Assessment of Spatial Pattern of Community Noise Pollution for Grand Trunk (G.T) Road Section, Peshawar Pakistan

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Abstract:- Most of the pollution which when decomposed in environment could not give us same healthy environment back as before. Since 1980 World Health Organization (WHO) has considered noise pollution a major problem for public and published several research articles, standards and guide lines. Grand Trunk road section from Kharkhany site to Aman Chowk of district Peshawar has been selected for spatial assessment. The road works as back bone for district Peshawar and for mapping five noise risk sites along with laterals has been contoured for community noise pollution by using ArcGIS Software. The maps of noise levels show the clear pic of current noise situation of the study area.

Keywords:- Community Noise, Noise Levels Spatial Pattern.

I. INTRODUCTION

Mechanical vibration results in production of sound. These vibrations are taken away from generator in form of sound waves. By (L.Davis and A.Cornwell 2006) sound pattern of noise may be explained in steady or continuous, intermittent and impact or impulse flow. In sound wave characteristics the distance between pressure peak as successive crust is called wavelength. As sound waves starts generating when flow of waves starts at cycle, So the number of wavelength that appears to specific section in 1sec of time is known as frequency of the wave The peak of the wave is called amplitude which represents peak intensity as well. This cycle of wave in specific time can be expressed in units of Hz (Hertz) or (1Cp=1Hz). A sound of 100 Hz mean it will cover 100 sound cycle per second. Another term used to describe human recognition of sound are loudness and pitch. Firstly, loudness is known as the high intensity of sound and is related to several factors like amplitude, wavelength, frequency and pitch. On the other side pitch is perceptual function of the frequency of wave that produce it. A shrill whistle will have high pitched sound and have high frequency as compare to other common man sound which have low frequency and low pitch. The expression of magnitude or sound pressure when expressed in decibels are sound pressure level (SPL). (A.Nathanson and A.Schneider 2017).

II. LITERATURE REVIEW

Mankind's activities either industrial, commercial, transportation and recreational all have consequences of noise pollution. Over population, ill managed urbanization and technological enhancements have triggered that generation of noise in developing countries. (Schwela 2017).

Geographic Information System (GIS) was used for Nairobi, Kenya (Wawa and Mulaku 2015), which is most advance tool in mapping of noise pollution. A study was done by using hand held sound level meter with GPS to know coordinates of that location. Leq was recorded in data sheets. The data of traffic intensity was obtained by Japan International Cooperation Agency (JICA) and government of the Republic of Kenya. The data of building was also obtained so that to achieved 2d noise modeling within short interval of time. The Rawalpindi city is for the largest city in Pakistan and is divide in two tehsils i.e. Potohar southern region and Rawal northern region. The study of Rawalpindi regarding noise pollution was done in 2013 (Kalim, Aslam and Masood 2014).The methodology was the usage of Sound level meter type 2240, Bruel and Kjarr,Denmark for measurements. The measurements survey was done at different times a day i.e. (10am -3pm) for three months.

III. METHODS

Initially section was divided for most critical location by concerning noise generating factors like offices, educational institutes, hospitals, commercial markets and traffic density pattern. For which station was chosen 1. Malik Taj market 2. Board canal road 3. University of Peshawar (UOP) 4. Spin jumat chowk 5. Aman chowk towards Saddar. These all stations were located as riskier zones regarding noise pollution for the study area section.

For noise data collection instrument Sound Level Meter (IEC651 type2, ANSI 1.4 type2) was used to collect noise data in decibels (dB) for one week. The instrument was pre calibrated and having a foam on top to record the avoid any dispersion of frequency. For the protocol of data collection, a simple approach of instrument keeping 130 cm above the

ground was used with having laptop on the other hand to record data in decibels. One data has been recorded it being shifted to laptop for excel sheets.

For the frequency the data collection was done for these five station on weekly basis. Along with this one day laterals to these five station recording was also done. The day for recording was divided in 5 peak and non-peak hours i.e. (8am to 9am), (1pm to 3pm), (5pm to 6pm) was named as peak hours' timings and (11pm to 1pm), (8 to 9pm) was named as

non-peak hour timings. These timings were mainly divided according to public activities in study area. The data was collected in 20 intervals for main station having a gap of 30 seconds for interval which makes it 10 minutes reading for each peak and non-peak hours. On the other side for laterals stations the 20 interval was kept with gap of 15 seconds to make 5 minutes reading each. This 5 minutes reading was taken twice for each peak and non-peak hours. From these five locations one station graph has been shown weekly along with laterals which shows the behavior briefly.
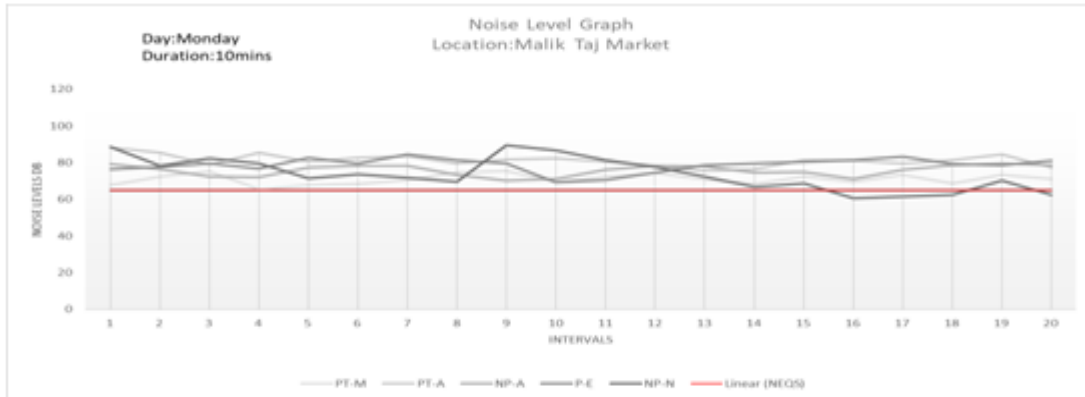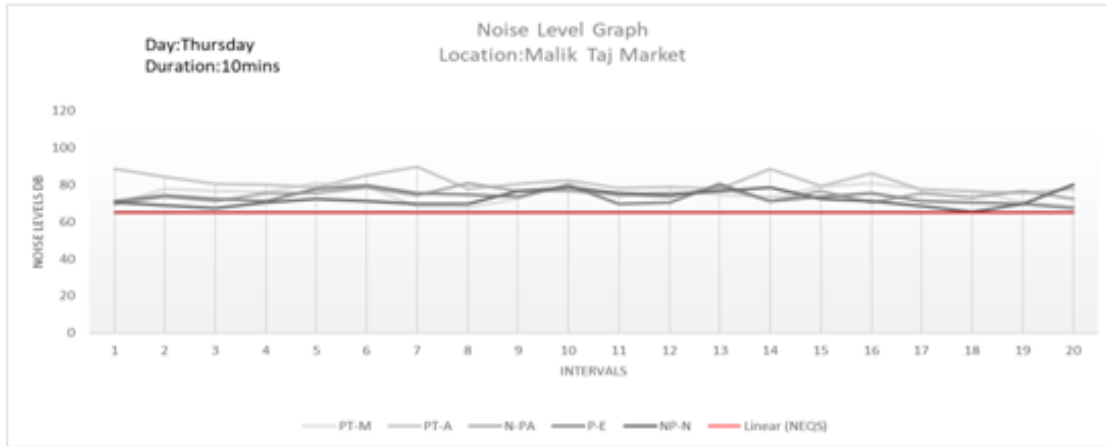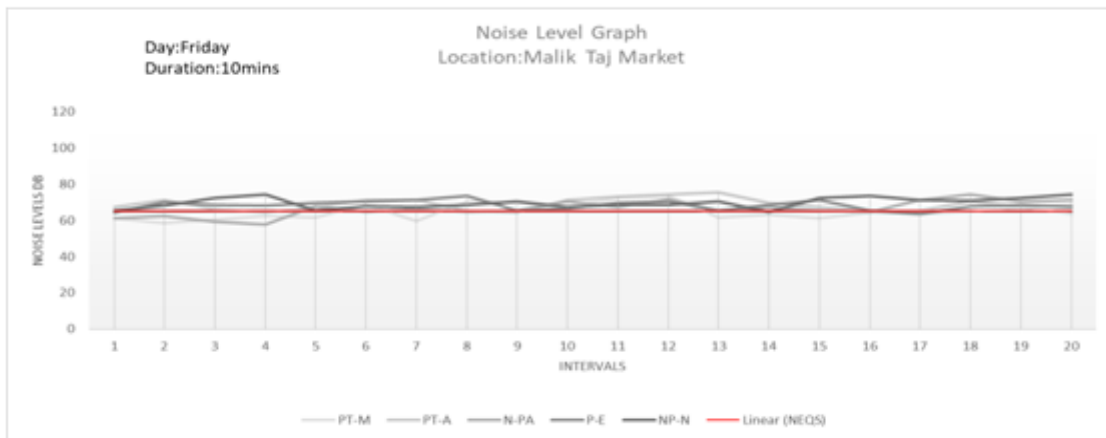

Monday
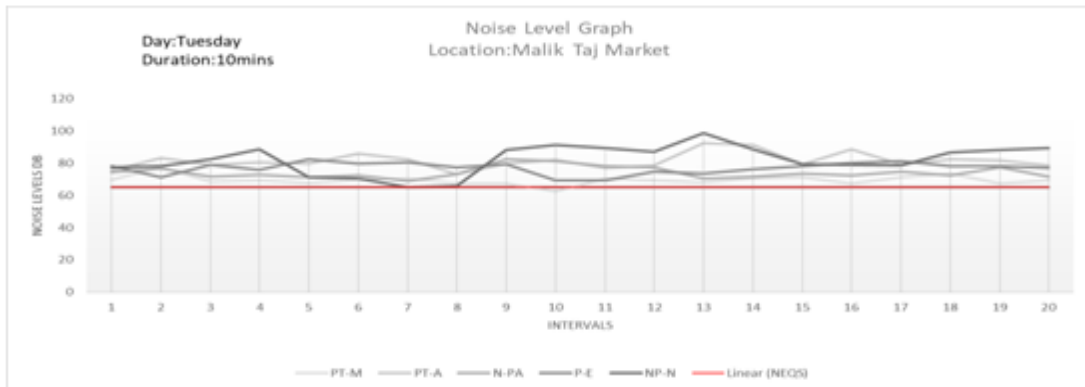
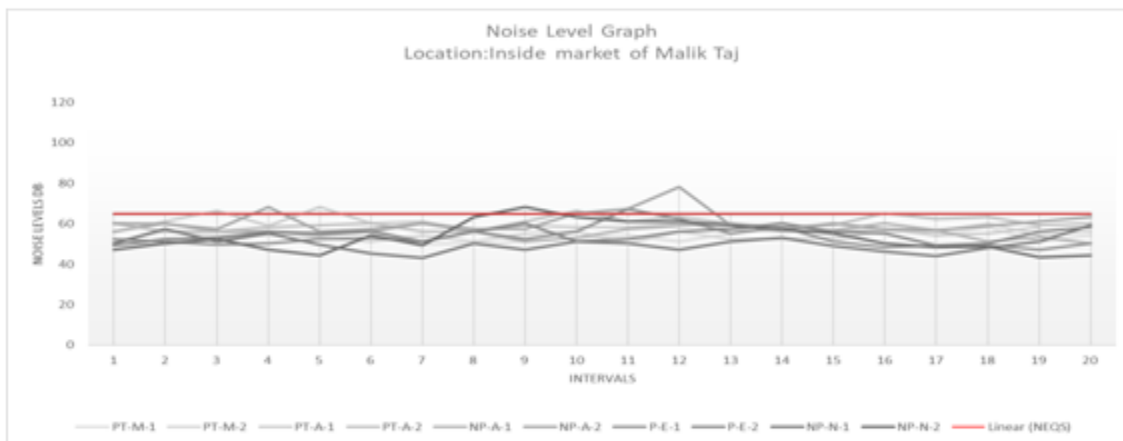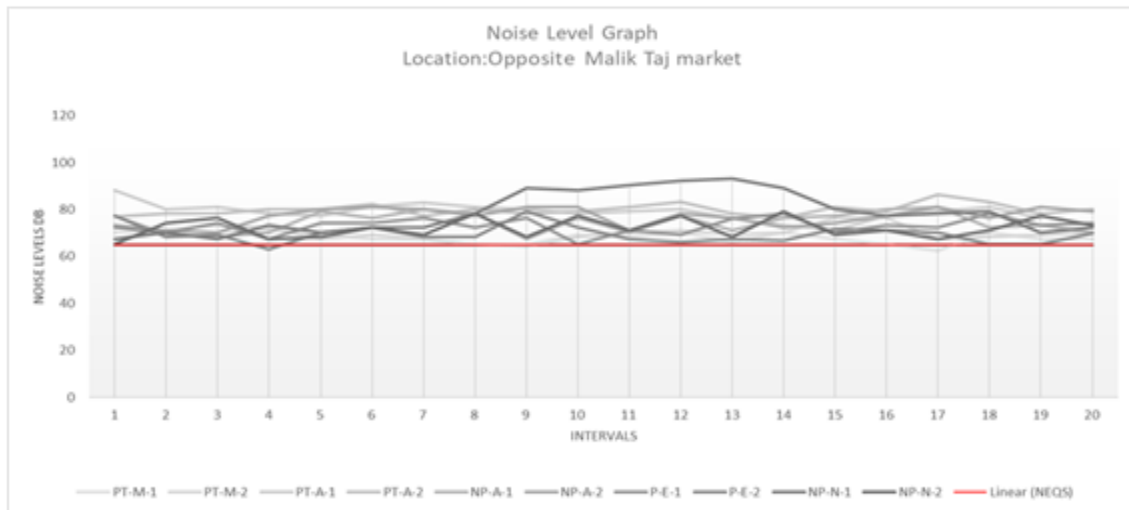
Tuesday
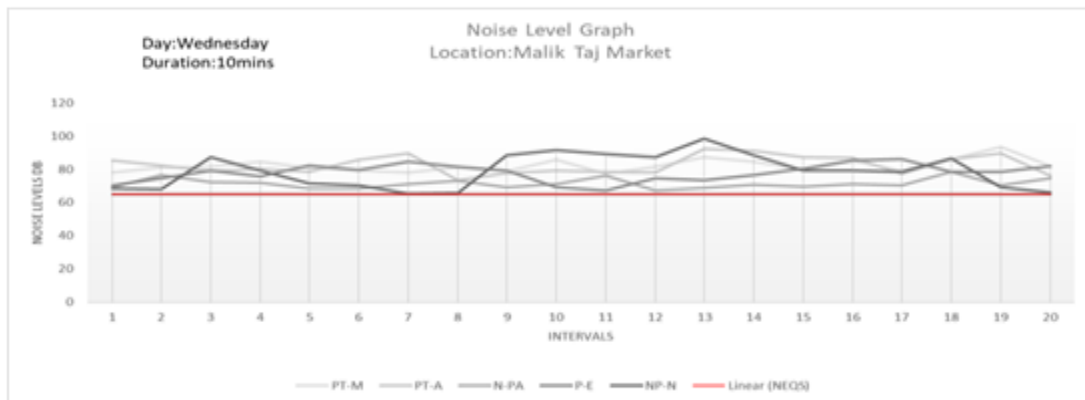
Wednesday

Thursday

Friday

Fig 1:- Malik Taj market

Inside market of Malik Taj

Opposite Malik Taj market
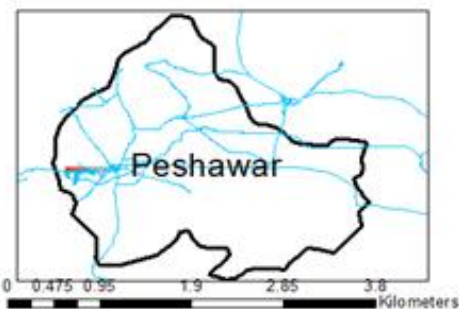
Fig 2:- Perpendicular/Normal to Malik Taj market
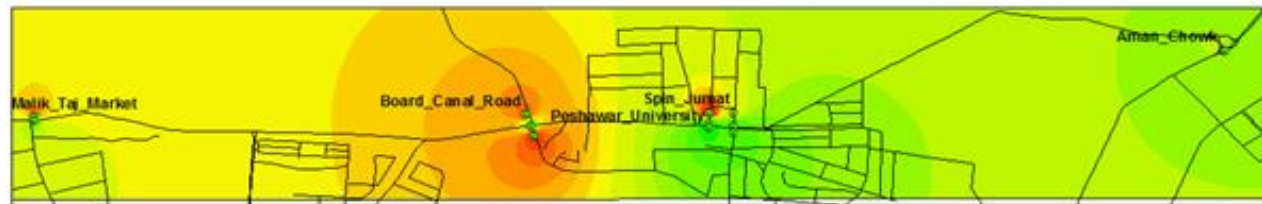

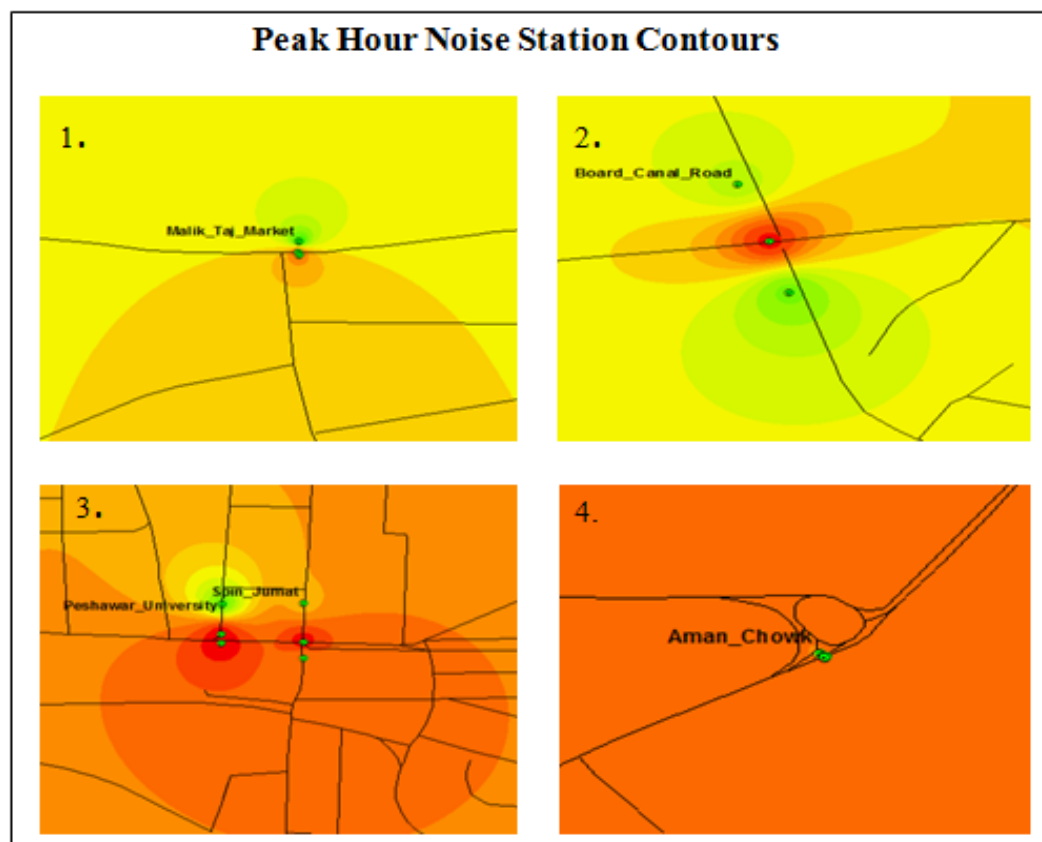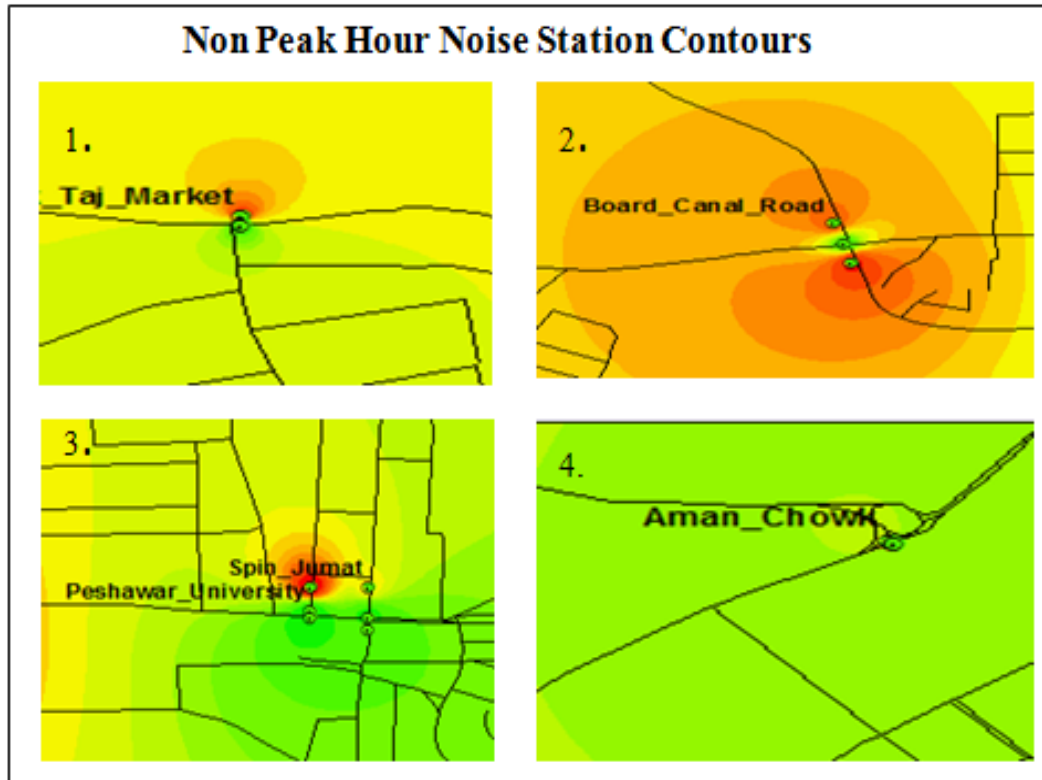Fig 3:- Geo spatial images of noise contours

Fig 3:- Section wise distribution of Stations

IV. CONCLUSIONS

From the detailed maps of noise contours it has been concluding that the section of study area is mostly effected by community noise pollution. The peak and non-peak behavior of the section is quiet alarming that how noise generating factors are enhancing noise pollution in public area of G.T road section. On the other hand, central locations were found most vulnerable as compare to laterals and surroundings respectively.

REFERENCES

[1]. A.Nathanson, J., & A.Schneider, R. (2017). *Basic Environmental Technology.* Uttar Pradesh: Pearson.

[2]. Kalim, Y., Aslam, T., & Masood, H. (2014). Noise pollution -A case study of Rawalpindi city ,Pakistan. *Pakj-sci-ind-res-A,phys.sci*, 95-102.

[3]. L.Davis, M., & A.Cornwell, D. (2006). *Introduction to Environmental Engineering.* McGraw- Hill Education.

[4]. Schwela, D. (2017). Environmental noise challenges and pollicies in low and middle income countries. *12th ICBEN Congress on Noise as a Public Health Problem.* Zurich: ICBEN.

[5]. Wawa, E. A., & Mulaku, G. C. (2015). Noise Pollution Mapping Uing GIS in Nairobi ,Kenya . *Journal of Geographical Information*, 486-493.