SPS1
Iowa (19

NATIONAL RESEARCH COUNCIL

STRATEGIC HIGHWAY RESEARCH PROGRAM

North Central Region, 1983 Sloan Place, Suite 10, St Paul, MN 55117, Tel (612) 776-2210 Fax (612) 776-7201

RICHARD C. INGBERG
Regional Engineer

March 20, 1992

Mr. Charles Potter
Iowa Department of Transportation
800 Lincoln Way
Ames, Iowa 50010

Dear Mr. Potter:

RE: SPS-1 on US 61 in Lee County
Sampling and Testing Plan

We have reviewed the Sampling and Testing Plan for the above referenced project, and it meets all SHRP requirements for field sampling and testing of the materials. There are two minor typographical errors that should be noted:

1. On page 8, T43 in the DGAB layer should be labeled T42.

2. On page 26, subgrade permeability tests are to be run on samples A3, A8, and A18.

Attached are two sets of blue and yellow labels to be used on samples if you desire. Blue are for labeling all asphalt materials, and yellow are to be used on soil samples. Note that "SPS-1", followed by the sample number is to be written in the space following Section ID.

We are looking forward to working with you on this project. Thank you for your efforts and your continued support of the SHRP/LTPP Program.

Best personal regards.

Sincerely,

Richard C. Ingberg
Regional Engineer

cc. Bernie Brown, Iowa DOT
Ann Johnson

Iowa Department of Transportation

800 Lincoln Way, Ames, Iowa 50010 515-239-1309

March 5, 1992 Ref. No. 435

Mr. Richard Ingberg
Regional Engineer
Strategic Highway Research Program
Braun Intertec Pavement Inc.
1404 Concordia Avenue
St. Paul, Minnesota 55104-5309

Dear Mr. Ingberg:

Enclosed are two sets of plans for our SPS-1 experiment on US 61 in Lee County. Enclosed also are two copies of our testing and sampling plan for SPS-1.

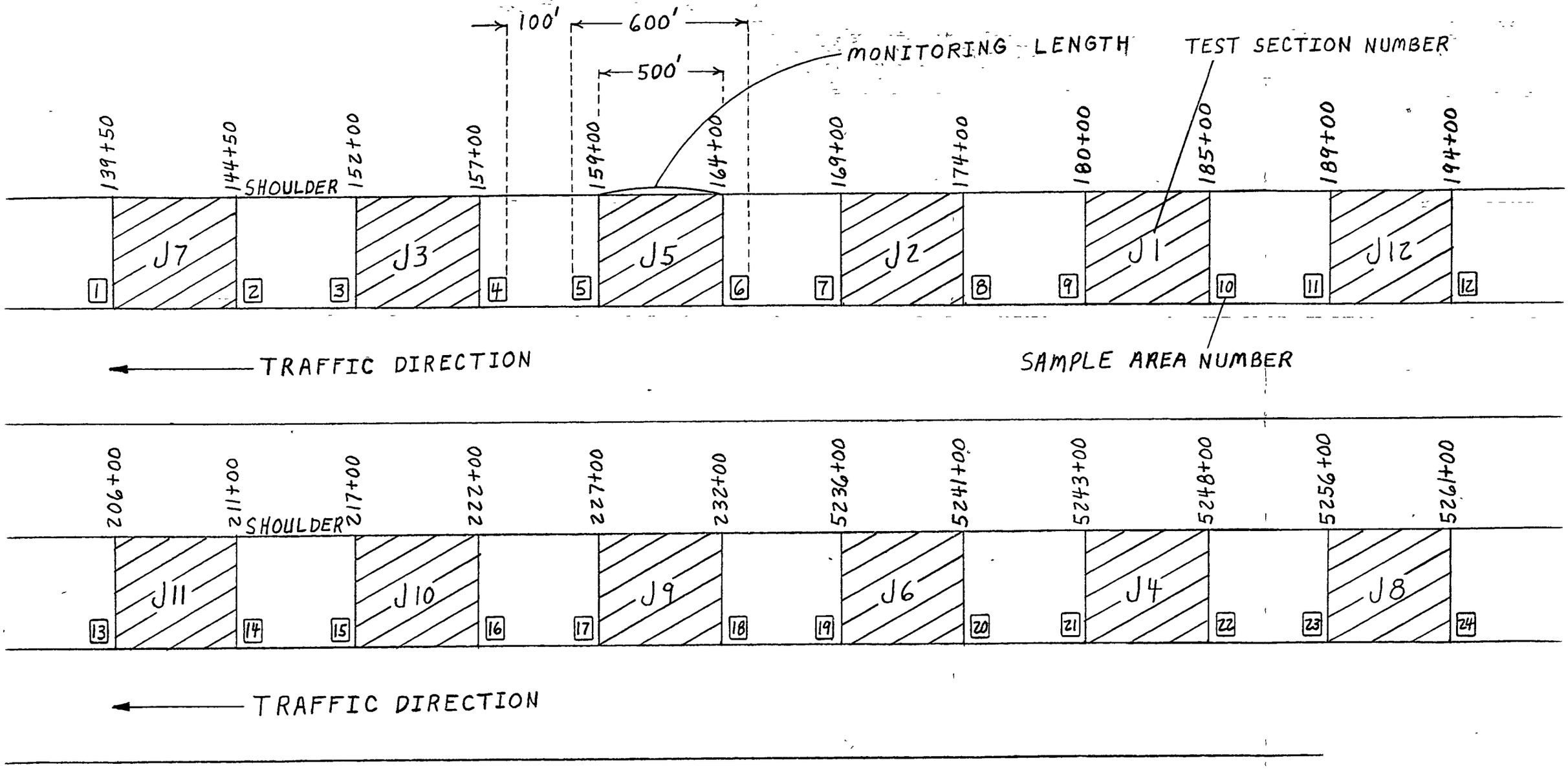
Work is scheduled to start in April 1992 on SPS-1, so approval of our testing and sampling plan is required before then. Thank you for your attention to this matter. If you have any questions, please contact me at (515)239-1309 in Ames, Iowa.

Sincerely,

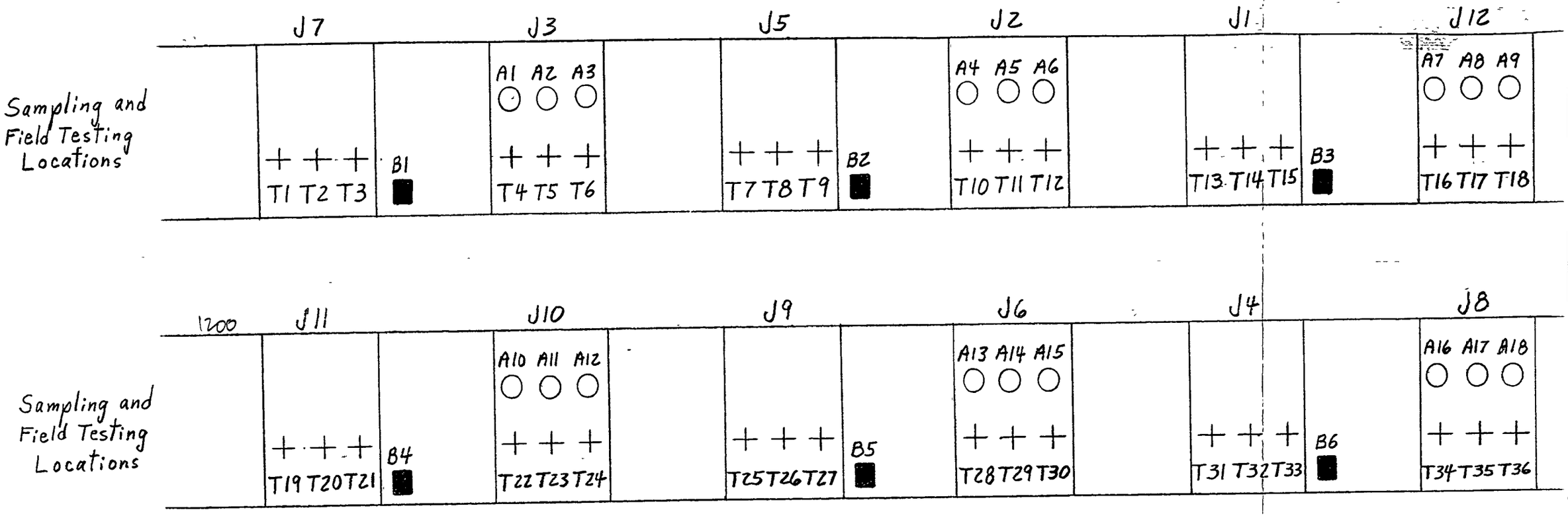
Charles J. Potter

Charles J. Potter
Ass't Special Investigations Engr
Materials

CJP:kmd
Enclosure
cc: B. C. Brown
O. J. Lane
K. B. Jone
B. R. McWaters



SITE LAYOUT WITH SAMPLING AREAS 2/4/92
LEE COUNTY US61 SPS-1 SBL

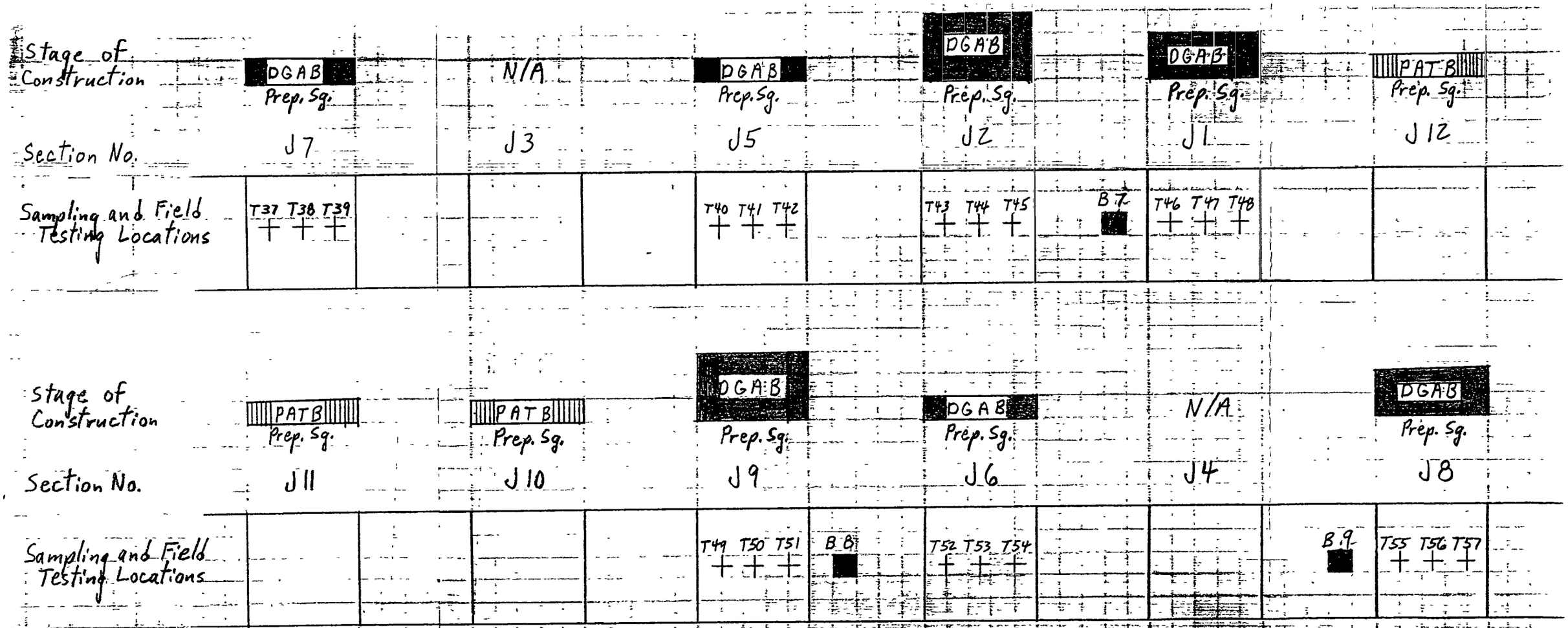


■ 2x2 bulk sampling location (B1-B6) to 12" below top of subgrade

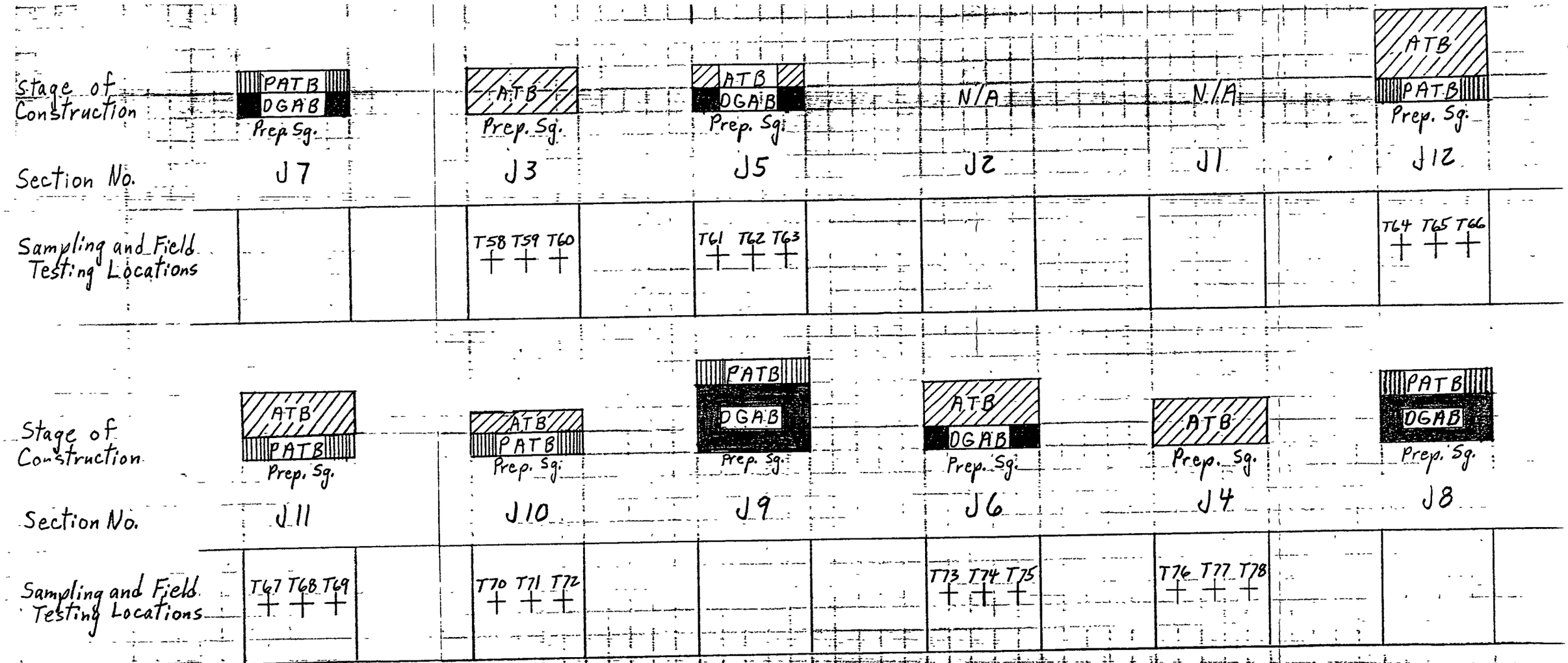
○ Shelby tube/splitspoon sampling to 4' below top of subgrade (A1-A18)

\+ Location of field testing (T1-T36)

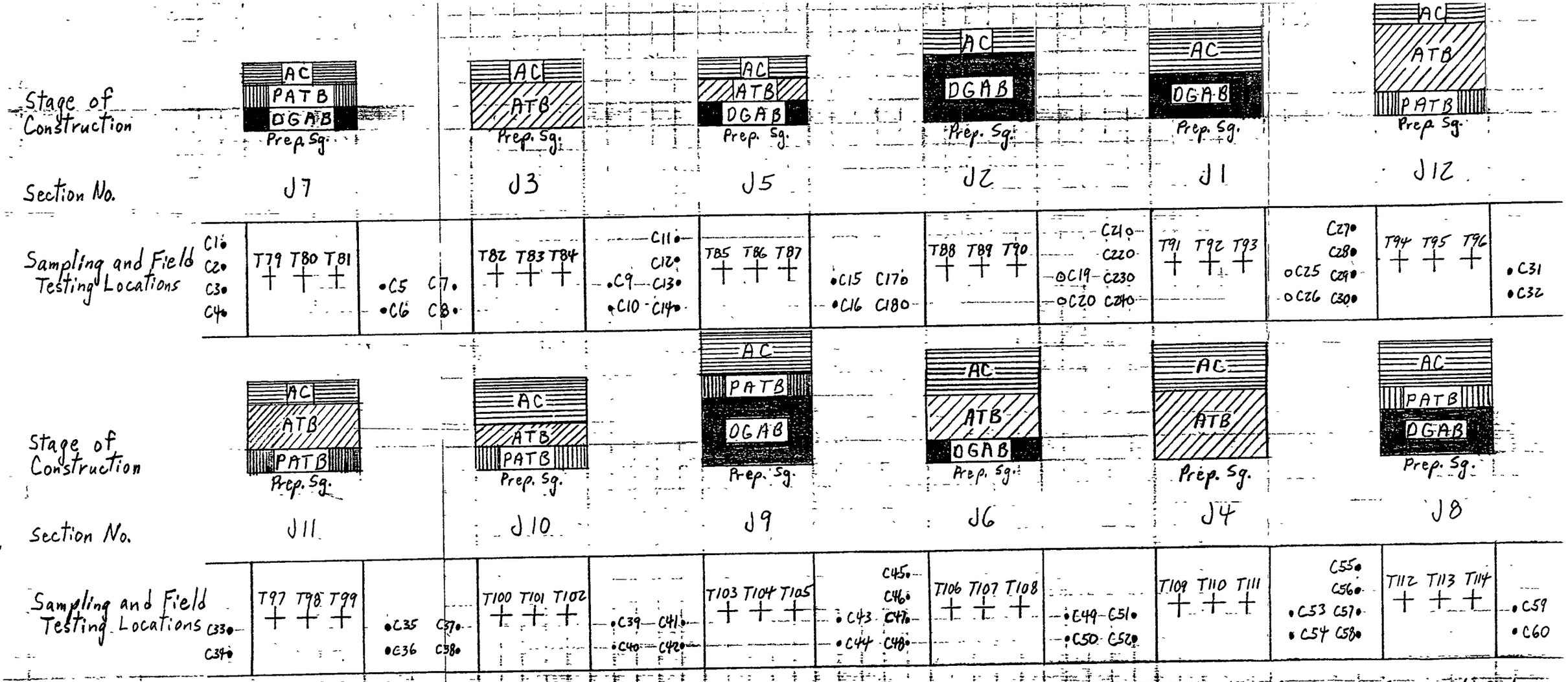
Sampling and Testing Locations for Subgrade



Sampling and Testing Locations for DGAB



Testing Locations for ATB

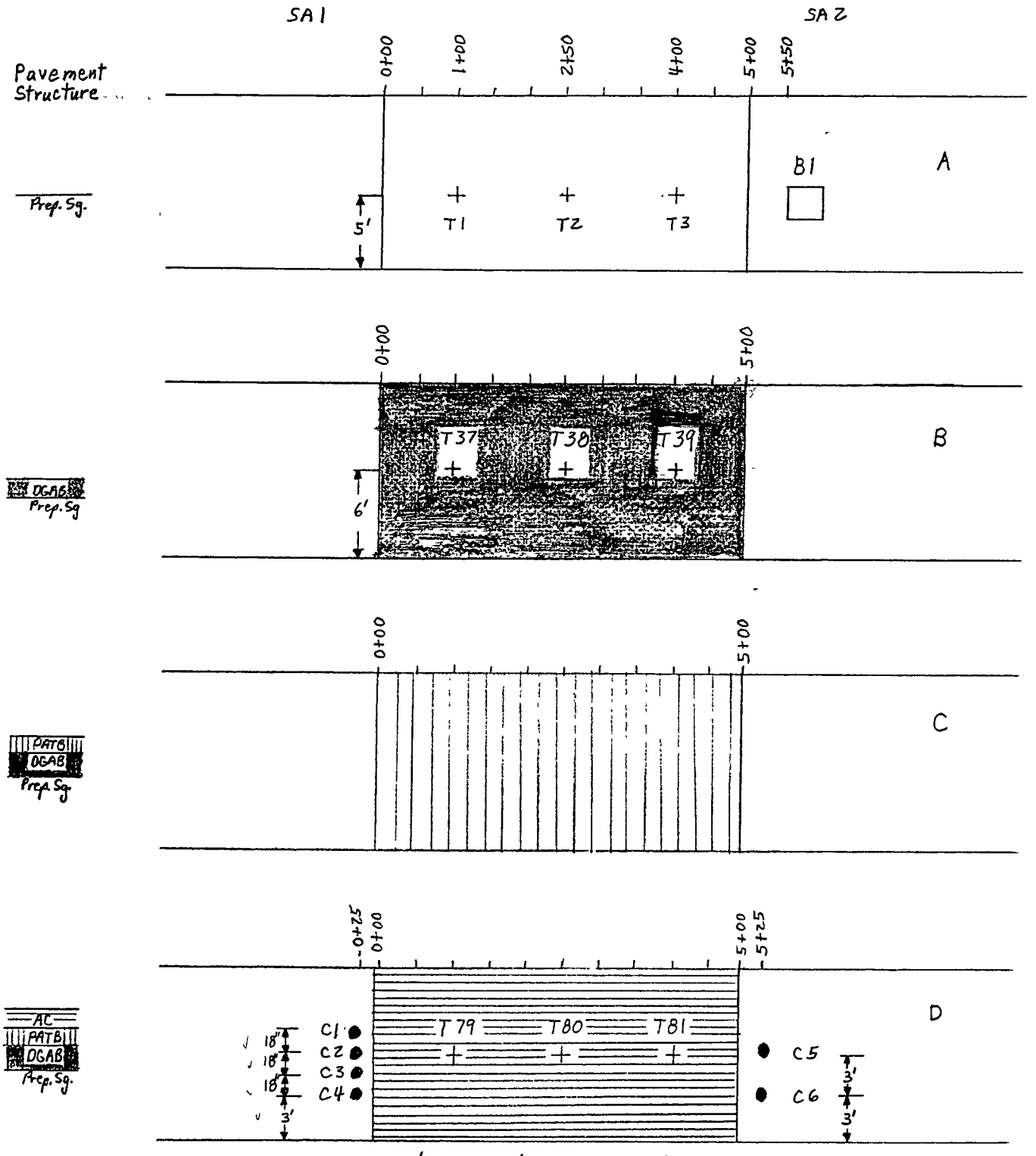


LEGEND

○ 4" OD Core of Asphalt Concrete Surface (C17-C26)
• 4" OD Core of Asphalt Concrete Surface and Treated Base (C1-C16, C27-C60)
+ Location of field testing within section (T79-T114)

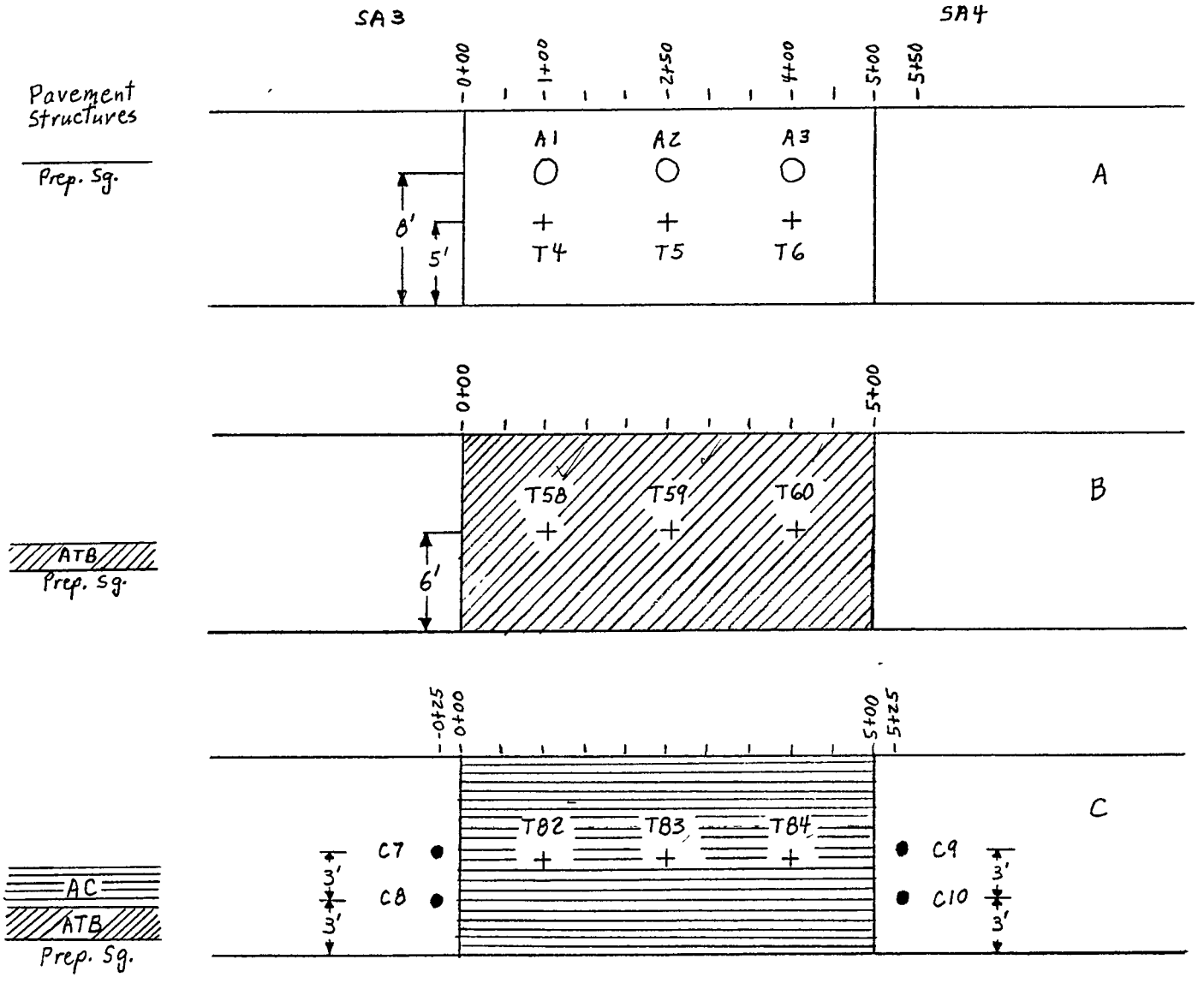
Prep. Sg. - Prepared Subgrade
PATB - Permeable Asphalt Treated Base
ATB - Asphalt Treated Base
DGAB - Dense Graded Aggregate Base
AC - Asphalt Concrete Surface

Sampling and Testing Locations for AC Surface



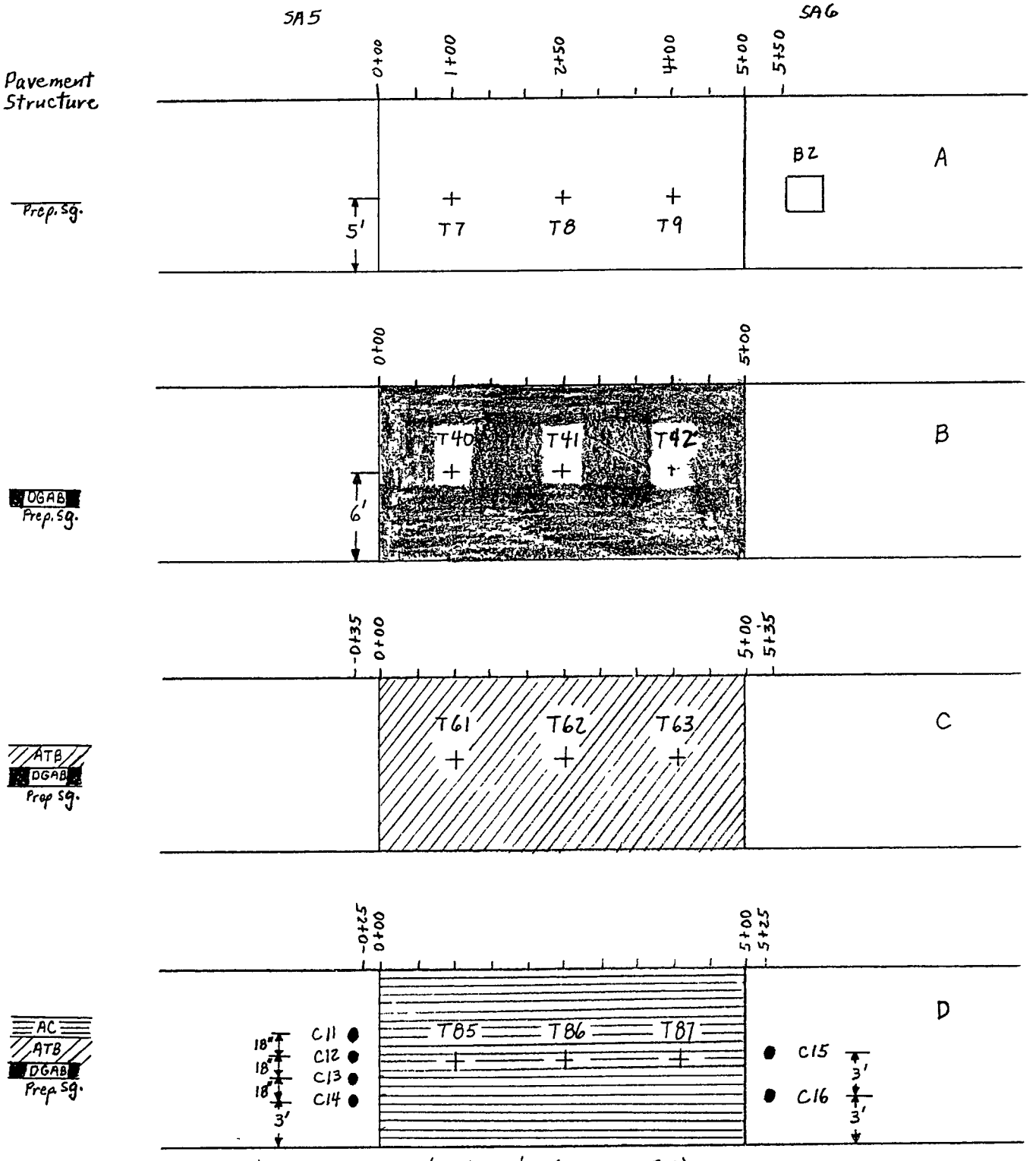
A Testing on prepared Subgrade (T1-T3, B1)
B Testing on compacted DGAB (T37 - T39)
C No testing on compacted PATB
D Testing on finished AC Surface (T79 - T81)
Coring AC Surface and bound layers (C1 - C6)

Sampling and Testing Plan for Test Section 7



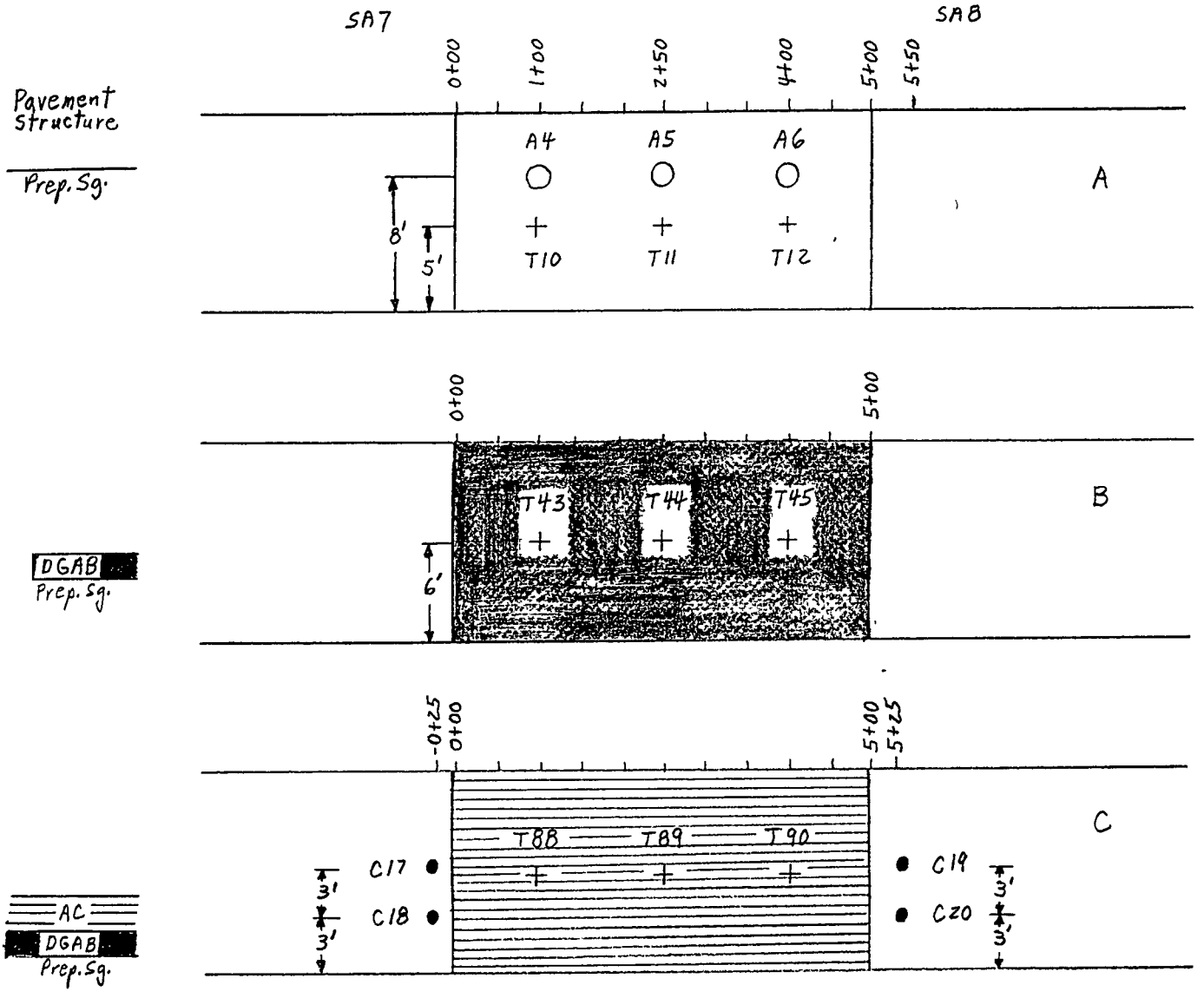
A Testing on prepared Subgrade (T4 - T6, A1 - A3)
B Testing on compacted ATB (T58 - T60)
C Testing on finished AC Surface (T82 - T84)
Coring AC Surface and bound layers (C7 - C10)

Sampling and Testing Plan for Test Section 3



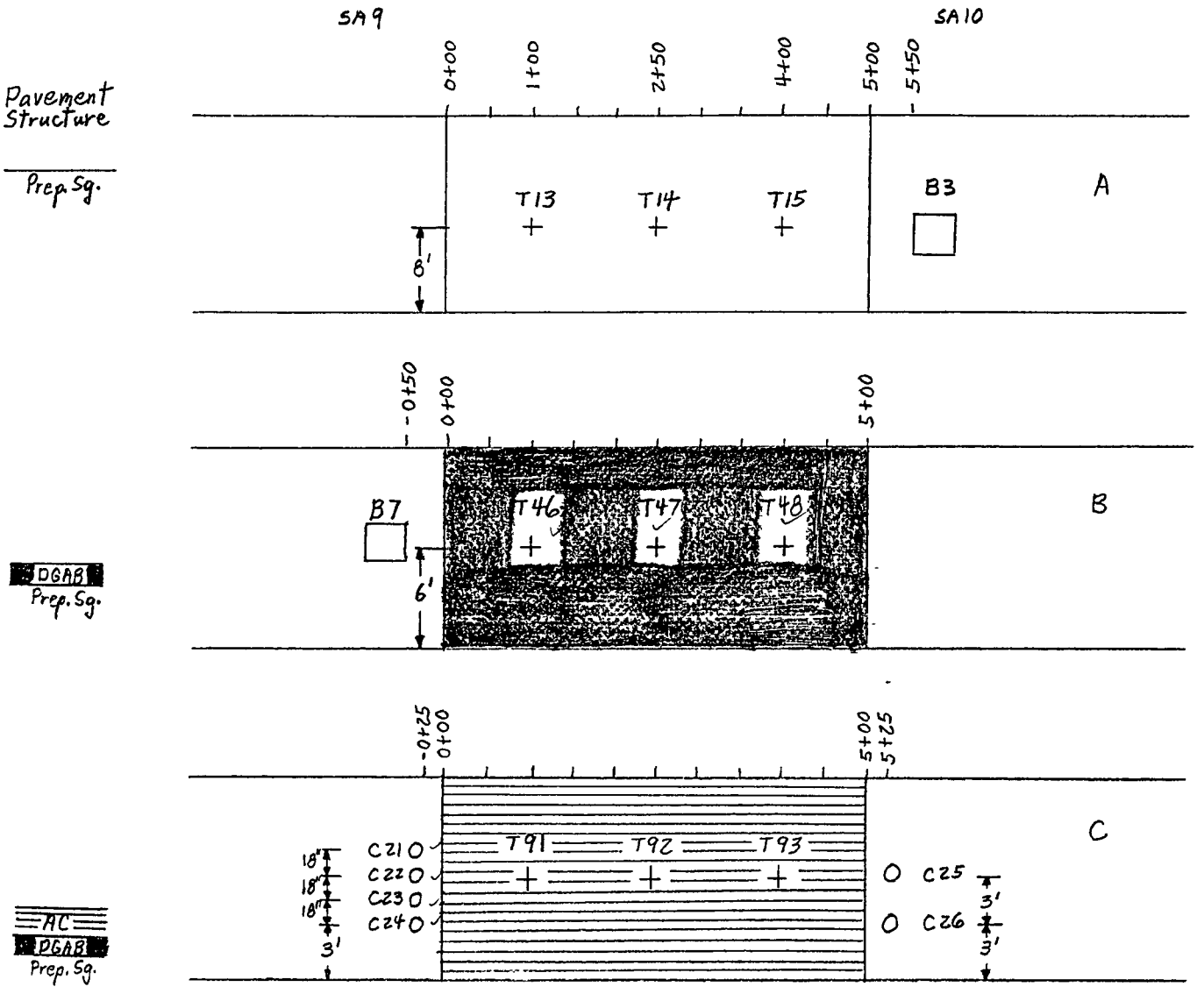
A Testing on prepared Subgrade (T7-T9, BZ)
B Testing on compacted DGAB (T40-T42)
C Testing on compacted ATB (T61-T63)
D Testing on finished AC Surface (T85-T87)
Coring AC Surface and bound layers (C11-C16)

Sampling and Testing Plan For Test Section 5



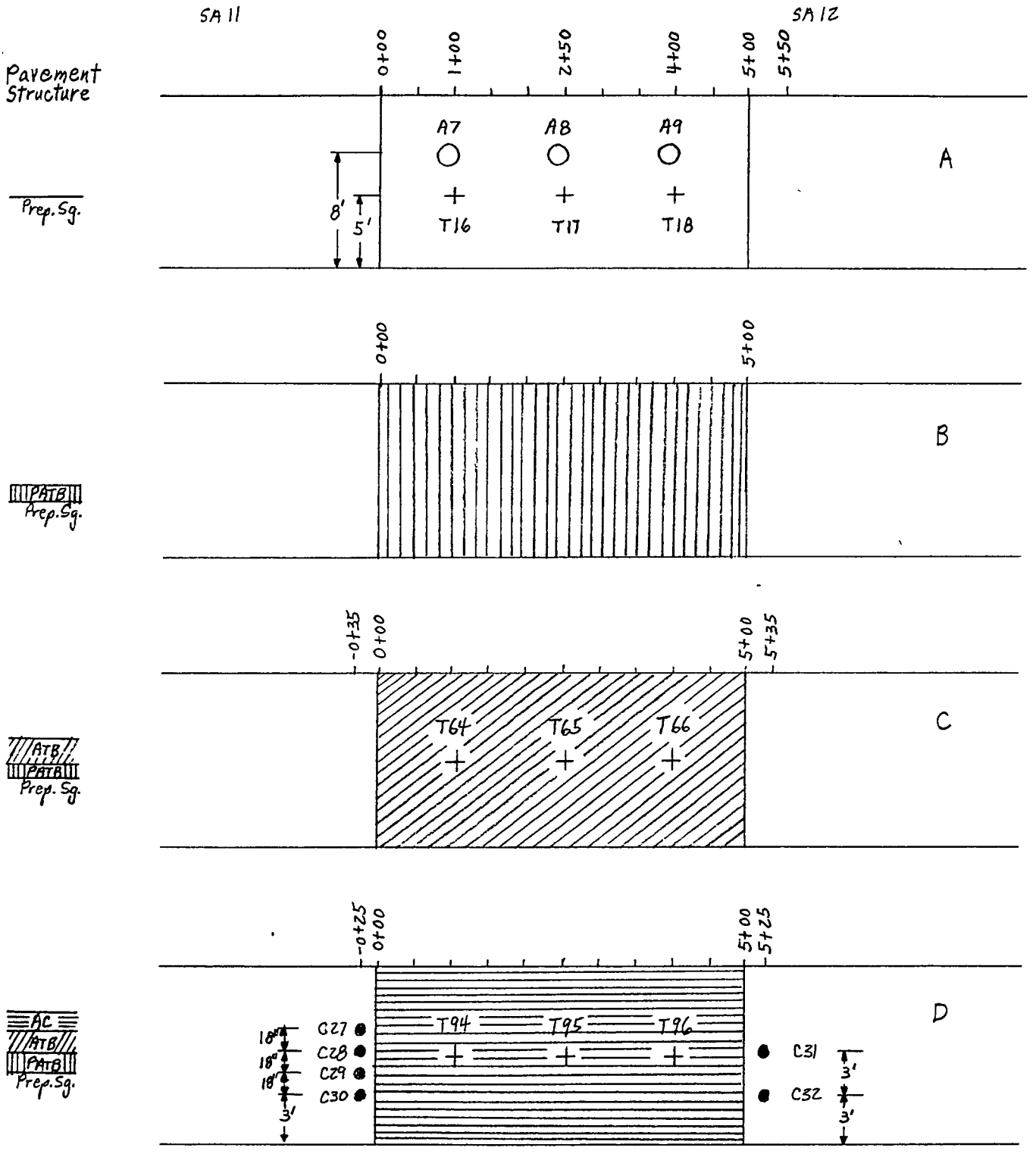
A Testing on prepared Subgrade (T10 - T12, A4-A6)
B Testing on compacted DGAB (T43-T45)
C Testing on finished AC Surface (T88 - T90)
Coring AC Surface and bound layers (C17 - C20)

Sampling and Testing Plan for Test Section 2



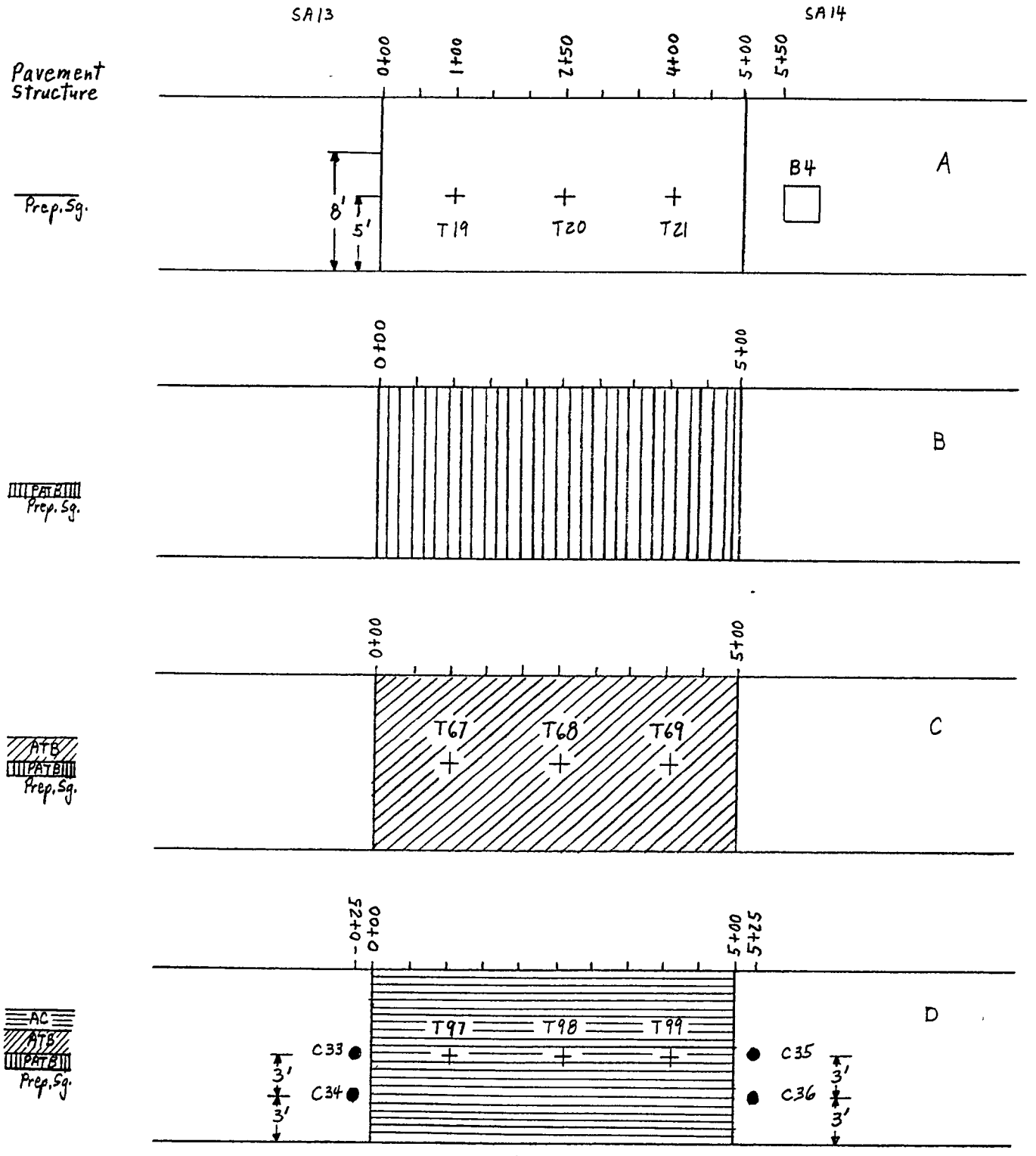
A Testing on prepared Subgrade (T13-T15, B3)
B Testing on compacted DGAB (T46-T48, B7)
C Testing on finished AC Surface (T91-T93)
Coring AC Surface only (C21-C26)

Sampling and Testing Plan for Test Section 1



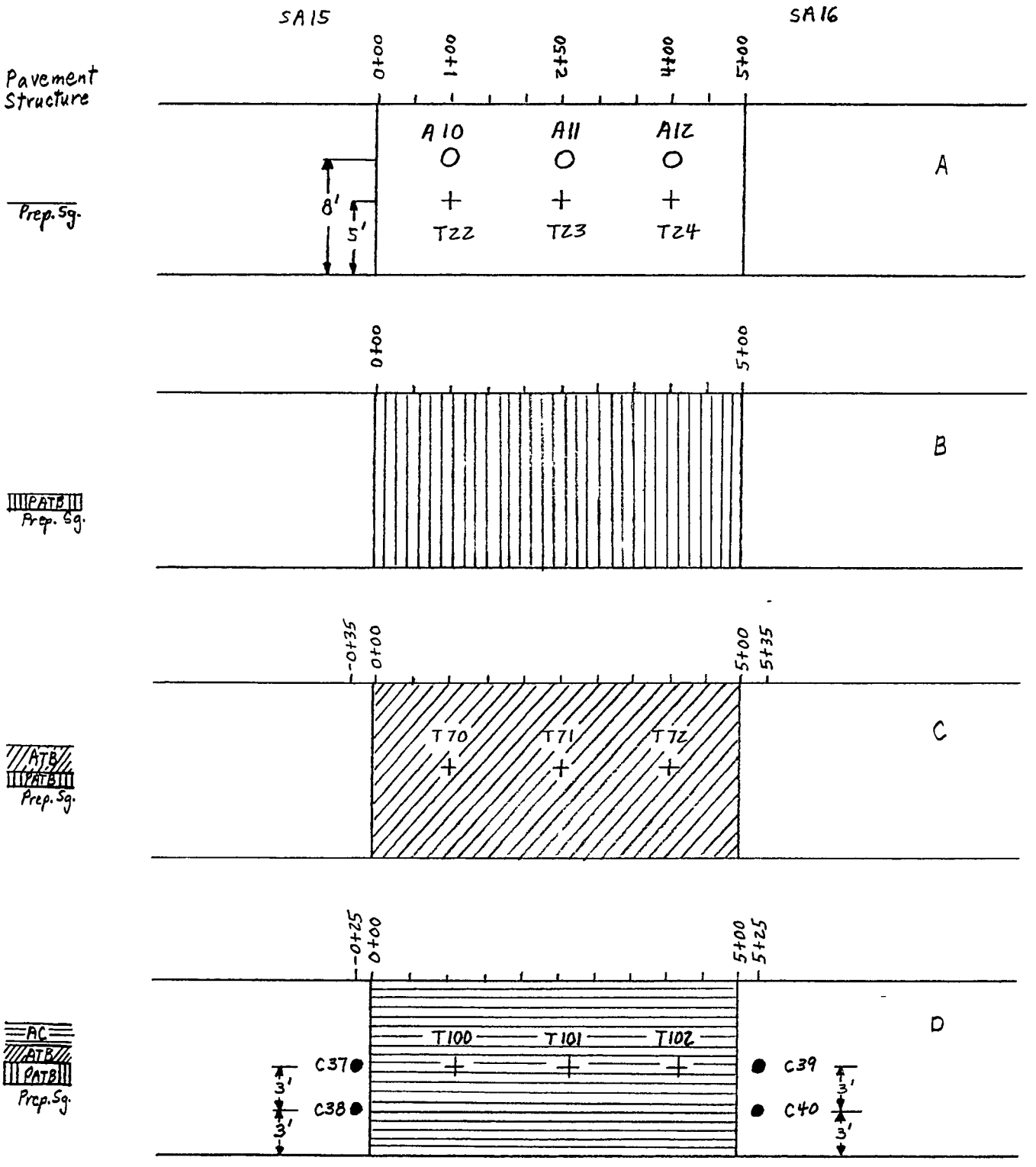
A Testing on prepared Subgrade (T16-T18, A7-A9)
B No testing on compacted PATB
C Testing on compacted ATB (T64-T66)
D Testing on finished AC Surface (T94-T96)
Coring AC Surface and bound layers (C27-C32)

Sampling and Testing Plan for Test Section 12



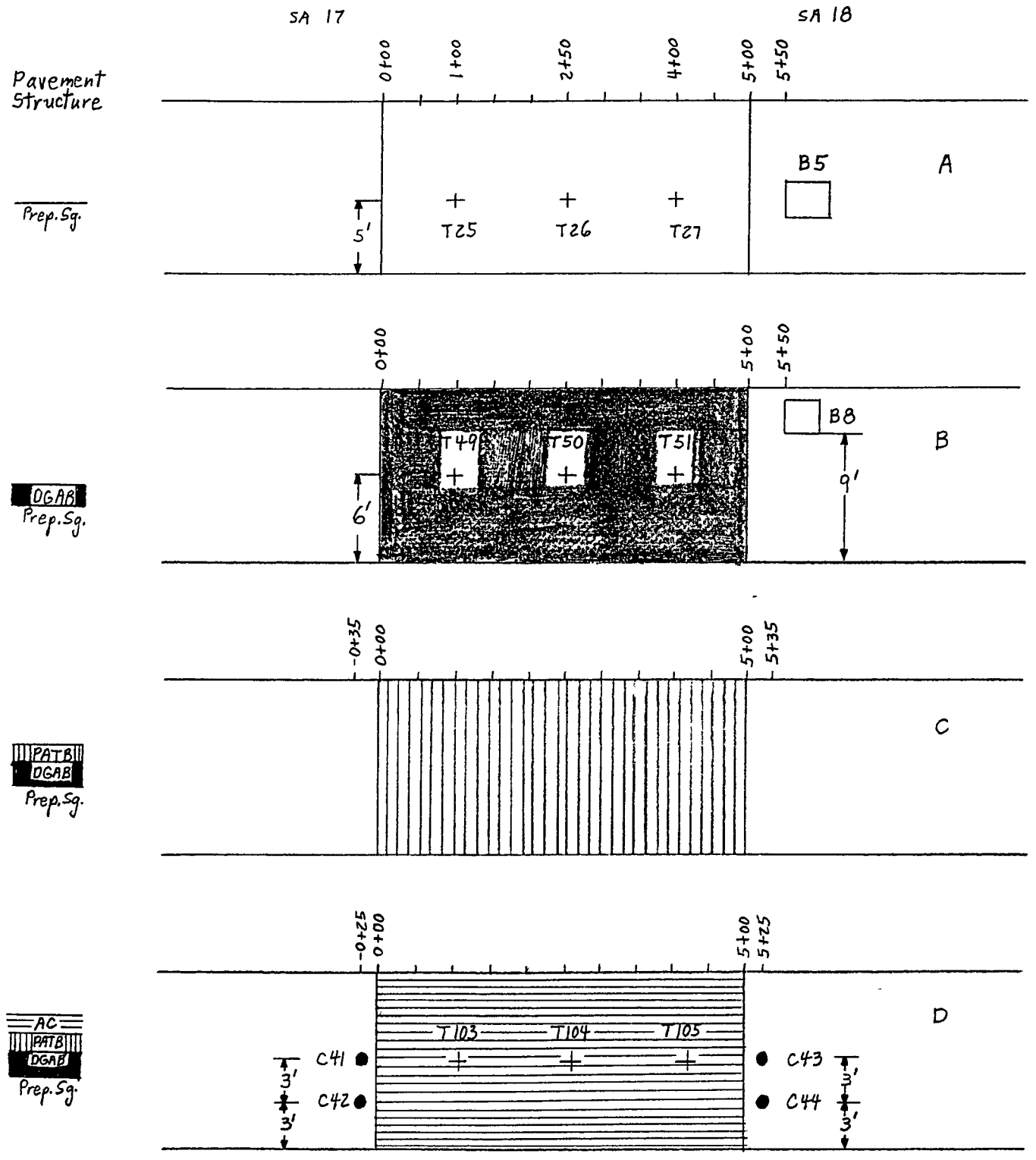
A Testing on prepared Subgrade (T19 - T21, B4)
B No testing on compacted PATB
C Testing on compacted ATB (T67 - T69)
D Testing on finished AC Surface (T97 - T99)
Coring AC Surface and bound layers (C33 - C36)

Sampling and Testing Plan for Test Section 11



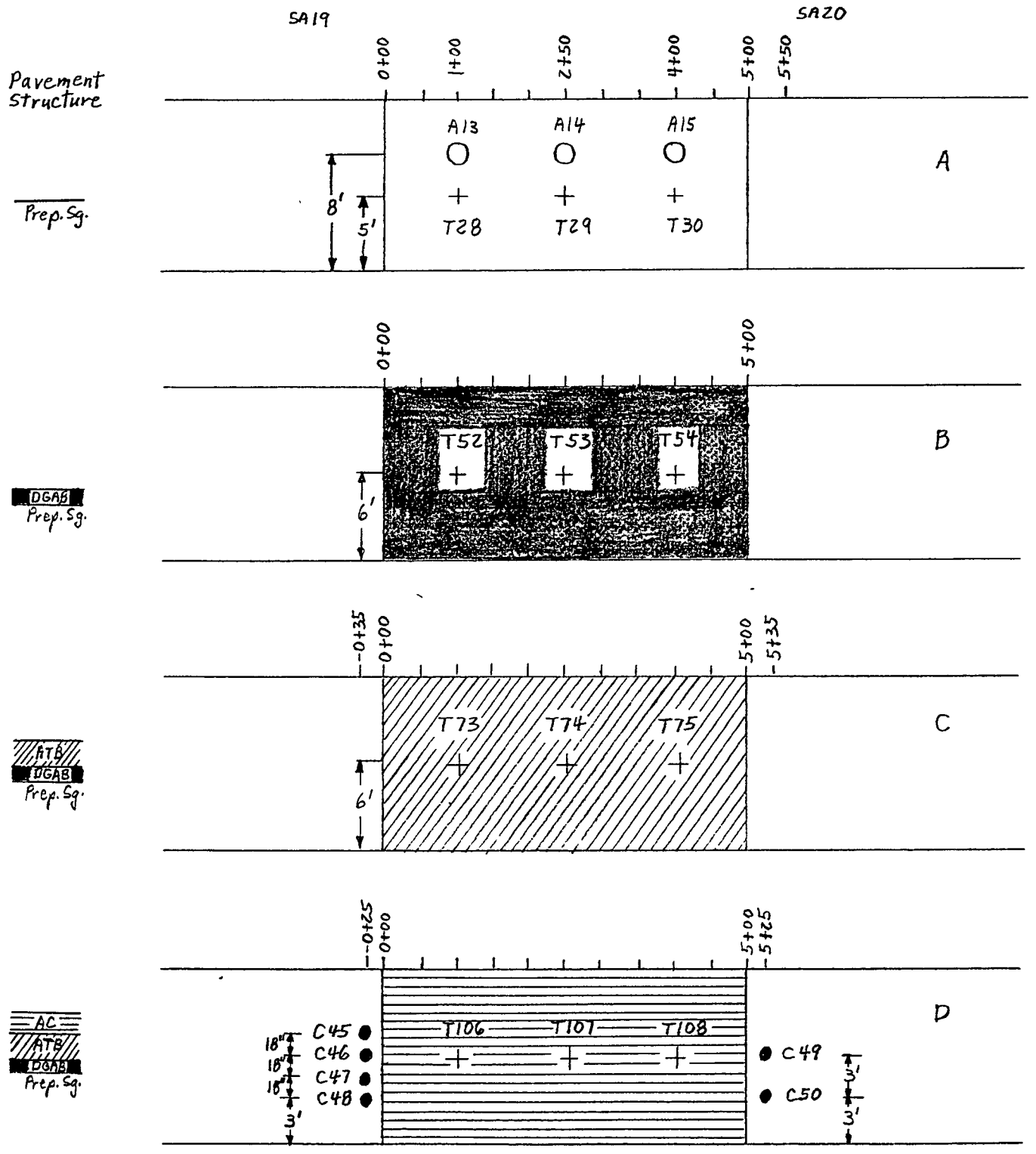
A Testing on prepared Subgrade (T22-T24, A10-A12)
B No testing on compacted PATB
C Testing on compacted ATB (T70 -T72)
D Testing on finished AC Surface (T100-T102)
Coring AC Surface and bound layers (C37-C40)

Sampling and Testing Plan for Test Section 10



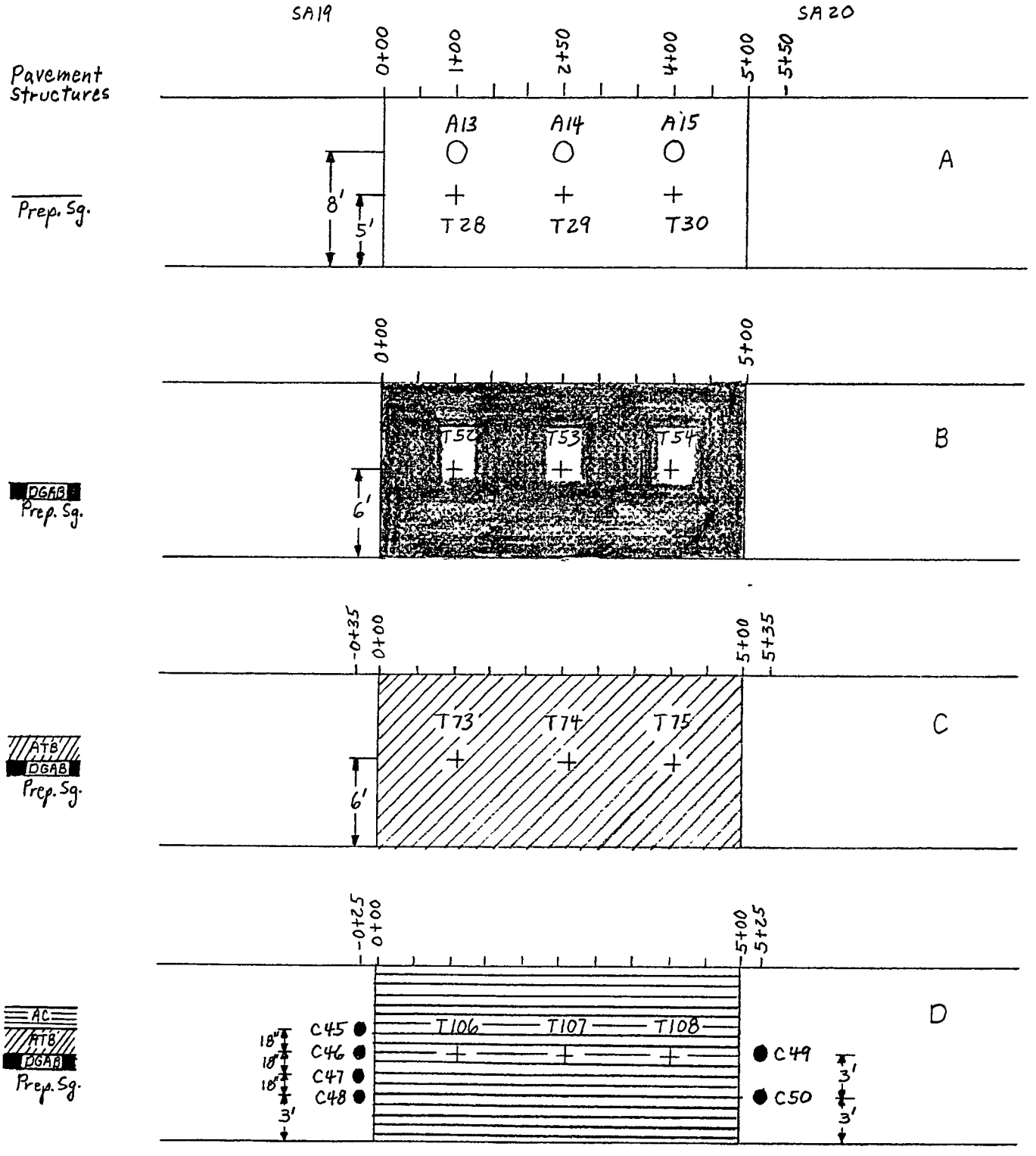
A Testing on prepared Subgrade (T25-T27, B5)
B Testing on compacted DGAB (T49-T51, B8)
C No Testing on compacted PATB
D Testing on finished AC Surface (T103-T105)
Coring AC surface and bound layers (C41-C44)

Sampling and Testing Plan for Test Section 9



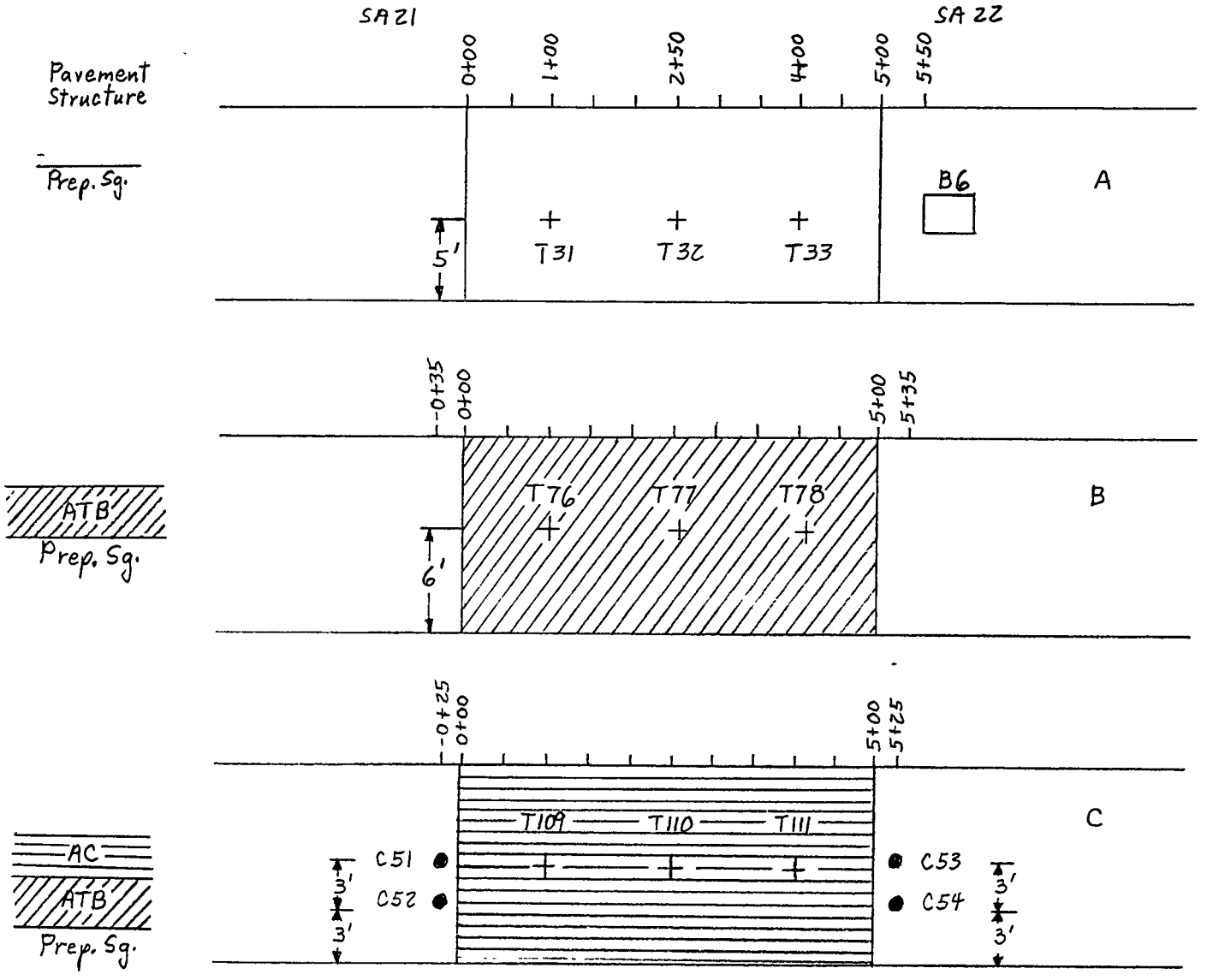
A Testing on prepared Subgrade (T28 - T30, A13 - A15)
B Testing on compacted DGAB (T52 - T54)
C Testing on compacted ATB (T73 - T75)
D Testing on finished AC Surface (T106 - T108)
Coring AC Surface and bound layers (C45 - C50)

Sampling and Testing Plan for Test Section 6



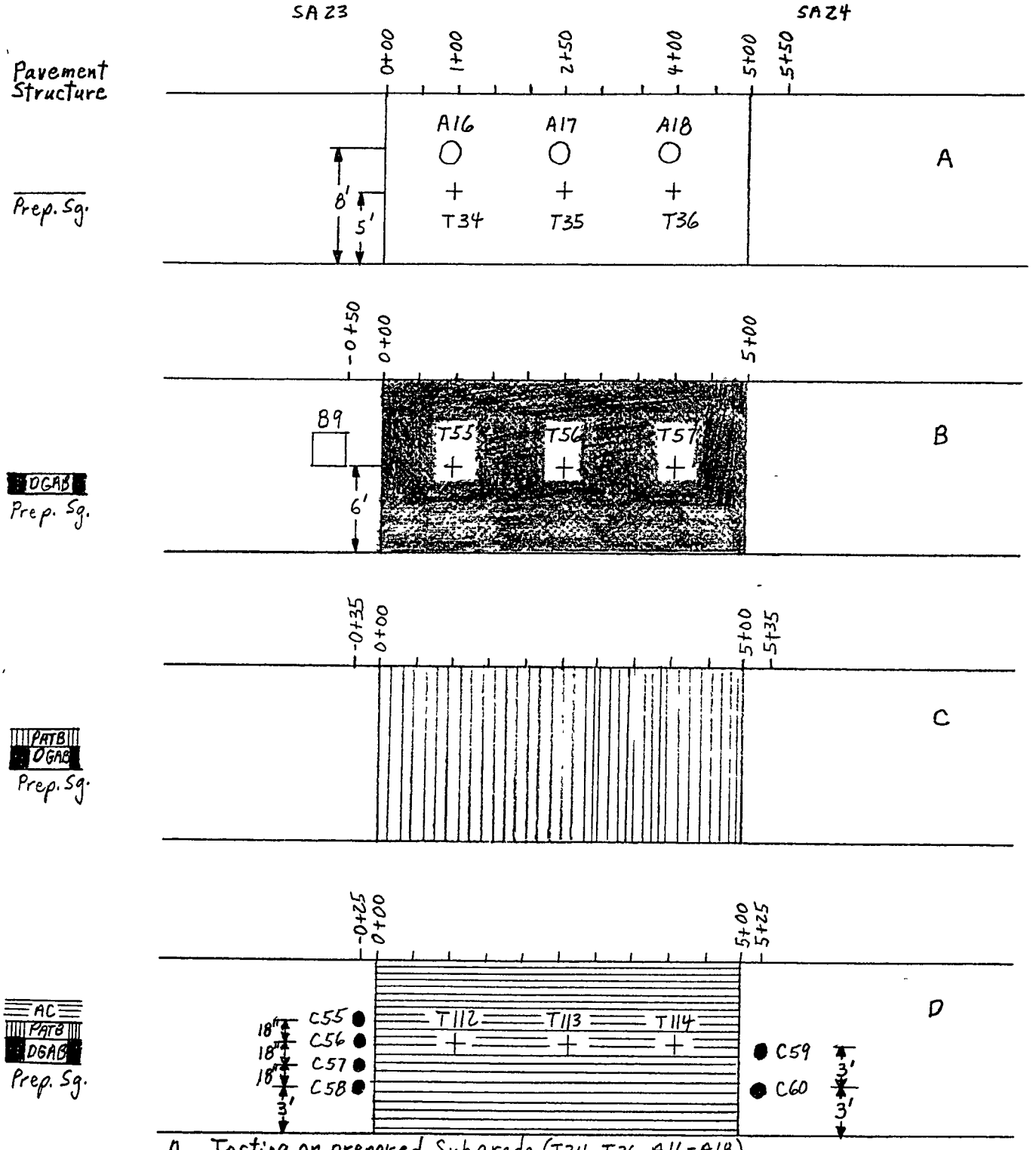
A Testing on prepared Subgrade (T28-T30, A13-A15)
B Testing on compacted DGAB (T52-T54)
C Testing on compacted ATB (T73-T75)
D Testing on finished AC Surface (T106-T108)
Coring AC Surface and bound layers (C45-C50)

Sampling and Testing Plan for Test Section 6



A Testing on prepared Subgrade (T31 - T33, B6)
B Testing on compacted ATB (T76 - T78)
C Testing on finished AC Surface (T109 - T111)
Coring AC Surface and bound layers (C51 - C54)

Sampling and Testing Plan for Test Section 4



A Testing on prepared Subgrade (T34-T36, A16-A18)
B Testing on compacted OGAB (T55-T57, B9)
C No testing on compacted PATB
D Testing on finished AC Surface (T112-T114)
Coring AC Surface and bound layers (C55-C60)

Sampling and Testing Plan for Test Section 8

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Subgrade				
Sieve Analysis	SS01	P51	6	B1-B6
Hydrometer to 0.01mm	SS02	P42	6	B1-B6
Atterberg Limits	SS03	P43	6	B1-B6
Classification	SS04	P52	24 6+18	B1-B6, A1-A18--Note 1
Moisture-Density Relations	SS05	P55	6	B1-B6
Resilient Modulus (at in-situ density and moisture)	SS07	P46	6	A2,A5,A9,A11,A14,A17
Unit Weight	SS08	P56	6	B1-B6
Natural Moisture Content	SS09	P49	6	B1-B6
Unconfined Comp. Strength	SS10	P54	6	A1,A4,A7,A10,A13,A16
In-Place Density		SHRP-LTPP Method	42 6+36	T1-T36, B1-B6
Permeability	SS11		3	A3,A8,A18
Unbound Granular Base				
Particle Size Analysis	UG01	P41	3	B7,B8,B9
Sieve Analysis (washed)	UG02	P41	3	B7,B8,B9
Atterberg Limits	UG04	P43	3	B7,B8,B9
Moisture-Density Relations	UG05	P44	3	B7,B8,B9
Resilient Modulus (at in-situ density and moisture)	UG07	P46	3	B7,B8,B9
Classification	UG08	P47	3	B7,B8,B9
Permeability	UG09	P48	3	B7,B8,B9
Natural Moisture Content	UG10	P49	3	B7,B8,B9
In-Place Density and Moisture		SHRP-LTPP Method	21	T37-T57

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Permeable Treated Asphalt Base				
Core Examination/Thickness	AC01	P01	30	C1-C6,C27-C44,C55-C60
Bulk Specific Gravity	AC02	P02	12	C5,C6,C29,C30,C33,C34, C37,C38,C41,C42,C59,C60
Maximum Specific Gravity	AC03	P03	3	BT-01,BT-02,BT-03 From Plant
Asphalt Content (extraction)	AC04	P04	3	BT-01,BT-02,BT-03 From Plant
*Moisture Susceptibility	AC05	P05	3	BT-01,BT-02,BT-03 From Plant
Permeability Flow	AC08	P08	1	BT-02 --Note 2
Resilient Modulus	AC09	P09	2	C1-C3,C55-C57 --Note 3
Tensile Strength	AC09	P09	8	C1-C4,C55-C58
Extracted Aggregate:				
Specific Gravity:				
Coarse Aggregate	AG01	P11	3	BT-01,BT-02,BT-03
Fine Aggregate	AG02	P12	3	BT-01,BT-02,BT-03
Type and Classification:				
Coarse Aggregate	AG03	P13	3	BT-01,BT-02,BT-03
Fine Aggregate	AG03	P13	3	BT-01,BT-02,BT-03
Gradation of Aggregate	AG04	P14	3	BT-01,BT-02,BT-03
NAA Test for Fine Aggregate	AG05	P14A	3	BT-01,BT-02,BT-03
Particle Shape				
Coarse Aggregate Shape	AG06	P14B	3	BT-01,BT-02,BT-03
Asphalt Cement:				
Abson Recovery	AE01	P21	3	BT-01,BT-02,BT-03
Penetration at 50F, 77F, 90F	AE02	P22	3	BT-01,BT-02,BT-03
Specific Gravity (60F)	AE03	P23	3	BT-01,BT-02,BT-03
Viscosity at 77F	AE04	P24	3	BT-01,BT-02,BT-03
Viscosity at 140F, 275F	AE05	P25	3	BT-01,BT-02,BT-03

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Asphalt Treated Base				
Core Examination/Thickness	AC01	P01	34	C7-C16,C27-C40,C45-C54
Bulk Specific Gravity	AC02	P02	34	C7-C16,C27-C40,C45-C54
Maximum Specific Gravity	AC03	P03	3	BT-20,BT-21,BT-22 From Plant
Asphalt Content (extraction)	AC04	P04	3	BT-20,BT-21,BT-22 From Plant
Moisture Susceptibility	AC05	P05	1	BT-21 From Plant
Resilient Modulus	AC07	P07	3	C11-C13,C27-C29,C45-C47
Tensile Strength	AC07	P07	12	C11-C14,C27-C30,C45-C48
In-Place Density		SHRP-LTPP Method	35	T58-T78,SA3-SA6,SA11-SA16, SA19-SA22
Extracted Aggregate:				
Specific Gravity:				
Coarse Aggregate	AG01	P11	3	BT-20,BT-21,BT-22
Fine Aggregate	AG02	P12	3	BT-20,BT-21,BT-22
Type and Classification:				
Coarse Aggregate	AG03	P13	3	BT-20,BT-21,BT-22
Fine Aggregate	AG03	P13	3	BT-20,BT-21,BT-22
Gradation of Aggregate	AG04	P14	3	BT-20,BT-21,BT-22
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3	BT-20,BT-21,BT-22
Coarse Aggregate Shape	AG06	P14B	3	BT-20,BT-21,BT-22
Asphalt Cement:				
Abson Recovery	AE01	P21	3	BT-20,BT-21,BT-22
Penetration at 50F, 77F, 90F	AE02	P22	3	BT-20,BT-21,BT-22
Specific Gravity (60F)	AE03	P23	3	BT-20,BT-21,BT-22
Viscosity at 77F	AE04	P24	3	BT-20,BT-21,BT-22
Viscosity at 140F, 275F	AE05	P25	3	BT-20,BT-21,BT-22

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Asphalt Cement (From Tanker)				
Penetration at 50F, 77F, 90F	AE02	P22	3	BC-01,BC-02,BC-03 From Plant
Specific Gravity (60F)	AE03	P23	3	BC-01,BC-02,BC-03 From Plant
Viscosity at 77F	AE04	P24	3	BC-01,BC-02,BC-03 From Plant
Viscosity at 140F, 275F	AE05	P25	3	BC-01,BC-02,BC-03 From Plant

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Asphaltic Concrete Surface and Binder				
Core Examination/Thickness	AC01	P01	60	C1-C60
Bulk Specific Gravity	AC02	P02	60	C1-C60
Maximum Specific Gravity	AC03	P03	3	BA-20,BA-21,BA-22 From Plant
Asphalt Content (extraction)	AC04	P04	3	BA-20,BA-21,BA-22 From Plant
Moisture Susceptibility	AC05	P05	3	BA-20,BA-21,BA-22 From Plant
Creep Modulus	AC06	P06	1	C7,C39,C53
Resilient Modulus	AC07	P07	6	C1-C3,C11-C13,C21-C23, C27-C29,C45-C47,C55-C57
Tensile Strength	AC07	P07	24	C1-C4,C11-C14,C21-C24, C27-C30,C45-C48,C55-C58
In-Place Density		SHRP-LTPP Method	60	SA1-SA24,T79-T114
Extracted Aggregate:				
Bulk Specific Gravity:				
Coarse Aggregate	AG01	P11	3	BA-20,BA-21,BA-22
Fine Aggregate	AG02	P12	3	BA-20,BA-21,BA-22
Type and Classification:				
Coarse Aggregate	AG03	P13	3	BA-20,BA-21,BA-22
Fine Aggregate	AG03	P13	3	BA-20,BA-21,BA-22
Gradation of Aggregate	AG04	P14	3	BA-20,BA-21,BA-22
NAA Test for Fine Aggregate Particle Shape	AG05	P14A	3	BA-20,BA-21,BA-22
Coarse Aggregate Shape	AG06	P14B	3	BA-20,BA-21,BA-22
Asphalt Cement:				
Abson Recovery	AE01	P21	3	BA-20,BA-21,BA-22
Penetration at 50F, 77F, 90F	AE02	P22	3	BA-20,BA-21,BA-22
Specific Gravity (60F)	AE03	P23	3	BA-20,BA-21,BA-22
Viscosity at 77F	AE04	P24	3	BA-20,BA-21,BA-22
Viscosity at 140F, 275F	AE05	P25	3	BA-20,BA-21,BA-22

Field and Laboratory Materials Testing Plan

Material Type and Properties	SHRP Designation	SHRP Protocol	Tests Per Layer	Material Source/ Test Location
Asphalt Cement (From Tanker)				
Penetration at 50F, 77F, 90F	AE02	P22	3	BC-01,BC-02,BC-03 From Plant
Specific Gravity (60F)	AE03	P23	3	BC-01,BC-02,BC-03 From Plant
Viscosity at 77F	AE04	P24	3	BC-01,BC-02,BC-03 From Plant
Viscosity at 140F, 275F	AE05	P25	3	BC-01,BC-02,BC-03 From Plant

Project Layer Numbering

Layer Number	Description
1	Subgrade
2	Embankment (subbase)
3	Graded Aggregate Base
4	Permeable Asphalt Treated Base
5	Dense Graded Asphalt Treated Base
6	Hot Mix Asphalt Concrete Surface (surface and binder mixes)

Scope of Material Sampling

Material and Sample Description	Number of Samples	Sample Location
Asphalt Concrete		
Coring - 4" diam. cores	60 ✓	C1-C60
Bulk Sampling (100 lbs. of each mix, uncompacted)	3 ✓	BA-20,BA-21,BA-22 From Plant
Unbound Base/Subbase Layers (per layer)		
Bulk sampling	3	B1-B3 7-97
Moisture content samples	3	B1-B3 7-97
Asphalt Treated Base		
Coring - 4" diam. cores	34 ✓	C7-C16,C27-C40 C45-C54
Bulk Sampling (100 lbs. per sample, uncompacted)	3 ✓	BT-20,BT-21,BT-22 From Plant
Permeable Asphalt Treated Base		
Coring - 4" diam. cores	30 ✓	C1-C6,C27-C44, C55-C60
Bulk Sampling (100 lbs. per sample, uncompacted)	3 ✓	BT-01,BT-02,BT-03 From Plant
Subgrade		
Splitspoon sampling	36* ✓	A1-A18
Thin-walled tube sampling (*2 tubes or 2 spoons or combination per hole)	36* ✓	A1-A18
Bulk Sampling (400 lbs each sample)	6 ✓	B1-B6
Moisture content samples	24	A1-A18,B1-B6 ✓
Permeability	6 ✓	A3,~~A9~~ A8,A18
Asphalt Cement (5 gallons each sample)	3 ✓	BC-01,BC-02,BC-03 From Plant

NOTE: If different AC mixes are used for the surface course and binder course, bulk samples should be obtained from each mix.

Scope of Field Testing

Material	Number of Tests	Location Designation
Asphalt Concrete		
In-situ density	60	T79-T114,SA1-SA24
Unbound Base/Subbase Layers (per layer)		
In-situ density, moisture content (nuclear gauge)	21	T37-T57
Moisture content samples	3	B7-B9
Asphalt Treated Base		
In-situ density	35	T58-T78,SA3-SA6 SA11-SA16,SA19-SA22
Subgrade		
In-situ density, moisture content (nuclear gauge)	42	T1-T36,B1-B6

Material Sampling for SHRP Asphalt Research Program

Material and Sample Description	Number of Samples	Material Source
Asphalt Cement (5 gallon containers)	11	Plant
Aggregate (55 gal. drums)	2	Plant
Finished Asphaltic Concrete Mix 50 lbs. each (surface, binder, ATB, PATB)	4	Plant
Asphalt Concrete - 4" diam. cores	24	C61-C84