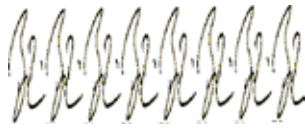


**Lowndes Holdings Corp.  
Proposed Dolostone Quarry**

**Preliminary Noise Control Study**

**Prepared by:**

A handwritten signature in black ink, appearing to read 'Bob Rimrott', with a stylized, cursive script.

**Bob Rimrott. M.A.Sc., P.Eng.**

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## **1. INTRODUCTION**

Aercoustics has conducted a preliminary noise control study for the proposed Dolostone quarry in the City of Hamilton, Ontario. The purpose of this study was to provide a preliminary opinion of noise control recommendations in order that the design and operation of the quarry will satisfy the Ministry of the Environment (MOE) noise guidelines. Figure 1 provides a key plan showing the location of the quarry, a site plan is provided as Figure 2 illustrating the quarry area and the locations of local residences. A site visit was conducted by the author in October 2003.

Sound level limits for the quarry noise on the close residential receptors were first established. These were based on the noise guidelines of the Ministry of the Environment (MOE). Next the noise predictions were performed of the quarry operations at these residential receptors. Where the predicted levels were found to exceed the MOE sound level limits, preliminary noise control measures were recommended to satisfy these limits.

## **2. SITE DESCRIPTION**

The proposed quarry, addressed by this noise study, consists of operations within the lands outlined in Figure 2. The site is described as part of Lot 1 and Lots 2 and 3, Concession 11 and comprises 154 ha. Operations within the each of the areas include rock drilling, extraction, aggregate material transportation with pit trucks, processing with a portable processing plant (crushing and/or screening) and aggregate haulage.

There are several residences in the vicinity of the proposed quarry area. They are all single family dwellings.

## **3. NOISE CRITERIA**

### **3.1. ACOUSTIC ENVIRONMENT**

Based on observations conducted in the site visit, the background sound in the vicinity of this quarry, at all of the residential receptors, is considered to have quiet background sounds in the daytime, evening and night time, dominated by natural sounds or infrequent human activity.

### **3.2. MOE SOUND LEVEL LIMITS**

The noise criteria used for this study is based on the MOE noise guidelines; specifically the following MOE Noise Pollution Control publications,

- 1) NPC-233 Guidelines on Information Required for the Assessment of Planned Stationary Sources of Sound
- 2) NPC-232 Sound Level Limits for Stationary Sources in Class 3 Areas (Rural)

Based on the acoustic environment described in the previous section, the appropriate acoustical classification for the residences is a MOE Class 3 classification. The applicable sound level limits for the residential receptors are provided in the table below. Refer to Figure 2 for the locations of the residential groups.

**Table 1: Quarry Operation Sound Level Limits**

Residential Group (see Figure 2)	Time of Day	Sound Level Limit (dBA)
R1-R16	07:00 - 19:00	<b>45</b>
	19:00 - 07:00	<b>40</b>

## **4. QUARRYING OPERATION**

The area of the proposed quarry is shown in Figure 2. The quarrying is broken up into four phases as shown in this figure. There will be two lifts with nominal lift heights of 20m each.

The 1<sup>st</sup> floor quarry elevation was assumed to be EL270m, a nominal depth of 20m from current grade elevation. The drill will operate in front of the working face. Two front end loaders will operate at the base of the working face and load pit trucks. These pit trucks will transport the aggregate material to the processing plant. Highway trucks will then be used to ship the processed material from this processing plant to off property locations.

The noise impact predictions for this preliminary study are limited to the 1<sup>st</sup> lift operation. This is considered sufficient for this preliminary study. Based on experience, the 2<sup>nd</sup> lift operation will generate a lower noise impact. Noise impact predictions of this 2<sup>nd</sup> lift operation will be included in the noise impact study of this quarry.

The equipment and operation of the quarry is as follows:

- 1) Shipment truck operation during the period of 06:00-19:00.
- 2) Quarrying limited to the daytime period of 07:00-19:00.
- 3) Maximum hourly pit truck volumes of 20 truck trips/hr (40 passes/hr)
- 4) Quarrying equipment includes:
  - 1 rock drill
  - 2 Front end loader operating at the working face
  - 1 portable primary processing plant
  - 1 Front end loader operating close to the processing plant
  - Pit trucks (max 20 trips/hr (40 passes/hr))
  - highway trucks (max 70 trips/hr (140 passes/hr))

## 5. NOISE PREDICTIONS & RECOMMENDED NOISE CONTROLS

The quarry operations described in the previous section were modelled for the noise predictions. These predictions were based on design case conditions for noise emission. This is when the quarry is running at capacity with all of the equipment operating simultaneously. The noise impact calculations are based on established prediction methods. The following table presents the reference sound levels used for the quarry equipment. These were based on data from the Aercoustics database.

**Table 2: Reference Sound Power Levels of Quarry Equipment**

Equipment	Reference Sound Power Level (dB(A))
Rock Drill (In-the-hole type)	117
Portable Processing Plant (crushing & screening) & Shipping Loader	125
Excavation Loader	112
Pit Trucks (40 passes/hr, 100m section, 25 km/hr)	104
Highway Trucks (140 passes/hr, 100m section, 25 km/hr)	102

The noise impact of the operation in these areas was predicted. Where the MOE sound level limits were calculated to be exceeded, noise control measures were modelled and the noise impact recalculated. This process was repeated until the sound level limits were satisfied.

### Preliminary Noise Control Recommendations

The preliminary noise control recommendations include the following:

- 1) Daytime operation for the significant noise sources of the quarry.
- 2) Limit on type and number of equipment.
- 3) Perimeter barriers in the form of earth berms and/or acoustical fences.
- 4) Repositioning on-property truck haul route and installation of barriers along both sides.
- 5) Local portable barrier and/or noise controls for drill at some locations.
- 6) Local barriers for the processing plant.
  - These barriers should be formed by leaving rock walls of unexcavated material

Refer to the Appendix A for figures illustrating the preliminary noise control recommendations and the noise impact predictions at the local receptors.

## **6. TRUCK TRAFFIC NOISE ON HAUL ROUTE**

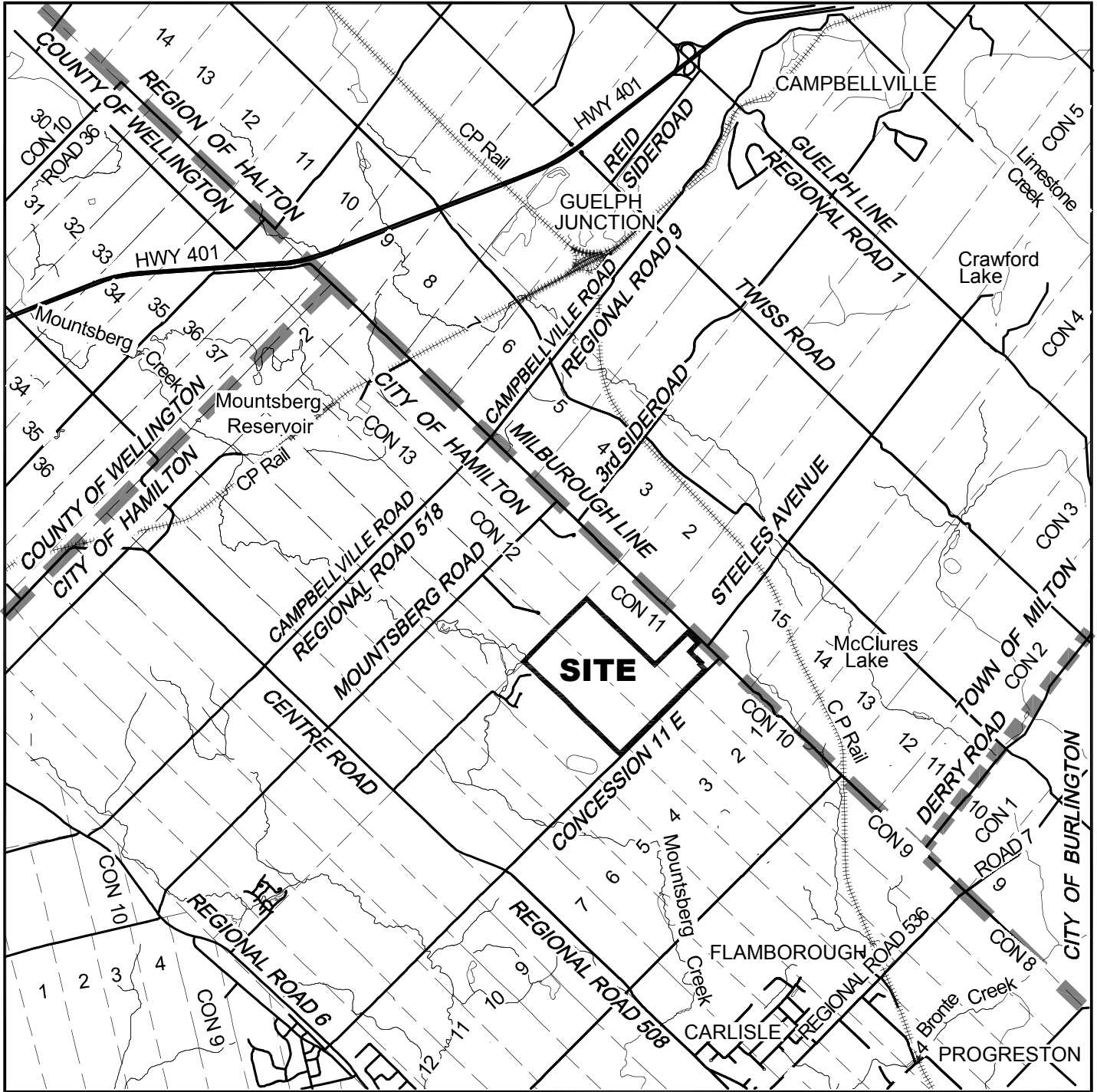
The noise impact of truck traffic on public roadways is not addressed by the MOE in their noise guidelines. They, however, require that consideration of noise impact be given to choose the off property haul route.

Aercoustics is currently in the process of conducting a study of off property haul route noise. The predicted noise of haul route truck traffic will be presented in the final noise impact study for this quarry.

## **7. CONCLUSIONS**

Aercoustics has conducted a preliminary noise control study for the proposed Dolostone quarry in the City of Hamilton, Ontario. The purpose of this study was to provide a preliminary opinion of noise control recommendations in order that the design and operation of the quarry will satisfy the Ministry of the Environment (MOE) noise guidelines. Figure 1 provides a key plan showing the location of the quarry, a site plan is provided as Figure 2 illustrating the quarry area and the locations of local residences. A site visit was conducted by the author in October 2003.

To this end, sound level limits, based on the MOE noise guidelines, were developed. Calculations were then carried out to determine the worst case noise for each of the quarry operation areas at each of the receptors. Where noise was predicted to exceed the MOE sound level limits, preliminary noise control recommendations and required equivalent source reference sound levels were provided. With the preliminary noise controls implemented, the MOE sound level limits should be satisfied at each receptor.



**Figure 1**  
**KEY MAP**

Scale: 1 : 60,000



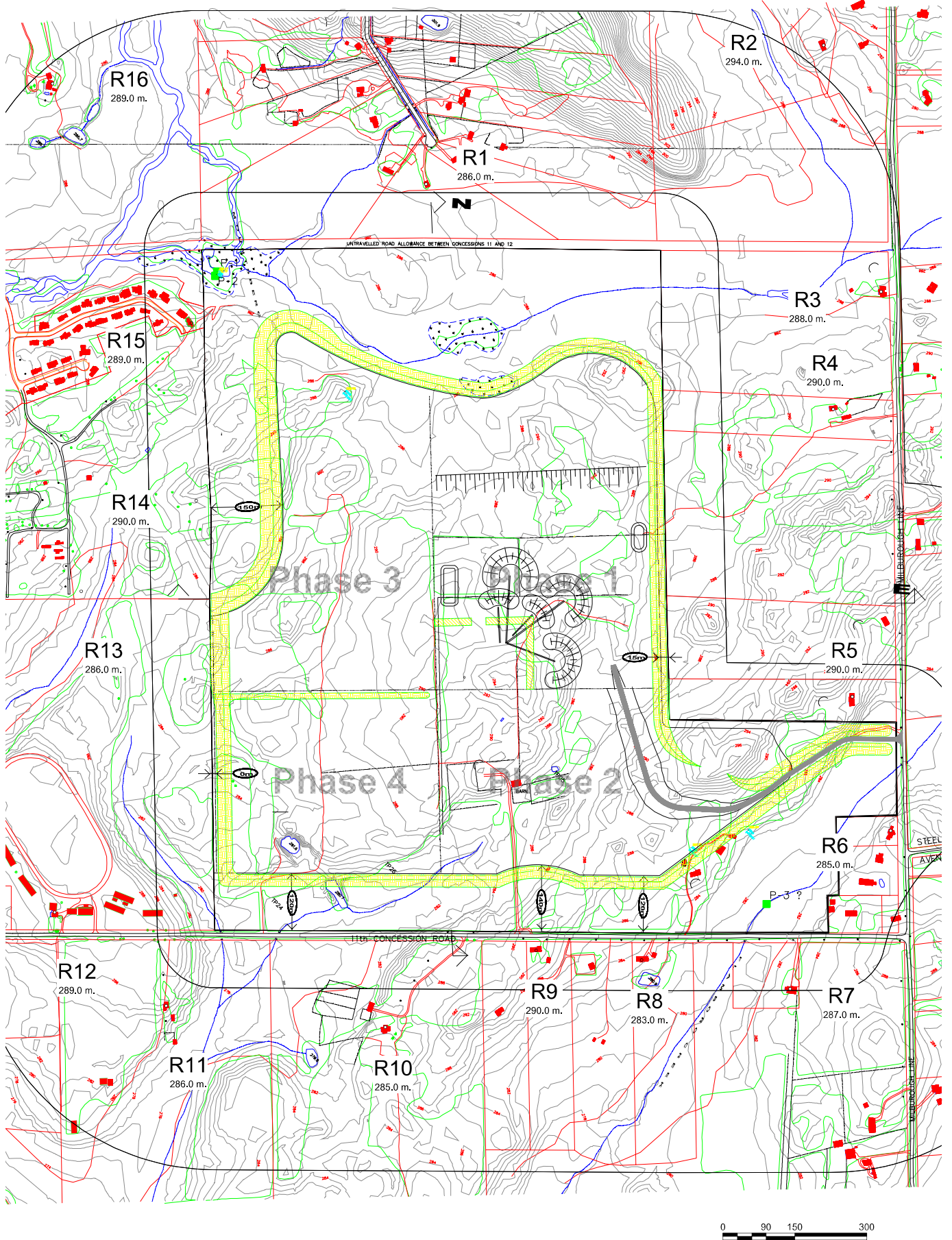
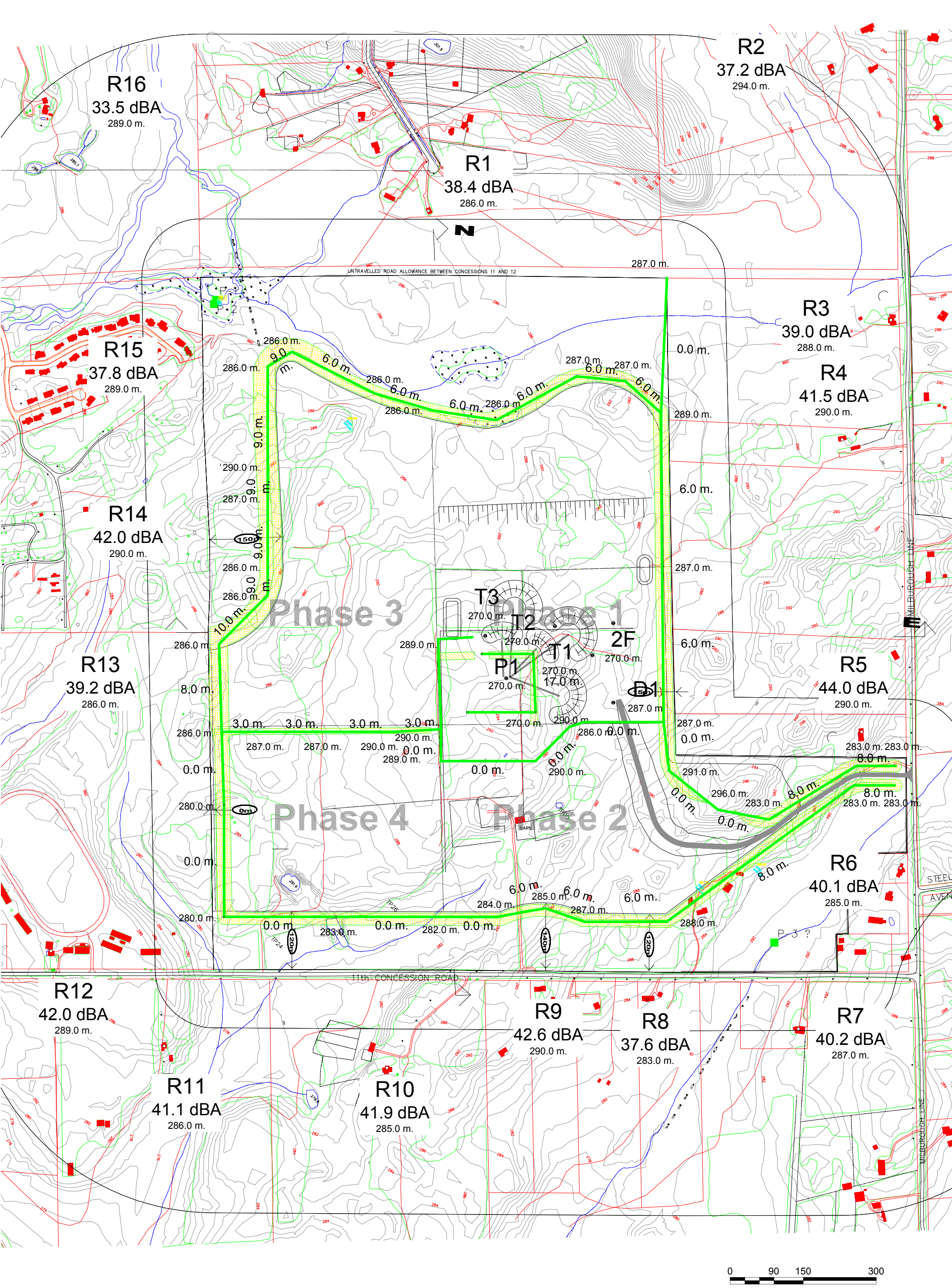


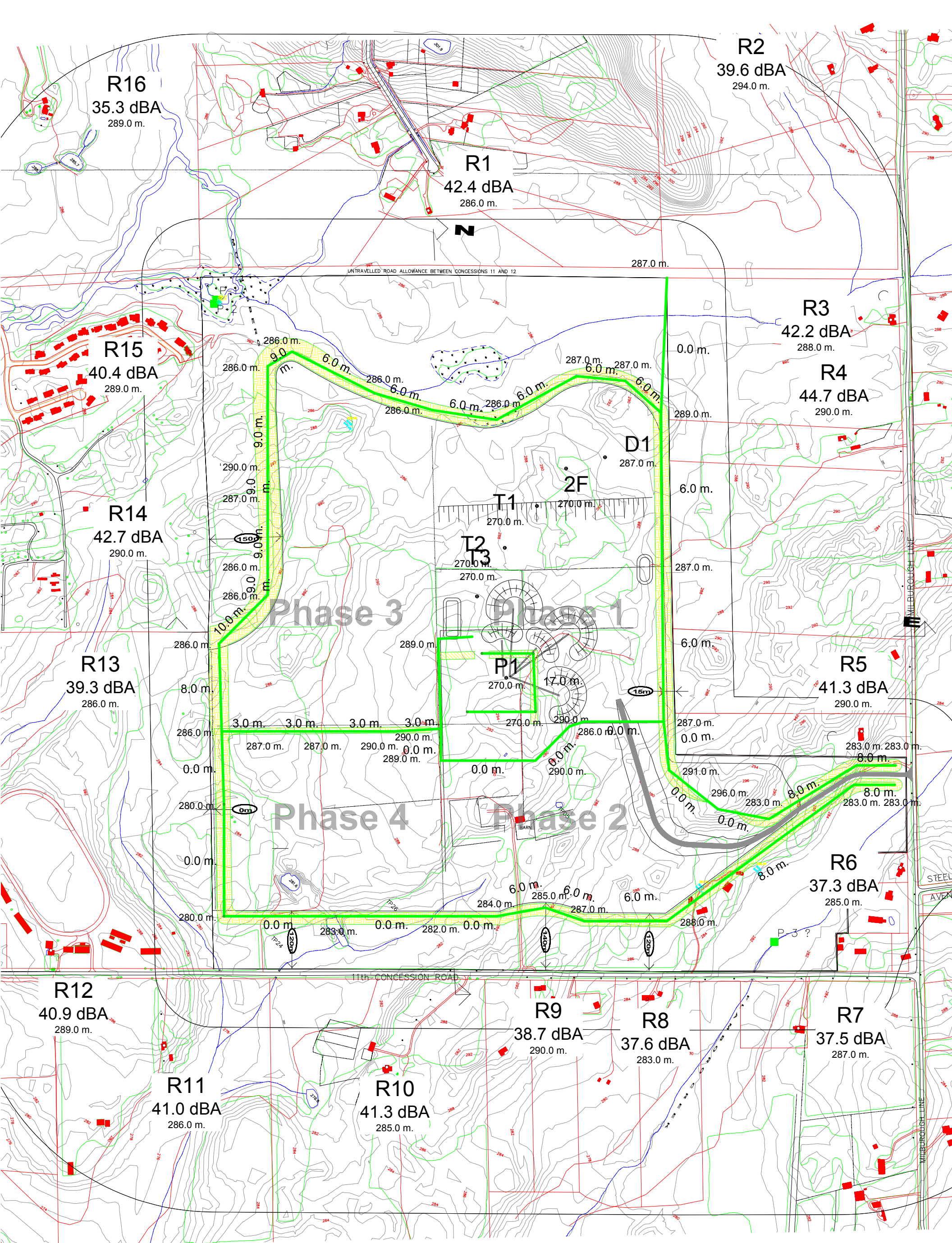
Figure 2:

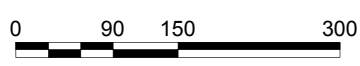
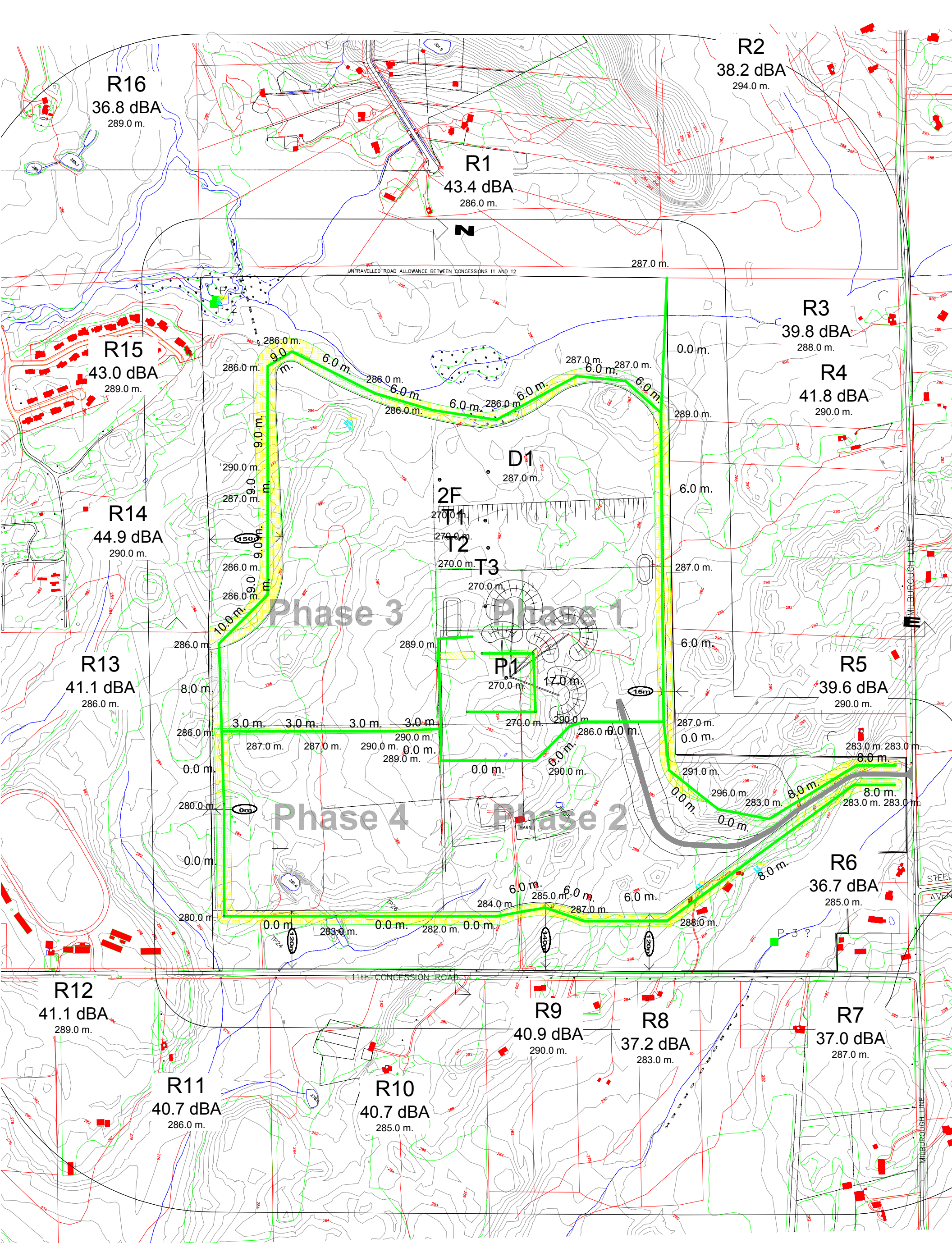
Site Plan illustrating the quarry area and locations of local residences

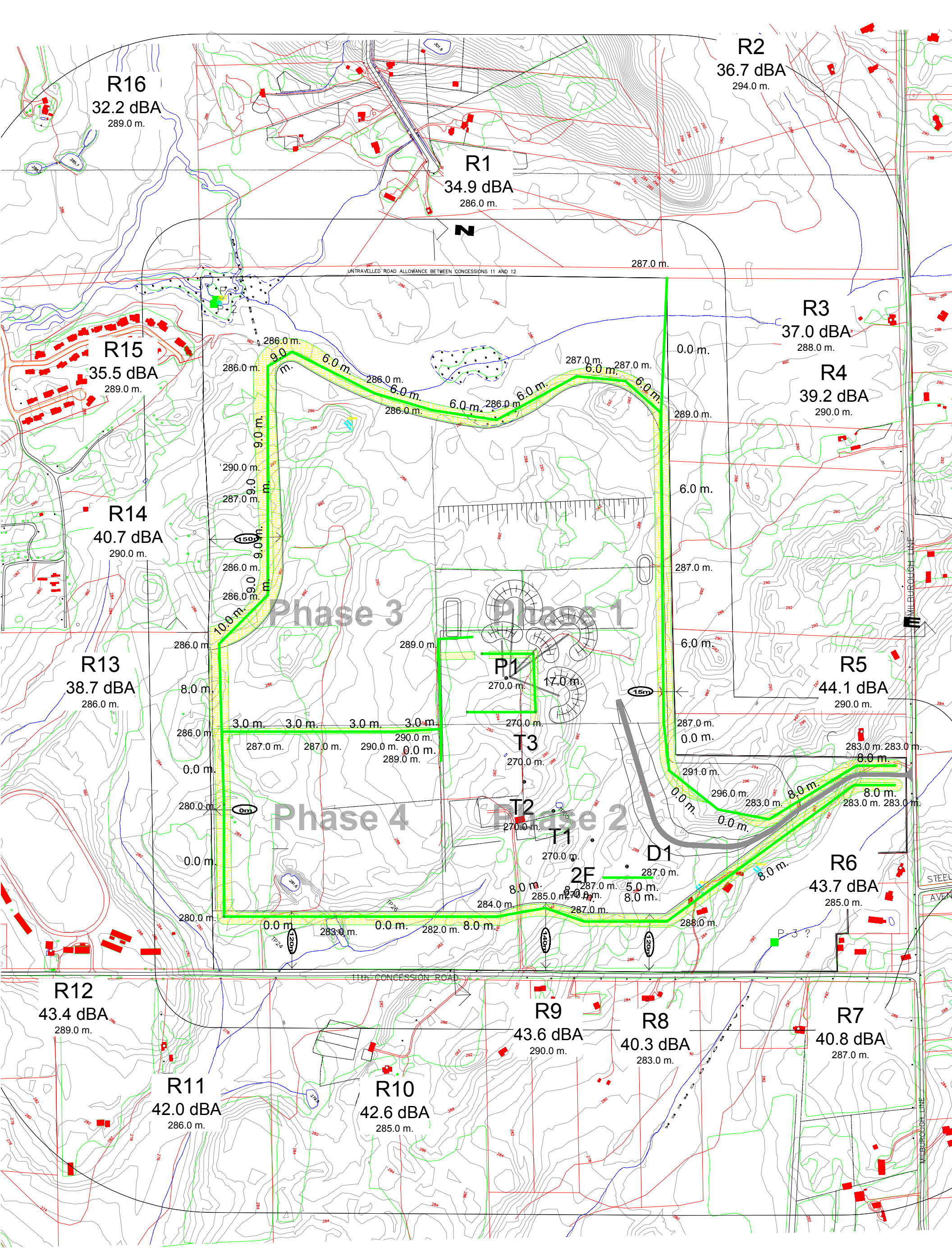
**Appendix A:**

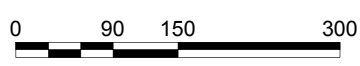
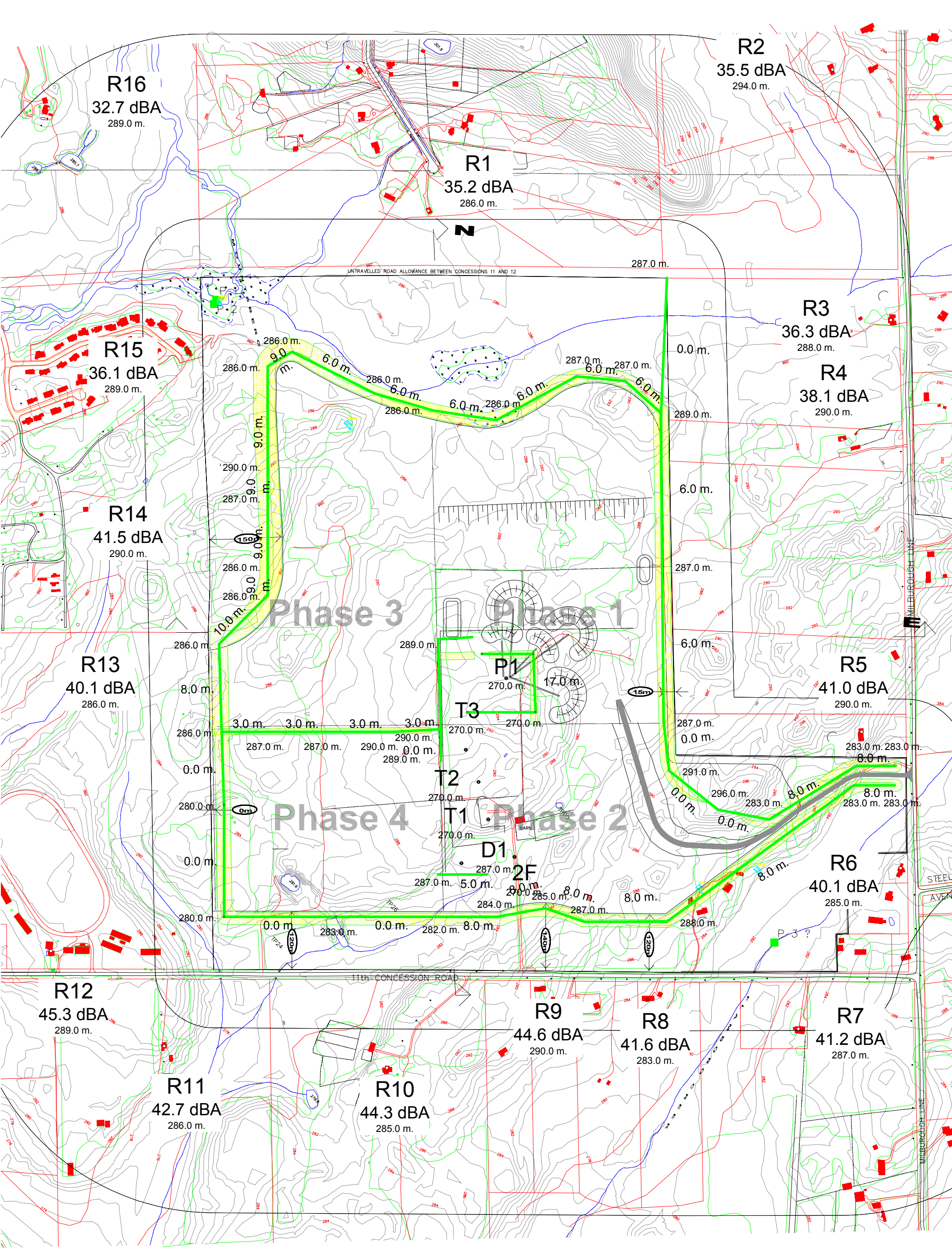
**Noise Impact Predictions**

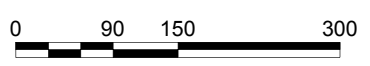
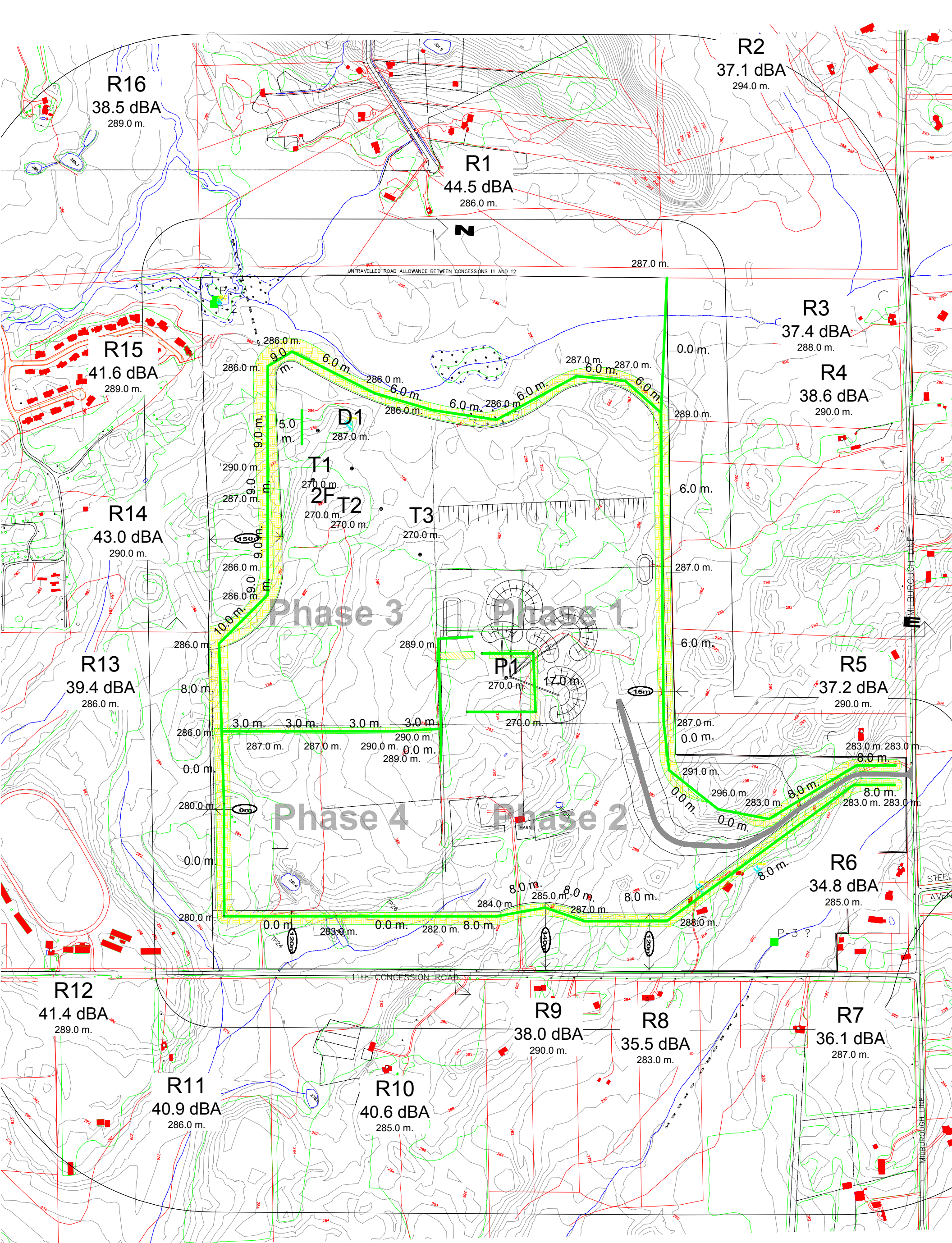


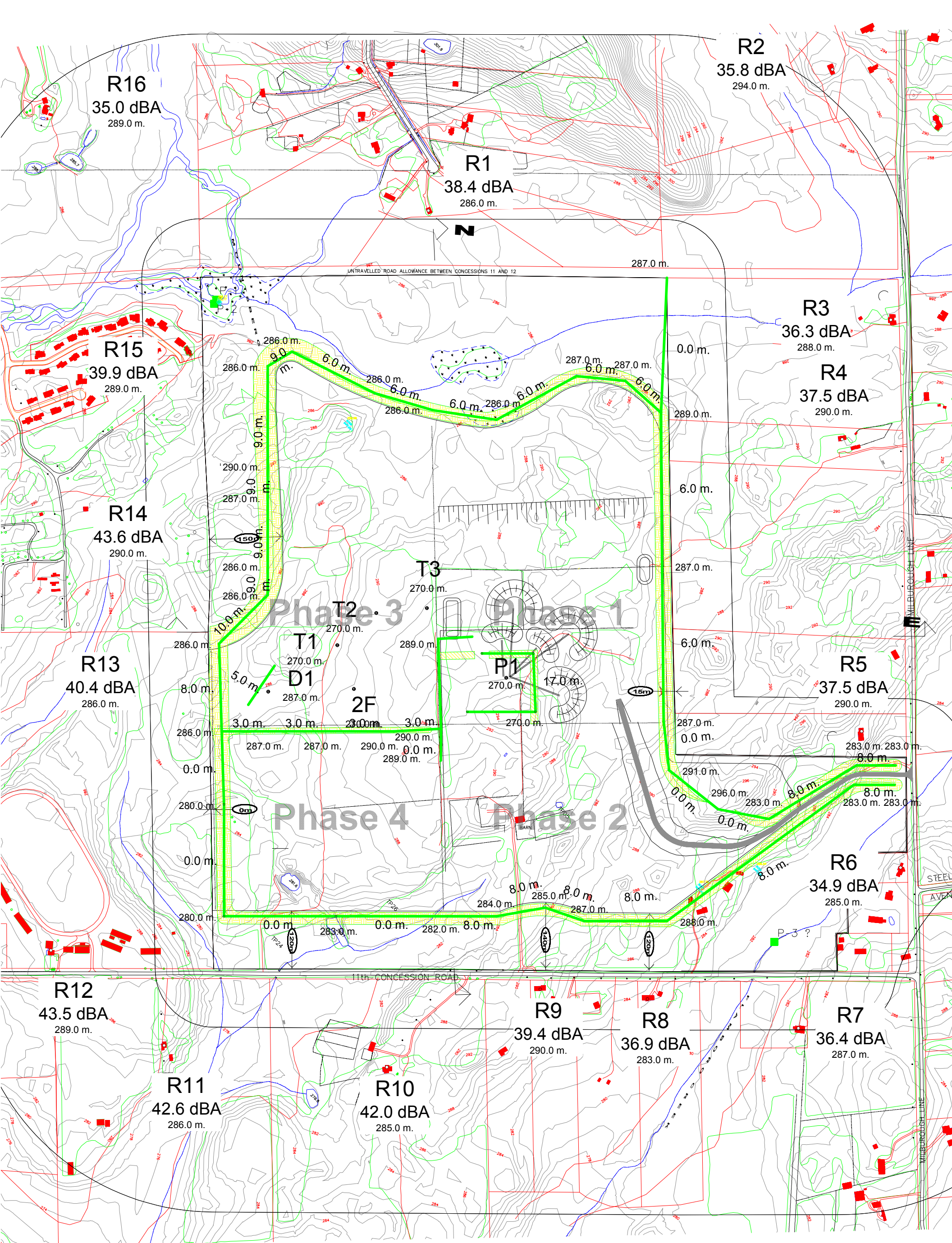


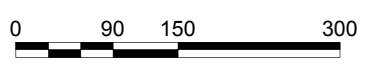
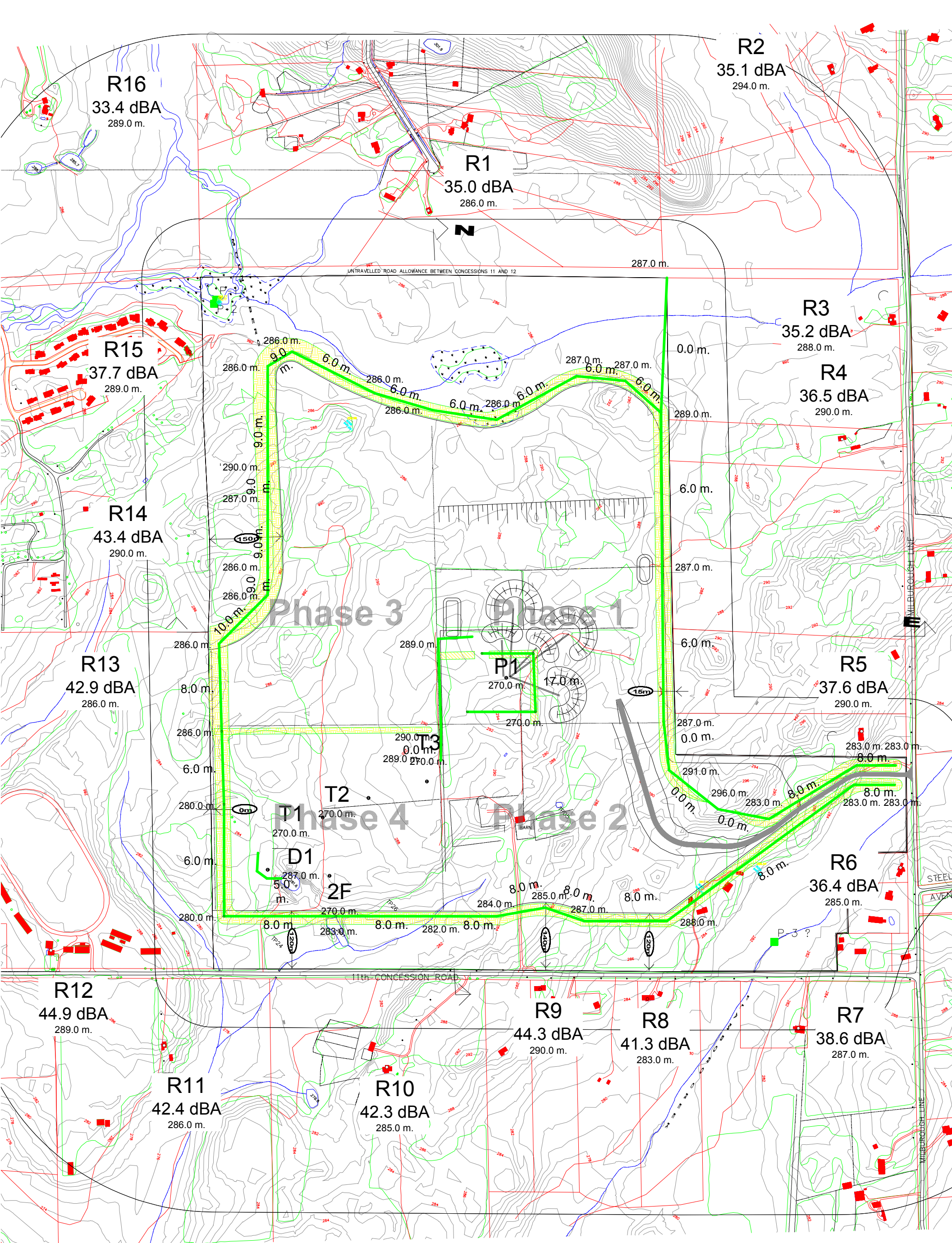












Project:	Lowndes										
	Shipment Truck noise										
	On-property access road section between roadway and extraction area										
Receptor	R5										
	Day						Night				
Source:	hT	hT	hT	hT			hT	hT	hT	hT	
Sh	2.5	2.5	2.5	2.5			2.5	2.5	2.5	2.5	
Se	283	283	283	283			283	283	283	283	
Rh	1.5	1.5	1.5	1.5			4.5	4.5	4.5	4.5	
Re	290	290	290	290			290	290	290	290	
RS	140	110	160	250			170	140	190	280	
BN	1	1	1	1			1	1	1	1	
B1h	10	10	10	10			10	10	10	10	
B1e	283	283	283	283			283	283	283	283	
B1S	20	20	20	20			20	20	20	20	
B2h	0	0	0	0			0	0	0	0	
B2e	0	0	0	0			0	0	0	0	
B2S	0	0	0	0			0	0	0	0	
G source	0	0	0	0			0	0	0	0	
G receiver	1	1	1	1			1	1	1	1	
G middle	1	1	1	1			1	1	1	1	
Co	0	0	0	0			0	0	0	0	
Cmeteo	0	0	0	0			0	0	0	0	
Berror	0	0	0	0			0	0	0	0	
dBA	32	34	31	27	<b>38</b>		31	33	30	27	<b>37</b>
	1659.6661	2690.6979	1275.6126	543.17029	6169.1469		1250.1429	1871.2826	997.45777	468.4508	4587.3341
31.5	36	38	35	31			35	36	34	30	
63	38	40	36	33			36	38	35	32	
125	40	42	39	35			38	40	37	34	
250	36	38	35	32			35	37	34	31	
500	30	33	29	26			29	31	28	25	
1000	23	26	22	18			22	24	21	18	
2000	18	20	16	11			16	17	14	10	
4000	7	10	5	0			5	7	3	0	
8000	0	0	0	0			0	0	0	0	
Source SPL @30m											
31.5	59	59	59	59			59	59	59	59	
63	62	62	62	62			62	62	62	62	
125	66	66	66	66			66	66	66	66	
250	65	65	65	65			65	65	65	65	
500	62	62	62	62			62	62	62	62	
1000	58	58	58	58			58	58	58	58	
2000	55	55	55	55			55	55	55	55	
4000	48	48	48	48			48	48	48	48	
8000	41	41	41	41			41	41	41	41	
dBA	64	64	64	64			64	64	64	64	

Project:	Lowndes												
	Shipment Truck noise												
	On-property access road section between roadway and extraction area												
Receptor	R6												
	Day						Night						
Source:	hT	hT	hT	hT			hT	hT	hT	hT			
Sh	2.5	2.5	2.5	2.5			2.5	2.5	2.5	2.5			
Se	283	283	283	283			283	283	283	283			
Rh	1.5	1.5	1.5	1.5			4.5	4.5	4.5	4.5			
Re	285	285	285	285			290	290	290	290			
RS	110	130	170	230			140	160	200	260			
BN	1	1	1	1			1	1	1	1			
B1h	10	10	10	10			10	10	10	10			
B1e	283	283	283	283			283	283	283	283			
B1S	20	20	20	20			20	20	20	20			
B2h	0	0	0	0			0	0	0	0			
B2e	0	0	0	0			0	0	0	0			
B2S	0	0	0	0			0	0	0	0			
G source	0	0	0	0			0	0	0	0			
G receiver	1	1	1	1			1	1	1	1			
G middle	1	1	1	1			1	1	1	1			
Co	0	0	0	0			0	0	0	0			
Cmeteo	0	0	0	0			0	0	0	0			
Berror	0	0	0	0			0	0	0	0			
dBA	33	32	30	28	<b>37</b>		33	32	30	27	<b>37</b>		
	2125.2998	1574.7502	970.9248	564.65797	5235.6328		1871.2826	1416.1257	899.94012	539.01195	4726.3603		
31.5	38	36	34	32			36	35	33	31			
63	39	38	35	33			38	37	35	33			
125	41	40	37	35			40	39	37	35			
250	37	36	34	32			37	36	34	31			
500	31	30	28	26			31	30	28	26			
1000	24	23	21	19			24	23	21	18			
2000	20	18	16	12			17	16	14	11			
4000	10	8	5	0			7	5	2	0			
8000	0	0	0	0			0	0	0	0			
Source SPL @30m													
31.5	59	59	59	59			59	59	59	59			
63	62	62	62	62			62	62	62	62			
125	66	66	66	66			66	66	66	66			
250	65	65	65	65			65	65	65	65			
500	62	62	62	62			62	62	62	62			
1000	58	58	58	58			58	58	58	58			
2000	55	55	55	55			55	55	55	55			
4000	48	48	48	48			48	48	48	48			
8000	41	41	41	41			41	41	41	41			
dBA	64	64	64	64			64	64	64	64			