OHIO DEPARTMENT OF TRANSPORTATION
INTER-OFFICE COMMUNICATION
Office of Environmental Services

TO: Jim Brushart, District 9 Deputy Director **DATE:** June 23, 2010
Attention: Greg Manson, District Environmental Coordinator

FROM: Noel Alcala, P.E., Noise and Air Quality Coordinator, OES

SUBJECT: Noise Analysis Addendum Report for Noise wall/Earthen Berm combination

PROJECT: (CRS): SCI-823-6.81 19415 (PID)

The subject Noise Analysis, received by this office on 6/10/10 and prepared by HDR, has been reviewed by this office and we have no comments. We find the report acceptable. The proposed noise barrier will protect 27 homes along Oliver Road NW of SR139. The height of the proposed noise barrier will range from 11.5'-12.5'. The currently proposed noise wall/earthen berm extends from approximately Sta. 480+50 to Sta. 508+50, however, no noise wall or earthen berm is proposed from Sta 499 to Sta. 503 because the roadway is in a cut section. The conventional noise wall will be utilized from Sta. 480+50 to Sta. 488+50, including on the bridge over Portsmouth-Minford Road (SR139). It is proposed to use the earthen berm from approximately Sta. 488+50 to Sta. 508+50. No noise wall or earthen berm is proposed from Sta 499 to Sta. 503 because the roadway is in a cut section. The approximate length of the noise wall/earthen berm system is 2400'.

Please provide the noise wall/earthen berm plan sheets for OES review when they become available.

Should you have any questions of concerns, feel free to contact Noel Alcala of this office at 614-466-5222.

NAA:na

c: Carmen Stemen, OES
Tom Barnitz, D-9
File
Reading File

"Hyre, Brad"
<Brad.Hyre@hdrinc.com>
06/10/2010 04:16 PM

To "Tom.Barnitz@dot.state.oh.us" <Tom.Barnitz@dot.state.oh.us>, "Noel.Alcala@dot.state.oh.us"
cc
bcc
Subject SCI-823-6.81: Noise Barrier/Berm

Tom/Noel,

Attached please find an addendum to the project's Noise Analysis Report for utilizing an earthen noise berm in lieu of a noise barrier for a portion of the subject project. The currently proposed noise barrier extends from approximately Sta. 480+50 to Sta. 508+50. While a berm was analyzed over the entire length, it is proposed to use the berm from approximately Sta. 488+50 to Sta. 508+50. The as-proposed noise barrier would be utilized for the remaining length, including on the bridge over Portsmouth-Minford Road.

Please don't hesitate to call if you have any questions or would like to further discuss. Thanks.

-Brad

Brad Hyre, P.E.
Vice President\Managing Principal

HDR | ONE COMPANY - *Many Solutions*
HDR Engineering, Inc.
9987 Carver Road | Suite 200 | Cincinnati, OH | 45242
Phone: 513-984-7500 | Cell: 513-509-7231
Email: brad.hyre@hdrinc.com

20100610_SCI-823-6.81_Revised Noise Addendum NSA 4.pdf

Technical Memorandum

Analysis of Traffic Noise Impact and Abatement Measures for NSA 4
Portsmouth Bypass (SCI-823-0.00, PID 19415)
Scioto County, Ohio

Addendum to Noise Analysis report prepared July 2006 and Addendum prepared January 2009

Based on a more accurate roadway profile and the desire to replace a previously recommended noise wall with a combination of a wall and a berm, the following addendum was prepared for noise sensitive area 4 (NSA 4). The following text replaces section 5.5 Barrier Wall Analysis – NSA 4.

5.5 Barrier Wall/Berm Analysis – NSA 4

A noise barrier analysis was performed for NSA 4 to determine if the construction of a noise wall transitioning into a noise berm would be reasonable and feasible in abating design year 2030 traffic noise levels at the noise sensitive receptor sites. Noise wall NSA 4 was modeled approximately 3.5 feet east of the northbound paved shoulder from approximate roadway station 480+50 extending north a distance of approximately 950 feet to approximate roadway station 490+00. Noise berm NSA 4 was modeled approximately 33 feet east of the northbound paved shoulder from approximate roadway station 490+00 extending north a distance of approximately 900 feet to approximate roadway station 499+00. At this point the roadway is in a cut-section, and noise berm NSA 4 starts again at approximate roadway station 503+00 extending north a distance of approximately 550 feet to approximate roadway station 508+50. A noise wall/berm was not evaluated along the east right-of-way because this section of roadway would be constructed on fill and is situated at a higher elevation than the receptor sites.

Proposed noise wall NSA 4 would have a maximum height of 12 feet and an average height of 11.5 feet. Proposed noise berm NSA 4 would have a maximum height of 12.5 feet and an average height of 12.5 feet. At a combined total length of 2,395 feet, noise wall/berm NSA 4 would provide a maximum noise reduction of 6 dB at residential receptor sites 2, 3, and 4 and would provide a reduction in noise level of 3 dB or greater at 25 receptor sites. With the level of noise reduction that this combination wall/berm provides, the noise wall/berm would meet the ODOT feasibility criterion.

Using an average cost of $17.50 per square foot (the square foot cost in 2006) for noise barrier construction, the total cost of the noise barrier is estimated at $507,504. This is a very conservative estimate, assuming the price per square foot of the berm is equal to that of the noise wall. In reality, the berm will be constructed with excess soil from the project, reducing the total cost of the berm and the amount of project waste. With a total of 25 benefited residential dwelling units, the average cost per benefited receptor would be $20,301. With an average cost of less than $25,000 per benefited receptor (the figure used in 2006), noise barrier NSA 4 would meet the ODOT reasonable cost criterion. Noise barrier NSA 4 would meet the ODOT criteria for a feasible and reasonable noise abatement measure and is recommended for construction as part of the project.

Appendix D TNM Data – Sound Level Spreadsheets

The TNM spreadsheets for "NSA 4 – NSA 4 Final Run" that were provided in Appendix D should be replaced with the attached TNM Spreadsheets titled "Revised NSA 4 –Wall/Berm".

Table 14 Noise Abatement Summary Table on page 28 has been revised to reflect the re-analysis.

Table 14
Noise Abatement Summary Table (Addendum)

Barrier	Maximum Insertion Loss[a] (dB)	Barrier Length (feet)	Average Barrier Height (feet)	Estimated Barrier Cost[b]	Benefitted Property[c]	Cost Per Benefitted Property	Effectiveness		Barrier Recommended[f]
							Feasible[d]	Reasonable[e]	
NSA 1	9.7	3,387	16.03	$950,112	21	$445,243	Yes	No	No
NSA 2 East	9.0	2,681	12.33	$578,532	67	$8,634	Yes	Yes	Yes
NSA 2 West	5.0	1,261	15.05	$332,066	13	$30,188	Yes	No	No
NSA 3	2.6	657	20.00	$229,950	0	N/A	No	No	No
NSA 4	5.7	2,395	12.10	$507,504	25	$20,301	Yes	Yes	Yes
NSA 5	6.7	1,709	13.34	$399,038	5	$79,807	Yes	No	No
NSA 6	8.0	1,108	11.10	$215,258	7	$30,751	Yes	No	No
NSA 7	No noise impacts identified in this NSA								
NSA 8	No noise impacts identified in this NSA								

Notes:
[a] Insertion Loss (IL) for each barrier is the maximum noise reduction of all residences protected by the barrier.
[b] Cost per noise barrier is assumed to be $17.50 per square foot.
[c] A receptor is considered benefitted by the noise barrier if the IL at the receptor site is 3 dB or greater.
[d] A noise barrier is considered acoustically feasible if the barrier can provide a noise reduction of at least 5 dB at one receptor site.
[e] A noise barrier is considered cost reasonable if the cost per benefitted receptor is less than $25,000.
[f] Recommendation is made if the noise barrier is cost-reasonable and acoustically-feasible

HDR
M Parsons

16 April 2010
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SCI-823 Portsmouth Bypass
RUN: Revised NSA 4
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
1	1	1	39.8	56.4	66	16.6	10	Sub'l Inc	54.5	1.9	8	-6.1
2	2	3	39.8	62.0	66	22.2	10	Sub'l Inc	56.4	5.6	8	-2.4
3	3	2	39.8	63.4	66	23.6	10	Sub'l Inc	57.7	5.7	8	-2.3
4	4	2	55.7	64.5	66	8.8	10	----	58.8	5.7	8	-2.3
5	5	1	55.7	64.6	66	8.9	10	----	59.3	5.3	8	-2.7
6	6	1	55.7	64.6	66	8.9	10	----	59.8	4.8	8	-3.2
7	7	2	55.7	63.7	66	8.0	10	----	60.1	3.6	8	-4.4
8	8	2	55.7	62.8	66	7.1	10	----	59.8	3.0	8	-5.0
14	15	1	39.8	55.3	66	15.5	10	Sub'l Inc	52.3	3.0	8	-5.0
15	16	1	39.8	59.4	66	19.6	10	Sub'l Inc	54.4	5.0	8	-3.0
16	17	1	39.8	62.4	66	22.6	10	Sub'l Inc	58.8	3.6	8	-4.4
17	18	2	39.8	60.3	66	20.5	10	Sub'l Inc	56.0	4.3	8	-3.7
18	19	3	39.8	60.7	66	20.9	10	Sub'l Inc	56.2	4.5	8	-3.5
19	20	2	39.8	61.6	66	21.8	10	Sub'l Inc	57.1	4.5	8	-3.5
20	21	2	55.7	61.5	66	5.8	10	----	58.9	2.6	8	-5.4

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	26	1.9	4.2	5.7
All Impacted	16	1.9	4.2	5.7
All that meet NR Goal	0	0.0	0.0	0.0

HDR 16 April 2010
M Parsons TNM 2.5

RESULTS: BARRIER DESCRIPTIONS
PROJECT/CONTRACT: SCI-823 Portsmouth Bypass
RUN: Revised NSA 4
BARRIER DESIGN: INPUT HEIGHTS

Barriers

Name	Type	Heights along Barrier			Length	If Wall	If Berm			Cost
		Min	Avg	Max		Area	Volume	Top Width	Run:Rise	
		ft	ft	ft	ft	sq ft	cu yd	ft	ft:ft	$
NSA 4 WALL	W	5.00	11.50	12.00	950	10925				191193
NSA 4 BERM 1	W	12.50	12.50	12.50	896	11200				195996
NSA 4 BERM 2	W	12.50	12.50	12.50	550	6875				120315
									Total Cost:	507504

HDR
M Parsons

16 April 2010
TNM 2.5

RESULTS: BARRIER-SEGMENT DESCRIPTIONS
PROJECT/CONTRACT: SCI-823 Portsmouth Bypass
RUN: Revised NSA 4
BARRIER DESIGN: INPUT HEIGHTS

Barriers		Segments										
Name	Type	Name	No.	Heights First Point	Average	Second Point	Length	If Wall Area	On Struc?	Important Reflections?	If Berm Volume	Cost
				ft	ft	ft	ft	sq ft			cu yd	$
NSA 4 WALL	W	480+50.00	2	5.00	7.50	10.00	50	372				6506
		481+00.00	3	10.00	10.00	10.00	50	495				8669
		481+50.00	4	10.00	10.50	11.00	49	520				9094
		482+00.00	5	11.00	11.00	11.00	50	545				9541
		482+50.00	6	11.00	11.50	12.00	50	570				9975
		483+00.00	7	12.00	12.00	12.00	50	595				10419
		483+50.00	8	12.00	12.00	12.00	50	595				10416
		484+00.00	9	12.00	12.00	12.00	50	594				10399
		484+50.00	10	12.00	12.00	12.00	50	594				10397
		485+00.00	11	12.00	12.00	12.00	50	594				10397
		485+50.00	12	12.00	12.00	12.00	50	596				10426
		486+00.00	13	12.00	12.00	12.00	50	595				10405
		486+50.00	14	12.00	12.00	12.00	49	594				10388
		487+00.00	15	12.00	12.00	12.00	50	596				10434
		487+50.00	16	12.00	12.00	12.00	49	594				10387
		488+00.00	17	12.00	12.00	12.00	50	595				10415
		488+50.00	18	12.00	12.00	12.00	50	594				10403
		489+00.00	19	12.00	12.00	12.00	50	596				10430
		489+50.00	20	12.00	12.00	12.00	58	691				12093
NSA 4 BERM 1	W	490+00.00	22	12.50	12.50	12.50	49	616				10779
		490+50.00	23	12.50	12.50	12.50	49	616				10781
		491+00.00	24	12.50	12.50	12.50	49	617				10795
		491+50.00	25	12.50	12.50	12.50	49	617				10792
		492+00.00	26	12.50	12.50	12.50	49	618				10818

		492+50.00	27	12.50	12.50	12.50	50	619				10839
		493+00.00	28	12.50	12.50	12.50	50	623				10903
		493+50.00	29	12.50	12.50	12.50	50	625				10931
		494+00.00	30	12.50	12.50	12.50	50	624				10926
		494+50.00	31	12.50	12.50	12.50	50	625				10941
		495+00.00	32	12.50	12.50	12.50	50	625				10944
		495+50.00	33	12.50	12.50	12.50	50	624				10926
		496+00.00	34	12.50	12.50	12.50	50	625				10944
		496+50.00	35	12.50	12.50	12.50	50	625				10931
		497+00.00	36	12.50	12.50	12.50	50	626				10955
		497+50.00	37	12.50	12.50	12.50	50	623				10906
		498+00.00	38	12.50	12.50	12.50	50	625				10944
		498+50.00	39	12.50	12.50	12.50	50	625				10941
NSA 4 BERM 2	W	503+00.00	41	12.50	12.50	12.50	50	625				10944
		503+50.00	42	12.50	12.50	12.50	50	625				10941
		504+00.00	43	12.50	12.50	12.50	50	625				10940
		504+50.00	44	12.50	12.50	12.50	50	625				10931
		505+00.00	45	12.50	12.50	12.50	50	625				10944
		505+50.00	46	12.50	12.50	12.50	50	624				10926
		506+00.00	47	12.50	12.50	12.50	50	625				10941
		506+50.00	48	12.50	12.50	12.50	50	625				10944
		507+00.00	49	12.50	12.50	12.50	50	624				10926
		507+50.00	50	12.50	12.50	12.50	50	625				10944
		508+00.00	51	12.50	12.50	12.50	50	625				10931

HDR 16 April 2010
M Parsons TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SCI-823 Portsmouth Bypass
RUN: Revised NSA 4

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Southbound	28.0	517	1	857,639.4	313,079.4	784.20				Average	
		513	2	857,796.2	312,941.6	776.70				Average	
		510	3	857,913.9	312,834.6	767.10				Average	
		509	4	857,998.3	312,761.5	763.20				Average	
		507+50	5	858,108.0	312,668.8	756.60				Average	
		505	6	858,295.1	312,505.7	745.40				Average	
		502+50	7	858,482.2	312,342.6	734.10				Average	
		500	8	858,669.4	312,179.6	722.90				Average	
		494	9	859,126.8	311,777.4	698.20				Average	
		490	10	859,423.9	311,525.4	691.00				Average	
		487+50	11	859,724.3	311,307.3	690.90				Average	Y
		484	12	859,927.4	311,183.0	696.70				Average	
		480	13	860,273.1	310,986.8	710.40				Average	
		475	14	860,714.7	310,770.2	726.10				Average	
		470	15	861,191.6	310,591.5	734.90				Average	
		465	16	861,659.6	310,426.2	736.80				Average	
		460	17	862,130.1	310,256.0	731.90				Average	
		455	18	862,595.9	310,091.0	724.40				Average	
		450	19	863,069.6	309,923.3	716.90				Average	
		445	20	863,544.4	309,760.5	712.80				Average	Y
		442	21	863,831.9	309,654.3	715.40				Average	
		435	22	864,484.7	309,425.3	736.40				Average	
		430	23	864,958.4	309,257.6	758.20					
Northbound	28.0	430	24	864,966.0	309,286.0	758.20				Average	

		435	25	864,491.0	309,451.0	736.40				Average	
		442	26	863,830.0	309,683.0	715.40				Average	Y
		445	27	863,547.0	309,786.0	712.80				Average	
		450	28	863,077.0	309,950.0	716.90				Average	
		455	29	862,606.0	310,114.0	724.40				Average	
		460	30	862,136.5	310,283.2	731.90				Average	
		465	31	861,667.1	310,452.4	736.80				Average	
		470	32	861,197.6	310,615.2	734.90				Average	
		475	33	860,724.5	310,796.7	726.10				Average	
		480	34	860,280.1	311,014.6	710.40				Average	
		484	35	859,942.2	311,205.0	696.70				Average	Y
		487+50	36	859,739.4	311,332.1	690.90				Average	
		490	37	859,426.5	311,557.8	691.00				Average	
		494	38	859,141.0	311,803.0	698.20				Average	
		500	39	858,685.0	312,204.0	722.90				Average	
		502+50	40	858,496.8	312,368.3	734.10				Average	
		505	41	858,308.6	312,532.6	745.40				Average	
		507+50	42	858,120.5	312,696.8	756.60				Average	
		509	43	858,016.5	312,788.8	763.20				Average	
		510	44	857,932.3	312,861.1	767.10				Average	
		513	45	857,809.6	312,968.1	776.70				Average	
		517	46	857,661.5	313,097.6	784.20					
Swauger Valley Road	12.0	1	47	863,547.0	308,702.0	650.00				Average	
		2	48	863,749.0	309,504.0	645.00				Average	
		3	49	863,832.0	310,020.0	633.00				Average	
		4	50	864,036.0	310,355.0	630.00					
Roadway6	20.0	1	51	859,197.0	310,847.0	635.00				Average	
		2	52	859,796.6	311,306.9	633.00					
Roadway7	12.0	point43	53	859,834.9	311,336.6	0.00				Average	
		point44	54	860,553.8	311,889.4	0.00					

HDR 16 April 2010
M Parsons TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: SCI-823 Portsmouth Bypass
RUN: Revised NSA 4

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per Unit Area	$ per Unit Vol.	Top Width	Run:Rise	$ per Unit Length			X	Y	Z	at Point	Seg Ht Increment	Perturbs #Up	#Dn	On Struct?	Important Reflections?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
NSA 4 WALL	W	0.00	24.00	17.50				0.00	480+50.00	2	860,245.9	311,053.3	707.02	5.00	1.00	5	5		
									481+00.00	3	860,202.5	311,077.3	705.07	10.00	1.00	10	10		
									481+50.00	4	860,159.4	311,101.7	703.19	10.00	1.00	10	10		
									482+00.00	5	860,116.5	311,126.4	701.32	11.00	1.00	11	11		
									482+50.00	6	860,073.8	311,151.6	699.54	11.00	1.00	11	11		
									483+00.00	7	860,031.3	311,177.1	698.23	12.00	1.00	12	12		
									483+50.00	8	859,989.0	311,203.0	696.72	12.00	1.00	12	12		
									484+00.00	9	859,946.9	311,229.2	695.36	12.00	1.00	12	12		
									484+50.00	10	859,905.1	311,255.8	694.13	12.00	1.00	12	12		
									485+00.00	11	859,863.6	311,282.8	693.04	12.00	1.00	12	12		
									485+50.00	12	859,822.3	311,310.1	692.08	12.00	1.00	12	12		
									486+00.00	13	859,781.1	311,337.8	691.27	12.00	1.00	12	12		
									486+50.00	14	859,740.3	311,365.9	690.59	12.00	1.00	12	12		
									487+00.00	15	859,699.8	311,394.3	690.05	12.00	1.00	12	12		
									487+50.00	16	859,659.3	311,423.1	689.32	12.00	1.00	12	12		
									488+00.00	17	859,619.3	311,452.2	689.05	12.00	1.00	12	12		
									488+50.00	18	859,579.4	311,481.6	688.92	12.00	1.00	12	12		
									489+00.00	19	859,539.8	311,511.4	688.93	12.00	1.00	12	12		
									489+50.00	20	859,500.4	311,541.6	689.08	12.00	1.00	12	12		
									490+00.00	21	859,479.6	311,595.3	692.14	12.00					
NSA 4 BERM 1	W	0.00	24.00	17.50				0.00	490+00.00	22	859,479.6	311,595.3	692.14	12.50	1.00	1	1		
									490+50.00	23	859,441.0	311,625.9	692.56	12.50	1.00	1	1		
									491+00.00	24	859,402.7	311,656.9	693.12	12.50	1.00	1	1		
									491+50.00	25	859,364.6	311,688.3	693.82	12.50	1.00	1	1		
									492+00.00	26	859,326.8	311,720.0	694.76	12.50	1.00	1	1		
									492+50.00	27	859,289.2	311,752.1	695.92	12.50	1.00	1	1		
									493+00.00	28	859,251.6	311,784.4	697.21	12.50	1.00	1	1		
									493+50.00	29	859,214.0	311,817.1	698.46	12.50	1.00	1	1		
									494+00.00	30	859,176.3	311,849.9	699.84	12.50	1.00	1	1		
									494+50.00	31	859,138.6	311,882.7	701.36	12.50	1.00	1	1		
									495+00.00	32	859,100.9	311,915.5	703.02	12.50	1.00	1	1		
									495+50.00	33	859,063.2	311,948.4	704.82	12.50	1.00	1	1		
									496+00.00	34	859,025.5	311,981.2	706.75	12.50	1.00	1	1		
									496+50.00	35	858,987.8	312,014.1	708.82	12.50	1.00	1	1		

									497+00.00	36	858,950.1	312,046.9	711.03	12.50	1.00	1	1		
									497+50.00	37	858,912.4	312,079.8	713.28	12.50	1.00	1	1		
									498+00.00	38	858,874.8	312,112.6	715.53	12.50	1.00	1	1		
									498+50.00	39	858,837.1	312,145.5	717.78	12.50	1.00	1	1		
									499+00.00	40	858,799.4	312,178.3	720.03	12.50					
NSA 4 BERM 2	W	0.00	99.99	17.50				0.00	503+00.00	41	858,497.8	312,441.1	738.03	12.50	1.00	1	1		
									503+50.00	42	858,460.1	312,474.0	740.28	12.50	1.00	1	1		
									504+00.00	43	858,422.4	312,506.8	742.53	12.50	1.00	1	1		
									504+50.00	44	858,384.7	312,539.7	744.78	12.50	1.00	1	1		
									505+00.00	45	858,347.0	312,572.5	747.03	12.50	1.00	1	1		
									505+50.00	46	858,309.3	312,605.4	749.28	12.50	1.00	1	1		
									506+00.00	47	858,271.6	312,638.2	751.53	12.50	1.00	1	1		
									506+50.00	48	858,233.9	312,671.0	753.78	12.50	1.00	1	1		
									507+00.00	49	858,196.2	312,703.9	756.03	12.50	1.00	1	1		
									507+50.00	50	858,158.5	312,736.7	758.28	12.50	1.00	1	1		
									508+00.00	51	858,120.8	312,769.6	760.53	12.50	1.00	1	1		
									508+50.00	52	858,083.1	312,802.4	762.73	12.50					