

~~CITY MAP.~~

# STREET CLASSIFICATION MANUAL

ALPHA ASSOCIATES, INCORPORATED

MORGANTOWN, WEST VIRGINIA 26505

# STREET CLASSIFICATION MANUAL

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## INTRODUCTION

In past years, developers and other interested parties have approached the Common Council of the City of Morgantown desiring to have a street right-of-way opened for public use.

Lack of a consistent policy for street opening has resulted in substandard construction of streets in the City of Morgantown.

Therefore, the Common Council of the City of Morgantown is desiring a Uniform Policy of Street Construction to apply in instances where a street is to be opened for traffic or an existing street is to be constructed.

This report addresses various conditions which may be encountered in the design and construction of streets in the City of Morgantown

Minimum design standards computed from acceptable engineering procedures for asphalt and concrete streets are given in the report. In many places, options are outlined so City Council and the City Engineering Department may have flexibility when considering individual cases.

By the construction of a street to the minimum standards recommended, inconvenience to citizens and tax dollars used for maintenance will be minimized.

## PROCEDURE

When a street or roadway is considered for opening or reconstruction, the following steps should be followed:

1. Referral of street(s) in question to the Engineering Department for study and recommendations:

2. Engineering Department Study:  
Areas Covered

A. Plan, Profile and Grade (PP&G)

The length of the street should have a complete up-to-date survey showing the existing layout including:

Right-of-way

Profile of center line, right and left property lines

Intersection with other roadways

Existing drainage

Existing utilities

Existing roadways, driveways, steps, walls, etc.

Abutting property owners identifying the deedbook and page where title is recorded

Enroachment on right-of-way with fences, shrubs, etc.

Proposed, engineered grade for acceptance by Council as a permanent grade

B. Utilities: Sanitary sewer, gas, water, electric, phone

Existing utilities (if any) should be shown on the PP&G.

Utility companies should be contacted as to what plans should be made to accommodate underground and overhead services.

Proposed utility locations should be shown on the PP&G.

#### C. Drainage

Drainage is the single most important factor to consider in roadway construction. Engineering evaluation should consider surface and sub-surface water and how it should be controlled. Storm sewers, underdrains, and necessary drainage should be planned for and shown on the P.P. & G.

#### D. Soil Support Values

The engineering evaluation should assign a value of good, fair or poor to the soil base in the area. Knowledge of local conditions and publications from the Soil Conservation Service and other governmental agencies can aid in this determination.

#### E. Intersection Design

Information from the Police Department on accident frequency and input from the Traffic Commission can aid in signing, striping, signaling and lighting requirements.

Pedestrian traffic, with consideration for handicap accessibility and usage should be addressed.

Visual obstructions such as hedges and fences should be studied so adequate sight distances are realized for vehicular and pedestrian safety.

#### F. Engineering Recommendation

After compiling the necessary information, the Engineering Department should report the following to City Council:

1. A recommended PP&G for adoption
2. Utility requirements
3. Drainage requirements
4. Pavement design thicknesses required
5. Cost estimates and recommendations for type of pavement and for sidewalk and curb construction
6. Additional Right-of-way requirements, if necessary
7. Location of driveway entrances for abutting property access

The implementation of the street construction could be accomplished in stages. A recommended sequence would be for the drainage and base stone to be placed initially. After construction has been completed on property adjacent to the street, fine grading, paving and sidewalk construction would proceed. The sequence of events should be determined by the City Engineering Department as part of its recommendation to City Council.

## STREET CLASSIFICATION INDEX

The following pages list Morgantown city streets according to the Street Classification Definitions. The lists were compiled after observing traffic patterns and A.D.T. traffic counts.

If future observations suggest a certain street has changed traffic characteristics, the City Engineering Department could evaluate the situation and recommend the street in question be re-classified.

## STREET CLASSIFICATION DEFINITIONS

1. Alley or Lane: A minor way used or intended to be used primarily for vehicular service access to the rear or side of properties other wise abutting a street.
2. Cul-De-Sac: A street serving primarily residential uses and having one end open to traffic and the other end terminated by a vehicular turn-around.
3. Minor Street: A street which is used or intended to be used primarily for access to abutting properties, which services or is intended to serve primarily residential structures and which is not identified as a Major Street, Collector Street, Arterial Street or Business Street.
4. Major Street: A street which is used or intended to serve primarily residential structures, who major purpose is to move traffic and whose secondary purpose is to serve abutting residential dwellings.
5. Collector Street: A street which carries traffic from business and residential sections to the arterial street system.
6. Arterial Street: A major thoroughfare or highway which is used primarily as a route through town or from one section of the city to another.
7. Business Street: A street, the predominate use of which is to provide access to abutting business, commercial, or industrial properties.
8. State Highway System: A roadway which is maintained by the West Virginia Department of Highways and is either a primary or secondary route in the State Highway System.

## STATE STREETS

STREET	FROM	TO
Boulevard	City Limits	Beechurst
Beechurst Ave.	Eighth St.	University Ave.
Route 7	City Limits	East Brockway
Brockway Ave.	South Walnut St.	East Brockway
East Brockway Ave.	Brockway Ave.	Rodgers St.
Dug Hill Road	Sabraton Ave.	City Limits
Hartman Run Road	Route 7	City Limits
Ices Ferry Road	College Ave.	City Limits
College Ave.	University Ave.	Ices Ferry Road
Willey St.	University Ave.	Ices Ferry Road
South Walnut St.	Cobun Ave.	Brockway Ave.
Cobun Ave.	South Walnut	Pleasant St.
Green Bag (Rt. 64)	City Limits (Near Mall)	City Limits
University Ave.	Beechurst Ave.	City Limits
Patterson Drive	Boulevard	University Ave.
VanVoorhis Road	University Ave.	City Limits
Collins Ferry Road	University Ave.	City Limits
University Ave.	Collins Ferry Road	Patterson Drive
Burroughs St.	Collins Ferry Road	VanVoorhis Road
Chestnut Ridge	VanVoorhis Road	City Limits
Pleasant St.	University Ave.	Cobun Ave.
Walnut St.	University Ave.	Brockway Ave.
Fayette St.	University Ave.	Spruce St.
High St.	Willey St.	Pleasant St.
Old Route 7	(Along Decker's Creek)	

## BUSINESS STREETS

STREET	FROM	TO
Warren St.	University Ave.	End
Donley St.	University Ave.	End
Mechanic St.	University Ave.	End
Hurley St.	University Ave.	End
Wharf St.	University Ave.	End
Clay St.	Wharf St.	Donley St.
Foundary St.	University Ave.	High St.
Kirk St.	University Ave.	Pleasant St.
Garrett St.	Moore St.	University Ave
Moore St.	University Ave.	Garrett St.
Walnut St.	University Ave.	The River
Water St.	End	End
Fayette St.	University Ave.	Water St.
Reed St.	Chestnut St.	Beechurst Ave
Chestnut St.	Willey St.	Foundary St.
First St.	Beechurst Ave.	End
Third St.	Beechurst Ave.	End
Hall St.	Third St.	First St.
Fourth St.	Beechurst Ave.	End
Fifth St.	Beechurst Ave.	End
Sixth St.	Beechurst Ave.	End
Irwin St.	Sixth St.	Fourth St.

## ARTERIAL STREETS

STREET	FROM	TO
Dorsey Ave.	University Ave.	City Limits
High St.	Pleasant St.	South High St.
South High St.	High St.	Dorsey Ave.
Grand St.	Cobun Ave.	Ross St.
Ross St.	Grand St.	City Limits
Wilson Road	Grand St.	White Ave.
White Ave.	Wilson Ave.	Old Route 7
Diamond St.	Carnegie St.	City Limits
Carnegie St.	Eljadio St.	Diamond St.
Sturgiss St.	Dug Hill Road	Route 7
Eljadid St.	Carnegie St.	Sturgiss St.
Sabraton Ave.	Rosemont St.	Dug Hill Road
Richwood Ave.	Willey St.	Rosemont St.
Prospect St.	Willey St.	North High St.
Prospect St.	North High St.	University Ave.
North High St.	Prospect St.	Willey St.
Hough St.	University Ave.	Beechurst Ave.
University Ave.	College Ave.	Patterson Drive
University Ave.	Baldwin St.	City Limits
Eighth St.	University Ave.	Beechurst Ave.
Willow Dale	Stewart St.	City Limits
Campus Drive	University Ave.	Beechurst Ave.
Stewart St.	University Ave.	City Limits
Falling Run Road	University Ave.	Protzman St.
Protzman St.	Falling Run Road	VanGilder St.
Mineral Ave.	Darst St.	Columbia St.

## COLLECTOR STREETS

STREET	FROM	TO
Valley View St.	Anderson Ave.	City Limits
Anderson Ave.	Valley View St.	Vista Place
Aspen St.	Anderson Ave.	Western Ave.
Western Ave.	Aspen St.	City Limits
Junior Ave.	Western Ave.	University Ave.
Killarney Dr.	Collins Ferry Road	City Limits
Pocahontas Ave.	Collins Ferry Road	University Ave.
Laurel St.	University Ave.	Patterson Drive
Baldwin St.	University Ave.	Patterson Drive
Oakland St.	Riverview Drive	Country Club Rd
Country Club Road	Oakland St.	Inglewood Blvd.
Evansdale Dr.	University Ave.	Dudley St.
McCullough Ave.	Willow Dale Road	Hoffman Ave.
VanGilder St.	Keyser St.	Stewart St.
North St.	University Ave.	Grove St.
Grove St.	North St.	Willow Dale Rd.
Afton St.	Grove St.	Willow Dale Rd.
Jones Ave.	North St.	Stewart St.
Grant Ave.	Eighth St.	Campus Drive
Yoke St.	Stewart St.	Falling Run Rd.
Cornell Ave.	College Ave.	Willey St.
Glendon Ave.	North High St.	Price St.
Price St.	Cornell Ave.	Willey St.
North High St.	Glendon Ave.	Prospect St.
Snider St.	Richwood Ave.	N Willey St.
Monongalia Ave.	Richwood Ave.	N Willey St.
James St.	Monongalia Ave.	Richwood Ave.
Charles Ave.	James St.	Hampton Ave.
Darst St.	Richwood Ave.	Hampton Ave.
Elkins St.	Darst Ave.	Richwood Ave.
Columbia St.	Richwood Ave.	Mineral Ave.
East Brockway	Rodgers St.	White Ave.
Hershman St.	East Brockway Ave.	White Ave.

## COLLECTOR STREETS

STREET	FROM	TO
Tremont Ave.	Rosemont St.	Colmar St.
Rosemont St.	Sabraton Ave.	Addison St.
Hillcrest St.	Sabraton Ave.	Folger Ave.
Cross St.	Folger Ave.	City Limits
Listravia Ave.	Dug Hill Road	Lincova St.
South Hills Drive	Courtney Ave.	VanDalia Road
Vandalia Road	South Hills Drive	White Ave.
Buckhannon Ave.	Jackson Ave.	Courtney Ave.
Maple Ave.	Grand St.	Buckhannon Ave.
Simpson St.	South High Street	Wilson Ave.
Prairie Ave.	University Ave.	South High St.
Wilson Ave.	Simpson St.	Grand St.
Wagner Road	Simpson St.	Dorsey Ave.
Leonard St.	Madigan Ave.	W Virginia Ave.
W Virginia Ave.	Dorsey Ave.	Mississippi St.
Callen Ave.	Mississippi St.	University Ave.
Barrickman St.	Madigan Ave.	Dorsey Ave.
Madigan Ave.	Barrickman St.	Mississippi St.
Mississippi St.	Callen Ave.	Green Bag Road
Hite St.	Dorsey Ave.	E Parkway Ave.
E Parkway Ave.	Hite St.	Mississippi St.

## BASIC DESIGN CRITERIA

There are several accepted formulas for the design of bituminous concrete (asphalt) pavement and concrete pavement. These formulas have been developed by highway institutes and material research institutes. Different state and local government agencies have modified these formulas and design guidelines to adapt for a range of various local conditions.

Basically all pavement design considers three basic parameters.

1. Quantity of traffic
2. Load of different vehicles
3. Support value of the underlying soil.

The quantity of traffic is the value most easily measured. Two basic types of traffic counts are conducted.

The first is the manual count. This type is subject to human error and will generally cost more than the automatic type. An advantage to the manual count is that the numbers of the different classes of vehicles may be noted.

The automatic count is less expensive, and able to be used over a wider area for a longer period of time. A disadvantage is that only the number of vehicles, regardless of weight, is counted.

Data gathered by the West Virginia Department of Highways (D.O.H.) is presented on page . These figures are for City Streets which feed into the State system.

Counters are usually left in place for one week. Numbers given are referred to as the Average Daily Traffic (ADT) which are the number of cars passing over the counting point in 24 hours, traveling both ways.

An in depth manual count is the only way to get reliable data for this figure. Since the D.O.H. uses automatic counters and no other information was available, interviews were held with members of the Morgantown Police Department and the Morgantown Street Department. From these interviews, a weight breakdown was arbitrarily assigned. These figures appear of page.

The figures represent what would be an average over a 20-year projected period.

The support value of the underlying soil can be determined from field investigation and laboratory testing. Data of this type has not been gathered and since the scope of this report was not intended to examine each individual case, three basic conditions were evaluated.

A value of good, fair or poor was assigned to each type of soil condition and subsequent pavement design figured for each of the three conditions.

Other factors considered in some of the design formulas are frost action, annual precipitation, impact loading and vibration.

To arrive at the recommended design thicknesses, representative formulas were solved using the parameters described above. The figures recommended fall within acceptable ranges of these formulas.

Other options which may be considered when designing street construction include:

1. SURFACE TEXTURE

- a. Asphalt - different mix designs may be incorporated which would result in skid resistance or smoother surface texture. Department of Highways Specifications should be followed when designing these special mixes.

- b. Concrete - grooving or scoring of the surface may be accomplished to improve drainage and wet weather riding conditions. Grooves should be no larger than the smallest coarse aggregate size.

## 2. SPEED CONTROL

Speed bumps are an acceptable method of speed control when designed to not cause vehicle damage and proper warning (signing) is given.

## DESIGN REFERENCES

TEXTS

Highway Engineering - Third Edition  
Ogelsby - John Wiley & Sons - 1975

Highway Engineering Handbook - Fifth Edition  
Woods, Berry, Goetz - McGraw-Hill - 1974

Highway Engineering  
Ritter & Paquette - Ronald Press - 1967

Design of Concrete Structures  
Winter & Nelson - McGraw-Hill - 1972

OTHER

West Virginia Department of Highways  
Annual Traffic Count Data - 1979

West Virginia Department of Highways  
Pavement Design Manual - 1966

American Association of State Highway Officials  
Standard Specifications for Highway Bridges - Tenth Edition

American Association of State Highway Officials  
Design Methods for Concrete Pavement

Portland Cement Association  
Concrete Thickness Design

National Asphalt Pavement Association - Riverdale, Maryland  
Various Publications

The Asphalt Institute - College Park, Maryland  
Various Publications

TRAFFIC COUNTS - 1979  
 Conducted by West Virginia Department of Highways

City Street	ADT = 24 hours bothways	Classification
Prospect (High to College)	6500	Arterial
North High (Prospect to Willey)	3000	Arterial
South High (Bridge to Simpson)	7000	Arterial
Charles (above DesMoines)	1000	Collector
Willowdale (outside city)	8500	State
Simpson (east of South High)	2000	Collector
Callen (University to Mississippi)	2000	Collector
Richwood (Snider)	6500	Arterial
Dorsey (before Hite)	6000	Arterial
Junior (off University)	4000	Collector
Jones (off North)	2000	Collector
Maple (Grand to Park)	400	Major
Wilson (off Park)	1500	Arterial
Richwood (past Charles)	6000	Arterial
Campus (below McClane)	5000	Arterial
Stewart (Willowdale-VanGilder)	3500	Arterial
Eljadid (before Bridge)	1000	Arterial

## VEHICULAR CLASSIFICATIONS

Class A - Gross Vehicle Weight<sup>1</sup> (GVW) less than 6000 pounds. Passenger cars, pick-up trucks, station wagons, vans.  
Load Factor<sup>2</sup> = 85%

Class B - GVW between 6000 and 12,000 pounds  
Single-axle delivery type vehicles; milk trucks, laundry trucks, supply vans.  
Load Factor = 12%

Class C - GVW between 12,000 and 20,000 pounds  
Single-axle heavy duty; dump trucks, school buses, street sweeper  
Load Factor = 2%

Class D - GVW between 20,000 and 40,000 pounds  
Dual axle; moving vans, fire engine, garbage truck.  
Load Factor = 0.5%

Class E - GVW between 40,000 and 50,000 pounds  
Dual axle = concrete blocks, mix-in-transit concrete, low-boy moving heavy equipment  
Load Factor = 0.4%

Class F - GVW greater than 50,000 pounds  
Dual or tri-axle = coal trucks, street flusher, low-boy heaving moving large equipment, stone and gravel trucks  
Load Factor = 0.1%

1 = GVW = total weight of vehicle and load in vehicle

2 = Load Factor = percentage of A.D.T. traffic count which has the GVW range listed. This is an arbitrarily estimated, 20 year average.

## 1. BUSINESS STREET: ADT (200-2000)

## a) Asphalt Pavement

Soil Base Condition

Good | Fair | Poor |

BASE

#4 Stone	-	4"	7"
#1 Stone	5"	4"	4"
Total	5"	8"	11"

PRIME COAT

- 0.3 to 0.6 gal/sy-

PAVEMENT

Base Course	1-1/2"	2"	3"
Wearing Course	1-1/2"	2"	2"
Total	3"	4"	5"

FULL DEPTH ASPHALT (NO BASE)

6" 8" 10"

## b) Concrete Pavement (4000 p.s.i.)

PAVEMENT

5" 5" 5"

BASE (#4 Stone)

0 - 4"

(#1 Stone)

- 2" -

RE-INF

#3 bars on 12" c-c

#3 bars Longitudinal on 12" c-c (Temperature)

SLUMP

4" Maximum

AIR ENTRAINMENT

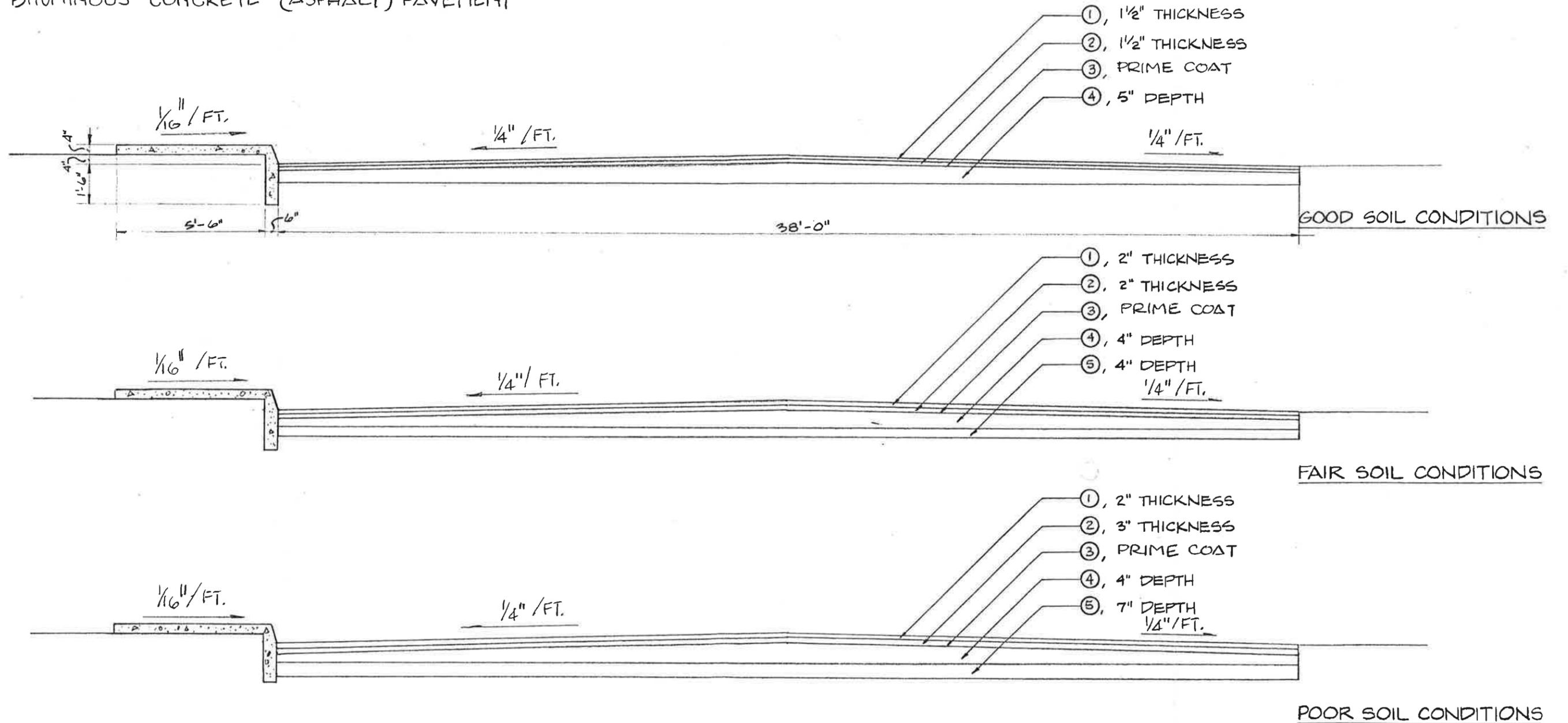
7-1/2% + 1-1/2%

JOINTS

40' maximum

BUSINESS STREET

BITUMINOUS CONCRETE (ASPHALT) PAVEMENT



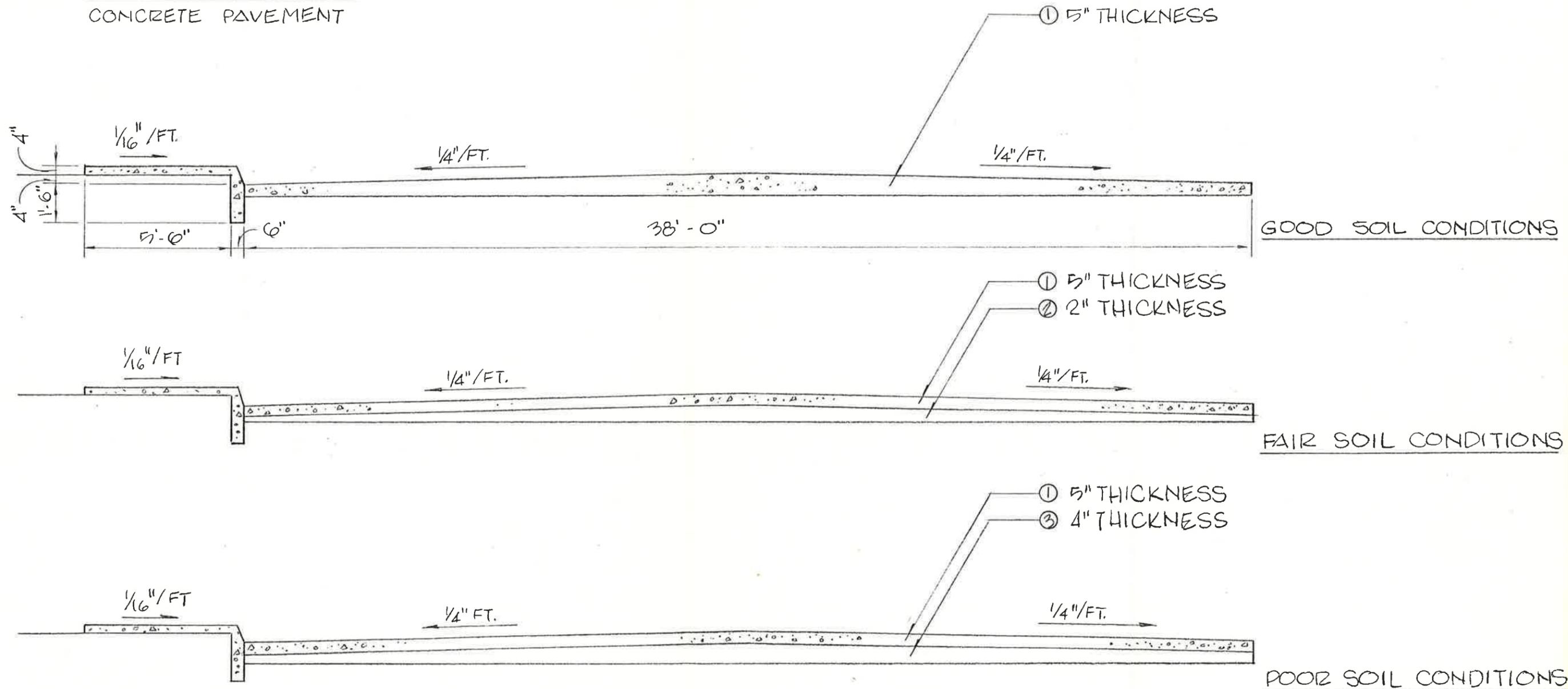
- ① WEARING COURSE
- ② BASE COURSE
- ③ PRIME COAT 0.3-0.6 GAL./SQ.YD.

- ④ #1 STONE
- ⑤ #4 STONE

ALL WORK, MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>	
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>	
SCALE: 1" = 4'	DESIGNED BY: L.J.D. SHEET NO.
DATE: 11-26-80	DRAWN BY: P.B. 19

BUSINESS STREET  
CONCRETE PAVEMENT



- ① CONCRETE PAVEMENT
- ② #1 STONE
- ③ #4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>		
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>		
SCALE: 1" = 4'	DESIGNED BY: L.J.D.	SHEET NO.
DATE: 11-26-80	DRAWN BY: R.C.M.	20

## 2. ARTERIAL STREET: ADT (5000-8000)

## a) Asphalt Pavement

Soil Base Condition

Good | Fair | Poor |

BASE

#4 Stone	4"	5"	6"
#1 Stone	2"	4"	6"
Total	6"	9"	12"

PRIME COAT

- 0.3 to 0.6 gal/sy-

PAVEMENT

Base Course	1-1/2"	2"	3"
Wearing Course	1-1/2"	2"	2"
Total	3"	4"	5"

FULL DEPTH ASPHALT (NO BASE)

6" 8" 10"

## b) Concrete Pavement (4000 p.s.i.)

PAVEMENT

6" 6" 6.5"

BASE (#4 Stone)

- - 4"

(#1 Stone)

- 2" -

RE-INF

6" x 6" x 10/10 (welded wire fabric)

#3 bars Longitudinal on 12" c-c (Temperature)

SLUMP

4" maximum

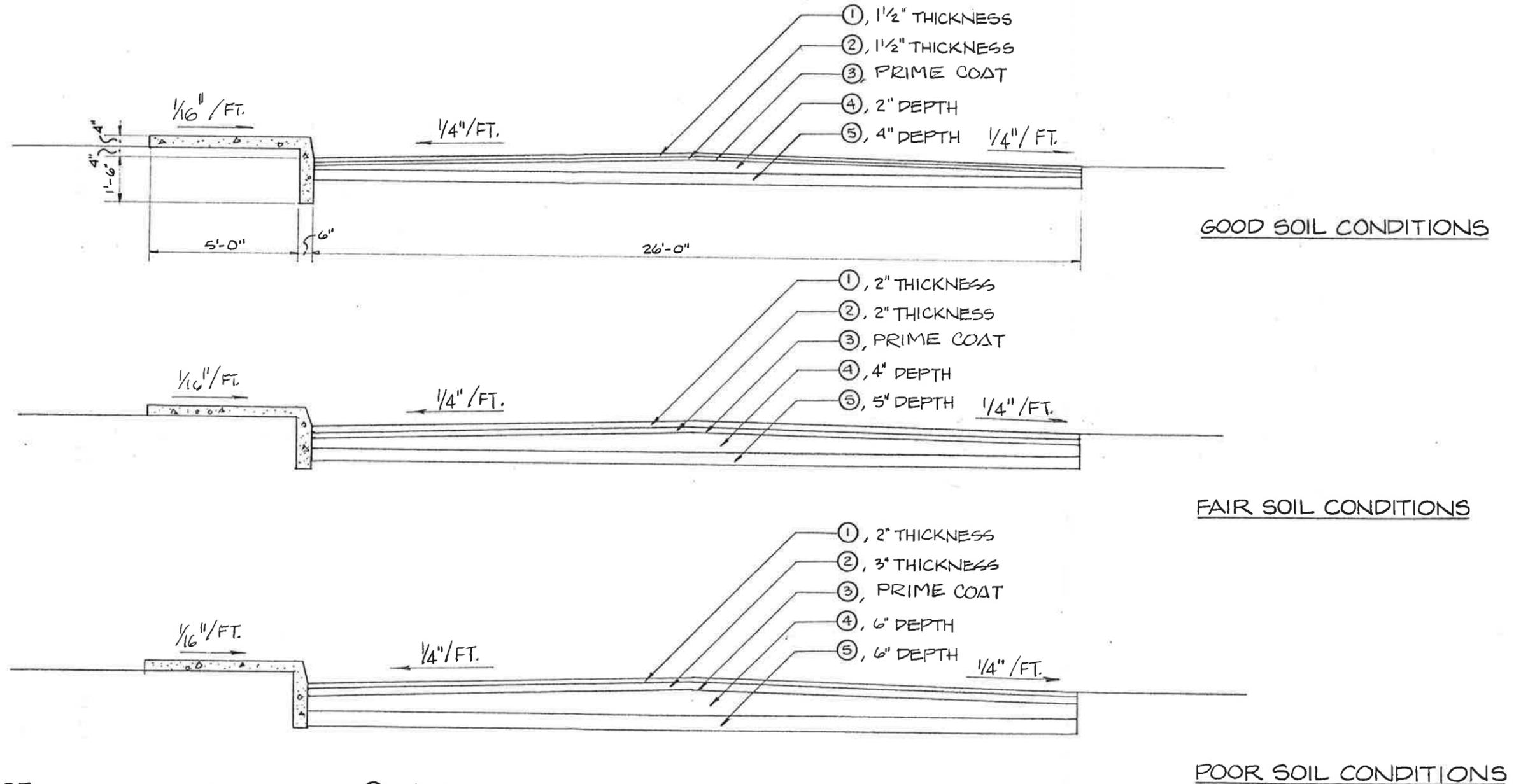
AIR ENTRAINMENT

7 1/2% + 1 1/2%

JOINTS

40' maximum

ARTERIAL STREET  
BITUMINOUS CONCRETE (ASPHALT) PAVEMENT



GOOD SOIL CONDITIONS

FAIR SOIL CONDITIONS

POOR SOIL CONDITIONS

- ① WEARING COURSE
- ② BASE COURSE
- ③ PRIME COAT 0.3-0.6 GAL./SQ. YD.

- ④ #1 STONE
- ⑤ #4 STONE

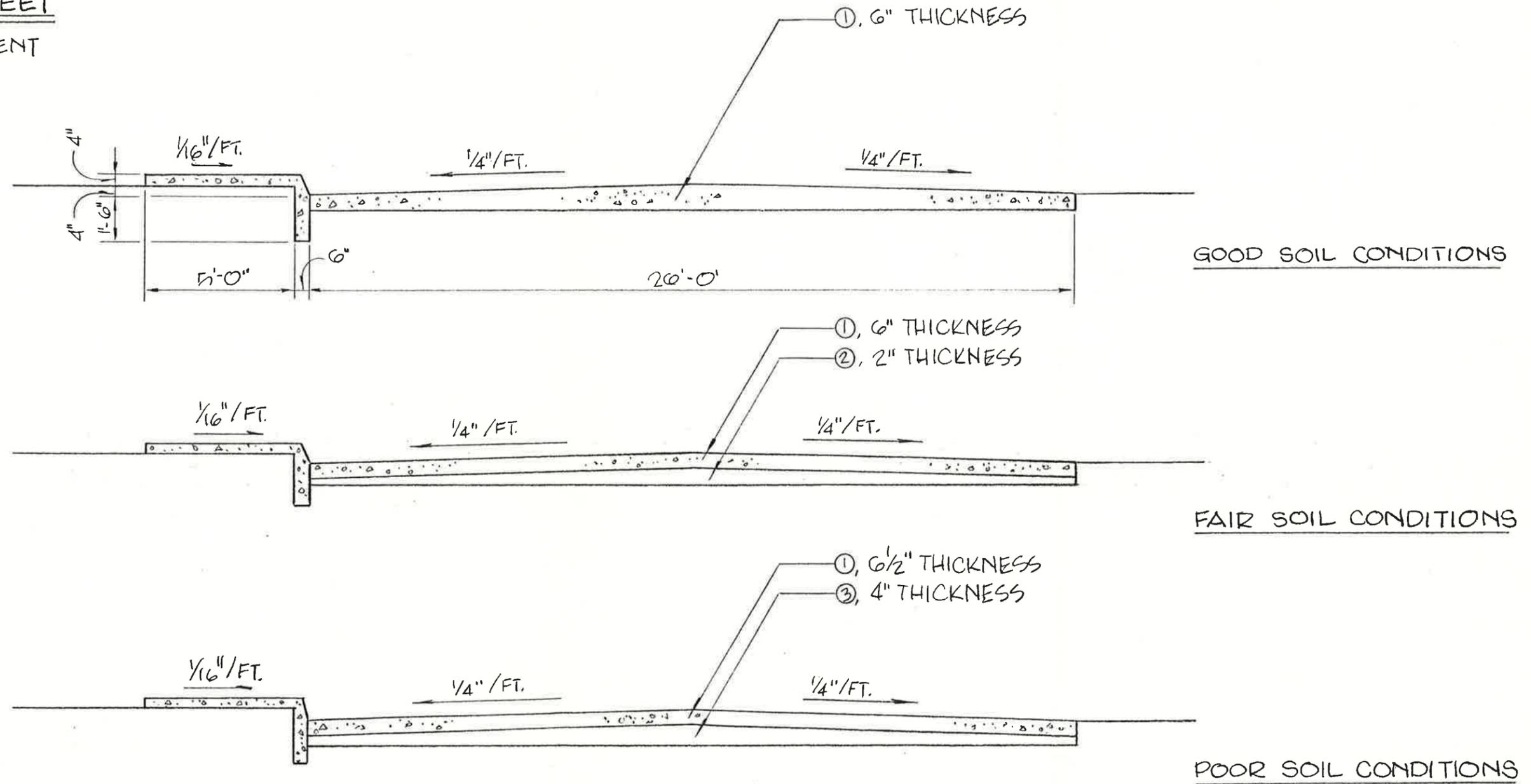
ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS

ALPHA ASSOCIATES  
INCORPORATED

DESIGN STANDARDS  
STREET CLASSIFICATIONS

SCALE: 1" = 4'    DESIGNED BY: L. J. D.    SHEET NO. 22  
DATE: 11-26-80    DRAWN BY: P. B.

ARTERIAL STREET  
CONCRETE PAVEMENT



- ① CONCRETE PAVEMENT
- ② #1 STONE
- ③ #4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS

<b>ALPHA ASSOCIATES INCORPORATED</b>		
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>		
SCALE: 1" = 4'	DESIGNED BY: L. J. D.	SHEET NO.
DATE: 11-26-80	DRAWN BY: R. C. M.	23

## 3. COLLECTOR STREET: ADT (2000-6000)

Soil Base Condition

## a) Asphalt Pavement

Good | Fair | Poor |

BASE

#4 Stone	-	4"	7"
#1 Stone	5"	4"	4"
Total	5"	8"	11"

PRIME COAT

- 0.3 to 0.6 gal/sy-

PAVEMENT

Base Course	1-1/2"	2"	3"
Wearing Course	1-1/2"	2"	2"
Total	3"	4"	5"

FULL DEPTH ASPHALT (NO BASE)

6" 8" 10"

## b) Concrete Pavement (3500 p.s.i.)

PAVEMENT

6" 6" 6"

BASE (#4 Stone)

- - 4"

(#1 Stone)

- 2" -

REINFORCEMENT

6" x 6" x 10/10 (welded wire fabric)

#3 bars Longitudinal on 12" c-c (Temperature)

SLUMP

4" Maximum

AIR ENTRAINMENT

7-1/2% + 1-1/2%

JOINTS

40' maximum

## 4. MAJOR STREET: (ADT 1000-5000)

Soil Base Condition

## a) Asphalt Pavement

Good | Fair | Poor |

BASE

#4 Stone	-	4"	7"
#1 Stone	5"	4"	4"
Total	5"	8"	11"

PRIME COAT

- 0.3 to 0.6 gal/sy-

PAVEMENT

Base Course	1-1/2"	2"	3"
Wearing Course	1-1/2"	2"	2"
Total	3"	4"	5"

FULL DEPTH ASPHALT (NO BASE)

6" 8" 10"

## b) Concrete Pavement (4000 p.s.i.)

PAVEMENT

5" 6" 6"

BASE (#4 Stone)

- - 4"

(#1 Stone)

- 2" -

REINFORCEMENT

6" x 6" x 10/10 (welded wire fabric)

#3 bars Longitudinal on 12" c-c (Temperature)

SLUMP

4" Maximum

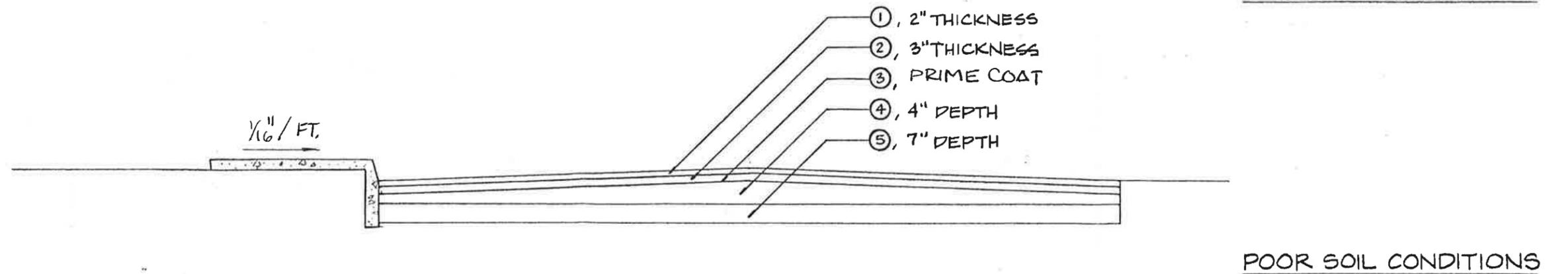
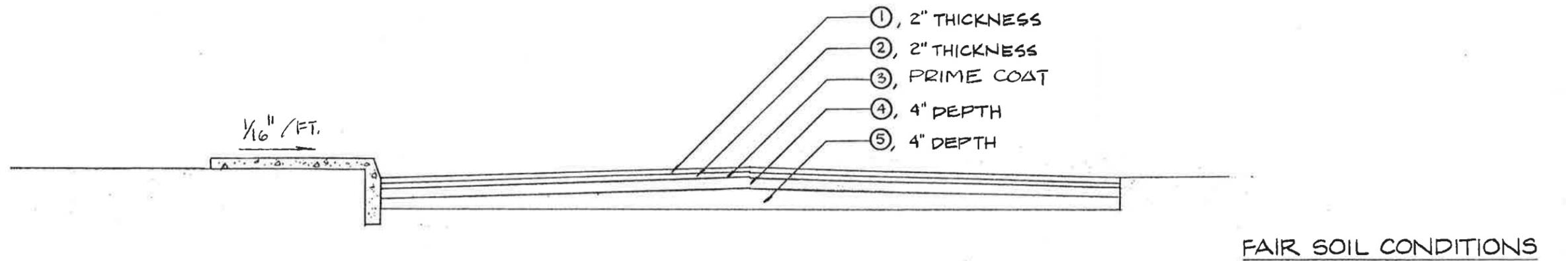
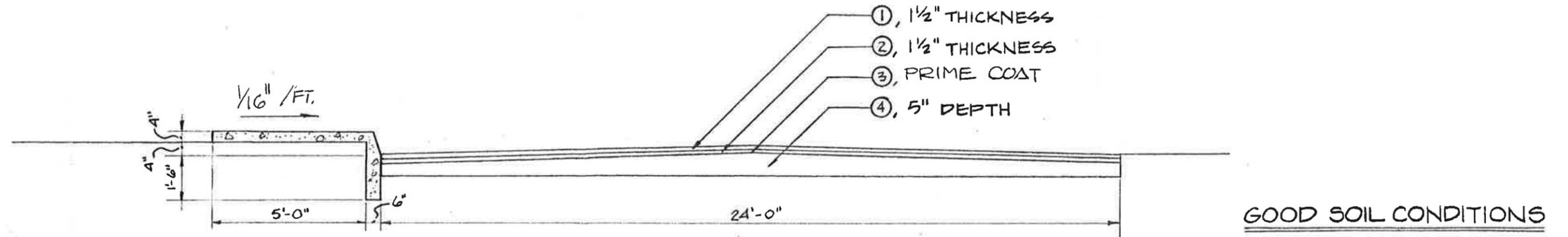
AIR ENTRAINMENT

7-1/2% + 1-1/2%

JOINTS

40' maximum

MAJOR AND COLLECTOR STREETS  
BITUMINOUS CONCRETE (ASPHALT) PAVEMENT



- ① WEARING COURSE
- ② BASE COURSE
- ③ PRIME COAT 0.3-0.6 GAL./SQ.YD.

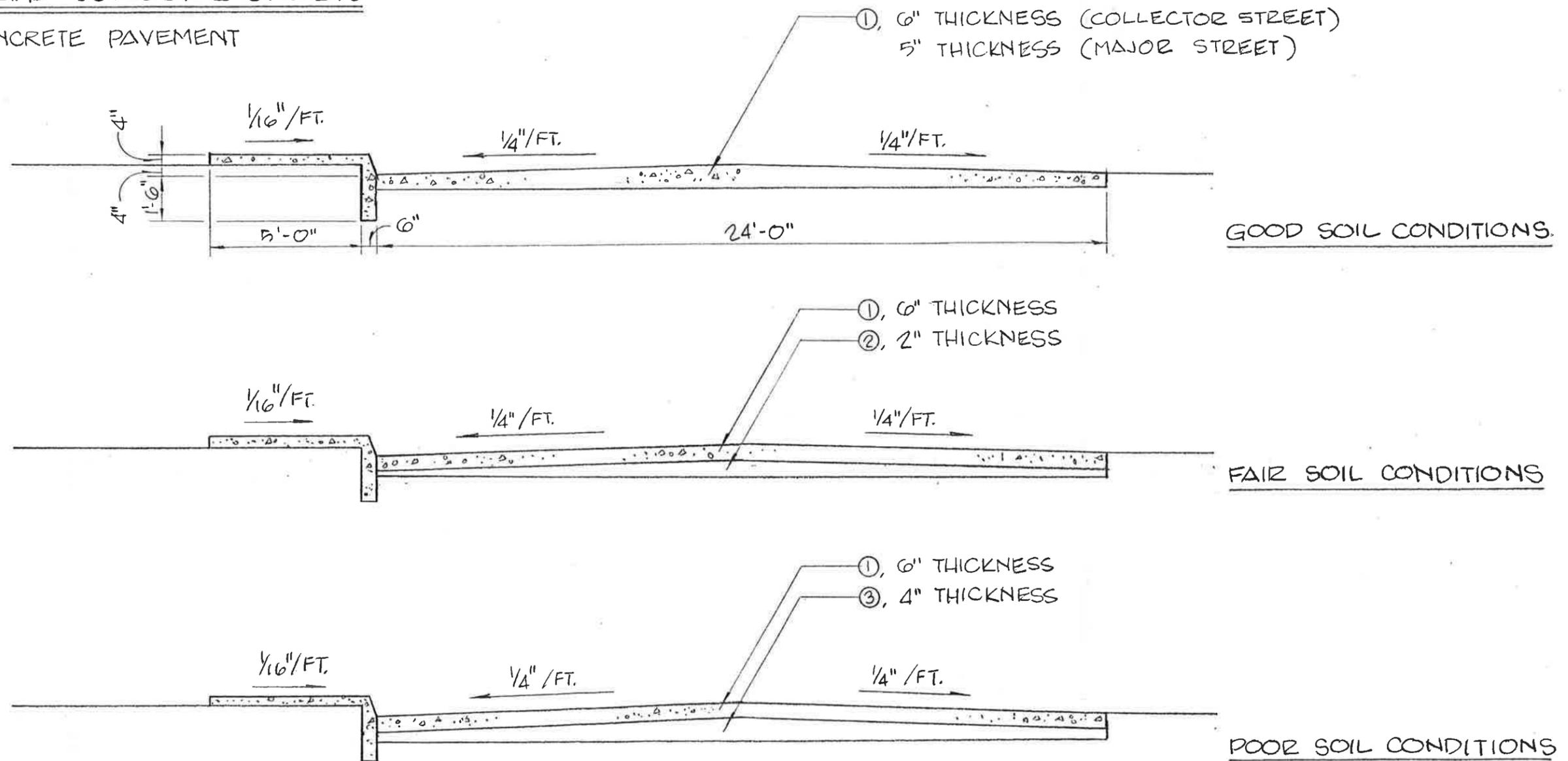
- ④ #1 STONE
- ⑤ #4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>	
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>	
SCALE: 1" = 4'	DESIGNED BY: L. J. D. SHEET NO.
DATE: 11-26-80	DRAWN BY: P. B. <span style="float: right;">26</span>

MAJOR AND COLLECTOR STREETS

CONCRETE PAVEMENT



- ① CONCRETE PAVEMENT
- ② #1 STONE
- ③ #4 STONE

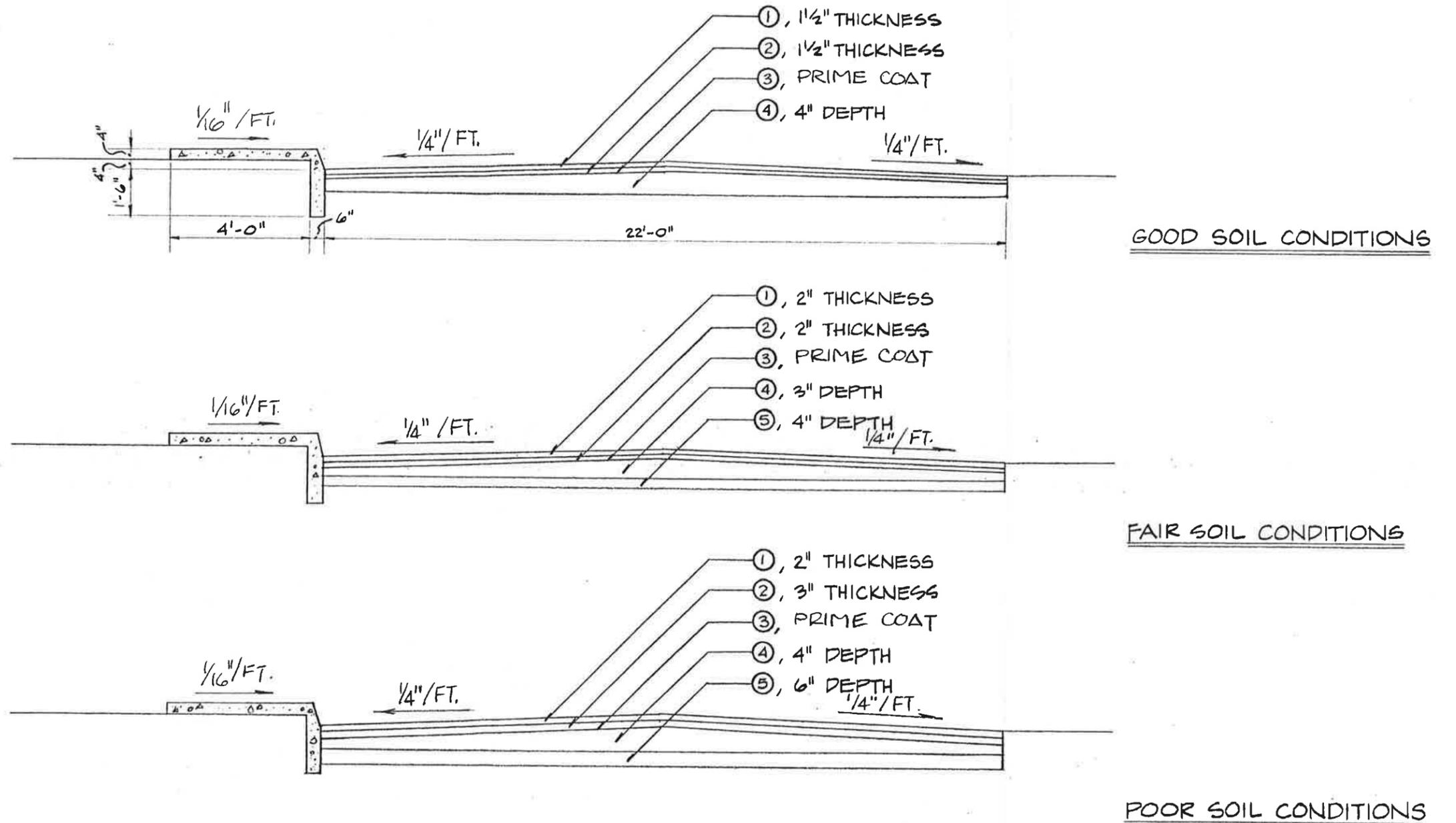
ALL WORK MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>		
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>		
SCALE: 1" = 4'	DESIGNED BY: L. J. D.	SHEET NO.
DATE: 11-26-80	DRAWN BY: B. C. M.	271

## 5. MINOR STREET: ADT (200-2000), CUL-DE-SAC, ALLEY OR LANE

	<u>Soil Base Condition</u>		
	Good	Fair	Poor
a) Asphalt Pavement			
<u>BASE</u>			
#4 Stone	-	4"	6"
#1 Stone	4"	3"	4"
Total	4"	7"	10"
 <u>PRIME COAT</u>	- 0.3 to 0.6 gal/sy-		
 <u>PAVEMENT</u>			
Base Course	1-1/2"	2"	3"
Wearing Course	1-1/2"	2"	2"
Total	3"	4"	5"
 <u>FULL DEPTH ASPHALT (NO BASE)</u>	5"	7"	9"
 b) Concrete Pavement (4000 p.s.i.)			
<u>PAVEMENT</u>	5"	5"	5"
<u>BASE</u> (#4 Stone)	-	-	4"
(#1 Stone)	-	2"	-
<u>REINFORCEMENT</u>			
6" x 12" x 10/10 (welded wire fabric)			
#3 bars Longitudinal on 12" c-c (Temperature)			
 <u>SLUMP</u>			
4" Maximum			
<u>AIR ENTRAINMENT</u>			
7 1/2% + 1 1/2%			
<u>JOINTS</u>			
40' maximum			

MINOR STREET AND CUL-DE-SAC  
BITUMINOUS CONCRETE (ASPHALT) PAVEMENT



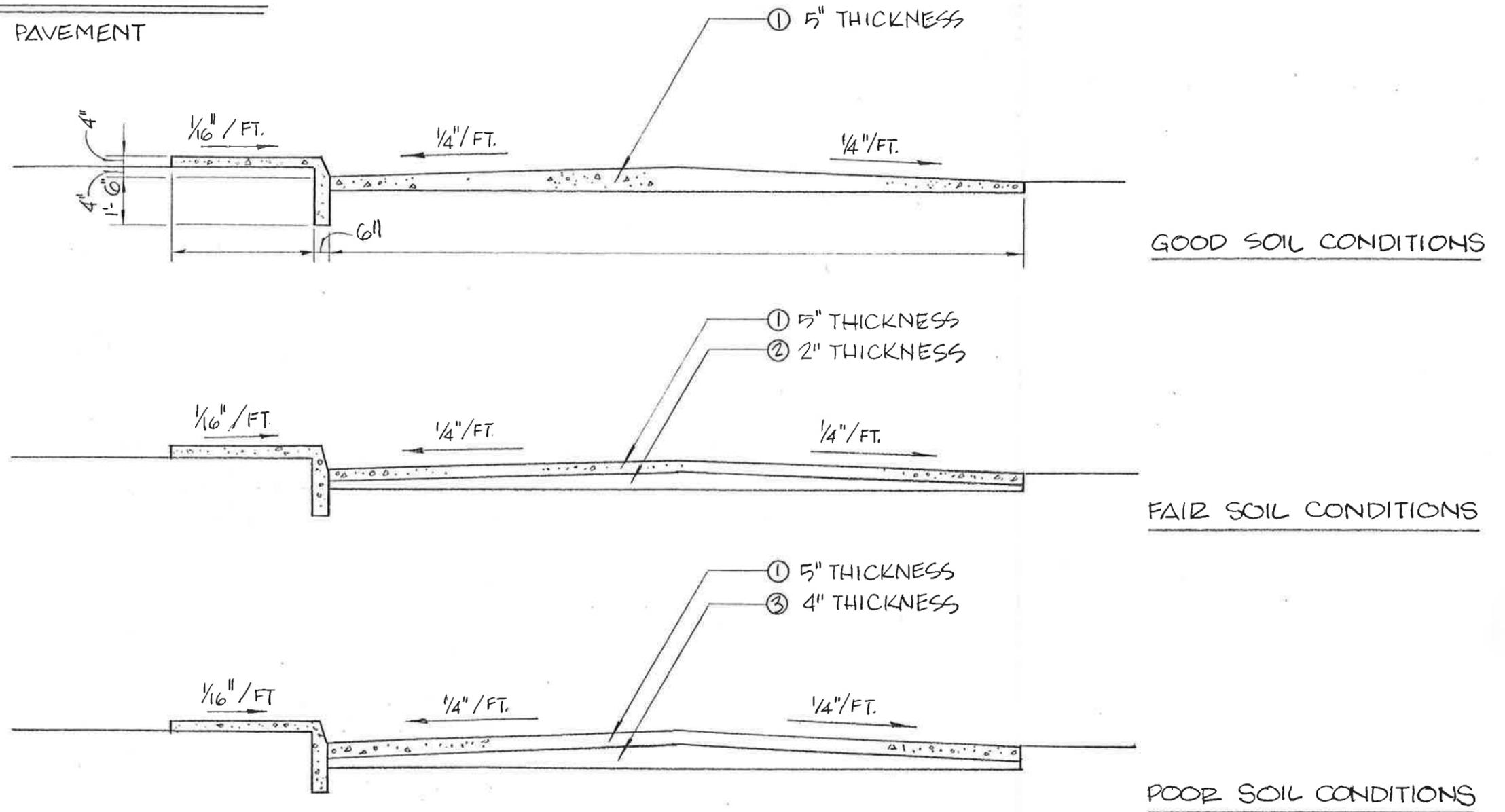
- ① WEARING COURSE
- ② BASE COURSE
- ③ PRIME COAT 0.3 - 0.6 GAL./SQ. FT.

- ④ #1 STONE
- ⑤ #4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>	
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>	
SCALE: 1" = 4'	DESIGNED BY: L. J. D. SHEET NO.
DATE: 11-26-80	DRAWN BY: P. B. 29

MINOR STREET AND CUL-DE-SAC  
CONCRETE PAVEMENT



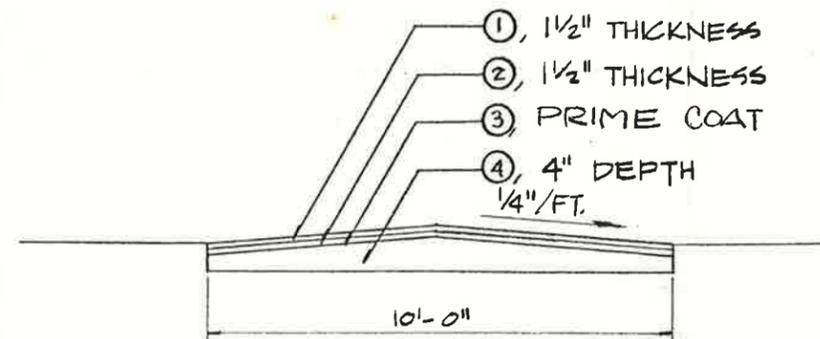
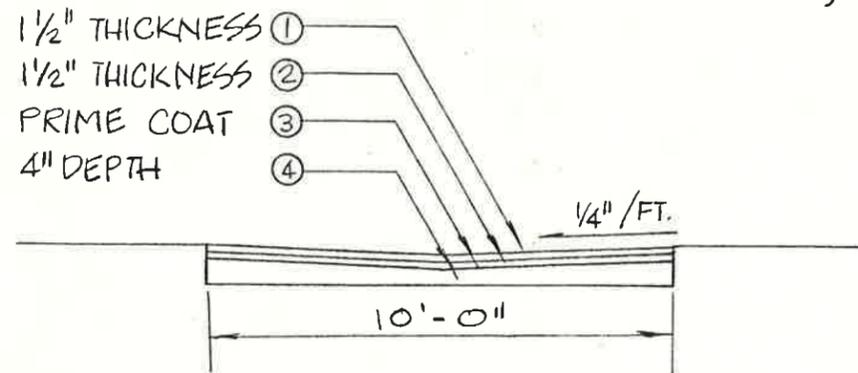
- ① CONCRETE PAVEMENT
- ② # 1 STONE
- ③ # 4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

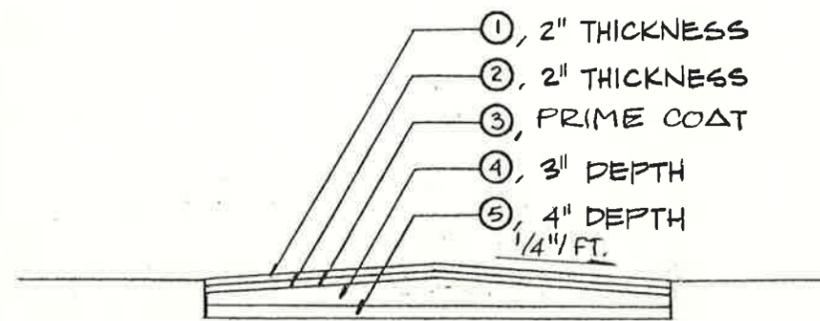
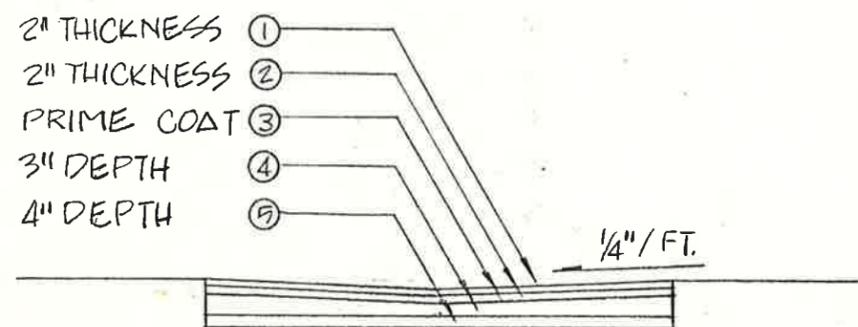
<b>ALPHA ASSOCIATES INCORPORATED</b>		
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>		
SCALE: 1" = 4'	DESIGNED BY: L. J. D.	SHEET NO.
DATE: 11-26-80	DRAWN BY: R. C. M.	30

ALLEY OR LANE

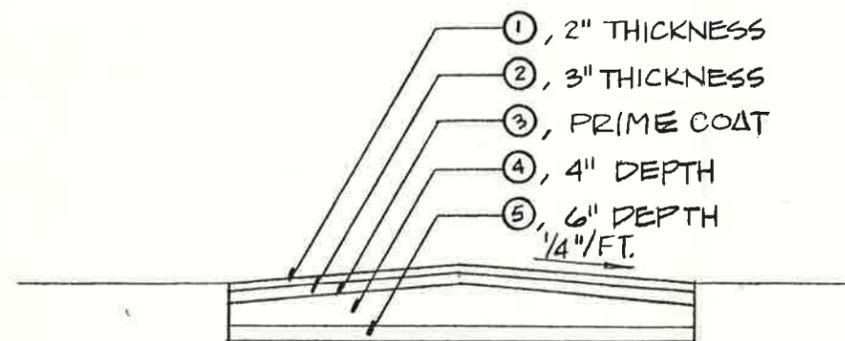
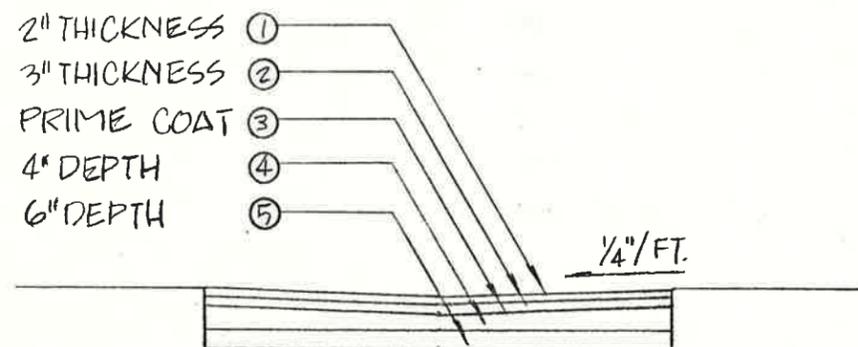
BITUMINOUS CONCRETE (ASPHALT) PAVEMENT



GOOD SOIL CONDITIONS



FAIR SOIL CONDITIONS



POOR SOIL CONDITIONS

- ① WEARING COURSE
- ② BASE COURSE
- ③ PRIME COAT 0.3 - 0.6 GAL./SQ.YD.

- ④ #1 STONE
- ⑤ #4 STONE

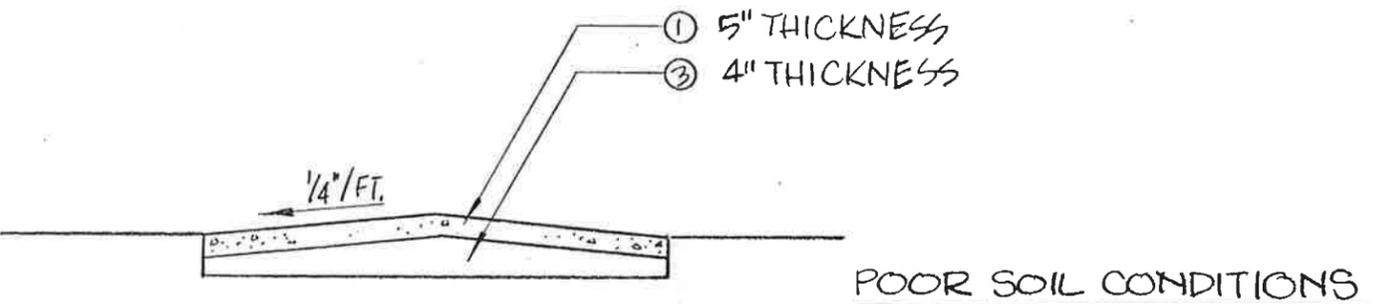
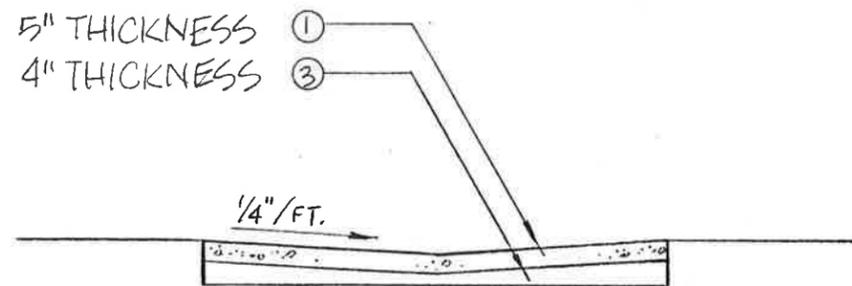
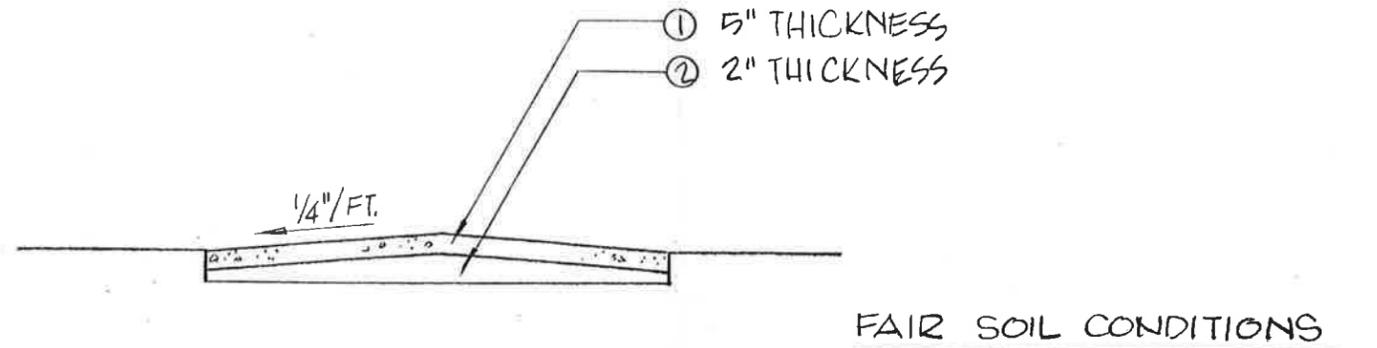
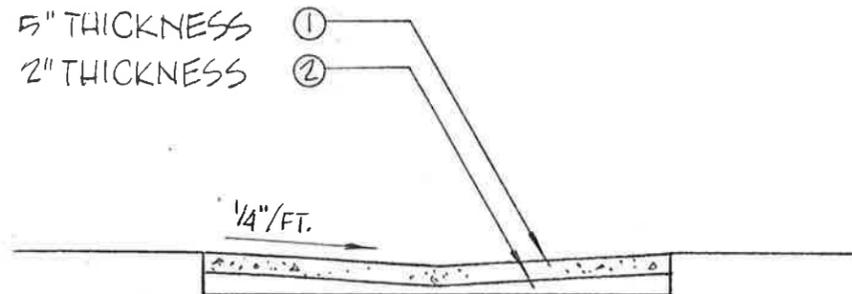
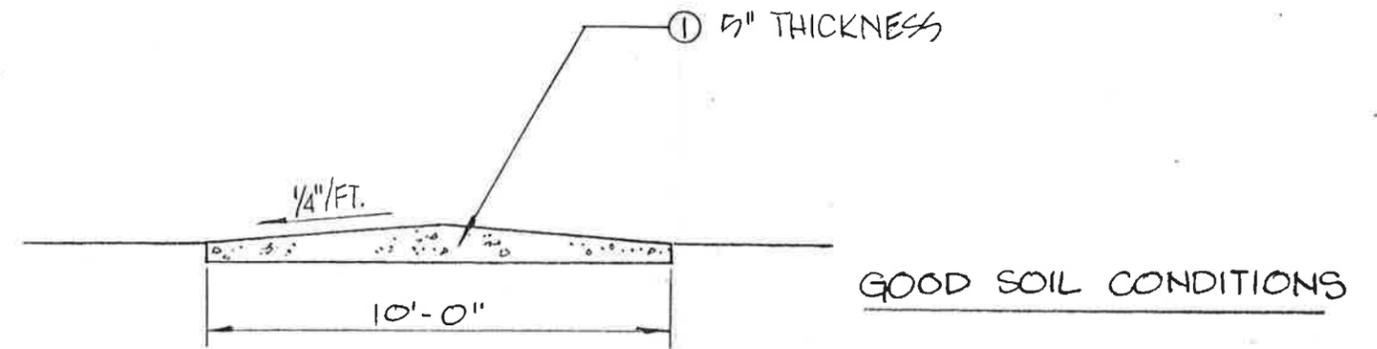
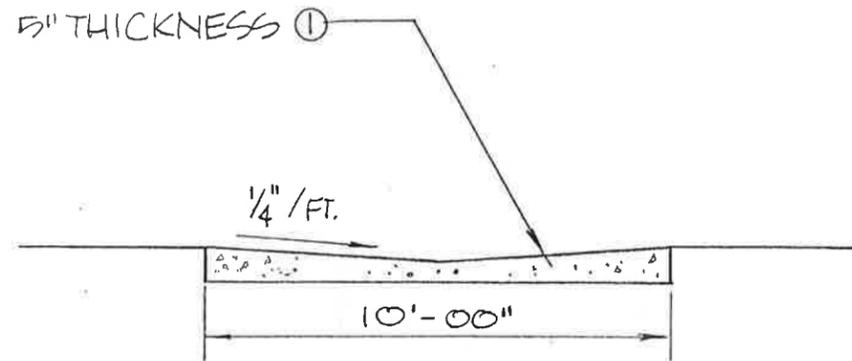
ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

ALPHA ASSOCIATES  
INCORPORATED

DESIGN STANDARDS  
STREET CLASSIFICATIONS

SCALE: 1" = 4'    DESIGNED BY: L. J. D. SHEET NO.  
DATE: 11-26-80    DRAWN BY: P. B.    31

ALLEY OR LANE CONCRETE PAVEMENT



- ① CONCRETE PAVEMENT
- ② #1 STONE
- ③ #4 STONE

ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE STANDARD SPECIFICATIONS OF THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS.

<b>ALPHA ASSOCIATES INCORPORATED</b>	
<b>DESIGN STANDARDS STREET CLASSIFICATIONS</b>	
SCALE: 1" = 4'	DESIGNED BY: L. J. D. SHEET NO.
DATE: 11-26-80	DRAWN BY: R. C. M. <span style="float: right;">32</span>

STREET CLASSIFICATION

	BUSINESS	ARTERIAL	COLLECTOR	MAJOR	MINOR	ALLEY	CUL-DE-SAC
RIGHT-OF-WAY	50'	40'	40'	40'	30'	12'	30' RADIUS
PAVEMENT	2 LANES 28' WIDE	2 LANES 26' WIDE	2 LANES 24' WIDE	2 LANES 24' WIDE	2 LANES 22' WIDE	1 LANE 10' WIDE	2 LANES 22' WIDE
PARKING	10' LANE PAVED	NO	NO	YES	YES	NO	NO
CURB	8" CONC.	8" CONC.	8" CONC.	6" CONC.	6" CONC. OR ROLLED	NO	6" CONC. OR ROLLED
SIDEWALK	6' WIDE 2 SIDES	5' WIDE 2 SIDES	5' WIDE 2 SIDES	5' WIDE 1 OR 2 SIDES	4' WIDE 1 OR 2 SIDES	NO	4' WIDE 1 OR 2 SIDES

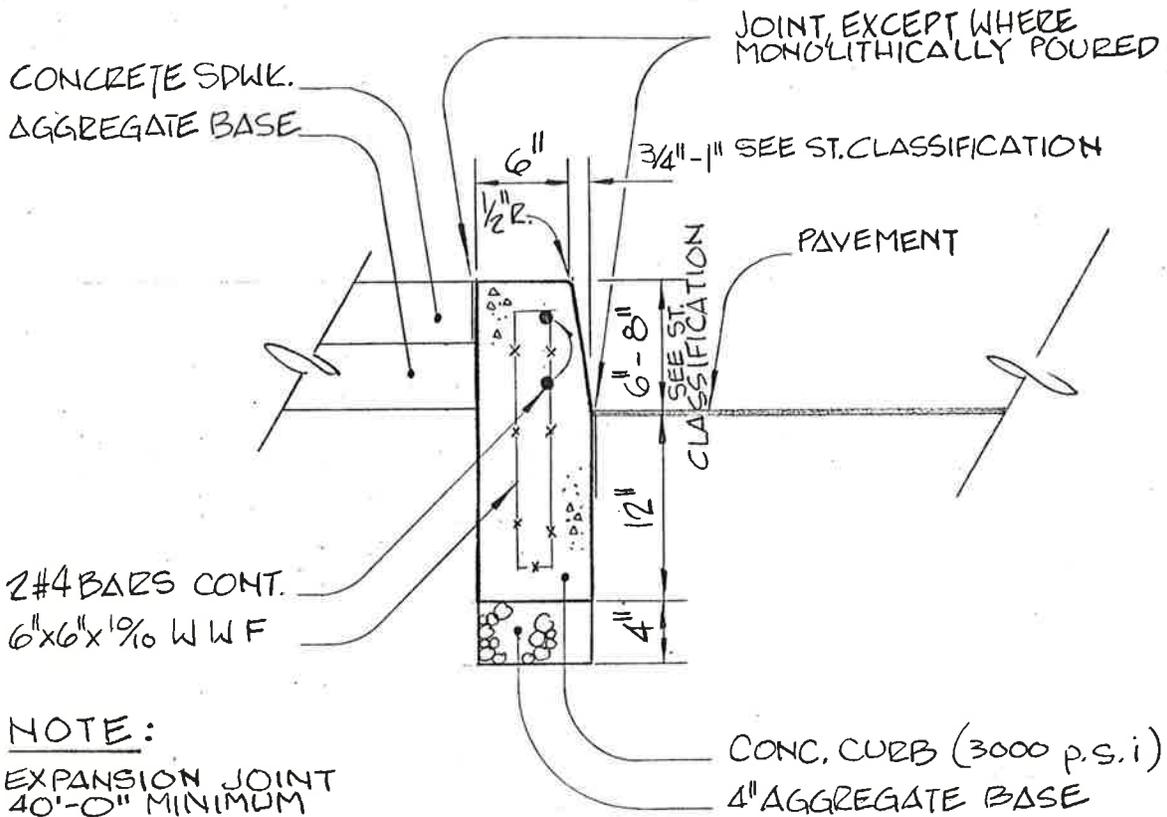
NOTES:

1. STANDARD OR ROLLED CURB MAY BE USED ON MINOR STREETS OR CUL-DE-SACS
2. A GRASS STRIP MAY BE USED BETWEEN THE BACK OF THE CURB AND THE SIDEWALK. HOWEVER THIS IS NOT STRONGLY RECOMMENDED FOR BUSINESS, ARTERIAL, COLLECTOR OR MAJOR STREETS BECAUSE OF THE EFFECTS OF SALT SPLASH ON THE GRASS. THE GRASS STRIP WOULD WORK WELL IN RESIDENTIAL AREAS WHICH HAVE MINOR STREETS AND CUL-DE-SACS FOR MAIL BOX LOCATION.
3. THE USE OF AN ASPHALT OR CONCRETE CURB ON THE SIDE OF THE STREET WHERE THE SIDEWALK IS NOT PLACED SHOULD BE CONSIDERED WHEN OVER-THE-SHOULDER RUN-OFF COULD CREATE PROBLEMS.
4. THE USE OF ASPHALT SIDEWALKS SHOULD BE CONSIDERED. BY USING PROPER BASE AND DRAINAGE, SEALING OF CURB JOINT, ETC. IT COULD ADEQUATELY REPLACE CONCRETE IN THE SIDEWALK DETAILS.
5. THESE ARE MINIMUM DESIGN STANDARDS. REVIEW BY THE CITY ENGINEERING DEPARTMENT SHOULD BE ACCOMPLISHED FOR EACH STREET SO SPECIAL CONDITIONS WHICH WARRANT SPECIAL DESIGN CONSIDERATIONS CAN BE IDENTIFIED.

**ALPHA ASSOCIATES  
INCORPORATED**

**DESIGN STANDARDS  
STREET CLASSIFICATIONS**

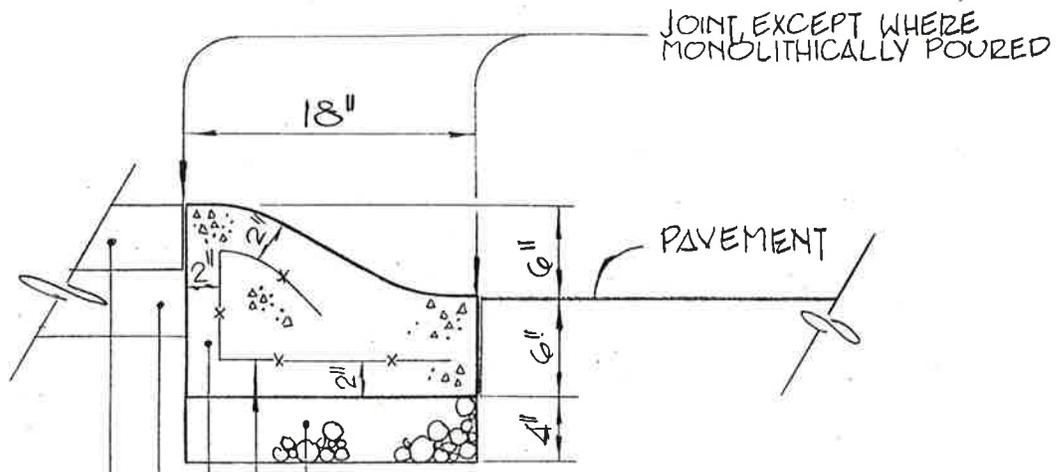
SCALE: —      DESIGNED BY: L.J.D.      SHEET NO. 33  
DATE: 11-26-80      DRAWN BY: R.C.M.



SECTION

SCALE: 1" = 1'

STANDARD CURB DETAIL

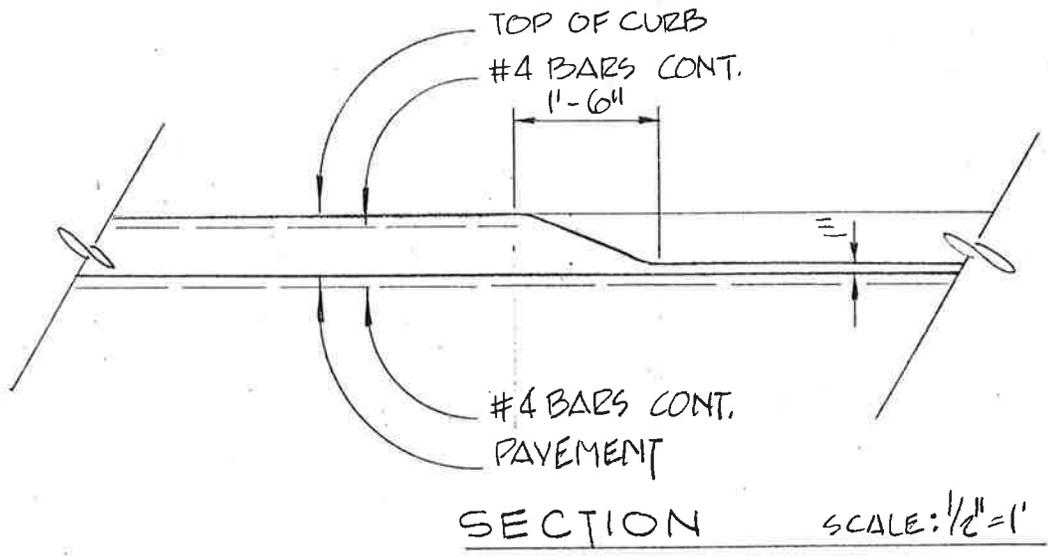
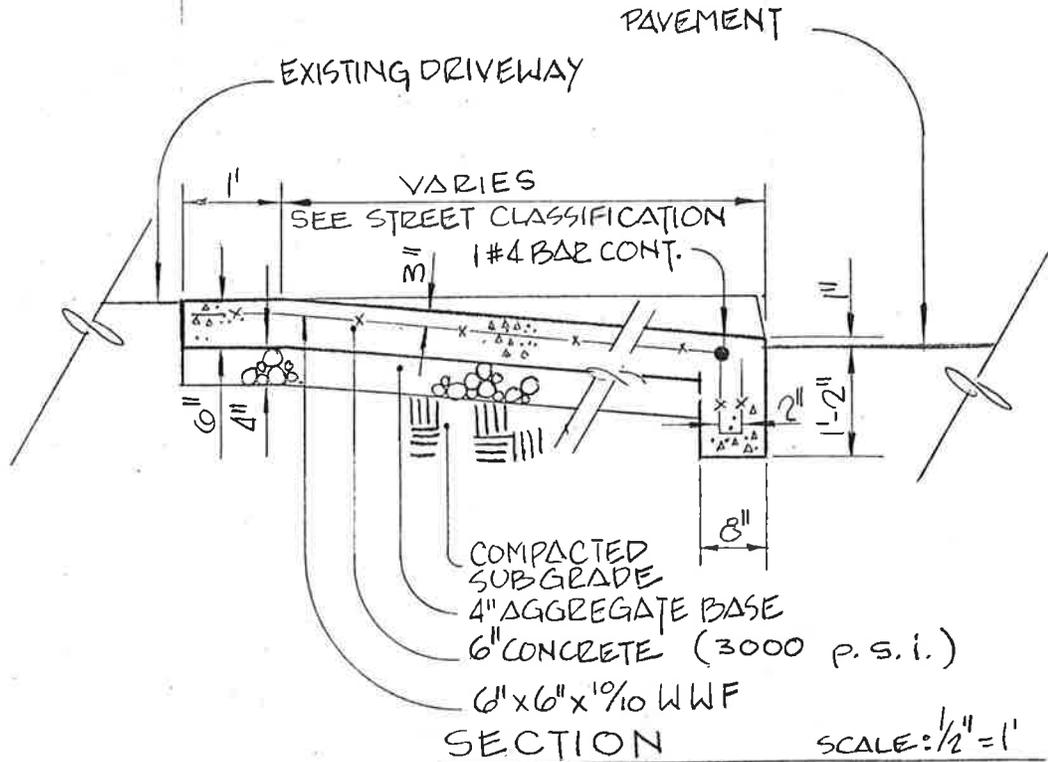


- 4" AGGREGATE BASE
- 6" x 6" x 1 9/10 W W F
- CONCRETE CURB (3000 p. s. i.)
- AGGREGATE BASE
- CONCRETE SIDEWALK

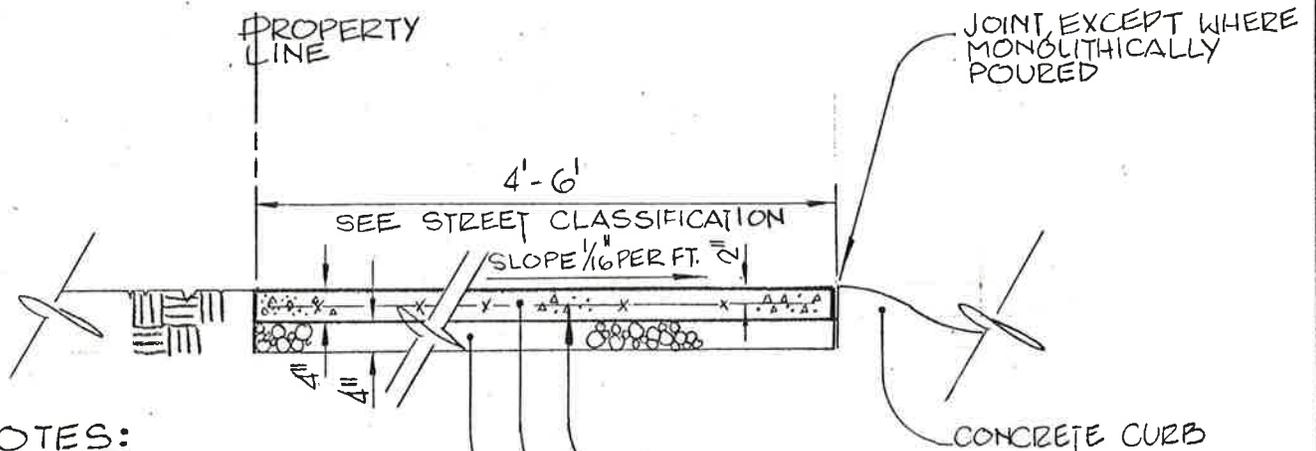
NOTE:  
EXPANSION JOINT  
40'-0" MINIMUM

SECTION  
SCALE: 1" = 1'

ROLLED CURB DETAIL



CURB CUT DETAIL

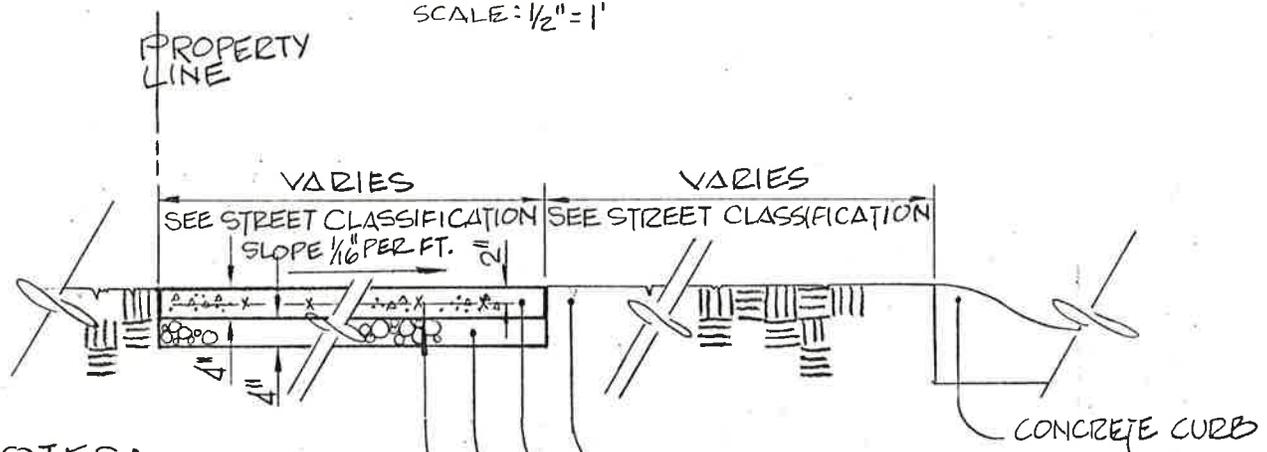


NOTES:

- BROOM SURFACE @ RT. & TO WALK.
- EXPANSION JOINT 40'-0" MINIMUM
- SAW CUT - 5'-0"

- 6" x 6" x 10/10 W W F.
- 4" THICK CONCRETE SIDEWALK (3000 p.s.i.)
- 4" THICK AGGREGATE BASE

SECTION  
SCALE: 1/2" = 1'



NOTES:

- BROOM SURFACE @ RT. & TO WALK
- EXPANSION JOINT 40'-0" MINIMUM
- SAW CUT - 5'-0"

- GRASS STRIP
- 4" THICK CONCRETE SIDEWALK (3000 p.s.i.)
- 4" THICK AGGREGATE BASE
- 6" x 6" x 10/10 W W F

SECTION  
SCALE: 1/2" = 1'

SIDEWALK AND GRASS STRIP DETAIL

## RECOMMENDATIONS

1. The Common Council of the City of Morgantown adopt the procedures and the minimum design standards outlined in this report.
2. These minimum design criteria, as applied and recommended by the City's Engineering Department, will be accepted by the Common Council of the City of Morgantown. If the person making the request would desire to challenge the recommendations made, that person shall employ a Registered Professional Engineer to arrive at soil support values by the use of accepted engineering procedure. If these figures are compiled properly and accepted by the City's Engineering Department, City Council could accept these as final for the street in question.

It is the intent of this appeal procedure to arrive at design data through the gathering of more specific data than the City may have at hand (see Basic Design Criteria); not to change the design procedure or method of assigning design values.

3. When a street is to be opened for development, the person opening the street may delay the placement of permanent pavement until the construction associated with the development is completed. The person making the request should arrange to place in an escrow account, the amount necessary to cover the cost of placing the permanent pavement. The drainage, utility and base requirements should be completed before development begins. The asphalt or concrete pavement, sidewalks and curb, should be placed lastly, using the escrow funds to pay for the construction.
4. Sections of the City Code which pertain to Motor Vehicles, Traffic and Street Construction be reviewed and updated. An example would be Section 20, Articles 10 and 11 which establish weight and load limits for City Streets.

5. Asphalt be considered for sidewalk construction. The author feels this is a practical, economic alternative which would reduce the financial burden abutting property owners must bear. Concrete curbs should remain as part of the street construction.
6. A traffic counter(s) be obtained so the City of Morgantown could collect data on traffic flow. This counter could be used for 8-9 months of the year. The City's Engineering Department could maintain and operate the counters and keep an up-to-date tabulation of the results.
7. The input of the City's Engineering Department, the Police Department and the Street Department should be solicited on a regular basis.
8. The Standard Specifications for Roads and Bridges, Latest Edition, as adopted by the West Virginia Department of Highways should be officially adopted by the City of Morgantown as the specifications governing materials and methods of construction for all street work.

Alpha Associates wishes to thank the following personnel of the City of Morgantown for their help and assistance in compiling information and willingly offering their assistance in formulating this report:

Mr. James E. Craig - City Councilman

Mr. James A. McLaughlin - City Councilman

Mr. Robert Gossler - City Planner

Mr. Bennie Palmer - Morgantown Police Department

Mr. Sim Reynolds - Street Commissioner

Mr. Al Fiorini - Equipment Supervisor

Mr. Howard Ralls - City Engineer