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A study of Land Zoning in the base of Traffic Noise Pollution Levels using ArcGIS: Kirkuk City as a Case Study

Shno Mustafa Ali * Ako Rashed Hama **
Younis Mustafa Ali ***

** College of Engineering/ University of Kirkuk,*
*** Department of Civil Engineering/ Komar University of Science and Technology*
****Faculty of Engineering/ University of Sulaimania*
*Email: shnoma@yahoo.com
**Email: ako.rashed@komar.edu.iq
***Email: younis.ali@univsul.edu.iq

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Abstract

This study is an approach to assign the land area of Kirkuk city [a city located in the northern of Iraq, 236 kilometers north of Baghdad and 83 kilometers south of Erbil [Climatic atlas of Iraq, 1941-1970] into different multi zones by using Satellite image and Arc Map10.3, zones of different traffic noise pollutions. Land zonings process like what achieved in this paper will help and of it's of a high interest point for the future of Kirkuk city especially urban planning and economic issues of the city. Also, it may be considered as a reference in solving the traffic jam problems in the city. Transportations and sounds of horn of vehicles are the major sources of traffic noise pollutions .Vehicular traffic noise problems are contributed by various types of vehicles such as heavy and medium trucks or buses or automobiles. During this study, six major regions within the city were selected (Governorate region, Baghdad road, Al Wasti, Al Askary, Al Nasir and North garage). A survey for all those six regions were taken place and noise measurements were captured at points or near to the intersections for a duration of three different periods days per a week [Sunday 3rd , Monday 4th , and Tuesday 5th] of January 2016. The results showed a high level of noise pollution and super passing on many occasions to the prescribed levels by Central Pollution Control Board (CPCB) , maximum level noise pollution value was 94.6 dB(A) in AlWasti region near to the road that leading to Kirkuk university , while minimum level noise pollution value was 48 dB(A) in AlNasir region. As a result, a noise map zoning was prepared for Kirkuk City for top peak working three days. The prepared noise distribution map will help and could be used as a considerable point for the future during designing projects related to transportations. Also in another hand, the map reflected indirectly the amount of regional air pollutions. High distributed noise pollution zones means a zone of a high air pollutions levels specially Co_x and No_x gaseous pollutions.

Keywords: *ArcGIS, Air Pollution, Kirkuk, Land zoning, Noise Pollution, Traffic Noise.*

1. Introduction

Sound is a physical phenomenon that stimulates the sense of hearing (Purohit et al., 2010). Noise is unwanted sound without agreeable musical quality. The differences between those two terms sound and noise are only when the effects of a sound are undesirable. American encyclopedia based on psychological factors states that the noise is extremely unpleasant to ears (khitoliya, 2007).Traffic noise is one of most immediate and identifiable environmental problem associated with rapid degree industrialization, urbanization, and population growth Traffic noise is considered to be one of the most important sources of noise pollution which have adverse effects on human health

(Williams and McCare, 1995). The main sources of vehicle noise pollution come from engines, exhaust systems, tires interacting with the road, horns, aerodynamic friction by the interaction between vehicles, sound of cooling fans, gearboxes and brakes. The most serious health hazards associated with high levels of noise exposure is deafness which initially causes temporary hearing problem or deafness while prolonged exposure to high levels of noise pollution causes a permanent deafness hearing damage (Singh and Kaur,2007). Some of the adverse effects of the noise pollution are the interfering with speech. Also, Noise leads to emotional and behavioral stresses such as increasing of the heart failure, headache and blood pressure. Besides that, noise effect on the patients who need rest and silence (Balashanmugam et. al., 2013).

Traffic noise will continue to be increased in magnitude and severity due to population growth, Urbanization and the associated growth in the use of automobiles. It will also continue to be growing due to the sustainable growth of vehicles (types and models). Highway noise pollution can be defined as the sum of the total noise produced in a specified point due to all the moving vehicles using that highway, thus produced noise pollution from vehicles depends on the type of the vehicle and its mode of operation (Balashanmugam et. al., 2013). The social surveys are showing that a dissatisfaction towards the traffic noise will express by people in their houses sometimes depends on the variability of the noise. Automobiles constitute the largest group of noisemakers. In main cities, about (60 -70) % of the noise pollution comes from the traffic roads (Khitoliya, 2007). (Singh and Kaur, 2007) reported that noise pollution levels reached 70 – 75.4 dB in the day times in the cities. The results of (Krishna et al., 2007) indicated a high noise pollution levels in the main roads in Nepal which were 60.1 dB to 110.2dB, and the noise was produced mainly from different motor vehicles ranged from 91.2 dB to 121dB. Study of (Jamrah et al. 2006) in Amman shows as high noise levels in day times as 46 – 81 dB(A) compared to night times which were 58 – 71 dB(A).

2. Materials and Methodology

For the purposes of measuring traffic noise pollution for the selected regions , six different site locations have been selected in Kirkuk city as in the (Table 1). The data have been taken during heavy traffic flowing conditions three different periods of time per a day so that they may represent and cover the noise pollution of the city. The time periods were as: 8:00 a.m. to -9:00 a.m. (supposed to be peak traffic hour density of the day) , 12:00 a.m. to 1:00 p.m. (Supposed to be the end of the governmental staff working hour) and 5:00 p.m. to 6:00 p.m. (time of the evening people marketing). The process is carried out continuously for three days of 3rd, 4th and 5th of January 2016. The locations of the understudy area of the six sites shown in all the figures.

Noise level survey was carried out to assess the noise distribution environment in the city. The noise levels were assessed by using sound level meter device (DT-85A). This instrument measures the sound pressure level in dB(A) (A-weighted decibel). Since human ear does not respond uniformly to the sound of all deferent frequencies specially those which are in low and high levels of frequencies than that those which are at the median or speech frequencies,then in an attempt to duplicate the response of human ear, the sound level are often fitted with three internationally defined frequencies weighting filters A,B, and C. The A-weighted decibel dB(A) is an adequate objective measurement providing a reasonable correlation with objectively determined ranking (Khitolya,2007) .

Sounds of frequencies from 800 to 3000 HZ are covered by the A - weighted scale. If the sound pressure level, L_1 in dB is measured at r1 meters, then the sound pressure level, L_2 in dB at r_2 meters is given by,

$$L2 = L1 - 20 \log_{10} (r_2/r_1) \quad \ldots(1)$$

If the sound levels are measured in terms of pressure, then, sound pressure level, LP is given by,

$LP = 20 \text{ Log}_{10} (P/P_o)$ dB(A) ...(2)

P is effective sound pressure in N/m^2

$P_\circ$ is reference pressure usually $2*10^{-5}$ N/m^2 (Purohit et al., 2010).

The Lp is measured against a standard reference pressure, Po is equivalent to zero decibels. The sound pressure is the pressure exerted at a point due to a sound producing sourc . The day night equivalent noise levels of a community (L_{dn}) can be expressed as:

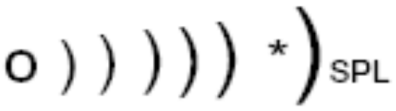
$L_{dn} = 10 \text{ x } \log_{10} [15/24 (10^{(Ld/10)}) + 9/24 (10^{[Ln + 10)/10]}]$ …(3)

where,

L_d = day-equivalent noise levels (from 6AM - 9 PM), dB (A)

L_n = night equivalent noise levels (from 9 PM - 6 AM), dB (A)

The day hours in respect to assessment of noise levels, is fixed from 6 AM - 9 PM (i.e., 15 hrs) and night hours from 9 PM - 6 AM (i.e., 9 hrs). A sound level of 10 dB is added to Ln due to the low ambient sound levels during night for assessing the Ldn values.



Definition of sound pressure

Table 1,
Description of the studied locations in Kirkuk city

Sites	Location	North	East	Description
1	governorate region	35°27'35.47"N	44°22'53.90"E	Which have heavy traffic volume because it is the center of Kirkuk and considers as a commercial area.
2	Baghdad street	35°25'29.52"N	44°22'22.84"E	Near traffic intersection which considers main road
3	Al Waseti region	35°25'17.25"N	44°20'38.14"E	This is near the university of Kirkuk and has heavy traffic volume.
4	Al Askary region	35°24'43.93"N	44°24'15.01"E	Residential area.
5	Al-Nasir region	35°25'17.94"N	44°24'15.98"E	Residential area, which is near a bridge with heavy traffic volume.
6	Garage Shemal region	35°28'20.37"N	44°24'16.49"E	

Table 2,
Details of the selected study sites in Kirkuk city

Sites	Location	Width of road (m)	Width of median strip (m)	Geometrical Description
1	Intersection of Kirkuk governorate	11.5	4.95	Have Six paths only Three paths were open for vehicles movements
2	Baghdad street	11.5	4.0	Have Six paths all paths are opening for vehicles movements
3	Al-Nasir street intersection	7.0	1.5	Have eight paths were open for vehicles movements
4	North garage	9.5	2.5	Have Six paths open for vehicles movements
5	Al waseti intersection	10	2.0	Have Six paths open for vehicles movements
6	Al askary intersection	10	2.0	Have Eight paths only Four paths were open for vehicles movements

Measurements of traffic noise were done by sound level meter type DT-85 A which is a small meter measures the noise for 15 minutes in each site then the screen of meter show maximum and a minimum value of noise by unit dB(A). Also the locations of the points were recorded using GPS device.

ArcGIS 10.3 software was used for zoning Kirkuk land area based on the recorded noise levels. The values of noise pollution level were mapped as data points relative to their specific locations. To cover the entire area, a contouring method was used based on IDW (inverse distance weighted) spatial interpolation technique. Generally, interpolation predicts cell values in a raster format using a given through a limited number of sample data. It is a veritable tool for prediction of unknown values for a given geographic point data which in this study is noise pollution sound levels (Yilmaz *et al*. 2005, Banerjee *et al*. 2009). IDW however explicitly implements the law of geography, which is pivoted on the hypothesis that closer things are more related than those farther apart. For its prediction, IDW utilizes the given values surrounding the predicted location. It predicts that each given point has a local influence that shrinks with space; thereby giving greater weights to points closest to the prediction location, based on distance decay effect. This process leads to the procedure being referred to as inverse distance weighted. This technique was applied to measure the spatial distribution and range of noise pollutions for Kirkuk city for the selected six sites in the area and for the consequent three days and each for six deferent periods of a day.

3. Results and Discussions

The data of traffic noise pollution showing a high values of the noise level in regions that has been chosen in Kirkuk city and not satisfactory as per standards prescribed by central pollution control board (CPCB) in the Table (3):

Table 3,
Ambient air quality standards in respect of noise by (CPCB) (Khitolya, 2007)

Area	Daytime dB(A)	Night time dB(A)
Industrial area	75	70
Commercial area	65	50
Residential area	55	45
Silence zone	50	40

In the first region as the results of measuring the sound pressure levels shown in the Table (4), the values of maximum and minimum ranged from values 50.4 to 88.8 dB(A). Governorate region considered to be as a commercial area and by referring to table 2, the maximum permissible values of sound pressure level is 65 dB (A) in all time of the measurement due to vehicles movability and because this site is center of Kirkuk city and contains many markets, restaurants, and supermarkets that lead values of noise level higher than the standards as listed in Table 2.

Table 4,
Noise levels in dB(A) at governorate site

Time	Sunday 3rd Jan. 2016		Monday 4th Jan. 2016		Tuesday 5th Jan. 2016	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	77.4	52.8	85.2	69.6	77.5	50.4
08:30-9:00	81.2	65.6	87.7	71.6	83.6	67
12:00-12:30	75.6	51.9	88.8	74	76.2	62.8
12:30-01:00	78.3	51.6	86.5	70.8	71.2	57.7
05:00-05:30	80.6	65.4	84.2	71.2	79.4	52.6
05:30-06:00	82.3	65.0	80.2	79.3	72.8	64.7

Table (5) presents the values of noise level pollutions measurements in Baghdad street region which considered as the main road in Kirkuk city, maximum value of noise was 91 dB(A) in the third day of the noise measurement which was very high comparing to the limits that prescribed in table (6) for main road which limit as 70-80 dB, while minimum value was 60.4 dB(A) on the first day.

Table 5,
Noise measurements pollutions levels in dB(A) at Baghdad street.

Time	Sunday 3rd Jan. 2016		Monday 4th Jan. 2016		Tuesday 5th Jan. 2016	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	77.9	70	78.5	66.2	84	74.7
08:30-9:00	72.4	61.2	77.5	62.3	75.9	69.9
12:00-12:30	75.6	63.4	82.4	69.2	90.3	81.3
12:30-01:00	78.6	64.9	77.0	70.0	88.5	79.6
05:00-05:30	72.4	60.4	82.4	74.3	91.0	73.0
05:30-06:00	68.9	63.9	77	69.2	87.2	66.2

Table 6,
Noise levels of different sources of traffic (Khitolya, 2007)

Source of Noise	Noise level dB(A)
Rail traffic	90-110
Heavy road traffic (highway)	80-90
Medium road traffic (main road)	70-80
Light road traffic (side street)	60-70

Table 7 represents the values of noise in the third region at ALWasti .The location of the site is near university of Kirkuk which have heavy traffic volume during all day hours. The values were high during 8:00-8:30 a.m. because the students starting attendance to their collages , also after 12 p.m. when students came back to their homes and this make noise level very high in this site , maximum value of noise was 94.6 dB(A)as shown in the table(5) which considerably was of higher pollution measurements values comparing to the rest five selected sites.

Table 7,
Noise levels at Al Wasti region.

Time	Sunday 3rd Jan. 2016		Monday 4th Jan. 2016		Tuesday 5th Jan. 2016	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	88.2	71	90.3	74.1	85.9	69.5
08:30-9:00	91.2	73.7	87.8	69.4	87.7	69.1
12:00-12:30	93.3	67.7	92.7	71.9	84.7	71.6
12:30-01:00	94.6	58	92	72.5	88.8	70.8
05:00-05:30	87.2	70.4	92.1	70.5	86.5	60.9
05:30-06:00	89.5	74.8	87.5	72.4	84.9	62.2

Noise levels of Al Askary region listed in table (8) which is residential, range of noise is (48.4-83.2) dB(A) the values are higher than the prescribed limits in table 2 which is 55 dB and this belongs to the noise pollution levels that came from many shops of woodworkers and markets of food materials and greengrocers found on this site.

Table 8,
Noise pollution levels at Al Askary region.

Time	Sunday 3rd Jan. 2016		Monday 4th Jan. 2016		Tuesday 5th Jan. 2016	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	78.9	51.0	77.5	56.6	81.5	64.2
08:30-9:00	81.9	48.9	84.1	52.6	75.0	66.8
12:00-12:30	76.5	63.2	80.8	61.7	80.1	64.8
12:30-01:00	69.0	48.4	73.7	49.8	76.5	59.9
05:00-05:30	82.9	61.7	63.7	49.0	83.2	69.0
05:30-06:00	68.5	59.8	80.0	65.7	80.8	64.8

In the fifth region as its shown in table (9) values of noise pollutions in AlNasir region were higher than the standards as table 2 ,because this region considered as a residential area and near a bridge with heavy traffic volume and have many exhibitions of ceramic and construction materials make the levels of noise pollution of higher levels and the maximum value was 81.5 dB(A), while the minimum value was 48 dB(A).

Table 9,
Noise levels at AL Nasir region.

Time	Sunday 3rd Jan. 2016		Monday 4th Jan. 2016		Tuesday 5th Jan. 2016	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	71.8	62.2	77.4	53.2	81.5	62.1
08:30-9:00	69	65	74.4	52.5	75	59.6
12:00-12:30	80.7	48	79.9	51.6	73.8	60
12:30-01:00	73	68.8	71.1	56.2	80.1	64.8
05:00-05:30	66.6	58.9	78	56	76.5	66.2
05:30-06:00	74.5	53.8	76.5	59.6	70.1	59.4

Last site was North garage which considers as an industrial area and has heavy hourly traffic volume from Kirkuk to the governorates of the north of Iraq. The maximum pollution levels values were 93.2 dB(A) as shown below in table (10) which is higher than limited values in Table2.

The reason behind the high levels of noise pollutions refers to that this site contains many shops of maintenance workshops and operation and maintenance of cars also repairing parts of those vehicles flashed and made accidents.

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Table 10,
Noise levels at North garage.

Time	First day		Second day		Third day	
	Max.	Min.	Max.	Min.	Max.	Min.
08:00- 8:30	83	76.2	80.1	68.2	75.4	74.3
08:30-9:00	88.4	67.9	83.2	52.3	88.9	66.3
12:00-12:30	75.6	64.3	78.9	55.1	90	77
12:30-01:00	79.3	68.4	88.3	60.4	92.3	80.5
05:00-05:30	85.8	73.8	80	58.2	86.2	72
05:30-06:00	93.2	80.1	75.1	56.1	87.4	74.5

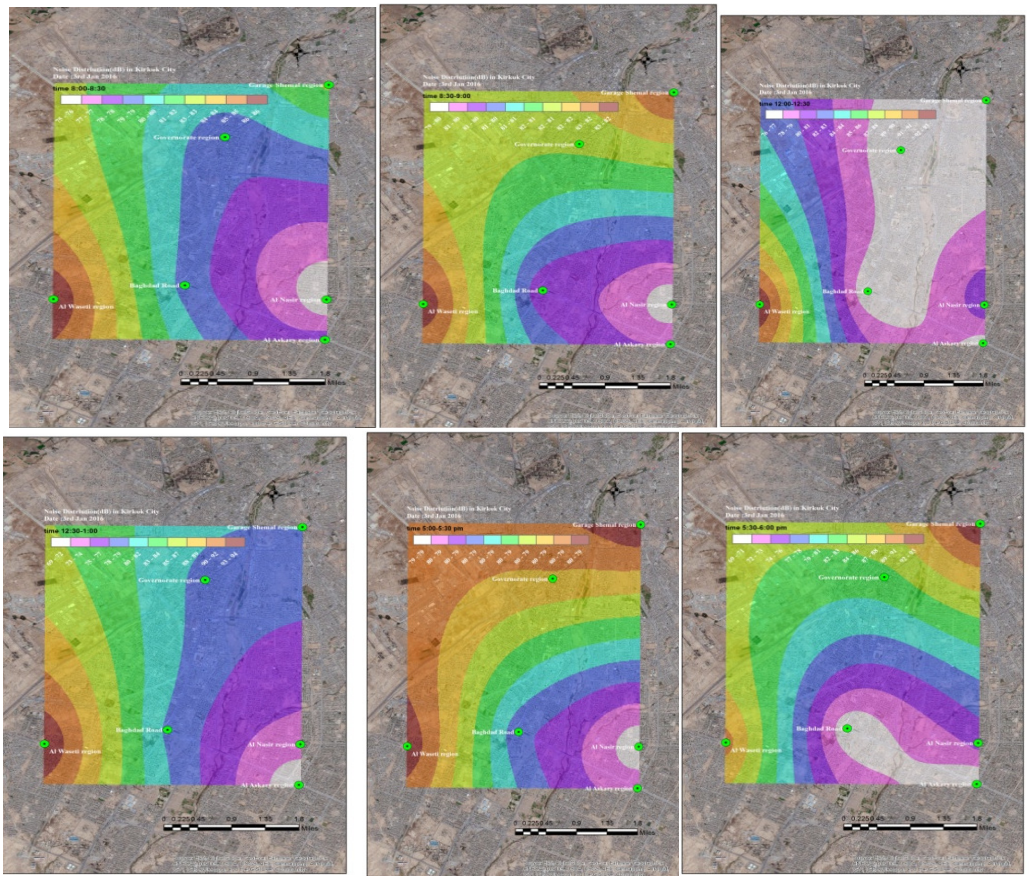


Fig. 1. Hourly Noise Distribution for the peak morning and evening traffic flow 3 Jan. 2015 Kirkuk City.

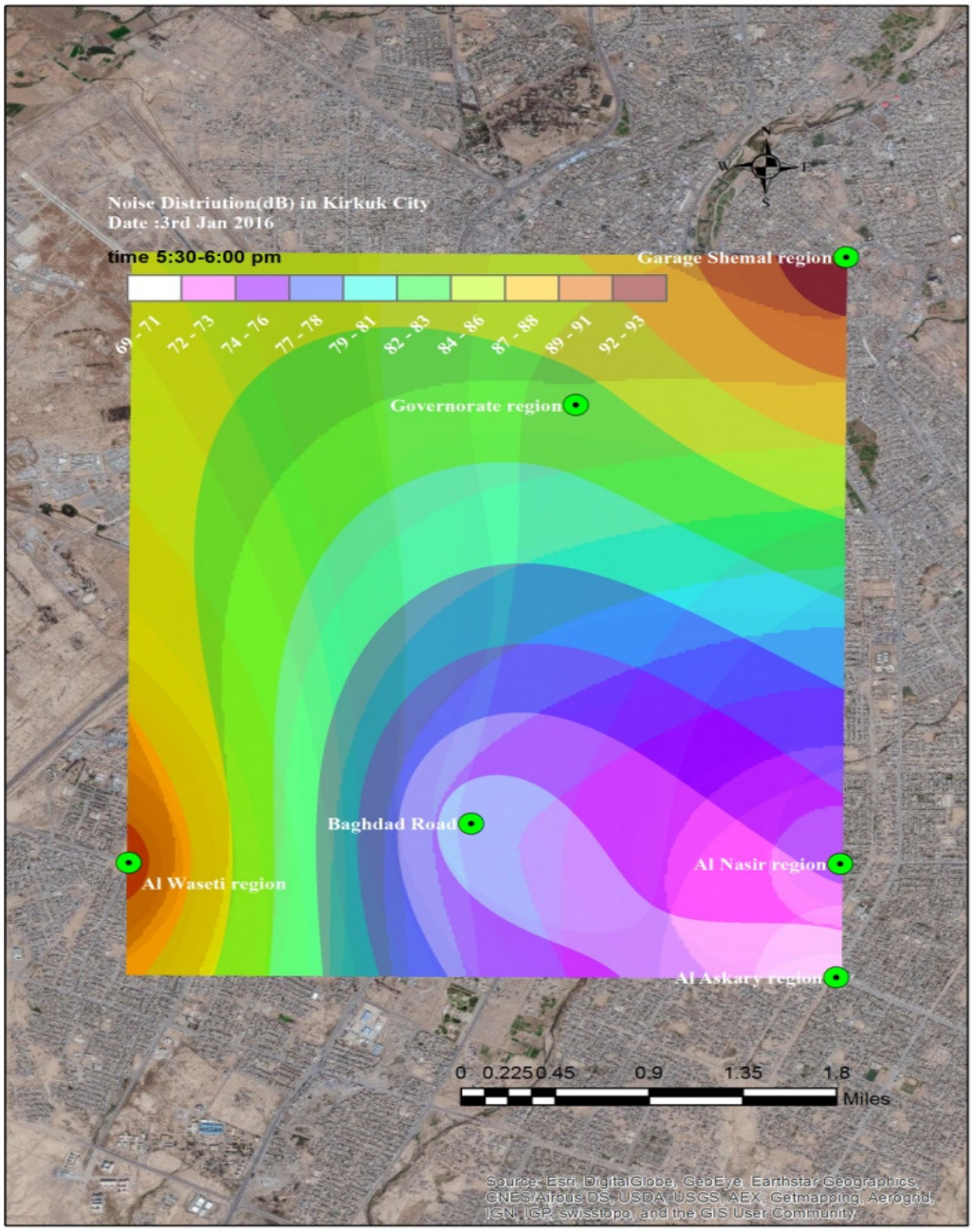


Fig. 2. Daily Noise Distribution for the peak morning and evening traffic flow 3 Jan. 2015 Kirkuk City.

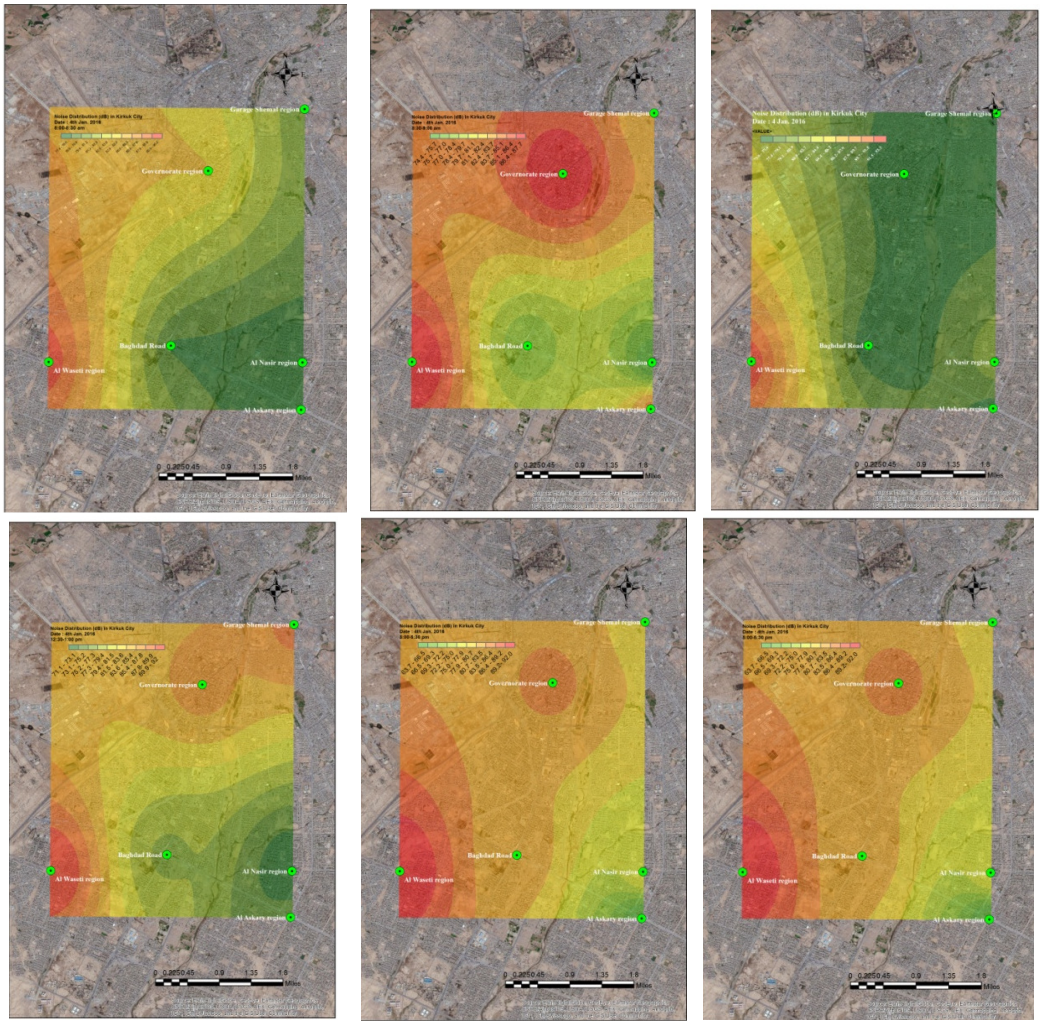


Fig. 3. Hourly Noise Distribution for the peak morning and evening traffic flow 4 Jan. 2015 Kirkuk City.

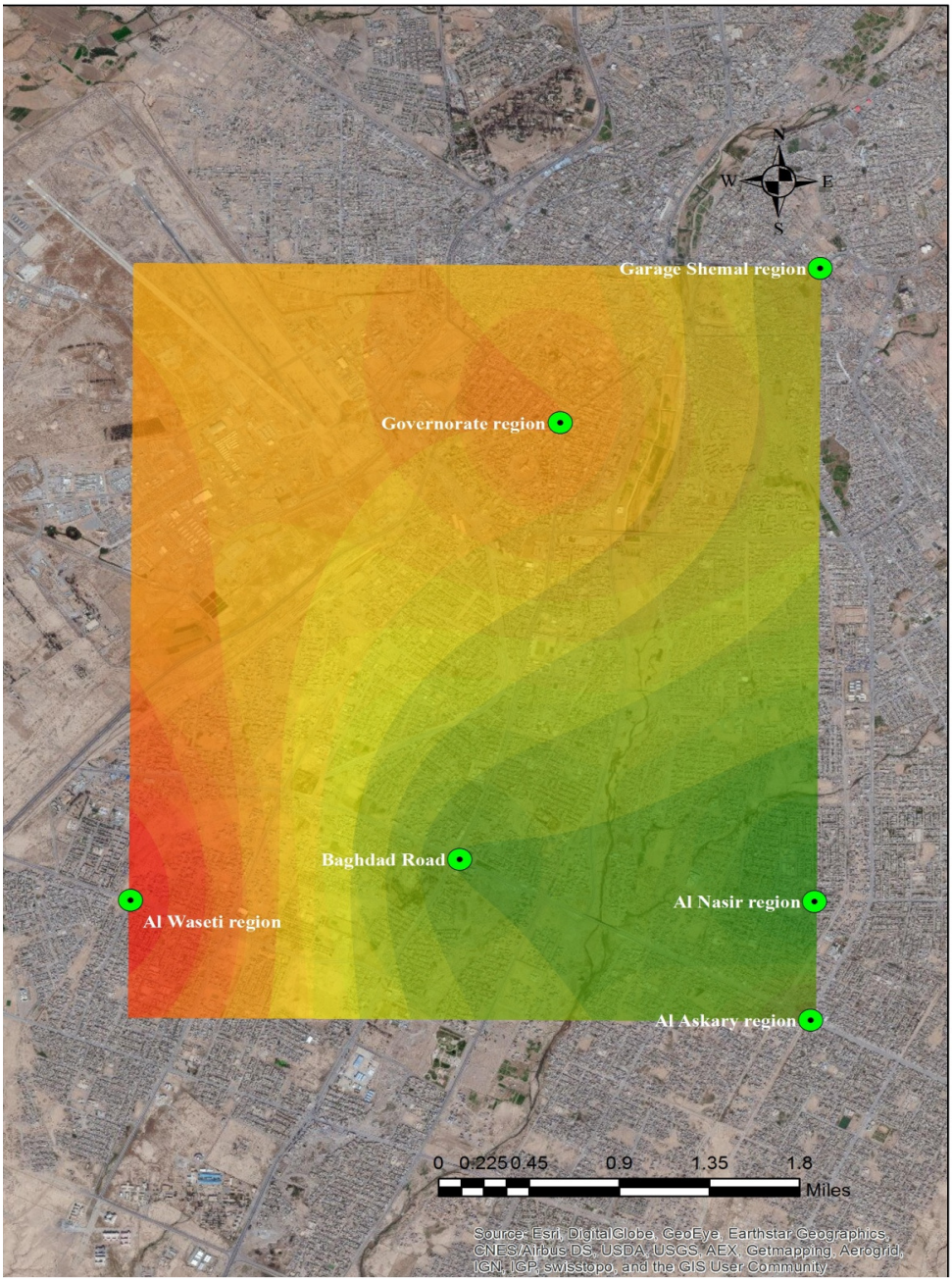
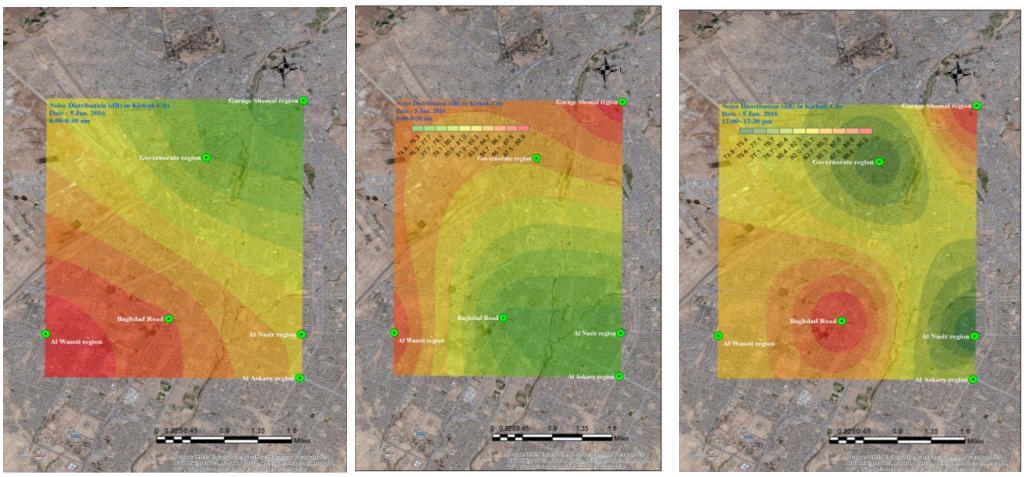


Fig. 4. Daily Noise Distribution for the peak morning and evening traffic flow 4 Jan. 2015 Kirkuk City.



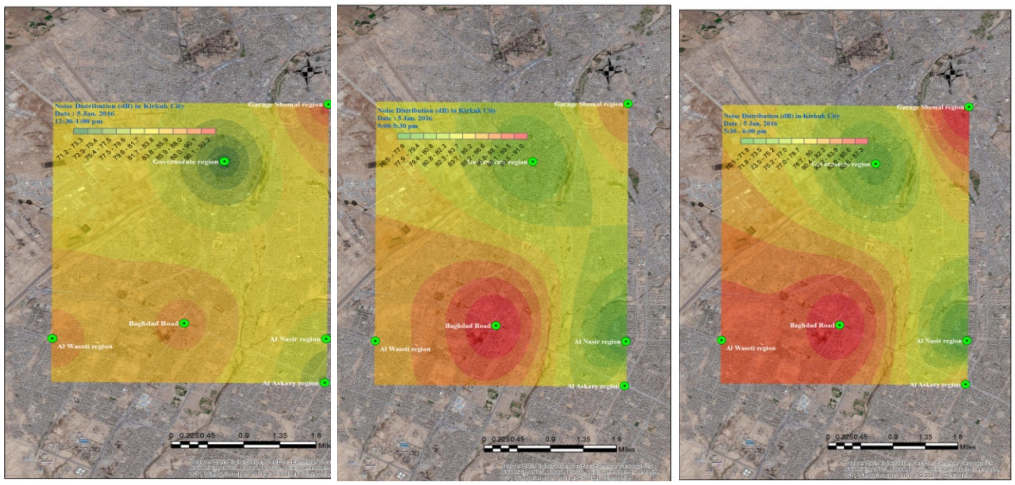


Fig. 5. Hourly Noise Distribution for the peak morning and evening traffic flow 5 Jan. 2015 Kirkuk City.

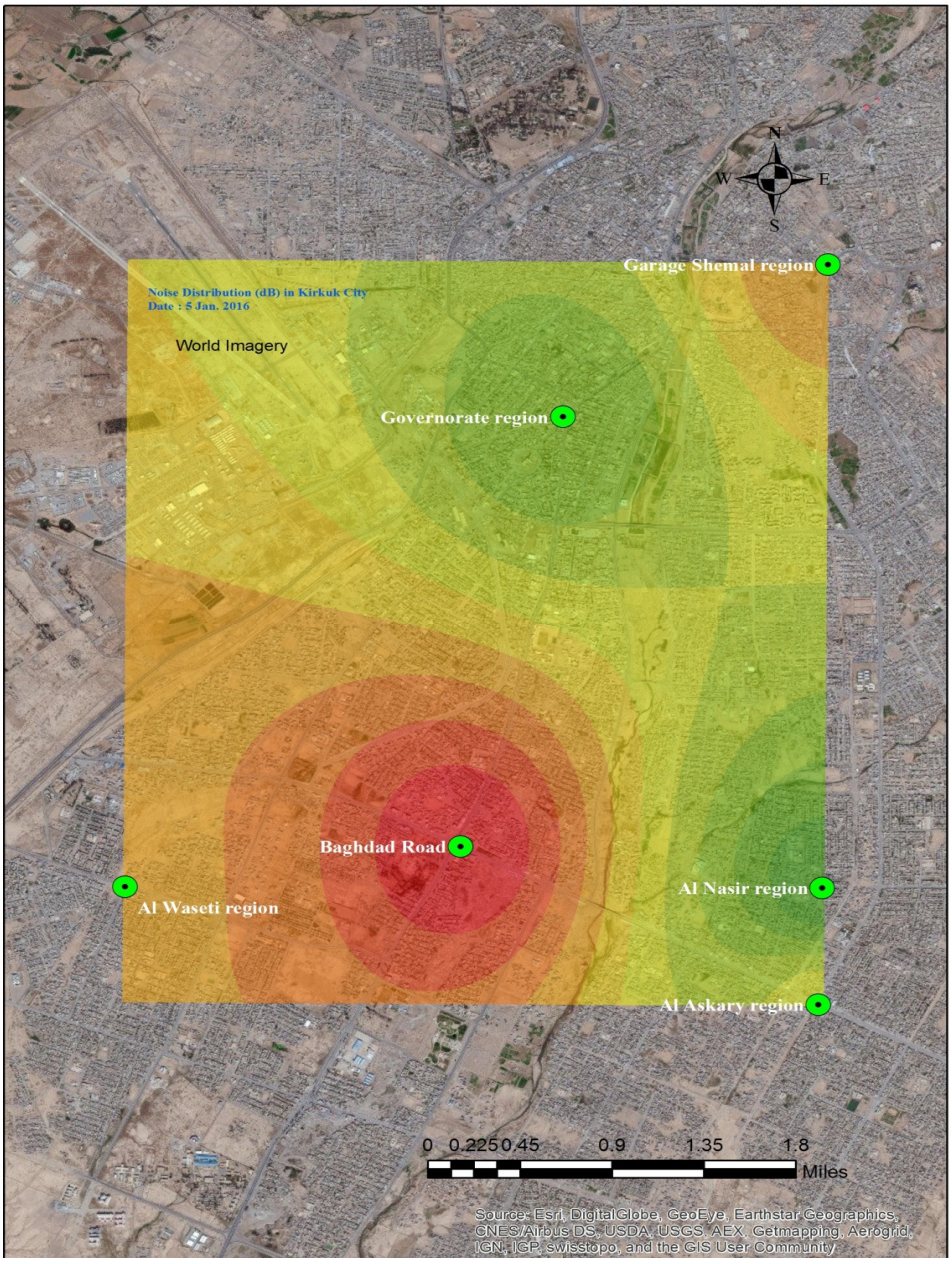


Fig. 6. Daily Noise Distribution for the peak morning and evening traffic flow 5 Jan. 2015 Kirkuk City.

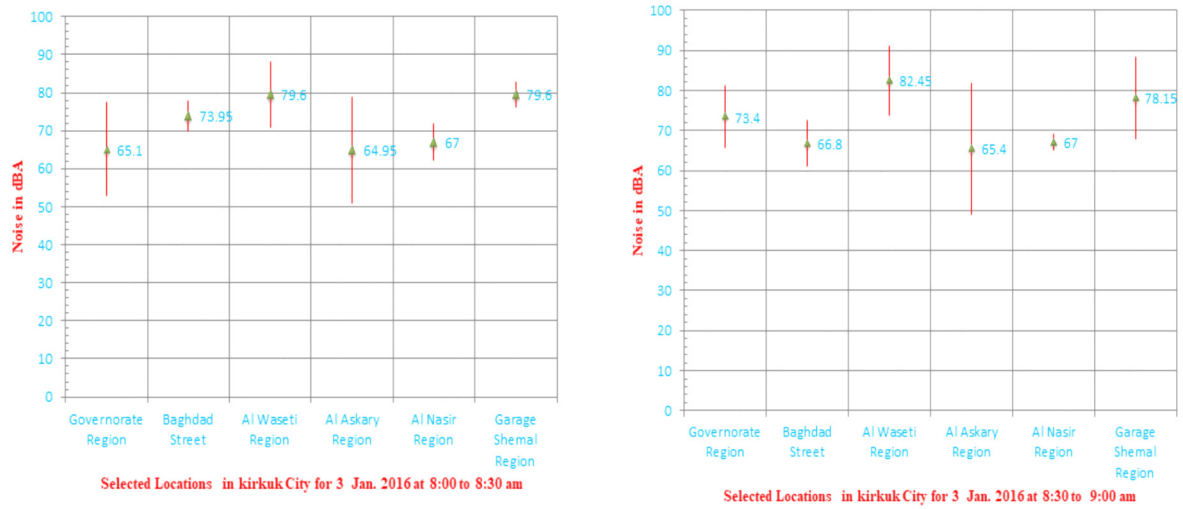


Fig. 7. Max, Min and Average Hourly Noise Distribution for the traffic flow 3 Jan. 2015 Kirkuk City.

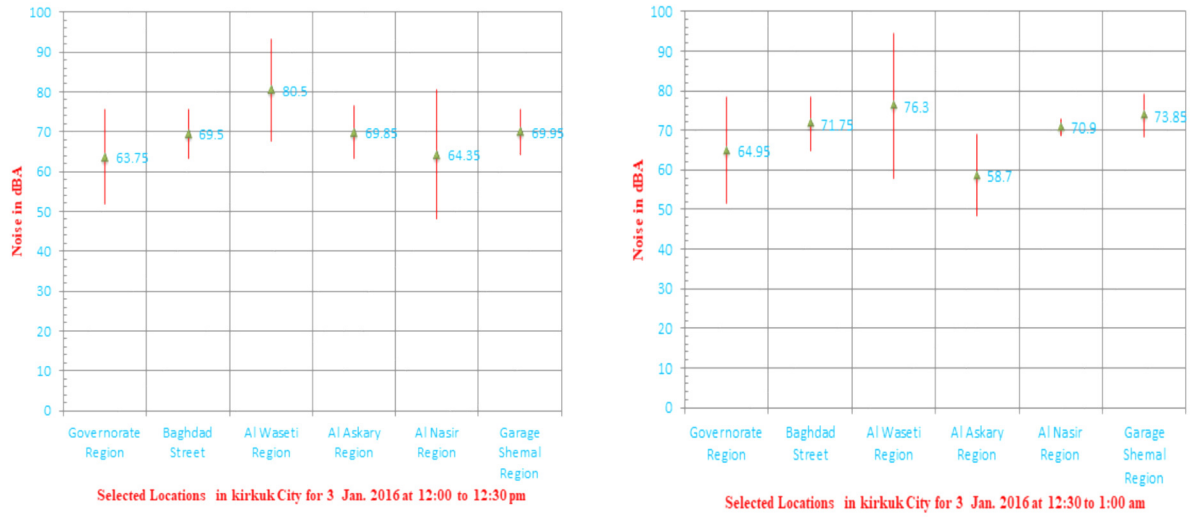


Fig. 8. Max, Min and Average Hourly Noise Distribution for the traffic flow 3 Jan. 2015 Kirkuk City.

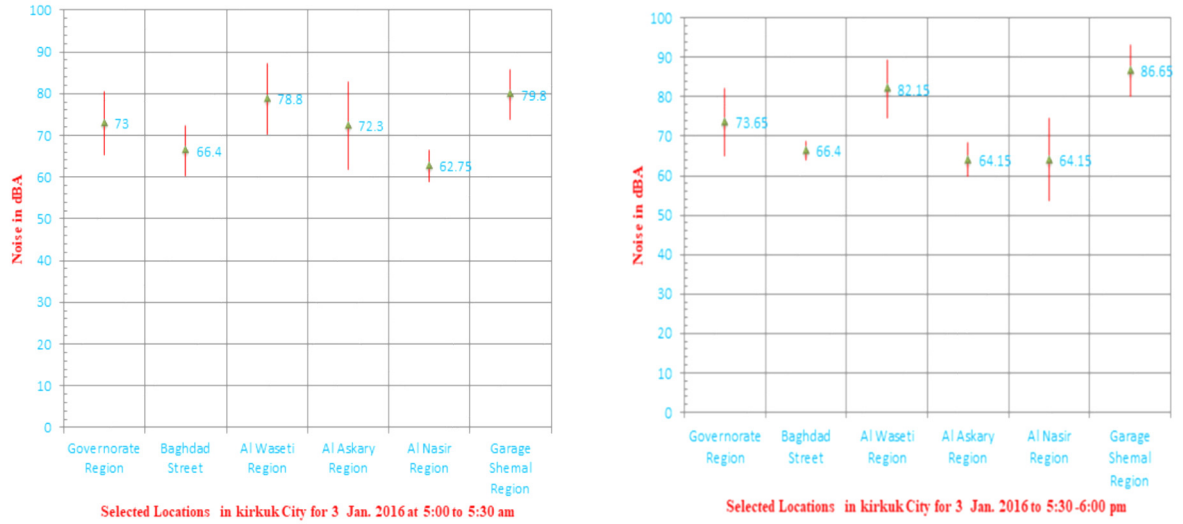


Fig. 9. Max , Min and Average Hourly Noise Distribution for the traffic flow 3 Jan. 2015 Kirkuk City.

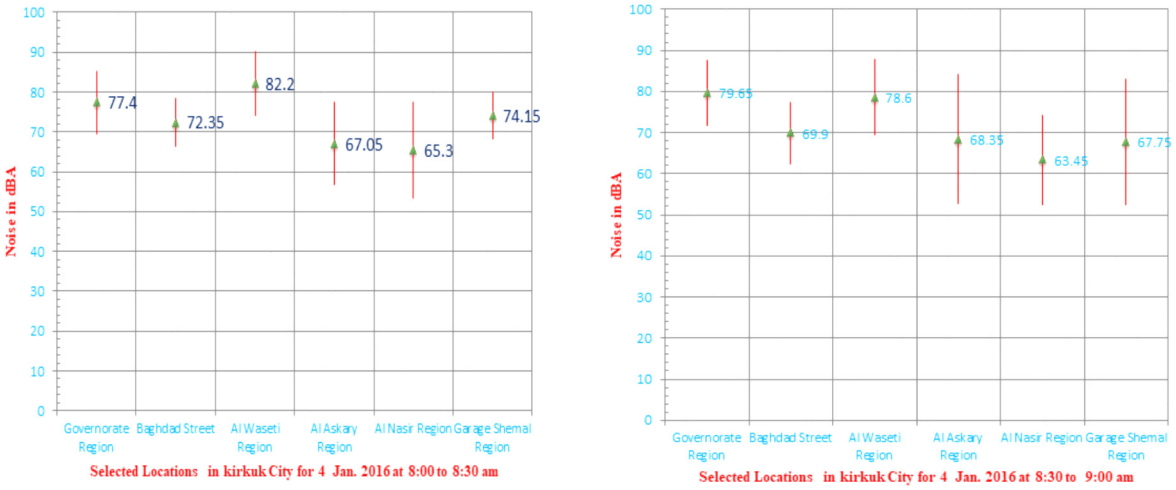


Fig. 10. Max , Min and Average Hourly Noise Distribution for the traffic flow 4 Jan. 2015 Kirkuk City.

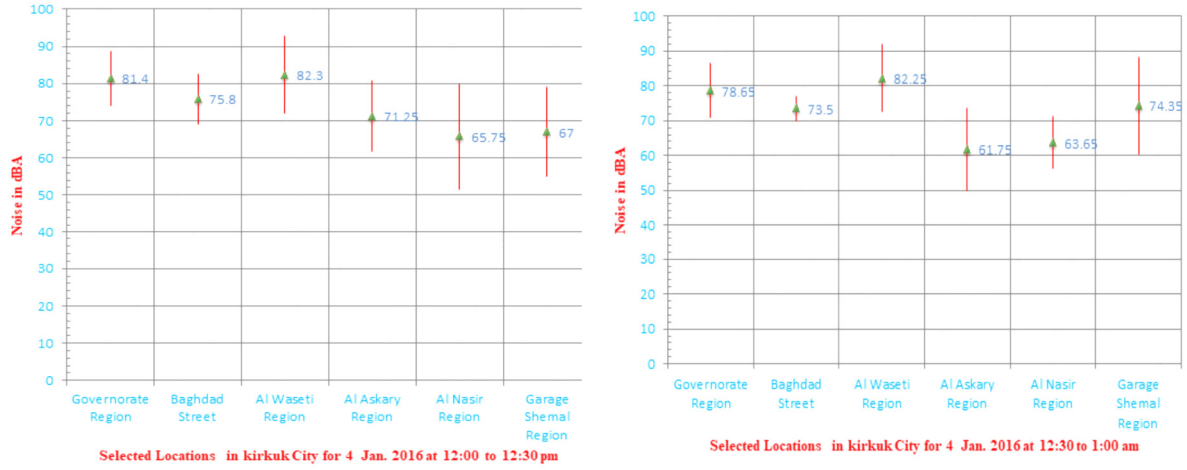


Fig. 11. Max , Min and Average Hourly Noise Distribution for the traffic flow 4 Jan. 2015 Kirkuk City.

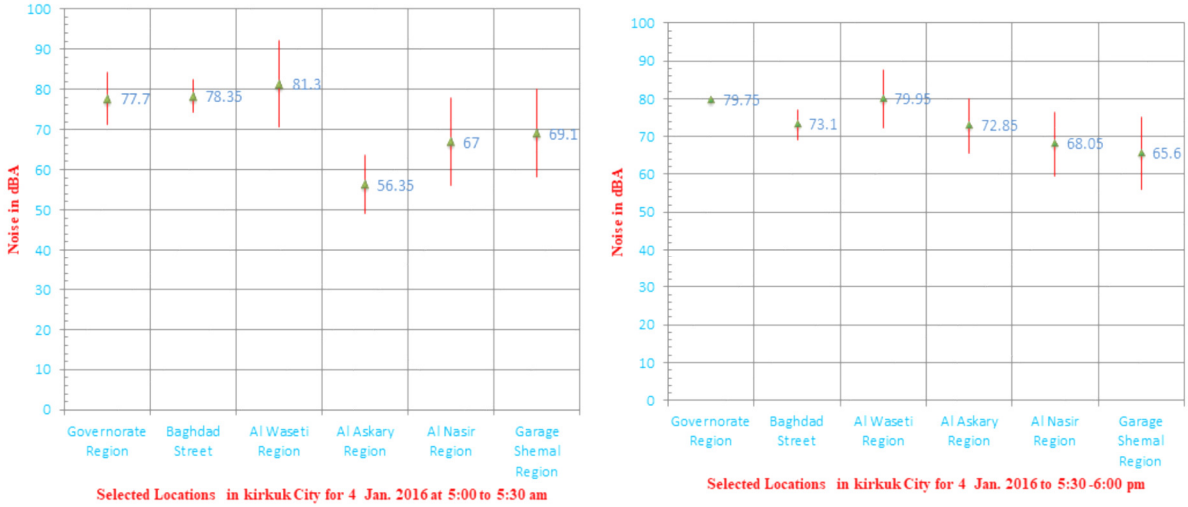


Fig. 12. Max , Min and Average Hourly Noise Distribution for the traffic flow 4 Jan. 2015 Kirkuk City.

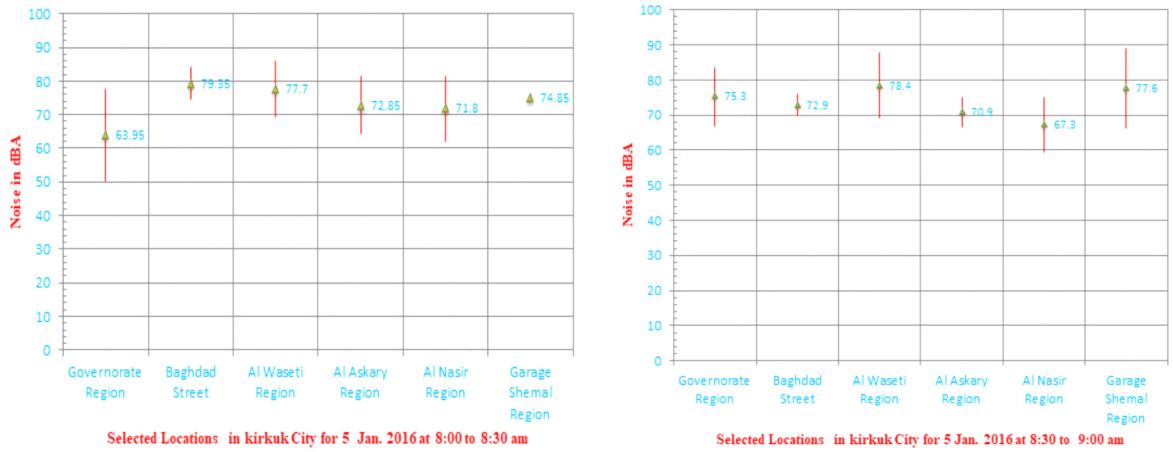


Fig .13. Max, Min and Average Hourly Noise Distribution for the traffic flow 5 Jan. 2015 Kirkuk City.

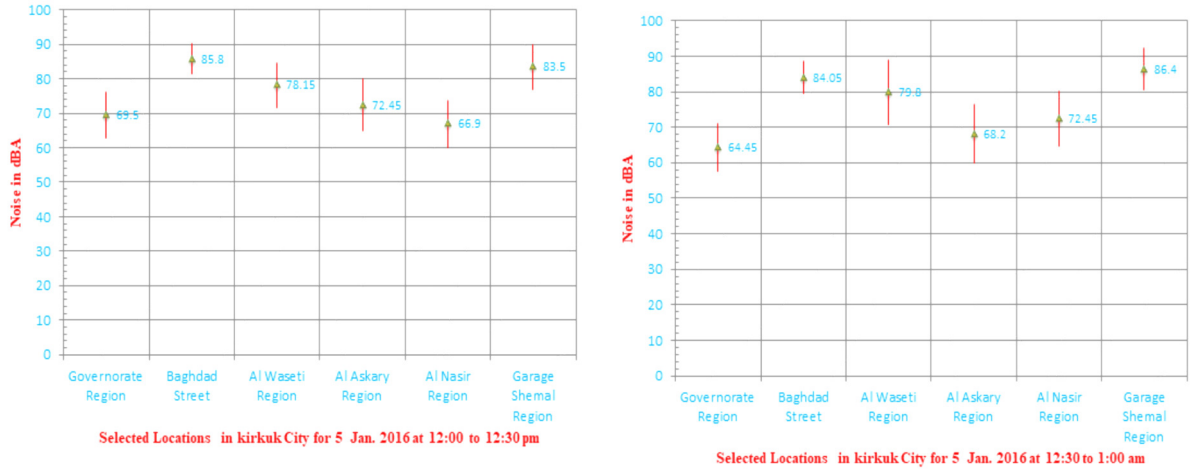


Fig. 14. Max, Min and Average Hourly Noise Distribution for the traffic flow 5 Jan. 2015 Kirkuk City.

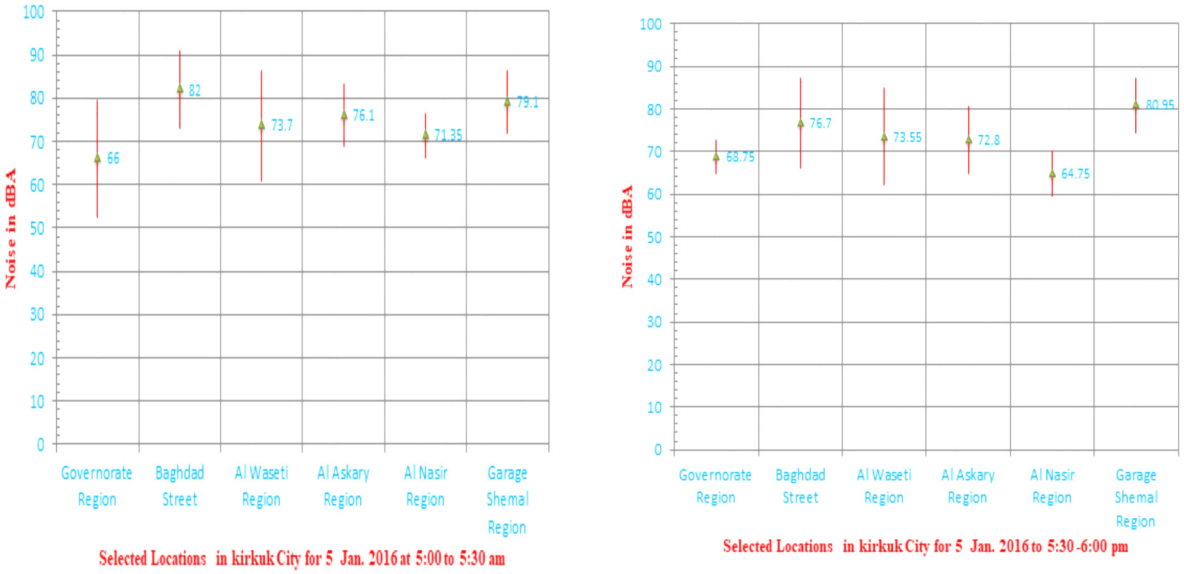


Fig. 15. Max, Min and Average Hourly Noise Distribution for the traffic flow 5 Jan. 2015 Kirkuk City.

4. Conclusion

This study was to evaluate the traffic noise pollution in Kirkuk city. High levels of traffic noise pollution due to vehicles, heavy trucks, governmental clerks pathways to their offices and others were observed in this study. The recorded levels of noise pollutions were over the standards. This study shows high levels of noise pollutions in the zones where the university is located and also where the governorate buildings council region is located as well. Results showing that AlWasti and Baghdad road regions were classified as noisy zones due to the high traffic flow of heavy trucks mobility and trailers that inter the center of Kirkuk from the southern cities and that area represent the entrance of the city. Those zones are also are noise pollution zones due to the nature of the wide roads passes through and they have. While for those regions where the governorate buildings are located, lower levels of noise pollution recorded and except just during the peak working hours of the day.

As a recommendation, and to reduce the noticed traffic noise pollutions in the zones, several steps may be implementing. Proper maintenance for the cross roads and solving the flexibility of the jammed traffics flow will help to decrease that high levels of noise pollutions. Quiet zones where the hospitals and the educational institutions located should be kept as silent zones as well as residential area. Planting of green trees along roads and high noise pollution areas will be helpful to absorb a fraction of the high sound pressure levels because they will act as barriers. The high sound level pollution regions indirectly showing the areas of high air pollution regions that need immediate actions to reduce that air pollutions and advices.

5. References

[1] Banerjee, D., S. K. Chakraborty, S. Bhattacharyya, and A. Gangopadhyay. "Appraisal and Mapping the Spatial-temporal Distribution of Urban Road Traffic Noise." *International Journal of Environmental Science & Technology* 6.2 (2009): 325-35. Print.

[2] Khitoliya, R. K. Enviroment Pollution: Management and Control for Sustainable Development. New Delhi: S Chand, 2014. Print.

[3] Li, Bengang, Shu Tao, R.w. Dawson, Jun Cao, and Kinche Lam. "A GIS Based Road Traffic Noise Prediction Model." Applied Acoustics 63.6 (2002): 679-91. Print.

[4] Murthy, V. Krishna, Ahmad Kamruzzaman Majumder, Sanjay Nath Khanal, and Deepak Prasad Subedi. "Assessment of Traffic Noise Pollution in Banepa, A Semi Urban Town of Nepal." Kathmandu University Journal of Science, Engineering and Technology 3.2 (2010). Print.

[5] P.Balashanmugam, V.Nehrukumar, K.Balasubramaniyan, and G.Balasubramanian. "Effect of Road Traffic Noise Pollution in Cuddalore Town: A Case Study." International Journal of Innovative Research in Science, Engineering and Technology. Research and Reviews, 21 Apr. 2015. Web. 11 Mar. 2017.

[6] Shammi, Q. J. Text Book of Environmental Sciences. Jodhpur, 2007. Print.

[7] Williams, I.d., and I.s. Mccrae. "Road Traffic Nuisance in Residential and Commercial Areas." Science of The Total Environment 169.1-3 (1995): 75-82. Print.

[8] Yilmaz, Guzel, and Yuksel Hocanli. "Mapping of Noise by Using Gis in ŞAnliurfa." Environmental Monitoring and Assessment 121.1-3 (2006): 103-08. Print.

دراسة تقسيم مدن ى مسا ات و مناطق متباينة من يث مستويات تلوث ضوضائي مروري باستخدام برنامج ArcGIS: نموذج دراسة مدينة كركوك

شنو مصطفى علي* ئاكو رشيد مه ** يونس مصطفى علي ***

**كلية الهندسة/ جامعة كركوك*

*** قسم الهندسة المدنية / جامعة كومار للعلوم والتكنولوجيا*

****كلية الهندسة/ جامعة السليمانية*

* البريد الالكتروني: shnoma@yahoo.com

** البريد الالكتروني: ako.rashed@komar.edu.iq

*** البريد الالكتروني: younis.ali@univsul.edu.iq

خلاصة

عتبر محتوى هذه الدراسة وسيلة علمية يمكن ان ستفاد منها لتقسيم مدينة كركوك والتي قع شمال العراق ٢٣٦كم شمال بغداد و ٨٣كم جنوب اربيل الى مناطق و مساحات مختلفة من حيث شدة المستويات التلوثي الضوضائي المروري فيها مت استخدام صور فضائية و برنامج ArcGIS من اجل ذلك . ان قسيم المساحات الى مناطق ذات مستويات لوثية متعددة و متباينة من حيث التلوث الضوضائي المروري لها اهمية كبيرة لمستقبل مدينة كركوك و خصوصا عند التصميم و التخطيط العمراني للمدينة . يمكن استخدام نتائج هذه الدراسة كمصدر علمي لحل مشكلة التضخم المروري في المدينة. من اهم مكونات التلوث الضوضائي هي اصوات ابواق السيارات و حركة العجلات و المواصلات المرورية والتى تالف من انواع مختلفة من حيث حجم العجلات الكبيرة منها والصغيرة و كذلك الانواع المختلفة من المحركات السيارات نفسها . اخذت ستة مناطق محددة من اجل دراستهن و هن : منطقة المحافظة , منطقة شارع بغداد , حي الواسطي , حي العسكري , حي النصر و كراج الشمال مت دراسة هذه المنطق الستة وحددت النقاط باستخدام جهاز GPS و اخذت قياسات لمستويات الضوضاء المروري و عادة كانت في التقاطعات المرورية او قريبة منها و علي مدى ثلاثة ايام مختلفة في الاسبوع و في ساعات مختلفة ضمن اليوم الواحد (الاحد و الاثنين و الثلاثاء من الاسبوع الاول من شهر الكانون الثاني من سنة٢٠١٦ . اضهرت النتائج مستويات عالية التلوث الضوضائي المروري وفق المواصفات العالمية و خصوصا (CPCB) و بلغت التلوث الضوضائي المروري مستوى ٩٤,٦ dB(A) حي الواسطي و قرب الجسر التي ودي الى جامعة كركوك في حين بلغت مستوى التلوث حدها الدنيا وكانت ٤٨ dB(A) في حي النصر مت اعداد خرائط كونتورية لتوزيع مستويات التلوث الضوضائي المروري للمدينة. هذه الخرائط يمكن ان كون ايضا خرائط للمانطق ذي التلوث الهوائي من حيث الغازات و الانبعاثات الغازية في المنطقة و خصوصا الانبعاثات كالرصاص و الزنك و الملوثات الغازية Nox , Sox .