VIVA-TECH INTERNATIONAL JOURNAL
FOR RESEARCH AND INNOVATION

ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

.

NOISE MONITORING USING GIS MAP

Devanand Patil[1], Pallavi Patil[2], Kalpita Pawar[3], Jignesh Wadkar[4]
[1](Department of Civil Engineering, Mumbai University , INDIA)
[2](Department of Civil Engineering , Mumbai University , INDIA)
[3](Department of Civil Engineering , Mumbai University , INDIA)
[4]((Department of Civil Engineering , Mumbai University , INDIA)

Abstract : *Noise effluence is a issue one might ignore if we are talking about a scenario From 2-3 decade before it was not that much of a concern but as in today's World its important to see through it cause noise pollution is in boom from past decades and causing issues in every sector and it is important too in the civil side so keeping all this in mind and providing a solution for it.*

As nowadays site selection is tedious and very lengthy process and do required lot of research and man work and to simplify one of it's process that is considering the noise ratio and selecting the best place with less noise pollution we are providing a solution by plotting a noise map on a Q-GIS map and showing a detailed information about noise dispersion on the map which will help to select you the project location . As nowadays the noise pollution is a issue of concern as if we select a area of high noise ratio it will have a adverse effects in the longevity of the structure and the other ill effects on the nearby structure so to overcome all this it can come in very handy to see through this factors with a standard and verified source of this information which is key to a building structure which will have a long life and will sustain many issue that are being caused due to the vibration and in today's life in the city it is very important to check all this as it was not done in past which was causing a lit of issues in the aftermath of the structure.

Keywords – MONITORING , NOISE MAPPING , NOISE POLLUTION, QGIS ,VIRAR CITY, TRAFIC NOISE

I.   INTRODUCTION

Moment, the noise pollution is one of the principle types of civic natural impurity. What's further, it's responsible for the negative goods that are dangerous to the earth and the particular weal of the people. The increase in noise pollution relies upon multitudinous rudiments and in addition, they increase in the civic population and therefore the expansion in the number of development exercises and vehicles sound is the source of communication, entered by transmitted swells of pressure and event of similar swells and their perception by the brain. A type of energy caused by vibration sound will sound like when it reaches the observance depends on the medium it travels through and strength of the original vibration. There's a direct relationship between noise and health. Noise- related problems include stress- related ails, hypertension, speech diseases, hail loss, sleep disturbances, and bring productivity. The habitual problem of noise pollution is noise convinced hail loss, causes further more health problems. The morning of noise pollution can be substantially credited to the unrestricted growth of civic population, there are numerous sources of noise, generally grouped into stationary, mobile and collaborative sources. Noise pollution is the total of unwanted or dangerous sounds that are in terms of health and quality of life, performing from mortal conditioning. In recent times, inordinate noise has also gained a different characteristic besides being a factor that causes discomfort. It's observed that when people are exposed to sound swells at high intensities for long ages of time, they lose their health. Environmental pollution and its attention are significantly adding and are causing a global trouble to the quality of the terrain and the fragile ecosystem of the Earth. operation of environmental pollution is a challenge in itself; air, water, dangerous waste and noise pollution are now serious enterprises in numerous nations. One of the serious and most frequently overlooked issues about environmental pollution is environmental noise. Noise is seen as a normal miracle.

Action plans and posterior auricular planning aren't seriously considered in numerous corridor of the world. As a result, the impact of noise isn't well understood. It's important to measure the position of noise expiring from specified sources and to partake similar information. Noise mapping is an optimization fashion that can be deduced for different time ages(day/ night and peak or non- peak hours). the main use of noise charts is to identify and quality the scale of noise problems at original, indigenous, public position and give information for city planning and business operation. noise chart provides spatial donation of aural and operation process. noise goods can be determined in Civilians by combining noise situations with the position of people living in the area and their sensibility to noise. The purpose of this study is to identify and quantify the extent of the noise problem. To study spatial donation of aural situation.

1.1 OBJECTIVES

The main objectives of the study are:
• To collect the noise data on different locations.
• To determine the noise contours of each area for Noise mapping.
• To Acquisition and comparison of noise levels for different zones in Virar
• To determine applications of Q-GIS in creating noise maps for the prevailing different noise levels in the study area.

Table No 1.1 Permitted noise level at different location

Types of area	Day Time	Night Times
Industrial area	75 dB	70 dB
Commercial area	65 dB	55 dB
Residential area	55 dB	45 dB
Silence zone	50 dB	40 dB

II. LITERATURE SURVEY

Guzel Yilmaz and Yuksel Hocanl (2006) [1]
Sanliurfa city is selected for this study. Noise levels are measured by Rion NL-31 equipment is used. Point source noise map and line source noise map were created using the measurements and studied thoroughly.

Ming Cai , Jingfang Zou , Jiemin Xie , Xialin Ma (2014) [2]
Guangzhou city is selected for this study. The road traffic noise in guangzhou is calculated using GPS data. GIS data are used to construct traffic noise maps in the daytime and at night. This study is expected to help control traffic noise pollution in Guangzhou because mapping can provide useful feedback to public authorities in implementing traffic management policies to reduce urban traffic noise.

Dipeshkumar R. Sonaviya and Bhaven N. Tandel (2019) [3]
Surat city is selected for this study. In this research study Sound PLAN can create noise contour maps in cities & the open environment from basic 3D geometry & traffic information. This study indicates that noise level is higher even during night time.

Ertugrul Esmeray & Sercan Eren –(2017) [4]
Tehran city selected ,they are developing the green lands in area with high NP , banning the travelling of noise making cars to the study area , restricting the construction of largecommercial & industrial centers in area where NP is high.

A.R.Akiladevi, T.Renganathan, R.Aravind Kumar, R.Banupriya, S.Vanisri [5]
In this study, we've observed the traffic noise level using sound meter in busy corridors of Chennai City. The traffic noise levels are observed in the range of 65-86 dB during peak and non-peak hours.

Prof.Vilas K Patil, Dr. Prashant P Nagrale, Suyash P Lunawat, Sarthak N Dharankar (2018) [6]
The areas of study were the busy and crowded locations in city of nasik. This study can be helpful to the city authorities for further planning of the city and restructuring the current road network. QGIS proved to be an

effective tool for creating maps from both spatial and non-spatial data.

Banerjee et al, (2009) [8]
In this paper Asansol city , West Bengal selected , they study present noise level in all the locations exceeds the prescribed limit. Based on the findings, the population in this industrial town is exposed to significantly high noise levels, which were caused mostly by road traffic. The study reveals that vulnerable establishments like schools and hospitals were subjected to significantly high noise level throughout the day and immediate mitigating measures are required to alleviate the problem.

Gino Dardanelli , Mauro Lo Brutto , Antonino Maltese [9]
This study realized the first acoustic map for vehicular traffic in the urban center of the city of Palermo. It was evident in the first analysis of the traffic data provided by the Urban Traffic Plan that the general situation of the town was rather congested. In this context, a heterogeneous situation was found. The first clear difference was found in the distribution of traffic flows

Amal Iaaly-Sankari, Oussama Jadayel, Nicolas El-Murr [11]
In this paper, it may be seen that Civilians handed an ideal tool for relating NRZ. The work handed a base for a comprehensive study of noise pollution and a proper platform for result interpretation. Ambient noise situations recorded were seen to be much advanced than respectable norms. The methodology developed herein could fluently be applied in analogous civic settings. farther work could be carried out in order to probe the temporal variation of noise situations, whether on diurnal, daily, or indeed yearly bases.

Kluijver and Stoter, 2003 [12]
In this paper berg city selected , they study important factors affecting noise level values such as: continuity of traffic flow, dimension of the road, position of the road, road surface materials, and type of signal system. In addition, disobeying traffic rules, irregular stop and move of vehicles , unpermitted parking on the road, and use of the small motor vehicles for freight are considered as noise- causing problems for the traffic flow.
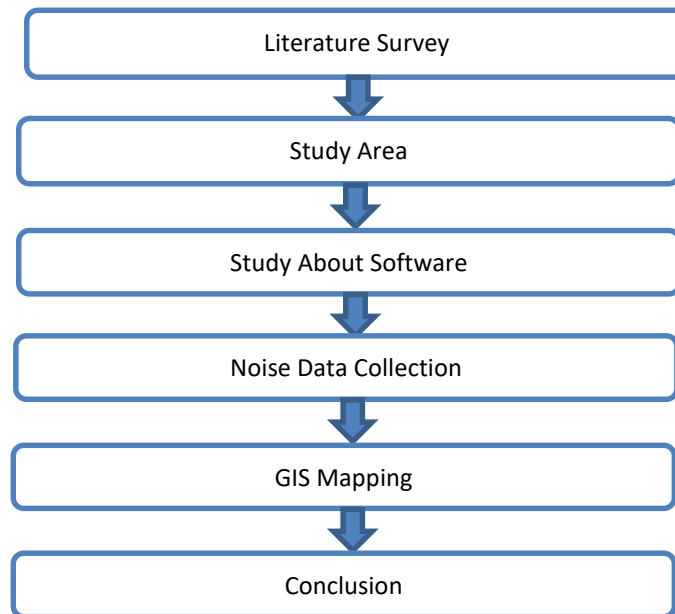
Geographia technica, 2017 [13]
This study realized the first acoustic map for vehicular traffic in the urban center of the city of Palermo. It was evident in the first analysis of the traffic data provided by the Urban traffic Plan that the general situation of the town was rather congested. In this context, a heterogeneous situation was found. The first clear difference was found in the distribution of traffic flows. Three distinct scenarios could be identified: main roads for access to the city, on which there are very steady daily trends and considerable traffic flows distributed on wide streets; roads of the city center where there are heavy traffic flows, mainly consisting of traffic to and from work and school, but on rather narrow carriageways; roads of peripheral areas whose flows are not significant in the economy of the macro-area.

Indian journal of science and technology April, 2019 [14]
Noise pollution is not only causing environmental but it also gives a negative impact on human health as if the hearing loss, hypertension, ischemic heart disease, annoyance, and sleep disturbance. Hereupon noise is dangerous to the environment as well as human being health so the noise control or noise mitigation is required to reduce the negative impact of noise pollution on the environment and human being. Noise control or mitigation is a technique of reducing unwanted sound emissions. There are various techniques of noise control or mitigation as if sounds insulation, sound absorption, vibration damping, and vibration isolation. This paper only highlights the noise mapping using GIS.

II. METHODOLOGY

```
┌─────────────────────────────┐
│      Literature Survey       │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│         Study Area           │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│     Study About Software     │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│     Noise Data Collection    │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│         GIS Mapping          │
└─────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐
│          Conclusion          │
└─────────────────────────────┘
```

In this study, we have studied some literature survey. we have selected Virar (east, west) location for data collection. we have use Q-GIS software for noise monitoring map. we watched some tutorials of Q-GIS software and we learn something from it. Noise data were collected by using the "METRAVI SL-4005 Sound Level Meter". Noise data readings were carried out during the working days from Monday to Friday.
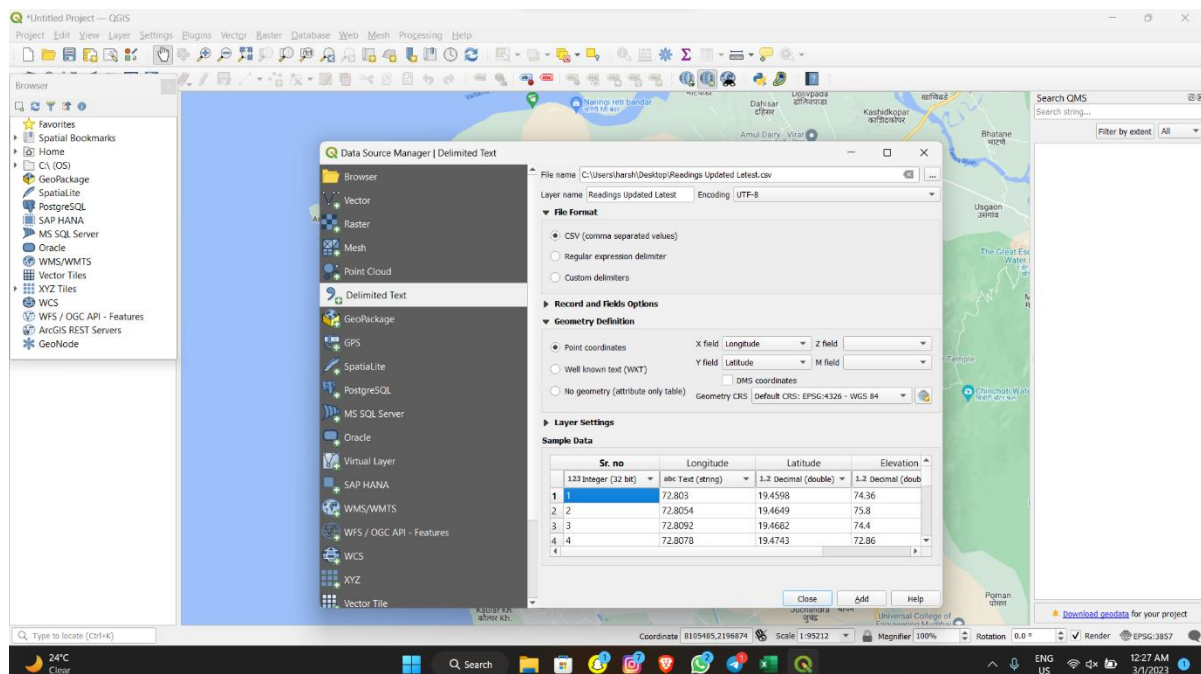

Fig.1.Data Input

Noise monitoring was divided into two parts as per central pollution control board BOISAR (CPCBB) guidelines, day/time and night/ time. The calibrator was used to calibrate a sound level meter for each measurement. This instrument was set for a weighting continuous and all the readings were taken as per CPCB protocol. Place the sound level meter at a sufficient distance from any obstacles or reflectors.. Place the microphone of the sound position cadence about1.3 to1.5 m above the ground. Place the microphone of the sound position cadence in the

4

direction of the sound source We will take reading of noise pollution and then we will put it in Q-GIS software then we will see the results of overall noise pollution of that particular area. We have conducted reading in both Virar (East ,West) location. We took readings at different locations like silent zone, residential building, commercial building etc. We took five reading at one location. I will take the average of those five readings and get that reading. Then we will put this reading in the Q-GIS map. Contour map will be prepared after that reading. Then we will see results of overall noise pollution of that particular area.

2.1 Study Area

The Areas of study were the busy and crowded locations in city of Virar. Virar city is in the state of Maharashtra in India located at 19.4564° N, 72.7925° E. The area of the city is 150 m^2 and Population is 1,221,234. The road networks are old and incapable of handling the heavy traffic. With the increasing number of vehicles this problem seems to get bigger.

Virar lies on the western seacoast of Maharashtra, to the north of Mumbai and gests warm, sticky climate throughout the time. In discrepancy to the last time, this time's Diwali saw an increase in noise situations across Maharashtra, stressed reports. According to the Maharashtra Pollution Control Board, the noise position during Diwali has increased by1.5 per cent during the day and 2.77 per cent at night. The Maharashtra Pollution Control Board(MPCB) measured noise pollution caused by firecrackers at 152 places across the state. Grounded on accounts, Virar recorded the loftiest diurnal noise position of10.55 per cent. This time, the sound position was set up to be71.66 rattle. Grounded on accounts, Virar recorded the loftiest diurnal noise position of10.55 per cent. This time, the sound position was set up to be 71.66 rattle.

2.2 Equipment Details

- Two models provide ± 1.5dB accuracy
- Meets IEC651 type II standard
- A and C weighting
- Higher and lower measure range :-
- Low (35 to 100 dB)
- High (65 to 130 dB)
- 0.1dB resolution
- Data holds and max holds
- Built-in calibration check (94dB)
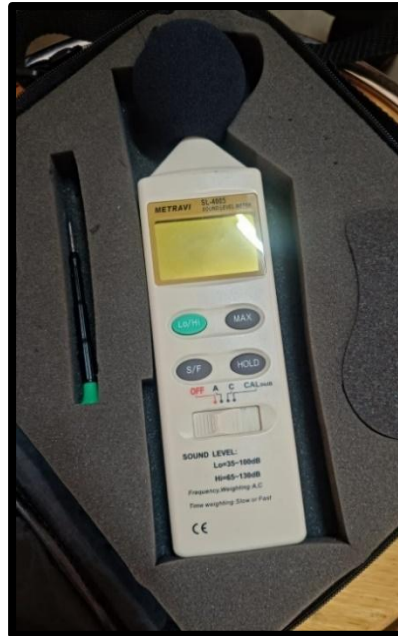- Large 3^1/2 digital LCD display with function indication.

Fig 1.1 Sound Level Meter

2.3 Q-GIS Software

In market there are lots of software which can make noise map. For this study we are using Q-GIS software. There are several mapping software programs; still, they're generally precious and have a steep literacy wind. Q- GIS(Quantum Geographic Information System) is a free, open- source software that allows druggies to produce, edit, fantasize, dissect, and publish geospatial information. There are numerous benefits to using Q-GIS First, the software offers numerous free online coffers and charts available to download. Q- GIS also accepts numerous vector train formats. Eventually, there are a variety of draw- sways for implicit use, and there are always new draw- sways being created. Plug- sways are redundant operations that can be downloaded to complete a specific task that isn't fluently fulfilled else Q-GIS provides a continuously growing number of capabilities provided by core functions and plugins. You can visualize, manage, edit, analyze data, and design maps.

Open-source software benefits from the contributions of experts and users worldwide and from the ability of all users to access and verify code, procedural algorithms, etc. In contrast, the code and procedural algorithms of some proprietary/commercial software packages are designed by a limited group of software developers and are often unavailable to users, making procedures somewhat of a "black box." In the next section, we will explore some aspects of the Q-GIS user interface. It is important to note before continuing that Q-GIS periodically releases new versions. The most recent long-term release (LTR) as of this publication is 3.4.5 (new LTR). This version is the one we will use for this document.
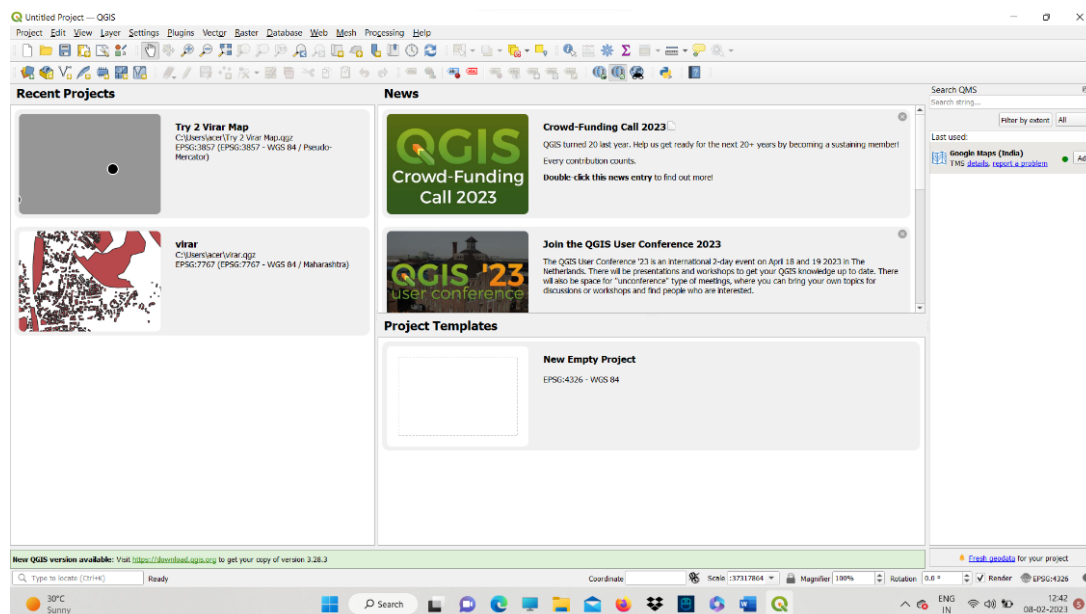
Fig.1.2 A Screenshot of Q-GIS Desktop

2.4 Function

2.4.1 Measure Line –
QGIS is suitable to measure real distances between given points according to a defined ellipsoid. To configure this, choose menu option Settings ‣ Options, click on the Chart tools tab and elect the applicable ellipsoid. .

2.4.2 Measure Area –
Areas can also be measured. In the measure window, the accumulated area size appears .

2.4.3 Measure Angle –
We can also measure angles. The cursor becomes cross-shaped. Click to draw the first member of the angle you wish to measure, also move the cursor to draw the asked angle. The measure is displayed in a pop- up dialog

2.4.4 Grid –
Grid allows you to add a match grid and coordinate reflections to the map canvas.
1) elect from menu View ‣ Decorations ‣ Grid. The dialog starts
2) spark the checkbox Enable grid checkbox and set grid delineations according to the layers loaded in the map canvas.
3) spark the checkbox Draw reflections checkbox and set reflection delineations according to the layers loaded in the map canvas.
4) Click(Apply) to corroborate that it looks as anticipated.
5) Click(OK) to close the dialog.

2.4.5 Copyright label –
adds a brand marker using the textbook you prefer to the chart.
1) elect from menu View ‣ Decorations ‣ Brand Marker. The dialog starts.
2) Enter the textbook you want to place on the chart. You can use HTML as shown in the illustration.
3) Choose the placement of the marker from the Placement elect string quintet box.
4) Make sure the checkbox Enable Brand Marker checkbox is checked.
5) Click(OK).

2.4.6 North Arrow-
places a simple north arrow on the chart oil. At present, there's only one style available. You can acclimate the angle of the arrow or let QGIS set the direction automatically. However, it makes its stylish conjecture as to how

7

the arrow should be acquainted, If you choose to let QGIS determine the direction. For placement of the arrow, you have four options, corresponding to the four corners of the chart oil.

2.4.7 Scale Bar –

we can control the style and placement, as well as the labeling of the bar. 1) elect from menu View ‣ Decorations ‣ Scale Bar

2) The dialog starts Choose the placement from the Placement elect string quintet box.

3) Choose the style from the Scale bar style elect string quintet box.

4) elect the color for the bar Color of bar select color or use the dereliction black color. Set the size of the bar and its marker Size of bar select number.

5) Make sure the checkbox Enable scale bar checkbox is checked. Optionally, check checkbox Automatically snap to round number on resize.

6) Click(OK).

2.4.8 Annotation Tools –

Tool in the trait toolbar provides the possibility to place formatted textbook in a balloon on the QGIS. Use the Text Reflection tool and click into the map canvas.

III. OBSERVATION TABLE

SR	LONGITUDE	LATITUDE	ELEVATION	ZONE
1	72.803	19.4598	74.36	Residential
2	72.8034	19.4649	75.8	Residential
3	72.8092	19.4682	74.4	Silence
4	72.8078	19.4743	72.86	Silence
5	72.8039	19.4694	72.22	Residential
6	72.8045	19.4637	79.94	Silence
7	72.8008	19.45.97	71.52	Silence
8	72.7986	19.4549	76.39	Silence
9	72.8004	19.4477	71.68	Residential
10	72.8004	19.4468	75.14	Residential
11	72.8082	19.5416	79.56	Commercial
12	72.8234	19.4429	68.88	Residential
13	72.8123	19.4566	80.62	Commercial
14	72.8145	19.4596	81.74	Silence
15	72.8125	19.4637	70.66	industrial
16	72.8148	19.4652	80.36	Residential

17	72.8143	19.4668	82.06	Silence
18	72.8157	19.4565	81.3	Silence
19	72.8176	19.4697	81.06	Silence
20	72.8202	19.4720	78.44	Silence
21	72.8212	19.4723	72.32	Silence
22	72.8243	19.4725	77.92	Residential
23	72.8310	19.4731	76.16	Commercial
24	72.8584	19.47.36	72.30	Silence

Table No. 1 Noise Readings

IV. CONCLUSION

Noise pollution is causing many harms to the environment . To get noise data simply at one place the noise Map is being prepared. Noise control and mitigation is very important in reducing the sound emission .

Collected noise data of Virar region shows the high noisy areas of Virar. Day time readings are taken to create Noise Map. These readings shows that the high noisy areas of Virar are mostly in Virar East . The most of noise pollution is caused due to traffic . The silent areas whose standard permissible noise level should be 50dB it is observed that in day time it raises up-to 80 , 81dB.

This noise map helps to get the noise data of Virar at one place which helps to find noisy area easily and take actions accordingly to reduce Noise pollution. The noise can be controlled by using various methods such as Noise Insulation , Sound Absorption , Vibration Insulation , etc
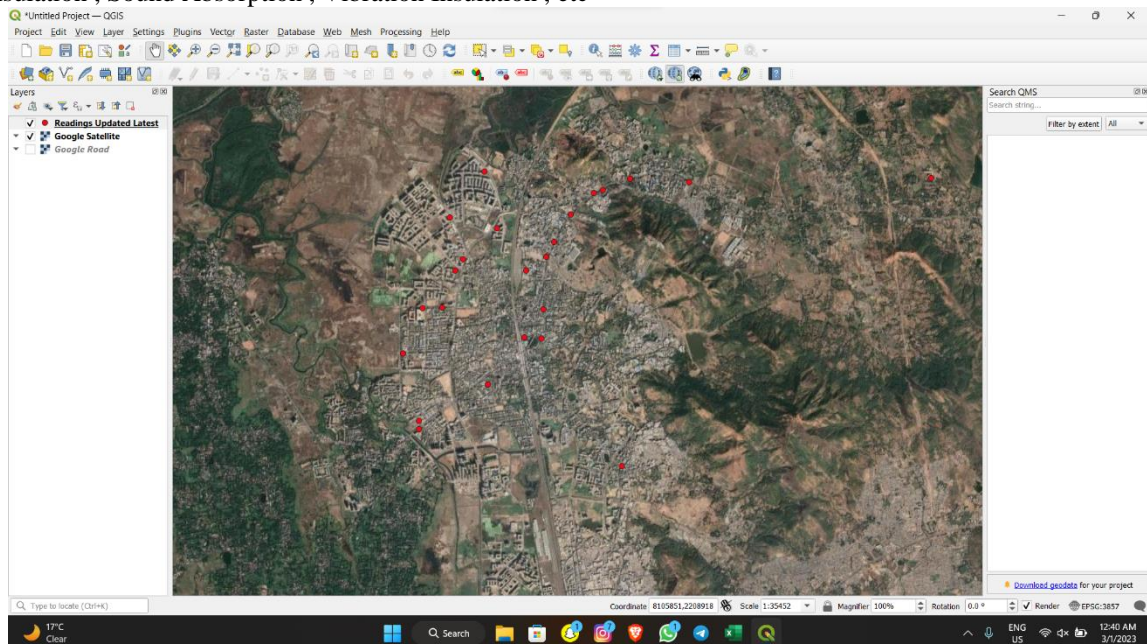

Fig.1.3 Point Plotting for Contour

V. ACKNOWLEDGEMENT

VI. REFERENCES

1. Guzel Yilmaz and Yuksel Hocanl, Mapping Of Noise By Using GIS In Sanliurfa, 2006.
2. Ming Cai , Jingfang Zou , Jiemin Xie , Xialin Ma, Road Traffic Noise Mapping in Guangzhou (China) Using GIS and GPS, 2014
3. Dipeshkumar R. Sonaviya and Bhaven N. Tandel, 2-D Noise Maps For Tier -2 City Urban Indian Roads, 2019
4. A.R.Akiladevi, T.Renganathan, R.Aravind Kumar, R.Banupriya, S.Vanisri, Mapping Of Noise Pollution By Using GIS On Busy Corridors in Chennai
5. Prof.Vilas K Patil, Dr. Prashant P Nagrale, Suyash P Lunawat, Sarthak N Dharankar, Noise Mapping Using Q-GIS, 2018
6. F. Farcas, Sivertun, Road business noise Civilians tools for noise mapping and a case study of skane region
7. Gino Dardanelli, Mauro Lo Brutto, Antonino Maltese, Analysis of Technical Criticalities for GIS Modelling an Urban Noise Map
8. Marina Butorina, Noise Zoning of the City Using Noise Mapping
9. Amal Iaaly-Sankari, Oussama Jadayel, Nicolas El-Murr, Title Name: Urban Noise Mapping :The Case of the City of El-Mina,   North Lebano.
10. Kluijver and Stoter, Noise pollution, 2003
11. Geographia technica, 2017
12. Indian journal of science and technology April, 2019