

**NOISE MONITORING AND MITIGATION ANALYSIS
WAL-MART STORE #4689-00
4800 WEST CEDAR HILLS DRIVE
CEDAR HILLS, UTAH**

April 2, 2007

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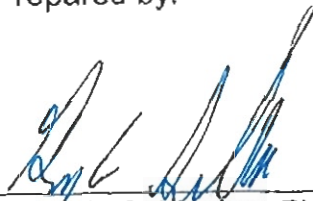
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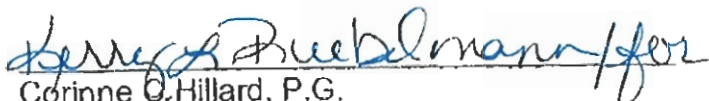
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4800 WEST CEDAR HILLS DRIVE
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TABLE OF CONTENTS

SECTION	PAGE
1. PURPOSE AND OBJECTIVES	1
2. NOISE CONTROL CRITERIA	3
3. EXISTING NOISE LEVELS	4
4. NOISE MEASUREMENT RESULTS	6
4.1 Lindon Retail Center Compressor Noise Operations Analysis..	6
4.2 Lindon Retail Center Compactor Noise Operations Analysis....	6
4.3 Lindon Retail Center Truck Well Noise Operations Analysis	7
4.4 Lindon Retail Center Parking Lot Noise Analysis	7
5. NOISE MITIGATION PROPOSED CEDAR HILLS RETAIL CENTER	9
5.1 Cedar Hills Retail Center Compressor Noise Operation Assessment	9
5.2 Cedar Hills Retail Center Compactor Noise Operation Assessment	10
5.3 Cedar Hills Retail Center Truck Well Noise Operation Assessment.....	10
5.4 Cedar Hills Retail Center Parking Lot Noise Assessment.....	11
5.5 Cedar Hills Retail Center Truck Operation Noise Assessment.	12
6. CLOSURE	13
6.1 Limitations	13

FIGURES

1	Cedar Hills Retail Center Site Plan
2	Lindon Retail Center Site Plan
3	Lindon Retail Center Compressor Operations Noise Analysis
4	Lindon Retail Center Compactor Operations Noise Analysis
5	Lindon Retail Center Truck Well Operations Noise Analysis
6	Lindon Retail Center Parking Lot Operations Noise Analysis
7	Proposed Cedar Hills Retail Center Compressor Operations Noise Cross Section
8	Proposed Cedar Hills Retail Center Compactor Operations Noise Cross Section
9	Proposed Cedar Hills Retail Center Truck Well Operations Noise Cross Section
10	Proposed Cedar Hills Retail Center Parking Lot Operations Noise Cross Section
11	Results Of Traffic Noise Modeling For Truck Operations At the Proposed Cedar Hills Retail Center

APPENDICES

A	Traffic Noise Modeling Results
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1. PURPOSE AND OBJECTIVES

Wal-Mart Corporation is proposing construction of a Wal-Mart Super Center (Retail Center) on the northwest side of the intersection of 4800 West Street and Cedar Hill Drive in Cedar Hills, Utah. Kleinfelder West, Inc. (Kleinfelder) was requested to assess the level of noise that may be created by potential noise sources at the facility and to evaluate whether the proposed noise-control features will be adequate to meet a 50 decibel (dBA) noise level criteria for adjacent residential land use on the north side of the proposed Retail Center. Although the City of Cedar Hills does not have a Noise Ordinance, a 50 dBA noise level criteria is an expected condition for the approval of the Retail Center for construction.

The proposed site design is shown on Figure 1, and includes construction of 8-foot high noise mitigation walls along the back (north) and east side of the building and parking lot and along the truck delivery traffic route on the north and east sides of the Retail Center. Noise control mitigation are proposed for the other potential noise sources associated with the facility, namely the refrigeration compressors, the trash compactor and the Truck Well loading dock facility which are shown on Figure 1.

The purpose of this noise study is to: 1) evaluate the level of noise that the Cedar Hills Wal-Mart store may generate; 2) evaluate the effectiveness of the proposed noise mitigation measures in reducing noise for adjacent residential land use to 50 dBA.

To assess noise and noise mitigating structures, Kleinfelder measured noise levels at an existing Wal-Mart Retail Center in Lindon, Utah, which is located approximately 5 miles southeast from the proposed Cedar Hills Retail Center. The Retail Center in Lindon was used for analysis and comparison because the Lindon Center was constructed recently (in 2004) and will be architecturally similar to the proposed Cedar Hills Center. The Lindon Center also has adjacent residential land uses and the Lindon

Center has noise mitigating structures in place such as those proposed for the Cedar Hills Center.

Our assessment included direct noise measurements made in the field at the proposed Cedar Hills Center and at the Lindon Center, and the modeling of truck traffic noise for delivery truck operations at the Cedar Hills Center.

2. NOISE CONTROL CRITERIA

The proposed Cedar Hills Retail Center parcel is zoned as commercial. It is bounded on the north by residential property, on the east, west and south by vacant commercial properties. The City of Cedar Hills does not have a Noise Ordinance, however as a condition of site development approval the City expects the proposed Retail Center to produce no more than a 50 dBA noise level at the residential land use boundary on the north side of the proposed Retail Center.

Noise control codes typically restrict noise levels on the basis of land use criteria. As an example, the Unincorporated Utah County Noise Ordinance is shown on the table below:

Zoning district in which the property lies where the sound is received	Daytime Noise: Maximum number of decibels (dBA) permitted between 7:00 am and 10:00 pm	Nighttime Noise: Maximum number of decibels (dBA) permitted between 10:00 pm and 7:00 am
Residential Zones (RA-5, RR-5, TR-5, CE-2)	55	50
Commercial Zones (NC-1, HS-1)	65	60
Industrial & Other Zones (I-1, CE-1, M&G-1, A-40)	80	80

From Utah County Regulation 12-3-3 (c)(1)

3. EXISTING NOISE LEVELS

Existing noise levels were collected by direct field measurements at the Lindon Wal-Mart Super Center located at 585 North State Street, Lindon, Utah. As previously mentioned, the Lindon Super Center was selected because it has similar exterior sound sources as the proposed Cedar Hills Retail Center and the Lindon sources have noise mitigation (sound walls) in place. Direct noise measurements were collected at the Lindon Super Center for the following purposes:

- To collect noise level measurements from an operating facility that is similar to that proposed at Cedar Hills;
- To assess the effectiveness of the noise mitigation features constructed in Lindon which are similar to those proposed for Cedar Hills;
- To collect actual noise level data for input parameters for use in modeling noise levels and noise mitigation effectiveness at the proposed Cedar Hills Retail Center.

Noise measurements were recorded on March 26, 27, and 29, 2007 at the Lindon Retail Center. Noise measurements were made with a Metrosonics db-3080 noise dosimeter which was calibrated at the beginning of the noise monitoring each day. All noise measurements were A-weighted which measures the sound frequencies that the human ear can hear. The dosimeter was programmed to record the average and maximum noise for a 5-minute measurement period or for the duration of operation of the noise source. The locations of the noise source areas at the Lindon Super Center are shown on Figure 2. These areas include refrigeration compressor areas, trash compactor areas, loading dock truck well areas, and parking lot areas. The locations of our noise measurements are shown on Figure 2. As shown on Figure 2, an 8-foot concrete wall separates the noise producing areas from adjacent properties.

Noise measurements were recorded near noise sources, inside the concrete wall and behind the wall to evaluate the noise mitigating performance of the noise source enclosures and the concrete wall. Noise measurements were made while the sources were in operation and producing noise.

4. NOISE MEASUREMENT RESULTS

4.1 LINDON RETAIL CENTER COMPRESSOR NOISE OPERATIONS ANALYSIS

Figure 3 illustrates the noise measurement results for the compressor operation noise for the Lindon Center. The compressor at the Lindon Center is enclosed by a perforated enclosure wall that is 12 feet high and open on the top (Figure 3). The compressor is located approximately 56 feet from the concrete wall which stands 6-feet above the surface on the inside facing the compressor, and 8-feet above the surface on the outside. The noise levels recorded at the compressor location were as follows:

63 dBA	At the compressor,
60 dBA	Inside the concrete wall adjacent to the compressor, and
46 dBA	Outside the concrete wall adjacent to the compressor.

Based on these measurements, the concrete wall reduces the compressor operation noise to a level below 50 dBA.

4.2 LINDON RETAIL CENTER COMPACTOR NOISE OPERATIONS ANALYSIS

Figure 4 illustrates the noise measurement results for the compactor operation noise for the Lindon Center. The compactor is enclosed by a 12-foot high concrete wall that is open on one side and on top (Figure 4). The open end of the compactor is located approximately 80 feet from the concrete wall which stands 6-feet above the surface on the inside facing the compactor, and 8-feet above the surface on the outside. The noise levels recorded at the compactor location were as follows:

63 dBA	At the compactor,
56 dBA	Inside the concrete wall adjacent to the compactor, and
45 dBA	Outside the concrete wall adjacent to the compactor.

Based on these measurements, the concrete wall reduces the compactor operation noise to a level below 50 dBA.

4.3 LINDON RETAIL CENTER TRUCK WELL NOISE OPERATIONS ANALYSIS

Figure 5 illustrates the noise measurement results for the truck well operations noise for the Lindon Center. The truck well is enclosed by an enclosure wall that is 12 feet high and open on one side and on top (Figure 5). The open end of the truck well is located approximately 60 feet from the concrete wall which stands 8-feet above the surface. The noise levels at the truck well were recorded when one or more large semi tractor trucks were backing into, or leaving the truck well area. The noise levels recorded at the truck well location were as follows:

68 dBA	Inside the concrete wall adjacent to the truck well,
54 dBA	Outside the concrete wall adjacent to the truck well
48 dBA	Outside the concrete wall adjacent to the truck well when trucks are not operating at the truck well

Based on these measurements, the 8-foot concrete wall does not reduce the truck well operation noise to a level below 50 dBA. We believe that the truck noise source is elevated in comparison to the other sources because the trucks operate closer to the concrete wall and have above cab exhausts that emit noise 10-feet or more above the surface.

4.4 LINDON RETAIL CENTER PARKING LOT NOISE ANALYSIS

Figure 6 illustrates the noise measurement results for the parking lot noise for the Lindon Center. The parking lot is an open area located approximately 94 feet from the concrete wall which stands 8-feet above the surface. The noise levels recorded at the parking lot location were as follows:

54 dBA	At the parking lot
52 dBA	Inside the concrete wall adjacent to the parking lot
48 dBA	Outside the concrete wall adjacent to the parking lot

Based on these measurements, the concrete wall reduces the parking lot noise to a level below 50 dBA.

5. NOISE MITIGATION PROPOSED CEDAR HILLS RETAIL CENTER

To assess the noise levels and mitigation performance for the proposed Cedar Hills Retail Center noise sources, we compared the locations and geometries of the noise sources for the proposed Center with the noise sources of the Lindon Retail Center.

5.1 CEDAR HILLS RETAIL CENTER COMPRESSOR NOISE OPERATION ASSESSMENT

Figure 7 illustrates the cross-sectional compressor operation noise conditions for the proposed Cedar Hills Center. For comparison, also shown on Figure 7 is the cross-sectional compressor operation noise for the Lindon Center. The compressor at the Cedar Hills Center will be a similar apparatus to the compressor at the Lindon Center, and will be enclosed by a solid enclosure wall that will be open on the top. The compressor will be located approximately 56 feet from the concrete wall which stands 8-feet above the surface at the top of a 4-foot grade that essentially places the top of the wall 12-feet above the compressor area surface. At the Lindon Center the compressor noise outside the 6- to 8-foot concrete wall was reduced from 60 dBA to 46 dBA.

Because the Cedar Hills compressor will be enclosed by a solid enclosure wall, and because the top of the proposed concrete wall will be 4- to 6-feet higher than the wall at the Lindon Center we expect the noise levels from the compressor operations will be less than 50 dBA at the residential property located outside the concrete wall shown on Figure 7.

5.2 CEDAR HILLS RETAIL CENTER COMPACTOR NOISE OPERATION ASSESSMENT

Figure 8 illustrates the cross-sectional compactor operation noise conditions for the proposed Cedar Hills Center. For comparison, also shown on Figure 8 is the cross-sectional compactor operation noise condition for the Lindon Center. The compactor at the Cedar Hills Center will be a similar apparatus to the compactor at the Lindon Center, and will be enclosed by a solid enclosure wall that will be open on one side and on top, with the open side facing to the south away from the residential properties on the north. The compactor will be located approximately 106 feet from the nearest residential property which will be separated by a concrete wall which stands 8-feet above the surface at the top of a 4-foot grade that essentially places the top of the wall 12-feet above the compactor area surface. At the Lindon Center, the compactor noise outside the concrete wall was reduced from 56 dBA to 45 dBA.

Because the Cedar Hills compactor enclosure will be facing away from the residential properties at a distance 50 feet greater than observed at the Lindon Center, and because the top of the proposed concrete wall will be 4- to 6-feet higher than the wall at the Lindon Center, we expect the noise levels from the compactor operations will be less than 50 dBA at the residential property located outside the concrete wall shown on Figure 8.

5.3 CEDAR HILLS RETAIL CENTER TRUCK WELL NOISE OPERATION ASSESSMENT

Figure 9 illustrates the cross-sectional truck well operation noise conditions for the proposed Cedar Hills Center. For comparison, also shown on Figure 9 is the cross-sectional truck well operation noise for the Lindon Center. The truck well at the Cedar Hills Center will be similar but smaller than the truck well at the Lindon Center, and will be enclosed by a solid enclosure wall that will be open on one side and on top, with the open side facing to the south away from the residential properties to the north. The truck

well will be located approximately 150 feet from the nearest residential property which will be separated by a concrete wall which stands 8-feet above the surface at the top of a 4-foot grade that essentially places the top of the wall 12-feet above the truck well area surface. At the Lindon Center the truck well noise outside the concrete wall was reduced from 68 dBA to 54 dBA.

Because the Cedar Hills truck well enclosure will be facing away from the residential properties at a distance 50 feet greater than observed at the Lindon Center, and because the top of the proposed concrete wall will be 4- to 6-feet higher than the wall at the Lindon Center we expect the noise levels from the truck well operation will be less than 50 dBA at the residential property located outside the concrete wall shown on Figure 9. However, we expect that noise levels above 50 dBA to occur on the adjacent property to the east that is proposed for storm water detention use.

5.4 CEDAR HILLS RETAIL CENTER PARKING LOT NOISE ASSESSMENT

Figure 10 illustrates the cross-sectional parking lot noise conditions for the proposed Cedar Hills Center. For comparison, also shown on Figure 10 is the cross-sectional parking lot operation noise for the Lindon Center. The parking lot at the Cedar Hills Center will be an open area similar to the parking lot at the Lindon Center. The parking lot will be located approximately 75 feet from the concrete wall which stands 8-feet above the surface at the parking lot area. At the Lindon Center the parking lot noise outside the concrete wall was reduced from 52 dBA to 48 dBA.

Although the Cedar Hills parking lot will be 25 feet closer to the concrete wall separating the Retail Center from the residential properties to the north than observed at the Lindon Center, the parking lot noise at the Lindon Center was not much higher than 50 dBA at the edge of the parking lot and should be mitigated to less than 50 dBA by the concrete wall shown on Figure 10.

5.5 CEDAR HILLS RETAIL CENTER TRUCK OPERATION NOISE ASSESSMENT

At the Lindon Retail Center truck well, truck operation noise was found to exceed 50 dBA outside of the 8-foot high concrete wall. We believe that the truck noise source is elevated in comparison to the other sources because the trucks operate closer to the concrete wall and have above cab exhausts that emit noise 10-feet or more above the surface, projecting noise over the 8-foot concrete wall.

To evaluate truck operation noise for the proposed Cedar Hills Retail Center we conducted a numerical traffic noise modeling analysis of potential truck noise for truck operation on the access routes located on the north and east sides of the Retail Center. The Federal Highways Administration Traffic Noise Model, version 2.5 (TNM 2.5) was used to calculate noise levels along the access routes. Information on existing ambient noise conditions in the area topography and ground surface type was used as model inputs. We modeled the access route for trucks traveling 15 miles per hour, which would be considered top speed on the access route. The proposed 8-foot concrete wall was entered into the modeling. The 16-foot high outside walls of the proposed retail center were also entered into the modeling to account for the reflective properties of the building walls. Modeling receptors were placed at each of the residential properties bordering the proposed Center.

The model results shown on Figure 11 indicate that with the proposed 8-foot high concrete wall separating the residential properties to the north, noise levels ranged from 48.4 dBA to 50.3 dBA only slightly exceeding 50 dBA at one location at these residential properties.

6. CLOSURE

6.1 LIMITATIONS

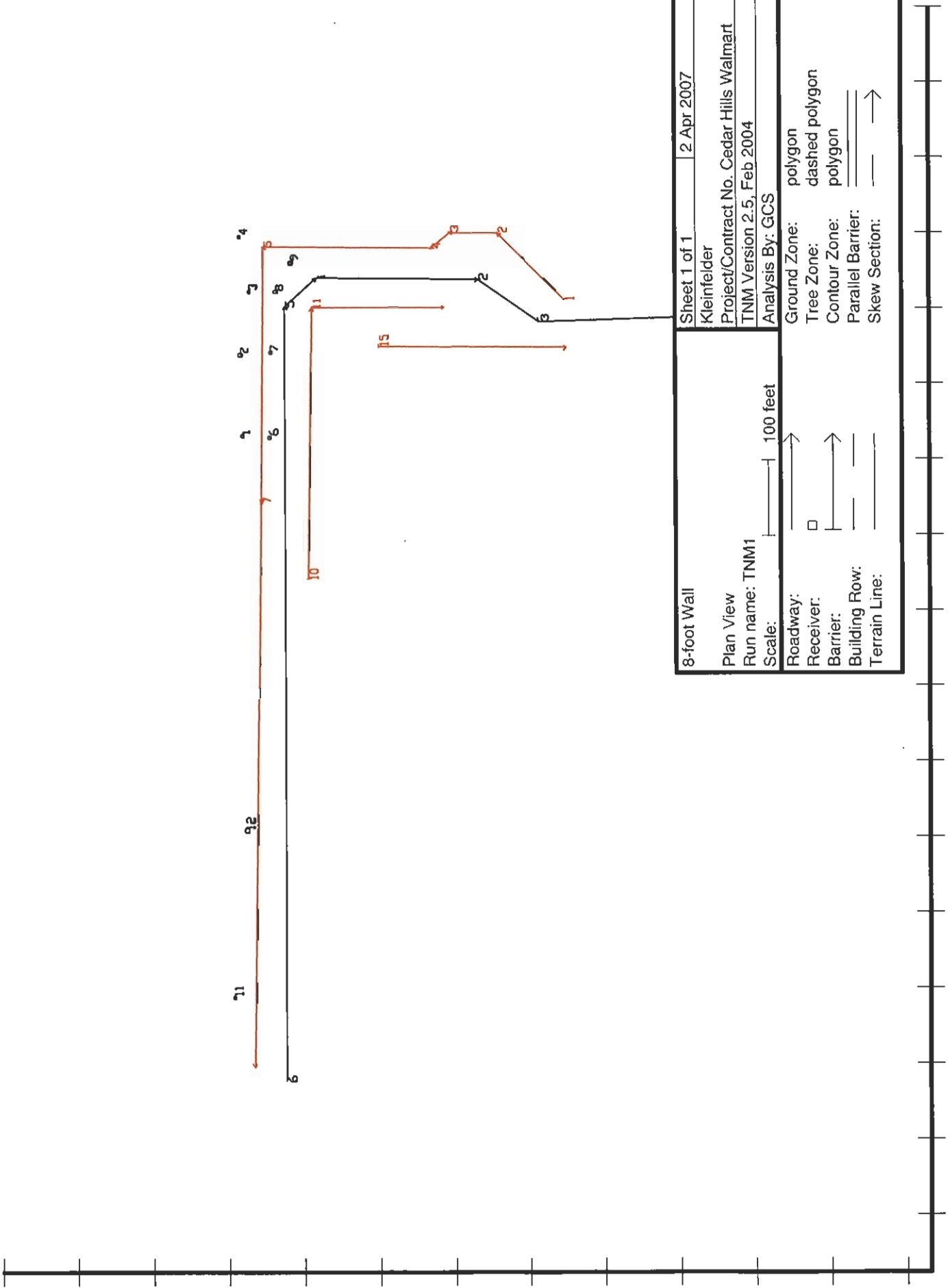
The recommendations contained in this report are based on our reviews, interpretations of plans, aerial photography, industry standard modeling, and study area reconnaissance and observations. This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, express or implied, is made.

Kleinfelder West, Inc., performed this study to assist the Pacland with the characterization the noise conditions, and mitigation strategies that can be implemented to reduce noise impacts at the proposed Cedar Hills Wal-Mart Super Center.

This report may be used only by the client and only for the purposes stated within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors may change over time, and additional work may be required. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else, unless specifically agreed to in advance by Kleinfelder in writing will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

TRAFFIC NOISE MODELING RESULTS



8-foot Wall	Sheet 1 of 1	2 Apr 2007
Plan View	Kleinfeilder	
Run name: TNM1	Project/Contract No. Cedar Hills Walmart	
Scale: 100 feet	TNM Version 2.5, Feb 2004	
Roadway:	Analysis By: GCS	
Receiver:	Ground Zone: polygon	Tree Zone: dashed polygon
Barrier:	Contour Zone: polygon	Parallel Barrier:
Building Row:	Skew Section:	
Terrain Line:		

125000 1425100 1425200 1425300 1425400 1425500 1425600 1425700 1425800 1425900 1426000 1426100 1426200 1426300 1426400 1426500 1426600

RESULTS: SOUND LEVELS

Cedar Hills Walmart

Kleinfelder
GCS

2 April 2007
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:
Cedar Hills Walmart
8-foot Wall

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		No Barrier		Increase over existing		Type Impact	With Barrier		Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			LAeq1h	LAeq1h	LAeq1h	LAeq1h	Calculated	Crit'n		Calculated	Crit'n			
			dB	dB	dB	dB	dB	dB		dB	dB	dB	dB	dB
Receiver1	1	1	47.0	50.3	66	3.3	10	---	---	50.3	0.0	8	-8.0	
Receiver2	2	1	47.0	48.8	66	1.8	10	---	---	48.8	0.0	8	-8.0	
Receiver3	3	1	47.0	49.7	66	2.7	10	---	---	49.7	0.0	8	-8.0	
Receiver4	4	1	47.0	48.4	66	1.4	10	---	---	48.4	0.0	8	-8.0	
Receiver6	6	1	47.0	63.8	66	16.8	10	Sub'l Inc		63.8	0.0	8	-8.0	
Receiver7	7	1	47.0	63.9	66	16.9	10	Sub'l Inc		63.9	0.0	8	-8.0	
Receiver8	8	1	47.0	62.9	66	15.9	10	Sub'l Inc		62.9	0.0	8	-8.0	
Receiver9	9	1	47.0	60.6	66	13.6	10	Sub'l Inc		60.6	0.0	8	-8.0	
Receiver11	11	1	47.0	48.5	66	1.5	10	---	---	48.5	0.0	8	-8.0	
Receiver12	12	1	47.0	49.6	66	2.6	10	---	---	49.6	0.0	8	-8.0	
Dwelling Units			# DUs		Noise Reduction									
			Min	Avg	Max									
			dB	dB	dB									
All Selected			10	0.0	0.0									
All Impacted			4	0.0	0.0									
All that meet NR Goal			0	0.0	0.0									