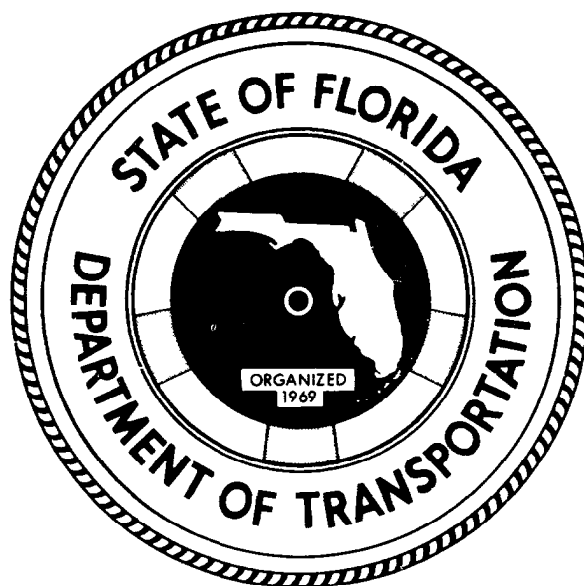


PLANS PREPARATION MANUAL



ROADWAY DESIGN OFFICE

TALLAHASSEE, FLORIDA

1981

PREFACE

This manual is intended for use as a guide to the preparation of plans for highway construction projects. Its purpose is to promote good engineering practice and good drafting techniques with the ultimate objective of providing plans with a high degree of uniformity and maximum readability.

It is designed for use by both engineers and draftsmen, Department of Transportation employees and consulting firms, engaged in the production of plans for the Florida Department of Transportation.

The manual is divided into five (5) sections. Section I deals with the preparation and assembly of roadway plans, covering the materials and techniques for presenting engineering plans in a uniform and understandable format. Also covered, by reference, are roadway design criteria and procedures.

Sections II and III address the preparation of Structure and Utility plans respectively.

Section IV contains appropriate examples of completed plan sheets to illustrate the correct procedures as described in previous sections.

Section V is reserved for future addendums to allow updating of this manual between reprintings so that it may be kept up-to-date with current design criteria and procedures.

With the implementation of the guidelines contained herein it is the intent that all plans be prepared according to the material outlined in the five sections of this manual.

TABLE OF CONTENTS

SECTION I	PREPARATION AND ASSEMBLY OF ROADWAY PLANS	
Chapter 1	Drafting Material	
	1.1 General	1
	1.2 Drafting Media	5
	1.3 Diazo Intermediates	6
	1.4 Xerographic Technical Products	6
	1.5 Graphic Aids	7
	1.6 Ordering Information	7
	1.7 Troubleshooting	10
	1.8 Glossary	13
Chapter 2	Key Sheet	
	2.1 Location Map	17
	2.2 North Point and Scale	18
	2.3 Project Number, County Name and Road Number	18
	2.4 Budget Item Number	19
	2.5 Length of Project Box	19
	2.6 Plans in Contract Plans Set	19
	2.7 Index of Sheets	19
	2.8 Governing Specifications	21
	2.9 State Map	21
	2.10 Railroad Crossing	21
	2.11 Designer's or Project Manager's Name	21
	2.12 Revision Dates	22
Chapter 3	Summary of Pay Items	
	3.1 General	23
	3.2 Summary of Pay Item Worksheet	23
	3.3 Pay Item Footnotes	23
	3.4 Skeleton Plans	23
	3.5 CES Input and Generation of Summary of Pay Item Plan Sheet	23
	3.6 New Pay Item Numbers	25
	3.7 Revision Dates	25
	3.8 Significant Figures in Estimating Quantities	25
Chapter 4	Drainage Map	
	4.1 General	32
	4.2 Plan Portion	32
	4.3 Profile Portion	33

Chapter 5	Typical Sections	
	5.1	General36
	5.2	Mandatory Information36
	5.3	Standard Notes for Typical Section Sheets37
Chapter 6	Summary of Quantities	
	6.1	General40
	6.2	Summary of Drainage Structures40
	6.3	Standard Notes for Summary of Quantities Sheet40
	6.4	Standard Pay Item Footnotes42
Chapter 7	Mass Diagram	
	7.1	General44
Chapter 8	Roadway Plan-Profiles	
	8.1	General46
	8.2	Roadway Plan Portion (Rural Construction) ..46
	8.3	Roadway Profile Portion (Rural Construction) ...49
	8.4	Roadway Plan Portion (Urban Construction) ..52
	8.5	Roadway Profile Portion (Urban Construction) ...54
Chapter 9	Lateral Ditch Plan-Profile	
	9.1	General56
	9.2	Plan Portion56
	9.3	Profile Portion56
Chapter 10	Drainage Structures	
	10.1	General58
	10.2	Rural Projects58
	10.3	Urban Projects.60
Chapter 11	Borrow Pit Soil Survey	
	11.1	General62
	11.2	Exceptions62
Chapter 12	Roadway Soil Survey	
	12.1	General63
	12.2	Method of Compiling and Presentation63
Chapter 13	Roadway Cross Section	
	13.1	General65

Chapter 14	Lateral Ditch Cross Sections	
	14.1 General	69
Chapter 15	Back of Sidewalk Profiles	
	15.1 General	70
Chapter 16	Intersection and Interchange Layouts	
	16.1 Intersections	72
	16.2 Interchanges	73
Chapter 17	Intersection and Interchange Profiles	
	17.1 Intersections	76
	17.2 Interchanges	76
Chapter 18	Maintenance of Traffic Details	
	18.1 General	78
	18.2 Types of Maintenance of Traffic Plans	78
	18.3 Maintenance of Traffic Items and Basis of Estimate	79
	18.4 Training	80
	18.5 Review and Evaluation	80
Chapter 19	Preparation of Utility Adjustment Sheets	
	19.1 General	82
	19.2 Design Procedures	82
Chapter 20	Bridge Design Data Sheet	
	20.1 General	84
	20.2 Design Procedure for Bridge and Bridge Culverts Over Water	84
	20.3 Design Procedure for Bridge Over Railroad Tracks	85
Chapter 21	Design Procedures and Criteria	
	21.1 General	86
	21.2 Design Procedures	86
	21.3 Design Criteria and References	87
	21.4 Design Criteria Memorandums	89

Chapter 22	Preparation of Plans for Rural Projects	
22.1	General	90
22.2	Preliminary Preparation	90
22.3	Preliminary Geometrics	90
22.4	Preliminary Profiles	91
22.5	Preliminary Cross Sections	92
22.6	Preliminary Review	93
22.7	Final Design	95
22.8	Drainage	97
22.9	Right-of-Way	98
22.10	Plans Assembly	100
Chapter 23	Preparation of Plans for Municipal Projects	
23.1	General	103
23.2	Preliminary Preparation	103
23.3	Preliminary Geometrics	104
23.4	Preliminary Profiles	105
23.5	Preliminary Cross Sections	107
23.6	Preliminary Review	107
23.7	Final Design	109
23.8	Drainage	111
23.9	Right-of-Way	113
23.10	Plans Assembly	113
Chapter 24	Preparation of Skeleton Plans	
24.1	General	115
24.2	Skeleton Plan Format	115
Chapter 25	Quality Control in Plan Preparation	
25.1	General	125
25.2	Check List for General Design and Safety Review	125
25.3	Check List for Plan Checkers	128
Chapter 26	Plan Revisions	
26.1	General	135
26.2	Revised Plan Sheets	135
26.3	Revision Letters	136
Chapter 27	Computer Applications in Plans Preparation	
27.1	General	143
27.2	Main Programs Available to the Designer for Preparation of Roadway Plans	143
27.3	COGO (Coordinate Geometry)	144
27.4	ROADS (Roadway Analysis and Design System)	144
27.5	Contour Plot	145
27.6	CES (Contract Estimating System)	145
27.7	Summary	145

Chapter 28	Plans Retention	
	28.1	Introduction 146
	28.2	"As-Built" Plans 146
	28.3	Plan Changes During Construction 147
Chapter 29	Crash Cushions	
	29.1	General 148
SECTION II	PREPARATION AND ASSEMBLY OF STRUCTURE PLANS	
Chapter 30	Structural Plans Assembly	
	30.1	General 149
	30.2	Summary of Bridge Pay Items 153
	30.3	Quantities 154
Chapter 31	Preliminary Structural Plans	
	31.1	Preliminary Plan Contents 155
Chapter 32	Final Structural Plans	
	32.1	Final Plan Contents 158
Chapter 33	Computer Programs for Structural Design	
	33.1	Available Programs 164
Chapter 34	Construction Plans (Shop Drawings)	
	34.1	Shop Drawing Submittals 166
SECTION III	PREPARATION AND ASSEMBLY OF UTILITY CONTRACT PLANS	
Chapter 35	Contract Utility Work	
	35.1	General 171
	35.2	Advantages 171
	35.3	Scheduling Procedures 172
Chapter 36	Utility Responsibility	
	36.1	Engineering 175
	36.2	Utility Pay Items 175
	36.3	Utility Specifications 175
	36.4	Utility Cost Estimates 176
	36.5	Utility Cost Allocation 176

Chapter 37	Plan Preparation and Assembly	
37 1	General	177
37 2	Assembly - When Combined Under Same Project Numbers as the Roadway Construction	177
37 3	Assembly - When Separate Set of Utility Plans Prepared Under the 6000 Series Project Number	178
Chapter 38	Checking and Pay Item Assignments	
38.1	General	179
38.2	Plans	179
38.3	Pay Items	180
Chapter 39	Processing for Contract	
39 1	General	181
39.2	Pre-Letting	181
39 3	Bid Review	182
39 4	Preconstruction Conference	182

LIST OF EXHIBITS

SECTION IV Exhibits

<u>Exhibit Name</u>	<u>Exhibit Number</u>
Key Sheet	
1 Key Sheet - F A Rural	1
2 Key Sheet Example Titles	2
Drainage Map	
1 Rural	3
2 Urban	4
3 Supplementary (Interchange)	5
Typical Sections	
1 Rural 2-Lane	6
2 Rural 4-Lane Divided	6
3 Rural 6-Lane Divided	6
4 Urban 2-Lane With Refuge Lanes	7
5 Urban 4-Lane Divided With Refuge Lanes	7
6 Urban 6-Lane Divided With Refuge Lanes	7
7 Urban 4-Lane Undivided	8
8 Urban 4-Lane Divided	8
9 Urban 6-Lane Divided	8
10 Interstate 4-Lane	9
11 Interstate 6-Lane	9
12 Interstate Ramps and Stage Construction	10
13 Shoulder Pavement (Interstate)	11
14 Rural Widening and Resurfacing	12
Summary of Quantities	
1 Summary of Quantities	13
2 Summary of Drainage Structures	14
Mass Diagram	15
Roadway Plan-Profile	
1 Rural	16
2 Urban	17
3 Interstate	18
4 Intersection	19
Outfall Plan-Profile and Lateral Ditch Plan-Profile20

Drainage Structures		
1	Storm Sewer	21
2	Cross Drain	22
Borrow Pit Soil Survey		23
Roadway Soil Survey		
1	Soil Survey Cover Sheet	24
2	Test Analysis Sheet	25
Roadway Cross Sections		
1	Rural	26
2	Urban	27
3	Interstate	28
Lateral Ditch Cross Sections		29
Back-of-Sidewalk Profiles		30
Intersection Detail		31
Interchange Layout		32
Interchange Detail		33
Intersection Profile		34
Ramp Profile		35
Cross Section Pattern Sheet		36
Maintenance of Traffic Plan		37
Utility Adjustments		38
Bridge Design Data Sheet		39

SECTION I PREPARATION AND ASSEMBLY OF ROADWAY PLANS

CHAPTER 1
DRAFTING MATERIALS

1.1 General Information






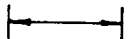
1. Introduction - The readability of plans is highly dependent upon the drafting techniques, the drafting materials, and the reproduction processes that are employed. Since the degree of success achieved with any reproduction process is also highly dependent upon the drafting materials used, the choice of appropriate drafting materials is of paramount importance.

2. Engineering Graphics Requirements - The following drafting practices are to be reflected on all drawings.

	<u>Size</u>	<u>Examples</u>
Character height	8½" x 14" - 120 Guide 22 " x 36" - 140 Guide (Desirable) 120 Guide (Minimum)	<i>123Abc</i> 123Abc <i>123Abc</i>
Spacing between adjacent characters	0.050 inch minimum	<i>abc</i> — — —
Spacing between lines of characters	½ to 1 times character height minimum	<i>↓abc</i> ↓abc
Shape of characters	Open, well rounded, uniform width, avoid crowding	Shape
Character style	Gothic upper or lower case	UPPER or Lower
Density of characters	Dense and uniform on a high contrast background	
Line width	0.012 inch minimum (Pen Size 00)	—
Open space between lines	0.050 inch minimum	==
Typed data	12 characters per inch maximum (12 point)	Roadway

Fractions	The total height of the fraction shall be twice that of the integer.	$\frac{1}{2}$ $\frac{1}{2}$
Recommended ink or pencil	Line weight to be equivalent to F or H pencil or drafting film pencil.	
Background of document	Free of undesirable background in all areas that contain information content No 3rd generation copies	

RECOMMENDED WEIGHT OF INK LINES SOLID OR BROKEN

<u>Line and Letter Weight</u>	<u>Template Size (Leroy)</u>	<u>Pen Size (Rapidograph)</u>	<u>Examples</u>
Light		0	
Medium		1	
Heavy		2 or 3	
Very Heavy		4	
Existing Ground		0	
Existing & Point Elevations	140	0	25 2
Datum Elevations	175	1 or 2	30
Sta No. Plan-Profile	175 or 200	2 or 2½	50+00
Sta. No. X-Section	200	2 or 2½	50+00
Dimension Line		00	

3 Description of Plan Sheets - All plans sheets shall be 22 inches by 36 inches. The border line shall be ½ inch from the top, bottom and right side, and 1½ inches from the left side, with two ¼ inch holes on 12 inch centers punched 5 inches from top and ½ inch from left edge and format preprinted. Film sheet shall be polyester film, 2 or 3 mil. thickness, double-matte with black imagery. The only exception shall be the plan and profile, profile or cross section

sheets which shall have dark green imagery when preprinted on film and a non-erasable green ink on the front side when paper vellum is used.

The Department has no objections to the use of polyester film for plan and profile, profile or cross section sheets. However, we do not require their usage because we do not use polyester film exclusively for these sheets.

Key

Material - Polyester film, black imagery

Format - As adopted

Use - Key Sheet

Drainage Map

Material - Polyester film, black imagery

Format - 5" depth grid of 1" square blocks, of 10 x 10 units per square inch with I D box upper right hand corner

Use - Drainage Map Sheet

Plan and Profile

Material - Paper vellum or polyester film with green imagery

Format - The top half for the plan, the bottom half containing a 10" depth grid of 1" square blocks of 10 x 10 units per square inch for the profile, with I D. box upper right hand corner

Use - Plan and Profile, Lateral Ditch or Outfall Ditches Sheet

Profile

Material - Paper vellum or polyester film with green imagery

Format - A 20" depth by 32" width grid 1" square of 5 x 20 units per square, with I.D box upper right hand corner

Use - Roadway Cross-section, Special Profiles, Mass Diagrams,
and Drainage Structures Sheets

Plan

Material - Paper vellum or polyester film with black imagery

Format - Border with I D box upper right hand corner of
sheet

Use - Typical Sections, Summary of Quantities, Summary of
Drainage Structures, Special Details, Design Data,
and Roadway Soil Survey Sheets

Bridge Design Data

Material - Polyester film with black imagery

Format - As adopted

Use - For Hydraulic Data in the Design of Bridges and Bridge
Culverts

Borrow Pit Soil Survey

Material - Paper vellum or polyester film with green imagery

Format - As adopted

Use - Borrow Pit Soil Survey

Utility

Material - Diazo intermediates

Format - A reverse sepia from plan-profile sheets

Use - Utility Adjustment Sheets

Miscellaneous Construction Details

Material - Diazo intermediate film, polyester film

Format - An intermediate of a plan-profile, cross-section, or
special detail sheet with I D box upper right hand
corner

Use - Construction Details or Detour Plan Sheets

Clearing and Grubbing

Material - Polyester film

Format - An aerial photo sheet

Use - For Selective Clearing and Grubbing Details

Right of Way

Material - Polyester film with black imagery

Format - Border with I D box lower right hand corner of sheet

Use - Right of Way Maps (Right of way maps are not normally part of the construction plans, however, they are a basis for or may be part of the legal description of parcels which are acquired for the project.)

1.2 Drafting Media

1. Drafting Films - Shall be a highly translucent, 2 or 3 mil thickness double-matte polyester film

2. Tracing and Drafting Cloth - No longer used in the preparation of plans

3 Drafting Vellums - Shall be 16 or 17 lb (medium weight) or 0027" thickness, 100% white rag, fine or medium toothed with 50% transparency

4 List of Approved Drafting Media

621-965 Plan and Profile Vellum Sheets K & E 99-9999 and Bruning 40-105 30651

621-967 Profile Vellum Sheets K & E 10-7155, Bruning 21, and GAF Draft Trace 250

621-973 Plan Film Sheets K & E 19-1253 (12-71 48591) and GAF Poly Trace 033

1 3 Diazo Intermediates

1 Diazo Intermediate Film - Shall be double-matte, 2 or 3 mil thickness, polyester film, with sepia or black imagery, standard exposure speed for ammonia-developing diazo printmakers

2 Diazo Intermediate Paper - Shall be an erasable, 100% rag paper, standard speed with either sepia or black imagery

3 Diazo Applique Film - Shall be a clear or matte thin polyester adhesive-back film, with a black reproducible diazo imagery

Note Diazo applique film is designed to reduce repetitive drafting of recurring drawing elements such as Location Maps. Because of problems in the reproduction process, any stick-on must be made of a heat resistant adhesive

1 4 Xerographic Technical Products

1 Erasable Xerographic Vellum - Should be a high-quality translucent vellum and yields a black, well-defined, high-contrast xerographic image which will produce a highly readable diazo reprint

2 Erasable Xerographic Bond - Should be a high-quality bond paper and yield a black, well-defined, high-contrast xerographic image

3 Erasable Xerographic Film - Should be a matte or clear-surfaced polyester drafting film that is specially designed to accept an erasable xerographic image

4 Xerographic Drafting Applique Film - Should be a 1.5 mil, matte-surfaced polyester film with a heat-resistant adhesive back. The matte drafting surface yields black, well-defined, highly reproducible xerographic copies and will also accept pencil, ink or typewritten images

1 5 Graphic Aids

1 Graphic Aid Requirements - All graphic aids must reflect the following standards

- a Sharp printing which assures quality reproduction.
- b Must transfer quickly and adhere easily to a variety of surfaces
- c Must be able to resist abrasion and cracking.
- d Their adhesive must be heat resistant for copying.
- e An intermediate film or photocopy of the final original should be made and inserted in the plans to reduce problems during reproduction.

2 Graphic Films - A pressure sensitive film either an acetate or mylar base film for shading and patterns

3 Graphic Tapes - Are available in a variety of different types and sizes

1 6 Ordering Information

1 Plan Sheet Supply Sources (for Department Offices)

Photo Positives - Standard plan sheet formats are available from the Florida Department of Transportation Photo Lab, Tallahassee, Florida, upon request via reproduction order form 301 Aerial Photo Sheets are also available from the Photo Lab Be sure to specify one of the following types of matte finishes when ordering

Clearview Matte - Used as an intermediate to run diazo film sheets Note: Special care should be used to avoid any dark background.

Single-Matte - Not recommended for use in plan preparations

Double-Matte - Used as an original sheet

Department of Transportation's supply unit will provide the following sheets upon request via a requisition form 244-01

621-965 Plan and Profile (Vellum)

621-967 Profile or Cross Sections (Vellum)

621-973 Plan (Film)

Preprinted formats are also available from vendors

2 List of Recommended Products

Diazo Intermediate Film

<u>Vendor</u>	<u>Catalog No.</u>
G A F	104 CPC 3
DIETZGEN	F 247 ME 3

Diazo Intermediate Paper

DIETZGEN	N 244 P
G A.F	407 EZ
K & E	21-2145
Ridgeway	11-1525
AM	30-1125

Diazo Applique Film

G A F.	102 APZ
--------	---------

Xerographic Applique Film

Arkwright	70-31-01
G A F	888-802

Xerographic Film

Arkwright	64-42-10 clear
Arkwright	75-42-05 double-matte

Film Pencils

Keuffel & Esser No. 205

Ruwe Pencils 3-S Black

Photographic Eradicator

Keuffel & Esser No. 58 0246
Erasing Fluid

Aqfa-Gevaert Copy No. 301
Line Eradicator
12 per case

Cleaning Fluid

Tri-Ethylene Chlorine

3 List of Vendors

AM Addressograph Multigraph Corporation
Bruning Division
4030 Boulevard Center Drive
Jacksonville, Florida 32207
(305) 855-7121

Arkwright Incorporated
1454 Kelton Drive
Stone Mountain, Georgia 30083
(404) 296-4161

Chartpak Marketing Services Department
1 River Road
Leeds, Massachusetts 01053
800-628-1910

Dietzgen Corporation
380 West Grant Street
P. O. Box 8475
Orlando, Florida 32806
(305) 241-5671

Flexigraph Corporation
Rolling Meadows, Illinois 60008

Formatt Graphic Products Corporation
Rolling Meadows, Illinois 60008

G A F Corporation
7445 Exchange Drive
Orlando, Florida 32805
(305) 855-1220

Keuffel & Esser Company
1565 San Marco Boulevard
Jacksonville, Florida 32207
(904) 398-6471

Koh-I-Noor Rapidograph, Inc
100 North Street
Bloomsbury, New Jersey 08804

Line-O-Tape
Industrial Research Assoc
5345 Mad River Road
Dayton, Ohio 45429

Ridgeway's
837 N E 2nd Avenue
Ft. Lauderdale, Florida 33304
(305) 764-7365

Sensitized Materials, Inc.
542 Armour Circle
N.E Atlanta, Georgia 30324

Zip-a-Tone, Inc.
150 Fence Lane
Hillside, Illinois 60162

1.7 Troubleshooting

1. Key Sheets - Avoid drafting the map portion of the Key Sheet. Instead, use an existing map of the project area and combine with the basic Key Sheet format (carrying title, index of sheets, etc.) to produce the finished Key Sheet. Suggested methods of accomplishing this are as follows

- a. Use a xerographic applique film or xerographic film to make a transparent positive from a map of the project area (note must be free of undesirable background). Place map on the basic Key Sheet format and make a Diazo Intermediate Film by exposing in an ozalid machine to produce the finished base Key Sheet.
- b. Use a photo positive of the location map in conjunction

with a photo positive of the basic Key Sheet format and make a Diazo Intermediate Film by exposing in an ozalid machine to produce the finished base Key Sheet

- c Attach an opaque or translucent copy of the location map to a similar copy of the basic Key Sheet format and forward to Tallahassee where the finished Key Sheet will be made by our Photogrammetry department (For in-house plans preparation.)

Do not use a Diazo Intermediate film or paper to make the Location Map to be placed on the Key Sheet

2 Aerial Photo Plan Sheets - Use ink or film pencils only.

Do not put notes in the dark areas of the Aerial Photo sheets without using a photographic eradiator to remove the emulsion in an area for notes

3 Drafting Tips

Erasing - The erasing of pencil lines and ink lines is a necessary technique to learn. When changing a detail a draftsman should use a soft pencil eraser so as not to damage the finish of the paper. Heavier lines are best removed with a Ruby pencil eraser. If the paper has been grooved by the line, it may be rubbed over with a burnisher or even with the back of the thumbnail. In erasing an ink line, hold the paper down firmly and rub lightly and patiently with a Ruby pencil eraser, first along the line and then across it, until the ink is removed. A triangle slipped under the sheet gives a good backing surface.

When an erasure is made close to other lines, select an opening of the best shape on the erasing shield and rub through it,

holding the shield down firmly, first seeing that both of its sides are clean. Wipe the eraser crumbs off the paper with a dustcloth or brush. Never scratch out a line or blot with a knife or razor blade, and use so-called ink erasers sparingly, if at all.

For extensive erasing, an electric erasing machine is a great convenience. Several successful models are on the market.

Film Erasing - For small areas dampen eraser for ease of erasing cleanly on drafting film without removing the emulsion.

For large areas use a cloth, water, and an abrasive to remove the ink from the film.

Inking - To prevent ink from smearing use a piece of drafting tape on the lower edges of square, circle symbol templates, and triangles.

Pens - Keep pens in a humidified system. When in use, wipe pen points with damp cheesecloth to clean points off.

Points Worth Noting

Never use the scale as a ruler for drawing lines.

Never draw horizontal lines with the lower edge of the T square.

Never use the lower edge of the T square as a horizontal base for the triangles.

Never cut paper with a knife and the edge of the T square or triangle as a guide.

Never use the T square as a hammer.

Never work with a dull pencil.

Never sharpen a pencil over the drawing board.

Never jab the dividers into the drawing board.

Never oil the joints of compasses.

Never use the dividers as reamers, pincers, or picks.

Never use a blotter on inked lines

Never screw the pen adjustment past the contact point of the nibs.

Never leave the ink bottle uncorked.

Never hold the pen over the drawing while filling.

Never put into the drawing-ink bottle a writing pen that has been used in ordinary writing ink.

Never try to use the same thumbtack holes in either paper or board when putting paper down a second time

Never scrub a drawing all over with an eraser after finishing. It takes the life out of the lines.

Never begin work without wiping off the table and instruments.

Never put instruments away without cleaning them. This applies with particular force to pens.

Never put bow instruments away without opening to relieve the spring

Never work on a table cluttered with unneeded instruments or equipment

Never fold a drawing or tracing.

1 8 Glossary

Applique film - a polyester material attached by an adhesive glue

Background density - the density of that portion of the negative image in which no inscription appears

Blackline - an ozalid print with white background and black lines

Blue-line - an ozalid print with white background and blue lines

Blueprint - a photographic reproduction with white lines on a blue background

Brownline print - a sepia line print with a white background made on a silver-sensitized paper by printing through a negative

Burnisher - a tool used to rub or polish

Cloth - a woven or pressed fabric of fibrous material as cotton, wool, synthetic fiber, etc. for drafting

Diazo - a film or paper sensitive to ultraviolet light or an ozalid copying machine

Drawing (reproducible) - a translucent drawing that can be used to make copies by any contact process

Film - a sheet or roll of a polyester translucent material

Film pencil - a pencil with a thin stick of plastic for use on polyester

Generation - a photographic reproduction made from an original for another reproduction, i.e., original camera negative is first generation, copy obtained from original camera negative is second generation, copy from this copy, third generation, etc.

Guide - a semi-rigid, warp resistant white plastic, engraved with symbols through the surface, exposing the inner black layer for permanent color contrast To be used with a scriber for controlled lettering

Ink - a finely ground carbon in suspension, with natural or synthetic gum added to make the mixture waterproof Non-waterproof ink flows more freely but smudges easily

Intermediate - that print which is used as a master for further reproductions

Lead pencil - a pencil with a thin stick of graphite

Leroy - a Keuffel & Esser Company trademark for lettering equipment

Mylar - a Dupont Co trademark for a polyester made in extremely thin sheets of great tensile strength or a commonly used name for a film reproduction

Nonreproducible - a term generally used to denote a document which, because of its material, is not capable of a satisfactory reproduction

Ozalid - a trademark for a machine or process for producing positive prints made directly from original drawings or printed material and developed dry in the presence of ammonia vapor

Paper - a thin flexible material made usually in sheets from pulp, prepared from rags, wood, or other fibrous materials and used for writing or printing on

Pen - a device used in writing or drawing with ink

Photopositive (or photocopy) - a positive image produced by the chemical action of light using photography via a negative or direct projection or contact on a material which has a photosensitive surface

Print - a copy of a drawing. Conventionally, this term is considered to mean a full or reduced size copy made by projection or contact

Rapidograph - a Koh-I-Noor trade name for technical drawing equipment

Right reading - an image which is readable from the front or image side of the material

Scriber - a precision-made instrument, designed to receive a pen, and in conjunction with the scriber guide make uniform letters

Sepia - a dark reddish-brown color, or a print of sepia color

Template - a pattern usually in the form of a thin metal, wooden or plastic plate, for forming an accurate copy of an object or shape

Tracing paper - a natural or transparentized sheet of paper on which drawings are traced

Translucent - admitting the passage of light; partially transparent

Vellum - a fine kind of parchment prepared from calfskin, lambskin, or kidskin or a strong paper made to resemble vellum used for reproduction purposes

Xerography - a process for copying printed material, pictures, etc by means of a dry ink copier, i e., xerox copy

CHAPTER 2

KEY SHEET

This sheet is the first one in the plans and contains general information concerning the project and the plans themselves. It is prepared on standard printed polyester film, as noted in Chapter 1, with the following information listed.

2.1 Location Map

This map is placed in the center of the sheet and consists of a reproduced portion of one or more county maps showing the project locations. City maps usually are used for municipal projects. Any convenient scale may be used for rural projects. Avoid drafting the map portion of the Key Sheet. Instead it is suggested that one of the methods described in Chapter 1, Section 1.7, be used. This will reduce drafting effort and expedite sheet preparation.

The intent of the location map is to provide enough information so that the project location is easily understood. This may make it necessary to show the Section, Township, Range and County lines together with Section, Township and Range numbers to make the location clear. Cities, towns and canals must be indicated. City limits are shown, as are urban limits where applicable. The population of incorporated towns and cities and census year is no longer required.

If a city map is used, streets should be shown and named. State highways are shown by State Road number and U.S. highway number if appropriate, the name of the next principal city to which these roads lead is placed at the edge of the map. Roads and topography are indicated by standard symbols in the Road Design standards.

The project location is shown by a heavy solid line of substantial width. It is sometimes advantageous to show station numbers at regular intervals, particularly with city street projects. The beginning and end of projects, any station equations, exceptions and beginning and ending of proposed bridges are to be stationed and flagged.

When several projects are covered by the same set of plans, the beginning and end of each project must be indicated clearly by Project Number and stationing.

The scale of the location map should be chosen so it will not interfere with other features of the Key Sheet. A common error is to place the location map on the sheet and then discover that insufficient space remains for the Index of Sheets, Project Title or the Length of Project Box.

Sometimes project flags are inked in advance of completion of the Key Sheet and when it is completed, interference with these flags is encountered. The flags should be arranged whenever possible to lie outside the body of the map.

2.2 North Point and Scale

The north point is placed at the top or on one side of the location map, preferably to the right. The map scale is shown directly below the north point. The scale is indicated by using a bar scale 1" long with ticks at each end. The scale distance is shown between the ticks. The map should be oriented so that the north point will be either toward the top of the sheet or to the right.

2.3 Project Number, County Name and Road Number

These are in the form of a title and large heavy letters are used. They are placed above the location map.

Where Federal Project numbers are involved, the corresponding State Project number is placed adjacent to the Federal Project number in brackets. Project numbers, road numbers and name of county should be inked with a mechanical lettering device. All of the remaining lettering on the Key Sheet may be free hand.

Projects that are independently prepared and are to be let in the same contract must have the additional project numbers (Federal and State) noted in the lower right hand corner of each Key Sheet.

2.4 Budget Item Number

The budget item number is placed adjacent to the sheet number box.

2.5 Length of Project Box

Lengths of roadway, bridges, exceptions, net and gross lengths are shown in a box at center of sheet below the location map. The net length of project is computed by taking the total length of roadway and bridges in feet and converting to miles, dropping all numbers past the thousandth of a mile, without rounding off. The roadway and/or bridge mileage will then be rounded so that their total equals the net length.

2.6 Plans in Contract Plans Set

A listing of plans included in the contract plans set shall be shown in the upper left corner. Order of listing will be Summary of Pay Items, Roadway, Signing and Pavement Marking, Signalization, Lighting, Landscaping, Architectural, and Structure. The total number of Summary of Pay Item Sheets should be shown

2.7 Index of Sheets

A complete index of roadway plans sheets must be placed on the left

side of the Key Sheet under the printed heading. When projects contain plan sets such as Structures, Signing, Signalization, etc., each plan set will have an index of sheets on their respective Key Sheets. Standard Index drawings necessary for each project are listed under Road Design or Traffic Design Standards (with booklet date shown). Box culvert index drawings, all approach slab details, any standards revised between publication of booklets or any other index drawing or special details not included in the booklets will be numbered and included in the index of plans.

The recommended order of placing the sheets in the roadway plans set is as follows

- Key Sheet
- Summary of Pay Items
- Drainage Map
- Typical Section
- Summary of Quantities
- Summary of Drainage Structures
- Mass Diagram
- Back of Sidewalk Profiles
- Roadway Plan-Profiles
- Drainage Structures
- Lateral Ditch Plan-Profiles
- Lateral Ditch Cross-Sections
- Intersection/Interchange Details
- Intersection/Interchange Profiles
- Cross-Section Pattern Sheet
- Borrow Pit Soil Survey
- Roadway Soil Survey

Roadway Cross Sections
Utility Contract Plan-Profiles
Maintenance of Traffic Details
Utility Adjustments
Approach Slabs
Box Culvert Indexes (when required)
Selective Clearing and Grubbing Details

2 8 Governing Specifications

The date of the governing specifications is inserted in the printed note at the lower right corner of the Key Sheet and supplement note added

2 9 State Map

A small scale map is printed at the upper right portion of the Key Sheet. The location of the project shall be indicated thereon

2 10 Railroad Crossing

When the project involves a railroad crossing, a sketch will be shown on the Key Sheet showing the station of crossing, railroad company name and FDOT/AAR National Inventory Crossing Number. A location sketch on the Key Sheet is not required on any project containing plan-profile sheets that cover crossing locations. A sketch should be included on Key Sheets for resurfacing projects or skeleton plans

2 11 Designer's or Project Manager's Name

The name of the designer responsible for the design of the plans will be printed below the length of project box, for in-house plans only. For plans prepared by a consultant firm, the name of that firm will be shown on the right hand side of the sheet and the name of the D O T

Project Manager will be printed under the length of project box

2.12 Revision Dates

The lead Key Sheet (usually Roadway) will show a complete record of all plan revisions. This includes not only the roadway revisions but revisions to the components (Structures, Signing and Pavement Markings, Lighting, Architectural, Summary of Pay Items, etc.) as well. This record of plan sheet revisions will be shown directly below the list of Standard Index drawings and will give the revised date and sheet number.

EXHIBIT 1 - Illustrates a completed Key Sheet

EXHIBIT 2 - Illustrates various Key Sheet Titles

CHAPTER 3
SUMMARY OF PAY ITEMS

3.1 General

This sheet is computer generated and shows all items and estimated quantities for the project or projects in a contract. These sheets are a contract plan set and are placed directly behind the lead Key Sheet (usually roadway) This includes all summaries for the component parts, i.e. structures, signing and pavement markings, etc., as well as for additional projects in the contract These sheets should be inserted in the same order of listing that is used for a contract plans set (see Section 2.6)

3.2 Summary of Pay Item Worksheet

After plans are complete, a worksheet summary of pay items or coding forms will be prepared by the design section. These will be used for input into CES and generating the summary of pay item plan sheet

3.3 Pay Item Footnotes

Footnotes for the appropriate items will be shown on the summary of quantities sheet or the typical section sheet for small projects.

3.4 Skeleton Plans

Summary of pay item sheets will have to be reduced to 8½" x 14" for use in skeleton plans.

3.5 CES Input and Generation of Summary of Pay Item Plan Sheet

The CES coordinator will input data by using the worksheets furnished

by the design section. When printouts of summaries are obtained, plans can be sent to Tallahassee. Copies should be made from the original and retained in the District office.

Summary of pay items for contracts containing more than one project shall be strung by the District office so that a complete contract summary can be obtained by requesting only the lead project number. Projects are to be strung in the same order as they appear above the location map on the Key Sheet.

The Tallahassee Structures section will input bridge summaries for structure plans prepared in Tallahassee. Structures should be loaded individually by structure number. The computer summary will print out individual structure quantities and a composite total for all structures on a project or a contract. The Tallahassee Roadside Development section will input landscaping summaries for plans prepared by their office.

Lighting plans prepared in Tallahassee will be loaded by Tallahassee Traffic Operations section.

All projects will be left open in the computer file until plans are sent to reproduction for printing. This allows the design section to make any necessary changes to their summary of pay item sheets until final printing. Each time a revision is made, a new computer printout must be obtained and inserted in the plans. If the District office desires to change District responsibility plans that are in Tallahassee, a new printout must be obtained and sent to Tallahassee for insertion in the plans. After plans are sent to reproduction the file will be locked.

Special attention is to be given in the identification of pay items for utility work by the highway contractor. Refer to the Utilities

Master Pay Item List or consult with the Estimates Section for appropriate application

3.6 New Pay Item Numbers

New pay items must be requested not less than two weeks before plans to Tallahassee date, so that they can be placed into the system.

3.7 Revision Dates

When summary of pay items are revised, revision dates should be shown across the top of the sheet

3.8 Significant Figures in Estimating Quantities

In estimating the quantity amounts, the accuracy (significant figures) should be as indicated in the "Basis of Estimate and Computations" manual. The majority of items are rounded to the nearest whole number with a few items calculated to tenths

Sheets 26 thru 31 illustrate various Summary of Pay Items

00000-0000

SUMMARY OF ROADWAY PAY ITEMS

A L T	ITEM NUMBER	ITEM	UN IT	00000-0000		00000-0000		00000-0000		QUANTITY TOTAL
				FA PART	FA NON PART	FA PART	FA NON PART	FA PART	FA NON PART	
	101-1	MOBILIZATION	LS	1.000						1.000
	102-1	MAINT OF TRAFFIC	LS	1.000						1.000
	102-3	COMMERCIAL MATL FOR DRIVEWAY MAINT	CY	50.000						50.000
	102-74	BARRICADE (TEMPORARY - CLASSES A, B & D)	ED	44100.000						44100.000
	102-75	CONSTRUCTION SIGNS (TEMP - POST MOUNTED)	ED	11100.000						11100.000
	102-77	HIGH INTENSITY FLASHING LIGHTS (TEMP - TYPE B)	ED	44100.000						44100.000
	102-79	PAVT MARKING (TEMPORARY - TAPE)	LF	5340.000						5340.000
	102-85	PAVT MARKING (TEMPORARY - PAINT)	LF	7200.000						7200.000
	104-1	ARTIFICIAL COVERINGS (TEMPORARY)	SY	1880.000						1880.000
	104-2	MULCHING (TEMPORARY)	SY	9401.000						9401.000
	104-3	SLDDING (TEMPORARY)	SY	9401.000						9401.000
	104-4	MOWING	AC	10.000						10.000
	104-5	SANDBAGGING	CY	20.000						20.000
	104-6	SLOPE DRAINS	LF	584.000						584.000
	104-10	BALED HAY OR STRAW (TEMPURARY)	TN	20.000						20.000
	110-1	CLEARING & GRUBBING	LS	234.000						234.000
	110-4	REM OF EXIST PAVT	SY	226803.000						226803.000
	120-4	SUBSOIL EXCAVATION	CY	1293663.000						1293663.000
	120-6	EMBANKMENT	CY	1.000						1.000
	120-8	FINAL DRESSING	LF	1000.000						1000.000
	120-77	SHEETING	LF	188012.000						188012.000
	162-1	MUCK BLANKET	SY	57412.000						57412.000
	285-701	OPTIUNAL BASE	SY	2069.000						2069.000
	285-702	OPTIUNAL BASE	SY	6164.000						6164.000
	285-705	OPTIUNAL BASE	SY	117597.000						117597.000
	285-707	OPTIUNAL BASE	SY	12480.000						12480.000
	300-1	HIT MATL	GA	370127.000						370127.000
	300-13	BIT MATL (PLANT MIX)(ASPH CEM 20)	GA	65945.000						65945.000
	300-14	BIT MATL (PLANT MIX)(ASPH CEM 20)(FC)	GA	1921.000						1921.000
	331-72-10	TYPE 5 ASPH CONC (1")	SY	5709.000						5709.000
	331-72-14	TYPE 5 ASPH CONC (1 1/2")	SY	118742.000						118742.000
	331-72-30	TYPE 5 ASPH CONC (3")	SY	51652.000						51652.000
	331-72-142	TYPE 5 ASPH CONC (VARIABLE)(1 1/2" AVG)	TY	1991.000						1991.000
	331-74	TYPE 5 ASPH CONC	SY	143496.000						143496.000
	337-70	ASPH CONC FRICTION COURSE (5/8")(FC-2)	TY	516.000						516.000
	359-1	MISC ASPHALT PAVEMENT	TN	8.000						8.000
	360-1	CONC APPRH SLABS	EA			50.000				50.000
	400-1	CLASS 1 CONC	CY							50.000
	400-15	CLASS 1 CONC	CY							5.000
	425-1	INLETS (DT BUT) (TYPE A)	EA			21.000				21.000
	425-1	INLETS (DT BUT) (TYPE R)	EA			11.000				11.000
	425-1	INLETS (DT BUT) (TYPE B)	EA			4.000				4.000
	425-1	INLETS (GUTTER) (TYPE S)	EA			5.000				5.000
	425-1	INLETS (GUTTER) (TYPE S)	EA			1.000				1.000
	425-2-101	MANHOLES (SPECIAL)	EA			1.000				1.000
	430-1-122	CONC PIPE CULV (15" SS)	LF			396.000				396.000
	430-1-123	CONC PIPE CULV	LF			1799.000				1799.000
	430-1-124	CONC PIPE CULV	LF			698.000				698.000
	520-1-7	CONC CURB & GUTTEK	LF			563.000				563.000
	520-1-10	CONC CURB & GUTTEK	LF			759.000				759.000

1/19/81
1445.J1

00000-0000

SUMMARY OF ROADWAY PAY ITEMS CONTRACT ITEMS CONTINUED

A L T	ITEM NUMBER	ITEM	UN IT	00000-0000		00000-0000		00000-0000		QUANTITY TOTAL
				FA PART	FA NON PART	FA PART	FA NON PART	FA PART	FA NON PART	
	520-5-42	CUNC TRAF SEP	(TYPE IV)	LF	140.000					140.000
	520-6-	CUNC JHLDK GUTTER	(6" #IDE)	LF	1710.000					1710.000
	521-1-	CUNC BARRIER WALL		LF	20.000					20.000
	536-1-	GUARDRAIL	(ROADWAY)	LF	6063.000					6063.000
	536-6-	END ANCHORAGE ASSEM TYPE II		EA	13.000					13.000
	550-1-	FENCING TYPE A		LF	22903.000					22903.000
	550-2-	FENCING TYPE B		LF	2693.000					2693.000
	550-3-	CORNEL POST ASSEM	(TYPE A FENCE)	EA	4.000					4.000
	550-4-	CORNEL POST ASSEM	(TYPE B FENCE)	EA	6.000					6.000
	550-5-	PULL & END POST ASSE 4	(TYPE A FENCE)	EA	73.000					73.000
	550-6-	PULL & END POST ASSE 4	(TYPE B FENCE)	EA	11.000					11.000
	570-1-	SLED & MULCH	(PERMANENT TYPE)	SY	127828.000					127828.000
	570-2-	GRASS SEED		LB	2641.000					2641.000
	570-3-	MULCH MATL		TN	106.000					106.000
	570-4-	FERTILIZER		MG	19.000					19.000
	570-5-	WATER FOR GRASS	(QUICK-GROWING TYPE)	LB	214.000					214.000
	570-6-	GRASS SEED		LB	792.000					792.000
	570-7-	SODDING		SY	57600.000					57600.000
	570-8-	SODDING		SY	2590.000					2590.000
	1514-120-31b	DUCTILE IRON PIPE (F&I)	(SAINT AUGUSTINE)	LF						
	1614-140-21c	DUCTILE IRON PIPE (F&I)	(MECH JOINT) (6")	LF						
	4-10-2-124	CORR STEEL PIPE CULV	(24" SS)	LF	252.000				225.000	225.000
	4-10-3-124	CORR ALUM PIPE CULV	(24" SS)	LF	252.000				225.000	225.000

SUMMARY OF SIGNAL PAY ITEMS

A L T	ITEM NUMBER	ITEM	UN IT	00000-0000		QUANTITY TOTAL
				FA	PART	
	620- 1- 1	GROUNDING ELECTRODE	LF	80.000		80.000
	630-112-	CUNDRUIT	LF	1600.000		1600.000
	630-118-	CUNDRUIT	LF	15.000		15.000
	630-152-	CUNDRUIT	LF	250.000		250.000
	632- 7- 1	CABLE	PI	2.000		2.000
	632- 8- 12	CABLE	PI	1850.000		1850.000
	634- 1-108	SPAN WIRE ASSEM	PI	1.000		1.000
	634- 1-110	SPAN WIRE ASSEM	PI	1.000		1.000
	639- 1- 2	PULL BOXES	EA	11.000		11.000
	639- 11- 2	ELECTRICAL POWER SERVICE (OVERHEAD)	AS	2.000		2.000
	641- 15- 45	CONCRETE STRAIN POLES (TYPE VI)	EA	2.000		2.000
	641- 15- 46	CONCRETE STRAIN POLES (TYPE VI)	EA	1.000		1.000
	641- 15- 51	CONCRETE STRAIN POLES (TYPE VI)	EA	1.000		1.000
	650- 3-111	TRAFFIC SIGNAL, 12" LIGHTWEIGHT (1 SECT 1 WAY)	AS	2.000		2.000
	650- 3-131	TRAFFIC SIGNAL, 12" LIGHTWEIGHT (3 SECT 1 WAY)	AS	4.000		4.000
	650- 3-132	TRAFFIC SIGNAL, 12" LIGHTWEIGHT (3 SECT 2 WAY)	AS	2.000		2.000
	650- 3-141	TRAFFIC SIGNAL, 12" LIGHTWEIGHT (4 SECT 1 WAY)	AS	2.000		2.000
	660- 12-	VEHICLE DETECTORS (LOOP TYPE)	EA	3.000		3.000
	660- 13-	VEHICLE DETECTORS (LOOP TYPE)	EA	3.000		3.000
	671- 11- 27	CONTROLLER, SOLID STATE (ACT)	EA	1.000		1.000
	671- 11- 31	CONTROLLER, SOLID STATE (ACT)	EA	1.000		1.000
	677- 11-	CABINET MOUNTING (BASE MOUNT)	EA	2.000		2.000

00000-0000

SUMMARY OF LIGHTING PAY ITEMS

A L T	ITEM NUMBER	ITEM	UN IT	00000-0000		QUANTITY	
				FA	PART	TOTAL	TOTAL
	400- 2-	CLASS II CONC	CY	267.000			267.000
	415- 1-	REINF STEEL	LBI	25420.000			25420.000
	455- 3-	PREST CONC PILING FJRN	LF	2340.000			2340.000
	455- 4-	(SUBSTRUCTURE)	(14" SQ)				
	455- 9-	PREST CONC PILING DRIV	LF	2340.000			2340.000
	455- 11-	(SUBSTRUCTURE)	(14" SQ)				
	455- 15-	UNL TEST PILES	EA	70.000			70.000
	455- 17-	PREFORMED PILE HOLES	EA	8.000			8.000
	715- 73-	PILE SPLICES	EA	8.000			8.000
	715- 80-140	INSTALL NEW CONDUCTORS, CONDUIT & PULL BOXES	LS	1.000			1.000
	715- 95-	LOAD CENTER	EA	7.000			7.000
	715- 96-	UNDERDECK LUMINA IRES	EA	2.000			2.000
	715- 98-100	HIGH MAST LIGHTING JNIT	EA	4.000			4.000
		(100')	EA	20.000			20.000

00000-0000

SUMMARY JF BRIDGE PAY ITEMS

A L T	ITCM NUMBER	ITEM	UN		00000-0000		00000-0000		00000-0000		QUANTITY	
			IT	BR #	FA PART	EA PART	FA PART	EA PART	FA PART	EA PART	FA PART	EA PART
400-	2-	4	CY	264.000	264.000	484.000	484.000	484.000	484.000	484.000	1496.000	
400-	2-	5	LF	258.000	258.000	352.000	352.000	352.000	352.000	352.000	1220.000	
400-	5-	4	EA	358.000	358.000	490.000	490.000	490.000	490.000	490.000	1696.000	
400-	31-		EA	2.000	2.000	2.000	2.000	2.000	2.000	2.000	8.000	
400-	92-		EA	2.000	2.000	2.000	2.000	2.000	2.000	2.000	8.000	
415-	1-	4	LB	50000.000	50000.000	102800.000	102800.000	102800.000	102800.000	102800.000	305600.000	
415-	1-	5	LB	31600.000	31600.000	50700.000	50700.000	50700.000	50700.000	50700.000	164600.000	
450-	1-	1	LF	373.000	373.000	1157.000	1157.000	1157.000	1157.000	1157.000	2314.000	
450-	1-	2	LF	1070.000	1070.000	1272.000	1272.000	1272.000	1272.000	1272.000	4684.000	
450-	1-	3	LF	1700.000	1700.000	900.000	900.000	900.000	900.000	900.000	5200.000	
455-	3-	2	LF	1700.000	1700.000	900.000	900.000	900.000	900.000	900.000	5200.000	
455-	4-	2	EA	40.000	40.000	40.000	40.000	40.000	40.000	40.000	160.000	
455-	9-	12	EA	22.000	22.000	22.000	22.000	22.000	22.000	22.000	44.000	
455-	17-	2	EA	1.000	1.000	1.000	1.000	1.000	1.000	1.000	4.000	
460-	91-	2	LF	229.000	229.000	325.000	325.000	325.000	325.000	325.000	1108.000	
524-	2-	2	SY	790.000	790.000	20453.000	20453.000	20453.000	20453.000	20453.000	1580.000	
528-	70-		SF	790.000	790.000	20453.000	20453.000	20453.000	20453.000	20453.000	40906.000	

CHAPTER 4
DRAINAGE MAP

4.1 General

The Drainage Map is prepared on printed film drainage map sheets with a cross section grid printed across the upper portion for plotting the project profile and proposed grade. It is plotted to some convenient scale according to need. Horizontal scales such as 1" = 200', 1" = 500', or 1" = 1,000' generally should be used to simplify plotting the profile. For municipal projects, the horizontal scale should be no smaller than 1" = 200'. The horizontal and vertical scales of the drainage map profile must always be such that the stations and elevations can be read directly from the grid without use of a scale. For projects involving interchanges, rest areas, etc., a supplemental drainage map on a 1" = 100' scale will be required for each of these areas. Only the plan portion will be required and it will be shown on a sheet without a profile grid. The purpose of this detail is to show the small areas needed to calculate pipe sizes for the tabulation of drainage structures within these special areas. Should major drains pass through one of these areas, a note should refer to the proper sheet for drainage area for the through structure.

4.2 Plan Portion

The plan portion shall include the following data:

1 Centerline of project with begin and end project stations, station equations and exceptions. Stationing should be shown at regular intervals.

2. Physical land features affecting drainage, such as lakes, streams, swamps, etc., together with past high water and date of occurrence, if available, and present water elevations along with the dates of the readings.

3 Existing roads, streets and drainage structures, showing type, size, flow line and any other pertinent data.

4 Drainage divides and information, where applicable, to indicate the overland flow of water. Maps of municipal sections may show areas to either one tenth or one hundredth acre depending on scale and the accuracy necessary. Areas of about 10 acres or larger should be shown to whole acres only, whether on municipal or rural drainage maps. Inserts are used to show areas that are of such magnitude that the boundaries cannot be plotted at the regular scale. Proposed drainage structures are plotted by symbol only in the plan portion and noted by structure number. Pipes to be labeled by size only.

5. Section, Township, Range and County lines are indicated for rural projects and, when possible, urban projects

6. A north point and scale are included on the plan

7. Aerial photography is desirable for the plan portion since it will document the development and often the drainage pattern which existed at time of design.

4.3 Profile Portion

The profile portion shall include the following data

1. The horizontal scale must be the same used for the plan portion

The standard vertical scale for rural and urban projects is 1" = 5' in level terrain and 1" = 10' in rolling terrain, although a scale of 1" = 20' sometimes is used for rural projects through rough terrain to avoid numerous profile breaks. However, a scale of 1" = 20' should never be used at locations of proposed storm sewer systems

2 The existing ground is plotted with a light solid line.

3 Show elevation datum at each side of sheet At times the 5" deep profile block is insufficient while the space available in the plan portion is in excess of need. The Tallahassee office can supply drainage map sheets on drafting film with either 8" deep or 10" deep profile blocks (for in-house use)

4 The proposed profile grade line is plotted on the profile with a heavy solid line and percents of grade are not shown. The profile grade is plotted along vertical curves, but no V.C. data is shown.

5 All proposed special ditches, except median, are plotted in the profile when horizontal and vertical scales permit. They are indicated with a heavy broken line (long dashes)

6 Proposed cross drains are plotted in the profile section and are identified by structure number Do not attempt to show skew or pipe slope in plotting but merely plot to elevation and location at point of crossing the construction centerline In cases of more than usual slope, show elevation at each end of structure. Median drains are not plotted in the profile section

7 For municipal projects, only the storm sewer and mainline structures are plotted in the profile. Laterals are not plotted Flow line elevations are posted along the main

8. All high waters affecting construction must be shown in the profile. Any high water that is to be lowered should be so noted and the design high water elevation given. A light broken line is plotted at the high water elevation, and the elevation is given

100 yr
Flood
Note

9. Design, base and overtopping discharge and stages are required on all Federal Aid Projects for structures three feet in height and over, or with openings greater than nine square feet. A "disclaimer" is recommended to avoid misuse and possible responsibility for changes in the basic characteristics over which the D.O.T. has no control.

EXHIBITS 3 thru 5 illustrate completed Drainage Maps

CHAPTER 5
TYPICAL SECTIONS

5.1 General

Typical sections show the design elements of the proposed roadway and are drawn in the form of cross sections depicting the work which is standard or typical. Usually this sheet is not drawn to scale.

The typical section must be complete in every detail and must show clearly all work to be done. Typical sections should show typical conditions only. Non-standard construction or conditions that prevail for short distances only should not be shown in typical sections.

When more than one typical section is necessary for a project, they should be placed consecutively, in order of stationing, from top to bottom of sheet. The station limits of each typical are shown below the typical section title. Typical section stationing should cover the entire project. Transitions from one typical to another should be included in the stationing of one or the other typical sections. Each sheet should carry a title in the lower right hand corner

When partial sections are necessary to cover other details, these sections should be shown near the main typical section to which they apply.

5.2 Mandatory Information

Typical sections for all projects must include the following data

1. Design speed for each typical
- 2 Traffic Data (2-way ADT)
 - a. current year
 - b 8 year (for 3-R projects only)
 - c. 20 year (or design year)

- d. For skid hazard projects only, the current year or expected year of construction traffic is required.
 - e. K, D and T factors
3. Cross Slopes
- a. Cross slopes of roadway pavement and shoulder surfaces and bridge decks are to be expressed as a decimal part of a foot vertically per foot horizontally. These cross slopes will be rounded to two decimal places, i.e., .02.
 - b. Median and outer slopes are to be shown by ratio, horizontal to vertical, i.e., 4 1.
4. Reference to all standard indexes necessary for construction of proposed typical section is to be shown.
5. The scope of work should be described in a clear, precise manner by describing the type and thickness of the subgrade stabilization, of subbase or base, ^{structural} surface course, friction course and shoulder pavement, if any, grassing, curbs and gutters, and sidewalks, if any.
6. Template Dimensions

5.3 Standard Notes for Typical Section Sheets

Below are standard notes which should be shown on typical section sheets when applicable

- 1. "All permanent grass areas are to receive a 4 inch muck blanket or topsoil treatment."
- 2. "For details and limits of selective clearing and grubbing see sheets ____."
- 3. "None of the existing limerock base that is removed is to be used in the construction of limerock base."

4. "All of the existing limerock base that is removed is to be incorporated in the stabilized portion of the subgrade."
5. "For median stabilizing see Standard Index No. 500."
6. "For stabilizing at intersections, turnouts, and graded connections see Standard Index No. 515. See typical section for depth and LBR."
7. (For shell or limerock stabilized base) "Construct trench as required. (Est ___' deep for purpose of earthwork computations.) Add approximately ___" loose measure of _____. Mix, shape and compact ___" deep and prime."
8. "Characteristics of the local subgrade may be of such nature that more _____ will be required than indicated above. The amount to be used will be specified by the engineer."
9. "The contractor should identify the 'proposed' option on which his initial bid is based by entering the three digit option code to the right side of the Item Number of optional base item on the submitted bid proposal."
- ok* ~~10.~~ 10. "The contractor shall bid on only one friction course alternate."
11. (Under paved shoulders) "At the contractor's option. This area may be of base material at no additional compensation."
12. (Under stabilized area) "Minimum LBR ___"
13. (When black base is called for with no stabilizing item)
(Other than widening projects) "The subgrade shall be firm, unyielding and in such condition that undue distortion will not occur."

14. (When open graded friction courses FC-2 or FC-3 are specified or allowed as an alternate) "Curb and gutter adjacent to open graded friction courses (FC-2) or (FC-3) is to be constructed $\frac{1}{2}$ inch below the edge of pavement instead of $\frac{1}{4}$ inch as shown on Index 300."

EXHIBIT 6 thru 12 illustrate some of the common typical section situations. These sections are for illustration only and are meant to be taken only as a guide as to what information is required in preparing typicals for contract plans.

CHAPTER 6
SUMMARY OF QUANTITIES

6.1 General

The Summary of Quantities sheet shows the summaries of guardrail, sodding, ditch pavement, sidedrain and earthwork when applicable. Tabulations for resurfacing projects show widths, lengths, and area when different widths are involved. Pay item footnotes for roadway plans may be shown on this sheet. As noted in Chapter 3, the necessary pay items and the estimated quantities are shown on the Summary of Pay Items sheet.

6.2 Summary of Drainage Structures

A summary of drainage structures sheet is required for all projects having drainage improvements. This sheet is separate from the Summary of Quantity sheet described in Section 6.1. (However, on smaller projects the Summary of Quantities sheet and the Summary of Drainage Structures could be combined on one sheet.) Quantities for bridge length culverts listed with summary of drainage are noted by symbol and footnote.

6.3 Standard Notes for Summary of Quantities Sheet

Below are standard notes which should be used on the Summary of Quantities sheet when applicable

1. (Under Summary of Guardrail, Underdrains and Ditch Pavement)
"Stationing shown above is approximate. Exact stations to be determined by the engineer during construction."
2. (Under Summary of Sodding) "The limits of sodding indicated

above are approximate and are to be adjusted where necessary as directed by the engineer to provide for continuity of construction or to suit the actual requirements."

3. (Under Summary of Drainage Structures Having Bridge Culverts) Show an asterick (*) by the concrete and steel quantities and the following footnote "*Denotes Bridge Culvert Quantity."
4. (Under Estimate of Turnouts and Side Drain) "Turnouts and side-drain are to be constructed at locations designated by the engineer in accordance with Index No. 515."
5. (Under Summary of Earthwork - Embankment Projects) "There is no direct pay for roadway, lateral ditch or channel excavation. Any suitable material may be used in the embankment at the option of the contractor."
6. "Embankment is fill in place with no shrinkage applied."
7. "Earthwork has been calculated using the _____ base option. If another option is constructed, there shall be no revision to the earthwork quantities ~~for which payment is by the plan quantity~~ or to the final dressing pay quantity."
8. "Estimated _____ C.Y. of unclassified material to be displaced by the storm sewer (or drainage structure) system not included in quantities shown above."
9. "All (or _____ C.Y. of) A-8 material to be stockpiled in areas designated by the engineer for use in muck blanket operations."
10. A note to the effect that borrow material is to be paid for by truck measure for small quantities (50,000 Cubic Yards or less).

Summary
of
Earthwork

6 4 Standard Pay Item Footnotes

Below are standard pay item footnotes which should be shown on the Summary of Quantities sheet when applicable

- 102-74 Barricades will be paid for on the basis of per barricade per day in use. The quantity shown is based on an estimated average of ____ barricades for ____ days.
- 102-75 Signs will be paid for on the basis of per sign per day in use. The quantity shown is based on an estimated average of ____ signs for ____ days.
- 102-76 Arrow Boards will be paid for on the basis of per arrow board per day in use. The quantity shown is based on an estimated average of ____ arrow boards for ____ days.
- 102-77 Flashing lights will be paid for on the basis of per flashing light per day in use. The quantity shown is based on an estimated average of ____ flashing lights for ____ days.
- 104-____
thru
104-____ Are estimated for prevention, control and abatement of erosion and water pollution and are to be used at locations designated by the plans or as directed by the engineer.
- 120-2 To be furnished by the contractor from areas provided by him.
- 120-6 Any borrow excavation required shall be furnished by the contractor from areas provided by him and the cost of furnishing such material is to be included in the price for embankment.
- 120-8 (For Resurfacing or Widening and Resurfacing Projects) The price and payment for this item shall also include all roadway excavation necessary to shape shoulders and front slopes and necessary compaction.
- 120-8 (For Resurfacing or Widening and Resurfacing Projects) Price

When not using 9' Roadway Show lders.

and payment for this item shall also include excavation for
trenches for widening and all roadway excavation necessary
to shape shoulders and front slopes and necessary compaction.

331-2 Included (or includes ____ tons) for adjustment of connections
or
331-73 to existing drives, streets, etc as directed by the engineer.

339-1 Included for pavement under guardrail.

400-1-15 Includes ____ C.Y. for miscellaneous construction as directed
by engineer.

400-2-1 Includes ____ C.Y. for bridge culverts.

415-1-1 Includes ____ LBS. for bridge culverts.

522-2 Estimated quantity to be constructed at locations designated
by the engineer in accordance with Index No. 515

550-2 Includes ____ Lin. Ft. of fence with barb wire attachment.

570-5 Based on ____ applications.

EXHIBIT 13 illustrates a completed Summary of Quantity Sheet.

EXHIBIT 14 illustrates a completed Summary of Drainage Structures
Sheet.

CHAPTER 7
MASS DIAGRAM

7.1 General

Mass diagrams are to be prepared for plans having roadway cross sections except for projects which pay for earthwork by the embankment pay item. For projects such as intersections, small parking areas, short approaches to bridges, etc., a mass diagram would be meaningless.

When the fill volume (without shrinkage) equals at least 60% of the total earthwork on a project, the payment will be embankment in place; and a mass diagram is not required.

The mass diagram is prepared on standard cross section sheets. Project stationing is used for horizontal datum and mass ordinates for vertical datum.

The length of project influences the horizontal scale. For long projects, a maximum ten stations per inch is allowable. For short projects, a horizontal scale should be chosen so that the mass diagram will occupy a major portion of the sheet. Stations numbers will be placed across the top or bottom of the sheet.

When shrinkage factors vary throughout the project, the shrinkage factors will be shown across the top of the sheet.

The extremes of the mass ordinates dictate the vertical scale to a great extent. The vertical scale should be such that few or no equations in vertical datum will be necessary. Where the difference between the greatest and least mass ordinate is small, a fairly large scale should be used.

The mass ordinate datum is to be placed on both the right and left sides of the sheet. The mass ordinate of each station is plotted and

the points connected by a medium weight solid line. This line generally can be drawn free hand instead of connecting points with a straight-edge.

The beginning and end of project or of construction, station equations, bridge stationing and station of balance points are indicated. Horizontal balance lines are indicated between balance points, and earthwork quantities are given for balance, borrow and excess sections. Zero datum is normally used to balance earthwork but datum lines other than zero may be used.

Excavation and fill of materials other than A-2, A-3 and A-2-4 generally are indicated with a dimension line between the extremes of cut and fill, together with the stations at the beginning and end of the section and the quantities. However, mass diagrams should be computed and plotted for this earthwork when the haul is significant.

A summary of earthwork is placed on the last mass diagram sheet for borrow projects and a summary of earthwork is placed on the summary of quantities sheet for an embankment project. Quantity breakdowns are required when two or more projects are in one contract.

Should have reference to Notes.

EXHIBIT 15 illustrates a completed Mass Diagram.

CHAPTER 8
ROADWAY PLAN-PROFILES

8.1 General

Roadway plans and profiles are prepared on standard 22" x 36" plan-profile sheets. Standard scales for rural construction are 1" = 100' in the plan and 1" = 100' horizontally and 1" = 10' vertically in the profile. Scales for municipal construction are usually 1" = 20' in the plan and 1" = 20' horizontally and 1" = 2' vertically in the profile.

At times it is advantageous to use scales other than those mentioned above. Such as 1" = 50' horizontally and 1" = 5' vertically. The plan scale is noted in the lower right corner of the plan portion or along the north arrow.

8.2 Roadway Plan Portion (Rural Construction)

The centerline of survey is centered in the plan portion of the sheet, with stationing running from left to right. When horizontal curves are involved, the centerline is positioned on the sheet to avoid breaks or match lines.

Thirty stations per sheet are used when the horizontal scale is 1" = 100' and each sheet should begin on an even 10 station. A "tick" mark is placed on the upper side of the centerline at every station. "Tick" marks on the even 5 stations are made 0.2" long and the station number shown above the "tick" mark outside of the R/W lines. The remaining "tick" marks are made 0.1" long with no station numbers shown.

P.C. and P.T. points of horizontal curves are indicated by small circles. Short radial lines are drawn from these points and labeled. P.I.'s are plotted using a small circle with a short section of tangent on either side.

Complete curve data will be shown for each horizontal curve using the following format:

CURVE DATA

P. I. Station

Δ (Delta Angle)

D (Degree of Curvature)

T (Tangent Length)

L (Length of Curve)

R (Radius Length)

e (Superelevation Rate)

P. C. Station

P. T. Station

In cases where the construction centerline does not coincide with the survey centerline, the construction centerline is to be indicated, with complete alignment data and ties to the survey centerline. As an exception to this, the construction centerline need not be shown when it is offset uniformly from the survey centerline for the entire length of the project.

All station equations must be included. These include equations occurring on the survey centerline and those equating survey and construction centerlines.

When aerial photography is not used for the plan portion, all existing topography is shown. All existing roads, streets, drives, buildings, underground and overhead utilities, walls, curbs, pavements, fences, railroads, bridges and drainage structures are plotted and labeled. Streams, ponds, lakes, wooded areas, ditches and all other physical features are shown. Existing pavement edges, curbs, sidewalks, pipes, etc. are plotted using a light broken line. See Index 002 for standard symbols.

Bearings are shown for all tangents in the direction of stations.

A north point is placed on every plan-profile sheet, drawn with a medium weight line and placed near the upper center or in the right hand portion of the plan sheet.

Station equations and angles are shown for all roads and streets intersecting or crossing the project.

All reference points are indicated by sketches (not to scale) and placed at locations removed from the centerline, giving station and intersecting angle.

County, city and urban limits are shown and tied to centerline by station and angle for projects crossing these boundaries.

The proposed construction limits for a rural project are indicated in the plans. The limits to be flagged and stationed are:

1. Beginning and end of project, also beginning and end of construction where construction limits are outside project limits. If plans cover more than one project, the limits of each must be clearly shown by station and project number. These should be shown both in plan and profile.
2. The limits of project breakdown necessary for separation of length and quantities for Federal Aid and non-Federal Aid projects.
3. The limits of each type of construction classification where more than one type is involved such as resurfacing, bridges, and widening.
4. Stations for beginning and end exceptions.

Proposed cross drain pipes and culverts are indicated in the plan by plotted symbol and are identified by drainage structure number only. Box culverts (single or multiple) having a length between inside faces of end supports of 20' or more are designated as bridge culverts and are identified by both drainage structure number and bridge number. The beginning and ending stations (outside wall to outside wall) are shown.

Proposed bridges and approach slabs are plotted by simple outline. The beginning and ending station of bridges and approach slabs are noted. Approach slabs are noted by their index number. Bridge numbers should also be shown.

Avoid showing detailed information regarding crossovers or intersections when these are of a type which can be handled by a standard detail. Merely identify the type of crossover and show its station location.

Lateral ditch details are usually shown on plan-profile sheets separate from the roadway plan-profiles. A short section of lateral ditch centerline is plotted on the roadway plan-profile sheet together with a note referring to lateral ditch sheets.

Right-of-way lines are shown and are dimensioned from the survey centerline or base line if survey and construction lines are parallel, otherwise dimension from construction line. Dimensions are shown at both ends of the sheet and must always be placed outside the beginning and ending station for each sheet.

8.3 Roadway Profile Portion (Rural Construction)

General notes for the project are placed in the upper left hand portion of the profile grid on the first plan-profile sheet.

The horizontal scale is the same as that used for the plan portion, and station limits of the profile must correspond exactly to those of the

plan of each sheet. Station numbers are placed across the bottom of the sheet just above the border line. Full station numbers are shown for even ten stations and single digit numbers for the remaining stations. For a horizontal scale of 1" = 100', a vertical scale of 1" = 10' is used, and for a horizontal scale of 1" = 50', a vertical scale of 1" = 5" is used.

The vertical elevation datum is selected with due regard for the extremes of elevation which will occur on each sheet, so that the profile will not crowd either the upper or lower limits of the profile grid.

Elevation datum is shown on both the left and right sides of the sheet and placed so that even 10-foot elevations will be on the inch lines for a 1" = 10' vertical scale and even 5-foot elevations will be on the inch lines for a 1" = 5' vertical scale.

Existing groundline elevations on the survey line are lettered vertically just above the station numbers at each end of the sheet only.

The existing groundline profile is plotted and inked, using a light solid line. When the centerline of construction is different from the survey centerline, the profile along the construction centerline may be plotted and shown with a light broken line

A-8 (muck) strata limits may be plotted in the profile and cross hatched. Strata boundaries of other unsuitable materials may also be plotted in the profile and labeled.

High water conditions are shown by the use of a light broken line (long dashes) at the high water elevation, with the elevation indicated numerically, and the year of the indicated high water given. If high water is to be lowered, the design high water elevation must be given.

Bench mark data are normally given just below the upper margin of the profile grid, or may be placed in the plan portion just above the upper profile margin at the appropriate corresponding station.

The proposed profile grade is shown by a heavy solid line. Vertical curve P.C., P.T. and P.I.'s are indicated by a small circle. Short sections of tangent are drawn with a light line each side of the P.I. and the intersecting grades posted on the tangent. Vertical lines are extended from the P.C. and P.T. points and a dimension line placed between these lines indicating the length of the vertical curve.

For vertical curves, the profile grade elevations are given on even stations and are placed between the dimension line and the grade line. The length dimension and the profile grade elevations are placed above the grade line for sag vertical curves, and below the grade line for crest vertical curves. The dimensions and elevations should be placed reasonably near the grade line whenever possible.

The P.I. elevation is lettered vertically above the P.I. circle for crest curves and below for sag curves. When the P.I. does not fall on an even station, the plus station is given. The profile grade elevation of the beginning and ending station of each sheet is lettered vertically just above the grade line, except when the beginning or ending station is on a vertical curve.

Percents of grades are indicated for each tangent on every sheet. In cases where the beginning or ending station of the sheet is on a vertical curve, the P.I. of which falls within the sheet, the percent of grade of the tangent extending from the adjacent sheet is indicated.

Station equations and exceptions shall be shown.

Special ditches are indicated in profile with a heavy broken line (long dashes) and the percent of grade and a beginning or ending (Ditch P.I.) elevations are given. In plans for four-lane projects, three special ditch grades (right and left roadway ditches and median ditch) sometimes will occur at the same location. In this case, it may be necessary to plot the median ditch against a separate elevation datum for clarity.

Uniform ditches of non-standard depth shall be indicated by a dimension line in the lower portion of the grid and noted as a special ditch with location and depth.

Proposed cross drain pipes and culverts are plotted in section with a heavy solid line. The section should be at the proposed location and grade of the structure crossing the centerline of construction. These cross drains are indicated by structure number only. Bridges and bridge culverts are noted as such and the beginning and ending stations given.

The project limits on applicable sheets are given in the same manner as in the plan portion of the sheet.

8.4 Roadway Plan Portion (Urban Construction)

The centerline is laid out on a scale of 1" = 20', and exactly six stations are used for each sheet. Each sheet should begin and end with an even-numbered station. Each station is marked by a "tick" mark 0.2" long, and the station number is placed near this mark. "Ticks" 0.1" long are placed at every 20' point between stations, but no plus station numbers are shown.

When aerial photo plan sheets are used, the utilities and other pertinent data must be shown in the plan portion using the proper symbols. Existing gas storage tanks for service stations must be located and plotted in the plan portion.

When aerial photography is not used existing topography is plotted from field survey notes along with existing utilities.

Utility adjustment sheets are made from reproducibles of the plan-profile sheets.

Alignment data, reference points, north point, bearings, project limits, etc., are shown as in the plan portion for rural construction plans.

Plans for urban construction include

1. Pavement, curb, curb and gutter, traffic separators, sidewalks, curb cut ramps, bridges, approach slabs, retaining walls, etc.
2. Station of return points with grade elevations of gutter or pavement edge at these points.
3. Station of radius points of traffic separator or median curb at median openings.
4. Station of end of curb and gutter at side street intersections, (when end is not at a return point) with proposed gutter grade elevation at these points. No station need be shown when the curb and gutter on returns is terminated three feet back of the right-of-way line, as the point of termination is set by the right-of-way width.
5. Limits of pavement and grading at side street intersections.

6. Control radii for traffic turns when these set median nose locations
7. The proposed drainage system is indicated by plotting storm sewer pipes with a single line and plotting the outline of inlets, manholes and junction boxes. Storm sewer pipes are noted by size. Lengths are shown when drainage structure sheets are not included in plans. Proposed inlets, manholes, junction boxes and special structures are noted only by structure numbers. Bridge and bridge culverts shall be shown as in rural construction.
8. When construction extends beyond the right-of-way lines for incidental construction, the limits of construction will be shown and temporary construction easements will be required. See R/W Manual Procedure 738-003, page 39.

8.5 Roadway Profile Portion (Urban Construction)

The profile portion of plan and profile sheets showing urban construction is prepared in a manner very similar to that for rural construction. The standard scales are 1" = 20' horizontally and 1" = 2' vertically, although a vertical scale of 1" = 5' has been used satisfactorily for some projects in hilly terrain.

When a 1" = 2' vertical scale is used, the vertical elevation datum should be placed so that numerically even elevations fall on the inch lines and only the elevations for the even two-foot intervals are shown. When a 1" = 5' scale is used, only even 5' and 10' elevations are shown, and these are placed on the inch line.

Existing ground line profiles and elevations, proposed profile grade line, vertical curve elevations, high waters, station equations, exceptions, reference points, bench mark notes, project limits and general notes are indicated exactly as in plans for rural construction.

Existing utility lines and mains are plotted by using light broken lines and symbols in accord with Index Number 002. Buried service connections less than four inches in diameter need not be shown. All surveyed elevations of utility lines should be plotted regardless of line size.

For normal construction, proposed gutter line profiles are not necessary. However, when gutters are not at normal grade, the gutter profile grades should be indicated as special gutter, unless shown on other special profile sheets.

When the plans do not include separate sheets of profile grades and sections for street intersections, prolongations of gutter profile grades across street intersections should be included.

Bridges, bridge culverts, cross drain pipes and culverts are plotted and stationed as in rural construction. The storm sewer pipe, inlets and manholes along the main line are shown. Pipes are noted by size, inlets and manholes by structure number, and flow line elevations are indicated. If complete information is shown elsewhere in plans proposed structures can be shown by structure number only. Proposed drainage structures are plotted with a medium heavy line.

EXHIBITS 16 thru 19 illustrate completed Plan-Profile Sheets.

CHAPTER 9
LATERAL DITCH PLAN-PROFILE

9.1 General

Lateral ditch plan-profiles are prepared on standard plan-profile sheets. The standard horizontal scale is 1" = 100'. If storm sewer construction is anticipated for a portion of the ditch, a scale of 1" = 50' may be used.

Plotting in the plan portion should be oriented to run the ditch centerline parallel to the long side of the sheet. The direction of the project centerline is to run from bottom to top of sheet.

9.2 Plan Portion

The plan portion shall include the following data.

1 The centerline of ditch and project are plotted and stationed as indicated in the roadway plan-profiles (Chapter 8). Alignment data and topography are placed on the plan. The bearing and/or curve points of the project centerline are shown, also, the north point.

2. All proposed drainage structures are plotted by symbol with structure numbers indicated. The project and ditch right-of-way lines are plotted and dimensioned.

3 The location station of the ditch is given in the lower right hand portion of the plan

9.3 Profile Portion

The profile portion shall include the following data

1. The profile section is prepared in the same manner as the profile portion of the roadway plan-profile sheets (Chapter 8). Existing

ground line profile, high water elevations, underground utilities, bench mark information and elevation datum are shown as described for roadway plan-profiles.

2. When the ditch survey centerline does not follow the flow line of the existing ditch or channel, the existing channel profile is shown with a broken line and so identified.

3. The limits and width of proposed clearing and grubbing outside the roadway right-of-way are indicated by a dimension line above the profile. The limits and quantity of proposed ditch excavation are shown by a dimension line above the profile when lateral ditch cross sections are not included in the plans.

4. The proposed ditch bottom width and rate of side slopes are shown by dimension in the profile grid.

5. When storm sewer construction is proposed along a lateral ditch, all of the proposed structures are plotted in the profile showing inlet or manhole type, flow line elevations, pipe or culvert size and structure numbers.

EXHIBIT 20 illustrates a completed Lateral Ditch Plan-Profile Sheet.

CHAPTER 10
DRAINAGE STRUCTURES

10.1 General

Structures are plotted simply as sections along the centerline of the structure. The spacing of sections must be such that the proposed structure can be plotted and proper notes included without overlapping sections. Sections are plotted successively by stations, beginning at bottom of sheet. All drainage structures are to be numbered sequentially, from beginning to end of the project. If for some reason a structure is plotted out of order, a note should be placed in the correct place in sequence referring to the sheet where the structure is plotted.

Proposed drainage structure sections may be eliminated from the plans provided sufficient information can be shown on the plan-profile sheets, Summary of Drainage Structures and cross sections. In some cases, it will be necessary to plot enough information on work sheets to insure that no conflicts occur between pipe and top slabs of inlets and manholes or utilities. It will be necessary to plot sections for special structures and include in plans. The elimination of structure plotting is the option of the District office.

10.2 Rural Projects

For plotting cross drain structures on rural projects, the following procedures should be followed:

- 1 Proposed drainage structure cross sections are prepared on standard cross section sheets, usually to the same scale as roadway cross sections, with the centerline of construction placed near the center of the sheet

2. The existing ground line is plotted at the location of the structure and is inked with a light solid line. The existing ground line elevation is placed immediately below the ground line at the survey line. Any existing structure at the location of a proposed structure is plotted with a medium broken line.

3. The roadway template and proposed structure are plotted in pencil using a heavy solid line, and the proposed profile grade elevation is given above the grade point. The ends of the proposed structure are dimensioned from the centerline.

4. Sections for skewed cross drains must be plotted along the centerline of the structure. Recovery area distances are to be measured at right angles to the project for all structures.

5. A note is placed below the plotted structure giving station, length and size of pipe or box culvert, right and left flow line elevations, the standard index numbers for endwalls, inlets or other accessory structures. The structure number and station will be shown near the right border of the sheet.

6. The standard pipe is concrete (Class III); any other class or type must be noted.

7. The same underground utilities as shown in the profile section of the roadway plan profile sheets are plotted in conjunction with each structure so that conflicts may be detected and to also alert the construction forces of near conflict. In the case of longitudinal pipes, a section should be plotted for each location of crossing of any underground utility.

10.3 Urban Projects

The procedure in plotting structures for urban projects is similar to that for rural projects, but with a few exceptions.

1. The ground line should be plotted for cross drains, stubs to inlets or endwalls outside the right-of-way and for ditch bottom inlets on side streets only. Where storm sewers run laterally or diagonally across the project, plotting must be in such a manner as to assure that minimum cover will result over pipes

2. Structures for storm sewer mains along the project should be plotted in proper sequence and without interruptions. Inlets located on returns of side streets are to be plotted at right angles to the side street. Inlets should not be located on short radius returns or in the way of sidewalks and curb cut ramps. These sections can usually be placed to the side of the sheet without interrupting continuity of plotting, but if not, these structures should be plotted on separate sheets with the appropriate cross reference notes given.

3 The same underground utilities as shown in the profile section of the roadway plan profile sheets are plotted in conjunction with each structure so that conflicts may be detected and to also alert the construction forces of near conflict. In the case of longitudinal pipes, a section should be plotted for each location of crossing of any underground utility.

4 Notes for cross drains are to conform to those of rural construction. For storm sewer systems where cross drains are not involved, the proposed inlets, manholes, junction boxes, endwalls, etc. are indicated by note as to station, type, flow line elevation and index numbers. The top elevation of proposed manholes, grate and inlet

elevations of ditch bottom inlets are given. Notes for pipes are to include only size and length, unless other than Class III concrete used, then Class must be noted.

5. Flow line elevations are indicated at each structure and at each pipe end. Flow direction arrows are shown for pipes in storm sewer systems and cross drains. Existing structures, which are to be abandoned but are to be plugged and remain in place, must be plotted along with the proposed template at that location.

EXHIBITS 21 thru 22 illustrate completed Drainage Structure Sheets.

CHAPTER 11
BORROW PIT SOIL SURVEY

11.1 General

The present policy of the Department is to require contractors to furnish their own source of borrow material. All additional materials required in sub-grade portion of the roadway will meet all requirements as prescribed by the soil testing laboratory.

11.2 Exceptions

Special conditions could dictate furnishing of borrow by the Department. For information to be shown and sheet format see Exhibit 23.

CHAPTER 12
ROADWAY SOIL SURVEY

12.1 General

Roadway soil survey information will be shown in roadway plans as a Test Analysis Sheet listing mechanical analysis for all samples of materials tested and recommended use for each. Soils having identical characteristics are assigned to the same stratum and group for identification and recommendation purposes. The Test Analysis Sheet will be signed by the District Materials Engineer.

12.2 Method of Compiling and Presentation

Upon completion of typical sections, alignment and proposed grades on the plan/profile sheets for the entire project, prints of these sheets will be sent to the District Testing Engineer for use by his department for collecting samples of soil for testing and classification. These classification and test results will be shown on the Test Analysis Sheet.

Water table elevation will be shown when encountered and weather conditions noted at time of sampling.

After completion of soils testing, the original cross sections will be sent to the District Testing Engineer for posting test boring data on the originals

Test borings will be shown on the original cross section where the samples were taken by either of two methods acceptable to the Department.

1. Show test hole columns (approximately 0.4" wide) below the ground line with stratum limits and numbers inside the columns.

2. Use heat resistant adhesive legend tape in column in lieu of stratum lines and numbers. Tape must have prior approval of the Department.

If there is need to connect the strata lines between test holes, it should be accomplished by use of a light pink pencil. The pink pencil will not normally show on Xerox prints.

EXHIBIT 24 illustrates a completed Roadway Soil Survey cover sheet.

EXHIBIT 25 illustrates a completed Test Analysis Sheet.

CHAPTER 13
ROADWAY CROSS SECTIONS

13.1 General

Standard cross section sheets are used for plotting roadway cross sections. The standard scale is 1" = 5' vertically and horizontally. Plans being prepared for multi-lane construction may make the 1" = 5' horizontal scale impractical to use and in such cases a scale of 1" = 10' or 1" = 20' horizontally may be used. The vertical scale of 1" = 5' will be used in all cases. The scale will be shown at the bottom right corner of the sheet.

Cross sections are plotted with stations increasing from bottom to top of sheet. Usually, only one column of sections is placed on a sheet.

Sections are normally centered on the sheet, using the heavy vertical grid line at the center of the sheet as the survey or base line. In cases of multi-lane construction by building a new roadway adjacent to an existing one, centering the sections will depend upon the location of the survey line and the side on which the new construction is to be placed. One of the heavy vertical grid lines is selected for the survey centerline so that the complete ultimate section will be centered approximately on the sheet. When the centerline of construction and survey are not parallel, the distance between each should be shown.

A heavy horizontal grid line is selected as an elevation datum line on an even five foot elevation for each section. As many sections as possible should be placed on a sheet spaced to avoid overlapping sections.

Existing ground lines are plotted and then inked with a light solid line. The existing ground line elevation at the centerline is inked just below the ground line at the centerline. The station number of the section is inked in heavy numerals opposite the ground line on the right side of the sheet.

Existing construction such as pavements, curbs, sidewalks, etc. must be plotted using a light broken line to indicate the bottom of the pavement, curbs, sidewalks, etc.

Existing longitudinal underground utility transmission and duct lines should be shown when lying within the horizontal limits of the project and within twelve inches below the ground surface or the excavation surface on which construction equipment is to be operated or within twelve inches below bottom of any stabilizing course called for on the plans. Small distribution or service lines need not be plotted.

Earthwork columns for A-2 or A-3 material are provided at the right side of the sheet, and columns for all other materials are placed on the left side of the sheet.

Earthwork columns are inked with heavy solid lines.

Soil data is plotted on cross sections at the location of the soil boring and shown by columns with the stratum number noted in each column. The soils information is plotted on the cross sections by the District Soils Engineer's office.

The proposed roadway template is plotted in pencil using a heavy solid line. The proposed grade elevation is placed vertically just above the template grade reference point. Cut and fill areas are indicated in pencil in the area column opposite the station number, and volumes are

penciled in the volume column midway between the area values

Station equations are shown even though a cross section may not be plotted at that point.

Balance points are shown to the nearest even foot, and earthwork totals for the balance are given

The completed sheet will have the proposed template, profile grade elevation, earthwork figures and the scale in pencil. All other data must be inked

These lettering sizes and weights are recommended

Station Numbers - 0.2" high, No. 2 or 2½ Rapidograph Pen

Earthwork Figures - No. 5 Ames Guide or 140 Leroy Guide

All lettering on cross section sheets should be between the horizontal 0.2" grid lines.

When right-of-way is narrow enough and a horizontal scale of 1" = 10' is used, it is possible to place two columns of cross sections on a sheet. Plotting progresses from the left to right as well as from bottom to top of sheet. The sheet is set up to provide earthwork columns for each column of sections. Usually, access roads and lateral ditches can be plotted in this manner.

With the increased use of the computer, many design sections are utilizing their capability to plot existing terrain and proposed templates to reduce the manhours required to produce a finished cross section sheet. The programs available and their applications are discussed under the section entitled "Computer Application in Plans Preparation".

The beginning and ending earthwork stations are shown. On projects with grade separations, intersections, interchanges, etc., the earthwork is totaled on the last cross section sheet for each of the above and

noted as to the station in which the earthwork is included on the project cross sections.

EXHIBITS 26 thru 28 illustrate completed Cross Section Sheets.

CHAPTER 14
LATERAL DITCH CROSS SECTIONS

14.1 General

Lateral ditch cross sections are prepared in a manner almost identical to that of roadway cross sections (Chapter 13). The same type cross section sheet is used, and the scale generally is the standard 1" = 5'. However, regardless of the horizontal scale used, the vertical scale must always be 1" = 5'.

Ditch rights-of-way frequently are narrow, and often it is possible to place two or more columns of ditch cross sections on one sheet. They are plotted exactly as roadway cross sections, progressing from bottom of sheet to top and from left to right.

A heavy vertical grid line should be chosen as the centerline or base line of each column of ditch cross sections, and a heavy horizontal grid line for the elevation datum for each section, as with roadway cross sections.

Soil surveys usually are not made on the lateral ditch locations except when a large amount of material is expected to be excavated and when the suitable material is to be used in the roadway. However, excavation is tabulated whether the material is classified or unclassified.

All other points mentioned in "Roadway Cross Sections" (Chapter 13) are applicable equally to lateral ditch cross sections.

EXHIBIT 29 illustrates a completed Lateral Ditch Cross
Section sheet.

CHAPTER 15
BACK OF SIDEWALK PROFILES

15.1 General

Profiles for use in establishing back-of-sidewalk grades are prepared on standard cross section sheets. They consist of two profiles, one along each right-of-way line, and are plotted against the same elevation datum. They are plotted with light broken lines, different line patterns being employed for the two profiles to distinguish between the right and left right-of-way lines.

The standard scale is 1" = 100' horizontally and 1" = 5' vertically. This combination works very well for projects having few locations where the grade would be critical. In business districts, however, it is often advantageous to use a vertical scale of 1" = 2' and a horizontal scale of 1" = 50' or 1" = 20'.

The elevation datum is shown on both right and left sides of the sheet. Station numbers are given below the profile. Full station numbers are shown at each even five stations and single digit numbers at every other station when the horizontal scale is 1" = 100'. For all other horizontal scales, the full station numbers are given at each station.

Existing pavement such as parking areas and filling station drives, which should be matched if possible with the proposed sidewalk grade, is indicated by dimension lines for each profile. The centerline for each intersecting street is indicated with a vertical line at the proper station, noting the station and street name. Intersecting streets on the right are shown by name below the profile, and those on the left are shown by name above the profile.

Drainage arrows to indicate slope of the ground at the right-of-way line are shown at each station and at plusses, when the information is avail-

able, and the drainage at that location significant.

Drainage arrows for the right right-of-way line are placed below the profile and those for the left right-of-way line are placed above. Arrows pointing toward the profile indicate drainage to the project, and arrows pointing away from the profile indicate drainage away from the project.

Building floor elevations for buildings along the project are indicated by a horizontal line drawn at the floor elevation and between the stations of the building limits. The elevation is shown numerically and the distance from centerline to face of building and side (right or left) are given. Entrances to buildings also are indicated if it appears this information would influence the grade selection. Top of existing utilities and the water table elevation may also be shown.

The proposed sidewalk grade line is plotted in pencil. Percents of grade are shown, P.I. stations and elevations are given and vertical curves, if any, are dimensioned. No elevations around V.C.'s need be given.

A title completes the sheet. Since grades shown on this sheet are at the back of proposed sidewalk, and grades shown on plan-profile sheets are centerline grade profiles, the difference in elevation between the two is noted below the title.

Too much stress cannot be placed on the necessity for accuracy and completeness of information contained on this sheet, as it must embrace all information necessary, and be utilized wholly, in establishment of grades for the project.

EXHIBIT 30 illustrates Back of Sidewalk Profiles.

CHAPTER 16
INTERSECTIONS AND INTERCHANGE LAYOUTS

16.1 Intersections

It is usually necessary to show details for intersections on separate sheets when it is impossible to show all detail on regular 1" = 100' scale plan-profile sheets.

In cases of simple intersections covering relatively small areas, regular plan-profile sheets can be used, placing the intersection layout in the plan portion and the necessary profile grades in the profile block.

For larger, more complicated intersections involving channelization or long connections, the layout should be placed on standard mylar sheets using match lines when more than one sheet is used. The profiles are prepared on standard cross section sheets.

Existing topography is not plotted on these details if it is covered elsewhere in the plans, unless pertinent to design. In most cases, information is given exactly as in the plan portion of municipal construction. Pavement edges, curb and gutter, channelizing and median curbs, drainage structures, pavement dimensions, radii and appropriate notes are included.

All intersection layouts must be dimensioned completely, stationed adequately and must include all pertinent construction notes and alignment data. Design speed data are given when appropriate. Extra pavement areas and curb and gutter quantities should be given for each intersection. A north point is indicated, and a title and scale is shown at the bottom right hand corner of the plan.

The scale used should be sufficient to cover all necessary details. A scale of 1" = 40' is the smallest that should be used for intersection layouts. Turning path templates are used to check the widths of turning lanes, and possible encroachments or conflicts. A scale suitable for such

a check should be used. The templates are cut for scales of 1" = 20', 1" = 40' and 1" = 50'.

16.2 Interchanges

Interchange layouts are prepared on standard size mylar sheets. The entire interchange should be placed on one sheet when possible, using a scale of 1" = 200'. In cases of large cloverleaf or directional interchanges, more than one sheet may be required for the layout. Appropriate match lines must be shown. Blow-ups of ramp terminals and channelized areas are plotted using a scale of 1" = 40'. Layouts must be dimensioned and stationed completely, with all alignment data and construction notes included. All curves are assigned a number and the curve data presented in tabular form. A coordinate system must be provided for all interchanges and coordinates computed for all control points with the coordinate data shown in tabular form. The curve data and coordinate data may be placed on the same sheet but separate of the layout.

Interchange ramps are to be identified by use of letters. Location of ramp baselines are usually on the right edge of pavement with relation to the direction of traffic and are clearly indicated. Stationing of ramps is to be in the same direction as the project and must be equated to project and crossroad stationing at ramp terminals.

A topographic worksheet for all interchanges will be required. This worksheet is prepared on a standard polyester film sheet or on aerial photo positives both on a scale of 1" = 200'. The following information should be shown:

1. All topography such as existing roads, property lines, utilities, houses, drives, drainage, right-of-way, etc.

2. Preliminary interchange geometrics and proposed right-of-way limits.
3. Proposed reconstruction of the crossroad, and all access roads and/or frontage roads within the interchange vicinity.
4. Contours, unless terrain is relatively flat.
5. Traffic diagram with ADT, DHV and K, D and T values.
6. The length of speed change lanes should be shown.
7. Design speed for ramps and crossroads.
8. Proposed bridge limits.
9. Proposed L.A. right-of-way limits.
10. Pavement transition from 4 lanes to 2, if applicable.
11. Limits of construction along the crossroad.

The preliminary interchange layout along with typical sections, signalization analysis, alternate studies, ramp profiles, plan profile sheets along main line and crossroads and detail of ramp terminals will be reviewed by the Department and FHWA and will be considered a 10% complete submittal. After alignment, grades, drainage and conceptual data are confirmed, another more detailed submittal will be required. This will be a 50% complete review. At this time final approval of the interchange layout, including right-of-way requirements, will be given. The State may also request intermediate submittals at any time during the design stage. The date of each submittal should be noted on the original layout.

In the final plans, it will be necessary to have the following sheets showing the interchange as listed below:

1. Interchange geometric layout.
2. Interchange drainage map.

3. Interchange topographic map (May be combined with other layout sheets when aerial photos used)
4. Interchange cross section pattern sheet
5. Ramp terminal details.

EXHIBITS 31 thru 33 illustrate completed Interchange Layout and Interchange Detail Sheets.

EXHIBIT 36 illustrates a completed cross section pattern sheet

CHAPTER 17
INTERSECTION AND INTERCHANGE PROFILES

17.1 Intersections

In addition to normal profile grade lines, supplemental profiles and sections may be necessary at intersections to define edge of pavement profiles other than those controlled by the profile grade line. It is important to develop accurate profiles and sections at locations of curbed channelization to ensure proper drainage. Pavement surface sections are plotted at nose points and other critical locations.

When intersections are detailed on plan-profile sheets, the horizontal scale in the profile is to be the same scale as the plan portion. A vertical scale of 1" = 1' for the profile portion is satisfactory, enabling elevations to be picked from the profile with sufficient accuracy.

For intersections having the plan detailed on a separate sheet, a standard cross section sheet is used for developing the profiles and sections.

For street intersections of municipal projects, scales of 1" = 10' horizontally and 1" = 1' vertically are satisfactory.

17.2 Interchanges

Ramp profile grades are developed along the baseline of each ramp. The edge of pavement profile opposite the baseline is also plotted. These profiles are plotted on standard cross section sheets.

The most common scales used for ramp profiles are 1" = 20' horizontally and 1" = 1' vertically or 1" = 50' horizontally and 1" = 1' or 1" = 2' vertically. These combinations are satisfactory and it is recommended that one of them

be used throughout the plans.

Sections at nose points are usually plotted on a scale of 1" = 10' horizontally and 1" = 1' vertically

EXHIBIT 34 illustrates Intersection Profiles.

EXHIBIT 35 illustrates Ramp Profiles.

CHAPTER 18
MAINTENANCE OF TRAFFIC DETAILS

18.1 General

Under the Federal Highway Administration Notice N 5000.7 dated October 13, 1978, State and local agencies were instructed to create a meaningful maintenance of traffic program by the preparation of a maintenance of traffic plan for every project, creation of separate pay items for maintenance of traffic work, provide training to employees who design or set up maintenance of traffic sites and to evaluate the effectiveness of such a program.

In response the Florida Department of Transportation adopted the above as guidelines for all Federal-Aid and State funded projects. The program has been in effect since August 1979 and has been accepted as a standard portion of the plans package.

18.2 Types of Maintenance of Traffic Plans

The type of maintenance of traffic plan depends on the type of project. The types are basically broken down into three categories:

1. Resurfacing, widening, signal, signing and lighting projects should be referred to specific cases as shown in the "Manual on Traffic Control and Safe Practices (MTCSP)".
2. Rural and municipal construction projects, including structure replacement projects, that can be referenced to the 600 series index drawings of the Road Design Standards.

3. Complex rural and urban projects requiring unique details with or without MTCSP and indexed drawings.

When maintenance of traffic details are prepared they should show signing and construction phasing for each step in the maintenance of traffic operation. These sheets should be placed in the plans as maintenance of traffic details and not as a separate set of plans with a Key Sheet, etc.

It is realized that no two projects can be handled in the same manner and the above is only a guide for plan preparation. During the design phase of all projects, the type, extent of details and method of presentation in the PS&E will be jointly determined by the District office and the FHWA Area Engineer.

Detours at railroad crossings are to be considered at the pre-design conference. Maintenance of railroad traffic for over/under pass projects should be considered even if maintenance of existing highway traffic is not a factor.

Contractors will be permitted to develop their own maintenance of traffic plan and it may be accepted if it is equal or superior to the Department's plan as determined by the Department and FHWA.

The person who will have the primary responsibility for assuring that the maintenance of traffic plan and other safety aspects are effectively administered will be assigned during the preconstruction conference and the name will be included in the minutes of the conference and a copy will be sent to the FHWA.

18.3 Maintenance of Traffic Items and Basis of Estimates

Whenever possible, items for maintenance of traffic should be broken out individually to ensure better control over the type and quantity of

items used to maintain traffic. These individual items fall under the 102 series of the master pay item list.

The maintenance of traffic (lump sum) item should include all items and services not included in individual bid items (Flagmen, Paddles, Flags, Off-duty Police, Maintaining Existing Pavement, Cones, Advisory Speed Signs, Temporary Route Markers).

For items which are paid for per each or lineal foot, the quantity is based on how much or how many of a specific item is required to properly maintain traffic. This is usually based on specific requirements or criteria dictated by conditions in the plans.

For items which are paid for per each per day (ED), usually barricades, flashing lights and construction signs, an estimate has to be made by the designer (usually with help from construction) on how many are required for how many calendar days to arrive at a quantity. The plan quantity is calculated by multiplying the number required by the number of calendar days.

Different quantities of per each per day items may be required for various lengths of time, in which case the plan quantity is the sum of all the quantities for the various times.

It is also advisable to keep abreast of new individual items for maintenance of traffic as there will be more established in the future.

18.4 Training

The Department currently has an ongoing Traffic Control and Safe Practices Training Program and has been expanded to include training of persons responsible for developing and designing traffic control plans, as well as those responsible for implementation and inspection of traffic control layouts.

18.5 Review and Evaluation

Random projects will be selected for review and a report of the find-

ings and recommendations will be made to correct any deficiencies in our procedures. Designers should constantly be aware of any changes which may result from these reviews.

EXHIBIT 37 illustrates a complete Maintenance of Traffic Plan.

CHAPTER 19

PREPARATION OF UTILITY ADJUSTMENT SHEETS

19.1 General

The purpose of Utility Adjustment Sheets is to provide some type of coordination between the contractor and the affected utility companies. These sheets will show the contractor approximate locations of existing, proposed and relocated utilities. This will aid the contractor in avoiding possible conflicts and/or damage to the utilities involved.

19.2 Design Procedures

1. After existing utilities are plotted on project plan-profile sheets, furnish all the utility companies involved with a set of prints for verification of existing utilities and for location of proposed and/or relocated utilities. These are usually marked on the set of blue-line prints furnished by the Department.

2. Upon receipt of verification from the utility companies the existing utilities as plotted on the plan-profiles should be reviewed to ensure that they are consistent with the marked prints returned by the utility company. Differences should be called to the attention of both the affected utility company and the design section. Appropriate corrections should be determined and corrected on the plan-profile sheets.

3. Reverse sepias should be obtained of the original plan-profile sheets, blocking out the general notes. The existing utilities should be highlighted on the reverse sepia with a heavy dashed line.

4. Draw or trace, using a very heavy solid line, the proposed and/or relocated utilities as accurately as possible from the marked blue-lines onto the reverse sepias. Use the standard utility symbols as shown on Index 002. Look for conflicts between proposed utilities and relocated

utilities, also making sure there is no interference with proposed storm sewer or other roadway appurtenances. Notify Utilities and Design if conflicts do occur.

5. Using the available rubber stamps or by pencil, indicate on the reverse sepias the disposition of all existing utilities, i.e. (TO BE REMOVED, TO REMAIN, TO BE RELOCATED, TO BE ADJUSTED, TO BE ABANDONED). Label proposed utilities to avoid confusion on reduced plans with extensive utility adjustments.

6. Add standard notes to the first sheet in the clear area where plan profile general notes were blocked out. Refer to Chapter 25, section 3, subsection G, for the standard notes.

Number these sheets consecutively after roadway cross sections. Label each sheet in lower right hand corner as 'UTILITY ADJUSTMENTS' and insert into plans.

7. The utilities should stand out boldly when these sheets are reproduced. Since these sheets are schematic in nature and reflect approximate locations, details of the roadway design may be eradicated to bring utility lines into sharp relief. Be certain that survey lines and stations are always clear.

EXHIBIT 38 illustrates a completed Utility Adjustment sheet

CHAPTER 20
BRIDGE DESIGN DATA SHEETS (BDDS)

20.1 General

The Bridge Design Data Sheet is an approved standard form for tabulating hydraulic design data used in bridge design. These sheets are required for bridge and bridge culverts over water and railroad overheads. Exceptions to the above occur for non-Federal Aid bridge culverts and some minor bridge widening projects where BDDS are not required. Parallel (dual) bridges can be shown on one sheet, although occasionally a second plan portion will be necessary. Along with the hydraulic design data, plan and profile of the bridge structure, existing topography site location and drainage areas are also shown. The effective area of opening should be shown for existing structures and structures at distant points in the same stream. The Bridge Number should also be shown on this sheet.

20.2 Design Procedure for Bridge and Bridge Culverts Over Water

1. Obtain a blank film copy of the Standard BDDS.
2. On the blank copy of data sheet, draw all available existing topography, contours, hydraulic data and data on existing structures. On bridge culverts, in some cases, the contours may be omitted. If aerial plan sheets of the area are available, these aeriels could be reproduced in the plan portion of the BDDS.
3. High water information including the present water elevation, if available, and month, day, and year taken shall be shown on the BDDS. This information, measured at the time of survey, shall be shown in the profile.

4. The Drainage Area and Location Map section should include a map with north point, of sufficient scale to show entire drainage area for the proposed structure. The drainage area boundaries should be inked using a very heavy broken line and the area shown within the boundary. Proposed structure and stationed centerline, if scale permits, should also be shown. Major existing structures over the same stream should be shown and numbered with corresponding existing structure information listed in the appropriate columns.

20.3 Design Procedure for Bridge Over Railroad Tracks

1. The plan section should include contours to demonstrate the existing features of railroad roadbed, ditches, backslopes, and drainage structures. Other specially pertinent information that should be shown are railroad and D.O.T. right-of-way lines (existing or proposed), railroad mile post tie and labeled with F D O T / A A.R. federal inventory crossing number.

2. The profile section is to show existing track profile and side ditch profiles along the railroad.

3. To substantiate proposed drainage facilities at the crossing, the location map section should show the drainage boundaries in the vicinity of the crossing. When the existing drainage features will be impacted by the proposed bridge a hydraulic study is required. This data shall be summarized using items 6 - 9, as noted on the BDDS, as appropriate.

EXHIBIT 39 illustrates a completed Bridge Design Data Sheet.

CHAPTER 21
DESIGN PROCEDURES AND CRITERIA

21.1 General

In preparing highway construction plans, a designer is usually designated as squad leader and is responsible for the execution of work. The squad leader should be a designer with considerable experience, capable of directing the design and assembly of plans with minimum supervision.

The squad leader must keep himself up-to-date on all design criteria and have available to him all necessary design manuals, pamphlets, memorandums and guides to ensure that the design meets all applicable state, local and federal requirements for engineering and safety.

21.2 Design Procedures

The designer usually has two approaches to a project, preparation as a rural project or preparation as a municipal project. Both have similar aspects in actual plans preparation but design criteria differs widely from rural to municipal projects.

To ensure that the design meets all pertinent criteria, the designer should follow the procedures for preparation of rural projects (Chapter 22) or procedures for preparation of municipal projects (Chapter 23).

A pre-design conference involving railroad and utility representatives should be scheduled when the roadway plans are approximately forty-five percent complete. Such conferences are scheduled for all municipal projects and any rural projects involving utility adjustments of a complex nature.

21.3 Design Criteria and References

Available to the roadway designer are many excellent publications on design criteria. In lieu of presenting all the criteria in this plans preparation manual, only the titles of the most widely used references are given providing the designer with the basic references he should have access to; for specialty projects he should seek out specific publications for reference.

1. Florida Department of Transportation Published References

- a. "Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways" (Green Book)
- b. "Procedures Manual for Flexible Pavement Design"
- c. "Drainage Manual"
- d. "Right of Way Engineering Manual"
- e. "Basis of Estimates and Computations"
- f. "Utility Manual - Volume I (Utilities) and Volume II (Railroads)"
- g. "Utility Accommodation Guide"
- h. Current "Standard Specifications for Road and Bridge Construction" and Supplements
- i. "Manual on Traffic Control and Safe Practices"
- j. Current "Roadway Design Standards"
- k. "Florida's Geometric Design Guide for Resurfacing, Restoration and Rehabilitation of Streets and Highways"
- l. "Utilities Master Pay Item Manual"

2. American Association of State Highway and Transportation Officials (AASHTO) Published References
 - a. "A Policy on Geometric Design of Rural Highways"
 - b. "A Policy on Design of Urban Highways and Arterial Streets"
 - c. "Geometric Design Guide for Resurfacing, Restoration, and Rehabilitation of Streets"
 - d. "Geometric Design Guide for Local Roads and Streets"
 - e. "Highway Design and Operational Practices Related to Highway Safety"
 - f. "A Guide on Safety Rest Areas for the National System of Interstate and Defense Highways"
 - g. "Geometric Design Standards for Highways Other Than Freeways"
 - h. "A Policy on the Accommodation of Utilities on Freeway Right-of-Way"
 - i. "A Guide for Bicycle Routes"
 - j. "A Guide for Accommodating Utilities on Highway Rights-of-Way"
 - k. "A Policy on Access Between Adjacent Railroads and Interstate Highways"
3. Federal Highway Administration Published References
 - a. "Manual on Uniform Traffic Control Devices"
 - b. "Handbook of Highway Safety Design and Operational Practices"
 - c. "Accommodation of Utility Plant Within the Right-of-Way of Urban Streets and Highways" - FHWA-RD-75-8 and 9

4. Other Published References

- a. "Capacity Manual" by National Research Council
- b. "Policies for Accommodation of Utilities on Highway Rights-of-Way" by Transportation Research Board

21.4 Design Criteria Memorandums

Often specific subjects or criteria are not presented in any publication or an official interpretation is needed to make clear the intent of specific design parameters. When such a situation arises official interpretations in the form of Design Criteria Memorandums will be sent to all the District offices and design consultants for their information and files.

CHAPTER 22
PREPARATION OF PLANS FOR RURAL PROJECTS

22.1 General

The procedures as outlined apply to conventional methods of plan preparation for rural projects of considerable length and may be varied for shorter projects.

22.2 Preliminary Preparation

All field books should be indexed. A check of level notes and horizontal curve data should be made. All field notes should be reduced. A work typical section should be drawn. The alignment, topography and centerline profile are plotted on a continuous "hard roll", if not furnished by Location.

22.3 Preliminary Geometrics

When aerial photography is used for plan-profile sheets, the alignment and the profile are plotted on the original sheets. Blue-line prints can now be made. Separate the plan from the profile by cutting along the profile border, and fasten each sheet together, matching the end station of the preceding sheet with the begin station of the following sheet for both the plan portion and the profile portion, thus producing two separate "hard rolls". (This method eliminates a bulky roll.) These two rolls may be used simultaneously for establishing the proposed grade.

All alignment should be reviewed for undesirable alignment such as broken back curves, curves in opposite directions with insufficient intervening tangent, curvature exceeding the maximum for the design speed, etc.,

and a study made of possible remedial measures by realignment. A check should also be made of undesirable horizontal-vertical curve combinations.

The rate of superelevation, based on the design speed, is indicated in conjunction with the curve data for each horizontal curve. In cases where no superelevation is required, it should also be noted. Superelevation rates are obtained from charts on the appropriate standard drawing or from AASHTO.

22.4 Preliminary Profiles

After determining that the horizontal alignment is satisfactory, a tentative grade can be established on the continuous roll. Several factors influence the choice of grades and are listed below:

1. ~~A minimum stopping~~ sight distance, based on the design speed, must be approved throughout the entire project. The minimum length of vertical curves will be adhered to. (See Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways - the "Green Book".) Minimum should not be considered as standard. If possible desirable stopping sight distance should be provided.

2. Definite clearances between the bottom of base and design high water elevations must be maintained. The standard clearance is 3.0 for interstate, 2' for 2-lane primary and 1' for secondary. Superelevation of curves must be taken into account so that the required clearance will be obtained at the low edge of pavement.

3. Grades should not exceed established maximum for type of facility.

4. Soils data should be examined for the possibility of eliminating or reducing the undercutting of unsuitable material, when this data becomes available.

.2% through bridge from Design MEMO.

5. Avoid secondary dips in the proposed grade, which, when not apparent to the driver, results in reduced passing zones.

6. Sizes of existing drainage structures may give some indication of drainage requirements and allow establishment of grades that will provide the required cover.

7. When railroads are crossed at grade, the proposed grade must meet the rail elevations. The grades of intersecting streets or highways also should be matched as closely as possible. The District Railroad Coordinator can determine if a railroad track adjustment is necessary or planned by the railroad company.

8. Economy of construction is an important factor in establishing grades. Total earthwork should be held to a minimum. When practical, cuts should produce sufficient material for construction of fills.

See page 43

22.5 Preliminary Cross Sections

After the tentative grade is completed on the "hard roll", the existing ground line can be plotted and inked in the profile portion of the plan-profile sheets. The tentative grade is now shown on prints of these sheets. The roadway cross section ground lines can be plotted using the tentative grade for spacing the sections. The ground line, ground line elevation at the centerline of survey, and the station number are inked.

The cross sections and prints of the plan-profile sheets can be sent to the District Soils Engineer for use in obtaining soils data.

Outfall and infall ditch surveys now can be plotted on a "hard roll". Alignment, topography and profile for each ditch are plotted. Cross sections

are plotted after it has been determined at which locations outfall ditches will be constructed. The profile is inked, and the remainder of the plotting is to remain in pencil. Existing structures, including major utility facilities, are plotted in both plan and profile. This roll will be used in the field inspection of drainage and later in establishing lateral ditch grades.

The roadway cross section templates are plotted now. When there is a possibility that numerous grade changes will be required to balance the earthwork, the templates should be plotted on prints of the cross sections. Grade changes also can be plotted on these prints, thus providing a record of the development of the final grades. Any special ditches should be planned at this stage.

On superelevated curves in well drained soils, the same elevation for both ditches need not be maintained unless drainage considerations dictate otherwise. The standard depth ditch is 3.5' deep, measured from the shoulder point. Special ditch grades must be used when necessary to avoid water pockets.

When plotting templates it is not necessary to indicate the thickness of surfacing. Only the total thickness of the base and surface need be plotted.

22.6 Preliminary Review

The grades can now be re-examined for possible improvements such as:

1. Can poor grade alignment combinations be eliminated?
2. Can passing sight distance be improved?
3. Can unnecessary handling of unsuitable material be avoided?
4. Are grade changes necessary by any special conditions revealed by examinations of the plotted roadway cross sections?

5. Are truck climbing lanes necessary? Check traffic data and warrants for truck climbing lanes.

The preliminary drainage map should be prepared as soon as the necessary information is available and must be as complete as possible for the preliminary field inspection.

Geometric layouts for intersections, pavement transitions, etc. are made prior to the field inspection. Intersection profiles should not be completed until the grade is finalized, but sufficient work profiles should be prepared to establish that satisfactory operation of the intersection is possible.

The centerline of an intersection or connection should be centered on the centerline of right-of-way or dedication of the side road. Offset, if any, to the centerline of pavement should be shown.

During the preparation of plans to this stage, it is desirable to make a list of questions of design which arise that should be resolved at the time of the field inspection. As many such questions as possible should be resolved at this point, to minimize future changes in the completed plans.

The preliminary field inspection or grade review is made by the highway designer, the drainage engineer, the location engineer, and a representative of the Federal Highway Administration if a Federal-Aid project. All preliminary plans (or prints), continuous rolls, aerial photographs are taken and the inspection is made by walking or riding the location.

Design features developed thus far are checked. The location, sizes and skew angles of proposed drainage structures are determined. The necessity for outfall ditches is determined and ditch sizes set. The validity of high water elevations is verified. Conditions requiring special

design features such as special or interceptor ditches, rim ditches, erosion control requirements, maintenance berms, etc., are examined.

Comments concerning design details or changes may be placed on the continuous rolls or prints for a detailed review in the office.

Upon completion of the field inspection and receipt of any necessary additional survey information, the design and plan details are revised by making all changes and corrections that were noted on the field review

If a railroad crossing is involved, the Diagnostic Team evaluation report should have been completed by the District Railroad Coordinator for the designer's information and guidance.

22.7 Final Design

Grades can now be finalized. Any grade or ditch revision resulting from the field check such as proper clearance over proposed drainage structures is made first. Earthwork is now computed and a preliminary mass diagram is prepared. (At this stage, the soil data must be available.)

End areas are obtained by computing the cut and fill areas. Earthwork volumes are computed by the average end area method. Muck, plastic materials and A-2, A-3 materials are computed separately. Material in each category is separated into roadway and subsoil excavation when both designations occur. The person computing the areas must be completely familiar with excavation classifications.

If extensive muck pockets occur it must be determined if a muck blanket is to be used on the project or if the muck will be used in fill areas to flush slopes. When plastic material is encountered in cuts, a check should be made for its use in fills. Refer to Standard Index 505

for details. Only after the use of these two materials has been established can the preliminary mass diagram for A-2, A-3 material be prepared. A-2, A-3 materials are to be used whenever possible in the subgrade.

Correction for earthwork shrinkage is accomplished by adding an amount to the fill quantity. This is called the "shrinkage factor" and is expressed as a percentage. Shrinkage factors for various material vary considerably and should be established by the District Office for each project.

In rolling terrain, where balancing grades are possible, it is often helpful to plot the grade profile on the mass diagram sheet (or print). Balance lines are introduced at proper points to insure balances at peaks of hills which provides for downhill haul in both directions. Excessively long hauls must be avoided.

A careful examination of the Mass Diagram will reveal locations where grade changes, if necessary, should be made. Excavation from any lateral ditches, intersections, or channel changes which might yield an appreciable amount of material usable for roadway construction should be estimated roughly and considered in the analysis.

Necessary grade changes now should be made, earthwork revised, and the preliminary mass diagram (or applicable portion) recomputed and plotted. After no further improvement can be made in grades, the remaining work on earthwork computations, except for the approximate location of borrow sections with the resulting amounts of borrow, may be deferred until the plans have been detailed completely. This will eliminate the necessity of last minute changes, etc.

Grades should be placed on the drainage map and the necessary corrections made on the plan-profile work sheets.

Intersection layouts should be completed and proposed profile grades and sections plotted. Although the layout may have been detailed on a work sheet for tracing later, grade profiles and sections usually can be developed on the sheet which will be placed in the completed plans. Roadway cross sections and earthwork must be corrected, when necessary, to reflect proposed intersection construction.

22.8 Drainage

Locations of shoulder gutter inlets and down pipes, median drains and intersection drainage should be determined, and the drainage structure cross sections plotted. The standard minimum cover over pipes is 12" from bottom of the base to the outside shell of the pipe. Reference must be made to the roadway cross sections to insure that the proper side slopes are used on the drainage structure sections. When substandard clearance between base and structure cannot be avoided, special treatment must be employed, using extra base material around the structure as indicated on Standard Index 280.

In case of skewed structures, the cross section is plotted along the centerline of the structure, correcting for pavement and shoulder width and side slopes on the skew.

When a pipe is placed under a railroad, care must be taken that the proper minimum cover is obtained and the limits of the special pipe accurately determined. For details of installations under railroads see Standard Index 280

Flow lines of drainage structures having been established, the required lateral ditches can be developed. Cross sections are plotted for the ditches to be excavated, drainage structures are plotted in the plan and profile and ditch grades are established. Ditch templates are plotted, and earthwork is computed.

Proposed drainage structures are to be indicated by structure number in the plan and profiles of the remainder of the plans, e.g., drainage map, plan profiles, and intersection and special detail sheets.

22.9 Right-of-Way

Right-of-way requirements must be checked. Roadway cross sections are reviewed, and if the limits of construction lie outside the established right-of-way, additional right-of-way must be requested, or cut and fill slopes revised so all proposed construction will be within the right-of-way.

Close cooperation and coordination of activities is to be maintained with the Right-of-Way office in the selection of corridors for location of the improvement and the establishment of reasonable right-of-way limits based on economics, alignment, grades, land use, typical sections, etc. As the preliminary layouts progress, the Engineer of Right-of-Way is to be constantly contacted, field reviews held, and rough appraisals obtained where necessary in order to assure a reasonable and practical facility that can be economically, esthetically and operationally justified.

The Right-of-Way office should be notified of the approximate right-of-way requirements as early as possible in the plans preparation stage in order that title search may be initiated and the final requirements furnished immediately after firm establishment of the requirements.

If for any reason the requirements are altered after having been furnished to the Right-of-Way office, that office must be notified immediately in writing. The right-of-way check of completed plans is made jointly by representatives of the Design office and the Right-of-Way office.

The right-of-way shown on the plans must be in exact agreement with that shown on the right-of-way map.

A reasonable berm width should be provided between the top of cut slope or toe of fill slope and the right-of-way line, especially in the case of heavy cuts and high fills. A minimum of 10' is desirable between limits of construction and the right-of-way line in moderate cuts and fills. A berm of 15' to 20' should be provided in areas of heavy cuts and fills.

In some cases, it may be less expensive to obtain a construction easement rather than right-of-way in fill sections where the toe of slope is outside the right-of-way. In these cases, however, a careful check should be made to determine if future development to the right-of-way line by the property owner would be detrimental to drainage of the project.

Lateral ditch cross sections are examined, and right-of-way requirements for the ditches established. A reasonable distance will be required between top of slope and right-of-way line, on one side, at least, if maintenance equipment cannot be operated in the ditch.

After right-of-way requirements are determined, this data is referred to the Right-of-Way office for completion of the right-of-way maps.

22.10 Plans Assembly

If it becomes necessary to revise or add roadway or other ditches during the development of the drainage structures, roadway cross sections and earthwork must be revised.

Earthwork can now be finalized. The mass diagram is recomputed or revised to reflect earthwork changes. Balance lines are drawn as described and balance points computed to the nearest foot. Earthwork quantities between balance points are added, and the balance quantities shown at the proper place on the roadway cross section sheets. These balances and quantities are placed on the mass diagram sheets and are added to the summary of earthwork which is placed on the last mass diagram sheet.

Quantities can be computed and tabulated on the quantities sheet. Quantity sheets are prepared in pencil on standard cross section sheets or prints of blank tabulation sheets. A careful check must be made to ensure all construction is covered by pay items and payment for all work is set up in accordance with the Standard Specifications.

The Key Sheet can now be prepared and completed, with the exception of the Index of Sheets. The drafting and tracing of the plan sheets should be complete. Final drafting consists of tracing the plan portion of the plan-profile sheets from the continuous roll and placing the profile grade line and the special ditch grade lines in the profile, transferring cross section templates to the tracings if prints were used as work sheets, completing intersection and special detail sheets, etc. The typical section should be corrected, if necessary, to reflect special conditions encountered during the final design of the project.

When final drafting has been completed, plans are assembled in proper order. The sheets now are numbered and cross referenced in the body. Unnecessary cross referencing is discouraged.

The Index of Sheets is prepared on a work sheet and is attached to the Key Sheet. It is extremely important that all Standard Drawings necessary for construction of the project be included. Intermediates of culvert standard drawings and originals or intermediates of approach slab drawings are placed in the plans.

The plans are now complete and ready for final field inspection and checking. In case of state projects, a final field inspection usually is not necessary. If the project is to be financed wholly or partially with Federal funds, the Area Engineer of the Federal Highway Administration will usually request a field inspection of completed plans in company with Department personnel.

The construction notes placed in the plans should be clear and to the point. Vague and muddled notes with uncertain or ambiguous meaning have no place in construction plans. Any note, the intent of which is not perfectly clear, is not satisfactory. Care must be taken that notes do not conflict with Standard Specifications.

The scope of all work must be indicated clearly and fully, either by drawing or by note.

Once a change or revision is initiated, it must be carried throughout the plans on all sheets affected.

After the final field inspection and final corrections, plans are subject to a complete check. This encompasses both a complete design and engineering review and a rigid routine check and cross check of details.

After checking has been completed, the Index of Sheets, typical sections, summary and special detail sheets, etc., can be inked to complete the final plans assembly.

Each set of plans prepared by the District Office or consultants and submitted to the Tallahassee office for checking or processing should be accompanied by a letter outlining any special design features in the plans assembly. Reasons for non-standard design should be explained as well as the basis for design. In the case of plans prepared in the Tallahassee office, documentation of design will be required.

CHAPTER 23
PREPARATION OF PLANS FOR MUNICIPAL PROJECTS

23.1 General

Many procedures followed in the Preparation of Plans for Rural Projects (Chapter 22) also are applicable to the Preparation of Plans for Urban Projects. Since these procedures have been discussed, complete descriptions will not be repeated.

23.2 Preliminary Preparation

The first several steps in Urban Plans Preparation are the same as the Rural Projects:

1. Familiarization of the squad leader with pertinent project data.
2. Indexing field notes.
3. Checking field notes.
4. Drawing proposed typical section or sections.
5. Plotting alignment, existing topography, underground utilities and ground line profile in the plan and profile portions of the continuous roll.
6. Outlining the drainage map.
7. Plotting alignment, topography and profile of outfalls.
(The location of outfalls for municipal projects frequently cannot be determined until the storm sewer system is designed, so this operation may be deferred.)

Roadway cross section ground lines are plotted on cross section sheets. In municipal type construction, there is usually relatively

little departure of grade from the existing ground, so variation in spacing of cross sections seldom is necessary. The plotting is the same as for rural projects. Existing pavement must be plotted. It is especially important to show existing pavement such as service station drives, parking areas and similar construction at the right-of-way line.

Underground utilities are plotted using symbols from Standard Index No. 002 as in rural plans design. Fronts of buildings near the right-of-way line are indicated at the correct distance from the centerline, and existing floor elevations are shown. Also underground gas storage tanks should be shown.

23.3 Preliminary Geometrics

The geometric layout is plotted on the continuous roll. This includes proposed sidewalk, curb and gutter, returns at cross street intersections, median curbs, traffic separators and left turn storage and other auxiliary lanes. The right-of-way line, which usually coincides with the back of the proposed or future sidewalk, is indicated. Care must be exercised to insure conformance of geometrics to the approved typical section and design criteria for the project.

Intersections to side streets are centered on the street dedications, except in rare cases when an existing street with curb and gutter is off center and proposed construction must meet existing construction. Offset, if any, to the centerline of pavement should be shown. A minimum width of 32' face to face of curbs is used for side street connections. Standard widths should be used for side streets except when connections must conform to existing curb and gutter sections.

23.4 Preliminary Profiles

Profiles used for establishing back-of-sidewalk grades now are plotted.

Grade requirements for municipal projects are quite different from those for rural projects. The ideal grade for municipal projects is one in which the proposed grade for the back of the sidewalk matches the existing ground profile in elevation. This condition rarely occurs except for short distances if back-of-sidewalk grades are established in accordance with design criteria, and compromise grades are selected which will minimize damage to adjacent property and reduce drainage complications.

To establish back-of-sidewalk grades, profiles along each right-of-way line are plotted against the same elevation datum. These profiles usually are plotted from elevations obtained from roadway cross sections at the right-of-way line. This method is satisfactory when sufficient cross sections or part sections are available to produce a reasonably accurate profile. (See Chapter 15 for specifics.)

Cross sections will be used to establish direction of drainage arrows which are placed above and below the profile. Care must be taken to avoid plotting invalid or misleading elevations, which would be the case if the right-of-way line were to fall in an existing ditch. In this event, the ground line immediately beyond the ditch limits should be plotted.

Elevations and limits of floors, locations of building entrances, and limits of existing pavements along the right-of-way line are indicated. Limits of private drives and entrance walks need not be shown. Profiles are inked using different colored ink for the right and left sides and different symbols for each side. Although the different colors will not be reproduced, they are a help to the designer.

Tentative grades now are established. On a print of the back-of-sidewalk profile are drawn grade lines which match as well as possible existing ground at the right-of-way line, using these criteria

1. The desirable minimum tangent length of the grade line is 300', with an absolute minimum of 250' unless otherwise specifically authorized.
2. The minimum rate of grade is 0.2% through flat sections of the state and 0.35% to 0.5% through rolling terrain.
3. Vertical curves will be required for breaks in grade as shown in Manual of Uniform Minimum Standards, page 36.
4. The high point should be at or near the centerlines of cross streets where possible.
5. The placing of low points in the grade at locations which would be detrimental to existing development should be avoided.
6. Standard clearance above high water elevations should be provided.

The grade must be such that the back of the sidewalk will not be above building floor elevations at entrances, particularly in the case of buildings at or near the right-of-way line. The grade should be sufficiently lower than floor elevations to allow for provision of adequate drainage away from the entrance. If at all practical, the grade of the sidewalk should be such that water will not be ponded behind it at locations where ground slopes toward the project. It is generally undesirable to have fill sections at the back of the proposed sidewalk. In case of a definite cross slope of the ground from one side of the project to the other, a compromise grade, compatible to the property development is established, with cut on one side and fill on the other.

At the location of superelevated curves separate profiles must be used for establishing grades for the right and left back of sidewalk.

Occasionally, a situation will arise where extensive development exists on both sides of the street and the ground or development on one side is somewhat higher than on the other. In this situation, a grade line fitting existing development on one side may cause extensive property damage on the opposite side. In such cases, an unsymmetrical section may be used, the total drop from centerline to gutter being greater than normal on one side and less than normal on the other. Separate profile grades would be required for each side. During transitions from unsymmetrical to normal sections and in superelevation transitions, care must be taken to avoid gutter grades flatter than the 0.2% minimum.

When preliminary back-of-sidewalk grades have been established, proposed sidewalks are plotted on prints of roadway cross section sheets. The prints are examined carefully for every possible improvement of grades, and revised if necessary.

23.5 Preliminary Cross Sections

Preliminary cross sections are prepared in a similar manner as described in section 22.5 for rural projects. However, special emphasis should be placed on matching existing streets, business drives, etc. and allowing for proper drainage.

23.6 Preliminary Review

The preliminary field review is now in order, the primary purpose of which is to determine feasibility of the geometrics and to make a careful review of proposed grades. A preliminary drainage inspection also may be made at this time, designating possible outfalls. However,

the final drainage system design naturally will depend upon the final grades adopted.

The review party should consist of the designers in charge of the plans preparation, the District Design Engineer or his designated substitute, and whenever possible, the District Location Engineer. At times, it might be helpful to have the District Drainage Engineer in the party, but usually the drainage review might be deferred until the grades are established. The Federal Highway Administration should be represented on all Federal Aid projects. The continuous plan and profile rolls, prints of the sheets covering proposed back-of-sidewalk grades, roadway cross section with the proposed sidewalks plotted, skeleton drainage map and aerial mosaics are taken on this inspection.

The most important function of the party is the review of the proposed grades. The grades are reviewed carefully, and any possible improvements noted. Of particular importance is the matching of grades at entrances of commercial buildings, parking areas, service station drives, etc. Matching of grade at side street intersections also is reviewed carefully. Conditions not evident in location field notes should receive careful attention, and notes concerning possible improvements made directly on the continuous roll or cross section prints.

Frequently, state highways slated for municipal improvement are in fast growing areas. Notes of development that has taken place subsequent to the location survey should be made, and the District Location Engineer notified so pertinent additional field information can be obtained.

The proposed geometrics at street intersections must be reviewed. This includes the location and appropriate width of side street connections

and median openings, left turn storage lanes, and design of channelized intersections, railroad crossings, etc.

23.7 Final Design

In this procedure, the major portion of design is developed on the continuous roll and prints of roadway cross sections. Tracing and transferring of information to the plan-profile and cross section sheets is deferred until the design is practically completed.

In some cases, however, this procedure cannot be followed exactly due to requests for alignment and layout information by property owners, city officials and others. Drafting on the original sheets prior to completion of design should be maintained at a practical minimum.

Following the preliminary field inspection, all necessary changes and corrections in proposed grades, additional topography, etc., are made on the continuous roll, back of sidewalk profile grades, and cross sections.

At this point, back of proposed sidewalk grades are converted to proposed centerline grades, and proposed grades of gutters on super-elevated curves and median curbs are plotted where applicable.

Profile grades for street intersections are established. Profiles of existing cross street dedication lines are plotted, and probable future back-of-sidewalk grades for a short section on the cross streets are established.

The centerline profile grade of the cross street is established. The normal cross slope of .02 ft./ft. should be maintained for 1 to 3 lanes. The outside lane shall always be on a .03 ft./ft. slope.

If it is an arterial street or state highway with present or future high volume traffic potential, special consideration should be given to the proposed grade through the intersection. The prime considerations of these intersections should be drainage, grade, sight distances, and the distance construction must extend up the side street.

When no parking lanes are proposed, it will not be practical to provide a distinct rise in grade along this line as an undesirable hump would result in the outer traffic lane.

Proposed return profiles and sections now are plotted. The minimum 32' width, face to face, is attained at the end of the return on cross streets. The drop from the proposed centerline grade of the cross street to the gutter line is computed in the standard manner. In cases where widths of existing cross streets are greater than 32', special studies may be required in order to better match existing conditions.

A minimum draining gutter grade of 0.2% must be maintained around returns as well as along the project. If a low point occurs on a return, care must be taken to avoid placing it in line with an existing or probable future sidewalk. Unnecessary sags must be avoided.

The steepness of grades on returns should be limited to a maximum desirable grade of 5% with 10% the absolute maximum. The steepness of grades around returns can be reduced by warping the crowns of both project and side street.

Diagonal sections are plotted through the intersection returns to check the adequacy of drainage to gutters on the returns, and to reveal possible undesirable dished sections. Return profiles and sections are not required in plans.

Templates and earthwork quantities may be transferred now or later to the roadway cross section sheets.

23.8 Drainage

After necessary grades have been established, the Drainage Section will then proceed with the design of the proposed drainage system. Drainage tabulation sheets are used by the designer in plotting the drainage system on the various plan sheets.

It is recommended that the planned storm sewers and appurtenances not be drafted in final form on the roadway plan profiles until after the pre-design conference with involved utilities and railroads.

Proposed inlets, manholes and pipes first are plotted in plan, omitting any construction notes. Locations of proposed structures are reviewed carefully. Inlets must be placed at low gutter points along the project and on returns and side street connections. When inlets are located within the limits of sag vertical curves, a minimum gutter grade of 0.2% must be maintained, using special gutter grades and a warped crown when necessary.

"Corner clipping" by pipes connecting the main system with structures on cross street connections or returns to cross streets should be avoided whenever possible if "clipping" necessitates more right-of-way. Inlets which would obstruct existing driveways or which fall in line with the proposed sidewalk or crosswalk must be shifted to eliminate undesirable conditions. Care must be used to avoid creating a heavy flow across crosswalks and curb drops.

The drainage structures are plotted as cross sections on standard cross section sheets with structure description. The standard minimum cover between the outside shell of the proposed pipe and the bottom of the proposed base is 12", and 18" of cover is preferable. Existing

underground utilities are plotted on the sections and a check is made for possible conflicts. All drainage structures are to be numbered.

Every effort should be made to avoid conflicts between the proposed storm sewer and existing major facilities such as sanitary sewers, large water mains, trunk telephone duct systems and high voltage underground electrical cables.

If conflicts cannot be avoided, or if an isolated conflict would result in lowering a considerable length of the proposed drainage system, it is advisable usually to provide a manhole for passing of storm water around the conflicting installation.

In the case of a sanitary sewer conflict, plans should indicate that a length of cast iron pipe is to be constructed through the inlet or manhole by the owner of the sewer. Conflicts and remedial installations are referred to the Drainage Section and the Utilities Section for final approval.

Gas mains should not be passed through the storm sewer system if at all possible. Extreme or totally unavoidable situations can be handled by seamless and jointless casing pipe around the gas carrier main.

A check should be made to assure that longitudinal pipes behind the curb will have sufficient cover at driveways. Proposed flow line grades are noted to the nearest 0.1 foot, except in the case of very flat pipe grades when the flow lines are indicated to the nearest 0.05 foot.

Proposed outfall plan sheets are completed. Ditches are treated in the same manner as for rural construction. When pipe outfalls are provided, pipes, inlets, manholes, and endwalls are plotted in the plan and in the profile. Structure numbers for inlets and manholes are

shown with pipe size. It is possible sometimes, in case of very short outfalls, to plot them in plan on the plan-profile sheets and to include the structures on the drainage structure sheets.

Drainage notes are placed on the plan-profile sheets, and structures and notes placed on the drainage map.

23.9 Right-of-Way

Right-of-way requirements are established. The right-of-way line for urban projects is usually along the back of proposed or future sidewalks, obtaining construction easements for any work outside of these lines. Additional right-of-way beyond the normal width is necessary frequently at intersecting streets due to encroachment of returns and storm sewer stub pipes, especially in cases of existing narrow dedications for side streets.

In addition to right-of-way necessary for construction, every effort should be made to establish right-of-way limits sufficient for pedestrian traffic. The right-of-way line at street corner returns should be set a minimum of five feet back of the back of curb.

Ample right-of-way for outfalls is established so it will contain the proposed construction. When right-of-way requirements have been established, they are furnished to the Right-of-Way Office for completion of the right-of-way map.

23.10 Plans Assembly

Drafting work on the plan-profile sheets now can be completed, and the Key Sheet prepared. Defer as much drafting as possible on the plan-profile sheets until final designs are completed to minimize thinning

of lines due to wear and to minimize the necessity for last minute "touching up". Any other incompleting drafting is concluded at this time.

When film photo plan sheets are used, all drafting should be ink.

The Summary of Quantities and various tabulations are prepared in the same manner as described under "Preparation of Plans for Rural Projects" (Chapter 22).

Plans sheets are assembled in order, the sheets numbered and cross referenced (when necessary) and the Index of Sheets completed as described for rural projects, and at this stage plans are ready for final checking.

CHAPTER 24
PREPARATION OF SKELETON PLANS

24.1 General

The skeleton plan preparation procedure as described in this chapter is approved for use on all State funded resurfacing, normal skid hazard projects and Federal Aid resurfacing projects, if safety modifications are not extensive. This procedure should not be used for projects that include the addition of lanes (either thru or turning lanes).

When this procedure is used, the project location must still be shown in the form of a location map. All work should be clearly indicated and a statement on the scope of work must be included.

24.2 Skeleton Plan Format

The preparation of a skeleton set of plans should follow the guidelines as shown below:

1. Use legal size (8½"x14") for all sheets.
2. Show state project number on all sheets.
3. Do not use Xerox sheets for originals.
4. All sheets including pay item sheets are to be numbered sheet 1 of 9, sheet 2 of 9, etc. Signing and pavement marking sheets are to be numbered consecutively with the rest of the plans. Do not prepare a separate Key Sheet for signing.
5. The designer's name should be placed on the Key Sheet
6. All summary of pay item sheets are to be inserted directly behind the Key Sheet (including signing and pavement markings).
Trim originals to proper size, do not reduce by Xeroxing.

7. Typical sections should be drawn if widening is included. This is necessary to indicate existing pavement, shoulder and ditch locations in respect to proposed construction.
8. Space must be provided on the Key Sheet for approval by the Director of Road Operations and the Division Administrator, FHWA.
9. The standard governing specifications note used on all plans must be shown on skeleton plans.
10. Tabulations of resurfacing (when width varies considerably), or tabulations of drainage structures may be necessary on some projects.
11. All projects involving railroads should include specific notation instructions as to the type of grade crossing to be worked and the type and class of railroad signal work anticipated according to the Standard Indexes by reference. If railroad crossing work is involved, Pay Items must include all reconstruction work to be performed by the highway contractor. A special sketch will be required to identify schematically the approximate alignment, location and FDOT/AAR National Inventory Crossing Number.

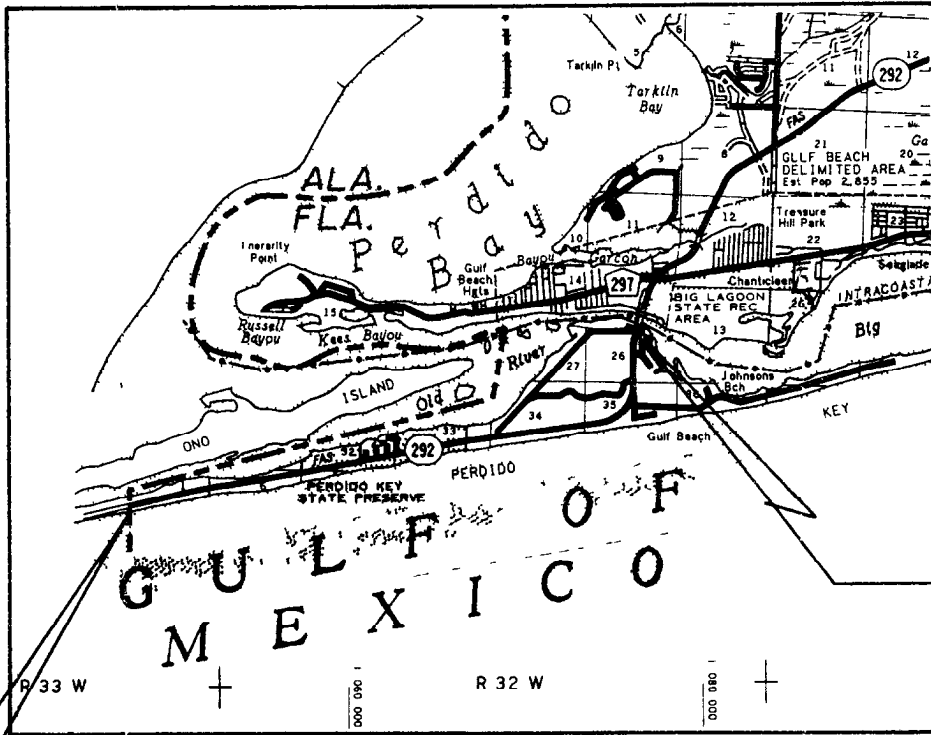
SHEETS 117 thru 124 illustrate a completed set of skeleton plans.

*ESCAMBIA COUNTY
STATE PROJECT NO.
00000-0000*

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

Plans for Proposed
State Highway

F.A. Project No. XX-00000(0)
State Project No. 00000-0000
Budget Item No. 000000
Escambia County
S.R. 292



2 Miles

End Project
M.P. No. 6.213

Begin Project
M.P. No. 0.000

J. R. Smith

Length of Project (Miles)	
Roadway	6.213
Bridges	0.000
Net Length	6.213
Exceptions	0.000
Gross Length	6.213

Submitted By: (Director of Road Operations)

Approved By: (Division Administrator, FHWA)

1/06/81
13.48.01

CESPA18A
PAGE 01 OF 01

00000-0000

SUMMARY OF ROADWAY PAY ITEMS

ITEM NUMBER	ITEM	UN IT	00000-0000 FA PART	QUANTITY TOTAL
101-1-	MOBILIZATION	LS	1.000	1.000
102-1-	MAINT OF TRAFFIC	LS	1.000	1.000
102-74-	BARRICADE (TEMPORARY - CLASSES A,B & D) (TEMP - POST MOUNTED)	ED	1500.000	1500.000
102-75-	CONSTRUCTION SIGNS	ED	900.000	900.000
102-77-	HIGH INTENSITY FLASHING	ED	600.000	600.000
102-85-	PAVT MARKING	LE	131219.000	131219.000
104-10-	BALED HAY OR STRAW	TN	20.000	20.000
120-8-	BURROW EXCAVATION	CY	669.000	669.000
250-70-	FINAL DRESSING	LS	1.000	1.000
286-71-	SHELL MATERIAL	CY	3508.000	3508.000
300-1-	TURNOUT CONSTRUCTION	TN	429.000	429.000
300-1-13	BIT MATL (TACK COAT)	GA	13089.000	13089.000
332-2-	BIT MATL (PLANT MIX)(ASPH CEM 20)	GA	191747.000	191747.000
332-7-	TYPE II ASPH CONC	IN	6520.000	6520.000
355-2-	SAHM	LF	5433.000	5433.000
400-1-	WATERPROOF CONC PAVT JNTS	CY	7.000	7.000
430-1-224	CLASS I CJNC (ENDWALLS)	LE	60.000	60.000
524-1-	CONC PIPE CULV (3")	SY	50.000	50.000
570-3-	MULCH MATL (PERMANENT TYPE)	TN	5.000	5.000
570-4-	FERTILIZER	TN	2.000	2.000
570-5-	WATER FOR GRASS	MG	30.000	30.000
570-9-	GRASS SEED	LB	7.000	7.000
575-1-	SODDING	SY	129.000	129.000
577-70-	REWORKING SHOULDERS	SY	3323.000	3323.000
A 300-1-14	BIT MATL (PLANT MIX)(ASPH CEM 20)(FC)	GA	67619.000	67619.000
A 337-70-5	ASPH CONC FRICTION COURSE (1") (FC-1 OR FC-4)	SY	86925.000	86925.000
A 337-71-5	ASPH CONC FRICTION COURSE (1") (FC-1 OR FC-4)	TN	75.000	75.000
B 300-1-14	BIT MATL (PLANT MIX)(ASPH CEM 20)(FC)	GA	39452.000	39452.000
B 337-70-2	ASPH CONC FRICTION COURSE (5/8") (FC-2)	SY	86925.000	86925.000
B 337-71-2	ASPH CONC FRICTION COURSE (5/8") (FC-2)	TN	75.000	75.000

PROJECT LOCATION

The project is located on S.R. 292 in southwest Escambia County, beginning at the Alabama State Line and proceeding east to end at the bridge pavement. The project begins at M.P. 0.000 and ends at M.P. 6.213, a distance of 32,804.64 feet (6.213 miles).

SCOPE OF WORK

The project consists of resurfacing the existing 24' pavement up to M.P. 5.741 and then resurfacing the existing 22' pavement for the remainder of the job up to M.P. 6.213. Also includes pavement markings and lengthening certain cross-drain structures in order to provide for safe recovery area between edge of pavement and ends of structure. Joints and cracks in the existing concrete pavement are to be sealed, as directed by the Engineer, in accordance with Section 356 of the Special Provisions for this project, prior to the leveling and resurfacing operation.

TYPICAL SECTION

Construct Sand Asphalt Hot Mix Leveling Course (125 lbs. per sq. yd. avg.) (500 lbs. stability), with Asphaltic Concrete Structural Course Type II (150 lbs. per sq. yd.) (500 lbs. stability) and Asphaltic Concrete Friction Course, either FC-1 or FC-4 (1" Thick) (Alt. A) or FC-2 (5/8" Thick) (Alt. B). Flush existing 10' shoulders with shell material from M.P. 0.000 to M.P. 5.741. Rework existing 6' shoulders from M.P. 5.741 to M.P. 6.213.

ROAD DESIGN STANDARDS - BOOKLET DATED JANUARY, 1981

001	Standard Abbreviations
002	Standard Symbols (3 sheets)
250	Straight Concrete Endwalls - Single and Multiple Pipe
280	Miscellaneous Drainage Details (3 Sheets)
500	Excavation, Embankment and Grading
510	Superelevation (2 Sheets)
516	Turnouts - Resurfacing Projects

TRAFFIC OPERATIONS STANDARDS - BOOKLET DATED JANUARY, 1981

17346	Special Marking Areas (6 Sheets)
17352	Typical Placement of Reflective Pavement Markers (2 Sheets)

NOTES

"It shall be the contractor's responsibility to determine the field location and length of any no-passing zone. No-passing zones shall be established in accord with Section 3B-3, 3B-4 and 3B-5 of the 1978 M U T C D. The Contractor's

proposed method of establishing no-passing zones must be approved in advance of construction by the Engineer. The cost of establishing the no-passing zones shall be considered as incidental to the traffic stripping items included in the contract "

GOVERNING SPECIFICATIONS

State of Florida Department of Transportation Standard Specifications dated 1977 and supplements thereto if noted in the special Provisions for this project

NOTES

- 1 Shoulders to be flushed as directed by the Engineer
- 2 Material used for flushing shoulders from M P 5 741 to M P 6 213 is not to be red clay, but is to be material that is, in the opinion of the Engineer, suitable for the permanent growth of vegetation
- 3 All existing DOT signs within the limits of construction are to be taken down by the Contractor and stockpiled and the appropriate maintenance unit notified so they may be picked up
- 4 The Maintenance of Traffic for the project will be done in accordance with the Manual on Traffic Control and Safe Practices for street and highway construction, maintenance and utility operation
- 5 Permanent signing to be done by others in accordance with M U T C D and approved standards
- 6 Maintenance of traffic shall be as in Case VI of the M T C S P

NOTES FOR PAY ITEMS

- | | |
|-----------------|--|
| Item No 102-74 | Barricades will be paid for on the Basis of per Barricade per day in use. The quantity shown is based on an estimated average of 10 barricades for 150 days |
| Item No 102-75 | Signs will be paid for on the Basis of per sign per day in use. The quantity shown is based on an estimated average of 6 signs for 150 days |
| Item No. 102-77 | Flashing lights will be paid for on the Basis of per flashing light per day in use. The quantity shown is based on an estimated average of 4 flashing lights for 150 days. |
| Item No 104-10 | To be placed if and where necessary as directed by the Engineer |

- Item No 120-2 To be furnished by the Contractor from areas provided by him Payment to be by truck measure
- Item No 120-8 Price and payment for this item shall also include all roadway excavation necessary to shape shoulders and front slopes and necessary compaction
- Item No 250-70 To be used from M P 0 000 to M.P 5 741 on existing shoulders, to be cut approximately 4" deep, rolled and shaped to typical section Material to be placed if and where necessary as directed by the Engineer
- Item No 286-71 Included for new construction Payment includes excavation and asphalt No separate payment will be made for the bituminous material
- Item No 524-1-1 Is an estimated quantity to be used if and where necessary as directed by the Engineer

BASIS OF ESTIMATE

- 300-1-3 0 03 gal per s y per layer
- 300-1-13 7 2% SAHM

CURVE DATA

All curves to be superelevated for 55 M P H as directed by the Engineer

<u>P I Mile Post</u>	<u>Degree of Curve</u>	<u>Superelev Design</u>
M P 1 013	0° 30'	55 MPH
M P 1 522	0° 30'	55 MPH
M P 2 121	0° 30'	55 MPH
M P 3 513	0° 30'	55 MPH
M P 5 209	2° 00'	55 MPH
M P 5 587	5° 00'	55 MPH

SUMMARY OF DRAINAGE STRUCTURES									
MILE POST	DESCRIPTION	SIZE	LENGTH		PIPE	SOD	CONC		REINF STEEL
			LT.	RT.	CONC		Class I	Class II	
					24"	SY	CY	CY	LB
5.55	Extend Exist Pipe & Endwall	24"	20'	0	20'	43	2.2		
5.68	Extend Exist Pipe & Endwall	24"	19	0	19'	43	2.2		
5.85	Extend Exist Pipe & Endwall	24"	21'	0	21'	43	2.2		
TOTAL					60'	129	6.6		

CHAPTER 25
QUALITY CONTROL IN PLAN PREPARATION

25.1 General

Every effort must be made to eliminate as many revisions, change orders, and supplemental agreements to plans as possible due to incompleteness of plan detail. Sufficient details should be shown by the designer to convey to all plan users and especially to the contractor, the intent of the design and scope of work to be constructed.

This chapter gives two check lists which should be used to help prevent the problems described above. The first check list should be used by the designer for a general check on design and safety and the second by the plans checker to ensure that the mechanical aspects of the plans are correct. These check lists are considered as a minimum requirement and an indepth evaluation and checking of some projects may be necessary to ensure completeness.

25.2 Check List for General Design and Safety Review

- ___ 1. Check gutters and valleys for a minimum grade (does not apply over crests of hills).
- ___ 2. Pleasing grades and sections. (Check for short tangent breaks broken back grades, highwater clearances and small sags in the grade line that may be eliminated.)
- ___ 3. Intersection layouts, grades, etc. (All intersections are to be carefully reviewed for conformity to AASHTO design standards and the "Manual of Uniform Minimum Standards". Check sections and profiles for sags or crests which reduce sight distance at intersections or on ramps, or which create an unpleasant

appearance. Special attention should be given grades which would create difficulties in night driving. For both day and night driving (particularly night driving) designs of intersections on hill tops should be examined carefully. Ideally, grade intersections should be in sags, rather than at the crest of hills. Adequate weaving, merging, storage and speed change lanes must be provided. Vertical and horizontal clearances also must be carefully checked.)

- ___ 4. Roadway alignment. (Horizontal alignment should be examined for conformance with the "Manual of Uniform Minimum Standards" (pages 27 and 28). General criteria for vertical alignment is given on page 32 of the MUMS. General controls for combinations of horizontal and vertical alignment are given on page 41 of the MUMS.)
- ___ 5. Sight distances at crest and sag vertical curves. (These criteria apply not only to through roadway, but also to ramps and at grade intersections. Check closely for restricted sight distances from ramps to cross roads.)
- ___ 6. Check for unnecessary long hauls of earthwork.
- ___ 7. Check for proper fit to adjacent property, streets and concurrent or proposed projects.
- ___ 8. Proper layout of return profiles and sections for intersections.
- ___ 9. Positive drainage from ditches and structures.
- ___ 10. Check for warranty of climbing lanes at steep grades.
- ___ 11. Conformity to the approved typical section.

- ___ 12. Check for standard method of removal and disposal of unsuitable material. (On rare occasions, the characteristics of unsuitable material are such that unusual methods of removal are required.)
- ___ 13. Review cross sections carefully with the view of improvement. (A change in rate of fill slopes or back slopes for a very short distance is undesirable. Check for locations where slopes may be economically flattened and eliminate necessity for short guardrail or shoulder gutter installations.)
- ___ 14. Encroachment on private property. (Adequate right-of-way for the proposed construction always should be obtained. In cases where substantial construction easements must be obtained, such as those necessitated in municipal sections by excessive subsoil excavation, such easements should be obtained along with right-of-way considerations.)
- ___ 15. Check superelevation rates for consistency with design speed.
- ___ 16. Are attenuators or guardrail required for spot hazards which cannot be eliminated.
- ___ 17. Do plans comply with design criteria related to highway safety?
- ___ 18. Are all required permits in hand? Are all special conditions of permits met in plans and/or specifications?
- ___ 19. Has a pre-design conference with Utility and Railroad Representatives been held for this project?
- ___ 20. If the project involves a railroad crossing, does the design file contain a copy of the Diagnostic Team Crossing Report?

25.3 Check List for Plan Checkers

A. Familiarize yourself with plans to be checked.

- ___ 1. Examine the plans carefully for completeness and determine whether additional information is needed.
- ___ 2. Obtain prints of right-of-way map, if map is available, for verifying right-of-way as shown on plans.
- ___ 3. If there are any proposed bridges, obtain prints, if available, from Bridge Department.
- ___ 4. Check adjacent projects as to construction status, future construction and possible future realignment.
- ___ 5. Read file, check to see that all agreed to conditions and permit stipulations have been complied with.

B. Key Sheet to include the following:

- ___ 1. Correct project numbers. Correct Budget Item number.
- ___ 2. Location of project, begin and end stations, equations, exceptions and bridge stations.
- ___ 3. Specifications date and note.
- ___ 4. Railroad crossing. Detail and number.
- ___ 5. Correct State Road numbers.
- ___ 6. North Point and scale.
- ___ 7. Designer or consultant name and D.O.T. project manager.

- #### C. Check all stationing throughout plans, beginning with the Key Sheet. (Note that temporary connections and transitions usually should lie outside of limits of project. Check length of project. Show all equations in stationing. Check for bridge cul-

vert classifications. When two or more projects are in the same set of plans, show limits of each project throughout the plans.)

___ D. Check drainage structures for grade, superelevation, plotting, slopes, length of structure, etc., on drainage structure sheets. Notes to conform with present practice. Height of fill is limited when using 8000 series culverts. Check for minimum cover. For pipe and culvert extensions to existing structures indicate the removal of existing headwalls and wings to such elevation as will clear shoulder grading line by one foot. Check for conflicts of proposed structures with existing utilities that are to remain in place. Check to make sure structure size is adequate to accommodate the pipes proposed.

E. Check the following against drainage structure sheets:

___ 1. Drainage Map.

___ 2. Plan and Profiles.

___ 3. Lateral Ditch Plan and Profiles.

___ 4. Detail construction, intersection details and special layouts. Notes to conform to present practice.

___ F. Check Summary of Drainage Structures against drainage structure sheets. (Concrete and steel quantities for concrete box culverts should be computed only from sections included in the plans.)

G. Check plan and profile sheets.

___ 1. Right-of-way lines against right-of-way map. (This is a joint responsibility of the Plans Department and the Right-of-Way Department. Be certain that the plans show

right-of-way sufficient for the proposed construction.
If any right-of-way requirements are changed on the plans,
the Right-of-Way Department is to be notified immediately.)

2. Notes on first plan sheet:

- ___ a. Grades shown are finished grades.
- ___ b. Utilities are to be adjusted by others as directed by
the Engineer.
- ___ c. B. M. Datum is national Geodetic Vertical Datum of
1929 (NGVD-'29).
- ___ d. Buildings to be removed by others unless otherwise
noted.
- ___ e. Existing drainage structures within construction limits
shall be removed (or remain) unless otherwise noted.
- ___ f. Railroad and Utility Agencies.
- ___ g. Any NGVD-'29 monument within the limits of construction
is to be protected. If in danger of damage, the proj-
ect engineer should notify:

Mr. Dennis Wegenast
Geodetic Information Center
ATTN: C-185
Rockville, Maryland 20852
Telephone No. (301)443-8631

- ___ h. If there are no utility adjustment sheets in the plans,
the following notes should be on the first plan-profile
sheet:
 - 1. The location of the proposed utilities shown in
the plans are approximate only: The exact location
shall be determined by the Engineer during con-
struction.

2. For utility adjustment symbols, see Index No. 002.

1. If there are no drainage structure sheets in the plans, the following note should be on the first plan-profile sheet:

1. Special attention is directed to the fact that ~~the~~ portions of some drainage structures extend into the stabilized portion of the road bed and extreme caution will be necessary in stabilization operations at these locations.

j. Permanent turnouts and driveway connections to private property, that lie outside the limits of limited access right-of-way and where access rights have not been acquired, shall be constructed in accordance with the turnout details and State Standard Specifications referenced on the Key Sheet of these plans. The Department, or the Department's contractor, shall not isolate adjacent and/or remainder property unless access rights are acquired. Access shall be provided to such property whenever construction interferes with the existing means of access.

3. Show rate of superelevation on curves. Check for other than standard superelevation transitions. A diagram must be included for non-standard transitions.

4. Vertical curve PC's, PT's and PI's properly designated and elevations shown.

5. Grade elevation shown at beginning and end of each sheet.

6. Check cross sections for special right-of-way ditches and varying depth ditches. Ditch notes may be shown on cross sections when necessary if so noted on plan-profile sheets

___ 7. Railroad crossings - show required crossing and signal type.

H. Check Lateral Ditch Plan sheets for

- ___ 1. Right-of-way lines shown with correct dimensions.
- ___ 2. Correct width of ditch and sufficient right-of-way.
- ___ 3. If there is an existing channel indicate the flow line of such by a broken line in the profile. Profile of natural ground should be shown if survey is located in an existing ditch.
- ___ 4. Indicate direction of flow with arrow.
- ___ 5. Check for highwater elevations where applicable.

I. Check Lateral Ditch Cross Sections for:

- ___ 1. Grade and plotting.
- ___ 2. Show lateral ditch excavation.
- ___ 3. Be sure right-of-way width shown is sufficient for excavation and for spoil if necessary.

J. Check Roadway Cross Sections for

- ___ 1. Plotting (grade, superelevation, width, transitions and pavement thickness). Depth of pavement template should be combined thickness of base and surfacing.
- ___ 2. Removal of unsuitable material (from soil survey). Check for correct classification of excavation.
- ___ 3. Check balances against mass diagram.
- ___ 4. Indicate proper scale.
- ___ 5. Check for correctness of any right-of-way lines when shown.

___ K. Roadway and Borrow Pit Soil Survey:

Check availability of material in borrow pits. Be sure enough suitable material is available to produce the required borrow.

L. Typical Section and Summary Sheets

1. Clearing and grubbing indicated as "standard" within the correct limits. Show note regarding selective clearing and grubbing or no clearing and grubbing on all Interstate projects.
2. All dimensions shown to correct limits.
3. All slopes indicated.
4. Check right-of-way limits.
5. Show value for subgrade stabilizing.
6. Refer to Index Numbers where applicable.
7. Check notes for standard procedure.
8. Check Summary of Pay Items. (Where applicable show quantity breakdown between various F. A. projects and State projects. Be sure that pay items are correctly shown for all work indicated on the plans.)
9. Check for a nominal amount of asphaltic concrete on a tonnage basis for street and driveway connections. Check also for the estimated quantity for 6" concrete sidewalk for driveway connections.
10. Check all tabulations of quantities shown on the Summary of Quantities sheet.
11. Check footnotes to pay items.
12. Check erosion control items and footnotes.
13. Maintenance of traffic items and details.

M. Index to Sheets:

- ___ 1. Check on Key Sheet. Be sure to include index sheets to cover all work in the plans. Check index sheet requirements (a) Typical Sections, (b) Summary of Drainage Structures, and (c) Items in Summary of Pay Items.
- ___ 2. Check that all sheets are indexed and included in plans. (Approach slabs and box culverts are not added by reproduction.)
- ___ 3. Check that all plans included in the contract plans set are noted.

N Utility Adjustment Sheets

- ___ 1. Notes on first sheet
 - ___ a. The locations of the proposed utilities shown in the plans are approximate only. The exact locations shall be determined by the Engineer during construction.
 - ___ b. For utility adjustment symbols, see Index No. 002.
- ___ 2. If utility adjustments are shown on plan-profile sheets, place preceding notes on first plan sheet.
- ___ 3. Are utility adjustment sheets complete?

CHAPTER 26
PLAN REVISIONS

26.1 General

Frequently plan revisions are necessary after the plans have been printed to correct or add specific sheets to ensure that a correct set of plans with the scope of work clearly defined is advertised and let to contract. Unless the revisions and revision letters are clear, personnel involved in handling the revisions must call the person initiating the changes to see how the plans are affected.

In order to adequately evaluate plans or specification changes and to assure that there is ample time to notify the various contractors who are preparing proposals, no changes will be made to any plans, whether they be Federal aid projects or State projects, within ten (10) days of the proposed bid letting. The exception to this would be when notification could be made to prospective bidders which can be transmitted by a simple telegram message which does not require plan changes or major changes in the specifications. Changes of this nature will be allowed to be made up to within 48 hours of the proposed bid letting.

Any deviation from the above can be made only upon authorization of the Director of Road Operations or one of the Deputy Directors of Road Operations.

26.2 Revised Plan Sheets

Original plans will be used in all cases when revisions are made. In no case will reproductions (sepias, etc.) or xerox copies of skeleton plans be used for making revisions.

To identify the original skeleton plan sheets, the Roadway Design section in Tallahassee will place a check mark in non-photo blue pencil on the bottom right hand corner of all original plan sheets when they are received.

When plans are to be revised, all requests for original plans will be made to the office of Final Plans in Tallahassee.

Each revised plan sheet will always show a revised date in the lower right hand corner of the sheet except for the computer printout of the summary of pay item sheets. The revised date on this sheet shall be shown at the top of the sheet.

The exception to showing a revised date on all sheets is when the plan set is completely revised, then only the Key Sheet is dated.

The lead key sheet (usually roadway) will show a complete record of all plan revisions that will include not only the roadway revisions, but revisions to the components (structures, signing and pavement markings, lighting, summary of pay items, etc.) as well. This is necessary to ensure that reproduction prints all revised sheets. It will be the responsibility of the office making the revisions to ensure that not only the component sheets are revised but that the lead key sheet shows a record of all revisions. The record of all plan revisions will be shown directly below the list of Standard Index Drawings and will give the revised date and sheet number.

26.3 Revision Letters

All revision letters will indicate the sheet numbers being changed, unless the revisions are extensive enough to require a complete reprinting, and in both cases an explanation of the changes made. Revision letters should be addressed to the Engineer of Specifications with copies to the

Deputy Design Engineer (Roadways), Engineer of Contracts, Engineer of Federal Aid (F.A. project only), State Estimates Engineer, Reproduction, and the District Design Engineer or the District Traffic Operations Engineer. All revisions affecting railroad or utility facilities are to be reported to the District Utility Engineer.

The revision letter to the Engineer of Specifications and the copies to Contracts, Federal Aid and Reproduction will accompany the plans when they are transmitted to Specifications. The other copies can be mailed separately. When revisions are made in the District office, all copies of the revision letter (Tallahassee Distribution) are to be forwarded to the Deputy Design Engineer (Roadways) with the revised plans.

For Federal Aid projects that have been authorized for letting by the F.H.W.A. the revision letter must give the name of the F.H.W.A. Engineer that authorized the changes and the date of authorization. When changes are made in Tallahassee offices on District responsibility plans, the letter should also indicate who made the request for the change.

SHEETS 138 thru 142 illustrate correct revision letters.

MEMORANDUM

State of Florida Department of Transportation

DATE August 1, 1980

TO Mr. R. B. Revell, Engineer of Specifications

FROM D. C. Bullard, Deputy Design Engineer (Roadways)

COPIES TO Messrs. J. T. Barefield, A. B. Burke, T. E. Drawdy,
J. B. Alford and T. H. Kalayci

SUBJECT B. I. No. 000000
State Project No. 00000-0000
F. A. Project No. M-0000(0)
S. R. 00, Any County

This will advise you that sheets 01, 02, 5, 6, 18, 56, 60 & 61 of the roadway plans and sheets 01, B-1 & B-24 of the bridge plans of the subject plans set have been revised in accordance with comments of Mr. Steve Busek of the Federal Highway Administration.

- Sheet 5 - Added a note under the typical section that the Contractor is to apply only friction course from Sta. 197+20 to Sta. 198+33. Removed reference to double course for limerock material in the composite base detail.
- Sheet 6 - Expanded footnotes as follows:
Item 110-1 to include buried fuel tanks, Item 331-2 to add quantity for approach slabs; Items 425-2-41 & 425-2-71 to change number of conflict manholes and to note F. A. non-participation; Items 337-70-1 & 337-70-4 to add quantity for approach slabs. Items 102-74, -75, & -77 to revise contract time. Added note requiring construction coordination with contractor on adjacent project.
- Sheet 13 - Changed "End Construction" to Sta. 198+33
- Sheet 56 - Changed payment for concrete barrier wall from maintenance of traffic to concrete barrier wall items.
- Sheet 60 - Changed payment for temporary attenuators from maintenance of traffic to concrete barrier wall items.
- Sheet 61 - Changed approach slab surfacing from 1½" Type S-1 asphaltic concrete to 100 lbs. of Type S-1 asphaltic concrete and 1" friction course.

Memorandum to Mr. R. B. Revell
August 1, 1980
Page Two

Sheets 01 & 02 (Roadway) - Added Items 102-72-2 (temporary barrier wall), and 102-83 (relocating temporary barrier wall) Revised quantities for Items 102-74 (temporary barricade), 102-75 (construction signs), 102-77 (flashing lights), 300-1-13 (plant mix), 331-2 (Type S-I asphaltic concrete), Alt. C Items 300-1-14 (plant mix) & 337-70-1 (friction course FC-1), and Alt. D Items 300-1-14 (plant mix) & 300-70-4 (friction course FC-4).

Sheet B-1 - Deleted test loads from the Estimated Bridge Quantities and deleted the note pertaining thereto.

Sheet B-24 - Added "or equal" to the note giving the manufacturer for stud anchors.

Sheet 01 (Bridge) - Deleted 455-10-90 (test loads) from the Summary of Pay Items.

CHJ db

MEMORANDUM

State of Florida Department of Transportation

DATE August 1, 1980

TO Mr. R. B. Revell, Engineer of Specifications

FROM D. C. Bullard, Deputy Design Engineer (Roadways)

COPIES TO Messrs. J. T. Barefield, A. B. Burke, T. E. Drawdy,
J. B. Alford and T. H. Kalaycı

SUBJECT B. I. No. 000000
State Project No. 00000-0000
F. A. Project No. M-0000(0)
S. R. 00, Any County

This will advise you that sheets 2 & 3 of the roadway plans of the subject plans set have been revised to change the proposed resurfacing over the existing pavement by increasing the Type S-I asphaltic concrete leveling course from 75 to 100 lbs. per square yard and eliminating the 100 lb. per square yard Type S-I asphaltic concrete surface course.

Sheet 2 - In Typical Section (Sta. 15+00 to Sta. 75+60) title, increased the leveling course and deleted the Type S-I asphaltic concrete surface course. In the Feathering Details, removed references S-I asphaltic concrete surface course.

Sheet 3 - Revised quantities for Items 300-1-3 (tack coat), 300-1-13 (plant mix), and 331-2 (Type S-I asphaltic concrete).

These changes were discussed with Mr. Tanzer Kalaycı of the District and verbally approved July 31, 1980 by Mr. Bill Deyo of the Federal Highway Administration.

CHJ:db

MEMORANDUM

State of Florida Department of Transportation

DATE August 1, 1980

TO Mr. R. B. Revell, Engineer of Specifications

FROM D. C. Bullard, Deputy Design Engineer (Roadways)

COPIES TO Messrs. J. T. Barefield, A. B. Burke, T. E. Drawdy,
J. B. Alford, C. B. Dunn

SUBJECT B. I. No. 000000
State Project Nos. 00000-0000 & 00000-0000
F. A. Project Nos. 000-000-0(0) & 000-000-0(0)
S. R. 00, Any County

This will advise you that sheet 4 of the roadway plans of the subject plans set has been revised to change temporary barrier wall note to delete contractor's requirement to deliver temporary barrier wall to D.O.T. maintenance yard.

Quantities were not affected by this revision.

This revision was requested by Mr. J. D. Malloy of the District office as F.H.W.A. will not participate in cost of delivering barrier wall.

WDH:db

MEMORANDUM

State of Florida Department of Transportation

DATE August 1, 1980

TO Mr. R. B. Revell, Engineer of Specifications

FROM D. C. Bullard, Deputy Design Engineer (Roadways)

COPIES TO Messrs. J. T. Barefield, T. E. Drawdy, J. B. Alford, and E. L. Best

SUBJECT B. I. No. 000000
State Project No. 00000-0000
S. R. 00
Any County

This will advise you that the roadway plans of the subject plans set have been completely revised to comply with current policy concerning use of Friction Course FC-2 with Asphaltic Concrete Type II by eliminating FC-2.

Please destroy all reproductions of the original roadway plans to prevent possible use in estimating and bidding.

CWB:db

CHAPTER 27
COMPUTER APPLICATION IN PLANS PREPARATION

27.1 General

The computer is relied on more and more by the designer to aid him in the preparation of plans, both rural and municipal.

There are available to the designer a variety of computer programs from which he may choose to aid in plans preparation, each one having specific areas of concern, with some having duplication of other programs.

The most efficient use of these programs comes when they are integrated into the conventional methods of plans preparation as discussed in Chapters 22 and 23 (Preparation of Rural and Municipal Projects). The designer should use his experience and knowledge of design procedures to know how and when the computer should be used. Most projects are ideal for computer applications, a few are not. Consultation with the District Computer Engineer or other experienced users will be helpful in determining which projects are or are not suitable for computer applications.

27.2 Main Programs Available to the Designer for Preparation of Roadway Plans

The primary programs available at this time for use in plans preparation are

1. COGO (Coordinate Geometry)
2. ROADS (Roadway Analysis and Design System)
3. Contour Plot
4. CES (Computer Estimating System)

As noted in section 27.1, each of these programs aid the designer in specific areas. In the following sections some of the main areas they are programmed for use in will be described, keeping in mind that, by far, these are not the only applications and that the designer should apply these programs to fit his situation.

27.3 COGO (Coordinate Geometry)

1. Is used on the majority of projects. This program can calculate the horizontal and vertical geometry.
2. Special details, intersection and interchange details can be computer plotted to any scale for tracing onto original sheets.
3. Canned COGO can be used to solve typical design situations such as return radius, intersection details, median noses, etc
4. COGO can also aid in calculation of quantities which are based on area computations.

27.4 ROADS (Roadway Analysis and Design System)

1. Can reduce, edit and plot existing ground lines from field books onto cross section sheets.
2. Can input subsurface data in the form of borings, soundings or depth of cover contours to allow subsoil excavation quantities to be calculated.
3. Plots the proposed roadway templates on the same cross section sheets used to plot the existing ground lines.
4. Calculates earthwork quantities, including subsoils if present.
5. Calculates superelevation, ditch and median profiles and all other elevations necessary to create the templates from R/W to R/W.

6. Under development are computer plots of the profile portion of the plan and profile sheet and plots of the mass diagram.

27.5 Contour Plot

1. This program creates, from field cross sections or an existing ROADS file with existing or proposed cross sections, a contour map to any scale and at any contour interval desired.

27.6 CES (Contract Estimating System)

1. This program is discussed in detail in Chapter 3.

27.7 Summary

These programs can be utilized independently or in combination to achieve the desired results. The designer should keep himself abreast of new programs and changes in the old ones to achieve optimum utilization of the computer.

Any information, training and assistance in coding or processing of any computer programs can be obtained from the District Computer Engineer.

CHAPTER 28
PLANS RETENTION

28.1 Introduction

As stated in the Florida Department of Transportation Procedure No. 287-001 "The original plans shall be microfilmed three years following project completion", i.e., three years after the final project payment.

All plans except Interstate and Turnpike plans are destroyed. Secondary plans are offered to the appropriate county, if declined they are also destroyed.

A microfilm record is retained in Tallahassee and a copy is sent to the appropriate District, with the master sent to the State Archives.

28.2 "As-Built" Plans

The Department has begun a process to convert projects complete on or after July 1, 1975, to "As-Built" status. The general method will be to bring plans to "As-Built" status at the time of microfilming so that the permanent record will indicate construction changes.

Only significant construction changes will be noted on the plans as "As-Built" revisions. The three methods below will be used to denote these changes

1. If no "As-Built" information is available, a note to this effect will be placed on the lead Key Sheet.
2. If the plans were not significantly changed during construction, a note on the lead Key Sheet will indicate that the plans are "As-Built".
3. For projects with significant changes, notes will be placed on the lead Key Sheet outlining the changes made during construction and any specific sheets which were revised.

28.3 Plan Changes During Construction

Any significant changes made to projects during construction should be forwarded to the Final Plans Office in Tallahassee once they have been approved, so that the original plans can be brought to "As-Built" status as scheduled.

CHAPTER 29
CRASH CUSHIONS

29.1 General

Crash cushions are to be used only when the hazard cannot feasibly be eliminated. Upon determination that a crash cushion will be required, prints of all sheets showing pertinent data of the area of hazardous location (plan-profile sheets, cross section sheets, plan layouts, structure plan-location sheet, structural span sheets and, approach slabs) should be mailed to:

State of Florida
Department of Transportation
605 Suwannee Street
Tallahassee, Florida 32301

ATTN Deputy Design Engineer (Roadways)
Mail Station 32

The above should be complied with before detailing of retaining walls, bridge parapets, etc. Selection of the crash cushion type and any special details required for roadway or structural design will be supplied by the Central office of Florida Department of Transportation thereby expediting plans and avoiding costly revisions.

This procedure is to be used for in-house and consultant projects where attenuation devices are necessary.

SECTION II: PREPARATION AND ASSEMBLY OF STRUCTURE PLANS

CHAPTER 30
STRUCTURAL PLANS ASSEMBLY

30.1 General

1. Drawing Material

All drawings in plans shall be drawn on a high quality polyester film material and be easily capable of producing sharp, legible prints. Drawings shall be made on standard size (36"x22"). Title blocks and borders shall conform to sheets used by FDOT structures section. The original film drawings (not paper sepias) of the Bridge Design Data Sheet and Boring Sheets should be included with the Bridge Plans; however, the title block for these sheets are not required to conform with the Structure Section title block.

2. Standard Drawings

Standard drawings are drawings produced and furnished by FDOT structures section intended for repeated use with little or no modifications. Standard drawings shall retain their drawing numbers and index numbers unless the drawings have been modified. See, also, 3(c) and 5(a).

3. Indexing of Sheets

- a. Index numbers are assigned by FDOT structures section after the final composition of the plans is known.
- b. All non-standard drawings in a set of plans, regardless of number of structures will be assigned a single unique index number.
- c. All standard drawings shall retain their index number.

Standard drawings that are modified shall be given the same considerations given to non-standard drawings. See 3(b).

- d. Bridge plans when let to contract with Roadway plans do not require a Key Sheet as described in Section I, Chapter 2, however, when Bridge plans are let to contract separately a Key Sheet, as described in Section I, Chapter 2 is required.

4. Drawing Numbers

The drawing number refers to the sheet assigned a particular index number. Example Dwg. 1 of 3 (Index 9999) would be the first drawing of a total of three drawings assigned to the index number 9999.

5. Sheet Numbers

- a. All sheets listed with the bridge plans shall be given a sheet number with an alphabetical prefix. Do not use the letters L, S or T. Plan sheets should be arranged in alphabetical order. Sheet numbers are independent from index numbers and drawing numbers.
- b. Single site (single or dual structures): All sheet numbers should use the prefix 'B'.
- c. Multiple sites: The cover sheet and all standard and common sheets should use the prefix 'A'. The sheets for each site shall utilize a single unique prefix beginning with 'B'.
- d. Approach slab sheets: The approach slab sheets are usually included with the roadway plans and, therefore,

should not be given a bridge plans sheet number. However, the approach slab sheets are processed by the Structures Section and are assigned a unique index number.

6. Federal Aid Project Number (if applicable) shall be shown on the first sheet of the set of plans only. This number is to be located within the top right block.
7. Budget Item Number (B.I. No.) shall be shown near the title block on the cover and plan and elevation sheets only.
8. Bridge Numbers shall be shown in the title block below the site description on the cover and elevation sheets only. This number(s) is the new number for the proposed structure(s), not to be confused with the number of the existing bridge. The new number shall be obtained from FDOT Structures Section.
9. Summary of Bridge Pay Items: This sheet will be a computer printout. It is numbered by the computer and should not be given a drawing, sheet, or index number.
10. Consultant name should be shown on each sheet that is prepared by a consultant.
11. Drawing Scales
 - a. General
Select a scale for all sheets that is large enough to clearly depict necessary details keeping in mind that half size prints of these sheets will be made.
 - b. Plan and Elevation (Engineers Scale)
1" = 10' if space permits, otherwise as large as possible.

- c. Substructure Units (Architects Scale)
 - 1. Plan Elevation views $3/8" = 1'$ (desirable).
 - 2. Section and Details $3/4" = 1'$ or larger.
- d. Superstructure (Architects Scale)
 - 1. Plan View - $1/4" = 1'$
 - 2. Sections - $3/8" = 1'$
 - 3. Details - $3/4" = 1'$ or larger
- e. Pile Layout (Engineers Scale)
 - 1. $1" = 10'$ or to fit sheet. (Note longitudinal and lateral scales may be different. Piling may be exaggerated in size for clarity.)

12. Preferred Order of Bridge Plans Sheets

- a. Single structures (one Bridge Site)
 - B- Plan and Elevation
 - B- Bridge Design Data Sheet
 - B- Borings
 - B- Pile Layout
 - B- Construction Data (Finish Grades)
 - B- End Bents
 - B- Intermediate Bents or Piers
 - B- Superstructure Sheets
 - B- Beam Sheets
 - B- Reinforcing Bar List
 - B- Standard Sheets
 - B- Detour Bridge Plan and Elevation
 - B- Detour Bridge Details
 - B- Retaining Wall Sheets

- B- Existing Bridge Sheets (if needed)
- Approach Slabs
- b. Multiple structures (more than one Bridge Site)
 - A-1 Cover Sheet
 - A- Standard or Common Sheets
 - B- Plan and Elevation
 - B- Bridge Design Data Sheet
 - B- Borings
 - B- Pile Layout
 - B- Construction Data (Finish Grades)
 - B- End Bents
 - B- Intermediate Bents or Piers
 - B- Superstructure Sheets
 - B- Beam Sheets
 - B- Reinforcing Bar List
 - B- Standard Sheets
 - B- Detour Bridge Plan and Elevation
 - B- Detour Bridge Details
 - B- Retaining Wall Sheets
 - B- Existing Bridge Sheets (if needed)
 - Approach Slabs
 - C-1 Plan and Elevation
 - C- Bridge Design Data Sheets
 - Etc.....

30.2 Summary of Bridge Pay Items

Summary of Bridge Pay Items (computer output sheet, see Chapter 3, Section I).

30.3 Quantities

Concrete quantities are to be calculated for each pour and tabulated for each unit of the structure and located on the design sheets for each unit.

CHAPTER 31
PRELIMINARY STRUCTURAL PLANS

31.1 Preliminary Plan Contents

1. Plan and Elevation Views should reflect:
 - a. Proposed minimum vertical clearance.
 - b. Minimum horizontal clearance.
 - c. Point of minimum vertical clearance.
 - d. Traffic count, % truck, ADT year, ADT year +20.
 - e. Design speed.
 - f. North arrow.
 - g. Bearings fixed and expansion.
 - h. Roadway width, curb width, shoulder width, sidewalk width.
 1. Slope of embankment.
 - j. Berm width.
 - k. Limits of slope pavement or riprap.
 1. Profile grade line, vertical and horizontal alignment.
 - m. Centerline of bridge and centerline of roadway.
 - n. Horizontal curve data.
 - o. Vertical curve data.
 - p. Span lengths, overall length of bridge.
 - q. Labels plan-elevation.
 - r. Elevation scale (vertical) on side of drawing.
 - s. Edge of shoulder.
 - t. Toe of slope.

- u. Station at begin and end of bridge and approach slabs.
 Station at centerline of bents or piers
 Station at centerline of intersection of roads.
 Stations on lower roadway or streams.
 - v. Distance to mile post from intersection of railroads.
 - w. Utilities, sanitary and storm sewers, telephones, etc.
 - x. Existing ground, profile grade and shoulder line in elevation.
 - y. Guardrail in plan and elevation.
 - z. Lighting.
 - aa. Test piles location and lengths.
 - bb. Location of borings.
 - cc. Skew angle.
 - dd. Bearing of centerline if tangent.
 - ee. Summary of pile lengths if pile length are preset (generally widening jobs).
 - ff. Detail of cut under beams showing clearance at end of bridge.
 - gg. Detail of connections to existing bulkheads, walls, etc.
 - hh. Details of fishing walks adjustments, steps where needed.
 - ii. Rubble riprap (if required)
2. Superstructure cross section show lanes, shoulders, handrails, slab thickness, girder type and spacing. For plate girders, show web depth and thickness.
 3. Pier - show size and length of cap, column size and spacing
 4. Intermediate bents - show size and length of cap, number and spacing for piles.

5. Approved bridge design data sheet.
6. Soils data, if available.
7. Prints of approved typical section for approaches and roadway plan-profile sheets in vicinity of structure.

CHAPTER 32
FINAL STRUCTURAL PLANS

32.1 Final Plan Contents

The following shows the suggested composition of individual sheets; however, all sheets shown below may not be required. Additional sheets might be necessary, such as stage construction sheets, retaining walls, bulkheads, etc.

1. Cover Sheet (this sheet not always required)
 - a. Index of Sheets
Prefix sheet numbers with an alphabetical letter for each structure (do not use the letters L, S or T).
 - b. Budget Item Number
 - c. Bridge Number
 - d. Loading
 - e. F.A.P. Number (first sheet only)
 - f. Name of Consultant
 - g. Key Map (if necessary)
2. Standard Drawings (applicable to more than one structure on the project)
 - a. Reinforcing steel standard bar bending details Index No. 10587.
 - b. Reinforcing steel quantities.
 - c. See structure standards for concrete barrier handrails, piling, gravity wall, bearing pads, and composite deck panels.
3. Sheet of General Notes (this sheet not always required)
 - a. Sketch showing surface finish details.

- b. Pile loads.
- c. Number of each type of neoprene pads provided by FDOT.
- d. Slope pavement or riprap details.
- e. Bid Item Notes.

4. Plan and Elevation Sheet

If cover sheet and/or general sheet is not used, then material listed above under these sheets should preferably be included on this sheet.

- a. Actual minimum vertical clearance.
- b. Minimum horizontal clearance.
- c. Point of actual minimum vertical clearance.
- d. Traffic count, % trucks, ADT year, ADT year +20.
- e. Design speed.
- f. North arrow.
- g. Bearings fixed and expansion.
- h. Roadway width, curb width, shoulder width, sidewalk width.
- i. Slope of embankment.
- j. Berm width.
- k. Limits of slope pavement or riprap.
- l. Profile grade line.
- m. Centerline of bridge and centerline of roadway.
- n. Horizontal curve data.
- o. Vertical curve data.
- p. Span lengths, overall length of bridge.
- q. Labels plan-elevation.
- r. Elevation scale on side of drawing.
- s. Edge of shoulder.
- t. Toe of slope.

- u. Station and begin and end of bridge and approach slabs.
Station at centerline of bents or piers.
Station at centerline of intersection of roads.
Stations on lower roadway or streams.
 - v. Distance to mile post from intersection of railroads.
 - w. Utilities, sanitary and storm sewers, telephones, etc.
 - x. Existing ground, profile grade and shoulder line in elevation.
 - y. Guardrail in plan and elevation.
 - z. Lighting.
 - aa. Water elevations.
 - bb. Locations of borings.
 - cc. Bridge number on each bridge and in title block.
 - dd. Skew angle.
 - ee. Bearing of centerline if tangent.
 - ff. Detail of cut under beams showing clearance at end of bridge.
 - gg. Detail of connections to existing bulkheads, walls, etc.
 - hh. Details of fishing walks adjustments, steps where needed.
 - ii. Rubble riprap (ff required).
5. Design Data Sheet
- Must be signed by Drainage Engineer. Plot proposed bridge on plan and elevation.
6. Soils Data
- a. Borings, date and by whom taken.
 - b. Type of rig.
 - c. Casing size.

- d. Sample size.
- e. Hammer weight and drop.
- f. Ground water elevation.
- g. Blow count at elevation taken on casing and spoon.
- h. Existing ground elevation.

7. Foundation Plans

On pile layout sheets, the piles in each bent, pier, end bent and abutment will be numbered sequentially, beginning with 1. The piles will be numbered from left to right - relative to the direction of stationing. Piles are to be located with respect to the centerline of construction and centerline of piers or begin (end) bridge line. Layout to indicate the stations of the intersection of the centerline piles and the profile grade line. Angles to be given between centerline piles or begin (end) bridge line, and profile grade line. Dimensions between piles to be given on a grid system.

- a. Test piles location and lengths.
- b. Summary of pile lengths if pile length is preset (generally widening jobs).

8. Construction Data

Finish grade elevations to be given at 10' increments maximum at diaphragm locations, at construction joints, at ends of spans along centerline beams or girders, at centerline roadway, at profile grade line, at gutter lines, at outside edge of copings along bridge and wingwall ends.

Typical Section through spans showing locations of elevation points.

9. Substructure

All substructures for each bridge - including end bents, intermediate bents and piers - will be numbered sequentially in order of increasing stationing.

- a. End bents.
- b. Piers or intermediate bents.
- c. Details.
 - 1) Plan - showing steps, elevations and piles.
 - 2) Elevation - showing half concrete lines and half reinforcing steel.
 - 3) Sections - cap, columns, footings, and pile layouts

10. Superstructure

- a. Superstructure spans
 - 1) Plan of superstructure..
 - 2) Half section through roadway and half end elevation.
 - 3) Pouring schedule.
- b. Superstructure Details
 - 1) Section through diaphragms.
 - 2) Construction joints.
 - 3) Deflections during pour.
 - 4) Buildups over top of beams.
 - 5) Section at end bents and intermediate supports.
 - 6) Drain details.
 - 7) Section at end bent showing end block details.

11. Beam Details (framing plans as required)

- a. Prestressed Beams
 - 1) Strand type, size, and pull.

- 2) Stirrup spacing and size.
- 3) Skew angles.
- 4) Bearing plate details.
- 5) Shielding details.
- 6) Concrete strength.
- 7) Release strength of concrete.
- 8) The use of strands pulled to 5,000 pounds in lieu of reinforcing steel to hold stirrup in position.

12. Miscellaneous Details

- a. Armor joint details and expansion joint details.

13. Standard Drawings (applicable to only one structure). See preferred order of bridge plans for multiple structures.

14. Existing Structures, as required:

Existing structure sheets should always follow the respective bridge plans, should be titled on each sheet in capital letters 'Existing Plans' and should carry sheet numbers with Prefix 'E'.

15. Repeat 5 to 14 for other structures as required for project.

16. Revisions:

All revisions shall be made on the original tracings. After the project has been let to contract, no erasures on the original will be permitted; all changes shall be circled and changes noted in the Revision Block.

CHAPTER 33
COMPUTER PROGRAMS FOR STRUCTURAL DESIGN

33.1 Available Programs

1. Cogo - solution of geometric problems.
2. Strud1 - structural design and analysis.
3. Roadway ground signs - design of ground mounted sign structures (two or three columns).
4. Steel truss - design of overhead signing truss.
5. Aluminum truss - design of overhead signing truss.
6. Type 'C' frangible tubes - design of single pole ground sign.
7. Aluminum cantilever (4 post) - design of overhead signing truss.
8. Aluminum butterfly (4 post) - design of overhead signing truss.
9. Bridge elevation - tabulation of finished grade elevations.
10. Bearing pad elevation - tabulation of elevations of bearing pads on bents.
11. Skewed bridge - three dimensional bridge geometry.
12. Reinforcing steel - tabulation and plot and weight estimation of reinforcing bars.
13. Simon - plate girder and box girder steel bridges.
14. Continuous beam (Georgia) - general program steel and concrete two (2) to eight (8) spans.
15. BC (beam construction program) - post-tensioned, segmental, cantilever design program.
16. TTI piling - TTI piling driving analysis wave equation.

17. Weap piling - wave equation analysis wave equation.
18. Pier - design and analysis bridge piers.
19. R/C column analysis - bi-axial analysis.
20. PCA R/C column - load factor bi-axial.
21. Prestressed concrete beam - design and analysis of pre-stress concrete beams.
22. Cugar II - steel curved girder analysis.
23. Curvbr - curve bridge girder analysis.

CHAPTER 34
CONSTRUCTION PLANS (SHOP DRAWINGS)

34.1 Shop Drawing Submittals

1. Construction drawings, consisting of complete field erection plans and any other working plans, showing details, dimensions, sizes of material and other information and data necessary for the complete fabrication and erection of the structure shall be submitted to the engineer for review and approval, all in accordance with the standard specifications and the provisions listed below.
 - a. Shop fabrication drawings for concrete reinforcing steel, which is detailed and listed on the project design drawings, are not required.
 - b. The F.D.D.T. allows and encourages the subcontractors to use reproducible sepias of the contract design drawings, where possible, as part of their construction drawings. Where sepias are used, the contractor is requested to change title block and clearly mark-up or indicate any changes made on the sepias when changing from design drawings to shop drawings.
 - c. Contractors and subcontractors have been urged to have their construction drawings prepared by and checked by qualified and experienced personnel, maintaining a high degree of accuracy, anything less is considered a basis for rejection of the drawings.

- d. Each construction drawing should contain the following items, as a minimum requirement: complete State Project Number, Drawing Title, Drawing Number, Date, and Place of Fabrication.
- e. Construction drawings for prestressed concrete products shall include complete shop fabrication details, a complete detensioning schedule, elongation calculations and calculations for any strand design change.
- f. Construction drawings for steel structures should include complete field and shop details and welding procedures for all prequalified welds.

2. Submittal of Drawings

- a. All construction drawings pertaining to structures which are transmitted to D.O.T., Tallahassee, should be addressed to:

Deputy Design Engineer (Structures)
Florida Department of Transportation
Haydon Burns Building, Mail Station 33
Tallahassee, Florida 32301

- b. On projects where the designer is a consulting engineer, the construction drawings may be transmitted directly to the consultant with a copy of the letter of transmittal being forwarded to the Deputy Design Engineer (Structures).
- c. The contractor should submit his construction drawings for the approval of the engineer with such promptness as to cause no delay in his fabrication schedule. Only in emergency cases should special consideration be requested.
- d. Construction drawings should be submitted for approval in the following quantities and conditions:

- 1) Prestressed concrete/items - eight (8) sets construction drawings/including beam bearing plates and four (4) sets of detensioning schedules, design calculations and elongation calculations.
- 2) Post tensioning systems - eight (8) sets of construction drawings (including calculations).
- 3) Structural steel - eight (8) sets construction drawings and four (4) copies of weld procedures.
- 4) Cofferdams constructed on railroad property - six (6) sets of cofferdam construction drawings should be submitted to the Deputy Design Engineer (Structures), D.O.T., Tallahassee. (Construction drawings for other types of cofferdams are not required unless specifically required by the contract design plans or special provisions.)
- 5) Movable bridges - eight (8) sets of construction drawings for structural steel, machinery, counterweight details and calculations, and eight (8) sets of descriptive literature and performance data for mechanical and electrical equipment and eight (8) sets of mechanical and electrical field assembly and completed assembly check-out procedures.
- 6) Overhead sign support structures - eight (8) sets of construction drawings and four (4) sets of redesign calculations if the contractor elects to use this option.
- 7) Miscellaneous items (grating, metal handrail, impact

attenuators, ladders, platforms, expansion joint armor angles, etc.) - six (6) sets of construction drawings.

8) Integral pile jackets - eight (8) sets of construction drawings.

9) Any other unusual special construction items or materials should be submitted for approval as directed by the contract design drawings or the special provisions.

3. Approval

a. The approval of the construction drawings by the D.O.T. shall be for compliance with the general design of the work as shown on the project contract drawings. The contractor shall make any corrections or resubmittals required by the D.O.T. approval, and shall be responsible for accuracy of details, dimensions compliance with contract specifications and satisfactory fit in the field.

b. The approval or non-approval of the construction drawings by the D.O.T. will be indicated by one of the following designations.

1) Approved, approved as submitted, no exceptions taken.

2) Approved as noted, approved as corrected, make corrections noted.

3) Resubmit, revise and resubmit.

4) Disapproved, rejected, not approved.

4. The approval designation shall be indicated on each and every drawing of sheet by the use of an ink stamp. This stamp shall also identify the approved (F.D.O.T. and/or Consulting Engineer

firm) and the date. All notations or corrections made on the approval prints should be consistently marked on all drawings, using a red pencil or pen.

5. Distribution of Approved Drawings

a. If the initial approval is performed by a Consulting Engineer, upon completion, he should retain one approved set of prints for his file and transmit all other sets to F.D.O.T., Tallahassee for review, stamping and distribution.

b. Final distribution is made in accordance with the following schedule:

D.O.T. Tallahassee Office File	- 1 set
D.O.T. Assigned Resident Engineer	- 2 sets
Prime Contractor	- 1 set
Subcontractor (Fabricator)	- 1 set

When prestressed concrete is involved the D.O.T. assigned Yard Inspector is furnished 2 sets; and when structural steel is involved, the D.O.T. assigned commercial testing laboratory is furnished with 2 sets.

SECTION III: PREPARATION AND ASSEMBLY OF UTILITY
CONTRACT PLANS

CHAPTER 35
CONTRACT UTILITY WORK

35.1 General

Most utility relocation work is performed by the utility owner on a force account basis. Other situations are best handled by competitive bidding under the terms of the Department's contract with the highway contractor. Such cases therefore require the proposed utility work to be included in the plans, specifications and general provisions in the same general manner and conditions as the other elements of the highway contract.

35.2 Advantages

The scheduling and coordination of utility relocation work in such a fashion as not to delay or disrupt the highway contractor in the performance of the major roadway and bridge contract requirements is required by both Department and Federal Highway Administration regulations. When utility relocation work is totally controlled by the utility owner, obvious problems can arise. Arranging for contract utility work to be done by the Department's contractor will normally

1. Reduce the quantity of personnel, equipment and material cluttering the work area at any given time.
2. Give the contractor total control of maintenance of traffic.
3. Eliminate conflicts between the contractor's schedule and the utility work schedule, thereby cancelling delay and damage claims against the Department by virtue of options under the standard specifications.

4. Reduce the cost to the Department and utility owner by eliminating duplication of charges for moving to projects and setting up construction operations, as well as separate charges for cleanup and vacating the project at the end of the contract.
5. Result in lower unit bids as compared to the alternative of a negotiated force account project.

Utility relocation work by the highway contractor is most successful when specified for projects containing work assignments most compatible with the experience and equipment common to construction of highways, storm sewers and bridges. Utility systems for water and sewer are the most adaptable. Manholes, underground duct and conduit construction for telephone and power cables can also be handled with little difficulty. Electrical and telephone systems can be covered under the Department's Contract Procedures, but such work is usually subcontracted with resulting increases in bid prices. Gas and petroleum pipe distribution systems can also be handled, but require very special attention in the specifications, plus advance approval of the Florida Public Service Commission.

35.3 Scheduling Procedures

Negotiations for Utility Joint Project Contracts are the responsibility of the District Utility Engineer according to Department Procedure 722-503. The normal sequence of activities and events is:

1. A/E 264 - Initial Statute Notice to utility owners using very preliminary construction plans and/or right of way maps.
2. Return of utility confirmation of facilities and property ownership for inclusion in roadway plans. See Section 1, Chapters

8.5 and 10.3.

3. A/E 265 - The Predesign Conference should be scheduled according to Section I, Chapter 21.2.
4. Final development of the roadway plans with notice to the District Utility Engineer at the seventy-five (75) percent completion stage for his use in providing prints to each utility agency.
5. A/E 266 - Negotiations are completed with utility agencies who now provide the specified type, size and number of utility contract drawings to the Department. These drawings are positioned correctly in the project plans assembly in conformance to Section I, Chapters 22 and 23. The designer proceeds with checking the inserted plans according to Section I, Chapter 25.3.
6. The Summary of Pay Items is completed with attention to the correct utility job number being noted on both the Summary of Quantity Sheet and the Key Sheet. This should be a 6000 series job number, as opposed to the standard 3000 series job number for the highway elements of the project.
7. The completed project plan, including the utility work portion, is submitted to the Central Office for routine processing by Design, Specifications and Contract Offices.
8. Following project letting and selection of apparent low bidder the utility owner is advised by the District Utility Engineer of the recommended unit prices. The owner can accept, or reject, this bid. If accepted, processing continues on to award and issue of the work order. If rejected, the owner must make

separate arrangements for the work while still liable for delays to the contractor's schedule. Field supervision begins with the Preconstruction Conference.

CHAPTER 36
UTILITY RESPONSIBILITY

36.1 Engineering

Following the Predesign Conference, the utility owner prepares the detail design and plans for all of the owners "utility work", and will furnish the Department complete original plans on standard size sheets (22" x 36"), all suitable for reproduction by the Department, together with a complete set of specifications covering all construction requirements for the "utility work". The final "utility work" plans shall be complete in every detail and will include a Summary of Quantities and Pay Item Sheet. The project scheduling system determines the latest date acceptable to the Department for receipt of the "utility work" plans and this date is to be incorporated in the legal agreement with the utility (Form 722-23 series) by the District Utility Engineer at the time of execution. Special attention at the Predesign Conference to scheduling dates, an acceptable plan format, and standardized pay item identification will eliminate delays at A/E 212 - Plans to Tallahassee.

36.2 Utility Pay Items

All utility owners and their consultants wishing to incorporate utility adjustment pay items into a Department contract must use the Department's standardized "Utility Pay Item Manual".

36.3 Utility Specifications

The Department's "Utility Pay Item Manual" provides sample specifications package and diagrams. Standardizing routine specifications

for normal utility fixtures and appurtenances is important both to the clarifying of the highway contract documents, as well as assuring the receipt of well balanced and competitive bids at the contract letting. Utilization of computer matched items considerably reduces the usual excess and unrelated specifications normally furnished by consultants in their attempt to cover "standard" projects with preprinted formats.

36.4 Utility Cost Estimates

The Department's Joint Project Agreement with the utility owner will specify the estimated cost of "utility work". The owner is required to submit a detailed cost estimate with the plans package for review by the Department.

36.5 Utility Cost Allocation

Reimbursement to the utility owner for the cost of "utility work" is established by State Statute 338.19 for nonreimbursable projects. The utility owner is required to deposit in advance of award of contract the estimated cost of such work, as the Department is prohibited from extending credit by advance financing. Both State and Federal projects must clearly distinguish which items of utility work are reimbursable to the owner and which items are not. Limits of Federal participation should be identified in the plans, as well as on the Pay Item Sheet.

CHAPTER 37
PLAN PREPARATION AND ASSEMBLY

37.1 General

Utility Contract Plans are processed in the same manner as any other section of the Department's standard construction plans. The routines specified in Chapters 22, 23 and 34 should be followed in principal when processing drawings for utility work as a part of the highway contract.

37.2 Assembly - When combined under same project numbers as the roadway construction

Section 22.10 and 23.9 describe the assembly routine to be followed when inserting Utility Contract Plans and Quantity Sheets in the Department's project plans. Careful attention to sheet numbering and job number assignment is important. The Utility Contract Plan - Profiles, when combined under the same Department contract as the roadway construction, will be assigned the position immediately following the Roadway Cross Section Sheets. The Utility Contract Summary of Pay Items will be positioned immediately after the Roadway Summary of Pay Items Sheet(s). The Utility Summary of Quantities should follow the Roadway Summary of Quantities Sheet.

On occasions, the amount of utility contract work to be performed by the highway contractor is small. Where reasonable, both the Utility Pay Item and Quantity Listings can be included directly on the respective sheets for the roadway work, provided reasonable space and separation is available to maintain clarity of definition between the different job numbers and federally participating items.

The proposed contract work must also be shown on the Utility Adjustment Sheets as outlined in Chapter 19. As the base sepias normally prepared from the roadway plan - profiles will not show the utility contract work, it will be necessary to draft utility work on the sepias in the same manner and using the same symbols as utility relocations being performed by others. Any conflicts in space allocation of the utility work with either elements of the roadway work, or utility work by others, should be immediately reported to the District Utility Engineer.

37.3 Assembly - When separate set of utility plans prepared under the 6000 series project number.

When the utility plans are to be prepared separately under a 6000 series project number, they should be prepared as though they were a separate set of plans. The plans should contain a Key Sheet, Summary of Pay Items, Summary of Quantities, Plan Sheets, Detail Sheets and Cross Sections if required.

When the proposed contract is being assembled (3000 series and 6000 series projects) the utility plans (6000 series) are placed after the last component of the 3000 series project. The Summary of Pay Items must be strung with the 3000 series projects and placed after the lead Key Sheet of the 3000 series project.

A note on the lead Key Sheet of the 3000 series project should be shown indicating that the 6000 series project is to be let in that contract.

Appropriate cross reference of utility plan details should be included in the 3000 series project and shown as proposed construction.

CHAPTER 38
CHECKING AND PAY ITEM ASSIGNMENTS

38.1 General

Utility Contract Plans are processed in the same manner as any other section of the Department's standard construction plans. The routine specified in Chapter 25 should be followed when checking utility contract plans that are an integral part of the highway project plans. Chapter 34 is an excellent guide for utility work involving buildings, pumping stations or other utility work of a structural nature.

38.2 Plans

Following the normal checking procedure for agreement between plan dimensions and specified quantities, a further general review of each plan-profile sheet must be completed to locate any possible conflicts with:

1. The project designed storm sewer system.
2. Other utilities that are designated either to remain in place or proposed as new facilities.
3. Proposed right of way limits for the project.
4. The design typical section and roadway construction template including sub-base and stabilization zones.

Any such conflicts located are to be immediately brought to the attention of the District Utility Engineer with the design file so noted that such action has been completed.

38.3 Pay Items

All consultants, private and public utilities, cities, counties, or others that proceed to incorporate utility adjustment pay items into a Department contract must use the Department's standard "Utility Master Pay Item Manual". This Manual is available in the office of District Design Engineers. Any problems concerning Pay Items should be first approached jointly by the District Computer Estimating System (C.E.S.) Coordinator, the District Utility Engineer and the Design Squad Chief responsible for the project in question. If still unresolved, contract should be made with the Preliminary Estimates Engineer at the Central Office.

The "Utility Pay Item Manual" must be utilized in checking the Summary of Pay Items Sheet(s), before releasing the plans to the Central Office. All Utility Pay Items should be loaded into the CES System for any utility construction contract. Design Group 29 should be used for all such pay items.

CHAPTER 39
PROCESSING FOR CONTRACT

39.1 General

Utility Contract Plans are processed in the same manner as any other type of Department construction contracts. Scheduling problems will arise if constant control over the utility owner's plans is not maintained. Continuous communication with the owner and/or consultant is required to maintain prescribed scheduling dates. The biweekly update of the MPSS reporting system should be gauged to complete Activity/Event 212 (Plans & R/W to Tallahassee) on time.

39.2 Pre-Letting

The design squad must insure the utility estimate is complete. The estimate is next compared with an independent estimate from the Department's Computer Estimating System to see if both estimates favorably compare prior to further processing of the plans package under A/E 212.

Special Provisions submitted with the owner's Utility Contract Plans are edited in accord with the "Utility Master Pay Item Manual" and forwarded to the Central Office with the complete plans package.

A separate check set of utility contract prints, including project Key Sheet, plus a copy of any revised specifications is furnished the District Utility Engineer for his transmittal to the owner for final concurrence simultaneously with release of the original plans package to the Central Office. The District Utility Engineer must immediately provide this information to the owner and thereafter coordinate any last changes following the guidelines in Chapter 26.

39.3 Bid Review

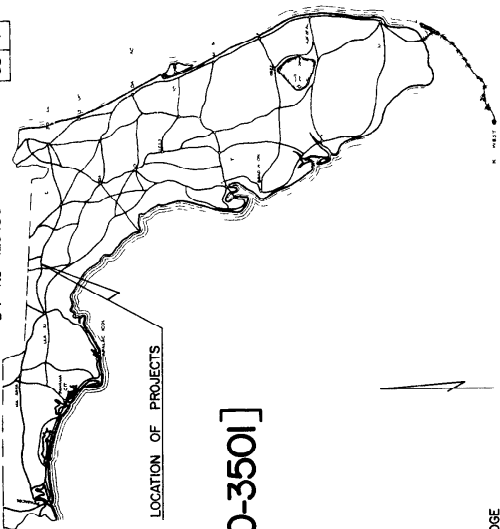
The Utility Joint Project Agreement (Form 722-23 Series) provides for final review of the utility owner prior to award of contract. The bid tabulations involving utility contract pay items are reviewed with the utility owner by the District Utility Engineer as promptly as possible following compilation of bids by the Department's Contract Officer. (Note The tabulations are not for public release and are not authorized to be copied and distributed.)

Following acceptance by the owner, the Award of Contract is issued and responsibility turned to the District Office to proceed with the scheduling of the Preconstruction Conference and issuance of the Contract Work Order.

39.4 Pre-Construction Conference

A complete copy of the legal agreement with the utility owner is provided the District Construction Office by the District Utility Engineer. The Department's Construction Personnel set the Preconstruction Conference date when all aspects of the utility work and scheduling will be reviewed jointly with the project contractor and utility owner. On complex utility work, the Department's District Design and Utility Office may be invited to furnish representatives to this conference to settle questions on limits of reimbursement, record keeping and design work required by any field changes.

SECTION IV: EXHIBITS



LOCATION OF PROJECTS

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED

STATE HIGHWAY

F.A. PROJ. NO. F-123-4(5) [STATE PROJ. NO. 00000-3501]
AND STATE PROJ. NO. 00001-3502
BROWN COUNTY
STATE ROAD NOS 201 & 102

THIS CONTRACT PLAN SET INCLUDES

- SUMMARY OF PAY ITEMS (4 SHEETS)
- ROADWAY PLANS
- SIGNING AND PAVEMENT MARKING PLANS
- STRUCTURE PLANS

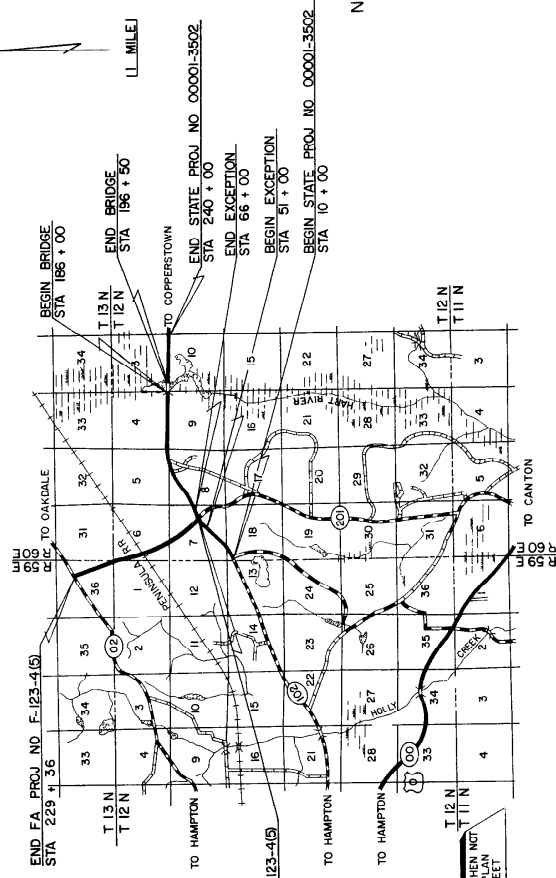
A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH GROUP OF PLANS

INDEX OF ROADWAY PLANS

SHEET NO	SHEET DESCRIPTION
1	KEY SHEET
2	DRAINAGE MAP
3	TYPICAL SECTION
4-5	SUMMARY OF QUANTITIES
6-10	PLAN AND PROFILE SHEETS
11-13	INTERSECTION DETAILS
14-17	DRAINAGE STRUCTURES
18-33	ROADWAY CROSS SECTIONS
34-38	UTILITY ADJUSTMENTS
39-44	SELECTIVE CLEARING AND GRUBBING
45-46	MISCELLANEOUS CONSTRUCTION DETAILS

ROAD DESIGN STANDARDS (BOOKLET DATED JANUARY 1980)

- 001 STANDARD ABBREVIATIONS
- 002 STANDARD SYMBOLS
- 230 DITCH BOTTOM INLET - TYPE A
- 250 STRAIGHT CONCRETE ENDWALLS
- 261 U-TYPE CONCRETE ENDWALLS
- 280 MISCELLANEOUS DRAINAGE DETAILS
- 281 DITCH PAVEMENT AND SODDING
- 400 GUARDRAIL
- 505 EMBANKMENT UTILIZATION
- 510 SUPERELEVATION
- 515 TURNOUTS



1/4 MILE



RR Crossing No 00000000K

REQUIRED WHEN NOT SHOWN ON PLAN PROFILE SHEET

- REVISIONS
- Roadway Sheets 01 02 1 6 7 8 13 (Revised 7-9-79)
 - Signing and Pavement Marking Sheets 01 5 2 6 9 3 7 (Revised 7 13 79)
 - Structure Sheets 01 02 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 (Revised 1 04 80)
 - Roadway Plans Completely Revised 1-24 80
 - Roadway Sheets 01 02 14 6 33 (Revised 1-30-80)

	00000-3501		00001-3502		TOTAL	
	LN. FT.	MILES	LN. FT.	MILES	LN. FT.	MILES
ROADWAY	12,836.00	2.450	20,450.00	3.873	33,286.00	6.323
BRIDGES	0.00	0.000	1,050.00	0.199	1,050.00	0.199
NET LENGTH OF PROJECT	12,836.00	2.450	21,500.00	4.072	34,436.00	6.522
EXCEPTIONS	0.00	0.000	1,500.00	0.284	1,500.00	0.284
GROSS LENGTH OF PROJECT	12,836.00	2.450	23,000.00	4.356	35,936.00	6.806

NAME OF FOOT PROJECT MANAGER WHEN PLANS PREPARED BY CONSULTANT FIRM
NAME OF FOOT DESIGNER WHEN PLANS PREPARED BY DEPARTMENT

NAME OF CONSULTANT FIRM WHEN PLANS PREPARED BY CONSULTANT

NOTE THESE PROJECTS TO BE LET TO CONTRACT WITH STATE PROJECTS NOS 00000-6501 AND 00001-6502 (UTILITY PLANS)

Revised 7 9 79
ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE FROM THE ORIGINAL DATA CONSIDERED WHEN OBTAINING SCALED DATA

CONVENING SPECIFICATIONS STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS DATED 1977 AND SUPPLEMENTS THERETO IF NOTED IN THE SPECIAL PROVISIONS FOR THIS PROJECT SUBMITTED BY

DIRECTOR OF ROAD OPERATIONS
APPROVED _____ DATE _____
DIVISION ADMINISTRATOR
FEDERAL HIGHWAY ADMINISTRATION

STATE PROJ. NO. 00000-0000
EARLY COUNTY

STATE ROAD NO 000

500 LEROY GUIDE
PEN SIZE 6

350 LEROY GUIDE
PEN SIZE 5

STATE PROJECT
ONLY

STATE PROJ. NOS. 00000-0000 AND 00000-0000
UPSON AND HURST COUNTY

STATE ROAD NO 000

TWO STATE PROJECTS
(TWO COUNTIES SHOWN)

F.A. PROJ. NO. M-000-0(00) [STATE PROJ. NO. 00000-00000]
RUSH COUNTY

STATE ROAD NO 000

F.A. PROJECT AND
STATE PROJECT

F.A. PROJ. NO. BR-000-0(00) [STATE PROJ. NOS. 00000-0000
AND 00000-00000]
PIKE COUNTY

STATE ROAD NO 000

F.A. PROJECT AND TWO STATE PROJECTS
(ONE COUNTY SHOWN)

F.A. PROJ. NO. F-000-0(00) [STATE PROJ. NO. 00000-00000]
AND STATE PROJ. NO. 00000-0000
BARNES COUNTY

STATE ROAD NOS 000 & 000

F.A. PROJECT AND STATE PROJECT
AND SEPARATE STATE PROJECT

F.A. PROJ NO. U-000-0(00) [STATE PROJ. NO. 00000-0000]
F.A. PROJ. NO. T-000-0(00) [STATE PROJ. NO. 00000-0000]
HALL COUNTY

STATE ROAD NO 000

TWO F.A. PROJECTS AND
TWO STATE PROJECTS

F.A. PROJ NO. I-00-0(00)000 [STATE PROJ. NO. 00000-00000]
BOONE COUNTY

STATE ROAD NO 000

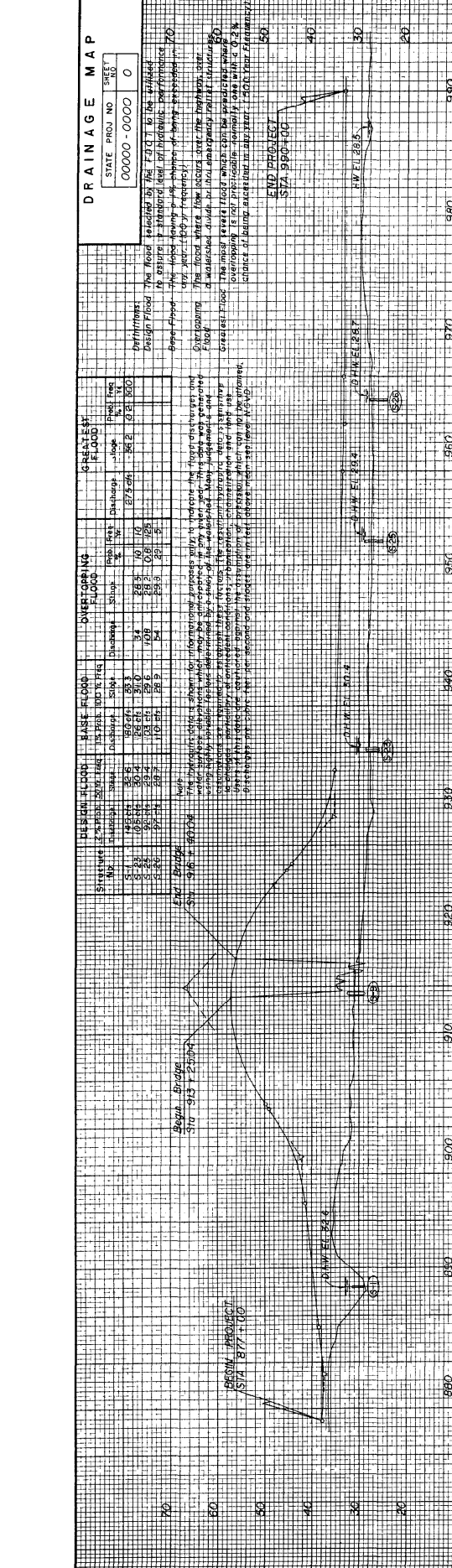
F.A. PROJECT-INTERSTATE

DRAINAGE MAP

STATE PROJ. NO.	SHEET
00000-0000	0

The flood elevations shown on this map are based on the Flood Insurance Rate Study (FIRS) for the United States, which was prepared by the Federal Emergency Management Agency (FEMA) in cooperation with the National Flood Insurance Administration (NFIA). The flood elevations are based on the Flood Insurance Rate Study (FIRS) for the United States, which was prepared by the Federal Emergency Management Agency (FEMA) in cooperation with the National Flood Insurance Administration (NFIA). The flood elevations are based on the Flood Insurance Rate Study (FIRS) for the United States, which was prepared by the Federal Emergency Management Agency (FEMA) in cooperation with the National Flood Insurance Administration (NFIA).

DESIGN FLOOD	BASE FLOOD	OVERFLOWING FLOOD	PRELIMINARY FLOOD
100 Year	100 Year	100 Year	100 Year
500 Year	500 Year	500 Year	500 Year
1000 Year	1000 Year	1000 Year	1000 Year



- ① 18 CMP N FL 35.35 E FL 26.64
- ② 24 CMP W FL 32.26 E FL 26.38
- ③ 18 CMP W FL 35.64 E FL 25.91
- ④ 18 CMP W FL 35.14 E FL 25.79
- ⑤ 18 CMP W FL 34.84 E FL 25.44
- ⑥ 24 CMP W FL 32.26 E FL 26.38
- ⑦ 18 CMP W FL 35.64 E FL 25.91
- ⑧ 18 CMP W FL 35.14 E FL 25.79
- ⑨ 18 CMP W FL 34.84 E FL 25.44
- ⑩ 24 CMP W FL 32.26 E FL 26.38
- ⑪ 18 CMP W FL 35.64 E FL 25.91
- ⑫ 18 CMP W FL 35.14 E FL 25.79
- ⑬ 18 CMP W FL 34.84 E FL 25.44
- ⑭ 24 CMP W FL 32.26 E FL 26.38
- ⑮ 18 CMP W FL 35.64 E FL 25.91
- ⑯ 18 CMP W FL 35.14 E FL 25.79
- ⑰ 18 CMP W FL 34.84 E FL 25.44
- ⑱ 24 CMP W FL 32.26 E FL 26.38
- ⑲ 18 CMP W FL 35.64 E FL 25.91
- ⑳ 18 CMP W FL 35.14 E FL 25.79
- ㉑ 18 CMP W FL 34.84 E FL 25.44
- ㉒ 24 CMP W FL 32.26 E FL 26.38
- ㉓ 18 CMP W FL 35.64 E FL 25.91
- ㉔ 18 CMP W FL 35.14 E FL 25.79
- ㉕ 18 CMP W FL 34.84 E FL 25.44
- ㉖ 24 CMP W FL 32.26 E FL 26.38
- ㉗ 18 CMP W FL 35.64 E FL 25.91
- ㉘ 18 CMP W FL 35.14 E FL 25.79
- ㉙ 18 CMP W FL 34.84 E FL 25.44
- ㉚ 24 CMP W FL 32.26 E FL 26.38
- ㉛ 18 CMP W FL 35.64 E FL 25.91
- ㉜ 18 CMP W FL 35.14 E FL 25.79
- ㉝ 18 CMP W FL 34.84 E FL 25.44
- ㉞ 24 CMP W FL 32.26 E FL 26.38
- ㉟ 18 CMP W FL 35.64 E FL 25.91
- ㊱ 18 CMP W FL 35.14 E FL 25.79
- ㊲ 18 CMP W FL 34.84 E FL 25.44
- ㊳ 24 CMP W FL 32.26 E FL 26.38
- ㊴ 18 CMP W FL 35.64 E FL 25.91
- ㊵ 18 CMP W FL 35.14 E FL 25.79
- ㊶ 18 CMP W FL 34.84 E FL 25.44
- ㊷ 24 CMP W FL 32.26 E FL 26.38
- ㊸ 18 CMP W FL 35.64 E FL 25.91
- ㊹ 18 CMP W FL 35.14 E FL 25.79
- ㊺ 18 CMP W FL 34.84 E FL 25.44
- ㊻ 24 CMP W FL 32.26 E FL 26.38
- ㊼ 18 CMP W FL 35.64 E FL 25.91
- ㊽ 18 CMP W FL 35.14 E FL 25.79
- ㊾ 18 CMP W FL 34.84 E FL 25.44
- ㊿ 24 CMP W FL 32.26 E FL 26.38

DRAINAGE MAP

STATE PROJ. NO.	5185
00000-0000	0

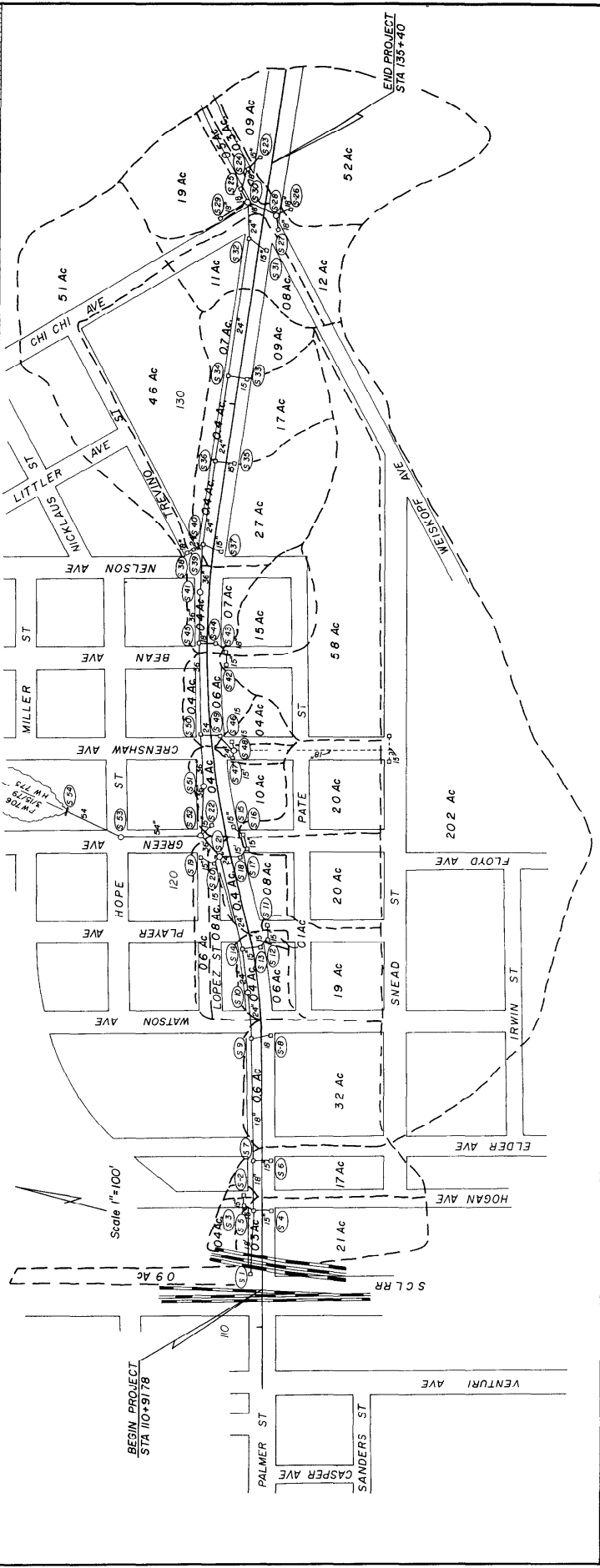
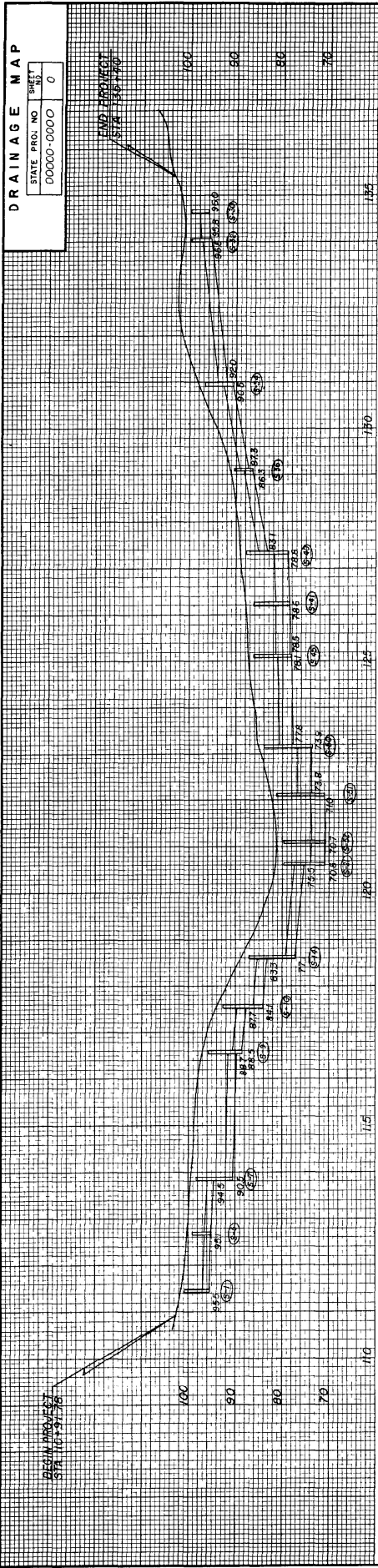
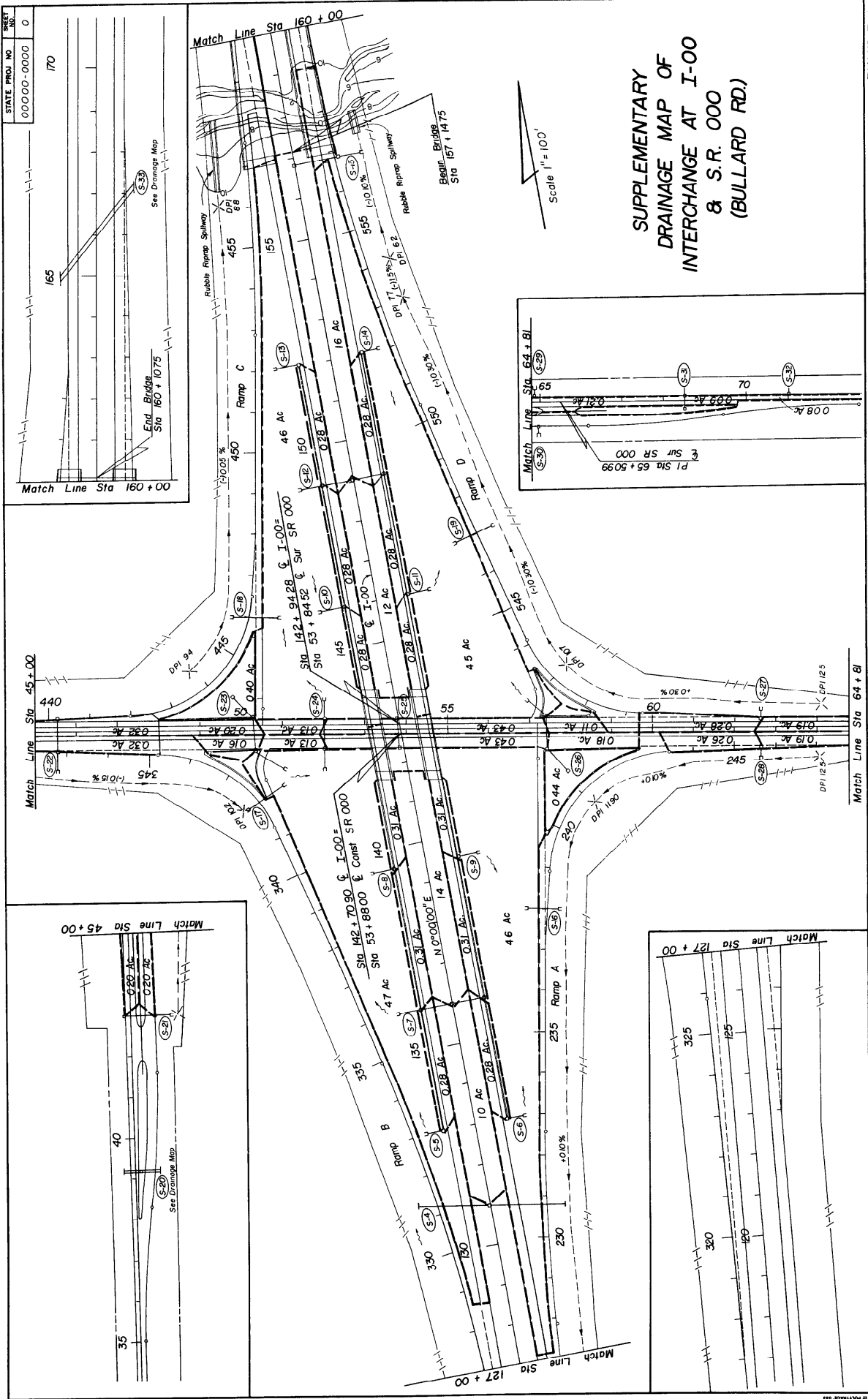


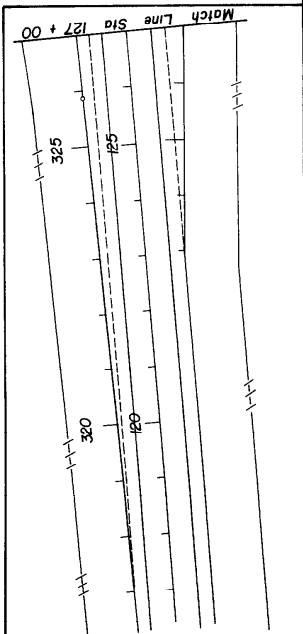
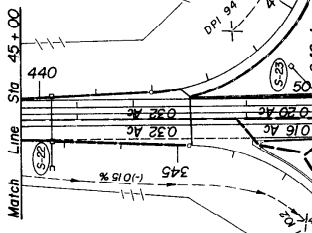
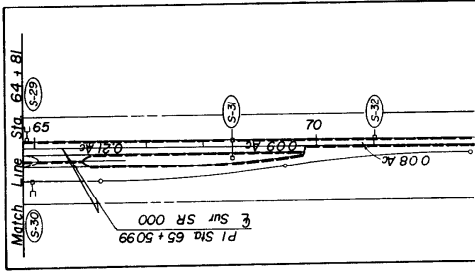
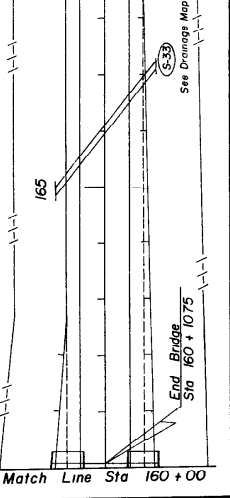
EXHIBIT 4

STATE PROJ NO	00000-0000
SHEET NO	0

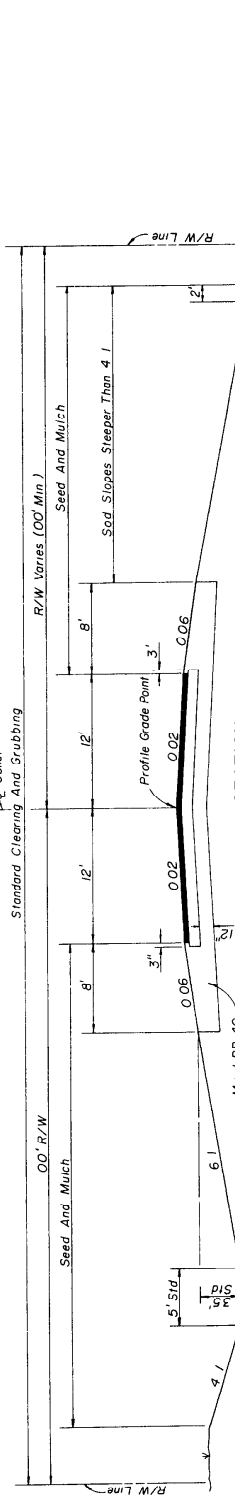


**SUPPLEMENTARY
DRAINAGE MAP OF
INTERCHANGE AT I-00
& S.R. 000
(BULLARD RD.)**

Scale 1" = 100'



2-LANE UNDIVIDED



TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

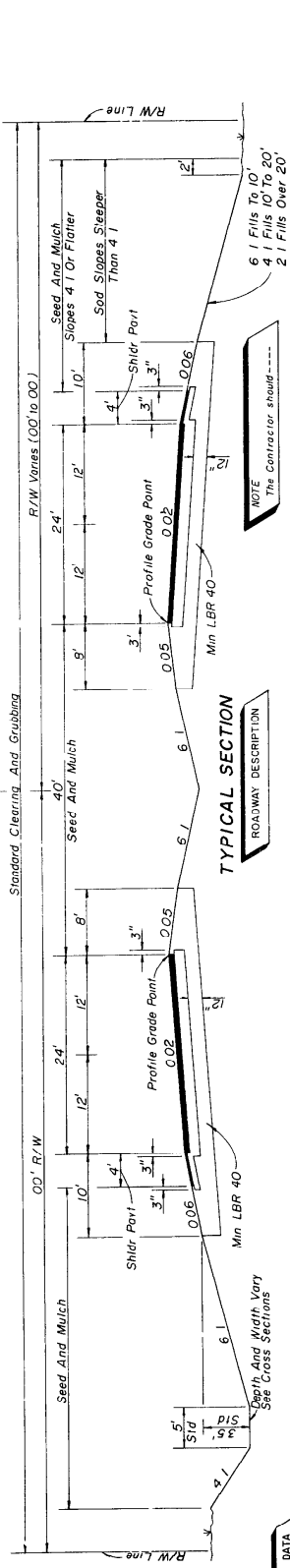
TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

TYPICAL SECTION
OPTIONAL BASE GROUP 5 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-1 OR FC-4 (1 1/2") ALT. A OR TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1 1/2") ALT. B
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
161 LIMEROCK BASE COURSE
165 5/8" ASPHALT BASE COURSE (TYPE 1)
166 5/8" ASPHALT BASE COURSE (TYPE 2)
167 4" ASPHALT BASE COURSE (TYPE 3)
FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 500, 505 B 510

NOTE
ALL PAVEMENT DESCRIPTION
FOR EXAMPLE ONLY

4-LANE DIVIDED



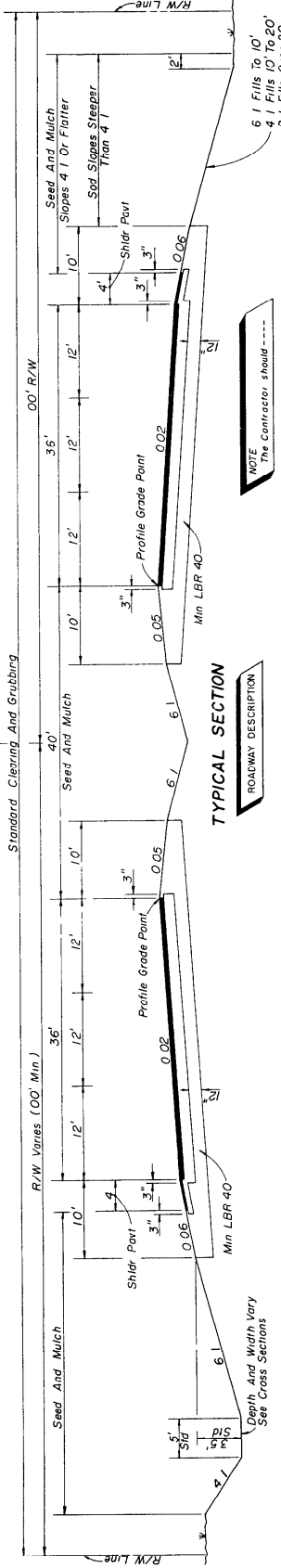
NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

6-LANE DIVIDED



NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

NOTE
The Contractor should identify the proposed option on which the initial bid is based by entering the three-digit optional base item on the submitted bid proposal.

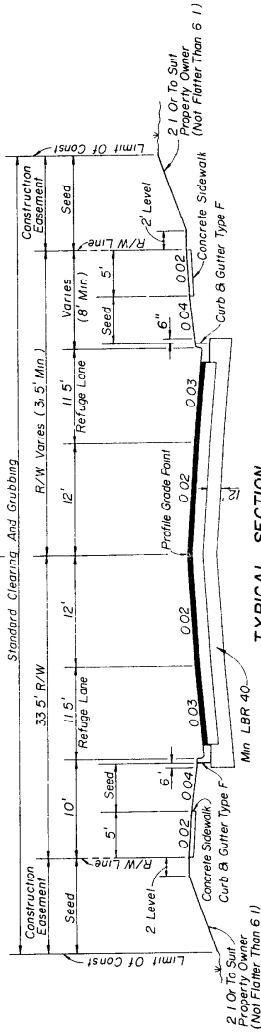
RURAL

TYPICAL SECTION(S)

TRAFFIC DATA

TRAFFIC DATA

2-LANE UNDIVIDED



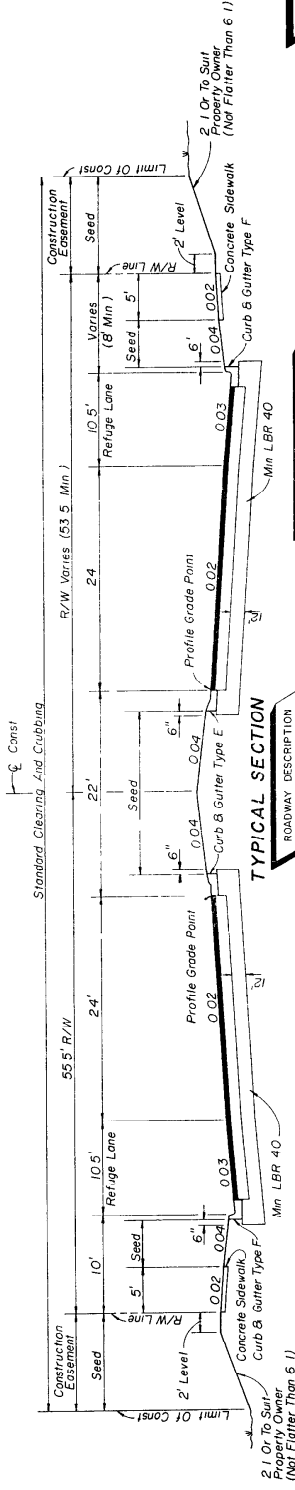
TYPICAL SECTION

OPTIONAL BASE GROUP 7 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (1 1/2" AND FRICTION COURSE FC-1 OR FC-4 (1"))
 OPTIONAL BASE COURSES PERMITTED: OPTION CODE
 10" LIMEROCK BASE COURSE 241
 7" ASPHALT BASE COURSE (TYPE 1) 245
 6" ASPHALT BASE COURSE (TYPE 2) 246
 4" ASPHALT BASE COURSE (TYPE 3) 247
 FOR ADDITIONAL DETAILS SEE INDEX NOS 300, 303, 304, 500, 511 & 515

19 --- ADT =
 19 --- ADT =
 20 --- ADT =
 K = ---%, D = ---%, T = ---
 Design Speed --- MPH

NOTE
 The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code number at the top of the bid. The number of optional base items on the submitted bid is a proposal.

4-LANE DIVIDED



TYPICAL SECTION

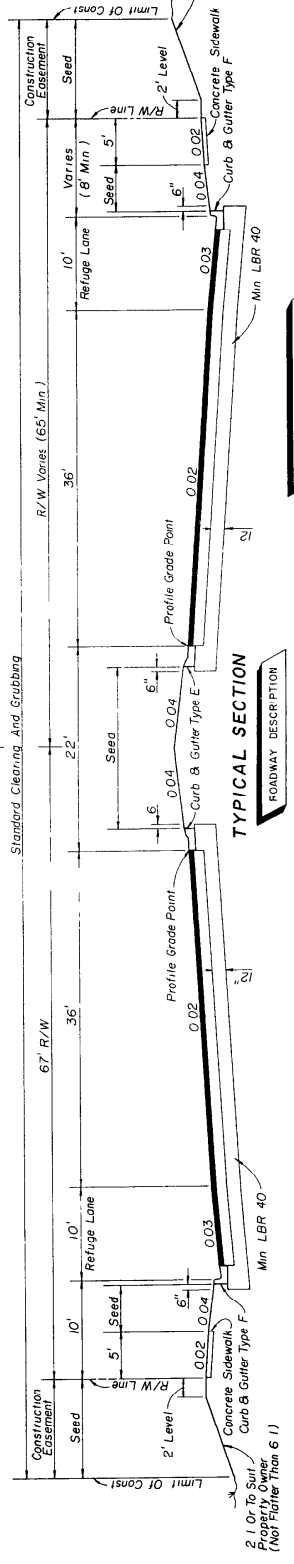
ROADWAY DESCRIPTION

TRAFFIC DATA

NOTE
 The Contractor should

NOTE
 ALL PAVEMENT DESCRIPTIONS FOR EXHIBIT 7

6-LANE DIVIDED



TYPICAL SECTION

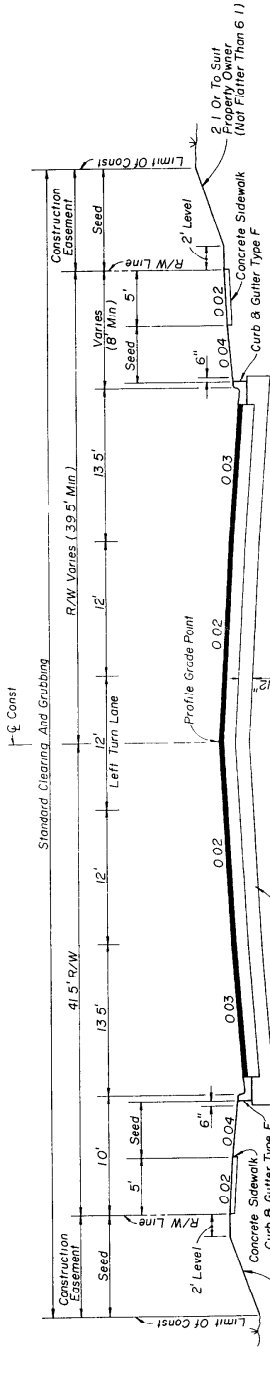
ROADWAY DESCRIPTION

TRAFFIC DATA

NOTE
 The Contractor should

NOTE
 ALL PAVEMENT DESCRIPTIONS FOR EXHIBIT 7

4-LANES UNDIVIDED

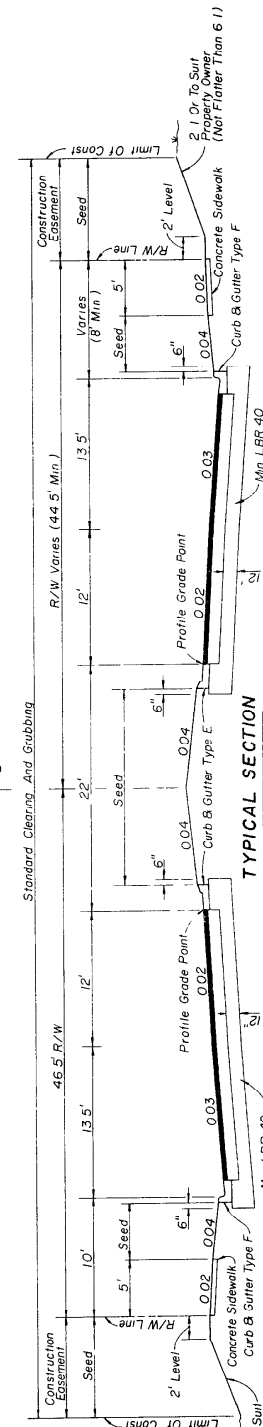


TYPICAL SECTION

OPTIONAL BASE GROUP 1 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (TYPE 1) AND FRICTION COURSE FC-2 (4") ALT. A OR TYPE S STRUCTURAL COURSE (TYPE 2) AND FRICTION COURSE FC-2 (4")
 10" LIME ROCK BASE COURSE PERMITTED
 OPTION CODE
 241 LIME ROCK BASE COURSE (TYPE 1)
 245 ASPHALT BASE COURSE (TYPE 2)
 246 ASPHALT BASE COURSE (TYPE 2)
 247 ASPHALT BASE COURSE (TYPE 3)
 FOR ADDITIONAL DETAILS SEE INDEX NGS 300, 303, 304, 500, 511 & 515

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

TYPICAL SECTION

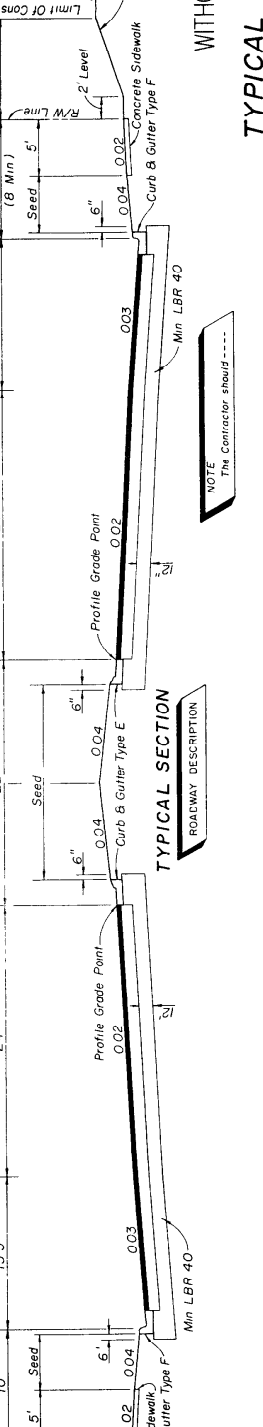


TYPICAL SECTION

OPTIONAL BASE GROUP 1 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (TYPE 1) AND FRICTION COURSE FC-2 (4") ALT. A OR TYPE S STRUCTURAL COURSE (TYPE 2) AND FRICTION COURSE FC-2 (4")
 10" LIME ROCK BASE COURSE PERMITTED
 OPTION CODE
 241 LIME ROCK BASE COURSE (TYPE 1)
 245 ASPHALT BASE COURSE (TYPE 2)
 246 ASPHALT BASE COURSE (TYPE 2)
 247 ASPHALT BASE COURSE (TYPE 3)
 FOR ADDITIONAL DETAILS SEE INDEX NGS 300, 303, 304, 500, 511 & 515

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

TYPICAL SECTION



TYPICAL SECTION

OPTIONAL BASE GROUP 1 (FOR THICKNESS, SEE BELOW) WITH EITHER TYPE S STRUCTURAL COURSE (TYPE 1) AND FRICTION COURSE FC-2 (4") ALT. A OR TYPE S STRUCTURAL COURSE (TYPE 2) AND FRICTION COURSE FC-2 (4")
 10" LIME ROCK BASE COURSE PERMITTED
 OPTION CODE
 241 LIME ROCK BASE COURSE (TYPE 1)
 245 ASPHALT BASE COURSE (TYPE 2)
 246 ASPHALT BASE COURSE (TYPE 2)
 247 ASPHALT BASE COURSE (TYPE 3)
 FOR ADDITIONAL DETAILS SEE INDEX NGS 300, 303, 304, 500, 511 & 515

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

4-LANE DIVIDED

6-LANE DIVIDED

URBAN WITHOUT REFUGE LANES

TYPICAL SECTION(S)

NOTE: PRESENT DESCRIPTION FOR EXAMPLE ONLY

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

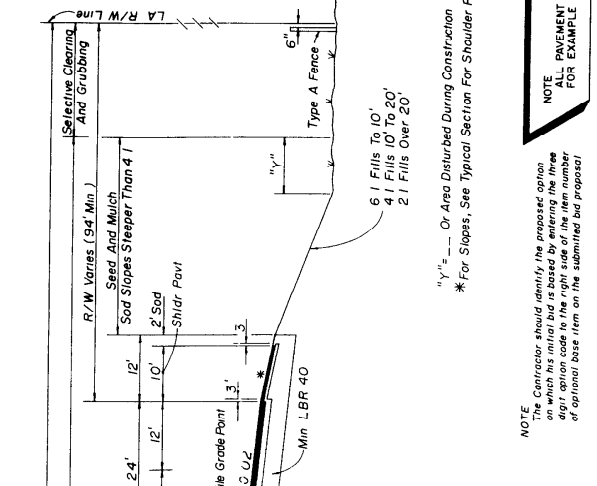
NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.

TRAFFIC DATA

TRAFFIC DATA

4-LANE



TYPICAL SECTION
 STA 1461+26 to STA 1488+00
 STAGE I CONSTRUCTION
 OPTIONAL BASE GROUP 1 (1 1/2" THICKNESS-SEE BELOW) WITH TYPE S STRUCTURAL COURSE (4") AND FRICTION COURSE FC-2 (1/2")

- OPTIONAL BASE COURSES PERMITTED
- | OPTIONAL BASE COURSE | OPTION CODE |
|-----------------------------------|-------------|
| 10" LIMEROCK BASE COURSE (TYPE 1) | 241 |
| 7" ASPHALT BASE COURSE (TYPE 2) | 245 |
| 5" ASPHALT BASE COURSE (TYPE 3) | 246 |
| 5" ASPHALT BASE COURSE (TYPE 3) | 247 |
- STAGE II CONSTRUCTION (NOT IN CONTRACT)
 LEVELING COURSE (TYPE III AC 100 LBS/SY AVG.) WITH TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-2 (1/2")

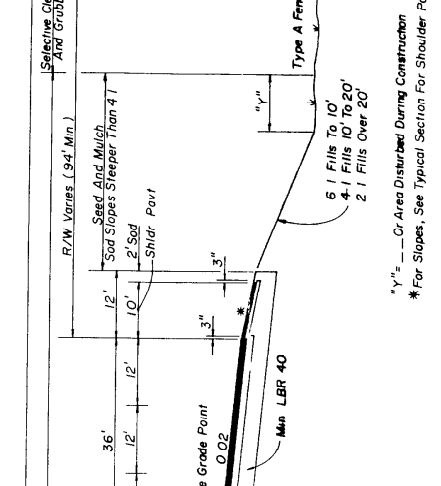
NOTE: The Contractor should identify the proposed option in the bid with the appropriate option code to the right side of the item number of optional base item on the submitted bid proposal.

FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 450, 505, 510 & 525

NOTE: The Contractor should identify the proposed option in the bid with the appropriate option code to the right side of the item number of optional base item on the submitted bid proposal.

FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 450, 505, 510 & 525

6-LANE



TYPICAL SECTION
 STA 1488+00 to STA 1540+00
 STAGE I CONSTRUCTION
 OPTIONAL BASE GROUP 7 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (4") AND FRICTION COURSE FC-2 (1/2")

- OPTIONAL BASE COURSES PERMITTED
- | OPTIONAL BASE COURSE | OPTION CODE |
|-----------------------------------|-------------|
| 10" LIMEROCK BASE COURSE (TYPE 1) | 241 |
| 7" ASPHALT BASE COURSE (TYPE 2) | 245 |
| 5" ASPHALT BASE COURSE (TYPE 3) | 246 |
| 5" ASPHALT BASE COURSE (TYPE 3) | 247 |
- STAGE II CONSTRUCTION (NOT IN CONTRACT)
 LEVELING COURSE (TYPE III AC 100 LBS/SY AVG.) WITH TYPE S STRUCTURAL COURSE (1 1/2") AND FRICTION COURSE FC-2 (1/2")

NOTE: The Contractor should identify the proposed option in the bid with the appropriate option code to the right side of the item number of optional base item on the submitted bid proposal.

FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 450, 505, 510 & 525

NOTE: The Contractor should identify the proposed option in the bid with the appropriate option code to the right side of the item number of optional base item on the submitted bid proposal.

FOR ADDITIONAL DETAILS SEE INDEX NOS 281, 400, 450, 505, 510 & 525

INTERSTATE

TYPICAL SECTION(S)

EXHIBIT 9

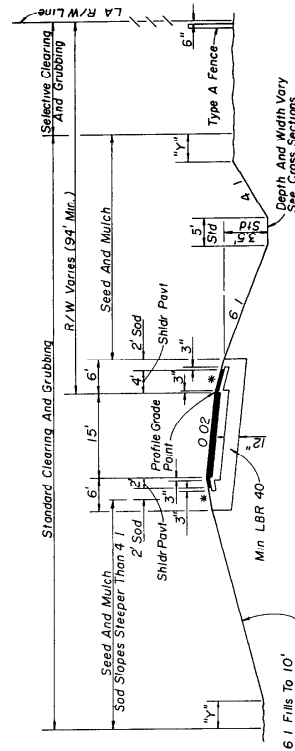
NOTE: ALL PAVEMENT DESCRIPTIONS FOR EXAMPLE ONLY

*'y'' = Cr Area Disturbed During Construction
 *For Slopes, See Typical Section For Shoulder Pavement

*'y'' = Cr Area Disturbed During Construction
 *For Slopes, See Typical Section For Shoulder Pavement

19 --- ADT =
 19 --- ADT =
 20 --- ADT =
 K = --- % , D = --- % , T = --- % (24 Hr)
 Design Speed --- MPH

19 --- ADT =
 19 --- ADT =
 20 --- ADT =
 K = --- % , D = --- % , T = --- % (24 Hr)
 Design Speed --- MPH

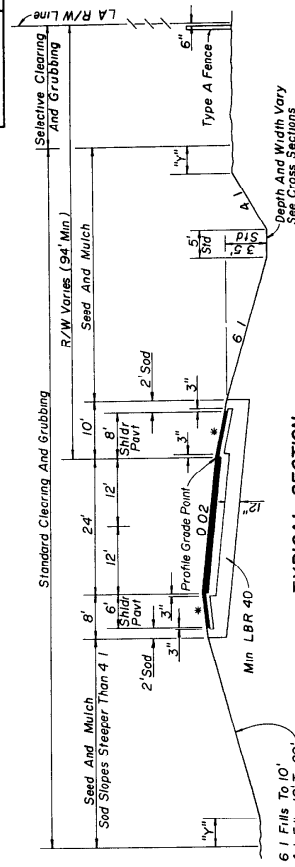


6:1 Fills To 10'
4:1 Fills 10' To 20'
2:1 Fills Over 20'

TYPICAL SECTION
SINGLE LANE RAMP

STAGE I CONSTRUCTION
OPTIONAL BASE GROUP 7 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1/2")
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
241 10" LIMEROCK BASE COURSE (TYPE 1)
245 7" ASPHALT BASE COURSE (TYPE 2)
246 6" ASPHALT BASE COURSE (TYPE 3)
247 5" ASPHALT BASE COURSE (TYPE 3)

STAGE II CONSTRUCTION (NOT IN CONTRACT)
LEVELING COURSE (TYPE III AC, 100 LBS/SY AVG) WITH TYPE S STRUCTURAL COURSE (1/2") AND FRICTION COURSE FC-2 (1/2")

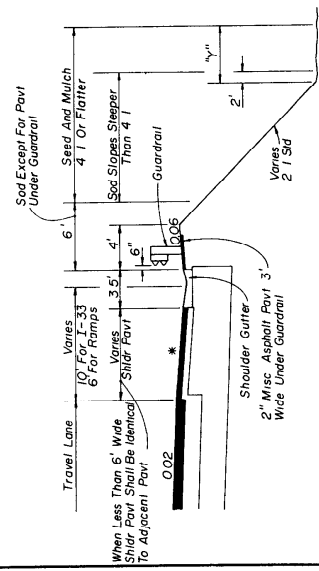


6:1 Fills To 10'
4:1 Fills 10' To 20'
2:1 Fills Over 20'

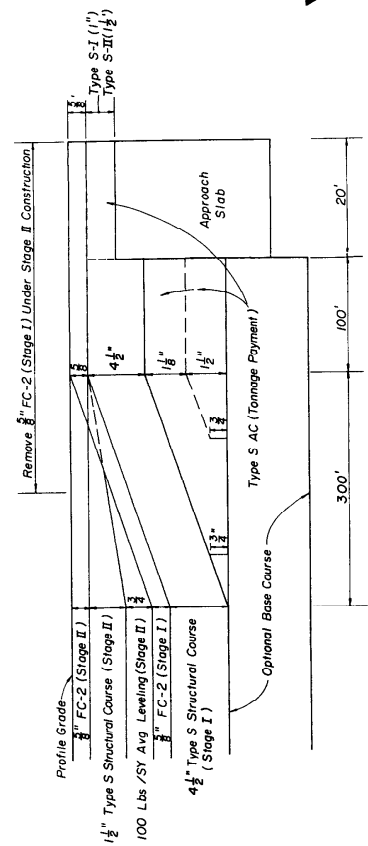
TYPICAL SECTION
TWO LANE RAMP

STAGE I CONSTRUCTION
OPTIONAL BASE GROUP 7 (FOR THICKNESS, SEE BELOW) WITH TYPE S STRUCTURAL COURSE (2") AND FRICTION COURSE FC-2 (1/2")
OPTIONAL BASE COURSES PERMITTED
OPTION CODE
241 10" LIMEROCK BASE COURSE (TYPE 1)
245 7" ASPHALT BASE COURSE (TYPE 2)
246 6" ASPHALT BASE COURSE (TYPE 3)
247 5" ASPHALT BASE COURSE (TYPE 3)

STAGE II CONSTRUCTION (NOT IN CONTRACT)
LEVELING COURSE (TYPE III AC, 100 LBS/SY AVG) WITH TYPE S STRUCTURAL COURSE (1/2") AND FRICTION COURSE FC-2 (1/2")



TYPICAL SECTION
SHOULDER PAVEMENT AND SHOULDER GUTTER

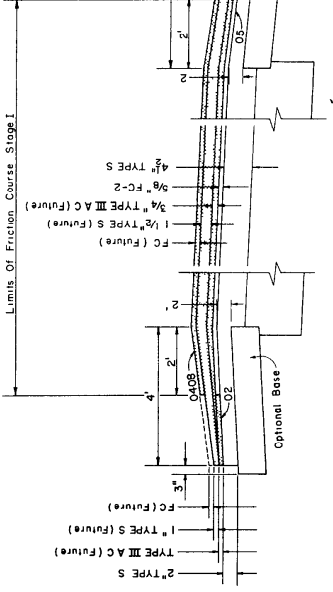


STAGE CONSTRUCTION AT BRIDGE APPROACHES

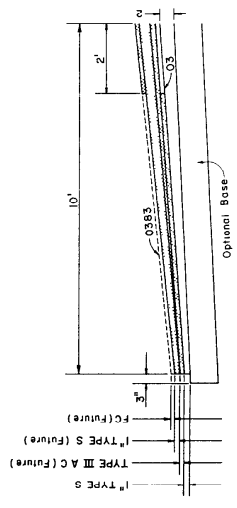
INTERSTATE
RAMPS & STAGE CONSTRUCTION
TYPICAL SECTION(S)

NOTE
ALL PAVEMENT DESCRIPTION
FOR EXAMPLE ONLY

"y" - Or Area Disturbed During Construction
* For Slopes, See Typical Section For Shoulder Pavement
Note
Stage I finished grade is 2" lower than the profile grade as shown in the plans except at bridge approaches



ROADWAY SHOULDERS I-00



ROADWAY SECTION FOR 10' PAVED MEDIAN SHOULDER

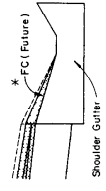
OPTIONAL BASE COURSES PERMITTED

4" LIMEROCK BASE	001
4" ASPHALT BASE COURSE (TYPE 1)	005
4" ASPHALT BASE COURSE (TYPE 2)	006
4" ASPHALT BASE COURSE (TYPE 3)	007
4" SAND ASPHALT HOT MIX	014
4 1/2" BANK RUN SHELL BASE	004

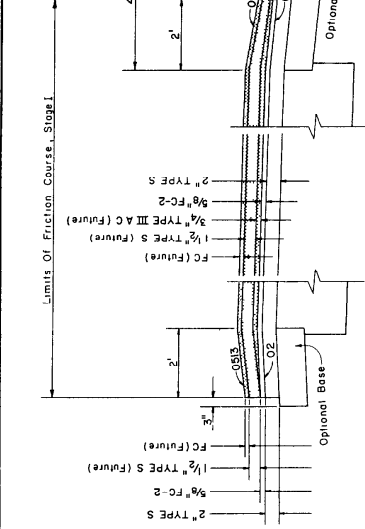
OPTIONAL BASE COURSES PERMITTED

4" LIMEROCK BASE	001
4" ASPHALT BASE COURSE (TYPE 1)	005
4" ASPHALT BASE COURSE (TYPE 2)	006
4" ASPHALT BASE COURSE (TYPE 3)	007
4" SAND ASPHALT HOT MIX	014
4 1/2" BANK RUN SHELL BASE	004

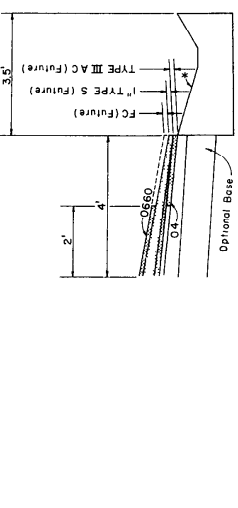
NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.



Shoulder Gutter



RAMP SHOULDERS



RAMP SECTION AT SHOULDER GUTTER

OPTIONAL BASE COURSES PERMITTED

4" LIMEROCK BASE	001
4" ASPHALT BASE COURSE (TYPE 1)	005
4" ASPHALT BASE COURSE (TYPE 2)	006
4" ASPHALT BASE COURSE (TYPE 3)	007
4" SAND ASPHALT HOT MIX	014
4 1/2" BANK RUN SHELL BASE	004

OPTIONAL BASE COURSES PERMITTED

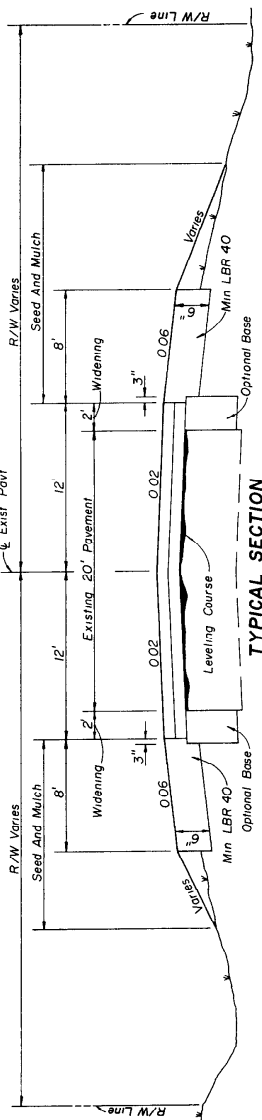
4" LIMEROCK BASE	001
4" ASPHALT BASE COURSE (TYPE 1)	005
4" ASPHALT BASE COURSE (TYPE 2)	006
4" ASPHALT BASE COURSE (TYPE 3)	007
4" SAND ASPHALT HOT MIX	014
4 1/2" BANK RUN SHELL BASE	004

TYPICAL SECTIONS FOR SHOULDER PAVEMENT I-00 AND RAMP

'NOT TO SCALE'

NOTE: ALL PAVEMENT DESCRIPTION FOR EXAMPLE ONLY

2-LANE UNDIVIDED



TYPICAL SECTION

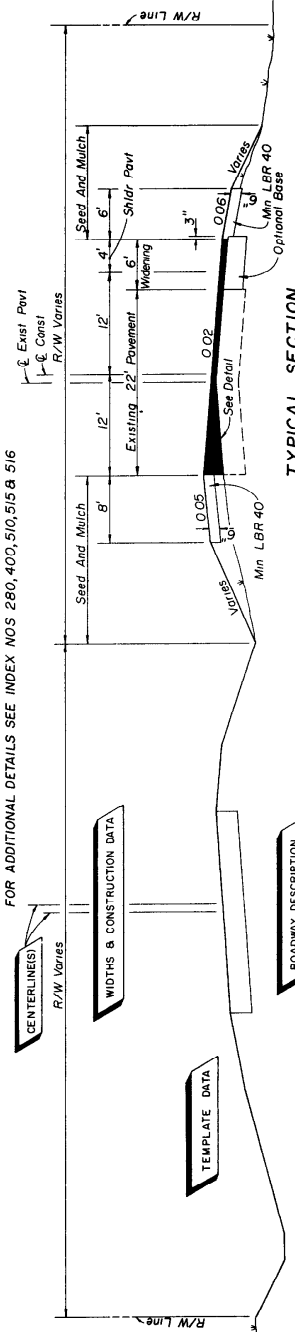
RESURFACING
 TYPE S LEVELING COURSE (75 LBS/SY AVG.) WITH EITHER
 TYPE S STRUCTURAL COURSE (150 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1") ALT. A OR
 TYPE S STRUCTURAL COURSE (200 LBS/SY) AND FRICTION COURSE FC-2 (1") ALT. B

WIDENING
 OPTIONAL BASE GROUP 9 (FOR THICKNESS, SEE BELOW) WITH EITHER
 TYPE S STRUCTURAL COURSE (150 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1") ALT. A OR
 TYPE S STRUCTURAL COURSE (200 LBS/SY) AND FRICTION COURSE FC-2 (1") ALT. B

OPTIONAL BASE COURSES - PERMITTED - (OPTIONAL CODE)
 321 12" LIMEROCK BASE COURSE
 325 8 1/2" ASPHALT BASE COURSE (TYPE 1)
 326 7" ASPHALT BASE COURSE (TYPE 2)
 327 6" ASPHALT BASE COURSE (TYPE 3)

FOR ADDITIONAL DETAILS SEE INDEX NOS 280, 400, 510, 515 & 516

NOTE: The Contractor should identify the proposed option on which his initial bid is based by entering the three digit option code to the right side of the item number of optional base item on the submitted bid proposal.



TYPICAL SECTION

4-LANE DIVIDED

TRAFFIC DATA

WIDTHS & CONSTRUCTION DATA

ROADWAY DESCRIPTION

RESURFACING

TYPE S OVERBUILD COURSE (275 LBS/SY AVG. INSIDE LANE) AND
 LEVELING COURSE (75 LBS/SY AVG.) WITH EITHER FC-4 (1") ALT. A OR
 TYPE S STRUCTURAL COURSE (150 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1") ALT. B

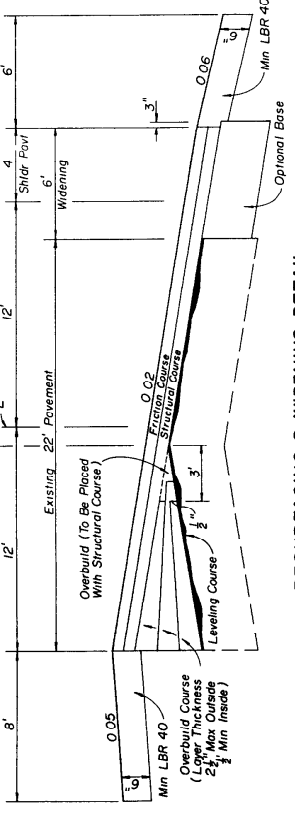
WIDENING
 OPTIONAL BASE GROUP 9 (FOR THICKNESS, SEE BELOW) WITH EITHER
 TYPE S STRUCTURAL COURSE (150 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1") ALT. A OR
 TYPE S STRUCTURAL COURSE (200 LBS/SY) AND FRICTION COURSE FC-2 (1") ALT. B

OPTIONAL BASE COURSES - PERMITTED - (OPTIONAL CODE)
 321 12" LIMEROCK BASE COURSE
 325 8 1/2" ASPHALT BASE COURSE (TYPE 1)
 326 7" ASPHALT BASE COURSE (TYPE 2)
 327 6" ASPHALT BASE COURSE (TYPE 3)

FOR ADDITIONAL DETAILS SEE INDEX NOS 280, 400, 510, 515 & 516

NOTE: ALL PAVEMENT DESCRIPTION FOR EXAMPLE ONLY

NOTE: The Contractor should



RESURFACING & WIDENING DETAIL

RURAL WIDENING AND RESURFACING TYPICAL SECTION(S)

NOTE: EARTHWORK AND NOTES FOR AN EMBANKMENT PROJECT ARE SHOWN IN THE EXAMPLE SUMMARY. THE SUMMARY OF EARTHWORK AND NOTES FOR THIS PROJECT ARE TO BE PROVIDED TO THE DISTRICT ENGINEER WHEN A MASS DIAGRAM IS INCLUDED IN PLANS.

SUMMARY OF EARTHWORK

DESCRIPTION	CY		CY	
	P	F	P	F
Roadway Excavation (A 2, A 3 Material)	44,823			
Roadway Excavation (A 8 Muck)	340			
Total Roadway Excavation	45,163			
Embankment	1,063,932			
Subsidiary Excavation (A 8 Material)	15,826			

- Notes:
- There is no direct pay for roadway, lateral ditch or channel excavation. Any suitable material may be used in the embankment at the option of the contractor.
 - Embankment is fill in place with no shrinkage applied.
 - 12,345 CY of A 8 material to be stockpiled in areas designated by the Engineer for use in muck blanket operations.
 - Earthwork has been calculated using the Limerock Base option. If another option is constructed, there shall be no revision to earthwork quantities.

PAY ITEM NOTES

- Item No 102-74: Barricades will be paid for on the basis of per barricade per day in use. The quantity shown is based on an estimated average of 35 Class A barricades for 200 days.
- Item No 102-75: Signs will be paid for on the basis of per sign per day in use. The quantity shown is based on an estimated average of 15 signs for 400 days and 4 signs for 200 days.
- Item No 102-77: Flashing lights will be paid for on the basis of per flashing light per day in use. The quantity shown is based on an estimated average of 75 flashing lights for 200 days.
- Item No 102-86-2: Barricades will be paid for on the basis of per barricade per day in use. The quantity shown is based on an estimated average of 28 barricades for 200 days.
- Item Nos 104-1 through 104-10: Estimated quantities for prevention, control and abatement of erosion and water pollution and are to be used at locations designated by the plans or as decreed by the Engineer.
- Item No 120-6: Any borrow excavation required shall be furnished by the contractor from areas provided by him and the cost of furnishing such materials is to be included in the cost for embankment.
- Item No 180-71: The rate of spread shall be 4" loose measure. The rate may be increased if decreed by the District Materials Engineer.
- Item No 331-73: Includes 10 tons for adjustments of connections to existing streets, drives etc as decreed by the Engineer.
- Item No 339-1: Includes 160 tons for pavement under guardrail and 63 tons for pavement under bridges.
- Item No 570-5: Based on two (2) applications.

SUMMARY OF GUARDRAIL

LOCATION	STA		SIDE	GUARDRAIL		END ANCHORAGE	
	TO	FROM		P	F	TYPE II	TYPE IV
N.B. I 00	592+00	601+00	Rt	900			
	602+95.5	604+33	Med	137.5			
	607+62	612+97.5	Rt	535.5			
	603+81.98	604+57.5	Rt	75.5			
S.B. I 00	600+34.5	601+82.5	Lt	360			
	608+92.5	612+97.5	Lt	600			
	607+20	608+57.5	Med	137.5			
S.R. 00	171+81.3	175+06.3	Med	650			
Ramp A	936+947	900+352	Lt	337.5			
Ramp B	796+944.8	803+81.98	Rt	687.5			
S.R. 00	797+00	801+00	Lt	400			
TOTAL				4811		2	9

Note: Stationing shown above is approximate. Exact stations to be determined by the Engineer during construction.

SUMMARY OF RIPRAP AND CONCRETE DITCH PAVEMENT AND SODDING

LOCATION	STA		SIDE	RIPRAP		CONCRETE		SODDING	
	TO	FROM		P	F	P	F	P	F
S 12	612+00	613+35	Lt	24					
S 12	695+00		Lt	28					
S 24	18+00		Lt	37					
S 24	158+00		Lt	126					
S 27	25+00		Lt	39					
S 31	405+00		Lt	28					
S 33	183+12		Lt	57					
S 44	0+42		Rt	16					
S 46	0+46		Lt	15					
TOTAL				50		346		104	

Note: Stationing shown above is approximate. Exact stations to be determined by the Engineer during construction.

SUMMARY OF SIDEDRAIN PIPE AND MITERED END SECTIONS

LOCATION	STA		SIDE	SIZE	PIPES		SECTIONS	
	TO	FROM			P	F	P	F
S.R. 00	50+45	131+25	Lt	24"	80			
	53+02	131+67	Lt	24"	54			
	53+02	131+67	Lt	24"	66			
S 44 (00 ft. ST.)			Lt	18"	84			
S 45 (00 ft. ST.)			Rt	18"	76			
S 46 (00 ft. ST.)			Lt	18"	64			
TOTAL					452			

Note: Turnouts and side drains are to be constructed at locations designated by the Engineer in accordance with Index No 515.

SUMMARY OF SODDING

LOCATION	STA		SIDE	SIZE	P		SY	
	TO	FROM			P	F	P	F
N.B. I 00	570+00	604+84	Med	774				
	570+00	583+00	Rt	333				
	587+57	582+00	Rt	36				
	592+00	602+47	Rt	657.8				
	603+82	608+10	Rt	789				
	607+35	613+00	Rt	393.3				
	612+00	650+00	Med	952				
	612+00	621+00	Rt	229				
	624+00	650+00	Rt	529				
S.B. I 00	570+00	604+84	Med	774				
	570+00	583+13	Lt	292				
	594+34	592+50	Lt	161				
	595+10	598+85	Lt	32				
	606+40	613+00	Lt	96.4				
	607+14	650+00	Med	953				
	618+50	620+94	Lt	54				
	624+34	650+00	Lt	570				
Ramp A	62+99	103+24	Lt	962				
	99+89	103+60	Rt	154				
Ramp B	885+11	893+00	Lt	175				
	897+00	900+32	Lt	1977				
Ramp C	785+46	802+50	Lt	3589				
	785+46	803+82	Rt	4445				
Ramp D	5100	36+90	Rt	657				
	7+59	33+35	Lt	905				
Drainage Structures				2661				
Paved Ditches				104				
TOTAL					35,841			

Note: The limits of sodding indicated are approximate and are to be adjusted where necessary, as decreed by the Engineer, to provide for continuity of construction or to suit the actual requirements.

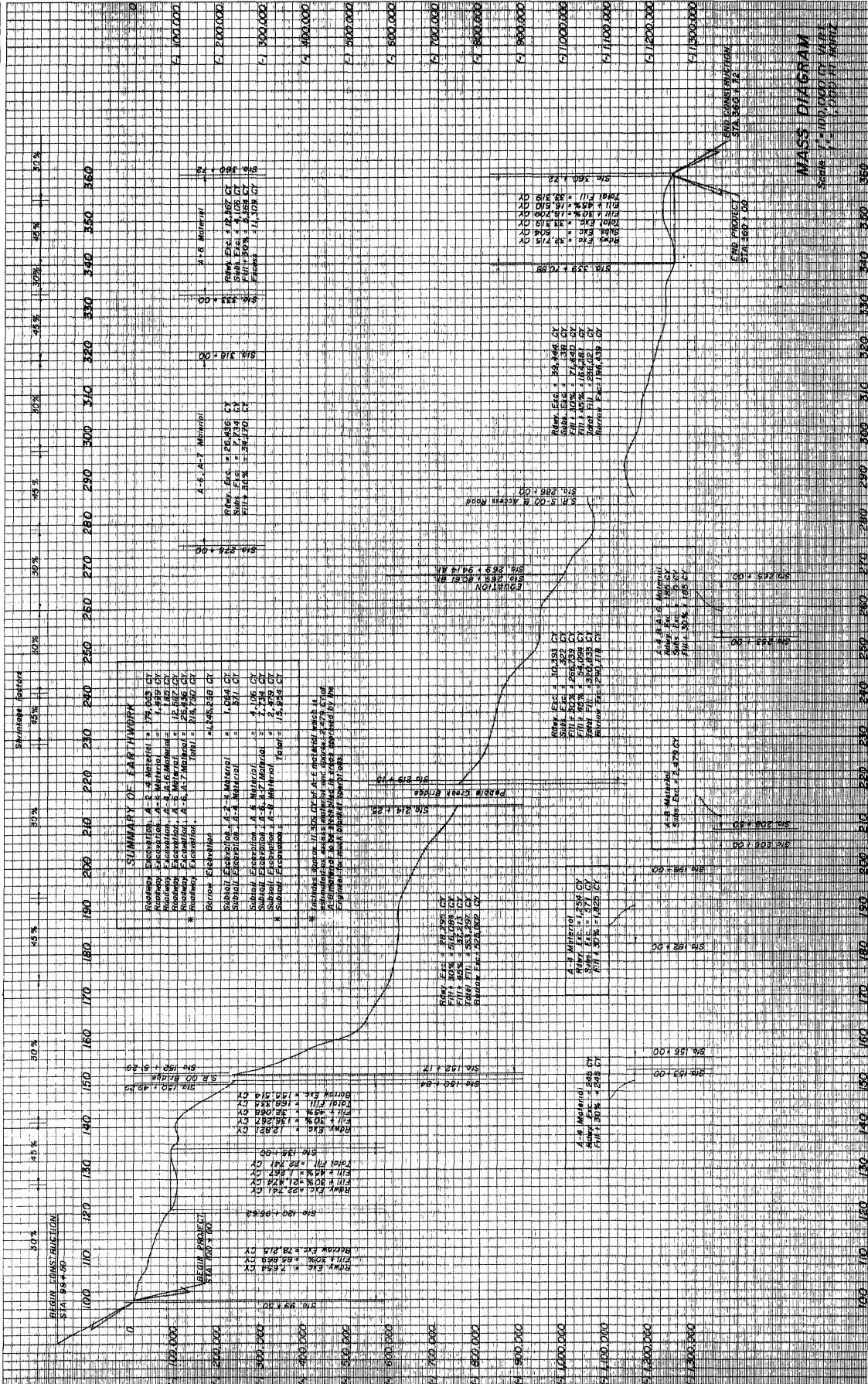
STR NO	INDEX NO	STATION	SIDE	TYPE	SIZE	LENGTH	CONCRETE PIPE	CMP	INLETS	RAISED END SECTIONS	ENDWALL GRATE	SOD CONC	CLASS I CONC	CLASS II CONC	REINF STEEL	REMARKS
							18" 24" 30" 42"	15"	A<20 B<30 C<50	24" 30"	LBS	ST	CY	CY	LBS	
P. S. 1	270	379+1.00	LI	Pipe Culvert, FES	24"	100'	100'			2		31.60				
P. S. 2	250	405+1.5	RI	Pipe Culvert, Endwall	061 30"	104'	208'					124.00	8.26			
P. S. 3	250	408+1.15	LI	Pipe Culvert, Endwall	061 30"	104'	208'					124.00	8.26			
P. S. 4	8052	432+1.00	RI	Conc Box Culvert	061 9'x9'	104'								238.86	35,654	
P. S. 5	8032	432+1.00	LI	Conc Box Culvert	061 9'x9'	104'								238.86	35,654	
P. S. 6	270	438+1.00	RI	Pipe Culvert, FES	30"	100'	100'			2		32.64				
P. S. 7	270	438+1.00	LI	Pipe Culvert, FES	30"	100'	100'			2		32.64				
P. S. 8	270	463+1.00	RI	Pipe Culvert, FES	30"	100'	100'			2		32.64				
P. S. 9	270	463+1.00	LI	Pipe Culvert, FES	30"	100'	100'			2		32.64				
P. S. 10	8013, 8013 S	Sur 370+0.00 (Sewer 48" x 48")	RI	Conc Box Culvert	10'x6'	147'								180.68	23,148	
P. S. 11	8050, 8013 S	Sur 370+0.00 (Sewer 48" x 48")	LI	Conc Box Culvert	10'x6'	147'								180.68	23,148	
P. S. 12	8050	477+1.00	RI	Conc Box Culvert	7'x 8'x9'	104'								280.91 *	45,606	
P. S. 13	231, 250	477+1.00	LI	Conc Box Culvert	7'x 8'x9'	104'								280.91 *	45,606	
P. S. 14	230, 8013, 8013 S	Sur 509+1.35 (Sewer 18" x 18")	LI, B, RI	Pipe Invert, Endwall	42"	214'								202.00	12,666	
P. S. 15	230, 8013, 8013 S	Sur 519+1.50 (Sewer 18" x 18")	LI, B, RI	Conc Box Culvert	10'x6'	307'								350.31	43,446	
P. S. 16	220, 261	523+1.00	RI	Inlet, Pipe, Endwall	15"	32'	56'	32'								
P. S. 17	220, 261	523+1.00	LI	Inlet, Pipe, Endwall	15"	31'	76'	31'								
P. S. 18	220, 261	568+1.50	RI	Inlet, Pipe, Endwall	15"	42'		42'								
P. S. 19	220, 261, 231	568+1.50	LI	Inlet, Pipe, Endwall	15"	42'		42'								
P. S. 20	261	185+1.00 Ramp A	LI, B, RI	Pipe Culvert, Endwall	24"	56'										
P. S. 21	261	288+1.00 Ramp B	LI, B, RI	Pipe Culvert, Endwall	24"	72'										
P. S. 22	220, 261	530+1.00	RI	Inlet, Pipe, Endwall	15"	58'		58'								
P. S. 23	220, 261	530+1.00	LI	Inlet, Pipe, Endwall	15"	58'		58'								
P. S. 24	220, 261	536+1.00	RI	Inlet, Pipe, Endwall	15"	56'		56'								
P. S. 25	220, 261	536+1.00	LI	Inlet, Pipe, Endwall	15"	56'		56'								
P. S. 26	220, 261	539+1.00	RI	Inlet, Pipe, Endwall	15"	45'		45'								
P. S. 27	220, 261	539+1.00	LI	Inlet, Pipe, Endwall	15"	45'		45'								
P. S. 28	220, 261, 231	541+1.50	RI	Inlet, Pipe, Endwall	15" x 18" x 18"	63' x 17'		63'								
P. S. 29	220, 261	541+1.50	LI	Inlet, Pipe, Endwall	15"	65'		65'								
P. S. 30	220, 261	544+1.00	RI	Inlet, Pipe, Endwall	15"	26'		26'								
P. S. 31	220, 261	544+1.00	LI	Inlet, Pipe, Endwall	15"	29'		29'								

TOTALS

P = PLAN QUANTITY
 F = FINAL QUANTITY

* Denotes Bridge Culvert Quantities

SUMMARY OF DRAINAGE STRUCTURES



STATE PROJ. NO. 00000-0000
SHEET NO. 00

780

775

765

760

755

750

RR Crossing No 0000000000
Signal Type 3 (Others)
Type 0 Index No 560

Bridge No 000000
Const Approach Slabs
Index No 0000

Curve Data
PI Sta 767+82.32
D = 1400 FT
T = 358.83'
L = 719.56'
R = 4819.72'
PC Sta 764+23.49
PT Sta 771+39.05

BM No 79
PI Sta 764+23.49
PI Sta 767+82.32
PI Sta 771+39.05

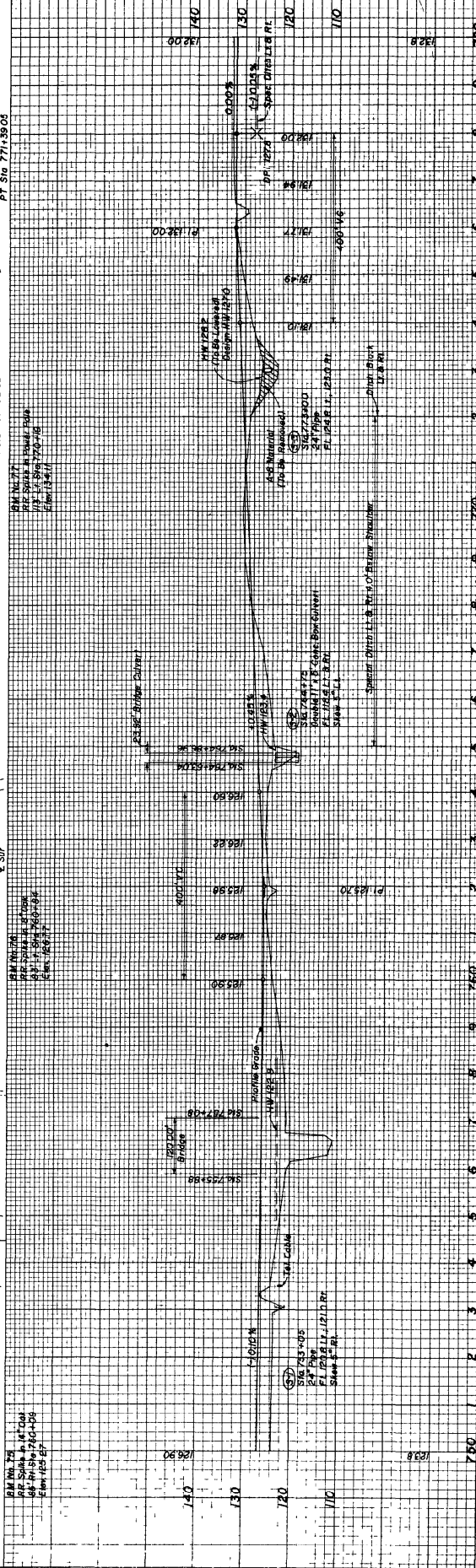
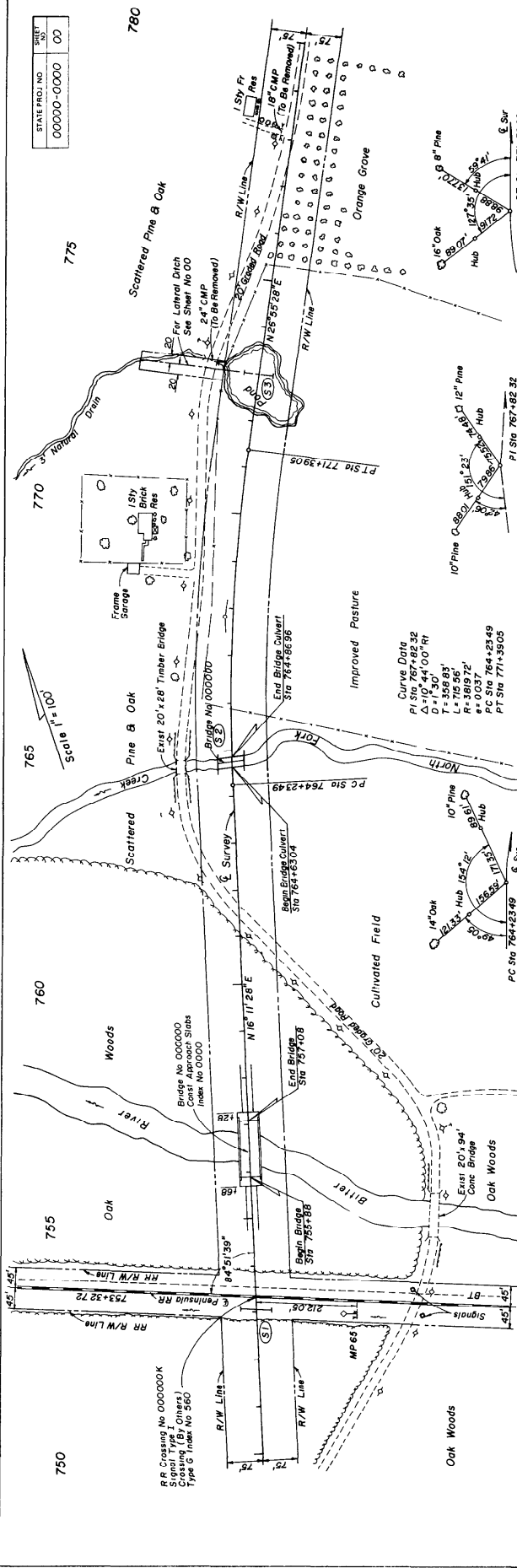
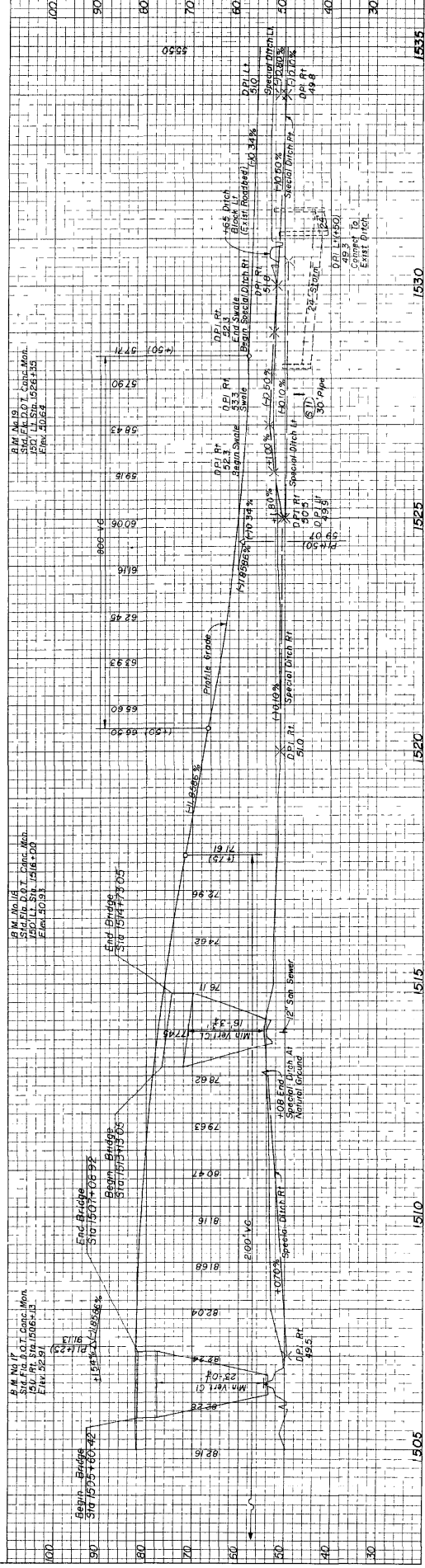
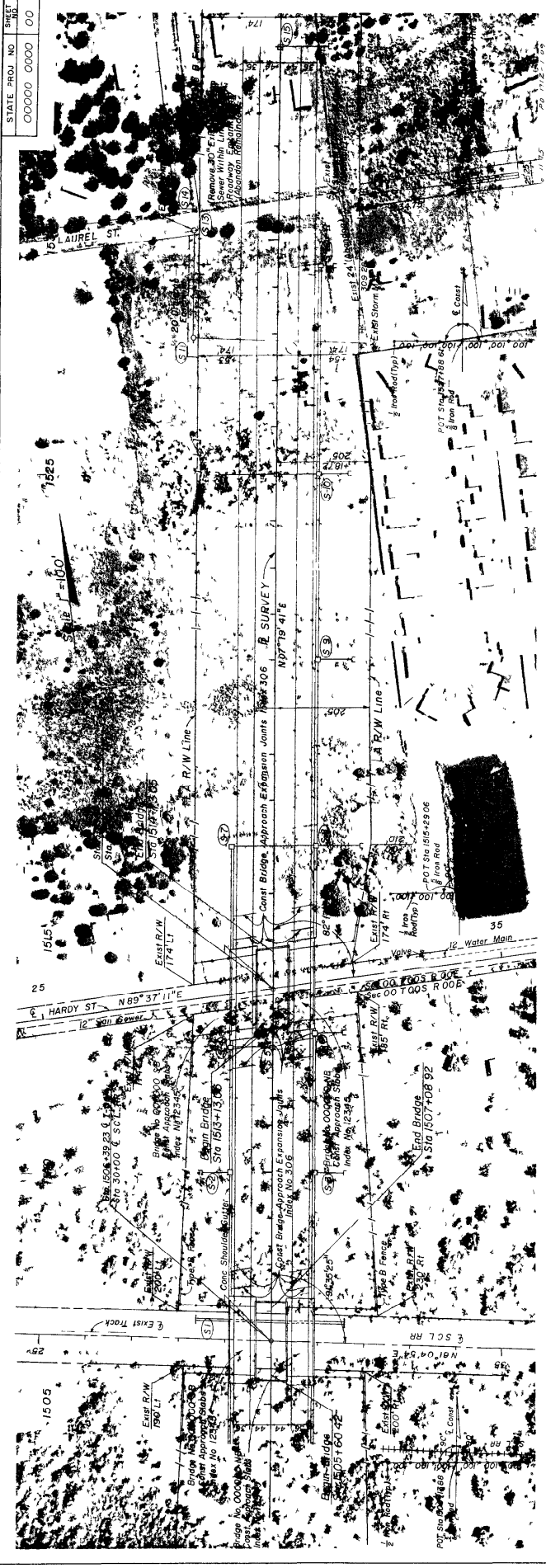
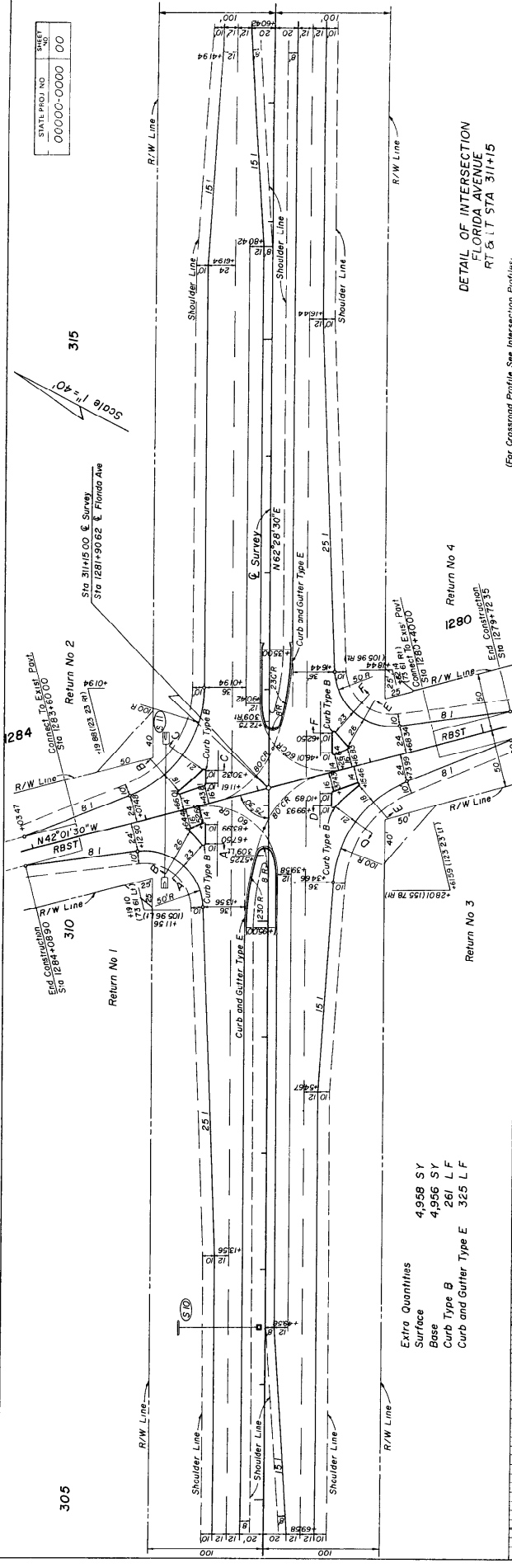


EXHIBIT 16

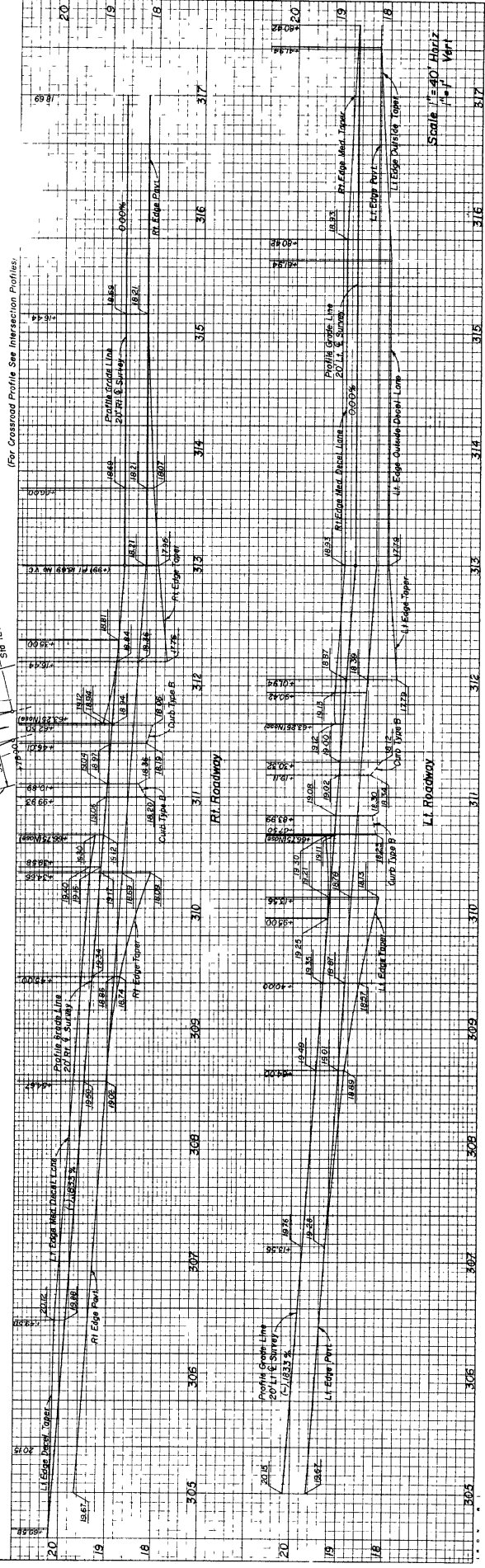


STATE PROJ. NO. SHEET NO.
00000-0000 00



Extra Quantities
 Surface 4956 SY
 Base 4956 SY
 Curb Type B 261 L.F.
 Curb and Gutter Type E 325 L.F.

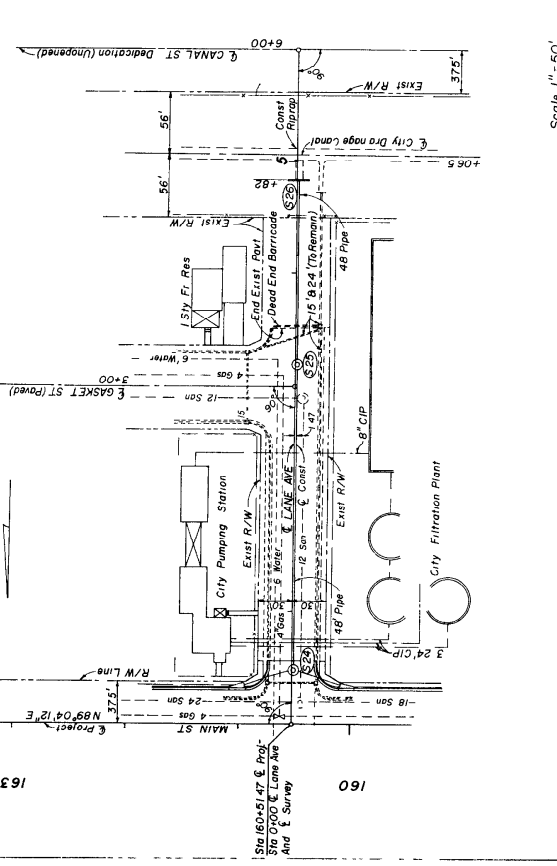
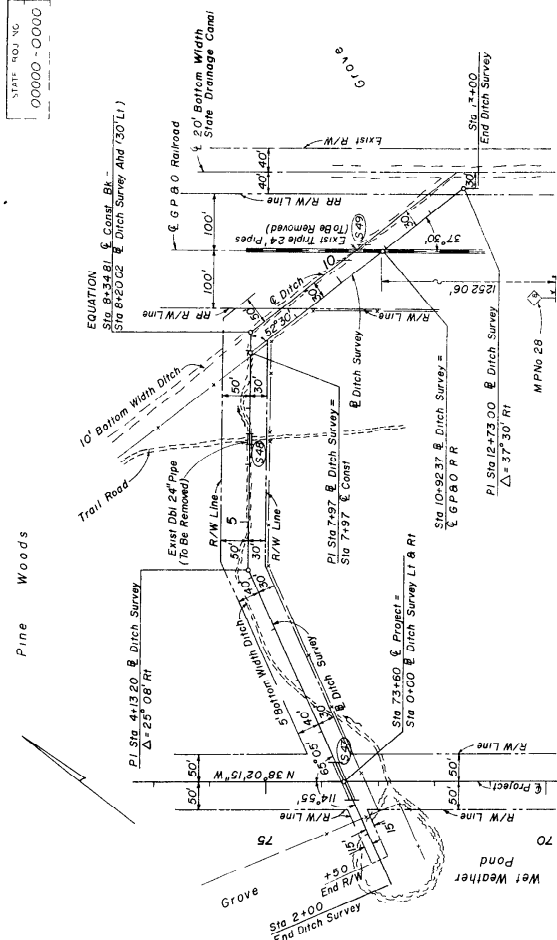
DETAIL OF INTERSECTION
 FLORIDA AVENUE
 RT 311+15



(For Crossroad Profile See Intersection Profiles.)

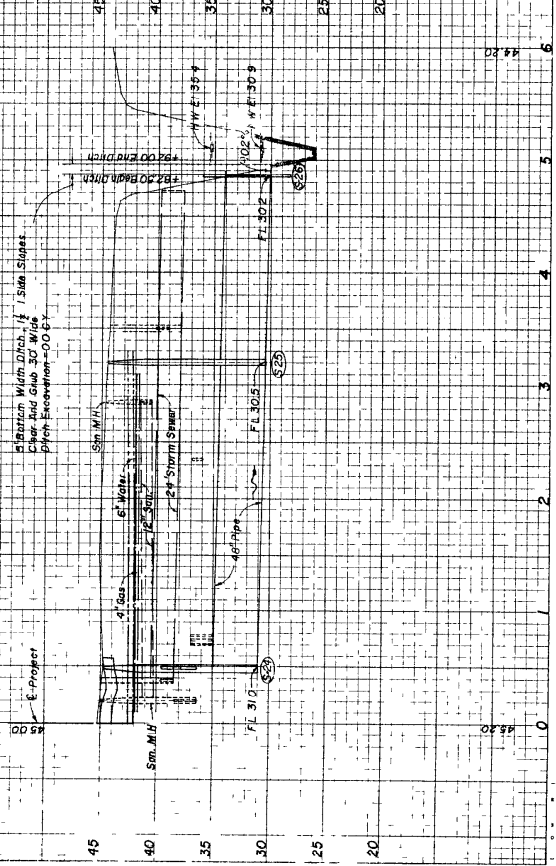
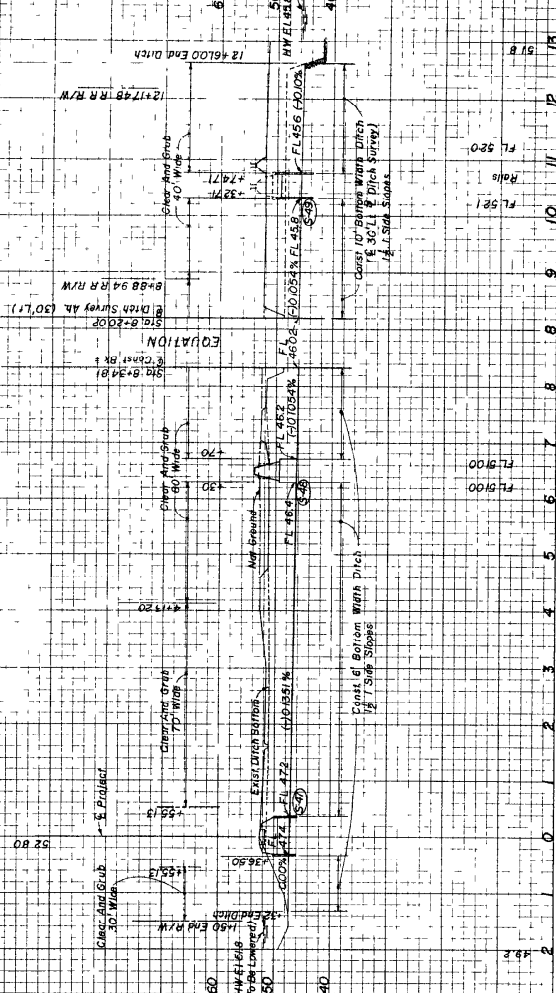
Scale 1" = 40' Horiz
 1" = 4' Vert

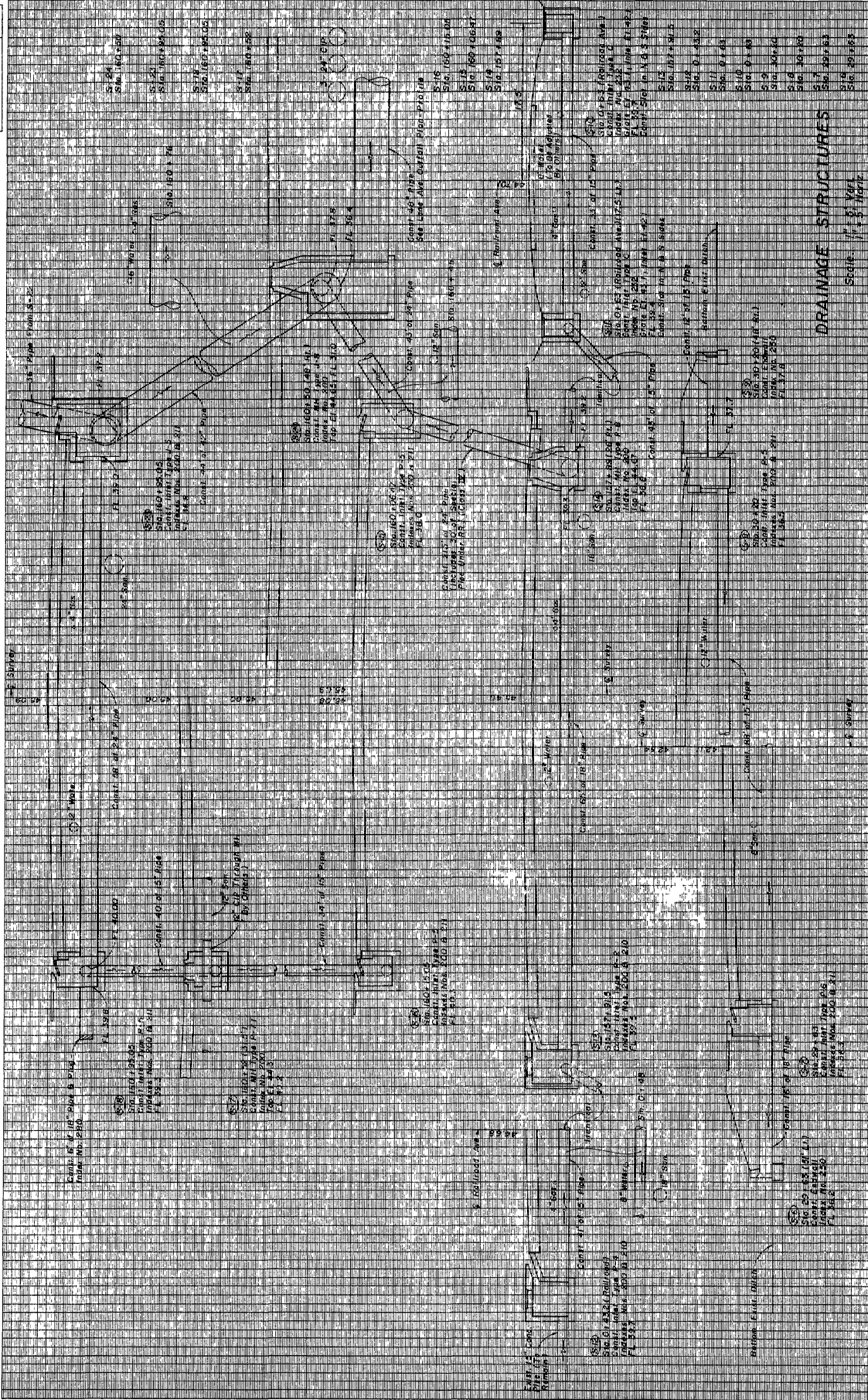
3747' 40.1' NG
00000 - 0000 00



Scale 1" = 100'
LATERAL DITCH LT & RT STA 73 + 6000

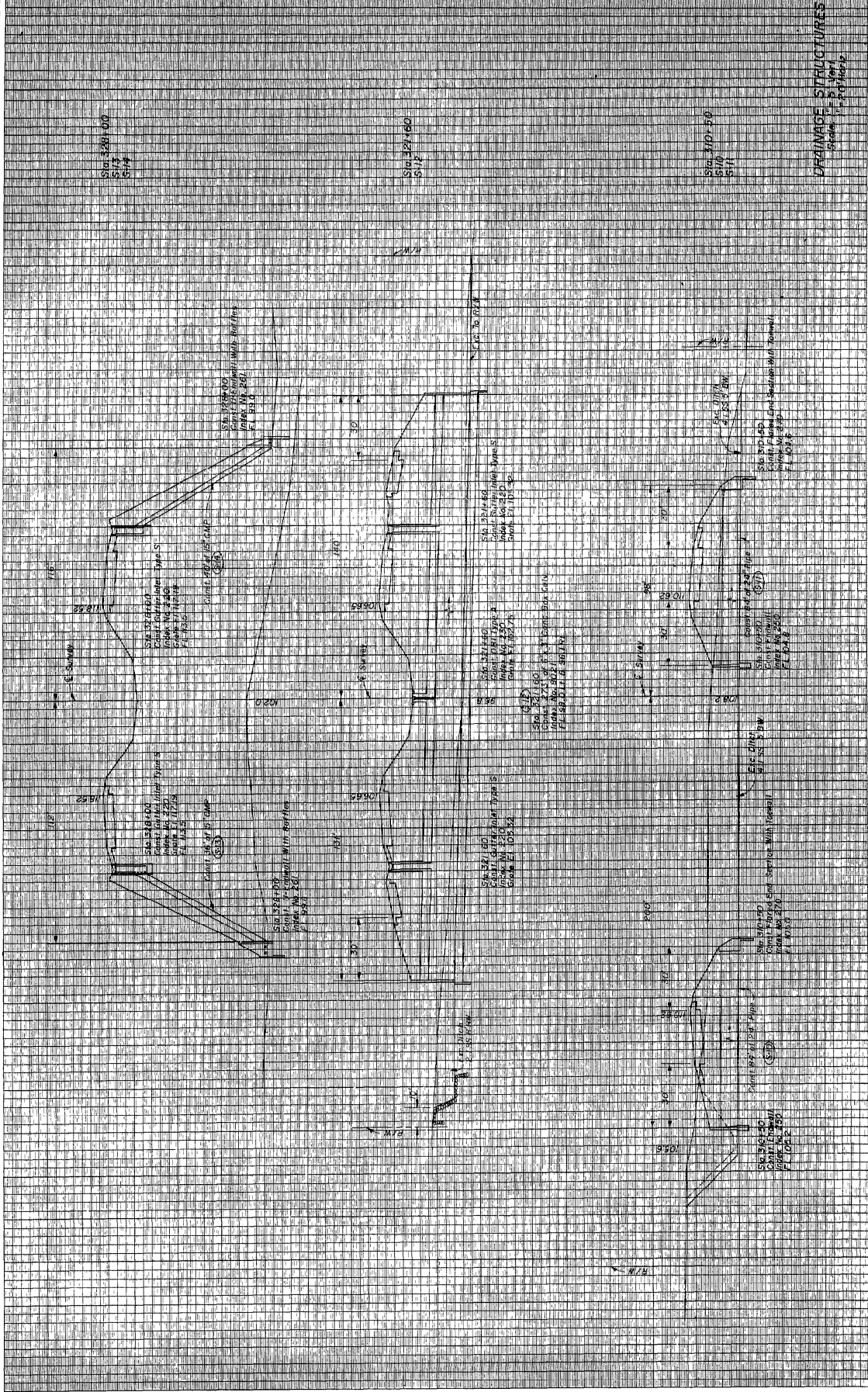
Scale 1" = 50'
LANE AVE OUTFALL RT STA 160+51.47





DRAINAGE STRUCTURES

Scale: 1" = 10' HORIZ.
1" = 4' VERT.



DRAINAGE STRUCTURES
 10/20/20
 10/20/20

Date Sampled 2/11-14/80
 Sampled by Adams, Betts, Cole
 Date tested 4/7-11/80

Laboratory No. 000-C
 Project No. 00000-0000
 Road No. S.R. 00 (I-80)
 Submitted by J. DOE Dist. R. L. H. Eng.

REPORT OF TESTS OF MATERIAL FROM BP 00-00 FOR USE IN EMBANKMENT AND SUBGRADE

Stratum No.	No. 100 Mesh		No. 40 Mesh		No. 20 Mesh		Liquid Limit	Plastic Index	Group
	Pass	Retain	Pass	Retain	Pass	Retain			
1	100	98	90	8	25	6	N.P.	A-2-4	Grey Silty Clayey Sand course poorly graded subrounded
2	100	96	64	54	54	6	N.P.	A-4	Mix to Grey Sandy Silt w/ Shell & Limerock coarse well graded subrounded
3	100	98	92	53	53	35	A-7	Rock (Refusal)	Grey & Brown Silty Limey Clay fine poorly graded subrounded

EMBANKMENT AND SUBGRADE MATERIAL

The material from Stratum No. 1 appears satisfactory for use in the embankment.
 The material from Stratum No. 2 appears satisfactory for use in the embankment above the water table existing during construction. No special attention should be followed in the use of this material as it is likely to retain excess moisture and may be difficult to dry.
 The material from Stratum No. 3 is not satisfactory for use in the subgrade under any conditions. However, this material may be used in the embankment sections above the water level existing during construction, but shall not be placed within 4 feet of the bottom of the proposed pavement or base in accordance with Index 505 (see below).
 The material from Stratum No. 4 is Rock (Refusal).
 The material from Stratum No. 5 is not satisfactory for use in the subgrade under any conditions. However, it may be used in the embankment when used in accordance with Index 505 (see below).

CHARACTERISTICS

*REVISED RECOMMENDATIONS for the use of Stratum No. 3 (A-4 Material)
 With excessive moisture and vibration the material may be unstable and difficult to compact. When wet the material easily produces "Quick" condition resulting in a loss of bearing capabilities.

CONDITIONS FOR PLACEMENT IN FILLS

- Utilize Index 505 with the following restrictions:
 - This material should be placed in layers no less than 2" nor greater than 4" thick with alternate layers of A-1 material not less than 2" thick and should be shaped to drain toward the outside slopes to prevent entrainment of water within the embankment.
 - The material should not be placed within 4" of any front slope as it is highly erosive.

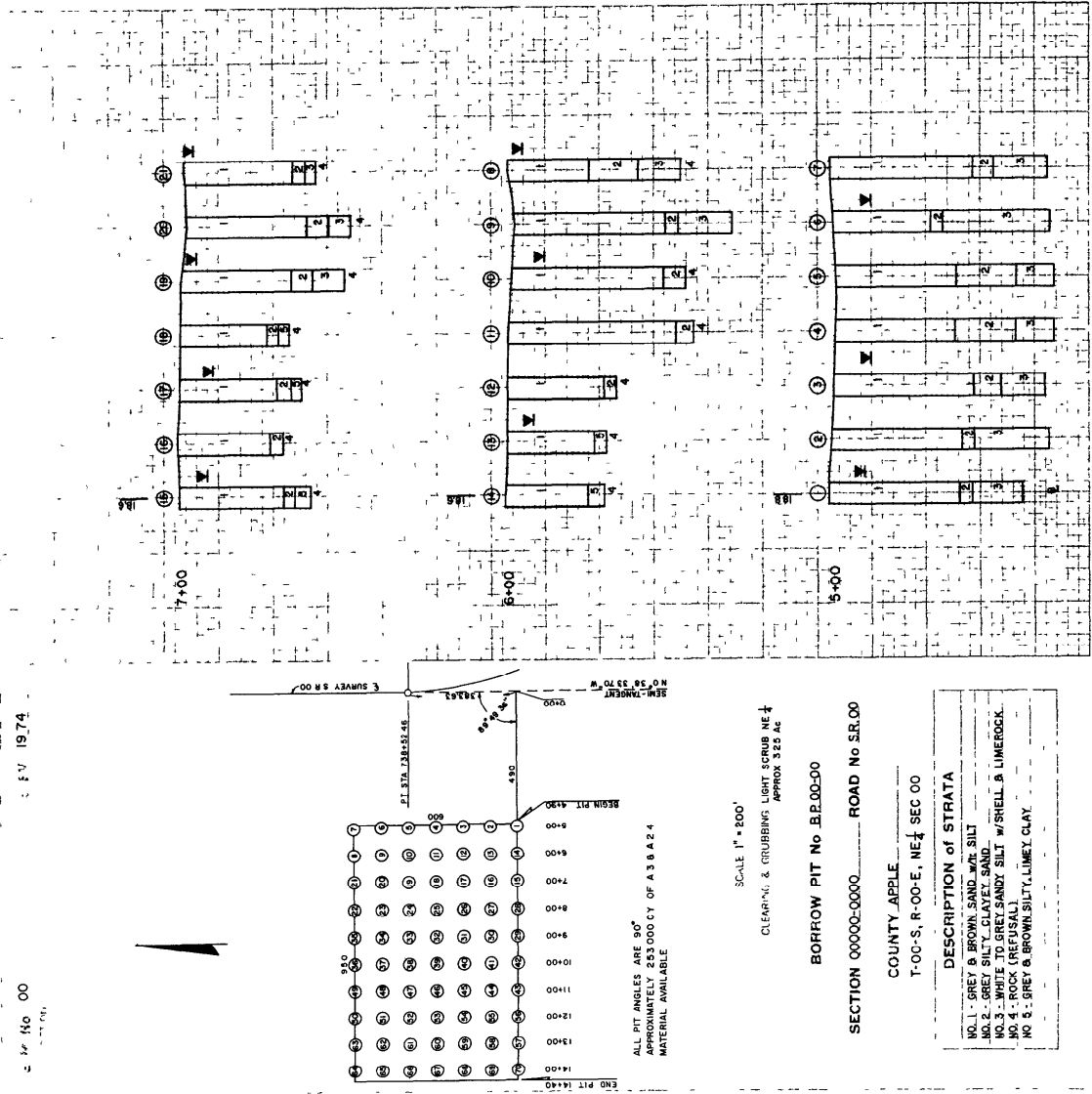
*REVISED RECOMMENDATIONS FOR THE USE OF Stratum No. 5 (A-7 Material)

This material may retain excessive moisture and be difficult to dry. With excessive moisture and vibration this material may be unstable and difficult to compact.

CONDITIONS FOR PLACEMENT IN FILLS

- Utilize Index 505 with the following restriction:
 - This material should be placed in layers not less than 2" nor greater than 4" thick with alternate layers of A-3 material not less than 2" thick and should be shaped to drain toward the outside slope to prevent entrainment of water within the embankment.

J. Doe
 District Materials Engineer



BORROW PIT No. 00-00 CROSS SECTIONS
 1" = 100' HORIZ
 1" = 5' VERT

SCALE 1" = 200'
 CLEARING & GRUBBING LIGHT SCRUB NE 1/4
 APPROX 325 AC

BORROW PIT No. B.P. 00-00
 SECTION 00000-0000 ROAD No S.R. 00

COUNTY APPLE
 T-00-S, R-00-E, NE 1/4 SEC 00

DESCRIPTION OF STRATA

NO. 1 - GREY & BROWN SAND w/IT SILT
NO. 2 - GREY SILTY CLAYEY SAND
NO. 3 - GREY SANDY SILT w/ SHELL & LIMEROCK
NO. 4 - ROCK (REFUSAL)
NO. 5 - GREY & BROWN SILTY LIMEY CLAY

DRAWN BY J. DOE DME
 CHECKED BY ADAMS, BETTS, COLE
 DATE SURVEYED 2/11/80

DISTRICT TENTH
 ROAD NO. 00(1-00)
 COUNTY CHERRY

STATE OF FLORIDA
 DEPARTMENT OF TRANSPORTATION
 MATERIALS AND RESEARCH

PROJECT NO. 00000-0000

CROSS SECTION SOIL SURVEY FOR THE DESIGN OF ROADS

DATE OF SURVEY 1-4-80 to 1-14-80
 SURVEY MADE BY S. DIGGER, D. MINER, S. BUCK
 SUBMITTED BY J. DOE - DISTRICT MATERIALS ENGINEER

SURVEY BEGINS STA. 000+00 SURVEY ENDS STA. 000+00

NOTE: STRATA BOUNDARIES ARE APPROXIMATE
 MAKE FINAL CHECK AFTER GRADING

WEATHER CLEAR

LEGEND WATER TABLE ENCOUNTERED

DESCRIPTION OF STRATA
NO 1 - GREY & BROWN SAND
NO 2 - COMP. FILL (ORANGE & BROWN SAND w/1/ CLAY & IRON ROCK)
NO 3 - MUCK
NO 4 - SAND ASPHALT OVER SAND SHELL & CLAY BASE
NO 5 - SURFACE TREATMENT OVER SAND ASPHALT

STRATUM CONNECTING LINES ARE SHOWN FOR ESTIMATING EARTHWORK
 ONLY. THESE LINES DO NOT INDICATE ACTUAL STRATUM LIMITS. SOIL
 STRATA ARE REPRESENTED AT BORING LOCATION ONLY

Lab. No. 00000 S
 Project No. 00000-0000
 Road No. 1-00
 Submitted By N O Boss District Engineer

Date Sampled 1-4-80 to 1-14-80
 Date Tested 1-7-80 to 1-22-80 (District Lab.)
 Date Tested 1-29-80 (Central Lab.)

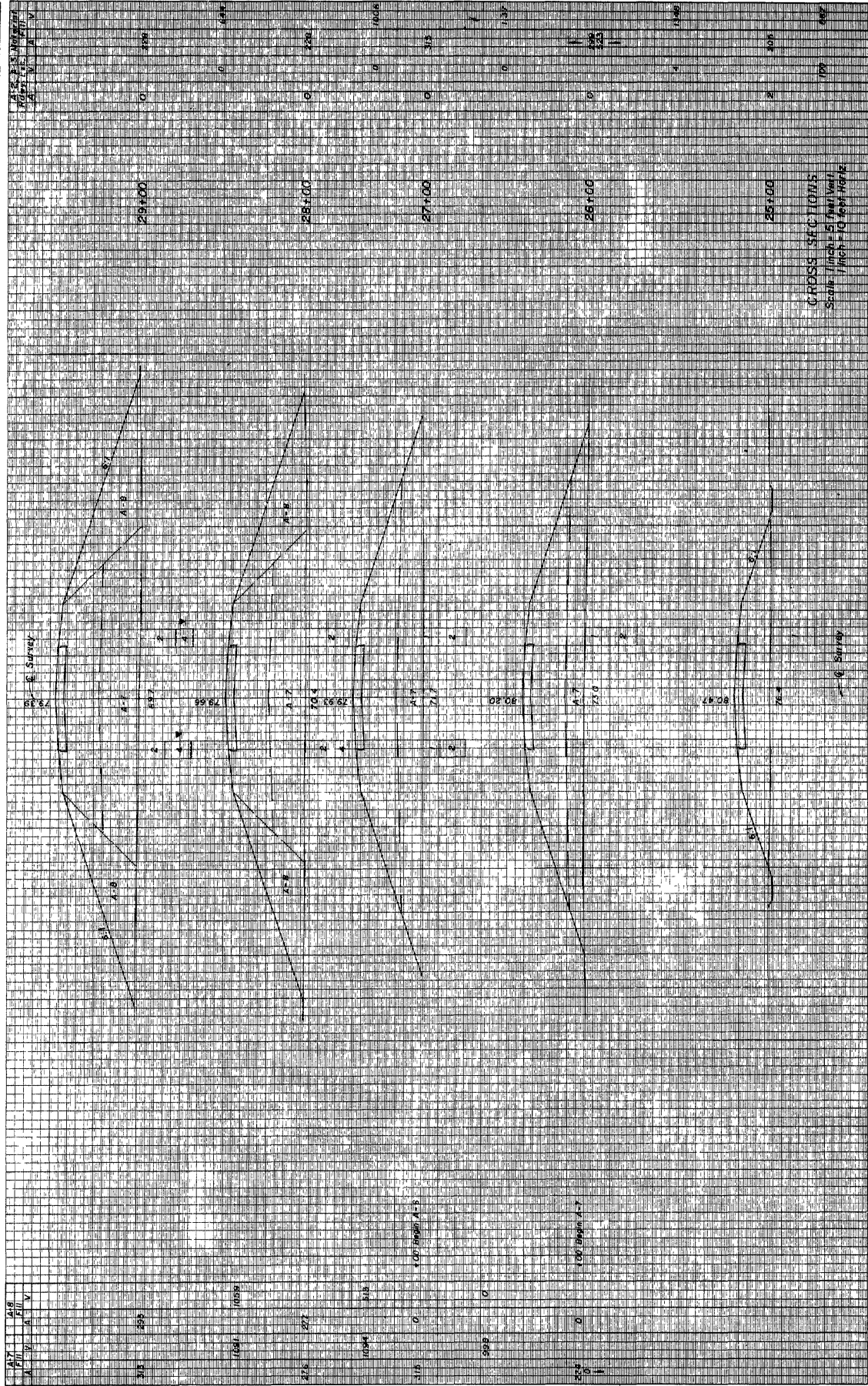
REPORT OF TESTS OF MATERIAL FROM ROADWAY
 FOR USE IN EMBANKMENT AND SUBGRADE

Stratum No.	Pass 10		Pass 40		Pass 60		Pass 200		N. Mech	N. Liquid Limit	Plastic Index	GROUP	DESCRIPTION
	Mech	%	Mech	%	Mech	%	Mech	%					
1	100	16	83	4	N P	N P	A 2.4	Comp. Fill (Orange & Brown Sand w/ Clay & Iron Rock)					
2	100	91	71	11	N P	N P	A-3	coarse well graded subrounded					
3	NO SAMPLE SUBMITTED												
4	93	88	73	5	N P	N P	A-3	Sand Asphalt over Sand Shell & Clay Base coarse well graded subrounded					
5	NO SAMPLE SUBMITTED												

EMBANKMENT AND SUBGRADE MATERIAL

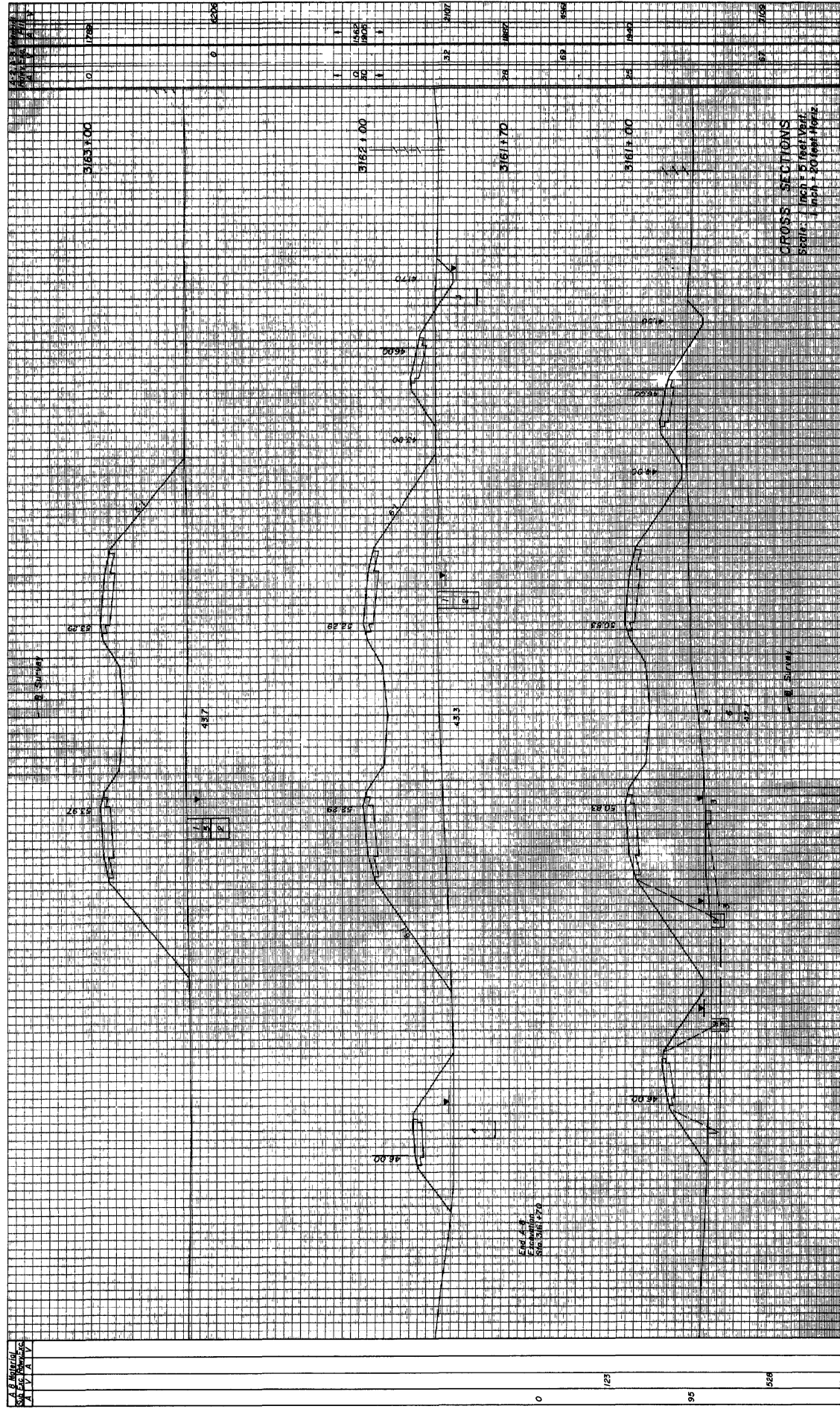
The material from Stratum No. 1 & 2 appears satisfactory for use in the embankment
 The material from Stratum No. 3 is muck and is not suitable for use in the embankment subgrade or as a stabilizer under any conditions
 The material from Stratum No. 4 is Sand Asphalt over Sand Shell & Clay base
 The material from Stratum No. 5 is Surface Treatment over Sand Asphalt

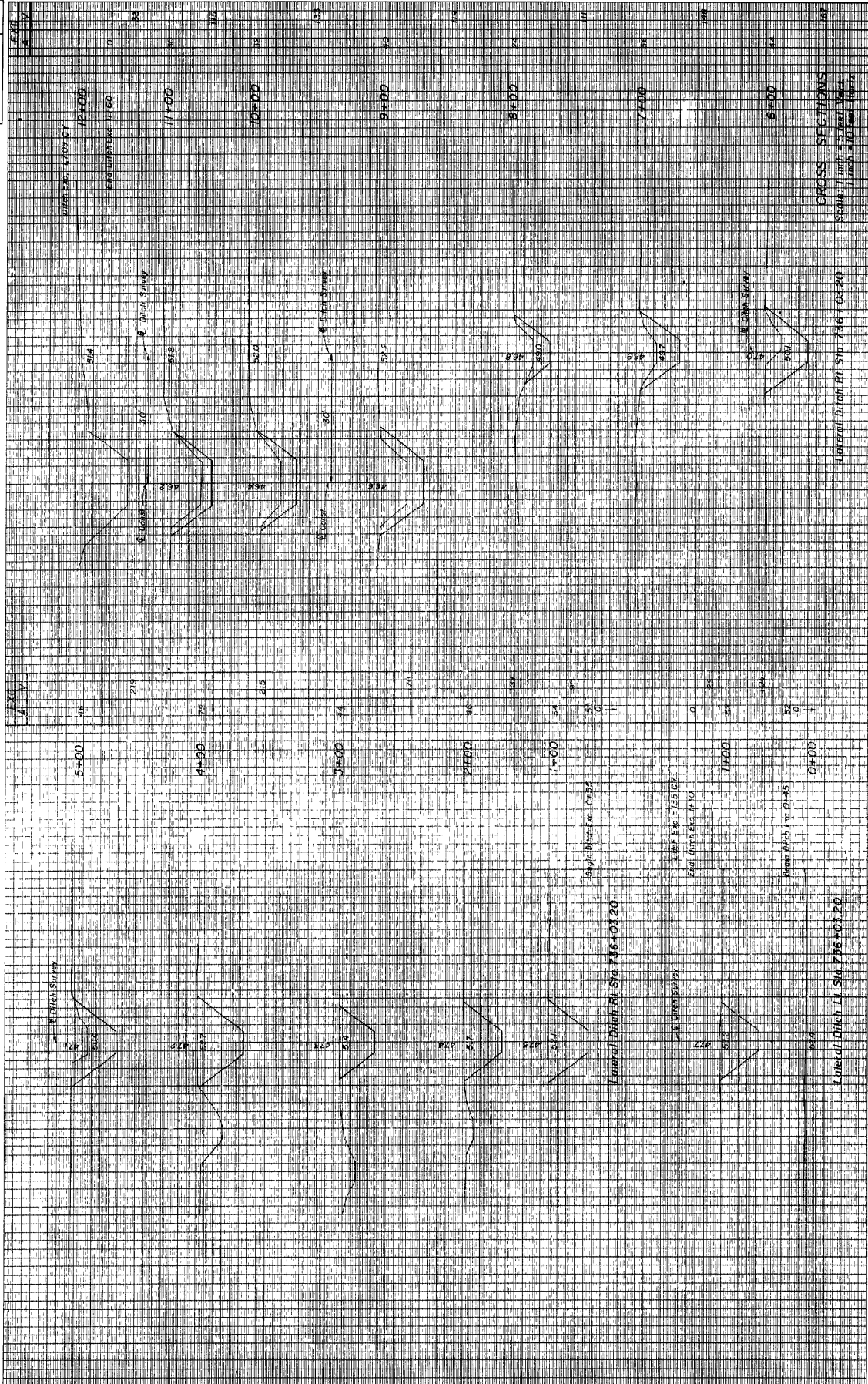
J. Doe
 J. Doe District Materials Engineer



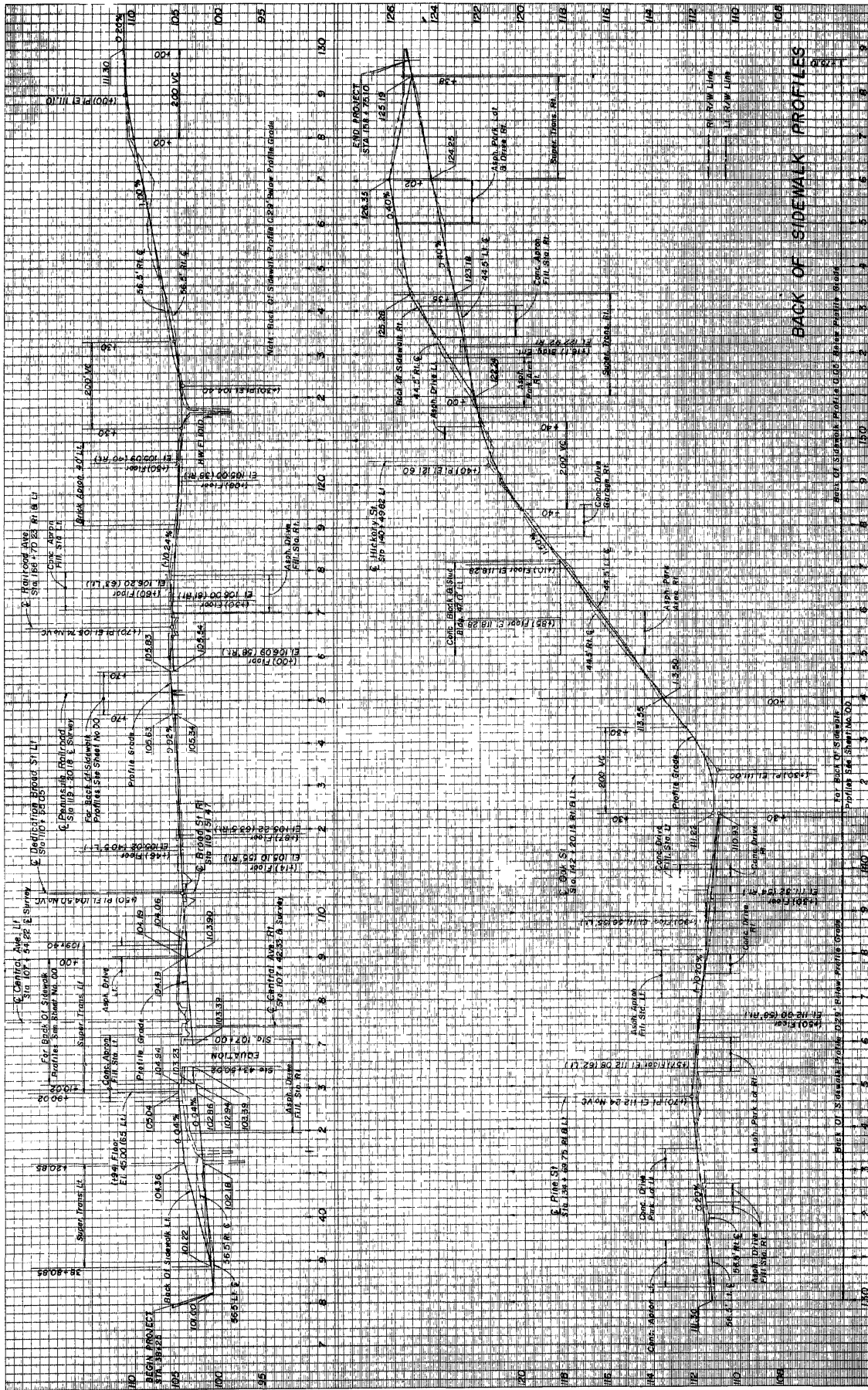


CROSS SECTIONS
Scale 1 inch = 20 feet
1 inch = 2 feet

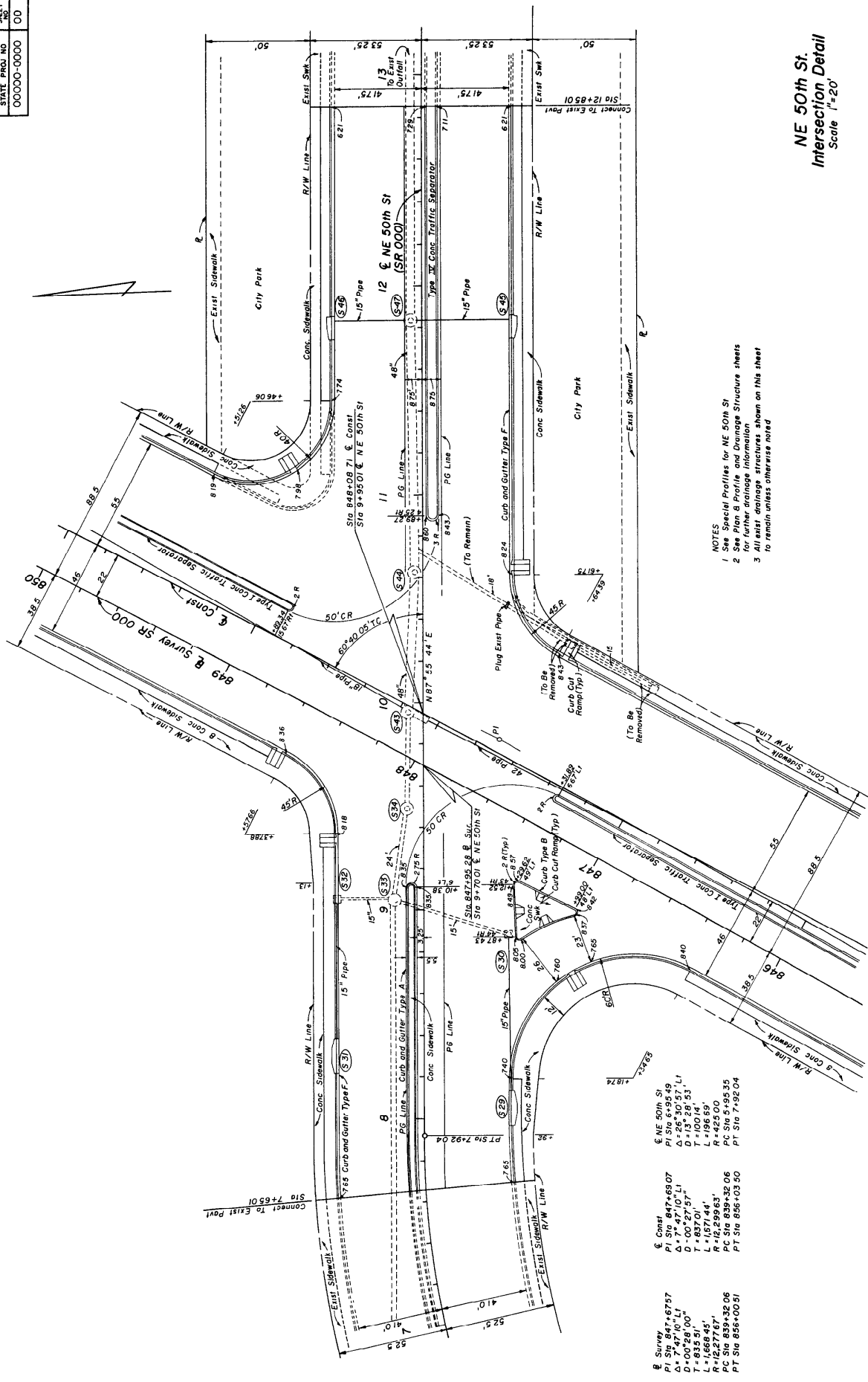




CROSS SECTIONS
Scale 1 inch = 5 feet



Author	
Checked	
Design	
Drawn	
Field	
Insp.	
Contract	
Client	
Date	



- NOTES
- 1 See Special Profiles for NE 50th St
 - 2 See Plan B Profile and Drainage Structure sheets for further drainage information
 - 3 All exist drainage structures shown on this sheet to remain unless otherwise noted

NE 50th St.
Intersection Detail
Scale 1"=20'

B Survey
 PI Sta 847+6757
 $\Delta = 7^{\circ}47'10''$ LI
 $D = 00^{\circ}28'00''$
 $T = 835.51'$
 $R = 12,277.61'$
 PC Sta 839+32.06
 PT Sta 856+00.51

Const
 PI Sta 847+69.07
 $\Delta = 7^{\circ}47'10''$ LI
 $D = 00^{\circ}27'57''$
 $T = 837.01'$
 $R = 12,299.63'$
 PC Sta 839+32.06
 PT Sta 856+03.50

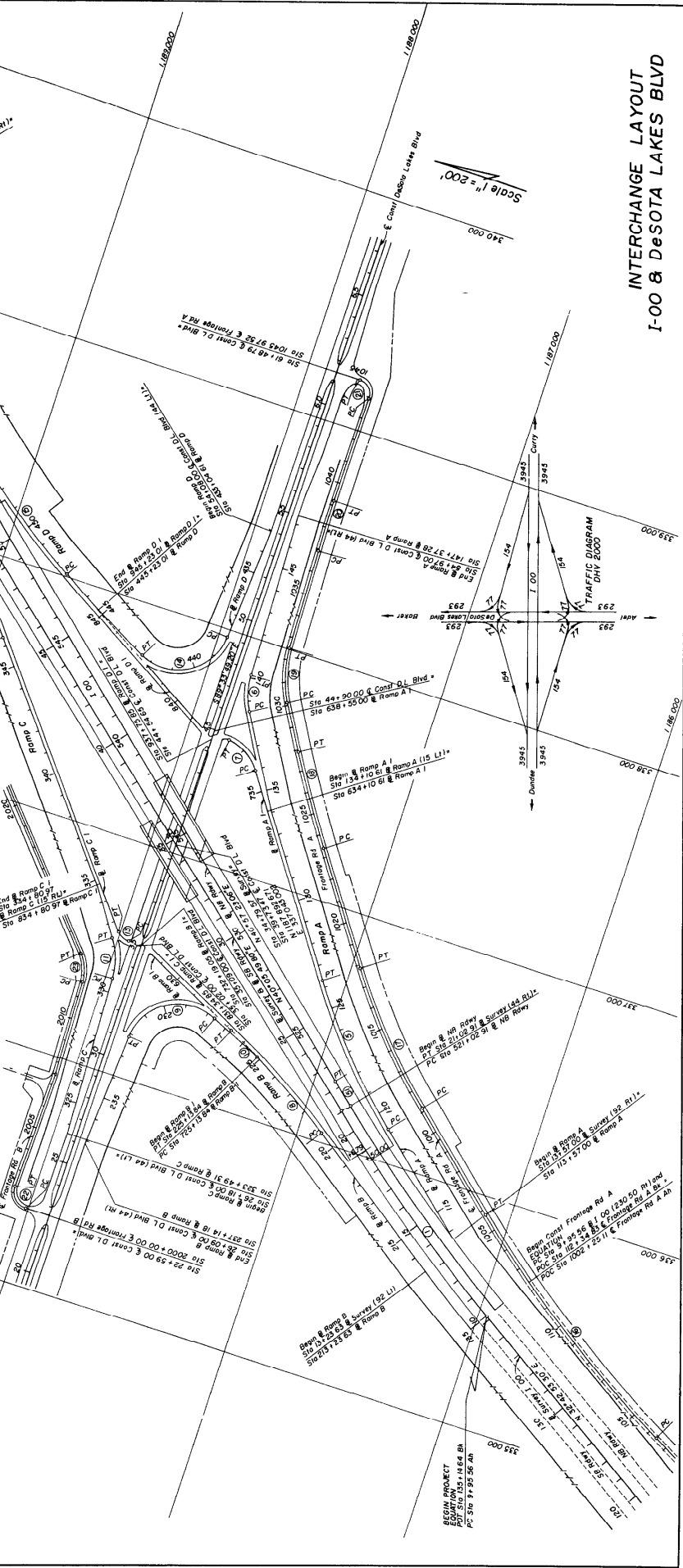
NE 50th St
 PI Sta 6+95.49
 $\Delta = 26^{\circ}30'57''$ LI
 $D = 13^{\circ}28'53''$
 $T = 100.16'$
 $R = 425.00'$
 PC Sta 5+195.35
 PT Sta 7+92.04

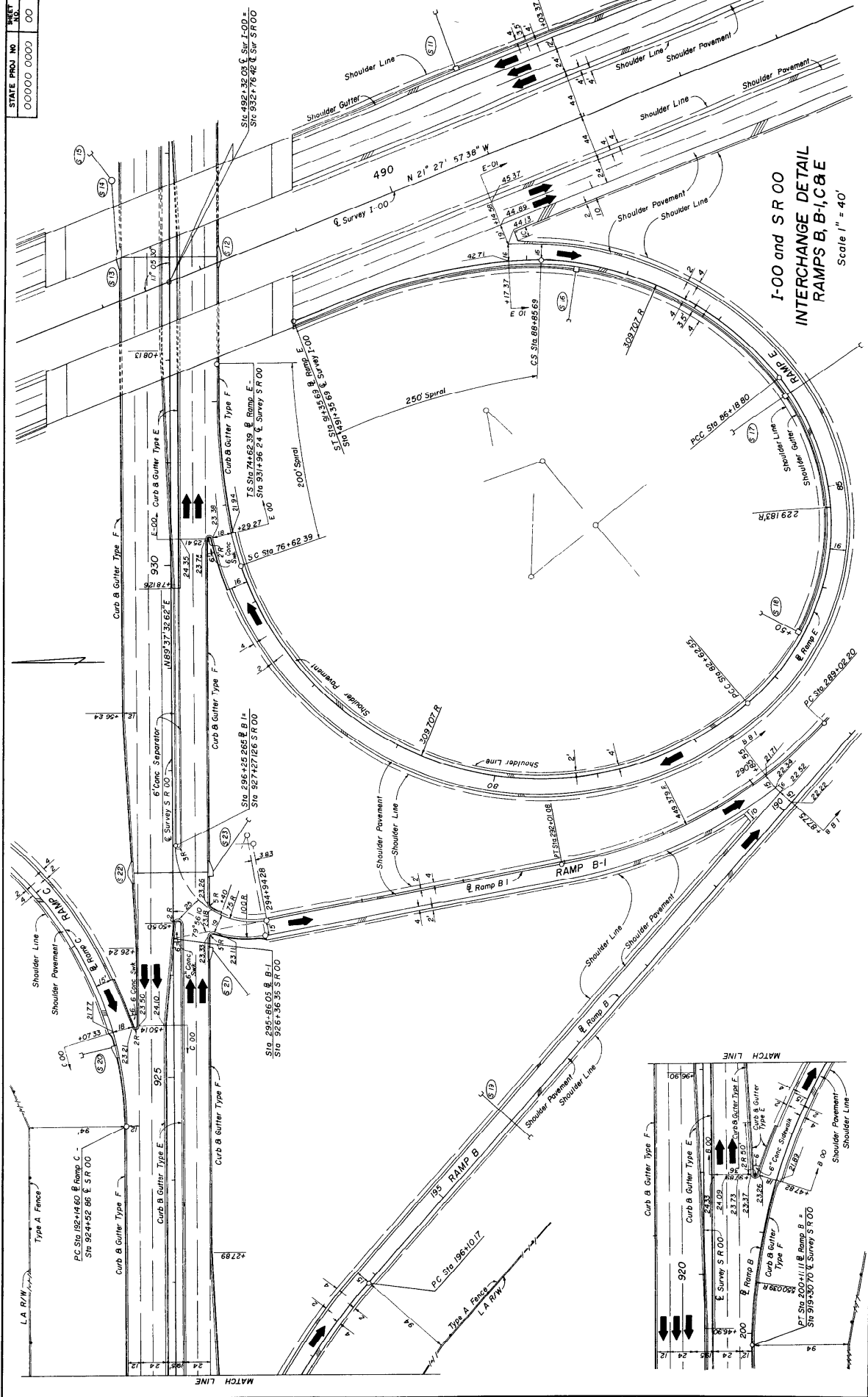
INTERCHANGE LAYOUT
 I-00 & DeSOTA LAKES BLVD

CURVE AND COORDINATE DATA

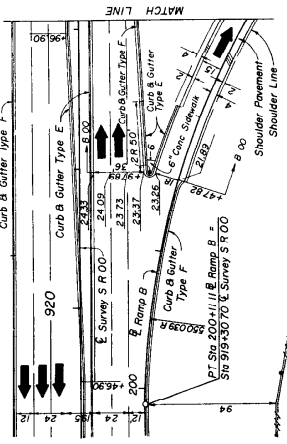
LINE NO.	PC STA	PI STA	PT STA	Δ	D	T	L	R	E	LOC/SP	PC	PI	PT	CENTER
											NORTH	EAST	NORTH	EAST
1	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
2	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
3	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
4	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
5	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
6	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
7	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
8	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
9	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
10	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
11	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
12	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
13	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
14	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
15	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
16	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
17	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
18	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
19	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
20	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
21	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
22	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
23	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
24	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
25	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
26	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203
27	9+5556	101+5000	211+0291	7° 22' 27"	0' 40" 00	55444	107' 25"	83' 34"	37'	026	335+499.573	335+499.551	1166+126.203	1166+126.203

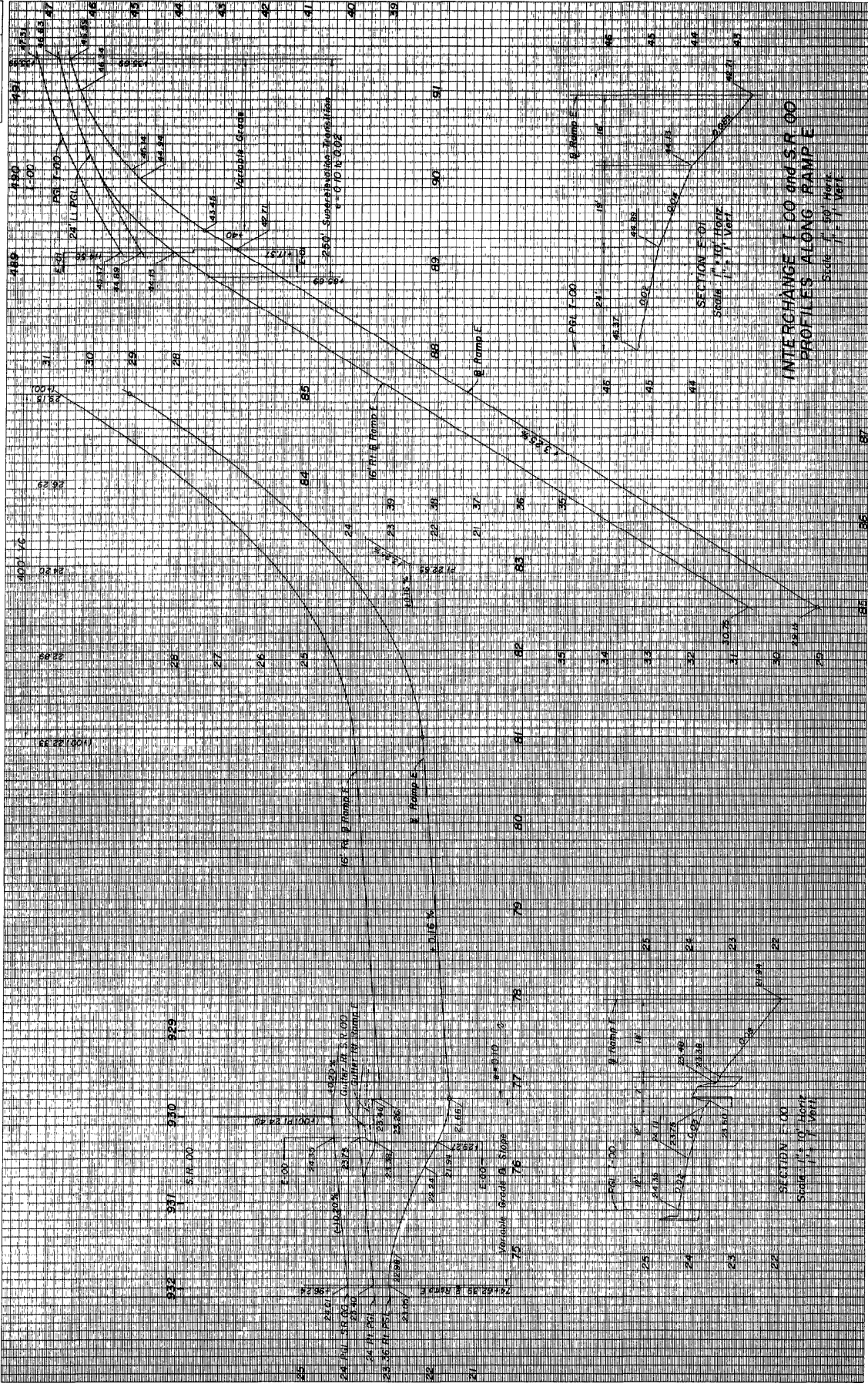
DATA THIS SHEET OR SUPPLEMENT SHEET





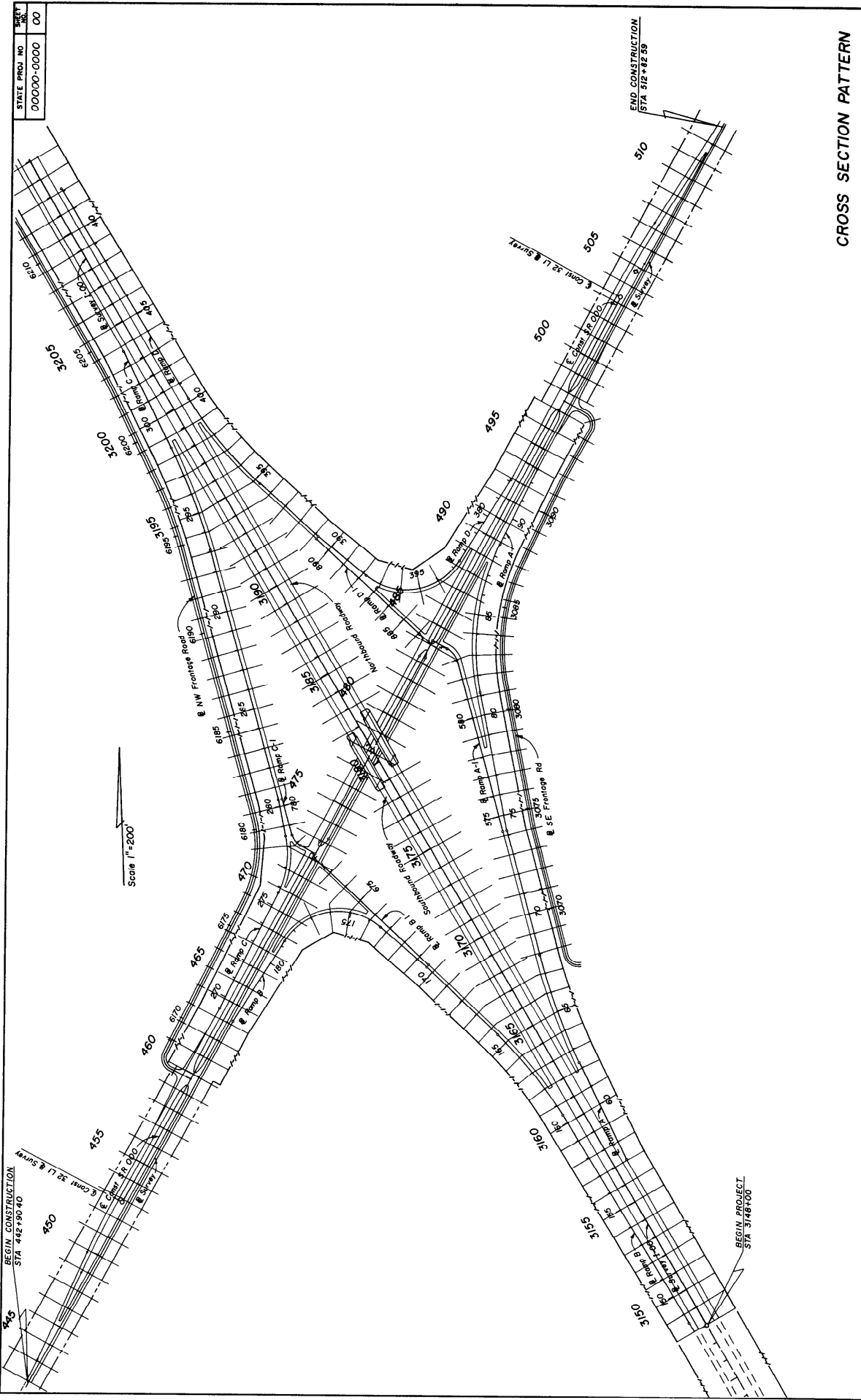
I-00 and S R 00
 INTERCHANGE DETAIL
 RAMPS B, B-1, C & E
 Scale 1" = 40'



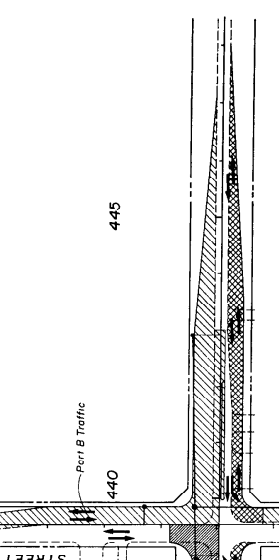


Author	
Checked	
Designed	
Drawn	
Reviewed	
Approved	
Date	
Scale	
Sheet	
Project	
Client	
Contract	
Location	
Notes	

STATE PROJ NO	347
00000-0000	00



CROSS SECTION PATTERN



WEST

PART A (Traffic On Existing Pavement)

1. Construct main storm sewer, construct laterals to median
2. Construct portion of median curb from Station 368 ahead and construct north pavement (indicated by hatched pattern) for left turn storage (EZZZ)

PART B (Westbound Traffic On North Pavement)

1. Remove and replace immediately south of separator. Construct transition curb and pavement from Station 366 to Station 368 (EZZZ). Construct left turn storage (indicated by hatched pattern) for left turn storage (EZZZ). Construct left turn storage (indicated by hatched pattern) for left turn storage (EZZZ).
2. Construct temporary median pavement for crossover from Station 365 to Station 366 (EZZZ)

CENTER

PART A (Traffic On Existing Pavement)

1. Construct main storm sewer, construct laterals
2. Construct separators and north portion of median curb
3. Construct north pavement

PART B (Central Boulevard Traffic On South Pavement, Main Street Traffic On East Pavement)

1. Construct northwest quadrant of intersection (EZZZ)

EAST

PART A (Traffic On Existing Pavement)

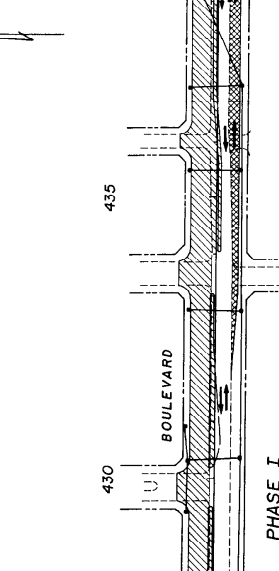
1. Construct temporary pavement along south side of existing pavement
2. Route traffic over part of existing pavement and temporary pavement (EZZZ)
3. Construct storm sewer, construct laterals to median on Central Boulevard east of Main Street and on Main Street
4. Construct curb, north portion of median curbs along Central Boulevard. Construct north pavement and Central Boulevard pavement on Main Street (EZZZ)

PART B (Central Boulevard Traffic On South Pavement, Main Street Traffic On East Pavement)

1. Construct northwest quadrant of intersection (EZZZ)

GENERAL NOTES

1. Maintain two way traffic on the facility and side streets as outlined by Index No. 641
2. Install construction signing prior to commencement of construction and maintain signing during construction in accordance with Index No. 641
3. Access shall be continuously maintained at the Glades Industrial Park located left of Station 429+85
4. Temporary pavement shall be a minimum of 1 asphaltic concrete surface on 6" lime rock base
5. Provide a minimum of 150 feet left turn storage on Central Boulevard at Main Street
6. On weekdays from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM temporary restriction to established traffic lanes will not be permitted



WEST

PART A (Traffic On North Pavement)

1. Complete storm sewer system. Construct temporary pavement on Main Street (EZZZ). Construct separator and south portion of median curb. Construct south pavement on Central Boulevard (indicated by hatched pattern) on Main Street (EZZZ)

PART B (Central Boulevard Traffic On North Pavement, Main Street Traffic On West Pavement)

1. Construct southeast quadrant of intersection (EZZZ)

CENTER

PART A (Traffic On North Pavement)

1. Complete storm sewer. Construct south portion of median curb and construct south pavement

PART B (Central Boulevard Traffic On North Pavement, Main Street Traffic On West Pavement)

1. Construct southeast quadrant of intersection (EZZZ)

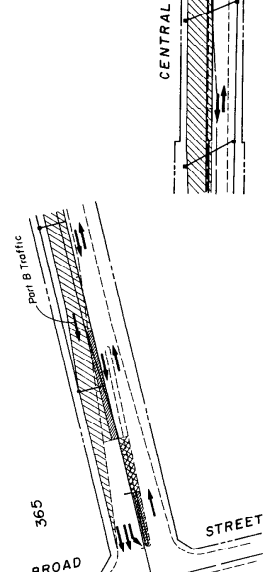
EAST

PART A (Central Boulevard Traffic On North Pavement, Main Street Traffic On East Pavement)

1. Complete storm sewer system. Construct temporary pavement on Main Street (EZZZ). Construct separator and south portion of median curb. Construct south pavement on Central Boulevard (indicated by hatched pattern) on Main Street (EZZZ)

PART B (Central Boulevard Traffic On North Pavement, Main Street Traffic On West Pavement)

1. Construct southeast quadrant of intersection (EZZZ)



WEST

PART A (Traffic On Existing Pavement)

1. Construct main storm sewer, construct laterals to median
2. Construct portion of median curb from Station 368 ahead and construct north pavement (indicated by hatched pattern) for left turn storage (EZZZ)

PART B (Westbound Traffic On North Pavement)

1. Remove and replace immediately south of separator. Construct transition curb and pavement from Station 366 to Station 368 (EZZZ). Construct left turn storage (indicated by hatched pattern) for left turn storage (EZZZ). Construct left turn storage (indicated by hatched pattern) for left turn storage (EZZZ).
2. Construct temporary median pavement for crossover from Station 365 to Station 366 (EZZZ)

CENTER

PART A (Traffic On Existing Pavement)

1. Construct main storm sewer, construct laterals
2. Construct separators and north portion of median curb
3. Construct north pavement

PART B (Central Boulevard Traffic On South Pavement, Main Street Traffic On East Pavement)

1. Construct northwest quadrant of intersection (EZZZ)

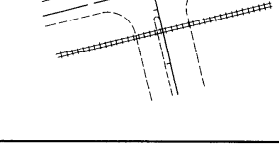
EAST

PART A (Traffic On Existing Pavement)

1. Construct temporary pavement along south side of existing pavement
2. Route traffic over part of existing pavement and temporary pavement (EZZZ)
3. Construct storm sewer, construct laterals to median on Central Boulevard east of Main Street and on Main Street
4. Construct curb, north portion of median curbs along Central Boulevard. Construct north pavement and Central Boulevard pavement on Main Street (EZZZ)

PART B (Central Boulevard Traffic On South Pavement, Main Street Traffic On East Pavement)

1. Construct northwest quadrant of intersection (EZZZ)



WEST

PART A (Traffic On North Pavement)

1. Complete storm sewer. Construct south portion of median curb and construct south pavement (EZZZ)

PART B (Westbound Traffic On North Pavement)

1. Construct separator and adjacent south pavement from Station 365 to Station 366 (EZZZ)

CENTER

PART A (Traffic On North Pavement)

1. Complete storm sewer. Construct south portion of median curb and construct south pavement

PART B (Central Boulevard Traffic On North Pavement, Main Street Traffic On West Pavement)

1. Construct southeast quadrant of intersection (EZZZ)

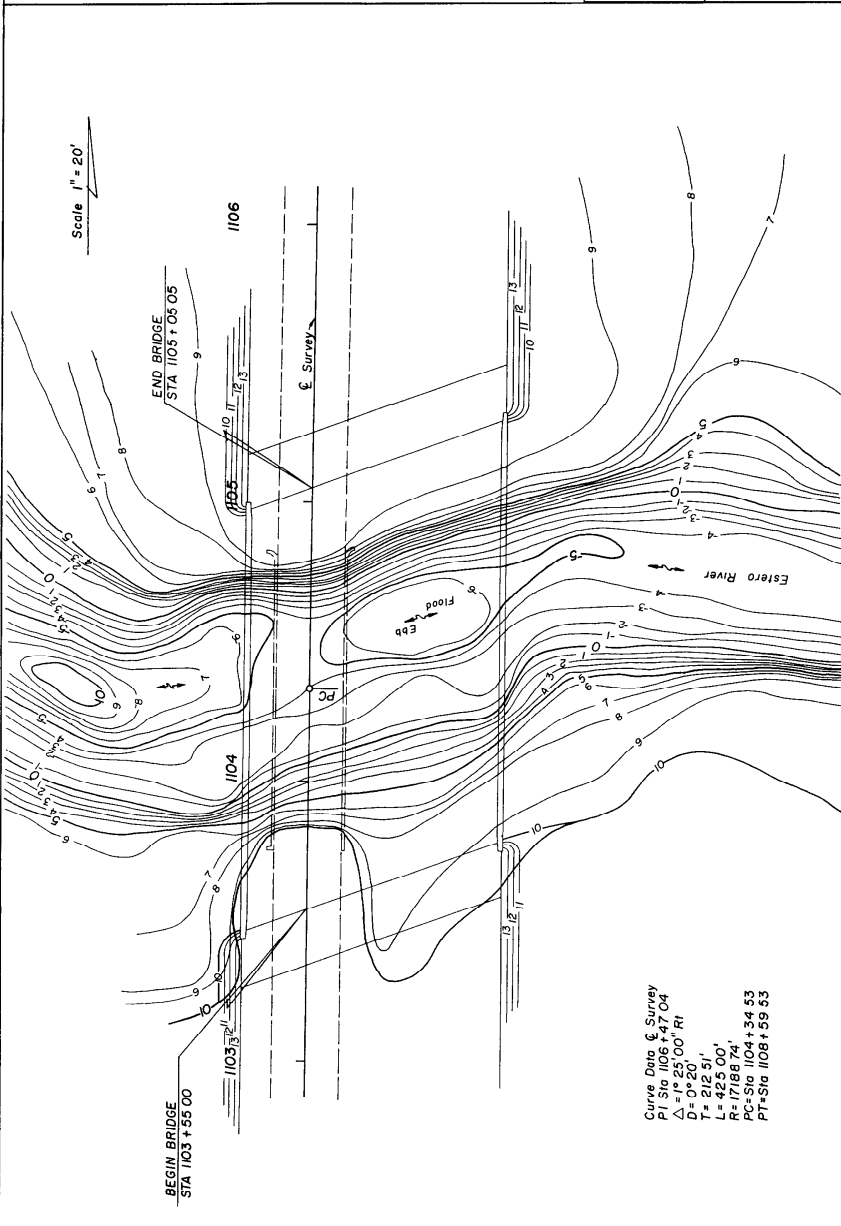
EAST

PART A (Central Boulevard Traffic On North Pavement, Main Street Traffic On East Pavement)

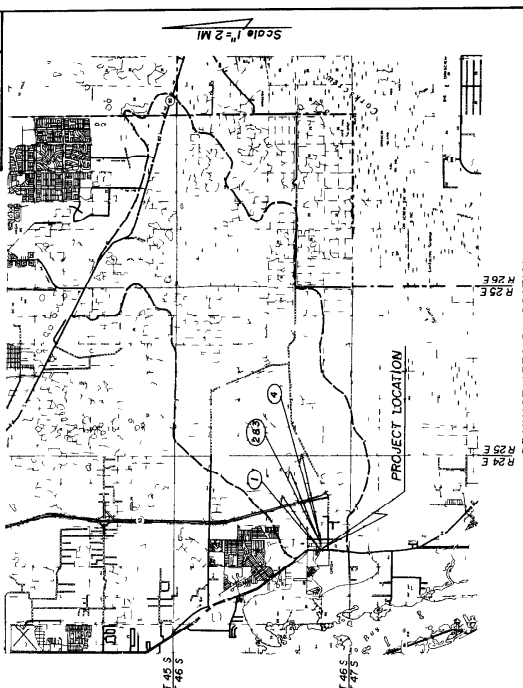
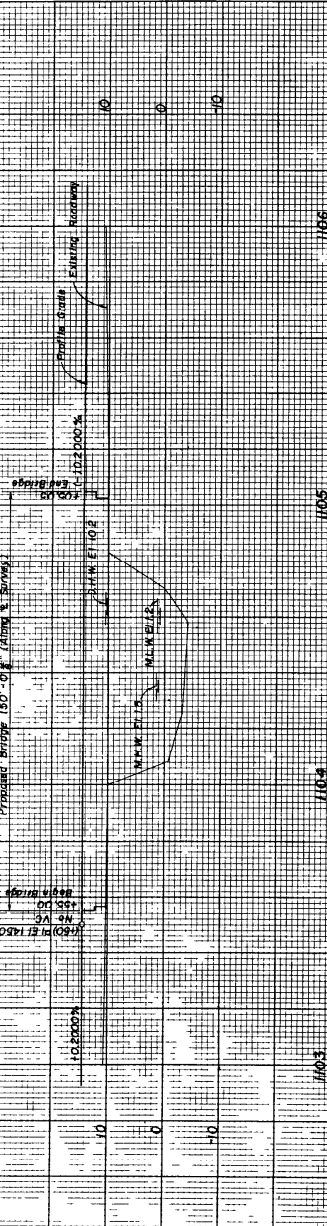
1. Complete storm sewer system. Construct temporary pavement on Main Street (EZZZ). Construct separator and south portion of median curb. Construct south pavement on Central Boulevard (indicated by hatched pattern) on Main Street (EZZZ)

PART B (Central Boulevard Traffic On North Pavement, Main Street Traffic On West Pavement)

1. Construct southeast quadrant of intersection (EZZZ)



Curve Data ξ Survey
 PC=1103+55.00
 PI=1104+00.00
 D=20° 20' 00" RI
 T=212.51'
 L=425.00'
 R=17188.74'
 PC-Sig 1104+34.53
 PT-Sig 1108+59.53



DRAINAGE AREA & LOCATION

(1) REFERENCE	(2) EXISTING STRUCTURES	(3)	(4)	(5)
FOUNDATION	Timber, Pile	Timber	Concrete	Unknown
GENERAL WIDTH	4.0 to 5.2	9.0 to 10.0	4.0 to 5.2	Unknown
SPRINKLE INSTRUCTION	Timber, Steel, Concrete	Timber	Concrete	Unknown
AREA OF OPENING @ P.W.	280 Sq. Ft.	Unknown	Unknown	Unknown
ELEV LOW MEMBER	7.03	11.89	11.89	Unknown

DESIGN DATA - BRIDGE NO. 000000

STRUCTURE RECOMMENDATIONS
 1. DESIGN SPEED 40.0
 2. BRIDGE ROADWAY WIDTH 30.0
 3. SIDEWAYS 2.0
 4. CENTERLINE GRADE 1.0200%

DRAINAGE RECOMMENDATIONS
 5. BEGIN BRIDGE STATION 1103.53 (AS SURVEYED) END BRIDGE STATION 1105.05 (AS SURVEYED) SKEW ANGLE 30.00%
 6. DRAINAGE AREA 78.53 AC
 7. LIMITS OF CHANNEL EXCAVATION RT 10.00 FT LT 10.00 FT
 8. CLEARANCE NAVIGATION HORIZ 25' ABOVE EL 118.11 (LL) DRIFT HORIZ 25' ABOVE EL 110.2
 9. DRAINAGE AREA 78.53 AC NORMAL HIGH WATER EL (NON TIDAL) MHW 150' MAW 20'

10. FLOOD DATA
 STAGE ELEV (NOV) (FT) 116.0 (E)
 AVERAGE VELOCITY (FPS) 3.8
 EXCEEDANCE PROB (%) 0.2%
 FLOOD PROTECT 0.2%

NOTE: The hydraulic data is shown for informational purposes only to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgments and assumptions are required to establish these factors. The resultant hydraulic data is relative to changes particularly on recession conditions. Urbanization, deforestation, and land use changes of this date are considered against the assumption of protection which can not be attained.

DEFINITIONS
 Design Flood: The flood selected by the FDOT to be utilized to assure a standard level of hydraulic performance.
 Base Flood: The flood having a 1% chance of being exceeded in any year (100 Year Frequency).
 100 Year Flood: The flood having a 1% chance of being exceeded in any year (100 Year Frequency).
 Greatest Flood: The most severe flood which can be predicted where overtopping is not practicable normally one with a 0.2% chance of being exceeded in any year (500 Year Frequency).

SCOUR RECOMMENDATION: No significant scour problems are anticipated at this site.

REMARKS: (1) Spring tide (2) Storm surge (3) Storm surge related tide stage occurring Sept. 3, 1959 (4) Base Flood information (5) Hydraulic conditions in Channel Area of Florida, Sept. 29, 1959, 10% water level flood protect the storm discharge and velocity of a storm of 100 year return period.

RECOMMENDED BY DIST. DRAINAGE ENGR. R. A. JOHNSON
 DATE 3/15/60
 CONC. ENGINEER OF DRAINAGE J. R. SMITH