

Appendix B
M-5 Core Site



SB M-5, outside lane, constructed 1998, station 145+___, at transverse joint, core A, (MTU ID M5-01).

NO PHOTO

NO PHOTO

SB M-5, outside lane, constructed 1998, station 145+08, at transverse joint, core B, (MTU ID M5-05).



SB M-5, outside lane, constructed 1998, station 145+___, away from transverse joint, core C, (MTU ID M5-03).



SB M-5, outside lane, constructed 1998, station 145+___, away from transverse joint, core D, (MTU ID M5-08).

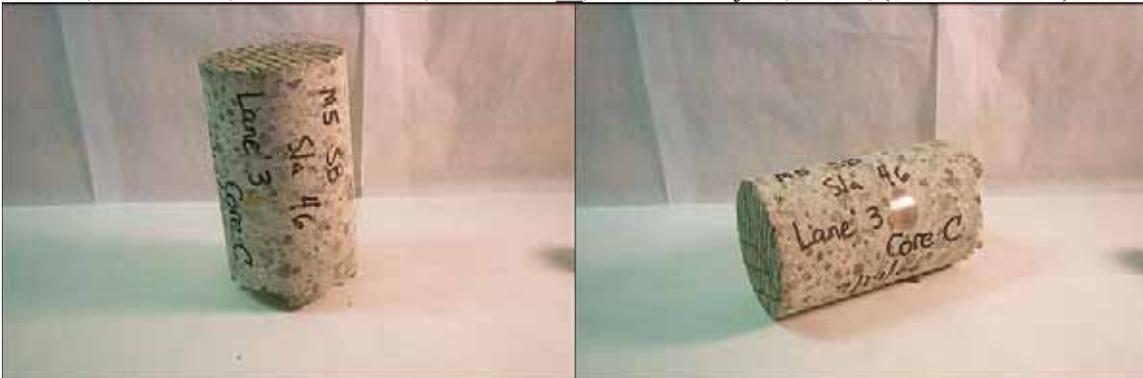
Appendix B
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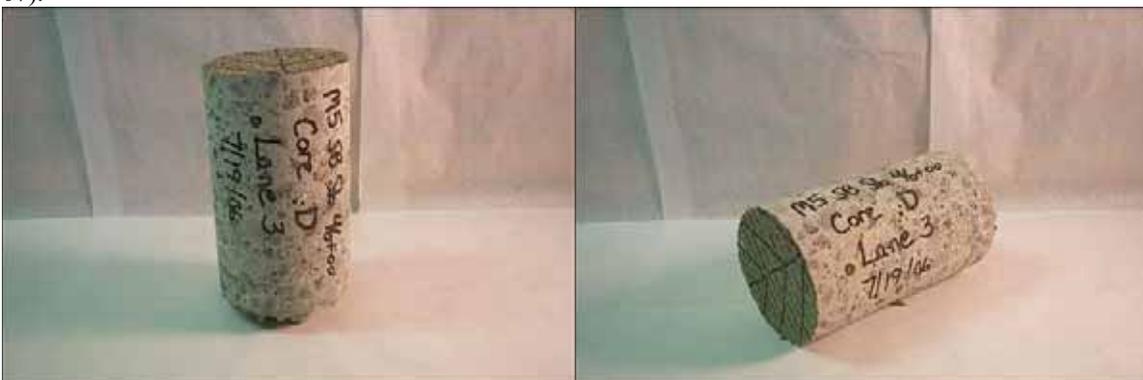
SB M-5, median lane, constructed 1998, station 46+___, at transverse joint, core A, (MTU ID M5-09).



SB M-5, median lane, constructed 1998, station 46+___, at transverse joint, core B, (MTU ID M5-06).



SB M-5, median lane, constructed 1998, station 46+___, away from transverse joint, core C, (MTU ID M5-07).



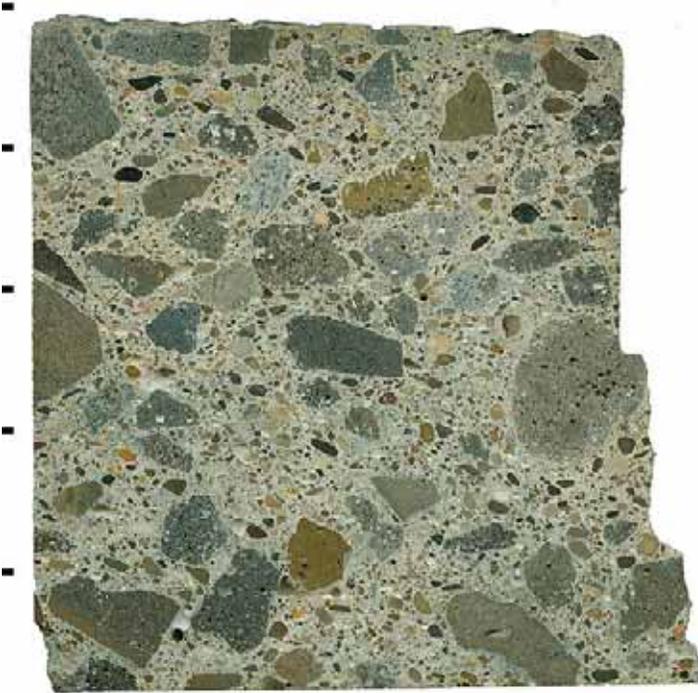
SB M-5, median lane, constructed 1998, station 46+___, away from transverse joint, core D, (MTU ID M5-02).

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M-5 Core Site



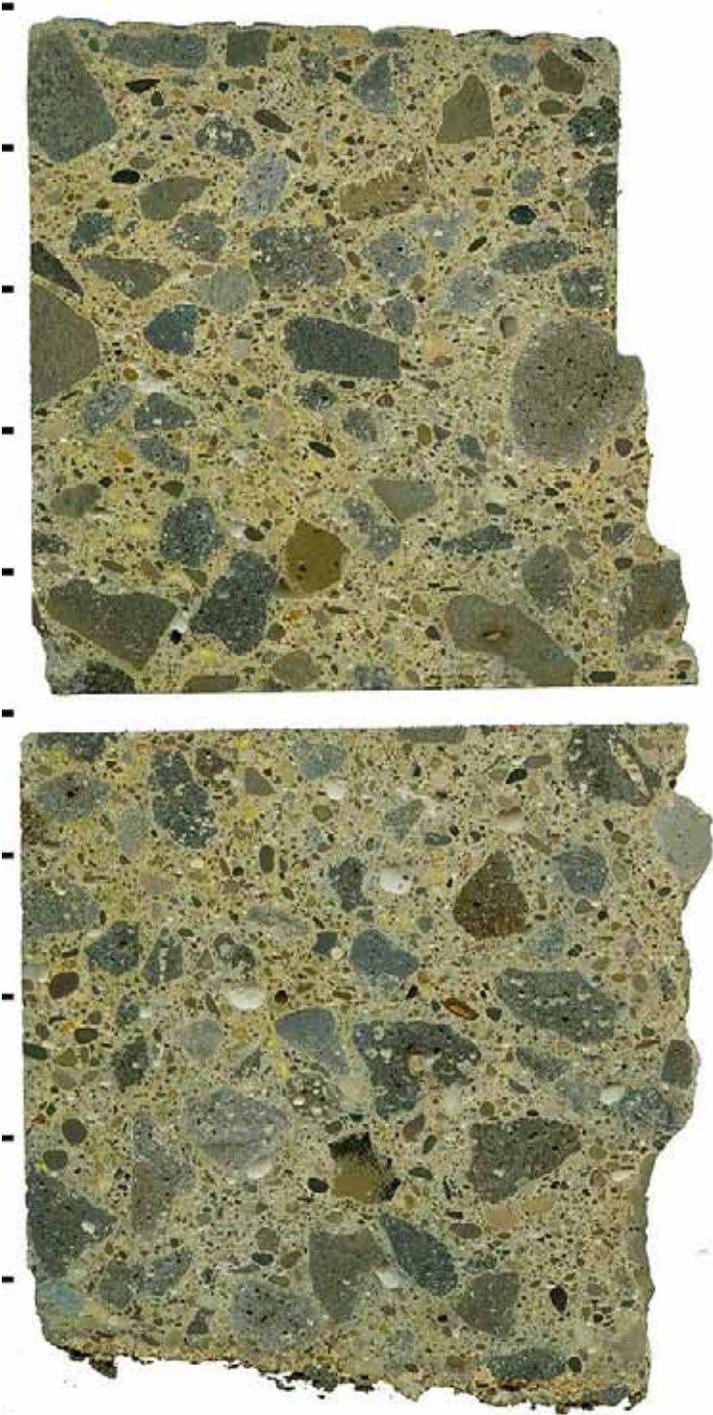
SB M-5, lanes 1 and 2, constructed 1998, station 46+___, at longitudinal joint, core D, (MTU ID M5-04).

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M-5 Core Site



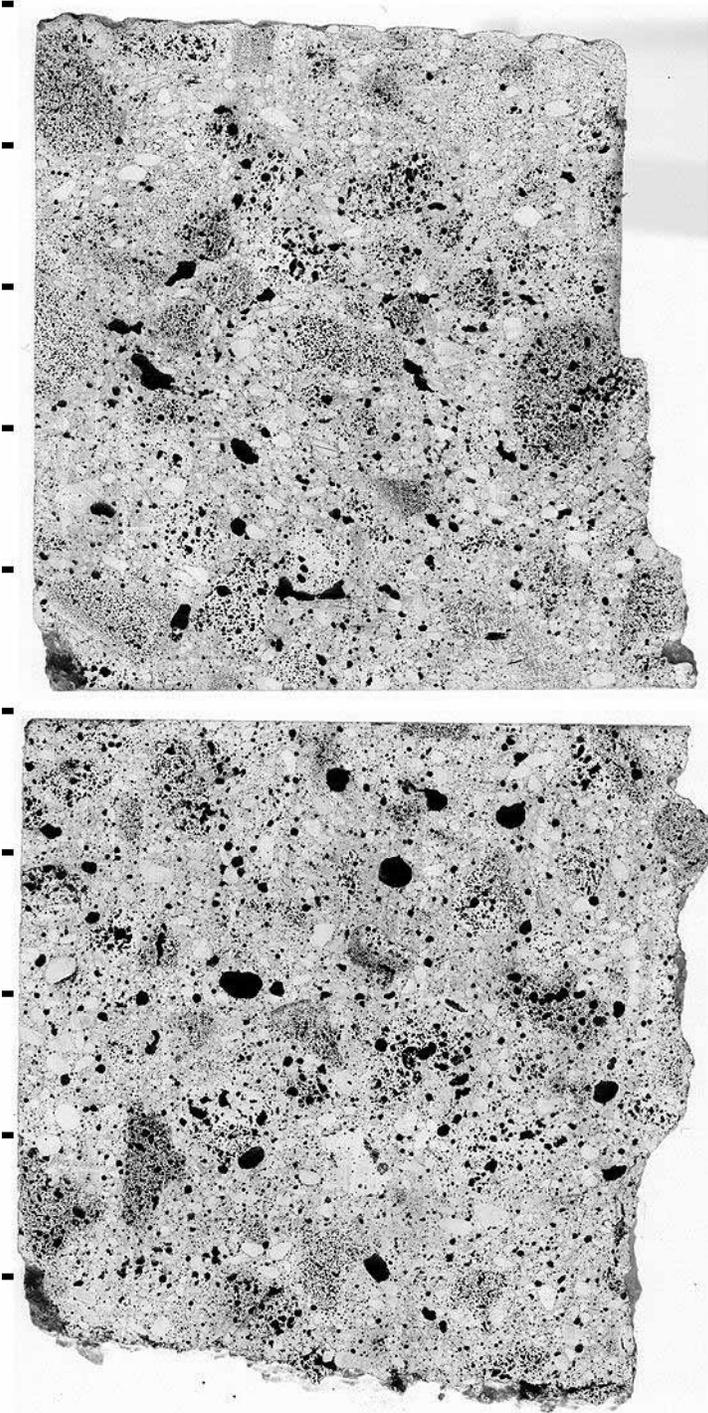
Slabs representing full cross section through pavement, as polished, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every inch.

Appendix B
M-5 Core Site



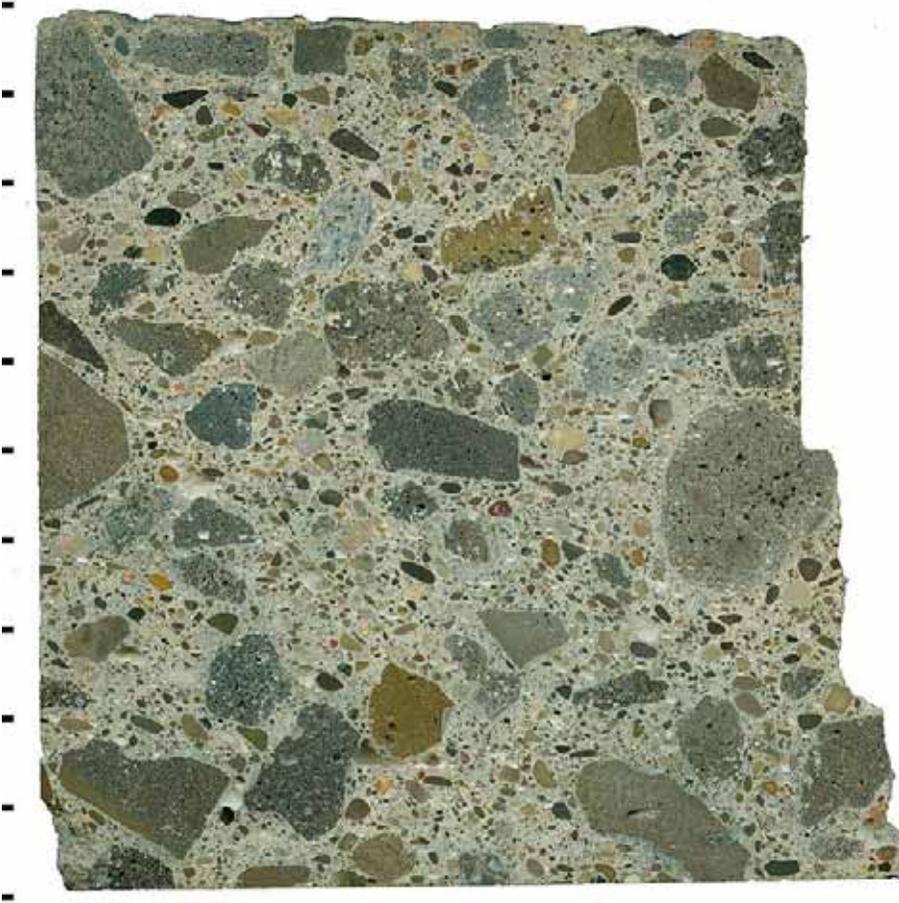
Slabs representing full cross section through pavement, after sodium cobaltinitrite stain, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every inch.

Appendix B
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Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every inch.

Appendix B
M-5 Core Site



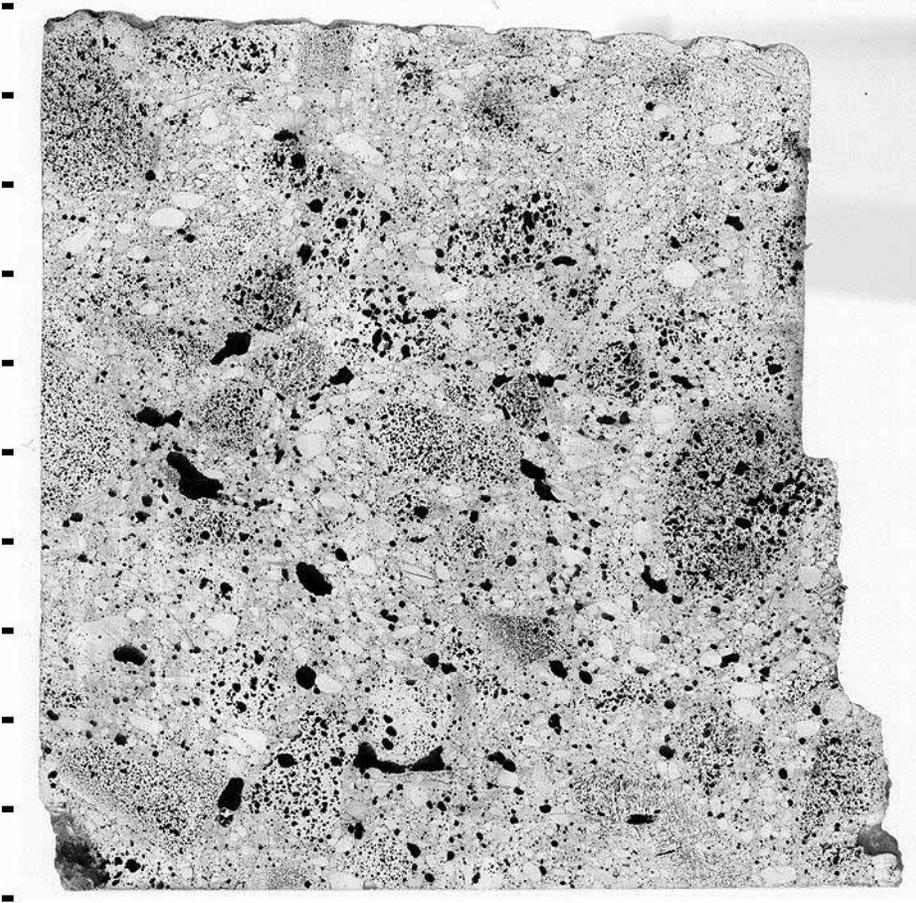
Slab representing cross section through top half of pavement, as polished, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



Slab representing cross section through top half of pavement, after sodium cobaltinitrite stain, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



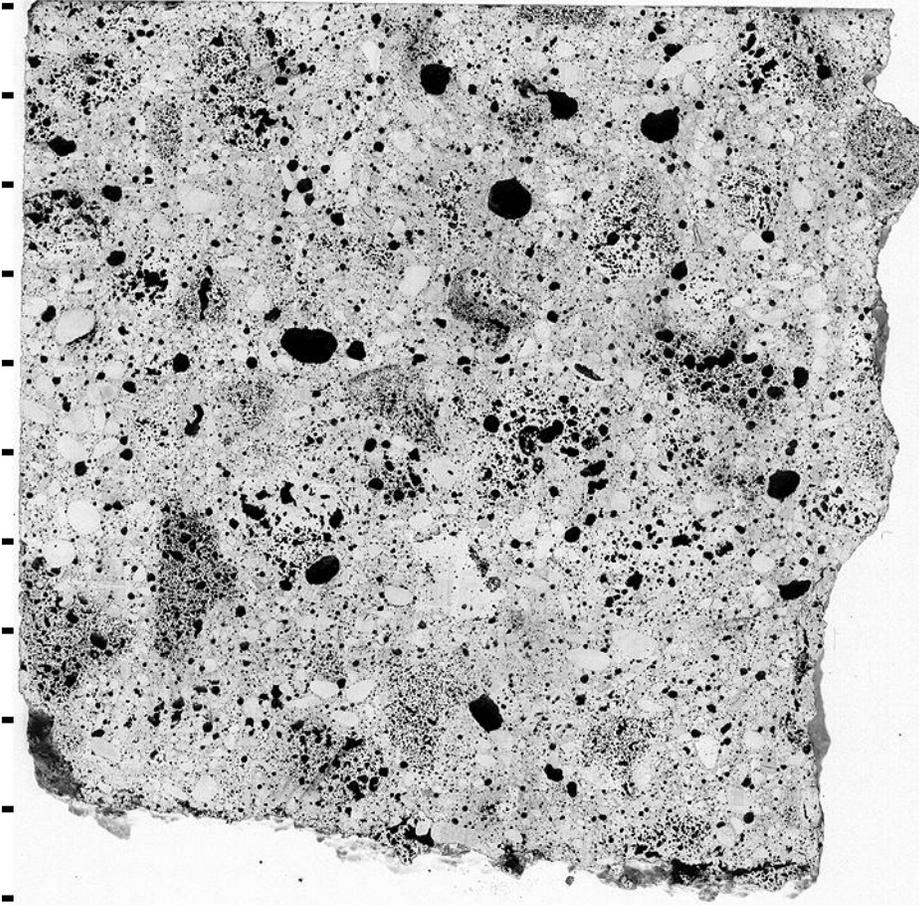
Slab representing cross section through bottom half of pavement, as polished, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



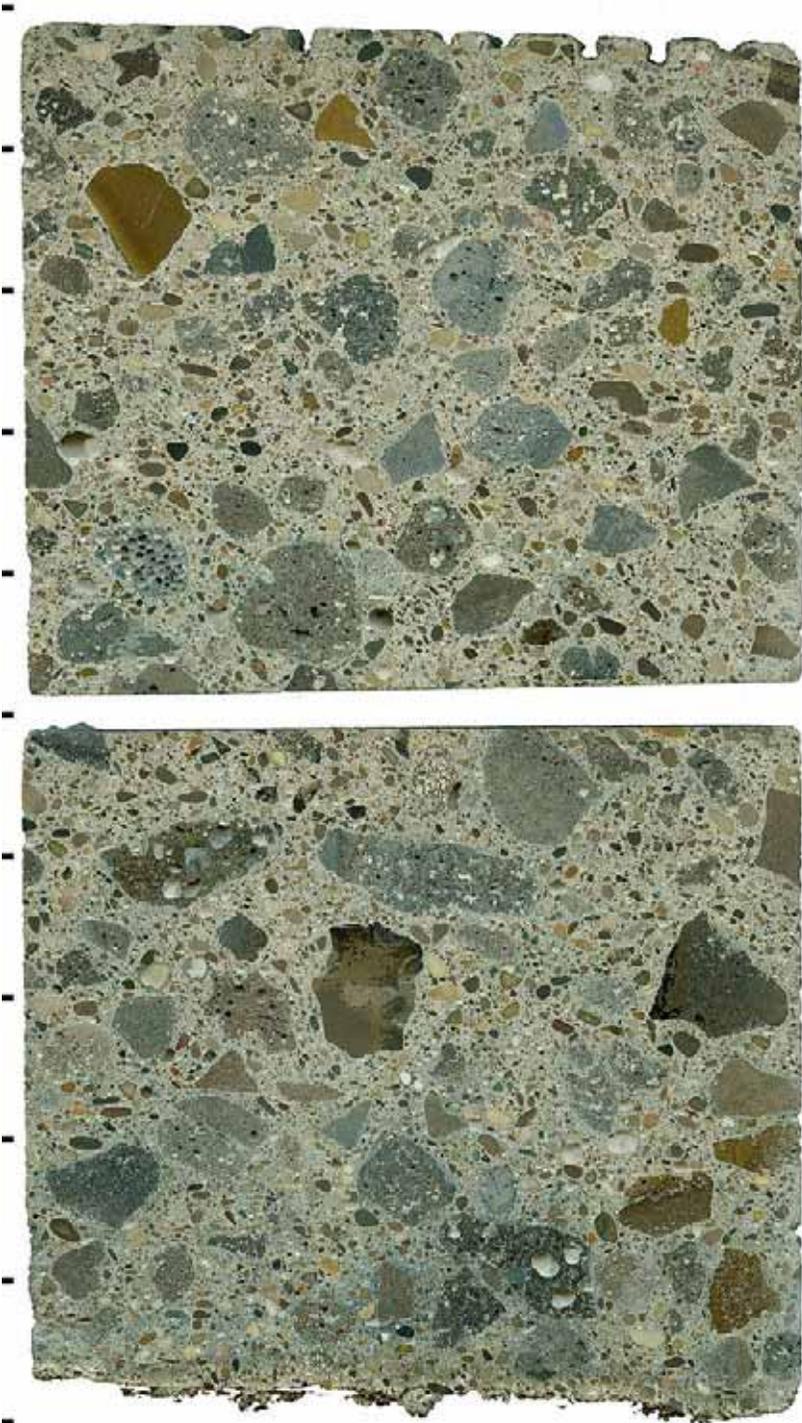
Slab representing cross section through bottom half of pavement, after sodium cobaltinitrite stain, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



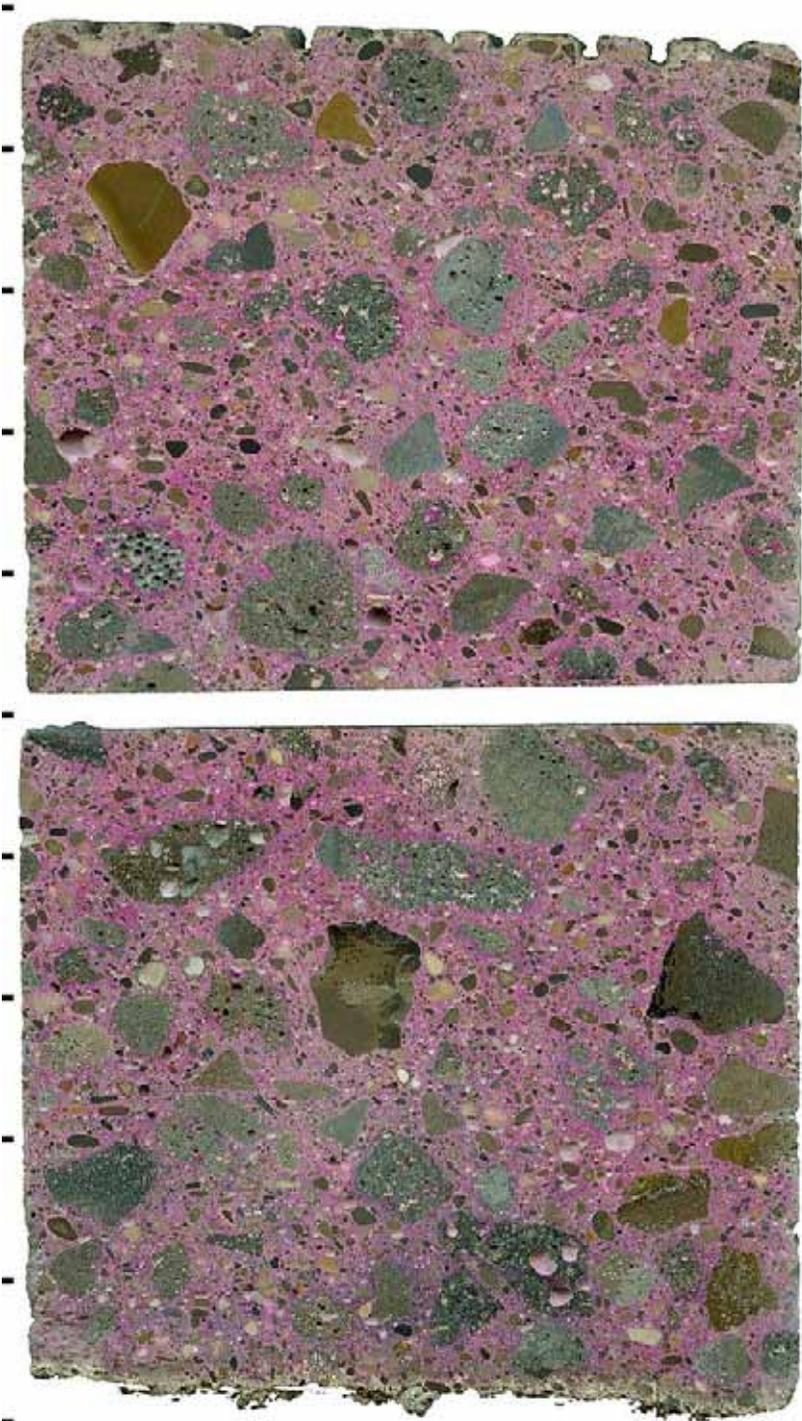
Slab representing cross section through bottom half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05, tic marks every half inch.

Appendix B
M-5 Core Site



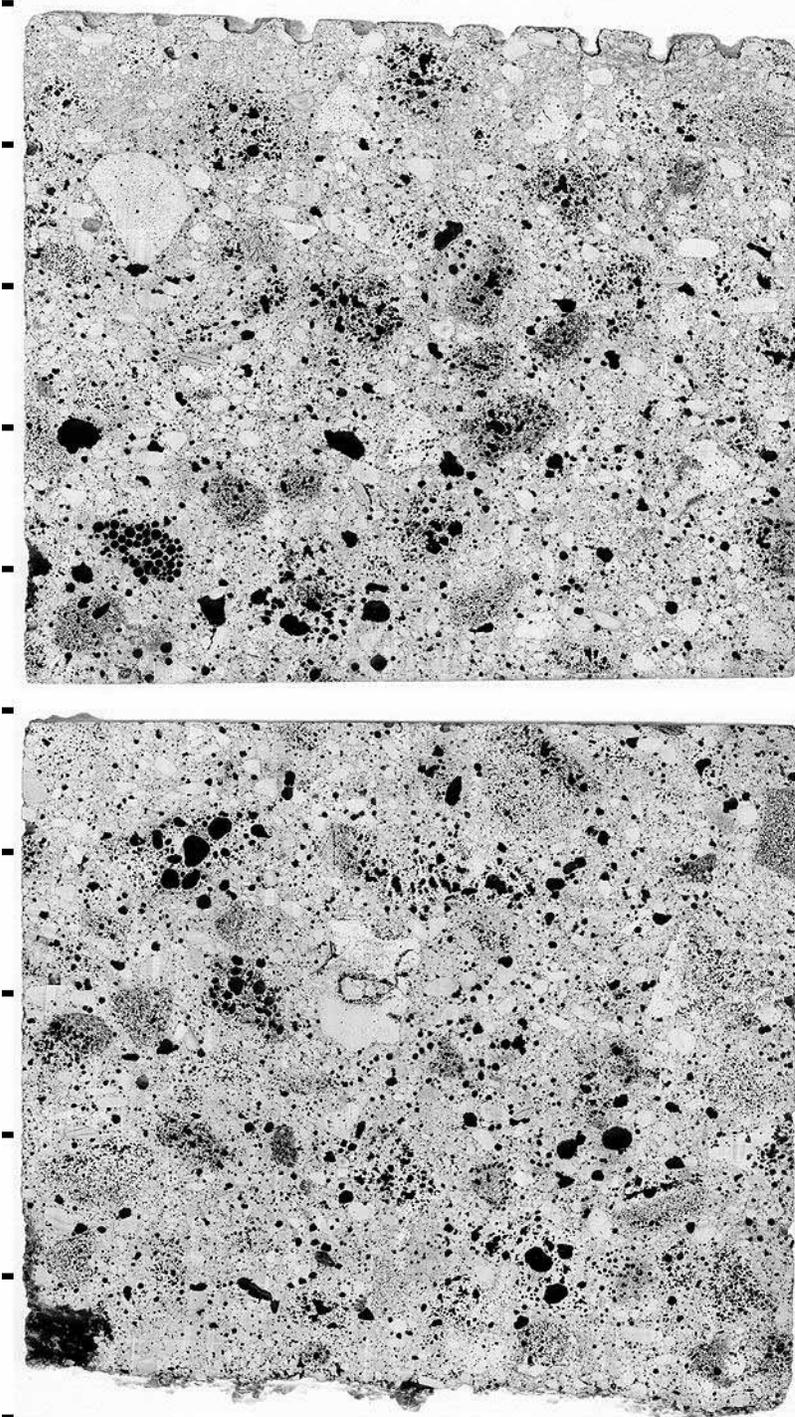
Slabs representing full cross section through pavement, as polished, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every inch.

Appendix B
M-5 Core Site



Slabs representing full cross section through pavement, after phenolphthalein stain, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every inch.

Appendix B
M-5 Core Site



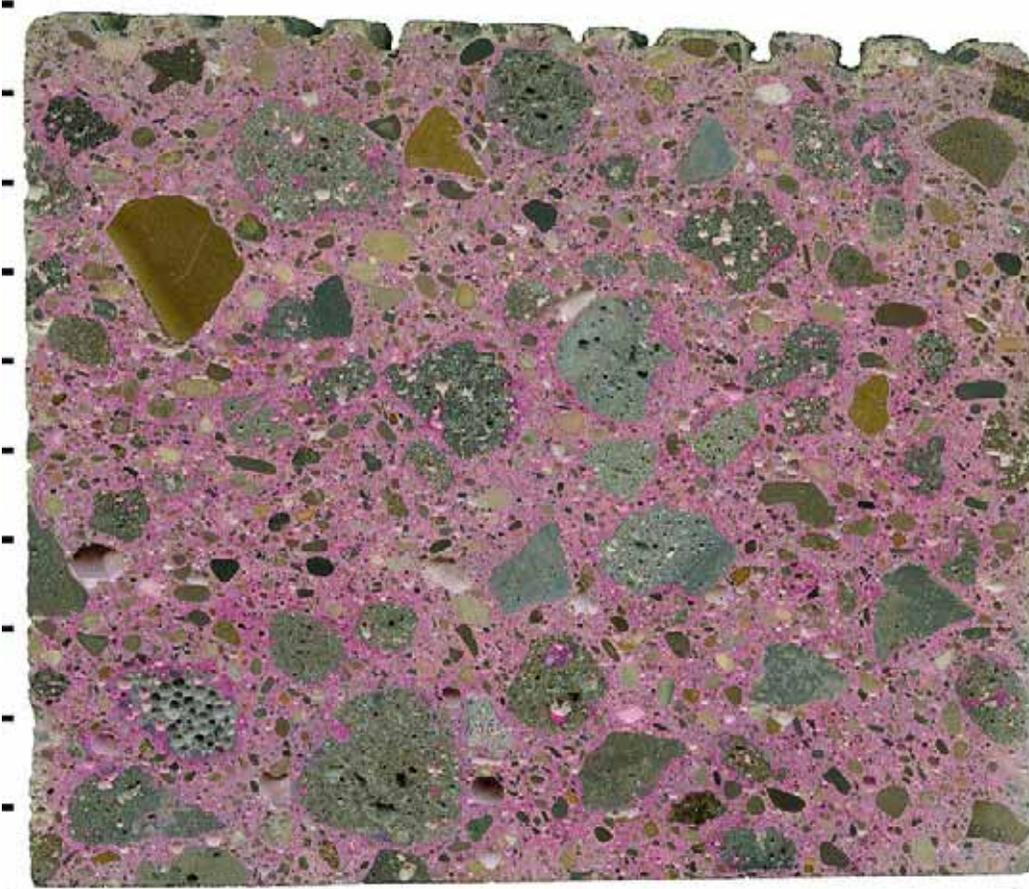
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every inch.

Appendix B
M-5 Core Site



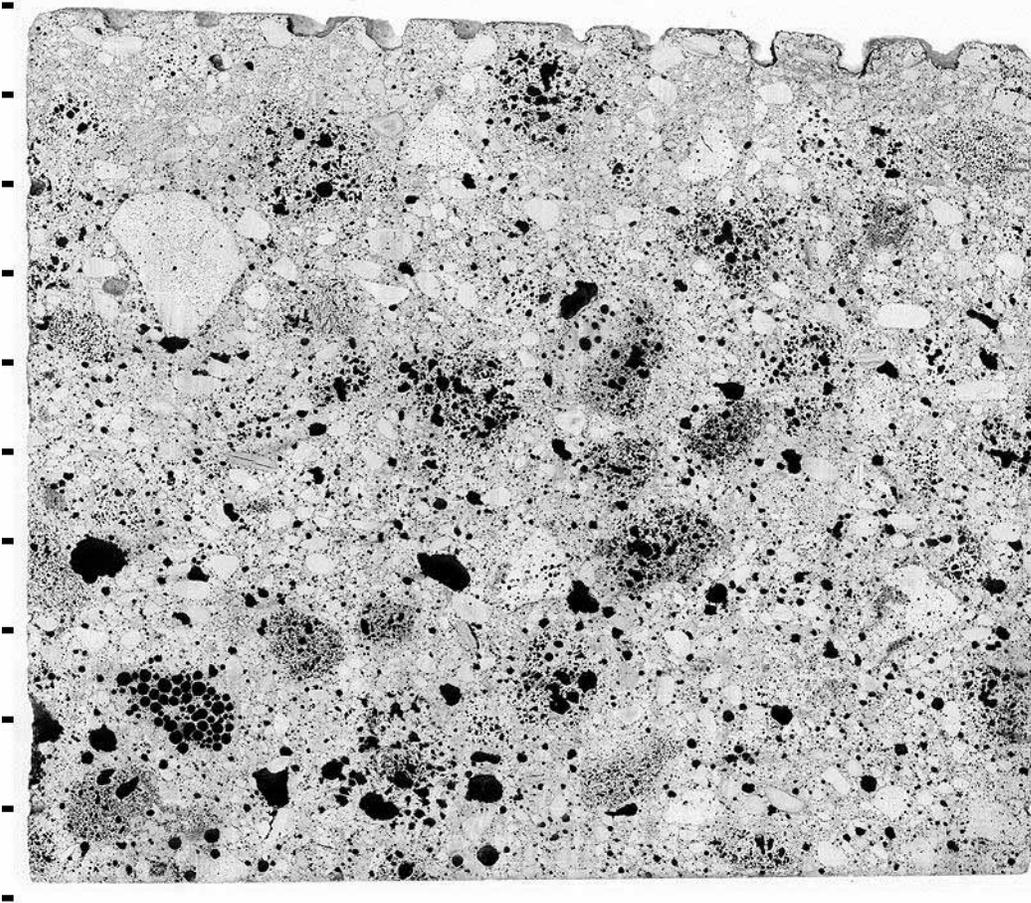
Slab representing cross section through top half of pavement, as polished, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
M-5 Core Site



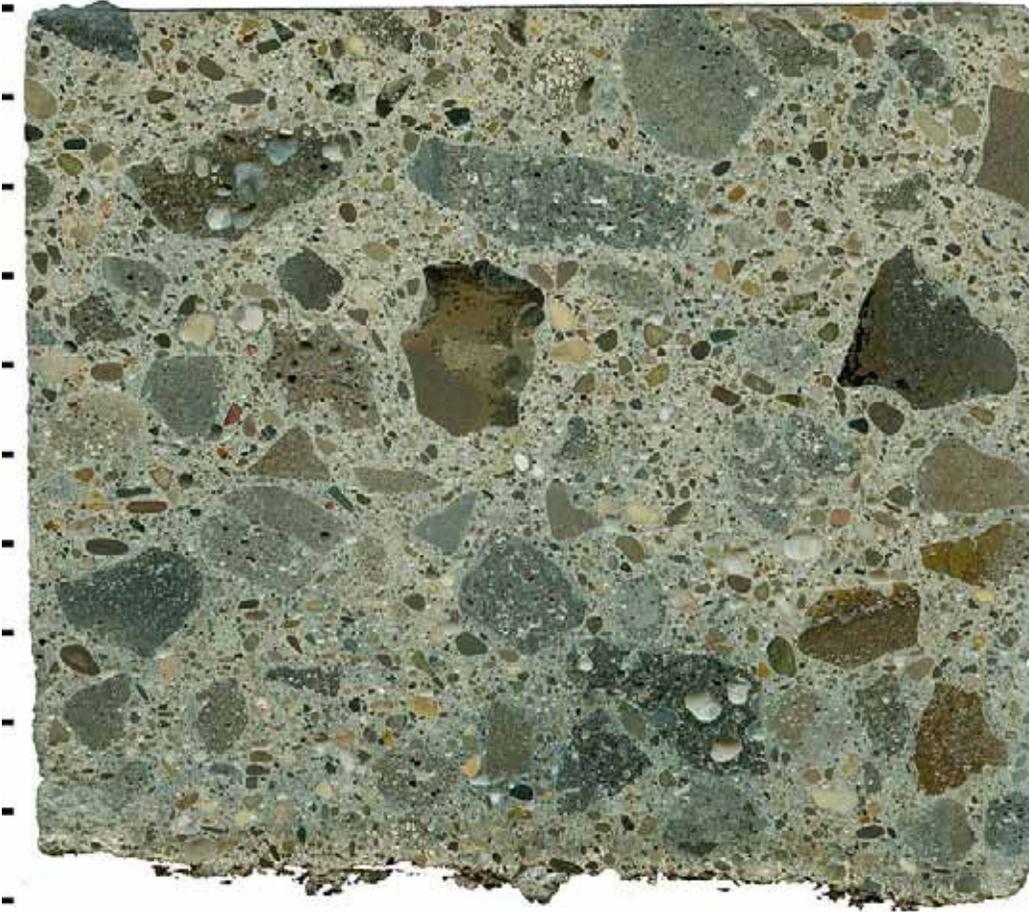
Slab representing cross section through top half of pavement, after phenolphthalein stain, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
M-5 Core Site



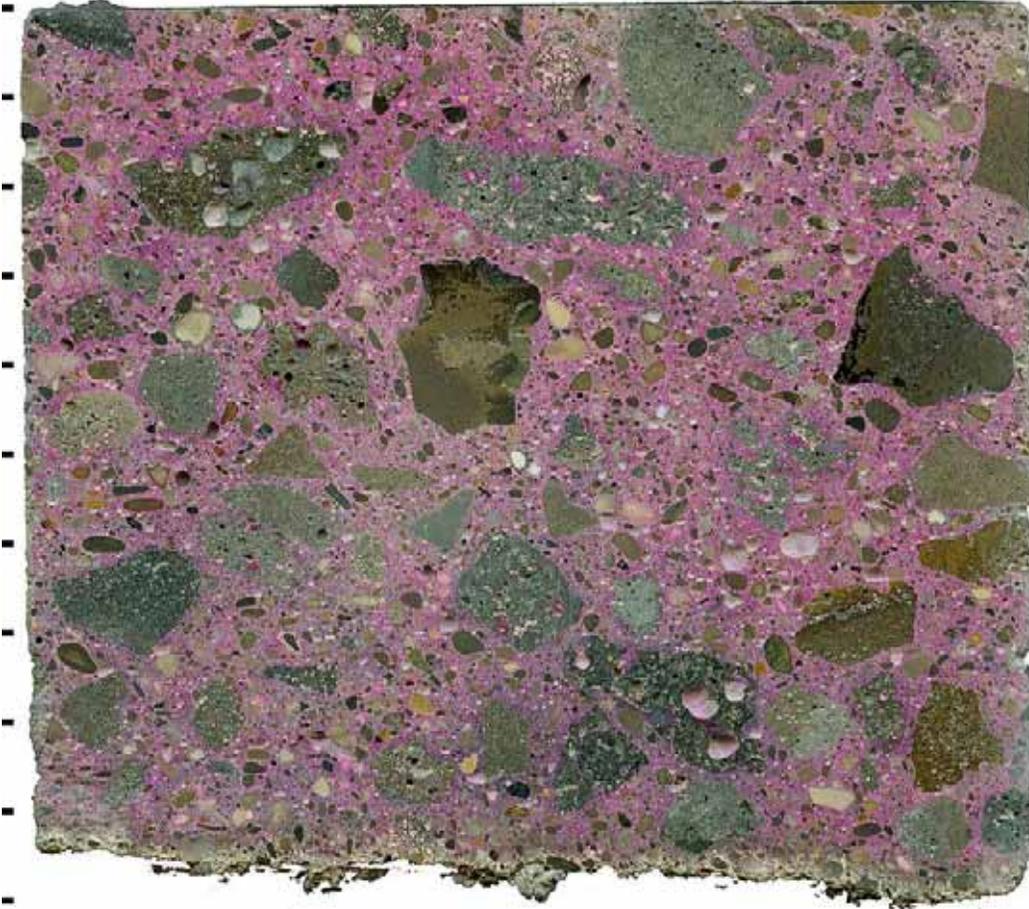
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
M-5 Core Site



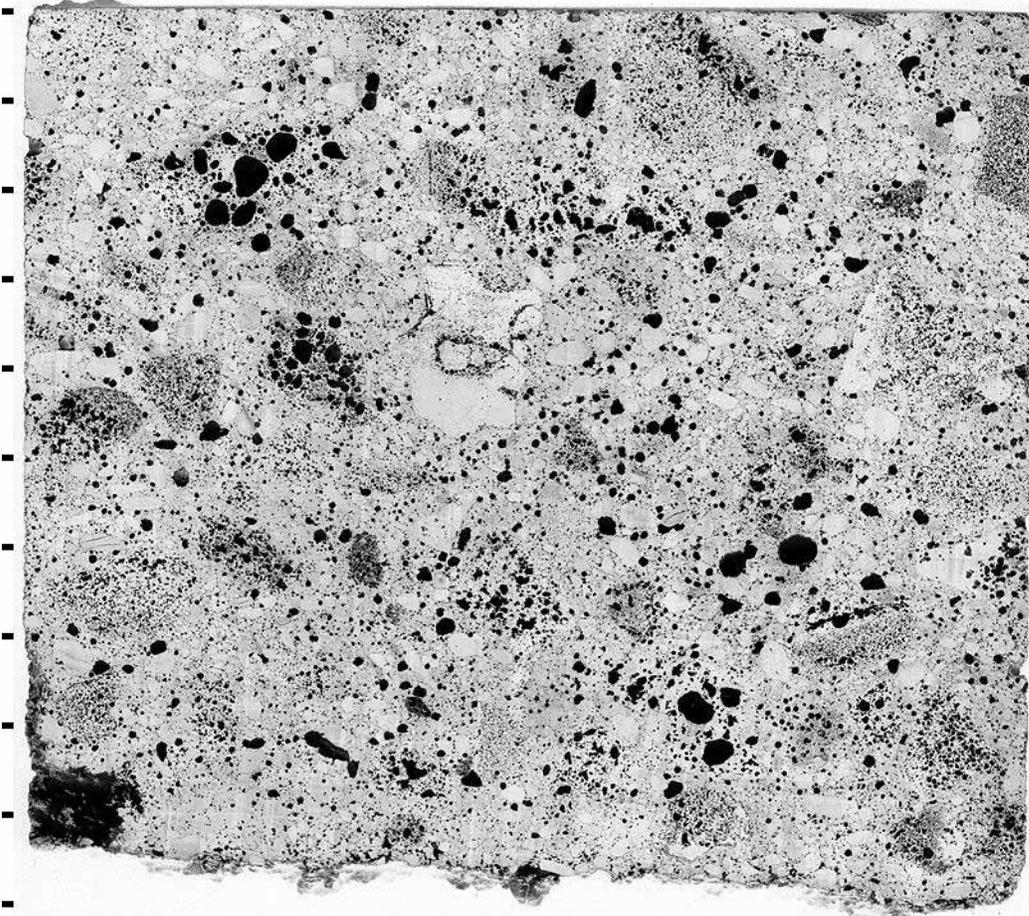
Slab representing cross section through bottom half of pavement, as polished, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
M-5 Core Site



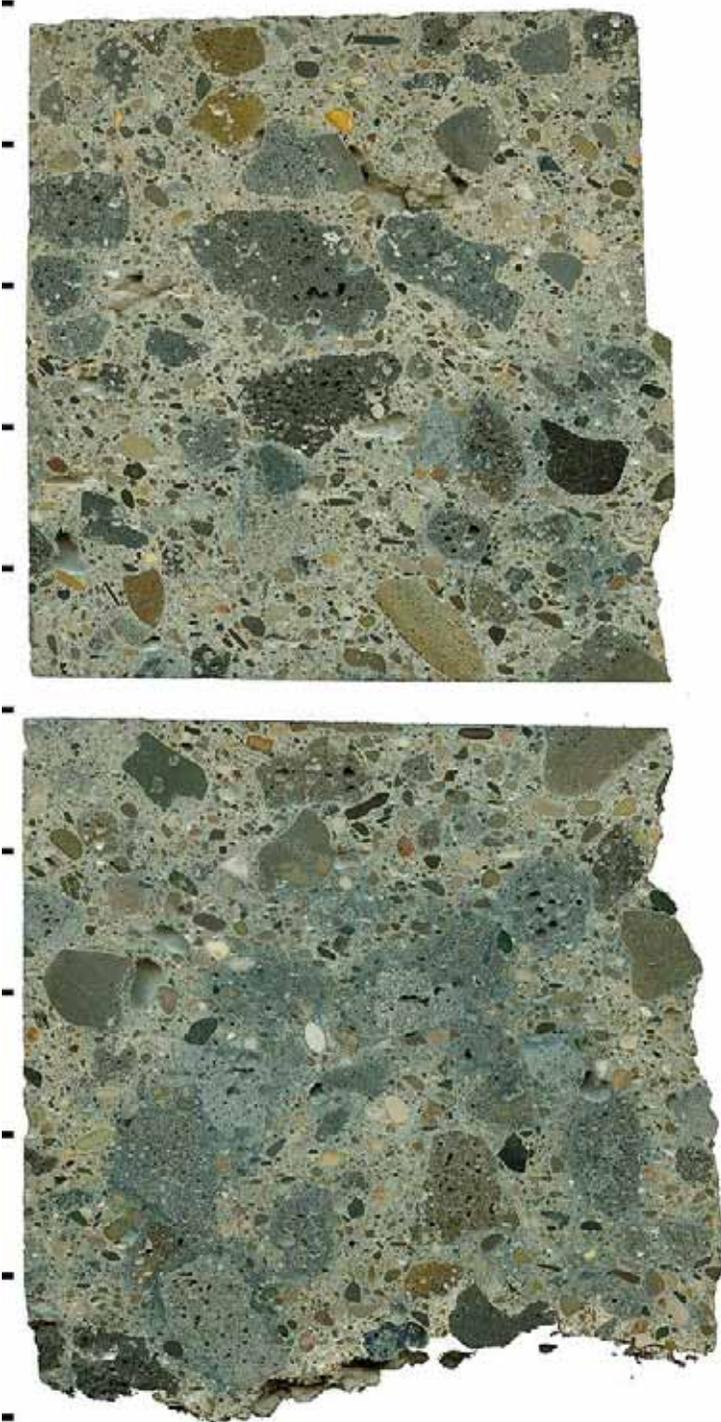
Slab representing cross section through bottom half of pavement, after phenolphthalein stain, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
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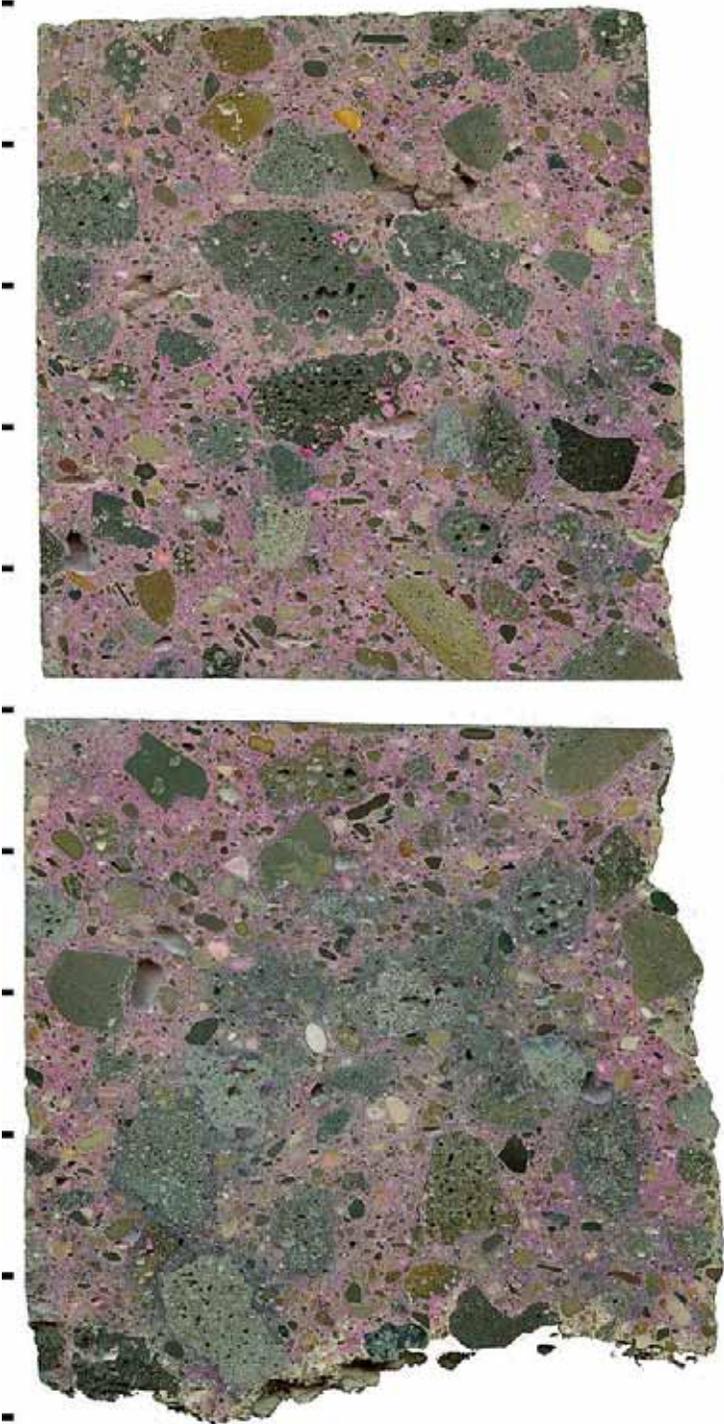
Slab representing cross section through bottom half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08, tic marks every half inch.

Appendix B
M-5 Core Site



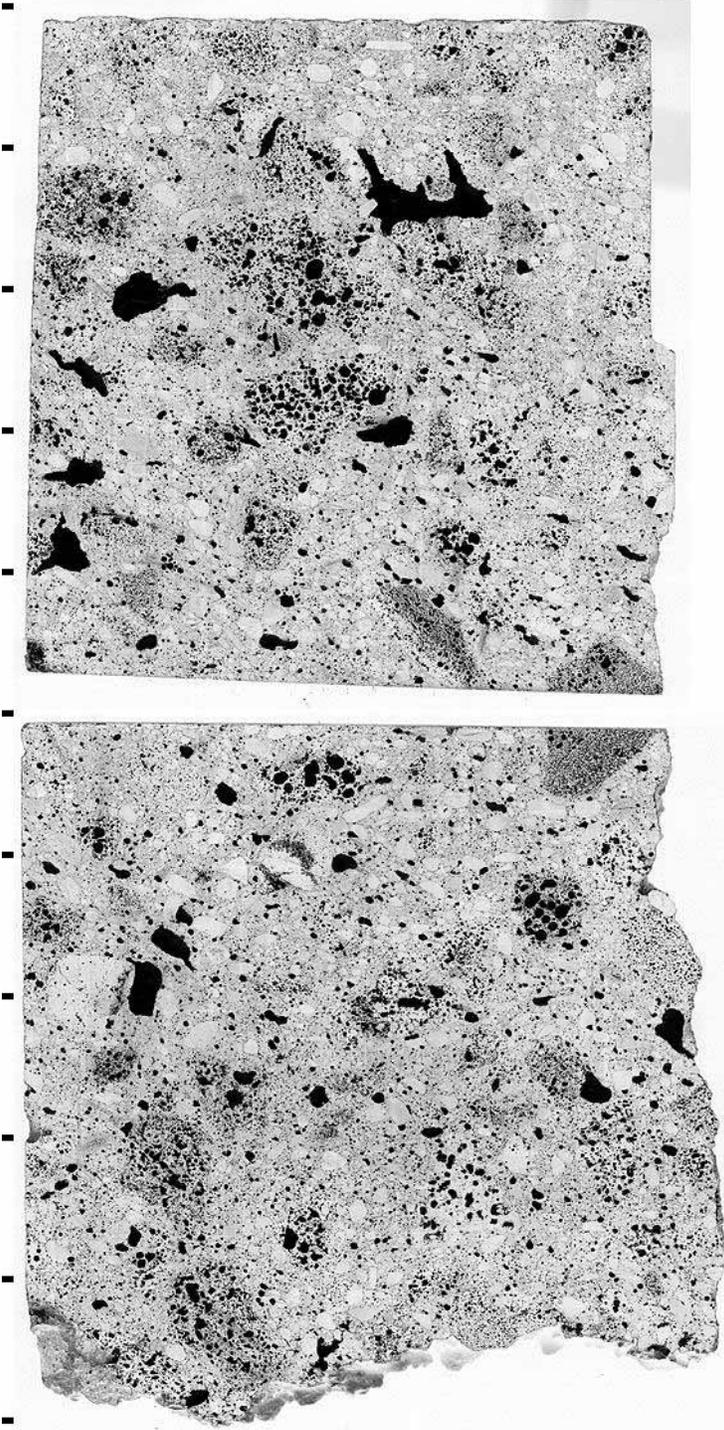
Slabs representing full cross section through pavement, as polished, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every inch.

Appendix B
M-5 Core Site



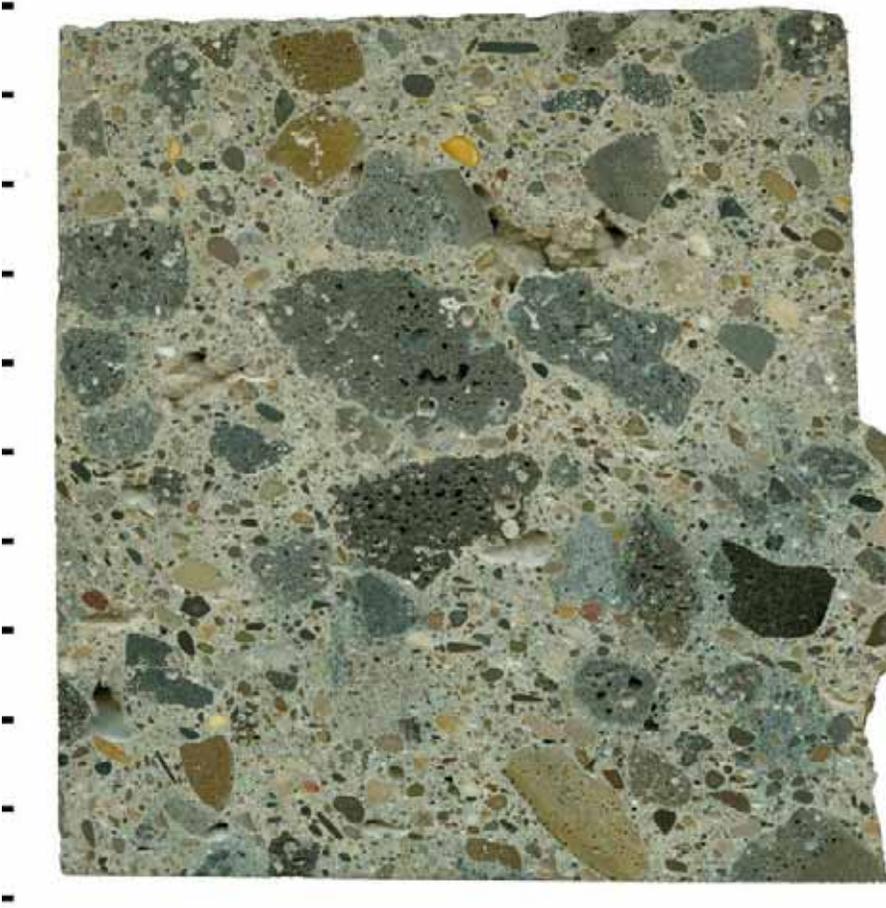
Slabs representing full cross section through pavement, after phenolphthalein stain, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every inch.

Appendix B
M-5 Core Site



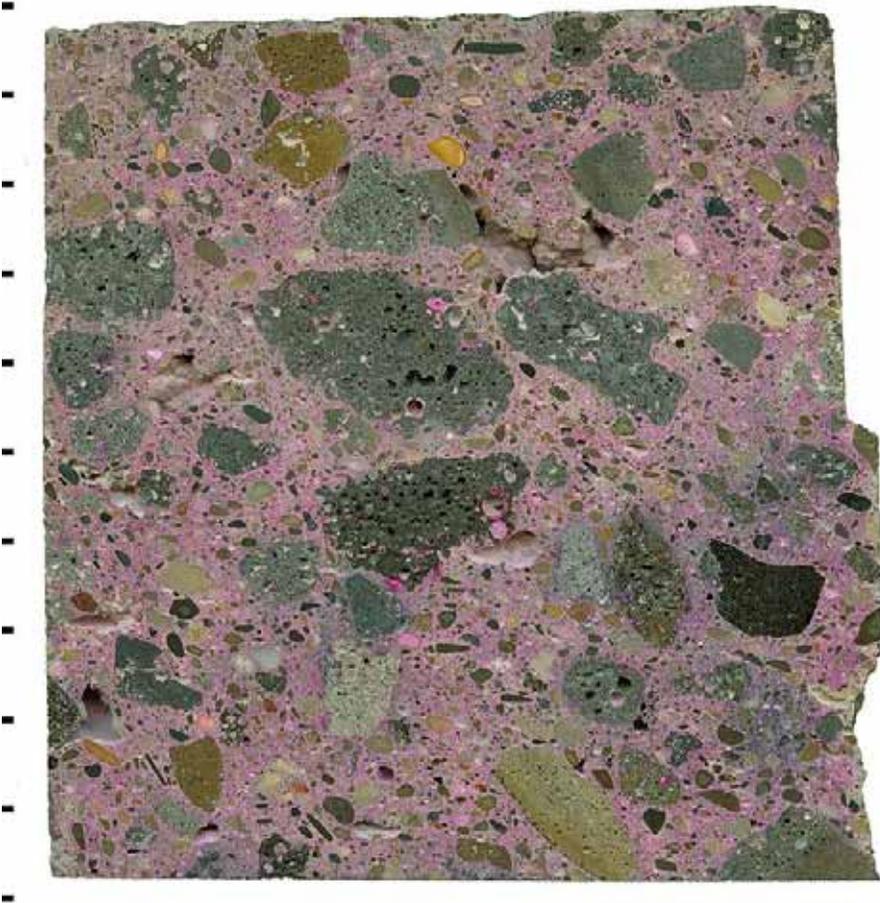
Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every inch.

Appendix B
M-5 Core Site



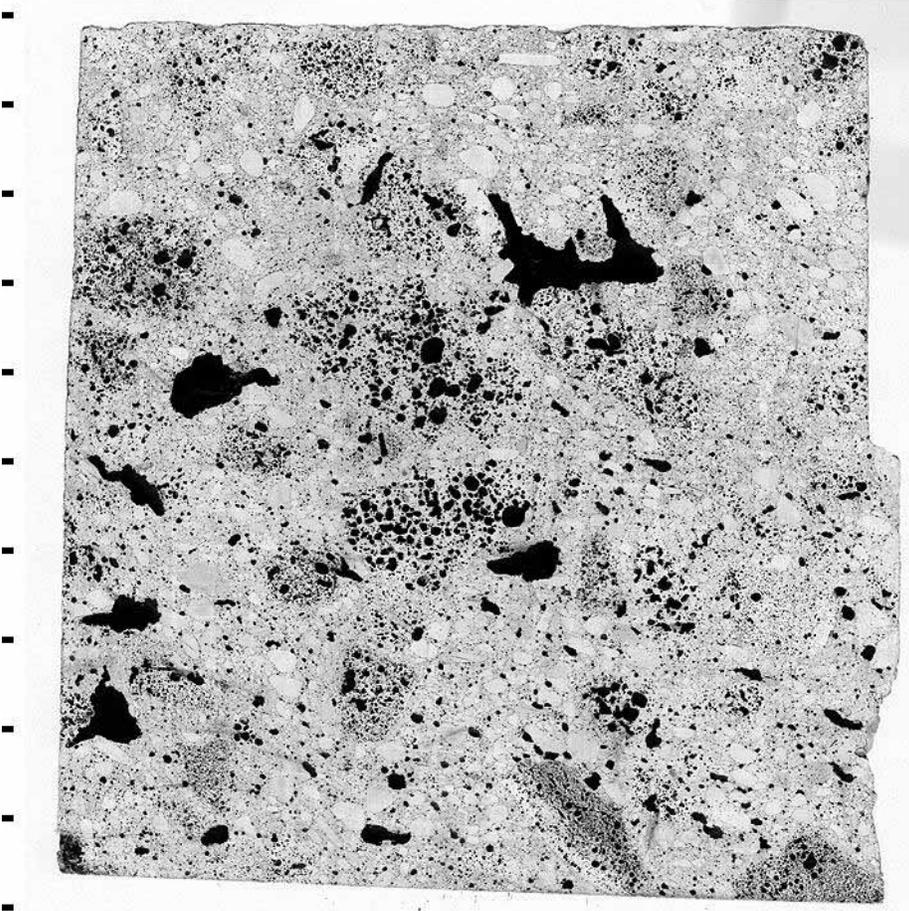
Slab representing cross section through top half of pavement, as polished, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
M-5 Core Site



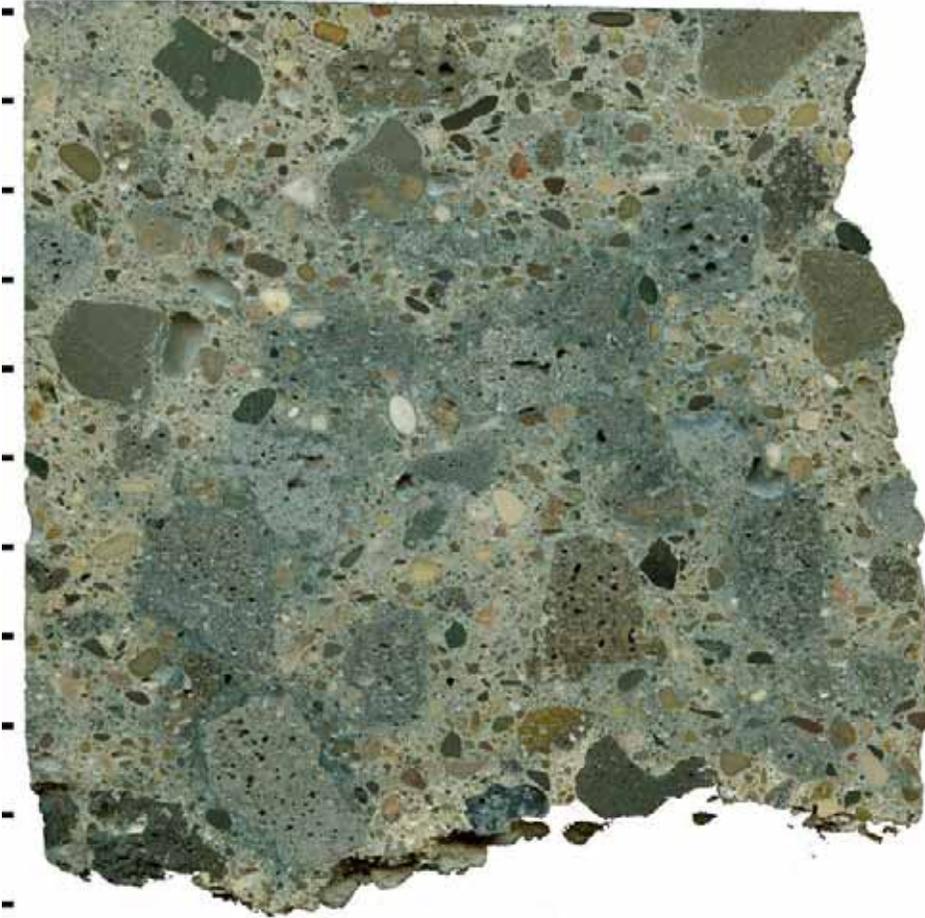
Slab representing cross section through top half of pavement, after phenolphthalein stain, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
M-5 Core Site



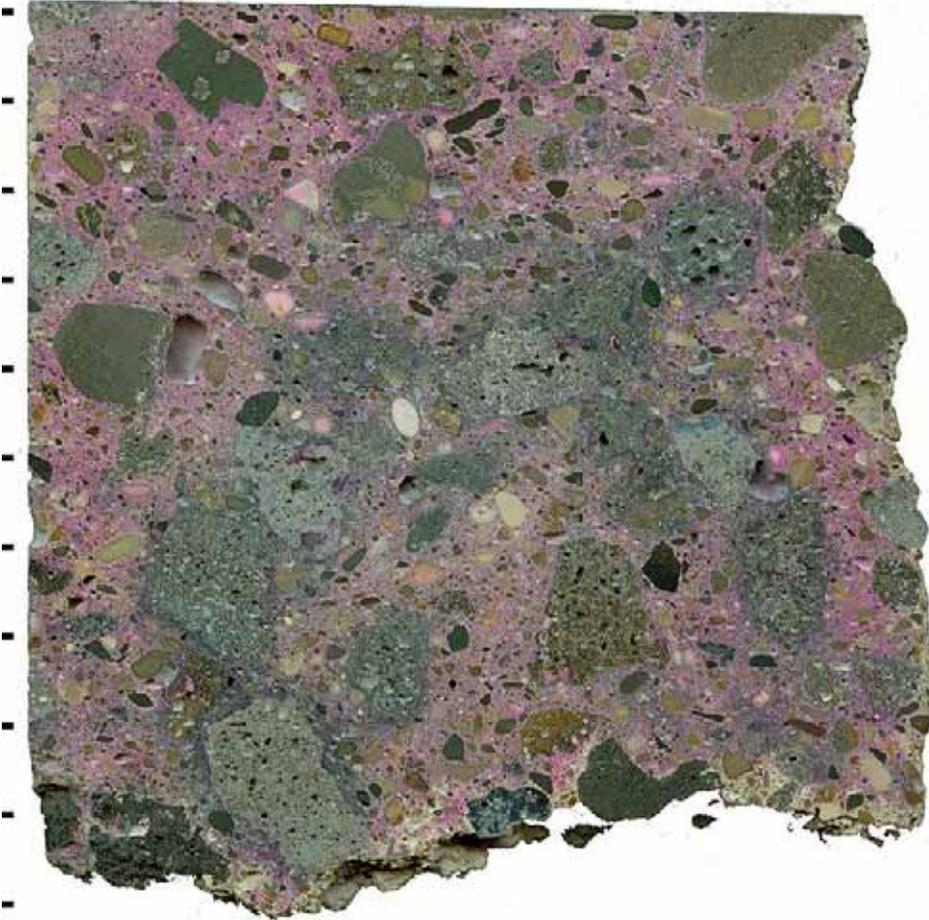
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
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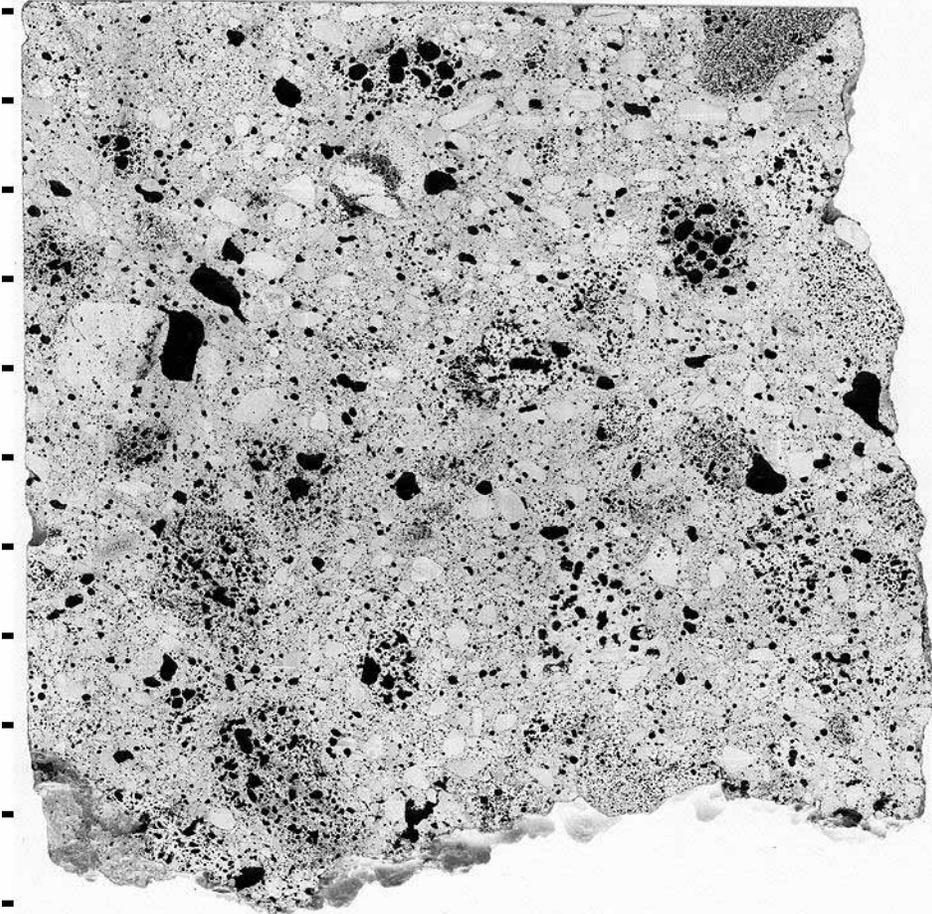
Slab representing cross section through bottom half of pavement, as polished, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
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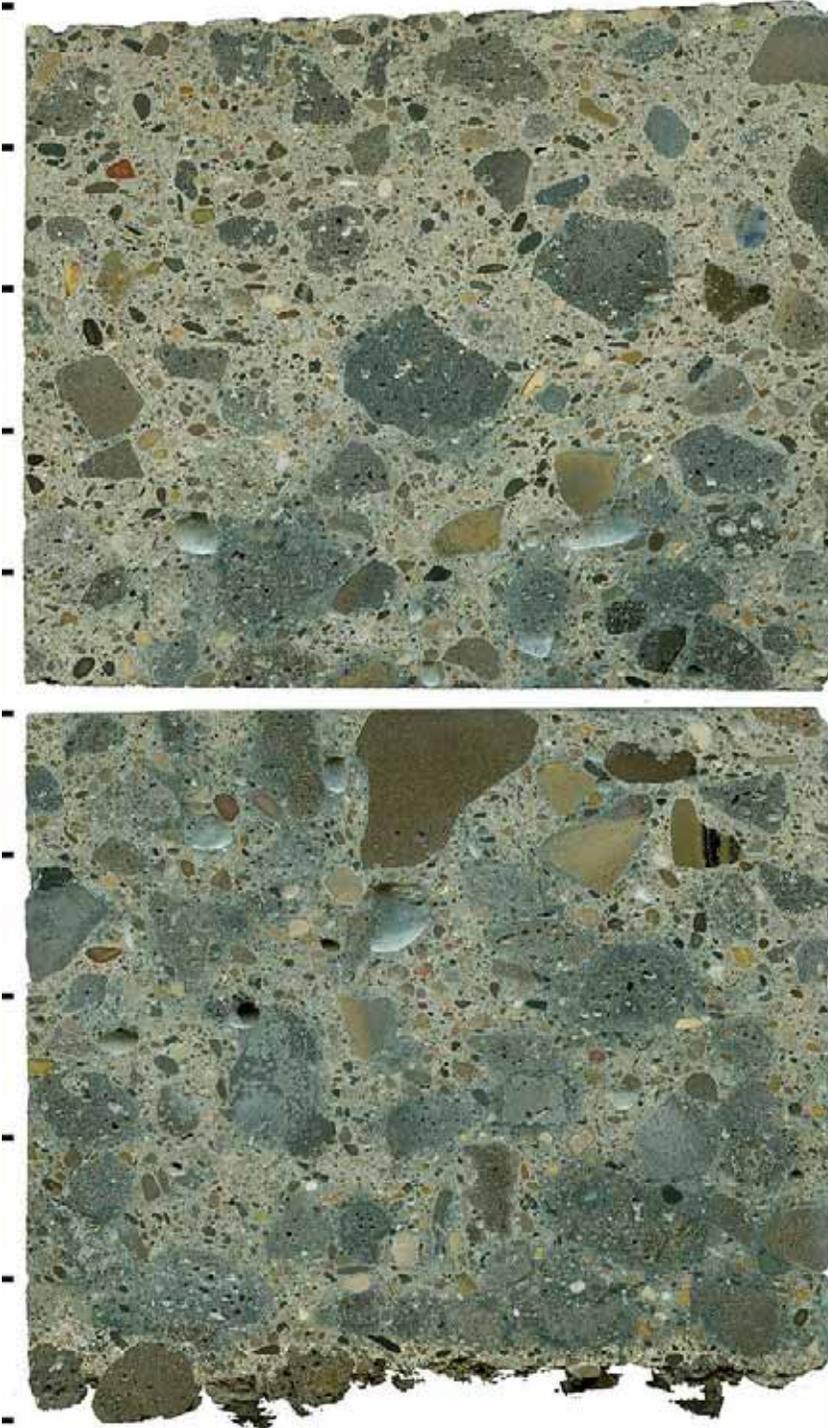
Slab representing cross section through bottom half of pavement, after phenolphthalein stain, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
M-5 Core Site



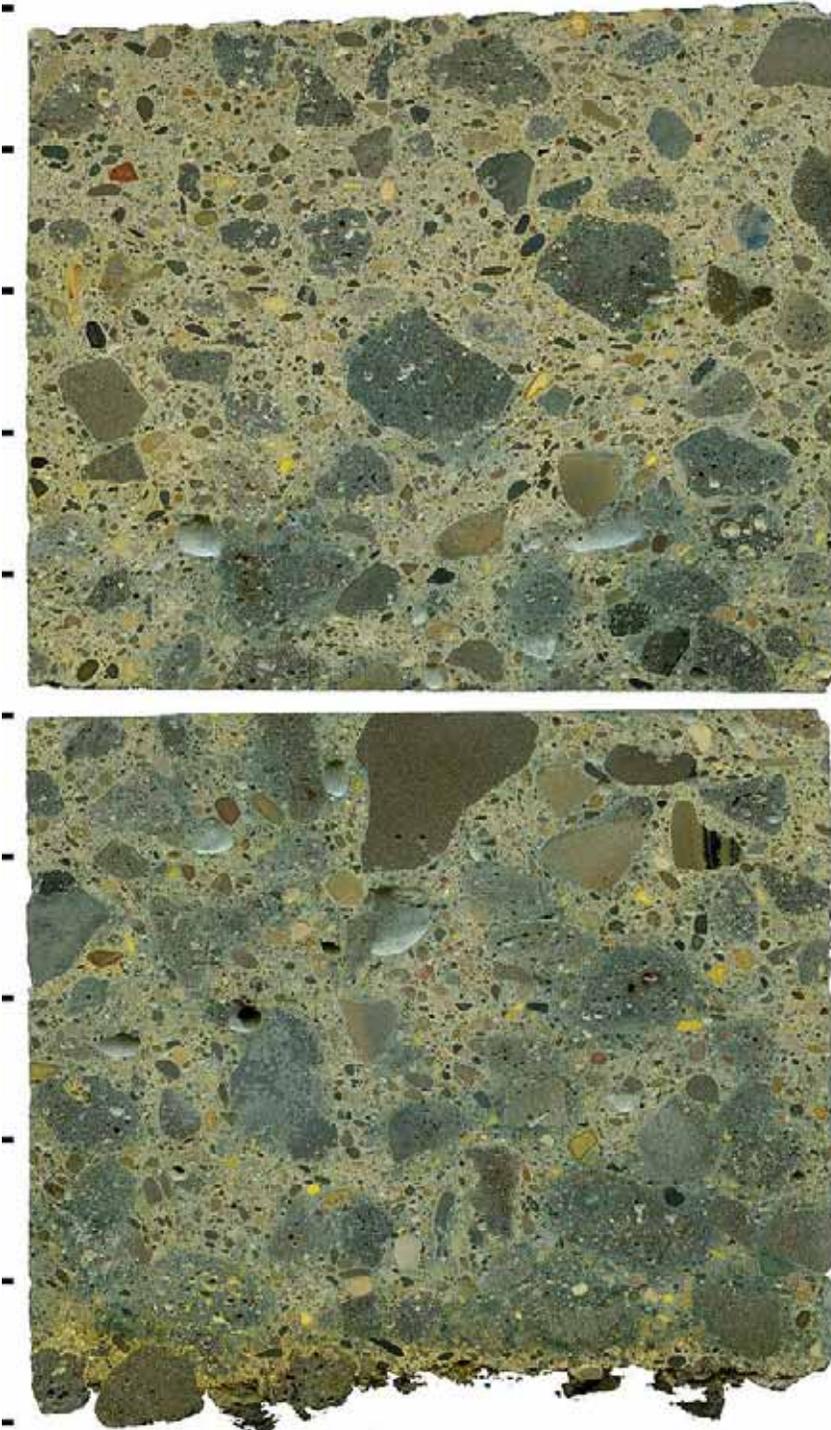
Slab representing cross section through bottom half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06, tic marks every half inch.

Appendix B
M-5 Core Site



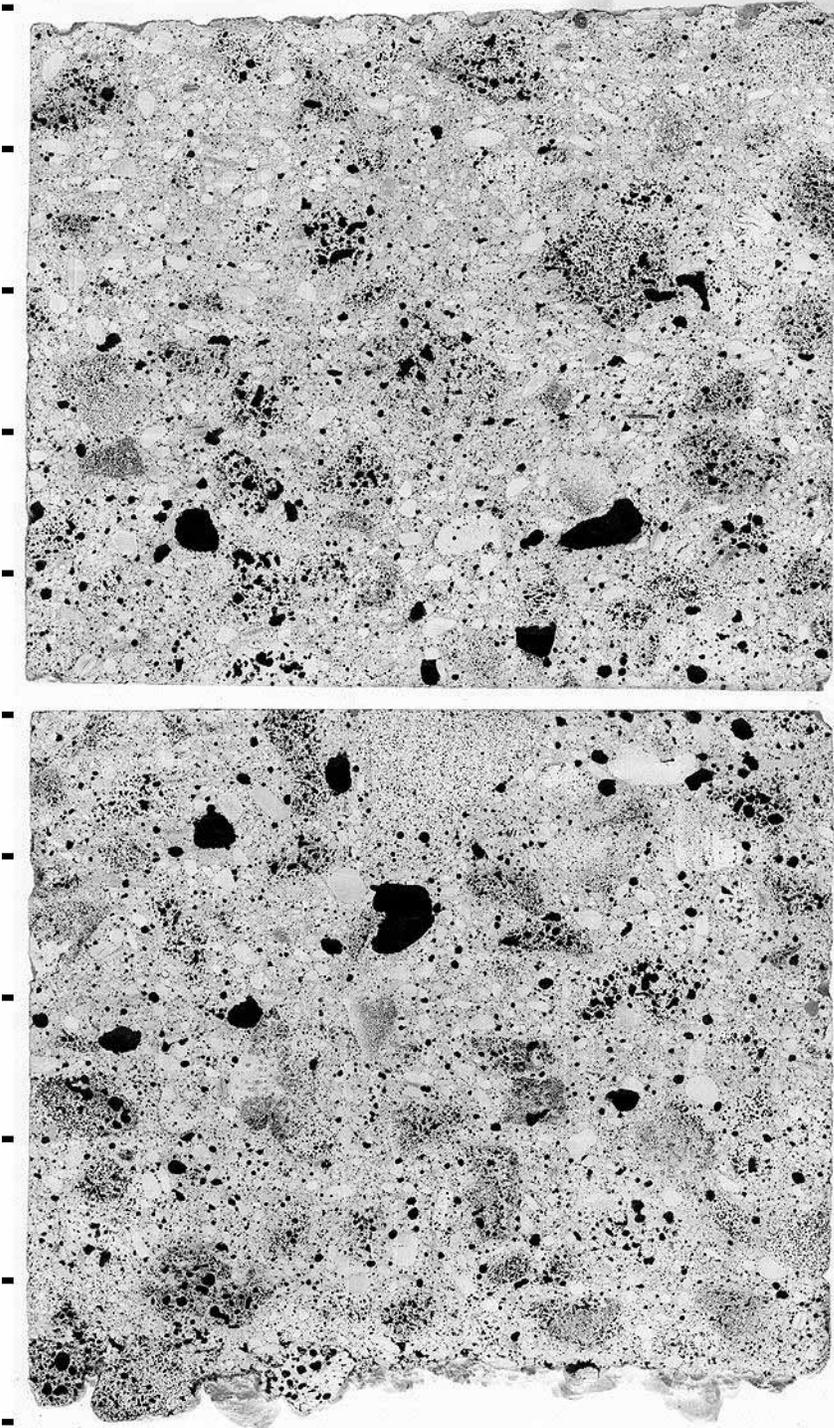
Slabs representing full cross section through pavement, as polished, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every inch.

Appendix B
M-5 Core Site



Slabs representing full cross section through pavement, after phenolphthalein stain, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every inch.

Appendix B
M-5 Core Site



Slabs representing full cross section through pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every inch.

Appendix B
M-5 Core Site



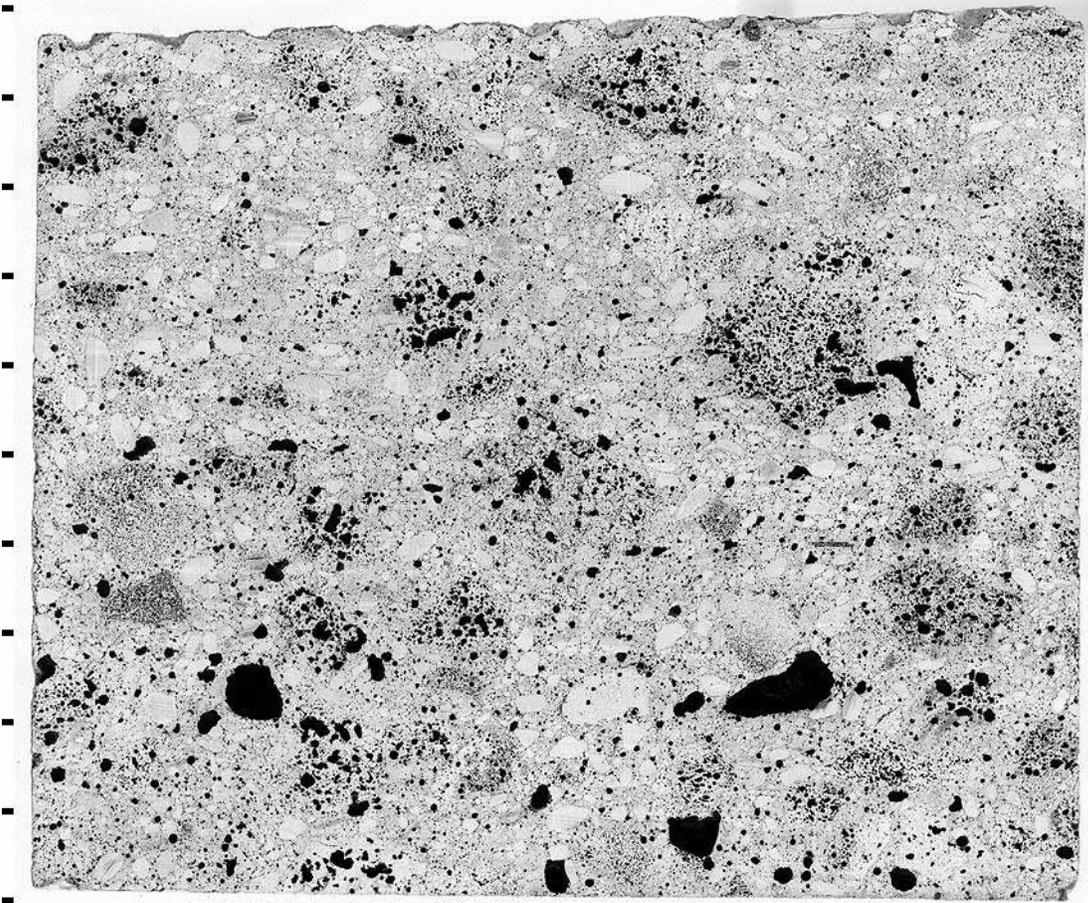
Slab representing cross section through top half of pavement, as polished, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site



Slab representing cross section through top half of pavement, after sodium cobaltinitrite stain, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site



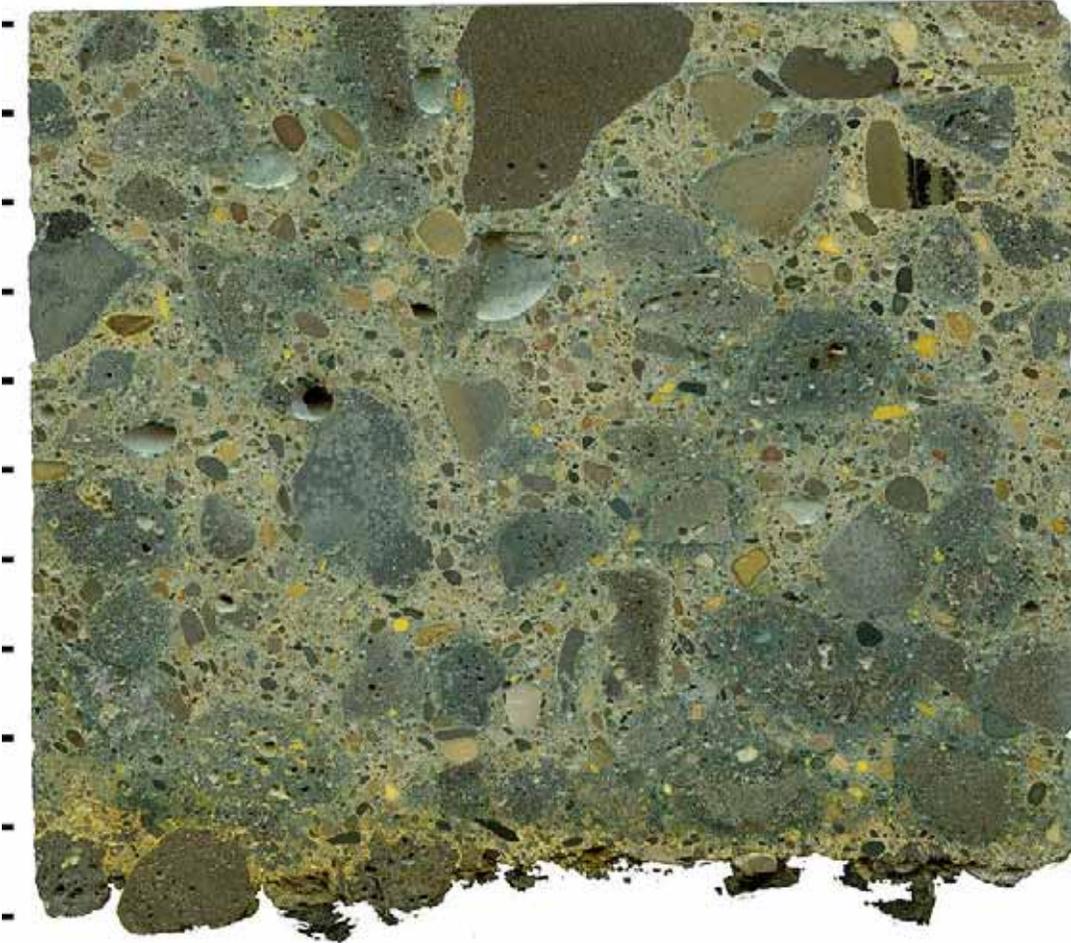
Slab representing cross section through top half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site



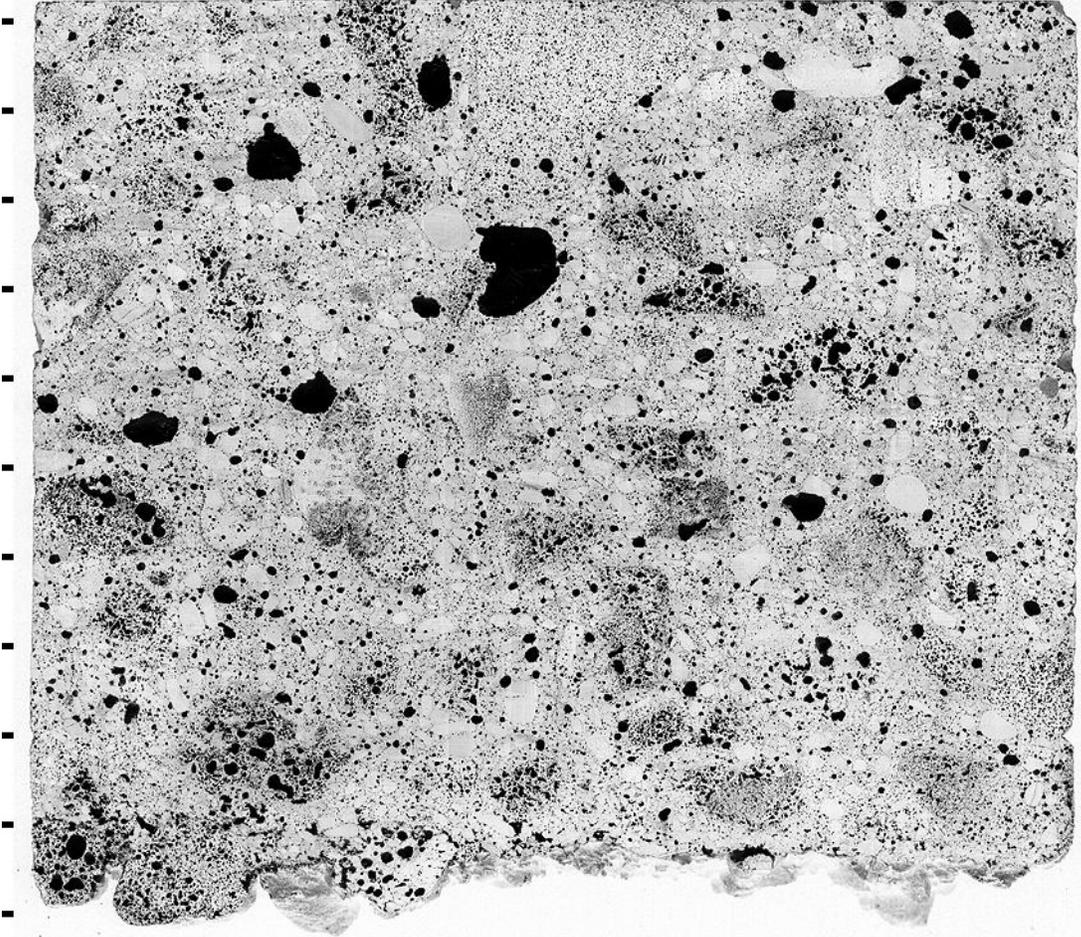
Slab representing cross section through bottom half of pavement, as polished, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site



Slab representing cross section through bottom half of pavement, after sodium cobaltinitrite stain stain, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site



Slab representing cross section through bottom half of pavement, after treatment to enhance air voids and cracks, SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02, tic marks every half inch.

Appendix B
M-5 Core Site

SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05

Data Analysed - 10/11/ 6 at 11:21			
Operator Name - Matt			
Sample ID - m5-5			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1974.857	1974.857	3949.714
Total Area Analyzed (cm ²)	38.7	38.7	77.4
Air Stops	58	53	111
Paste Stops	213	194	407
Aggregate Stops	485	509	994
Secondary Phase Stops	0	0	0
Total Stops	756	756	1512
# of Air Void Intercepts	894	836	1730
# of Filled Void Intercepts	3	2	5
Results			
Air vol%	7.7	7.0	7.3
Paste vol%	28.2	25.7	26.9
Aggregate vol%	64.2	67.3	65.7
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.156	0.152	0.154
Paste/Air ratio	3.67	3.66	3.67
Specific Surface (mm ² /mm ³)	23.6	24.2	23.9
Void Frequency (voids/m)	453	423	438
Average Chord Length (mm)	0.169	0.166	0.168

Appendix B
M-5 Core Site

SB M-5, constructed 1998, outside lane, away from transverse joint, core D, MTU ID M5-08

Data Analysed - 9/29/ 6 at 15:39			
Operator Name - Matt			
Sample ID - m5-8			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1974.857	1974.857	3949.714
Total Area Analyzed (cm ²)	38.7	38.7	77.4
Air Stops	53	57	110
Paste Stops	209	211	420
Aggregate Stops	494	488	982
Secondary Phase Stops	0	0	0
Total Stops	756	756	1512
# of Air Void Intercepts	943	866	1809
# of Filled Void Intercepts	0	0	0
Results			
Air vol%	7.0	7.5	7.3
Paste vol%	27.7	27.9	27.8
Aggregate vol%	65.3	64.6	64.9
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.145	0.159	0.152
Paste/Air ratio	3.94	3.70	3.82
Specific Surface (mm ² /mm ³)	27.2	23.3	25.2
Void Frequency (voids/m)	478	439	458
Average Chord Length (mm)	0.147	0.172	0.159

Appendix B
M-5 Core Site

SB M-5, constructed 1998, median lane, at transverse joint, core B, MTU ID M5-06

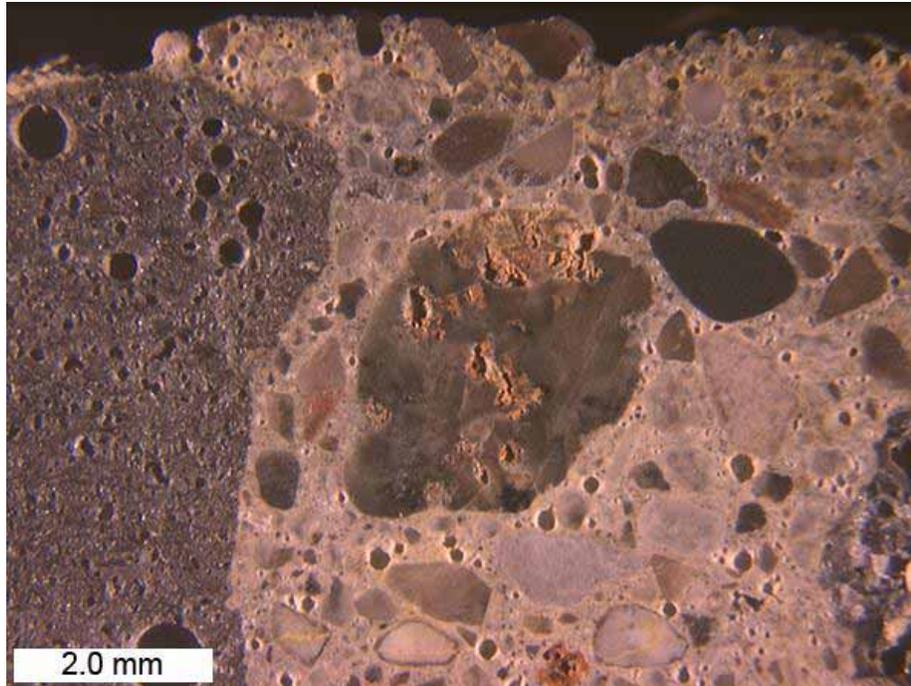
Data Analysed - 10/ 6/ 6 at 15:10			
Operator Name - Matt			
Sample ID - m5-6			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1974.857	1974.857	3949.714
Total Area Analyzed (cm ²)	38.7	38.7	77.4
Air Stops	63	68	131
Paste Stops	194	190	384
Aggregate Stops	499	498	997
Secondary Phase Stops	0	0	0
Total Stops	756	756	1512
# of Air Void Intercepts	1008	877	1885
# of Filled Void Intercepts	3	0	3
Results			
Air vol%	8.3	9.0	8.7
Paste vol%	25.7	25.1	25.4
Aggregate vol%	66.0	65.9	65.9
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.126	0.141	0.133
Paste/Air ratio	3.08	2.79	2.93
Specific Surface (mm ² /mm ³)	24.5	19.7	22.0
Void Frequency (voids/m)	510	444	477
Average Chord Length (mm)	0.163	0.203	0.182

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M-5 Core Site

SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02

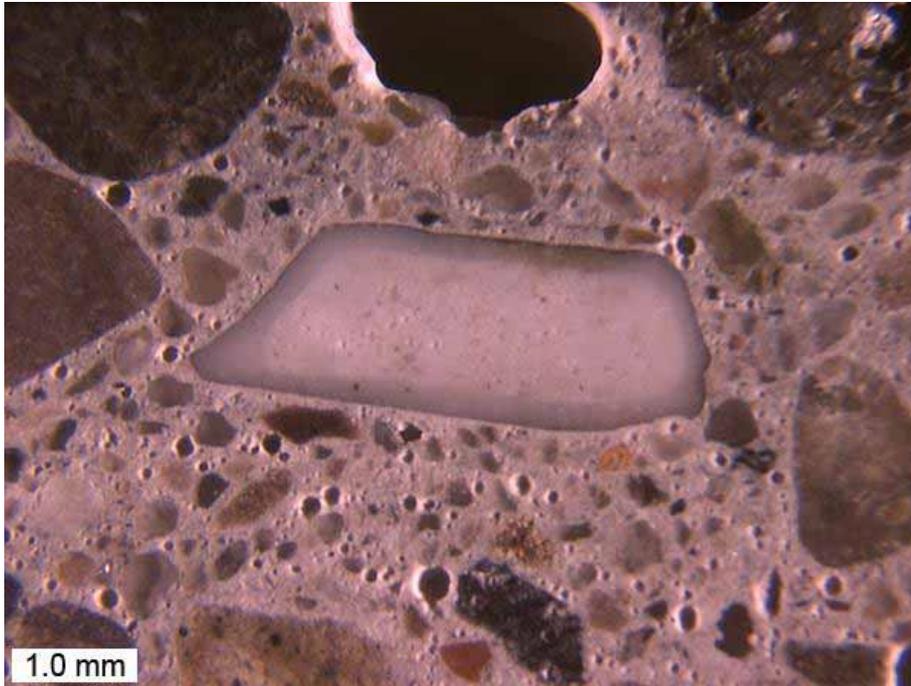
Data Analysed - 10/ 4/ 6 at 12: 0			
Operator Name - Matt			
Sample ID - m5-2			
Raw Data			
	bottom half	top half	summary
Total Traverse Length (mm)	1974.857	1974.857	3949.714
Total Area Analyzed (cm ²)	38.7	38.7	77.4
Air Stops	72	33	105
Paste Stops	191	203	394
Aggregate Stops	493	520	1013
Secondary Phase Stops	0	0	0
Total Stops	756	756	1512
# of Air Void Intercepts	971	978	1949
# of Filled Void Intercepts	3	1	4
Results			
Air vol%	9.5	4.4	6.9
Paste vol%	25.3	26.9	26.1
Aggregate vol%	65.2	68.8	67.0
Secondary Phase vol%	0.0	0.0	0.0
Spacing Factor (mm)	0.128	0.112	0.132
Paste/Air ratio	2.65	6.15	3.75
Specific Surface (mm ² /mm ³)	20.7	45.4	28.4
Void Frequency (voids/m)	492	495	493
Average Chord Length (mm)	0.194	0.088	0.141

Appendix B
M-5 Core Site



Successive close-up images of alkali silica reaction in fine aggregate and associated cracking near pavement surface, after sodium cobaltinitrite stain, polished slab from SB M-5, constructed 1998, outside lane, at transverse joint, core B, MTU ID M5-05.

Appendix B
M-5 Core Site



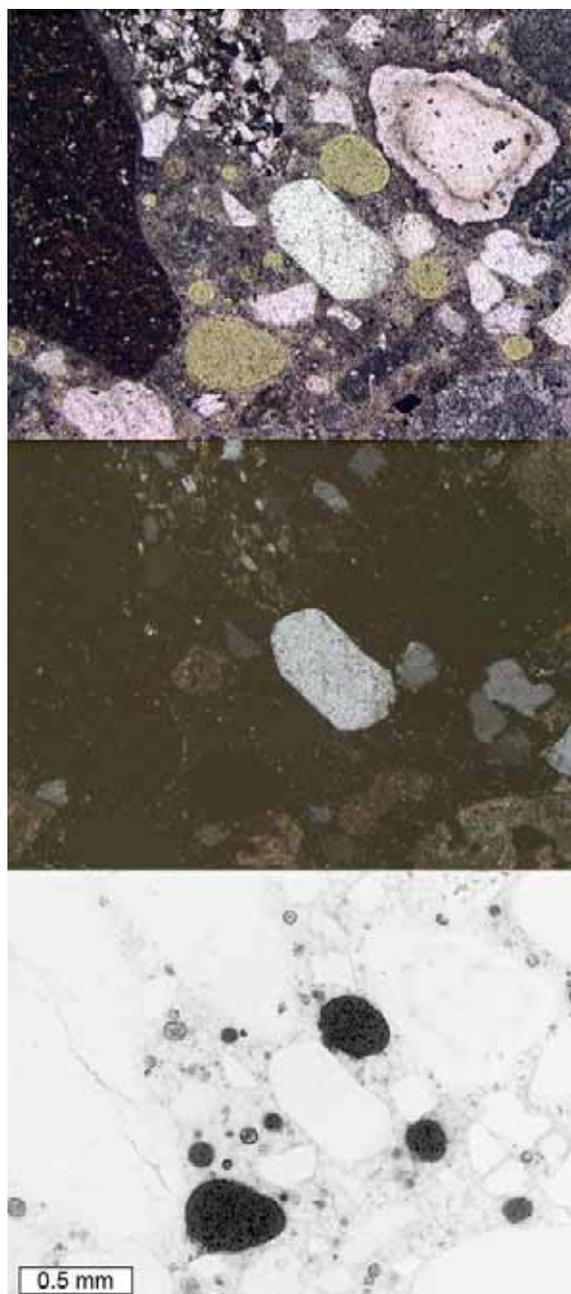
Alkali silica reaction in fine aggregate, without cracking, before and after sodium cobaltinitrite stain, polished slab from SB M-5, constructed 1998, median lane, away from transverse joint, core D, MTU ID M5-02.

Appendix B
M-5 Core Site



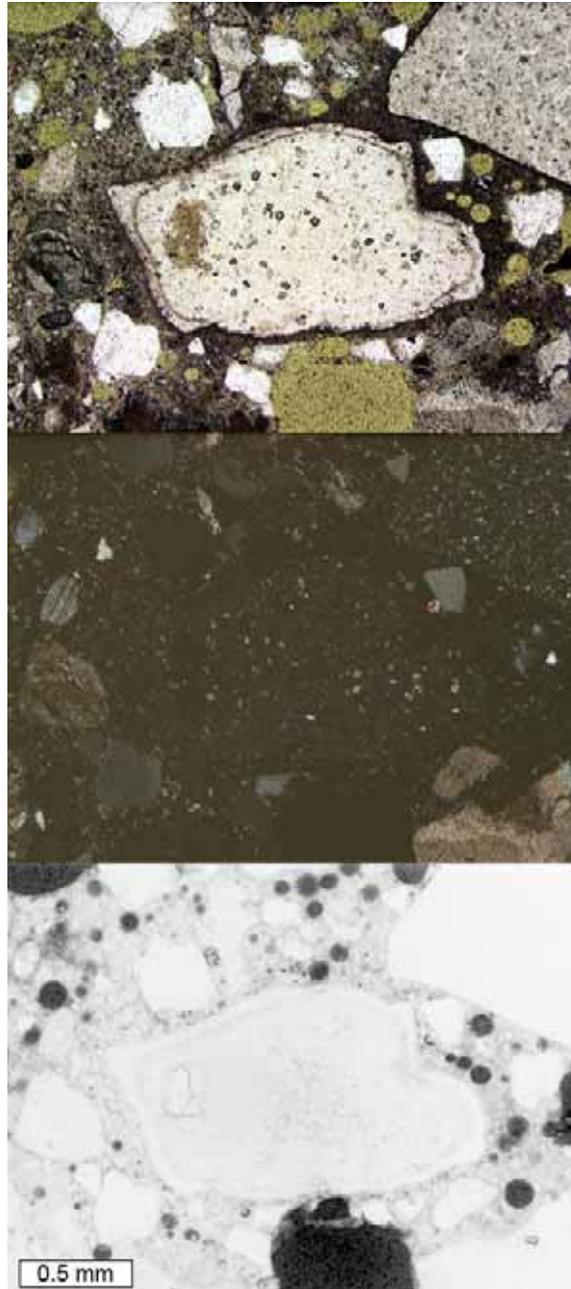
Example of chert particle and brown siltstone particle, both exhibiting signs of alkali-silica reaction, from thin section prepared from core from M-5, outside lane, at joint, MTU ID M5-05. From top to bottom: transmitted light, crossed-polars, and epifluorescent mode images.

Appendix B
M-5 Core Site



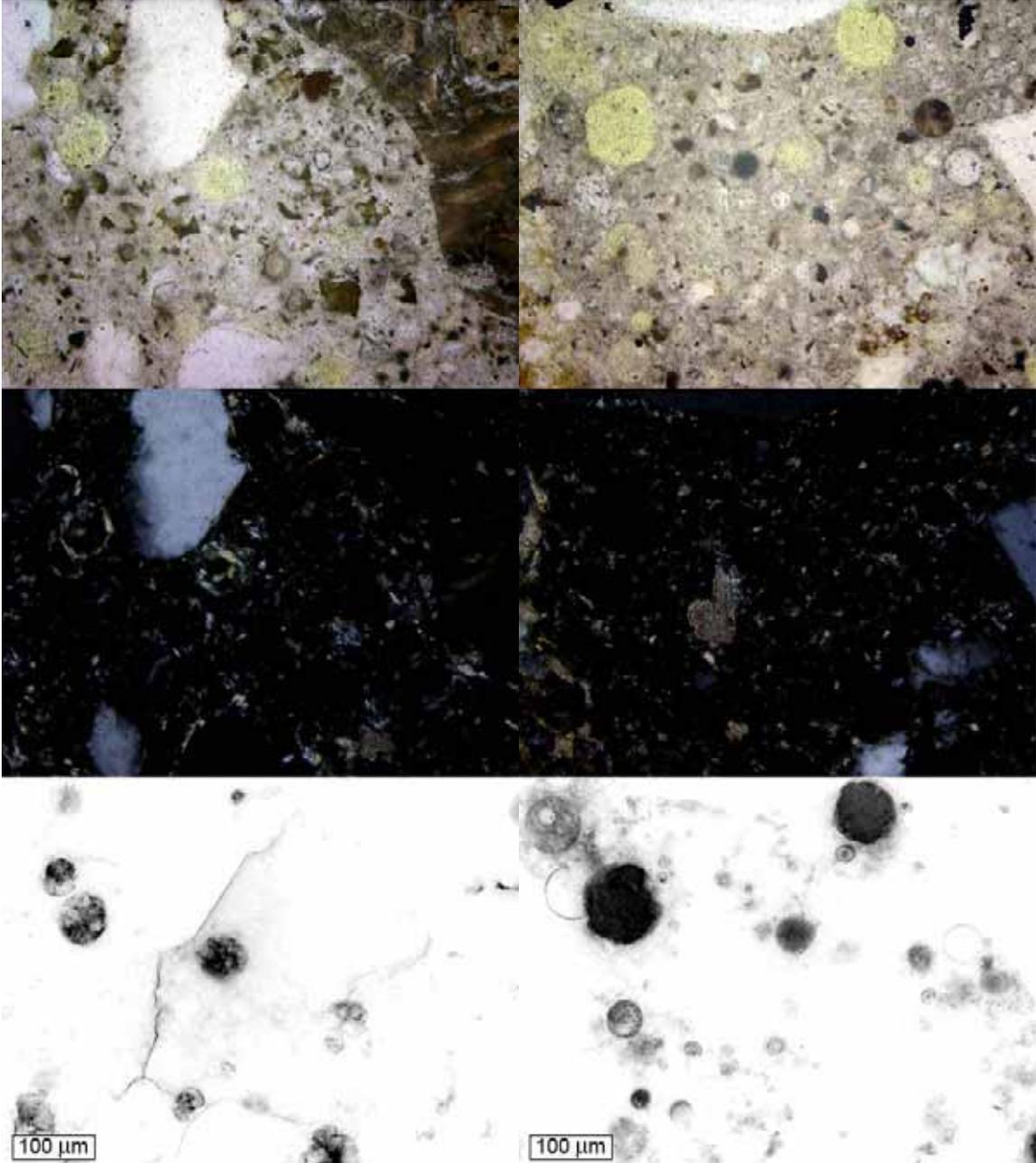
Close up example of chert particle and brown siltstone particle from previous figure, both exhibiting signs of alkali-silica reaction, with minor cracking within brown siltstone particle, from thin section prepared from core from M-5, outside lane, at joint, MTU ID M5-05. From top to bottom: transmitted light, crossed-polars, and epifluorescent mode images.

Appendix B
M-5 Core Site



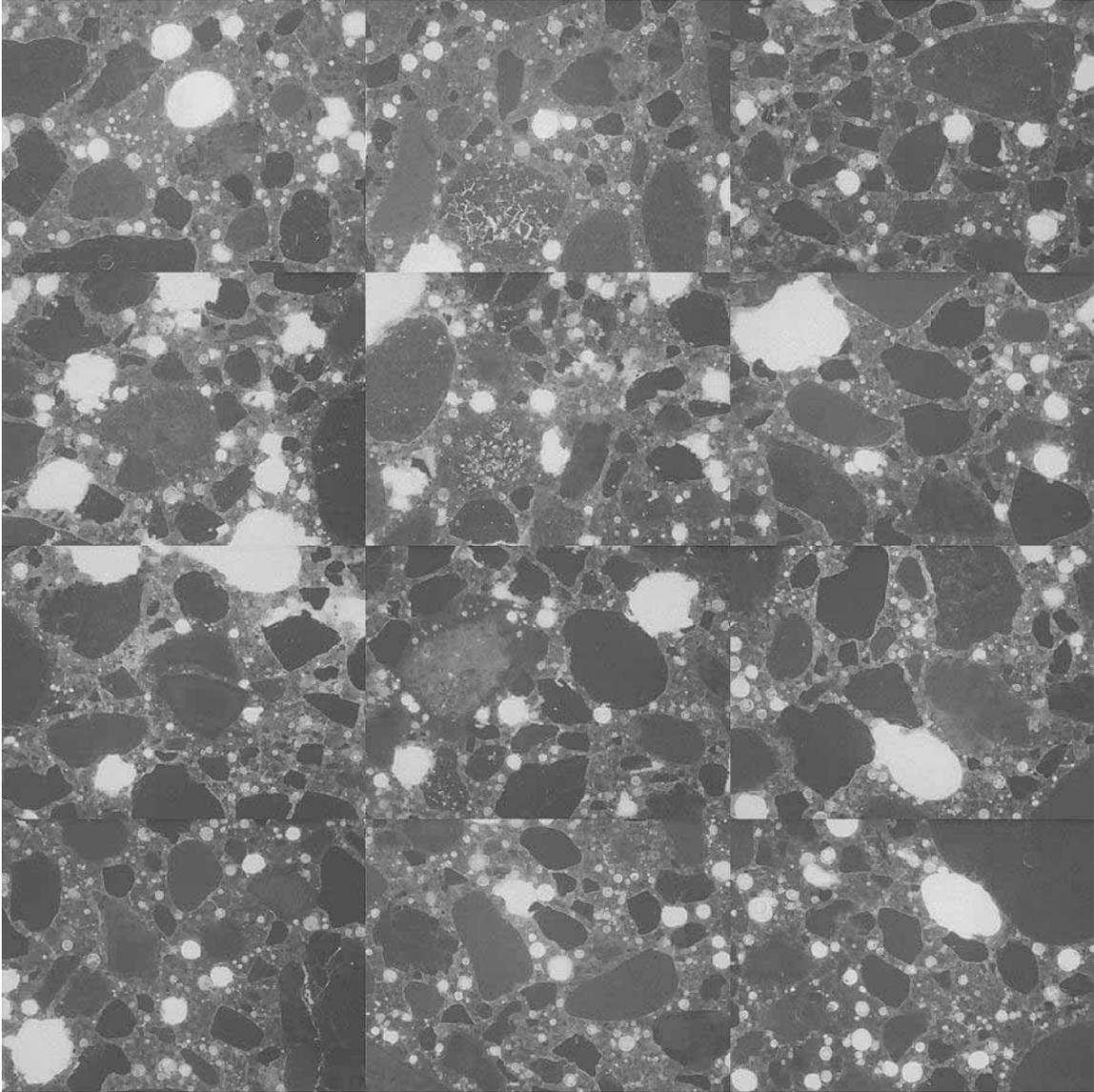
Example of chert exhibiting signs of alkali-silica reaction, but without cracking, from thin section prepared from core from M-5, outside lane, away from joint, MTU ID M5-08. From top to bottom: transmitted light, crossed-polars, and epifluorescent mode images.

Appendix B
M-5 Core Site



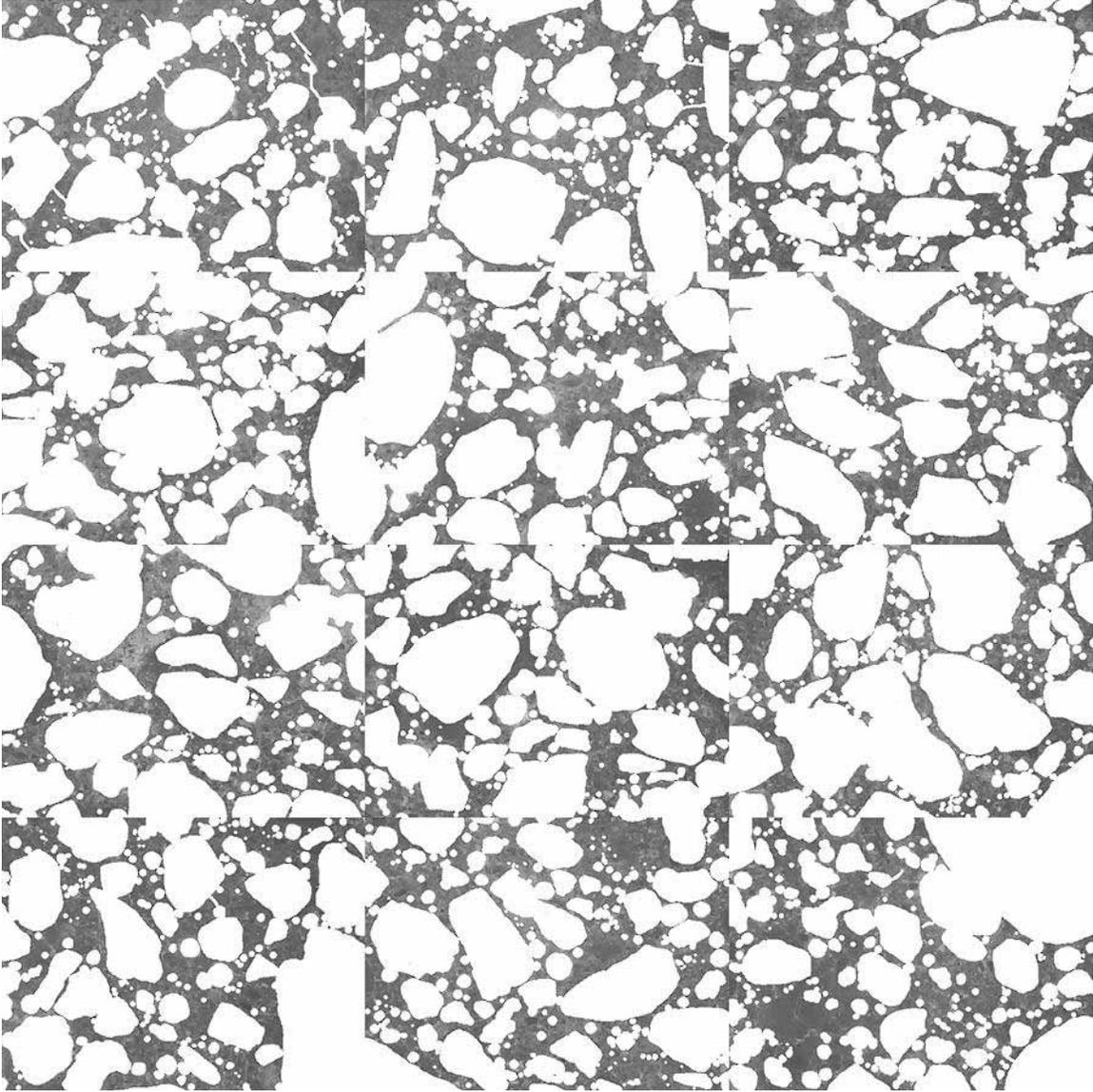
Examples of cement paste both without (left) and with (right) fly ash. Left-hand side image from core M-5, outside lane, at transverse joint, MTU ID M5-05. Right-hand side image from core M-5, median lane, away from joint, MTU ID M5-02. From top to bottom: transmitted light, crossed-polars, and epifluorescent mode images.

Appendix B
M-5 Core Site



Mosaic of 12 epifluorescent mode images collected from thin sections prepared from core M-5, outside lane, at transverse joint, MTU ID M5-05 (each individual frame measures 2.612 x 1.959 mm).

Appendix B
M-5 Core Site



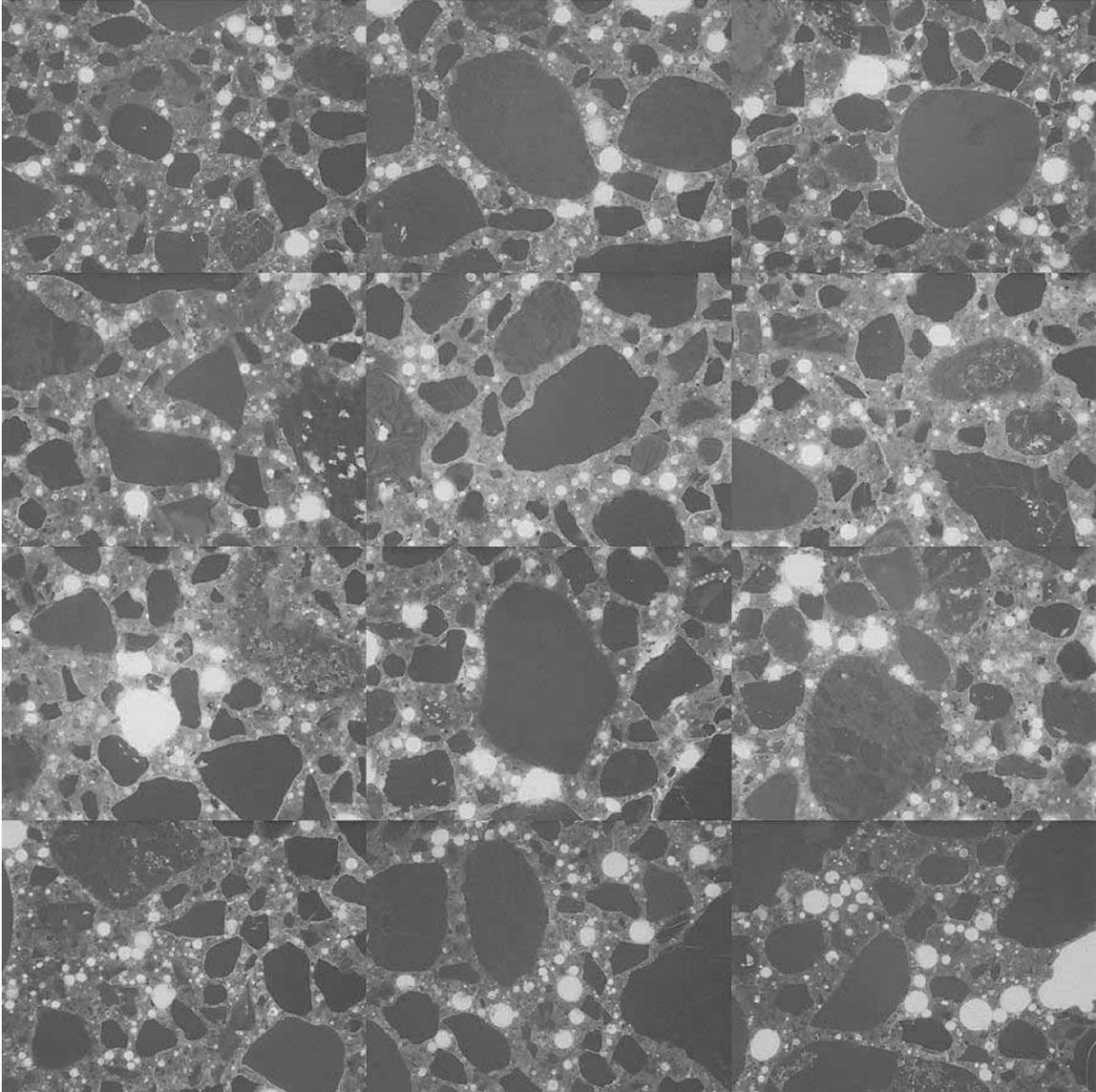
Mosaic of 12 epifluorescent mode images collected from thin sections prepared from M-5, outside lane, at transverse joint, MTU ID M5-05, after masking out air voids and fine aggregate to isolate cement paste (each individual frame measures 2.612 x 1.959 mm).

Appendix B
M-5 Core Site

Average cement paste pixel intensities per frame, and equivalent w/c values (as compared to 28-day moist cured mortar samples) from thin section prepared from core from M-5, outside lane, at joint, MTU ID M5-05.

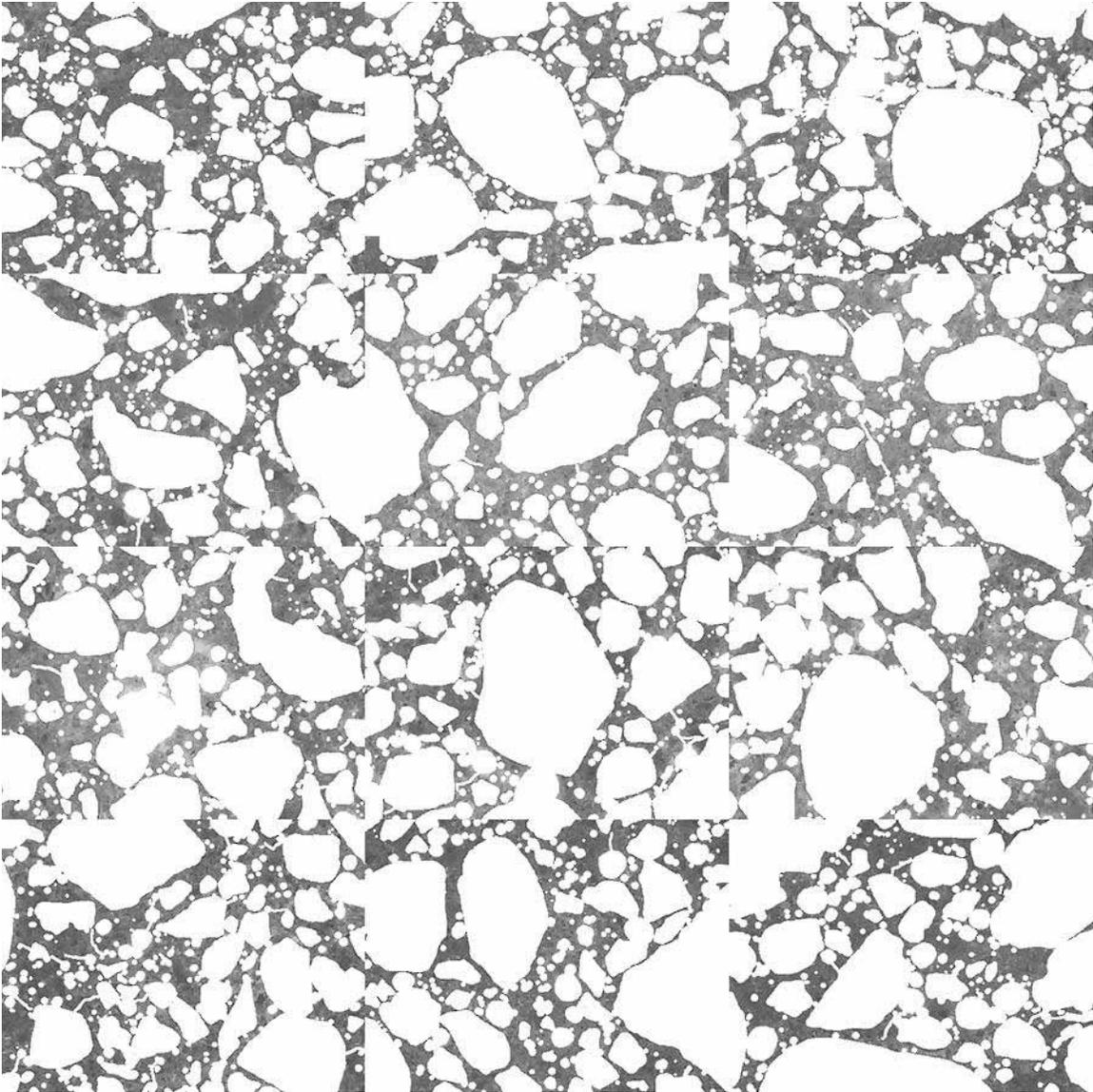
cement paste pixel fluorescence measurements (average intensity per frame)			
68	68	55	67
66	62	65	54
62	51	61	56
equivalent w/c ($y = 0.0044x + 0.0329$)			
0.30	0.33	0.33	0.27
0.32	0.32	0.30	0.32
0.27	0.30	0.26	0.30

Appendix B
M-5 Core Site



Mosaic of 12 epifluorescent mode images collected from thin sections prepared from core from M-5, median lane, away from transverse joint, MTU ID M5-02 (each individual frame measures 2.612 x 1.959 mm).

Appendix B
M-5 Core Site



Mosaic of 12 epifluorescent mode images collected from thin sections prepared from core M-5, median lane, away from transverse joint, MTU ID M5-05, after masking out air voids and fine aggregate to isolate cement paste (each individual frame measures 2.612 x 1.959 mm).

Appendix B
M-5 Core Site

Average cement paste pixel intensities per frame, and equivalent w/c values (as compared to 28-day moist cured mortar samples) from thin section prepared from core from M-5, median lane, away from transverse joint, MTU ID M5-02.

cement paste pixel fluorescence measurements (average intensity per frame)			
63	73	68	69
90	89	84	68
81	59	56	52
equivalent w/c ($y = 0.0044x + 0.0329$)			
0.34	0.31	0.35	0.33
0.34	0.42	0.42	0.40
0.33	0.39	0.29	0.28