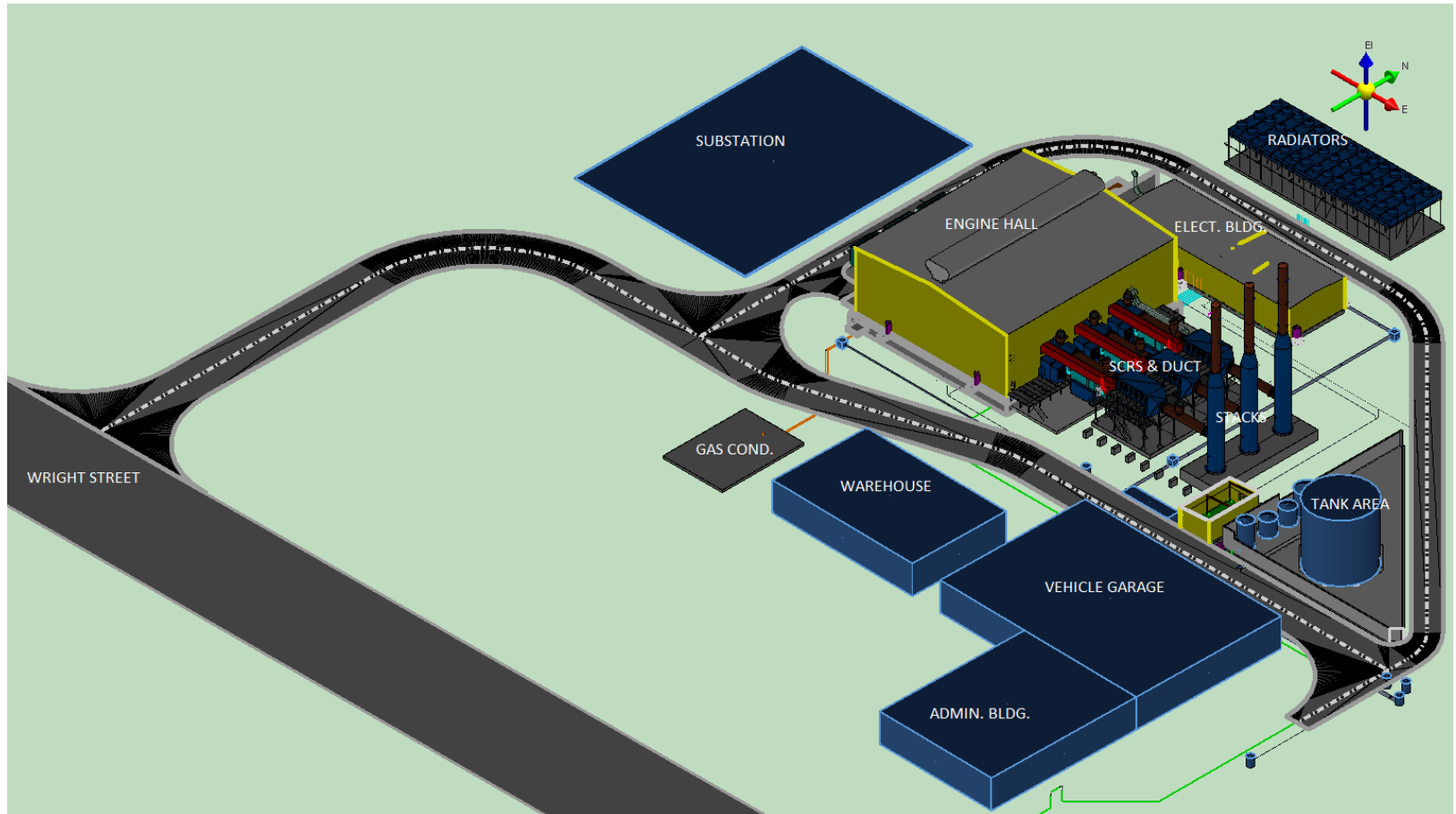


## Noise Assessment Update



- Started developing acoustical model on Feb. 12, 2016
- Baseline outdoor sound measurements performed April 18 to 20, 2016
  - Average 1-hour range is 39 to 44 dBA
  - Average nighttime 1- hour range is 38 to 39 dBA
- Draft noise report received from Shiner on May 23, 2016
- No city/state/federal code quantitative noise limits for the MEC
- Codes in other states provide limits at nighttime of up to 55 dBA
- Recommended sound criteria for the MEC is limited to a 10 dBA increase in order to minimize the noise impact's significance, which is based on the California Environmental Act



# Noise Assessment Update

## COMPARISON EXAMPLES OF NOISE LEVELS

Noise Source	Decibel Level	Decibel Effect
Passenger car at 65 mph at 25 ft (77 dBA); Living room music (76 dBA); radio or TV-audio, vacuum cleaner (70 dBA).	70	Arbitrary base of comparison. Upper 70s are annoyingly loud to some people.
Conversation in restaurant, office, background music, Air conditioning unit at 100 feet.	60	Half as loud as 70 dBA. Fairly quiet.
Quiet suburb, conversation at home. Large electrical transformers at 100 feet.	50	One-fourth as loud as 70 dBA.
Library, bird calls (44 dBA); lowest limit of urban ambient sound	40	One-eighth as loud as 70 dBA.
		Source: Industrial Noise Control

- Base design included noise mitigation as follows:
  - Acoustical construction for Engine Hall
  - Exhaust gas silencers
  - Charge air intake silencers
  - Low-noise radiators
- Model indicated noise level per base design is 49 to 54 dBA for 3 engines @ full load and max. ambient temperature of 99° F:
  - Base Design  $\leq$  Average 1-hour + 10 dBA o.k.
  - Base Design  $>$  Average nighttime 1-hour + 10 dBA n.g.
- Further noise assessment required for nighttime noise reduction

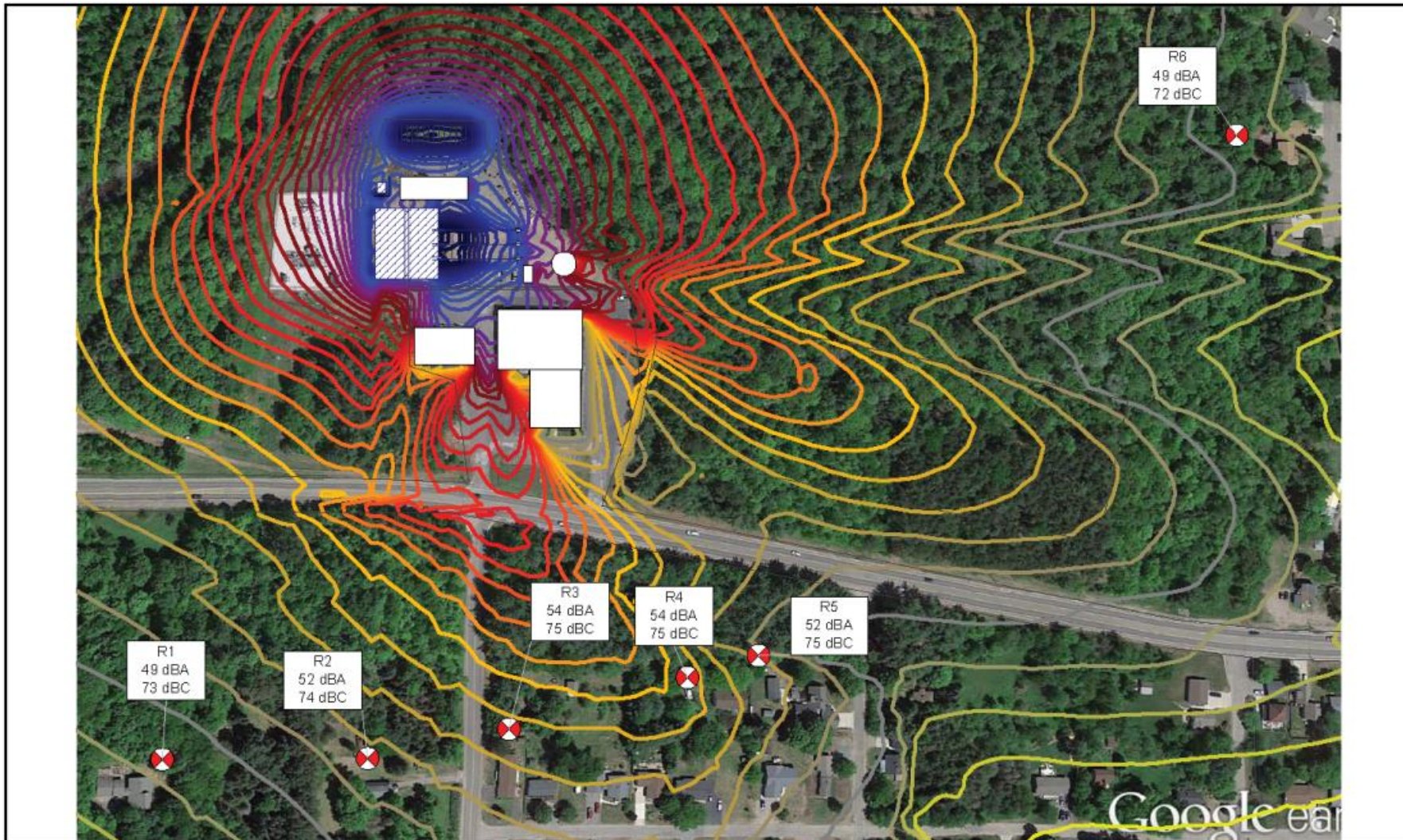


Figure 3. Marquette Energy Center  
 Sound Level Contours - Facility with Base Mitigation

	>= 35.0 dBA		Point Source
	>= 40.0 dBA		Line Source
	>= 45.0 dBA		Area Source
	>= 50.0 dBA		vert. Area Source
	>= 55.0 dBA		Building
	>= 60.0 dBA		Cylinder
	>= 65.0 dBA		Barrier
	>= 70.0 dBA		Ground Absorption
	>= 75.0 dBA		Contour Line
	>= 80.0 dBA		Receiver
	>= 85.0 dBA		Calculation Area

Scale 1 : 1663		
Units in meters		
UTM Zone 16		
Datum WGS84		
Rev	Date	
A	5/20/16	
<b>Shiner + Associates, Inc.</b>		



- Additional Noise Attenuation Options Being Implemented:
  - ✓ Additional exhaust gas duct silencer between engine and SCR
  - ✓ Additional baffles for the charge air ventilation system
  - ✓ Low noise radiator fan blade modification
- Other Noise Attenuation Options Considered:
  - ✓ Low noise radiator relocation
  - ✓ Ultra low noise radiators
  - ✓ Facility re-orientation
  - ✓ Sound barrier walls/berms/trees



## Noise Results Summary

Noise Attenuation	Benefits	Total Noise Level (dBA)	Max. 49 dBA Criteria Met	Cost Impact
Base Design	Overall plant noise mitigation	54	No	\$0
Base Design + Add'l. Exhaust Silencer + Add'l. CAU Baffle	Noise mitigation of: <ul style="list-style-type: none"> <li>- Exhaust duct breakout noise</li> <li>- Low-frequency noise</li> <li>- Stack outlet noise</li> </ul>	51	No	\$196,377
Base Design + Add'l. Exhaust Silencer + Radiator Mod. @ 86° F	Radiator noise mitigation	< 47	Yes	\$212,017

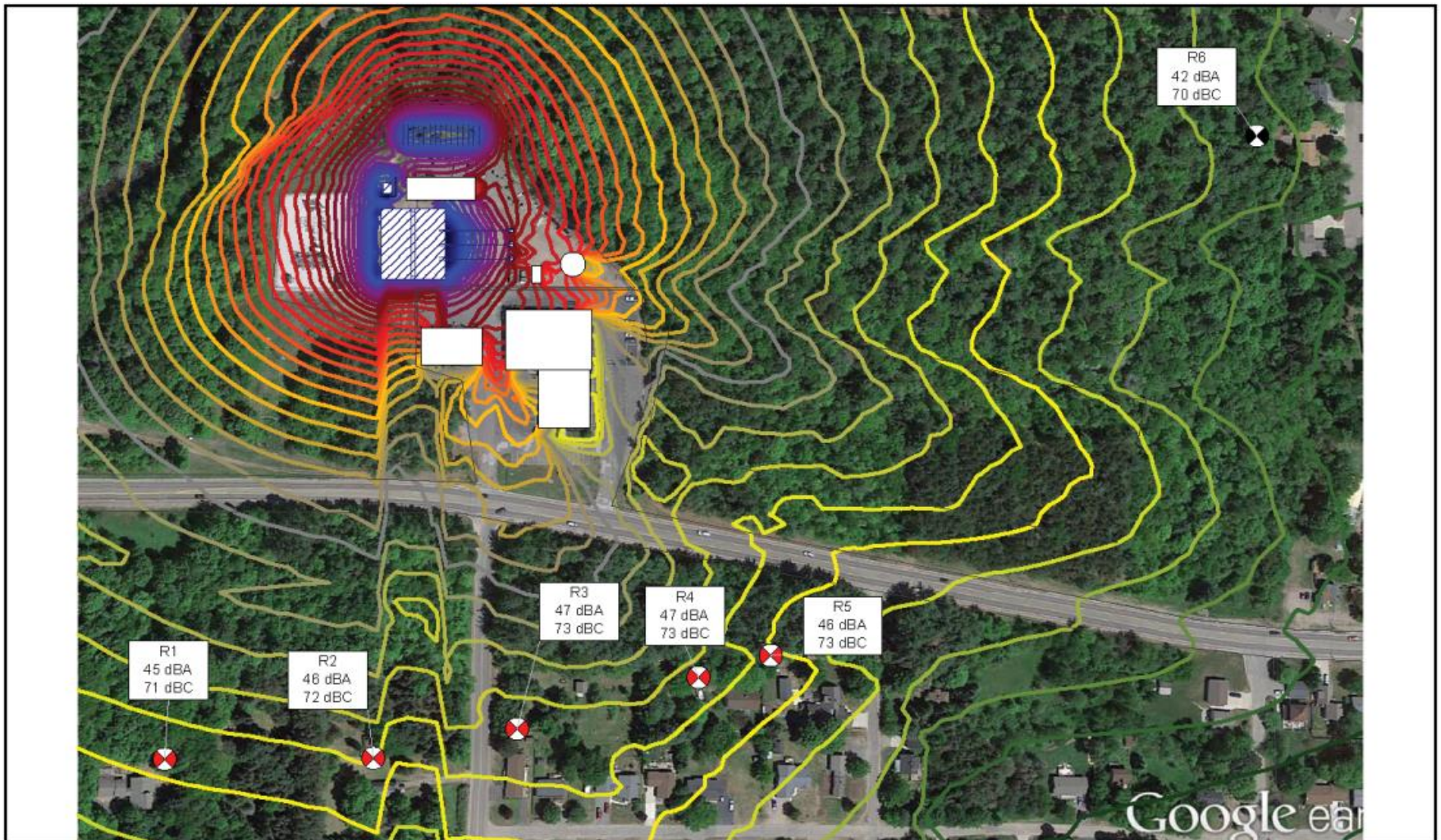


Figure 6. Marquette Energy Center

Sound Level Contours - Facility with Additional Exhaust Silencers and Radiators with AxialFan Fans at 350 rpm.

<ul style="list-style-type: none"> <li><span style="color: green;">▬</span> &gt;= 35.0 dBA</li> <li><span style="color: green;">▬</span> &gt;= 40.0 dBA</li> <li><span style="color: yellow;">▬</span> &gt;= 45.0 dBA</li> <li><span style="color: yellow;">▬</span> &gt;= 50.0 dBA</li> <li><span style="color: orange;">▬</span> &gt;= 55.0 dBA</li> <li><span style="color: red;">▬</span> &gt;= 60.0 dBA</li> <li><span style="color: red;">▬</span> &gt;= 65.0 dBA</li> <li><span style="color: purple;">▬</span> &gt;= 70.0 dBA</li> <li><span style="color: purple;">▬</span> &gt;= 75.0 dBA</li> <li><span style="color: blue;">▬</span> &gt;= 80.0 dBA</li> <li><span style="color: blue;">▬</span> &gt;= 85.0 dBA</li> </ul>	<ul style="list-style-type: none"> <li>+ Point Source</li> <li>▬ Line Source</li> <li>▨ Area Source</li> <li>▬ vert. Area Source</li> <li>▭ Building</li> <li>▭ Cylinder</li> <li>▬ Barrier</li> <li>▭ Ground Absorption</li> <li>▬ Contour Line</li> <li>⊗ Receiver</li> <li>▭ Calculation Area</li> </ul>	<p>Scale 1 : 3263</p> <p>Units in meters</p> <p>UTM Zone 16</p> <p>Datum: WGS84</p>	<p>North Arrow</p>
		Rev	Date
		A	6/3/16