

Purpose

The purpose of this research is:

- To find the optimal/best potential location for new Hospital inside Kathmandu valley.
- To work in proven methodology to establish top list of potential sites for a new hospital.
- In Kathmandu Valley and identify a shortlist of sites.
- To evaluate the alternative for the best location.

Introduction

Selecting a location for a potential hospital often decides the success or the failure of such a facility. It is thus important to assess the locations from multiple dimensions before selecting the site. This document focuses on the multi factor evaluation of hospital sites using **Data Driven Analysis process (DDAP)** and evaluates three potential sites inside Kathmandu valley. This document is considered three major factors and eleven sub factors in the evaluation. Findings show that among the sub factors, cost of land, population density and proximity to public transport evolved as the three most significant sub factors.

While opening a Hospital can be a very lucrative business, a lack of demand causes many hospitals to close overtime. There are many different factors that can account for a Hospital's success such as location, competition, patient experiences, Doctor's rating and specialities, etc. These are some important questions that every investor must carefully answer before deciding whether to open a hospital or not.

Besides there are many other factors such as environmental, clinical, potential to grow, legal and regulatory etc.

To demonstrate the process of picking a location for a client opening a business, the project will focus on answering the following question: "If the client wanted to open a world class hospital inside Kathmandu Valley, what areas are the best options to open the Hospital?"

We will follow the data driven approach and perform various analytics on those data to answer the following questions.

1. General
2. Location wise babal thaum xa?
 - a. Does the highway network, locally and strategically, have the capacity to access and serve the hospital?
 - b. Kathmandu ko sabai point bata xito pugna sakinxa
 - c. Existing Highway networks to connect to outside of KTM
 - d. Traffic Congestion ko ni issue khasai xaina
 - e. Public Transportation ko availability and

f. Availability of developable land

Data

To answer this business problem, the following factors have to be extracted from various data sources:

- Population & Ethnic Distribution of Each Neighborhood (Nepal Census)
- Income Distribution of Each Neighborhood (Nepal Census)
- Number of Hospitals in Each Neighborhood (Google Map API)
- Air Quality Index (data from <https://pollution.gov.np/>) and Local Research

The Nepal Census data was extracted from Census of Nepal

Data Collection

To answer this business problem, the following factors have to be extracted from various data sources:

- Population & Ethnic Distribution of Each Neighborhood (Nepal Census)
- Income Distribution of Each Neighborhood (Nepal Census)
- Number of Hospitals in Each Neighborhood (Google Map API)
- Distance to the hospitals from prime areas (Google Directions API)
- Air Quality Index (data from <https://pollution.gov.np/>) and Local Research

Besides, we have collected the following data manually.

1. Major hospitals inside Kathmandu Valley and various data related to them

a. General

- i. Name of Hospital
- ii. Latitude
- iii. Longitude
- iv. Address
- v. Phone Number
- vi. Website
- vii. Key Highlights
- viii. Owner Name
- ix. Owner Background

b. Location and Space

- i. Built up Area

- ii. Open Space Area
- iii. Availability of Public Transportation
- iv. Easy access from all points of Valley
- v. Traffic Congestion
- vi. Less Air Pollution
- vii. Less Noise Pollution
- viii. Encouragement of Sustainable use of Resources
- ix. Enough Car/Bike Parking
- x. Can be Accesed from Multiple Directions
- xi. Cafeteria for Visitors
- xii. Waiting Room for Visitors
- xiii. Sufficient Waiting Area
- xiv. Distance from Thankot
- xv. Distance from Koteshwor
- xvi. Distance from Sanga
- xvii. Distance from Airport

c. Infrastructure and equipments

- i. Number of Beds
- ii. Number of Hospital Rooms
- iii. Number of Operating Theatre
- iv. Number of Ambulances
- v. Number of Ventilators
- vi. Number of special care beds
- vii. Number of Private and VIP cabins

d. Staff Details

- i. Number of Doctors
- ii. Number of Nurses
- iii. Number of Assistants

e. Capacity Utilization

- i. Number of Out Patients
- ii. Number of In Patients
- iii. Number of recurring Patients

f. System and Process

- i. Easy Appointment Booking Over Internet
- ii. Mobile App
- iii. Public Noticeboard and Easy to Navigate Directions
- iv. International Relations Desk
- v. Enough Consulting Time with Doctors
- vi. Implementation of EMR
- vii. Telemedicine Facility for Remote patients
- viii. Food Catering services to patients
- ix. Laundry services to patients
- x. 24/7 in house specialists
- xi. Availability of treatment packages for IPD
- xii. Average Time Taken for Discharge
- xiii. Average Length of Stay
- xiv. Mortality rate
- xv. Patient Safety Guidelines and Goals
- xvi. Patient Family Education

g. Key specialists

- i. Doctor Name
- ii. Availability
- iii. Key Specialization

h. Clinical Departments

- i. Cancer Care
- ii. Cardiac Sciences
- iii. Diagnostic Medicine
- iv. Digestive Diseases
- v. Emergency Medicine & Pre Hospital Care
- vi. ENT-Head & Neck Surgery
- vii. Internal Medicine, Endocrinology & Wellness
- viii. Neurosciences
- ix. Peri Operative Medicine
- x. Physiotherapy & Rehabilitation

- xi. Renal Sciences
- xii. Rheumatology and Clinical immunology
- xiii. Clinical Nutrition and Dietetics
- xiv. Critical Care
- xv. Dentistry
- xvi. Dermatology
- xvii. General Surgery
- xviii. Gynecology and Obstetrics
- xix. Laboratory Medicine & Pathology
- xx. Neuro-psychiatry
- xxi. Ophthalmology
- xxii. Orthopedics and Joint Reconstruction
- xxiii. Paediatrics and Neonatology
- xxiv. Plastic Reconstructive and Cosmetic Surgery
- xxv. Pulmonology

i. Other Facilities

- i. Number of Pharmacies Inside Hospital
- ii. Number of Discounted Pharmacies
- iii. Number of Pharmacies within 200m radius
- iv. ATM machines within 200m radius
- v. Restaurants / Convenience Store Nearby

j. Franchise & Branches

- i. Franchise to 3rd party
- ii. Number of Branches/Franchises
- iii. Number of Checkup Clinics
- iv. Number of Official Branches

k. User Reviews

l. Miscellaneous

- i. Population Density-1KM Radius
- ii. Population Density-3KM Radius
- iii. Traffic data

- iv. Growing Population within 3KM Radius
- v. Space for Growth and Expansion
- vi. Helipad
- vii. Doctor on Call
- viii. Home care counselling
- ix. AI and Future Ready Health
- x. Sanitation and Cleanliness

m. Environmental impacts

- i. pollution
- ii. Harm to Historical and Cultural Assets
- iii. Remarks

Data Processing and Compilation

All the hospitals located inside and near kathmandu is taken from google map api.All the necessary fields used for ranking top hospitals is also taken. Then, an algorithm traverses through all the fields that are provided , then compares the weights of all those fields for all the hospitals to find the top 10 significant hospitals.

Major Criteria and Criteria Weight

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
1	General	4920	Name of Hospital	1000	1024
			Latitude	990	4096
			Longitude	980	3072
			Address	980	5120
			Phone Number		
			Website		
			Key Highlights		
			Owner Name		
			Owner Background		
2	Location and Space	1910	Built up Area		
			Open Space Area	960	6144
			Availability of Public Transportation	950	7168
			Easy access from all points of Valley		
			Traffic Congestion		
			Less Air Pollution		
			Less Noise Pollution		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
3	Infrastructure and equipments		Encouragement of Sustainable use of Resources		
			Enough Car/Bike Parking		
			Can be Accesed from Multiple Directions		
			Cafeteria for Visitors		
			Waiting Room for Visitors		
			Sufficient Waiting Area		
			Distance from Thankot		
			Distance from Koteshwor		
			Distance from Sanga		
			Distance from Airport		
5	Staff Details		Number of Beds		
			Number of Hospital Rooms		
			Number of Operating Theatre		
			Number of Ambulances		
			Number of Ventilators		
			Number of special care beds		
			Number of Private and VIP cabins		
			Number of Doctors		
			Number of Nurses		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
6	Capacity Utilization		Number of Nurses		
			Number of Assistants		
			Number of Out Patients		
			Number of In Patients		
7	System and Process		Number of recurring Patients		
			Easy Appointment Booking Over Internet		
			Mobile App		
			Public Noticeboard and Easy to Navigate Directions		
			International Relations Desk		
			Enough Consulting Time with Doctors		
			Implementation of EMR		
			Telemedicine Facility for Remote patients		
			Food Catering services to patients		
			Laundry services to patients		
			24/7 in house specialists		
			Availability of treatment packages for IPD		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
			Average Time Taken for Discharge		
			Average Length of Stay		
			Mortality rate		
			Patient Safety Guidelines and Goals		
			Patient Family Education		
8	Key specialists		Doctor Name		
			Availability		
			Key Specialization		
9	Clinical Departments	990	Cancer Care		
			Cardiac Sciences	960	6144
			Diagnostic Medicine	950	7168
			Digestive Diseases		
			Emergency Medicine & Pre Hospital Care		
			ENT-Head & Neck Surgery		
			Internal Medicine, Endocrinology & Wellness		
			Neurosciences		
			Peri Operative Medicine		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
			Physiotherapy & Rehabilitation		
			Renal Sciences		
			Rheumatology and Clinical immunology		
			Clinical Nutrition and Dietetics		
			Critical Care		
			Dentistry		
			Dermatology		
			General Surgery		
			Gynecology and Obstetrics		
			Laboratory Medicine & Pathology		
			Neuro-psychiatry		
			Ophthalmology		
			Orthopedics and Joint Reconstruction		
			Paediatrics and Neonatology		
			Plastic Reconstructive and Cosmetic Surgery		
			Pulmonology		
10	Other Facilities		Number of Pharmacies Inside Hospital		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
			Number of Discounted Pharmacies		
			Number of Pharmacies within 200m radius		
			ATM machines within 200m radius		
			Restaurants / Convenience Store Nearby		
11	Franchise & Branches		Franchise to 3rd party		
			Number of Branches/Franchies		
			Number of Checkup Clinics		
			Number of Official Branches		
13	Miscellaneous		Population Density-1KM Radius		
			Population Density-3KM Radius		
			Traffic data		
			Growing Population within 3KM Radius		
			Space for Growth and Expansion		
			Helipad		
			Doctor on Call		
			Home care counselling		

SN	Main Criteria	Main Weight	Sub Criteria	Sub Criteria Weight	Priority
			AI and Future Ready Health		
			Sanitation and Cleanliness		
14	Environmental impacts		pollution		
			Harm to Historical and Cultural Assets		
			Remarks		

Most Significant Hospitals According to our Data

These are the top 10 hospitals computed by weighted system with data available.

SN	Name of Hospital	Latitude	Longitude	Weight
1	Civil Service Hospital Of Nepal	27.6863031	85.3388038	5880
2	Himal hospital	27.710568	85.3284891	4920
3	Kantipur Hospital	27.6855939	85.3447983	4920
4	KIST Medical College Teaching Hospital	27.6629355	85.33509900000001	4920
5	Kathmandu Model Hospital	27.702041	85.3201443	4920
6	Nidan Hospital Ltd.	27.6789865	85.3158868	4920
7	Nobel Hospital	27.69793709999999	85.3481702	4920
8	भेनस अस्पताल	27.6972168	85.33765179999999	4920
9	Norvic International Hospital	27.6899471	85.3192466	4920
10	Nepal-Bharat Maitri Hospital	27.711591	85.3456219	4920

Significant hospitals inside kathmandu

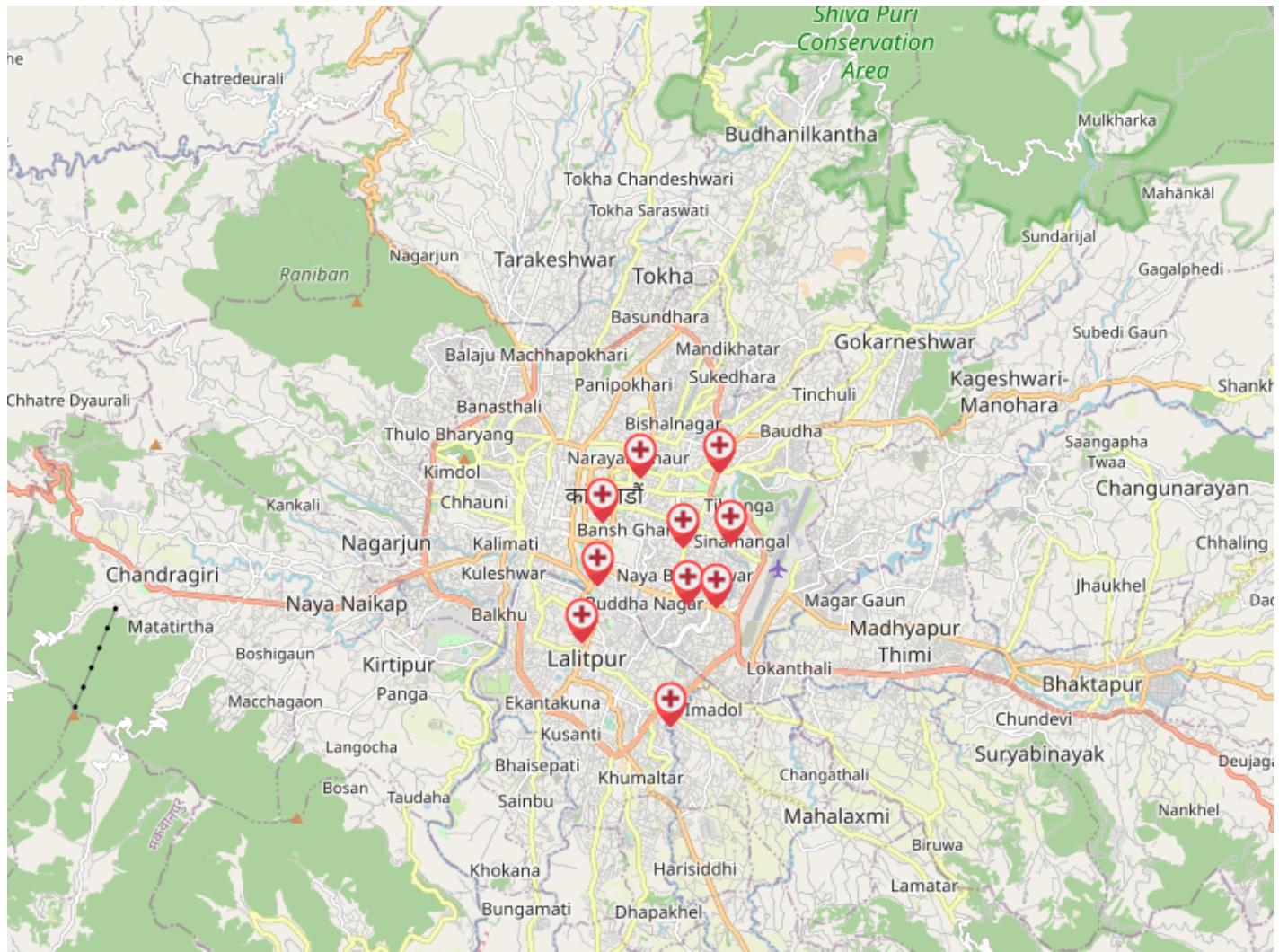
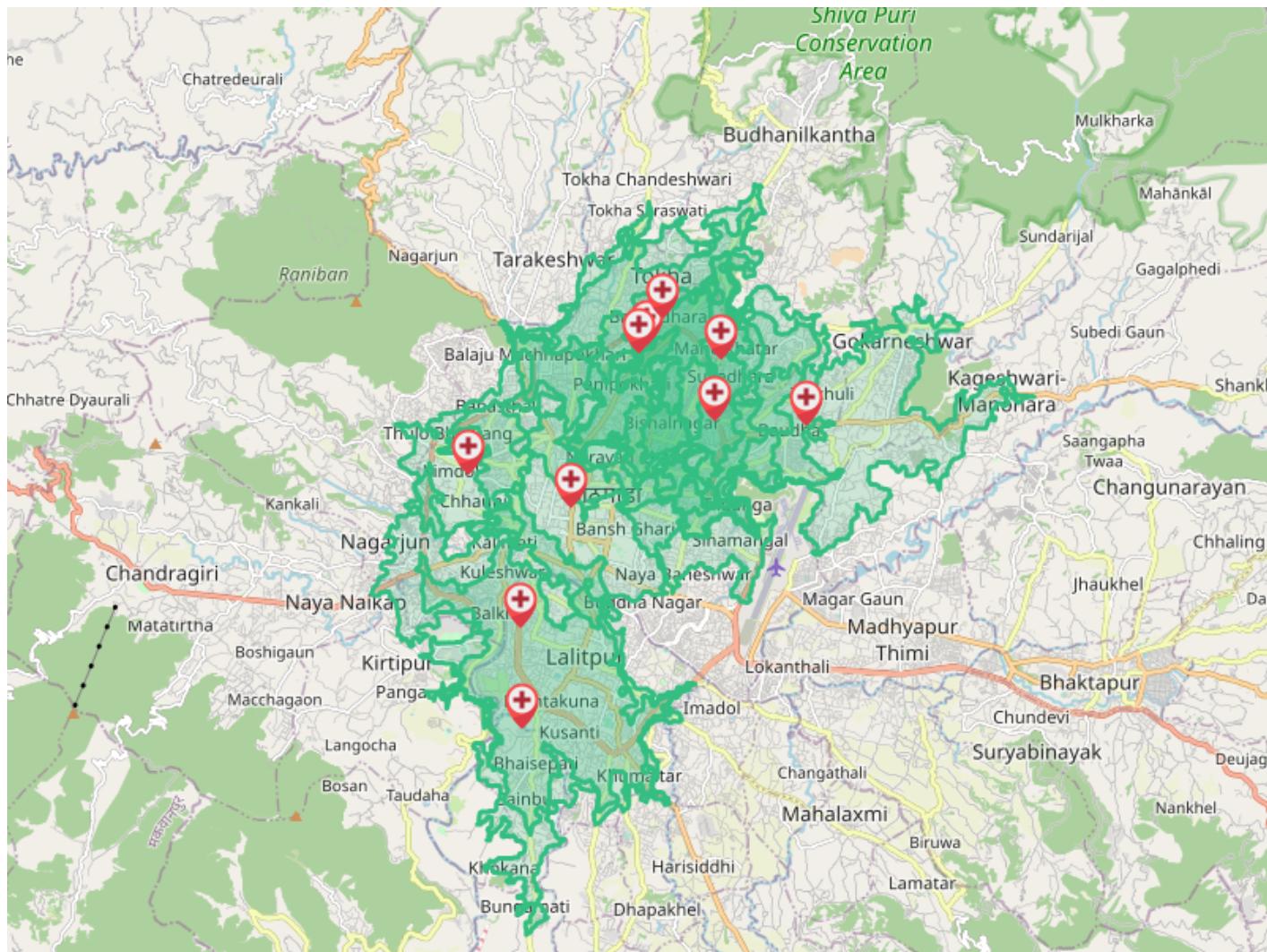
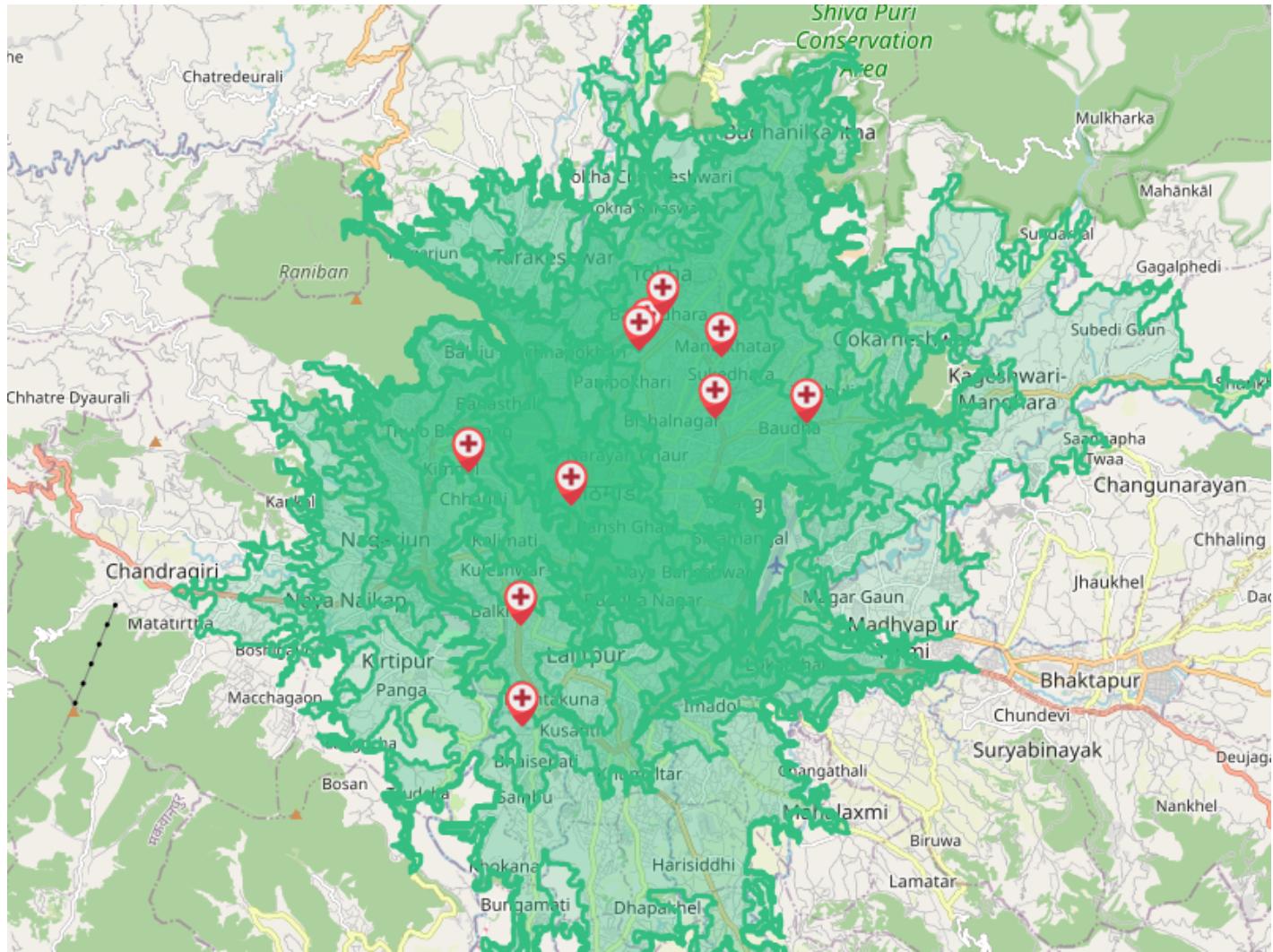


Image of Significant hospitals in kathmandu



Isoline image of Significant hospitals within 10 minutes

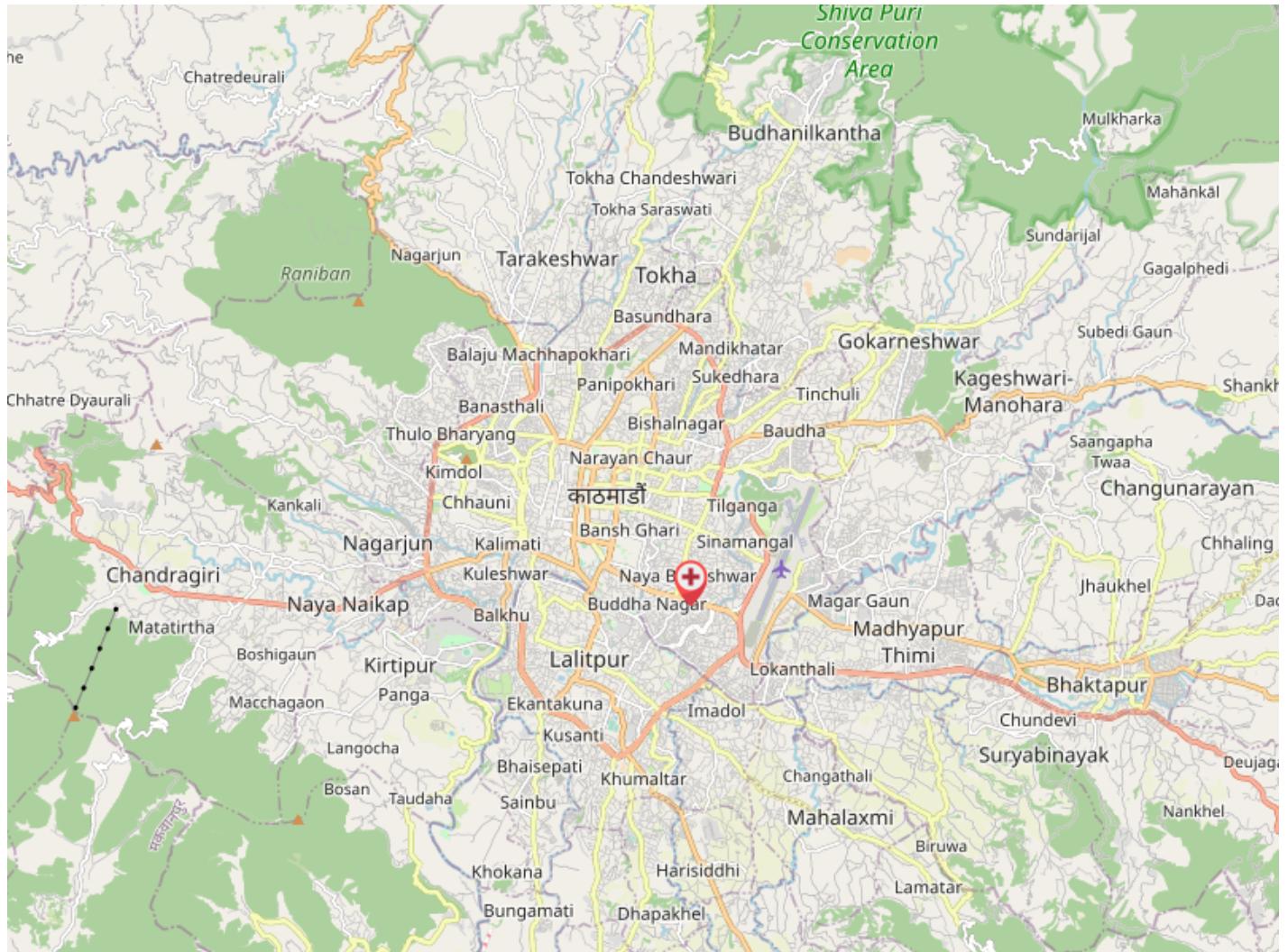


Isoline image of Significant hospitals within 10 minutes

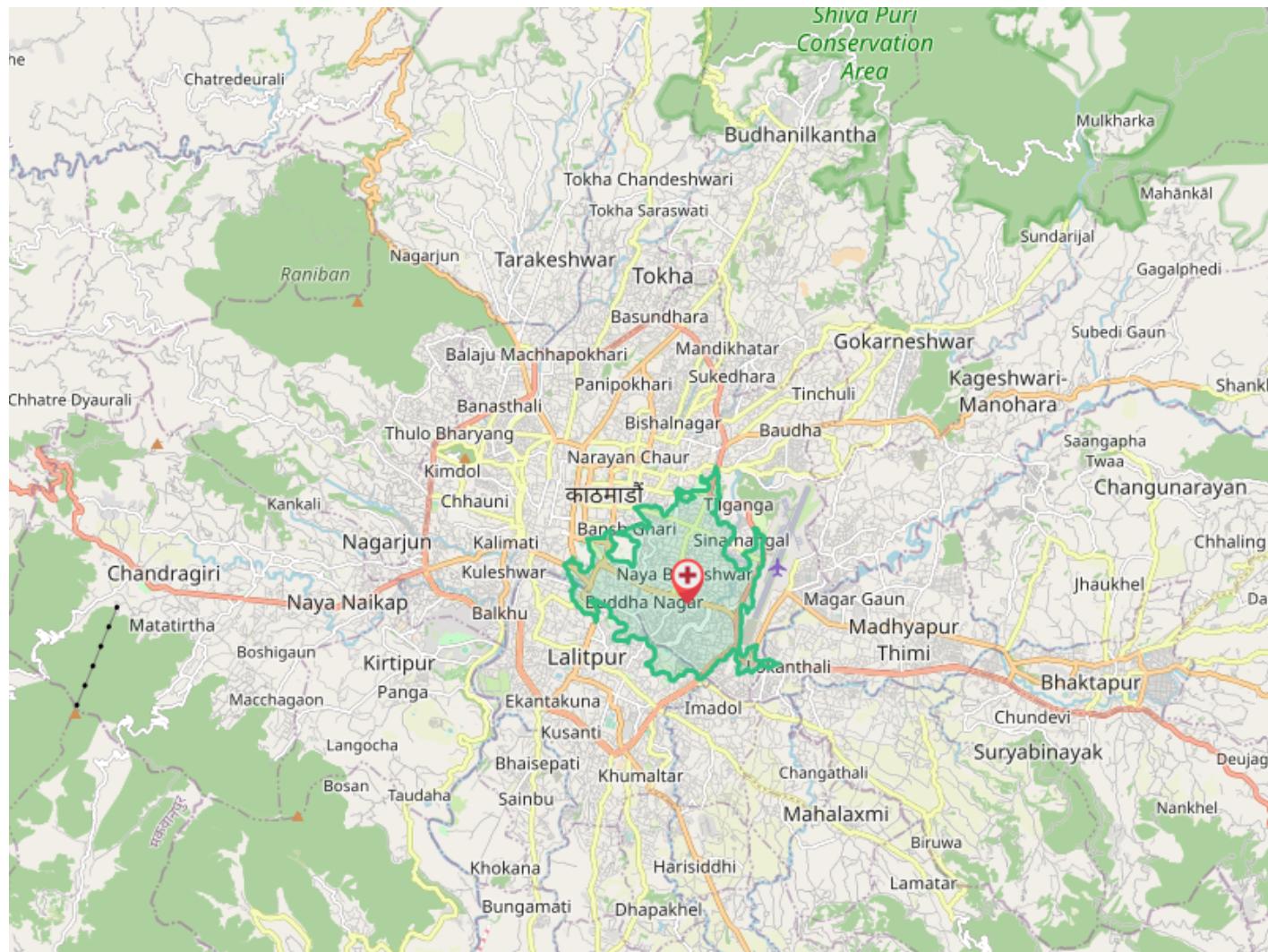
Significant Hospital Details

Below are the manually inserted data for hospitals that determined the most significant hospitals available in Kathmandu. These data were given some weights to be used in our weighted system. However, the collected data might not be utterly precise.

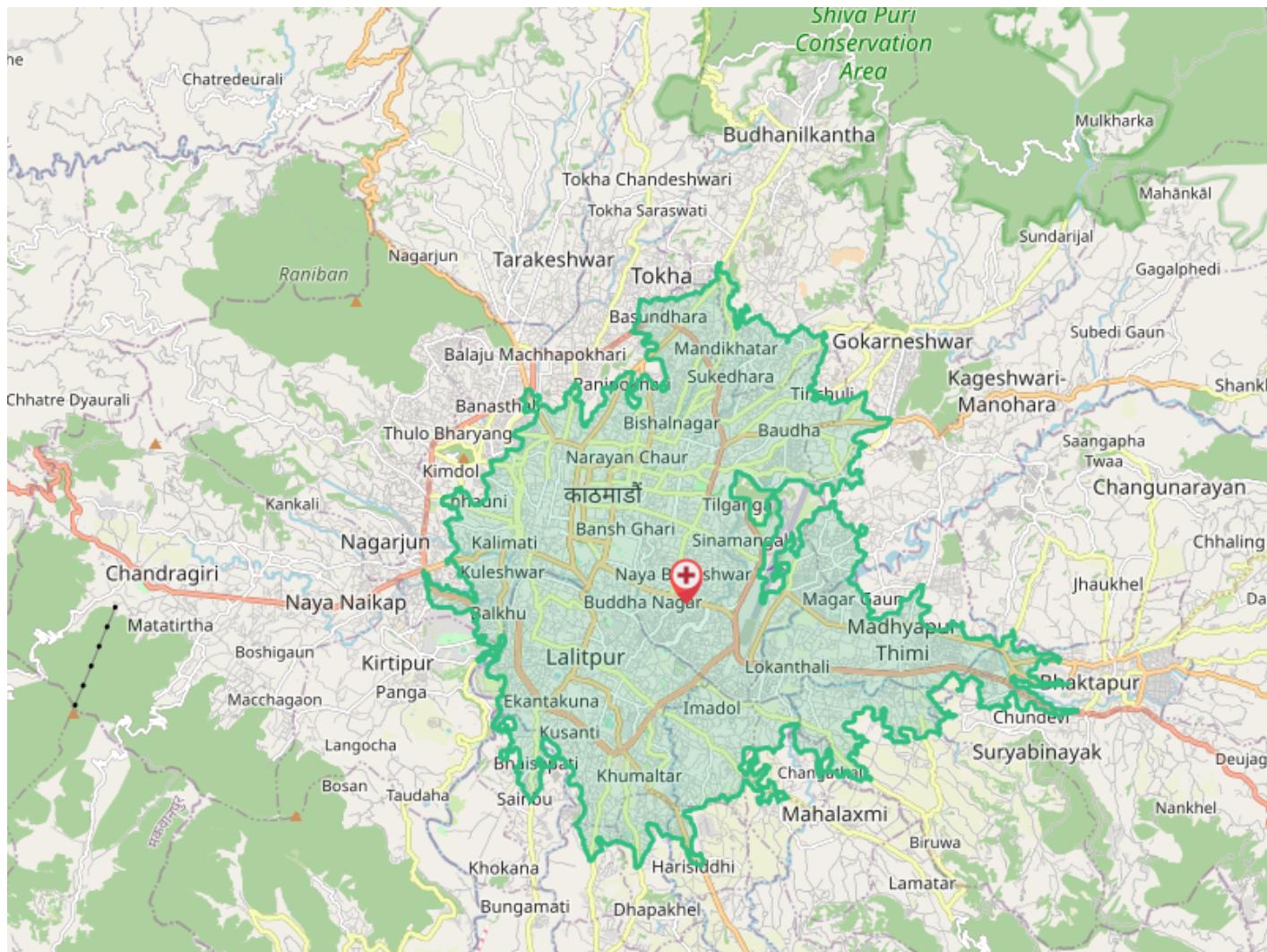
1. Civil Service Hospital Of Nepal



Civil Service Hospital Of Nepal



Civil Service Hospital Of Nepal isoline image within 10 minutes



Civil Service Hospital Of Nepal isoline image within 20 minutes

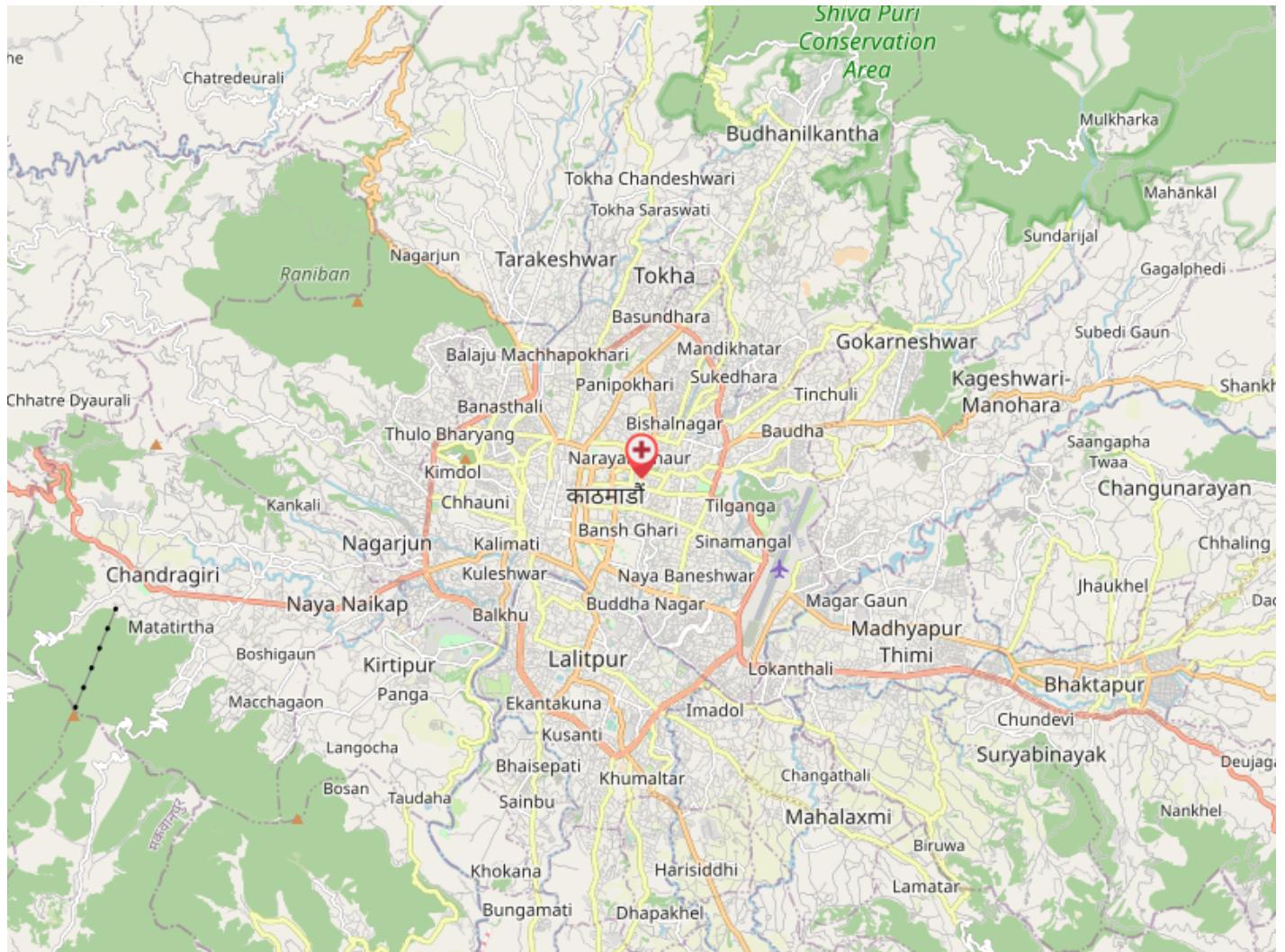
General

Name of Hospital	Civil Service Hospital Of Nepal
Latitude	27.6863031
Longitude	85.3388038
Address	Minbhawan Marg, Kathmandu 44600, Nepal
Phone Number	01-4107000
Website	http://www.civilservicehospital.org/

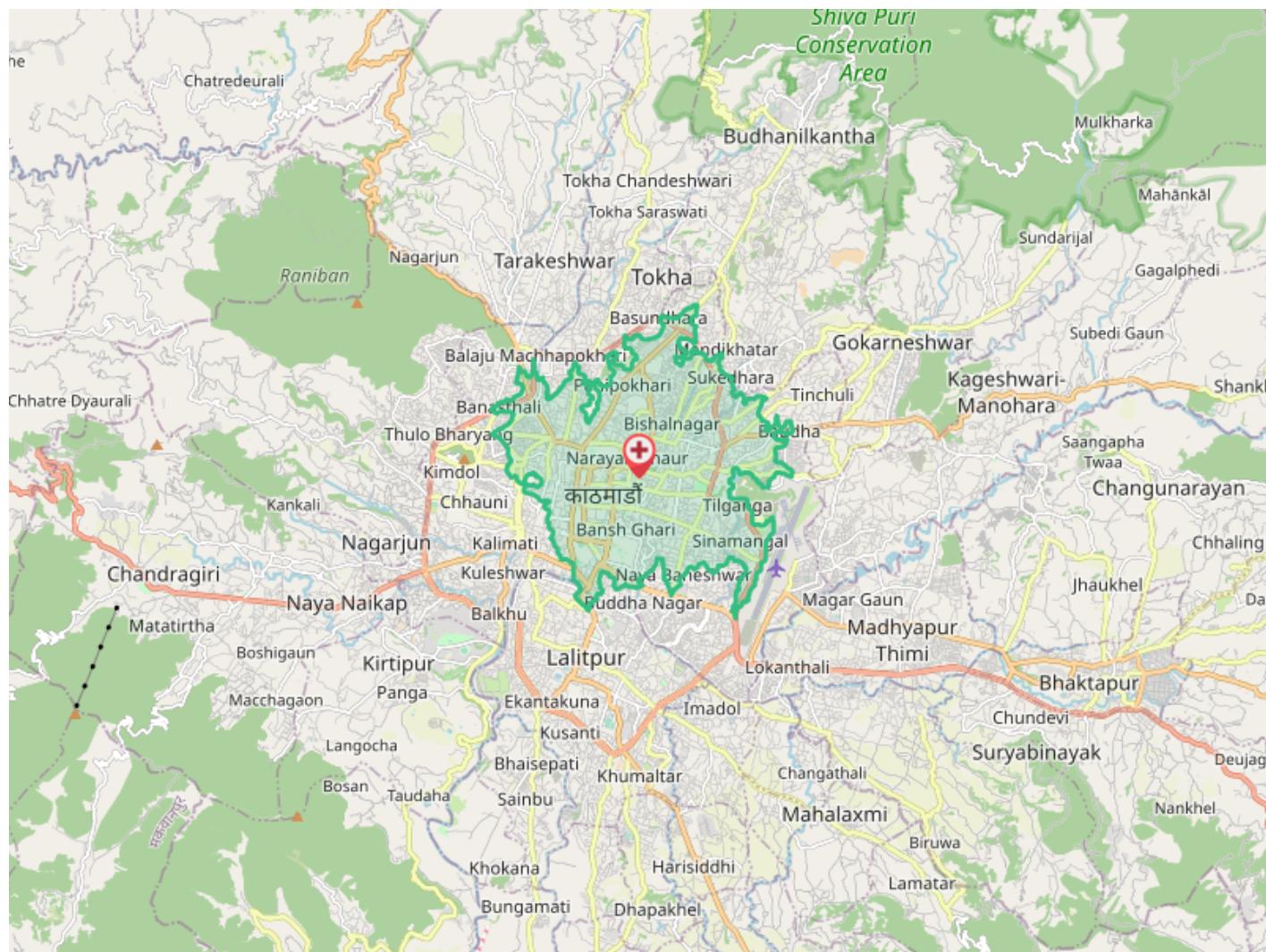
Location and Space

Open Space Area	20
Distance from Thankot	15.2 km
Distance from Koteshwor	1.9 km
Distance from Sanga	18.3 km
Distance from Airport	3.2 km

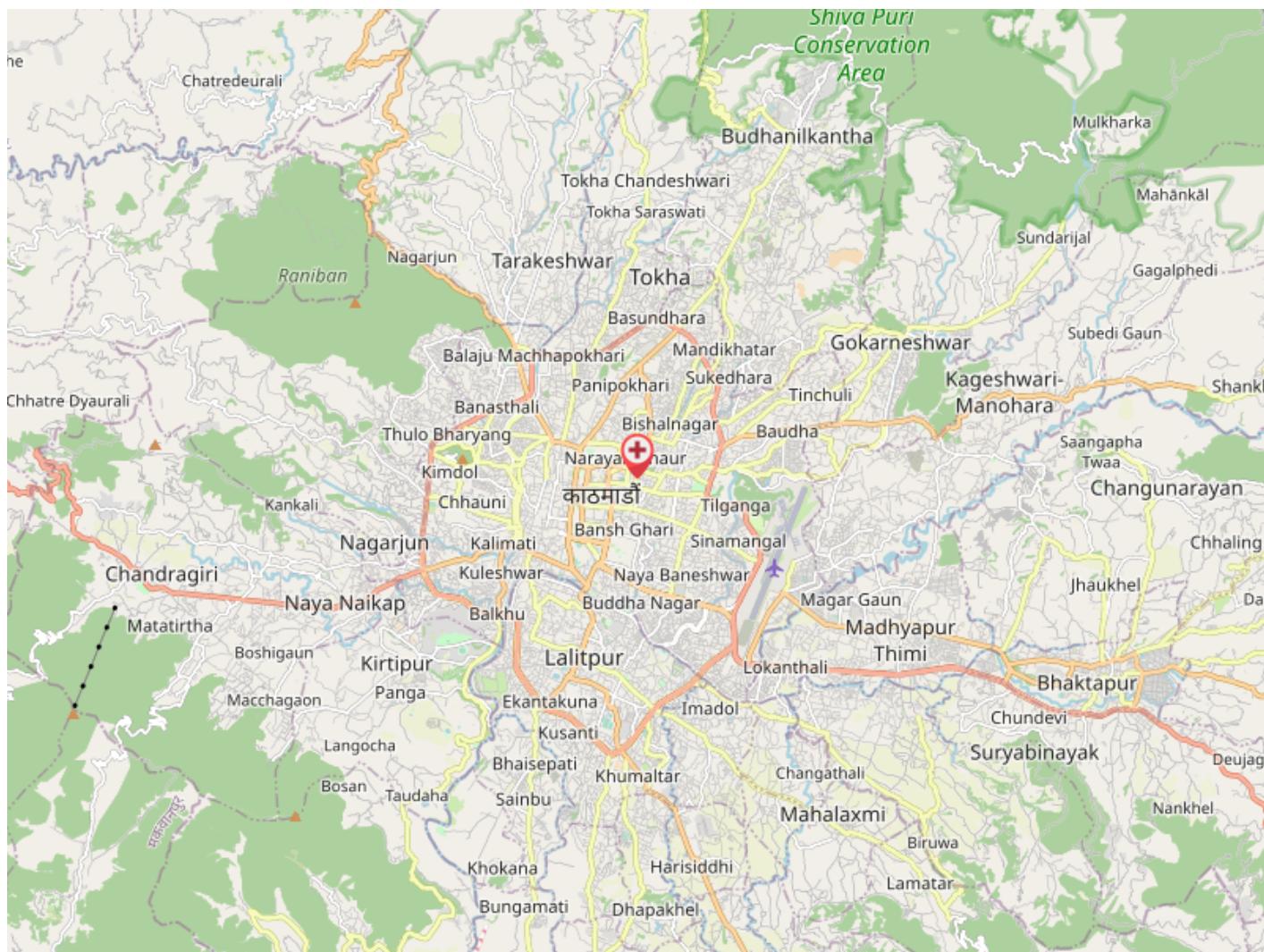
2. Himal hospital



Himal hospital



Himal hospital isoline image within 10 minutes



Himal hospital isoline image within 20 minutes

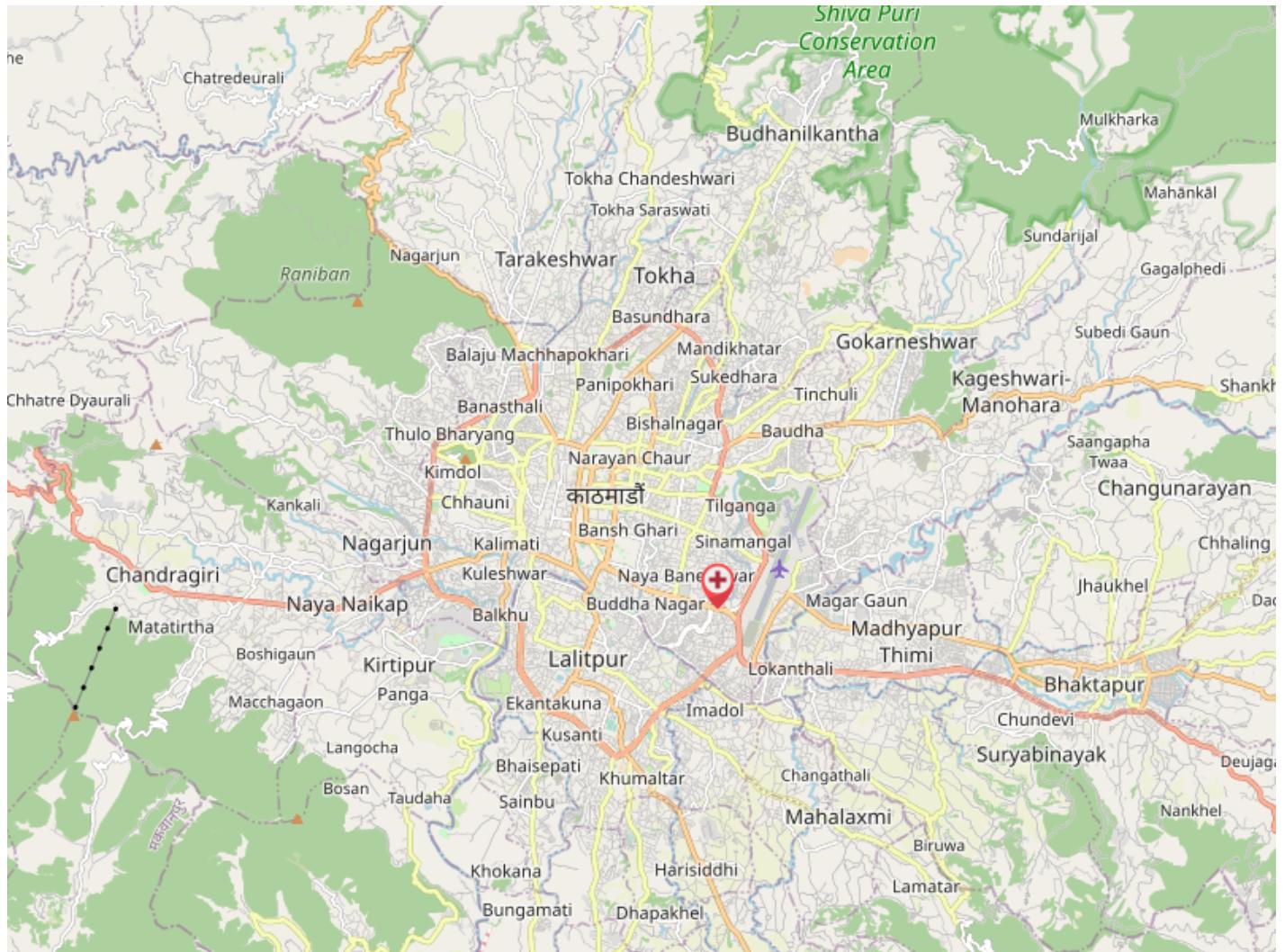
General

Name of Hospital	Himal hospital
Latitude	27.710568
Longitude	85.3284891
Address	Thirbum Marg, Kathmandu 44600, Nepal
Phone Number	01-4536348
Website	http://himalhospital.com/

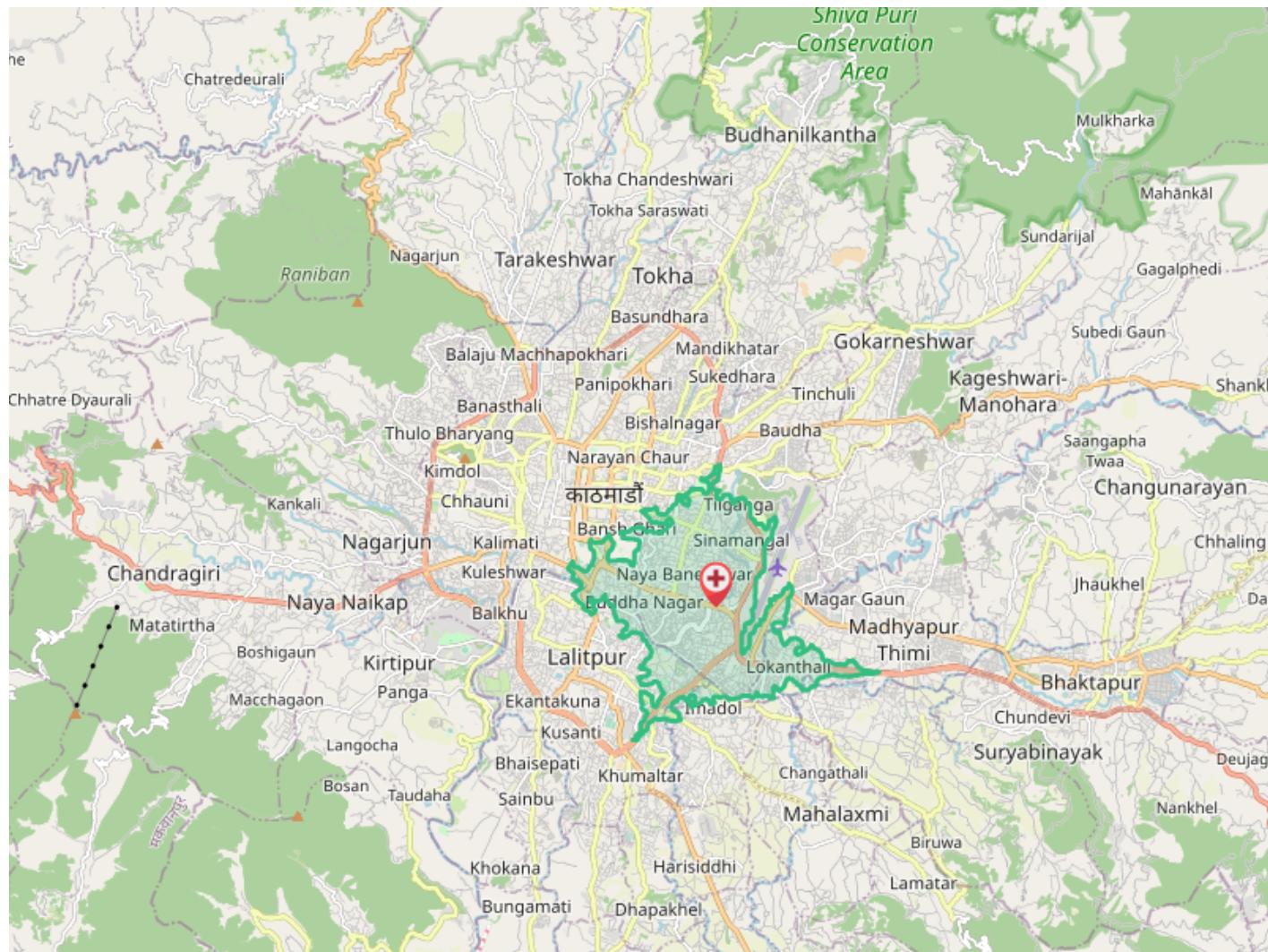
Location and Space

Distance from Thankot	15.1 km
Distance from Koteshwor	5.9 km
Distance from Sanga	22.3 km
Distance from Airport	3.3 km

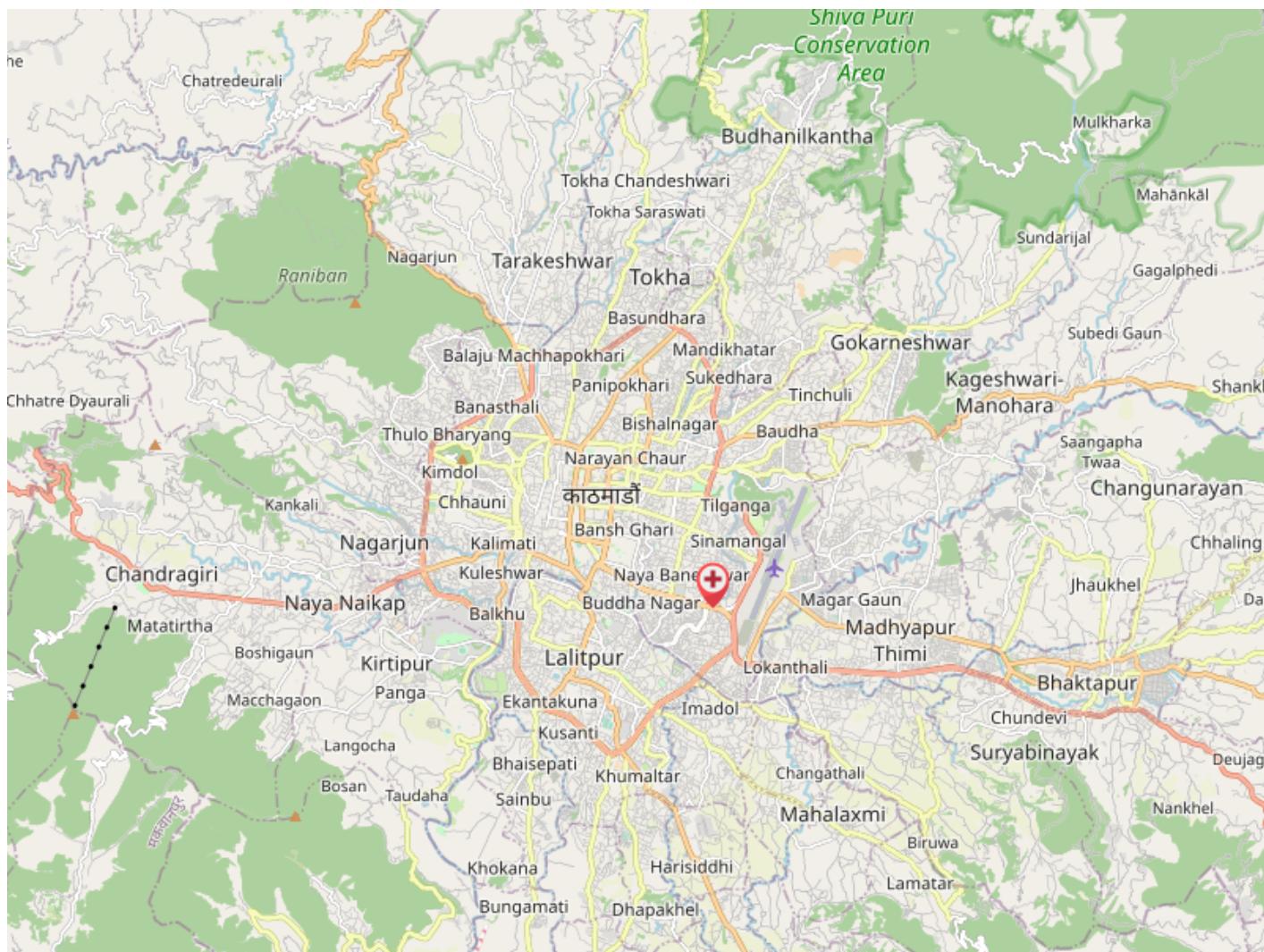
3. Kantipur Hospital



Kantipur Hospital



Kantipur Hospital isoline image within 10 minutes



Kantipur Hospital isoline image within 20 minutes

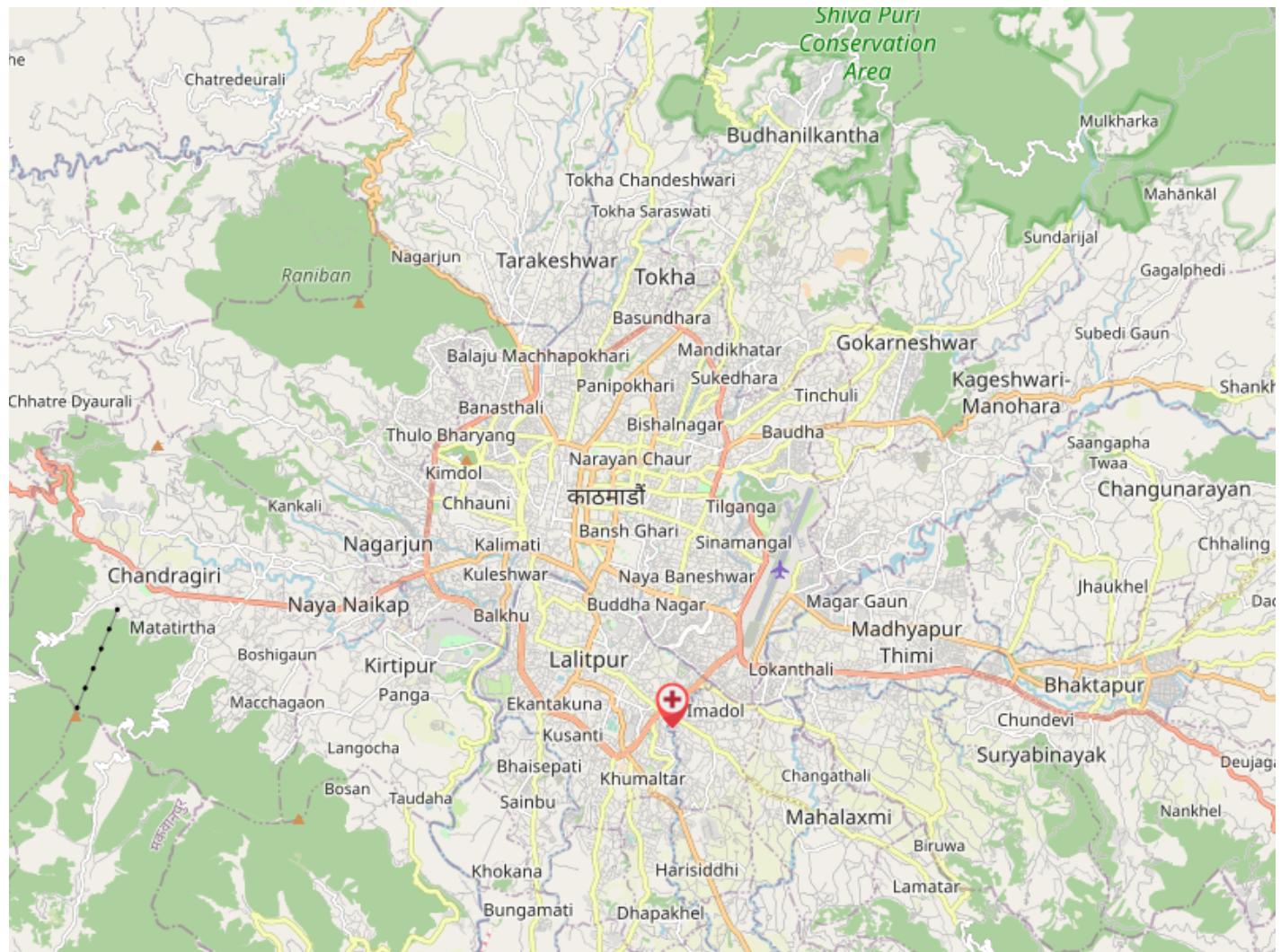
General

Name of Hospital	Kantipur Hospital
Latitude	27.6855939
Longitude	85.3447983
Address	Shriganesh Marg, Kathmandu 44600, Nepal
Phone Number	01-4111627
Website	http://kantipurhospital.com/

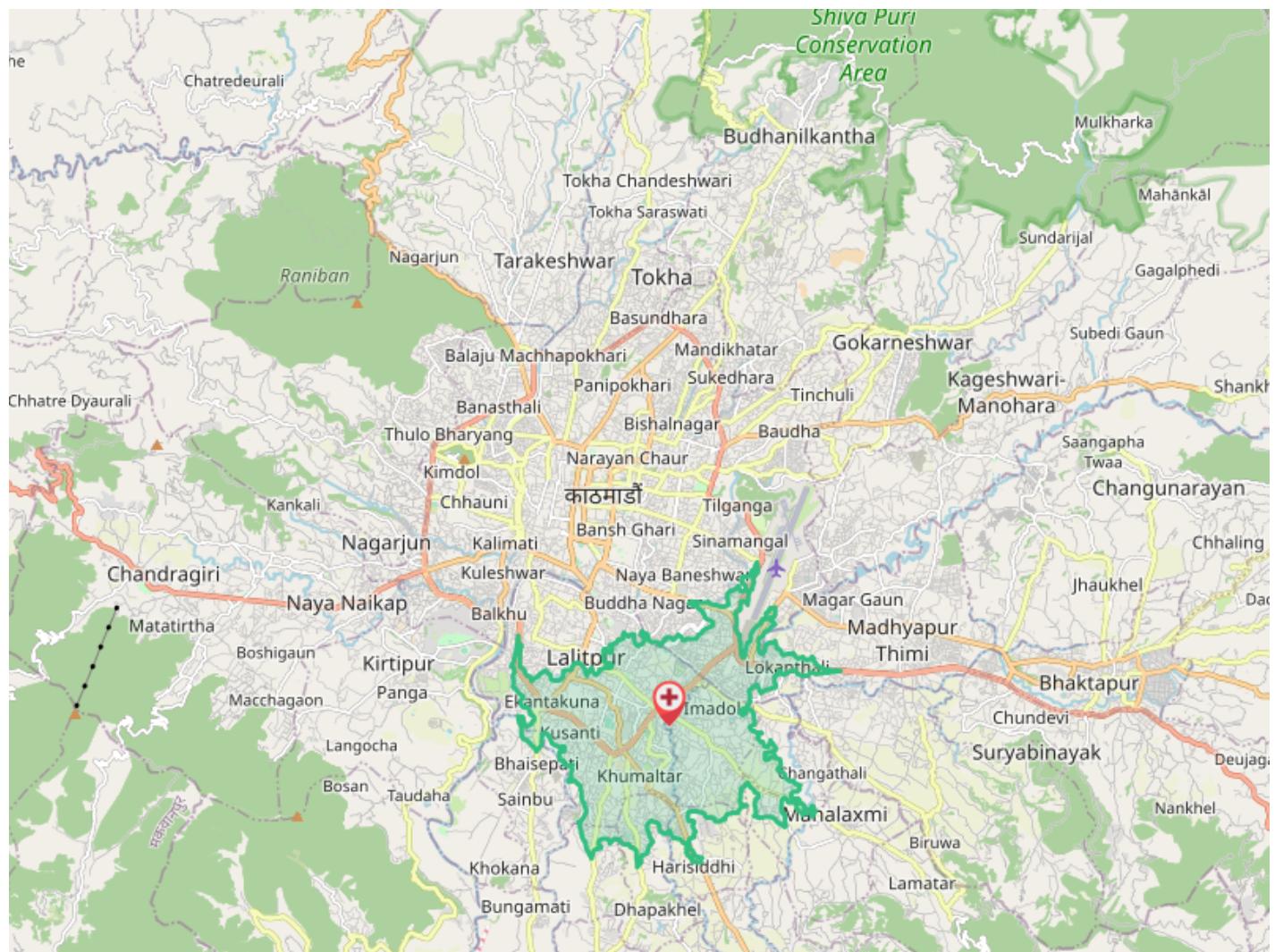
Location and Space

Distance from Thankot	16.1 km
Distance from Koteshwor	1.2 km
Distance from Sanga	17.5 km
Distance from Airport	2.4 km

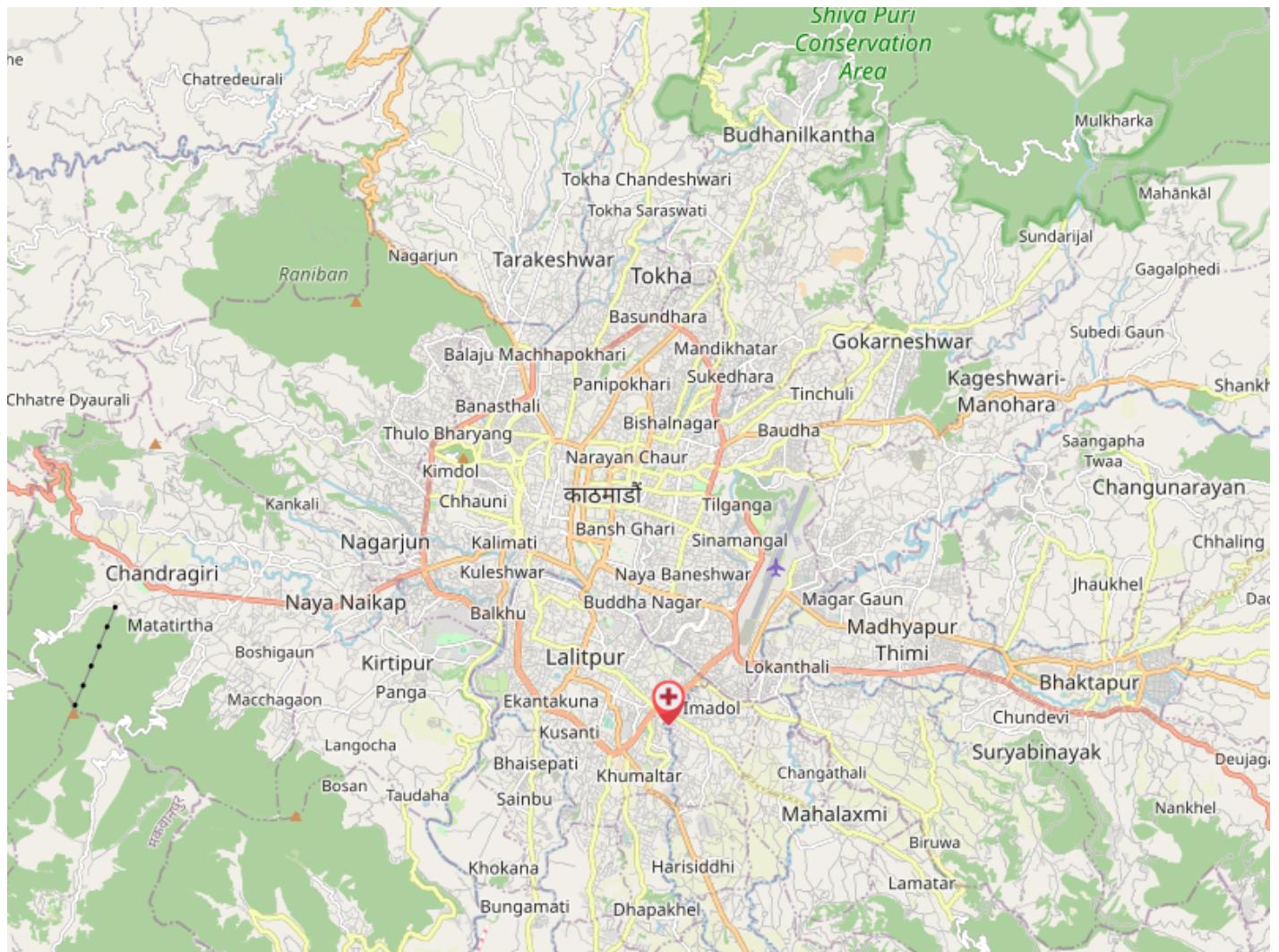
4. KIST Medical College Teaching Hospital



KIST Medical College Teaching Hospital



KIST Medical College Teaching Hospital isoline image within 10 minutes



KIST Medical College Teaching Hospital isoline image within 20 minutes

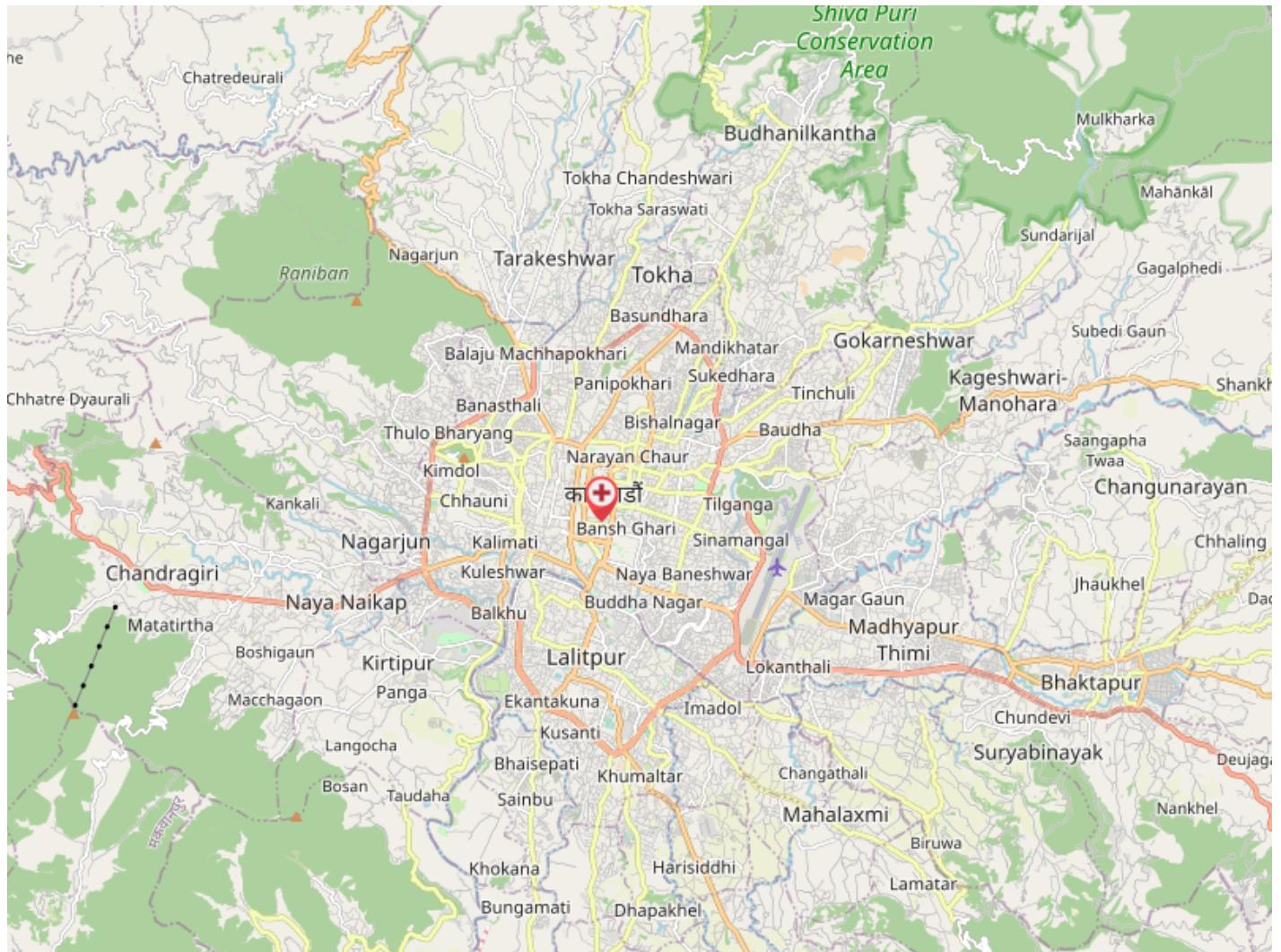
General

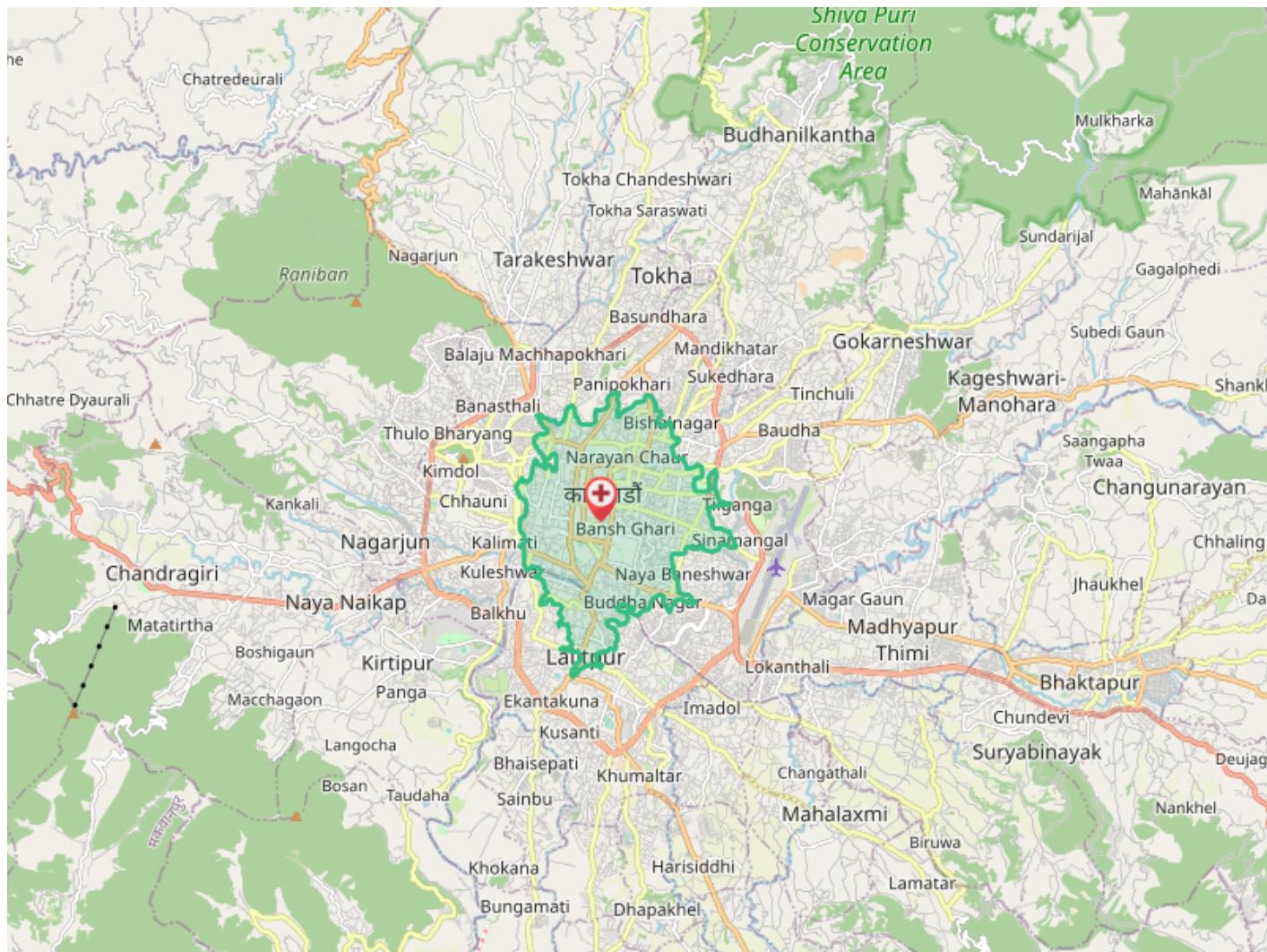
Name of Hospital	KIST Medical College Teaching Hospital
Latitude	27.6629355
Longitude	85.33509900000001
Address	KIST Hospital Road, Mahalaxmi 44700, Nepal
Phone Number	01-5201496
Website	http://www.kistmcth.edu.np/

Location and Space

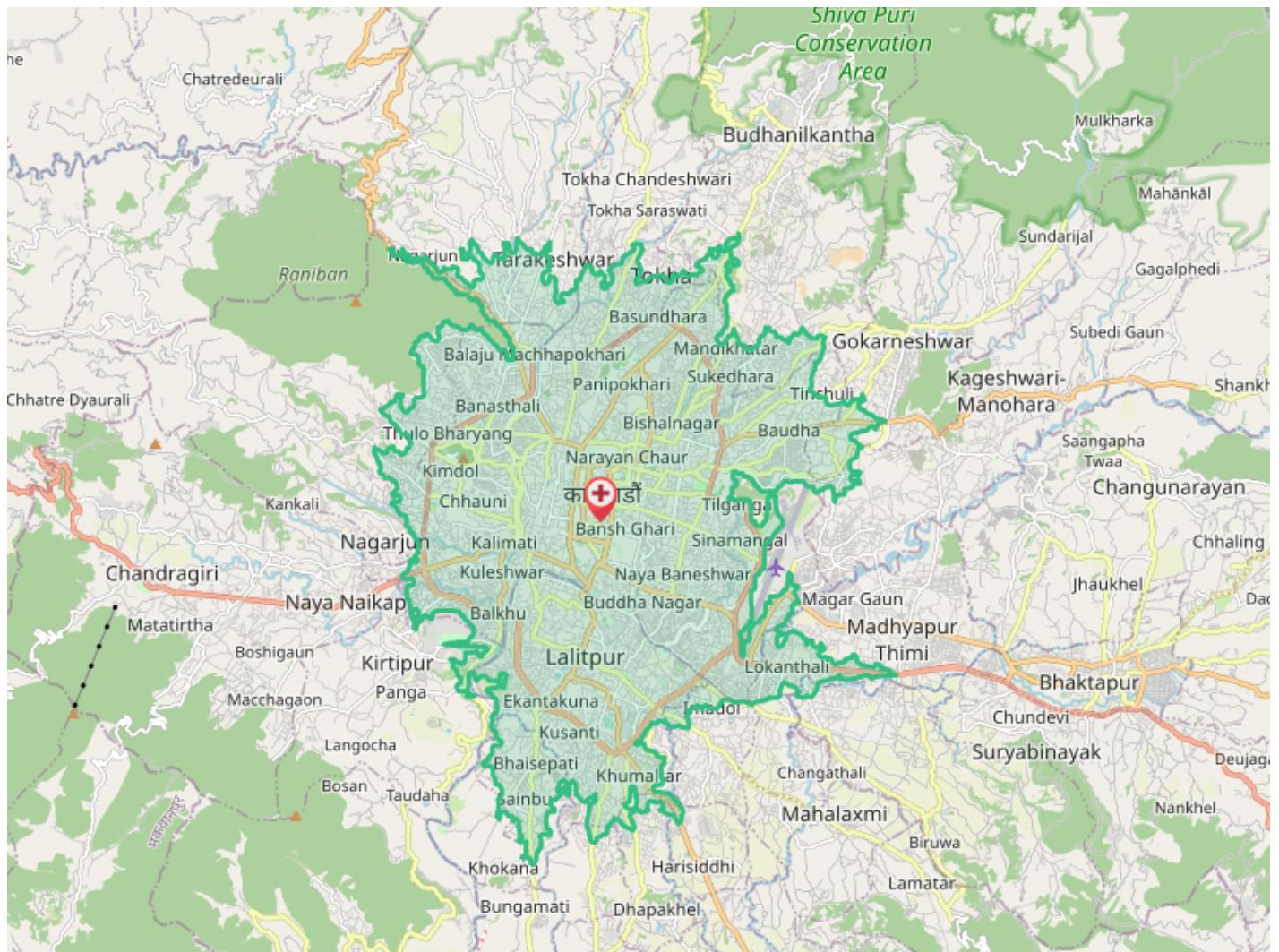
Distance from Thankot	16.7 km
Distance from Koteshwor	2.8 km
Distance from Sanga	19.2 km
Distance from Airport	5.6 km

5. Kathmandu Model Hospital





Kathmandu Model Hospital isoline image within 10 minutes



Kathmandu Model Hospital isoline image within 20 minutes

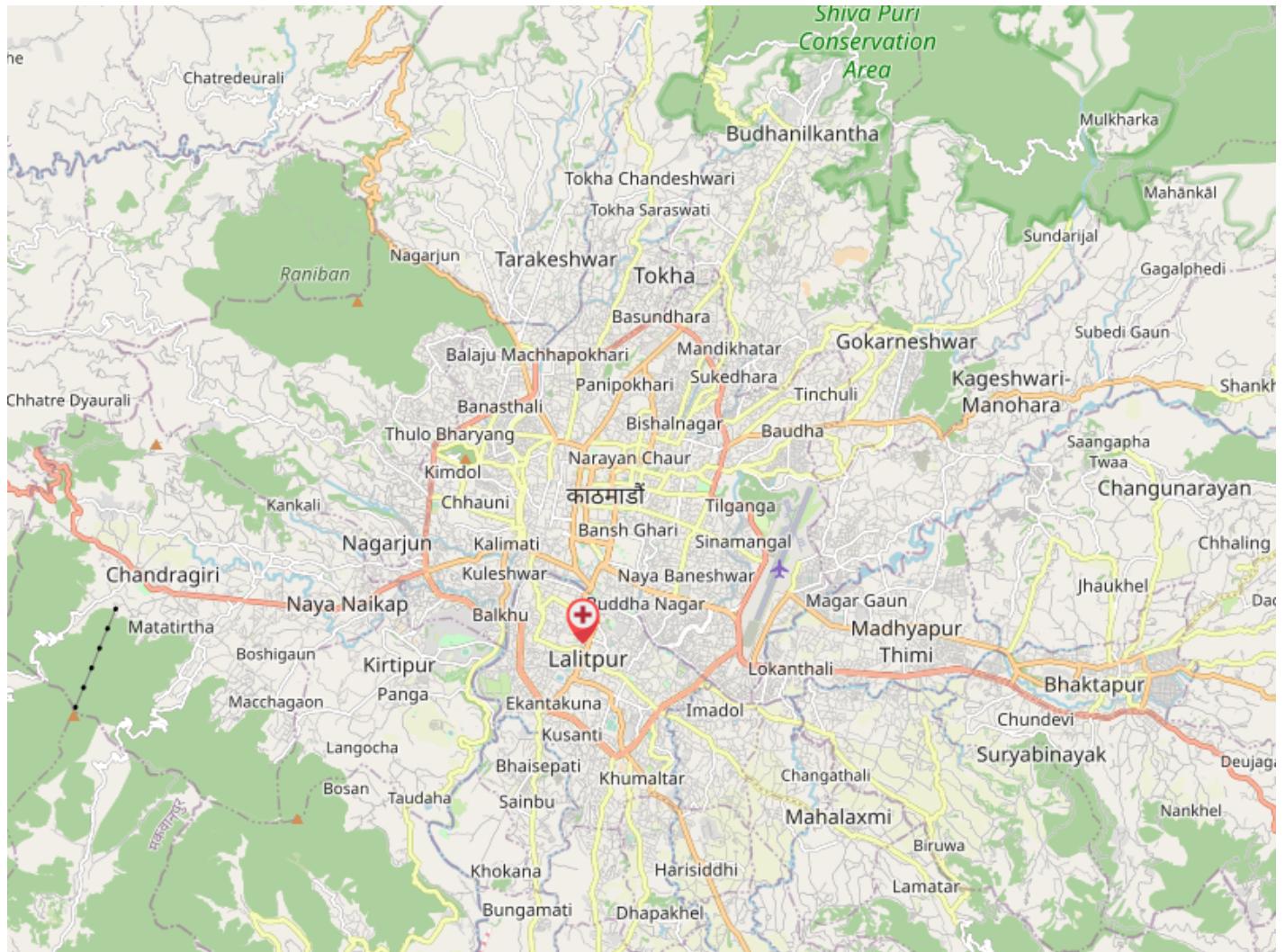
General

Name of Hospital	Kathmandu Model Hospital
Latitude	27.702041
Longitude	85.3201443
Address	Red Cross Marg, Kathmandu 44600, Nepal
Phone Number	01-4240805
Website	http://pfectnepal.org/

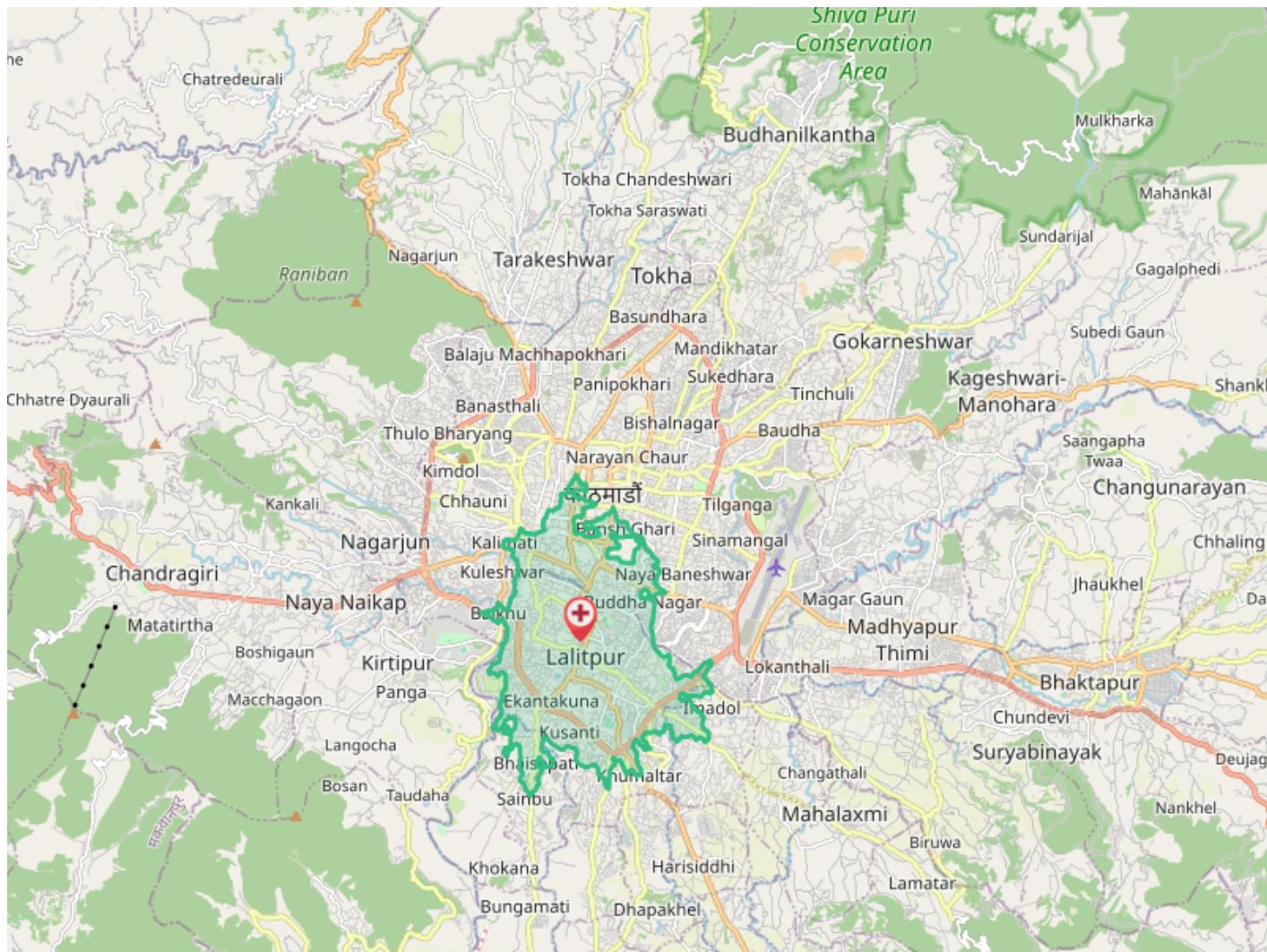
Location and Space

Distance from Thankot	13.9 km
Distance from Koteshwor	4.9 km
Distance from Sanga	21.2 km
Distance from Airport	4.6 km

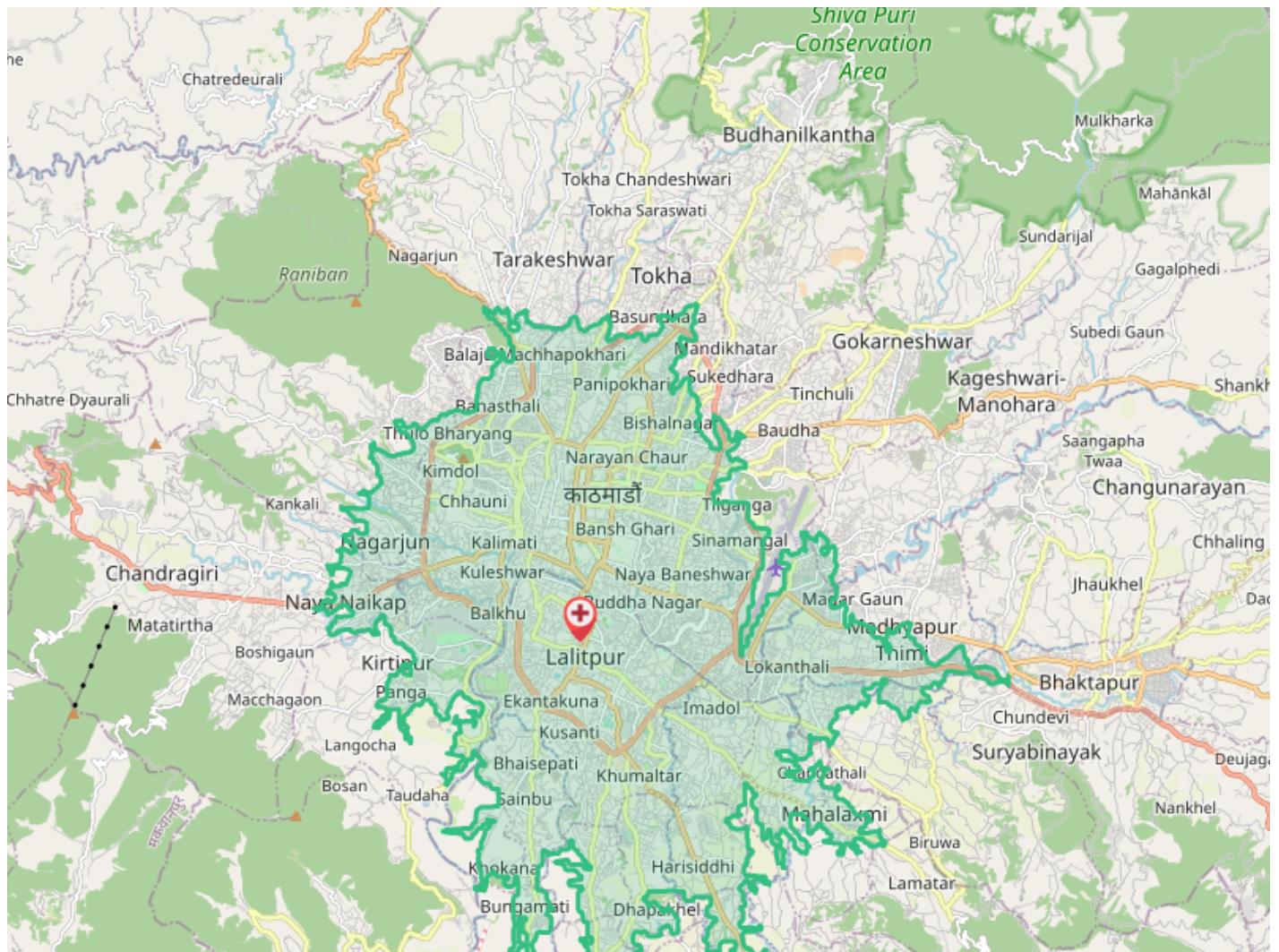
6. Nidan Hospital Ltd.



Nidan Hospital Ltd.



Nidan Hospital Ltd. isoline image within 10 minutes



Nidan Hospital Ltd. isoline image within 20 minutes

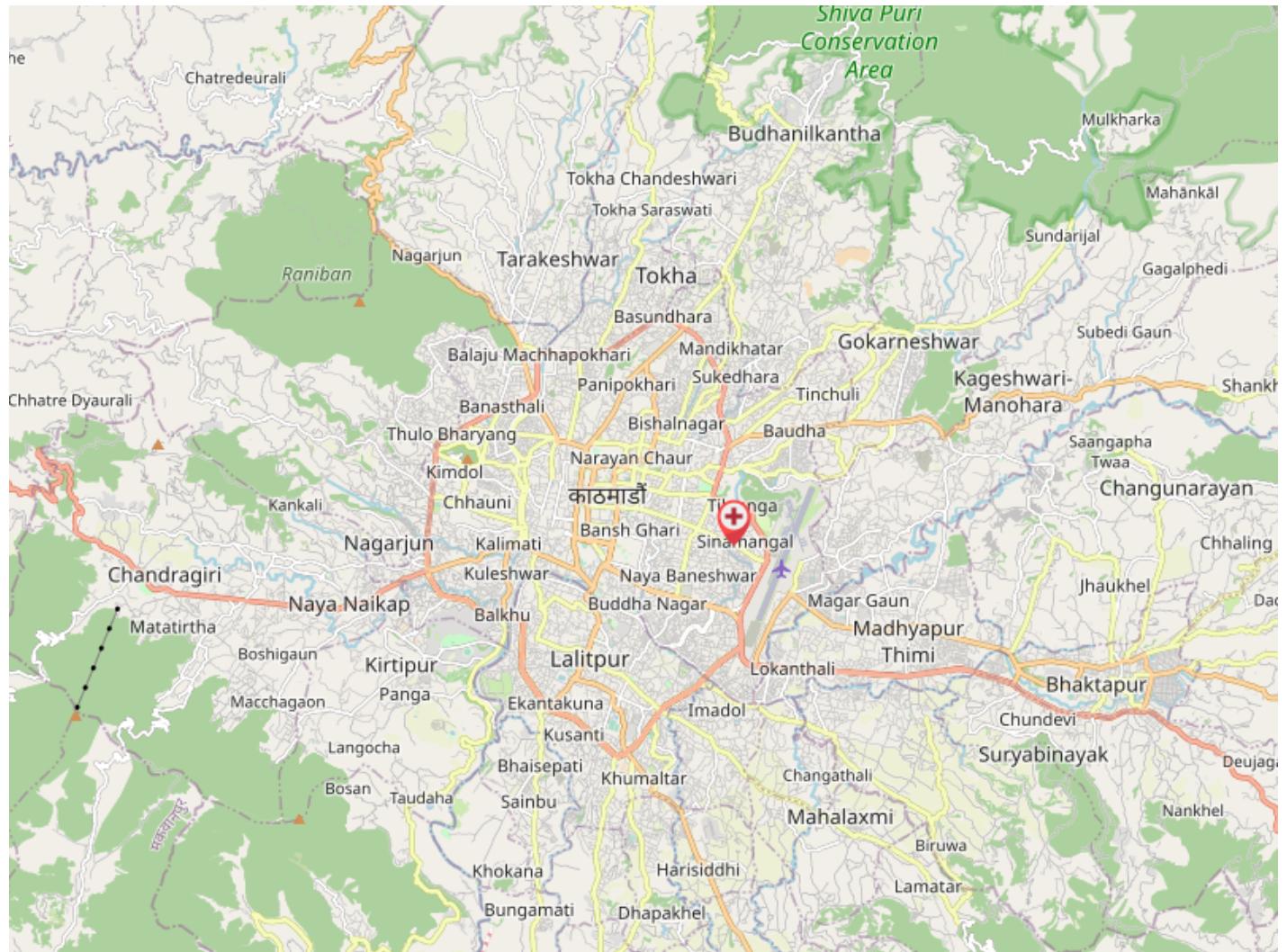
General

Name of Hospital	Nidan Hospital Ltd.
Latitude	27.6789865
Longitude	85.3158868
Address	Lalitpur 44600, Nepal
Phone Number	01-5431333
Website	http://www.nidanhospital.com/

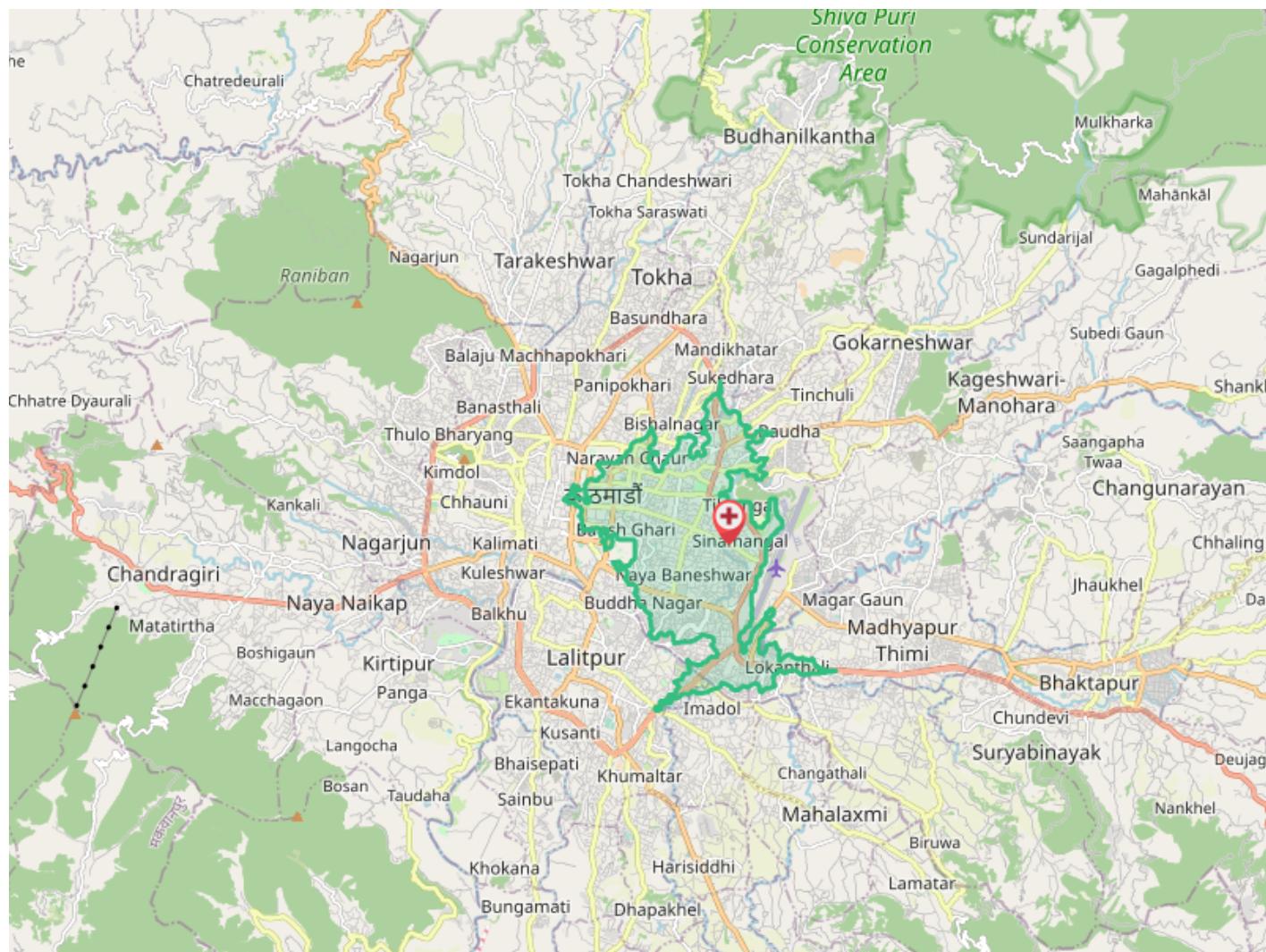
Location and Space

Distance from Thankot	13.3 km
Distance from Koteshwor	4.9 km
Distance from Sanga	21.2 km
Distance from Airport	7.2 km

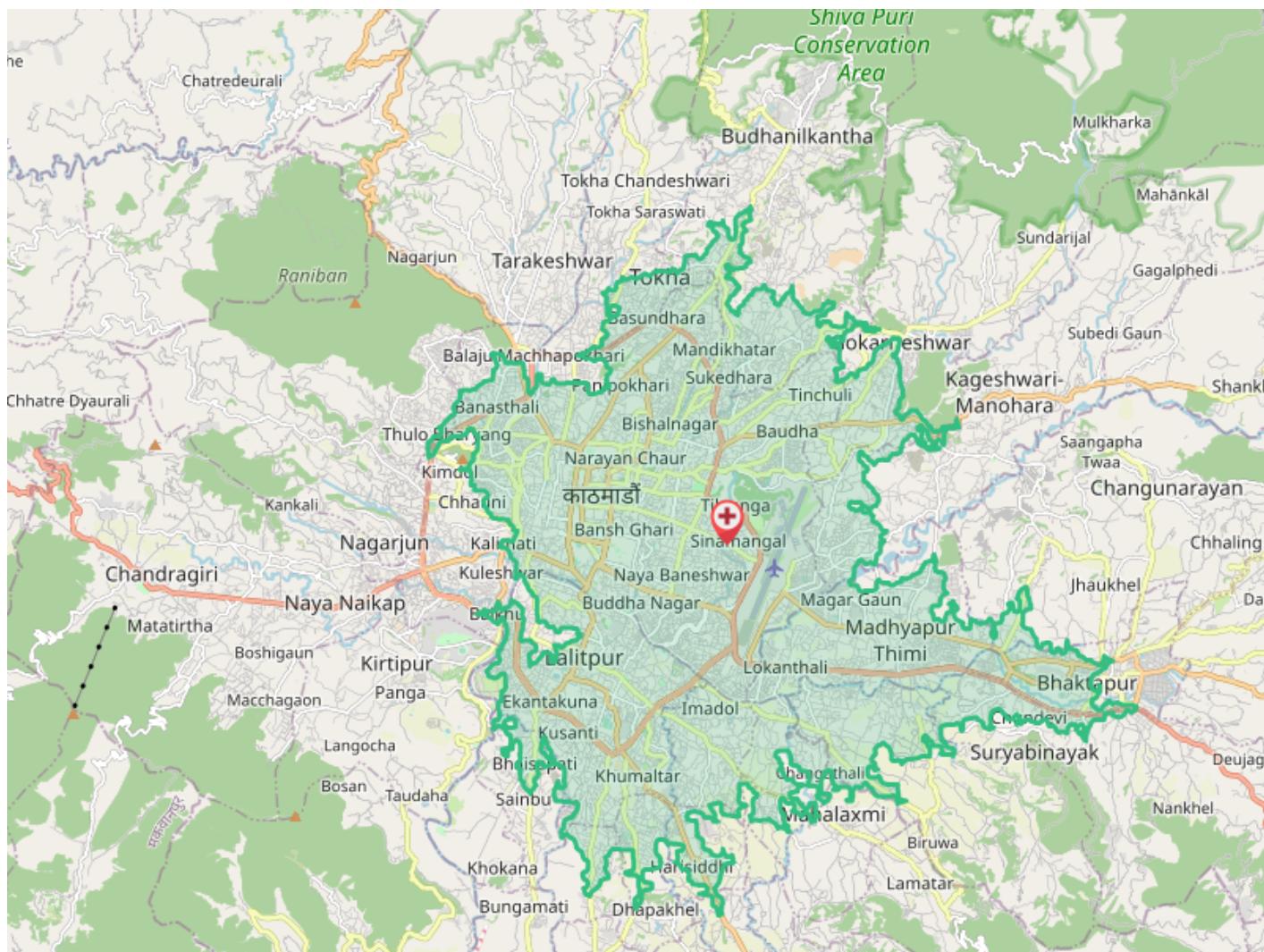
7. Nobel Hospital



Nobel Hospital



Nobel Hospital isoline image within 10 minutes



Nobel Hospital isoline image within 20 minutes

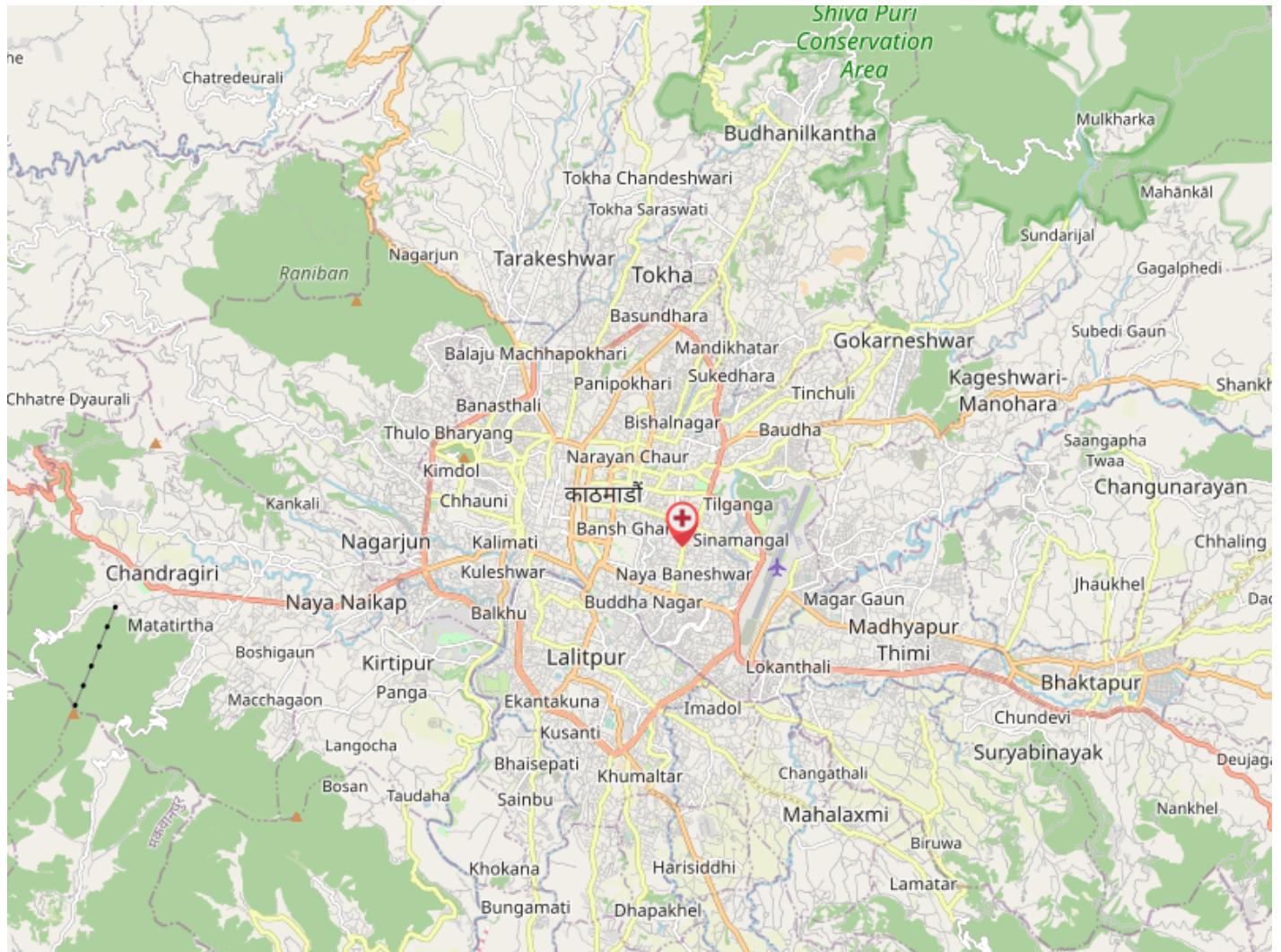
General

Name of Hospital	Nobel Hospital
Latitude	27.69793709999999
Longitude	85.3481702
Address	Sinamangal Rd, Kathmandu 44600, Nepal
Phone Number	01-4110842
Website	http://www.nobelhospital.com

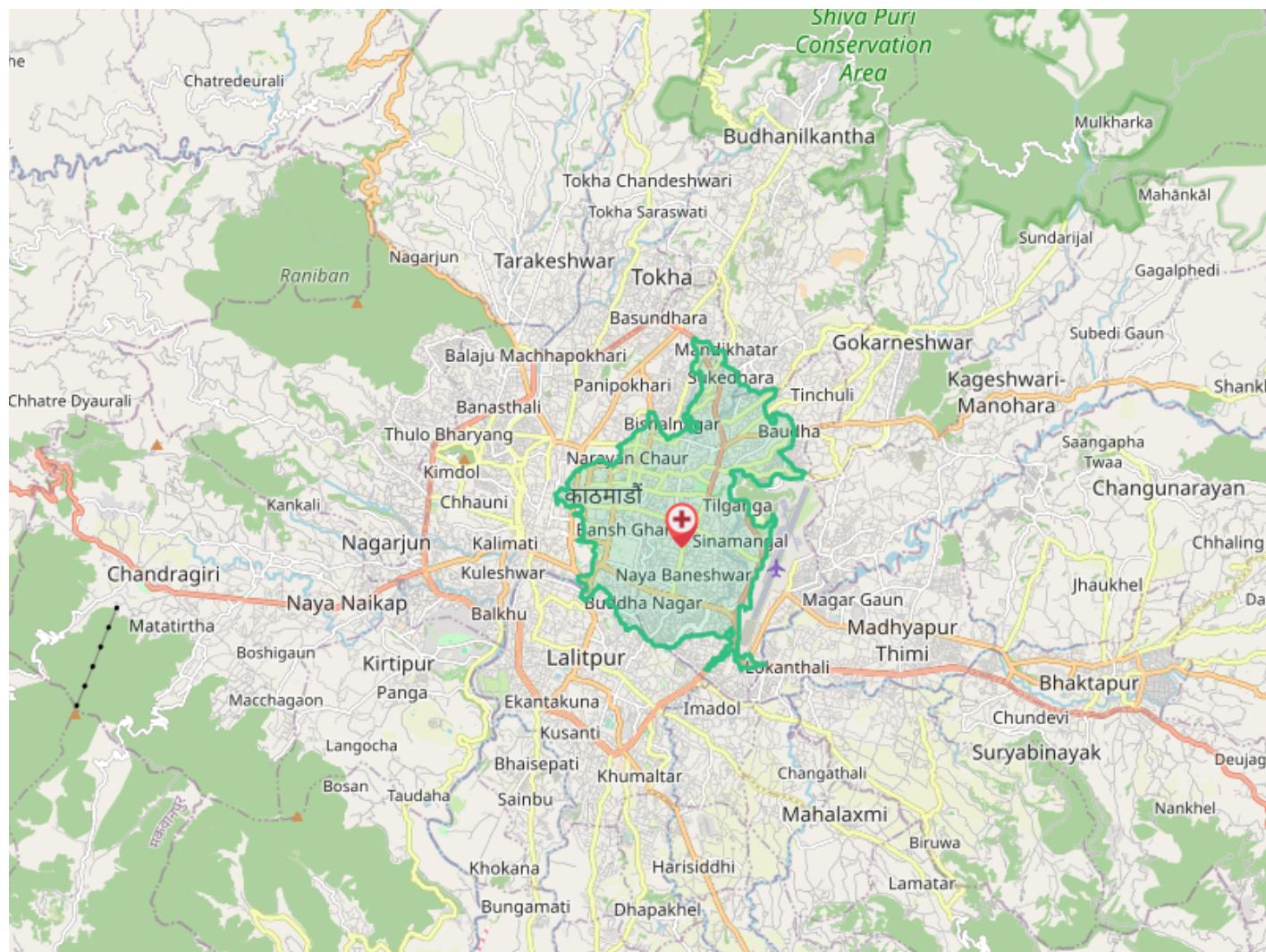
Location and Space

Distance from Thankot	18.1 km
Distance from Koteshwor	3.0 km
Distance from Sanga	19.3 km
Distance from Airport	1.7 km

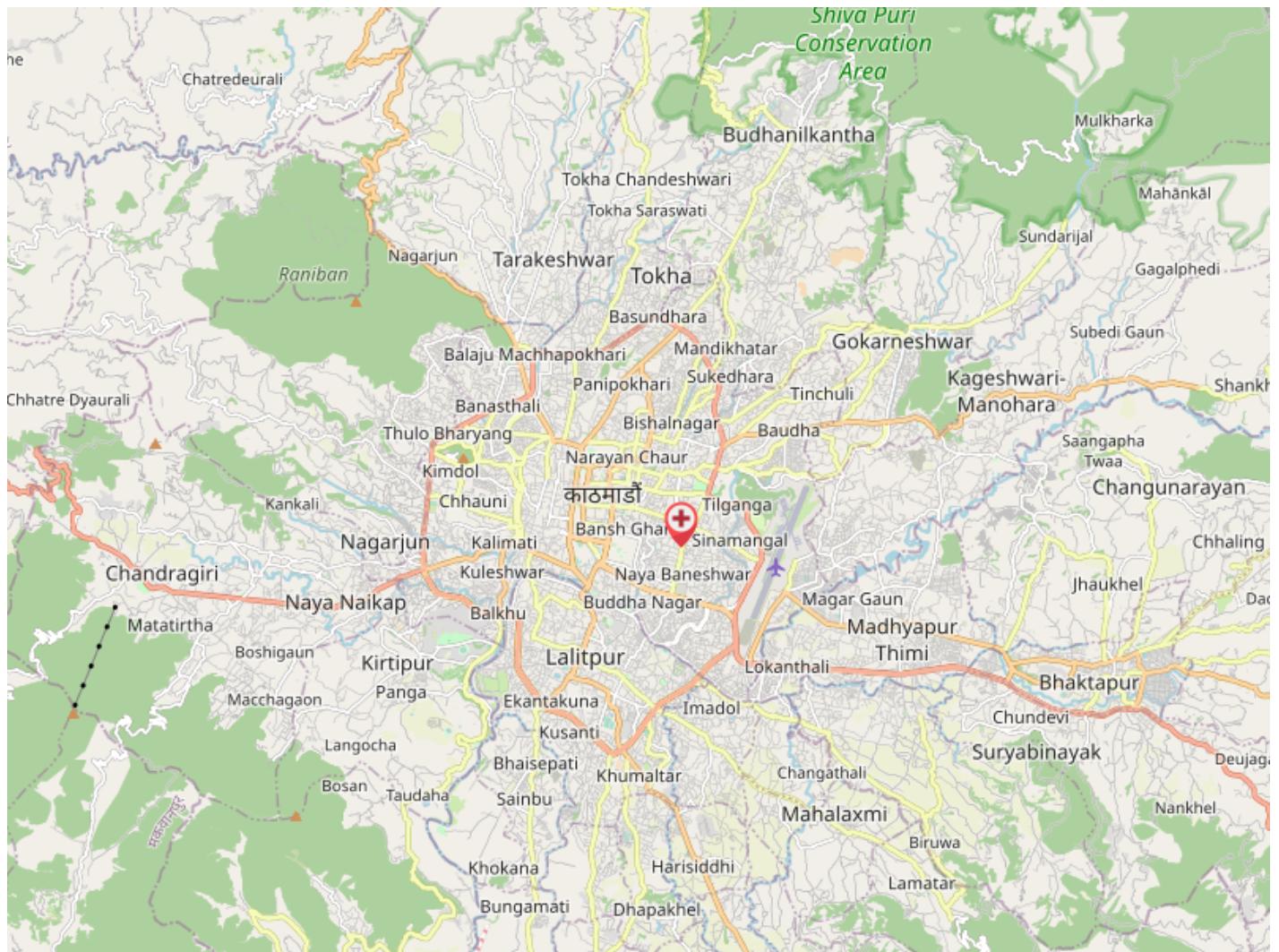
8. भेनस अस्पताल



भेनस अस्पताल



भेनस अस्पताल isoline image within 10 minutes



भेन्स अस्पताल isoline image within 20 minutes

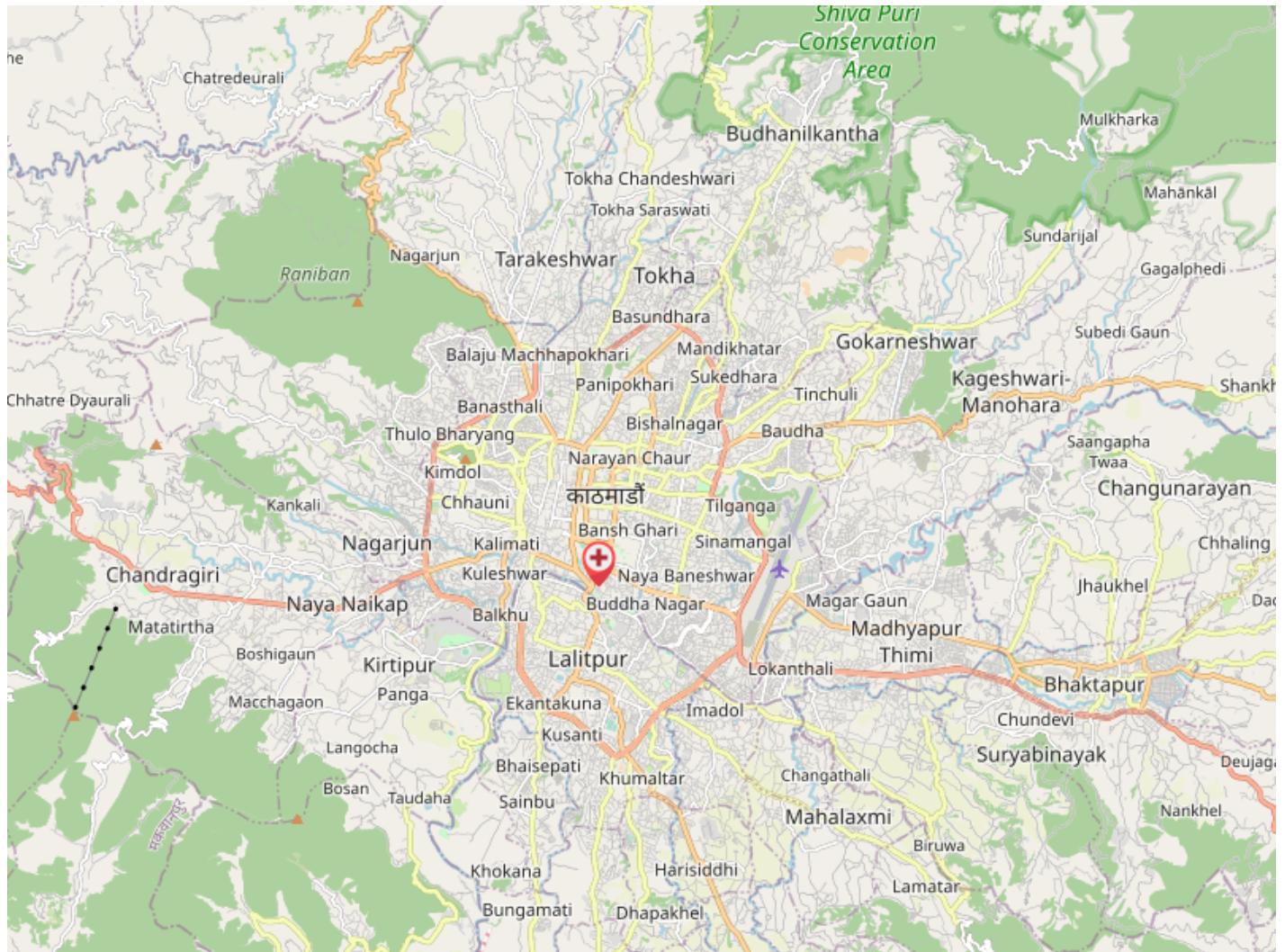
General

Name of Hospital	भेन्स अस्पताल
Latitude	27.6972168
Longitude	85.33765179999999
Address	Devkota Sadak, Kathmandu 44600, Nepal
Phone Number	01-4475120
Website	http://www.venushospital.com.np/

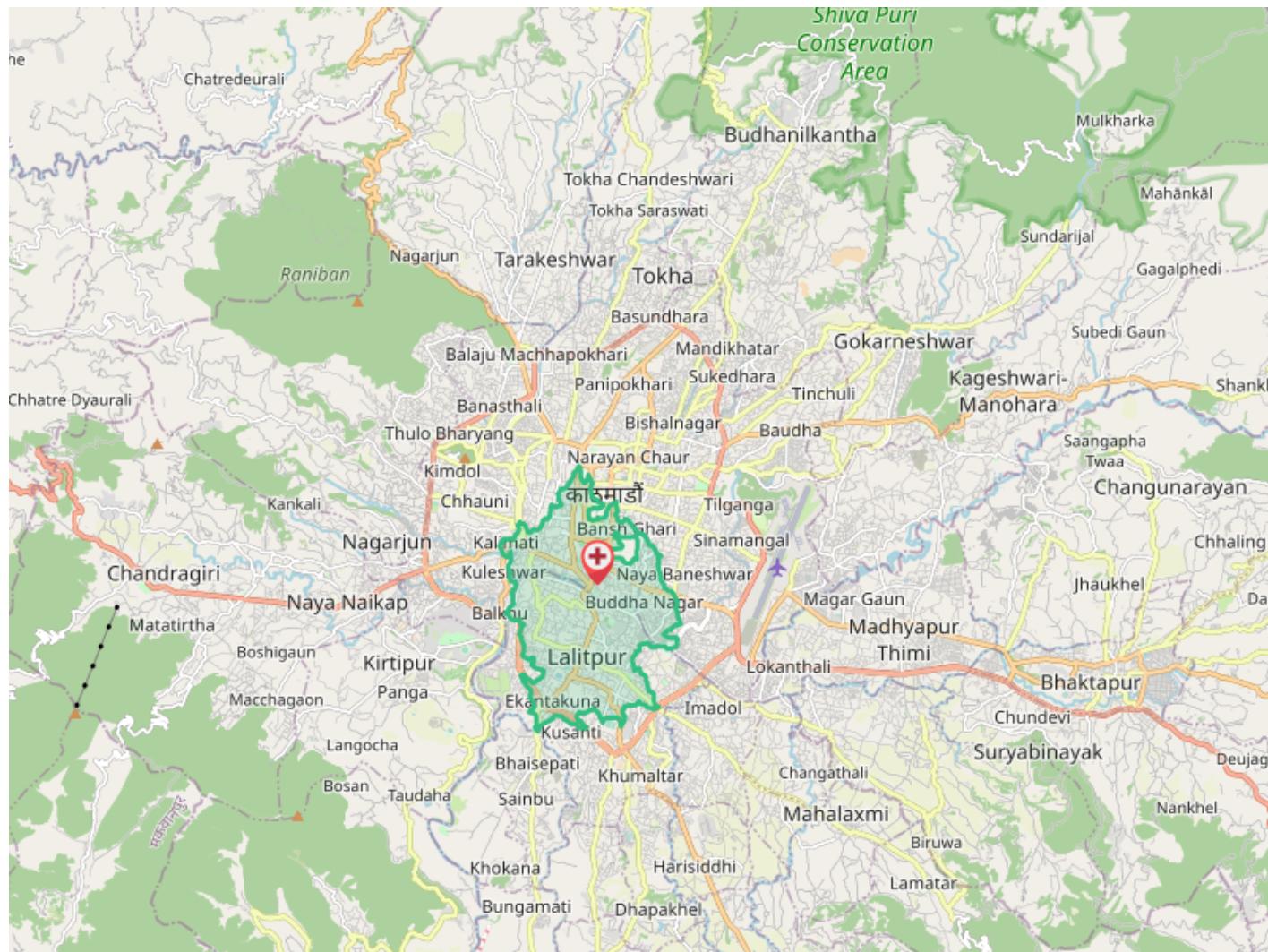
Location and Space

Distance from Thankot	15.6 km
Distance from Koteshwor	3.1 km
Distance from Sanga	19.5 km
Distance from Airport	3.0 km

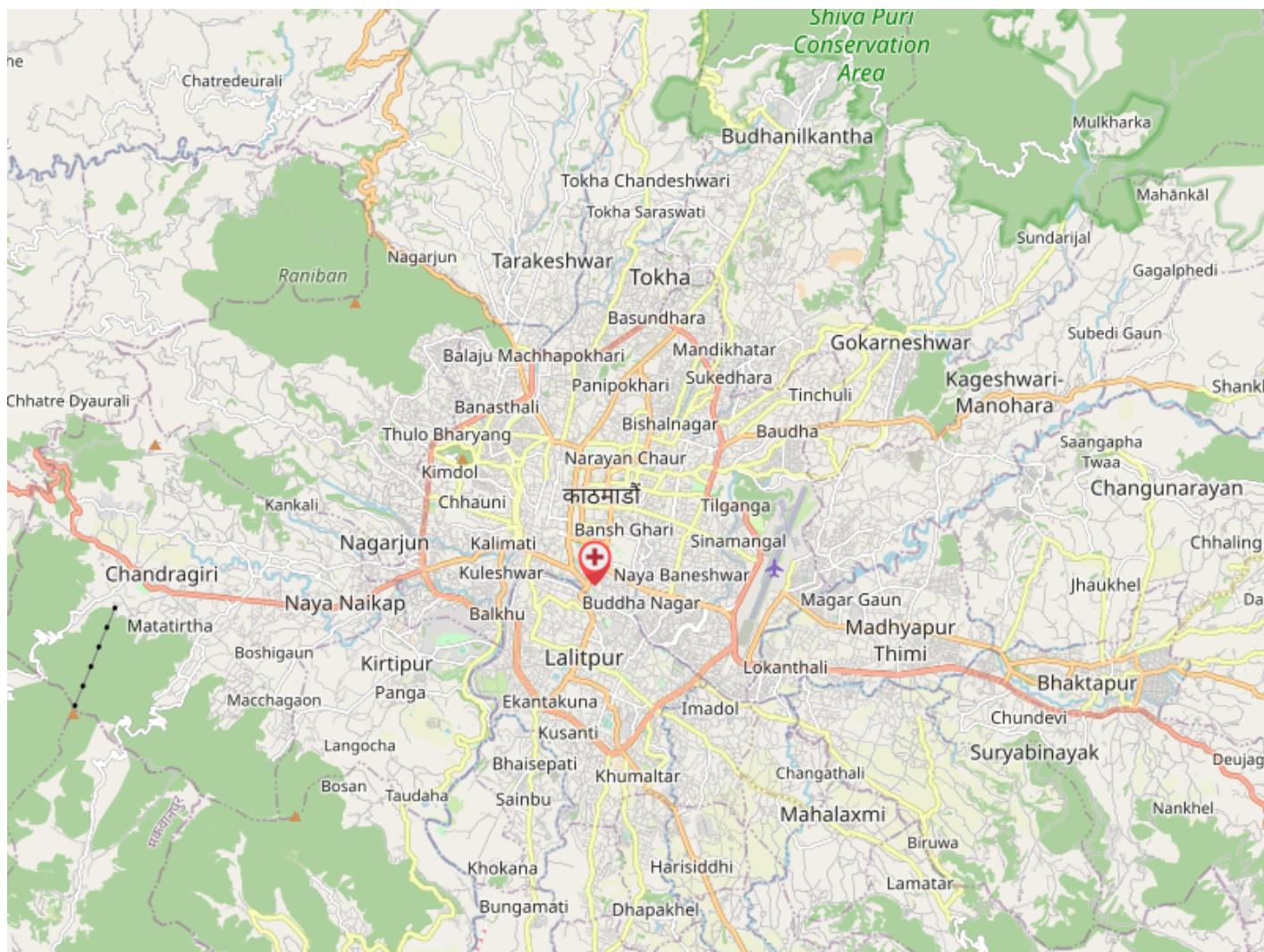
9. Norvic International Hospital



Norvic International Hospital



Norvic International Hospital isoline image within 10 minutes



Norvic International Hospital isoline image within 20 minutes

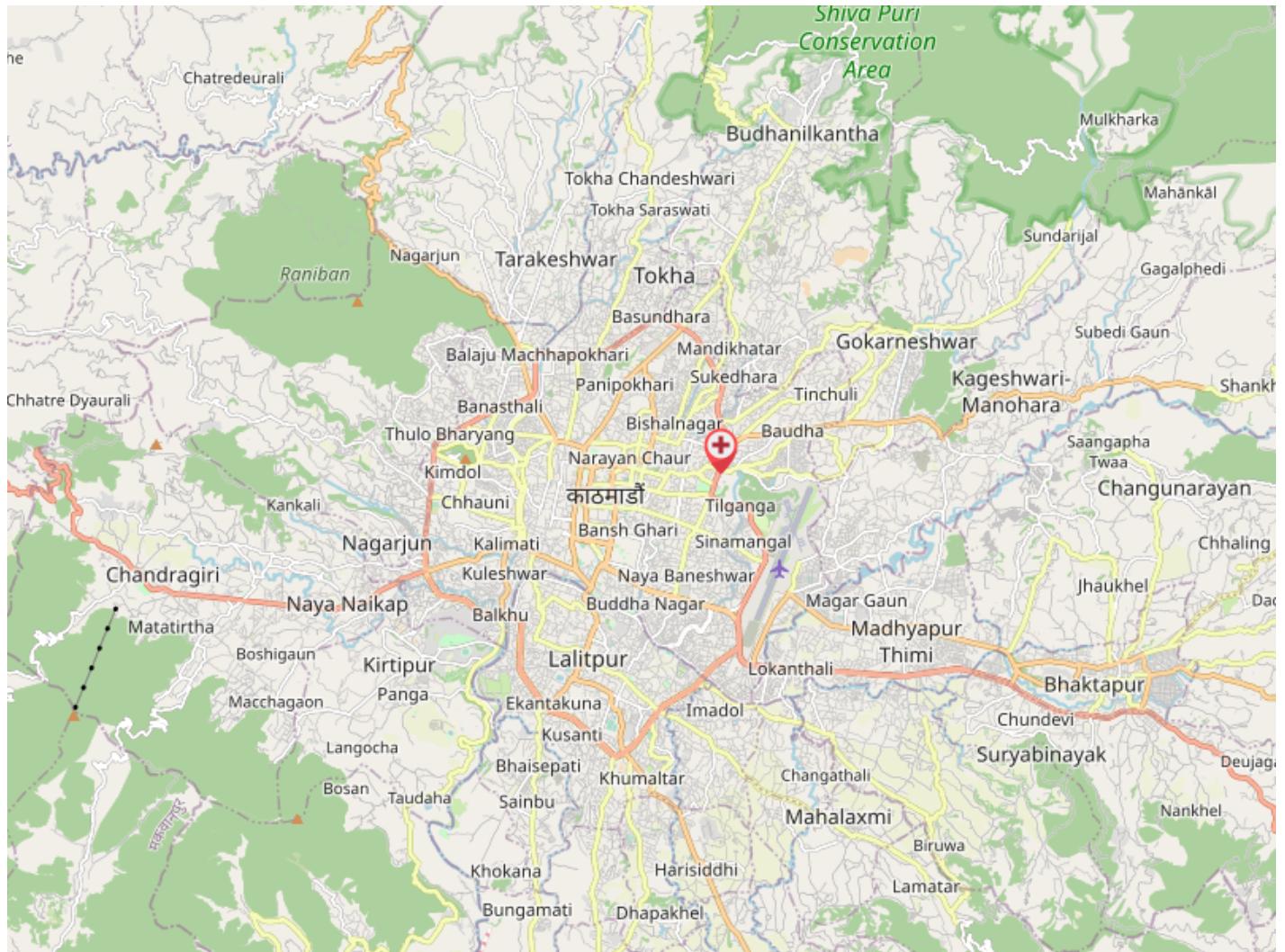
General

Name of Hospital	Norvic International Hospital
Latitude	27.6899471
Longitude	85.3192466
Address	Thapathali, Kathmandu 44617, Nepal
Phone Number	01-5970032
Website	http://www.norvichospital.com/

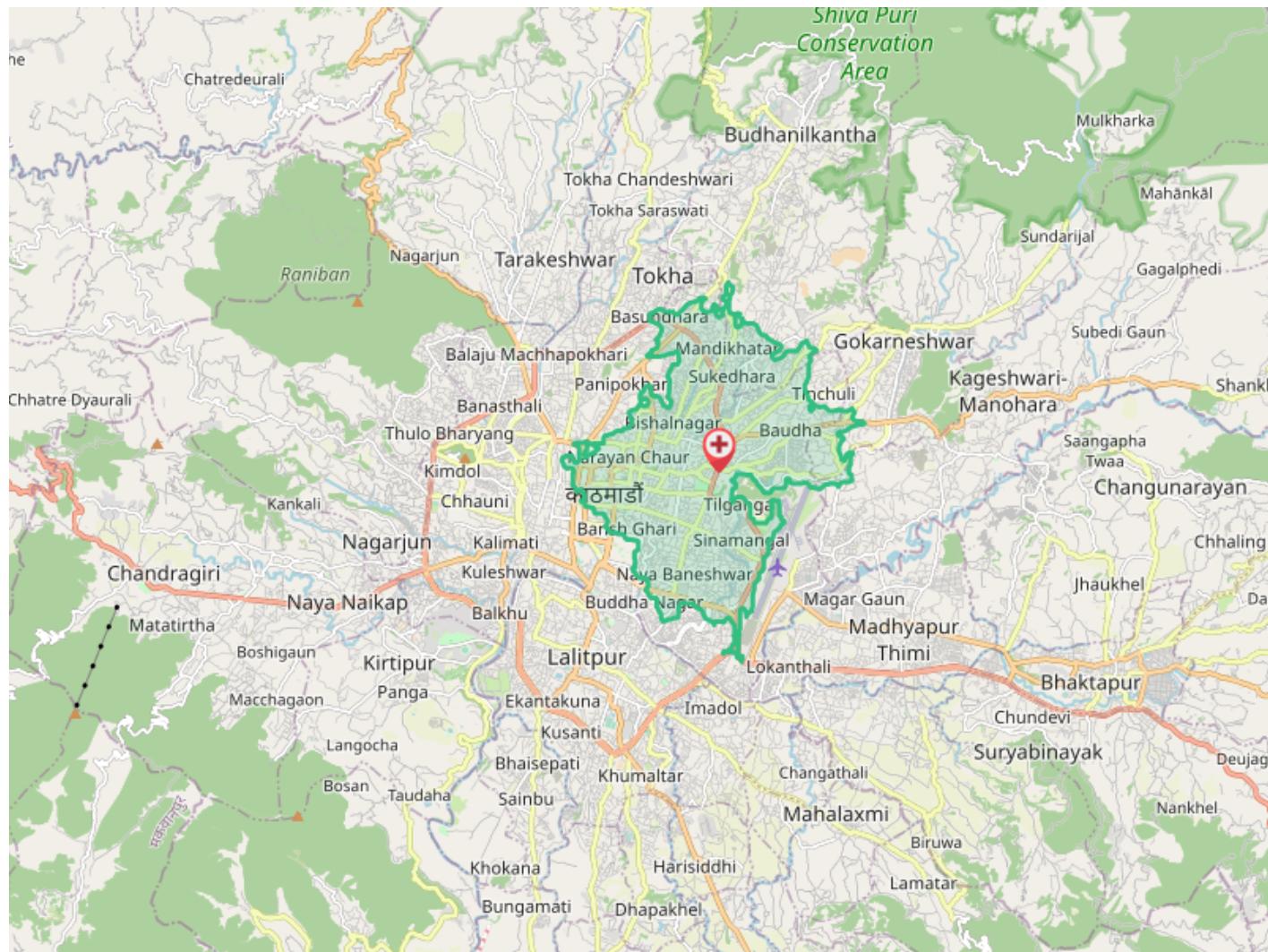
Location and Space

Distance from Thankot	12.6 km
Distance from Koteswor	4.5 km
Distance from Sanga	20.8 km
Distance from Airport	5.8 km

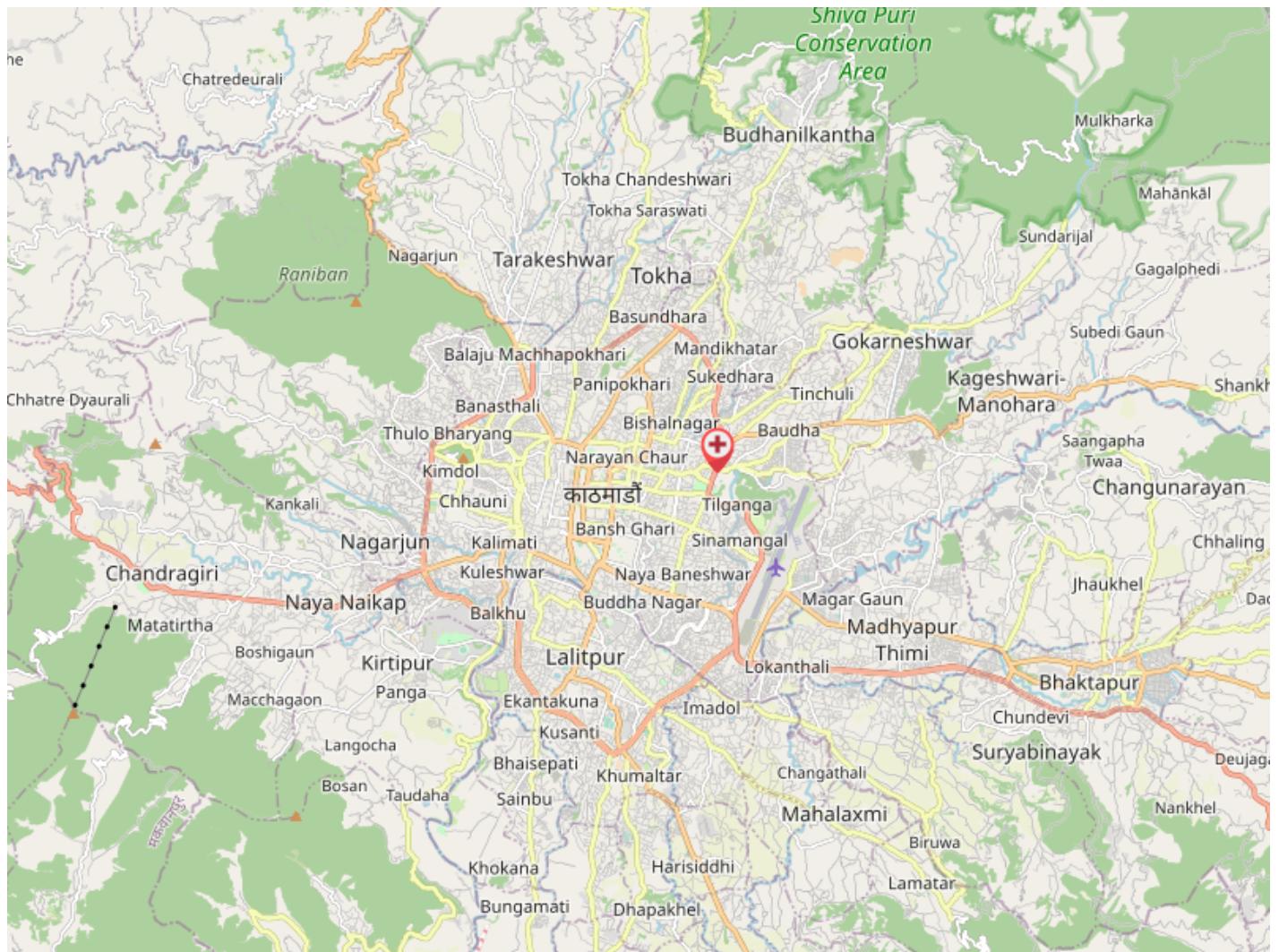
10. Nepal-Bharat Maitri Hospital



Nepal-Bharat Maitri Hospital



Nepal-Bharat Maitri Hospital isoline image within 10 minutes



Nepal-Bharat Maitri Hospital isoline image within 20 minutes

General

Name of Hospital	Nepal-Bharat Maitri Hospital
Latitude	27.711591
Longitude	85.3456219
Address	Dakshina Murti Marga, Kathmandu 44600, Nepal
Phone Number	01-5241288
Website	https://nbmh.com.np/

Location and Space

Distance from Thankot	17.1 km
Distance from Koteshwor	5.4 km
Distance from Sanga	22.2 km
Distance from Airport	2.4 km

Data Processing and Compilation

All the data has been fed to our proprietary Research software (developed by Ombryo Pte Ltd. Singapore) The software uses GPT-3 Algorithm from Open AI to extract useful information from the data and predict the best optimised location for the hospital. We have open sourced the entire dataset on the github (<https://github.com/ombryo/sdasda>)

Major Criteria and Criteria Weight

This is decided by Investors and key stakeholders themselves

Conclusion

Based on the extensive research and the preferences, the location that will be the ideal for building a new Hospital, is **Lokanthali Chowk (23N, 87E)**.

For this conclusion we have taken into consideration following factors:

The suggested location is

- i. sufficiently far away from major hospitals

Suggestion Location Summary

Location: Lokanthali Chowk (23N, 87E) .

Features:

This location satisfies the following criteria: