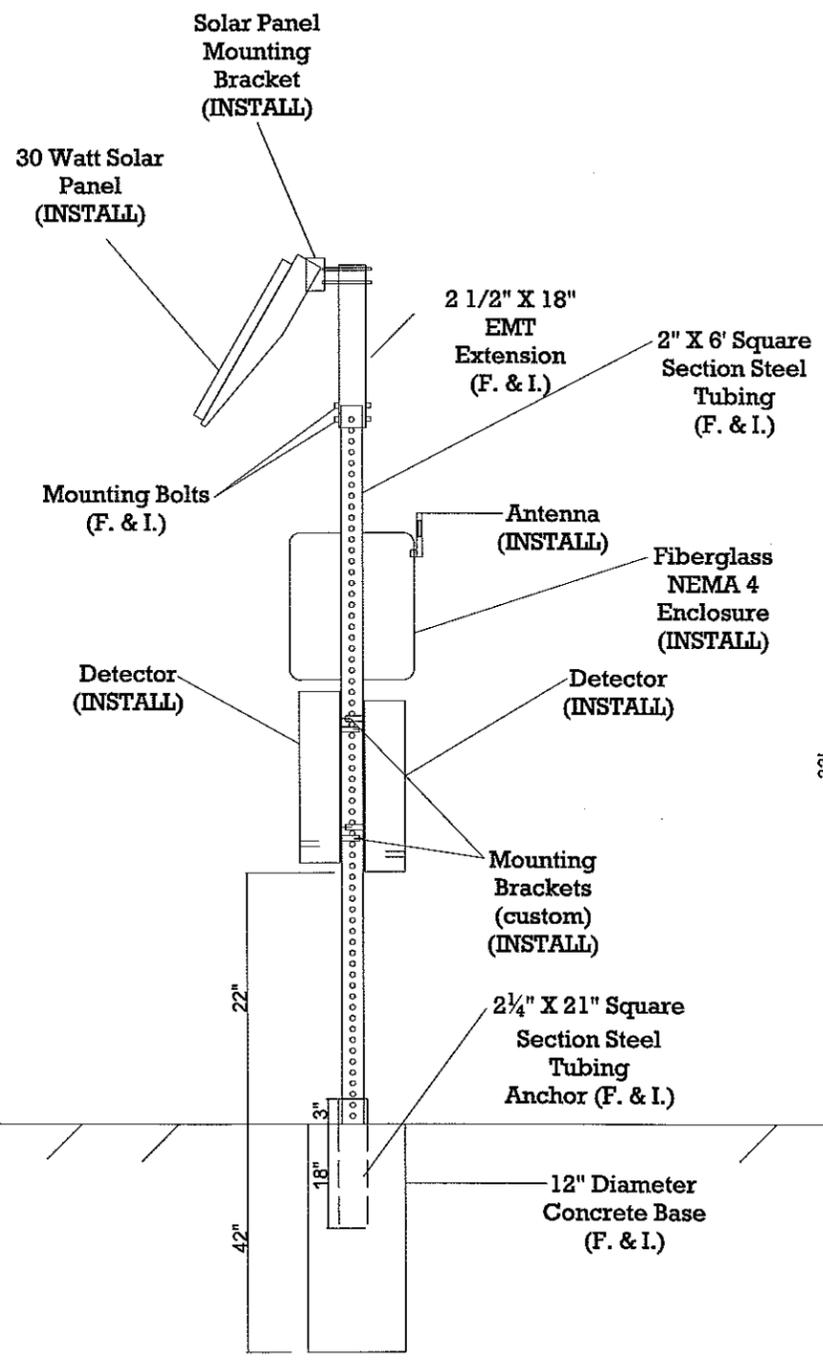
SHEET  
 5  
 OF  
 20

**Side View**

**Rear View**



NOTE: Attachments to be made at top AND bottom of equipment box



NOTES:  
 Bracket to be made from Stainless or Galvanized steel  
 Bracket thickness to be 1/8 Inch  
 Corners of bracket to be radiused and de-burred  
 Bolt holes to be drilled and de-burred

DETECTOR EQUIPMENT BOX ATTACHMENT DETAIL

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Print Name: **ERIK D. MINCE**

*Erik D. Mince*

Date: 6/13/11 License # 24156

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STATE PROJECT NO. X

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CITY PROJECT NO. X

DRAWN BY M. BRESSLER

DESIGNED BY M. GALLAGHER

CHECKED BY M. GALLAGHER

COMM. NO. 0117332

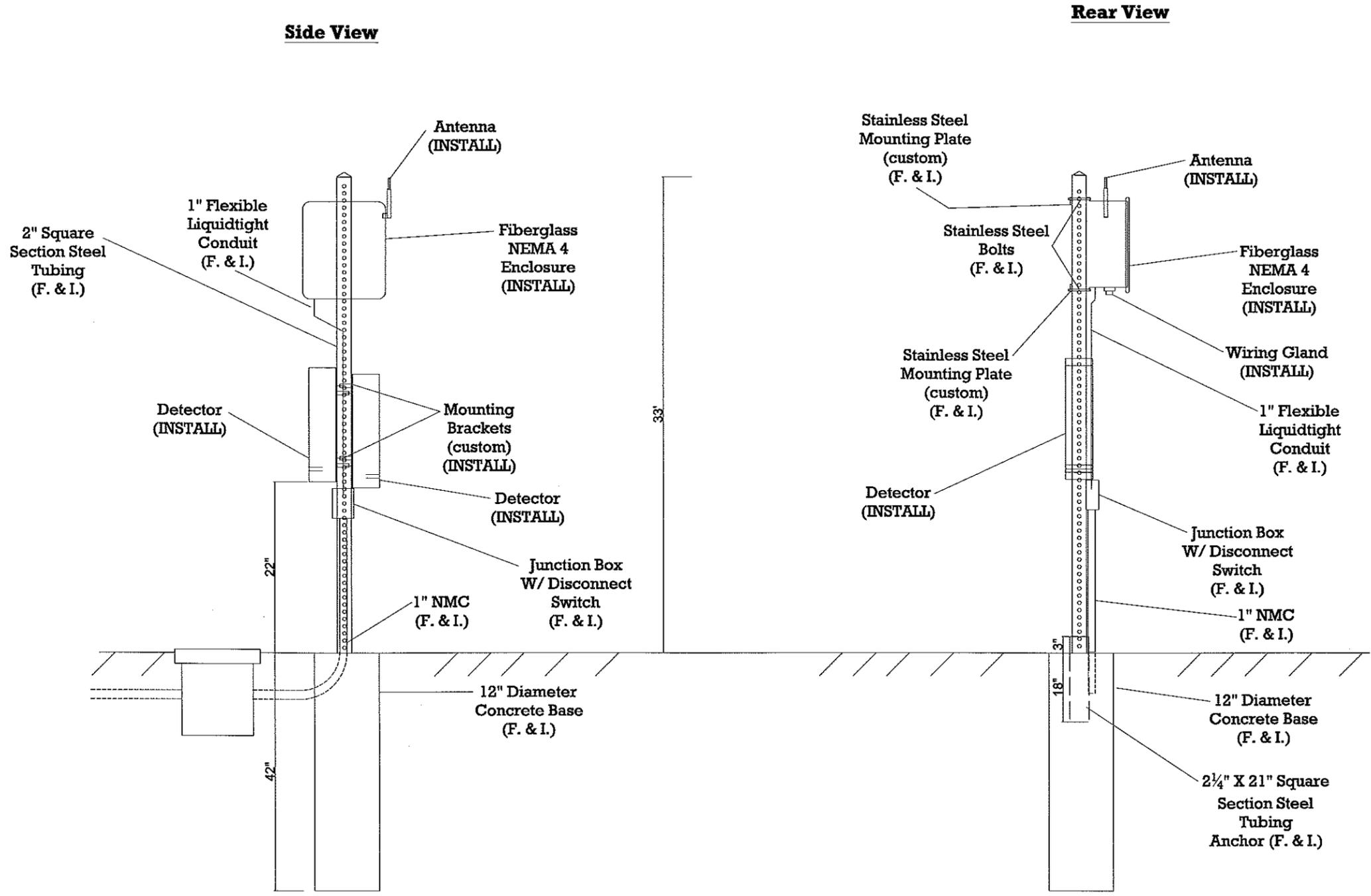


MINNESOTA DEPARTMENT OF TRANSPORTATION

DETECTOR EXTERIOR COMPONENT LAYOUT (SOLAR)

WILDLIFE DETECTION AND WARNING SYSTEM

SHEET 6 OF 20



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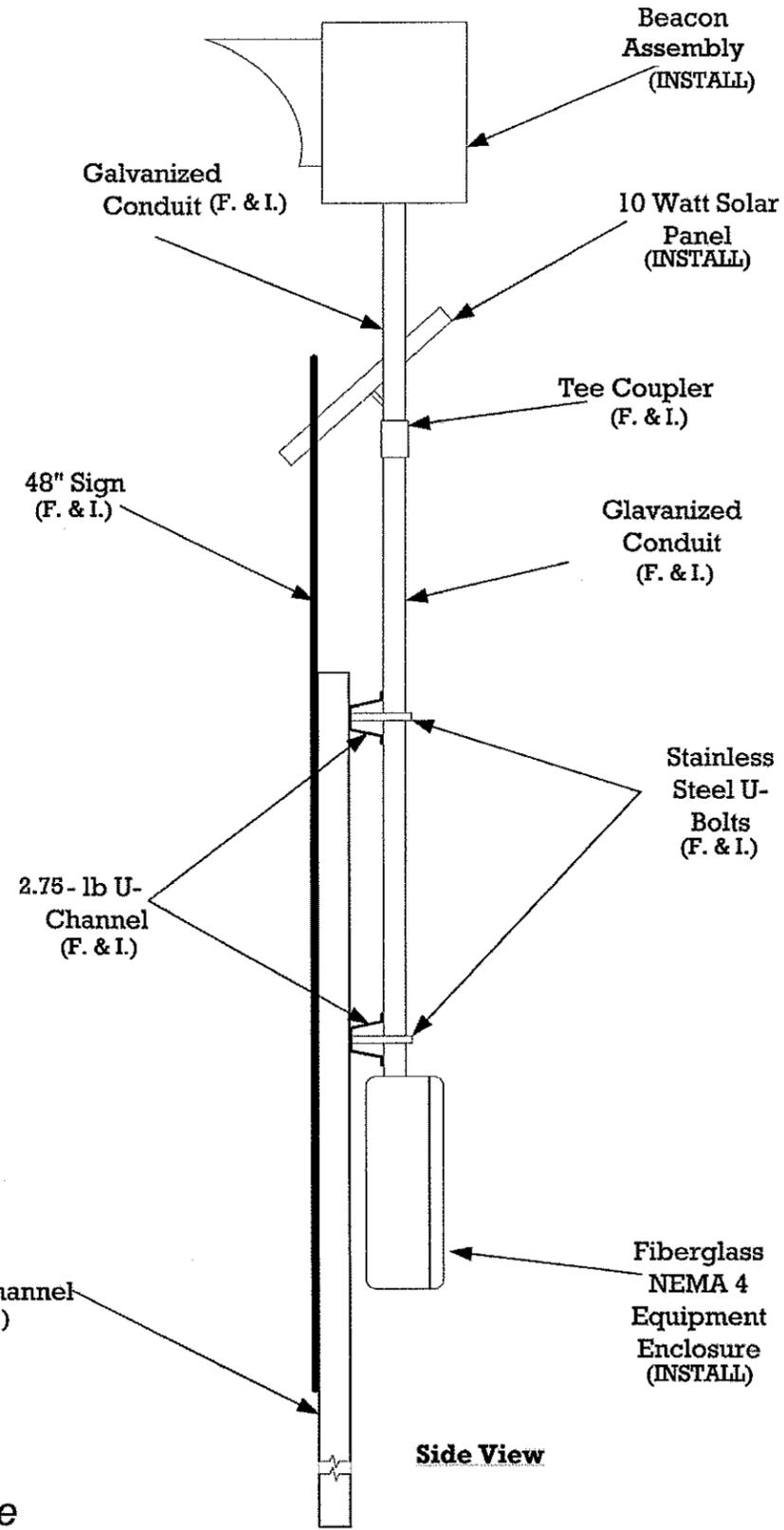
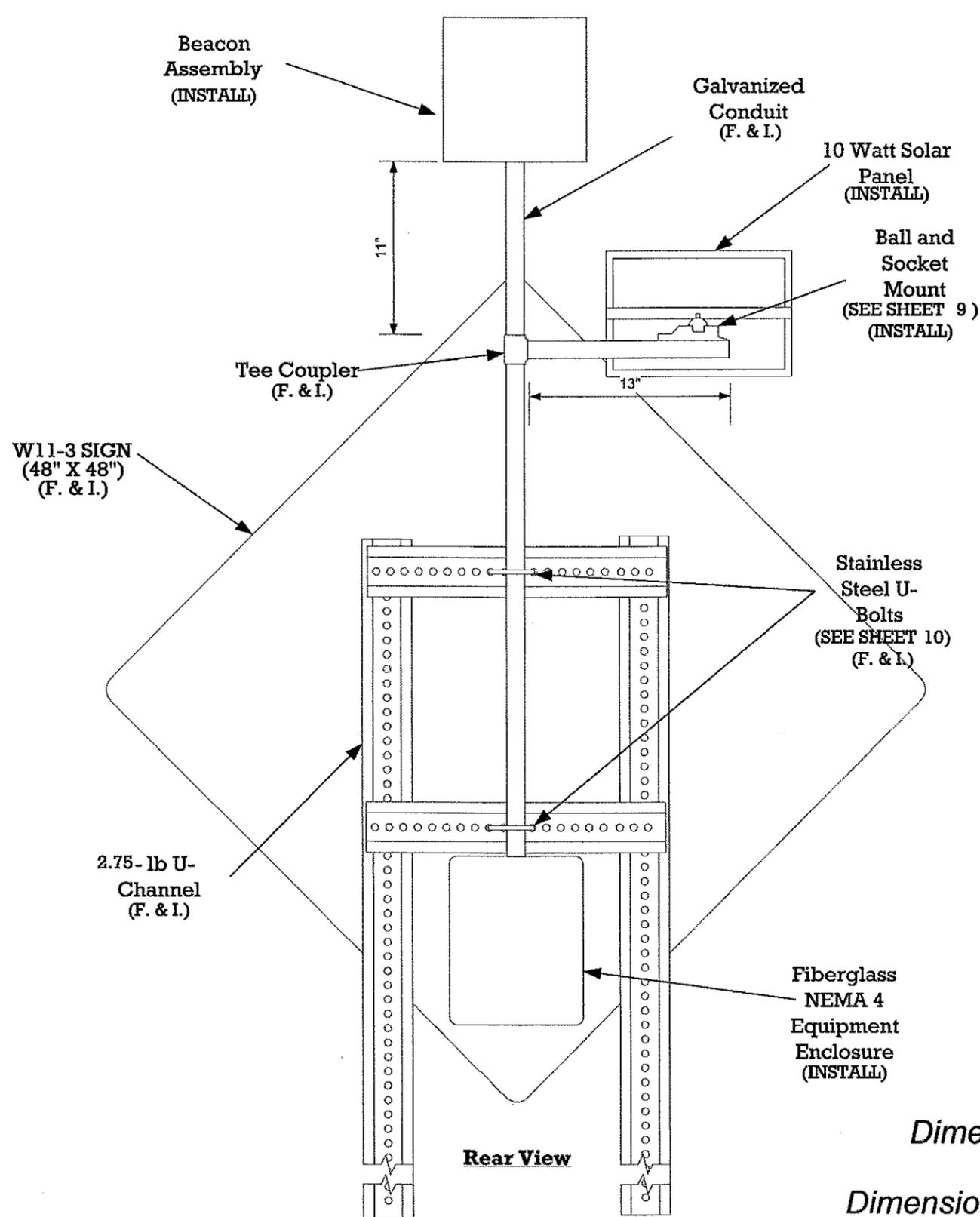
STATE AID PROJECT NO. X	DRAWN BY M. BRESSLER
STATE PROJECT NO. X	DESIGNED BY M. GALLAGHER
COUNTY PROJECT NO. X	CHECKED BY M. GALLAGHER
CITY PROJECT NO. X	COMM. NO. 0117332



**ENGINEERS  
 PLANNERS  
 DESIGNERS**

**MINNESOTA DEPARTMENT OF TRANSPORTATION**  
 DETECTOR EXTERIOR COMPONENT LAYOUT (AC POWER)  
 WILDLIFE DETECTION AND WARNING SYSTEM

**SHEET**  
**7**  
**OF**  
**20**



Dimensions in inches  
 Dimensions Are Approximate

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NO	DATE	BY	CKD	APPR	REVISION

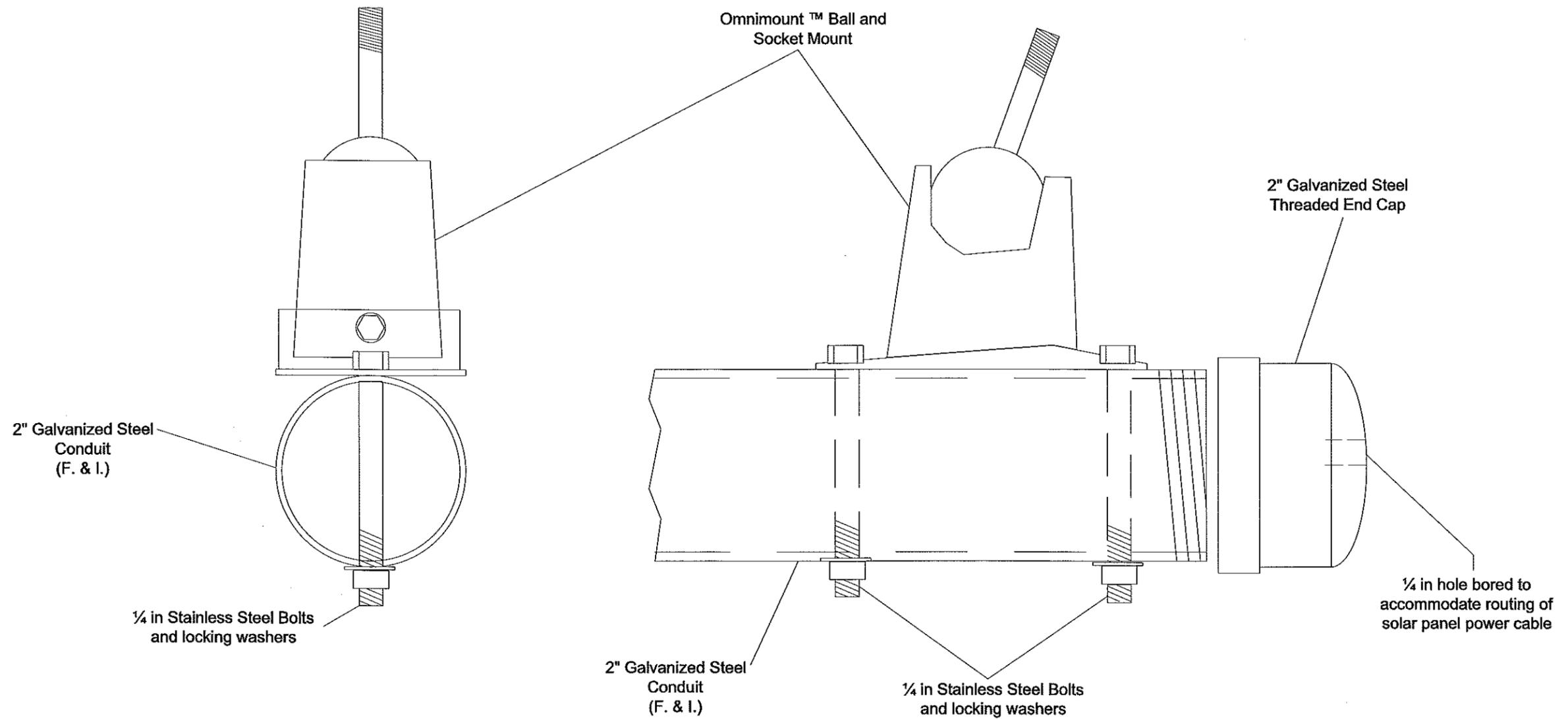
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*Erik D. Minge*  
 Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
 STATE PROJECT NO. X  
 COUNTY PROJECT NO. X  
 CITY PROJECT NO. X  
 DRAWN BY **M. BRESSLER**  
 DESIGNED BY **M. GALLAGHER**  
 CHECKED BY **M. GALLAGHER**  
 COMM. NO. 0117332



MINNESOTA DEPARTMENT OF TRANSPORTATION  
 SIGN COMPONENT LAYOUT (SOLAR)  
 WILDLIFE DETECTION AND WARNING SYSTEM

SHEET 8 OF 20



**NOTES:**

ALL ITEMS SHALL BE INSTALLED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE.

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*Erik D. Minge*

Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X

STATE PROJECT NO. X

COUNTY PROJECT NO. X

CITY PROJECT NO. X

DRAWN BY  
M. BRESSLER

DESIGNED BY  
M. GALLAGHER

CHECKED BY  
M. GALLAGHER

COMM. NO. 0117332



**ENGINEERS  
PLANNERS  
DESIGNERS**

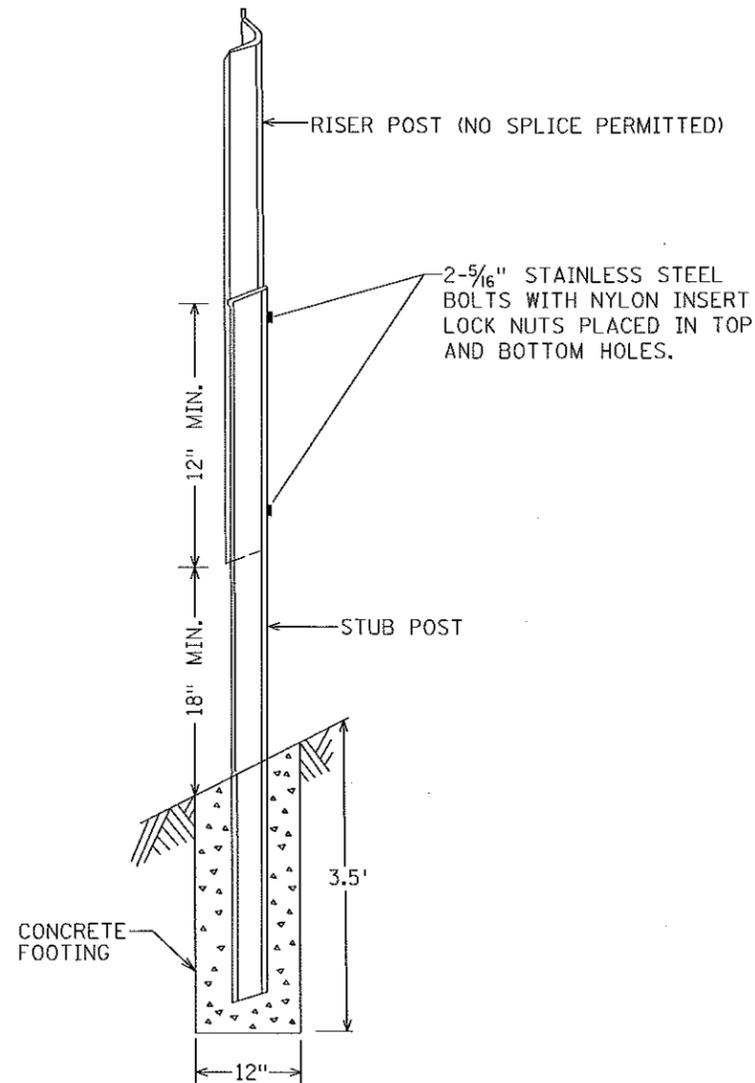
**MINNESOTA DEPARTMENT OF TRANSPORTATION**

SIGN SOLAR PANEL MOUNTING DETAIL

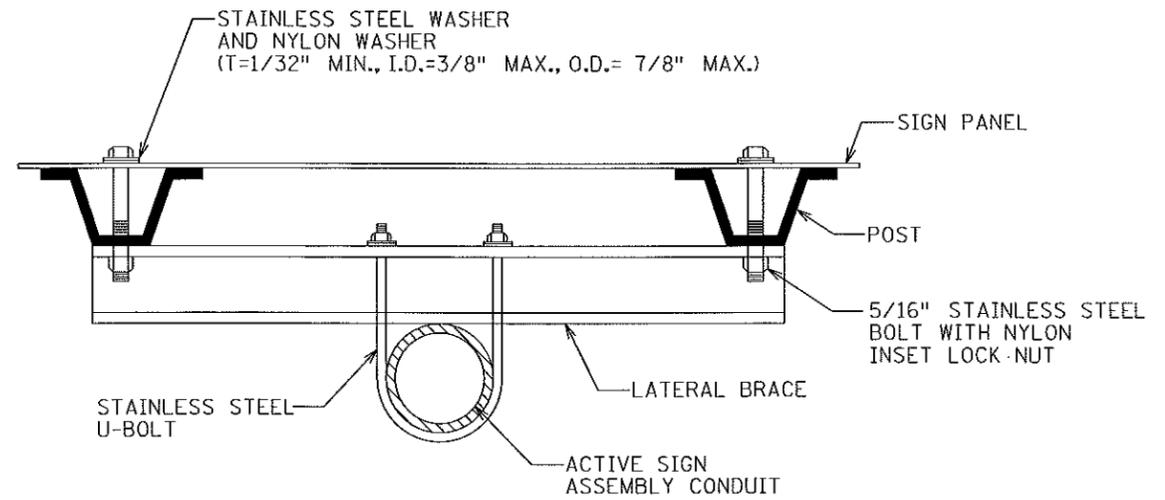
**WILDLIFE DETECTION AND WARNING SYSTEM**

**SHEET 9 OF 20**

TYPE C POST



FOOTING DETAIL



ACTIVE SIGN ASSEMBLY CONNECTION  
(TWO PER SIGN)

NOTES:

ALL ITEMS SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

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NO	DATE	BY	CHKD	APPR	REVISION

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Print Name: **ERIK D. MINGE**  
*Erik D. Minge*  
Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
STATE PROJECT NO. X  
COUNTY PROJECT NO. X  
CITY PROJECT NO. X

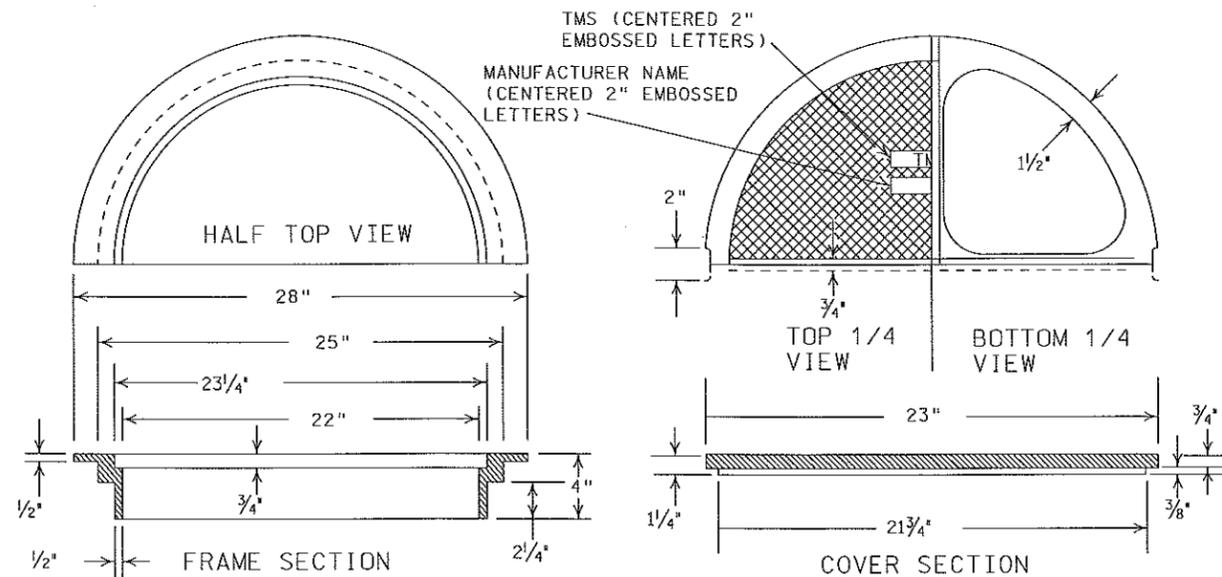
DRAWN BY M. BRESSLER  
DESIGNED BY M. GALLAGHER  
CHECKED BY M. GALLAGHER  
COMM. NO. 0117332



ENGINEERS  
PLANNERS  
DESIGNERS

MINNESOTA DEPARTMENT OF TRANSPORTATION  
SIGN ASSEMBLY CONNECTION DETAIL  
WILDLIFE DETECTION AND WARNING SYSTEM

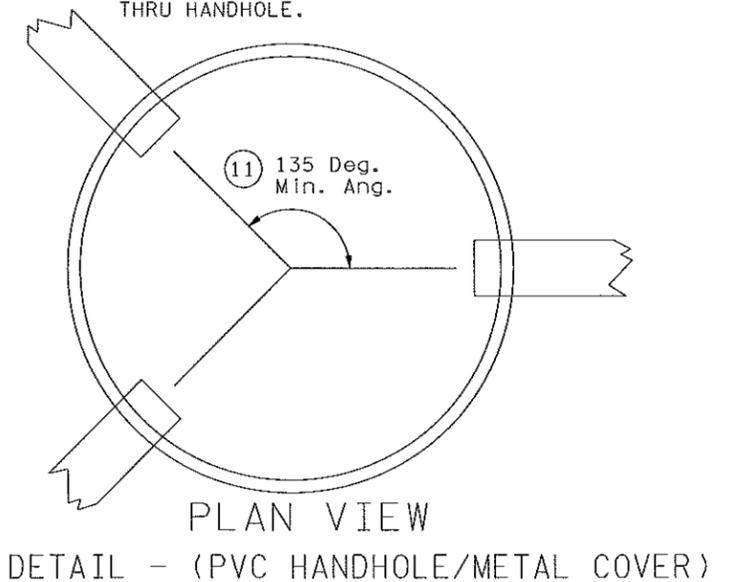
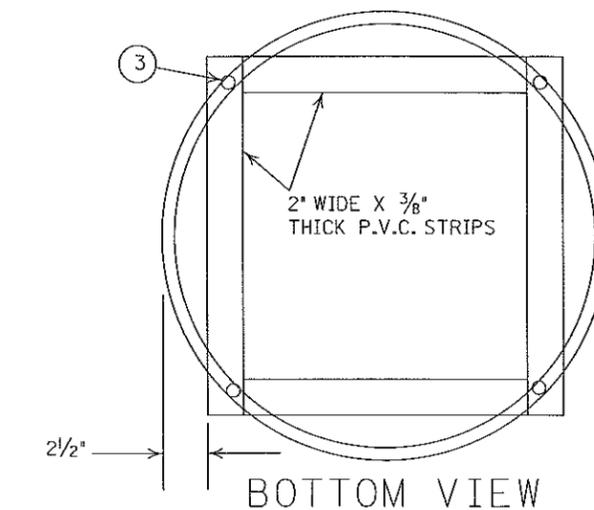
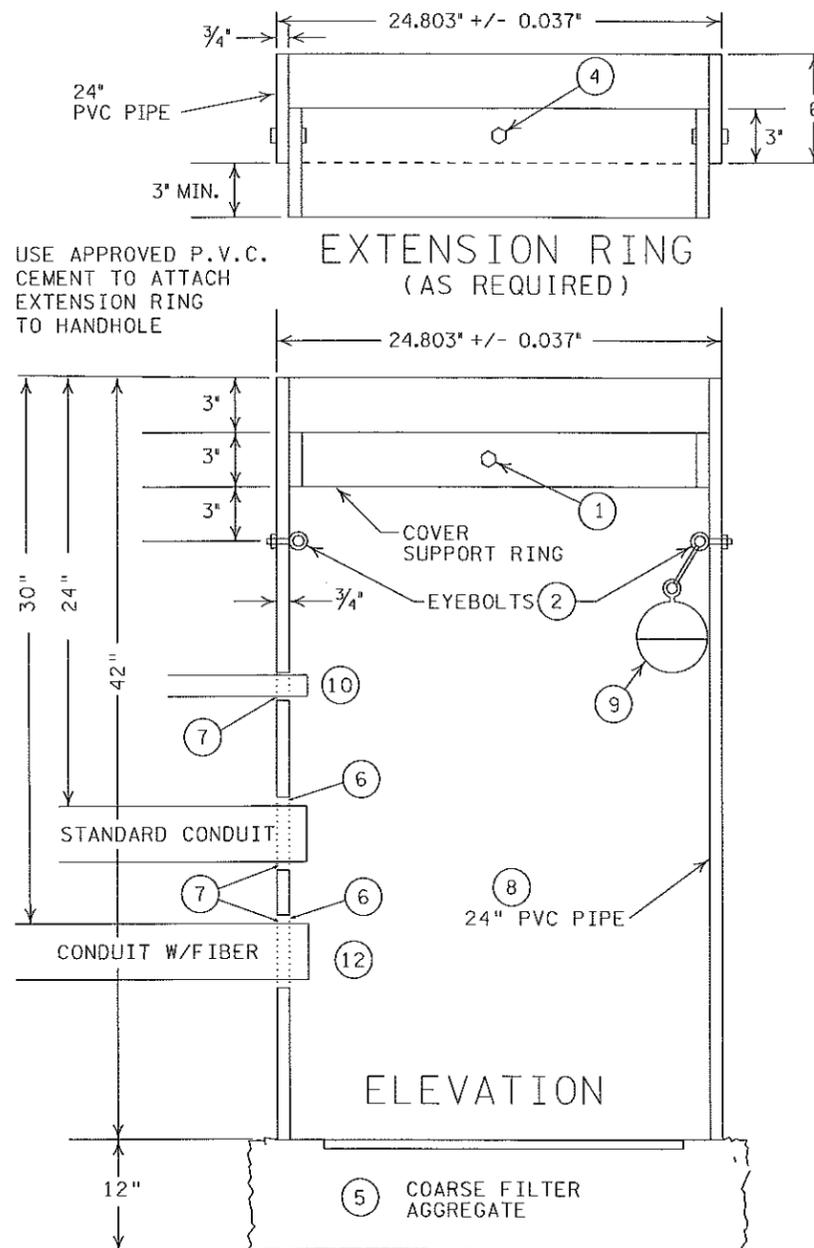
SHEET  
10  
OF  
20



FRAME AND COVER CASTING

LIGHT DUTY METAL COVER

NOTE:  
ALL CASTINGS ARE GRAY IRON PER  
MN/DOT SPEC. 3321 CLASS 35B



NOTES:

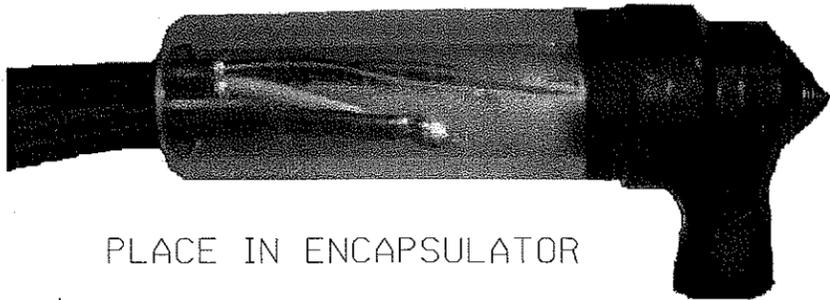
- ① ATTACH SPLIT 24" DIA. P.V.C. COVER SUPPORT RING WITH FOUR 3/8 " DIA. X 2" LONG BOLTS AND NUTS AT 90° APART.
- ② TWO TYPE 2 SHOULDER EYEBOLTS, 3/8 " DIA. X 1 1/4 " SHANK LENGTH, WITH HEX. NUTS AT 180° APART (FOR LIFTING HANDHOLES AND SUPPORTING ELECTRICAL CABLES).
- ③ FOUR 1/4 " X 1 1/4 " LONG GALVANIZED LAG SCREWS.
- ④ ATTACH SPLIT 24" DIA. PVC EXTENSION RING WITH FOUR 3/8 " DIA. X 2" LONG BOLTS AT 90° APART. THE BOLTS & NUTS COMPLY WITH MN/DOT 3391.2E, THE OTHER HARDWARE WITH 3392.
- ⑤ COMPACT COARSE FILTER AGGREGATE COMPLYING WITH MN/DOT 3149.2H TO A 12" DEPTH.
- ⑥ CONDUIT ENTRANCES IN THE BARREL ARE SIZED 1.0" LARGER THAN THE CONDUIT USED.
- ⑦ PLUG HANDHOLE AT CONDUIT INSTALLATION, PROVIDING A WATER TIGHT SEAL.
- ⑧ THE PVC PIPE COMPLIES WITH ASTM F 9T-1.
- ⑨ INSTALL ORANGE LOCATER BALL WITH TIE WRAP TO EYE BOLT
- ⑩ MINIMUM CONDUIT DEPTH FOR LOOP WIRES SHALL BE 1.5'.
- ⑪ F&I CONDUITS NO SHARPER THAN 135 DEG. FOR INSTALLATIONS OF CONDUIT WHERE FIBER WILL PASS THRU.
- ⑫ F&I CONDUITS WITH FIBER PASSING THRU AT 30" DEPTH THRU HANDHOLES. TRANSITION TO/FROM STANDARD 36" FIBER DEPTH OR PUSH DEPTH OUTSIDE HANDHOLES. NOTE: PROVIDE 36" CONDUIT STUB OUT FOR DIRECT BURIED FIBER PASSING THRU HANDHOLE.



CUT & REMOVE DRAIN WIRE

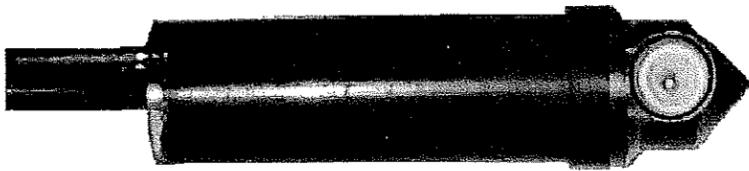


STAGGER SOLDERED BUTT SPLICE



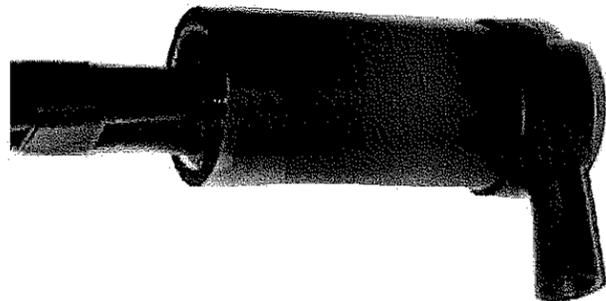
PLACE IN ENCAPSULATOR

TAPE WIRE TOGETHER BEFORE SPLICE



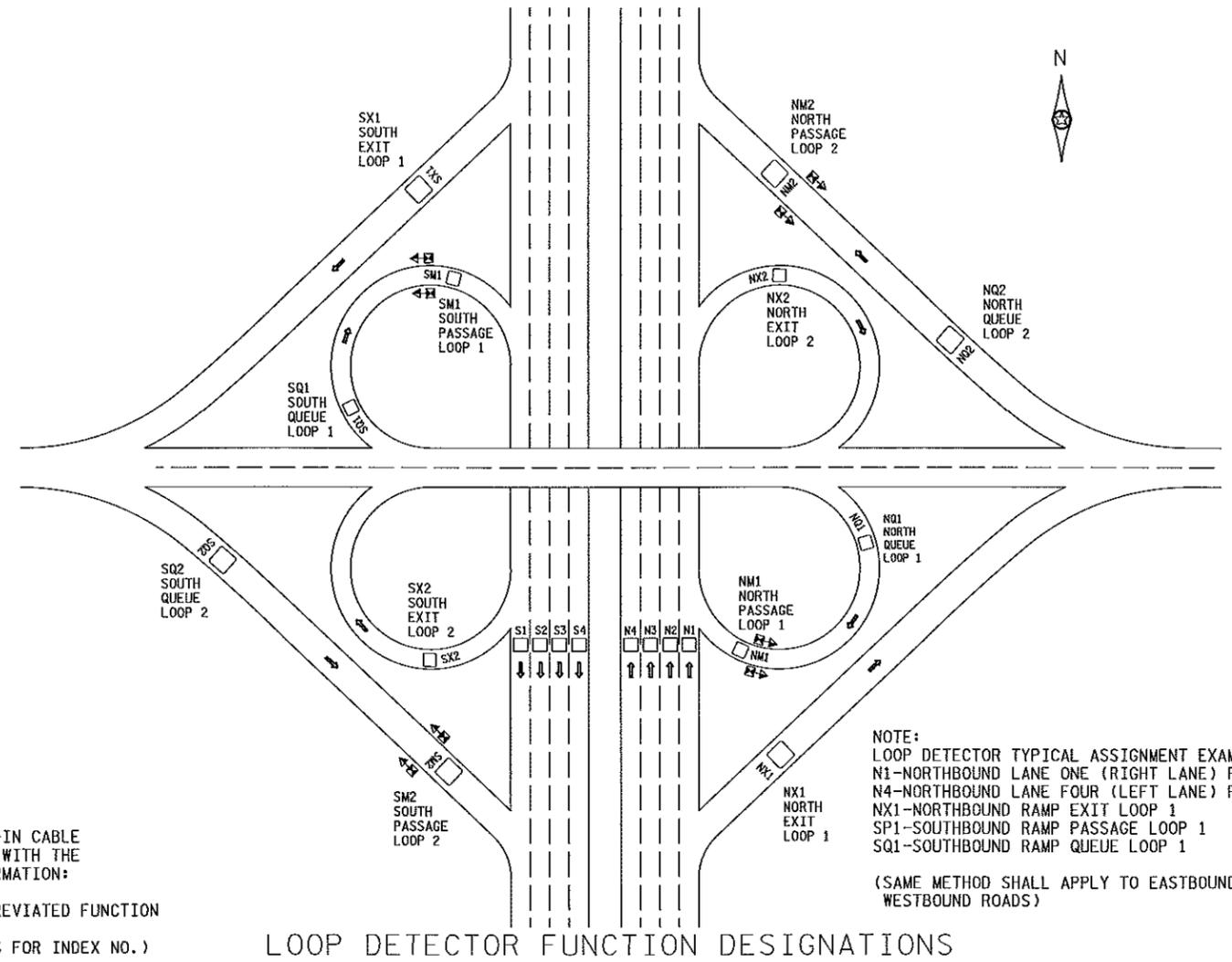
PLACE WIRE NUT IN ONE END TO BLOCK OPENING

TAPE

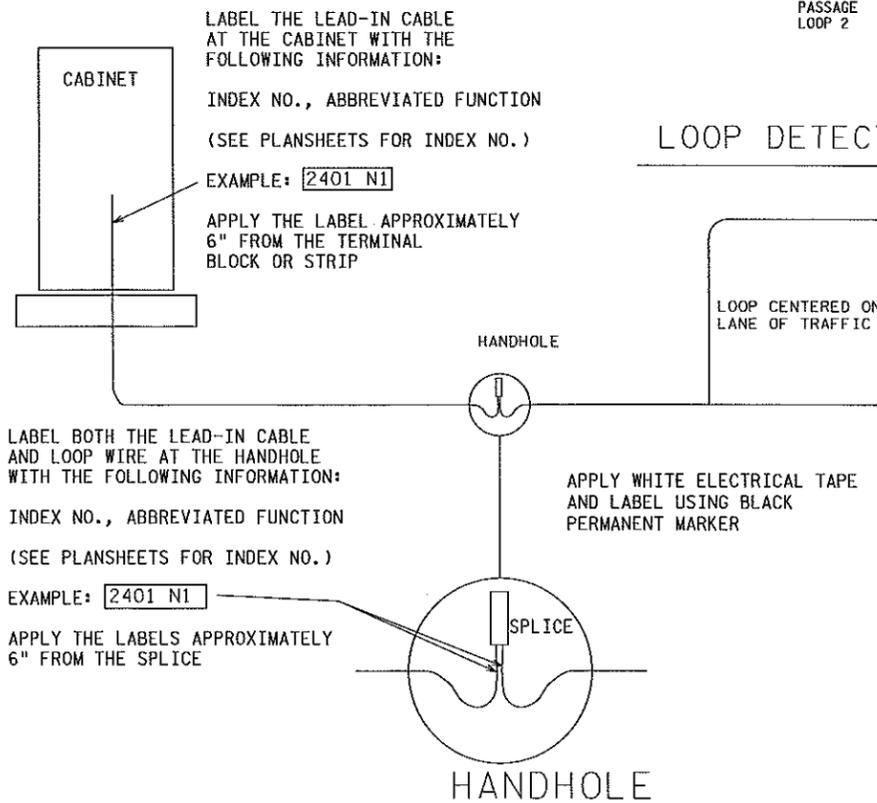


FILL ENCAPSULATOR COMPLETELY-ALLOW FINISHED SPLICE TO CURE SO EPOXY DOES NOT RUN OUT

LOOP DETECTOR SPLICE FOR SAWCUT AND PREFORMED LOOPS

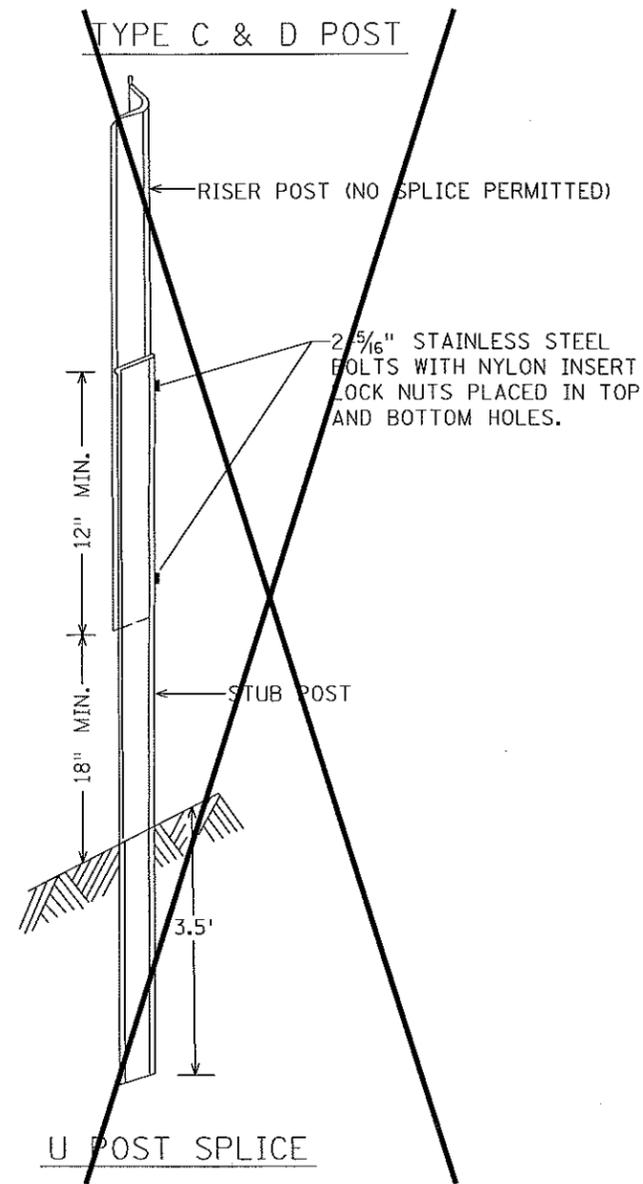


LOOP DETECTOR FUNCTION DESIGNATIONS

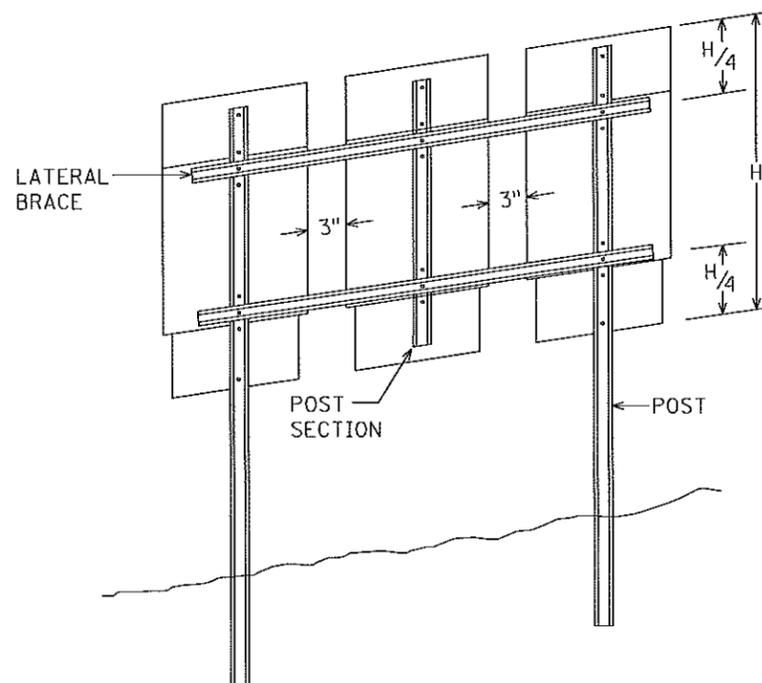
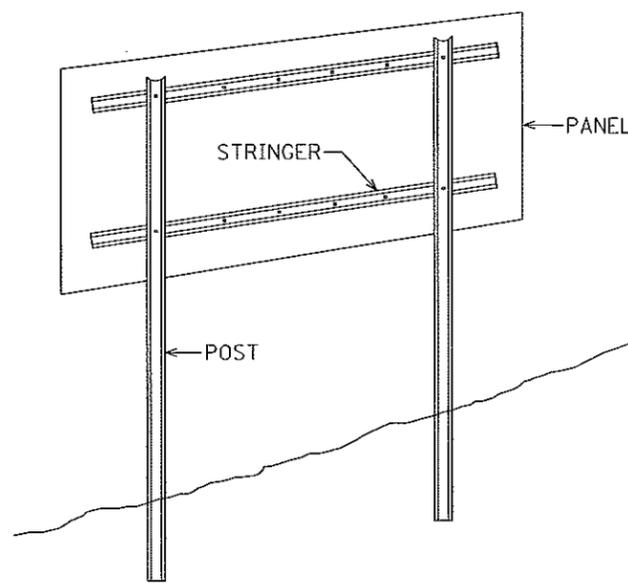
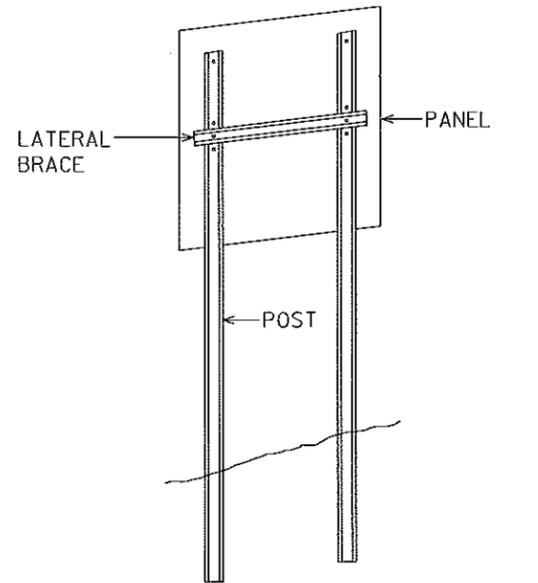
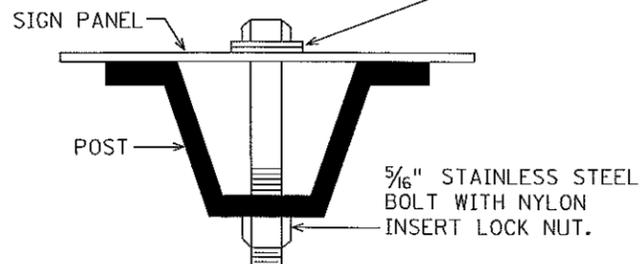


LOOP DETECTOR CABLE LABELING

TMS LOOP DETECTOR TYPICAL-PART TWO



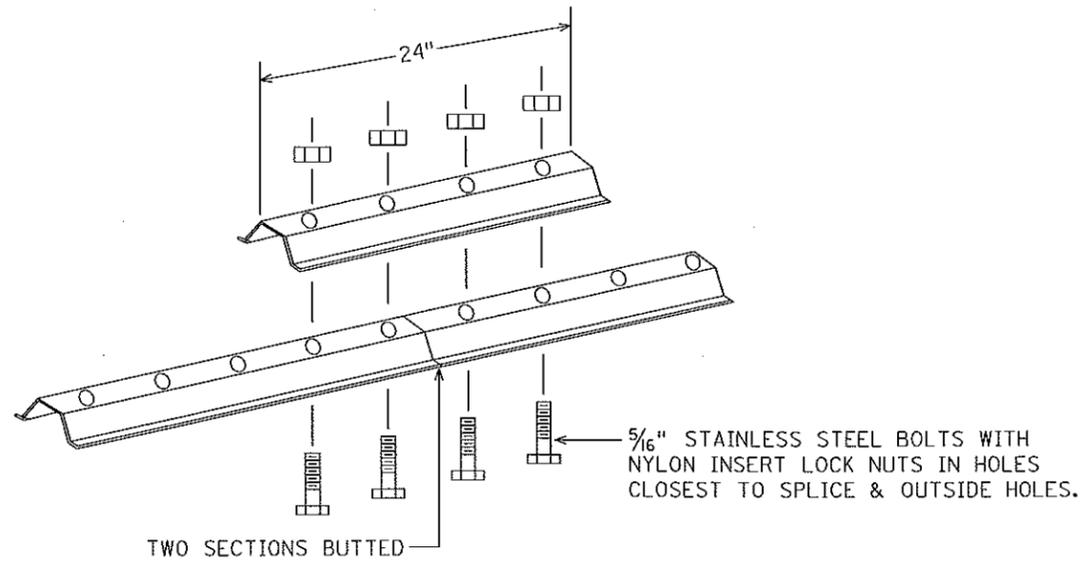
STAINLESS STEEL WASHER AND NYLON WASHER  
( $T = \frac{1}{32}$ " MIN., I.D. =  $\frac{3}{8}$ " MAX., O.D. =  $\frac{7}{8}$ " MAX.)



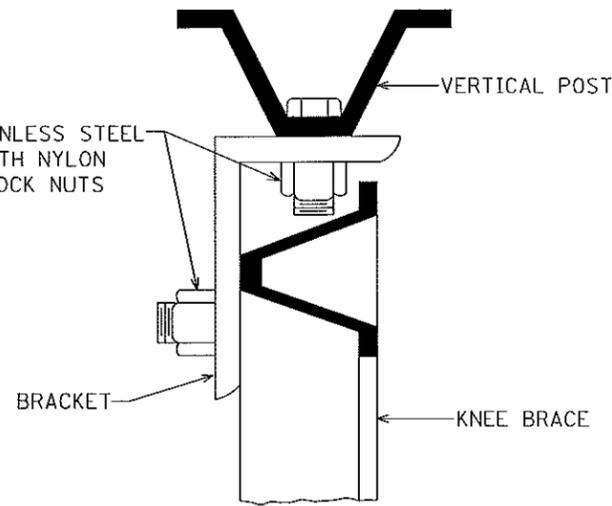
NOTES:

1. USE 3 LB/FT STUB POSTS, RISER POSTS, STRINGERS, KNEE BRACES, LATERAL BRACES AND KNEE BRACE STUB POSTS. ALL SHALL CONFORM TO MN/DOT 3401.
2. FOR TYPE D SIGN POSTS LENGTHS AND SPACINGS, SEE SIGN DATA SHEET.
3. 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).
4. MOUNTING (PUNCH CODE) FOR TYPE C SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
5. ALL RISER (VERTICAL) U POSTS SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
6. USE STAINLESS STEEL  $\frac{5}{16}$ " BOLTS, WASHERS AND NYLON INSERT LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
7. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
8. BRACING STUBS SHALL BE NO MORE THAN 4" ABOVE GROUND AND EMBEDDED AT LEAST  $3\frac{1}{2}$ '.
9. A-FRAME BRACKET SHALL BE STEEL CONFORMING TO MN/DOT 3306 AND GALVANIZED IN ACCORDANCE WITH MN/DOT 3394.
10. COLLARS SHALL BE USED TO SHIM OVERLAYS AND DEMOUNTABLE LEGEND AWAY FROM PANEL WHERE INTERFERENCE WITH BOLT HEADS IS ENCOUNTERED. MN/DOT 3352.2A5.
11. 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.
12. 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.
13. 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.

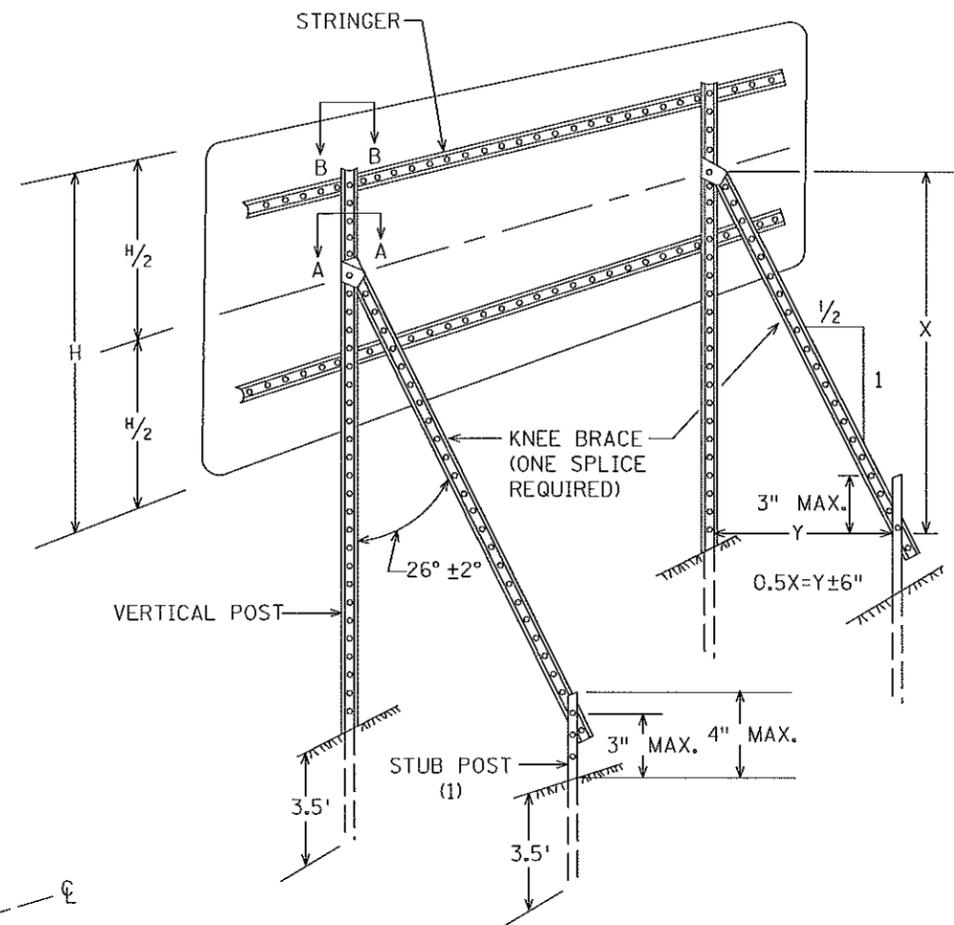
TYPE C & D SIGN  
STRUCTURAL DETAILS



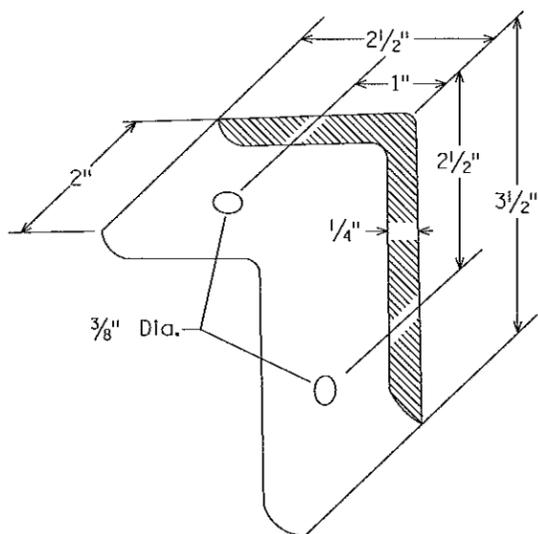
LATERAL BRACE OR STRINGER SPLICE DETAIL (EXPLODED VIEW)



SECTION A-A

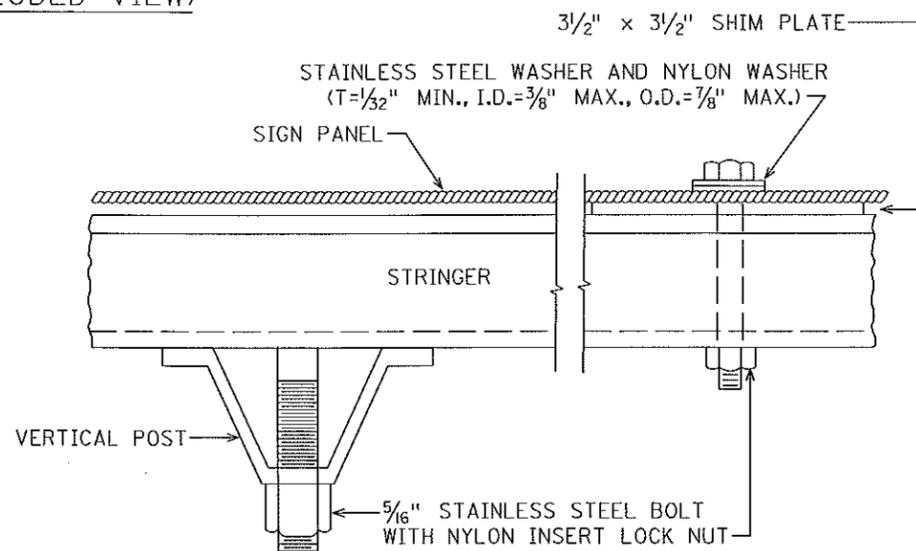


TYPICAL "A-FRAME" INSTALLATION TYPE "D" SIGNS

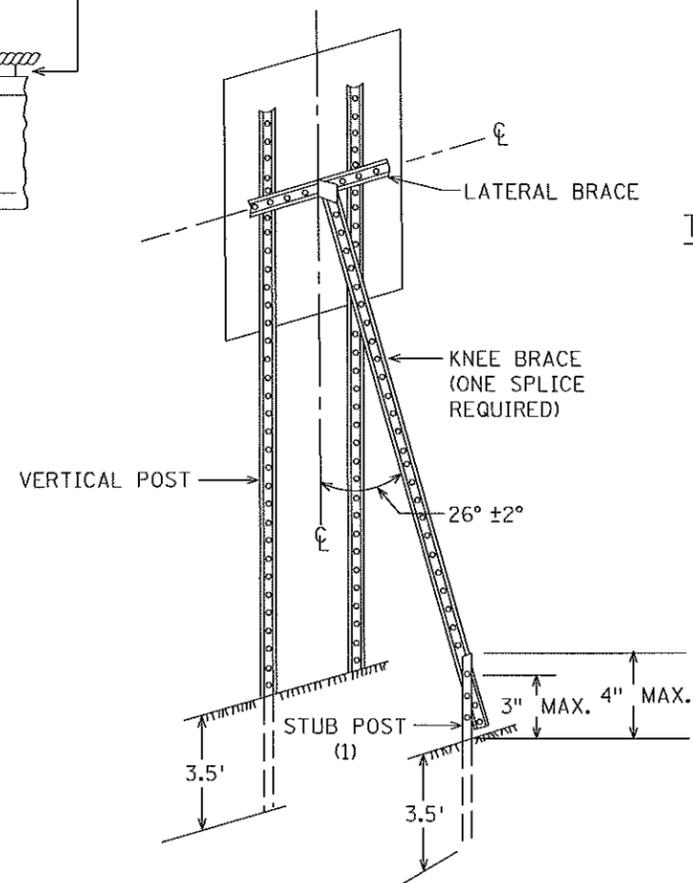


A-FRAME BRACKET

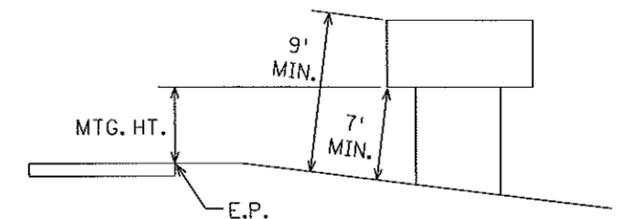
(STEEL MN/DOT 3306 GALVANIZED PER MN/DOT 3394)



SECTION B-B



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

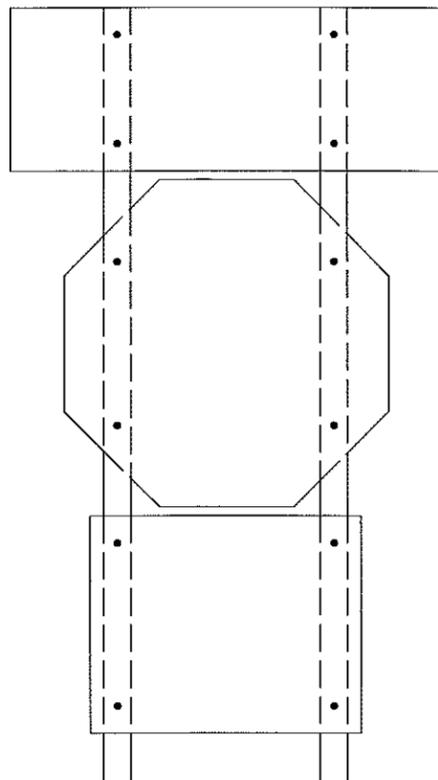


TYPICAL MOUNTING

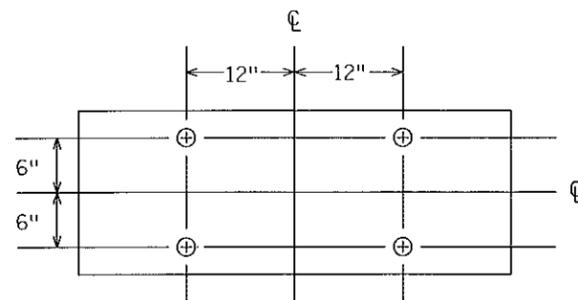
(1) OFFSET STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST. ATTACH STUB POST AND KNEE BRACE BACK TO BACK.

TYPE C & D SIGN STRUCTURAL DETAILS

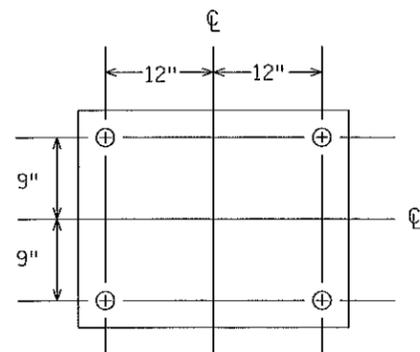
Sheet 2 of 3



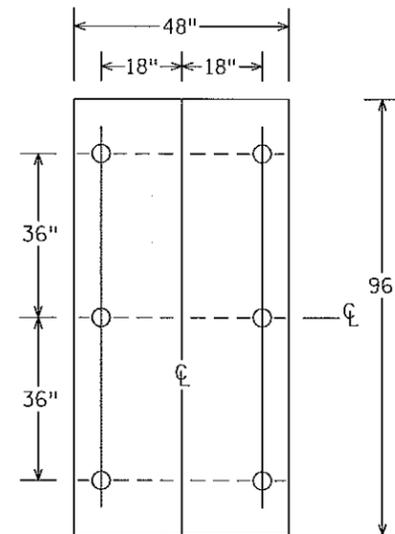
R6-1, R1-1 & (R6-3 OR R6-3a)  
MOUNTING



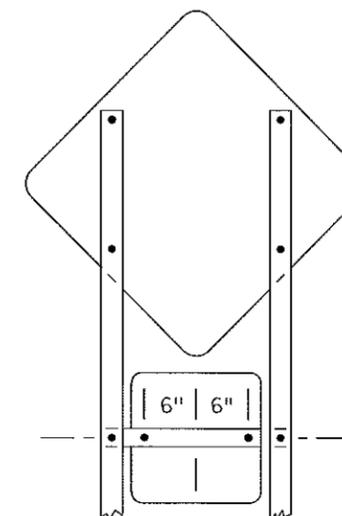
PUNCHING FOR R6-1(48" x 18")



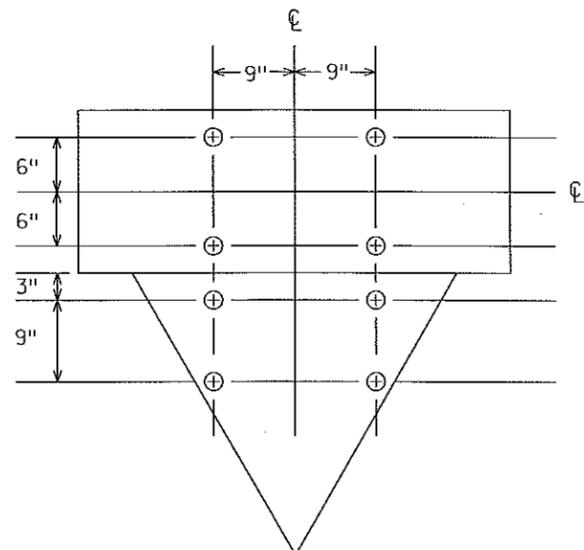
PUNCHING FOR R6-3 OR R6-3a(30" x 24")



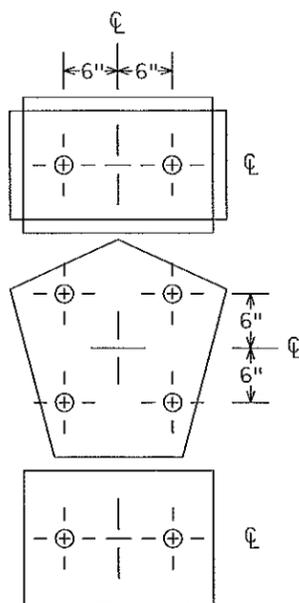
PUNCHING FOR R2-4b  
SPEED LIMIT



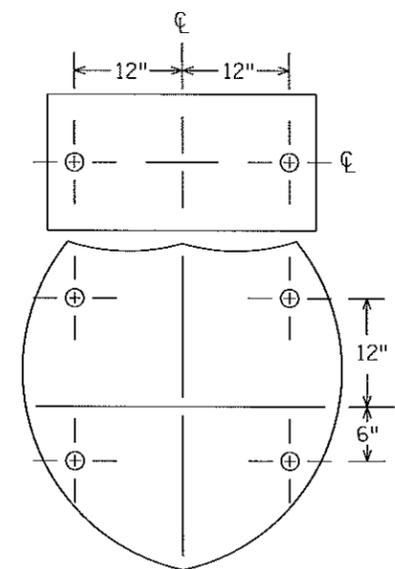
(W1-1, W1-2, W1-3, W1-4 OR W1-5) & W13-1  
MOUNTING



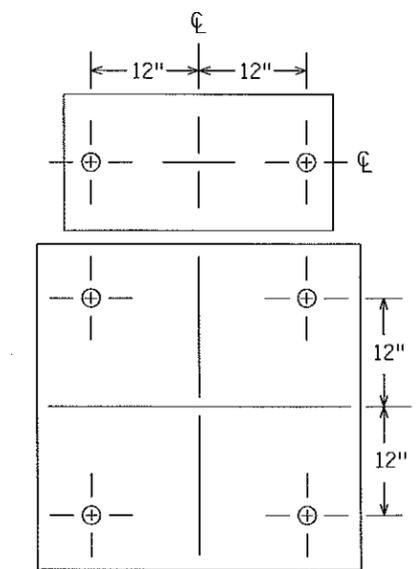
PUNCHING FOR R6-1(48" x 18")  
& R1-2(36" x 36" x 36")



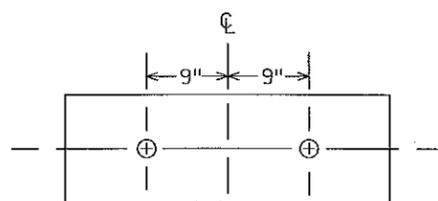
M2-1A [21" x 15"] OR  
(M3-1A, M3-2A, M3-3A OR M3-4A) [24" x 12"] AND  
M1-6 [24" x 24"] AND  
(M5-1A, M5-2A, M6-1A, M6-2A, M6-3A M6-4A, M6-5A OR M6-6A) [21" x 15"]  
PUNCHING



(M3-1A, M3-2A, M3-3A OR M3-4A) [30" x 15"] AND  
M1-1 [45" x 36" OR 36" x 36"]  
PUNCHING



(M3-1, M3-1A, M3-2, M3-2A, M3-3, M3-3A M3-4 OR  
M3-4A) [30" x 15"] AND (M1-4 OR M1-5A) [36" x 36"]  
PUNCHING

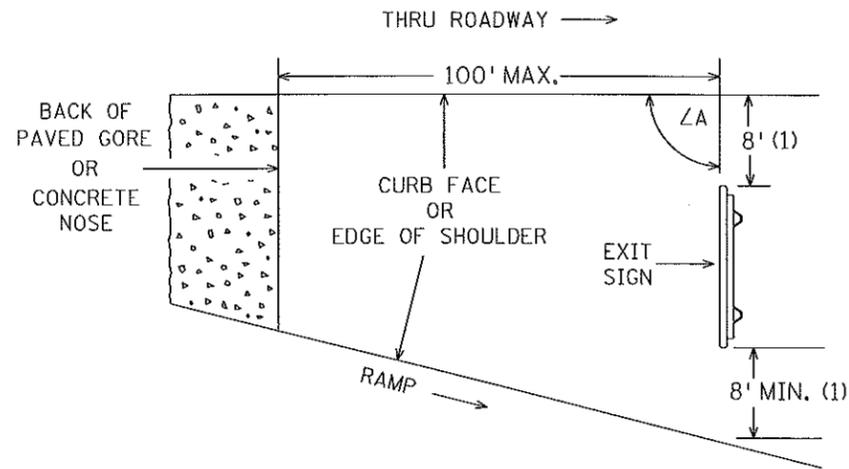


PUNCHING FOR R6-1(36" x 12")

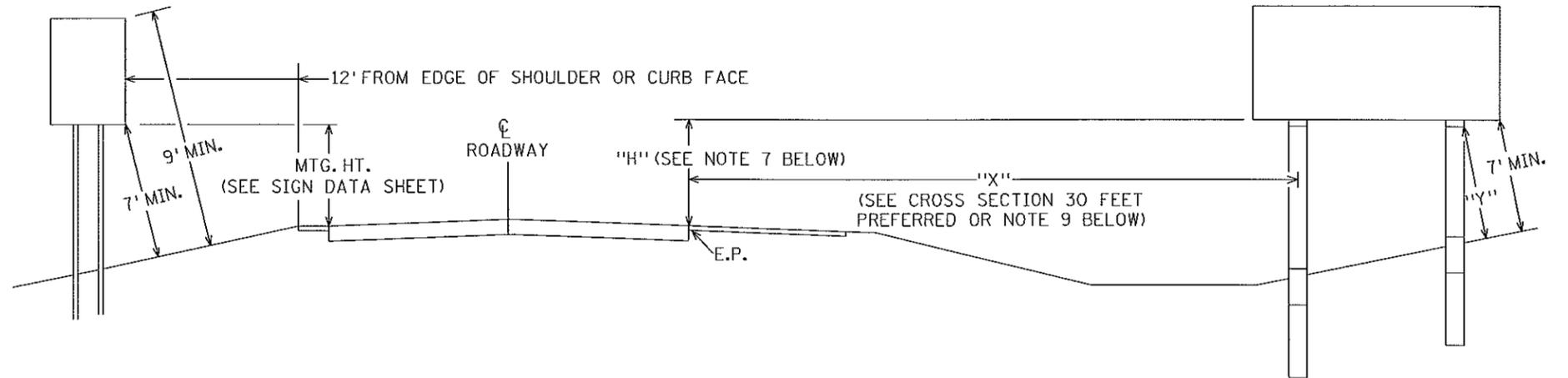
TYPE C & D SIGN  
STRUCTURAL DETAILS

Sheet 3 of 3

GORE PLACEMENT

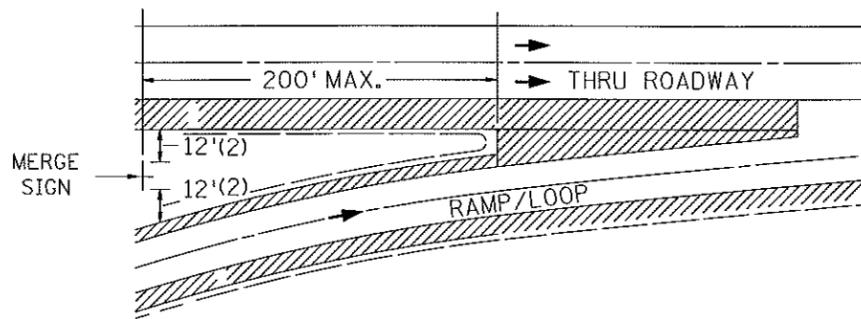


ROADSIDE PLACEMENT



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

MAJOR 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.

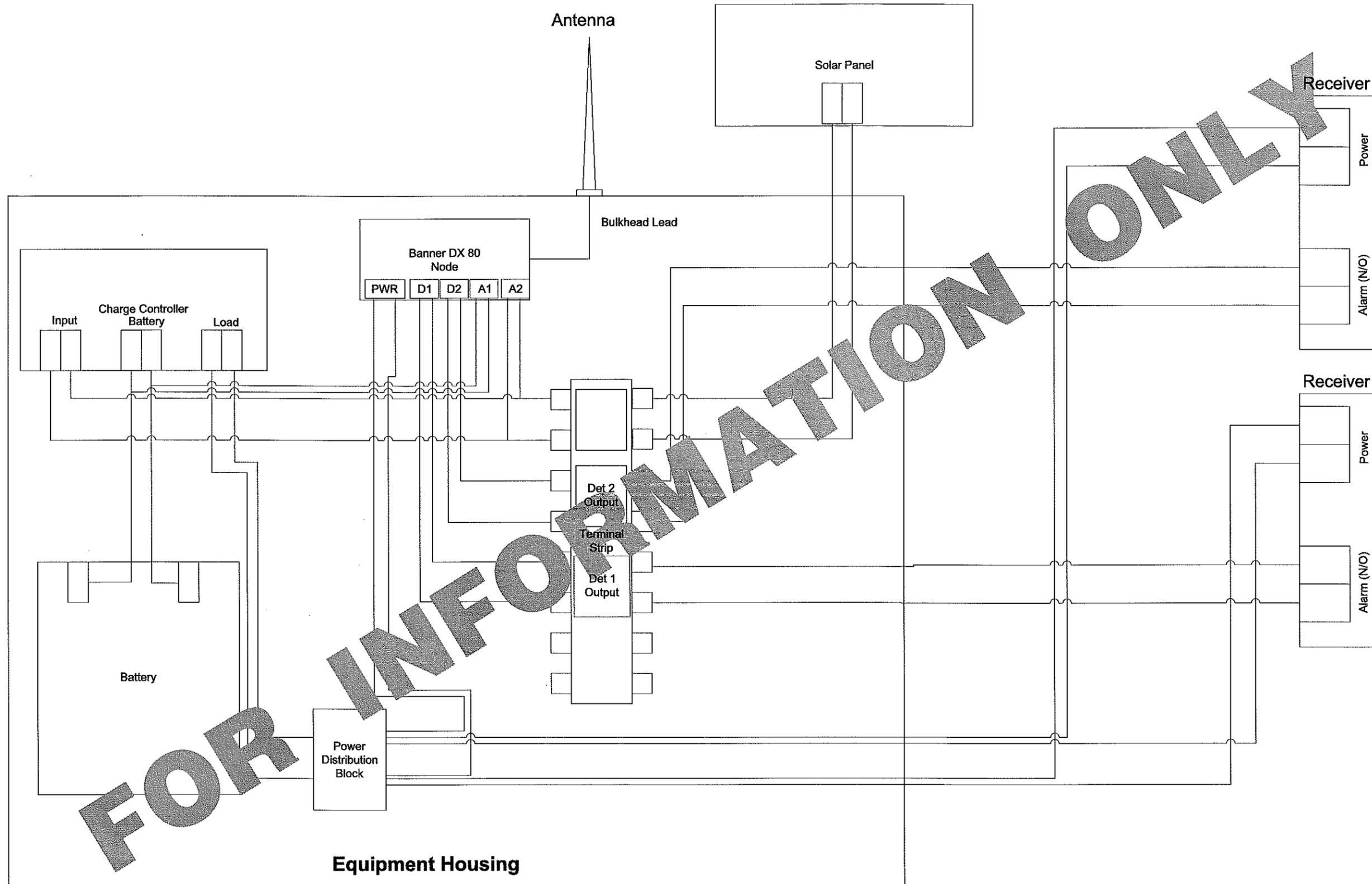
(2) MERGE SIGNS

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. IF A SECONDARY SIGN IS MOUNTED BELOW A MAJOR SIGN, THE MAJOR SIGN SHALL BE AT LEAST 8' ABOVE THE PAVEMENT EDGE AND THE SECONDARY SIGN AT LEAST 5'.
2. ALL ROUTE MARKERS, WARNING AND REGULATORY SIGNS SHALL BE AT LEAST 7' ABOVE PAVEMENT EDGE.
3. SIGN FACES SHALL BE VERTICAL.
4. OVERHEAD SIGNS SHALL BE POSITIONED AT RIGHT ANGLES TO THE THRU ROADWAY UNLESS OTHERWISE NOTED.
5. TO AVOID SPECULAR GLARE,  $\Delta A$  SHALL BE APPROXIMATELY  $93^\circ$  FOR SIGNS LOCATED LESS THAN 30' FROM THE EDGE OF PAVEMENT AND APPROXIMATELY  $92^\circ$  FOR SIGNS LOCATED 30' OR MORE FROM EDGE OF PAVEMENT. THIS APPLIES TO SIGNS TYPE A, C, & D AND INCLUDES SIGNS IN THE GORE.
6. "Y" IS THE PERPENDICULAR DISTANCE FROM THE GROUND LINE TO THE FRICTION FUSE ON THE POST. THIS DISTANCE SHALL BE AT LEAST 7'.
7. WHERE "X" IS LESS THAN 30', "H" SHALL BE  $7' \pm 6"$ . WHERE "X" IS 30' OR GREATER, MINIMUM AND PREFERRED "H" IS 5'.
8. LATERAL CLEARANCES GIVEN APPLY TO RIGHT AND OR LEFT SIDE INSTALLATION.
9. 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



FOR INFORMATION ONLY

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NO	DATE	BY	CHKD	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 Licensed Professional Engineer under the laws of the State of Minnesota.

Pr Int Name: **ERIK D. MINGE**

*Erik D. Minge*

Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
 STATE PROJECT NO. X  
 COUNTY PROJECT NO. X  
 CITY PROJECT NO. X

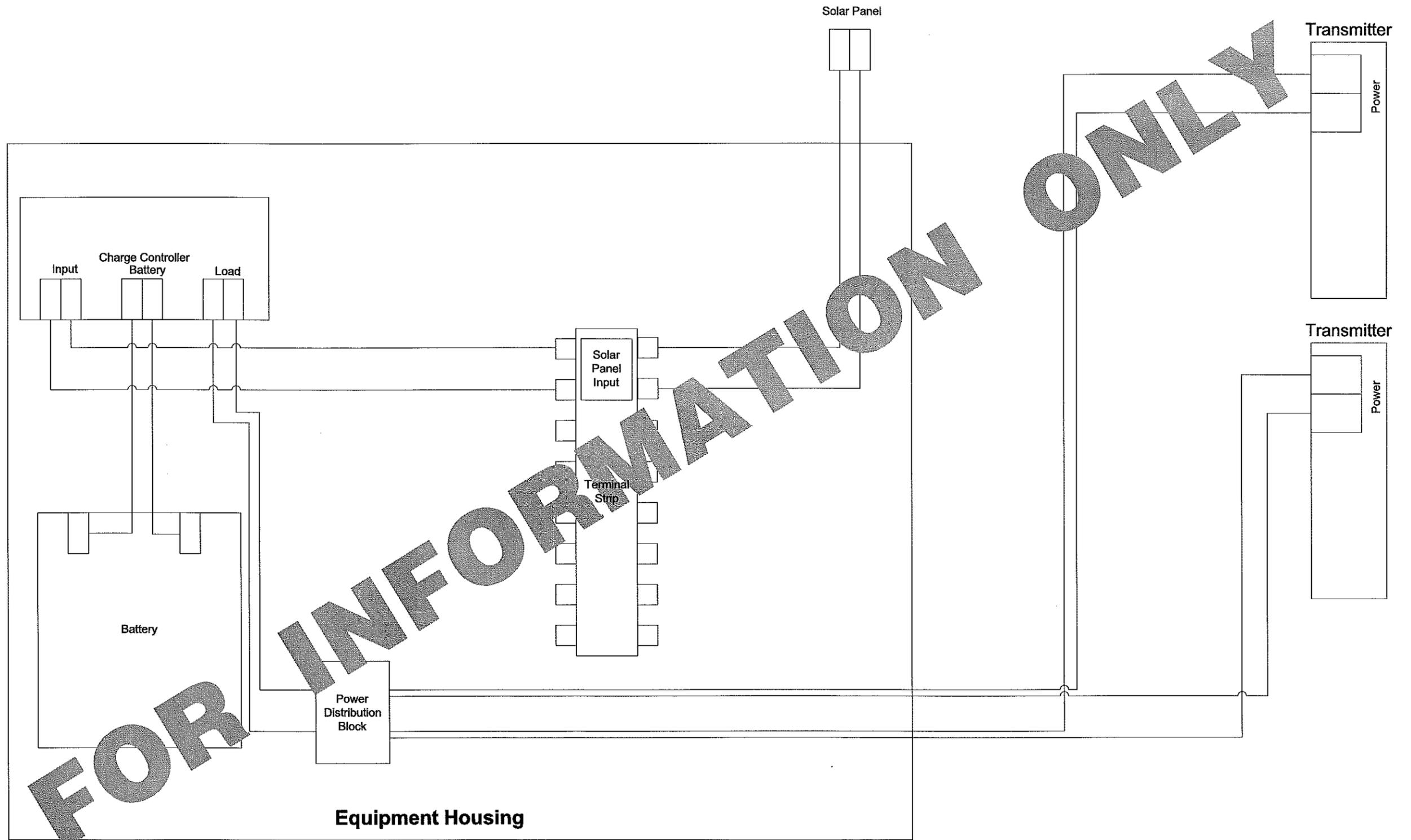
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 DESIGNED BY: M. GALLAGHER  
 CHECKED BY: M. GALLAGHER  
 COMM. NO. 0117332



**ENGINEERS  
 PLANNERS  
 DESIGNERS**

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 DETECTOR RECEIVER COMPONENTS  
 WIRING SCHEMATIC (SOLAR)  
 WILDLIFE DETECTION AND WARNING SYSTEM

SHEET 18 OF 20



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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 Licensed Professional Engineer under the laws of the State of Minnesota.  
 Print Name: **ERIK D. MINCE**  
*Erik D. Mince*  
 Date: 6/13/11 License # 24156

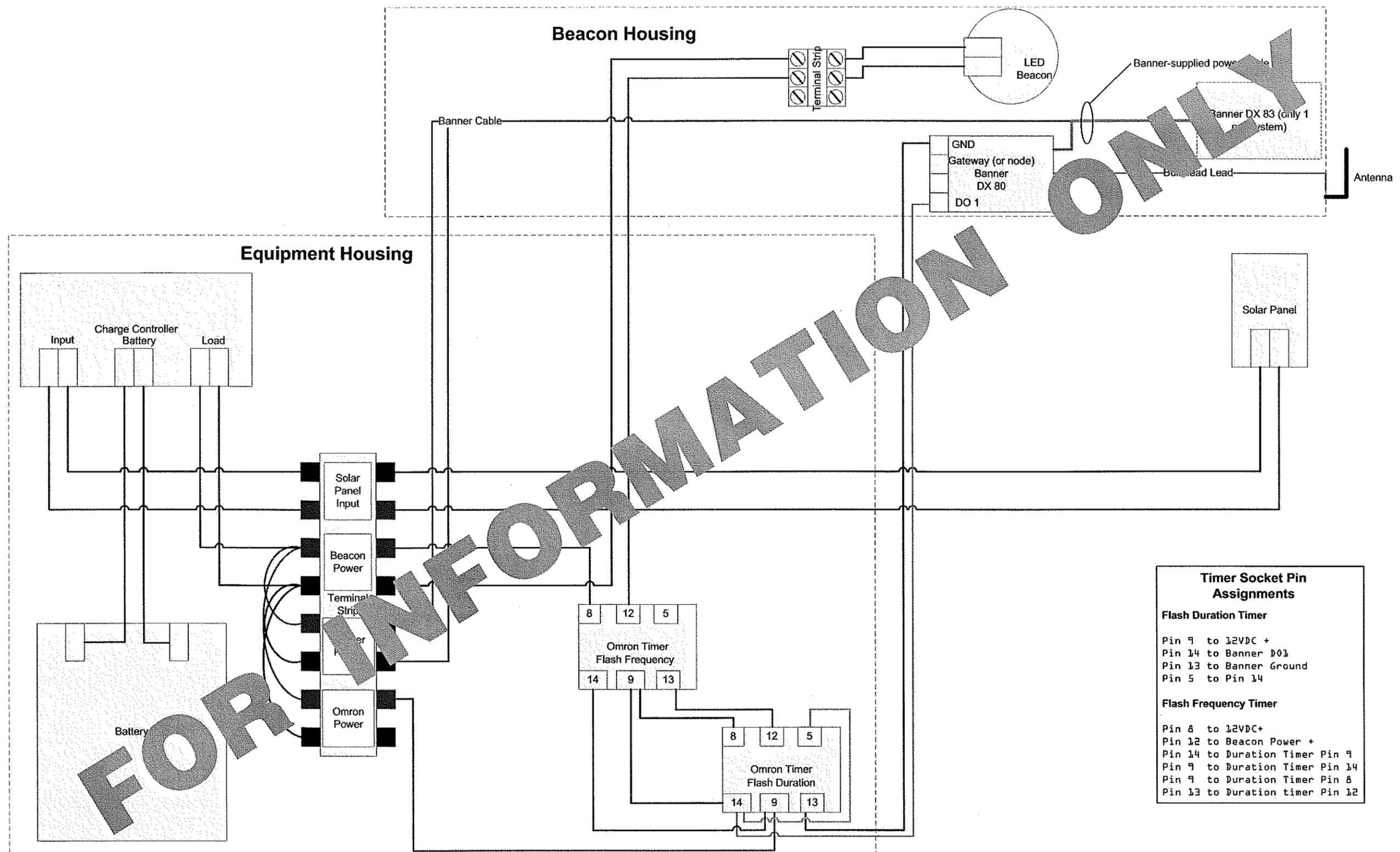
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STATE PROJECT NO. X	DESIGNED BY M. GALLAGHER
COUNTY PROJECT NO. X	CHECKED BY M. GALLAGHER
CITY PROJECT NO. X	COMM. NO. 0117332



**ENGINEERS  
 PLANNERS  
 DESIGNERS**

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 DETECTOR TRANSMITTER COMPONENTS  
 WIRING SCHEMATIC (SOLAR)  
 WILDLIFE DETECTION AND WARNING SYSTEM

SHEET  
 19  
 OF  
 20



**Timer Socket Pin Assignments**

**Flash Duration Timer**

Pin 9 to 12VDC +  
 Pin 14 to Banner DO1  
 Pin 13 to Banner Ground  
 Pin 5 to Pin 14

**Flash Frequency Timer**

Pin 8 to 12VDC+  
 Pin 12 to Beacon Power +  
 Pin 14 to Duration Timer Pin 9  
 Pin 9 to Duration Timer Pin 14  
 Pin 9 to Duration Timer Pin 8  
 Pin 13 to Duration timer Pin 12

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NO	DATE	BY	CHKD	APPR	REVISION

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I hereby certify that this plan, specification, or report 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: **ERIK D. MINGE**

*Erik D. Minge*

Date: 6/13/11 License # 24156

STATE AID PROJECT NO. X  
 STATE PROJECT NO. X  
 COUNTY PROJECT NO. X  
 CITY PROJECT NO. X

DRAWN BY M. BRESSLER  
 DESIGNED BY M. GALLAGHER  
 CHECKED BY M. GALLAGHER  
 COMM. NO. 0117332



ENGINEERS  
 PLANNERS  
 DESIGNERS

MINNESOTA DEPARTMENT OF TRANSPORTATION  
 ACTIVE SIGN WIRING SCHEMATIC (SOLAR)  
 WILDLIFE DETECTION AND WARNING SYSTEM

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