STATE PROJECT	FEDERAL PROJECT	
	PROJECT	CONTRACT
4676 - 1 - 71	HES 1201(3)	1

Index of Sheets

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PLAN OF PROPOSED IMPROVEMENT

C.T.H. "KK" – C.T.H. "CE" ROAD

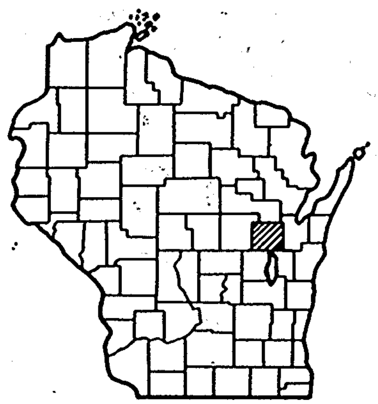
C.T.H. "N"

OUTAGAMIE COUNTY

STATE PROJECT NUMBER
4676-1-71

B. B. SHERMAN

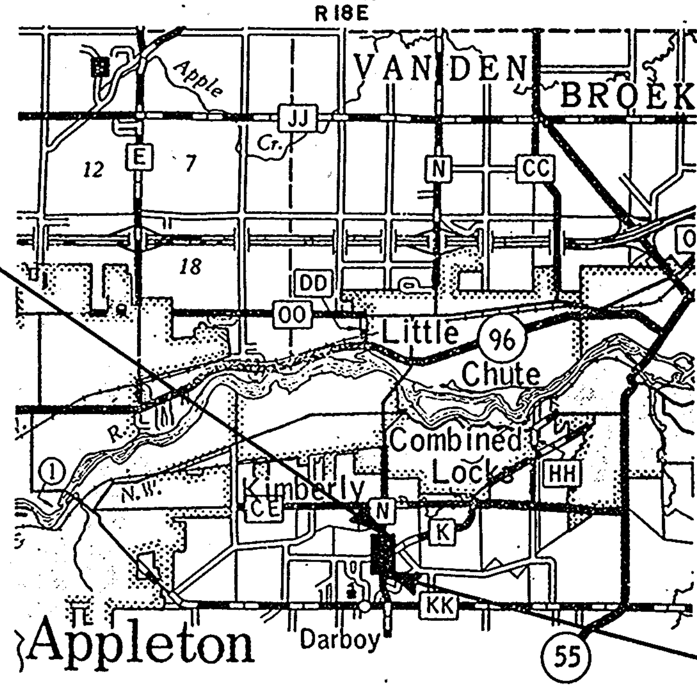
RECEIVED
APR 29 1985
OUTAGAMIE COUNTY HIGHWAY COMMISSION



N-15

OUTAGAMIE

SCALES
5 FT. PLAN & PROFILE 50 FT.



END PROJECT
STA. 112+00.00

BEGIN PROJECT
STA. 100+50.00
X = 2,447,300(± 200') *
Y = 161,900(± 200') *

Design Designation

A.D.T. 1984	= 5,600
A.D.T. 2004	= 8,200
D.H.V. 2004	= 1,080
D.	= 60-40
T.	= 10%
V.	= 50 M.P.H.

Conventional Signs

County Line
Township or Range Line
Section Line
Corporate or City Limits
Property line
Lot Line
Existing Right of Way Line
New Right of Way Line
Base or Survey Line
Slope Intercept
Existing Roadway or Private Entrance
Caution Symbol (Combustible fluids under pressure) — CAUTION
Railroads
Fence — (TYPE)
Culverts in Place
Culverts Required
Power Pole
Telephone or Telegraph Pole
Right of Way Markers
Marsh
Wooded Area
Grade Elevation

Layout Scale 0 1 2 MI.

Total Net Length of Centerline = 0.218 Mi. URBAN

* — COORDINATES SCALED FROM U.S.G.S. TOPOGRAPHIC MAP, APPLETON, WI., 15 MIN QUADRANGLE, CENTRAL ZONE, FOR IDENTIFICATION ONLY.

N-15

JOYCE WIS. TELE 5-1-86

LET — 4676-1-71 W/ 4990-0-10

APPROVED FOR OUTAGAMIE COUNTY
11-3-83 — DATE
Michael A. Marsden — COUNTY HIGHWAY COMMISSIONER

WISCONSIN CHARLES H. CHRISTENSEN E-16276 GREEN BAY, WIS. PROFESSIONAL ENGINEER

PLANS PREPARED BY
AYRES ASSOCIATES
CONSULTING ENGINEERS
GREEN BAY, WISCONSIN

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

Surveyor	O.A. & A.	District Checker	
Designer	O.A. & A.	C.O. Checker	MRA
District Supervisor	J.E.F.	C.O. Coordinator	MWT

Approved:
Date 10/23/84 — District Transportation Director

Approved:
Date 12-6-84 — Chief Design Engineer

Approved:
Date 12/7/84 E. J. Byrkit — Director of Development

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION 5 — WISCONSIN DIVISION

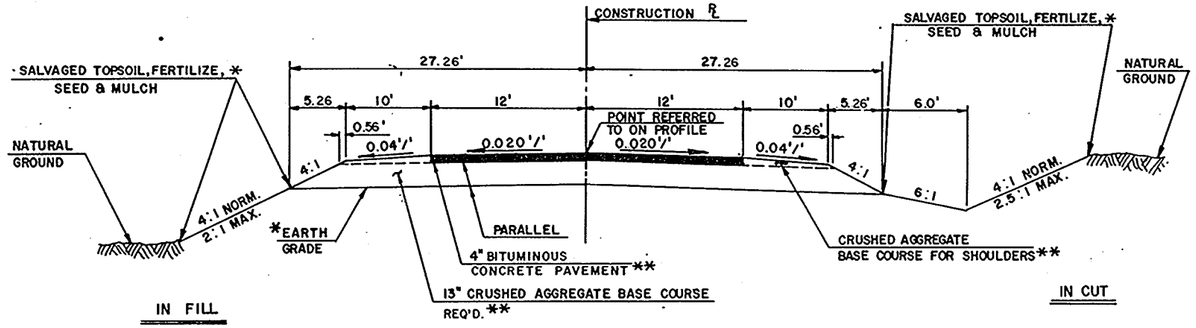
Approved:
Date — Division Administrator

Cat. No. 2130 - 010

STATE PROJECT NUMBER	SHEET NO.
4676-1-71	2

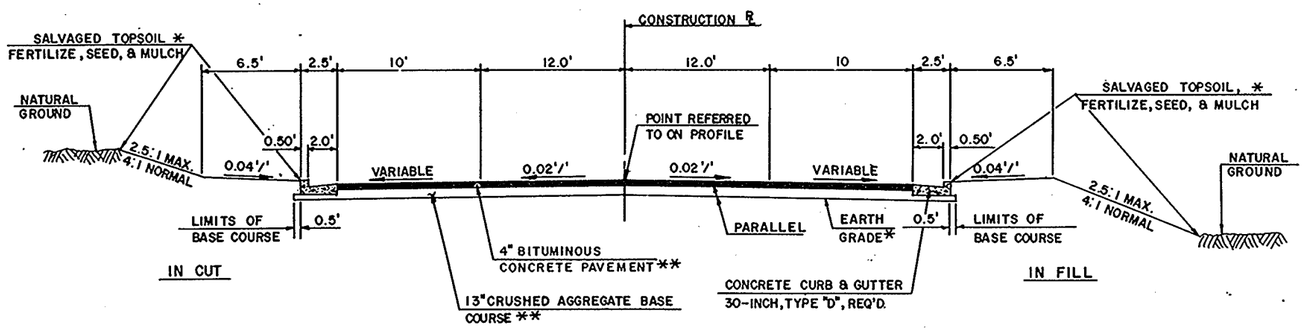
TYPICAL SECTIONS & GENERAL NOTES FOR

C.T.H. "N" OUTAGAMIE CO.



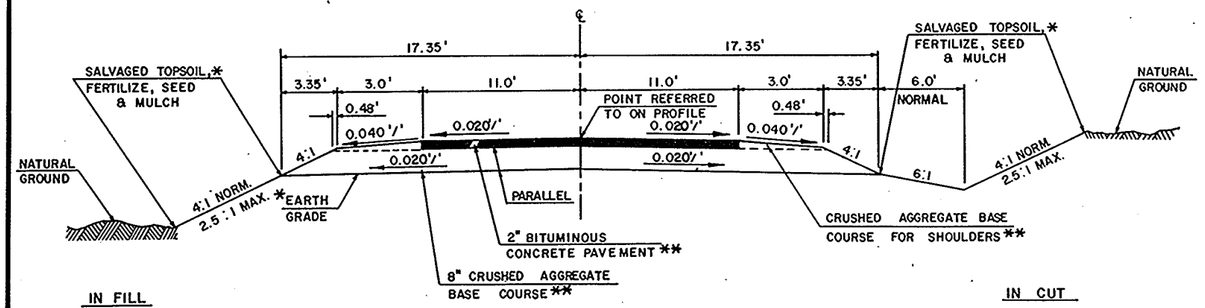
TYPICAL FINISHED SECTION FOR C.T.H."N"

STA. 100 + 50 - EMMONS RD.



TYPICAL URBAN SECTION FOR C.T.H."N"

EMMONS RD.- STA. 111 +00.00



TYPICAL FINISHED SECTION FOR EMMONS ROAD & BUCHANAN STREET

* NOT PART OF THIS CONTRACT

** PRODUCING AND HAULING ONLY

GENERAL NOTES

THE LOCATIONS OF EXISTING AND PROPOSED UTILITY INSTALLATIONS AS SHOWN ON THE PLANS ARE APPROXIMATE. THERE MAY BE OTHER UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

PRIVATE UTILITY COMPANIES SHALL ADJUST OR MOVE ALL FACILITIES WHICH INTERFERE WITH NEW CONSTRUCTION.

ALL TIES ON THIS PLAN ARE HORIZONTAL UNLESS DESCRIBED

ALL DISTANCES ARE GROUND DISTANCES.

ALL RADII SHOWN ARE TO THE FACE OF CURB, UNLESS OTHERWISE NOTED.

THE EXACT LOCATION AND WIDTH FOR PRIVATE ENTRANCES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.

CURB HEIGHT AT ENDS OF CURB AND GUTTER SHALL BE TAPERED FROM 2-6 INCHES IN 4 FEET.

FINAL LOCATION FOR THE ENDS OF BEAM GUARD AS DIRECTED IN THE FIELD BY THE ENGINEER.

ALL BUTT JOINTS SHALL BE SAW CUT. (BY OTHERS)

UTILITIES

WISCONSIN ELECTRIC POWER COMPANY
807 SOUTH ONEIDA STREET
P. O. BOX 1699
APPLETON, WI. 54913
ATTENTION: NORBERT P. SCHEMM
TELEPHONE (414) 735-0705
CALLED 5-1-85 10 00 AM

WISCONSIN BELL, INC.
221 WEST WASHINGTON STREET
P. O. BOX 2159
APPLETON, WI 54911
ATTENTION: JAMES DE WALL, ASST. MGR. OUTSIDE PLANT ENGINEER
TELEPHONE (414) 735-3255
CALLED 5-1-85 10:15 AM

WISCONSIN GAS COMPANY
1921 8TH STREET SOUTH
P. O. BOX 789
WISCONSIN RAPIDS, WI 54494
ATTENTION: DEAN SULLIVAN
TELEPHONE (715) 423-2800
10 20 AM

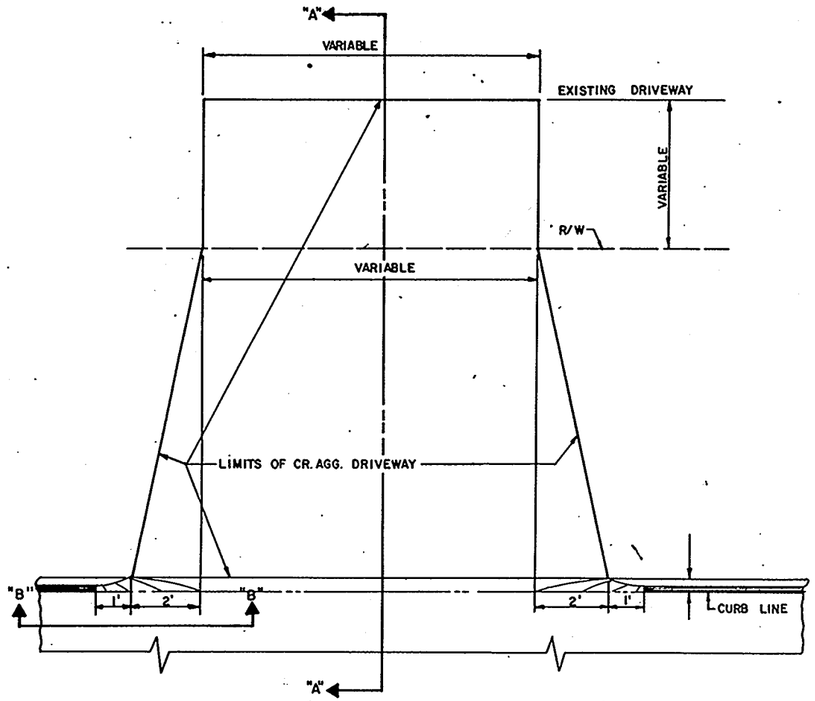
STANDARD DETAIL DRAWINGS

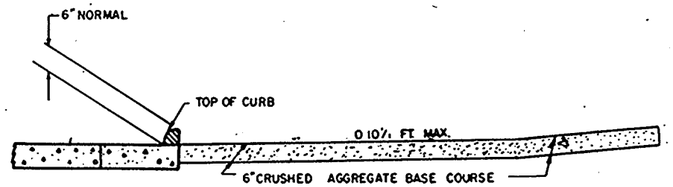
CATCH BASIN, MANHOLE AND INLET COVERS	8A5-3B
INLETS, TYPE 8, 9, 10 AND 11	8C5-1
CONCRETE CURB, CONCRETE CURB AND GUTTER AND PAVEMENT TIES	8D1-8
CONCRETE SURFACE DRAINS	8D4-1
APRON ENDWALLS FOR CULVERT PIPE AND PIPE ARCHES	8F1-9
LAYOUT DETAILS FOR AT-GRADE SIDE ROAD INTERSECTION	9A1-5
CLASS 'A' STEEL PLATE BEAM GUARD (TWO SHEETS)	14B2-7A & B
CONSTRUCTION BARRICADES AND STANDARD SIGNS	15C1-7

STATE PROJECT NUMBER	SHEET NO.
4676 - 1 - 7.1	2.1

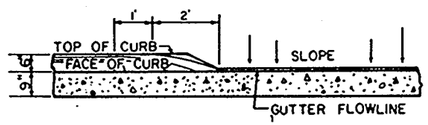
CONSTRUCTION DETAILS & MISCELLANEOUS QUANTITIES FOR

C.T.H. "N" OUTAGAMIE CO.



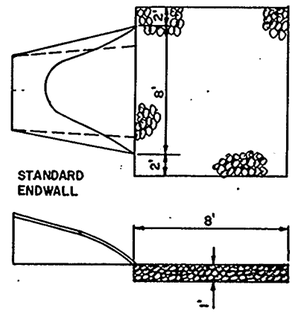


SECTION "A-A"



SECTION "B-B"

DETAIL OF CR. AGG. DRIVEWAYS



RIPRAP DISCHARGE APRON

PRIVATE ENTRANCE PIPES *

STATION	LOCATION	DIA. (IN.)	LENGTH (FT.)	TYPE	CLASS	THICKNESS (INCH.) STEEL	THICKNESS (INCH.) ALUMINUM	APRON ENDWALLS
8 + 75	EMMONS RD., LT.	18	28	C.P.	III	0.064	0.060	2

* NOT PART OF THIS CONTRACT

REMOVE GUARD RAIL *

LOCATION	QUANTITY L.F.
102 + 25 - 105 + 62 RT.	337
102 + 65 - 105 + 63 LT.	298

INLETS AND COVERS

STRUCTURE NO.	LOCATION	TYPE	COVER	RIM	FLOW LINE
1	106 + 80, 50' LT.	8	MS	735.7	731.9

PRODUCING AND HAULING CRUSHED AGGREGATE BASE COURSE

LOCATION	TONS
100 + 50 - 112 + 00	4,675
EMMONS	410
BUCHANON	325
DRIVEWAYS	140

STORM SEWER

LOCATION FROM	TO	SIZE IN.	LENGTH FT.	TYPE	ELEVATION INLET	ELEVATION DISCH.	REMARKS	RIPPAP C.Y.
1	1A	24	130	R.C.P., CL. III, S.S.	731.9±	731.0±	1-24" R.C. ENDWALL REQUIRED	2

CONCRETE CURB AND GUTTER

LOCATION	30" TYPE D	36" TYPE D
105 + 50 - 111 + 00	1,125	
S.W., SE RADII		170

STEEL PLATE BEAM GUARD, CLASS A

STATION	- STATION	L.F.	ANCHORAGES
102 + 50	105 + 80 (LT.)	330	2
102 + 50	105 + 90 (RT.)	340	2

PRODUCING AND HAULING BITUMINOUS CONCRETE PAVEMENT

LOCATION	TONS
100 + 50 - 112 + 00	1,080
EMMONS	50
BUCHANON	30

LANDSCAPING *

LOCATION	SALVAGED TOPSOIL AND MULCH S.Y.	FERT. CWT.	SEED. LB.	SOD. S.Y.	EROSION MAT S.Y.
100 + 50 - 112 + 00	3,325	1.8	60		25
SIDE ROADS	375	0.2	10		
PIPE ENDS				10	
UNDISTRIBUTED				40	25

ESTIMATE OF QUANTITIES

DATE 12/12/84

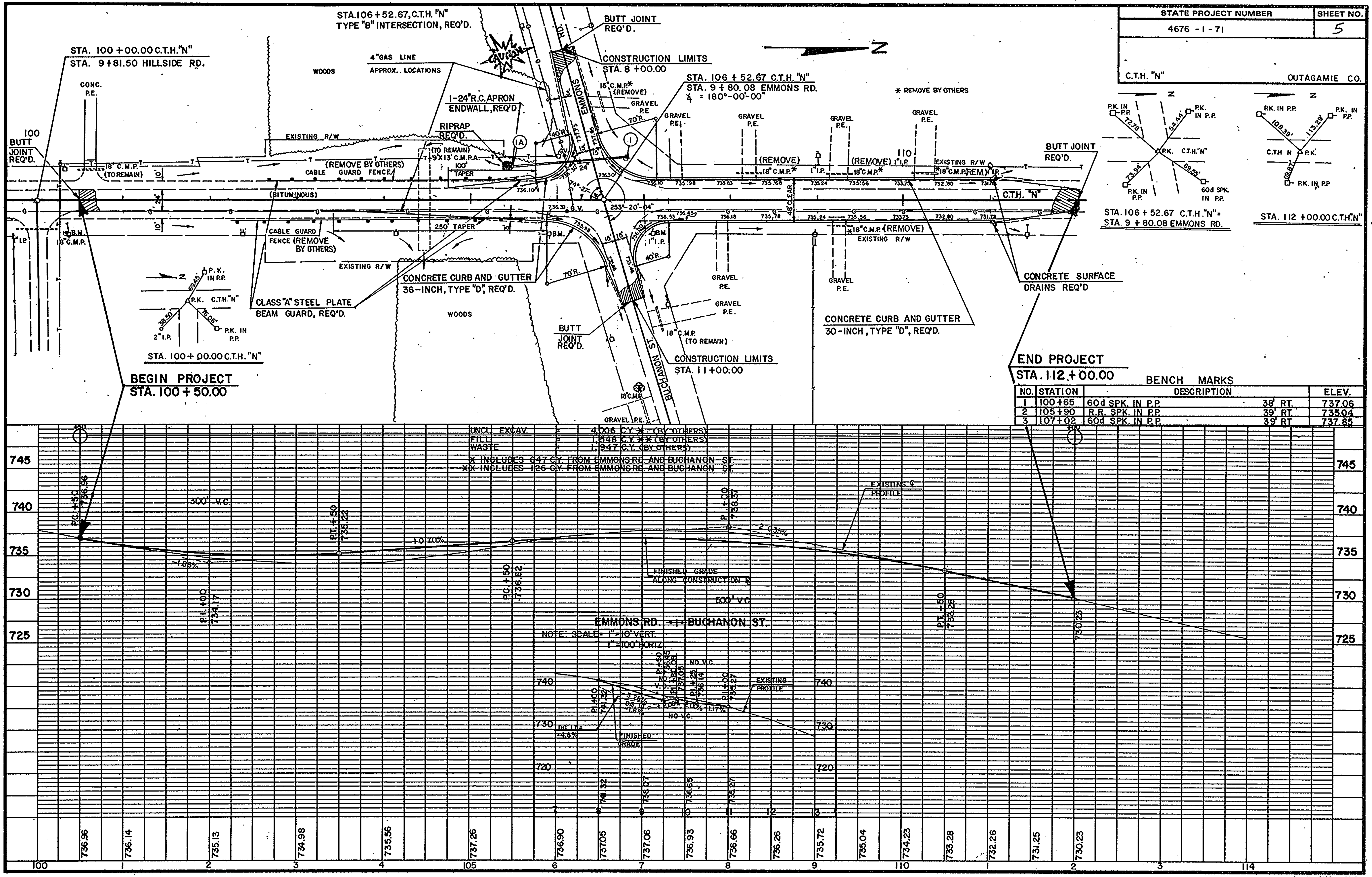
PROJECT ID: 4676-01-71
OUTAGAMIE COUNTY
C.T.H. KK - C.T.H. CE
C.T.H. N

ITEM	ITEM DESCRIPTION	UNIT	TOTAL	4676-01-71 QUANTITY
40501	BITUMINOUS MATERIAL FOR PLANT MIXES	TON	65.00	65.00
40934	CONCRETE SURFACE DRAINS	C.Y.	3.00	3.00
52264	REINFORCED CONCRETE APRON ENDWALLS FOR CULVERT PIPE, 24-INCH	EACH	1.00	1.00
60133	CONCRETE CURB AND GUTTER, 30-INCH, TYPE D	L.F.	1,125.00	1,125.00
60170	CONCRETE CURB AND GUTTER, 36-INCH, TYPE D	L.F.	170.00	170.00
60601	RIPRAP	C.Y.	2.00	2.00
60829	REINFORCED CONCRETE PIPE, CLASS III, STORM SEWER, 24-INCH	L.F.	130.00	130.00
61123	INLETS, TYPE 8	EACH	1.00	1.00
61170	INLET COVERS, TYPE MS	EACH	1.00	1.00
61406	ANCHORAGES FOR STEEL PLATE BEAM GUARD	EACH	4.00	4.00
61408	STEEL PLATE BEAM GUARD, CLASS A	L.F.	670.00	670.00
61912	MOBILIZATION, PROJECT 4676-1-71	L.S.	1.00	1.00
64303	TRAFFIC CONTROL, PROJECT 4676-1-71	L.S.	1.00	1.00
90001	PRODUCING AND HAULING CRUSHED AGGREGATE BASE COURSE	TON	5,550.00	5,550.00
90003	PRODUCING AND HAULING BITUMINOUS CONCRETE PAVEMENT	TON	1,160.00	1,160.00

SHEET 3

STATE PROJECT NUMBER	SHEET NO.
4676 - I - 71	5

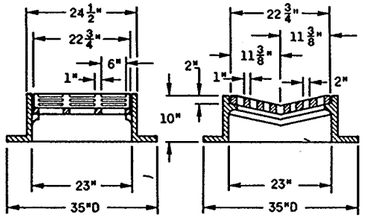
C.T.H. "N" OUTAGAMIE CO.



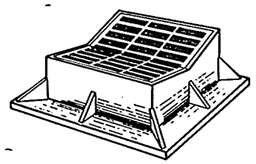
BENCH MARKS

NO.	STATION	DESCRIPTION		ELEV.
1	100+65	60d SPK. IN P.P.	38' RT.	737.06
2	105+90	R.R. SPK. IN P.P.	39' RT.	735.04
3	107+02	60d SPK. IN P.P.	39' RT.	737.85

Cat. No. 2130 - 0140



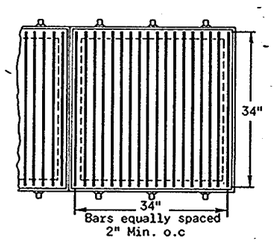
Round Frame



Alternate Frame
(Square type)
35" Square

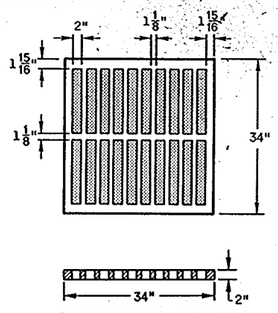
TYPE "B"

(Approximate Weight 395 lbs.)
Frame Weight 285 lbs.
Grate Weight 110 lbs.



STEEL GRATE

(Approximate Weight 209 lbs.)



CAST IRON GRATE

(Approximate Grate Weight 285 lbs)

GENERAL NOTES

Details of construction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

Detail drawings for proposed alternate designs for Catch Basin, Manhole and Inlet Covers shall be submitted to the Engineer for approval providing that such alternate designs make provision for equivalent capacity and strength.

All Catch Basin, Manhole and Inlet Covers which are placed in vehicular traffic areas shall be "Non-Rocking" type.

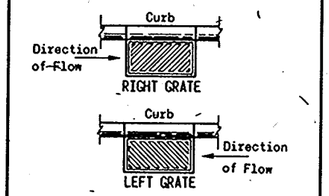
Adjustment of the cover to grade may be accomplished by the use of mortar and brick, or by precast concrete grade rings. Precast concrete grade rings shall conform to the specifications for Precast Reinforced Concrete Manhole Sections, AASHTO Designation M199, except that when such units are wet cast, they shall be made with air-entraining portland cement. Maximum adjustment shall be 8 inches.

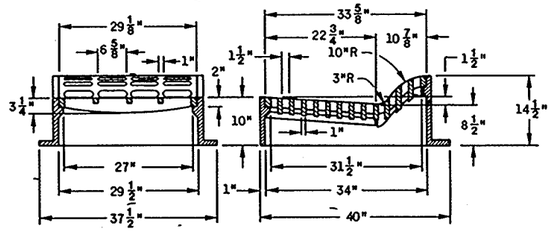
The actual weight of covers may vary within 5 percent, plus or minus, of the approximate weight.

The Type "MS" cover may either be a cast iron grate or a steel grate and frame at the contractors option. A frame is not required with the cast iron cover.

The steel grating shall be capable of carrying an H20 load on a 2'- 10" max. clear span and shall have a minimum section modulus thru the main bearing bars of 3.80 inches^3 per ft. of width. The grating shall be cut in such a manner that all riveted or welded connections are left intact. End banding with a ⅜" min. thickness is required. The size of the frame shall be such that when the grate is in place, the clearance between the grate and the frame will not exceed ⅝" on any side. Main bars shall be laterally supported by transverse bars. Grating and frame shall be galvanized as specified in AASHTO Designation M-111 after fabrication. Grating shall be approved by the Engineer.

Diagonal Slots shall be oriented to the direction of flow. RIGHT and LEFT grates or grates that are manufactured to be reversible and can be used as either RIGHT or LEFT grates shall be furnished depending on direction of flow. (See sketch below)



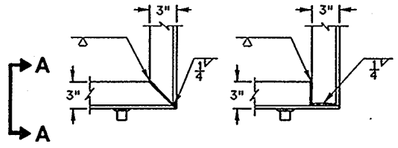


TYPE "MS"

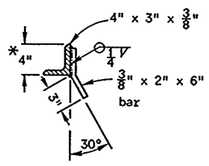
CAUTION: DO NOT USE GRATES WITH LONGITUDINAL SLOTS WHERE BICYCLE TRAFFIC IS PERMITTED.

TYPE "F"

(Approximate Weight 850 lbs.)
Frame 515 lbs.
Back grate 160 lbs.
Front grate 175 lbs.

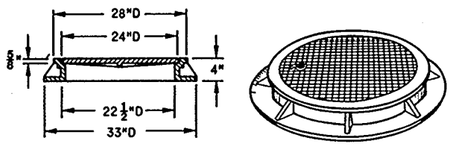


TYPICAL CORNER OF FRAME FOR STEEL GRATE



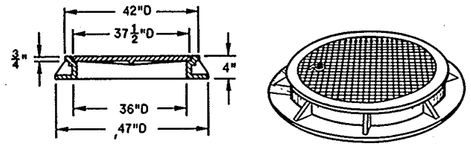
SECTION A-A

*4" dimension may vary according to type of grating used



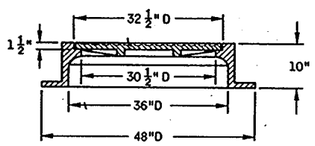
TYPE "L"

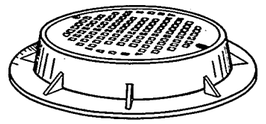
(Approximate Weight 220 lbs.)



TYPE "M"

(Approximate Weight 535 lbs.)





TYPE "K"

(Approximate Weight 785 lbs.)

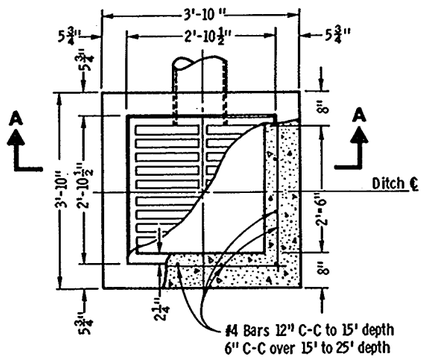
CATCH BASIN MANHOLE AND INLET COVERS

State of Wisconsin
Department of Transportation
Division of Highways

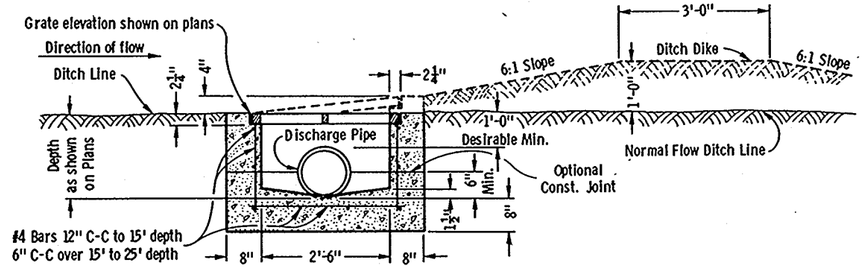
APPROVED 11-23-77 DATE — SUPERVISING DEVELOPMENT ENGINEER
APPROVED 11-25-77 DATE — CHIEF OF FACILITIES DEVELOPMENT
FHWA

S.D.D. 8 A5-3b

S.D.D. 8 A5-3b



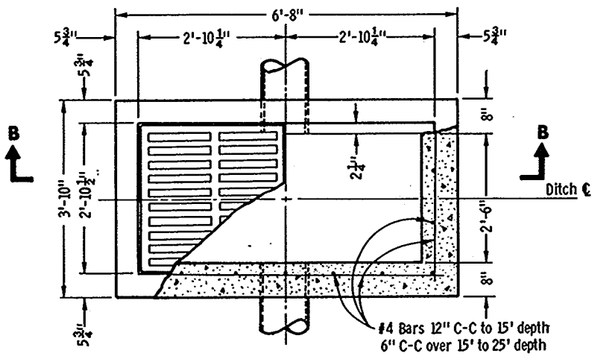
PLAN VIEW



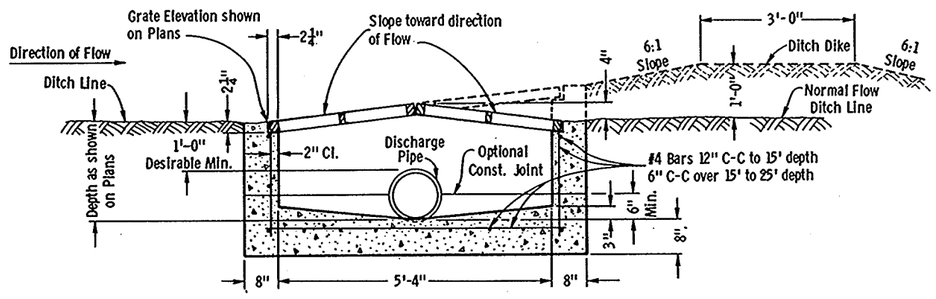
SECTION A-A

INLET TYPE 8

REINFORCED CONCRETE



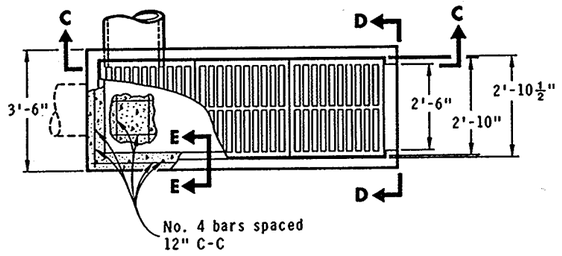
PLAN VIEW



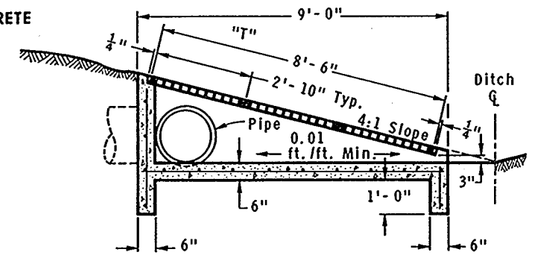
SECTION B-B

INLET TYPE 9

REINFORCED CONCRETE



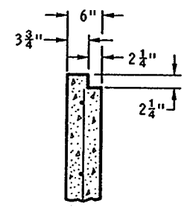
PLAN VIEW



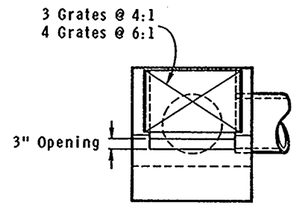
SECTION C-C

INLET TYPE 10

REINFORCED CONCRETE



SECTION E-E



VIEW D-D

GENERAL NOTES

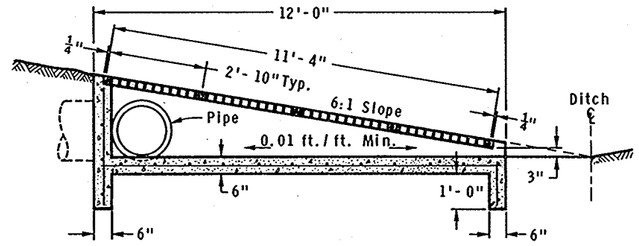
Details of construction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

Detailed drawings for proposed alternate designs for Inlets which may include precast reinforced concrete inlets, shall be submitted to the Engineer for approval providing that such alternate designs make provision for equivalent capacity and strength.

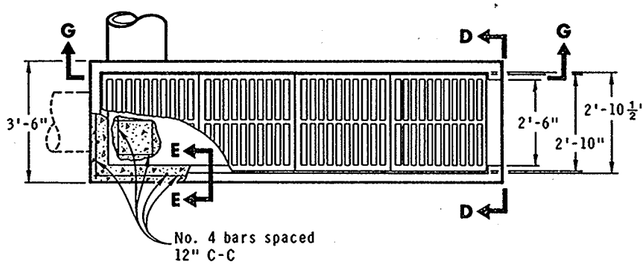
Precast reinforced concrete inlet units, if used, shall conform to the requirements of the Catch Basins, Manholes and Inlets Section of the Standard Specification's.

All Inlets are designated on the Plans as "Inlets, 8-MS", etc. This designation is interpreted to mean that the number, or first digit designates the masonry portion of the structure and the following letter designates the type of cover or iron casting to be used therewith to comprise the complete unit.

All bar steel reinforcement shall be embedded 2 inches clear unless otherwise shown or noted.



SECTION G-G



PLAN VIEW
INLET TYPE 11
REINFORCED CONCRETE

INLETS TYPE 8,9,10 and 11

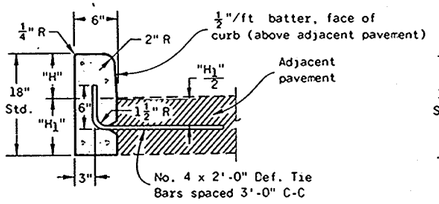
State of Wisconsin
Department of Transportation
Division of Highways

RECOMMENDED FOR APPROVAL:
4-30-74 DATE — CHIEF of FACILITIES DEVELOPMENT

APPROVED
5-02-74 DATE — STATE HIGHWAY ENGINEER

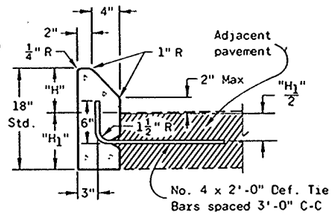
S.D.D. 8C5-1

S.D.D. 8C5-1



"H" = 9" Max. and $3\frac{1}{2}$" Min. and shall be 6" unless otherwise shown on the plans.
"H_1" = Same as adjacent pavement thickness for rigid pavement and 12" for non-rigid pavement (Tie Bars omitted).

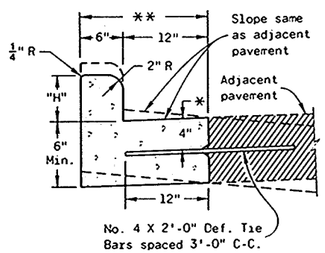
TYPE "A" (INCLUDING TIE BARS) TYPE "D" (EXCLUDING TIE BARS)



"H" = 6" Max. and 4" Min. and shall be 6" unless otherwise shown on the plans.
"H_1" = Same as adjacent pavement thickness for rigid pavement and 12" for non-rigid pavement (Tie Bars omitted).

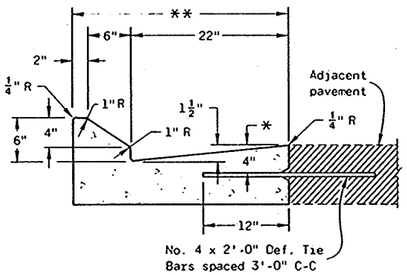
TYPE "G" (INCLUDING TIE BARS) TYPE "J" (EXCLUDING TIE BARS)

CONCRETE CURB



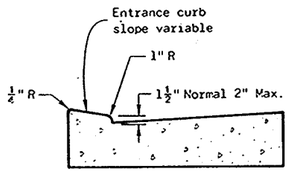
TYPE "A" (INCLUDING TIE BARS) TYPE "D" (EXCLUDING TIE BARS)

CONCRETE CURB & GUTTER 18"

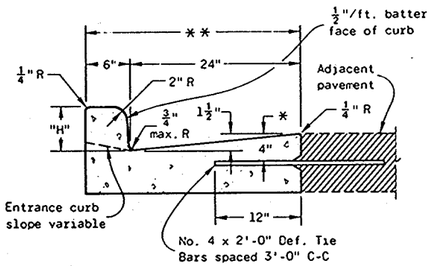


TYPE "G" (INCLUDING TIE BARS) TYPE "J" (EXCLUDING TIE BARS)

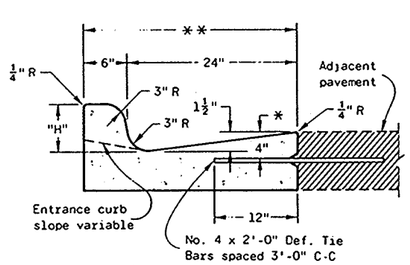
CONCRETE CURB & GUTTER 30"



ALTERNATE ENTRANCE CURB
(When directed by the Engineer)



TYPE "A" (INCLUDING TIE BARS) TYPE "D" (EXCLUDING TIE BARS)

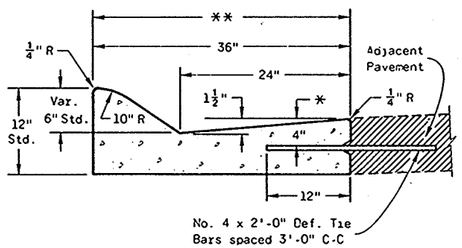


TYPE "K" (INCLUDING TIE BARS) TYPE "L" (EXCLUDING TIE BARS)

CONCRETE CURB & GUTTER 30"

"H" = 9" Max. $3\frac{1}{2}$" Min and shall be 6" unless otherwise shown on the plans.

CONCRETE CURB & GUTTER



TYPE "A" (INCLUDING TIE BARS) TYPE "D" (EXCLUDING TIE BARS)

CONCRETE CURB & GUTTER 36"

GENERAL NOTES

Details of construction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

Joints shall not be sealed in Concrete Curb or Concrete Curb & Gutter

Where Concrete Curb, Concrete Curb & Gutter or Concrete Pavement is poured adjacent to existing concrete, "Pavement Ties" shown on this drawing are required

Pavement Ties and Tie Bars shall be epoxy coated in conformance with Subsection 505.2.4 of the Standard Specifications

The bottom of the curb and gutter may be constructed parallel to subgrade or base course provided a minimum of 6 inches depth of concrete is maintained at the flow line.

The thickness of curb and gutter at the pavement edge shall be $7\frac{1}{2}$" min.

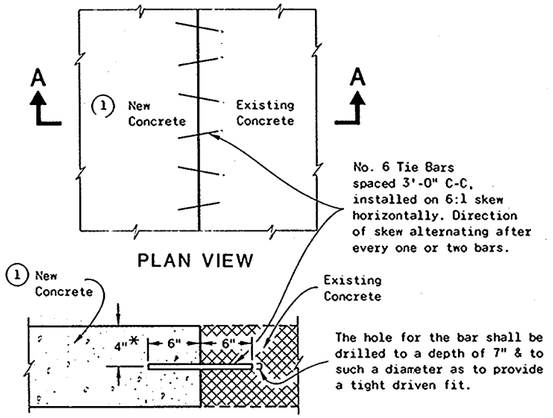
Integral Curb & Gutter when used shall be measured and paid for as Curb & Gutter and shall conform to the details for Concrete Curb & Gutter including the Transverse Gutter Slope. Tie Bars are not required with this alternate.

The limits of the base course, if used, are shown on the typical cross sections elsewhere in the plans. Any additional width of base course necessary to accomodate paving equipment will be at the contractors expense.

(1) = New Curb & Gutter, Surface Drains, Concrete Pavement or other New Concrete.

* = Or center of pavement, whichever is less.

** = Pay limits for Concrete Integral Curb & Gutter



PLAN VIEW

SECTION A-A

PAVEMENT TIES

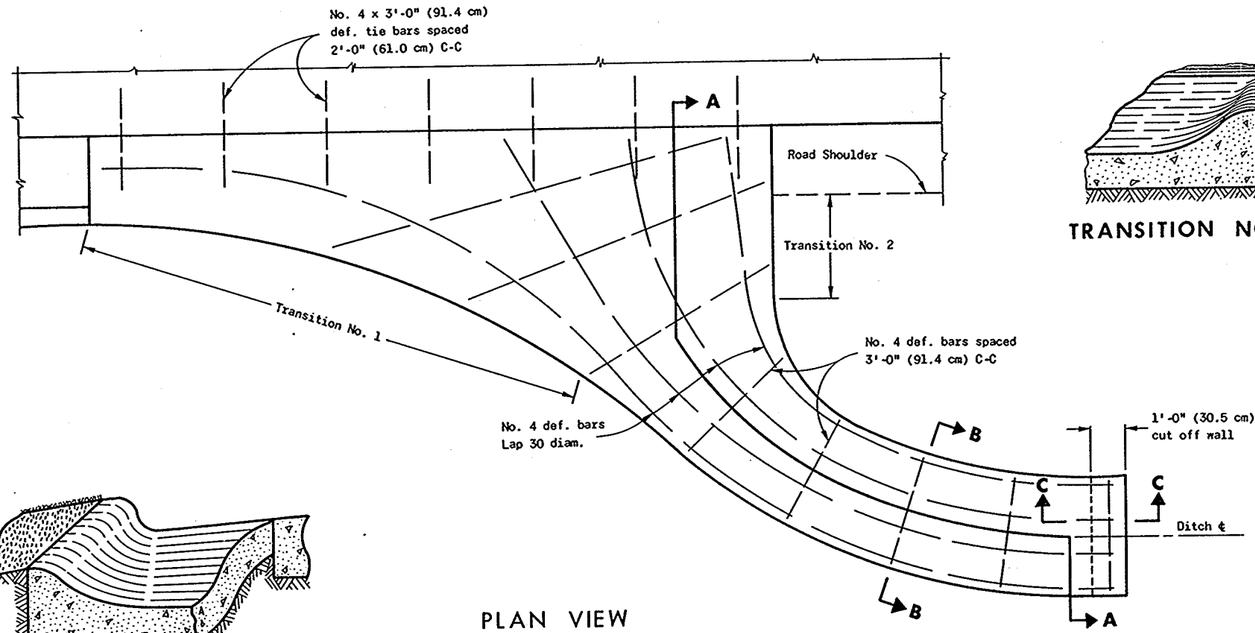
CONCRETE CURB, CONCRETE CURB & GUTTER AND PAVEMENT TIES

State of Wisconsin
Department of Transportation

APPROVED 9-24-84 DATE
CHIEF DESIGN ENGINEER
FHWA

S.D.D. 8 D 1-8

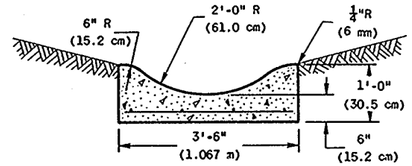
S.D.D. 8 D 1-8



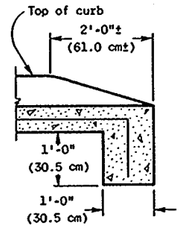
PLAN VIEW

TRANSITION NO. 1

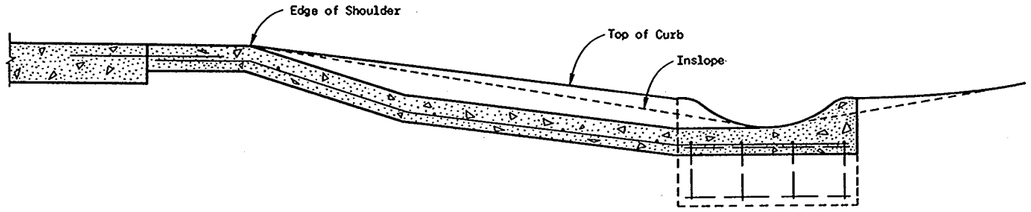
TRANSITION NO. 2



SECTION B-B



SECTION C-C



SECTION A-A

GENERAL NOTES

Details of constuction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

Typical design only; exact design and flume length may be modified by the Engineer to meet field conditions.

METHOD OF DIMENSIONING

1'-0" (30.5 cm)

1'-0" (30.5 cm)

BASIS: 1 in. = EXACTLY 25.4 mm

CONCRETE SURFACE DRAIN

State of Wisconsin
Department of Transportation
Division of Highways

RECOMMENDED FOR APPROVAL:

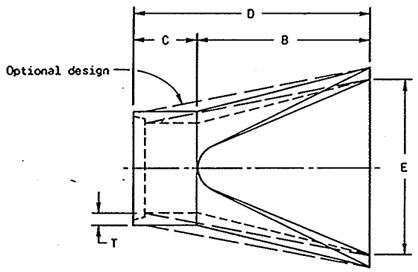
1-1-14 DATE — CHIEF OF FACILITIES DEVELOPMENT

APPROVED

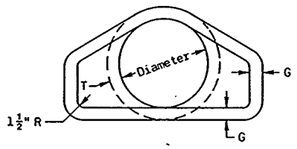
1-15-74 DATE — STATE HIGHWAY ENGINEER

S.D.D. 8D4-1

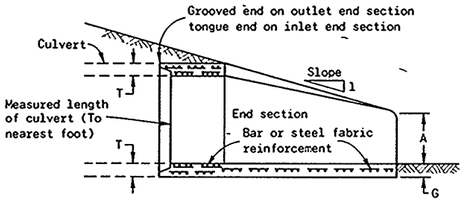
S.D.D. 8D4-1



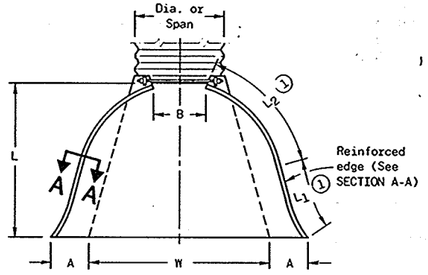
PLAN



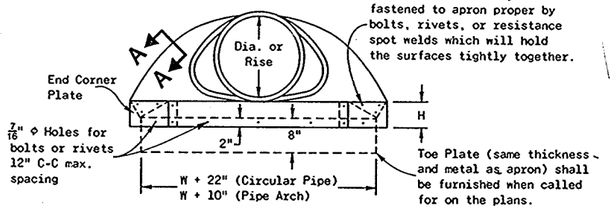
END VIEW



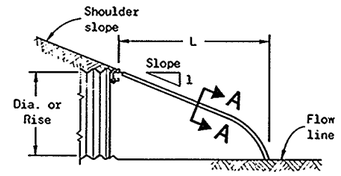
LONGITUDINAL SECTION



PLAN

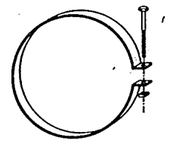


END VIEW

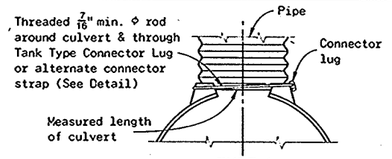


SIDE ELEVATION

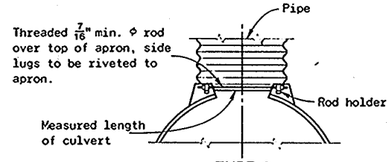
1" Wide, 12 Ga. (0.109" thick) galvanized strap with standard 6" x ¾" band bolt and nut.



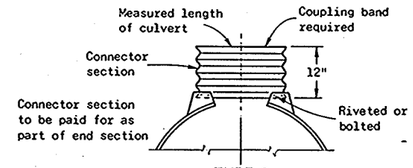
Alternate for Type 1 Connection
END SECTION CONNECTOR STRAP



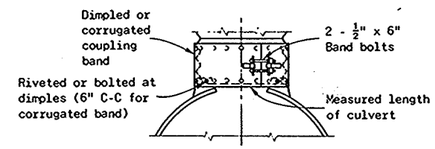
TYPE 1
For 12" thru 24" only (Circular pipe)



TYPE 2
For 30" & 36" only (Circular pipe)
For 17"x13" thru 57"x38" only (Pipe arch)

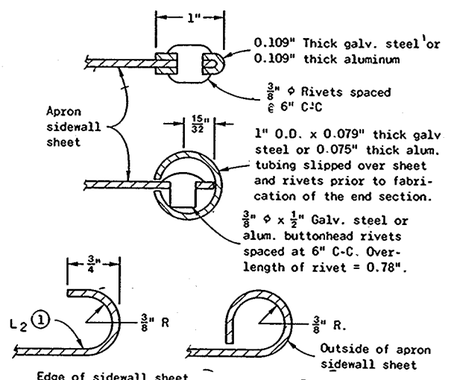


TYPE 3
For 42" thru 84" only (Circular pipe)
For 64"x43" & 71"x47" (Pipe arch)



TYPE 5
Alternate for:
All sizes corrugated circular pipe & pipe arches

NOTE: Dimpled band fits over outside of endwall, and corrugated band fits inside endwall. Dimpled band may be used with helically corrugated pipe.



SECTION A-A

GENERAL NOTES

Details of construction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

Variations of the dimensions and designs shown hereon will be permitted providing equivalent capacity and structural integrity are attained, and prior approval of the Engineer is obtained.

Concrete culvert endwalls may not be used with galvanized steel or aluminum culvert pipe or vice versa.

Galvanized steel or aluminum endwalls shall normally be installed on culvert pipe of the same metal. The use of galvanized steel endwalls on aluminum pipes is permitted, provided the two metals at the joint interface are kept separated by a suitable insulating material approximately 1/16" thick or greater. Such material would be an asphalt impregnated fabric, a sheet plastic, a rubber gasket or other non-degradable material of substantial strength.

When two or more pipe arches with apron endwalls are to be laid adjacent to each other, they shall be separated by the following amount:

PIPES: Total width of apron endwall less the diameter of pipe plus 6 inches.
PIPE ARCHES: Total width of apron endwall less the span dimension of the pipe arch plus 6 inches.

(1) A combination of steel rod rolled into edge sidewall (L_1), and 180° roll on edge of sidewall (L_2), is permitted for metal apron endwalls up to 60" diameter for circular pipe, and 77" x 52" for pipe arches.

CONNECTION DETAILS

CIRCULAR PIPE

For circumferentially corrugated pipe use Endwall Connection Details 1, 2, 3 or 5 as applicable.

For helically corrugated pipe use Endwall Connection Details 1, 2 or 5.

For helically corrugated pipes with two circumferential corrugations at each end use Endwall Connection Details 1, 2 or 3.

PIPE ARCH

Use Endwall Connection Details 2, 3 or 5 as applicable.

PIPE DIA. (In.)	APPROX. WEIGHT PER SECTION	DIMENSIONS (Inches)							APPROX. SLOPE
		T	A	B	C	D	E	G	
12	530	2	4	24	48⅞	72⅞	24	2	3 to 1
15	740	2¼	6	27	46	73	30	2¼	
18	990	2½	9	27	46	73	36	2½	
21	1,280	2¾	9	36	37½	73½	42	2¾	
24	1,520	3	9½	43½	30	73½	48	3	
27	1,930	3¼	10½	49½	24	73½	54	3¼	
30	2,190	3½	12	54	19¾	73¾	60	3½	
36	4,100	4	15	63	34¾	97¾	72	4	
42	5,380	4½	21	63	35	98	78	4½	
48	6,550	5	24	72	26	98	84	5	3 to 1
54	8,040	5½	27	65	*33¼ - **35	*98¼ - **100	90	5	2½ to 1
60	8,730	6	*30 - **35	60	39	99	96	5	2 to 1
66	10,630	6½	*24 - **30	*72 - **78	*21 - **27		102	5½	
72	12,520	7	*24 - **36	78	21		108	6	
78	14,430	7½	*24 - **36	78	21	99	114	6½	2 to 1
84	18,160	8	36	90½	21	111½	120	6½	1½ to 1

* Minimum ** Maximum

REINFORCED CONCRETE APRON ENDWALLS

PIPE DIA. (In.)	MIN. THICKNESS (Inches)		DIMENSIONS (Inches)						APPROX. SLOPE
	STEEL	ALUM.	A ±1"	B MAX.	H ±1"	L ±1½"	L1 (1)	L2 (1)	W ±2"	
12	0.064	0.060	6	6	6	21	12	17½	24	2½ to 1
15			7	8		26	14	21¾	30	
18			8	10		31	15	28¼	36	
21		0.060	9	12		36	18	29⅝	42	
24	0.064	0.075	10	13	6	41	18	37¼	48	
30	0.079	0.075	12	16	8	51	18	52¼	60	
36	0.079	0.105	14	19	9	60	24	59⅛	72	
42	0.109	0.105	16	22	11	69	24	76⅝	84	2½ to 1
48		0.135	18	27	12	78	24	81	90	2¼ to 1
54		0.135		30		84	30	85½	102	2 to 1
60		0.164		33		87	–	–	114	1¾ to 1
66				36		87	–	–	120	1½ to 1
72				39		87	–	–	126	1¼ to 1
78				42		87	–	–	132	1¼ to 1
84	0.109	0.164	18	45	12	87	–	–	138	1¼ to 1

NOTE: All splices to be lap riveted or bolted.

METAL APRON ENDWALLS FOR CIRCULAR PIPE

PIPE-ARCH DIMENSIONS (Inches)		MIN. THICK. (Inches)		DIMENSIONS (Inches)							APPROX. SLOPE
SPAN	RISE	STEEL	ALUM.	A ±1"	B MAX.	H ±1"	L ±1½"	L1 (1)	L2 (1)	W ±2"	
17	13	0.064	0.060	7	9	6	19	14	16	30	2½ to 1
21	15		0.060	7	10		23	14	19⅜	36	
24	18		0.060	8	12		28	18	21¾	42	
28	20	0.064	0.075	9	14		32	18	27½	48	
35	24	0.079	0.075	10	16	6	39	18	37⅝	60	
42	29	0.079	0.105	12	18	8	46	24	45⅜	75	
49	33	0.109	0.105	13	21	9	53		54¾	85	
57	38		0 135	18	26	12	63		68	90	2½ to 1
64	43		0.135		30		70	24	72¾	102	2¼ to 1
71	47		0 164		33		77	30	82¼	114	2¼ to 1
77	52		0.164		36		77	–	–	126	2 to 1
83	57	0.109	0.164	18	39	12	77	–	–	138	2 to 1

NOTE: All splices to be lap riveted or bolted.

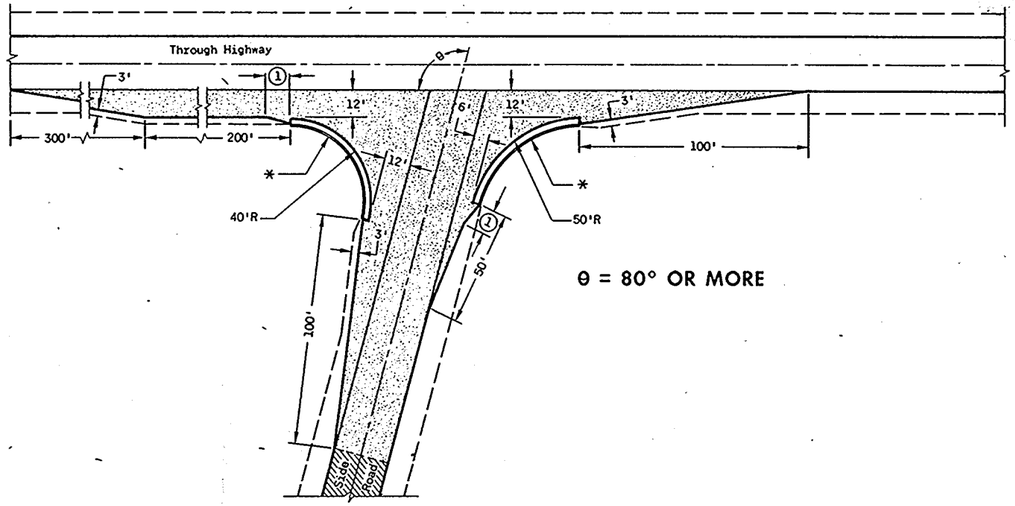
METAL APRON ENDWALLS FOR PIPE ARCHES

APRON ENDWALLS FOR CULVERT PIPE AND PIPE ARCHES

State of Wisconsin
Department of Transportation

APPROVED 2-15-82 DATE — CHIEF DESIGN ENGINEER
FHWA

S.D.D. 8 F 1-9

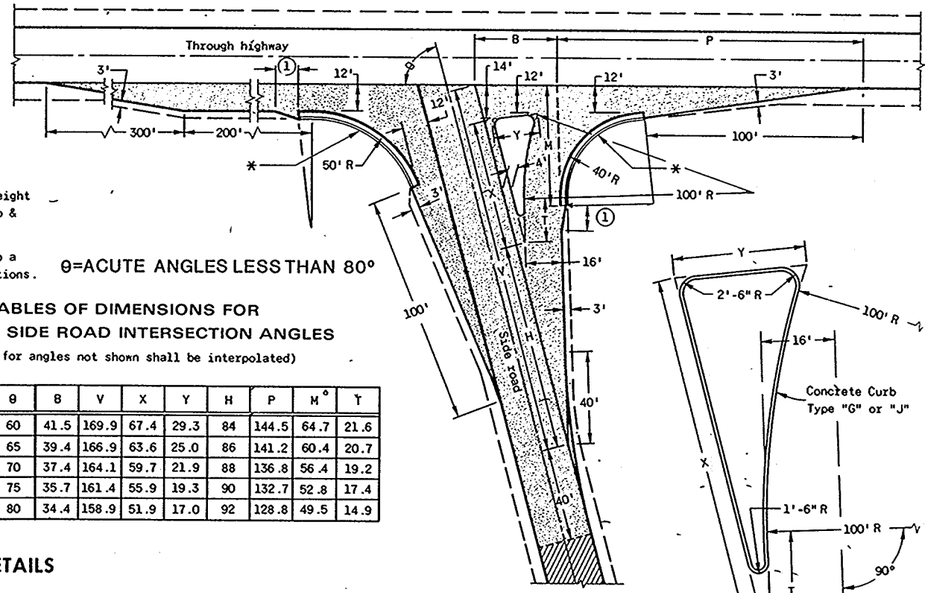


θ = 80° OR MORE

* Concrete Curb & Gutter 36". Taper curb height 0" to 6" in 10'-0" length at ends of curb & gutter sections.

Provide sod or salvaged topsoil & seed to a 3'-0" width in back of curb & gutter sections.

(1) 10' Typical



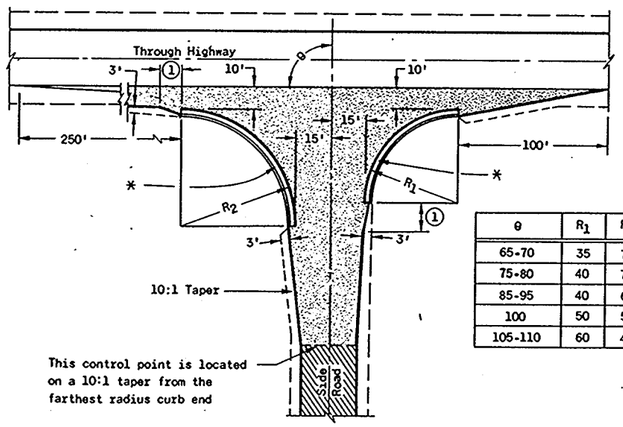
θ=ACUTE ANGLES LESS THAN 80°

TABLES OF DIMENSIONS FOR VARIABLE SIDE ROAD INTERSECTION ANGLES

(Values for angles not shown shall be interpolated)

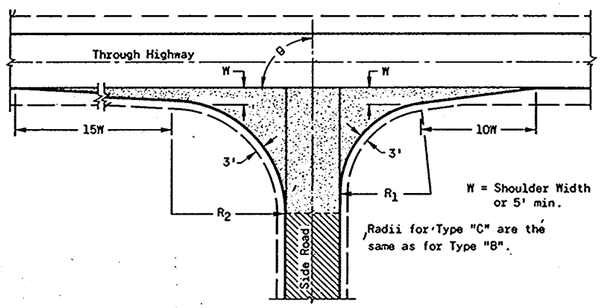
θ	B	V	X	Y	H	P	M°	T
60	41.5	169.9	67.4	29.3	84	144.5	64.7	21.6
65	39.4	166.9	63.6	25.0	86	141.2	60.4	20.7
70	37.4	164.1	59.7	21.9	88	136.8	56.4	19.2
75	35.7	161.4	55.9	19.3	90	132.7	52.8	17.4
80	34.4	158.9	51.9	17.0	92	128.8	49.5	14.9

TYPE "A" SIDE ROAD INTERSECTION DETAILS

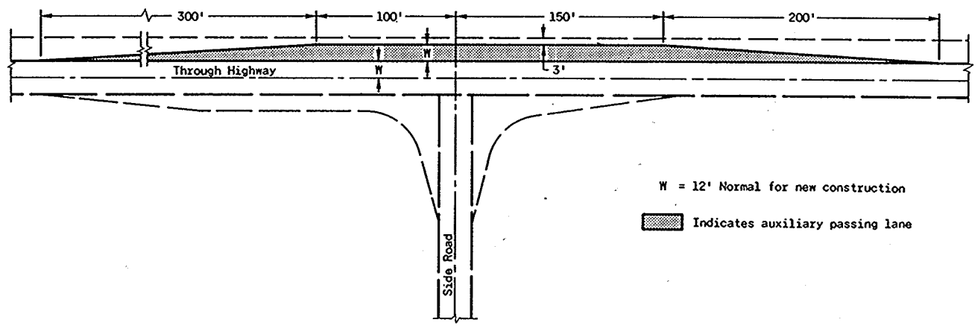


θ	R_1	R_2
65-70	35	70
75-80	40	70
85-95	40	60
100	50	55
105-110	60	45

TYPE "B" SIDE ROAD INTERSECTION DETAILS



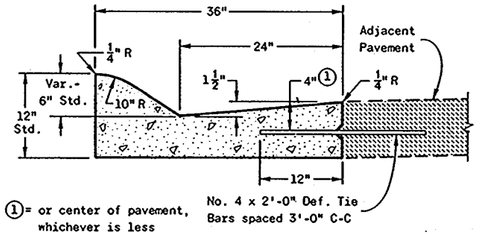
TYPE "C" SIDE ROAD INTERSECTION DETAILS



W = 12' Normal for new construction

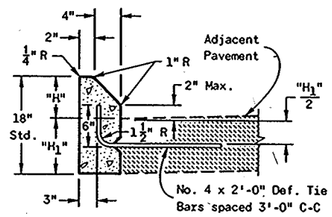
Indicates auxiliary passing lane

PASSING LANE DETAIL



TYPE "A" (INCLUDING TIE BARS) TYPE "D" (EXCLUDING TIE BARS)

CONCRETE CURB & GUTTER 36"



"H" = 6" Max. and 4" Min. and shall be 6" unless otherwise shown on the plans.

"H_1" = Same as adjacent pavement thickness for rigid pavement and 12" for non-rigid pavement (Tie Bars omitted).

TYPE "G" (INCLUDING TIE BARS) TYPE "J" (EXCLUDING TIE BARS)

CONCRETE CURB

GENERAL NOTES

Designs may be used interchangeably in combination or separately for any one complete intersection depending upon intersection angle and surfacing of each approach roadway.

SIDE ROAD SURFACING NOTE

If the side road is not presently paved, pavement shall be placed to the limits shown. In the case where the construction limits are beyond the paving limits, crushed aggregate surfacing shall be placed between the paving limits and construction limits.

If the side road is presently paved, new pavement shall be placed to the limits of design as shown and beyond, if necessary, to meet existing pavement.

If the side road is the construction project, the intersection surfacing shall be the same as for the project.

New Pavement

Existing Surface

LAYOUT DETAILS FOR AT-GRADE SIDE ROAD INTERSECTIONS

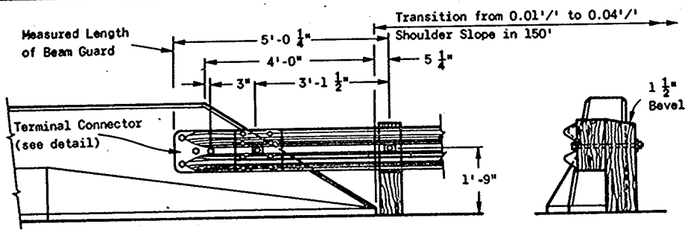
State of Wisconsin
Department of Transportation

APPROVED 12-15-80 DATE
FHWA

CHIEF DESIGN ENGINEER

S.D.D. 9 A 1-5

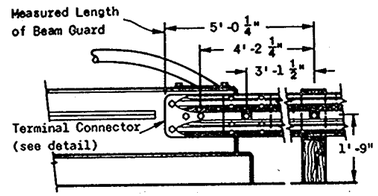
S.D.D. 9 A 1-5



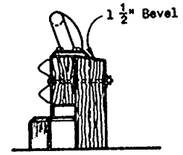
FRONT VIEW

END VIEW

SLOPED FACE PARAPET

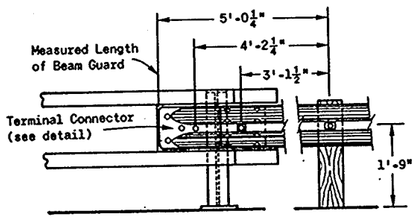


FRONT VIEW

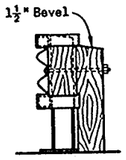


END VIEW

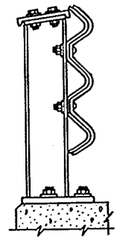
VERTICAL FACE PARAPET



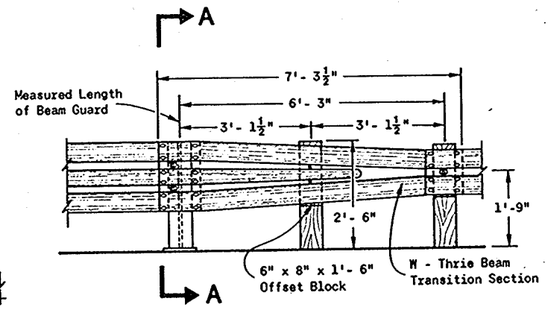
FRONT VIEW



END VIEW



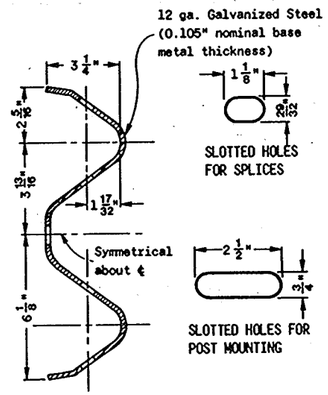
SECTION A-A



FRONT VIEW

RAILING TYPE "W"

RAILING TYPE "F"



SECTION THRU RAIL ELEMENT

GENERAL NOTES

Details of construction, materials and workmanship not shown on this drawing shall conform to the pertinent requirements of the Standard Specifications and the applicable Special Provisions.

The type of anchorage and the exact location of the beginning and end of each beam guard installation shall be as shown on the plans or as directed by the Engineer.

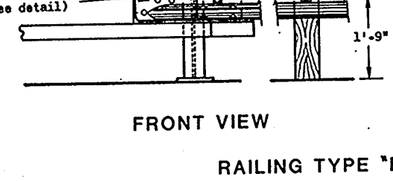
Shoulder widening to accommodate the anchored end of the beam guard shall be accomplished at a rate of widening not to exceed 5 to 1.

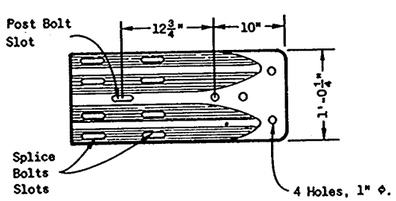
Standard Anchorages - Upon approval of the Engineer, the 6 foot offset may be reduced to nothing where existing conditions will not permit the desirable offset. However, when no offset greater than or equal to 3 feet can be provided, the minimum length of guardrail in advance of an obstacle (obstacle to anchor) shall be 150 feet.

The "Post Footing Details at Piers" shall be used when beam guard posts are over structure footings and less than 3 feet - 6 inches of earth is provided over the top of the footing.

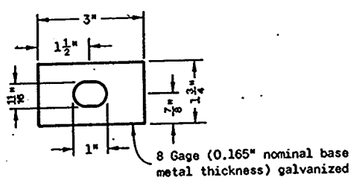
(1) The minimum clearance from the front face of beam guard to obstacle shall be 4 feet unless otherwise shown on contract plans. When clearance is less than 4 feet, post spacing shall be reduced to 3 feet - 1½ inches C-C.

(2) This section shall include at least one 12'- 6" Rail Element and a Terminal Connector or W-Thrie Beam Transition Section as required for structure mounting.





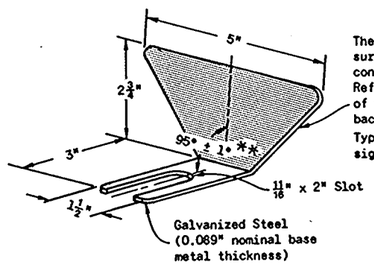
TERMINAL CONNECTOR



RECTANGULAR PLATE WASHER

(Shall be omitted at selected locations when Type 1 Anchorages are used.)

STRUCTURE MOUNTING DETAILS



The reflectorized surface(s) shall consist of Silver Reflective Sheeting of the type used as background on Type I, Type II, or Type III signs

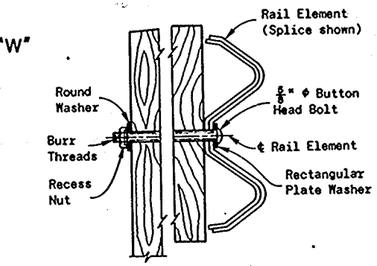
REFLECTOR SPACING

	Beam Guard Length	Reflector Spacing	No. Surfaces Reflectorized	Min. No. Reflectors
One Way Traffic	< 200'	50' C-C	1	3
	> 200'	100' C-C	1	
Two Way Traffic	< 200' *	25' C-C	1 *	6
	> 200' *	50' C-C	1 *	
Two Way Traffic	< 200'	50' C-C	2 **	3
	> 200'	100' C-C	2 **	

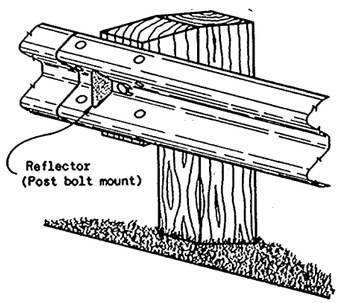
* Every other reflector reversed for 2-way visibility. Contractor may furnish two-sided reflectors in lieu of one-sided reflectors.

** Angle of bend to be 90° ± 1° for two-sided reflectors.

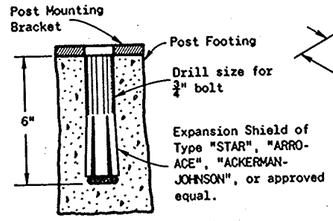
REFLECTOR DETAIL



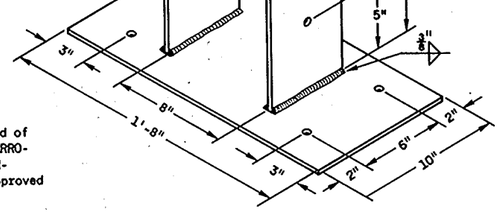
BUTTON HEAD BOLT DETAIL



TYPICAL INSTALLATION



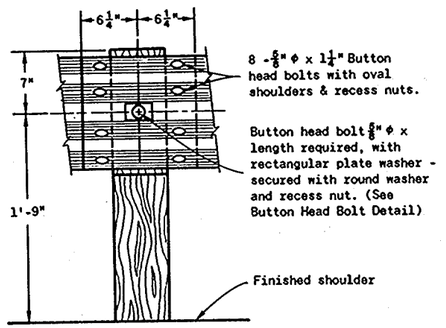
EXPANSION SHIELD DETAIL



POST MOUNTING BRACKET

NOTE:
Drill all holes in mounting bracket 7/8" ϕ.
Use 3/8" minimum thickness ASTM A 36 steel plate for all pieces and galvanize after fabrication & drilling.

POST FOOTING DETAIL AT PIERS



RAIL ELEMENT SPLICING AND POST MOUNTING DETAIL

NOTE:
THIS STANDARD DETAIL DRAWING CONSISTS OF TWO SHEETS AND BOTH SHEETS ARE REQUIRED WHEN THIS DRAWING IS CALLED FOR IN CONTRACT PLANS.

CAUTION: WHEN SPECIAL ANCHORAGES ARE SPECIFIED, SHEET 7c IS ALSO REQUIRED.

CLASS "A"
STEEL PLATE BEAM GUARD

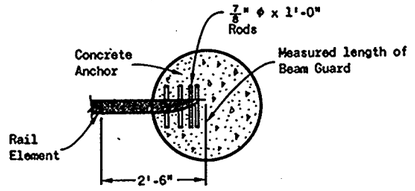
State of Wisconsin
Department of Transportation

APPROVED 3-6-84
DATE
FHWA

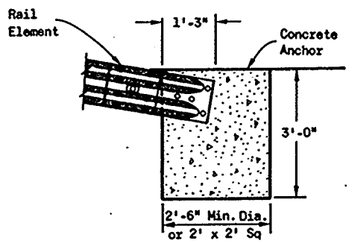
D. D. Ahrens
CHIEF DESIGN ENGINEER

S.D.D. 14 B 2-7a

S.D.D. 14 B 2-7a



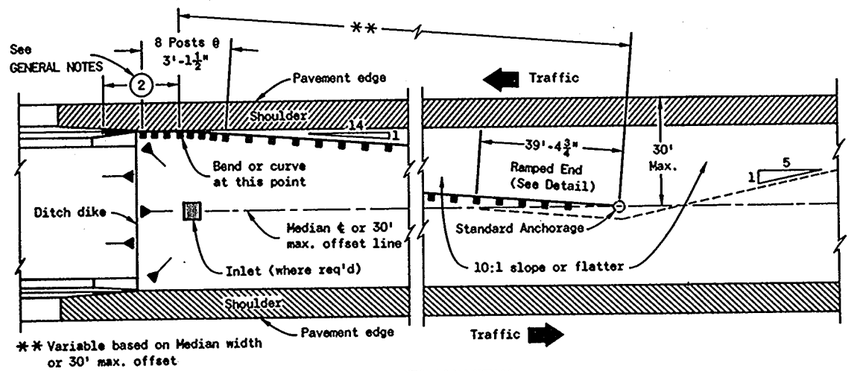
PLAN VIEW IN SECTION



FRONT VIEW IN SECTION

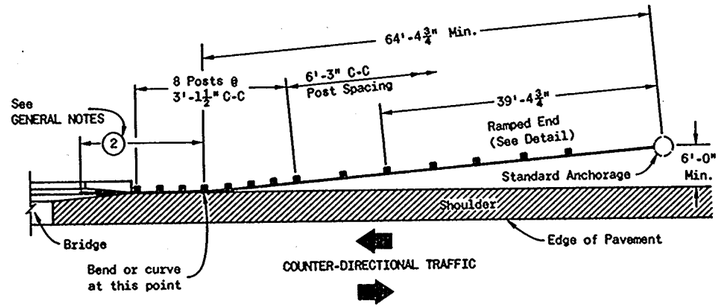
STANDARD ANCHORAGE DETAIL

(Standard Specification Item "Anchorage for Steel Plate Beam Guard")



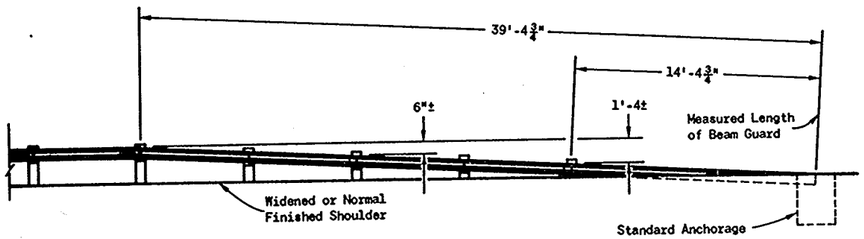
PLAN VIEW

TYPICAL MEDIAN INSTALLATION AT STRUCTURES



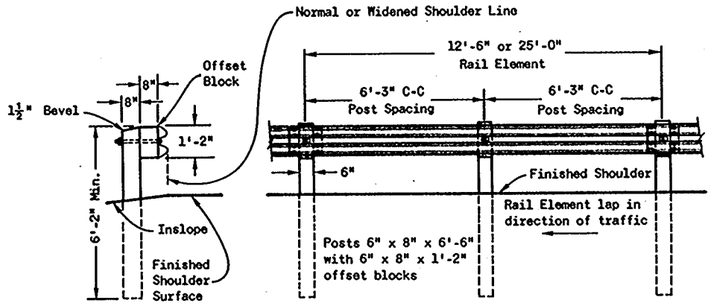
PLAN VIEW

TYPICAL INSTALLATION AT FULL WIDTH STRUCTURES



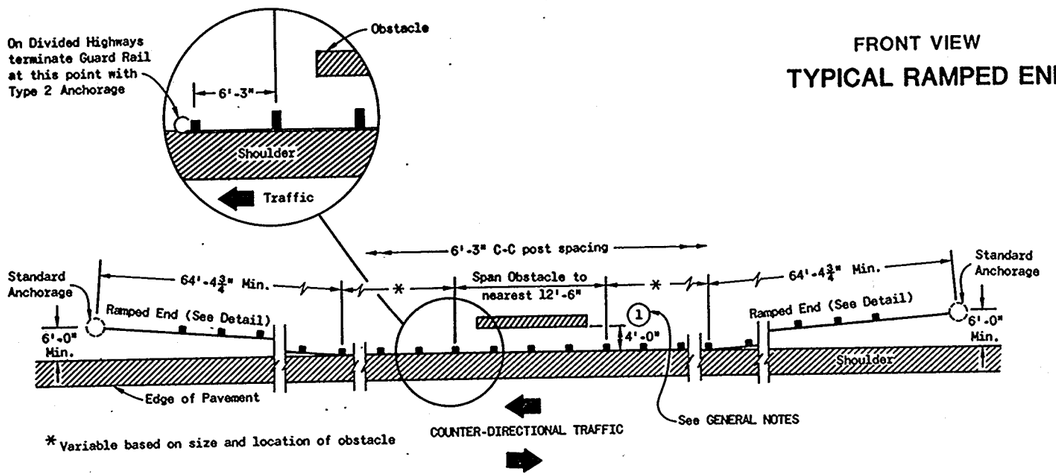
FRONT VIEW

TYPICAL RAMPED END



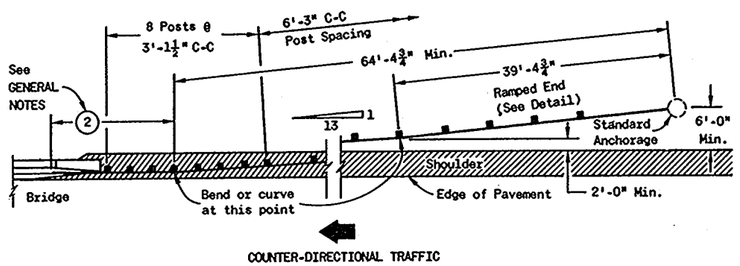
END VIEW FRONT VIEW

TYPICAL STEEL PLATE BEAM GUARD INSTALLATION



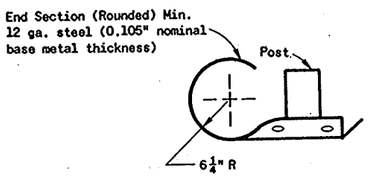
PLAN VIEW

TYPICAL INSTALLATION AT OBSTACLES



PLAN VIEW

TYPICAL INSTALLATION AT NARROW STRUCTURES



PLAN VIEW

END SECTION (ROUNDED)

CLASS "A"
STEEL PLATE BEAM GUARD

State of Wisconsin
Department of Transportation

S.D.D. 14 B 2-7b

S.D.D. 14 B 2-7b