
**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION**



FINAL

Plasphalt Project

**The Performance Evaluation of 21st Street
Plasphalt Project**

District 5-0, Wilson Borough

Prepared By:

**Jelena Vukov, P.E.
Apex Companies, LLC**

OCTOBER 2008

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	PLASPHALT™ PROJECT REQUIREMENTS	1
2.0	21ST STREET PLASPHALT PROJECT	3
2.1	PLASPHALT PAVING (2003).....	3
2.2	ASPHALT PLANT PRODUCTION.....	5
2.3	TRPA MATERIAL SPECIFICATIONS	5
3.0	PERFORMANCE EVALUATIONS	7
3.1	FIRST-YEAR PERFORMANCE EVALUATION (2004).....	7
3.2	SECOND-YEAR PERFORMANCE EVALUATION (2005).....	7
3.3	THIRD-YEAR PERFORMANCE EVALUATION (2006).....	8
3.4	FOURTH-YEAR PERFORMANCE EVALUATION (2007).....	8
3.5	FIFTH-YEAR PERFORMANCE EVALUATION (2008).....	9
4.0	CONCLUSIONS	10
5.0	ACKNOWLEDGEMENTS	11

ATTACHMENTS

Attachment 1	Instructions to Local Government on Plasphalt Pavement Courses Plasphalt HMA Pavement Course Specifications
Attachment 2	PennDOT Draft Guidelines for Plasphalt Project Evaluations
Attachment 3	Project Contract Site Location Map
Attachment 4	Pre-paving Photographs Initial Paving Field Evaluation Form Initial Paving Photographs
Attachment 5	Hellertown Materials Plant Photographs
Attachment 6	Job Mix Formulas Plasphalt Test Results
Attachment 7	First-Year Performance Evaluation (2004)
Attachment 8	Second-Year Performance Evaluation (2005)
Attachment 9	Fourth-Year Performance Evaluation (2007)
Attachment 10	Fifth-Year Performance Evaluation (2008)

1.0 INTRODUCTION

Under the Strategic Recycling Program, PennDOT provides assistance to Districts in the selection and performance evaluation of recycled materials and demonstration projects that incorporate recyclable materials. This report provides an overview on the paving operations and a 5-year performance evaluation of 21st Street Plasphalt Project performed in the Borough of Wilson, Pennsylvania. This report is intended to satisfy the demonstration project reporting requirements of the PennDOT, Bureau of Construction and Materials (BCM).

The Borough of Wilson awarded two contracts to Lehigh Valley Site Contractors Inc. to perform Plasphalt paving of three residential streets within the Borough: Hay Terrace (2002), 21st Street and Jefferson Street (2003). This report provides the performance evaluation for the 21 Street plasphalt project; separate reports are issued for the plasphalt paving projects on Jefferson Street and Hay Terrace Plasphalt projects.

1.1 Plasphalt Project Requirements

Hot mix asphalt concrete containing Treated Recycled Plastic Aggregate (TRPA) is referred to by the trade name PlasphaltTM (plasphalt). TRPA material is composed of ground recycled thermoplastic, treated with a proprietary process to improve the bond strength between the plastic and asphalt binder. For the Wilson Borough project, TRPA materials were provided by Telecan International, Inc., Albuquerque, New Mexico, through a local representative. At this time there is still limited available research on the performance-related properties of plasphalt. Some initial studies suggest that plasphalt, when used as a pavement surface, has the potential to prevent or lessen the severity of rutting.

Local governments in Pennsylvania have been interested in the use of plasphalt material for several reasons including: Liquid Fuels monies can be used to fund plasphalt on

municipal projects, the resistance to rutting is reported in research, and there is a real and perceived benefit to the Commonwealth in the use of recycled plastic materials.

To address this interest in plasphalt use, PennDOT developed use guidelines for municipalities and other entities interested in plasphalt paving. These guidelines, *Instructions to Local Governments who agree to use Plasphalt Hot Mix Asphalt (HMA) Pavement Courses* and Plasphalt HMA Pavement Course Specifications are provided in Attachment 1.

Plasphalt specifications call for the use of hot mix asphalt (HMA) with some of the conventional aggregate substituted with treated recycled plastic aggregate (TRPA) to a maximum of 1.5% substitution. Because plasphalt paving projects are considered experimental, BCM requires performance evaluations to compare them to standard paving mixes. As provided in Attachment 2, PennDOT Engineering Technology & Information (ETI) Division, Bureau of Construction Materials, provided Plasphalt specifications and a Draft Work Plan for Evaluation of Plasphalt Recycled Aggregate Substitute in HMA for Municipality Use and Specifications.

The use guidelines recommend that a minimum quantity of 600 tons, or 7040 square yards (approximately one lane mile at 12 feet wide land at 1 ½” depth) of Plasphalt HMA Pavement course to be used to compare against a standard Superpave 9.5 mm pavement wearing course (control section). These guidelines also call for evaluations that involve crack and rut inspections on both control and plasphalt sections. Along with the crack surveys, string line or straightedge rut measurements, photograph logs, and recording the dates and the severity of pavement distress are required to be taken and maintained throughout the five-year evaluation period.

Although minimum quantity requirement guidelines were not followed, the application was monitored for performance. Approximately 15 tons of wearing course were placed on 21st Street.

2.0 21st STREET PLASPHALT PROJECT

2.1 Plaspphalt Paving (2003)

The 21st Street Plaspphalt project was performed in District 5-0, Wilson Borough, Northampton County, between Pine Street and Northampton Street. This resurfacing project was performed as a Municipal Service Project #03-48-418-01, awarded to Lehigh Valley Site Contractors, Inc. Attachment 3 provides the Wilson Borough Plaspphalt Project contract information and Site Location Map.

The 21st Street project involved the reconstruction of approximately 50 foot length and 32 feet wide section of fairly steep South 21st Street to the Northampton Street intersection. Prior to paving, this section was observed to be significantly damaged, with evidence of “shoving” or non-typical rutting especially present on the dividing section and turning lanes. This type of damage can be caused by traffic entering the section before proper surface cooling temperatures were achieved on previous paving activities, or from heavy traffic load use (trucks and cars) on a steep slope. No plans or other documentation were available on the previous performed work at this location. However, the difference in paving surface elevations with curb and curb grate suggest resurfacing was, at minimum, performed in the past. Pre-reconstruction photographs are provided in Attachment 4.

For reconstruction, the road was milled to a 5 inches depth and 35 tons of conventional 19.5mm (3.5 inch) base repair course was placed on an area of approximately 178 square yards. The following day, a 9.5 mm (1.5 inch) Superpave plaspphalt wearing course was placed on the same reconstructed area, totaling approximately 15 tons of plaspphalt material. Plaspphalt delivery temperatures were within normal limits established by BCM. A vibratory roller and small surface roller were used to finish the placement. Three loose box samples of plaspphalt were collected during paving. No surface density meter readings were taken at this location.

It is the opinion of District 5-0 and Apex that the future evaluation of plasphalt performance at this location may provide insight to the performance of plasphalt at higher ESEL loads because of the combination of grade (steepness) and heavier truck traffic observed.

Conventional paving material was prepared at ABE Materials, Easton PA. Plasphalt was prepared at the Hellertown Materials, Hellertown, PA. Even though the 21st Street is considered a very small project (15 tons), it was agreed by all parties that that field evaluations of the placement of materials and yearly visual inspections would be performed.

Plasphalt paving was conducted on September 18, 2003. Wilson Borough officials, including Mr. Greg Drake, Superintendent of Public Works, and plasphalt representative, Mr. Terry Crouthamel, Sr. were also present intermittently for the paving activities. Mr. Robert Boyer, Municipal Services Supervisor, Mr. Robin Sukely, (BCM), Mr. Joseph Kretulskie, District 5-0 Municipal Services, and Ms. Jelena Vukov of Apex Companies, LLC representing PennDOT Pollution Prevention Section – Environmental Quality Assurance Division (PPS-EQAD) were present during the paving operations and present at the asphalt plant.

Mr. Greg Drake was provided copies of truck deliver slips for 19 mm base, 1.5 mm conventional and 9.5 mm plasphalt HMA. TR1461 Field Evaluation Form and photographs of the paving operation are provided in Attachment 4.

Paving was initiated on September 18, 2003, by Lehigh Valley Site Contractors, Inc. Equipment used for paving included a Barber Greene Model BT 211. For compaction, Lehigh used the Dynapac CC422 (large vibratory roller) and Dynapac Model CC122 (small roller). Small HMA paving quantities and short paving distance prohibited setting a rolling pattern.

Surface temperature of 19 mm base repair course as taken at 75 °F, with all edges tack coated prior to plaspalt placement. Mix delivery temperature for plaspalt was taken at 308 °F, and surface temperatures was measured at 104 °F.

Three loose samples were collected from mat behind the paver. The fourth loose sample increment was collected at Easton (asphalt plant) on the conventional wearing course mix.

2.2 Asphalt Plant Production

PennDOT District 5-0 State Material Inspectors were present at the Hellertown Plant during plaspalt production. Standard aggregate dosing equipment was not determined to not be functional for introduction of Treated Recycled Plastic Aggregate (TRPA) material into asphalt mixes in earlier plaspalt projects. The Hellertown Asphalt Plant addressed this by adding a separate auxiliary hopper with pneumatic injection, and a separate dosing machine, specifically for the introduction of TRPA into the asphalt mix. TRPA was added to the hopper from cardboard boxes via a small front-end loader. Although adequate for this scale of operations, this method of TRPA addition would not be adequate for larger scale plaspalt projects. No problems were observed during production. Attachment 5 contains photographs of TRPA material and plant hopper systems and Attachment 6 provides plant job mix results and burn test results from loose samples collected at the plant. Plaspalt material, as analyzed by the asphalt plant, met specifications.

2.3 TRPA Material Specifications

At the Hellertown asphalt plant, TRPA materials were observed to be packaged in plastic tarp and cardboard boxes without any markings to indicate their production or expiration dates. According to Mr. Terry Crouthamel, Sr., provided TRPA materials for the 2003 paving jobs were delivered to the Commonwealth in September 2002. Some concerns were raised by PennDOT about the shelf-life of TRPA materials (ability to “retain” a

charge) and if the material used in this project still met manufacturing specifications. It was agreed upon by all parties this issue would be clarified for any future approved work.

3.0 PERFORMANCE EVALUATIONS

3.1 First-year Performance Evaluation (2004)

The first-year evaluation was performed on May 11, 2004 by Mr. Joseph Kretulskie and Ms. Jelena Vukov. The following summarizes the key findings of the first-year visual evaluation from the site inspection. Attachment 7 provides photographs of the inspection and core sampling activities.

- In general, the plaspalt pavement shows good aging. No rutting or surface impairment was observed. Photographs YR1-1, YR-2 and YR-3 show wearing surface conditions.
- As expected, asphalt binder has worn off the plaspalt wearing surface. Photo YR1-4 shows coated aggregate and some plastic (TRPA) pieces showing embedded in the asphalt wearing coat. The predominant visible colors of TRPA are red, blue and yellow. No visible TRPA pieces were observed dislodged along the road side. Photographs YR1-4 and YR1-5 show close-ups of surface conditions. Grey and clear plastics were the predominant colors of plastic pieces (TRPA) introduced in the design mix. It is undetermined whether these predominant plastics color pieces have melted or are not visible at the surface.

3.2 Second-year Performance Evaluation (2005)

The second-year evaluation was performed on June 27, 2005, by Mr. Joseph Kretulskie and Ms. Jelena Vukov. The following summarize the key findings of the second-year visual evaluation. Attachment 8 provides photographs.

- In general, the plaspalt paving section shows good aging. See Photograph YR2-1.
- No rutting was observed in the southbound traffic lane, near the Northampton intersection. This area was previously identified as having the highest deformations (before reconstruction and paving). See Photograph YR2-2.

- Midpoint on northbound traffic lane on area was identified with slight rutting, maximum measurement of 5/64 inches deep (see Photographs YR2-3 and YR2-4).
- A circular concave indentation was observed forming on the southbound traffic lane, approximately 14 feet from Northampton Street. The diameter of impact was approximately 4 feet, with maximum depth of 1 and 1/8 inches. See Photographs YR2-5 and YR2-6.
- No other rutting or cracking was observed in northbound or southbound traffic lanes (Photographs YR2-7 and YR2-8).
- As expected, asphalt binder has worn off the wearing surfaces, exposing coated aggregate and TRPA pieces. No visible difference to plaspphalt paving surface in terms of exposed TRPA material was discernable from previous (first-year evaluation). No loss of TRPA pieces from plaspphalt course surface were observed.

3.3 Third-year Performance Evaluation (2006)

On-site evaluation was not performed at 21st Street in 2006.

3.4 Fourth-year Performance Evaluation (2007)

The fourth-year evaluation was performed on July 6, 2007, by Mr. Joseph Kretulskie and Ms. Jelena Vukov. Photographs with diagram of observed critical areas are provided in Attachment 9. The following summarizes the key findings of the walkthrough and visual observations:

- Pavement shows normal wear and some rut progression observed at previously (2005) identified areas. See Photograph YR4-1.
- On the northbound lane (8 feet from end of pavement – Northampton Street), a slight increase to rutting measured. Maximum rut depth measured at 1/4 inches. See photograph YR4-3.

- Continued expansion of circular depression on southbound land (14 feet from Northampton Street). Impacted area measured 4.5 feet long in the traffic path and 8 feet wide. Maximum depth at center measured at 1 3/8 inch. See Photograph YR4-4.
- First observance of hairline fracture (cracking) identified close to edge of paving (along Northampton Street). Measured 6 feet long, and ¼ inches in depth and width. See Photograph YR4-5.
- No visible difference was observed to plasphalt surface in terms of loss of fines (TRPA).

3.5 Fifth-year Performance Evaluation (2008)

The fifth-year evaluation was performed on July 10, 2008, by Mr. Joseph Kretulskie, PennDOT and Ms. Jelena Vukov and Mr. David Miller (Apex). Photographs with diagram of observed critical areas are provided in Attachment 10. The following summarizes the key findings of the walkthrough and visual observations:

- Pavement shows normal wear and some rut progression observed at previously (2007) identified areas. See Photographs YR5-1 and YR5-2.
- On the northbound lane (from approximately 22 to 38 feet from end of pavement – Northampton Street), a slight increase in rutting was measured. Maximum rut depth measured at ½ inches. See Photograph YR5-3.
- Continued expansion of circular depression on southbound land (14 feet from Northampton Street). Impacted area measured 4.5 feet long in the traffic path and 9 feet wide. Maximum depth at center measured at 1 3/8 inch. See Photograph YR5-4.
- Continued expansion of hairline fracture (cracking) close to edge of paving (along Northampton Street). Measured 7 feet long, and ¼ inches in depth and width. See Photograph YR5-5.
- No visible difference was observed to plasphalt surface in terms of loss of fines (TRPA).

4.0 CONCLUSIONS

The performance evaluation of plaspphalt on 21st Street in Wilson Borough was performed over a 5-year period (2003-2008). 21st Street is considered a low ESAL residential street, but interesting for evaluation because it has a steep grade and has been observed to have a heavier truck traffic load. The evaluations included plaspphalt testing and visual observations and measurements. No control sections were paved at this location.

The plaspphalt pavement at this location shows comparative aging to standard conventional mixes. Minimal rutting has been observed during the five-year performance evaluation period. The exception to this is an area developing of a circular rut formation located in the southbound traffic lane. This circular rut formation does not appear directly attributable to traffic patterns, but likely caused by subgrade subsidence. The five-year evaluation of plaspphalt at this location of steep grade and higher observed truck traffic is encouraging in terms potential of rut-resistance performance.

It should be noted that TRPA material is no longer available to the Commonwealth for since 2003. It is recommended that any future plaspphalt paving projects in the Commonwealth continue to undergo the performance evaluation process as stipulated in PennDOT BCM Use Guidance Document. Some general recommendations include:

- Plaspphalt should only be used at site locations where it's promoted characteristics can be fully tested.
- Reject high temperature plaspphalt loads.
- Obtain manufacturer certification on TRPA material, including production date and "shelf life" use restrictions.
- Require density testing and cores of base course for project documentation.

5.0 ACKNOWLEDGEMENTS

This 5-year evaluation and has been funded by the Pennsylvania Department of Environmental Protection through the Strategic Recycling Program as administered by PennDOT Pollution Prevention Section - EQAD.

A special appreciation is extended to Mr. Joseph Kretulskie, District 5-0 Municipal Services for his technical assistance and continual support on the Hay Terrace Plaspphalt project. Mr. Kretulskie has been instrumental in compiling test and technical information on plaspphalt materials, and assisting the Pollution Prevention Section – EQAD in performing the yearly performance evaluations on this project.

ATTACHMENT 1

**Instructions to Local Government on Plasphalt Pavement Courses
Plasphalt HMA Pavement Course Specifications**

Instructions to Local Governments who agree to use Plasphalt HMA Pavement Courses as an experimental feature.:

1. Following the guidelines in PENNDOT Pub. 242 (Pavement Policy Manual), specify the appropriate Superpave Asphalt Mixture Design, HMA Pavement Course(s) for the selected roadway.
2. In the contract, specify separate Construction Item Numbers and Quantities for the regular Superpave pavement course (control section) and the Plasphalt pavement course (experimental section). The local government will need to make a decision on how many tons or square yards of Plasphalt HMA Pavement Course are to be placed on the project. It is suggested that a minimum quantity of 600 tons or 7040 square yards (approximately 1-lane mile at 12 feet wide lane at 1½" depth) of Plasphalt HMA Pavement Course).

Example:

Item No. 0409-0484 Superpave Asphalt Mixture Design, HMA Wearing Course,
PG 64-22, 0.3 to < 3 Million ESALs, 9.5 mm Mix, 1½" Depth,
SRL-M

Item No. 2409-0484 Superpave Asphalt Mixture Design, HMA Wearing Course,
PG 64-22, 0.3 to < 3 Million ESALs, 9.5 mm Mix, 1½" Depth,
SRL-M (Plasphalt)

3. Include the attached bid document language, Plasphalt specifications, and Work Plan into the contract.
4. Indicate in the project plans or have the Engineer direct the Contactor to place the control sections and experimental sections in a typical evaluation pattern on the roadway (see attached workplan)
5. Notify Mr. Robin Sukley, of the PENNDOT EIT Division, when projects using Plasphalt will be constructed. Phone (717) 787-3137 or Email sukleyr@dot.state.pa.us

Include in Bid Documents:

Experimental Use of Plaspalt HMA Pavement Courses.

Where indicated on the plans or directed by the Engineer, place Plaspalt HMA Pavement Courses as an experimental feature. Construct Plaspalt HMA pavement courses in accordance with the attached Specification for Experimental Use of Plaspalt HMA Pavement Courses. Provide a Job Mix Formula for the Plaspalt HMA Pavement Course that uses the same materials and has the same or very similar aggregate gradation and asphalt content as the control section.

Where indicated on the plans or directed by the Engineer, place Superpave Asphalt Mixture Design, HMA Pavement Courses as a control section. Construct Superpave Asphalt Mixture Design, HMA Pavement Courses as specified and in accordance with Pub. 408, Sections 309 and/or 409.

HMA Producers are to contact a Plaspalt representative for technical assistance in developing job-mix formulas and producing Plaspalt HMA Pavement Courses.

**SPECIFICATION
PLASPHALT HMA PAVEMENT COURSES**

DESCRIPTION - This work is the construction of hot mix asphalt (HMA) using a combination of virgin aggregate and treated recycled plastic aggregate (TRPA) materials. Use a maximum of 1.5 percent TRPA material consisting of shredded, granulated, and treated recycled plastic from Plasphalt Project, LLC. Construct Plasphalt courses as specified in Sections 309 and 409 except as modified or supplemented as follows.

MATERIALS - Section 309.2 or 409.2 with additions and modifications as follows:

(b) Aggregate

5. Treated Recycled Plastic Aggregate (TRPA) Material. Provide TRPA material from Plasphalt Project, LLC. Provide TRPA material meeting the physical and chemical properties as recommended by the manufacturer. Include a description of the plan to control TRPA in the quality control plan. Keep all TRPA material free of foreign materials.

(d) Composition of Mixtures. As required by Section 309 or 409.2(d) and as follows:

The Plasphalt HMA mixture consists of the TRPA material, virgin aggregate(s), and bituminous material. Obtain samples of the TRPA material from the stockpile, as required in the quality control plan, and determine the average TRPA gradation. Maintain records of the testing of TRPA gradation and make available for review when directed. Determine the average stock gradations of virgin aggregate to be blended with the TRPA material. Determine the proportions of the TRPA and virgin materials to meet the specified mix composition requirements of virgin mixes. Prepare and test Superpave gyratory specimens as directed in Bulletin 27, Chapter 2A, and have the job-mix formula reviewed.

CONSTRUCTION - Section 309.3 or 409.3 with additions and modifications as follows:

(b) Bituminous Mixing Plant. Add the following:

1. Batch Plant. Modify the batch plant to allow measuring the mass (weight) of the treated recycled plastic aggregate (TRPA) material prior to incorporation into the pug mill. Design the cold feed bin, conveyor system, charging chute(s), and any special bins, if used, to avoid segregation and sticking of the TRPA material.

2. Drum Mixer Plant. Modify the drum mixer plant to prevent direct contact of the TRPA materials with the burner flame and/or overheating of the TRPA material in the process.

MEASUREMENT AND PAYMENT - Section 309.4 or 409.4

ATTACHMENT 2

PennDOT Draft Guidelines for Plasphalt Project Evaluations

By:

Date:

WORK PLAN

EVALUATION OF PLASPHALT RECYCLED PLASTIC AGGREGATE SUBSTITUTE IN HMA FOR MUNICIPALITY USE

INTRODUCTION: Plasphalt is a treated recycled plastic aggregate substitute for hot-mix asphalt (HMA) materials. Local government roadways in the state of Pennsylvania are interested in field use of Plasphalt material. The Plasphalt material potentially will prevent or lessen severity of rutting in hot-mix asphalt and also provides a potential use for recycled plastic.

OBJECTIVE: The objective of this research is to evaluate this Plasphalt for performance as compared to that of a standard paving mix.

(Set limits of the project include location map of projects)

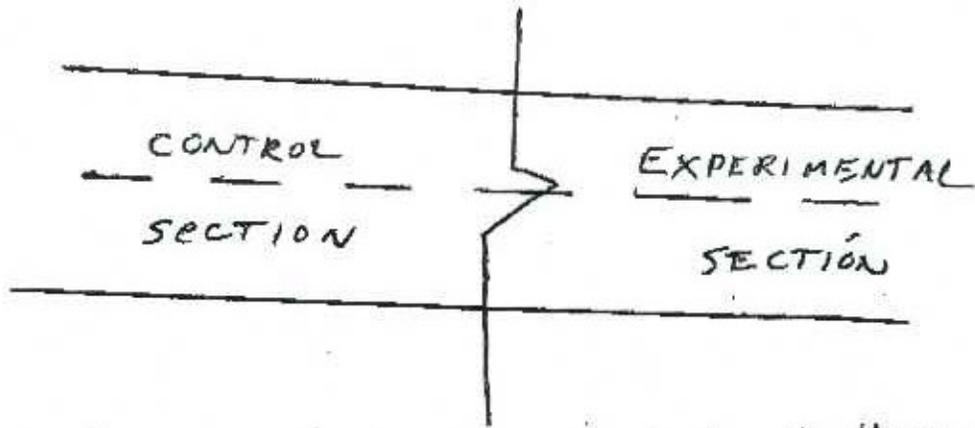
PLAN OF STUDY: The plan of study will be to compare Plasphalt pavement wearing course to standard Superpave 9.5 mm pavement wearing course (control section) on low trafficked roadways owned by various local governments. A control section of a standard Superpave 9.5 mm paving mix must be placed at the same time the Plasphalt pavement course is placed for proper comparison. The study will involve crack and rut inspections of both the Plasphalt and control sections. Inspections are to be conducted twice a year, for five years. Form TR 1461 (8-99) is to be filled out for each project site during each inspection. Along with the crack surveys, string line or straightedge rut measurements, photo logs recording the dates and the severity of pavement are to be taken and maintained.

Updates from these 20-30 projects by the Bureau of Municipal Services will be forwarded to Robin Sukley, Engineering Technology & Information Division, yearly, on the number, locations and status of all the municipal project sites.

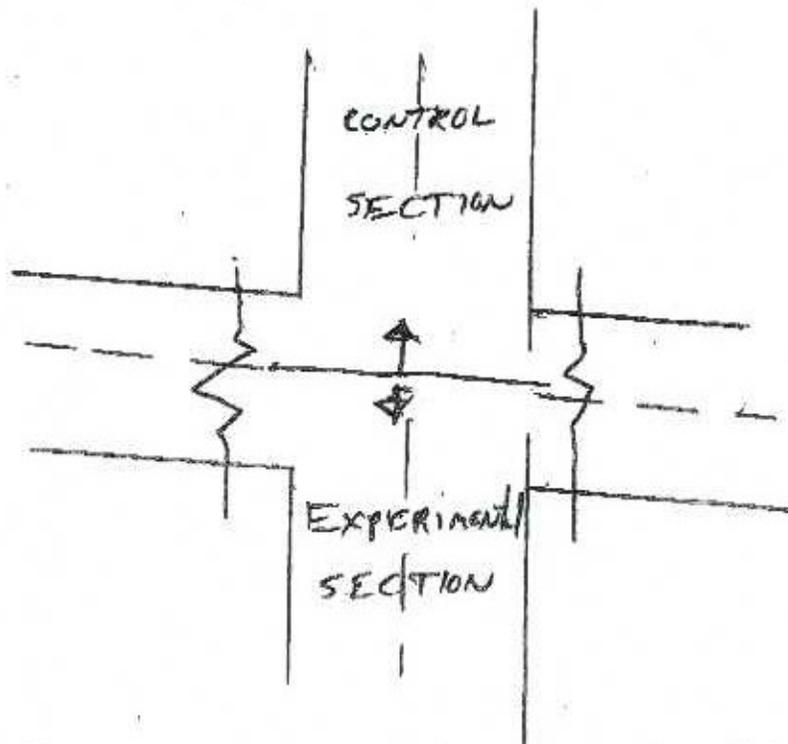
STAFFING: Research Project Manager: Pat Sullivan of the Department's Bureau of Municipal Services will be the centralized data collector for all local government projects and ensure that the biannual crack and rut inspections are performed on each project site.

REPORTING: A combination construction and final report will be written by the Research Project Manager within 90 days of collecting the final data at the end of the five-year evaluation period. The report will provide the findings, conclusions, and recommendations for potential implementation of Plasphalt pavement courses.

SCHEDULE: This will be a five-year evaluation.



Typical Roadway Evaluation Pattern



Typical Intersection Evaluation Pattern
 MODIFY FOR FIELD CONDITIONS



FIELD EVALUATION FORM

Information for project and product identification for use with FHWA Form 1461

Product/Technology Name* _____

Project Name* _____

Construction Project No.* _____

District Contact Person _____ Phone No. _____

Location*: District _____ County _____
SR# _____ Segment _____ Offset _____

Anticipated Date of Construction _____

Date Work Plan Approved _____ Date Feature Constructed _____

Date Evaluation Scheduled to End _____ Actual End of Evaluation _____

Construction Quantity _____ Units _____ (sy, cf, lf, m², m³, m, etc.)

Material/Technology Purpose/ Use* _____

Product PE# (if known) _____

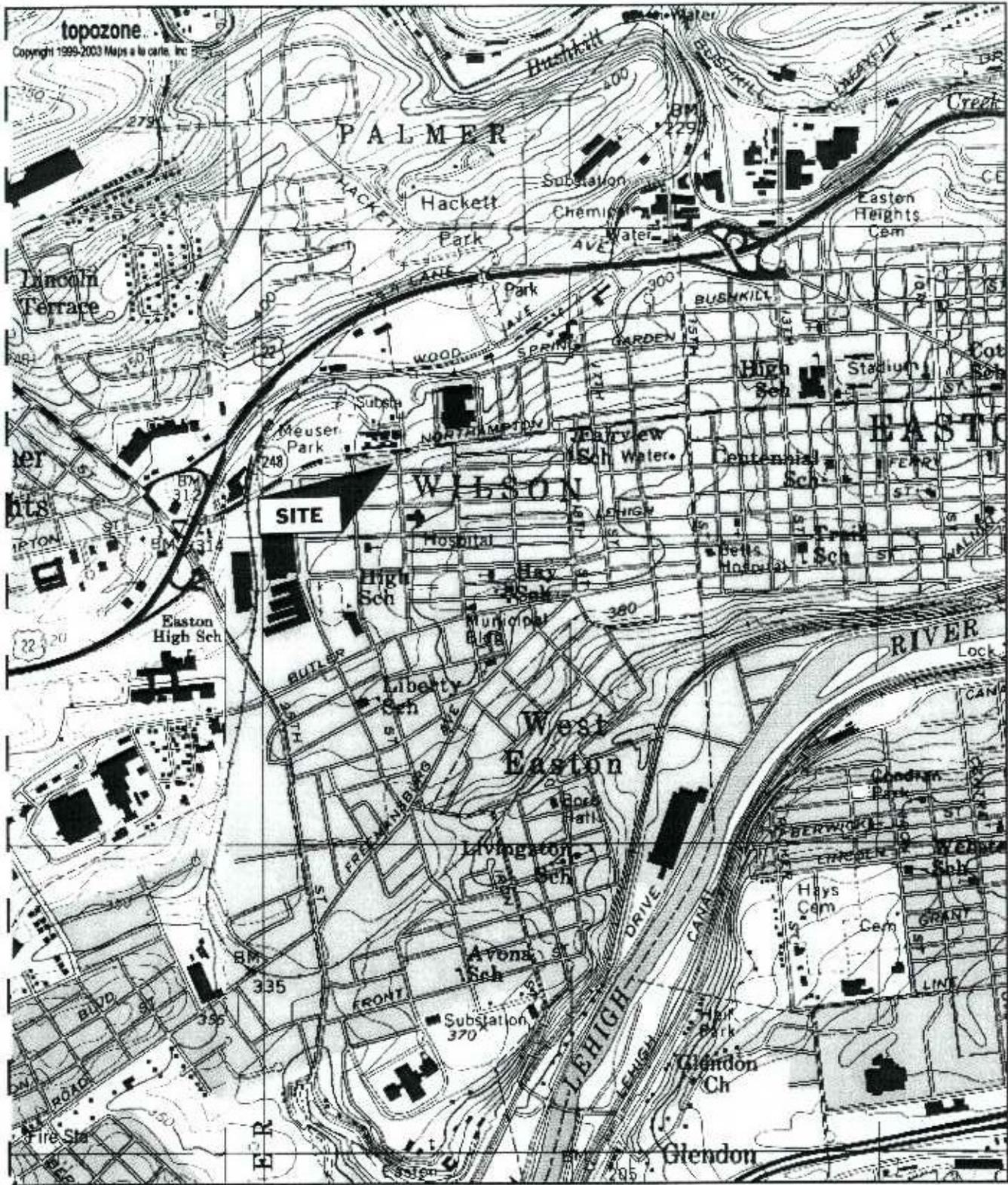
Comments

*Denotes minimum information required. Other information to be provided if available at time of notification or initiation.

If you have any questions concerning this form, please call the Engineering technology and Information Division, Bureau of construction and materials at (717) 787-36580. This information can be faxed to ETI at (717) 783-5955

ATTACHMENT 3

Project Contract
Site Location Map



0 0.3 0.6 0.9 1.2 1.5 km

0 0.1 0.2 0.3 0.4 0.5 mi

UTM 18 479761E 4503589N (NAD27)

Hay School, USGS EASTON (NJ) Quadrangle

Projection is UTM Zone 18 NAD83 Datum



M=-12.397

G=-0.156



**PROPOSAL & CONTRACT
(WHEN EXECUTED)**

Instructions on Page 4

(THIS PROPOSAL INCLUDES
INSTRUCTION TO BIDDERS)

6110-515-9000

STEVE GOCY

A. DEPOSIT OF PROPOSALS:

All envelopes containing Bid proposals shall be clearly marked "Bid Proposal for Letting of July 28, 2003." DATE

Borough Of Wilson
MUNICIPALITY (NAME & TYPE)

Karen Lohrman
SECRETARY

Sealed Proposals will be received on or before 4:00 pm, on the above Letting Date. TIME

2040 Hay Terrace Easton Pa 18042
ADDRESS

Bids will be opened and read at approximately 7:30 pm, on the above Letting Date. TIME

PROPOSALS MUST BE MAILED OR OTHERWISE DELIVERED TO THE ABOVE ADDRESS.

1. The contractor proposes to furnish and deliver all materials (including Form TR-465, Daily Bituminous Mixture Certification) and to do and perform all work on the following project as more specifically set forth in the Schedule of Prices (Attachment), in accordance with drawings and specifications on file at The Borough of Wilson as well as the supplements and special requirements contained herein and/or attached hereto and current PennDOT Specifications (Publication 408), except (a) **bidders MUST be pre-qualified by Penn DOT (See Attachment 1A)**, and (b) Marshall testing of bituminous paving materials is not required (Sec. 401)
2. If designated as the successful bidder, the contractor will begin work on the date specified in the notice to proceed or as otherwise provided in the special requirements, and will complete all work within 90 working days.
3. Accompanying this proposal is a certified check or bid bond in the amount of 10% made payable to the municipality as a proposal guarantee which, it is understood, will be forfeited in case the contractor fails to comply with the requirements of the proposal.

B. PROPOSAL OF: Lehigh Valley Site Contractors, Inc.
5143 Lower Mud Run Road
Easton, PA 18040
NAME / ADDRESS OF CONTRACTOR

CONTRACTOR'S CERTIFICATION

It is hereby certified as follows:

1. The only persons) interested in this proposal as principals) is (are):
Lehigh Valley Site Contractors, Inc.
2. None of the above persons are employees of the municipality.
3. This proposal is made without collusion with any other person, firm or corporation.
4. All plans and specifications referred to above and the site of the work have been examined by the contractor. The contractor understands that the quantities indicated herein are approximate and are subject to change as may be required; and that all work is payable on the basis of the unit prices listed on the Schedule of Prices (Attachment 1)

- 5. The contractor will comply with all requirements of the laws and implementing regulations of the Commonwealth of Pennsylvania and the United States relating to human relations, equal opportunity and non-discrimination in employment, and will pay to workmen employed in the performance of the contract the wages to which they may be entitled.
- 6. The contractor will provide the municipality with a performance bond, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions thereof, and a payment bond, conditioned on the prompt payment of all material furnished and labor supplied or performed in the prosecution of the work, in accordance with the Public Works Contractors' Bond Law of 1967; and an affidavit accepting the provisions of the Workmen's Compensation Act of 1915, as amended.

Lehigh Valley Site Contractors, Inc.
CONTRACTOR

WITNESSED OR ATTESTED BY:



Stephen M. Nelson
TITLE: _____ (SEAL)
Stephen M. Nelson, Vice-Pres./Asst. Sec.

H. Christian Budenz
TITLE: _____ (SEAL)
H. Christian Budenz, Vice-Pres./Asst. Sec.

TO BE EXECUTED ONLY IN THE EVENT THE ABOVE PROPOSAL IS ACCEPTED

ACCEPTED ON: _____
DATE

MUNICIPALITY

ATTESTED BY: _____
TITLE



TITLE

TITLE

ATTACHMENT #1

LOCATION OF WORK:

The Borough of Wilson
South 21st Street, Jefferson Ave.

DESCRIPTION OF WORK:

The work will be performed complete in-place including maintenance and protection of traffic. The project consists of milling existing bituminous pavement 3 1/2" and 5" depth, 3 1/2" 19 mm base course (base repair), milling of paving notches, 9.5mm Plaspalt leveling course, 1 1/2" 9.5mm Plaspalt wearing course, Crafcro PolyPatch, and sealing of completed paving project with rubberized joint sealant.

THIS PORTION TO BE COMPLETED

ESCALATOR CLAUSE :

SCHEDULE OF PRICES

1. Item No.	2. Quantities	3. Units	4. *Description	5. Unit Price	6. Total
1	167	SY	Milling of Bituminous Pavement 5" Depth	\$ 12.00	\$ 2,004.00
2	633	SY	Milling of Bituminous Pavement 3 1/2" Depth	\$ 7.95	\$ 5,032.35
3	75	SY	Milling of Paving Notches 4' Wide	\$ 12.00	\$ 900.00
4	160	Ton	19 mm Base Course (Base Repair)	\$ 43.40	\$ 6,944.00
5	67	Ton	9.5 mm PLASPALT ^{conventional} Leveling Course	\$ 71.00	\$ 4,757.00
6	1,250	SY	1 1/2" 9.5 mm PLASPALT Wearing Course	\$ 7.10	\$ 8,875.00
7	1,084	SY	1 1/2" 9.5 mm Conventional Wearing Course	\$ 4.70	\$ 5,094.80
8	1,700	LF	Sealing of curb-line, around utilities, and paving notches utilizing Rubberized Joint Sealant.	\$ 1.75	\$ 2,975.00
9	900	Gals.	Crafcro PolyPatch Fine Mix Type 2	\$ 23.00	\$ 20,700.00
10	1	LUMP SUM	Lower Manhole at intersection of Jefferson and Palmer	\$ 835.00	\$ 835.00
		***	Bids will be awarded on a total of items 1-9 to the lowest RESPONSIBLE bidder.	***	
*DESCRIPTION: Must include ADT on wearing surfaces. USE OF CUTBACK ASPHALT IS PROHIBITED BETWEEN MAY 1st AND OCTOBER 31st EXCEPT AS NOTED IN BULLETIN NO. 25.					\$58,117.15
				TOTAL AMOUNT OF BID	\$ 58,117.15

PROPOSAL AND CONTRACT INSTRUCTIONS - FORM 944

1. The proposal must be typewritten or printed.
2. If more than one proposal on any project is submitted by any individual, firm or partnership, corporation or association under the same or different names, only one lowest proposal will be considered.
3. Description of Work - -
 - A. If additional space is needed, insert appropriately numbered attachment and note "Continued on Attached work sheets."
4. Part A of Page 1 to be completed by municipality. Part B of Page 1 to be completed by contractor. Schedule of Prices - Column #1 (Item), #2 (Approximate quantities), #3 (Unit, i.e., ton, square yard, linear feet, etc.) and #4 (Description, i.e., bituminous materials- ID2, FJ1, FB1, BCBC, etc.) must be filled in by the municipality to insure equitable bidding. Columns #5 (Unit Price), #6 (Total), and total amount of bid, must be filled in by the contractor. If more space is needed, add note at the bottom of the page; "Continued on Attachment No. 1-A," and add additional sheet designated as Attachment No. 1-A, 1-B, etc. Repeat for each additional sheet required.
5. If liquidated damages are to be assessed, add the following sentence to Part A #2. If all work is not completed on time, liquidated damages will be assessed at the rate of \$200.00 per additional working day. (OR "... as set forth in the attached schedule.")
6. Payment and Performance bonds are provided only by the successful bidder. Contracts under \$5,000 - bonds must be in 50% of the contract amount. Contracts in excess of \$5,000 - bonds must be in 100% of the amount of contract. Bond Forms MS-944 Attachments 2 and 3 and Workmen's Compensation Affidavit Attachment 4 must be submitted by the successful bidder within 20 days of the contract award. Failure to submit the bonds shall constitute grounds to cancel the contract.
7. *Construction projects, where the estimated cost of the total project exceeds \$25,000, are subject to the provisions of the Pennsylvania Prevailing Wage Act 442. It is the responsibility of the municipality to obtain the Prevailing Wage Scale for the area and include it in the proposal. If the Prevailing Wage Act applies, this fact shall be noted in the advertisement.

On projects utilizing Federal Revenue Sharing Funds, if the project cost exceeds \$2,000 and is financed with 25% or more Federal Revenue Sharing Funds, the Davis Bacon Act applies. Again it is the responsibility of the municipality to obtain the Davis Bacon Wage Rates, include them in the proposal and note the fact in the advertisement. If both Acts are applicable, the Davis Bacon Act has preference over the Pennsylvania Prevailing Wage Act.
8. An ESCALATOR CLAUSE is optional; if used, it must be included in the proposal prepared by the municipality. An escalator clause may not be inserted by the contractor.

*(1961, Aug. 15, P. L. 987; 43 P.S. 165)



PERFORMANCE BOND (With Corporate Surety)

KNOW ALL MEN BY THESE PRESENTS, That we,

(NAME AND ADDRESS OF CONTRACTOR)

as Principal and _____

(SURETY COMPANY)

a corporation incorporated under the laws of the State of _____

(NAME OF STATE)

as Surety

are held and firmly bound unto _____

(NAME OF MUNICIPALITY)

in the full and just sum of

(\$

) dollars

lawful money to the United States of America, to be paid to the above Municipality or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above Municipality, bearing even date herewith, for the undertaking of certain obligations as therein set forth.

NOW, THEREFORE, the condition of this obligation is such that if the above bounden Principal, as Contractor, shall in all respects comply with and faithfully perform the terms and conditions of said Contract, including the Specifications and conditions referred to and made a part thereof, and such alterations as may be made in said Specifications as therein provided, and shall well and truly, and in a manner satisfactory to the municipality fulfill all obligations as therein set forth, then this Obligation shall be void, but otherwise the same shall be and remain in full force, virtue and effect.

It is further provided that any alteration which may be made in the terms of the contractor or its specifications with the express approval of the Municipality or the Principal to the other, shall not in any way release the Principal and the Surety or either or any of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the surety of any such alteration or forbearance being hereby waived.

IN WITNESS WHEREOF, the said Principal and Surety have duly executed this Bond under Seal, pursuant to due and legal action authorizing the same to be done on _____

(DATE OF BOND)



Attest / Witness:

CONTRACTOR

BY

TITLE:

TITLE:



Attest / Witness:

SURETY COMPANY

TITLE:

TITLE:

KNOW ALL MEN BY THESE PRESENTS, that we

[Redacted box]

as PRINCIPAL and a corporation incorporated under the laws of the State of _____ as SURETY, are held and firmly bond unto the _____, in the full and just sum of _____ (\$ _____) dollars, lawful money of the United States of America, to be paid to the said _____ or its assigns, to which payment well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bounden Principal has entered into a contract with the above municipality hereinafter called Obligee, bearing even date herewith, for the improvement of a certain section of highway or bridge in said Municipality consisting of:

_____ for approximately the sum of: _____ (\$ _____) dollars.

NOW, THEREFORE, the condition of this obligation is such that if the above bounden PRINCIPAL shall and will promptly pay or cause to be paid in full all sums of money which may be due by contract or otherwise, to any individual, firm, partnership, association or corporation, for all material furnished or labor supplied or performed in the prosecution of the work, whether or not the said for material or labor entered into and became component parts of the work and for rental of the equipment used and services rendered by public utilities in, or in connection with the prosecution of such work, then this obligation to be void, otherwise to remain in full force and effect.

The PRINCIPAL and SURETY, hereby, jointly and severally, agree with the Obligee herein that any individual firm, partnership, association or corporation, which has performed labor or furnished material in the prosecution of the work as provided, and any public utility which has not been paid in full therefor, may sue in assumpsit on this Payment Bond in his, their, or its own name and may prosecute the same to final for such sum or sums as may be justly due him, them or it, and have execution thereon. Provided, however, that the Obligee shall not be liable for the payment of any costs of expenses of such suit.

RECOVERY by any individual, firm, partnership, association or corporation hereunder shall be subject to the provisions of the "Public Works Contractors' Bond Law of 1967", Act No. 385, approved December 20, 1967, P.L. 869, which Act shall be incorporated herein and made a part hereof, as fully and completely as though its provisions were fully and at length herein recited.

It is further provided that any alterations which may be made in the terms of the contract or in the work to be done or materials to be furnished or labor to be supplied or performed under it or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal to the other, shall not in any way release the PRINCIPAL and the SURETY or SURETIES of any such alteration, extension of forbearance being hereby waived.

IN WITNESS WHEREOF, the said PRINCIPAL and SURETY have duly executed this Bond under seal this _____ day of _____, 20 _____.



WITNESS:

CONTRACTOR

TITLE:

BY:

TITLE



WITNESS:

SURETY COMPANY

TITLE:

TITLE:

AFFIDAVIT RE
ACCEPTING PROVISIONS OF THE WORKMEN'S COMPENSATION ACT

State of _____

County of _____

)
)
) ss:
)
)

being duly sworn according to law deposes and says that they have
he has
it has

accepted the provisions of the Workmen's Compensation Act of 1915 of the Commonwealth of Pennsylvania, with

has his
its supplements and amendments, and have insured their liability thereunder in accordance with the terms of said
its

Act with _____

(SURETY COMPANY)

(TYPE OR PRINT)

CONTRACTOR

BY _____

SIGNATURE

Sworn to and subscribed before me this _____ day of _____ A.D. 20 _____

SIGNATURE

My Commission Expires _____

(DATE)

ANTI-COLLUSION AFFIDAVIT

County _____

Municipality _____

Project Number _____

State of Pennsylvania

Fed. Project No. _____
(If Applicable)

County of Montgomery

The undersigned deponent deposes and says that he is the Vice-Pres./Asst. Sec. of the Lehigh Valley Site Contractors, Inc. Company; that he is authorized to make this affidavit on behalf of said company in compliance with section 102.06 (e) of Department Specifications, Publication 408, as amended and that the said company has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract.

Lehigh Valley Site Contractors, Inc.
(Contractor)

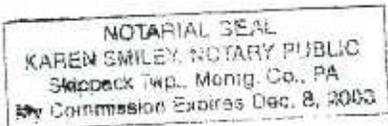
BY

H. Christian Budenz

H. Christian Budenz, Vice-Pres./Asst. Sec.

Sworn to and subscribed before me the undersigned notary public this

28th day of July, 2003



Karen Smiley
Notary Public

My Commission expires 12/08/03

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we LEHIGH VALLEY SITE CONTRACTORS, INC.
5143 Lower Mud Run Road
Easton, PA 18040

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and LIBERTY MUTUAL INSURANCE COMPANY
1787 Sentry Parkway, Building 18, Suite 450
Blue Bell, PA 19422

(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of Massachusetts*
as Surety, hereinafter called the Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

Borough of Wilson

as Oblige, hereinafter called the Oblige, in the sum of

Ten Percent (10%) of the Bid

Dollars (\$ ---)

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

(Here insert full name, address and description of project)

Paving South 21st Street and Jefferson Avenue

NOW, THEREFORE, if the Oblige shall accept the bid of the Principal and the Principal shall enter into a Contract with the Oblige in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Oblige the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Oblige may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

* and authorized to transact business in the Commonwealth of Pennsylvania

Signed and sealed this 28th day of July

2003

Linda Price (Witness)

LEHIGH VALLEY SITE CONTRACTORS, INC.

H. Christian Budenz, Vice-Pres./Asst. Sec. LIBERTY MUTUAL INSURANCE COMPANY

Alan R. Hein (Title) Attorney-in-fact

(Witness)

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY
BOSTON, MASSACHUSETTS
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint **R. M. SHEPHERD, RICHARD H. SHEPHERD, R. H. SHEPHERD, JR., ALAN R. HEIN, DAVID E. KELLS, JR., DAVID B. KANE, ROBERT J. COLMAN, ALL OF THE CITY OF FORT WASHINGTON, STATE OF PENNSYLVANIA**

.....
each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding **EIGHTY MILLION AND 00/100**..... DOLLARS (\$ **80,000,000.00**.....) each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 16th day of May, 2003.

LIBERTY MUTUAL INSURANCE COMPANY

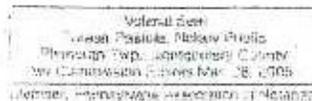
By Garnet W. Elliott
Garnet W. Elliott, Assistant Secretary



COMMONWEALTH OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 16th day of May, 2003, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.



By Teresa Pastella
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 28th day of July, 2003.



By David M. Carey
David M. Carey, Assistant Secretary

any value for purposes, note, when, receipt, or security, amount, deposit, currency, rate, interest, just rate - r returned value guaranteed.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day

**NOTICE FROM SURETY REQUIRED BY
TERRORISM RISK INSURANCE ACT OF 2002**

In accordance with the Terrorism Risk Insurance Act of 2002 (referred to hereinafter as the "Act"), this disclosure notice is provided for surety bonds on which one or more of the following companies is the issuing surety: Liberty Mutual Insurance Company; Liberty Mutual Fire Insurance Company; LM Insurance Corporation; The First Liberty Insurance Corporation; Liberty Insurance Corporation; Employers Insurance Company of Wausau (formerly "EMPLOYERS INSURANCE OF WAUSAU A Mutual Company"); Peerless Insurance Company; and any other company that is a part of or added to the Liberty Mutual Group for which surety business is underwritten by Liberty Bond Services (referred to collectively hereinafter as the "Issuing Sureties").

NOTICE FORMS PART OF BOND

This notice forms part of surety bonds issued by any one or more of the Issuing Sureties.

DISCLOSURE OF PREMIUM

The premium attributable to any bond coverage for "acts of terrorism" as defined in Section 102(1) of the Act is Zero Dollars (\$0.00).

**DISCLOSURE OF FEDERAL PARTICIPATION
IN PAYMENT OF TERRORISM LOSSES**

The United States will reimburse the Issuing Sureties for ninety percent (90%) of any covered losses from terrorist acts certified under the Act exceeding the applicable surety deductible.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
PREQUALIFICATION CERTIFICATE

In accordance with the Department regulations you are hereby notified of the performance factor, maximum capacity rating, and work classifications assigned to you. You are eligible to perform as a Prime Contractor.

Business Partner ID:	000981	Maximum Capacity:	\$32,265,660.00
Status:	Qualified	Performance Factor:	7
Federal ID Number:	23-2520028	Issued:	05/01/2003
Line-of-Credit:	\$1,500,000	Effective:	05/01/2003
Line-of-Credit Expiration:	05/01/2004	Expiration:	04/30/2005

Contractor:

Lehigh Valley Site Contractors, Inc.
Lehigh Valley Site Contractors, Inc.
5143 Lower Mud Run Road
Easton, PA 18040

Code	Work Classification
A	Clearing and Grubbing
C	Roadway Excavating and Grading
C1	NonRoadway, Drainage, Structure Related Excavation and Grading
C2	Drilling and Blasting
C3	Geotextiles
C4	Rubblizing
C6	Drilling
F	Bituminous Pavement
F1	Bituminous Pavement Patching and Repair
F2	Bituminous Joint and Crack Sealing
F3	Milling, Rumble Strips, Scarification Bituminous or Concrete
F4	Bituminous Surface Treatments, Seal Coats
H	Drainage, Water Main, Storm Sewer
H1	Pipe and Culvert Cleaning
H2	Pavement Base Drains
K	Curbs, Sidewalks, Inlets, Manholes
K1	Masonry Work
K2	Concrete and Masonry Coatings
M1	Selective Tree Removal, Trimming

Angela Howell

Certificates

Back

MS-329 (4-93)



PROJECT APPROVAL

 COUNTY: NORTHAMPTON
 MUNICIPALITY: Wilson Blvd
 PROJECT NUMBER: 03-48418-01

SECTION 1: Proposed Project Information.

 Approved Start Date: 8/7/03 Person Interviewed: G. DRAKE Title: SUPT OF PUB WORKS
 Contractor: LEHIGH VALLEY SITE CONTR, INC Contract Type: IN PLACE FORCE / SUPV / EQ / ENT / MATERIAL
 MS-329 Project: YES NO Revision No.: _____ Budget Item No.: 439 Bank Loan / Bond Issue: N/A

Location of Work	From	To	Length	Width	Type	
					From	To
<u>21ST ST</u>	<u>NORTHAMPTON ST</u>	<u>SOUTH</u>	<u>.01</u>	<u>32</u>	<u>SD</u>	<u>N/C</u>
<u>JEFFERSON ST</u>	<u>PRATER ST</u>	<u>16TH ST</u>	<u>.12</u>	<u>28</u>	<u>S</u>	<u>S</u>

 Scope of Work: RECONSTRUCTION: (1) 17x6 5 1/2" DEPTH. PURE STONE BASE 19 1/2"
BINDER AND 1 1/2" 9.5 1/2" SUPERPAVE / ASPHALT
RESULT FINISH: (2) SELECT BASE REPAIR OF UTILITY TRENCH 5 1/2"
OVERLAY ONE SIDE 9.5 1/2" SUPERPAVE AND OTHER SIDE
9.5 1/2" SUPERPAVE WITH ASPHALT. (AS PER 4/2/01 PERMISSION)
 Remarks: NOTE: 17x DESIGN MUST BE APPROVED PRIOR TO CONSTRUCTION.
ALSO INCLUDED IN THIS CONTRACT IS CRACK SEALING ON
VARIOUS BOLD STREETS.

Proposed Funding	State (Act 655)	County (Act 32)	General Funds	Other *	Total
	<u>58,117.15</u>				<u>58,117.15</u>

* Source of Other Funding

Engineering Fees: N/A

SECTION 2: Approval and Instructions to Municipalities.

1. If any changes are made, such as increasing or decreasing the length or width of work, the amount of aid granted, or a change in the type of improvement, contact your Engineering District Municipal Services Representative.
2. County Aid Grants for a project will not be made until authorized by the Department at the conclusion of the project. These monies must be expended from and deposited to the General Fund.
3. The municipality must certify that all materials and work done on the aforementioned project shall conform to the current Pennsylvania Department of Transportation Specifications and that all work will be done within the legal right of way or with permission of the abutting property owners.
4. All work performed on this project must be charged to the Budget Item Number shown on this form.
5. Your municipality has the responsibility to obtain its own engineering and inspection. These are permissible Liquid Fuels expenditures.
6. Retain this form and attach all contracts, advertisements, bid tabulations, bonds and any other project materials. Present these documents to state and local auditors upon request.

 APPROVED: [Signature] DATE: 8.7.03

(MUNICIPAL SERVICES REPRESENTATIVE)

 Original: District Office
 cc: Municipality 8.7.03

ATTACHMENT 4

Pre-paving Photographs (2003)
Initial Paving Field Evaluation Form
Initial Paving Photographs (2003)

**PRE-PAVING PICTURES
21ST STREET**



PP-1
View of 21st Street towards Northampton Street.



PP-2
View of 21st Street from Northampton Street/21st Street intersection. Note asphalt surface deformations/rutting.



PP-3
Another view of 21st Street from Northampton Street.

**PRE-PAVING PICTURES
21st STREET**



PP-4
Closer view of wearing surface deformations/
rutting.



PP-5
Close up of rutting (shoving).



PP-6
Another close-up view of rutting (shoving).



FIELD EVALUATION DATA FORM

Information for project and product identification for use with FHWA Form 1461

Product/Technology Name* Plasphalt (9.5 mm), Hellertown Materials

Project Name* Wilson Borough, 21st Street (south),
at Northhampton St. intersection (0.1 mile)

Construction Project No.* Municipal Services Project #03-48418-01 (1 of 2)

District Contact Person* Joseph Kretulskie **Telephone*** 610-791-6024

Location*: **District** 5-0 **County:** Northhampton

SR# 21st St. **Segment:** 50 ft x 32 ft **Offset:** NA

Anticipated Date of Construction: 9/18/03

Date Work Plan Approved 9/18/03 **Date Feature Constructed** 9/09/03

Date Evaluation Scheduled to End: 9/18/03 **Actual End of Evaluation:** 9/18/03

Construction Quantity: 15 **Units:** tons (sy, cf, lf, m, m², m³, etc.)

Unit Cost: \$78.89/ton or \$7.10/SY (from construction contract)

Material/Technology Purpose /Use*: See Design Mix

Product PE# (if known) Robin Sukely, Bureau of Construction & Materials (717) 787-3137

Comments:

This reconstructed section is on a significant slope. Pavement section, prior to milling, showed severe signs of "shoving". The plasphalt wearing surface was closed to traffic and reached sufficient cooling temperature prior to being opened. At 11:00 AM (9/18/03) the surface temperature was measured at 104 degrees Fahrenheit.

*Denotes minimum information required. Other information to be provided if available at time of notification or initiation.

If you have any questions concerning this form, please call the Engineering Technology and Information Division, Bureau of Construction and Materials at (717) 787-3137. This information can be faxed to ETI Attention: Robin Sukley, PE at (717) 783-5955 or emailed to rsukley@state.pa.us.

Construction Record

CONTRACTOR/PRODUCER: Lehigh Valley Site Contractors, Inc.

(Please attach a copy of the JMF's)

LIST TOOLS/EQUIPMENT USED

Paving Equipment: Barber Greene Model BT 211

Compaction Equipment: Larger Roller Dynapac CC422 (large vibratory roller)
Small Roller Dynapac CC122

ROLLER PATTERN: *None established* ROLLER PICK-UP yes no

Small quantity and short paving distance prohibited setting a rolling pattern.

MIX DELIVERY

TEMPERATURE *N/A*

control *one reading 308 degree F (Plasphalt)*

Surface temperature of 19 mm repair course – 75 degree F, all edges tack coated prior to plasphalt placement.

Plasphalt paving performed between 9-10:30 AM.

WEATHER: *Overcast-cloudy, temp. 60's;*

morning 11:00- 3:00 PM (Plasphalt and Control)

List any problems during construction?

None. _____

Bi-Annual Performance Record (CONTROLS MAY NEED TO BE INSTALLED PRIOR)

Pavement Condition Rating Form

CRACKING TYPE & LOCATION (video logging may be substituted)

RUT MEASUREMENTS & LOCATION

String line or straight edge method

SHOVING? _____ EARLY AGEING? _____

**INITIAL PAVING PICTURES
21ST STREET**



IP-1
Base repair in progress.



IP-2
Plasphalt paving, view from Northampton Street.

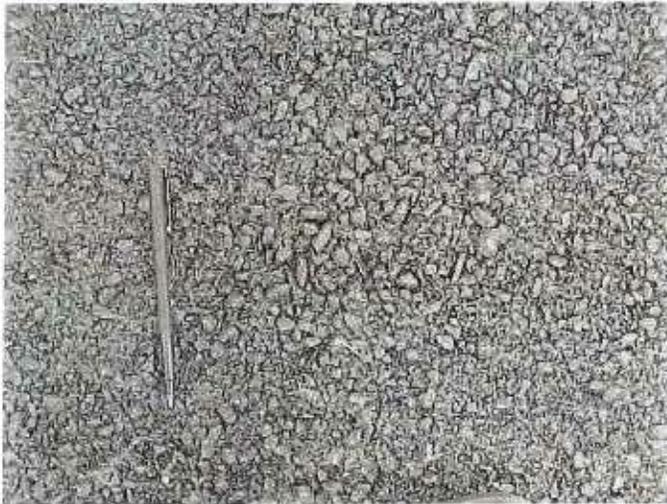


IP-3
End of 21st Street during plasphalt rolling.

**INITIAL PAVING PICTURES
21ST STREET**



IP-4
East curb inlet detail. Shows raised base from previous repairs.

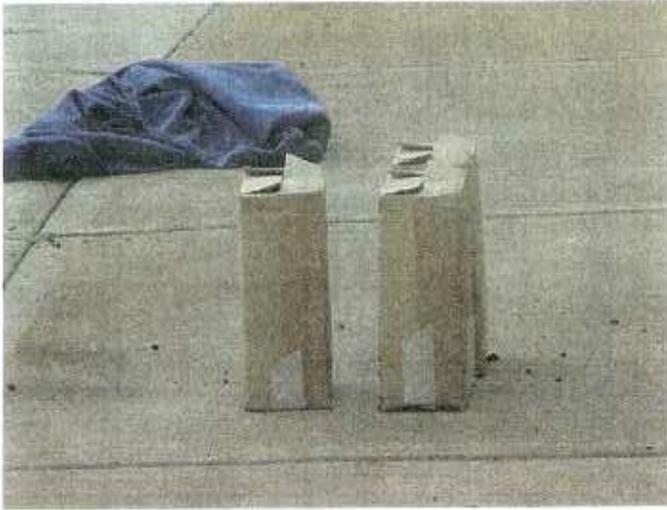


IP-5
Close-up of asphalt wearing course pavement.



IP-6
View of 21st Street (finished paving project).

**INITIAL PAVING PICTURES
21st STREET**



IP-7

Collection of 3 loose box samples from mat.

ATTACHMENT 5

Hellertown Materials Plant Photographs

**ATTACHMENT 5
HELLERTOWN MATERIALS PLANT**



TRPA Materials provided in cardboard boxes from New Mexico manufacturer.



TRPA introduced into batch mix through separate auxiliary hopper with pneumatic injection.



Hellertown Materials Asphalt Plant.

ATTACHMENT 6

Job Mix Formulas

Plasphalt Asphalt Plant Test Results

Software by
H&K
©1999

JOB MIX FORMULA REPORT

SUPPLIER CODE

ABE 48A 41

MATERIAL CLASS

S P 9 5

JMF No.

0 3 S 1 1

AGGREGATE SRL

L

Date: March-03 Spec: 9.5 mm, < 0.3 ESAL Tons _____ P.O. _____

Suppliers Name: ABE Materials Location Easton, PA.

Bituminous Plant Type: Simplicity-AB Daily Capacity: 6000lb. Batch Mix Time

Dry	Wet
-	45

CMS NO. [][][][][][] SR [][][][][][] Sec. [][][]

Material Supplier Code	Supplier Name	Material Code	Material Class	% in Mix	Bulk Sp.Gr.	% Absorption
ABE48A14	ABE Materials	207	EI3	40.8	2.722	0.35
CHE45A14	Chestnut Ridge	207	A1	17.4	2.576	0.96
ABE48A14	ABE Materials	203	A8	35.6	2.729	0.58
CITGO-5	CITGO	Asphalt	PG 64-22	6.2	1.032	
Alternate AC Suppliers: CHEV2-15, COAS4-15, VALR1-15, TRUM3-15						

JOB MIX FORMULA AND DESIGN

	AC %	75µm #200	150µm #100	300µm #50	600µm #30	1.18 #16	2.36 #8	4.75 #4	9.5 3/8"	12.5 1/2"	19.0 3/4"	25.0 1"	37.5 1 1/2"	50.0 2"	F/A %	Pb _w %
Upper	7.0	8.0		17	24	37	51	73	100	100					1.2	
Design	6.2	5.0	8	11	18	31	45	65	96	100					0.8	5.9
Lower	5.4	2.0		5	12	25	39	57	88	100					0.6	
% Virgin AC	6.2			% Reclaimed AC												

MIX CHARACTERISTICS (MARSHALL)

Theor. Density lb./cu.ft.	Lab Density lb./cu.ft.	% Voids	% VFA	% VMA	Stability	Flow	% Pass #8	% Pass 1/2"
153.7	147.5	4.1	76.9	17.5	N/A	N/A	45	100

MIX CHARACTERISTICS (GYFATORY)

Design ESALS	Gyrations @ Nini	Gyrations @ Ndes	Gyrations @ Nmax	Max Density (kg/m ³)/Sp.Gr.	Ndes Density (kg/m ³)/Sp.Gr.
< 0.3	6	50	75	2.463	2.363
	% Voids @ Nini	% Voids @ Ndes	% Voids @ Nmax		
	13.5	4.1	2.2		

IGNITION FURNACE DATA

Oven Make	Set. Temp.	Sample Size	A.C. Correction Factor (C.)	#200 Correction Factor (200C _f)
Thermolyne	538	1200	0.17	0.2

Designed by *Alan J. Rupp* Date 3/19/03
 Approved & Submitted by *REVIEWER* Date 3/19/02
 Reviewed by Mat's Engineer *Joseph J. Kasal* Date 3/19/03

Software by
H&K
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JOB MIX FORMULA REPORT

JMF No.

0	3	S	2	5
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SUPPLIER CODE

ABE 48A 41

MATERIAL CLASS

S R 1 9 B

AGGREGATE SRL

L

Date: March-03 Spec 19.0mm Binder <0.3 ESAL 15% RAP Ton: _____ P.O. _____

Suppliers Name: ABE Materials Location Easton, PA.

Bituminous Plant Type: Simplicity-AB Daily Capacity: 6000lb. Batch Mix Time

Dry	Wet
-	45

CMS NO.

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 SR

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 :Sec.

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Material Supplier Code	Supplier Name	Material Code	Material Class	% in Mix	Bulk Sp.Gr.	% Absorption
ABE48A14	ABE Materials	207	E3	21.8	2.722	0.35
CHE45A14	Chestnut Ridge	207	A1	9.4	2.576	0.96
ABE48A14	ABE Materials	203	A8	31.2	2.729	0.58
ABE48A14	ABE Materials	203	A57	18.0	2.733	0.44
ABE48A41	ABE Materials	017	RAP	15.0		
CITGO-5	CITGO	Asphalt	PG 64-22	4.6	1.032	
Alternate AC Suppliers: CHEV2-15, COAS4-5, VALR1-15, TRUM3-15						

JOB MIX FORMULA AND DESIGN

	AC %	75µm #200	150µm #100	300µm #60	600µm #30	1.18 #16	2.36 #8	4.75 #4	9.5 3/8"	12.5 1/2"	19.0 3/4"	25.0 1"	37.5 1 1/2"	50.0 2"	F/A %	Pb _c %
Upper	6.0	7.5		15	19	28	38			97	100	100			1.2	
Design	5.3	4.5	6	9	13	22	32	47	79	89	96	100			0.9	5.0
Lower	4.6	1.5		3	7	16	26			81	88	100			0.6	
% Virgin AC	4.6	% Reclaimed AC						0.7								

MIX CHARACTERISTICS (MARSHALL)

Theor. Density lb./cu.ft.	Lab Density lb./cu.ft.	% Voids	% VFA	% VMA	Stability	Flow	% Pass #8	% Pass 1/2"
156.1	150.0	4.0	74.6	15.6	N/A	N/A	32	89

MIX CHARACTERISTICS (GYRATORY)

Design ESALS	Gyrations @ Nini	Gyrations @ Ndes	Gyrations @ Nmix	Max Density (kg/m ³)/Sp.Gr.	Ndes Density (kg/m ³)/Sp.Gr.
< 0.3	6	50	75	2.502	2.404
	% Voids @ Nini	% Voids @ Ndes	% Voids @ Nmix		
	14.1	4.0	2.6		

IGNITION FURNACE DATA

Oven Make	Set. Temp.	Sample Size	A.C. Correction Factor (C.)	#200 Correction Factor (200C _f)
Thermolyne	538	1500	0.21	0.2

Designed by *[Signature]* Date 3/19/03
 Approved & Submitted by *[Signature]* Date 3/19/02
 Reviewed by Mat's Engineer *[Signature]* Date 3/19/03



JOB MIX FORMULA REPORT

JMF No.

0	3	S	0	1
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SUPPLIER CODE: HEL48A41
 MATERIAL CLASS: S P 9 5
 AGGREGATE SRL: M

Date: August-03 Spec: 9.5mm <3 ESAL Plaspalt Tons: P.O.:

Suppliers Name: Hellertown Materials Location: Hellertown, PA

Bituminous Plant Type: McCarter-AB Daily Capacity: 5000lb. Batch Mix Time:

Dry	Wet
5	45

CMS NO.

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 SR

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 Sec.

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Material Supplier Code	Material Supplier Name	Material Code	Material Class	% in Mix	Bulk Sp Gr	% Absorption
SCI48A14	Stockertown Materials	207	B3	63.3	2.749	0.64
SCI48A14	Stockertown Materials	203	A8	29.0	2.730	0.78
	Treated Recycled Plastic Aggregate	203	TRPA	1.4	0.960	
	Citgo	Asphalt	PG 64-22	6.3	1.031	-
Alternate AC Suppliers: CHEV2-15, COAS4-15, VALR1-15, TRUM3-15						

JOB MIX FORMULA AND DESIGN

	AC %	75µm #200	150µm #100	300µm #50	600µm #30	1.18 #16	2.36 #8	4.75 #4	9.5 3/8"	12.5 1/2"	19.0 3/4"	25.0 1"	37.5 1 1/2"	50.0 2"	F/A %	Pb _w %
Design	6.3	5.0	7	10	18	30	45	71	97	100					0.8	6.0
% Virgin AC	6.3	%		% Reclaimed AC												

MIX CHARACTERISTICS (GYRATORY)

Design ESALS	Gyrations @ Nini	Gyrations @ Ndes	Gyrations @ Nmax	Max Density (kg/m ³)/Sp.Gr	Ndes Density (kg/m ³)/Sp.Gr
< 0.3	6	50	75	2.444	2.345
% Voids @ Nini	% Voids @ Ndes	% Voids @ Nmax	% VMA @ Ndes	% VFA @ Ndes	Weight @115mm
13.8	4.1	2.9	17.8	77.3	4806

IGNITION FURNACE DATA

Oven Make	Set. Temp.	Sample Size	A.C. Correction Factor (C _i)	#200 Correction Factor (200C _i)
Thermolyne	538	1200	1.71	0.2

COMBINED AGGREGATE CONSENSUS PROPERTIES

AASHTO T176 Sand Equivalent	AASHTO T304 Uncompacted Void Content	ASTM D5821 Coarse Aggregate Angularity	ASTM D4791 Flat & Elongated
85.0	49.0	(1 Face) 100 / (2 Face) 100	2.6

Designed by: Joseph R. Smith - Asphalt Consultant Date: 8/5/2002

Approved & Submitted by:  Edward Morrison 125 Date: 8/11/2003
 Sign: Print: Tech ID#

Reviewed by Materials Unit:  Date: 8/14/03



JOB MIX FORMULA REPORT

JMF No.

0 2 S 0 1

SUPPLIER CODE

HEL48A41

MATERIAL CLASS

S P 9 5

AGGREGATE SRL

M

Date: July-02 Spec: 9.5mm < 3 ESAL Plaspphalt Tons: P.O.:

Suppliers Name: Hellertown Materials Location: Hellertown, PA

Bituminous Plant Type: McCarter-AB Daily Capacity: 5000lb. Batch Mix Time: Dry Wet

CMS NO: SR: Sec:

Dry	Wet
5	45

Material Supplier Code	Material Supplier Name	Material Code	Material Class	% in Mix	Bulk Sp.Gr.	% Absorption
SCI48A14	Stockertown Materials	207	B3	63.3	2.757	0.38
SCI48A14	Stockertown Materials	203	A8	29.0	2.729	0.7
	Treated Recycled Plastic Aggregate	203	TRPA	1.4	0.96	
	Citgo	Asphalt	PG 64-22	6.3	1.031	
Alternate AC Suppliers: CHEV2-15, COAS4-15, VALR1-15, TRUM3-15						

JOB MIX FORMULA AND DESIGN

Design	AC %	75µm #200	150µm #100	300µm #50	600µm #30	1.18 #16	2.36 #8	4.75 #4	9.5 3/8"	12.5 1/2"	19.0 3/4"	25.0 1"	37.5 1 1/2"	50.0 2"	F/A %	Pb. %
	6.3	5.0	7	10	18	30	45	71	97	100					0.8	6.1
% Virgin AC	6.3	%		Reclaimed AC												

MIX CHARACTERISTICS (GYRATORY)

Design ESALS	Gyrations @ Nini	Gyrations @ Ndes	Gyrations @ Nmax	Max Density (kg/m³)/Sp.Gr.	Ndes Density (kg/m³)/Sp.Gr.
< 0.3	6	50	75	2.444	2.345
% Voids @ Nini	% Voids @ Ndes	% Voids @ Nmax	% VMA @ Ndes	% VFA @ Ndes	Weight @115mm
13.8	4.1	2.9	17.8	77.3	4806

IGNITION FURNACE DATA

Oven Make	Set. Temp.	Sample Size	A.C. Correction Factor (C _i)	#200 Correction Factor (200C _i)
Thermolyne	538	1200	1.52	0.1

COMBINED AGGREGATE CONSENSUS PROPERTIES

AASHTO T176 Sand Equivalent	AASHTO T304 Uncompacted Void Content	ASTM D5821 Coarse Aggregate Angularity	ASTM D4791 Flat & Elongated
85.0	49.0	(1 Face) 100 / (2 Face) 100	2.6

Designed by: Joseph R. Smith - Asphalt Consultant Date: 8/5/2002

Approved & Submitted by: *Edward Morrison* Edward Morrison 125 Date: 8/5/2002

Reviewed by Materials Unit: *Joseph Smith* Date: 8/12/02

200

SUPERPAVE SAMPLE WORKSHEET

Date:	18-Sep-03	Material:	9.5mm Plaspfalt 0<0.3 ESAL
Producer:	Hellertown Materials	S.R.#:	Wilson Boro
Technician:	Edward Morrison	P.O.#:	

Weight of material:	1235.5
Wt. of basket & material:	4290.0
Oven scale Wt:	
Chamber set Pt.:	538
Weight loss:	94.5
Percent loss:	7.65
Temp comp:	0.19
Asphalt Calibration Factor:	1.52

Design AC:	6.3
Calibrated AC content:	5.94

Dry Weight:	1140.8
Washed Weight:	1078.3
Weight of Loss:	62.5
#200 Correction Factor:	0.1

Sieve	Wt.	Plus Loss	% Passing	Design L (D) U
#200	6.5	69.0	5.9	2 (5) 8
#100	20.7	83.2	7	1 (7) 13
#50	49.9	112.4	10	4 (10) 16
#30	111.0	173.5	15	12 (18) 24
#16	217.0	279.5	25	24 (30) 36
#8	420.5	483.0	42	39 (45) 51
#6				
#4	714.0	776.5	68	63 (71) 79
1/4"				
3/8"	1067.0	1129.5	99	89 (97) 100
1/2"	1078.3	1140.8	100	92 (100) 100
3/4"				
1"				
1 1/2"				
2"				

Sample Number	Asphalt Content	Theo. Gmm	Dry Weight	Samp+ H ₂ O+Vol	Vol+H ₂ O Weight	Weight In H ₂ O	SSD Weight	Sample Volume	Gmb @Ndes	Voids @Ndes	VMA @Ndes	VFA @Ndes
	A	B	C	D	E	F	G	H	I	O	P	Q
						D-E		G-H	$\frac{C}{H}$	$\frac{100 \times (I-(18))}{Gsb}$	$\frac{(W/100) \times A}{Gsb}$	$\frac{P-Q}{P}$
1	6.3	2.430	4627.0	10280.4	7636.5	2643.9	4642.5	1998.6	2.315	4.7	18.8	75.0
2	6.3	2.430	4630.2	10283.4	7636.5	2646.9	4653.6	2006.7	2.307	5.1	19.1	73.3
									2.311	4.9	19.0	74.2

PTM 740		
1	Mass of Bit. Mix	2000.6
2	Mass of Pyc. + Water	7636.5
3	Line 1 + Line 2	9637.1
4	Mass Pyc. + (Mix + Water)	8813.7
5	(3-4) = Vol. Voidless Mix	823.4
6	(1+5) = Max. Sp.Gr. of Mix	2.430

740 RUNNING AVERAGE		
1	9/18/2003	2.430
2		
3		
4		
5		
AVERAGE n=5		2.430

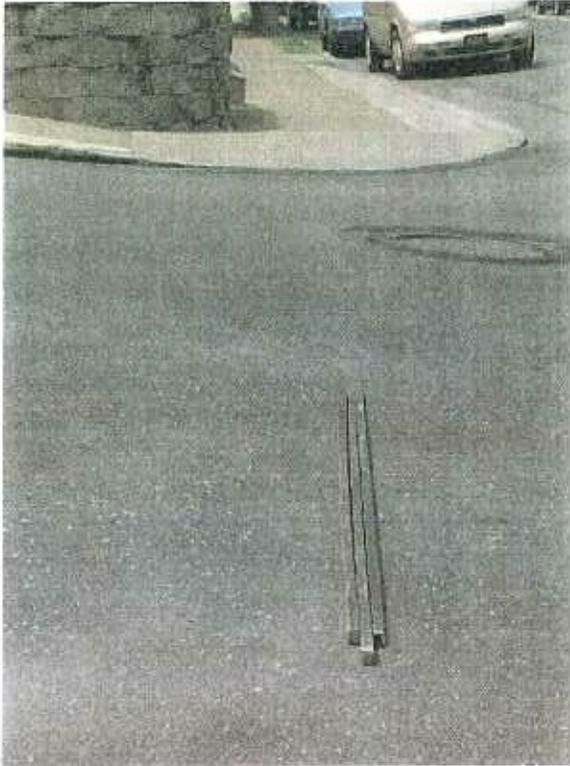
Bulk Gravity of Aggregate	2.673
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Remarks:

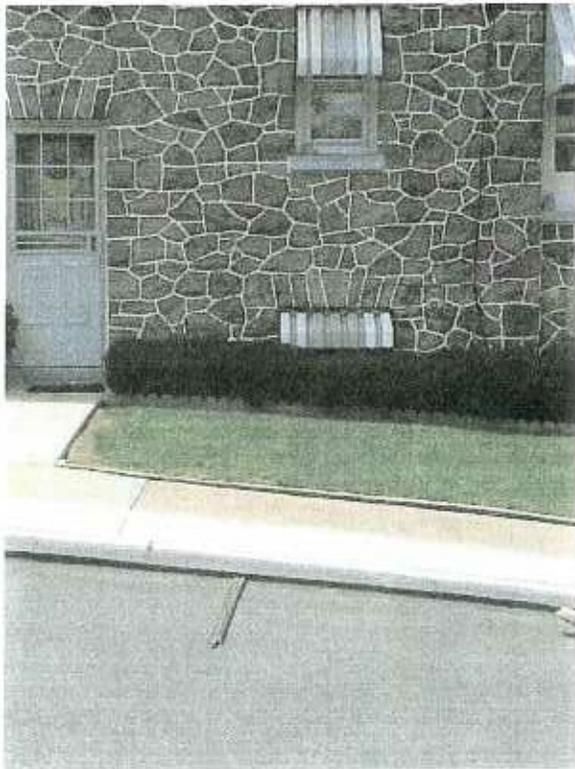
ATTACHMENT 7

First-Year Performance Evaluation (2004)

FIRST-YEAR EVALUATION PICTURES
MAY 10, 2004
21st STREET



YR1-1
Critical location for rutting evaluation. No rutting observed.



YR1-2
Measured no rutting in southbound traffic lane.

FIRST-YEAR EVALUATION PICTURES
MAY 10, 2004
21st STREET



YR1-3
Close-up of plasphalt wearing surface. TRPA visible.



YR1-4
Close-up of plasphalt wearing surface. Note some loss of fines.



YR1-5
Close-up plasphalt wearing surface.

ATTACHMENT 8

Second-Year Performance Evaluation (2005)

**SECOND-YEAR EVALUATION PICTURES
2005
21ST STREET**



YR2-1
View of 21st Street looking west.



YR2-2
No rutting observed on northbound traffic lane near intersection. This was area previously observed with the highest level of rutting prior to reconstruction.

**SECOND-YEAR EVALUATION PICTURES
2005
21st STREET**



YR2-3
Slight rutting observed 16 ft from intersection,
8 ft from curb on northbound traffic lane.

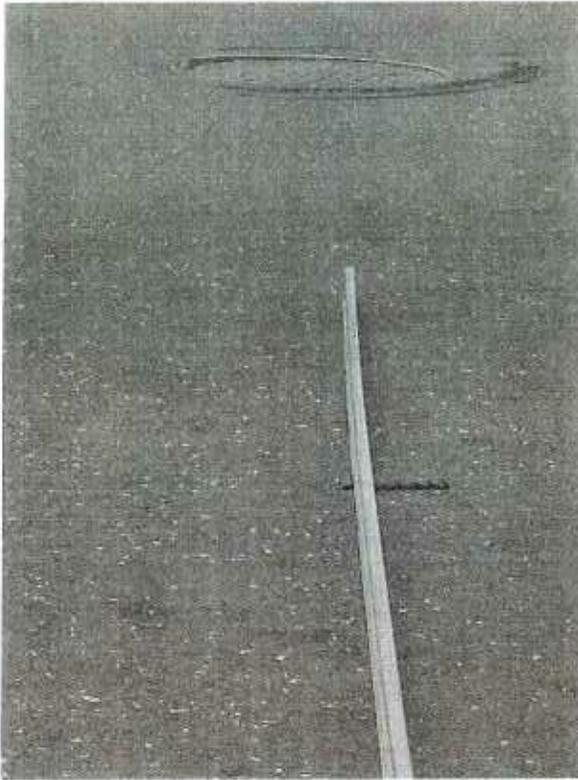


YR2-4
Close-up of rutting (YR2-3), measured 15/64"
deep.

SECOND-YEAR EVALUATION PICTURES

2005

21st STREET



YR2-5

The start of a circular depression observed in southbound traffic lane, located 10 ft from curb and 14 ft from edge of intersection pavement.



YR2-6

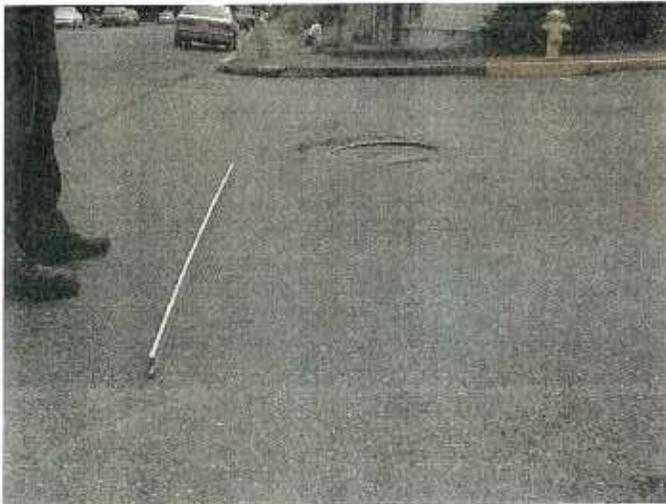
Close-up of rutting measurement, 1-1/8 " deep, shape, 4 foot diameter.

**SECOND-YEAR EVALUATION PICTURES
2005
21st STREET**



YR2-7

No rutting observed in northbound traffic lane
(in line with traffic flow).



YR2-8

No rutting observed in southbound lane (close
to edge of pavement).

ATTACHMENT 9

Fourth-Year Performance Evaluation (2007)

FOURTH-YEAR EVALUATION PICTURES

2007

21st STREET



YR4-1
View of 21st Street from Northampton intersection.



YR4-2
No rutting observed near edge of pavement.



YR4-3
Slight increase in rutting at 8 ft off curb x 16 ft from edge of pavement in northbound traffic lane. Measured 1/4" deep.

FOURTH-YEAR EVALUATION PICTURES

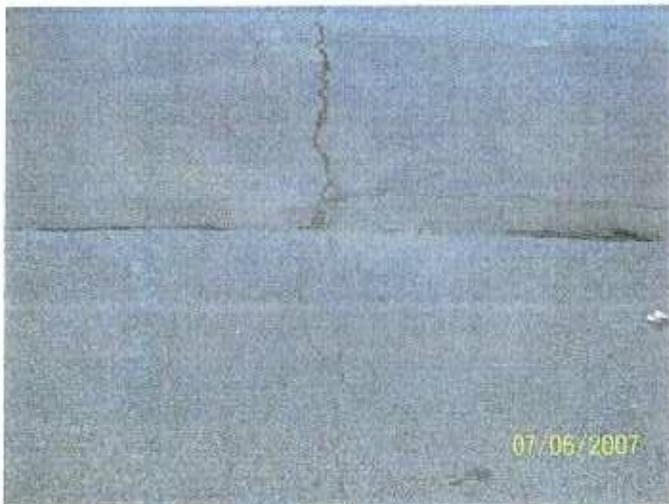
2007

21st STREET



YR4-4

Expanded depression (circular shape) at location of 14 ft from edge, and 10 ft from curb in southbound traffic lane since 2007 measurements. 4.5 feet x 8 feet oval shape, max depth of 1-3/8".

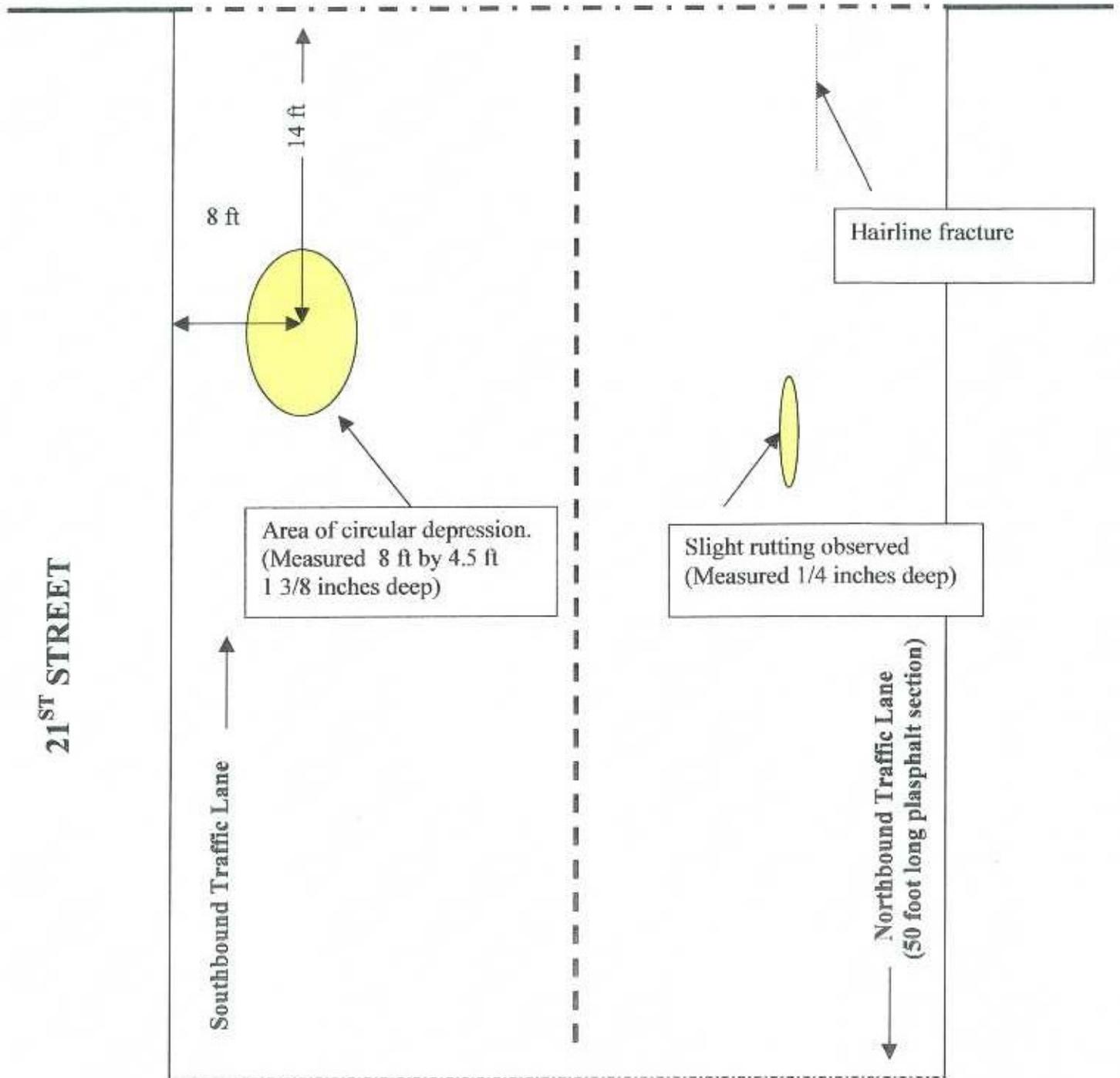


YR4-5

Start of hairline cracking observed at edge of pavement, max. depth/width of 1/4 inch.

21ST STREET
WILSON BOROUGH
(Not to Scale Diagram)
AREAS OF RUTTING AND CRACKING (2007)

NORTHAMPTON STREET

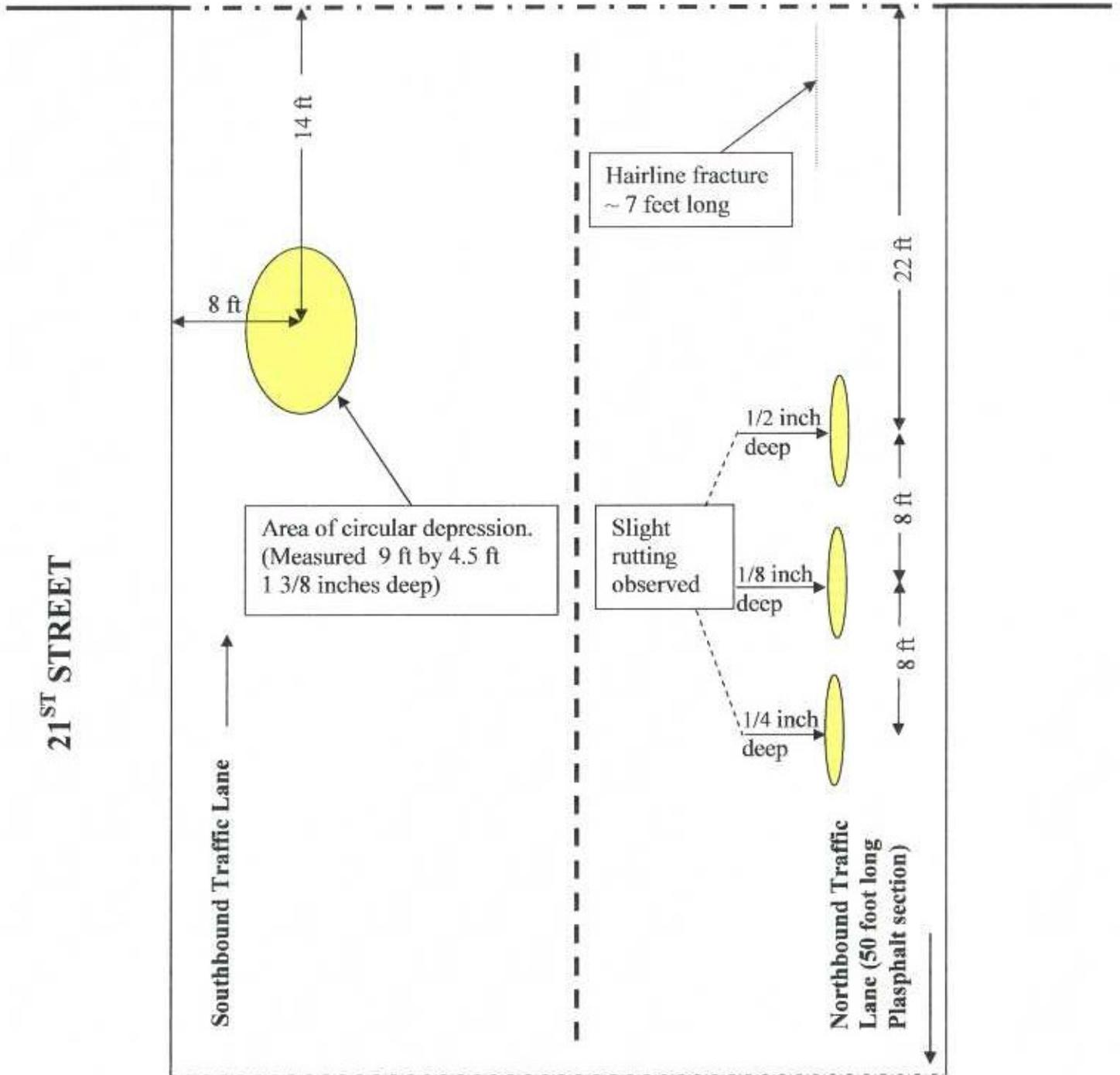


ATTACHMENT 10

Fifth-Year Performance Evaluation (2008)

21ST STREET
WILSON BOROUGH
(Not to Scale Diagram)
AREAS OF RUTTING AND CRACKING (2008)

NORTHAMPTON STREET



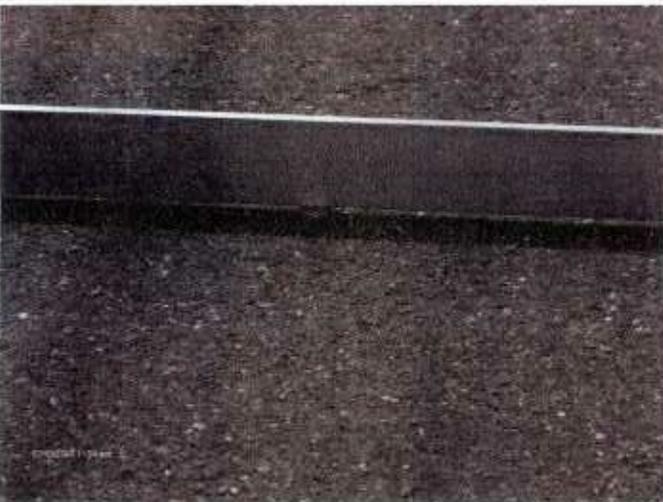
FIFTH-YEAR EVALUATION PICTURES
2008
21st STREET



YR5-1
View of 21st Street from Northampton
intersection.



YR5-2
No rutting observed near edge of pavement in
Southbound Traffic Lane. X



YR5-3
Rutting observed near edge of pavement in
Northbound Traffic Lane. Measured 1/2 inch
deep.

FIFTH-YEAR EVALUATION PICTURES
2008
21ST STREET



YR5-4

Expanded depression (circular shape) at location of 14 ft from edge, and 10 ft from curb in southbound traffic lane.

4.5 feet x 9 feet oval shape, max depth of 1-3/8".



YR5-5

Hairline cracking observed at edge of pavement, max. depth/width of 1/4 inch.