

Noise

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Noise

This section describes existing noise conditions, major noise sources, and the regulatory framework related to noise levels in Ventura. It is essential for the City to identify the community's primary noise sources, and areas with high noise levels, to plan for new noise-sensitive uses in quieter areas or require that project applicants take appropriate measures to reduce exposure to ambient noise.

Key issue areas discussed in this section include:

- Traffic, particularly from U.S. 101, SR 126, and SR 33, and major arterials, is the most prevalent noise source in the city.*
- Activities at the Ventura County Fairgrounds continue to be a source of noise complaints from some city residents.*
- The City may wish to consider updating its noise/land use compatibility criteria to be consistent with the most recently published OPR guidance in terms of acceptable and unacceptable exterior noise limits for different land uses.*

Noise Background

Noise is defined as loud, unpleasant, unexpected, or undesired sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level. The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the "A-weighted" levels of those sounds. Therefore, the A-weighted noise scale is used for measurements and standards involving the human perception of noise.

Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. A 10 dB increase represents a 10-fold increase in sound intensity, a 20 dB change represents a 100-fold difference, a 30 dB change represents a 1,000-fold difference, etc. Thus, a doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB, and a halving of the energy would result in a 3 dB decrease.

In addition to the actual instantaneous measurement of sound levels, the duration of sound is important because sounds that occur over a long period of time are more likely to be a nuisance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (L_{eq}). The L_{eq} is essentially the average noise level over a period of time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest RMS

(root mean squared) sound pressure level within the measuring period, and L_{\min} is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important because noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using the Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a 10-dB(A) penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.), or the Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5-dB(A) penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a 10-dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. Noise levels described by L_{dn} and CNEL usually do not differ by more than 1 dB.

Human perception of noise has no simple correlation with acoustical energy. The perception of noise is not linear in terms of dB(A) or in terms of acoustical energy. Two equivalent noise sources do not sound twice as loud as one source. It is widely accepted that the average healthy ear can barely perceive increases or decreases of 3 dB(A); that a change of 5 dB(A) is readily perceptible; and that an increase (decrease) of 10 dB(A) sounds twice (half) as loud (Caltrans 2013).

Vibration Background

Groundborne vibration consists of the oscillatory waves that move from a source through the ground to adjacent structures. It is typically measured in peak particle velocity (ppv) or vibration decibels (VdB). Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise (Federal Transit Administration 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses. Vibration significance ranges from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, the general threshold where minor damage can occur in fragile buildings (Federal Transit Administration 2018). The general human response to different levels of groundborne vibration velocity levels is described in Table 1.

Table 1: Human Response to Different Levels of Groundborne Vibration

Vibration Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception for many people
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible – many people find that transportation-related vibration at this level is unacceptable
85 VdB	Vibration acceptable only if there are an infrequent number of events per day
	VdB = vibration decibels <i>Sources: Federal Transit Administration 2018.</i>

Policy and Regulatory Context

California Code of Regulations

Interior noise levels for habitable rooms and non-residential space are regulated by Title 24 of the California Code of Regulations (CCR). Title 24, Part 2 (2019 California Building Code), Chapter 12, Section 1206.4 requires that interior noise levels attributable to exterior sources not exceed 45 CNEL in any habitable room within a residential structure. A habitable room is a room used for living, sleeping, eating, or cooking. Bathrooms, closets, hallways, utility spaces, and similar areas are not considered habitable rooms under this regulation. Title 24, Part 11 (2019 California Green Building Standards Code), Chapter 5, Section 5.507.4.2 requires that interior noise levels attributable to exterior sources not exceed 50 dBA Leq[1h] in occupied areas of non-residential spaces during any hour of operation when exposed to noise levels of 65 dBA Leq[1h] during any hour of operation or located within the 65 CNEL noise contour of an airport, freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

City of Ventura General Plan

California Government Code Section 65302(f) requires all General Plans to include a Noise Element that addresses noise-related impacts in the community. The 2005 Ventura General Plan discusses issues related to noise in the chapter, "Our Healthy and Safe Community" and includes Policy 7E: Minimize the harmful effects of noise. The policy includes actions to require acoustical analysis and noise reduction techniques for potential residential development exposed to excessive noise or in commercial and industrial areas; construct sound walls and use sound reducing paving materials; request termination of auto racing and limits on concert noise at the County fairgrounds; and update the Noise Ordinance to restrict noise generating activities like leaf blowers and trash collection, and provide standards for residential development in commercial and industrial districts.

The current Noise Element includes noise/land use compatibility guidelines, which are used when the City makes environmental and development decisions in order to identify and avoid noise/land use conflicts to the greatest extent practicable (see Table 2). These criteria identify the ambient noise levels that are considered normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable for a variety of land uses. For example, ambient noise levels up to 60 CNEL are considered normally acceptable for single-family residential land uses.

Table 2: Acceptable Noise Levels/Land Use Compatibility Guidelines

Land Use Category	Community Noise Exposure Ldn or CNEL, dBA			
	Normally Acceptable ¹	Conditionally Acceptable ²	Normally Unacceptable ³	Clearly Unacceptable ⁴
Residential - Low-Density Single-Family, Duplex, Mobile Homes	< 60	55-70	70-75	75-80
Residential – Multi-Family	< 65	60-70	70-75	75-80
Transient Lodging - Motels, Hotels	< 65	60-70	70-80	N/A
Schools, Libraries, Churches, Hospitals, Nursing Homes	< 65	60-70	70-80	N/A
Auditoriums, Concert Halls, Amphitheaters	N/A	<70	65-80	N/A
Sports Arena, Outdoor Spectator Sports	N/A	<75	70-80	N/A
Playgrounds, Neighborhood Parks	<70	N/A	67.6-75	72.5-80
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<75	N/A	70-80	N/A
Office Buildings, Business, Commercial and Professional	<70	67.5-77.5	75-80	N/A
Industrial, Manufacturing, Utilities, Agriculture	<75	70-80	N/A	N/A
<p>N/A = Not available</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. Normally Acceptable = Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements. 2. Conditionally Acceptable = New construction or development should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features included in design. Conventional construction, but with closed windows and fresh air supply or air conditioning, will normally suffice. 3. Normally Unacceptable = New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in design. 4. Clearly Unacceptable = New construction or development should generally not be undertaken. <p>Sources: City of Ventura 2005.</p>				

City of Ventura Municipal Code

The City of Ventura Noise Ordinance (Municipal Code §10.650) prohibits unnecessary, excessive, or annoying noise in the city. The Ordinance does not control traffic noise but applies to all noise sources located on private property including traffic noise. As part of this ordinance, properties within the city are assigned a noise zone based on their corresponding land use. "Noise-sensitive" properties are designated as Noise Zone I; residential properties are designated Noise Zone II; commercial properties are included in Noise Zone III, and industrial/agricultural districts are designated as Noise Zone IV. The Ordinance also limits the amount of noise generated by uses during normal operation that may affect the surrounding areas. Table 3 shows the allowable noise levels and corresponding times of day for each of the identified noise zones.

Table 3: Exterior Noise Levels

Time Period	Zone I	Zone II	Zone III	Zone IV
7 A.M. to 10 P.M.	50 dBA	50 dBA	60 dBA	70 dBA
10 P.M. to 7 A.M.	45 dBA	45 dBA	55 dBA	70 dBA
Sources: City of Ventura Municipal Code §10.650.130B				

The noise standards shown in Table 3 apply to any noise-generating activity that exceeds the applicable level for a cumulative period of more than 30 minutes in any hour. For noise levels that last less than 30 minutes, the following standards apply: maximum noise levels equal to the value of the noise standard plus 5 dBA for a cumulative period of no more than 15 minutes in any hour, 10 dBA for a cumulative period of no more than 5 minutes in any hour, 15 dBA for a cumulative period of no more than 1 minute in any hour, or 20 dBA for any period of time. If the ambient sound level exceeds the allowable exterior standard, the ambient levels become the standard.

The following noise standards for interior noise levels apply for all multifamily residential units within Zones I or II. Daytime (7 a.m.–10 p.m.) noise levels shall not exceed 45 dBA and nighttime (10pm-7am) shall not exceed 40 dBA (Section 10.650.130 C.1).

Section 10.650.150D of the Ordinance exempts construction activities from the above standards, provided that they are conducted between 7 a.m. and 8 p.m. Construction activity is permitted between the hours of 8 p.m. and 7 a.m., provided that the noise levels do not exceed the standards specified in Table 3.

The Municipal Code does not include vibration level limits but does include the following performance standard for uses permitted in industrial zones that may impact residential uses or zones: "Any objectionable continuous or periodic vibration resulting from any industrial zone use shall not be noticeable at the property line" (Section 24.470.030).

Emerging Trends

Noise Reduction Technology

For new building construction, interior noise from exterior sources continues to improve as building standards provide more stringent requirements for building assemblies, windows, doors, and insulation. For example, the California Green Building Standards Code continues to advance sound insulation requirements for building envelopes and exterior windows near noise sources like highways, and airports, or where ambient noise is excessive. Moreover, the California Green Building Standards increasingly stringent building insulation requirements to improve energy conservation provide co-benefits to interior noise reduction. In general, technological advancements like quiet pavement, tires with low rolling resistance, quieter motors and exhaust systems, and electric trains, cars, and buses are also reducing noise at the source. As these technologies become more widely adopted over time, they will continue to improve the ambient noise environment.

Existing Conditions

Noise Sources

Major sources of noise in Ventura include motor vehicles; railroad operations; commercial, agricultural and industrial activity; recreational activities associated with the Ventura County Fairgrounds; and intermittent nuisances like construction and amplified noise. The most widespread and predominant noise source is traffic noise from motor vehicles driving along roadways. Traffic noise is of concern because it is characterized by a high number of individual events, which often create a sustained noise level.

Traffic Noise

Traffic noise is the primary noise source in Ventura. The highest noise levels occur along high traffic volume roadways, including freeways, highways, and arterials. These roadways in Ventura include U.S. 101, SR 126, and SR 33; and major streets such as Victoria Avenue, Main Street, Telephone Road, and Telegraph Road.

Railway Noise

Railway operations are predominantly a localized source of noise along railroad corridors. The Union Pacific Railroad (UPRR) operates one rail line through the city. The UPRR corridor runs parallel to Highway 101 crossing over the highway in the northern portion of the city. Train pass-bys can be disturbing to nearby receivers, particularly at night. Trains also generate ground-borne vibration and noise, which varies depending on the type of train, weight of load haulage, track conditions, and other factors. The railroad runs through and adjacent to residential neighborhoods in the city, which results in the potential for noise/land use compatibility conflicts with new and existing residential development, especially if railroad operations increase in the future.

Rail transit service is provided by Metrolink and AMTRAK (Ventura County Transportation Commission n.d.). Metrolink provides rail service between Ventura and Union Station in Los Angeles on the Ventura County line. Presently, three trains in both the daytime and evening operate the entire length of the route between Ventura and Union Station. Rail service is also provided by AMTRAK via the Pacific Surfliner,

which runs between San Luis Obispo to the north and San Diego to the south, and the Coast Starlight, which runs between Seattle to the north and Los Angeles to the south. The Pacific Surfliner operates twelve daily round trips and the Coast Starlight operates once daily service.

Commercial, Agricultural, and Industrial Activities

Commercial and industrial activities can produce noise from heavy traffic, deliveries, and machinery. While industrial activity primarily occurs along Ventura Avenue and along the southside of U.S. 101 between Arundell Avenue and Victoria Avenue, commercial activity occurs throughout the city, particularly along major roadways. Industrial and service commercial uses typically generate the highest levels of stationary noise from heating, ventilation, and air conditioning (HVAC) systems, loading docks, and machinery, all potentially on a continual basis depending on the nature of the activity. Operation of retail and restaurants also generate noise from people conversing and engaging in outdoor activities (e.g. crowds) and amplified music. Many commercial and industrial areas are not located near noise-sensitive residential areas. However, this is a concern where retail/restaurant uses and residential uses are collocated, such as in Downtown Ventura and the Midtown area, along East Main Street. Temporary street closures to allow for outdoor restaurant uses due to the COVID-19 pandemic could be a source of noise complaints from residential uses near the outdoor restaurants or from residential uses on roadways where traffic is diverted, if the closures continue for a long period of time or are made permanent. Potential noise concerns can also arise when new mixed-use developments (such as live-work developments that collocate residential uses with commercial, office, or light industrial uses) are proposed.

Agricultural operations produce noise associated with equipment such as diesel engines, aerial application aircrafts (crop dusters), bird frightening devices, and tractors. Many of these noise sources are related to seasonal operations. Agricultural areas are primarily located in the southern and eastern areas of the city.

Recreational Activities

Certain recreational activities that occur in the city may be considered substantial noise generators. Noise-generating events occur periodically but may produce high levels of noise that are audible at nearby locations. Activities at the Ventura County Fairgrounds continue to be a source of noise complaints from some city residents. The Ventura County Fairgrounds holds events, such as music concerts, fireworks, and other events that create noise audible to residential areas. The fairgrounds also host the Ventura Raceway, which hosts auto races generally on Saturday nights.

Another intermittent source of recreational noise is the Grant Park Shooting Range. This facility was closed to the public in 2006 but continues to be used intermittently by the Ventura Police Department.

Construction Noise

Construction activity typically generates substantial short-term increases in ambient noise levels in the immediate vicinity of construction sites, which can be disruptive to nearby noise-sensitive receivers. Each phase of demolition and construction has its own noise characteristics; some will generate higher continuous noise levels than others, and some may generate substantial intermittent noise levels from high-impact activities (e.g., pile driving) depending on the type and number of equipment used. Noise impacts from construction are typically limited to an approximately 200-foot radius around the construction site.

Amplified Noise

Amplified noise is noise that is increased in volume using sound amplifying devices, such as radios, televisions, loudspeakers, stereos, megaphones, and public address systems. Amplified noise is typically associated with social gatherings in residential areas and large events held in public spaces such as parks, restaurants, the beach, and music/event venues. The frequency of events that produce amplified noise levels typically increases during the summer months due to increased use of the beach for large vents such as festivals. Amplified noise is also associated with the use of speaker systems at schools, drive-through restaurants, the Ventura County Fairgrounds, and at outdoor music festivals held multiple times annually at various locations, as well as day-to-day activities of residents who use radios, televisions, and stereos in their residences for entertainment. Amplified noise levels can range from approximately 65 dBA L_{max} at 30 feet for drive-through restaurant speakers to approximately 90 to 100 dBA at outdoor festivals (Illingworth & Rodkin, Inc. 2010; Alpine Hearing Protection 2017).

Vibration Sources

Typical vibration sources the Ventura include construction activities and railroad operations. Railroad tracks run through and adjacent to residential neighborhoods in the city, which can result in land use conflicts, including human annoyance and structural damage due to transient vibration, especially if railroad operations increase in the future. Construction vibration is associated with specific vibratory equipment, like vibratory rollers, impact-driven equipment, like pile drivers, and equipment carrying heavy loads, like large, burdened heavy duty trucks. Vibration is also generated by heavy manufacturing, but no heavy manufacturing activities that would be expected to generate substantial levels of vibration currently occur in the city.

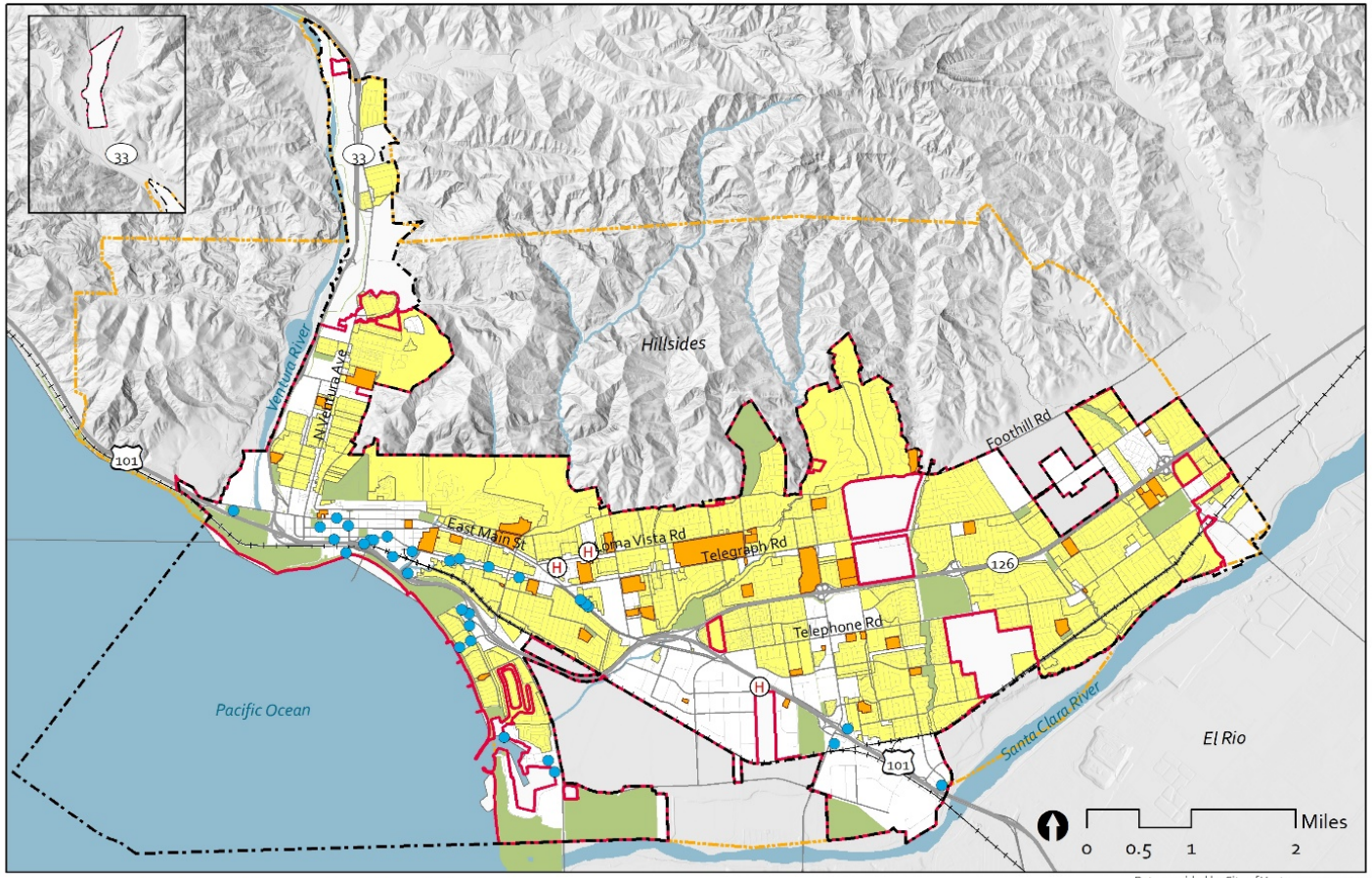
Existing Noise Conditions

In order to help characterize existing noise conditions in Ventura, noise measurements will be taken in various locations throughout the city after the pandemic closures are over.

Noise-sensitive Land Uses

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each of these uses. The existing General Plan defines noise-sensitive land uses as residential uses, hotels, schools, and hospitals. The general locations of noise-sensitive land uses in Ventura are shown in Figure 1.

Figure 1: Noise-Sensitive Land Uses in Ventura



Data provided by City of Ventura, 2019, 2020.

Noise-Sensitive Land Uses in the City of Ventura

Ventura City Limits	Railroad	Noise-Sensitive Land Uses
Sphere of Influence	Roadway	Residential
Planning Boundary		School
Green/Open Space		Hospital
		Hotel



Issues and Opportunities

The following list identifies issues and opportunities related to noise that can be addressed in the General Plan update:

- The current Noise Element does not include definitions of vibration-sensitive receivers. The City could add definitions as well as any necessary California Building Code references and requirements to provide clarity in the application of vibration standards.
- The current Noise Element and Municipal Code do not include specific noise level limits on construction noise, which limits the City's ability to regulate construction noise and to evaluate the significance of construction noise impacts under the California Environmental Quality Act. The City could add best management practices and provide standards that can be used to monitor, regulate and enforce construction noise activities. For example, the City may consider adopting the criteria recommended by the Federal Transit Administration, which provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. These criteria include daytime noise thresholds of 80 dBA Leq for residential land uses, 85 dBA Leq for commercial land uses, and 90 dBA Leq for industrial land uses for an 8-hour period (Federal Transit Administration 2018, Table 7-3).
- Since publication of the current Noise Element, the Office of Planning and Research has updated its recommended noise/land use compatibility criteria to consolidate some land use categories and provide more flexibility in the criteria for certain land uses. The City may wish to consider updating its noise/land use compatibility criteria to be consistent with the most recently published OPR guidance.
- The City may consider adding policies related to mitigating noise and vibration associated with railroad operations, including policies to require additional noise insulation and vibration reducing features for new residential development along railroad corridors in compliance with City and state building codes, and to collaborate with the Ventura County Transportation Commission to encourage implementation of vibration-reducing measures, such as slower speed limits on trains through residential areas and routine maintenance of wheel and rail surfaces.
- The current Noise Element does not specify the magnitude of a noise level increase from mobile sources that would be considered significant under the California Environmental Quality Act (CEQA), which limits the City's ability to consistently evaluate mobile noise sources. The City may wish to consider establishing standards for evaluating impacts to roadway noise levels. For example, the City may consider adopting thresholds of a 5-dBA increase (a readily perceptible increase) in areas where existing and future ambient noise levels are within the clearly acceptable or normally acceptable ranges and a 3-dBA increase (a barely perceptible increase) in areas where existing or future ambient noise levels are within the normally unacceptable or clearly unacceptable ranges (see Table 2).

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