EXHIBIT I
NOISE EMISSIONS AND COMMUNICATION INTERFERENCE

As stated in Arizona Administrative Code R14-3-219:

Describe the anticipated noise emission levels and any interference with communication signals which will emanate from the proposed facilities.

Background and Existing Conditions

Corona discharge from electrical transmission lines generates audible noise, and radio and television interference. Corona is a luminous discharge that emanates from an energized conductor due to ionization of the surrounding air and is caused by a voltage gradient which exceeds the breakdown strength of air. Corona is a function of the voltage gradient at the conductor surface. This voltage gradient is controlled by engineering design and is a function of voltage, phase spacing, conductor diameter, conductor bundle, height of overhead conductors, line geometry, and meteorological conditions. In particular, irregularities on the surface of the conductor such as nicks, scratches, contamination, insects, and water droplets increase the amount of corona discharge. Consequently, during periods of rain and foul weather, corona discharge increases. This corona activity contributes to a small increase in power loss and is the source of transmission line audible noise and radio and television interference. For the various transmission line designs considered for the High-Tech Interconnect Project (HIP or Project), the maximum calculated voltage gradient at the conductor surface is lower than corona inception and extinction levels. Successful operation of 230 kilovolt (kV) transmission lines with similar gradients indicates that the Project would only create modest corona effects.

Noise

Noise is defined as unwanted sound. Sound travels in waves from a specific source and exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB). Zero dB corresponds roughly to the threshold of average human hearing and 120 to 140 dB corresponds to the threshold of pain. Human response to noise is subjective and can vary from person to person. Factors that can influence individual response include intensity, frequency, and time pattern of the noise; the amount of background noise prior to the intruding noise; and the nature of work or human activity that is exposed to the noise. **Table I-1** depicts average decibel levels for everyday sounds.

Table I-1
Common Noise Levels

Type	Description	Decibel Level
Painful	Firearms, air raid siren, jet engine	140 dB
	Jet take-off, amplified rock music at 4-6 feet, car stereo, band practice	120 dB

Table I-1 Common Noise Levels		
Type	**Description**	**Decibel Level**
Extremely Loud	Snowmobile, chain saw, pneumatic drill	100 dB
	Lawnmower, shop tools, truck traffic, subway	90 dB
Very Loud	Alarm clock, busy street	80 dB
	Conversation, dishwasher	60 dB
Moderate	Moderate rainfall	50 dB
	Quiet room	40 dB
Faint	Whisper, quiet library	30 dB
Source: American Speech-Language-Hearing Association 2017		

Audible noise associated with transmission lines as a result of corona discharge is a function of line voltage. The amount of audible noise is directly related to the level of corona activity which in turn is affected by the conductor physical condition, contamination, and meteorological conditions, most notably rain. Transmission line audible noise is characterized by crackling, frying, sputtering, and low frequency tones which are best described as humming sounds. Audible noise from transmission lines primarily occurs during foul weather conditions. Audible noise increases with rain or during dust storms, although it is generally masked by the background noise of rain and wind. In dry or fair-weather conditions, the conductors operate below the corona-inception level and noise is typically only slightly audible at the edge of the transmission line right-of-way (ROW).

For the new RS-28 Substation, transformers are expected to be the main source of audible noise. The predominant noise from a transformer is a hum comprised of sound in the frequency range of 75 hertz (Hz) to 1200 Hz which is within the frequency range of the human ear. The transformer sound level is specified at the time of purchase and the specified sound level is controlled by the design and manufacturing of the transformer. The specifications for a transformer require a design that is in compliance with the sound level limits specified by industry standards, governing regulations, or local ordinances. Disconnect switches and circuit breaker operations create momentary, but very infrequent, noise.

Environmental noise is usually measured in A-weighted decibels (dBA). Environmental noise typically varies over time, and different types of noise descriptors are used to account for this variability. The noise descriptor most commonly used to establish noise exposure guidelines for specific land uses is the day/night average noise level, commonly referred to as DNL. The noise level experienced at a particular site or area depends on the distance between the source and a specific receptor (humans, wildlife, etc.), presence or absence of noise barriers and other shielding features, and the amount of noise reduction provided by the intervening terrain. Some land uses are considered more sensitive to noise levels than others due to the amount of noise exposure and the types of activities typically involved.

Sources of noise in the area of the Project primarily relate to transportation sources, industrial and commercial type developments, and normal residential area noise. Specifically, trains run along the Union Pacific Railroad (UPRR), west of the Schrader Overhead Transition Corridor from which transmission structures would transition from overhead to underground. Additionally, there is local access traffic to subdivisions as well as typical residential noise itself near the Schrader Overhead Transition Corridor. The route on Intel's Ocotillo Campus would primarily have noise from the Intel Ocotillo Campus expansion and operations. The segment from the existing Henshaw Substation to Intel's Ocotillo Campus has vacant land and agriculture on the Gila River Indian Community to the west and existing industrial and commercial operations to the east. Baseline ambient noise levels were estimated using the relationship between population density and noise levels.

The area around the proposed routes and the RS-28 Substation predominantly includes land use that is Residential or Industrial/Commercial. Typical ambient noise levels for these densities range from 50 to 60 dBA.

Sensitive receptors in the immediate area of the proposed routes and the RS-28 Substation include residential subdivisions around the Schrader Overhead Transition Corridor and south of Intel's Ocotillo Campus. However, within the Schrader Overhead Transition Corridor there is the existing Schrader Substation and transmission lines that travel out of the substation; on the west side of the Intel Ocotillo Campus planned expansion facilities is an existing 69 kV transmission line. The non-residential receptors within 1,000 feet of the proposed routes and the RS-28 Substation include the Gila River Medical Center and Desert Palms Presbyterian Church. There are no other sensitive noise receptors located within 1,000 feet of the Project.

Noise impacts associated with the Project would result from construction, operation, and maintenance activities. During construction, equipment used for clearing and grading (substation, access roads, and structure sites), assembly and erection of structures, wire pulling and splicing, and rehabilitation activities would generate noise. This heavy equipment would include cranes, trucks, and tractor graders. **Table I-2** identifies typical construction equipment noise levels.

Table I-2
Typical Construction Equipment Noise Levels

Equipment Type	Noise Level at 50 Feet
Backhoe	85 dB
Front-end loader	85 dB
Concrete truck/mixer	85 dB
Water truck	81 dB
Tractor grader	80 dB
Flat-bed trucks	84 dB
Source: Federal Highway Administration Noise Handbook. August 2006	

Noise from construction activities would be audible, particularly to the closest residents in the subdivision directly adjacent to the Schrader Overhead Transition Corridor and the Sun Lakes community south of Intel's Ocotillo Campus. This construction noise, however, would not be considered a major impact because construction would occur during daytime hours when tolerance to noise is higher and likely to be considered only a nuisance.

Night-time construction would be limited to comply with noise ordinances in the City of Chandler.

During operation, generated noise from transmission lines can best be described as a crackling or hissing sound. Generally, noise is not noticeable on a 230 kV transmission line but may occur during wet-weather conditions such as rain, and possibly during the summer for brief periods after windstorms deposit dust on the line conductors. During maintenance activities, noise could be generated from a vehicle driving along the access roads for structure and line inspection or equipment and crew conducting maintenance or repairs.

Noise from the operation of the proposed RS-28 Substation is generally described as a low hum and also would increase in hot-weather conditions when transformer cooling fans and pumps are more likely to be in operation.

Intel has an internal policy of limiting the sound levels generated by the Ocotillo Campus to 55 dBA during the day and 45 dBA at night as measured from the property boundary with adjacent residences. The Salt River Project Agricultural Improvement and Power District (SRP) RS-28 Substation equipment would generate sound as part of the broader operations on the Intel Ocotillo Campus. SRP has provided the noise limitations on its transformers, substation configuration, and block wall specification to Intel as inputs to the overall sound study for the Ocotillo Campus. Intel would configure the site to meet their target sound limits, incorporating SRP's transmission line and substation assets.

Communication Interference

High voltage transmission line radio frequency noise is not expected to be noticeable outside the immediate vicinity of the transmission lines. Radio interference is most likely to affect the amplitude modulation (AM) broadcast band; frequency modulation (FM) radio is rarely affected by transmission lines. Only AM receivers located immediately adjacent to the transmission line have the potential to be affected by radio interference, and the effect may only be significant during rainy weather.

The radiated noise field intensity diminishes with increasing frequency. At frequencies above 30 megaHertz, the radiated noise field intensity is so low it is difficult to detect. Therefore, FM radio reception and cellular telephone communication are above the frequency range where radio interference has been experienced with previous projects, and no objectionable interference is expected with any of the Project components. At the frequency range of FM radio or above, any rare instance of interference would generally be due to microsparks, which can be identified and corrected.

SRP utilizes field intensity instrumentation capable of measuring radiated noise and interference from 150 kiloHertz up to 1 gigaHertz. These instruments are used for investigating reports of unusual relatively high transmission line noise, as well as for compiling ambient noise level data.

Radio interference is expected to be minimal, due to predominately industrial, commercial, office and suburban character of the area along the Project and the proposed ROW widths for the Project. Furthermore, SRP is ready to address radio interference resulting from construction and operation of the transmission line with corrective measures such as smoothing nicks on the conductor surface or tightening hardware, which can be implemented to eliminate radio interference complaints. In addition to any transmission repairs, relevant corrective actions may include adjusting or modifying receivers; adjusting, repairing, replacing, or adding antennas; antenna signal amplifiers; filters or lead-in cables; or other corrective actions. Based on the design parameters and physical configuration of the proposed facilities for the Project, no objectionable noise and interference with radio signals is anticipated.

References

American Speech-Language-Hearing Association, Noise, 2017, accessed 8/16/2019. [Online] Located at: http://www.asha.org/uploadedFiles/AIS-Noise.pdf

Federal Highway Administration Noise Handbook. August 2006 [Online], accessed 8/6/2019. Located at : http://www.nrc.gov/docs.pdf

Occupational Safety and Health Administration, Occupational Noise Exposure. Accessed 8/16/19. [Online] Located at: https://www.osha.gov/SLTC/noisehearingconservation/