



























## WEST

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

GUE-541-0.00 COS-541-31.87

WHEELING & LIBERTY TOWNSHIPS,
GUERNSEY COUNTY
LINTON TOWNSHIP,
COSHOCTON COUNTY

#### PROJECT DESCRIPTION:

2 LANE ASPHALT CONCRETE RESURFACING, AND RELATED WORK.

Project Earth Disturbed Area = N/A Maintenance Project)
Estimated Contractor Earth Disturbed Area = N/A Maintenance Project)
Mafine of Intent Earth Disturbed Area = N/A Maintenance Project)

LOCATION	COUNTY	ROUTE	PROJECT TERMINI		NET	
LOCATION	COUNT		BEGIN	/ END	LENGTH MILES	
ı	GUE	SR 541	0.00	8.47	8.46	
2	cos	SR 541	31.87	34.90	3.03	

EXISTING PAVEMENT TYPE	PAVEMENT AREA
	SQ YARDS
448	5544
448	93509
448	5914
·	
	(2723)
	í
448	37330
	(777)

PROPOSED PAVEMENT							
	448 ASPHALT CONCRETE						
THICKNESS	INTERMEDIATE COURSE, TYPE 1, PG 70-22	THICKINESS	SURFACE COURSE, TYPE 1, PG 70-22				
INCHES	CU. YARDS	INCHES	CU. YARDS				
1	454.0		4540				
1	154,0	1	154.0				
-	2597.5	1	2597.5				
_ 1	164,3	1	164.3				
1	(75.6)	1	(75.6)				
	2840.2		2840.2				
1	1036.9	1	1036.9				
1	(21.6)	1	(21.6)				
	10153		1015.3				

#### Revised Bid Items: Alternate 1

R	ef Item No	Qty	Cnit		Description
13	448E46080	4509	CUYD	Asphalt Concrete In	ermediate Course, Type 1, PG 70-22
0					10 h 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7
14	44815410	4161	CUYD	Asphalt concrete Su	face Course, Type 1, PG 70-22M

### Added Bid Items: Alternate 2

Ref	/ Item No	Qty	Unit	Description
-	448E90000	1155	CU YD	Asphalt Concrete, Misc.: Evotherm
			0	
1	448E90000	1155	CU YD	Asphalt Concrete, Misc.: Aspha-Min
M	448E90000	1339	CU YD	Asphalt Concrete, Misc.: Sasobit
	7 4	1		
	448E46904	1602	CU YD	Asphalt concrete Surface Course, Type 1, PG 70-22M
The same of the sa				
	448E46020	3545	CU YD	Asphalt Concrete Intermediate Course, Type 1, PG 64-22



Section Limits

Place the WMA and control sections as follows:

Control Section: Cos-541-31.87 to 34.90 (3:03 mile Evotherm: Gue-541-0.00 to 2.74 (Bridge Rd TR0186) (2.70 mile)

Aspha-min: Gue-541-2.70 (Bridge Rd.-TR0186) to 5.40 (Structure No. 541-0540) (2.70 mile)

Sasobit : Gue-541-5.40 (Structure No. 541-0540) to 8.47 (eastern most ramps of I-77) (3.07 m)

Mix Design

control section mix to meet ODOT requirements. Design three surface course mixes to incorporate the above noted WMA technologies. Use the same aggregates and gradation in all four mixes. Design RAP into the control mix at the desired percentage of 0 to 15 percent by adjusting the wirgin binder for the RAP binder content to achieve the design total binder content. Use the same binder content and RAP content for all four mixes. Use the same starting binder grade (PG 70-22M before altering with WMA products) in all four mixes.

#### Construction

The mainline Intermediate Course shall be a Type 1, PG 64-22 placed 0.75" thick. All Surface Course mixes shall be Type PG 70-22M placed 1.25" thick.

Construct at least 500 tons of control section mix before beginning any WMA mix production. Before placement of WMA produce a test batch of a minimum of 50 tons of each WMA mix to verify mix properties and acceptability. Do not place the test material on the project. Sample and test one series of QC tests. Place and compact the test material. Provide results to the DET.

For each section provide a roller pattern and suitable nuclear or non-nuclear gauge results to satisfy the WMA supplier adequate density is being achieved.

#### **Evotherm:**

For the Evotherm adjust the asphalt plant to take into account the total emulsion vs. residue, ensuring the mixture binder content conforms to the job mix formula. Provide a total addata sheet to the researcher and Engineer summarizing the emulsion technical data and final PG grade.

#### Sasobit:

Add Sasobit at a rate of 1.5% of the total binder. If plant induced, use a feed method to achieve blending acceptable to the supplier and that achieves a uniform blend.

#### Aspha-Min:

Add Aspha-Min at a rate of 0.3% of the total mix. Use a feed method to achieve blending acceptable to the supplier and that achieves a uniform blend.





- DOT, FHWA, Associations and Industry Reps
- Goal was to obtain a few quick projects to gather needed information to establish longer term goals for use of and proper implementation of WMA



Assist the C. Researcher

ODOT will hire a researcher to collect data and test materials used in the project.

Assist the ODOT researcher with needed traffic control for coring he will conduct and for other sample taking as needed. Set aside material as requested for researcher lab testing. In addition, the ODOT Researcher will pay separately for material, hauling and placement of the same three WMA mixes and control mix in the APTLF located at Lancaster Campus of Ohio University. Contact the Ohio University APTLF for quantities.

- Production information
- Plant type
- Plant model
- Describe method of introducing WMA additive(s)
- Production rate
- Aggregate temperature
- Mix discharge temperatures (history during production)
- Observations regarding motor amperages. Record the amperage reading from the hot elevator drag chain motor(s) every 60 minutes of production.
- Use of silos and typical storage time. Provide the minimum, maximum and average time mix was held in silo storage.

- Laydown ormation
- Temperange of WMA at load out
- Truck type (tandems, the bottom etc)
  - Haul distance/Haul time
  - Release agent used (it any
- Observations regarding dumping material/sticking in truck beds (if any)
  - Use of windrow or transfer vehicles
    - Paver type and model
      - Vibratory screed on?
      - Screed heated?
    - Compacted thickness
    - Record the mat temperature measured immediately behind screed every 60 minutes of placement.
    - Roller Train
    - Type and model
    - Weight
    - Amplitude and frequency of vibratory rollers (if applicable)
    - Tire pressure of pneumatic roller (if applicable)
- Roller pattern used for each WMA mix and the control section

- Moisture content of mix at load out (sampled from truck) and all QC data.
  - Provide fuel consumption data for the plant and paving train for each of the four sections.



### Plant

- Average mix production rate in tons/hour over entire
  - Conventional Mix Test Period
  - WMA Test Period
  - Ibs CO2/hour; Ibs NOx/hours; Ibs VOC/hour reported as MW of propane
    - Conventional Test Period (average all runs)
    - WMA Test Period (average all runs)
    - percent Reduction



#### Paver

- Anomalies in sempling and results
- Visual observations of emissions
  - Conventional Test Period
  - WMA Test Period
- Mix temperature (hopper and mat)
  - Conventional Test Period
  - WMA Test Period
  - Percent reduction
- Background-corrected asphalt fume emissions (TPM and BSM) reported in mg/m3
  - Conventional Test Period (average all runs)
  - WMA Test Period (average all runs)
- percent Reduction

### APTLF Contracted Research

• To build and test pavement sections containing each of the selected mixtures (3 WMA types and one conventional) as a wearing (sacrificial) course compacted on conventional HMA layers designed following perpetual pavement guidelines.

### APTLF Contracted Research

- To examinate influence of pavement thickness on the tensile strain developed at the bottom of the perpetual pavement layer.
- To compare the performance of WMA mixtures with that of conventional HMA in the controlled setting of the APLF.
- To document the performance of perpetual pavements containing 3 types of WMA and one conventional wearing course and to monitor pavement response in the form of deflections, strains and pressures in and under perpetual pavements.



	Type I
Usage ("I for Surface)	Surface
Traffic Designation: C"1" it Heavy ; "2" it Light ;	Medium
line item Reference Numberisi	103
% Binder Content @ Max. Stability	6.2
% Binder Content @ Max. Unit Weight	7.2
% Binder Content @ Opt. Air Voids	6.1
Max Theoretical @ Optimum	2.429
PS Stade by Proposal	PG 70-22
96 Virgin Binder	5.3
Virgin Binder Grade	PG 70-22



Polymer Type (SBR-or SBS)
Viking Temperature
Compaction Temperature
FX4 Ratio
50-30 Ratio

SBS							
300 -	320 F						
30	300 F						
0.5 ok							
4	ОK						
81.0	0K						

			Coarse aggregate				
%	Size	Туре	Producer/Location	Code	ODOT Gsb		
53	No. 8	Limestone	Shelly Materials - E. Fultonham, OH	4413	2.606		
88888888888888888							
			Fine aggregate				
%	Size	Туре	Producer/Location	Code	ODOT Gsb		
32	Sand	Natural	Shelly Materials - Coshocton, OH	4403	2.585		
<u> </u>							
000000000000000000000000000000000000000		***************************************	999999999999999999999999999999999999999				
			*RAP				
%	% AC	Туре	Source	Composition	Gse		
15	5.01	Crushed	Projects 547-97 & 766-98	Limestone / Natural	2.691		

		ODOT SP	EC. BAND
Sieve	% Pass	Lijky	
2" (50.8)	100	100	100
1-1/2" (38.1)	100	100	100
1" (25.4)	100	100	100
3/4" (19)	100	100	100
1/2" (12.7)	100	100	100
3/8" (9.5)	92	90	100
#4 (4.75)	51	45	57
#8 (2.36)	38	30	45
#16 (1.18)	28	17	35
#30 (0.6)	18	12	25
#50 (0 3)		5	18
<b>#</b> 100 (0.15)	4	2	10
#200 (0.075)	2.8		





Thanks to ODOT District 5 personnel in their assistance and willingness to participate in this work.

Thanks for your attending!

