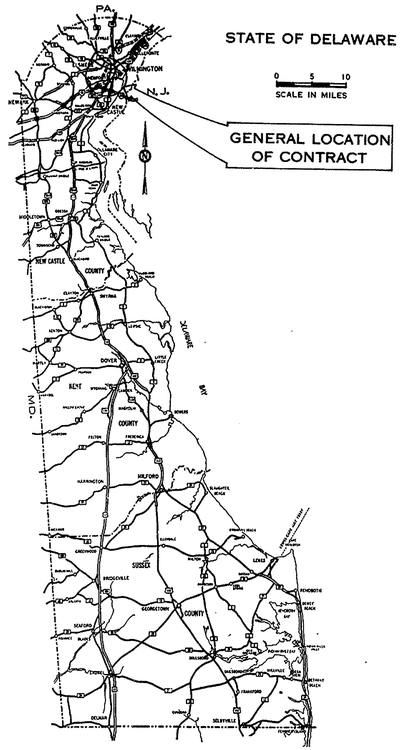


DESIGN DESIGNATION

FEDERAL CLASS	SECONDARY	
A.D.T.	13,512	
D.H.V.	1351	
DESIGN SPEED	50	M.P.H.
MIN. STOPPING SIGHT DISTANCE	350	FT.
MAX. S.E.	.06	FT./FT.
MAX. DEGREE CURVE	7 °-0'	
MAX. % GRADE	6 %	

THE STATE OF DELAWARE

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

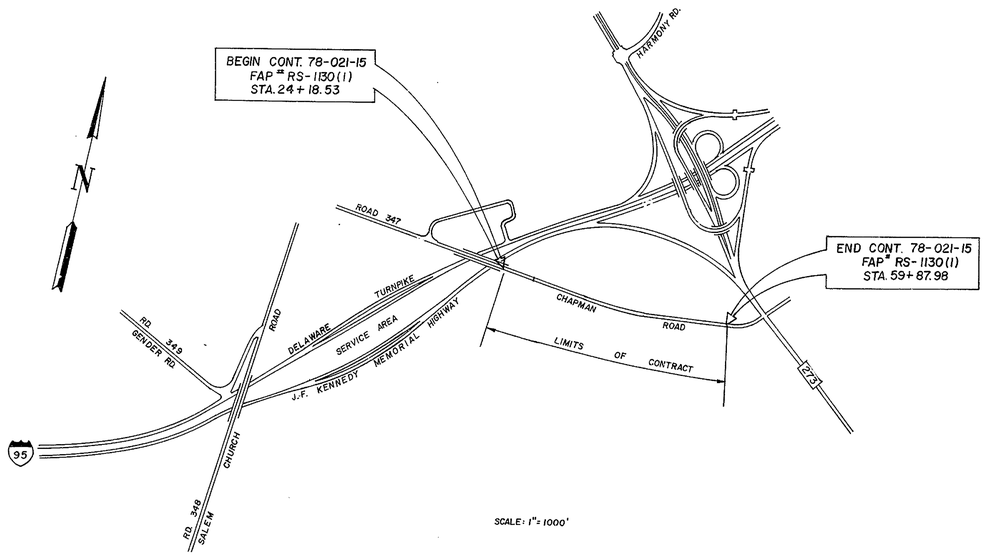
SPECIFICATIONS AND
CONSTRUCTION PLAN FOR:

CONTRACT NUMBER 78-021-15

FEDERAL AID PROJECT NUMBER RS-1130(1)

BEGIN PROJECT: STATION NO. 24+18.53 **END:** STATION NO. 59+87.98

LENGTH: 3569.45 FEET = 0.676 MILES
LENGTH: 1088.25 METERS = 1.088 KILOMETERS



CONTRACT	COUNTY	STATE	F.H.W.A. REG. NO.	FEDERAL AID PROJECT NUMBER	FISCAL YEAR	SHEET NUMBER	TOTAL SHEETS
78-021-15	N.C.	DEL.	3	RS-1130(1)		1	47

CHAPMAN ROAD PHASE II
(I-95 TO RELOCATED S.R. 273)

SURVEY BOOKS

INDEX OF SHEETS

1 TITLE SHEET
4-9 TYPICAL SECTIONS & DETAIL SHEETS
2-3 QUANTITY SHEETS
13-17 PLANS & PROFILE SHEETS
10-12 GRADE SHEETS
32-47 STANDARD SHEETS
C-2, C-3, D-1-11, D-2-4, D-3-4, D-7-5, D-9-7, D-13-1, D-15, D-16, G-2-9, G-3-5, G-4-6, G-5, G-7-1, S-3
18-22 MAINT. OF TRAFFIC PLANS SHEETS
23-27 SIGNING & STRIPING PLANS SHEETS
28-31 EROSION CONTROL PLANS SHEETS

UTILITIES

NEW CASTLE COUNTY SANITARY SEWER — N.C.C.S.S.
DELMARVA POWER & LIGHT COMPANY — DPL CoUG
DIAMOND STATE TELEPHONE COMPANY — DST. UG.
WILMINGTON SUBURBAN WATER COMPANY — WSW

AS-BUILT SHOWN IN RED
JAC 6-27-88

SCALES

TITLE SHEET	1"= 1000	FEET
	304.89	METERS
CONSTRUCTION	1"= 30	FEET
	9.146	METERS
VERTICAL PROFILE	1"= 5	FEET
	1.542	METERS

DIVISION OF HIGHWAYS

RECOMMENDED
PROJECT ENGINEER
RECOMMENDED 3/29 19 83
VERNISTO L. DONATO, JR. REGISTERED NO. 4960 DELAWARE PROFESSIONAL ENGINEER
SEAL

RECOMMENDED
ROAD DESIGN ENGINEER
RECOMMENDED 3/29 1983
SEAL

RECOMMENDED
DEPUTY DIRECTOR OF HIGHWAYS
RECOMMENDED 3/31 1983
GARY B. HOMEWOOD REGISTERED NO. 2662 DELAWARE PROFESSIONAL ENGINEER
SEAL

APPROVED
DIRECTOR OF HIGHWAYS
APPROVED 3/31 1983
ROBERT B. BERNIKER II REGISTERED NO. 1565 DELAWARE PROFESSIONAL ENGINEER
SEAL

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED _____ 19__
DIVISION ADMINISTRATOR

FOR INFORMATION ONLY		
AVAILABLE MATERIAL (+ ADJ FACTOR)	EMBANKMENT (+ ADJ FACTOR)	BORROW TYPE F (+ ADJ FACTOR)
C.Y.	C.Y.	C.Y.
8,104	28,771	20,667

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL.	RS-1130(1)	2	47

CHAPMAN ROAD - PHASE II

PREL. TRACING A.G. DESIGN _____ CHKD. _____

REVISIONS

* FIXED QUANTITY ITEM: SEE SECT. 109.06 OF STD. SPECIFICATIONS.

SECTION NO.	201	202	203	205	207	208	209	303		401	402	605*	610	615					617	620				704	706	
DESCRIPTIONS / ROADWAY	Clearing & Grubbing	Excavation & Embankment	Channel Excavation	Rock Excavation For Roadway	Excavation and Backfill for Structures	Excavation and Backfill for Pipe Trenches	Borrow (+Adj. Factor)	Crusher Run Base Course	Lateral Subbase Drainage Ditches	Hot-Mix, Hot Laid Bituminous Concrete Pavement	Hot-Mix Bituminous and/or Asphalt Cold Patch (TRM)	Bar Reinforcement	Subfoundation Backfill	Reinforced Concrete Pipe CLASS III					Galvanized Corrugated Steel Pipe	Flared End Section				Portland Cement Concrete Gutter	Portland Cement Concrete Parkway Curb	
						TYPE F / TYPE B			TYPE B / TYPE C					15"	18"	24"	30"	60"	15" 14 GA.	15" RCP	18" RCP	24" RCP	30" RCP	4"	TYPE I	MONOLITHIC
UNIT	L.S.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	C.Y.	SY./IN.	L.F.	TON	TON	LBS.	C.Y.	L.F.					L.F.	EA.				S.Y.	L.F.	
SHEET 13		2,823	110		45	665			33,735	169	1,206	748		960	10	-	90	-	-	84	184	-	2	-	-	622	620	115
" 14		3,368	-		-	19			65,282	69	1,261	751		-	-	-	-	-	-	-	115	-	-	-	-	-	1,503	-
" 15		4,254	-		-	23			79,929	30	1,929	913		-	-	60	-	-	-	-	-	2	-	-	-	-	352	272
" 16		1,805	-		-	157			39,832	-	1057	441		-	-	-	-	321	18	-	-	-	-	1	1	-	500	150
" 17		900	-		-	374			32,505	-	1,262	788		-	-	711	-	212	-	-	-	-	-	-	-	4	330	556
TOTAL	L.S.	13,159	110	75	45	1,238	20667	520	270,287	268	6,715	3,684	422	960	10	771	90	533	18	84	299	2	2	1	1	626	3,911	1,093
PROPOSAL	L.S.	13,159	110	75	45	1,235	20667	520	270,287	268	6,715	3,684	422	960	10	771	90	533	18	84	299	2	2	1	1	626	3,911	1,093
NON-PARTICIPATING		1,182			5	362			14,824		598	157				15			18					1		250	

SECTION NO.	707	708	711							713	715	716	S.P.	723	724		725	726	735	736	737	738	739	733	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.
DESCRIPTIONS / ROADWAY	Integral Portland Cement Concrete Curb & Gutter	Portland Cement Concrete Sidewalk	Catch Basins							Adjusting & Repairing Existing Catch Basins & Manholes	Galvanized Steel Beam Guardrail with Steel Posts	Twisted End Anchorages	Removal Of Exist. Headwalls	Topsoiling	Permanent Roadside Seeding & Mulching	Crownvetch Seeding & Mulching	Erosion Control Seeding 1	Mulching, (Excelsior Blankets)	Calcium Chloride for Dust Control	Removal of Existing Portland Cement Concrete Pavement, Curb, Sidewalk, ETC.	Perforated Pipe Underdrain	Flagman	Field Office	Rip Rap	Undercut Excavation	Crusher Run (TRM)	Baled Hay or Straw	Maintenance of Traffic	Converting Existing Catch Basin to Junction Box	Junction Box	
	TYPE 3	4"	B	J	FWBD-1	FWBD-2	FWBD-2 MOD. #1						4"							6"			Grouted						Nº 2	A
UNIT	L.F.	S.F.	EA.							EA.	L.F.	EA.	EA.	S.Y.	S.Y.		ACRE	S.Y.	TON	S.Y.	L.F.	HRS.	L.S.	S.Y.	C.Y.	TON	EA.	L.S.	EA.	EA.	
SHEET 13	-	-	2	-	1	-	-	-		950	1	-	6,218	4,281	1,937		0.14	1,937		-	-			44					-	-	
" 14	-	-	2	-	-	-	-	-		-	-	-	3,461	3,461	-		.06	-		-	987			6					-	-	
" 15	355	1,692	-	1	1	2	-	4		-	-	-	2,421	2,284	137		.06	137		-	1,300			32					1	-	
" 16	153	-	-	-	-	2	-	-		125	1	-	1,367	1,196	861		.03	171		-	340			-					-	-	
" 17	962	230	-	7	1	-	1	6		-	-	2	1,107	1,107	-		-	-		180	-			-					-	3	
TOTAL	1,470	1,922	4	8	3	4	1	10		1,075	2	2	14,574	12,329	2,935		0.31	2,245	20	180	2,627	587	L.S.	82	400	1,777	162	L.S.	1	3	2
PROPOSAL	1470	1,922	4	8	3	4	1	10		1,075	2	2	14,574	12,329	2935		0.31	2,245	20	180	2,627	587	L.S.	82	400	1,777	162	L.S.	1	3	2
NON-PARTICIPATING	525	1,611		1	1					125	1		1,339	1,031	308			308													

GENERAL NOTES

1. Construction of this contract shall conform to the Delaware Department of Highways and Transportation Standard Specifications dated January 1,1974,and supplemental specifications thereto dated January 1, 1980, plans and special provisions.
2. C.R.-1 pre-mixed base course can be substituted for Crusher Run Base Course provided it will be used throughout the whole project and provided there is no change in the unit price bid and the method of measurement is the same.
3. Borrow, Type B shall be used for undercut backfill.
4. Location of utilities shown on these plans are approximate. The contractor shall notify "Miss Utility" two (2) consecutive working days prior to any excavation so that all affected utilities may respond and determine the exact location of their existing facilities on the job site. Conflicts of utilities with proposed construction shall be coordinated by the contractor with the Engineer and the utility company involved.
5. The contractor shall remove and reset all fences disturbed by construction. The fence shall be reset to the new Right of Way line on properties where right of way taking is involved. On properties where no right of way taking is involved the contractor, under the direction of the Engineer, shall reset affected fence at location designated by the property owner. No separate payment shall be made for removal & resetting of fence. Payment shall be incidental to Section 201, Clearing and Grubbing. Any item lost or damaged shall be replaced at the contractor's expense.
6. Guardrail, including any salvagable posts designated on the plans to be removed, shall remain the property of the Division Of Highways and shall be stockpiled by the contractor at Bear Yard as directed by the Engineer. Payment for this work shall be incidental to Section 201, Clearing and Grubbing.
7. Unless otherwise indicated on the plans, all existing pipes no longer in service within the limits of construction shall be removed in accordance with Section 202.12 or abandoned as directed by the Engineer. Abandoned pipe shall be plugged with concrete Payment to be incidental to Sec 202.
8. As directed by the Engineer, the contractor will provide and install 4" plastic sleeves in new concrete island for future traffic sign post installation. Payment to be incidental to Section 708, P.C.C. Sidewalk.
9. Any traffic sign or street sign damaged or lost during construction shall be the contractor's responsibility.
10. The contractor shall not leave excavated areas deeper than 2" adjacent to the traveled way after construction has shutdown for the day.
11. Poor subgrade soils within certain areas of the existing roadbed will be encountered and will require undercut excavation. The following areas within the roadway limits in particular, are designated for undercut excavation.

    Right of STA. 30+00 to STA. 38+70
    Right of STA. 41+40 to STA. 42+00
    Left of STA. 52+00 to STA. 53+00

12. Locations for pipe underdrains as shown on the plans were determined by soil survey. The actual depth and grade of pipe underdrains shall be determined in the field to intercept underground water and discharge it to the nearest storm sewer or ditch as directed by the Engineer.
13. During construction, straw or baled hay shall be placed at inlets and outlets of the drainage system. The bales shall be secured by staking and accumulated sediment shall be periodically removed.
14. Payment for Depressed Median Island and Depressed P.C.C. Sidewalk shall be incidental to Sec. 708, P.C.C. Sidewalk.
15. The contractor shall take necessary precautions when constructing the P.C.C. Islands at the entrances to the office and apartment complex at Sta. 55+40 so as not to disturb the existing signs and light pole located thereto. Any damage to these shall be the contractor's responsibity to correct or replace.
16. No separate payment will be made under this contract for Roto-milling. Payment will be incidental to Sec. 401 Hot-Mix Hot-Laid Bit. Conc. Pavement.

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL.	RS-1130(1)	3	47

CHAPMAN ROAD - PHASE II

PREL. TRACING A.G. DESIGN CHKD.

REVISIONS

AS-BUILT

* FIXED QUANTITY ITEM: SEE SEC. 109.06 OF STD. SPECIFICATIONS

SECTION NO.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	602*	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	S.P.	725	S.P.	S.P.	S.P.	S.P.	S.P.	
DESCRIPTIONS / ROADWAY	Furnishing Borrow Type C for Pipe and Utility Trench Backfill	P.C.C. Crossable Median	Removal & Installation of Existing Light Pole & Luminaire on New Bases	Butt Joint	Temporary Barricades		Permanent Pavement Striping - (4")	Painting Of White Or Yellow 4" Line	Portland Cement Conc. Masonry	Warning Signs		Barricade Warning Lights		Arrow Boards	Trainee	Trainee	Replacement of Stone Pillar	Guardrail To Barrier Connection (Approach Type)	Erosion Control Excavation & Embankment (Temp. Erosion Control)	Stone Stabilization No. 103	Initial Expense	Sawing Of Joints		Permanent Pavement Striping	
					Type II	Type III			Stationary	Temporary	Type B	Type C		2								Hot-Mix	Conc.		
UNIT	C.Y.	S.Y.	EA.	S.Y.	EA.		L.F.		C.Y.	EA.		EA.		EA./DAY	HRS.		L.S.	EA.	C.Y.	TON	L.S.	L.F.		S.F	
SHEET 13	485	75	-	-					13									2				-	4		
" 14	19	-	-	-														-				-	-		
" 15	17	-	1	-													L.S.	-				23	-		
" 16	30	-	-	-														-				-	-		
" 17	223	-	-	305														-				1,110	-		
TOTAL	774	75	1	305	60	8	3,500	15,100	13	10	17	36	56	124	1,760	11,576	L.S.	2			L.S.	1,133	4	152	
PROPOSAL	774	75	1	305	60	8	3,500	15,100	13	10	17	36	56	124	1,760	11,576	L.S.	2	1,426	50	L.S.	1,133	4	152	
NON-PARTICIPATING	4																								

GENERAL NOTES CONTINUATION

17. Excelsior blanket mulch shall be used on all slopes 2:1 or greater.
18. The contractor shall, prior to laying a run of drainage pipe, excavate within the proposed pipe alignment at points of possible utility conflict to the depth of the proposed storm drainage main to determine if a conflict is inevitable. If a conflict is imminent, the Engineer shall determine a new invert for the proposed drainage pipe if feasible. If the test holes indicate a change in alignment of the pipe, the excavation and backfill of the test holes shall be measured and paid for in accordance with Sec. 208, Excavation and Backfill for pipe trenches, but only to the depth excavated.
19. Nose of P.C.C. Parkway Curb, Type 1 Monolithic, shall be depressed at 10' as shown on details on sheet 7.
20. As directed by the Engineer, the Contractor will provide and install 4" Plastic Sleeves in new Concrete Island for Future Traffic Sign Post Installation. Payment to be incidental to Section 708, P.C.C. Sidewalk.
21. The contractor shall construct & maintain during construction of project, the Sediment Trap shown on sheet 16 located at the exist. ditch on the Delmarva Power Co. property. Upon completion of project, the said Sediment Trap shall remain and shall be the responsibility of the Delmarva Power Co. to maintain.

LEGEND FOR CONSTRUCTION PLANS

- 2" Type C Hot Mix & 5" Type B Hot Mix (2 Lifts At 3" & 2") Over 10" Crusher Run Base Course.
- 4" Min Hot Mix Overlay (2" Type C Hot Mix & 2" Type B Hot Mix) Over Existing Pavement.
- 2" Type C Hot Mix Over (10" Crusher Run Base Course For Inside Shoulders) And (6" Crusher Run Base Course For Outside Shoulders).
- 4" P.C.C. Sidewalk Over 4" Crusher Run Base Couse.
- P.C.C. Parkway Curb, Type 1.
- Integral P.C.C. Curb & Gutter, Type 3.
- P.C.C. Parkway Curb, Type 1 Monolithic Unless Otherwise Indicated.
- 4" Portland Cement Concrete Gutter.
- GR.65.00 GR.66.00 Side Ditch
- Galvanized Steel Beam Guardrail With Steel Posts.
- Pavement Patching
- 2" Type C Hot Mix & 2" Type B Hot Mix Over 10" Crusher Run Base Course
- Soil Borings
- 2" Type C Hot Mix Laid Bituminous Concrete Pavement

NOTE:
SEE SHEET NO. 5 FOR DIFFERENT SHOULDER & SIDE SLOPE DETAILS

TYPICAL SECTIONS

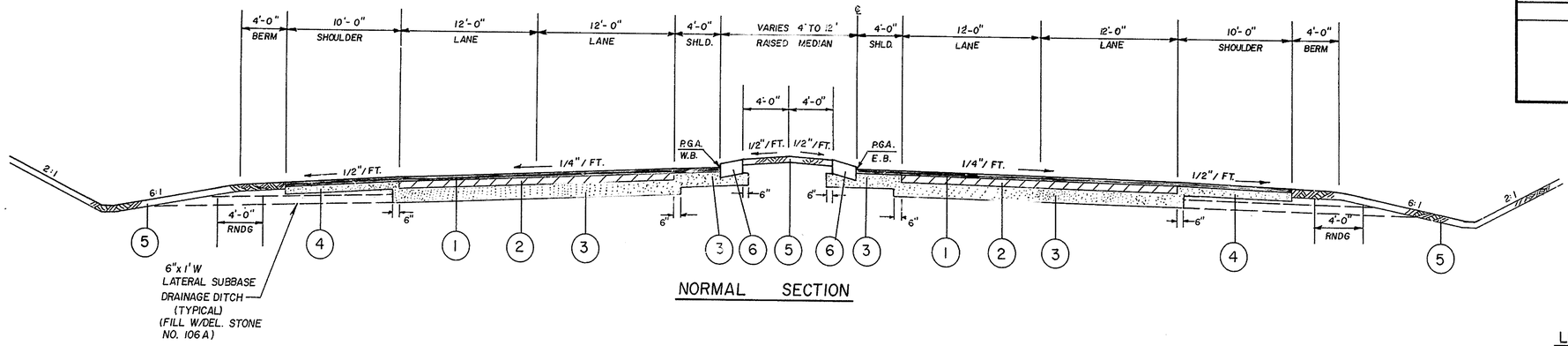
SCALE: HOR: 3/16"= 1' VERT: 1/4"=1'

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL	RS-1130(1)	4	47

CHAPMAN ROAD - PHASE II

PREL. TRACING A.G. DESIGN _____ CHKD. _____

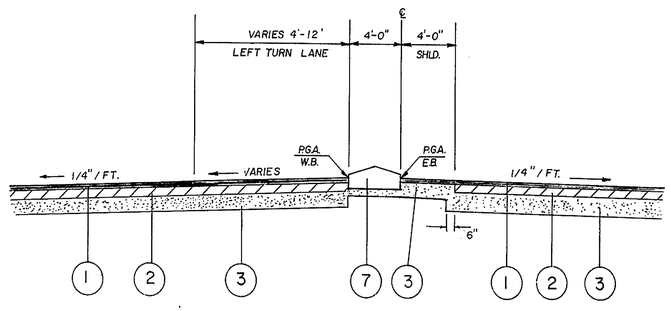
REVISIONS



NORMAL SECTION

LOCATIONS FOR LATERAL SUBBASE DRAINAGE DITCHES

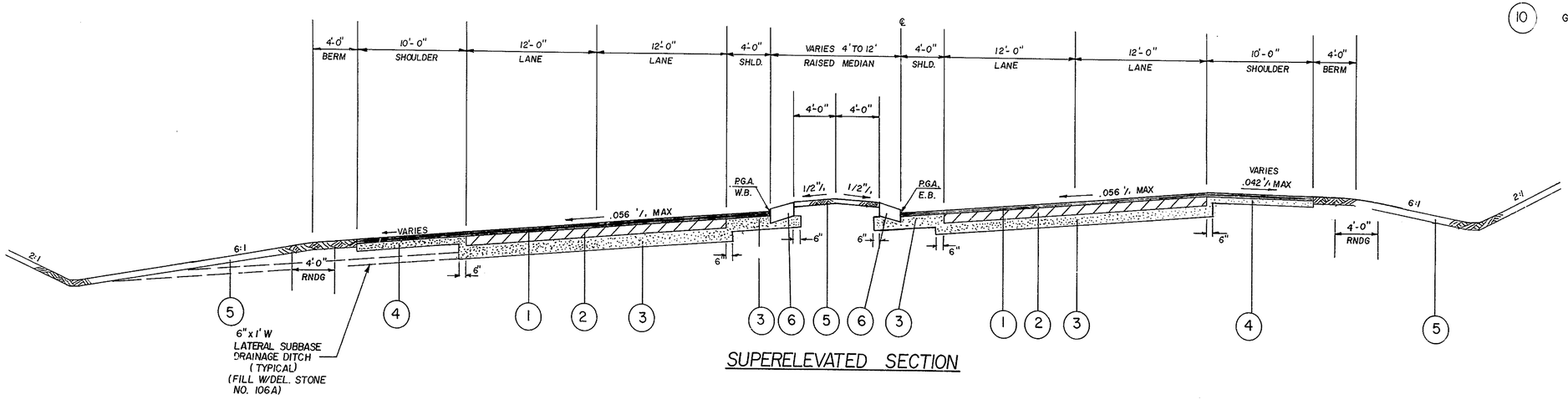
STA. 30+50 LT.
STA. 31+50 LT.
STA 32+50 LT. & RT
STA. 33+50 LT. & RT.
STA. 34+50 RT.
STA. 48+00 RT.
STA. 49+00 RT.



LEFT TURN LANE SECTION
E.B. & W.B. FOR NEW PAVEMENT

LEGEND FOR TYPICAL SECTIONS

1. 2" TYPE C HOT-MIX
2. 5" TYPE B HOT-MIX (2 LIFTS AT 3" & 2")
3. 10" CRUSHER RUN BASE COURSE
4. 6" CRUSHER RUN BASE COURSE
5. 4" TOPSOIL, SEED, & MULCH
6. P.C.C. PARKWAY CURB, TYPE I
7. P.C.C. PARKWAY CURB, TYPE I (MONOLITHIC)
8. P.C.C. CURB & GUTTER, TYPE 3
9. 4" TOPSOIL, CROWNVETCH, SEEDING & MULCHING
10. GALVANIZED STEEL BEAM GUARDRAIL (STEEL POSTS)



SUPERELEVATED SECTION

SIDE SLOPE DETAILS

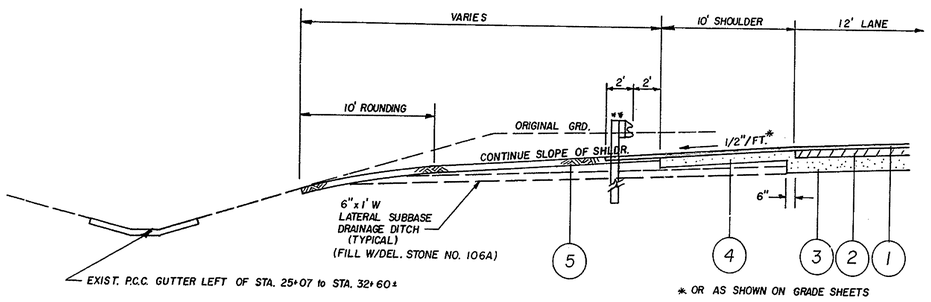
SCALE: HOR. 3/16"=1'-0" VERT. 1/4"= 1'-0"

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL	RS-1130(1)	5	47

CHAPMAN ROAD- PHASE II

PREL. TRACING A.G. DESIGN _____ CHKD. _____

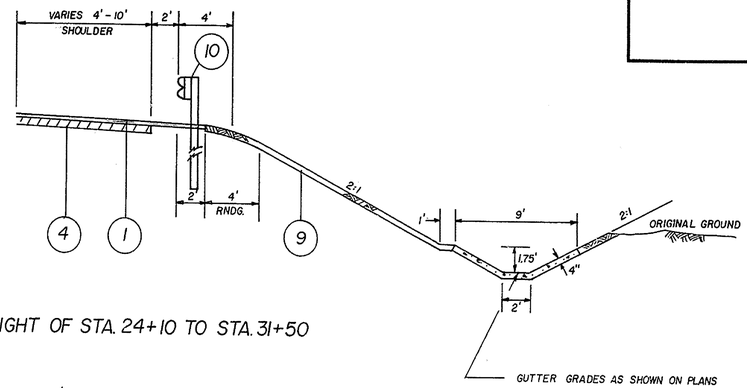
REVISIONS



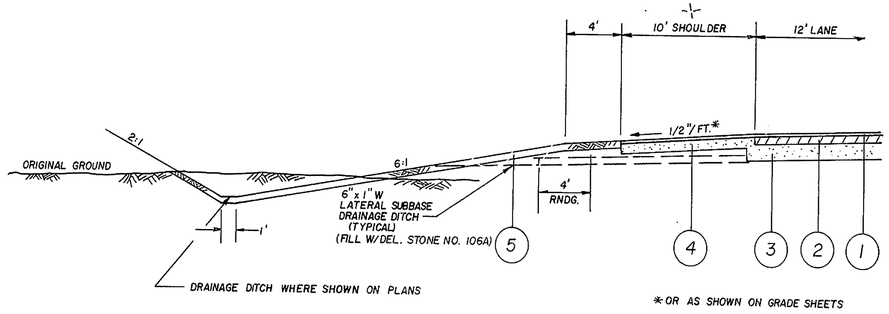
* OR AS SHOWN ON GRADE SHEETS

** STA. 25+00 TO STA. 26+00

LEFT OF STA. 25+00 TO STA. 31+50
RIGHT OF STA. 24+18.53 TO STA. 25+00

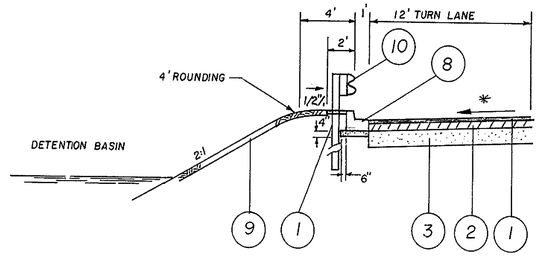


RIGHT OF STA. 24+10 TO STA. 31+50



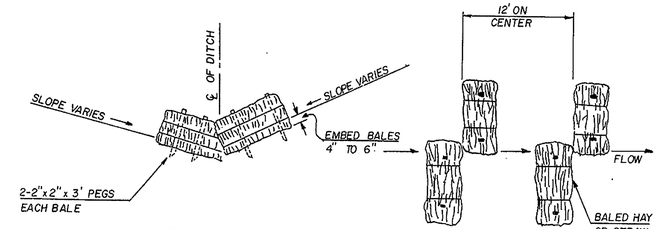
* OR AS SHOWN ON GRADE SHEETS

LEFT OF STA. 32+00 TO STA. 37+00
RIGHT OF STA. 32+00 TO STA. 36+00
45+50 TO STA. 49+50 (12' LANE)



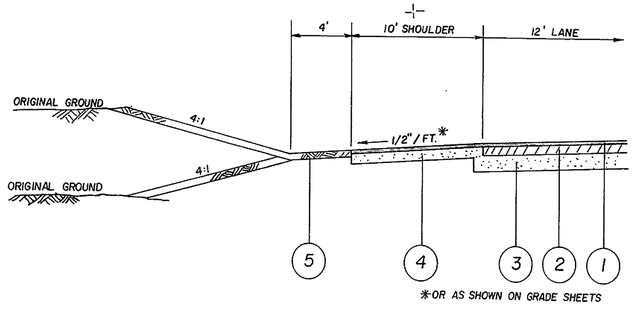
LEFT OF STA. 49+00 TO STA. 50+50

* SLOPE AS SHOWN ON GRADE SHEETS

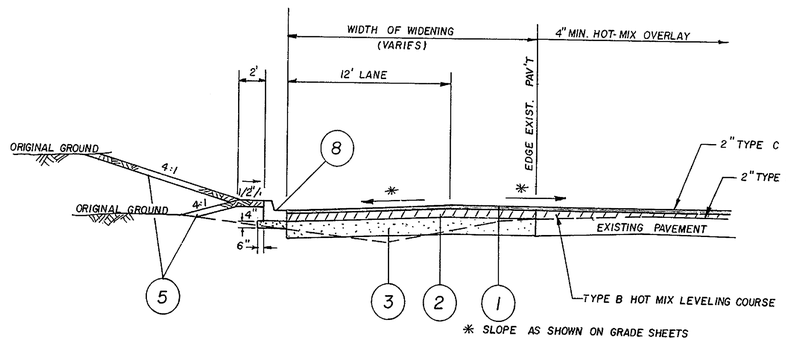


BALED HAY OR STRAW EROSION CHECK

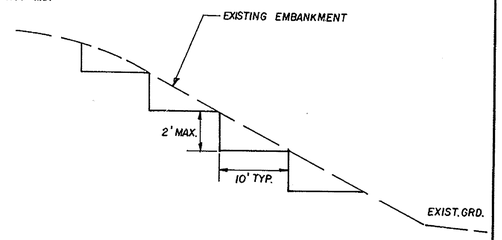
NOTE: Measurement and payment will be by the Bale in place. See Special Provisions.



LEFT OF STA. 38+00 TO STA. 45+00
STA. 51+00 TO STA. 54+50 (12' LANE)
RIGHT OF STA. 37+00 TO STA. 45+00
STA. 51+00 TO STA. 54+00 (12' LANE)



LEFT OF STA. 54+60 TO STA. 59+87.98



BENCHING DETAIL

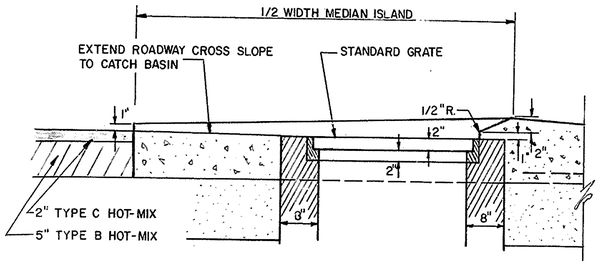
(NO SCALE)

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL	RS-1130(1)	6	47

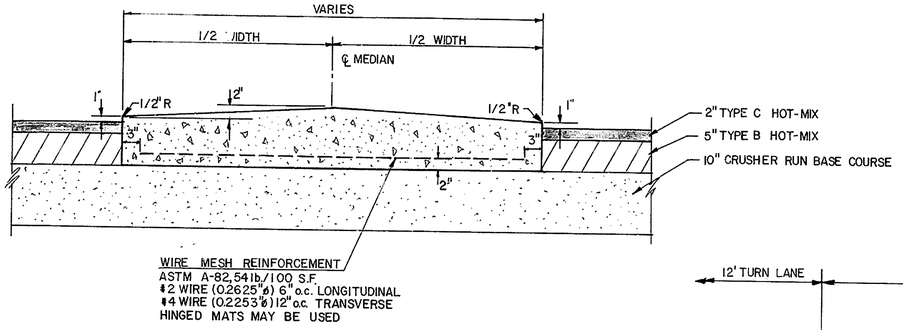
CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

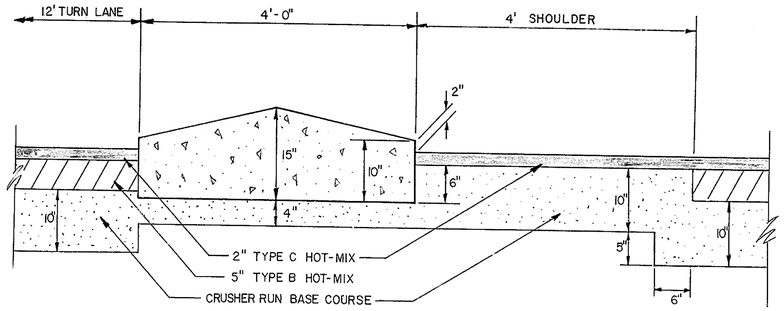


SECTION A-A
SCALE: 1"=1'-0"

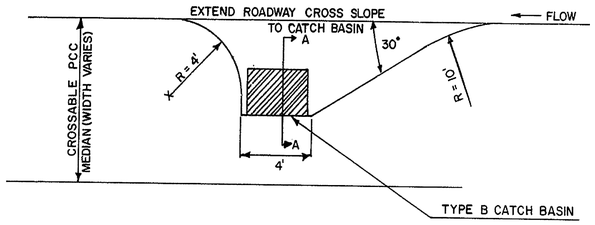


WIRE MESH REINFORCEMENT
ASTM A-82, 54 lb./100 S.F.
#2 WIRE (0.2625"ø) 6" o.c. LONGITUDINAL
#4 WIRE (0.2253"ø) 12" o.c. TRANSVERSE
HINGED MATS MAY BE USED

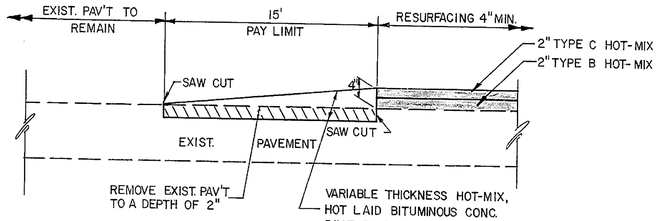
P.C.C. CROSSABLE MEDIAN
STA. 27+20 TO STA. 28+20
SCALE: 1"=1'-0"



P.C.C. PARKWAY CURB TYPE I, MONOLITHIC
ON NEW PAV'T
SCALE: 1"=1'-0"

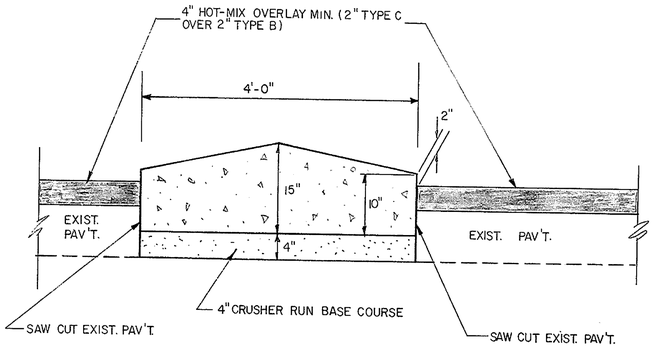


30° ISLAND OPENING & TYPE B CATCH BASIN
SCALE: 1/4"=1'-0" STA 28+00

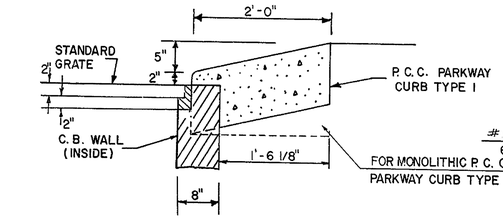


NOTE: HOT MIX USED IN TAPER TO BE INCLUDED IN UNIT PRICE BID FOR SECTION 401, HOT MIX, HOT LAID BITUMINOUS CONC. PAVEMENT. PREPARATION OF TAPER BOX TO BE PAID FOR UNDER SECTION S.P, BUTT JOINT.

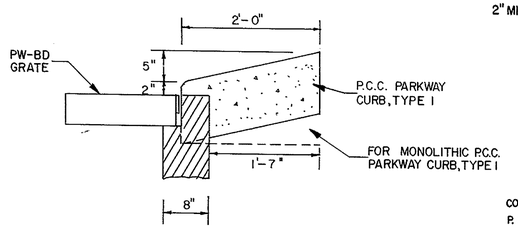
BUTT JOINT
NO SCALE



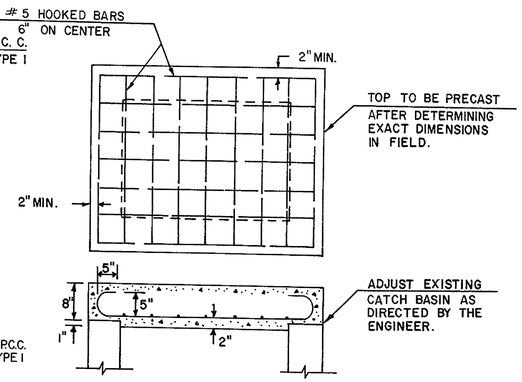
P.C.C. PARKWAY CURB TYPE I, MONOLITHIC
ON EXIST. PAV'T.
SCALE: 1"=1'-0"



B CATCH BASINS
ADJACENT TO P.C.C. PARKWAY CURB TYPE I
NOT TO SCALE

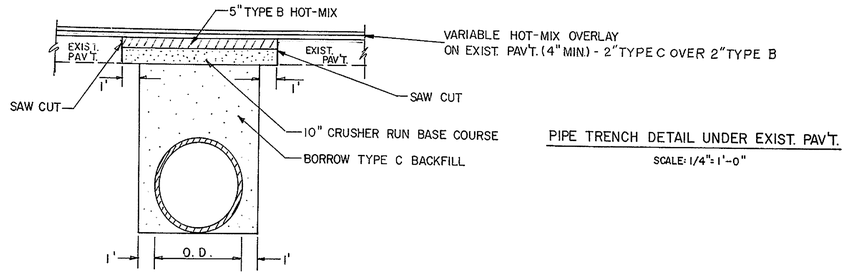


PW-BD CATCH BASIN
ADJACENT TO P.C.C. PARKWAY CURB, TYPE I
NO SCALE



COST OF REMOVING EXISTING CATCH BASIN TOP, AND P.C.C. MASONRY AND REINFORCING STEEL ARE TO BE INCLUDED IN UNIT PRICE BID FOR CONVERTING EXISTING CATCH BASINS TO JUNCTION BOXES.

CONVERTING CATCH BASIN
TO JUNCTION BOX
NOT TO SCALE



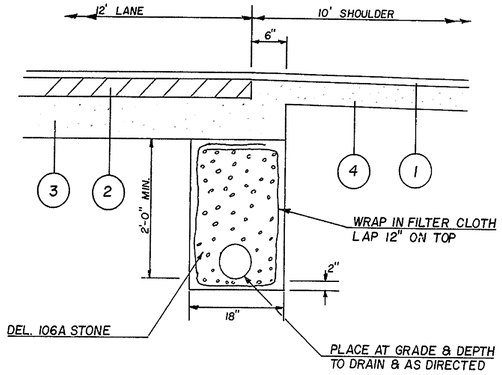
PIPE TRENCH DETAIL UNDER EXIST. PAV'T.
SCALE: 1/4"=1'-0"

COUNTY	CONTRACT	ENWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
New Castle	78-021-15	3	DEL	RS-1130(1)	7	47

CHAPMAN ROAD- PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

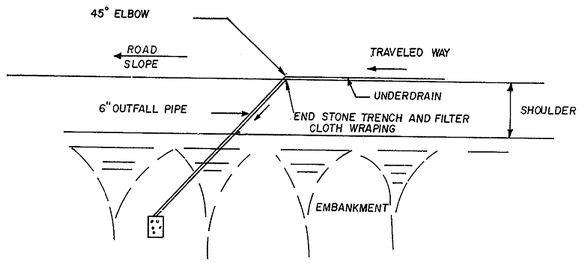
REVISIONS



PERFORATED UNDERDRAIN DETAIL

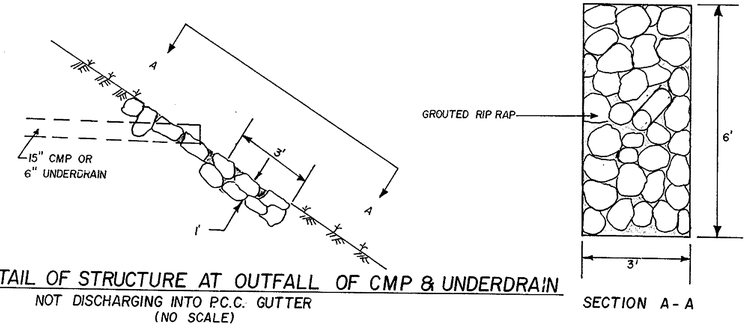
(NO SCALE)

NOTE: PAYMENT FOR FILTER CLOTH AND STONE BACKFILL SHALL BE INCIDENTAL TO SEC. 737, PERFORATED PIPE UNDERDRAIN.



UNDERDRAIN LAYING PROCEDURE

(NO SCALE)



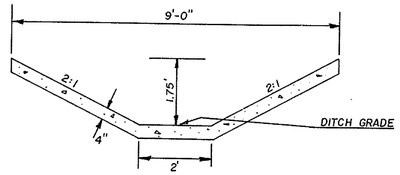
DETAIL OF STRUCTURE AT OUTFALL OF CMP & UNDERDRAIN NOT DISCHARGING INTO P.C.C. GUTTER

(NO SCALE)

SECTION A - A

NOTE:

1. WHEN OUTFALL PIPE GOES INTO A CATCH BASIN, MAINTAIN A MINIMUM INVERT OF 4" ABOVE THE BOTTOM BASIN.
2. MEASUREMENT & PAYMENT FOR OUTFALL PIPE CONNECTOR SHALL BE IN ACCORDANCE TO SECTION 737.05 OF THE STANDARD SPECIFICATION.
3. GROUTED RIPRAP FOR OUTFALL EROSION PROTECTION SHALL BE MEASURED & PAID FOR UNDER SECTION 733.

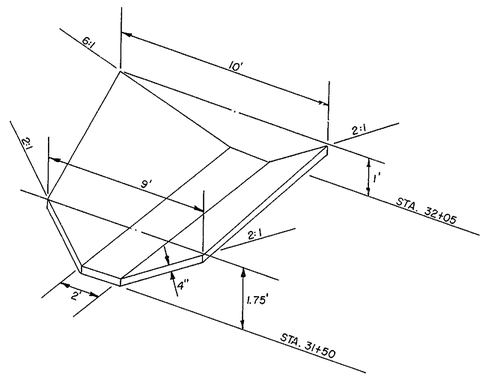


DETAIL OF P. C. C. GUTTER

RIGHT OF STA. 25+35 TO STA. 31+50

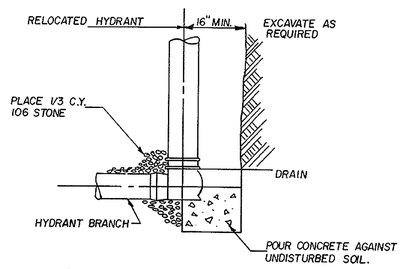
SCALE: 1/2"= 1'-0"

NOTE: Cut-off wall is to be constructed at the beginning and end of P. C. C. gutter in accordance with the detail shown on Std. Sheet No. C-3. The cost of the cut-off wall complete in place to be incidental to the unit price bid for P. C. C. gutter.



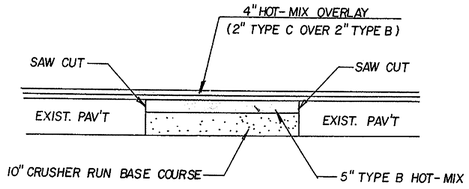
GUTTER TRANSITION FROM STA. 31+50 TO STA. 32+05

(NO SCALE)



RELOCATING EXISTING FIRE HYDRANT

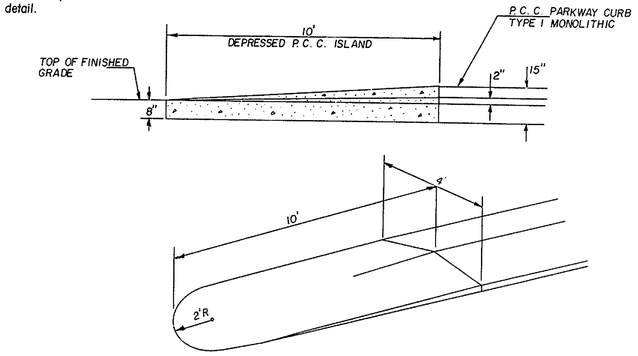
(NO SCALE)



DETAIL FOR PAVEMENT PATCHING

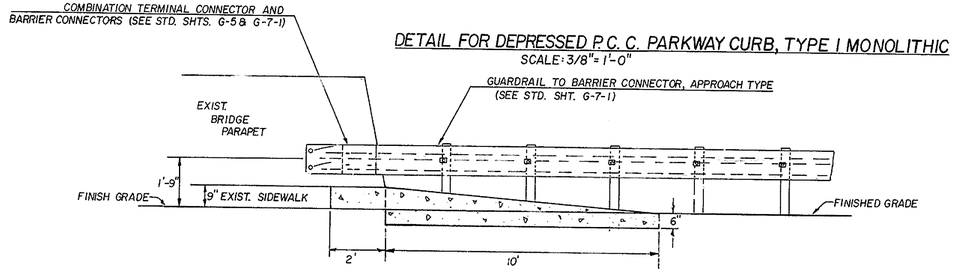
SCALE: 3/8"= 1'-0"

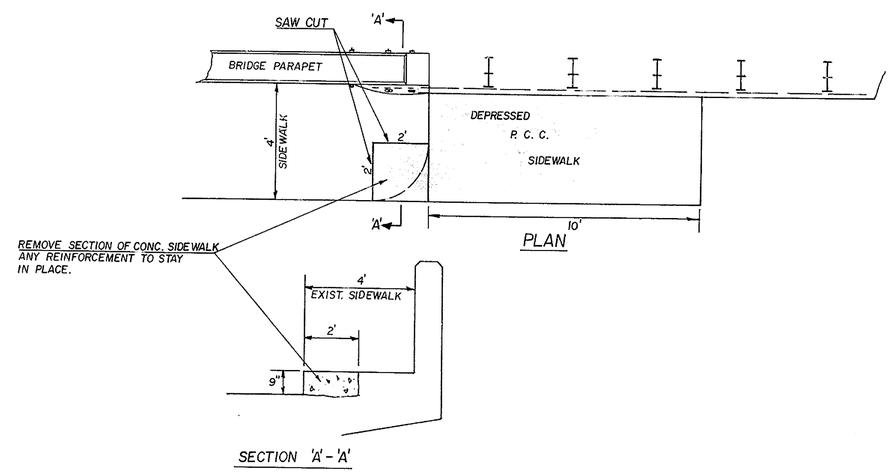
NOTE: There will be no separate payment for patching. All labor and materials needed to complete the work shall be paid for under the respective items shown in the detail.



DETAIL FOR DEPRESSED P.C.C. PARKWAY CURB, TYPE I MONOLITHIC

SCALE: 3/8"= 1'-0"





PLAN

SECTION 'A'-'A'

DETAIL OF DEPRESSED P.C.C. SIDEWALK AT BRIDGE APPROACH

SCALE: 3/8"= 1'-0"

AS-BUILT

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL.	RS-1130(1)	8	47

CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

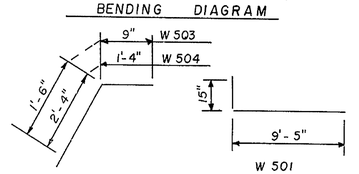
NOTES

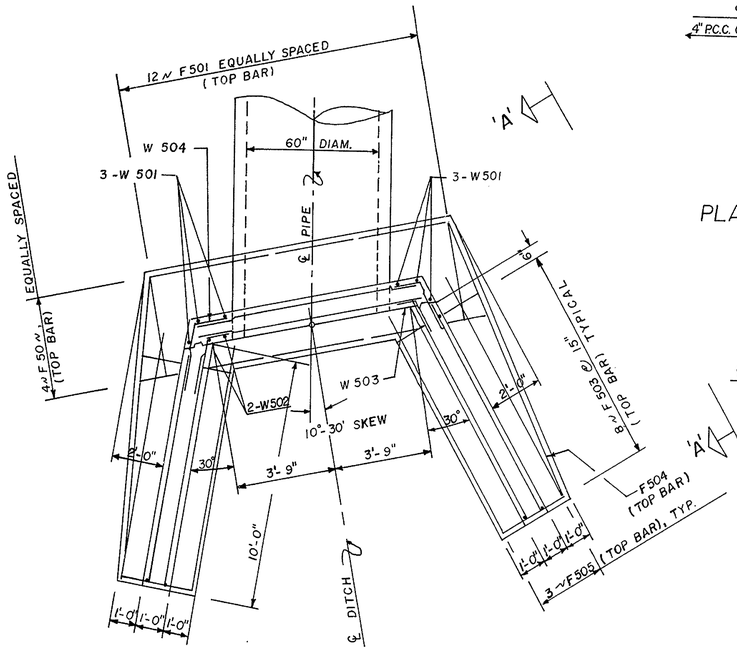
1. DESIGN CRETERIA: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGE 1977 AND INTERIMS.
2. LOADING: AASHTO, HS-20-44
3. SPECIFICATIONS: MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE STD. SPECS. OF DEL. DEPT. OF HIGHWAYS AND TRANSPORTATION, DIVISION OF HIGHWAYS DATED JANURARY 1, 1974 AND SUPPLEMENTAL SPECIFICATIONS DATED JANURARY 1, 1980 AND SPECIAL PROVISIONS.
4. ALLOWABLE STRESSES: ALL CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH Fc = 3,000 PSI, Fc = 1200 PSI, REINFORCING STEEL Fs = 24,000 PSI.
5. FOUNDATION: UNSUITABLE MATERIALS ENCOUNTERED WITHIN THE LIMITS OF THE BOTTOM OF FOOTING CONSTRUCTION SHALL BE EXCAVATED TO UNIFORM DEPTH AND REPLACED BY SUBFOUNDATION BACKFILL AS REQUIRED BY THE ENGINEER.
6. BAR REINFORCEMENT SHALL MEET THE REQUIREMENTS OF A.S.T.M. A-615 GRADE 60.
7. ALL CONSTRUCTION JOINTS ARE TO BE 2" x 4" KEYED.
8. ALL OUTSIDE CONCRETE CORNERS SHALL BE CHAMFERED 3/4".
9. BACKFILL SHALL BE DONE SIMULTANEOUSLY ON BOTH SIDES OF PIPE.

REINFORCING BAR LIST

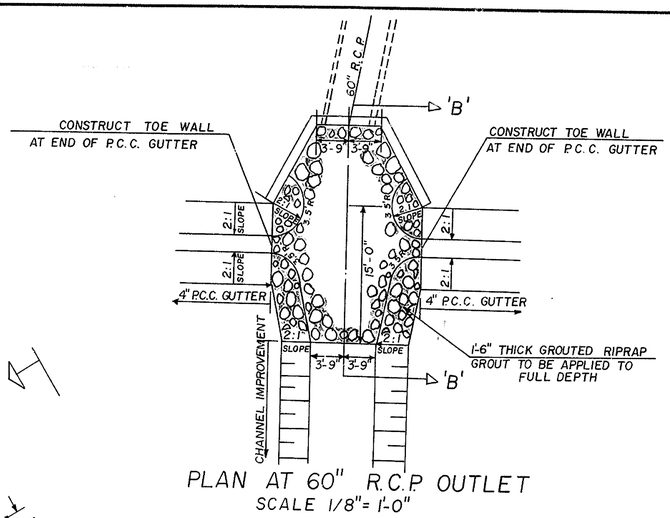
STRAIGHT BARS				BEND BARS			
MARK	SIZE	NUMBER	LENGHT	MARK	SIZE	NUMBER	LENGHT
W 502	5	6	9'-5"	W 501	5	6	10'-8"
W 505	5	8	8'-10"	W 503	5	18	2'-3"
W 506	5	8	6'-0"	W 504	5	18	3'-8"
W 507	5	9(2 SETS)	6'-0" TO 9'-3"				
W 408	4	9(2 SETS)	6'-0" TO 9'-3"				
W 409	4	4	3'-4"				
W 410	4	4	8'-10"				
W 411	4	4	5'-9"				
W 412	4	16	8'-4"				
F 501	5	12	3'-8"				
F 502	5	4	11'-8" TO 13'-7"				
F 503	5	8(2 SETS)	2'-8" TO 3'-6"				
F 504	5	2	10'-9"				
F 505	5	6	9'-0"				

BENDING DIAGRAM

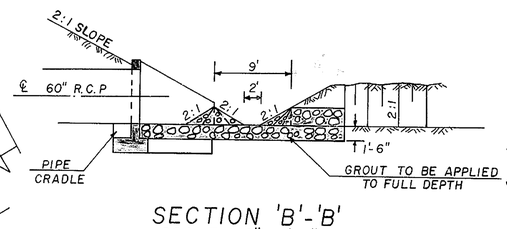




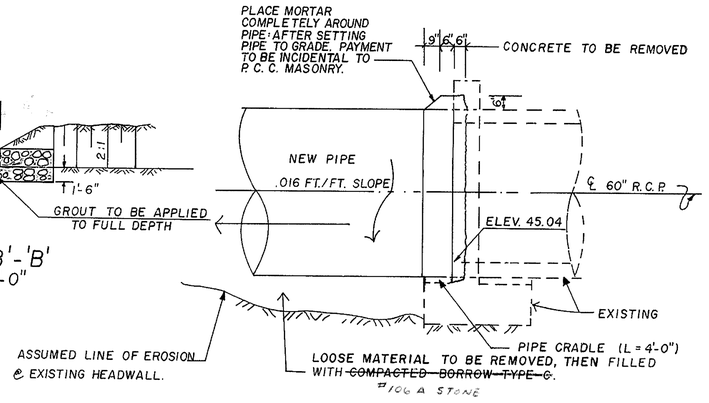
PLAN
SCALE 3/8" = 1'-0"



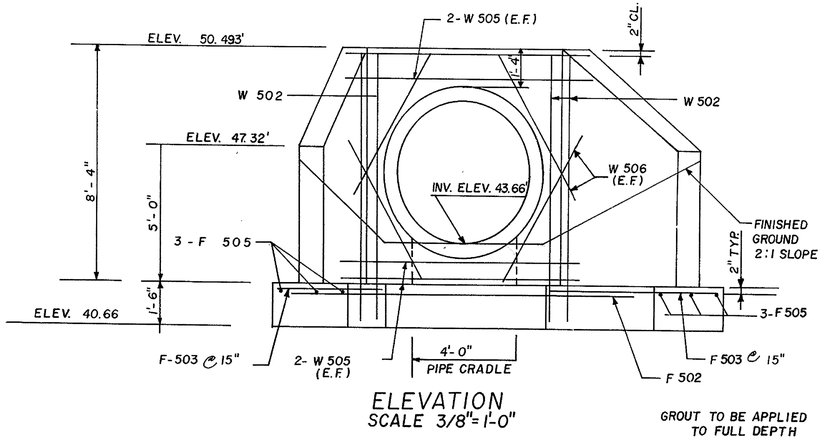
PLAN AT 60" R.C.P OUTLET
SCALE 1/8" = 1'-0"



SECTION 'B'-'B'
SCALE 1/8" = 1'-0"

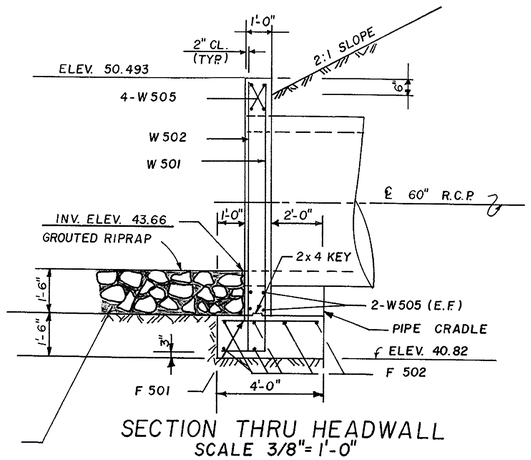


JOINT DETAIL BETWEEN THE OLD AND NEW PIPE
SCALE 3/8" = 1'-0"

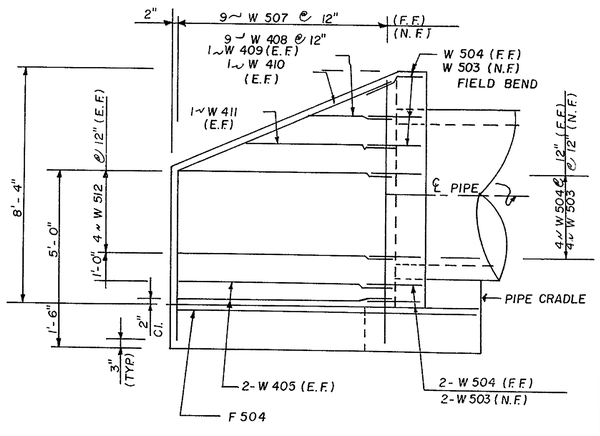


ELEVATION
SCALE 3/8" = 1'-0"

GROUT TO BE APPLIED TO FULL DEPTH



SECTION THRU HEADWALL
SCALE 3/8" = 1'-0"



VIEW A-A
SCALE 3/8" = 1'-0"

DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

HEADWALL DETAILS AND BAR LIST

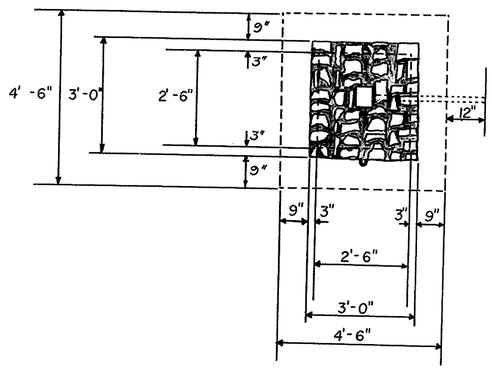
D T C	SCALE 3/8" = 1'-0" 1/8" = 1'-0"	APPROVED BY BRIDGE ENGINEER

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL	RS-1130(1)	9	47

CHAPMAN ROAD- PHASE II

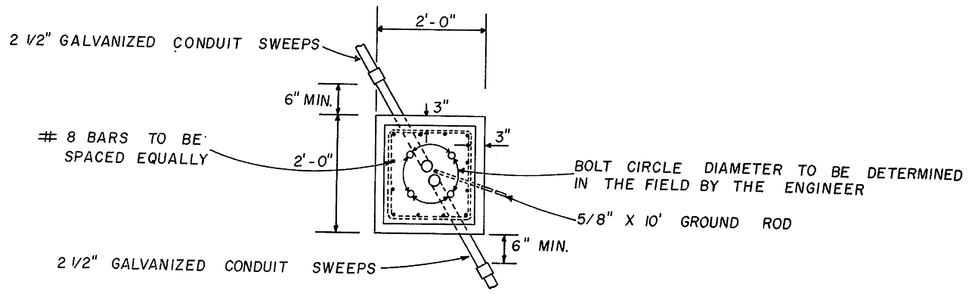
PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS



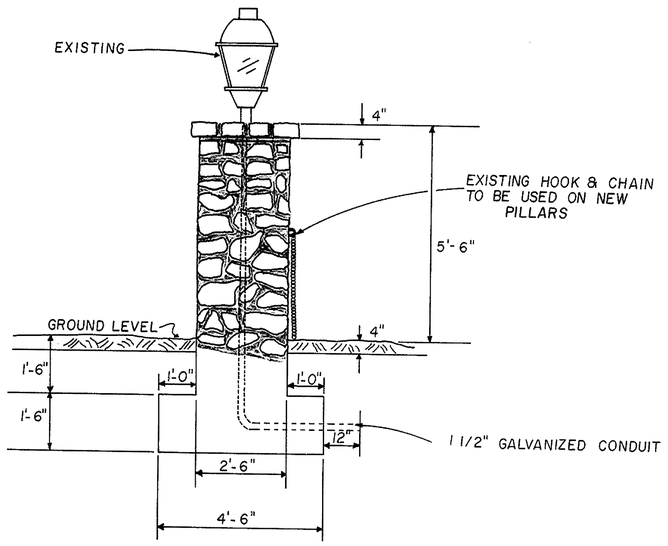
PLAN

SCALE 1/2" = 1'-0"



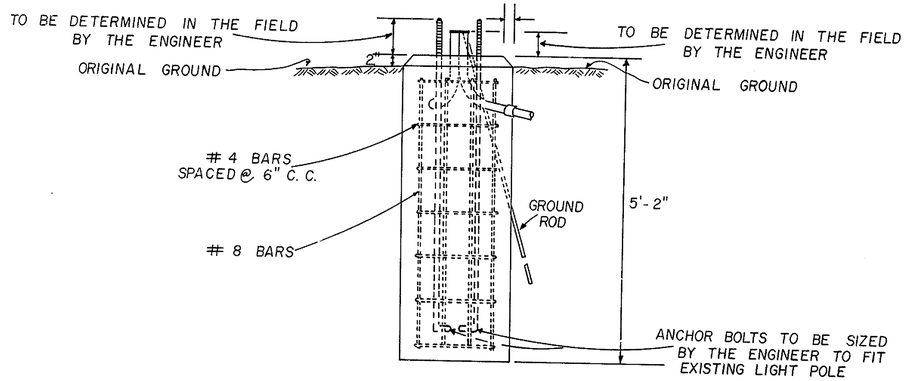
PLAN

SCALE 3/4" = 1'-0"



DETAIL FOR STONE PILLARS

ENTRANCE TO DP&L RECREATION AREA
STA. 47+80±
SCALE 1/2"= 1'-0"



TYPICAL LIGHT POLE BASE

(TO BE LOCATED IN THE FIELD BY THE ENGINEER)
SCALE 3/4" = 1'-0"

NOTES:

1. The entire stone pillars shall be removed and reconstructed behind the new Right Of Way Line or at the location designated by the property owner and as directed by the engineer.
2. Stones from the existing pillars shall be used as a guide for determining the size, texture and color of the new stones necessary for construction.
3. Existing lanterns shall be salvaged and reused on the new pillars.
4. All wirings of the fixtures shall be in accordance with the National Electrical Code.
5. Direct bury cable may be used.
6. Provide 1 1/2" galvanized conduit in masonary structures.
7. Lump sum price bid for replacement of stone pillars includes removal of existing pillars, P.C.C. Masonary, P.C.C. Footing, Excavation and Backfill, 1 1/2" Galvanized Conduit, Wiring and any incidentals necessary to complete construction of the proposed work.

NOTES:

1. Base to be used with existing light pole and luminaire. See Standard Sheet T-2 for applicable information.
2. See Special Provisions for Construction Methods.
3. Payment to be incidental to S.P. Removal And Installation Of Existing Light Pole & Luminaire On New Pole Bases.

BAR SCHEDULE			
BAR #	QTY.	LENGTH	TOTAL LENGTH
# 4	12	4'-6"	54'-0"
# 8	7	6'-0"	42'-0"

GRADES & GEOMETRICS SHEET

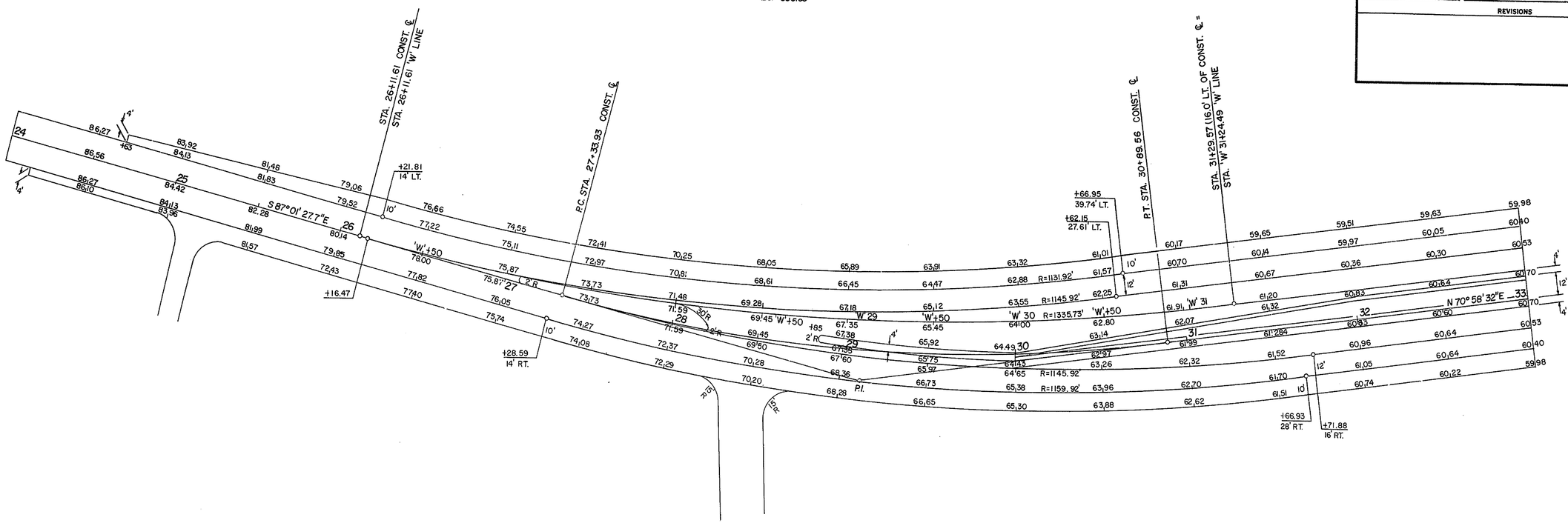
COUNTY	CONTRACT	FHWA REQ. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL.	RS-1130(1)	10	47

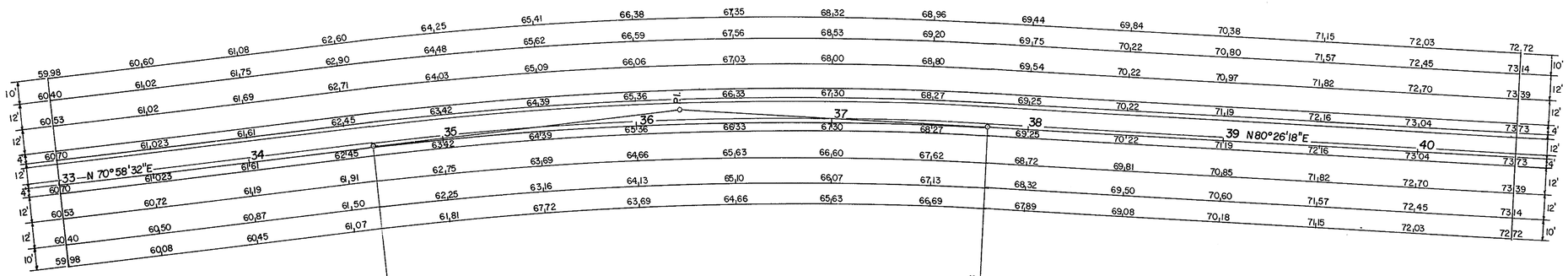
CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

P.I. STA. 29 13.96 CONST. ℄
Δ = 22° 00' LT.
D = 6°11'11"
R = 926.17'
T = 180.03'
L.C. = 355.63'





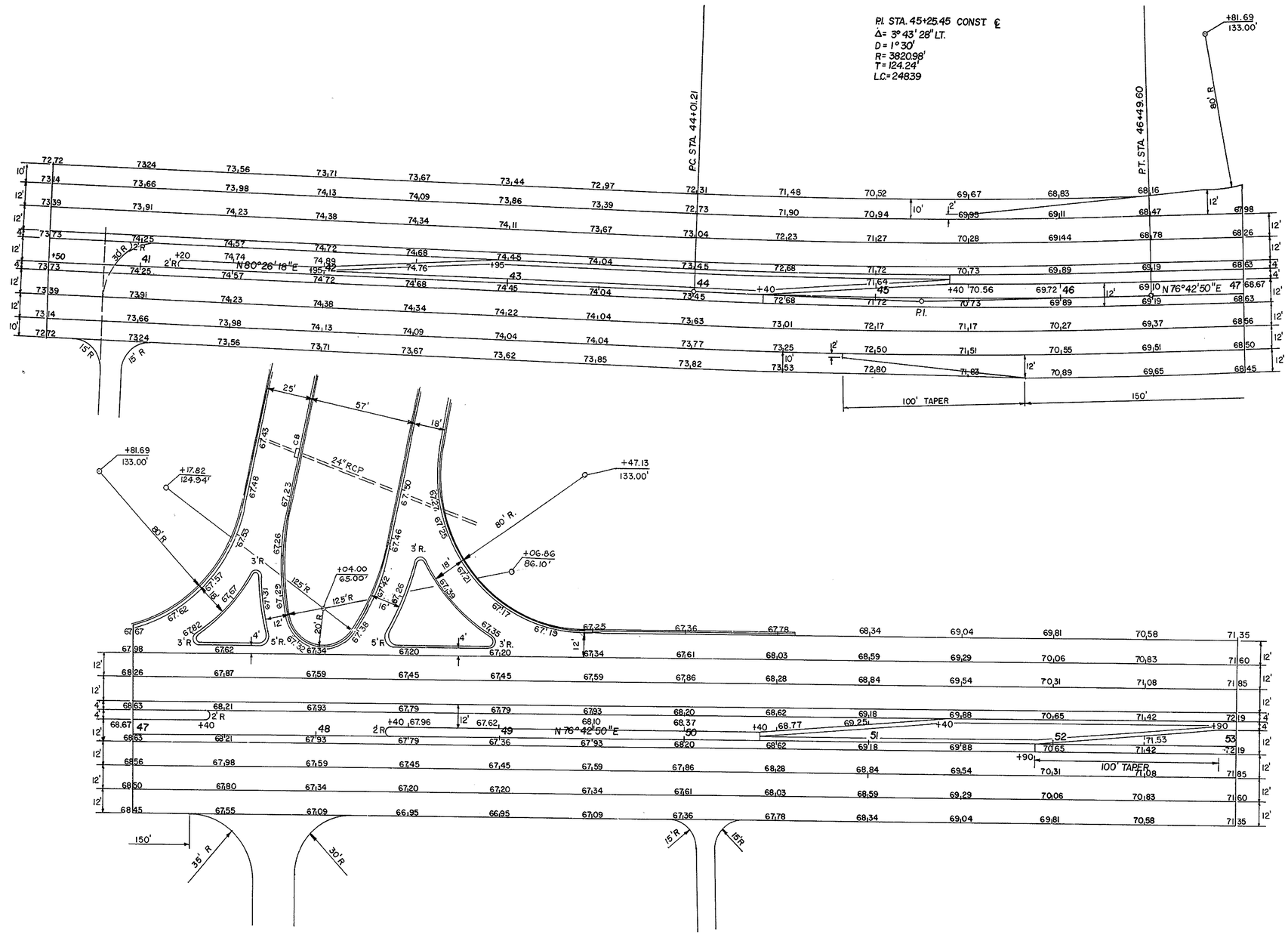
GRADES & GEOMETRICS SHEET

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N. C.	78-021-15	3	DEL.	RS-1130(1)	11	47

CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS



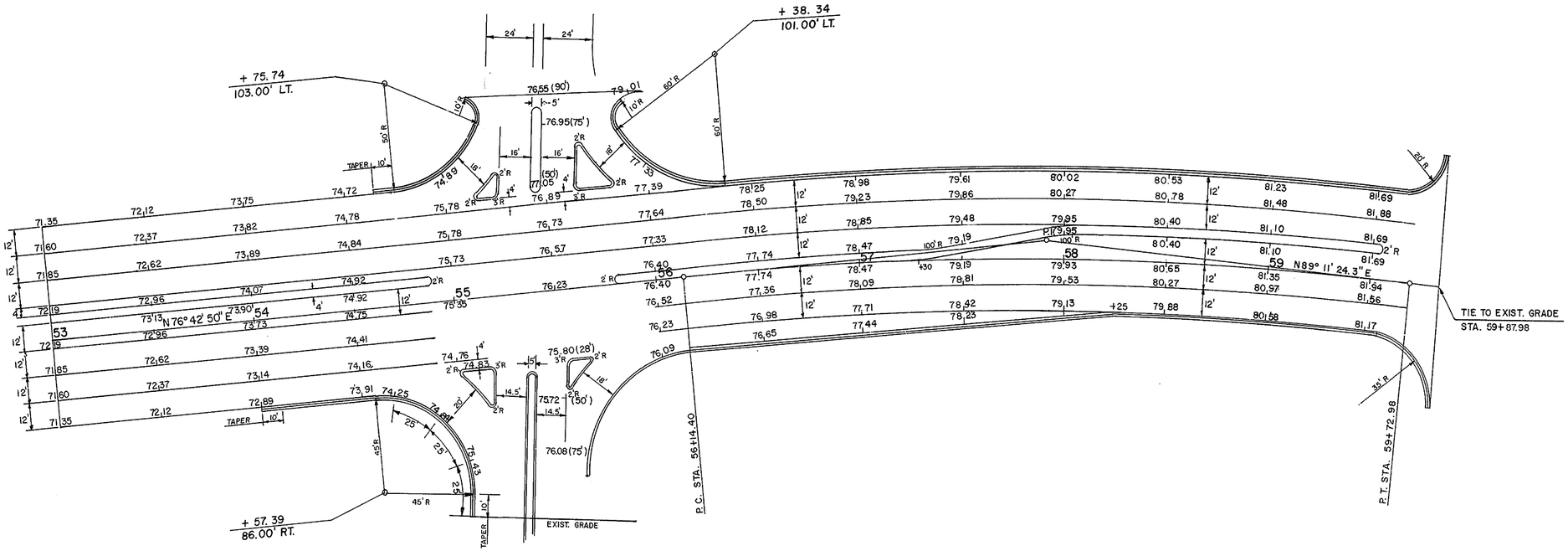
COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-19	3	DEL.	RS-1130(1)	12	47

CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

GRADES & GEOMETRICS SHEET



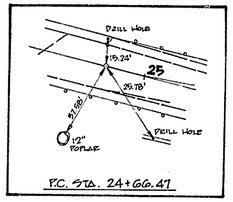
P.I. STA. 57+94.40
△=12° 28' 35" RT.
D = 3° 28' 46"
T = 180.00'
R = 1646.71'
L.C.= 358.58'

COUNTY	CONTRACT	FHWA R.O.W. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	70-021-15	3	DEL	RS-1130(1)	5	47

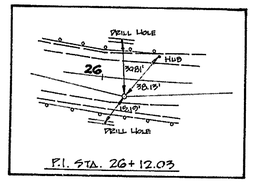
CHAPMAN ROAD - PHASE II

PREL. TRACING JA Fultz DESIGN _____ CHKD. _____

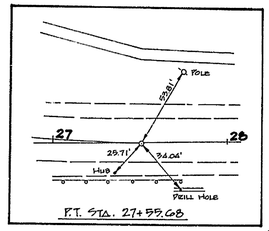
REVISIONS



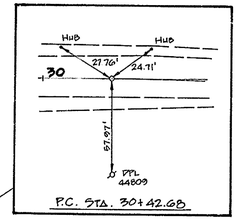
P.C. STA. 24+66.47



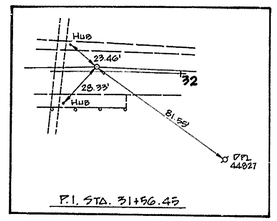
P.I. STA. 26+12.03



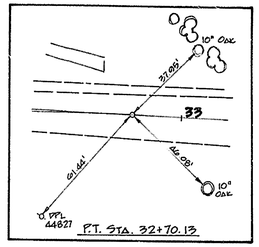
P.T. STA. 27+59.68



P.C. STA. 30+42.68



P.I. STA. 31+56.45



P.T. STA. 32+70.13

SURVEY

P.I. STA. = 26+12.03
Δ = 16° 16' 40" LT.
T = 145.61'
L = 289.26'

CONSTRUCTION ℄

P.I. STA 29+13.96
Δ = 22° 00' LT.
D = 6° 11' 11"
R = 926.17'
T = 180.03'
L.C. = 355.63'
P.C. = STA 27+33.93
P.T. = STA 30+89.56

NOTE: Roto Mill existing pavement and replace with 2" Type C Hot Mix to finish grade from STA. 24+18.53 to STA. 24+66.42.

Construct 10' Depressed Sidewalk (See sht. 7)

P.C. STA. 24+66.42

Place 1 Guardrail to Barrier Connection, Approach Type

Place 625 L.F. of Galvanized Steel Beam Guardrail

Place 1 Twisted End Anchorage

Remove Exist. Guardrail

Construct Depressed Sidewalk (See sht. 7)

Place 1 Guardrail to Barrier Connection, Approach Type

Remove existing guardrail & place 100 L.F. of Galvanized Steel Beam Guardrail

25+00 58.59

Saw Cut

71.00

69.39

Construct P.C.C. Gutter

Place 375 L.F. of Galvanized Steel Beam Guardrail

REGINA COLE

Remove 65 L.F. Of Exist. Gutter

Place 1 Flared End Section

P.C.C. Crossable Median See sht. 6

Relocate gate & fence See General Note Nº 5

Construct 14'x150'x5'H Sediment Trap, Earth Outlet Type. See Sht. 29

+47.04 42.70

+68.52 38.96

Place 390 L.F. Galvanized Steel Beam Guardrail

Construct P.C.C. Gutter

Place 1 Flared End Section

29+00 76.00'

NOTE: Actual alignment of ditch should be determined in the field to align with existing ditch@STA. A 2+00.

Fill existing ditch and section of exist. ditch outside pipe trench limits with Type F Borrow as directed by the Engineer

Bottom of existing ditch El=42.00

+67.42 151.84

+96.14 144.70

STA. 32+00 End Guardrail

Place 42 S.Y. Grouted Riprap

Place 2.0 S.Y. Grouted Riprap

CONSTRUCT 11'x148'x5'H SEDIMENT TRAP EARTH OUTLET TYPE. SEE SHT. 29

65' Channel Improvement

54.15

53.50

45.75

+70.84 89.80'

+02.50 81.24'

B.M. 1 — DRILL HOLE IN CONC. SIDEWALK OF BRIDGE 14' LT. STA. 24+65. EL. 87.15

B.M. 2 — CHISLED X ON CONC. HEADWALL OF BOX CULVERT 43' RT. STA. 31+31. EL. 51.64

NOTES: See sheet Nº 7 for detail of P.C.C. Gutter Transition from STA. 31+50 to STA. 32+05.

See sheet Nº 8 for details of the extension of the 60" R.C.P.

Borings taken from Const. ℄.

P.I. STA. 31+56.45
Δ 03° 53' 20" RT
T 113.77'
L 227.45'

P.V.I. STA. 31+50 EL. 56.62
L.V.C. = 600'
M.G. = 4.66'
S.S.D. = 428'

CATCH BASIN, MANHOLE, AND JUNCTION BOX SCHEDULE

Nº	TYPE	STATION	TOP GRATE	INVERT
CB-1*	B	28+00 LT.	71.37	66.37
CB-2	B	30+00 RT.	64.43	58.43
CB-3	PWBD-1	32+50	60.60	57.35

*See sht no.6 for details of CB-1.

PIPE SCHEDULE

Nº	TYPE	LENGTH	INT. INV.	DISCH. INV.
1	15"CSP 14 Ga.	57'	66.37	60.57
2	18" R.C.P.	90'	60.00	55.72
3	15"CSP 14 Ga.	57'	50.43	51.89
4	60" R.C.P.	84'	45.04	43.66
5	15" CSP 14 Ga.	70'	57.35	55.00

-42766 %

HORIZONTAL : 1" = 20'
VERTICAL : 1" = 5'
DATUM : 50

PROFILE SURVEY ℄

PROPOSED PROFILE CONST. ℄

PVC

P.V.I.

EL. 57.5

Topsoil & Root Mat
No Sample
A-7-6 (12)

A-4(7)
A-4(7)
A-6 (7)
A-6(14)
A-4(6)
A-4(3)

Topsoil A-4 (7)

Grass A-1-b(0) A-2-4(0) A-4

Topsoil A-4(9) A-4(0)

GR. 87.90 GR. 85.85 GR. 84.42 GR. 82.28 GR. 80.14 GR. 78.00 GR. 75.87 GR. 73.73 GR. 71.59 GR. 69.45 GR. 67.44 GR. 65.69 GR. 64.20 GR. 62.97 GR. 61.09 GR. 61.28 GR. 60.82 GR. 60.60 GR. 60.70

+10.69 +64.42 +89.00 25 +34.00 +50.00 26 +50.00 27 +50.00 28 +18.00 +38.00 +50.00 +74.00 29 +50.00 30 +50.00 31 +10.00 +37.00 +50.00 32 +50.00 33

SMITH & BURRIS RENDERING CO

COMMONWEALTH TRUST CO

WOODS

STATE OF DELAWARE

MATCH LINE STA. 33+00

D C B A 1 5 10 A B C D

AS BUILT

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	76-021-15	3	DEL	RS-1130(1)	14	47

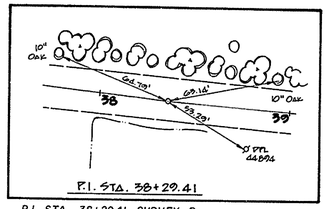
CHAPMAN ROAD - PHASE II

PREL. TRACING Wilmington DESIGN _____ CHKD. _____

REVISIONS

PIPE SCHEDULE				
№	TYPE	LENGTH	INT. INV.	DISCH. INV.
6	15" C.S.P. 14 GA.	62'	59.86	57.37
7	15" C.S.P. 14 GA.	53'	63.66	63.00

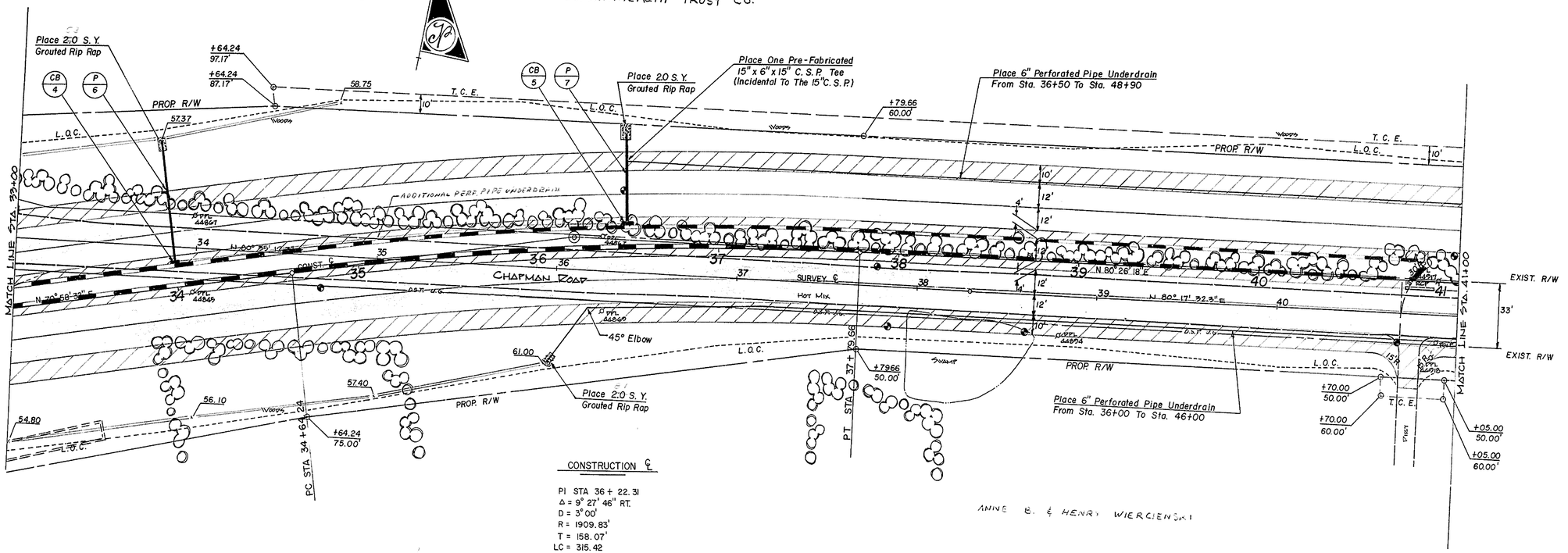
CATCH BASIN, MANHOLE AND JUNCTION BOX SCHEDULE				
№	TYPE	STATION	TOP GRATE	INVERT
CB-4	B	34+00 LT.	61.61	58.86
CB-5	B	36+50 LT.	66.33	63.66



P.I. STA. 38+29.41

P.I. STA. 38+29.41 SURVEY ℄
Δ 0°17'40" LT.

COMMONWEALTH TRUST CO.

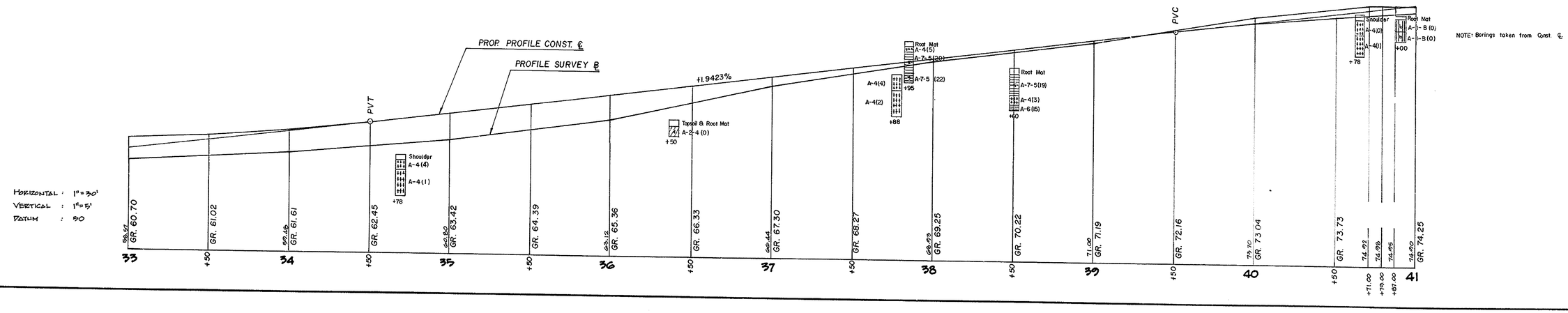


CONSTRUCTION ℄

PI STA 36 + 22.31
Δ = 9° 27' 46" RT.
D = 3° 00'
R = 1909.83'
T = 158.07'
LC = 315.42

ANNE B. & HENRY WIERCIENSKI

B.M. 3 NAIL IN DFL 44918, 20' RT. OF STA. 40+87.
EL. 75.12



NOTE: Borings taken from Const. ℄

AS-BUILT

NOTE: Sta 44+96.45 To Sta 46+67.96 LEFT- Remove only those trees within the 10' easement that will interfere with the grading of the side slope.

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL	RS-1130(1)	15	47

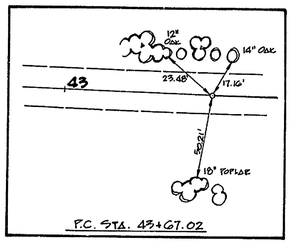
CHAPMAN ROAD - PHASE II

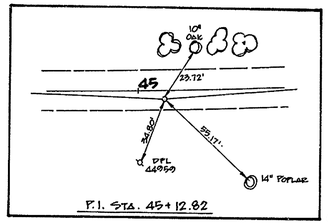
PREL. TRACING J. White DESIGN _____ CHKD. _____

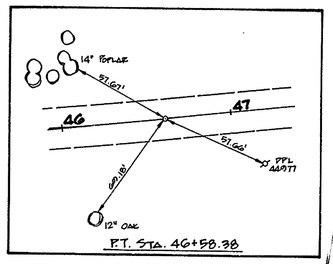
REVISIONS

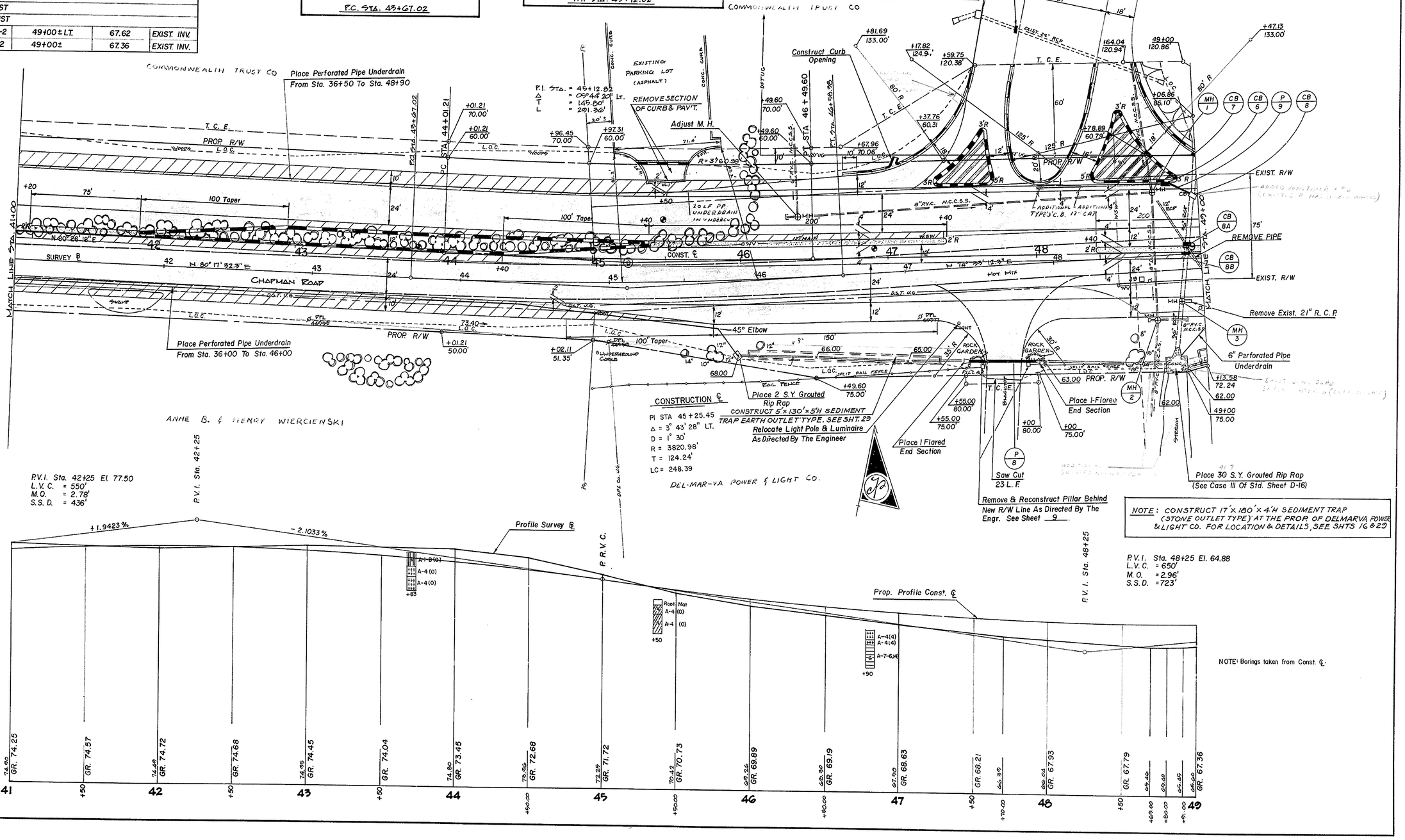
PIPE SCHEDULE				
Nº	TYPE	LENGTH	INT. INV.	DISCH. INV.
8	15" R.C.P.	45'	64.19	63.33
9	15" R.C.P.	15'	62.92	EXIST. INV.

CATCH BASIN, MANHOLE AND JUNCTION BOX SCHEDULE				
Nº	TYPE	STATION	TOP GRATE	INVERT
CB-6	PW BD-1	48+90 LT.	67.04	62.92
CB-7	J	49+10 LT.	67.15	EXIST. INV.
CB-8	CONVERT TO JUNCTION BOX			
MH-1	ADJUST			
MH-2	ADJUST			
MH-3	ADJUST			
CB-8A	PW BD-2	49+00± LT.	67.62	EXIST. INV.
CB-8B	PW BD-2	49+00±	67.36	EXIST. INV.









COUNTY	CONTRACT	FHWA R.C.G. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL	RS-1130(1)	16	47

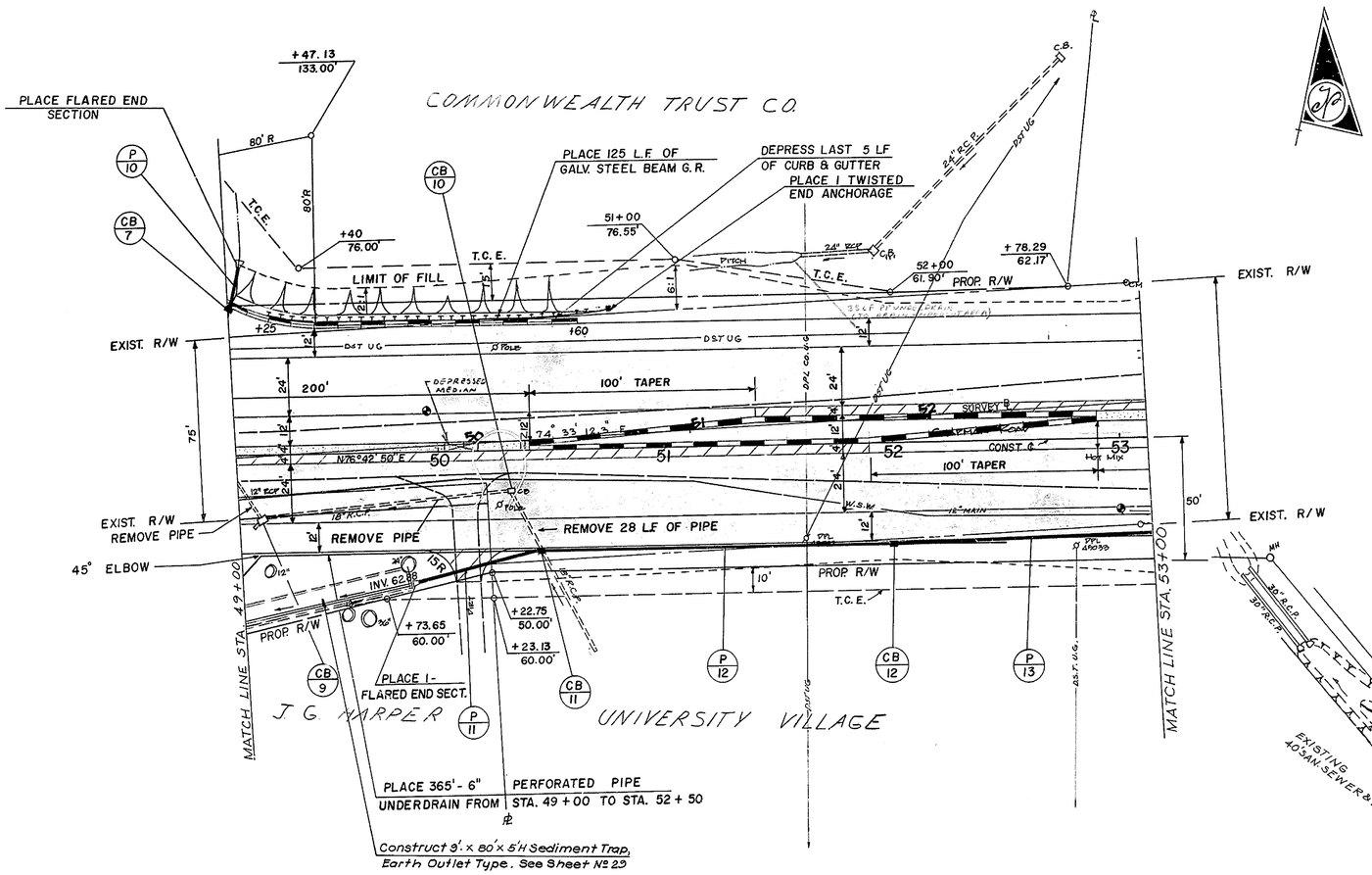
CHAPMAN ROAD - PHASE II

PREL. TRACING 11/20/10 DESIGN _____ CHKD. _____

REVISIONS

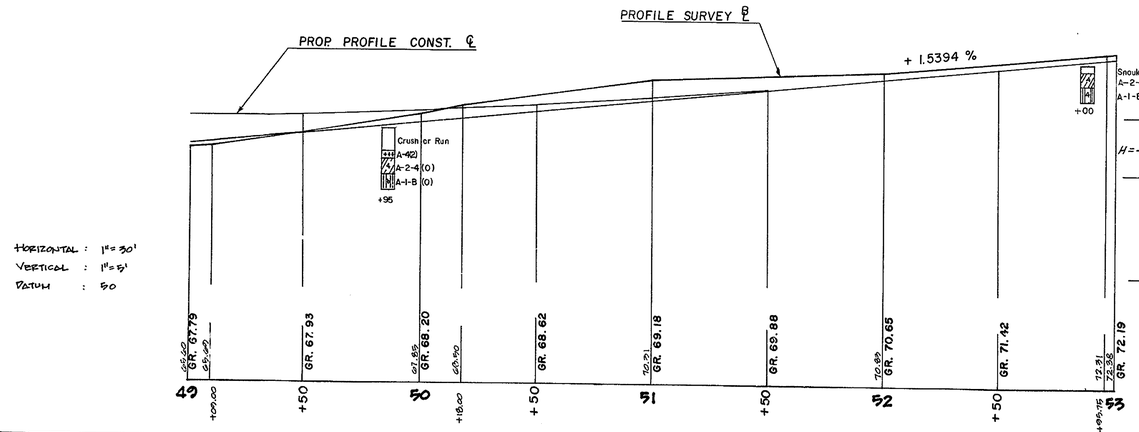
B.M. 4 CONCRETE MONUMENT
50' LT. ℄ STA. 52+95.75
ELEV. 70.61

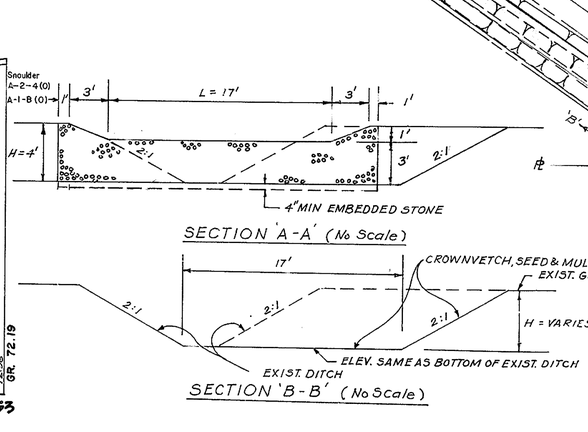
AS-BUILT

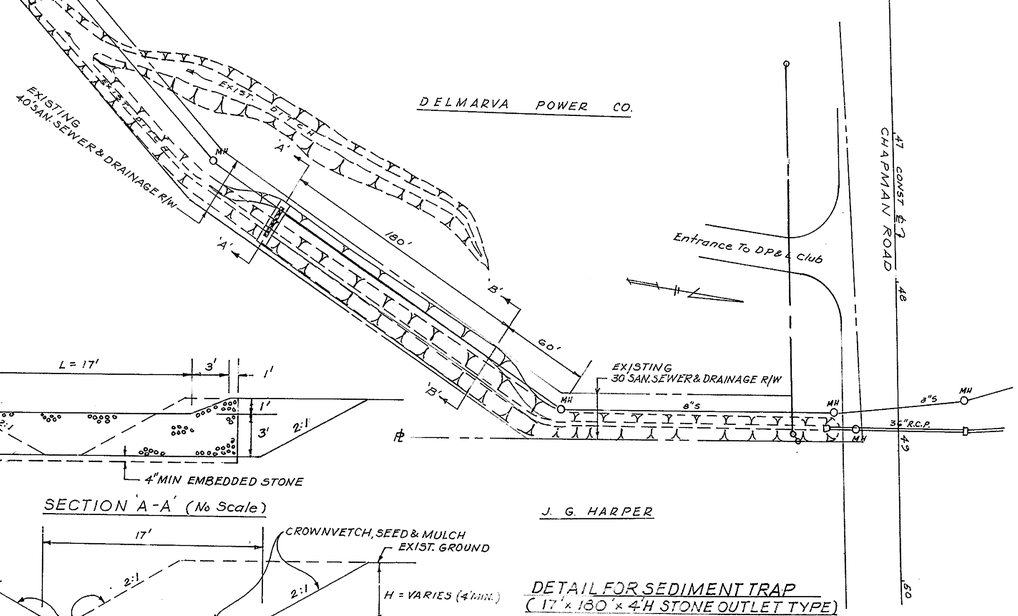


PIPE SCHEDULE				
No.	TYPE	LENGTH	INT. INV.	DISCH. INV.
10	30" R.C.P.	18'	61.00	60.75
11	24" R.C.P.	55'	63.32	62.88
12	24" R.C.P.	153'	64.55	63.32
13	24" R.C.P.	245'	66.51	64.55

CATCH BASIN, MANHOLE AND JUNCTION BOX SCHEDULE				
No.	TYPE	STATION	TOP GRATE	INVERT
CB-7	J	49+10 LT.	67.15	EXIST. INV.
CB-9	REMOVE	CATCH BASIN		
CB-10	REMOVE	CATCH BASIN		
CB-11	PWBD-2	50+45 RT.	67.41	63.32
CB-12	PWBD-2	52+00 RT.	69.81	64.55







DETAIL FOR SEDIMENT TRAP
(17' x 180' x 4'H STONE OUTLET TYPE)
LOCATION: DP&L Co. PROPERTY

NOTE: FOR ADDITIONAL DETAIL, SEE SHT. 29

AS-BUILT

COMMONWEALTH TRUST CO.

NOTE: Where Existing Concrete Islands Are Removed, The Areas Not Directly Under New Conc. Island Shall Be Replaced W/Full Depth Pavement Consisting Of 2" Type C Hot Mix And 5" Type B Hot Mix Over 10" Crusher Run Base Course.

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	18-021-15	3	DEL	RS-1130(1)	17	47

CHAPMAN ROAD - PHASE II

PREL. TRACING AG DESIGN CHKD.

REVISIONS

CONSTRUCTION ℄

PI STA 57 + 94.40
Δ = 12° 28' 35" RT.
D = 3° 28' 46"
T = 180.00'
R = 1646.71'
LC = 358.58'

P.C. STA. 56+14.40 Const. ℄

P.I STA. 57+94.40 Const. ℄

P.T. STA. 59+72.98 Const. ℄ = STA 'S' 7+97.27

EQ - PT STA 59 + 72.98 = STA 'S' 7+ 97.27

PC STA 56+14.40

PC STA 7+07.13

Remove headwall & plug pipe at both ends as directed by the Engineer.

Remove pipe & headwall

Butt Joint

Butt Joint tie to exist pave. STA 59+87.98

Saw Cut Edge Of Pav't

Relocate fire hydrant (BY OTHERS)

Construct P.C.C. Gutter to curb opening

REMOVE EXIST. MC. P.C. GUTTER & REPLACE FOR PROP. DRAINAGE

UNIVERSITY VILLAGE

COMMONWEALTH TRUST CO.

Curb Transition

Depress curb

PROP R/W

EXIST. R/W

MATCH LINE STA 53+00

CONST. ℄

SURVEY ℄

L.O.C.

T.C.E.

CONC. CURB

PARKING LOT

EXIST. DRIVE

GRASS

PITCH

N 74° 55' 12.3" E

N 76° 42' 50" E

N 89° 11' 24.3" E

200' Taper

END OF MATHEMATICAL GRADES AND END OF PROFILE ALONG SURVEY ℄

BEGIN. OF PROFILE ALONG CONST. ℄ AND BEGIN. OF SPLINED GRADES

BEGIN 4" AVG. HOT MIX OVERLAY

PROFILE SURVEY ℄

PROFILE CONST. ℄

PROPOSED PROFILE CONST. ℄

EXIST. PROFILE ALONG PROP. CONST. ℄

+1.5394 %

Topsoil
A-6(7)

Topsoil
A-2-4(0)
A-4(1)

Topsoil
A-4(0)
A-1-6(0)
A-6(7)

Water

NOTE: Borings taken off Const. ℄.

HORIZONTAL : 1" = 50'
VERTICAL : 1" = 5'
DATUM : 50

	53		54		55		56		57		58		59		60
	72.38	74.09	73.56	74.42		75.02		75.90		76.57		77.41		78.14	
GR.	72.19	78.96	73.73	74.75		73.35		76.23		76.40		77.74		78.47	
				+50.00				+50.00				+50.00			
		78.66		79.19		79.40		80.32		81.02		81.61		82.08	
GR.		79.93		80.65		81.35				81.94					

PIPE SCHEDULE

Nº	TYPE	LENGTH	INT. INV.	DISCH INV.
13	24" R.C.P.	245'	66.51	64.55
14	24" R.C.P.	80'	67.63	66.51
15	15" R.C.P.	32'	74.15	73.80
16	15" R.C.P.	10'	74.45	73.80
17	15" R.C.P.	145'	76.13	74.45
18	15" R.C.P.	20'	EXIST. INV.	76.13
19	15" R.C.P.	32'	76.44	76.13
20	15" R.C.P.	148'	78.06	76.13
21	15" R.C.P.	60'	73.97	73.10
22	15" R.C.P.	137'	75.99	73.97
23	15" R.C.P.	127'	77.94	75.99

CATCH BASIN, MANHOLE AND JUNCTION BOX SCHEDULE

Nº	TYPE	STATION	TOP GRATE	INVERT
JB-1	Nº 2	54+65 LT.	Set in field	67.63
JB-2	Nº 2	56+10 LT.	Set in field	73.80
JB-3	Nº 2	54+46 RT.	Set in field	70.90 66.66
CB-20	PWBD-2Mod"J"	56+22 RT.	75.89	73.10
CB-13	PWBD-1	56+10 LT.	76.98	74.15
CB-14	J	56+15 LT.	76.81	74.45
CB-15	J	57+60 LT.	79.46	76.13
CB-16	J	57+60 RT.	79.03	76.44
CB-17	J	59+00 LT.	81.15	78.06
CB-18	ADJUST CATCH BASIN			
CB-19	ADJUST CATCH BASIN			
CB-21	J	56+85 RT.	76.88	73.97
CB-22	J	58+25 RT.	79.27	75.99
CB-23	J	59+55 RT.	81.03	77.94
MH-4	ADJUST MANHOLE			
MH-5	ADJUST MANHOLE			
MH-6	ADJUST MANHOLE			
MH-7	ADJUST MANHOLE			

COUNTY	CONTRACT	FHWA REG NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NEW CASTLE	78-021-15	3	DEL	RS-1130(1)	18	47

CHAPMAN ROAD – PHASE II

PREL. TRACING C. H. Short DESIGN _____ CHKD. _____

REVISIONS

MAINTENANCE OF TRAFFIC PLAN
AND SUGGESTED CONSTRUCTION SEQUENCE

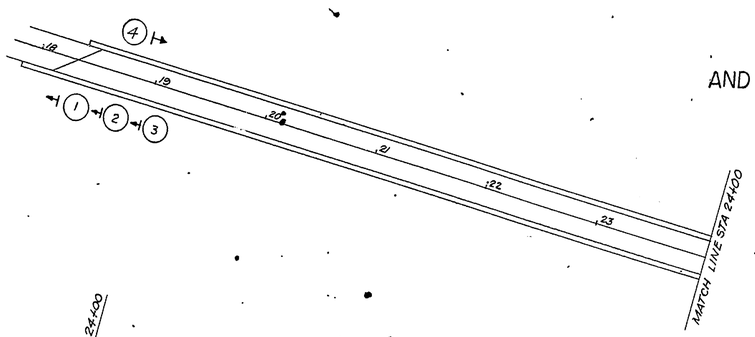
PHASE I CONSTRUCT SHADED SECTION (WORK AREA). TRAFFIC ON EXISTING ROADWAY

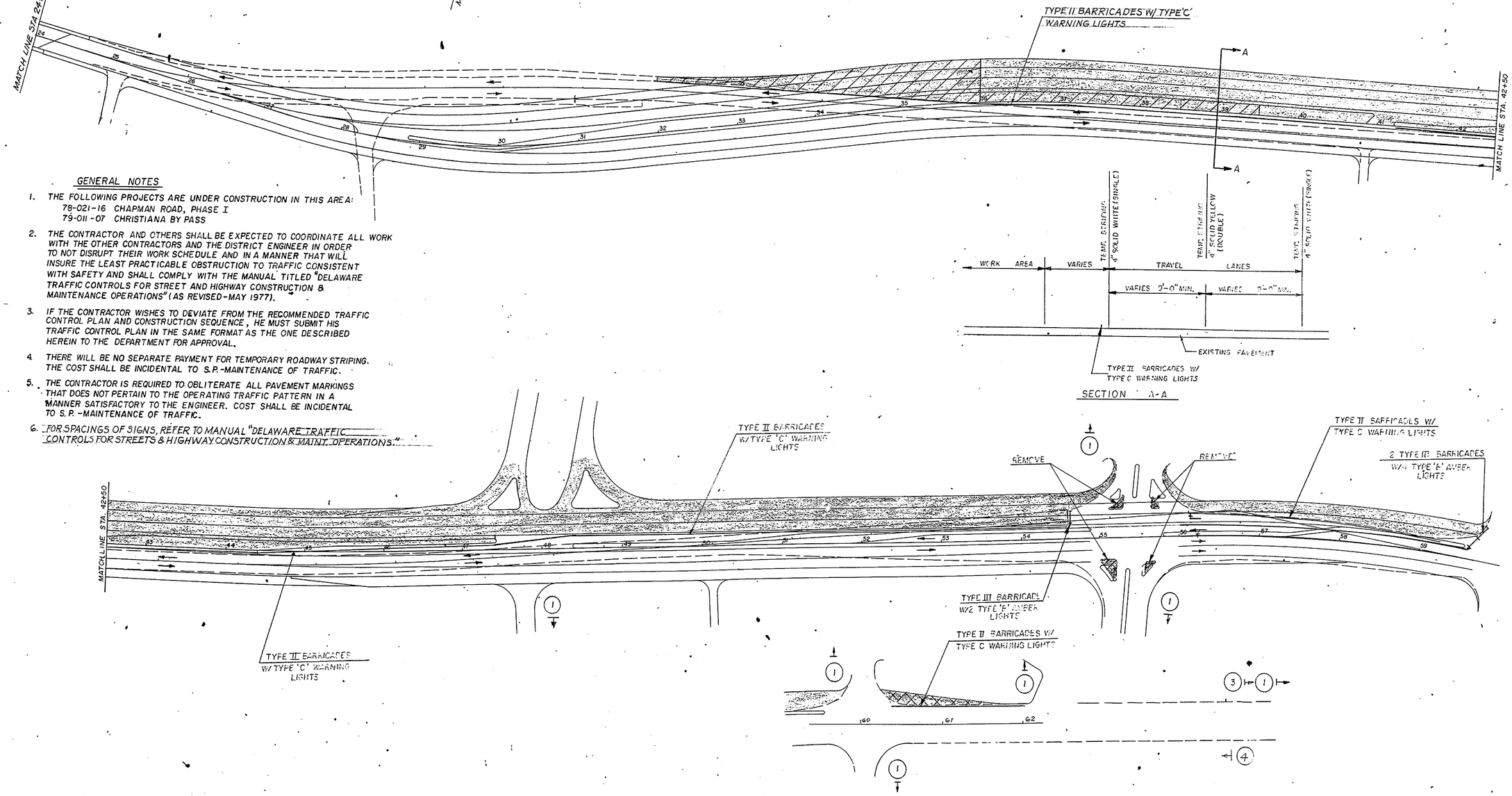
TRM (2" TYPE C HOT MIX OVER 10" C.R. BASE COURSE)

. . . (2" TYPE C & 2" TYPE B HOT MIX OVER 10" C.R. BASE COURSE)

SIGN LEGEND

1. ROAD CONSTRUCTION AHEAD (W/TYPE B AMBER LIGHT)
2. ROAD CONSTRUCTION 1000 FT. (W/TYPE B AMBER LIGHT)
3. ROAD CONSTRUCTION 500 FT.
4. END CONSTRUCTION





GENERAL NOTES

1. THE FOLLOWING PROJECTS ARE UNDER CONSTRUCTION IN THIS AREA:
   78-021-16 CHAPMAN ROAD, PHASE I
   79-011-07 CHRISTIANA BY PASS
2. THE CONTRACTOR AND OTHERS SHALL BE EXPECTED TO COORDINATE ALL WORK WITH THE OTHER CONTRACTORS AND THE DISTRICT ENGINEER IN ORDER TO NOT DISRUPT THEIR WORK SCHEDULE AND IN A MANNER THAT WILL INSURE THE LEAST PRACTICABLE OBSTRUCTION TO TRAFFIC CONSISTENT WITH SAFETY AND SHALL COMPLY WITH THE MANUAL TITLED "DELAWARE TRAFFIC CONTROLS FOR STREET AND HIGHWAY CONSTRUCTION & MAINTENANCE OPERATIONS" (AS REVISED-MAY 1977).
3. IF THE CONTRACTOR WISHES TO DEVIATE FROM THE RECOMMENDED TRAFFIC CONTROL PLAN AND CONSTRUCTION SEQUENCE, HE MUST SUBMIT HIS TRAFFIC CONTROL PLAN IN THE SAME FORMAT AS THE ONE DESCRIBED HEREIN TO THE DEPARTMENT FOR APPROVAL.
4. THERE WILL BE NO SEPARATE PAYMENT FOR TEMPORARY ROADWAY STRIPING. THE COST SHALL BE INCIDENTAL TO S.P.-MAINTENANCE OF TRAFFIC.
5. THE CONTRACTOR IS REQUIRED TO OBLITERATE ALL PAVEMENT MARKINGS THAT DOES NOT PERTAIN TO THE OPERATING TRAFFIC PATTERN IN A MANNER SATISFACTORY TO THE ENGINEER. COST SHALL BE INCIDENTAL TO S.P.-MAINTENANCE OF TRAFFIC.
6. FOR SPACINGS OF SIGNS, REFER TO MANUAL "DELAWARE TRAFFIC CONTROLS FOR STREETS & HIGHWAY CONSTRUCTION & MAINT. OPERATIONS."

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NEW CASTLE	78-021-15	3	DEL	RS-1130(1)	19	47

CHAPMAN ROAD – PHASE II

PREL. TRACING C. H. Short DESIGN _____ CHKD. _____

REVISIONS

MAINTENANCE OF TRAFFIC PLAN
AND SUGGESTED CONSTRUCTION SEQUENCE

PHASE II CONSTRUCT SHADED AREA (WORK AREA). TRAFFIC ON NEWLY CONSTRUCTED WESTBOUND LANES AND SECTIONS OF EXISTING ROADWAY AS SHOWN.

TRM. (2" TYPE C HOT MIX OVER 10" CRUSHER RUN BASE COURSE

SIGN LEGEND

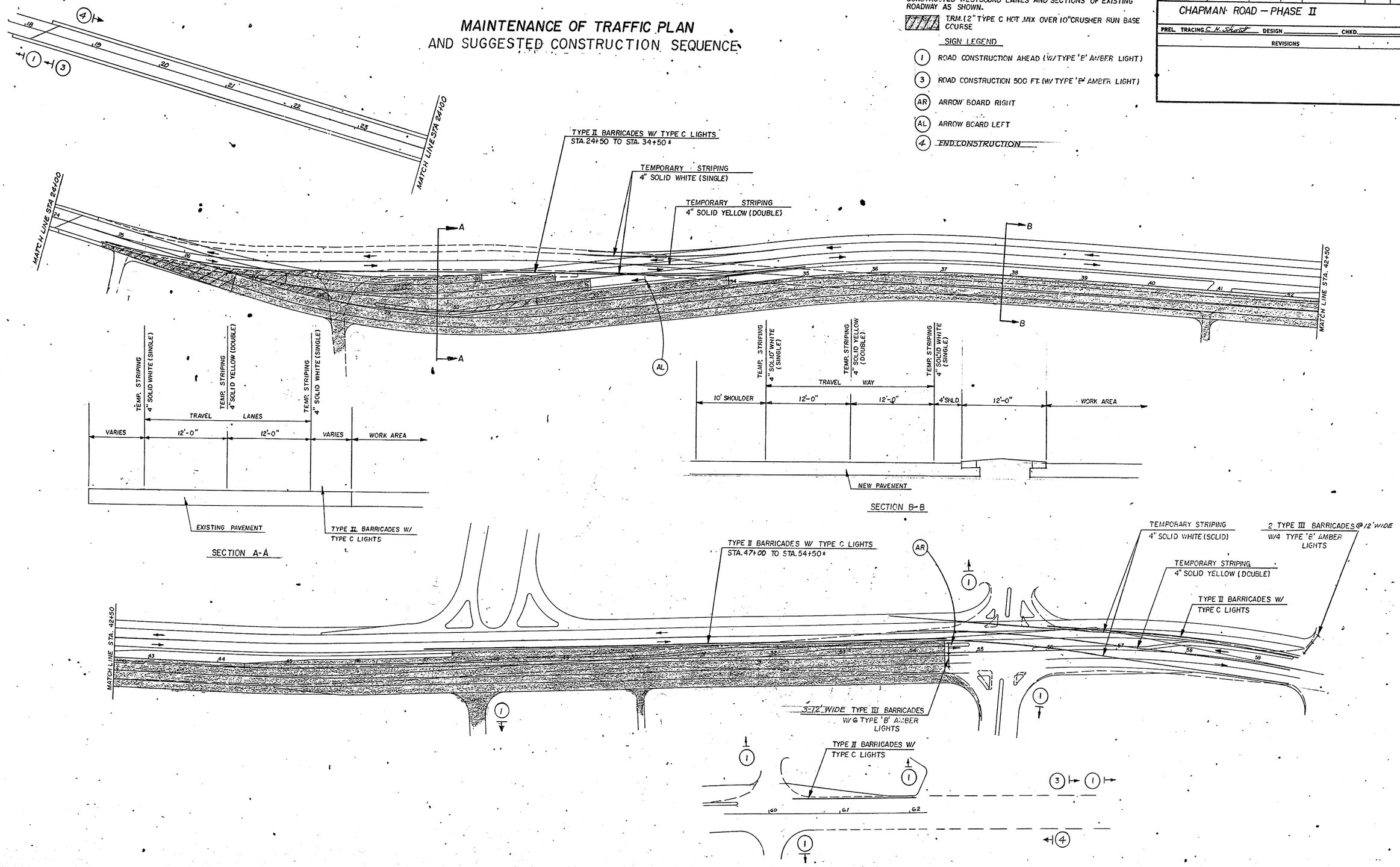
(1) ROAD CONSTRUCTION AHEAD (W/ TYPE 'B' AMBER LIGHT)

(3) ROAD CONSTRUCTION 500 FT. (W/ TYPE 'B' AMBER LIGHT)

(AR) ARROW BOARD RIGHT

(AL) ARROW BOARD LEFT

(4) END CONSTRUCTION



COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NEW CASTLE	78-021-15	3	DEL	RS-1130(1)	20	47

CHAPMAN ROAD — PHASE II

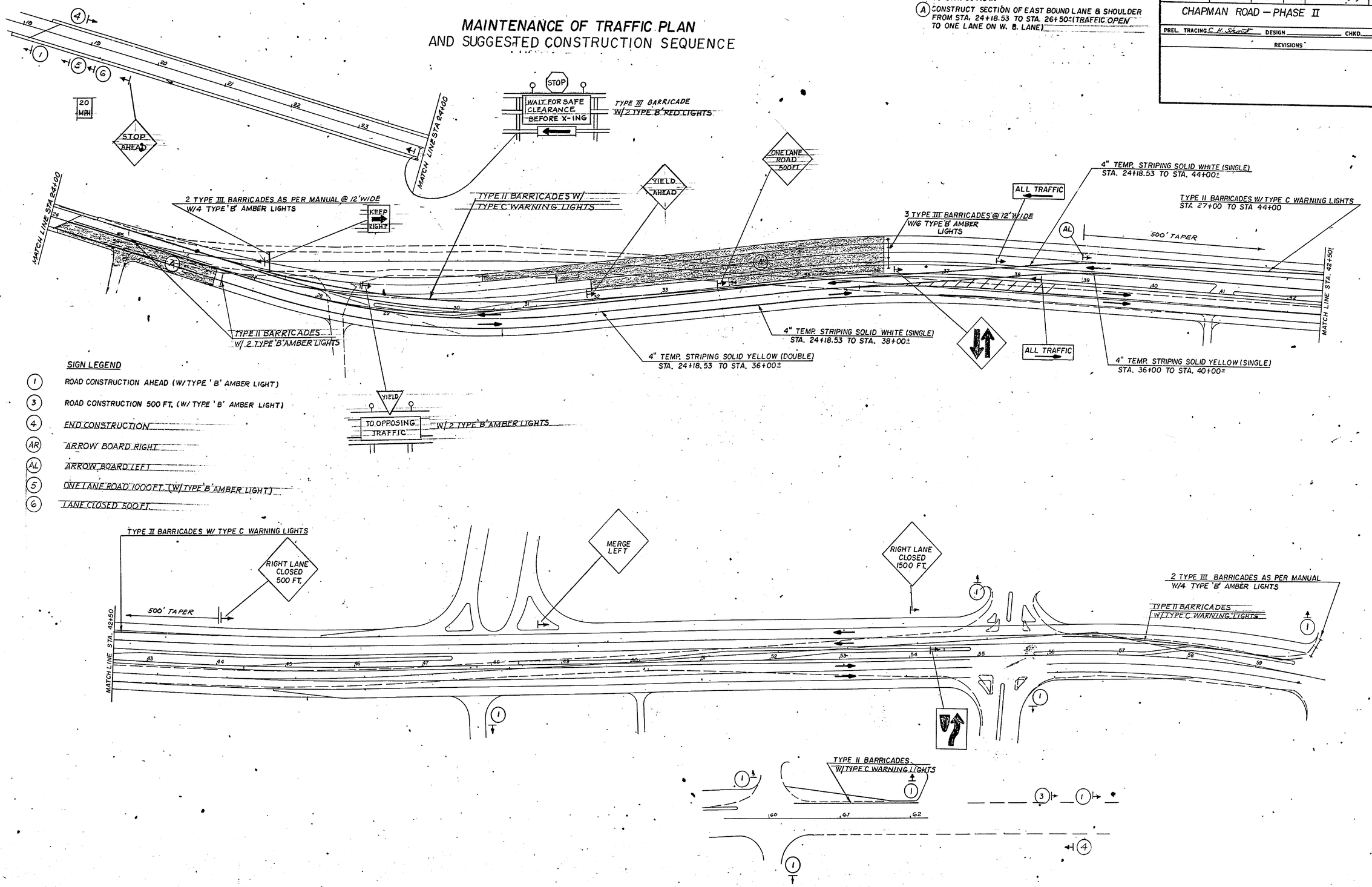
PREL. TRACING C. H. Short DESIGN CHKD.

REVISIONS

MAINTENANCE OF TRAFFIC PLAN
AND SUGGESTED CONSTRUCTION SEQUENCE

PHASE III (A) CONSTRUCT SHADED AREA (WORK AREA) STA. 30+50 TO STA. 36+15±.

(A) CONSTRUCT SECTION OF EAST BOUND LANE & SHOULDER FROM STA. 24+18.53 TO STA. 26+50± (TRAFFIC OPEN TO ONE LANE ON W. B. LANE)



SIGN LEGEND

(1) ROAD CONSTRUCTION AHEAD (W/ TYPE 'B' AMBER LIGHT)

(3) ROAD CONSTRUCTION 500 FT. (W/ TYPE 'B' AMBER LIGHT)

(4) END CONSTRUCTION

(AR) ARROW BOARD RIGHT

(AL) ARROW BOARD LEFT

(5) ONE LANE ROAD 1000 FT. (W/ TYPE 'B' AMBER LIGHT)

(6) LANE CLOSED 500 FT.

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NEW CASTLE	78-021-15	3	DEL	RS-1130(1)	21	47

CHAPMAN ROAD — PHASE II

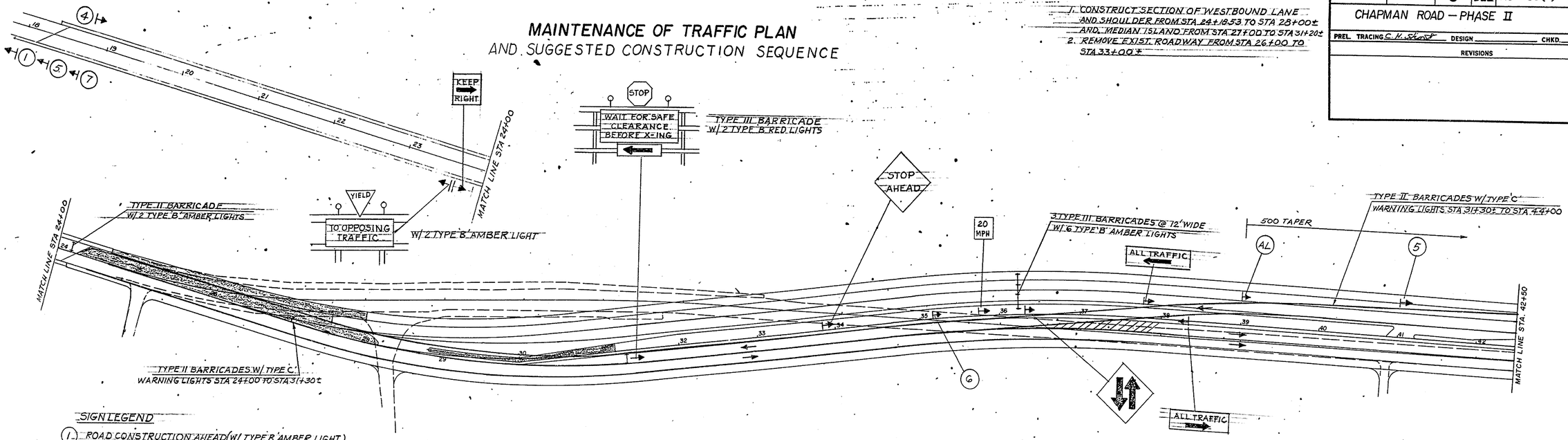
PREL. TRACING C.H. Short DESIGN _____ CHKD. _____

REVISIONS

MAINTENANCE OF TRAFFIC PLAN
AND SUGGESTED CONSTRUCTION SEQUENCE

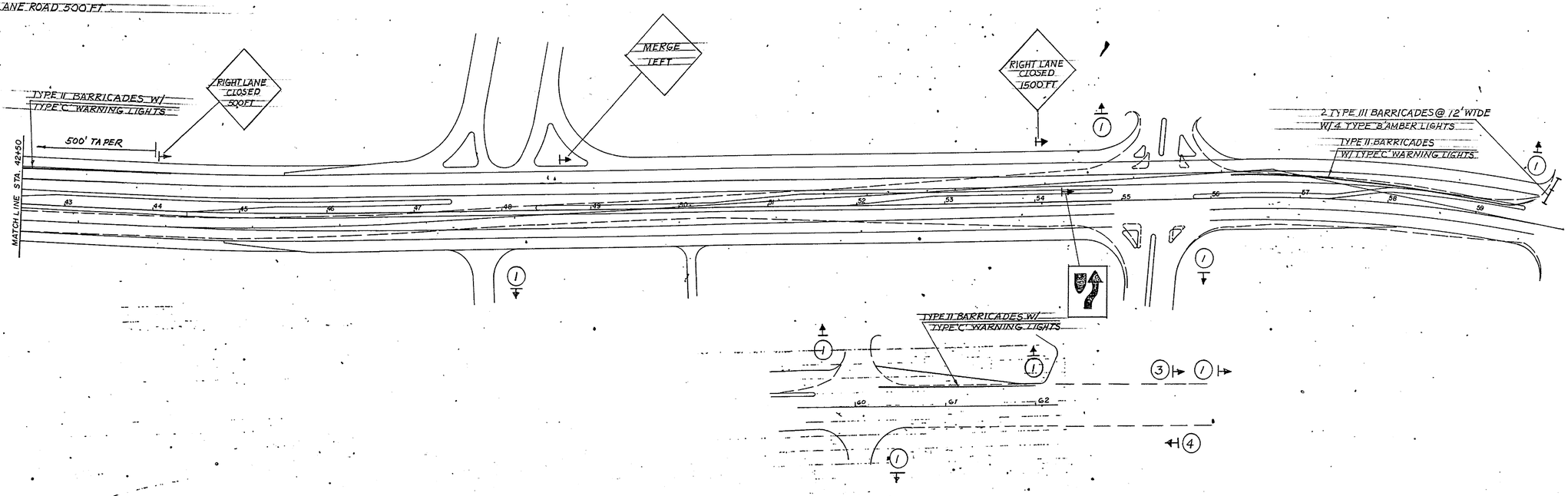
PHASE IV

1. CONSTRUCT SECTION OF WESTBOUND LANE AND SHOULDER FROM STA 24+18.53 TO STA 28+00± AND MEDIAN ISLAND FROM STA 27+00 TO STA 31+20±
2. REMOVE EXIST. ROADWAY FROM STA 26+00 TO STA 33+00±



SIGN LEGEND

1. ROAD CONSTRUCTION AHEAD (W/ TYPE B AMBER LIGHT)
3. ROAD CONSTRUCTION 500 FT. (W/ TYPE B AMBER LIGHT)
4. END CONSTRUCTION
AL. ARROW BOARD LEFT
5. ONE LANE ROAD 1000 FT
6. LANE CLOSED 500 FT.
7. ONE LANE ROAD 500 FT.



MAINTENANCE OF TRAFFIC PLAN
AND SUGGESTED CONSTRUCTION SEQUENCE

COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NEW CASTLE	78-021-15	3	DEL.	RS-1130(1)	22	47

CHAPMAN ROAD — PHASE II

PREL. TRACING C. K. Short DESIGN _____ CHKD. _____

REVISIONS

PHASE V

(A) CONSTRUCT MEDIAN FROM STA. 36+00 TO STA 39+50± AND REMOVE EXISTING PAVEMENT FROM STA 26+00 TO STA. 35+00± (TRAFFIC ON NEW ROADWAY.

(B) CONSTRUCT CONCRETE ISLANDS AND REMAINING CURBS AND OVERLAY EXISTING PAVEMENT BETWEEN STA 54+50 TO STA. 59+82.98 MAINTAINING TRAFFIC AS DIRECTED BY THE ENGINEER

SIGN LEGEND

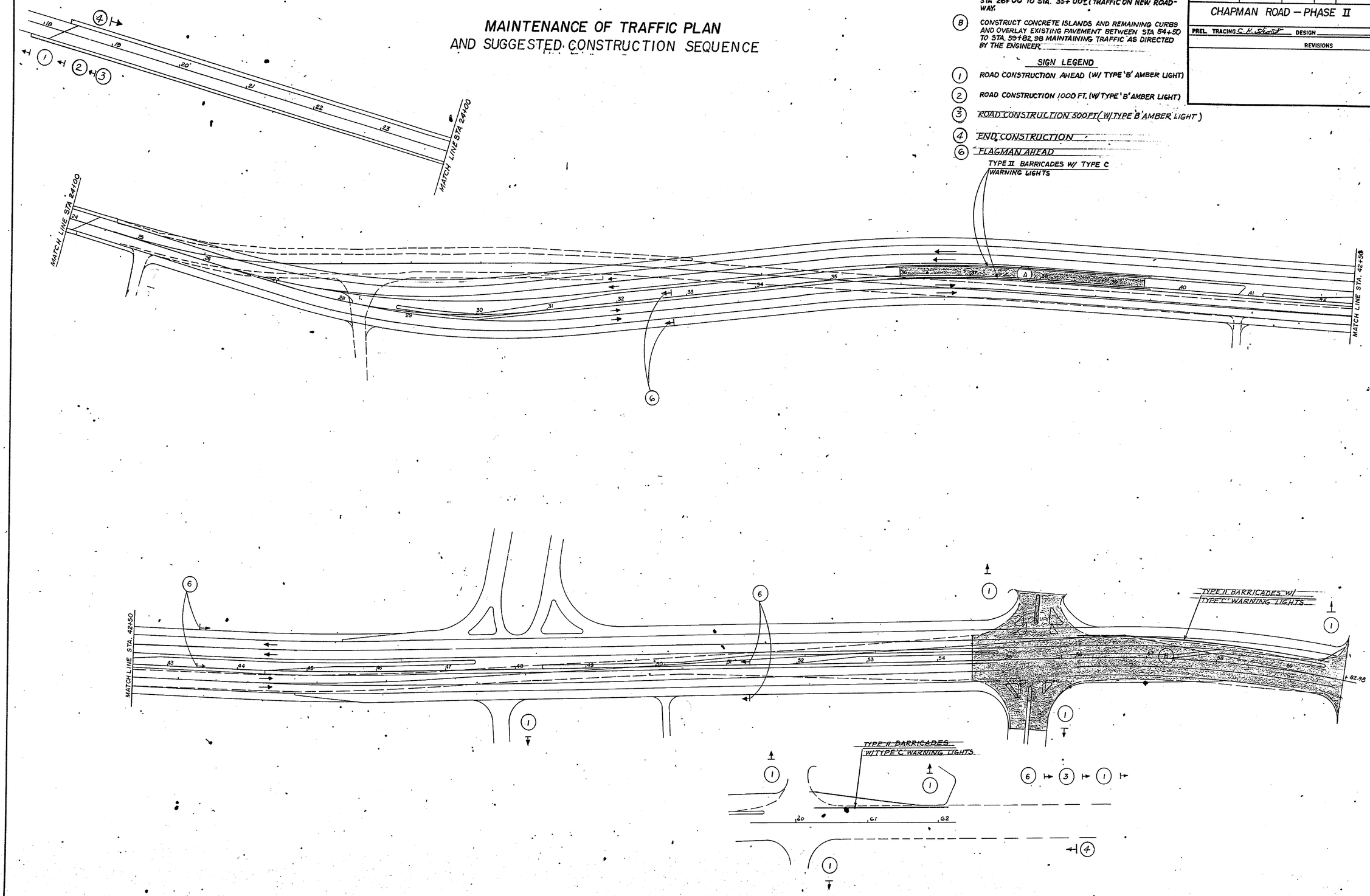
(1) ROAD CONSTRUCTION AHEAD (W/ TYPE 'B' AMBER LIGHT)

(2) ROAD CONSTRUCTION 1000 FT. (W/ TYPE 'B' AMBER LIGHT)

(3) ROAD CONSTRUCTION 500 FT. (W/ TYPE 'B' AMBER LIGHT)

(4) END CONSTRUCTION

(6) FLAGMAN AHEAD

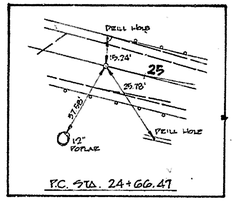


COUNTY	CONTRACT	FHWA. REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL	RS-1130(1)	23	47

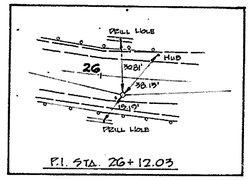
CHAPMAN ROAD - PHASE II

PREL. TRACING M. White DESIGN _____ CHKD. _____

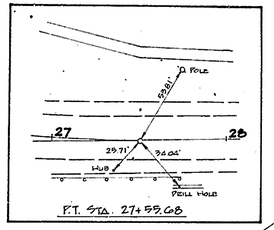
REVISIONS



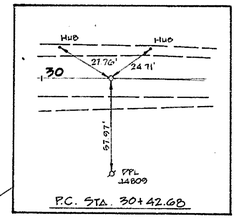
P.C. STA. 24+66.47



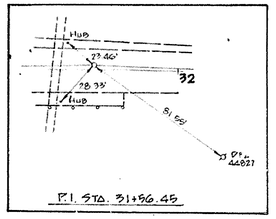
P.I. STA. 26+12.03



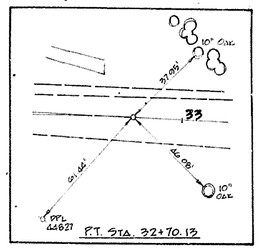
P.T. STA. 27+59.68



P.C. STA. 30+42.68



P.I. STA. 31+56.45



P.T. STA. 32+70.13

SURVEY

P.I. STA. = 26+12.03
Δ = 16° 16' 40" Lt.
T = 145.61'
L = 289.26'

CONSTRUCTION ℄

PI STA 29+13.96
Δ= 22° 00' LT.
D= 6° 11' 11"
R = 926.17'
T = 180.03'
LC= 355.63'
PC = STA 27+33.93
PT = STA 30+89.56

NOTE: Rota Mill existing pavement and replace with 2" Type C Hot Mix to finish grade from STA. 24+18.53 to STA. 24+66.42.

Construct 10' Depressed Sidewalk (See sht. 7)

P.C. STA. 24+66.42

Place 1 Guardrail to Barrier Connection, Approach Type

Place 625 L.F. of Galvanized Steel Beam Guardrail

Concrete Sidewalk

Concrete Gutter

Place 1 Twisted End Anchorage

SPEED LIMIT 40

P.T. STA. 27+59.68

R/W

Utility Pole

P.C.C Crossable Median See sht. 6

+33.93

Construct Depressed Sidewalk (See sht. 7)

Place 1 Guardrail to Barrier Connection, Approach Type

Remove existing guardrail & place 100 L.F. of Galvanized Steel Beam Guardrail

25+00 58.59

Hot Mix

Concrete Gutter

Exist R/W

Prop R/W

Construct P.C.C. Gutter

Place 375 L.F. of Galvanized Steel Beam Guardrail

+00 62.10

Place 1 Flared End Section

T.C.E.

Relocate gate & fence See General Note Nº 5

+47.04 42.70

T.C.E. OR

+68.52 38.95

29+00 75.00

Place 1 Flared End Section

Construct P.C.C. Gutter

Place 390 L.F. Galvanized Steel Beam Guardrail

NOTE: Actual alignment of ditch should be determined in the field to align with existing ditch @ STA. A 2+00.

+02.50 81.24

65' Channel Improvement

+96.14 19.90

Bottom of existing ditch El.=42.00

Place 42 S.Y. Grouted Riprap

Fill existing ditch outside pipe trench with Type F Borrow as directed by the Engineer

Place 2.0 S.Y. Grouted Riprap

P.I. STA. 31+56.45
Δ 03° 53' 20" RT
T 113.77'
L 227.45'

B.M. 1 — Drill Hole in Conc. Sidewalk of Bridge 14' Lt. Sta. 24+63. El. 87.15

B.M. 2 — Chisled X on Conc. Headwall of Box Culvert 43' Rt Sta. 31+31. El. 51.64

NOTES: See sheet Nº 7 for detail of P.C.C. Gutter Transition from STA. 31+50 to STA. 32+05.
See sheet Nº 8 for details of the extension of the 60" R.C.P.
Borings taken from Const. ℄.

CHAPMAN ROAD

Hot Mix

SURVEY ℄

N 76° 41' 52.3" E

N 80° 30' 12.3" E

90°00'

Guardrail

Match Line Sta. 33+60

CB 1 CB 2 CB 3

P 1 P 2 P 4 P 5

Topsoil A-4 (0)

Topsoil & Root Mat No Sample A-7-6 (12)

A-4 (7) A-4 (7) A-6 (7) A-6 (14) A-4 (6) A-4 (3)

EL. 57.5

EL. 39.60 Root mat A-2-4 (0)

Grass A-1-B (0) A-2-4 (0) A-4 (0)

Topsoil A-4 (9) A-4 (0)

HORIZONTAL : 1" = 50'
VERTICAL : 1" = 5'
DATUM : 50

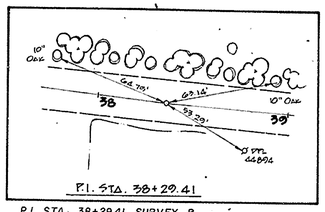
D C B A 1 5 10 A B C D

COUNTY	CONTRACT	FHWA REG. NO	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
NC	78-021-15	3	DEL	RS-1130(1)	24	47

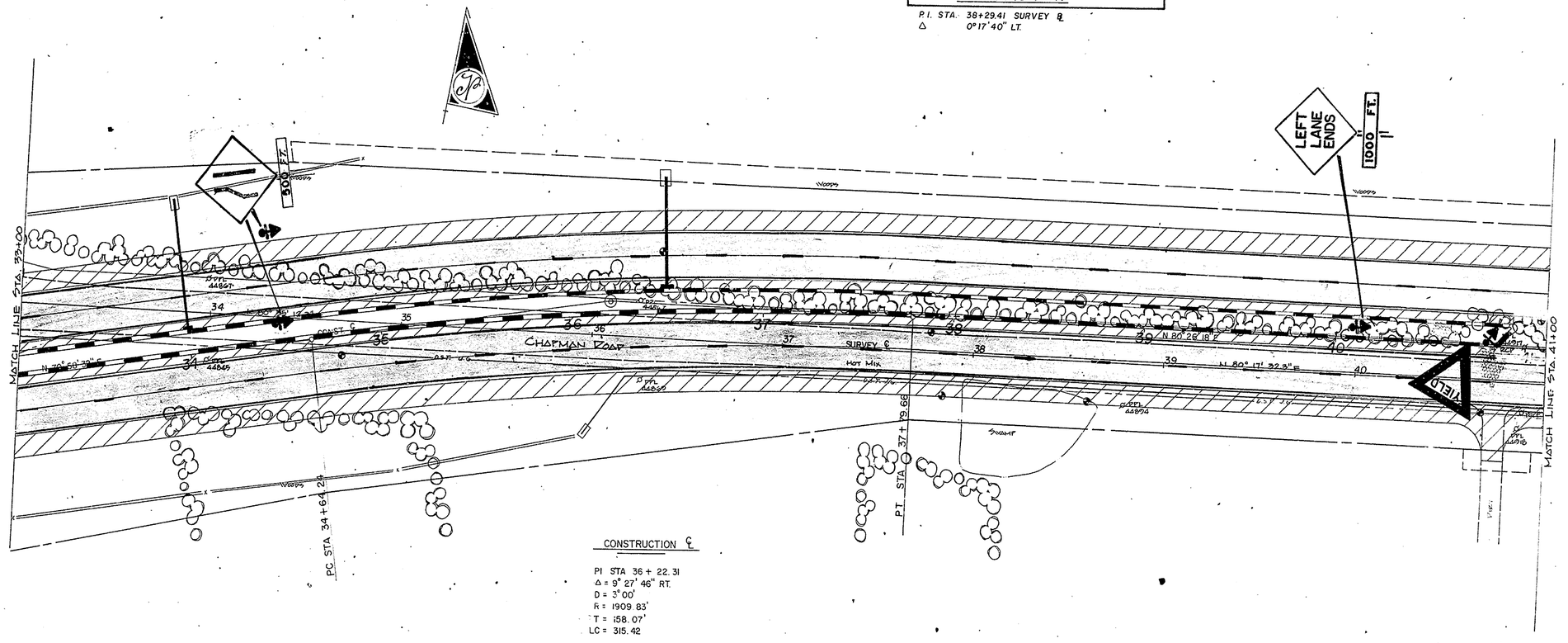
CHAPMAN ROAD - PHASE II

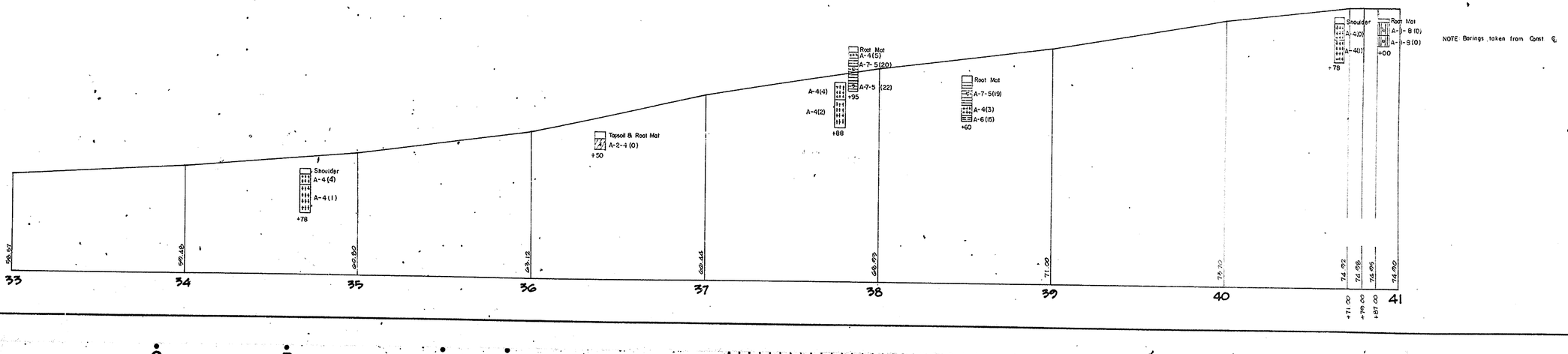
PREL. TRACING Whitt DESIGN _____ CHKD. _____

REVISIONS



P.I. STA. 38+29.41 SURVEY ℄
Δ 0°17'40" LT.





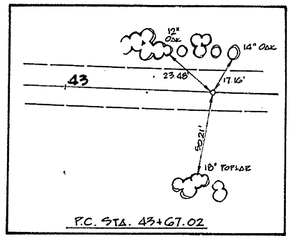
HORIZONTAL : 1" = 30'
VERTICAL : 1" = 5'
DATUM : 50

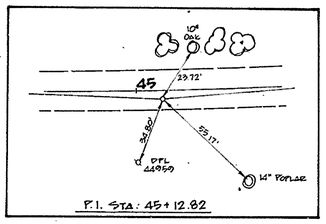
COUNTY	CONTRACT	FHWA REG. NO	STATE	FED. AID PROJECT NO.	SHEET NO.	TO SHEETS
N C	78-021-15	3	DEL	RS-1130(1)	25	47

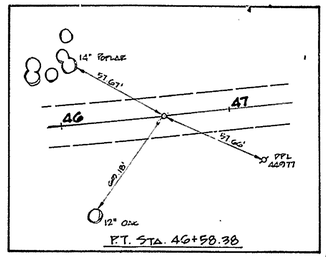
CHAPMAN ROAD - PHASE II

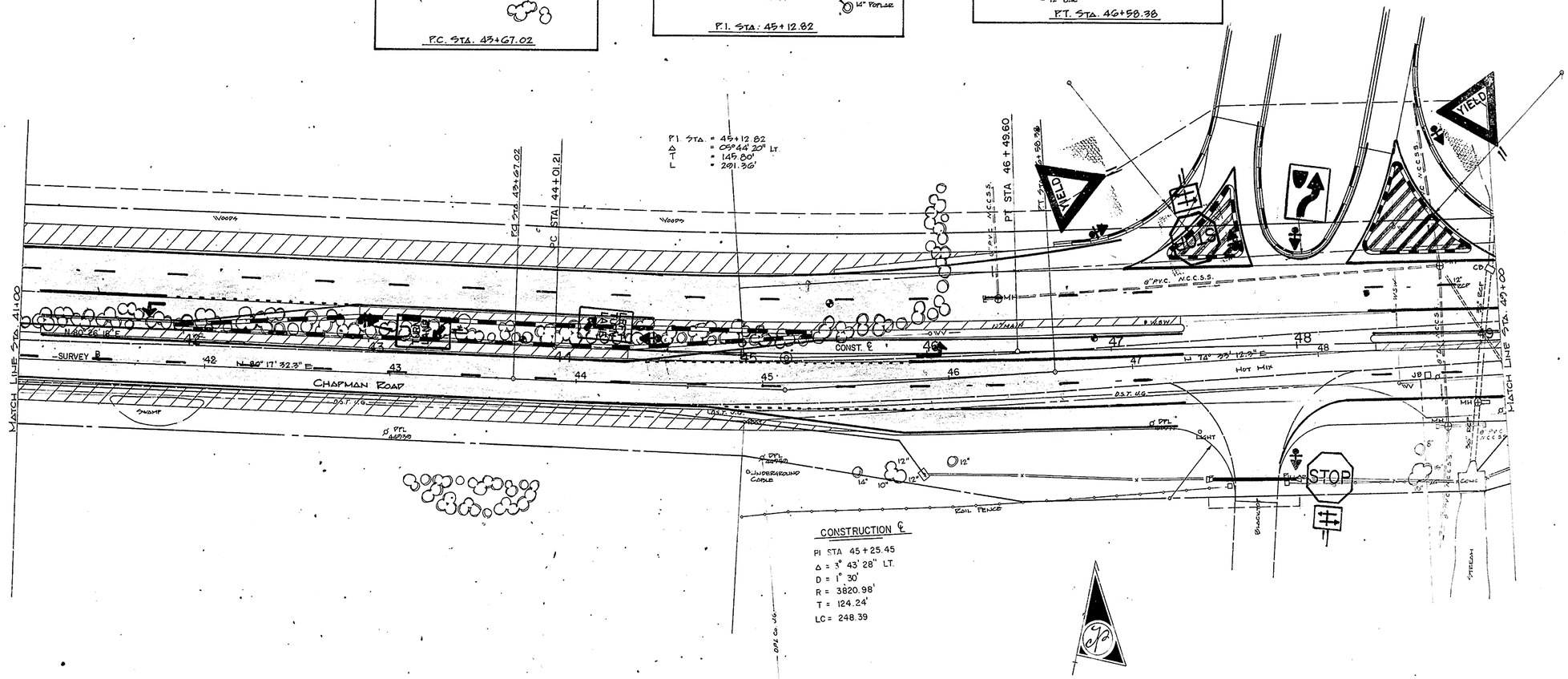
PREL. TRACING J. White DESIGN _____ CHKD. _____

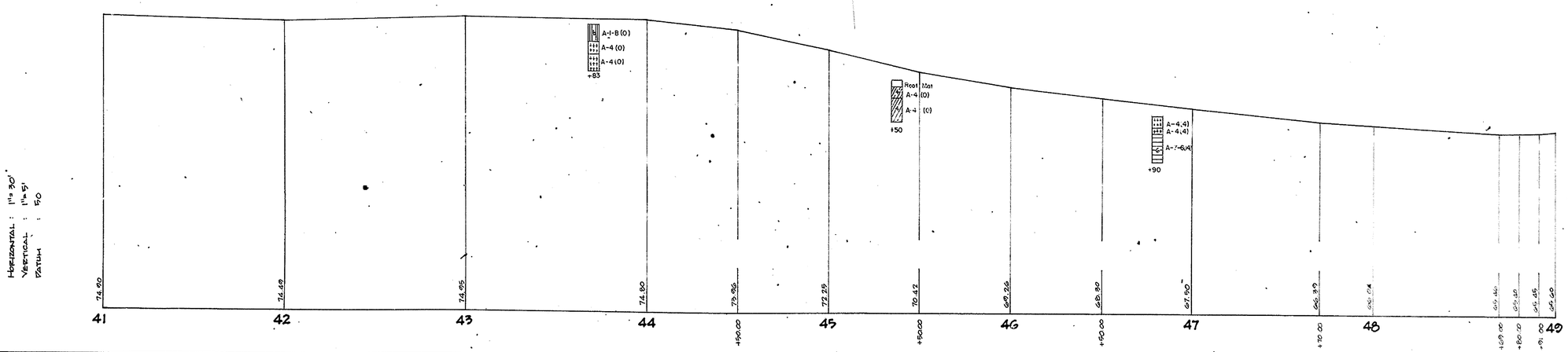
REVISIONS











NOTE: Borings taken from Const. ℄.

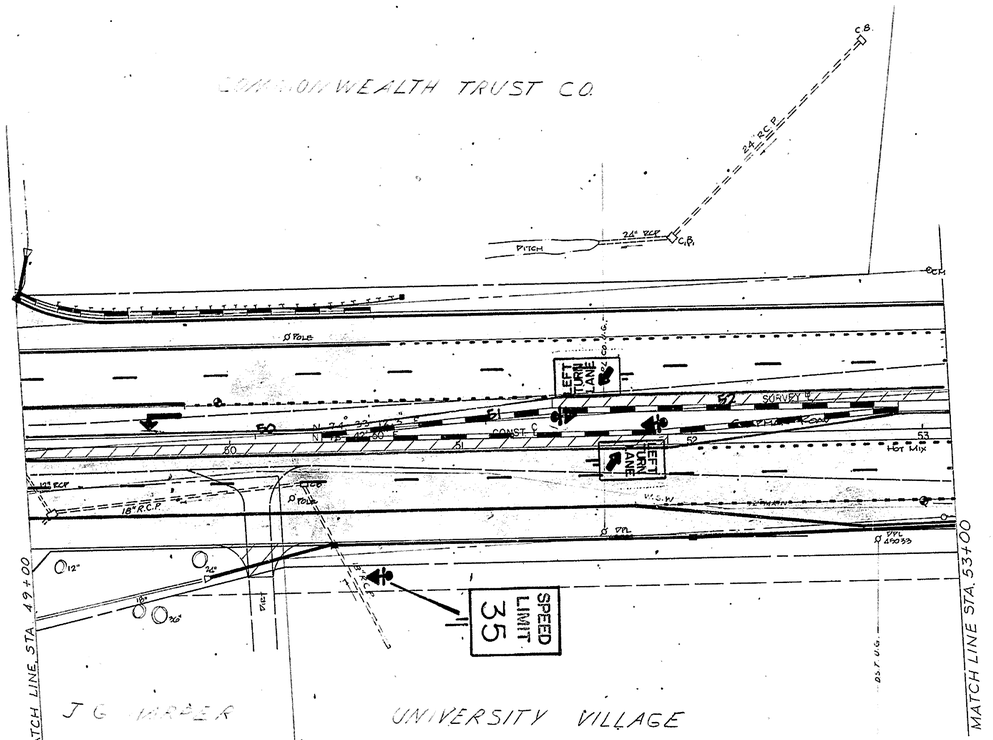
COUNTY	CONTRACT	FHWA REG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N C	78-021-15	3	DEL	RS-1130(1)	26	47

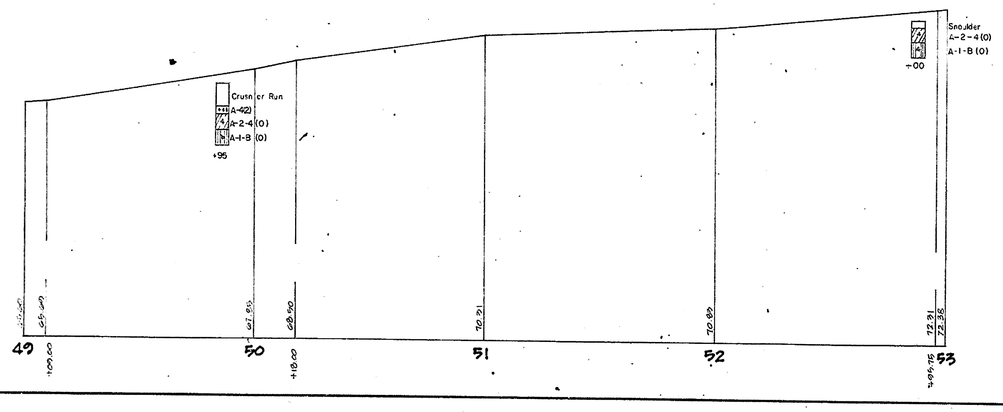
CHAPMAN ROAD - PHASE II

PREL. TRACING [illegible] DESIGN _____ CHKD. _____

REVISIONS

B.M. 4 CONCRETE MONUMENT
50' LT. ℄ STA. 52+95.75
ELEV. 70.61





HORIZONTAL : 1" = 30'
VERTICAL : 1" = 5'
DATUM : 50

NOTE: Borings taken from Const. ℄.

COUNTY	CONTRACT	FHWA NEG. NO.	STATE	FED. AID PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	78-021-15	3	DEL	RS-1130(1)	27	47

CHAPMAN ROAD - PHASE II

PREL. TRACING _____ DESIGN _____ CHKD. _____

REVISIONS

COMMONWEALTH TRUST CO.

UNIVERSITY VILLAGE

CONSTRUCTION ℄
P.I. STA 57+94.40
Δ = 12° 28' 35" RT.
D = 3° 28' 46"
T = 180.00'
R = 1646.71'
LC = 358.58'

P.C. STA 56+14.40 Const ℄

P.I. STA 57+94.40 Const ℄

P.I. STA 59+72.98 Const ℄ = STA 57+97.27

Butt Joint

Remove headwall & plug pipe at both ends as directed by the Engineer.

Remove pipe & headwall

Relocate fire hydrant

Construct RCC Gutter to curb opening

Curb Transition

Butt Joint

EQ — PT STA 59+72.98 = STA 57+97.27

PROPOSED PROFILE CONST. ℄

EXIST. PROFILE ALONG PROP. CONST. ℄

PROFILE SURVEY ℄

PROFILE CONST ℄

+1.5394 %

BEGIN 4" AVG. HOT MIX OVERLAY

END OF MATHEMATICAL GRADES AND END OF PROFILE ALONG SURVEY ℄

BEGIN OF PROFILE ALONG CONST. ℄ AND BEGIN. OF SPLINED GRADES

NOTE: Borings taken off Const. ℄

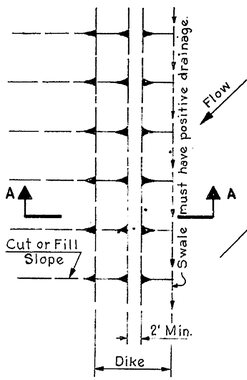
HORIZONTAL : 1" = 50'
VERTICAL : 1" = 5'
DATUM : 50

PIPE SCHEDULE				
Nº	TYPE	LENGTH	INT. INV.	DISCH INV.
13	24" R.C.P.	245'	70.00	66.99
14	24" R.C.P.	80'	71.12	70.00
15	15" R.C.P.	32'	74.15	73.80
16	15" R.C.P.	10'	74.45	73.80
17	15" R.C.P.	145'	76.13	74.45
18	15" R.C.P.	20'	EXIST. INV.	76.13
19	15" R.C.P.	32'	76.44	76.13
20	15" R.C.P.	148'	79.06	76.13
21	15" R.C.P.	60'	73.97	73.10
22	15" R.C.P.	137'	75.99	73.97
23	15" R.C.P.	127'	77.94	75.99

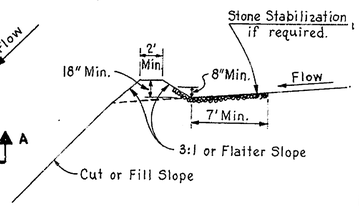
CATCH BASIN, MANHOLE AND JUNCTION BOX SCHEDULE.				
Nº	TYPE	STATION	TOP GRATE	INVERT
JB-1	Nº 2	54+65 LT.	74.75	71.12
JB-2	Nº 2	56+10 LT.	Set in field	73.80
JB-3	Nº 2	54+46 RT.	Set in field	70.00
CB-20	PWBD-2Mod*1	56+22 RT.	75.89	73.10
CB-13	PWBD-1	56+10 LT.	76.98	74.15
CB-14	J	56+15 LT.	76.81	74.45
CB-15	J	57+60 LT.	79.46	76.13
CB-16	J	57+60 RT.	79.03	76.44
CB-17	J	59+00 LT.	81.15	78.06
CB-18	ADJUST CATCH BASIN			
CB-19	ADJUST CATCH BASIN			
CB-21	J	56+85 RT.	76.88	73.97
CB-22	J	58+25 RT.	79.27	75.99
CB-23	J	59+55 RT.	81.03	77.94
MH-4	ADJUST MANHOLE			
MH-5	ADJUST MANHOLE			
MH-6	ADJUST MANHOLE			
MH-7	ADJUST MANHOLE			

TEMPORARY DIVERSION DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil with a general life expectancy of one year or less, constructed immediately above a cut or fill slope, that intercepts storm runoff from higher areas and diverts it away from exposed slopes to a stabilized outlet. Used to prevent excessive erosion until the permanent storm drainage features are installed and the slopes are stabilized.



PLAN VIEW



SECTION A-A

EROSION PLAN SYMBOL

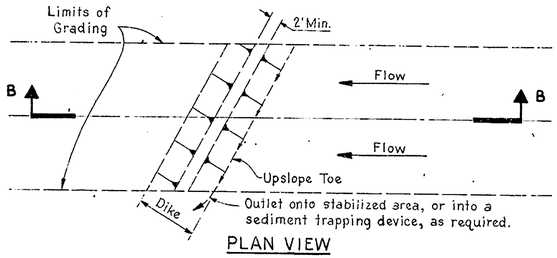
DD ——— DD

NOTES:

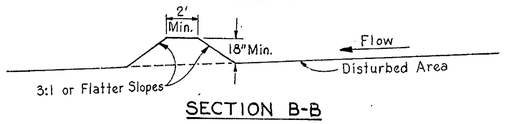
1. All dikes shall be machine compacted.
2. The swale formed by the upslope toe of the dike must have positive drainage (minimum of 0.25% grade) to the outlet. This design does not apply when the grade of the swale is greater than 10% (maximum grade).
3. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if periodic inspection deems necessary. When the slope is from 2% to 5% the channel (flow area) should be stabilized; using Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103 which is placed in a 3 inch thick layer and pressed into the soil, shall be used. The area to be stabilized by the stone shall be as shown by Section A-A above.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or unstable upland area shall be conveyed to a sediment trapping device such as a sediment trap or a sediment basin, or to an area that is protected by any of these practices.
5. Diversion dikes must be protected with Section 725, "Erosion Control, Seeding I" or Section 725, "Erosion Control, Seeding II" applied immediately after construction.
6. Periodic inspection and required maintenance shall be provided.

TEMPORARY INTERCEPTOR DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil or gravel, to remain for a period of usually less than one year, constructed across disturbed rights of way and similar sloping areas. Used to shorten the length of exposed slopes thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to stabilized outlets until permanent stabilization of the slopes is established.



PLAN VIEW



SECTION B-B

EROSION PLAN SYMBOL

ID ——— ID

NOTES:

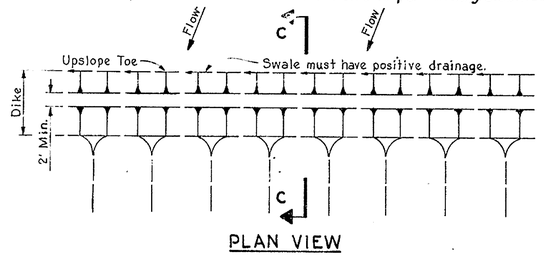
1. All dikes shall be machine compacted.
2. All interceptor dikes must have positive drainage to an outlet. The grade of the swale, formed at the upslope toe of the dike, shall be from 0.5% to 1.0%.
3. The top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic. The area of the construction crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, which is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.
4. The spacing of the interceptor dikes along the graded slope shall be as follows:

Maximum slope of area above dike	>10%	5 to 10%	< 5%
Distance between interceptor dikes	100 Feet	200 Feet	300 Feet

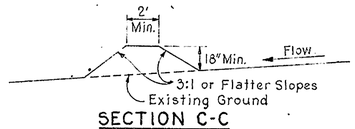
The field location may be adjusted as needed in order to utilize a stabilized safe outlet.
5. Interceptor dikes must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin, when either the interceptor dike swale or the drainage area above the dike are not adequately stabilized.
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consist of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The area to be covered by the stone shall be as shown by Section A-A for Temporary Diversion Dikes
7. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately after construction to protect the dike from erosion.
8. Periodic inspection and required maintenance shall be provided.

TEMPORARY PERIMETER DIKE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A ridge of compacted soil, life expectancy of one year or less, constructed at the perimeter of the site or disturbed area that is used to divert sediment laden storm runoff to an on-site trapping facility or to divert runoff from a stabilized upland area away from the construction area. These dikes shall remain in place until the construction site is permanently stabilized.



PLAN VIEW



SECTION C-C

EROSION PLAN SYMBOL

PD ——— PD

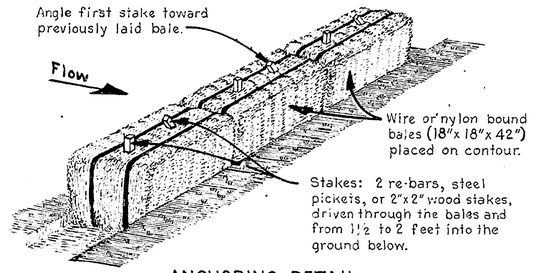
NOTES:

1. All dikes shall be machine compacted.
2. The grade of the swale formed at the upslope toe of the dike is dependent upon the topography, but must have positive drainage to an outlet. This design should not be used when the grade for the swale will be greater than 10% (maximum grade).
3. When the slope of the swale is less than 2%, stabilization may not be required; however, it should be added where periodic inspection deems necessary. When the slope is 2% or greater, stabilization shall be required. See Note 3 for Temporary Diversion Dike for details. The minimum area to be stabilized shall be the swale flow area.
4. Runoff diverted from a protected or stabilized area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or gravel outlet structure.
5. The dikes must be located far enough away from the disturbed area to permit machine regrading and cleanout.
6. Section 725, Erosion Control, Seeding I or Seeding II shall be applied immediately following construction to protect the dike.
7. Periodic inspection and required maintenance shall be provided.

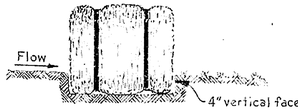
APPROVED: DATE: _____ DIRECTOR OF HIGHWAYS	CONTRACT NO. 78-721-15	SHEET NO	TOTAL SHEETS
	CHAPMAN ROAD-PHASE II	28	47
	SHEET NUMBER EC-1		
	EROSION CONTROL DETAILS TEMPORARY DIKES		
RECOMMENDED: DATE: _____ DEPUTY DIRECTOR OF HIGHWAYS	PREL. TRACING WRJ DESIGN WJ CHKD. _____ REVISIONS		

TEMPORARY STRAW (or HAY) BALE DIKE
(DRAINAGE AREAS LESS THAN ½ ACRE)

A barrier installed across, or at the toe of a slope, that is used to intercept and detain small amounts of sediment from unprotected areas of less than one-half (½) acre. Straw bales must not be used on high sediment producing areas, above "high risk" areas, where water is concentrated in a channel, or where there is a possibility of a washout. They may be used where erosion would normally occur in the form of sheet erosion and where the length of the slope above the barrier is less than 100 feet.



ANCHORING DETAIL



EROSION PLAN SYMBOL

SBD ——— SBD

EMBEDDING DETAIL

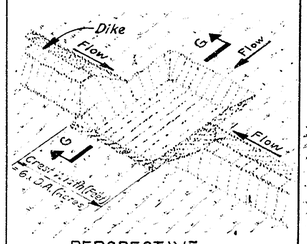
NOTES:

1. Bales shall be placed in a row with ends tightly abutting the adjacent bales.
2. Each bale shall be embedded in the soil a minimum of 4".
3. Bales shall be securely anchored in place by stakes or re-bars driven through the bales. The first stake in each bale shall be angled toward previously laid bale to force bales together.
4. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
5. Bales shall be removed when they have served their usefulness in order to prevent the blocking or impeding of storm flow or drainage.

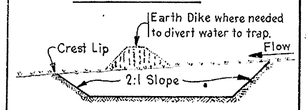
EARTH OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

An earth outlet sediment trap consists of a basin formed by excavation and/or embankment. The discharge point for the trap is over a crest or by an outlet channel that are cut into natural ground.

EXCAVATED EARTH OUTLET SEDIMENT TRAP

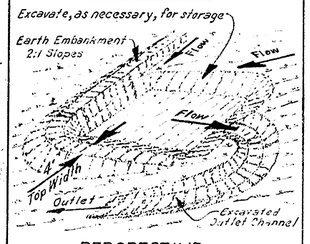


PERSPECTIVE

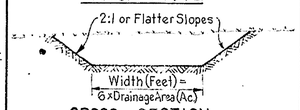


SECTION G-G

EMBANKMENT EARTH OUTLET SEDIMENT TRAP



PERSPECTIVE



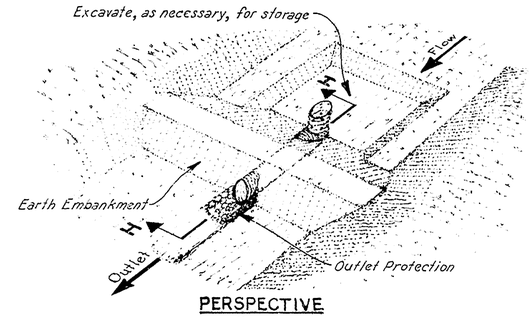
CROSS SECTION OUTLET CHANEL

NOTES:

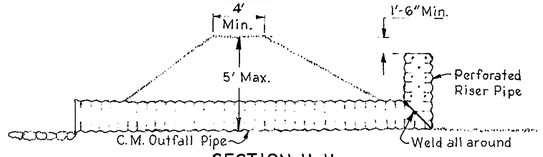
1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the earth outlet shall be level. The outlet width (feet) shall be equal to 6 times the drainage area (acres). If an embankment is used to form the sediment trap, the outlet crest shall be at least one foot below the top of the embankment. The outlet shall be free of any restrictions to flow.
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
5. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to one-half of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

PIPE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A pipe outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is a perforated riser pipe with an outfall pipe through the embankment.



PERSPECTIVE



SECTION H-H

NOTES:

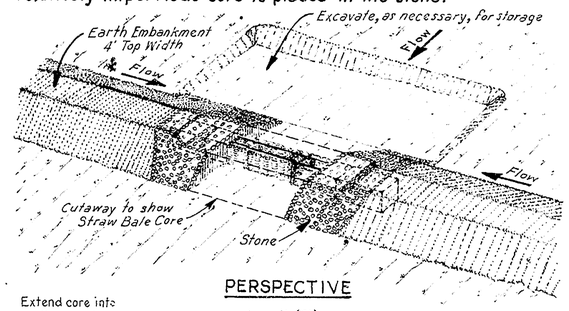
1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The top of the embankment shall be at least 1½ feet above the crest of the riser.
4. The outfall pipe and perforated riser shall be made from corrugated metal. All pipe connections shall be watertight.
5. The diameter of the riser shall be the same or larger than the diameter of the outfall pipe. At least the top ⅔ of the riser shall be perforated with ½ inch diameter holes spaced 8 inches vertically and 10 to 12 inches horizontally. Select the required diameter for the outfall pipe from the following table:

Maximum Drainage Area (acres)	1	2	3	4	5 *
Minimum Pipe Diameter (Inches)	12	18	21	24	30

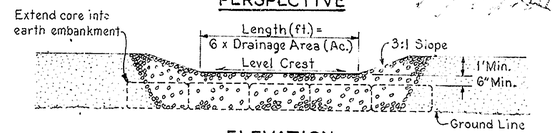
6. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
7. Fill material around the outfall pipe shall be hand compacted in 4-inch layers. A minimum of 2 feet of hand compacted backfill shall be placed before construction equipment will be permitted to operate or cross over the pipe.
8. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
9. The structure shall be inspected after each rain and repairs shall be made when required.
10. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
11. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

STONE OUTLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A stone outlet sediment trap consists of a basin formed by an embankment or by excavation and embankment. The outlet for the trap is over a level stone section. The stone outlet for a sediment trap differs from that for a stone outlet structure because of the intentional ponding of water behind the stone. To provide for the ponding, a relatively impervious core is placed in the stone.



PERSPECTIVE



ELEVATION

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material, or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The crest of the stone outlet shall be level and at least 1 foot below the top of the embankment. The crest width (feet) of the outlet shall be equal to 6 times the drainage area (acres).
4. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments, used to form sediment traps, shall be 4 feet.
5. The crushed stone used to form the outlet shall meet Delaware Standard Gradation Size № 103. Gravel meeting the above gradation requirement may be used if crushed stone is not available.
6. The drawings above show straw bales being used to form the core. The bales shall be anchored in accordance with the details for Straw Bale Dike, shown on Standard Sheet Number EC-1. Other materials (timber, concrete block, etc.) may be used for the core. All core material must be firmly anchored to the ground. The core shall be covered by a minimum of 6 inches of stone.
7. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
8. The structure shall be inspected after each rain and repairs shall be made when required.
9. Sediment shall be removed and the trap restored to its original dimensions, whenever the sediment accumulates to ½ of the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that erosion will not occur.
10. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.

APPROVED: DATE:	CONTRACT NO. 78-021-15
	CHAPMAN ROAD-PHASE II
	SHEET NO 23 / TOTAL SHEETS 47
DIRECTOR OF HIGHWAYS	SHEET NUMBER EC-3
	EROSION CONTROL DETAILS
	SEDIMENT TRAPS
RECOMMENDED: DATE:	PREL. TRACING W.D. DESIGN W.D. CHK'D.
	REVISIONS
DEPUTY DIRECTOR OF HIGHWAYS	

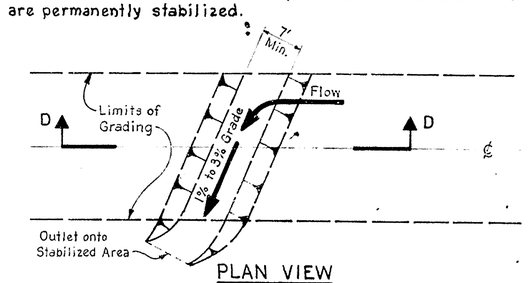
GENERAL NOTES FOR SEDIMENT TRAPS.

A sediment trap is a temporary basin of limited capacity formed by excavation and/or embankment, that is used to intercept sediment laden storm runoff and to trap and retain the sediment in order to protect drainageways, properties and rights of way below the sediment trap from sedimentation. They are usually installed in a drainageway, at a storm drainage inlet, or at other points of discharge from a disturbed area.

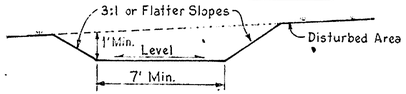
1. The drainage area for a sediment trap shall not exceed 5 acres.
2. The sediment trap should be located to obtain the maximum storage benefit from the terrain, for ease of cleanout of the trapped sediment and to minimize interference with construction activities.
3. The volume of a sediment trap as measured at the elevation of the crest of the outlet shall be at least 1,800 cubic feet per acre of drainage area. The volume of the trap shall be calculated using standard mathematical procedures. The volume of a natural basin may be approximated by the equation; Volume (cu. ft.) = 0.4 x surface area (sq. ft.) x maximum depth (ft.).
4. All embankments for sediment traps shall not exceed 5 feet in height, as measured at the low point of the original ground along the centerline of the embankment. Embankments shall have a minimum top width of 4 feet.
5. There are 4 types of outlets for sediment traps. Each sediment trap is named according to the type of outlet that it has. Each of the types have different design criteria and are discussed seperately. The outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the trap and that erosion of the outlet does not occur.
6. A trap may have several different outlets with each outlet conveying part of the flow based on the criteria for each outlet type, and the combined outlet capacity shall be adequate to carry the total required flow. For example, a 12 foot earth outlet (adequate for 2 acres) and a 12 inch diameter pipe outlet (adequate for 1 acre) could be used for a three acre drainage area.
7. There is no standard symbol for a sediment trap. Each type shall be delineated on the Erosion Plan in such a manner that it will not be confused with any other features. Each trap in the plans shall be numbered consecutively and a summary table (on the same plan sheet) shall show the following information:
   a) type of trap
   b) size of outlet
   c) trap dimensions
   d) embankment height and depth of excavation
   e) drainage area.

TEMPORARY INTERCEPTOR SWALE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway located across disturbed areas or rights of way. Used to shorten the length of exposed slopes, thereby reducing the potential for erosion by intercepting the storm runoff and diverting it to a stabilized outlet or sediment trapping device. The swale shall remain in place until the disturbed areas are permanently stabilized.



PLAN VIEW



SECTION D-D

EROSION PLAN SYMBOL

IS IS

NOTES:

1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.
2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.
3. Interceptor swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
4. The spacing of the interceptor swales along the graded slope shall be as follows:

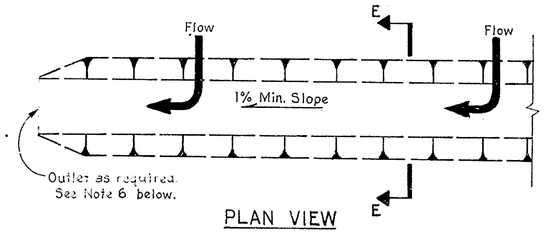
Maximum slope of area above swale	> 10%	5 to 10%	< 5%
Distance between interceptor swales	100 Feet	200 Feet	300 Feet

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

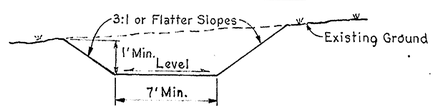
5. Interceptor swales must have an outlet that functions with a minimum of erosion. Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin.
6. When it is deemed necessary by the periodic inspections, the flow area of the swale shall be stabilized using "Stone Stabilization", which consists of a three inch thick layer of stone (Delaware Standard Gradation Size № 103) that is pressed into the soil. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8 inches vertically above the bottom.
7. At all points where several or more vehicle crossings per day will be made, the side slopes may be made flatter to allow construction traffic to cross. The entire swale area in the vicinity of the crossing shall be stabilized using "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103, that is placed in two seperate layers each three inches thick. Each layer is compacted into the soil after placement.
8. Periodic inspection and required maintenance shall be provided.

TEMPORARY PERIMETER SWALE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary excavated drainageway, located along the perimeter of the site or disturbed areas, that is used to prevent offsite storm runoff from entering the disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area. The swale shall remain in place until the disturbed area is permanently stabilized.



PLAN VIEW



SECTION E-E

EROSION PLAN SYMBOL

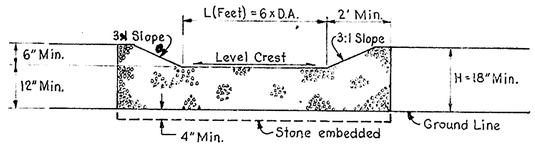
PS PS

NOTES:

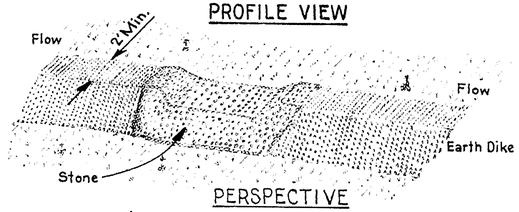
1. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.
2. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the specified criteria and be free of bank projections or other irregularities which will impede normal flow. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the swale. Fills shall be compacted to prevent unequal settlement that will cause damage in the completed swale.
3. Perimeter swales shall have a minimum grade of one percent and the bottom of the swale shall be level.
4. Runoff diverted from a protected or stabilized upland area shall outlet directly to an undisturbed stabilized area, into a level spreader, or to a grade stabilization structure. Runoff diverted from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment basin, sediment trap, or to an area that is protected by any of these practices.
5. Where the slope of the swale is less than 2%, stabilization may not be required, but should be added if deemed necessary by the periodic inspections. When the slope is from 2% to 5% the channel (flow area) should be stabilized with Section 725, "Erosion Control, Excelsior Blanket, Net or Jute Mesh"; Section 725, "Chemical Erosion Control"; or "Stone Stabilization". Where the slope of the swale is greater than 5%; "Stone Stabilization", consisting of stone that meets Delaware Standard Gradation Size № 103 which is placed in a 3 inch thick layer and then is pressed into the soil, shall be used. The lining shall extend across the bottom and up both sides of the channel to a height of at least 8" vertically above the bottom.
6. Periodic inspection and required maintenance shall be provided.

STONE OUTLET STRUCTURE
(DRAINAGE AREAS LESS THAN 5 ACRES)

A temporary crushed stone dike installed in conjunction with and as a part of a diversion dike, interceptor dike, or perimeter dike that is used to provide a protected outlet for the dike. They apply to any point of discharge where there is a need to dispose of runoff at a protected outlet or to diffuse concentrated flow for the duration of the period of construction. Stone outlet structures also allow the area behind the dike to dewater.



PROFILE VIEW



PERSPECTIVE

EROSION PLAN SYMBOL

SOS
L=

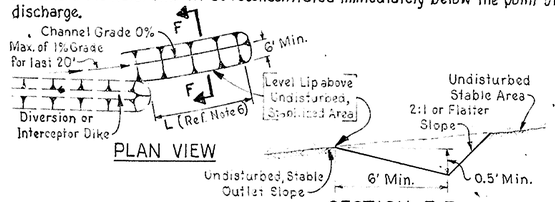
NOTES:

1. The stone shall be crushed stone. Gravel may be used only when crushed stone is not available. The stone shall meet Delaware Standard Gradation Size № 103.
2. The crest of the stone dike shall be at least six inches lower than the lowest elevation of the top of the earth dike. The crest shall be level.
3. The stone outlet structure shall be embedded into the soil a minimum of four inches.
4. The minimum length, in feet, of the crest of the stone outlet structure shall be equal to six times the number of acres of the contributing drainage area.
5. The stone outlet structure shall be inspected after each rain, and the stone shall be replaced when the structure ceases to function as intended due to silt accumulation among the stone, washout, construction traffic damage, etc.
6. When the drainage area above the structure is not stabilized, a sediment basin or a sediment trap must be used in conjunction with the stone outlet structure.

APPROVED: DATE:	CONTRACT NO. 78-021-15	SHEET NO	TOTAL SHEETS
	CHAPMAN ROAD - PHASE II	30	
DIRECTOR OF HIGHWAYS	SHEET NUMBER EC-2 EROSION CONTROL DETAILS TEMPORARY SWALES and OUTLET STRUCTURES		
RECOMMENDED: DATE:	PREL. TRACING WD	DESIGN WD	CHKD.
		REVISIONS	
DEPUTY DIRECTOR OF HIGHWAYS			

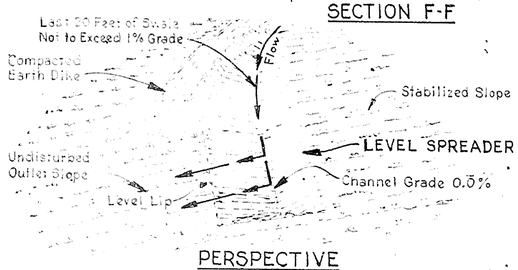
TEMPORARY LEVEL SPREADER

An outlet that is constructed at zero percent grade across the slope whereby concentrated runoff may be discharged at non-erosive velocities onto an undisturbed area that is stabilized by existing vegetation. Used to convert a concentrated flow of sediment-free storm runoff into sheet flow and to outlet it onto areas that are stabilized by existing vegetation in a manner that does not cause erosion. Should be used only in those situations where the spreader can be constructed on undisturbed soil, where the area directly below the level lip is stabilized by existing vegetation, where the drainage area above the spreader is stabilized by existing vegetation, and where the water will not be reconcentrated immediately below the point of discharge.



PLAN VIEW

SECTION F-F



PERSPECTIVE

EROSION PLAN SYMBOL

L=

NOTES:

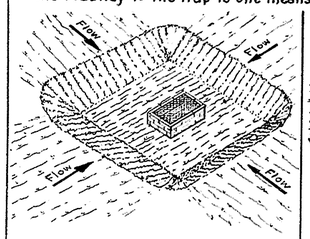
1. Level spreaders shall be constructed under the direct supervision of the Engineer.
2. Construct level lip on zero percent grade to insure uniform spreading of sediment-free runoff (converting channel flow to sheet flow).
3. Level spreader shall be constructed on undisturbed soil (not on fill).
4. The entrance channel shall not exceed a 1% grade for at least 20 feet before entering the spreader.
5. Storm runoff converted to sheet flow shall outlet onto stabilized areas. Water shall not be reconcentrated immediately below the point of discharge.
6. Spreader length will be determined by estimating Q_{10} (10 year frequency storm flow) and selecting the appropriate length from table below:

Design Q_{10} (c.f.s.)	Maximum Length L (feet)
Up to 10	15
11 to 20	20
21 to 30	26
31 to 40	36
41 to 50	44

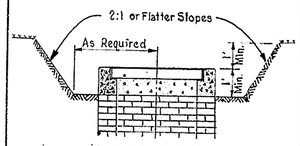
7. Periodic inspection and required maintenance shall be provided.

STORM INLET SEDIMENT TRAPS
(DRAINAGE AREA: 5 ACRES OR LESS)

A storm inlet sediment trap consist of a basin formed by excavation or by natural ground that discharges through an opening in a storm drain inlet structure. This opening can either be the inlet opening or a temporary opening made by omitting bricks or blocks in the inlet wall. An inlet located in a median swale or a side ditch of the roadway might use the inlet opening as an outlet. A pavement inlet in a curbed section would require a temporary opening. The trap should be out of the roadway so as not to interfere with construction. Placing the trap back of the curb and diverting water from the roadway to the trap is one means of doing this.

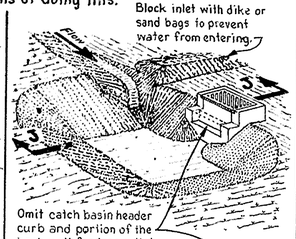


PERSPECTIVE

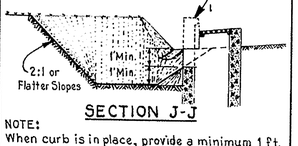


CROSS SECTION

MEDIAN DRAIN



PERSPECTIVE



SECTION J-J

NOTE:
When curb is in place, provide a minimum 1 ft. wide opening in the curb or use a sand bag dam to force water over the curb to the trap.

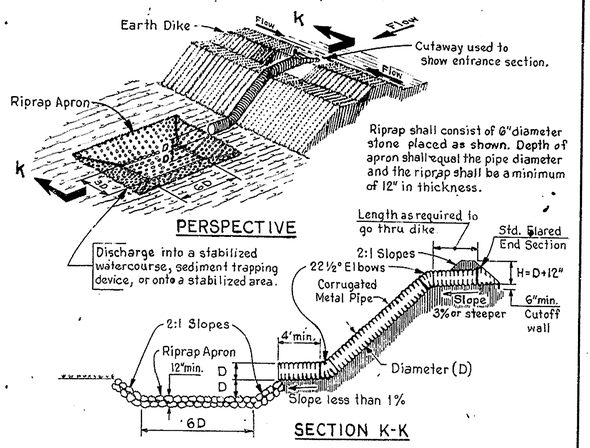
CURB DRAIN

NOTES:

1. The area under embankments shall be cleared, grubbed and stripped of all vegetation and root mat. The pool area shall be cleared.
2. The fill material for embankments shall be free of roots or other woody vegetation, as well as oversized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being placed.
3. The outlet crest shall be at least 1 foot below the top of any embankment, or in the case of excavation, at least 1 foot below the ground adjacent to the trap.
4. The capacity of the outlet shall be based on the size of the catch basin outlet pipe. Select the allowable drainage area from the table in Note 5 under Pipe Outlet Sediment Traps on Standard Sheet Number EC-3.
5. All cut and fill slopes used in the construction of sediment traps shall be 2:1 or flatter. The minimum top width of embankments used to form sediment traps shall be 4 feet.
6. The structure shall be inspected after each rain and repairs shall be made when required.
7. Sediment shall be removed and the trap restored to its original dimensions, when the sediment has accumulated to ½ the design depth of the trap. Removed sediment shall be disposed of in a suitable area, as approved by the Engineer, and in such a manner that it will not erode.
8. Construction operations shall be carried out in such a manner that erosion and water polution are minimized.
9. The sediment trap shall be removed and the area shall be stabilized after the drainage area above the trap has been properly stabilized.
10. See also the General Notes for Sediment Traps on Standard Sheet EC-3.

GRADE STABILIZATION STRUCTURE
RIGID PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A rigid pipe with a prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



PERSPECTIVE

SECTION K-K

EROSION PLAN SYMBOL

RPSD-Diameter Example: RPSD-12 = Rigid Pipe Slope Drain with 12" C.M. Pipe.

NOTES:

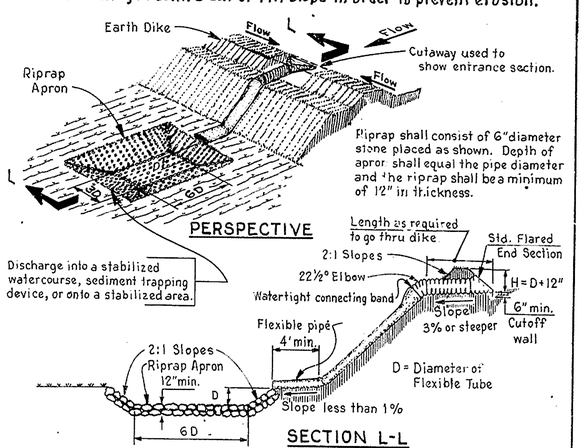
1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
5. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
6. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

7. Follow-up inspection and any needed maintenance shall be performed after each storm.

GRADE STABILIZATION STRUCTURE
FLEXIBLE PIPE SLOPE DRAINS
(DRAINAGE AREA: 5 ACRES OR LESS)

A flexible tubing with a rigid pipe and prefabricated flared entrance section, temporarily placed to extend from the top to the bottom of a slope, used to convey surface runoff safely down the slope without causing erosion. Pipe slope drains are to be used whenever concentrated flows of surface runoff are to be conveyed down a cut or fill slope in order to prevent erosion.



PERSPECTIVE

SECTION L-L

EROSION PLAN SYMBOL

FPSD-Diameter Example: FPSD-18 = Flexible Pipe Slope Drain with 18" C.M. Pipe inlet section and 18" dia. flexible tubing.

NOTES:

1. The entrance section and the inlet pipe shall have a slope of 3% or steeper.
2. The top of the earth dike over the inlet pipe and of all dikes carrying water to the slope drain shall be at least 1 foot higher at all points than the top of the inlet pipe.
3. The inlet pipe shall be corrugated metal pipe with water tight connecting bands at all joints.
4. The flexible tubing shall be the same diameter as the inlet pipe and shall be constructed of a durable material with hold-down grommets spaced 10' on centers.
5. The flexible tubing shall be securely fastened to the corrugated metal pipe with metal strapping or watertight connecting collars.
6. The flexible tubing shall be securely anchored to the slope by staking at the grommets provided.
7. A riprap apron shall be provided at the outlet. The stone shall have a minimum dimension of 6" and shall be placed in a layer at least 12" in thickness, to the lines and grades shown by the drawing above.
8. The soil around and under the inlet pipe and entrance section shall be hand tamped in 4" lifts to the top of the earth dike.
9. Pipe slope drains are to be sized in accordance with the following table:

Maximum Drainage Area (acres)	0.5	1.5	2.5	3.5	5.0
Minimum Pipe Diameter (inches)	12	18	21	24	30

10. Follow-up inspection and any needed maintenance shall be performed after each storm.

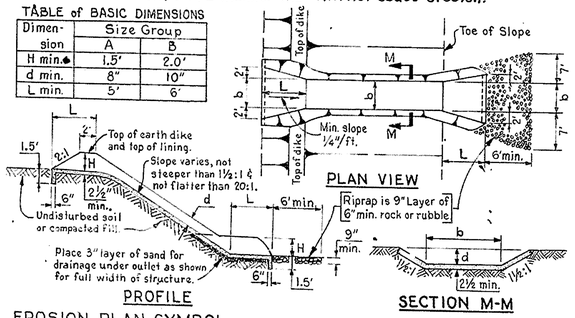
APPROVED: DATE:	CONTRACT NO. 78-021-15	SHEET NO	TOTAL SHEETS
	CHAPMAN ROAD-PHASE II	3	47
DIRECTOR OF HIGHWAYS	SHEET NUMBER EC-4		
	EROSION CONTROL DETAILS		
RECOMMENDED: DATE:	SEDIMENT TRAPS AND GRADE STABILIZATION STRUCTURES		
	PREL. TRACING WD	DESIGN WD	CHKD.
DEPUTY DIRECTOR OF HIGHWAYS	REVISIONS		

GRADE STABILIZATION STRUCTURE
PAVED CHUTE OR FLUME
(DRAINAGE AREA: 36 ACRES OR LESS)

A temporary channel lined with bituminous concrete, Portland cement concrete, or comparable non-erodible material, placed to extend from the top of a slope to the bottom of a slope, that is used to convey concentrated flow of surface runoff down the slope in a manner that will not cause erosion.

TABLE of BASIC DIMENSIONS

Dimension	Size Group A	Size Group B
H min.	1.5'	2.0'
d min.	8"	10"
L min.	5'	6'



PLAN VIEW

PROFILE

SECTION M-M

EROSION PLAN SYMBOL

PCF-Size Group, Bottom Width Example: PCF-A2 = Paved chute or flume, Size Group A with a 2 ft. bottom width (b). The selected size shall be shown on the erosion plan.

NOTES:

1. The structure shall be placed on undisturbed soil or on well compacted fill.
2. The cut or fill slope shall not be steeper than 1½:1 and shall not be flatter than 20:1.
3. The top of the earth dike at the entrance and of all dikes carrying water to the entrance shall not be lower at any point than the top of the lining at the entrance to the structure.
4. The lining at the entrance to the structure shall extend the distance H above the lining crest as shown in the drawing above.
5. The lining shall be placed beginning at the lower end and proceeding up the slope to the upper end. The lining shall be well compacted and free of voids and have a reasonably smooth surface finish.
6. The entrance floor at the upper end of the structure shall be sloped toward the outlet at a rate of ¼ to ½ inch per foot.
7. The cutoff walls at the entrance and discharge aprons shall be continuous with the lining.
8. The lining shall consist of Portland cement concrete, bituminous concrete, or comparable non-erodible material.
9. An energy dissipator of adequate design shall be used at the outlet to prevent erosion.
10. Chutes or flumes are divided into two size groups, which have basic dimensions as shown by the tabulation in the drawing above. Each size group has various bottom widths and allowable drainage areas as shown below:

Size	Bottom Width b, feet	Max. D.A. acres
A-2	2	5
A-4	4	8
A-6	6	11
A-8	8	14
A-10	10	18

Size	Bottom Width b, feet	Max. D.A. acres
B-4	4	14
B-6	6	20
B-8	8	25
B-10	10	31
B-12	12	36

If a minimum of 75% of the drainage area will have a good grass or woodland cover throughout the life of the structure, the drainage areas listed above may be increased by 50%. If a minimum of 75% of the drainage area will have a good mulch cover throughout the life of the structure, the drainage areas listed above may be increased by 25%. Structures of size group B shall have their outfall velocity checked for erosion potential downstream.