ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

SUBSURFACE INVESTIGATION

STATE JOB NO. BB0620

FEDERAL AID PROJECT NO. NHPP-40-4-86)161

HWY. 391 INTCHNG. IMPVTS. (S)

STATE HIGHWAY 40 SECTION 33

IN PULASKI COUNTY

The information contained herein was obtained by the Department for design and estimating purposes only. It is being furnished with the express understanding that said information does not constitute a part of the Proposal or Contract and represents only the best knowledge of the Department as to the location, character and depth of the materials encountered. The information is only included and made available so that bidders may have access to subsurface information obtained by the Department and is not intended to be a substitute for personal investigation, interpretation and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated herein.
TO: Mr. Trinity Smith, Engineer of Roadway Design

SUBJECT: Job No. BB0620
Hwy. 391 Intchng. Impvts. (S)
Route 40 Section 33
Pulaski County

Transmitted herewith is the requested Soil Survey, Strength Data and Resilient Modulus test results for the above referenced job. The project consists of reconstructing the ramps for the Highway 391 Interchange on Interstate 40. Samples were obtained in the entrance and exits ramps and on Maybelline Road.

Based on laboratory results of samples obtained, the subgrade soils consist primarily of moderately plastic sandy clay. Highly plastic clays were encountered at isolated locations within the project limits. Cross-sections are not currently available, but it is assumed that the construction grade line will closely match that of the existing roadway. The subgrade soils are expected to provide a stable working platform with conventional processing if the weather conditions are favorable during construction. If embankment is to be placed within the existing ditch line, all soft unstable organic material will need to be undercut prior to embankment construction. It is anticipated that the undercut will be no more than two feet. The undercut may be back filled with locally available unspecified material.

Listed below is the additional information requested for use in developing the plans:

1. The Qualified Products List (QPL) indicates that Aggregate Base Course (Class CL-7) is available from commercial producers located at the river ports in Little Rock.

2. Asphalt Concrete Hot Mix

<table>
<thead>
<tr>
<th>Type</th>
<th>Asphalt Cement %</th>
<th>Mineral Aggregate %</th>
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<tr>
<td>Surface Course</td>
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</table>

Michael C. Benson
Materials Engineer

MCB:pt:bjj
Attachment
cc: State Constr. Eng. – Master File Copy
    District 6 Engineer
    System Information and Research Div.
    G. C. File
DATE - 05/31/2016
JOB NUMBER - BB0620

SEQUENCE NO. - 1
MATERIAL CODE - SSRVPS
SPEC. YEAR - 2014
SUPPLIER ID. - 1
COUNTY/STATE - 60
DISTRICT NO. - 06

JOB NAME - HWY.391 INTCHNG. IMPVTS. (S)

******************************************************************************
* STATION LIMITS R-VALUE AT 240 psi *
******************************************************************************

BEGIN JOB - END JOB LESS THAN 5

RESILIENT MODULUS
12+00 7058

REMARDS - 

AASHTO TESTS : T190
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED SAMPLES

Job No. BB0620
Date Sampled: 5/25/16
Date Tested: May 25, 2016
Name of Project: HWY.391 INCHNG. IMPVTS. (S)
County: Pulaski
Sampled By: D.THORNTON
Lab No.: 20161379
Sample ID: RV231

Material Code SSRVPS
Station No.: 12+00
Location: 21'RT
Depth: 0-5'
AASHTO Class: A-6(3)
Material Type (1 or 2): 2

1. Testing Information:
Preconditioning - Permanent Strain > 5% (Y=Yes or N=No) N
Testing - Permanent Strain > 5% (Y=Yes or N=No) N
Number of Load Sequences Completed (0-15) 15

2. Specimen Information:
Specimen Diameter (in):
Top 3.97
Middle 3.96
Bottom 3.96
Average 3.96
Membrane Thickness (in): 0.00
Height of Specimen, Cap and Base (in): 8.03
Height of Cap and Base (in): 0.00
Initial Length, Lo (in): 8.03
Initial Area, Ao (sq. in): 12.34
Initial Volume, AoLo (cu. in): 99.07

3. Soil Specimen Weight:
Weight of Wet Soil Used (g): 3075.20

4. Soil Properties:
Optimum Moisture Content (%): 107.7
Maximum Dry Density (pcf): 16.4
95% of MDD (pcf): 15.6
In-Situ Moisture Content (%): N/A

5. Specimen Properties:
Wet Weight (g): 3075.20
Compaction Moisture content (%): 16.3
Compaction Wet Density (pcf): 118.28
Compaction Dry Density (pcf): 101.70
Moisture Content After Mr Test (%): 16.2

6. Quick Shear Test (Y=Yes, N=No, N/A=Not Applicable): #VALUE!

7. Resilient Modulus, Mr:
12749(Sc)^-0.33838(S3)^0.21568

8. Comments

9. Tested By: C.GARRETT Date: May 25, 2016
## AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
### RECOMPACTED SAMPLES

**Job No.** | BB0620  
**Date Sampled:** | 5/25/16  
**Date Tested:** | May 25, 2016  
**Name of Project:** | HWY.391 INTCHNG. IMPVTS. (S)  
**County:** | Code: 60 Name: PULASKI  
**Sampled By:** | D.THORTON  
**Lab No.:** | 20161379  
**Sample ID:** | RV231  
**Location:** | 21'TRT  
**Material Code** | SSRVPS  
**Station No.:** | 12+00  
**Depth:** | 0-5'  
**AASHTO Class:** | A-6(3)  
**Material Type (1 or 2):** | 2  
**LONGITUDE:** |  

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<th>PARAMETER</th>
<th>Chamber Confining Pressure</th>
<th>Nominal Maximum Axial Stress</th>
<th>Actual Applied Max. Axial Load</th>
<th>Actual Cyclic Load</th>
<th>Actual Contact Load</th>
<th>Actual Max. Axial Stress</th>
<th>Actual Cyclic Stress</th>
<th>Actual Contact Stress</th>
<th>Average Recov Def. LVDT 1 and 2</th>
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**TESTED BY** | C.GARRETT  
**DATE** | May 25, 2016  
**REVIEWS BY** |  
**DATE** | 
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
MATERIALS DIVISION

AASHTO T 307-99 - RESILIENT MODULUS OF SUBGRADE SOILS
RECOMPACTED / THINWALL TUBE SAMPLES

Job No. BB0620
Date Sampled: 5/25/16
Date Tested: May 25, 2016
Name of Project: HWY.391 INTCHNG. IMPVTS. (S)
County: Code: 60 Name: PULASKI
Sampled By: D.THORTON
Lab No.: 20161379
Sample ID: RV231
LATITUDE:

Material Code SSRVPS
Station No.: 12+00
Location: 21'RT

Depth: 0-5'
AASHTO Class: A-6(3)
Material Type (1 or 2): 2

\[ M_R = K_1 \left(S_c\right)^{K_2} \left(S_3\right)^{K_5} \]

\[ K_1 = 12,749 \]
\[ K_2 = -0.33838 \]
\[ K_5 = 0.21568 \]
\[ R^2 = 0.93 \]

Resilient Modulus QA Plot

Cyclic Stress, psi

Resilient Modulus, psi

- S3 = 6 psi
- S3 = 4 psi
- S3 = 2 psi
**SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT**

**DATE** 06/07/16  
**SEQUENCE NO.** 1  
**JOB NUMBER** BB0620  
**MATERIAL CODE** SSRVPS  
**FEDERAL AID NO.** TO BE ASSIGNED  
**SPEC. YEAR** 2014  
**PURPOSE** SOIL SURVEY SAMPLE  
**SUPPLIER ID.** 1  
**SPEC. REMARKS** NO SPECIFICATION CHECK  
**COUNTY/STATE** 60  
**SUPPLIER NAME** STATE  
**DISTRICT NO.** 06  
**NAME OF PROJECT** HWY.391 INTCHNG. IMPVTS. (S)  
**PROJECT ENGINEER** NOT APPLICABLE  
**PIT/QUARRY** ARKANSAS  
**LOCATION** PULASKI COUNTY  
**DATE SAMPLED** 05/10/16  
**SAMPLED BY** D.THORTON  
**DATE RECEIVED** 05/16/16  
**SAMPLE FROM** TEST HOLE  
**DATE TESTED** 05/31/16  

**MATERIAL DESC.** SOIL SURVEY  
**VALUE** PAVEMENT SOUNDINGS

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**% PASSING**

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<th>1 1/2 IN.</th>
<th>3/4 IN.</th>
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**LIQUID LIMIT** 29  
**PLASTICITY INDEX** 15  
**AASHTO SOIL** A-6(10)  
**UNIFIED SOIL** -  
**% MOISTURE CONTENT** 20.6  
**ACHMSE (IN)** ---  
**ACHMBC (IN)** ---  
**PCCP (IN)** 9.0  
**AGG.BASE CRS. CL-7 (IN)** 5.0  
**AASHTO TESTS** T24 T88 T89 T90 T265
**Soil Survey / Pavement Sounding Test Report**

**Date:** 06/07/16  
**Sequence No.:** 2  
**Job Number:** BB0620  
**Material Code:** SSRVPS  
**Federal Aid No.:** To Be Assigned  
**Spec. Year:** 2014  
**Purpose:** Soil Survey Sample  
**Supplier ID.:** 1  
**Spec. Remarks:** No Specification Check  
**County/State:** 60  
**Supplier Name:** State  
**District No.:** 06  
**Name of Project:** HWY.391 INTCHNG. IMPVTS. (S)  
**Project Engineer:** Not Applicable  
**Pit/Quarry:** Arkansas  
**Location:** Pulaski County  
**Sampled By:** D. Thornton  
**Date Sampled:** 05/10/16  
**Date Received:** 05/16/16  
**Date Tested:** 05/31/16  
**Sample From:** Test Hole

**Material Desc.:** Soil Survey - R Value - Pavement Soundings

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| Liquid Limit | 31 | 29 | 50 |
| Plasticity Index | 18 | 15 | 34 |
| AASHTO Soil | A-6(5) | A-6(10) | A-7-6(24) |
| Unified Soil | - | - | - |
| % Moisture Content | 22.3 | 22.6 | 28.1 |

| ACHMIS (IN) | 4.0 | 2.5 | - |
| ACHMBC (IN) | 2.0 | 5.0 | - |
| Agg. Base CRS. CL-7 (IN) | 8.0 | - | - |

**Remarks:** W=Multiple Layers  
**AASHTO Tests:** T24 T88 T89 T90 T265
DATE - 06/07/16
SEQUENCE NO. - 3
JOB NUMBER - BB0620
MATERIAL CODE - SSRVPS
FEDERAL AID NO.- TO BE ASSIGNED
SPEC. YEAR - 2014
PURPOSE - SOIL SURVEY SAMPLE
SUPPLIER ID. - 1
SPEC. REMARKS - NO SPECIFICATION CHECK
COUNTY/STATE - 60
SUPPLIER NAME - STATE
DISTRICT NO. - 06
NAME OF PROJECT - HWY.391 INTCHNG. IMPVTS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - PULASKI COUNTY
DATE SAMPLED - 05/10/16
SAMPLED BY - D. THORNTON
DATE RECEIVED - 05/16/16
SAMPLE FROM - TEST HOLE
DATE TESTED - 05/31/16
MATERIAL DESC. - SOIL SURVEY - R VALUE- PAVEMENT SOUNDINGS

LAB NUMBER - 20161378
SAMPLE ID - S230
TEST STATUS - INFORMATION ONLY
STATION - 14+00
LOCATION - 06RT
DEPTH IN FEET - 0-5
MAT' L COLOR - BR/GR
MAT' L TYPE - -
LATITUDE DEG-MIN-SEC - 34 47 4.30
LONGITUDE DEG-MIN-SEC - 92 07 34.00

% PASSING

2 IN. - -
1 1/2 IN. - -
3/4 IN. - -
3/8 IN. - 100
NO. 4 - 99
NO. 10 - 97
NO. 40 - 95
NO. 80 - 90
NO. 200 - 61

LIQUID LIMIT - 18
PLASTICITY INDEX - 3
AASHTO SOIL - A-4(0)
UNIFIED SOIL - -
% MOISTURE CONTENT - 19.4

ACHMSc (IN) - 2.0
ACHMBC (IN) - 5.0
ACHMSc (IN) - 2.0
AGG.BASE CRS. CL-7 (IN) - 5.0

REMARKS - W=MULTIPLE LAYERS

AASHTO TESTS : T24 T88 T89 T90 T265
DATE - 05/31/16
JOB NUMBER - BB0620
FEDERAL AID NO. - TO BE ASSIGNED
PURPOSE - SOIL SURVEY SAMPLE
SPEC. REMARKS - NO SPECIFICATION CHECK
SUPPLIER NAME - STATE
NAME OF PROJECT - HWY.391 INTCHNG. IMPVTS. (S)
PROJECT ENGINEER - NOT APPLICABLE
PIT/QUARRY - ARKANSAS
LOCATION - PULASKI COUNTY
SAMPLED BY - D.THORTON
SAMPLE FROM - TEST HOLE
DATE SAMPLED - 05/10/16
DATE RECEIVED - 05/16/16
DATE TESTED - 05/31/16

MATERIAL DESC. - SOIL SURVEY - RESISTANCE R-VALUE ACTUAL RESULTS

| LAB NUMBER | 20161379 |
| SAMPLE ID | RV231 |
| TEST STATUS | INFORMATION ONLY |
| STATION | 12+00 |
| LOCATION | 21RT |
| DEPTH IN FEET | 0-5 |
| MAT'L COLOR | BROWN |
| MAT'L TYPE | |
| LATITUDE DEG-MIN-SEC | 34 47.23 |
| LONGITUDE DEG-MIN-SEC | 92 07.478 |

% PASSING

- 2 IN. -
- 1 1/2 IN. -
- 3/4 IN. - 100
- 3/8 IN. - 84
- NO. 4 - 69
- NO. 10 - 59
- NO. 40 - 49
- NO. 80 - 44
- NO. 200 - 37

LIQUID LIMIT - 37
PLASTICITY INDEX - 24
AASHTO SOIL - A-6(3)

% MOISTURE CONTENT -

REMARKS - SAMPLE FULL OF SYNITE

AASHTO TESTS : T24  T88  T89  T90  T265
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.comments: W=MULTIPLE LAYERS

Tuesday, June 07, 2016
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**Comments:** W=MULTIPLE LAYERS

*Tuesday, June 07, 2016*