

STATE OF MINNESOTA
DEPARTMENT OF HIGHWAYS
TRAFFIC CONTROL SIGNAL SYSTEM &
CONSTRUCTION PLAN FOR INTERSECTION RECONSTRUCTION

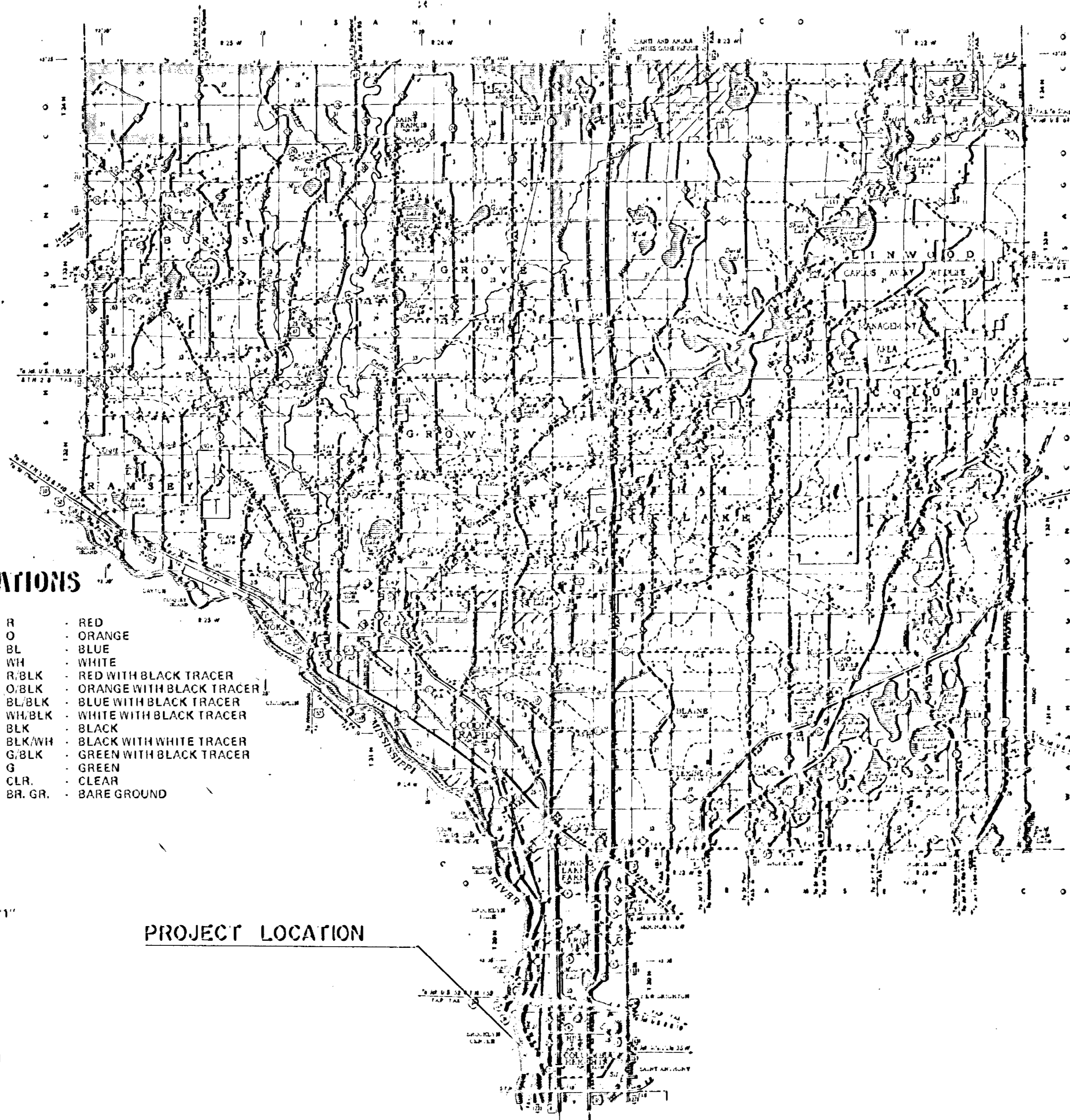
County State Aid Highway No. 1
AT THE JUNCTION OF C.S.A.H. 1 & C.S.A.H. 2

CONVENTIONAL SIGNS

Table of conventional signs with symbols and descriptions.

ABBREVIATIONS

Table of abbreviations for colors, materials, and symbols used in the plan.



PROJECT LOCATION

INDEX OF SHEETS

- 1. TITLE AND INDEX MAP
2. ESTIMATED QUANTITIES & STANDARD PLATES
3. TYPICAL SECTIONS & CROSS SECTIONS
4. TYPICAL SECTIONS & DETAILS
5. LOOP DETECTOR DETAILS
6. LAYOUT AT C.S.A.H. #1 AND 37th AVE. N.E.
7. SIGNAL SYSTEM LAYOUT
8. WIRING DIAGRAM
9. INTERSECTION RECONSTRUCTION LAYOUT

I hereby certify that this plan was prepared under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.
Paul A. Kunk

ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCES WILL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

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

Paul K. Kunk
COUNTY ENGINEER DATE 11-17-81

ANOKA COUNTY REG. NO. 6549

RECOMMENDED FOR APPROVAL C.E. Weichselbaum 11/23/81
DISTRICT STATE AID ENGINEER

RECOMMENDED FOR APPROVAL Robert D. Johnson 3-25-1982
STATE AID PLANS ENGINEER

APPROVED 3/28/83 [Signature]
STATE ROAD ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED: [Signature] DIVISION ADMINISTRATOR DATE

DESIGN DESIGNATION

ADT 1982 CSAH.1, 23,000; CSAH.2, 5,000
ADT 2002 CSAH.1, 40,000; CSAH.2, 10,000
HEAVY COMMERCIAL
NA Ton Design Soil Factor
Design Speed CSAH.1-55 MPH, CSAH.2-30 MPH
Design Speed not achieved at:
STA N/A TO STA MPH
STA N/A TO STA MPH

SPECIFICATIONS REFERENCE

THE 1978 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION" SHALL GOVERN

FORM MHD 21165 - 10 - 58

STATEMENT OF ESTIMATED QUANTITIES				
ITEM NO.	ITEM	UNIT	TOTAL ESTIMATED QUANTITIES	TOTAL FINAL QUANTITIES
2101.502	CLEARING	TREE	1	
2101.507	GRUBBING	TREE	1	
2104.505	REMOVE BITUMINOUS & CONCRETE PAVEMENT	SQ. YD.	215	
① 2105.501	CUTTON EXCAVATION	CU. YD.	96(P)	
② 2105.521	GRANULAR DORROW (L.V)	CU. YD.	209	
③ 2211.501	AGGREGATE BASE, CLASS 5	TON	177	
2331.504	BITUMINOUS MATERIAL FOR MIXTURE	TON	3	
2331.510	BINDER COURSE MIXTURE	TON	60	
2341.504	BITUMINOUS MATERIAL FOR MIXTURE	TON	5	
④ 2341.508	WEARING COURSE MIXTURE	TON	83	
2535.501	BITUMINOUS CURB	LIN. FT.	725	
2545.521	2" RIGID STEEL CURBOUT	LIN. FT.	150	
2545.523	2" HOT METALLIC CURBOUT	LIN. FT.	1785	
2545.531	UNDERGROUND WIRE 12 COND. NO. 12	LIN. FT.	3155	
2545.533	PULL BOXES	F.M.H	14	
2565.501	FULL TRAFFIC-CONTROLLED TRAFFIC CONTROL SYSTEM	SIG. SYS.	1	
0565.601	INTERCONNECT COORDINATION EQUIPMENT (37TH AVENUE)	LRP SUM	1	
2575.501	ROADSIDE SHEDDING	ACRE	0.15(P)	
2575.502	SEED, MIXTURE G	POUND	12	
2575.511	MULCH MATERIAL, TYPE 1	TON	0.3	
2575.531	COMMERCIAL FERTILIZER, ANALYSIS 10-10-10	TUN	0.05	

- ① INCLUDES 12 CU. YDS. FOR NEW ENTRANCE LEFT OF STA. 10+38.
- ② INCLUDES 20 CU. YDS. FOR ISLAND CONSTRUCTION & 4 CU. YDS. FOR NEW ENTRANCE CONSTRUCTION
- ③ INCLUDES 52 TON FOR NEW ENTRANCE CONSTRUCTION.
- ④ INCLUDES 25 TON FOR NEW ENTRANCE & 13 TON FOR PAVING ISLANDS.

BASIS OF PLANNED QUANTITIES

- 2211 AGGREGATE BASE, CLASS 5
145 LBS./CU. FT. COMPACTED
- 2331 PLANT MIXED BINDER COURSE
BITUMINOUS MIXTURE 220 LBS./S.Y. PER 2" THICKNESS
BITUMINOUS MATERIAL FOR MIXTURE 4.5% BY WEIGHT
- 2341 PLANT MIXED WEAR COURSE
BITUMINOUS MIXTURE 165 LBS./S.Y. PER 1 1/2" THICKNESS
BITUMINOUS MATERIAL FOR MIXTURE 6.0% BY WEIGHT
- 2575 ROADSIDE SHEDDING BASED ON HORIZONTAL MEASUREMENTS PLUS 10%
- 2575 MULCH MATERIAL, TYPE 1 - 2 TONS PER ACRE
- 2575 SEED, MIXTURE NO. 6 - 75 LBS. PER ACRE
- 2575 COMMERCIAL FERTILIZER, ANALYSIS 10-10-10 - 500 LBS. PER ACRE

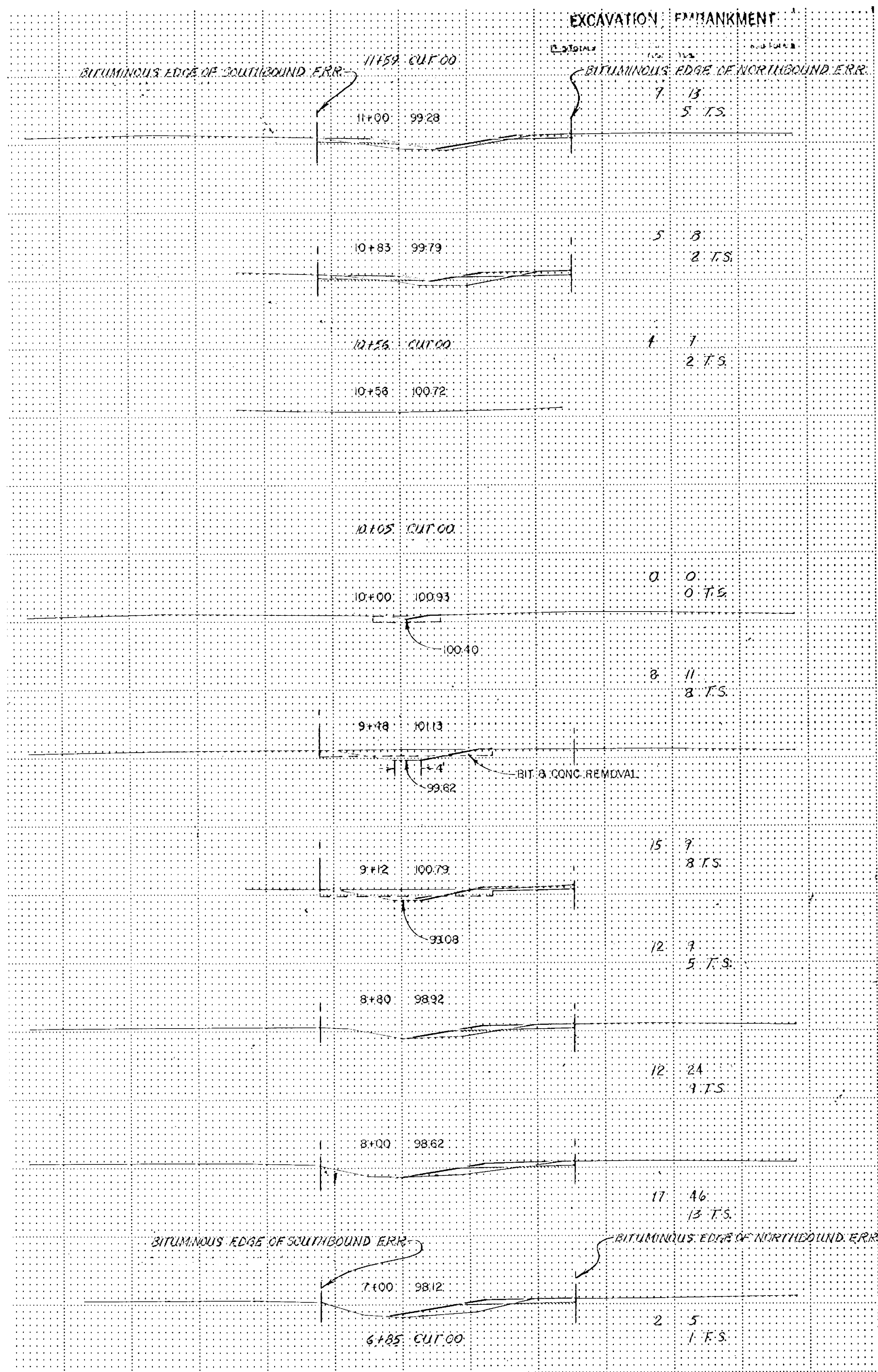
SPECIAL DETAILS

THE CONTRACTOR SHALL REMOVE, AND STOCKPILE IF NECESSARY, SUFFICIENT TOPSOIL MATERIAL WITHIN THE EXCAVATION AREAS AND AREAS ON WHICH EMBANKMENT WILL BE PLACED, FOR TOPSOIL COVERING ON THE NEW SLOPES AND DITCH BOTTOMS. THIS WILL REQUIRE APPROXIMATELY 76 CU. YDS. TO PROVIDE A MINIMUM COVER OF 3". THIS WORK WILL BE CONSIDERED AS INCIDENTAL TO CUTTON EXCAVATION.

The following Standard Plates, approved by the Federal Highway Administration, shall apply on this project.

PLATE NO.	DESCRIPTION
8000H	STANDARD BARRICADES
8110C	TRAFFIC SIGNAL BRACKETING (POLE MOUNTED)
8111B	TRAFFIC SIGNAL BRACKETING (PIEDestal MOUNTED)
8112C	PIEDestal FOUNDATION
8113C	INDUCTIVE VEHICLE DETECTOR INSTALLATION
8115C	PEDESTRIAN PUSH BUTTON INSTALLATION
8116C	STEEL CURB POST
8117F	PRECAST CONCRETE HANDHOLE (OR PULLBOX)
8118C	SERVICE EQUIPMENT & POLE, TRAFFIC CONTROL SIGNALS
8119C	GROUND MOUNTED CABINET FOUNDATION
(1) 8120	POLE FOUNDATION
8120C	PIEDestal & PIEDestal BASE
(1) 8123	POLE & MAST ARM (LUMINAIRE & TRAFFIC LIGHTS ASSEMBLY)
8124C	MAST ARM SIGNAL HEAD MOUNTS
8125A	SWING-AWAY HINGE (FOR TRAFFIC SIGNAL ARM MAST)
(1) 8126	A 100 MAST ARM POLE FOUNDATION
8130D	SAW CUT LOOP DETECTORS
0003A	SPECIFICATION REFERENCE TO STANDARD PLATES

(1) SEE SPECIAL PROVISIONS FOR APPLICABLE STANDARD PLATES

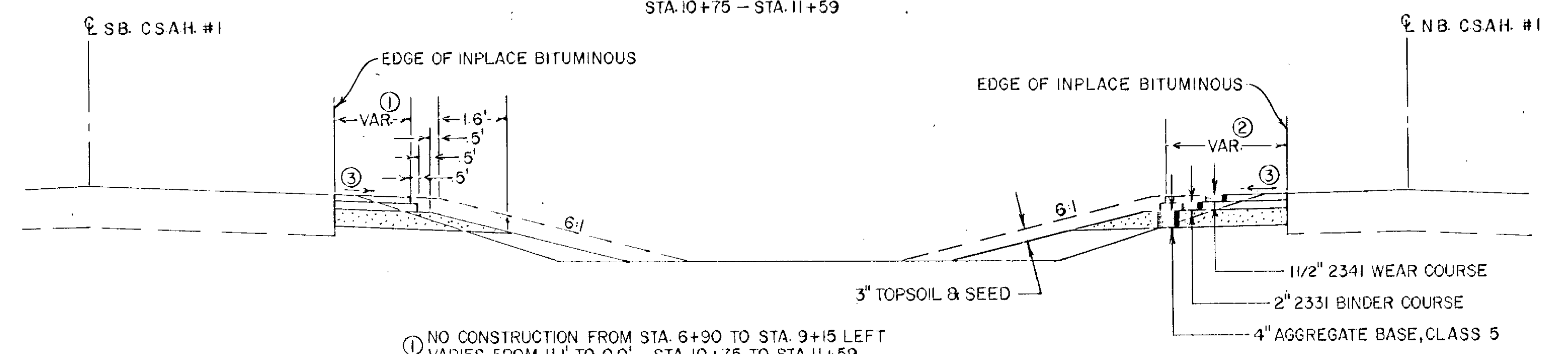


TYPICAL SECTIONS

ALL DIMENSIONS NOMINAL

DEPRESSED MEDIAN CONSTRUCTION

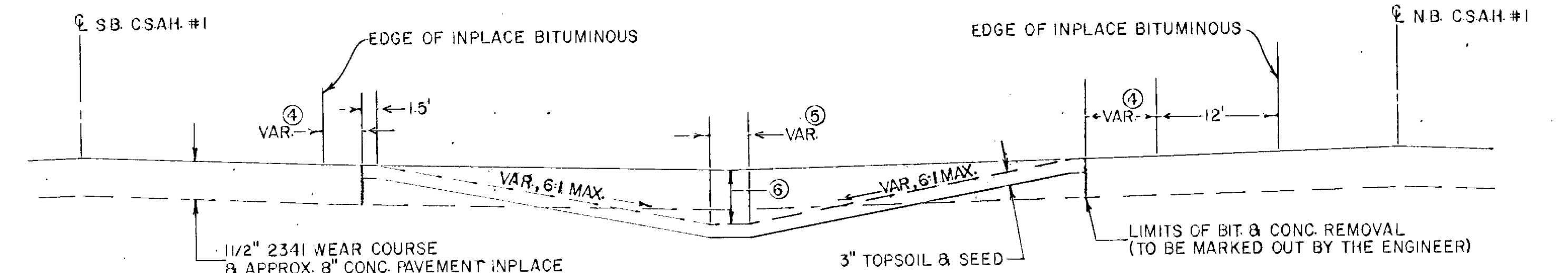
STA. 6+90 - STA. 9+15
STA. 10+75 - STA. 11+59



- ① NO CONSTRUCTION FROM STA. 6+90 TO STA. 9+15 LEFT VARIES FROM 11' TO 0.0' - STA. 10+75 TO STA. 11+59
- ② 12' FROM STA. 6+90 TO STA. 9+15 VARIES FROM 11.1' TO 0.0' - STA. 10+75 TO STA. 11+59
- ③ MATCH INPLACE BITUMINOUS SLOPE

DEPRESSED MEDIAN CONSTRUCTION

STA. 9+15 - STA. 10+05



- ④ VARIES FROM 0.0' TO 8.0' - STA. 9+45 TO STA. 10+00
- ⑤ VARIES FROM 0.0' TO 4.0' - SEE X-SECTS FOR WIDTHS
- ⑥ SEE X-SECTS FOR ELEVATION OF DEPRESSED MEDIAN

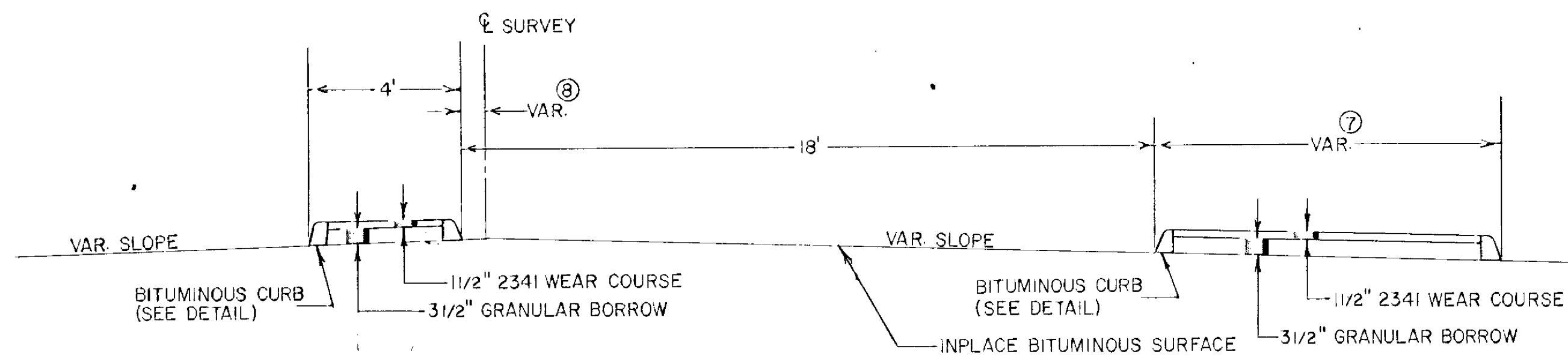
ALL DIMENSIONS NOMINAL

CENTER ISLAND CONSTRUCTION

STA. 26+73 - STA. 29+98

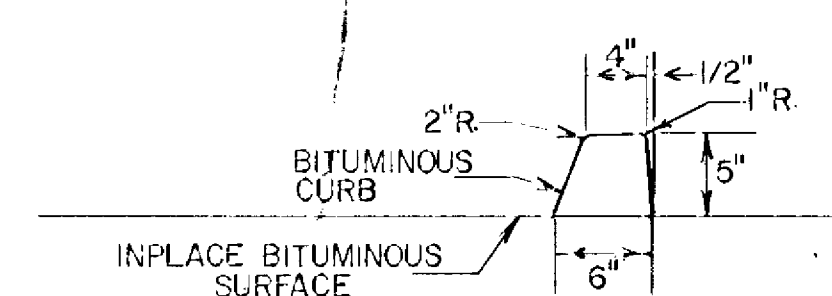
RIGHT TURN ISLAND CONSTRUCTION

STA. 26+73 - STA. 26+95



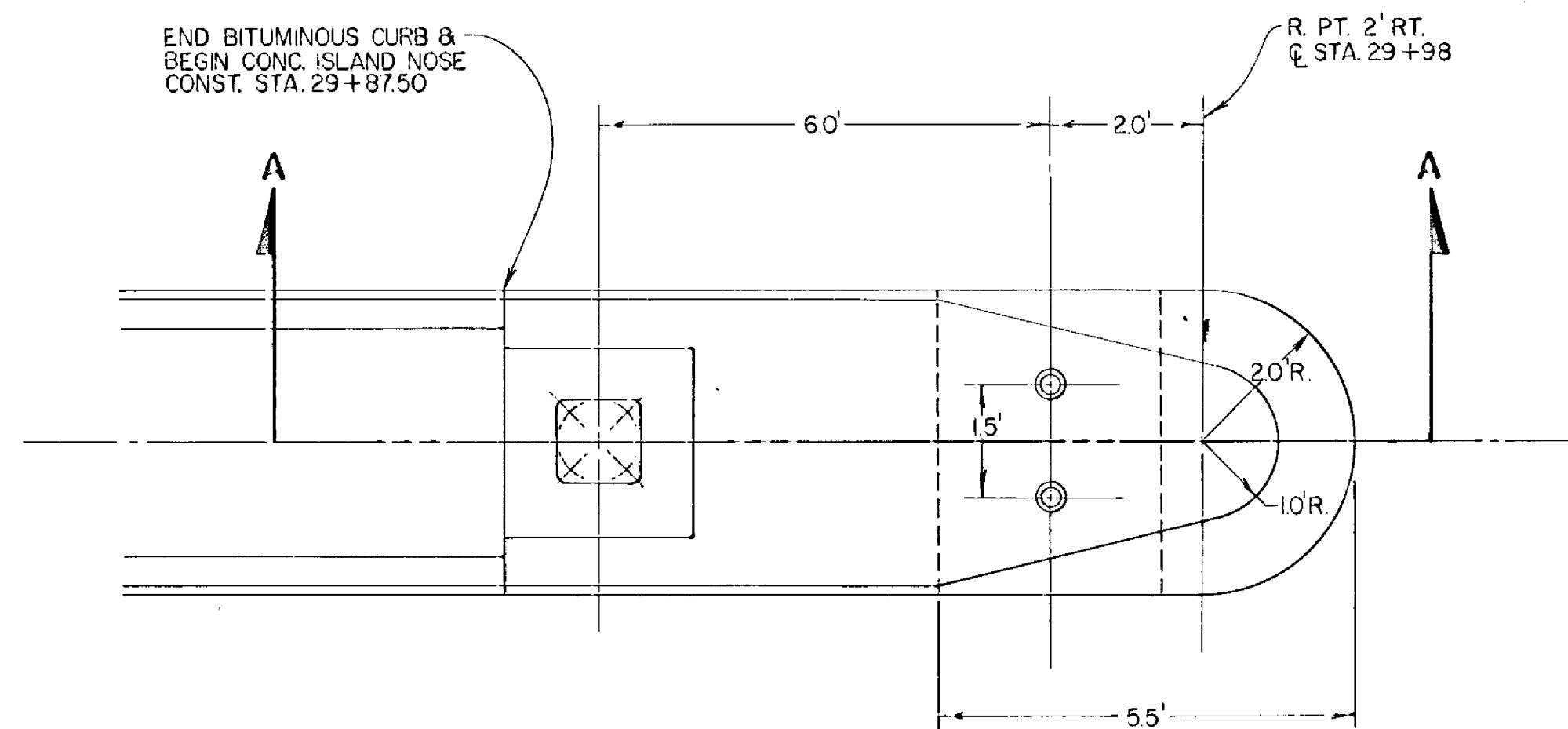
- ⑦ SEE PLAN SHEET FOR WIDTH OF ISLAND
- ⑧ SEE PLAN SHEET FOR CENTER ISLAND ALIGNMENT

BITUMINOUS CURB DETAIL



NOTE: CONTRACTOR MAY MODIFY BITUMINOUS CURB DETAIL UPON APPROVAL OF THE ENGINEER (PRIOR TO USE)

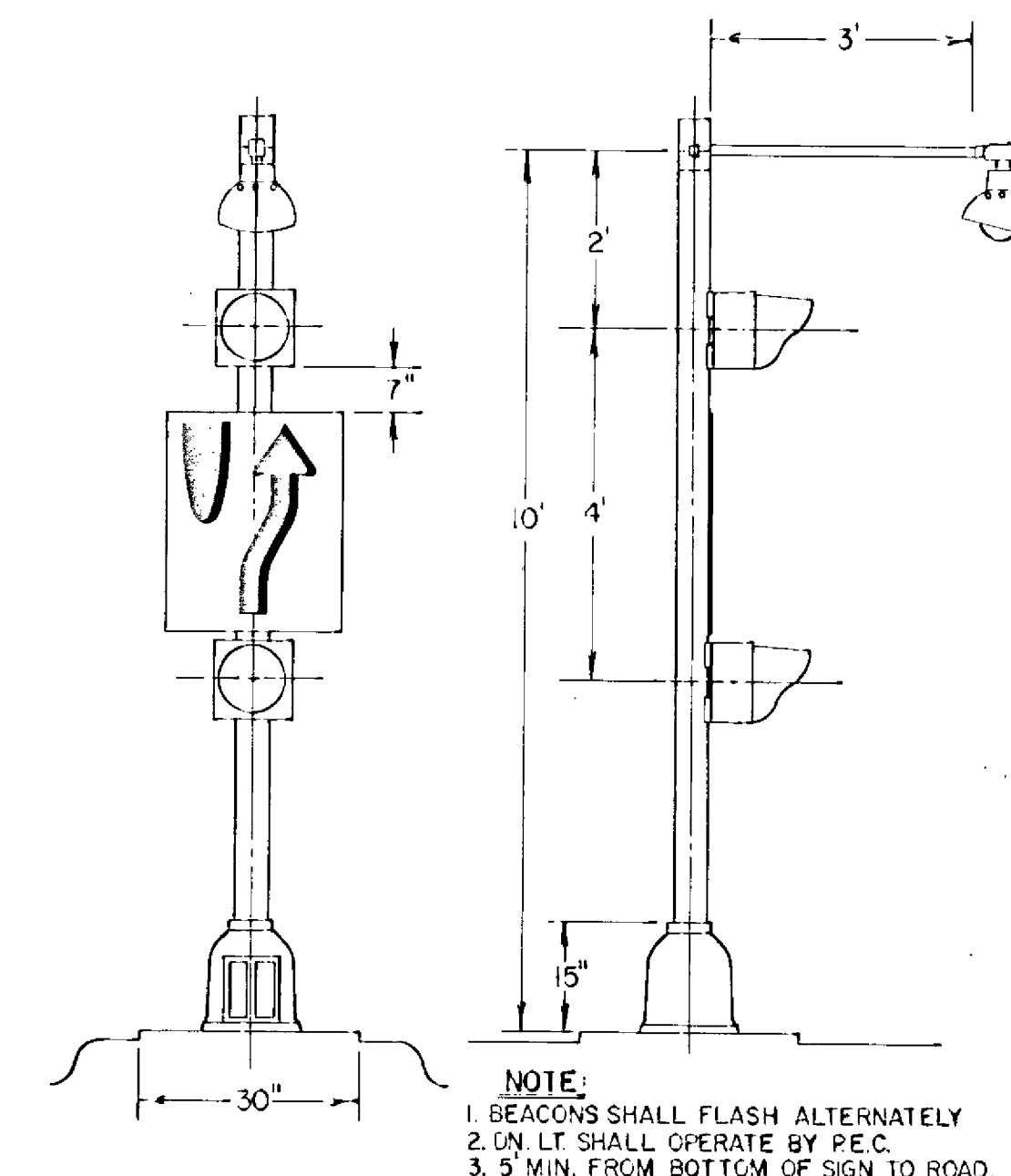
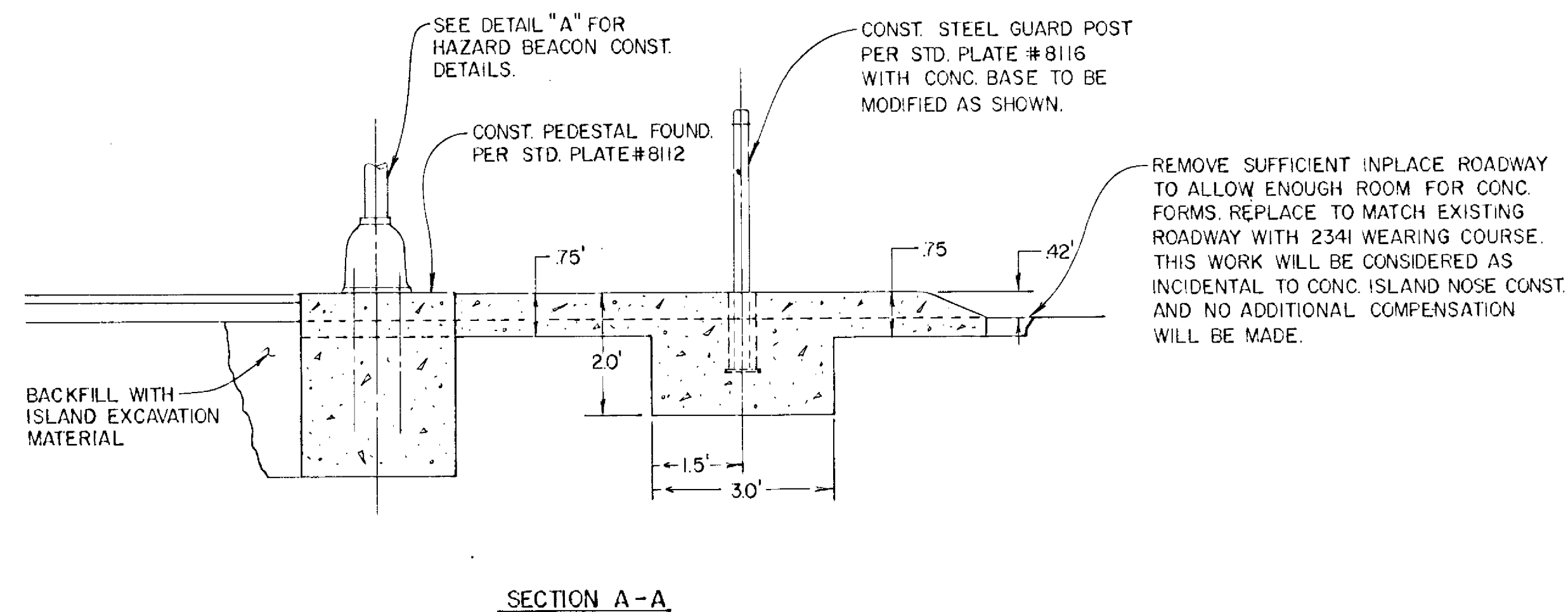
CONC. ISLAND NOSE CONST. DETAIL



**DETAIL "A"
DUAL HAZARD BEACON**

MATERIAL LIST

- 1-4" X 10" PEDESTAL SHAFT
- 1-4" PEDESTAL SLIPFITTER COLLAR
- 1-DOWN LIGHT EXT. 3/4" R.S.C. X 3' LONG
- 1-DOWN LIGHT FIXTURE (PER SS-126 ON PAGE 15 S.S.)
- 1-3/4" CLOSE NIPPLE
- 1-3/4" ENTRANCE ELBOW
- 1-1/4" TO 3/4" REDUCING BUSHING
- 2-8" SIZE AMBER BEACON
- 1-PEDESTAL BASE & SHAFT PER 8112
- 1-PEDESTAL FOUNDATION PER 8112
- 4-PPB MOUNTING SADDLE
- 1-24" X 30" KEEP RIGHT PER R4-7
- 2-STEEL GUARD POST PER 8116
- (SEE CONC. ISLAND NOSE CONST. DETAIL FOR MODIFICATIONS TO CONC. BASE.)



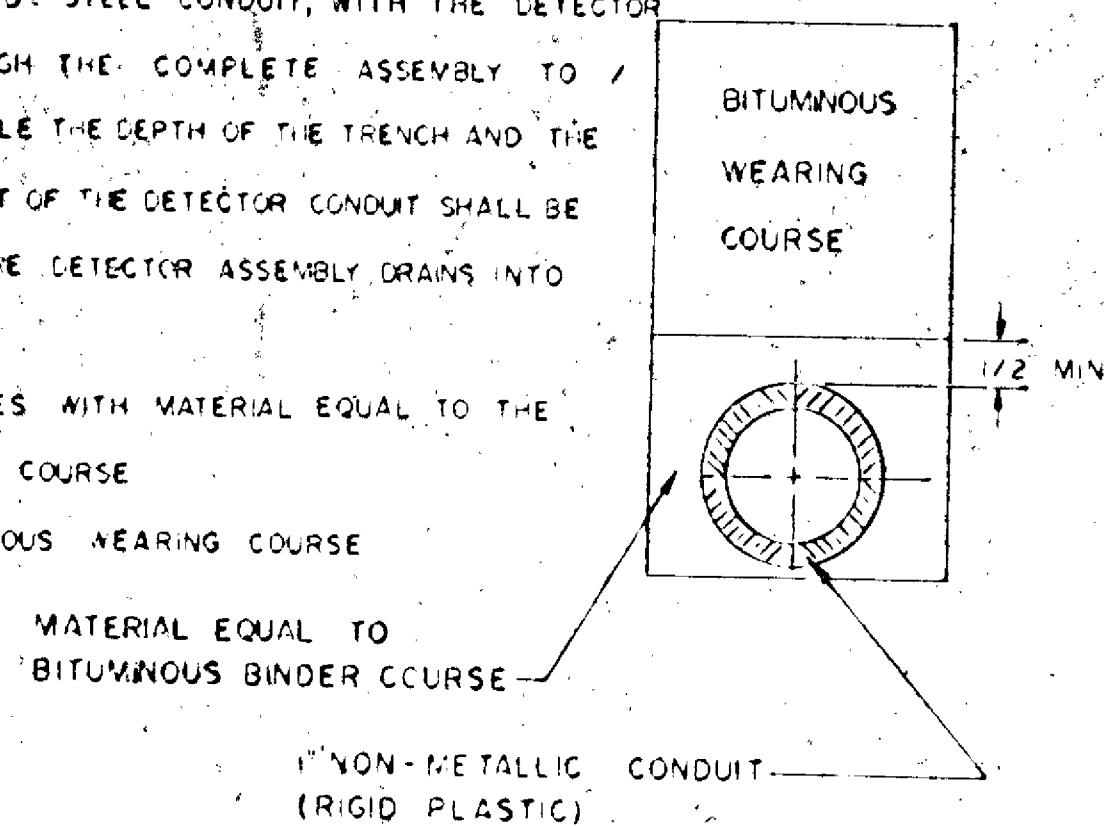
CONDUIT INSTALLATION DETAIL "A"

FOR LOOP DETECTOR

SCALE NONE

LOOP DETECTOR CONDUITS SHALL BE INSTALLED AS FOLLOWS:

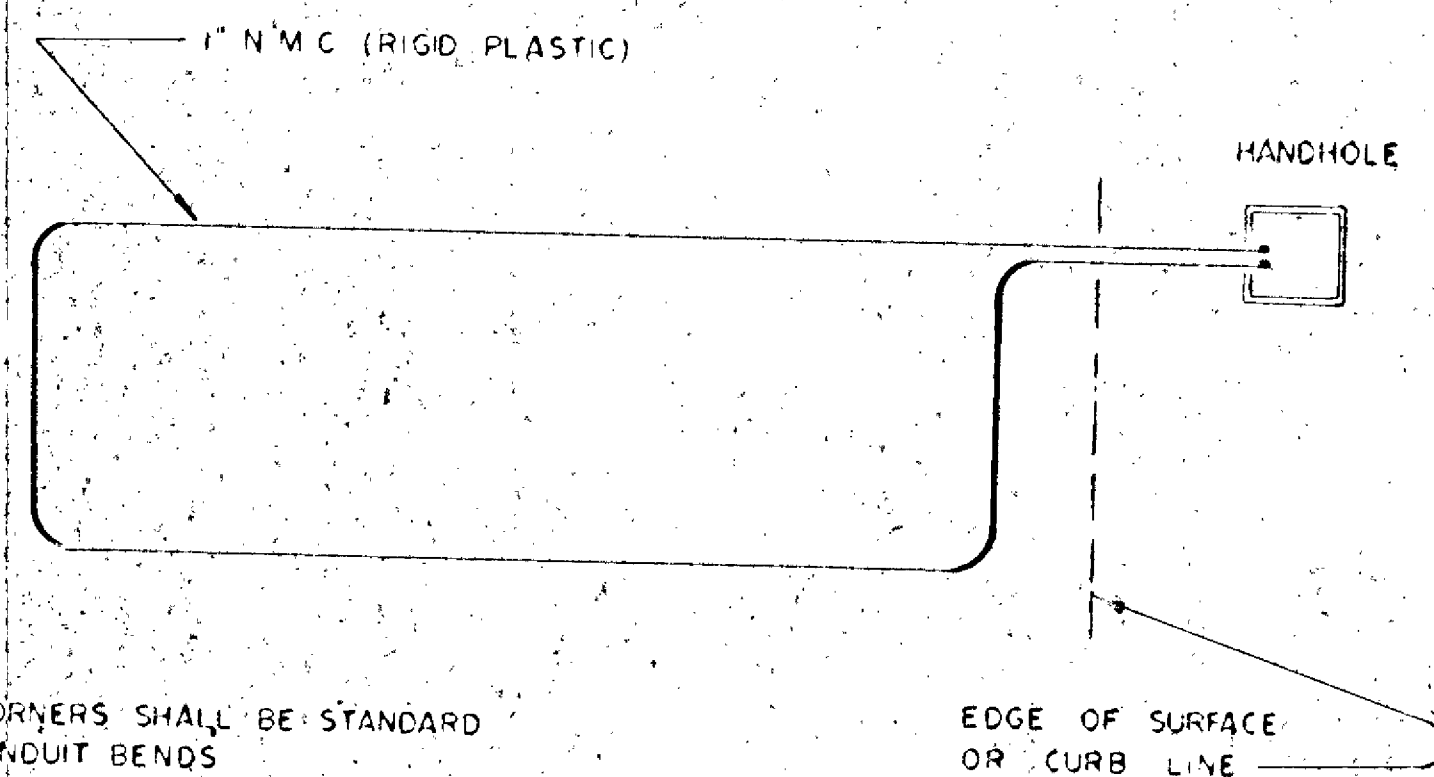
- 1) INSTALL THE BITUMINOUS BINDER COURSE
- 2) CUT TRENCHES FOR ALL DETECTORS AND INSTALL EACH COMPLETE DETECTOR ASSEMBLY, INCLUDING WHERE SHOWN PLASTIC CONDUIT, "T" CONDULET, AND STEEL CONDUIT, WITH THE DETECTOR WIRE PULLED THROUGH THE COMPLETE ASSEMBLY TO / FROM THE HANDHOLE THE DEPTH OF THE TRENCH AND THE RESULTANT PLACEMENT OF THE DETECTOR CONDUIT SHALL BE SUCH THAT THE ENTIRE DETECTOR ASSEMBLY DRAINS INTO THE HANDHOLE
- 3) REFILL THE TRENCHES WITH MATERIAL EQUAL TO THE BITUMINOUS BINDER COURSE
- 4) INSTALL THE BITUMINOUS WEARING COURSE



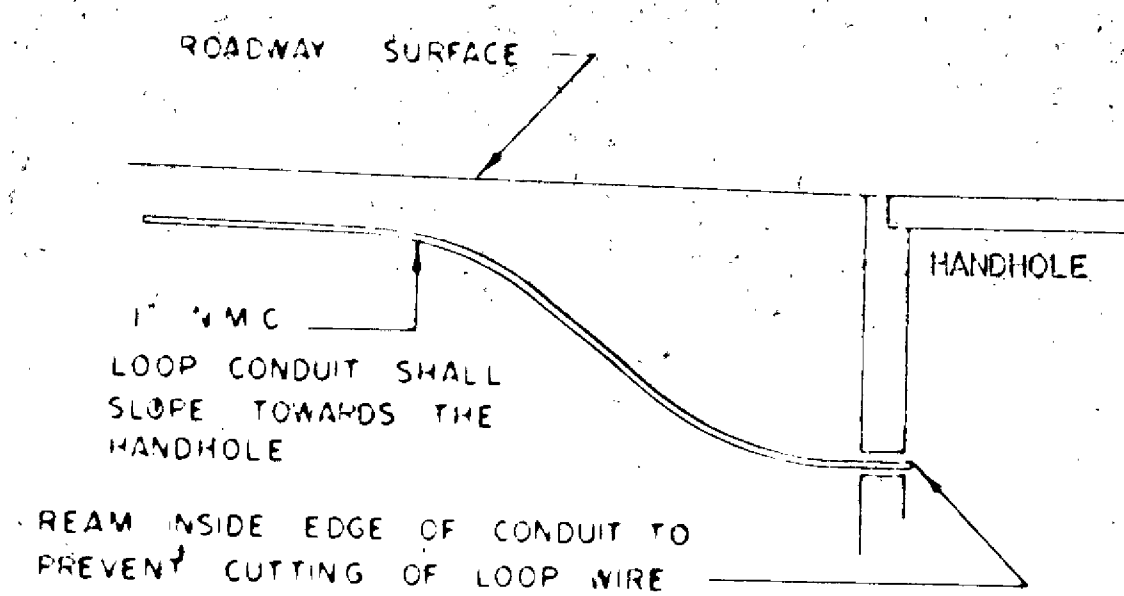
LOOP DETECTOR DETAIL "B"

SCALE NONE

PLAN VIEW

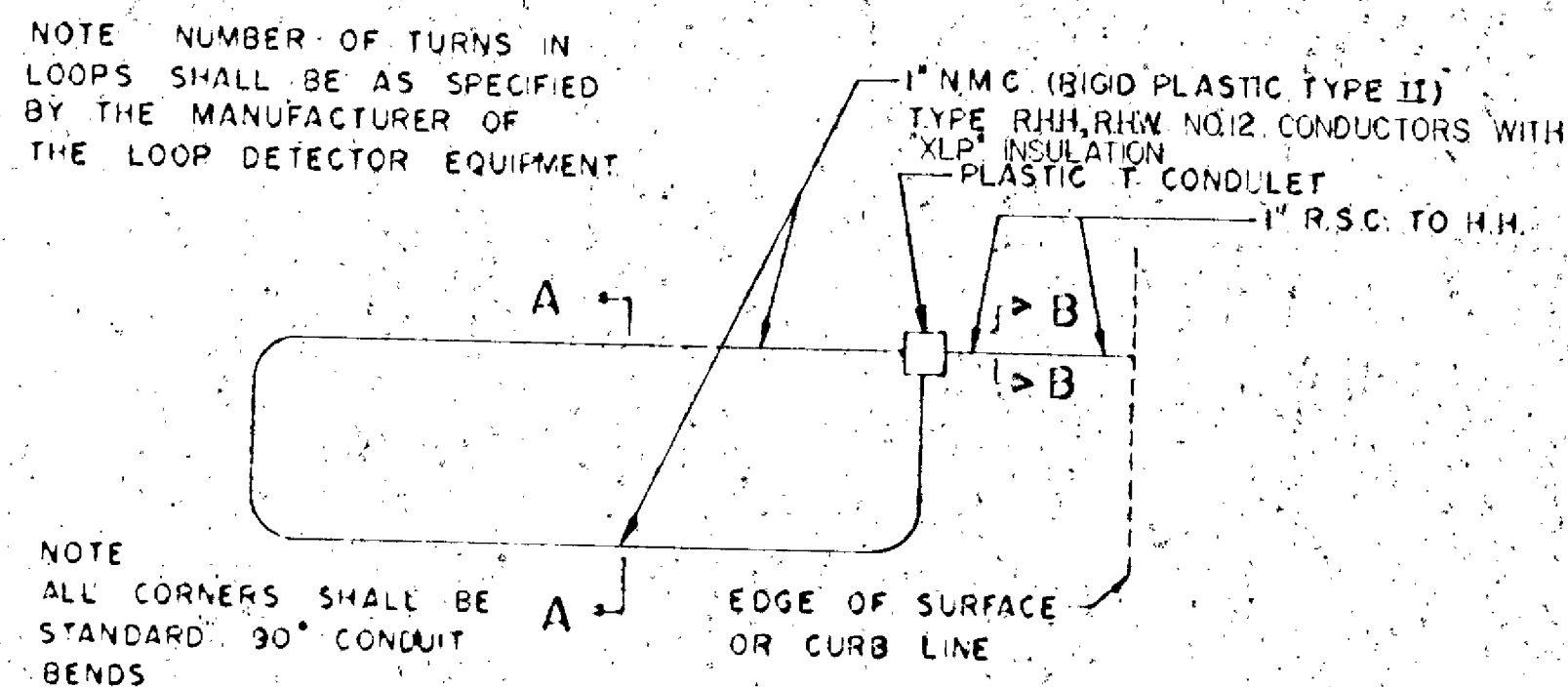


DRAINAGE DETAILS



LOOP DETECTOR DETAIL "C"

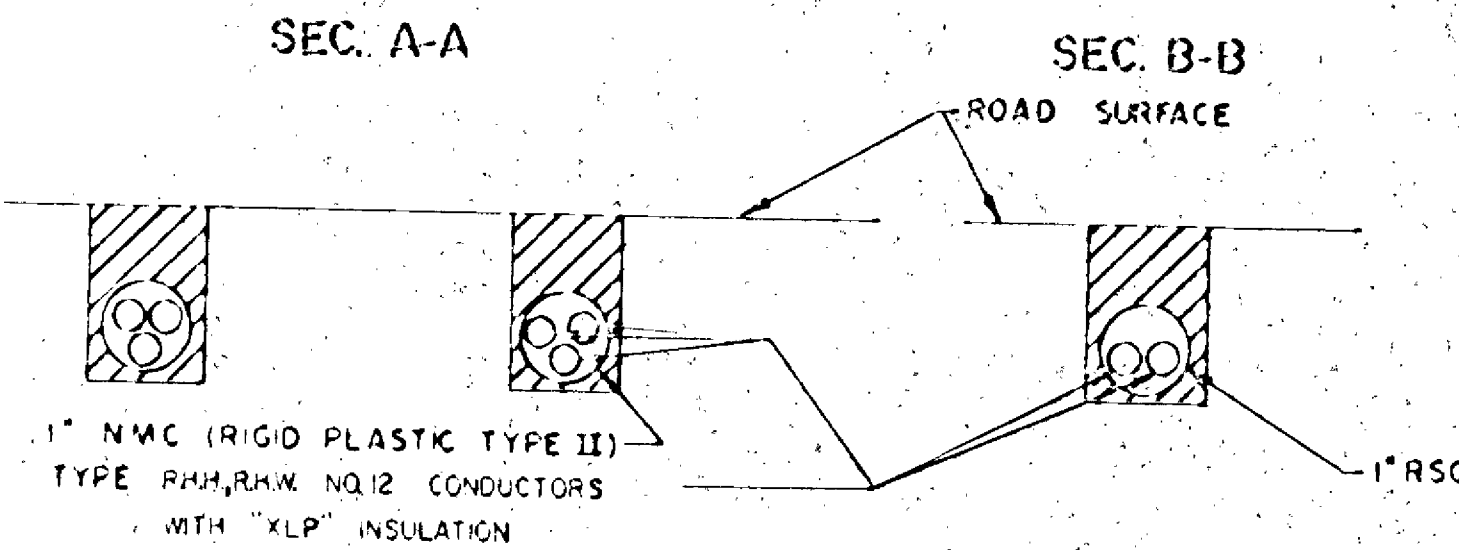
PLAN VIEW



NOTE NUMBER OF TURNS IN LOOPS SHALL BE AS SPECIFIED BY THE MANUFACTURER OF THE LOOP DETECTOR EQUIPMENT.

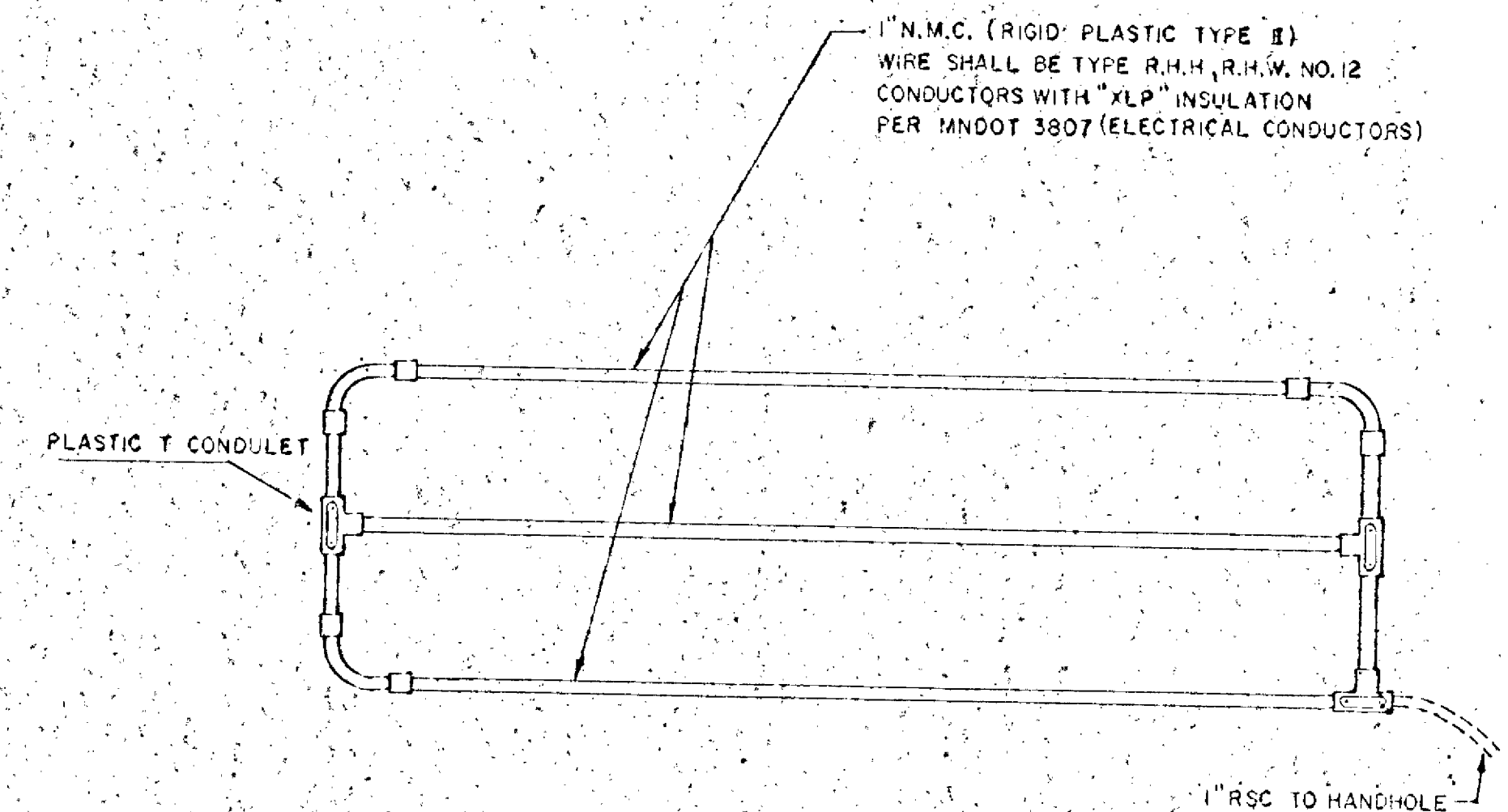
NOTE ALL CORNERS SHALL BE STANDARD 90° CONDUIT BENDS

TYPICAL SECTIONS



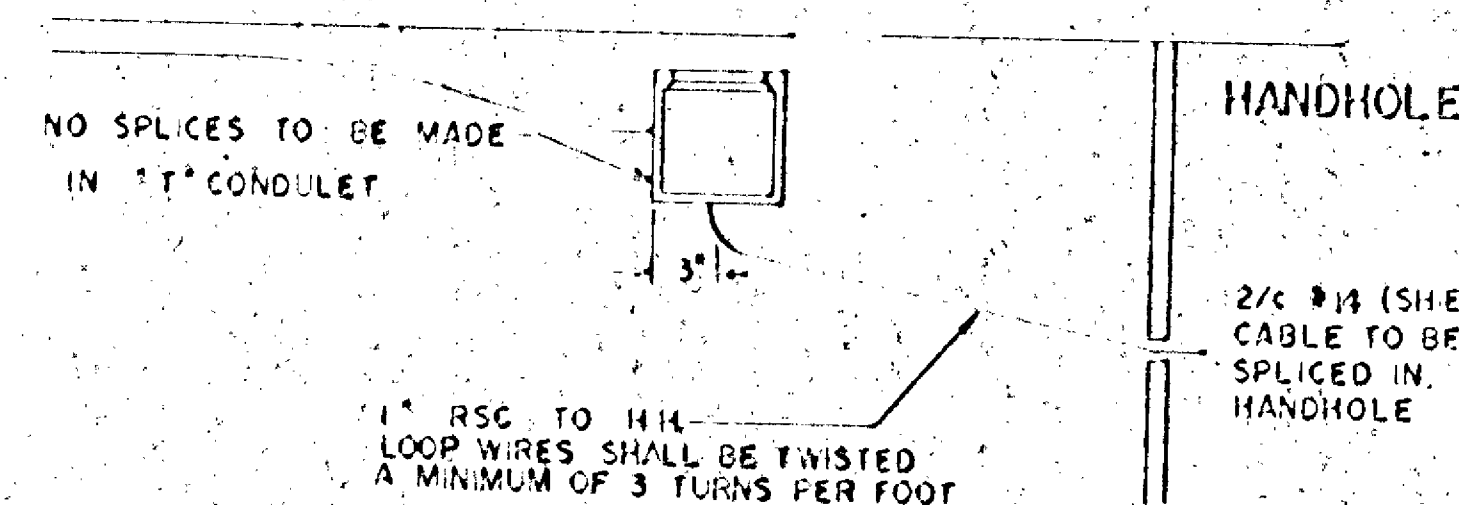
LOOP DETECTOR DETAIL "D"

PLAN VIEW



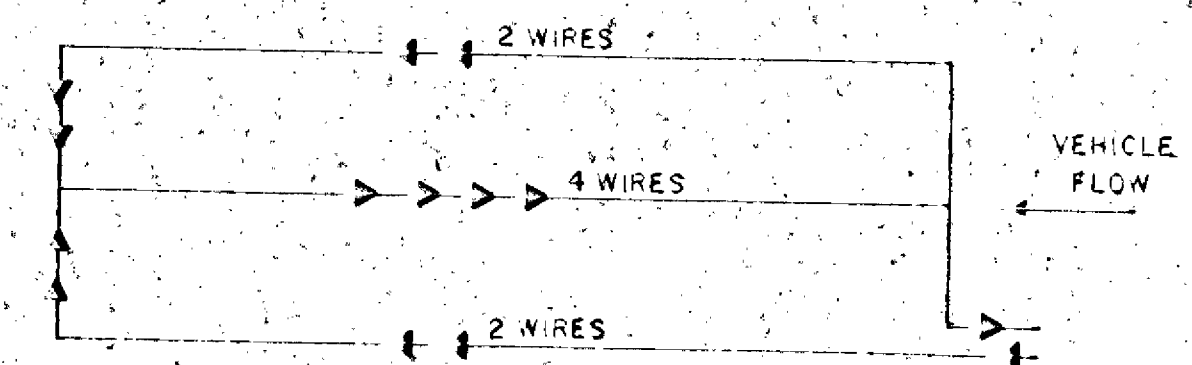
ALL CORNERS SHALL BE STANDARD 90° CONDUIT BENDS

DRAINAGE DETAILS



NOTE LOOP CONDUIT SHALL SLOPE TOWARDS "T" CONDULET AND STEEL CONDUIT SHALL SLOPE TOWARDS HANDHOLE SUCH THAT ENTIRE DETECTOR INSTALLATION DRAINS INTO HANDHOLE

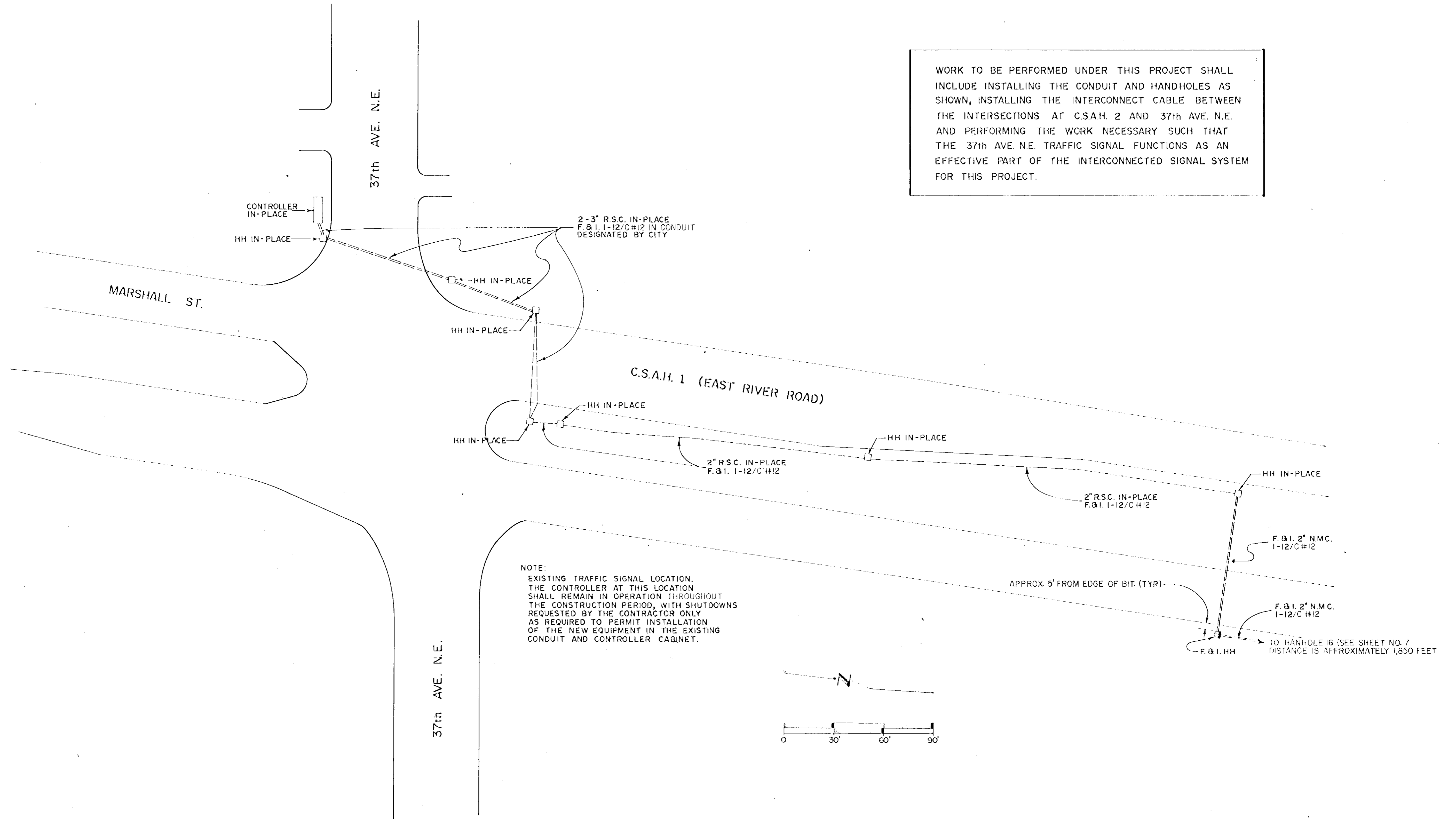
WIRE METHOD



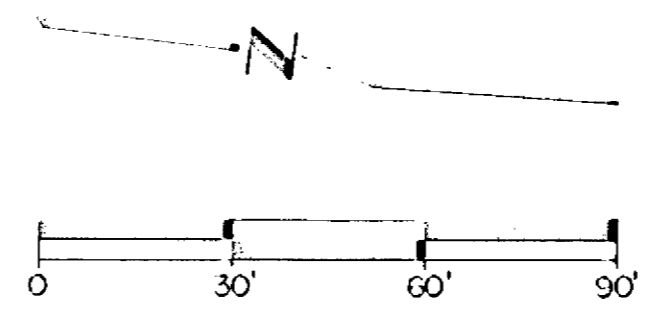
LOOP DETECTOR DETAILS

C.S.A.H. 1 & C.S.A.H. 2

WORK TO BE PERFORMED UNDER THIS PROJECT SHALL INCLUDE INSTALLING THE CONDUIT AND HANDHOLES AS SHOWN, INSTALLING THE INTERCONNECT CABLE BETWEEN THE INTERSECTIONS AT C.S.A.H. 2 AND 37th AVE. N.E. AND PERFORMING THE WORK NECESSARY SUCH THAT THE 37th AVE. N.E. TRAFFIC SIGNAL FUNCTIONS AS AN EFFECTIVE PART OF THE INTERCONNECTED SIGNAL SYSTEM FOR THIS PROJECT.



NOTE:
EXISTING TRAFFIC SIGNAL LOCATION.
THE CONTROLLER AT THIS LOCATION SHALL REMAIN IN OPERATION THROUGHOUT THE CONSTRUCTION PERIOD, WITH SHUTDOWNS REQUESTED BY THE CONTRACTOR ONLY AS REQUIRED TO PERMIT INSTALLATION OF THE NEW EQUIPMENT IN THE EXISTING CONDUIT AND CONTROLLER CABINET.



LAYOUT AT
C.S.A.H. 1 & 37th AVE. N.E.

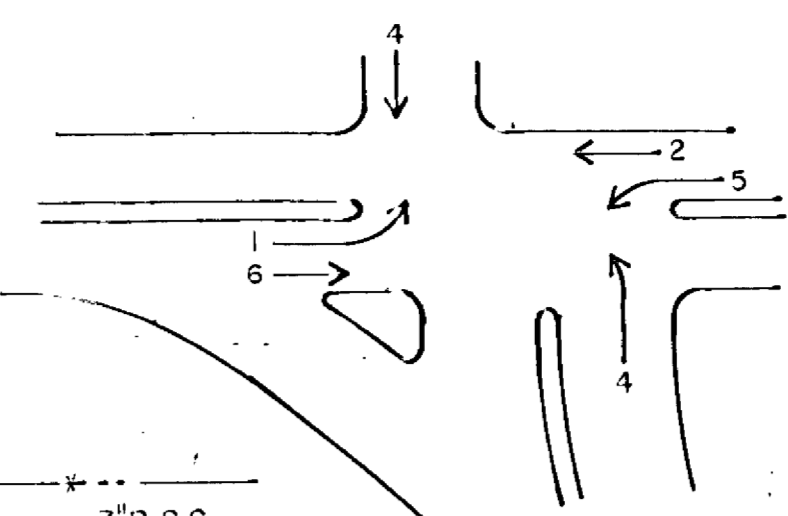
SIGNAL INDICATIONS

FACE	PHASE	FLASH	INDICATION			SIZE
			R	Y	G	
1-1	1	R	12	12	12	
2-1	2	R	12	12	12	
2-2	3	R	12	12	12	
1-1	4	R	12	12	12	
4-2	4	R	12	12	12	
4-3	4	R	12	12	12	
4-4	4	R	12	12	12	
4-5	4	R	12	12	12	
4-6	4	R	12	12	12	
4-7	4	R	12	12	12	
5-1	5	R	12	12	12	12
6-1	6	R	12	12	12	
6-2	6	R	12	12	12	

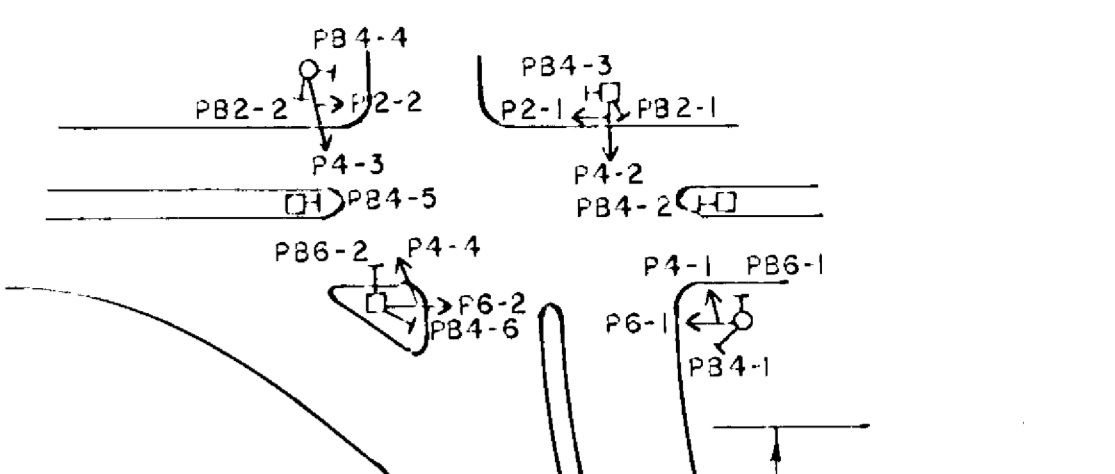
LOOP DETECTORS

NUMBER	SIZE	FUNCTION	DIST. FROM STOPLINE
D1-1	2-6x20	CALL & EXTEND	---
D2-1	6x6	CALL & EXTEND	420'
D2-2	6x6	CALL & EXTEND	420'
D4-1	6x6	EXTEND ONLY	30'
D4-2	6x20	CALL ONLY AFTER DELAY	---
D4-3	6x6	CALL & EXTEND	150'
D4-4	6x6	CALL & EXTEND	150'
D5-1	2-6x20	CALL & EXTEND	---
D6-1	6x6	CALL & EXTEND	420'
D6-2	6x6	CALL & EXTEND	420'
D6-3	6x20	CALL ONLY	---
D6-4	6x20	CALL ONLY	---

SIGNAL PHASING

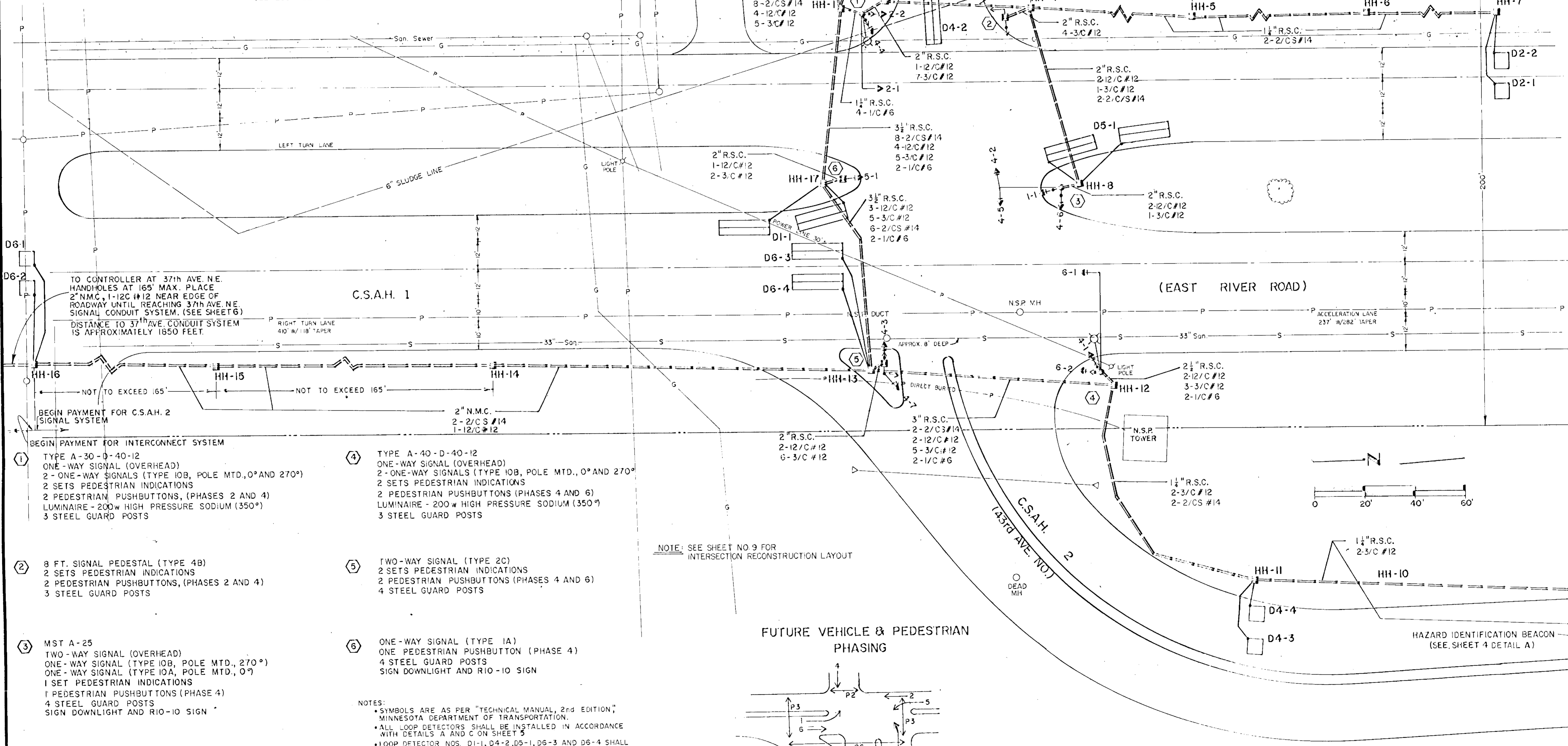


PEDESTRIAN SIGNALS AND PUSHBUTTONS



*SPECIAL SIGNAL FACE (SEE SPECIAL PROVISIONS)

1 DISTANCE TO FRONT EDGE OF DETECTOR
2 SEE LOOP DETAIL "D"



TO CONTROLLER AT 37th AVE. N.E. HANDHOLES AT 165' MAX. PLACE 2" N.M.C., 1-12/C #12 NEAR EDGE OF ROADWAY UNTIL REACHING 37th AVE. N.E. SIGNAL CONDUIT SYSTEM. (SEE SHEET 6)
DISTANCE TO 37th AVE. CONDUIT SYSTEM IS APPROXIMATELY 1850 FEET.

- ① TYPE A-30-D-40-12 ONE-WAY SIGNAL (OVERHEAD)
2 ONE-WAY SIGNALS (TYPE 10B, POLE MTD., 0° AND 270°)
2 SETS PEDESTRIAN INDICATIONS
2 PEDESTRIAN PUSHBUTTONS, (PHASES 2 AND 4)
LUMINAIRE - 200w HIGH PRESSURE SODIUM (350°)
3 STEEL GUARD POSTS

- ② 8 FT. SIGNAL PEDESTAL (TYPE 4B)
2 SETS PEDESTRIAN INDICATIONS
2 PEDESTRIAN PUSHBUTTONS, (PHASES 2 AND 4)
3 STEEL GUARD POSTS

- ③ MST A-25
TWO-WAY SIGNAL (OVERHEAD)
ONE-WAY SIGNAL (TYPE 10B, POLE MTD., 270°)
ONE-WAY SIGNAL (TYPE 10A, POLE MTD., 0°)
1 SET PEDESTRIAN INDICATIONS
1 PEDESTRIAN PUSHBUTTONS (PHASE 4)
4 STEEL GUARD POSTS
SIGN DOWNLIGHT AND RIO-10 SIGN

- ④ TYPE A-40-D-40-12 ONE-WAY SIGNAL (OVERHEAD)
2 ONE-WAY SIGNALS (TYPE 10B, POLE MTD., 0° AND 270°)
2 SETS PEDESTRIAN INDICATIONS
2 PEDESTRIAN PUSHBUTTONS (PHASES 4 AND 6)
LUMINAIRE - 200w HIGH PRESSURE SODIUM (350°)
3 STEEL GUARD POSTS

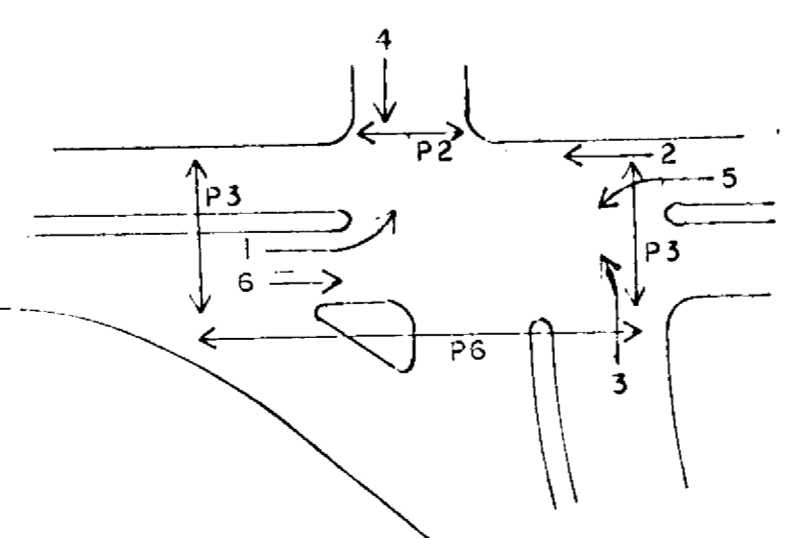
- ⑤ TWO-WAY SIGNAL (TYPE 2C)
2 SETS PEDESTRIAN INDICATIONS
2 PEDESTRIAN PUSHBUTTONS (PHASES 4 AND 6)
4 STEEL GUARD POSTS

- ⑥ ONE-WAY SIGNAL (TYPE 1A)
ONE PEDESTRIAN PUSHBUTTON (PHASE 4)
4 STEEL GUARD POSTS
SIGN DOWNLIGHT AND RIO-10 SIGN

NOTES:
*SYMBOLS ARE AS PER "TECHNICAL MANUAL, 2nd EDITION," MINNESOTA DEPARTMENT OF TRANSPORTATION.
*ALL LOOP DETECTORS SHALL BE INSTALLED IN ACCORDANCE WITH DETAILS A AND C ON SHEET 5
*LOOP DETECTOR NOS. D1-1, D4-2, D5-1, D6-3 AND D6-4 SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL D ON SHEET 5

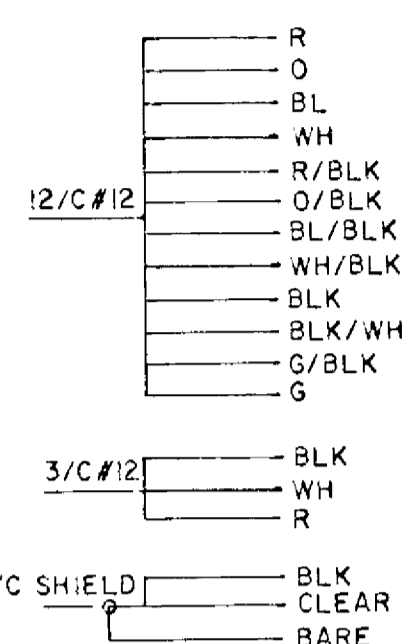
NOTE: SEE SHEET NO. 9 FOR INTERSECTION RECONSTRUCTION LAYOUT

FUTURE VEHICLE & PEDESTRIAN PHASING



SIGNAL SYSTEM LAYOUT
C.S.A.H. 1 & C.S.A.H. 2

TYPICAL CONDUCTOR COLOR CODE



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

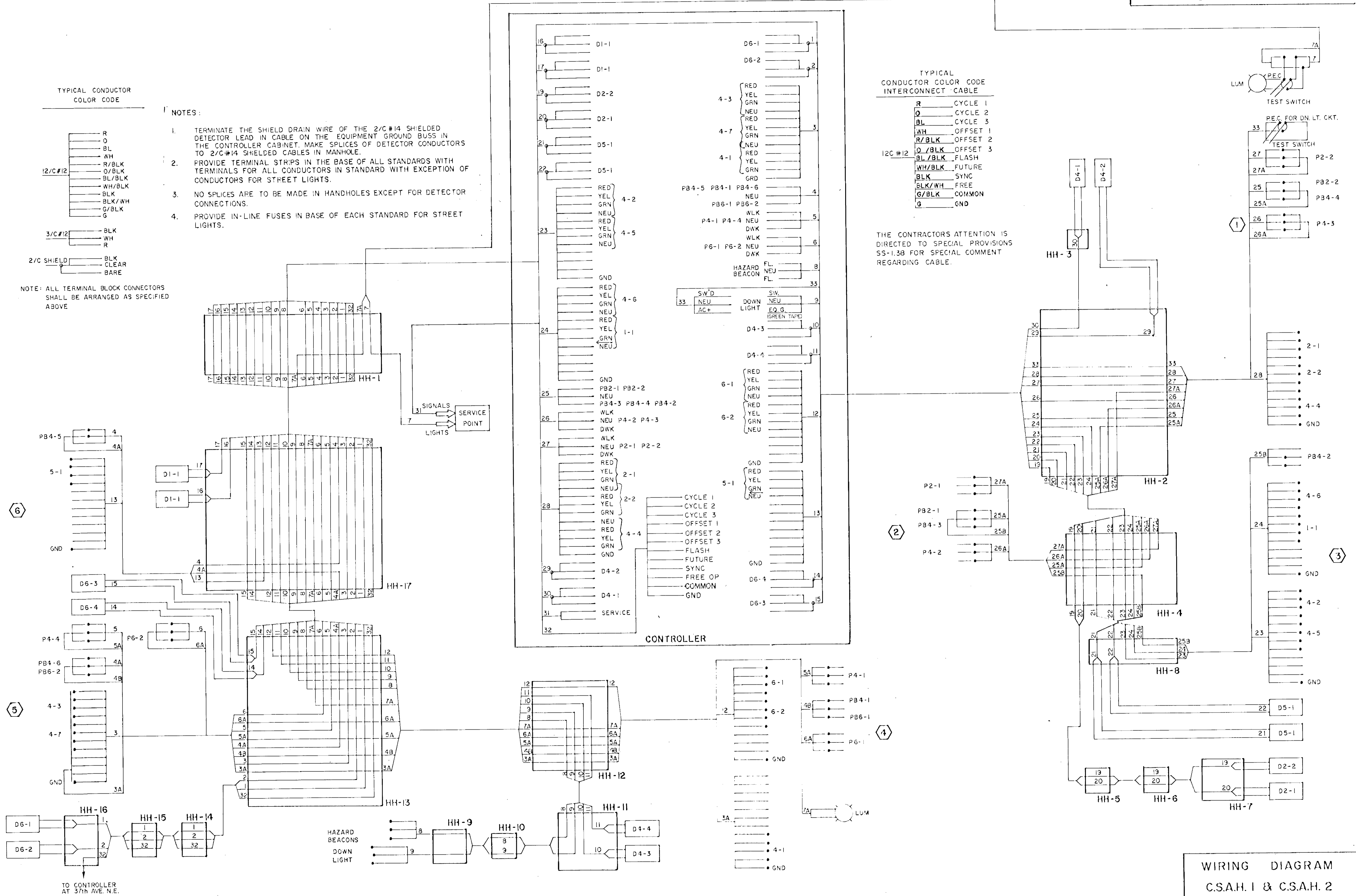
NOTES:

1. TERMINATE THE SHIELD DRAIN WIRE OF THE 2/C #14 SHIELDED DETECTOR LEAD IN CABLE ON THE EQUIPMENT GROUND BUSS IN THE CONTROLLER CABINET. MAKE SPLICES OF DETECTOR CONDUCTORS TO 2/C #14 SHIELDED CABLES IN MANHOLE.
2. PROVIDE TERMINAL STRIPS IN THE BASE OF ALL STANDARDS WITH TERMINALS FOR ALL CONDUCTORS IN STANDARD WITH EXCEPTION OF CONDUCTORS FOR STREET LIGHTS.
3. NO SPLICES ARE TO BE MADE IN HANDHOLES EXCEPT FOR DETECTOR CONNECTIONS.
4. PROVIDE IN-LINE FUSES IN BASE OF EACH STANDARD FOR STREET LIGHTS.

TYPICAL CONDUCTOR COLOR CODE INTERCONNECT CABLE

R	CYCLE 1
O	CYCLE 2
BL	CYCLE 3
WH	OFFSET 1
R/BLK	OFFSET 2
O/BLK	OFFSET 3
BL/BLK	FLASH
WH/BLK	FUTURE
BLK	SYNC
BLK/WH	FREE
G/BLK	COMMON
G	GND

THE CONTRACTORS ATTENTION IS DIRECTED TO SPECIAL PROVISIONS SS-1.3B FOR SPECIAL COMMENT REGARDING CABLE.



WIRING DIAGRAM C.S.A.H. 1 & C.S.A.H. 2

CITY OF MINNEAPOLIS WATERWORKS

WORK TO BE DONE BY OTHERS

FENCE TO BE REMOVED & GATE TO BE RELOCATED BY OTHERS

CONSTRUCT NEW ENTRANCE WITH 4" CL. 5 AGGREGATE BASE & 2" 2341 WEAR COURSE (END CONSTRUCTION AT FENCE LINE)

NEW ENT. LOCATION, STA. 10+38

OLD ENT. TO BE REMOVED BY OTHERS

REMOVE INPLACE BITUMINOUS & CONCRETE
CONSTRUCT DEPRESSED MEDIAN

SAWCUT OR JACKHAMMER TO THIS LINE

ESTIMATED LEVELING AREA
(LIMITS TO BE DETERMINED IN THE FIELD)

EDGE OF INPLACE BITUMINOUS

BEGIN MEDIAN CONSTRUCTION
STA. 6+87

EDGE OF INPLACE-BIT.

DEPRESSED MEDIAN

+45 BEGIN 7:1 PARABOLIC FLARE

52'R, STA. 10+00

EXTEND MEDIAN NOSE

SHORTEN MEDIAN NOSE

CLEAR & GRUB ONE TREE

END MEDIAN CONSTRUCTION
STA. 11+59

+59 BEGIN 7:1 PARABOLIC FLARE

DEPRESSED MEDIAN

NORTHBOUND LANES
CSAH #1

SOUTHBOUND LANES

N.S.P. DUCT

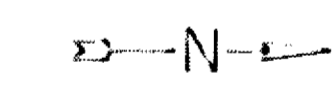
33" SAN SEWER

BEGIN 150' RADIUS
468' LT. OF STA. 26+73

PI STA. 23+07.11
Δ = 88° 35' 30" LT.
R = 158.00'
D = 36° 15' 47"
L = 244.30'
T = 154.16'

N.S.P. TOWER

DRAINAGE CULVERT



END 150' RADIUS, BEGIN 158' RADIUS
000' LT. OF STA. 28+50

PLATE BEAM GUARDRAIL

43rd Ave. No.

END CENTER ISLAND CONSTRUCTION STA. 30+00
(SEE SHEET NO. 4 FOR ISLAND NOSE DETAIL)

SCALE: 1" = 20'