




LSC TRANSPORTATION CONSULTANTS, INC.
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August 9, 2018

Mr. Heath Herber
Mule Deer Investments
2727 Glen Arbor Drive
Colorado Springs, CO 80920

RE: Gardens at North Carefree
PUD-18-001
Noise Impact Study
El Paso County, Colorado
LSC #174311

PUD-18-004



Dear Mr. Herber:

In response to your request, LSC Transportation Consultants, Inc. has completed a detailed analysis of the noise impacts of North Carefree Circle on the proposed Gardens at North Carefree residential development. The site is located south and east of the intersection of North Carefree Circle and Akers Drive in Colorado Springs, Colorado. LSC has completed an evaluation of the noise exposure for submittal to El Paso County in accordance with the Federal Highway Administration (FHWA) requirements.

LSC used the software program Traffic Noise Model Version 2.5—developed by FHWA—to predict the noise levels at six locations in the development. The locations are shown in Figure 1. The receiver points are located on the north side of the development, closest to North Carefree Circle. An elevation of five feet was assumed for the receivers.

The input data for the noise predictions included traffic volumes, roadway geometry, topographic elevations, and the locations of the receivers. The analysis was completed using the projected 2040 afternoon peak-hour traffic volumes from the *Gardens at North Carefree Traffic Impact Analysis* by LSC dated August 9, 2018.

The results of the noise prediction show that in the year 2040, all locations have predicted noise levels that would not exceed 67 decibels Leq. The noise analysis inputs and outputs are attached.

Please contact me if you have any questions or need further assistance.

Respectfully submitted,

LSC TRANSPORTATION CONSULTANTS, INC.



By: Kirstin D. Ferrin, P.E.
Senior Transportation Engineer

KDF:bjwb

Enclosures: Figure 1
Noise Analysis Inputs/Outputs

1. Label the receivers or increase the text size for the lots to be legible.

2. Callout the offset distance from the property line the receiver locations were modeled at. Per the grading plan the roadway slope extends past the property line. The receiver should be set back from the toe of the slope.

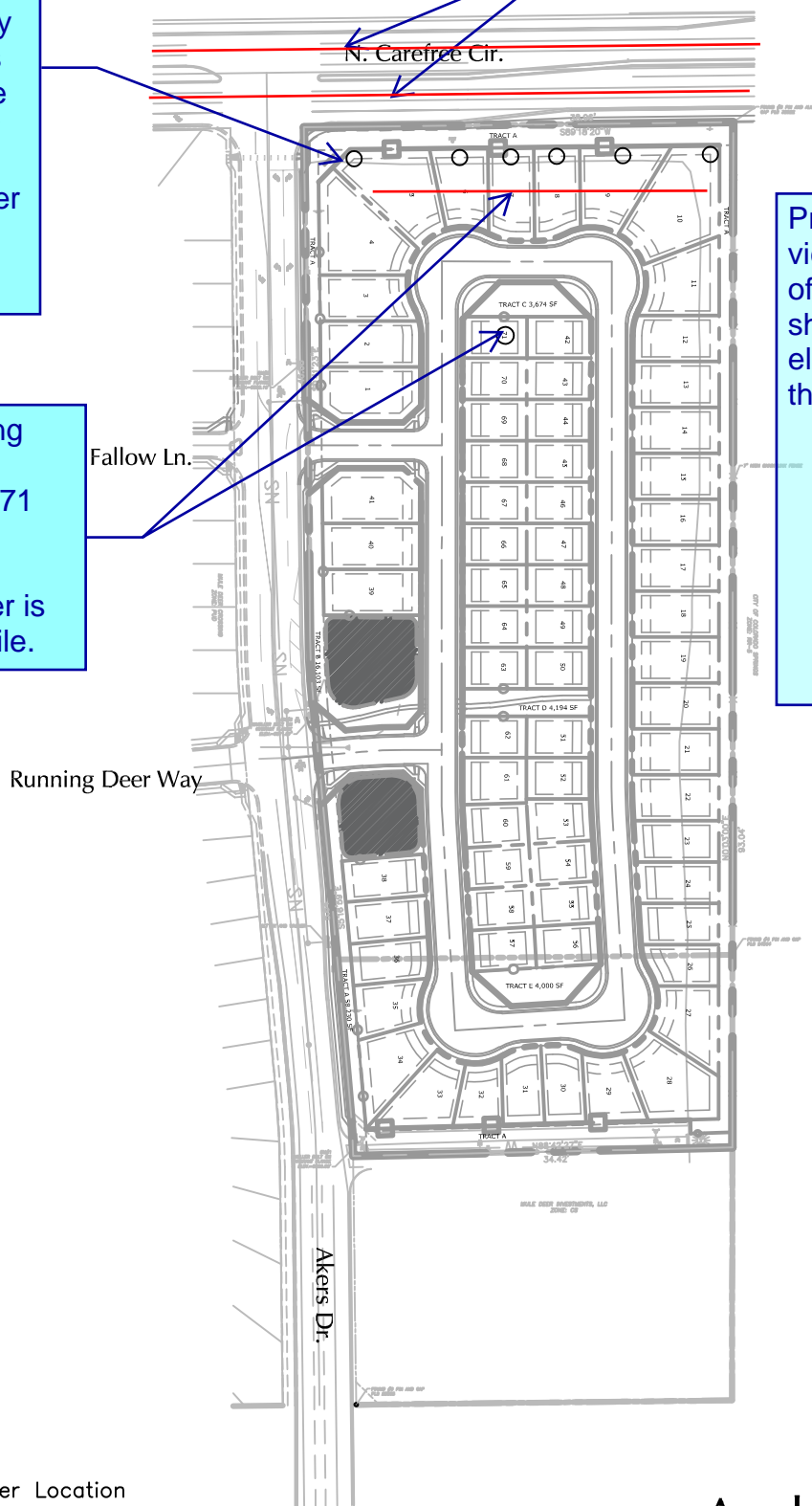
Show the roadway model location.

Approximate Scale
Scale: 1" = 200'

Provide a skew view/cross section of the model to show receiver elevation relative to the roadway.

1. Does a building row need to be modeled for Lot 71 receiver?

2. Lot 71 receiver is not in the input file.



LEGEND:
○ = Receiver Location



Figure 1
**Noise
Analysis Data**

Gardens at North Carefree Noise Analysis (LSC #174311)

RESULTS: SOUND LEVELS

Gardens North Carefree

LSC													7 August 2018	
KDF													TNM 2.5	
													Calculated with TNM 2.5	
RESULTS: SOUND LEVELS														
PROJECT/CONTRACT:			Gardens North Carefree											
RUN:			2040 PM Peak Hour											
BARRIER DESIGN:			INPUT HEIGHTS										Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.	
ATMOSPHERICS:			68 deg F, 50% RH											
Receiver														
Name		No.	#DUs	Existing LAeq1h	No Barrier LAeq1h	Increase over existing		Type	With Barrier		Noise Reduction			
					Calculated	Crit'n	Calculated	Crit'n	Impact	Calculated LAeq1h	Calculated	Goal	Calculated minus Goal	
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
Lot 5		1	1	0.0	64.2	67	64.2	10	----	64.2	0.0	8	-8.0	
Lot 6		2	1	0.0	62.8	67	62.8	10	----	62.8	0.0	8	-8.0	
Lot 7		3	1	0.0	62.4	67	62.4	10	----	62.4	0.0	8	-8.0	
Lot 8		5	1	0.0	62.2	67	62.2	10	----	62.2	0.0	8	-8.0	
Lot 9		7	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0	
Lot 10		8	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0	
Dwelling Units			# DUs	Noise Reduction										
				Min	Avg	Max								
				dB	dB	dB								
All Selected			6	0.0	0.0	0.0								
All Impacted			0	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								

Provide the receiver input

INPUT: TRAFFIC FOR LAeq1h Volumes

Gardens North Carefree

LSC		7 August 2018										
KDF		TNM 2.5										
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:		Gardens North Carefree										
RUN:		2040 PM Peak Hour										
Roadway	Points											
Name	Name	No.	Segment		MTrucks		HTrucks		Buses		Motorcycles	
			Autos		V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB North Carefree W/O Akers	point1	1	1535	35	48	35	32	35	0	0	0	0
	point2	2										
WB North Carefree W/O Akers	point3	3	1338	35	42	35	28	35	0	0	0	0
	point4	4										
EB North Carefree E/O Akers	point5	5	1571	35	50	35	33	35	0	0	0	0
	point7	7	1571	35	50	35	33	35	0	0	0	0
	point8	8	1571	35	50	35	33	35	0	0	0	0
	point9	9	1571	35	50	35	33	35	0	0	0	0
	point10	10	1571	35	50	35	33	35	0	0	0	0
	point11	11	1571	35	50	35	33	35	0	0	0	0
	point12	12	1571	35	50	35	33	35	0	0	0	0
	point13	13	1571	35	50	35	33	35	0	0	0	0
	point14	14	1571	35	50	35	33	35	0	0	0	0
	point15	15	1571	35	50	35	33	35	0	0	0	0
	point16	16	1571	35	50	35	33	35	0	0	0	0
	point17	17	1571	35	50	35	33	35	0	0	0	0
	point18	18	1571	35	50	35	33	35	0	0	0	0
	point19	19	1571	35	50	35	33	35	0	0	0	0
	point20	20	1571	35	50	35	33	35	0	0	0	0
	point21	21	1571	35	50	35	33	35	0	0	0	0
	point22	22	1571	35	50	35	33	35	0	0	0	0
	point23	23	1571	35	50	35	33	35	0	0	0	0
	point6	6										

INPUT: TRAFFIC FOR LAeq1h Volumes

Gardens North Carefree

WB North Carefree E/O Akers	point24	24	1293	35	41	35	27	35	0	0	0	0
	point26	26	1293	35	41	35	27	35	0	0	0	0
	point27	27	1293	35	41	35	27	35	0	0	0	0
	point28	28	1293	35	41	35	27	35	0	0	0	0
	point29	29	1293	35	41	35	27	35	0	0	0	0
	point30	30	1293	35	41	35	27	35	0	0	0	0
	point31	31	1293	35	41	35	27	35	0	0	0	0
	point32	32	1293	35	41	35	27	35	0	0	0	0
	point33	33	1293	35	41	35	27	35	0	0	0	0
	point34	34	1293	35	41	35	27	35	0	0	0	0
	point35	35	1293	35	41	35	27	35	0	0	0	0
	point36	36	1293	35	41	35	27	35	0	0	0	0
	point37	37	1293	35	41	35	27	35	0	0	0	0
	point38	38	1293	35	41	35	27	35	0	0	0	0
	point39	39	1293	35	41	35	27	35	0	0	0	0
	point40	40	1293	35	41	35	27	35	0	0	0	0
	point41	41	1293	35	41	35	27	35	0	0	0	0
	point42	42	1293	35	41	35	27	35	0	0	0	0
	point25	25										

Provide a narrative explaining why a "grouped" modeling was used instead of a lane by lane modeling.

INPUT: ROADWAYS

Gardens North Carefree

LSC							7 August 2018				
KDF							TNM 2.5				
INPUT: ROADWAYS		Gardens North Carefree					Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA				
PROJECT/CONTRACT:		Gardens North Carefree									
RUN:		2040 PM Peak Hour									
Roadway Name	Width	Points 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	%		
EB North Carefree W/O Akers	33.0	point1	1	2,537.6	6,395.8	6,546.00				Average	
		point2	2	3,188.4	6,403.7	6,586.00					
WB North Carefree W/O Akers	33.0	point3	3	3,186.0	6,455.7	6,546.00				Average	
		point4	4	2,537.0	6,447.8	6,586.00					
EB North Carefree E/O Akers	33.0	point5	5	3,200.7	6,403.9	6,586.00				Average	
		point7	7	3,214.9	6,404.0	6,587.00				Average	
		point8	8	3,233.6	6,404.3	6,588.00				Average	
		point9	9	3,248.4	6,404.4	6,589.00				Average	
		point10	10	3,263.4	6,404.6	6,590.00				Average	
		point11	11	3,280.3	6,404.8	6,591.00				Average	
		point12	12	3,300.4	6,405.1	6,592.00				Average	
		point13	13	3,322.2	6,405.3	6,593.00				Average	
		point14	14	3,344.5	6,405.6	6,594.00				Average	
		point15	15	3,369.8	6,405.9	6,595.00				Average	
		point16	16	3,396.9	6,406.2	6,596.00				Average	
		point17	17	3,424.1	6,406.6	6,597.00				Average	
		point18	18	3,451.3	6,406.9	6,598.00				Average	
		point19	19	3,479.8	6,407.3	6,599.00				Average	
		point20	20	3,517.0	6,407.7	6,600.00				Average	
		point21	21	3,564.9	6,408.3	6,601.00				Average	
		point22	22	3,658.8	6,409.4	6,602.00				Average	
		point23	23	3,905.1	6,412.4	6,600.00				Average	
		point6	6	3,973.6	6,413.2	6,598.00					
WB North Carefree E/O Akers	33.0	point24	24	3,982.3	6,465.9	6,598.00	Signal	0.00	50	Average	
		point26	26	3,904.5	6,464.7	6,600.00				Average	

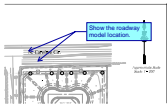
INPUT: ROADWAYS

Gardens North Carefree

		point27	27	3,658.2	6,461.4	6,602.00				Average	
		point28	28	3,564.2	6,460.3	6,601.00				Average	
		point29	29	3,516.3	6,459.7	6,600.00				Average	
		point30	30	3,479.1	6,459.2	6,599.00				Average	
		point31	31	3,450.6	6,458.9	6,598.00				Average	
		point32	32	3,423.5	6,458.6	6,597.00				Average	
		point33	33	3,396.3	6,458.2	6,596.00				Average	
		point34	34	3,369.1	6,457.9	6,595.00				Average	
		point35	35	3,343.9	6,457.6	6,594.00				Average	
		point36	36	3,321.6	6,457.3	6,593.00				Average	
		point37	37	3,299.8	6,457.1	6,592.00				Average	
		point38	38	3,279.7	6,456.8	6,591.00				Average	
		point39	39	3,262.7	6,456.6	6,590.00				Average	
		point40	40	3,247.8	6,456.4	6,589.00				Average	
		point41	41	3,233.0	6,456.3	6,588.00				Average	
		point42	42	3,214.3	6,456.0	6,587.00				Average	
		point25	25	3,200.1	6,455.9	6,586.00					

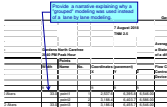
Markup Summary

dsdlaforce (10)



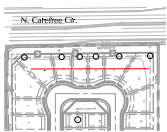
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Author: dsdlaforce
Date: 9/10/2018 10:02:07 AM
Color: ■

Show the roadway model location.

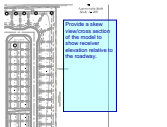


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Page Label: 7
Author: dsdlaforce
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Provide a narrative explaining why a "grouped" modeling was used instead of a lane by lane modeling.

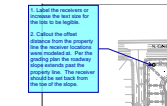


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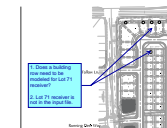
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Date: 9/10/2018 10:33:25 AM
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Provide a skew view/cross section of the model to show receiver elevation relative to the roadway.



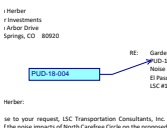
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Author: dsdlaforce
Date: 9/10/2018 10:35:30 AM
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1. Label the receivers or increase the text size for the lots to be legible.
2. Callout the offset distance from the property line the receiver locations were modeled at. Per the grading plan the roadway slope extends past the property line. The receiver should be set back from the toe of the slope.



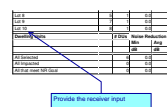
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1. Does a building row need to be modeled for Lot 71 receiver?
2. Lot 71 receiver is not in the input file.



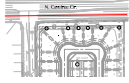
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PUD-18-004

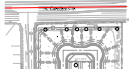


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Page Label: 4
Author: dsdlaforce
Date: 9/10/2018 9:51:34 AM
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Provide the receiver input



Subject: Line
Page Label: 3
Author: dsdlaforce
Date: 9/10/2018 9:52:36 AM
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Page Label: 3
Author: dsdlaforce
Date: 9/10/2018 9:52:43 AM
Color: ■