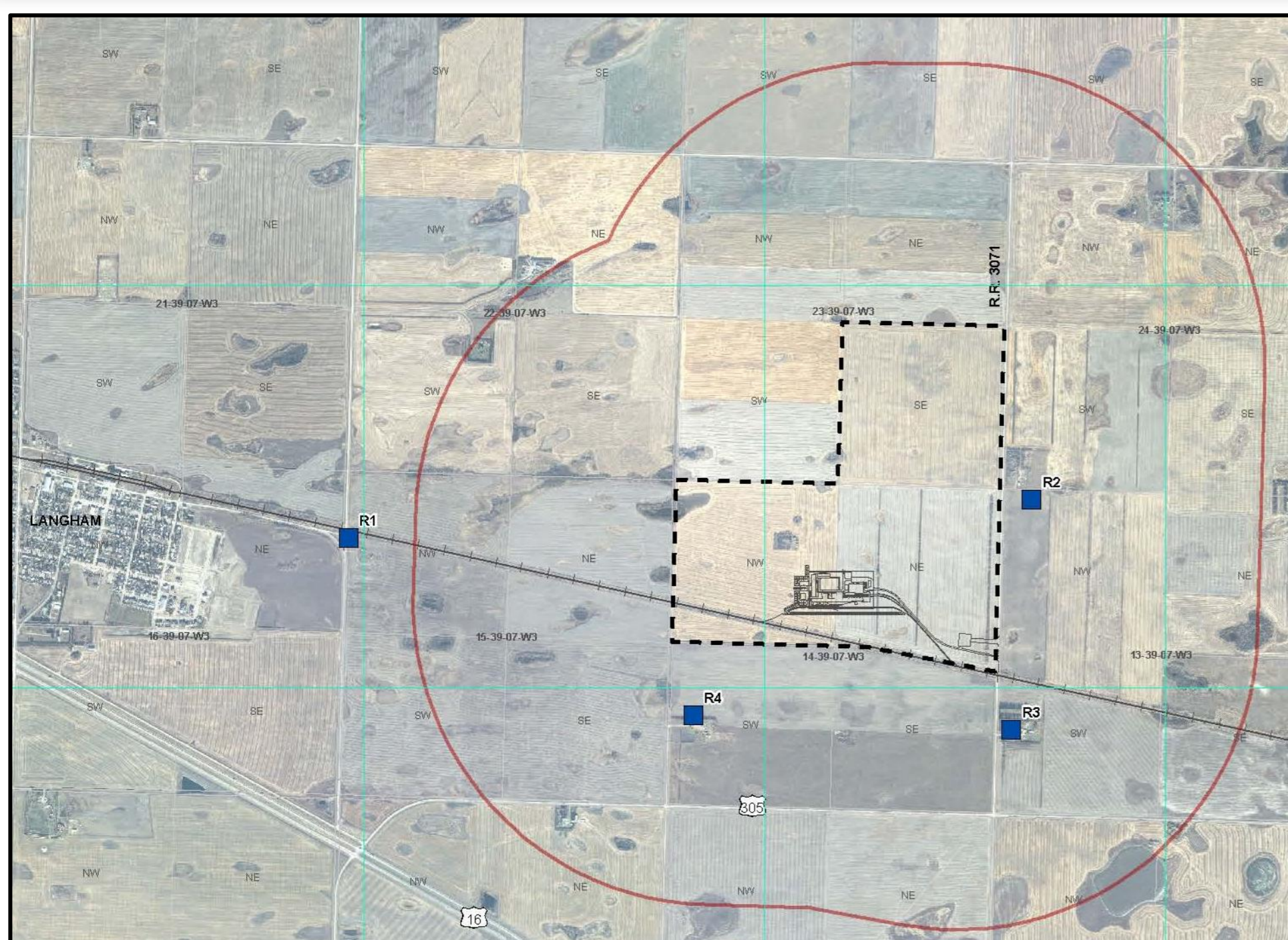


Noise Impact Assessment



FORTUNE
MINERALS LIMITED



Noise monitoring locations (R1, R2, R3 and R4) surrounding the proposed SMPP, east of Langham, SK

MDH Engineered Solutions Corp. (MDH) completed a Noise Impact Assessment (NIA) to assess the noise effects associated with the operation of the proposed Fortune Minerals Limited (FML) **Saskatchewan Metals Processing Plant (SMPP)** near the Town of Langham, Saskatchewan. The NIA has been completed in support of the environmental impact assessment for the proposed facility. The NIA predicts the noise effects of normal operations of the SMPP on receptors nearest to the proposed site in order to determine if any management or mitigation measures are required. The assessment included:

- ❑ Baseline sound monitoring at four locations surrounding the proposed location;
- ❑ Determination of the relevant noise emission sources attributable to the SMPP;
- ❑ Noise modelling to predict the sound propagation from those sources and the resultant sound levels at the receptors; and
- ❑ A comparison of those levels to the Permissible Sound Levels (PSLs).

Methodology

The methods used to conduct the NIA are consistent with the requirements of the Alberta Energy and Utilities Board's *Directive 38: Noise Control (EUB, 2007)*. The approach used to assess the potential noise effects during normal operations of the SMPP are outlined below:

- ❑ Establish baseline conditions at the receptors by conducting a minimum 24-hour continuous sound survey at each location. Monitoring was conducted at each location in the spring, summer, and fall;
- ❑ Calculate Permissible Sound Levels (PSLs) for the receptors according to the Directive;
- ❑ Predict noise levels from normal facility operations by:
 - Identifying noise sources from the SMPP;
 - Quantifying the acoustical power of these sources; and
 - Modelling the sound propagation from these sources to the receptors;
- ❑ Compare the predicted cumulative CSLs (Comprehensive Sound Levels) to the PSLs to assess compliance with the Directive. The predicted cumulative CSL includes the expected sound contributions from the facility plus the baseline, or ambient, noise levels. If the predicted cumulative CSL is less than or equal to the PSL, the effect is acceptable. If the PSL is exceeded, mitigation measures are required to reduce the predicted CSL to an acceptable level (less than or equal to the PSL); and
- ❑ Assess the potential for the operation of the SMPP to increase the existing sound environment at the receptors.



Noise monitoring equipment including microphone, anemometer, data logger and solar panel

Baseline Monitoring

Baseline sound level monitoring was completed to establish the existing sound environment at the receptors identified for the NIA. Four receptors (identified as R1, R2, R3, and R4) were selected for 24-hour noise monitoring. The sound level meter (SLM) was set up at each of the noise monitoring locations in the spring, summer, and fall. It ran for at least 24 hours to record daytime (07:00 to 22:00) and nighttime (22:00 to 07:00) sound levels. The sound monitoring equipment was set up 15 m from each residence, as stipulated in the Directive. The microphone was mounted on a tripod at a height of approximately 1.5 m above the ground.

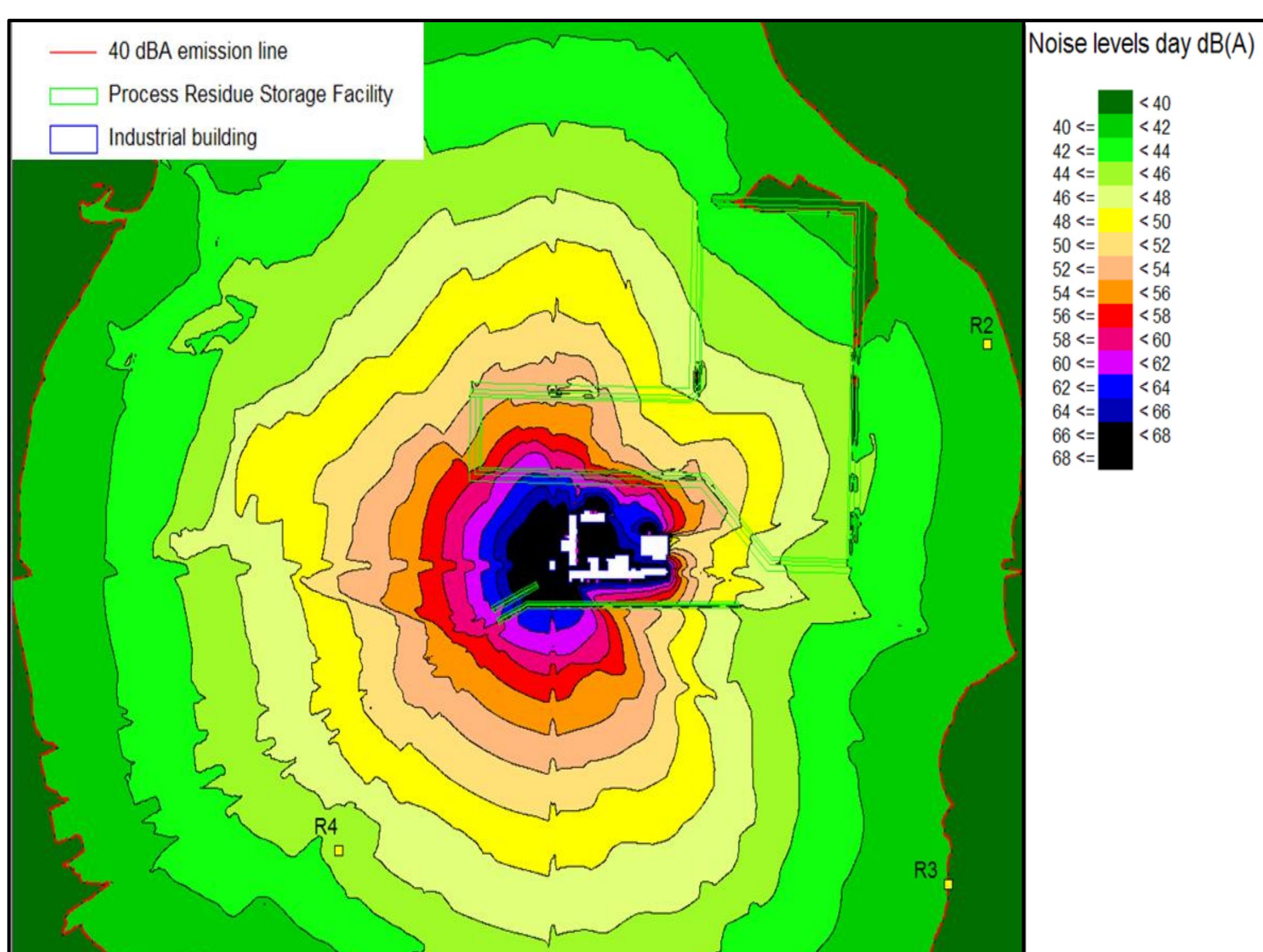
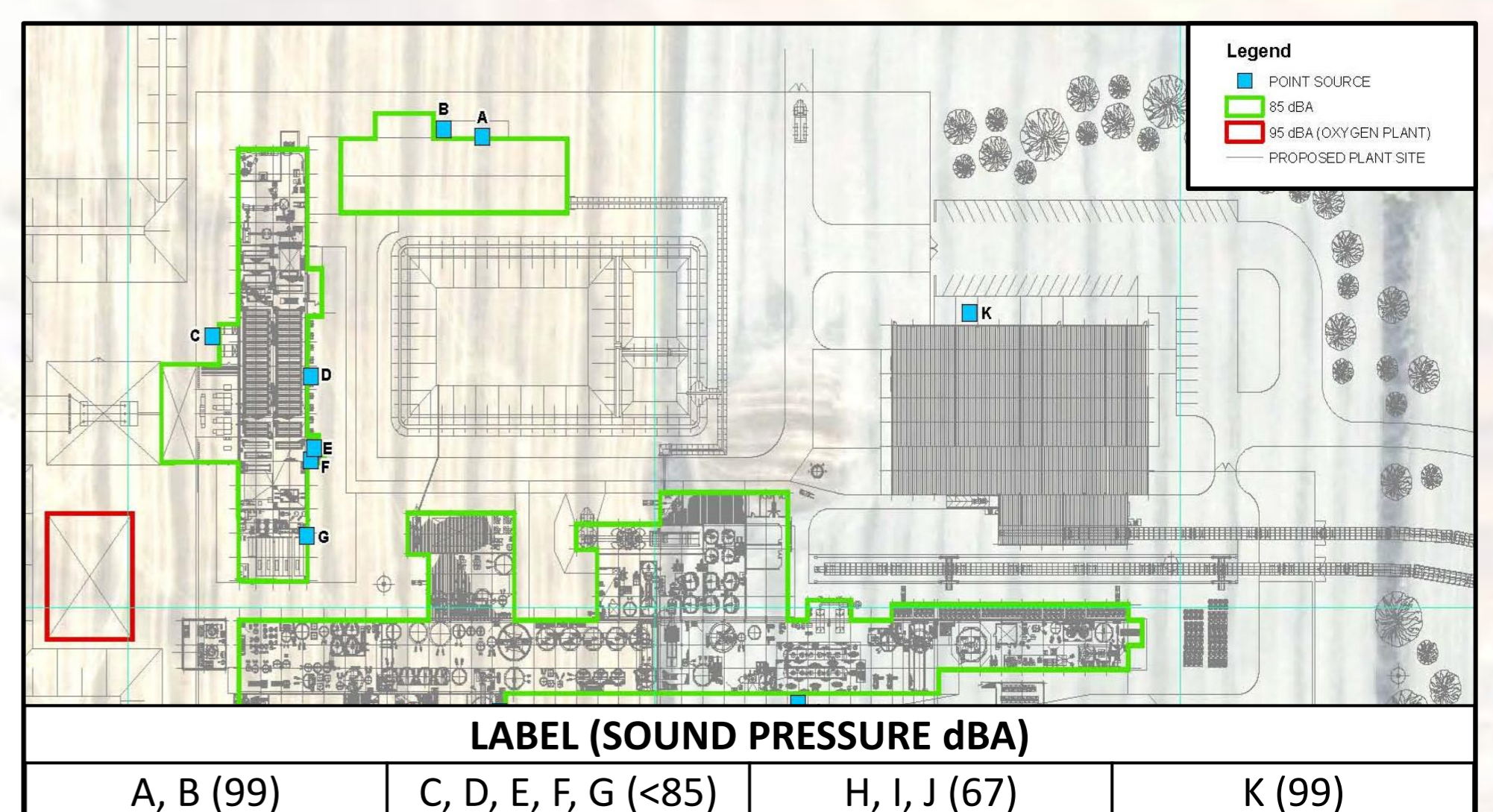
The captured data was analyzed to determine the baseline daytime and nighttime CSLs. Noise spikes which appeared to be inconsistent with the data were interpreted as abnormal noise events and were not included in the baseline CSL determination.

The baseline CSLs were not used to determine compliance with the directive since the average rural ASL specified in the Directive is considered to be representative of baseline conditions. However, baseline monitoring provides historical background data which can be used for reference once the facility is operational.

NIA Results

The predicted noise emissions from various pieces of equipment outside the SMPP are summarized in the table and corresponding figure below. These were input as point sources in the noise model. In addition, the SMPP buildings were modelled as "industrial buildings," with the building facades defined as area sources. In order to ensure the most conservative results from the noise modelling, the sound pressure levels outside of the buildings were estimated to be:

- ❑ 85 dBA at a distance of approximately 9 m from the oxygen plant;
- ❑ 70 dBA 1 m from the processing facility; and
- ❑ 70 dBA 1 m from the cobalt and copper electrowinning and bismuth recovery buildings.



The sound levels predicted with the model are added to the average rural Ambient Sound Level and compared to the Permissible Sound Level. The table below summarizes the model results and the figure shows the predicted noise contour map showing the sound contribution from the facility to the surrounding area. The graph shows an emission limit line of 40.0 dBA, corresponding with the lowest PSL (at receptor R2).

The results of the NIA indicate that the PSL is slightly exceeded at two of the receptor locations. However, further noise monitoring will not be completed at this time, since actual noise levels are expected to be lower than those predicted here due to the conservatism of the modelling inputs. MDH recommends that further monitoring be conducted once the facility is operational in order to confirm the actual noise propagation resulting from the SMPP and to determine if any further mitigation measures are required.

RECEPTOR	PREDICTED SOUND LEVEL FROM THE SMPP		AVERAGE RURAL ASL		COMBINED FACILITY AND AMBIENT NOISE LEVEL		EUB PERMISSIBLE SOUND LEVEL		MEETS EUB GUIDELINE LIMIT	
	DAY dBA Leq[15]	NIGHT dBA Leq[9]	DAY dBA	NIGHT dBA	DAY dBA Leq[15]	NIGHT dBA Leq[9]	DAY dBA Leq[15]	NIGHT dBA Leq[9]	DAY	NIGHT
R2	41.0	41.0	45	35	46.5	42.0	50	40	YES	NO (2)*
R3	39.4	39.4	50	40	50.4	42.7	55	45	YES	YES
R4	44.5	44.5	50	40	51.1	45.8	55	45	YES	NO (0.8)*

* Brackets indicate the amount by which the PSL is exceeded (dBA).