



MEMORANDUM

Department of Natural Resources

STATE OF ALASKA

Division of Mining, Land & Water

Mining Section

TO: **Memo to Casefile APMA J20195690#1**

DATE: 6/15/2023

TELEPHONE: 451-2736

FROM: Dave Charron
Geologist 4

SUBJECT: Airblast Attenuation

Notes from review of Constantine North Seismic Refraction Study using explosives at the Klehini and Plateau sites as requested in APMA application amendment J20195690#1.

Energy released in an explosion creates an air overpressure, commonly called an airblast, in the form of a propagating wave. If the receiver is close enough to the blast, the overpressure can be felt as a pressure front as the airblast passes. The accompanying booming sound lasts for only a few seconds. The explosive charges are buried 3-5' below ground surface resulting in an airblast with a frequency content below about 250Hz¹. Its important to note that there is a exponential difference in noise from a confined blast than an unconfined or open air blast. Several public comments incorrectly referenced unconfined blast decibels.

Using the federal Office of Surface Mining and Reclamation Enforcement's Airblast Prediction excel spreadsheet I calculated the estimated sound pressure level (SPL) unweighted decibels (dB) and weighted decibels (dba)² from 2.5 lb explosive charge at 1', 660', 1320', 1 mile (5280') from a confined detonation³. A-weighted decibel (dBA) is an expression of relative loudness of sounds as perceived by the human ear. These estimates are based on worst case scenario as far as having zero wind, unfavorable atmospheric & weather conditions, and without the additional attenuation of the forest and topography.

Distance	Peak unweighted decibels (dB) ⁴ and Peak A-weighted decibels (dBA)	Comparative Peak Noises
1 foot adjacent to shot hole	157(dB)	.30-06 hunting rifle 24" barrel is 163(dB)
660 feet or 1/8 mile	112(dB)/103(dBA)	Chainsaw is 110(dB) or single riding lawnmower passing close by is 103(dBA) noise.
1320 feet or 1/4 mile	107(dB)/98(dBA)	Weedeater Trimmer is 96 (dBA)
5280 feet or 1 mile	97(dB)/88(dBA)	Bedside alarm clock ringing 85(dBA)

ATTENUATION MAPS FOR KLENINI AND PLATEAU SITE ARE ATTACHED

¹ 250hz used in calculating A-weighted decibels (dBA)

² Utilizing A-weighting conversion calculator and at 250hz.

³ Explosives to be confined 3-5' under the soil.

⁴ Rounded Up.



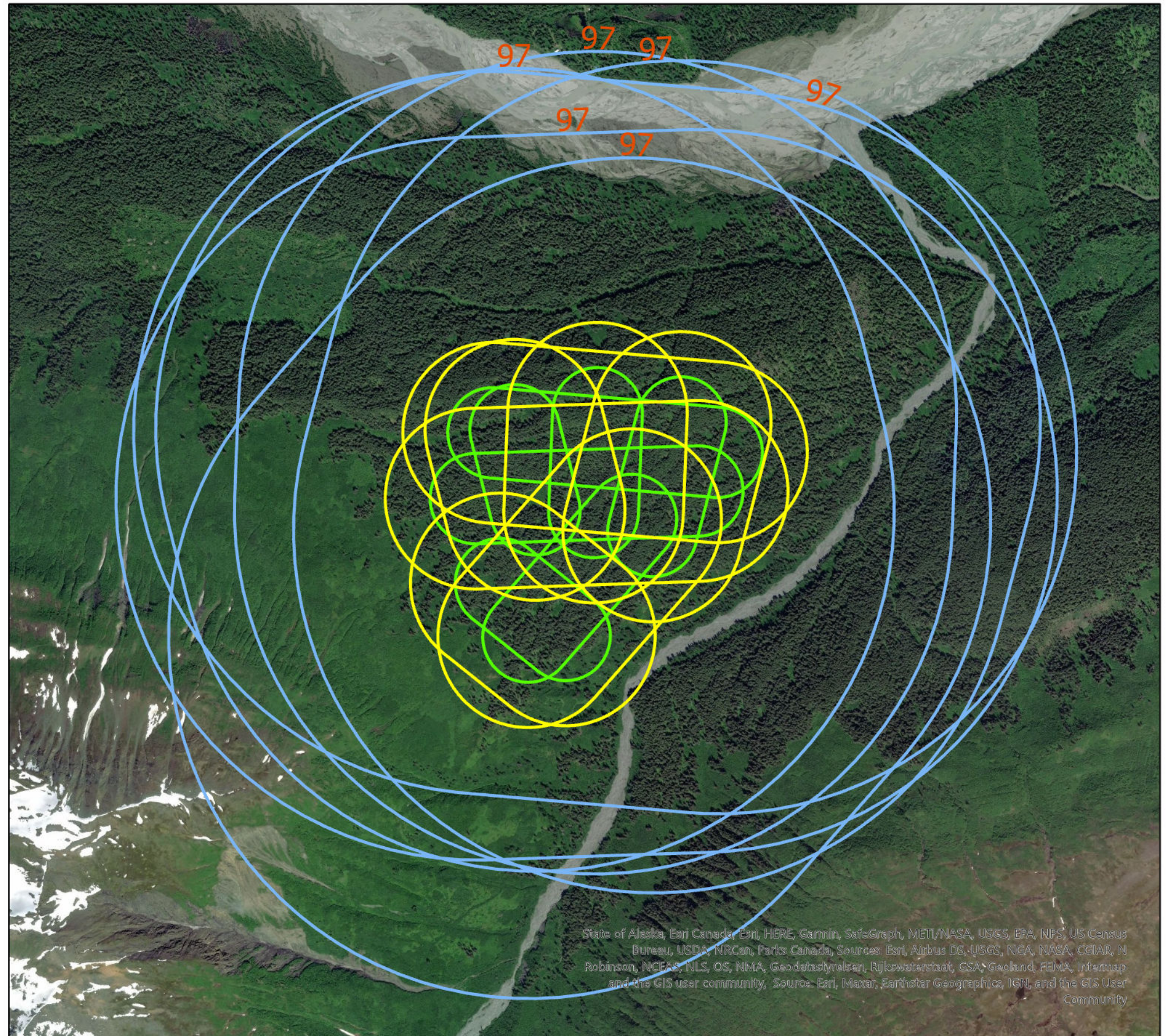
APMA J20195690 AMENDMENT # 1

Seismic Refraction Study (Airblast Attenuation, Worst Case Scenario*)
Peak unweighted dB @ 1' from largest shot end detonation is 157dB sound pressure level

Comparative Noise @ 1' from detonation
Muzzle Braked, Standard .338 Win Mag Hunting Rifle
Peak unweighted 170dB sound pressure level

Legend

-  Plateau_SL 1mi Airblast 97dB
-  Plateau_SL 1320' Airblast 107dB
-  Plateau_SL 660' 112dB



State of Alaska, Esri Canada, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGLAR, N Robinson, NCEAS, NLS, OS, NIMA, Geodatasysteisen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community. Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community





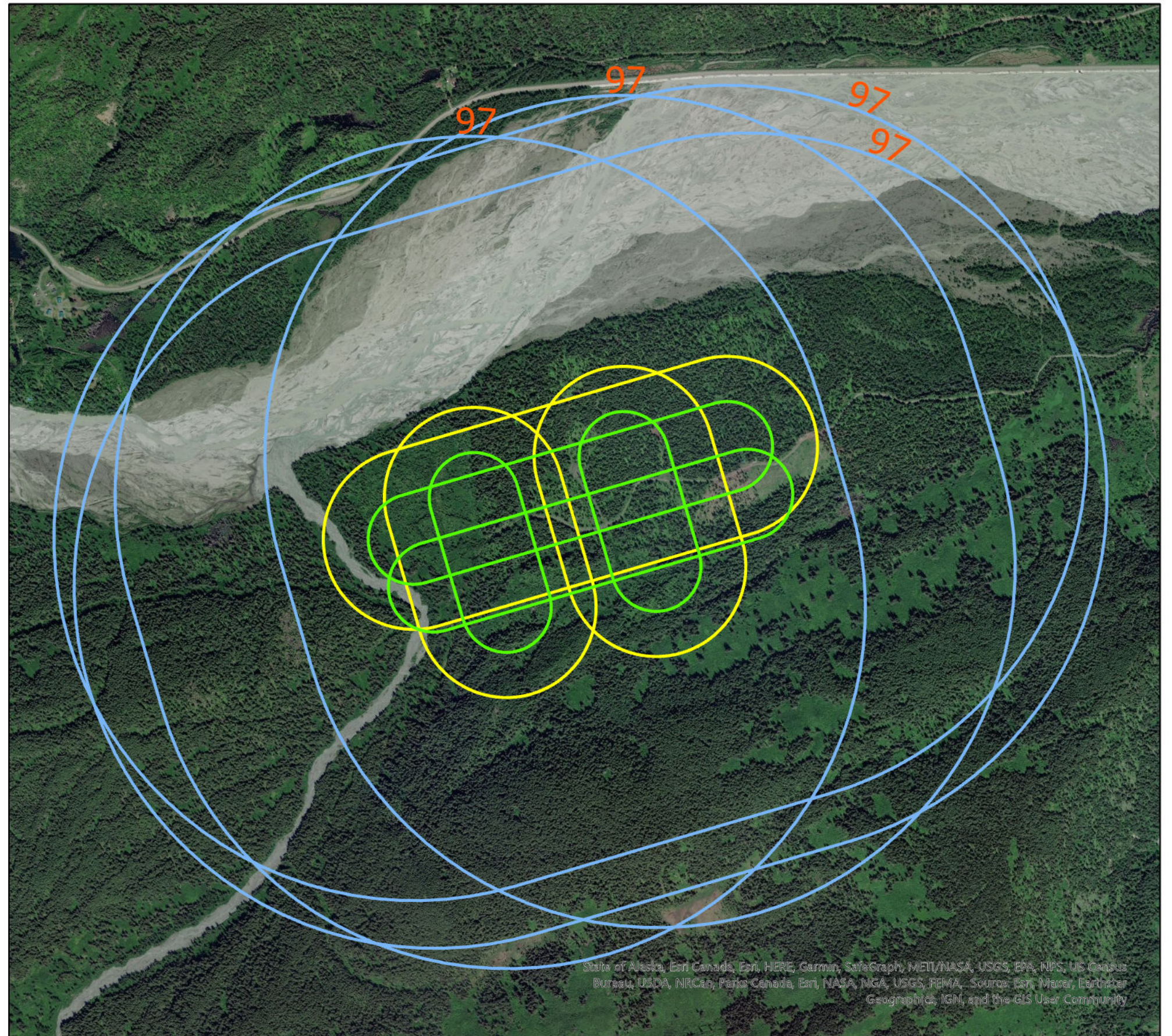
APMA J20195690 AMENDMENT # 1

Seismic Refraction Study (Airblast Attenuation, Worst Case Scenario*)
Peak unweighted dB @ 1' from largest shot end detonation is 157dB sound pressure level

Comparative Noise @ 1' from detonation
Muzzle Braked, Standard .338 Win Mag Hunting Rifle
Peak unweighted 170dB sound pressure level

Legend

-  Klehini_SL 660' Airblast 112db
-  Klehini_SL 1320' Airblast 107dB
-  Klehini_SL 1mi Airblast 97dB



State of Alaska, Esri Canada, Esri, HERE, Garmin, safeGraph, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCAN, Parks Canada, Esri, NASA, MGA, USGS, FEMA, Source: Esri, Maxar, Earthstar Geographics, IGN, and the GIS User Community

