ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



SUBSURFACE INVESTIGATION

IN		PULASKI	COUNTY
STATE HIGHWAY	40	SECTION	33
	HWY. 391	I INTCHNG. IMPVTS. (S)	
FEDERAL AID PROJEC	CT NO. N	HPP-40-4-86)161	
STATE JOB NO.		BB0620	

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.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

June 21, 2016

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

Type	Asphalt Cement %	Mineral Aggregate %
Surface Course	4.9	95.1
Binder Course	4.2	95.8
Base Course	3.8	96.2

Materials Engineer

MCB:pt:bjj Attachment

State Constr. Eng. – Master File Copy CC:

District 6 Engineer

System Information and Research Div.

G. C. File

MICHAEL BENSON, MATERIALS ENGINEER

*** SOIL SURVEY STRENGTH TEST REPORT ***

DATE - 05/31/2016 SEQUENCE NO. - 1

JOB NUMBER - BB0620 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

REMARKS -

-

AASHTO TESTS : T190

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

Job No. Date Sampled: Date Tested: Name of Project:	BB0620 5/25/16 May 25, 2016 HWY.391 INTCHNG.		Material Co Station No.: Location:		SSRVPS 12+00 21'RT	
County: Sampled By: Lab No.: Sample ID: LATITUDE:	Code: 60 D.THORTON 20161379 RV231	Name: PULASKI	Depth: AASHTO C Material Ty LONGITUI	pe (1 or 2):		0-5' A-6(3) 2
1. Testing Inform	Preconditioning - Permanent	ermanent Strain > 5% (t Strain > 5% (Y=Yes or	N=No)			N N
	Number of Load Sec	quences Completed (0-	15)			15
2. Specimen Info						
	Specimen Diameter	(in):				
	Тор					3.97
	Middle					3.96
	Bottom					3.96 3.96
	Average Membrane Thicknes	e (in):				0.00
	Height of Specimen,	` '				8.03
	Height of Cap and B					0.00
	Initial Length, Lo (in)					8.03
	Initial Area, Ao (sq. i					12.34
	Initial Volume, AoLo	(cu. in):				99.07
3. Soil Specimen	-	1.7.1				
	Weight of Wet Soil U	Jsed (g):				3075.20
4. Soil Properties	s:					
•	Optimum Moisture C	Content (%):				107.7
	Maximum Dry Densi	ty (pcf):				16.4
	95% of MDD (pcf):					15.6
	In-Situ Moisture Con	ntent (%):				N/A
5. Specimen Pro	nerties:					
o. opcomici i io	Wet Weight (g):					3075.20
	Compaction Moisture	e content (%):				16.3
	Compaction Wet De					118.28
	Compaction Dry Der	• ., ,				101.70
	Moisture Content Aft	• ., .				16.2
6. Quick Shear T	est (Y=Yes, N=No, N	/A=Not Applicable):				#VALUE!
7. Resilient Mode	ulus, Mr:			12749(Sc)	^-0.33838	(S3)^0.21568
8. Comments						
9. Tested By:	C.GARRETT		Date: May 25, 20°	16		

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT **MATERIALS DIVISION**

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

SSRVPS 12+00 21'RT

Material Code Station No.: Location: HWY.391 INTCHING. IMPVTS. (S) May 25, 2016 5/25/16 BB0620 Name of Project: Date Sampled: Date Tested: Job No.

PULASKI Name: Code: 60 D.THORTON County:

20161379 RV231 Sampled By: Sample ID: Lab No.:

LATITUDE:

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

	Chamber	Nominal	Actual	Actual	Actual	Actual	Actual	Actual	Average	Resilient	Resilient
	Confining	Maximum	Applied	Applied	Applied	Applied	Applied	Applied	Recov Def.	Strain	Modulus
PARAMETER	Pressure	Axial	Max. Axial	Cyclic Load	Contact	Мах.	Cyclic	Contact	LVDT 1		
		Stress	Load		Poad	Axial	Stress	Stress	and 2		
						Stress					
DESIGNATION	တိ	Scyclic	Р _{мах}	P _{cyclic}	Pcontact	S _{max}	S _{cyclic}	Scontact	H _{avg}	ž	M
UNIT	psi	psi	lbs	sql	sql	psi	psi	psi	ij	in/in	psi
Sequence 1	6.0	2.0	25.2	22.6	2.5	2.0	1.8	0.2	0.00100	0.00012	14,789
Sequence 2	0.9	4.0	47.1	44.5	2.6	3.8	3.6	0.2	0.00219	0.00027	13,227
Sequence 3	6.0	6.0	69.7	66.2	3.5	5.6	5.4	0.3	0.00360	0.00045	11,951
Sequence 4	0.9	8.0	91.9	85.9	0.9	7.4	7.0	0.5	0.00566	0.00070	9,872
Sequence 5	0.9	10.0	112.4	103.8	9.8	9.1	8.4	0.7	0.00820	0.00102	8,237
Sequence 6	4.0	2.0	25.0	22.4	2.6	2.0	1.8	0.2	0.00112	0.00014	13,074
Sequence 7	4.0	4.0	46.5	43.9	2.6	3.8	3.6	0.2	0.00251	0.00031	11,386
Sequence 8	4.0	6.0	67.4	64.7	2.7	5.5	5.2	0.2	0.00421	0.00052	10,001
Sequence 9	4.0	8.0	89.8	84.6	5.2	7.3	6.9	0.4	0.00628	0.00078	8,772
Sequence 10	4.0	10.0	111.2	103.4	7.8	9.0	8.4	9.0	0.00864	0.00108	7,787
Sequence 11	2.0	2.0	25.0	22.4	2.5	2.0	1.8	0.2	0.00125	0.00016	11,700
Sequence 12	2.0	4.0	46.3	43.7	2.7	3.8	3.5	0.2	0.00282	0.00035	10,086
Sequence 13	2.0	0.9	8.99	63.9	2.8	5.4	5.2	0.2	0.00470	0.00059	8,858
Sequence 14	2.0	8.0	88.0	83.4	4.6	7.1	6.8	0.4	0.00687	0.00086	7,904
Sequence 15	2.0	10.0	109.1	102.1	7.1	8.8	8.3	9.0	0.00941	0.00117	7,058

DATE	DATE
C.GARRETT	
TESTED BY	REVIEWED BY

May 25, 2016

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT MATERIALS DIVISION

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

Job No.BB0620Material Code SSRVPSDate Sampled:5/25/16Station No.: 12+00Date Tested:May 25, 2016Location: 21'RT

Name of Project: HWY.391 INTCHNG. IMPVTS. (S)
County: Code: 60 Name: PULASKI

Sampled By:D.THORTONDepth: 0-5'Lab No.:20161379AASHTO Class: A-6(3)Sample ID:RV231Material Type (1 or 2): 2LATITUDE:LONGITUDE:

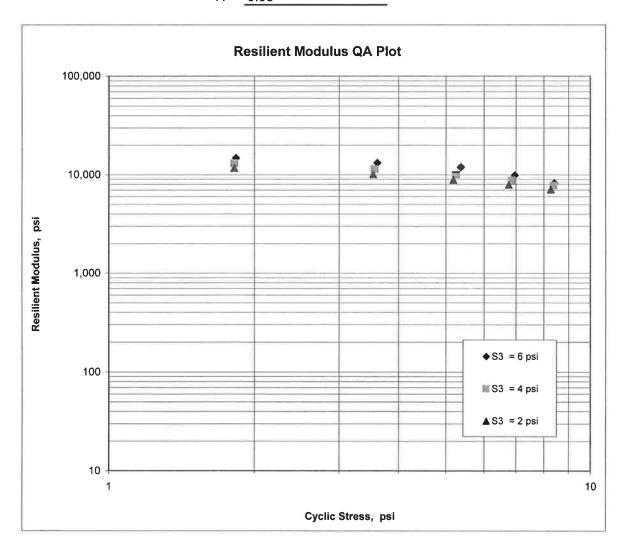
$$M_R = K1 (S_C)^{K2} (S_3)^{K5}$$

K1 = 12,749

K2 = -0.33838

K5 = 0.21568

 $R^2 = 0.93$



MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

	DOIL	DORVEL ,	/ IAVBINDIVI		ONDING 185.	I KHIOK	_	
DATE - 06/ JOB NUMBER - BB0 FEDERAL AID NO TO PURPOSE - SOI SPEC. REMARKS - NO SUPPLIER NAME - STA NAME OF PROJECT - H PROJECT ENGINEER - N PIT/QUARRY - ARKAN LOCATION - PULAS SAMPLED BY - D.THOR	620 BE ASSI L SURVE SPECIFI TE WY.391 OT APPL ISAS RTON	Y SAMPLICATION (INTCHNG ICABLE	CHECK			MATERI SPEC. SUPPLI COUNTY DISTRI	IAL YEA IER Y/ST ICT SAMI	NO 1 CODE - SSRVPS R - 2014 ID 1 ATE - 60 NO 06 PLED - 05/10/16 EIVED - 05/16/16
SAMPLE FROM - TEST MATERIAL DESC SOI		7V _ D	ייאד.ווד_ סאיי	TM T	MT COUNDIN		TEST	ED - 05/31/16
LAB NUMBER	=	2016137		-	20161373 S225			
SAMPLE ID TEST STATUS STATION	-	02+00	ATION ONLY	e	INFORMATION 17+00	ON ONLY	#0 #0	S226 INFORMATION ONLY 09+00
LOCATION DEPTH IN FEET MAT'L COLOR	-	CL 0-5 BR/GR			05LT 0-5 BR/GR		943 184	06LT 0-5 BROWN
MAT'L TYPE LATITUDE DEG-MIN- LONGITUDE DEG-MIN-						9.40 37.20		34 47 1.60 92 07 40.00
% PASSING 2				***			=1	
3/4	IN	100		-	100		91	100 99
NO.	10 -				98 96		20 20 20	91 83
NO.	40 = 80 = 200 = 80	96		3	94 91 71		*	78 74 50
LIQUID LIMIT	-	29		1.50	29		í≅c	25
PLASTICITY INDEX AASHTO SOIL UNIFIED SOIL	1.55 2.55 3.55		0)	: := :=	15 A-6(8)		*** ***	8 A-4(1)
% MOISTURE CONTENT	3243	20.	6		23.9		20	17.3
ACHMSC	(IN) -			100.0			12	4.5W
ACHMBC PCCP	(IN) -	9.0		e	9.5		196	12.5W
AGG.BASE CRS. CL-7	(IN) -	5.0		100	7.0		7 <u>=</u>	5.0
	-			2			-	
	-			=				
	-			28.0				

REMARKS - W=MULTIPLE LAYERS

39

AASHTO TESTS : T24 T88 T89 T90 T265

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MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

*** SOIL S	URVEY / PAVEMENT	50	UNDING TEST	REPORT	* * *	
DATE - 06/07/16 JOB NUMBER - BB0620 FEDERAL AID NO TO BE ASSIG PURPOSE - SOIL SURVEY SPEC. REMARKS - NO SPECIFIC SUPPLIER NAME - STATE NAME OF PROJECT - HWY.391 I PROJECT ENGINEER - NOT APPLI PIT/QUARRY - ARKANSAS	SAMPLE CATION CHECK CNTCHNG. IMPVTS.	(S)		MATERIA SPEC. SUPPLIA COUNTY DISTRIA	CE NO. = 2 AL CODE - SSRV YEAR - 2014 ER ID 1 YSTATE - 60 CT NO 06	
LOCATION - PULASKI COUNT	Ϋ́				AMPLED = 05/1	
SAMPLED BY - D. THORTON					ECEIVED = 05/1	
SAMPLE FROM - TEST HOLE MATERIAL DESC SOIL SURVEY	ער ביינונעני מ ב	c M c	NT COINDING		ESTED = 05/3	1/16
	20161375				20161377	
			S228		S229	0377.37
	INFORMATION ONLY		INFORMATION 12+00	N ONLY	= INFORMATION = 12+00	ONLY
	10+00 05RT	<u>=</u>	12+00 06RT		- 21RT	
	0-5	\hat{e}	0-5		0-5	
	BR/GR	##.	BROWN		BROWN	
MAT'L TYPE	DRY OR		Dicomi		BROWN	
LATITUDE DEG-MIN-SEC -	34 47 2.10	-	34 47	2.40	34 47 2	2.30
LONGITUDE DEG-MIN-SEC =				17.70		7.80
% PASSING 2 IN						
1 1/2 IN		12			#1. (2)	
3/4 IN		-			100	
3/8 IN	100	5	100		99	
•	99	0.00	99		97	
	99	V a	98		93	
NO. 40 -		_	95		86	
NO. 80 =	61	1.77	92		83	
NO. 200 =	50		81		75	
LIQUID LIMIT =	31	22	29		50	
PLASTICITY INDEX		22	15		34	
AASHTO SOIL		\dot{e}	A-6(10)		A-7-6(24)	
UNIFIED SOIL		$\widetilde{\mathcal{A}}_{i}$			<u>=</u>	
% MOISTURE CONTENT -	22.3	-	22.6		28.1	
ACHMSC (IN) -	4.0	2	2.5		4 944	
ACHMBC (IN)	2.0	-	5.0			
AGG.BASE CRS. CL-7 (IN)	8.0					
THE STATE OF THE S		7			Ē	
		-			2	
13E		-			-	
		-			2	
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ve.		=			=	

REMARKS - W=MULTIPLE LAYERS

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AASHTO TESTS : T24 T88 T89 T90 T265

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MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

DATE - 06/0 JOB NUMBER - BB00 FEDERAL AID NO TO B PURPOSE - SOID SPEC. REMARKS - NO S SUPPLIER NAME - STAT NAME OF PROJECT - HO PROJECT ENGINEER - NO PIT/QUARRY - ARKANS LOCATION - PULASI SAMPLED BY - D.THOR SAMPLE FROM - TEST B MATERIAL DESC SOID	520 BE ASSI SURVE SPECIFI FE VY.391 OT APPI SAS KI COUN FON HOLE	Y SAMPLE CATION CHECK INTCHNG. IMPVTS. ICABLE		SEQUENCE NO 3 MATERIAL CODE - 5 SPEC. YEAR - 2 SUPPLIER ID 3 COUNTY/STATE - 6 DISTRICT NO 0 DATE SAMPLED - 0 DATE RECEIVED - 0 DATE TESTED - 0 GS	SSRVPS 2014 1 50 06 05/10/16 05/16/16
LAB NUMBER	_		12	_	
	_	20161378	-	_	
SAMPLE ID	_	S230	2	-	
TEST STATUS	_	INFORMATION ONLY	H	_	
STATION	-	14+00	5	-	
LOCATION	-	06RT	5. S	-	
DEPTH IN FEET	-	0 - 5	_	_	
MAT'L COLOR	_	BR/GR	-	_	
MAT'L TYPE	-		2 2	_	
LATITUDE DEG-MIN-S	SEC -	34 47 4.30	= ≅	_	
LONGITUDE DEG-MIN-S	SEC -	92 07 34.00			
% PASSING 2	IN : -		i e	i n i	
1 1/2	IN		15	.₩/	
	IN		\' <u>@</u>	Tank!	
	IN	100	-	₩	
	4 -			-350	
	10 -		15	7 2	
	40 -	95	V2	•	
			: 2	965	
=	80 -	90	(m	TES	
NO. 2	200 -	61			
LIQUID LIMIT	_	18	=	<u>\$</u>	
PLASTICITY INDEX	_	3	Ω .	:=:	
AASHTO SOIL	-	A-4(0)	=		
UNIFIED SOIL	-		#	57.	
% MOISTURE CONTENT	_	19.4	=	-	
ACHMSC	(IN) -	2.0	5	_	
ACHMBC	(IN) -	5.0	의 (1) 필요	-	
ACHMSC		2.0	9	_	
	(IN) -		*:	-	
AGG.BASE CRS. CL-7	(IN)	5.0	2.0	-	
	_		a	-	
	-		-	-	
	-		81	-	
	_		2.1	-	
	_		-	-	

REMARKS - W=MULTIPLE LAYERS

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AASHTO TESTS : T24 T88 T89 T90 T265

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MICHAEL BENSON, MATERIALS ENGINEER *** SOIL SURVEY / PAVEMENT SOUNDING TEST REPORT ***

50) <u> </u>	SURVEI	/ 1	SA A PMPIN T	SOUNDI	NG IESI	KE POI	X1 """		
DATE - 05/31/1 JOB NUMBER - BB0620 FEDERAL AID NO TO BE A PURPOSE - SOIL SU SPEC. REMARKS - NO SPEC SUPPLIER NAME - STATE NAME OF PROJECT - HWY. 3 PROJECT ENGINEER - NOT A PIT/QUARRY - ARKANSAS	ASSI JRVE CIFI 391	Y SAMP CATION INTCHN	CHI	ECK			MATER SPEC. SUPPL COUNT	ENCE NO. PIAL CODE YEAR SIER ID. PY/STATE RICT NO.	- - -	RV 2014 1 60
LOCATION - PULASKI (COUN	TY					DATE	SAMPLED	_	05/10/16
SAMPLED BY - D.THORTON								RECEIVED		
SAMPLE FROM - TEST HOLE	6									05/31/16
MATERIAL DESC SOIL S		EY - RE	SIS	TANCE R	-VALUE	ACTUAL				<i>v</i> = / = -/ = -
LAB NUMBER		20161			-			3)		
		RV231			: :-			90		
TEST STATUS	\sim	INFOR	TAM	CON ONLY				35.5 		
STATION	(😅	12+00			8			30		
		21RT								
DEPTH IN FEET	100	0 - 5			-			-		
MAT'L COLOR	\mathbb{R}^{2}	BROWN			Ç.			30		
MAT'L TYPE	-				120			9 4 3		
LATITUDE DEG-MIN-SEC								⊕:		
LONGITUDE DEG-MIN-SEC	-	92	07	47.80						
% PASSING 2 IN.	-									
1 1/2 IN.					022			=7.		
3/4 IN		100			200			ær.		
3/8 IN.		84			100			-		
NO. 4		69			O.T.			3 0		
NO. 10					(<u>)</u>			-		
NO. 40) =			***		
	100				075 075			50 50		
NO. 200										
1107 200										
LIQUID LIMIT	7	37			-			i+1		
PLASTICITY INDEX	=	24			-			=		
AASHTO SOIL	77	A-6 (3)		_			= = = = = = = = = = = = = = = = = = =		
UNIFIED SOIL	100				=			(#C		
% MOISTURE CONTENT	-									
	2				==			9		
	-				÷			:6		
	*				Ħ.			175		
	77				2.1			12		
	-				<u>=</u> /			E		
	-				94.1 			-		
	=							=======================================		
	2							=		
	-				2 0			÷		

REMARKS - SAMPLE FULL OF SYNITE

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AASHTO TESTS : T24 T88 T89 T90 T265

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JOB: BB0620

Arkansas State Highway Transporation Department

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

COUNTY NO. 60 DATE TESTED

Materials Division

Michael Benson, Materials Engineer

STA.#	LOC.	DEPTH	COLOR	#4	#10	#40	#80	#200	L.L.	P.I.	SOIL CLASS	<i>LAB</i> #:	%MOISTURE
12+00	21RT	0-5	BROWN	69	59	49	44	37	37	24	A-6(3)	RV231	
02+00	CL	0-5	BR/GR	99	99	98	96	79	29	15	A-6(10)	S224	20.6
07+00	05LT	0-5	BR/GR	98	96	94	91	71	29	15	A-6(8)	S225	23.9
09+00	06LT	0-5	BROWN	91	83	78	74	50	25	8	A-4(1)	S226	17.3
10+00	05RT	0-5	BR/GR	99	99	85	61	50	31	18	A-6(5)	S227	22.3
12+00	06RT	0-5	BROWN	99	98	95	92	81	29	15	A-6(10)	S228	22.6
12+00	21RT	0-5	BROWN	97	93	86	83	75	50	34	A-7-6(24)	S229	28.1
14+00	06RT	0-5	BR/GR	99	97	95	90	61	18	3	A-4(0)	S230	19.4

5/31/2016

DATE TESTED

5/31/2016

Arkansas State Highway Transporation Department

JOB: BB0620
JOB NAME: HWY.391 INTCHNG, IMPVTS. (S)

COUNTY NO. 60

Materials Division

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Michael Benson, Materials Engineer

SD.							
PAVEMENT SOUNDINGS	AGG.BASE CRS. CL-7 5.0	AGG.BASE CRS. CL-7 7.0	AGG.BASE CRS. CL-7 5.0				AGG.BASE CRS. CL-7
	PCCP 9.0	PCCP 9.5	PCCP	AGG.BASE CRS. CL-7 8.0	AGG.BASE CRS. CL-7	AGG.BASE CRS. CL-7	ACHIMSC
	ACHMBC —		ACHMBC 12.5W	ACHMBC 2.0	ACHMBC	ACHMBC 5.0	ACHMBC
	ACHMSC	ACHMSC	ACHIMSC 4.5W	ACHMSC 4.0	ACHMSC	ACHMSC 2.5	ACHIMSC
STA.# LOC.	ರ	05LT	06LT	05RT	21RT	06RT	06RT
STA.#	05+00	07+00 05LT	00+60	10+00	12+00	12+00	14+00

5.0

2.0

5.0

2.0

Tuesday, June 07, 2016

comments: W=MULTIPLE LAYERS