EVALUATION OF ASPHALT BINDERS

CONSTRUCTION REPORT

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16. ABSTRACT

In August, 1995, The Oklahoma Department of Transportation (ODOT) completed construction on ODOT Project Number NH-186(190). Briefly, this project consisted of milling and resurfacing a 10.9 km (6.8 mi) long section of U.S. 69. Pavement placed under NH-186(190) included 102 mm (4 in) of Type "A" asphalt concrete (AC) and 51 mm (2 in) of Type "B" AC surface. The surface course contained test sections of AC with various asphalt cement binders. Field performance of the various binders is intended to be evaluated and compared.

0.8 km (0.5 mi) long test sections of AC surface were placed. Binders used in the test sections were AC-20 (viscosity grade) asphalt cement modified with Type I-D Polymer, AC-20 asphalt cement with Type II-C Polymer, and AC-20 with III-Polymer. In other test sections, binders used were AC-20 asphalt cement modified with Type I-D Polymer and mixed with 25 percent recycled asphalt, unmodified AC-30, and unmodified AC-40.

Combinations of fabric reinforcement were also used. Strip membrane was applied over transverse depression cracks, and full-width fabric reinforcement was applied over the traffic lanes. In 0.8 km (0.5 mi) test sections, Strip membrane was applied without full-width fabric, full-width fabric was used without strip membrane, and in one section, neither strip membrane or full-width fabric was used.

Various problems have occurred since NH-186(190) began. The project was not completed until fall, 1995. Substandard aggregate was used, resulting in aggregate breaking and crushing in the pavement surface, with large amounts of aggregate in the surface lost to ravelling. These conditions made it necessary to overlay one lane of the Southbound Expressway. The other expressway will likely be overlaid soon. The binder sections to be evaluated were located in the surface course, and it is unlikely that they can be evaluated accurately.

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INTRODUCTION

The Oklahoma Department of Transportation (ODOT) is conducting a field performance evaluation of selected asphalt binders on U.S. 69 between Checotah and Eufaula (Figure 1). The evaluation includes sections of asphalt modified by polymers Type I-D, II-C, and III-C. Also included are section where unmodified AC-20 AC-20 with 25 percent recycled asphalt, unmodified AC-30, and unmodified AC-40 are used as the binder.

The evaluation is being done on the surface course of a newly rehabilitated asphalt concrete roadway. The surface is ODOT's Type "B" asphalt concrete gradation. 0.8 km (0.5 mi) test sections of asphalt concrete where modified asphalt cements Type I-D, II-C, and III-C make up the binders

are included. The evaluation also includes test sections of the same length where the Type "B" surface has the following binders; unmodified AC-20, AC-20 with 25 percent recycled asphalt, AC-30 and AC-40.

In addition to the various asphalt binders, the roadway includes sections where patched cracks are covered with strip membrane, with and without full width fabric reinforcement in the driving lanes, with strip membrane only (no full-width fabric), full-width fabric only, and a section with neither strip membrane or full width fabric.

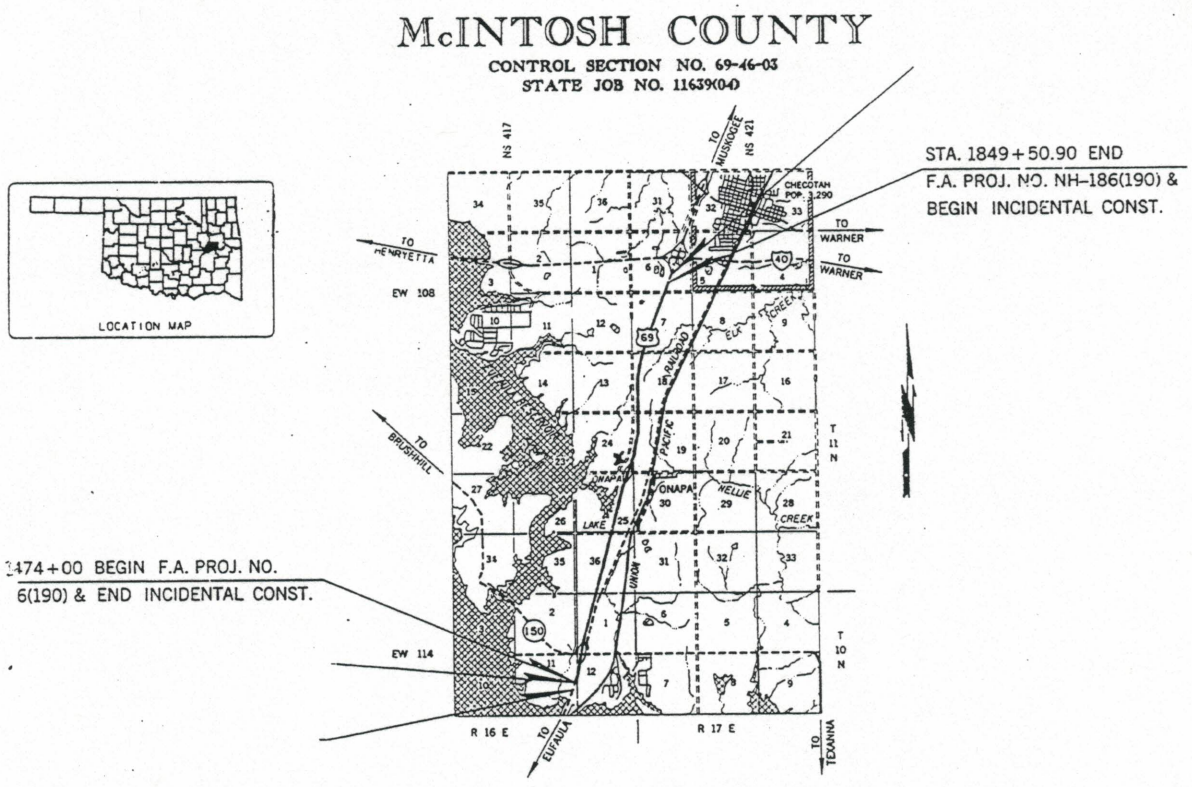


Figure 1. Project NH-186(190) Location.

EXISTING ROADWAY, BEFORE NH-186(190)

U.S. 69, in the project area, is a divided four-lane highway with an ADT of 11,000 (1994 figures). U.S. 69 is a major north-south route in Eastern Oklahoma. Trucks make up 29 percent of the traffic in the project area.

This section of roadway was originally constructed to replace parts of U.S. 69 which were routed through the City of Eufaula (now U.S. 69B). Construction was done under ODOT Project F-186(89), completed in September, 1974, and (unknown proj. No.), completed in 1976.

Original construction consisted of a 51 mm (2 in) Type "B" asphalt concrete surface on a 152 mm (6 in) Type "A" asphalt concrete (AC) layer. The AC layers were placed over a 0.6 m (24 in) lime treated (2 percent lime) subgrade.

In 1981, the entire project area was overlaid under Project SAP-46(121). 76 mm (3 in) of Type "B" asphalt was laid over the existing surface.

There has been considerable maintenance activity on this project area. In many areas, lane (3.6 m or 12 ft) wide patches have been placed. Length of these patches varies from 91 m (300 ft) to over 0.8 km (0.5 mi). In other areas, the full expressway width has been patched. Depth of the one and two lane-wide patches is approximately 19 mm (3/4 in).

Cores drilled before construction were 11.5 to 12 in, which approximates the depth from historical information available.

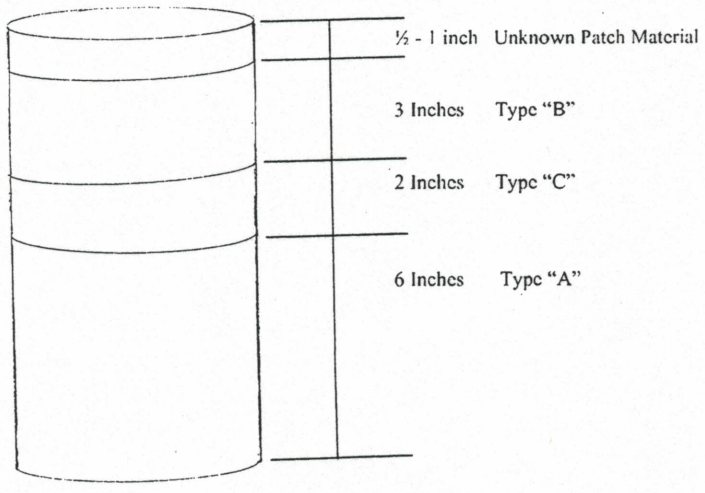


Figure 2. Diagram of Existing Asphalt Layers, Prior to NH-186(190) Construction.

Project NH-186(190) provided a much-needed rehabilitation to this section of U.S. 69. The entire project area had rutting, with rut depths varying from 8 mm (0.3 in) to 46 mm (1.8 in). At the north end of the southbound expressway, corrugations had formed in the bottom of the ruts. Rut depths, measured on June 3, 1994 (before NH-186(190) construction) are graphed in Figure 3, and listed in Appendix "B".

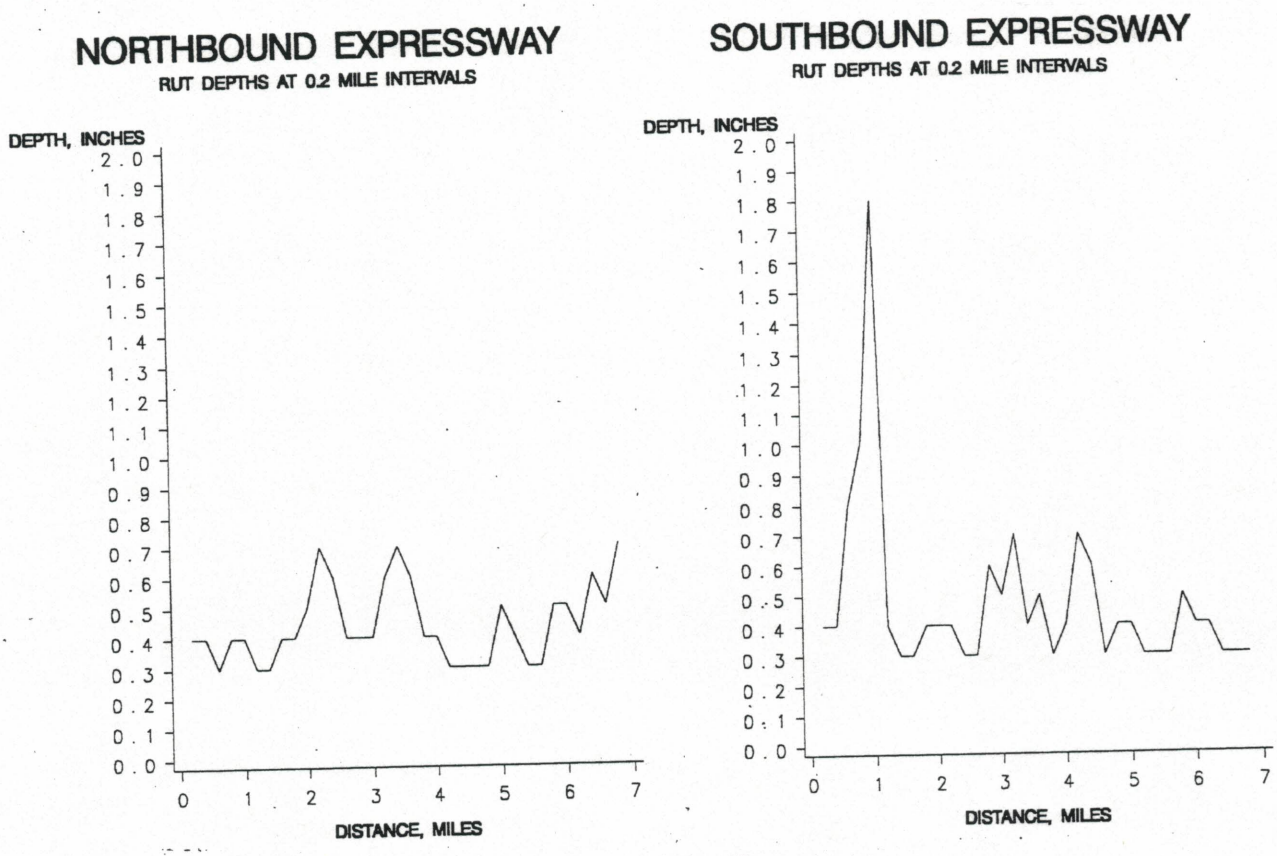


Figure 3. Rut Depths, Measured in Direction of Traffic.

Cracking was also a considerable problem before NH-186(190) Transverse cracks had developed throughout the project area, with spacing between the cracks varying from 15 to 30 m (50 to 100 ft). The transverse cracks were 25 to 50 mm (1 to 2 in) wide at the surface. ODOT Maintenance Forces had attempted to keep the cracks sealed. Crack sealing had been done with CRS-2, and in many of the cracks, CRS-2 had accumulated over time. Some of the CRS-2 had not cured, leaving the tops of many of the wider cracks, forming reservoirs of soft, viscous material which made crack patching difficult during construction (Figure 4). All of the full width transverse cracks had formed depressions extending 0.3 to 0.6 m (1 to 2 ft) on each side of the crack. These depressions were deepest adjacent to the crack. Depression depths ranged from 50 to 125 mm (2 to 5 in) Figure 5 shows this condition. Some of the rutted areas had longitudinal cracks in the bottom of the ruts. Other areas had random and block cracking. In places where cracks intersected, sections of pavement or patching material (whichever made up the surface) often spalled out, leaving "holes in the pavement (Figure 6).

All of the factors described above combined to create an extremely rough ride. ODOT's "Condition Rating For Flexible Pavements" (Appendix B) is a composite of roadway condition regarding cracking, distortion, ravelling, surface roughness, and base failure, if any. Condition rating before NH-186(190) construction was 62 percent (poor).

Figure 4. Uncured CRS-2 in Cracks.

Figure 5. Typical Depressed Transverse Crack.

Figure 6. Area at Intersection of Cracks with Surface Pavement Layer Spalled Away.

PROJECT NH-186(190)

NH-186(190) was a rehabilitation project summarized as follows. 51 mm (2 in) of the existing surface was removed by coldmilling (Figure 7). A retrofit edge drain (Figure 8) was installed on one edge of each expressway, over the full project length. Cracks 25 mm (1 in) or more wide were patched, then strip membrane was applied over them. A 102 mm (4 in) base of Type "A" asphalt concrete was placed over the milled surface after crack patching and strip membrane application. Fabric reinforcement was applied over the Type "A" base in the traffic lanes, and a 51 mm (2 in) layer of Type "B" asphalt concrete was placed to form the surface. Each of these operations are discussed in greater detail below. The experimental asphalt binder sections were part of the surface course. The Southbound Expressway contained three different polymer modified binders in three experimental sections. The three different asphalt binders were contained in the Northbound Expressway surface course. The project also contained sections with strip membrane over patched cracks with and without fabric reinforcement, and a section with no strip membrane or fabric reinforcement. With the exception of the fabric reinforecment combinations and experimental asphalt binder sections there was no difference in construction operations between the two expressways.
Fabric application and surface course laydown operations are discussed separately, by expressway. All other operations were similar for both expressways.

COLDMILLING

Coldmilling (Figure 7) was done to a depth of approximately 51 mm (2 in). Ruts, depression cracks, and other surface irregularities in the existing roadway made milling to a uniform depth impossible. Milling was done to depth necessary to provide a smooth grade after it was complete. Employees of the subcontractor doing the miling, and ODOT field personnel kept the depth as close as possible to 51 mm (2 in), although actual depth was slightly greater or less than 51 mm (2 in) at most locations.

EDGE DRAIN INSTALLATION

On this project, edge drains were installed onto an existing roadway. Briefly, edge drain installation operations consisted of the following. Excavating a 0.3 m (1 ft) wide trench, then placing separator fabric to line it as shown in Figure 8. 10 mm (4 in) diameter edge drain conduit was placed in the center of the trench bottom, and the trench was filled with aggregate. Trench depth was generally 0.6 m (2 ft), although depth was variable as shown in plan details. Details regarding edge drain installation are included in Figure 8.

Figure 7. Coldmilling, Project NH-186(190)

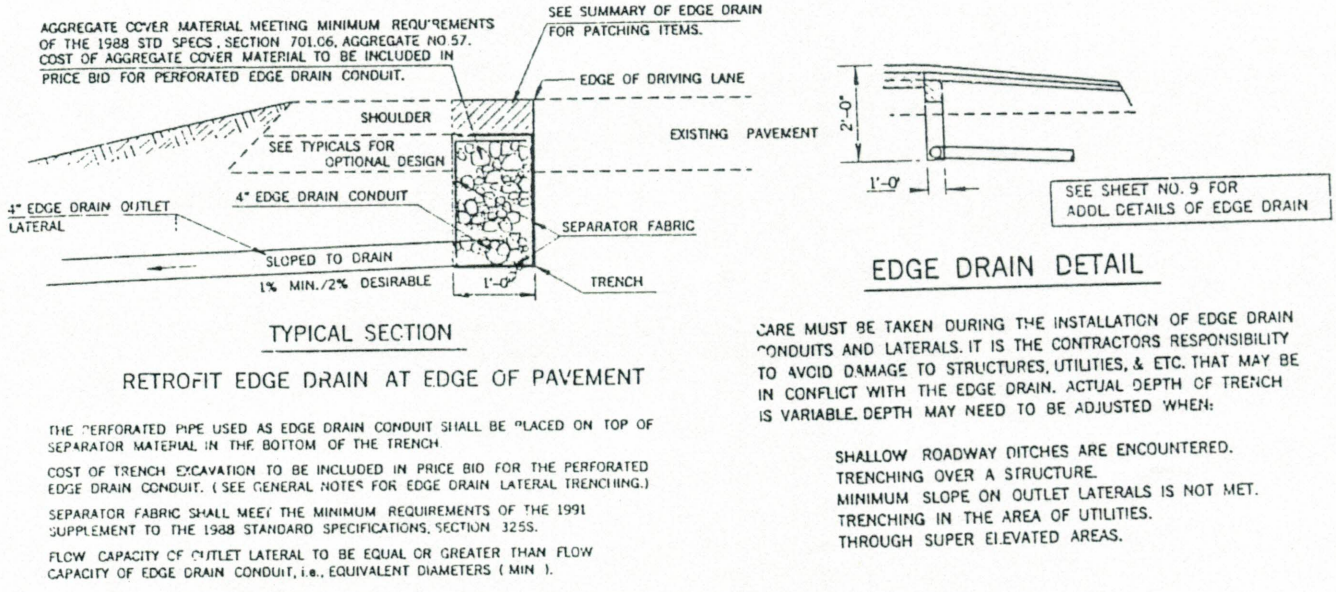


Figure 8. Retrofit Edge Drain, Project NH-186(190)

CRACK PATCHING

Crack patching was done after coldmilling and edge drain installation. The plans required that strip membrane be placed over all cracks with surface widths of 25 mm (1 in) or greater. Cracks of this size were to be widened by routering, and cleaned of dust and other residue with compressed air. Following cleaning, they were to be filled with Type "A" microsurfacing. Once the cracks had been routered, cleaned, and filled, the strip membrane was to be applied over them.

Routering the top 102 mm (4 in) and cleaning cracks was to be done by a subcontractor. Once these operations began, it was discovered that the routering operation was very difficult to carry out with the (rental) equipment available to the subcontractor. Most of the cracks with widths requiring routering were the transverse depression cracks described earlier. ODOT maintenance forces had attempted to seal these, and other larger cracks with CRS-2. They had been doing this for several years, and CRS-2 had accumulated in the cracks. Much of the CRS-2 had not cured, and small reservoirs of it had formed in each crack, with the surface of the uncured CRS-2 nearly level with the milled roadway surface.

When employees of the subcontractor doing the crack treatment attempted to router the cracks (Figure 9), the built up CRS-2 made it difficult to see the crack edges as the crack meandered across the roadway. Also, the CRS-2 stuck to router bits, making it difficult to distinguish crack edges. Plans required cracks be routered to a depth of 102 mm (4 in). The subcontractor doing the work was only able to get a small number of bits long enough to router to that depth (127 mm or 5 in bits). The bits they had broke regularly. After all of the bits in the small stock they had when work began had broken, additional bits had to be fabricated by a local machine shop. Each time the bits on hand broke, the routering operation stopped until more bits could be fabricated.

The routering, cleaning, and patching operation began on August 29, 1994. By September 16, it was decided that enough cracks had been routered, so that the router crew could expect to stay ahead of the crack patching crew. On that date, the patching crew began filling the cracks with the Type "A" microsurfacing. When the patching crew completed filling cracks, the microsurfacing was flush with the milled roadway surface. By September 19, 1994, ODOT field personnel, contractor's and subcontractor's employees noticed that microsurfacing in most of the patched cracks had dropped down into the crack so that the top of the microsurfacing was now approximately 12 mm (1/2 in) below the milled roadway surface (Figure 10).

At this point, crack repair operations were halted. After a meeting on this problem, the contractor and ODOT field personnel agreed that other methods of crack cleaning and patching would be substituted for those shown on the plans. The new method was to consist of patching with a "modified Type asphalt concrete" (ODOT's Type "B" without the 19 mm (3/4 in) and 12 mm (1/2 in) aggregate). It was also decided that no more crack routering was to be done before patching. Cracks would be cleaned with compressed air, then patched. Patching consisted of placing the modified "B" mix in the crack and making a small mound of "B" mix over it, then rolling the material into the crack with a 15-ton roller (Figure 11). This method proved to be

more successful than that on the plans (material in the cracks stayed flush with the surface), and the new method was much faster than that planned. Where the micro surfacing had sunk into the CRS-2 in the cracks, the new method was used to bring patch surfaces up to grade. Cracks on the remainder of the project were patched in this manner also.

Figure 9. Routering Cracks.

Figure 10. Microsurfacing Patch Which has Dropped into Crack.

Figure 11. Rolling "Modified Type "B" Mix Used as Crack Patch Material.

APPLICATION OF STRIP MEMBRANE

The strip membrane applied over the patched cracks was Phillips Pro-Guard, manufactured by Phillips fibers division. Descriptive literature on Pro-Guard, supplied by the manufacturer, is included in Appendix "C".

Application of the Pro-Guard over the patched cracks, described below, began on September 26, 1994. After cleaning the patched crack surfaces with a hand broom, they were further cleaned with compressed air. Strips of Pro-Guard were cut to roadway width, and laid on the milled roadway upside down, parellel to the crack to which they would be applied, 3 to 4 feet from it. AC-20, at temperatures of 350 to 375 degrees F, was sprayed on the surface of the crack where the Pro-Guard was to be applied (Figure 12). The AC-20 was sprayed in a strip approximately 1 m (3 ft) wide (1 ½ feet each side of the crack). The heated AC-20 was also sprayed on the bottom of the Pro-Guard strip. When the bottom of the Pro-Guard and the suface along the top of the crack were both covered with AC-20, employees with insulated, gauntlet-type gloves flipped the Pro-Guard over, applying them on the crack surface. The contractor's employees then pressed the strips down with their feet (Figure 13), to insure that the entire strip was in contact with the AC-20. The AC-20 set up within five minutes, leaving the Pro-Guard securely fastened to the surface over the crack. Figure 14 shows Pro-Guard strips after application. Strip membrane was applied over the cracks on the entire project with the exception of a section located between stations 1800 + 60 and 1825 +00, Southbound Expressway, where strip membrane was omitted and a section between 1823 + 10 and 1849 + 50.90, Northbound expressway where neither strip membrane or full-width fabric was applied (Figure 17).

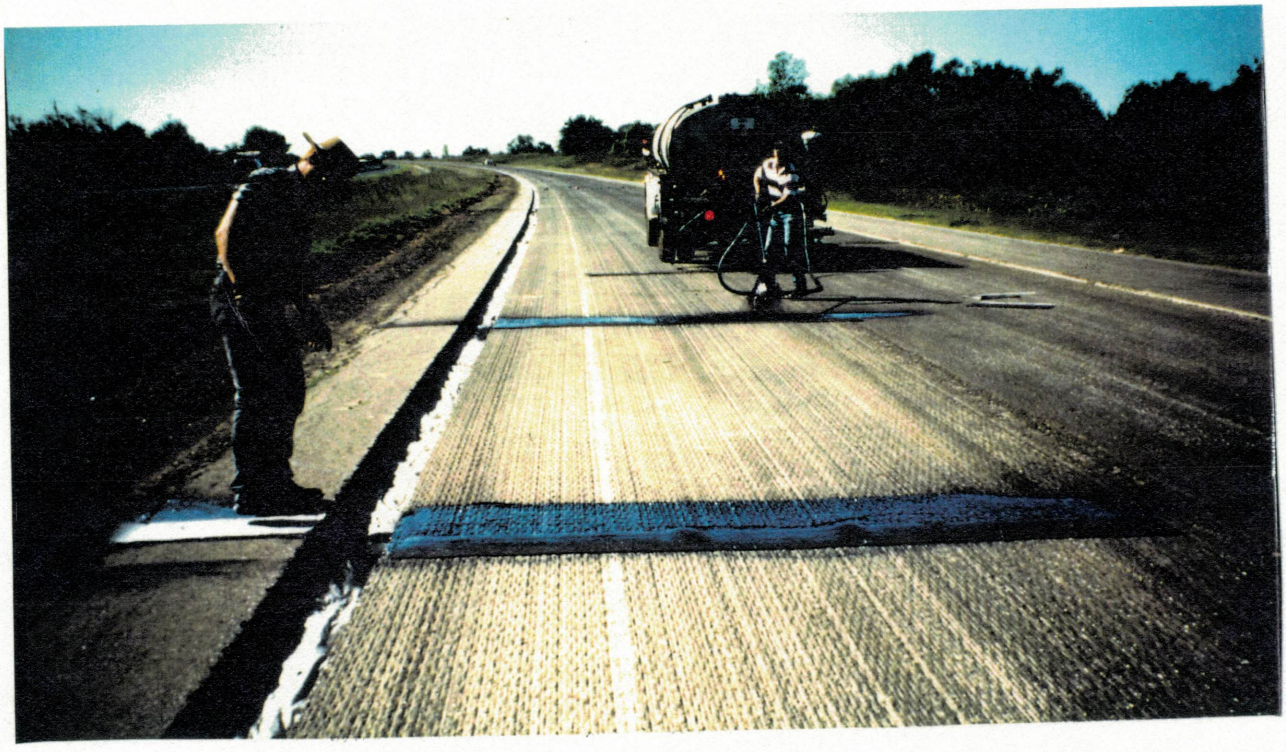


Figure 12. AC-20 on Roadway Before Pro-Guard Application.

Figure 13. Pressing Pro-Guard into AC-20.

Figure 14. Pro-Guard After Application.

PLACING TYPE "A" AC BASE

When cracks with widths 25 mm (1 in) or greater had been patched, and Pro-Guard applied over them, the 102 mm (4 in) thich Type "A" base was laid. The base was placed in two 51 mm (2 in) thick lifts. Before laydown operations on the Southbound Expressway began, the contractor laid a two inch thick , 12 ft wide, 250 long test strip of This mix. The test strip did not meet stability aspects of ODOT Specification 708.04. The material not passing was removed. The second trial batch did meet all requirements. Placement of the Type "A" base (first lift) began on August 3, and was completed by September 15, 1994 in the Southbound Expressway. The Type "A" base in the Northbound was laid from May 2 to 17, 1995.

PLACING FULL WIDTH FABRIC REINFORCEMENT

Amoco Petromat fabric reinforcement was applied over the Type "A" base over the traffic lanes of the entire project with two exceptions. Between stations1823 +10 and 1849 + 50, Northbound expressway, no fabric or strip membrane was used. In the sections from station 1825 + 00 to 1849 +50.90, Southbound Expressway and station 1496 + 40 to 1577 +25, Northbound Expressway, strip membrane was applied without full width fabric. Fabric and strip membrane locations are shown in Figure 17.

Fabric was applied in accordance with ODOT specifications 420.01 - 420.06 and 712.01 (Appendix A). Prior to application, tack was applied at an (average) rate of 0.1 L /0.84 m (0.21 gal/sy) No unusual problems were encountered during fabric placement. A three man crew, using

a tractor- mounted roller, (Figure 15) did the fabric application for the entire project. Except for construction vehicles, no traffic ran on the fabric between application and laydown of the Type "B" surface over the fabric.

A 50 m (164 ft) long section of Bitutex fabric (Figure 16) was substituted for Petromat between stations 1825 +00 and 1823 + 36, in the outside (west) lane, Southbound Expressway. Bitutex is a new reinforcing fabric. Bitutex differs from fabrics now in general use by ODOT, in that it has a polyester gridwork on one side of the fabric. The gridwork provides increased strength, and may enhance field performance. The gridwork also makes Bitutex easier to apply, since it keeps it from wrinkling, as other fabrics often do during placement. Appendix A includes manufacturer's literature describing bitutex.

Figure 15. Full width fabric application.

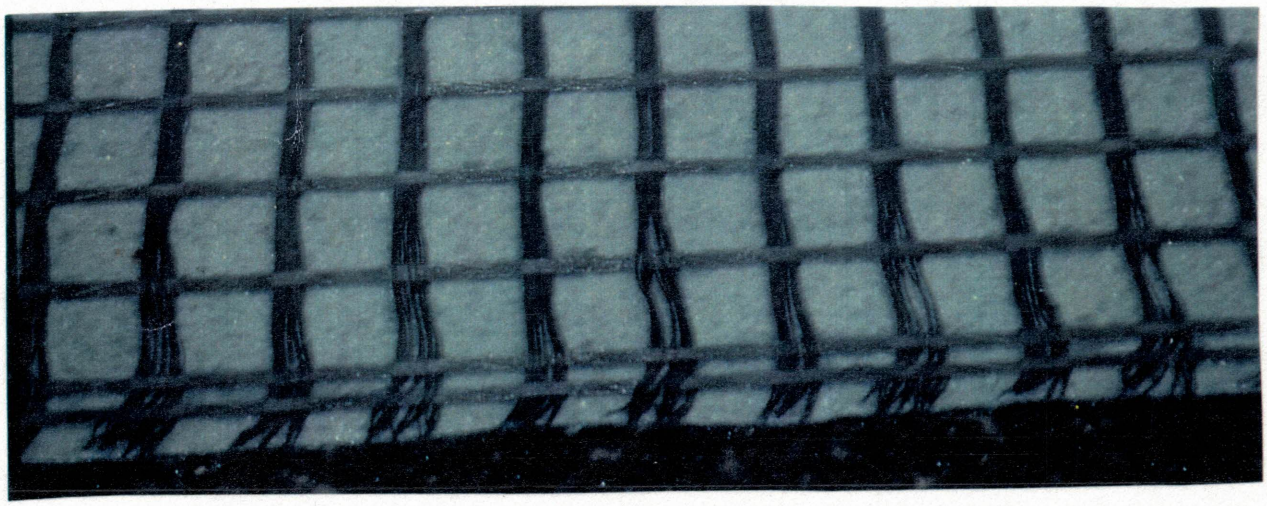
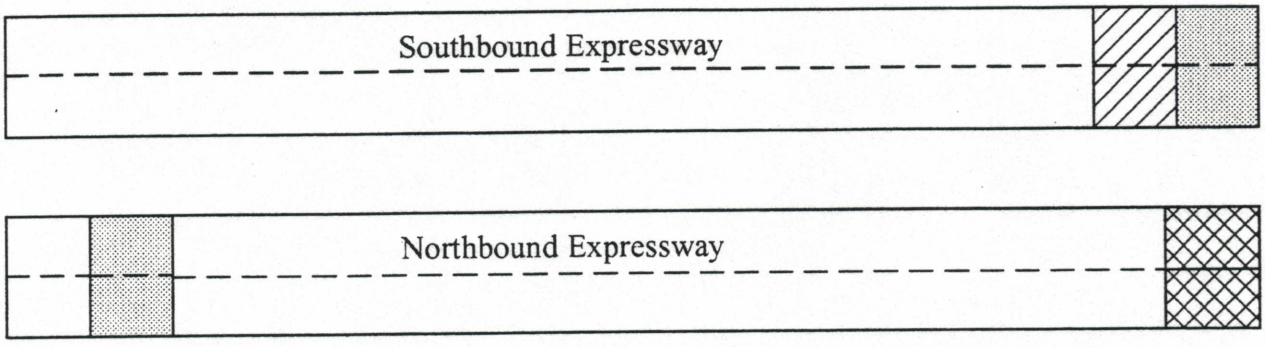


Figure 16. Bitutex Fabric after installation.



Symbol	Fabric	Test Section Location (Station and Expressway)
	Strip Membrane and Full-width Fabric.	1474 + 00 - 1800 +60, Souththbound Expressway and 1474 + 00 - 1495 + 38.88 and 1577 + 25 - 1823 + 10, Northbound Expressway
	Strip membrane only (No Full width fabric)	1825 + 00 - 1849 + 50.90, Southbound Expressway and 1495 + 38.88 - 1577 + 25, Northbound Expressway
	Full-width Fabric only (No Strip Membrane)	1800 +60 - 1825 + 00,* Southbound Expressway
	No Strip Membrane or Full- width Fabric.	1823 + 10 - 1849 + 50.90, Norththbound Expressway

* Includes Bitutex Section located station 1823 + 36 - 1825 + 00, Outside (West) Lane only, Southbound (Left) Expressway.

Figure 17. Strip Membrane and Full Width Fabric Reinforcement Locations.

TYPE "B" SURFACE, SOUTHBOUND EXPRESSWAY

The Type "B" surface course of the Southbound Expressway contained the three polymer modified asphalt concrete being evaluated . These were located as shown in Figure 16.

All of the modified asphalt binders were produced by Koch Materials Corporation, Stroud , Oklahoma. John Wingo of Koch Materials observed the laydown of all three of the modified asphalt sections.

Type I-D Modified Asphalt Binder.

Type I polymer modified asphalt is based on properties of conventional asphalt after modifiication with styrene block copolymers. The type used here was styrene butadiene styrene. Type I-D asphalt binder was substituted for the unmodified AC-20 shown on the plans by change order through the ODOT Construction Residency handling the inspection and contract administration on NH-186(190). Due to this change, there is no unmodified AC-20 control section on The Southbound Expressway, as planned.

Thickness of the Type "B" surface was 51 mm (2 in). The surface was laid in one lift.

Laydown of the surface course began on October 22, 1994. Work began in the section beginning at the north end of the project (Station 1849 + 50.90) in the left (west) lane of the left (southbound) expressway. All asphalt laydown operations on this project were done with belly dump trucks delivering asphalt mix to the roadway and dumping it in winrows in front of the laydown machine. Mix from the winrows was then transferred to the hopper on the laydown machine by a pickup elevator, mounted on the front of the laydown machine.

Trial batches were run before beginning the Type "B" surface. The second batch met ODOT requirements (the first did not meet stability aspects of ODOT Special Provision CA708005 - 708-5(A -D)91S .

Modified binders which have increased viscosity also require a higher temperature range at which the asphalt concrete is mixed (1). Mix temperatures, measured in the winrow and at the screed of the laydown machine were 154 to 168 degrees C (310 to 335 degrees F). This may have been higher than necessary, although Type I asphalt concrete must be at least 280 degrees for breakdown rolling and any hand work. Contractor's employees stated that the Type I asphalt concrete seemed to stick to rakes and shovels slightly more than unmodified mixes, but otherwise handled like unmodified mixes.

Type II-C Modified Asphalt Binder

Type II-C Modified binder was used in the surface mix in the area shown in Figure 17. Many benefits are attributed to asphalt concrete made with Type II-C (Styrene Butadiene Rubber Latex) modified asphalts. These include decreased temperature susceptibility, increased rut resistance, and resistance to stripping (2).

The surface of the left (west) lane, left (southbound) expressway, Type II-c section, was laid October 22, 1994. The surface of the right (east) lane, left (southbound) expressway, in this section, was laid October 23, 1994. As with the other experimental sections, the modified binder was used in a mix with ODOT's Type "B" gradation (Appendix A). No unusual requirements or other difficulties regarding the laydown operation were noted by ODOT Field personnel or Contractor's employees. Mixes containing Type II-C modified binders have essentially the same temperaturee requirements as those modified with I-D polymers. Breakdown rolling, hand work, etc. must be done with temperature 138 degrees C (280 degrees F) or higher. Temperatures during laydown operations on both Obtober 22 and 23 were 163 to 166 degrees C (325 to 330 degrees F), measured by ODOT project inspector and RDTT. Temperature was measured in the winrow and the augers of the laydown machine with a non-contact thermometer.

Type III-D Modified Asphalt Binder

Modifiication of asphalt cement with Type III-D (ethylene vinyl acetate) improves four essential properties of the binder. These are cohesion, temperature susceptibility, rheological behavior, and adhesion(3).

Laydown operations for the Type III-D modified section were the same as for the other two polymer modified asphalt sections. All operations involving working of the mix must be done at temperatures of 138 degrees C (280 degrees F) or higher. Temperatures measured in the winrow and augers of the laydown machine were 154 to 166 degrees C (310 to 330 degrees F).

As with the two previously discussed polymer modified asphalt sections, no unusual observations or situations were noted. While they were within the specified limits, temperatures of all three mixes with polymer modified binders were higher than necessary.

TYPE "B" SURFACE, NORTHBOUND EXPRESSWAY

The Northbound Expressway contained test sections where unmodified asphalt cements AC-30, AC-40, and AC-20 containing 25 percent recycled asphalt were used as binders. As in the Southbound Expressway, the remainder of the surface consisted of asphalt concrete with AC-20, modified with I-D polymer as the binder. Locations of these test sections are shown in Figure 17.

Type I-D Modified Asphalt Binder

Laydown operations for the Southbound Expressway were done between May 25 and June 8, 1995. The sections of the roadway where the binder was AC-20 asphalt cement modified with I-D polymer were laid in a manner similar to that used on sections of the Southbound Expressway which contained this binder. Temperatures measured in the winrow and the augers of the laydown machine were 141 degrees C (285 degrees F) to 157 degrees C (315 degrees F).

Unmodified AC-30 Binder

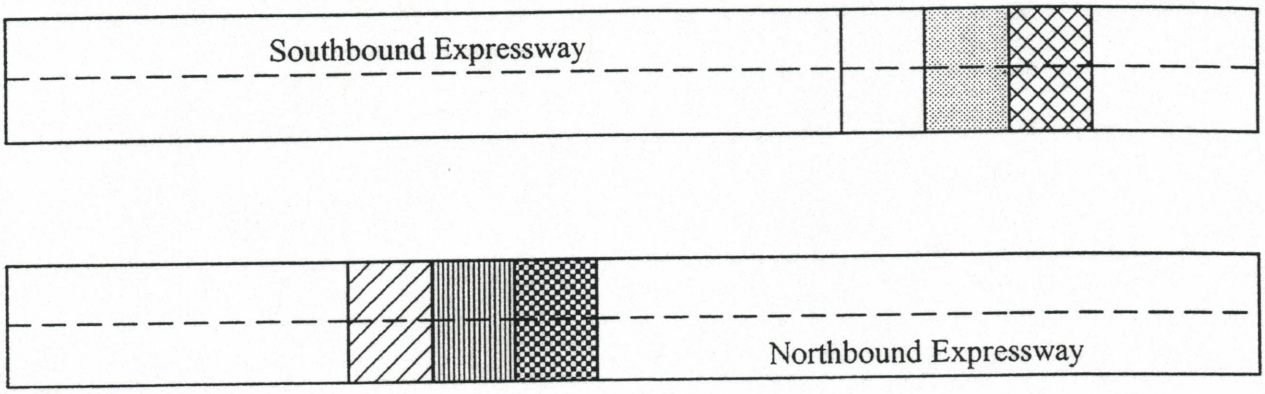
ODOT most commonly uses AC-20 (viscosity grade) asphalt cement as the binder in asphalt pavements. AC-30 is a "stiffer" or more viscous asphalt cement, relative to the commonly used grade. The softer asphalt cement grades are usually used in colder climates (4), and are recommended to produce a mix which is less susceptible to low temperature shrinkage cracking (5). Asphalt concretes produced with AC-30 binder may be more resistant to rutting (relative to softer grade binders). However, other factors such as compaction rolling, asphalt content, etc. may have more effect on this than the binder used.

The surface course containing the AC-30 binder was laid June 3 and 5, 1995. Mix temperature was 149 to 154 degrees C (300 310 degrees F). No problems or unusual conditions were noted during placement of the surface in this section.

Unmodified AC-40 Binder

AC-40 is a "stiffer" or more viscous asphalt cement grade than AC-30. It would also be expected to be increasingly susceptible to low temperature to low temperature shrinkage cracking. Increased resistance to rutting is a possible benefit of the use of this binder, although other factors may affect resistance to rutting more than viscosity grade (5).

The Type "B" surface in this section was laid June 3 and 5, 1995. Surface course laydown operations in the "AC-40 Section" were completed without unusual problems, and no unusual conditions were noted. Mix temperature temperature, measured in the winrow and at the laydown machine augers was 149 to 154 degrees C (300 to 310 degrees F).



Symbol	Binder	Test Section Location (Station and Expressway)
	AC-20, Modified with I-D Polymer.	1721 + 40 - 1747 +80, Southbound Expressway
	AC-20, Modified with II-C Polymer.	1747 + 80 - 1774 + 20, Southbound Expressway
	AC-20, Modified with III-C Polymer.	1774 + 20 - 1800 + 60, Southbound Expressway
	AC-20, Modified with I-D Polymer and Combined with 25 percent Recycled Asphalt.	1580 + 80 - 1607 + 20, Northbound Expressway
	Unmodified AC-30	1607 + 20 - 1633 + 60 Northbound Expressway
	Unmodified AC-40	1633 + 60 - 1660 + 00, Northbound Expressway

Figure 18. Location of Test Sections, Project NH-186(190).

PROBLEMS

SOUTHBOUND EXPRESSWAY

In November, 1994, construction operations on the Southbound Expressway, Project NH-186(190) had been completed. Both directions of traffic had been routed to the Northbound Expressway, with a New Jersey Barrier Wall between them. At that time it was determined that, it would be in the best interests of both ODOT and the contractor if construction operations did not continue through the winter. Both parties agreed that Project time should be suspended until April, 1995. The contractor moved most of his personnel to other locations until April, 1995. In February, 1995, the Southbound Expressway was surveyed by ODOT Research Personnel. The survey was done following reports, from ODOT field personnel, of aggregate ravelling off of the surface course in the driving lanes.

During the survey, it was observed that the loss of aggregate was generally occurring where it (aggregate) was breaking or crushing under traffic. The aggregate which was breaking did not appear capable of passing ODOT's LA Abrasion Test. Following the survey, stockpiles at the contractor's asphalt plant were re-sampled and tested. It was found that the aggregate in them did not meet ODOT's LA Abrasion Specification. Earlier samples, from the same source, had passed this test. Plant stockpiles existing at that time were then removed and replaced with material passing all ODOT requirements. During the February, 1995 surveys, it was noted that some areas of the surface course appeared to be segregated by aggregate size. Larger size rocks in the mix appeared to form longitudinal strips on the surface. Loss of aggregate from the surface continued until July, 1995, when both traffic lanes of the Southbound Expressway were overlaid with 19 mm (3/4 in) of Type "D" Asphalt Concrete. This was done before cores could be taken to determine if the surface course in this expressway was indeed segregated. Because of this, no determination was made on whether the surface course was actually segregated.

When the Type "D" overlay described above was done, some type of leakage (diesel fuel, hydraulic fluid, etc.) Occurred, which deterioration of the overlay in a narrow strip approximately 0.3 m (1 ft) wide, located in the inside wheel path, outside lane. Maintenance Forces patched these failures until April 1, 1996. At that time ODOT Field personnel required the contractor to return. The overlay was coldmilled to a 37 mm (1 1/2 in) depth , and replaced with a 37 mm (1 1/2 in) thick overlay, covering the 3.6 m (12 ft) wide outside (west) lane, from the north end of the project to station 1573 + 00 (north 5.2 miles of the project. This area covers all three of the test sections containing the polymer modified binders.

NORTHBOUND EXPRESSWAY

All aggregate used in asphalt mixes in the Northbound expressway was from stockpiles replaced after the re-sampling referred to above. The aggregate sampled after this met ODOT Specifications, although the margin between test values and the specification limit was small in some cases. Mine chat, which is considerably harder than the aggregate first used, was mixed

with the other aggregate as it was in the Southbound Expressway, with the mine chat making up most of the smaller sizes of aggregate in the mix. Observations from the February 5 and 12, 1996 survey, regarding the Northbound Expressway are described in the following paragraphs. No cracks were observed in any of the sections surfaced with AC-20 binder mixes, including the "AC-20 Recycle Section" (Station 1580 + 80 to 1607 + 20), and the section without fabric reinforcement or strip membrane reinforcement (Station 1823 + 00 to 1849 + 50.90). Cracking was observed in the AC-30 and AC-40 binder sections. This is also described below. Sections with binders of these stiffer grades of asphalt cement were expected to be more prone to cracking than those with AC-20 binder. This was not expected to occur in the short time between completion of this expressway and the time of the survey, however. Observations of the AC-30 and AC-40 Sections were made on February 12, 1996.

AC-30 Binder Section

The 0.8 km (1/2 mi) long AC-30 Section has longitudinal cracking in one wheel path or the other of the outside (east) driving lane, over approximately 60 percent of it's length. The 91 m (300 ft) long crack mapped section (Appendix "B") has relatively more cracking than the rest of the section, with approximately 75 percent of its length cracked. A smaller percent (approximately 10 percent) of this section has longitudinal cracking in both wheel paths. Cracks typical of those in this section on February 12, 1996, are shown in Figure 18.

AC-40 Binder Section

This section also had longitudinal cracks in the wheel paths of the outside lane. Approximately 90 percent of the 0.8 km (1/2 mi) long section has cracking in at least one wheel path, with approximately 75 percent cracked in both wheel paths. The 91 m (300 ft) long crack mapped section had cracking, in at least one wheel path over 100 percent of its length, with approximately 75 percent of the total length cracked in both wheel paths of the outside lane. Figure 19 shows typical cracking in the AC-40 section. The cracked mapped section is included in Appendix "B".

Other Problems

It was noted during the February 12 survey that the entire Northbound Expressway is showing the effects of the marginal aggregate used. The problems beginning to show up in the Northbound Expressway are similar to those noted on the Southbound, before it was overlaid.

Aggregate is ravelling off of the surface course (Figure 20). The aggregate often breaks easily when scraped with a screwdriver. Breaks are generally one of two types. Breaks either along planes, as shale breaks, or the individual rock simply crushes under traffic. A large percentage of the breaks are along a horizontal plane. The broken off portion of the individual rock is then lost, leaving what remains of it in am small "hole" or depression. Some rocks break vertically, along one or more planes. Later, the broken pieces work loose under traffic and are lost. Where these

types of breakage have occurred, they can easily be seen, any of the rock remaining shows up as a gray or white color. Which contrasts with the black binder (Figure 18). Where aggregate is lost, other particles adjacent to it are then unsupported on one side, and are less able to absorb stresses from vehicle tires. The resulting small "holes" tend to fill with water from precipitation which cannot drain off. Where aggregate loss happens to be adjacent to cracking, as in the AC-30 and AC-40 Sections, aggregate tends to spall out of the top edge of the cracks, making the cracking quickly become more severe and likely to crack further in the future.

There appear to be some areas in the surface course which are segregated by aggregate size. The majority of these appear as longitudinal strips, where the larger sizes of aggregate have collected, without the usual smaller sizes and fines between them. All asphalt concrete laid on this project was hauled from the plant to the laydown in belly dump trucks, then dumped in a winrow. A winrow elevator picked up the mix and dropped it into the hopper of the laydown machine. It is possible that larger aggregate could rolled down the sides of the winrow, and collected along the sides. If this, or some similar action occurred, the limited mixing taking place in the hopper and the augers would not be enough to prevent segregation. Any segregation resulting from this type of action would be likely to have the form of longitudinal strips.

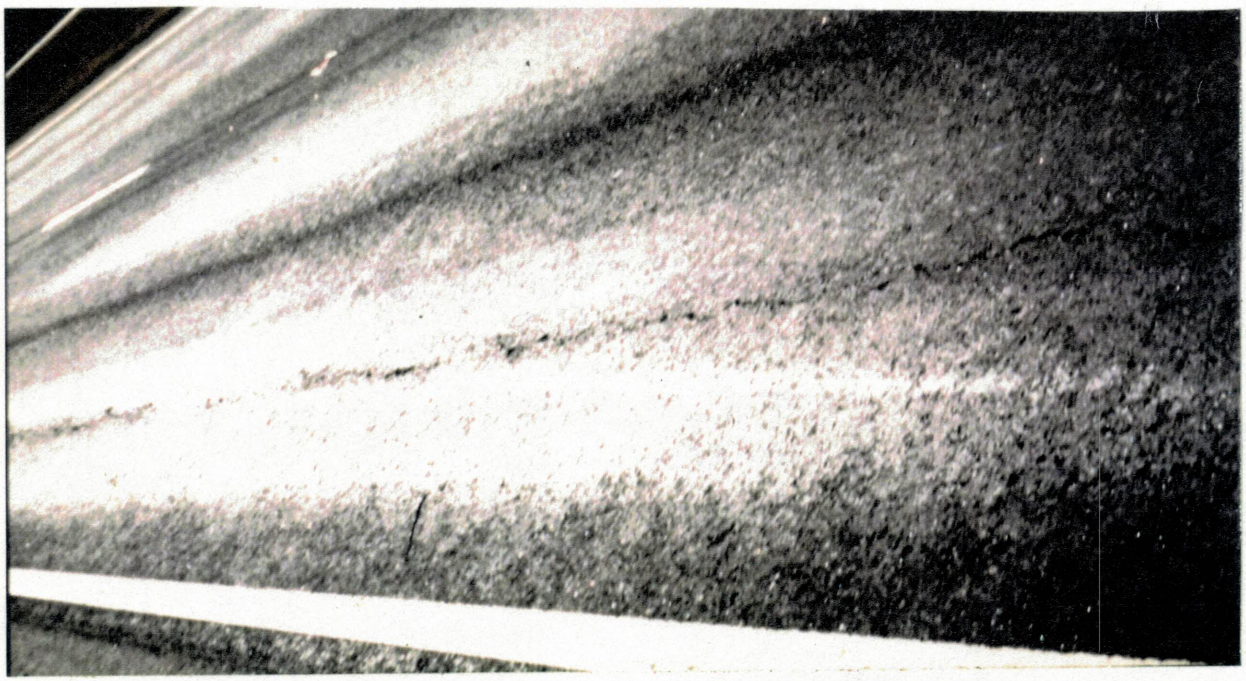
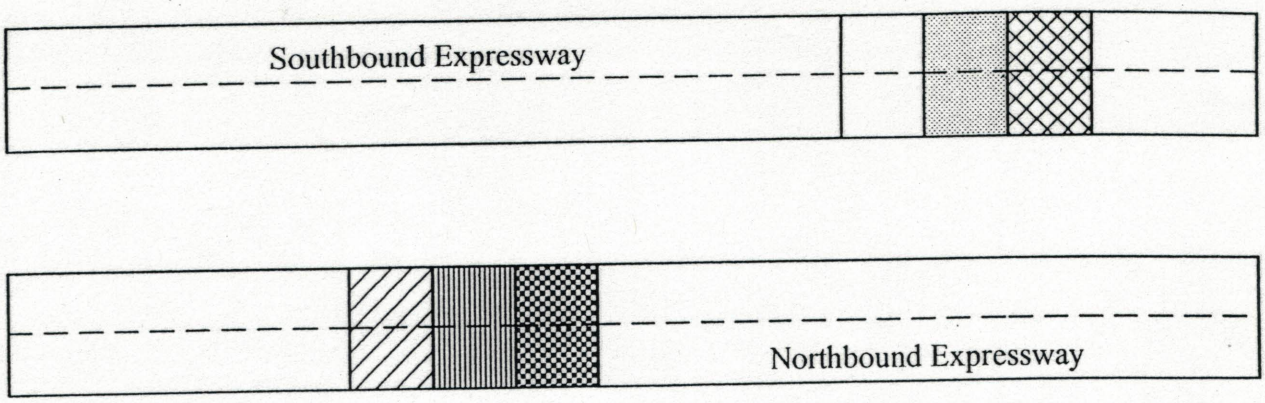


Figure 19. Typical Cracking in AC-30 Section.



Symbol	Binder	Test Section Location (Station and Expressway)
	AC-20, Modified with I-D Polymer.	1721 + 40 - 1747 +80, Southbound Expressway
	AC-20, Modified with II-C Polymer.	1747 + 80 - 1774 + 20, Southbound Expressway
	AC-20, Modified with III-C Polymer.	1774 + 20 - 1800 + 60, Southbound Expressway
	AC-20, Modified with I-D Polymer and Combined with 25 percent Recycled Asphalt.	1580 + 80 - 1607 + 20, Northbound Expressway
	Unmodified AC-30	1607 + 20 - 1633 + 60 Northbound Expressway
	Unmodified AC-40	1633 + 60 - 1660 + 00, Northbound Expressway

Figure 18. Location of Test Sections, Project NH-186(190).

Figure 20. Typical Cracking in AC-40 Section.

Figure 21. Ravelling of Aggregate From Surface Course.

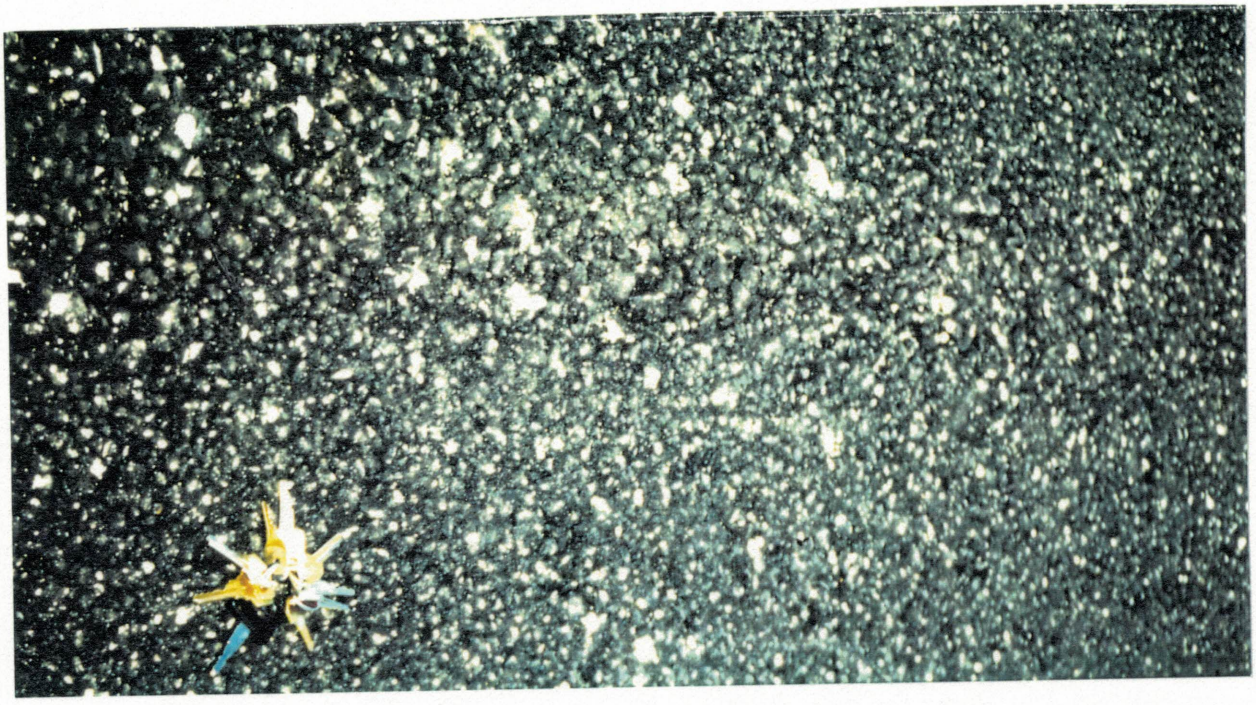


Figure 22. Broken Aggregate in Surface Course.

REFERENCES

1. J.W. Button, Asphalt Additives in Thick Hot Mixed Asphalt Concrete Pavements. Research Report 187-18, Texas transportation Institute, Texas A & M University, College Station, 1991.

2. E.R. Brown, Frazier Parker, Jr., and Michael R. Smith. Study of the Effectiveness of Styrene-Butadiene-Rubber Latex in Hot Mix Asphalt Mixes, Transportation Research Record 1342.

3. Maurice Vivier, Bernard Brule, Committee on Characteristics of Bituminous Materials. Benefits of Polymer-Modified Asphalt, Transportation Research Record 1342.

4. Thickness Design, Asphalt Pavements for Heavey Wheel Loads. Asphalt Institute Manual Series Number 23, First Edition, 1986.

5. Mix Design Methods for Asphalt Concrete and Other Hot - Mix Types. Asphalt Institute Manual Series Number 2, Sixth Edition, 1993.

APPENDIX A

ODOT AND MANUFACTURER'S

SPECIFICATIONS AND SPECIAL PROVISIONS

O K L A H O M A D O T
BAMS/PES - PROPOSAL AND ESTIMATION SYSTEM

SPECIAL PROVISIONS TEXT

CA708005 - 708-5(A-D)91S POLYMER MODIFIED ASPHALT CEMENT

708-5(a-d) 91S
12-12-90
rev. 6-24-91
rev. 7-8-92

These Special Provisions revise, amend, and where in conflict, supersede applicable subsections of Section 708 of the Standard Specifications for Highway Construction, Edition of 1988 and the Supplement thereto, Edition of 1991.

708.03. ASPHALT MATERIALS. (Add Table 2A-1, 2A-2 and 2A-3 as follows:)

Table 2A-1 - Requirements for Type I Polymer Modified Asphalt Cement

		I-A	I-B	I-C	I-D
Penetration,77 Deg.F, 100g, 5sec.	Min	100	75	50	40
	Max	150	100	75	75
Penetration,39.2 Deg.F,200g,60sec.	Min	40	30	25	25
Viscosity, 140 Deg.F, Poises	Min	1000	2500	5000	5000
Viscosity, 275 Deg.F, cSt	Max	2000	2000	2000	2000
Softening Point, R&B, Deg. F	Min	110	120	130	140
Flash Point, Deg. F	Min	425	425	450	450
Solubility in TCE, %*	Min	99.0	99.0	99.0	99.0
Separation, R&B difference, Deg. F**	Max	4	4	4	4
RTFOT Residue:					
Elastic Recovery, % ***	Min	45	45	45	50
Penetration, 39.2 Deg.F,200g,60s	Min	20	15	13	13

*Solubility to be conducted on the original asphalt by AASHTO T-44.
**Test Method OHD L-41, Method A.
***Test Method OHD L-42.

Description:

Type I Polymer Modified asphalts are normally produced by modifying conventional asphalt cements with styrene block copolymers.

SPECIAL PROVISIONS TEXT

CA708005 - 708-5(A-D)91S POLYMER MODIFIED ASPHALT CEMENT

Typical Applications:

Type I-A

Binder for use in hot mix asphalt concrete in cold service conditions and in hot applied surface treatment applications and crack filling.

Type I-B

All purpose grade intended for dense or open graded asphalt concrete and hot applied sealing applications in hot climates.

Type I-C

All purpose grade for dense or open graded asphalt concrete and hot applied sealing application in hotter climates than I-B.

Type I-D

Hot climate applications where asphalt concrete is to be used in high volume traffic areas carrying large percentages of trucks.

Table 2A-2 - Requirements for Type II Polymer Modified Asphalt Cement

		II-A	II-B	II-C
Penetration, 77 Deg.F, 100g, 5 sec.	Min	100	70	80
Viscosity, 140 Deg.F, Poises	Min	800	1600	1600
Viscosity, 275 Deg.F, cSt	Max	2000	2000	2000
Ductility, 39.2 Deg.F, 5 cpm, cm	Min	50	50	25
Flash Point, Deg.F	Min	450	450	450
Solubility*, %	Min	99	99	99
Toughness, 77 Deg.F, 20 ipm,in-lbs	Min	75	110	110
Tenacity, 77 Deg.F, 20 ipm,in-lbs	Min	50	75	75
RTFOT or TFOT Residue:				
Viscosity, 140 Deg.F, Poises	Max	4000	8000	8000
Ductility, 39.2 Deg.F, 5 cpm, cm	Min	25	25	8
Toughness, 77 Deg.F, 20 ipm,in-lbs.	Min			110
Tenacity, 77 Deg.F, 20 ipm,in-lbs.	Min			75

*Solubility to be conducted on the original asphalt by AASHTO T-44.

SPECIAL PROVISIONS TEXT

CA708005 - 708-5(A-D)91S POLYMER MODIFIED ASPHALT CEMENT

Description:

Type II Polymer Modified Asphalts are normally produced by modifying conventional asphalt cements with styrene butadiene rubber latex or neoprene latex.

Typical Applications:

Type II-A

Binder for use in hot mix asphalt concrete in cold service conditions and in hot applied surface treatment applications and crack filling.

Type II-B and II-C

All purpose grade intended for dense or open graded asphalt concrete and hot applied sealing applications in hot climates.

Table 2A-3 - Requirements for Type III Polymer Modified Asphalt Cement

		III-A	III-B	III-C	III-D	III-E
Penetration,77 Deg.F,100g,5 sec.	Min	30	30	30	30	30
	Max	130	130	130	130	130
Penetration, 39.2 Deg.F, 200g, 60 sec.	Min	48	35	26	18	12
Viscosity, 275 Deg.F, cSt	Min	150	150	150	150	150
	Max	1500	1500	1500	1500	1500
Softening Point, R&B, Deg.F	Min	125	130	135	140	145
Flash Point, Deg.F	Min	425	425	425	425	425
Separation*		Homog	Homog	Homog	Homog	Homog
FTFOT Residue:						
Loss, %	Max	1.0	1.0	1.0	1.0	1.0
Penetration, 39.2 Deg.F, 200g, 60 sec.	Min	24	18	13	9	6

* Test Method OHD L-41, Method B

Description:

Type III Polymer Modified Asphalts are normally produced by blending conventional asphalt cements with ethyl vinyl acetate or polyethylene.

SPECIAL PROVISIONS TEXT

CA708005 - 708-5(A-D)91S POLYMER MODIFIED ASPHALT CEMENT

Typical Applications:

The Type III asphalts are distinguished by differences in consistency at 39.2 Degrees F (4 Degrees C) using the penetration test and at high temperatures using the softening point test. As one moves from left to right in the table, as with the other asphalts, the materials become progressively harder, or stiffer. The philosophy of Type III PMA is to require the softening point be 40 Degrees F higher than the normal daily maximum air temperature during the hottest month of service. Low temperature penetration is set based on normal daily minimum air temperatures during the coldest month.

(15) THIS PAY ITEM IS FOR "CONTECH'S PAVEPREP SA", "AMOCO FABRICS AND FIBERS' PRO-GUARD" OR AN APPROVED EQUAL. IF THE CONTRACTOR DESIRES, THEY MAY USE A NON-SELF ADHESIVE FORM OF THE STRESS RELIEF INNERLAYER. IF THIS OPTION IS CHOOSEN THE CONTRACTOR MUST ATTACH THE STRIP WITH TACK COAT AS PER THE MANUFACTURER'S RECOMMENDATION. COST OF TACK COAT TO BE INCLUDED IN PRICE BID FOR FABRIC MEMBRANE. THE MEMBRANE SHALL BE A 12" WIDE, HIGH DENSITY ASPHALT MASTIC SANDWICHED BETWEEN TWO LAYERS OF POLYESTER FABRIC. IT SHALL MEET THE FOLLOWING CRITERIA BASED ON THE CONTRACTORS PROVISION OF A TYPE A OR TYPE B MATERIALS CERTIFICATION:

PROPERTY	CRITERIA	TEST
DENSITY	80 LBS / CU. FT.	ASTM-E-12-70
WEIGHT	0.9 LBS / SQ. FT.	
THICKNESS	0.135 IN.	ASTM-D1777
(RATING 95% AFTER LOADING)		
ABSORPTION	1% MAX	ASTM-D517-68
BRITTLENESS	PASS	ASTM-D517-68
SOFTENING POINT (MASTIC)	200° F MIN.	ASTM-D-2398-68
COLD FLEX	NO CRACKING OR SEPARATION	*
HEAT STABILITY	NO DRIPPING OR DELAMINATION	* *
FLAMABILITY	SELF EXTINGUISHING	FEDERAL FMVSS 302
PERCENT ELONGATION	100%	ASTM-D-882 MOD. * * *
TENSILE STRENGTH	1150 LBS / SQ. IN.	ASTM-D-882 MOD. * * *

* 2" X 5" SPECIMEN, 180° BOND ON 2" MANDREL 0° F. (BENT TOWARD WOVEN SIDE)
* * 2" X 5" SPECIMEN, HUNG VERTICALLY IN MECHANICAL CONVECTION OVEN 2 HRS. AT 190° F
* * * 12" / MIN. TEST SPEED AND ONE INCH INITIAL DISTANCE.

THE SURFACE UPON WHICH THE MATERIAL IS TO BE PLACED SHALL BE FREE OF DIRT, WATER, AND VEGETATION. THE MEMBRANE SHALL BE APPROXIMATELY CENTERED ON THE CRACK AND COVER THE CRACK COMPLETELY.

IF TACK COAT IS USED, THE WIDTH OF APPLICATION SHOULD BE MATERIAL WIDTH (12") PLUS 2" TO 3" TACK COAT SHOULD BE APPLIED AT A RATE OF 0.10 TO 0.15 GAL / SQ. YD. RECOMMENDED TEMPERATURE FOR THE TACK COAT APPLICATION IS 350° F TO 375° F, WITH MINIMUM TEMPERATURE BEING 290° F.. IF MATERIAL MUST BE PLACED WHEN AIR TEMPERATURE IS BELOW 45° F., A HIGHER TEMPERATURE AND APPLICATION RATE MAY BE NECESSARY. EMULSION SHALL NOT BE ALLOWED FOR THIS TACK COAT.

THE MEMBRANE SHALL BE PLACED BEFORE THE TACK COAT HAS COOLED ENOUGH TO LOSE ADHESION. THE WOVEN POLYESTER SIDE IS TO BE PLACED UP. HAND ROLLING MAY BE NECESSARY TO ACHIEVE BONDING. MATERIAL INSTALLED IN COLD WEATHER SHOULD BE OVERLAYED AS SOON AS POSSIBLE.

JOINTS IN THE MATERIAL SHALL BE OVERLAPPED 4" MINUMUM. CORNERING CAN BE ACHIEVED BY WALKING THE EXCESS MATERIAL TO ONE SPOT, SLICING THE BUBBLE WITH A RAZOR KNIFE, AND OVERLAPPING THE MATERIAL. ADDITIONAL TACK SHALL BE REQUIRED TO BOND THE TWO MATS AT JOINTS AND OTHER OVERLAPPING AREAS. THE CONTRACTOR SHALL INSURE THAT ALL EDGES OF THE MATERIAL ARE FIRMLY BONDED TO THE OLD PAVEMENT.

REMOVAL AND REPLACEMENT OF MATERIAL THAT IS DAMAGED IS THE RESPONSIBILITY OF THE CONTRACTOR. THE MINIMUM SIZE PATCH SHALL OVERLAP 4" BEYOND THE DAMAGED PORTION ON ALL SIDES.

PAYMENT SHALL BE FOR THE LINEAR FOOT OF MATERIAL IN PLACE, WHICH SHALL BE FULL COMPENSATION FOR SUPPLYING ALL MATERIALS INCLUDING TACK COAT, EQUIPMENT, LABOR, AND INCIDENTALS TO COMPLETE THE WORK AS SPECIFIED. PAYMENT SHALL BE BASED ON LINEAR FEET OF CRACK COVERAGE. MATERIAL NECESSARY FOR OVERLAP AT THE JOINTS IS NOT TO BE MEASURED FOR PAYMENT.

PHILLIPS FIBERS CORPORATION
A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY
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GENERIC SPECIFICATION FOR USE WITH PR0-GUARD®

I) Stress Absorbing Interlayer Strip System For Joints And Cracks

Material shall consist of two layers of high strength fabric (a nonwoven and a high modulus scrim) with a modified asphaltic mastic sandwiched in between the two reinforcement fabrics. The material should have the following typical properties:

Property	Typical Value	Test
Tensile Strength: MD	370 lbs/in (2700 lbs/in^2)	ASTM D-882*
XMD	340 lbs/in (2450 lbs/in^2)	
Elongation	100%	ASTM D-882*
Puncture Strength	650 lbs (1" rod)	ASTM E-154
	220 lbs (5/16" rod)	ASTM D-4833
Peel Adhesion**	2.5 lbs/in	ASTM D-413
Specific Gravity (mastic)	1.67	ASTM D-70-82
Weight/Gallon (mastic)	14.0 lbs	ASTM D-70-82
Density	80.0 lbs/ft^3	ASTM E-12-70
Weight	0.9 lbs/ft^2	
Thickness	0.135 in, 95% retained after loading	ASTM D-1777
Water Absorption (mastic)	1% maximum	ASTM D-517-92
Brittleness	Passes	ASTM D-517-92
Softening Point (mastic)	205°F (minimum)	ASTM D-36-86
Cold Flex	No separation - 2" X 5" specimen, 180° bend on 2" mandrel @ 0°F	ASTM D-146-90
Heat Stability	No dripping or delamination after 2 hours @ 190° on a 2" X 5" sample suspended vertically in a mechanical convection oven	
Polymeric Reinforcement	Cycles to break (single fiber) - 3,500,000 cycles	PFC
Flammability	Self-extinguishing/NBR	Federal FMVSS 302

***12 inches/minute test speed and 1 inch distance between the grips were used.**

****Critical property for product performance and dimensional stability during installation and in service life.**

II) Surface Preparations

For best performance, all cracks should be filled with suitable crack filler prior to the placement of the stress relieving interlayer material.

A) Before installing stress relieving interlayer, surface must be dry.
B) Surface should be free of dust, dirt and vegetation.
C) Excessively spalled or otherwise distressed areas must be repaired.
D) Portland cement concrete slabs and/or joints should be stabilized.

III) Installation

No special handling equipment is generally required for handling rolls of material.

A) Apply asphalt cement tack coat at least 0.10 gallons/square yard. For milled, or other irregular surfaces, and in cold temperature applications the rate should be increased, but not to exceed a maximum of 0.20 gallons/square yard.

Note: Emulsions are not recommended due to long cure time. In certain cases when ambient temperature is 70°F and rising, CRS-2 or RS-2 emulsion may be used, provided they are allowed to break completely prior to installation of stress relieving interlayer.

B) Overspray the asphaltic tack approximately 2" wider than the width of the stress relieving interlayer.

C) Roll the nonwoven, fuzzy side of stress reliever interlayer into the asphaltic tack coat prior to the time asphalt cement has cooled and lost it tackiness.

D) If required, pneumatically roll to ensure contact and adhesion to the existing pavement surface.

E) After the installation of the stress relieving interlayer system has been completed, use a normal tack coat prior to resurfacing with asphalt overlay.

SECTION 420
FABRIC REINFORCEMENT
FOR
ASPHALT CONCRETE PAVEMENT

420.01. DESCRIPTION. This work shall consist of the application of reinforcement fabric for plant mix asphalt concrete pavement in accordance with these Specifications and in reasonably close conformity with the locations and dimensions shown on the Plans or established by the Engineer.

420.02. MATERIALS. Materials shall meet the requirements specified in the following Subsections of Section 700 - Materials.

Reinforcement Fabric	712.01
Asphalt Cement	708.03

420.03. EQUIPMENT.

(a) **General.** Equipment and tools necessary for performing all parts of the work shall be furnished by the Contractor in conformance with Subsection 108.06.

(b) **Distributors.** Distributors shall meet the requirements of Subsection 401.03. Distributor units shall also be equipped with a hand spray with a single nozzle and positive shut off valve.

(c) **Fabric Laydown Equipment.** Mechanical laydown equipment shall be capable of handling full or partial rolls of fabric and shall be capable of laying the fabric smoothly without excessive wrinkles and/or folds. When manual laydown is required, a length of standard one inch pipe, together with suitable roll tension devices shall be used for proper roll handling.

(d) **Miscellaneous Equipment.** Miscellaneous equipment shall include stiff bristle brooms to smooth the fabric, scissors or blades to cut the fabric, and brushes as required for use in applying asphalt binder to fabric overlap at spliced joints.

420.04. CONSTRUCTION METHODS.

(a) **Surface Preparation.** The surface on which the fabric is to be placed shall be free of dirt, dust, water, oil or other foreign matter.

(b) **Application of Bituminous Binder.** Bituminous binder material shall be heated and uniform spray applied over the area to be fabric covered. Laps shall be mopped between layers of fabric. The longitudinal lap may be sprayed with the distributor.

The minimum application temperature of the bituminous binder shall not be less than 290° F. If the fabric is oversprayed, the maximum application temperature shall not exceed 325° F. to avoid damage to the fabric. The

bituminous binder shall be applied at the rate of 0.20 to 0.35 gal/sq yd (actual application rates will be based on asphalt retention tests for the fabric used) as established by the Engineer. Application of the bituminous material shall be accomplished with an asphalt distributor. Areas not accessible to the distributor shall be hand sprayed. The distributor shall be started and stopped over paper or roofing felt to provide neat cutoff lines. The width of binder application shall be two to six inches wider than the fabric width. Care shall be exercised in the application of the binder to avoid spills or excessive application to cause flushing of the bituminous material.

(c) **Placement of Reinforcement Fabric.** The fabric shall be placed after the bituminous binder has been applied and before the binder has cooled and lost tackiness. The fabric shall be unrolled and placed into the binder with the unfused (fuzzy) side down with a minimum of wrinkles. Every effort shall be made to lay the fabric as smoothly as possible. The fabric shall be broomed to remove air bubbles and maximize fabric contact with the pavement surface. Wrinkles shall be cut and laid out flat. If misalignment of the fabric occurs the fabric shall be cut, realigned and jointed as directed by the Engineer. Overlap of fabric at joints shall be between 4 and 6 inches. Transverse joints shall be shingled in the direction of paving to prevent edge pick up by the paver. Additional binder shall be applied to joints at the rate specified by the Engineer. Transverse joints shall be mopped, brushed or hand sprayed. The longitudinal joints shall be sprayed with the distributor. The reinforcement fabric shall be embedded into the bituminous binder and bonded to the pavement. Self-propelled pneumatic tired rollers may be used if deemed necessary by the Engineer. Fabric not overlaid the same day shall be blotted with clean apparently dry sand before being turned to traffic. Sand for blotting will be included in other items for payment.

(d) **Weather Limitations.** Asphalt binder shall not be applied for installation of the fabric when the air temperature is less than 50°F unless otherwise approved by the Engineer.

(e) **Tack Coat.** Tack coat, if required, for the pavement overlay shall be applied in accordance with Section 407. The bituminous material type, grade, rate of application and temperature shall be approved by the Engineer. Cut-back asphalt or emulsified asphalt containing petroleum distillate additives shall not be used.

(f) **Pavement Overlay.** Placement of the asphalt concrete pavement overlay should closely follow fabric lay down unless otherwise permitted by the Engineer. Any damage or disbonding of the fabric reinforcement membrane caused by traffic or wet weather conditions due to unnecessary delay or negligence of the Contractor shall be repaired at his own expense. In the event excess binder bleeds through the fabric before the overlay is placed, the excess material shall be blotted by spreading sand on the affected area as directed by the Engineer. The temperature of the paving mix at time of placement on the reinforcement fabric membrane shall not exceed 325°F to prevent damage to the fabric. The turning of pavers or other vehicles should be gradual and kept to a minimum to avoid damage to the fabric. Should equipment tires pick up the fabric or the paver cause movement of the membrane during paving operations asphalt paving mix may be broadcast ahead of trucks and the paver to prevent damage. Any damage to the reinforcement membrane due to equipment shall be repaired by the Contractor at his expense.

420.05. METHOD OF MEASUREMENT.

(a) Fabric reinforcement will be measured by the square yard in place.

(b) Bituminous binder will be measured by the gallon in accordance with Subsection 109.01(a).

420.06. BASIS OF PAYMENT. The accepted quantities of fabric reinforcement and bituminous binder, measured as provided above, will be paid for at the contract unit price for:

(A)	FABRIC REINFORCEMENT	SQ. YD.
(B)	BITUMINOUS BINDER	GAL.

which shall be full compensation for furnishing all materials, equipment, labor and incidentals to complete the work as specified.

712.01. FABRIC REINFORCEMENT FOR ASPHALT CONCRETE PAVEMENT.

(a) **General.** The fabric shall be an approved paving grade fused on one side, nonwoven, needle punched, material constructed of long chain synthetic polymers composed of at least 85 percent polyesters, polyolefins or polyamides by weight.

(b) **Test Requirements.** The reinforcement fabric shall meet the following test requirements:

Tests	Limit	Test Method
Weight	3-6 oz/sq yd	ASTM D 2646
Tensile Strength(Grab Method)	90 lbs minimum	ASTM D 1682
Elongation at break	55% minimum	ASTM D 1682
Asphalt Retention	0.20 gal/sq yd minimum	ODOT Procedure

(c) **Packaging and Storing.** The fabric shall be supplied by the manufacturer in rolls of standard widths and lengths uniformly wound onto suitable cylinder forms or cores to aid in handling and unrolling by the use of mechanical laydown equipment. Rolls supplied shall provide full coverage of the payment with a minimal number of joint splices.

712.01

Rolls of fabric shall be furnished with a suitable type wrapping for protection against sunlight and moisture. When stored outdoors, the rolls shall be elevated and covered with a tarpaulin.

(d) **Sampling and Testing.** The Contractor shall furnish a type A materials certification for the reinforcement fabric in accordance with Subsection 106.12. A 3 square yard sample of the fabric for testing shall also be furnished to the Materials Engineer from each lot or shipment by the Engineer.

SECTION 712A
CONSTRUCTION FABRICS

712.01. FABRIC REINFORCEMENT FOR ASPHALT CONCRETE PAVEMENT.

(a) **General** (Add the following.) Reinforcement fabric manufactured with continuous filament fiber may be furnished unfused.

BITUTEX

GRIDS WITH FABRIC FOR ASPHALT OVERLAYS

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Synteen Gewebe Technik GmbH

BITUTEX®

BITUTEX® composite products are specifically designed for use in asphalt pavements. They are a patent pending family of products in which woven polyester grids are combined with non woven polyester paving fabrics. This unique design provides waterproofing and significantly higher tensile strengths than can be achieved with conventional paving fabrics. The higher tensile strength substantially improves crack retardation performance.

BITUTEX® is the intelligent solution to many asphalt paving problems. With proper design, **BITUTEX®** will lower maintenance costs and add significant life to most asphalt projects.

SYNTEEN has manufactured woven products for over ninety years and specialized in technical fabrics for the last forty years. Today, SYNTEEN products are used worldwide. SYNTEEN Engineering and Research and Development Departments have worked closely for the last several years in developing **BITUTEX®**. It is designed to enhance the performance of asphalt pavement while meeting the application requirements of the contractor. **BITUTEX®** is the cost effective solution to the challenges and expectations of asphalt paving.

BITUTEX® is a geo-grid/geo-textile composite material. **BITUTEX®** combines a woven high tenacity polyester grid with a non woven polyester fabric in a single material. It is intended for use in asphalt overlays.

Why use **BITUTEX®** in asphalt overlays?

Cracking is a common problem with asphalt pavements. Cracks can be caused by the condition of the old road surface, stress factors, temperature changes, moisture and freeze/thaw cycles. Geo-textiles provide a waterproofing membrane and have been proven to reduce cracking. Because of their ability to extend the life of asphalt pavements, Geo-textiles are used extensively today.

BITUTEX® is a second generation paving material. The combination of the woven grid with the non woven fabric offers significantly more strength than conventional paving fabrics. This results in even greater crack resistance.

BITUTEX® provides the recognized benefits of a waterproofing membrane not achieved with "paving grid only" products and makes the application process practical.

BITUTEX® combines the benefits of paving fabrics and grids in a single sheet. This means a simple, cost effective, one step application on your paving material.

BITUTEX® Properties

- woven high tenacity polyester grid coated with SBR (styrene-butadiene rubber)
- polyester non woven fabric
- flexible and light weight
- high tensile strength
- elongation over 19%
- creep resistant
- absorbent fabric
- high temperature stability - withstands temperatures up to 425° F without significant shrinkage
- available in various sizes, weights and strengths

BITUTEX® Benefits

- extended pavement life for longer time periods between repaving
- lower maintenance costs
- simple, fast, economical installation
- less preparation work
- shrink resistant at high temperatures
- can be used in cold temperature applications
- thick rubber coating protects grid from cuts caused by aggregate
- highly break and tear resistant
- reduced asphalt requirements
- better asphalt bonding
- increased reinforcement and stabilization
- elongation properties compatible with those of asphalt
- retards cracking
- better fatigue reduction and stress distribution
- improved waterproofing
- greater design flexibility

Suggested applications of **BITUTEX®**

- under new asphalt overlays
- road widening
- in weak lanes of multi-lane projects
- reinforcement in high stress areas
- resurfacing over Portland Cement Concrete (within design limitations)
- airfields
- parking lots
- bridge decks
- under railroad ballast

BITUTEX® Installation Procedures

The installation of **BITUTEX®** in asphalt overlays is a relatively simple procedure similar to the installation of paving fabrics.

1. Store **BITUTEX®** in a clean dry location on a level surface. To avoid deformations do not store more than 3 rolls high.
2. Fill cracks in excess of 1/4 inch. Refill as required until flush with the surface. Repair larger cracks and pot holes, depressions and other irregularities with slurry seal, cold or hot mix. Local engineer may specify an asphalt leveling course if irregularities are excessive.
3. Surface must be dry and temperature should be 50° F and rising.
4. Sweep surface clean of dirt and debris.
5. Uniformly spray approximately 0.25 gallons/square yard (GSY) residual asphalt to the prepared road surface. Cationic or anionic asphalt emulsion are NOT recommended. This is a nominal target rate. The actual rate prescribed will vary with the porosity of the pavement surface. (Example: Recently milled surfaces may be more porous and require more sealant. At street intersections where vehicle braking is commonplace, it is a good practice to reduce the sealant to 0.20 GSY.) The asphalt distributor truck must be capable of spraying at the prescribed temperature and uniform rate. The spray temperature of the sealant should not exceed 300° F and the temperature in the distributor truck should not exceed 325° F. A hydrostatic calibrated type distributor is recommended. No drilling or skipping is permitted. A small hand spray with positive shut off valve should be available with the equipment. Apply sealant to the surface area 2 to 6 inches wider than the width of the **BITUTEX®** being installed.
6. Remove spills or drools of sealant.
7. Install **BITUTEX®** with the waterproofing membrane side down and the reinforcing grid side up. Use approved mechanical laydown equipment. Small jobs can be installed manually.
8. Avoid application techniques that create wrinkles. If wrinkles over 1-1/2 inches occur, cut wrinkles and lay flat. A small amount of additional sealant may be required to ensure proper bonding.
9. Overlap **BITUTEX®** 1 to 3 inches at longitudinal and transverse joints. Transverse joints should be "shingled" in the direction of the paving.
10. Use of a rubber wheeled pneumatic roller is recommended for additional bonding.

11. Moderate curves can be negotiated by stretching the fabric on the outside of the curve. For sharper curves or special configurations, cut the fabric and piece to fit. In no case should wrinkles large enough to cause laps or folds be permitted. Should wrinkles occur, cut and lay flat as outlined above.
12. Align **BITUTEX®** so that it is at least 12 inches away from curbs and road edges.
13. Prior to the overlay, unessential traffic on **BITUTEX®** should be eliminated. For essential construction traffic, keep braking and turning to a minimum. Quick stops and sharp turns may cause damage.
14. Place the hot mix overlay in the normal manner. Again, avoid excessive turning of the paver. The temperature of the hot mix should not exceed 325° F.
15. The minimum compacted asphalt overlay thickness is 1-1/2 inches and should be installed immediately following the **BITUTEX®** placement. No tack coat is required on top of the **BITUTEX®**.
16. To insure the complete saturation of the **BITUTEX®**, follow the normally specified asphalt compaction method.
17. The normally specified asphalt compaction method is recommended to insure the complete saturation of the **BITUTEX®**.
18 If rain occurs prior to the asphalt overlay and causes a blistered appearance or bond loss, it can be corrected by pneumatic rolling until adhesion is restored.
19. Traffic on the **BITUTEX®** should be avoided. If it is impossible to avoid temporary traffic on the **BITUTEX®** prior to the overlay, lightly sand (1 - 2 lbs/sq. yd.) the **BITUTEX®** for protection during the traffic period. The surface may be slippery, especially if wet. Appropriate warning signs and/or flagpersons are highly advised.

BITUTEX COMPOSITE - 8
531.029 - #8

Manufacturing Process		
Grid	Woven	
Fabric	Non-Woven	
Polymer Type		
Grid	Polyester	
Fabric	Polyester	
Grid Coating	Styrol Butadien Rubber (SBR)	
Mass (DIN 53854)	500 g/m²	14.8 oz/yd²
Grid Aperture Size	30 mm x 30 mm	1.18 in x 1.18 in
Thickness (DIN 53855T1)	3.0 mm	0.12 in
Tensile Strength (DIN 53857T1)		
Strength 5% Strain		
MD	15.2 kN/m	1,040 lbs/ft
XD	12.0 kN/m	821 lbs/ft
Ultimate Strength		
MD	62.0 kN/m	4,240 lbs/ft
XD	62.0 kN/m	4,240 lbs/ft
Elongation		
MD	20%	
XD	22%	
Temperature Factors (DIN 51005)		
Softening Point	240° C	464° F
Melting Point	260° C	500° F

minor manufacturing variations may occur

SYNTEEN USA, INC.

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APPENDIX B

MEASUREMENTS AND OBSERVATIONS

Rut Measurements, NH-186 (190) Project Area. Measured June 3, 1994.			
Southbound Expressway.		**Northbound Expressway**	
Distances are from the north end of the project (Sta. 1849 + 50.90) and extend southward (in direction of traffic).		Distances are from the south end of the project (Sta. 1474 + 00) and extend Northward (in direction of traffic).	
Distance (mi)	**Rut Depth (in)**	**Distance (mi)**	**Rut Depth (in)**
0.2	0.4	0.2	0.4
0.4	0.4	0.4	0.4
0.6	0.8	0.6	0.3
0.8	1.0	0.8	0.4
1.0	1.8	1.0	0.4
1.2	0.4	1.2	0.3
1.4	0.3	1.4	0.4
1.6	0.3	1.6	0.4
1.8	0.4	1.8	0.5
2.0	0.4	2.0	0.7
2.2	0.4	2.2	0.6
2.4	0.3	2.4	0.4
2.6	0.3	2.6	0.4
2.8	0.6	2.8	0.4
3.0	0.5	3.0	0.6
3.2	0.7	3.2	0.7
3.4	0.4	3.4	0.6
3.6	0.5	3.6	0.4
3.8	0.3	3.8	0.4
4.0	0.4	4.0	0.3
4.2	0.7	4.2	0.3
4.4	0.6	4.4	0.3

Date: 6-3-94

Location: SOUTHBOUND U.S. 59

Length: 6.8 MILES.

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: NH-186(190)

Control Section: 69-46-03

Surveyed By: STAFF WILLIAMS

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
1. 100-98% = EXCEL. 2. 97-90% = SUPER. 3. 89-80% = GOOD 4. 79-65% = AVER. 5. 64-50% = POOR 6. 50%-LESS= FAIL	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1 = LESS THAN 5% 2 = 5% TO 15% 3 = 15% TO 30% 4 = 30% OR MORE

RATING INTERVAL (MI.)	CONDITION RATING (%)	CRACKING: LONGITUDINAL	CRACKING: TRANSVERSE	CRACKING: RANDOM	CRACKING: BLOCK	CRACKING: ALLIGATOR	CRACKING: CRACKING	DISTORTION: MINOR BLEEDING	DISTORTION: INTER. BLEEDING	DISTORTION: MAJOR BLEEDING	DISTORTION: SHOVING	DISTORTION: CORRUGATING	DISTORTION: DISTORTION	RAVELING: MINOR	RAVELING: INTERMEDIATE	RAVELING: MAJOR	RAVELING: RAVELING	SURFACE ROUGHNESS: SMOOTH	SURFACE ROUGHNESS: MOD. ROUGH	SURFACE ROUGHNESS: ROUGH	SURFACE ROUGHNESS: SURFACE ROUGH	BASE FAILURE: MODERATE	BASE FAILURE: SEVERE	BASE FAILURE: BASE FAILURE	RUT DEPTH: 0.1 or 0.2 INCH	RUT DEPTH: 0.3 or 0.4 INCH	RUT DEPTH: 0.5 or GREATER	PATCH FT²	COMMENTS
0.2	60		X	X																(3)						4		1200	DEPRESS. CRACKS @ 100' INTERVALS.
0.4	60			(3)																(3)						4		1,200	
0.6	65			(2)																(3)						5		ENTIRE	
0.8	60			(3)																(3)						5		2,000	
1.0	65			(2)																(3)						5			
1.2	60			(3)																(3)						4			
1.4	65			(2)																(3)						4		3,600	
1.6	65			(2)																(3)						4		12,000	
1.8	65			(2)																(3)						4		6,000	
2.0	65			(2)																(3)						4		12,000	
2.2	60			3																(3)						4		12,000	
2.4	65			2																(3)						4		6,000	
2.6	65			2																(3)						4		3,600	
2.8	65			2																(3)							4	6,000	
3.0	60			3																(3)							4	6,000	
3.2	65			2																(3)							4	2,000	

ALL SECTIONS HAVE TRANSVERSE DEPRESSION CRACKS AT 50'—100' INTERVALS.

Date: 6-3-94

Location: SOUTHBOUND L.S. 59

Length: 6.8 MILES

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: NH-185(190)

Control Section: 69-46-03

Surveyed By: GARY WILLIAMS

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
1. 100-98% = EXCEL. 2. 97-90% = SUPER. 3. 89-80% = GOOD 4. 79-65% = AVER. 5. 64-50% = POOR 6. 50%-LESS= FAIL	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1 = LESS THAN 5% 2 = 5% TO 15% 3 = 15% TO 30% 4 = 30% OR MORE

RATING INTERVAL (MI.)	CONDITION RATING (%)	CRACKING: LONGITUDINAL	CRACKING: TRANSVERSE	CRACKING: RANDOM	CRACKING: BLOCK	CRACKING: ALLIGATOR	CRACKING: CRACKING	DISTORTION: MINOR BLEEDING	DISTORTION: INTER. BLEEDING	DISTORTION: MAJOR BLEEDING	DISTORTION: SHOVING	DISTORTION: CORRUGATING	DISTORTION: DISTORTION	RAVELING: MINOR	RAVELING: INTERMEDIATE	RAVELING: MAJOR	RAVELING: RAVELING	SURFACE ROUGHNESS: SMOOTH	SURFACE ROUGHNESS: MOD. ROUGH	SURFACE ROUGHNESS: ROUGH	SURFACE ROUGHNESS: SURFACE ROUGH	BASE FAILURE: MODERATE	BASE FAILURE: SEVERE	BASE FAILURE: BASE FAILURE	RUT DEPTH: 0.1 or 0.2 INCH	RUT DEPTH: 0.3 or 0.4 INCH	RUT DEPTH: 0.5 or GREATER	PATCH FT²	COMMENTS
3.4	65		2	2													1			4						4		12,000	
3.6	65		2	2													1			4							4	12,000	
3.8	60		3	3													1			4						4		6,000	
4.0	60		3	3													1			4						4		6,000	
4.2	55		4	4													1			4							4	0	
4.4	60		3	3													1			4							4	0	
4.6	65		2	2													1			4						4		6,000	
4.9	65		2	2													1			4						4		12,000	
5.0	55		4	4													1			4						4		0	
5.2	60		3	3													1			4						4		6,000	
5.4	60		3	3													1			4						4		6,000	
5.6	55		4	4													1			4						4		0	
5.8	55		4																	4							4	12,000	
6.0	65		2	2													1			4						4		12,000	
6.2	65		2	2													1			4						4		12,000	
6.4	65		2	2													1			4						4		12,000	

* ALL SECTIONS HAVE TRANSVERSE CRACKS AT 50-100 L...

Date: 6-3-'94

Location: SOUTHBOUND U.S. 69

Length: 6.8 MI.

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: NH-186(190)

Control Section: 69-46-03

Surveyed By: GARY WILLIAMS

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
1. 100-98% = EXCEL. 2. 97-90% = SUPER. 3. 89-80% = GOOD 4. 79-65% = AVER. 5. 64-50% = POOR 6. 50%-LESS= FAIL	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1 = LESS THAN 5% 2 = 5% TO 15% 3 = 15% TO 30% 4 = 30% OR MORE

RATING INTERVAL (MI.)	CONDITION RATING (%)	CRACKING: LONGITUDINAL	TRANSVERSE	RANDOM	BLOCK	ALLIGATOR	CRACKING	DISTORTION: MINOR BLEEDING	INTER. BLEEDING	MAJOR BLEEDING	SHOVING	CORRUGATING	DISTORTION	RAVELING: MINOR	INTERMEDIATE	MAJOR	RAVELING	SURFACE ROUGHNESS: SMOOTH	MOD. ROUGH	ROUGH	SURFACE ROUGH	BASE FAILURE: MODERATE	SEVERE	BASE FAILURE	RUT DEPTH: 0.1 or 0.2 INCH	0.3 or 0.4 INCH	0.5 or GREATER	PATCH FT^2	COMMENTS
6.6	55		*/4														1			4						4		12,000	
6.8	55		1/4														1			4						4		12,000	
OVERALL 61.6 ≈ 62%																													

[illegible] TRANSVERSE DEPRESSION CRACKS AT 50-100' INTERVALS.

Date: 6-3-94

Location: U.S. 69, N.B.

Length: N.B. 6.8 MI.

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: NH-185(192)

Control Section: 69-46-03

Surveyed By: G.W.

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
1. 100-98% = EXCEL. 2. 97-90% = SUPER. 3. 89-80% = GOOD 4. 79-65% = AVER. 5. 64-50% = POOR 6. 50%-LESS= FAIL	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1 = LESS THAN 5% 2 = 5% TO 15% 3 = 15% TO 30% 4 = 30% OR MORE

RATING INTERVAL (MI.)	CONDITION RATING (%)	CRACKING: LONGITUDINAL	CRACKING: TRANSVERSE	CRACKING: RANDOM	CRACKING: BLOCK	CRACKING: ALLIGATOR	CRACKING: CRACKING	DISTORTION: MINOR BLEEDING	DISTORTION: INTER. BLEEDING	DISTORTION: MAJOR BLEEDING	DISTORTION: SHOVING	DISTORTION: CORRUGATING	DISTORTION: DISTORTION	RAVELING: MINOR	RAVELING: INTERMEDIATE	RAVELING: MAJOR	RAVELING: RAVELING	SURFACE ROUGHNESS: SMOOTH	SURFACE ROUGHNESS: MOD. ROUGH	SURFACE ROUGHNESS: ROUGH	SURFACE ROUGHNESS: SURFACE ROUGH	BASE FAILURE: MODERATE	BASE FAILURE: SEVERE	BASE FAILURE: BASE FAILURE	RUT DEPTH: 0.1 or 0.2 INCH	RUT DEPTH: 0.3 or 0.4 INCH	RUT DEPTH: 0.5 or GREATER	PATCH FT²	COMMENTS
0.2	65		3	3																4						4			
0.4	65		3	3																4						4			
0.6	55		4	3																4						4			
0.8	55		4	3																4						4			
1.0	65		3	2																4						4			
1.2	65		3	2																4						4			
1.4	65		3	2																4						4			
1.6	65		3	2																4						4			
1.8	55		4	3																4						4			
2.0	55		4	3																4						3	4		
2.2	55		4	3																4						3	4		
2.4	55		4	3																4							4		
2.6	65		3	2																4						4			
2.8	65		3	2																4						4			
3.0	65		3	2																4						4			
3.2	55		4	3																4						3	4		

Date: 6-3-94

Location: N.B. U.S. 69

Length: 6.8 MI.

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: NH-186(19)

Control Section: 69-95-03

Surveyed By: G.W.

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	

1. 100-98% = EXCEL.
2. 97-90% = SUPER.
3. 89-80% = GOOD
4. 79-65% = AVER.
5. 64-50% = POOR
6. 50%-LESS= FAIL

1 = LESS THAN 5%
2 = 5% TO 15%
3 = 15% TO 30%
4 = 30% OR MORE

		CRACKING						DISTORTION						RAVELING				SURFACE ROUGHNESS				BASE FAILURE			RUT DEPTH				
RATING INTERVAL (MI.)	CONDITION RATING (%)	LONGITUDINAL	TRANSVERSE	RANDOM	BLOCK	ALLIGATOR	CRACKING	MINOR BLEEDING	INTER. BLEEDING	MAJOR BLEEDING	SHOVING	CORRUGATING	DISTORTION	MINOR	INTERMEDIATE	MAJOR	RAVELING	SMOOTH	MOD. ROUGH	ROUGH	SURFACE ROUGH	MODERATE	SEVERE	BASE FAILURE	0.1 or 0.2 INCH	0.3 or 0.4 INCH	0.5 or GREATER	PATCH FT²	COMMENTS
3.4	60		4	3																4							4		
3.6	65		3	2										✓						4							4		
3.8	65		3	2																4						4			
4.0	65		3	2																4						4			
4.2	55		4	3																4						4			
4.4	55		4	3																4						4			
4.6	55		4	3										✓						4						4			
4.8	60		4	2										✓						4						4			
5.0	60		4	2										✓						4							4		
5.2	60		4	2										✓						4						4			
5.4	55		4	3										✓						4						4			
5.6	55		4	3										✓						4						4			
5.8	60		4	2										✓						4							4		
6.0	60		4	2										✓						4							4		
6.2	65		3	2										✓						4						4			
6.4	65		3	2										✓						4							4		

Date: 6-3-94

Location: U.S. 69 (N.B.)

Length: 6.8 MI.

CONDITION RATING FOR FLEXIBLE PAVEMENTS

Project Number: _____

Control Section: _____

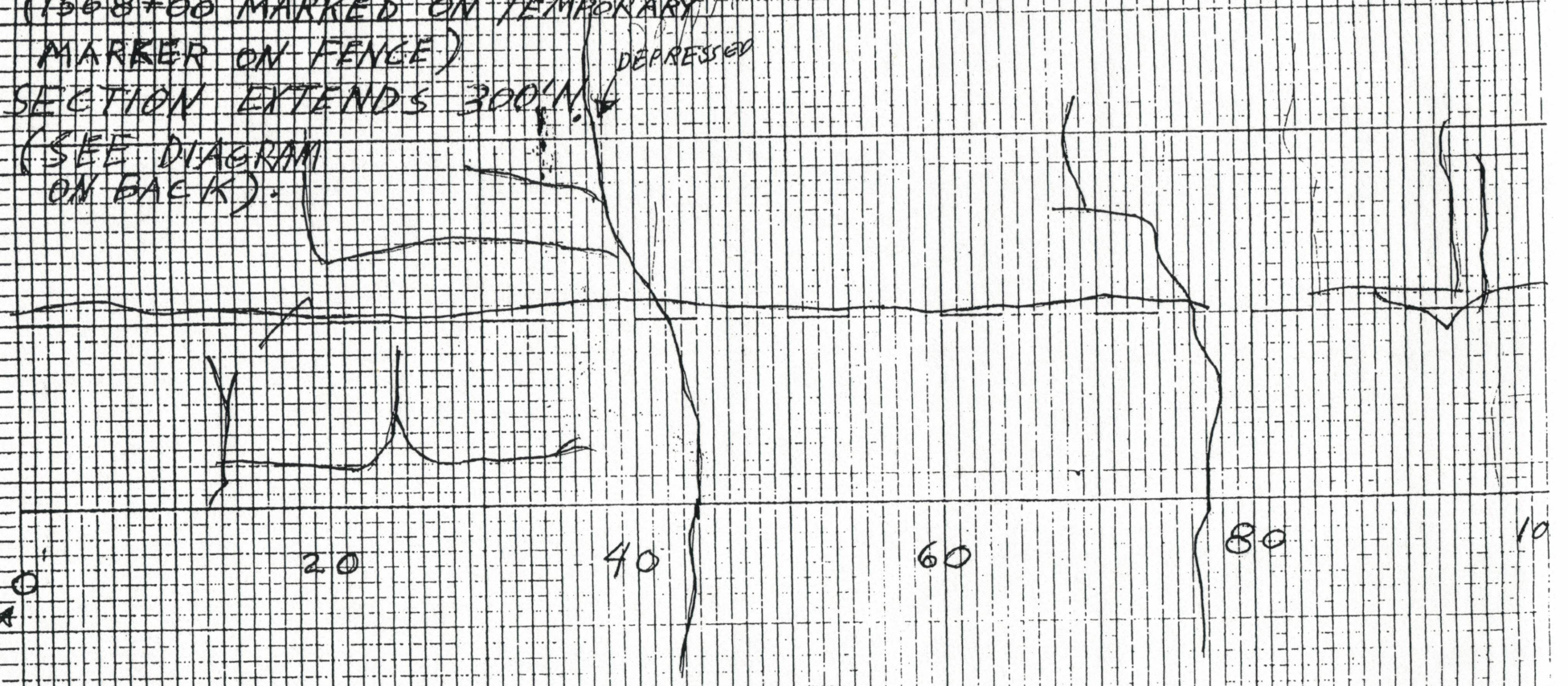
Surveyed By: _____

LEGEND FOR RATING CLASSES

CONDITION RATING	CRACKING	DISTORTION	RAVELING	SURFACE ROUGHNESS	BASE FAILURE	TOTAL SURFACE AREA OF RATING INTERVAL
1. 100-98% = EXCEL. 2. 97-90% = SUPER. 3. 89-80% = GOOD 4. 79-65% = AVER. 5. 64-50% = POOR 6. 50%-LESS= FAIL	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1-2-3-4	1 = LESS THAN 5% 2 = 5% TO 15% 3 = 15% TO 30% 4 = 30% OR MORE

RATING INTERVAL (MI.)	CONDITION RATING (%)	CRACKING: LONGITUDINAL	CRACKING: TRANSVERSE	CRACKING: RANDOM	CRACKING: BLOCK	CRACKING: ALLIGATOR	CRACKING: CRACKING	DISTORTION: MINOR BLEEDING	DISTORTION: INTER. BLEEDING	DISTORTION: MAJOR BLEEDING	DISTORTION: SHOVING	DISTORTION: CORRUGATING	DISTORTION: DISTORTION	RAVELING: MINOR	RAVELING: INTERMEDIATE	RAVELING: MAJOR	RAVELING: RAVELING	SURFACE ROUGHNESS: SMOOTH	SURFACE ROUGHNESS: MOD. ROUGH	SURFACE ROUGHNESS: ROUGH	SURFACE ROUGHNESS: SURFACE ROUGH	BASE FAILURE: MODERATE	BASE FAILURE: SEVERE	BASE FAILURE: BASE FAILURE	RUT DEPTH: 0.1 or 0.2 INCH	RUT DEPTH: 0.3 or 0.4 INCH	RUT DEPTH: 0.5 or GREATER	PATCH FT²	COMMENTS
6.6	90		2	1				1						1													4	0.2 mi	
6.8	90		2	1				1						1													4	0.2 mi	
OVERALL																													
62.06 ≈ 62%																													

CRACK MAP SECTION #1
BEGINS AT STA. 1568+00
(1568+00 MARKED ON TEMPORARY
MARKER ON FENCE)
SECTION EXTENDS 300' N.
(SEE DIAGRAM
ON BACK).

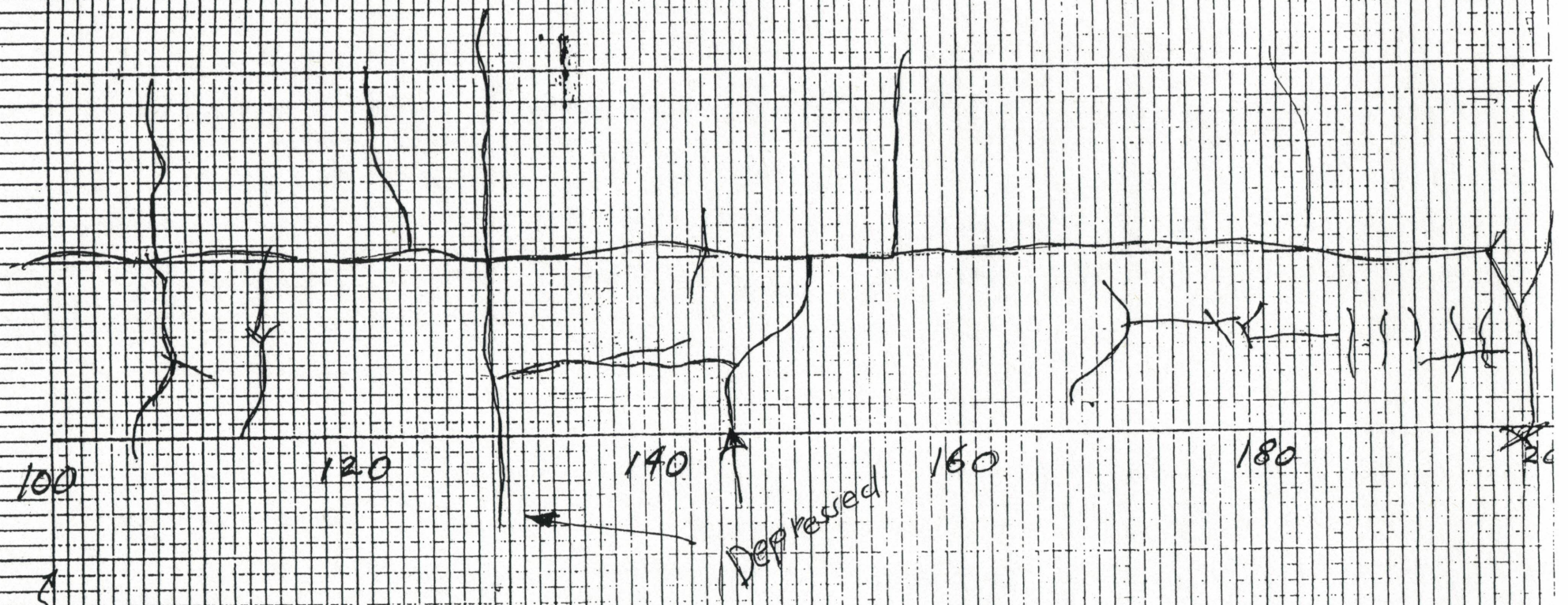


STA
1568+00

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP SECTION #1

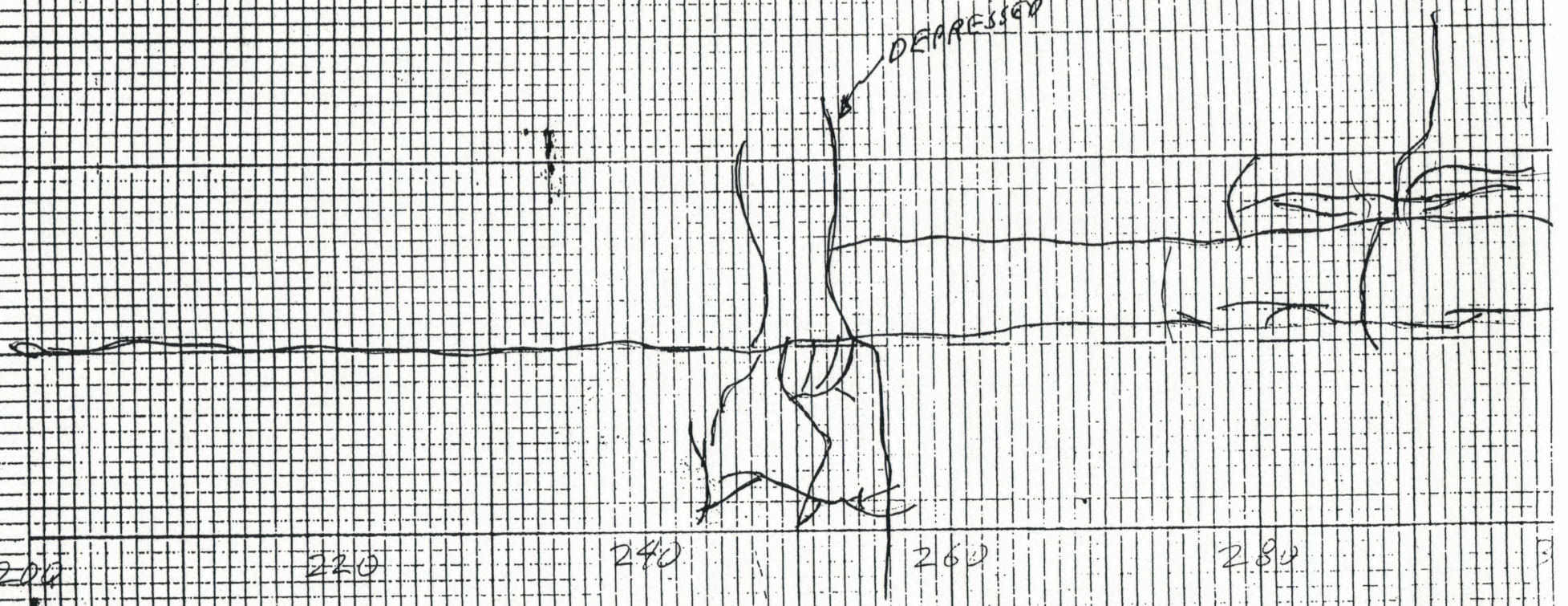


STA 1569+00

CRACK YEAR	LT LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-96

CRACK MAP SECTION #1



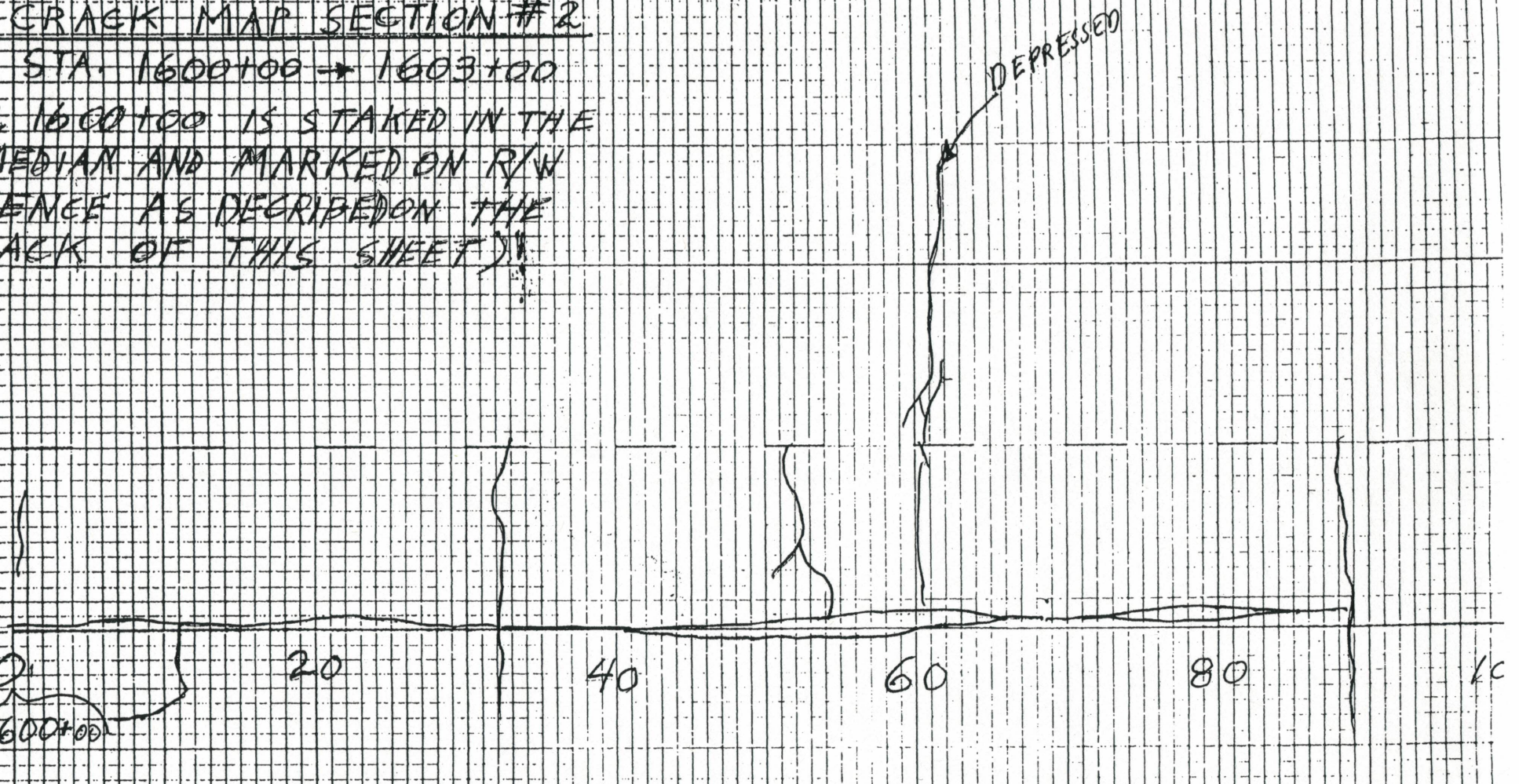
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

GA-94

CRACK MAP SECTION #2

STA. 1600+00 → 1603+00

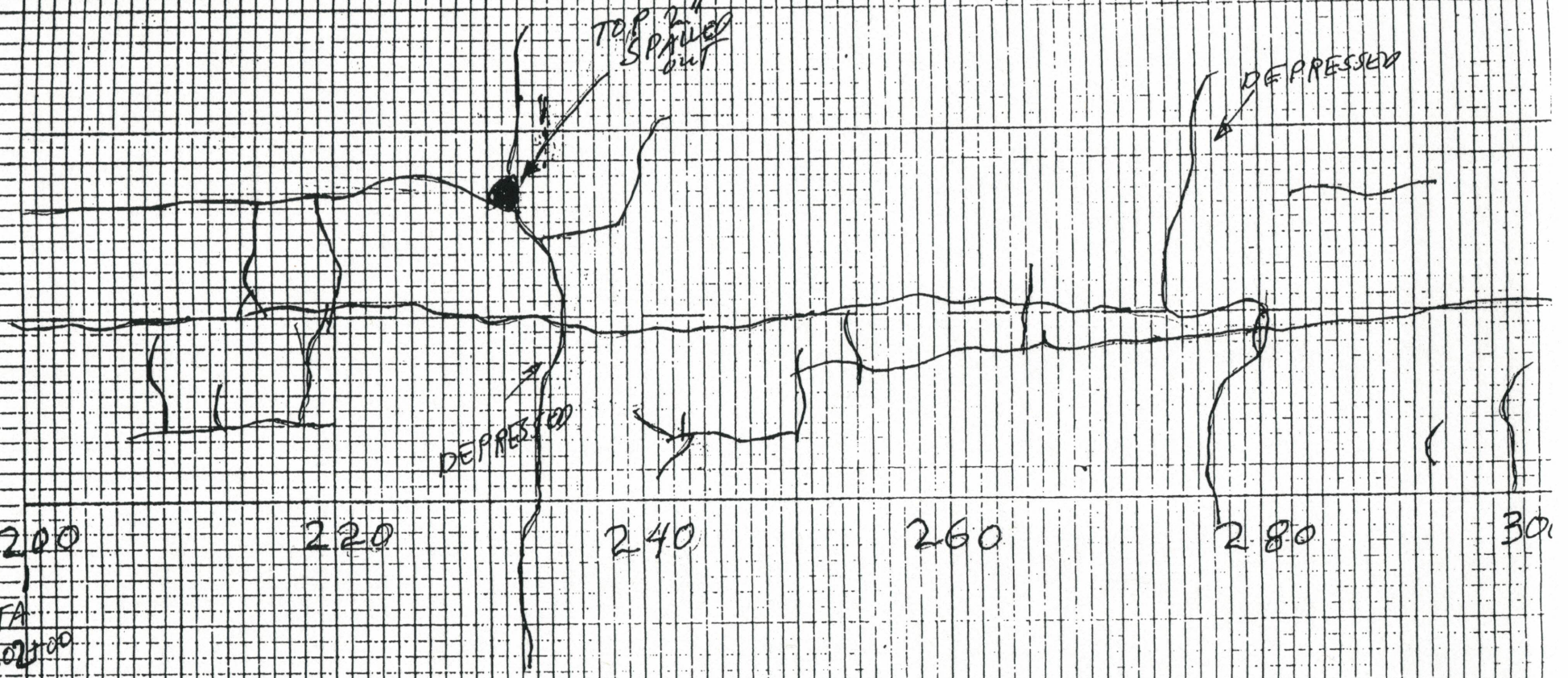
(STA. 1600+00 IS STAKED IN THE MEDIAN AND MARKED ON R/W FENCE AS DESCRIBED ON THE BACK OF THIS SHEET)



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

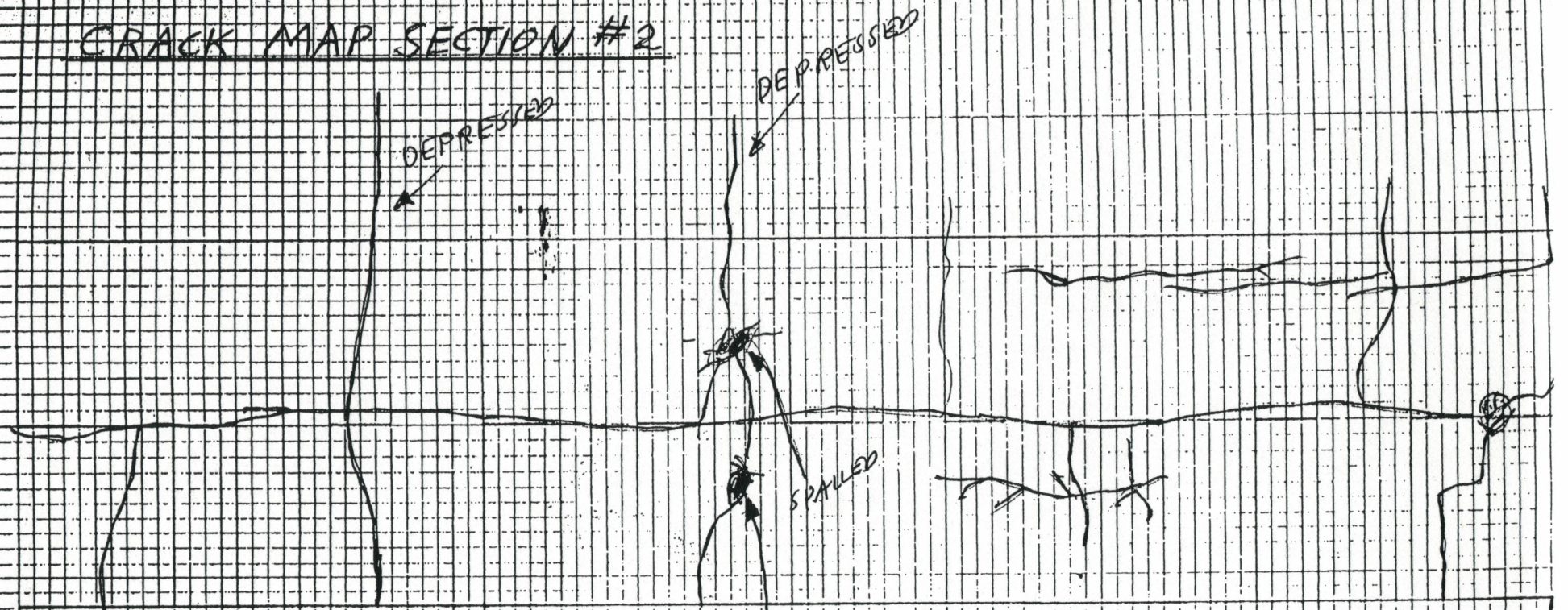
6-4-94
(BEFORE CONSTRUCTION)

CRACK MAP SECTION # 2



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

CRACK MAP SECTION #2



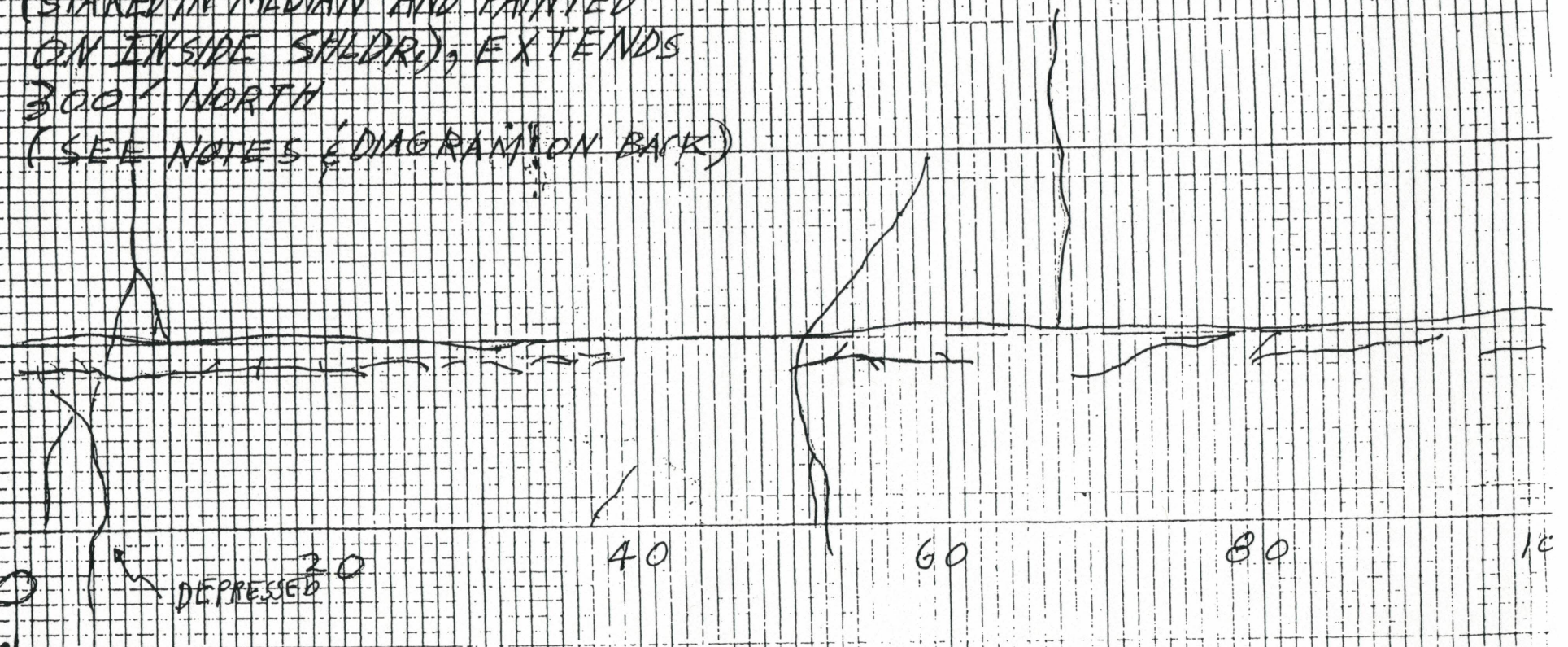
STA. 1601+00

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP SECTION #3

BEGINS AT STATION 1625+00
(STAKED IN MEDIAN AND PAINTED
ON INSIDE SHLDR), EXTENDS
300' NORTH
(SEE NOTES & DIAGRAM ON BACK)

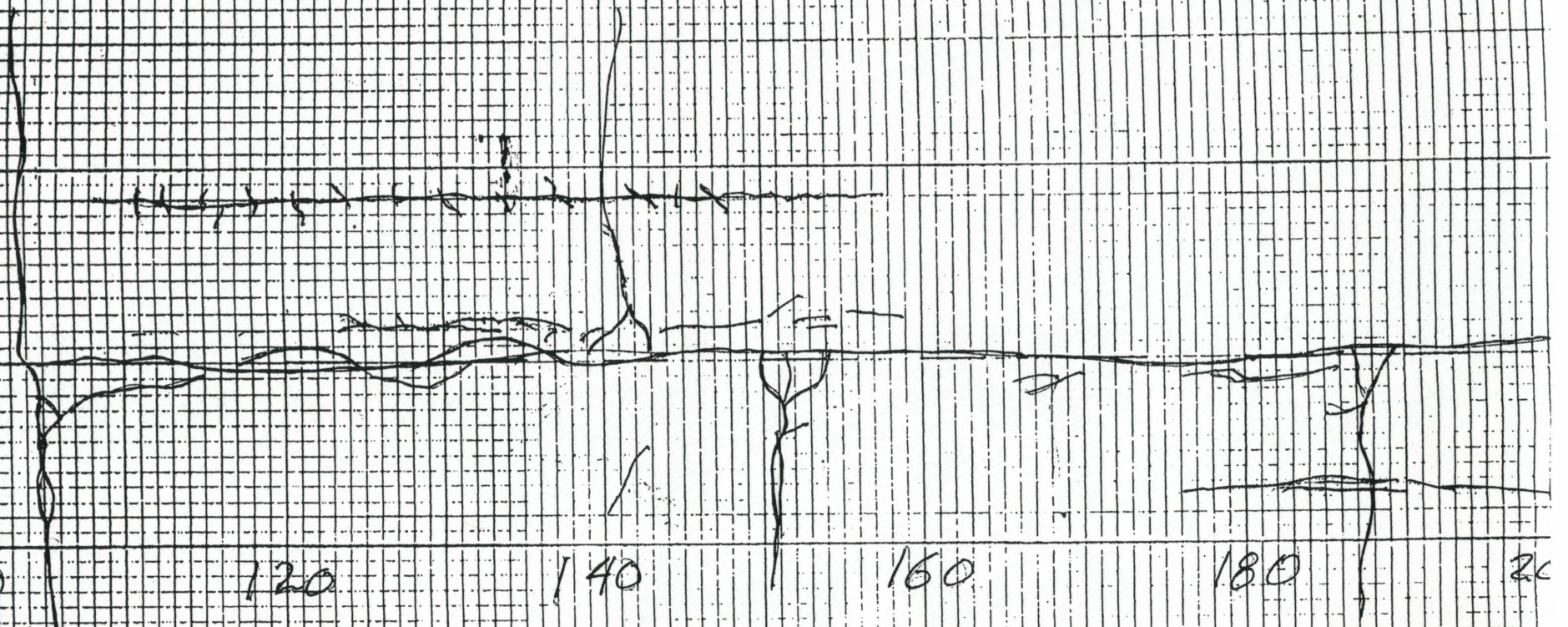


STA. 1625+00

CRACK YEAR	LT LANE	RT LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94
(BEFORE CONSTRUCTION

CRACK MAP SECTION #3

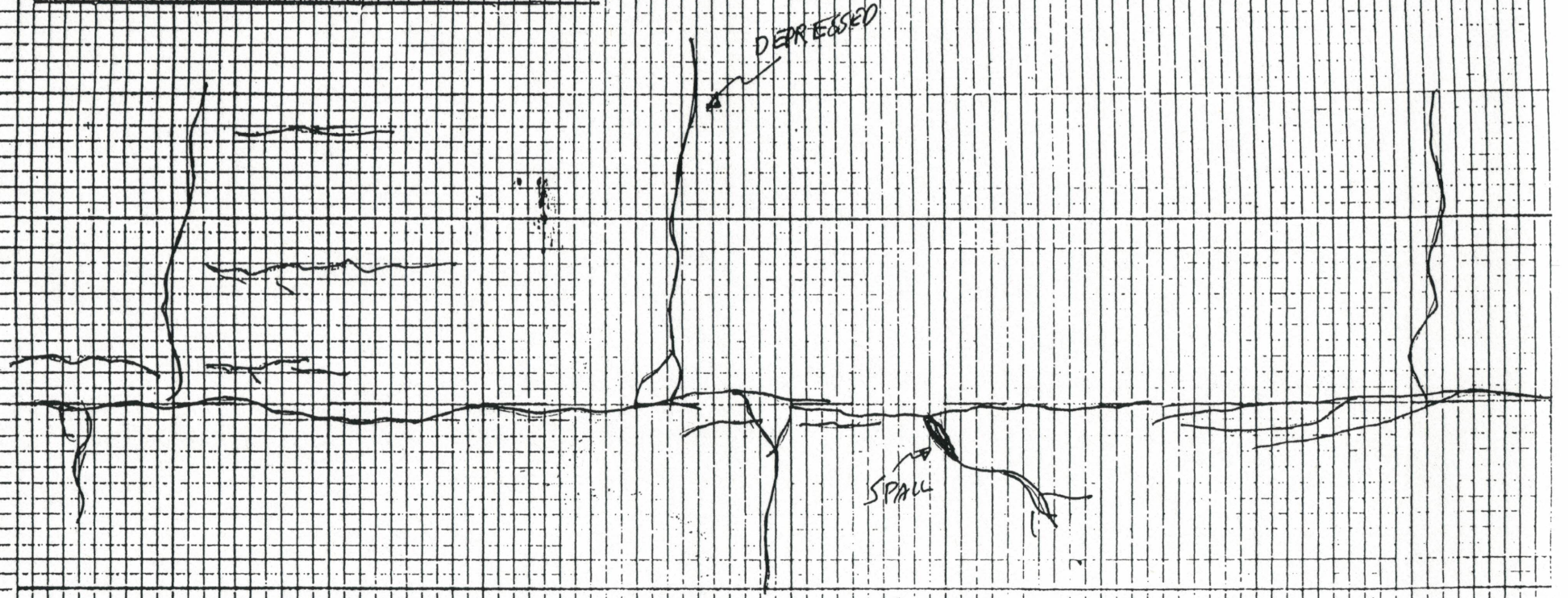


1626
+
00

CRACK YEAR	LT LANE	RT LANE
2		
3		
4		
5		
6		
7		
8		

6-4-96

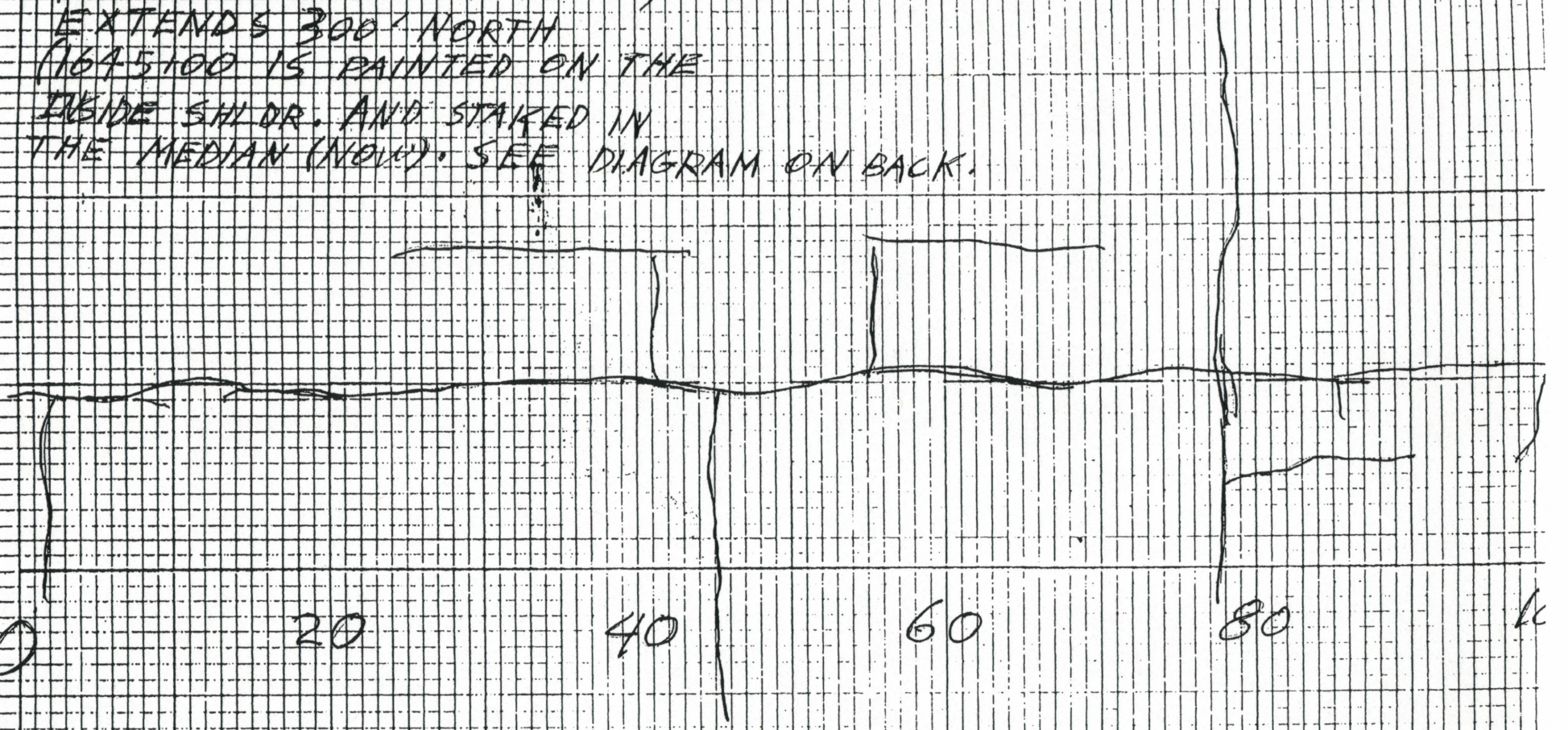
CRACK MAP SECTION #3.



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

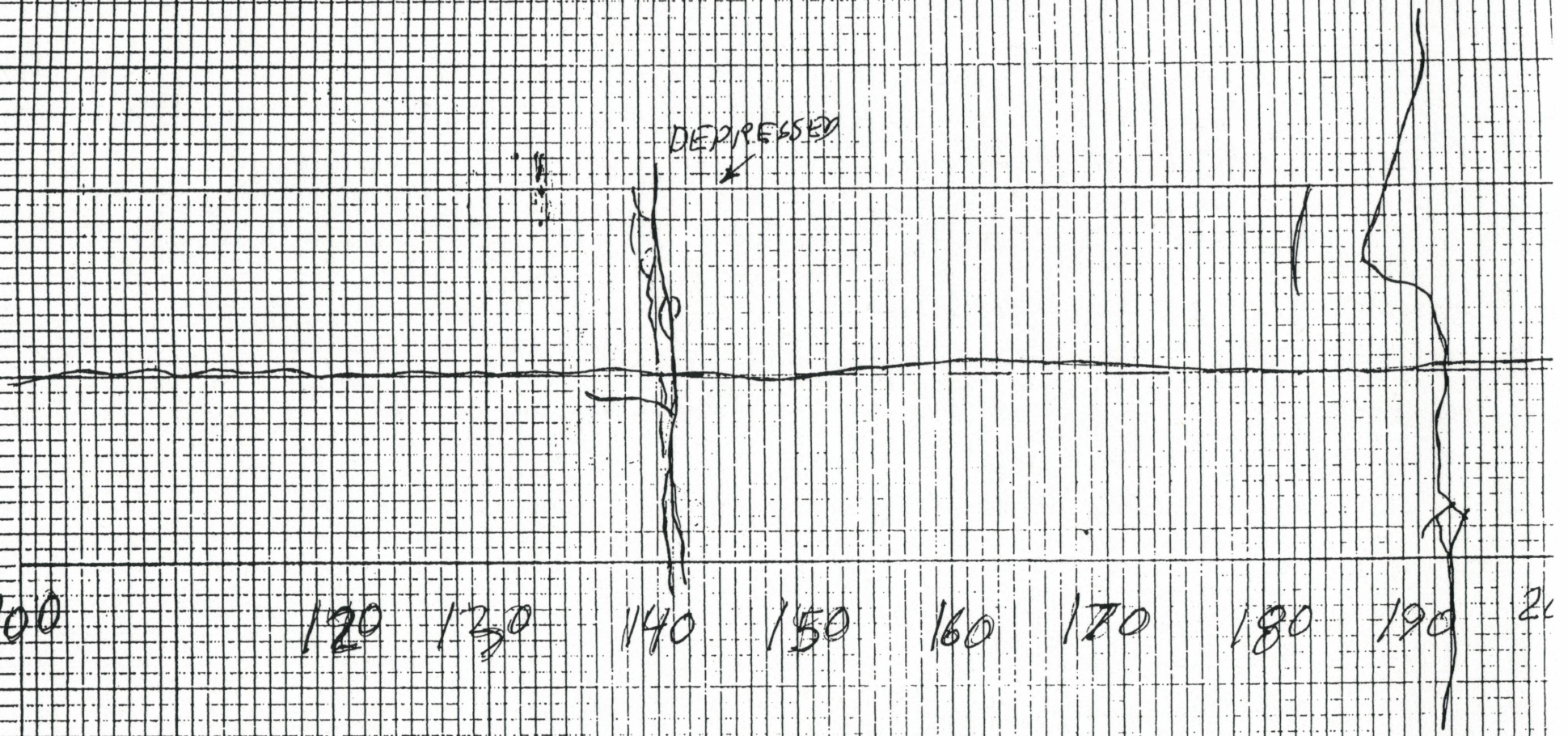
CRACK MAP SECTION #4
BEGINS AT STATION 1645+00,
EXTENDS 300' NORTH
(1645+100 IS PAINTED ON THE
INSIDE SHLDR. AND STAKED IN
THE MEDIAN (NOW). SEE DIAGRAM ON BACK.



CRACK YEAR	LT. LANE	RT. LANE
1		
2		
3		
4		
5		
6		
7		
8		
9		

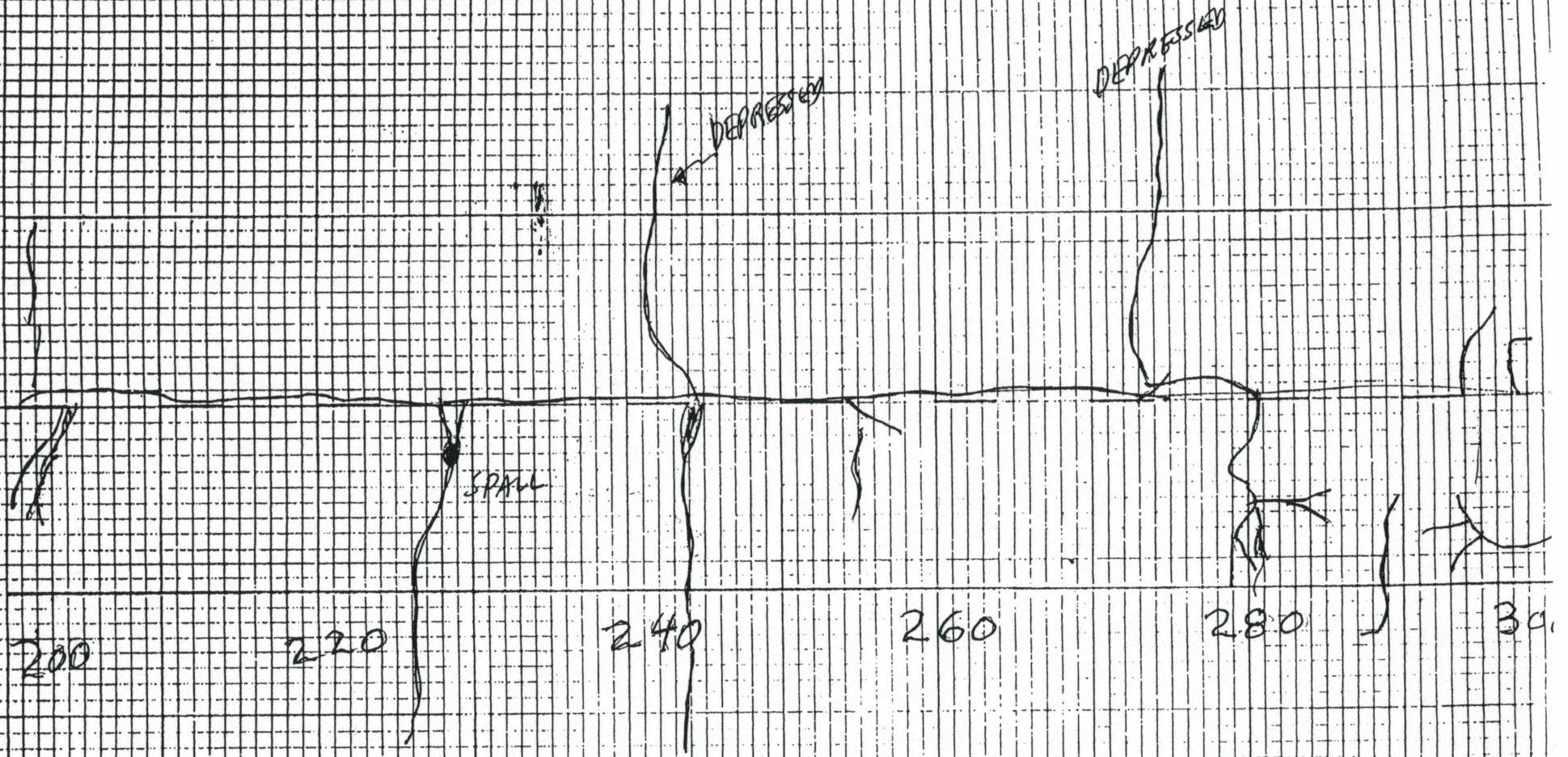
6-4-9
(BEFORE CONSTRUCTION)

CRACK MAP SECTION #4



CRACK YEAR	LT. LANE	RT. LANE
1		
2		
3		
4		
5		
6		
7		
8		

CRACK MAP SECTION # 4



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

CRACK MAP SECTION #5

STA. 1714 ~ → 1711 ~

STA. 1714+00 IS STAKED IN MEDIAN AND (TEMPORARILY) PAINTED ON INSIDE SHLDR.

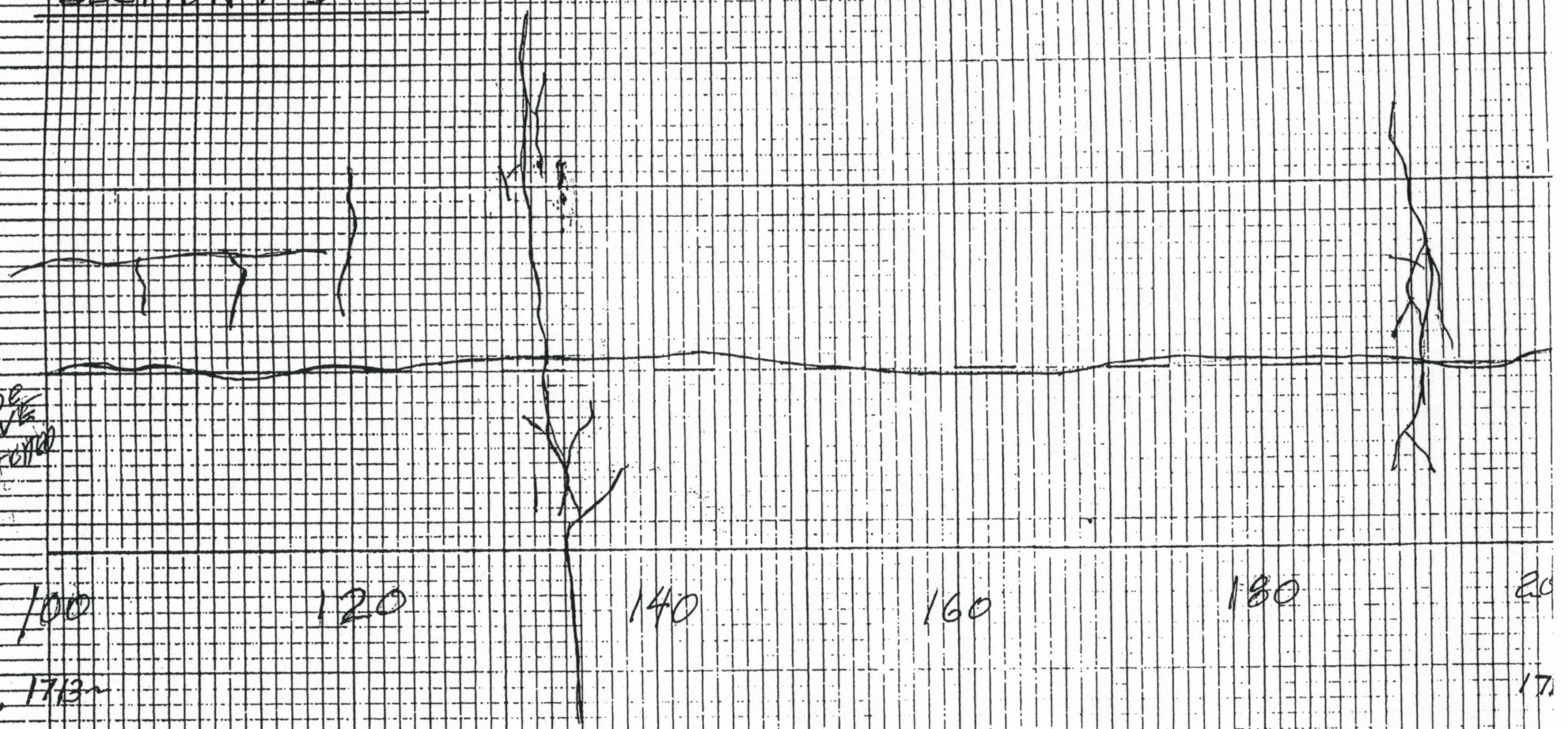
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

N S

OUTSIDE LANE IS COVERED WITH A FULL-WIDTH (12' WIDE) PATCH THROUGH THIS ENTIRE ½ MI. SECTION.

6-4-94

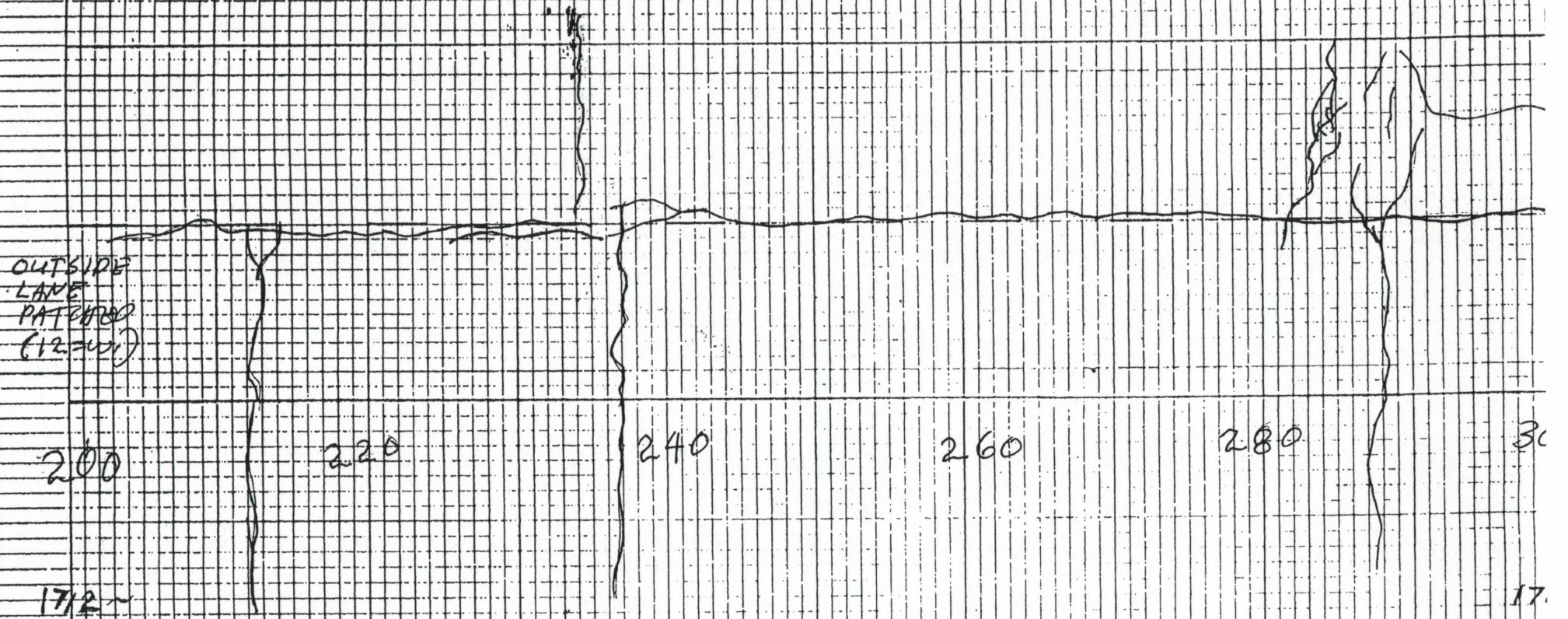
CRACK MAP
SECTION # 5



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP
SECTION # 5



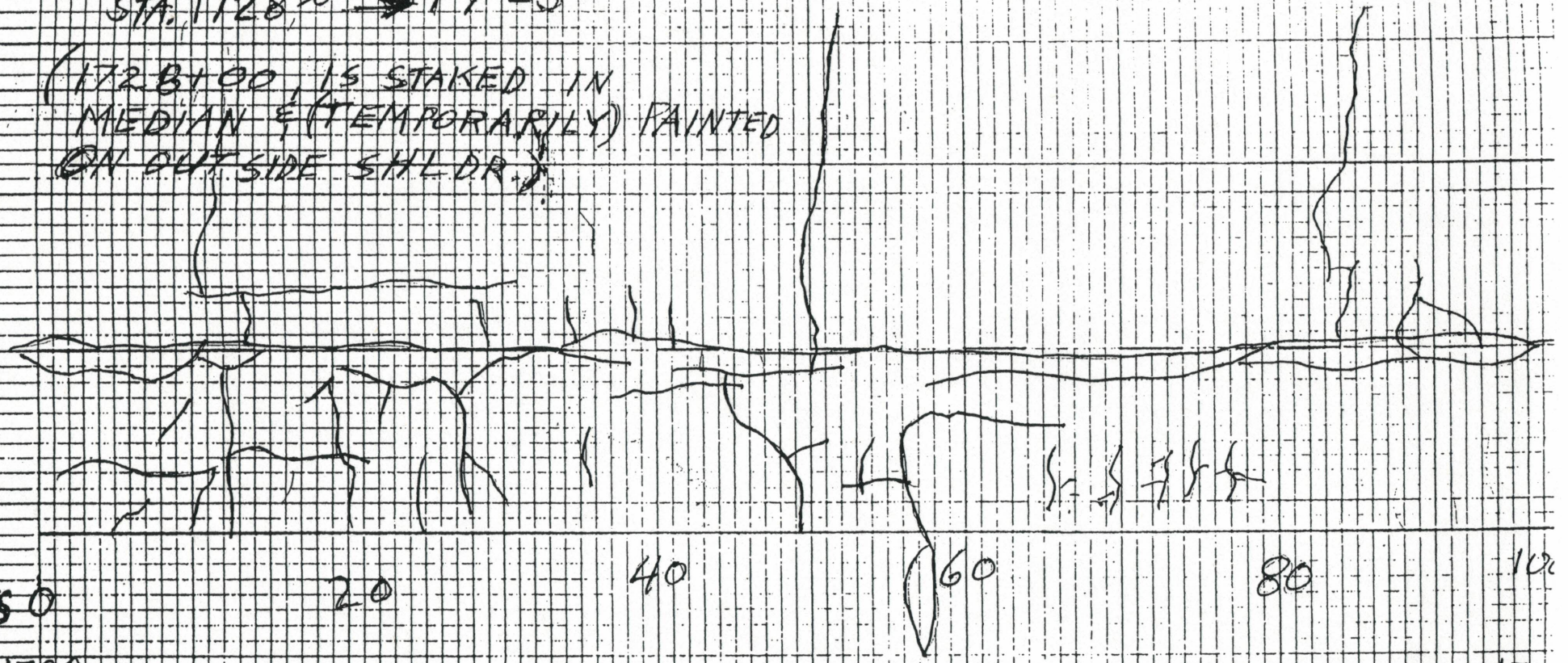
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP SECTION #6

STA. 1728~ → 1725~

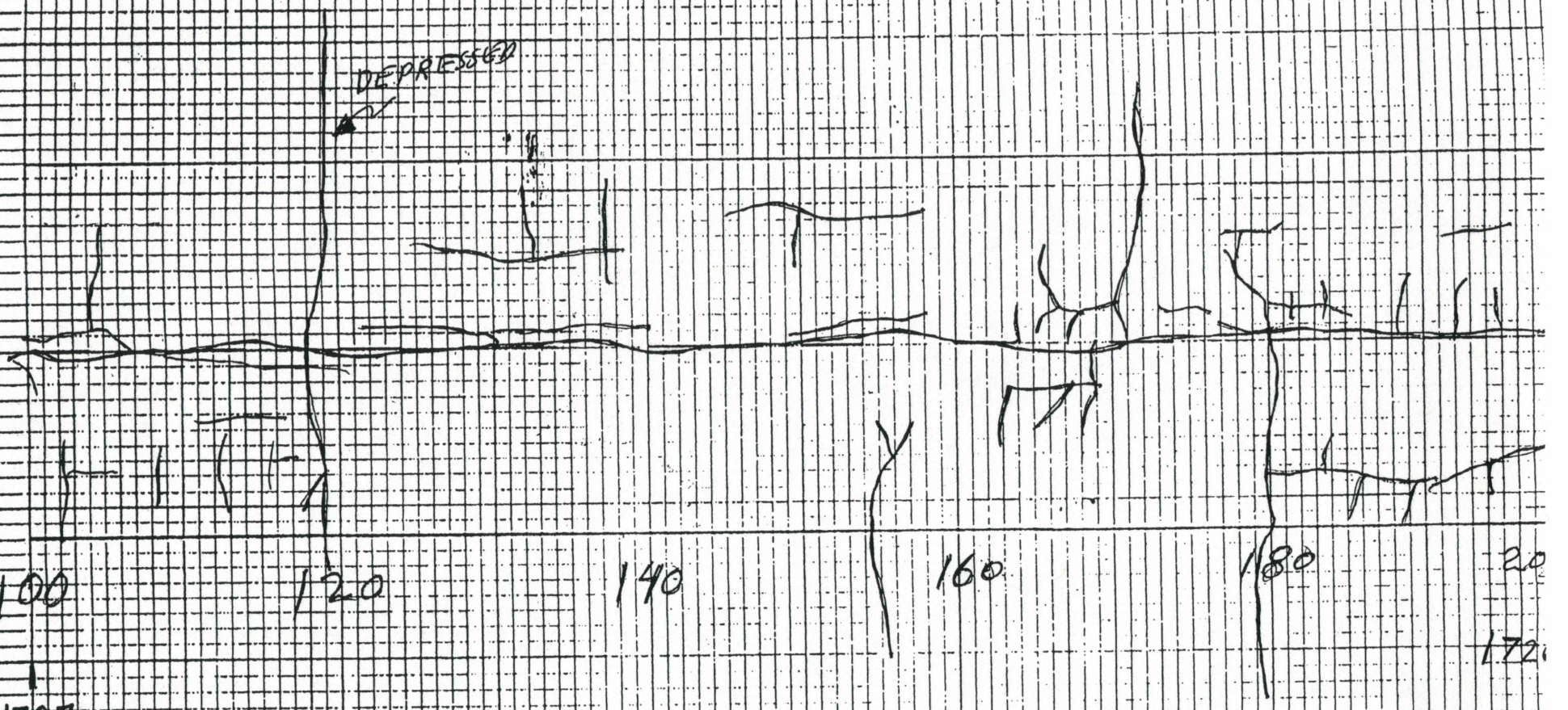
(172 B+00 IS STAKED IN MEDIAN & (TEMPORARILY) PAINTED ON OUTSIDE SHLDR.)



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
9		

6-4-94

CRACK MAP SECTION #6

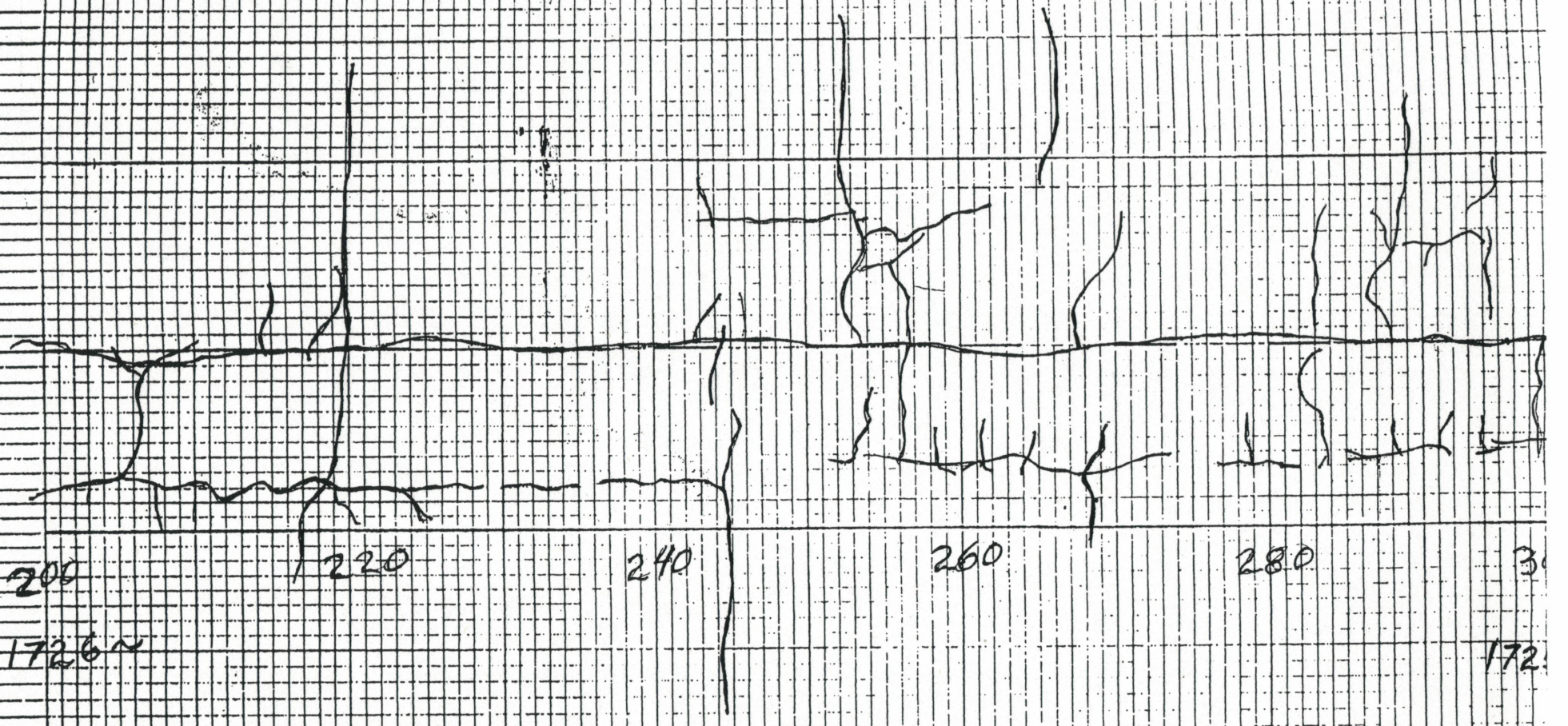


1727

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP SECTION #6



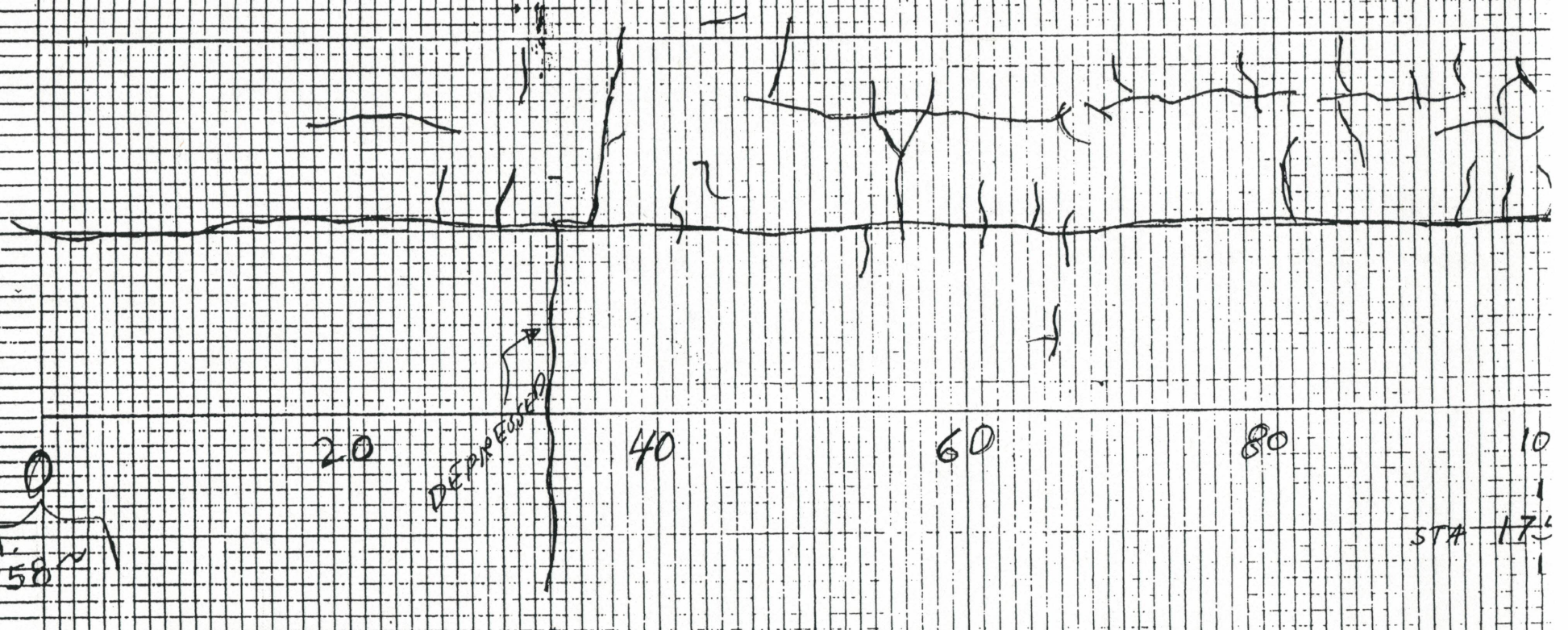
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

SECTION No. 7

LOCATED STA. 1758+00 → 1755+00

6-4-84



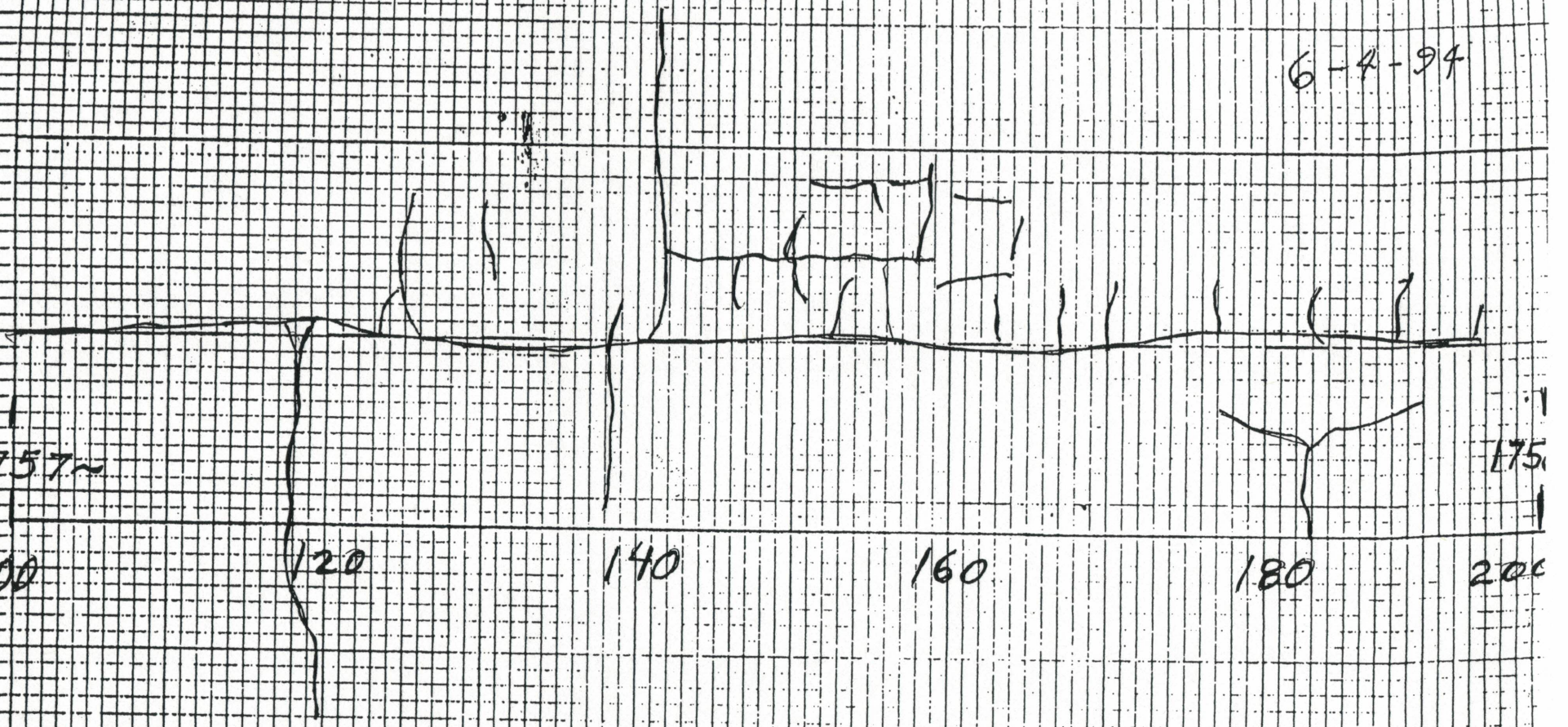
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

STA. 1758+00 IS STAKED IN THE MEDIAN. ALSO, 1758+00 IS (TEMPORARILY) PAINTED ON THE EAST SIDE SHLDR.

STA. 1758 → 1755
(A. END) (S. END)

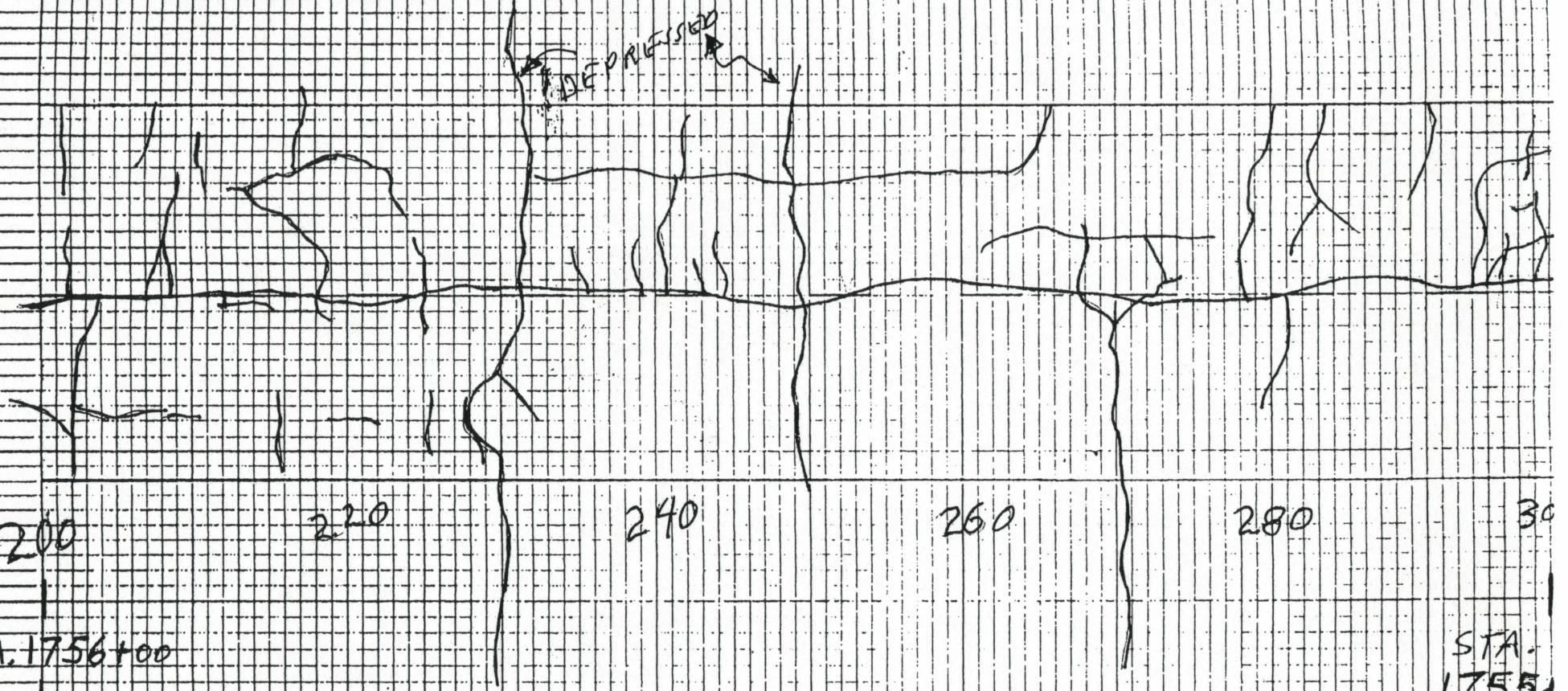
SECTION #7

6-4-94



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

SECTION #7

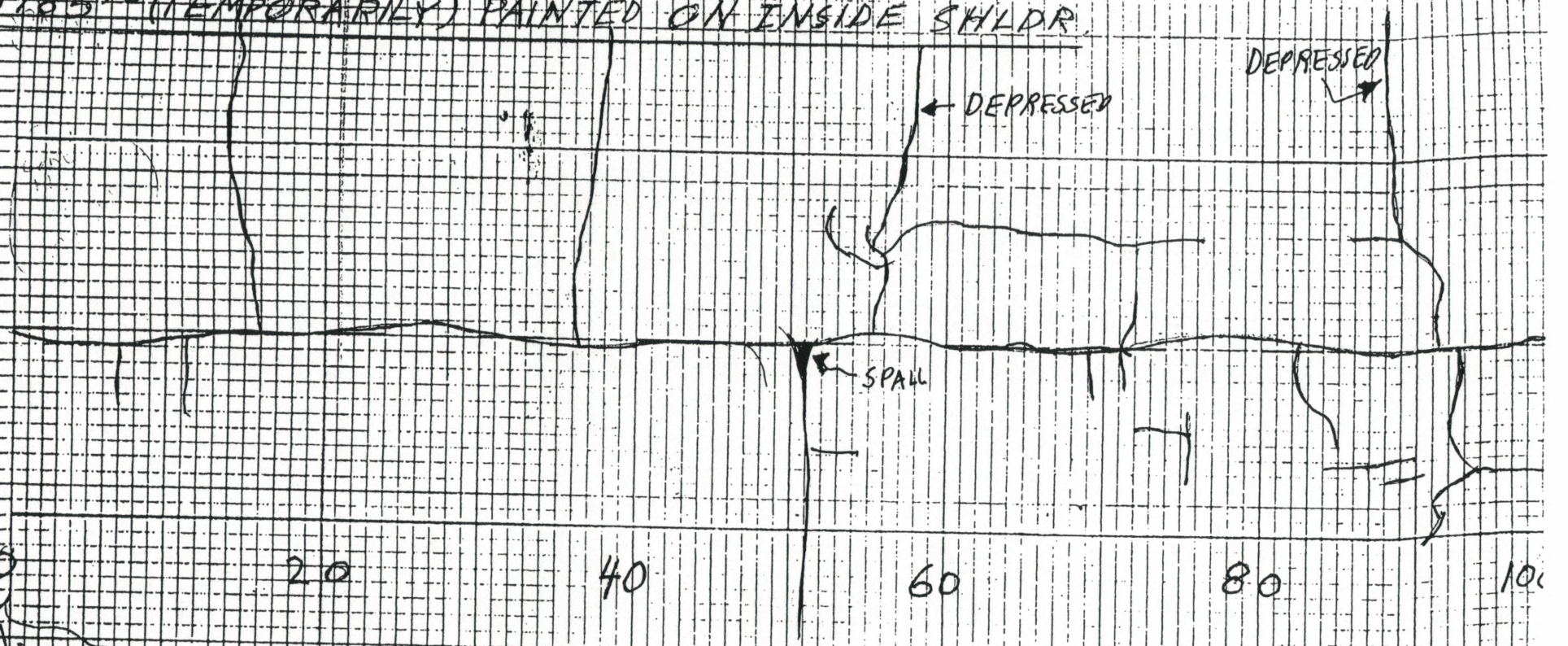


CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

CRACK MAP SECTION No. 8

STA. 1785 → 1782

1785 ~ (TEMPORARILY) PAINTED ON INSIDE SHLDR



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94 (BEFORE CONSTRUCTION)

CRACK MAP SECTION No. 8

STA. 1785~ → 1782~

1785+00 (TEMPORARILY)
PAINTED ON ESIDE SHLDR.
(INSIDE LANE PATCHED 12' WIDE (± 75' LONG))
PATCH BEGINS HERE →

PATCH ENDS HERE

SPALL

SPALL

100 120 140 160 180 20

STA. 1784~

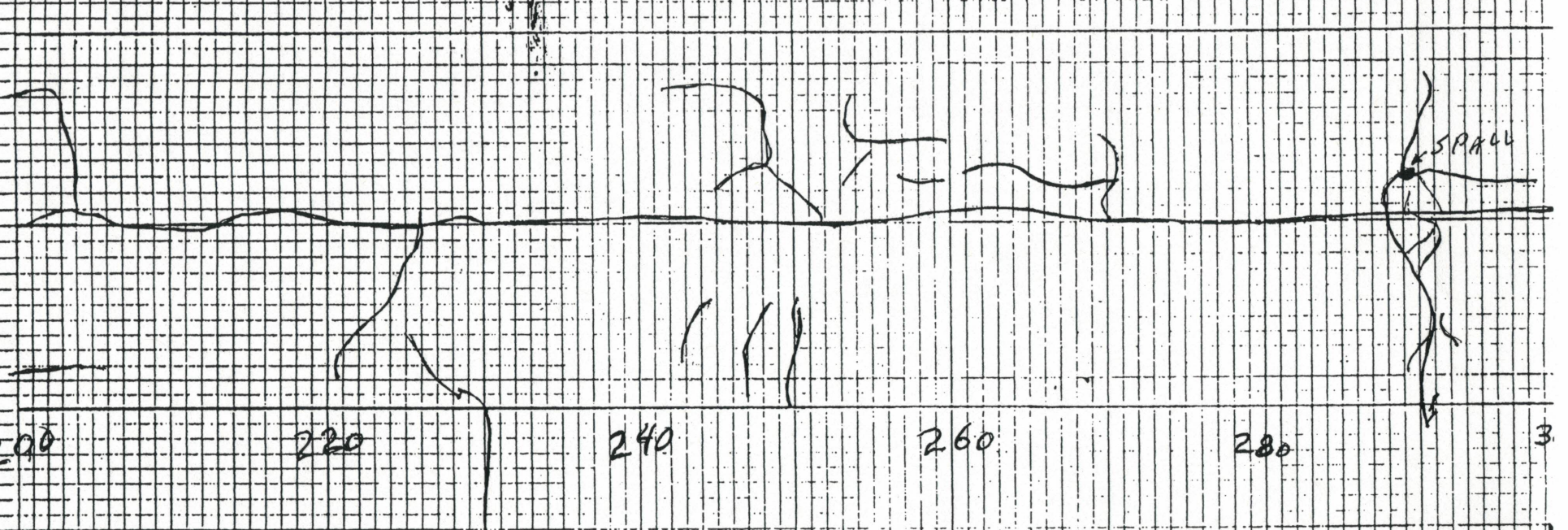
DEPRESSED

STA. 1783

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94

CRACK MAP SECTION No. 8



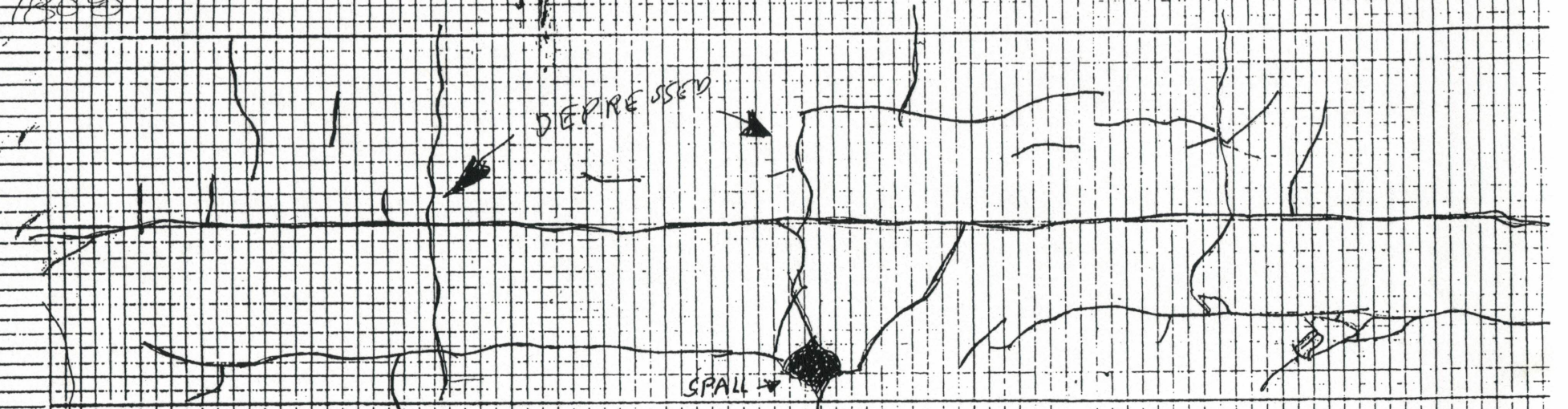
CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

CRACK MAP SECTION #9

BEGINS @ STA. 1808+00 (NB. END)

EXTENDS 300' S.

(STA. 1808+00 IS STAKED IN MEDIAN AND PAINTED ON INSIDE SHLDR.)



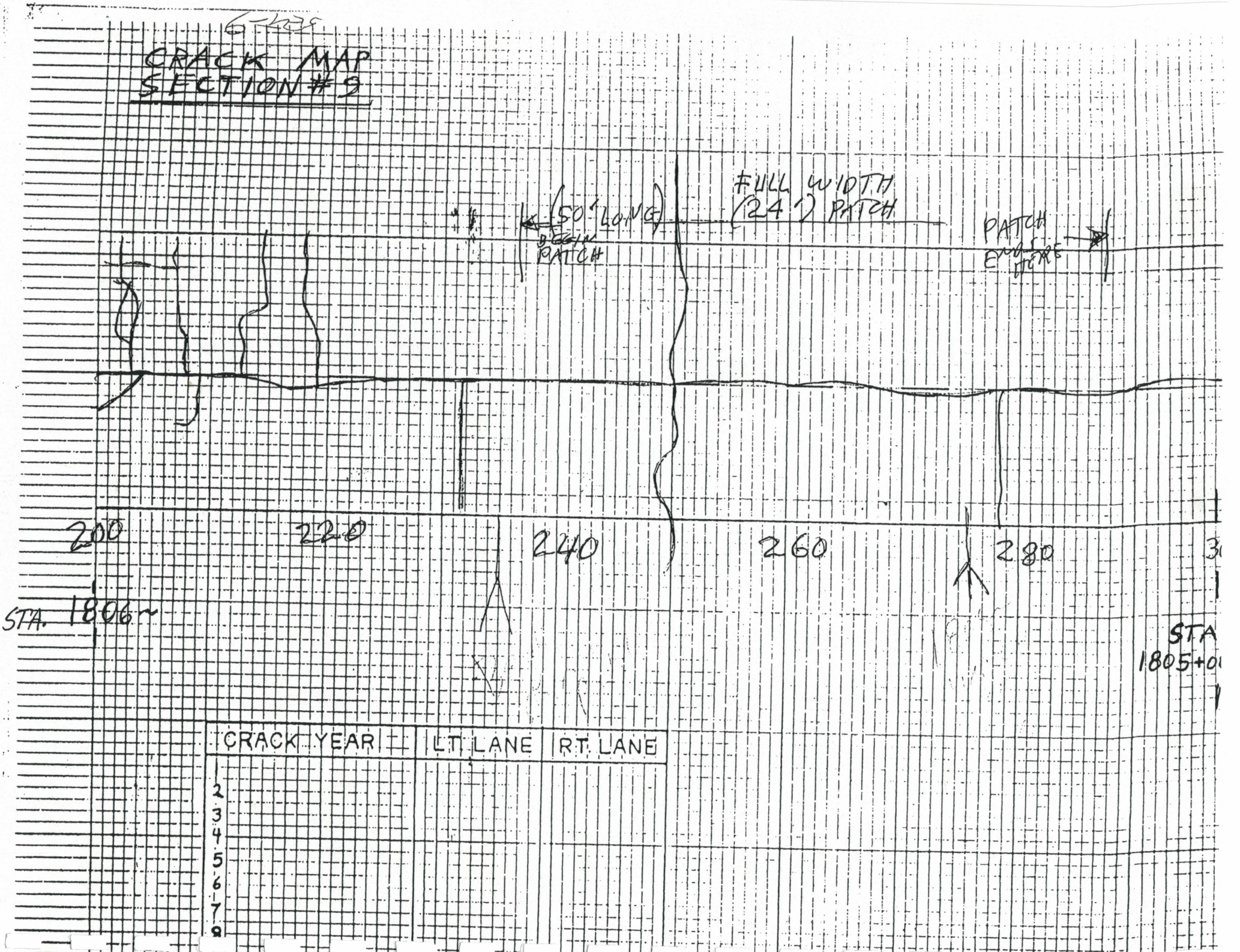
STA. 1808~

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

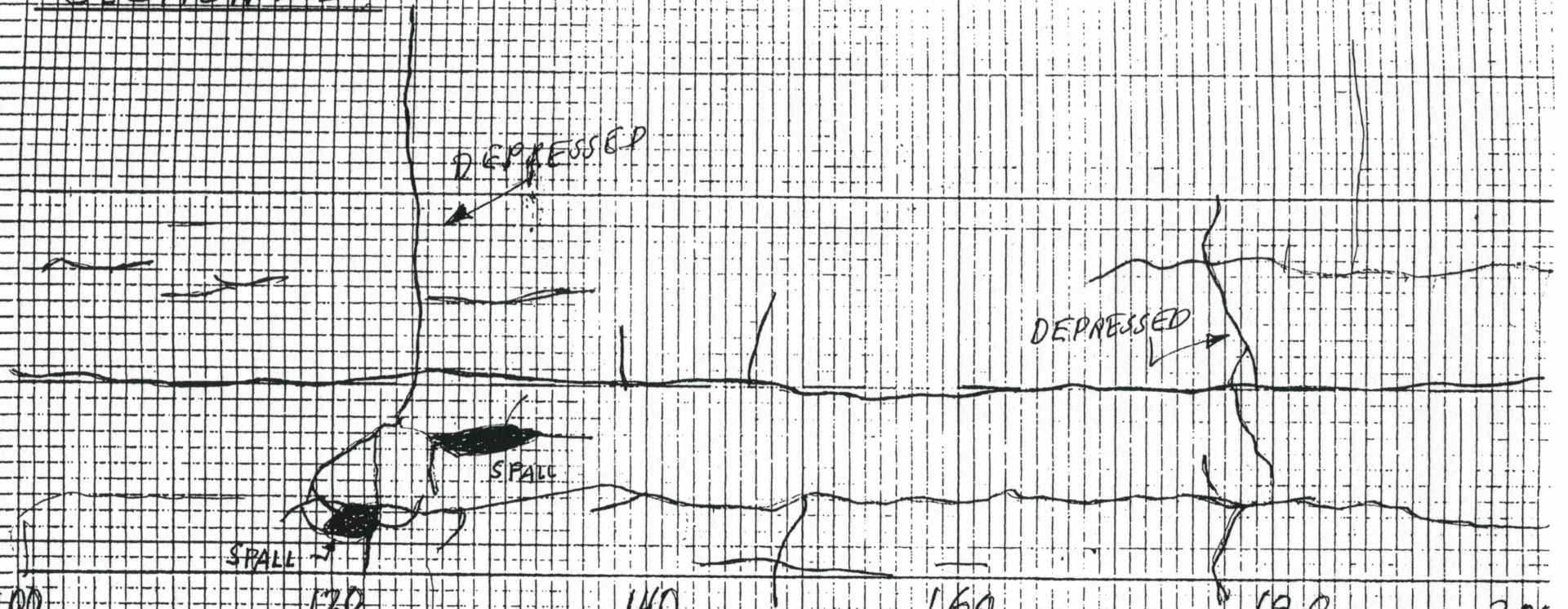
STA. 18

6-4-94

CRACK MAP SECTION #9



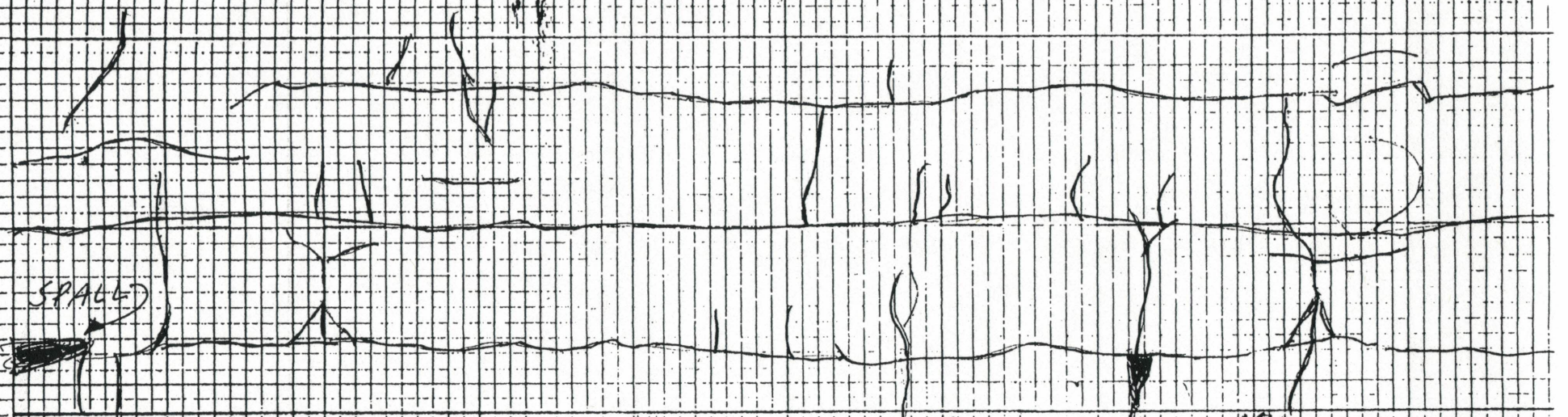
CRACK MAP
SECTION # 9



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-94
(BEFORE CONSTRUCTION)

CRACK MAP
SECTION # 10



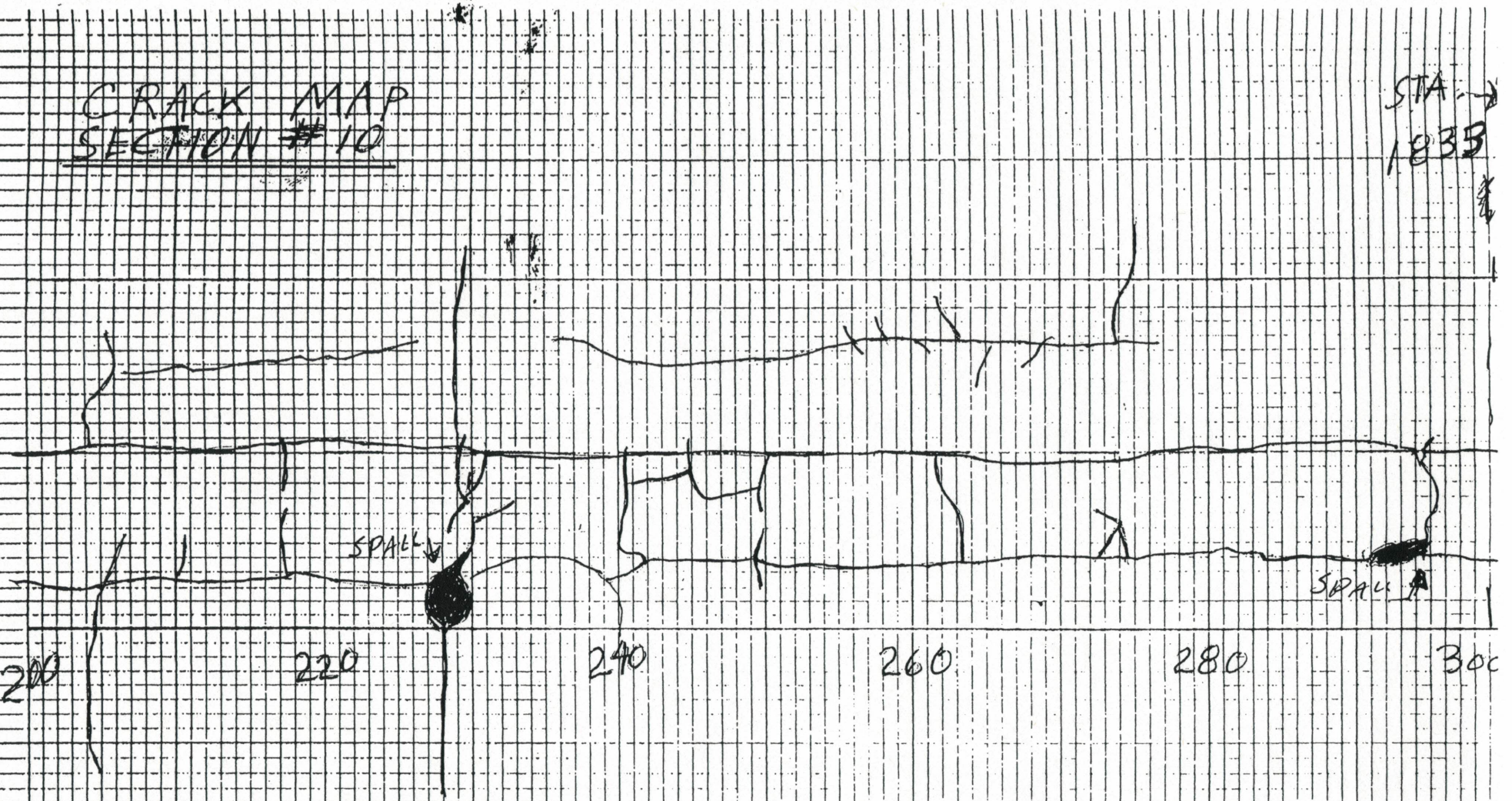
1836~

1835

CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-96

CRACK MAP
SECTION #10



CRACK YEAR	LT. LANE	RT. LANE
2		
3		
4		
5		
6		
7		
8		

6-4-95

APPENDIX C

ODOT

DAILY REPORTS

OF ROAD INSPECTOR

FOR LAYING ASPHALT MIXTURES

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 1

Date 6-3-95

Project NH 186 (190) C.S. No. _____ Division one

Material Type B (AC 30) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1 S.I.	160+20 — 16[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4693	516.90
					Total	4693	516.90

	Start		Temperature of Mixture at Spreading						Stop
Time	7:20	9:30							9:[illegible]
Temp. ° F.	310	310°							310

Weather: A. M. Clear P. M. Clear Temp. Min. 65° Max. 70°

Summary

Course	[illegible]					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.						
Total This Rpt.	4693	516.90				
Total to Date	4693	516.90				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.	110.3					

RECEIVED
APR 26 1996
RES. & DEV. DIV.

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

Tons to 516.90

351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 1

Date 6-2-95

Project _____ C.S. No. _____ Division 8 NE.

Material Type B Asph. (11 C 40) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1633+60-1642+03	RT	LT & Rt Rd	16	2"	1605	
1st	1642+03-1666+00	Rt	Lt Rt & Rt ½	16'	2"	3073	516.57
					Total	4678	516.57

Temperature of Mixture at Spreading

	Start								Stop
Time	9:55	12:30							1:50
Temp.	300°	310°							310°

Weather A. M. Cldy P. M. Cldy Temp. Min. 65° Max. 85

Summary

Course	2" Lift LT & RT LN RT Exp					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Previous						
Total This Date	4678	516.57				
Total to Date	4678	516.57				
Avg. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yds Req'd.	102.4					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1						
2						

cc: 1 – Resident Engr.
1 – Laboratory

TON'S TO 516.57

DT-331A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 2

Date 6-5-95

Project NH186 (190) C.S. No. _____ Division ONE

Material TYPE B ASPH (AC 40) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1633+60 – 1642+63.5	Rt	Rt	12	2"	1204	335.36
1st	1643+71.25 – 1660+00	"	Rt	12	2"	2305	
					Total	3509	335.36

Temperature of Mixture at Spreading

	Start									Stop
Time	1:20									2:30
Temp. ° F.	300°									300°

Weather: A. M. cldy P. M. cldy Temp. Min. 61° Max. 83°

Summary

Course	2'L, FT Rt+LtLN Rt Exp					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	4678	516.57				
Total This Rpt.	3509	335.36				
Total to Date	8187	851.93				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TOTAL TONS TO DATE 14851.69

INSPECTOR

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 2

Date 6-5-95

Project NH186(190) C.S. No. _____ Division ONE

Material Type B Asph (AC 30) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1607+20 - 1633+60	Rt	Rt	12'	2"	3520	312.64
					Total	3520	312.64

	Start	Temperature of Mixture at Spreading							Stop
Time	11:30	12.30							1:00
Temp. ° F.	300°	305							305

Weather: A. M. Cldy P. M. _____ Temp. Min. _____ Max. _____

Summary

Course	2" Lift (1+R1 Ln					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	4693	516.90				
Total This Rpt.	3520	312.64				
Total to Date	8213	829.54				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr. To OST
1 – Laboratory Date Tdal ~~H7633~~

Jerry Langevin
INSPECTOR

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 10

Date 5-26-95

Project NH-186(190) C.S. No. _____ Division ONE

Material "Type B" Asph 1-D Polymer Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1ST	1473+40-1478+46 62	RT	RT	12	2"	675	
	1478+47 62 = 1493+90	—	—	—		2057	266.89
					Total	2732	266.89

Temperature of Mixture at Spreading

	Start								Stop
Time	7:30	8:30							8:45
Temp. ° F.	315°	310°							300°

Weather: A. M. Cldy P. M. Cldy Temp. Min. 60° Max. 72°

Summary

Course	MAINLINE Polymod		Guard Rail Widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	106204	11007.96	548	124.15		
Total This Rpt.	2732	266.89	—	—		
Total to Date	108936	11274.85	548	124.15		
Av. Lbs/Sq. Yd. Laid	207.4					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr. TON'S TO DATE
1 – Laboratory

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 11

Date 5-30-95

Project NH 186(190) C.S. No. _____ Division ONE

Material Type "B" Asph 1-D Polymer Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1ST	1493+90 - 1523+12.35	RT	RT LN	12'	.2"	3811	386.08
1ST	1537+11.88 - 1545+00	RT	"	12'	.2"	1052	

Total 4946 386.08

Temperature of Mixture at Spreading

	Start								Stop
Time	7:30	9:00							9:30
Temp. ° F.	310°	305°							300°

Weather: A. M. Cldy P. M. Rain Temp. Min. 62° Max. 71°

Summary

Course	Main Line Poly Mod		Guard Rail Widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	108936	11274.85	548	124.15		
Total This Rpt.	4946	386.08	—	—		
Total to Date	113882	11660.93	548	124.15		
Av. Lbs/Sq. Yd. Laid	205.2					
Lbs/Sq. Yd. Req'd.	205.2					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr. TON'S TO 13561.18
1 – Laboratory

B. L. Mantz

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 12

Date 6-2-95

Project NH 186(190)

C.S. No. _____

Division One

Material Type B Asph I-D [illegible]

Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1545+00 - 1554+00	Rt	Lt	12'	2"	1200	95.65
				Total		1200	95.65

	Start	Temperature of Mixture at Spreading							Stop
Time	7:00								7:30
Temp. ° F.	315°								310°

Weather: A. M. Cldy P. M. Cldy Temp. Min. [illegible] Max. 80°

Summary

Course	Main Line Paving	[illegible]	
	Sq. Yds. / Tons	Sq. Yds / Tons	Sq. Yds. / Tons
Total Prev. Rpts.	113882 / 11,660.93	548 / 120.15	
Total This Rpt.	1200 / 95.65	- / -	
Total to Date	115082 / 11756.58	548 / 120.15	
Av. Lbs/Sq. Yd. Laid	204.3		
Lbs/Sq. Yd. Req'd.	205.0		

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TONS 11,756.58
20 136.83

[illegible]

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 13

Date 6-3-95

Project NH 186(190) C.S. No. _____ Division ONE

Material Type "B" asph I-D Polymer Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1ST	1660+00 – 1723+50	RT	LT	16'	2"	11,289	1082.87
				Total		11,289	1082.87

	Start	Temperature of Mixture at Spreading							Stop
Time	2:00	3:30	4:55	6:25					6:40
Temp. ° F.	315°	310°	315	310°					315°

Weather: A. M. Cldy P. M. Cldy Temp. Min. _____ Max. _____

Summary

Course	Mainline Polymod		Guardrail Widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	115082	11756.58	548	124.15		
Total This Rpt.	11289	1082.87	–	–		
Total to Date	126371	12,839.45	548	124.15		
Av. Lbs/Sq. Yd. Laid	203.2					
Lbs/Sq. Yd. Req'd.	203.0					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr. TONS TO 12839.70
1 – Laboratory

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 14

Date 6-5-95

Project NH-186(130) C.S. No. _____ Division _____

Material TYPE B ASph 1-D Polymer Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1660+00 - 1694+00	Rt	Rt	12'	3"	4533	315.19
					Total	4533	315.19

	Start		Temperature of Mixture at Spreading						Stop
Time	2:30	4:00							4:25
Temp. ° F.	305	300°							300°

Weather: A. M. cldy P. M. cldy Temp. Min. 61 Max. 83°

Summary

Course	MA. W.L.NE LATEX mod		Guard Rail widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	126371	12839.45	548	124.15		
Total This Rpt.	4533	315.19	—	—		
Total to Date	130904	13154.64	548	124.15		
Av. Lbs/Sq. Yd. Laid	200.9					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TOT TONS TO DATE 15054.89

Jerry Pogue
INSPECTOR

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 15

Date 6-6-95

Project NH 186 (190) C.S. No. _____ Division _____

Material Type B Asph 1-D polymer Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
15+	1723+50 - 1731+75	Rt	Rt 4' shld	16'	3"	1467	144.07
					Total	1467	144.07

	Start	Temperature of Mixture at Spreading						Stop
Time	7:00	7:40						7:40
Temp. ° F.	310°	305°						305°

Weather: A. M. Cldy P. M. Cldy Temp. Min. 60° Max. 70°

Summary

Course						
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	130904	15154.64	548	124.15		
Total This Rpt.	1467	144.07	—	—		
Total to Date	132371	13,298 71	548	124.15		
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TOT TONS TO DATE 15,198.96

INSPECTOR

DT 351A
Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 16

Date 6-7-95

Project NH 156 (114)

C.S. No. _____

Division One

Material Type B Asph. PG Polymer

Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st.	173+72 - 184+50.90	Rt	Rt + Shld	16	2"	20935	2149.73
					Total	20935	2149.73

Temperature of Mixture at Spreading

	Start								Stop
Time	10:00	11:45	2:00	3:05	5:00	5:45	6:40		7:10
Temp. ° F.	305°	300°	305°	300°	310°	285°	285°		285

Weather: A. M. Cldy P. M. Cldy Temp. Min. 65° Max. 91°

Summary

Course	2" Lift Mainline Ethleyr mod		Guardrail widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	132371	13258.71	548	124.15		
Total This Rpt.	20935	2149.73	—	—		
Total to Date	153306	15408.44	548	124.15		
Lbs/Sq. Yd. Laid	201.5					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

Total TONS TO DATE 17,548.09

INSPECTOR

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 17

Date 6-8-95

Project NH 186 (190) C.S. No. _____ Division ONE

Material TYPE B ASPH. 1-D DOUGHE. Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	11+94.00 - 18+59.20	Rt	Rt.	13'	2"	20736	1992.16
					Total	20736	1992.16

Temperature of Mixture at Spreading

	Start								Stop
Time	7:10	8:10	9:40	11:20	1:20	2:50			4:05
Temp. ° F.	310°	295°	300°	285°	310°	310°			305°

Weather: A. M. Clear P. M. Clear Temp. Min. 64° Max. 88°

Summary

Course	2" Lift Mainline Rt+Lt Exp. Mod		Guardrail widening			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	153306	15448.44	548	124.15		
Total This Rpt.	20736	1992.16	—	—		
Total to Date	174042	17440.60	548	124.15		
Av. Lbs/Sq. Yd. Laid	200.4					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches	
					Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TOTAL TONS TO DATE 17440.25

INSPECTOR

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 1

Date 10-22-94

Project NH-186 (190) C.S. No. _____ Division One

Material (Asphaltic Conc. Type B Mod) Type II-C Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st.	177+00 - 174+300	Lt	Lt	12	2"	3733	349.77
					Total	3733	349.77

	Start		Temperature of Mixture at Spreading						Stop
Time	12:30	1:30							3:20
Temp. °F.	325°	330°							325°

Weather: A. M. C/R P. M. C/R Temp. Min. 75° Max. 75°

Summary

Course	MAINLINE PMOD					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	0	0				
Total This Rpt.	3733	349.77				
Total to Date	3733	349.77				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.		Thick., Inches Measured	Thick., Inches Plan
1 LI-1	1:00	176+60	LT	LT	2¼"	2"
2						

cc: 1– Res. Engr. TONS TO DATE 1424.30
1 – Laboratory

Kenneth Prater
INSPECTOR

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 1

Date 10-22-94

Project NH 186 (190) C.S. No. _____ Division One

Material Type B Asph (Mod AC) (Type 1-D) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st.	1799+50.90 – 1797+00	Lt	Lt	12'	2"	6868	697.32
					Total	6868	697.32

	Start		Temperature of Mixture at Spreading						Stop
Time	7:45	9:25							11:00
Temp. °F.	325°	330°							330°

Weather: A. M. Clr P. M. Clr Temp. Min. 65° Max. 70°

Summary

Course	1S	MAINLINE PMOD				
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	0	0				
Total This Rpt.	6868	697.32				
Total to Date	6868	697.32				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1	L-1-1	10:00	1839+90	Lt	Lt	2 1/8"	2"
	L-1-2	10:30	1808+88	Lt	Lt	2 1/8"	2"
2							

cc: 1– Res. Engr. 70 ~ S TO
1 – Laboratory DATE 697.32

J. Porter
INSPECTOR

DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 7

Date 10-22-94

Project NH 186 (190) C.S. No. _____ Division one

Material (Asphaltic Conc. Type B mod) Type III-D Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	179+00 - 177+00	L1	Lt	12'	2"	3600	377.21
					Total	3600	377.21

	Start		Temperature of Mixture at Spreading						Stop
Time	11:00	11:30							12:30
Temp. °F.	310°	315							325

Weather: A. M. C/R P. M. C/R. Temp. Min. 70° Max. 73°

Summary

Course 1st	MAINLINE PMOD					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	0	0				
Total This Rpt.	3600	377.21				
Total to Date	3600	377.21				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1 L1-1	12:00	178+52	Lt	Lt	2¼"	2"
2						

cc: 1– Res. Engr. TONS TO
1 – Laboratory DATE 10/11.53

Ronald Pail
INSPECTOR

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 2

Date 10-23-94

Project NH 186 (190) C.S. No. _____ Division One

Material Asphaltic Conc. Type B and Type II-C Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1779+00 - 1747+80	Lt	Rt	16	2"	5547	526.63
					Total	5547	526.63

	Start		Temperature of Mixture at Spreading						Stop
Time	1:20	2:30							3:30
Temp. °F.	335°	335°							330.

Weather: A. M. Clr P. M. Clr. Temp. Min. 70 Max. 75.

Summary

Course	Mainline Prod.					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	3733	349.77				
Total This Rpt.	5547	526.63				
Total to Date	9280	876.40				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1 L1-2	2:00	1774+75	Lt	Rt	1 7/8"	2"
2 L1-3	3:00	1756+86	Lt	Rt	2 1/8"	2"

cc: 1– Res. Engr.
1 – Laboratory

TONTO
Date. 3345.84

K Dale
INSPECTOR

ev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 2

Date 10-23-94

r ect NH-186 (190) C.S. No. _____ Division one

laterial Asphaltic Conc. Type B. (Type A-1)) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1849+50 - 1804+30	Lt	Rt	16	2"	8037	872.42
				Total		8037	872.42

	Start	Temperature of Mixture at Spreading							Stop
Time	7:30	10:00	11:00						11:30
Temp. °F.	335°	320°	3						320°

Weather: A. M. CLR P. M. CLR Temp. Min. 60 Max. 65.

Summary

Course	Main Line Paved					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	6868	697.32				
Total This Rpt.	8037	872.42				
Total to Date	14905	1569.74				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
	LT-3	8:00	1804+00	Lt	Lt	2 1/8"	2"
1	L-2-1	10:00	1840+00	Lt	Rt	2 1/8"	2"
	L-2-2	10:30	1819+65	Lt	Rt	2 3/8"	2"
2	L-2-3	11:00	1812+00	Lt	Rt	2"	2"

c... 1– Res. Engr.
1 – Laboratory

Tons TO
Date 229.72

Kenneth Prater
INSPECTOR

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 2

Date 10-23-94

Project NH-186(190) C.S. No. _____ Division One

Material Asphaltic Concrete Type III-D Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1	1804+30 -- 1779+00	LT	RT	16	2"	11498	522.49
				Total		11498	522.49

	Start		Temperature of Mixture at Spreading						Stop
Time	11:00	12:00							1:20
Temp. °F.	330°	330.							330°

Weather: A. M. CLR P. M. CLR Temp. Min. 65 Max. 70

Summary

Course	mainline pmod.					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	3600	377.21				
Total This Rpt.	11498	522.49				
Total to Date	8098	899.70				
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1 LI-2	11:30	1790+88	LT	RT	2¼"	2"
2 LI-3	12:30	1795+10	LT	RT	2⅛"	2"

cc: 1– Res. Engr.
1 – Laboratory

TONS TO DATE 2819.21.

INSPECTOR

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 4

Date 10-25-94

Project NH 186 (190) C.S. No. _____ Division ONE

Material ASPHALTIC CONC T 4.0" B pmod (1-D) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1614+10 - 1573+11 38	Lt	Lt	12'	2"	10265	
1st	1523+12 35 - 1478+47 42	Lt	Lt	12'	2"	5953	1748.85
1st	1478+46 62 - 1473+60	Lt	Lt	12'	2"	649	
					Total	16867	1748.85

	Start	Temperature of Mixture at Spreading							Stop
Time	8:00	9:00	11:30	1:00	3:00				5:30
Temp. ° F.	320°	325°	330°	325°	325°				320°

Weather: A. M. Cldy P. M. Clr Temp. Min. 47° Max. 61

Summary

Course	Main Line Pmod					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	28594	2840.65				
Total This Rpt.	16867	1748.85				
Total to Date	45461	4589.50				
Av. Lbs/Sq. Yd. Laid	201.9					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1	L-4-1	8:30	1523+83	Lt	Lt	1 7/8"	2"
	L-4-2	9:10	1596+35	Lt	Lt	1 3/4"	2"
2	L-4-3	12:40	1572+71	Lt	Lt	2"	2"
	L-5-1	1:20	1555+00	Lt	Lt	2"	2"
	L-5-2	2:45	1515+05	Lt	Lt	2"	2"
	L-5-3		1493+71	Lt	Lt	1 3/4"	2"

c 1– Res. Engr.
1 – Laboratory

TONS TO DATE 6365.20

Jerry Langer
INSPECTOR

DEPARTMENT OF TRANSPORTATION

Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 5

Date 10-26-94

Project NH 186 (190) C.S. No. _____ Division ONE

Material Asphaltic Conc Type B (1-D) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
	1722+35 - 1642+71.25	Lt	Rt+4'Shld	16'	2"	14158	2308.94
	1642+63.93 - 1602+00	Lt	Rt+4'Shld	16'	2"	7223	
					Total	21381	2308.94

	Start	Temperature of Mixture at Spreading							Stop
Time	9:30	11:00	1:00	3:00	4:00	5:00			7:00
Temp. °F.	330°	330°	335°	335°	320°	325			325

Weather: A. M. CLR P. M. CLR Temp. Min. 42° Max. 61°

Summary

Course	MAINLINE PMOD					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	45461	4589.50				
Total This Rpt.	21381	2308.94				
Total to Date	66842	6898.44				
Av. Lbs/Sq. Yd. Laid	206.0					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1	LG-1	10:00	1618+60	Lt	Rt Shld	1 7/8"	2"
	LG-2	10:45	1658+00	"	Lt Lane	2 1/4"	2"
	LG-3	11:30	1645+22	"		2 1/4"	2"
2	LT-1	1:15	1630+08	"	"	2 1/8"	2"
	LT-2	2:45	1615+70	"	"	2 1/8"	2"
	LT-3	3:30	1610+40	"	"	2 3/4"	2"

cc: 1 – Res. Engr. TONS TO DATE 8674.54
1 – Laboratory

Kenneth Prater
INSPECTOR

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 3.

Date 10-24-94

Project NH-156(190) C.S. No. _____ Division one

Material Asphaltic Conc (Type B) Type I-D Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1711+95 - 1642+71.25	Lt	Lt	12'	2"	9885	902.88
1st	1642+63.03 - 1614+10	Lt	Lt	12'	2"	3804	368.03
						Total	13,689 / 1270.91

	Start	Temperature of Mixture at Spreading							Stop
Time	11:30	1:00	2:00	3:00	4:00				4:30
Temp. °F.	320°	325°	330	330°	325°				325°

Weather: A. M. Pt/cldy P. M. Pt/cldy Temp. Min. 53° Max. 70°

Summary

Course	MAINLINE PMod					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	14905	1569.74				
Total This Rpt.	13689	1270.91				
Total to Date	28594	2840.65				
Av. Lbs/Sq. Yd. Laid	198.7					
Lbs/Sq. Yd. Req'd.	205.0					

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1	L3-1	12:00	1695+13	Lt	Lt	1 5/8"	2"
	L3-2	2:00	1664+50	Lt	Lt	1 7/8"	2"
2	L3-3	3:30	1644+00	Lt	Lt	1 1/8"	2"

1– Res. Engr.
1 – Laboratory

TONS TO DATE. ~~4695.85~~ 4616.75

INSPECTOR

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 6

Date 10-27-94

Project NH-186(190) C.S. No. _____ Division One

Material Asphaltic Conc Type B Plant Mix (1/2"-D) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1602+00 - 1537+11.08	LT	RT 2 LANES	16'	2"	11536	1335.96
1st	1523+12.35 - 1478+47.42	LT	RT 2 LANES	16'	2"	7938	1046.17
1st	1478+46.62 - 1473+60	LT	" "	16	2"	865	
					Total	20339	2382.13

Temperature of Mixture at Spreading

	Start								Stop
Time	9:00	10:00	11:30	1:00	3:00	4:30	5:30		7:30
Temp. °F.	335°	375	370	320	325°	320°	325°		325°

Weather: A. M. CR P. M. CLR Temp. Min. 45° Max. 67°

Summary

Course	MAIN LINE PMOD.					
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	66842	6898.44				
Total This Rpt.	20339	2382.13				
Total to Date	87,181	9280.57				
Av. Lbs/Sq. Yd. Laid	212.					
Lbs/Sq. Yd. Req'd.	205					

Information on Sampling

		Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1	28-1	9:20	1590+60	LT	RT 2 LANE SIDE	2½"	2"
	28-2	10:15	1575+48	"	"	2¼"	"
	28-3	11:05	1560+00	"	"	2¼"	"
2	29-1	1:00	1546+64	"	"	2¼"	"
	29-2	1:50	1516+51	"	"	2¼"	"
	29-3	2:40	1503+93	"	"	2¼"	"
	2-10-1	3:30	1488+96	"	"	2½"	"
	2-10-2	4:30	1474+50	"	"	2½"	"
	2-10-3	6:00	1462+10	"	"	2½"	"

Copies: 1 – Res. Engr. 1 – Laboratory

TONS TO DATE: 11,056.67

LAEC: 11,

Larry Dwyer
INSPECTOR

Rev. 10-76

79.38

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 11

Date 10-28-94

Project NH-186 (190) C.S. No. _____ Division One

Material Asph. Type "B" (Recycle) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	1849+50 - 1705+30	Lt	10' Shld	10	2" to 1½"	16023.	1482.23
					Total	16023	1482.23

Temperature of Mixture at Spreading

	Start								Stop
Time	10:15	10:45	12:30	2:00	3:30				500
Temp. ° F.	285	295°	295	300°	295°				300°

Weather: A. M. C/R P. M. C/R Temp. Min. 45° Max. 73°

Summary

Course			3" Lift Crossovers and Miscellaneous			
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	97202	4253.10	20580	2322.51		
Total This Rpt.		—	16023	1482.23		
Total to Date	97202	4253.10	36603	3804.74		
Lbs/Sq. Yd. Laid			207.9			
Lbs/Sq. Yd. Req'd.			VAR.			

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Plan
1						
2						

c: 1– Res. Engr.
1 – Laboratory 4575.0 TONS TO

Kenneth Pratt
INSPECTOR

DT 351A
R 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. 12

Date 10-29-94

Project NH 186 (190) C.S. No. _____ Division One

Material Asphaltic Conc. Type B (Recycle) Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
	Ramp @ onramp 1624470 - 1629472	Lt	Ramp	Vari	Vari	891	92.5
	Ramp @ onramp 1654400 - 1663400	Lt	Ramp	Vari	Vari	1180	110.78
	1705430 - 1694711	Lt	"	10'	2"	6954	
	1644238 - 1556400	Lt	"	10'	2"	9626	
					Total	18571	1706.43

	Start	Temperature of Mixture at Spreading							Stop
Time	9:10	9:30	11:30	1:30	3:00	4:00			5:15
Temp. °F.	300°	295°	305°	300°	295	300°			300°

Weather: A. M. Clr P. M. Partly Cloudy Temp. Min. 51 Max. 77°

Summary

Course	Over Existing		2" Thick Type B Recycle		Overlay on Ramp	
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	[illegible]	[illegible]	36603	3202.72	—	—
Total This Rpt.	—	—	18571	1503.15	1991	203.28
Total to Date	[illegible]	[illegible]	55174	5307.89	1991	203.28
Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Thick., Inches Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

TONS TO DATE 1764.33

INSPECTOR

Rev. 10-76

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION
Daily Report of Road Inspector
For Laying Asphalt Mixtures

Report No. #13

Date 10-30-94

Project NH-186(190)

C.S. No. _____ Division ONE

Material Type B Asph (Recycled)

Spec. Item _____

Day's Run

Course	Station to Station	Expwy	Lane	Width Feet	Thick, Inches	Sq. Yds.	Tons
1st	Ramp @ 150 1511+00 - 1508+00	Lt	SBound Off Ramp	VAR	VAR Leveling	711	76.04
1st	Ramp @ 150 1477+50 - 1488+00	Lt	SBound On Ramp	VAR	VAR Leveling	1528	167.30
1st	1556+00 - 1537+11.08	Lt	10' shld	10	2" x 1.5"	2099	57.55
1st	1523+12.35 - 1478+47.42	Lt	10' shld	10	2" - 1.5"	4961	487.34
1st	1478+46.62 - 1478+60	Lt	10' shld	10	2" - 1½"	541	51.38
1st	1689+50 - 1654+00	LT	SBound RAMPS	VAR	2"	1590+2167 3756	487.60
					Total	13596	1327.21

Temperature of Mixture at Spreading

	Start								Stop
Time	8:00	10:00	11:16	1:00					3:00
Temp. °F.	300°	298°	300°	295°					290°

Weather: A. M. PtLy Cldy P. M. PtLyCldy Temp. Min. 55° Max. _____

Summary

Course	Overlay Existing		Mill Cross Outs, Ramps & Mainline 4 10' shld.		Leveling Case Ramp	
	Sq. Yds.	Tons	Sq. Yds	Tons	Sq. Yds.	Tons
Total Prev. Rpts.	97282	4253.16	55174	5307.89	1991	203.28
Total This Rpt.	-	-	11357	1083.87	2239	243.34
Total to Date	97282	4253.16	66531	6391.76	4230	446.62
Av. Lbs/Sq. Yd. Laid						
Lbs/Sq. Yd. Req'd.						

Information on Sampling

	Time	Station	Expwy.	Lane	Thick., Inches Measured	Plan
1						
2						

cc: 1– Res. Engr.
1 – Laboratory

Tons to Date 11691.54

INSPECTOR