

TECH TIP

Non-Residential Population Estimate Methodologies

Did you know the Nevada Chemical Accident Prevention Program (CAPP) requires population estimates calculated for the Hazard Assessment to include the following when located within the circle of concern?

- Institutions, such as schools, hospitals, prisons, parks and recreational areas.
- Major commercial, office, and industrial buildings.

Even when there is no residential population within the circle of concern, this non-residential population must still be estimated and reported. Interestingly enough, there is no established, or widely used, methodology to estimate population in these non-residential

areas. A general internet search will reveal many studies and academic papers on the subject but provide no solid solution. Several studies state more research would need to be done to even establish a viable method for calculating non-residential population. So, what do facilities have to do to stay compliant with the Nevada regulations?

How do I estimate the non-residential population?

While collaborating with a few individuals to tackle the issue, a few methodologies emerged which could be substantiated enough to stand on their own. While simplistic, they attempt to use a reliable data source, maintain simple calculations, and provide a reasonable, if not conservative, estimate that is substantiated by the calculations.

One method is to find the area of concern, expressed in square miles, and determine what percentage that area makes up of the City boundary. Then, use the total city population to calculate that same percentage of the overall population. It may be important to also include notes or explanation about residential vs. industrial areas population fluctuations during daytime business hours vs. at night. Additional data may be available at the [Census Bureau Data](#) website, depending on what assumptions are being made. While simplistic, it is a reasonable methodology, and the information is readily available on the internet. One challenging aspect of this method is supporting assumptions used and documenting where resource data was found.



TECH TIP



Another method is to estimate the staff size of the neighboring building based on square footage. According to [How Much Office Space Do We Need Per Employee? \[2023\]: OSHA Office Space Requirements Per Person - Zippia](#), “The average office size in the US is between 150-175 square feet per employee.” In rural areas, it may make more sense to estimate this way if there are only a few neighbors. Benefits of this methodology include that it can also be used to estimate the average occupancy of residences when there are a few unaccounted houses in the area. Challenges with this methodology occur when estimating densely populated areas and when additional considerations are required.

Lastly, a methodology utilizing the on-site, full-time employee count could be applied. By calculating the ratio of full-time employees to the square footage of the facility space, that same ratio may be applied to other buildings in the area to estimate commercial building population. The benefits include data that is readily available and the ease of calculation. A challenging aspect when utilizing this method includes calculating the affected square footage of other buildings and adding up piecemeal population estimates.

Summary

No matter what methodology is chosen, whether it be one of those above, or another formulated to provide the results needed, the following are a few items to remain vigilant about.

- Keep calculations simple. With no standard methodology, there is also no need to overcomplicate the analysis.
- Back up the data and assumptions used. Make sure data is acquired by supportable, reliable sources and ensure assumptions are reasonable.
- Obtain Feedback. Make sure there’s a review or feedback on the methodology and assumptions before completing the calculations. Different perspectives matter.
- Remember the regulation only requires major commercial, office, and industrial buildings. Smaller properties and unoccupied lots should not be included and can be justifiably omitted from the calculations.



www.RMPCorp.com
(949) 282-0123
Find us on [LinkedIn](#)

About the Author:

Ms. Smith is a Principal Engineer and has been with Risk Management Professionals for over 11 years. She is involved in a variety of activities associated with CalARP, NDEP CAPP, EPA RMP, and OSHA PSM compliance programs. She specializes in ammonia refrigeration, power generation, agriculture, water / wastewater treatment, and manufacturing industries. She is an active member in committees for both RETA and IIAR. Connect with Stephanie on [LinkedIn](#).

