APPENDIX I

Noise Assessment

Tim Miller Associates, Inc.

Memorandum:

To: Ann Cutignola

From: Maureen S. Fisher, TMA

Date: November 17, 2011

Subject: Orchard Ridge - Noise Assessment

Summary of Noise Assessment from - DEIS

Existing Conditions: The Property is currently vacant and therefore does not generate noise and is not considered a sensitive receptor. Below are noise measures of the ambient noise on the Property, collected by Tim Miller Associates, Inc. (TMA).

Table 1
Onsite Noise Measurements

Location #1 - 150 feet east of CSX Railroad Tracks				
	Leq (dB) (A)	L10 (db) (A)	L90 (dB) (A)	Lmax (dB) (A)
Daytime (07:00-20:00)	61.3	57.1	40.9	90.0
Nighttime (20:00-07:00)	63.4	57.4	37.0	90.0
Location #2 - 450 feet east of CSX Railroad				
	Leq (dB) (A)	L10 (db) (A)	L90 (dB) (A)	LMax (dB) (A)
Daytime (07:00-20:00)	56.3	60.1	41.2	76.8
Nighttime 20:00-07:00)	54.6	53.4	37.7	77.8
Location #3 - 100 feet west of Route 303				
	Leq (dB) (A)	L10 (db) (A)	L90 (dB) (A)	LMax (dB) (A)
Daytime 07:00-20:00)	61.4	64.0	56.6	88.7
Nighttime (20:00-07:00)	57.4	61.0	42.2	87.1
Source: TMA, 2010 Casella 460 Dosimeter, dB12 Software				

The CSX railroad line is a source of noise generation impacting the property, mainly on the western half of the Property. Traffic noise from Route 303 is a source of noise generation impacting the eastern boundary of the Property. The extent of the impact is shown in the ambient noise measurements collected and calculated above. The average noise measurement for daytime for each of the locations range from 56.3 to 61.4 and the average noise measurement for nighttime ranges from 54.6 to 63.4.

HUD Requirements (US. Department of Housing and Urban Development)

Though this is not a HUD funded project, it is a privately funded project, TMA is determining the CSX railroad impacts to the proposed residential development by using the HUD policies and regulations. According to The *Noise Guidebook, published by US Department of Housing and Urban Development, March 1985*, the site acceptability standards are: Acceptable - no greater than 65 dB DNL (Day-Night average sound level), Normally

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Acceptable - above 65 dB but not exceeding 75 dB (DNL), and Unacceptable - above 75 dB (DNL). As shown above in Table 1, the measurements collected for existing conditions show that the railroad line will not exceed that 65 dB at the closest sensitive receptor location (located 150 feet from the railroad line).

Mitigation Measures

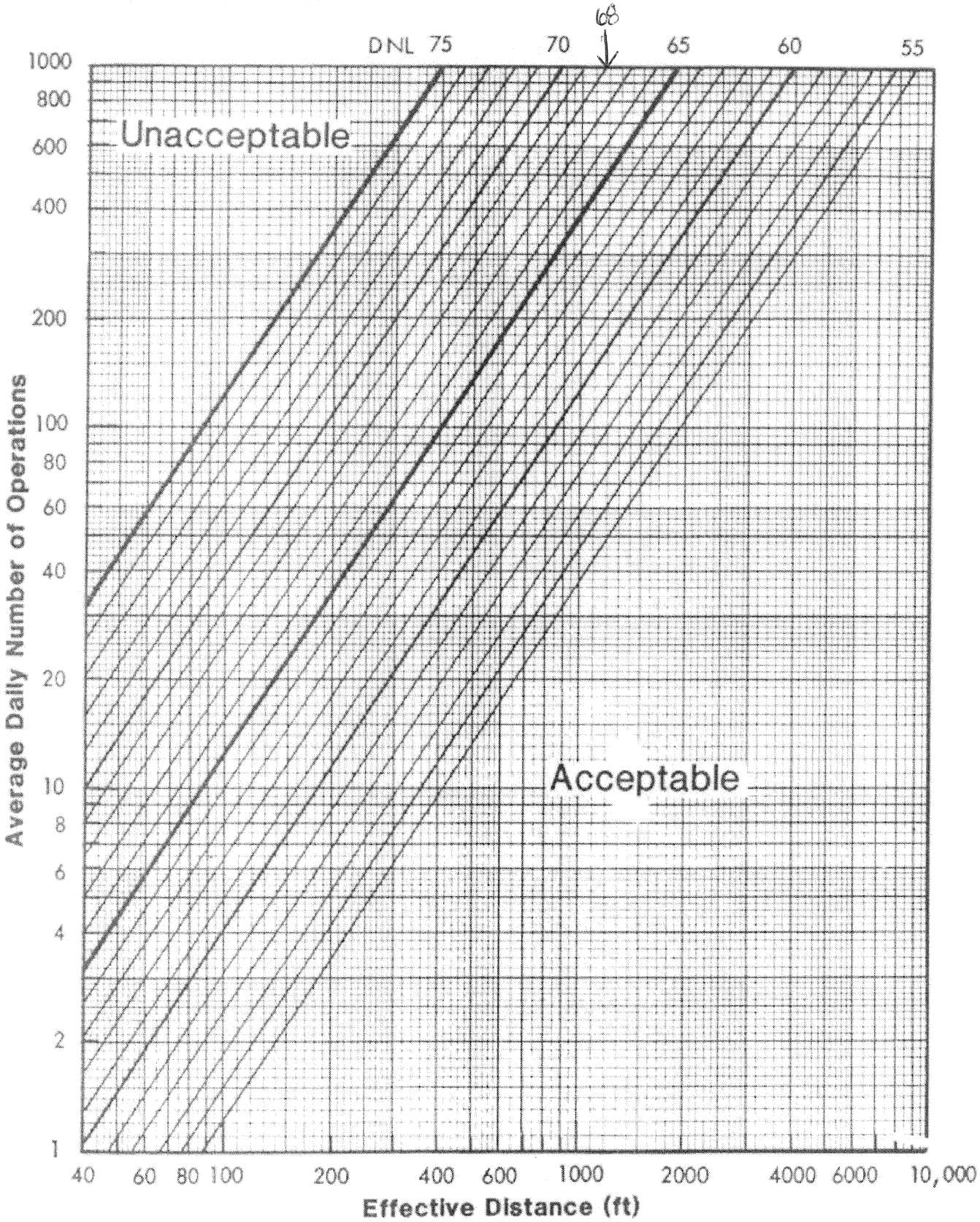
The US Department of Housing and Urban Development, The Noise Guidebook, has information on barriers and how useful one is to help with mitigation or attenuating noise decibels. Tim Miller Associates completed Workchart 3, Worksheet D, Workchart 5, and Workchart 6 (attached to this memo) to determine the expected noise at the closest sensitive receptor on the site, using the proposed garage buildings as a noise barrier. These garage buildings are proposed to run along the Property boundary directly adjacent to the CSX railroad.

Using information provided in The Noise Guidebook, Workchart 3 shows the existing noise level on the property (at 150 feet off the railroad line) to be 68 dB DNL. Workchart 5 was used to determine the R, D and h factors for site elevations and distances to be used in Workchart 6 to determine the barrier potential performance. Workchart 6 determined that the garage barriers, if 12 foot in height with no gaps along the western property boundary (adjacent to the railroad), would provide a 7.5 decibel decrease at 150 feet from the railroad (the closest sensitive receptor on site). Using the 68 dB DNL determined from Workchart 3 and subtracting 7.5 from that noise levels gives a projected 60.5 dB DNL, which is below the 65 DNL acceptable through HUD guidelines.

The above mentioned decibel reading (60.5 dB DNL) was determined assuming the garages, or barrier, along the western boundary are to be no shorter than 12 feet high and that there are no gaps in the garage buildings.

Other mitigation measures that can help the residential buildings to reduce noise indoors is to use noise reducing materials during the construction of the residential buildings. Sound proofing design principles include: Sealing dead space, increasing the mass of the wall, and decreasing vibratory responses. These construction techniques can be accomplished with commonly used drywall, silicone caulk, properly sealing double paned windows (or using an acoustically rated window system), as well as properly selected thermal insulation.

Workchart 3
Railroads - Diesel Locomotives



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Railway Noise
Computations and Findings

Noise Assessment Guidelines

Adjustments for Diesel Locomotives

	9 No. of Locomotives 2	10 Average Speed (Table 9)	11 Horns (Enter 10)	12 Night-time (Table 5)	13 No. of Trains (Line 2a)	14 Adj. No of Opns.	15 DNL (Workchart 3)	16 Barrier Attn.	17 Partial DNL
Railway No. 1	2 x	1.0 x	1 x	1.0 x	24 =	48	68 -	7.5 =	60.5
Railway No. 2	_____ x	_____ x	_____ x	_____ x	_____ =	_____	_____ -	_____ =	_____
Railway No. 3	_____ x	_____ x	_____ x	_____ x	_____ =	_____	_____ -	_____ =	_____

Adjustments for Railway Cars or Rapid Transit Trains and Electric Locomotives

	18 Horns on Electric Trains only (Enter 100)	19 Number of cars 50	20 Average Speed (Table 10)	21 Bolted Rails (Enter 4) Welded (Enter 1)	22 Night-time (Table 5)	23 No. of Trains (Lines 2a and 2b)	24 Adj. No. of Opns.	25 DNL (Workchart 4)	26 Barrier Attn.	27 Partial DNL
Railway No. 1	_____ x	_____ x	_____ x	_____ x	_____ x	_____ =	_____	_____ -	_____ =	_____
Railway No. 2	_____ x	_____ x	_____ x	_____ x	_____ x	_____ =	_____	_____ -	_____ =	_____
Railway No. 3	_____ x	_____ x	_____ x	_____ x	_____ x	_____ =	_____	_____ -	_____ =	_____

Combined Locomotive and Railway Car DNL (See combining noise levels table for procedures)

Partial DNL Railway No. 1	Partial DNL Railway No. 2	Partial DNL Railway No. 3	Partial DNL Total DNL for all Railways
_____	_____	_____	_____

Signed Maureen S. Fisher Date 11/17/11

Workchart 5
Noise Barrier

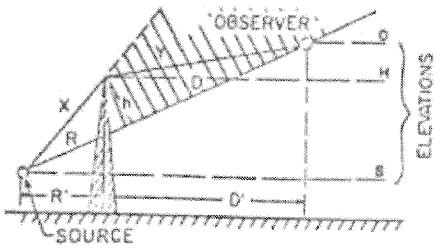
To find R, D and h from Site Elevations and Distances

Enter the values for:

H= _____ R'= _____

S= _____ D'= _____

O= _____



Fill out the following worksheet (all quantities are in feet):

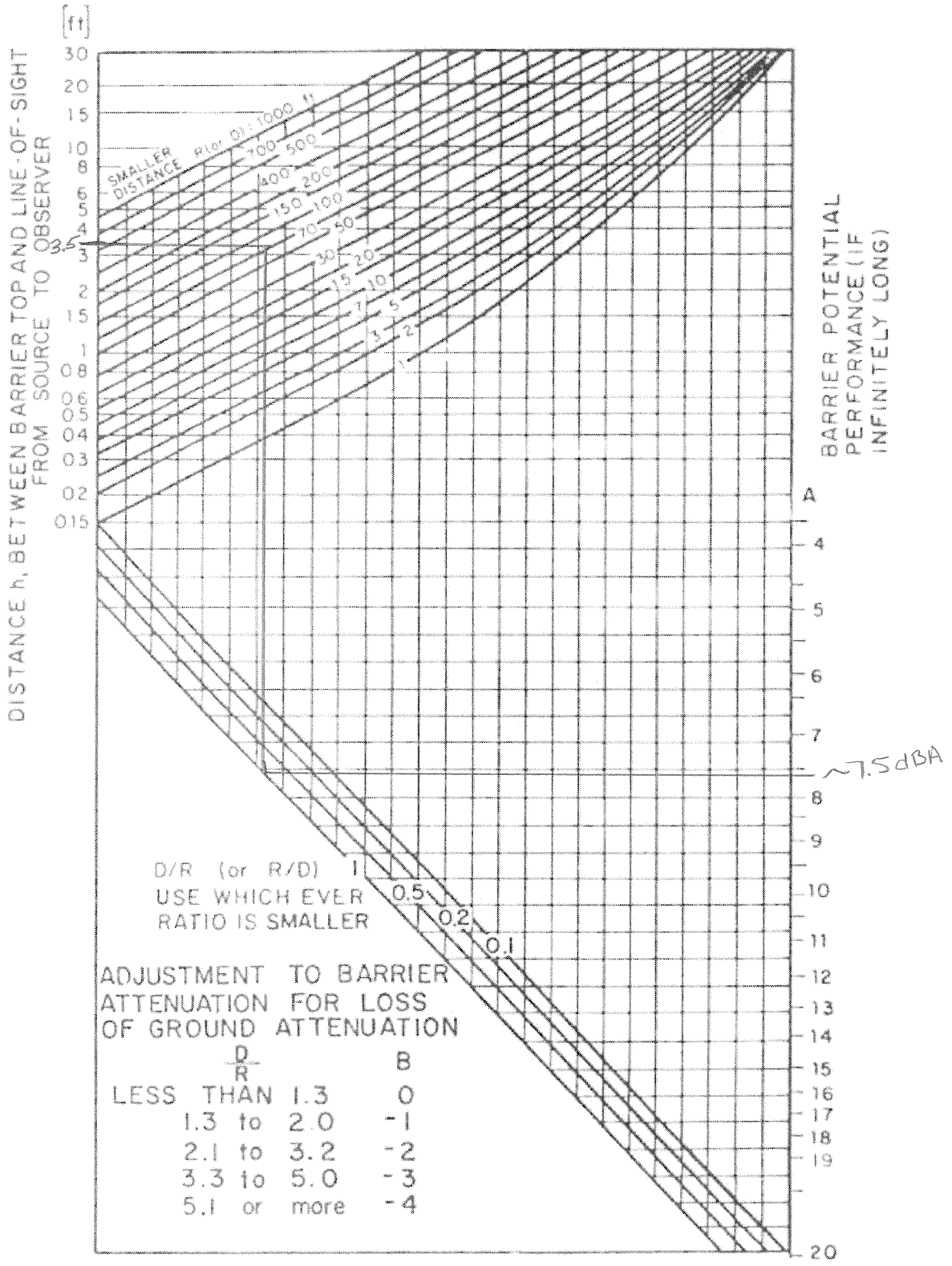
1. Elevation of barrier top minus elevation of source	[H 190	] −	[S 189	] = [1 1.0]
2. Elevation of observer minus elevation of source	[O 184	] −	[S 189	] = [2 -5.0]
3. Map distance between source and observer (R' + D')				[3 150]
4. Map distance between barrier and source (R')				[4 75]
5. Line 2 divided by line 3	[2	] ÷	[3	] = [5 -0.033333333]
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5	] ×	[5	] = [6 0.001111111]
7. 40% of line 6	[0.4	] ×	[6	] = [7 0.000444444]
8. One minus line 7	[1.0	] −	[7	] = [8 0.999555556]
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5	] ×	[4	] = [9 -2.499999975]
10. Line 1 minus line 9	[1	] −	[9	] = [10 3.499999975]
11. Line 10 times line 8	[10	] ×	[8	] = [11 3.498] = h
12. Line 5 times line 10	[5	] ×	[10	] = [12 -0.116666666]
13. Line 4 divided by line 8	[4	] ÷	[8	] = [13 75.033334812]
14. Line 13 plus line 12	[13	] +	[12	] = [14 74.91669] = R
15. Line 3 minus line 4	[3	] −	[4	] = [15 75]
16. Line 15 divided by line 8	[15	] ÷	[8	] = [16 75.033334812]
17. Line 16 minus line 12	[16	] −	[12	] = [17 75.1500] = D

[**Note:** the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x + (-y) = x-y. And subtracting a negative number is like adding: x-(-y)=x+y.

Round off R and D to nearest integer, h to one decimal place.

h = 3.5

Workchart 6
Noise Barrier



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SHEET NO. 1 OF 1

~~CALCULATED~~ Created BY Maureen Fisher DATE 11/17/11

CHECKED BY Jon Dahlgren DATE 11/17/11

SCALE - As shown