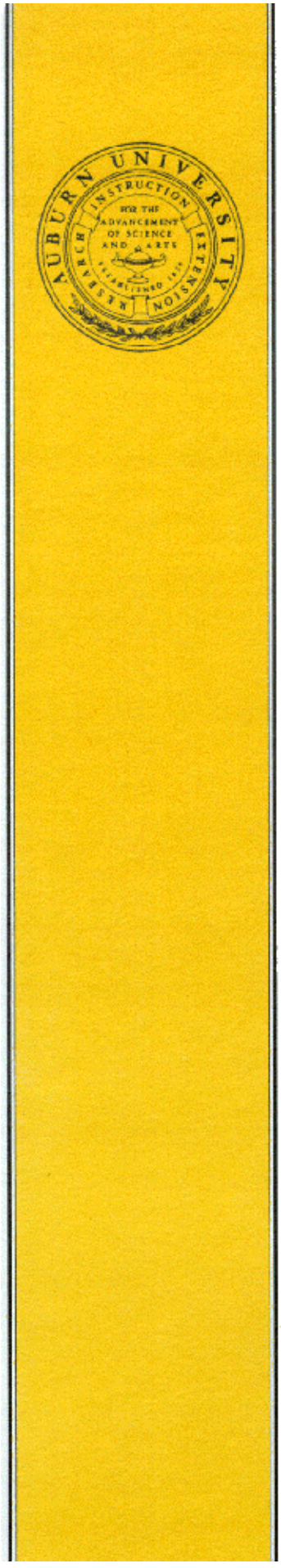

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CONSTRUCTION OF THE 2003 NCAT PAVEMENT TEST TRACK

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April 2004

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Sponsored by

Alabama Department of Transportation
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TABLE OF CONTENTS

Background……..…….. 1
Scope……..…… 1
Objectives……..…… 3
Experiment Design…… 3
Preconstruction……...……...…… 8
Plant Operations…….…… 10
Laboratory Operations……... 12
Roadway Operations…….. 12
Structural Study Sections……... 16
Rutting Study Sections……... 22
Extended Traffic Sections…….. 29
Laboratory Performance…… 29
Trucking Operations…….. 30
Field Performance…….. 30
Instrumentation…….. 32
Summary…… 33
Acknowledgements…… 34
Appendix A – New Section Construction Data……. 35
Appendix B – Section Descriptions and Initial Data……. 91

ABSTRACT

An experimental facility has been constructed near the campus of Auburn University for the purpose of conducting research to extend the life of flexible pavements. Experimental sections on the 1.7 mile Pavement Test Track are cooperatively funded by external sponsors, most commonly state DOT's, with operation and research managed by the National Center for Asphalt Technology (NCAT). Originally, Forty-six different flexible pavements were installed at the facility, each at a length of 200 feet. Materials and methods unique to section sponsors were imported during construction to maximize the applicability of results. A design lifetime of truck traffic (10 million equivalent single axle loadings, or ESALs) was applied over a two-year period of time, with field performance documented weekly.

Following the completion of the initial 3-year cycle of research begun in 2000, the Track was recently rebuilt to facilitate another round of research in 2003. Sponsors were again given the opportunity to select research options that best fit their needs. Ultimately, it was decided by the sponsor oversight committee that only half of the Track (23 of 46 original sections) would be rebuilt. Of these sections, 9 were utilized for a structural experiment (1 for transition into and out of 8 official structural sections) by removing the existing pavement all the way down to uniform subgrade materials (approximately 30 inches). Fourteen were shallow mill and inlay rutting study sections (i.e., between ¾ and 4 inches deep), while the other 23 sections simply remained in place to serve as a continuation of the original 2000 rutting experiment.

Documentation of the methods utilized and quality results obtained in the 2003 reconstruction effort are summarized herein to provide other researchers with information necessary to replicate the materials, mixes, and construction efforts in any supplemental activities that may serve to extend the benefits of this project beyond the original intent of the sponsoring entities. For example, it may be possible to run identically proportioned materials through an unrelated production facility and replicate the effort in other locales. Moreover, this document provides a baseline reference of construction quality through which results from weekly field performance testing can be viewed.

KEYWORDS
Asphalt, APT, Rutting, Mechanistic

Construction of the 2003 NCAT Pavement Test Track

R. Buzz Powell and E. Ray Brown

Background

An experimental facility has been constructed near the campus of Auburn University for the purpose of conducting research to extend the life of flexible pavements. Experimental sections on the 1.7 mile Pavement Test Track are cooperatively funded by state DOTs (Figure 1) and the Federal Highway Administration (FHWA), with operation and research managed by the National Center for Asphalt Technology (NCAT). In 2000, forty-six different flexible pavements were installed at the facility, each at a length of 200 feet. Materials and methods unique to section sponsors were imported during construction to maximize the applicability of results. A design lifetime of truck traffic (10 million equivalent single axle loadings, or ESALs) was applied over a two-year period of time, with field performance documented weekly.

Unlike conventional efforts on public roadways, research at the NCAT Pavement Test Track is conducted in a closed-loop facility where axle loadings are precisely monitored and environmental effects are identical for every mix. An array of surface parameters (smoothness, rutting, cracking, etc.) was monitored weekly as truck traffic accumulated to facilitate objective performance analyses. State DOT's typically have to wait 10 to 15 years to obtain less reliable results in full-scale field studies on public roadways.

Sponsors typically compare the performance of two or more sections constructed with different materials and/or methods to obtain information that can be used to build future pavements with the greatest amount of rut resistance. In addition to assessing alternatives for sponsors, NCAT is responsible for guiding the overall effort in a direction that could address policy issues for the highway industry as a whole. Specifically, laboratory methods that have the potential to predict rutting when used before and during construction have been compared to field performance for every experimental mix in order to recommend the most suitable method(s).

Scope

Following the completion of the initial 3-year cycle of research begun in 2000, the Track was recently rebuilt to facilitate another round of research in 2003. Sponsors have again been given the opportunity to select research options that best fit their needs. As a result of numerous meetings of the Track Research Oversight Committee, in which each sponsor has the opportunity to provide input and guidance into overall project management, it was decided that only half of the Track (23 of 46 original sections) would be rebuilt.

Of the rebuilt sections, 9 were utilized for a structural experiment (1 for transition into and out of 8 official structural sections) by removing the existing pavement all the way down to uniform subgrade materials (approximately 30 inches) and rebuilding to have varying thicknesses and varying materials. Fourteen were shallow mill and inlay rutting study sections (i.e., between ¾ and 4 inches deep), while the other 23 sections simply

remained in place to serve as a continuation of the original 2000 rutting experiment (Figure 2).

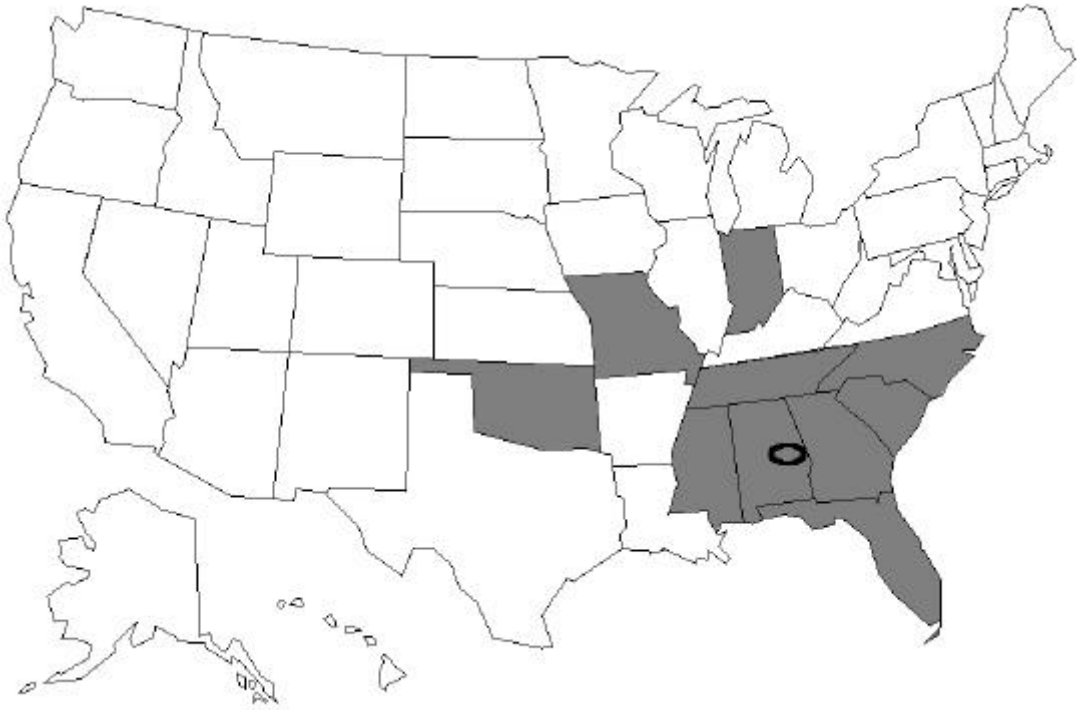

Figure 1 – Track Research Sponsors (Research Oversight Committee) Less FHWA

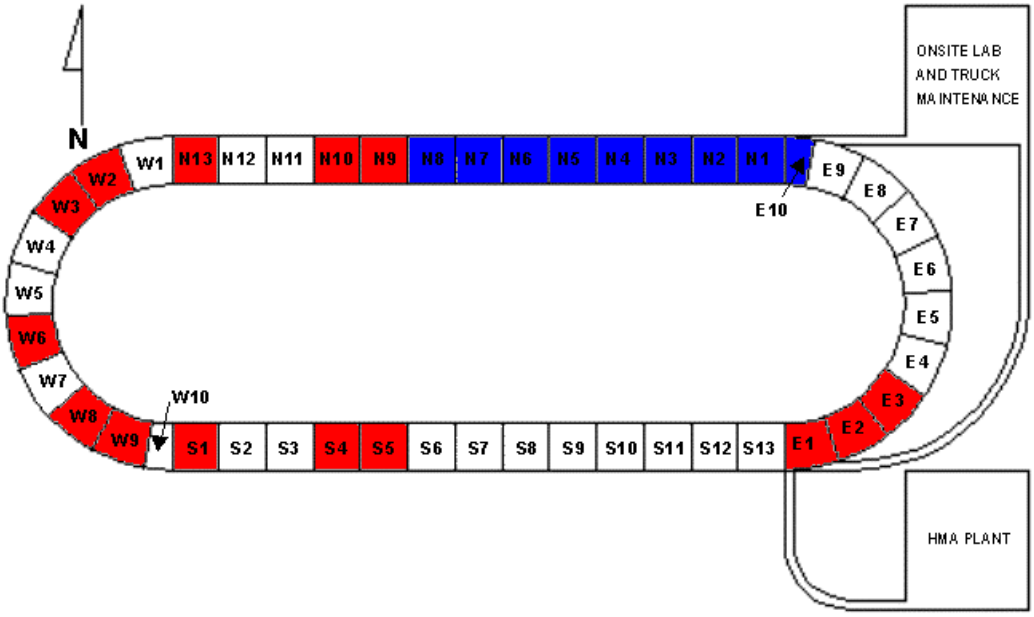

Figure 2 – 2003 Experiment (Blue = Structural Sections, Red = Rutting Studies)

Objectives

The primary objective of the 2003 NCAT Pavement Test Track is to compare field performance of 45 experimental pavements. The anticipated distress in pavements with identical and robust foundations is rutting. Rutting is expected to be minor in sections that were originally built in 2000 and are now being subjected to a second round of design traffic. In these 23 sections, durability and top down cracking will be observed. Of the 22 sections rebuilt in 2003, eight sections rebuilt from the subgrade up will be monitored for structural distresses (such as fatigue cracking). Rutting is the anticipated distress in the remaining 14 sections that were paved in 2003 to shallow depths on top the deep 2000 foundation that remained in place. In addition to comparing field performance, the second objective of the project is to utilize laboratory testing to successfully predict field differences.

Documentation of the methods utilized and quality results obtained in the 2003 reconstruction effort are summarized herein to provide other researchers with information necessary to replicate the materials, mixes, and construction efforts in any supplemental activities that may serve to extend the benefits of this project beyond the original intent of the sponsoring entities. For example, it may be possible to run identically proportioned materials through an unrelated production facility and replicate the effort in other locales. Moreover, this document provides a baseline reference of construction quality through which results from weekly field performance testing can be evaluated.

Experiment Design

Many sponsors chose not to replace their sections for the 2003 Track so they could extend their performance comparisons over another 10 million ESALs, which would raise the total traffic on these sections to 20 million ESALs. Although the primary objective in extending traffic on these sections is to broaden performance comparisons to include durability and fatigue, they also serve to provide another 3 years of aging and subsequent input into the rutting models developed as a result of the 2000 experiment. Weekly field performance testing will be conducted to characterize how rutting, roughness, texture, density, frictioin, and surface deflection change as traffic accumulates beyond the 10 million ESALs originally applied.

Fourteen sections were milled from a depth of ¾ to 4 inches as specified by the research sponsor. While some states wanted to conduct another full (4 inch) depth rutting experiment, other states chose to compare the performance of different (shallow mill and inlay) pavement preservation techniques. Table 1 is included to summarize each sponsor's objective in the 2003 mill and inlay rutting experiment, where total milled depth is equal to the sum of the thickness of upper and lower paving depths.

Table 1 – Summary of Mixes for Rutting Study Sections

Location Quad	Sec	Mix Layer	Mill Depth (in)	Paved Thickness (in) Bot	Top	Research Sponsor	Quick Reference for Section Research	Mix Type	Description of Dominant Fraction Mix Stockpile
E	2	BT	4	2	2	FL	HVS 76-22	Super	Alachua Screenings
E	3	BT	4	2	2	FL	HVS 67-22	Super	Alachua Screenings
N	9	BT	4	2	2	MO	Limestone / Angular Chert	SMA	Reeds Springs 3/4 Limestone D3
N	10	BT	4	2	2	MO	Limestone / Gravel Sand	SMA	Girerdea 1/2 Limestone D1
N	13	B	3.5	1.75		SC	19 mm Liberty	Super	#6M Stone
N	13	T	3.5		1.75	SC	Cayce	SMA	Cayce 7M
W	2	BT	4	2	2	MO	Limestone / Porphyry	SMA	Cape Girardeau 1/2 Limestone D1
W	3	T	1.25		1.25	SC	9.5 mm Goretown	Super	Goretown # 789 Stone
W	6	T	0.75		0.75	MS	4.75 mm	Super	Cherokee Limestone
W	8	T	1		1	NC	NovaChip	NovaChip	Pineville 3/8 Chip (Scalped 78M)
W	9	T	1		1	NC	9.5 mm Superpave	Super	Pineville Washed Screenings
S	1	B	3.5	1.75		SC	19 mm Liberty	Super	#6M Stone
S	1	T	3.5		1.75	SC	Liberty SMA	SMA	Liberty 780 (1/2)
S	4	B	4	3		TN	3/4 Limestone	Super	Algood #57 Limestone
S	4	T	4		1	TN	Drainable Surface	OGFC	Dickson #7 Limestone
S	5	T	1.5		1.5	TN	Lower Gyrations vs 2000	Super	Arlington 1/2 Crushed Pit Gravel
E	1	BT	4	2	2	TN	1/2 SMA	SMA	Rinker #7 Limestone

In cases where full (4 inch) depth rutting experiments were planned, stone matrix asphalt (SMA) was a popular study topic. Several sponsors are investigating the effect of reducing aggregate specification requirements on SMA performance. For example, will mixes designed with high Los Angeles (LA) abrasion loss aggregates exhibit more production and performance problems than mixes produced using aggregates having lower LA abrasion values? Thicker sections were placed in multiple lifts as a function of nominal maximum aggregate size.

In cases where pavement preservation studies are planned, shallow mill and inlay methods were required. In these comparisons, sponsors hope to learn which thin overlay options are the most cost effective. For example, will proprietary surface mixes produce better field performance than conventional mixes produced with the same stockpiles?

In either case, only the outside (traffic) lane was replaced in new rutting study sections. Consequently, the inside lane was used as a haul road and work platform. Milling was extended approximately 1.5 feet beyond the existing centerline and edgeline. Additionally, specifications controlling milling and pavement inlay thicknesses had strict acceptance limits to ensure the final product would yield the intended results.

Eight test sections were approved for construction in a structural experiment on the 2003 Track. Discussions between Department of Civil Engineering Faculty, NCAT research engineers, industry consultants and project sponsors were held in order to develop recommendations for the best use of these sections in the experiment.

With only eight sections devoted to the structural study, and many factors that could be investigated, it was impossible to execute a full factorial examining all possible combinations. Therefore, it was decided to focus primarily upon the effects of HMA thickness and binder grade as they relate to structural performance. In future testing cycles, as more sections are added to a structural experiment, additional factors will be evaluated. In fact, the results of this experiment will not only be beneficial for the present study, but should help guide future experiment design.

Generally speaking, the eight structural sections were designed for varying traffic levels; resulting in a thin, medium and thick design for three sections using unmodified binder. The three sections were then repeated with three additional sections, with a polymer modified binder used throughout the depth of the HMA. The final two sections were designed for the medium traffic level, where one had an SMA surface layer and the second had the same structure with a rich bottom. The 6-inch dense crushed aggregate base previously used at the Track was again installed under all 8 sections. An improved subgrade was raised as necessary under each section to bring them up to the proper surface elevation. New subgrade soils were the same material used to build the Track in 2000.

It is hypothesized that these 8 sections will exhibit differing performance and types of distress over the 2-year trafficking cycle. The varying thickness should serve to ensure that some meaningful distresses are observed; some earlier than others. Also, the modified binders, rich bottom and SMA surface sections will enable meaningful comparisons between conventional and modified mixes. The layout of the test sections was such that construction and rehabilitation efforts are as efficient as possible. For example, it was more efficient to place the thick sections together to more easily maintain a uniform cross slope. The structural design of the eight sections was done according to the 1993 AASHTO Design Guide methodology using the design input parameters included in Table 2.

Table 2 – 2003 Track Structural Design Inputs

Input Parameter	**Value**
Reliability	95%
Variability	0.45
ΔPSI	1.2
Axle Weights per Truck	Steer Axle = 12 kip Tandem Axle = 40 kip 5 Single Axles = 20 kip / axle
HMA Structural Coefficient (a_1)	0.44
Dense Graded Aggregate Base Coefficient (a_2)	0.14
Dense Graded Aggregate Base Stiffness	30,000 psi
Improved Subgrade Soil Structural Coefficient (a_3)	0.05
Improved Subgrade Soil Stiffness	8,000 psi
Subgrade Soil Stiffness	5,500 psi

The level of reliability and variability were chosen to be consistent with current Alabama Department of Transportation (ALDOT) designs. The axle weights were the current weights on the triple trailers in use at the Track. The structural coefficients were used previously in designing the existing test sections. Since similar materials were used, they are still appropriate. The stiffnesses of the aggregate base and improved soil were correlated using the structural coefficients and figures in the 1993 AASHTO Guide.

The structural sections had to be compatible with the existing grades at the Track. A total of approximately 29 inches of material (placed when the Track was originally built in

2000) was removed and replaced with new material. The 29 inches consisted of 5, 7 or 9 inches of HMA, 6 inches of dense crushed aggregate base (CAB), and sufficient subgrade material to extend the original Track subgrade to the bottom of the new CAB.

The number of design ESALs was calculated according to the AASHTO methodology for the axle weights given above with the 12 kip steer axle treated as a single axle. It is expected that approximately 965,000 laps of the design vehicle will be applied in the track cycle to provide the 10 million ESALs. It should be noted that an iterative procedure was used to ensure convergence between the SN to determine equivalency factors and the required SN obtained from the AASHTO design equation.

The design HMA thickness and amount of additional fill were determined. The following equations were derived and used to find the appropriate thicknesses of each layer.

$$SN = a1D1 + a2D2 + a3(D3 + D4) \quad (1)$$

where: a1, a2, a3 are given above
D2 = 6 in.
D4 = 12 in. (existing)
D1, D3 are unknown

$$D = D1 + D2 + D3 + D4 \quad (2)$$

where: D = 42 in.

Once the appropriate SN values were determined for each traffic level, the two above equations were solved for the two unknowns, D1 and D3. Table 3 lists the resulting design thicknesses for each of the three traffic levels. Additionally, since all the traffic will be applied to each of the sections, it is instructive to determine the reliability level at one traffic level. It was suggested to examine the reliability at the previous level of ESALs (10 million). These are also listed in Table 3.

Table 3 - Preliminary Structural Sections for 2003 Track

Traffic	ESALs, 10^6	HMA, in.	GB, in.	Additional Fill, in.	SN	Total Traffic Reliability
Full	7.7	7.5	6	16.5	5.6	87%
2 / 3	5.1	6.5	6	17.5	5.2	82%
1 / 3	2.5	5.5	6	18.5	4.8	65%

While these thicknesses were derived directly from the AASHTO Guide, it was beneficial to expand the range of thicknesses, for experimentation sake, to include more diversity in the cross sections. Therefore, it was decided to change the thicknesses shown in Table 3 to those shown in Tables 4 and 5. It is believed that these changes should aid in distinguishing the sections in terms of structural performance.

Table 4 - Final Structural Sections for 2003 Track

Traffic	HMA, in. (D_1)	GB, in. (D_2)	Additional Fill, in. (D_3)	SN	Reliability at $10*10^6$ ESAL
Full	9	6	15	6.2	92%
2 / 3	7	6	17	5.4	68%
1 / 3	5	6	19	4.6	30%

As stated previously, the test sections were laid out to minimize construction and rehabilitation efforts. Figure 3 summarizes the final experimental plan described in Track reconstruction contract documents.

Table 5 - Final Structural Study Test Plan for 2003 Track

Section	HMA, in.	GB, in.	Fill, in.	Design Features
1	5	6	19	Modified Asphalt
2	5	6	19	Neat Asphalt
3	9	6	15	Neat Asphalt
4	9	6	15	Modified Asphalt
5	7	6	17	Modified Asphalt
6	7	6	17	Neat Asphalt
7	7	6	17	Modified (SMA) Surface, Opt Neat Binder
8	7	6	17	Modified (SMA) Surface, Rich Neat Binder

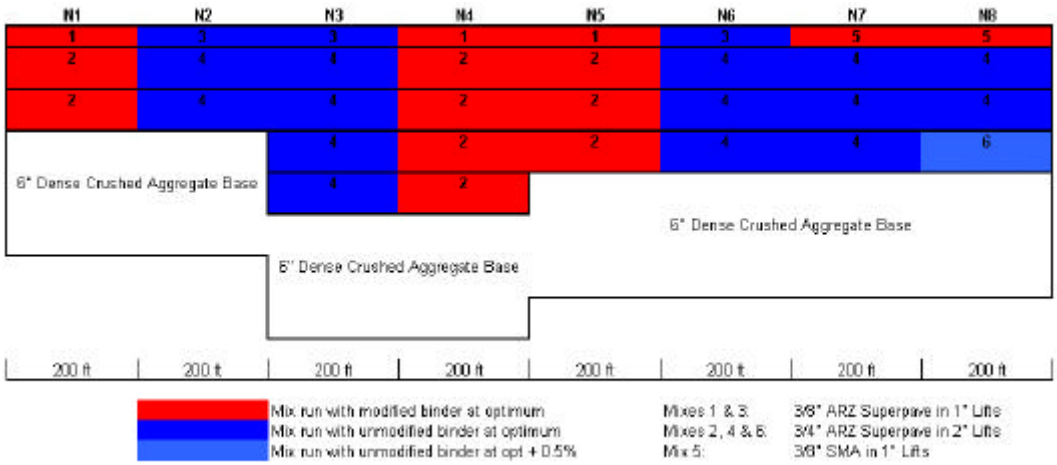

Figure 3 – Schematic View of Structural Sections (1 or 2 inch Lifts Only)

Preconstruction

Sponsors were encouraged to consider research efforts in other sections in developing their comparison rutting studies. Most sponsors chose to ship in their own unique local aggregates while relying upon the "Track stock" asphalt binders. Pay items were set up in the construction contract to pay for shipping stockpile materials from each state on a per ton basis, and liquid asphalt was supplied in accordance with sponsors' mix designs with respect to source and performance grade.

The project was developed, let and administered by ALDOT under the guidance of the sponsor oversight committee. To avoid circumstances where multiple sponsor representatives would need to interact with the contractor, NCAT served as the oversight committee's project representative. This responsibility entailed communicating sponsor's acceptance and adjustment recommendations to ALDOT personnel, as well as advising ALDOT on dispute resolution issues.

Following a series of mandatory prebid meetings, East Alabama Paving was identified as the low qualified bidder on the Track reconstruction project on March 28, 2003. Contract specifications allowed the contractor to bid the job using an offsite plant within a 30-minute haul distance from the Track. Consequently, East Alabama Paving chose to use the Track's prepared plant site as a staging area for out-of-state aggregate stockpiles (Figure 4) and produce mix at their new plant (shown in Figure 5) located approximately 10 minutes away. Steps were taken by both NCAT (Figure 6) and the contractor to ensure that stockpiles were managed properly during long haul shipping, while being temporarily stored at the Track, while being short hauled to the new plant and while being stored at the contractor's plant awaiting mix production.

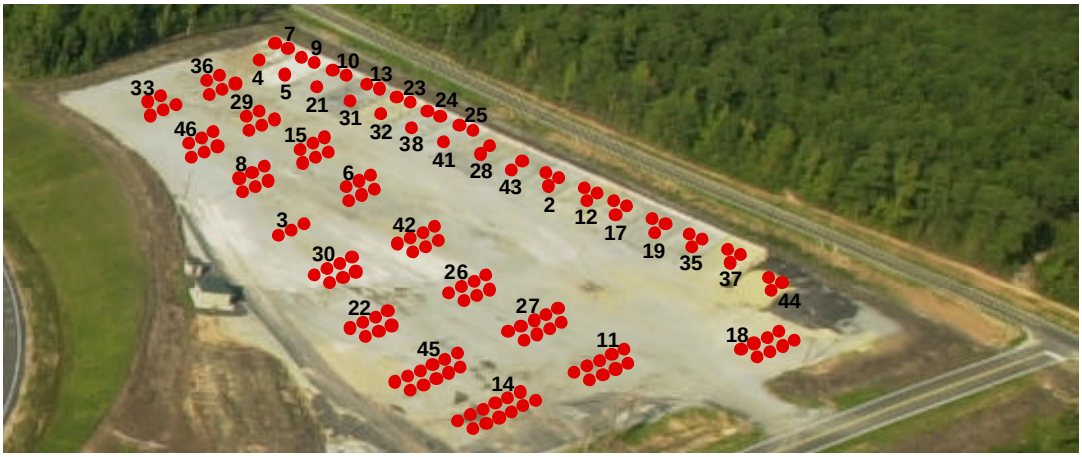

Figure 4 – Stockpile Staging Plan on Prepared Track Plant Site

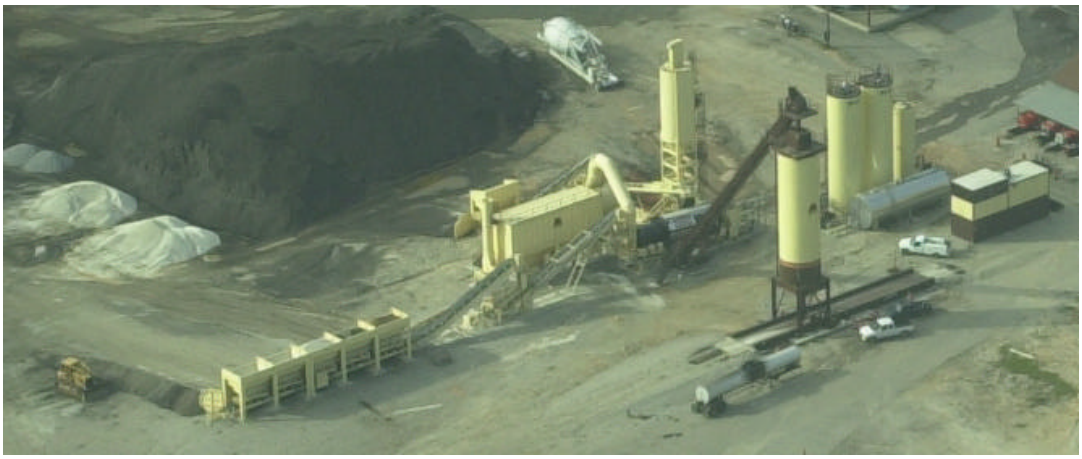

Figure 5 – Contractor's New Plant Used to Produce All Track Mixes

Figure 6 – Protecting Stockpiles at Track Prior to Shipment to New Plant

Plant Operations

Laboratory job-mix formulas were used as a starting point when each mix was trial run through the plant for the first time, except that actual stockpile gradations were used to make adjustments to the bin percentages wherever possible. Stockpile moisture contents were measured daily on any mixes that were scheduled for production to minimize the effect on plant operations and resulting final mix proportions, and gradations were measured each time a stockpile was handled so that breakdown could be accurately considered in subsequent proportioning decisions. The construction season was unusually wet, and additional moisture contents were measured any time mix was run after a rainfall event (regardless of whether it had already been conducted).

Trial mixes were run through the contractor's offsite facility (located about a 10 minute haul distance from the Track) before any final mixes were placed to verify that produced mix properties met each sponsors' expectations. In addition to being tested in the laboratory, mixes were also paved in off-Track locations to evaluate mat placement quality (as shown in Figure 7). State sponsors had an opportunity to evaluate these results and make necessary changes before final mixes were produced for on-Track placement. Whether for trial or final placement purposes, a sufficient quantity of material was wasted on either side of the production run to ensure that tested material exhibited uniform characteristics.

Figure 7 – Paving Trial Mix Before Placement on Track

Based upon average results from all trial and Track mix runs, a "typical" description of material usage may be presented. After the drum had been preheated, it was necessary to run approximately 12 tons of blended aggregate through the plant to achieve a temperature hot enough that would allow coated material to be run up the "cold" drag

chain into the storage silo. With the flow of liquid binder then turned on, subsequent coated material was run up the drag chain and into the silo.

The initial 12 tons of coated material was run through the silo and wasted into an empty dump truck to ensure that a suitable sample was taken from subsequent material. Enough material to facilitate testing and/or placement was then run continuously into the silo and ultimately loaded out into either tandem dump trucks (for placement on the tangents) or live bottom dump trucks (for placement on the super elevated curves). No trucks were loaded until the plant computer indicated that enough material was in the silo to complete the production run. When loading was allowed to commence, textbook "front-back-center" methods were employed to limit the possibility of segregation. With a sufficient quantity of mix en route to the Track, another 16 tons of suspect coated material (assumed to have variable asphalt content) was wasted in a standby dump truck as the flow of liquid binder was simultaneously terminated. Lastly, 12 tons of blended aggregates were run through the plant and wasted (necessary because of the large volume of blended aggregates in the drum at the end of the run).

Random blended samples of uncoated material were recovered from the cold feed belt during production using a shovel and a brush (shown in Figure 8), while representative coated samples were recovered using conventional shovel sampling methods. A mechanical hot-mix sample splitting device was used in the onsite laboratory to avoid rapid cooling associated with conventional quartering and its subsequent effect on laboratory sample compaction temperatures.

Figure 8 – Recovering Random Sample Portions from Cold Feed Belt at Plant

Laboratory Operations

An NCAT ignition furnace was utilized to measure asphalt contents and recover uncoated aggregates for washed gradation testing. Volumetric samples were prepared using the Superpave gyratory compactor (SGC) for the majority of the Track, with a Marshall hammer being used for select SMAs (as required). Both laboratory density and roadway compaction were compared to theoretical maximum values obtained via the Rice method to compute percent compaction and air voids. Drybacks were utilized for sections containing absorptive materials.

After the results from subsequent laboratory test data (included as Appendix A) had been digested by onsite sponsor representatives, plant settings were adjusted and either another trial run was deemed necessary or the final plant-run job-mix formula was established. Whenever practical, trial mix was placed either at the site of the 2000 plant or on a new paved stockpile storage area so that sponsor representatives could consider placement and compaction in their decision making process (shown in Figure 7). Following the determination of the final job-mix formula, production of mix for placement on the Track surface was authorized.

When mix was produced for placement on the surface of the Track, a number of representative samples were fabricated in the laboratory using a Superpave gyratory compactor (SGC). These samples were compacted to the (sponsor-designated) design gyration level to facilitate laboratory performance testing of various types. Additionally, a large amount of loose material was stored in metal buckets so that more samples could be compacted at a later time.

For quality control testing purposes, a sublot was defined as each placement of mix in a lane lift, where all lane lifts placed with the same mix within a section made up a statistical lot. One sample of produced mix was taken for each sublot to evaluate conformance with asphalt content and gradation specification requirements. The mean absolute deviation of measured asphalt contents could not vary from the production job-mix formula by more than 0.3 percent. The mean absolute deviation of recovered aggregate blends could not vary by more than 3 percent on coarse sieves (#4 and above), 2 percent on middle sieves (#100 to #8), and 1 percent on dust (< #200). On the roadway, the mean absolute deviation of mat density could not vary by more than 1.2 from the 94 percent target (as a percentage of the theoretical laboratory maximum density).

Roadway Operations

Construction of the actual test sections was allowed to begin after sponsors were satisfied with their trial mix results. Enough mix was produced in a continuous run to accommodate placement of the outside lane with uniform material. Since most of the equipment was relatively cool due to the nature of the sporadic production runs, plant production temperatures averaged 321°F for mixes with unmodified asphalt and 328°F for mixes containing modified asphalt (both measured in the truck immediately after discharge from the silo).

Twenty-four ton haul trucks were loaded and driven the short distance from the offsite plant to the Track location of test section placement, with live bottom trucks being used to place most curve sections and conventional dump trucks used to place all sections on the tangents. Paving was allowed to begin only when all necessary trucks were lined up and ready to discharge into the material transfer device (MTD).

The paver (shown in Figure 9) was preheated and raised slightly off the surface of the previously placed mat using hand-placed hot-mix asphalt material, mounded to a thickness that would provide a smooth transition with the adjacent section. When a steady flow of mix was available from the MTD, the paver pulled off the joint and began its slow movement to the far end of the section. In most cases, placement operations proceeded in the direction of traffic (counter-clockwise). At the far end of the joint, the paver overran the distance requirement by 5 to 10 feet and lifted up the screed. This allowed the paver to be driven clear of the immediate construction zone.

Figure 9 – Preparing to Pave a Test Section with Aggressive Rolling

Shovels were then used to remove the mound of material that had been left in place at the end of the run when the screed was lifted. This excess material was removed and wasted off the side of the shoulder for later cleanup and removal. Concurrently, dual breakdown rollers were working to compact the first half of the mat before excessive cooling occurred. With a cleanly defined fresh mat at the far end of the run, breakdown rollers were allowed to proceed to the far end of the mat. When rollers reached the far end, they simply ramped down the end of the mixture that had been placed and reversed direction.

Relative increases in density were monitored with uncorrected, nondestructive methods to identify the breakpoint in the compaction operation, which was used to prevent excessive rolling (in addition to visual observations). Vibratory steel-wheeled rollers (Figure 10) were used for breakdown rolling, a pneumatic rubber-tired roller (Figure 11) was used as necessary for intermediate rolling, and the vibratory steel-wheeled roller was used in static mode for finish rolling. In select cases, the pneumatic rubber-tired roller was utilized after the conventional compaction window had closed (e.g., in the heat of the following day) in order to satisfy the density specification.

Figure 10 – Fleet of Rollers Utilized to Achieve Density on Track

Figure 11 – Pneumatic Rubber-Tired Rolling in Intermediate Temperatures

Concurrently, the MTD was advanced slightly and boomed over to accommodate dumping 2 to 3 tons of blended mix into a front-end loader (as presented in Figure 12). This material would be utilized for the fabrication of numerous research specimens that would later be used for laboratory performance testing. When filled with material that was representative of the new mat, the front-end loader was driven back to the onsite laboratory where material was sampled via shovel and stored in buckets for staged heating and sample compaction.

Figure 12 – Sampling Representative Research Mix from Roadway

In compacting the typical experimental section, 3 coverages with the vibratory steel-wheeled roller were accomplished with 9 passes. The first pass was begun when the paver was approximately half way down the section. Generally, rollers were operated at high frequency and low amplitude; however, the mats were monitored closely to avoid aggregate breakdown. The pneumatic rubber-tired roller was utilized in several instances where sponsor representatives requested its use to simulate their standard practice and when density was not achieved using steel-wheeled compactors alone. Steel-wheel rollers were utilized in static mode to accomplish finish rolling, which typically consisted of 3 coverages via 9 passes with the mat at or just under 175°F.

Once the placement and compaction operation for both lanes had been completed, a straightedge was used to identify a distance from the far end of the mat that would most likely accommodate a smooth transition between sections. A chalk line was then popped at this distance and a masonry saw was used to cut a clean vertical face in the new mat. Lastly, a backhoe was used to pull all excess material off the shoulder for later cleanup and removal.

The Alabama Department of Transportation (ALDOT) conventional smoothness specification was utilized to review and accept the quality of joint construction for every section on the Track. Based upon a ¼ inch deviation tolerance using a 15 ft straightedge, it was decided (based upon objective smoothness analyses) that diamond grinding (shown in Figure 13) should be utilized to enhance the rideability of 16 transverse joints.

Figure 13 – Diamond Grinding Select Sections for Smoother Joints

Generally, cores were cut from the last 25 feet of each pull (one from each wheelpath and one mid-lane, for a total of 3 per section) so that corrected nuclear gauge testing could be done non-destructively in the research (middle 150 feet) portion of each section. The target density for all sections was 94 percent with an average absolute error of no more than 1.2 percent, unless the section sponsor elected to change some portion of this requirement. For example, several sponsors who included SMA mixes on the 2003 Track were not concerned about over compaction.

Structural Study Sections

The structural experiment (shown in Figure 14), cosponsored by the State of Alabama, Indiana and the Federal Highway Administration, necessitated the deep removal of approximately 1700 feet of the North tangent. This was accomplished by ramping down from either end and successively milling back and forth (shown in Figures 15 and 16) until the 2000 subgrade was exposed. An automated tarping system was utilized as needed to weather proof the subgrade prior to new material (excavated from the same onsite borrow pit used to build the Track's subgrade in 2000, shown in Figure 17) being placed, which proved invaluable in the unusually wet season (see Figure 18).

Figure 14 – Location of 8 Section Structural Experiment

Figure 15 – Deep Milling to Remove Existing Pavement Structure

Stratified random test locations (3 per section) were selected before construction that will also be used for weekly performance analysis as truck traffic is being applied to the completed surfaces. To facilitate a full understanding of performance under traffic, these locations were also utilized for density control testing using nondestructive methods. Tests were conducted in each wheelpath (thus, 6 tests per 200 foot section) with the addition of each lift. Density in lower subgrade materials was required to meet or exceed 95 percent of the laboratory standard proctor value, while the top 6 inches was required to meet or exceed 100 percent. All densities in the dense crushed aggregate base were required to meet or exceed 98 percent of the laboratory standard.

Figure 16 – Completed Deep Milling of Hot-Mix Asphalt Layers

Figure 17 – Onsite Source for Structural Subgrade Material

Figure 18 – Tarping System Utilized During Subgrade Construction

As the planned elevation of the raised subgrade (which varied by section depending on the thickness of overlying asphalt layers) was being attained, it was necessary to correct settlement (apparent visually in Figure 19 and graphically in Figure 20) that had occurred since the North tangent fill was originally placed back in 1999. It was determined through a settlement study that it would be possible to mitigate approximately 850 feet of fill that had consolidated underlying materials (just under a foot at the most extreme point) where the Track crosses an old creek bed. This work was accomplished using the same onsite borrow materials that were being used to raise the subgrade, thus ensuring comparable performance quality. HMA leveling (shown in Figure 21) was placed in 6 separate plant runs over 4 production days to level the inside lane as research lifts were completed in the outside lane. In this manner, grade was restored to both the inside and outside lanes of the rebuilt Track using extra HMA for the inside and extra subgrade for the outside.

Figure 19 – Visually Discernable Settling of North Tangent

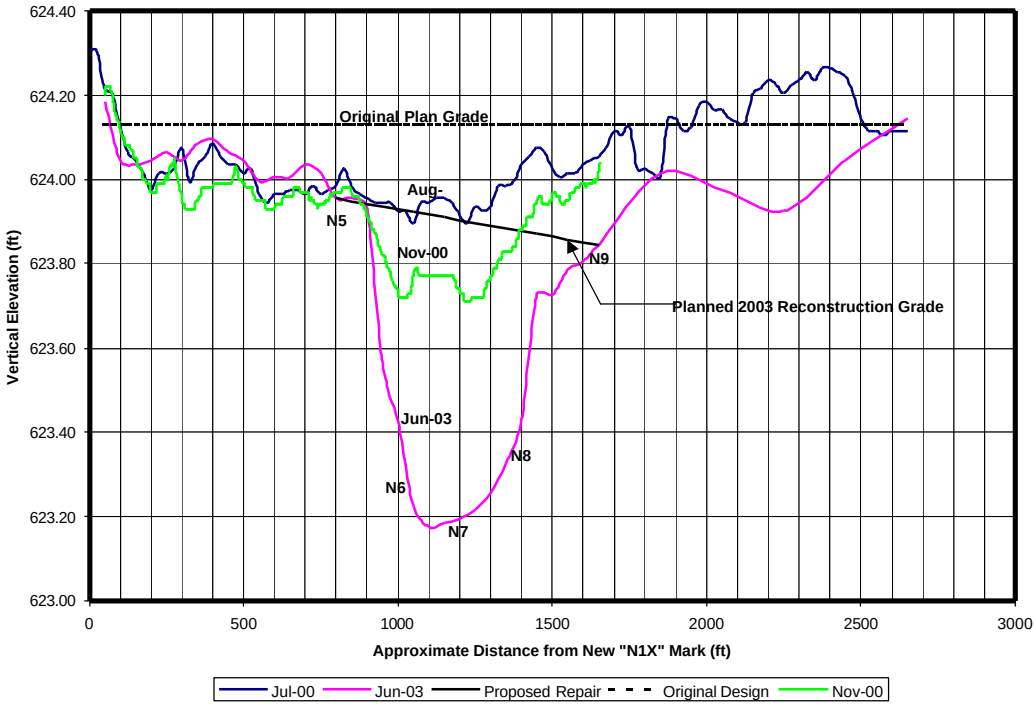

Figure 20 – Settlement Over Time with Mitigation Plan

With the new subgrade and unbound base materials in place, placement of the HMA layers for the structural experiment could commence. Since the contractor bid the supply of structural section aggregates at no cost, these sections were built first and were utilized to shake down the contractor's new plant. Indiana will be replicating all eight structural

sections in their APT facility located at Purdue University in an effort to obtain comparable results using their load simulation technology.

Figure 21 – Inside Lane Leveling for Settlement Mitigation

Construction and instrumentation of the structural experiment has been documented in detail in a separate document by the Principal Investigator of this effort, Dr. David Timm. It is expected that this document will be published in the first quarter of 2004. It was critical that sections be paved as close to target thicknesses as possible to maximize the meaning of research results; consequently, screed placement thickness was checked via survey (Figure 22).

Figure 22 – Wheelpath Survey to Fine Tune Screed Placement Thickness

Rutting Study Sections

Near the completion of the structural experiment, the Contractor was allowed to mill all rutting study sections at the same time. The justification for this decision was based upon the fact that higher quality in thickness control could be attained throughout the Track if intermittent stopping and starting of the milling operation could be avoided. Milled depths were checked as the operation commenced to evaluate compliance with sponsors' objectives (see Figure 23). In order to protect the newly milled surfaces until each section could be repaved, the automated tarping system previously described was used to prevent water intrusion (see Figure 24).

Figure 23 – Detailed Mill Thickness Verification

Figure 24 – Weather Protection for Milled Rutting Sections

Following the completion of all required milling, the placement of new rutting study sections began. As previously stated, each sponsor designed an experiment that best suited their individual research needs. A brief description on the construction of each sponsor's experimental sections is included in the following paragraphs, with construction quality data for all presented in Appendix A.

The first sections installed were funded by the Florida Department of Transportation (Figure 25), who chose to build a validation experiment for their Gainesville Heavy Vehicle Simulator (HVS) work. Two sections (E2 and E3) were built with the same target gradation, where one was produced with unmodified asphalt and one was produced with modified asphalt. Field performance in these two sections will be compared over the two-year traffic period to differences observed in much quicker HVS testing in Gainesville. Slight differences in dust between E2 and E3 resulted from the plants inability to waste baghouse fines during production, which will be a consideration in the assessment of final results. As a result of production problems related to high moisture content stockpiles, it was necessary to order additional materials to place the top lifts on Florida's 2 new sections. Results from quality testing for Florida's sections E2 and E3 are included in Appendix A. Additionally, another cycle of design traffic will be applied to the 2 sections built for Florida (S6 and S7) on the 2000 Track.

Figure 25 – Construction of Florida Test Section

The State of Missouri (Figure 26) joined the sponsor group in 2003. In anticipation of their widespread use of SMA surface mixes, Missouri chose to compare the performance of three SMA surfaced sections built with stockpiles of varying quality. Results from the production and performance testing of these sections will potentially be used to establish specification limits for new SMA construction statewide.

Several problems were experienced while building Missouri's 3 new rutting study sections. Production problems at the plant associated with the mineral filler feeding system caused an excessive amount of material waste, making it impossible to place the second lift on one section without reordering additional material. Also, an insufficient amount of fiber was blown into the mix in another section, which made it necessary to mill and replace the defective material. Lastly, an estimation error in available stockpile quantities caused one section to be placed short; however, the as-built length of the short section is well beyond the pre-selected random test location for the last test cell. No significant problems related to the general quality of stockpile materials were encountered. Results from quality testing for Missouri's sections N9, N10 and W2 are included in Appendix A.

Figure 26 – Construction of Missouri Test Section

The State of South Carolina (Figure 27) elected to continue traffic on their two 2000 Track sections and added three additional sections for 2003. Two of the new sections were utilized to build comparison SMA sections using varying quality aggregates, while the third section is being used to evaluate a proposed source of aggregates for the construction of low volume roadways. Both SMA surface mix sections are underlain by Superpave binder mixes with the same job mix formula.

No significant problems were noted in the production of the first Superpave binder mix; however, dust generation during the production of the soft aggregates caused the fines to run high during the construction of the second section. The latter binder mix was placed and milled twice because it did not meet the sponsor's expectations for quality. The third placement was accepted when laboratory performance test results indicated no difference in binder mix rutting susceptibility between comparison sections. This facilitated an objective comparison between SMA surface mixes without fear of unknown influence from potential differences in binder mix performance. For these reasons, it was necessary to order a significant quantity of additional material to build these sections. Results from quality testing for South Carolina's sections N13, W3 and S1 are included in Appendix A. Additionally, another cycle of design traffic will be applied to the 2 sections built for South Carolina (S8 and S11) on the 2000 Track.

Figure 27 – Construction of South Carolina Test Section

The State of Mississippi (Figure 28) chose to continue traffic in their limestone versus gravel study from the 2000 Track and add an additional section to study small aggregate mixes for low volume roadways. Their 2000 experiment showed that gravel mixes could perform just as well as more expensive mixes blended with limestone to improve performance. By extending traffic they hope to be able to evaluate durability properties. Results from quality testing for Mississippi's section W6 are included in Appendix A. Additionally, another cycle of design traffic will be applied to the 2 sections built for Mississippi (S2 and S3) on the 2000 Track.

Figure 28 – Construction of Mississippi Test Section

The State of North Carolina (Figure 29) opted to compare the performance of a Superpave section with a NovaChip section produced using the same stockpiles. Intermittent rain was the biggest challenge faced during the construction of North Carolina's new sections. Two attempts to pave the Superpave sections were deemed unacceptable due to heavy unexpected rainfall between production and placement, which resulted in unacceptable longitudinal cracking as the mat quickly cooled. The NovaChip section was also initially paved in the rain and was replaced after it was determined the mat was unacceptably rough. Results from quality testing for North Carolina's sections W8 and W9 are included in Appendix A. Additionally, another cycle of design traffic will be applied to the 2 sections built for North Carolina (S9 and S10) on the 2000 Track.

Figure 29 – Construction of North Carolina Test Section

The State of Tennessee (Figure 30) elected to replaced both of their 2000 sections on the South tangent and add a third section in the East curve. In this three section experiment, they are evaluating one of the mixes they placed in 2000 redesigned with a reduced level of compactive effort (75 gyrations versus 125 gyrations), as well as their first design and placement with gap graded mixes in the form of both an open graded friction coarse (OGFC) and an SMA. No significant problems were encountered during the production and placement of the four mixes used to build Tennessee's three new test sections. Results from quality testing for Tennessee's sections S4, S5 and E1 are included in Appendix A.

Figure 30 – Construction of Tennessee Test Section

Extended Traffic Sections

Both Georgia (Figure 31) and Oklahoma (Figure 32) chose to continue traffic on their 2000 sections and not add any additional sections for 2003. Their objective in choosing the traffic only option is that durability will become more of an issue as a result of two more seasonal cycles and the application of another design level of traffic.

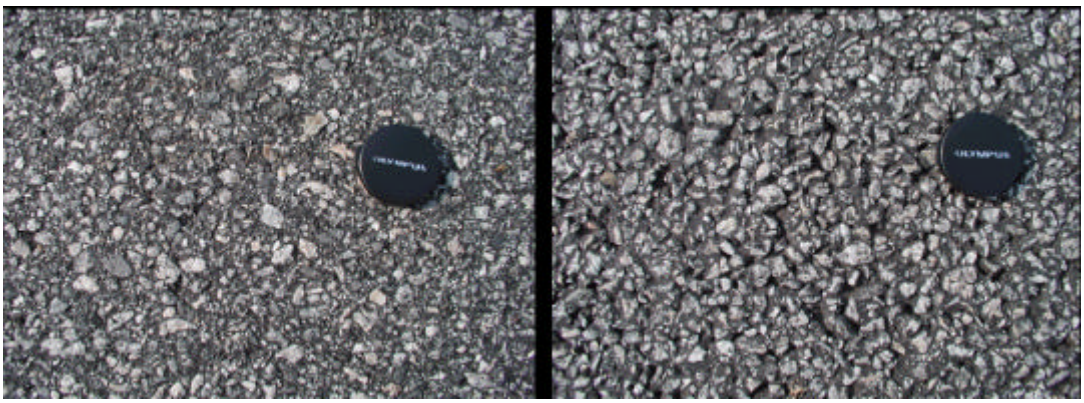

Figure 31 – Georgia's Traffic Only Mixes (Superpave Left, SMA Right)

Figure 32 – Oklahoma's Traffic Only Mixes (Hveem Left, Superpave Right)

Laboratory Performance

Laboratory performance testing will be conducted on samples compacted during construction that were sealed in vacuum bags and refrigerated to prevent age stiffening (to simulate the onsite quality control testing perspective). Subsequent testing will be conducted on samples compacted after construction (to evaluate the effect of reheating on sample performance) and on samples blended in the laboratory (to simulate the mix design approval perspective). In addition to validating existing models, this experiment is intended to evaluate the effect of reheating on laboratory performance of samples prepared in field and mix design laboratories. Fundamental and simulative testing will both be included in this analysis. A summary of planned laboratory testing is included in Table 6.

Table 6 - Summary of 2003 QC and Performance Testing

Plant Production	Roadway Inspection	Laboratory Quality Control	Laboratory Performance
Production Diary	Delivered Mix Temperatures	Daily Binder Viscosities	LWT Laboratory Mixed Pre-Construction
Stockpile Mapping	Mapping Rolling Patterns	Production Mix Moisture	LWT Plant Run During Construction
Stockpile Moisture & Gradation	Relative and Final Density Testing	Ignition Binder Content x 2	Conf Rep Load w/ Dyn Mod During Construction
Binder & Cold Belt Sampling	Milling & Paving Thickness Surveys	Washed Ignition Gradations x 2	Unconfined Creep During Construction
HMA Truck Sampling	Longitudinal & Joint Smoothness	Sample Compaction & Volumetrics x 12	LWT Reheated & Compacted Post-Construction

The full battery of laboratory performance testing planned for rutting study sections will also be conducted on structural study sections; however, additional samples will be prepared to facilitate mechanistic-empirical (ME) performance analyses. Resilient modulus, triaxial compression using confinement with cyclic loading, and shear testing will be conducted on the HMA that was used to build the structural experiment. Additionally, a large amount of material will be saved to satisfy any future testing needs that may be identified. Resilient modulus testing will be conducted on subgrade soils and dense crushed aggregate base materials that were sampled from the roadway during construction. FWD testing will be utilized to determine seasonal stiffness parameters, and fatigue testing will be conducted on beam samples prepared post-construction using reheated materials.

Trucking Operations

Drivers are again being utilized to apply traffic to the surface of the facility to optimize the meaning of the simulation. In consideration of driver safety, trucking operations were initiated after the new test pavements had been striped and marked. A single truck was run on the Track for approximately one month, and full (four truck) operations began as soon as safety and equipment protocols were established in December of 2003. Eight-axle triple trailer trains (shown in Figure 33) are now being utilized to apply 10 million ESALs to the surface of experimental mixes within the two-year loading cycle. A fifth legally loaded, single box trailer rig will be added to the fleet in January of 2004 to serve as a control vehicle to facilitate studying how fuel economy changes with Track roughness. It is anticipated that trucking operations will be completed by the end of 2005.

Figure 33 – Triple Trailer Trains Used to Apply Accelerated Loading

Field Performance

A system has been developed to allow for the recording of a pavement condition video log for the permanent project record. This system will supplement manual pavement management surveys in which cracking is mapped (as shown in Figure 34), longitudinal and transverse profiles are recorded, and deflections are measured. Figure 35 illustrates how stratified random sampling was used to identify weekly test locations. High-speed datalogging will be used to capture the pavements' response to loading at various speeds

via the sensor array described in Figure 36. These data will be compared to predicted responses using ME analysis methods based upon input from basic material property testing of construction materials. Further, fatigue and rutting performance predictions will be compared to actual measurements to validate performance models.

In a complementary research effort, the Indiana Department of Transportation plans to ship sufficient quantities of construction materials to their Accelerated Performance Test (APT) facility to build identical structures for testing with their full-scale loaded wheel simulator.

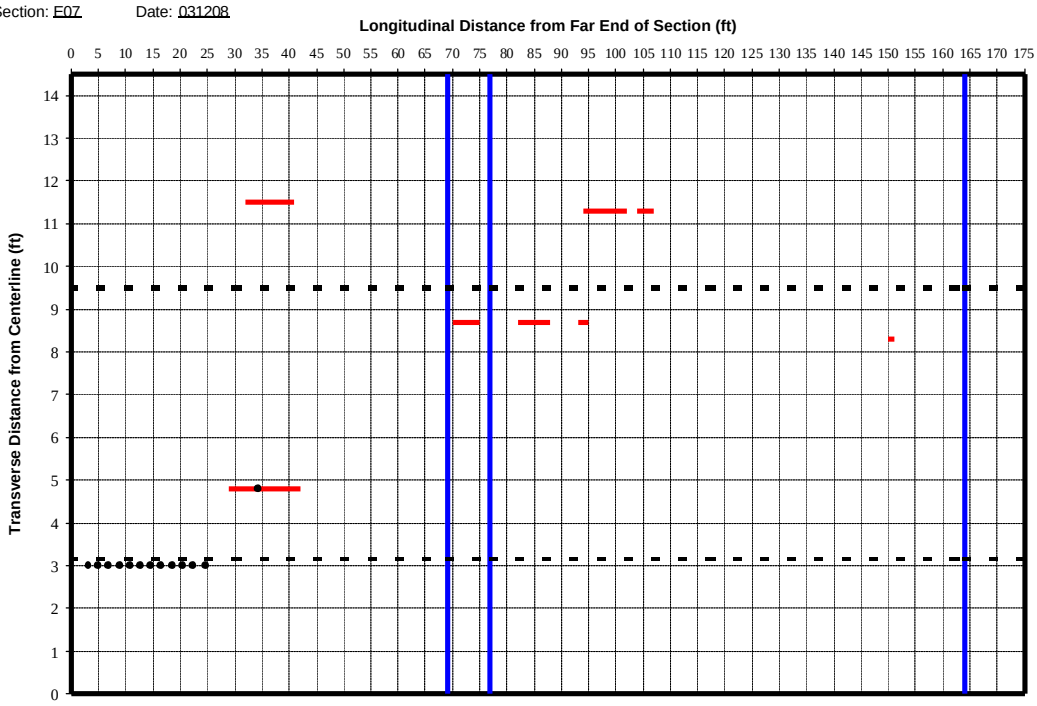

Figure 34 – Distress Mapping on an Extended Traffic Section with Cracking

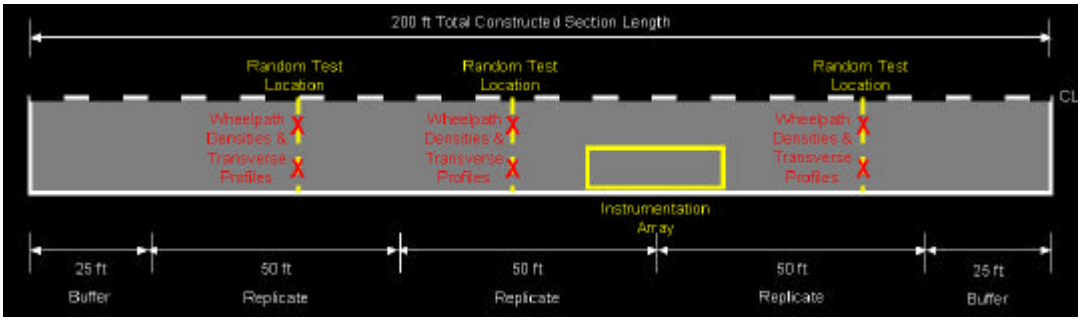

Figure 35 – Test Section Schematic (Instrumentation in Structural Sections Only)

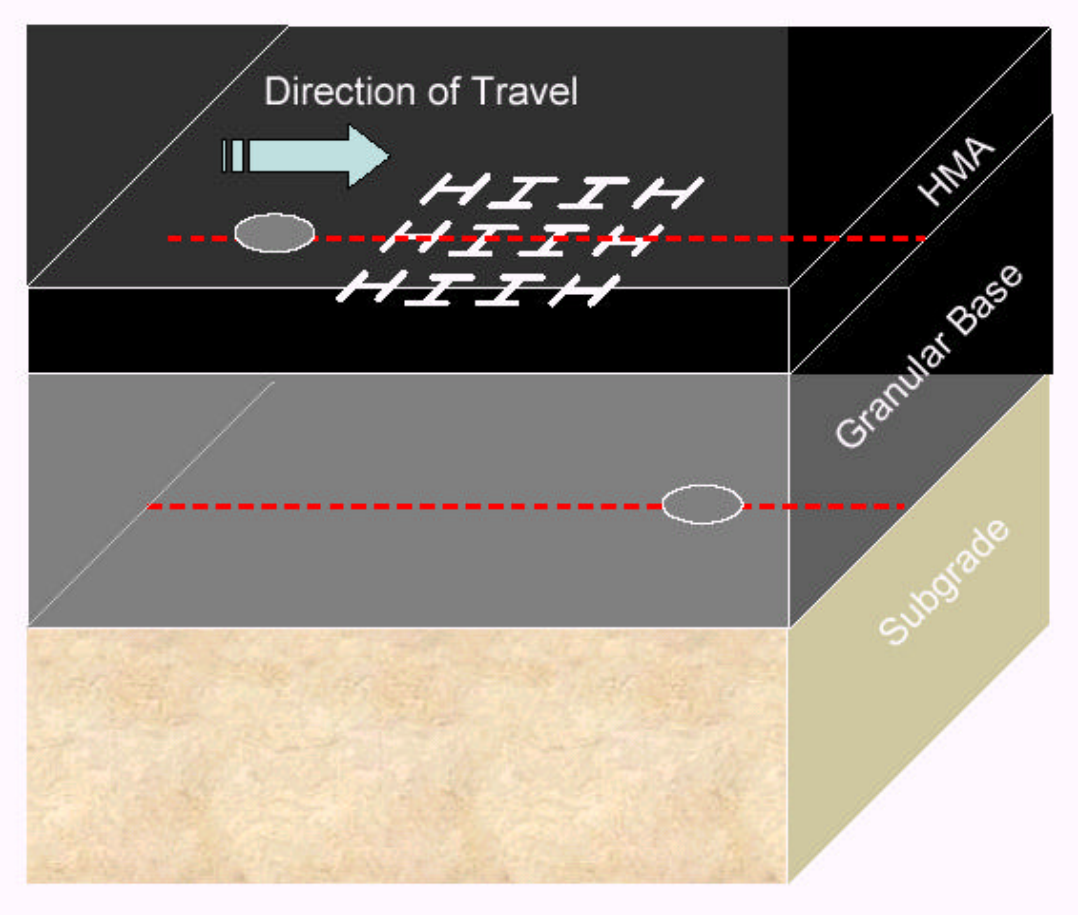

Figure 36 – Schematic Instrumentation Plan for Typical Structural Sections

Instrumentation

An automated weather station (shown in Figure 37) will summarize climatological conditions for the facility on an hourly basis, while multi-depth temperature instrumentation and subgrade moisture gages will characterize the performance environment for each individual test section. These data will feed into an environmental database that can be easily queried for performance modeling. Post-processing experiences from the 2000 Track are being utilized to build a real time research interface to environmental data from the 2003 Track so that researchers from the main NCAT facility can study data online that has been reliably filtered to remove anomalous readings.

Figure 37 – Automated Weather Station (Structural Study in Background)

While structural sections were being constructed, instrumentation intended to characterize the response of the various structural designs to actual load events was installed. Loads will be applied via onsite trucking operations and falling weight deflectometer (FWD). In the latter case, measured surface deflections can be utilized in conjunction with stress and strain measurements within the pavement structure and lab-determined basic material properties to evaluate the suitability of mechanistic pavement analysis and subsequent design. Instrumentation in the structural experiment has been documented in detail in a separate document by the Principal Investigator of this effort, Dr. David Timm.

Summary

An overview of the reconstruction effort for the 2003 Track has been provided herein. While much effort went into building sections of high quality in order to avoid confounding field performance results, it is anticipated that some sections will require rehabilitation before 10,000,000 ESALs have been completed. Rehabilitation and repair options will be studied whenever possible; however, it will be necessary to manage these activities such that trucking operations are not excessively hindered.

When trucking operations have been completed, trenching will be performed in select sections to verify the effective depth of observed distresses. At that time, destructive samples (i.e., slabs and cores) will be made available to section sponsors. In this manner, material can be recovered that will accommodate recompaction studies, slab rutting performance analyses, etc.

Based upon information generated in the 2003 structural experiment, it is likely a comprehensive structural experiment will be a dominant feature of the experiment design in the 2006 Track. Over successive funding cycles, research on trucking components (e.g., tires, drive trains, etc.) is expected to become more prevalent in Track operations.

ACKNOWLEDGEMENTS

The authors thank all the members of the Track research cooperative for their ongoing support in sponsoring this research project:

- Alabama Department of Transportation
- Florida Department of Transportation
- Georgia Department of Transportation
- Indiana Department of Transportation
- Mississippi Department of Transportation
- Missouri Department of Transportation
- North Carolina Department of Transportation
- Oklahoma Department of Transportation
- South Carolina Department of Transportation
- Tennessee Department of Transportation
- Federal Highway Administration

The authors thank the Alabama Department of Transportation for committing additional personnel and equipment in support of monthly performance testing.

Appendix A

New Section Construction Data

Quadrant: **E**
Section: **2**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Limestone
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	94	92
No. 4	74	72
No. 8	53	55
No. 16	43	44
No. 30	37	37
No. 50	23	25
No. 100	9	11
No. 200	4.0	5.7
Asphalt Content:	7.9	7.7
Pill Bulk Gravity:		2.189
TMD (Rice):		2.280
Avg Air Voids		4.0
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 29, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	8.0
S1A Marine Limestone	10.0
S1B Marine Limestone	25.0
Alachua Screenings	50.0
Florida Local Sand	15.0
Approximate Length (ft):	213
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	306
Avg Section Compaction:	95.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **E**
Section: **2**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Limestone
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	94	93
No. 4	74	73
No. 8	53	55
No. 16	43	44
No. 30	37	37
No. 50	23	24
No. 100	9	10
No. 200	4.0	5.1
Asphalt Content:	7.9	7.8
Pill Bulk Gravity:		2.203
TMD (Rice):		2.271
Avg Air Voids		3.0
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 01, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.17
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	8.0
S1A Marine Limestone	8.0
S1B Marine Limestone	27.0
Alachua Screenings	50.0
Florida Local Sand	15.0

Approximate Length (ft):	213
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	300
Avg Section Compaction:	94.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **E**
Section: **3**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Limestone
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	94	92
No. 4	74	73
No. 8	53	55
No. 16	43	44
No. 30	37	36
No. 50	23	24
No. 100	9	11
No. 200	4.0	6.0
Asphalt Content:	7.9	7.9
Pill Bulk Gravity:		2.209
TMD (Rice):		2.260
Avg Air Voids		2.3
Avg VMA:		13

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, July 30, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	7.9
S1A Marine Limestone	10.0
S1B Marine Limestone	25.0
Alachua Screenings	50.0
Florida Local Sand	15.0

Approximate Length (ft):	189
Survey Mill / Lift Thickness (in):	2.2
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	317
Avg Section Compaction:	94.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **E**
Section: **3**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Limestone
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	94	92
No. 4	74	73
No. 8	53	54
No. 16	43	43
No. 30	37	36
No. 50	23	24
No. 100	9	10
No. 200	4.0	5.3
Asphalt Content:	7.9	8.2
Pill Bulk Gravity:		2.226
TMD (Rice):		2.308
Avg Air Voids		3.6
Avg VMA:		13

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 01, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.17
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	7.9
S1A Marine Limestone	8.0
S1B Marine Limestone	27.0
Alachua Screenings	50.0
Florida Local Sand	15.0

Approximate Length (ft):	189
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	340
Avg Section Compaction:	93.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **1**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	80
3/8"	72	71
No. 4	53	49
No. 8	45	40
No. 16	36	33
No. 30	28	24
No. 50	15	13
No. 100	8	8
No. 200	5.0	5.5
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.496
TMD (Rice):		2.586
Avg Air Voids		3.5
Avg VMA:		12

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 21, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.4
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.2
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	338
Avg Section Compaction:	93.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **1**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	96
1/2":	84	85
3/8"	72	69
No. 4	53	52
No. 8	45	44
No. 16	36	35
No. 30	28	29
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.8
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.465
TMD (Rice):		2.575
Avg Air Voids		4.3
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	326
Avg Section Compaction:	92.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **1**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	81
No. 8	62	63
No. 16	47	51
No. 30	34	38
No. 50	19	20
No. 100	11	12
No. 200	5.0	7.0
Asphalt Content:	6.3	6.2
Pill Bulk Gravity:		2.373
TMD (Rice):		2.482
Avg Air Voids		4.4
Avg VMA:		18

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	0.6
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	326
Avg Section Compaction:	92.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **2**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	93
1/2":	84	84
3/8"	72	74
No. 4	53	53
No. 8	45	43
No. 16	36	35
No. 30	28	24
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.481
TMD (Rice):		2.575
Avg Air Voids		3.7
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 21, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.4
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	326
Avg Section Compaction:	94.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **2**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	72
No. 4	53	51
No. 8	45	43
No. 16	36	37
No. 30	28	29
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.466
TMD (Rice):		2.590
Avg Air Voids		4.8
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	328
Avg Section Compaction:	93.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **2**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	80
No. 8	62	63
No. 16	47	51
No. 30	34	38
No. 50	19	21
No. 100	11	12
No. 200	5.0	6.6
Asphalt Content:	6.3	6.1
Pill Bulk Gravity:		2.344
TMD (Rice):		2.488
Avg Air Voids		5.8
Avg VMA:		18

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	311
Avg Section Compaction:	92.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **3**
Sublot: **Lower Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	90
1/2":	84	79
3/8"	72	68
No. 4	53	50
No. 8	45	44
No. 16	36	39
No. 30	28	30
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.6
Pill Bulk Gravity:		2.450
TMD (Rice):		2.553
Avg Air Voids		4.0
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, July 16, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	65
24 Hour Rainfall (in):	0
Lift type:	Lower Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.5
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.3
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	326
Avg Section Compaction:	94.6

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **3**
Sublot: **Upper Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	100
1/2":	84	84
3/8"	72	75
No. 4	53	57
No. 8	45	48
No. 16	36	42
No. 30	28	33
No. 50	15	20
No. 100	8	11
No. 200	5.0	6.7
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.441
TMD (Rice):		2.571
Avg Air Voids		5.1
Avg VMA:		16

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 17, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Upper Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.5
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	346
Avg Section Compaction:	93.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **3**
Sublot: **Lower Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	93
1/2":	84	84
3/8"	72	74
No. 4	53	53
No. 8	45	43
No. 16	36	35
No. 30	28	24
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.496
TMD (Rice):		2.575
Avg Air Voids		3.1
Avg VMA:		13

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 21, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.4
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.7
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	329
Avg Section Compaction:	93.7

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: N
Section: 3
Sublot: Upper Binder

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	72
No. 4	53	51
No. 8	45	43
No. 16	36	37
No. 30	28	29
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.469
TMD (Rice):		2.590
Avg Air Voids		4.7
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	320
Avg Section Compaction:	93.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **3**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	80
No. 8	62	63
No. 16	47	51
No. 30	34	38
No. 50	19	21
No. 100	11	12
No. 200	5.0	6.6
Asphalt Content:	6.3	6.1
Pill Bulk Gravity:		2.347
TMD (Rice):		2.488
Avg Air Voids		5.7
Avg VMA:		17

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.2
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	325
Avg Section Compaction:	92.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **4**
Sublot: **Lower Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	88
1/2":	84	77
3/8"	72	66
No. 4	53	49
No. 8	45	42
No. 16	36	36
No. 30	28	28
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	4.5	4.4
Pill Bulk Gravity:		2.456
TMD (Rice):		2.571
Avg Air Voids		4.5
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, July 16, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	65
24 Hour Rainfall (in):	0
Lift type:	Lower Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.5
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	336
Avg Section Compaction:	92.7

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **4**
Sublot: **Upper Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	79
3/8"	72	66
No. 4	53	49
No. 8	45	43
No. 16	36	36
No. 30	28	26
No. 50	15	14
No. 100	8	8
No. 200	5.0	5.5
Asphalt Content:	4.5	4.7
Pill Bulk Gravity:		2.480
TMD (Rice):		2.557
Avg Air Voids		3.0
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 17, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Upper Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.6
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	340
Avg Section Compaction:	92.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **4**
Sublot: **Lower Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	71
No. 4	53	51
No. 8	45	42
No. 16	36	34
No. 30	28	24
No. 50	15	13
No. 100	8	7
No. 200	5.0	5.1
Asphalt Content:	4.5	4.4
Pill Bulk Gravity:		2.482
TMD (Rice):		2.568
Avg Air Voids		3.3
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 21, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.4
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.3
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	326
Avg Section Compaction:	93.2

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **4**
Sublot: **Upper Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	72
No. 4	53	52
No. 8	45	44
No. 16	36	37
No. 30	28	28
No. 50	15	15
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.451
TMD (Rice):		2.571
Avg Air Voids		4.7
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.7
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	304
Avg Section Compaction:	92.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **4**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	81
No. 8	62	61
No. 16	47	49
No. 30	34	37
No. 50	19	21
No. 100	11	12
No. 200	5.0	6.7
Asphalt Content:	6.3	6.1
Pill Bulk Gravity:		2.356
TMD (Rice):		2.494
Avg Air Voids		5.5
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 28, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	347
Avg Section Compaction:	93.4

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **5**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	79
3/8"	72	66
No. 4	53	49
No. 8	45	43
No. 16	36	36
No. 30	28	26
No. 50	15	14
No. 100	8	8
No. 200	5.0	5.5
Asphalt Content:	4.5	4.7
Pill Bulk Gravity:		2.473
TMD (Rice):		2.557
Avg Air Voids		3.3
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 17, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.6
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	343
Avg Section Compaction:	93.2

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: N
Section: 5
Sublot: Lower Binder

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	71
No. 4	53	51
No. 8	45	42
No. 16	36	34
No. 30	28	24
No. 50	15	13
No. 100	8	7
No. 200	5.0	5.1
Asphalt Content:	4.5	4.4
Pill Bulk Gravity:		2.490
TMD (Rice):		2.568
Avg Air Voids		3.0
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 21, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.4
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	324
Avg Section Compaction:	92.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **5**
Sublot: **Upper Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	82
3/8"	72	72
No. 4	53	52
No. 8	45	44
No. 16	36	37
No. 30	28	28
No. 50	15	15
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	4.5	4.3
Pill Bulk Gravity:		2.461
TMD (Rice):		2.571
Avg Air Voids		4.3
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.2
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	306
Avg Section Compaction:	92.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **5**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	81
No. 8	62	61
No. 16	47	49
No. 30	34	37
No. 50	19	21
No. 100	11	12
No. 200	5.0	6.7
Asphalt Content:	6.3	6.1
Pill Bulk Gravity:		2.358
TMD (Rice):		2.494
Avg Air Voids		5.5
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, July 28, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	0.9
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	342
Avg Section Compaction:	93.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **6**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	90
1/2":	84	78
3/8"	72	71
No. 4	53	53
No. 8	45	44
No. 16	36	36
No. 30	28	27
No. 50	15	15
No. 100	8	9
No. 200	5.0	5.7
Asphalt Content:	4.5	5.0
Pill Bulk Gravity:		2.483
TMD (Rice):		2.558
Avg Air Voids		2.9
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, July 18, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.5
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.6
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	325
Avg Section Compaction:	96.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **6**
Sublot: **Lower Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	96
1/2":	84	85
3/8"	72	74
No. 4	53	52
No. 8	45	43
No. 16	36	35
No. 30	28	24
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.481
TMD (Rice):		2.561
Avg Air Voids		3.1
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.2
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	318
Avg Section Compaction:	93.4

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **6**
Sublot: **Upper Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	93
1/2":	84	82
3/8"	72	71
No. 4	53	52
No. 8	45	45
No. 16	36	39
No. 30	28	30
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.7
Asphalt Content:	4.5	4.6
Pill Bulk Gravity:		2.451
TMD (Rice):		2.577
Avg Air Voids		4.9
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.3
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	318
Avg Section Compaction:	94.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **6**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Grn/Lms/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	83	81
No. 8	62	62
No. 16	47	50
No. 30	34	37
No. 50	19	21
No. 100	11	12
No. 200	5.0	6.8
Asphalt Content:	6.3	6.2
Pill Bulk Gravity:		2.356
TMD (Rice):		2.480
Avg Air Voids		5.0
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 29, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
89 Columbus Granite	24.0
8910 Opelika Limestone	27.0
M10 Columbus Granite	30.0
Shorter Coarse Sand	19.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	317
Avg Section Compaction:	93.7

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **7**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	90
1/2":	84	78
3/8"	72	71
No. 4	53	83
No. 8	45	44
No. 16	36	36
No. 30	28	27
No. 50	15	15
No. 100	8	9
No. 200	5.0	5.7
Asphalt Content:	4.5	5.0
Pill Bulk Gravity:		2.485
TMD (Rice):		2.558
Avg Air Voids		2.9
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, July 18, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.5
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.7
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	328
Avg Section Compaction:	95.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **7**
Sublot: **Lower Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	96
1/2":	84	85
3/8"	72	74
No. 4	53	52
No. 8	45	43
No. 16	36	35
No. 30	28	24
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.482
TMD (Rice):		2.561
Avg Air Voids		3.1
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	310
Avg Section Compaction:	93.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **7**
Sublot: **Upper Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	93
1/2":	84	82
3/8"	72	71
No. 4	53	52
No. 8	45	45
No. 16	36	39
No. 30	28	30
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.7
Asphalt Content:	4.5	4.6
Pill Bulk Gravity:		2.459
TMD (Rice):		2.577
Avg Air Voids		4.6
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.3
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	326
Avg Section Compaction:	94.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **7**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 blows
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Granite
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	53	49
No. 8	25	24
No. 16	19	20
No. 30	16	17
No. 50	14	14
No. 100	11	12
No. 200	9.0	9.2
Asphalt Content:	6.1	6.2
Pill Bulk Gravity:		2.261
TMD (Rice):		2.438
Avg Air Voids		7.3
Avg VMA:		21

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, July 30, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.0
89 Columbus Granite	77.0
M10 Columbus Granite	17.0
Boral Flyash	6.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	337
Avg Section Compaction:	93.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **8**
Sublot: **Base**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyra (rich)
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	92
1/2":	84	83
3/8"	72	73
No. 4	53	54
No. 8	45	45
No. 16	36	37
No. 30	28	26
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.5
Asphalt Content:	5.0	5.2
Pill Bulk Gravity:		2.509
TMD (Rice):		2.558
Avg Air Voids		1.9
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, July 18, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0
Lift type:	Base
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	5.0
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.9
Type of Tack Coat Utilized:	NA
Target Tack Application Rate (gal/sy):	
Avg Temperature In Truck (F):	328
Avg Section Compaction:	93.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: N
Section: 8
Sublot: Lower Binder

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	96
1/2":	84	85
3/8"	72	74
No. 4	53	52
No. 8	45	43
No. 16	36	35
No. 30	28	24
No. 50	15	14
No. 100	8	9
No. 200	5.0	5.6
Asphalt Content:	4.5	4.5
Pill Bulk Gravity:		2.494
TMD (Rice):		2.561
Avg Air Voids		2.6
Avg VMA:		13

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, July 22, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.12
Lift type:	Lower Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.9
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	313
Avg Section Compaction:	93.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **8**
Sublot: **Upper Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	80 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Lms/Grn/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	94	93
1/2":	84	82
3/8"	72	71
No. 4	53	52
No. 8	45	45
No. 16	36	39
No. 30	28	30
No. 50	15	16
No. 100	8	9
No. 200	5.0	5.7
Asphalt Content:	4.5	4.6
Pill Bulk Gravity:		2.453
TMD (Rice):		2.577
Avg Air Voids		4.8
Avg VMA:		15

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 24, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	62
24 Hour Rainfall (in):	0
Lift type:	Upper Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.3
78 Opelika Limestone	33.0
57 Opelika Limestone	22.0
M10 Columbus Granite	25.0
Shorter Coarse Sand	20.0

Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	331
Avg Section Compaction:	93.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **8**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 blows
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Granite
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	99	100
No. 4	53	49
No. 8	25	24
No. 16	19	20
No. 30	16	17
No. 50	14	14
No. 100	11	12
No. 200	9.0	9.2
Asphalt Content:	6.1	6.2
Pill Bulk Gravity:		2.269
TMD (Rice):		2.437
Avg Air Voids		6.9
Avg VMA:		21

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, July 30, 2003
24 Hour High Temperature (F):	86
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.0
89 Columbus Granite	77.0
M10 Columbus Granite	17.0
Boral Flyash	6.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.1
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	339
Avg Section Compaction:	93.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **9**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Limestone
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	80	85
No. 4	30	32
No. 8	16	15
No. 16	13	11
No. 30	12	10
No. 50	12	10
No. 100	11	9
No. 200	9.0	8.2
Asphalt Content:	6.5	6.2
Pill Bulk Gravity:		2.303
TMD (Rice):		2.446
Avg Air Voids		5.8
Avg VMA:		18

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, July 31, 2003
24 Hour High Temperature (F):	88
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.04
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.4
1/2 D3 Reed Springs Limestone	63.0
Missouri Manufactured Sand	25.0
3/4 D1 Reed Springs Limestone	8.5
Genevieve Mineral Filler	3.5
Approximate Length (ft):	197
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	326
Avg Section Compaction:	95.2

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **9**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Limestone
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	97
3/8"	80	83
No. 4	30	37
No. 8	16	17
No. 16	13	13
No. 30	12	12
No. 50	12	11
No. 100	11	10
No. 200	9.0	8.6
Asphalt Content:	6.5	6.6
Pill Bulk Gravity:		2.317
TMD (Rice):		2.439
Avg Air Voids		5.0
Avg VMA:		17

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 22, 2003
24 Hour High Temperature (F):	88
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.5
1/2 D3 Reed Springs Limestone	65.3
Missouri Manufactured Sand	30.7
Genevieve Mineral Filler	4.0
Approximate Length (ft):	160
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	325
Avg Section Compaction:	95.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **10**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Lms/Chert
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	90	94
3/8"	78	84
No. 4	20	27
No. 8	19	18
No. 16	16	15
No. 30	14	13
No. 50	12	12
No. 100	11	11
No. 200	8.0	10.2
Asphalt Content:	6.4	6.3
Pill Bulk Gravity:		2.290
TMD (Rice):		2.442
Avg Air Voids		6.2
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 01, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	69
24 Hour Rainfall (in):	0.17
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.5
1/2 D1 Girerdea Limestone	50.5
3/4 D1 Girerdea Limestone	12.8
Fenton Gravel Sand	13.2
Cape Girerdea Sand	14.5
Genevieve Mineral Filler	9.0
Approximate Length (ft):	206
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	337
Avg Section Compaction:	97.5

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **10**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Lms/Chert
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	90	95
3/8"	78	87
No. 4	20	30
No. 8	19	21
No. 16	16	17
No. 30	14	15
No. 50	12	14
No. 100	11	13
No. 200	8.0	11.5
Asphalt Content:	6.4	6.2
Pill Bulk Gravity:		2.349
TMD (Rice):		2.454
Avg Air Voids		4.3
Avg VMA:		17

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 22, 2003
24 Hour High Temperature (F):	88
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.5
1/2 D1 Girerdea Limestone	50.5
3/4 D1 Girerdea Limestone	10.3
Fenton Gravel Sand	13.2
Cape Girerdea Sand	16.0
Genevieve Mineral Filler	10.0
Approximate Length (ft):	246
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	334
Avg Section Compaction:	95.6

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **13**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Granite
Gradation Type:	TRZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	99	100
1/2":	76	80
3/8"	64	68
No. 4	39	42
No. 8	25	29
No. 16	19	24
No. 30	15	20
No. 50	9	14
No. 100	5	9
No. 200	3.0	5.3
Asphalt Content:	4.3	4.3
Pill Bulk Gravity:		2.424
TMD (Rice):		2.501
Avg Air Voids		3.1
Avg VMA:		11

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, August 06, 2003
24 Hour High Temperature (F):	85
24 Hour Low Temperature (F):	67
24 Hour Rainfall (in):	0.05
Lift type:	Binder
Planned Mill / Lift Thickness (in):	1.8

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.2
6M Liberty Granite	35.6
789 Liberty Granite	44.6
Liberty Manufactured Sand	10.9
Liberty Regular Screenings	7.9
Hydrated Lime	1.0
Approximate Length (ft):	199
Survey Mill / Lift Thickness (in):	1.5
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.07
Avg Temperature In Truck (F):	325
Avg Section Compaction:	93.9

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **N**
Section: **13**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Granite
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	97	95
3/8"	67	71
No. 4	27	32
No. 8	19	21
No. 16	16	18
No. 30	14	16
No. 50	14	15
No. 100	13	14
No. 200	11.0	12.1
Asphalt Content:	5.9	5.9
Pill Bulk Gravity:		2.324
TMD (Rice):		2.393
Avg Air Voids		2.9
Avg VMA:		16

Construction Diary

Relevant Conditions for Construction

Completion Date:	Tuesday, August 19, 2003
24 Hour High Temperature (F):	87
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0.03
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.8

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	5.6
7M Cayce Granite	73.0
89M Cayce Granite	10.0
Cayce Regular Screenings	8.0
Boral Flyash	8.0
Hydrated Lime	1.0
Approximate Length (ft):	199
Survey Mill / Lift Thickness (in):	1.7
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.07
Avg Temperature In Truck (F):	353
Avg Section Compaction:	94.6

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: W
Section: 2
Sublot: Binder

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Porph/Lms
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	92	89
3/8"	56	57
No. 4	24	23
No. 8	18	18
No. 16	15	15
No. 30	13	13
No. 50	12	12
No. 100	11	11
No. 200	9.0	10.0
Asphalt Content:	6.4	6.6
Pill Bulk Gravity:		2.287
TMD (Rice):		2.407
Avg Air Voids		5.0
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, August 04, 2003
24 Hour High Temperature (F):	87
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0.27
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	7.0
3/4 D1 Oakville Limestone	38.0
3/4 Iron Mountain 284 Porphyry	30.1
3/4 Iron Mountain 426 Porphyry	22.4
Genevieve Mineral Filler	9.5
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	310
Avg Section Compaction:	97.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: W
Section: 2
Sublot: Surface

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	75 gyrations
Binder Performance Grade:	70-22
Modifier Type:	SBS
Aggregate Type:	Porph/Lms
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	92	88
3/8"	56	54
No. 4	24	22
No. 8	18	17
No. 16	15	14
No. 30	13	13
No. 50	12	12
No. 100	11	11
No. 200	9.0	9.7
Asphalt Content:	6.4	6.1
Pill Bulk Gravity:		2.293
TMD (Rice):		2.414
Avg Air Voids		5.0
Avg VMA:		19

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, August 04, 2003
24 Hour High Temperature (F):	87
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0.27
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	7.0
3/4 D1 Oakville Limestone	38.0
3/4 Iron Mountain 284 Porphyry	30.1
3/4 Iron Mountain 426 Porphyry	22.4
Genevieve Mineral Filler	9.5
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	2.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	333
Avg Section Compaction:	96.8

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
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3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: W
Section: 3
Sublot: Surface

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	50 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Limestone
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	100	100
No. 4	67	79
No. 8	42	51
No. 16		39
No. 30	24	29
No. 50		21
No. 100	12	14
No. 200	6.0	8.7
Asphalt Content:	6.3	6.2
Pill Bulk Gravity:		2.337
TMD (Rice):		2.403
Avg Air Voids		2.7
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, August 07, 2003
24 Hour High Temperature (F):	85
24 Hour Low Temperature (F):	68
24 Hour Rainfall (in):	0.29
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.3

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
789 Goretown Limestone	62.0
Goretown Regular Screenings	30.0
Goretown Washed Screenings	7.0
Hydrated Lime	1.0
Approximate Length (ft):	205
Survey Mill / Lift Thickness (in):	1.3
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	335
Avg Section Compaction:	92.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
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3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **W**
Section: **6**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/Grv/Snd
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	100	100
No. 4	99	98
No. 8	72	75
No. 16	43	50
No. 30	30	35
No. 50	18	22
No. 100	11	15
No. 200	8.0	11.3
Asphalt Content:	7.5	6.1
Pill Bulk Gravity:		2.314
TMD (Rice):		2.411
Avg Air Voids		4.0
Avg VMA:		16

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, August 21, 2003
24 Hour High Temperature (F):	88
24 Hour Low Temperature (F):	68
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	0.8

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.5
Cherokee Limestone	69.3
Guntown Crushed Gravel	18.8
Mississippi Natural Sand	10.9
Hydrated Lime	1.0
Approximate Length (ft):	203
Survey Mill / Lift Thickness (in):	0.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	310
Avg Section Compaction:	92.2

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
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4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **W**
Section: **8**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Proprietary
Compactive Effort:	100 gyrations
Binder Performance Grade:	70-28
Modifier Type:	SB
Aggregate Type:	Granite
Gradation Type:	OGFC

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	94	96
No. 4	37	40
No. 8	26	25
No. 16	19	19
No. 30	14	15
No. 50	11	13
No. 100	6	10
No. 200	4.0	7.5
Asphalt Content:	5.0	4.7
Pill Bulk Gravity:		2.549
TMD (Rice):		2.687
Avg Air Voids		
Avg VMA:		16

Construction Diary

Relevant Conditions for Construction

Completion Date:	Saturday, August 23, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	66
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	5.0
3/8 Chip Pineville Granite	72.0
Pineville Dry Screenings	18.0
Pineville Washed Screenings	10.0

Approximate Length (ft):	197
Survey Mill / Lift Thickness (in):	1.3
Type of Tack Coat Utilized:	CRS-2p
Target Tack Application Rate (gal/sy):	0.2
Avg Temperature In Truck (F):	340
Avg Section Compaction:	

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **W**
Section: **9**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Granite
Gradation Type:	ARZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	100	100
3/8"	97	98
No. 4	82	83
No. 8	60	61
No. 16	38	43
No. 30	28	32
No. 50	19	23
No. 100	11	15
No. 200	5.0	7.5
Asphalt Content:	6.3	5.8
Pill Bulk Gravity:		2.541
TMD (Rice):		2.643
Avg Air Voids		3.9
Avg VMA:		18

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, August 21, 2003
24 Hour High Temperature (F):	88
24 Hour Low Temperature (F):	68
24 Hour Rainfall (in):	0
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.3
78M Pineville Granite	23.0
Pineville Washed Screenings	77.0

Approximate Length (ft):	203
Survey Mill / Lift Thickness (in):	1.0
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	315
Avg Section Compaction:	93.4

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: S
Section: 1
Sublot: Binder

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	100 gyrations
Binder Performance Grade:	67-22
Modifier Type:	NA
Aggregate Type:	Granite
Gradation Type:	TRZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	99	100
1/2":	76	81
3/8"	64	68
No. 4	39	43
No. 8	25	31
No. 16	19	25
No. 30	15	21
No. 50	9	15
No. 100	5	10
No. 200	3.0	5.9
Asphalt Content:	4.3	4.9
Pill Bulk Gravity:		2.446
TMD (Rice):		2.491
Avg Air Voids		1.8
Avg VMA:		12

Construction Diary

Relevant Conditions for Construction

Completion Date:	Monday, August 18, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Binder
Planned Mill / Lift Thickness (in):	1.8

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	4.6
6M Liberty Granite	35.6
789 Liberty Granite	44.6
Liberty Manufactured Sand	10.9
Liberty Regular Screenings	7.9
Hydrated Lime	1.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.6
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.07
Avg Temperature In Truck (F):	325
Avg Section Compaction:	95.7

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **S**
Section: **1**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Granite
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	99
1/2":	95	92
3/8"	70	74
No. 4	28	33
No. 8	22	25
No. 16		24
No. 30	17	22
No. 50		19
No. 100	14	16
No. 200	12.0	13.0
Asphalt Content:	4.9	5.1
Pill Bulk Gravity:		2.394
TMD (Rice):		2.444
Avg Air Voids		2.0
Avg VMA:		16

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, August 20, 2003
24 Hour High Temperature (F):	91
24 Hour Low Temperature (F):	68
24 Hour Rainfall (in):	0.11
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.8

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	5.2
780(1/2) Liberty Granite	70.0
6M Liberty Granite	12.0
Liberty Regular Screenings	8.0
Boral Flyash	9.0
Hydrated Lime	1.0
Approximate Length (ft):	200
Survey Mill / Lift Thickness (in):	1.7
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.07
Avg Temperature In Truck (F):	345
Avg Section Compaction:	95.6

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **S**
Section: **4**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	75 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Lms/RAP
Gradation Type:	TRZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	92	90
1/2":	71	68
3/8"	58	56
No. 4	40	33
No. 8	28	25
No. 16	21	22
No. 30	18	19
No. 50	10	11
No. 100	6	6
No. 200	4.0	4.4
Asphalt Content:	4.2	4.3
Pill Bulk Gravity:		2.450
TMD (Rice):		2.532
Avg Air Voids		3.2
Avg VMA:		13

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, August 14, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Binder
Planned Mill / Lift Thickness (in):	3.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	3.6
57 Algood Limestone	35.0
7 Algood Limestone	23.0
10 Algood Limestone	20.0
Monterey Natural Sand	12.0
Algood RAP	10.0
Approximate Length (ft):	198
Survey Mill / Lift Thickness (in):	2.5
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	338
Avg Section Compaction:	96.3

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: S
Section: 4
Sublot: Surface

Laboratory Diary

General Description of Mix and Materials

Design Method:	OGFC
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Limestone
Gradation Type:	OGFC

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	97	95
3/8"	74	78
No. 4	18	19
No. 8	5	5
No. 16	2	3
No. 30	2	3
No. 50	2	2
No. 100	2	2
No. 200	2.0	1.6
Asphalt Content:	6.0	5.8
Pill Bulk Gravity:		
TMD (Rice):		2.442
Avg Air Voids		
Avg VMA:		

Construction Diary

Relevant Conditions for Construction

Completion Date:	Friday, August 15, 2003
24 Hour High Temperature (F):	90
24 Hour Low Temperature (F):	70
24 Hour Rainfall (in):	0.02
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.0
7 Dickson Limestone	90.0
8 Danley Limestone	10.0

Approximate Length (ft):	198
Survey Mill / Lift Thickness (in):	1.3
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	320
Avg Section Compaction:	

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **S**
Section: **5**
Sublot: **Surface**

Laboratory Diary

General Description of Mix and Materials

Design Method:	Superpave
Compactive Effort:	75 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Grv/Lms/Snd
Gradation Type:	TRZ

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	96	96
3/8"	87	87
No. 4	68	66
No. 8	45	43
No. 16	33	30
No. 30	22	21
No. 50	10	10
No. 100	7	7
No. 200	5.0	5.5
Asphalt Content:	5.5	5.6
Pill Bulk Gravity:		2.323
TMD (Rice):		2.392
Avg Air Voids		2.9
Avg VMA:		14

Construction Diary

Relevant Conditions for Construction

Completion Date:	Thursday, August 14, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.01
Lift type:	Surface
Planned Mill / Lift Thickness (in):	1.5

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	5.5
1/2 Arlington Crushed Gravel	56.0
10 Memphis Limestone Screening	25.0
Arlington Natural Sand	19.0

Approximate Length (ft):	203
Survey Mill / Lift Thickness (in):	1.7
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	325
Avg Section Compaction:	93.1

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: **E**
Section: **1**
Sublot: **Binder**

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Limestone
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	95	94
3/8"	75	75
No. 4	32	36
No. 8	22	22
No. 16	16	16
No. 30	12	13
No. 50	11	12
No. 100	10	11
No. 200	9.0	9.6
Asphalt Content:	6.2	6.5
Pill Bulk Gravity:		2.229
TMD (Rice):		2.375
Avg Air Voids		6.1
Avg VMA:		18

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, August 13, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.23
Lift type:	Binder
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
7 Rinker Limestone	70.0
10 Rinker Limestone Screenings	15.0
8 Danley Limestone	10.0
Boral Flyash	5.0
Approximate Length (ft):	199
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	310
Avg Section Compaction:	97.0

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Quadrant: E
Section: 1
Sublot: Surface

Laboratory Diary

General Description of Mix and Materials

Design Method:	SMA
Compactive Effort:	50 gyrations
Binder Performance Grade:	76-22
Modifier Type:	SBS
Aggregate Type:	Limestone
Gradation Type:	SMA

Avg. Lab Properties of Plant Produced Mix

Sieve Size:	Design	QC:
1":	100	100
3/4":	100	100
1/2":	95	91
3/8"	75	69
No. 4	32	35
No. 8	22	23
No. 16	16	17
No. 30	12	14
No. 50	11	12
No. 100	10	11
No. 200	9.0	10.0
Asphalt Content:	6.2	6.3
Pill Bulk Gravity:		2.266
TMD (Rice):		2.376
Avg Air Voids		4.6
Avg VMA:		17

Construction Diary

Relevant Conditions for Construction

Completion Date:	Wednesday, August 13, 2003
24 Hour High Temperature (F):	89
24 Hour Low Temperature (F):	71
24 Hour Rainfall (in):	0.23
Lift type:	Surface
Planned Mill / Lift Thickness (in):	2.0

Plant Configuration and Placement Details

Component:	% Setting:
Asphalt Content (Plant Setting)	6.2
7 Rinker Limestone	70.0
10 Rinker Limestone Screenings	15.0
8 Danley Limestone	10.0
Boral Flyash	5.0
Approximate Length (ft):	199
Survey Mill / Lift Thickness (in):	1.8
Type of Tack Coat Utilized:	PG67-22
Target Tack Application Rate (gal/sy):	0.03
Avg Temperature In Truck (F):	340
Avg Section Compaction:	96.4

General Notes:

1) Mixes are referenced by quadrant (E=East, N=North, W=West, and S=South), section number (sequential) and sublot;
2) Sections are listed in the order they appear on the Track beginning with E2 and continuing counterclockwise to E1;
3) The total research thickness of all rutting study sections ranges from 3/4 to 4 inches by design;
4) The total HMA thickness of all structural study sections (N1 through N8) ranges from 5 to 9 inches by design;
5) ARZ, TRZ, and BRZ refer to gradations intended to pass above, through and below the restricted zone, respectively;
6) SMA and OGFC refer to stone matrix asphalt and open-graded friction course, respectively.

Appendix B

Section Descriptions and Initial Data

Track Quad	Section Num	Year Placed	Top Lift Agg Blend Type	Design Method	Design NMA	Grad Type	Binder Grade	Binder Modifier	Lift Type	Tot Des Thick	Survey Thick	IRI_{ini} (in/mile)	MTD_{ini} (mm)
E	**2**	**2003**	**Marine Limestone**	**Super**	**12.50**	**ARZ**	**67-22**	**NA**	**Dual**	**4.00**	**3.9**	**58.4**	**0.15**
E	**3**	**2003**	**Marine Limestone**	**Super**	**12.50**	**ARZ**	**76-22**	**SBS**	**Dual**	**4.00**	**4.0**	**58.8**	**0.16**
E	4	2000	Granite	Super	12.50	BRZ	76-22	SBS	Dual	4.00	4.1	46.0	0.64
E	5	2000	Granite	Super	12.50	TRZ	76-22	SBS	Dual	4.00	4.2	63.9	0.57
E	6	2000	Granite	Super	12.50	TRZ	67-22	NA	Dual	4.00	4.2	43.4	0.57
E	7	2000	Granite	Super	12.50	TRZ	76-22	SBR	Dual	4.00	4.2	50.2	0.67
E	8	2000	Granite	Super	12.50	ARZ	67-22	NA	Dual	4.00	4.2	40.0	0.39
E	9	2000	Granite	Super	12.50	ARZ	76-22	SBS	Dual	4.00	4.1	71.0	0.44
N	**1**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**76-22**	**SBS**	**Struc**	**5.00**	**4.8**	**57.0**	**0.17**
N	**2**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**67-22**	**NA**	**Struc**	**5.00**	**4.9**	**56.4**	**0.13**
N	**3**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**67-22**	**NA**	**Struc**	**9.00**	**9.1**	**35.1**	**0.15**
N	**4**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**76-22**	**SBS**	**Struc**	**9.00**	**8.9**	**48.4**	**0.09**
N	**5**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**76-22**	**SBS**	**Struc**	**7.00**	**7.0**	**59.3**	**0.12**
N	**6**	**2003**	**Grn/Lms/Sand**	**Super**	**9.50**	**ARZ**	**67-22**	**NA**	**Struc**	**7.00**	**7.1**	**51.9**	**0.14**
N	**7**	**2003**	**Granite**	**SMA**	**9.50**	**SMA**	**76-22**	**SBS**	**Struc**	**7.00**	**7.1**	**43.7**	**0.40**
N	**8**	**2003**	**Granite**	**SMA**	**9.50**	**SMA**	**76-22**	**SBS**	**Struc**	**7.00**	**7.0**	**41.5**	**0.46**
N	**9**	**2003**	**Lms/Chert**	**SMA**	**12.50**	**SMA**	**70-22**	**SBS**	**Dual**	**4.00**	**3.5**	**97.1**	**0.80**
N	**10**	**2003**	**Lms/Gravel**	**SMA**	**12.50**	**SMA**	**70-22**	**SBS**	**Dual**	**4.00**	**3.7**	**49.7**	**0.97**
N	11	2000	Granite	Super	12.50	TRZ	76-22	SBS	Multi	4.00	4.1	39.4	0.77
N	12	2000	Granite	SMA	12.50	SMA	76-22	SBS	Multi	4.00	3.9	48.8	1.00
N	**13**	**2003**	**Granite**	**SMA**	**12.50**	**SMA**	**76-22**	**SBS**	**Multi**	**3.50**	**3.1**	**55.0**	**1.12**
W	1	2000	Granite	SMA	12.50	SMA	76-22	SBR	Dual	4.00	3.9	52.5	1.00
W	**2**	**2003**	**Porph/Lms**	**SMA**	**12.50**	**SMA**	**70-22**	**SBS**	**Dual**	**4.00**	**3.6**	**66.1**	**1.07**
W	**3**	**2003**	**Limestone**	**Super**	**9.50**	**ARZ**	**67-22**	**NA**	**Multi**	**1.25**	**1.4**	**60.6**	**0.32**
W	4	2000	Granite	OGFC	12.50	OGFC	76-22	SBR	Multi	4.00	4.1	51.5	1.40
W	5	2000	Granite	OGFC	12.50	OGFC	76-22	SBS	Multi	4.00	4.3	52.5	1.43
W	**6**	**2003**	**Lms/Grv/Sand**	**Super**	**4.75**	**ARZ**	**76-22**	**SBS**	**Multi**	**0.75**	**0.8**	**75.0**	**0.20**
W	7	2002	Granite	OGFC	12.50	OGFC	76-22	SB	Multi	0.60	NA	95.8	1.11
W	**8**	**2003**	**Granite**	**OGFC**	**9.50**	**OGFC**	**70-28**	**SB**	**Multi**	**1.00**	**1.2**	**182.4**	**1.09**
W	**9**	**2003**	**Granite**	**Super**	**9.50**	**ARZ**	**67-22**	**NA**	**Multi**	**1.00**	**1.0**	**46.7**	**0.22**
W	10	2000	Gravel	Super	12.50	BRZ	76-22	SBR	Dual	4.00	3.9	164.7	0.81
S	**1**	**2003**	**Granite**	**SMA**	**12.50**	**SMA**	**76-22**	**SBS**	**Multi**	**3.50**	**3.3**	**86.9**	**0.58**
S	2	2000	Gravel	Super	9.50	BRZ	76-22	SBS	Multi	4.00	3.9	55.8	0.43
S	3	2000	Lms/Gravel	Super	9.50	BRZ	76-22	SBS	Multi	4.00	4.0	38.2	0.46
S	**4**	**2003**	**Limestone**	**OGFC**	**12.50**	**OGFC**	**76-22**	**SBS**	**Multi**	**4.00**	**3.9**	**54.8**	**1.06**
S	**5**	**2003**	**Grv/Lms/Sand**	**Super**	**12.50**	**TRZ**	**76-22**	**SBS**	**Multi**	**1.50**	**1.6**	**50.6**	**0.32**
S	6	2000	Lms/RAP	Super	12.50	ARZ	67-22	NA	Dual	4.00	4.1	65.0	0.27
S	7	2000	Lms/RAP	Super	12.50	BRZ	67-22	NA	Dual	4.00	4.0	40.2	0.28
S	8	2000	Marble-Schist	Super	12.50	BRZ	76-22	SBS	Multi	3.60	3.8	65.6	0.62
S	9	2000	Granite	Super	12.50	BRZ	67-22	NA	Dual	3.00	3.0	31.0	0.68
S	10	2000	Granite	Super	12.50	ARZ	67-22	NA	Dual	3.00	3.1	41.8	0.44
S	11	2000	Marble-Schist	Super	9.50	BRZ	76-22	SBS	Multi	3.60	3.6	76.5	0.51
S	12	2000	Limestone	Hveem	12.50	TRZ	70-28	SB	Dual	4.00	3.8	74.6	0.41
S	13	2000	Granite	Super	12.50	ARZ	70-28	SB	Dual	4.00	4.0	130.6	0.38
E	**1**	**2003**	**Limestone**	**SMA**	**12.50**	**SMA**	**76-22**	**SBS**	**Dual**	**4.00**	**3.6**	**81.9**	**1.10**

Notes: - Mixes are listed counterclockwise beginning with section E2 (sections replaced in 2003 are presented in bold type).
- "Dual" lift type indicates that the upper and lower lifts were constructed with the same mix.
- "Struc" lift type indicates that the section is part of a structural experiment composed of numerous layers.
- "Multi" lift type indicates that the upper and lower lifts were constructed with different mixes.
- ARZ, TRZ, and BRZ refer to gradations intended to pass above, through, and below the restricted zone, respectively
- SMA and OGFC refer to stone matrix asphalt and open-graded friction course mixes, respectively.