M E M O

FILE CODE		
1-Div 2-Proj 3-City 4-Hwy		
ORIGIN		DATE
ITEM	#	

TO: __ Construction Division
__ Bismarck District
__ Bridge Division
__ Design Division
__ City of Bismarck
X City of Mandan T. Little
__ FHWA

FR: David K. O. Leer, Design Engineer
N.D. Department of Transportation
608 East Boulevard Avenue
Bismarck, ND 58505-0700

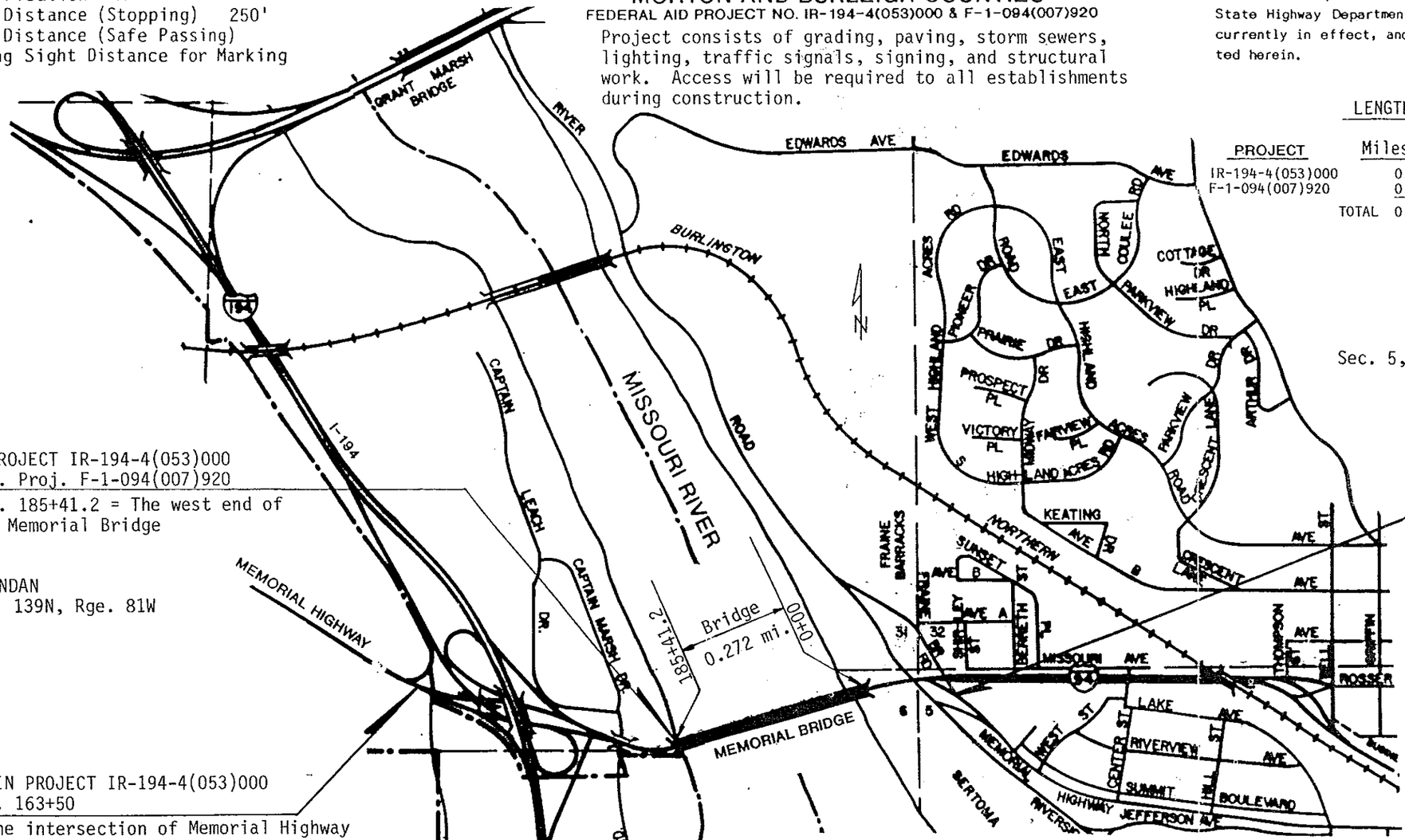
DT: June 1, 1990

RE: Projects IR-194-4(053)000 and
F-1-094(007)920 - Memorial Bridge

The PS & E for the Memorial Bridge project is scheduled for July 12, 1990, at 8:30 a.m., in room 330 of the Highway Building.

Enclosed are preliminary plans for the roadway portion of the projects. Bridge plans, as well as plans for signing, marking, and lighting, will be mailed separately in approximately three weeks.

gmn
enclosure



JOB#_____

FHWA REGION	STATE	PROJECT	SHEET NO.
8	N.D.	IR-194-4(053)000 F-1-094(007)920	1

DESIGN DATA

Traffic	Average Daily						Est. 30th Max. Hr.
Current (1990)	12,900	Pass.	700	Trucks	13,600	Total	1360
Forecast (2010)	15,950	Pass.	850	Trucks	16,800	Total	1680

Design Speed 35 MPH
Traffic Classification "M"
Minimum Sight Distance (Stopping) 250'
Minimum Sight Distance (Safe Passing)
Minimum Passing Sight Distance for Marking
Bridges HS 20

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

MORTON AND BURLEIGH COUNTIES

FEDERAL AID PROJECT NO. IR-194-4(053)000 & F-1-094(007)920

Project consists of grading, paving, storm sewers, lighting, traffic signals, signing, and structural work. Access will be required to all establishments during construction.

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway Department November 1986, Standard Drawings currently in effect, and other Contract Provisions submitted herein.

LENGTH OF PROJECT

PROJECT	Miles-Gross	Miles-Net
IR-194-4(053)000	0.415	0.415
F-1-094(007)920	0.396	0.396
TOTAL	0.811	0.811

END PROJECT IR-194-4(053)000
= Beg. Proj. F-1-094(007)920
= Sta. 185+41.2 = The west end of the Memorial Bridge

MANDAN
Sec. 31, Twp. 139N, Rge. 81W

BISMARCK
Sec. 5, Twp. 138N, Rge. 80W

END PROJECT F-1-094(007)920
Sta. 6+50.16
= The intersection of Memorial Highway and Fraine Barracks Road in Bismarck

BEGIN PROJECT IR-194-4(053)000
Sta. 163+50
= The intersection of Memorial Highway and 46th Ave. SE in Mandan

PRELIMINARY

Date May 30, 1990

APPROVED DATE ________

CHIEF ENGINEER
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

21

DIVISION ADMINISTRATOR DATE

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-194(053)000	

NOTES

100 011 GENERAL: The engineer will attend to the removal of existing fences to the highway right of way line and to the relocation or adjustment of utility facilities as shown on the plans. Equipment shall work around utility poles, within the area, that are not to be disturbed.

100 020 WORK SCHEDULE: In order to minimize interference with traffic operations, a detailed schedule shall be agreed to prior to beginning work, between the engineer, utility companies, and the contractor and subcontractors, if any.

100 021 WEEKLY PLANNING/REPORTING MEETING:

A. Purpose of Weekly Meeting.

1. Purpose of Weekly Meeting.

B. Contractor's Project Manager/Superintendent: Planning and Reporting.

1. The contractor will be required to provide a written schedule of the next week's work and a tentative schedule of the following week.

2. The contractor will be responsible for sending a knowledgeable representative to conduct a weekly Reporting/Planning meeting.

3. Reporting/Planning meeting will include discussion of problems encountered during the current week; information of interest to local authorities, subcontractors, utilities, and next week's prospective schedule.

4. The contractor will organize the weekly meeting contacting interested agencies. These agencies include, but are not limited to, the following:

a. State Highway Department.
b. City Engineer's representative.
c. Police department.
d. Fire department.
e. Ambulance service.
f. Telephone Co.
g. Power Co.
h. Cable T.V.
i. Gas Co.
j. Railroad Co.
k. Subcontractors.
l. Chamber of Commerce.

100 030 UNDERGROUND UTILITIES: The contractor shall notify the local utility companies prior to the beginning of construction, so they may determine the location of all utilities in the project area. Subcutting or scarifying over utility lines may be eliminated if, in the opinion of the engineer, a hazardous situation exists. Separate plans, if any, showing relocation or adjustment work to be performed by utility companies to accommodate highway construction will be made available to the contractor, upon request to the engineer.

100 060 DETOURS: The contractor shall maintain the streets used as detours (streets to be designated by the engineer) and repair areas damaged by the detoured traffic. Upon completion of the project, the contractor shall restore the streets to a condition at least equal to that which existed at the time traffic was routed over them. Work shall be as deemed necessary by the engineer. The repair and maintenance of the detours will be paid for in accordance with Section 107.05 B of the Standard Specifications - Haul Roads. Necessary route markers will be furnished by the state highway department and erected and maintained by the contractor as an incidental item.

100 070 PAVEMENT PROTECTION: The contractor shall protect the existing pavement during the course of construction. Surface repair which is required because of the contractor's operations shall be repaired by the contractor at the contractor's expense. Normal maintenance of existing pavement shall be performed by the State Highway Maintenance forces.

100 130 TREES, SHRUBS, AND NATIVE GRASSES: The contractor shall exercise care in his construction operations to ensure that trees, shrubs, and native grasses within the right of way and outside the construction area are not disturbed.

100 133 The contractor will be required to conduct the construction activities in such a manner as to comply with the Air Pollution Control Regulations of the state of North Dakota. Water will be used to control dust on the construction site.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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NOTES

100 145 CONTRACTOR LOCATED AGGREGATE AND/OR BORROW PITS: Prior to surface disturbance or removal of material from a contractor located pit, the contractor shall provide the North Dakota Department of Transportation (NDDOT) with the legal description of the location of the pit. The NDDOT will review this information to determine the probability of any significant cultural resources being affected. The contractor shall submit this information to the NDDOT at least fourteen days prior to stripping the surface or removing any material from the pit. If the NDDOT determines that there is a moderate or higher potential for cultural resources to exist in the affected area, the contractor will be required to obtain the State Historical Preservation Officer's (SHPO) clearance before any material from the pit will be accepted. In order to obtain SHPO clearance, the contractor will be responsible for having a cultural resource survey conducted by a qualified archeologist. They survey shall be submitted to the NDDOT. NDDOT will coordinate with the SHPO once the cultural resource survey is received. Apart from an extension of time, no payment or claim for any damages shall be made to the contractor as compensation for damage for any delays or hindrances from any cause whatsoever in the progress of the work because of this required review. This review conducted by the NDDOT will not relieve the contractor of any responsibility for complying with all federal and state laws and regulations concerning the preservation of cultural resources that are discovered during the operation of the pit. The NDDOT will not participate in the cost of complying with federal or state laws and regulations regarding the salvage or preservation of cultural resources that are discovered during operation of the pit.

105 110 PAVEMENT SWEEPING: The contractor shall sweep new pavements before opening to traffic and for final acceptance. For this sweeping, the contractor shall furnish and utilize a vacuum type sweeper to control the dust. All costs connected with this work shall be included in the price bid of other items.

200 010 SHRINKAGE: 20 percent additional volume in yardage computed by the end area method is allowed for shrinkage in earth embankment.

200 057 TREE REMOVAL: Tree removal within the right of way limits is not a separate pay item. The cost of tree removal shall be incidental to the price bid for "Clearing and Grubbing."

200 060 PAVEMENT REMOVAL: All concrete and pavements paid for as removal shall be deducted from the excavation quantity.

200 080 CONCRETE REMOVAL: Removal of P.C. Concrete sidewalks and driveways shall be paid for as "Removal of Concrete."

200 130 TOPSOIL: Total topsoil from clearing and grubbing areas is approximately _____ cubic yards.

200 252 WASTE DISPOSAL: All excess excavation and old concrete sidewalks, driveways, curb and gutter, pavement, bituminous surfacing, etc., shall be disposed of off the highway right of way at a site selected by the contractor and approved by the Engineer. Disposal in wetland areas will not be approved. The cost of disposal (and obtaining of the disposal area) shall be included in the price bid for other items.

200 300 WATER: The quantity shown for water is the estimated amount required for the aggregate base course and to serve as dust palliative. Water for grading operations shall be paid for as "Moisture Control."

200 301 WATER: The cost of applying water for compaction and for use as a dust palliative, as required, shall be included in the price bid for "Water."

200 360 COMPACTION AND DENSITY CONTROL: Compaction and density controls shall be in accordance with Section 203.02 F of the Standard Specifications _____.

400 050 AUTOMATIC BATCHING EQUIPMENT: The automatic batching equipment as specified in AASHTO M-156 will not be required on this project.

400 080 HOT BITUMINOUS PAVEMENT: The 8" hot bituminous pavement shall be laid in 3 (3) lifts with the top lift having a depth of approximately 2 inches.

400 100 OLD BITUMINOUS PAVEMENT: The old bituminous pavement removed under the pay item "Removal of Bituminous Surfacing," shall become the property of the contractor.

550 130 CONCRETE PROTECTION: Adjacent P.C.C. Pavement shall be protected during the application of all bituminous and asphalt materials to prevent any discoloration of the pavement. Failure to comply will result in the contractor having to clean the pavement at the contractor's own expense. The P.C.C. Pavement slab shall not be used as a table for stockpiling, mixing, or drying of any material.

704 010 MAINTAINING ACCESS: The contractor will be responsible for providing access to all residential dwelling and business establishments adjacent to this project. Final details on location of access points and construction procedures shall be worked out with the engineer in the field prior to start of the project.

FHWA REGION	STATE	FED. AID PROJ NO	SHEET NO
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NOTES

704 TRAFFIC CONTROL:
015 A. The contractor shall provide a qualified traffic maintenance person with the following minimum qualifications:

1. This person shall:

a. Have completed a course of study based on the MUTCD and furnish proof.

b. Be conversant with the contents and intentions contained within the MUTCD and the NDSHD Specifications.

c. Have previous experience working with maintenance and protection of traffic.

d. Be competent to supervise personnel with lessor training in traffic maintenance operations.

e. Be present on the project on a daily basis unless released by the engineer.

2. Duties:

a. To provide traffic control as required by the plans, Standard Specifications, Special Provisions, or MUTCD or as directed by the engineer.

b. The traffic control person shall provide documentation of each day's inspection results and remedial activities.

3. All costs associated with the above requirements shall be included in the price bid for the traffic control items.

704 TRAFFIC CONTROL DEVICES LIST: The quantity listing for traffic
040 control construction area has sufficient quantities for traffic control at all sites. The contractor will be paid for the signs and devices used at each site even though he may move signs from one completed site to the next.

708 SODDING: Sodding quantities have been provided to sod
010 construction areas where the adjacent property has sod established. Sodding locations will be determined by the engineer.

900 RIVER ROAD IMPROVEMENTS: Three hundred thirty-five (335) feet of
P01 River Road improvements (city funds only) are included in these plans. The contractor's attention is directed to sheets identified "River Road Improvements" for special notes, incidental items, and special details which pertain only to that section of roadway. The items "Reset W-Beam Gaurdrail" and "Reset W-Beam Guardrail - Flared End Treatment and Transition" include all labor and materials for removal and resetting existing guardrails and flared ends. Access shall be maintained to local residential dwellings on River Road during construction.

FHWA REGION	STATE	FED. AID PROJ NO	SHEET NO
8	N.D.	IR-194(053)000	

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	IR-194(053)000	F-1-094(007)920	City Proj. 88670 (City Funds Only)	TOTAL
103	0100	Contract Bond	L. Sum	1			1
201	0330	Clearing and Grubbing	L. Sum	1			1
202	0112	Removal of Concrete	Sq. Yd.		42		42
202	0114	Removal of Concrete Pavement	Sq. Yd.		190		190
202	0121	Remove and Salvage Bituminous Surfacing	Ton	5,735		271	6,056
202	0130	Removal of Curb and Gutter	L. Ft.		396		396
202	0231	Remove and Reset Inlets	Ea.		1		1
202	0243	Remove and Reset Historical Monument	L. Sum	1	1		2
203	0101	Common Excavation - Type A	Cu. Yd.	~~30,388~~ 32,654	176	300	~~30,864~~ 33,132
203	0109	Topsoil	Cu. Yd.	5,000			5,000
203	0190	Moisture Control	L. Sum	1			1
216	0100	Water	"M" Gal.	~~378~~ 412	4	3	~~385~~ 419
302		Aggr. Base Course, Cl. 37	Ton	3,690	100		3,790
401	0103	MC-70, 250 Liquid, or SP-6 Emulsified Asphalt	Gal.	1,805	70		1,875
401	0112	RC-250, 800 Liquid, or CRS-2 Emulsified Asphalt	Gal.	4,426	70		4,496
401	0152	SS-1h or CSS-1h Emulsified Asphalt	Gal.	890	20		910
406	0190	Hot Bituminous Pavement - Cl. 33	Ton	3,218	88	325	3,631
406	0320	120-150 Asphalt Cement	Ton	174	6	18	198
420	0145	Cover Coat Material - Cl. 43	Ton	158	3	15	176
550	0112	8 In. Non-reinforced Concrete Pavement - Cl. AE	Sq. Yd.	3,265			3,265
550	0230	Doweled Expansion Joint Assembly	L. Ft.	257			257
550	0240	Doweled Contraction Joint Assembly	L. Ft.	612			612
550	0809	Preformed Compression Joint Seal 9/16 In.	L. Ft.	1,838			1,838
550	0958	Longitudinal Joint Silicone Seal	L. Ft.	452			452

FHWA REGION	STATE	FED. AID PROJ NO	SHEET NO
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SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	IR-194(053)000	F-1-094(007)920	City Proj. 88670 (City Funds Only)	TOTAL
550	0961	Expansion Joint Silicone Seal	L. Ft.	257			257
702	0100	Mobilization	L. Sum	1			1
704	0100	Flagging	M. Hr.	2,000	500		2,500
704	0105	Obliteration of Pavement Marking	L. Ft.				
704	1000	Traffic Control Signs	Unit				
704	1052	Type III Barricade	Ea.				
704	1060	Delineator Drums	Ea.				
704	1065	Traffic Cones	Ea.				
704	1072	Flexible Delineators	Ea.				
704	1087	Sequencing Arrow Panel - Type C	Ea.				
706	0300	Field Laboratory - Type C	Ea.	1			1
708	2280	Seeding - Type B Class V	Acre	8			8
708	4000	Sodding	Sq. Yd.	500			500
714	0115	Pipe, Concrete Reinforced 12 In. - Cl. III - Storm Drain	L. Ft.	58			58
714	0210	Pipe, Concrete Reinforced 15 In. - Cl. III - Storm Drain	L. Ft.	620			620
714	3000	End Section, Concrete Reinforced 12 In.	Ea.	1			1
714	3005	End Section, Concrete Reinforced 15 In.	Ea.	6			6
714	3010	End Section, Concrete Reinforced 18 In.	Ea.	2			2
714	9630	Relay End Section, All Types and Sizes	Ea.	3			3
714	9720	Underdrain, Pipe PVC Perforated - 4 In.	L. Ft.	5,483			5,483
722	0100	Manhole - 48 In.	Ea.	1			1
722	0110	Manhole - 60 In.	Ea.	2			2
722	1100	Manhole Riser - 48 In.	L. Ft.	8			8
722	1110	Manhole Riser - 60 In.	L. Ft.	9			9

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.	IR-194(053)000	

SUMMARY OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	IR-194(053)000	F-1-094(007)920	City Proj. 88670 (City Funds Only)	TOTAL
722	4100	Inlet Type 1	Ea.	2			2
722	4110	Inlet Type 2	Ea.	13			13
722	4140	Inlet Shallow Type 2	Ea.	2			2
722	6200	Adjust Manhole	Ea.				
748	0140	Curb and Gutter, Type I	L. Ft.	10,578	437	951	11,966
750	0100	Sidewalk, Concrete	Sq. Yd.	366	262	104	732
750	1000	Driveway Concrete	Sq. Yd.			27	27
764	1050	Reset W-Beam Guardrail	L. Ft.			483	483
764	1060	Reset W-beam Guardrail - Flared End Treatment and Transition	Ea.			4	4
950	0120	Traffic [illegible]	M. Hr.	1000	1000		2000
[illegible]		Temporary [illegible]	L. S.	1			1

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO
8	N.D.	F-1-094(004)920	

BASIS OF ESTIMATE

SURFACING

Description	Unit	Quantity/S.Y./Inch
Hot Bit. Pvmt., Cl. 33	Ton	0.05556
120-150 Asphalt Cement @ 5.4% of Hot Bit. Pvmt.	Ton	0.00300
Aggr. Base Course Cl. 37 @ 1.875 Ton/C.Y.	Ton	0.05208

Description	Unit	Quantity/S.Y.
SS-1h or CSS-1h Emuls. Asph. for Tack Coat @ 0.05 Gal./S.Y.	Gal.	.05
MC-70, 250, or SP-6 Liq. Asph. for Prime @ 0.35 Gal./S.Y.	Gal.	0.35
RC-250 or 800 Liq. Asph. or CRS-2 Emuls. Asph. for Seal Coat @ 0.35 Gal./S.Y.	Gal.	0.35
Cover Coat Material, Cl. 45 @ 25 Lbs./S.Y.	Ton	.0125

GRADING

WATER: 10 Gal. C.Y. of estimated embankment quantities and 20 Gal./Ton of aggregate base course and salvaged base course. An estimated quantity has bee included in the quantities for use as a dust palliative.

SODDING: The exact limits for the installation of sod shall be determined by the engineer in the field.

MAXIMUM SIZE OF AGGREGATE

Description	Type of Aggregate	Max. Size
Hot Bit. Pvmt., Cl. 33	Crushed	5/8"
Cover Coat Material, Cl. 45		1/2"
Aggregate Base Crse., Cl. 37	Crushed	3/4"

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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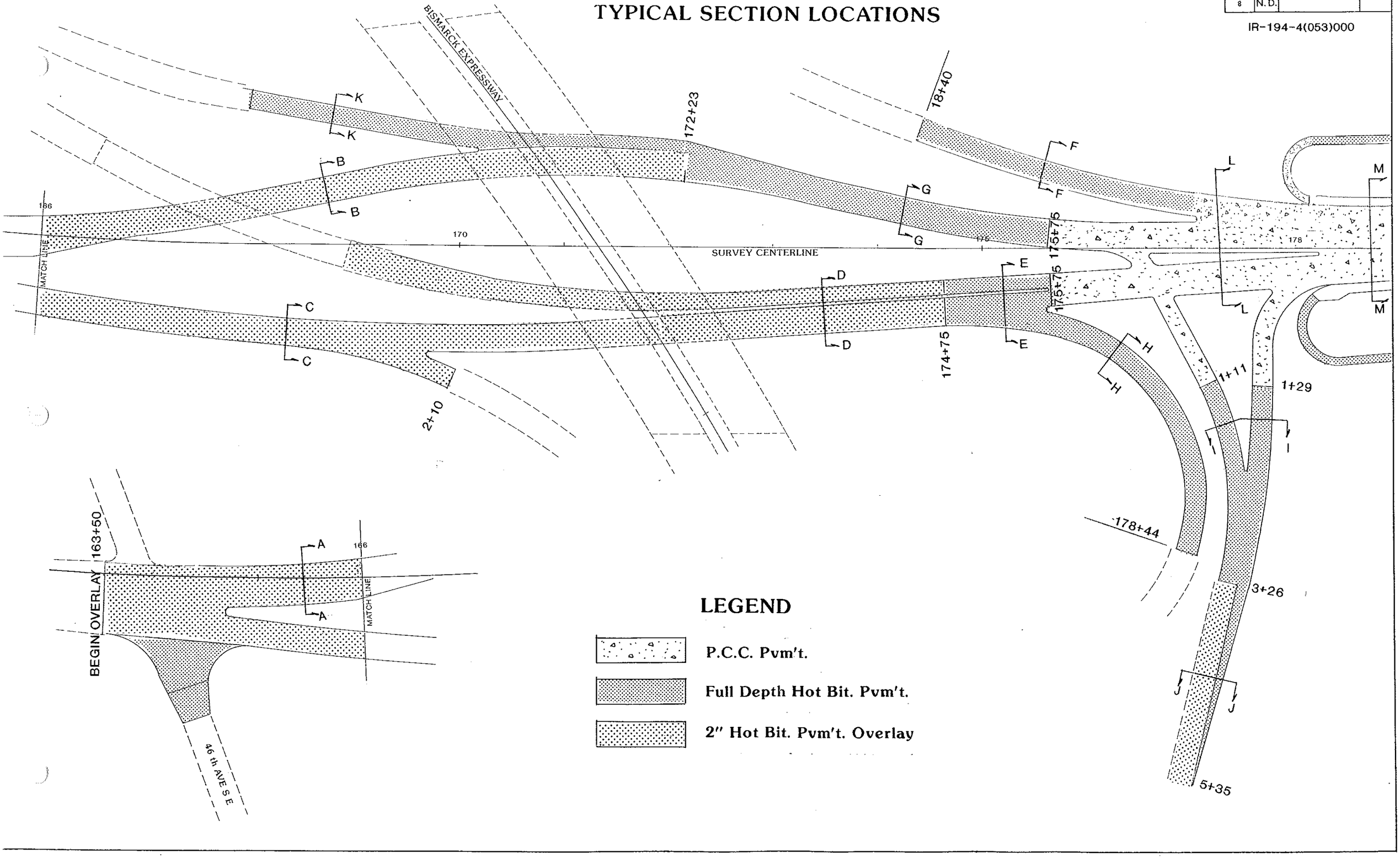
IR-194-4(053)000

TYPICAL SECTION LOCATIONS



LEGEND

P.C.C. Pvm't.

Full Depth Hot Bit. Pvm't.

2" Hot Bit. Pvm't. Overlay

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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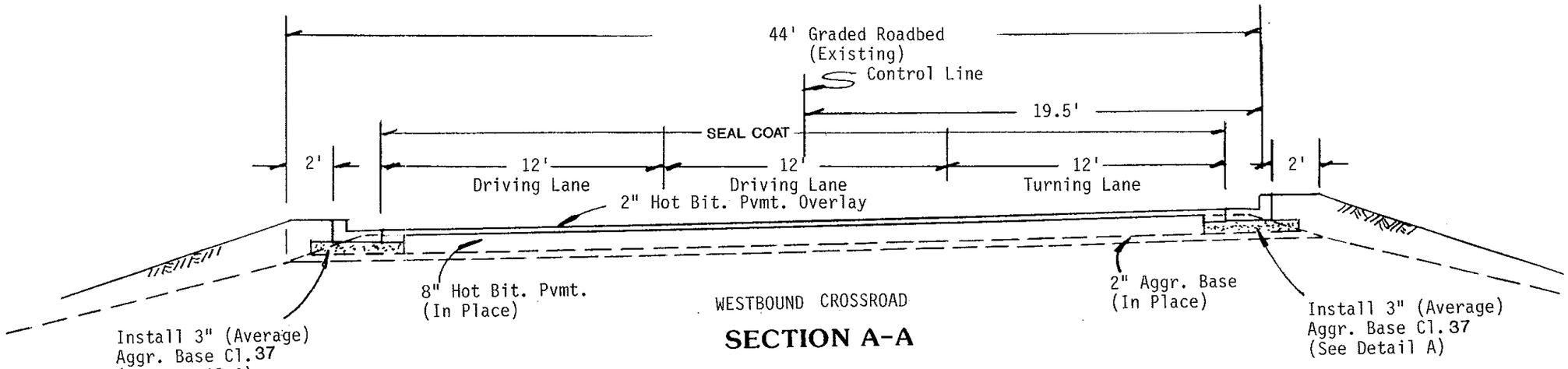
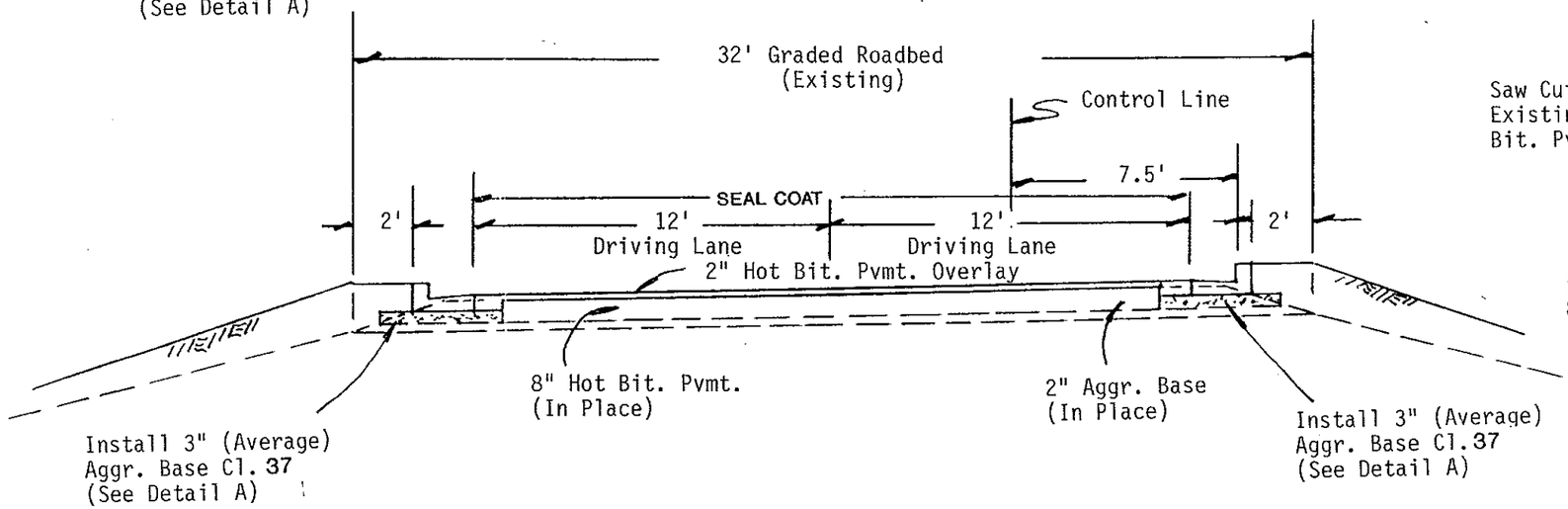


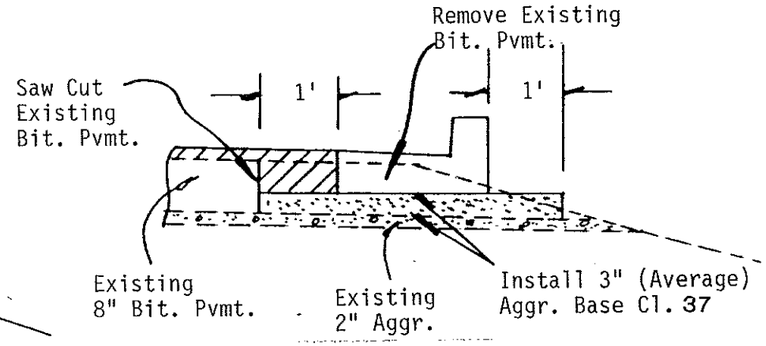
WESTBOUND CROSSROAD

SECTION A-A



WESTBOUND CROSSROAD

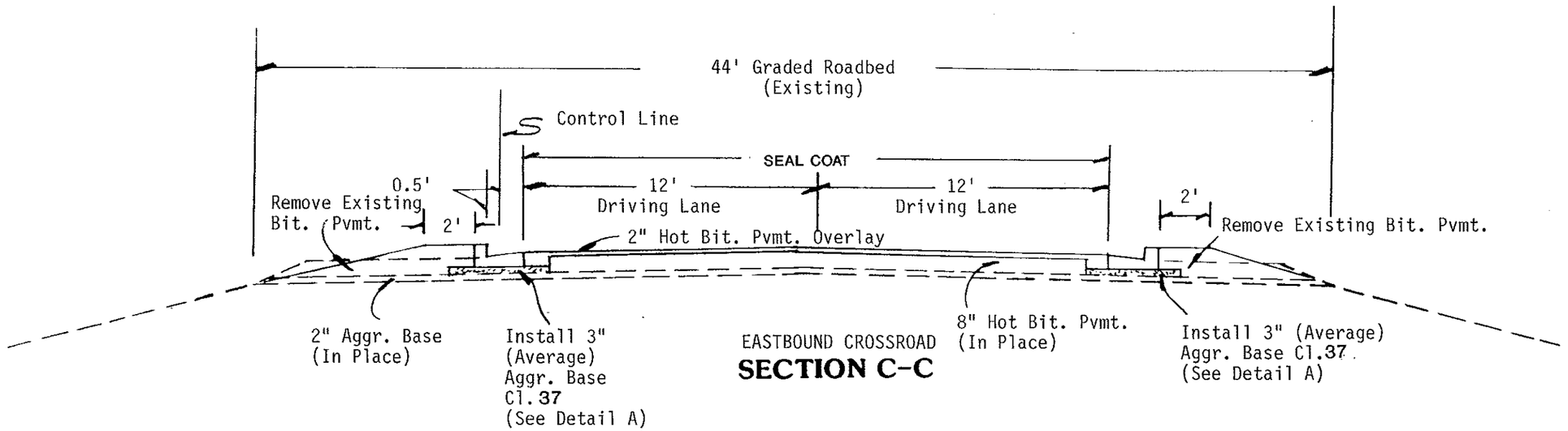
SECTION B-B



DETAIL A

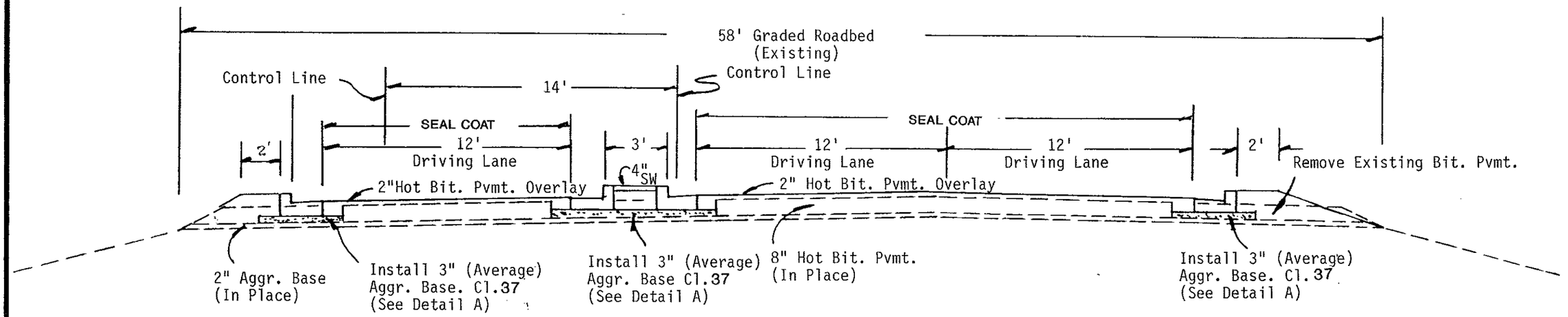
SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



EASTBOUND CROSSROAD

SECTION C-C

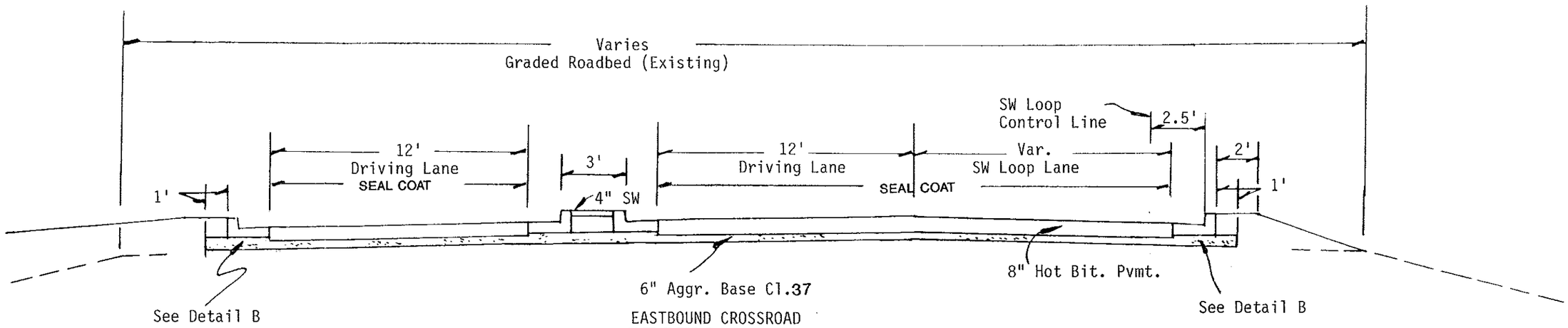


EASTBOUND CROSSROAD

SECTION D-D

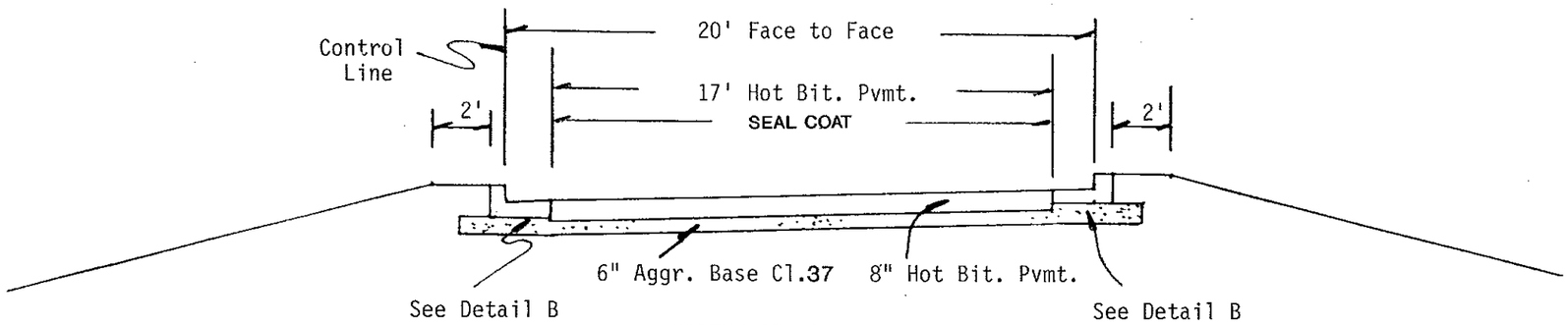
SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



EASTBOUND CROSSROAD

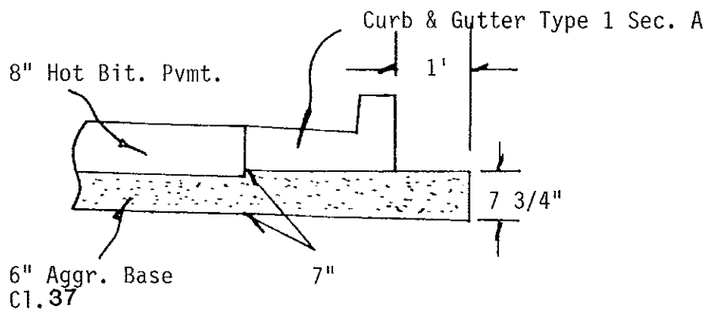
SECTION E-E



NORTHWEST RAMP

SECTION F-F

Note: Section K-K (Northwest Loop) same as Section F-F except 18' Face to Face



DETAIL B

SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

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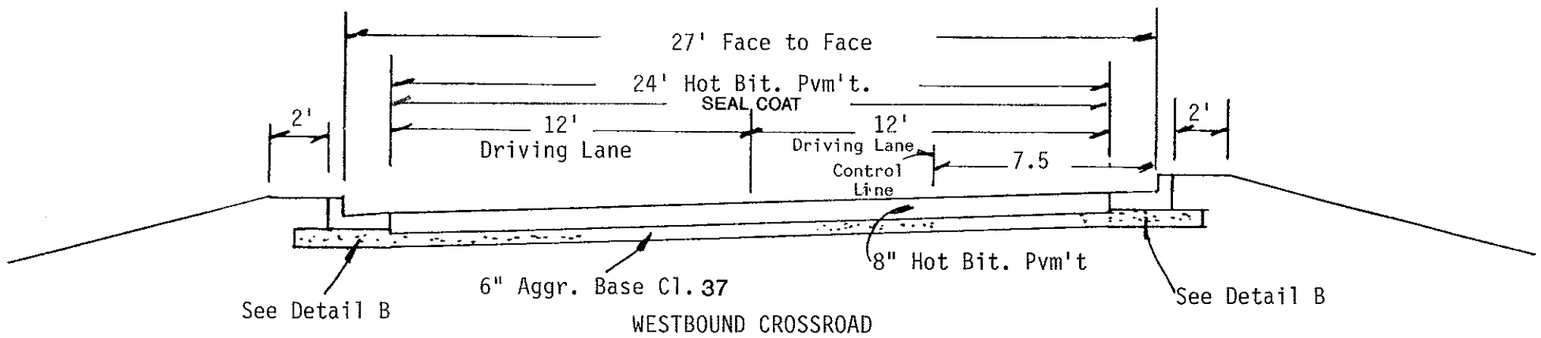
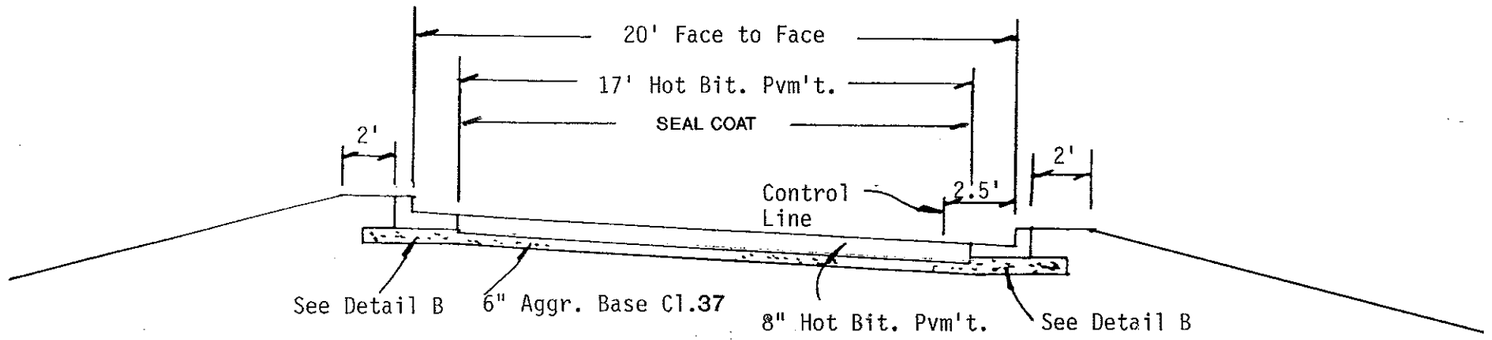
8	N.D.	IR-194-4(053)000	



WESTBOUND CROSSROAD

SECTION G-G



SOUTHEAST LOOP

SECTION H-H

SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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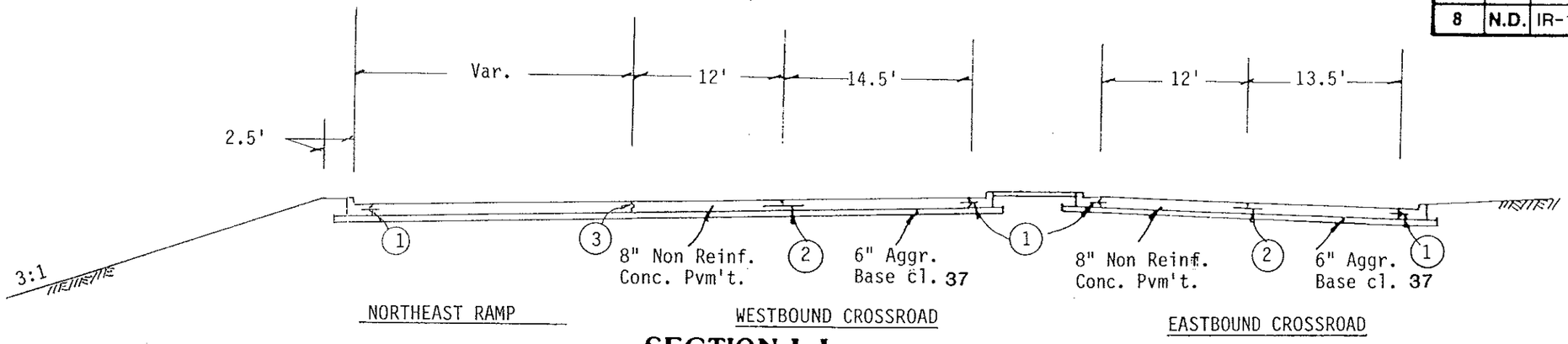
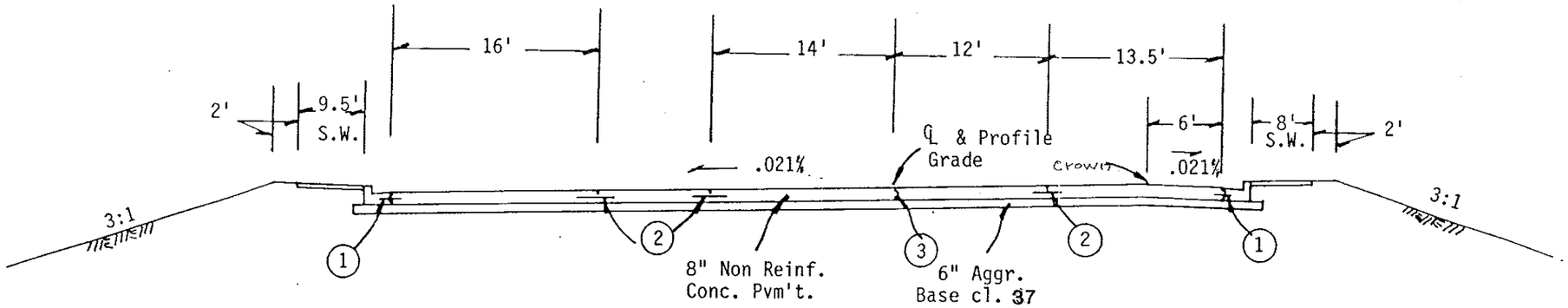


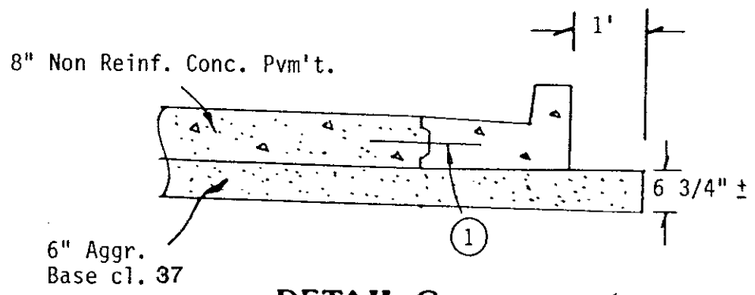
SECTION L-L

(Approx. Sta. 177+40)



SECTION M-M

(Approx. Sta. 179+60)

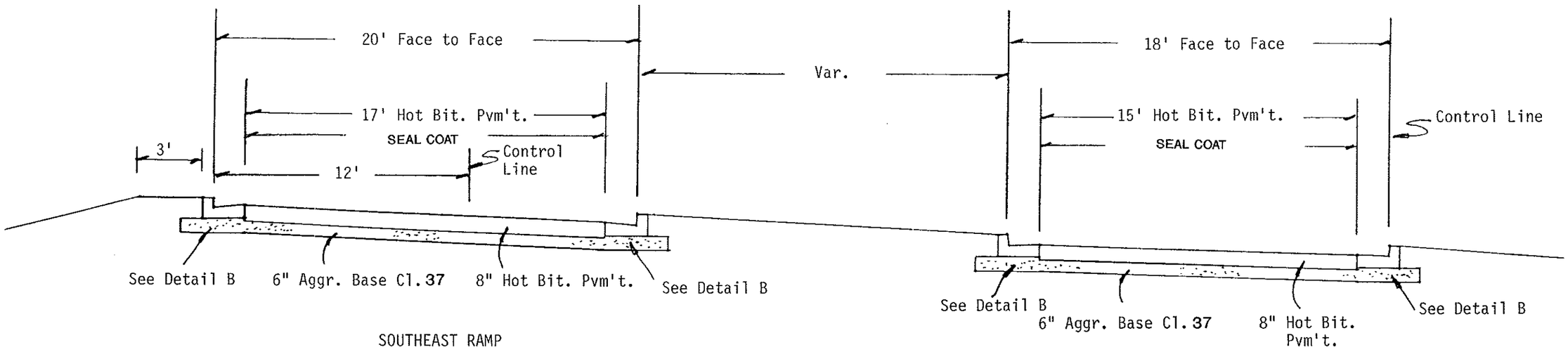


DETAIL C

① No. 3 x 1'-6" Tie Bars @ 3'-6" cc (continous)
② No. 4 x 2'-6" Tie Bars @ 3'-6" cc (continous)
③ Keyed joint with Silicone Seal

SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

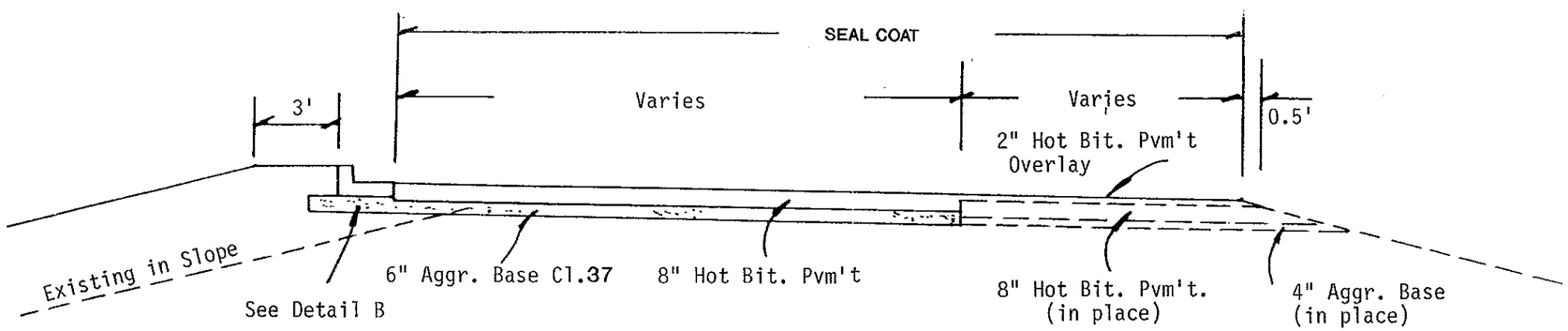
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



SOUTHEAST RAMP

SECTION I-I

SOUTHEAST RAMP-WESTBOUND LANE

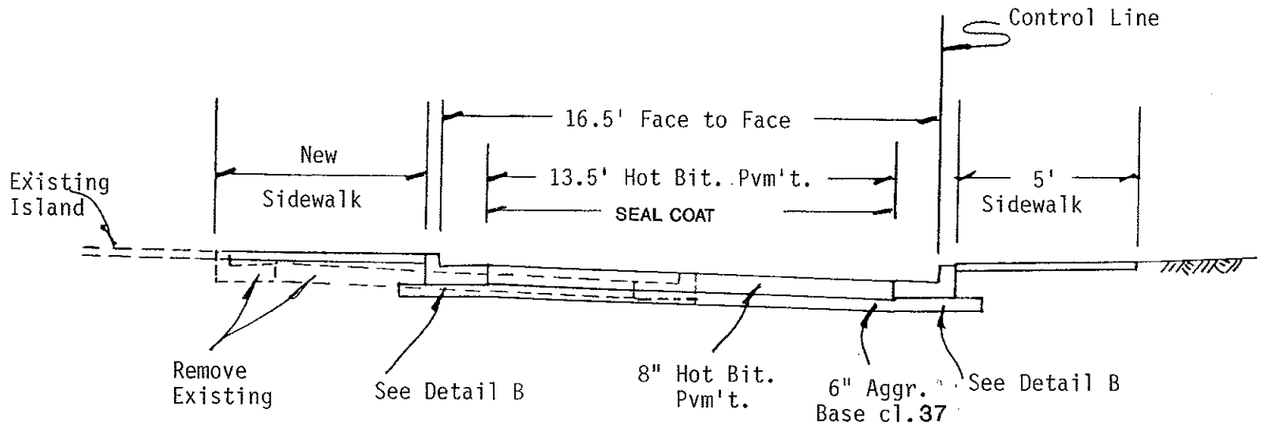


SOUTHEAST RAMP WIDENING

SECTION J-J

SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

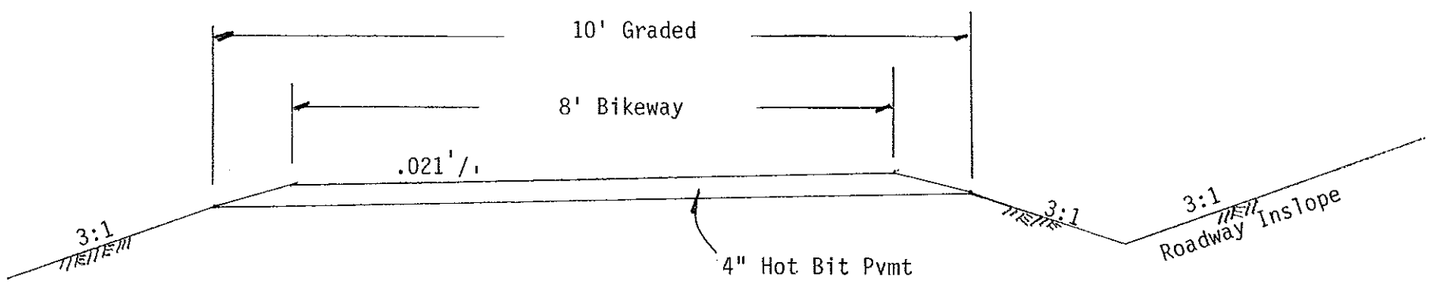
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



Memorial Highway

SECTION N-N

(Approx. Sta. 5+25)

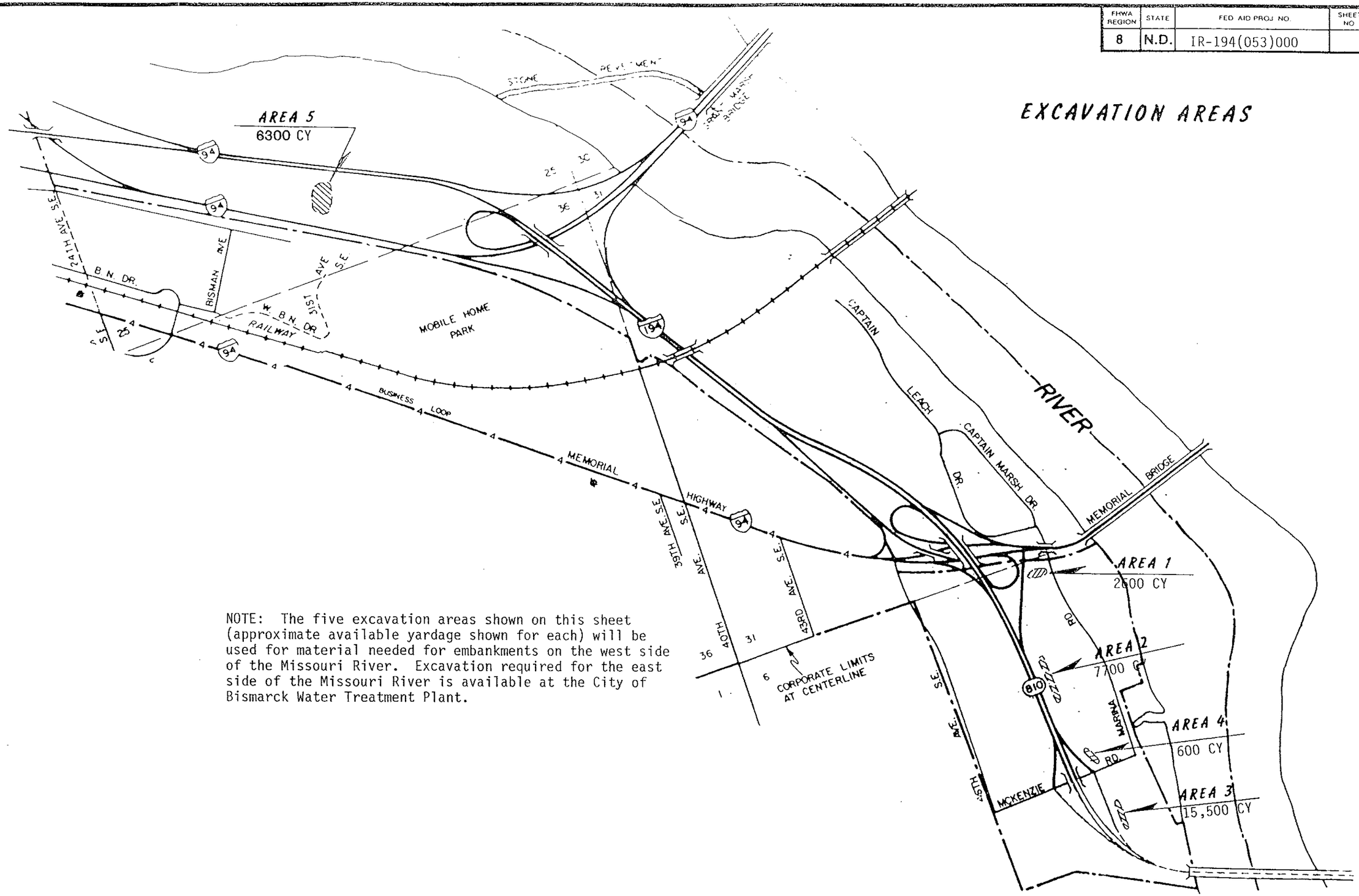


BIKEWAY SECTION

SEE TYPICAL SECTIONS ON PERFORATED PIPE LOCATION SHEET FOR MODIFIED SHAPE OF AGGREGATE BASE AT PERFORATED PIPE LOCATIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194(053)000	

EXCAVATION AREAS



NOTE: The five excavation areas shown on this sheet (approximate available yardage shown for each) will be used for material needed for embankments on the west side of the Missouri River. Excavation required for the east side of the Missouri River is available at the City of Bismarck Water Treatment Plant.

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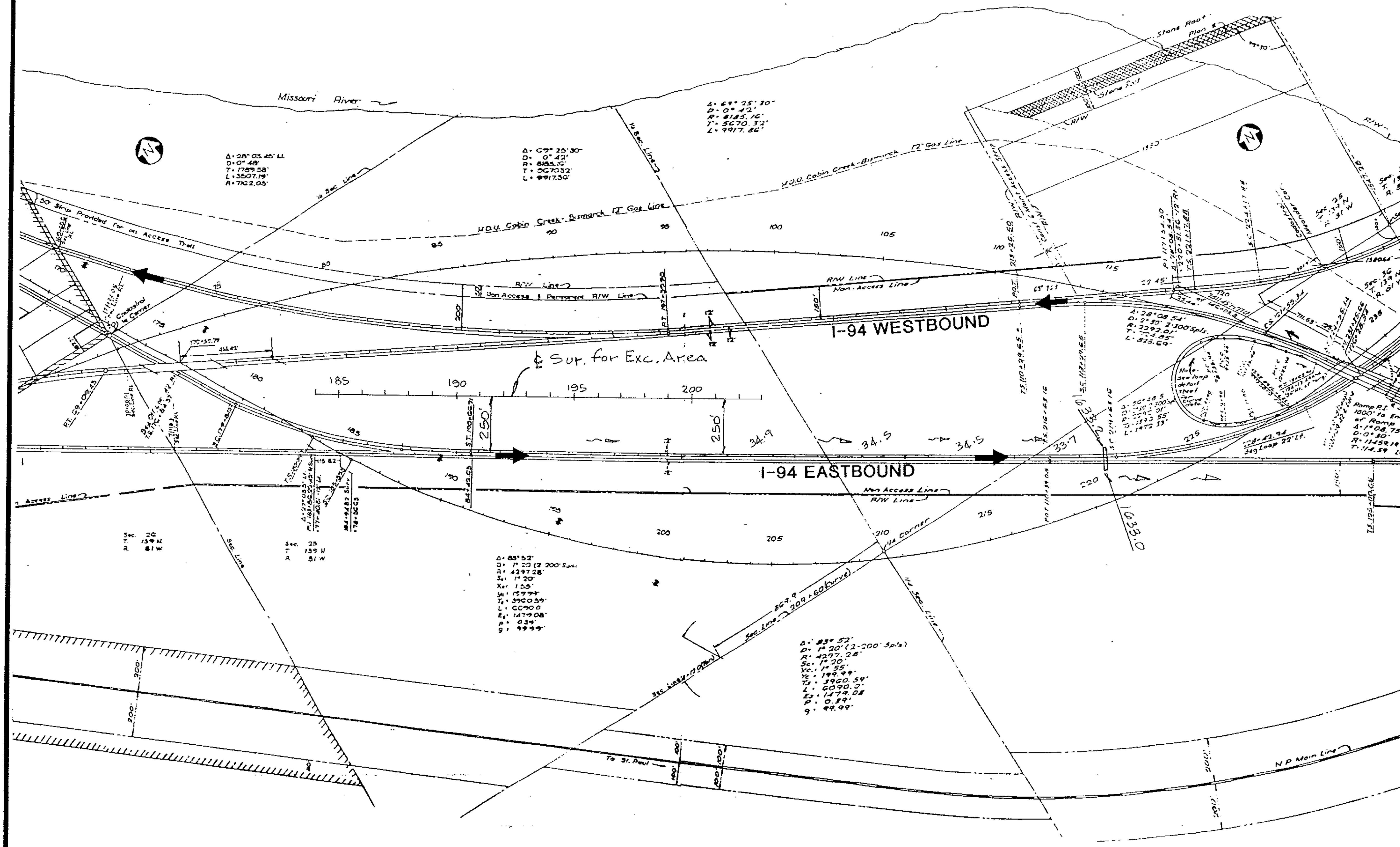
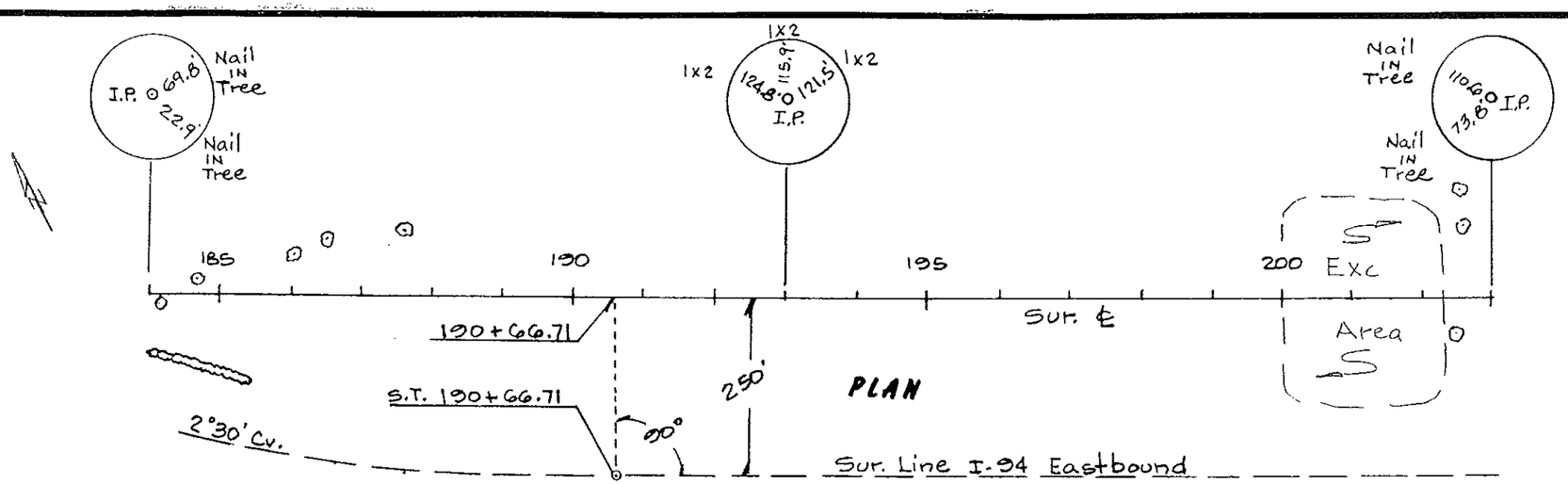
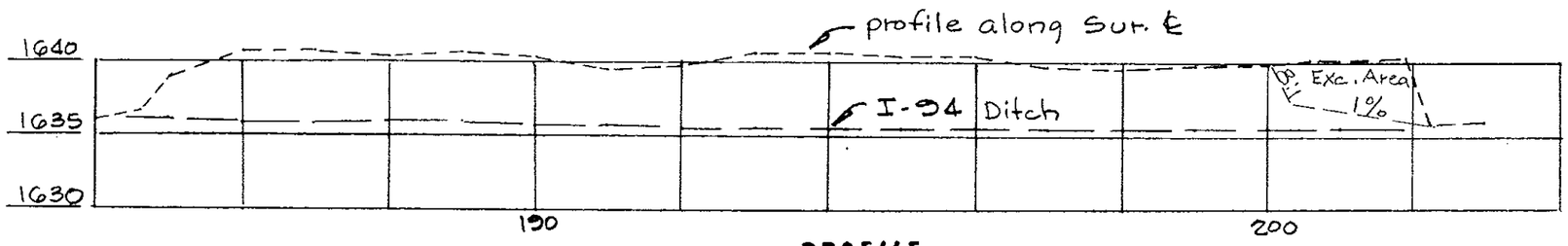
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

EXCAVATION AREA 5

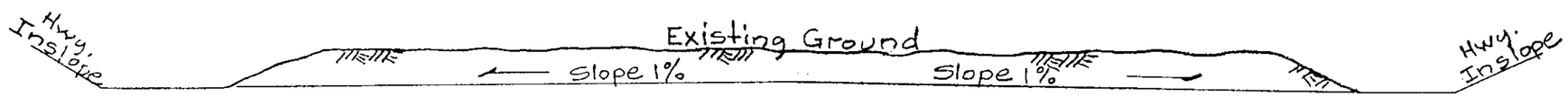


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	





PROFILE



SECTION

NOTE: Approximately 6300 CY of excavation will be required from this excavation area. This material is to be excavated near the eastern end of the area (approx. Sta. 200+00 Ahd) 6 inches of topsoil shall be stripped and replaced after the material is removed. The area shall be shaped with no slopes steeper than 8:1. Cart ways shall be obliterated and all disturbed areas seeded.

EXCAVATION AREA 5

512645

PERFORATED PIPE LOCATIONS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

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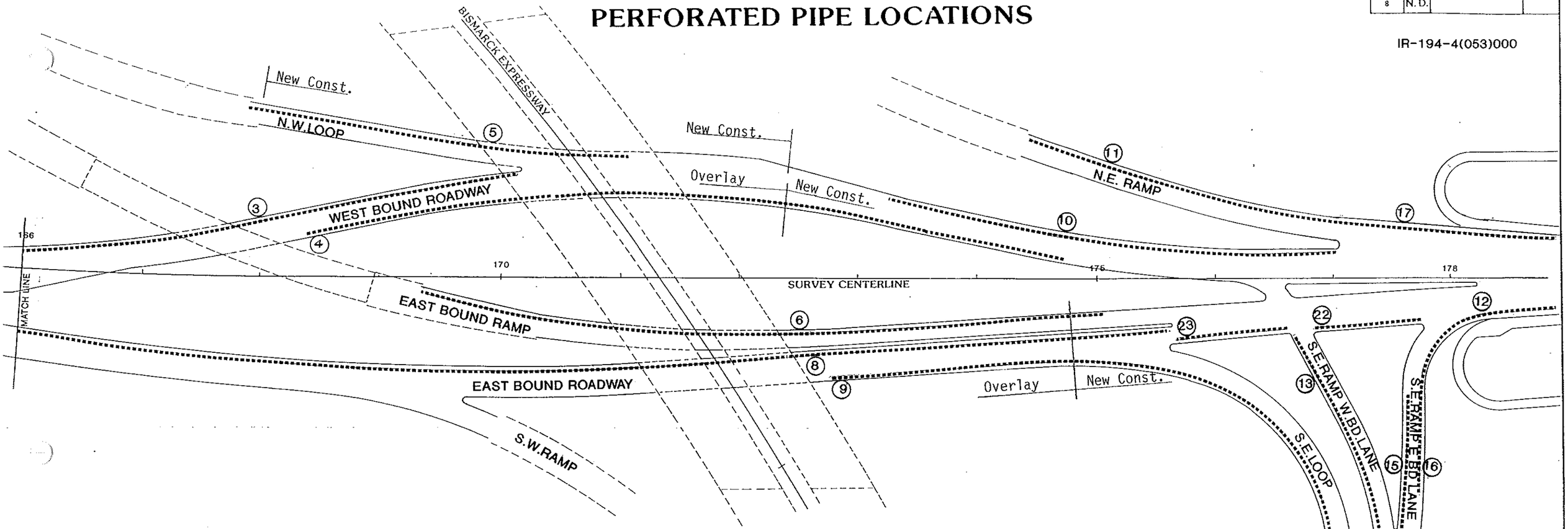
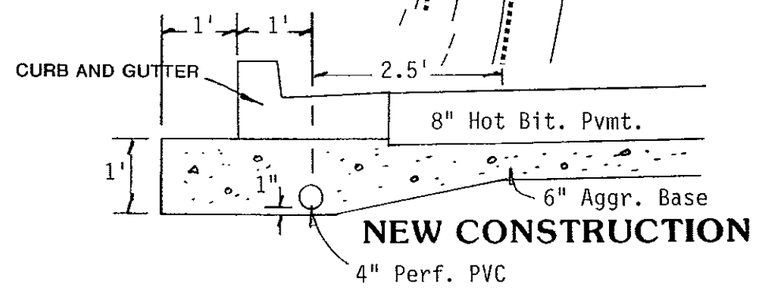
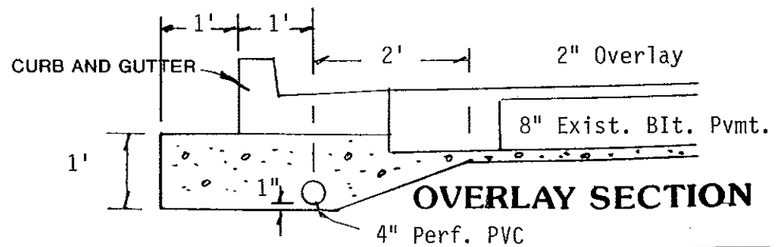


INSTALL 4" PERFORATED PIPE 5483 LF

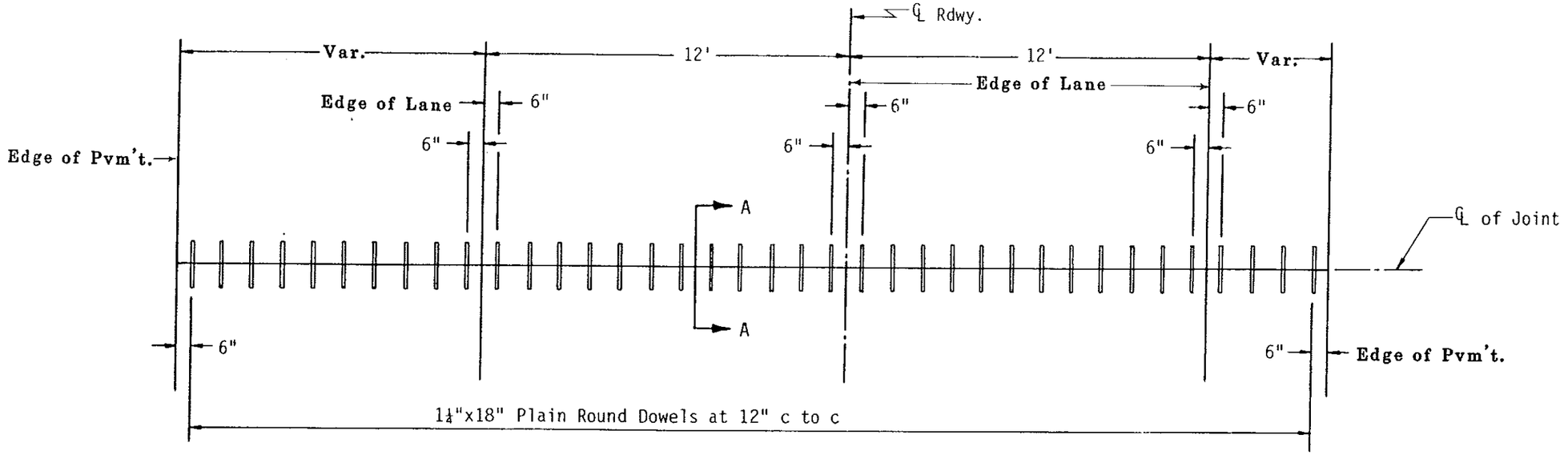
NW Loop	9+05 to 12+30 Lt.
W Bd. Rdwy.	164+50 to 170+25 Lt.
	168+55 to 174+60 Rt.
	173+50 to 176+90 Lt.
NE Ramp	18+42 to 23+70 Lt.
E. Bd. Ramp	26+70 to 175+60 Lt.
E. Bd. Rdwy.	164+80 to 175+70 Lt.
	172+95 to 178+44 Rt. (Loop)
	175+80 to 176+70 Rt.
	177+00 to 177+85 Rt.
SE Ramp (W.Bd. Lane)	0+20 to 3+00 Rt.
SE Ramp (E.Bd. Lane	1+20 to 2+15 Rt.
	1+75 to 179+65 (E.Bd. Rt.)



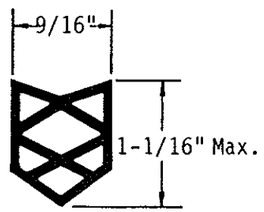


FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

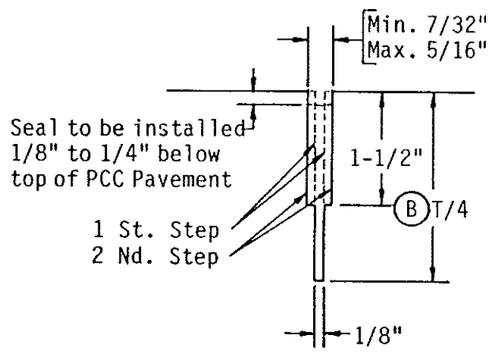
CONTRACTION JOINT DETAILS



CONTRACTION JOINT DOWEL BAR ASSEMBLY



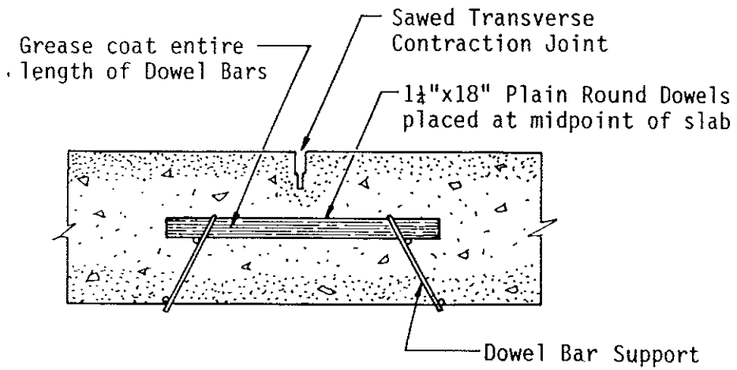
PREFORMED COMPRESSION JOINT SEAL FOR TRANSVERSE CONTRACTION JOINTS



SAWED TRANSVERSE JOINT

Ⓑ T/4= One-Fourth thickness of PCC Pavement

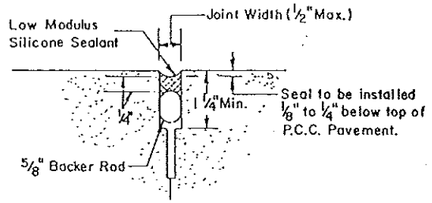
NOTE: Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer.



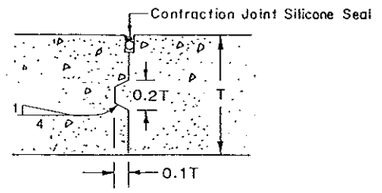
SECTION A-A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

JOINT DETAILS

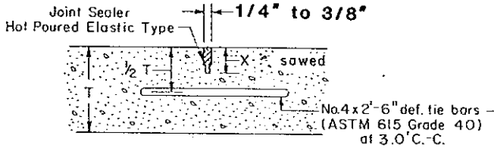


CONTRACTION JOINT SILICONE SEAL

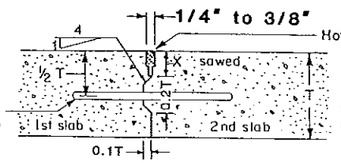


LONGITUDINAL KEYED JOINT
(MID-DEPTH OF PAVEMENT)

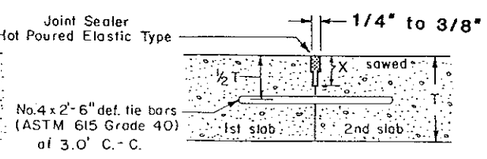
$X = T/3 + 1/4"$



SAWED LONGITUDINAL JOINT

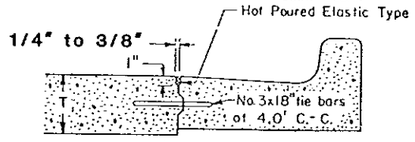


LONGITUDINAL CONSTRUCTION JOINT
(KEYED TIED JOINT)

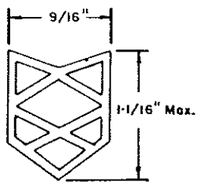


LONGITUDINAL CONSTRUCTION JOINT
(TIED BUTT JOINT)

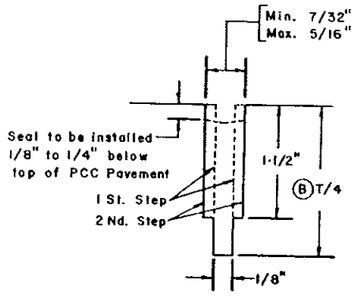
NOTE: The Joint Sealer on Longitudinal Joints shall have a Minimum Depth of 1 inch.



JOINT SEALER AT ALL
CURB & GUTTER SECTIONS

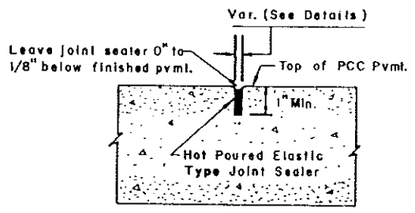


PREFORMED COMPRESSION
JOINT SEAL FOR TRANSVERSE
CONTRACTION JOINTS



SAWED TRANSVERSE JOINT

NOTE: (B) T/4 = One-Fourth thickness of PCC Pavement



JOINT SEALER DETAIL

Applies to sawed joints

NOTE: Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer.

NOTE:

Preformed inserts used to form grooves for transverse joints will not be allowed.

Preformed compression joint seals of other shapes may be used. The shape and dimensions must be approved by the Engineer.

All transverse doweled contraction joints and the keyed non-tied longitudinal shall be sealed as shown in the detail Contraction Joint Silicone Seal.

The hot poured elastic type joint filler shall meet the requirements of section 826.02 A.2 of the standard specifications.

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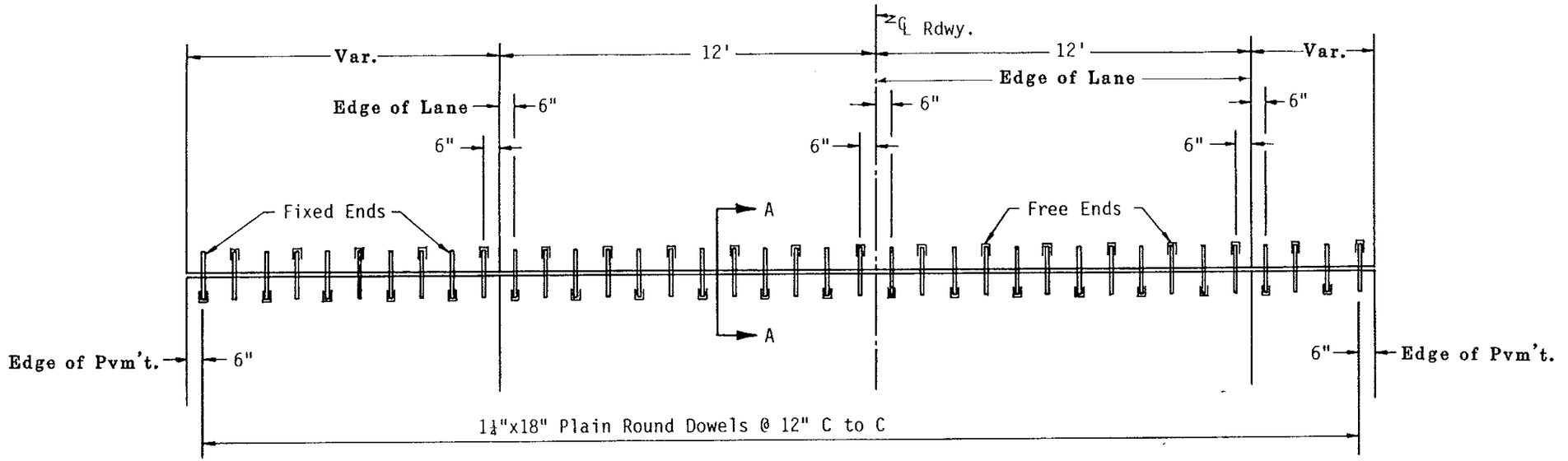
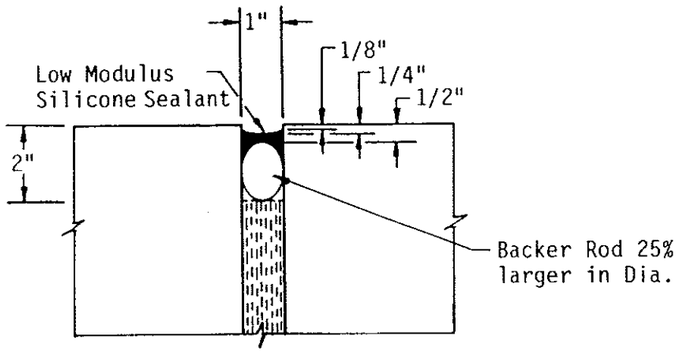
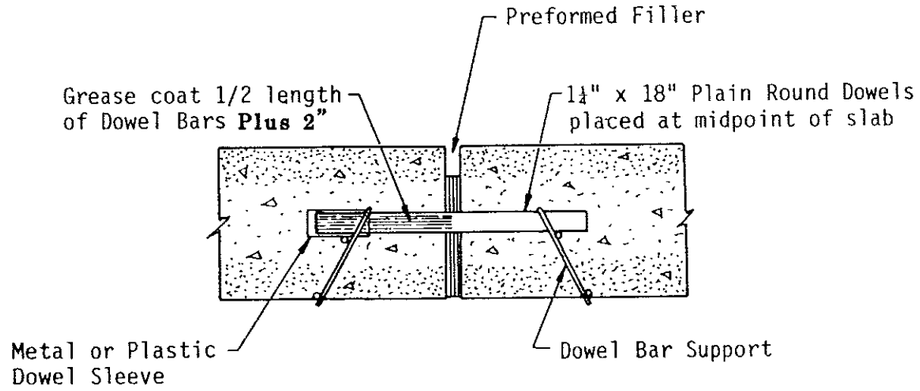
EXPANSION JOINT DETAILS



EXPANSION JOINT DOWEL BAR ASSEMBLY



INSTALLATION
(Expansion Joint Seal)



SECTION A-A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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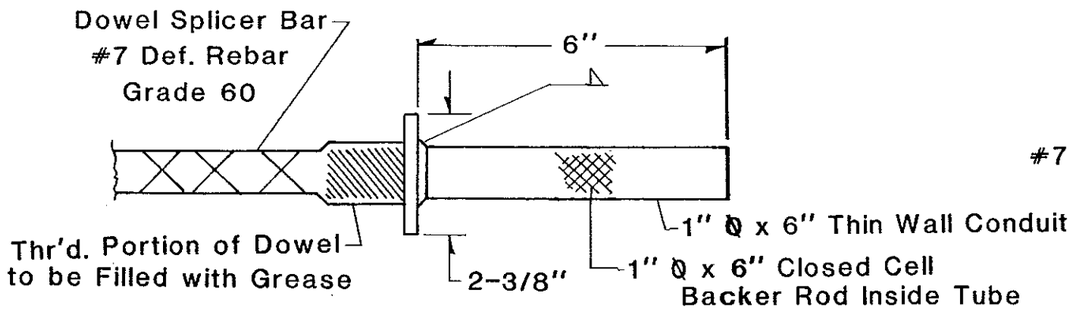
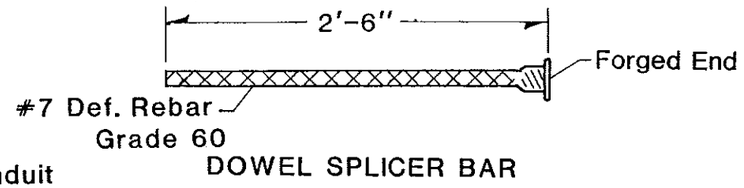
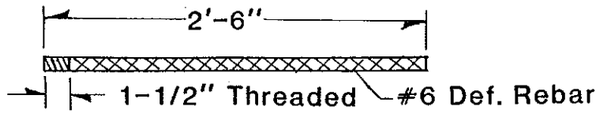


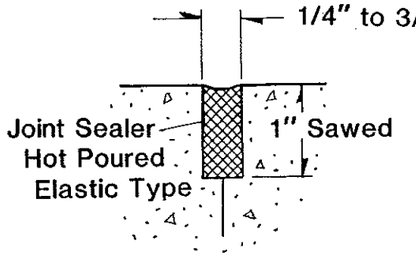
DETAIL "A"



DOWEL SPLICER BAR

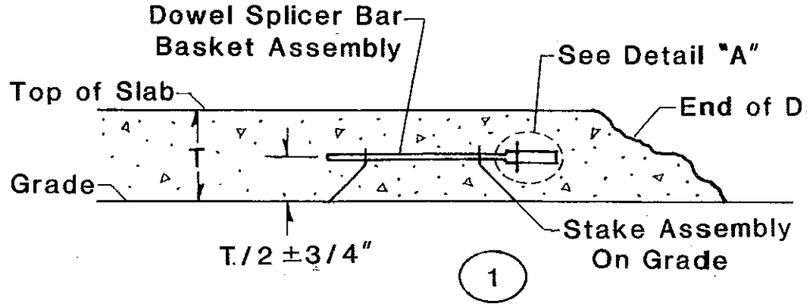


DOWEL IN

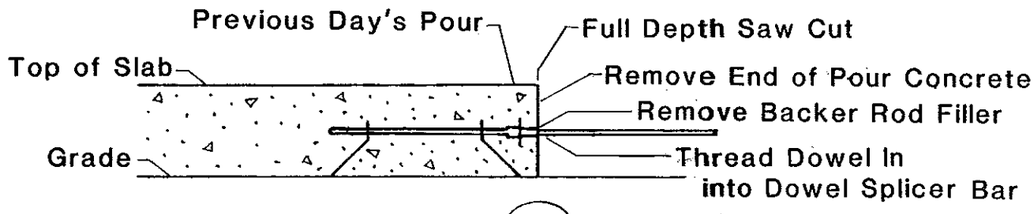


DETAIL "B"

Note: Construction Joints to be Sawed to a Depth of 1" & a Width of 1/4" to 3/8" & Sealed.



1



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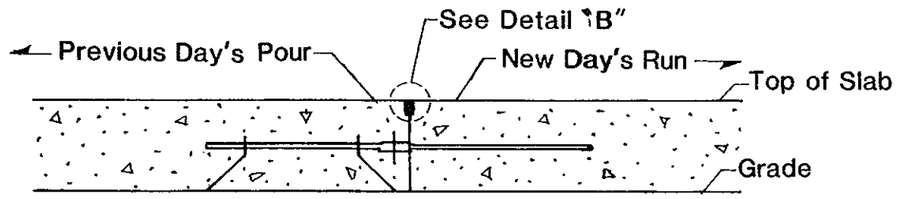

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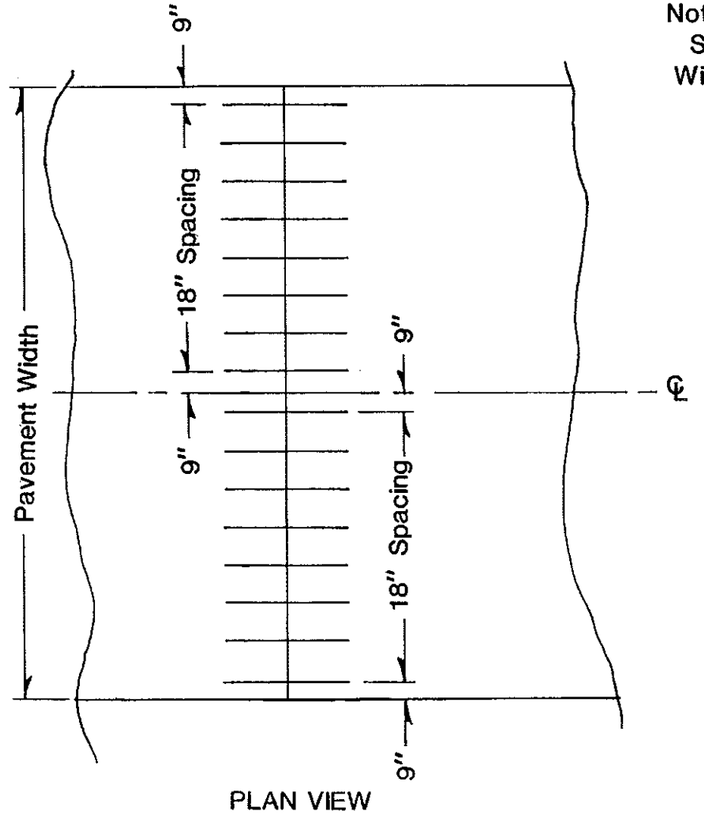

PLAN VIEW

TRANSVERSE
CONSTRUCTION JOINT

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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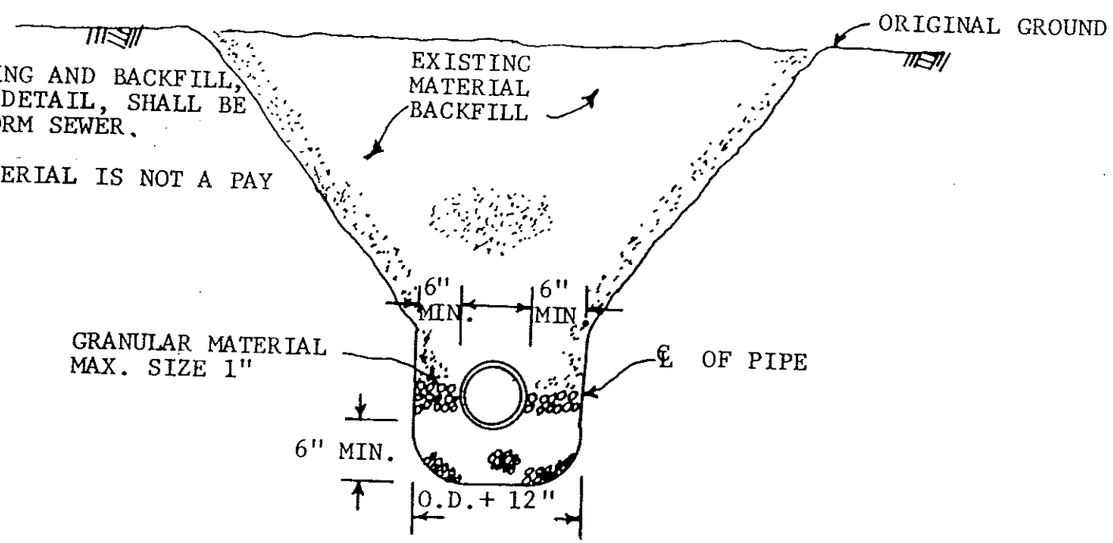
NOTE: THE BEDDING AND BACKFILL, AS SHOWN IN THE DETAIL, SHALL BE USED FOR ALL STORM SEWER.

THE GRANULAR MATERIAL IS NOT A PAY ITEM.



BEDDING AND BACKFILL SECTION

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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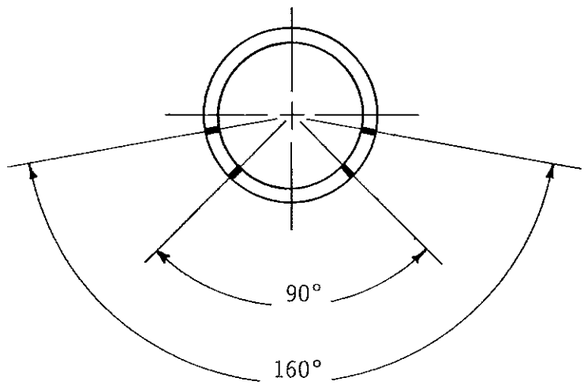
P V C D E T A I L



ANGULAR POSITION OF ROWS

PIPE SIZE	ROWS OF PERFORATIONS	NO. OF PERFORATIONS PER ROW*
4"	4	48

*For 12.5 Foot Pipe
Laying Lengths

PERFORATED PVC SEWER PIPE

1. Type of Pipe

   The pipe shall be Polyvinyl Chloride Sewer Pipe with Solvent Cemented Joints as specified in ASTM D-3034 or F-949.

2. Perforations shall be circular and 1/4" + 1/16" in diameter. They should be arranged in ROWS parallel to the axis of the pipe and shall be spaced approximately 3" center to center along the ROWS. The spigot end of the pipe shall be unperforated for a length equal to the depth of the socket. The placement and total number of the ROWS shall be as shown above with an allowable tolerance of $\pm 10^{0}$. The spigot and bell end shall be unperforated for a length equal to the depth of the spigot.

3. The nominal laying length of the pipe shall be 12.5 feet. Shorter or longer laying lengths shall be provided if required.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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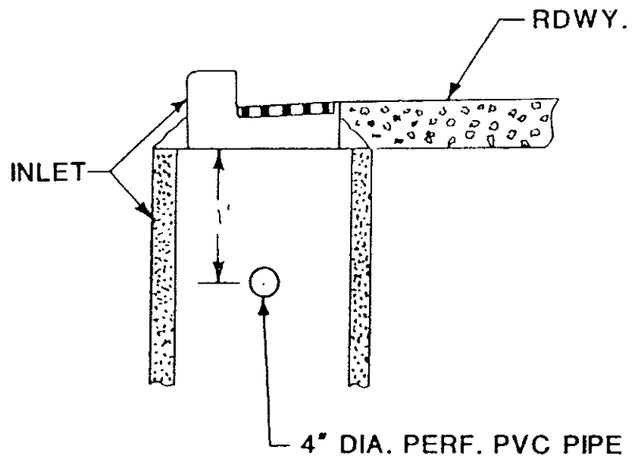
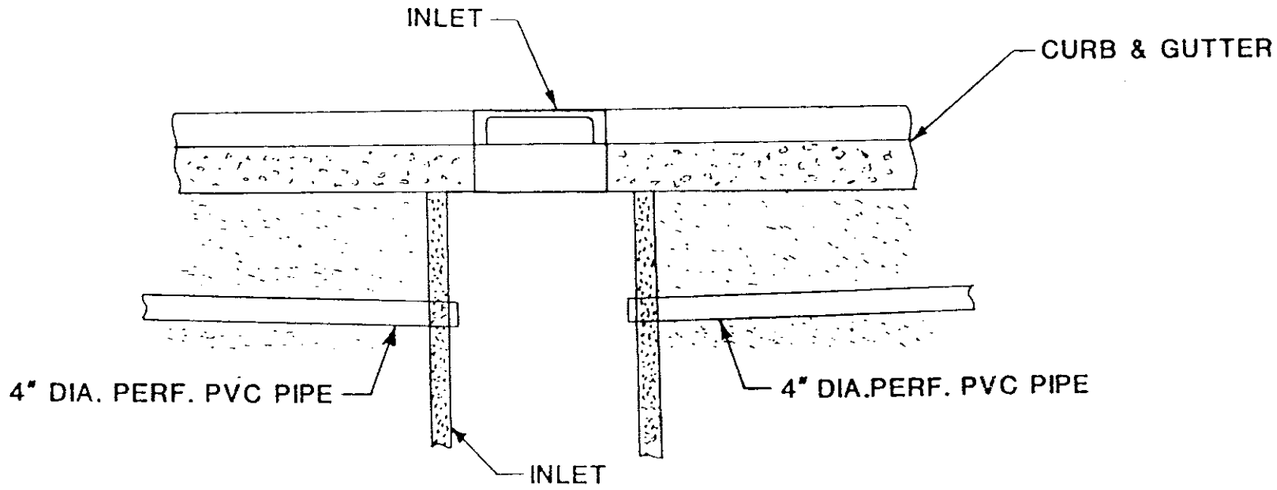
PERFORATED PIPE-INLET CONNECTION DETAIL



SIDE VIEW



FRONT VIEW

KNOCKOUTS TO BE PUT IN INLETS TO ACCOMMODATE PIPE. COST OF KNOCKOUTS AND GROUTING OF PVC INTO INLET TO BE INCLUDED IN THE PRICE BID FOR INLETS.

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ALIGNMENT TIES TO TARGETS

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FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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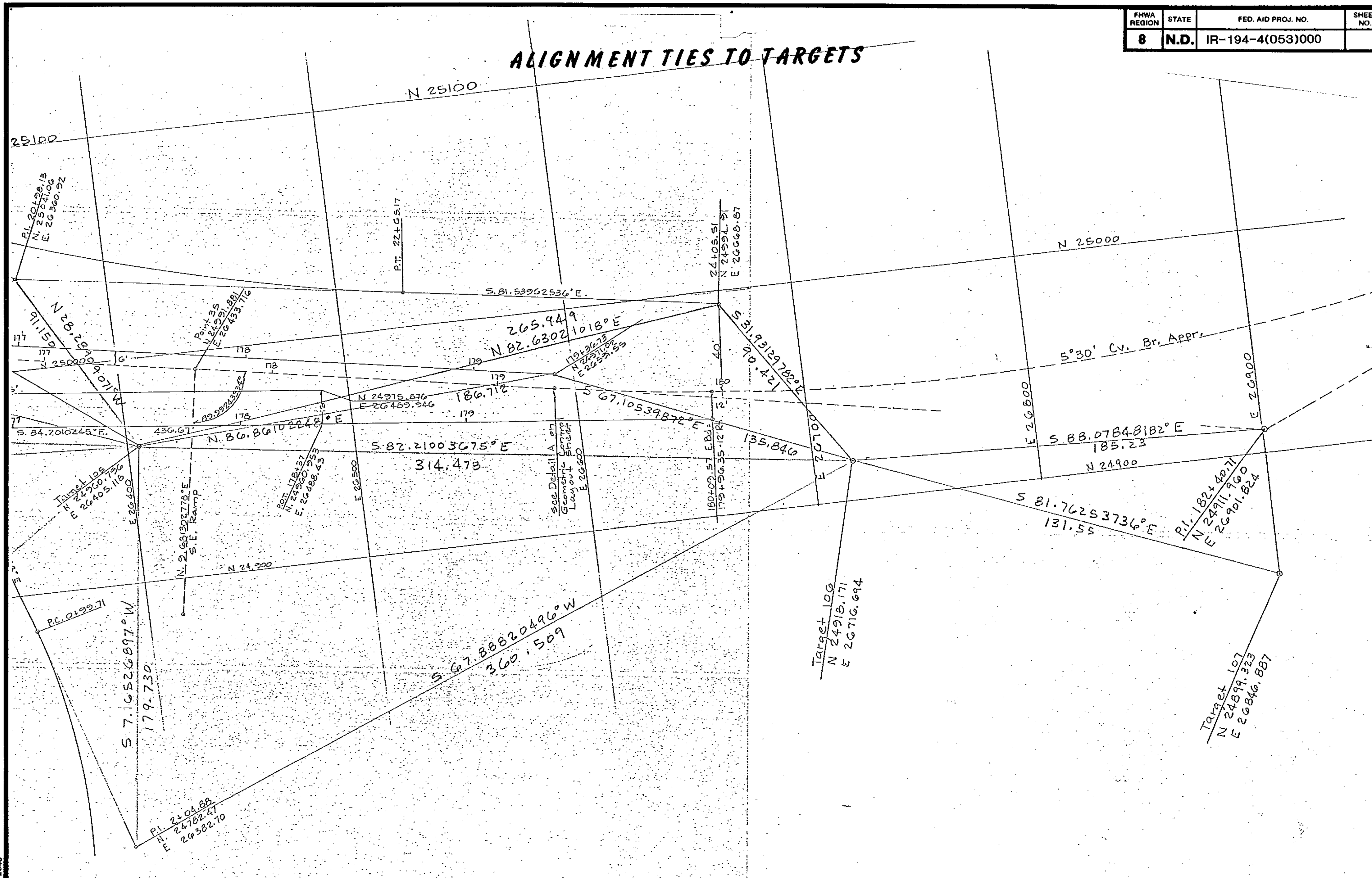
ALIGNMENT TIES TO TARGETS



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N 25000
N 24900
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265.949
N.82.63021018°E
186.712
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135.846
S.82.21003675°E
314.473
N.86.86102248°E
S.84.2010445°E.
436.67'
S 31.93129782°E
90.421
5°30' Cv. Br. Appr.
S 88.07848182°E
185.23
S 81.76253736°E
131.55
S 67.88820496°W
360.509
S 7.16526897°W
179.730
N 28.28?
91.150
Target 105
N 24930.796
E 26405.118
Target 106
N 24918.171
E 26716.694
Target 107
N 24899.323
E 26846.887
P.I. 182+40.71
N 24911.960
E 26901.824
P.I. 2+04.88
N. 24782.47
E. 26382.70
P.I. 20+98.13
N. 25041.06
E. 26360.92
P.T. 22+65.17
24+05.51
N 24994.91
E 26668.87
Point 35
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179+36.73
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E 26531.55
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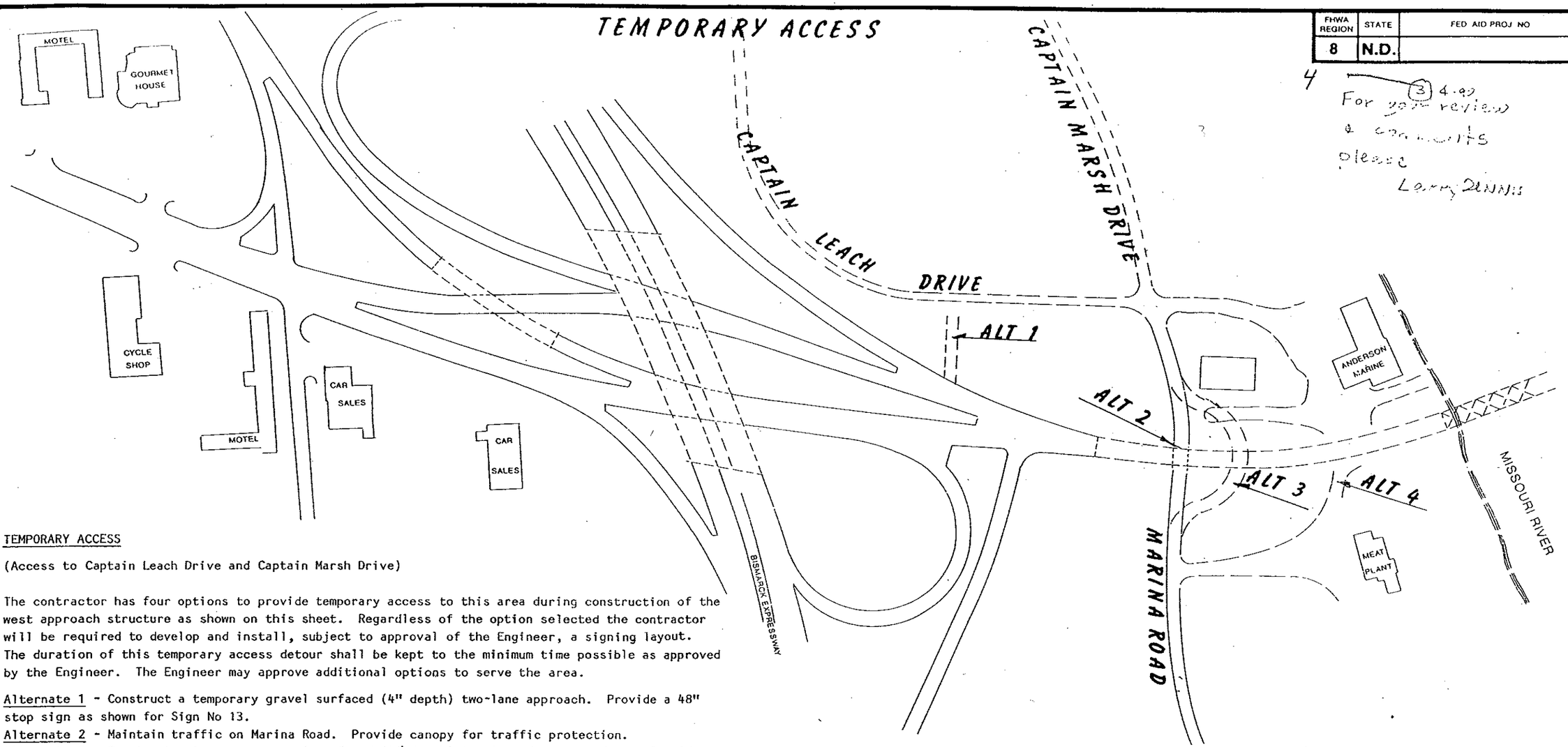
E 26459.946
Bgn. 178+37
N 24960.953
E 26488.43
N. 2.68130277°E
S.E. Ramp
P.C. 0+99.71
E 26400
E 26500
E 26600
E 26700
E 26800
E 26900
See Detail A on Geometric Control Layout Sheet
180+02.57 E.Bd.
179+96.35 12' Lt.
40'
12'
6'
177
178
179
180

512845

FHWA REGION	STATE	FED AID PROJ NO	SHEET NO
8	N.D.		

4

(3) 4-92
For your review
& comments
please
Larry DENNIS



TEMPORARY ACCESS

(Access to Captain Leach Drive and Captain Marsh Drive)

The contractor has four options to provide temporary access to this area during construction of the west approach structure as shown on this sheet. Regardless of the option selected the contractor will be required to develop and install, subject to approval of the Engineer, a signing layout. The duration of this temporary access detour shall be kept to the minimum time possible as approved by the Engineer. The Engineer may approve additional options to serve the area.

Alternate 1 - Construct a temporary gravel surfaced (4" depth) two-lane approach. Provide a 48" stop sign as shown for Sign No 13.
Alternate 2 - Maintain traffic on Marina Road. Provide canopy for traffic protection.
Alternate 3 - Construct a temporary gravel surfaced (4" depth) two-lane detour roadway. Provide canopy for traffic protection.
Alternate 4 - Obtain easements from property owners for temporary traffic routing on private property. Provide canopy for traffic protection.

The requirement for a canopy can be waived, subject to approval of the Engineer, if the contractor elects to switch traffic from one alternate to another using a sequence of operation which, in the opinion of the Engineer, will provide adequate protection to the traffic.

If a canopy is constructed the canopy is considered to be an added safeguard and does not relieve the contractor of any responsibility for the safety of the public.

Approval by the engineer shall be for plan and specification compliance and not for the structural adequacy of the canopy.

The canopy must be erected before the concrete deck is removed and remain in place until after the new deck is complete. The canopy must be supported from the ground. The erection of the canopy shall be completed in a minimum amount of time and with the least inconvenience to the public, and applies to the roadway open to public use. ?
This provision applies to that portion of the roadway open to public use?

The canopy shall be of a design and material selected by the contractor and approved by the engineer. The minimum vertical clearance from the traveled roadway to the bottom of the canopy shall be 13'-6". The canopy shall project a minimum distance of 5'-0" beyond the outside edge of curb of the proposed structure.

The canopy shall project a minimum distance of 5'-0" beyond the edge of the driving lanes beneath the structure.

After completion of the structure, the canopy shall be removed and shall remain the property of the contractor.

The lump sum bid for "Temporary Access" shall be full compensation for furnishing, installing, maintaining, relocating, and removing traffic control items, canopies (if any), flagging, temporary roadways, and easements (if any).

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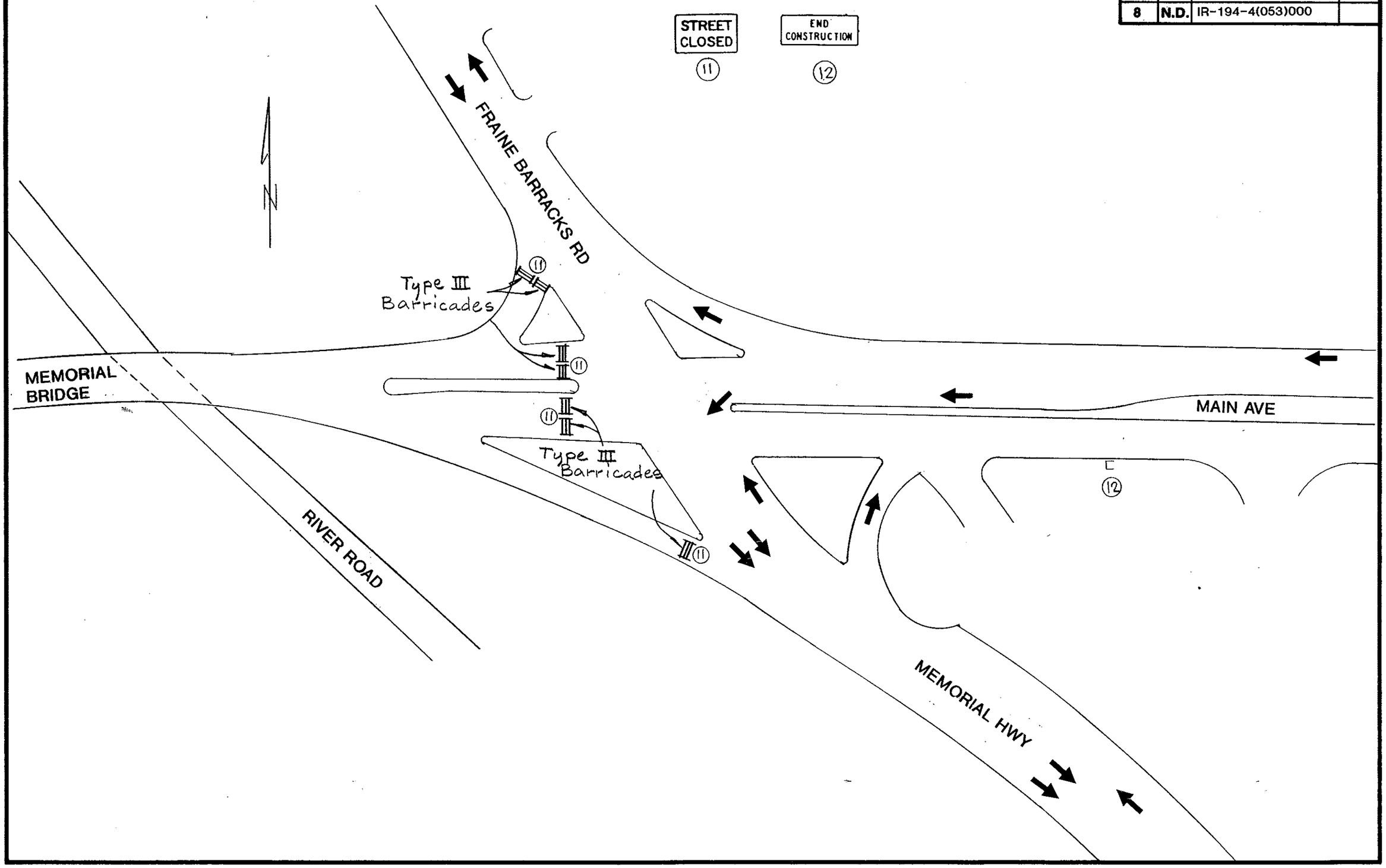
DETOUR 1000FT (9)

DETOUR 500FT (10)

MEMORIAL HIGHWAY DETOUR

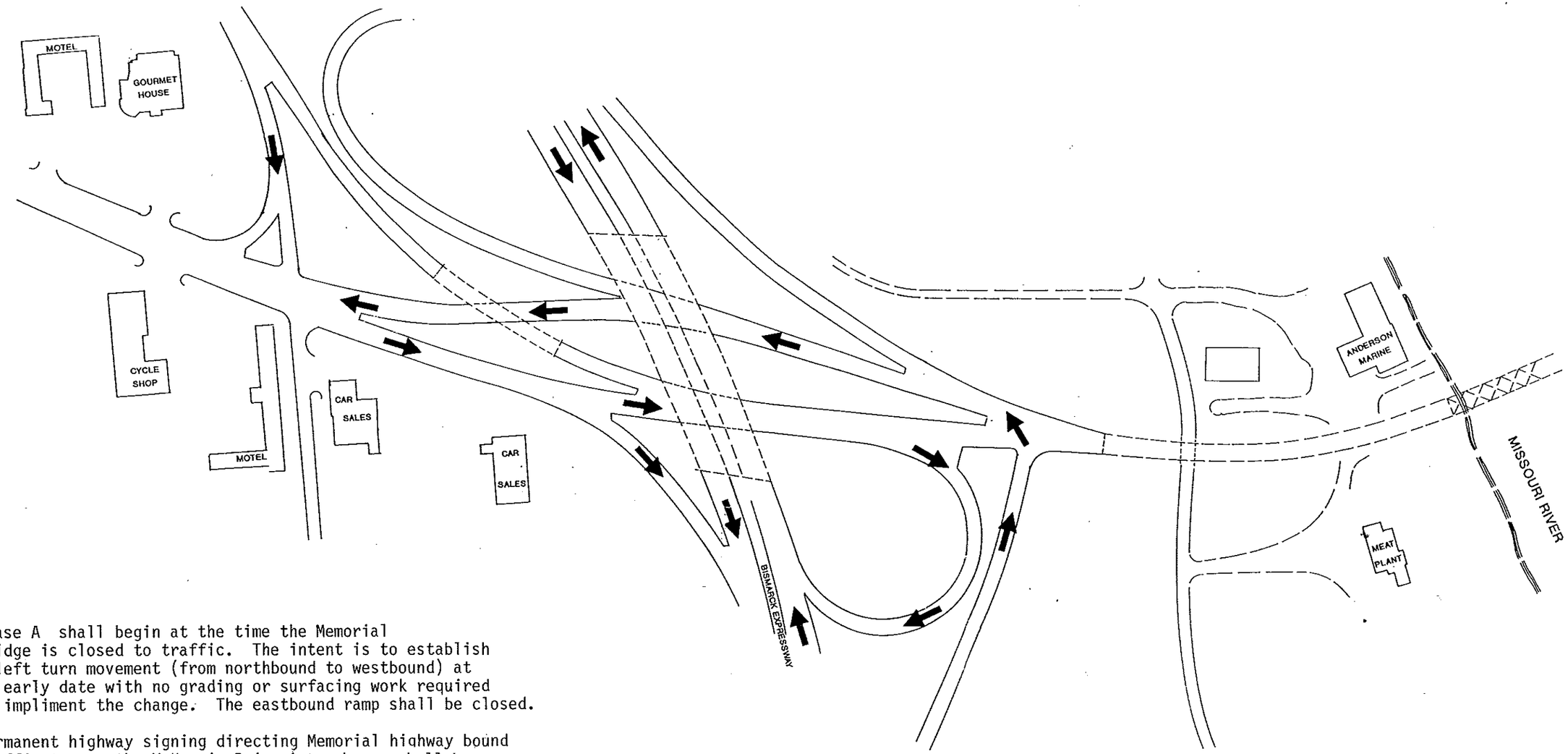
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

IR-194-4(053)000

INTERCHANGE CONSTRUCTION PHASE A



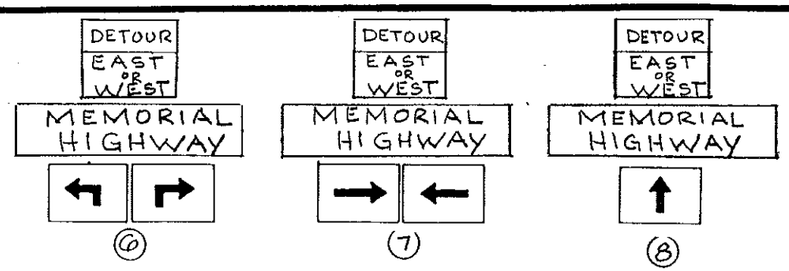
Phase A shall begin at the time the Memorial Bridge is closed to traffic. The intent is to establish a left turn movement (from northbound to westbound) at an early date with no grading or surfacing work required to impliment the change. The eastbound ramp shall be closed.

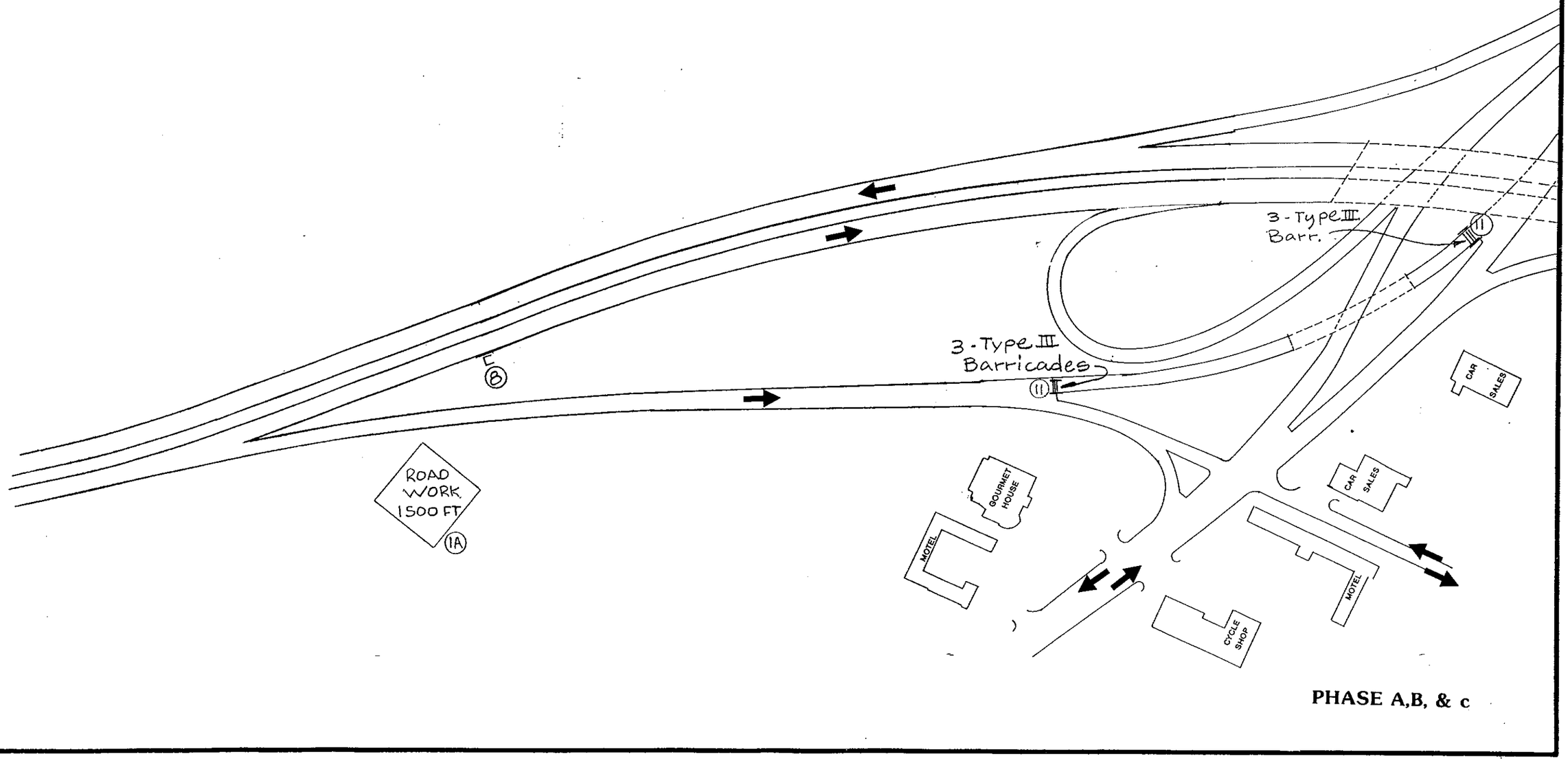
Permanent highway signing directing Memorial highway bound traffic to use the McKenzie Drive interchange shall be removed or covered.

Permanent highway signing directing traffic toward Bismarck Main Avenue using Memorial Bridge shall be removed or covered. All removed or covered signs shall be reinstalled or uncovered upon completion of construction or as directed by the Engineer.

Temporary widening of the S.E. loop and the construction of a temporary taper between the S.E. ramp and the S.E. loop shall be completed prior to diverting traffic as shown for Phase B.

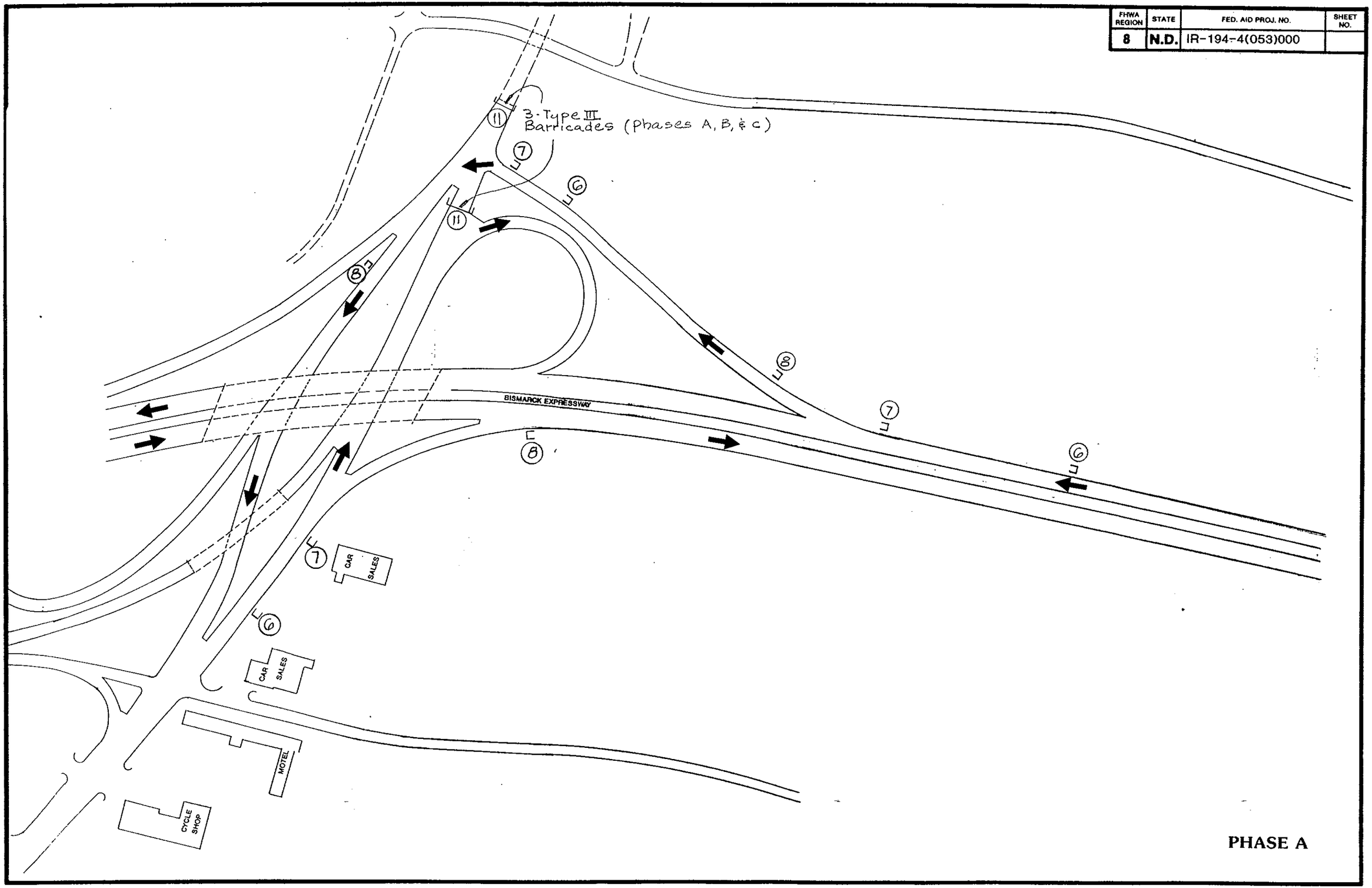
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	





PHASE A,B, & c

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

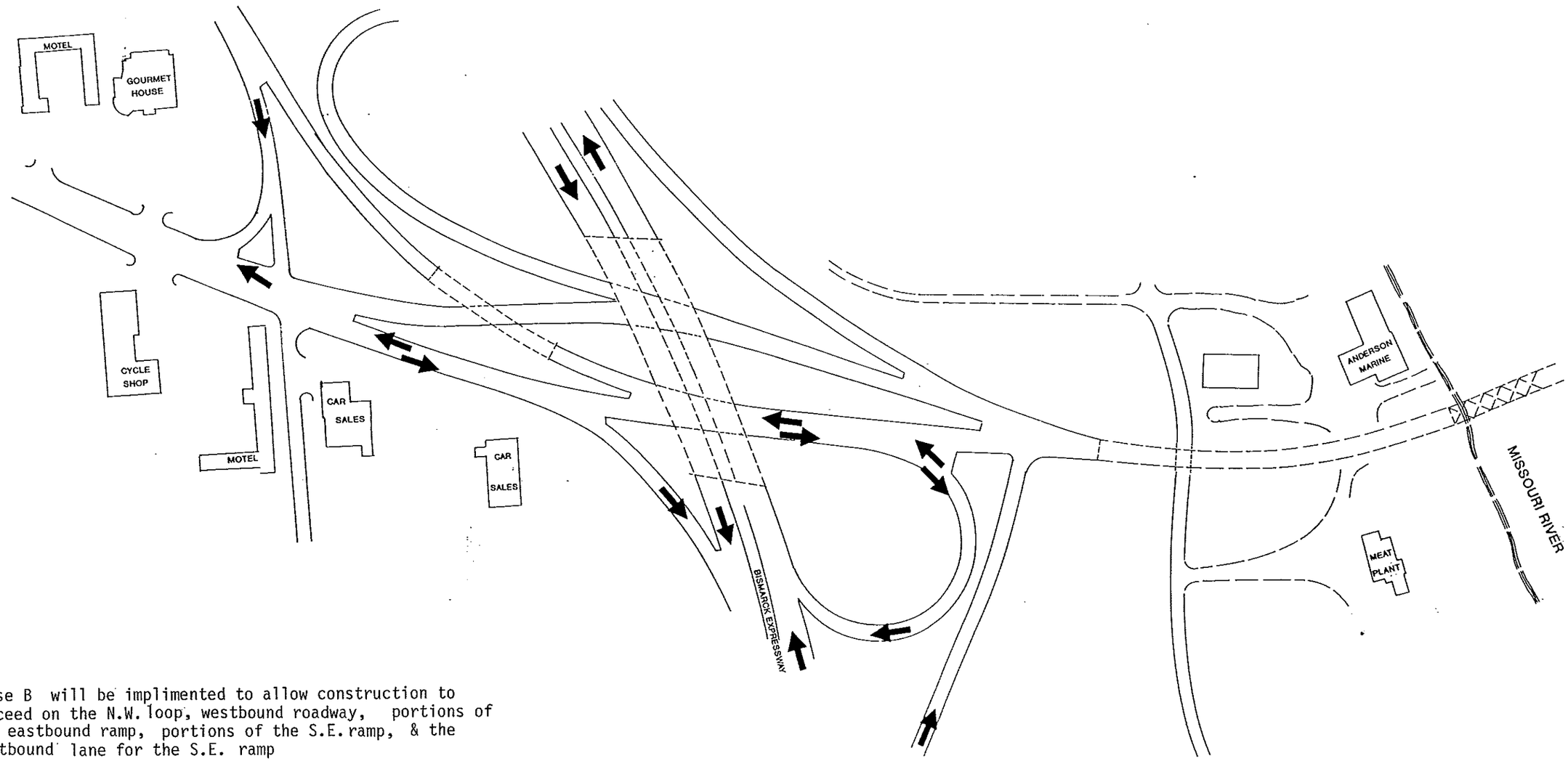


PHASE A

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

IR-194-4(053)000

INTERCHANGE CONSTRUCTON PHASE B



Phase B will be implimented to allow construction to proceed on the N.W. loop, westbound roadway, portions of the eastbound ramp, portions of the S.E. ramp, & the westbound lane for the S.E. ramp

The Engineer may require certain portions of curb & gutter construction to be delayed in order for two way traffic to use narrow sections of the S.E. loop, westbound lane & S.E. ramp & median island areas near Sta. 176+60

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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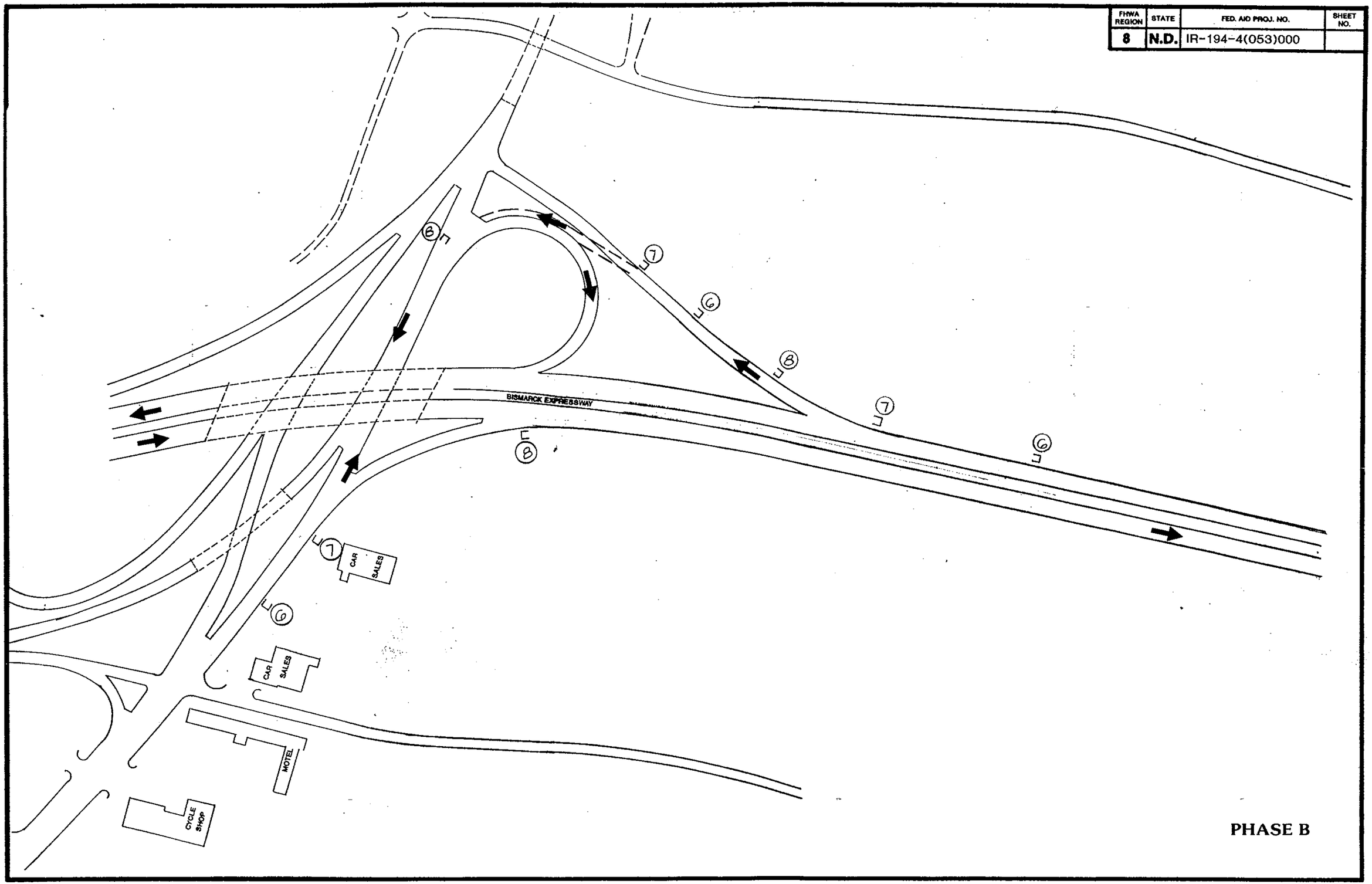
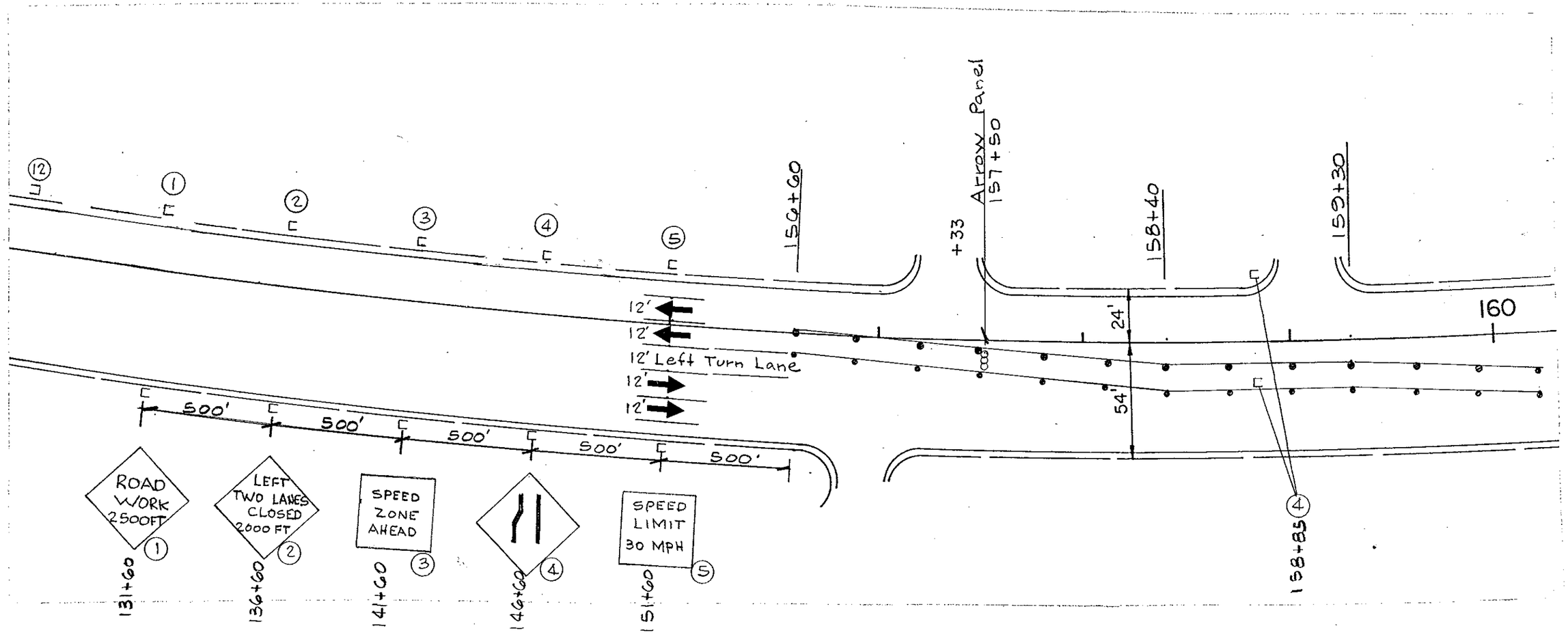


PHASE B

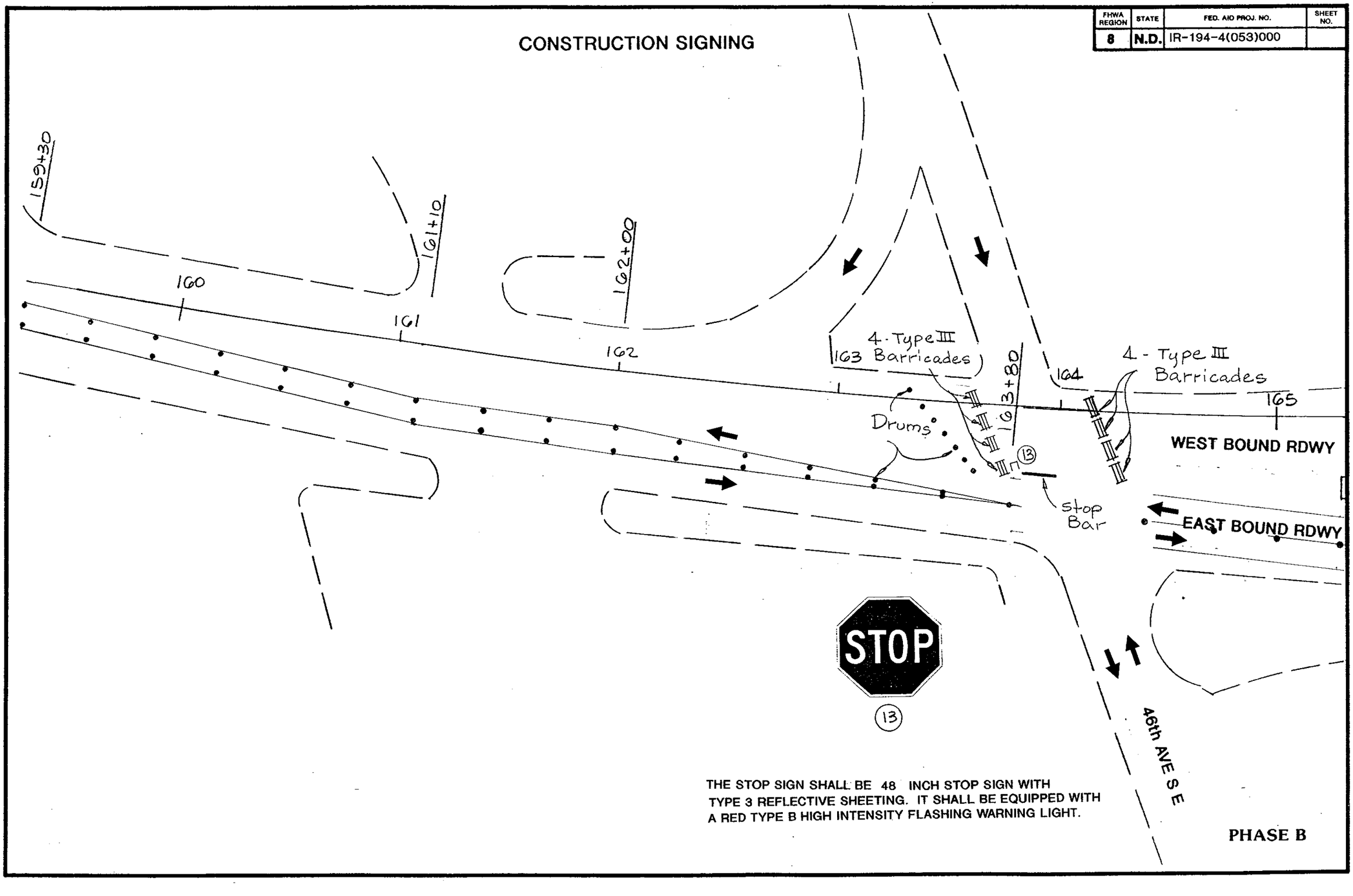
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING

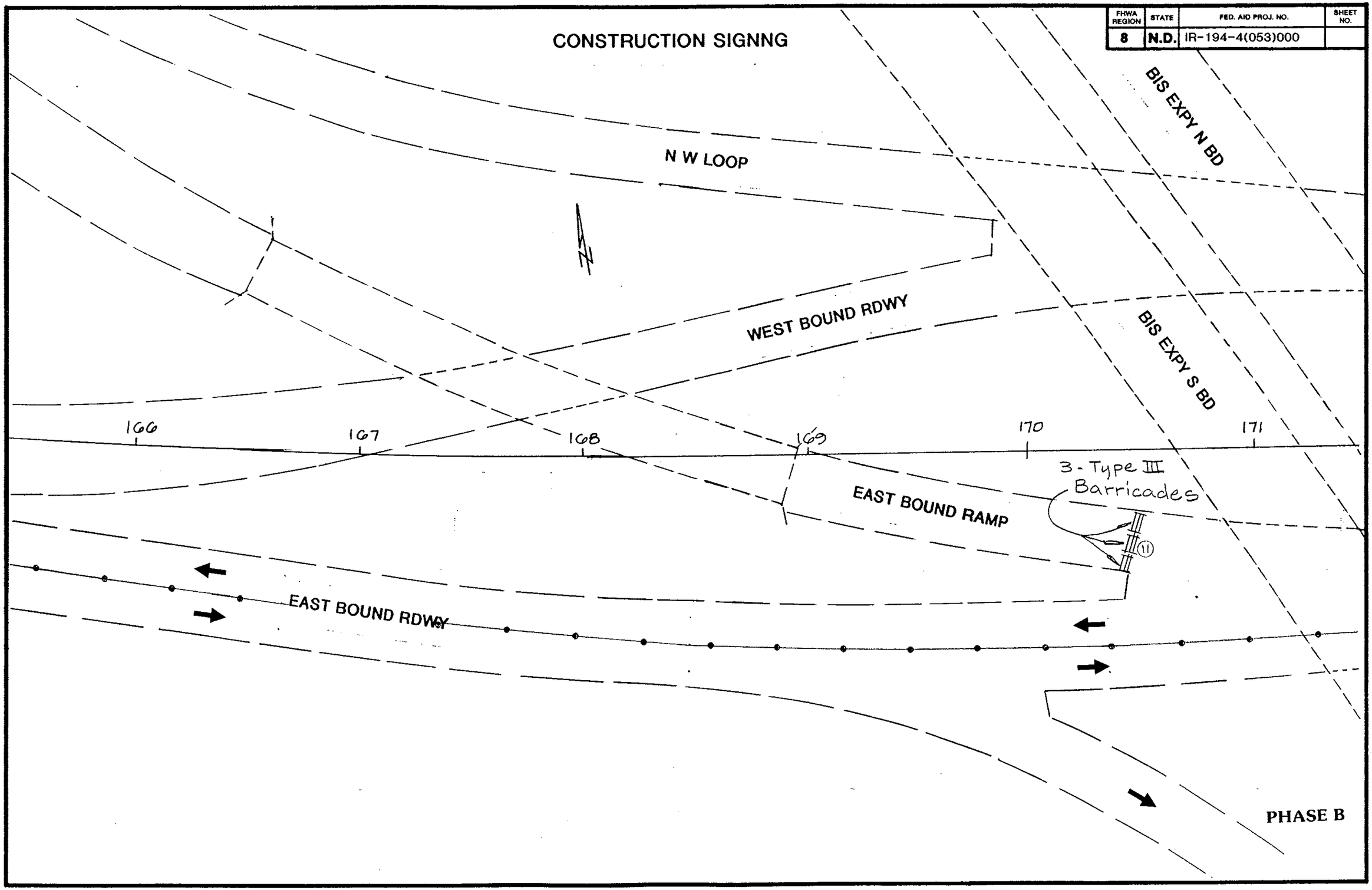


THE STOP SIGN SHALL BE 48 INCH STOP SIGN WITH TYPE 3 REFLECTIVE SHEETING. IT SHALL BE EQUIPPED WITH A RED TYPE B HIGH INTENSITY FLASHING WARNING LIGHT.

PHASE B

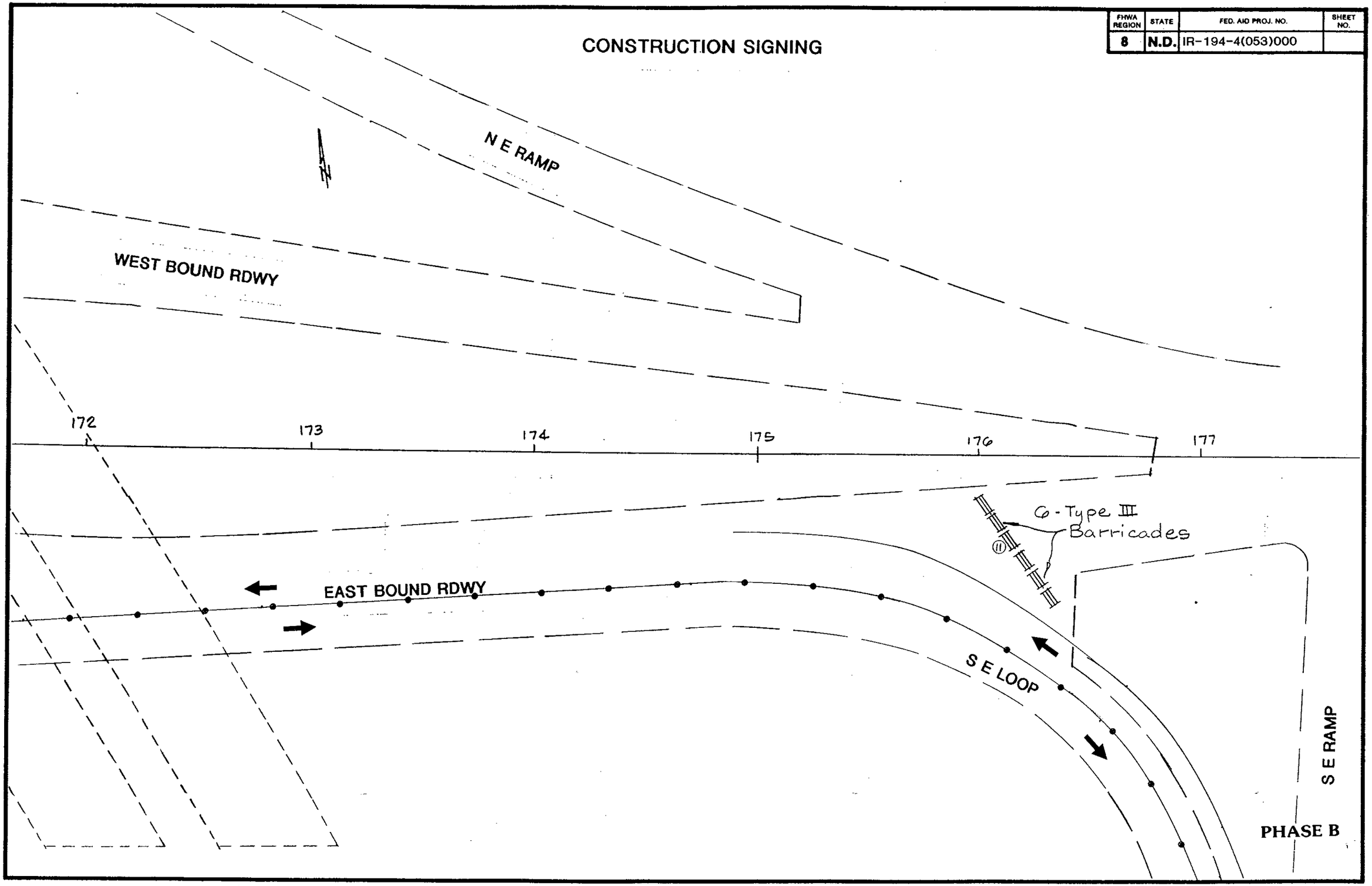
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNNG



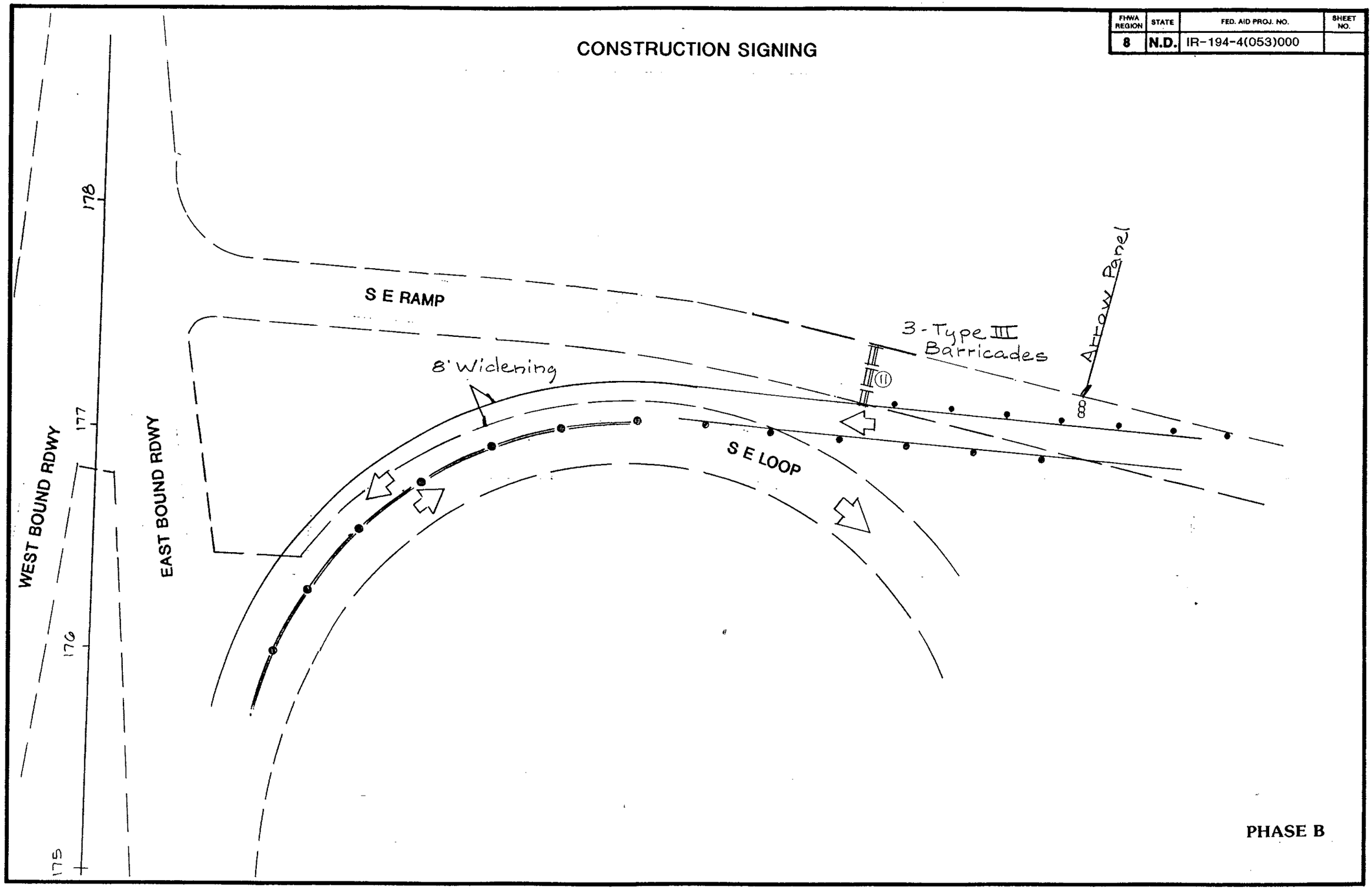
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING

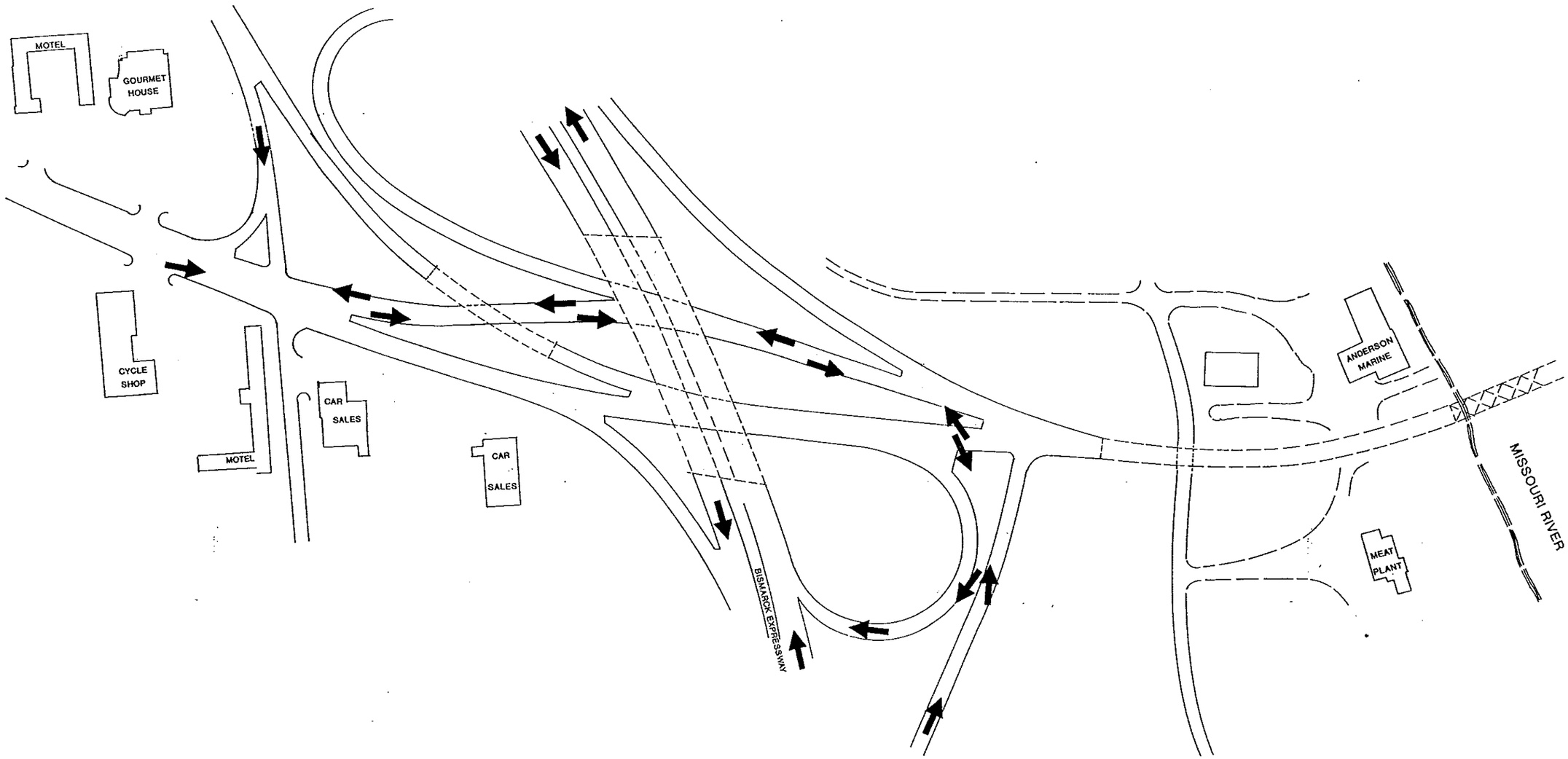


PHASE B

FHWA REGION	STATE	FED. AID PROJ. NO	SHEET NO.
8	N. D.		

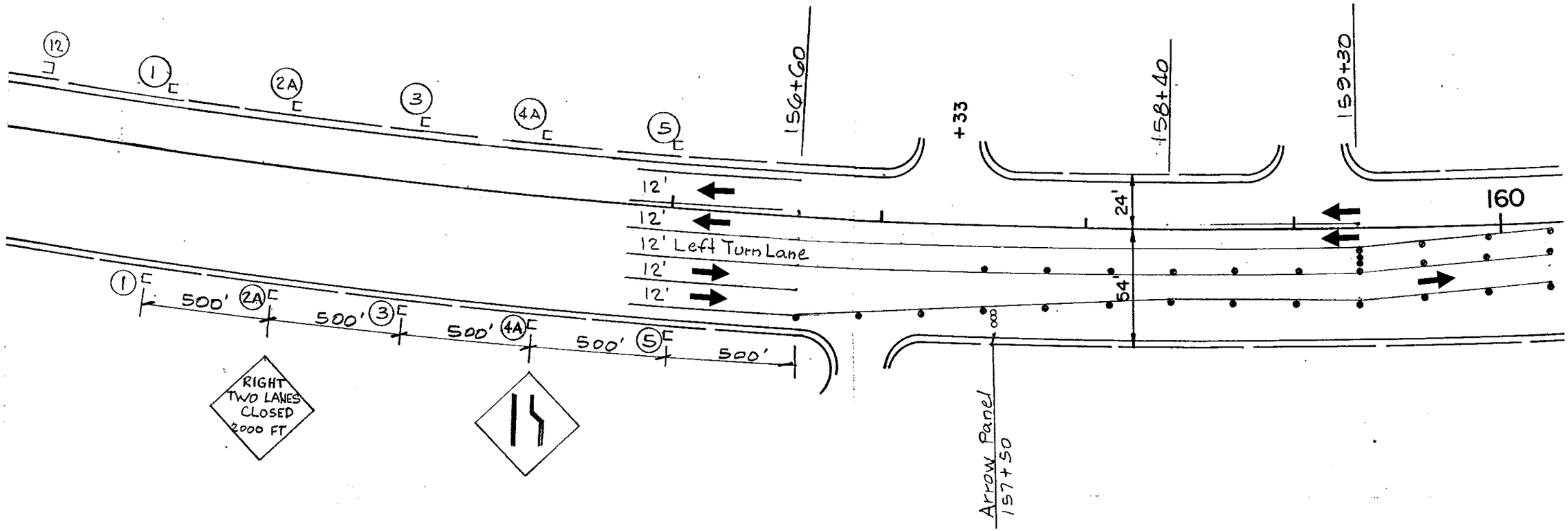
IR-194-4(053)000

INTERCHANGE CONSTRUCTION PHASE C



Phase C will be implimented to allow construction to proceed on the remaining work areas.

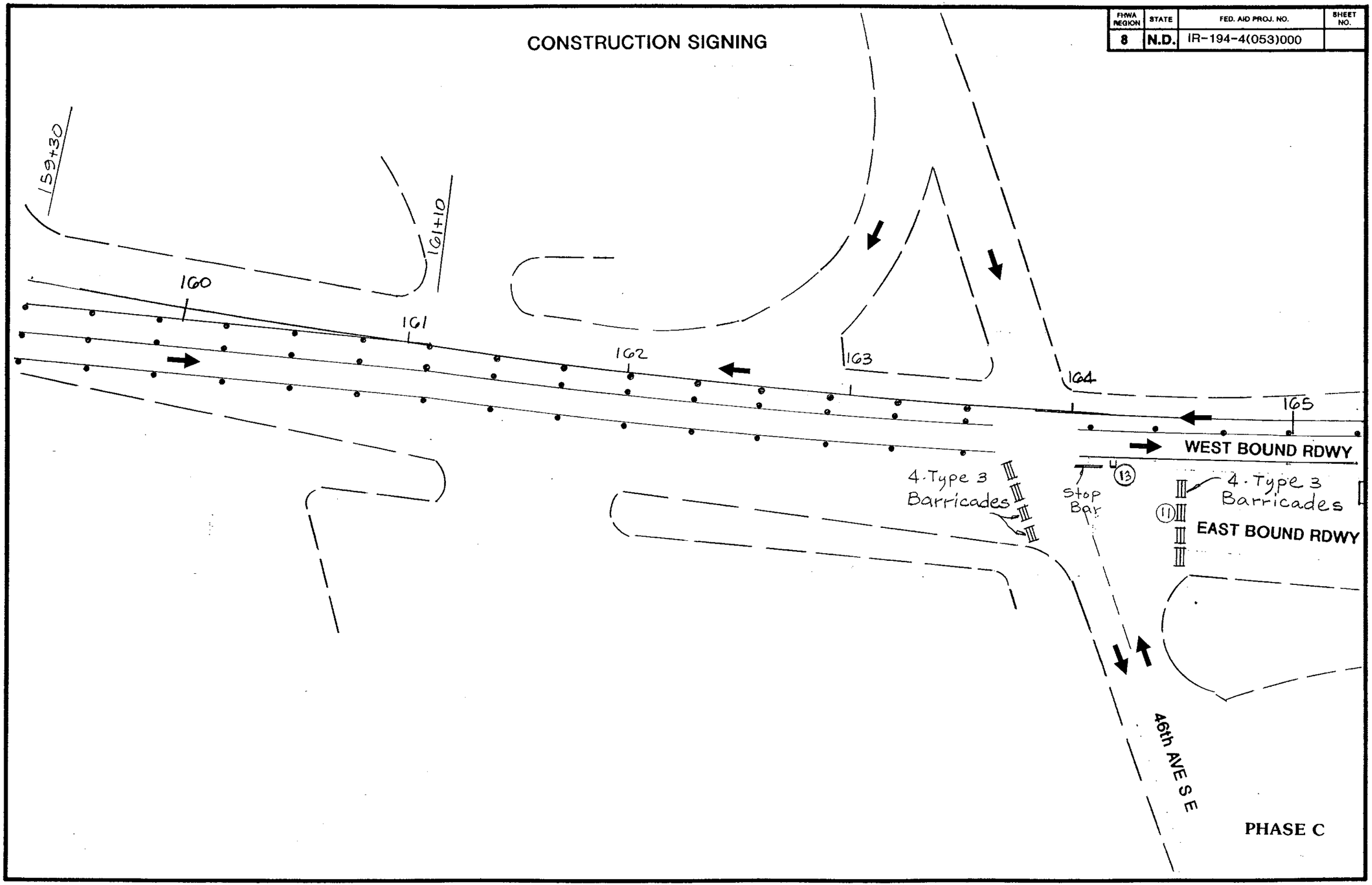
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	



PHASE C

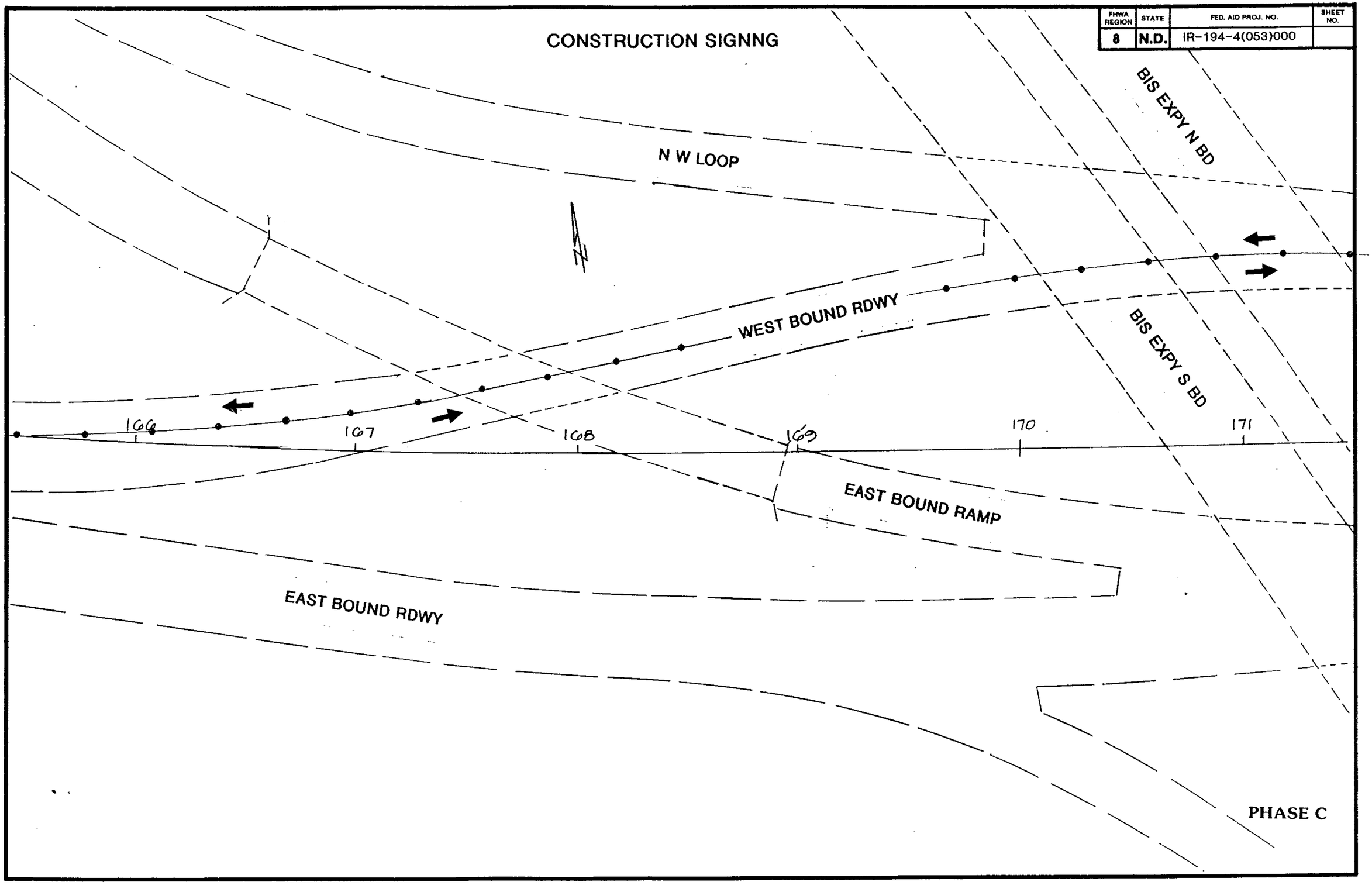
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING



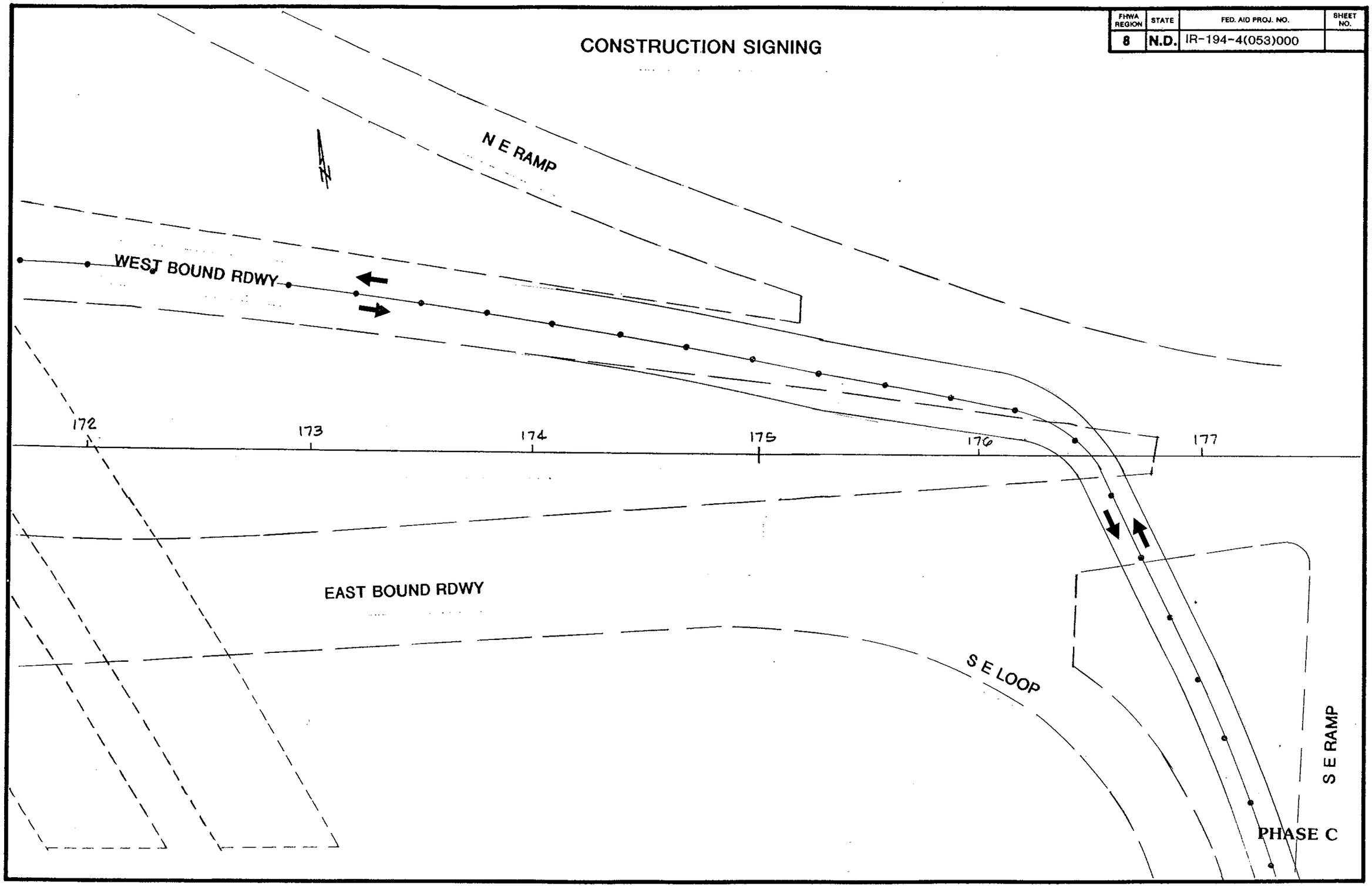
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNNG



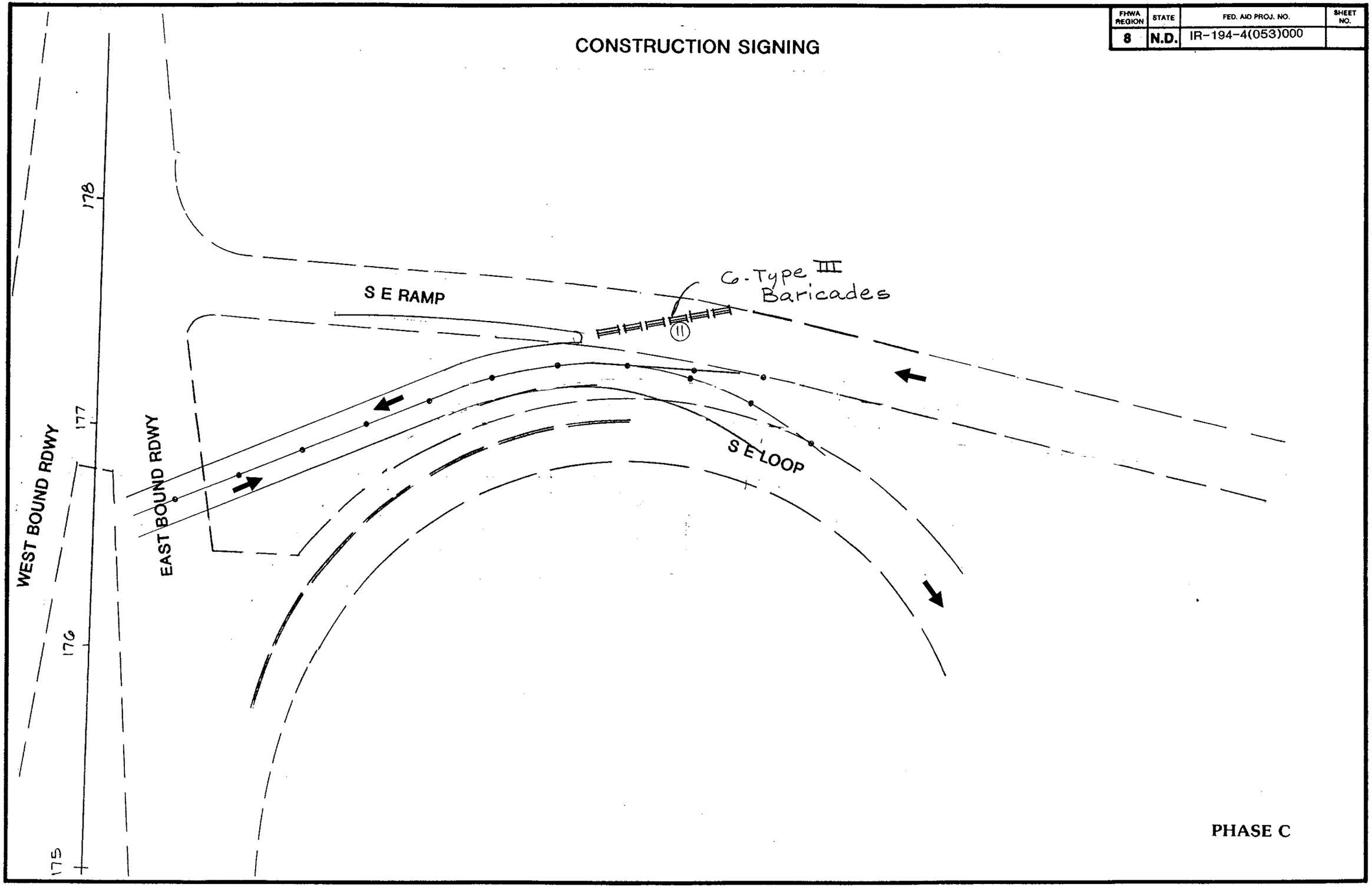
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING

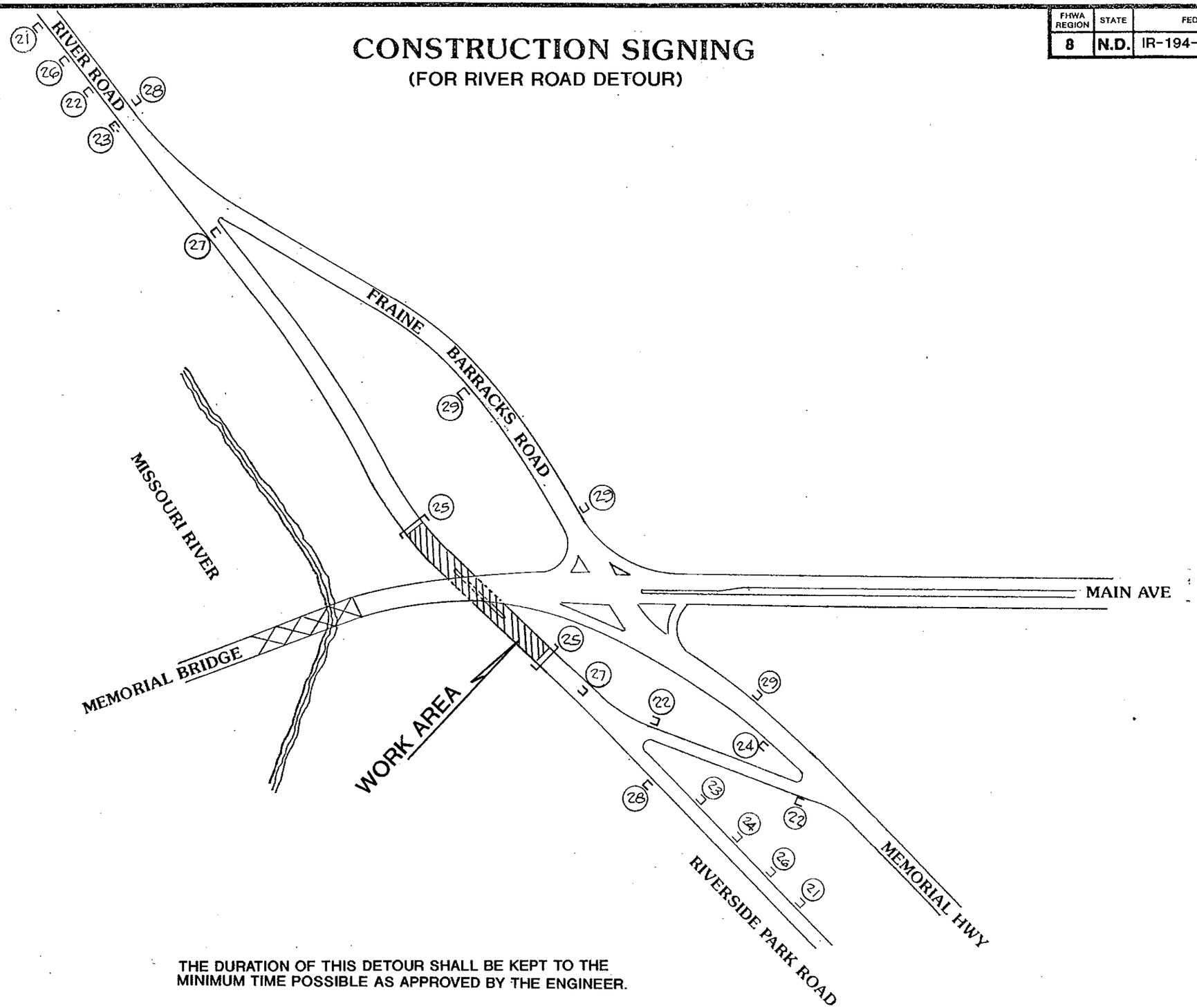


PHASE C

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-194-4(053)000	

CONSTRUCTION SIGNING

(FOR RIVER ROAD DETOUR)



THE DURATION OF THIS DETOUR SHALL BE KEPT TO THE MINIMUM TIME POSSIBLE AS APPROVED BY THE ENGINEER.

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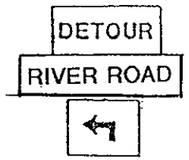
CONSTRUCTION SIGNING
(FOR RIVER ROAD DETOUR)

21



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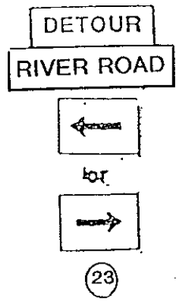

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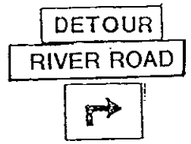

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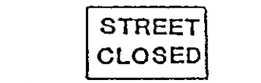

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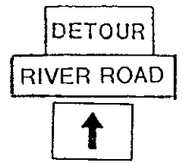
26



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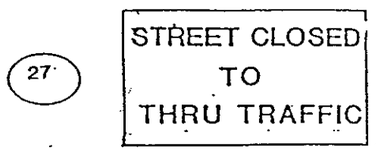

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FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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PRT SLO CON 'ND4'

S L O P E S T A K E L I S T I N G - M U L T I P L E R O A D W A Y S

MULTIPLE ROADWAY DESIGN CONFIGURATION ND4
ALT 1 MED EDGES ALT 2

East Bound Rdwy

	ALTERNATIVE	STATION	ALIGNMENT OFFSET	P.G.ELEV	SKEW	SLOPE STAKE OFFSET	ELEV	SLOPE	C/F
BASELINE		165+ 0.00							
LEFT	1	165+ 3.51	41.02	1640.03	0.99481	35.96	1639.36	-6.03	0.67
RIGHT	2	165+ 3.51	41.02	1639.90	0.99481	70.20	1639.39	-4.02	0.51
BASELINE		166+ 0.00							
LEFT	1	166+ 5.33	52.10	1641.26	0.99448	46.09	1640.43	-6.03	0.83
RIGHT	2	166+ 5.33	52.10	1641.49	0.99448	81.22	1641.00	-4.02	0.49
BASELINE		167+ 0.00							
LEFT	1	167+ 7.29	61.87	1642.65	0.99624	55.22	1641.71	-6.02	0.94
RIGHT	2	167+ 7.29	61.87	1643.09	0.99624	91.21	1642.53	-4.01	0.56
BASELINE		168+ 0.00							
LEFT	1	168+ 9.32	69.78	1644.03	0.99766	64.24	1643.27	-6.01	0.75
RIGHT	2	168+ 9.32	69.78	1644.69	0.99766	99.53	1644.01	-4.01	0.67
BASELINE		169+ 0.00							
LEFT	1	169+10.20	75.29	1644.29	0.99940	70.63	1643.68	-6.00	0.61
RIGHT	2	169+10.20	75.29	1645.06	0.99940	105.74	1644.20	-4.00	0.86
BASELINE		170+ 0.00							
LEFT	1	170+10.21	76.57	1642.52	0.99996	71.42	1641.83	-6.00	0.69
RIGHT	2	170+10.21	76.57	1643.23	0.99996	105.25	1642.81	-4.00	0.42
BASELINE		171+ 0.00							
LEFT	1	171+10.25	73.49	1639.17	0.99862	67.03	1638.26	-6.01	0.91
RIGHT	2	171+10.25	73.49	1639.68	0.99862	103.56	1638.93	-4.00	0.76
BASELINE		172+ 0.00							
LEFT	1	172+10.48	66.79	1636.09	0.99750	60.85	1635.27	-6.01	0.82
RIGHT	2	172+10.48	66.79	1636.26	0.99750	98.07	1635.21	-4.01	1.05
BASELINE		173+ 0.00							
LEFT	1	173+10.73	59.71	1635.51	0.99750	55.03	1634.90	-6.01	0.61
RIGHT	2	173+10.73	59.71	1635.25	0.99750	90.97	1634.20	-4.01	1.05
BASELINE		174+ 0.00							
LEFT	1	174+10.98	52.63	1636.24	0.99750	48.21	1635.67	-6.01	0.57
RIGHT	2	174+10.98	52.63	1635.89	0.99750	84.14	1634.79	-4.01	1.11

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	BASELINE STA	MATERIAL NAME	END AREAS	-- UNADJUSTED VOLUMES -- INCR	FROM BAL	ACCUM	MULT FACTOR	-- ADJUSTED VOLUMES -- INCR	FROM BAL	ACCUM	MASS ORDINATE
	East										
1	Bound	165+ 0.00 FILL	8.23	0	0	0	1.200	0	0	0	0.
2	Rdwy	EARTH	0.00	0	0	0	1.000	0	0	0	
3		166+ 0.00 FILL	4.79	25	25	25	1.200	29	29	29	-29.
4		EARTH	0.00	0	0	0	1.000	0	0	0	
5		167+ 0.00 FILL	6.46	21	46	46	1.200	25	55	55	-55.
6		EARTH	0.00	0	0	0	1.000	0	0	0	
7		168+ 0.00 FILL	4.15	20	66	66	1.200	24	79	79	-79.
8		EARTH	0.00	0	0	0	1.000	0	0	0	
9		169+ 0.00 FILL	6.04	19	85	85	1.200	23	102	102	-102.
10		EARTH	0.00	0	0	0	1.000	0	0	0	
11		170+ 0.00 FILL	3.21	17	102	102	1.200	21	122	122	-122.
12		EARTH	0.01	0	0	0	1.000	0	0	0	
13		171+ 0.00 FILL	12.23	29	131	131	1.200	34	157	157	-157.
14		EARTH	-0.02	0	0	0	1.000	0	0	0	
15		172+ 0.00 FILL	15.94	52	183	183	1.200	63	219	219	-219.
16		EARTH	0.00	0	0	0	1.000	0	0	0	
17		173+ 0.00 FILL	8.44	45	228	228	1.200	54	274	274	-274.
18		EARTH	0.00	0	0	0	1.000	0	0	0	
19		174+ 0.00 BACKFILL	0.00	0	0	0	1.200	0	0	0	-311.
20		FILL	8.46	31	260	260	1.200	38	311	311	
21		EARTH	0.00	0	0	0	1.000	0	0	0	
22											
23	$$$$ FILE 'MASSPLT ' HAS BEEN SAVED										
24											
25											

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FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
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West Bound Rdwy

	ALTERNATIVE	STATION	ALIGNMENT OFFSET	ALIGNMENT P.G.ELEV	ALIGNMENT SKEW	SLOPE STAKE OFFSET	SLOPE STAKE ELEV	SLOPE STAKE SLOPE	SLOPE STAKE C/F
BASELINE		165+ 0.00							
LEFT	3	165+ 0.13	7.91	1639.45	0.99933	-32.19	1636.10	-6.00	3.35
RIGHT	4	165+ 0.13	7.91	1640.00	0.99933	19.12	1639.47	-6.00	0.53
BASELINE		166+ 0.00							
LEFT	3	166+ 0.47	1.17	1638.86	0.99521	-30.59	1636.92	-6.03	1.94
RIGHT	4	166+ 0.47	1.17	1639.54	0.99521	12.49	1639.00	-6.03	0.54
BASELINE		167+ 0.00							
LEFT	3	167+ 1.17	-11.75	1636.36	0.98729	-49.30	1633.52	-6.08	2.84
RIGHT	4	167+ 1.17	-11.75	1636.84	0.98729	-1.30	1636.46	-6.07	0.39
BASELINE		168+ 0.00							
LEFT	3	168+ 2.45	-30.93	1634.27	0.97675	-58.59	1633.11	-6.14	1.17
RIGHT	4	168+ 2.45	-30.93	1634.68	0.97675	-10.37	1632.67	-6.14	2.01
BASELINE		169+ 0.00							
LEFT	3	169+ 4.28	-51.94	1634.93	0.97890	-88.15	1632.36	-6.13	2.57
RIGHT	4	169+ 4.28	-51.94	1634.64	0.97890	-33.58	1632.98	-6.13	1.66
BASELINE		170+ 0.00							
LEFT	3	170+ 5.76	-69.23	1636.30	0.99280	-91.77	1635.90	-6.04	0.40
RIGHT	4	170+ 5.76	-69.23	1635.60	0.99280	-35.39	1631.53	-6.04	4.27
BASELINE		171+ 0.00							
LEFT	3	171+ 5.99	-76.00	1636.94	0.99989	-100.47	1636.19	-6.00	0.74
RIGHT	4	171+ 5.99	-76.00	1636.45	0.99989	-41.02	1631.95	-6.00	4.50
BASELINE		172+ 0.00							
LEFT	3	172+ 6.06	-72.26	1637.23	0.99598	-96.61	1636.52	-6.02	0.71
RIGHT	4	172+ 6.06	-72.26	1636.70	0.99598	-30.49	1631.10	-6.02	5.60
BASELINE		173+ 0.00							
LEFT	3	173+ 7.09	-57.90	1637.38	0.98095	-83.91	1636.46	-6.12	0.92
RIGHT	4	173+ 7.09	-57.90	1636.95	0.98095	-13.87	1631.08	-6.12	5.87
BASELINE		174+ 0.00							
LEFT	3	174+ 9.40	-36.25	1636.84	0.97698	-58.30	1637.10	6.14	-0.26
RIGHT	4	174+ 9.40	-36.25	1637.20	0.97698	10.26	1630.96	-6.14	6.24
BASELINE		175+ 0.00							
LEFT	3	175+11.35	-16.37	1636.84	0.98670	-41.75	1637.69	6.07	-0.85
RIGHT	4	175+11.35	-16.37	1637.55	0.98870	12.34	1634.15	-6.07	3.40

512645

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

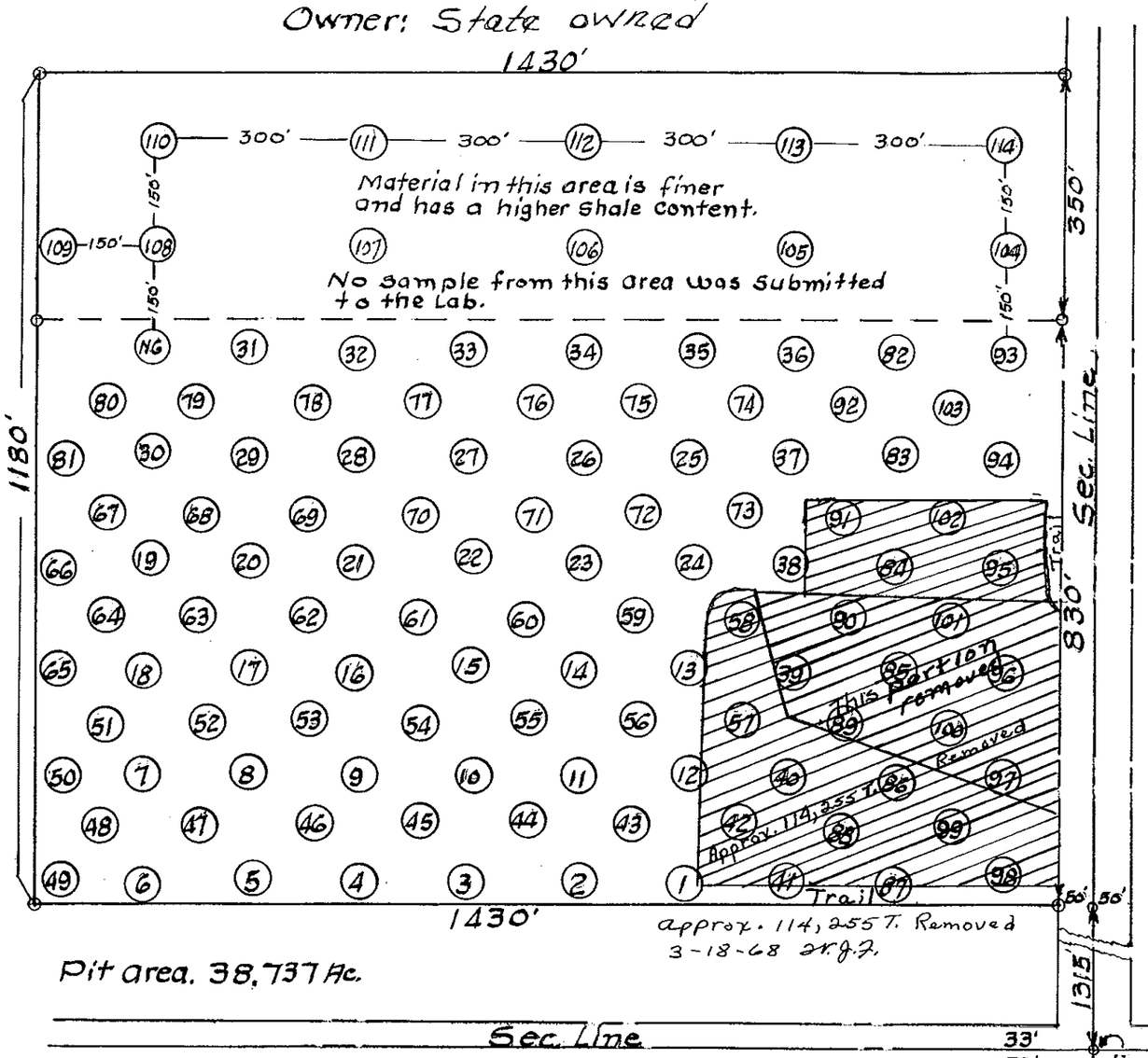
	BASELINE STA	MATERIAL NAME	END AREAS	-- UNADJUSTED VOLUMES -- INCR	FROM BAL	ACCUM	MULT FACTOR	-- ADJUSTED VOLUMES -- INCR	FROM BAL	ACCUM	MASS ORDINATE
West	165+ 0.00	FILL	22.92	0	0	0	1.200	0	0	0	0.
		EARTH	0.00	0	0	0	1.000	0	0	0	
1 Bound	166+ 0.00	FILL	17.66	75	75	75	1.200	90	90	90	-90.
2 Rdwy		EARTH	0.00	0	0	0	1.000	0	0	0	
3											
4	167+ 0.00	FILL	23.00	76	151	151	1.200	91	181	181	-181.
5		EARTH	0.00	0	0	0	1.000	0	0	0	
6	168+ 0.00	FILL	18.30	77	229	229	1.200	93	274	274	-275.
7		EARTH	-0.05	0	0	0	1.000	0	0	0	
8	169+ 0.00	FILL	30.35	92	320	320	1.200	110	385	385	-385.
9		EARTH	-0.08	0	0	0	1.000	0	0	0	
10	170+ 0.00	FILL	43.33	138	459	459	1.200	166	551	551	-551.
11		EARTH	-0.15	0	0	0	1.000	0	0	0	
12											
13	171+ 0.00	FILL	42.93	160	619	619	1.200	192	743	743	-744.
14		EARTH	0.00	0	0	0	1.000	0	0	0	
15	172+ 0.00	FILL	53.36	178	797	797	1.200	214	957	957	-958.
16		EARTH	0.00	0	0	0	1.000	0	0	0	
17	173+ 0.00	FILL	66.68	225	1022	1022	1.200	269	1226	1226	-1227.
18		EARTH	0.52	1	0	0	1.000	1	0	0	
19	174+ 0.00	FILL	130.30	373	1395	1395	1.200	448	1674	1674	-1659.
20		EARTH	7.74	16	16	16	1.000	16	16	16	
21											
22	175+ 0.00	FILL	131.65	495	1890	1890	1.200	593	2268	2268	-2225.
23		EARTH	6.87	28	43	43	1.000	28	43	43	

FORM NO. 218

NORTH DAKOTA STATE HIGHWAY DEPARTMENT
TEST HOLE PLAT

SE¼ Sec. 28, T. 140, R. 77

Owner: State owned



Notes:

In general the material in this deposit lies in layers of sand and gravel therefore, material shall be removed to the full depth shown by test hole and well mixed to produce uniform gradation. Pit operation shall be started on the east end and worked in a westerly direction. Pit operation shall be conducted in a manner not to strip more area than what is needed at any one time.

It is agreed that after the sand and gravel has been removed the top soil or stripping shall be replaced in open pit and smoothed, leaving the pit sides as flat as possible

PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
1	1.5	9.0	6	10	15	32	Rock.
2	1.5	10.5	7	10	15	32	Fine Sandy clay
3	1.5	10.0	6	8	14	34	Clay.
4	2.0	2.5 Gr 1.0 S. clay 5.0 Gr	5	7	10	26	"
5	2.0	8.0 Gr 3.5 Sand	3	5	7	23	"
6	2.0	8.0 Gr 3.0 Sand	4	7	11	26	Fine Sandy Clay
7	3.0	11.0	4	6	10	25	Fine Sand
8	3.0	2.0 Sand 10.0 Gr	5	7	10	24	"
9	1.5	11.0 Gr 2.5 S.	6	10	13	32	Sand
10	2.5	3.0 S 7.0 Gr.	0	5	7	22	Sandy clay.
11	2.5	8.5	5	7	12	31	"
12	2.0	10.5	5	7	14	30	"
13	2.0	10.0	4	6	12	28	Fine Sandy clay
14	1.5	2.5 Gr 1.5 S 7.5 Gr	4	10	14	31	"
15	2.5	2.5 S 8.5 Gl 1.5 S.	6	10	13	30	Sand
16	4.0	8.0 Gr 2.5 S	6	10	12	30	Gravel
17	2.0	2.0 S 4.0 Gr	5	7	12	30	Fine Sand
18	3.0	1.5 S 3.0 Gr 1.5 S 10.0 Gr 2.0 S	5	10	15	33	Sand + Shale.
19	2.0	1.5 S 8.0 Gr	5	10	14	28	Sand
20	2.0	2.5 S 6.0 Gr 2.0 S 3.5 Gr 1.5 S	4	6	10	25	"
21	3.0	2.0 S 10.0 Gr	3	6	11	27	Gravel
22	3.5	10.5	5	8	15	32	"
23	1.5	13.5	6	8	14	30	"
24	2.0	11.0	7	12	15	33	"
25	3.5	2.5 S 9.0 Gr	6	10	13	32	Gravel
26	1.5	13.5	5	7	12	30	"
27	1.5	12.5 Gr 1.0 S.	7	10	15	32	Sand.
28	2.5	11.5	5	8	14	31	Sand + Shale
29	2.0	2.0 Gr 1.5 S	0	5	10	27	Fine Sand
30	1.5	2.5 Gr 3.0 S. clay 1.5 Gr 4.5 Gr 3.0 S. 6.0 Gr	5	10	15	32	Gravel
31	3.5	2.5 S 2.0 Gr 1.0 S 5.0 Gr	0	5	8	23	Sand + Shale
32	3.0	2.0 S 8.5 Gr	2	4	10	25	"
33	1.5	4.5 S 6.5 Gr.	3	5	8	25	Fine Sand.
34	2.5	2.5 S. 1.5 Gr 6.0 Gr	2	4	8	22	Fine Sandy Clay
35	2.0	2.5 S 9.5 Gr	5	8	15	32	Fine Sand
36	2.0	2.0 S 10.0 Gr	6	10	14	30	Gravel
37	2.0	2.0 S. 8.0 Gr	5	8	12	30	Sand
38	2.0	4.0 S 8.0 Gr	7	10	16	35	Fine Sand.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-1-094(004)920	

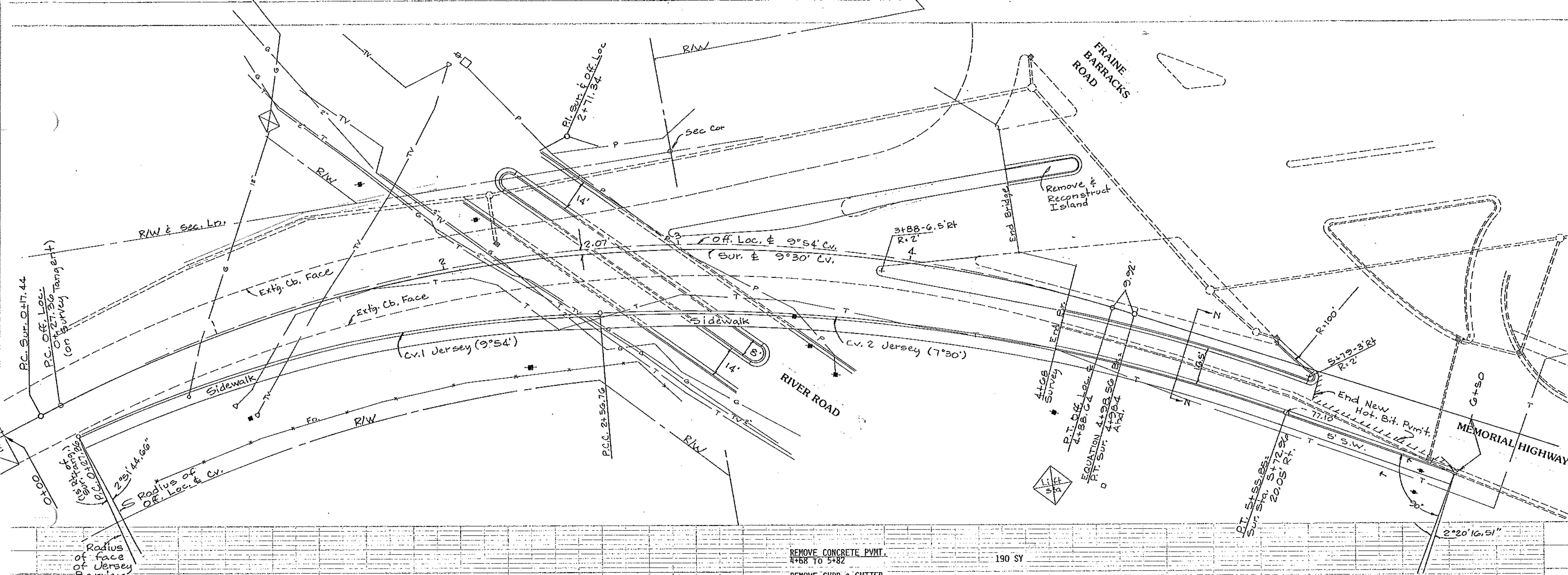
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	F-1-094(004)920	

PIT ANALYSIS BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
39	1.5	2.0S 9.0Gr	5	8	13	34	Fine Sand
40	2.0	9.0Gr	4	6	12	30	Gravel
41	1.0	1.5S 1.5Gr 3.0S 6.0Gr	5	8	12	31	Sandy clay
42	1.5	10.5	6	10	14	30	"
43	1.5	11.5	6	10	15	33	"
44	2.0	10.0	5	8	12	30	"
45	2.0	11.5	5	8	12	30	"
46	1.5	5.0 F.Gr 6.0 Gr 2.5S 3.0S 5.5Gr	4	6	10	25	Clay
47	4.0	2.0S 5.5Gr 3.0S 6.0Gr	5	7	11	26	Sandy clay
48	1.5	2.0S 5.5Gr 3.0S 6.0S	6	10	15	32	"
49	1.5	2.5Gr 3.5S	0	2	5	16	Sand
50	1.5	5.0 F.Gr 8.5S	0	0	5	20	"
51	2.0	7.5	5	10	15	32	Sandy shale
52	6.5	7.0	7	11	16	35	Fine Sand
53	2.5	2.0S 5.5Gr 6.0Gr	4	7	10	31	Sandy clay
54	2.0	4.0Gr 1.5S 5.0Gr	4	8	12	30	Fine sand
55	1.5	11.5Gr 3.0S	2	5	10	30	Clay
56	2.0	3.0S 10.0Gr	4	6	12	28	Gravel
57	1.5	13.0	6	10	16	35	Clay
58	1.5	11.5	7	11	17	36	Sand
59	2.0	12.0	6	12	17	36	"
60	2.5	2.5S 10.5Gr	5	8	12	30	Clay
61	4.0	11.0	5	10	15	33	Sand
62	2.5	12.0	5	8	12	32	"
63	2.0	4.0Gr 2.0S 5.5Gr	5	10	16	33	Fine sand
64	2.0	10.5	6	8	12	32	"
65	2.0	2.0S 8.0Gr 2.0S	6	8	15	34	Sand
66	1.5	4.0 F.Gr 7.0 Gr 2.0S	2	2	7	26	"
67	2.0	10.0Gr 1.5S	6	10	16	32	Fine Sandy clay
68	4.0	5.0S 1.0Gr 2.0S clay 2.0 Gr	4	7	10	25	Clay
69	2.0	2.0S 4.0Gr 2.5 S. clay 4.0 Gr	2	2	6	26	Fine Sand
70	1.5	2.0S 10.5 Gr	5	8	12	28	"
71	2.5	12.0	5	8	13	34	Sand & Shale
72	2.0	2.0S 11.0Gr	7	12	16	35	Gravel
73	2.5	2.5S 10.0Gr	7	12	17	35	"
74	3.0	12.0	6	10	16	34	Fine Sand.
75	5.0	2.0S 8.0Gr	4	8	15	33	Gravel
76	2.0	11.0	5	7	12	32	Fine Sand.
77	2.0	2.0S 8.5Gr	0	4	7	27	Sand & Shale
78	1.0	4.0 F.Gr 2.0S 4.5Gr	0	4	6	20	"

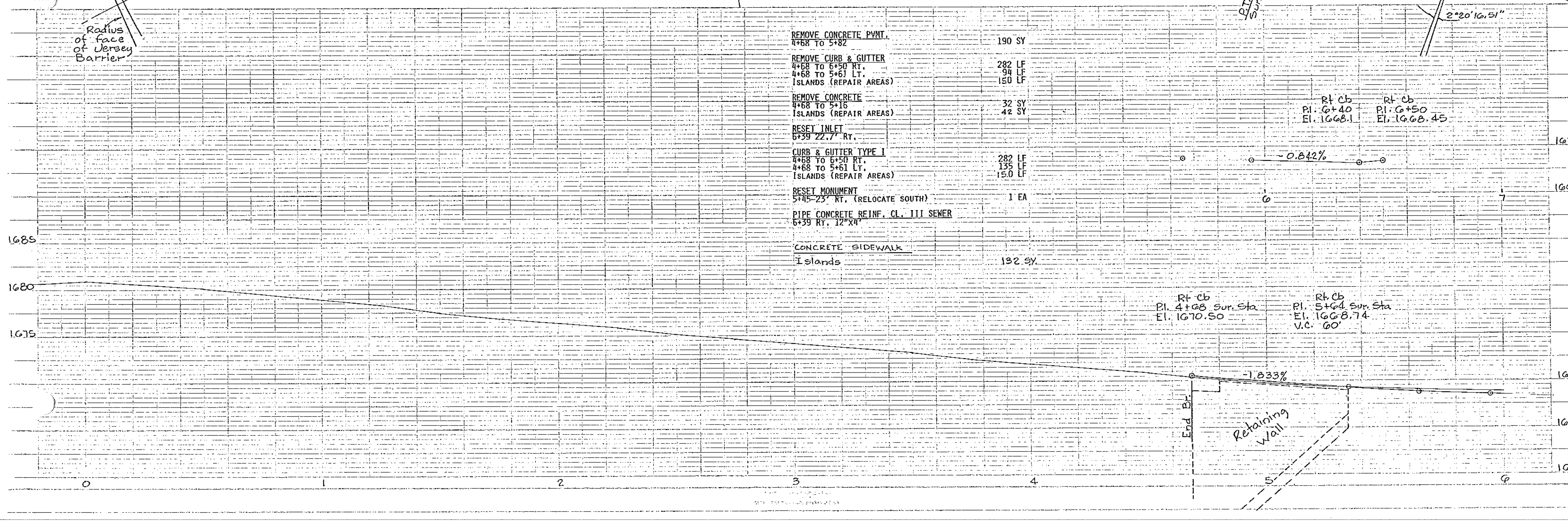
PIT ANALYSIS BY TEST HOLES

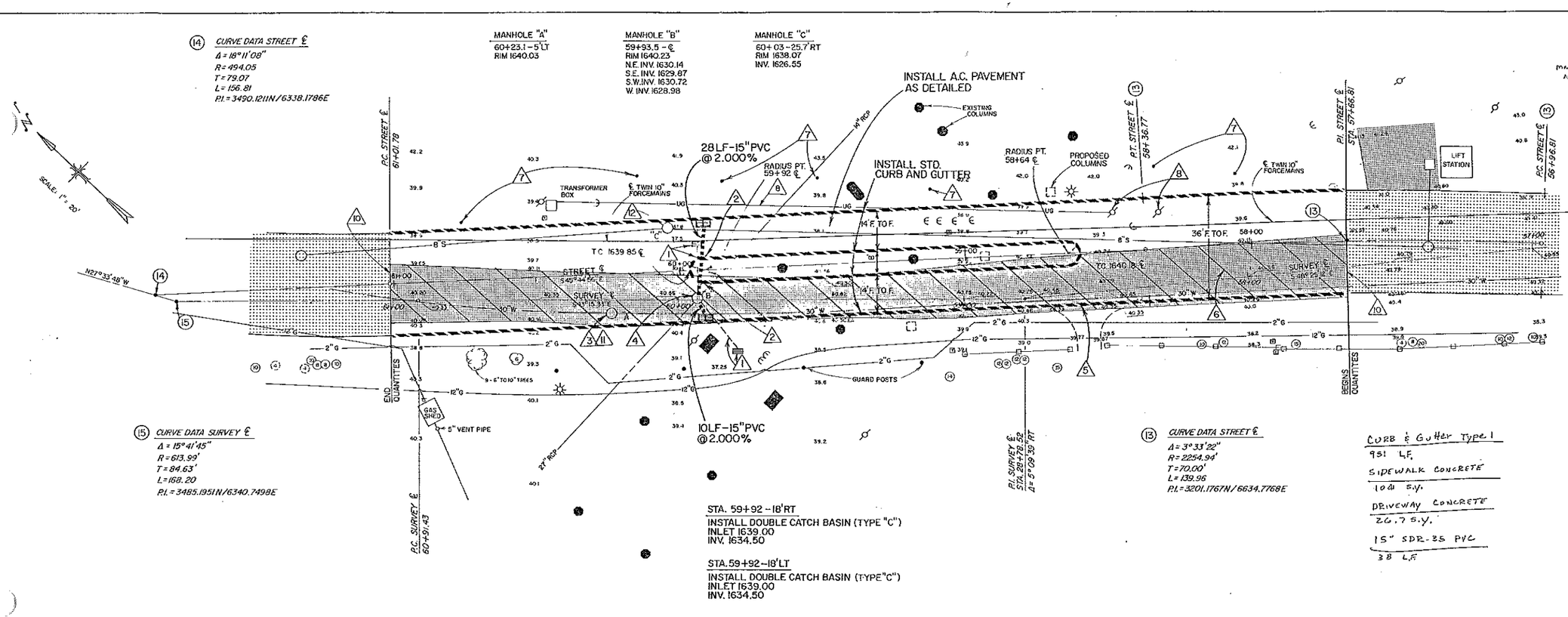
Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1½" Screen	% Retained on 1" Screen	% Retained on ¾" Screen	% Retained on ¼" Screen	Bottom of Test Hole in
79	No	Good					
80	3.0	5.0 F.Gr 2.0 F.S 4.0 Gr	3	7	12	28	Gravel
81	5.5	3.5Gr 1.5 Clay 8.0 Gr 2.0S	4	7	11	27	Sand & Shale
82	1.5	9.0	6	10	16	35	Clay
83	1.5	1.5S 12.0Gr	7	11	16	34	Sandy Shale
84	2.5	3.5S 5.0Gr	6	10	15	33	Gravel
85	1.5	3.0S 8.0Gr	5	7	14	30	Fine Sand
86	2.0	2.0S 8.0Gr	5	10	16	32	Sand & Shale
87	1.0	2.5Gr 2.0 Clay 4.0 Gr 1.0 S	5	7	11	30	Clay
88	2.0	3.5Gr 1.0 Clay 3.5Gr	4	6	8	20	Fine Sandy clay
89	3.0	2.0S 10.0Gr	4	8	12	30	Gravel
90	2.0	11.0	5	10	16	36	Fine Sand
91	2.0	3.0S 11.0Gr	7	11	15	32	Sand
92	2.0	3.0S 9.0Gr	7	12	17	35	Sandy clay
93	6.0	9.0	6	10	15	33	Gravel
94	1.5	13.5	7	10	15	34	Fine Sand
95	1.5	12.5	6	10	15	36	Fine Sandy clay
96	2.0	2.0S 9.0Gr	5	10	13	32	Sand
97	0.5	13.5	5	8	13	30	Fine Sand
98	1.0	5.0Gr 3.0S	2	4	8	22	Clay
99	0.5	8.5Gr 2.0S	6	8	12	32	"
100	1.5	13.0	5	8	12	30	Sand
101	3.0	2.0S 9.5Gr	7	11	16	35	Fine Sand
102	1.5	12.5	6	12	16	36	Sandy clay
103	3.0	12.0	5	8	12	34	Gravel
Totals	225.5	1148.0	483	820	1287	3067	
104	2.5	2.0S 6.5Gr	2	5	10	24	Sandy clay
105	2.0	4.0S 3.5Gr	2	5	8	25	Fine Sand
106	3.0	3.0S 4.0Gr	0	3	6	24	"
107	1.0	2.0S 8.0Gr	0	4	7	22	Sand & Shale
108	2.0	1.5Gr 1.5 S 7.0Gr	0	4	6	21	Fine Sand
109	2.5	3.5S 1.5Gr 1.5S 5.0Gr	2	2	6	22	"
110	2.5	3.0S 2.0Gr	0	0	3	15	"
111	2.0	3.0S 4.0Gr	2	4	7	22	"
112	2.0	3.5S 3.5Gr	2	5	8	25	"
113	2.5	1.5S 2.0Gr 2.0S 8.0Gr	0	0	3	16	Clay
114	1.5	2.5S 2.5Gr	0	2	4	15	"
Totals	23.5	87.0	10	34	68	231	



FRAINE BARRACKS ROAD
RIVER ROAD
MEMORIAL HIGHWAY
R/W
R/W & Sec. Ln.
Sec Cor
Pl. Sur. & Off. Loc. 2+71.34
Off. Loc. ℄ 9°54' Cv.
(Sur. ℄ 9°30' Cv.
Extg. Cb. Face
Sidewalk
Cv. 1 Jersey (9°54')
Cv. 2 Jersey (7°30')
Remove & Reconstruct Island
End Bridge
3+88-6.5' Rt R=2'
4+65 Survey
P.T. Off. Loc. ℄ 4+88.64
EQUATION 4+98.50 Bk. P.T. Sur. 4+98.64 Ahd.
P.T. 5+55.85 Sur. Sta. 5+72.96 20.05 Rt.
5+79-3' Rt R=2'
R=100'
End New Hot. Bit. Pvm't.
5' S.W.
77.18'
6+50
2°20'16.51"
P.C.C. 2+50.76
P.C. Sur. 0+17.44
P.C. Off. Loc. 0+27.36 (on Survey Tangent)
2°51'44.66"
Radius of Off. Loc. ℄ Cv.
Radius of face of Jersey Barrier
0+00
14'
2.07'
8'
9.92'

REMOVE CONCRETE PVMT.	
4+68 TO 5+82	190 SY
REMOVE CURB & GUTTER	
4+68 TO 6+50 RT.	282 LF
4+68 TO 5+61 LT.	94 LF
ISLANDS (REPAIR AREAS)	150 LF
REMOVE CONCRETE	
4+68 TO 5+16	32 SY
ISLANDS (REPAIR AREAS)	42 SY
RESET INLET	
6+39 22.7' RT.	
CURB & GUTTER TYPE I	
4+68 TO 6+50 RT.	282 LF
4+68 TO 5+61 LT.	135 LF
ISLANDS (REPAIR AREAS)	150 LF
RESET MONUMENT	
5+45-23' RT. (RELOCATE SOUTH)	1 EA
PIPE CONCRETE REINF. CL. III SEWER	
6+39 RT. 12"x4'	
CONCRETE SIDEWALK	
Islands	132 SY





REV.	DATE	DESCRIPTION	BY
△			
△			
△			
△			

RIVER ROAD IMPROVEMENTS
CITY OF BISMARCK, NORTH DAKOTA

STA. 57+66.81 TO STA 61+01.78
RIVER ROAD

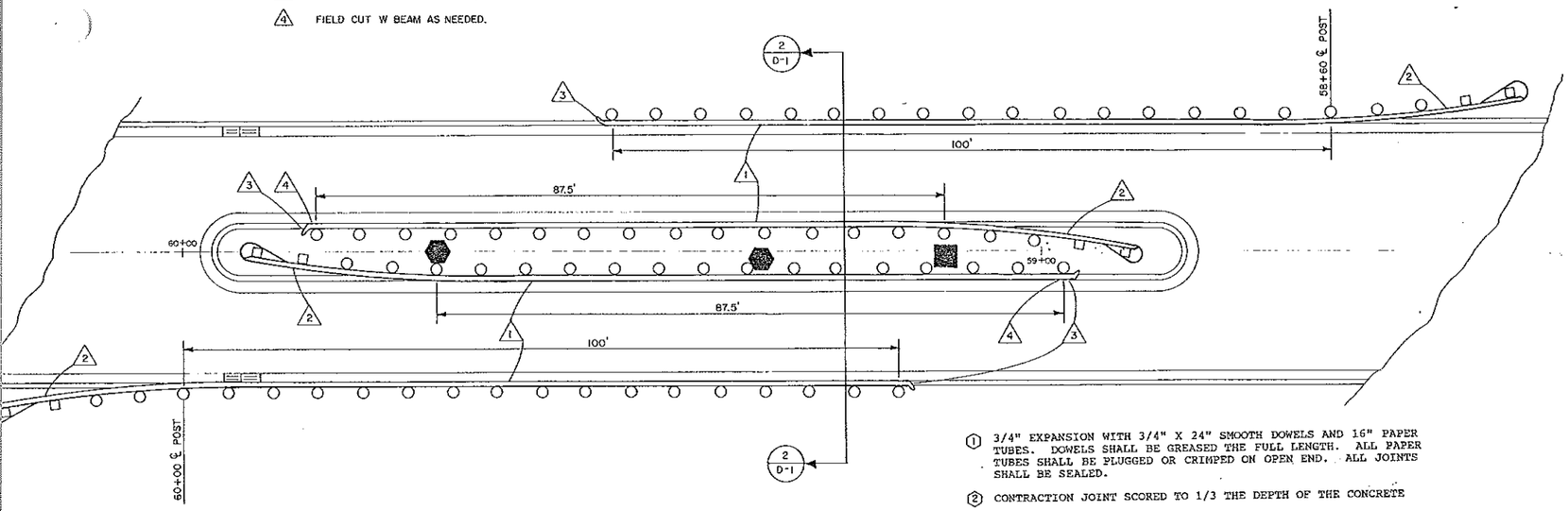
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS • ARCHITECTS
FARGO • BISMARCK • MINNEAPOLIS

DRAWN BY: BJH	SCALE: AS SHOWN	PROJECT NO. 88670
CHECKED BY:	DATE: MAR 1989	SHEET P-1 of
APPROVED BY:		

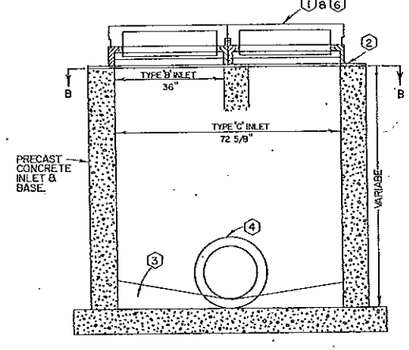
ULTEIG ENGINEERS

CONSTRUCTION NOTES

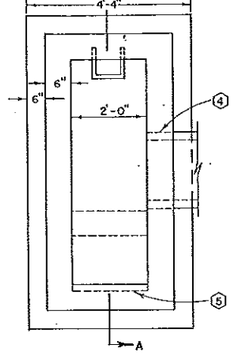
1. W BEAM GUARDRAIL TO BE FURNISHED IN ACCORDANCE WITH NDSHD STANDARD SPECIFICATIONS. INSTALL W BEAM GUARDRAIL AS DETAILED ON PAGES D-764-1 AND D-764-2 OF NDSHD STANDARD CONSTRUCTION DRAWINGS.
2. INSTALL TRANSITION AND BUFFER END SECTION AS DETAILED ON D-764-2.
3. INSTALL FLARED END SECTION, MEASURED AS GUARDRAIL.
4. FIELD CUT W BEAM AS NEEDED.



1 D-1 W BEAM GUARDRAIL LAYOUT DETAIL
SCALE 1" = 10'



SECTION A-A

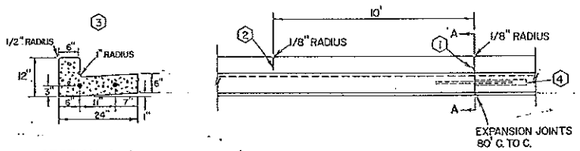


SECTION B-B

1. TYPE "B" INLET CASTING SHALL BE NEENAH FOUNDRY NO. R-3067 WITH TYPE V GRATE OR AN APPROVED EQUAL. TYPE "C" INLET CASTINGS SHALL BE NEENAH FOUNDRY NO. R-3295 WITH TYPE V GRATE OR AN APPROVED EQUAL.
2. ALLOWANCE FOR ADJUSTMENT - 1 1/2" MIN. TO 3" MAX. ADJUST HEIGHT BY USE OF BRICKS AND OR GROUT, GROUT TO BE BETWEEN ALL SURFACES.
3. GROUT INLET INVERT TO PROVIDE SMOOTH POSITIVE DRAINAGE TO PIPE.
4. WATERTIGHT SEAL AROUND PIPE.
5. PROVIDE CASTING NOTCH AT BOTH ENDS FOR TYPE "C" INLETS.
6. BOLTS FOR CASTING SHALL BE TEMPER FINISH - DOUBLE HEAT TREATED - 1038 S.A.E. GRADE 5, WITH CAD-DICHROMATE PLATING. BOLT REQUIREMENTS FOR TYPE "B" INLET: 3 - 1/2"0X21/2" BOLTS WITH 1 NUT AND 1 WASHER, OR AS REQUIRED BOLT REQUIREMENTS FOR TYPE"C" INLET: 2 - 1/2"0X41/2" BOLTS WITH NUT AND 8 WASHERS AND 4 - 1/2"0X21/2" BOLTS WITH NUT AND WASHER EACH, OR AS REQUIRED.ON MULTIPLE TYPE INLETS, WASHERS SHALL BE USED AS SPACERS BETWEEN THE CASTINGS TO ATTAIN PROPER AND STABLE ALIGNMENT OF THE CASTINGS. ON SINGLE INLETS AND THE END CASTING OF MULTIPLE INLETS, THE BOLTS SHALL BE PLACED WITH THE NUTS ON THE OUTSIDE OF THE CASTING. NUTS SHALL HAVE A 3/8" BAR 3" LONG WELDED TO THE SIDE OF THE NUT IN SUCH A MANNER AS TO ALLOW PROPER TIGHTENING OF THE BOLT. WELDED NUT AND BAR SHALL BE COATED TO PREVENT RUSTING.
7. WALLS TO BE REINFORCED WITH #4 @ 14" O.C./E.W. @ ℄ WALL. REINFORCE BASE SLAB WITH #4 @ 15" O.C./E.W., ADDITIONAL 2 - #4 CONTINUOUS AROUND EDGE

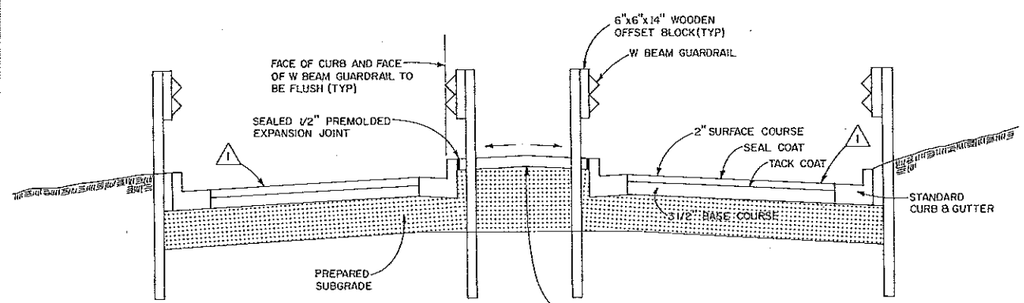
3 D-1 TYPE "B" & "C" INLETS
NOT TO SCALE

1. 3/4" EXPANSION WITH 3/4" X 24" SMOOTH DOWELS AND 16" PAPER TUBES. DOWELS SHALL BE GREASED THE FULL LENGTH. ALL PAPER TUBES SHALL BE PLUGGED OR CRIMPED ON OPEN END. ALL JOINTS SHALL BE SEALED.
2. CONTRACTION JOINT SCORED TO 1/3 THE DEPTH OF THE CONCRETE
3. CURB AND GUTTER SHALL BE 6" AND UNREINFORCED UNLESS OTHERWISE SPECIFIED.
4. DOWELS SHALL BE SUPPORTED BY AN APPROVED SUPPORT MADE OF NO. 7 AWG WIRE.



SECTION A-A

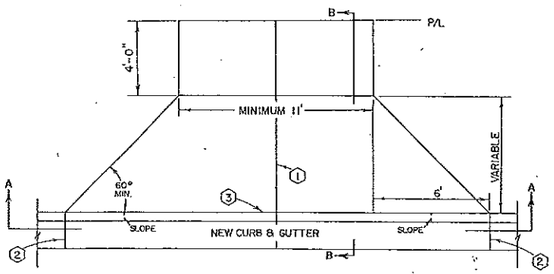
4 D-1 STANDARD CURB & GUTTER
NOT TO SCALE



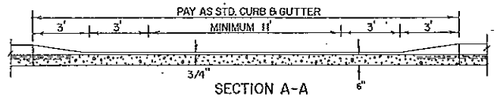
CONSTRUCTION NOTES

ASPHALT PAVEMENT SHALL MEET THE REQUIREMENTS FOR CLASS B MIX AS PER C[illegible] BISMARCK'S STANDARD SPECI[illegible]NS.

2 D-1 TYPICAL ROAD CROSS SECTION
NOT TO SCALE

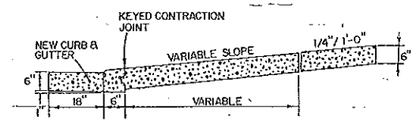


PLAN VIEW



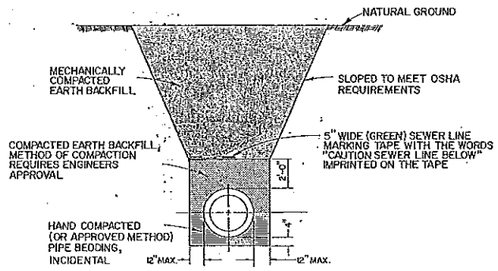
SECTION A-A

5 D-1 DROP CURB & DRIVEWAY DETAIL
NOT TO SCALE



SECTION B-B

1. CENTER JOINT TO BE USED ON ALL DRIVEWAYS 16' IN WIDTH OR GREATER. JOINT SHALL BE A KEYED CONSTRUCTION JOINT OR A CONTRACTION JOINT SCORED 1/3 THE DEPTH OF THE CONCRETE. JOINT SHALL BE SEALED.
2. THIS SHALL BE A CONTRACTION JOINT SCORED 1/3 THE DEPTH OF THE CONCRETE. JOINT SHALL BE SEALED.
3. THIS JOINT OPTIONAL WHEN POURED CONTIGUOUS.



6 D-1 PIPE TRENCH DETAIL
NOT TO SCALE

REV.	DATE	DESCRIPTION	BY
△			
△			
△			
△			

RIVER ROAD IMPROVEMENTS
CITY OF BISMARCK, NORTH DAKOTA

CONSTRUTION DETAILS

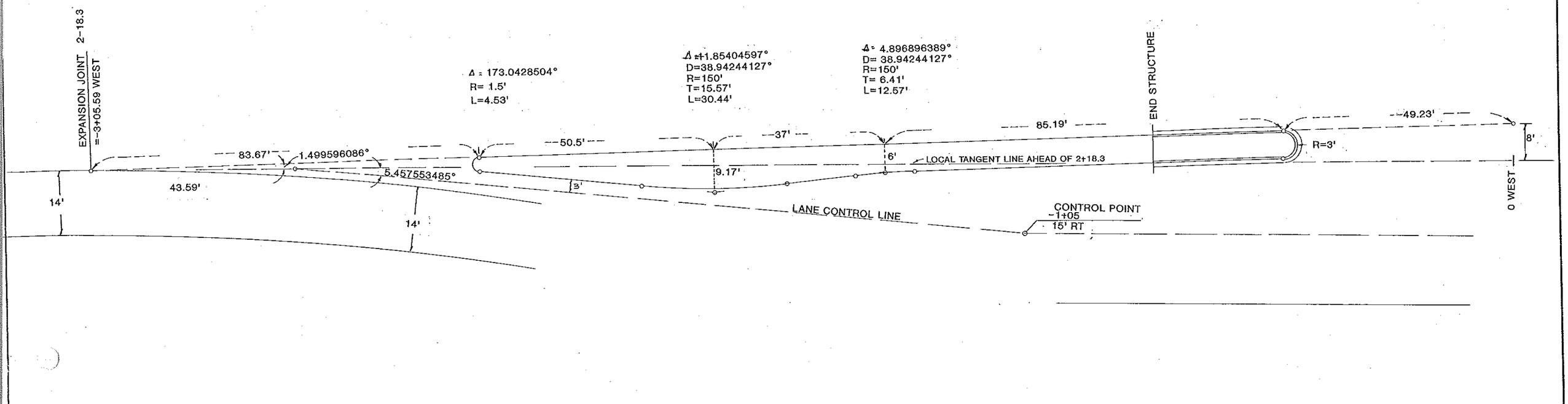
ULTEIG ENGINEERS, INC. CONSULTING ENGINEERS • ARCHITECT FARGO • BISMARCK • MINNEAPOLIS

ULTEIG ENGINEERS

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.		

ISLAND GEOMETRIC CONTROL

EAST APPROACH



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

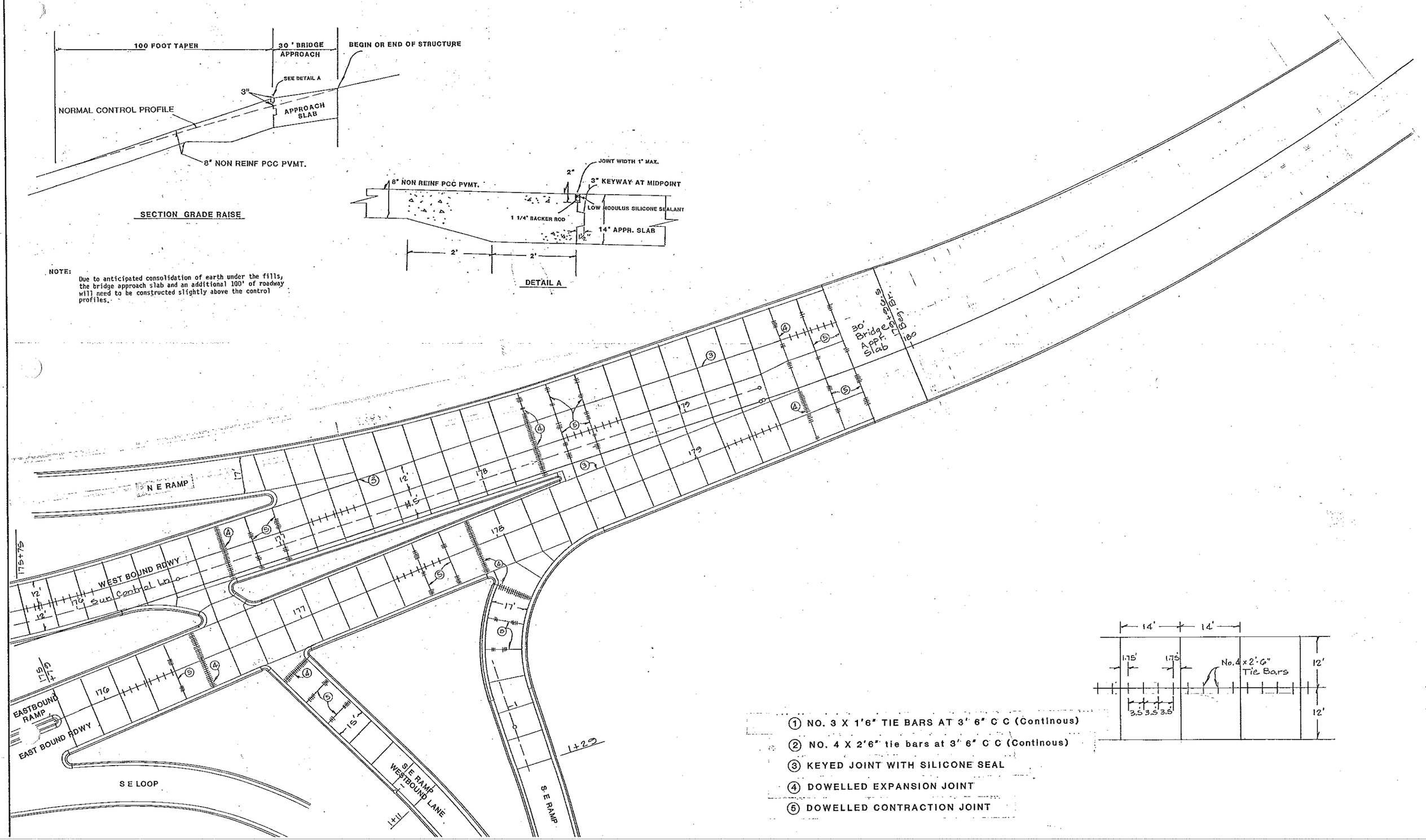
PCC PAVEMENT DETAILS

BRIDGE APPROACH GRADE MODIFICATION

SECTION GRADE RAISE

NOTE:
Due to anticipated consolidation of earth under the fills, the bridge approach slab and an additional 100' of roadway will need to be constructed slightly above the control profiles.

DETAIL A



① NO. 3 X 1'6" TIE BARS AT 3' 6" C C (Continous)
② NO. 4 X 2'6" tie bars at 3' 6" C C (Continous)
③ KEYED JOINT WITH SILICONE SEAL
④ DOWELLED EXPANSION JOINT
⑤ DOWELLED CONTRACTION JOINT

P.C. N.W. Loop 7+01.6

8° Cv.

P.I. N.W. Loop 8+35.5

Beg Cb & Gtr 9+16.1 - 4.1 Lt Beg Tangent Alignment (New)

P.T. N.W. Loop (Existing) 9+66.1

P.C. 10+85.09 (New)

Δ = 10.80918359°
D = 8°
R = 716.78'
T = 67.81'
L = 135.10'

S. 70.12308896° E.

Existing N.W. Loop Control

18'

N.W. Loop

R = 2'

31.45

12'

6'

7.5'

P.I. 167+95.87 W. Bd. Sur.

West Bound Roadway

128.00

N. 81°53'45.91" E.

31.18

P.C. 162+23.83 W. Bd. Sur.

Inv 31.62

P.C. 164+41.08 W. Bd. Sur.

100.38

S. 74°21'47.26" E.

12'

6'

6'

165

5° Cv 12

166

167 Cv 12 5°

Cv 1 1°30'

Old Hwy 10 ℄

168

SURVEY ℄

170

Grate 47.61 Inv. 44.48

Cb 47.87

27

100' Taper

5° Cv

20.75'

164

164+07.96 = 0+07.13 (46Th)

61°08'

+76 E.Bd. R=4.5'±

165

P.C. 165+12.88 W. Bd. Sur.

P.C. 165+52.68

P.T. 168+39.10

R=60'

R=35'

164+97.52 E.Bd Rdwy - 61.5' Rt 1+02.74 46Th Ave S.E - 54.5' Lt.

SIGN

+80

Temp. Ramp

+70

+27

R/W

40'

30'

+57

2

East Bound Roadway

2.5'

12'

12'

26.5'

168

2°30' Cv 9

169

170

2.5'

12° Cv.

R=3'

2.40

CONCRETE DRAIN

Beg S.W.R. 168+00.00 = 168+00 - 24' Rt.

P.C. 0+30

P.I. 168+53.63

R/W

5.1

GEOMETRIC CONTROL LAYOUT

SIGN

SIGN

SWIMMING POOL

GAS VALVE

SIGN

SIGN

34.08

Edge Exist. Shldr

12'

4'

9'

12'

12'

12'

12'

4'

Edge Exist. Shldr

160

161

End Strip
Proj 161+10

162

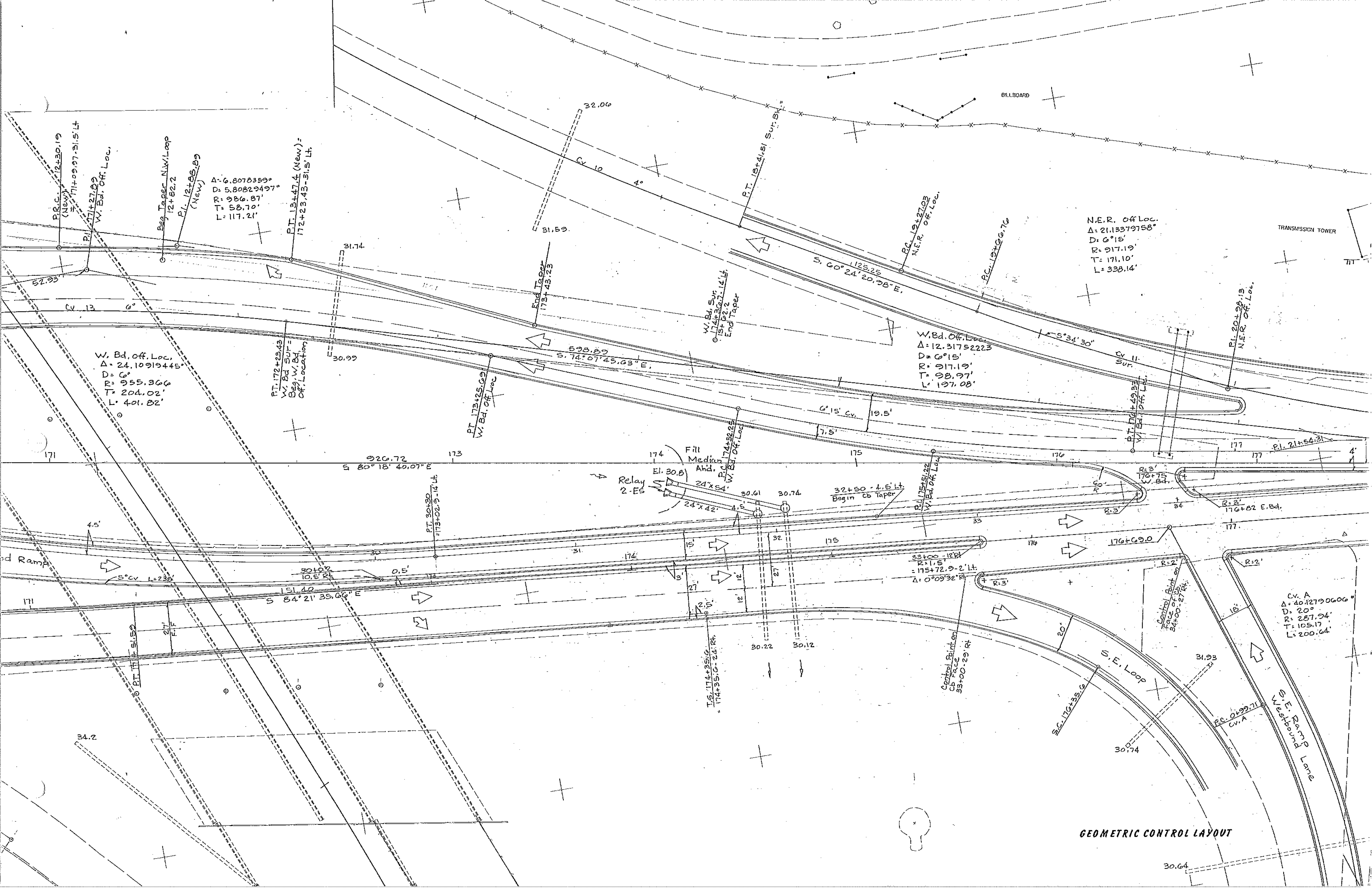
441.89
S. 09°23'14.34" E

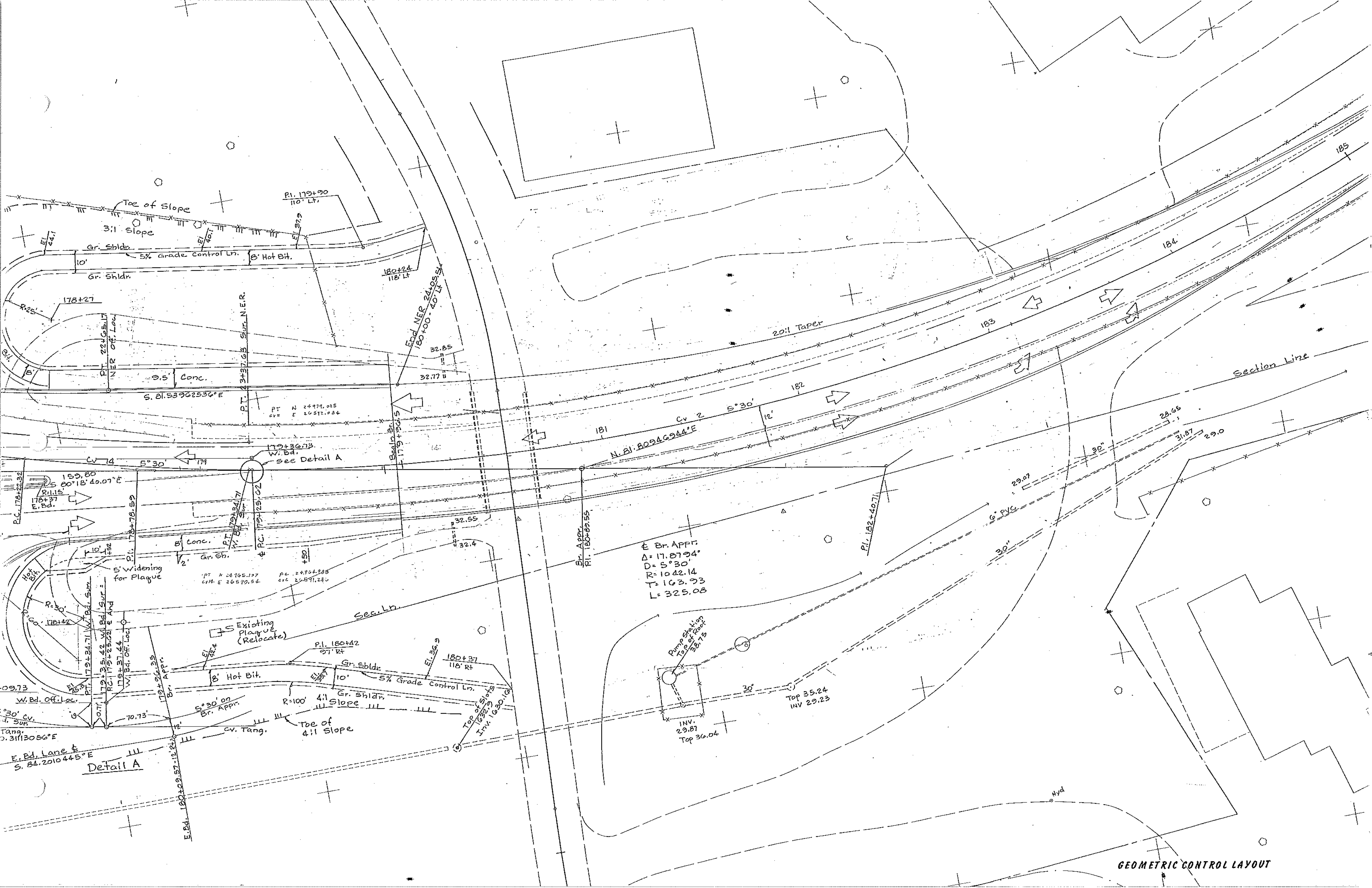
163

SIGN

SIGN

GEOMETRIC CONTROL LAYOUT


GEOMETRIC CONTROL LAYOUT
BILLBOARD
TRANSMISSION TOWER
N.E.R. Off Loc.
Δ: 21.13379758°
D: 6°15'
R: 917.19'
T: 171.10'
L: 338.14'
Δ: 6.8078359°
D: 5.808294 97°
R: 986.87'
T: 58.70'
L: 117.21'
W. Bd. Off. Loc.
Δ: 24.10919445°
D: 6°
R: 955.366
T: 204.02'
L: 401.82'
W.Bd. Off. Loc.
Δ: 12.31752223
D: 6°15'
R: 917.19'
T: 98.97'
L: 197.08'
Cv. A
Δ: 40.12790606°
D: 20°
R: 287.94'
T: 105.17
L: 200.64'
S. 60° 24' 20.98" E.
S. 74° 07' 45.63" E.
S 80° 18' 40.07" E
S 84° 21' 35.06" E
Cv. 10
Cv. 13
Cv. 11
Fill Median Ahd.
Relay 2-Es
El. 30.8
24" x 54'
24" x 42'
32+50 - 4.5' Lt. Begin Cb Taper
S.E. Loop
S.E. Ramp Westbound Lane
Control Point on Cb Face 33+00-29' Rt.
Control Point on Face of Cb. 34+00-27' Rt.
P.C. 0+99.71 Cv. A
6°15' Cv.
5° Cv L=236'



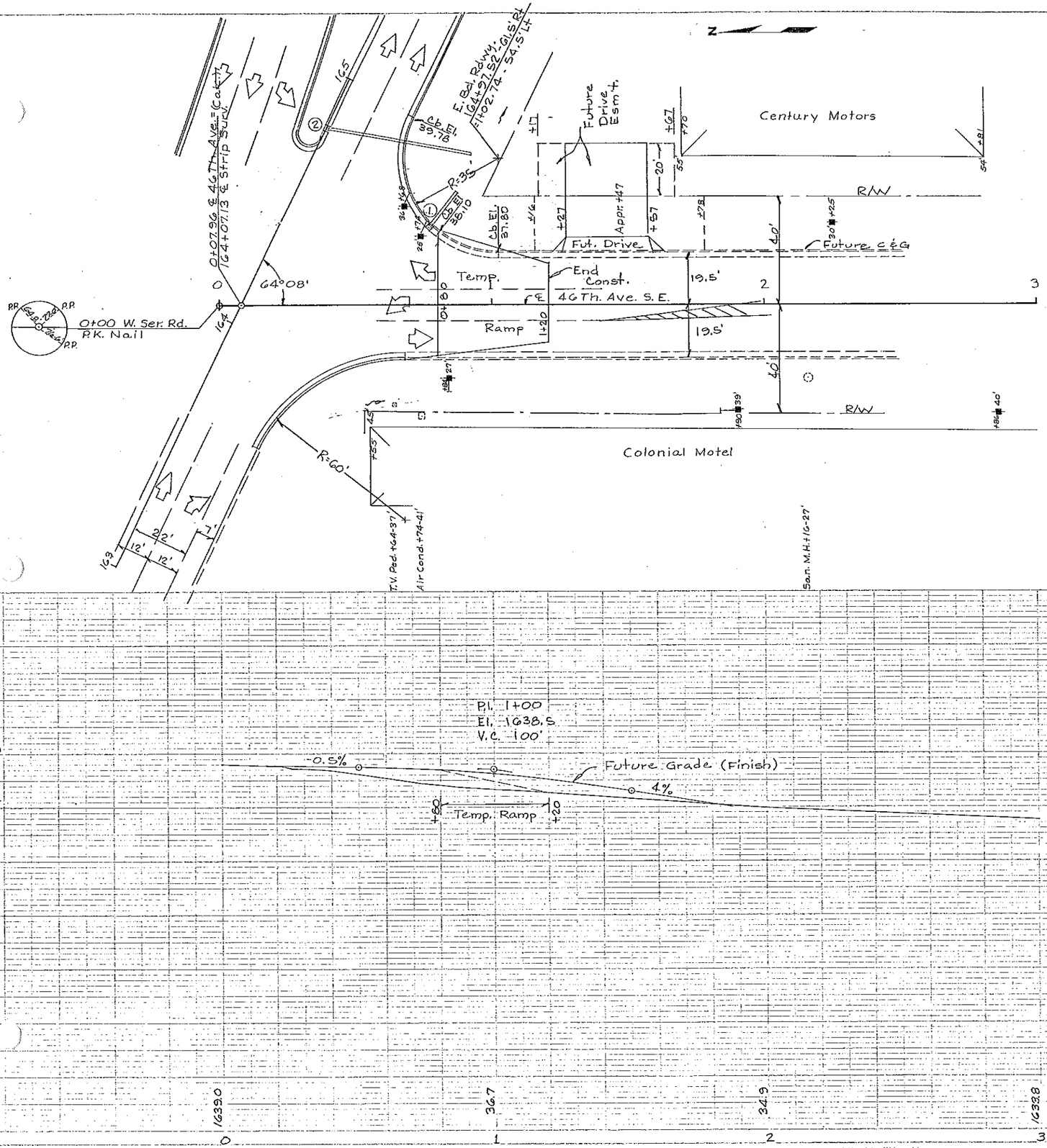
Toe of Slope
3:1 Slope
P.I. 179+90
110' Lt.
Gr. Shldr.
5% Grade Control Ln.
8' Hot Bit.
Gr. Shldr.
10'
180+24
118' Lt
178+27
R=25'
End NER 24+05.51
180+00 - 40' Lt
32.85
32.77
9.5'
Conc.
S. 81.53962536°E
PT N 24979.025
E 26532.834
20:1 Taper
185
184
183
182
181
Section Line
Cv 2
5°30'
12'
N. 81.80946944°E
Cv 14
5°30'
179
179+36.73
W. Bd.
See Detail A
159.80
S 80°18'40.07"E
R=1.15'
178+37
E. Bd.
Begin Br.
179+90.5
32.55
32.4
8' Conc.
Gr. Sh.
5' Widening
for Plaque
28.65
31.87
29.0
30"
29.07
6" PVC
30"
P.I. 182+40.71
Br. Appr.
P.I. 180+89.55
℄ Br. Appr.
Δ= 17.8794°
D= 5°30'
R= 1042.14
T= 163.93
L= 325.08
Sec. Ln.
Existing
Plaque
(Relocate)
P.I. 180+42
97' Rt
180+37
118' Rt
Gr. Shldr.
5% Grade Control Ln.
8' Hot Bit.
10'
Gr. Shldr.
R=100'
4:1 Slope
Toe of
4:1 Slope
S°30' on
Br. Appr.
Cv. Tang.
70.73'
E. Bd. Lane ℄
S. 84.2010445°E
Detail A
Top of Slots
1632.9
Inv. 1630.16
Pump Station
Top of Roof
38.75
INV.
29.87
Top 36.04
30"
Top 35.24
INV 29.23
Hyd
GEOMETRIC CONTROL LAYOUT

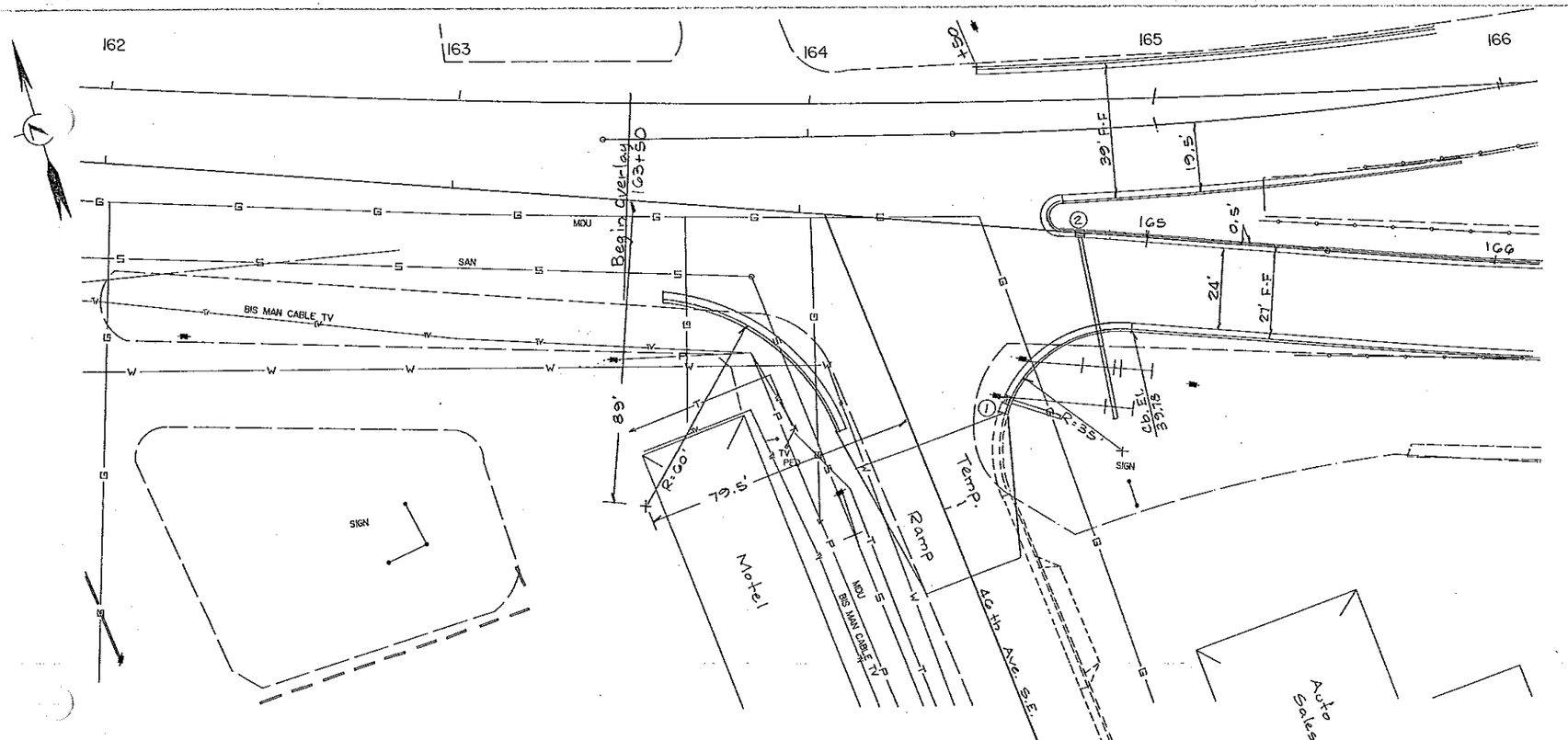
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.		

CURB & GUTTER TYPE I — 67.2 LF
SW RADIUS — 46 LF
SE RADIUS

PIPE CONCRETE REINF. CL. III SEWER
1-1 15"X14" 1 ES

INLETS
1-1 1-TYPE 2 "V" GRATE





CURB & GUTTER TYPE I

164+50 TO 166+00 WBD, LT.	150 LF
164+72 TO 166+00 WBD, RT.	150 LF
NOSE	14.2 LF
164+97.2 TO 166+00 EBD, RT.	102.8 LF
164+76 TO 166+00 EBD, LT.	124 LF

PIPE CONCRETE REINF. CL. III SEWER
1-2 15"X54' 1-15" ES

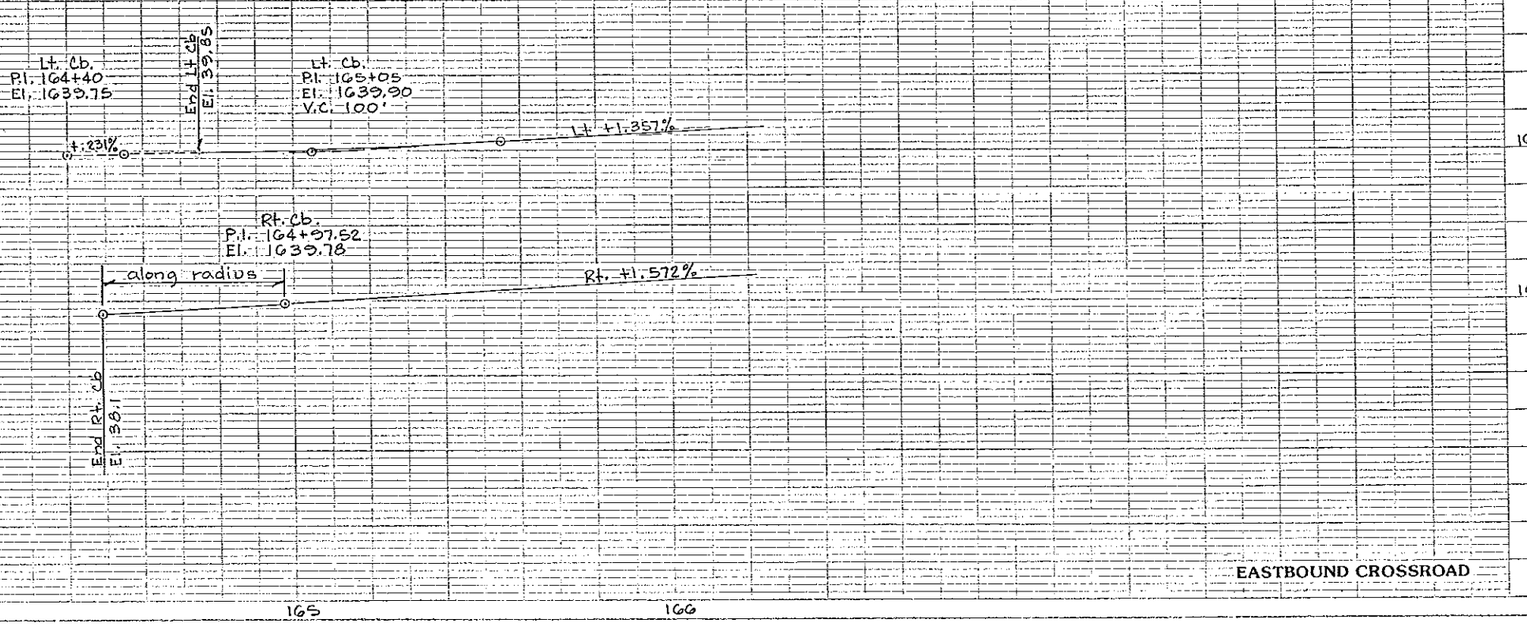
INLETS
1-2 1-TYPE 2 "V" GRATE

INLET NO. 1
STATION 164+63± EASTBOUND 50'± RT.

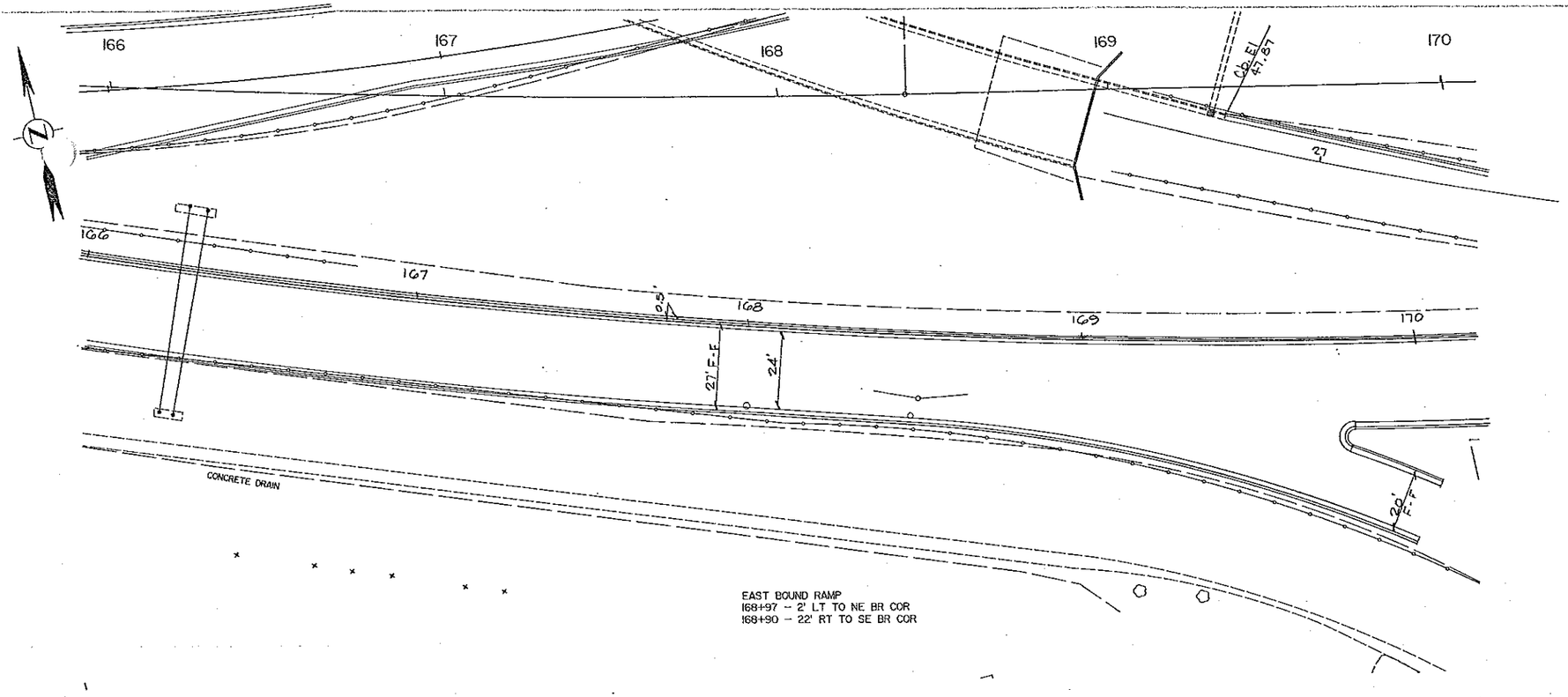
INLET--TYPE 2
GRATE STYLE "V"
GRATE ELEVATION 1637.60
BASE ELEVATION 1633.31
INVERT ELEVATION 1633.5
OUTLET ELEVATION 1633.0
"H" DISTANCE 3.70'

INLET NO. 2
STATION 164+80 EASTBOUND ℄

INLET--TYPE 2
GRATE STYLE "V"
GRATE ELEVATION 1639.20
BASE ELEVATION 1633.51
INVERT ELEVATION 1633.7
OUTLET ELEVATION 1633.0
"H" DISTANCE 5.36'

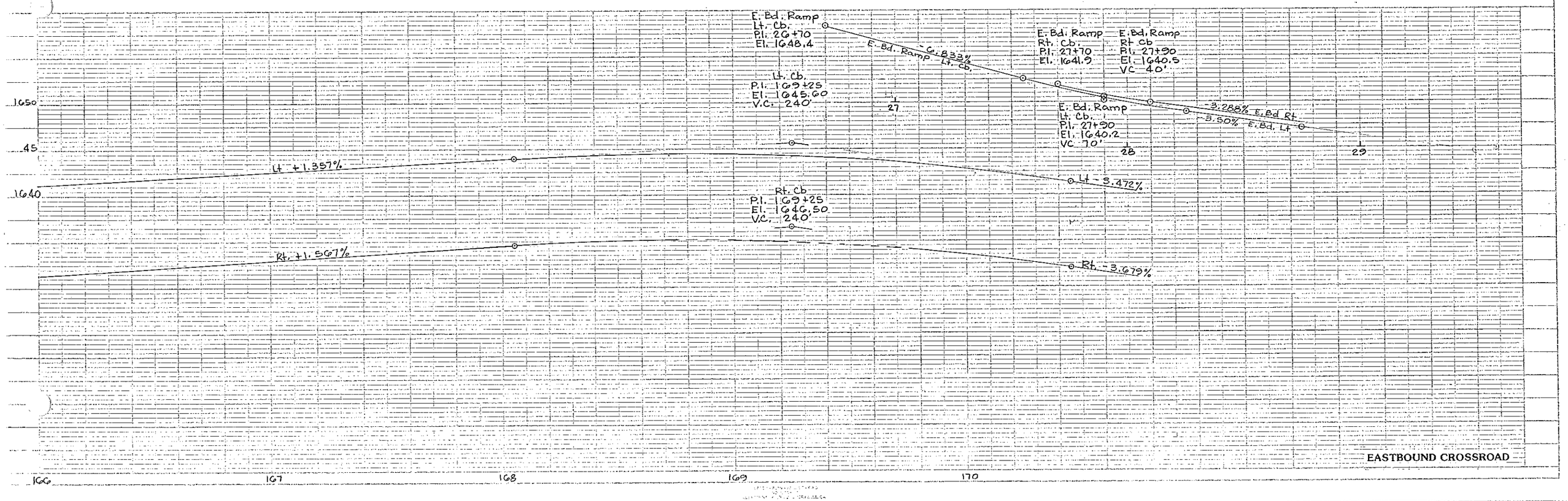


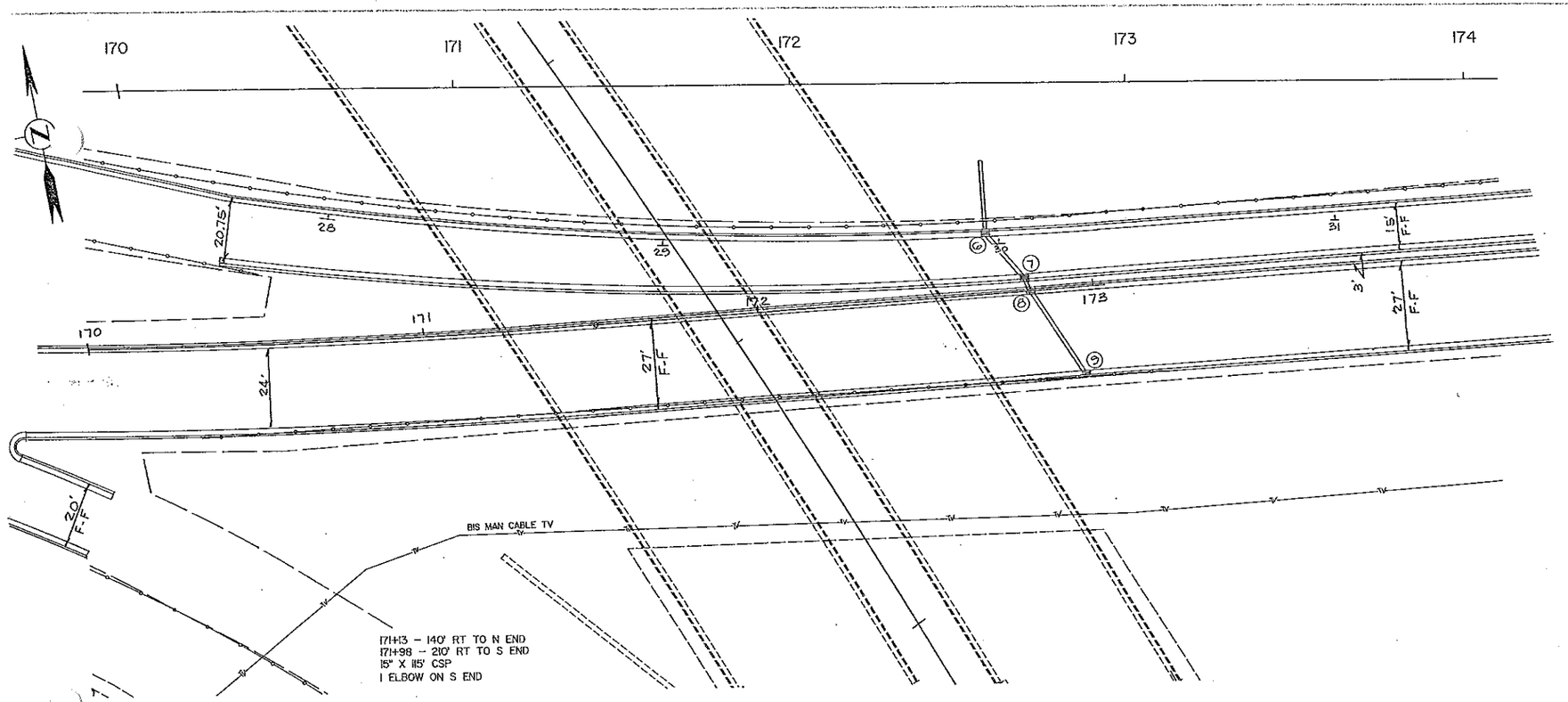
EASTBOUND CROSSROAD



CURB & GUTTER TYPE I

26+70 TO 27+50 EBD. RAMP LT.	80 LF
166+00 TO 170+00 EBD. LT.	400 LF
166+00 TO 2+10 SW RAMP RT.	405 LF
2+10 LT. TO 170+00 EBD. RT.	57 LF





CURB & GUTTER TYPE I

27+50 TO 174+00 EBD. RAMP LT.	377.1 LF
27+50 TO 174+00 EBD. RAMP RT.	357.1 LF
170+00 TO 174+00 EBD. LT. & RT.	800 LF

SIDEWALK CONCRETE

171+00 TO 174+00 MEDIAN	163.5 SY

PIPE CONCRETE REINF. CL. III SEWER

1-6 TO OUTLET 18"X14" 1 ES
1-6 TO 1-7 15"x16'
1-7 TO 1-8 15"x4'
1-8 TO 1-9 15"x28'

INLETS

1-6 1-TYPE 2 DR/DL
1-7 1-TYPE 2 DR/DL
1-8 1-TYPE 2 DR/DL
1-9 1-TYPE 2 DR/DL

INLET NO. 6
STATION 29+96
EASTBOUND RAMP LT.

INLET--TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1634.40
BASE ELEVATION 1631.09
INVERT ELEVATION 1631.30
OUTLET ELEVATION 1631.20
"H" DISTANCE 2.98'

INLET NO. 7
STATION 30+07
EASTBOUND RAMP RT.

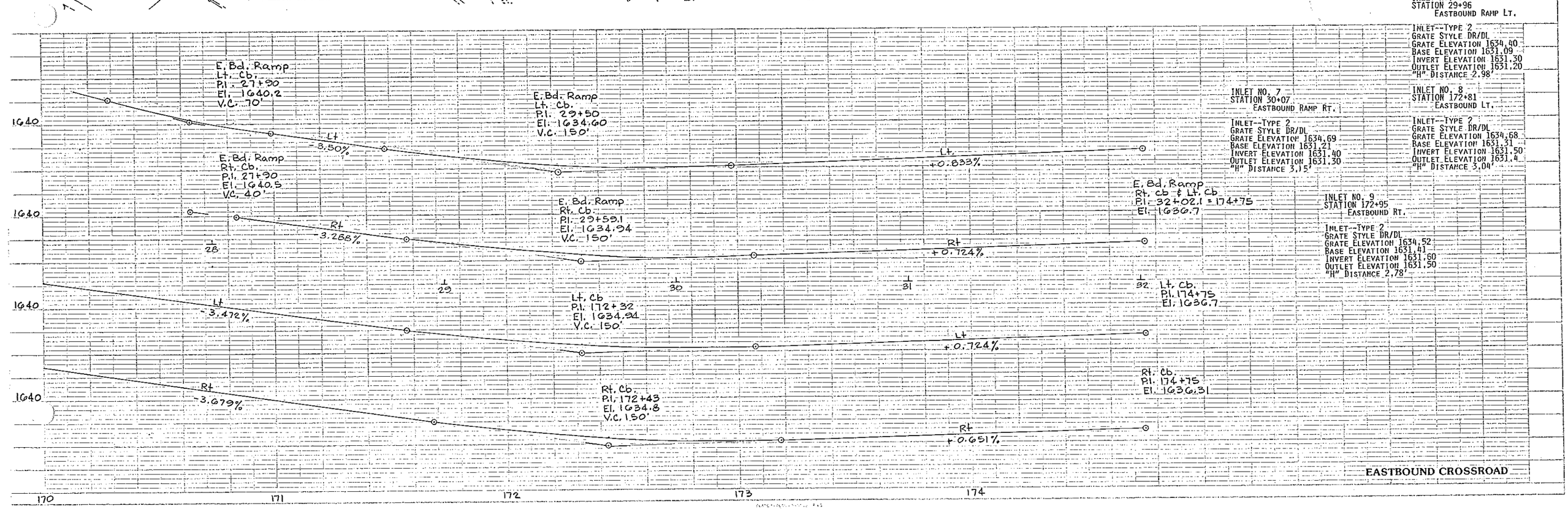
INLET--TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1634.69
BASE ELEVATION 1631.23
INVERT ELEVATION 1631.40
OUTLET ELEVATION 1631.30
"H" DISTANCE 3.15'

INLET NO. 8
STATION 172+81
EASTBOUND LT.

INLET--TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1634.68
BASE ELEVATION 1631.31
INVERT ELEVATION 1631.50
OUTLET ELEVATION 1631.4
"H" DISTANCE 3.04'

INLET NO. 9
STATION 172+95
EASTBOUND RT.

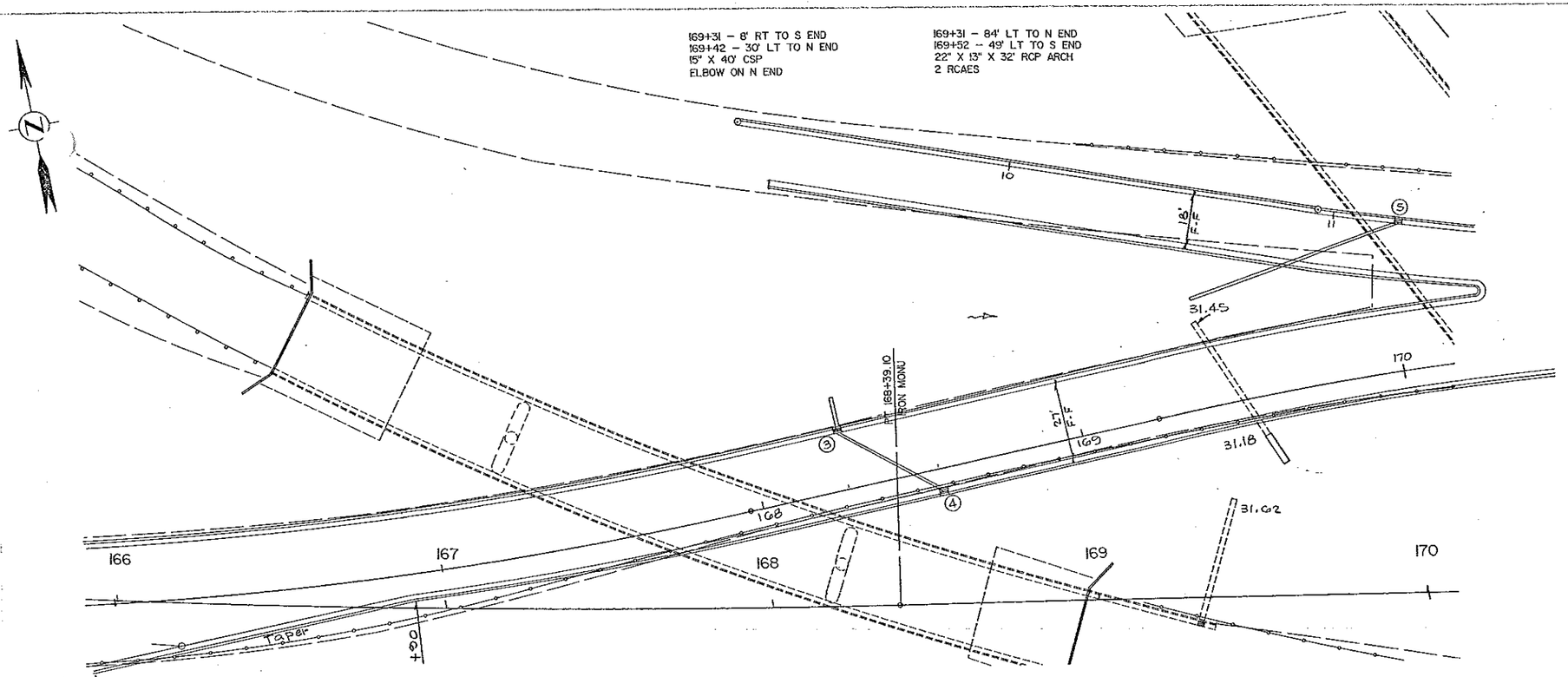
INLET--TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1634.52
BASE ELEVATION 1631.41
INVERT ELEVATION 1631.60
OUTLET ELEVATION 1631.50
"H" DISTANCE 2.78'



EASTBOUND CROSSROAD

169+31 – 8' RT TO S END
169+42 – 30' LT TO N END
15" X 40' CSP
ELBOW ON N END

169+31 – 84' LT TO N END
169+52 – 49' LT TO S END
22" X 13" X 32' RCP ARCH
2 RCAES



CURB & GUTTER TYPE I
9+05 TO 11+40 NW LOOP LT. 235 LF
8+94 TO 11+45 NW LOOP RT. 251 LF
166+00 TO 170+28 WBD. LT. 434.3 LF
166+00 TO 170+00 WBD. RT. 400 LF

PIPE CONCRETE REINF. CL. III SEWER
I-4 TO I-3 15"X36'
I-3 TO OUTLET 15"X4' 1 ES
I-5 TO OUTLET 15"X64' 1 ES

INLETS
I-3 1-SHALLOW TYPE 2 DR/DL
I-4 1-SHALLOW TYPE 2 DR/DL
I-5 1-TYPE 2 DR/DL

CULVERTS
169+55 WBD. RT. 22"x13"x10' RCP-A
CL. III EXTENSION RELAY 1 ES

INLET NO. 3
STATION 168+27
WESTBOUND LT.

INLET--SHALLOW TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1633.49
BASE ELEVATION 1631.61
INVERT ELEVATION 1631.8
OUTLET ELEVATION 1631.7
"H" DISTANCE 1.55'

INLET NO. 4
STATION 168+55
WESTBOUND RT.

INLET--SHALLOW TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1633.70
BASE ELEVATION 1631.71
INVERT ELEVATION 1631.90
OUTLET ELEVATION 1631.80
"H" DISTANCE 1.66'

INLET NO. 5
STATION 11+20
NW LOOP LT.

INLET--TYPE 2
GRATE STYLE DR/DL
GRATE ELEVATION 1635.44
BASE ELEVATION 1631.81
INVERT ELEVATION 1632.00
OUTLET ELEVATION 1631.6
"H" DISTANCE 3.30'

N.W.L.-Lt. Cb
P.I. 9+05
El. 1641.2

N.W.L.-Lt. Cb.
P.I. 9+45
El. 1640.65
VC 80'

N.W. Loop
Lt. Cb.
P.I. 10+85
El. 1635.7
VC 120'

N.W. Loop
Lt Cb
P.I. 11+45
El. 1636.25
V.C. None

N.W.L.-Rt.Cb.
P.I. 8+94
El. 1642.25

N.W.L.-Rt.Cb.
P.I. 9+24
El. 1641.70
VC 60'

N.W. Loop
Rt. Cb.
P.I. 10+85
El. 1636.0
V.C. 120'

N.W. Loop
Rt. Cb.
P.I. 11+45
El. 1636.47

Lt. Cb.
P.I. 166+08
El. 1639.15
V.C. 120'

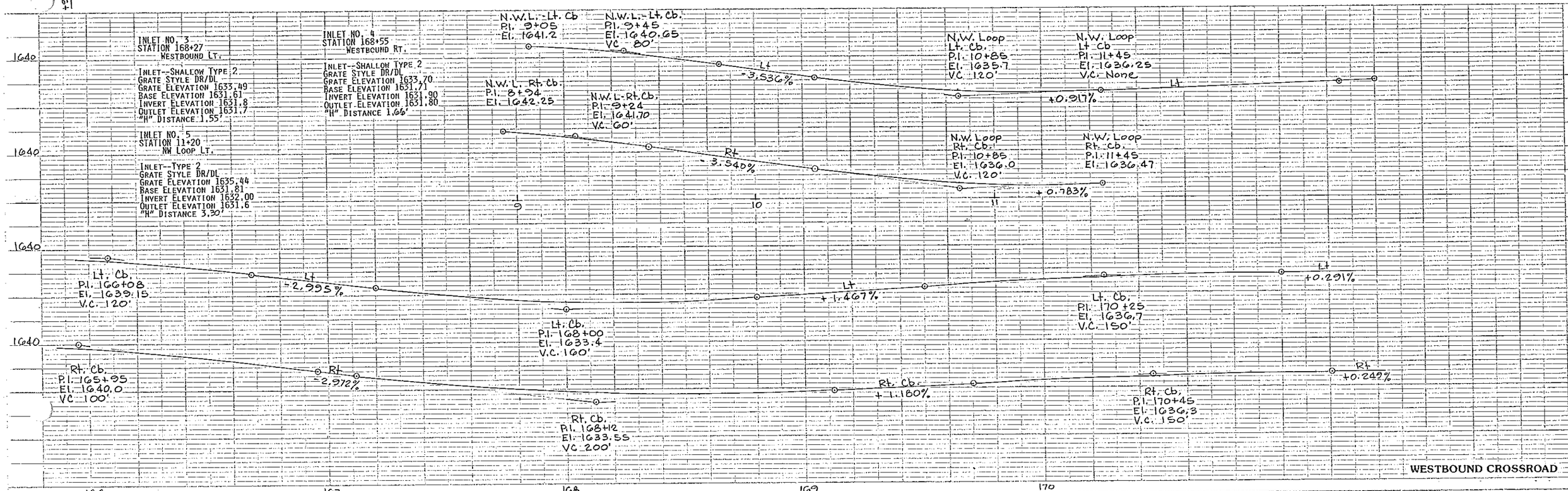
Lt. Cb.
P.I. 168+00
El. 1633.4
V.C. 160'

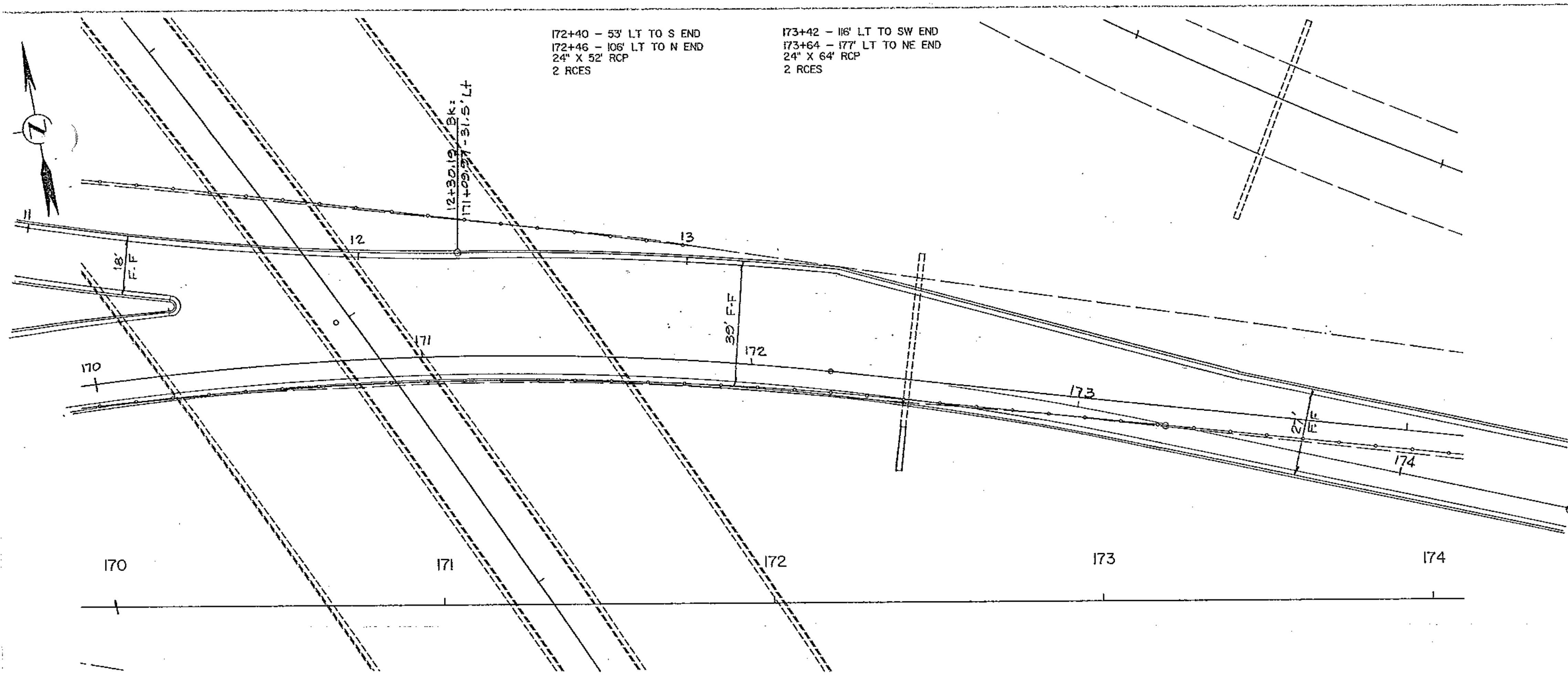
Lt. Cb.
P.I. 170+25
El. 1636.7
V.C. 150'

Rt. Cb.
P.I. 165+95
El. 1640.0
VC 100'

Rt. Cb.
P.I. 168+12
El. 1633.55
VC 200'

Rt. Cb.
P.I. 170+45
El. 1636.3
V.C. 150'



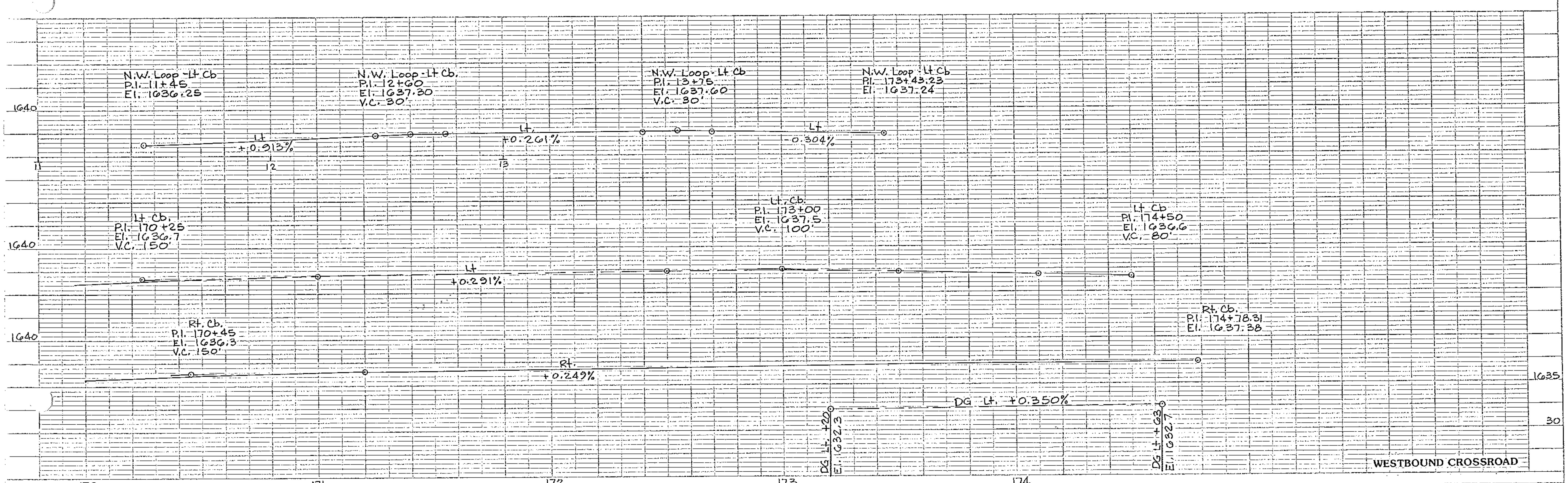


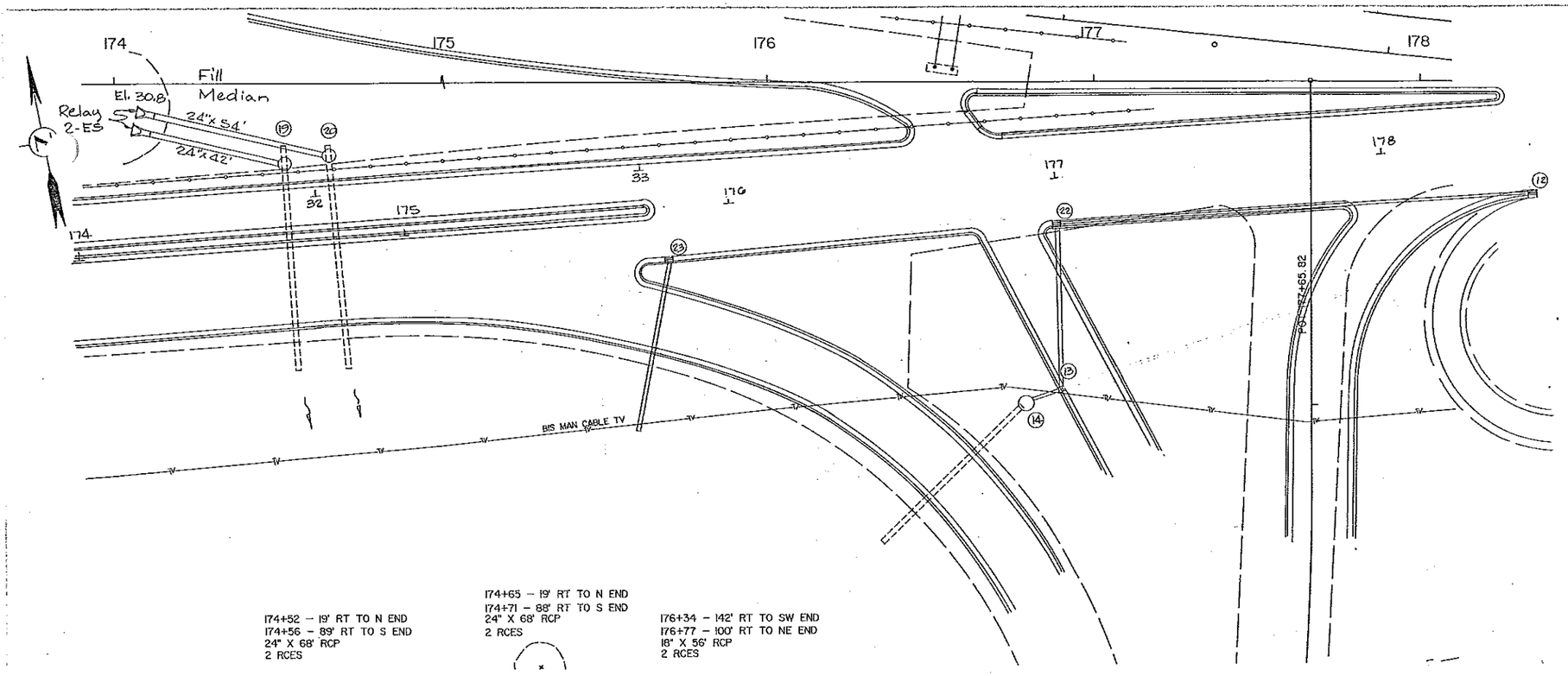
CURB & GUTTER TYPE I

11+40 NW Loop to 174+00 Wbd. Lt.	384 LF
170+00 to 174+00 Wbd. Rt.	400 LF

CULVERTS

172+47 Wbd. Rt. 24"x14' RCP Cl. III Relay ES


N.W. Loop - Lt Cb
P.I. 11+45
El. 1636.25
N.W. Loop - Lt Cb.
P.I. 12+60
El. 1637.30
V.C. 30'
N.W. Loop - Lt Cb
P.I. 13+75
El. 1637.60
V.C. 30'
N.W. Loop - Lt Cb
P.I. 173+43.23
El. 1637.24
Lt +0.913%
Lt +0.261%
Lt -0.304%
Lt Cb.
P.I. 170+25
El. 1636.7
V.C. 150'
Lt Cb.
P.I. 173+00
El. 1637.5
V.C. 100'
Lt Cb
P.I. 174+50
El. 1636.6
V.C. 80'
Lt +0.291%
Rt. Cb.
P.I. 170+45
El. 1636.3
V.C. 150'
Rt. Cb.
P.I. 174+78.31
El. 1637.38
Rt. +0.249%
DG Lt. +0.350%
DG Lt. +20
El. 1632.3
DG Lt. +63
El. 1632.7
1640
1635
30
170
171
172
173
174
WESTBOUND CROSSROAD



CURB & GUTTER TYPE I

174+00 TO 176+57 EBD. RAMP LT.	261 LF
174+00 TO 175+72.9 MEDIAN	350.5 LF
174+00 RT. TO 176+00 SE LOOP RT.	200 LF
176+75 TO 178+38 ISLAND	338 LF
176+00 TO 177+92 EBD. RT.	241 LF

SIDEWALK CONCRETE

174+00 TO 175+73.9 MEDIAN	38.6 SY
176+72 TO 178+38 MEDIAN	115.6 SY

CULVERTS

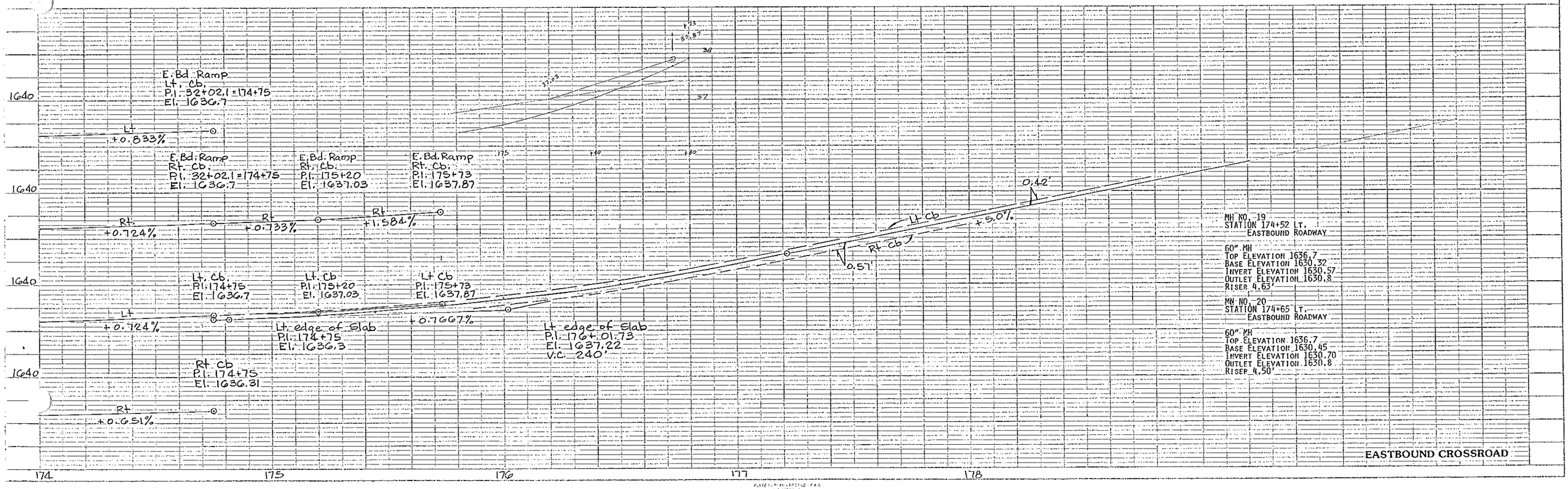
174+52 LT. & BK. 24"x42' CL. III RELAY ES
174+65 LT. & BK. 24"x54' CL. III RELAY ES

MANHOLE

M-19 60"
M-20 60"

MANHOLE RISER

M-19 60"x4.63'
M-20 60"x4.50'



MH NO. 19
STATION 174+52 LT.
EASTBOUND ROADWAY

60" MH
TOP ELEVATION 1636.7
BASE ELEVATION 1630.32
INVERT ELEVATION 1630.57
OUTLET ELEVATION 1630.8
RISER 4.63'

MN NO. 20
STATION 174+65 LT.
EASTBOUND ROADWAY

60" MH
TOP ELEVATION 1636.7
BASE ELEVATION 1630.45
INVERT ELEVATION 1630.70
OUTLET ELEVATION 1630.8
RISER 4.50'

EASTBOUND CROSSROAD

Southeast Ramp
East Bound Lane
Δ= 13°00'13.59"
D= 6°
R= 955.37'
T= 108.88'
L= 216.73'

P.C. 1+09.73

P.I. 2+18.61

P.T. 3+26.46
(Old P.T. 3+13.81)

P.C. 5+47.14
(Old P.C. 5+34.4)

P.I. 2+04.88
Cv. A

P.T. 3+00.35
Cv. A

P.C. 0+99.71
Cv. A

Cv. A
Δ= 40.12790600°
D= 20°
R= 287.94'
T= 105.17'
L= 200.64'

0+00 S.E. Ramp
177+65.82

176+93.0
0+00

S.C. 176+35.6

T.S. 174+35.6

12' S.E. Ramp Eastbound Lane

8' S.E. Ramp Westbound Lane

S.E. Loop

S.E. Ramp

6° Cv.

20° Cv.

12'

3.85'

15.5'

8'

20'

18"RCP

Extend 8'
Relay 1-ES

U.S. West
2-300 PR

CURB & GUTTER TYPE I

SE Ramp Lt.	487 LF
SE Ramp Rt.	177 LF
SE Ramp-Westbound Lane Lt.	182 LF
SE Ramp-Westbound Lane Rt.	284 LF
176+00 to 178+44 SE Loop Lt. & Rt.	488 LF

PIPE CONCRETE REINF, CL. III SEWER

I-23 to I-13 15"x48'
I-13 to M-14 15"x12'
I-15 to I-16 15"x18'
I-16 to Outlet 15"x26' 1 ES
I-12 to I-22 15"x144'
I-23 to Outlet 15"x52' 1 ES

MANHOLES
M-14 48"

MANHOLE RISER
M-14 48"x7.50'

INLETS
I-12 I-Type 2 "V" Grate
I-13 I-Type 2 DR/DL
I-15 I-Type 1 DR/DL
I-16 I-Type 1 DR/DL
I-22 I-Type 1 "V" Grate
I-23 I-Type 1 "V" Grate

INLET NO. 13
STATION 0+71
SE Ramp Westbound Lane Rt.

Inlet--Type 2
Grate Style DR/DL
Grate Elevation 1640.34
Base Elevation 1636.01
Invert Elevation 1636.20
Outlet Elevation 1635.80
"H" Distance 4.00'

INLET NO. 15
STATION 1+74
SE Ramp Rt.

Inlet--Type 1
Grate Style DR/DL
Grate Elevation 1642.93
Base Elevation 1638.49
Invert Elevation 1638.68
Outlet Elevation 1638.34
"H" Distance 3.85'

INLET NO	12
TYPE	DR/DL
GRATE STYLE	V
STA.	178+46 - E.Bd. RT
GRATE ELEV.	1649.44
BASE ELEV	1645.11
INVERT ELEV	1645.30
OUTLET ELEV.	1638.03
"H" DIST.	4.00 FT

MH. NO. M-14
STATION 0+70
SE Ramp Westbound Lane Rt.

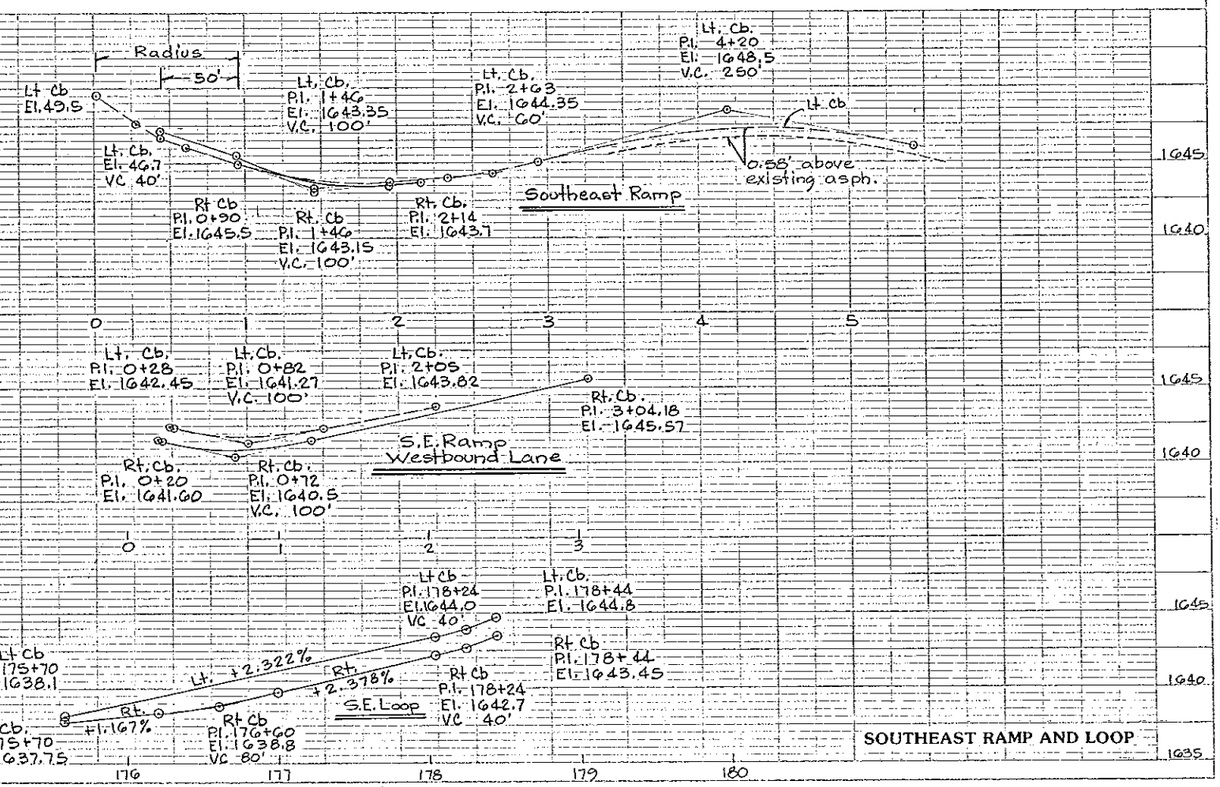
48" Manhole
Top Elevation 1640.80
Base Elevation 1631.72
Invert Elevation 1631.93
Riser 7.50'

INLET NO. 16
STATION 1+75
SE Ramp Lt.

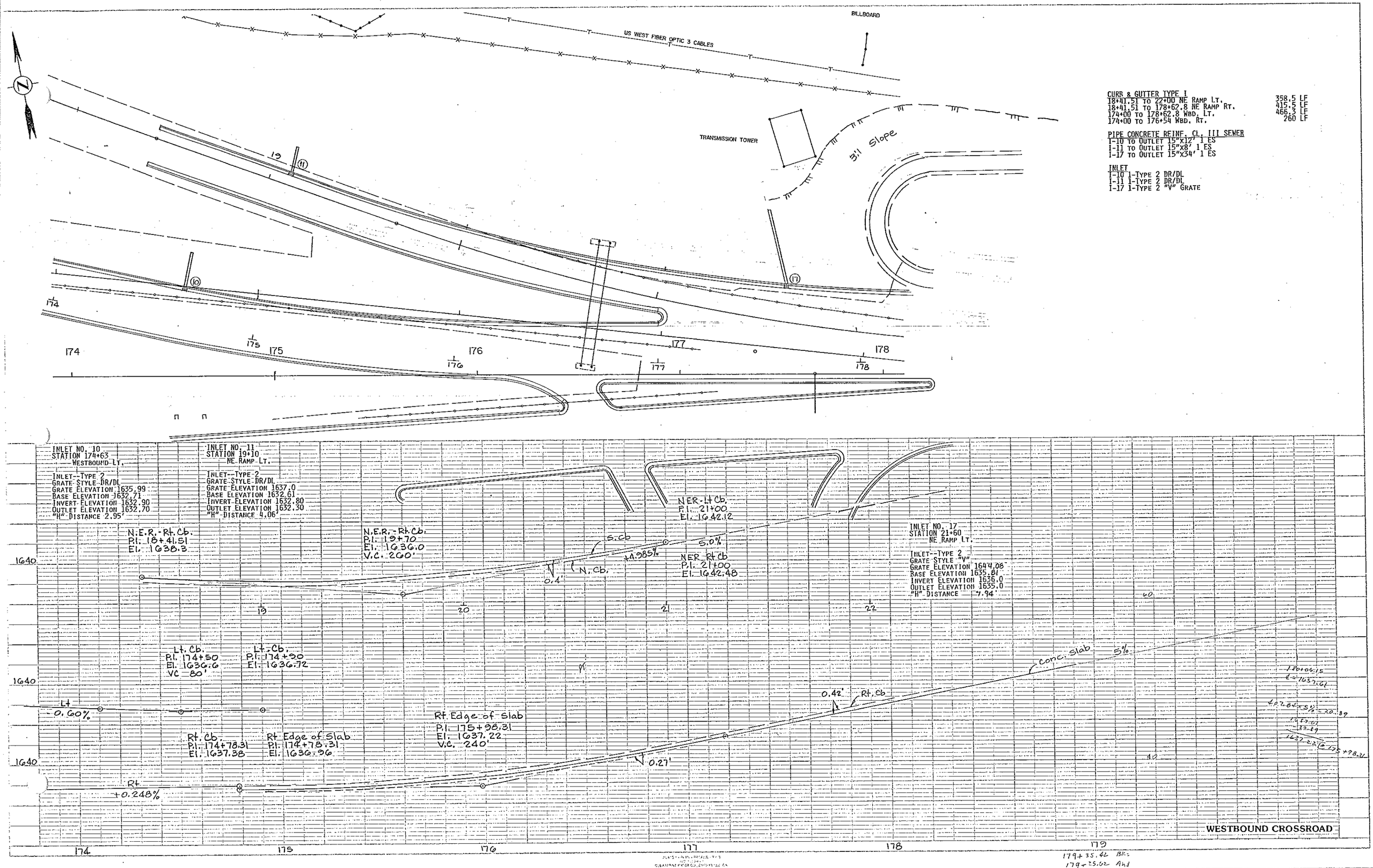
Inlet--Type 1
Grate Style DR/DL
Grate Elevation 1643.01
Base Elevation 1638.15
Invert Elevation 1638.34
Outlet Elevation 1636.0
"H" Distance 4.53

INLET NO	22
TYPE	Inlet - Type 1
GRATE STYLE	V
STA.	177+00 - E.Bd. RT
GRATE ELEV.	1642.17
BASE ELEV	1637.84
INVERT ELEV	1636.03
OUTLET ELEV.	1636.20
"H" DIST.	3.74 FT

INLET NO	23
TYPE	Inlet - Type 1
GRATE STYLE	V
STA.	175+80 - E.Bd. RT
GRATE ELEV.	1638.11
BASE ELEV	1632.52
INVERT ELEV	1632.71
OUTLET ELEV.	1630.80
"H" DIST.	5.00 FT



SOUTHEAST RAMP AND LOOP



CURB & GUTTER TYPE I

18+41.51 TO 22+00 NE RAMP LT.	358.5 LF
18+41.51 TO 178+62.8 NE RAMP RT.	415.5 LF
174+00 TO 178+62.8 WBD. LT.	466.3 LF
174+00 TO 176+54 WBD. RT.	260 LF

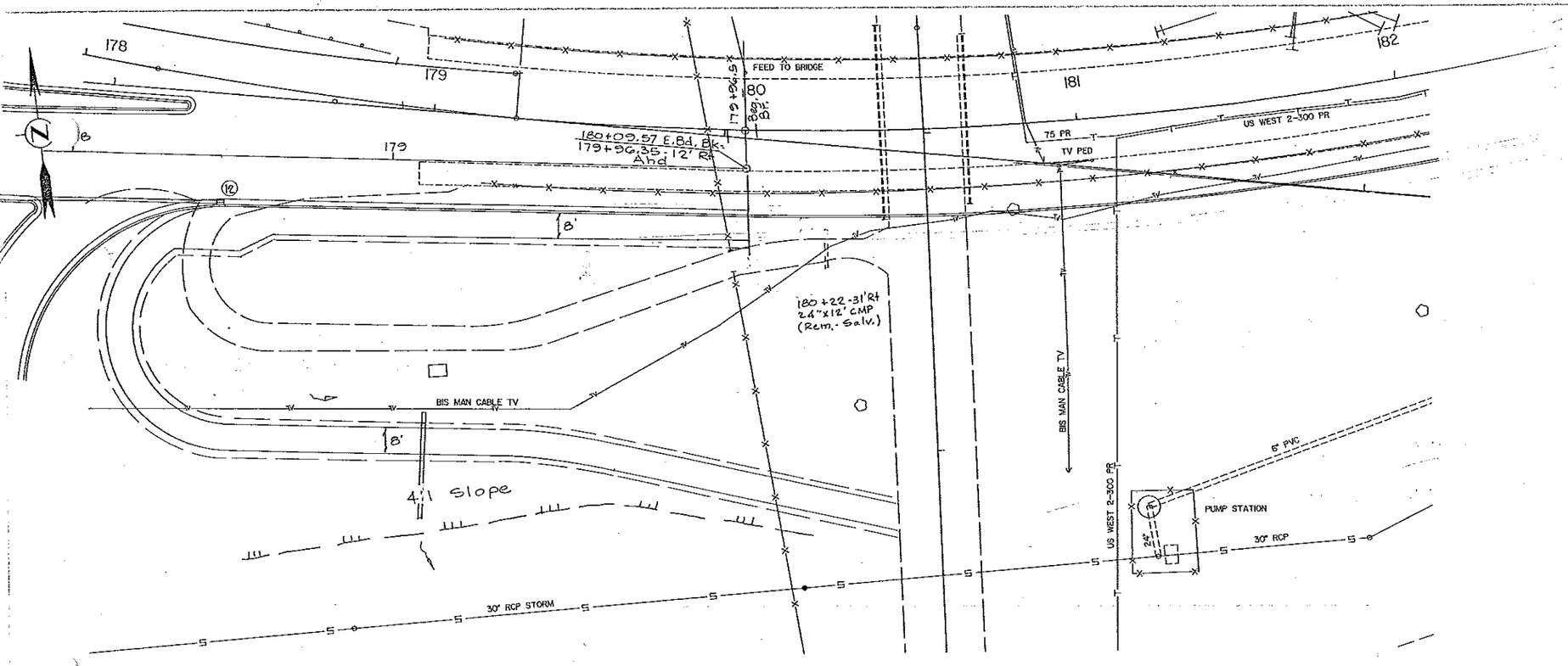
PIPE CONCRETE REINF. CL. III SEWER

I-10 TO OUTLET 15"x12'	1 ES
I-11 TO OUTLET 15"x8'	1 ES
I-17 TO OUTLET 15"x34'	1 ES

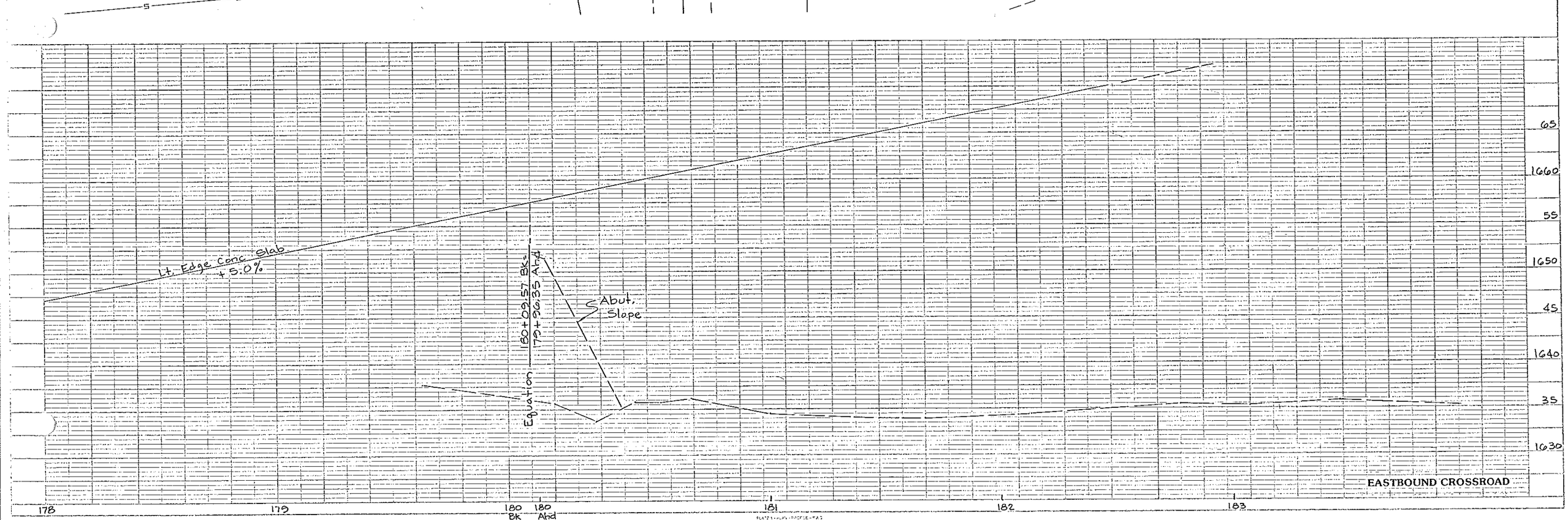
INLET

I-10	1-TYPE 2 DR/DL
I-11	1-TYPE 2 DR/DL
I-17	1-TYPE 2 "V" GRATE

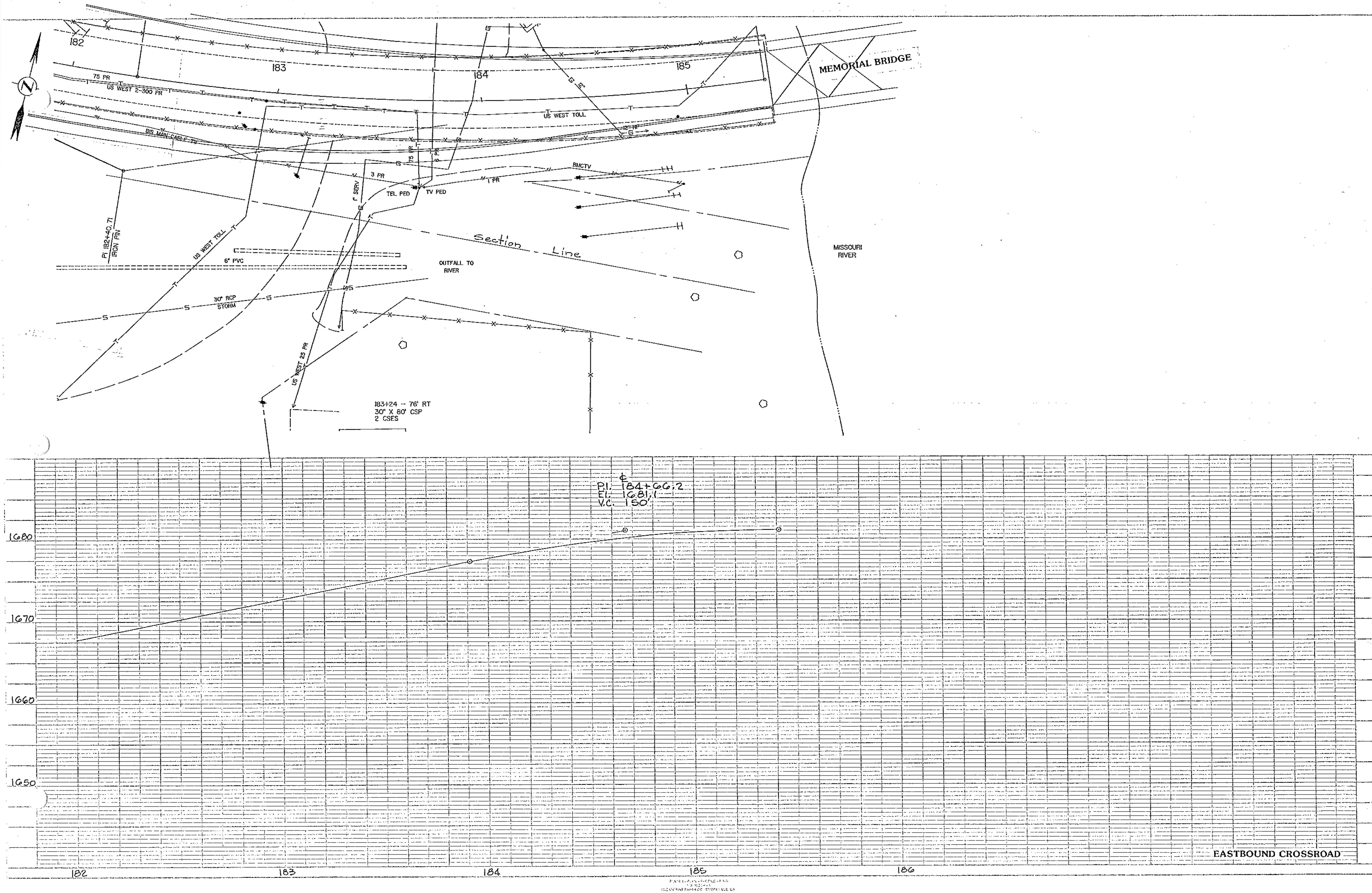
179+35.62 Abs
179+25.62 Ahd



CURB & GUTTER TYPE I 178+00 to 180+00 EBD. Rt.	200.0 LF
SIDEWALK CONCRETE 178+27 to 180+00 Rt.	164.8 SY
RESET MONUMENT FROM 179+12-65' Rt. to 178+48-28' Rt.	1 EA
CULVERT 179+00 Rt. 18"x30' CMP - 2 ES	



CHORD DEFINITION
Δ = 33° 38' 40" LT
D = 5° 30'
R = 1042.14'
T = 315.08'
L = 611.72'
US WEST FIBER OPTIC 3 CABLES
3:1 Slope
3:1 Slope
R/W
out 34.5
BIG MAN CABLE TV
US WEST 75 PR
180+26-41'Lt.
24"x12' C.M.P.
(Rem.-Salv.)
P.T. 23+37.63 Sur. N.ER.
PC 179+25.62 ℄ Ahd
PK NAIL
179+35.62 W. Bd. Sur. Bk
Beg. Br.
FEED TO BRIDGE
178
179
180
181
182
22
23
24
179+36.73 W.Bd.
Off. Loc. =
179+25.62 - 6' Lt
P.T. 179+34.71
W. Bd. Sur.
5°30' Cv
Cv 2
US WEST 2-300 PR
75 PR
CURB & GUTTER TYPE I
22+00 TO 24+02. NE RAMP LT. 202.0 LF
SIDEWALK CONCRETE
22+08 TO 24+02. LT. 201.5 SY
INLETS
I-18 1-TYPE 2 "V" GRATE
I-21 1-CATCH BASIN - 6" BEEHIVE
PIPE CONCRETE REINFORCED CL. III SEWER
I-18 TO I-21 15"X58'
I-21 TO OUTLET 15"X50' 1 ES
INLET NO. 18
STATION 23+60
NE RAMP LT.
INLET--TYPE 2
GRATE STYLE "V"
GRATE ELEVATION 1654.75
BASE ELEVATION 1650.42
INVERT ELEVATION 1650.61
OUTLET ELEVATION 1634.30
"H" DISTANCE 4.0'
Inlet No. 21
Station 179+50-100'Lt.
Inlet-Type Shallow
Grate Style 6" Beehive
Grate Elevation 1637.50
Base Elevation 1634.30
Invert Elevation 1634.49
Outlet Elevation 1634>20
"H" Distance 1.93'
NER. Lt.Cb.
P.I. 24+05.51
El. 1657.40
Rt. Edge Conc. Slab
+5.0%
Lt. Cb. NER
Abut. Slope
Equation 179+35.62 Bk. 179+25.62 Ahd
1670
60
1660
50
1650
40
1640
1630
WESTBOUND CROSSROAD
178
179
180
181
182
183



MEMORIAL BRIDGE
182
183
184
185
75 PR
US WEST 2-300 PR
US WEST TOLL
BIS MAN CABLE TV
BMCTV
1 PR
3 PR
TEL PED
TV PED
PI 182+40.71
IRON PIN
US WEST TOLL
6" PVC
30" RCP
STORM
Section Line
OUTFALL TO
RIVER
MISSOURI
RIVER
US WEST 25 PR
183+24 - 76' RT
30" X 80' CSP
2 CSES
P.I. 184+66.2
El. 1681.1
V.C. 150'
1680
1670
1660
1650
EASTBOUND CROSSROAD
186

TEL. PED

MISSOURI RIVER

12" WP

8" SERVICE

US WEST 6 PR

22.8

PIER TIES

19.9

21.0

POC 182+31.48
REBAR

DOG KENNEL

PT 185+37.34

182

183

184

185

MEMORIAL BRIDGE

75 PR

US WEST 2-300 PR

12"

℄
P.I. 184+66.2
El. 1681.1
V.C. 150'

-5.0%

1680

1670

1660

1650

182

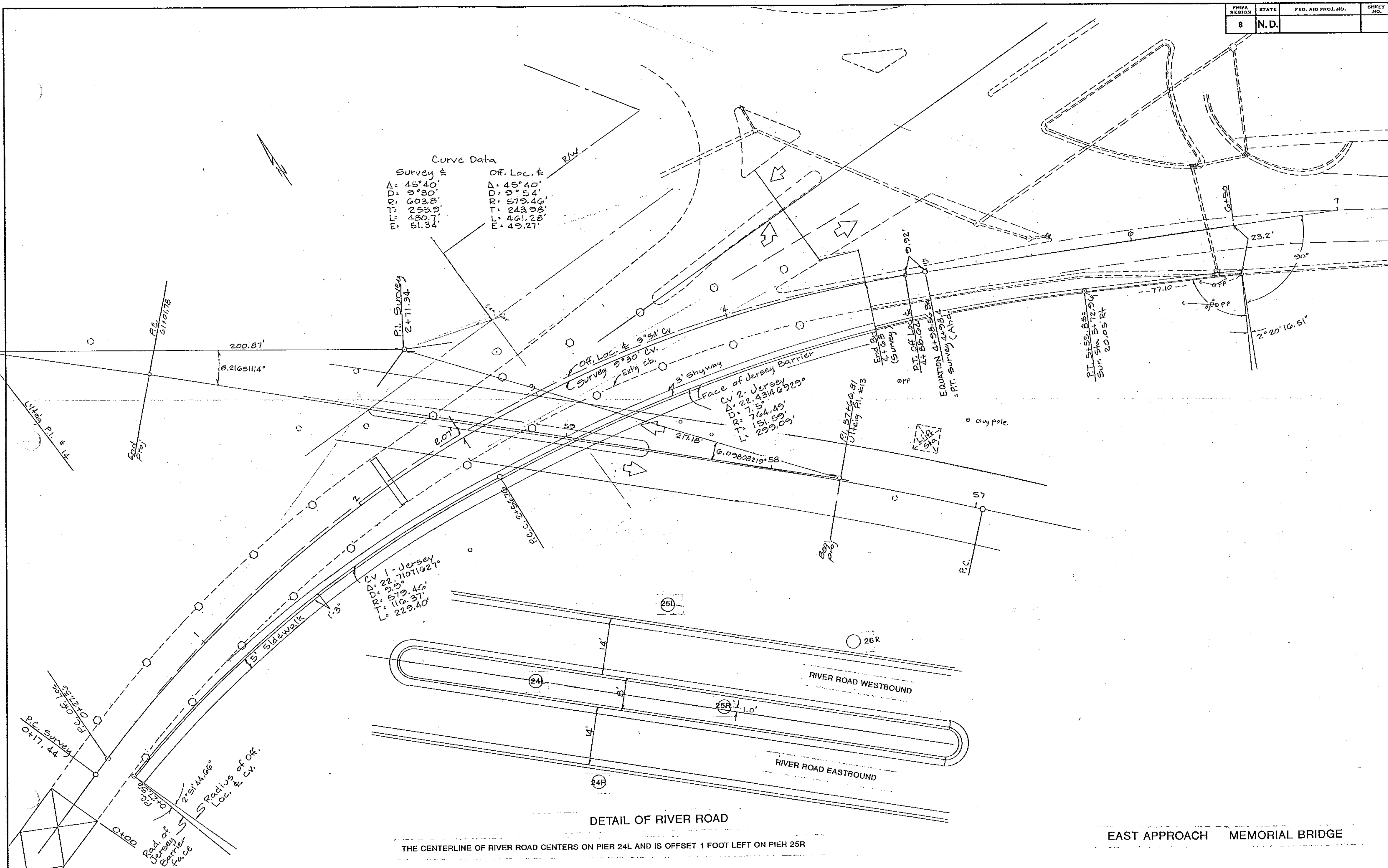
183

184

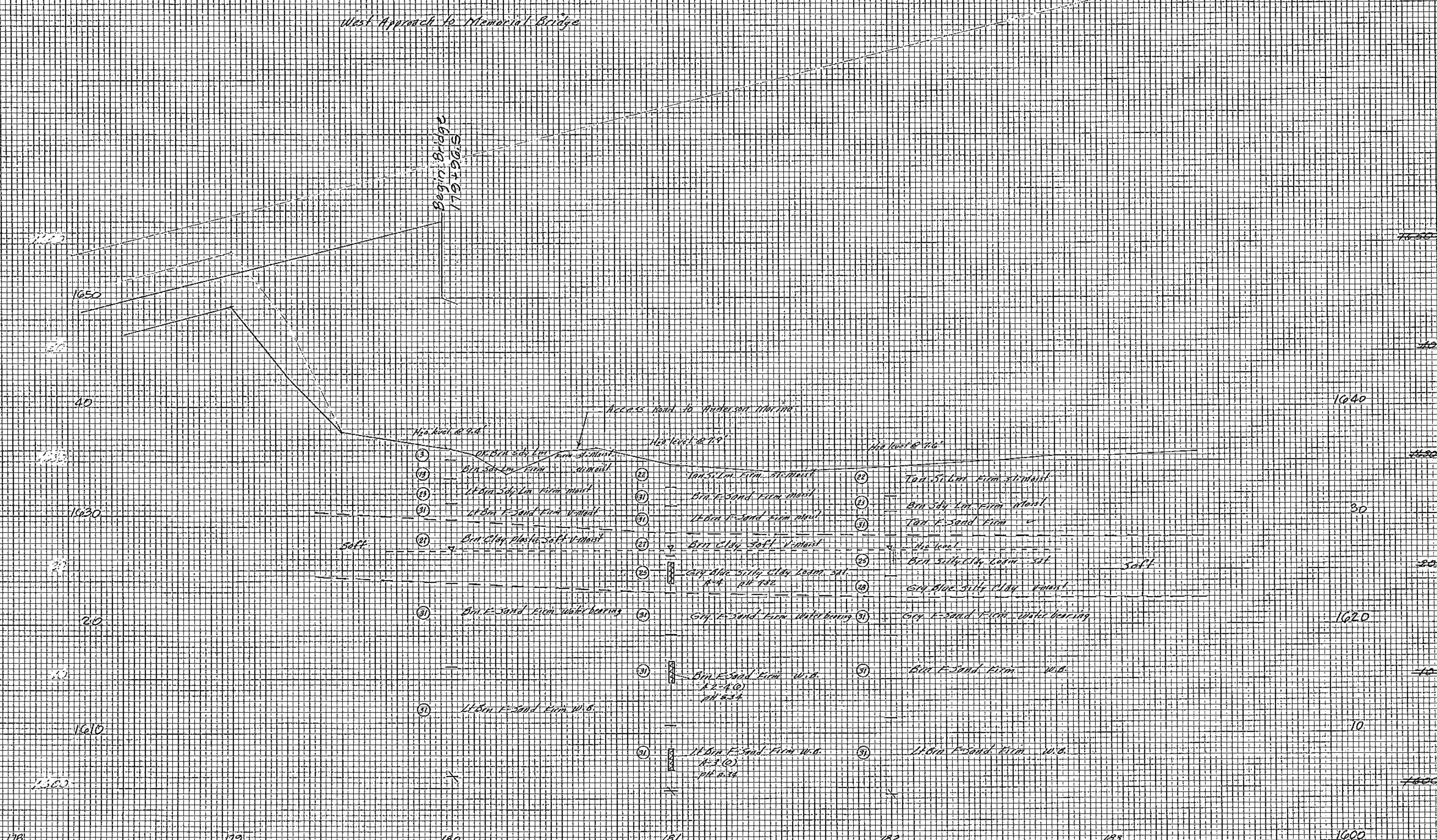
185

186

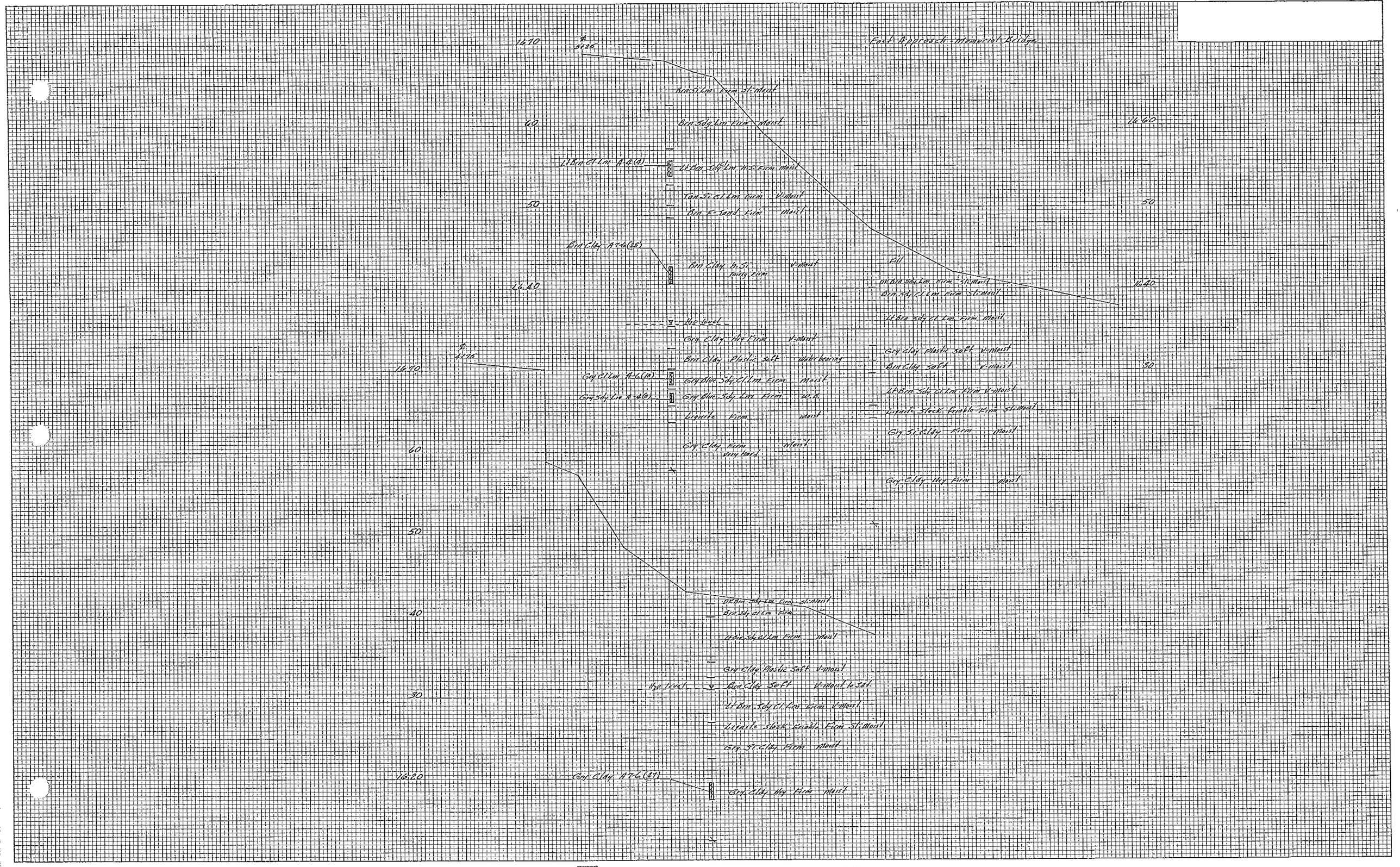
WESTBOUND CROSSROAD



FHWA REGION
STATE
FED. AID PROJ. NO.
SHEET NO.
8
N.D.
Curve Data
Survey ℄
Δ: 45°40'
D: 9°30'
R: 603.8'
T: 253.9'
L: 480.7'
E: 51.34'
Off. Loc. ℄
Δ: 45°40'
D: 9°54'
R: 579.46'
T: 243.98'
L: 461.28'
E: 49.27'
R/W
P.I. Survey 2+71.34
P.C. 6+01.78
200.87'
8.21651114°
Ult'e's P.I. # 14
End Proj.
Off. Loc. ℄ 9°54' Cv.
Survey 9°30' Cv.
Ext'g cb.
3' Shyway
Face of Jersey Barrier
Cv 2- Jersey
Δ: 22.431469259°
D: 7.5°
R: 764.49'
T: 151.59'
L: 299.09'
217.18'
6.09808219°
P.I. 57+60.81 Ult'e's P.I. #13
Beg. Proj.
P.C.
End Bt. 4+68 (Survey)
P.T. Off. Loc. ℄ 4+80.64
EQUATION 4+98.56 Bk = P.T. Survey 4+98.4 (Ahd)
P.T. 5+55.85 = Sur. Sta. 5+72.90, 20.05' Rt
Guy pole
Lift Sta.
23.2'
90°
77.10
2°20'16.51"
6+50
2.07'
P.R.C. 2+56.76
Cv 1- Jersey
Δ: 22.71071627°
D: 9.9°
R: 579.46'
T: 116.37'
L: 229.40'
1'-3"
5' Sidewalk
P.C. Survey 0+17.44
P.C. Off. Loc. 0+21.36
0+00
2°51'44.66"
5 Radius of Off. Loc. ℄ Cv.
Rad. of Jersey Barrier Face 5
25L
26R
24L
25R
24R
14'
8'
1.0'
RIVER ROAD WESTBOUND
RIVER ROAD EASTBOUND
DETAIL OF RIVER ROAD
THE CENTERLINE OF RIVER ROAD CENTERS ON PIER 24L AND IS OFFSET 1 FOOT LEFT ON PIER 25R
EAST APPROACH MEMORIAL BRIDGE


West Approach to Memorial Bridge
Begin Bridge
Sta 179+64
1650
40
1630
20
1610
1640
30
1620
10
1600
Access Road to Anderson Marina
H2O level @ 9.4'
H2O level @ 7.9'
H2O level @ 7.6'
DK Brn Sdy Lm Firm sl-Moist
Brn Sdy Lm Firm sl-Moist
Lt Brn Sdy Lm Firm Moist
Lt Brn F-Sand Firm V-Moist
Brn Clay Plastic Soft V-Moist
Soft
Brn F-Sand Firm Water bearing
Lt Brn F-Sand Firm W.B.
Tan Si Lm Firm sl-Moist
Brn F-Sand Firm Moist
Lt Brn F-Sand Firm Moist
Brn Clay Soft V-Moist
Gry Blue Silty Clay Loam Sat.
A-4 pH 7.82
Gry F-Sand Firm Water bearing
Brn F-Sand Firm W.B.
A-2-4(0)
pH 6.34
Lt Brn F-Sand Firm W.B.
A-3(0)
pH 8.34
Tan Si Lm Firm sl-Moist
Brn Sdy Lm Firm Moist
Tan F-Sand Firm
H2O level
Brn Silty Clay Loam Sat
Gry Blue Silty Clay V-Moist
Gry F-Sand Firm Water bearing
Brn F-Sand Firm W.B.
Lt Brn F-Sand Firm W.B.
178
179
180
181
182
183

F-1-096 (007) 920



FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

Areas Volume

2+00.00
Cut
Fill .840

S.E. Loop
Cut
Fill .218

Cut
Fill .613

1+50.00
S.E. Ramp E. Bd
SER W Bd
S.E. Ramp W. Bd Lane
Cut
Fill .334

Cut
Fill .1024

1+00.00
S.W.
4:1
4:1
S.E. Ramp E. Bd Lane
S.E. Ramp W. Bd Lane
Cut
Fill .588

0+50.00
S.W.
4:1 Skewed
S.E. Ramp E. Bd Lane
Cut
Fill .1311

Cut
Fill .592

0+00.00 SE Ramp

STA 0+00.00 TO 2+00.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

Areas Volume

4+50.00

4+00.00

3+50.00

Cut
Fill .489

3+00.00

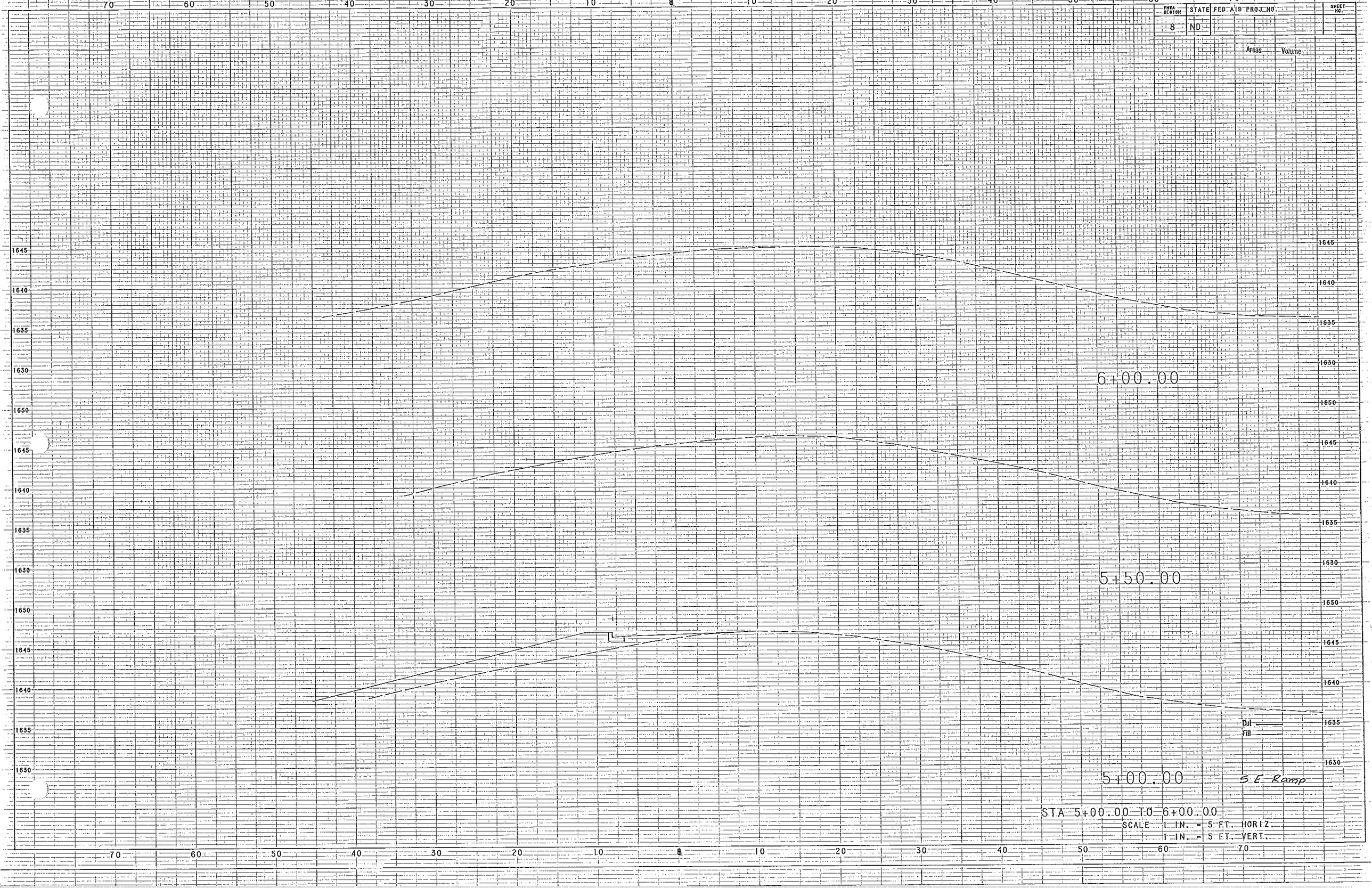
S.E. Ramp

2+50.00

STA 2+50.00 TO 4+50.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

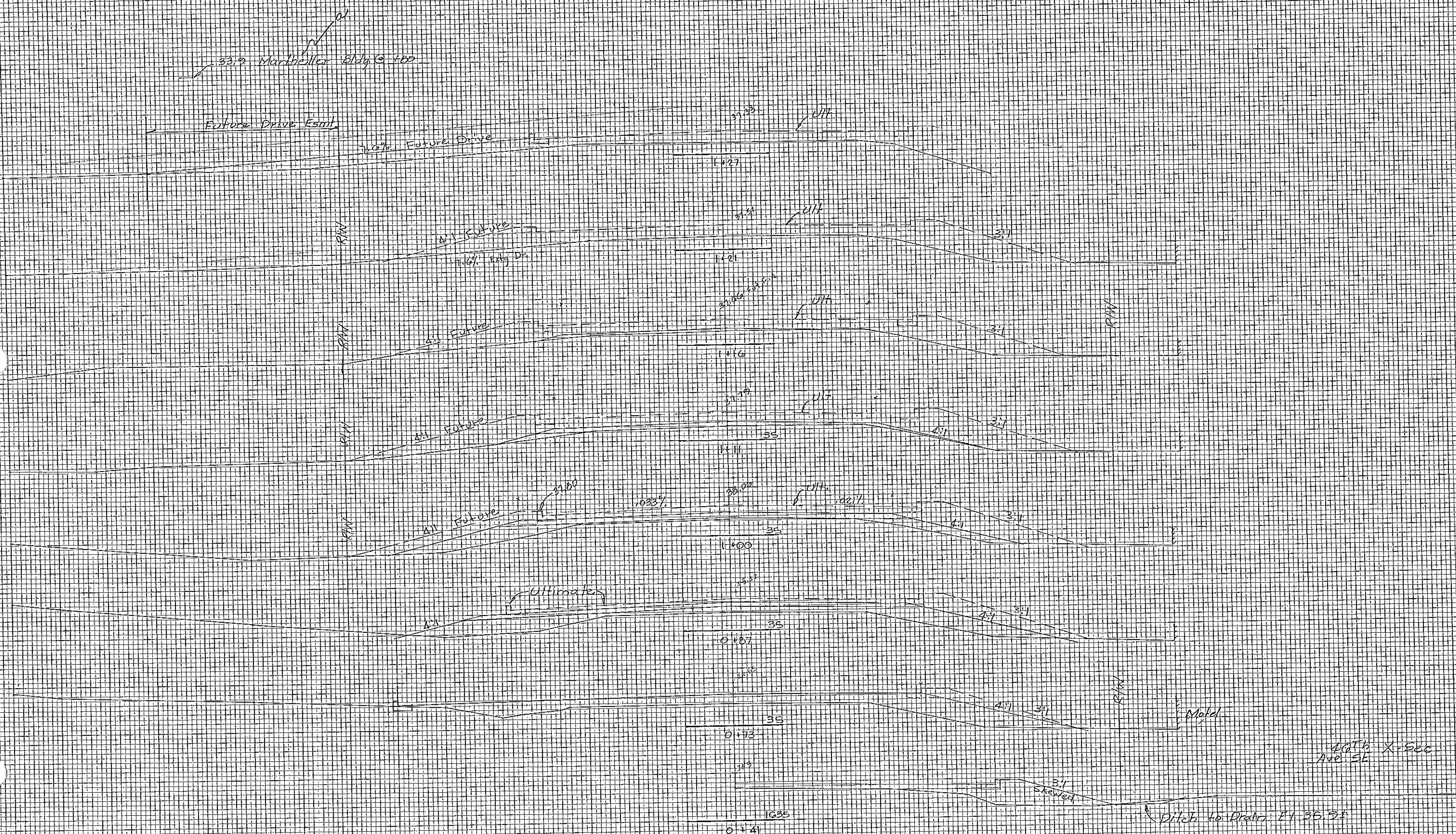
Areas Volume

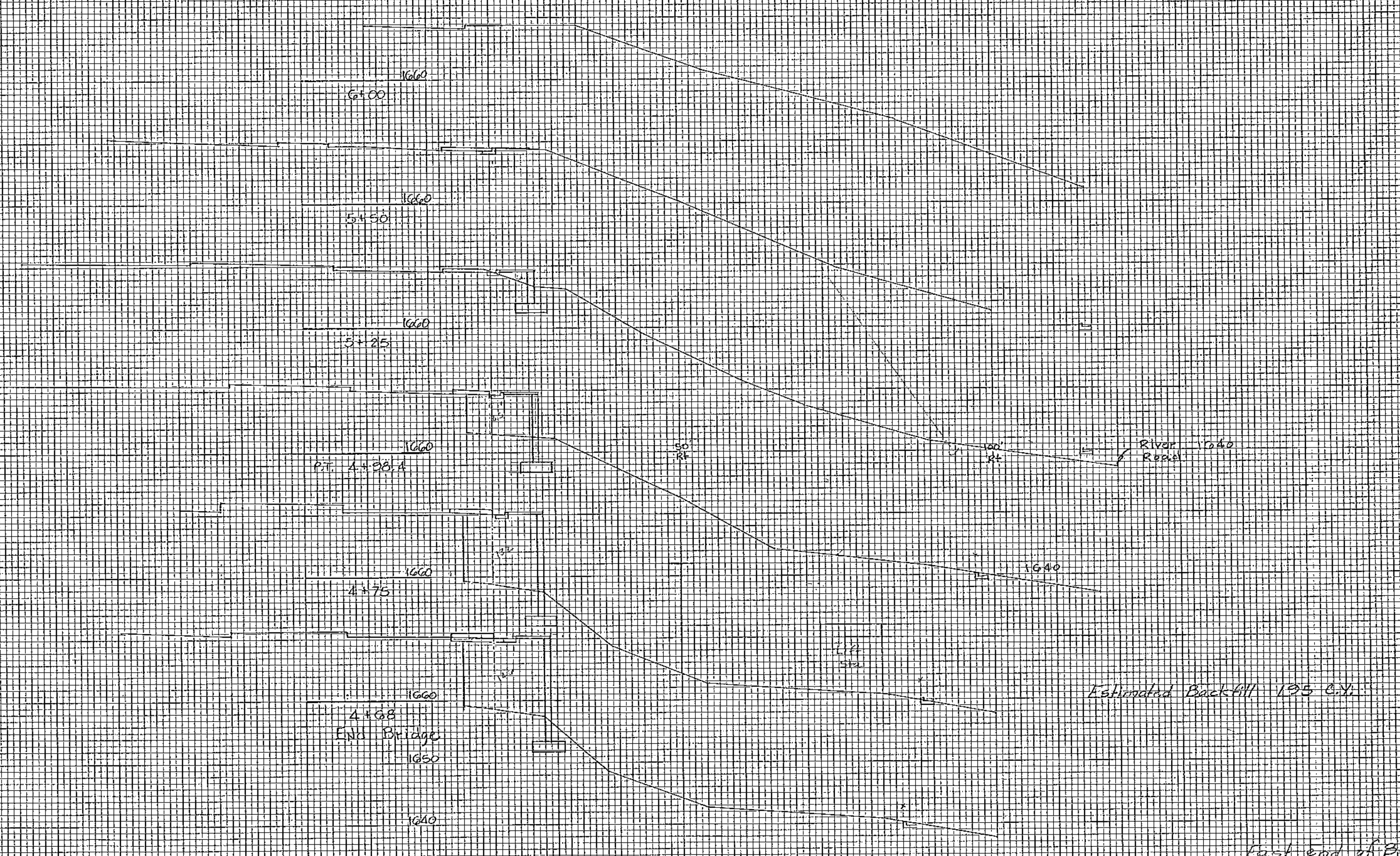


STA 5+00.00 TO 6+00.00

SCALE 1 IN. = 5 FT. HORIZ.

1 IN. = 5 FT. VERT.


33.9 Martbeller Bldg @ 1+00
Future Drive Esmt
Future Drive
1+27
U/H
4:1 Future
Exig Dr.
1+21
3:1
R/W
1+16
1+11
35
4:1
.033%
.021%
38.00
1+00
Ultimate
0+87
0+73
Motel
0+41
3:1
Skewed
Ditch to Drain El 36.51
46Th Ave SE X-Sec


6+00
1660
5+50
1660
5+25
1660
P.T. 4+98.4
1660
50 Rt
100 Rt
River Road
1640
4+75
1660
4+68
End Bridge
1660
1650
1640
Estimated Backfill 195 C.Y.
East end of Br.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1639.16
1638.74
165+75.36
1639.86
165+75.36
1638.9
165+75.00

1639.27
1638.86
165+58.30
1639.97
165+58.30
1638.9
165+58.00

1639.36
1638.95
165+30.21
1640.00
165+30.21
1639.0
165+30.00

1639.45
1639.03
165+00.13
1640.00
165+00.13
1639.0
165+00.00

1639.53
1639.12
164+69.06
1640.00
164+69.06
1639.0
164+69.00

1639.59
1639.18
164+47.01
1640.00
164+47.01
1639.1
West Bound Rdwy
164+47.00

STA 164+47.00 TO 165+75.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

70 60 50 40 30 20 10 ℄ 10 20 30 40 50 60 70

REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1645
1640
1635
1630

1636.36
1635.94
167+01.17
1636.84
167+01.17
1636.5

167+00.00

1645
1640
1635
1630

1636.93
1636.52
166+82.00
1637.41
166+82.00
1637.0

166+81.00

1645
1640
1635
1630

1637.50
1637.09
166+62.85
1637.98
166+62.85
1637.3

166+62.00

1645
1640
1635
1630

1638.09
1637.67
166+40.70
1638.64
166+40.70
1637.9

166+40.00

1645
1640
1635
1630

1638.86
1638.44
166+00.47
1639.54
166+00.47
1638.7

West Bound Rdwy

166+00.00

STA 166+00.00 TO 167+00.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

REGION	STATE	FED. AID PROJ NO.		NO.
8	ND			

1634.22
1635.80
168+42.07
1634.41
168+42.07
1632.7
168+39.10

1634.27
1635.86
168+02.45
1634.68
168+02.45
1633.2
168+00.00

1635.14
1634.72
167+44.63
1635.66
167+44.63
1634.2
167+43.00

1635.88
1635.46
167+17.33
1636.37
167+17.33
1635.6
167+16.00

1636.06
1635.64
167+11.27
1636.54
167+11.27
1636.1
167+10.00

West Bound Rdwy

STA 167+10.00 TO 168+39.10

SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

REGION	STATE FED AID PROJ. NO.
8	ND

1635.11
169+16.54

1634.78
169+16.54

169+12.00

1634.93
169+04.28

1634.64
169+04.28

169+00.00

1634.78
168+94.06

1633.95
168+94.06

168+90.00

1634.46
168+71.59

1634.42
168+71.59

168+68.00

1634.30
1635.89
168+56.27

1634.39
168+56.27

West Bound Rdwy

168+53.00

STA 168+53.00 TO 169+12.00

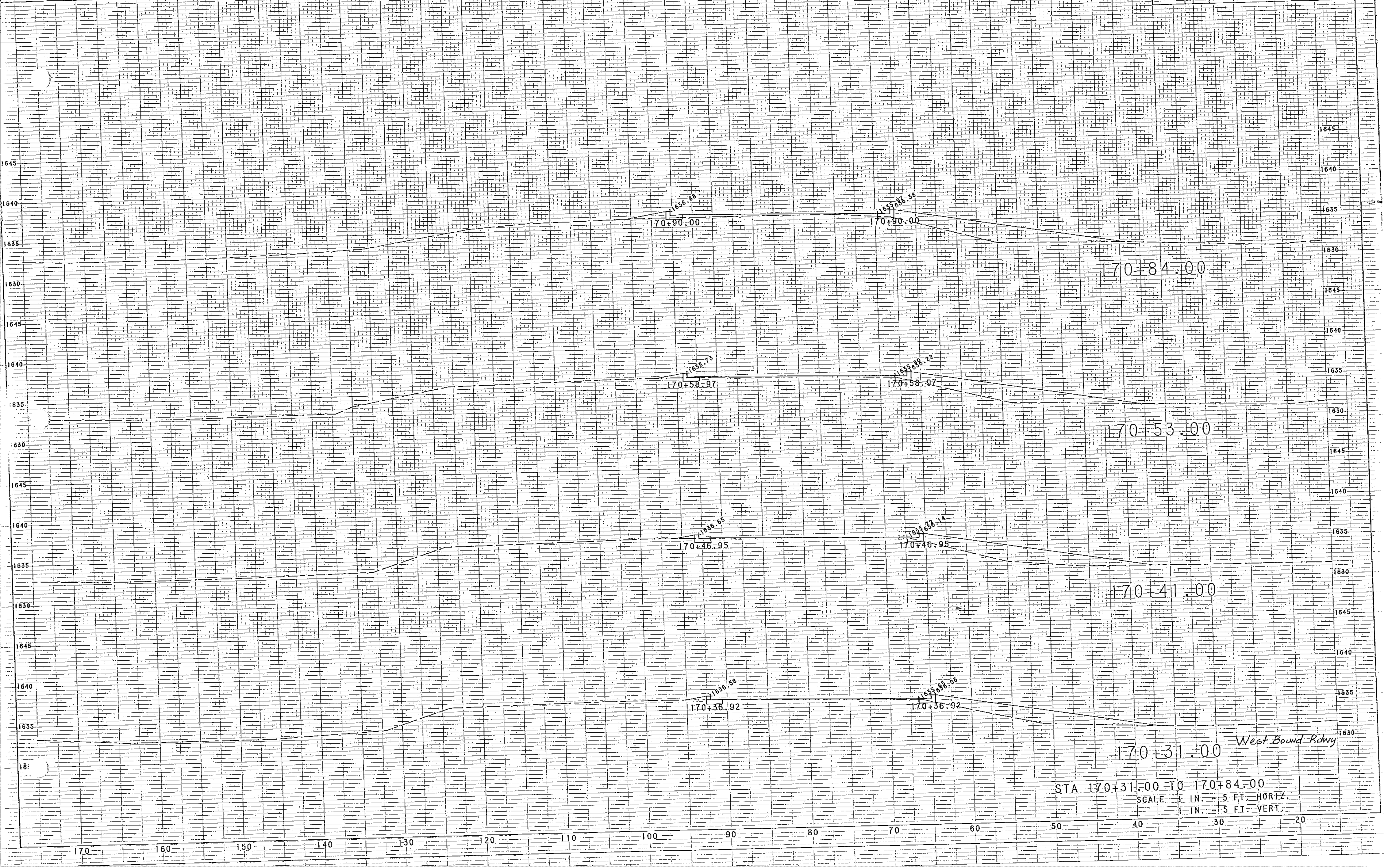
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

REGION	STATE
8	ND

1636.34
170+09.79
1635.83
170+09.79
170+04.00
1636.30
170+05.76
1635.80
170+05.76
170+00.00
1636.12
169+89.64
1635.63
169+89.64
169+84.00
1635.86
169+68.41
1635.40
169+68.41
West Bound Rdwy
169+63.00

STA 169+63.00 TO 170+04.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED. AID PROJ. NO.	NO.
8	ND		



STA 170+31.00 TO 170+84.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED_AID PROJ_NO.	SHEET NO.
8	ND		

1631.15
171+79.00
1636.86.63
171+9.00
171+73.00
1637.07
171+52.98
1636.88.57
171+52.98
171+47.00
1637.00
171+27.98
1636.88.51
171+27.98
171+22.00
1636.94
171+05.99
1636.88.44
171+05.99
171+00.00 West Bd. Rdwy

STA 171+00.00 TO 171+73.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1637.33
172+40.25
1636.76
172+40.25
172+34.00
1637.30
172+32.19
1636.76
172+32.19
172+26.00
1637.23
172+06.06
1636.70
172+06.06
172+00.00
1637.18
171+89.01
1636.66
171+89.01
171+83.00
West Bound Rdwy

STA 171+83.00 TO 172+34.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1637.10
1636.88
173+67.43
4:1
78
DG 32.4
1637.10
173+67.43
1631.0
173+59.00

1637.35
173+18.31
5.35:1
1636.98
173+18.31
1631.0
173+11.00

1637.36
173+07.09
5.65:1
1636.93
1636.95
173+07.09
1630.9
173+00.00

1637.39
172+95.89
6:1
1636.92
1636.92
172+95.89
1630.8
172+89.00 West Bound Rdwy

172+95 to 173+67
Transition from 6:1 to 4:1

STA 172+89.00 TO 173+59.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1645
1640
1635
1630

1636.42
175+11.35
1637.50
175+11.35
1632.0
175+00.00

1636.27
174+52.39
1637.31
174+52.39
80
4:1
5:1
DG 32.7

1630.9
174+42.00

1636.51
174+33.96
1637.26
174+33.96
80
4:1
DG 32.6

1631.0
174+24.00

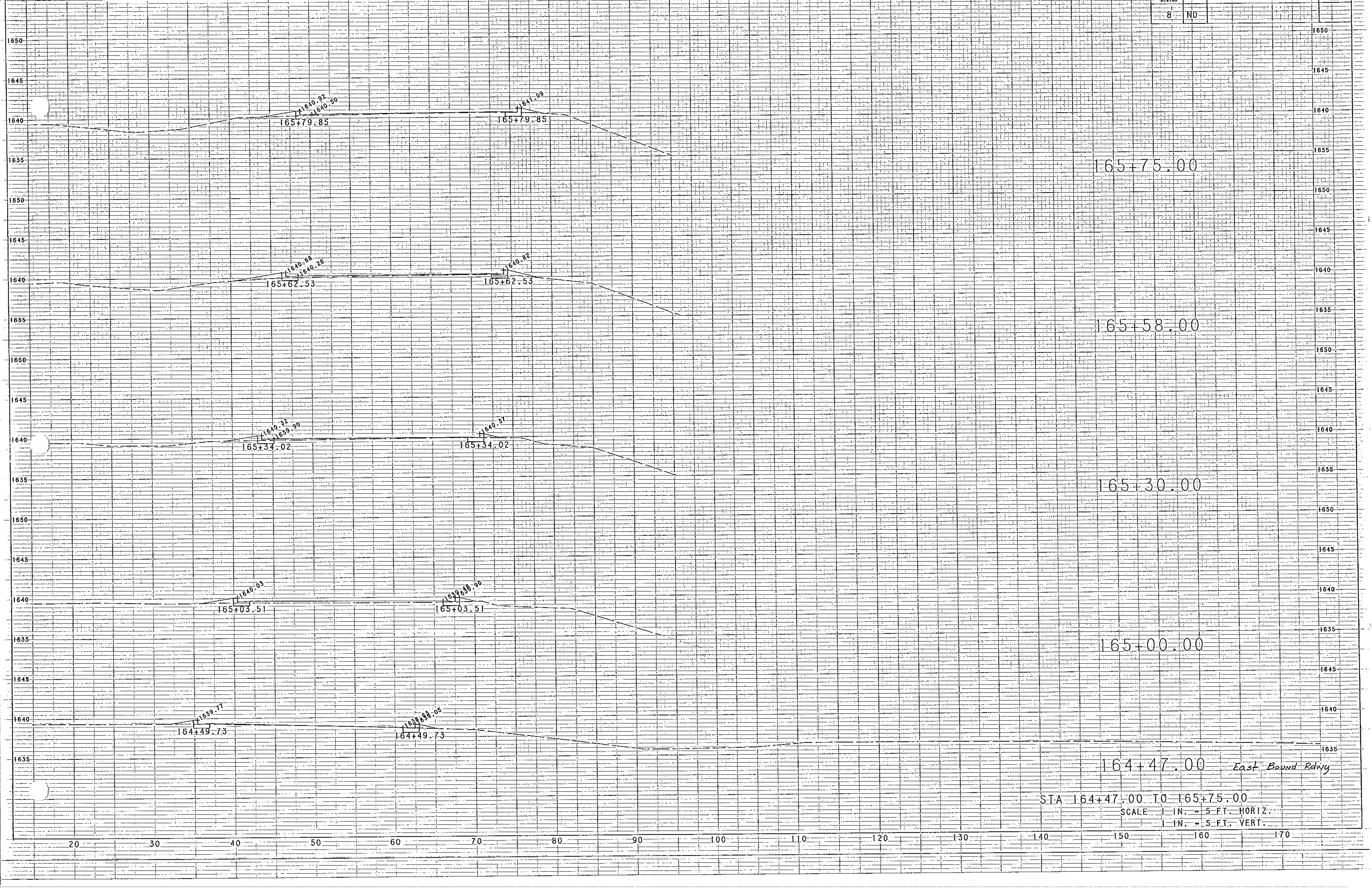
1636.45
174+09.40
1637.20
174+09.40
80
4:1
5:1
DG 32.5

West Bound Rdwy

1631.0
174+00.00

STA 174+00.00 TO 175+00.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

120 110 100 90 80 70 60 50 40 30 20 10 0 10 20



8
ND
1640.92
1640.50
1641.09
165+79.85
165+79.85
165+75.00
1640.88
1640.26
1640.82
165+62.53
165+62.53
165+58.00
1640.32
1639.90
1640.37
165+34.02
165+34.02
165+30.00
1640.03
165+03.51
165+03.51
165+00.00
1639.77
164+49.73
164+49.73
164+47.00
East Bound Rdwy
STA 164+47.00 TO 165+75.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

8 ND

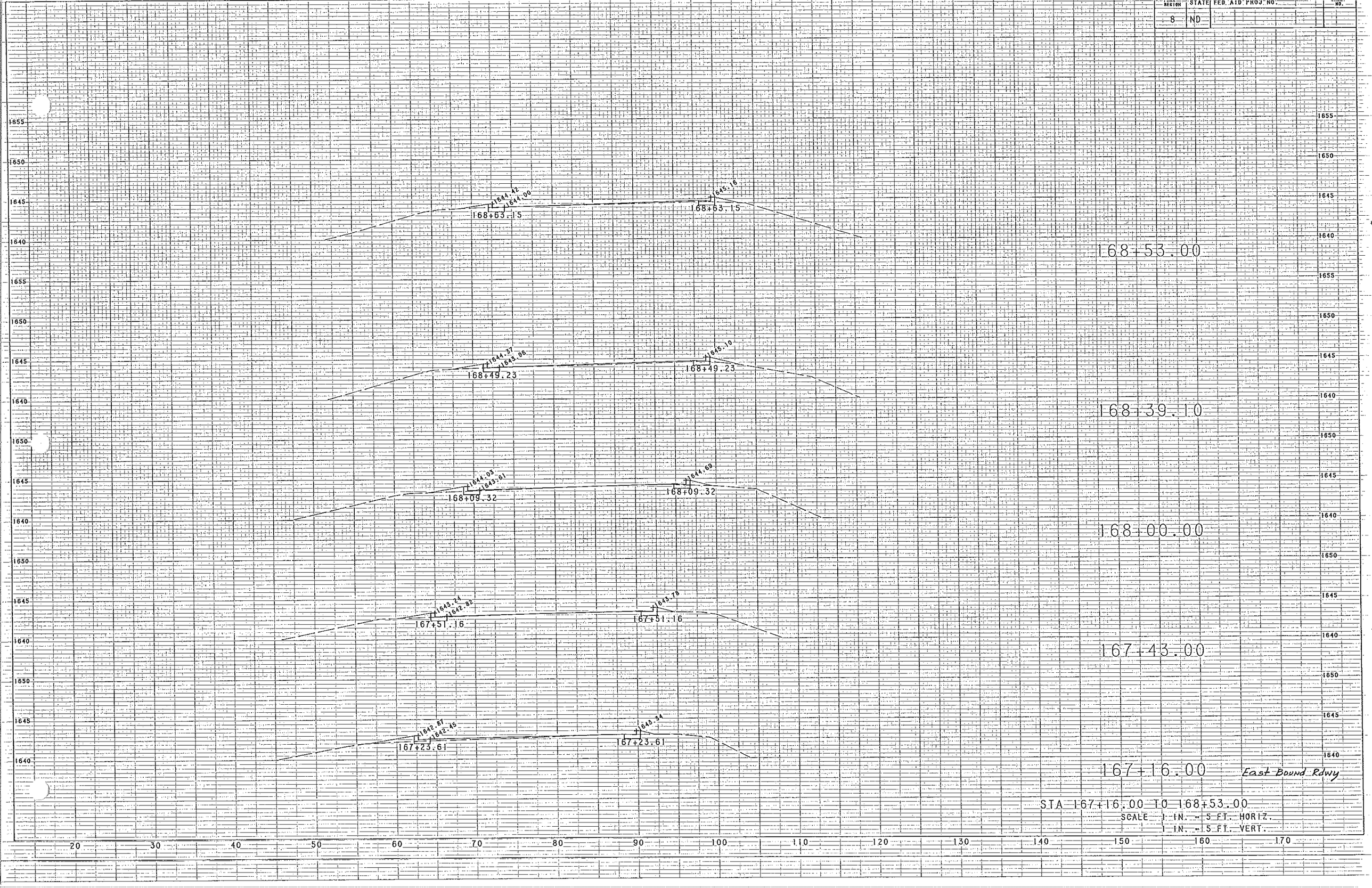
1642.78
1642.37
167+17.49
1643.25
167+17.49
167+10.00
1642.05
1642.23
167+07.29
1643.09
167+07.29
167+00.00
1642.38
1641.96
166+87.91
1642.78
166+87.91
166+81.00
1642.12
1641.70
166+68.54
1642.18
166+68.54
166+62.00
1641.81
1641.40
166+46.11
1642.13
166+46.11
166+40.00
1641.26
1640.84
166+05.33
1641.49
166+05.33
166+00.00 East Bound Rdwy

STA 166+00.00 TO 167+10.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

1650 1645 1640

20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170

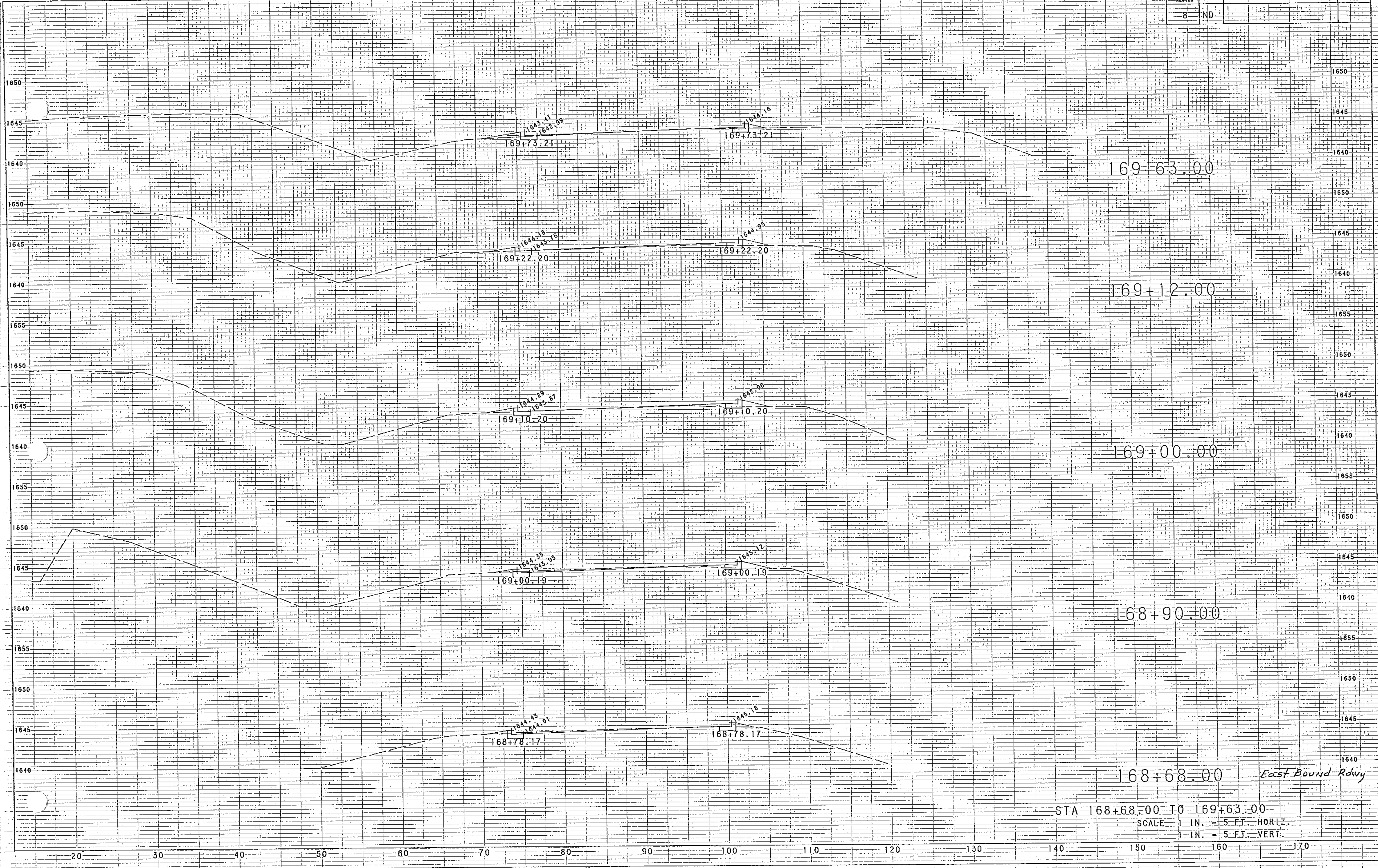
REGION	STATE	FED. AID PROJ. NO.	NO.
8	ND		



STA 167+16.00 TO 168+53.00

SCALE 1 IN. = 5 FT. HORIZ.

1 IN. = 5 FT. VERT.


8 ND
169+63.00
1643.41
1642.99
169+73.21
1644.16
169+73.21
169+12.00
1644.18
1643.76
169+22.20
1644.95
169+22.20
169+00.00
1644.29
1643.87
169+10.20
1645.06
169+10.20
168+90.00
1644.35
1643.93
169+00.19
1645.12
169+00.19
168+68.00
1644.43
1644.01
168+78.17
1645.18
168+78.17
East Bound Rdwy
STA 168+68.00 TO 169+63.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170

REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	ND		

1640.80
1640.38
170+63.21
1641.41
170+63.21
170+53.00

1641.22
1640.80
170+51.21
1641.86
170+51.21
170+41.00

E. Bound Ramp
1641.56
1641.15
170+41.21
1642.22
170+41.21
170+31.00

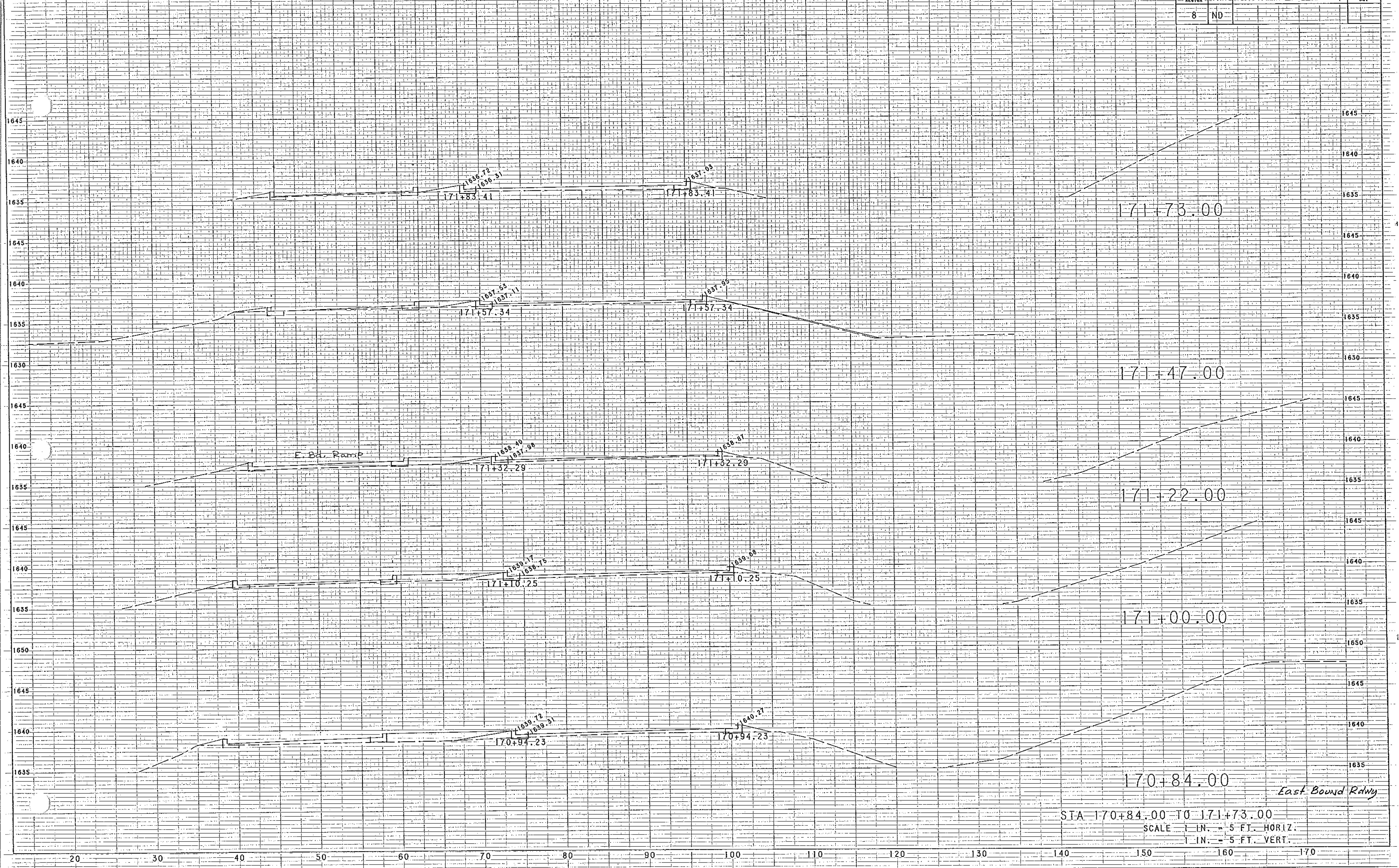
1642.41
1641.99
170+14.21
1643.11
170+14.21
170+04.00

1642.52
1642.10
170+10.21
1643.23
170+10.21
170+00.00

1642.94
1642.52
169+94.21
1643.67
169+94.21
169+84.00 East Bound Rdwy

STA 169+84.00 TO 170+53.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

1650
1645
1640
1635
20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170


8
ND
1636.72
1636.31
171+83.41
1637.03
171+83.41
171+73.00
1637.53
1637.11
171+57.34
1637.95
171+57.34
171+47.00
E. Bd. Ramp
1638.40
1637.98
171+32.29
1638.87
171+32.29
171+22.00
1639.17
1638.75
171+10.25
1639.68
171+10.25
171+00.00
1639.72
1639.31
170+94.23
1640.27
170+94.23
170+84.00
East Bound Rdwy
STA 170+84.00 TO 171+73.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

8 ND

1635.11
172+99.70
1634.83
1635.22
172+99.70

172+89.00

1635.58
1635.16
172+44.56
1635.59
172+44.56

172+34.00

1635.67
1635.25
172+36.54
1635.72
172+36.54

172+26.00

1636.08
1635.67
172+10.48
1635.26
172+10.48

172+00.00

E Bd Ramp
1636.46
1636.05
171+93.43
1636.72
171+93.43

171+83.00

East Bound Rdwy

STA 171+83.00 TO 172+89.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

1645 1640 1635 1630

20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170

8	ND

East Bound Rdwy

STA 173+00.00 TO 174+24.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

8 ND

174+42.00

E. Bd. Rdwy

STA 174+42.00
SCALE 1 IN. = 5 FT. HORIZ.
1 IN. = 5 FT. VERT.

8	ND

Areas Volume

N.E Ramp

W. Bound

E. Bd.

N.E.R

W. Bd.

E. Bd.

EXIST DBL 24" RCP

1633.6

1632.6

1632.4

1632.0

1630.9

1631.0

175+56.00

Cut 0
Fill 570

Cut 0
Fill 270

175+20.00

Cut 0
Fill 609

175+12.00

Cut 0
Fill 219

175+00.00

Cut 0
Fill 460

174+42.00

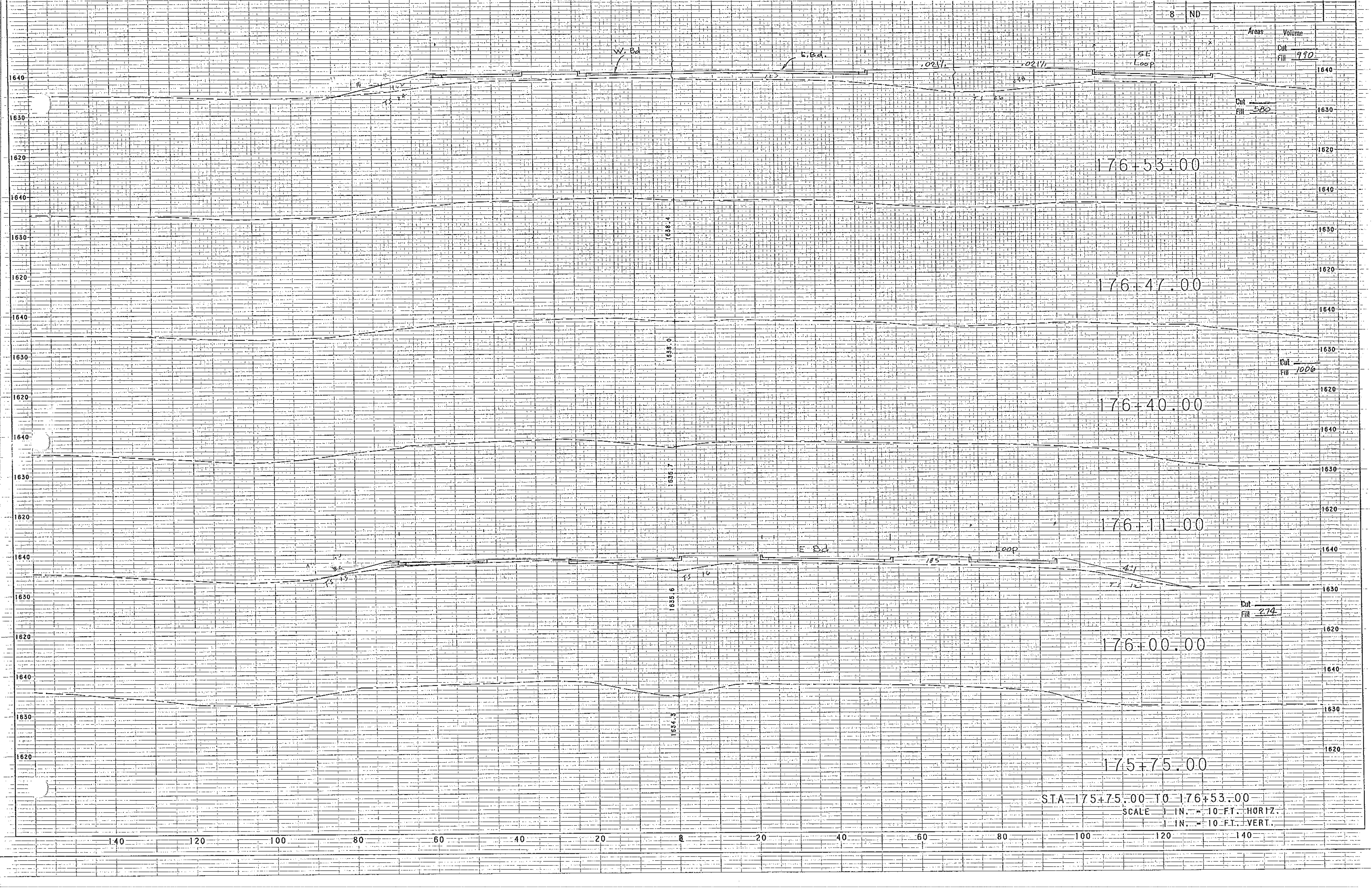
Cut 0
Fill 138

174+24.00

STA 174+24.00 TO 175+56.00

SCALE 1 IN. = 10 FT. HORIZ.

1 IN. = 10 FT. VERT.


8
ND
Areas
Volume
Cut
Fill 990
W. Bd
E. Bd.
.021'/'
.021'/'
SE
Loop
Cut
Fill 580
176+53.00
1638.4
176+47.00
1638.0
Cut
Fill 1006
176+40.00
1636.7
176+11.00
E Bd
Loop
1635.6
Cut
Fill 274
176+00.00
1634.3
175+75.00
STA 175+75.00 TO 176+53.00
SCALE 1 IN. = 10 FT. HORIZ.
1 IN. = 10 FT. VERT.
1640
1630
1620
140
120
100
80
60
40
20
℄
20
40
60
80
100
120
140

8	ND			

STA 176+72.00 TO 177+24.00
SCALE 1 IN. = 10 FT. HORIZ.
1 IN. = 10 FT. VERT.

Station	Elevation
8	ND

Areas Volume

177+92.00

177+74.00

177+64.00

Cut
Fill 1615

Cut
Fill 373

177+47.00

1643.7

1642.9

1642.5

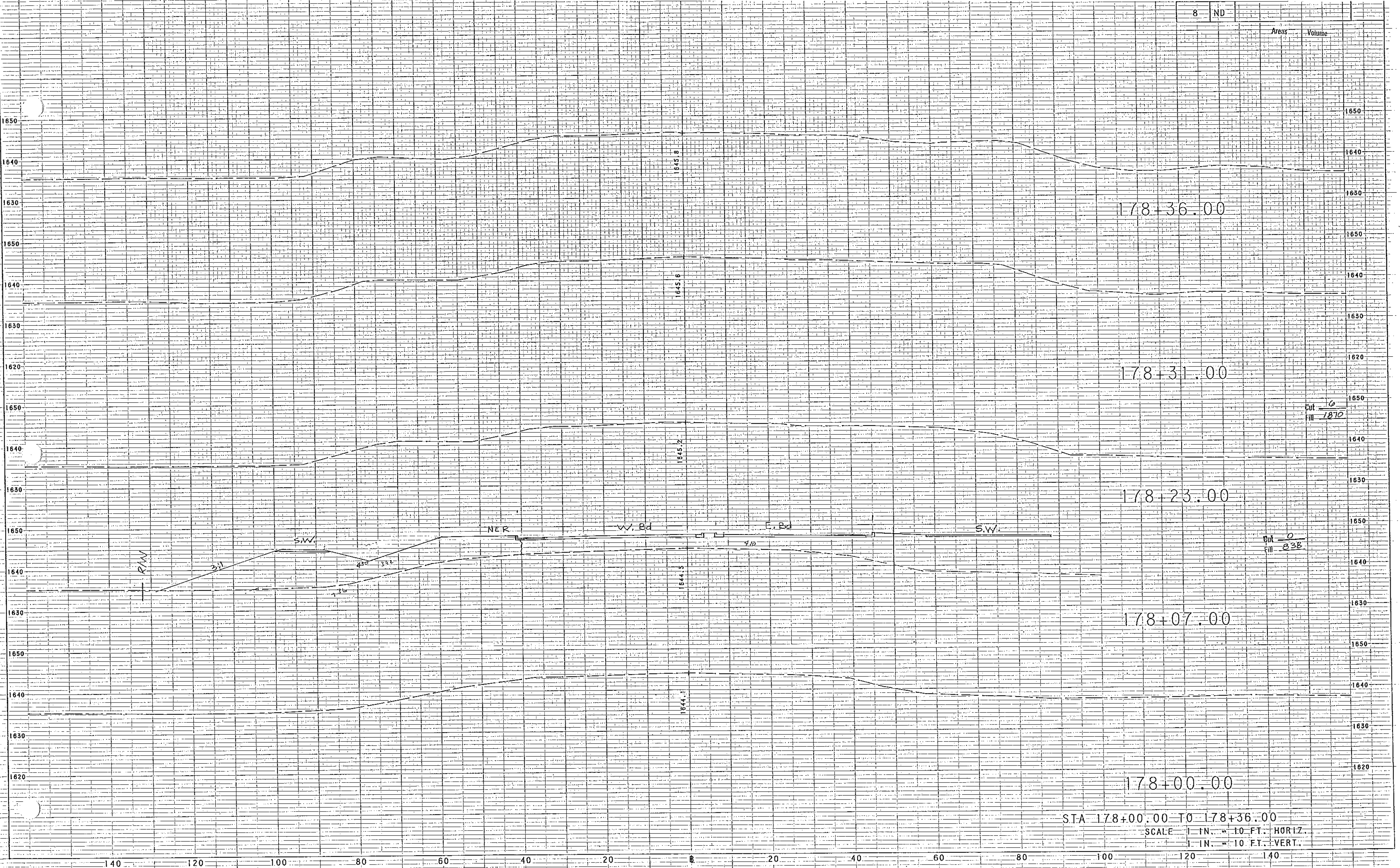
1641.8

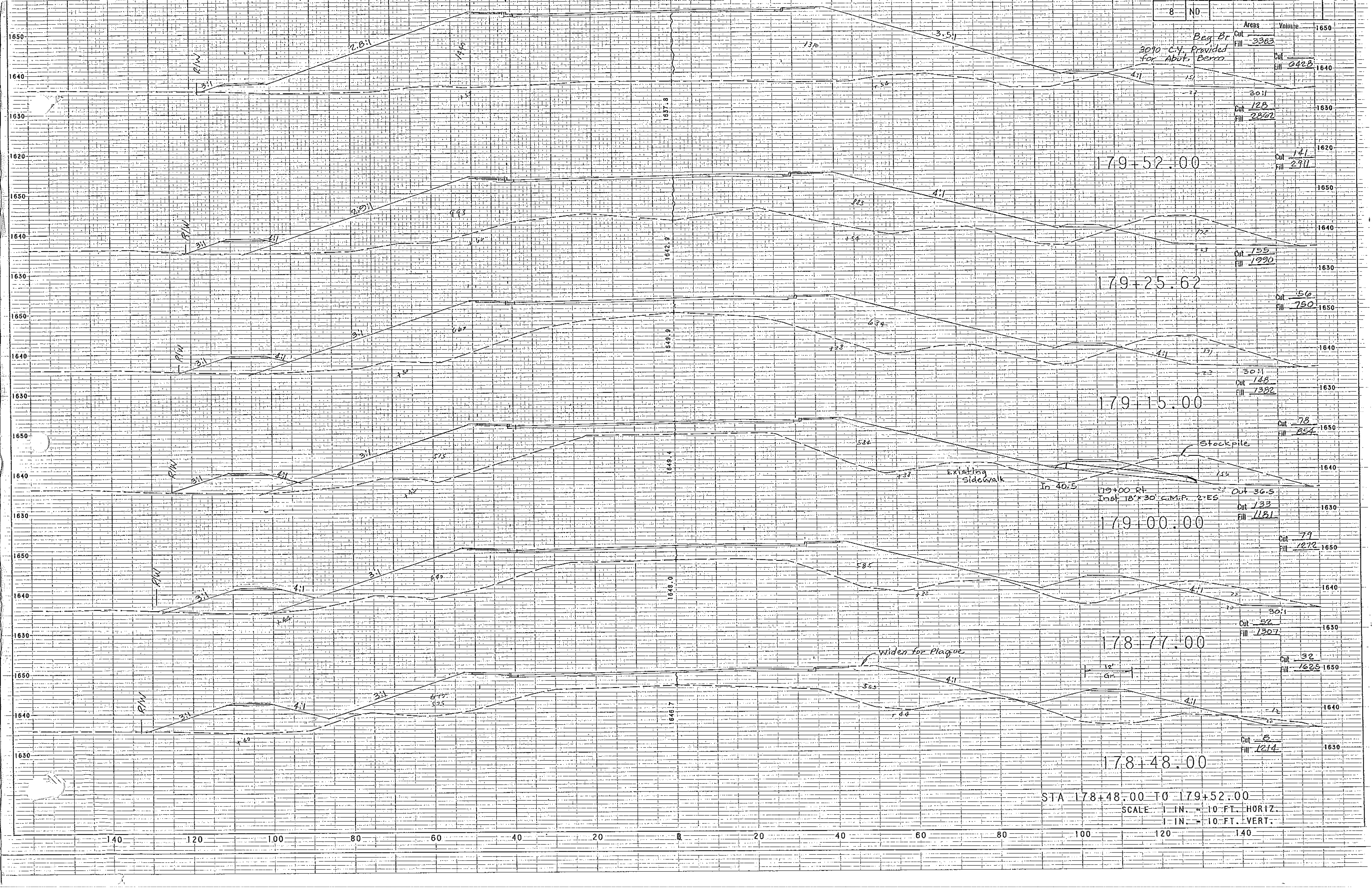
4:1

Leg of Transmission Tower

STA 177+47.00 TO 177+92.00

SCALE 1 IN. = 10 FT. HORIZ.
1 IN. = 10 FT. VERT.


8
ND
Areas
Volume
178+36.00
1645.8
178+31.00
1645.6
Cut 0
Fill 1870
178+23.00
1645.2
R/W
S.W.
3:1
NER
W. Bd
E. Bd
S.W.
Cut 0
Fill 838
178+07.00
1644.5
178+00.00
1644.1
STA 178+00.00 TO 178+36.00
SCALE 1 IN. = 10 FT. HORIZ.
1 IN. = 10 FT. VERT.
140 120 100 80 60 40 20 ℄ 20 40 60 80 100 120 140
1650 1640 1630 1620


8
ND
Areas
Volume
Beg Br
3090 C.Y. Provided
for Abut. Berm
Cut
Fill 3383
Cut
Fill 3428
Cut 128
Fill 2862
179+52.00
Cut 141
Fill 2911
Cut 155
Fill 1990
179+25.62
Cut 56
Fill 750
Cut 148
Fill 1382
179+15.00
Cut 78
Fill 854
Stockpile
Existing Sidewalk
In 40.5
179+00 Rt
Inst. 18"x30" C.M.P. 2-ES
Out 36.5
Cut 133
Fill 1181
179+00.00
Cut 79
Fill 1272
Cut 52
Fill 1307
178+77.00
Widen for Plaque
Cut 32
Fill 1625
12' Gr.
Cut 8
Fill 1214
178+48.00
1637.8
1642.9
1649.9
1649.4
1648.0
1646.7
R/W
3:1
4:1
2.8:1
2.9:1
3.5:1
30:1
STA 178+48.00 TO 179+52.00
SCALE: 1 IN. = 10 FT. HORIZ.
1 IN. = 10 FT. VERT.
140
120
100
80
60
40
20
20
40
60
80
100
120
140
1650
1640
1630
1620